Contents

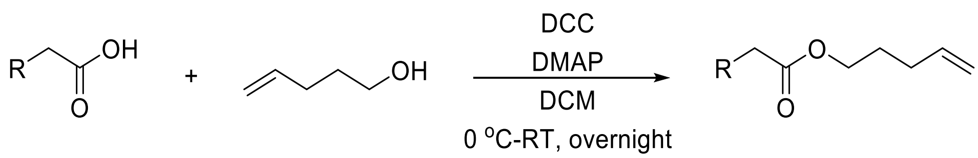
I. Supplemental Methods

1.1 General Information

All reagents were purchased from commercially available sources and used without further purification. All reactions were monitored by either ^{1}H NMR or thin layer chromatography (TLC) carried out on 0.25 mm pre-coated silica plates (F-254) purchased from Silicycle, Quebec, Canada, using shortwave UV light as visualizing agent and KMnO4 or phosphomolybdic acid (PMA) as developing agents. Flash column chromatography was performed using SiliaFlash-P60 silica gel (40 – 63 μm) purchased from Silicycle, Quebec, Canada. ^{1}H, ^{13}C and ^{19}F NMR spectra were recorded on a Bruker DRX-600 spectrometers operating at 600 MHz for proton nuclei, 151 MHz for carbon nuclei and 565 MHz for fluorine nuclei were calibrated using residual undeuterated solvent as an internal reference (CDCl3: 7.26 ppm ^{1}H NMR and 77.00 ppm ^{13}C NMR). PR160L 390 nm LEDs (25% intensity) from Kessil Lights were used as light source. For reporting NMR peak multiplicities, the following abbreviations were used: s = singlet, d = doublet, t = triplet, q = quartet, quin = quintet, hept = heptet, m = multiplet. High-resolution mass spectra (HRMS) or mass spectra (MS) were recorded on an Agilent UHPLC TOF mass spectrometer using electrospray ionization time-of-flight (ESI-TOF), chemical ionization time-of-flight (CI-TOF), atmospheric pressure chemical ionization (APCI) or gas chromatography–mass spectrometry (GC-MS).

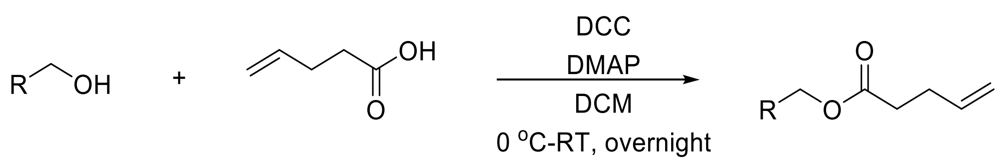
1.2 General Procedures for Substrate Synthesis

General Procedure 1 for the Synthesis of Unactivated Alkenes



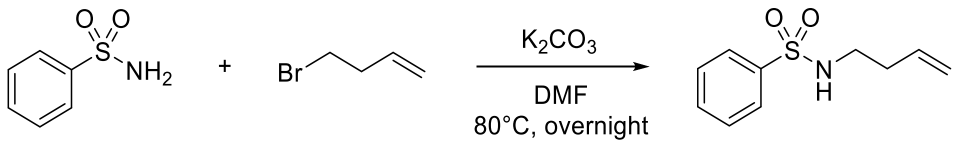
To an RB flask were added 5-pentenol (4.9 mmol, 1.96 equiv), carboxylic acid (2.5 mmol, 1.0 equiv), 4-dimethylamino pyridine (0.24 mmol, 0.097 equiv), and a stir bar. The RB flask was then evacuated and backfilled with nitrogen gas three times. Dry dichloromethane (0.225 M) was added via syringe to the RB flask, dissolving the solid components. The RB flask was then placed in an ice bath positioned on top of a stirring plate. Dicyclohexyl carbodiimide (4.85 mmol, 1.94 mmol) was added to the mixture via syringe dropwise over a period of 5 minutes. The ice bath was then removed, allowing the reaction to return to room temperature. The reaction was left to stir overnight. Following reaction, the mixture was concentrated through rotary evaporation. Subsequent flash column chromatography (hexanes/EtOAc) allowed for isolation of the ester.[1-2]

General Procedure 2 for the Synthesis of Unactivated Alkenes



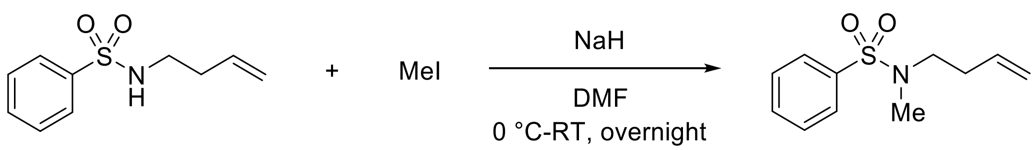
To an RB flask were added 5-pentenoic acid (2.5 mmol, 1.0 equiv), alcohol (4.9 mmol, 1.96 equiv), 4-dimethylamino pyridine (0.24 mmol, 0.097 equiv), and a stir bar. The RB flask was then evacuated and backfilled with nitrogen gas three times. Dry dichloromethane (0.225 M) was added via syringe to the RB flask, dissolving the solid components. The RB flask was then placed in an ice bath positioned on top of a stirring plate. Dicyclohexyl carbodiimide (4.85 mmol, 1.94 mmol) was added to the mixture via syringe dropwise over a period of 5 minutes. The ice bath was then removed, allowing the reaction to return to room temperature. The reaction was left to stir overnight. Following reaction, the mixture was concentrated through rotary evaporation. Subsequent flash column chromatography (hexanes/EtOAc) allowed for isolation of the ester.[1-2]

Procedure for the Synthesis of N-(but-3-en-1-yl)benzenesulfonamide



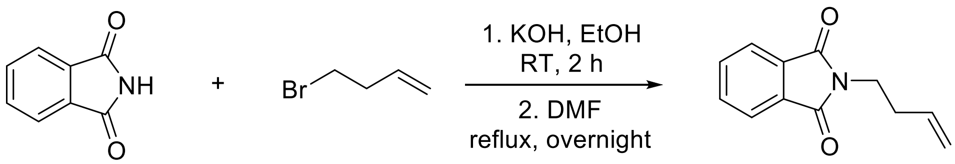
To an RB flask were added benzenesulfonamide (944 mg, 6.0 mmol), 4-bromobut-1-ene (0.8 mL, 6.0 mmol), dimethylformamide (30 mL), and a stir bar. Potassium carbonate (830 mg, 6.0 mmol) was added to the reaction mixture. After stirring overnight at 80 °C, the mixture was cooled to room temperature and quenched with water. The reaction mixture was then washed with brine and extracted with diethyl ether. The organic layer was concentrated through rotary evaporation. Subsequent flash column chromatography (hexanes/EtOAc) (3:1) allowed for isolation of *N*-(but-3-en-1-yl)benzenesulfonamide.[3]

Procedure for the Synthesis of N-(but-3-en-1-yl)-N-methylbenzenesulfonamide



To an RB flask were added sodium hydride (60% in mineral oil, 240 mg, 6 mmol), dimethylformamide (25 mL), a solution of *N*-(but-3-en-1-yl)benzenesulfonamide (1.20 g, 5 mmol) in DMF (5 mL), and a stir bar in an ice bath at 0 °C. The reaction mixture was brought to room temperature and stirred for 30 minutes. The reaction mixture was cooled to 0 °C in an ice bath again, and a solution of methyl iodide (1.06 g, 7.5 mmol) in DMF (5 mL) was added dropwise over a period of 5 minutes by syringe. The reaction mixture was brought to room temperature and left to run overnight. The reaction mixture was quenched with a saturated aqueous solution of sodium bicarbonate. The mixture was then washed with brine and extracted with diethyl ether. The organic phase was dried over sodium sulfate and concentrated through rotary evaporation. Subsequent flash column chromatography (hexanes/EtOAc) (10:1) produced *N*-(but-3-en-1-yl)-*N*-methylbenzenesulfonamide.[4]

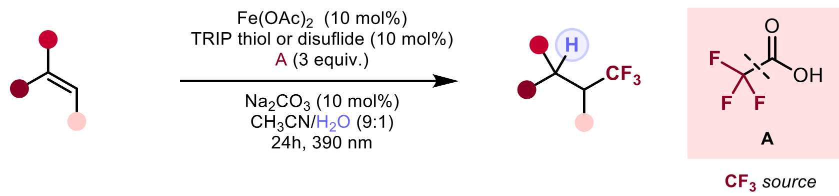
Procedure for the Synthesis of 2-(but-3-en-1-yl)isoindoline-1,3-dione



To an RB flask were added phthalimide (1.71 g, 11.6 mmol), potassium hydroxide (0.650 g, 11.6 mmol), ethyl alcohol (20 mL), and a stir bar. The reaction mixture was stirred at room temperature for 2 h and evaporated to remove EtOH. The resulting residue was then dissolved in dimethylformamide (15 mL) and 4-bromobut-1-ene (1.10 mL, 12.8 mmol) was added. The reaction mixture was stirred at reflux overnight. The reaction mixture was cooled, diluted with ethyl acetate, and quenched with saturated sodium bicarbonate. The mixture was then washed with brine. The extracted organic layer was dried over sodium sulfate and concentrated through rotary evaporation. Subsequent flash column chromatography (hexanes/EtOAc) (10:1) produced 2-(but-3-en-1-yl)isoindoline-1,3-dione.[5]

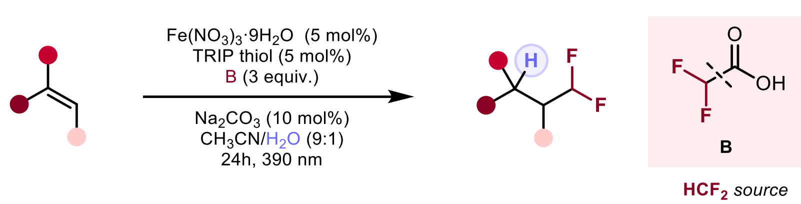
1.3 General Procedures for Photocatalytic Hydrofluoroalkylation

General Procedure A for hydrotrifluoromethylation of alkenes



$Fe(OAc)_2$ (10 mol%, 0.1 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) and TRIP disulfide (10 mol%, 0.1 equiv.) (in the case using TRIP thiol, HAT reagent was added via syringe after backfilling with N_2) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes (0.1 mmol, 1.0 equiv.) and CF_3COOH (0.30 mmol, 3.0 equiv) in MeCN/H_2O (9:1, 0.1 M in regard to alkenes) via syringe under N_2. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated, and the residue was then purified by flash column chromatography to give the corresponding hydrotrifluoromethylated products.

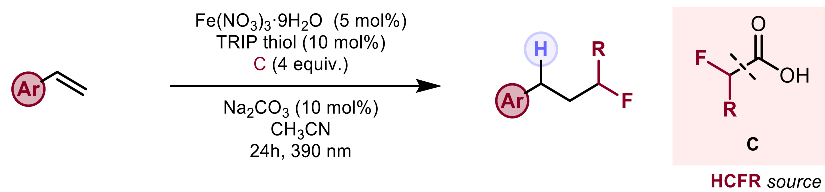
General Procedure B for hydrodifluoromethylation of alkenes



$Fe(NO_3)_3\cdot 9H_2O$ (5 mol%, 0.05 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes (0.1 mmol, 1.0 equiv.), HCF_2COOH (0.30 mmol, 3.0 equiv) and TRIP thiol (5 mol%, 0.05 equiv.) in MeCN/H_2O (9:1, 0.1 M in regard to alkenes) via syringe under N_2. The reaction mixture was placed under 390nm

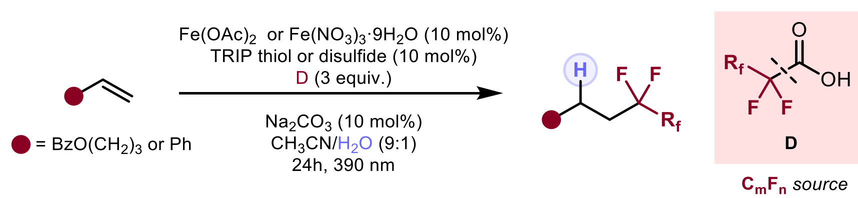
Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated, and the residue was then purified by flash column chromatography to give the corresponding hydrodifluoromethylated products.

General Procedure C for hydromonofluoromethylation of alkenes



$Fe(NO_3)_3 \cdot 9H_2O$ (5 mol%, 0.05 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes (0.1 mmol, 1.0 equiv.), $H_2CFCOOH$ (0.40 mmol, 4.0 equiv) and TRIP thiol (10 mol%, 0.1 equiv.) in MeCN (0.1 M in regard to alkenes) via syringe under N_2. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated, and the residue was then purified by flash column chromatography to give the corresponding hydromonofluoroalkylated products.

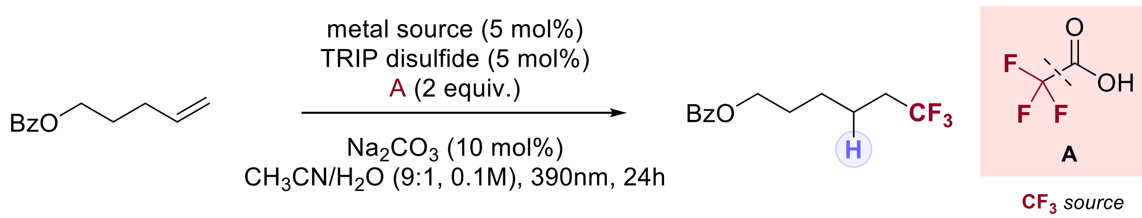
General Procedure D for hydro(perfluoro)alkylation of alkenes



Fe salt (10 mol%, 0.1 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) and TRIP disulfide (10 mol%, 0.1 equiv.) (in the case using TRIP thiol, HAT reagent was added via syringe after backfilling with N_2) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes (0.1 mmol, 1.0 equiv.) and (perfluoro)alkyl carboxylic acid (0.30 mmol, 3.0 equiv) in MeCN/H2O (9:1, 0.1 M in regard to alkenes) via syringe under N_2. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated, and the residue was then purified by flash column chromatography to give the corresponding hydroperfluoroalkylated products.

II. Supplemental Discussion

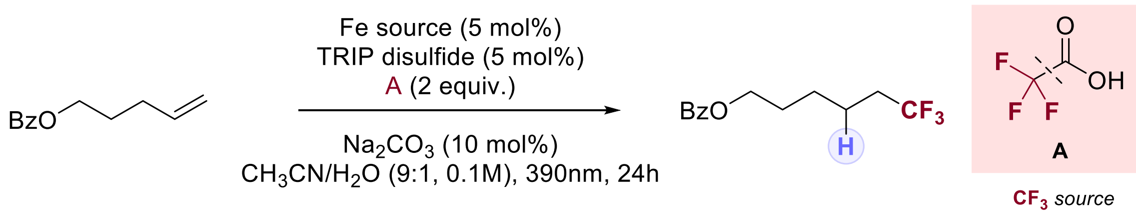
2.1 Optimization of Hydrotrifluoromethylation



entry	metal source	yield
1	$Fe(acac)_3$	ND[a]
2	$Fe(NO_3)_3 \cdot 9H_2O$	32
3	$FeCl_3 \cdot 6H_2O$	56
4	$Fe(OTf)_2$	60
5	$FeCl_2$	72
6	$Fe(OAc)_2$	68
7	$Cu(MeCN)_4BF_4$; $Cu(OTf)_2$	ND[a]

[a] Almost full recovery of starting material.

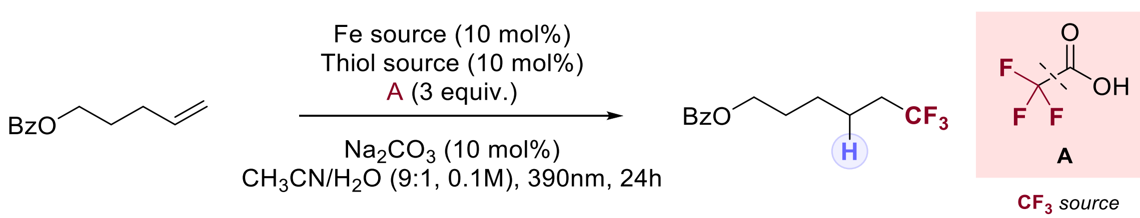
Supplemental Table 1. Catalyst screening.



entry	[Fe]	yield
[a]1	$FeCl_2$	76
[a,b]2	$FeCl_2$	80
[a]3	$Fe(OAc)_2$	74
[a,b]4	$Fe(OAc)_2$	92

[a]10 mol% of [Fe] and 10 mol% of thiol/disulfide. [b]with 3 equiv. of CF_3COOH.

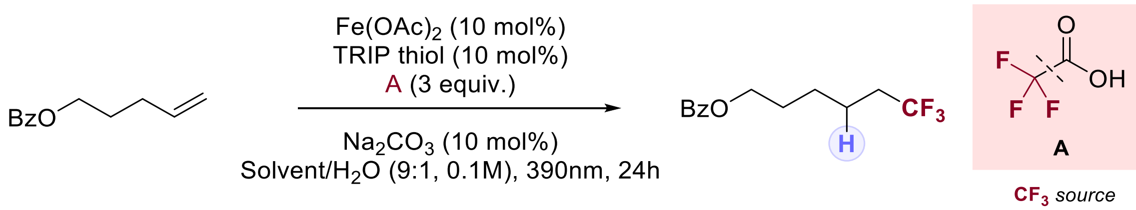
Supplemental Table 2. Catalyst, TFA loading screening.



entry	[Fe]	Thiol source	yield
1	$Fe(OAc)_2$	TRIP thiol	86(84)[a]
2	$Fe(OAc)_2$	TRIP disulfide	92(89)[a]

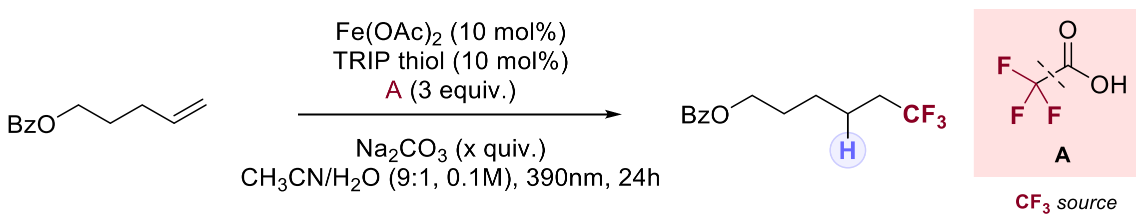
[a] isolated yield in parentheses.

Supplemental Table 3. HAT reagents comparison in hydrotrifluoromethylation.



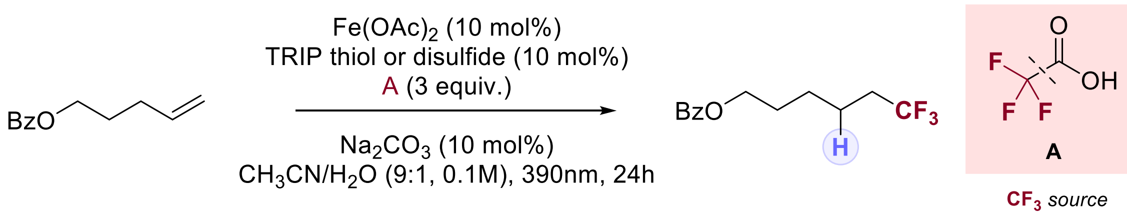
entry	Solvent	yield
1	DCM	trace
2	THF	20
3	EA	42
4	Acetone	76

Supplemental Table 4. Solvent screening.



entry	x	yield
1	no base	72
2	10 mol%	86
3	20 mol%	80
4	40 mol%	76
5	60 mol%	70
6	100 mol%	62

Supplemental Table 5. Base additive loading screening

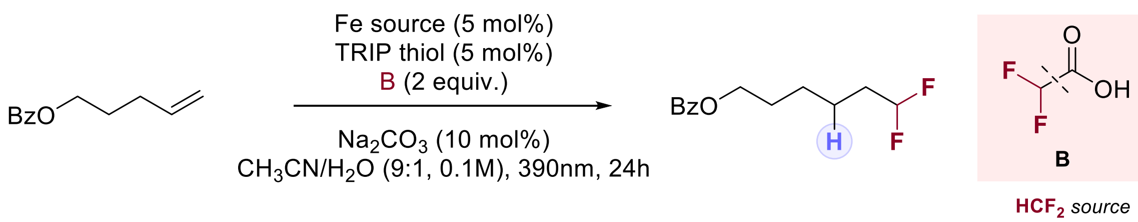


entry	Deviations from standard conditions	yield
1	no Fe	ND[a]; ND[b]
2	no light	ND[a]; ND[b]
3	no HAT reagent	trace[a]; trace[b]
4	no water	18[a]; 24[b]

[a] with TRIP thiol. [b] with TRIP disulfide.

Supplemental Table 6. Control experiments.

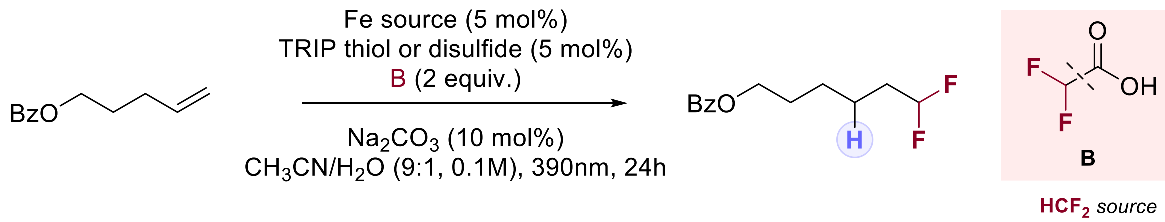
2.2 Optimization of Hydrodifluoromethylation



entry	[Fe] source	yield
1	$Fe(NO_3)_3\ 9H_2O$	48
2	$FeCl_3\ 6H_2O$	38
3	$Fe(OTf)_3$	36
4	$FeCl_2$	44
5	$Fe(OAc)_2$	42
[a]6	$Fe(NO_3)_3\ 9H_2O$	35

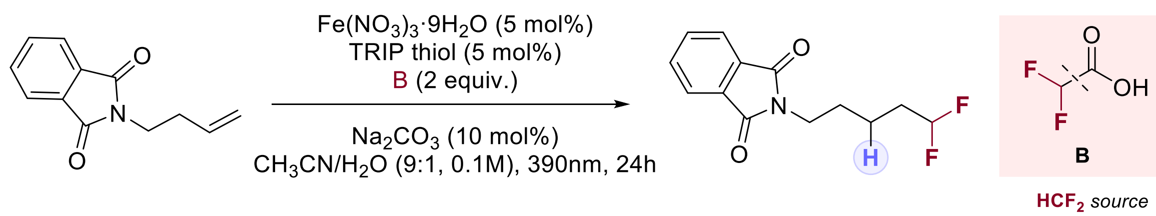
[a]10 mol% of [Fe] and TRIP disulfide.

Supplemental Table 7. Iron catalyst screening



entry	[Fe]	Thiol source	yield
1	$Fe(NO_3)_3$ $9H_2O$	TRIP thiol	52
2	$Fe(NO_3)_3$ $9H_2O$	TRIP disulfide	48
3	$Fe(OAc)_2$	TRIP thiol	46
4	$Fe(OAc)_2$	TRIP disulfide	42

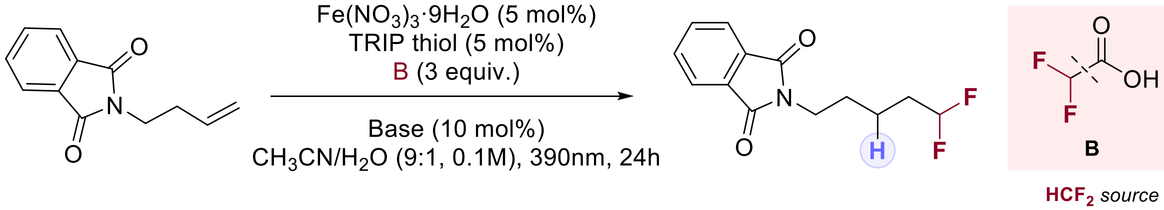
Supplemental Table 8. The comparison between TRIP thiol and TRIP disulfide as competent HAT reagents in hydrodifluoromethylation.



entry	[Fe]	yield
1	$Fe(NO_3)_3{\cdot}9H_2O$	50
2	$Fe(OAc)_2$	38
[a]3	$Fe(NO_3)_3{\cdot}9H_2O$	76(75)[b]
[a]4	$Fe(OAc)_2$	54

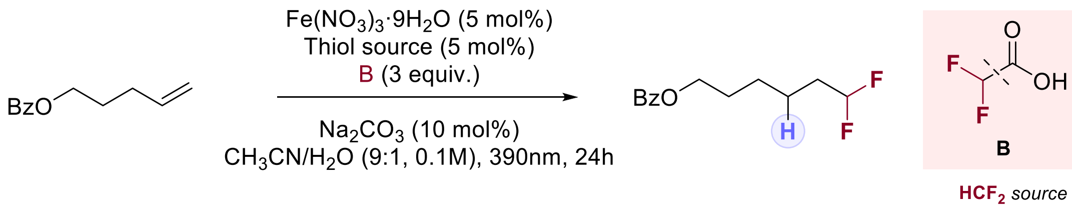
2-(but-3-en-1-yl)isoindoline-1,3-dione was used as substrate due to more precise NMR integration. [a] 3 equiv. of HCF_2COOH. [b] isolated yield in parentheses.

Supplemental Table 9. Loading of difluoroacetic acid screening



entry	Base	yield
1	Na_2CO_3	76
2	K_2CO_3	54
3	Cs_2CO_3	68

Supplemental Table 10. Base additive screening

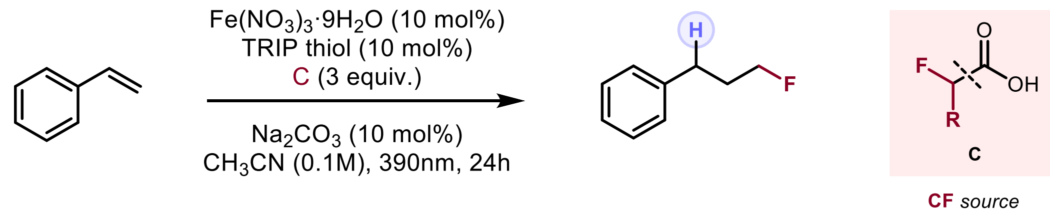


entry	thiol source	yield
1	4-CF3-thiolphenol	60
2	4-Cl-thiolphenol	74
3	4-MeO-thiolphenol	79
4	3,5-CF3-thiolphenol	51
5	2-MeO-thiolphenol	58
6	2-CO2Me-thiolphenol	68
7	TRIP thiol	93(89)[a]

[a]isolated yield in parentheses.

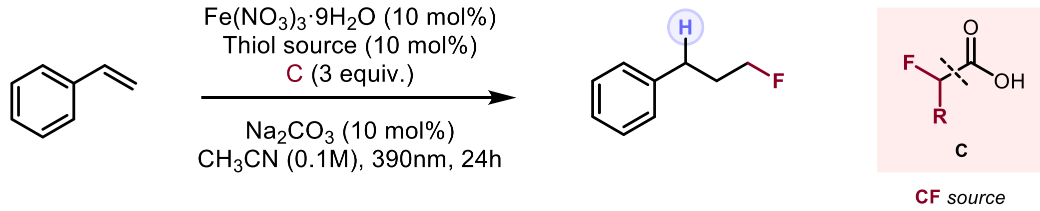
Supplemental Table 11. Aryl thiol screening (with pent-4-en-1-yl benzoate as substrate).

2.3 Optimization of Hydromonoluoromethylation



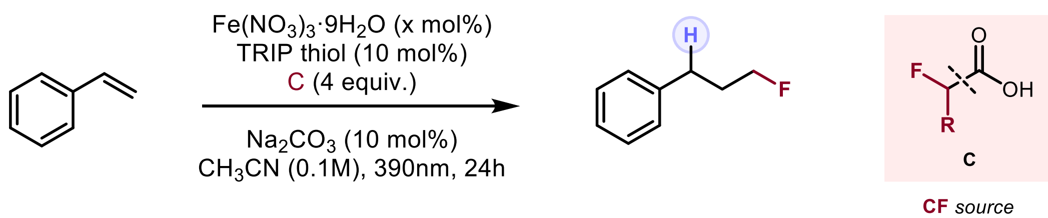
entry	[Fe]	yield
1	$Fe(NO_3)_3 \cdot 9H_2O$	25
2	$FeCl_3 \cdot 6H_2O$	trace
3	$Fe(OAc)_2$	13
4	$Fe_2(C_2O_4)_3 \cdot 6H_2O$ (5 mol%)	trace
5	$Fe_2(SO_4)_3 \cdot 5H_2O$ (5 mol%)	trace

Supplemental Table 12. Iron catalyst screening.



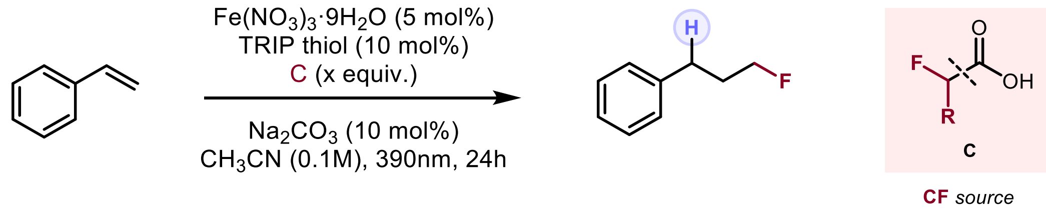
entry	[Fe]	yield
1	TRIP thiol	25
2	2-MeO-thiolphenol	messy
3	4-F-thiolphenol	messy
4	TRIP silanethiol (5 mol%)	messy
5	TRIP disulfide (5 mol%)	messy

Supplemental Table 13. Thiol/disulfide screening.



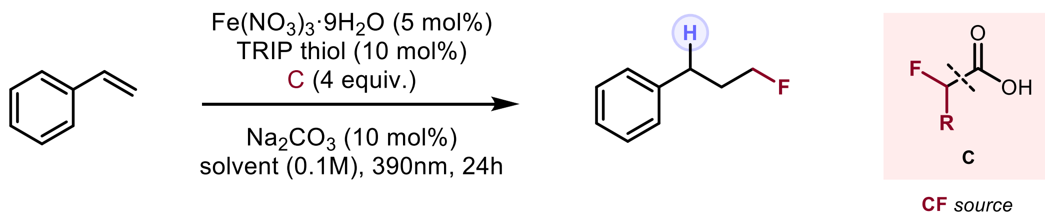
entry	x	yield
1	2.5	21
2	5	43
3	10	25

Supplemental Table 14. Catalyst loading screening.



entry	x	yield
1	3	28
2	4	43
3	6	42

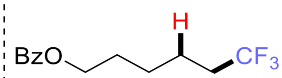
Supplemental Table 15. Monofluoroacetic acid loading screening.



entry	Solvent	yield
1	CH_3CN	43
2	CH_3CN/H_2O (9:1)	42
3	DCE; DCE/H_2O (1:1)	ND

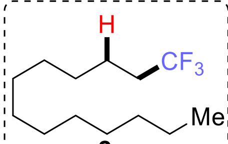
Supplemental Table 16. Solvent screening.

2.4 Characterization of Corresponding Products



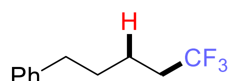
1

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.12 – 7.97 (m, 2H), 7.61 – 7.51 (m, 1H), 7.44 (t, J = 7.8 Hz, 2H), 4.34 (t, J = 6.5 Hz, 2H), 2.17 – 2.05 (m, 2H), 1.85 – 1.77 (m, 2H), 1.70 – 1.61 (m, 2H), 1.57 – 1.50 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.62, 132.94, 130.33, 129.55, 128.39, 127.13 (q, J = 276.3 Hz), 64.56, 33.67 (q, J = 28.6 Hz), 28.43, 25.32, 21.69 (q, J = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.38 (t, J = 11.0 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[6]



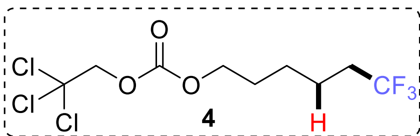
2

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 2.10 – 2.00 (m, 2H), 1.59-1.50 (m, 2H), 1.41 – 1.26 (m, 18H), 0.88 (t, J = 6.9 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 127.35 (q, J = 276.2 Hz), 33.78 (q, J = 28.3 Hz), 31.96, 29.67, 29.63, 29.60, 29.41, 29.39, 29.23, 28.75, 22.73, 21.88 (q, J = 2.9 Hz)., 14.13. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.48 (t, J = 11.0 Hz). GC-MS: [M]+ calcd. for C13H25F3: 238.1908; Found 238



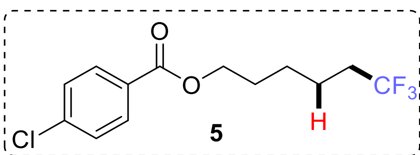
3

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.29 (t, J = 7.6 Hz, 2H), 7.23 – 7.14 (m, 3H), 2.64 (t, J = 7.6 Hz, 2H), 2.16 – 2.03 (m, 2H), 1.74-1.66 (m, 2H), 1.63 – 1.57 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 141.69, 128.42, 128.36, 127.18 (q, J = 276.3 Hz), 125.95, 35.50, 33.63 (q, J = 28.4 Hz), 30.47, 21.54 (q, J = 2.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.32 (t, J = 11.0 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[7]



4

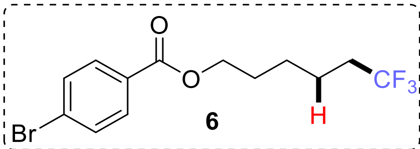
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 4.77 (s, 2H), 4.25 (t, J = 6.5 Hz, 2H), 2.15-2.03 (m, 2H), 1.81-1.70 (m, 2H), 1.66-1.58 (m, 2H), 1.55-1.44 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 154.03, 127.06 (q, J = 276.3 Hz), 94.46, 76.76, 68.74, 33.60 (q, J = 28.6 Hz), 28.22, 24.86, 21.57 (q, J = 2.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.39 (t, J = 10.7 Hz). HRMS APCI: $[M+H]^+$ calcd. for C9H13Cl3F3O3: 330.9877; Found 330.9870



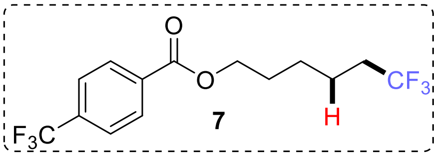
5

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.03 – 7.92 (m, 2H), 7.49 – 7.38 (m, 2H), 4.33 (t, J = 6.5 Hz, 2H), 2.18 – 2.03 (m, 2H), 1.87 – 1.74 (m, 2H), 1.69-1.60 (m, 2H), 1.56 – 1.48 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 165.75, 139.41, 130.94, 128.74, 127.11 (q, J = 276.3 Hz), 64.82, 33.64 (q, J = 28.4 Hz), 28.37, 25.28, 21.67 (q, J = 2.8 Hz). ^{19}F NMR

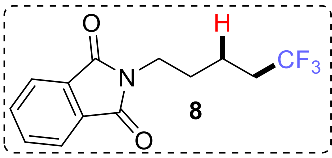
(565 MHz, Chloroform-*d*) δ -66.36 (t, *J* = 11.0 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[8]



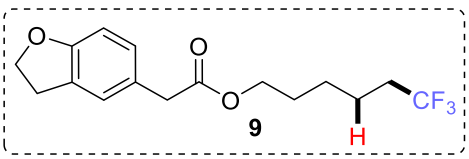
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.94 – 7.85 (m, 2H), 7.63 – 7.55 (m, 2H), 4.33 (t, *J* = 6.5 Hz, 2H), 2.17 – 2.04 (m, 2H), 1.84 – 1.76 (m, 2H), 1.70 – 1.62 (m, 2H), 1.56 – 1.48 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 165.88, 131.74, 131.08, 129.20, 128.07, 127.10 (q, *J* = 276.2 Hz), 64.84, 33.63 (q, *J* = 28.5 Hz), 28.36, 25.27, 21.67 (q, *J* = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.36 (t, *J* = 10.8 Hz). HRMS APCI: $[M+H]^+$ calcd. for C13H15BrF3O2: 339.0202; Found 339.0199



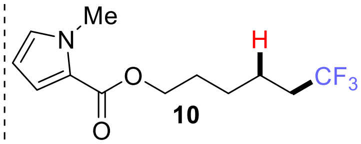
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.15 (d, *J* = 8.1 Hz, 2H), 7.71 (d, *J* = 8.2 Hz, 2H), 4.37 (t, *J* = 6.5 Hz, 2H), 2.20 – 2.04 (m, 2H), 1.87-1.79 (m, 2H), 1.71 – 1.60 (m, 2H), 1.58-1.50 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 165.39, 134.49 (q, *J* = 32.7 Hz), 133.52, 129.96, 127.10 (q, *J* = 276.3 Hz), 125.45 (q, *J* = 3.8 Hz), 123.65 (q, *J* = 272.8 Hz), 65.14, 33.64 (q, *J* = 28.6 Hz), 28.35, 25.26, 21.68 (q, *J* = 2.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -63.13, -66.37 (t, *J* = 11.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C13H15F6O2: 329.0971; Found 329.0967



Prepared according to General Procedure A and obtained as white solid. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.85 (dd, *J* = 5.4, 3.0 Hz, 2H), 7.73 (dd, *J* = 5.5, 3.0 Hz, 2H), 3.72 (t, *J* = 7.1 Hz, 2H), 2.21 – 2.07 (m, 2H), 1.82-1.73 (m, 2H), 1.66-1.57 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 168.37, 134.04, 132.05, 126.97 (q, *J* = 276.4 Hz), 123.31, 37.27, 33.25 (q, *J* = 28.7 Hz), 27.66, 19.31 (q, *J* = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.35 (t, *J* = 11.0 Hz). m.p.: 75-76 °C. The compound characterization was reported in literature and the NMR data matched with previous characterization.[9]

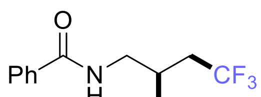


Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.14 – 7.09 (m, 1H), 6.99 (dd, *J* = 8.2, 1.9 Hz, 1H), 6.73 (d, *J* = 8.1 Hz, 1H), 4.56 (t, *J* = 8.7 Hz, 2H), 4.09 (t, *J* = 6.5 Hz, 2H), 3.53 (s, 2H), 3.19 (t, *J* = 8.7 Hz, 2H), 2.13 – 1.98 (m, 2H), 1.69-1.60 (m, 3H), 1.60 – 1.53 (m, 2H), 1.43-1.36 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.15, 159.27, 128.85, 127.39, 127.11 (q, *J* = 276.5 Hz), 125.91, 125.78, 109.19, 71.29, 64.35, 40.77, 33.60 (q, *J* = 28.4 Hz), 29.70, 28.20, 25.11, 21.56 (q, *J* = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.36 (t, *J* = 11.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C16H20F3O3: 317.1359; Found 317.1355



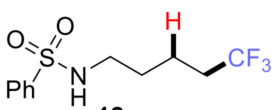
10

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 6.93 (dd, *J* = 4.0, 1.8 Hz, 1H), 6.78 (t, *J* = 2.2 Hz, 1H), 6.11 (dd, *J* = 3.9, 2.5 Hz, 1H), 4.23 (t, *J* = 6.5 Hz, 2H), 3.92 (s, 3H), 2.18 – 2.01 (m, 2H), 1.79 – 1.71 (m, 2H), 1.67-1.59 (m, 2H), 1.55-1.46 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 161.32, 129.52, 127.14 (q, *J* = 276.3 Hz), 122.51, 117.72, 107.83, 63.34, 36.81, 33.67 (q, *J* = 28.5 Hz), 28.52, 25.33, 21.66 (q, *J* = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.38 (t, *J* = 11.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C12H17F3NO2: 264.1206; Found 264.1201



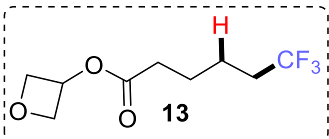
11

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.76 (d, *J* = 7.7 Hz, 2H), 7.51 (t, *J* = 7.4 Hz, 1H), 7.44 (t, *J* = 7.6 Hz, 2H), 6.28 (s, 1H), 3.60-3.48 (m, 2H), 2.26 – 2.11 (m, 2H), 1.95-1.86 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 167.78, 134.28, 131.68, 127.90, 126.98 (q, *J* = 276.2 Hz), 126.85, 38.77, 31.36 (q, *J* = 29.1 Hz), 22.59 (q, *J* = 2.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.13 (t, *J* = 10.8 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[8]



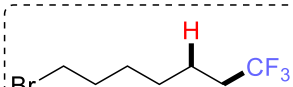
12

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.87 (d, *J* = 7.7 Hz, 2H), 7.60 (t, *J* = 7.4 Hz, 1H), 7.53 (t, *J* = 7.6 Hz, 2H), 4.61 (t, *J* = 6.4 Hz, 1H), 2.99 (q, *J* = 5.9 Hz, 2H), 2.07-1.97 (m, 2H), 1.59 – 1.53 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.81, 132.79, 129.21, 127.01, 126.88 (q, *J* = 276.3 Hz), 42.70, 33.16 (q, *J* = 28.7 Hz), 28.73, 19.05 (q, *J* = 3.2 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.34 (t, *J* = 11.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C11H15F3NO2S: 282.0770; Found 282.0765



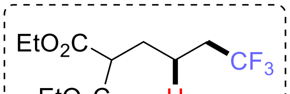
13

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.50 – 5.40 (m, 1H), 4.89 (ddd, *J* = 7.5, 6.3, 1.0 Hz, 2H), 4.63 (ddd, *J* = 7.5, 5.3, 1.0 Hz, 2H), 2.40 (t, *J* = 7.3 Hz, 2H), 2.16 – 2.04 (m, 2H), 1.76-1.68 (m, 2H), 1.65 – 1.57 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.27, 126.95 (q, *J* = 276.3 Hz), 77.54, 67.92, 33.45 (q, *J* = 28.8 Hz), 33.41, 23.77, 21.43 (q, *J* = 2.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.37 (t, *J* = 10.6 Hz). HRMS APCI: $[M+H]^+$ calcd. for C9H14F3O3: 227.0890; Found 227.0885

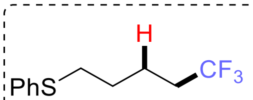


14

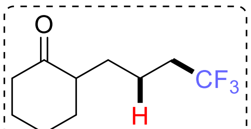
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 3.41 (t, *J* = 6.7 Hz, 2H), 2.12 – 2.04 (m, 2H), 1.91-1.81 (m, 2H), 1.64-1.54 (m, 2H), 1.53 – 1.44 (m, 2H), 1.44-1.37 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 127.19 (q, *J* = 276.3 Hz), 33.63 (q, *J* = 28.3 Hz), 33.60, 32.44, 27.86, 27.74, 21.76 (q, J = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.41 (t, J = 11.0 Hz). GC-MS: [M]+ calcd. for C7H12BrF3: 232.0074; Found 232.0



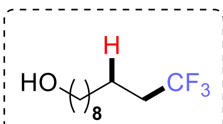
15 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 4.28-4.15 (m, 4H), 3.33 (t, J = 7.4 Hz, 1H), 2.19 – 2.06 (m, 2H), 1.97 (q, J = 7.7 Hz, 2H), 1.67-1.58 (m, 2H), 1.27 (t, J = 7.1 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 168.99, 126.84 (q, J = 276.3 Hz), 61.57, 51.59, 33.47 (q, J = 28.8 Hz), 27.69, 19.89 (q, J = 3.1 Hz), 14.06. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.40 (t, J = 10.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C11H18F3O4: 271.1152; Found 271.1146



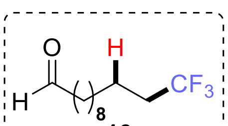
16 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.36 – 7.32 (m, 2H), 7.31-7.27 (m, 2H), 7.22 – 7.16 (m, 1H), 2.98 – 2.89 (m, 2H), 2.15 – 2.01 (m, 2H), 1.76-1.66 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 136.13, 129.44, 128.96, 127.01 (q, J = 276.4 Hz), 126.15, 33.34 (q, J = 28.8 Hz), 33.32, 28.16, 21.06 (q, J = 3.0 Hz). ^{19}F NMR (565 MHz,) δ -66.35 (t, J = 10.8 Hz). GC-MS: [M]+ calcd. for C11H13F3S: 234.0690; Found 234.1



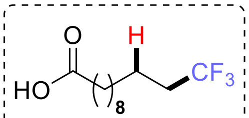
17 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 2.44-2.37 (m, 1H), 2.34 – 2.24 (m, 2H), 2.16 – 1.99 (m, 4H), 1.91 – 1.80 (m, 2H), 1.71-1.64 (m, 2H), 1.57 – 1.51 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 212.61, 127.11 (q, J = 276.3 Hz), 50.41, 42.14, 33.98, 33.97 (d, J = 28.5 Hz), 28.58, 28.00, 25.08, 19.78 (q, J = 3.1 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.38 (t, J = 10.7 Hz). GC-MS: [M+H]+ calcd. for C10H16F3O: 209.1148; Found 209.0



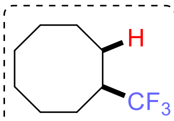
18 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 3.57 (t, J = 6.7 Hz, 2H), 2.04 – 1.92 (m, 2H), 1.53-1.44 (m, 4H), 1.34-1.19 (m, 13H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 127.30 (q, J = 276.3 Hz), 63.04, 33.72 (q, J = 28.3 Hz) 32.77, 29.48, 29.37, 29.28, 29.16, 28.68, 25.72, 21.83 (q, J = 2.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.44 (t, J = 11.0 Hz). HRMS APCI: $[M-H2O+H]^+$ calcd. for C11H20F3: 209.1512; Found 209.1507



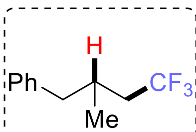
19 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 9.77 (s, 1H), 2.42 (t, J = 7.4 Hz, 2H), 2.10-2.00 (m, 2H), 1.66-1.60 (m, 2H), 1.55-1.49 (m, 2H), 1.39 – 1.26 (m, 16H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 202.91, 127.30 (d, J = 276.2 Hz), 43.91, 33.72 (q, J = 28.3 Hz), 29.30, 29.26, 29.14, 29.13, 28.67, 22.06, 21.83 (q, J = 2.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.41 (t, J = 11.0 Hz). GC-MS: [M+H]+ calcd. for C11H13F3S: 239.1618; Found 239.0



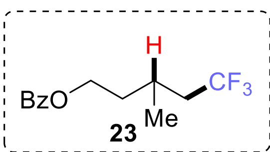
20 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 2.35 (t, *J* = 7.5 Hz, 2H), 2.10-2.02 (m, 2H), 1.68-1.59 (m, 2H), 1.59-1.50 (m, 2H), 1.38 – 1.25 (m, 14H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 179.46, 127.31 (q, *J* = 276.3 Hz), 33.92, 33.73 (d, *J* = 28.3 Hz), 29.30, 29.27, 29.17, 29.14, 29.02, 28.68, 24.66, 21.83 (t, *J* = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.42 (t, *J* = 11.0 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[8]



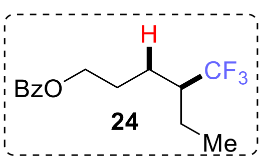
21 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 2.27-2.18 (m, 1H), 1.90-1.81 (m, 2H), 1.80 – 1.71 (m, 2H), 1.62 – 1.49 (m, 10H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 128.97 (q, *J* = 279.5 Hz), 41.92 (q, *J* = 24.4 Hz), 26.38, 26.29, 25.57 (q, *J* = 2.6 Hz), 25.11. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -73.34 (d, *J* = 9.8 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[10]



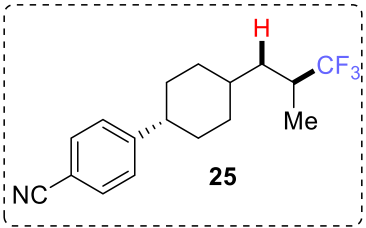
22 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.30 (t, *J* = 7.5 Hz, 2H), 7.22 (t, *J* = 7.4 Hz, 1H), 7.15 (d, *J* = 7.5 Hz, 2H), 2.67 (dd, *J* = 13.6, 6.6 Hz, 1H), 2.53 (dd, *J* = 13.6, 7.5 Hz, 1H), 2.21 – 2.09 (m, 2H), 1.97 – 1.86 (m, 1H), 1.02 (d, *J* = 6.4 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.56, 129.17, 128.42, 127.19 (q, *J* = 277.5 Hz), 126.29, 43.22, 39.54 (q, *J* = 27.1 Hz), 29.65 (q, *J* = 2.3 Hz), 19.61. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -63.11 (t, *J* = 11.2 Hz). GC-MS: [M]+ calcd. for C11H13F3: 202.0969; Found 202.1



23 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.06 – 8.00 (m, 2H), 7.59 – 7.54 (m, 1H), 7.47-7.41 (m, 2H), 4.42 – 4.34 (m, 2H), 2.26-2.15 (m, 1H), 2.15 – 2.08 (m, 1H), 2.08-1.97 (m, 1H), 1.97 – 1.88 (m, 1H), 1.76-1.66 (m, 1H), 1.12 (d, *J* = 6.7 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 164.67, 131.13, 128.30, 127.66, 126.54, 125.11 (q, *J* = 277.4 Hz), 60.59, 38.33 (q, *J* = 27.2 Hz), 33.41, 23.22 (q, *J* = 2.5 Hz), 17.75. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -63.30 (t, *J* = 11.1 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[6]

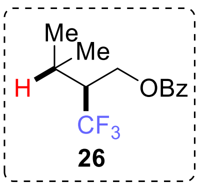


24 Prepared according to General Procedure A and obtained as colorless oil. 1.3:1 mixture of regioisomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.00-7.91 (m, 2H), 7.52-7.46 (m, 1H), 7.41-7.31 (m, 2H), 4.38-4.29 (m, 0.84H), 4.28-4.23 (m, 1.16H), 2.24-2.18 (m, 0.38H), 2.09 – 1.92 (m, 1.14H), 1.89 – 1.75 (m, 1.74H), 1.73 – 1.51 (m, 2.63H), 1.51 – 1.32 (m, 2.09H), 0.96-0.90 (m, 1.74H), 0.89-0.83 (m, 1.26H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.57, 166.41, 133.09, 132.98, 130.23, 130.03, 129.55, 129.53, 128.51 (q, J = 280.6 Hz), 128.43, 128.36 (q, J = 280.2 Hz), 128.40, 64.57, 62.35,43.63 (q, *J* = 24.8 Hz), 39.69 (q, *J* = 25.7 Hz), 30.09 (q, J = 2.5 Hz), 27.24 (q, J = 2.6 Hz), 26.05, 23.83 (q, J = 2.6 Hz), 20.66 (q, J = 2.7 Hz), 19.95, 14.00, 11.16. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -69.85 (d, J = 9.6 Hz), -70.50 (d, J = 9.7 Hz). HRMS APCI: $[M+H]^+$ calcd. for C14H18F3O2: 275.1253; Found 275.1247



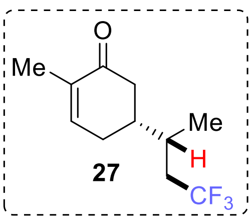
25

Prepared according to General Procedure A and obtained as colorless oil. 7:1 mixture of regioisomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.58 (d, J = 8.0 Hz, 1H), 7.30 (d, J = 8.3 Hz, 1H), 2.60-2.50 (m, 1H), 2.32 – 2.21 (m, 0.78H), 1.98 – 1.84 (m, 4.25H), 1.69-1.62 (m, 0.5H), 1.58-1.50 (m, 1.21H), 1.50 – 1.40 (m, 3.12H), 1.32-1.26 (m, 1H), 1.20-1.13 (m, 0.86H), 1.13-1.09 (m, 2.23H), 1.06 – 1.00 (m, 1.37H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 152.80, 152.55, 132.28, 132.25, 128.69 (q, J = 282.1 Hz), 128.63 (q, J = 279.2 Hz), 127.66, 127.63, 119.13, 119.11, 109.86, 109.80, 49.41 (q, J = 23.3 Hz), 44.56, 44.31, 36.71 (q, J = 2.4 Hz), 36.54 (q, J = 1.6 Hz), 35.15 (q, J = 26.2 Hz), 34.00, 33.95, 33.89, 33.80, 33.64, 33.47, 32.08, 30.11, 29.31, 18.45 (q, J = 2.7 Hz), 12.95 (q, J = 3.2 Hz), 12.83. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -65.61 (d, J = 10.3 Hz), -73.47 (d, J = 8.8 Hz). HRMS APCI: $[M+H]^+$ calcd. for C17H21F3N: 296.1621; Found 296.1615



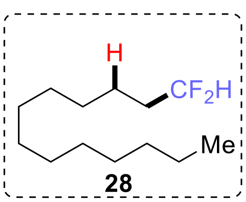
26

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.04 (d, J = 7.7 Hz, 2H), 7.58 (t, J = 7.4 Hz, 1H), 7.45 (t, J = 7.6 Hz, 2H), 4.52 (qd, J = 11.9, 5.5 Hz, 2H), 2.53-2.41 (m, 1H), 2.39-2.19 (m, 1H), 1.15 (d, J = 7.0 Hz, 3H), 1.08 (d, J = 7.0 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.22, 133.24, 129.71, 129.67, 128.47, 127.33 (d, J = 281.7 Hz), 59.96, 59.94, 47.97 (q, J = 24.1 Hz), 25.65 (d, J = 2.2 Hz), 20.92, 19.02. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -65.99 (d, J = 9.8 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[11]



27

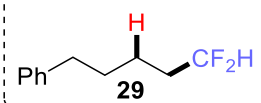
Prepared according to General Procedure A and obtained as colorless oil. 1:1 mixture of diastereomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 6.74 (d, J = 6.1, 1H), 2.52-2.43 (m, 1H), 2.38-2.27 (m, 1H), 2.23 – 2.02 (m, 4H), 1.99 – 1.87 (m, 2H), 1.82 – 1.76 (m, 3H), 1.05 (dd, J = 6.6, 4.2 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 199.43, 199.39, 144.40, 144.31, 135.68, 135.65, 127.10 (q, J = 277.3 Hz), 41.91, 40.33, 40.18, 40.13, 37.77 (q, J = 27.5 Hz), 37.58 (q, J = 27.7 Hz), 31.47 (q, J = 2.2 Hz), 31.40 (q, J = 2.2 Hz), 29.90, 28.29, 16.32, 16.21, 15.66, 15.64. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -63.52 (t, J = 11.0 Hz), -63.54 (t, J = 11.0 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[12]



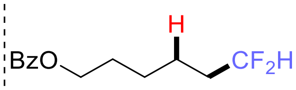
28

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.79 (tt, J = 57.0, 4.6 Hz, 1H), 1.88-1.73 (m, 2H), 1.48-1.40 (m, 2H), 1.37 – 1.25 (m, 18H), 0.88 (t,

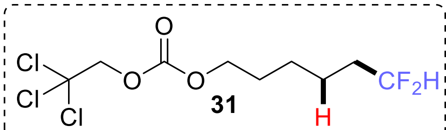
J = 6.9 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 117.52 (t, J = 238.6 Hz), 34.10 (t, J = 20.6 Hz), 31.92, 29.65, 29.63, 29.59, 29.44, 29.37, 29.35, 29.07, 22.69, 22.13 (t, J = 5.4 Hz), 14.11. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.73 (dt, J = 57.1, 17.6 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[13]



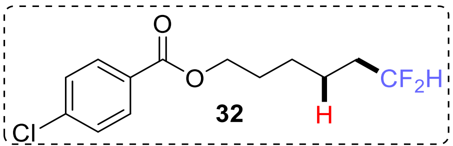
29 Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.31 – 7.26 (m, 2H), 7.21 – 7.14 (m, 3H), 5.78 (tt, J = 56.9, 4.5 Hz, 1H), 2.68 – 2.58 (m, 2H), 1.92 – 1.78 (m, 2H), 1.75 – 1.61 (m, 2H), 1.52 – 1.44 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 141.98, 128.38, 125.87, 117.34 (t, J = 238.7 Hz), 35.67, 33.98 (t, J = 20.7 Hz), 30.87, 21.78 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.72 (dt, J = 56.4, 17.3 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[14]



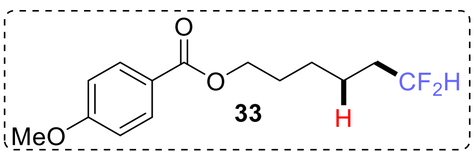
30 Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.07 – 8.01 (m, 2H), 7.58 – 7.54 (m, 1H), 7.47 – 7.41 (m, 2H), 5.81 (tt, J = 56.8, 4.4 Hz, 1H), 4.33 (t, J = 6.5 Hz, 2H), 1.92 – 1.75 (m, 4H), 1.58 – 1.46 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.64, 132.91, 130.38, 129.54, 128.37, 117.23 (t, J = 238.9 Hz), 64.68, 33.98 (t, J = 20.7 Hz), 28.56, 25.64, 21.83 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.88 (dt, J = 57.0, 17.6 Hz). HRMS APCI: $[M+H]^+$ calcd. for C13H17F2O2: 243.1191; Found 243.1190



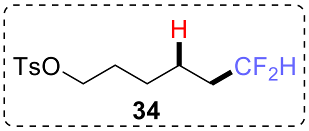
31 Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.81 (tt, J = 56.8, 4.4 Hz, 1H), 4.77 (s, 2H), 4.24 (t, J = 6.6 Hz, 2H), 1.90-1.79 (m, 2H), 1.78 – 1.72 (m, 2H), 1.54 – 1.44 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 154.04, 117.13 (t, J = 238.8 Hz), 94.47, 76.75, 68.90, 33.89 (t, J = 20.8 Hz), 28.35, 25.19, 21.69 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.96 (dt, J = 56.8, 17.4 Hz). HRMS APCI: $[M+H]^+$ calcd. for C9H14Cl3F2O3: 312.9971; Found 312.9967



32 Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.02 – 7.92 (m, 2H), 7.47 – 7.37 (m, 2H), 5.81 (tt, J = 56.9, 4.4 Hz, 1H), 4.32 (t, J = 6.6 Hz, 2H), 1.91 – 1.76 (m, 4H), 1.57 – 1.47 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 165.77, 139.37, 130.94, 128.80, 128.73, 117.20 (t, J = 238.9 Hz), 64.94, 33.95 (t, J = 20.9 Hz), 28.51, 25.61, 21.79 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.90 (dt, J = 57.2, 18.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C13H16ClF2O2: 277.0801; Found 277.0796

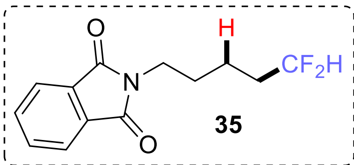


33 Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.04 – 7.94 (m, 2H), 6.99 – 6.86 (m, 2H), 5.81 (tt, J = 56.9, 4.5 Hz, 1H), 4.30 (t, J = 6.5 Hz, 2H), 3.86 (s, 3H), 1.91-1.82 (m, 2H), 1.81 – 1.76 (m, 2H), 1.57-1.47 (m, 4H). ^{13}C NMR (151 MHz, CDCl$_3$) δ 166.40, 163.34, 131.55, 122.81, 117.25 (t, J = 238.7 Hz), 113.61, 64.38, 55.44, 33.98 (t, J = 20.8 Hz), 28.60, 25.66, 21.84 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.86 (dt, J = 56.7, 17.4 Hz). HRMS APCI: [M+H]$^+$ calcd. for C14H19F2O3: 273.1297; Found 273.1293



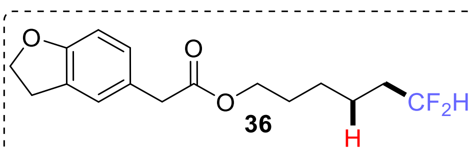
34

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.83 – 7.75 (m, 2H), 7.39 – 7.32 (m, 2H), 5.76 (tt, J = 56.8, 4.4 Hz, 1H), 4.03 (t, J = 6.3 Hz, 2H), 2.45 (s, 3H), 1.82 – 1.72 (m, 2H), 1.70-1.63 (m, 2H), 1.44 – 1.34 (m, 4H). ^{13}C NMR (151 MHz, CDCl$_3$) δ 144.81, 133.11, 129.89, 129.87, 127.88, 117.06 (t, J = 238.9 Hz), 70.14, 33.81 (t, J = 20.8 Hz), 28.62, 24.93, 21.63, 21.44 (t, J = 5.6 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -116.00 (dt, J = 57.0, 17.7 Hz). HRMS APCI: [M+NH4]$^+$ calcd. for C13H22F2NO3S: 310.1283; Found 310.1279



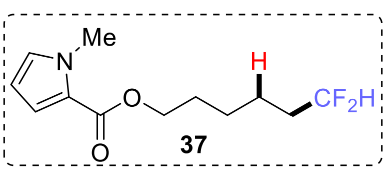
35

Prepared according to General Procedure B and obtained as white solid. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.85 (dd, J = 5.4, 3.0 Hz, 2H), 7.72 (dd, J = 5.5, 3.0 Hz, 2H), 5.80 (tt, J = 56.7, 4.4 Hz, 1H), 3.71 (t, J = 7.2 Hz, 2H), 1.95 – 1.83 (m, 2H), 1.79-1.72 (m, 2H), 1.55 – 1.49 (m, 2H). ^{13}C NMR (151 MHz, CDCl$_3$) δ 168.40, 133.99, 132.08, 123.26, 117.03 (t, J = 239.0 Hz), 37.49, 33.55 (t, J = 21.0 Hz), 28.04, 19.44 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.97 (dt, J = 56.8, 17.5 Hz). m.p.: 76-77 °C. HRMS APCI: [M+H]$^+$ calcd. for C13H14F2NO2: 254.0987; Found 254.0984



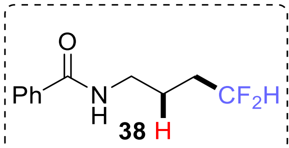
36

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.11 (d, J = 2.0 Hz, 1H), 6.99 (dd, J = 8.1, 1.9 Hz, 1H), 6.72 (d, J = 8.1 Hz, 1H), 5.78 (tt, J = 56.8, 4.4 Hz, 1H), 4.55 (t, J = 8.7 Hz, 2H), 4.09 (t, J = 6.6 Hz, 2H), 3.53 (s, 2H), 3.19 (t, J = 8.7 Hz, 2H), 1.86-1.74 (m, 2H), 1.69 – 1.60 (m, 2H), 1.50 – 1.40 (m, 2H), 1.40-1.34 (m, 2H). ^{13}C NMR (151 MHz, CDCl$_3$) δ 172.16, 159.26, 128.85, 127.38, 125.95, 125.78, 117.21 (t, J = 238.8 Hz), 109.17, 71.29, 64.47, 40.78, 33.92 (t, J = 20.8 Hz), 29.70, 28.35, 25.43, 21.72 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.86 (dt, J = 56.5, 17.8 Hz). HRMS APCI: [M+H]$^+$ calcd. for C16H21F2O3: 299.1453; Found 299.1448



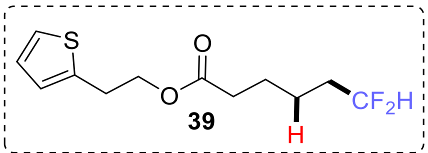
37

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 6.93 (dd, J = 4.0, 1.8 Hz, 1H), 6.78 (t, J = 2.2 Hz, 1H), 6.11 (dd, J = 3.9, 2.5 Hz, 1H), 5.81 (tt, J = 56.9, 4.5 Hz, 1H), 4.22 (t, J = 6.5 Hz, 2H), 3.92 (s, 3H), 1.91 – 1.79 (m, 2H), 1.78-1.71 (m, 2H), 1.55 – 1.44 (m, 4H). ^{13}C NMR (151 MHz, CDCl$_3$) δ 161.35, 129.48, 122.56, 117.70, 117.26 (t, J = 238.7 Hz), 107.82, 63.46, 36.81, 33.99 (t, J = 20.7 Hz), 28.65, 25.65, 21.83 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.85 (dt, J = 56.8, 17.7 Hz). HRMS APCI: [M+H]$^+$ calcd. for C12H18F2NO2: 246.1300; Found 242.1296



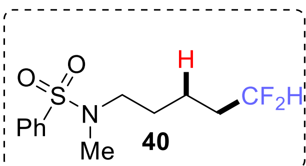
38

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.79 – 7.73 (m, 2H), 7.53 – 7.48 (m, 1H), 7.48-7.40 (m, 2H), 6.23 (s, 1H), 5.88 (tt, J = 56.6, 4.2 Hz, 1H), 3.53 (q, J = 6.7 Hz, 2H), 2.00-1.86 (m, 2H), 1.86-1.76 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 167.68, 134.42, 131.58, 128.64, 126.82, 116.87 (t, J = 239.1 Hz), 39.21, 31.47 (t, J = 21.3 Hz), 22.46 (t, J = 5.2 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.99 (dt, J = 56.9, 17.6 Hz). HRMS APCI: $[M+H]^+$ calcd. for C12H14F2NO: 214.1038; Found 214.1034



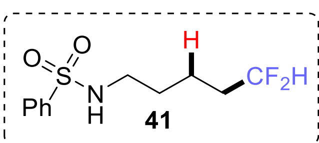
39

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.16 (dd, J = 5.1, 1.2 Hz, 1H), 6.94 (dd, J = 5.1, 3.4 Hz, 1H), 6.86 (dt, J = 3.3, 1.1 Hz, 1H), 5.79 (tt, J = 56.8, 4.4 Hz, 1H), 4.31 (t, J = 6.7 Hz, 2H), 3.16 (td, J = 6.7, 0.9 Hz, 2H), 2.35 (t, J = 7.4 Hz, 2H), 1.90 – 1.76 (m, 2H), 1.74-1.64 (m, 2H), 1.52 – 1.43 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.07, 139.94, 126.87, 125.52, 124.03, 117.09 (t, J = 238.9 Hz), 64.59, 33.94, 33.76 (t, J = 20.8 Hz), 29.32, 21.62 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.91 (dt, J = 57.1, 17.6 Hz). HRMS APCI: $[M+H]^+$ calcd. for C12H17F2O2S: 263.0912; Found 263.0909



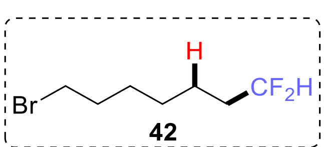
40

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.83 – 7.75 (m, 2H), 7.62 – 7.57 (m, 1H), 7.56 – 7.50 (m, 2H), 5.81 (tt, J = 56.8, 4.4 Hz, 1H), 3.02 (t, J = 6.9 Hz, 2H), 2.73 (s, 3H), 1.93 – 1.78 (m, 2H), 1.64 – 1.57 (m, 2H), 1.57 – 1.48 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 137.47, 132.60, 129.09, 127.33, 117.13 (t, J = 239.0 Hz), 49.65, 34.68, 33.45 (t, J = 20.9 Hz), 27.00, 19.06 (t, J = 5.6 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.85 (dt, J = 57.0, 17.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C12H18F2NO2S: 278.1021; Found 278.1016



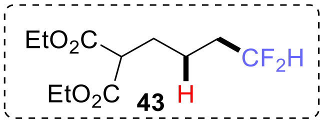
41

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.92 – 7.82 (m, 2H), 7.62 – 7.57 (m, 1H), 7.56-7.51 (m, 2H), 5.75 (tt, J = 56.7, 4.4 Hz, 1H), 4.70 (t, J = 6.3 Hz, 1H), 2.97 (q, J = 6.7 Hz, 2H), 1.83 – 1.72 (m, 2H), 1.57-1.49 (m, 2H), 1.50 – 1.41 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.86, 132.74, 129.19, 127.02, 116.93 (t, J = 239.0 Hz), 42.85, 33.41 (t, J = 21.0 Hz), 29.09, 19.08 (t, J = 5.6 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -116.05 (dt, J = 57.0, 17.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C11H16F2NO2S: 264.0864; Found 264.0860

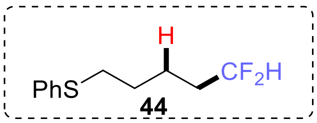


42

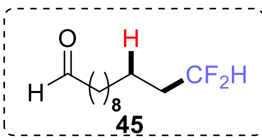
Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.80 (tt, J = 56.9, 4.5 Hz, 1H), 3.41 (t, J = 6.8 Hz, 2H), 1.90 – 1.78 (m, 4H), 1.51 – 1.44 (m, 4H), 1.42-1.35 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 117.31 (t, J = 238.7 Hz), 33.95 (t, J = 20.7 Hz), 33.71, 32.51, 28.21, 27.89, 21.92 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.85 (dt, J = 56.7, 17.8 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[15]



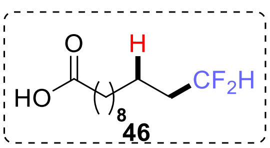
Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 5.81 (tt, J = 56.7, 4.4 Hz, 1H), 4.25-4.16 (m, 4H), 3.33 (t, J = 7.4 Hz, 1H), 1.95 (q, J = 7.7 Hz, 2H), 1.92-1.81 (m, 2H), 1.54 – 1.47 (m, 2H), 1.27 (t, J = 7.1 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 169.16, 116.85 (t, J = 239.1 Hz), 61.50, 51.77, 33.72 (t, J = 21.1 Hz), 28.10, 19.98 (t, J = 5.6 Hz), 14.07. ^{19}F NMR (565 MHz, Chloroform-d) δ -116.12 (dt, J = 56.8, 17.9 Hz). GC-MS: $[M+H]^+$ calcd. for C11H19F2O4: 253.1246; Found 253



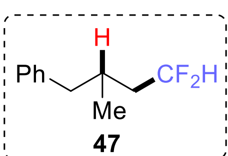
Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.36 – 7.31 (m, 2H), 7.31-7.27 (m, 2H), 7.20 – 7.16 (m, 1H), 5.79 (tt, J = 56.8, 4.4 Hz, 1H), 2.93 (t, J = 7.2 Hz, 2H), 1.89 – 1.78 (m, 2H), 1.73-1.66 (m, 2H), 1.64 – 1.57 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 136.35, 129.29, 128.93, 126.03, 117.09 (t, J = 239.0 Hz), 33.61 (t, J = 20.9 Hz), 33.41, 28.55, 21.25 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.89 (dt, J = 57.2, 17.8 Hz). HRMS APCI: $[M+H]^+$ calcd. for C11H15F2S: 217.0857; Found 217.0854



Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 9.77 (s, 1H), 5.79 (tt, J = 57.0, 4.6 Hz, 1H), 2.42 (t, J = 7.4 Hz, 2H), 1.87 – 1.76 (m, 2H), 1.66-1.60 (m, 2H), 1.47-1.39 (m, 2H), 1.36 – 1.27 (m, 12H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 202.93, 117.50 (t, J = 238.7 Hz), 43.92, 34.08 (t, J = 20.6 Hz), 29.33, 29.32, 29.14, 29.03, 22.10 (t, J = 5.4 Hz)., 22.07. ^{19}F NMR (565 MHz, Chloroform-d) δ -115.75 (dt, J = 57.0, 17.6 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[16]

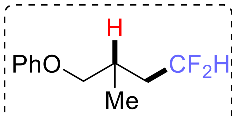


Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 5.79 (tt, J = 57.0, 4.6 Hz, 1H), 2.35 (t, J = 7.5 Hz, 2H), 1.89 – 1.74 (m, 2H), 1.67-1.59 (m, 2H), 1.47-1.40 (m, 2H), 1.35 – 1.27 (m, 12H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 180.04, 117.50 (t, J = 238.7 Hz), 34.08 (t, J = 20.7 Hz), 34.03, 29.32, 29.18, 29.03, 24.65, 22.10 (t, J = 5.5 Hz). ^{19}F NMR (565 MHz, Chloroform-d) δ -115.73 (dt, J = 57.0, 17.5 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[16]



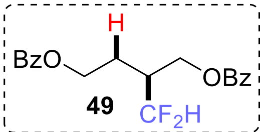
Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.32-7.27 (m, 2H), 7.23 – 7.19 (m, 1H), 7.17 – 7.12 (m, 2H), 5.95 – 5.72 (m, 1H), 2.64 (dd, J = 13.5, 6.8 Hz, 1H), 2.51 (dd, J = 13.5, 7.7 Hz, 1H), 2.10-1.98 (m, 1H), 1.95-1.82 (m, 1H), 1.74-1.60 (m, 1H), 0.98 (d, J = 6.6 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.95, 129.15, 128.35, 126.16, 116.99 (t, J = 238.7 Hz), 43.52, 40.37 (t,

J = 20.1 Hz), 29.91 (t, J = 5.2 Hz), 19.61. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -114.61 (dt, J = 56.9, 17.5 Hz). GC-MS: [M]+ calcd. for C11H14F2: 184.1064; Found 184.1



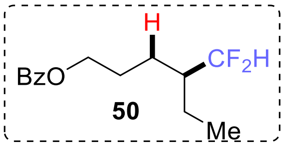
48

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.32 – 7.26 (m, 2H), 6.98-6.92 (m, 1H), 6.91 – 6.86 (m, 2H), 5.99 (tt, J = 56.8, 4.8 Hz, 1H), 3.86 (dd, J = 9.1, 5.4 Hz, 1H), 3.79 (dd, J = 9.1, 6.6 Hz, 1H), 2.30 – 2.21 (m, J = 6.7 Hz, 1H), 2.17-2.06 (m, 1H), 1.89-1.77 (m, 1H), 1.12 (d, J = 6.9 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 158.79, 129.50, 120.88, 116.89 (t, J = 238.7 Hz), 114.47, 72.27, 38.14 (t, J = 20.7 Hz), 28.42 (t, J = 5.3 Hz), 17.16. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -113.17 – -116.09 (m). GC-MS: [M]+ calcd. for C11H14F2O: 200.1013; Found 200.0



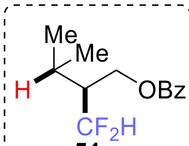
49

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.15-7.92 (m, 4H), 7.61-7.49 (m, 2H), 7.46-7.36 (m, 4H), 6.16 – 5.92 (m, 1H), 4.56-4.43 (m, 4H), 2.61 – 2.48 (m, 1H), 2.25-2.16 (m, 1H), 2.06-1.96 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.37, 166.12, 133.33, 133.13, 129.89, 129.62, 129.58, 129.55, 128.51, 128.45, 116.68 (t, J = 242.9 Hz), 62.29, 62.12 (t, J = 5.7 Hz), 39.88 (t, J = 20.0 Hz), 24.36 (t, J = 4.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -121.50 – -125.84 (m). HRMS APCI: $[M+H]^+$ calcd. for C19H19F2O4: 349.1246; Found 349.1239



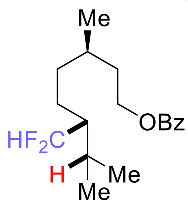
50

Prepared according to General Procedure B and obtained as colorless oil. 1.2:1 mixture of regioisomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.07-7.98 (m, 2H), 7.61-7.55 (m, 1H), 7.50-7.41 (m, 2H), 5.94-5.63 (m, 1H), 5.78 (m, 0.88H), 4.43-4.38 (m, 1.12H), 4.35-4.31 (t, J = 6.5 Hz, 1H), 2.06-1.97 (m, 1H), 1.91 – 1.73 (m, 2.26H), 1.72 – 1.63 (m, 0.74H), 1.62 – 1.41 (m, 4H), 0.96 (dt, J = 24.7, 7.4 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.62, 166.50, 133.02, 132.94, 130.31, 130.16, 129.54, 128.42, 128.39, 118.80 (t, J = 242.5 Hz), 118.53 (t, J = 242.6 Hz), 64.86, 62.78, 43.12 (t, J = 18.5 Hz), 39.25 (t, J = 18.9 Hz), 30.19 (dd, J = 5.7, 3.5 Hz), 26.74 (t, J = 4.6 Hz), 26.17, 23.62 (t, J = 4.5 Hz), 20.76 (dd, J = 6.0, 4.4 Hz), 19.96, 14.17, 11.15. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -112.85 – -131.83 (m). HRMS APCI: $[M+H]^+$ calcd. for C14H19F2O2: 257.1348; Found 257.1344



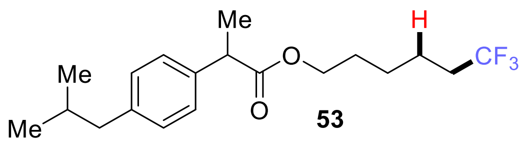
51

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.06 – 7.99 (m, 2H), 7.59 – 7.55 (m, 1H), 7.47-7.42 (m, 2H), 6.01 (td, J = 55.9, 3.5 Hz, 1H), 4.55 – 4.44 (m, 2H), 2.18-2.07 (m, 2H), 1.11 (d, J = 6.7 Hz, 3H), 1.07 (d, J = 6.5 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.34, 133.14, 129.93, 129.61, 128.46, 117.24 (t, J = 243.0 Hz), 60.72 (t, J = 5.7 Hz), 47.46 (t, J = 18.1 Hz), 25.53 (t, J = 3.7 Hz), 20.62, 19.77. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -117.23 – -125.25 (m). HRMS APCI: $[M+H]^+$ calcd. for C13H17F2O2: 243.1191; Found 243.1188



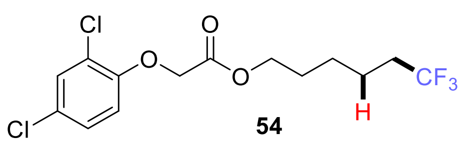
52

Prepared according to General Procedure B and obtained as colorless oil. 1:1 mixture of diastereomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.04 (d, *J* = 7.7 Hz, 2H), 7.55 (t, *J* = 7.4 Hz, 1H), 7.44 (t, *J* = 7.7 Hz, 2H), 5.78 (td, *J* = 56.5, 3.6 Hz, 1H), 4.43 – 4.30 (m, 2H), 1.97-1.87 (m, 1H), 1.87-1.79 (m, 1H), 1.65 – 1.53 (m, 4H), 1.53 – 1.40 (m, 2H), 1.38 – 1.30 (m, 1H), 1.01-0.97 (m, 3H), 0.97-0.91 (m, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.68, 132.85, 130.46, 129.54, 128.34, 119.00 (t, *J* = 242.4 Hz), 118.93 (t, *J* = 242.3 Hz), 63.40, 63.38, 47.83 (t, *J* = 17.4 Hz), 35.51, 35.45, 35.38, 30.40, 30.36, 27.11 (dd, *J* = 5.7, 3.6 Hz), 27.01 (dd, *J* = 5.8, 3.5 Hz), 21.94 (t, *J* = 4.4 Hz), 21.89 (t, *J* = 4.5 Hz)., 19.75, 19.71, 19.58, 19.41, 19.39. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -116.39 – -124.91 (m). HRMS APCI: $[M+H]^+$ calcd. for C18H27F2O2: 313.1974; Found 313.1969



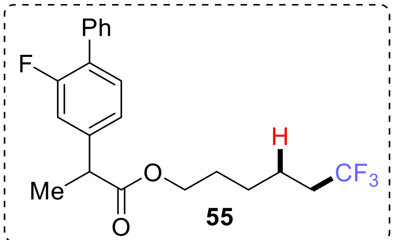
53

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.19 (d, *J* = 8.1 Hz, 2H), 7.09 (d, *J* = 8.1 Hz, 2H), 4.14 – 3.98 (m, 2H), 3.68 (q, *J* = 7.2 Hz, 1H), 2.44 (d, *J* = 7.2 Hz, 2H), 2.04 – 1.92 (m, 2H), 1.89-1.79 (m, 1H), 1.60-1.56 (m, 2H), 1.53 – 1.47 (m, 5H), 1.32-1.25 (m, 2H), 0.89 (d, *J* = 6.6 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 174.76, 140.55, 137.83, 129.30, 127.14, 127.09 (q, *J* = 276.3 Hz), 64.13, 45.19, 45.01, 33.58 (q, *J* = 28.4 Hz), 30.19, 28.16, 24.99, 22.36, 21.48 (q, *J* = 3.0 Hz), 18.35. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.42 (t, *J* = 10.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C19H28F3O2: 345.2036; Found 345.2031



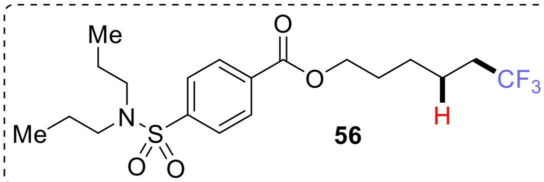
54

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.32 (d, *J* = 2.5 Hz, 1H), 7.09 (dd, *J* = 8.8, 2.6 Hz, 1H), 6.71 (d, *J* = 8.8 Hz, 1H), 4.62 (s, 2H), 4.13 (t, *J* = 6.5 Hz, 2H), 2.04 – 1.94 (m, 2H), 1.64 – 1.56 (m, 2H), 1.52-1.46 (m, 2H), 1.36-1.26 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 168.14, 152.41, 130.38, 127.56, 127.14, 127.06 (q, *J* = 276.4 Hz), 124.29, 114.67, 66.38, 65.11, 33.56 (q, *J* = 28.5 Hz), 28.14, 24.99, 21.54 (q, *J* = 2.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.36 (t, *J* = 10.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C14H16Cl2F3O3: 359.0423; Found 359.0427



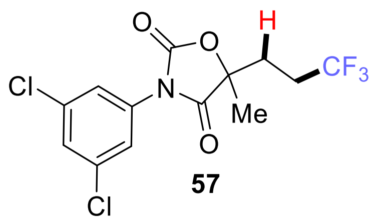
55

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.57-7.50 (m, 2H), 7.47 – 7.41 (m, 2H), 7.41 – 7.33 (m, 2H), 7.17 – 7.09 (m, 2H), 4.15-4.07 (m, 2H), 3.75 (q, *J* = 7.1 Hz, 1H), 2.08 – 1.96 (m, 2H), 1.67-1.59 (m, 2H), 1.57 – 1.52 (m, 5H), 1.40-1.32 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.98, 159.68 (d, *J* = 248.4 Hz), 141.86 (d, *J* = 7.7 Hz), 135.46, 130.78 (d, *J* = 3.9 Hz), 128.93 (d, *J* = 3.1 Hz), 128.47, 127.83 (q, *J* = 13.6 Hz), 127.08 (q, *J* = 276.2 Hz), 123.52 (d, *J* = 3.3 Hz), 115.23 (d, J = 23.5 Hz), 64.54, 45.08, 33.59 (q, J = 28.4 Hz), 28.17, 25.06, 21.53 (q, J = 3.0 Hz), 18.28. ^{19}F NMR (565 MHz, Chloroform-d) δ -66.36 (t, J = 11.0 Hz), -117.67 (dd, J = 13.0, 8.8 Hz). HRMS APCI: $[M+H]^+$ calcd. for C21H23F4O2: 383.1629; Found 383.1623



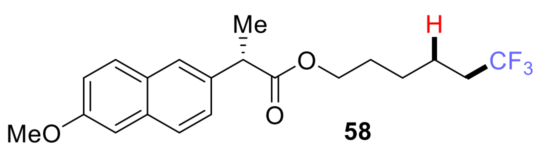
56

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 8.15 (d, J = 8.4 Hz, 2H), 7.88 (d, J = 8.4 Hz, 2H), 4.37 (t, J = 6.5 Hz, 2H), 3.16 – 3.06 (m, 4H), 2.17 – 2.06 (m, 2H), 1.86 – 1.78 (m, 2H), 1.68-1.62 (m, 2H), 1.60-1.50 (m, 6H), 0.87 (t, J = 7.4 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 165.28, 144.32, 133.59, 130.19, 127.11 (q, J = 276.3 Hz), 127.04, 65.24, 49.95, 33.62 (q, J = 28.5 Hz), 28.34, 25.26, 21.95, 21.67 (q, J = 3.0 Hz), 11.16. ^{19}F NMR (565 MHz, Chloroform-d) δ -66.35 (t, J = 11.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C19H29F3NO4S: 424.1764; Found 424.1754



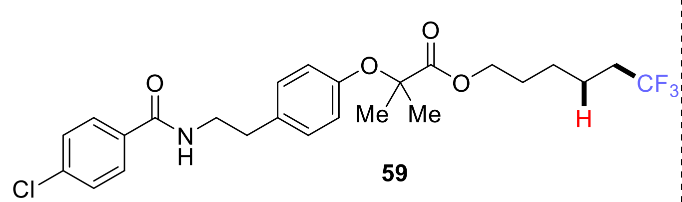
57

Prepared according to General Procedure A and obtained as white soid. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.42-7.32 (m, 3H), 2.30 – 2.24 (m, 1H), 2.19 – 2.08 (m, 3H), 1.64 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.71, 151.80, 135.70, 132.29, 129.26, 126.06 (q, J = 276.2 Hz), 123.65, 84.08, 29.37 (q, J = 3.2 Hz), 28.23 (q, J = 30.4 Hz), 22.25. ^{19}F NMR (565 MHz, Chloroform-d) δ -66.40 (t, J = 9.8 Hz). m.p.: 114-115 ºC. HRMS APCI: $[M+H]^+$ calcd. for C13H11Cl2F3NO2: 356.0063; Found 356.0067



58

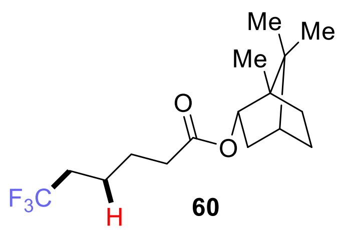
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.70 (d, J = 8.7 Hz, 2H), 7.67 – 7.64 (m, 1H), 7.39 (dd, J = 8.5, 1.8 Hz, 1H), 7.14 (dd, J = 8.9, 2.6 Hz, 1H), 7.11 (d, J = 2.5 Hz, 1H), 4.12 – 4.02 (m, 2H), 3.91 (s, 3H), 3.84 (q, J = 7.1 Hz, 1H), 1.89 – 1.82 (m, 2H), 1.58-1.56 (m, 4H), 1.48-1.41 (m, 2H), 1.26 – 1.20 (m, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 174.68, 157.68, 135.76, 133.69, 129.22, 128.92, 127.11, 127.05 (q, J = 276.5 Hz) 126.20, 125.94, 119.04, 105.57, 64.25, 55.31, 45.51, 33.48 (q, J = 28.5 Hz), 28.19, 24.99, 21.48 (q, J = 3.0 Hz), 18.30. ^{19}F NMR (565 MHz, Chloroform-d) δ -66.44 (t, J = 10.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C20H24F3O3: 369.1672; Found 369.1665



59

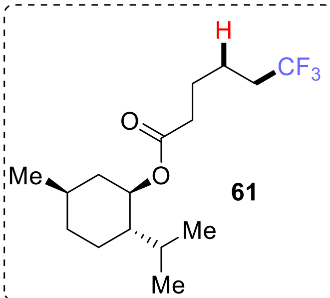
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 7.65 – 7.59 (m, 2H), 7.43 – 7.35 (m, 2H), 7.14 – 7.03

(m, 2H), 6.89 – 6.75 (m, 2H), 6.13-6.02 (m, 1H), 5.30 (s, 6H), 4.16 (t, *J* = 6.5 Hz, 2H), 3.66 (q, *J* = 6.6 Hz, 2H), 2.85 (t, *J* = 6.9 Hz, 2H), 2.04 – 1.94 (m, 2H), 1.66 – 1.63 (m, 2H), 1.56 – 1.48 (m, 2H), 1.33 (p, *J* = 7.9 Hz, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 174.30, 166.37, 154.20, 137.66, 132.99, 132.29, 129.48, 128.83, 128.24, 127.05 (q, *J* = 276.3 Hz), 119.26, 79.12, 64.97, 53.43, 41.23, 34.72, 33.55 (q, *J* = 28.5 Hz), 28.09, 25.38, 25.01, 21.50 (q, *J* = 3.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.33 (t, *J* = 10.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C25H30NF3ClO4: 500.1810; Found 500.1816



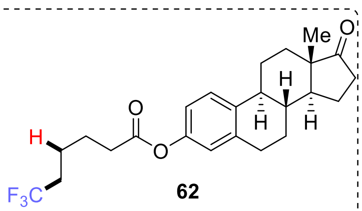
60

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 4.93-4.87 (m, 1H), 2.44 – 2.30 (m, 3H), 2.19 – 2.01 (m, 2H), 1.94-1.87 (m, 1H), 1.78 – 1.66 (m, 4H), 1.66 – 1.59 (m, 2H), 1.35-1.28 (m, 1H), 1.27 – 1.19 (m, 2H), 0.91 (s, 3H), 0.88 (s, 3H), 0.83 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.36, 173.33, 127.05 (q, *J* = 276.8 Hz), 80.01, 79.98, 48.77, 48.74, 47.83, 47.80, 44.91, 44.88, 36.86, 36.84, 34.17, 34.14, 33.52 (q, *J* = 28.7 Hz), 28.05, 28.03, 27.13, 27.11, 24.16, 24.14, 21.47, 19.72, 19.69, 18.85, 18.83, 13.50, 13.48. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.39 (t, *J* = 10.9 Hz). HRMS APCI: $[M+NH4]^+$ calcd. for C16H29F3NO2: 324.2145; Found 234.2143



61

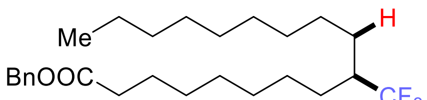
Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 4.69 (td, *J* = 10.9, 4.4 Hz, 1H), 2.36 – 2.29 (m, 2H), 2.14 – 2.05 (m, 2H), 2.01-1.95 (m, 1H), 1.88-1.81 (m, 1H), 1.73-1.65 (m, 4H), 1.63 – 1.58 (m, 2H), 1.52-1.44 (m, 1H), 1.40-1.34 (m, 1H), 1.26 – 1.18 (m, 1H), 1.10-1.01 (m, 1H), 0.93-0.87 (m, 7H), 0.76 (d, *J* = 7.0 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.62, 127.03 (q, *J* = 276.2 Hz), 74.28, 47.02, 40.94, 34.25, 34.18, 33.50 (q, *J* = 28.4 Hz), 31.39, 26.32, 24.13, 23.41, 22.01, 21.45 (q, *J* = 3.2 Hz), 20.74, 16.25. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.43 (t, *J* = 10.8 Hz). HRMS APCI: $[M+NH4]^+$ calcd. for C16H31F3NO2: 326.2301; Found 326.2292



62

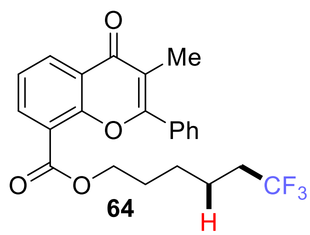
Prepared according to General Procedure A and obtained as white soid. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.24-7.20 (m, 1H), 6.79-6.75 (m, 1H), 6.75-6.71 (m, 1H), 2.88 – 2.80 (m, 2H), 2.51 (t, *J* = 7.3 Hz, 2H), 2.47-2.40 (m, 1H), 2.37-2.31 (m, 1H), 2.26-2.18 (m, 1H), 2.13-2.03 (m, 3H), 2.02 – 1.91 (m, 2H), 1.91-1.87 (m, 1H), 1.76 (p, *J* = 7.5 Hz, 2H), 1.66 – 1.60 (m, 2H), 1.59 – 1.36 (m, 6H), 0.84 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.83, 148.47, 138.08, 137.47, 127.0 (q, *J* = 276.3 Hz), 126.45, 121.51, 118.68, 50.44, 47.96, 44.16, 38.00, 35.87, 33.85, 33.50 (q, *J* = 28.6 Hz), 31.56, 29.41, 26.34, 25.76, 23.97, 21.60, 21.47 (q, *J* = 3.1 Hz), 13.84. ^{19}F NMR

(565 MHz, Chloroform-*d*) δ -66.32 (t, *J* = 10.8 Hz). m.p.: 94-95 ºC. HRMS APCI: $[M+H]^+$ calcd. for C24H30F3O3: 423.2142; Found 423.2150



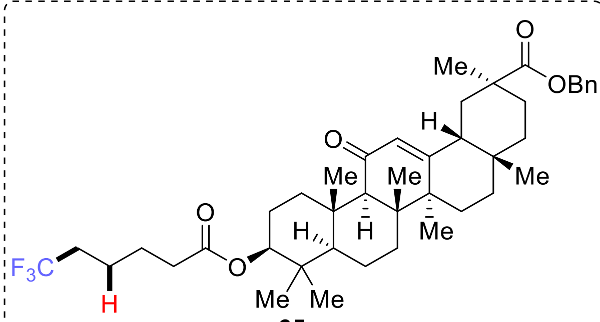
63

Prepared according to General Procedure A and obtained as colorless oil. 1:1 mixture of regioisomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.43 – 7.30 (m, 5H), 5.11 (s, 2H), 2.35 (t, *J* = 7.5 Hz, 2H), 2.01 – 1.93 (m, 1H), 1.67-1.61 (m, 2H), 1.57-1.52 (m, 2H), 1.42 – 1.26 (m, 24H), 0.88 (t, *J* = 6.9 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.68, 173.64, 136.14, 136.13, 128.79 (q, J = 280.6 Hz), 128.55, 128.19, 66.10, 66.08, 42.56 (q, *J* = 24.6 Hz), 34.32, 34.29, 31.89, 31.85, 29.72, 29.65, 29.55, 29.53, 29.42, 29.38, 29.30, 29.25, 29.21, 29.18, 29.08, 29.05, 29.03, 27.85, 27.84, 27.82, 26.88, 26.86, 26.82, 24.93, 24.90, 22.68, 22.66, 14.11. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -70.05– -70.18 (m, 3F). HRMS APCI: $[M+H]^+$ calcd. for C26H42F3O2: 443.3131; Found 443.3131



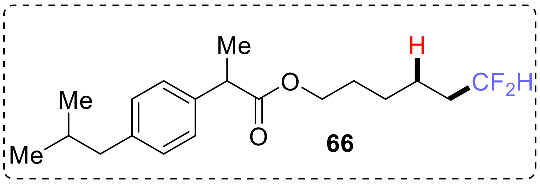
64

Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.47 (dd, *J* = 7.9, 1.8 Hz, 1H), 8.26 (dd, *J* = 7.5, 1.8 Hz, 1H), 7.77 (dt, *J* = 6.8, 2.2 Hz, 2H), 7.54 (dd, *J* = 5.1, 1.9 Hz, 3H), 7.45 (t, *J* = 7.7 Hz, 1H), 4.36 (t, *J* = 6.5 Hz, 2H), 2.23 (s, 3H), 2.02 – 1.92 (m, 2H), 1.76 – 1.70 (m, 2H), 1.55 – 1.48 (m, 2H), 1.44-1.35 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 178.27, 164.63, 161.08, 154.45, 136.16, 133.11, 130.85, 130.51, 129.31, 128.44, 127.05 (q, *J* = 276.3 Hz), 124.05, 123.34, 120.72, 117.76, 65.22, 33.56 (q, *J* = 28.4 Hz), 28.31, 25.22, 21.57 (q, *J* = 3.0 Hz), 11.75. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.38 (t, *J* = 11.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C23H22F3O4: 419.1465; Found 419.1457



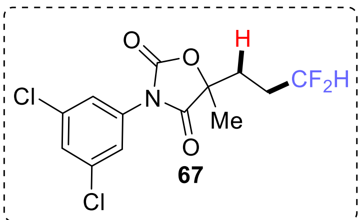
65

Prepared according to General Procedure A and obtained as white solid. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.50 – 7.29 (m, 5H), 5.54 (s, 1H), 5.20 (d, *J* = 12.2 Hz, 1H), 5.09 (d, *J* = 12.2 Hz, 1H), 4.53 (dd, *J* = 11.8, 4.7 Hz, 1H), 2.83-2.76 (m, 1H), 2.38 – 2.30 (m, 3H), 2.15-2.07 (m, 2H), 2.06 – 1.97 (m, 3H), 1.97-1.91 (m, 1H), 1.84-1.76 (m, 1H), 1.74 – 1.59 (m, 9H), 1.49 – 1.26 (m, 9H), 1.16 (s, 6H), 1.11 (s, 3H), 1.09 – 0.97 (m, 2H), 0.91-0.85 (m, 6H), 0.82-0.76 (m, 1H), 0.73 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 199.99, 176.22, 172.81, 169.11, 136.14, 128.63, 128.47, 128.31, 128.26, 127.03 (q, *J* = 276.3 Hz), 80.72, 66.23, 61.68, 55.01, 48.24, 45.37, 44.00, 43.18, 41.06, 38.78, 38.08, 37.65, 36.93, 34.25, 33.49 (q, *J* = 28.4 Hz), 32.70, 31.79, 31.18, 28.42, 28.29, 28.08, 26.46, 26.40, 24.14, 23.59, 23.31, 21.50 (q, *J* = 3.1 Hz), 18.68, 17.38, 16.75, 16.41. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.36 (t, *J* = 11.0 Hz). m.p.: 184-185 ºC HRMS APCI: $[M+H]^+$ calcd. for C43H63F3O5: 713.4387; Found 713.4375



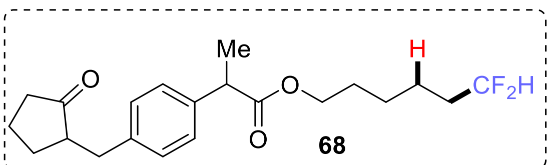
66

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.22 – 7.17 (m, 2H), 7.11 – 7.06 (m, 2H), 5.74 (tt, *J* = 56.9, 4.5 Hz, 1H), 4.13 – 4.00 (m, 2H), 3.68 (q, *J* = 7.1 Hz, 1H), 2.44 (d, *J* = 7.1 Hz, 2H), 1.90-1.80 (m, 1H), 1.80 – 1.69 (m, 2H), 1.60 – 1.57 (m, 2H), 1.48 (d, *J* = 7.2 Hz, 3H), 1.44 – 1.35 (m, 2H), 1.30-1.25 (m, 2H), 0.89 (d, *J* = 6.6 Hz, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 174.79, 140.54, 137.85, 129.30, 127.14, 117.21 (t, *J* = 238.7 Hz), 64.27, 45.19, 45.01, 33.91 (t, *J* = 20.7 Hz), 30.19, 28.31, 25.32, 22.37, 21.68 (t, *J* = 5.5 Hz), 18.39. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.86 (dt, *J* = 57.0, 17.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C19H29F2O2: 327.2130; Found 327.2125



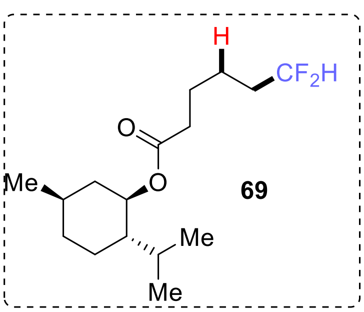
67

Prepared according to General Procedure B and obtained as white solid. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.40-7.33 (m, 3H), 5.83 (tt, *J* = 56.1, 3.9 Hz, 1H), 2.13 – 2.05 (m, 2H), 2.06 – 1.95 (m, 1H), 1.90 – 1.79 (m, 1H), 1.63 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.07, 152.03, 135.65, 132.41, 129.18, 123.71, 115.58 (t, *J* = 240.2 Hz), 84.80, 29.08 (t, *J* = 5.7 Hz), 28.02 (t, *J* = 22.2 Hz), 22.40. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -116.87 (dt, *J* = 56.1, 17.0 Hz). m.p.: 121-122 °C. HRMS APCI: $[M+H]^+$ calcd. for C13H12Cl2F2NO3: 338.0157; Found 338.0161



68

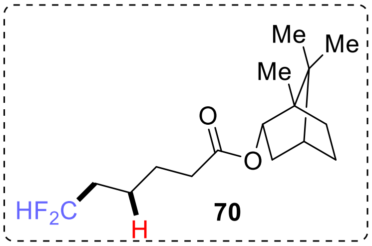
Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.21 (d, *J* = 7.9 Hz, 2H), 7.12 (d, *J* = 7.9 Hz, 2H), 5.75 (tt, *J* = 56.9, 4.4 Hz, 1H), 4.06 (tt, *J* = 8.1, 4.1 Hz, 2H), 3.68 (q, *J* = 7.2 Hz, 1H), 3.12 (dd, *J* = 14.0, 4.2 Hz, 1H), 2.51 (dd, *J* = 13.9, 9.5 Hz, 1H), 2.38 – 2.29 (m, 2H), 2.14 – 2.05 (m, 2H), 1.99-1.92 (m, 1H), 1.81 – 1.69 (m, 3H), 1.61 – 1.53 (m, 3H), 1.48 (d, *J* = 7.2 Hz, 3H), 1.44-1.37 (m, 2H), 1.34 – 1.27 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 220.18, 174.65, 138.87, 138.45, 129.11, 129.09, 127.52, 117.18 (t, *J* = 238.8 Hz), 64.35, 50.97, 45.17, 38.18, 35.19, 33.90 (t, *J* = 20.8 Hz), 29.24, 28.29, 25.33, 21.66 (t, *J* = 5.5 Hz), 20.53, 18.41. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.86 (dt, *J* = 56.7, 17.7 Hz). HRMS APCI: $[M+H]^+$ calcd. for C21H29F2O3: 367.2079; Found 367.2075



69

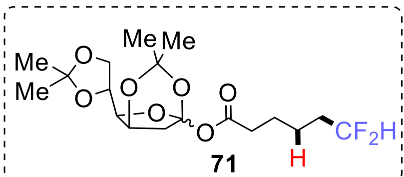
Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.80 (tt, *J* = 56.8, 4.5 Hz, 1H), 4.69 (td, *J* = 10.9, 4.4 Hz, 1H), 2.34 – 2.29 (m, 2H), 2.00-1.94 (m, 1H), 1.90 – 1.79 (m, 3H), 1.72 – 1.64 (m, 4H), 1.53-1.45 (m, 3H), 1.39 – 1.34 (m, 1H), 1.10-1.01 (m, 1H), 1.00-0.93 (m, 1H), 0.92 – 0.85 (m, 7H), 0.76 (d, *J* = 6.9 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.83, 117.10 (t, *J*

= 238.9 Hz), 74.18, 47.02, 40.95, 34.36, 34.26, 33.78 (t, J = 20.8 Hz), 31.39, 26.31, 24.50, 23.42, 22.02,21.63 (t, J = 5.6 Hz), 20.75, 16.27. ^{19}F NMR (565 MHz, Chloroform-d) δ -115.96 (dt, J = 56.6, 17.5 Hz). HRMS APCI: $[M+H]^+$ calcd. for C16H29F2O2: 291.2130; Found 291.2126



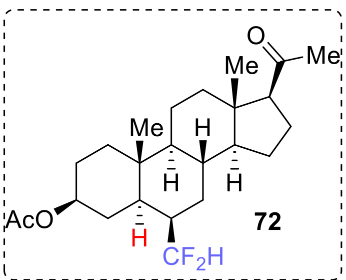
70

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 5.81 (tt, J = 56.7, 4.5 Hz, 1H), 4.89 (dq, J = 10.0, 1.9 Hz, 1H), 2.39-2.31 (m, 3H), 1.94 – 1.81 (m, 3H), 1.77 – 1.67 (m, 4H), 1.55-1.47 (m, 2H), 1.34 – 1.20 (m, 3H), 0.91 (s, 3H), 0.87 (s, 3H), 0.83 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.56, 117.10 (t, J = 238.9 Hz), 79.89, 48.74, 47.80, 44.88, 36.84, 34.33, 33.79 (t, J = 21.0 Hz), 28.04, 27.12, 24.51, 21.64 (t, J = 5.5 Hz), 19.70, 18.84, 13.50. ^{19}F NMR (565 MHz, Chloroform-d) δ -115.93 (dt, J = 57.1, 18.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C16H27F2O2: 289.1974; Found 289.1972



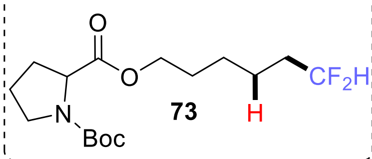
71

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-d) δ 6.14 (s, 1H), 5.82 (tt, J = 56.7, 4.4 Hz, 1H), 4.86 (dd, J = 5.9, 3.6 Hz, 1H), 4.69 (d, J = 5.8 Hz, 1H), 4.44-4.37 (m, 1H), 4.12-4.07 (m, 1H), 4.07-3.97 (m, 2H), 2.40-2.27 (m, 2H), 1.91-1.79 (m, 2H), 1.69 (p, J = 7.5 Hz, 1H), 1.53 – 1.47 (m, 5H), 1.46 (s, 3H), 1.38 (s, 3H), 1.35 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.61, 117.00 (t, J = 239.0 Hz), 113.32, 109.38, 100.74, 85.07, 82.28, 79.32, 72.87, 66.82, 33.90, 33.71 (t, J = 21.0 Hz), 26.99, 25.95, 25.13, 24.67, 24.08, 21.50 (t, J = 5.6 Hz). ^{19}F NMR (564 MHz, Chloroform-d) δ -116.01 (dt, J = 56.8, 17.5 Hz). HRMS APCI: $[M+H]^+$ calcd. for C18H29F2O7: 395.1876; Found 395.1873



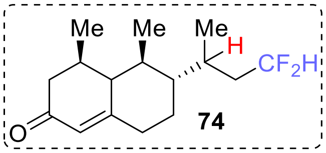
72

Prepared according to General Procedure B and obtained as colorless oil. 8.1:1 mixture of diastereomers. ^{1}H NMR (600 MHz, Chloroform-d) δ 5.91 (td, J = 56.6, 7.6 Hz, 0.89H), 5.69 (td, J = 56.4, 2.5 Hz, 0.11H), 4.66 – 4.51 (m, 1H), 2.46 (t, J = 9.0 Hz, 1H), 2.15 – 2.03 (m, 4H), 2.00 – 1.93 (m, 4H), 1.93-1.86 (m, 1H), 1.86-1.80 (m, 1H), 1.79 – 1.68 (m, 4H), 1.67-1.52 (m, 4H), 1.49 – 1.25 (m, 5H), 1.17 – 0.96 (m, 4H), 0.87 (s, 2.70H), 0.79 (s, 0.33H), 0.703-0.65 (m, 1H), 0.56 (s, 2.67H), 0.55 (s, 0.33H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 209.38, 170.69, 118.06 (dd, J = 241.7, 239.4 Hz), 73.86, 63.64, 56.23, 54.54, 45.06 (d, J = 7.2 Hz), 44.12, 43.17 (t, J = 18.6 Hz), 39.17, 38.77, 35.83, 32.84 (d, J = 5.1 Hz), 31.96, 31.78 (dd, J = 8.1, 3.6 Hz), 31.51, 27.56, 24.37, 22.80, 21.42, 21.03, 15.96, 13.52. ^{19}F NMR (565 MHz, Chloroform-d) δ -114.20 (dddd, J = 287.4, 57.2, 16.4 Hz), -122.66 – -128.15 (m). HRMS APCI: $[M+H]^+$ calcd. for C24H37F2O3: 411.2705; Found 411.2703



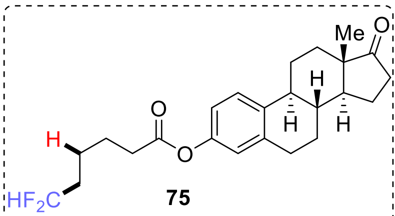
73

Prepared according to General Procedure B and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.73 (tt, *J* = 57.0, 4.6 Hz, 1H), 4.28 – 3.99 (m, 3H), 3.53 – 3.29 (m, 2H), 2.20-2.07 (m, 1H), 1.93 – 1.70 (m, 5H), 1.63-1.52 (m, 2H), 1.43 – 1.32 (m, 13H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 173.30, 173.08, 154.40, 153.82, 117.25 (t, J = 238.9Hz), 117.15 (t, J = 239.0Hz), 79.84, 79.72, 64.61, 64.59, 59.18, 58.88, 46.56, 46.32, 33.91 (t, *J* = 20.8 Hz), 30.94, 29.98, 28.46, 28.43, 28.32, 25.49, 25.37, 24.32, 23.62, 21.76 (t, *J* = 5.1 Hz), 21.72 (d, *J* = 5.2 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.93 (ddt, *J* = 56.8, 26.4, 17.6 Hz). HRMS APCI: $[M+H]^+$ calcd. for C16H28F2NO4: 336.1981; Found 336.1981



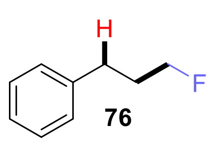
74

Prepared according to General Procedure B and obtained as colorless oil. 1:1 mixture of diastereomers. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 5.99-5.77 (m, 1H), 5.77-5.73 (m, 1H), 2.51 – 2.40 (m, 1H), 2.39-2.33 (m, 1H), 2.33 – 2.20 (m, 2H), 2.07 – 1.55 (m, 8H), 1.23 – 1.13 (m, 1H), 1.11-1.06 (m, 3H), 0.99 – 0.92 (m, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 199.57, 170.51, 124.66, 124.63, 117.21 (t, J = 239.0 Hz), 117.17 (t, J = 239.0 Hz), 42.42, 42.04, 40.84, 40.56, 40.54, 39.27, 39.17, 38.56 (t, *J* = 20.1 Hz), 38.09 (t, *J* = 20.1 Hz), 37.62, 37.61, 32.99, 32.99, 32.22-32.18 (m), 32.16-32.13 (m), 29.77, 28.32, 16.93, 16.36, 16.00, 14.95, 14.94. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -111.43 – -119.70 (m). HRMS APCI: $[M+H]^+$ calcd. for C16H25F2O: 271.1868; Found 271.1870. The compound characterization was reported in literature and the NMR data matched with previous characterization.[1]



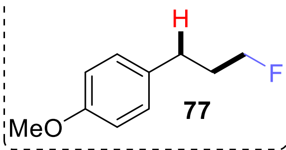
75

Prepared according to General Procedure B and obtained as white solid. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.31-7.27 (m, 1H), 6.88-6.83 (m, 1H), 6.81-6.78 (m, 1H), 5.83 (tt, *J* = 56.8, 4.4 Hz, 1H), 2.94-2.88 (m, 2H), 2.58 (t, *J* = 7.4 Hz, 2H), 2.54 – 2.48 (m, 1H), 2.44 – 2.36 (m, 1H), 2.34-2.25 (m, 1H), 2.20-2.10 (m, 1H), 2.10 – 1.98 (m, 2H), 1.98-1.94 (m, 1H), 1.94-1.84 (m, 2H), 1.94-1.79 (m, 2H), 1.69 – 1.41 (m, 9H), 0.91 (s, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.01, 148.50, 138.04, 137.41, 126.42, 121.52, 118.69, 118.69, 117.03 (t, *J* = 239.0 Hz), 50.42, 47.94, 44.14, 37.99, 35.85, 34.02, 33.75 (t, *J* = 20.9 Hz), 31.54, 29.40, 26.33, 25.75, 24.35, 21.63, 21.59 (t, *J* = 5.5Hz), 21.58, 21.55, 13.82. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -115.98 (dt, *J* = 56.7, 17.6 Hz). m.p.: 95-96 °C. HRMS APCI: $[M+H]^+$ calcd. for C24H31F2O3: 405.2236; Found 405.2244



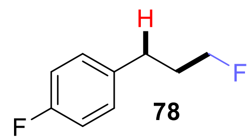
76

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.32 – 7.27 (m, 2H), 7.23-7.18 (m, 3H), 4.46 (dt, *J* = 47.2, 6.0 Hz, 2H), 2.78 – 2.70 (m, 2H), 2.06 – 1.97 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 141.11, 128.49, 128.47, 126.04, 83.15 (d, *J* = 164.8 Hz), 32.04 (d, *J* = 19.9 Hz), 31.33 (d, *J* = 5.4 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.01 (tt, *J* = 47.2, 25.3 Hz). GC-MS: [M]+ calcd. for C9H11F: 138.0845; Found 138



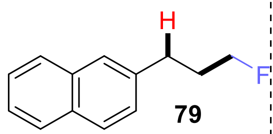
77

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.13 – 7.08 (m, 2H), 6.86 – 6.82 (m, 2H), 4.44 (dt, *J* = 47.2, 5.9 Hz, 2H), 3.79 (s, 3H), 2.72 – 2.66 (m, 2H), 2.04 – 1.90 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 157.93, 133.14, 129.39, 113.87, 83.14 (d, *J* = 164.6 Hz), 55.27, 32.26 (d, *J* = 19.6 Hz), 30.38 (d, *J* = 5.4 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.09 (tt, *J* = 47.4, 25.6 Hz). HRMS APCI:: [M-H]+ calcd. for C10H12FO: 167.0867; Found 167.0865



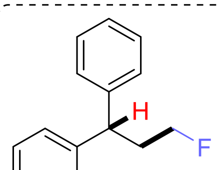
78

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.17 – 7.13 (m, 2H), 7.00 – 6.95 (m, 2H), 4.45 (dt, *J* = 47.2, 5.9 Hz, 2H), 2.76 – 2.70 (m, 2H)., 2.05 – 1.90 (m, 2H). ^{13}C NMR (151 MHz, Chloroform-*d*) δ 161.39 (d, *J* = 243.8 Hz), 136.68 (d, *J* = 3.3 Hz), 129.83 (d, *J* = 7.7 Hz), 115.21 (d, *J* = 21.0 Hz), 82.93 (d, *J* = 164.7 Hz), 32.14 (d, *J* = 19.7 Hz), 30.53 (d, *J* = 5.4 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -117.45 (tt, *J* = 9.7, 5.7 Hz), -220.32 (tt, *J* = 46.5, 25.5 Hz). GC-MS: [M]+ calcd. for C9H10F2: 156.0751; Found 156



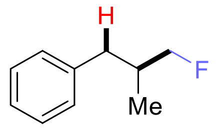
79

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.84 – 7.75 (m, 3H), 7.64 (d, *J* = 1.6 Hz, 1H), 7.44 (dddd, *J* = 18.4, 8.1, 6.8, 1.4 Hz, 2H), 7.34 (dd, *J* = 8.4, 1.8 Hz, 1H), 4.49 (dt, *J* = 47.2, 5.9 Hz, 2H), 2.96 – 2.88 (m, 2H), 2.17 – 2.03 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 138.57, 133.60, 132.07, 128.06, 127.62, 127.43, 127.20, 126.61, 126.01, 125.29, 83.10 (d, *J* = 165.0 Hz), 31.93 (d, *J* = 19.7 Hz), 31.46 (d, *J* = 5.4 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -215.61 – -231.03 (m). GC-MS: [M]+ calcd. for C13H13F: 188.1001; Found 188



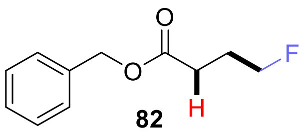
80

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.29 (dd, *J* = 8.1, 7.1 Hz, 4H), 7.25 (dd, *J* = 4.5, 2.9 Hz, 4H), 7.21 – 7.17 (m, 2H), 4.39 (dt, *J* = 47.0, 6.0 Hz, 2H), 4.17 (t, *J* = 8.0 Hz, 1H), 2.49-2.39 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 143.86, 128.60, 127.87, 126.44, 82.06 (d, *J* = 164.6 Hz), 46.43 (d, *J* = 5.4 Hz), 36.05 (d, *J* = 19.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.88 (tt, *J* = 47.5, 24.2 Hz). GC-MS: [M]+ calcd. for C15H15F: 214.1158; Found 214



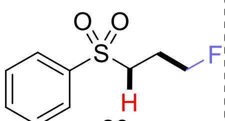
81

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.32 – 7.27 (m, 2H), 7.22 – 7.19 (m, 1H), 7.18 – 7.15 (m, 2H), 4.27 (dd, *J* = 47.5, 5.5 Hz, 2H), 2.77 (dd, *J* = 13.6, 6.5 Hz, 1H), 2.47 (dd, *J* = 13.5, 8.0 Hz, 1H), 2.18 – 1.96 (m, 1H), 0.95 (dd, *J* = 6.8, 1.1 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 139.88, 129.19, 128.31, 126.05, 87.42 (d, *J* = 168.8 Hz), 38.68 (d, *J* = 5.6 Hz), 36.09 (d, *J* = 18.2 Hz), 15.65 (d, *J* = 6.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -224.20 (td, *J* = 47.3, 20.4 Hz). GC-MS: [M]+ calcd. for C10H13F: 152.1001; Found 152



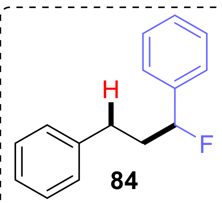
82

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.40 – 7.29 (m, 5H), 5.13 (s, 2H), 4.48 (dt, *J* = 47.1, 5.8 Hz, 2H), 2.52 (t, *J* = 7.4 Hz, 2H), 2.09-1.99 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.72, 135.87, 128.60, 128.30, 128.23, 82.89 (d, *J* = 165.3 Hz), 66.40, 29.96 (d, *J* = 5.1 Hz), 25.76 (d, *J* = 20.4 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.97 (dp, *J* = 73.7, 25.6 Hz). HRMS APCI: [M+H]+ calcd. for C11H14FO2: 197.0973; Found 197.0972



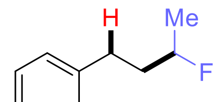
83

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.95 – 7.89 (m, 2H), 7.71 – 7.65 (m, 1H), 7.61 – 7.57 (m, 2H), 4.52 (dt, *J* = 46.8, 5.7 Hz, 2H), 3.27 – 3.21 (m, 2H), 2.20 – 2.09 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 138.91, 133.93, 129.43, 128.05, 81.55 (d, *J* = 167.9 Hz), 52.53 (d, *J* = 4.3 Hz), 24.09 (d, *J* = 20.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.52 (tt, *J* = 46.9, 25.9 Hz). HRMS APCI: [M+H]+ calcd. for C9H12FO2S: 203.0537; Found 203.0533



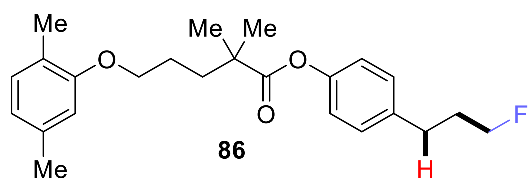
84

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.39 – 7.35 (m, 2H), 7.34 – 7.31 (m, 3H), 7.31 – 7.27 (m, 2H), 7.22 – 7.18 (m, 3H), 5.43 (ddd, *J* = 47.8, 8.5, 4.4 Hz, 1H), 2.87 – 2.68 (m, 2H), 2.38 – 2.24 (m, 1H), 2.18 – 2.05 (m, 1H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 141.13, 140.16 (d, *J* = 19.7 Hz), 128.48, 128.46, 128.30 (d, *J* = 2.0 Hz), 126.05, 125.57 (d, *J* = 6.8 Hz), 93.65 (d, *J* = 170.9 Hz), 38.82 (d, *J* = 23.9 Hz), 31.32 (d, *J* = 4.3 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -176.01 (ddd, *J* = 46.5, 30.0, 15.9 Hz). GC-MS: [M]+ calcd. for C15H15F: 214.1158; Found 214



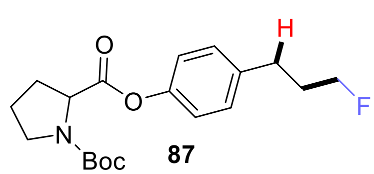
85

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.31 – 7.27 (m, 2H), 7.20 (dd, *J* = 7.5, 1.4 Hz, 3H), 4.74 – 4.57 (m, 1H), 2.84-2.76 (m, 1H), 2.72-2.64 (m, 1H), 2.04-1.92 (m, 1H), 1.90 – 1.74 (m, 1H), 1.34 (dd, *J* = 23.9, 6.2 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 141.50, 128.44, 125.95, 90.05 (d, *J* = 165.0 Hz), 38.67 (d, *J* = 20.8 Hz), 31.37 (d, *J* = 4.9 Hz), 21.00 (d, *J* = 22.6 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -174.22 (ddqd, *J* = 47.9, 31.8, 23.7, 16.0 Hz). GC-MS: [M]+ calcd. for C10H13F: 152.1001; Found 152



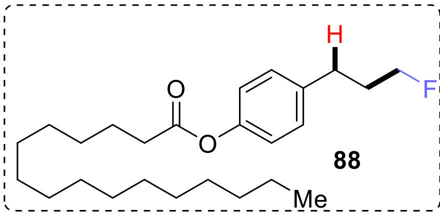
86

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.21 – 7.15 (m, 2H), 7.02-6.98 (m, 1H), 6.98 – 6.92 (m, 2H), 6.69 – 6.64 (m, 1H), 6.64-6.60 (m, 1H), 4.45 (dt, *J* = 47.2, 5.9 Hz, 2H), 4.01-3.94 (m, 2H), 2.79 – 2.68 (m, 2H), 2.30 (s, 3H), 2.17 (s, 3H), 2.05 – 1.94 (m, 2H), 1.36 (s, 6H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 176.47, 156.88, 149.25, 138.45, 136.48, 130.34, 129.35, 123.62, 121.44, 120.74, 111.95, 82.97 (d, *J* = 165.0 Hz), 67.80, 42.40, 37.16, 32.04 (d, *J* = 19.8 Hz), 30.72 (d, *J* = 5.4 Hz), 25.28, 25.16, 21.40, 15.79. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.24 (tt, *J* = 47.4, 25.6 Hz). HRMS APCI: [M+H]+ calcd. for C24H32FO3: 387.2330; Found 387.2325



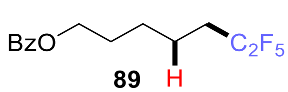
87

Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.23-7.16 (m, 2H), 7.06-7.00 (m, 2H), 4.55 – 4.39 (m, 3H), 3.65 – 3.41 (m, 2H), 2.78-2.69 (m, 2H), 2.44 – 2.28 (m, 1H), 2.22 – 2.12 (m, 1H), 2.08 – 1.91 (m, 4H), 1.47 (d, *J* = 7.4 Hz, 9H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 171.74, 154.45, 153.76, 149.04, 148.83, 138.78, 138.58, 129.48, 129.33, 121.39, 121.06, 82.98 (d, *J* = 164.8 Hz), 82.95 (d, *J* = 165.4 Hz), 80.20, 79.95, 59.18, 59.06, 46.62, 46.44, 32.02 (d, *J* = 19.9 Hz), 31.99 (d, *J* = 19.6 Hz), 31.06, 30.74, 30.71, 28.43, 24.48, 23.70. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -219.84 – -220.64 (m). HRMS APCI: [M+H]+ calcd. for C19H27FNO4: 352.1919; Found 352.1916

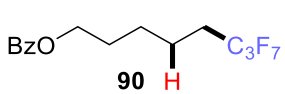


88

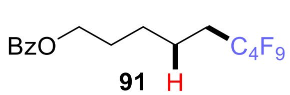
Prepared according to General Procedure C and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.21-7.16 (m, 2H), 7.02 – 6.97 (m, 2H), 4.45 (dt, *J* = 47.2, 5.9 Hz, 2H), 2.79 – 2.67 (m, 2H), 2.54 (t, *J* = 7.5 Hz, 2H), 2.06 – 1.93 (m, 2H), 1.74 (p, *J* = 7.5 Hz, 2H), 1.42 – 1.25 (m, 24H), 0.88 (t, *J* = 7.0 Hz, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 172.49, 149.02, 138.50, 129.37, 121.51, 82.99 (d, *J* = 164.9 Hz), 34.42, 32.02 (d, *J* = 19.9 Hz), 31.94, 30.73 (d, *J* = 5.1 Hz), 29.71, 29.69, 29.67, 29.66, 29.61, 29.47, 29.37, 29.27, 29.12, 24.98, 22.70, 14.13. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -220.23 (tt, *J* = 47.5, 25.5 Hz). HRMS APCI: [M+H]+ calcd. for C25H42FO2: 393.3164; Found 393.3148



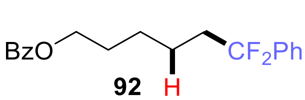
89 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.07 – 8.00 (m, 2H), 7.59 – 7.54 (m, 1H), 7.44 (t, *J* = 7.8 Hz, 2H), 4.34 (t, *J* = 6.5 Hz, 2H), 2.10-1.99 (m, 2H), 1.86-1.78 (m, 2H), 1.73-1.64 (m, 2H), 1.57 – 1.52 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.64, 132.97, 130.33, 129.56, 128.40, 119.24 (qt, *J* = 285.2, 36.4 Hz), 115.76 (tq, *J* = 251.5, 37.5 Hz), 64.58, 30.62 (t, *J* = 22.2 Hz), 28.47, 25.75, 20.14 (t, *J* = 3.7 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -85.45, -118.22 (t, *J* = 18.5 Hz). HRMS APCI: $[M+H]^+$ calcd. for C14H16F5O2: 311.1065; Found 311.1060



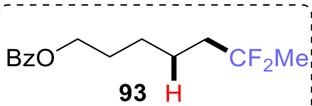
90 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.08 – 8.00 (m, 2H), 7.59 – 7.54 (m, 1H), 7.44 (t, *J* = 7.8 Hz, 2H), 4.34 (t, *J* = 6.5 Hz, 2H), 2.15 – 2.03 (m, 2H), 1.87 – 1.77 (m, 2H), 1.73-1.66 (m, 2H), 1.59 – 1.51 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.65, 132.98, 130.34, 129.57, 128.41, 117.93 (qt, *J* = 287.5, 34.1 Hz), 117.71 (tt, *J* = 253.2, 30.9 Hz), 108.93 (tq, *J* = 263.4, 37.0 Hz), 64.59, 30.58 (t, *J* = 22.4 Hz), 28.49, 25.77, 19.97 (t, *J* = 3.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -80.61 (t, *J* = 10.1 Hz), -115.36 (tdt, *J* = 20.0, 14.7, 10.0 Hz), -127.83 (d, *J* = 6.0 Hz). HRMS APCI: $[M+H]^+$ calcd. for C15H16F7O2: 361.1003; Found 361.1029



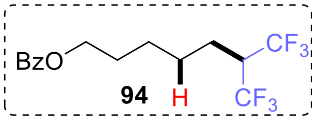
91 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.08 – 7.99 (m, 2H), 7.61 – 7.52 (m, 1H), 7.44 (t, *J* = 7.6 Hz, 2H), 4.34 (t, *J* = 6.5 Hz, 2H), 2.16-2.03 (m, 2H), 1.87 – 1.77 (m, 2H), 1.77-1.65 (m, 2H), 1.60 – 1.49 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.61, 132.93, 130.31, 129.53, 128.37, 120.54-106.87 (m, C4F9), 64.55, 30.72 (t, *J* = 22.4 Hz), 28.46, 25.73, 19.95 (t, *J* = 3.8 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -81.09 (t, *J* = 11.2 Hz), -114.59 (dd, *J* = 37.7, 18.2 Hz), -124.50 (d, *J* = 11.6 Hz), -125.98 – -126.13 (m). HRMS APCI: $[M+H]^+$ calcd. for C16H16F9O2: 411.1001; Found 411.0992

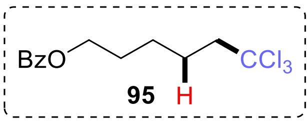


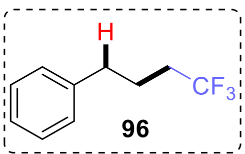
92 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.08 – 7.99 (m, 2H), 7.59 – 7.52 (m, 1H), 7.49 – 7.36 (m, 7H), 4.29 (t, *J* = 6.6 Hz, 2H), 2.23 – 2.09 (m, 2H), 1.81 – 1.71 (m, 2H), 1.56-1.43 (m, 2.3 Hz, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.61, 137.36 (t, *J* = 26.6 Hz), 132.86, 130.38, 129.61, 129.52, 128.38, 128.34, 124.89 (t, *J* = 6.2 Hz), 122.97 (t, *J* = 242.1 Hz), 64.76, 39.00 (t, *J* = 27.6 Hz), 28.52, 25.80, 22.28 (t, *J* = 4.0 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -95.51 (t, *J* = 16.3 Hz). HRMS APCI: $[M+H]^+$ calcd. for C19H24F2NO2: 336.1770; Found 336.1762

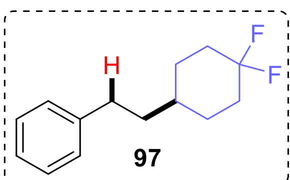


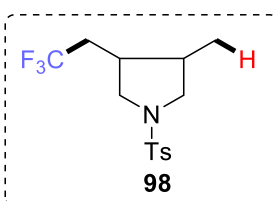
93 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.04 (d, *J* = 7.7 Hz, 2H), 7.56 (t, *J* = 7.4 Hz, 1H), 7.44 (t, *J* = 7.6 Hz, 2H), 4.33 (t, *J* = 6.6 Hz, 2H), 1.92-1.75 (m, 4H), 1.60 – 1.46 (m, 7H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.66, 132.89, 130.41, 129.54, 128.36, 124.23 (t, *J* = 237.7 Hz), 64.78, 37.85 (t, *J* = 25.4 Hz), 28.57, 25.88, 23.28 (t, *J* = 28.1 Hz), 22.46 (t, *J* = 4.7 Hz). ^{19}F NMR (564 MHz, Chloroform-*d*) δ -90.59 (q, *J* = 17.5 Hz). HRMS APCI: $[M+H]^+$ calcd. for C14H19F2O2: 257.1348; Found 257.1344

 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.07 – 7.98 (m, 2H), 7.59 – 7.53 (m, 1H), 7.45 (t, *J* = 7.8 Hz, 2H), 4.33 (t, *J* = 6.5 Hz, 2H), 2.90-2.79 (m, 1H), 1.90 – 1.70 (m, 4H), 1.64-1.57 (m, 2H), 1.54 – 1.47 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.64, 132.95, 130.32, 129.54, 128.38, 123.97 (q, *J* = 281.3 Hz), 123.95 (q, *J* = 281.6 Hz), 64.63, 47.99 (hept, *J* = 27.8 Hz), 28.35, 26.93, 25.95, 23.65 (hept, *J* = 1.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -67.05 (d, *J* = 8.1 Hz). HRMS APCI: $[M+H]^+$ calcd. for C15H17F6O2: 343.1127; Found 343.1121

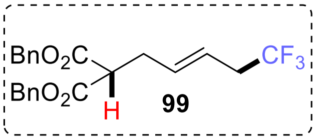
 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 8.08 – 8.02 (m, 2H), 7.59-7.54 (m, 1H), 7.49 – 7.41 (m, 2H), 4.36 (t, *J* = 6.5 Hz, 2H), 2.76 – 2.67 (m, 2H), 1.91 – 1.79 (m, 4H), 1.60-1.55 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 166.63, 132.94, 130.29, 129.55, 128.37, 99.88, 64.64, 55.00, 28.50, 26.17, 24.99. GC-MS: [M]+ calcd. for C13H15Cl3O2: 308.0138; Found 308

 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.32 – 7.28 (m, 2H), 7.23 – 7.19 (m, 1H), 7.19 – 7.14 (m, 2H), 2.69 (t, *J* = 7.6 Hz, 2H), 2.13 – 2.03 (m, 2H), 1.93 – 1.86 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 140.68, 128.56, 128.38, 127.19 (q, *J* = 276.5 Hz), 126.27, 34.64, 33.10 (q, *J* = 28.5 Hz), 23.50 (q, *J* = 2.9 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.18 (t, *J* = 10.8 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[17]

 Prepared according to General Procedure D and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.30 – 7.26 (m, 2H), 7.21 – 7.15 (m, 3H), 2.68 – 2.59 (m, 2H), 2.13 – 2.02 (m, 2H), 1.88 – 1.78 (m, 2H), 1.77 – 1.62 (m, 2H), 1.61 – 1.57 (m, 2H), 1.39 – 1.29 (m, 3H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 142.38, 128.39, 128.29, 125.79, 123.80 (dd, *J* = 241.9, 239.5 Hz), 37.52 (d, *J* = 2.6 Hz), 35.23, 33.61, 33.45 (d, *J* = 2.9 Hz), 33.42, 33.30, 28.89 (d, *J* = 9.4 Hz). ^{19}F NMR (565 MHz, Chloroform-*d*) δ -81.46 – -111.74 (m). GC-MS: [M]+ calcd. for C14H18F2: 224.1377; Found 224

 Prepared according to General Procedure A and obtained as colorless oil. ^{1}H NMR (600 MHz, Chloroform-*d*) δ 7.76 – 7.67 (m, 2H), 7.34 (dd, *J* = 8.2, 2.3 Hz, 2H), 3.64-3.50 (m, 0.21H), 3.56-3.47 (m, 1.06H), 3.38-3.33 (m, 0.79H), 3.11 – 3.04 (m, 1.59H), 3.00-2.95 (m, 0.23H), 2.81-2.76 (m, 0.22H), 2.46-2.41 (m, 3H), 2.34 – 2.23 (m, 1.85H), 2.16 – 2.07 (m, 0.80H), 1.95 – 1.74 (m, 1.55H), 0.97 (d, *J* = 6.2 Hz, 0.65H), 0.77 (d, *J* = 6.7 Hz, 2.35H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 143.62, 143.59, 133.91, 133.67, 129.76, 129.74, 127.50, 127.40, 126.59 (q, *J* = 277.0 Hz), 126.35 (q, *J* =276.9 Hz), 54.46, 53.96, 53.01, 50.41, 39.68 (q, *J* = 2.6 Hz), 38.69, 35.85 (q, *J* = 28.9 Hz), 35.73 (q, *J* = 2.6 Hz), 35.23, 32.41 (q, *J* = 28.8 Hz), 21.55, 21.54, 15.68, 13.25. ^{19}F NMR (565 MHz, Chloroform-*d*)

δ -64.99 (t, *J* = 10.9 Hz), -65.03 (t, *J* = 10.9 Hz). HRMS APCI: $[M+H]^+$ calcd. for C14H19F3NO2S: 322.1083; Found 322.1077

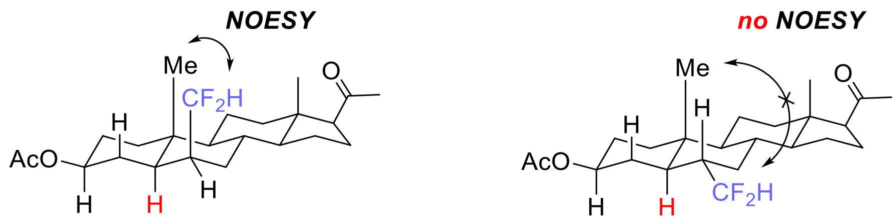


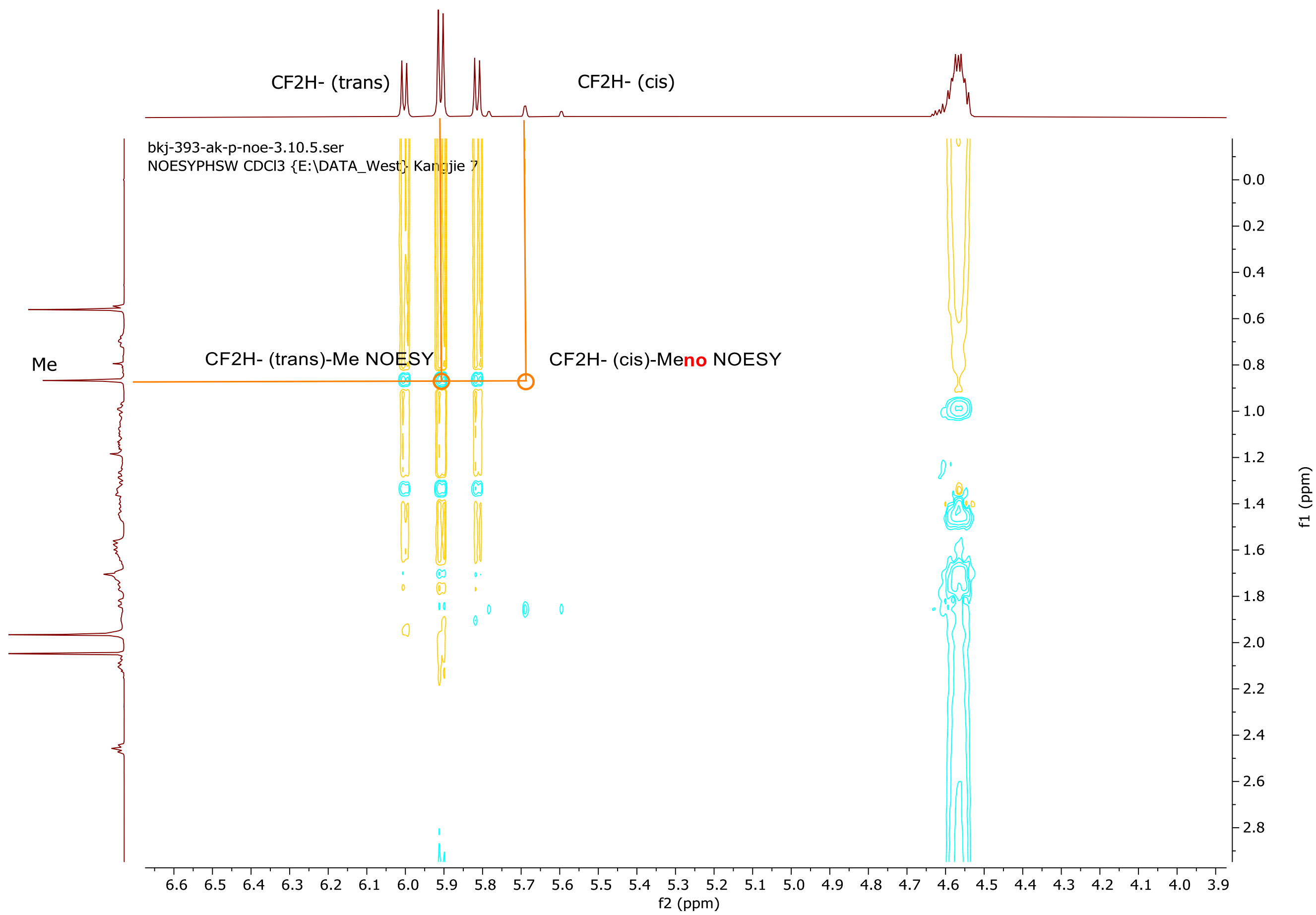
99

Prepared according to General Procedure A and obtained as colorless oil. ^1H NMR (600 MHz, Chloroform-*d*) δ 7.41 – 7.25 (m, 10H), 5.64 (dt, *J* = 14.6, 7.0 Hz, 1H), 5.44 (dt, *J* = 14.9, 7.0 Hz, 1H), 5.20 – 5.09 (m, 4H), 3.61-3.44 (m, 1H), 2.78 – 2.59 (m, 4H). ^{13}C NMR (151 MHz, $CDCl_3$) δ 168.37, 135.27, 133.06, 128.58, 128.43, 128.28, 125.75 (q, *J* = 276.5 Hz), 121.37 (q, *J* = 3.6 Hz), 67.26, 51.55, 37.19 (q, *J* = 29.7 Hz), 31.61. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -66.51 (t, *J* = 10.9 Hz). The compound characterization was reported in literature and the NMR data matched with previous characterization.[18]

2.5 Relative configuration of compound 72

On the basis of NMR experiment, we have assigned the major diastereomers of products **72** as shown below:

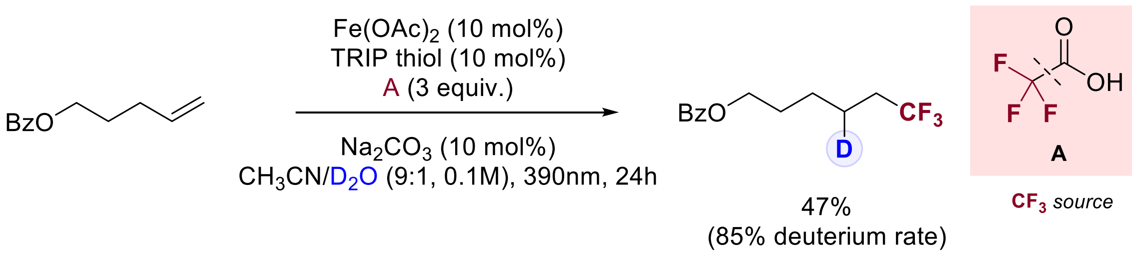


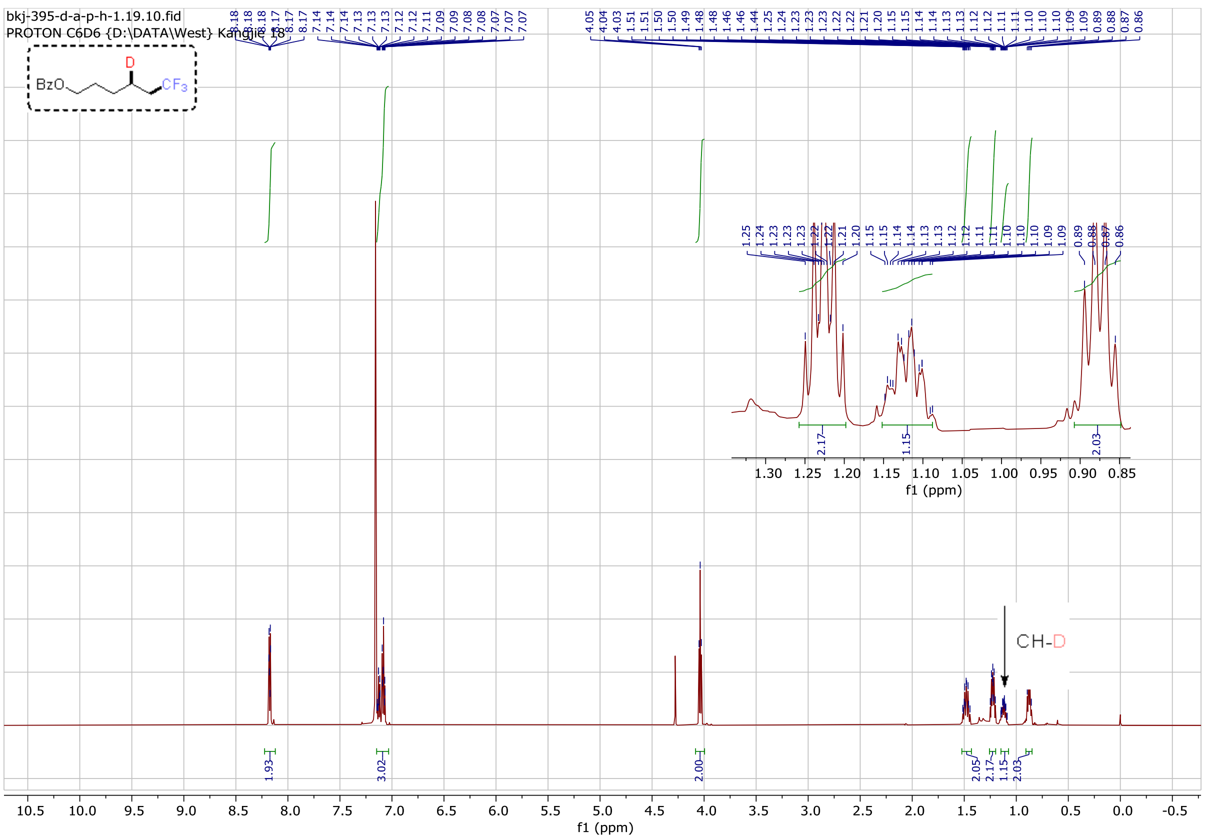


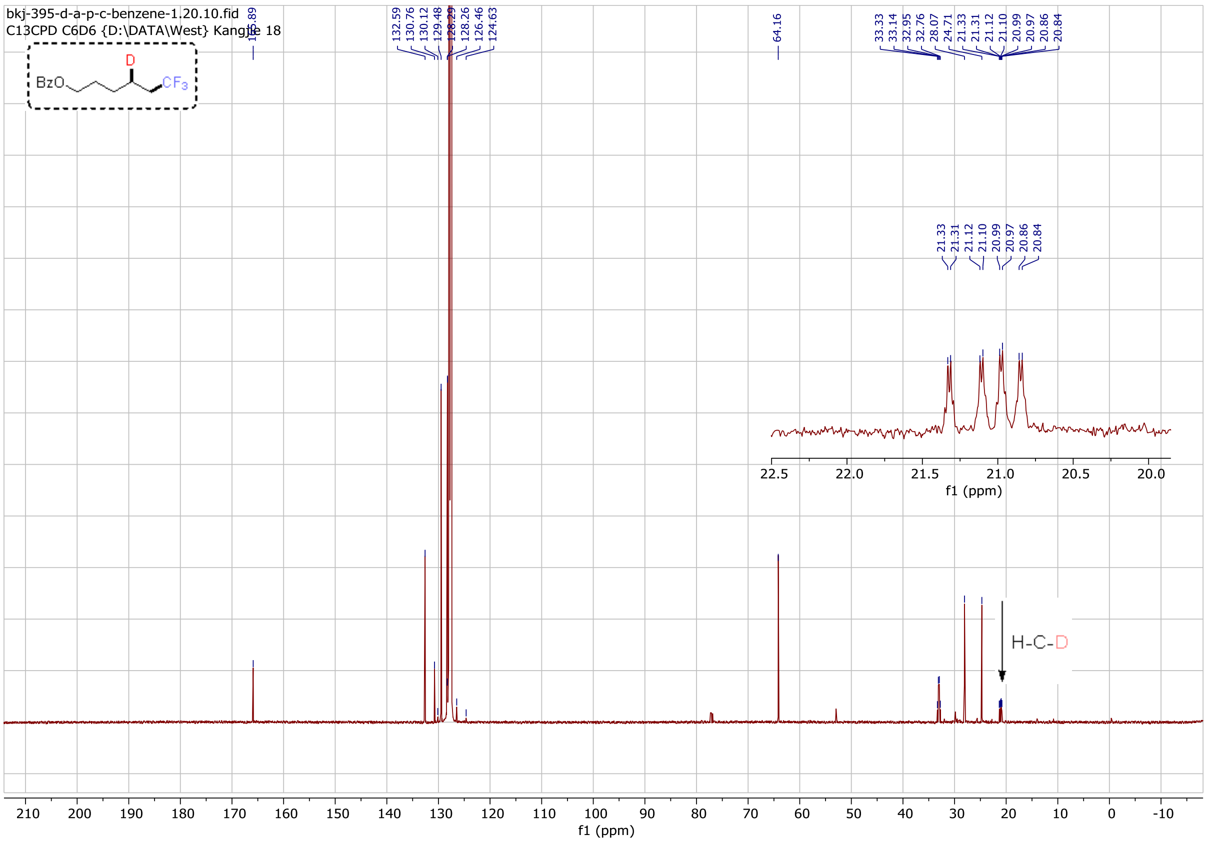
For **72**-trans, a strong NOE was observed for CF_2H (trans)/Me. However, there is no significant NOE observed for CF_2H (cis)/Me of **72**-cis. Therefore, major isomer of **72** should be the trans-product, which also correlates the finding by Wu and co-workers.[19]

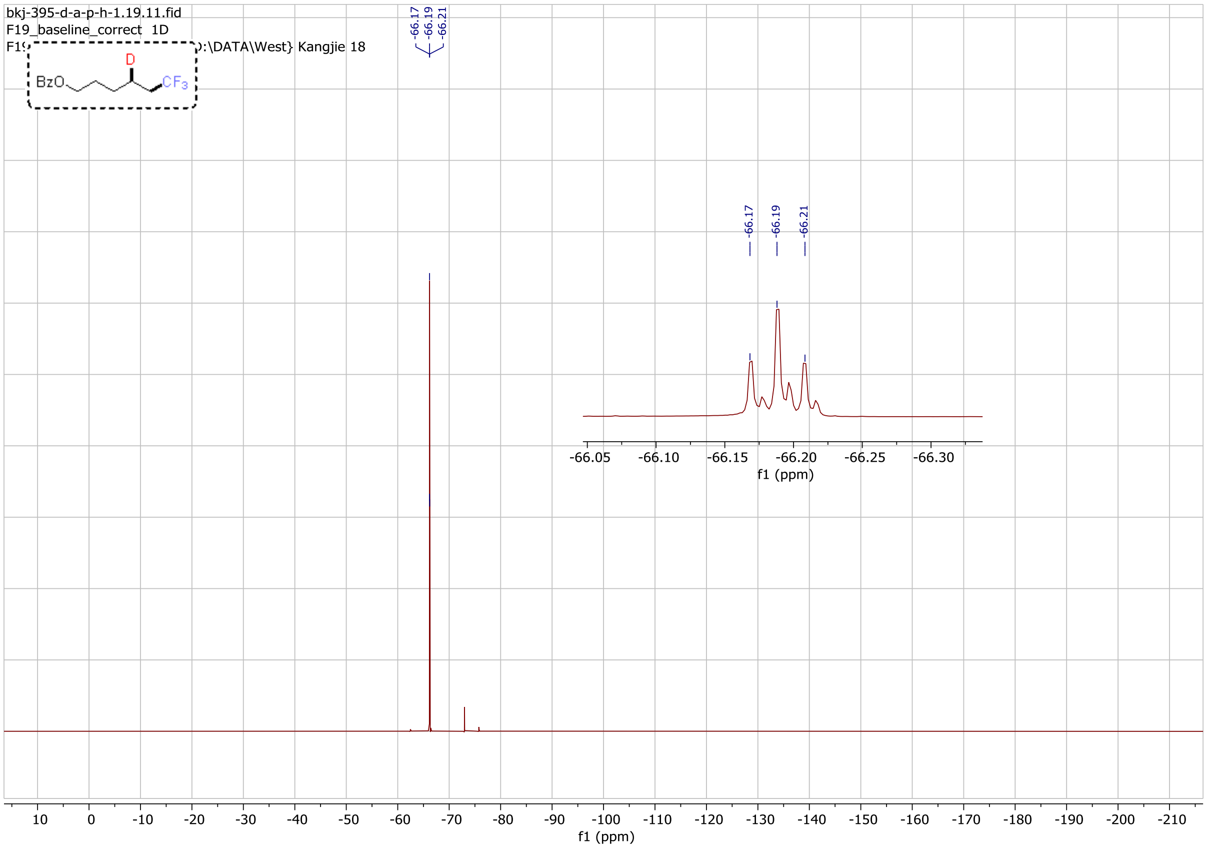
2.6 Deuterium labelling and kinetic isotope effect (KIE) studies

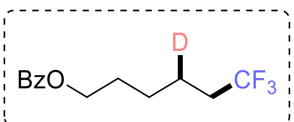
Deuterium labelling experiments





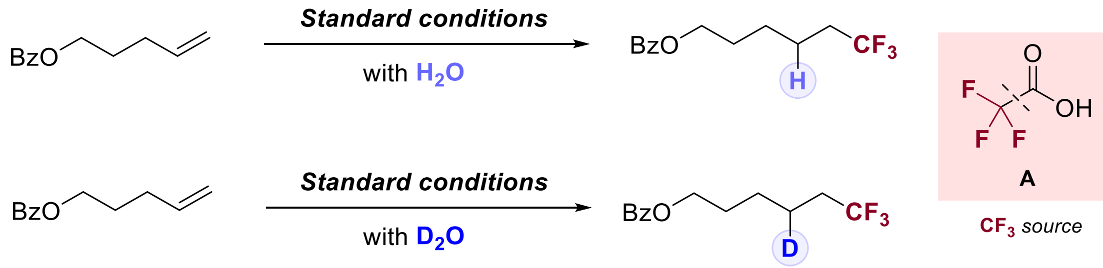

bkj-395-d-a-p-c-benzene-1.20.10.fid
C13CPD C6D6 {D:\DATA\West} Kangjie 18
BzO
D
CF3
H-C-D
f1 (ppm)





^{1}H NMR (600 MHz, Benzene-d_6) δ 8.22 – 8.12 (m, 2H), 7.15 – 7.03 (m, 3H), 4.04 (t, J = 6.6 Hz, 2H), 1.52-1.43 (m, 2H), 1.26 – 1.20 (m, 2H), 1.15-1.08 (m, 1.10H), 0.91-0.85 (m, 2H). ^{13}C NMR (151 MHz, C_6D_6) δ 165.89, 132.59, 130.76, 129.48, 128.26, 127.38 (q, J = 276.5 Hz), 64.16, 33.05 (q, J = 28.3 Hz), 28.07, 24.71, 21.33, 21.31, 21.12, 21.10, 20.99, 20.97, 20.86, 20.84. ^{19}F NMR (565 MHz, Benzene-d_6) δ -66.19 (t, J = 11.3 Hz). HRMS APCI: [M+H]$^+$ calcd. for C13H15DF3O2: 262.1160; Found 262.1156

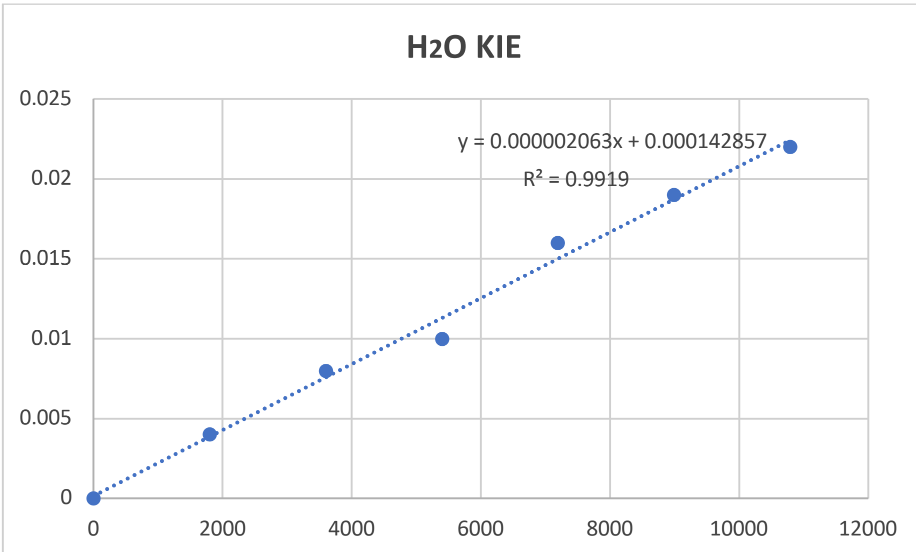
Kinetic isotope effect (KIE) experiments



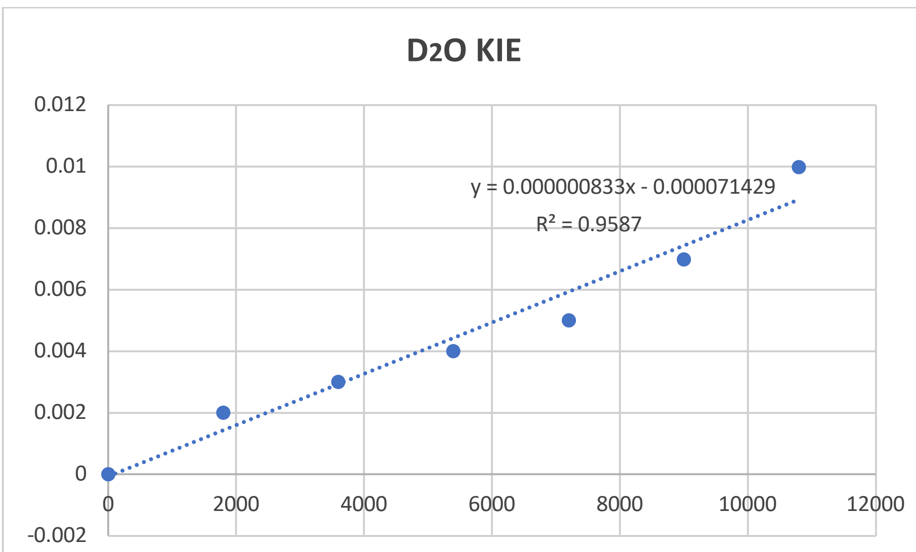
$Fe(OAc)_2$ and Na_2CO_3 were added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes, CF_3COOH and TRIP thiol in $MeCN/H_2O$ (9:1, 0.1 M in regard to alkenes) via syringe under N_2. Note: Both reactions were run on 0.2 mmol of the substrate and $PhCF_3$ was added as internal standard. The reaction mixture was placed under 390nm Kessil® light. At different time points, the aliquot of reaction mixture is directly transferred to NMR tube and reaction progress was monitored by ^{19}F NMR.

t (s)	H_2O (M)	t (s)	D_2O (M)
0	0	0	0
1800	0.004	1800	0.002
3600	0.008	3600	0.003
5400	0.01	5400	0.004
7200	0.016	7200	0.005
9000	0.019	9000	0.007
10800	0.022	10800	0.01

entry	mmol acid	mmol alkene	mmol iron	mmol thiol	initial rate (M/s)
H_2O KIE	0.3	0.1	0.01	0.01	2.06×10^{-6}
D_2O KIE	0.3	0.1	0.01	0.01	0.83×10^{-6}



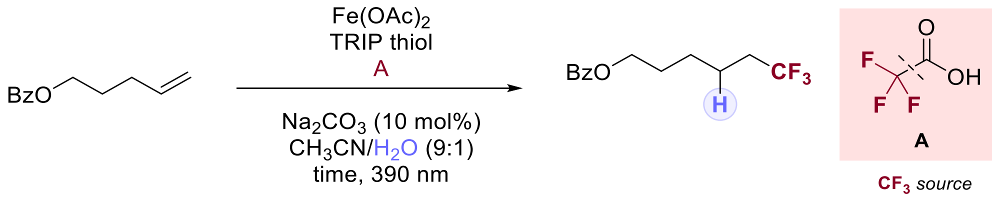
Reaction with H_2O (standard conditions): $y = (2.06 \times 10^{-6})(k_H)x + (1.4 \times 10^{-4})$, $R^2 = 0.9916$



Reaction with D_2O: $y = (0.83 \times 10^{-6})\ (k_D)x - (7.1 \times 10^{-4})$, $R^2 = 0.9587$

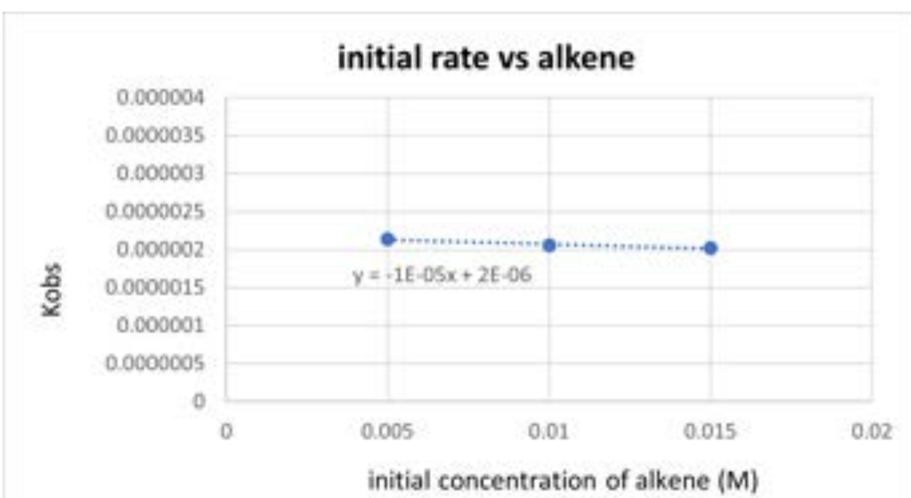
KIE: $k_H/k_D = 2.5$

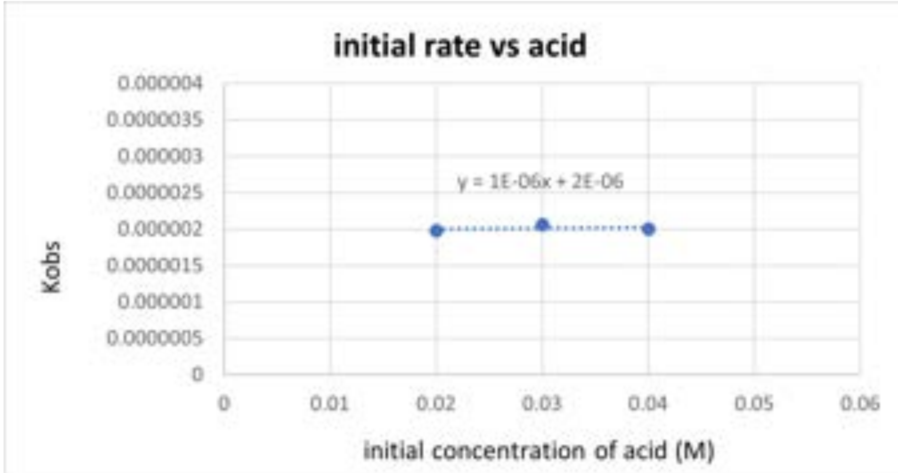
2.7 Kinetic studies to determine reaction rate law

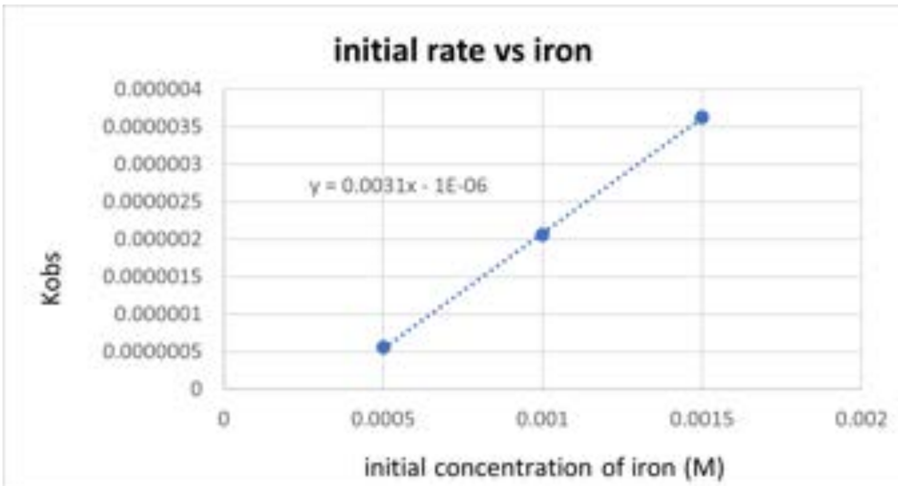


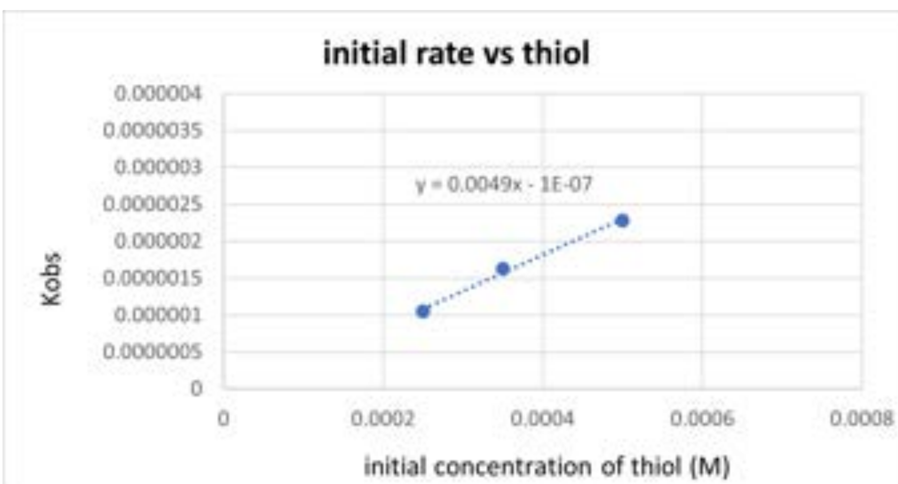
$Fe(OAc)_2$ and Na_2CO_3 were added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes, CF_3COOH and TRIP thiol in MeCN/H_2O (9:1, 0.1 M in regard to alkenes) via syringe under N_2. Note: All reactions were run on 0.2 mmol of the substrate and $PhCF_3$ was added as internal standard. The reaction mixture was placed under 390nm Kessil® light. At different time points, the aliquot of reaction mixture is directly transferred to NMR tube and reaction progress was monitored by ^{19}F NMR.

entry	mmol acid	mmol alkene	mmol iron	mmol thiol	initial rate (M/s)
1	0.3	0.1	0.01	0.01	2.06×10^{-6}
2	0.3	0.05	0.01	0.01	2.14×10^{-6}
3	0.3	0.15	0.01	0.01	2.02×10^{-6}
4	0.2	0.1	0.01	0.01	1.98×10^{-6}
5	0.4	0.1	0.01	0.01	2×10^{-6}
6	0.3	0.1	0.005	0.01	5.6×10^{-7}
7	0.3	0.1	0.015	0.01	3.63×10^{-6}
8	0.3	0.1	0.01	0.0025	1.05×10^{-6}
9	0.3	0.1	0.01	0.0035	1.63×10^{-6}
10	0.3	0.1	0.01	0.005	2.28×10^{-6}
11	0.3	0.1	0.01	0.0075	2.5×10^{-6}



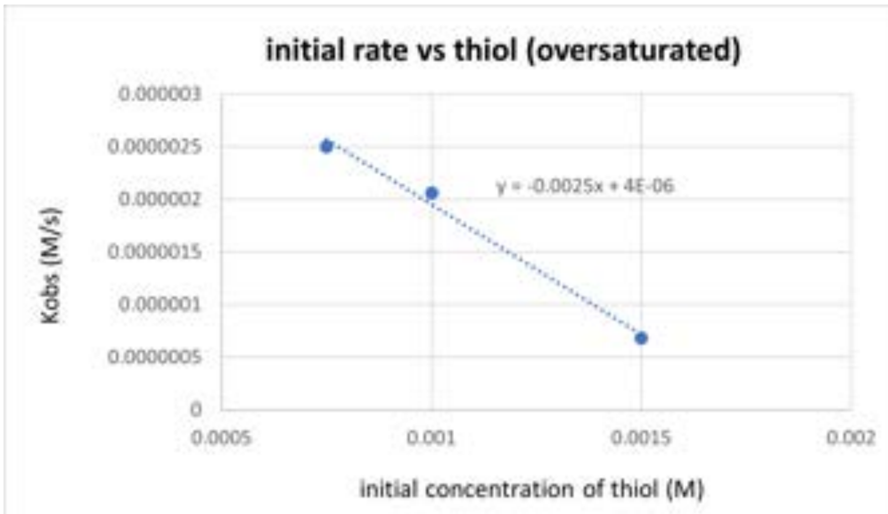

initial rate vs acid
Kobs
y = 1E-06x + 2E-06
0.000004
0.0000035
0.000003
0.0000025
0.000002
0.0000015
0.000001
0.0000005
0
0
0.01
0.02
0.03
0.04
0.05
0.06
initial concentration of acid (M)


initial rate vs iron
Kobs
y = 0.0031x - 1E-06
0.000004
0.0000035
0.000003
0.0000025
0.000002
0.0000015
0.000001
0.0000005
0
0
0.0005
0.001
0.0015
0.002
initial concentration of iron (M)


initial rate vs thiol
Kobs
y = 0.0049x - 1E-07
0.000004
0.0000035
0.000003
0.0000025
0.000002
0.0000015
0.000001
0.0000005
0
0
0.0002
0.0004
0.0006
0.0008
initial concentration of thiol (M)

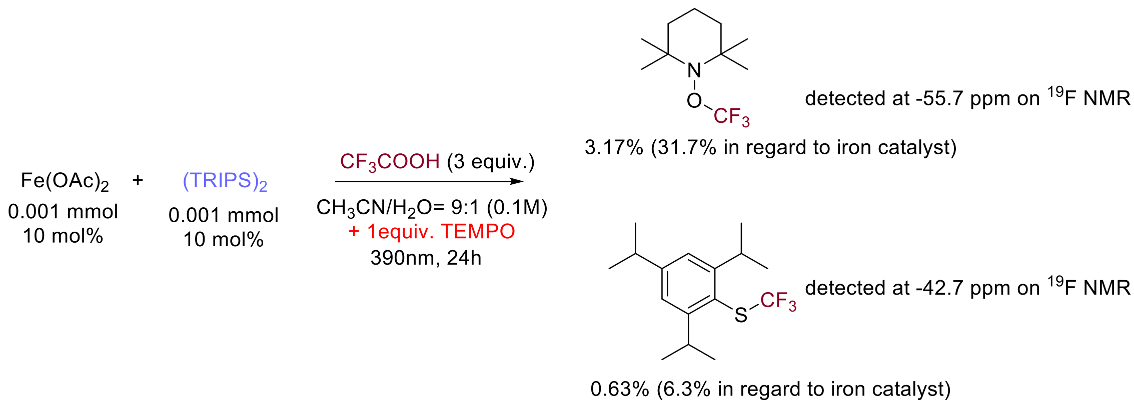
With higher loading of thiol catalyst (15 mol%), negative order of thiol is observed. The oversaturation of thiol catalyst may lead to other side reactions, consuming thiol and circumventing the following dual catalytic cycle with iron and other reactants.

entry	mmol acid	mmol alkene	mmol iron	mmol thiol	initial rate (M/s)
12	0.3	0.1	0.01	0.015	6.8×10^{-7}

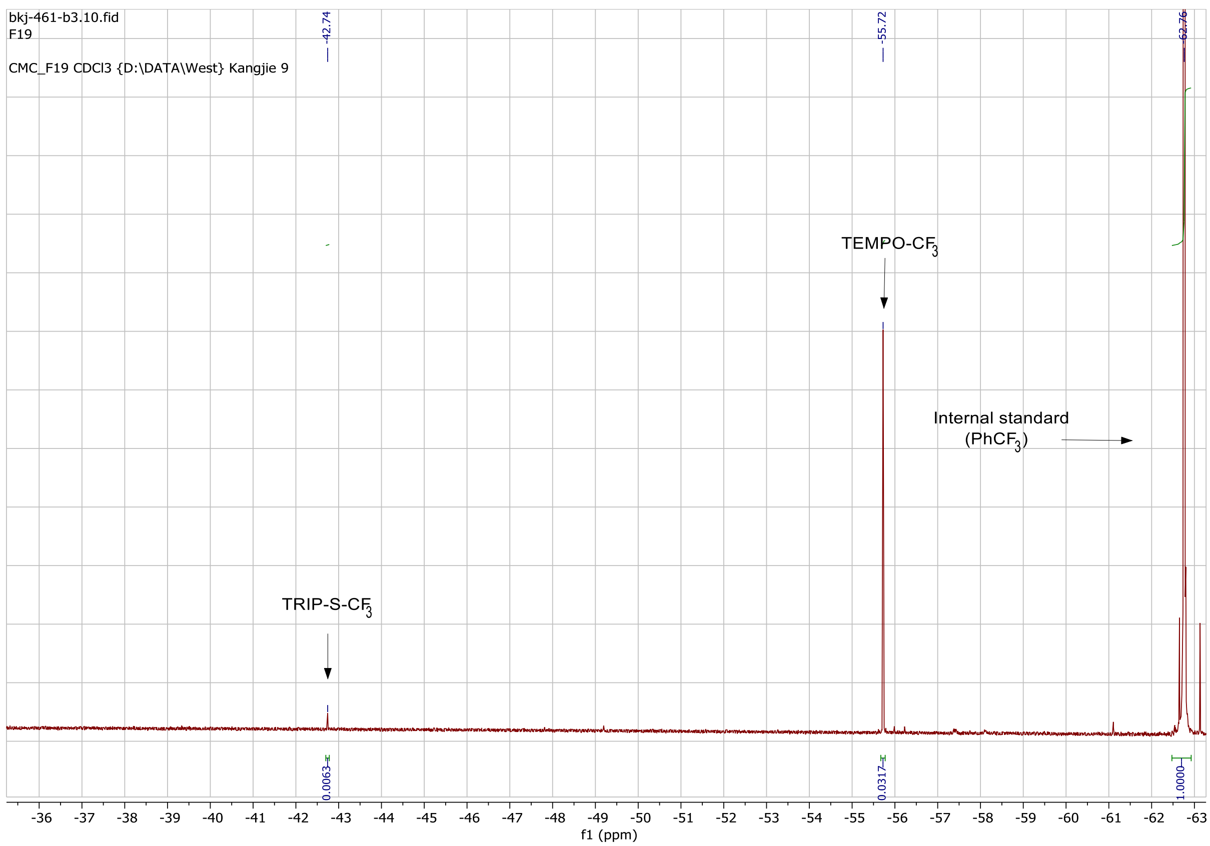


Indicated by previous reports[20-23] and our study on disulfide formation (see 2.7 Study of disulfide formation), thiol catalyst can form disulfide under light irradiation. Furthermore, TEMPO-trapping experiment demonstrates that higher concentration of disulfide could quench CF_3 radical, indicated by peak at -42.74ppm on ^{19}F NMR, suggesting the generation of TRIP-SCF_3.[24]

With higher concentration of TRIP thiol in the system, it is more likely to form disulfide under light irradiation, which can sequester the CF_3 radical, leading to drastically decreased rate of thiol and showing negative order when reaching oversaturation.

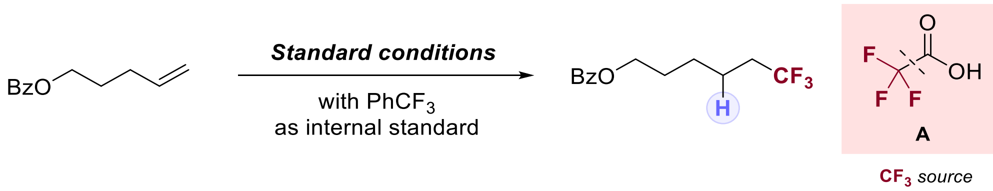


Fe(OAc)2
0.001 mmol
10 mol%
+
(TRIPS)2
0.001 mmol
10 mol%
CF3COOH (3 equiv.)
CH3CN/H2O= 9:1 (0.1M)
+ 1equiv. TEMPO
390nm, 24h
detected at -55.7 ppm on 19F NMR
3.17% (31.7% in regard to iron catalyst)
detected at -42.7 ppm on 19F NMR
0.63% (6.3% in regard to iron catalyst)



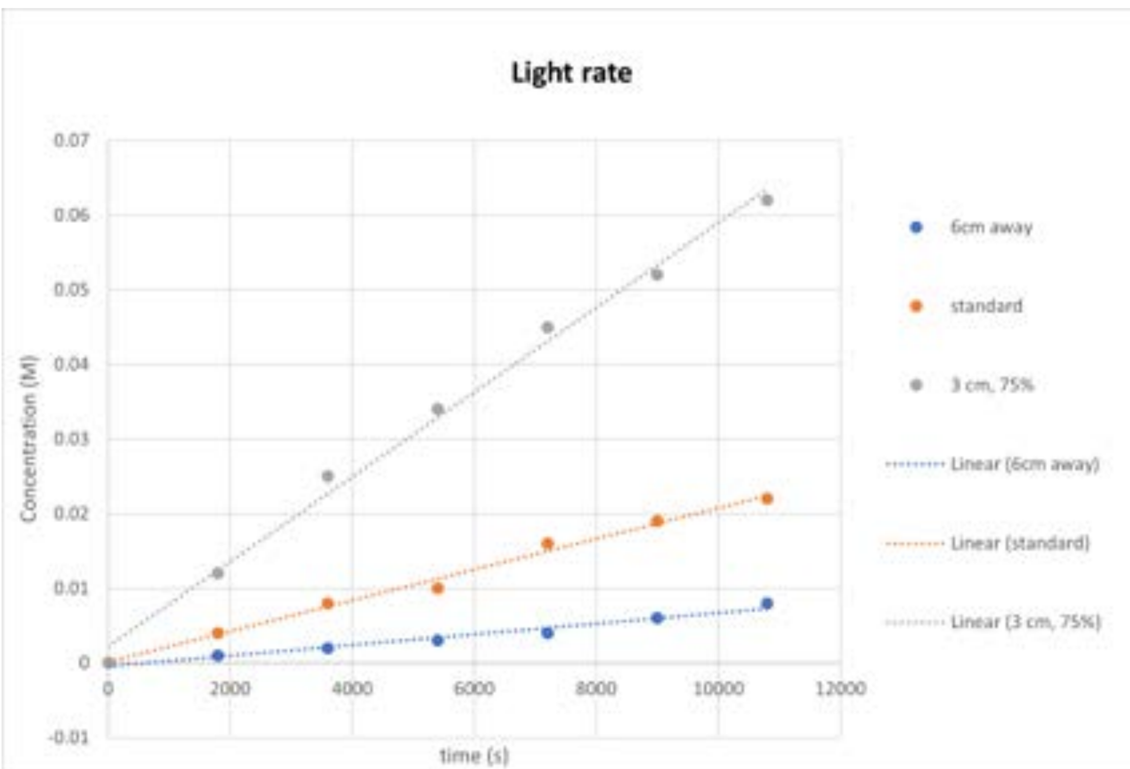
bkj-461-b3.10.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 9
-42.74
-55.72
-62.76
TEMPO-CF3
Internal standard
(PhCF3)
TRIP-S-CF3
0.0063
0.0317
1.0000
f1 (ppm)

2.8 Light intensity impact on reaction rate

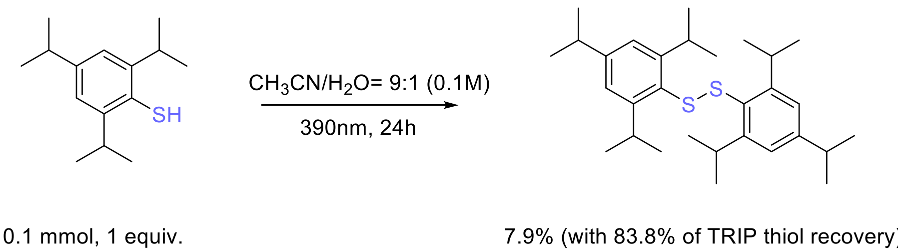


Following General Procedure A, all reactions were run on 0.2 mmol of the substrate and $PhCF_3$ was added as internal standard. The reaction mixture was placed under 390nm Kessil® light. At different time points, the aliquot of reaction mixture is directly transferred to NMR tube and reaction progress was monitored by ^{19}F NMR. Reaction rate is correlated to light intensity postively, indicating a light-dependent character of the system.

entry	mmol acid	mmol alkene	mmol iron	mmol thiol	initial rate (M/s)
25%, 3cm	0.3	0.1	0.01	0.01	2.06×10^{-6}
75%, 3cm	0.3	0.1	0.01	0.01	5.68×10^{-6}
25%, 6cm	0.3	0.1	0.01	0.01	7.14×10^{-7}



2.9 Study of the disulfide formation



TRIP thiol (0.1 mmol, 1 equiv. was added to MeCN/H_2O (9:1, 0.1 M) via syringe after backfilling with N_2) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. With solid formation observed over time, crude NMR indicated the formation of TRIP disulfide in 7.9% yield with 83.8% TRIP thiol recovery. The formation of disulfide could further engage in homolysis under light irradiation, leading to generation of thiyl radical, which can oxidize Fe(II) catalyst to photoreactive Fe(III) species, initiating the fluoroalkyl radical generation.[20-23]

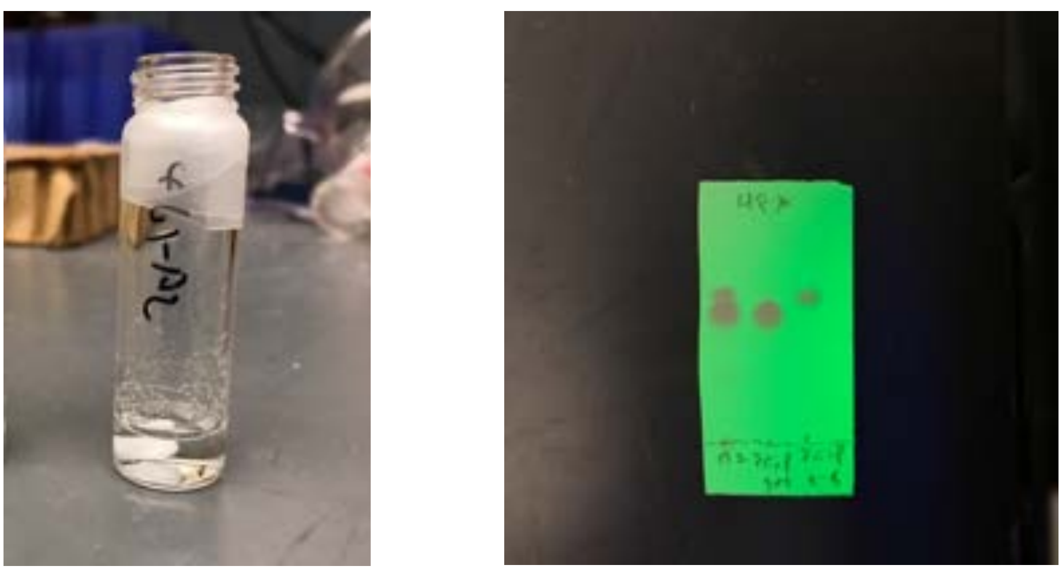
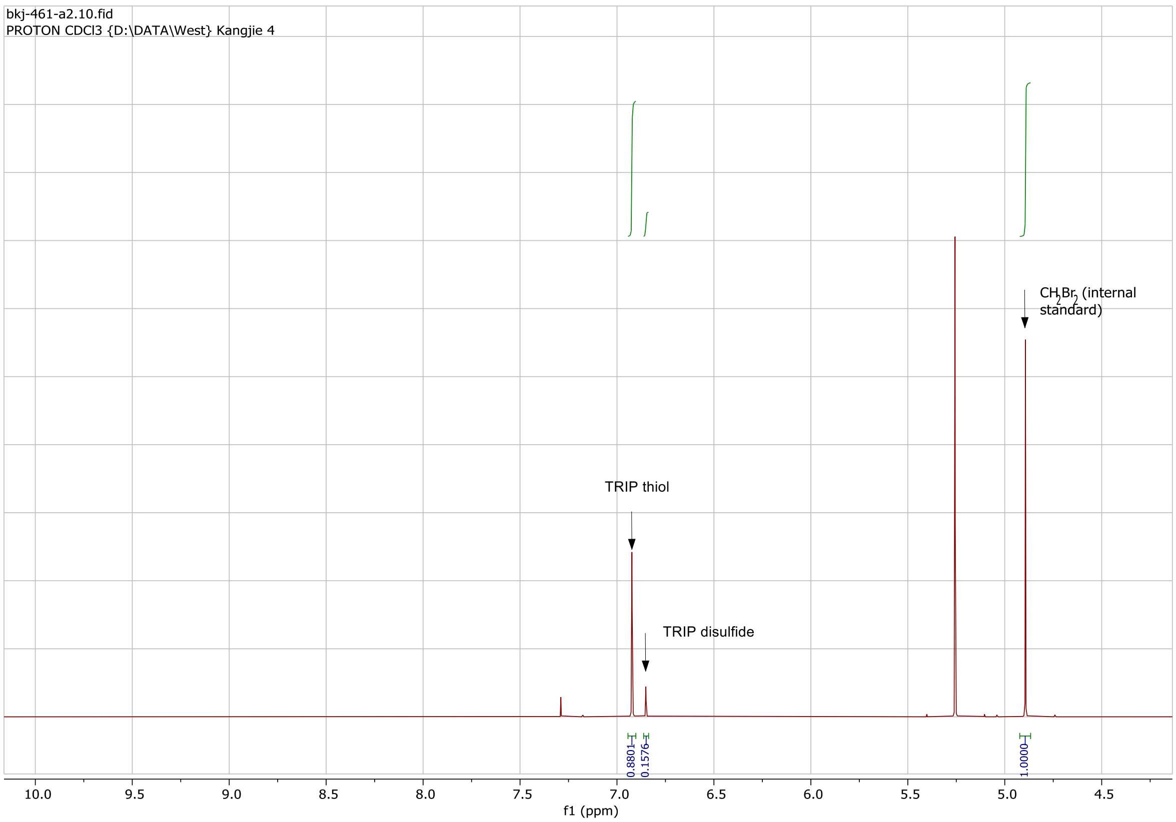
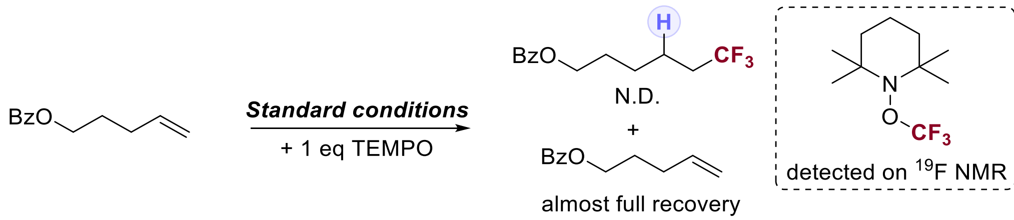


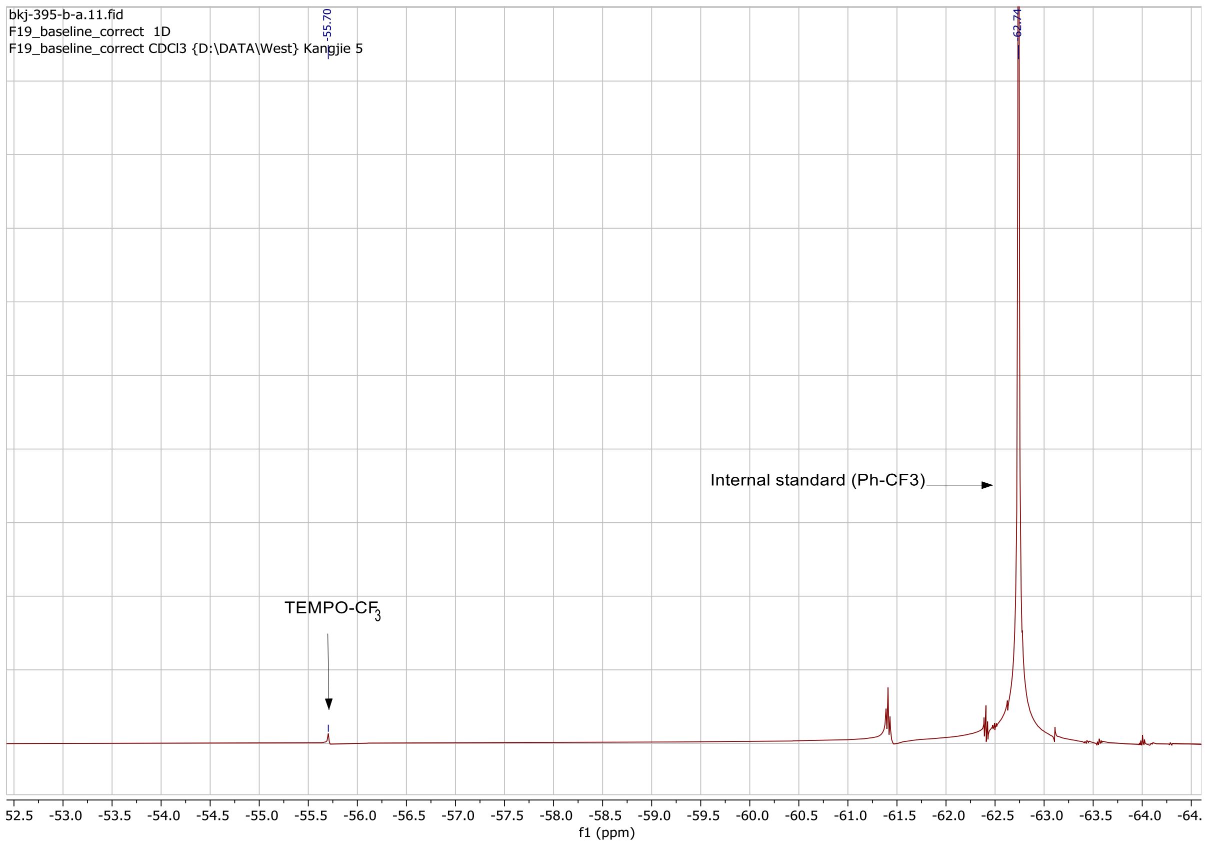
Figure S1. Left: solid formation (TRIP disulfide). Right: TLC spotting (left to right: reaction mixture, pure TRIP thiol, pure TRIP disulfide).


bkj-461-a2.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 4
TRIP thiol
TRIP disulfide
CH2Br2 (internal standard)
0.8801
0.1576
1.0000
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
f1 (ppm)

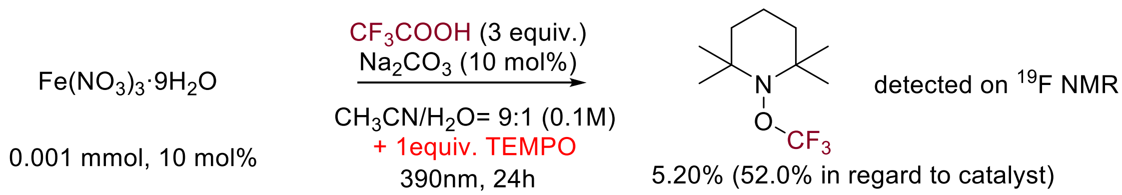
2.10 TEMPO experiment study



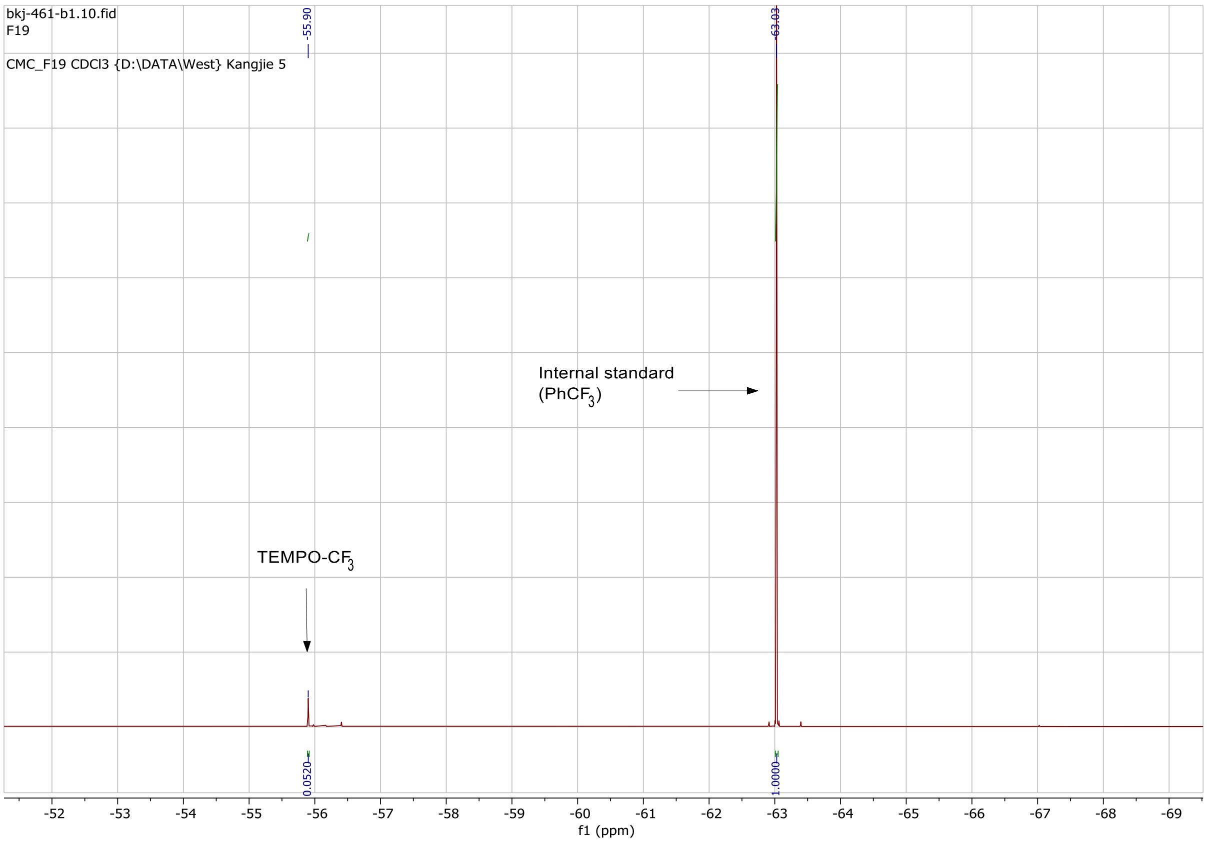
$Fe(OAc)_2$ (10 mol%, 0.1 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) and TEMPO (1 equiv.) were added via syringe after backfilling with N_2) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by addition of alkenes (0.1 mmol, 1.0 equiv.) TRIP thiol (10 mol%, 0.1 equiv.) and CF_3COOH (0.30 mmol, 3.0 equiv) in $MeCN/H_2O$ (9:1, 0.1 M in regard to alkenes) via syringe under N_2. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated and directly applied for crude ^{19}F NMR (with $PhCF_3$ as internal standard). The detection of TEMPO-CF_3 at -55.70 ppm suggested CF_3 radical generation in the system.[25]


bkj-395-b-a.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 5
-55.70
-62.74
Internal standard (Ph-CF3)
TEMPO-CF3
52.5 -53.0 -53.5 -54.0 -54.5 -55.0 -55.5 -56.0 -56.5 -57.0 -57.5 -58.0 -58.5 -59.0 -59.5 -60.0 -60.5 -61.0 -61.5 -62.0 -62.5 -63.0 -63.5 -64.0 -64.
f1 (ppm)

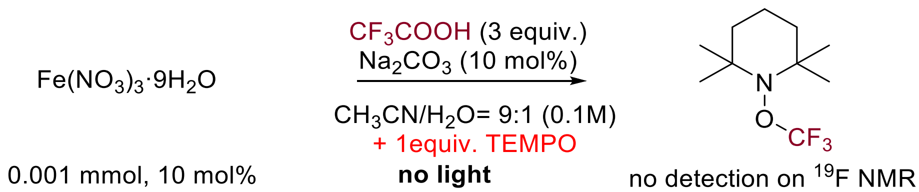
2.11 Evidence of visible-light induced homolysis of trifluoroacetic acid with iron

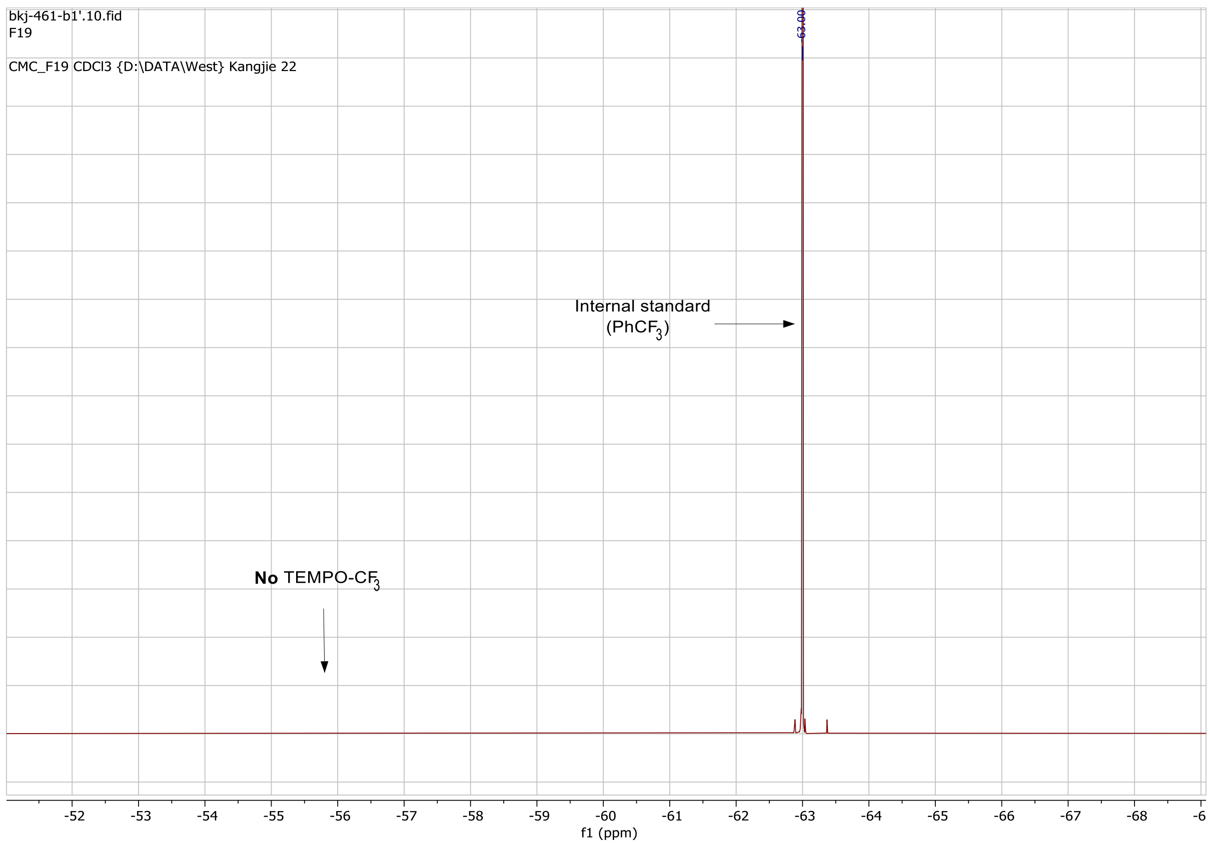


$Fe(NO_3)_3 \cdot 9H_2O$ (10 mol%, 0.1 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) and TEMPO (1 equiv.) were added via syringe after backfilling with N_2) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by CF_3COOH (0.30 mmol, 3.0 equiv.) in MeCN/H_2O (9:1, 0.1M) via syringe under N_2. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated and directly applied for crude ^{19}F NMR (with $PhCF_3$ as internal standard).

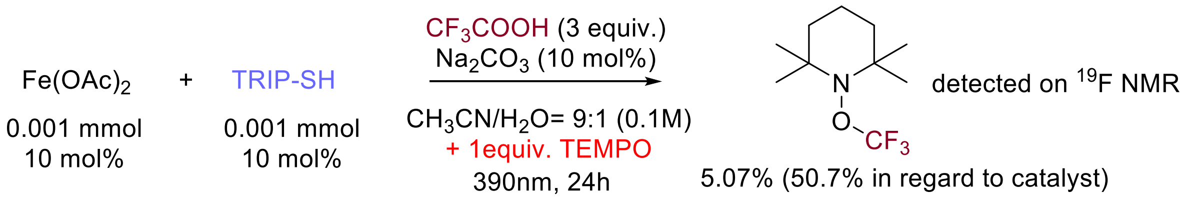


Indicated by ^{19}F NMR, photoactive Fe(III) ($Fe(NO_3)_3{\cdot}9H_2O$) could induce the homolysis of trifluoroacetic acid (TFA) under light irradiation, as TEMPO-CF_3 was detected at -55.9 ppm in 5.2% yield (52.0% in regard to iron).

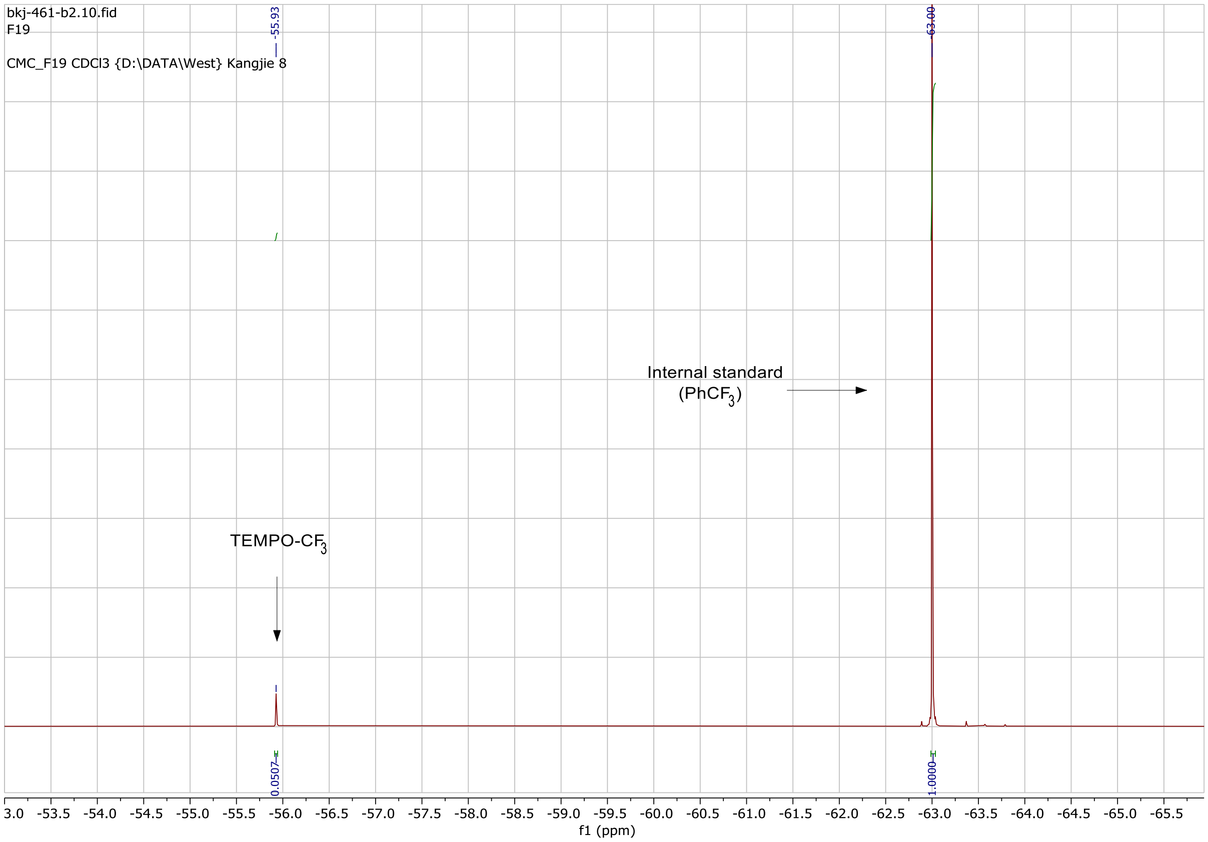




Indicated by ^{19}F NMR, in the absence of light irradiation, the homolysis of trifluoroacetic acid (TFA) by Fe(III) ($Fe(NO_3)_3{\cdot}9H_2O$) is not observed, supporting light is necessary in promoting homolysis of TFA to afford CF_3 radical.

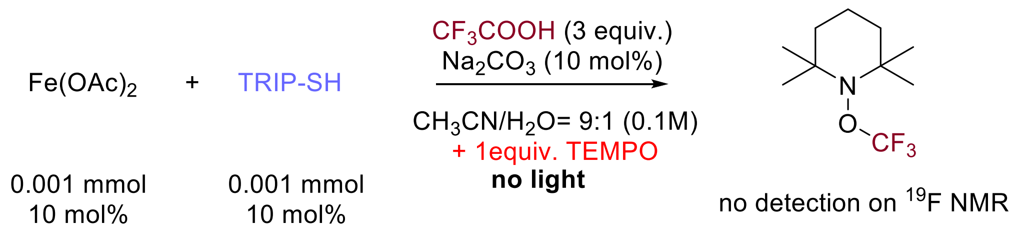


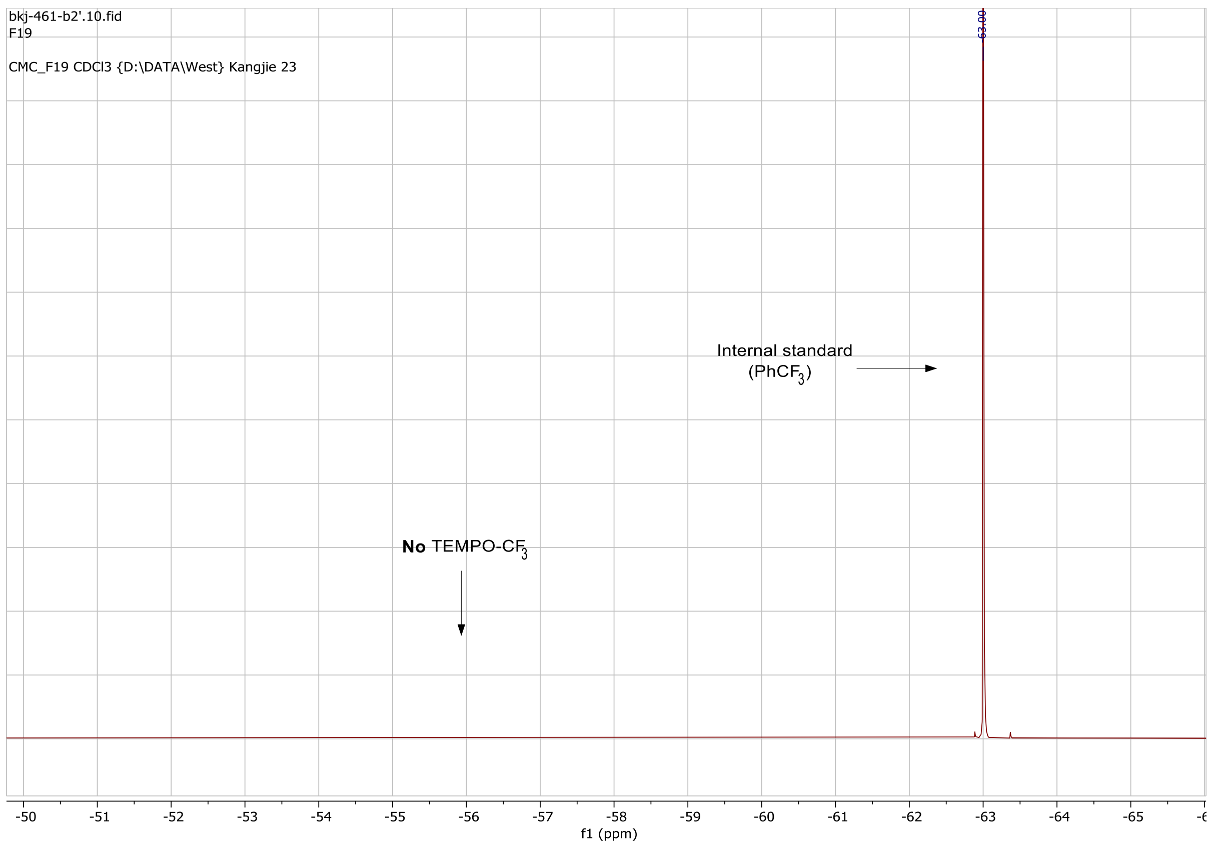
$Fe(OAc)_2$ (10 mol%, 0.1 equiv.), Na_2CO_3 (10 mol%, 0.1 equiv.) and TEMPO (1 equiv.) were added via syringe after backfilling with N_2) was added in an oven-dried 8-mL test vial containing a Teflon®-coated magnetic stir bar. The vial was evacuated and backfilled with N_2 (repeated for 4 times), followed by TRIPSH (10 mol%, 0.1 equiv.), CF_3COOH (0.30 mmol, 3.0 equiv.) in $MeCN/H_2O$ (9:1, 0.1M) via syringe under N_2. The reaction mixture was placed under 390nm Kessil® light after sealing the punctured holes of the vial cap with vacuum grease and electric tape/parafilm for better air-tight protection and allowed to react at room temperature for 24 h. Following this, the reaction mixture was filtered through a pad of celite which was subsequently rinsed with DCM. The filtrate was concentrated and directly applied for crude ^{19}F NMR (with $PhCF_3$ as internal standard).



As demonstrated in the section of 2.7 Study of disulfide formation and illustrated by previous reports,[20-23] thiol or disulfide can undergo homolysis under light irradiation, which is capable of oxidizing lower-valent iron species to photoactive iron (III) species, engaging in the following photoinduced homolysis of trifluoroacetic acid.

Indicated by ^{19}F NMR, the mixture of $Fe(OAc)_2$ and TRIP thiol could induce the homolysis of trifluoroacetic acid (TFA) under light irradiation, as TEMPO-CF_3 was detected at -55.9 ppm in 5.07% yield (50.7% in regard to iron).



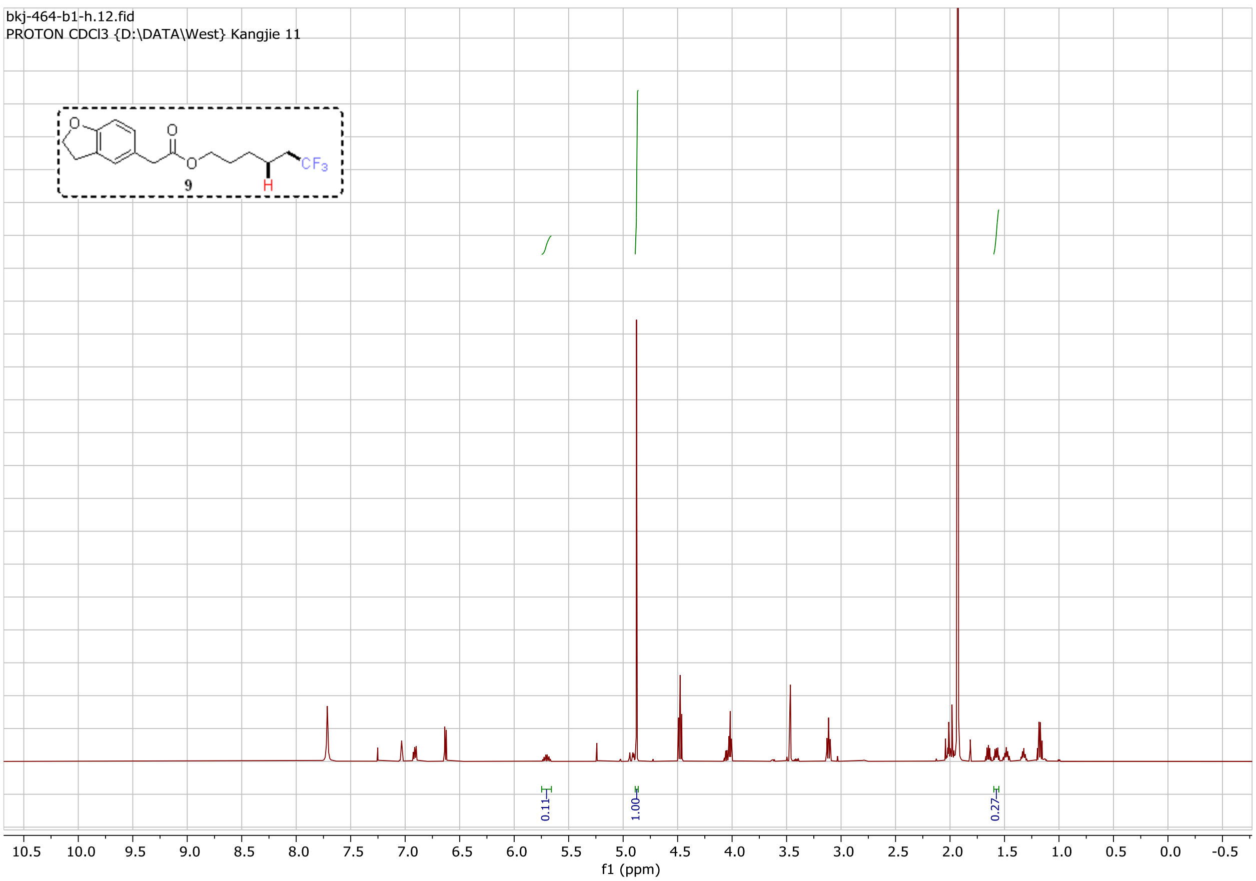


Similar to Fe(III) counterpart and indicated by ^{19}F NMR, the homolysis of trifluoroacetic acid is not observed by the combination of Fe(II) ($Fe(OAc)_2$) and TRIP thiol in the absence of light irradiation, confirming light is necessary in inducing homolysis of trifluoroacetic acid to afford CF_3 radical.

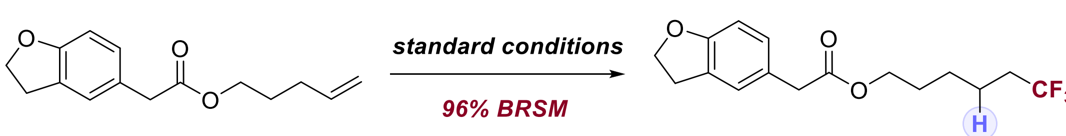
2.12 Mass balance studies of hydrofluoroalkylation of representative examples

Mass balance studies of heterocycle-containing substrates

Trifluoromethylation Examples

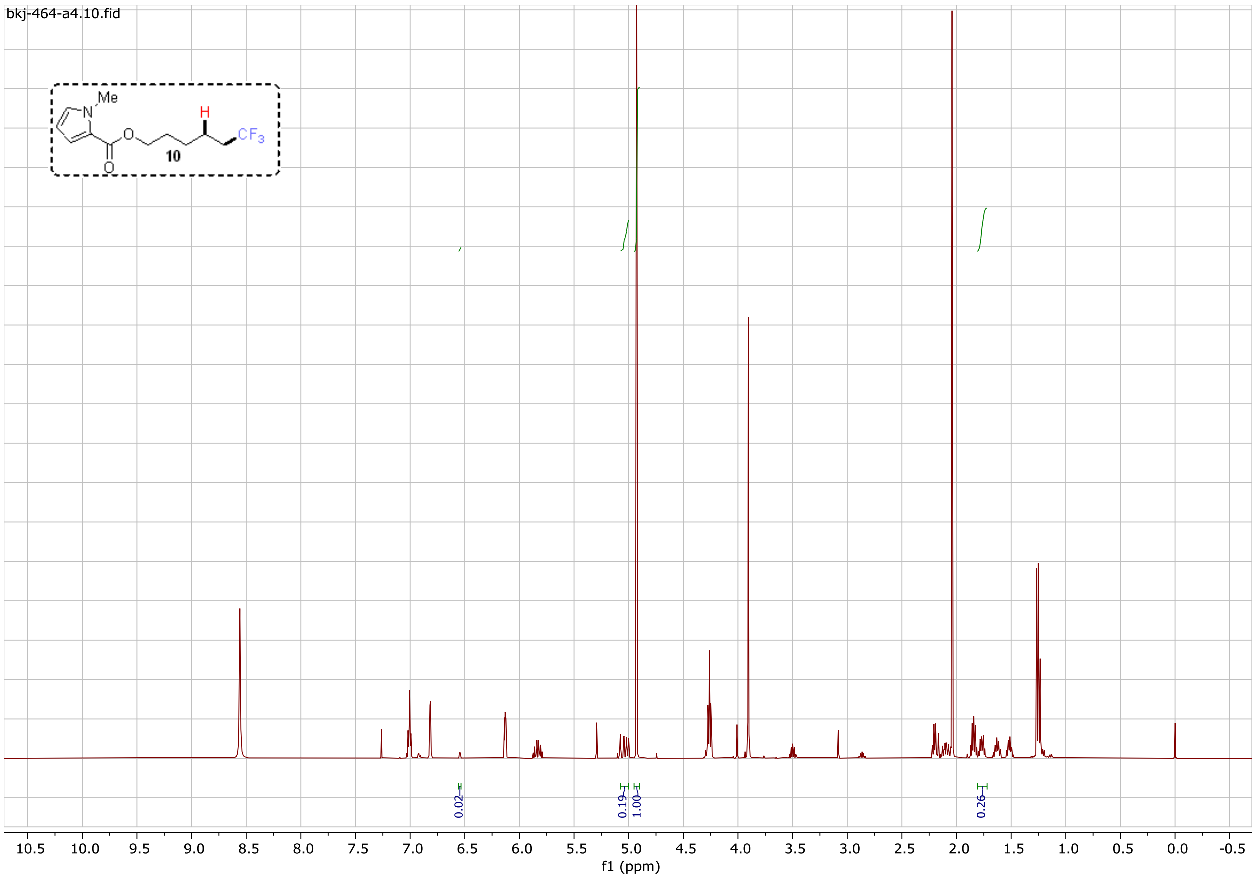


As indicated in the crude [1]H NMR, **9** is produced in 54% NMR yield at 1.60-1.55 (m, 2H) with 44% residual starting material rat (5.75-5.66, m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). The mass-balance of this reaction is 98%.



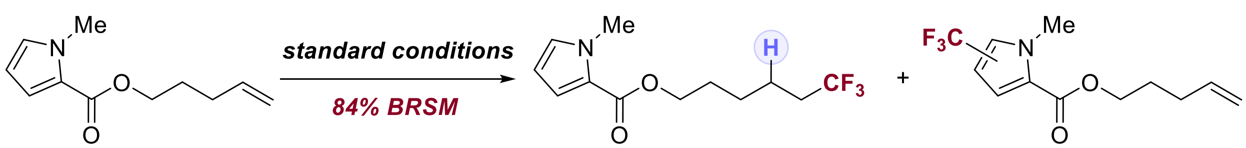
44% starting material recovery

9, 54% NMR yield



As indicated in the crude [1]H NMR, **10** is observed in 52% NMR yield at 1.81-1.71 (m, 2H) with 38% residual starting material recovery at (5.07-5.00, m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). The mass-balance is 90% from these two species.

The reduced mass balance from can be explained by slightly competitive trifluoromethylation of the pyrrole ring (diagnostic peak at 6.56-6.53 (m, 1H)) to form trifluoromethylated starting material **10'** (single isomer), accounting for 8% NMR yield. This species has been isolated and characterization is provided below. With this, the overall mass balance is 98%.

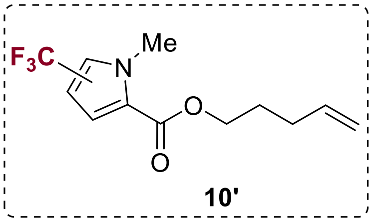


38% starting material recovery

10, 52% NMR yield

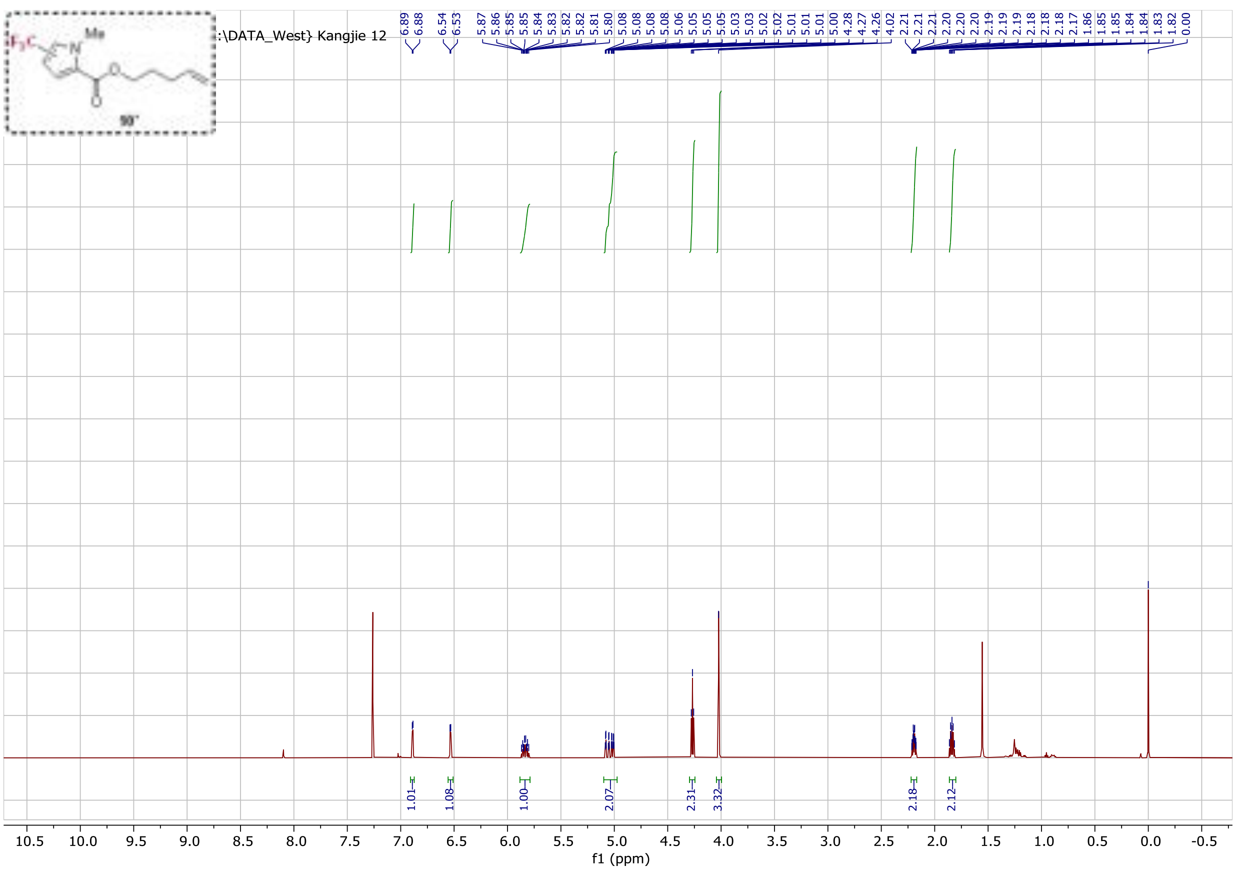
10', 8% NMR yield

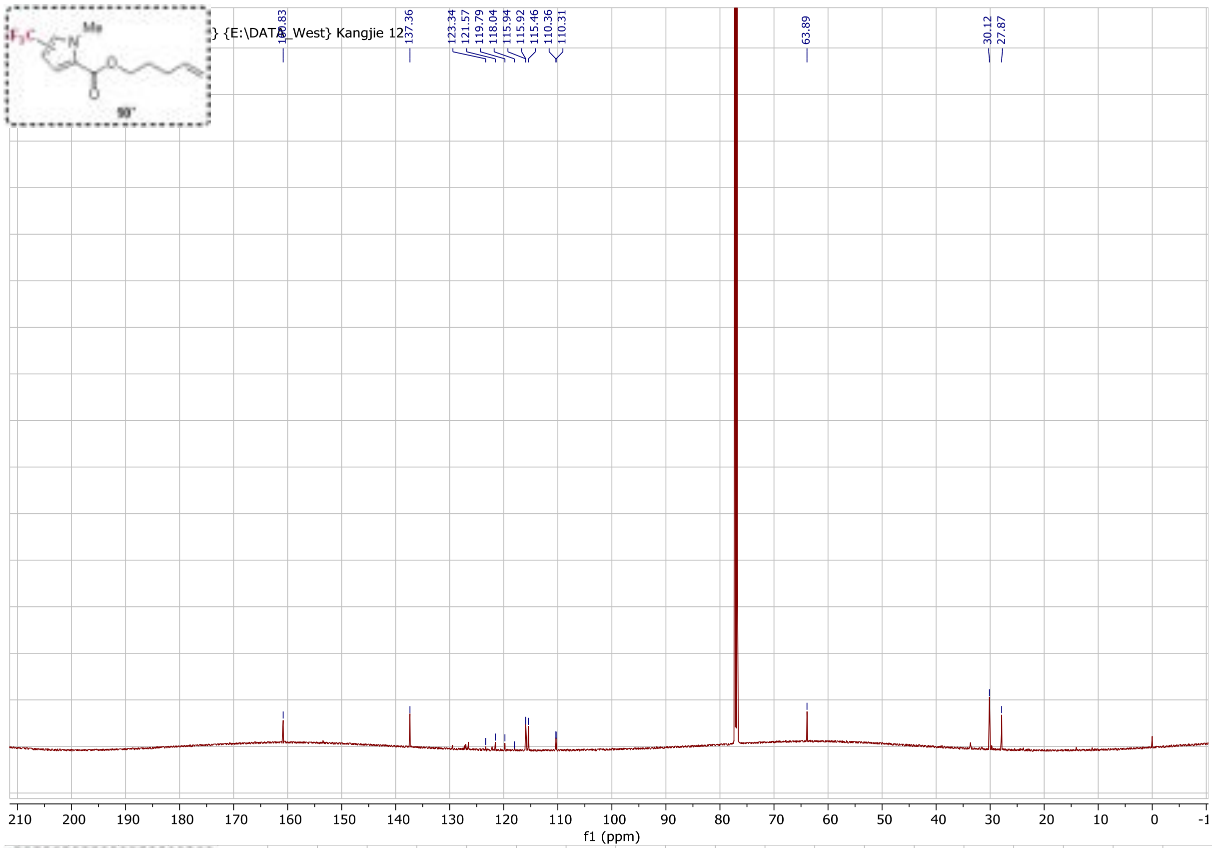
The characterization data of **10’** is shown below,

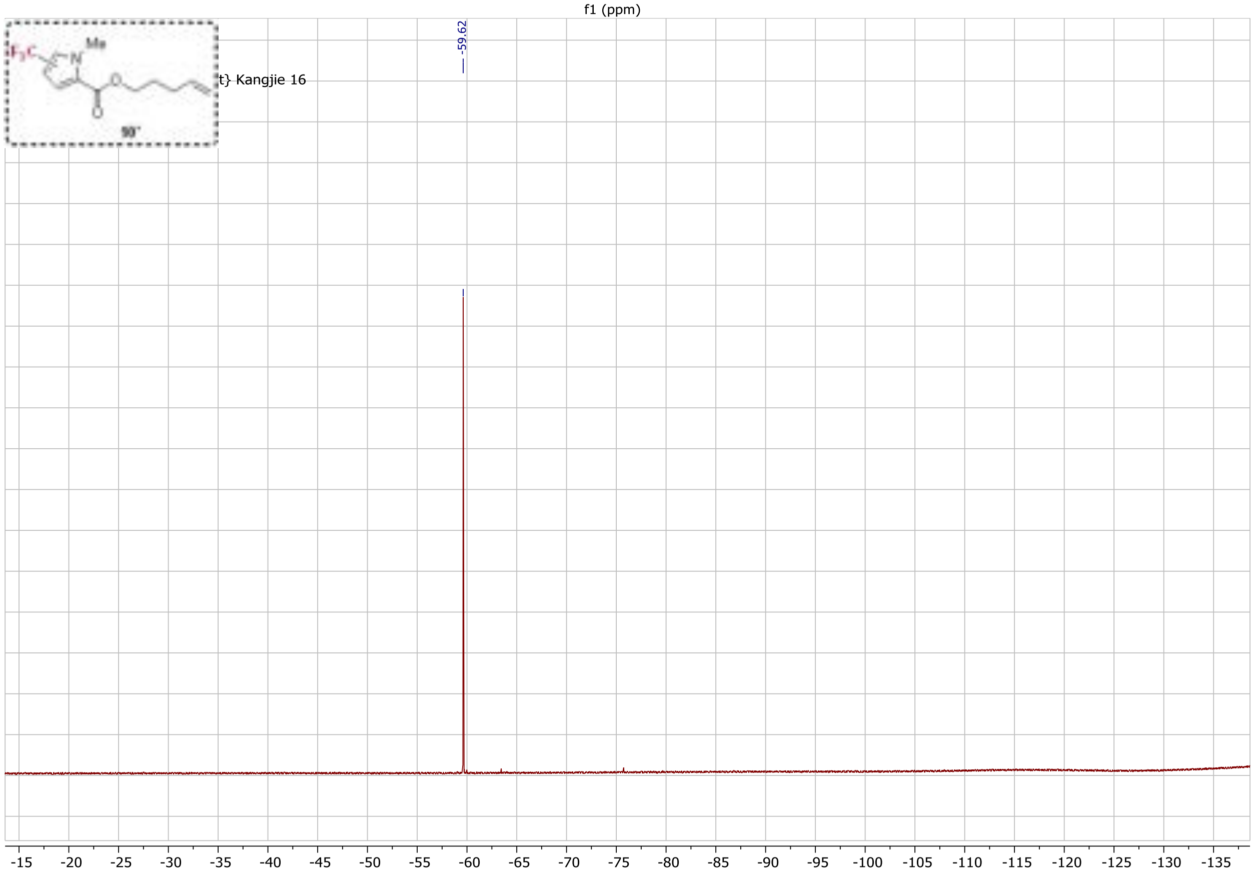


10'

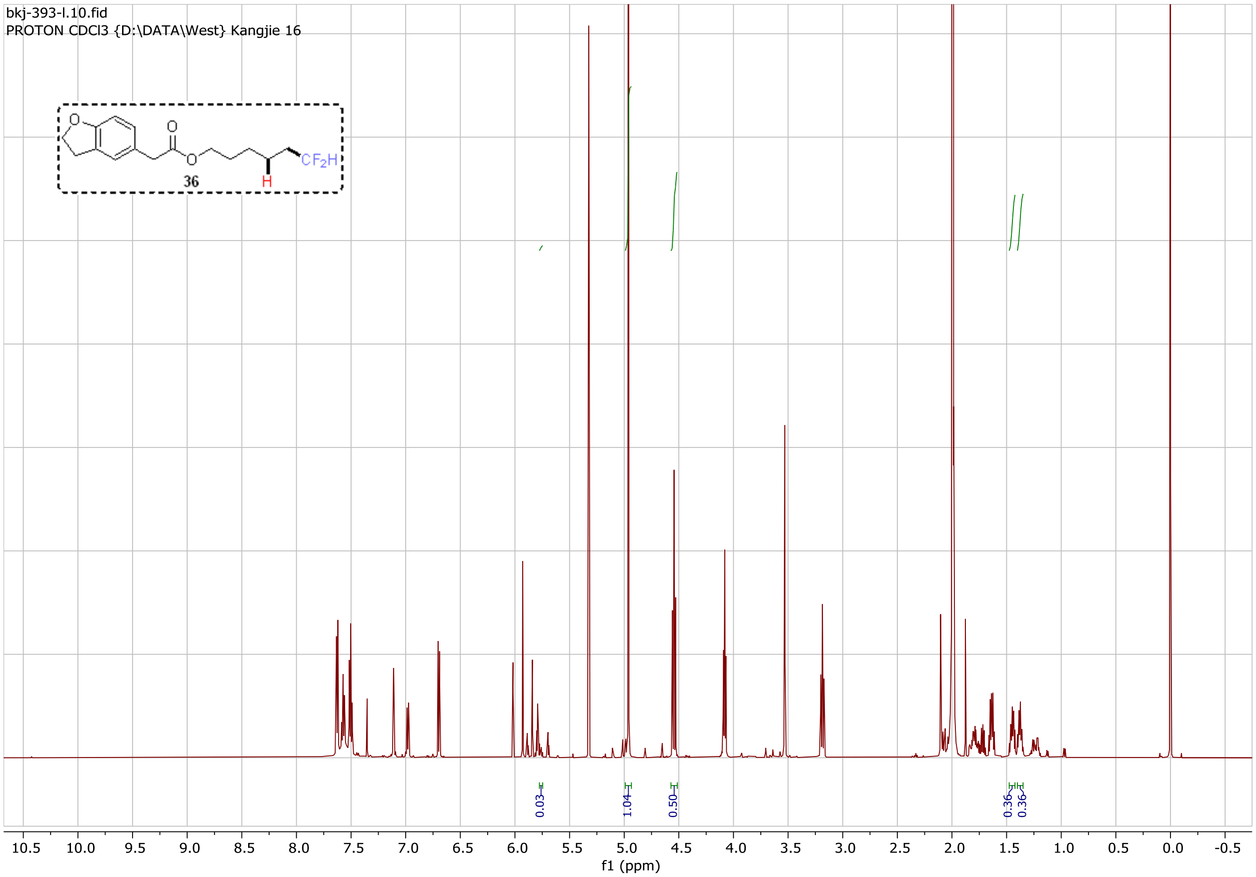
^{1}H NMR (600 MHz, Chloroform-*d*) δ 6.89 (d, *J* = 4.1 Hz, 1H), 6.53 (d, *J* = 4.1 Hz, 1H), 5.89-5.79 (m, 1H), 5.10 – 4.97 (m, 2H), 4.27 (t, *J* = 6.6 Hz, 2H), 4.02 (s, 3H), 2.22 – 2.17 (m, 2H), 1.86 – 1.80 (m, 2H). ^{13}C NMR (151 MHz, $CDCl_3$_3mm tube) δ 160.83, 137.36, 120.68 (q, *J* = 267.8 Hz), 115.93 (q, *J* = 2.4 Hz), 115.46, 110.34 (q, *J* = 7.6 Hz), 63.89, 30.12, 27.87. ^{19}F NMR (565 MHz, Chloroform-*d*) δ -59.62. HRMS APCI: $[M+H]^+$ calcd. for C12H15F3NO2: 262.1049; Found 262.1054



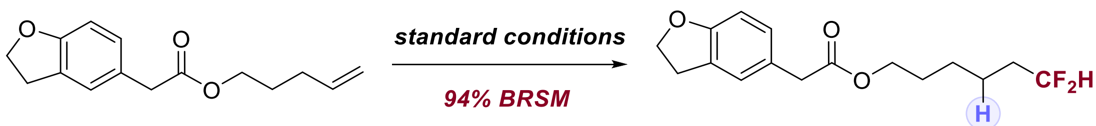

} {E:\DATA_West} Kangjie 12
160.83
137.36
123.34
121.57
119.79
118.04
115.94
115.92
115.46
110.36
110.31
63.89
30.12
27.87
90°
f1 (ppm)


t} Kangjie 16
-59.62
90°
f1 (ppm)

Difluoromethylation examples.

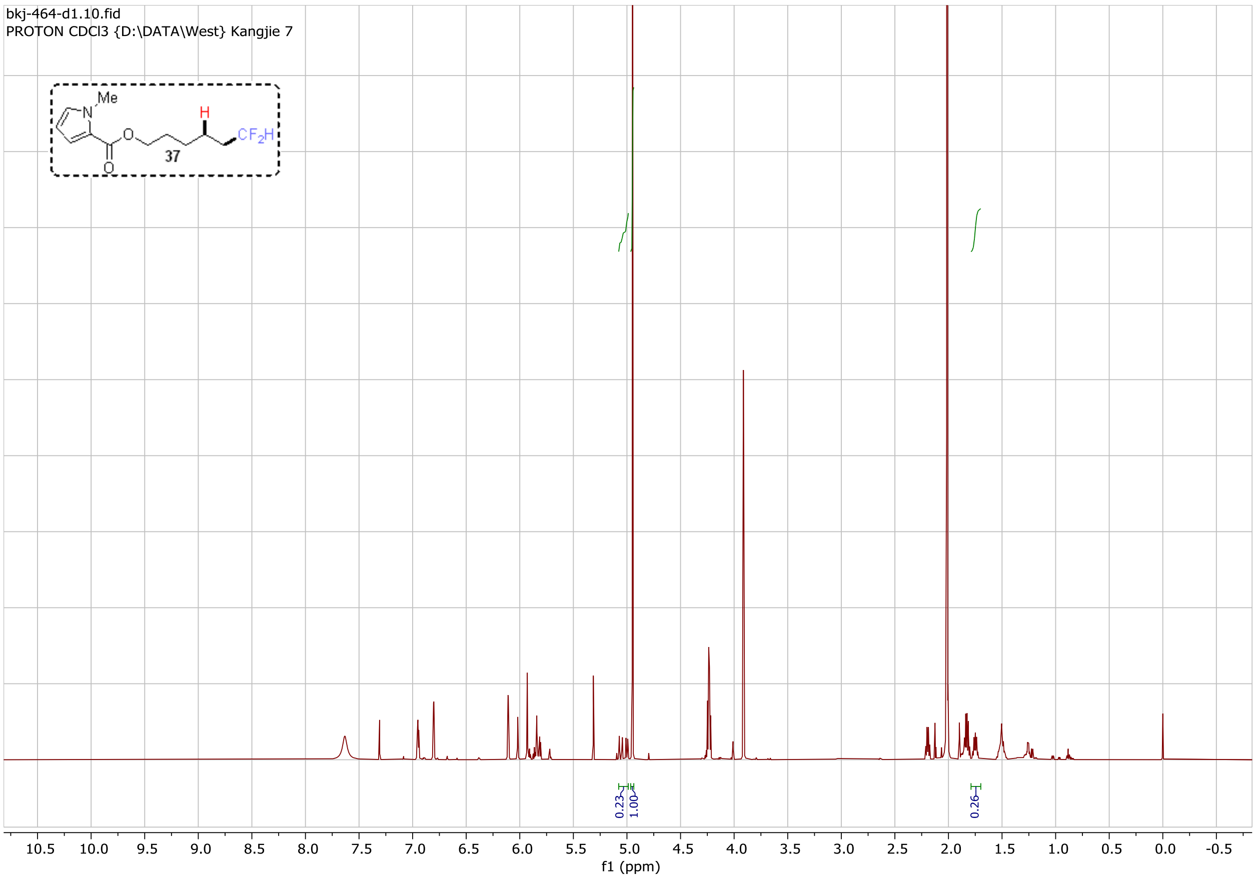


As indicated in the crude [1]H NMR, **36** is produced in 72% NMR yield (1.48-1.42, m, 2H) with 24% residual starting material at 5.81-5.74 (partially overlapped with product peak) (m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). The internal standard is slightly overlapped with substrate peak which shows integration of 1.04 at 4.9 ppm. No other significant products are observed. The mass balance is approximately 96%.

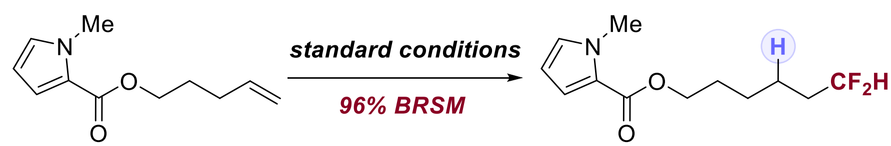


24% starting material recovery

36, 72% NMR yield

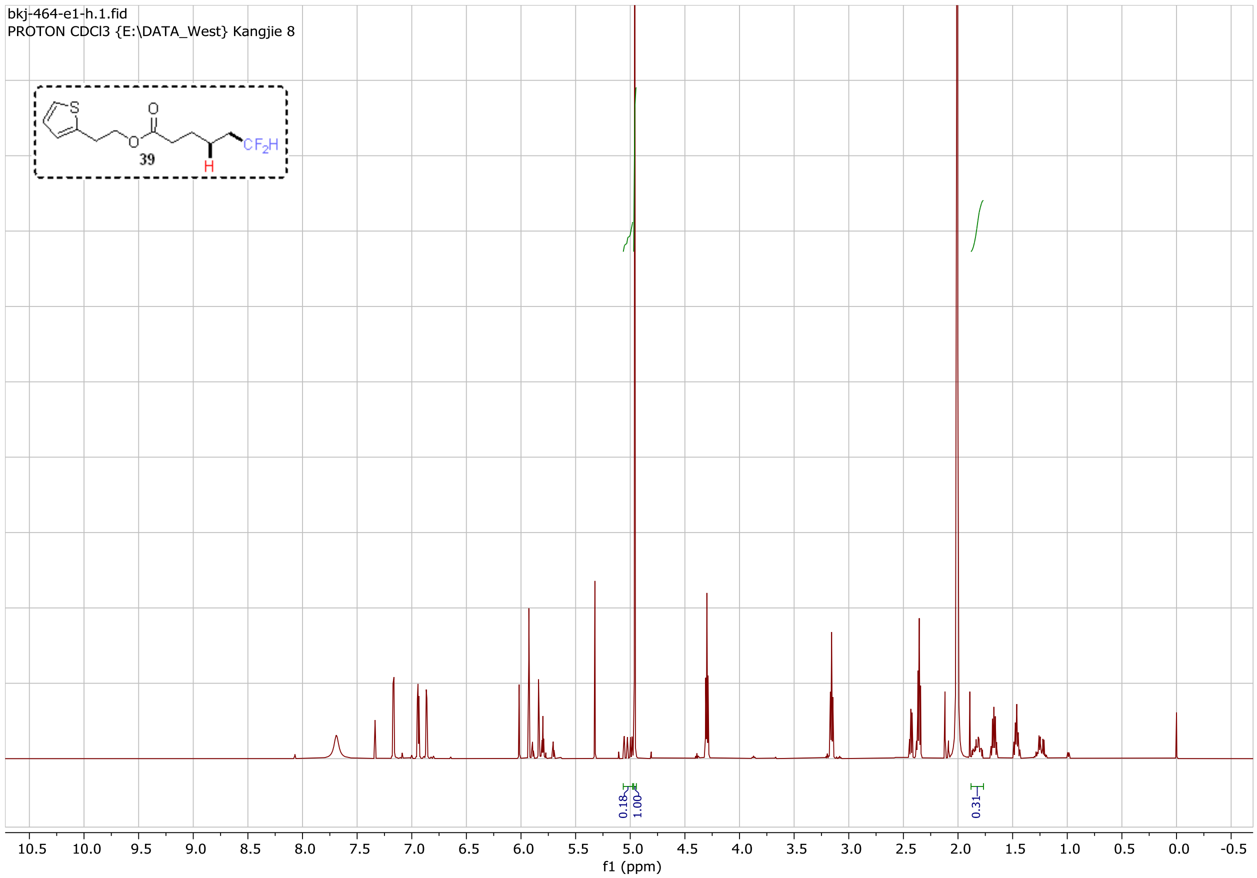


As indicated in the crude ^{1}H NMR, **37** is produced in 52% NMR yield (1.79-1.70, m, 2H) with 46% of starting material recovery at 5.07-4.99 (m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance of this reaction is 98%.

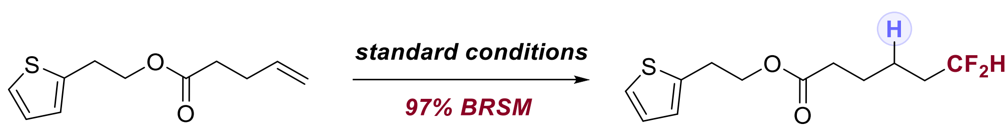


46% starting material recovery

37, 52% NMR yield



As indicated in the crude ^{1}H NMR, **39** is produced in 62% NMR yield (1.88-1.77, m, 2H) with 36% residual starting material at 5.07-4.98 (m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance of the reaction is 98%.

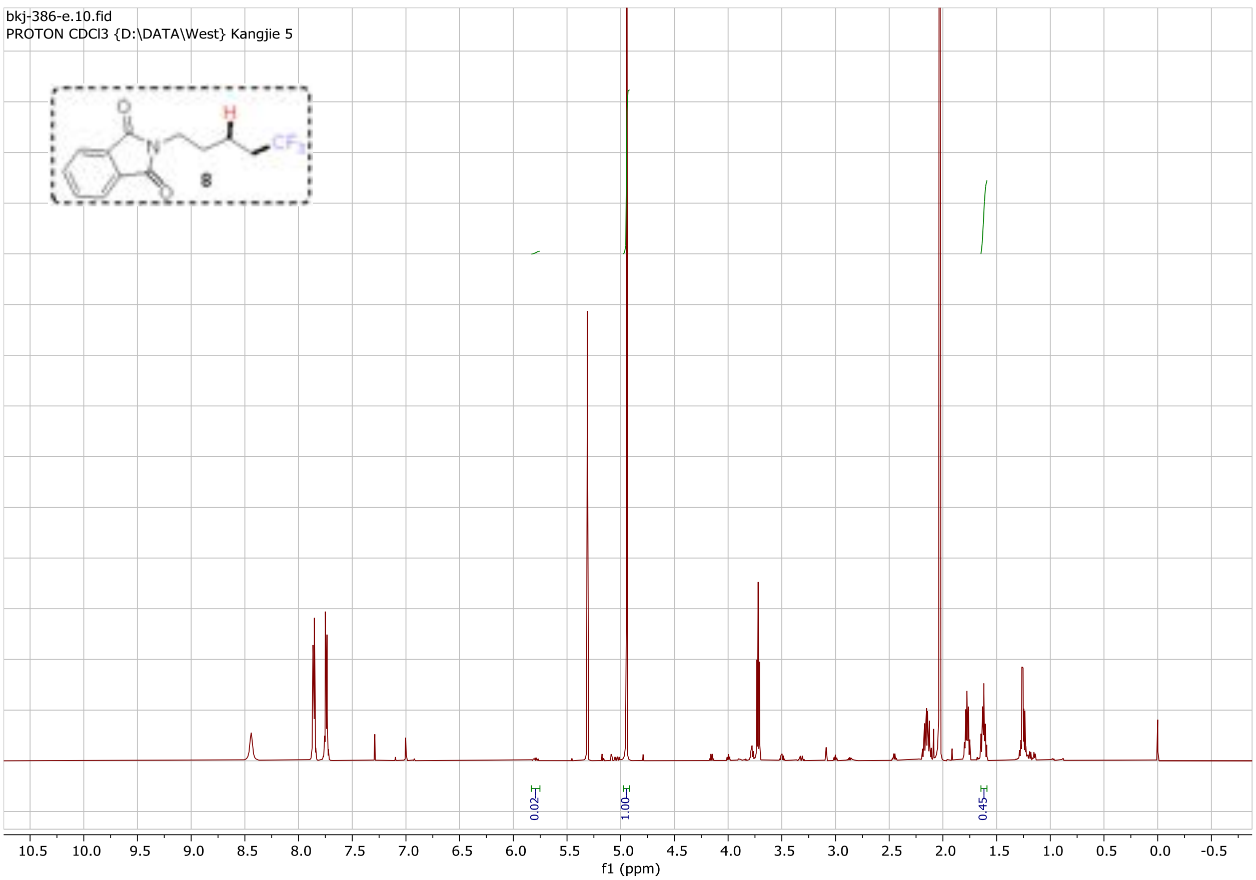


36% starting material recovery

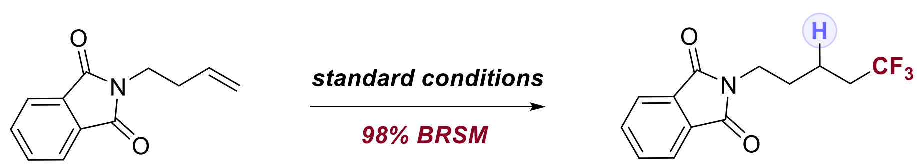
39, 62% NMR yield

Mass balance studies of representative substrates

Hydrotrifluoromethylation of representative examples

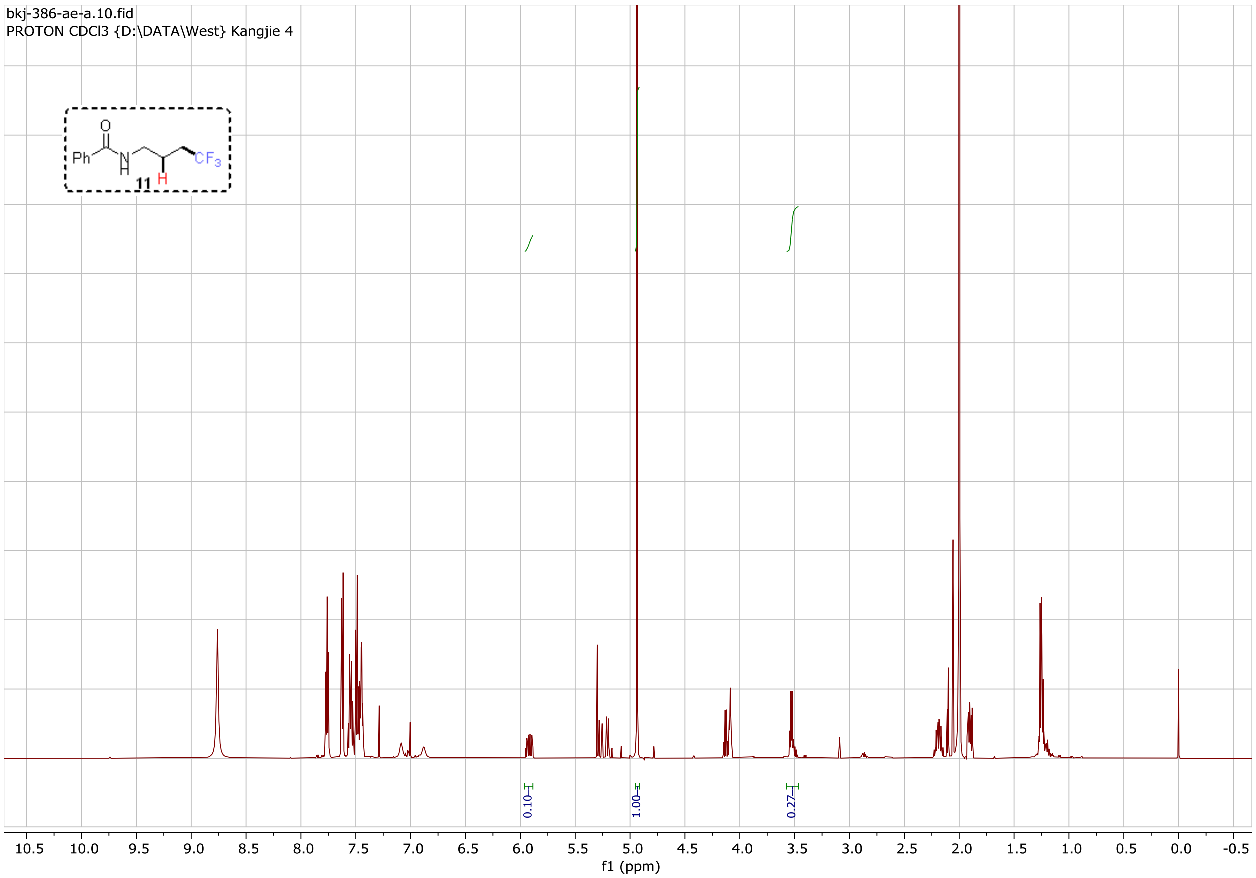


As indicated in the crude [1]H NMR, **8** is produced in 90% NMR yield (1.65-1.58, m, 2H) with 8% residual starting material at 5.84-5.74 (m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance is 98%

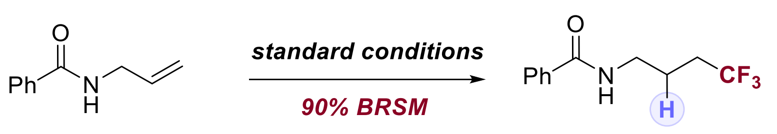


8% starting material recovery

8, 90% NMR yield



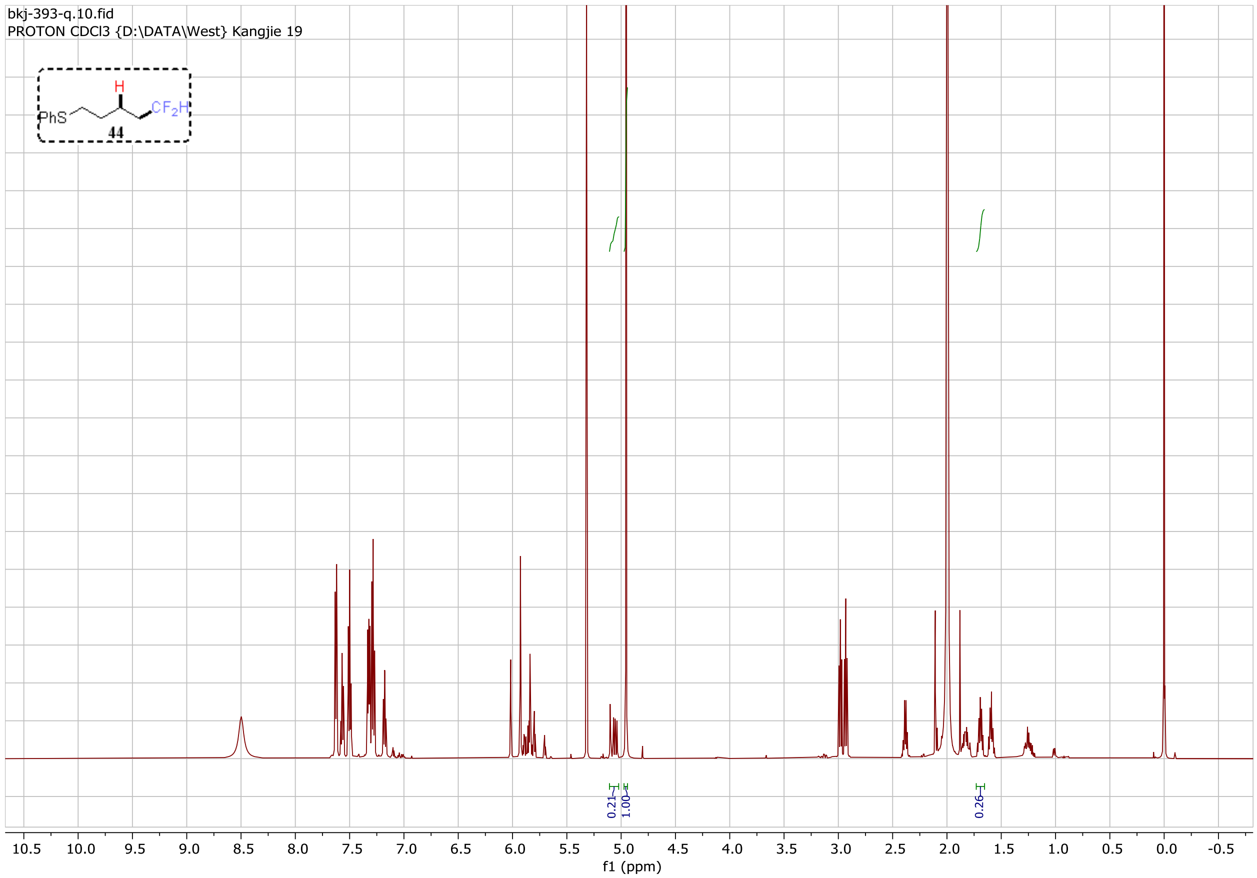
As indicated in the crude [1]H NMR, **11** is produced in 54% NMR yield at 3.59-3.45 (m, 2H) with 40% residual starting material (5.97-5.87, m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance is 94%.



40% starting material recovery

11, 54% NMR yield

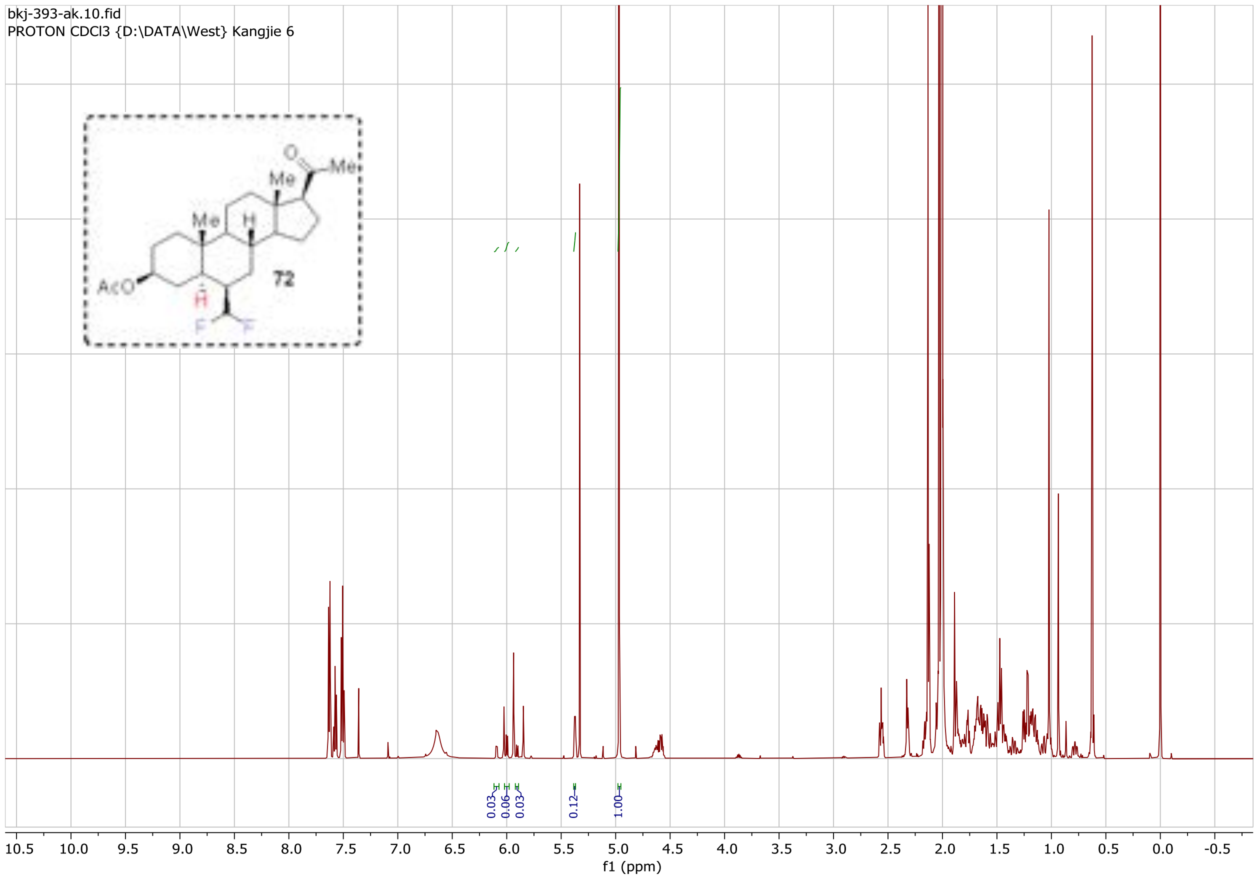
Hydrodifluoromethylation of representative examples



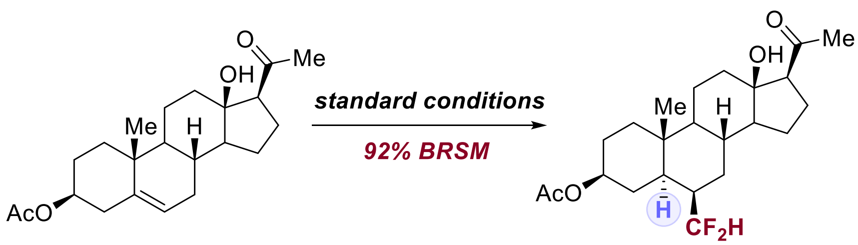
As indicated in the crude ^{1}H NMR, **44** is produced in 52% NMR yield at 1.73-1.65 (m, 2H) with 42% residual starting material at (5.11-5.803, m, 2H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance is 94%.

42% starting material recovery

44, 52% NMR yield



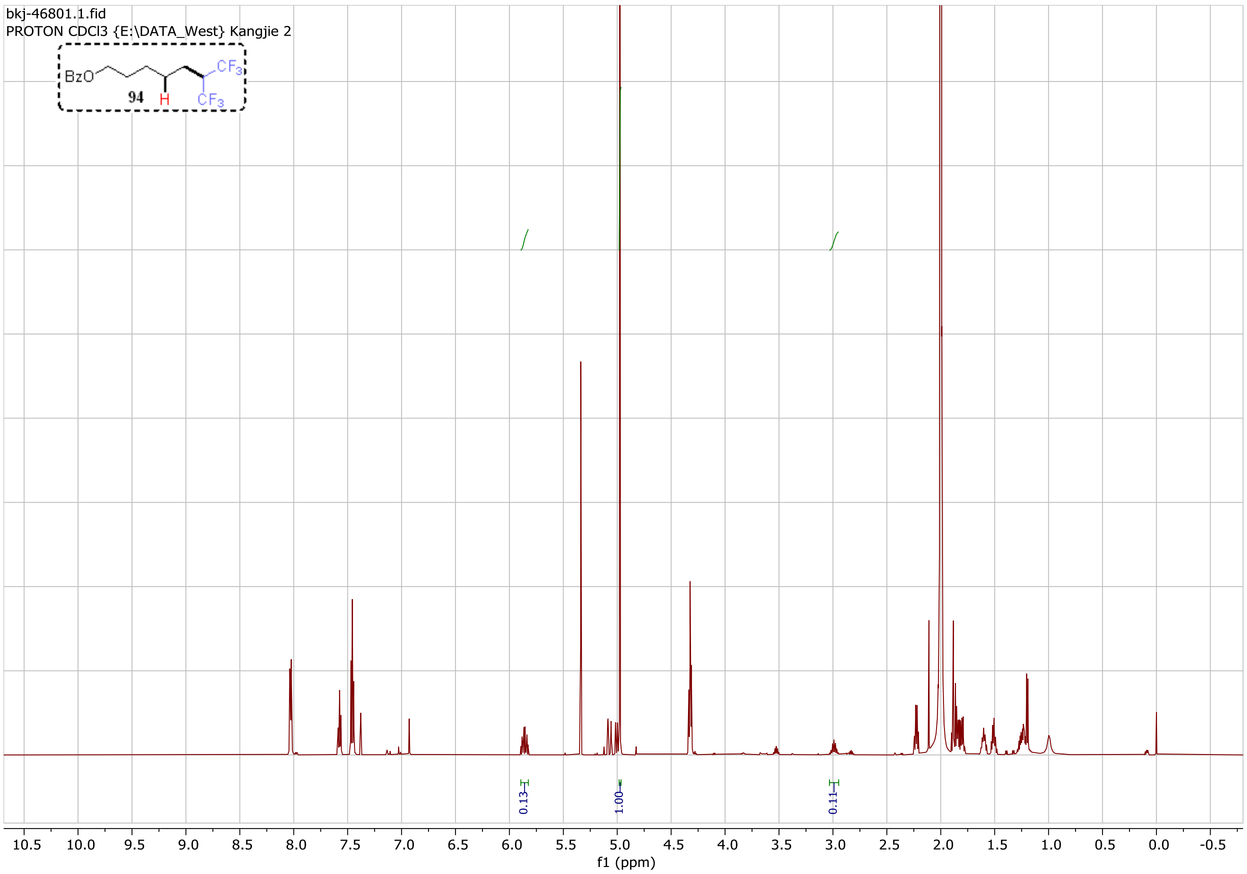
As indicated in the crude ^{1}H NMR, **72** is produced in 48% NMR yield at 1.73-1.65 (m, 2H) with 48% residual starting material at 5.39-5.36 (m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance is 96%.



48% starting material recovery

72, 48% NMR yield

Hydrofluoroalkylation of a representative substrate

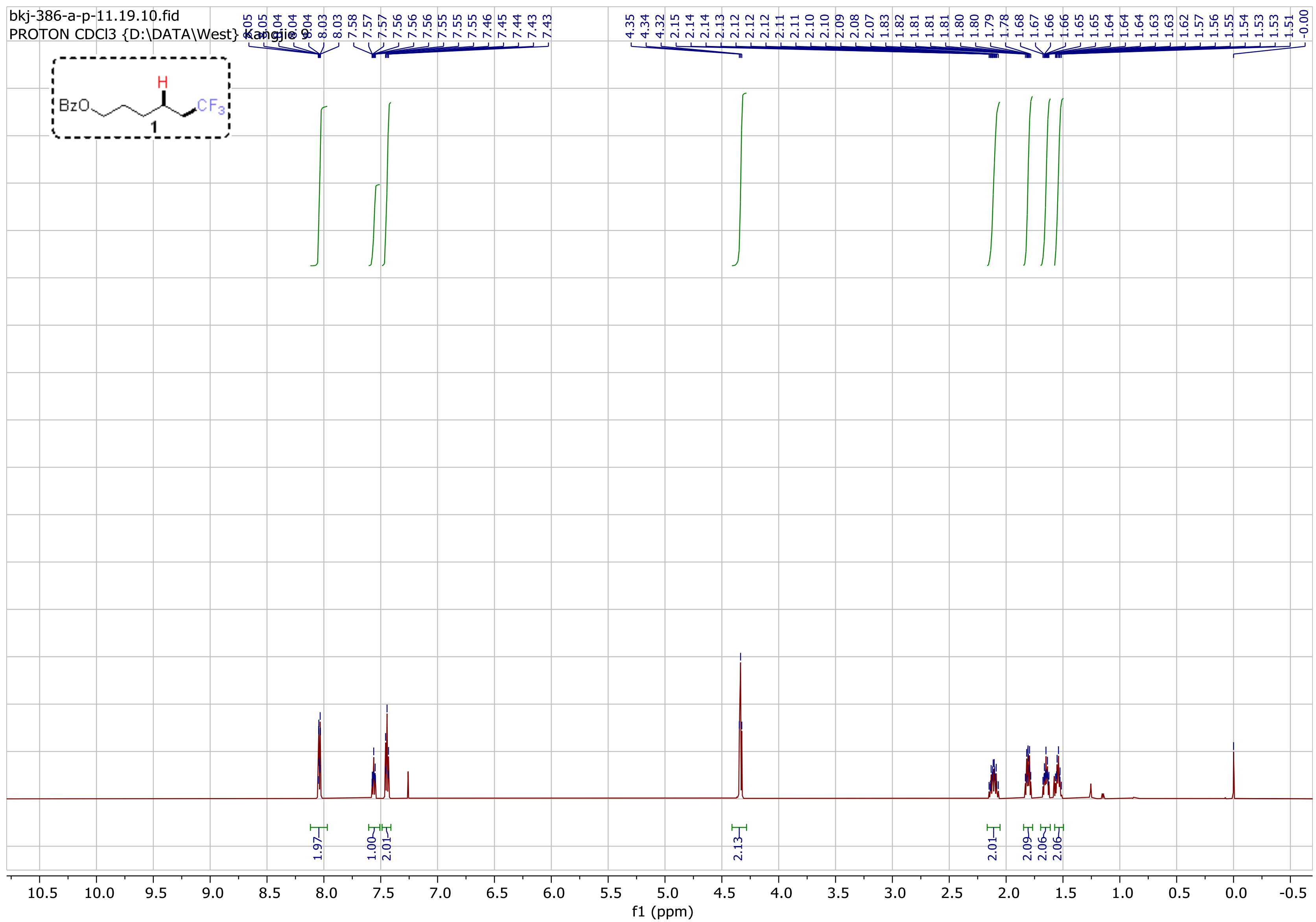


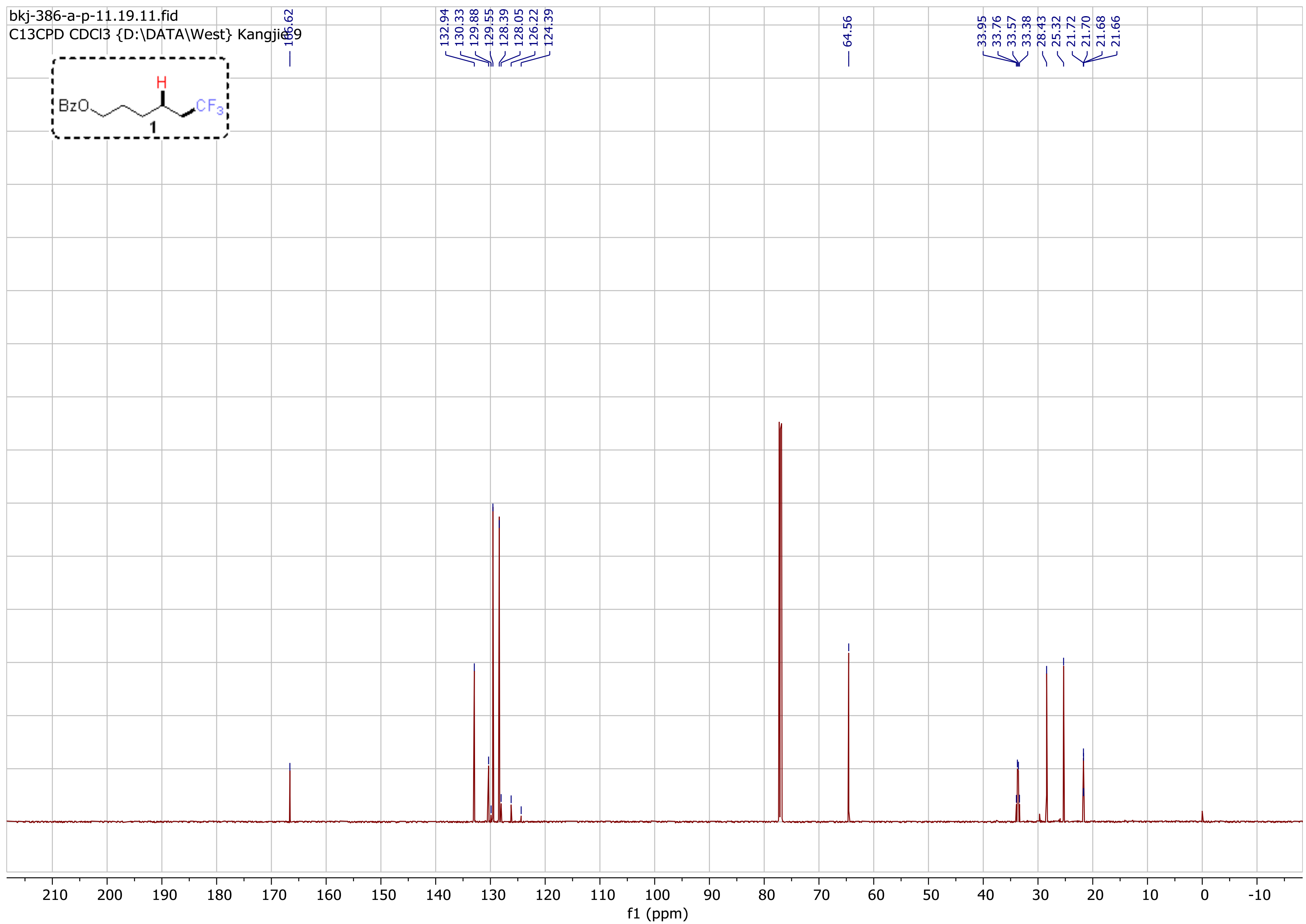
As indicated in the crude [1]H NMR, **94** is produced in 44% NMR yield at 3.03-2.95 (m, 1H) with 52% residual starting material at 5.90-5.82 (m, 1H) (in regard to 0.1 mmol CH_2Br_2 as internal standard). No other significant products are observed. The mass-balance is 96%.

52% starting material recovery

94, 44% NMR yield

III. Supplemental Figure


bkj-386-a-p-11.19.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 9
BzO
H
CF3
1
8.05 8.05 8.04 8.04 8.04 8.03 8.03 7.58 7.57 7.57 7.56 7.56 7.56 7.55 7.55 7.55 7.46 7.45 7.44 7.43 7.43
4.35 4.34 4.32 2.15 2.14 2.14 2.13 2.12 2.12 2.12 2.11 2.11 2.10 2.10 2.09 2.08 2.07 1.83 1.82 1.81 1.81 1.81 1.80 1.80 1.79 1.78 1.68 1.67 1.66 1.66 1.65 1.65 1.64 1.64 1.64 1.63 1.63 1.62 1.57 1.56 1.55 1.54 1.53 1.53 1.51 -0.00
1.97
1.00
2.01
2.13
2.01
2.09
2.06
2.06
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)



bkj-386-a-p-11.19.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 9
BzO
H
CF3
1
166.62
132.94
130.33
129.88
129.55
128.39
128.05
126.22
124.39
64.56
33.95
33.76
33.57
33.38
28.43
25.32
21.72
21.70
21.68
21.66
210
200
190
180
170
160
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140
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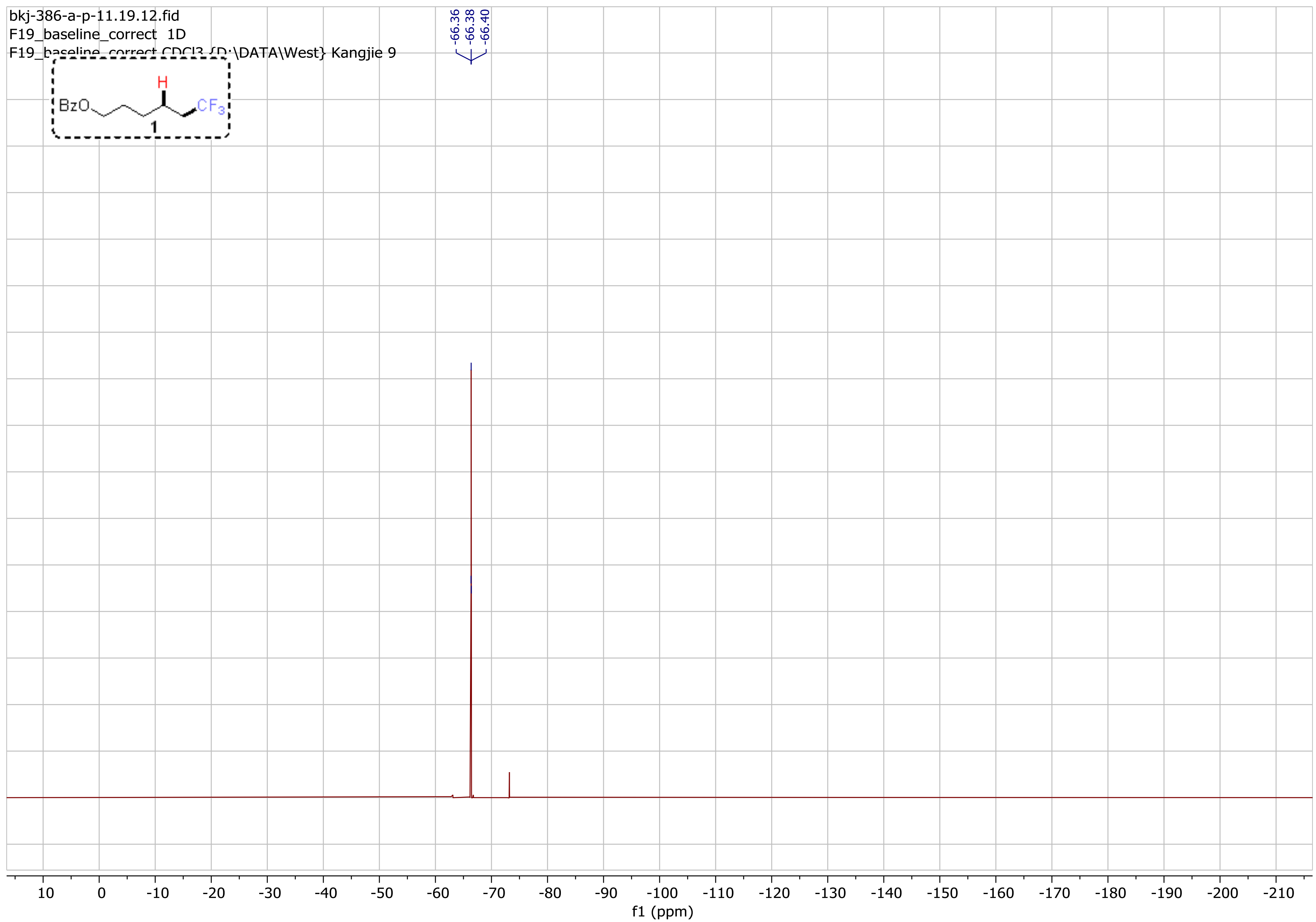
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)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F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 9
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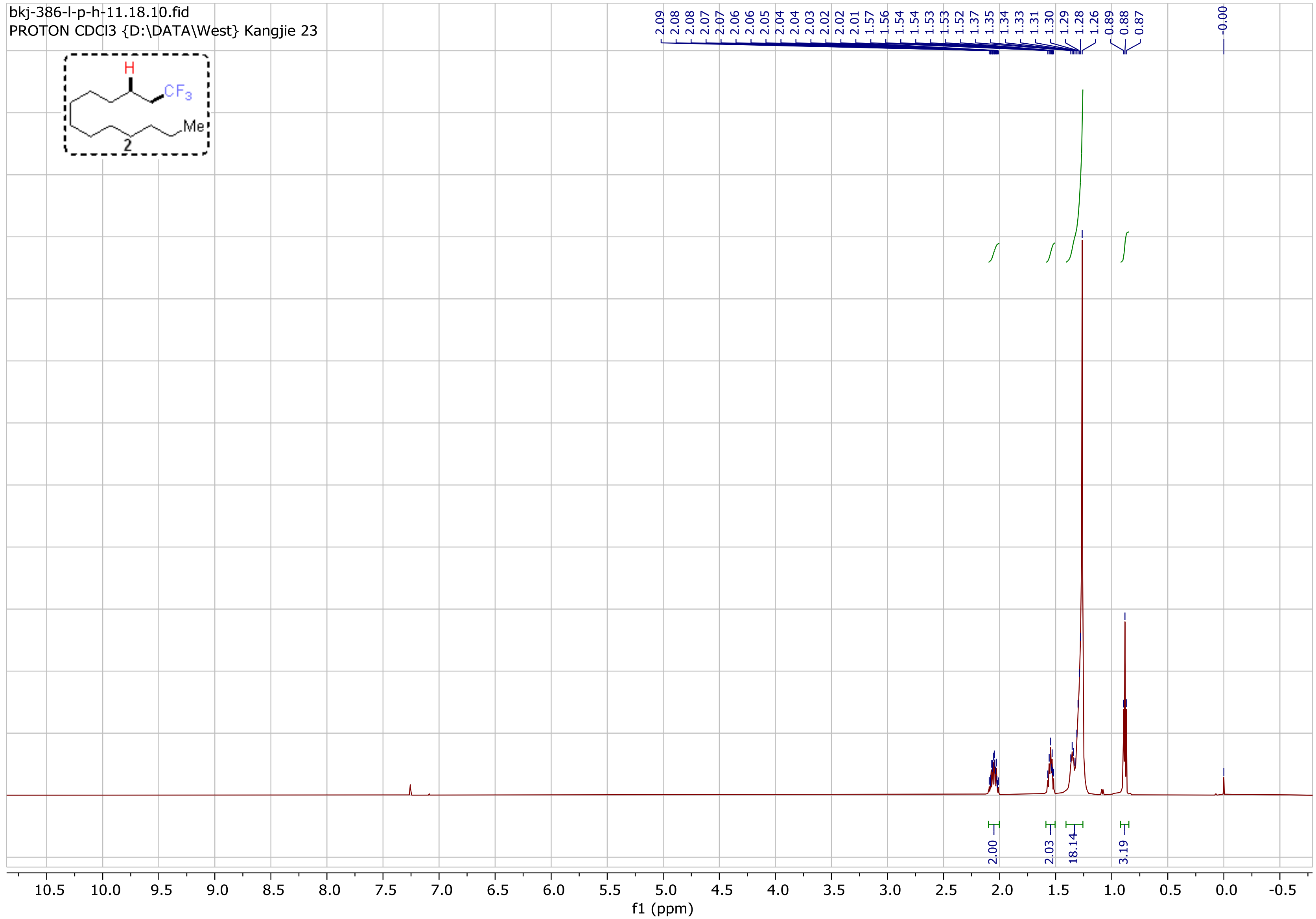
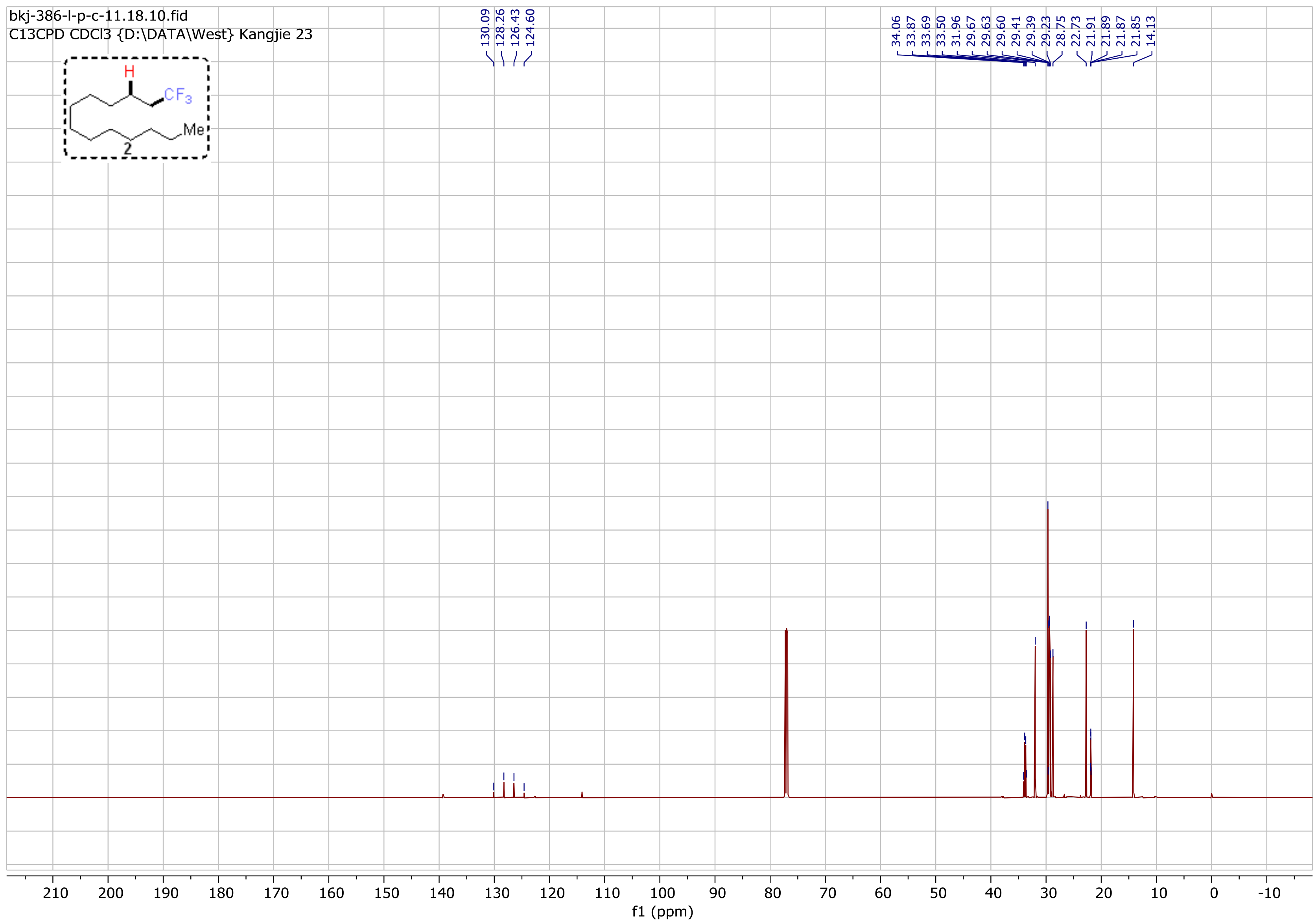
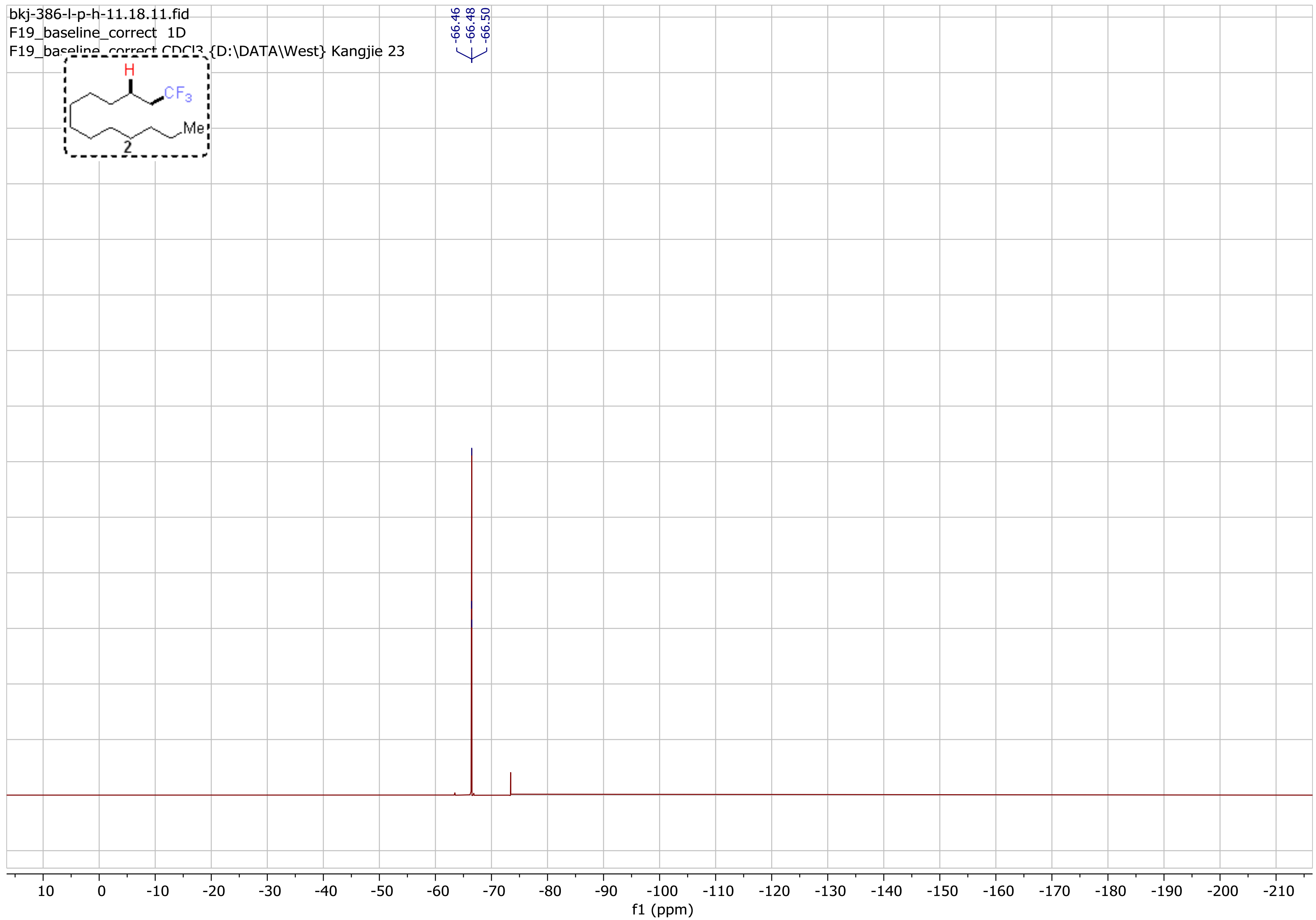
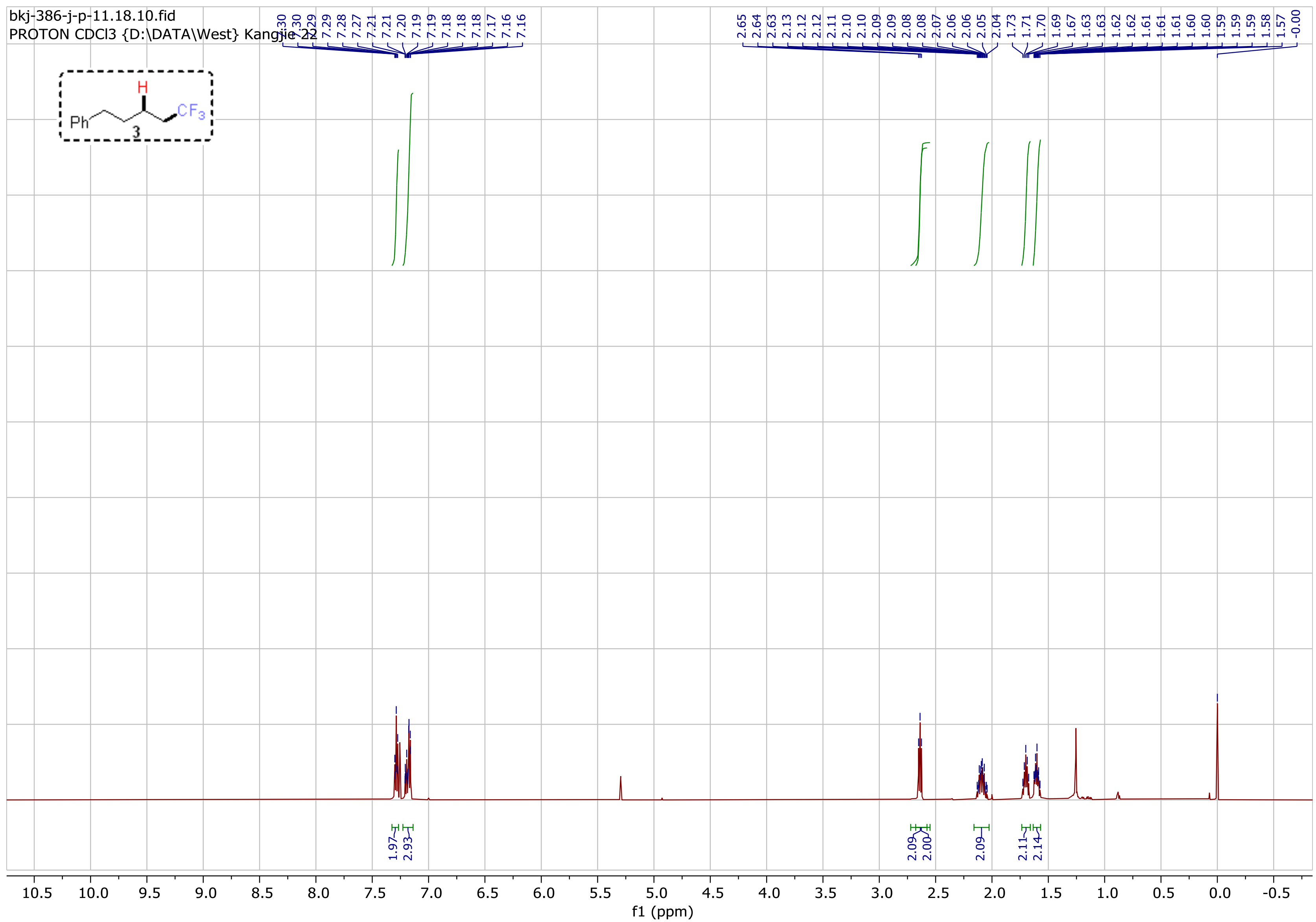
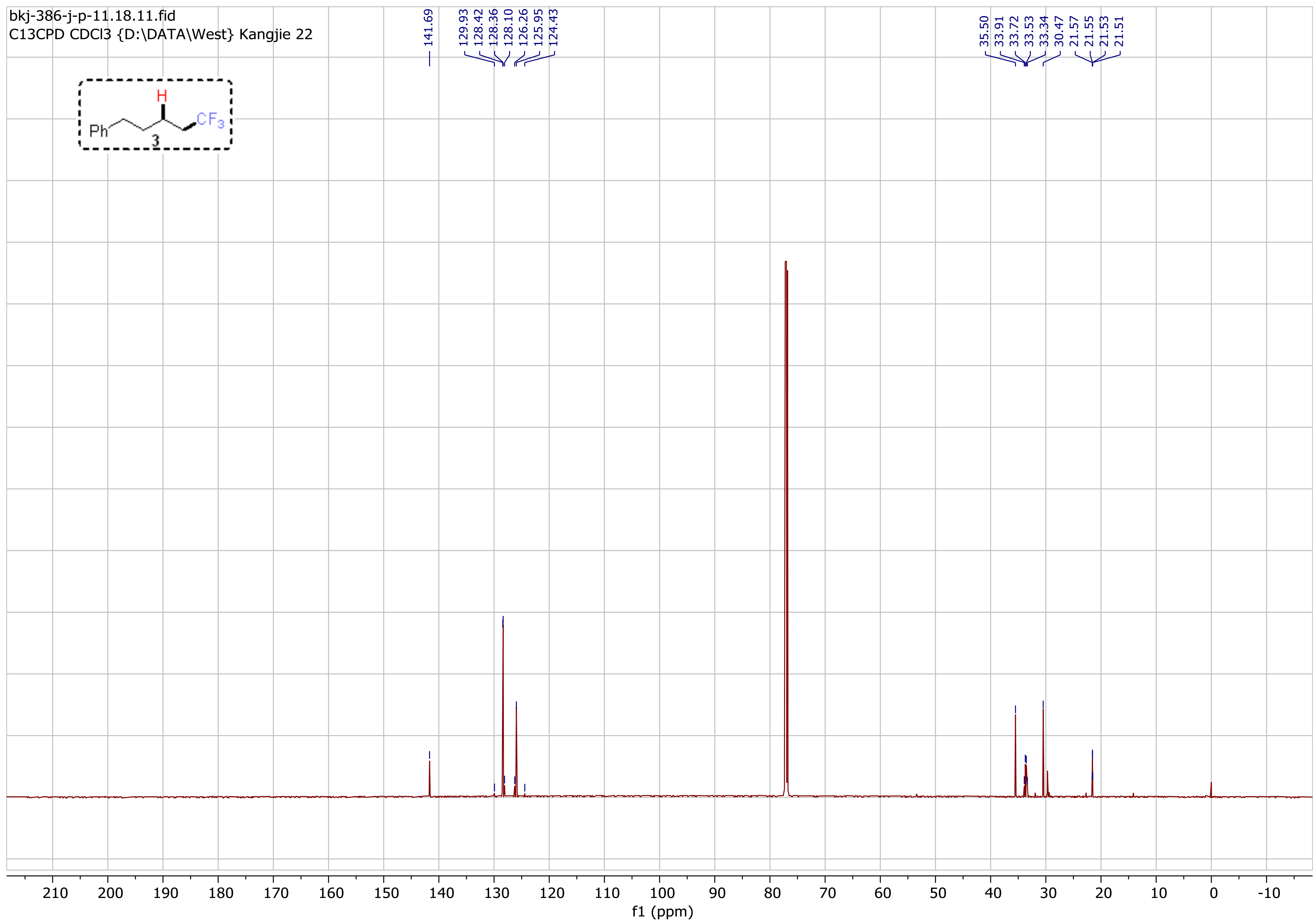
CF3
1
-66.36
-66.38
-66.40
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

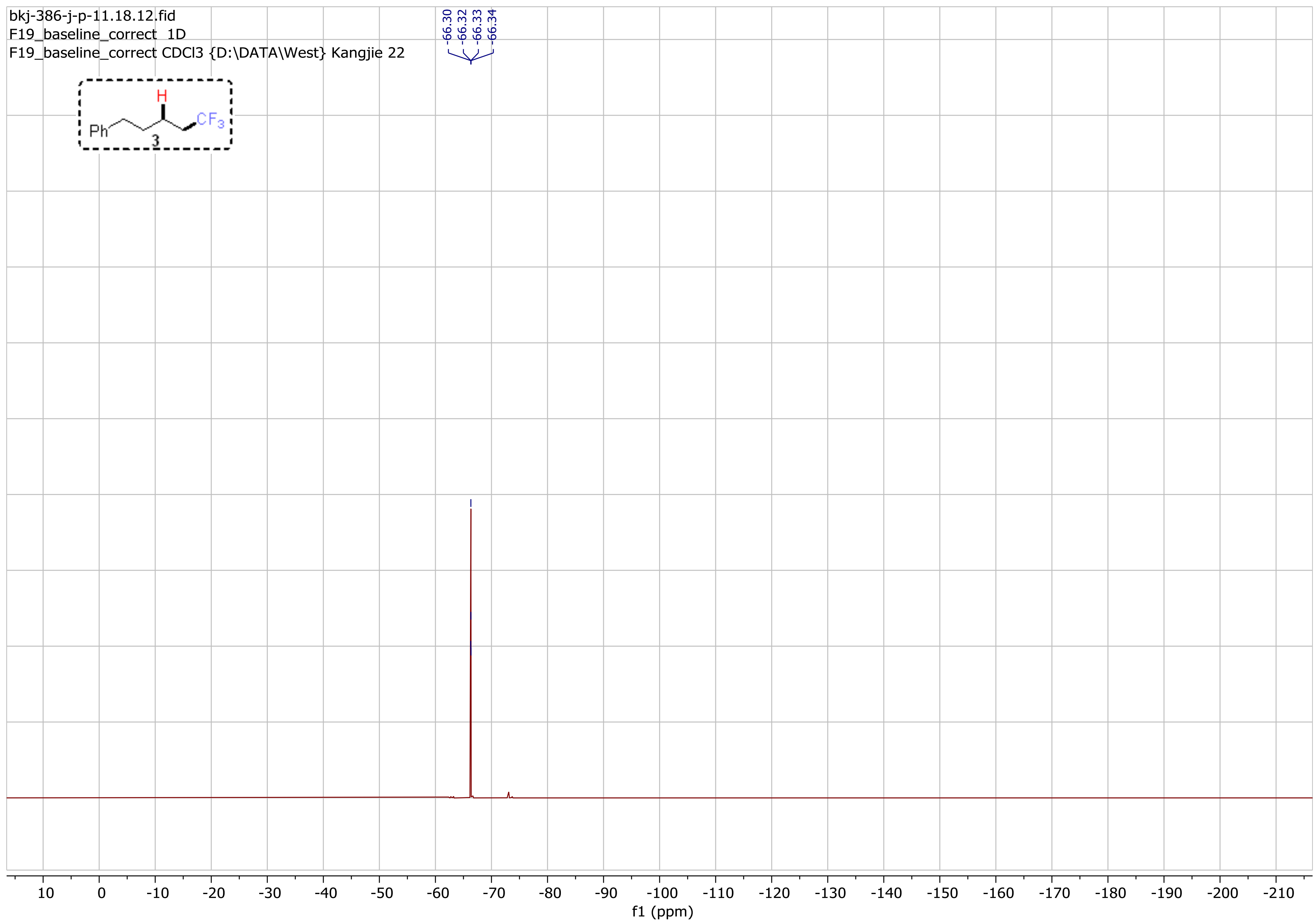

bkj-386-l-p-h-11.18.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 23
H
CF3
Me
2
2.09 2.08 2.08 2.07 2.07 2.06 2.06 2.05 2.04 2.04 2.03 2.02 2.02 2.01 1.57 1.56 1.54 1.54 1.53 1.53 1.52 1.37 1.35 1.34 1.33 1.31 1.30 1.29 1.28 1.26 0.89 0.88 0.87
-0.00
2.00
2.03
18.14
3.19
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

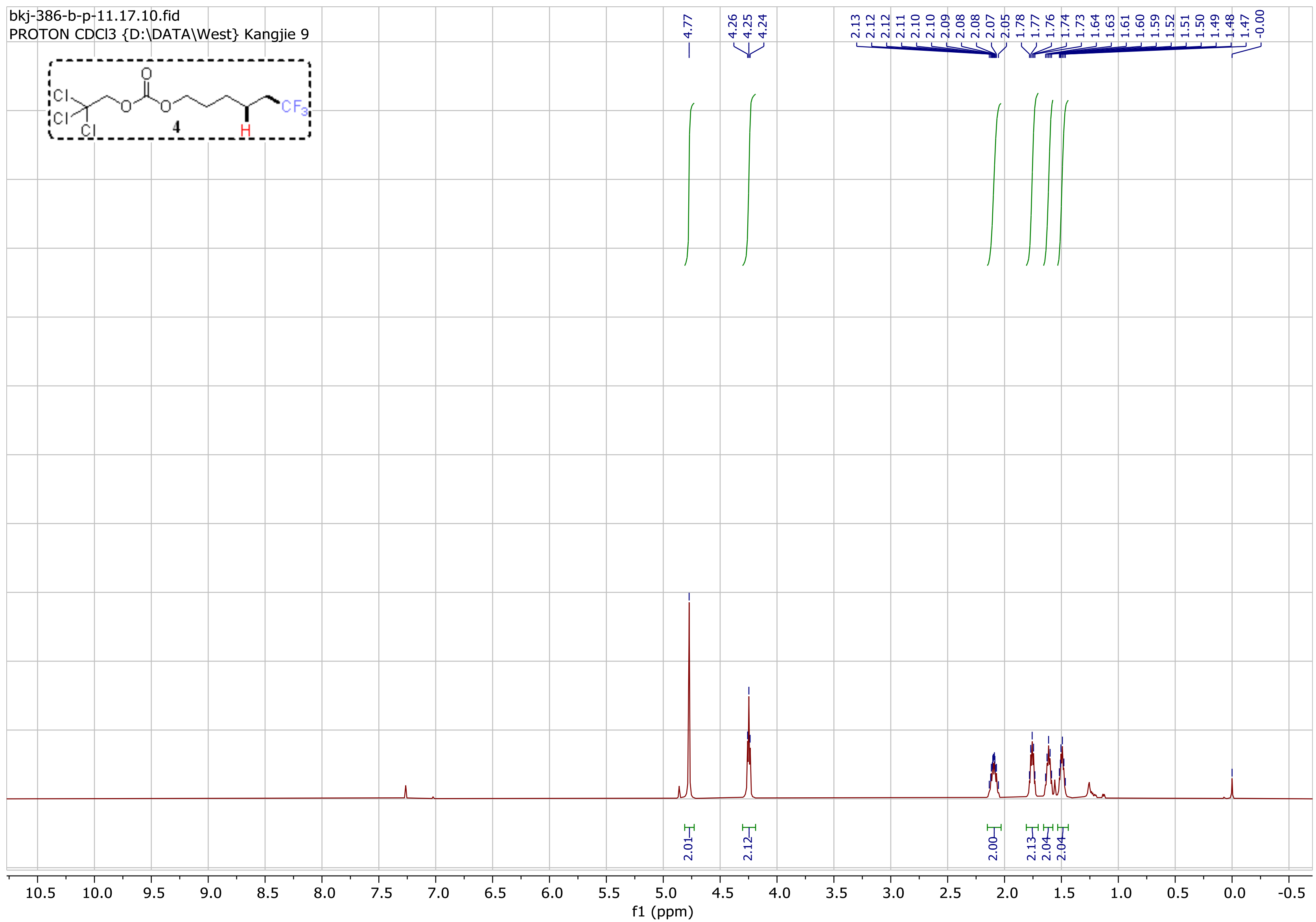

bkj-386-l-p-c-11.18.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 23
H
CF3
Me
2
130.09
128.26
126.43
124.60
34.06
33.87
33.69
33.50
31.96
29.67
29.63
29.60
29.41
29.39
29.23
28.75
22.73
21.91
21.89
21.87
21.85
14.13
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


bkj-386-l-p-h-11.18.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 23
-66.46
-66.48
-66.50
H
CF3
Me
2
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

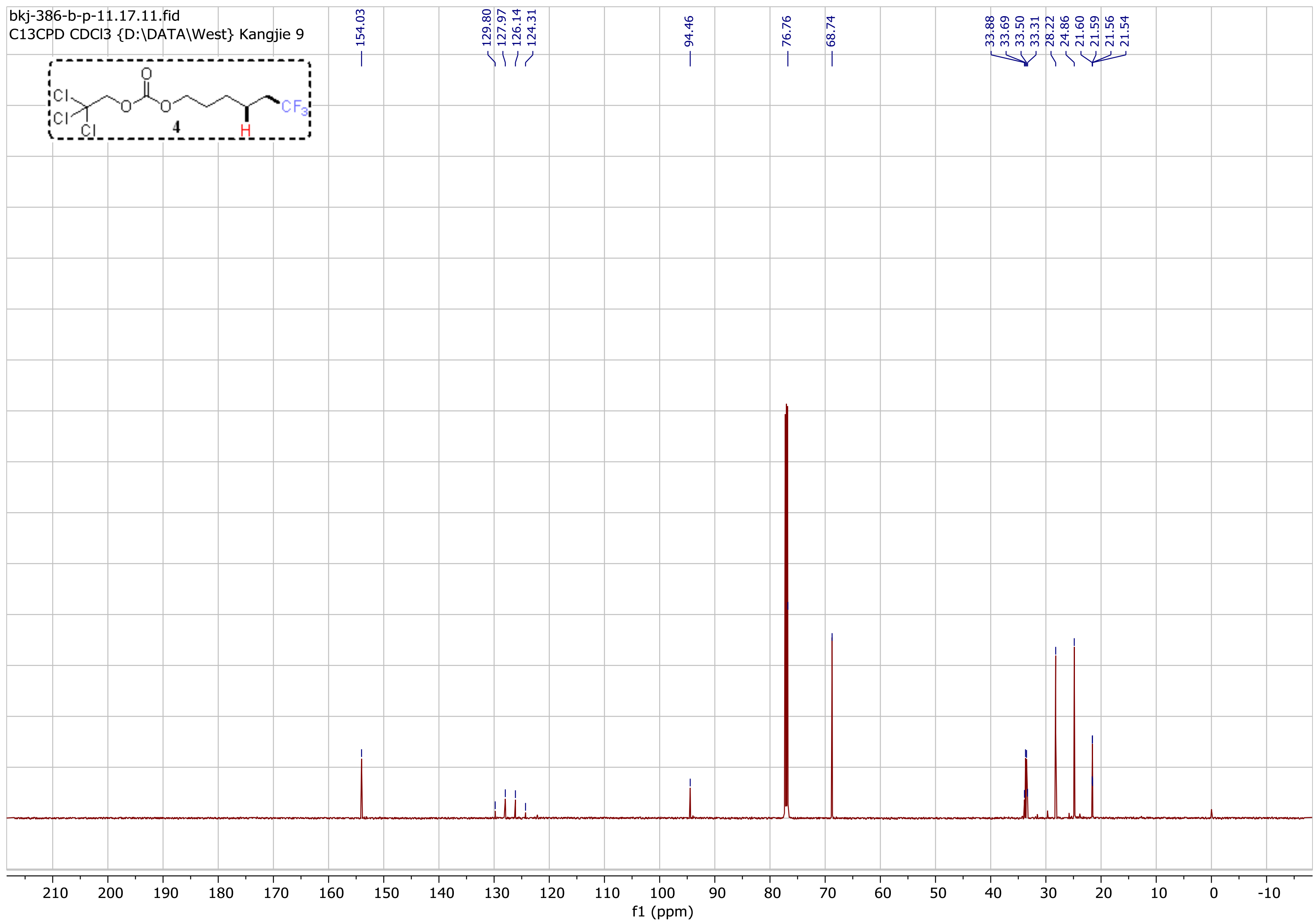

bkj-386-j-p-11.18.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 22
Ph
H
CF3
3
7.30 7.30 7.29 7.29 7.28 7.27 7.21 7.21 7.20 7.19 7.19 7.18 7.18 7.18 7.17 7.16 7.16
2.65 2.64 2.63 2.13 2.12 2.12 2.11 2.10 2.10 2.09 2.09 2.08 2.08 2.07 2.06 2.06 2.05 2.04 1.73 1.71 1.70 1.69 1.67 1.63 1.63 1.62 1.62 1.61 1.61 1.61 1.60 1.60 1.59 1.59 1.59 1.58 1.57 -0.00
1.97
2.93
2.09
2.00
2.09
2.11
2.14
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


bkj-386-j-p-11.18.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 22
Ph
H
CF3
3
141.69
129.93
128.42
128.36
128.10
126.26
125.95
124.43
35.50
33.91
33.72
33.53
33.34
30.47
21.57
21.55
21.53
21.51
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

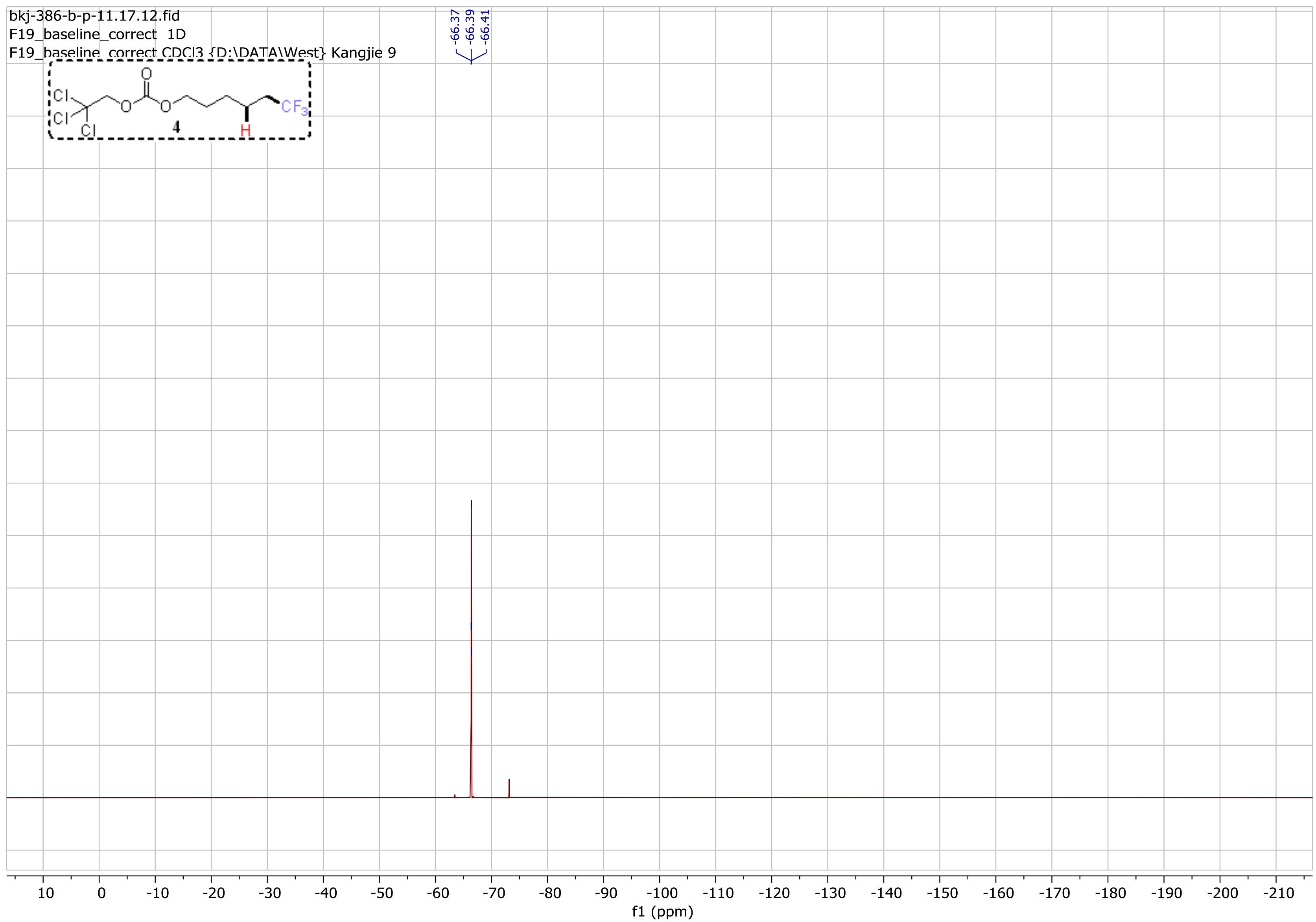

bkj-386-j-p-11.18.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 22
-66.30
-66.32
-66.33
-66.34
H
CF3
Ph
3
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)



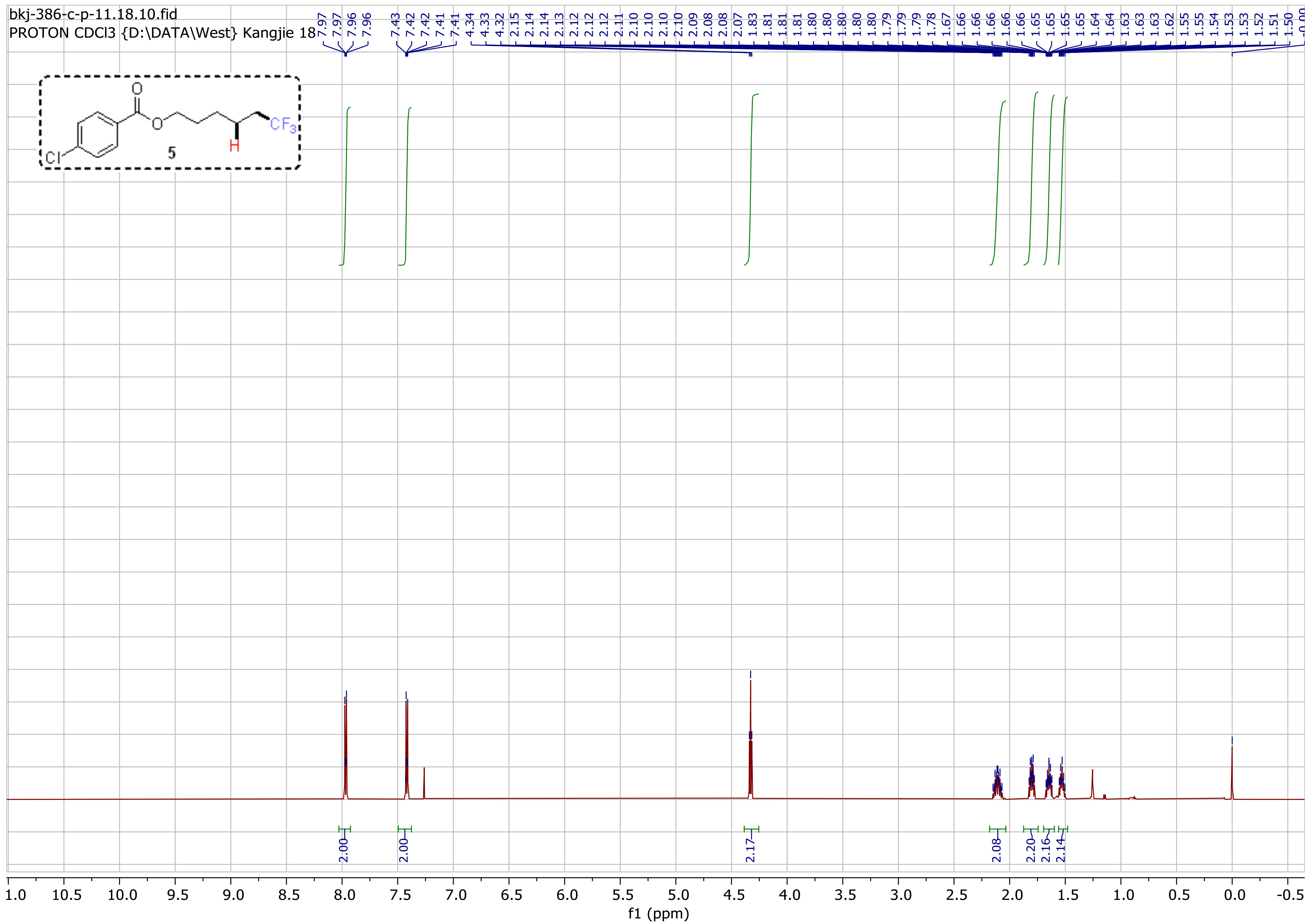
bkj-386-b-p-11.17.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 9
Cl
Cl
Cl
O
O
O
4
H
CF3
4.77
4.26
4.25
4.24
2.13
2.12
2.12
2.11
2.10
2.10
2.09
2.08
2.08
2.07
2.05
1.78
1.77
1.76
1.74
1.73
1.64
1.63
1.61
1.60
1.59
1.52
1.51
1.50
1.49
1.48
1.47
-0.00
2.01
2.12
2.00
2.13
2.04
2.04
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)



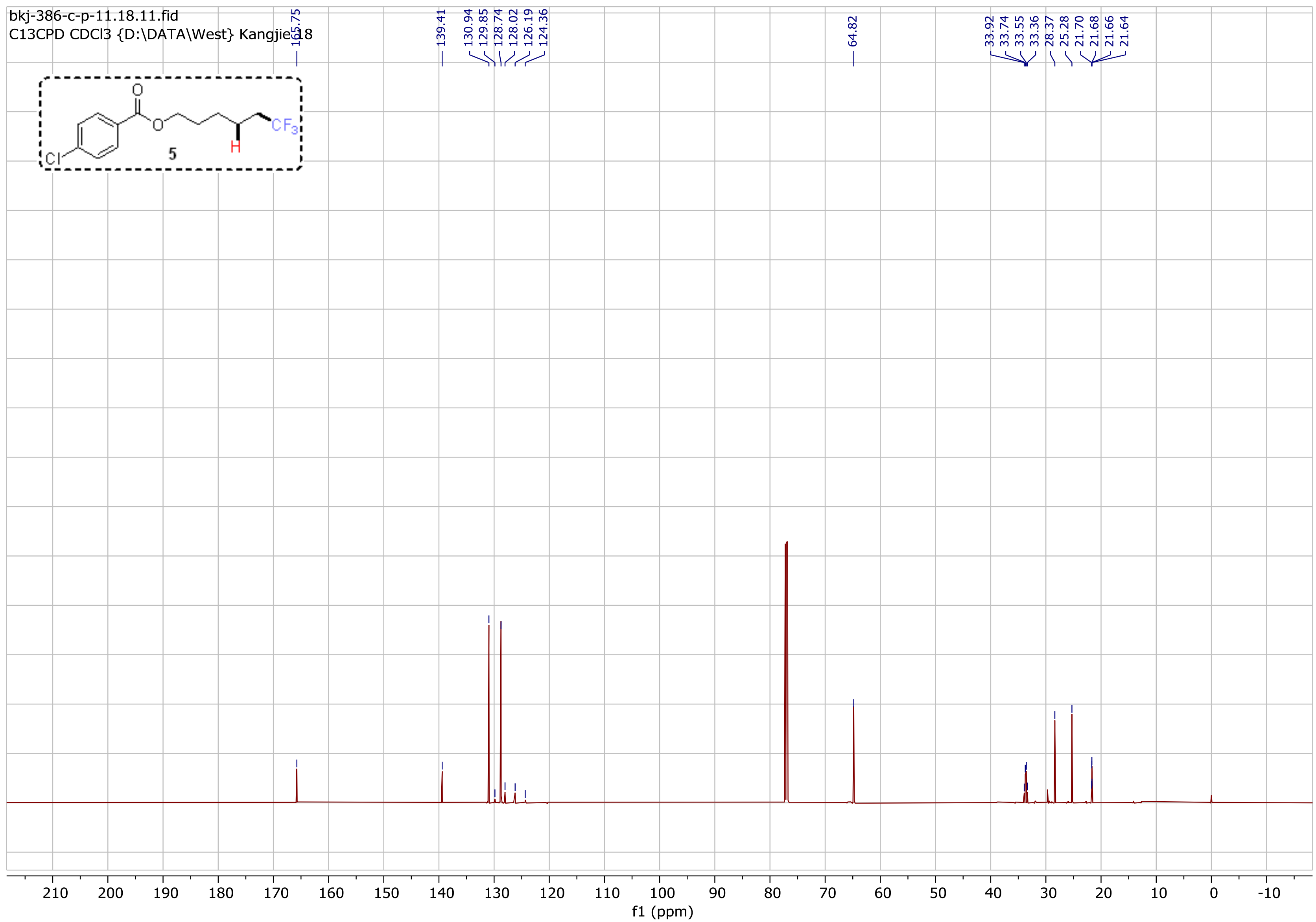
bkj-386-b-p-11.17.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 9
4
154.03
129.80
127.97
126.14
124.31
94.46
76.76
68.74
33.88
33.69
33.50
33.31
28.22
24.86
21.60
21.59
21.56
21.54
f1 (ppm)

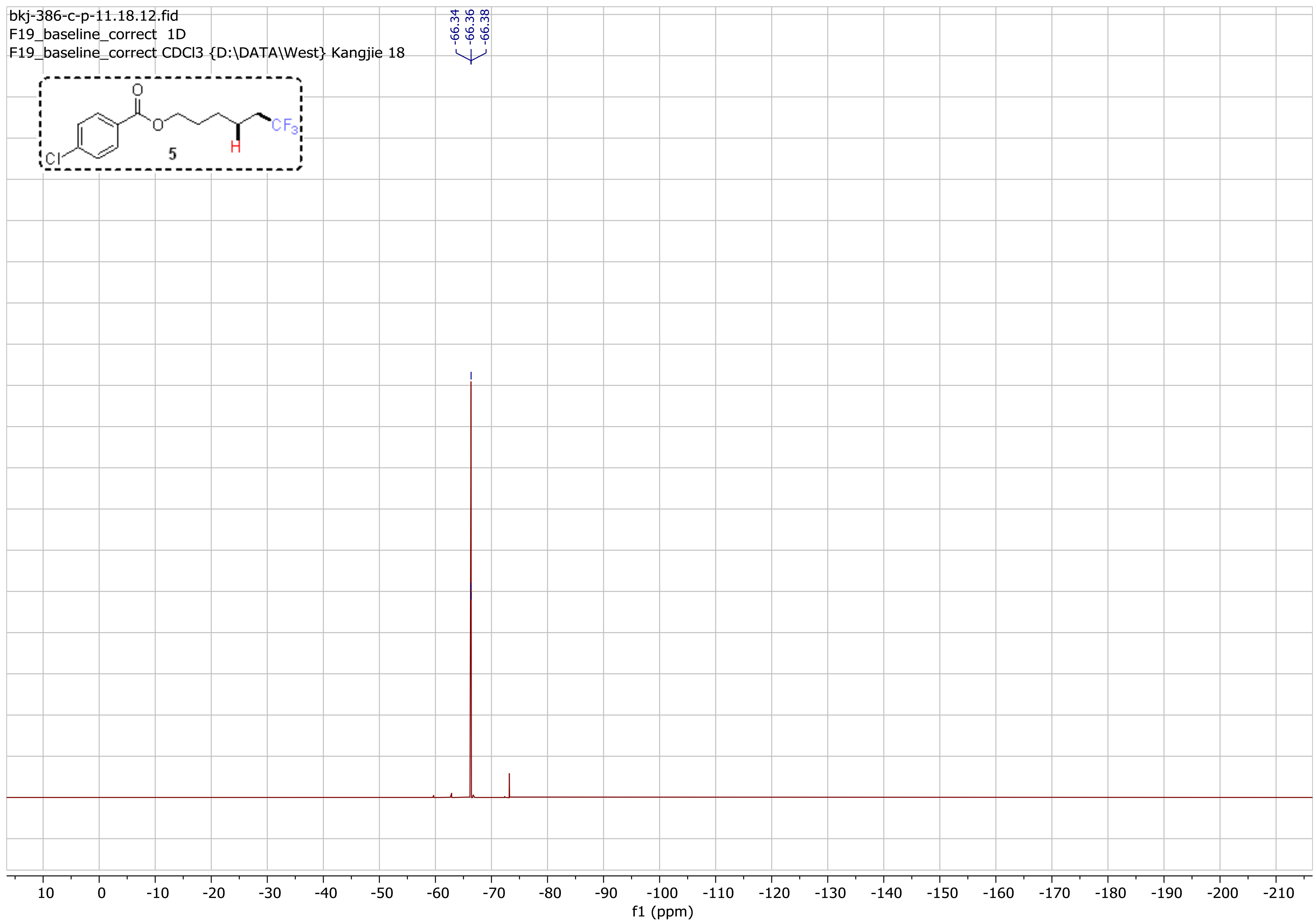


bkj-386-b-p-11.17.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 9
-66.37
-66.39
-66.41
Cl
Cl
Cl
O
O
O
4
H
CF3
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

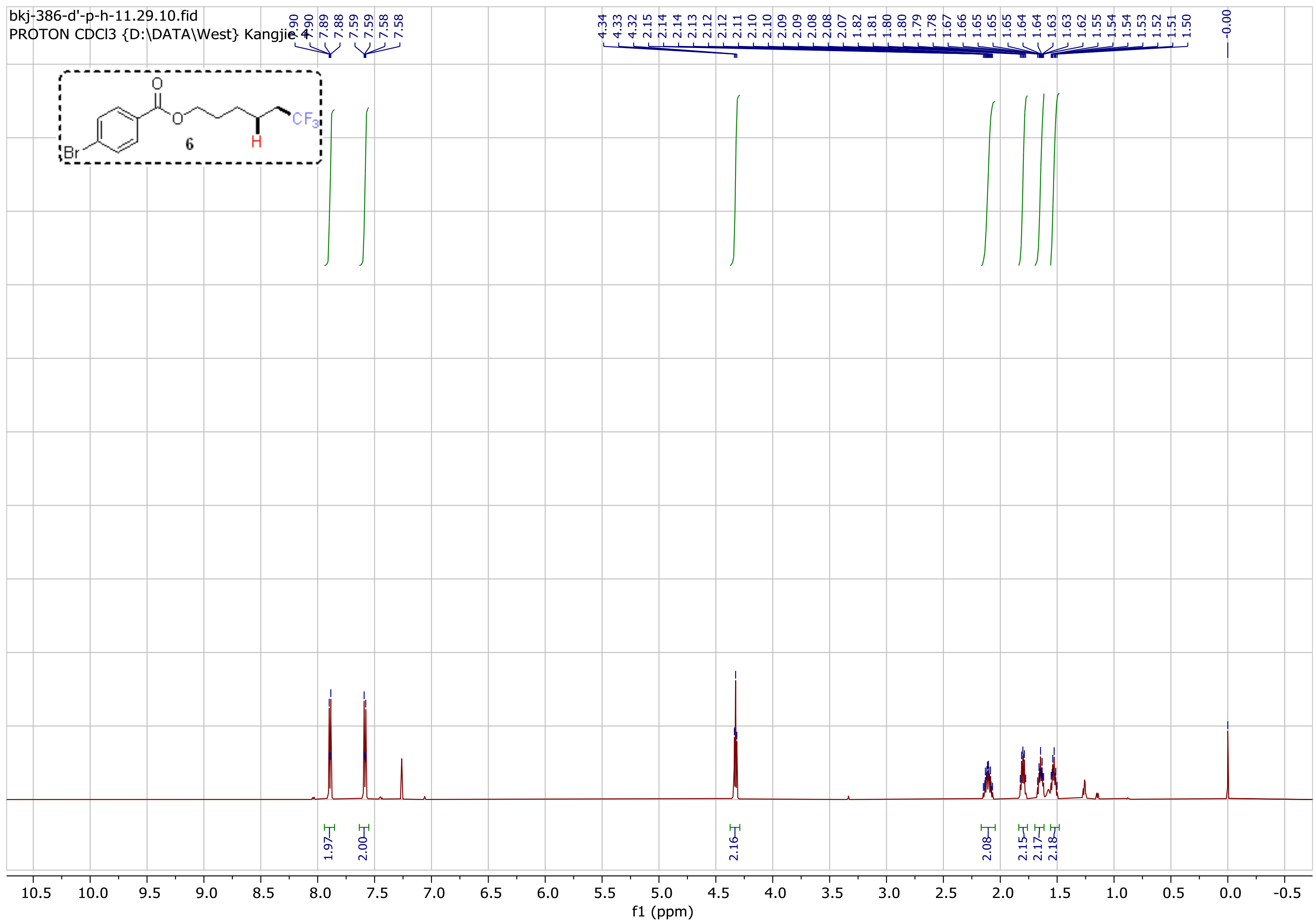


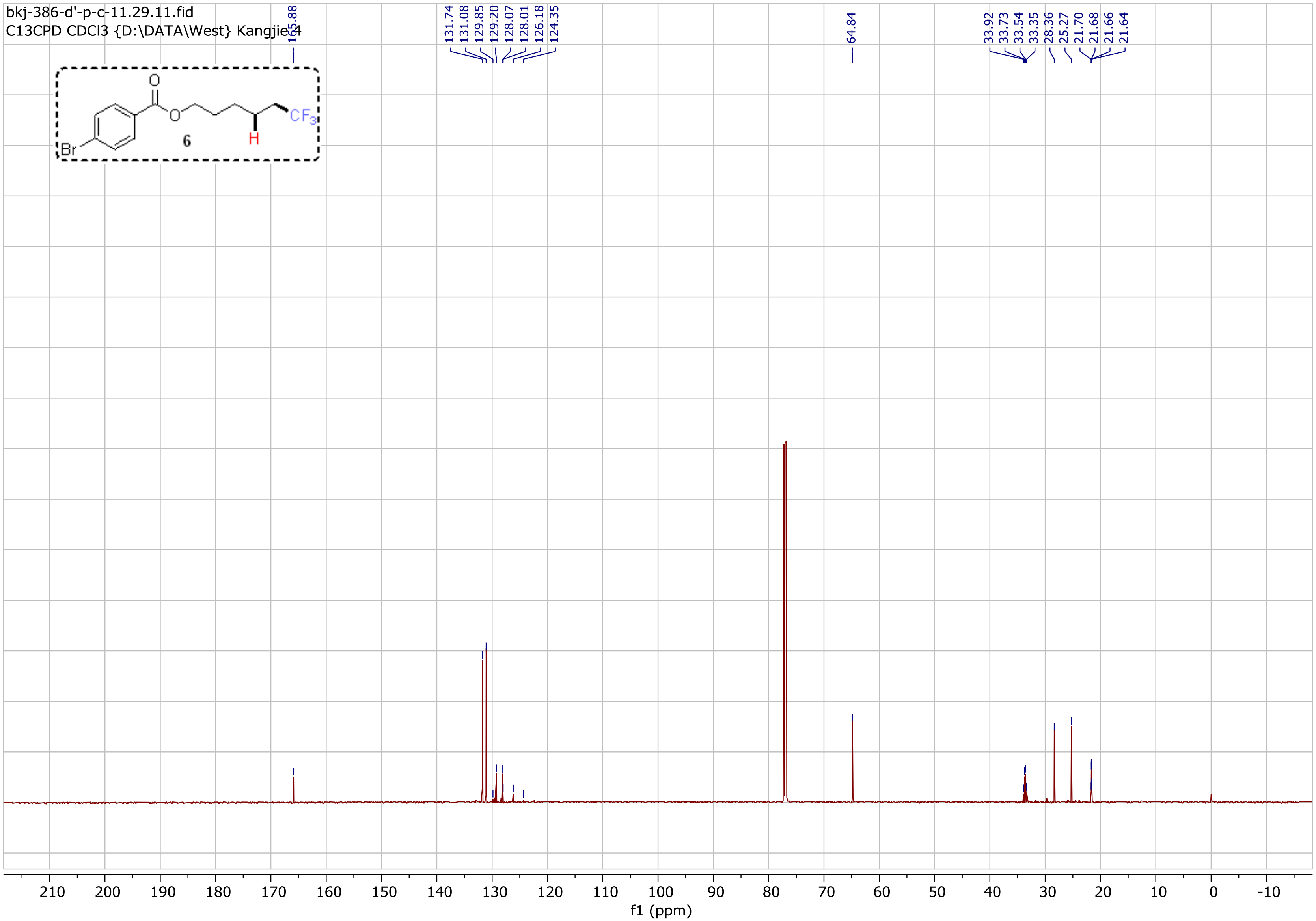
bkj-386-c-p-11.18.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 18
5
f1 (ppm)

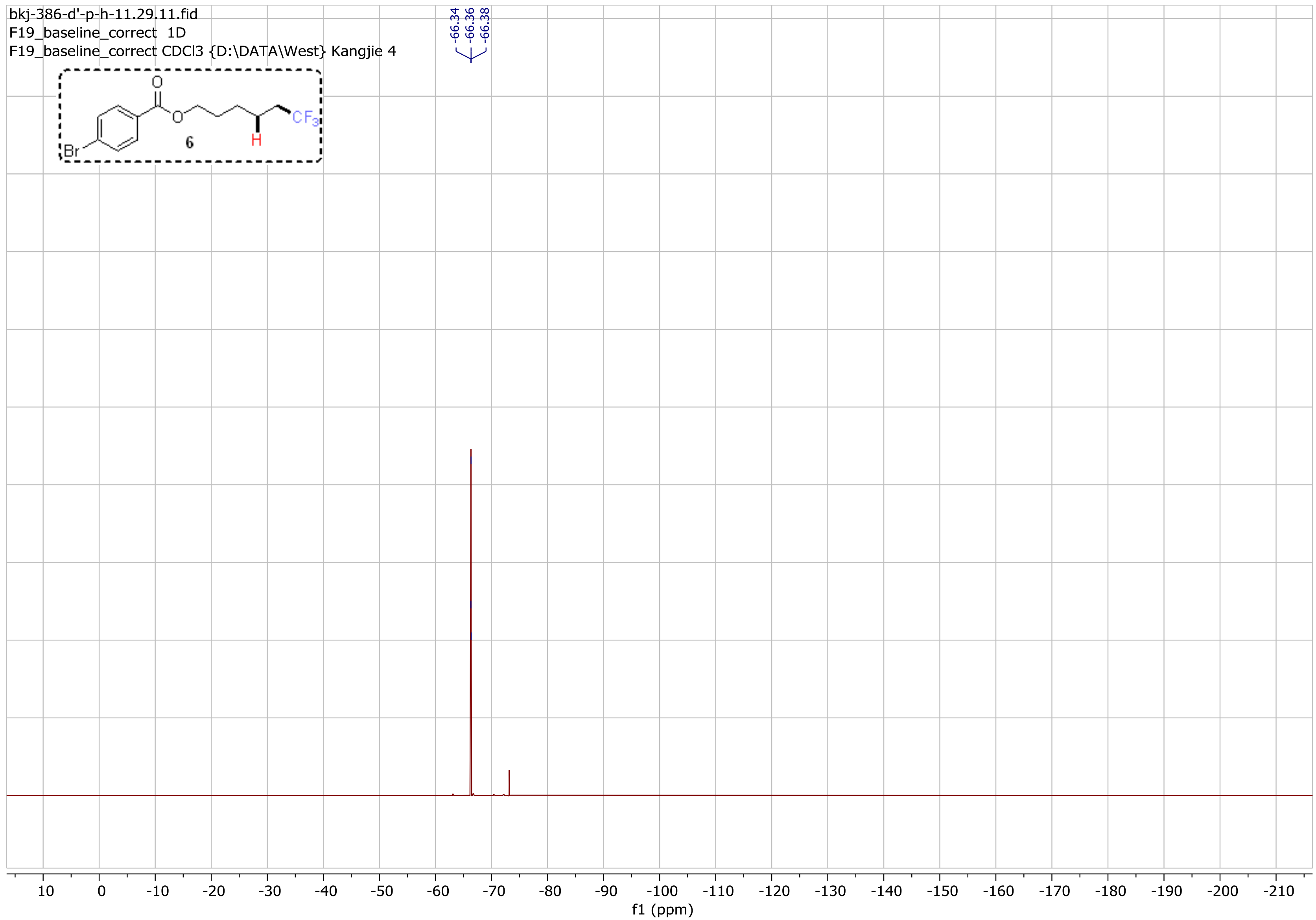

bkj-386-c-p-11.18.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie18
165.75
139.41
130.94
129.85
128.74
128.02
126.19
124.36
64.82
33.92
33.74
33.55
33.36
28.37
25.28
21.70
21.68
21.66
21.64
O
O
Cl
H
CF3
5
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



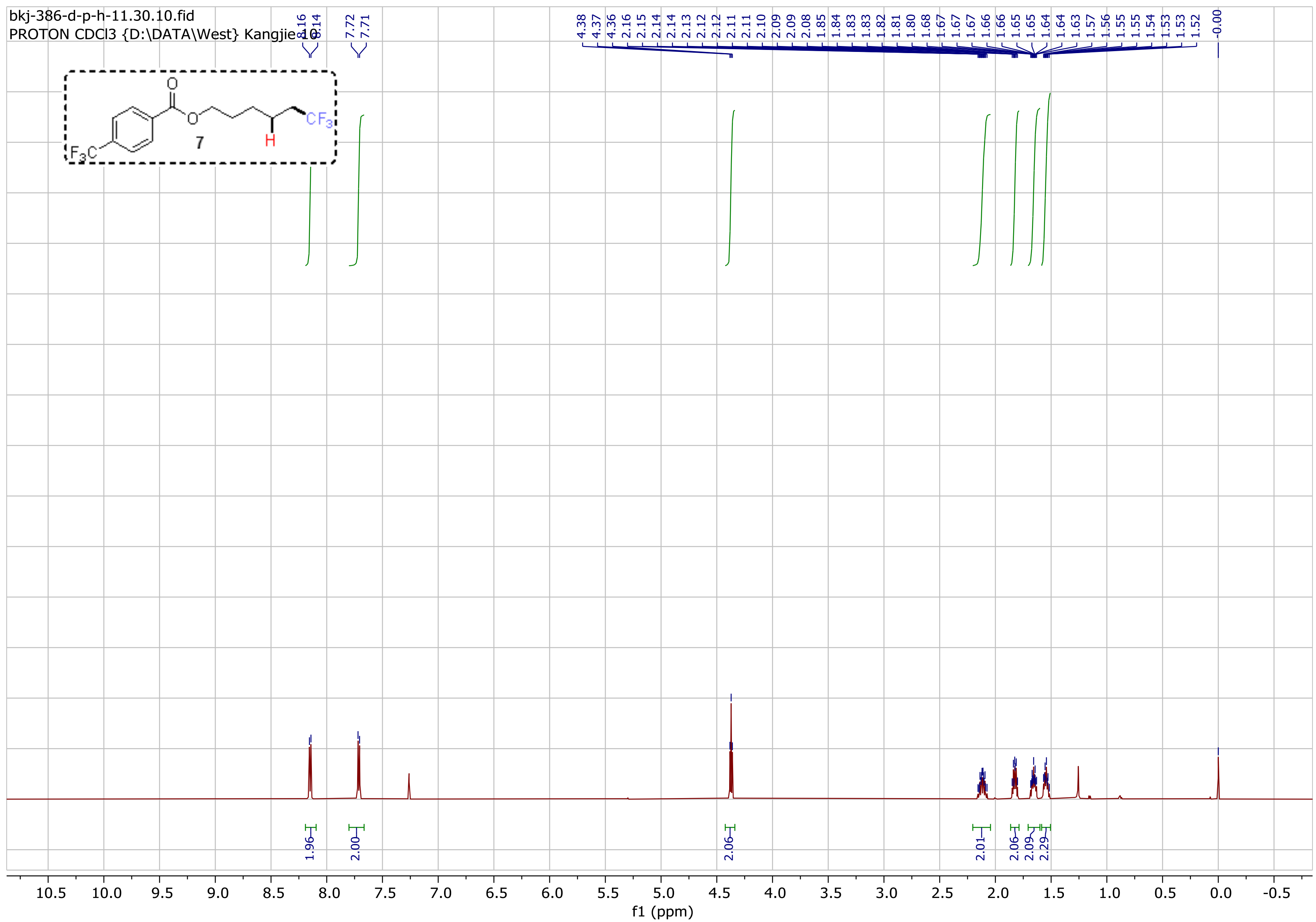
bkj-386-c-p-11.18.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 18
-66.34
-66.36
-66.38
O
O
Cl
CF3
H
5
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


bkj-386-d'-p-h-11.29.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 4
7.90 7.90 7.89 7.88 7.59 7.59 7.58 7.58
4.34 4.33 4.32 2.15 2.14 2.14 2.13 2.12 2.12 2.11 2.10 2.10 2.09 2.09 2.08 2.08 2.07 1.82 1.81 1.80 1.80 1.79 1.78 1.67 1.66 1.65 1.65 1.65 1.64 1.64 1.63 1.63 1.62 1.55 1.54 1.54 1.53 1.52 1.51 1.50
-0.00
Br
O
O
6
H
CF3
1.97
2.00
2.16
2.08
2.15
2.17
2.18
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

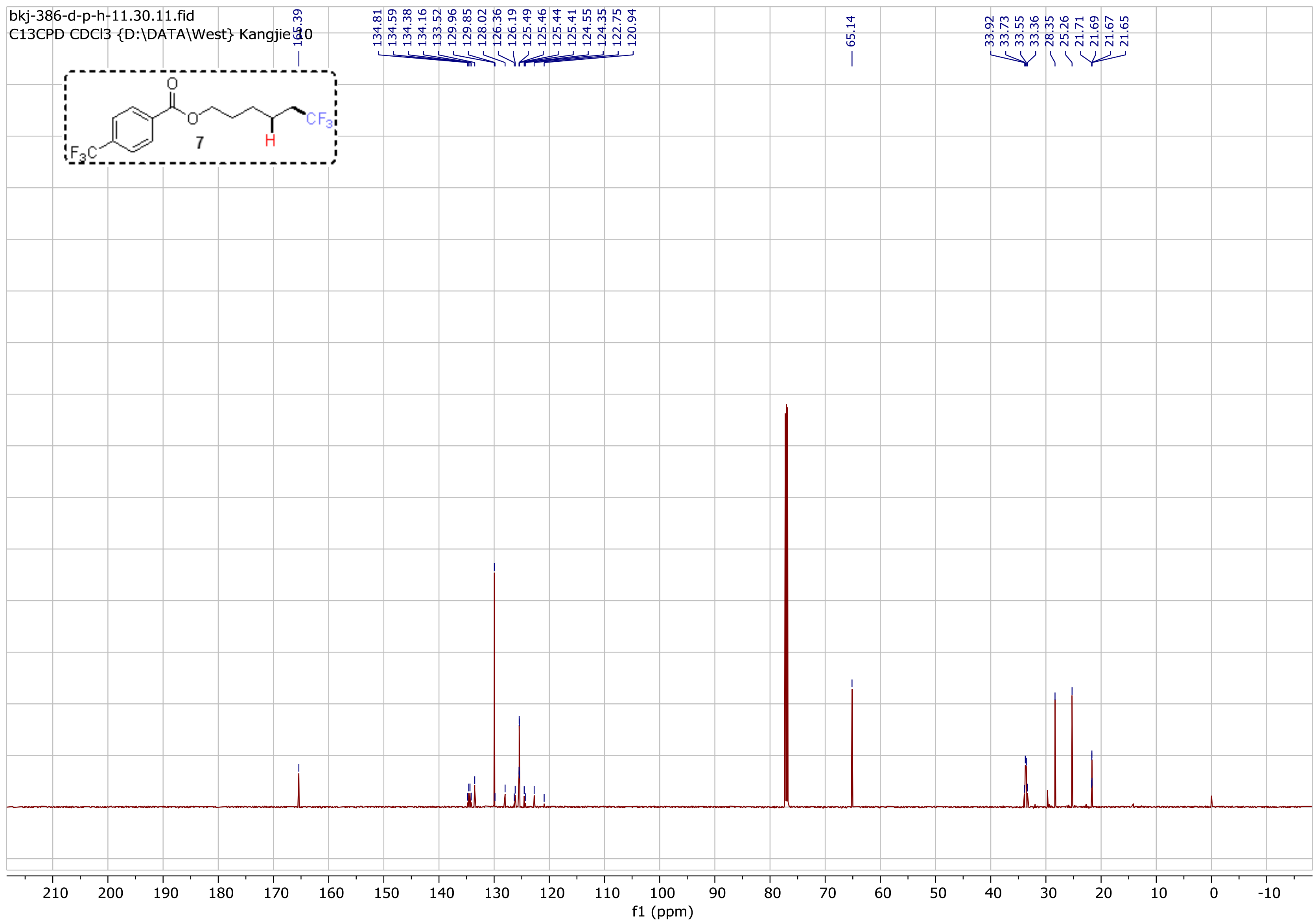

bkj-386-d'-p-c-11.29.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 4
165.88
131.74
131.08
129.85
129.20
128.07
128.01
126.18
124.35
64.84
33.92
33.73
33.54
33.35
28.36
25.27
21.70
21.68
21.66
21.64
O
O
Br
CF3
H
6
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

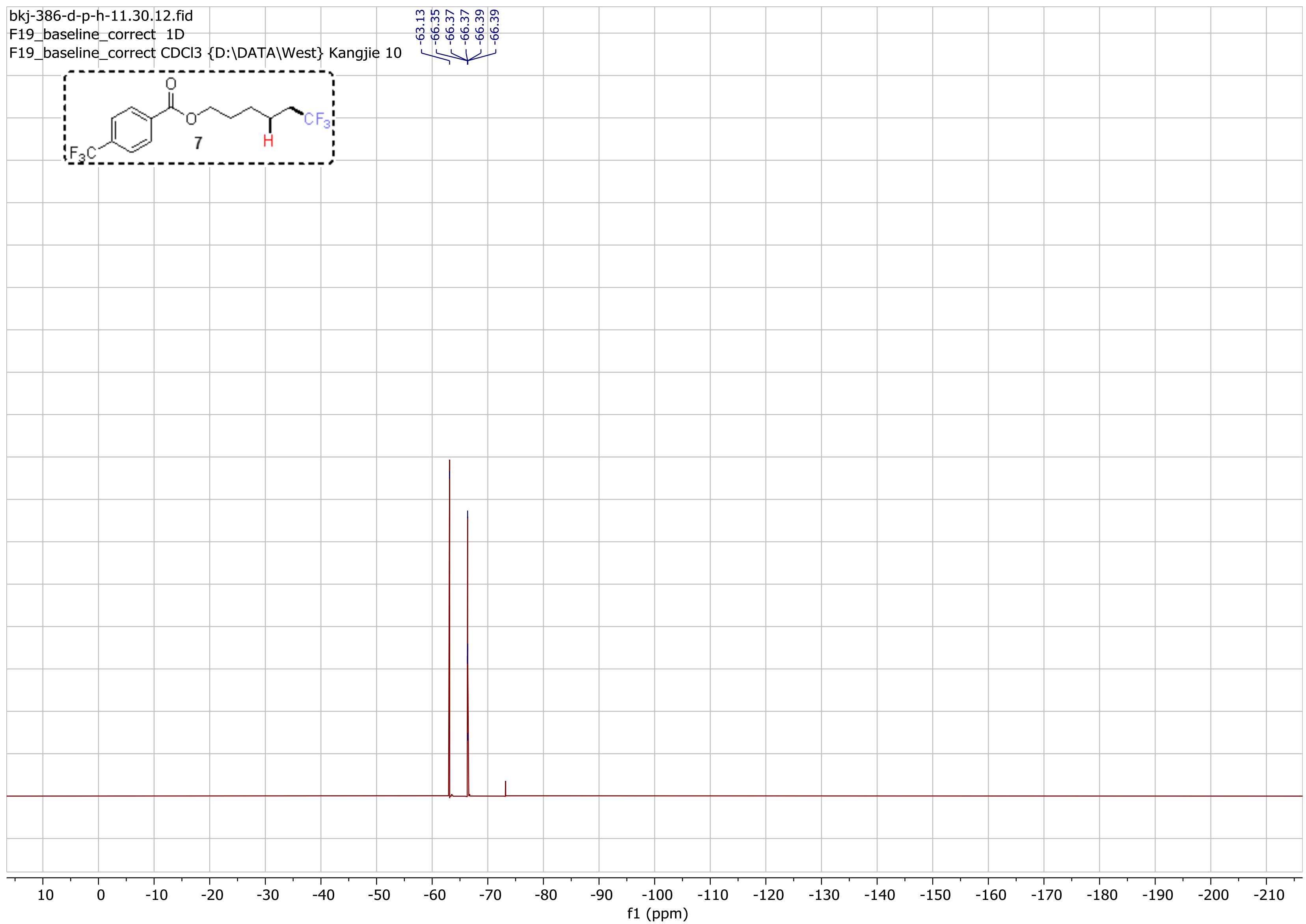


bkj-386-d'-p-h-11.29.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 4
-66.34
-66.36
-66.38
O
O
Br
H
CF3
6
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)



bkj-386-d-p-h-11.30.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 10
8.16
8.14
7.72
7.71
4.38
4.37
4.36
2.16
2.15
2.14
2.14
2.13
2.12
2.12
2.11
2.11
2.10
2.09
2.09
2.08
1.85
1.84
1.83
1.83
1.82
1.81
1.80
1.68
1.67
1.67
1.67
1.66
1.66
1.65
1.65
1.64
1.64
1.63
1.57
1.56
1.55
1.55
1.54
1.53
1.53
1.52
-0.00
O
O
CF3
F3C
H
7
1.96
2.00
2.06
2.01
2.06
2.09
2.29
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


bkj-386-d-p-h-11.30.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 10
165.39
134.81
134.59
134.38
134.16
133.52
129.96
129.85
128.02
126.36
126.19
125.49
125.46
125.44
125.41
124.55
124.35
122.75
120.94
65.14
33.92
33.73
33.55
33.36
28.35
25.26
21.71
21.69
21.67
21.65
O
O
F_3C
CF_3
H
7
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-386-d-p-h-11.30.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 10
-63.13
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-66.37
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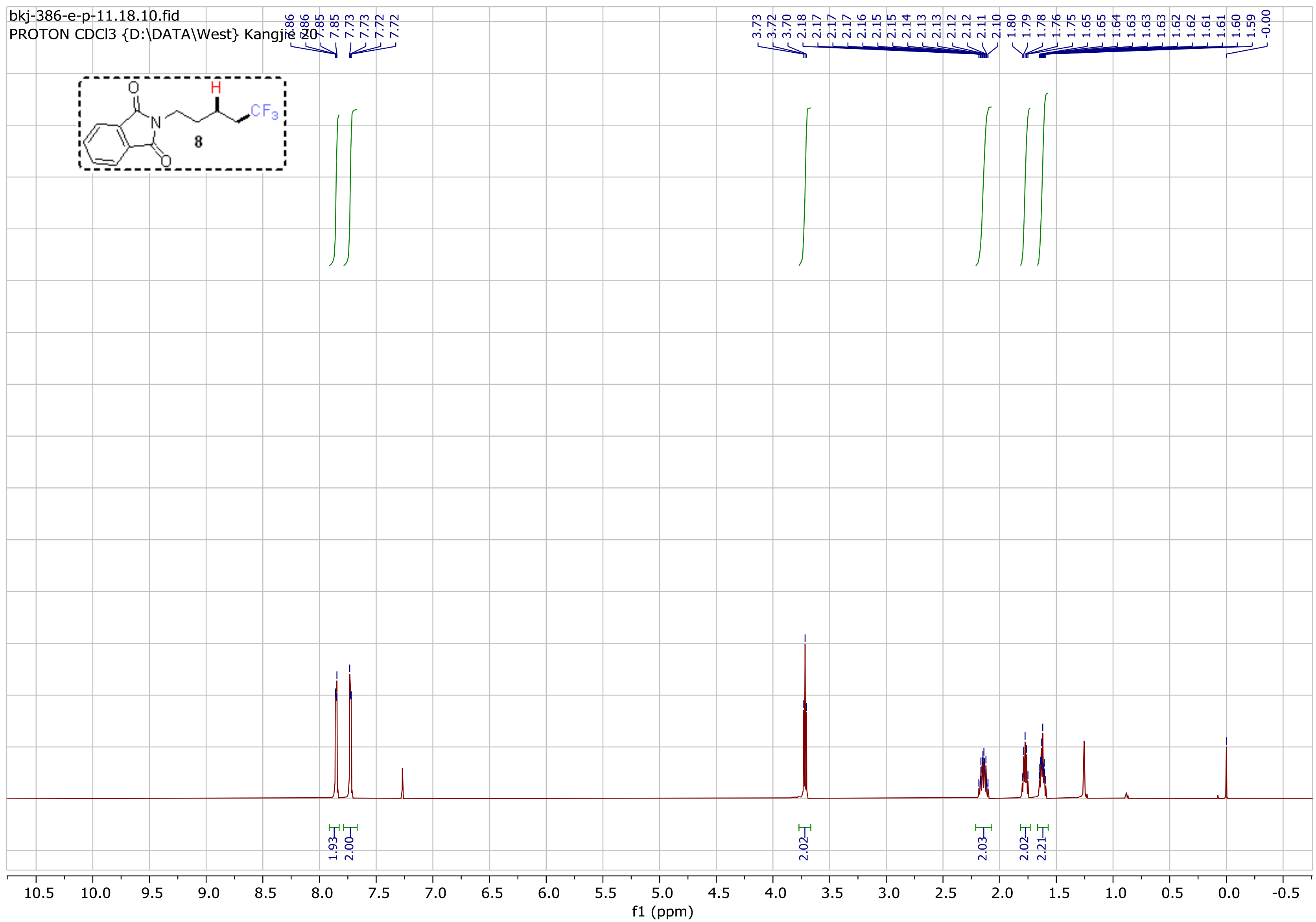
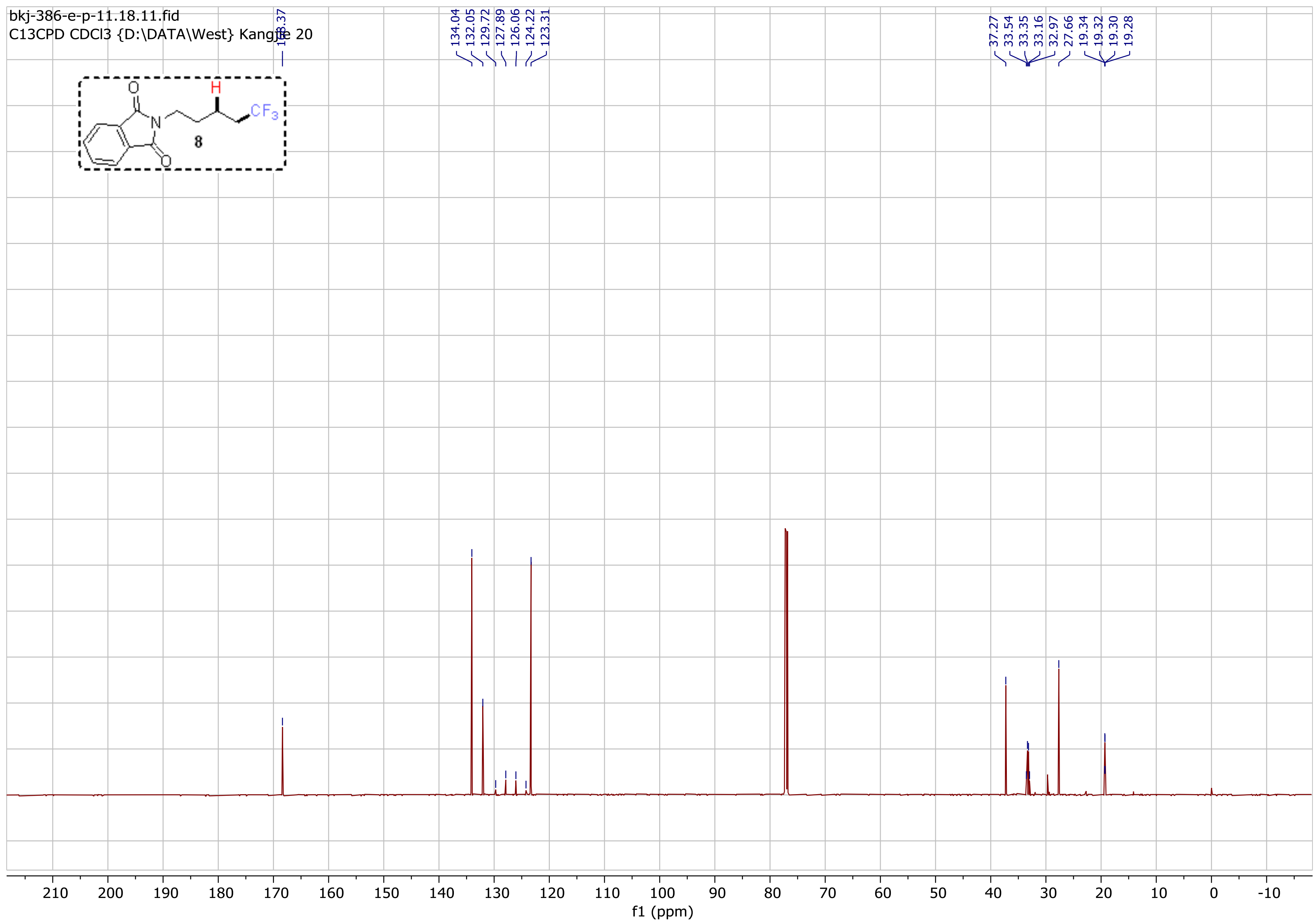
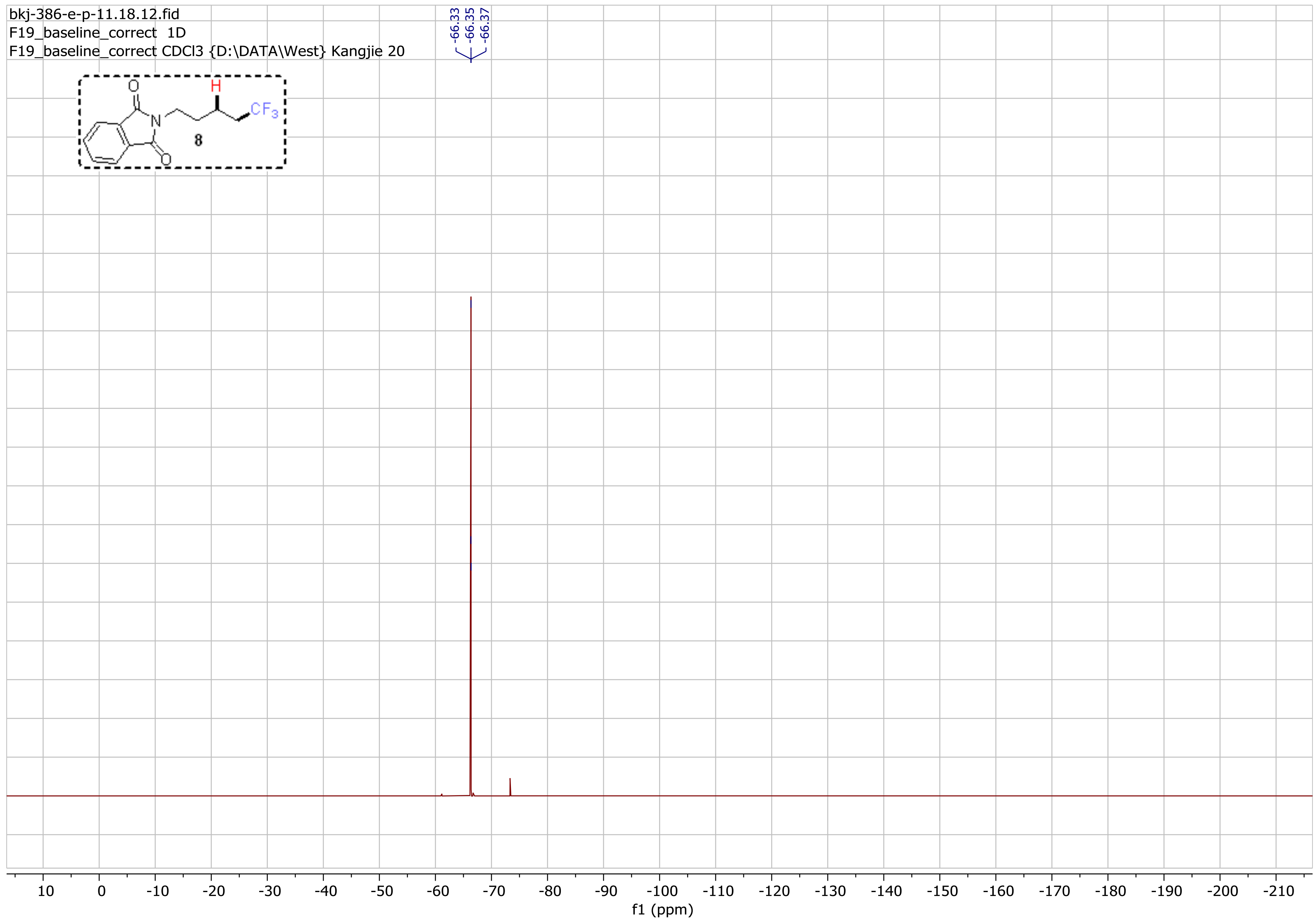
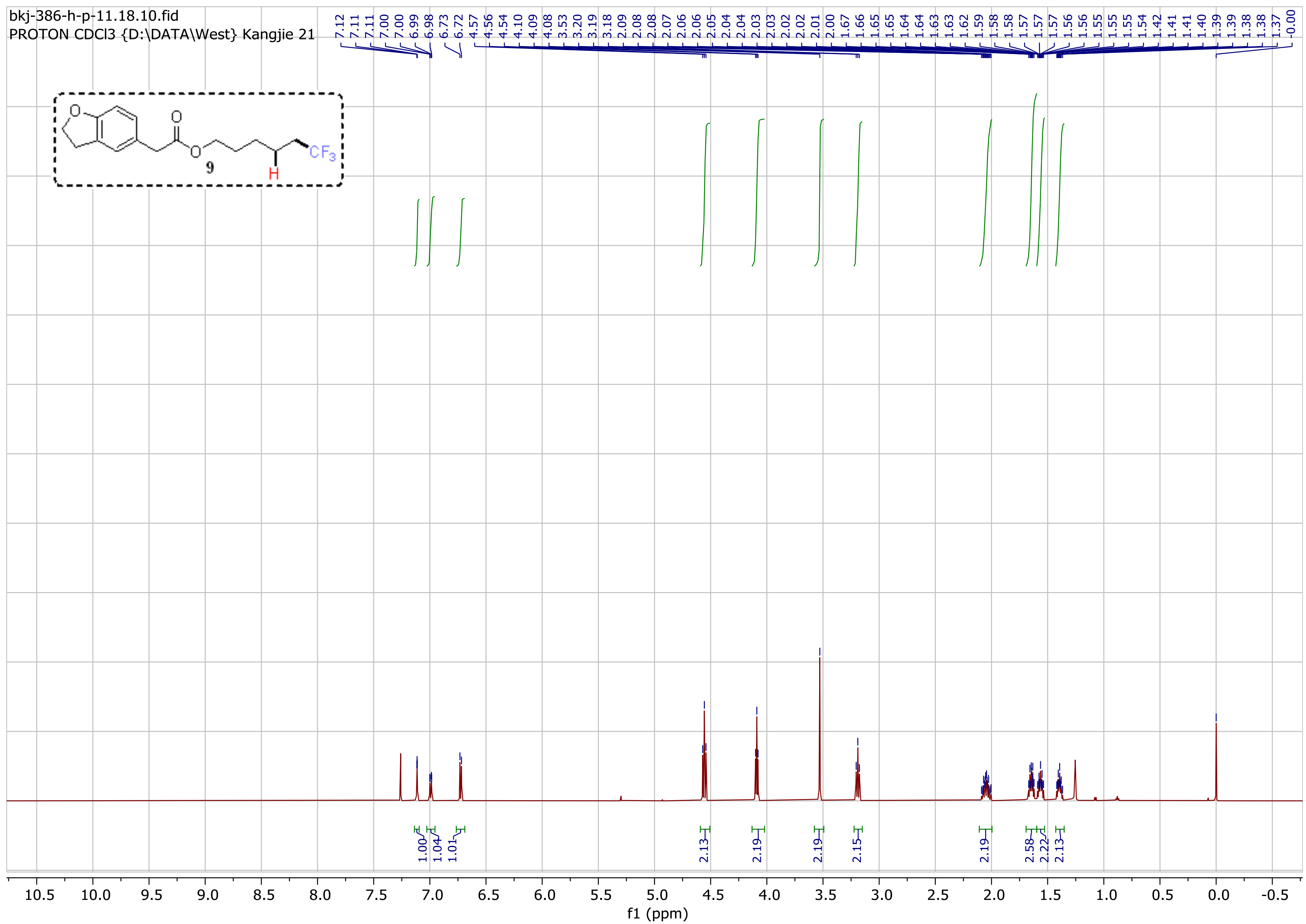
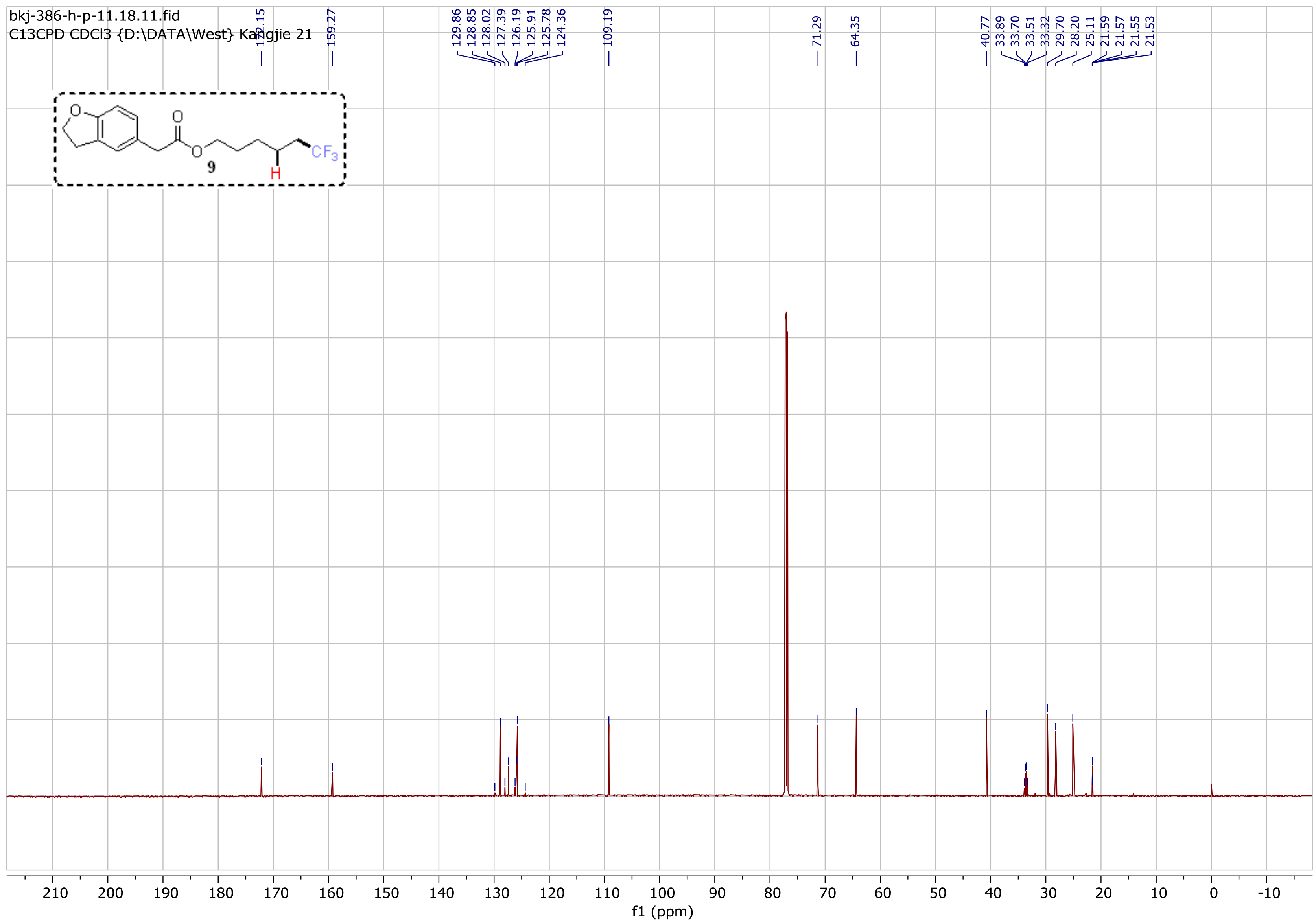
-66.39
-66.39
7
f1 (ppm)

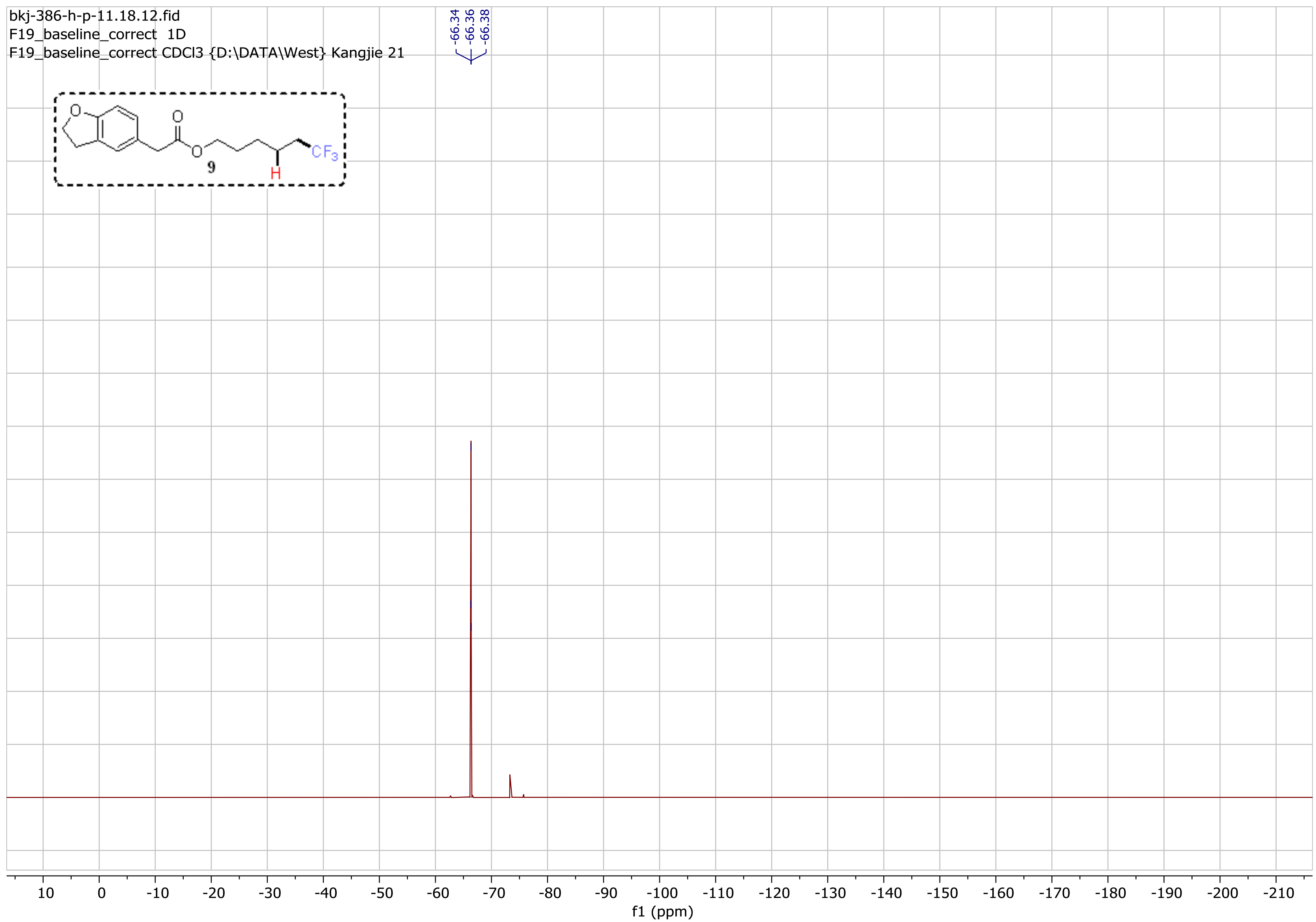

bkj-386-e-p-11.18.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 20
7.86
7.86
7.85
7.85
7.73
7.73
7.72
7.72
3.73
3.72
3.70
2.18
2.17
2.17
2.17
2.16
2.15
2.15
2.14
2.13
2.13
2.12
2.12
2.11
2.10
1.80
1.79
1.78
1.76
1.75
1.65
1.65
1.64
1.63
1.63
1.63
1.62
1.62
1.61
1.61
1.60
1.59
-0.00
O
N
O
H
CF3
8
1.93
2.00
2.02
2.03
2.02
2.21
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

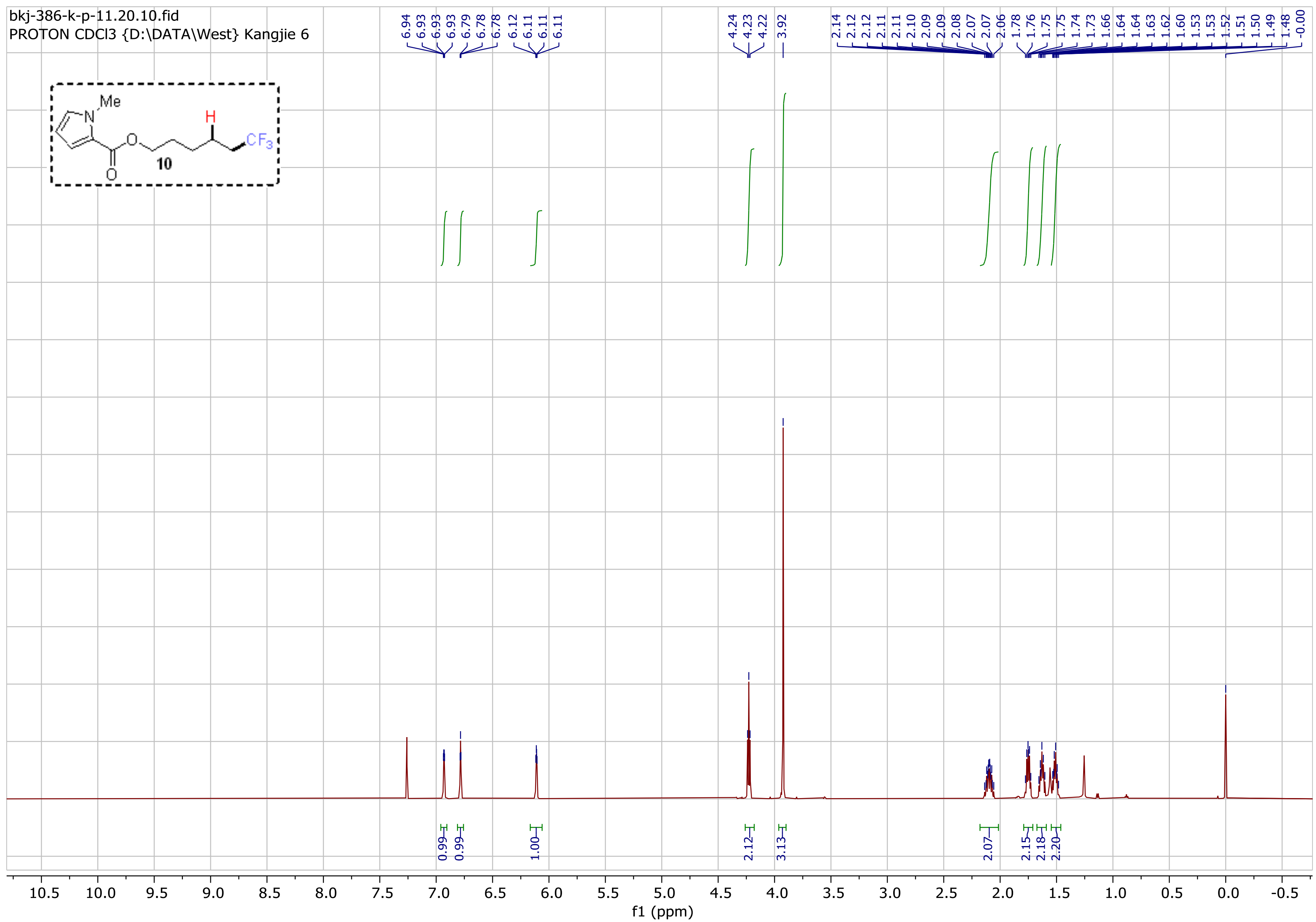

bkj-386-e-p-11.18.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 20
168.37
134.04
132.05
129.72
127.89
126.06
124.22
123.31
37.27
33.54
33.35
33.16
32.97
27.66
19.34
19.32
19.30
19.28
O
N
O
H
CF3
8
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

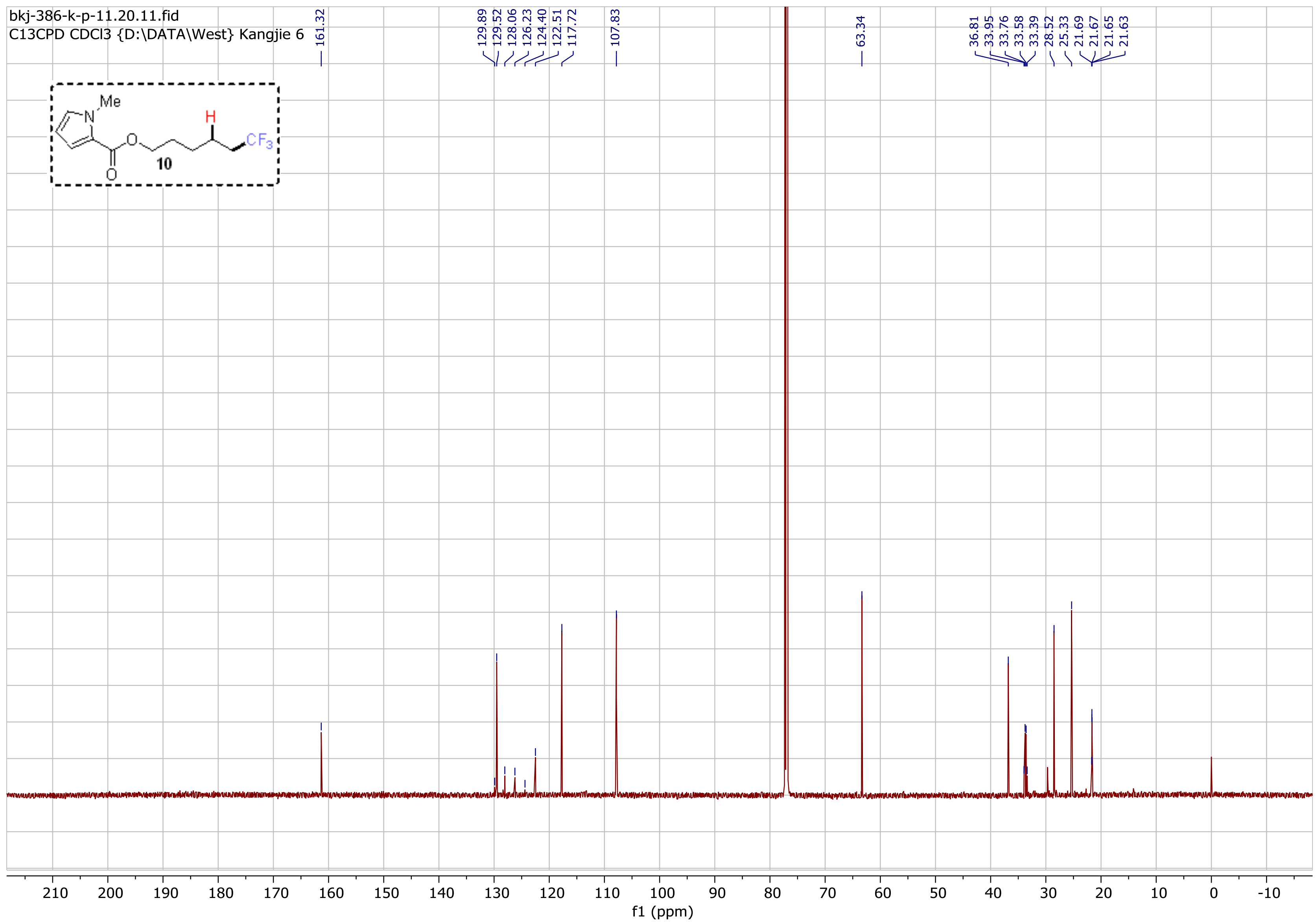

bkj-386-e-p-11.18.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 20
-66.33
-66.35
-66.37
O
N
H
CF3
O
8
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

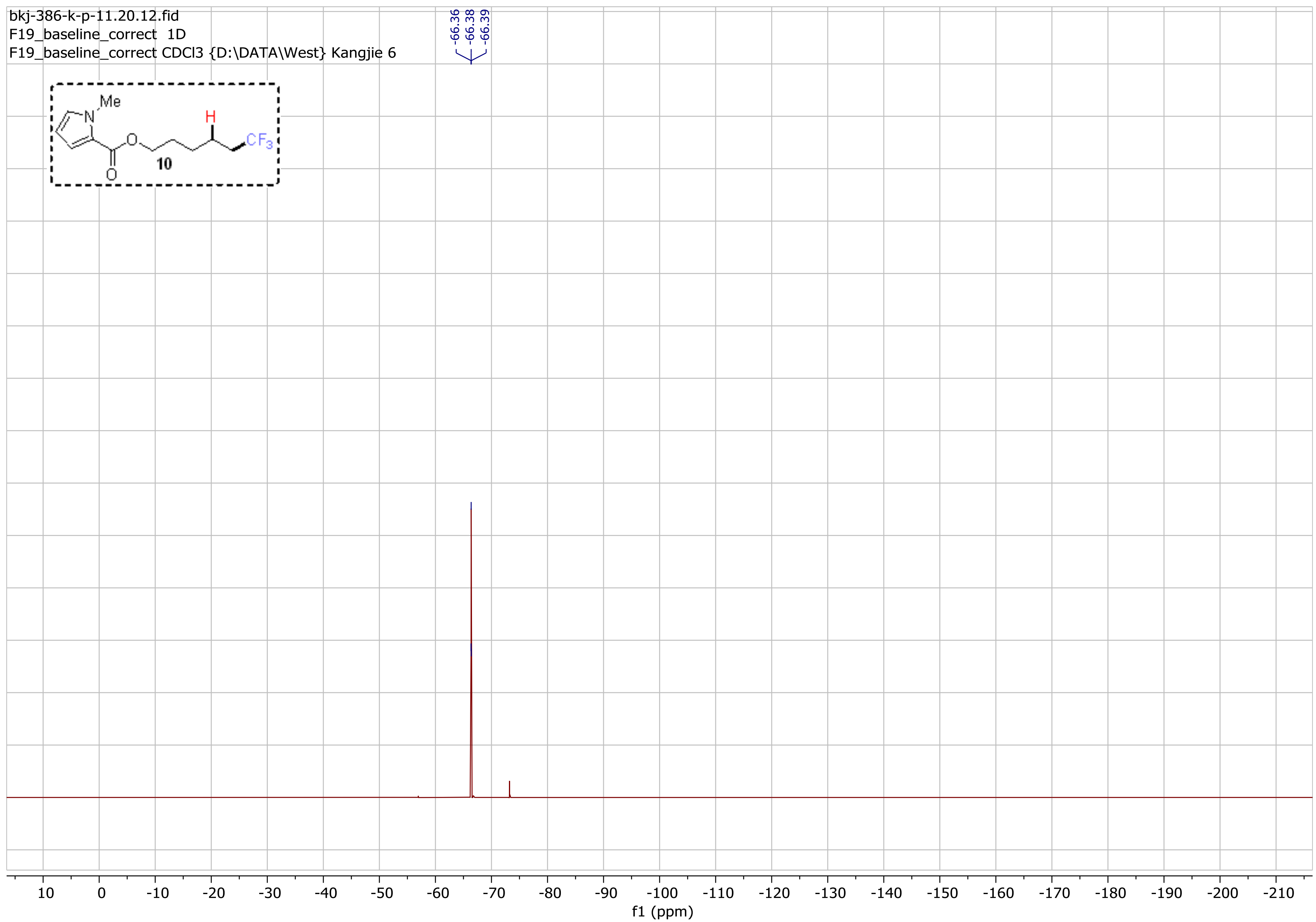

bkj-386-h-p-11.18.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 21
7.12 7.11 7.11 7.00 7.00 6.99 6.98 6.73 6.72 4.57 4.56 4.54 4.10 4.09 4.08 3.53 3.20 3.19 3.18 2.09 2.08 2.08 2.07 2.06 2.06 2.05 2.04 2.04 2.03 2.03 2.02 2.02 2.01 2.00 1.67 1.66 1.65 1.65 1.64 1.64 1.63 1.63 1.62 1.59 1.58 1.58 1.57 1.57 1.57 1.56 1.56 1.55 1.55 1.55 1.54 1.42 1.41 1.41 1.40 1.39 1.39 1.38 1.38 1.37 -0.00
9
1.00 1.04 1.01 2.13 2.19 2.19 2.15 2.19 2.58 2.22 2.13
f1 (ppm)

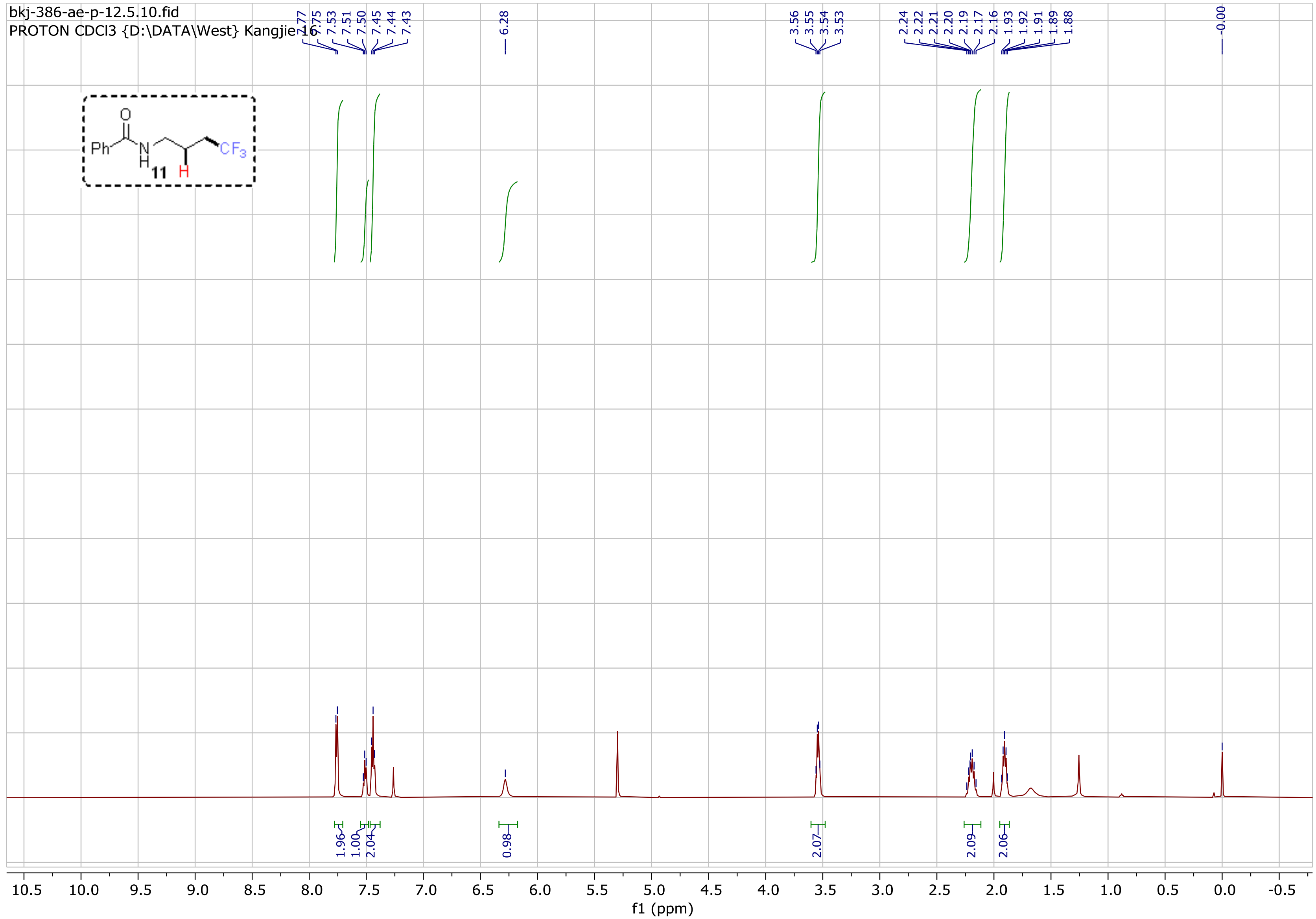

bkj-386-h-p-11.18.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 21
172.15
159.27
129.86
128.85
128.02
127.39
126.19
125.91
125.78
124.36
109.19
71.29
64.35
40.77
33.89
33.70
33.51
33.32
29.70
28.20
25.11
21.59
21.57
21.55
21.53
9
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

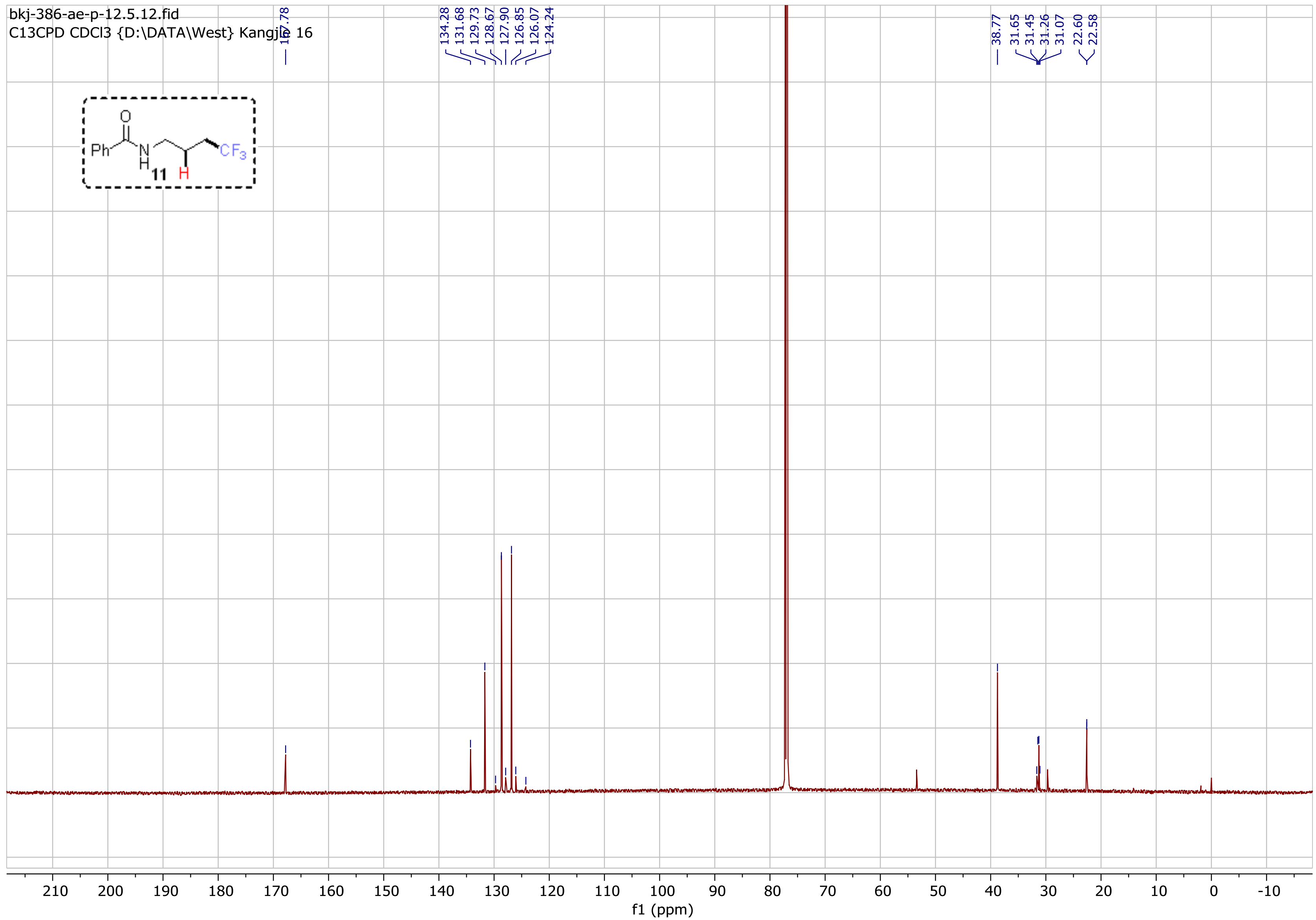

bkj-386-h-p-11.18.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 21
-66.34
-66.36
-66.38
9
f1 (ppm)

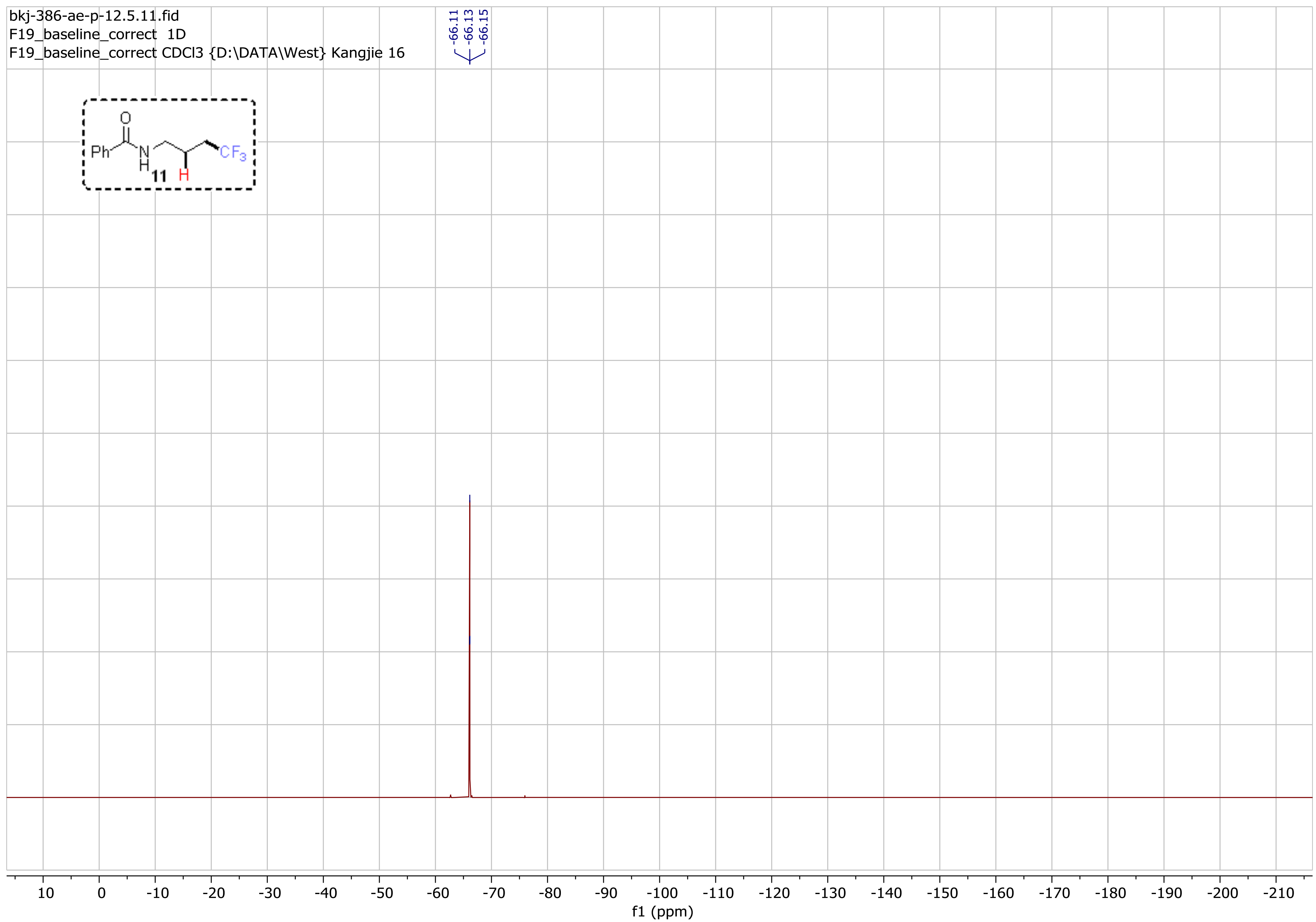

bkj-386-k-p-11.20.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 6
Me
N
O
O
H
CF3
10
6.94
6.93
6.93
6.93
6.79
6.78
6.78
6.12
6.11
6.11
6.11
4.24
4.23
4.22
3.92
2.14
2.12
2.12
2.11
2.11
2.10
2.09
2.09
2.08
2.07
2.07
2.06
1.78
1.76
1.75
1.75
1.74
1.73
1.66
1.64
1.64
1.63
1.62
1.60
1.53
1.53
1.52
1.51
1.50
1.49
1.48
-0.00
0.99
0.99
1.00
2.12
3.13
2.07
2.15
2.18
2.20
f1 (ppm)

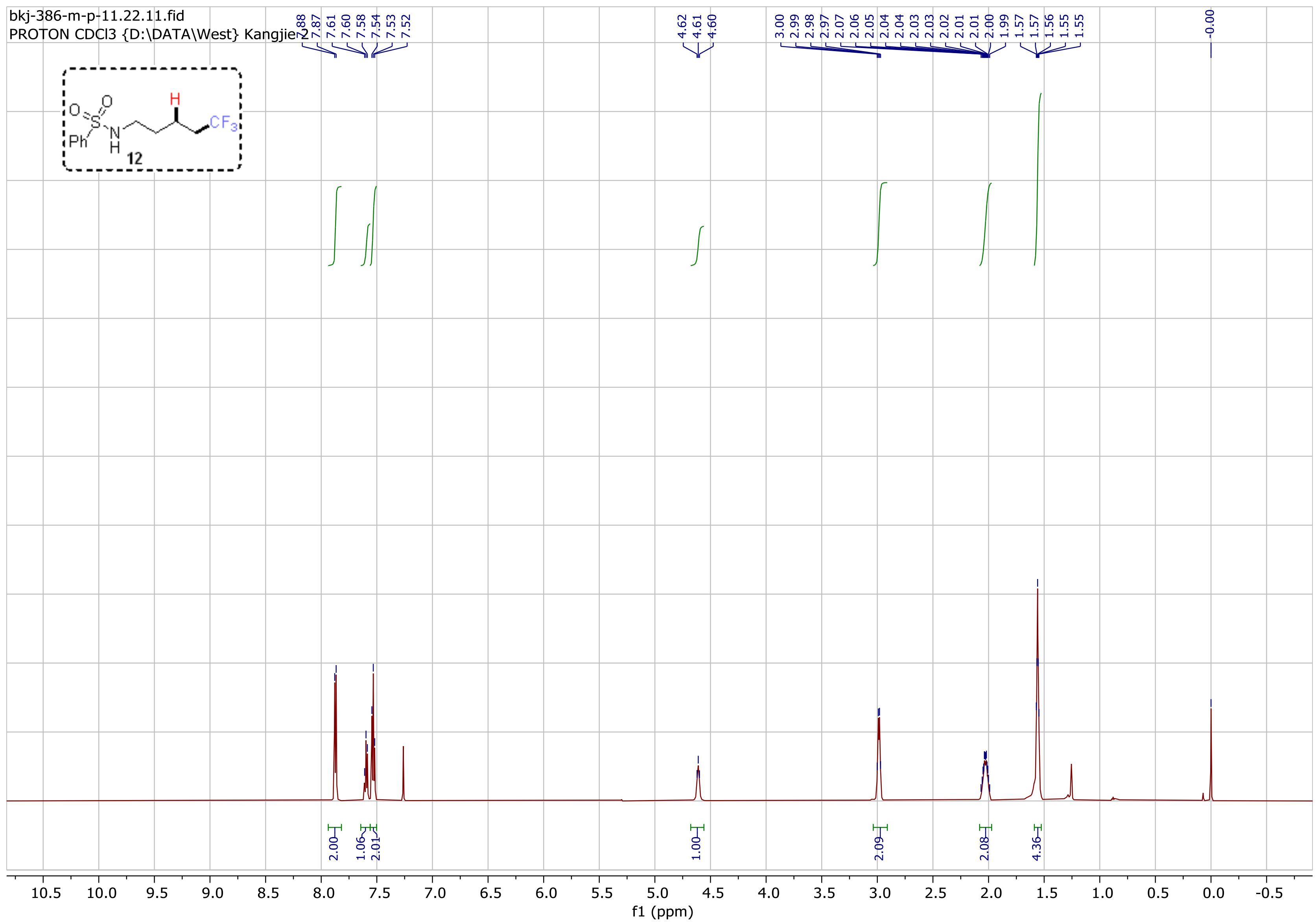

bkj-386-k-p-11.20.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 6
Me
N
O
O
H
CF3
10
161.32
129.89
129.52
128.06
126.23
124.40
122.51
117.72
107.83
63.34
36.81
33.95
33.76
33.58
33.39
28.52
25.33
21.69
21.67
21.65
21.63
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


bkj-386-k-p-11.20.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 6
-66.36
-66.38
-66.39
Me
N
O
O
10
H
CF3
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

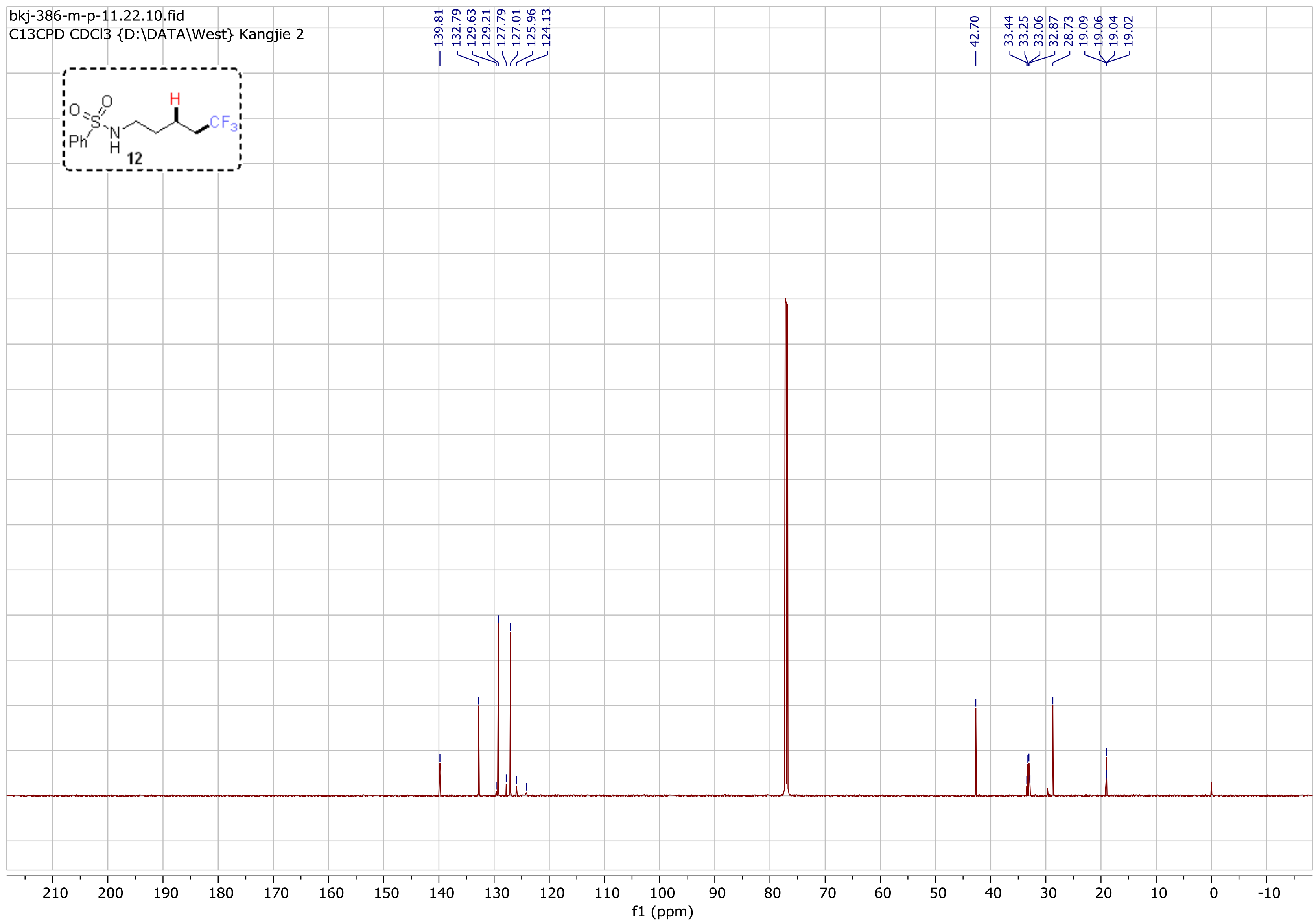

bkj-386-ae-p-12.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 16
7.77
7.75
7.53
7.51
7.50
7.45
7.44
7.43
6.28
3.56
3.55
3.54
3.53
2.24
2.22
2.21
2.20
2.19
2.17
2.16
1.93
1.92
1.91
1.89
1.88
-0.00
Ph
O
N
H
11
H
CF3
1.96
1.00
2.04
0.98
2.07
2.09
2.06
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

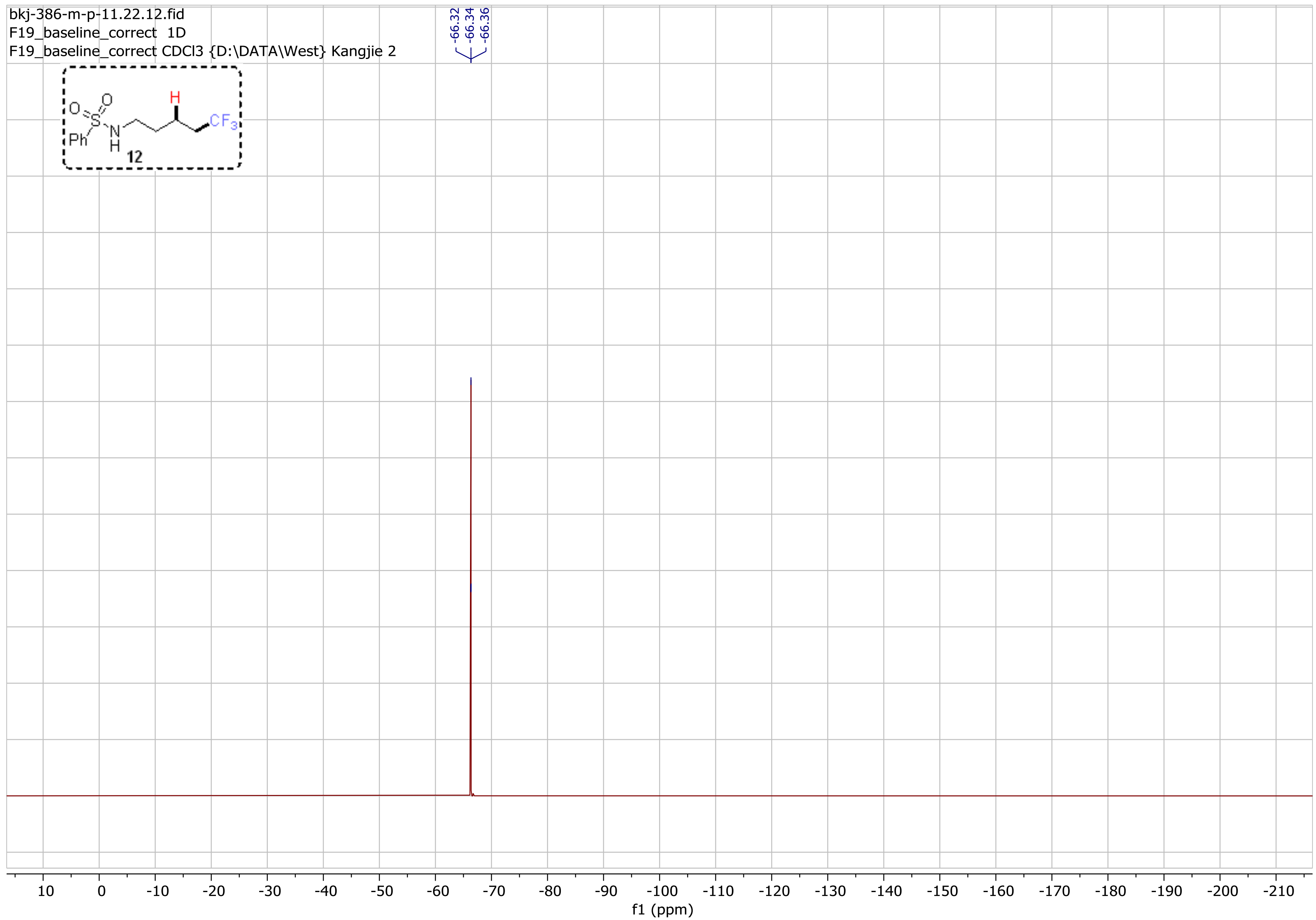

bkj-386-ae-p-12.5.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 16
167.78
134.28
131.68
129.73
128.67
127.90
126.85
126.07
124.24
38.77
31.65
31.45
31.26
31.07
22.60
22.58
Ph
O
N
H
11
H
CF3
f1 (ppm)

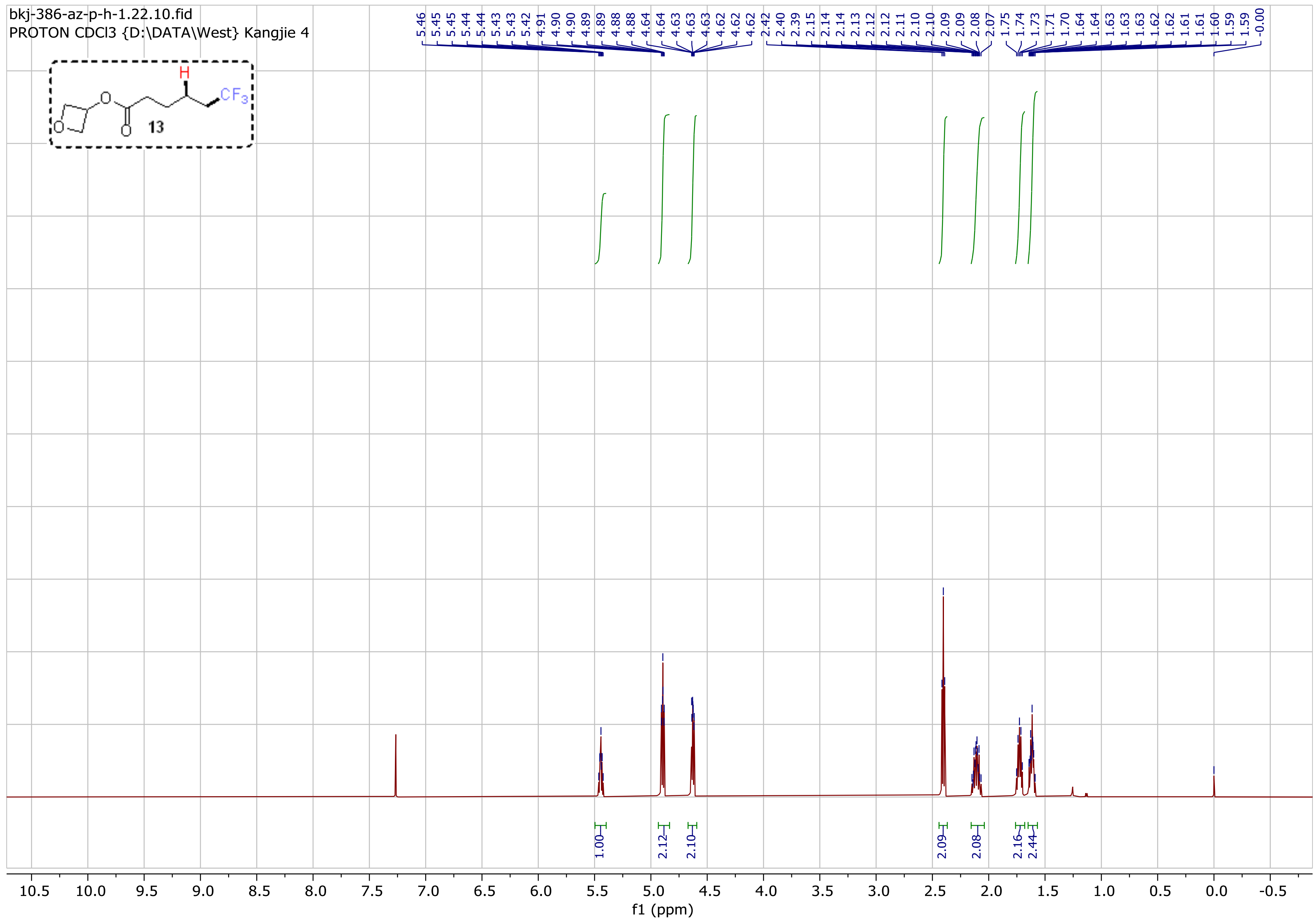

bkj-386-ae-p-12.5.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 16
-66.11
-66.13
-66.15
O
Ph
N
H
11
H
CF3
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

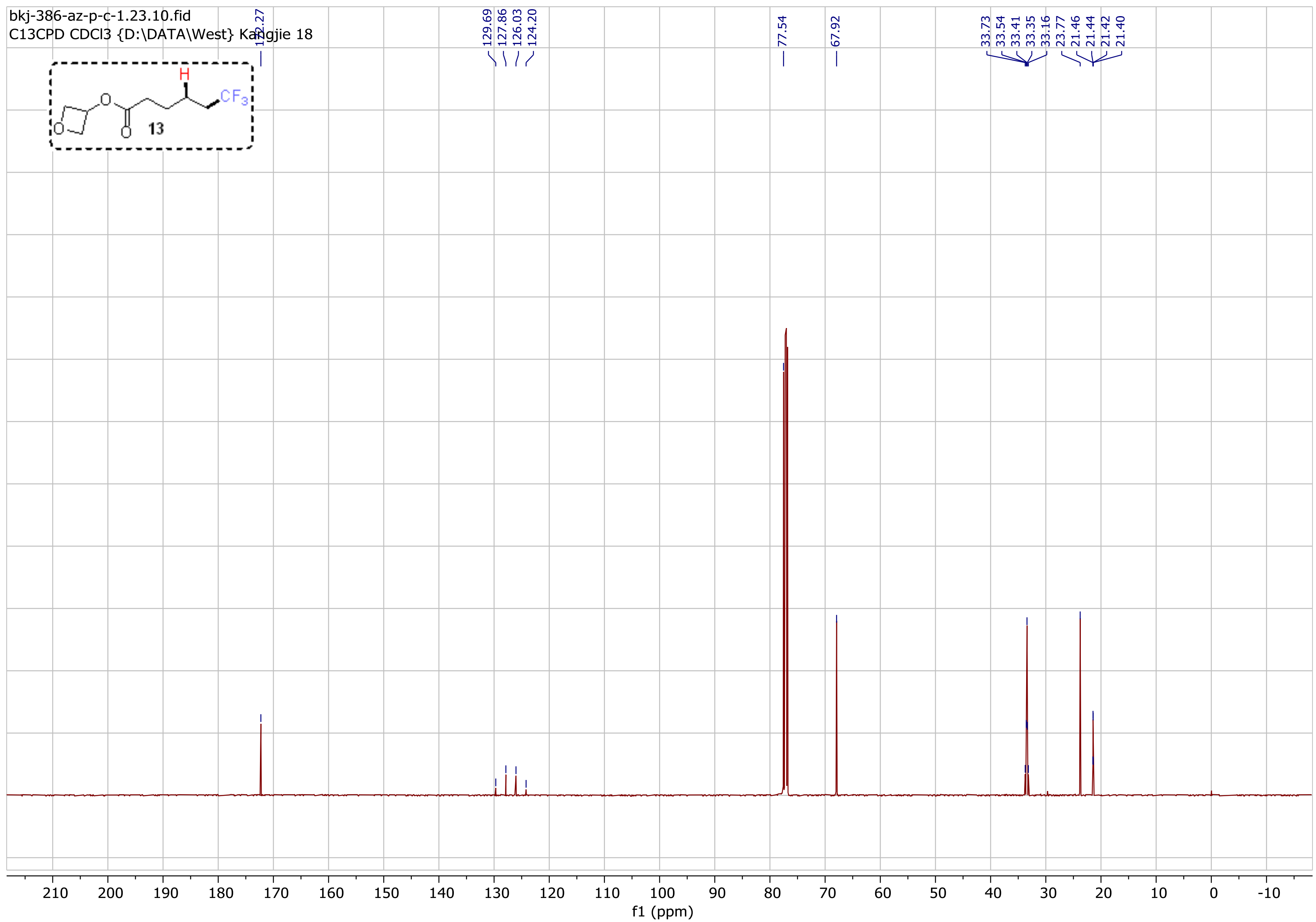


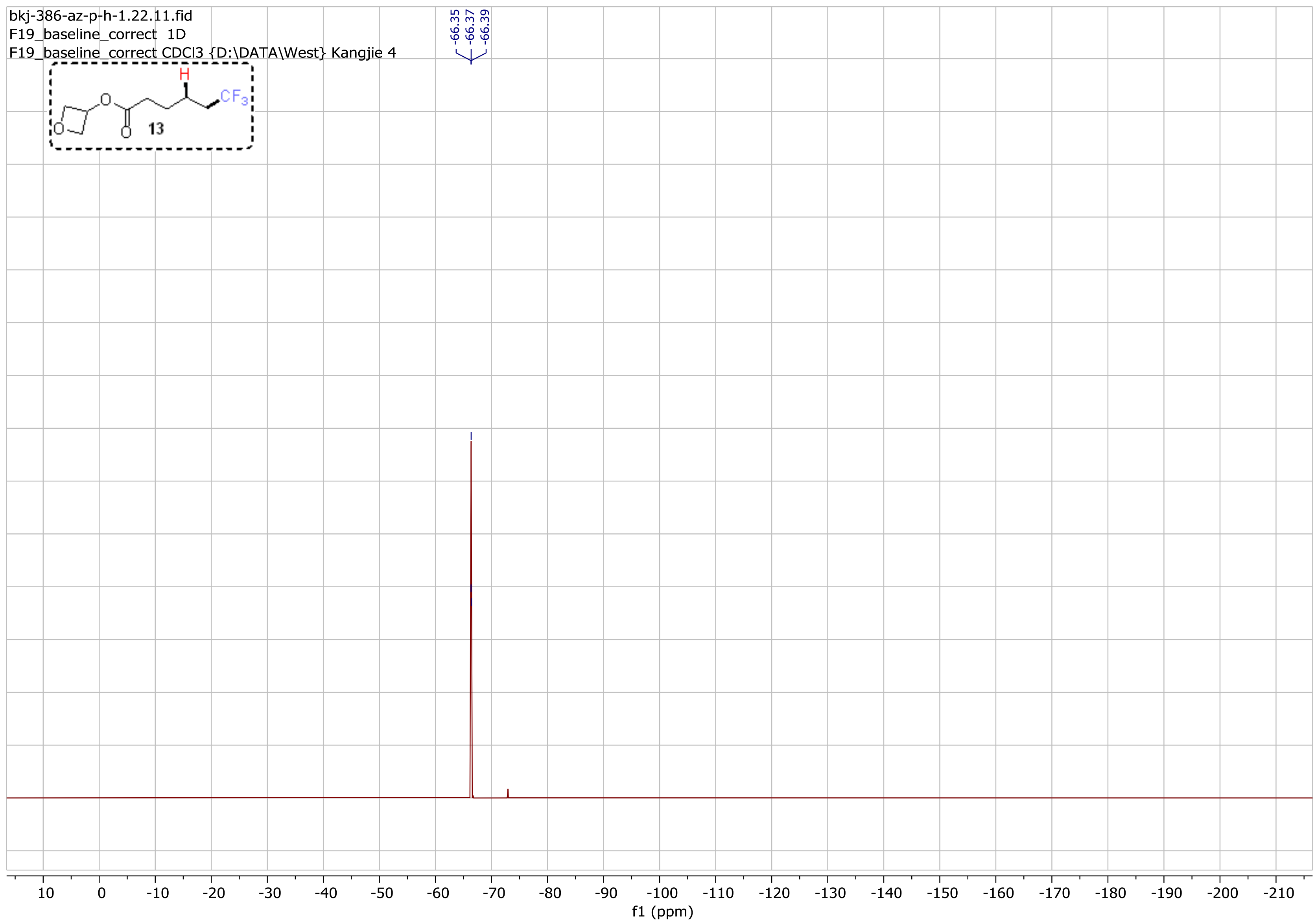
bkj-386-m-p-11.22.11.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 2
7.88 7.87 7.61 7.60 7.58 7.54 7.53 7.52
4.62 4.61 4.60
3.00 2.99 2.98 2.97 2.07 2.06 2.05 2.04 2.04 2.03 2.03 2.02 2.01 2.01 2.00 1.99 1.57 1.57 1.56 1.55 1.55
-0.00
12
2.00 1.06 2.01 1.00 2.09 2.08 4.36
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


bkj-386-m-p-11.22.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 2
12
139.81
132.79
129.63
129.21
127.79
127.01
125.96
124.13
42.70
33.44
33.25
33.06
32.87
28.73
19.09
19.06
19.04
19.02
f1 (ppm)

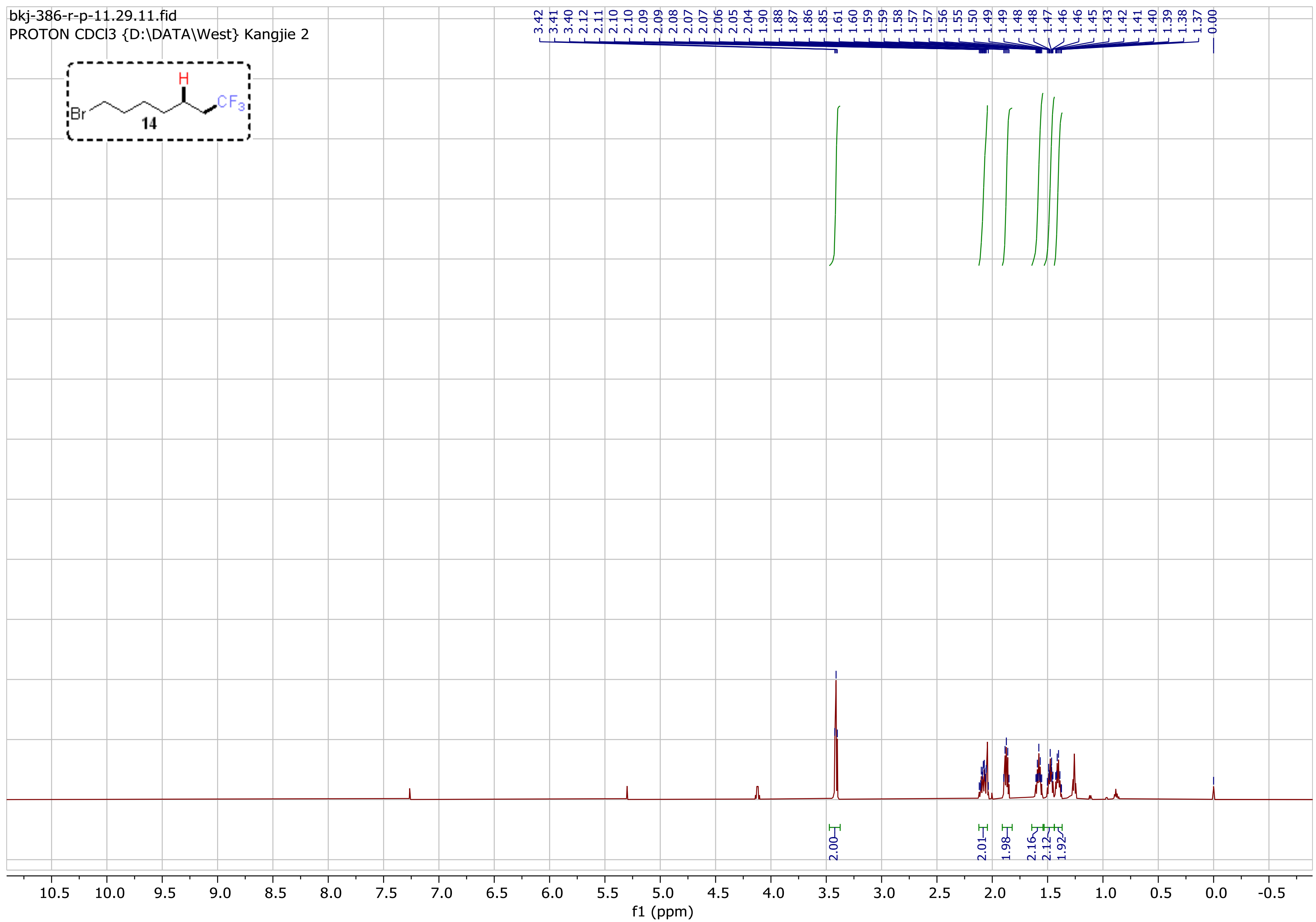

bkj-386-m-p-11.22.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 2
-66.32
-66.34
-66.36
O
O
S
Ph
N
H
H
CF3
12
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

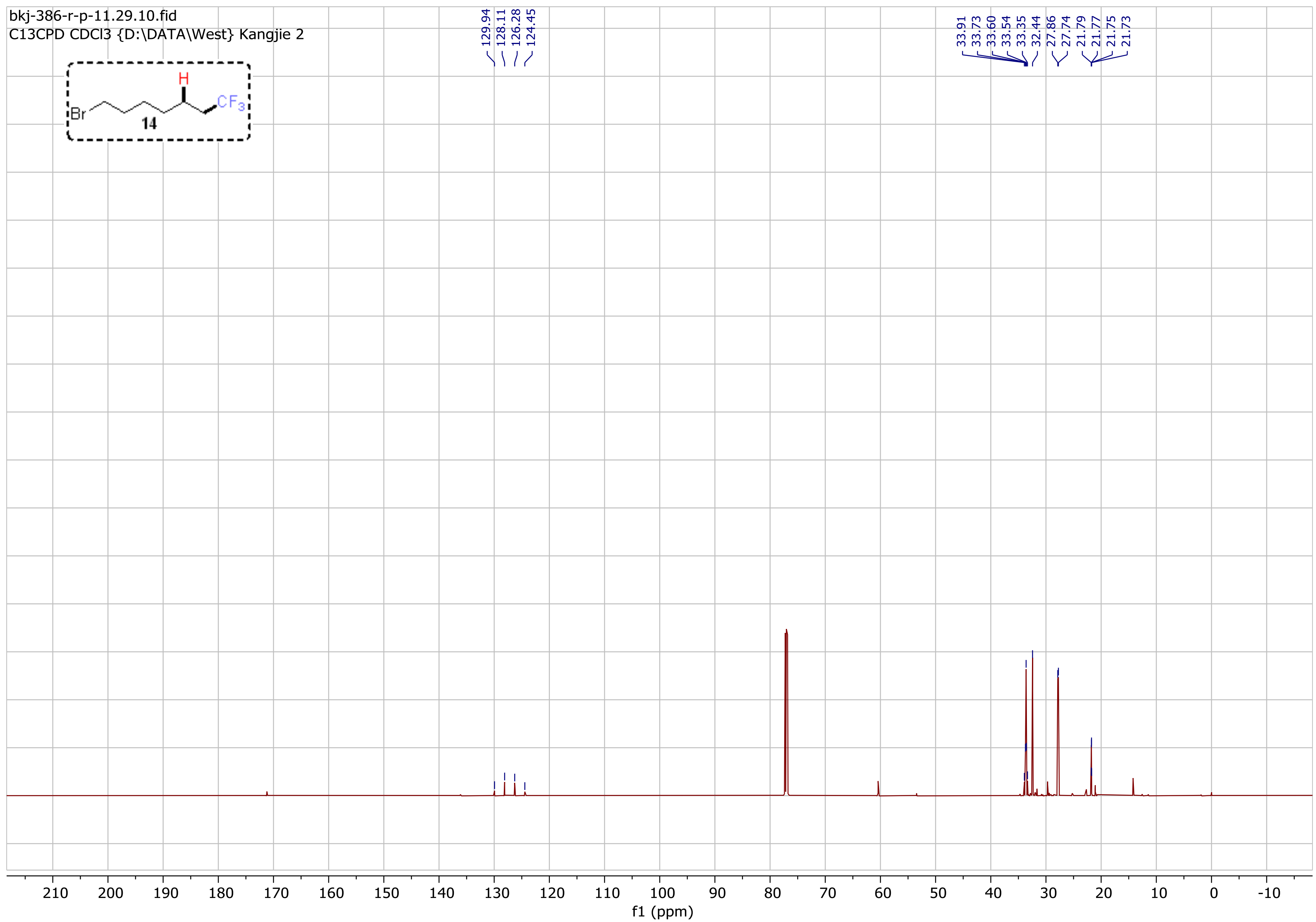

bkj-386-az-p-h-1.22.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 4
13
H
CF3
5.46 5.45 5.45 5.44 5.44 5.43 5.43 5.42 4.91 4.90 4.90 4.89 4.89 4.88 4.88 4.64 4.64 4.63 4.63 4.63 4.62 4.62 4.62 2.42 2.40 2.39 2.15 2.14 2.14 2.13 2.12 2.12 2.11 2.10 2.10 2.09 2.09 2.08 2.07 1.75 1.74 1.73 1.71 1.70 1.64 1.64 1.63 1.63 1.63 1.62 1.62 1.61 1.61 1.60 1.59 1.59 -0.00
1.00
2.12
2.10
2.09
2.08
2.16
2.44
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

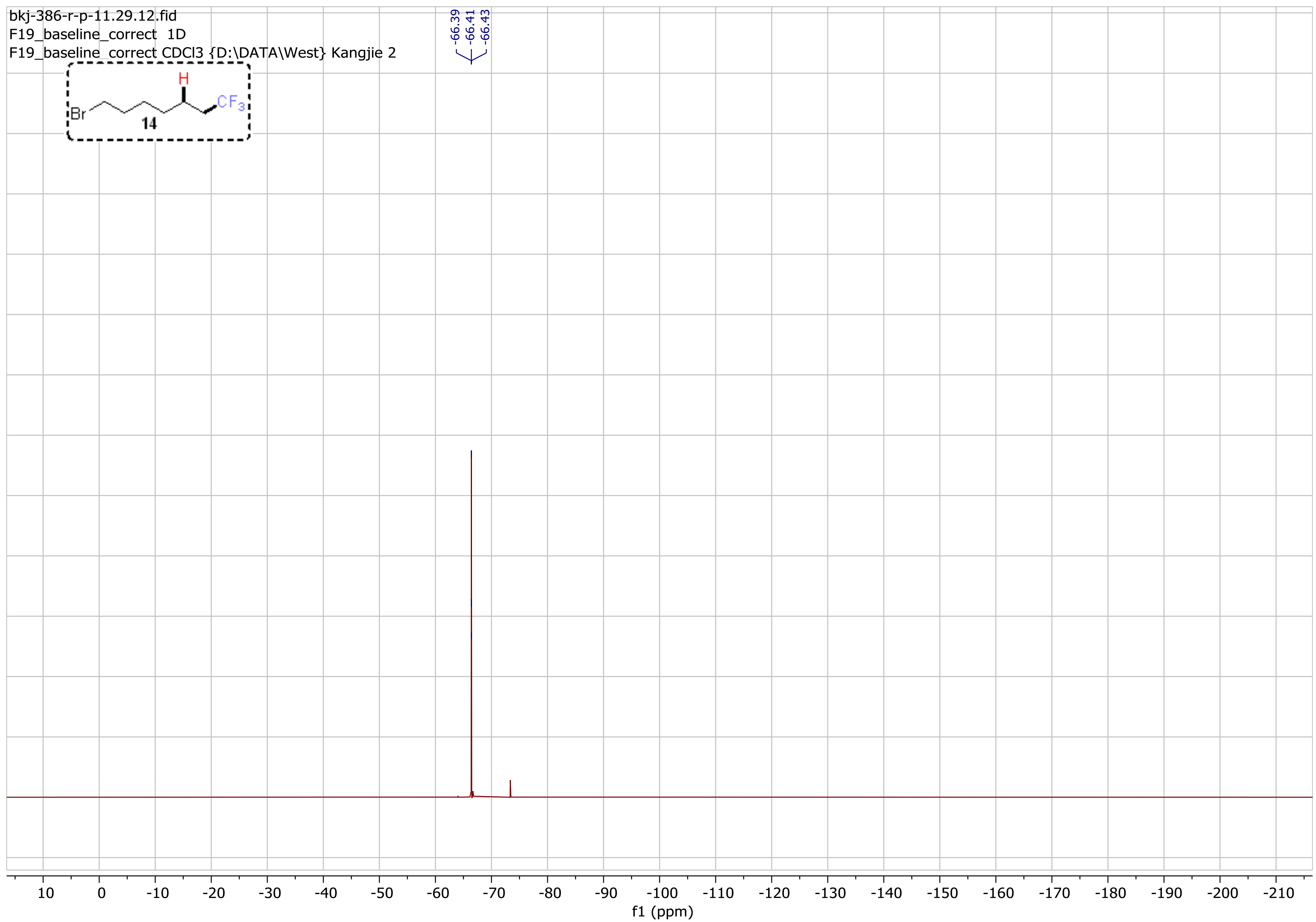

bkj-386-az-p-c-1.23.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 18
172.27
129.69
127.86
126.03
124.20
77.54
67.92
33.73
33.54
33.41
33.35
33.16
23.77
21.46
21.44
21.42
21.40
13
f1 (ppm)



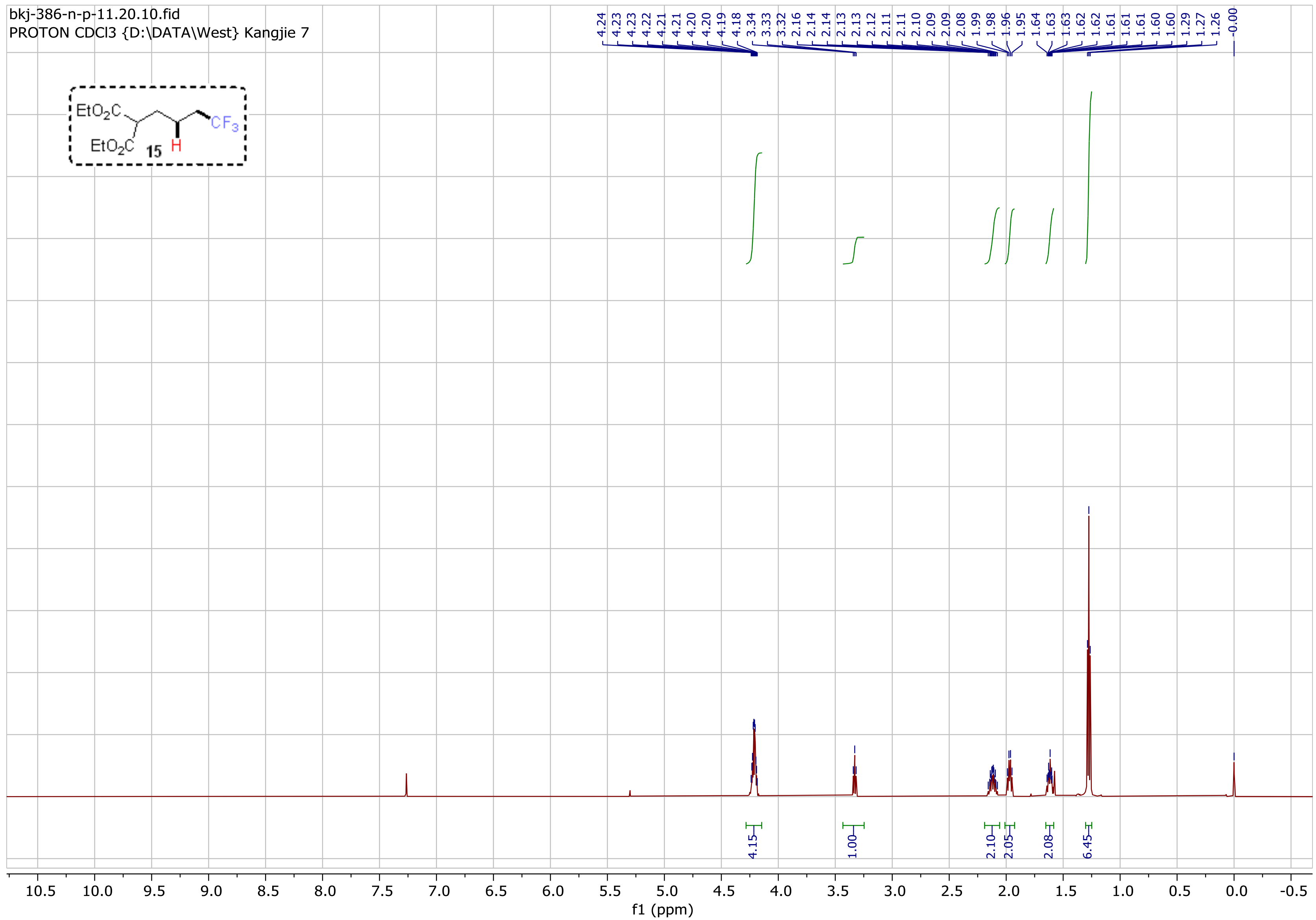
bkj-386-az-p-h-1.22.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 4
-66.35
-66.37
-66.39
H
CF3
O
O
O
13
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


bkj-386-r-p-11.29.11.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 2
Br
H
CF3
14
3.42 3.41 3.40 2.12 2.11 2.10 2.10 2.09 2.09 2.08 2.07 2.07 2.06 2.05 2.04 1.90 1.88 1.87 1.86 1.85 1.61 1.60 1.59 1.59 1.58 1.57 1.57 1.56 1.55 1.50 1.49 1.49 1.48 1.48 1.47 1.46 1.46 1.45 1.43 1.42 1.41 1.40 1.39 1.38 1.37 0.00
2.00
2.01
1.98
2.16
2.12
1.92
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

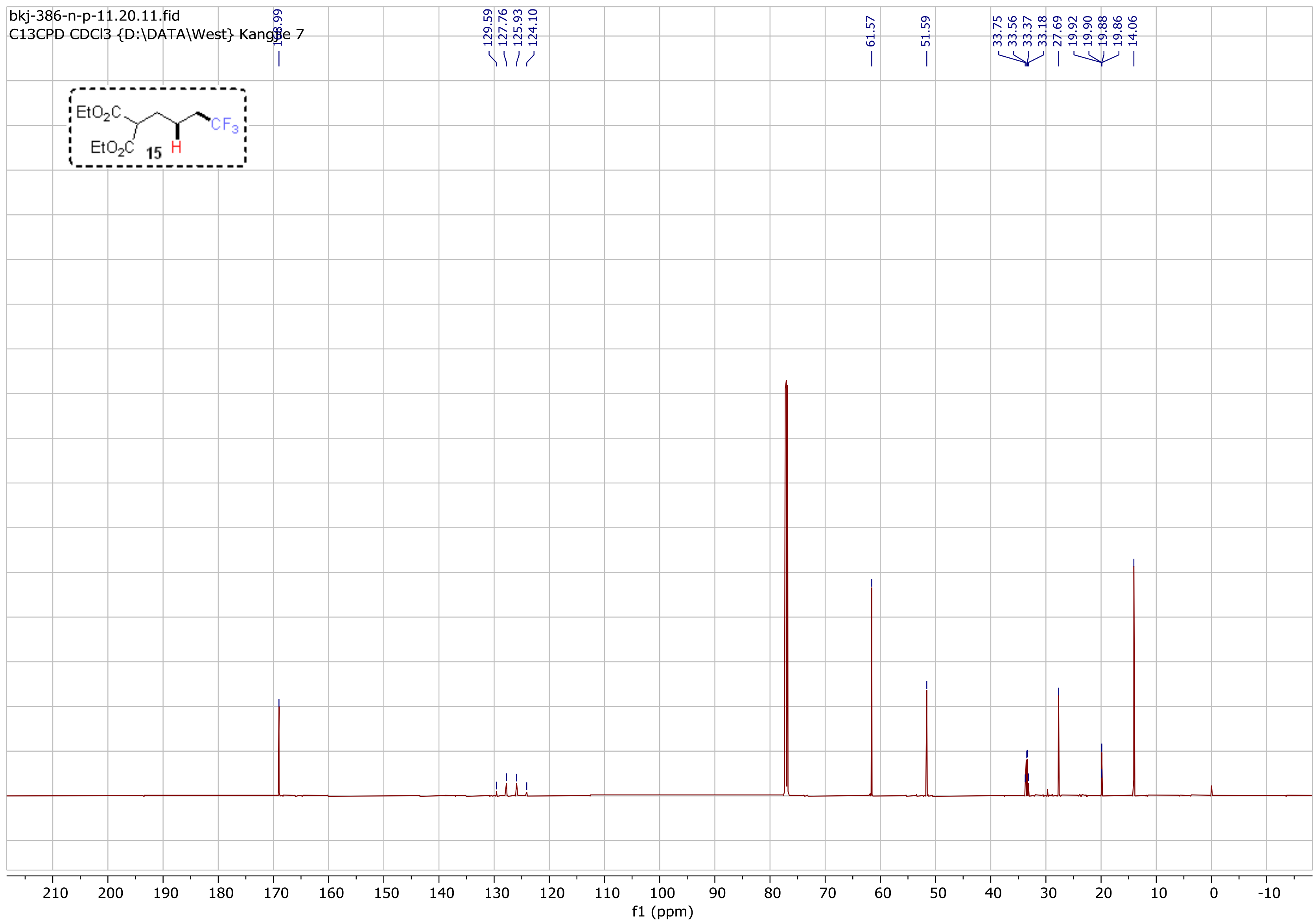

bkj-386-r-p-11.29.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 2
Br
H
CF3
14
129.94
128.11
126.28
124.45
33.91
33.73
33.60
33.54
33.35
32.44
27.86
27.74
21.79
21.77
21.75
21.73
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



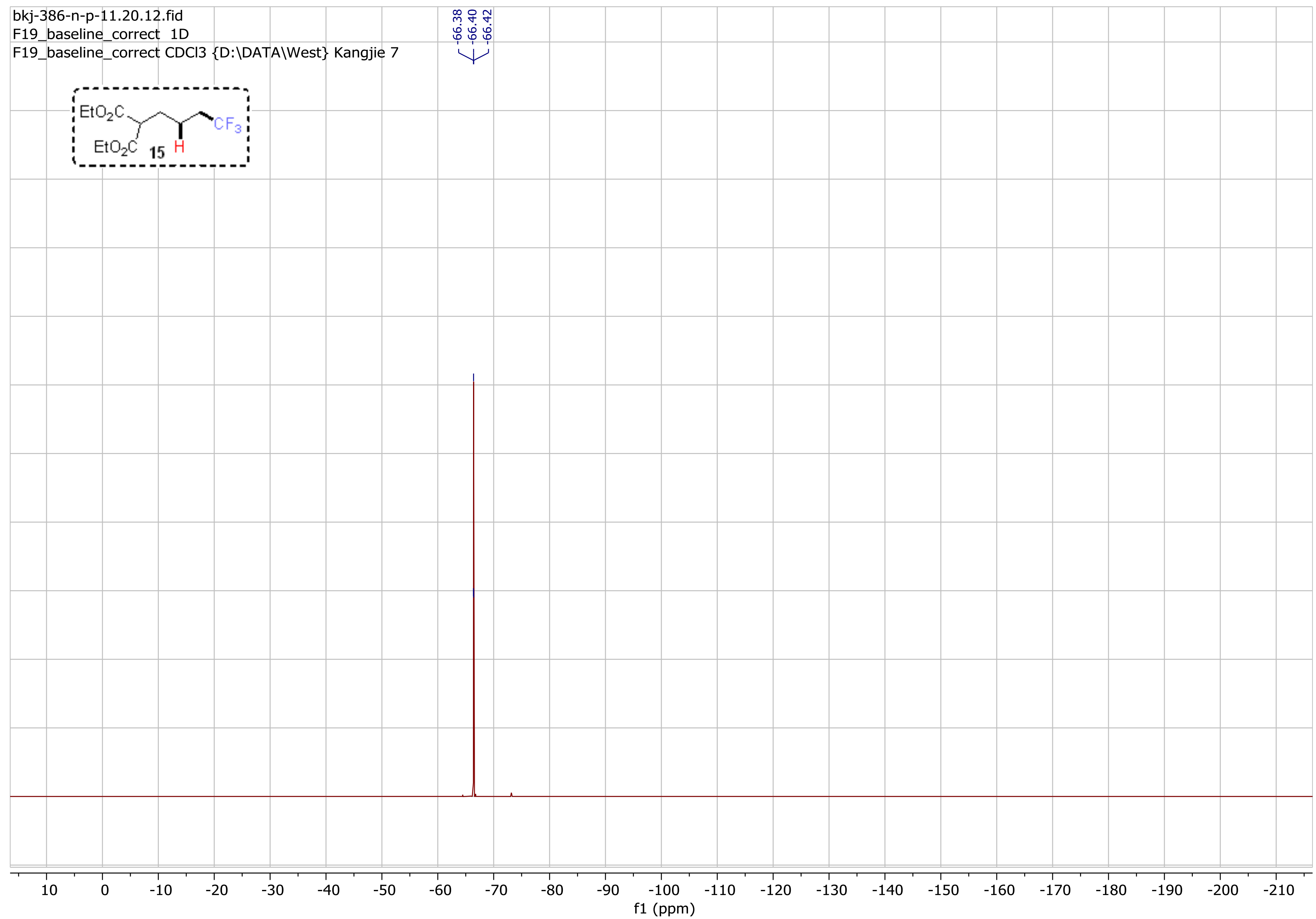
bkj-386-r-p-11.29.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 2
Br
H
CF3
14
-66.39
-66.41
-66.43
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

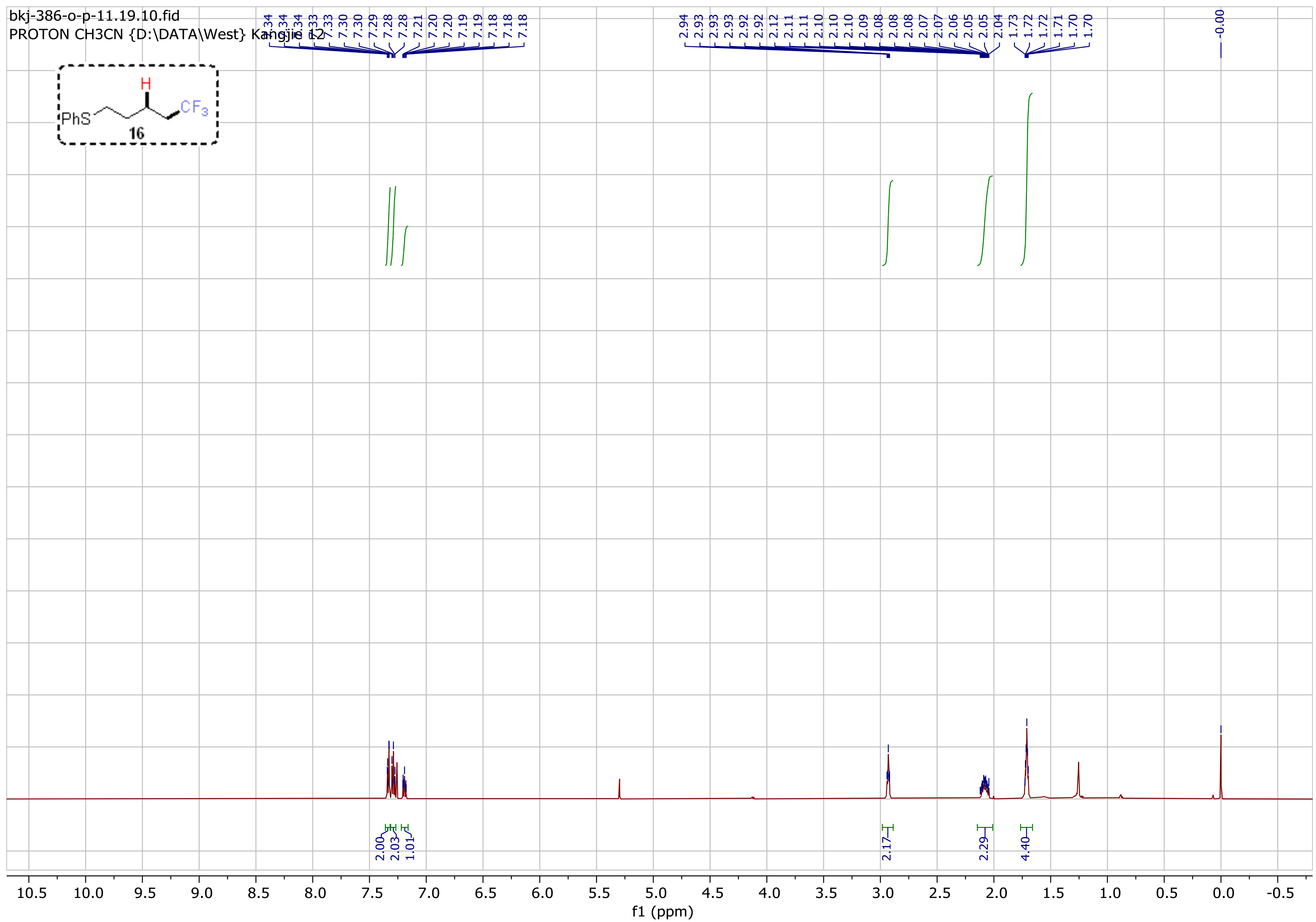


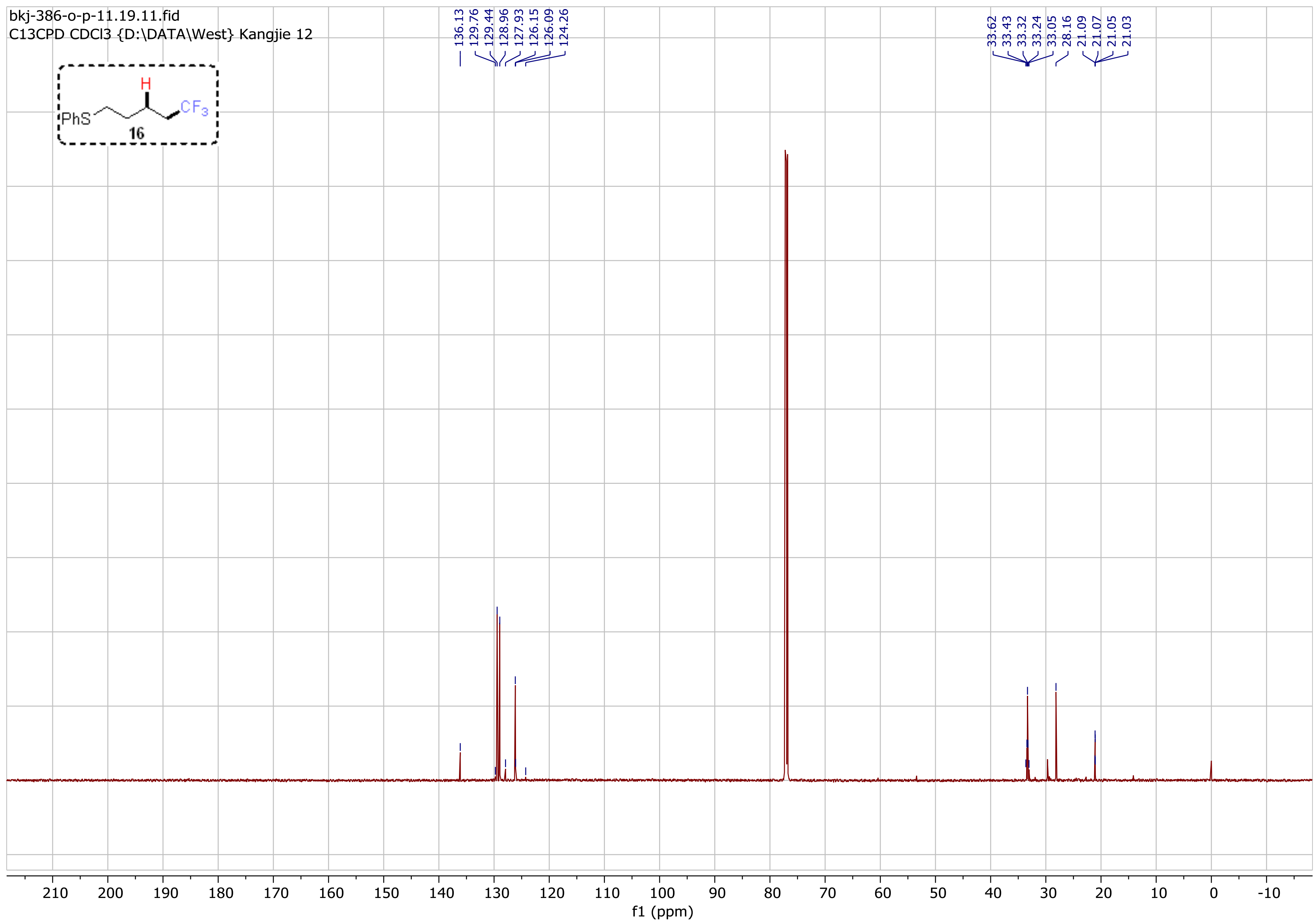
bkj-386-n-p-11.20.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
EtO2C
EtO2C
15
H
CF3
4.24 4.23 4.23 4.22 4.21 4.21 4.20 4.20 4.19 4.18 3.34 3.33 3.32 2.16 2.14 2.14 2.13 2.13 2.12 2.11 2.11 2.10 2.09 2.09 2.08 1.99 1.98 1.96 1.95 1.64 1.63 1.63 1.62 1.62 1.61 1.61 1.61 1.60 1.60 1.29 1.27 1.26 -0.00
4.15
1.00
2.10
2.05
2.08
6.45
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

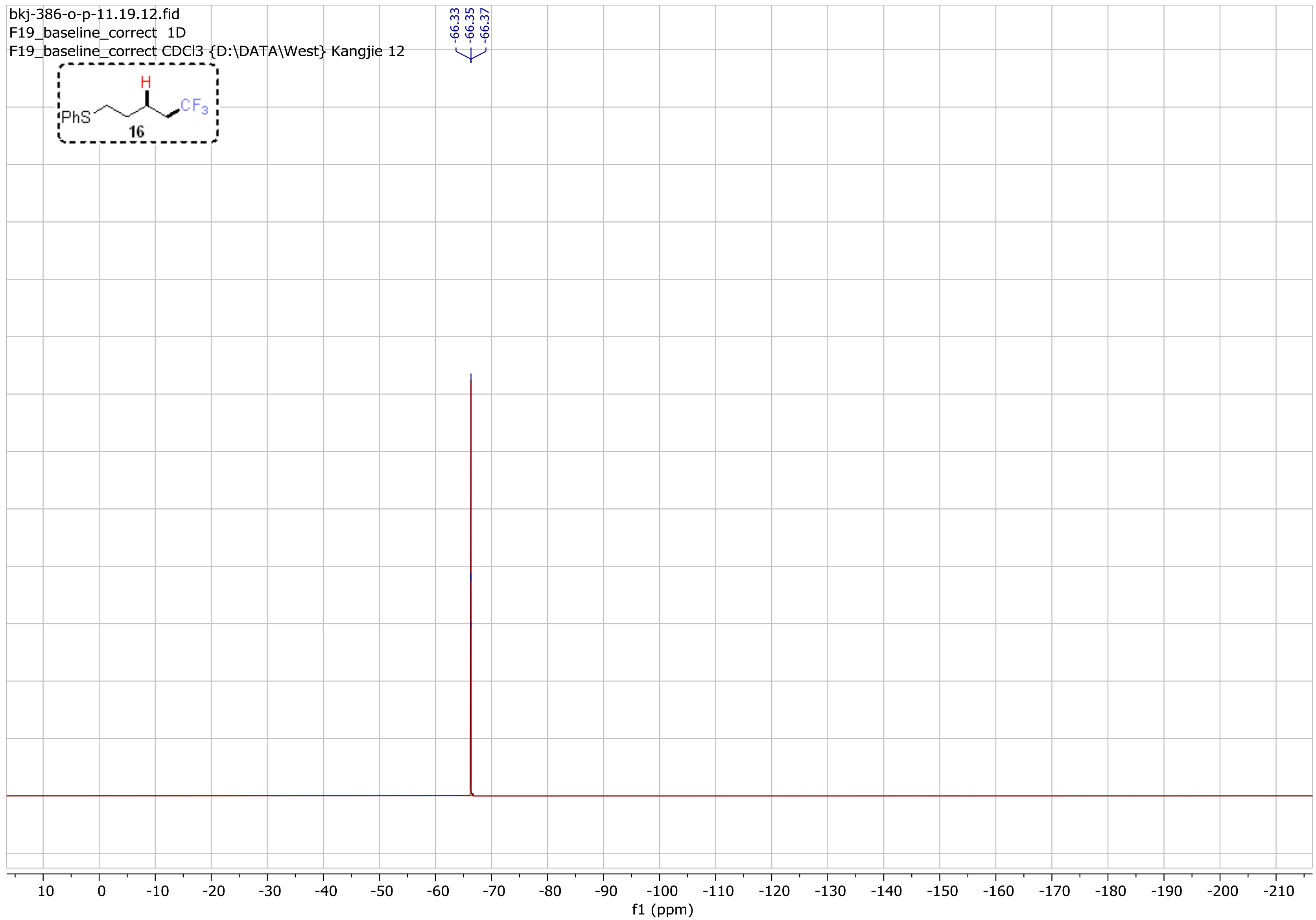


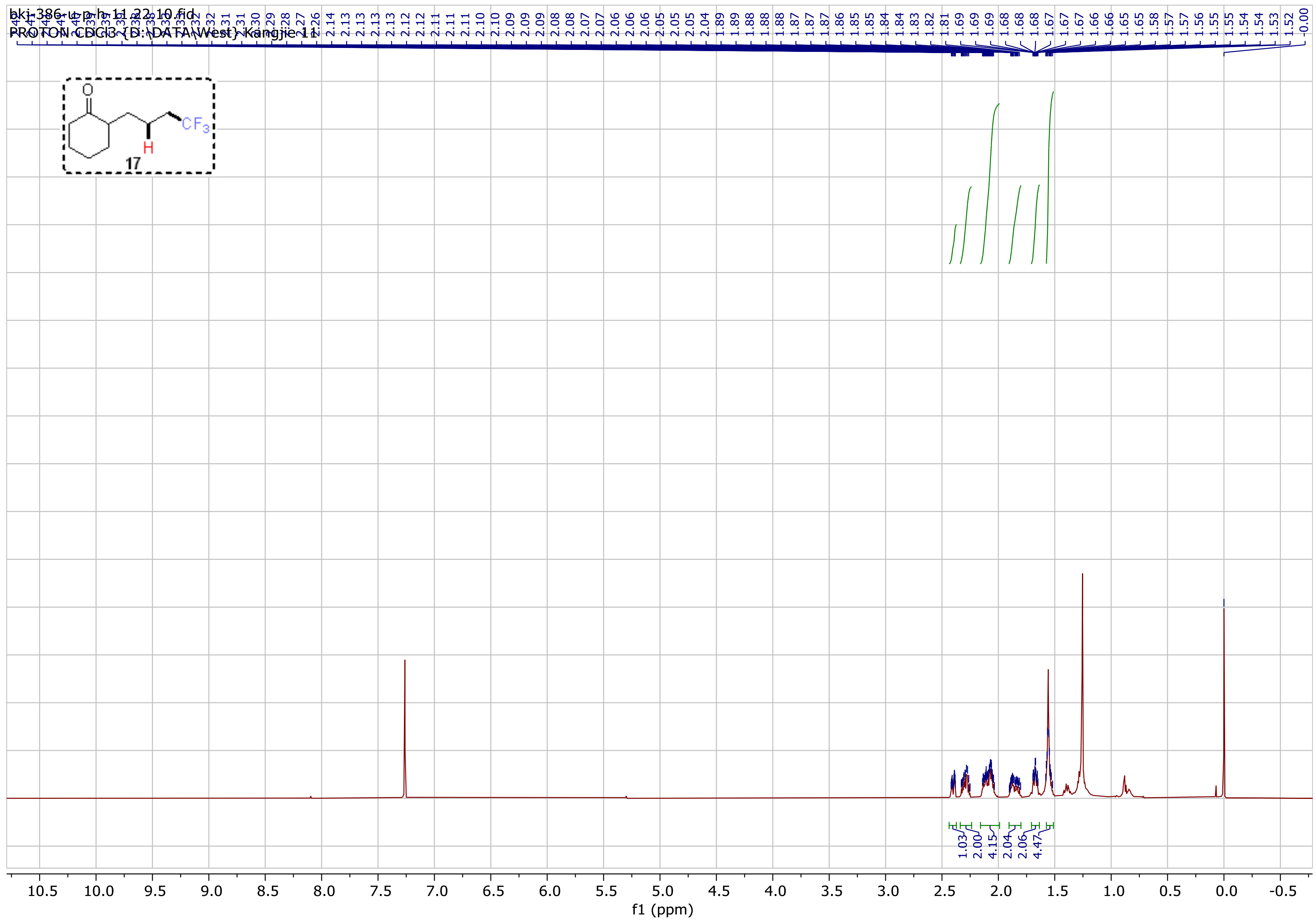
bkj-386-n-p-11.20.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
168.99
129.59
127.76
125.93
124.10
61.57
51.59
33.75
33.56
33.37
33.18
27.69
19.92
19.90
19.88
19.86
14.06
EtO_2C
EtO_2C
15
H
CF_3
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-386-n-p-11.20.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 7
-66.38
-66.40
-66.42
EtO2C
EtO2C
15
H
CF3
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bkj-386-o-p-11.19.10.fid
PROTON CH3CN {D:\DATA\West} Kangjie 12
PhS
H
CF3
16
7.34
7.34
7.34
7.33
7.33
7.30
7.30
7.29
7.28
7.28
7.21
7.20
7.20
7.19
7.19
7.18
7.18
7.18
2.94
2.93
2.93
2.93
2.92
2.92
2.12
2.11
2.11
2.10
2.10
2.10
2.09
2.08
2.08
2.08
2.07
2.07
2.06
2.05
2.05
2.04
1.73
1.72
1.72
1.71
1.70
1.70
-0.00
2.00
2.03
1.01
2.17
2.29
4.40
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

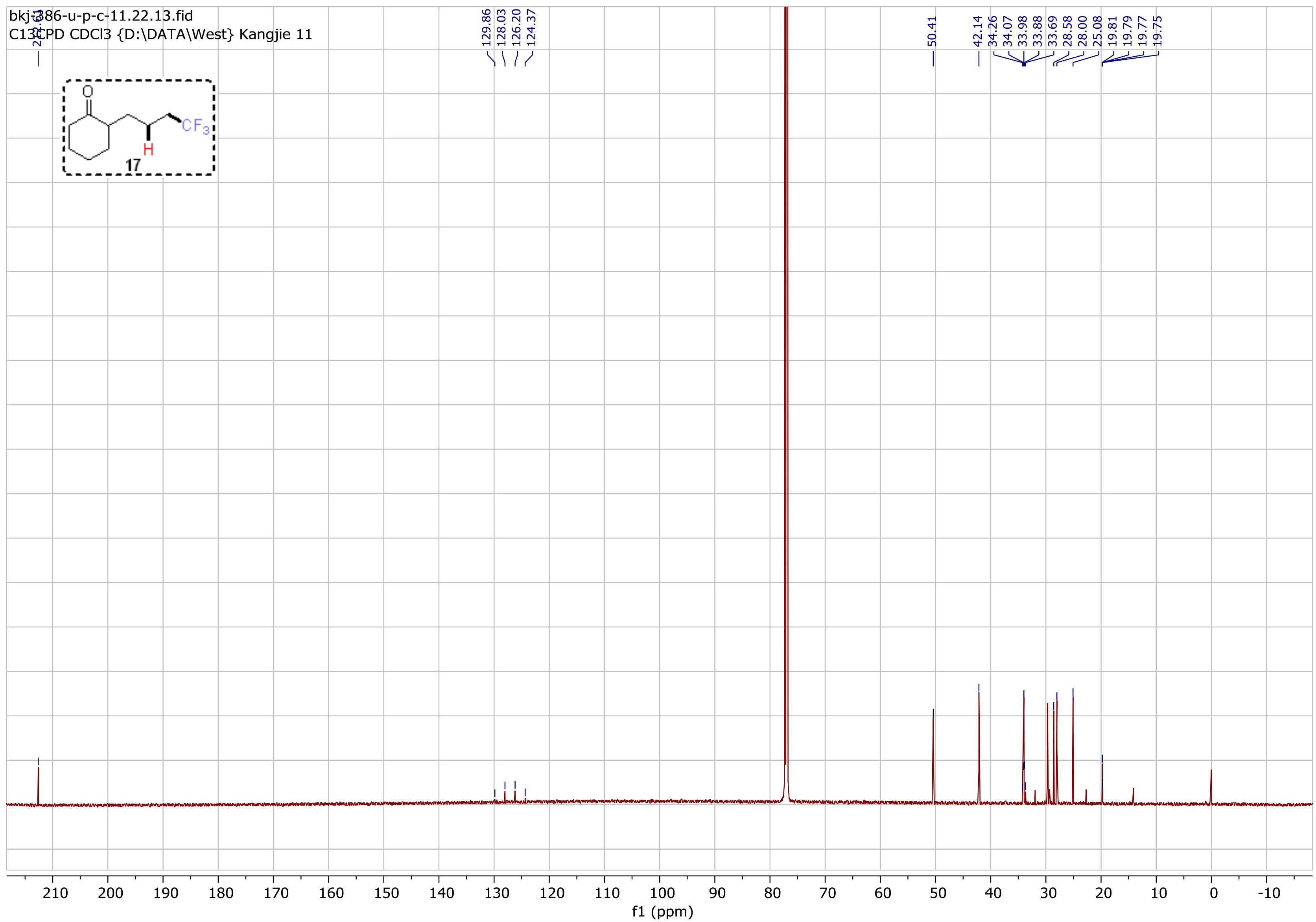

bkj-386-o-p-11.19.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 12
PhS
H
CF3
16
136.13
129.76
129.44
128.96
127.93
126.15
126.09
124.26
33.62
33.43
33.32
33.24
33.05
28.16
21.09
21.07
21.05
21.03
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

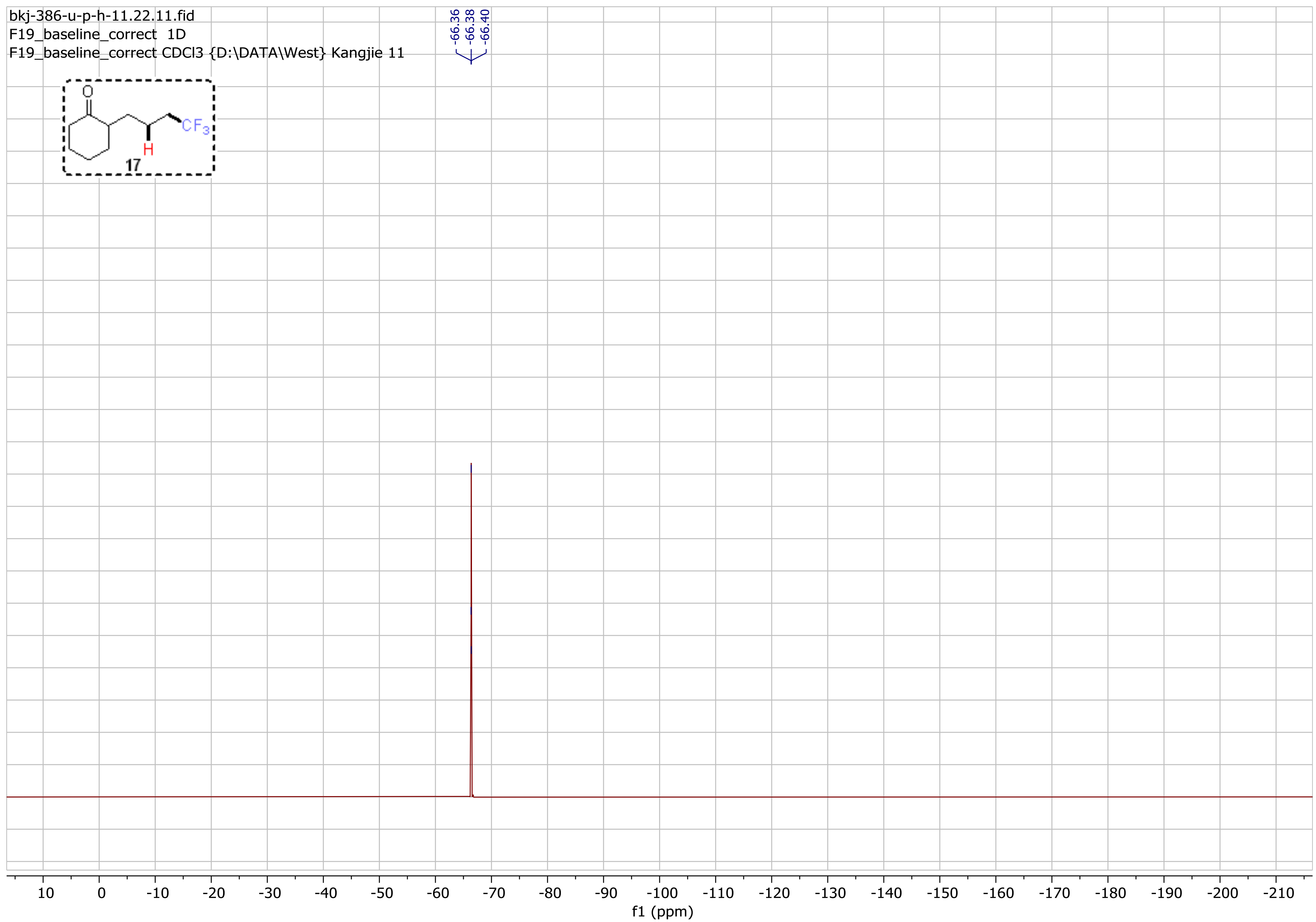

bkj-386-o-p-11.19.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 12
PhS
H
CF3
16
-66.33
-66.35
-66.37
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

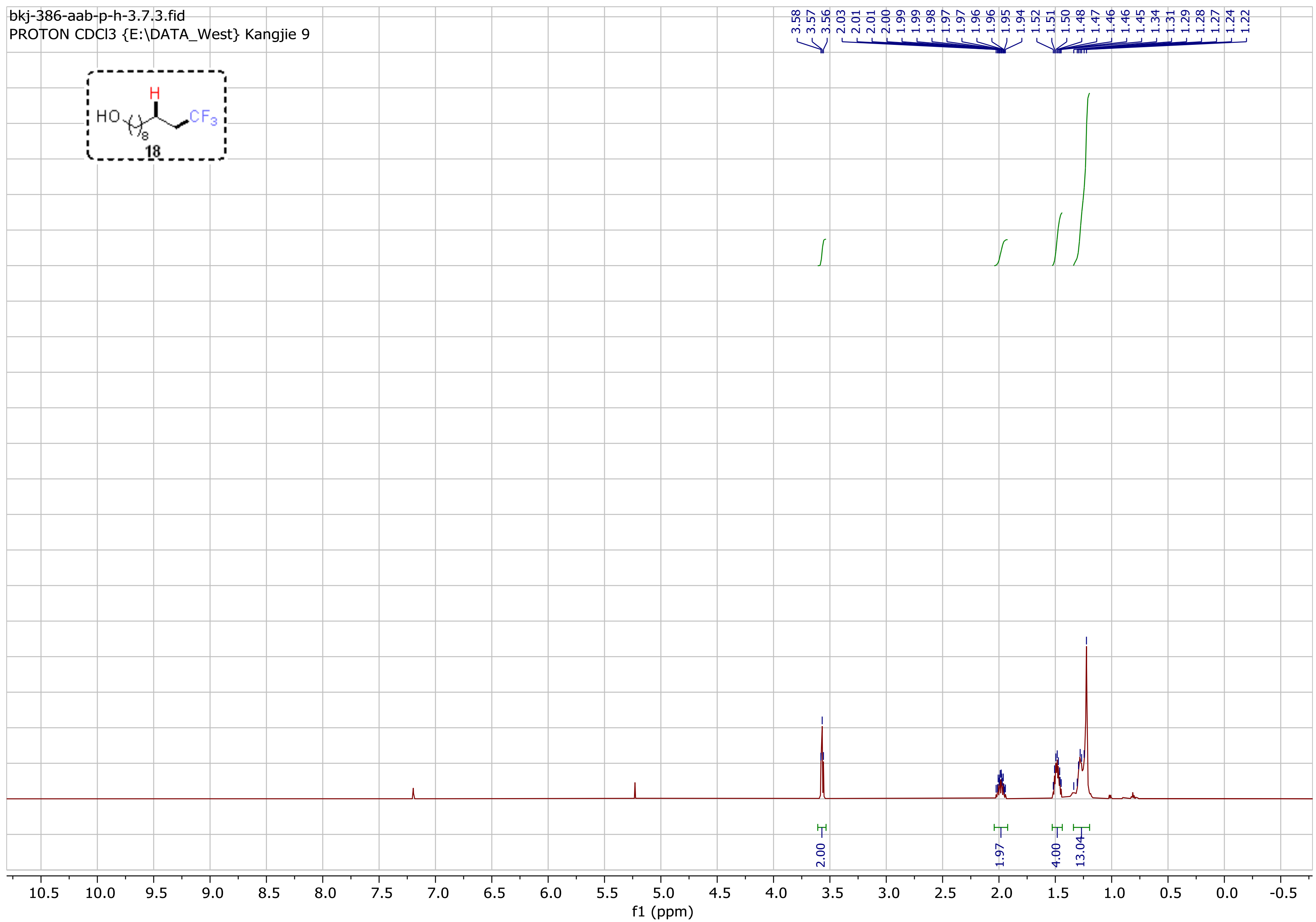


bki-386-u-p-h 11 22 10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 11
2.26
2.14
2.13
2.13
2.13
2.13
2.12
2.12
2.11
2.11
2.11
2.10
2.10
2.09
2.09
2.09
2.08
2.08
2.07
2.07
2.06
2.06
2.06
2.05
2.05
2.05
2.04
1.89
1.89
1.88
1.88
1.88
1.87
1.87
1.87
1.86
1.85
1.85
1.84
1.84
1.83
1.82
1.81
1.69
1.69
1.69
1.68
1.68
1.68
1.67
1.67
1.67
1.66
1.66
1.65
1.65
1.58
1.57
1.57
1.56
1.55
1.55
1.54
1.54
1.53
1.52
-0.00
O
H
CF_3
1.03
2.00
4.15
2.04
2.06
4.47
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

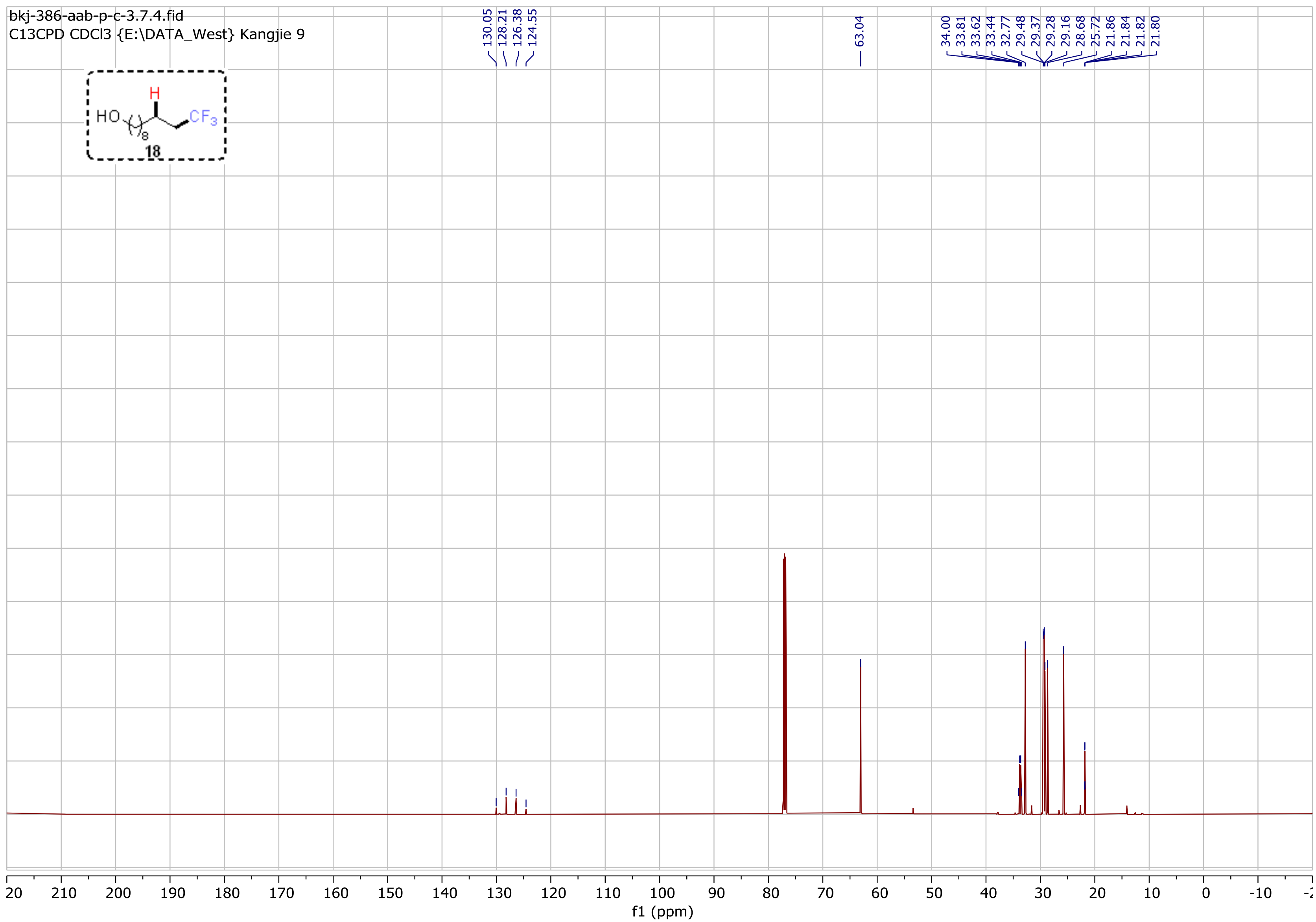
17

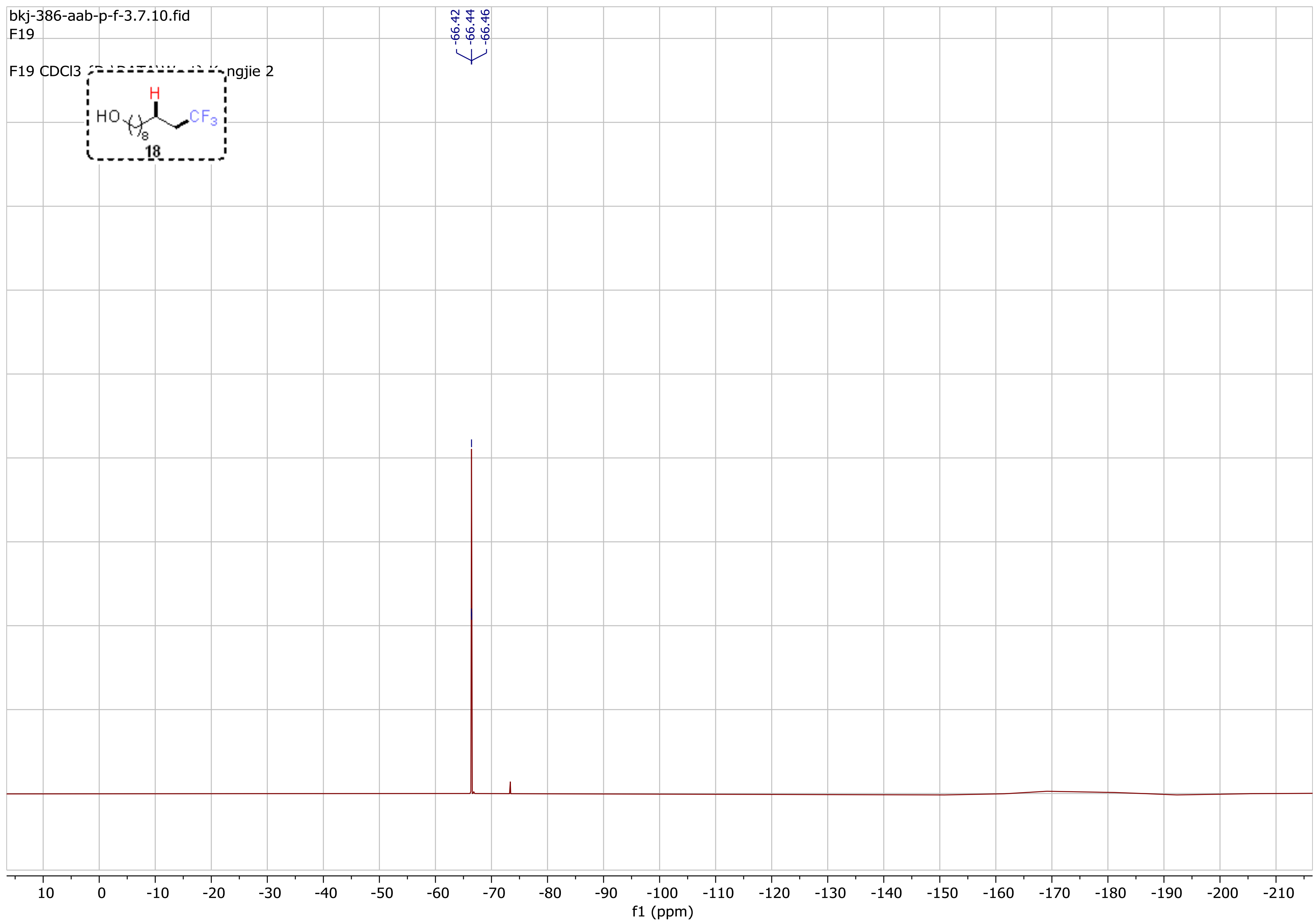

bkj-386-u-p-c-11.22.13.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 11
129.86
128.03
126.20
124.37
50.41
42.14
34.26
34.07
33.98
33.88
33.69
28.58
28.00
25.08
19.81
19.79
19.77
19.75
O
H
CF3
17
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

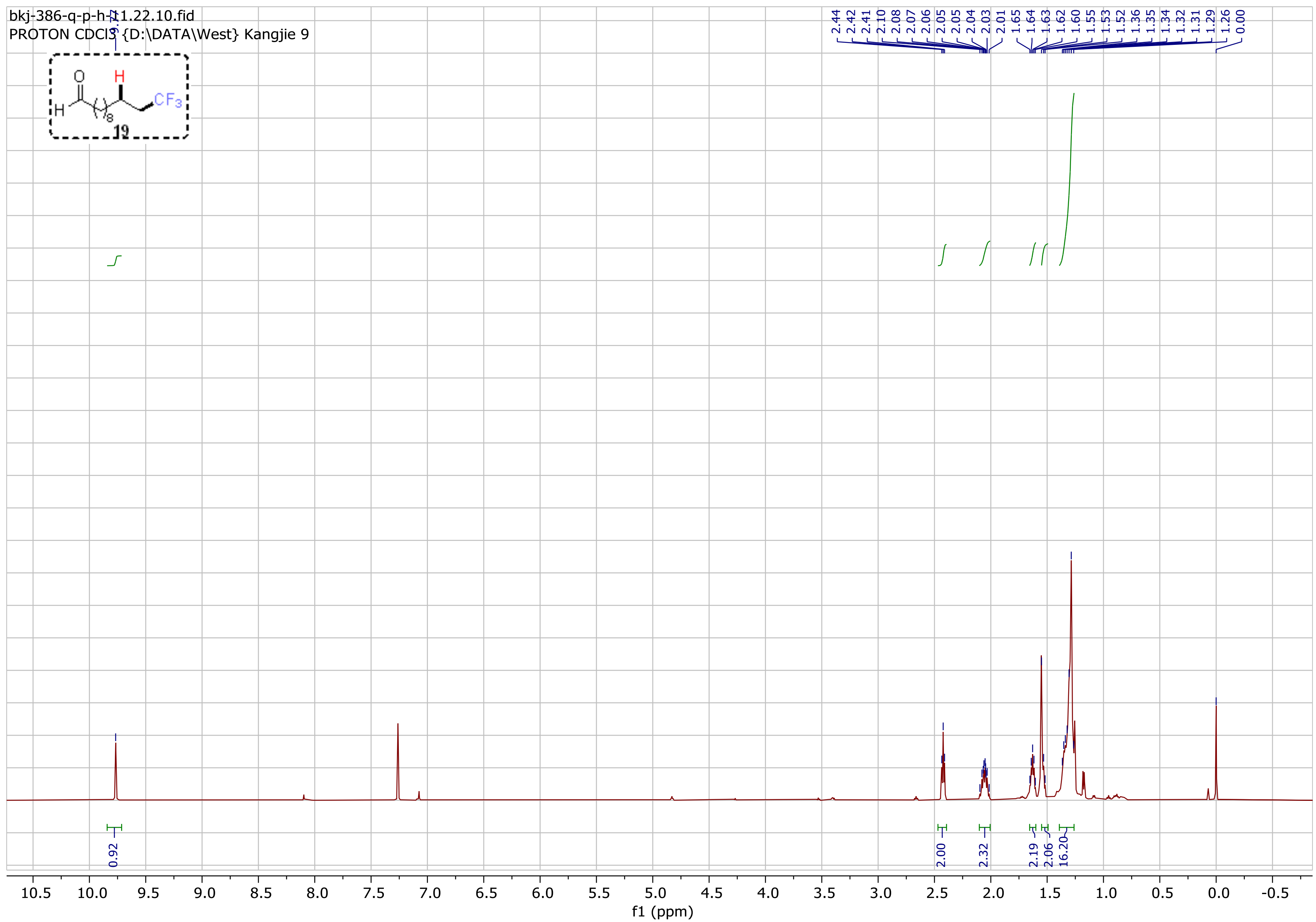

bkj-386-u-p-h-11.22.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 11
-66.36
-66.38
-66.40
O
H
CF3
17
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

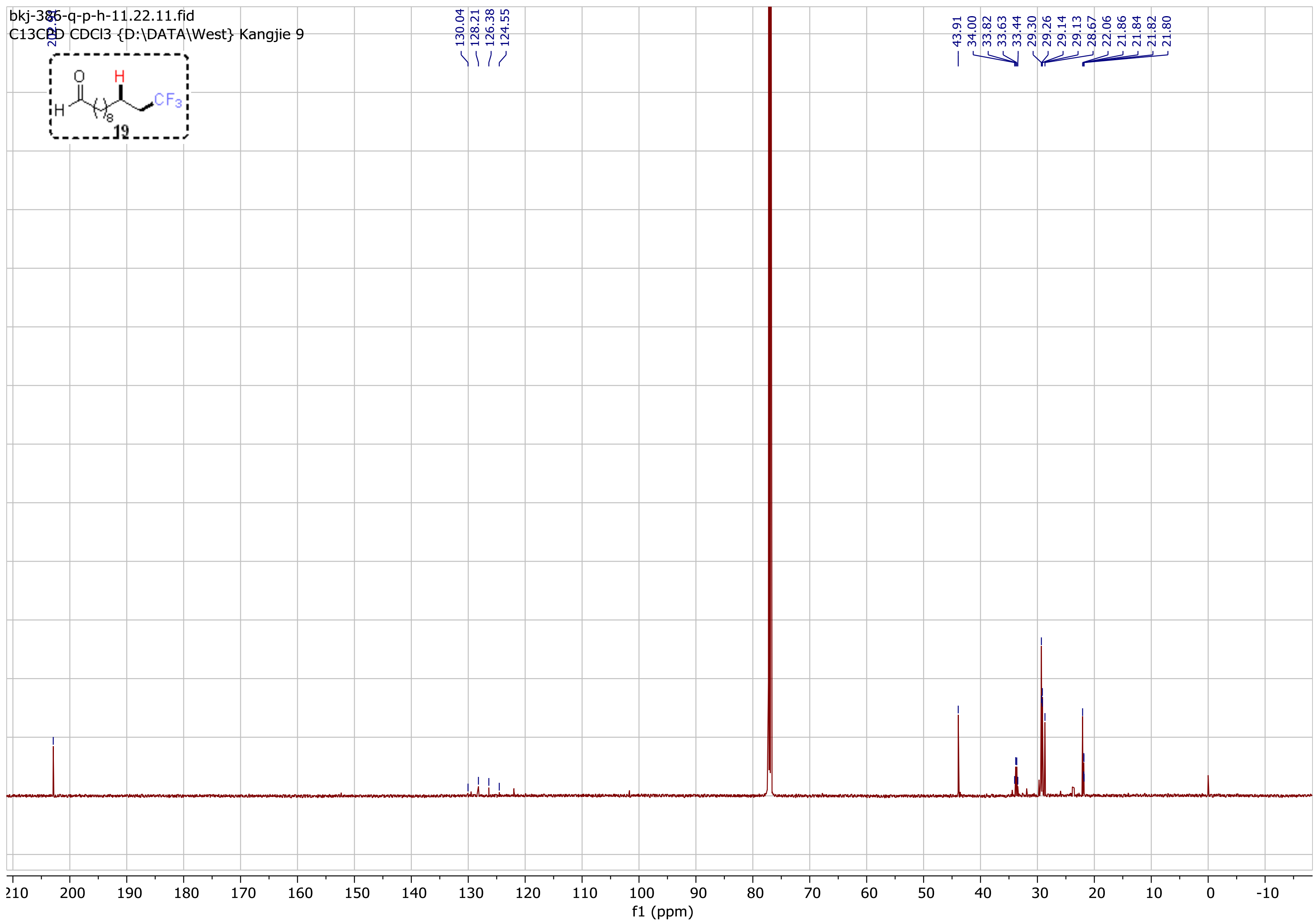


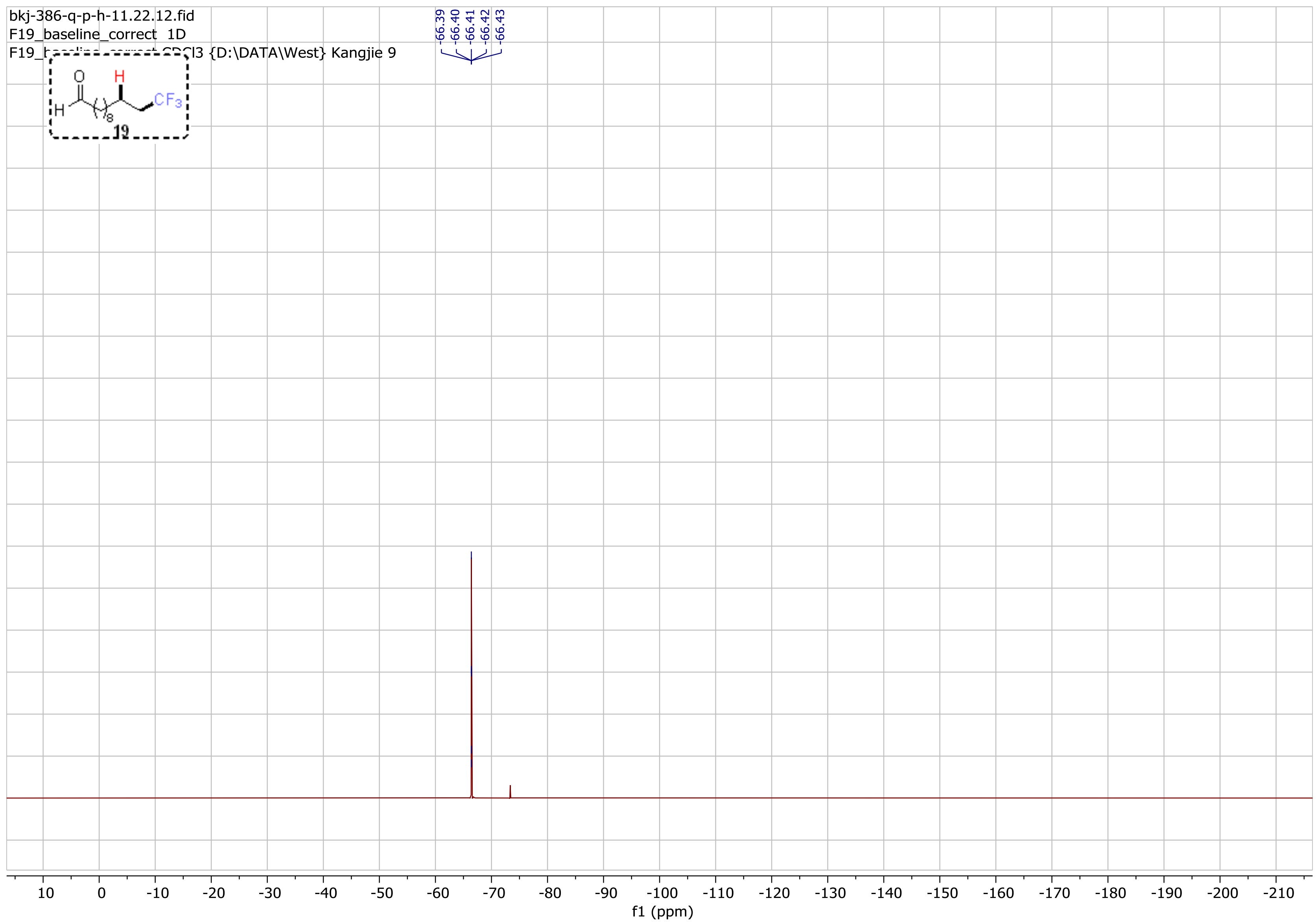
bkj-386-aab-p-h-3.7.3.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 9
HO
H
CF3
8
18
3.58
3.57
3.56
2.03
2.01
2.01
2.00
1.99
1.99
1.98
1.97
1.97
1.96
1.96
1.95
1.94
1.52
1.51
1.50
1.48
1.47
1.46
1.46
1.45
1.34
1.31
1.29
1.28
1.27
1.24
1.22
2.00
1.97
4.00
13.04
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

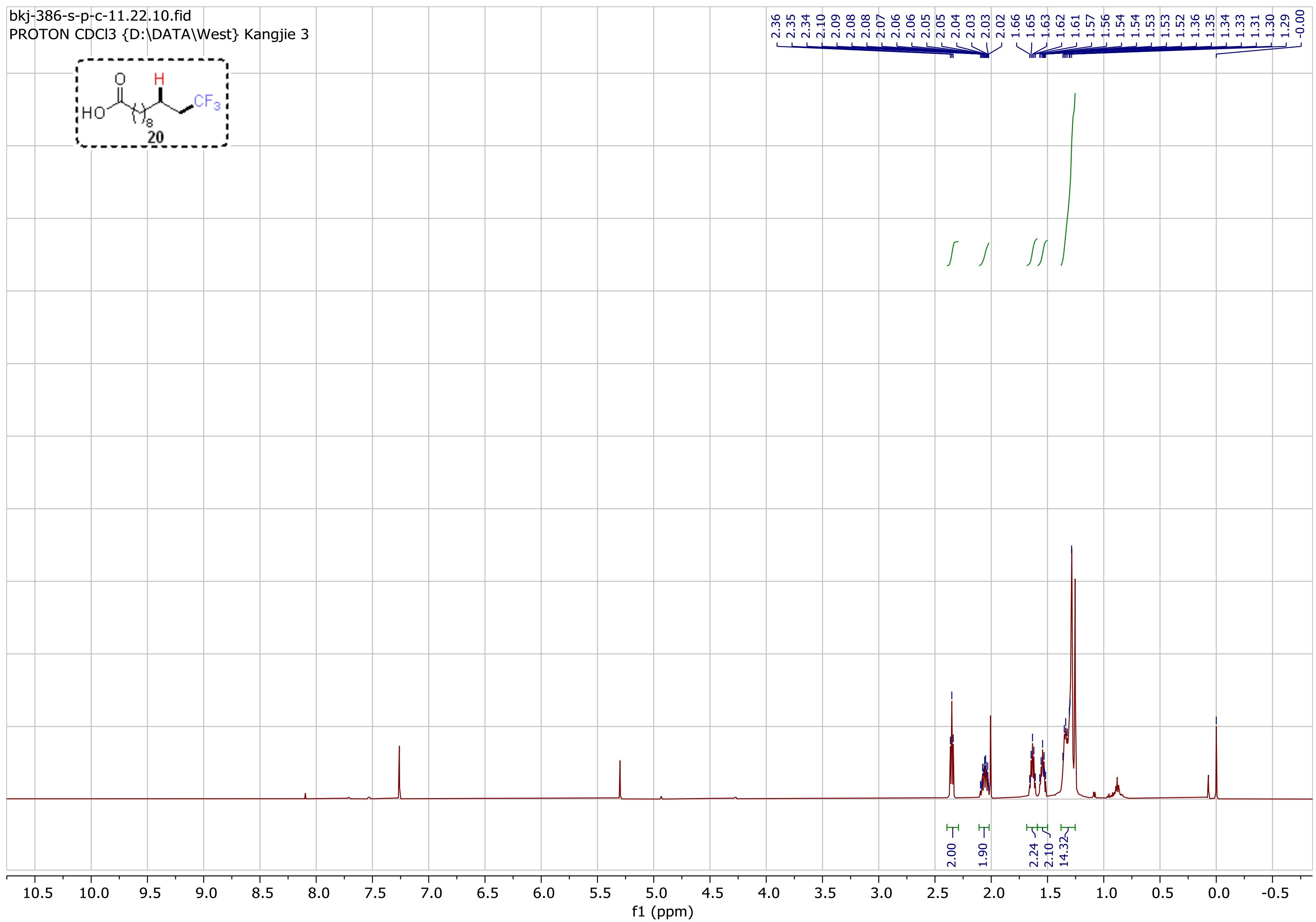

bkj-386-aab-p-c-3.7.4.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 9
HO
H
CF3
8
18
130.05
128.21
126.38
124.55
63.04
34.00
33.81
33.62
33.44
32.77
29.48
29.37
29.28
29.16
28.68
25.72
21.86
21.84
21.82
21.80
f1 (ppm)

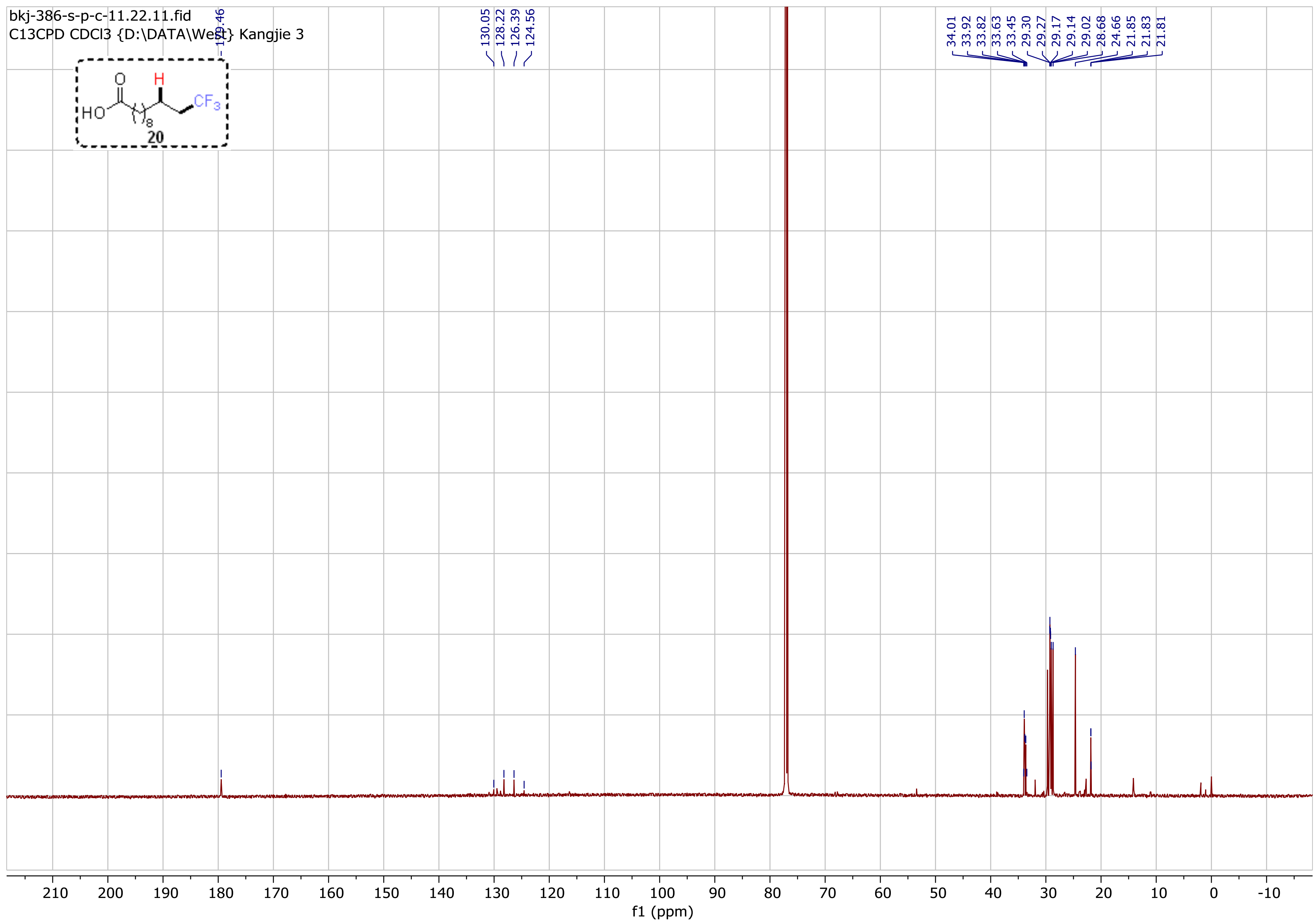

bkj-386-aab-p-f-3.7.10.fid
F19
F19 CDCl3
ngjie 2
HO
H
CF3
8
18
-66.42
-66.44
-66.46
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


bkj-386-q-p-h-11.22.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 9
2.44
2.42
2.41
2.10
2.08
2.07
2.06
2.05
2.05
2.04
2.03
2.01
1.65
1.64
1.63
1.62
1.60
1.55
1.53
1.52
1.36
1.35
1.34
1.32
1.31
1.29
1.26
0.00
O
H
H
CF3
8
19
0.92
2.00
2.32
2.19
2.06
16.20
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

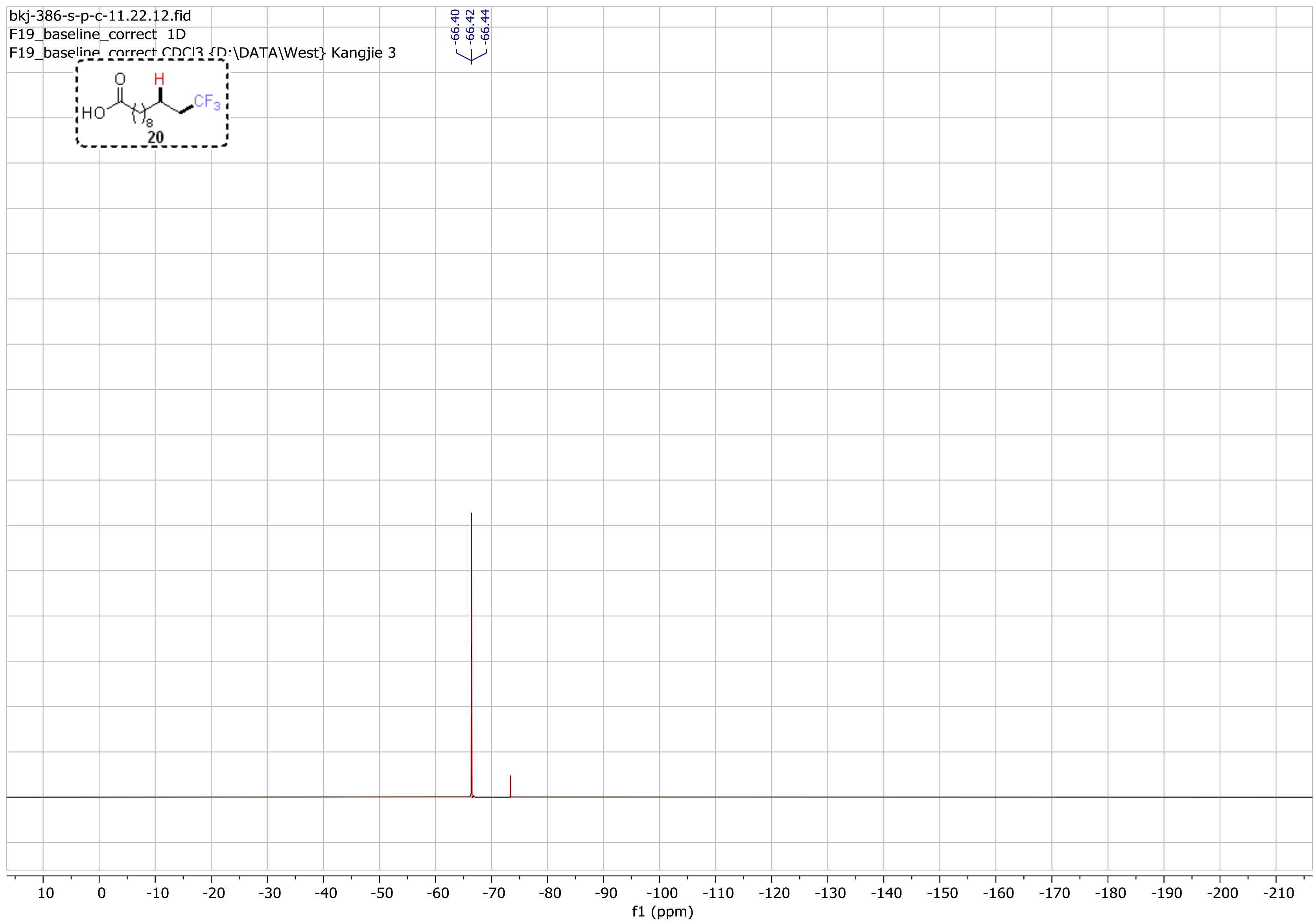

bkj-386-q-p-h-11.22.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 9
19
130.04
128.21
126.38
124.55
43.91
34.00
33.82
33.63
33.44
29.30
29.26
29.14
29.13
28.67
22.06
21.86
21.84
21.82
21.80
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-386-q-p-h-11.22.12.fid
F19_baseline_correct 1D
CDCl3 {D:\DATA\West} Kangjie 9
-66.39
-66.40
-66.41
-66.42
-66.43
O
H
H
CF3
8
19
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

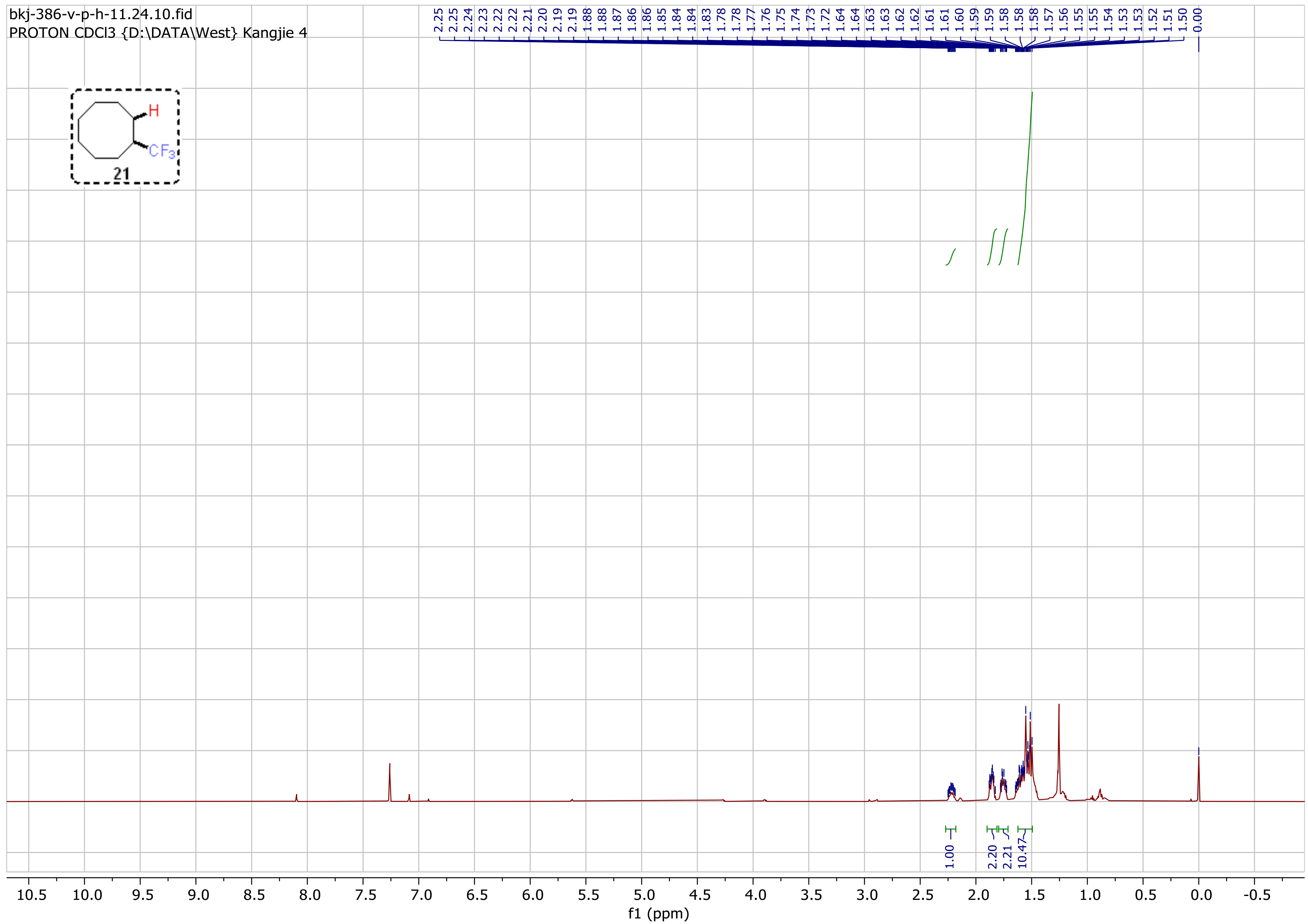

bkj-386-s-p-c-11.22.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 3
HO
O
H
CF3
8
20
2.36 2.35 2.34 2.10 2.09 2.08 2.08 2.07 2.06 2.06 2.05 2.05 2.04 2.03 2.03 2.02 1.66 1.65 1.63 1.62 1.61 1.57 1.56 1.54 1.54 1.53 1.53 1.52 1.36 1.35 1.34 1.33 1.31 1.30 1.29 -0.00
2.00
1.90
2.24
2.10
14.32
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

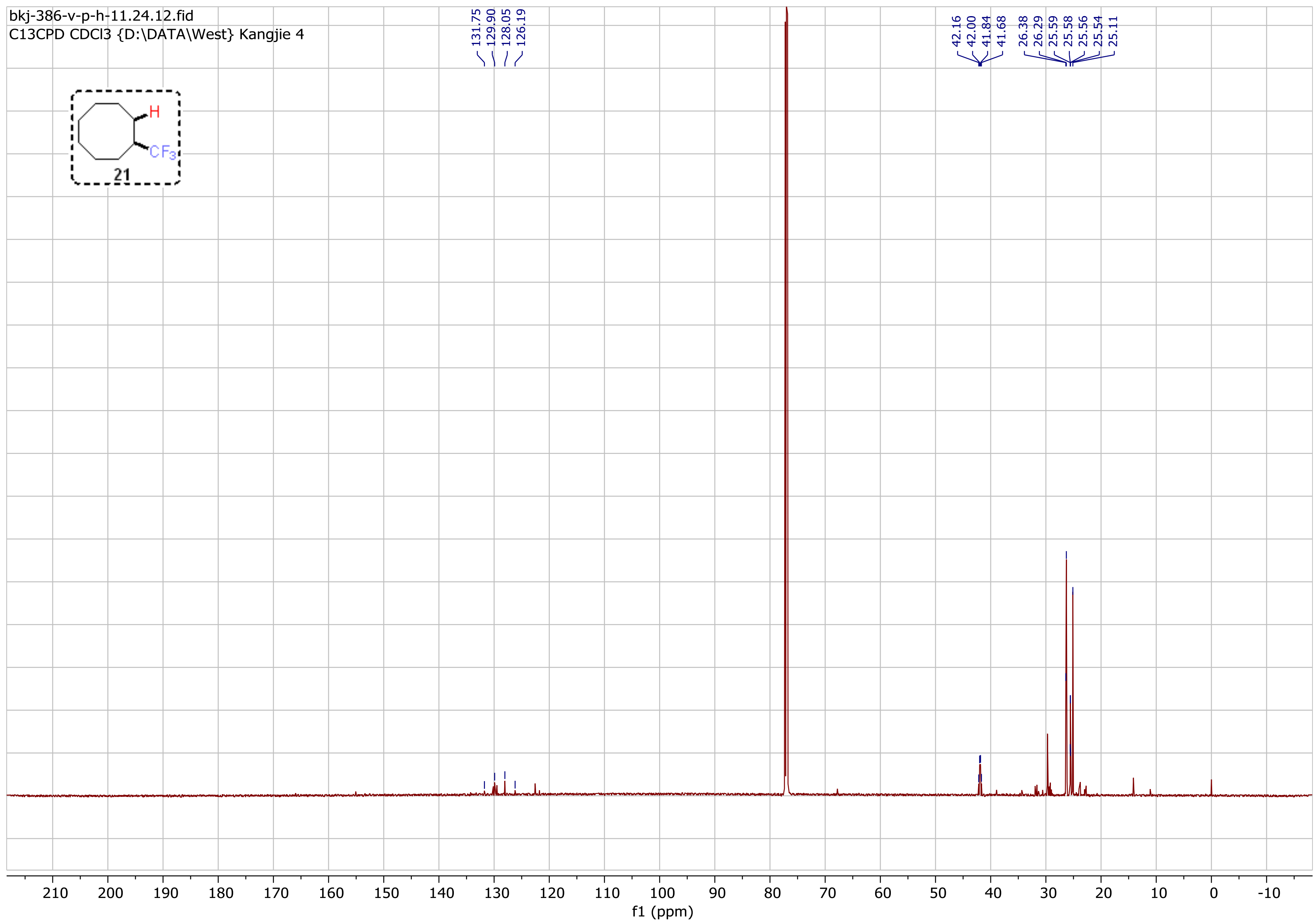


bkj-386-s-p-c-11.22.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 3
179.46
130.05
128.22
126.39
124.56
34.01
33.92
33.82
33.63
33.45
29.30
29.27
29.17
29.14
29.02
28.68
24.66
21.85
21.83
21.81
HO
O
H
CF3
8
20
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

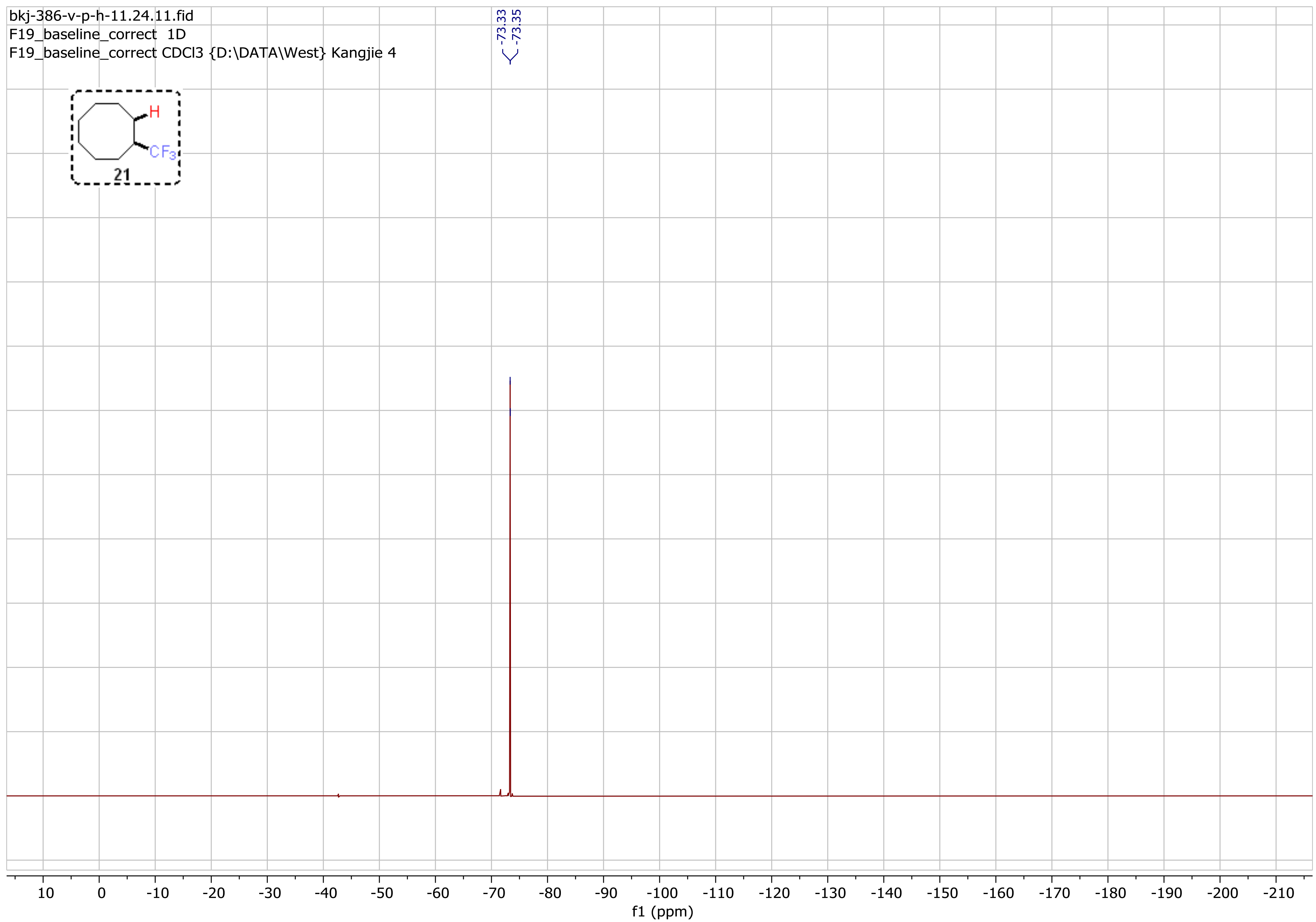


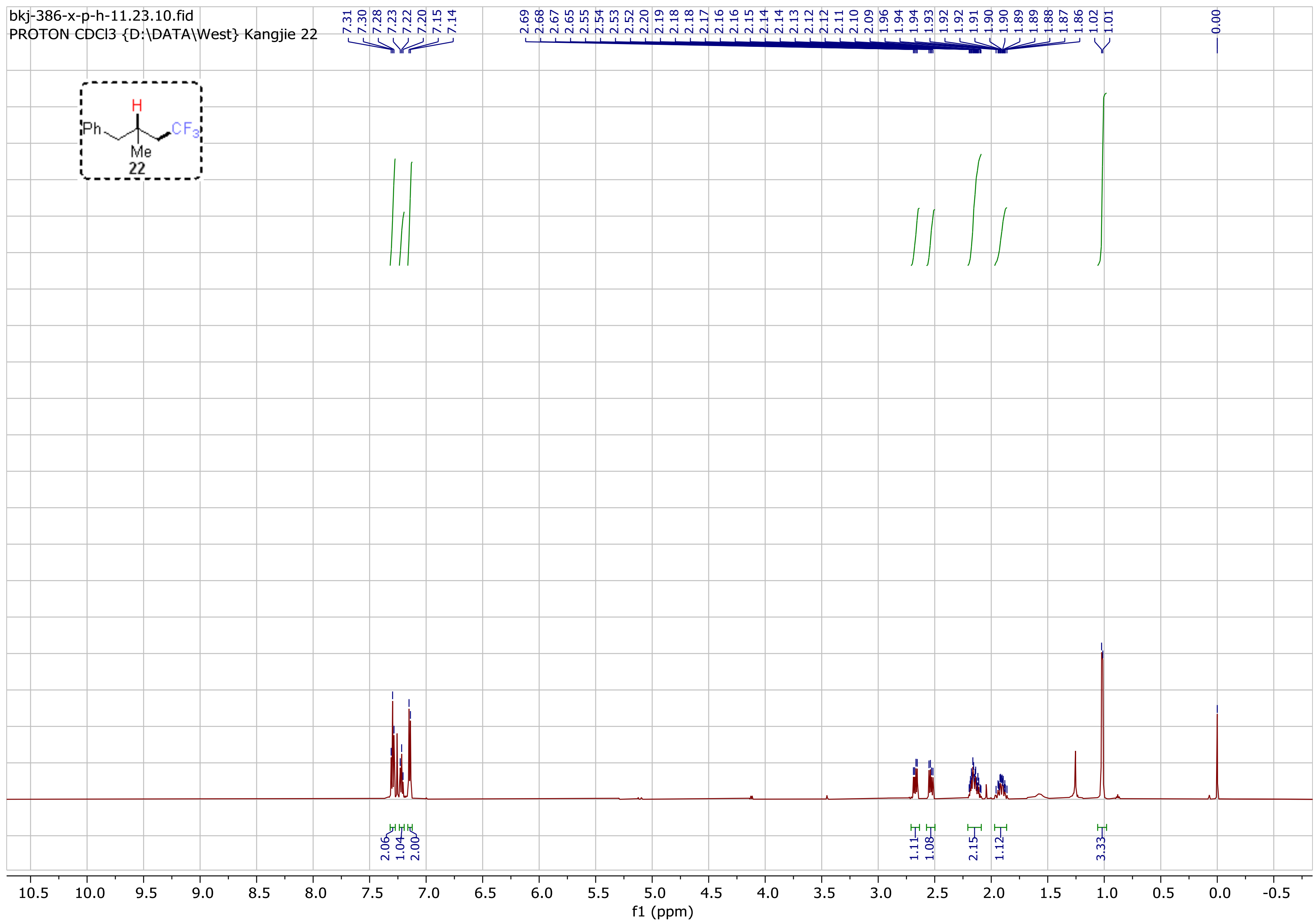
bkj-386-s-p-c-11.22.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
-66.40
-66.42
-66.44
HO
O
H
CF3
8
20
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

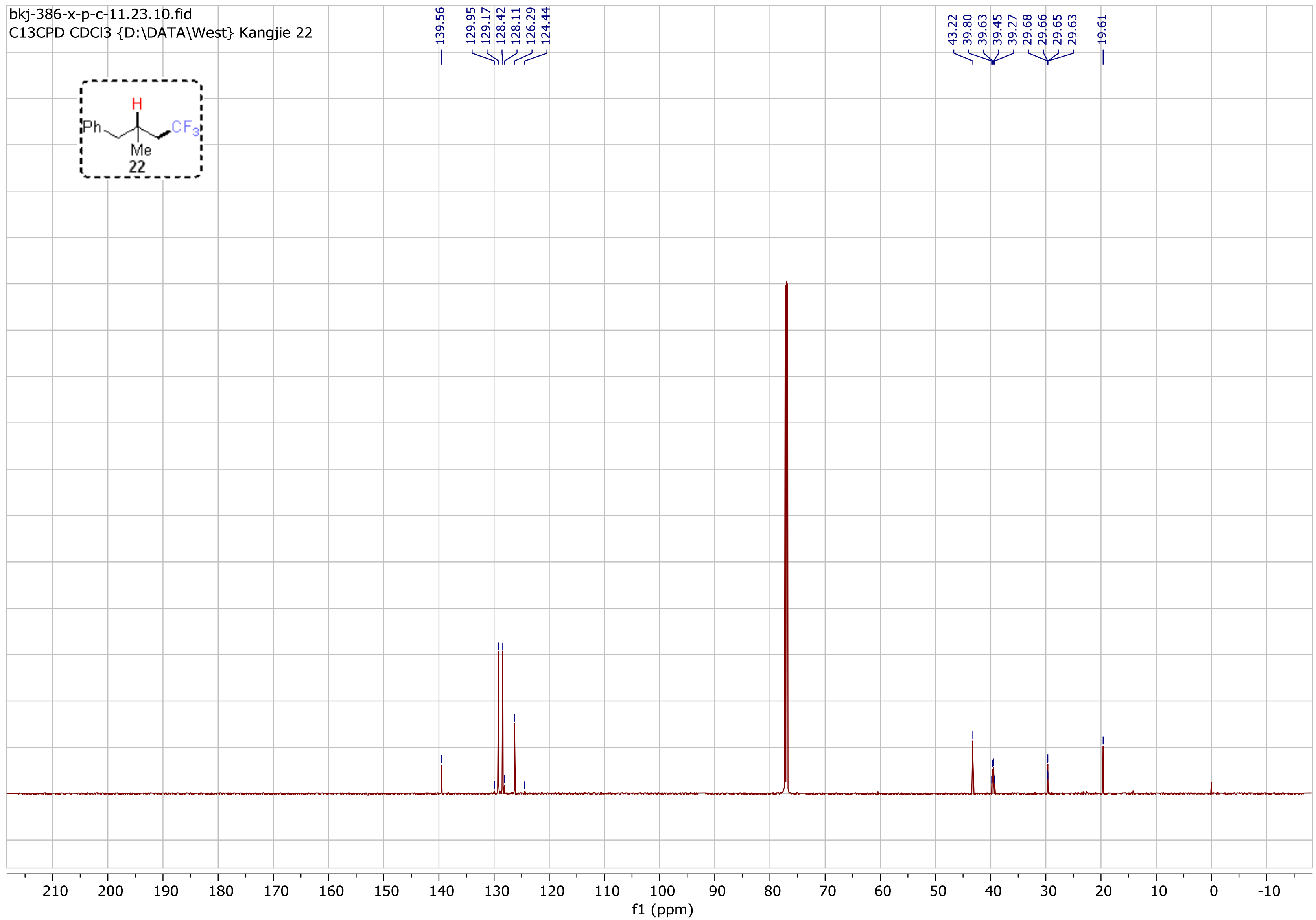

bkj-386-v-p-h-11.24.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 4
21
H
CF3
2.25 2.25 2.24 2.23 2.22 2.22 2.21 2.20 2.19 2.19 1.88 1.88 1.87 1.86 1.86 1.85 1.84 1.84 1.83 1.78 1.78 1.77 1.76 1.75 1.74 1.73 1.72 1.64 1.64 1.63 1.63 1.62 1.62 1.61 1.61 1.60 1.59 1.59 1.58 1.58 1.58 1.57 1.56 1.55 1.55 1.54 1.53 1.53 1.52 1.51 1.50 0.00
1.00
2.20
2.21
10.47
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)



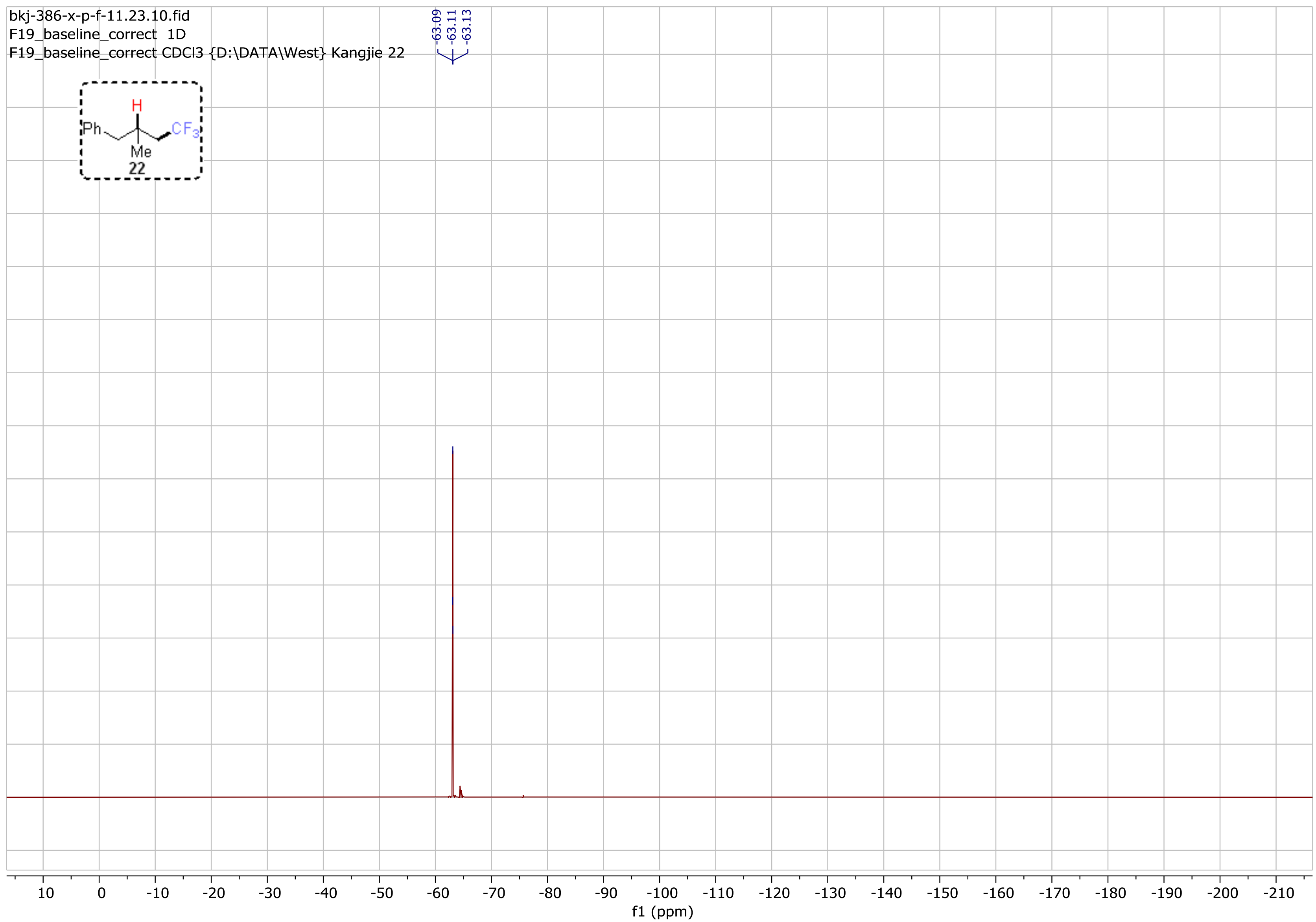
bkj-386-v-p-h-11.24.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 4
131.75
129.90
128.05
126.19
42.16
42.00
41.84
41.68
26.38
26.29
25.59
25.58
25.56
25.54
25.11
H
CF3
21
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


bkj-386-v-p-h-11.24.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 4
-73.33
-73.35
H
CF3
21
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

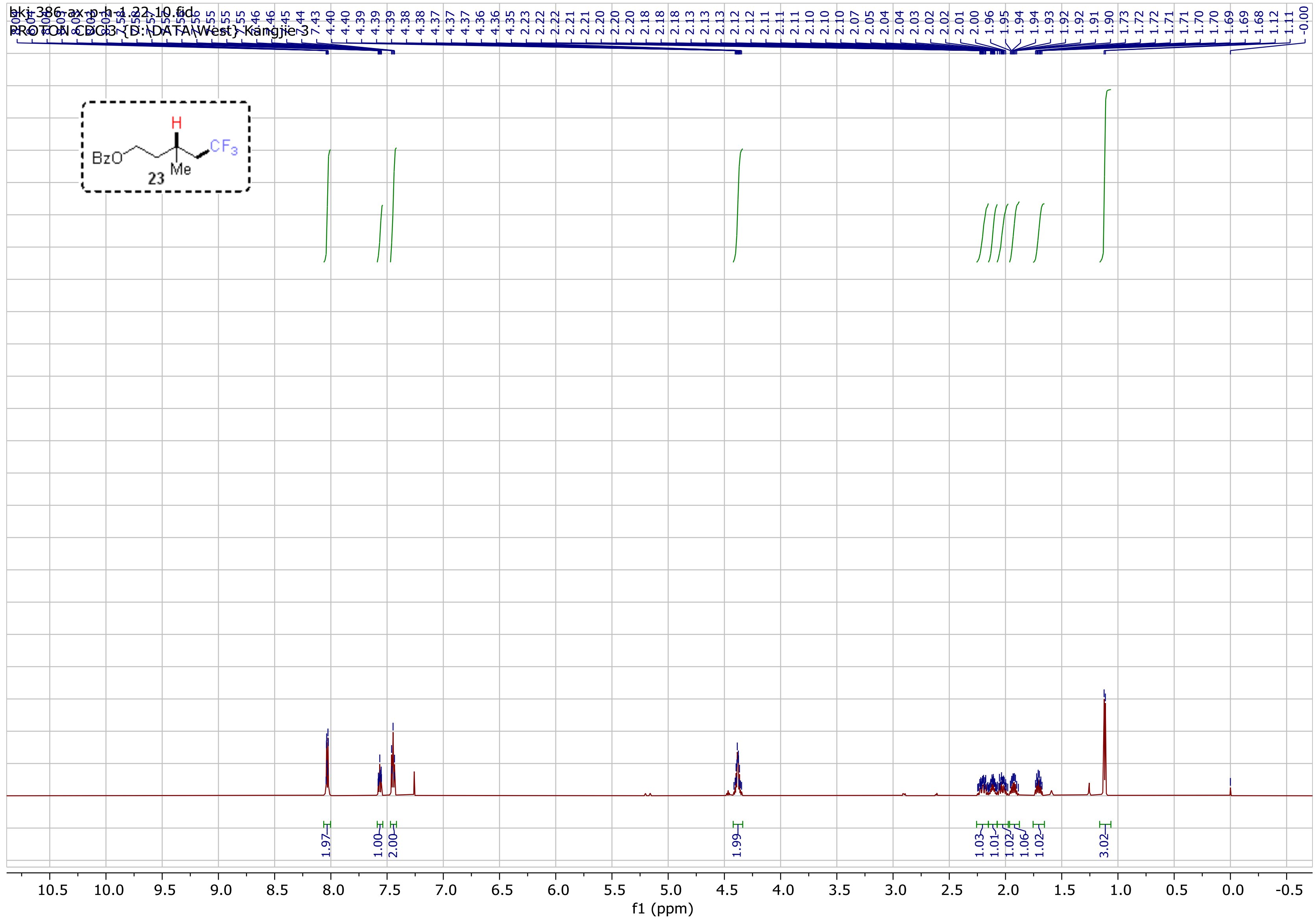

bkj-386-x-p-h-11.23.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 22
Ph
H
Me
CF3
22
7.31
7.30
7.28
7.23
7.22
7.20
7.15
7.14
2.69
2.68
2.67
2.65
2.55
2.54
2.53
2.52
2.20
2.19
2.18
2.18
2.17
2.16
2.16
2.15
2.14
2.14
2.13
2.12
2.12
2.11
2.10
2.09
1.96
1.94
1.94
1.93
1.92
1.92
1.91
1.90
1.90
1.89
1.89
1.88
1.87
1.86
1.02
1.01
0.00
2.06
1.04
2.00
1.11
1.08
2.15
1.12
3.33
f1 (ppm)

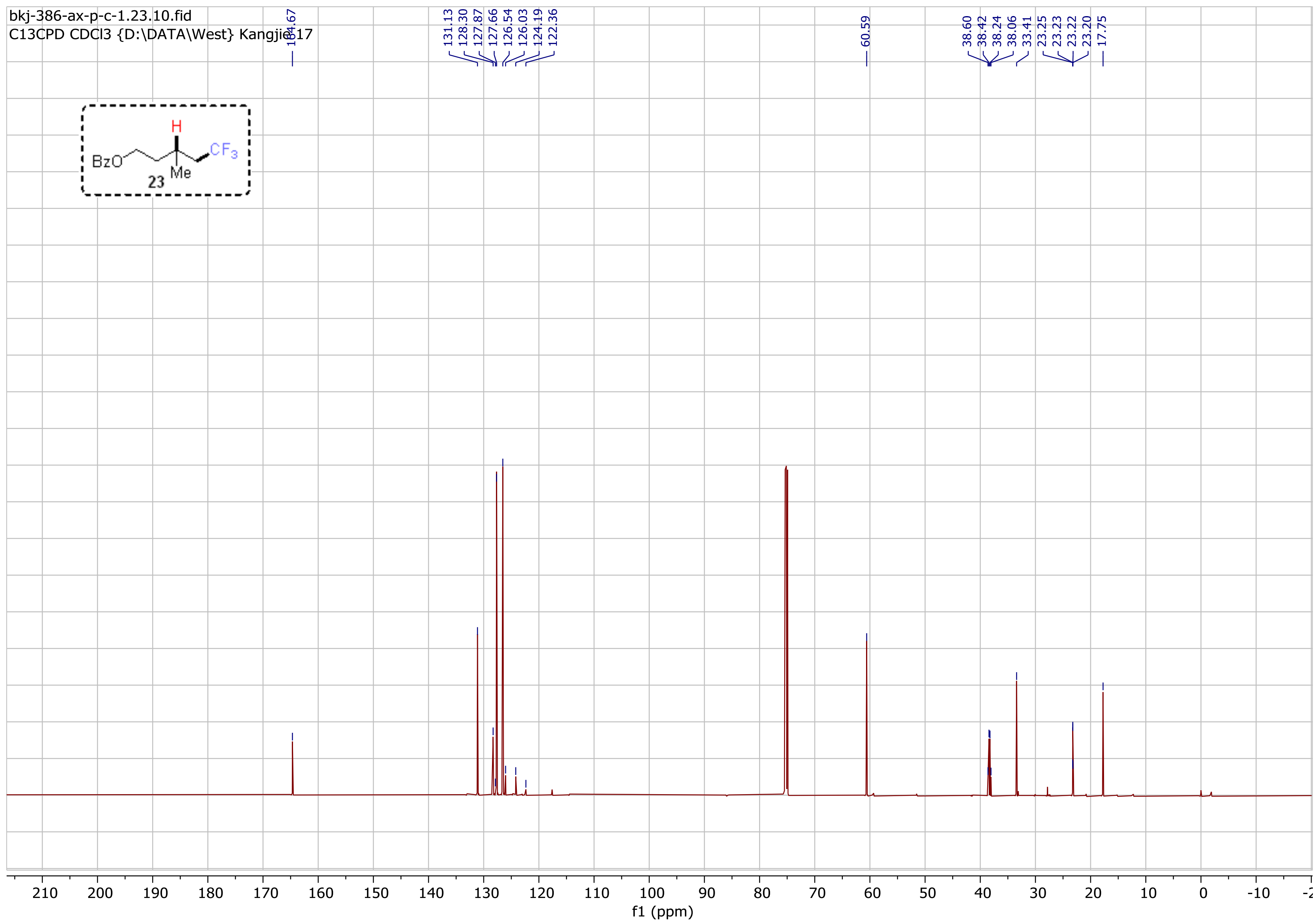


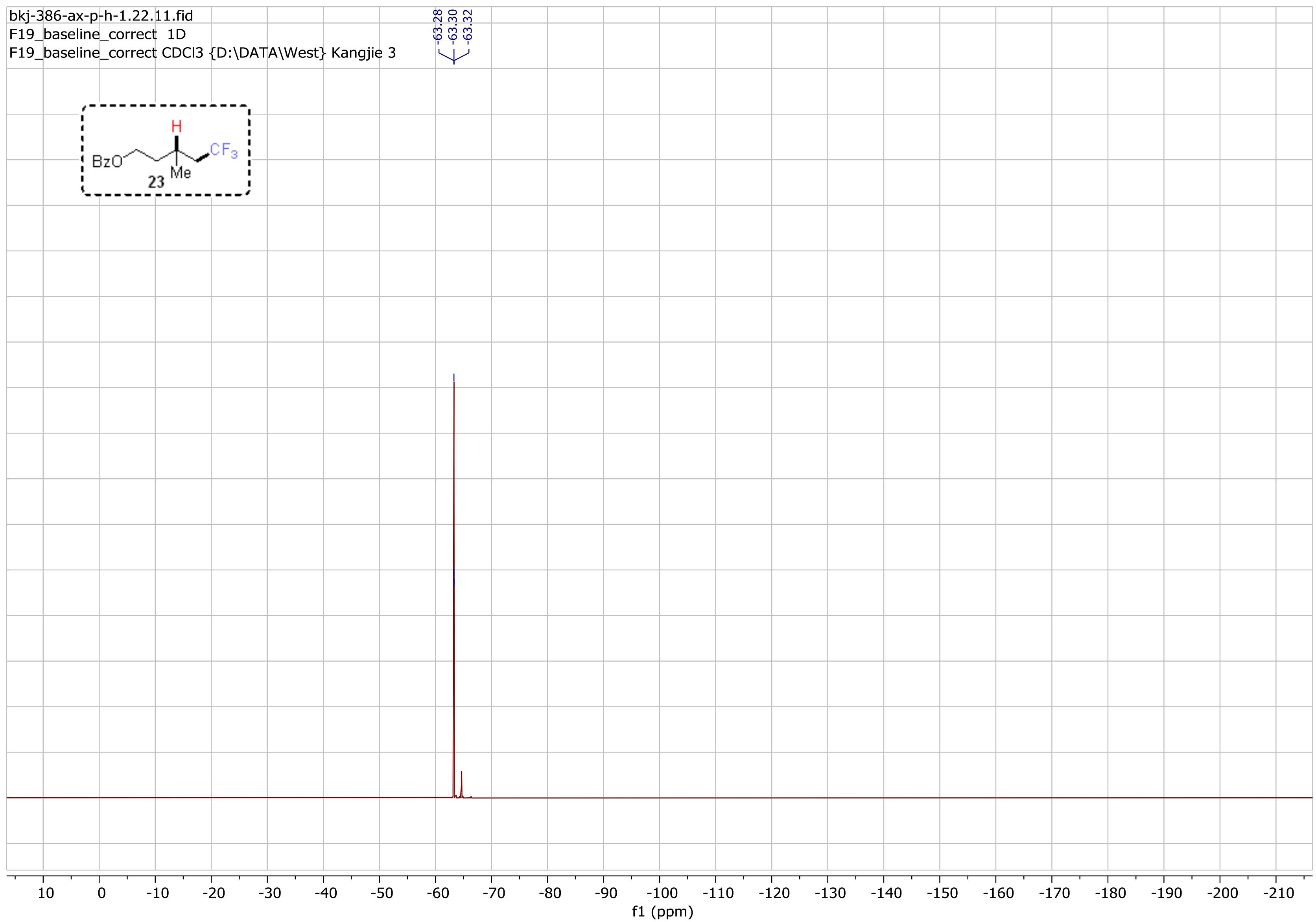
bkj-386-x-p-c-11.23.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 22
139.56
129.95
129.17
128.42
128.11
126.29
124.44
43.22
39.80
39.63
39.45
39.27
29.68
29.66
29.65
29.63
19.61
Ph
H
Me
CF3
22
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

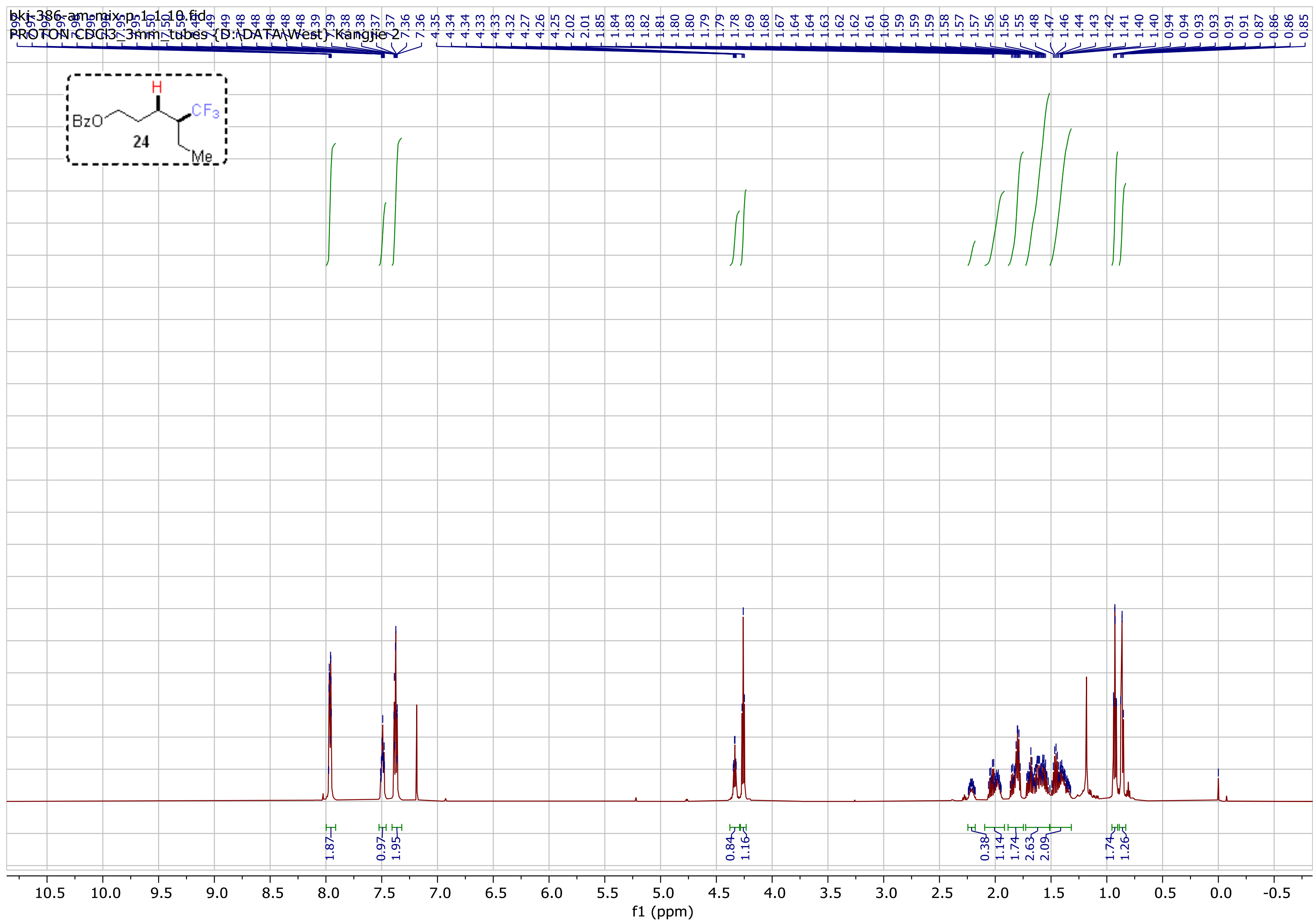


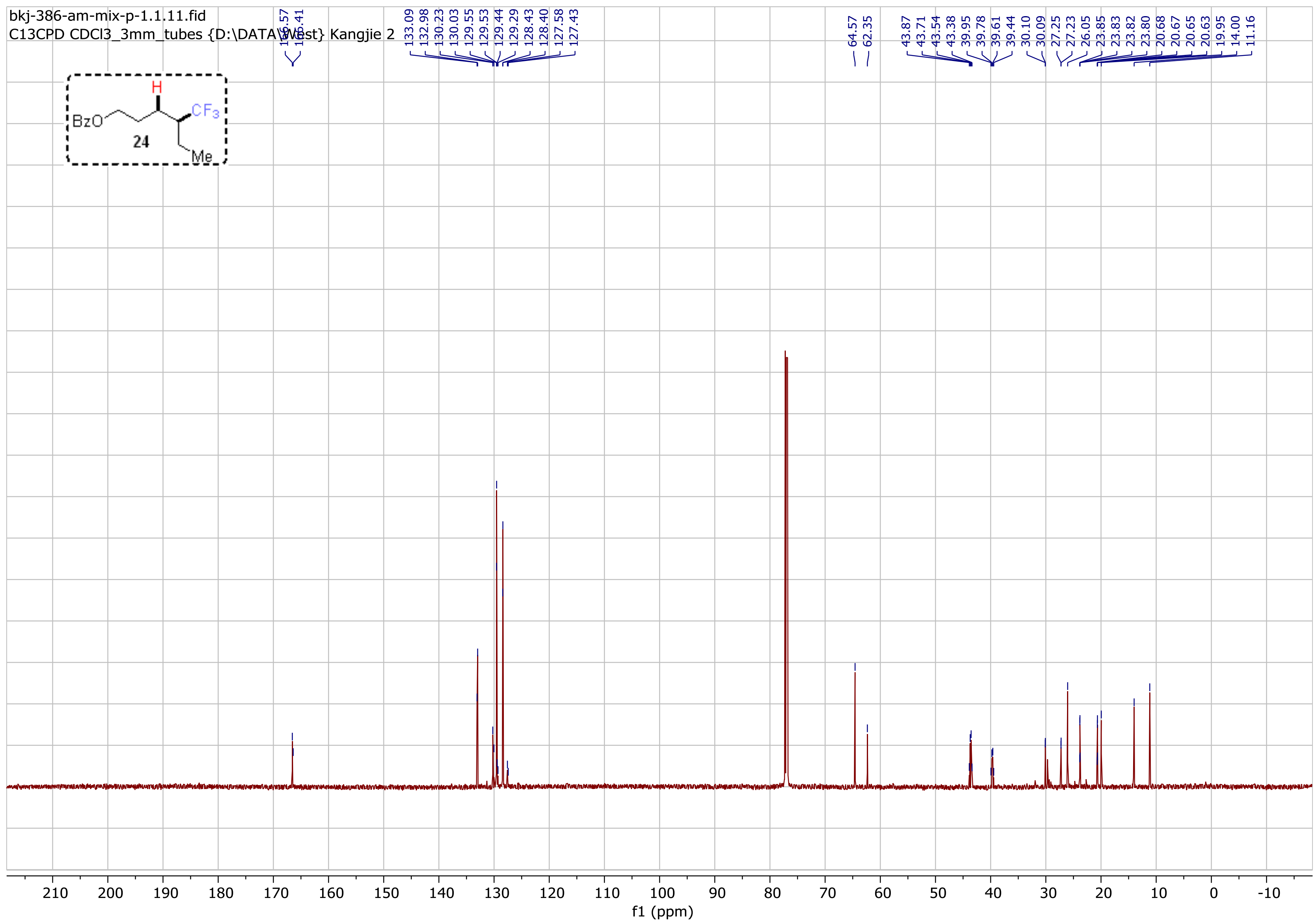
bkj-386-x-p-f-11.23.10.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 22
-63.09
-63.11
-63.13
H
Ph
CF3
Me
22
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

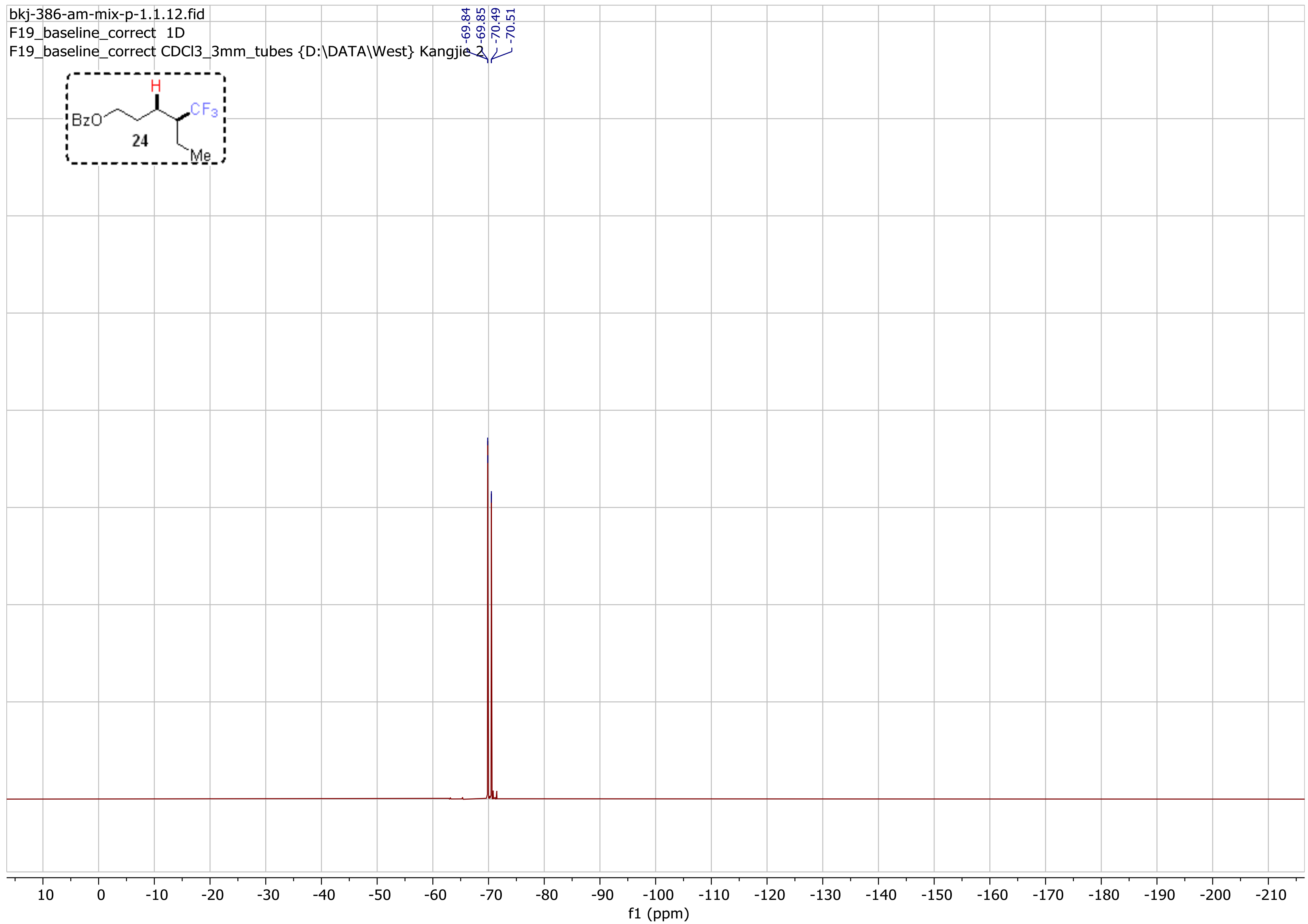

bki-386-ax-p-h-1.22.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 3
BzO
H
CF3
Me
23
f1 (ppm)

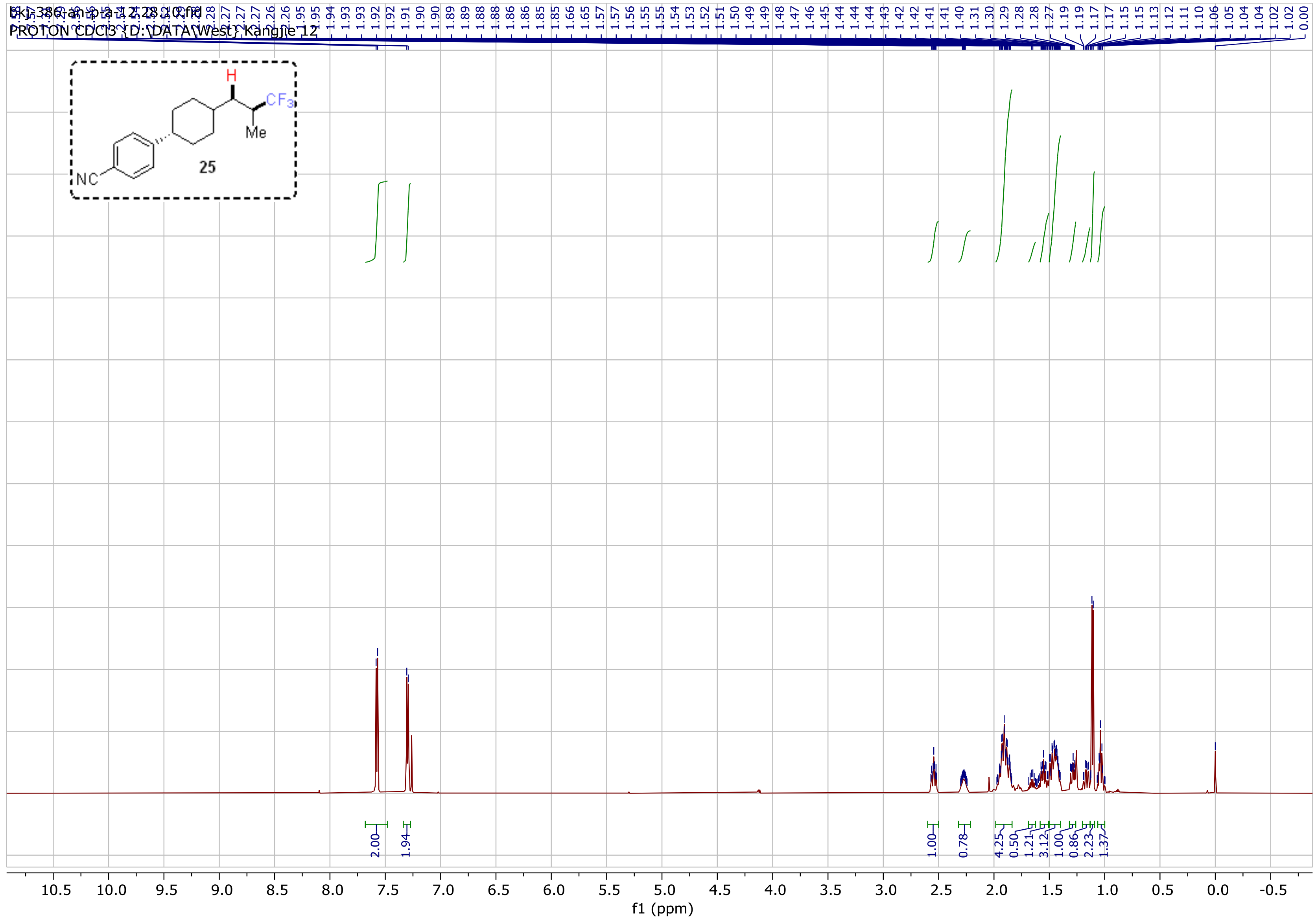

bkj-386-ax-p-c-1.23.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 17
164.67
131.13
128.30
127.87
127.66
126.54
126.03
124.19
122.36
60.59
38.60
38.42
38.24
38.06
33.41
23.25
23.23
23.22
23.20
17.75
BzO
H
CF3
Me
23
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

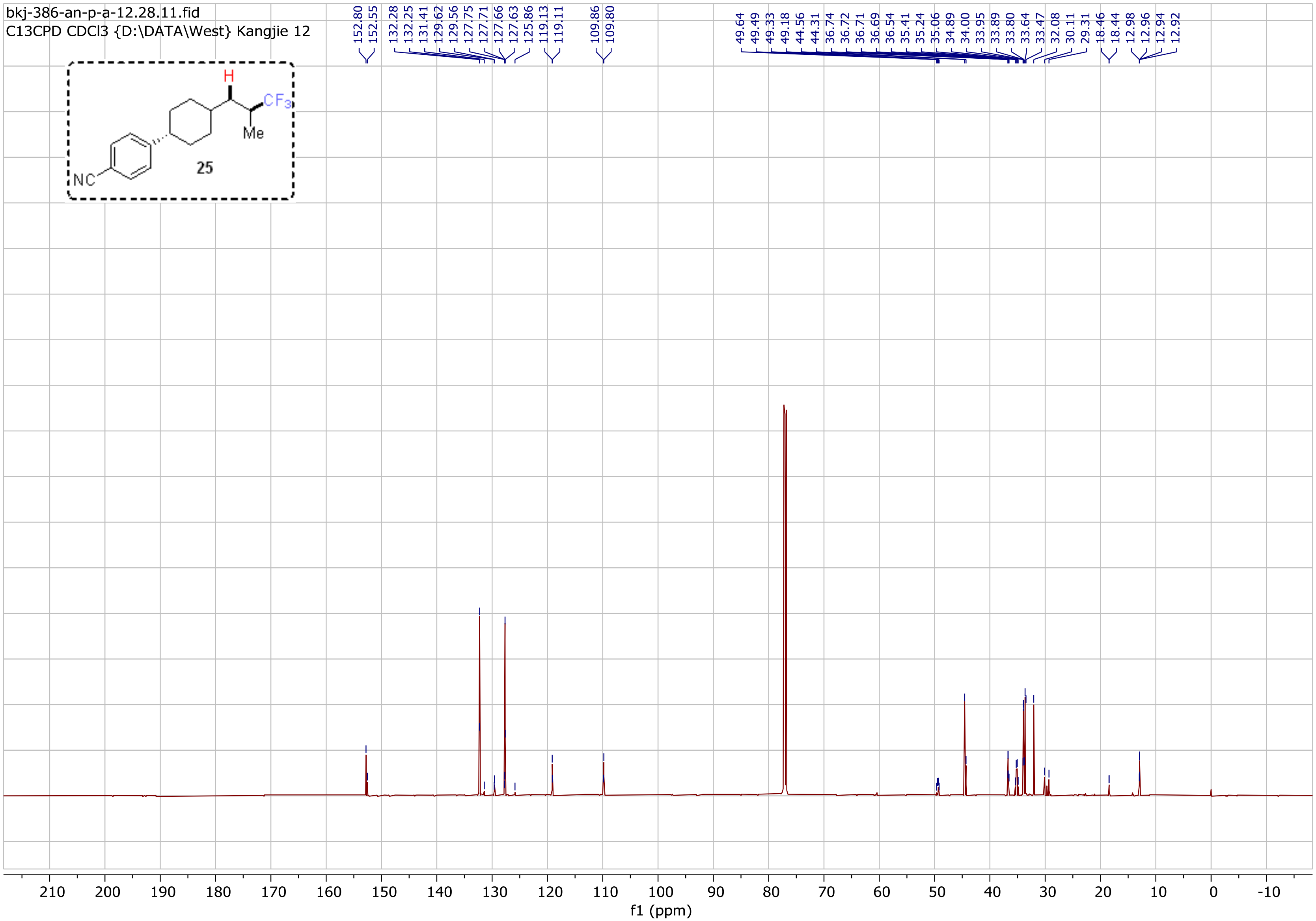

bkj-386-ax-p-h-1.22.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
-63.28
-63.30
-63.32
BzO
H
CF3
Me
23
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

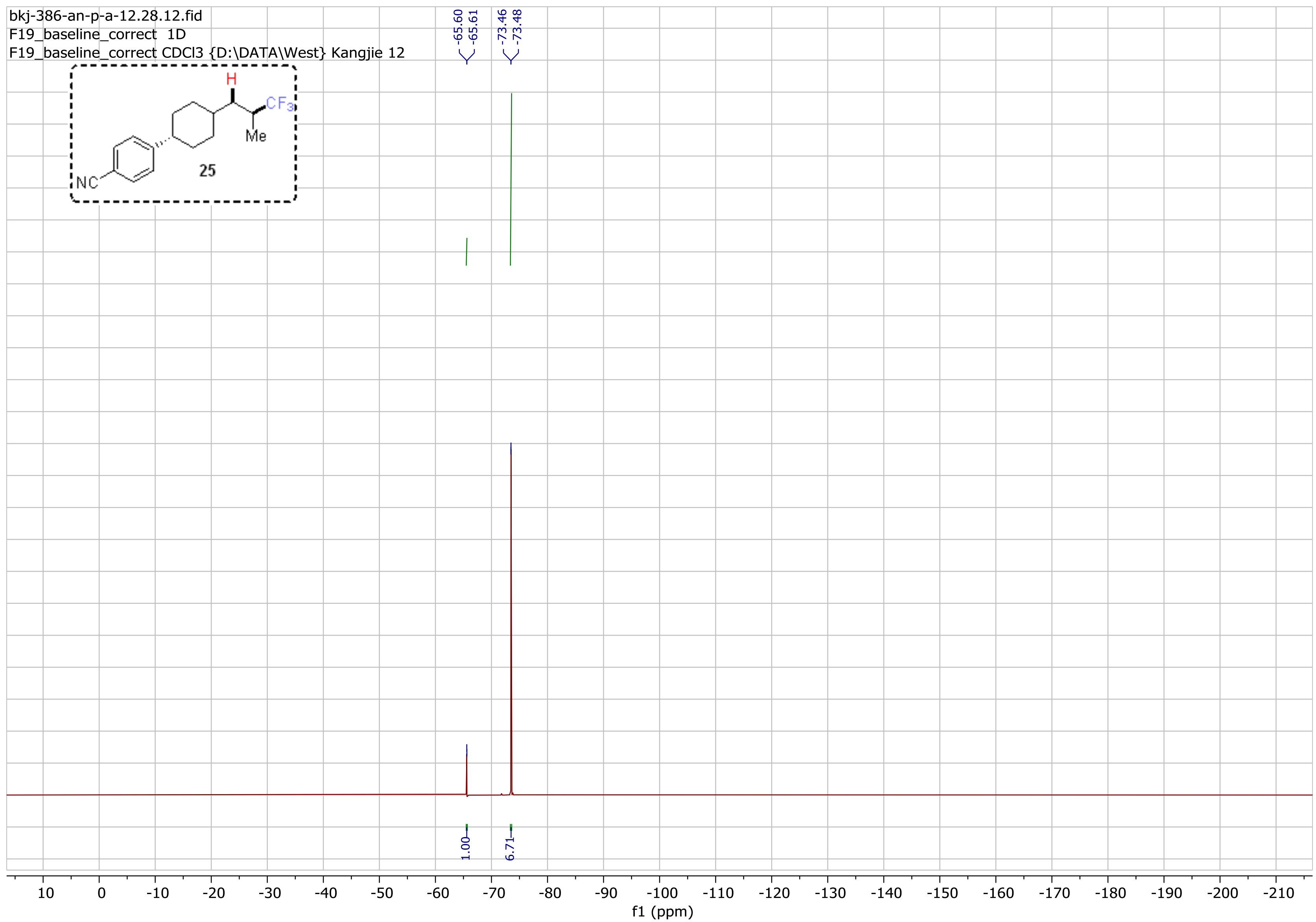

bki-386-am-mix-p-1-1-10.fid
PROTON CDCl3_3mm_tubes {D:\DATA\West} Kangjie 2
BzO
H
CF3
24
Me
f1 (ppm)
1.87
0.97
1.95
0.84
1.16
0.38
1.14
1.74
2.63
2.09
1.74
1.26

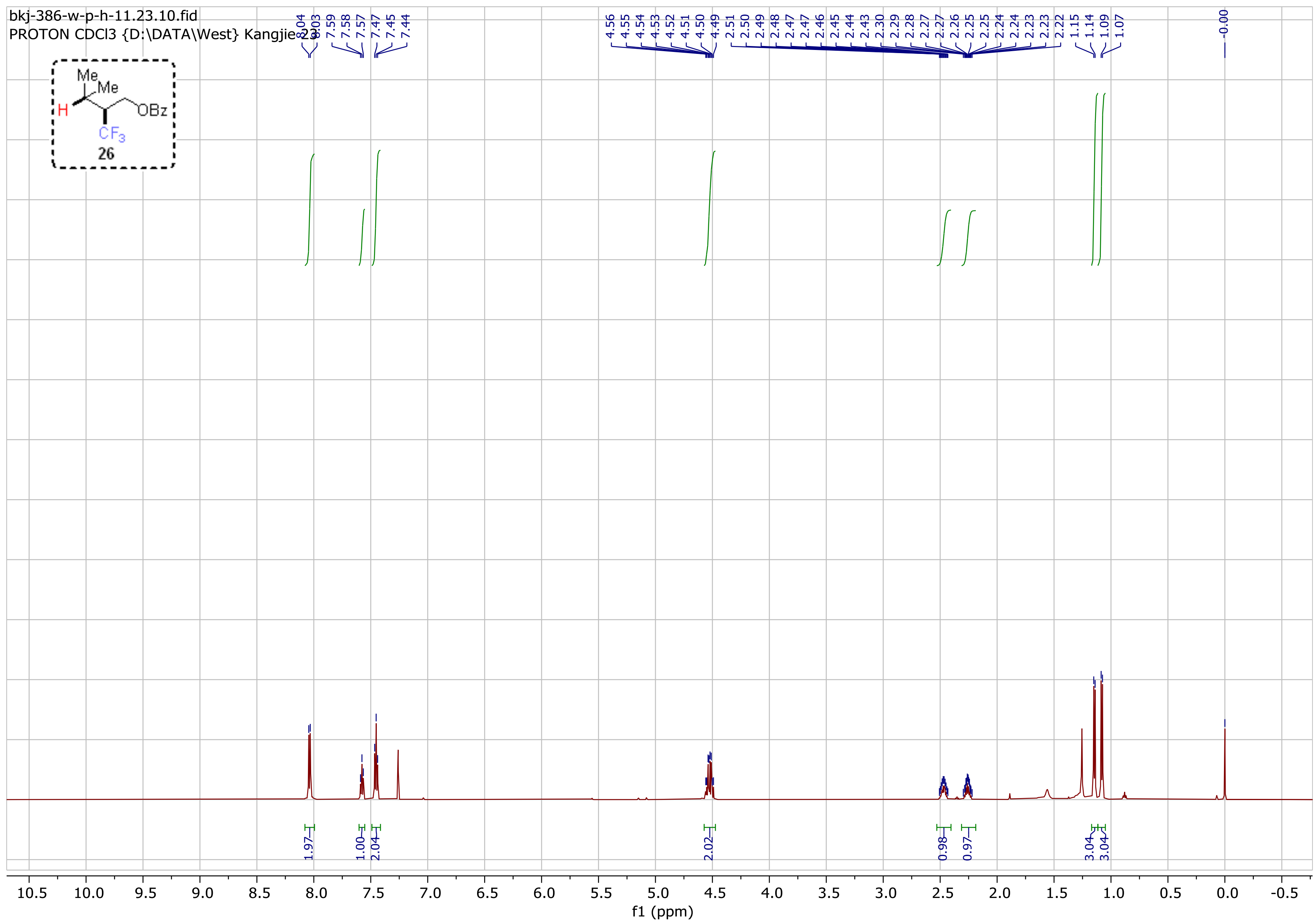

bkj-386-am-mix-p-1.1.11.fid
C13CPD CDCl3_3mm_tubes {D:\DATA\West} Kangjie 2
BzO
H
CF3
24
Me
166.57
166.41
133.09
132.98
130.23
130.03
129.55
129.53
129.44
129.29
128.43
128.40
127.58
127.43
64.57
62.35
43.87
43.71
43.54
43.38
39.95
39.78
39.61
39.44
30.10
30.09
27.25
27.23
26.05
23.85
23.83
23.82
23.80
20.68
20.67
20.65
20.63
19.95
14.00
11.16
f1 (ppm)

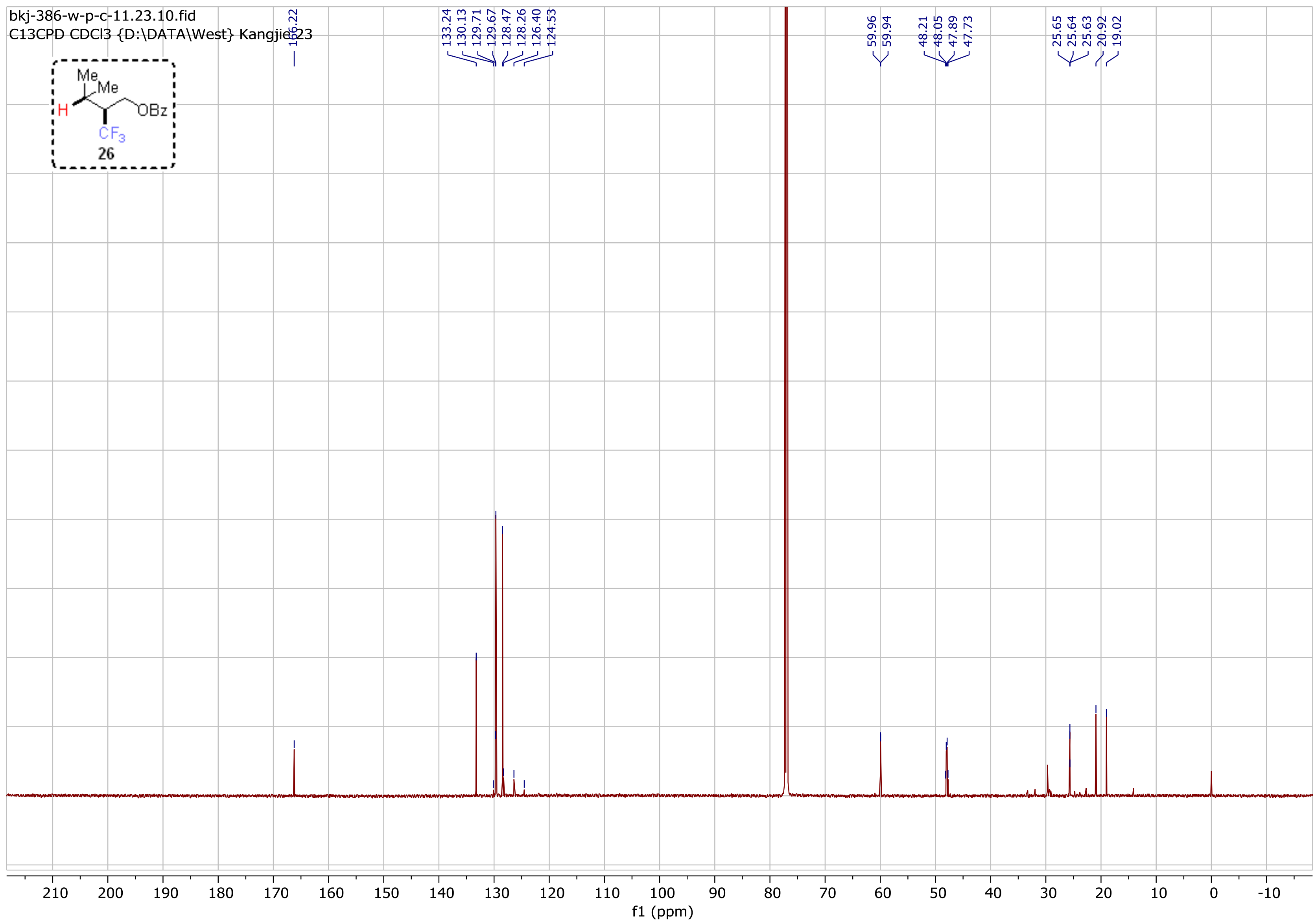

bkj-386-am-mix-p-1.1.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3_3mm_tubes {D:\DATA\West} Kangjie 2
-69.84
-69.85
-70.49
-70.51
BzO
H
CF3
Me
24
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

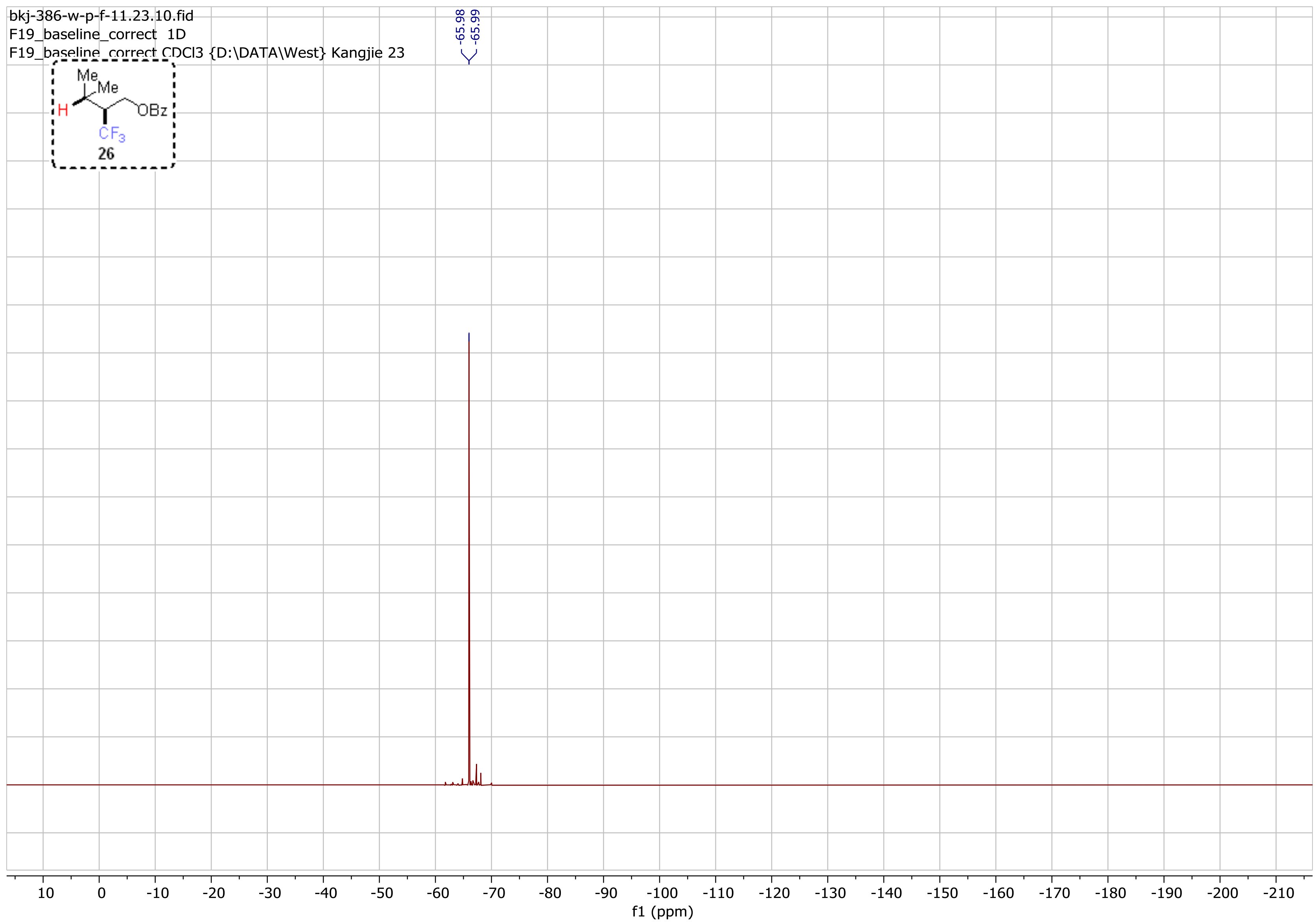

PROTON CDCl3 {D:\DATA\West} Kangjie 12
NC
H
CF3
Me
25
f1 (ppm)


bkj-386-an-p-a-12.28.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 12
H
CF3
Me
NC
25
152.80
152.55
132.28
132.25
131.41
129.62
129.56
127.75
127.71
127.66
127.63
125.86
119.13
119.11
109.86
109.80
49.64
49.49
49.33
49.18
44.56
44.31
36.74
36.72
36.71
36.69
36.54
35.41
35.24
35.06
34.89
34.00
33.95
33.89
33.80
33.64
33.47
32.08
30.11
29.31
18.46
18.44
12.98
12.96
12.94
12.92
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


bkj-386-an-p-a-12.28.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 12
H
CF3
Me
NC
25
-65.60
-65.61
-73.46
-73.48
1.00
6.71
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

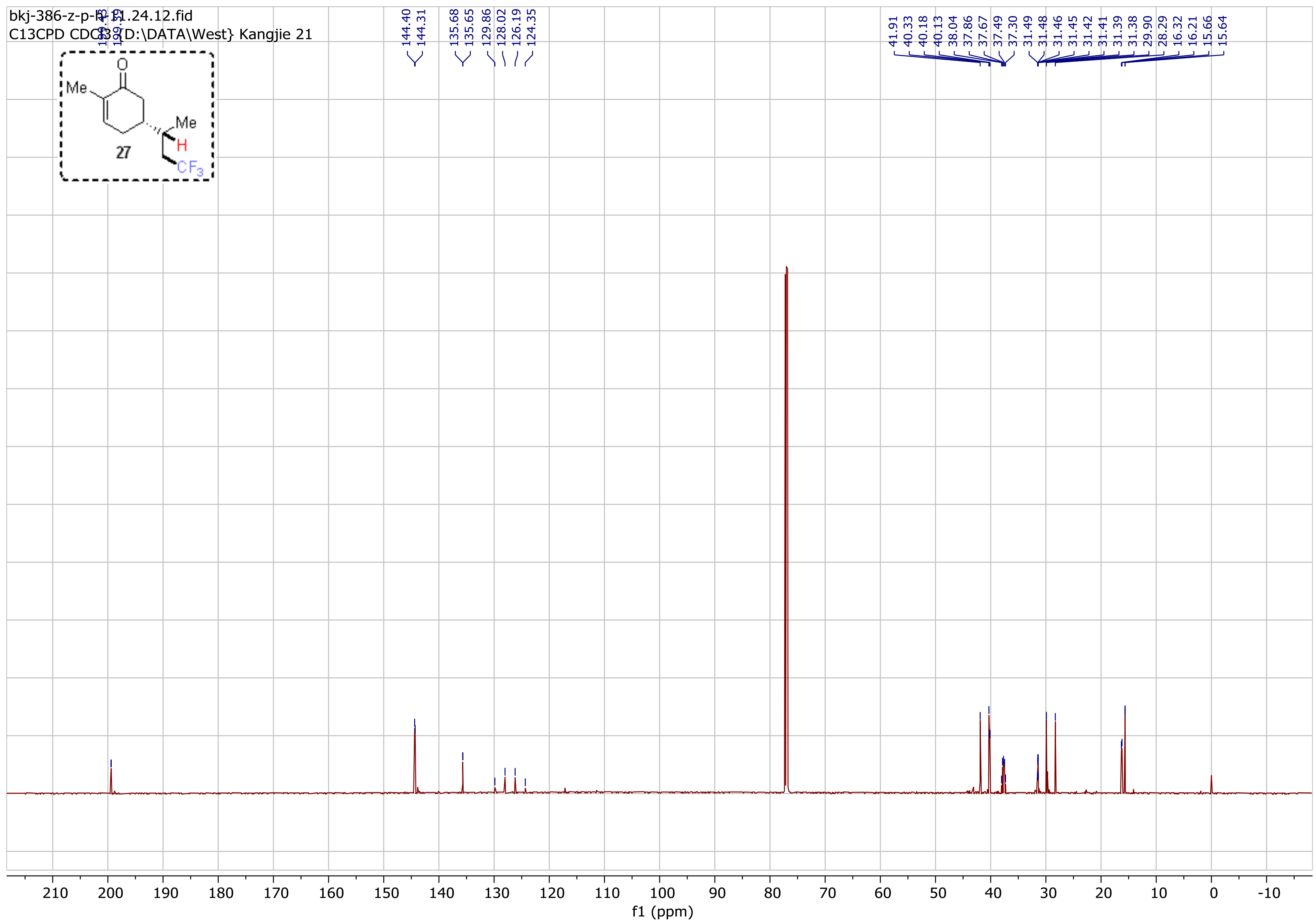

bkj-386-w-p-h-11.23.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie-23
Me
Me
H
OBz
CF3
26
8.04
8.03
7.59
7.58
7.57
7.47
7.45
7.44
4.56
4.55
4.54
4.53
4.52
4.51
4.50
4.49
2.51
2.50
2.49
2.48
2.47
2.47
2.46
2.45
2.44
2.43
2.30
2.29
2.28
2.27
2.27
2.26
2.25
2.25
2.24
2.24
2.23
2.23
2.22
1.15
1.14
1.09
1.07
-0.00
1.97
1.00
2.04
2.02
0.98
0.97
3.04
3.04
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

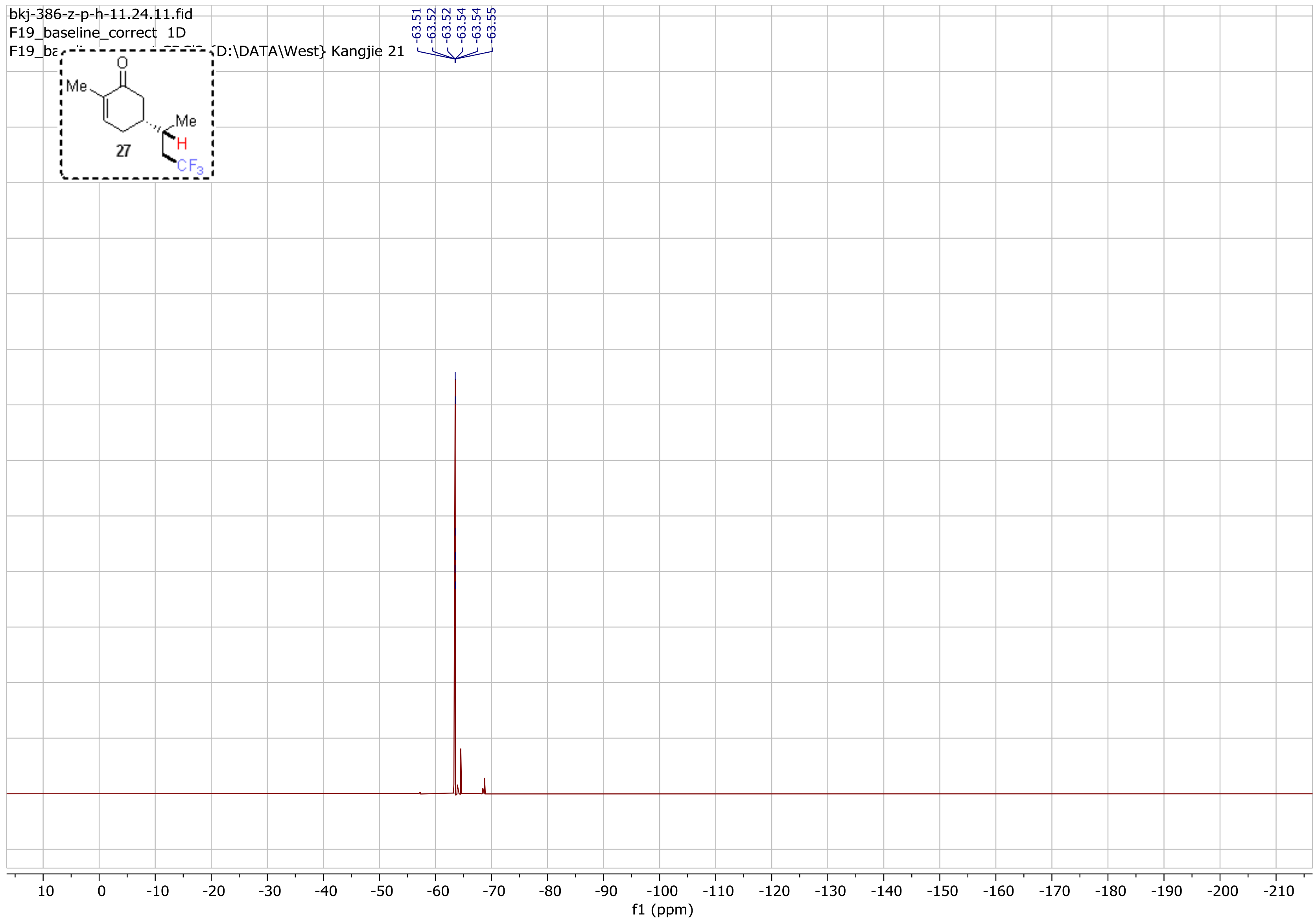

bkj-386-w-p-c-11.23.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 23
166.22
133.24
130.13
129.71
129.67
128.47
128.26
126.40
124.53
59.96
59.94
48.21
48.05
47.89
47.73
25.65
25.64
25.63
20.92
19.02
Me
Me
H
OBz
CF3
26
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

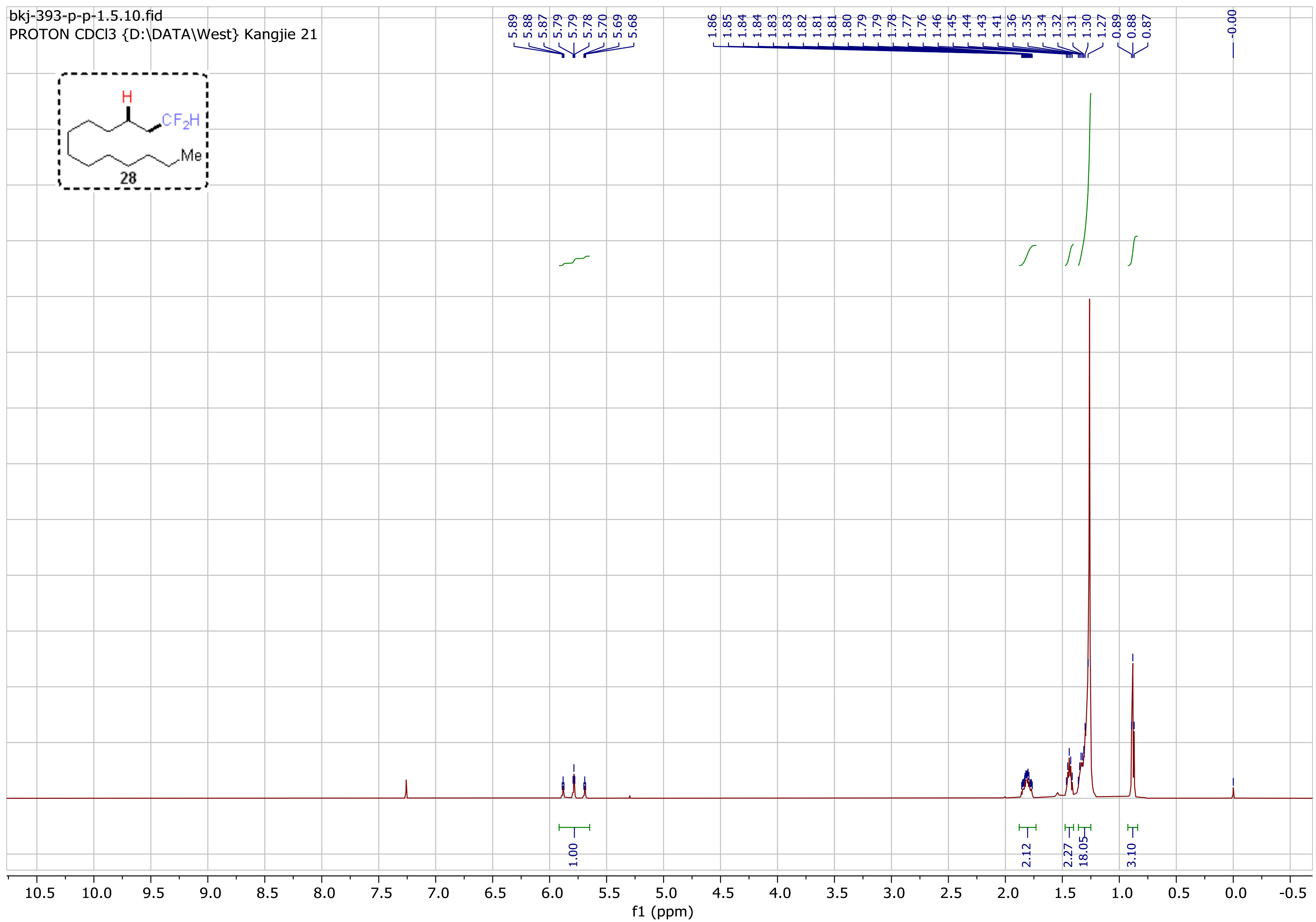


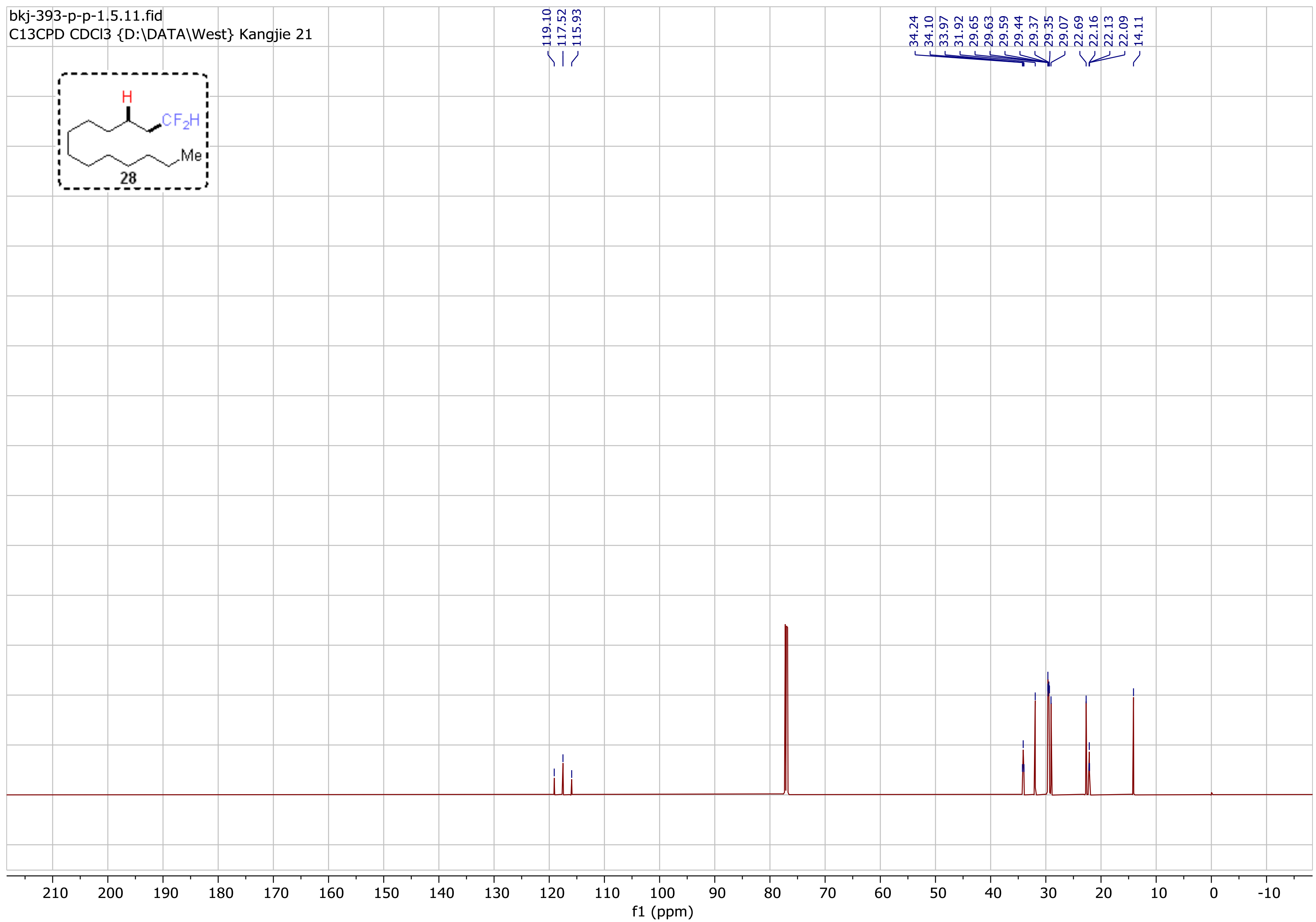
bkj-386-w-p-f-11.23.10.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 23
-65.98
-65.99
Me
Me
H
OBz
CF3
26
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

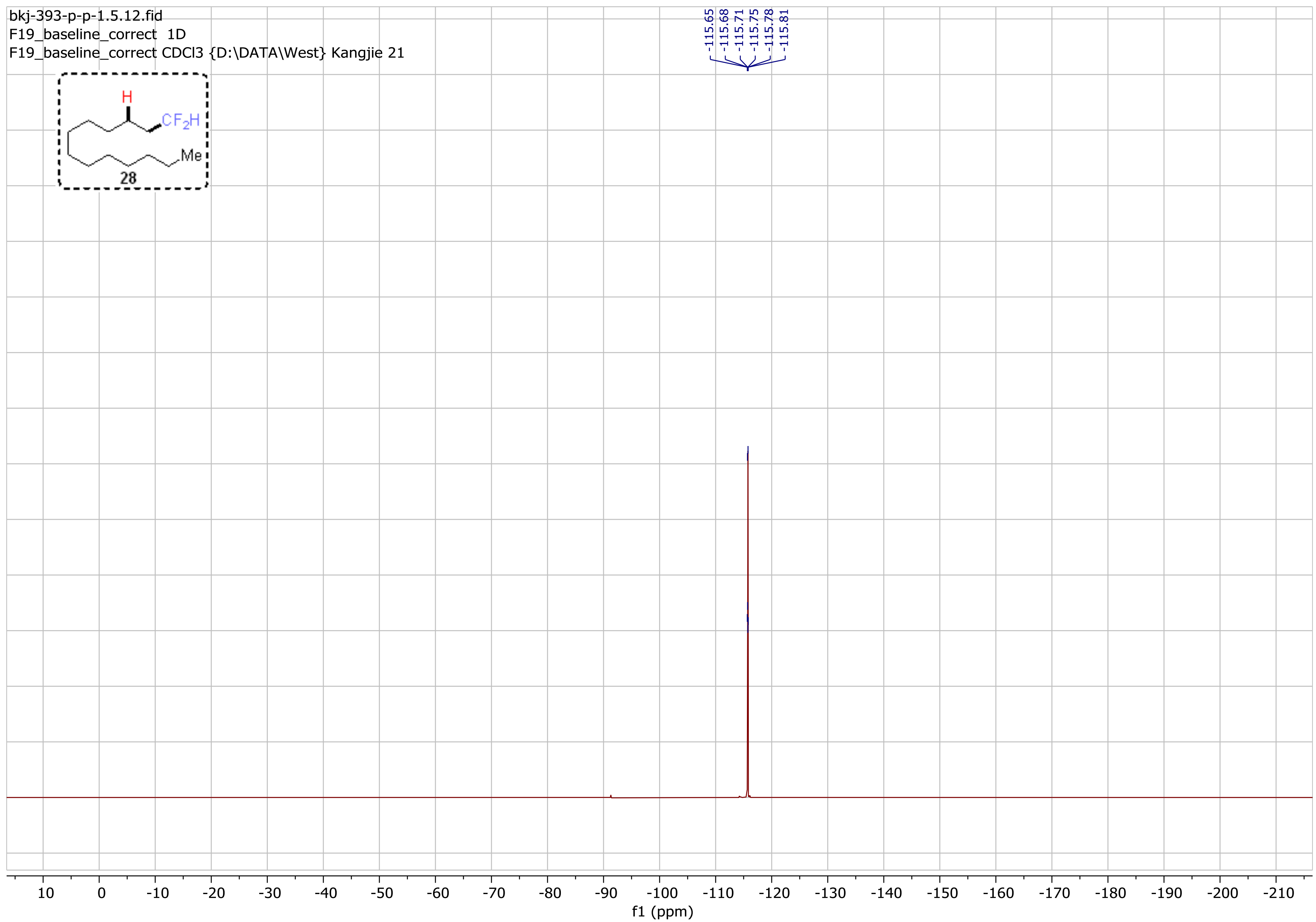

PROTON CDCl3 {D:\DATA\West} Kangjie 21
27
f1 (ppm)

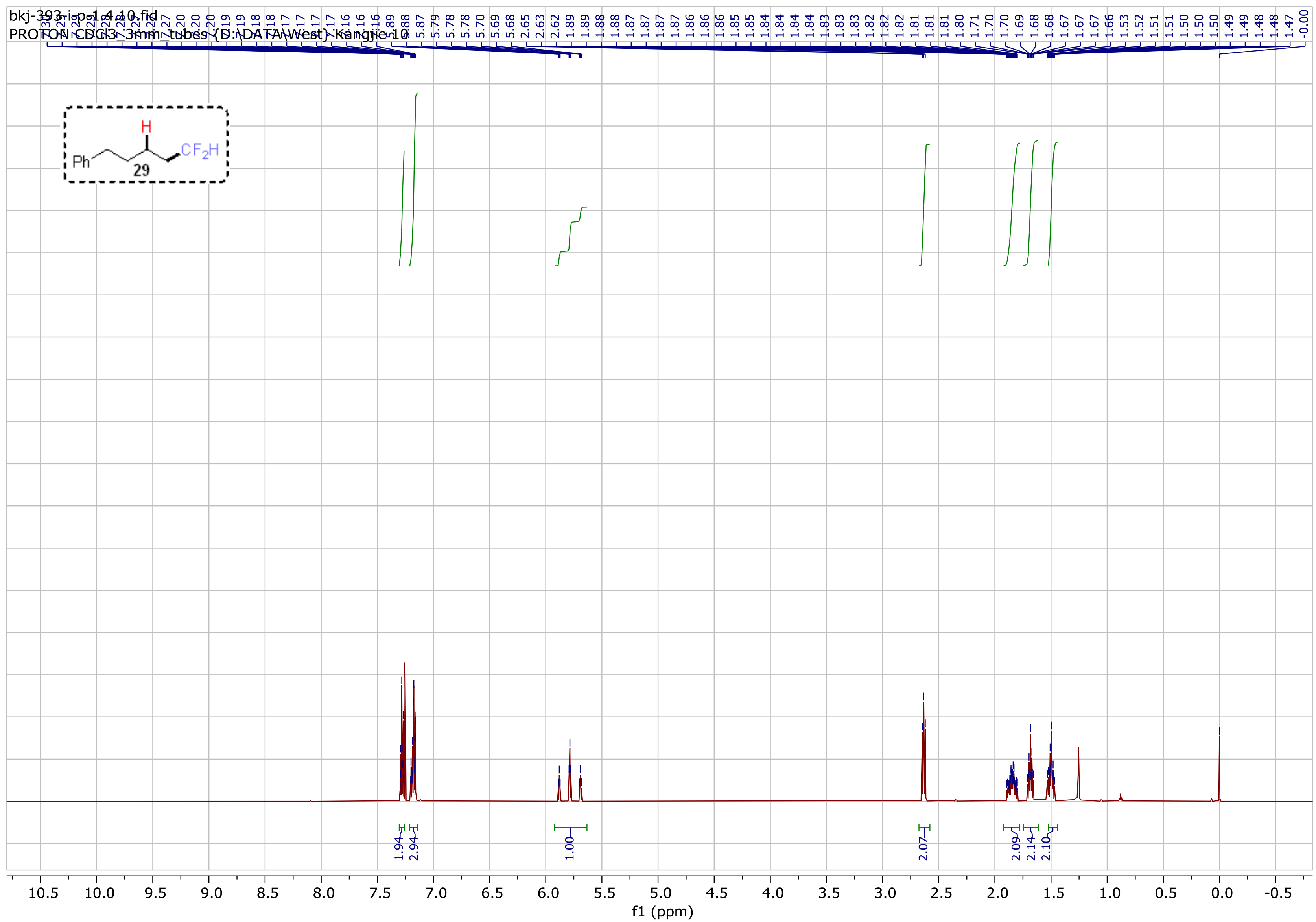

bkj-386-z-p-I-11.24.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 21
Me
O
Me
H
CF3
27
144.40
144.31
135.68
135.65
129.86
128.02
126.19
124.35
41.91
40.33
40.18
40.13
38.04
37.86
37.67
37.49
37.30
31.49
31.48
31.46
31.45
31.42
31.41
31.39
31.38
29.90
28.29
16.32
16.21
15.66
15.64
f1 (ppm)

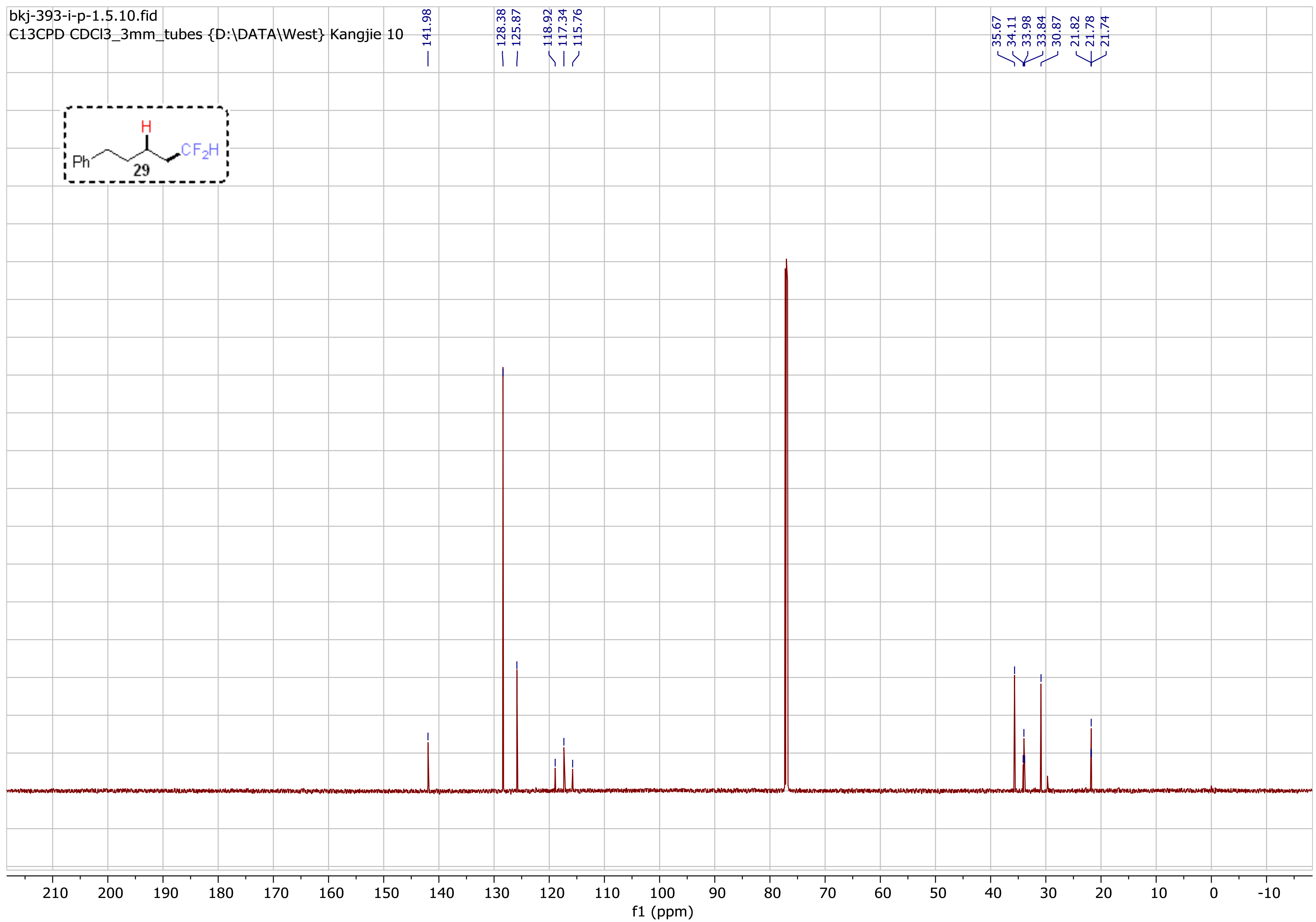

bkj-386-z-p-h-11.24.11.fid
F19_baseline_correct 1D
D:\DATA\West} Kangjie 21
-63.51
-63.52
-63.52
-63.54
-63.54
-63.55
Me
O
Me
H
CF3
27
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

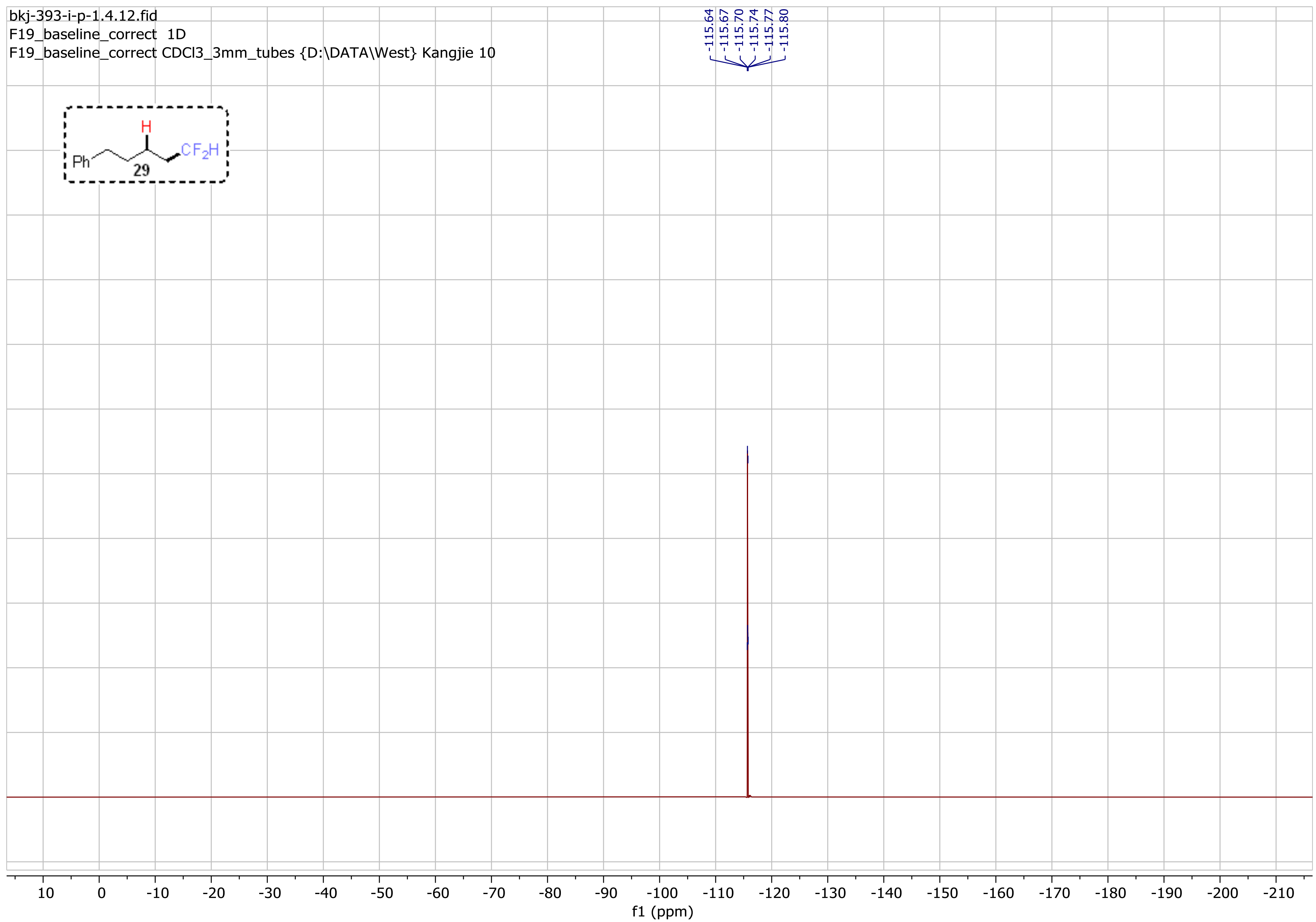

bkj-393-p-p-1.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 21
H
CF2H
Me
28
5.89
5.88
5.87
5.79
5.79
5.78
5.70
5.69
5.68
1.86
1.85
1.84
1.84
1.83
1.83
1.82
1.81
1.81
1.80
1.79
1.79
1.78
1.77
1.76
1.46
1.45
1.44
1.43
1.41
1.36
1.35
1.34
1.32
1.31
1.30
1.27
0.89
0.88
0.87
-0.00
1.00
2.12
2.27
18.05
3.10
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

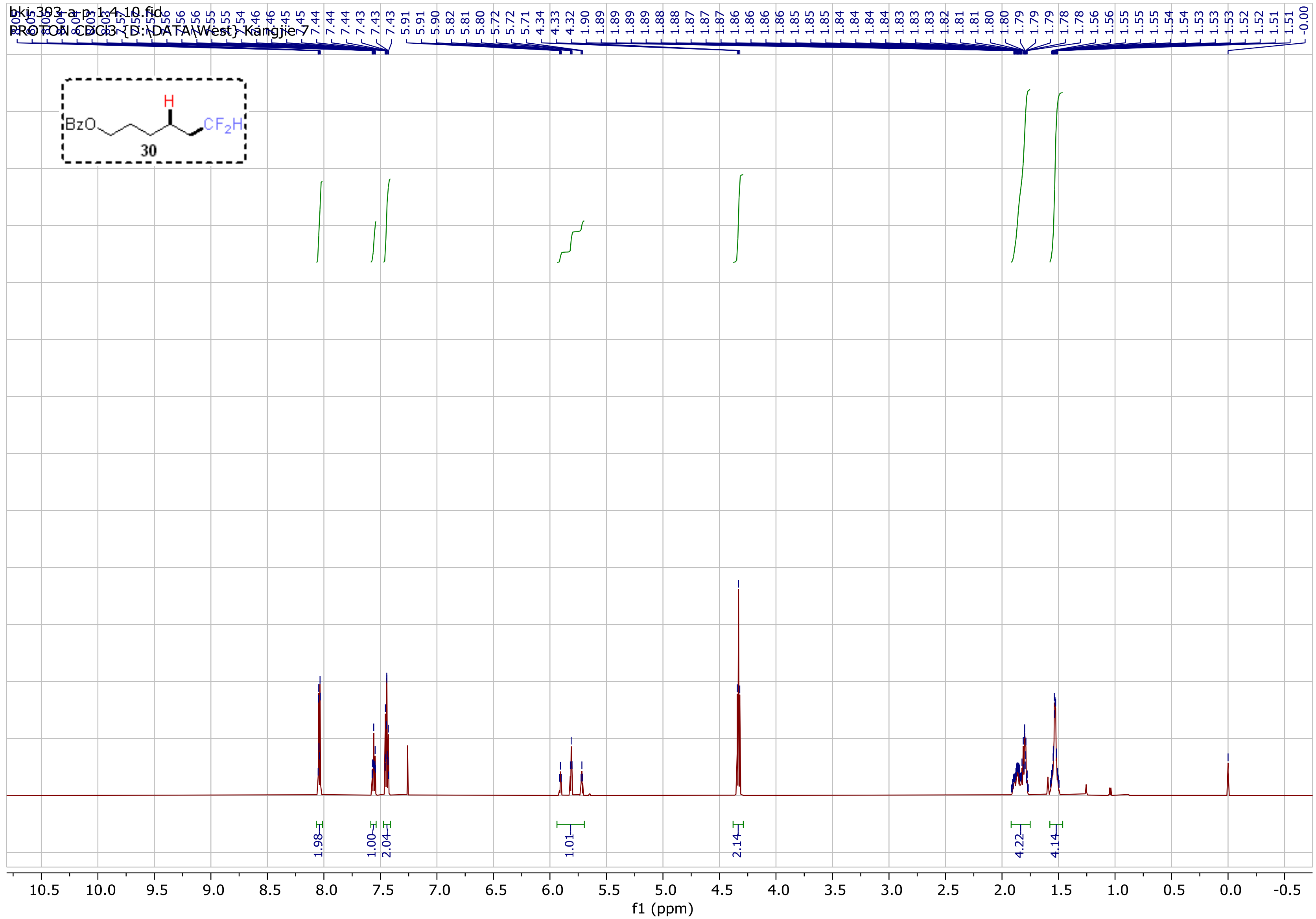

bkj-393-p-p-1.5.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 21
119.10
117.52
115.93
34.24
34.10
33.97
31.92
29.65
29.63
29.59
29.44
29.37
29.35
29.07
22.69
22.16
22.13
22.09
14.11
H
CF2H
Me
28
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

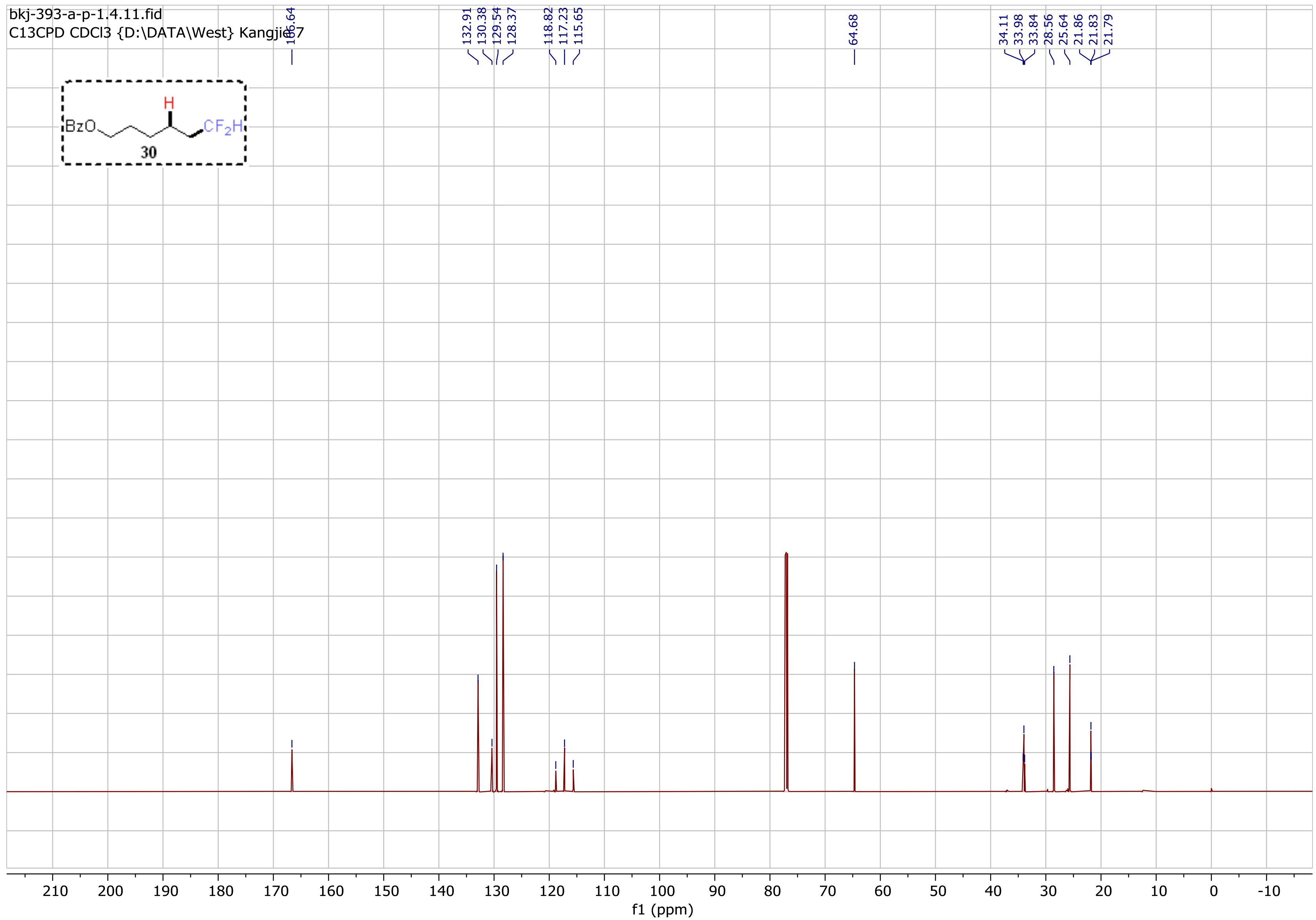

bkj-393-p-p-1.5.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 21
H
CF2H
Me
28
-115.65
-115.68
-115.71
-115.75
-115.78
-115.81
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

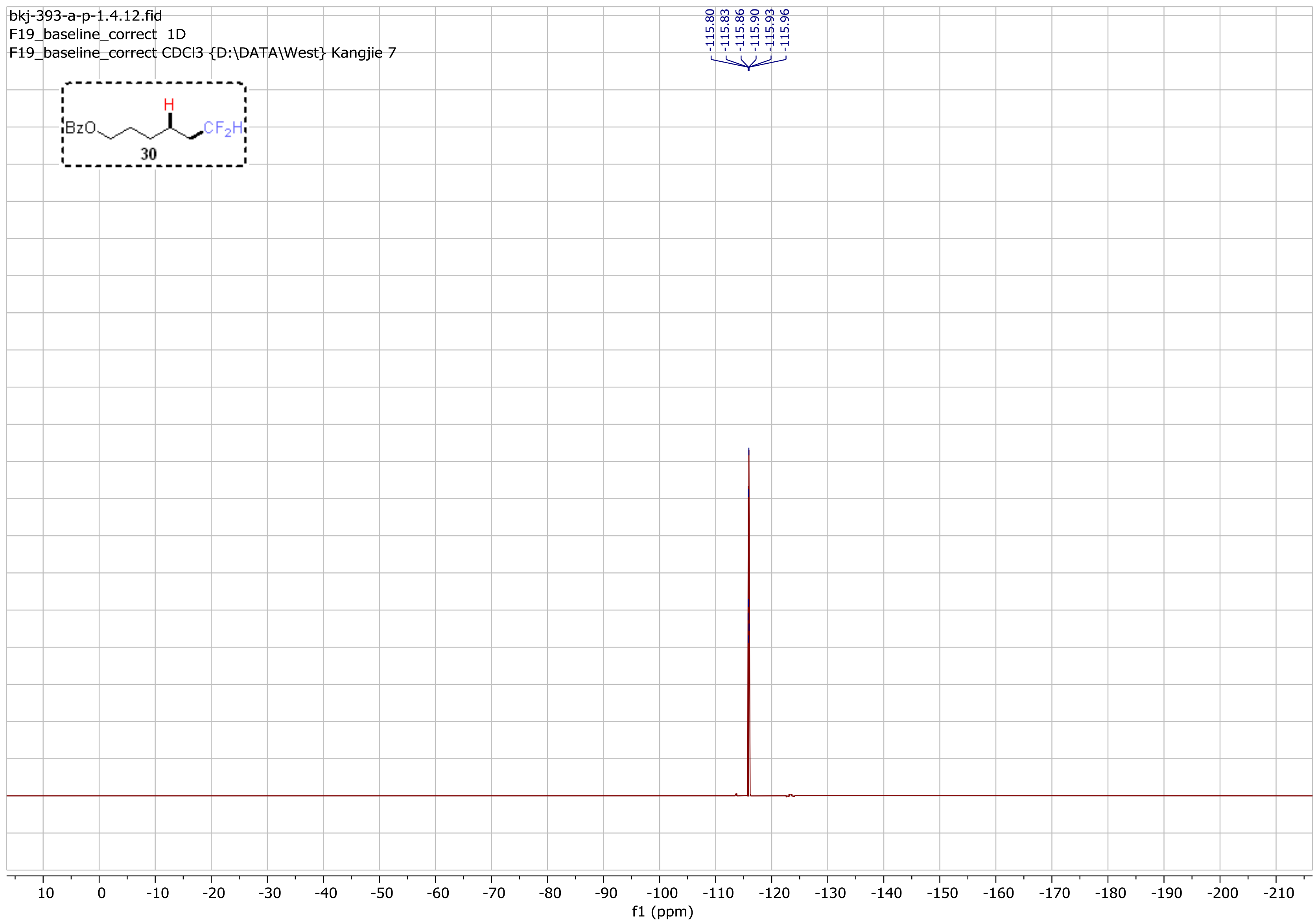

bkj-393-i-p-1.4.10.fid
PROTON CDCl3_3mm_tubes {D:\DATA\West} Kangjie 10
Ph
H
CF2H
29
1.94
2.94
1.00
2.07
2.09
2.14
2.10
f1 (ppm)

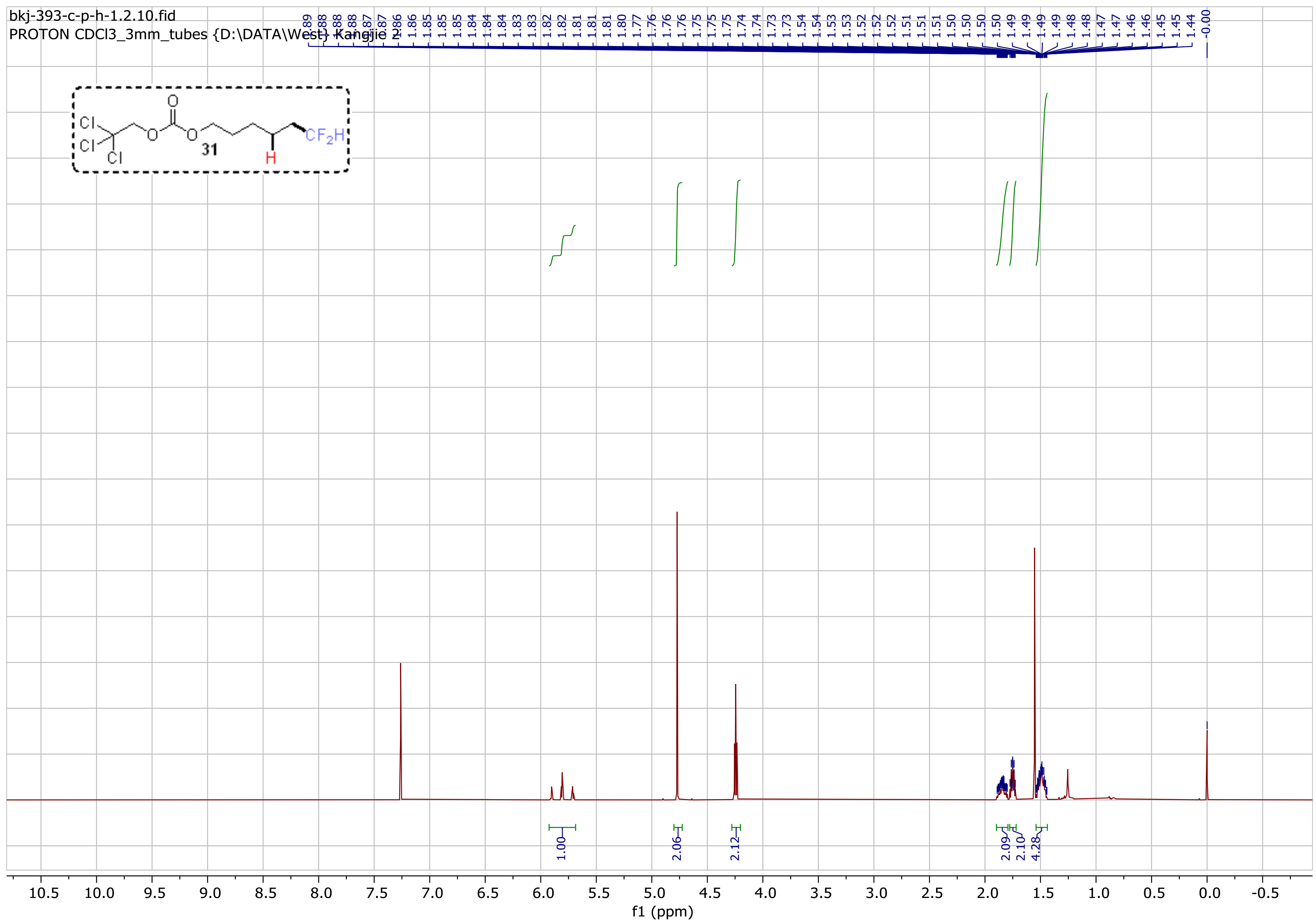

bkj-393-i-p-1.5.10.fid
C13CPD CDCl3_3mm_tubes {D:\DATA\West} Kangjie 10
141.98
128.38
125.87
118.92
117.34
115.76
35.67
34.11
33.98
33.84
30.87
21.82
21.78
21.74
H
Ph
CF2H
29
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

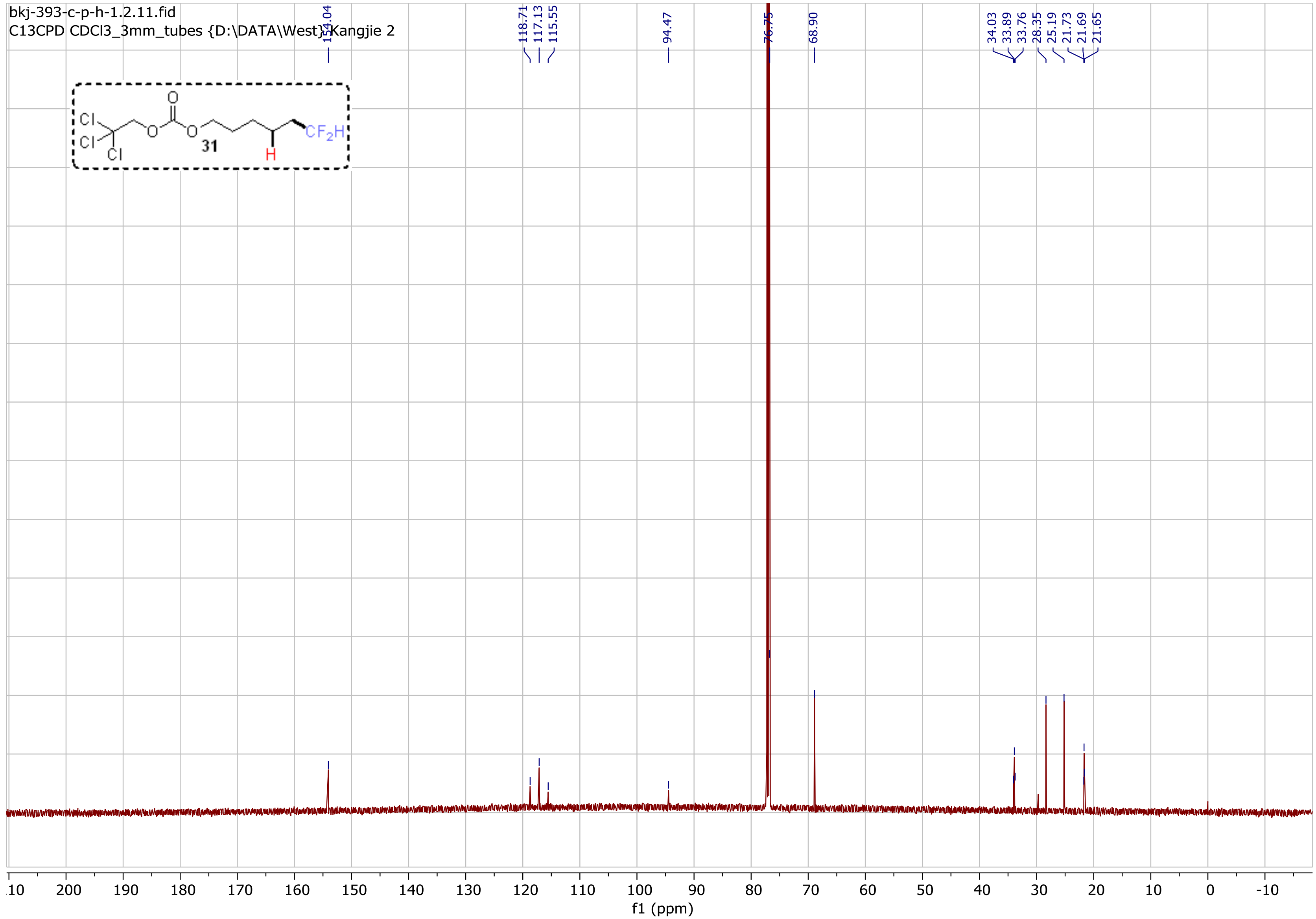

bkj-393-i-p-1.4.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3_3mm_tubes {D:\DATA\West} Kangjie 10
-115.64
-115.67
-115.70
-115.74
-115.77
-115.80
Ph
H
CF2H
29
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bki-393-a-p-1-4.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
BzO
H
CF2H
30
1.98
1.00
2.04
1.01
2.14
4.22
4.14
f1 (ppm)

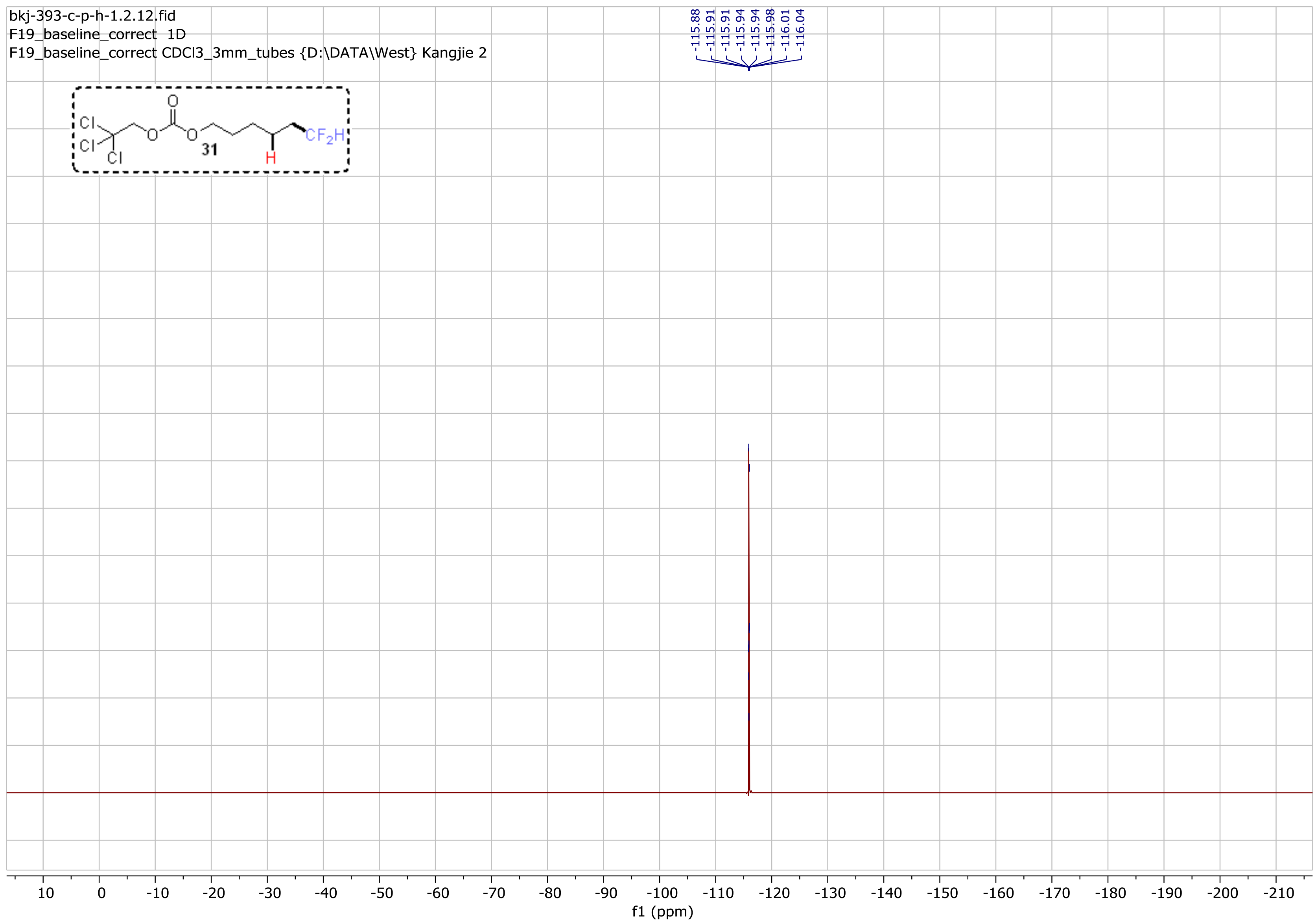

bkj-393-a-p-1.4.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie7
166.64
132.91
130.38
129.54
128.37
118.82
117.23
115.65
64.68
34.11
33.98
33.84
28.56
25.64
21.86
21.83
21.79
BzO
H
CF2H
30
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

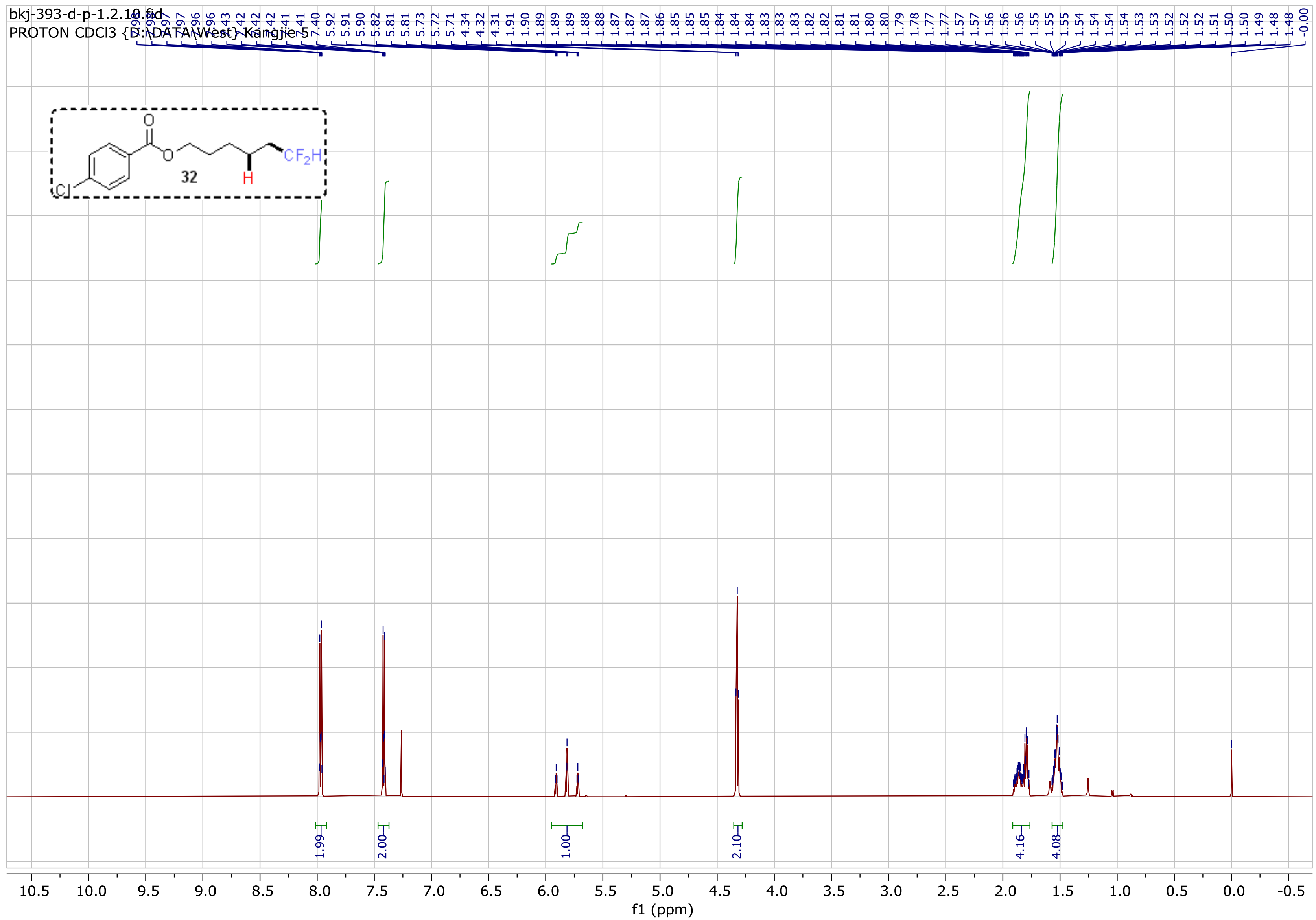

bkj-393-a-p-1.4.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 7
-115.80
-115.83
-115.86
-115.90
-115.93
-115.96
BzO
H
CF2H
30
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

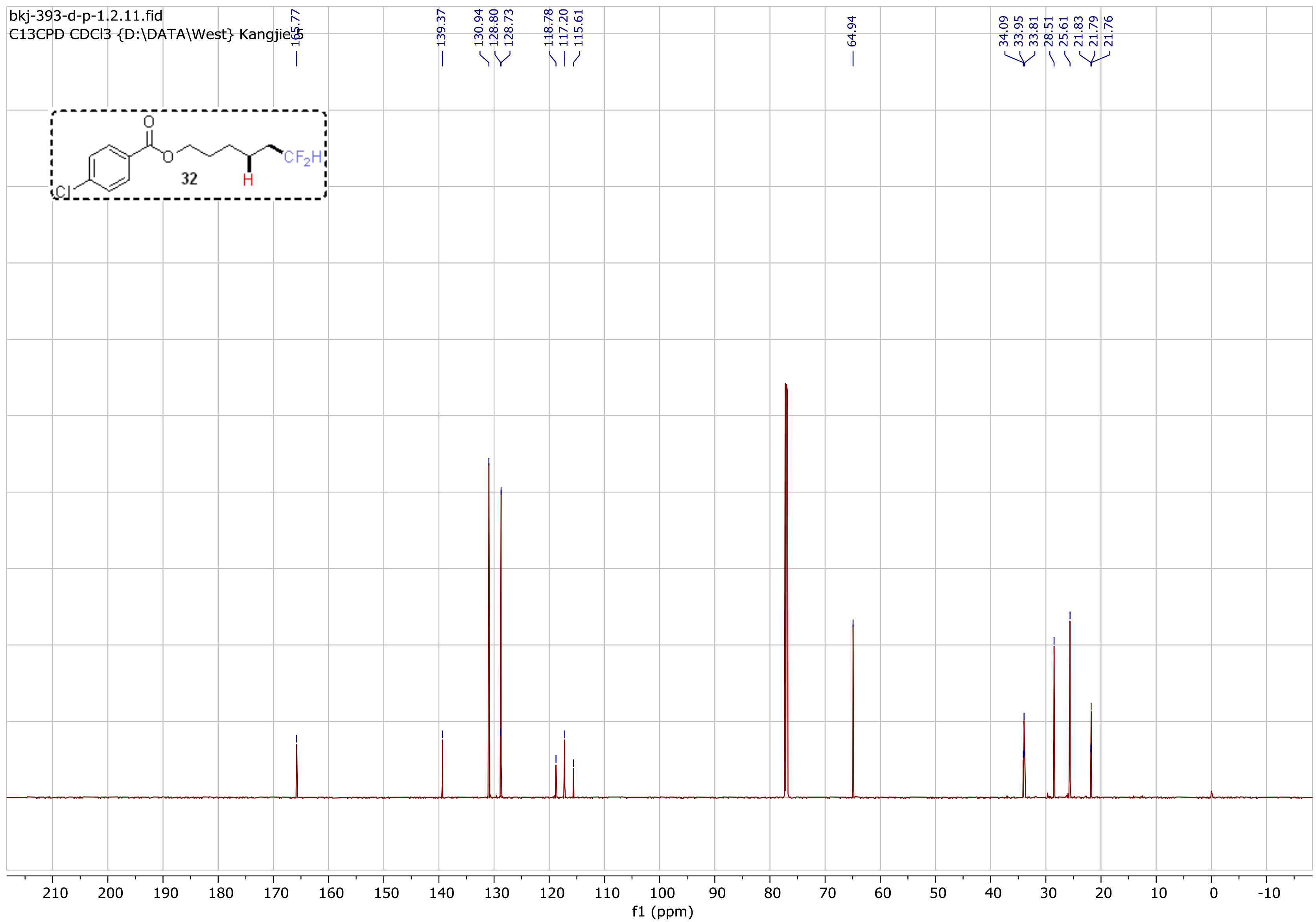

bkj-393-c-p-h-1.2.10.fid
PROTON CDCl3_3mm_tubes {D:\DATA\West} Kangjie 2
31
1.00
2.06
2.12
2.09
2.10
4.28
f1 (ppm)

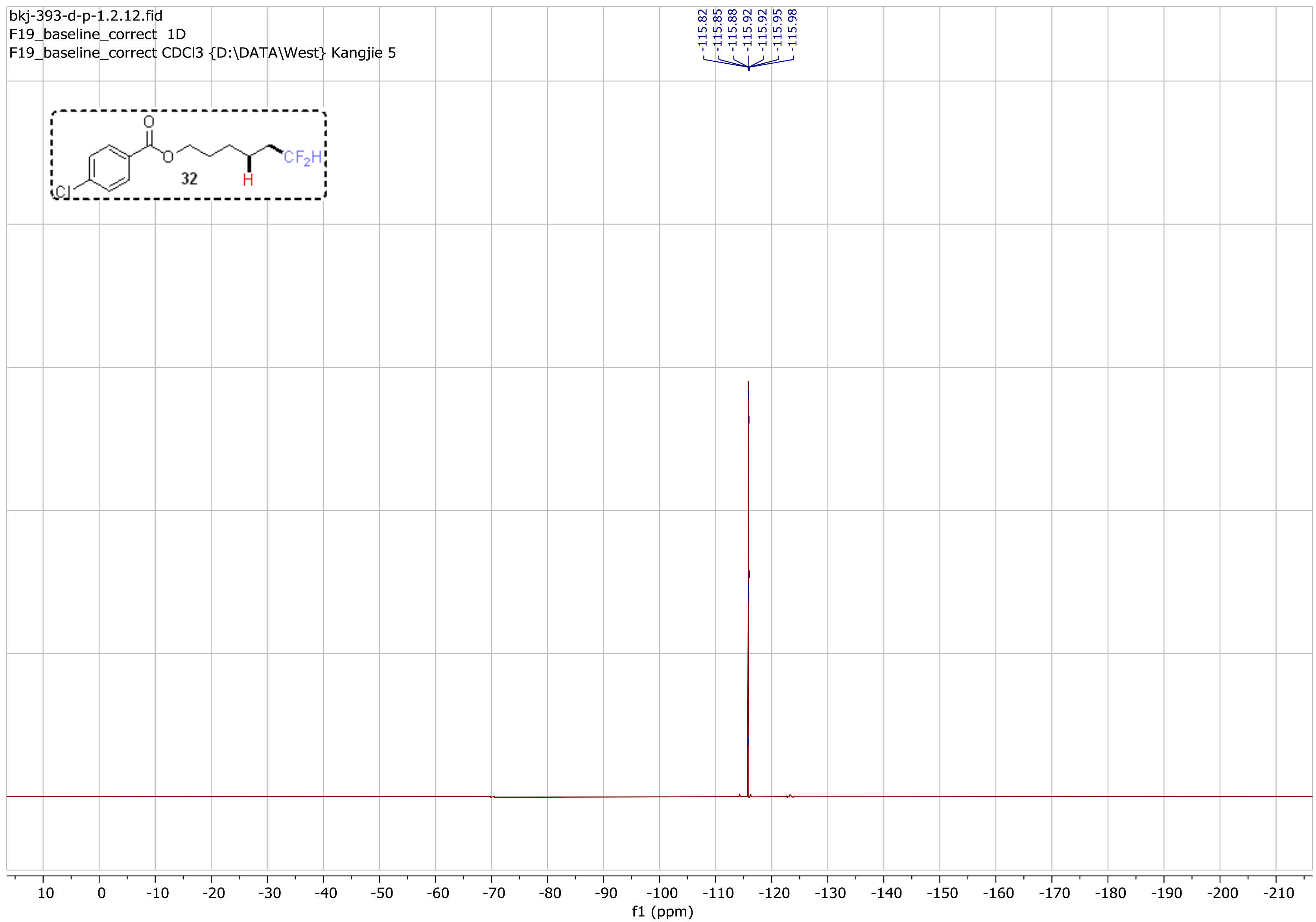


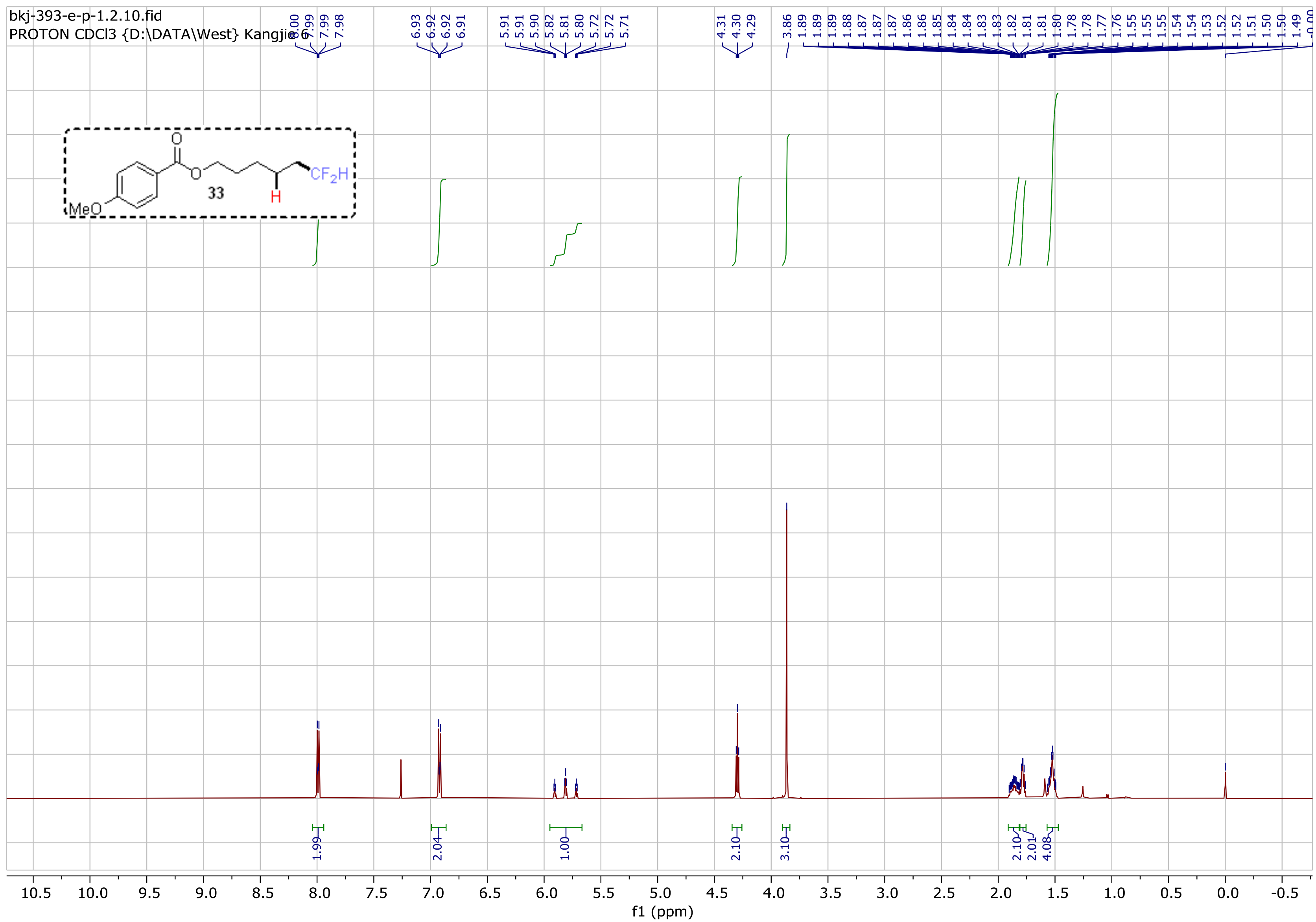
bkj-393-c-p-h-1.2.11.fid
C13CPD CDCl3_3mm_tubes {D:\DATA\West} Kangjie 2
154.04
118.71
117.13
115.55
94.47
76.75
68.90
34.03
33.89
33.76
28.35
25.19
21.73
21.69
21.65
Cl
Cl
Cl
O
O
O
31
H
CF2H
f1 (ppm)

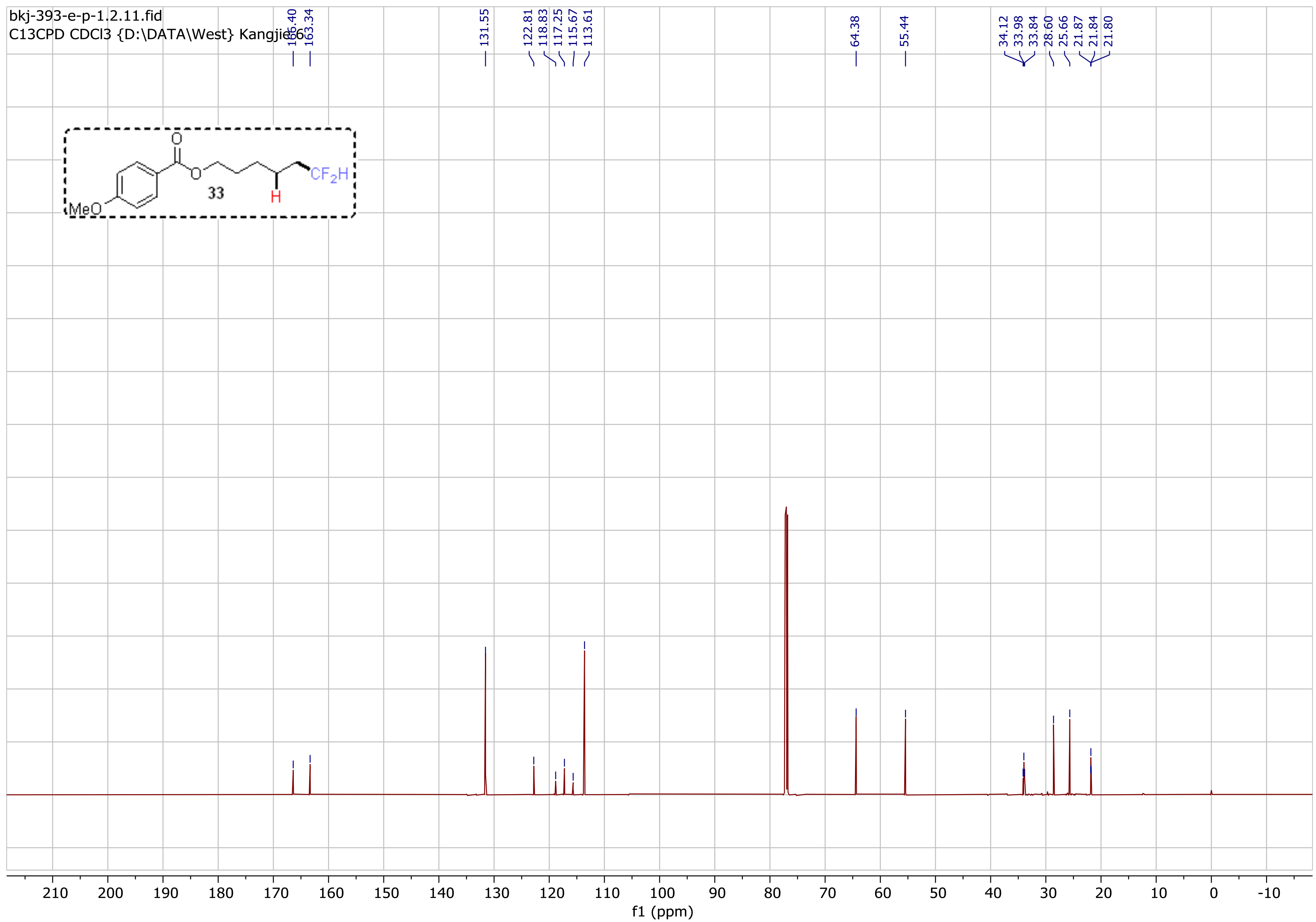

bkj-393-c-p-h-1.2.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3_3mm_tubes {D:\DATA\West} Kangjie 2
-115.88
-115.91
-115.91
-115.94
-115.94
-115.98
-116.01
-116.04
31
f1 (ppm)

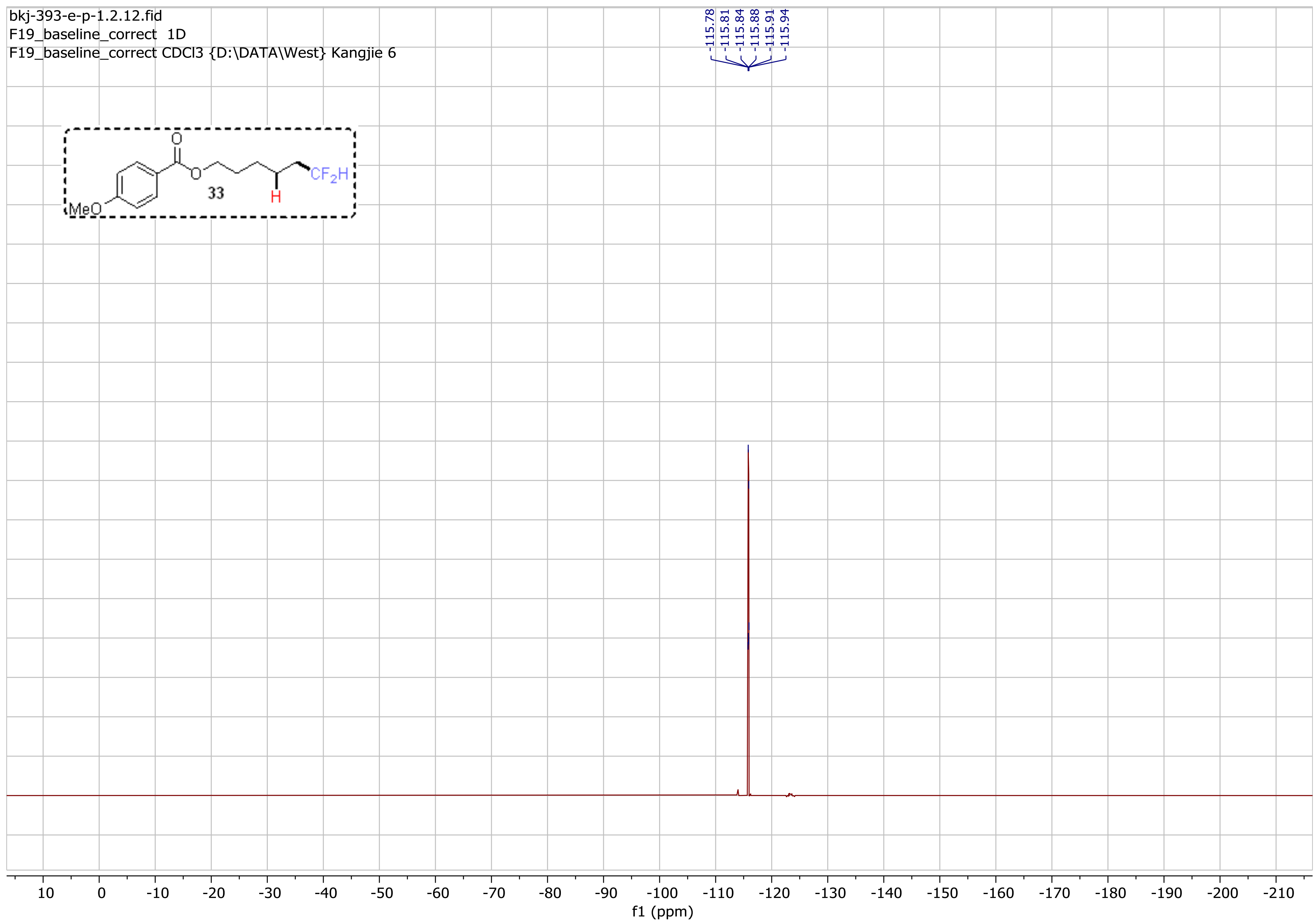

bkj-393-d-p-1.2.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 5
32
f1 (ppm)
1.99
2.00
1.00
2.10
4.16
4.08

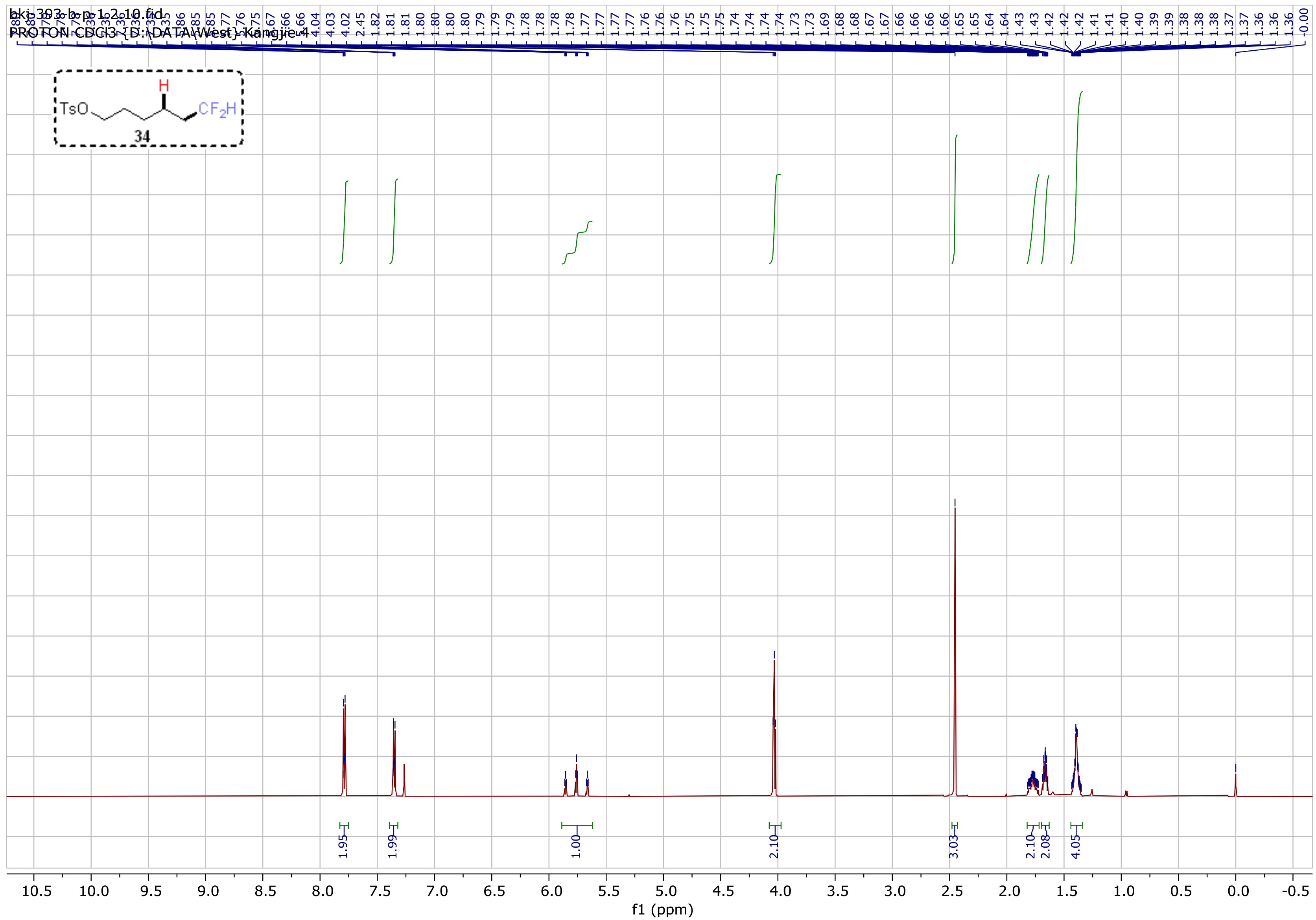

bkj-393-d-p-1.2.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 5
165.77
139.37
130.94
128.80
128.73
118.78
117.20
115.61
64.94
34.09
33.95
33.81
28.51
25.61
21.83
21.79
21.76
32
f1 (ppm)

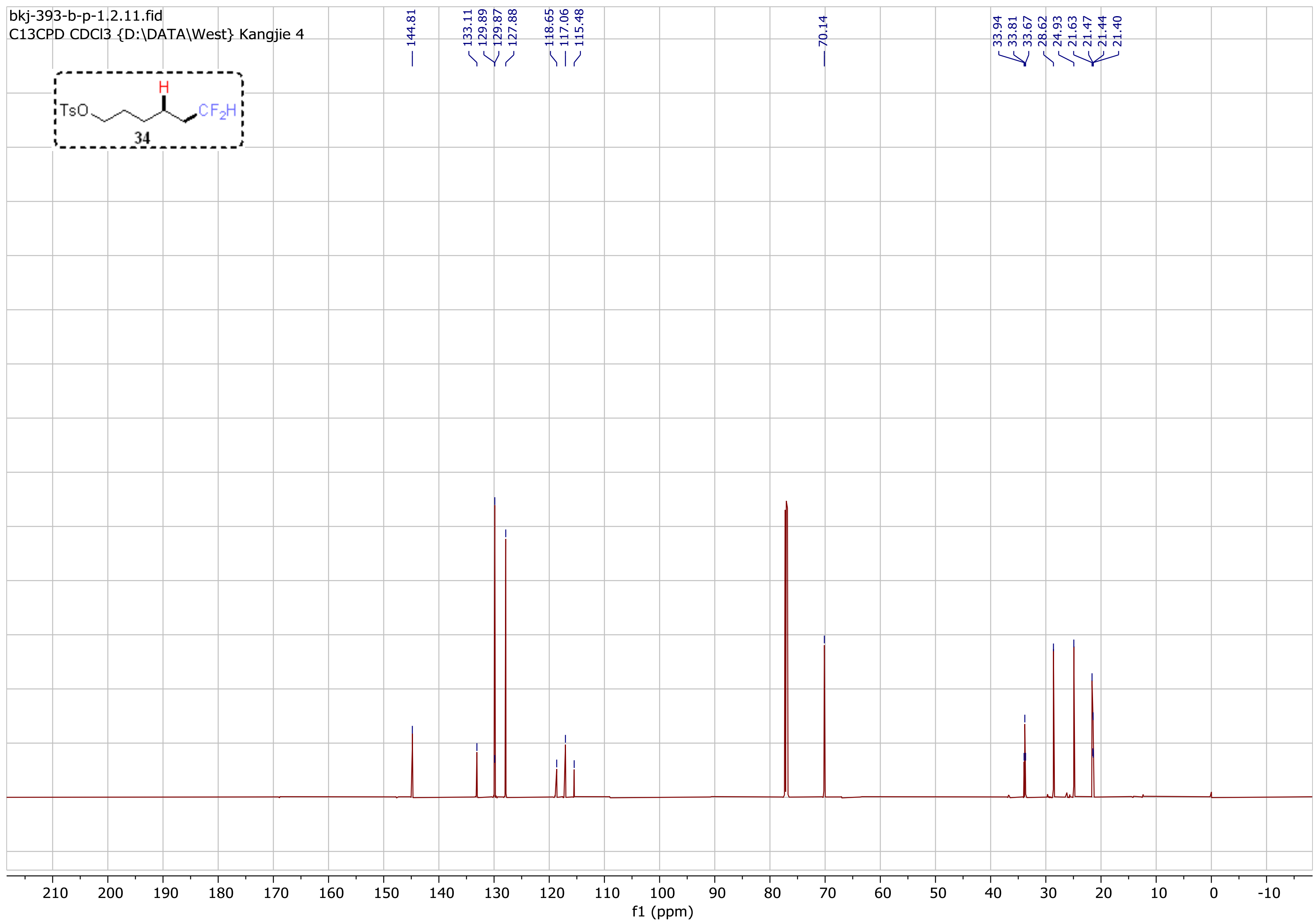

bkj-393-d-p-1.2.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 5
-115.82
-115.85
-115.88
-115.92
-115.92
-115.95
-115.98
O
O
Cl
32
H
CF_2H
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

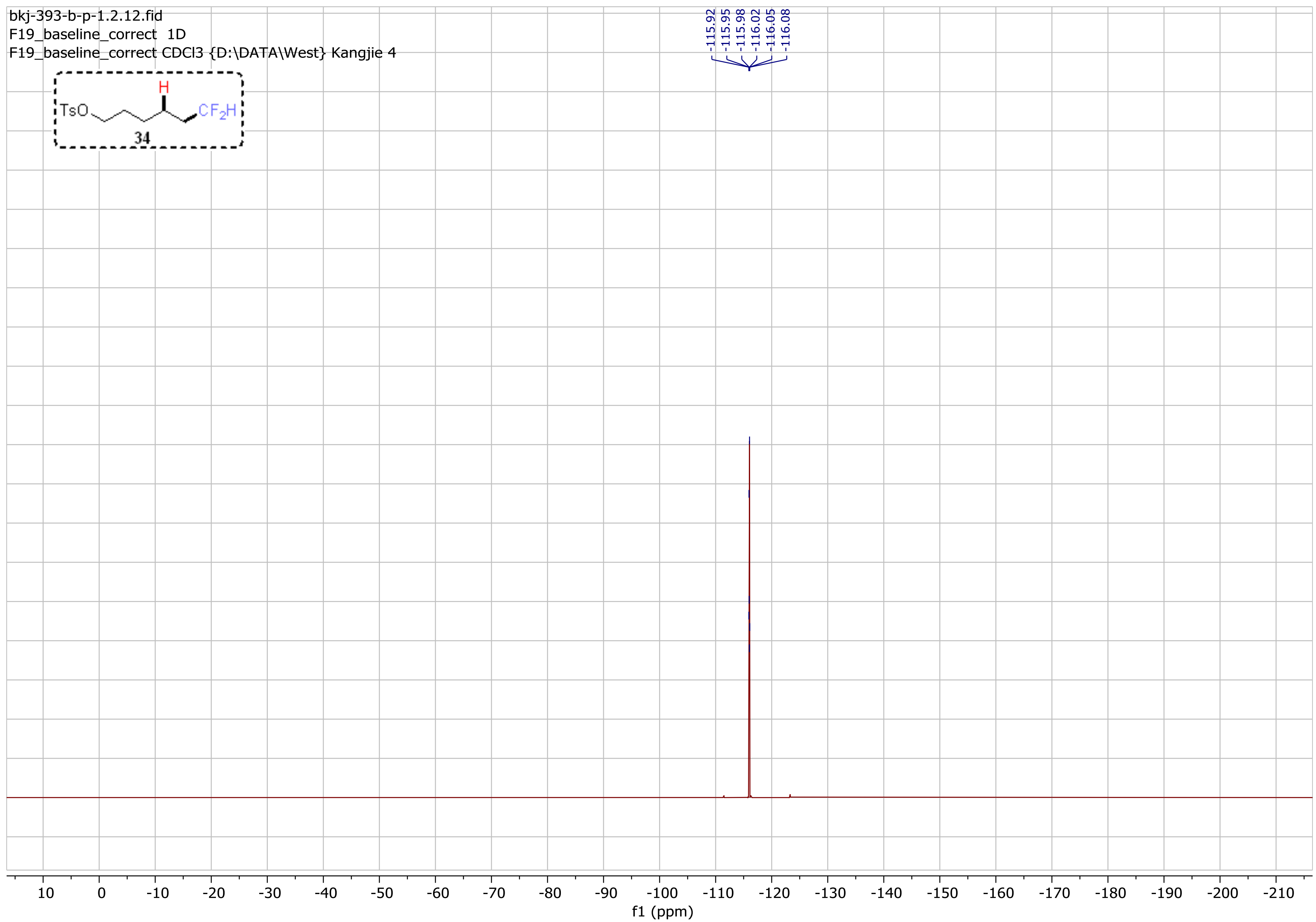

bkj-393-e-p-1.2.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 6
8.00
7.99
7.99
7.98
6.93
6.92
6.92
6.91
5.91
5.91
5.90
5.82
5.81
5.80
5.72
5.72
5.71
4.31
4.30
4.29
3.86
1.89
1.89
1.89
1.88
1.87
1.87
1.87
1.86
1.86
1.85
1.84
1.84
1.83
1.83
1.82
1.81
1.81
1.80
1.78
1.78
1.77
1.76
1.55
1.55
1.55
1.54
1.54
1.53
1.52
1.52
1.51
1.50
1.50
1.49
-0.00
MeO
O
33
H
CF_2H
1.99
2.04
1.00
2.10
3.10
2.10
2.01
4.08
f1 (ppm)


bkj-393-e-p-1.2.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie66
166.40
163.34
131.55
122.81
118.83
117.25
115.67
113.61
64.38
55.44
34.12
33.98
33.84
28.60
25.66
21.87
21.84
21.80
MeO
O
O
33
H
CF2H
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

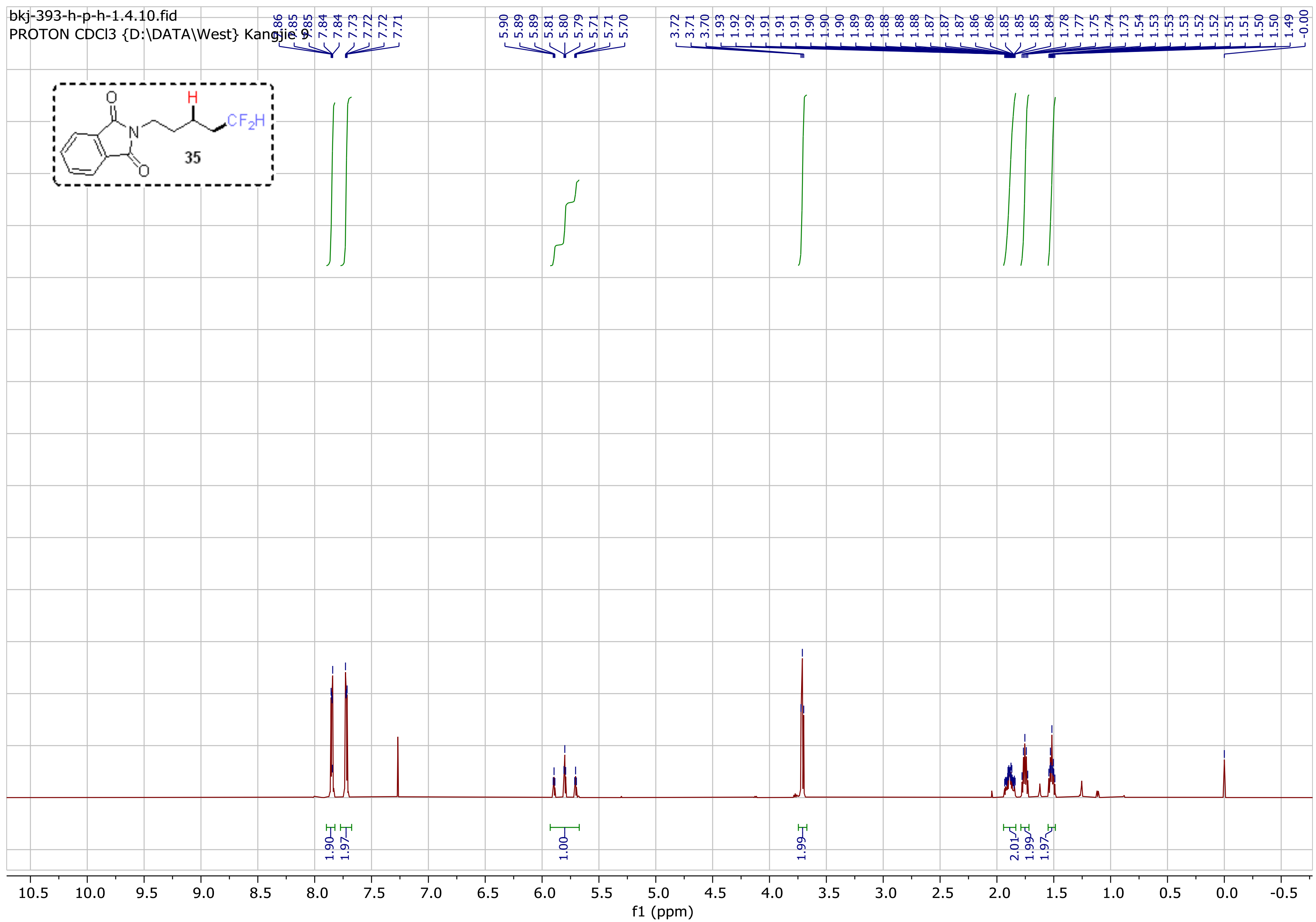

bkj-393-e-p-1.2.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 6
-115.78
-115.81
-115.84
-115.88
-115.91
-115.94
MeO
O
O
33
H
CF2H
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bki-393-b-p-1.2.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 4
TsO
H
CF2H
34
1.95
1.99
1.00
2.10
3.03
2.10
2.08
4.05
f1 (ppm)

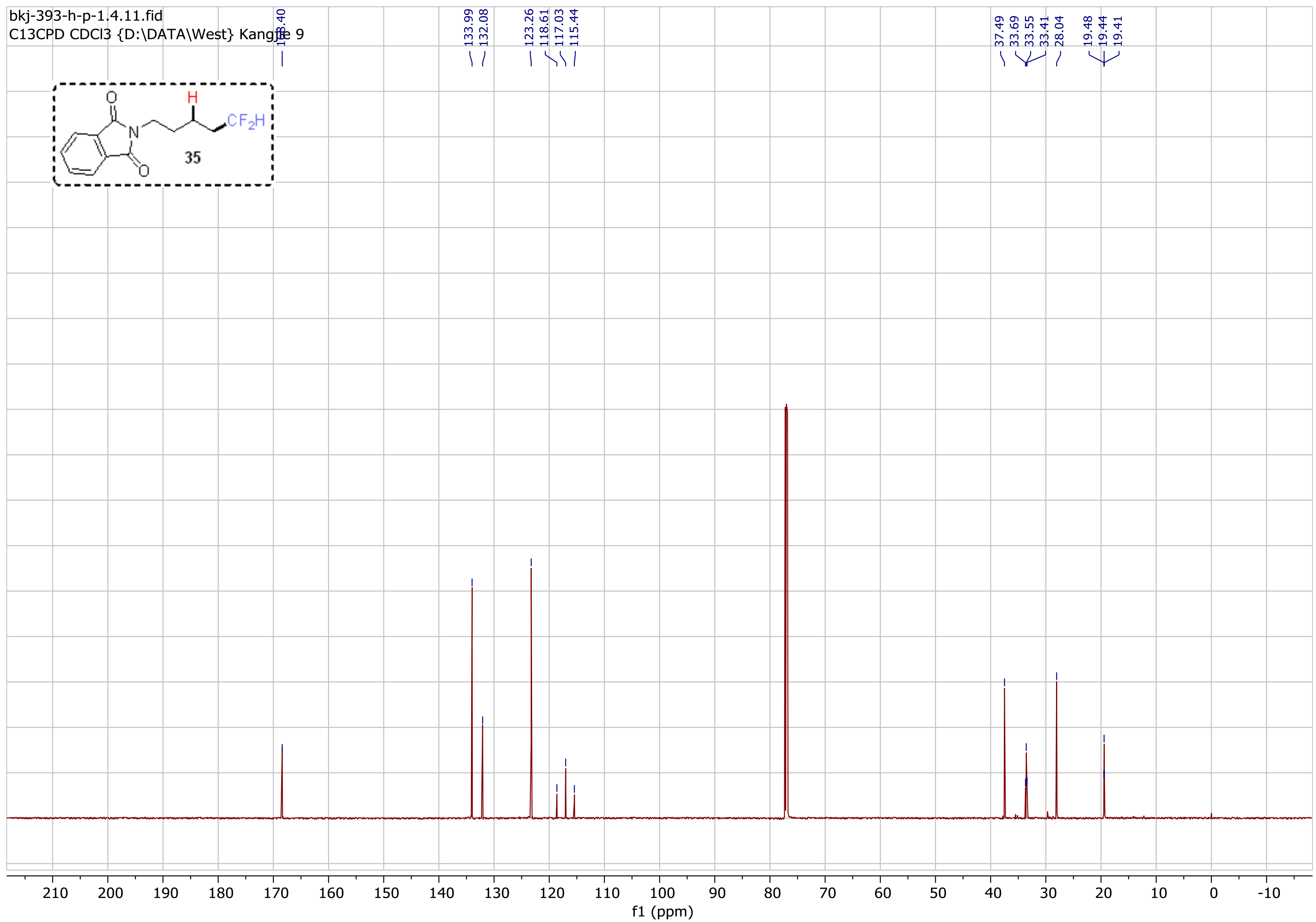

bkj-393-b-p-1.2.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 4
TsO
H
CF2H
34
144.81
133.11
129.89
129.87
127.88
118.65
117.06
115.48
70.14
33.94
33.81
33.67
28.62
24.93
21.63
21.47
21.44
21.40
f1 (ppm)



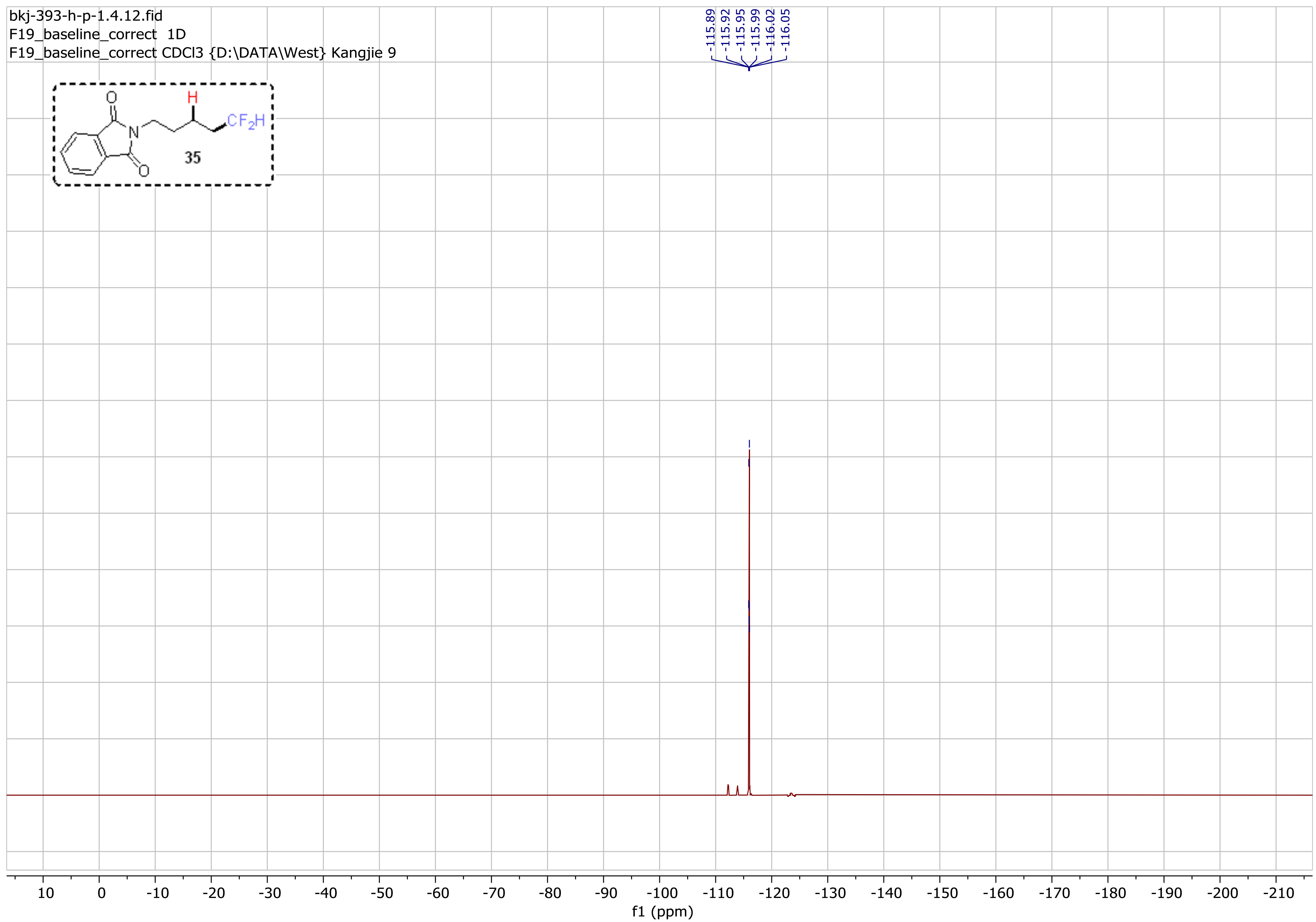
bkj-393-b-p-1.2.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 4
TsO
H
CF2H
34
-115.92
-115.95
-115.98
-116.02
-116.05
-116.08
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

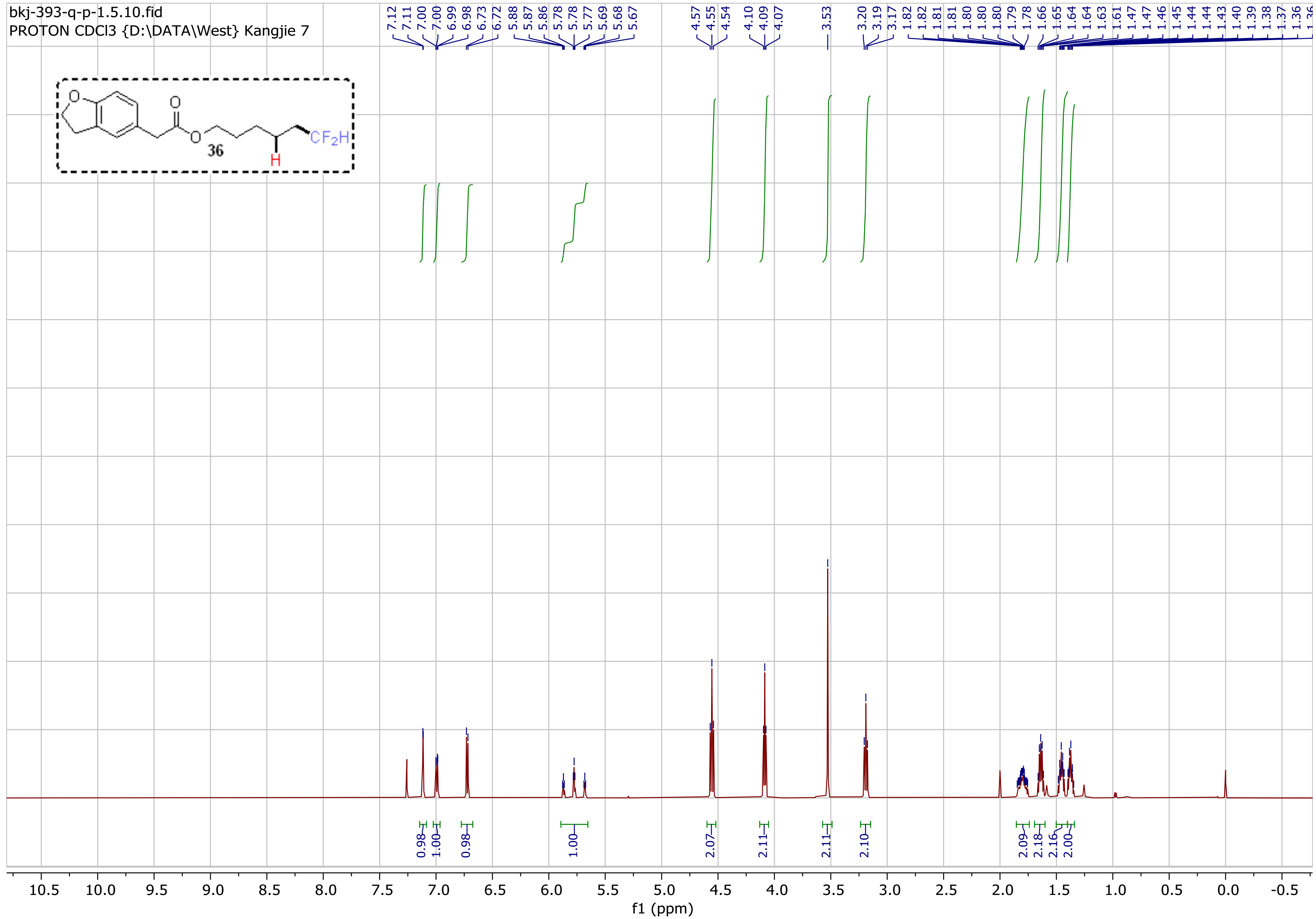


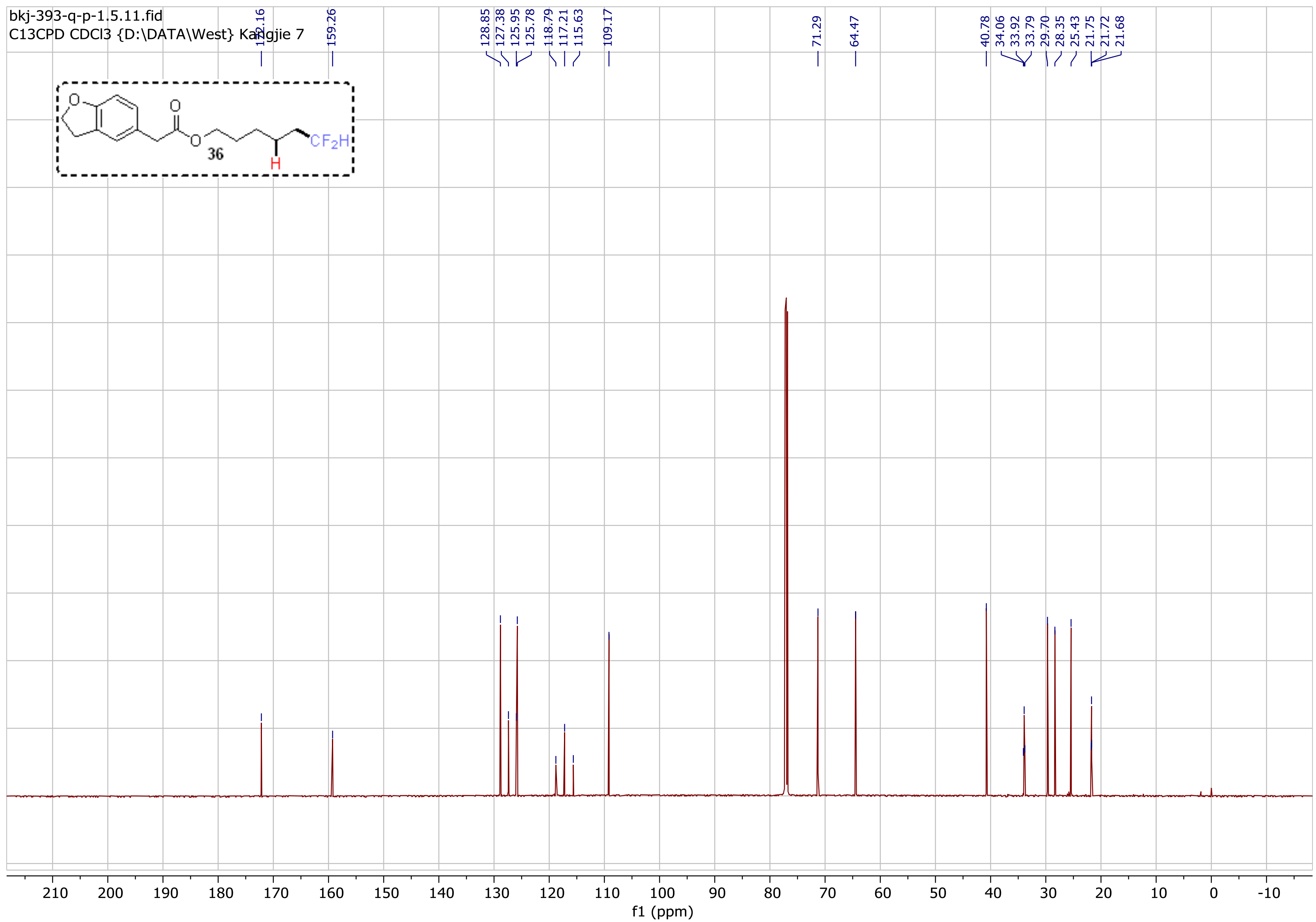
bkj-393-h-p-h-1.4.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 9
7.86 7.85 7.85 7.84 7.84 7.73 7.72 7.72 7.71
5.90 5.89 5.89 5.81 5.80 5.79 5.71 5.71 5.70
3.72 3.71 3.70 1.93 1.92 1.92 1.91 1.91 1.91 1.90 1.90 1.90 1.89 1.89 1.88 1.88 1.88 1.87 1.87 1.87 1.86 1.86 1.85 1.85 1.85 1.84 1.78 1.77 1.75 1.74 1.73 1.54 1.53 1.53 1.53 1.52 1.52 1.51 1.51 1.50 1.50 1.49 -0.00
35
1.90
1.97
1.00
1.99
2.01
1.99
1.97
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

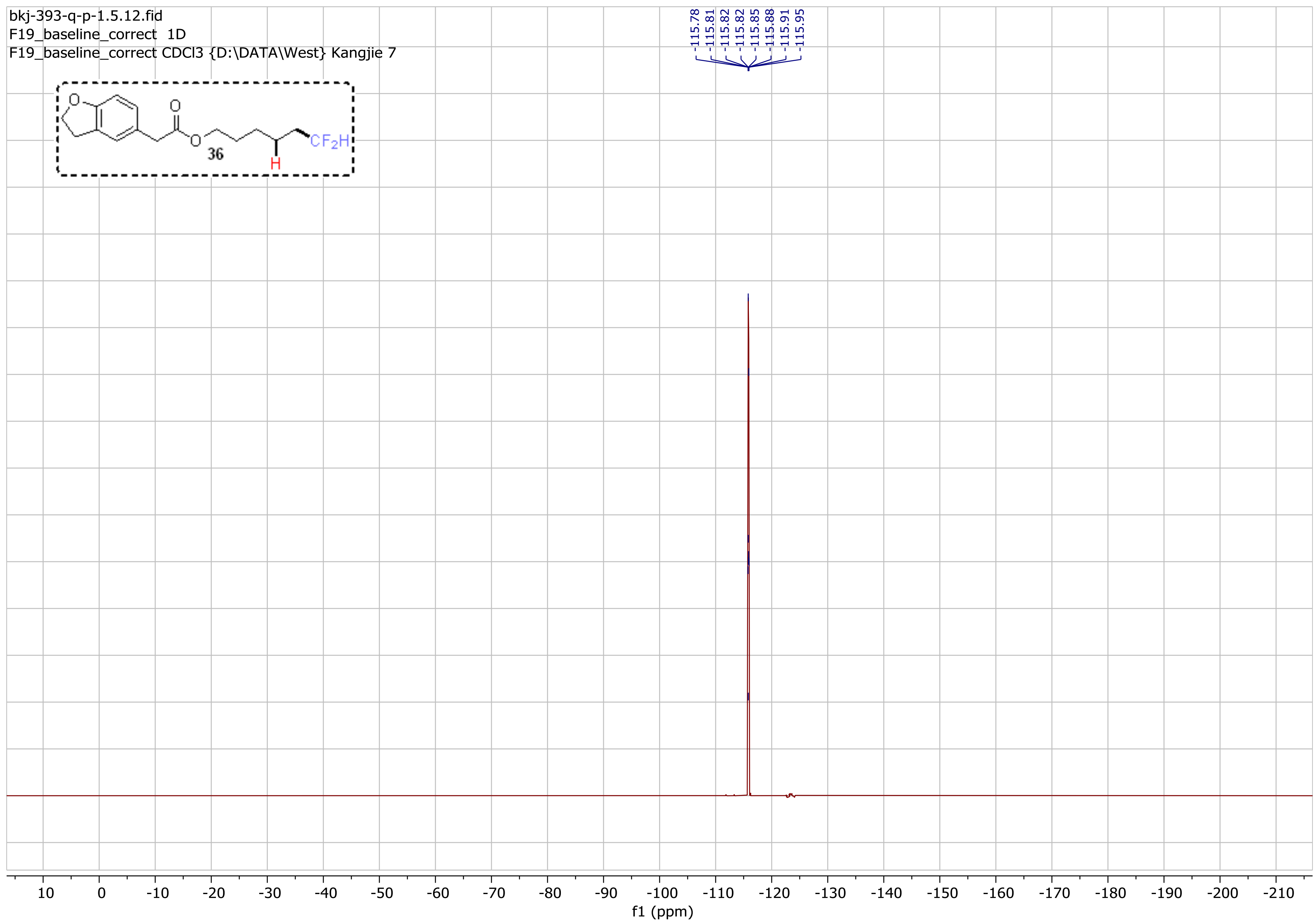


bkj-393-h-p-1.4.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 9
168.40
133.99
132.08
123.26
118.61
117.03
115.44
37.49
33.69
33.55
33.41
28.04
19.48
19.44
19.41
H
CF2H
O
N
O
35
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

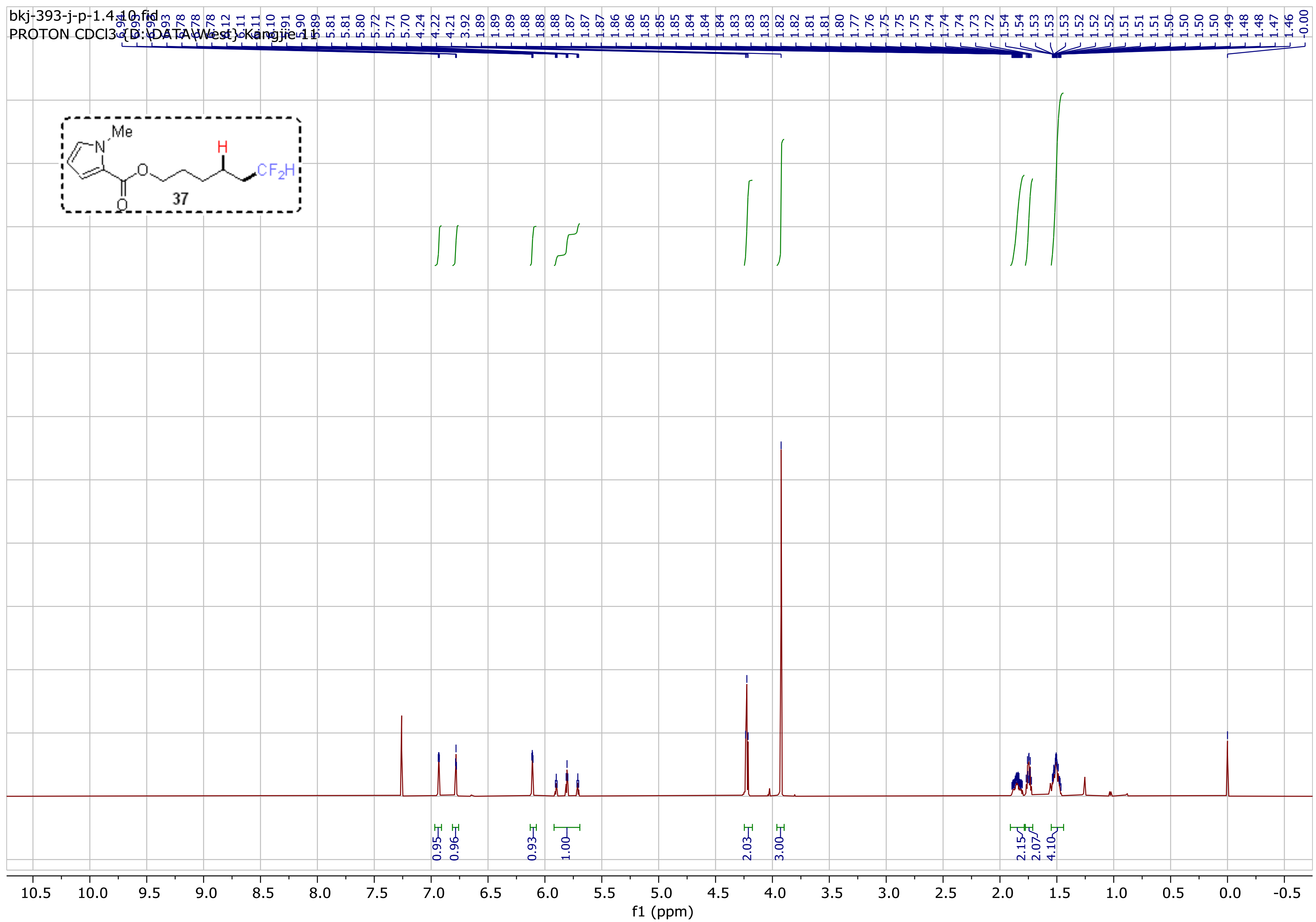

bkj-393-h-p-1.4.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 9
35
-115.89
-115.92
-115.95
-115.99
-116.02
-116.05
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

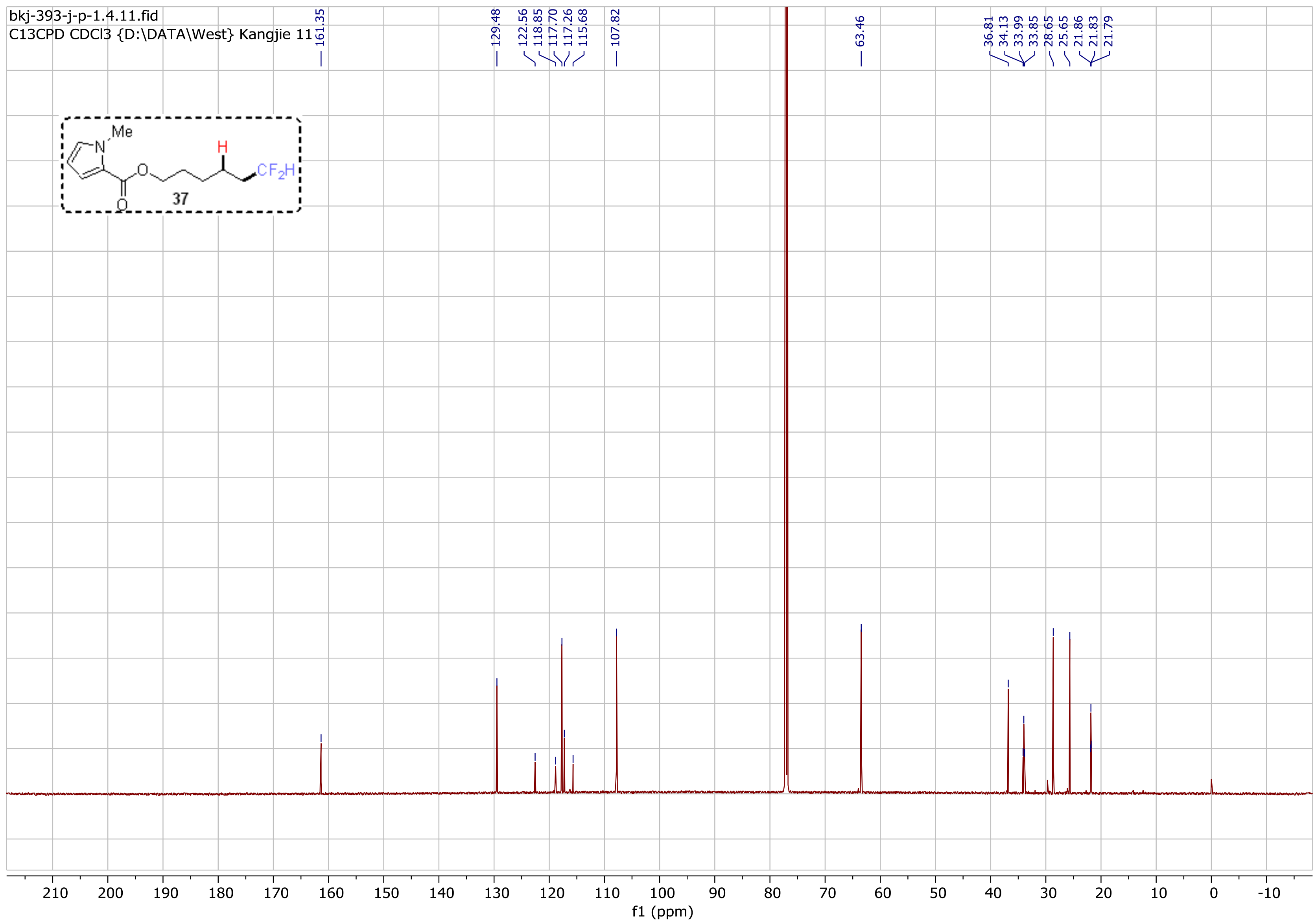

bkj-393-q-p-1.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
36
7.12 7.11 7.00 7.00 6.99 6.98 6.73 6.72 5.88 5.87 5.86 5.78 5.78 5.77 5.69 5.68 5.67
4.57 4.55 4.54 4.10 4.09 4.07 3.53 3.20 3.19 3.17
1.82 1.82 1.81 1.81 1.80 1.80 1.80 1.79 1.78 1.66 1.65 1.64 1.64 1.63 1.61 1.47 1.47 1.46 1.45 1.44 1.44 1.43 1.40 1.39 1.38 1.37 1.36
0.98 1.00 0.98 1.00 2.07 2.11 2.11 2.10 2.09 2.18 2.16 2.00
f1 (ppm)


bkj-393-q-p-1.5.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
172.16
159.26
128.85
127.38
125.95
125.78
118.79
117.21
115.63
109.17
71.29
64.47
40.78
34.06
33.92
33.79
29.70
28.35
25.43
21.75
21.72
21.68
36
CF_2H
H
O
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

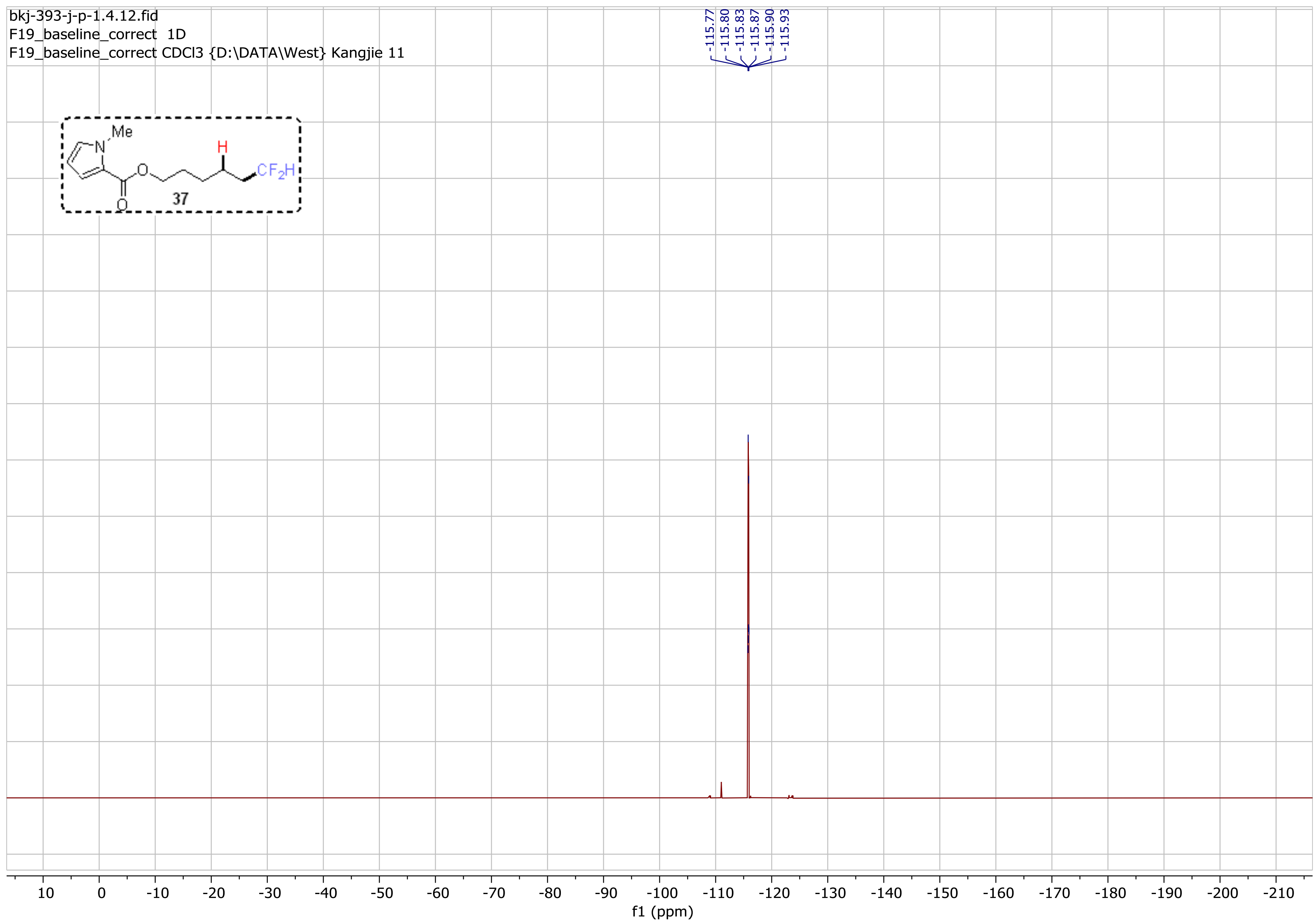


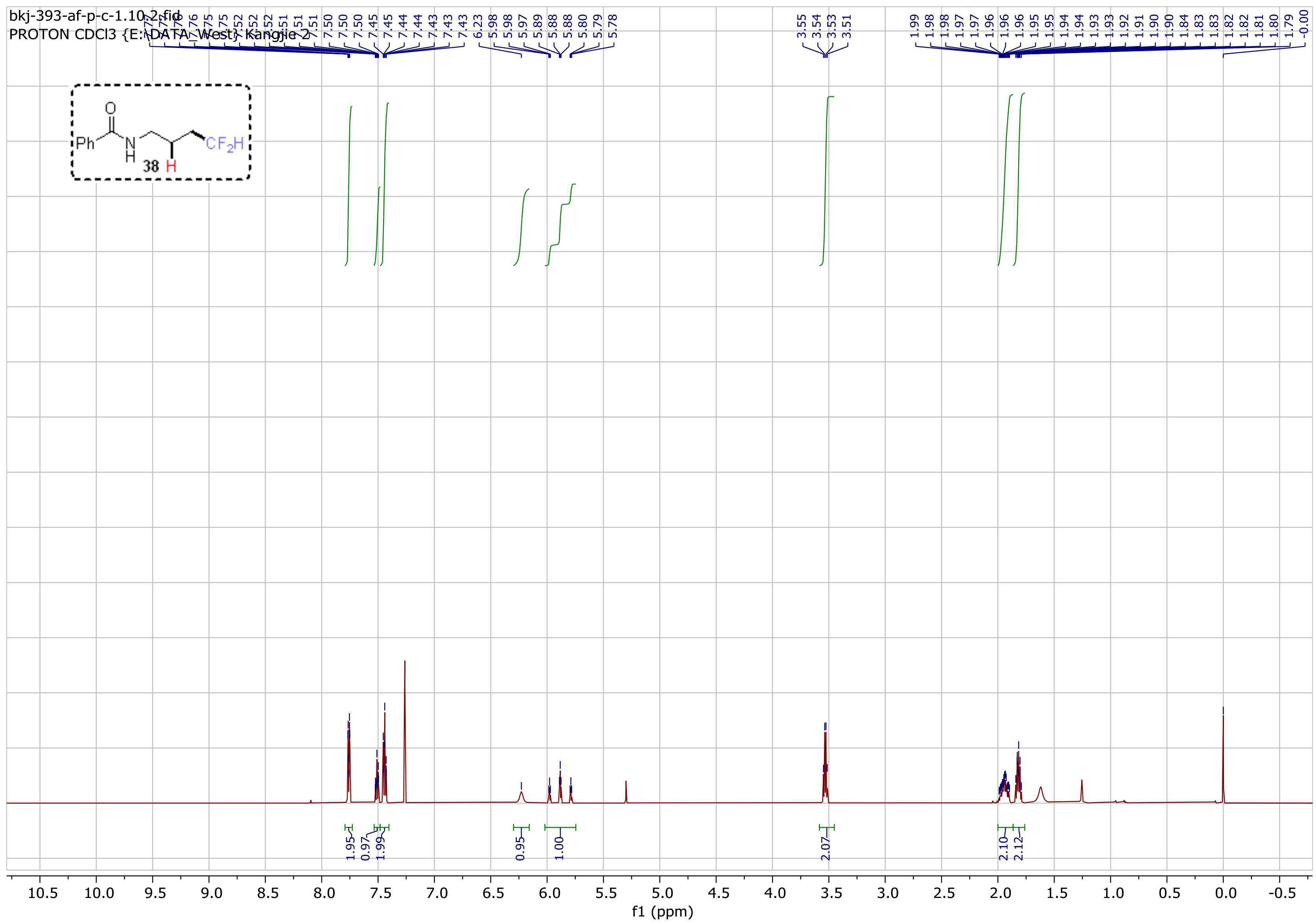
bkj-393-q-p-1.5.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 7
36
CF2H
H
-115.78
-115.81
-115.82
-115.82
-115.85
-115.88
-115.91
-115.95
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

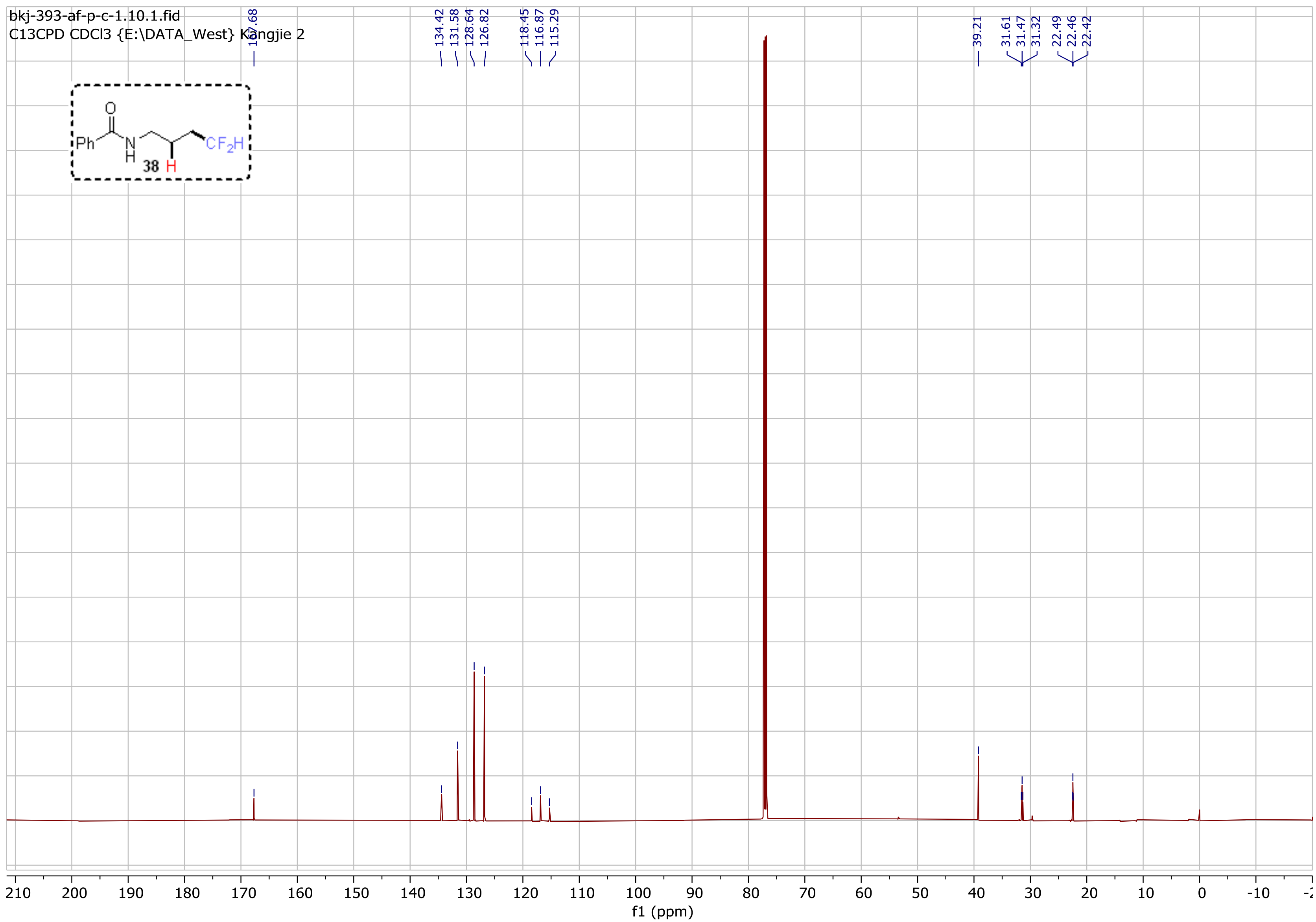

bkj-393-j-p-1.4.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 11
Me
N
O
O
H
CF2H
37
0.95
0.96
0.93
1.00
2.03
3.00
2.15
2.07
4.10
f1 (ppm)



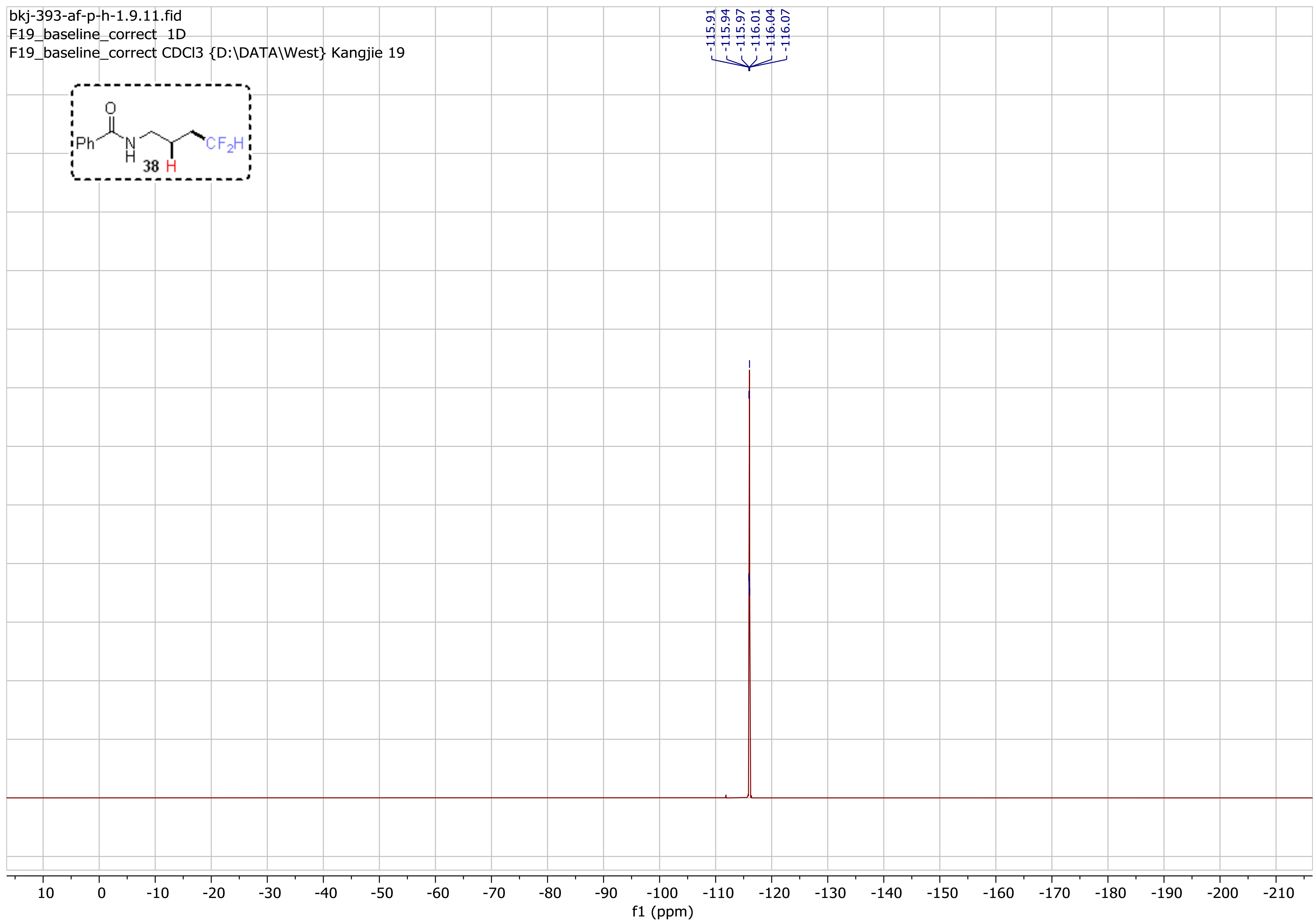
bkj-393-j-p-1.4.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 11
161.35
129.48
122.56
118.85
117.70
117.26
115.68
107.82
63.46
36.81
34.13
33.99
33.85
28.65
25.65
21.86
21.83
21.79
Me
N
O
O
H
CF2H
37
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

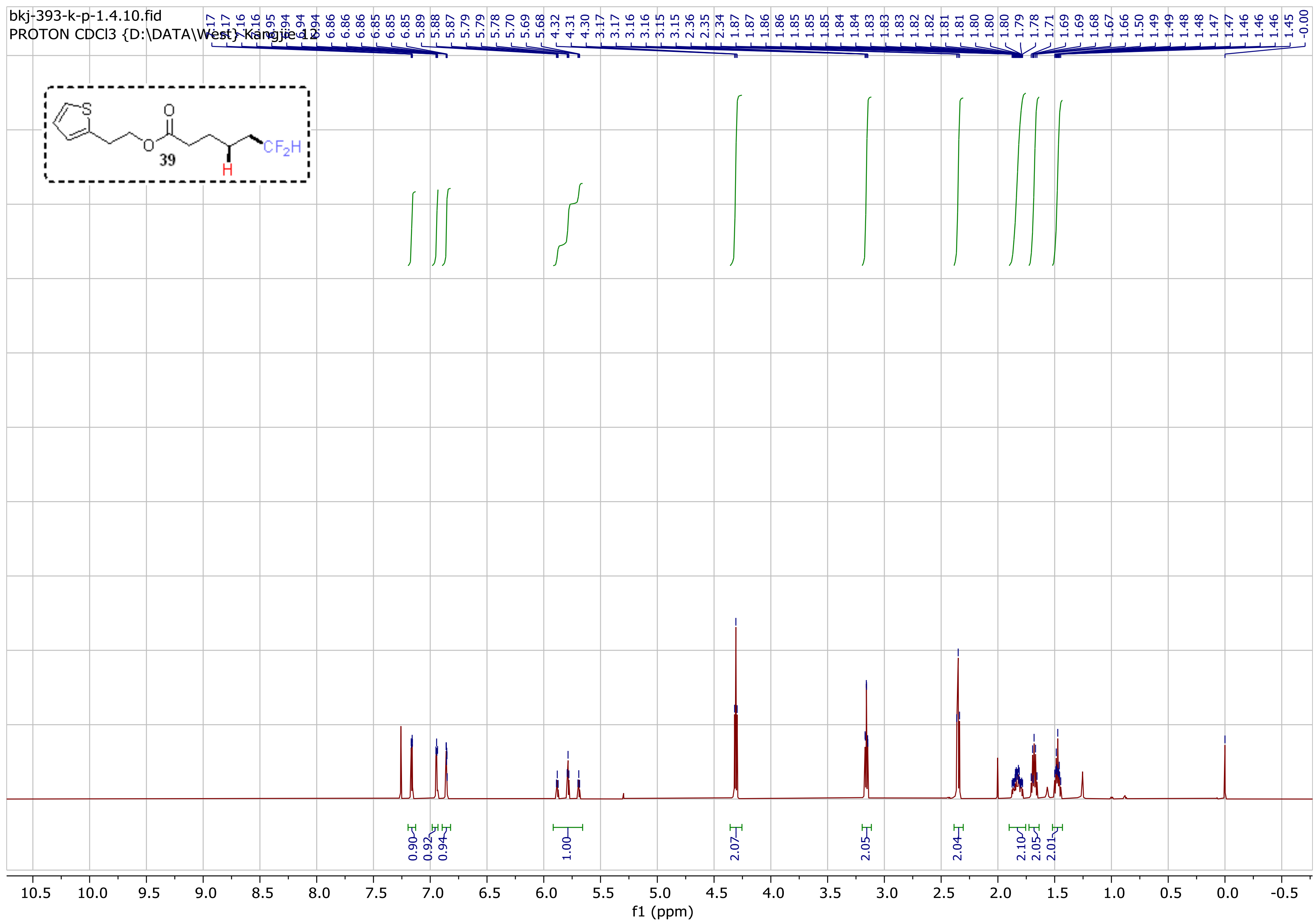

bkj-393-j-p-1.4.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 11
-115.77
-115.80
-115.83
-115.87
-115.90
-115.93
Me
N
O
O
H
CF2H
37
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


bkj-393-af-p-c-1.10.2.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 2
Ph
O
N
H
38
H
CF2H
7.50
7.50
7.50
7.45
7.45
7.44
7.44
7.43
7.43
7.43
6.23
5.98
5.98
5.97
5.89
5.88
5.88
5.80
5.79
5.78
3.55
3.54
3.53
3.51
1.99
1.98
1.98
1.97
1.97
1.96
1.96
1.96
1.95
1.95
1.94
1.94
1.93
1.93
1.92
1.91
1.90
1.90
1.84
1.83
1.83
1.82
1.82
1.81
1.80
1.79
-0.00
1.95
0.97
1.99
0.95
1.00
2.07
2.10
2.12
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

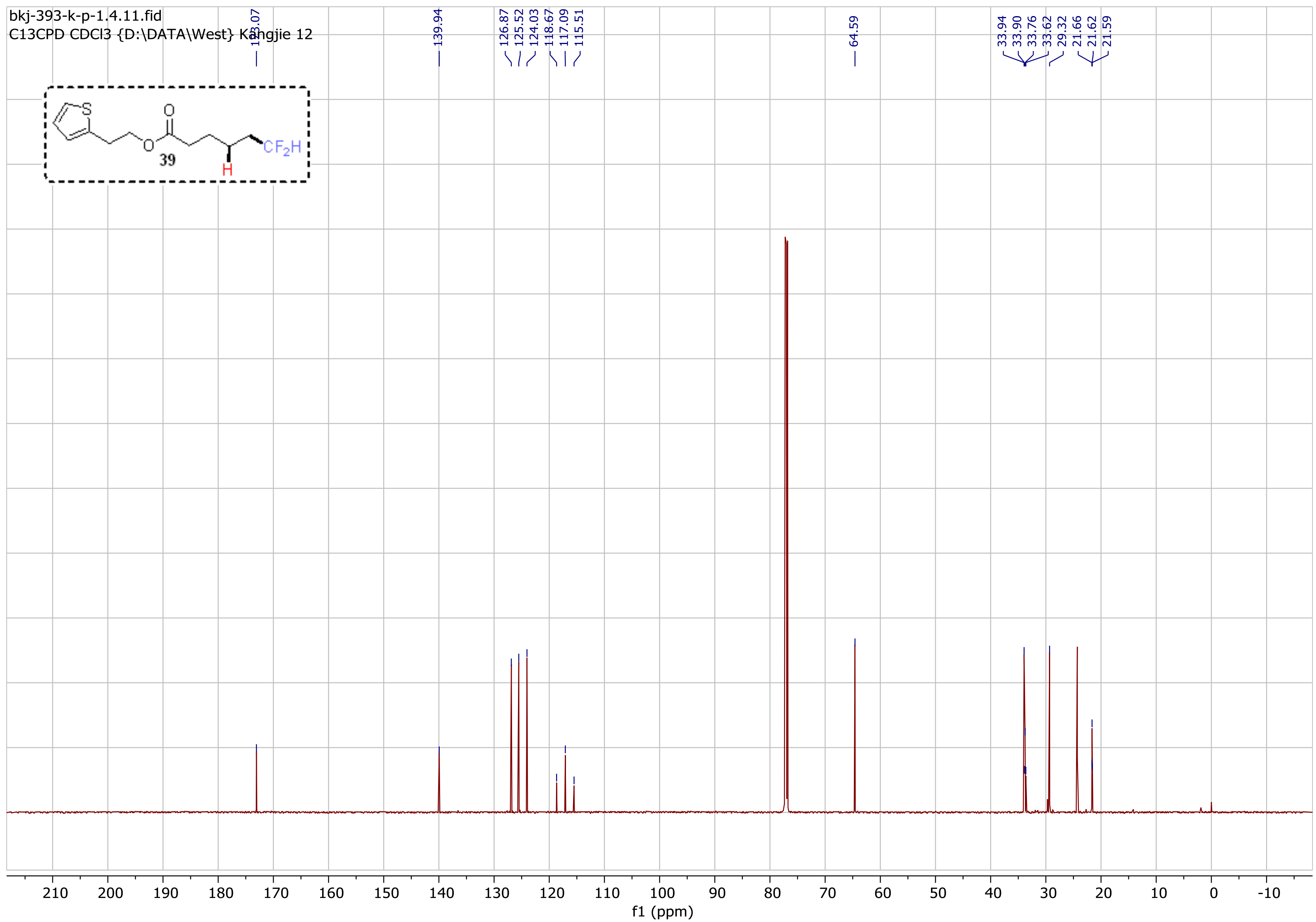


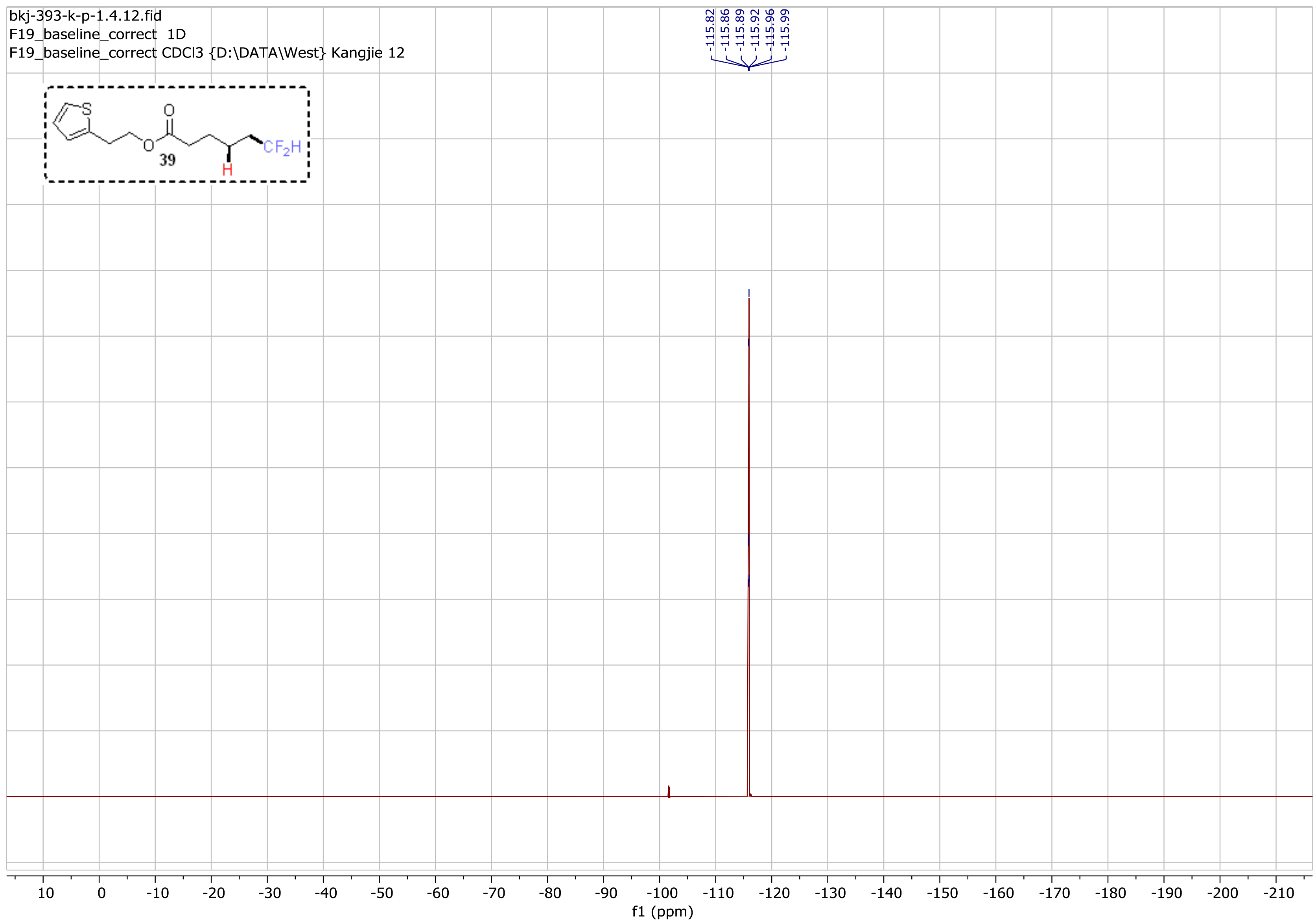
bkj-393-af-p-c-1.10.1.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 2
167.68
134.42
131.58
128.64
126.82
118.45
116.87
115.29
39.21
31.61
31.47
31.32
22.49
22.46
22.42
Ph
O
N
H
38
H
CF2H
f1 (ppm)

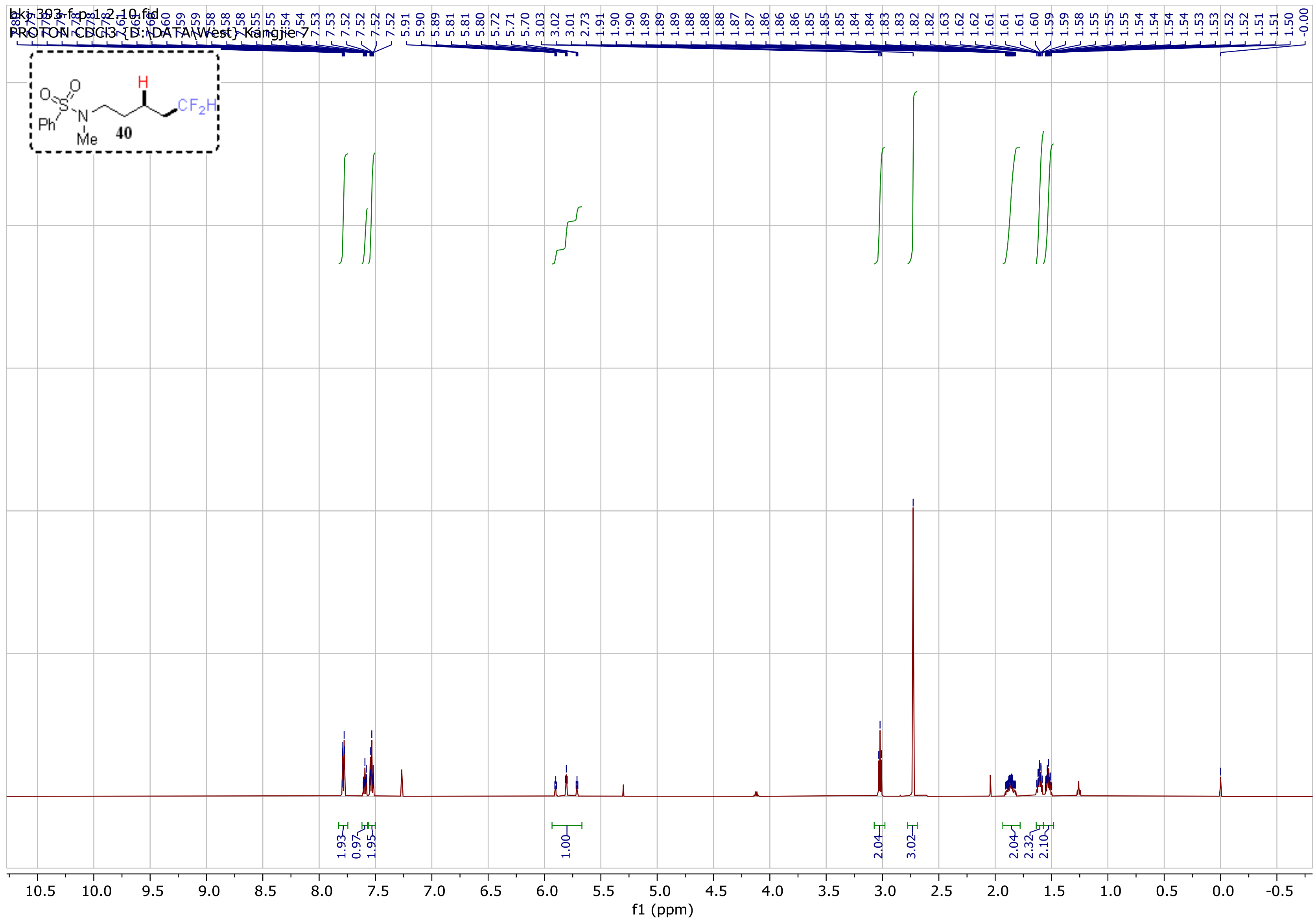

bkj-393-af-p-h-1.9.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 19
Ph
O
N
H
38
H
CF_2H
-115.91
-115.94
-115.97
-116.01
-116.04
-116.07
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

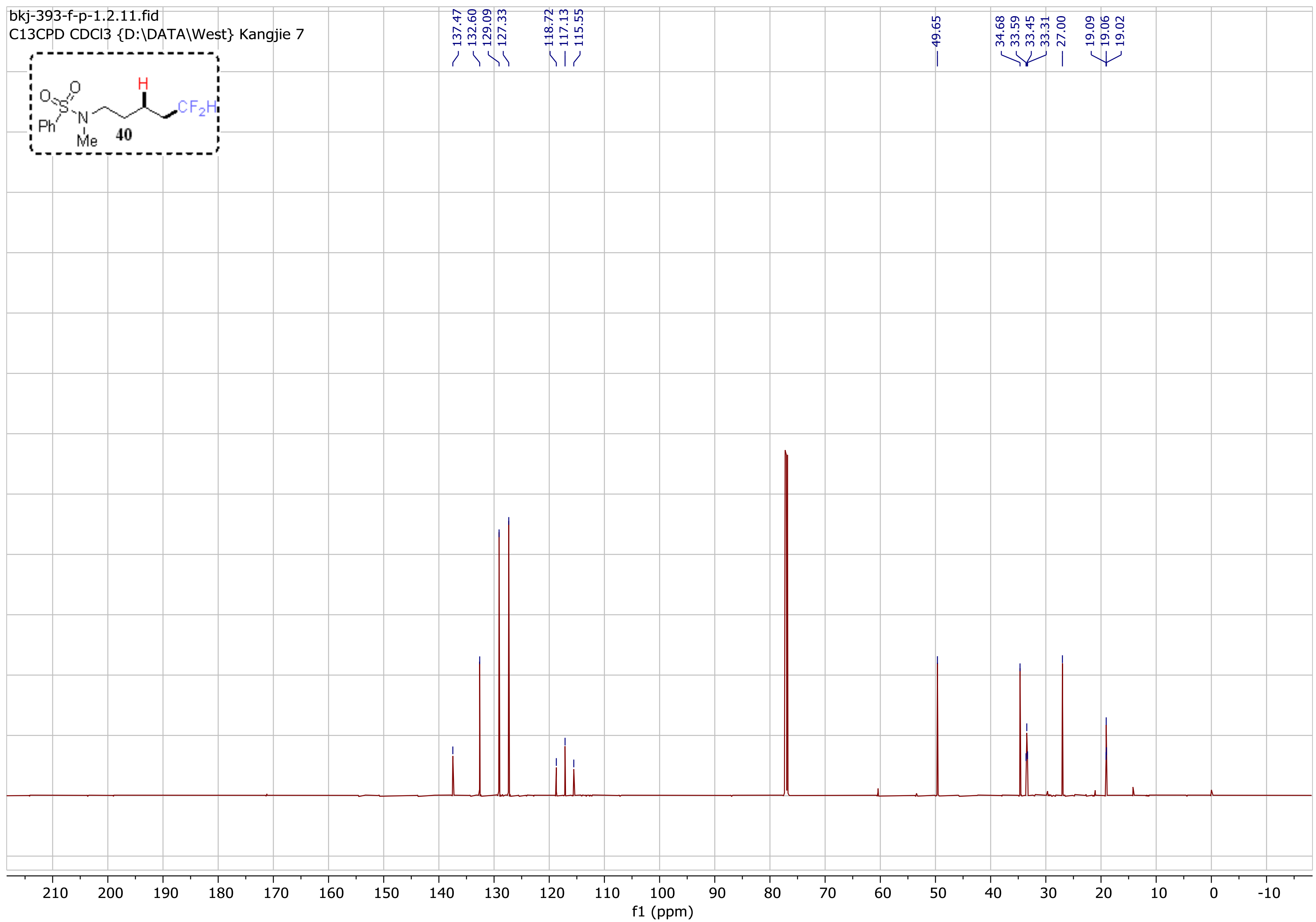


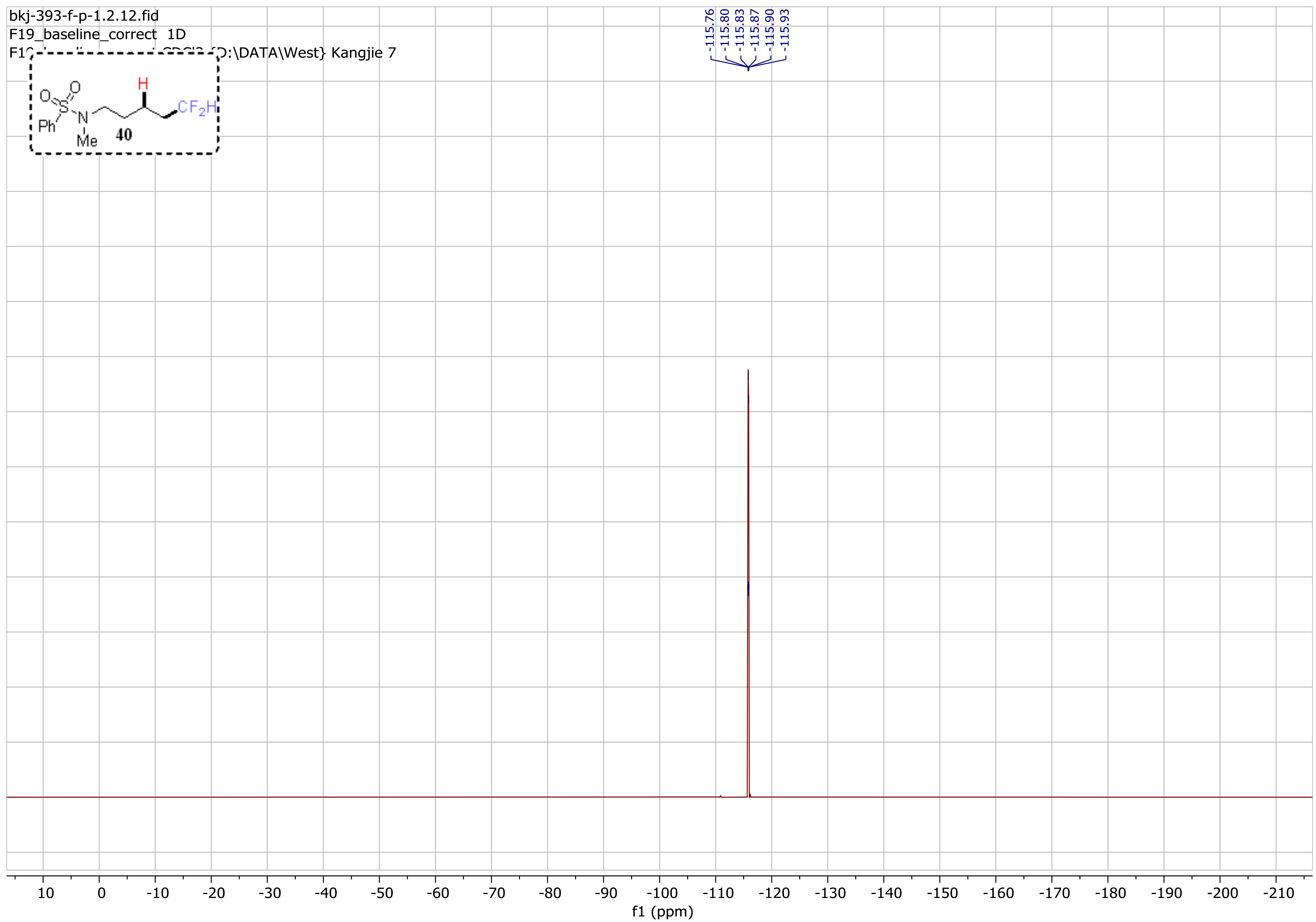
bkj-393-k-p-1.4.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 12
39
CF2H
H
O
S
f1 (ppm)


bkj-393-k-p-1.4.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 12
39
CF2H
H
139.94
126.87
125.52
124.03
118.67
117.09
115.51
64.59
33.94
33.90
33.76
33.62
29.32
21.66
21.62
21.59
f1 (ppm)

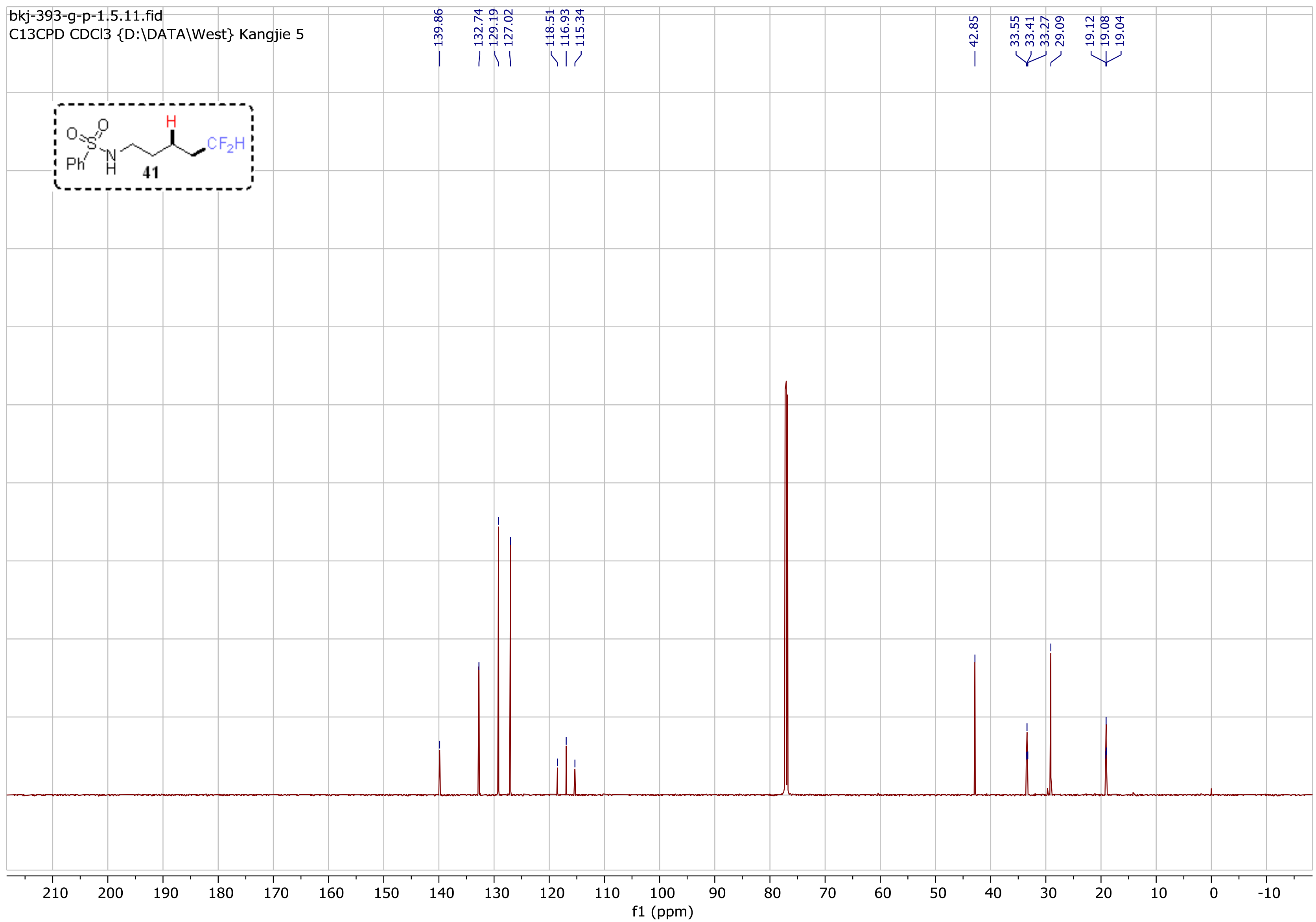

bkj-393-k-p-1.4.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 12
-115.82
-115.86
-115.89
-115.92
-115.96
-115.99
39
CF2H
H
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

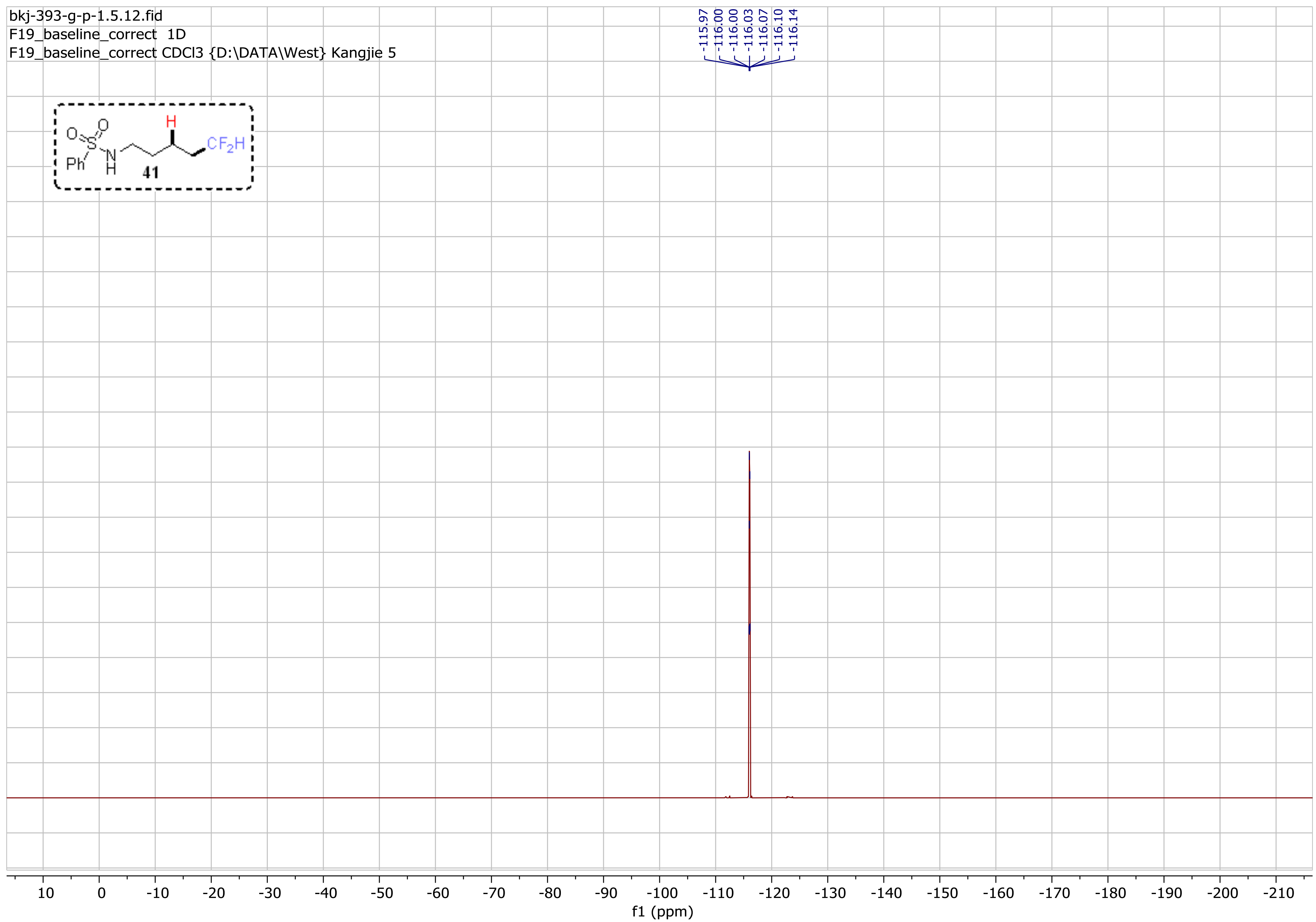

bki-393-f-p-1-2-10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
f1 (ppm)

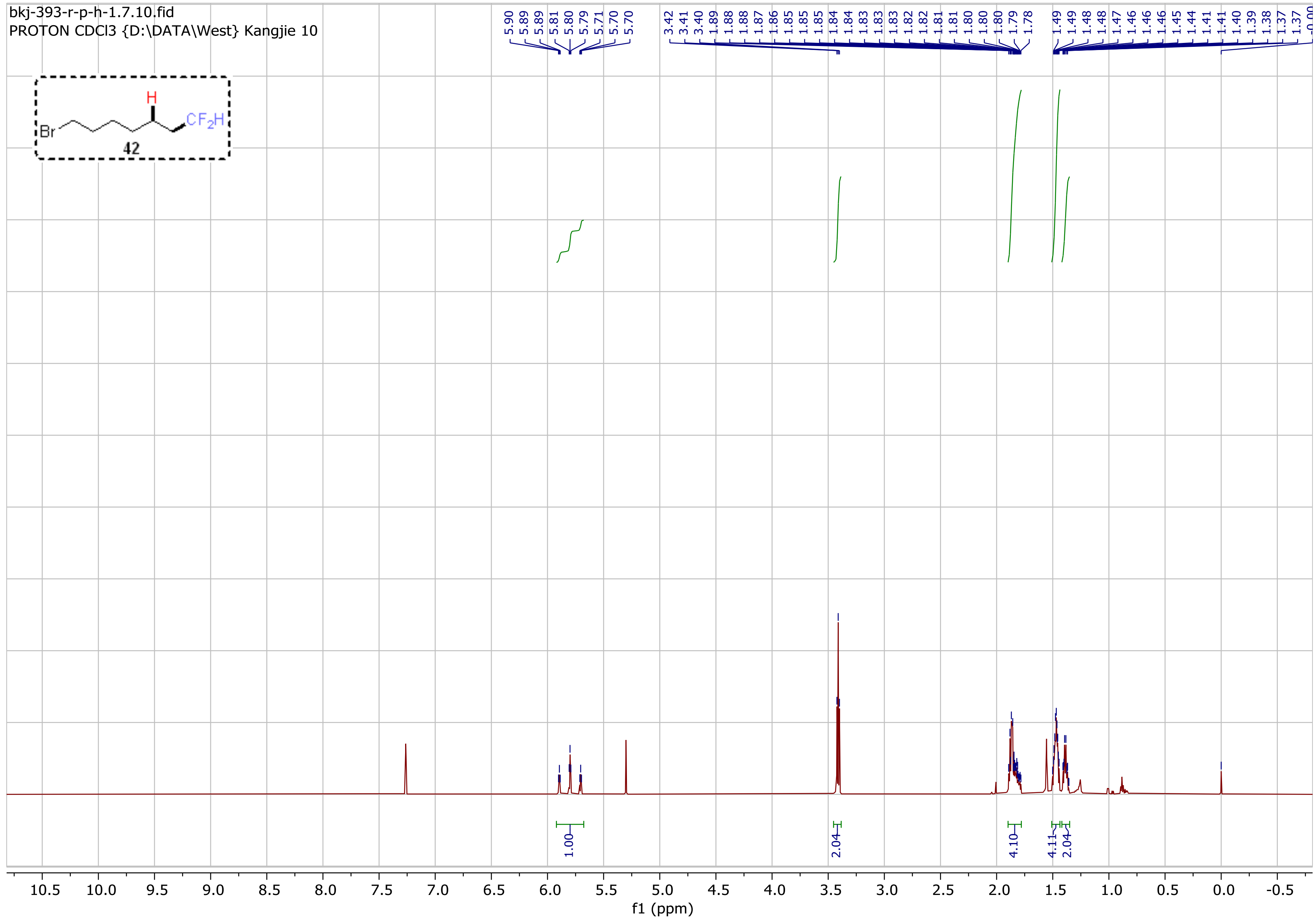

bkj-393-f-p-1.2.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
O
O
S
Ph
N
Me
H
CF2H
40
137.47
132.60
129.09
127.33
118.72
117.13
115.55
49.65
34.68
33.59
33.45
33.31
27.00
19.09
19.06
19.02
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

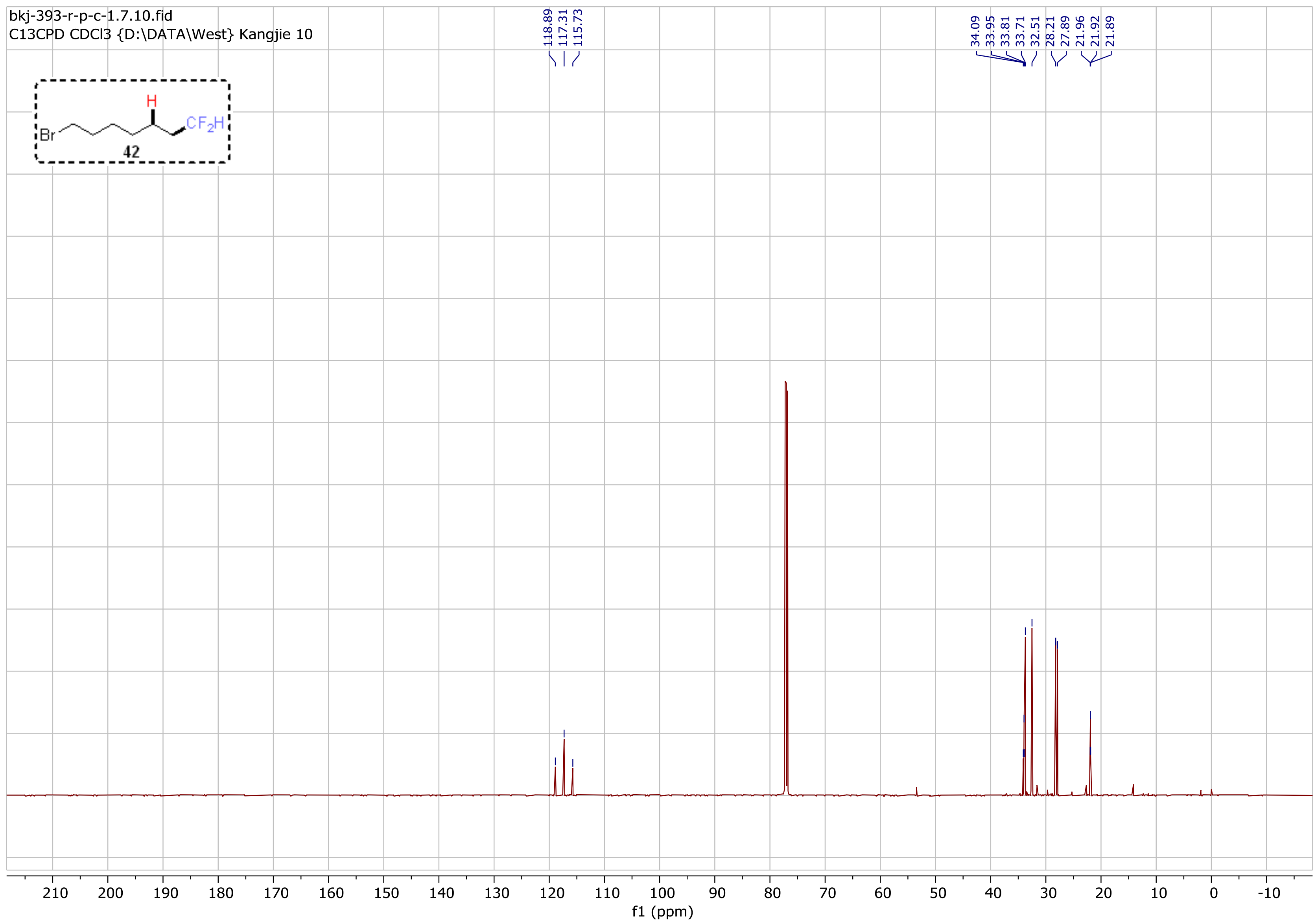

bkj-393-f-p-1.2.12.fid
F19_baseline_correct 1D
D:\DATA\West} Kangjie 7
Ph
N
Me
H
CF2H
40
-115.76
-115.80
-115.83
-115.87
-115.90
-115.93
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

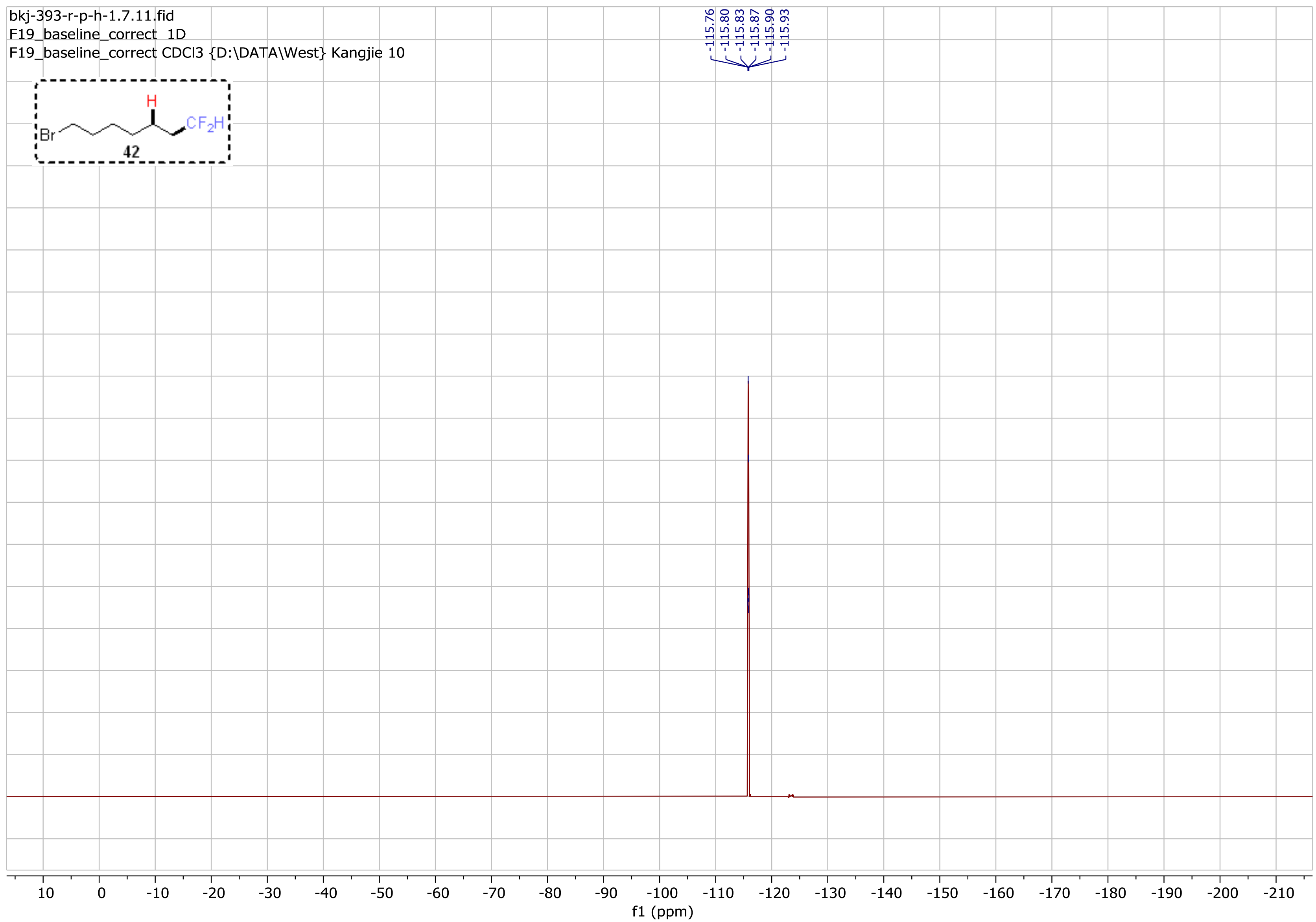

bkj-393-g-p-1.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 5
41
7.88
7.88
7.88
7.87
7.87
7.87
7.61
7.60
7.59
7.59
7.58
7.58
7.58
7.54
7.54
7.53
7.53
7.52
7.52
5.85
5.84
5.83
5.75
5.75
5.74
5.66
5.65
5.65
4.71
4.70
4.69
2.99
2.98
2.97
2.96
1.82
1.81
1.80
1.80
1.80
1.79
1.79
1.78
1.78
1.77
1.77
1.77
1.76
1.76
1.75
1.75
1.74
1.74
1.74
1.73
1.72
1.56
1.55
1.54
1.52
1.51
1.48
1.47
1.46
1.46
1.46
1.45
1.45
1.44
1.44
1.44
-0.00
1.93
0.98
1.91
1.00
0.99
2.05
2.05
2.13
2.07
f1 (ppm)

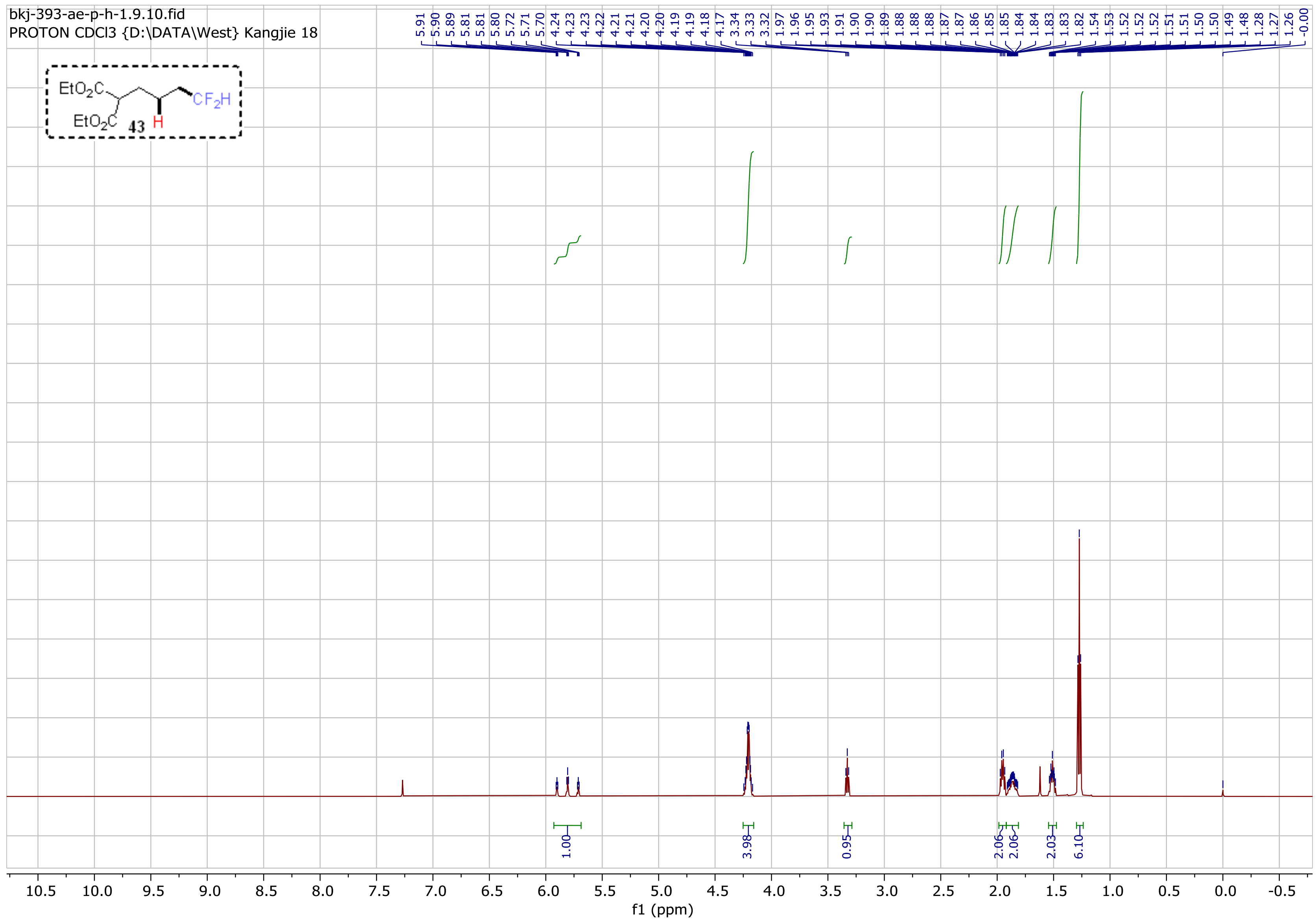

bkj-393-g-p-1.5.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 5
139.86
132.74
129.19
127.02
118.51
116.93
115.34
42.85
33.55
33.41
33.27
29.09
19.12
19.08
19.04
O
O
S
Ph
N
H
H
CF2H
41
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-393-g-p-1.5.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 5
-115.97
-116.00
-116.00
-116.03
-116.07
-116.10
-116.14
O
O
S
Ph
N
H
H
CF2H
41
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

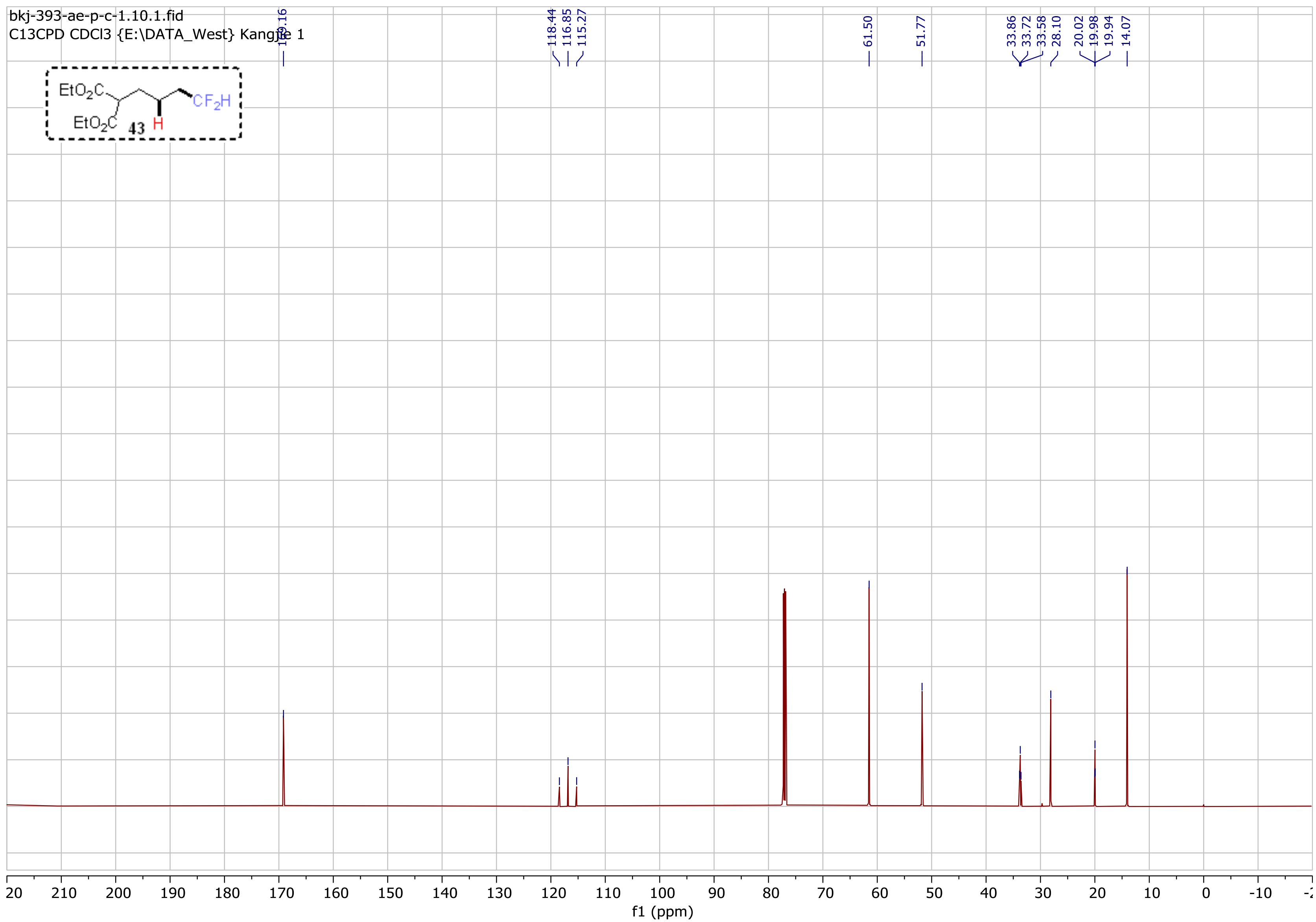

bkj-393-r-p-h-1.7.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 10
Br
H
CF2H
42
5.90
5.89
5.89
5.81
5.80
5.79
5.71
5.70
5.70
3.42
3.41
3.40
1.89
1.88
1.88
1.87
1.86
1.85
1.85
1.85
1.84
1.84
1.83
1.83
1.83
1.82
1.82
1.81
1.81
1.80
1.80
1.80
1.79
1.78
1.49
1.49
1.48
1.48
1.47
1.46
1.46
1.46
1.45
1.44
1.41
1.41
1.40
1.39
1.38
1.37
1.37
1.00
2.04
4.10
4.11
2.04
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

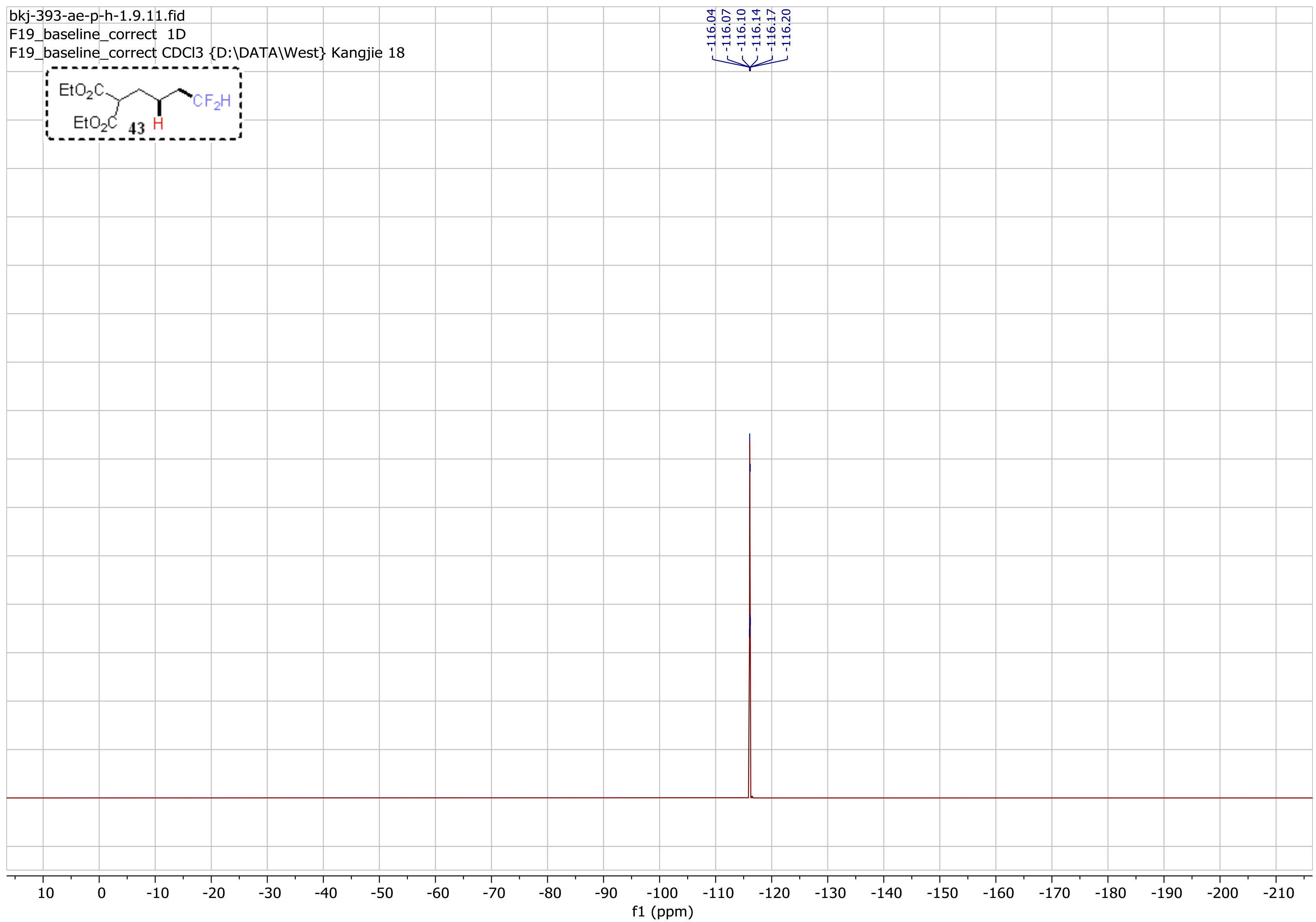

bkj-393-r-p-c-1.7.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 10
118.89
117.31
115.73
34.09
33.95
33.81
33.71
32.51
28.21
27.89
21.96
21.92
21.89
Br
H
CF2H
42
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-393-r-p-h-1.7.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 10
Br
H
CF2H
42
-115.76
-115.80
-115.83
-115.87
-115.90
-115.93
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

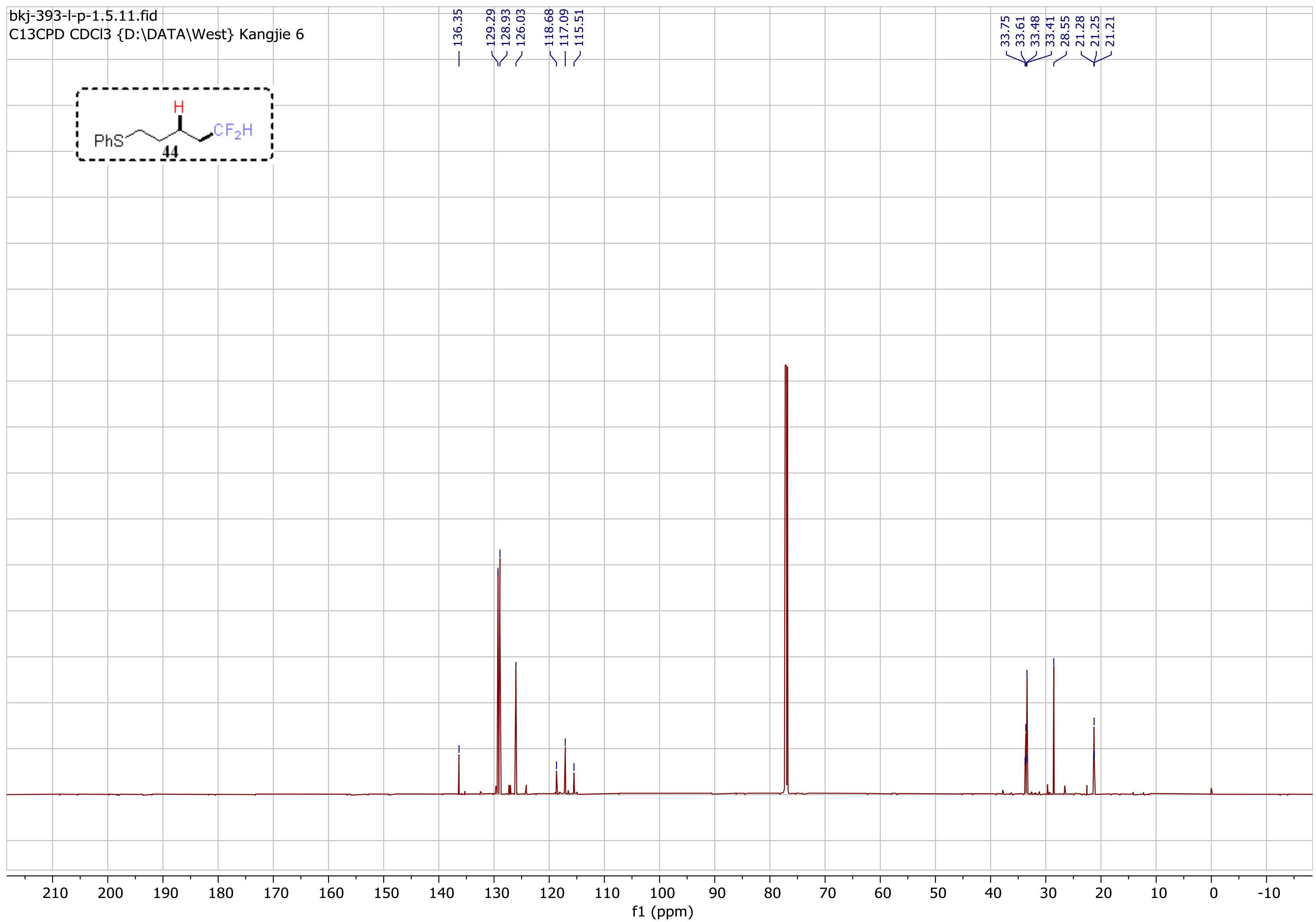


bkj-393-ae-p-h-1.9.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 18
EtO2C
EtO2C
43
H
CF2H
5.91 5.90 5.89 5.81 5.81 5.80 5.72 5.71 5.70 4.24 4.23 4.23 4.22 4.21 4.21 4.20 4.20 4.19 4.19 4.18 4.17 3.34 3.33 3.32 1.97 1.96 1.95 1.93 1.91 1.90 1.90 1.89 1.88 1.88 1.88 1.87 1.87 1.86 1.85 1.85 1.84 1.84 1.83 1.83 1.82 1.54 1.53 1.52 1.52 1.52 1.51 1.51 1.50 1.50 1.49 1.48 1.28 1.27 1.26 -0.00
1.00
3.98
0.95
2.06
2.06
2.03
6.10
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

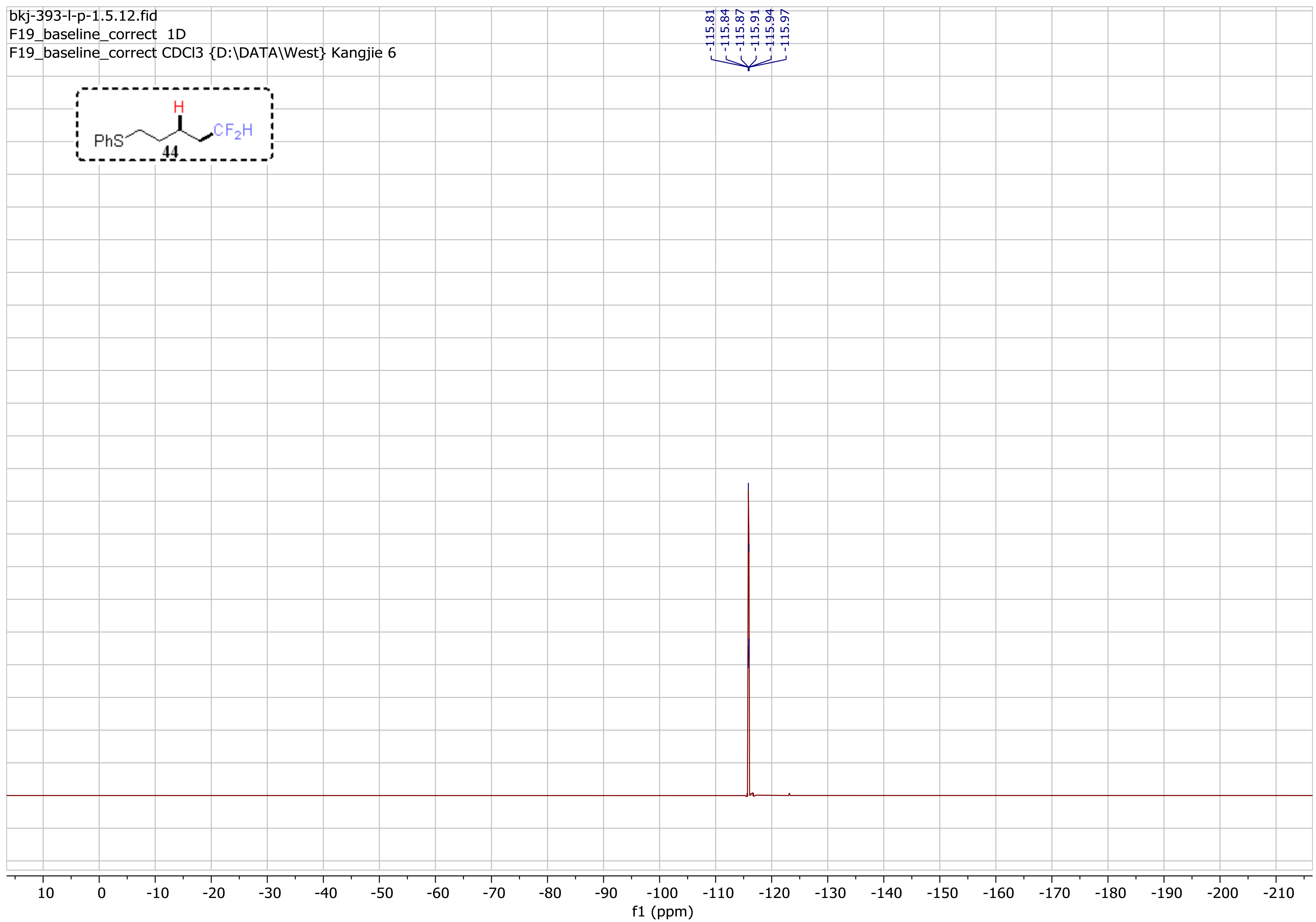

bkj-393-ae-p-c-1.10.1.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 1
169.16
118.44
116.85
115.27
61.50
51.77
33.86
33.72
33.58
28.10
20.02
19.98
19.94
14.07
EtO2C
EtO2C
43
H
CF2H
f1 (ppm)

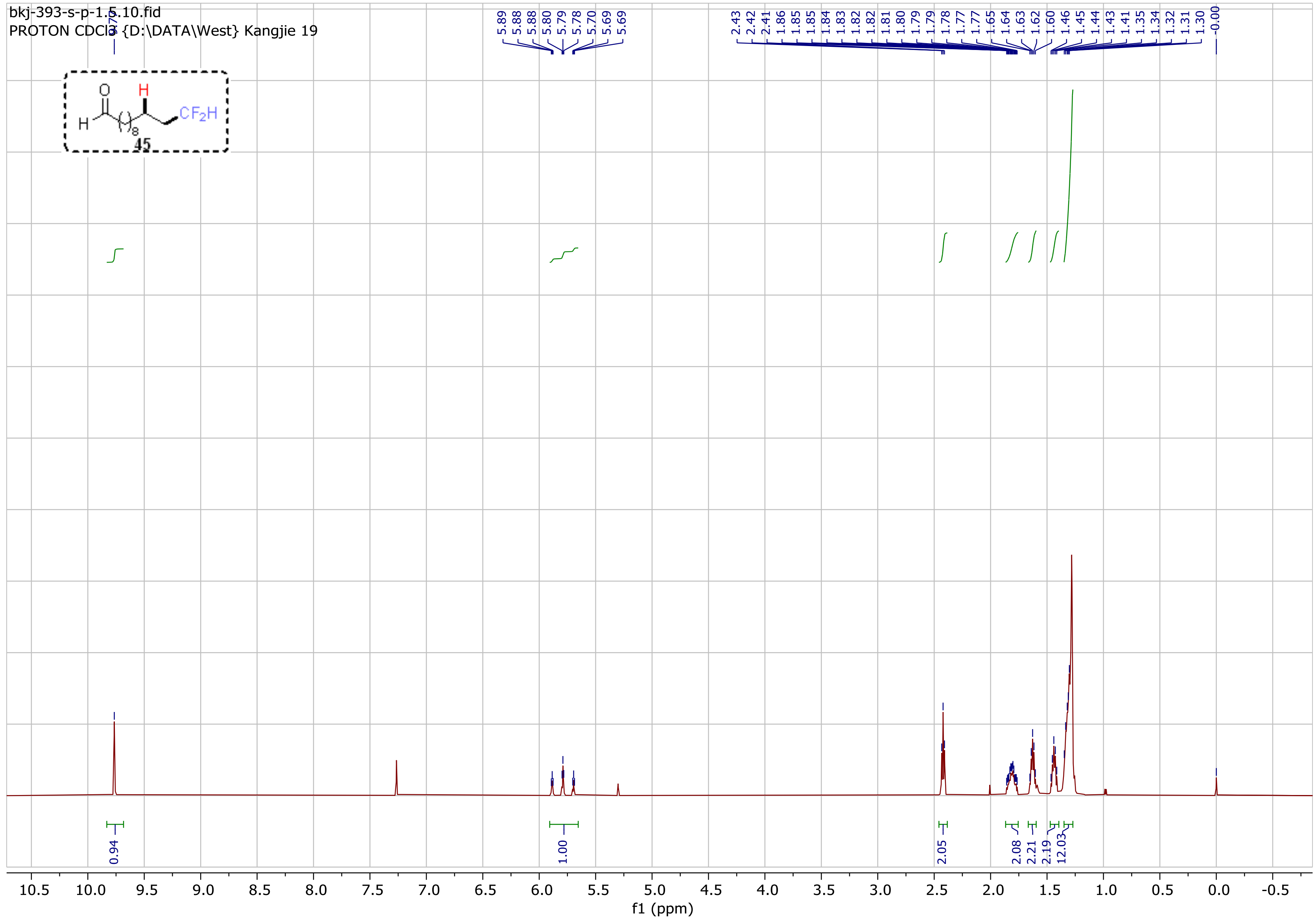

bkj-393-ae-p-h-1.9.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 18
EtO2C
EtO2C
43
H
CF2H
-116.04
-116.07
-116.10
-116.14
-116.17
-116.20
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

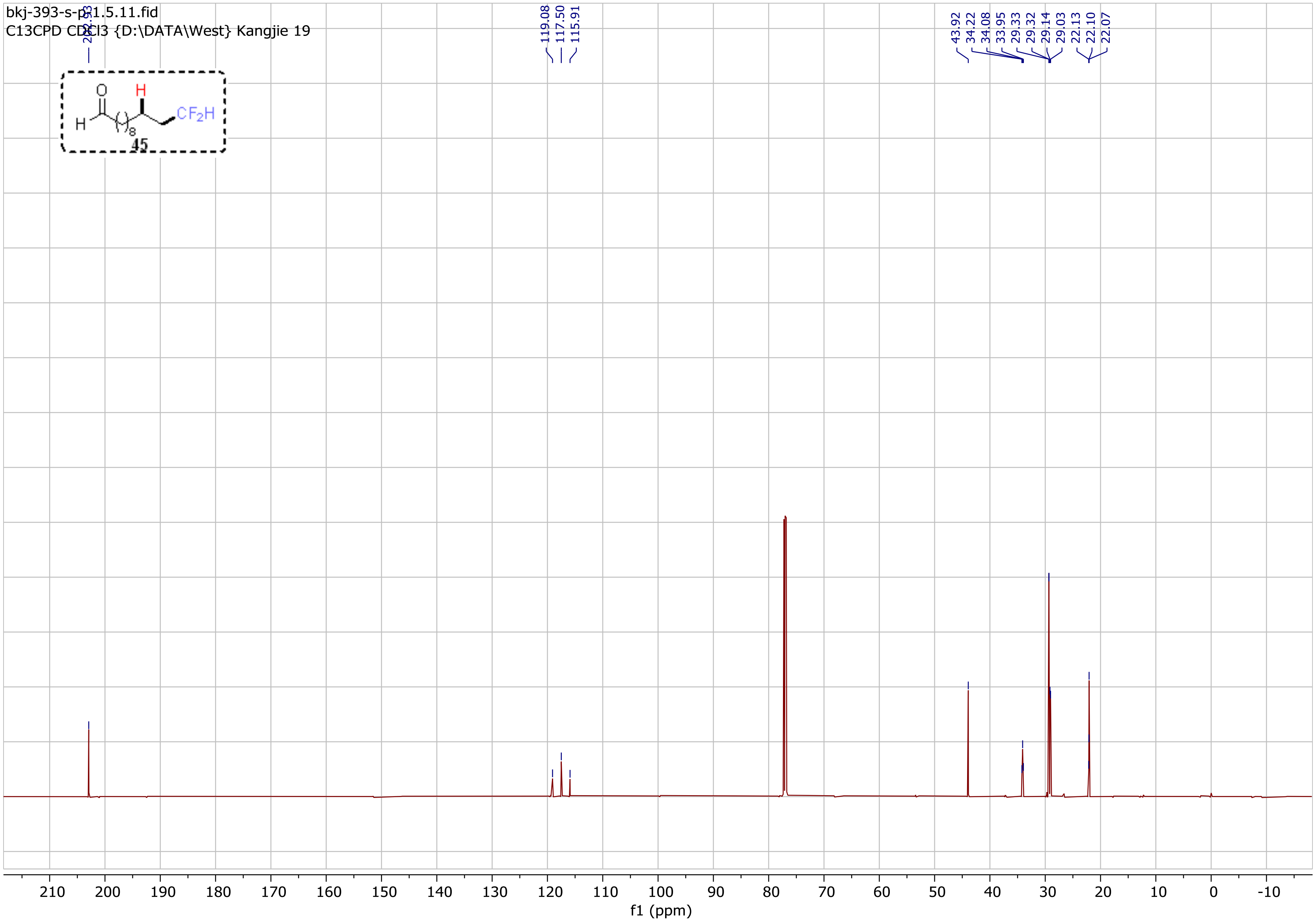

bkj-393-l-p-1.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 6
PhS
H
CF2H
44
7.34
7.33
7.33
7.33
7.32
7.32
7.32
7.30
7.29
7.28
7.28
7.27
7.27
7.20
7.19
7.19
7.19
7.18
7.18
7.17
7.17
7.17
5.89
5.88
5.87
5.79
5.79
5.78
5.70
5.69
5.68
2.94
2.93
2.92
1.88
1.87
1.87
1.86
1.86
1.85
1.85
1.85
1.84
1.84
1.83
1.83
1.82
1.82
1.82
1.81
1.81
1.80
1.80
1.79
1.79
1.72
1.71
1.70
1.69
1.68
1.63
1.63
1.62
1.61
1.61
1.60
1.60
1.59
1.59
1.59
1.58
1.57
-0.00
1.92
1.90
0.92
1.03
2.00
2.02
2.00
2.03
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

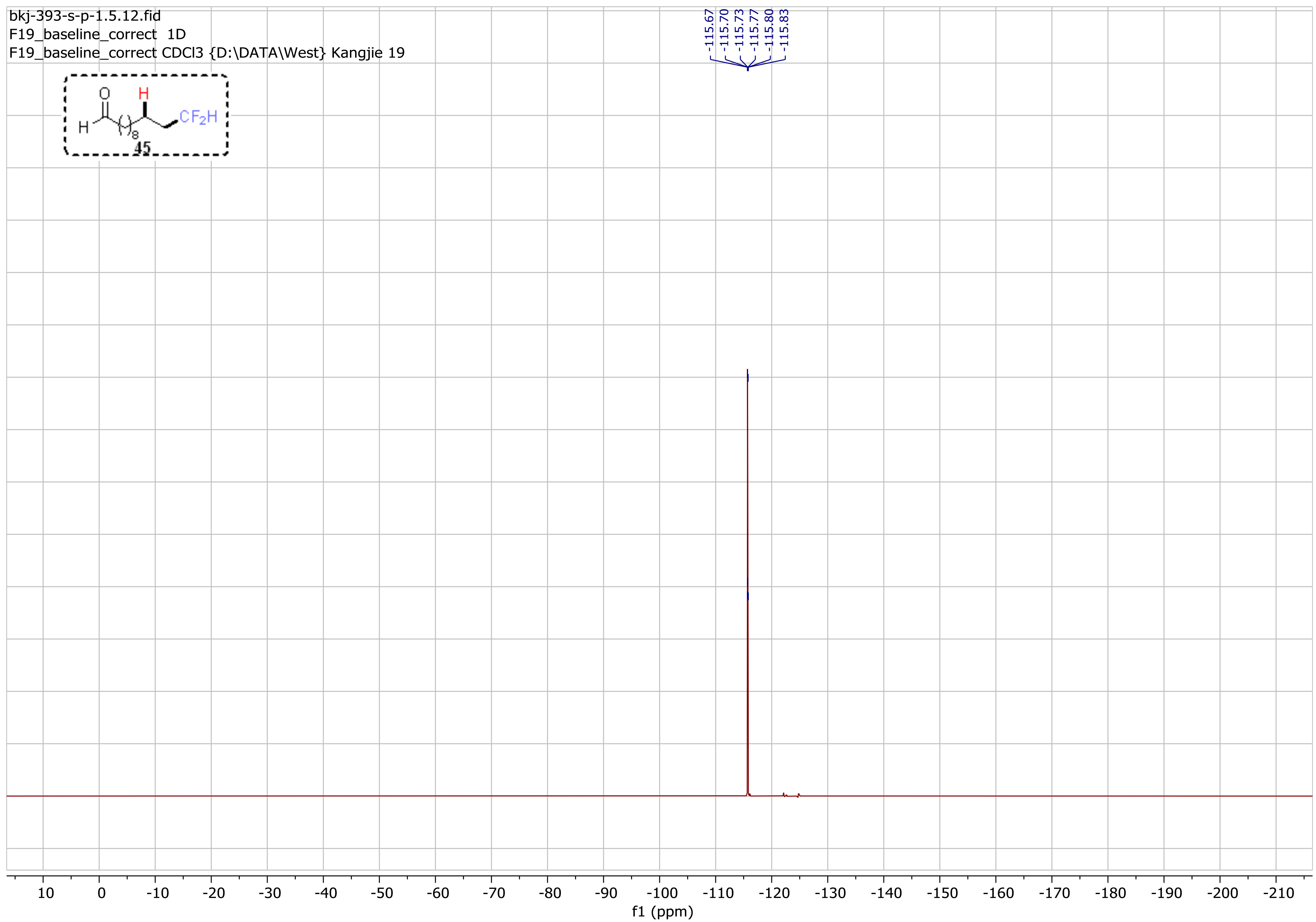


bkj-393-l-p-1.5.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 6
PhS
H
CF2H
44
136.35
129.29
128.93
126.03
118.68
117.09
115.51
33.75
33.61
33.48
33.41
28.55
21.28
21.25
21.21
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

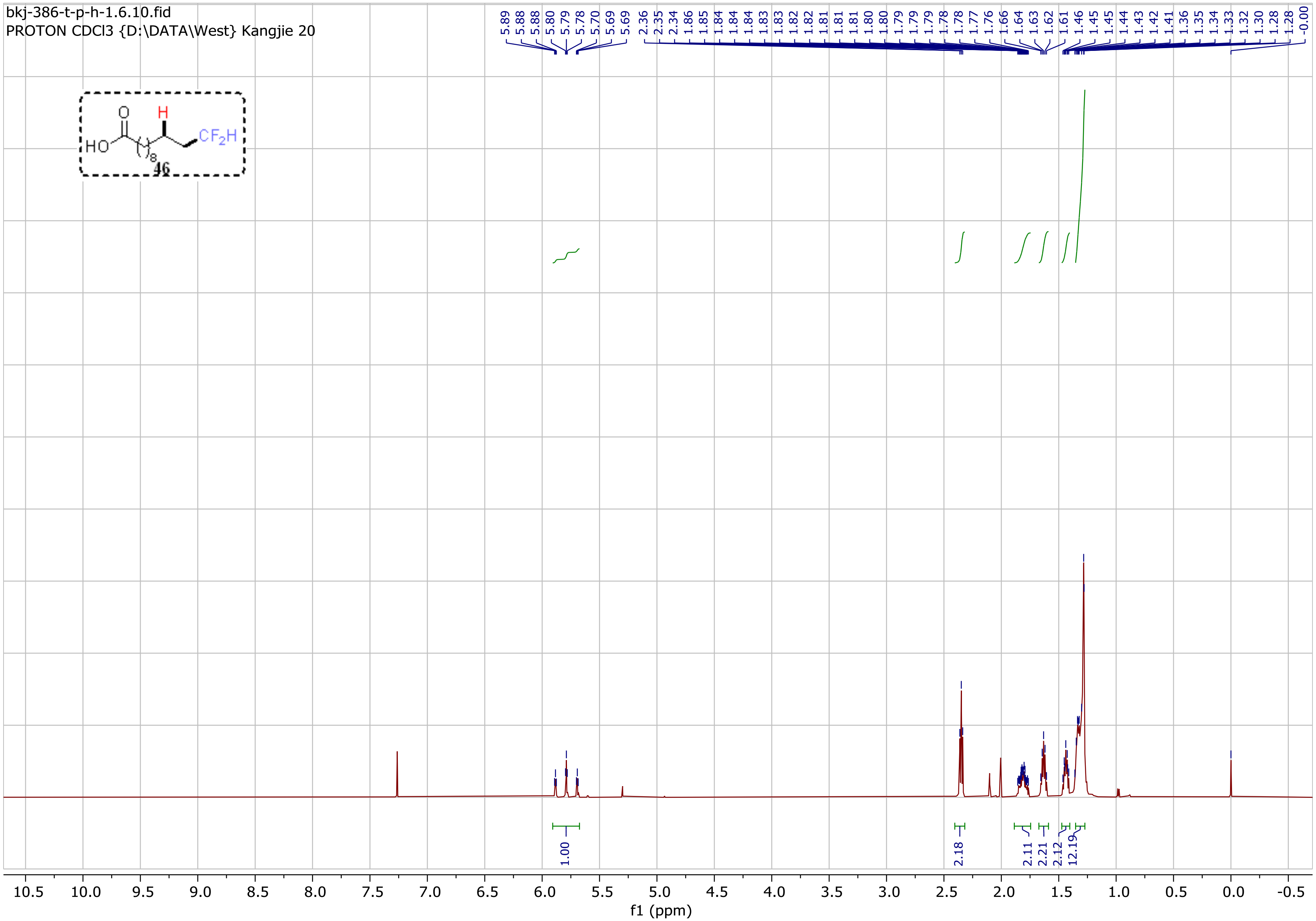

bkj-393-l-p-1.5.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 6
H
PhS
CF2H
44
-115.81
-115.84
-115.87
-115.91
-115.94
-115.97
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bkj-393-s-p-1.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 19
45
5.89 5.88 5.88 5.80 5.79 5.78 5.70 5.69 5.69
2.43 2.42 2.41 1.86 1.85 1.85 1.84 1.83 1.82 1.82 1.81 1.80 1.79 1.79 1.78 1.77 1.77 1.65 1.64 1.63 1.62 1.60 1.46 1.45 1.44 1.43 1.41 1.35 1.34 1.32 1.31 1.30 -0.00
0.94
1.00
2.05
2.08
2.21
2.19
12.03
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

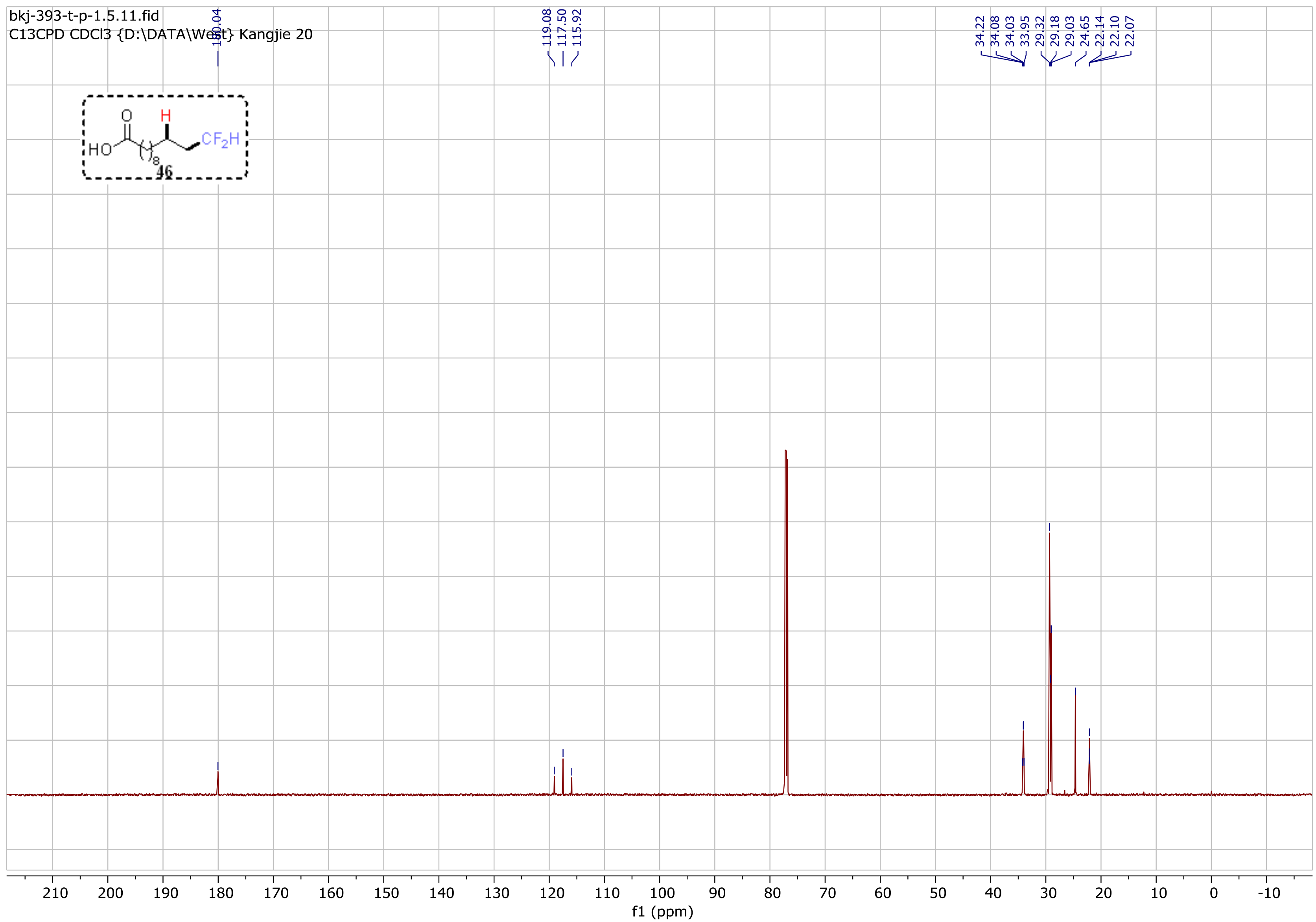

bkj-393-s-p1.5.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 19
202.93
119.08
117.50
115.91
43.92
34.22
34.08
33.95
29.33
29.32
29.14
29.03
22.13
22.10
22.07
H
O
H
CF2H
8
45
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

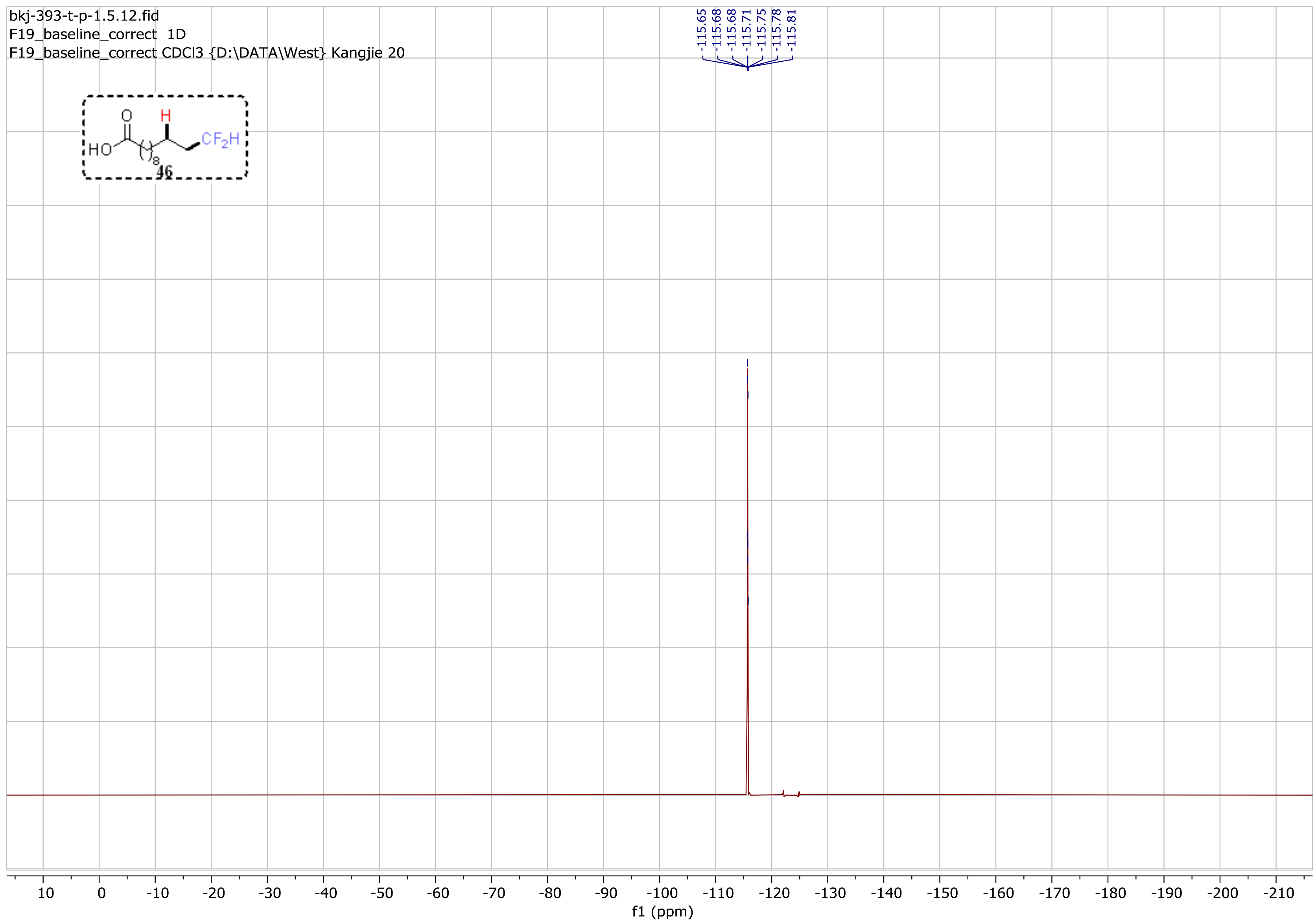


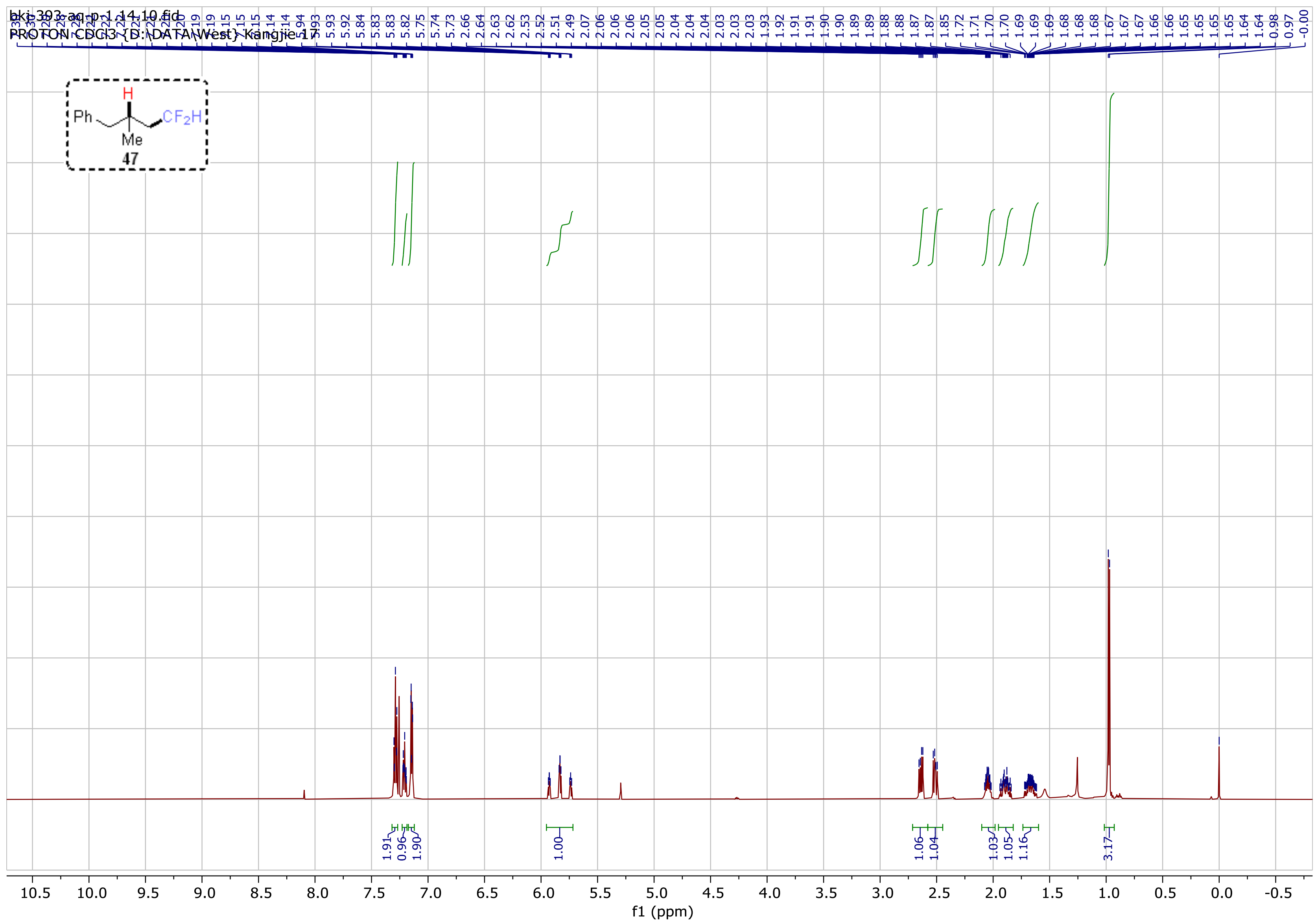
bkj-393-s-p-1.5.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 19
45
-115.67
-115.70
-115.73
-115.77
-115.80
-115.83
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)



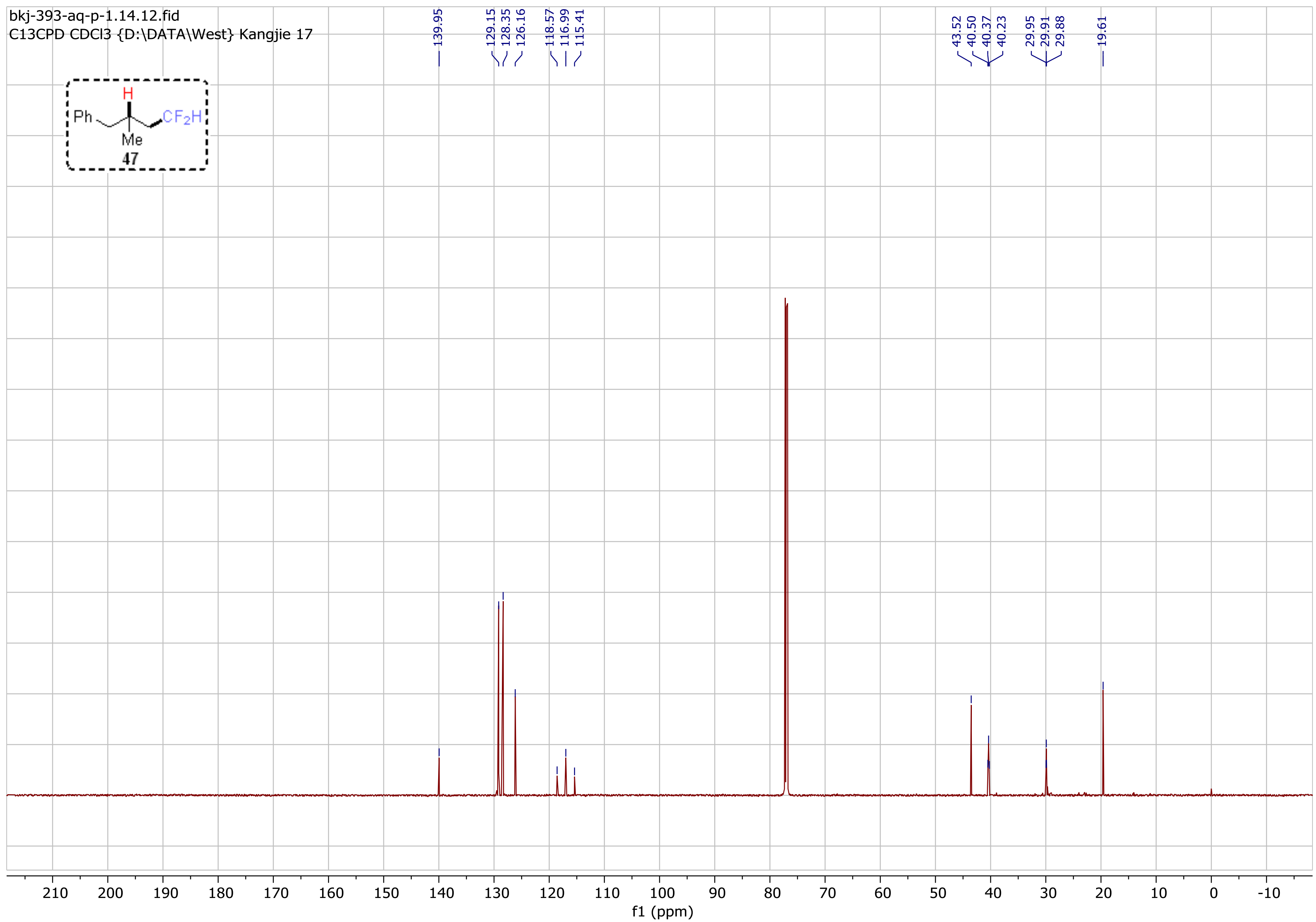
bkj-386-t-p-h-1.6.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 20
HO
O
H
CF2H
8
46
5.89
5.88
5.88
5.80
5.79
5.78
5.70
5.69
5.69
2.36
2.35
2.34
1.86
1.85
1.84
1.84
1.84
1.83
1.83
1.82
1.82
1.81
1.81
1.81
1.80
1.80
1.79
1.79
1.79
1.78
1.78
1.77
1.76
1.66
1.64
1.63
1.62
1.61
1.46
1.45
1.45
1.44
1.43
1.42
1.41
1.36
1.35
1.34
1.33
1.32
1.30
1.28
1.28
-0.00
1.00
2.18
2.11
2.21
2.12
12.19
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

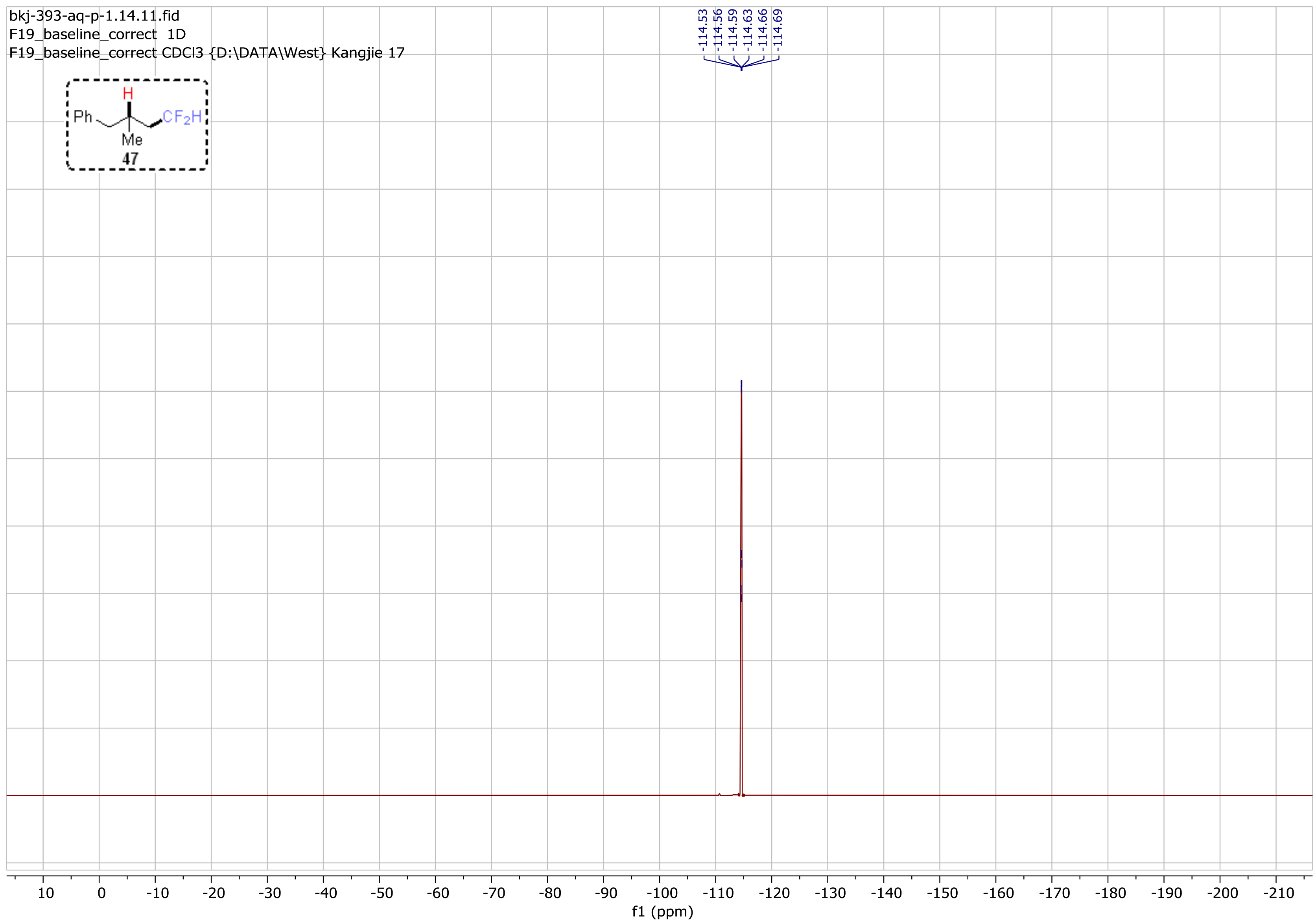

bkj-393-t-p-1.5.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 20
180.04
119.08
117.50
115.92
34.22
34.08
34.03
33.95
29.32
29.18
29.03
24.65
22.14
22.10
22.07
HO
O
H
CF2H
8
46
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

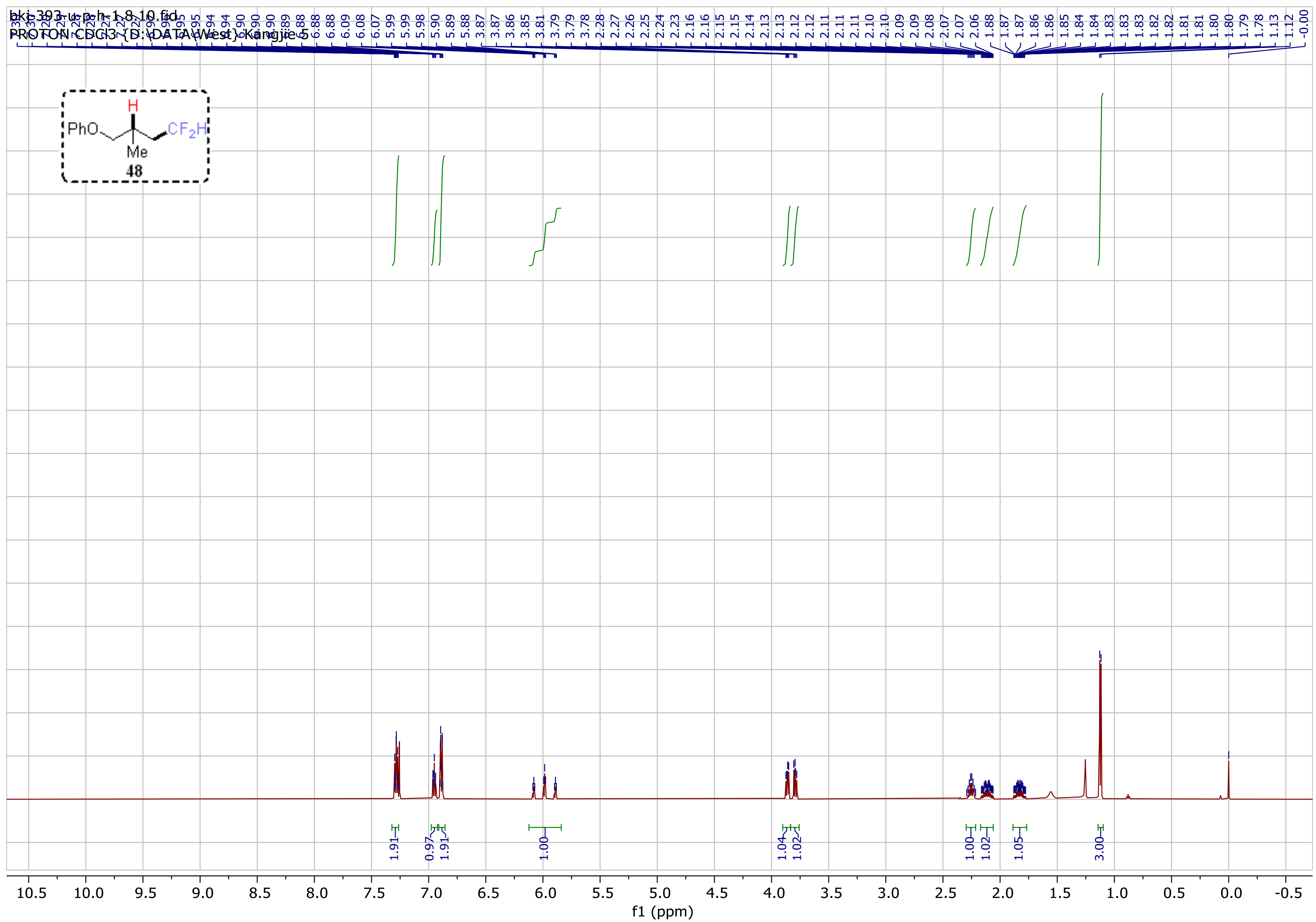

bkj-393-t-p-1.5.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 20
-115.65
-115.68
-115.68
-115.71
-115.75
-115.78
-115.81
HO
O
H
CF2H
8
46
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

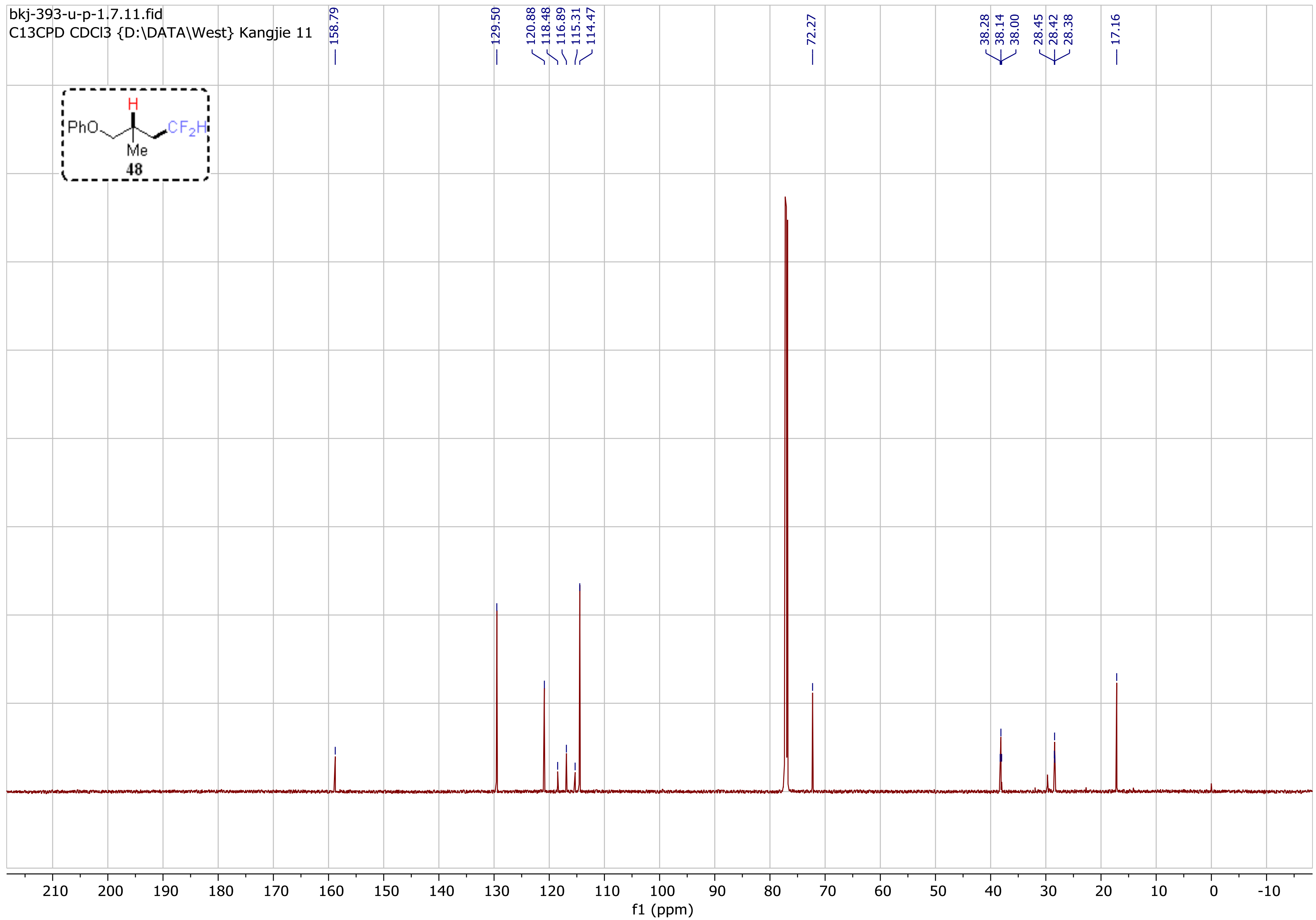


bki-393-aq-p-1.14.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 17
Ph
H
CF2H
Me
47
1.91
0.96
1.90
1.00
1.06
1.04
1.03
1.05
1.16
3.17
f1 (ppm)

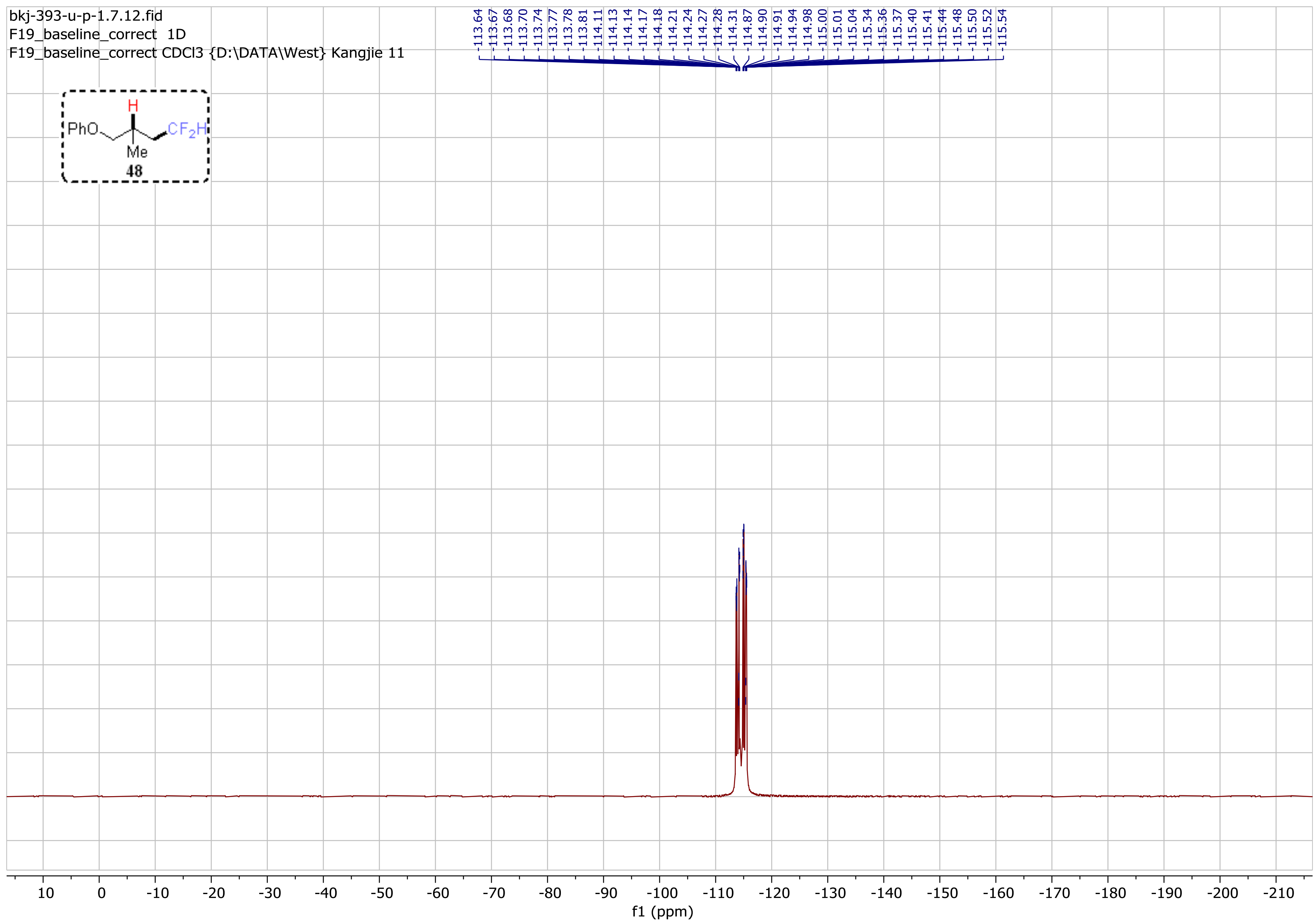

bkj-393-aq-p-1.14.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 17
139.95
129.15
128.35
126.16
118.57
116.99
115.41
43.52
40.50
40.37
40.23
29.95
29.91
29.88
19.61
Ph
H
Me
CF2H
47
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

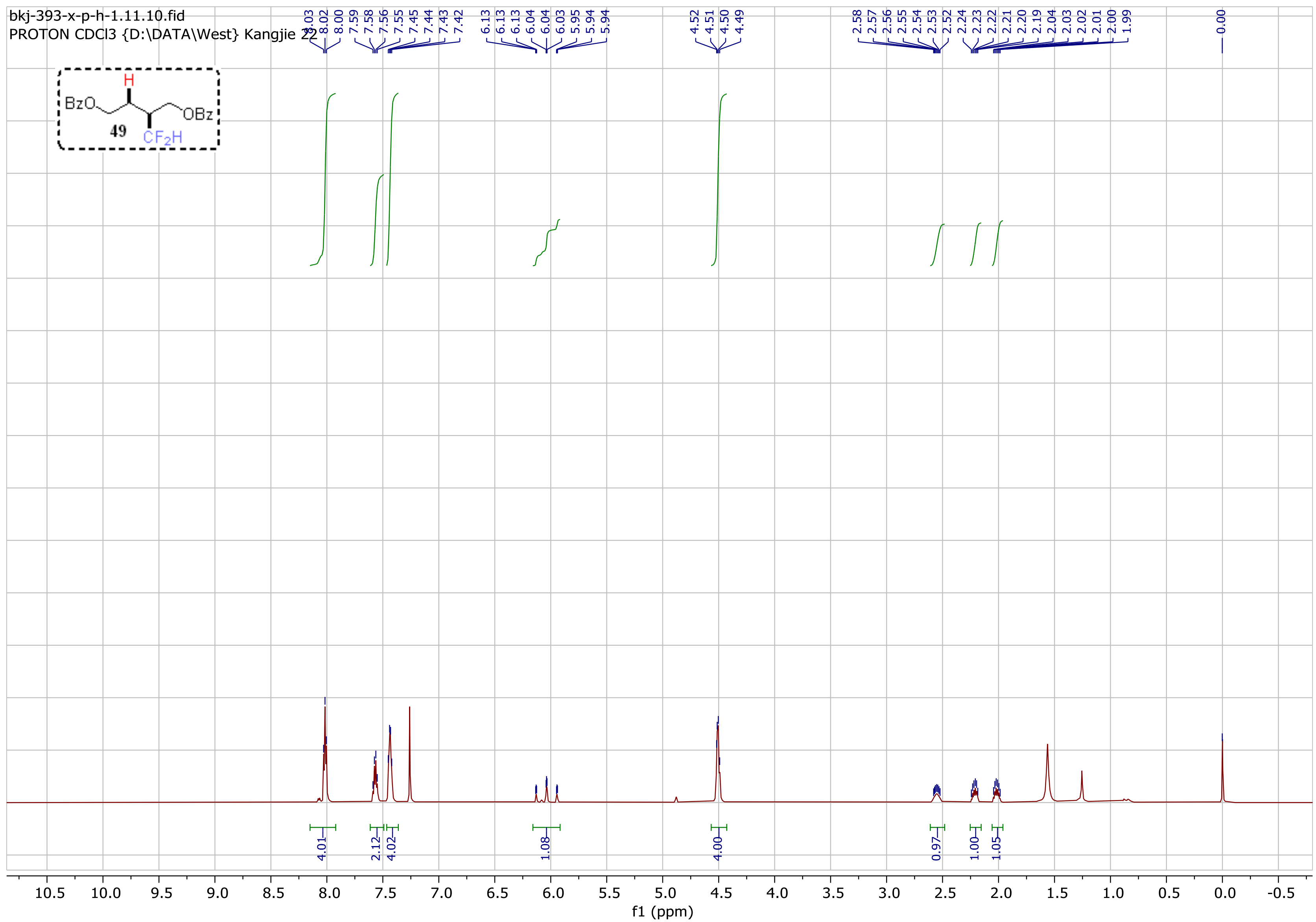

bkj-393-aq-p-1.14.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 17
Ph
H
CF2H
Me
47
-114.53
-114.56
-114.59
-114.63
-114.66
-114.69
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

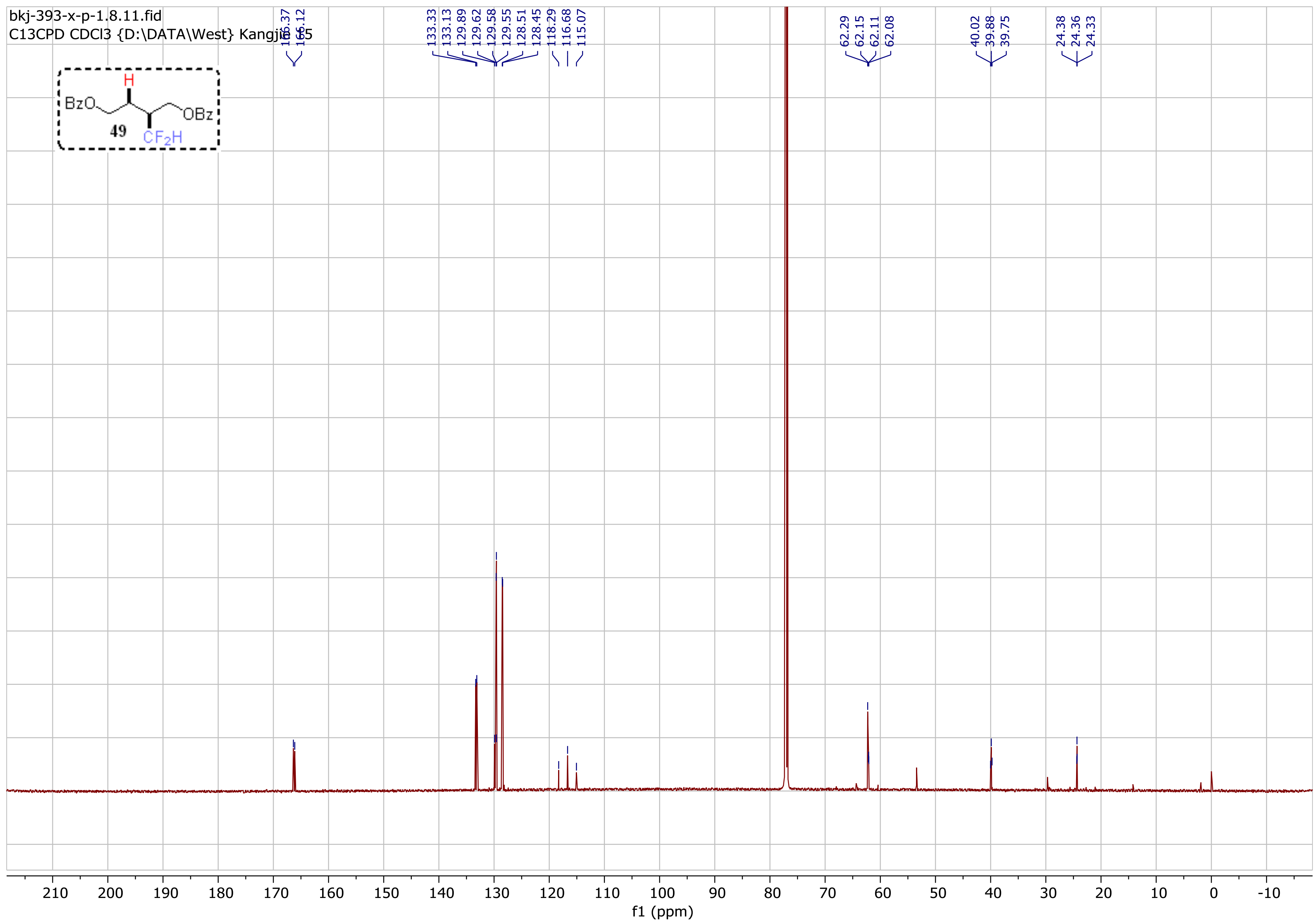

bki-393-u-p-h-1-8-10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 5
PhO
H
CF2H
Me
48
1.91
0.97
1.91
1.00
1.04
1.02
1.00
1.02
1.05
3.00
f1 (ppm)



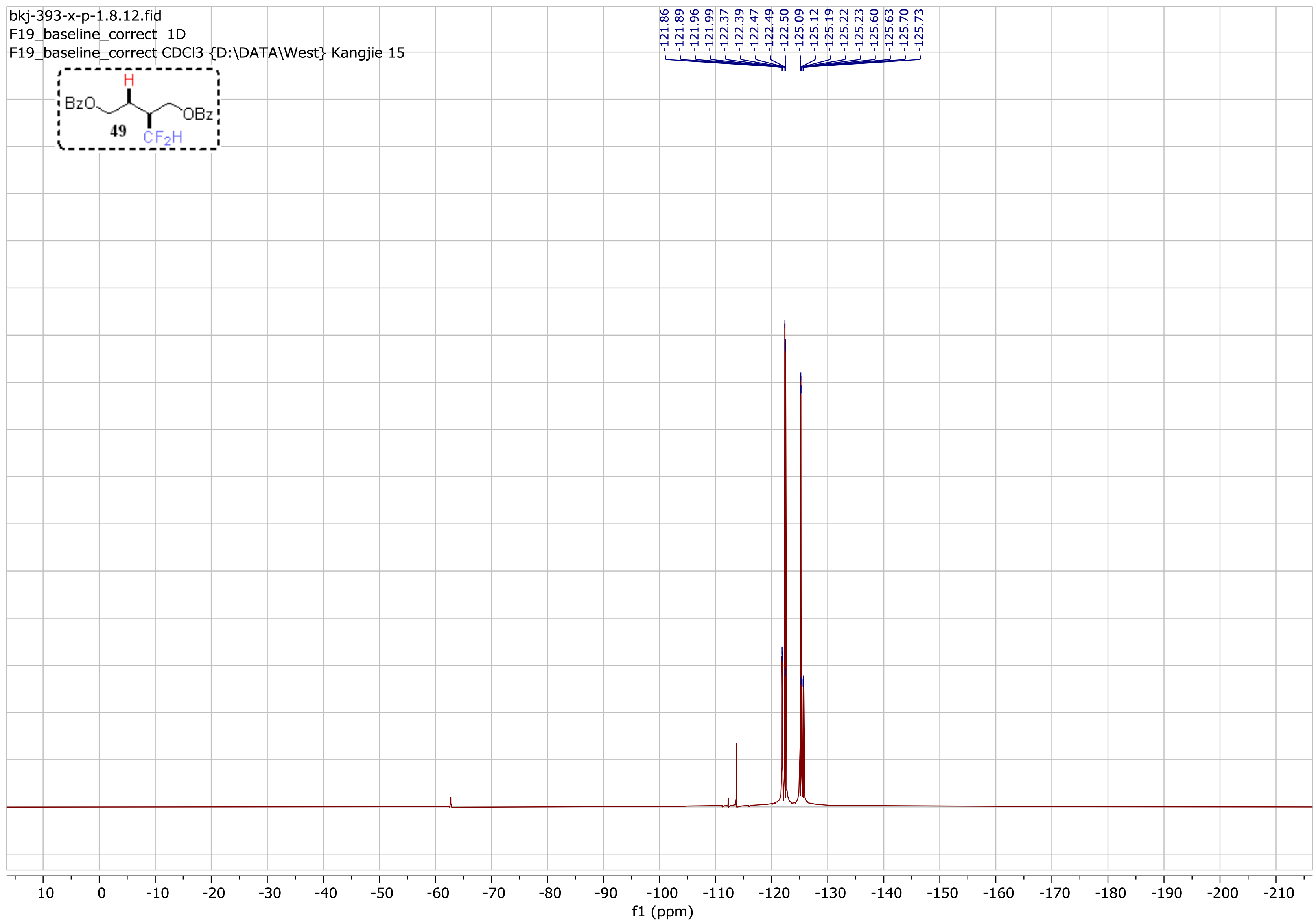
bkj-393-u-p-1.7.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 11
158.79
129.50
120.88
118.48
116.89
115.31
114.47
72.27
38.28
38.14
38.00
28.45
28.42
28.38
17.16
PhO
H
Me
CF2H
48
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


bkj-393-u-p-1.7.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 11
PhO
H
Me
CF2H
48
-113.64
-113.67
-113.68
-113.70
-113.74
-113.77
-113.78
-113.81
-114.11
-114.13
-114.14
-114.17
-114.18
-114.21
-114.24
-114.27
-114.28
-114.31
-114.87
-114.90
-114.91
-114.94
-114.98
-115.00
-115.01
-115.04
-115.34
-115.36
-115.37
-115.40
-115.41
-115.44
-115.48
-115.50
-115.52
-115.54
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

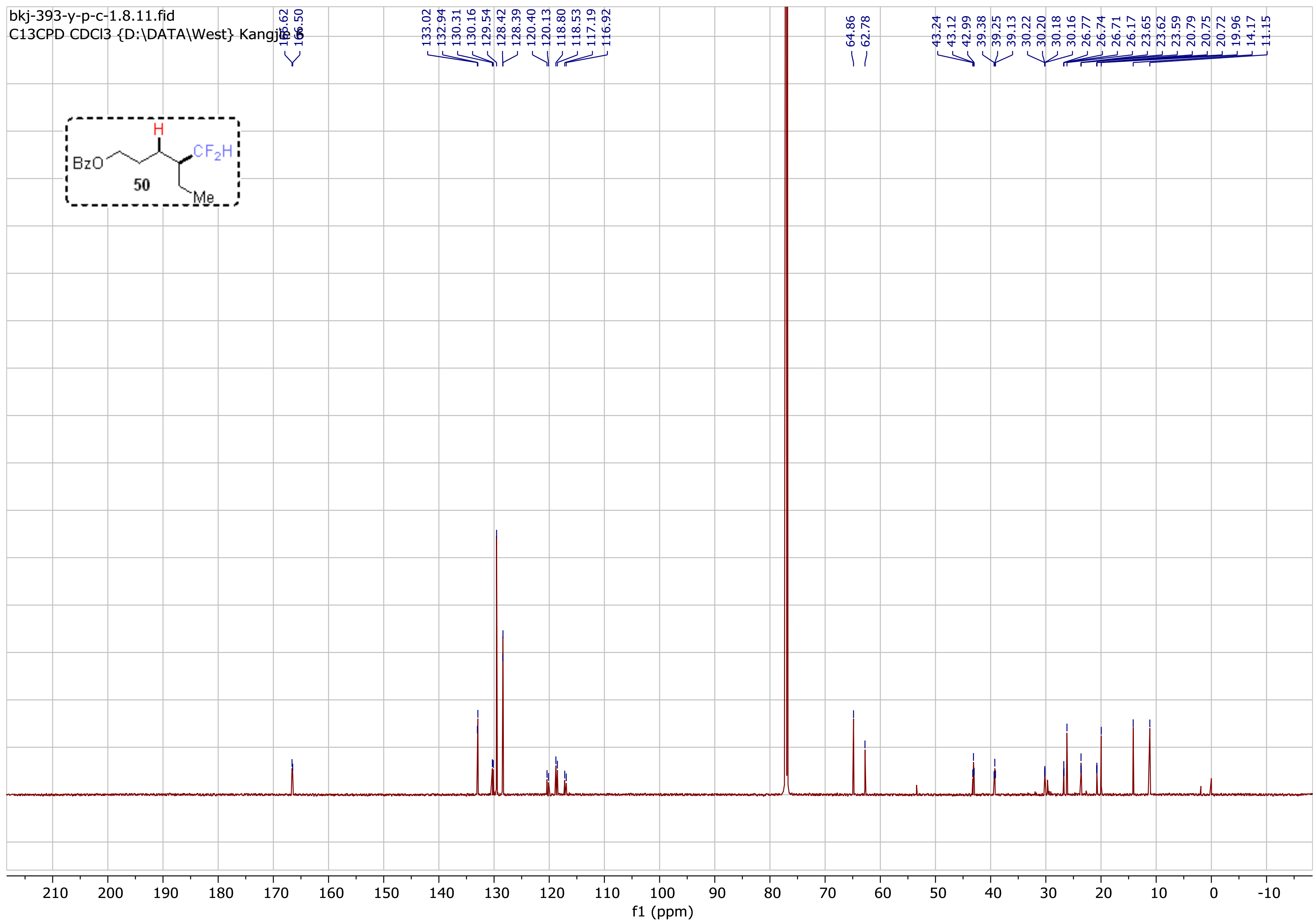

bkj-393-x-p-h-1.11.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 22
BzO
H
OBz
49
CF2H
8.03 8.02 8.00 7.59 7.58 7.56 7.55 7.45 7.44 7.43 7.42
6.13 6.13 6.13 6.04 6.04 6.03 5.95 5.94 5.94
4.52 4.51 4.50 4.49
2.58 2.57 2.56 2.55 2.54 2.53 2.52 2.24 2.23 2.22 2.21 2.20 2.19 2.04 2.03 2.02 2.01 2.00 1.99
0.00
4.01 2.12 4.02 1.08 4.00 0.97 1.00 1.05
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)



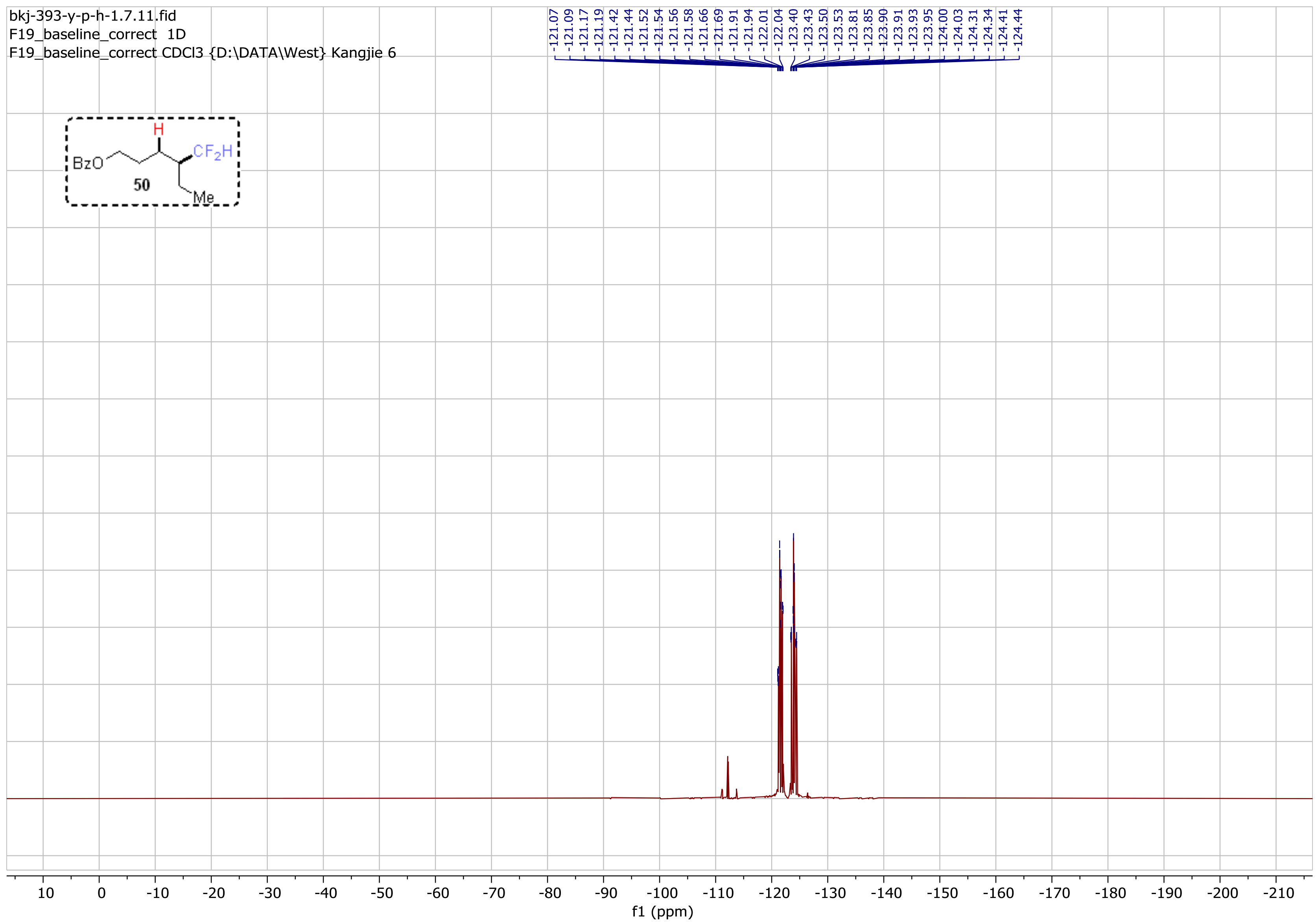
bkj-393-x-p-1.8.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 55
BzO
H
OBz
49
CF2H
166.37
166.12
133.33
133.13
129.89
129.62
129.58
129.55
128.51
128.45
118.29
116.68
115.07
62.29
62.15
62.11
62.08
40.02
39.88
39.75
24.38
24.36
24.33
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

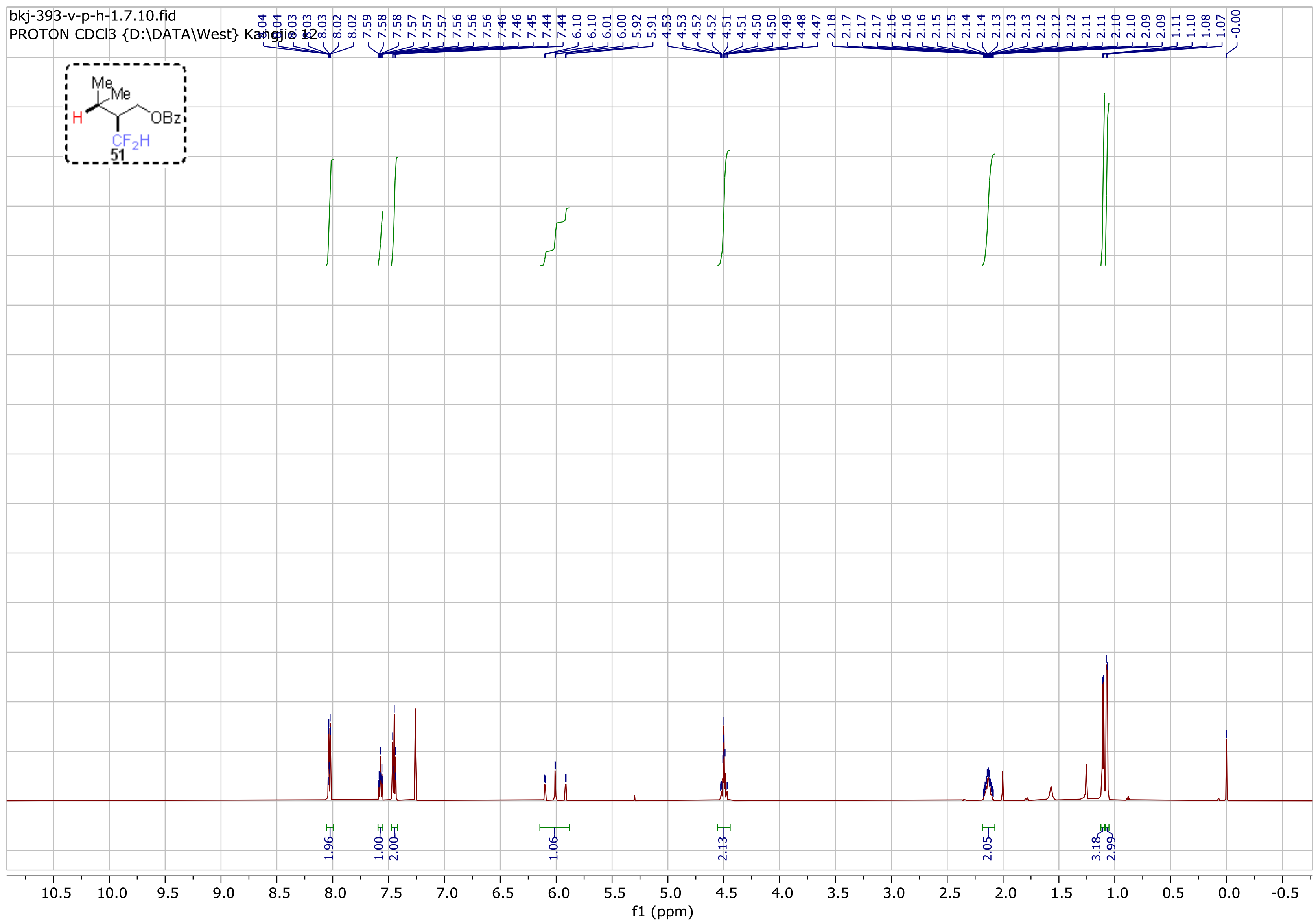

bkj-393-x-p-1.8.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 15
BzO
H
OBz
49
CF2H
-121.86
-121.89
-121.96
-121.99
-122.37
-122.39
-122.47
-122.49
-122.50
-125.09
-125.12
-125.19
-125.22
-125.23
-125.60
-125.63
-125.70
-125.73
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

bki-393-v-p-h-1.7.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 6
BzO
H
CF2H
Me
50
1.93
1.00
2.00
1.04
0.88
1.12
1.00
2.26
0.74
4.34
3.18
f1 (ppm)

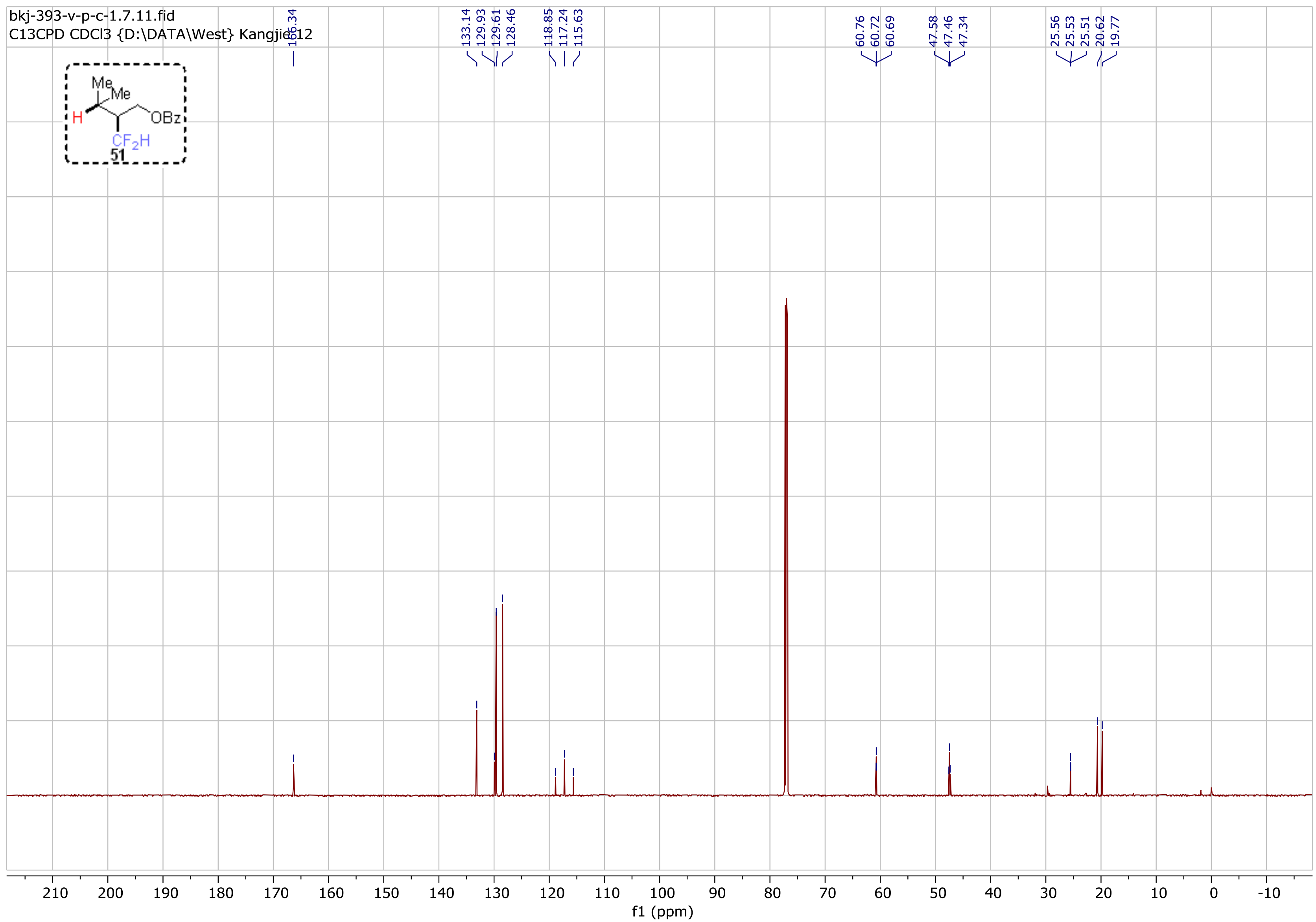


bkj-393-y-p-c-1.8.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 6
166.62
166.50
133.02
132.94
130.31
130.16
129.54
128.42
128.39
120.40
120.13
118.80
118.53
117.19
116.92
64.86
62.78
43.24
43.12
42.99
39.38
39.25
39.13
30.22
30.20
30.18
30.16
26.77
26.74
26.71
26.17
23.65
23.62
23.59
20.79
20.75
20.72
19.96
14.17
11.15
BzO
H
CF2H
Me
50
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

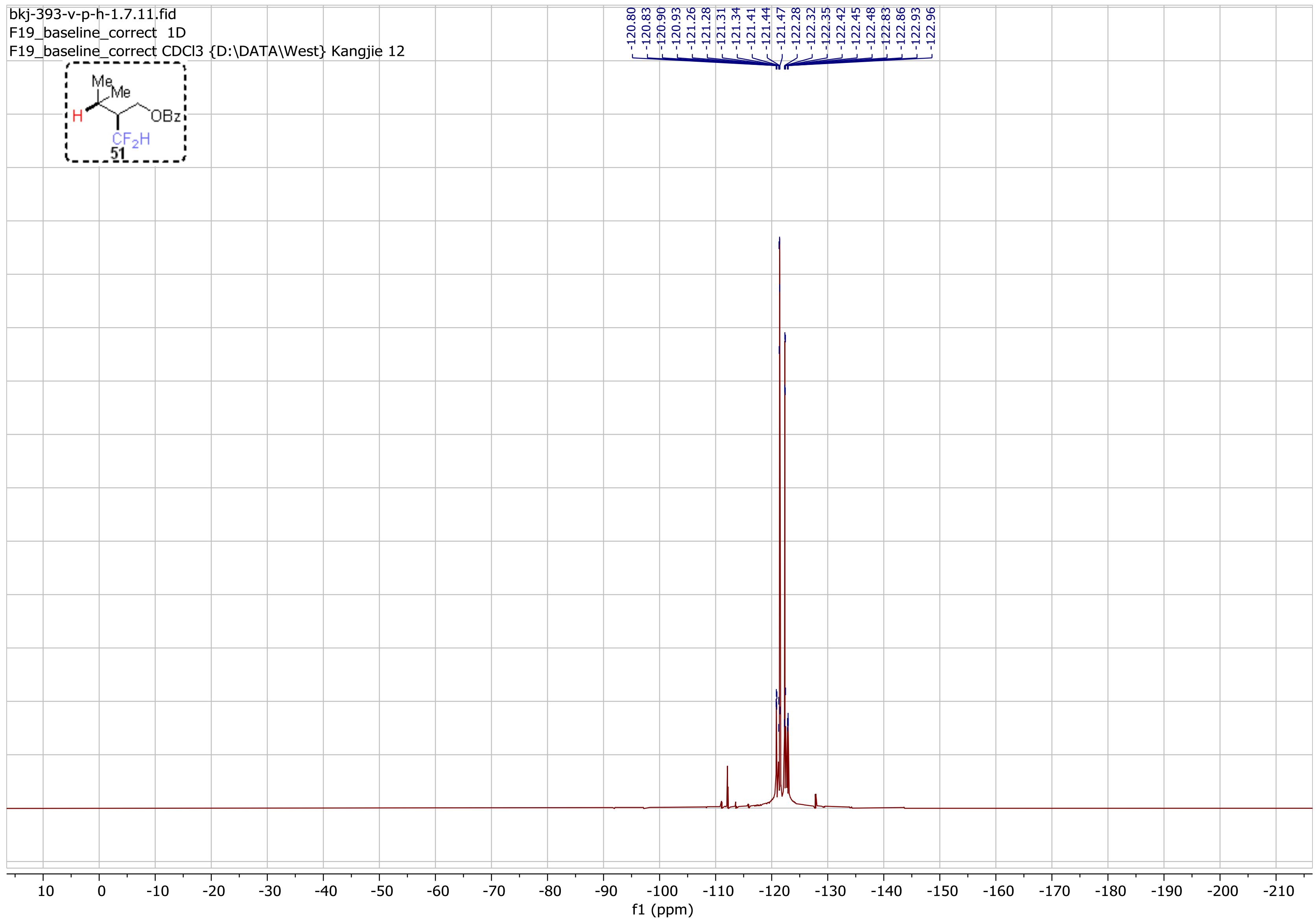

bkj-393-y-p-h-1.7.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 6
BzO
H
CF2H
Me
50
-121.07
-121.09
-121.17
-121.19
-121.42
-121.44
-121.52
-121.54
-121.56
-121.58
-121.66
-121.69
-121.91
-121.94
-122.01
-122.04
-123.40
-123.43
-123.50
-123.53
-123.81
-123.85
-123.90
-123.91
-123.93
-123.95
-124.00
-124.03
-124.31
-124.34
-124.41
-124.44
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

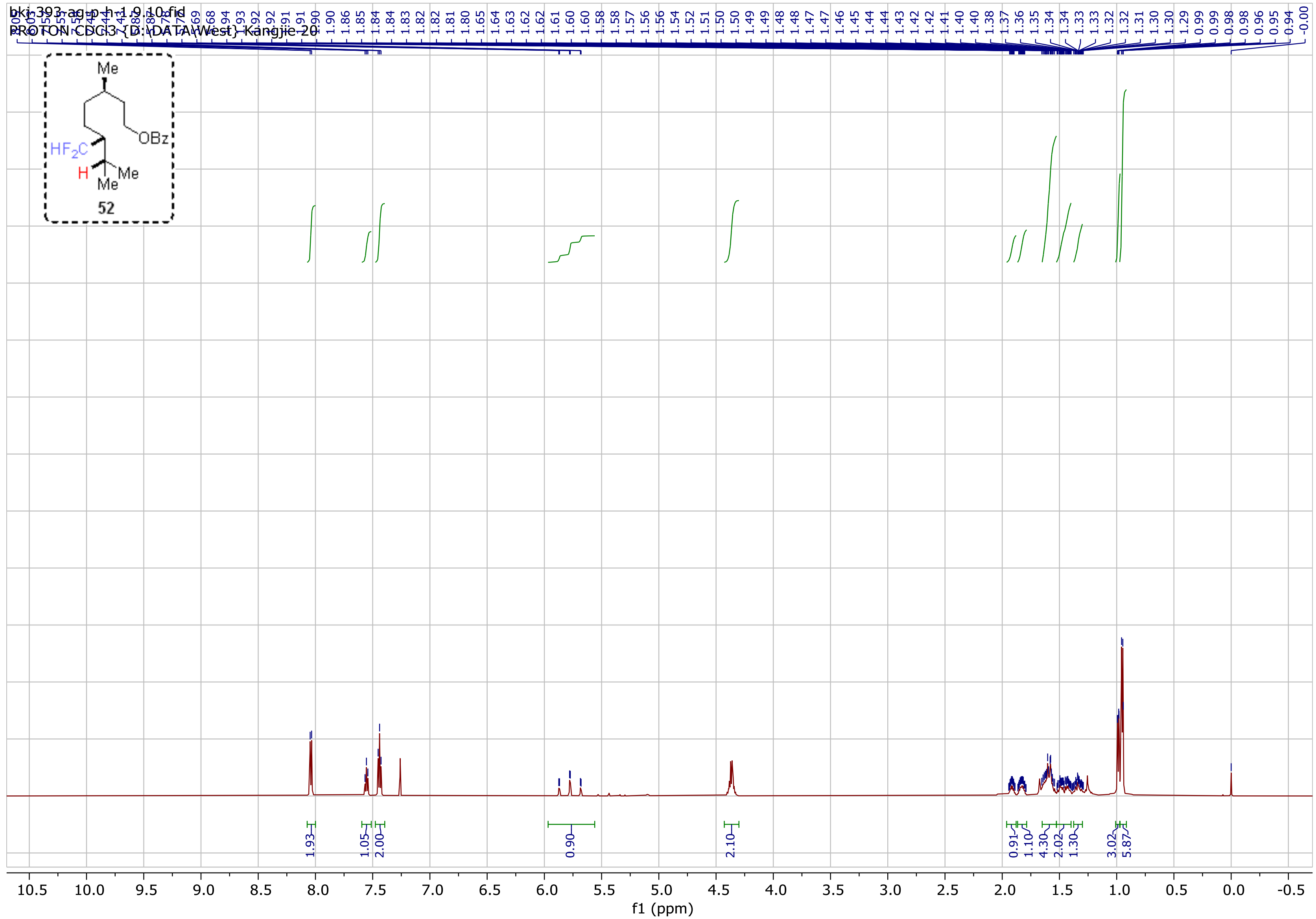


bkj-393-v-p-h-1.7.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 12
Me
Me
H
OBz
CF2H
51
8.04 8.04 8.03 8.03 8.03 8.02 8.02 7.59 7.58 7.58 7.57 7.57 7.57 7.56 7.56 7.56 7.46 7.46 7.45 7.44 7.44 6.10 6.10 6.01 6.00 5.92 5.91 4.53 4.53 4.52 4.52 4.51 4.51 4.50 4.50 4.49 4.48 4.47 2.18 2.17 2.17 2.17 2.16 2.16 2.16 2.15 2.15 2.14 2.14 2.13 2.13 2.13 2.12 2.12 2.12 2.11 2.11 2.10 2.10 2.09 2.09 1.11 1.10 1.08 1.07 -0.00
1.96
1.00
2.00
1.06
2.13
2.05
3.18
2.99
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

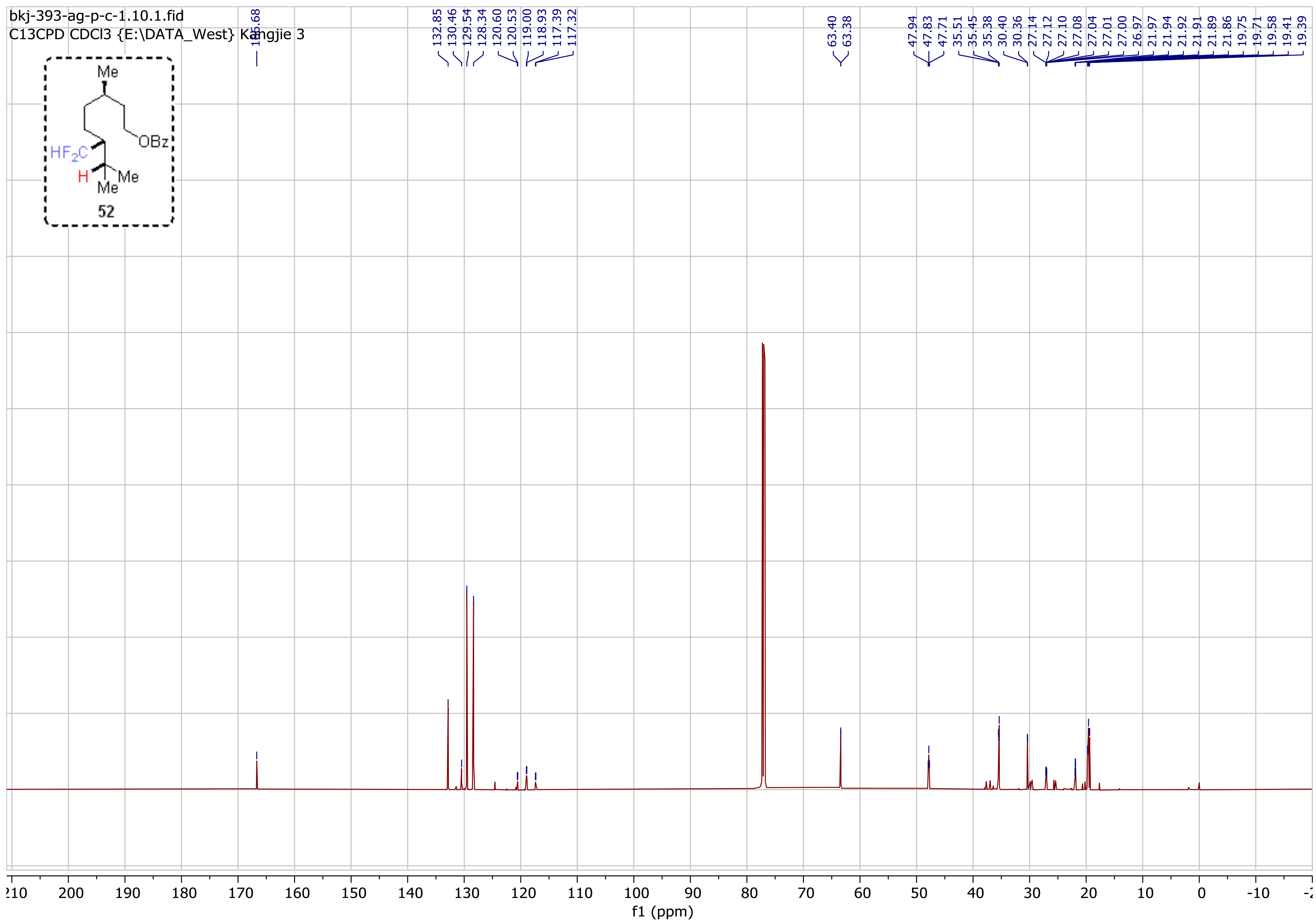


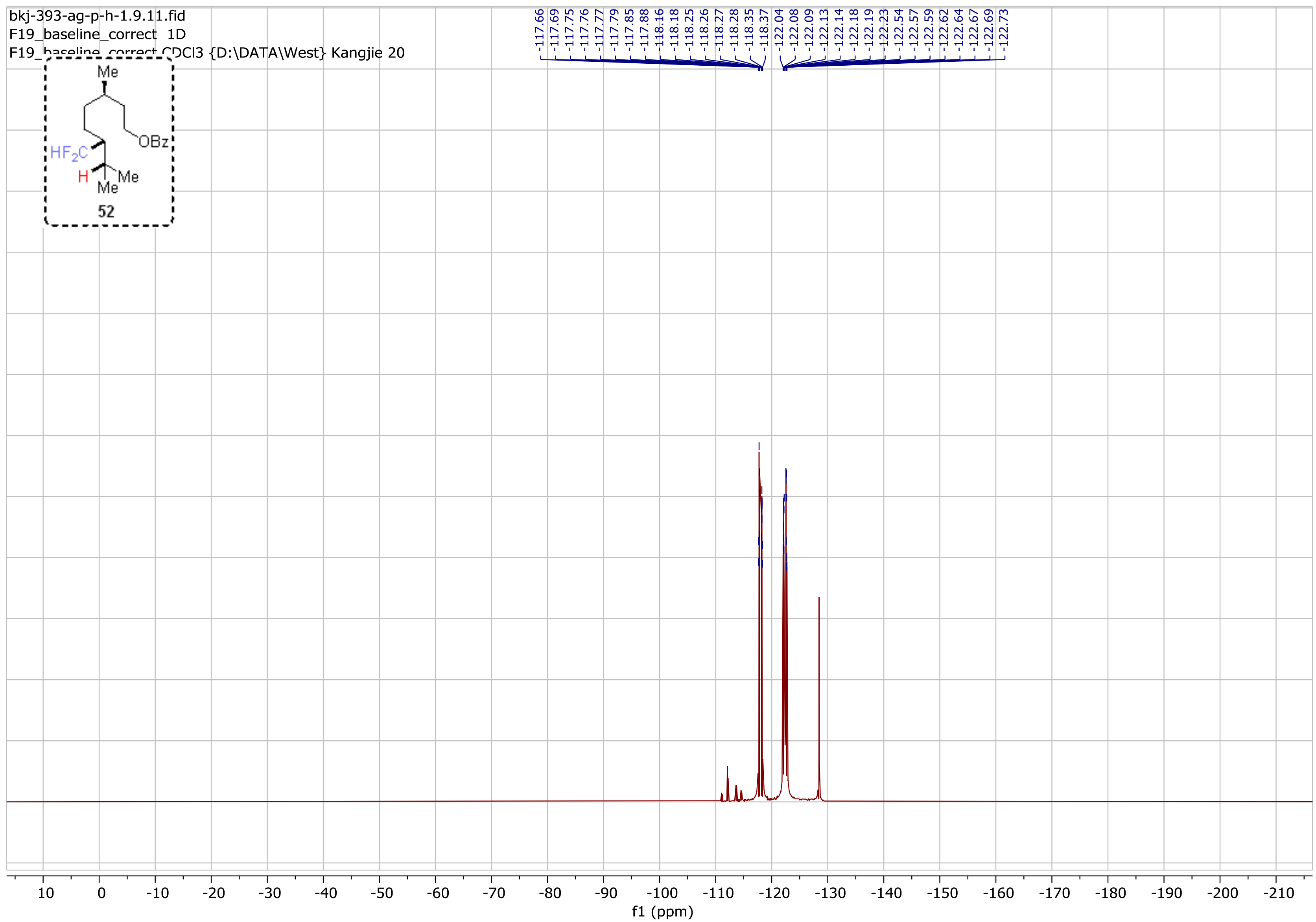
bkj-393-v-p-c-1.7.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 12
166.34
133.14
129.93
129.61
128.46
118.85
117.24
115.63
60.76
60.72
60.69
47.58
47.46
47.34
25.56
25.53
25.51
20.62
19.77
Me
Me
H
OBz
CF2H
51
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

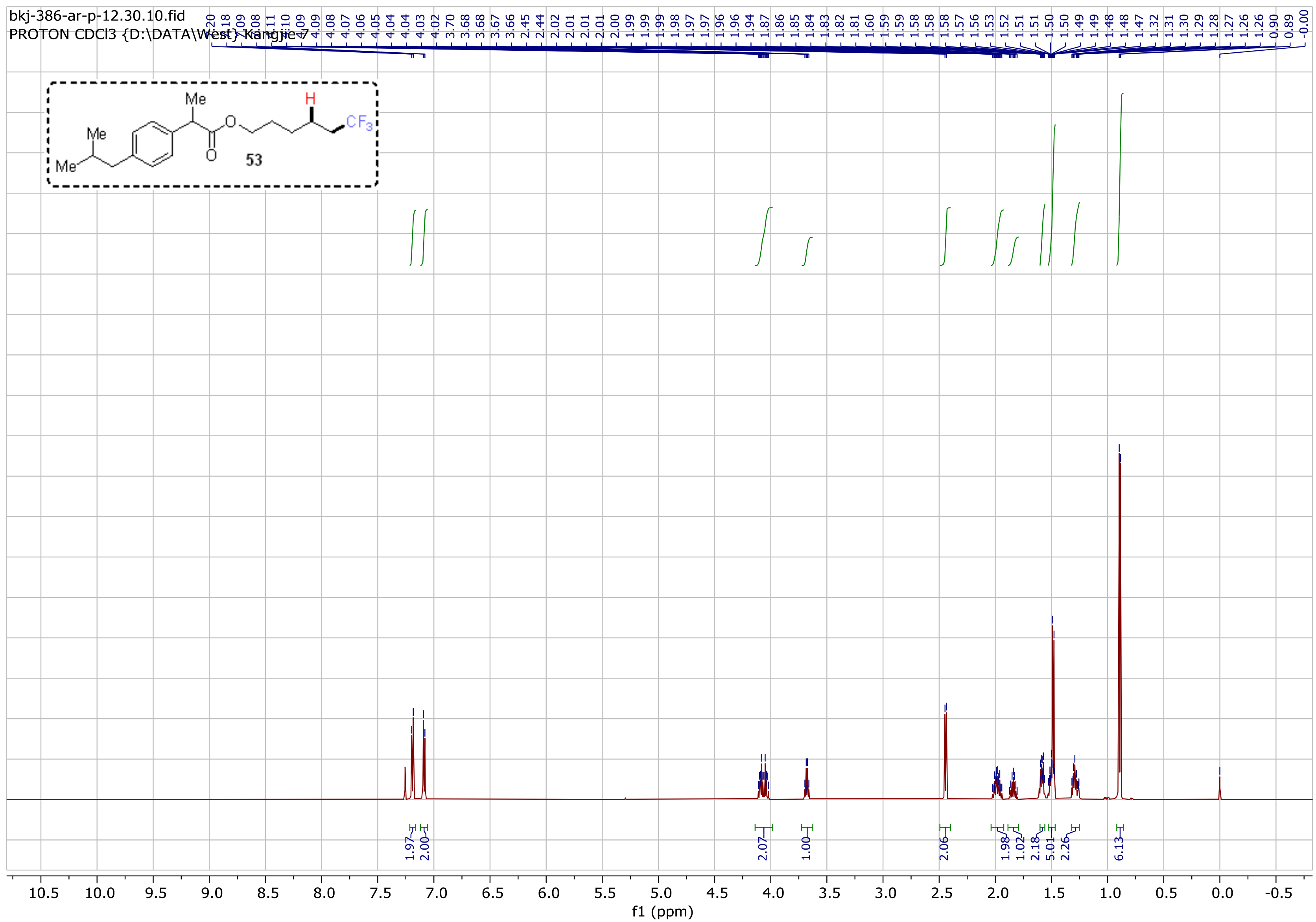

bkj-393-v-p-h-1.7.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 12
Me
Me
H
OBz
CF2H
51
-120.80
-120.83
-120.90
-120.93
-121.26
-121.28
-121.31
-121.34
-121.41
-121.44
-121.47
-122.28
-122.32
-122.35
-122.42
-122.45
-122.48
-122.83
-122.86
-122.93
-122.96
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

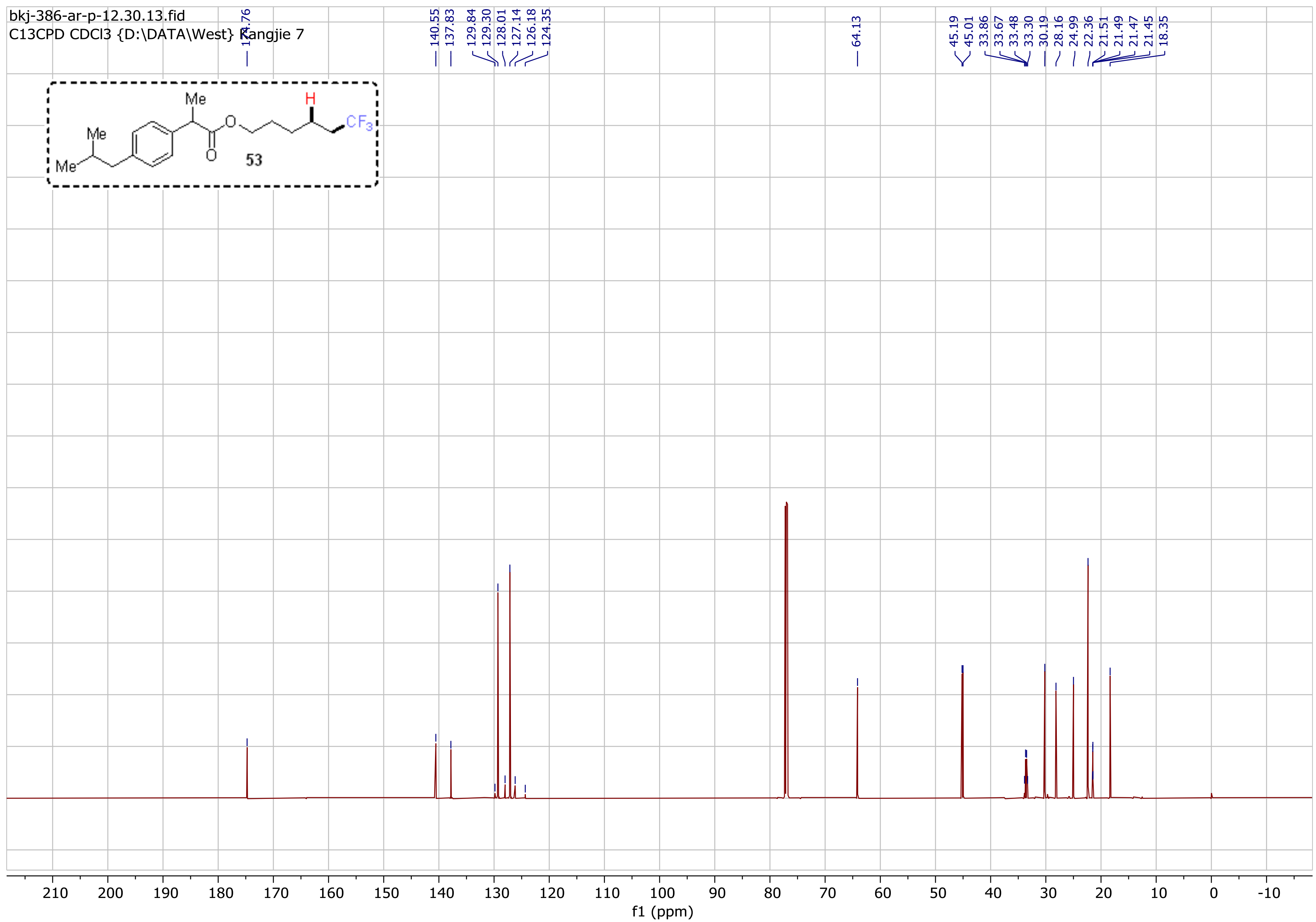


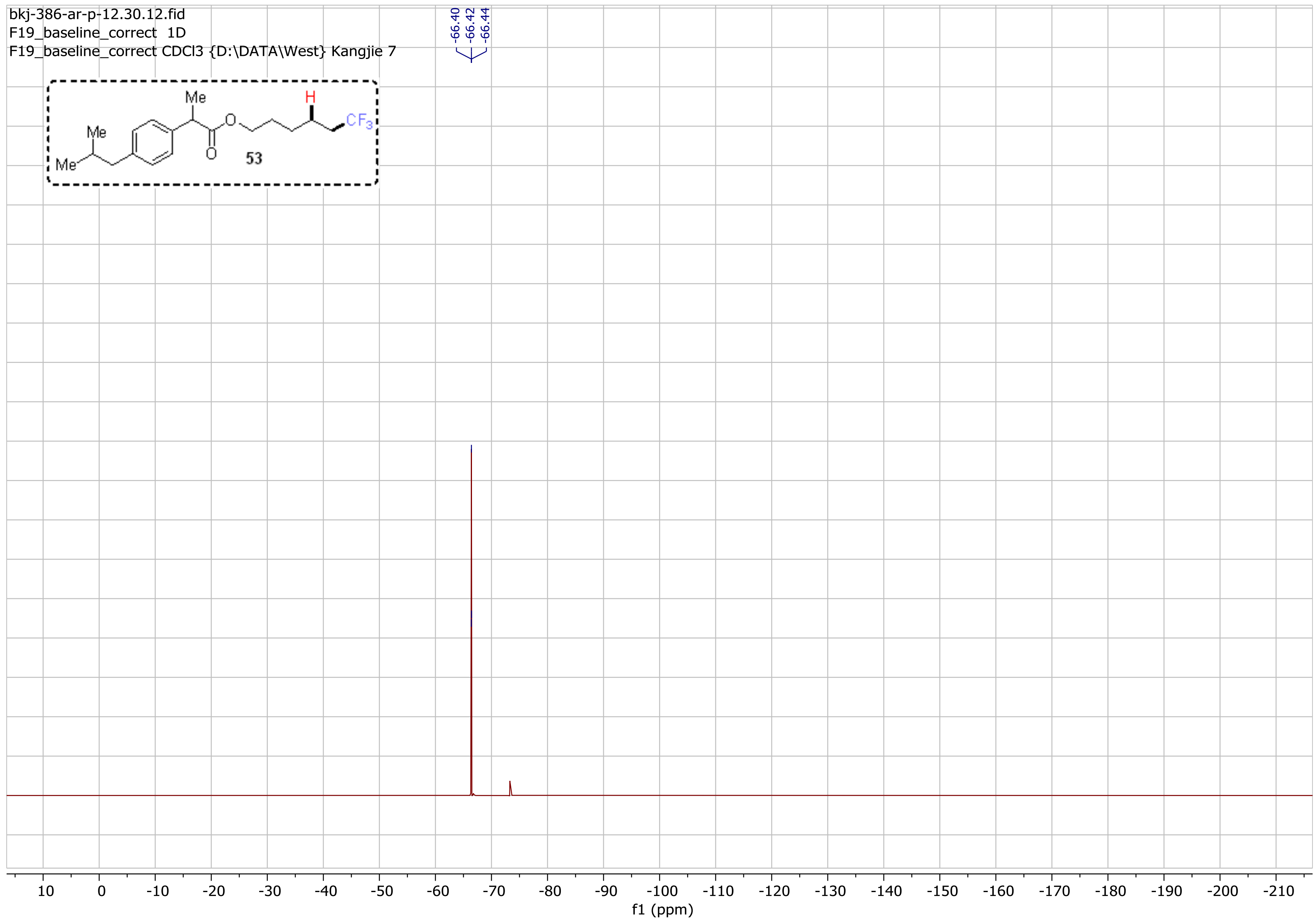
bki-393-ag-p-h-1.9.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 20
Me
OBz
HF_2C
H
Me
Me
52
1.93
1.05
2.00
0.90
2.10
0.91
1.10
4.30
2.02
1.30
3.02
5.87
f1 (ppm)

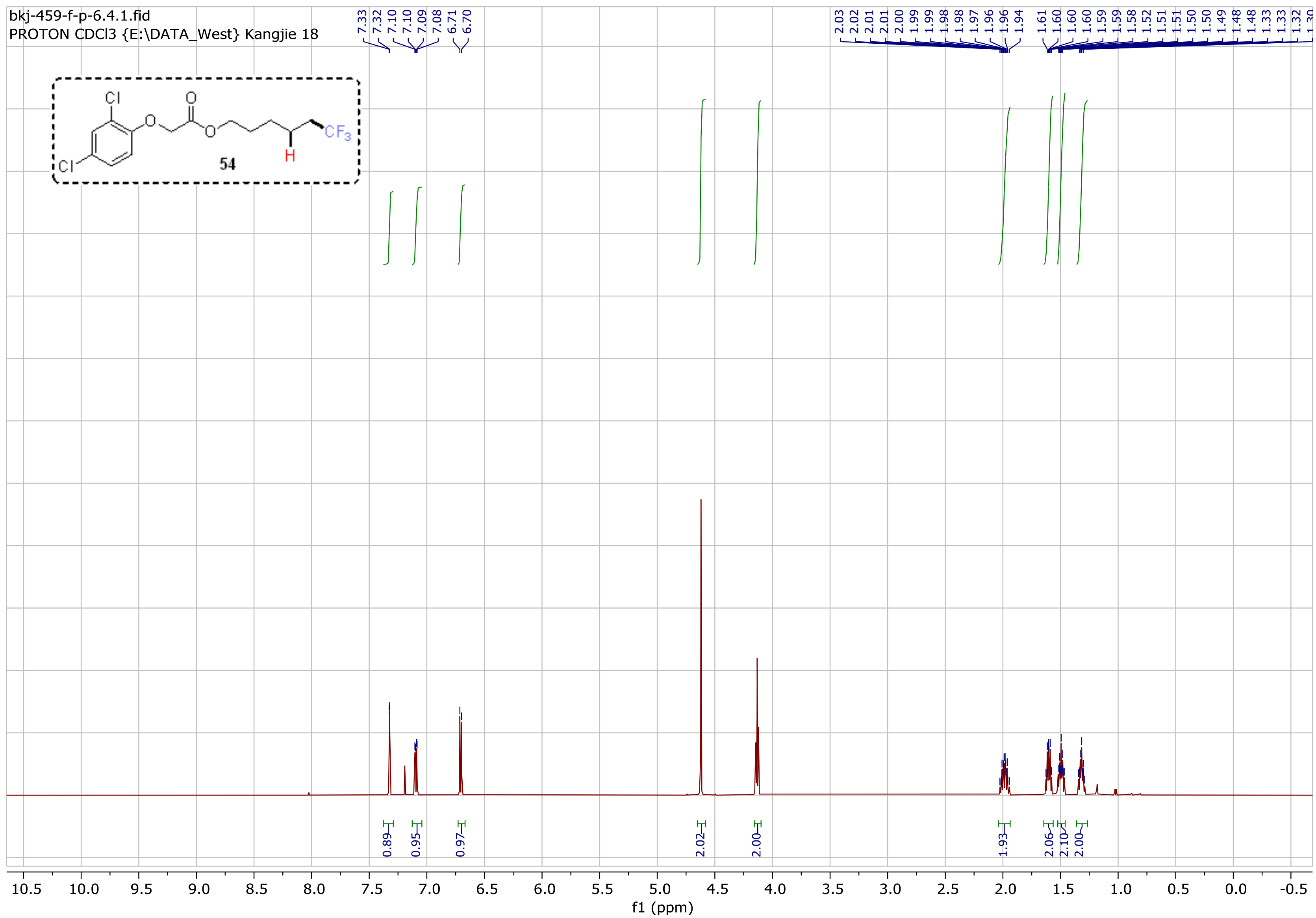

bkj-393-ag-p-c-1.10.1.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 3
Me
OBz
HF2C
H
Me
Me
52
166.68
132.85
130.46
129.54
128.34
120.60
120.53
119.00
118.93
117.39
117.32
63.40
63.38
47.94
47.83
47.71
35.51
35.45
35.38
30.40
30.36
27.14
27.12
27.10
27.08
27.04
27.01
27.00
26.97
21.97
21.94
21.92
21.91
21.89
21.86
19.75
19.71
19.58
19.41
19.39
f1 (ppm)

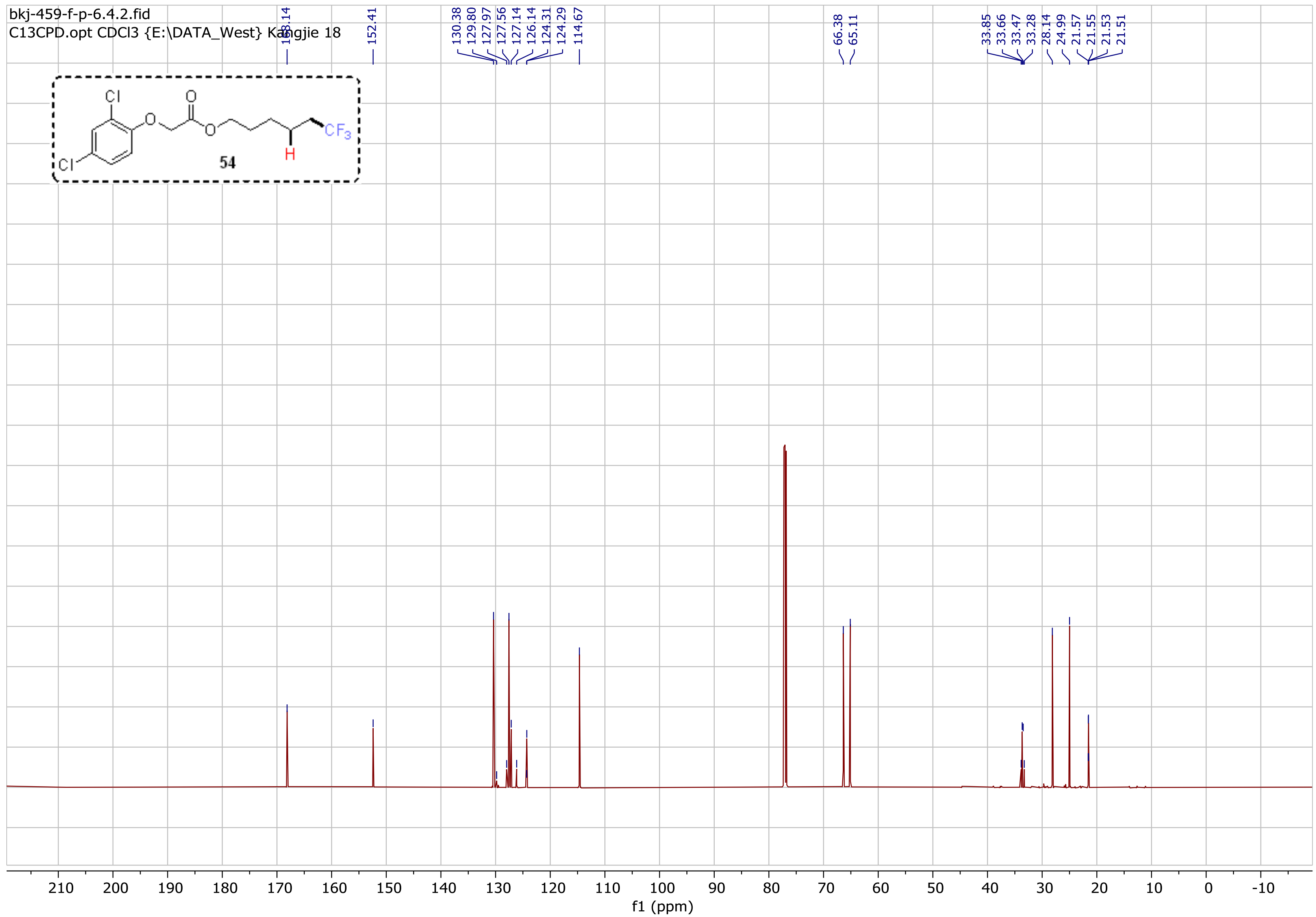

bkj-393-ag-p-h-1.9.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 20
Me
OBz
HF_2C
H
Me
Me
52
-117.66
-117.69
-117.75
-117.76
-117.77
-117.79
-117.85
-117.88
-118.16
-118.18
-118.25
-118.26
-118.27
-118.28
-118.35
-118.37
-122.04
-122.08
-122.09
-122.13
-122.14
-122.18
-122.19
-122.23
-122.54
-122.57
-122.59
-122.62
-122.64
-122.67
-122.69
-122.73
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bkj-386-ar-p-12.30.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
Me
Me
Me
O
O
H
CF3
53
1.97
2.00
2.07
1.00
2.06
1.98
1.02
2.18
5.01
2.26
6.13
f1 (ppm)

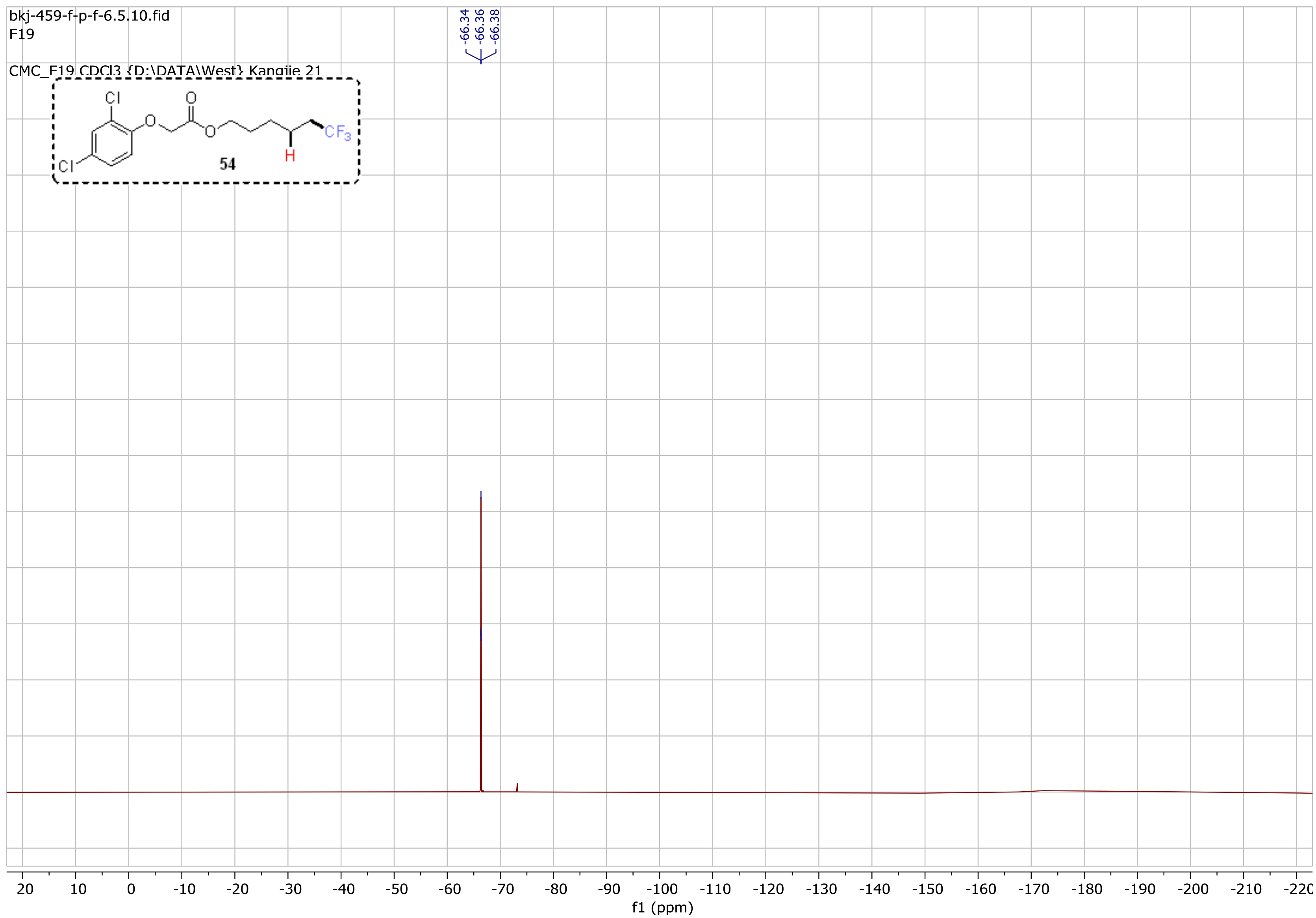

bkj-386-ar-p-12.30.13.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
174.76
140.55
137.83
129.84
129.30
128.01
127.14
126.18
124.35
64.13
45.19
45.01
33.86
33.67
33.48
33.30
30.19
28.16
24.99
22.36
21.51
21.49
21.47
21.45
18.35
Me
Me
Me
Me
O
O
H
CF3
53
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

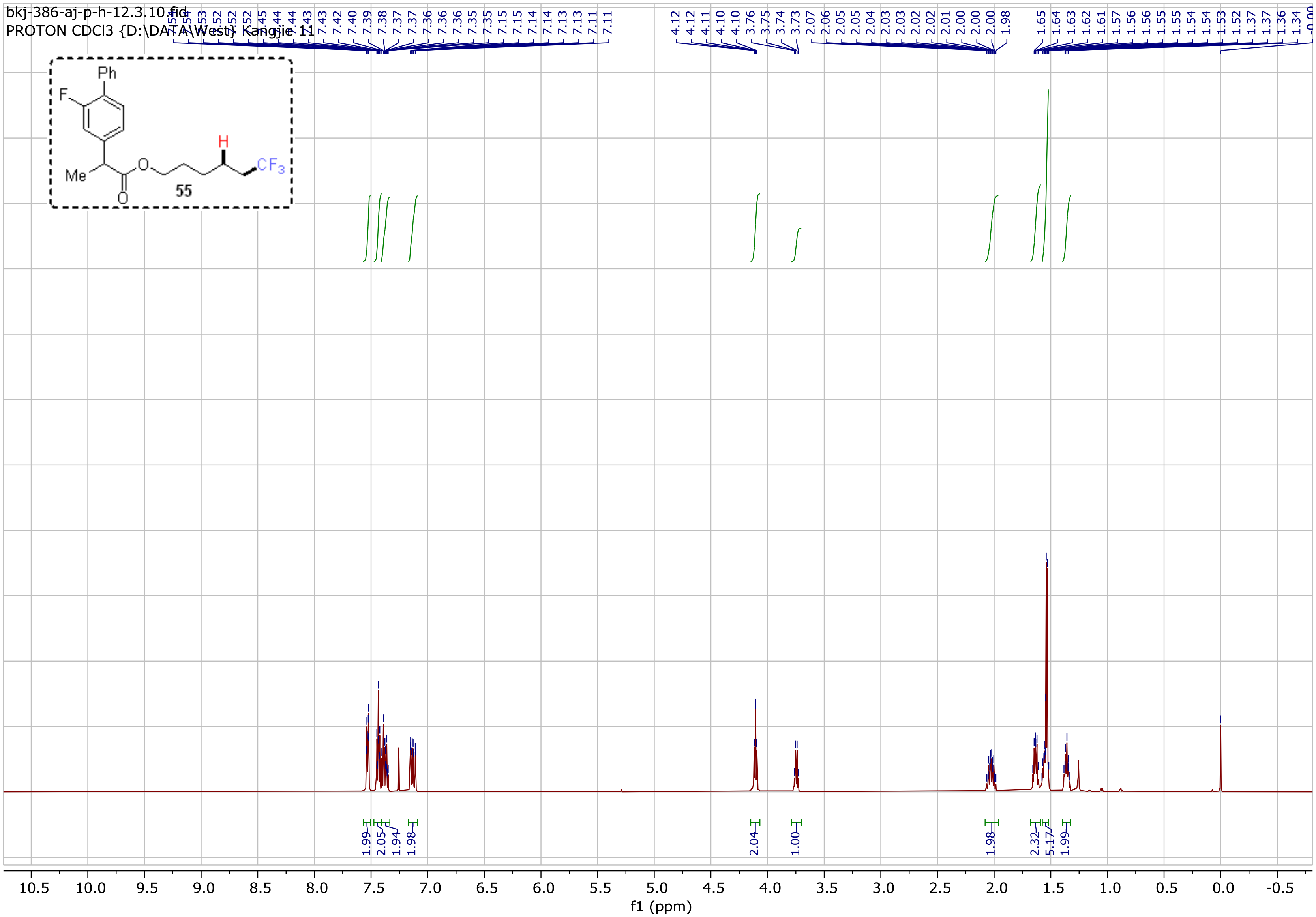

bkj-386-ar-p-12.30.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 7
-66.40
-66.42
-66.44
Me
Me
Me
O
O
H
CF3
53
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

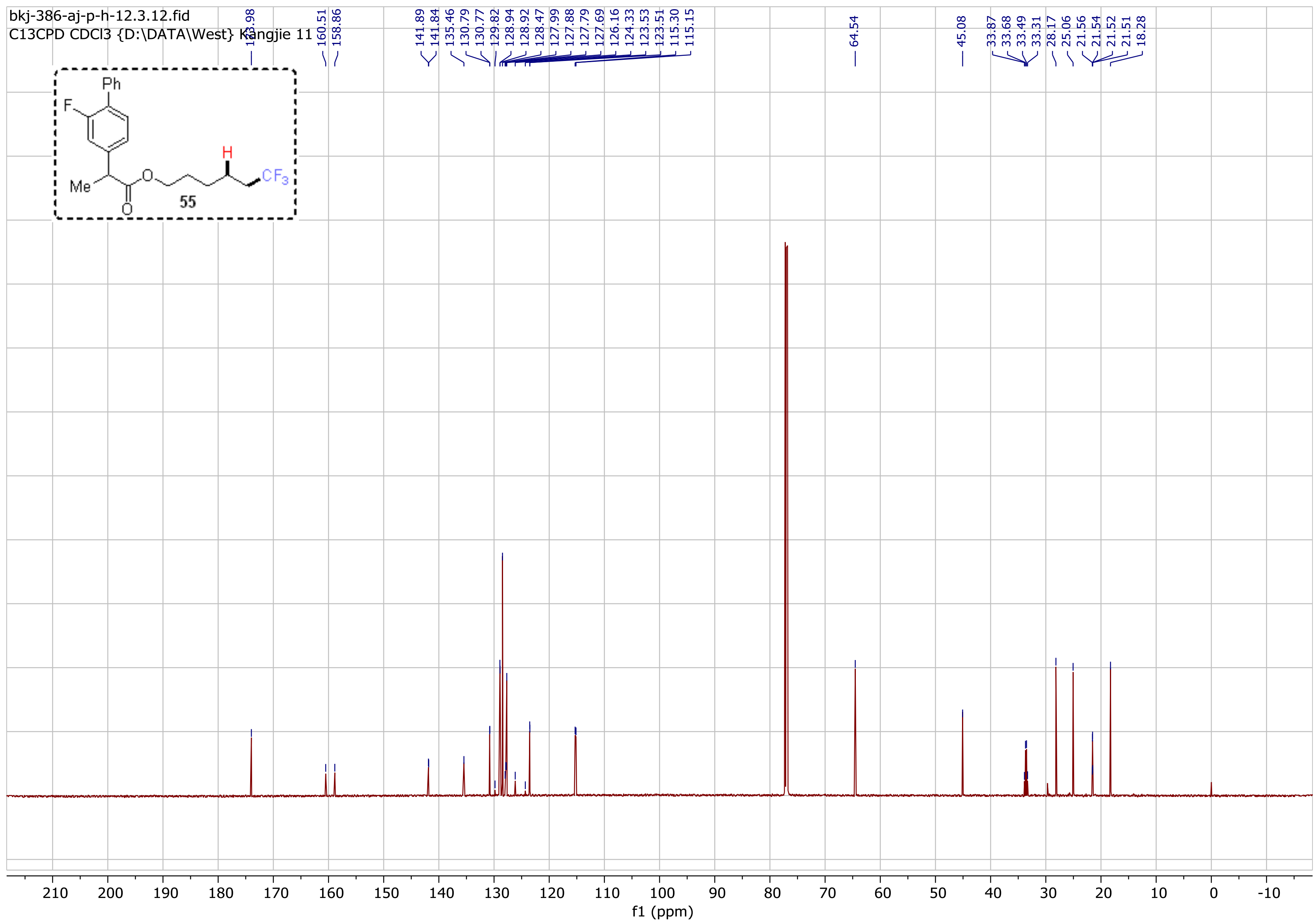

bkj-459-f-p-6.4.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 18
7.33 7.32 7.10 7.10 7.09 7.08 6.71 6.70
2.03 2.02 2.01 2.01 2.00 1.99 1.99 1.98 1.98 1.97 1.96 1.96 1.94 1.61 1.60 1.60 1.60 1.59 1.59 1.58 1.52 1.51 1.51 1.50 1.50 1.49 1.48 1.48 1.33 1.33 1.32
Cl
O
Cl
O
O
H
CF3
54
0.89
0.95
0.97
2.02
2.00
1.93
2.06
2.10
2.00
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)



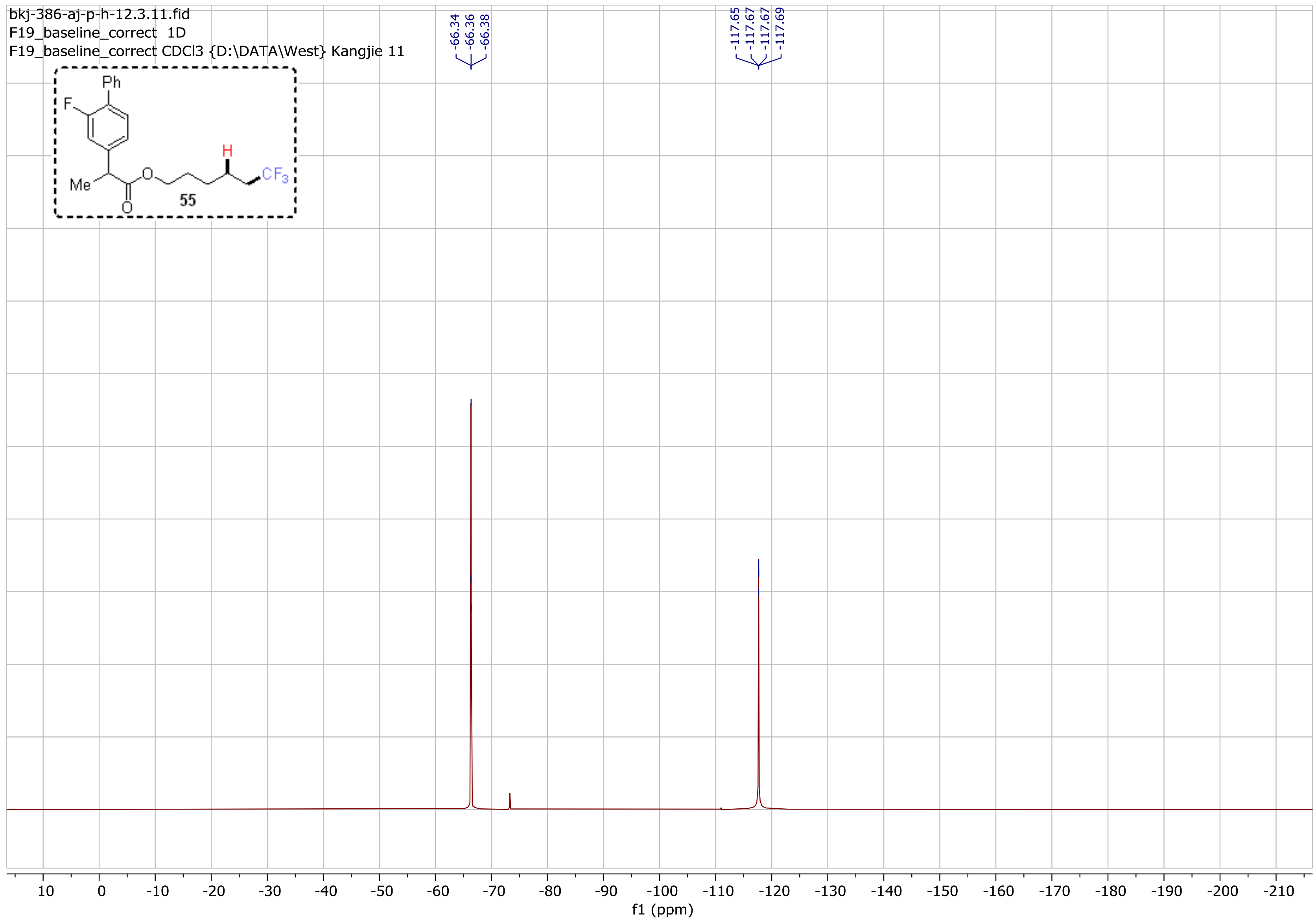
bkj-459-f-p-6.4.2.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 18
168.14
152.41
130.38
129.80
127.97
127.56
127.14
126.14
124.31
124.29
114.67
66.38
65.11
33.85
33.66
33.47
33.28
28.14
24.99
21.57
21.55
21.53
21.51
Cl
O
CF3
H
54
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

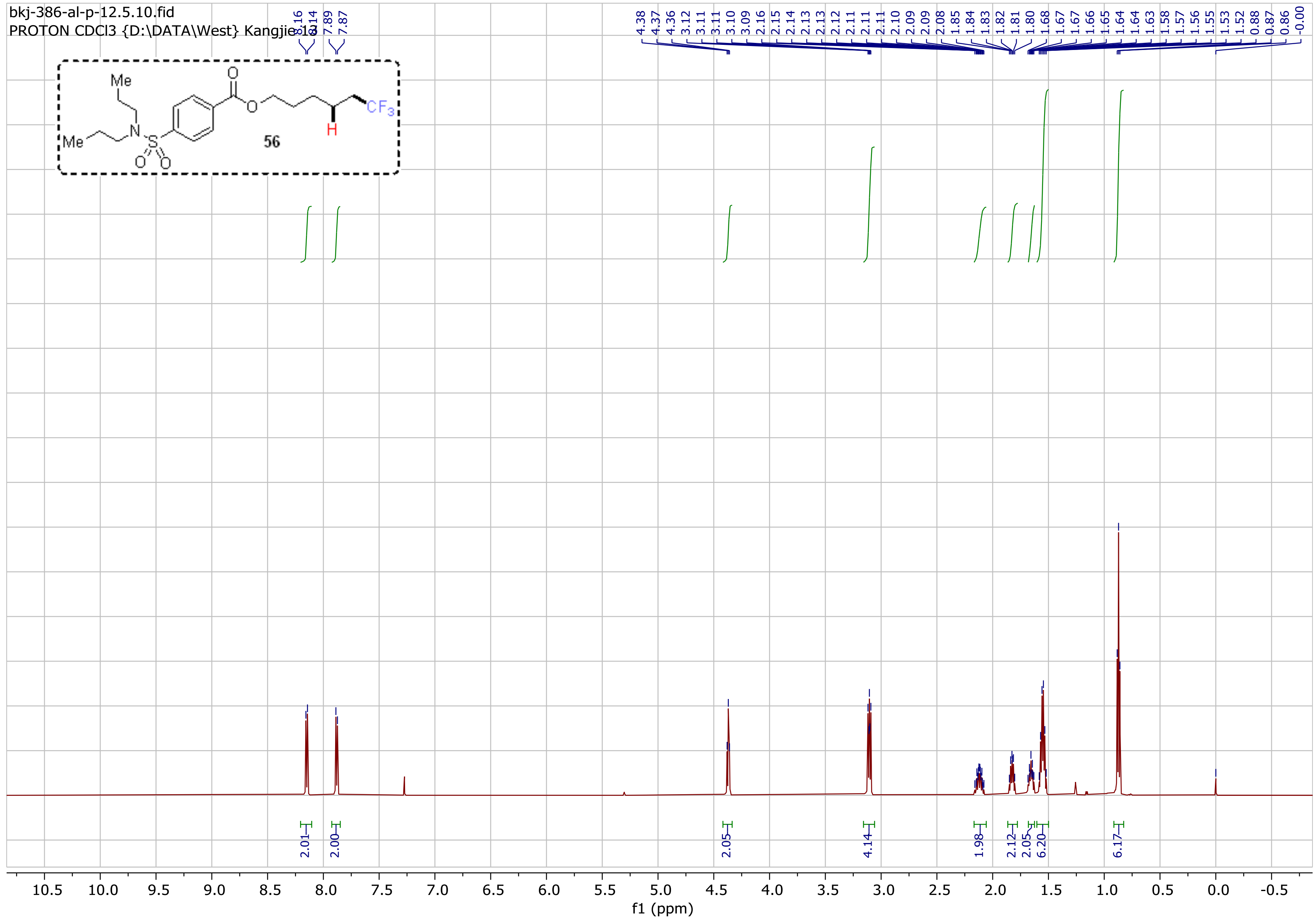

bkj-459-f-p-f-6.5.10.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 21
Cl
O
O
O
Cl
H
CF3
54
-66.34
-66.36
-66.38
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)


bkj-386-aj-p-h-12.3.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 11
Ph
F
Me
O
O
H
CF3
55
7.54
7.54
7.53
7.52
7.52
7.52
7.45
7.44
7.44
7.43
7.43
7.42
7.40
7.39
7.38
7.37
7.37
7.36
7.36
7.36
7.35
7.35
7.15
7.15
7.14
7.14
7.13
7.13
7.11
7.11
4.12
4.12
4.11
4.10
4.10
3.76
3.75
3.74
3.73
2.07
2.06
2.05
2.05
2.04
2.03
2.03
2.02
2.02
2.01
2.00
2.00
2.00
1.98
1.65
1.64
1.63
1.62
1.61
1.57
1.56
1.56
1.55
1.55
1.54
1.54
1.53
1.52
1.37
1.37
1.36
1.34
-0.00
1.99
2.05
1.94
1.98
2.04
1.00
1.98
2.32
5.17
1.99
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

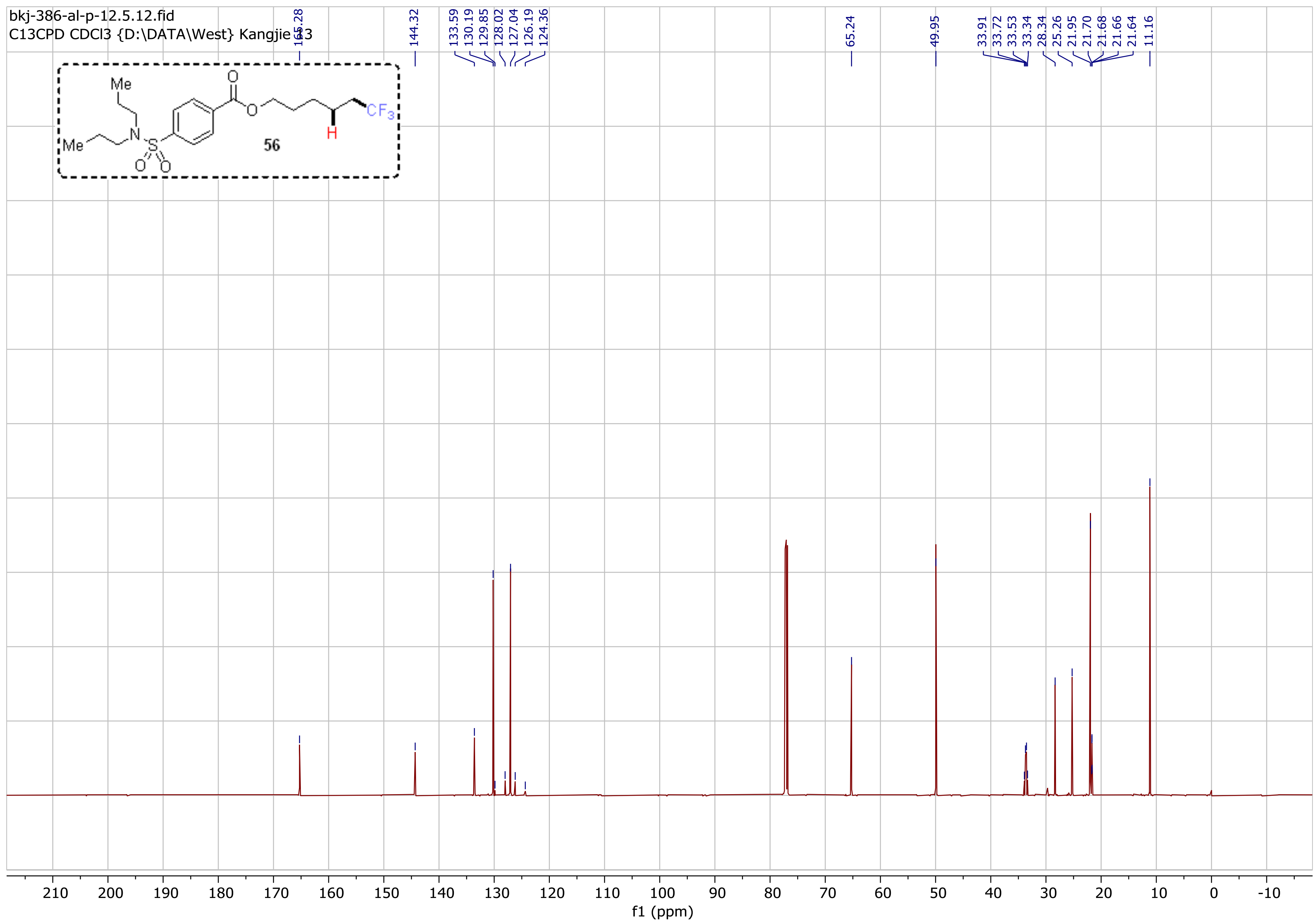


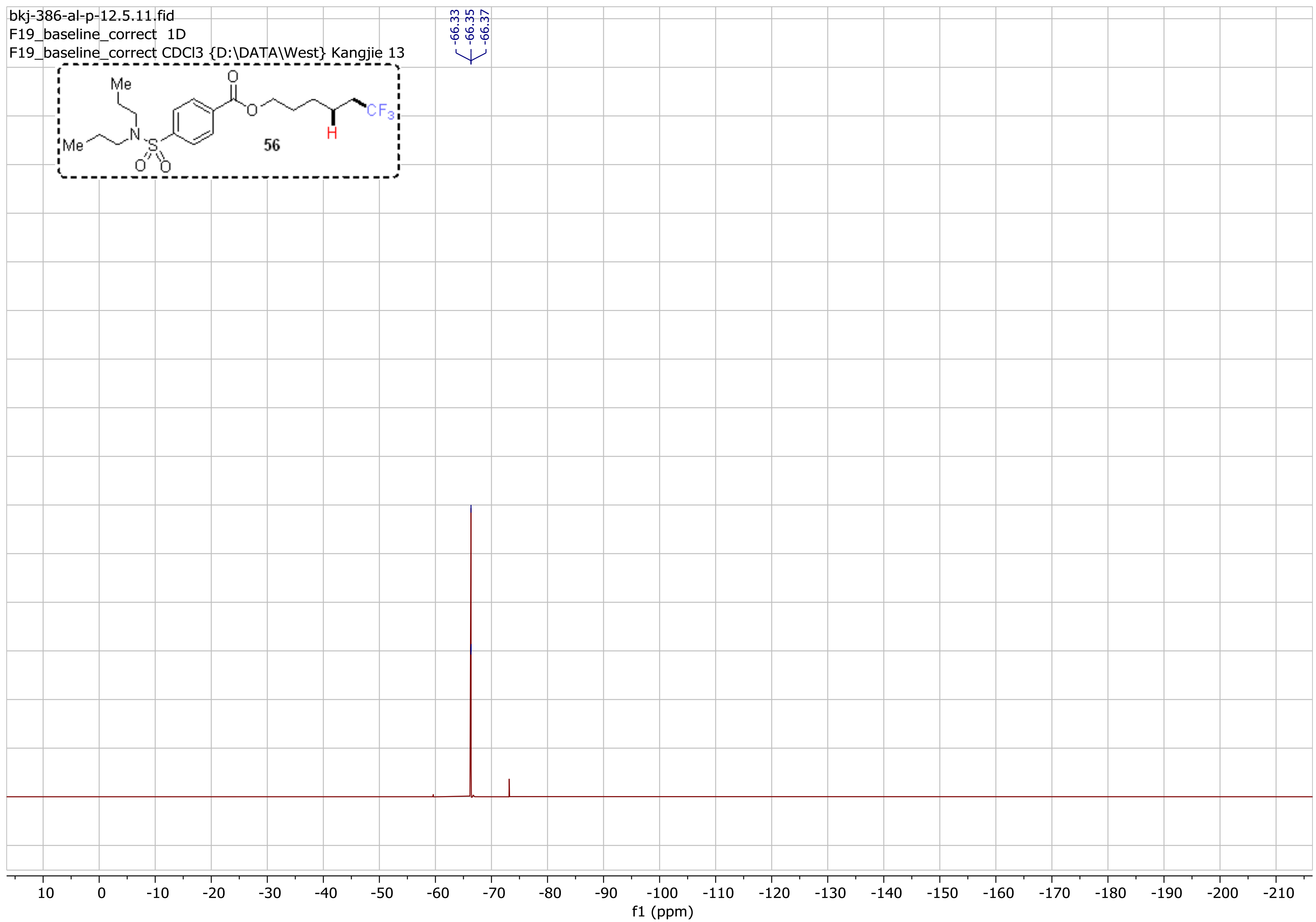
bkj-386-aj-p-h-12.3.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 11
173.98
160.51
158.86
141.89
141.84
135.46
130.79
130.77
129.82
128.94
128.92
128.47
127.99
127.88
127.79
127.69
126.16
124.33
123.53
123.51
115.30
115.15
64.54
45.08
33.87
33.68
33.49
33.31
28.17
25.06
21.56
21.54
21.52
21.51
18.28
Ph
F
Me
O
O
H
CF_3
55
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

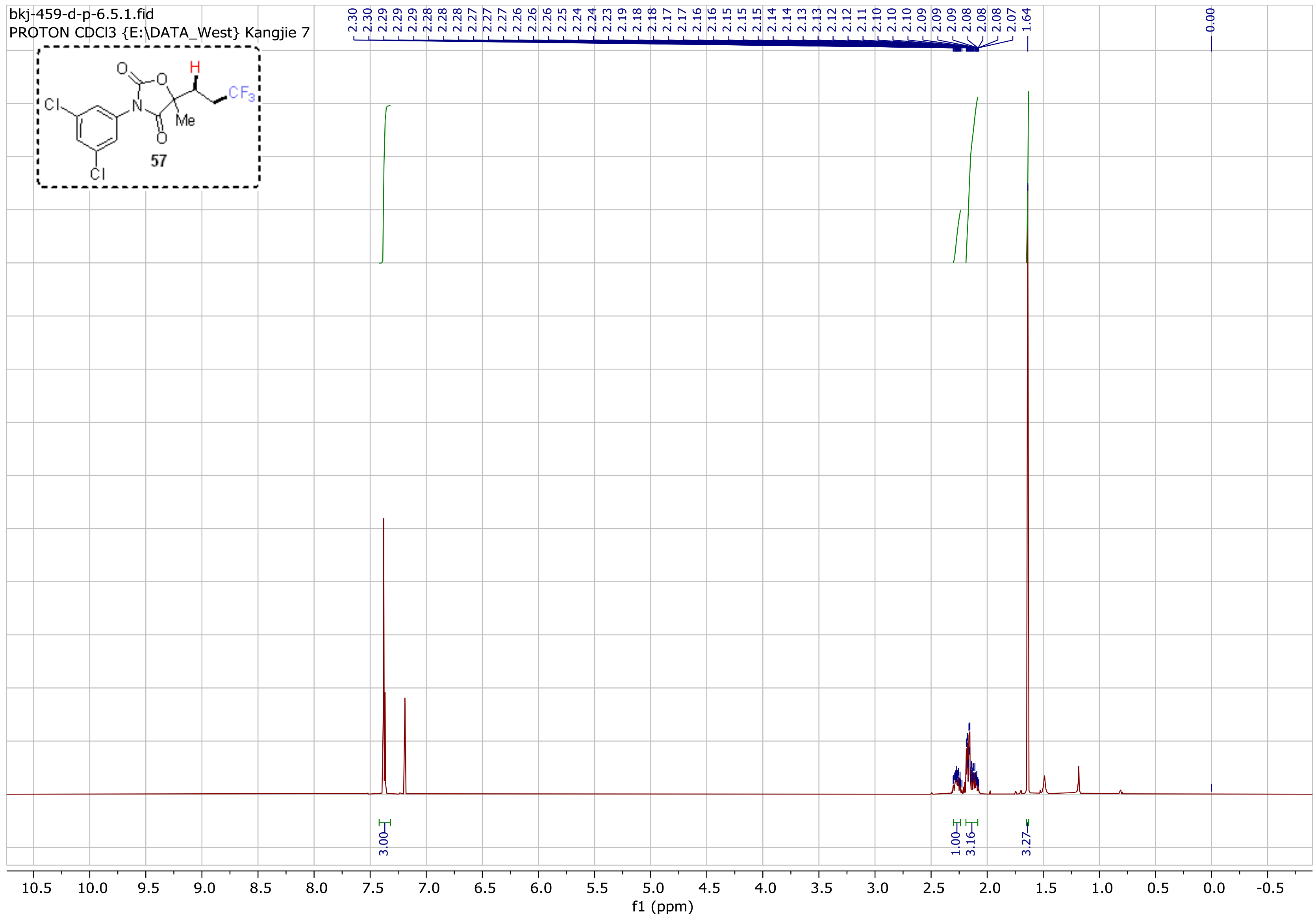

bkj-386-aj-p-h-12.3.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 11
Ph
F
Me
O
O
H
CF3
55
-66.34
-66.36
-66.38
-117.65
-117.67
-117.67
-117.69
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)



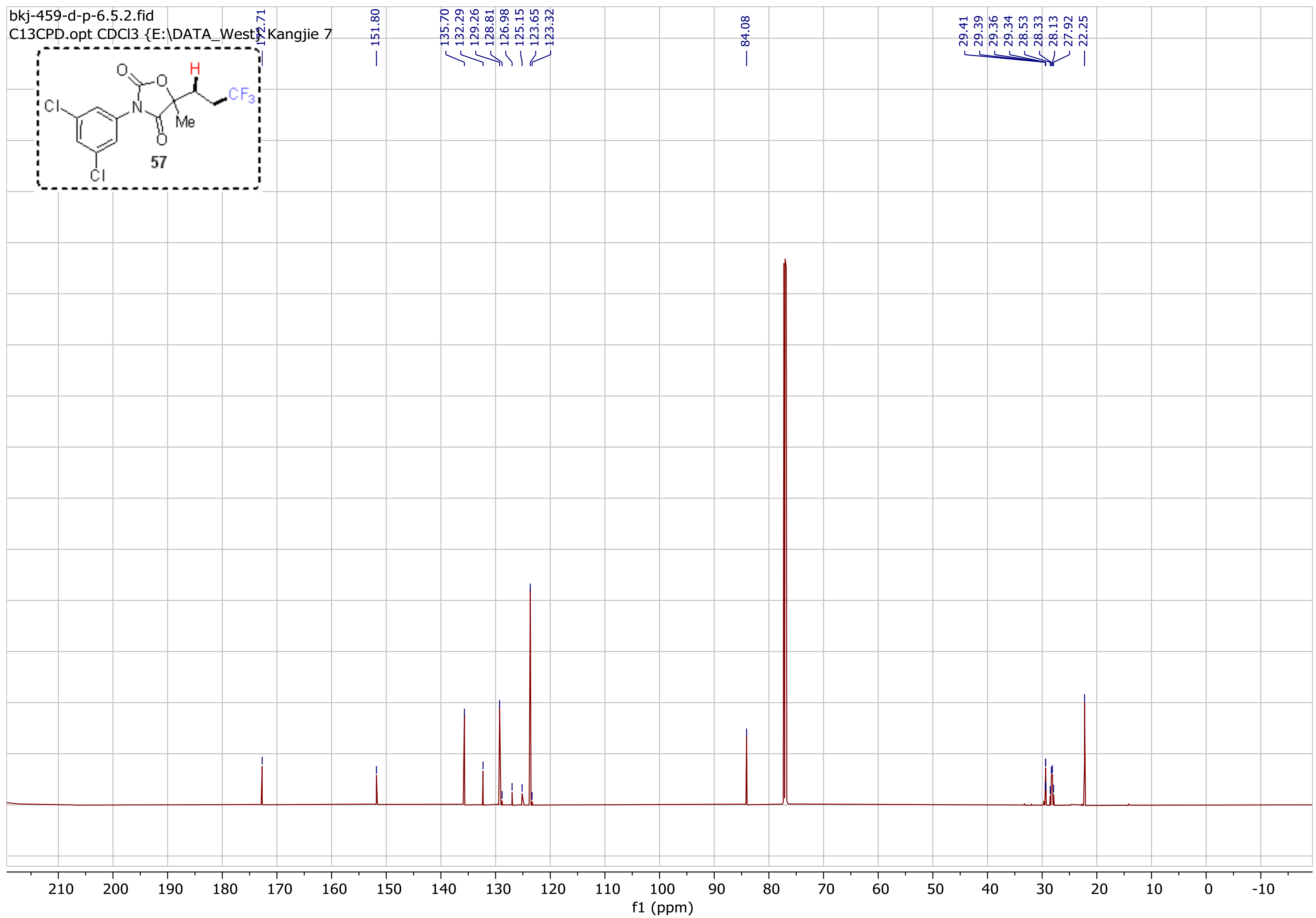
bkj-386-al-p-12.5.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 18
8.16
8.14
7.89
7.87
4.38
4.37
4.36
3.12
3.11
3.11
3.10
3.09
2.16
2.15
2.14
2.13
2.13
2.12
2.11
2.11
2.11
2.10
2.09
2.09
2.08
1.85
1.84
1.83
1.82
1.81
1.80
1.68
1.67
1.67
1.66
1.65
1.64
1.64
1.63
1.58
1.57
1.56
1.55
1.53
1.52
0.88
0.87
0.86
-0.00
Me
Me
N
S
O
O
O
O
H
CF3
56
2.01
2.00
2.05
4.14
1.98
2.12
2.05
6.20
6.17
f1 (ppm)

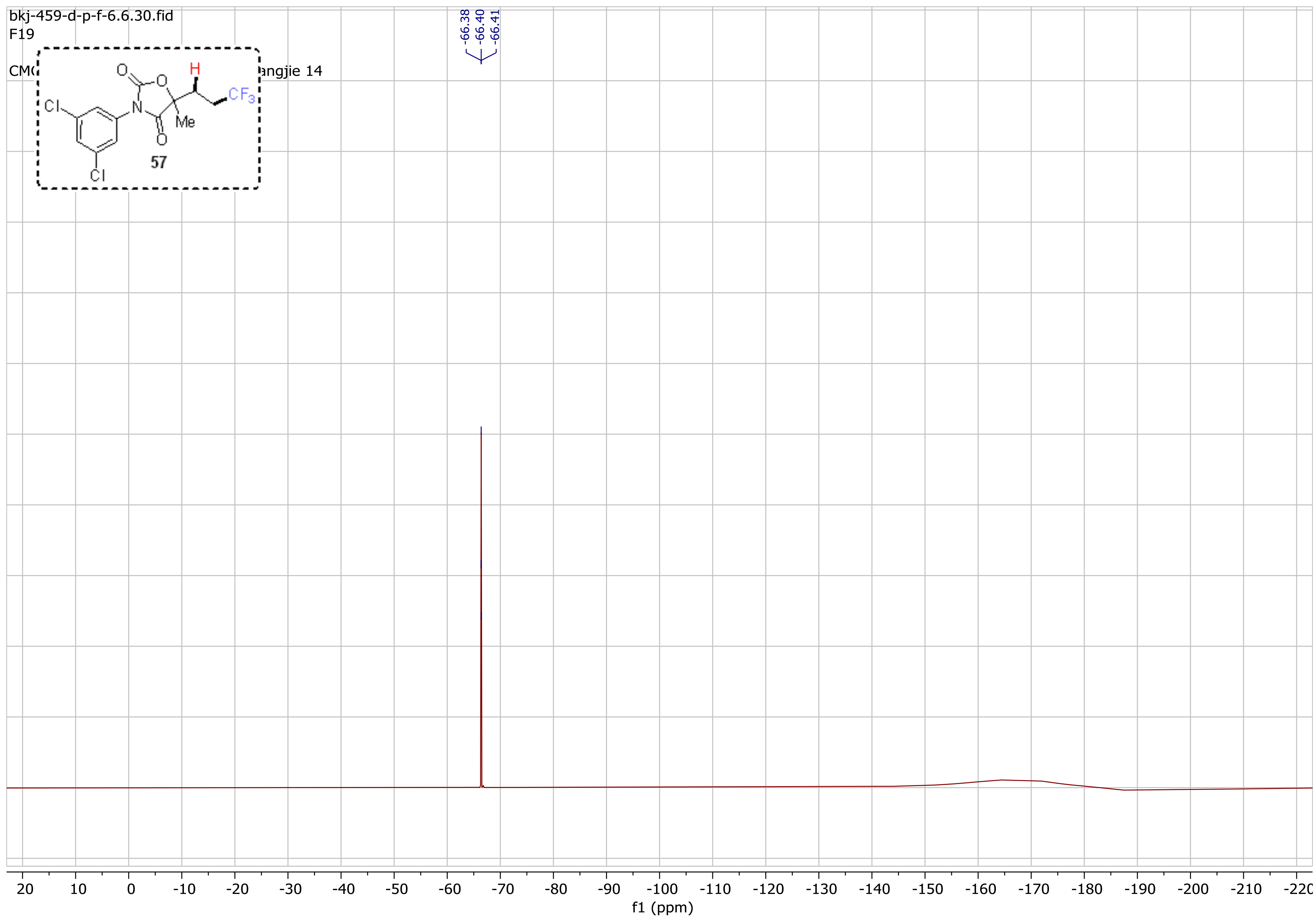

bkj-386-al-p-12.5.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 53
165.28
144.32
133.59
130.19
129.85
128.02
127.04
126.19
124.36
65.24
49.95
33.91
33.72
33.53
33.34
28.34
25.26
21.95
21.70
21.68
21.66
21.64
11.16
Me
Me
N
S
O
O
O
O
H
CF3
56
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

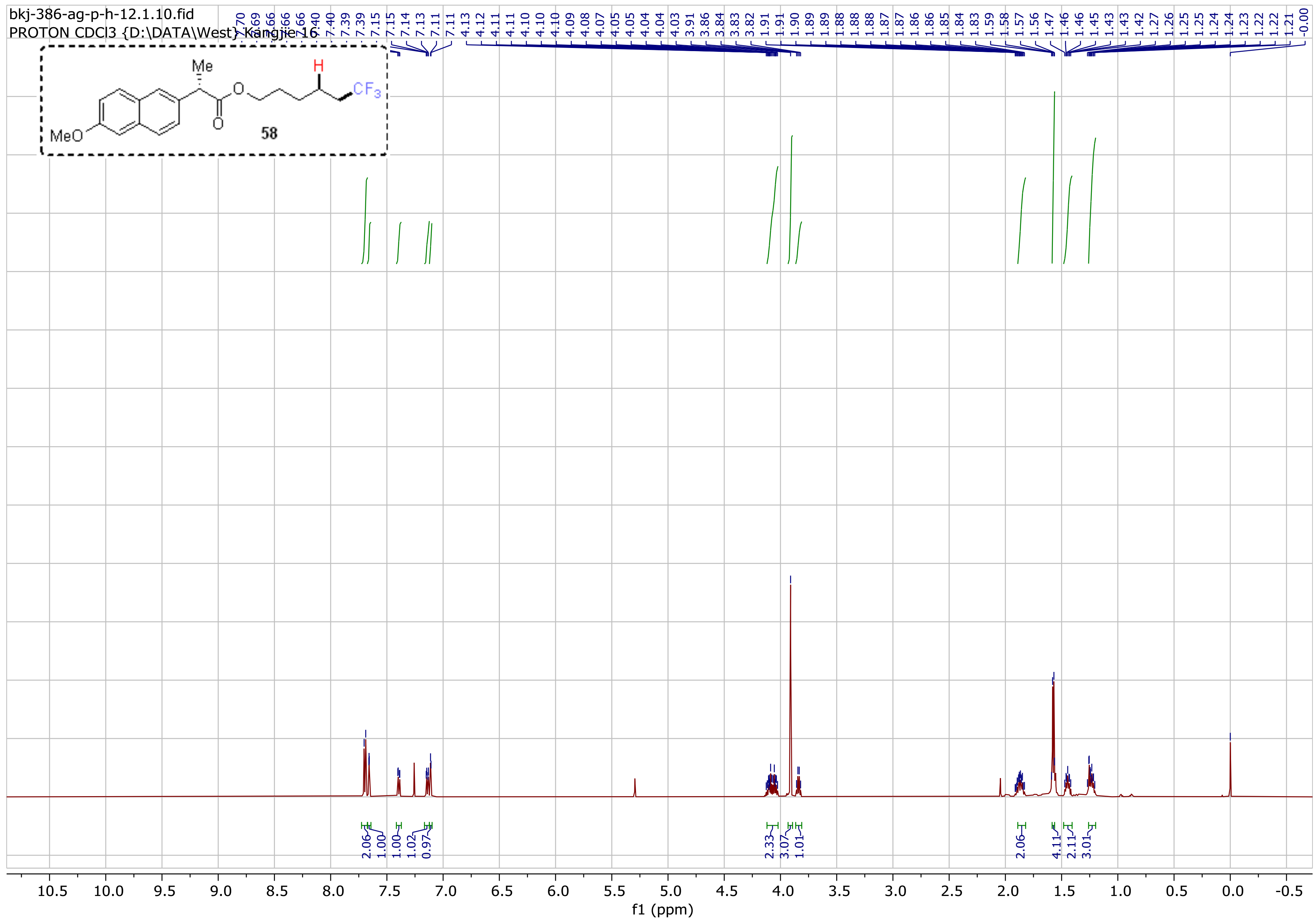

bkj-386-al-p-12.5.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 13
Me
Me
N
S
O
O
O
O
H
CF3
56
-66.33
-66.35
-66.37
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)



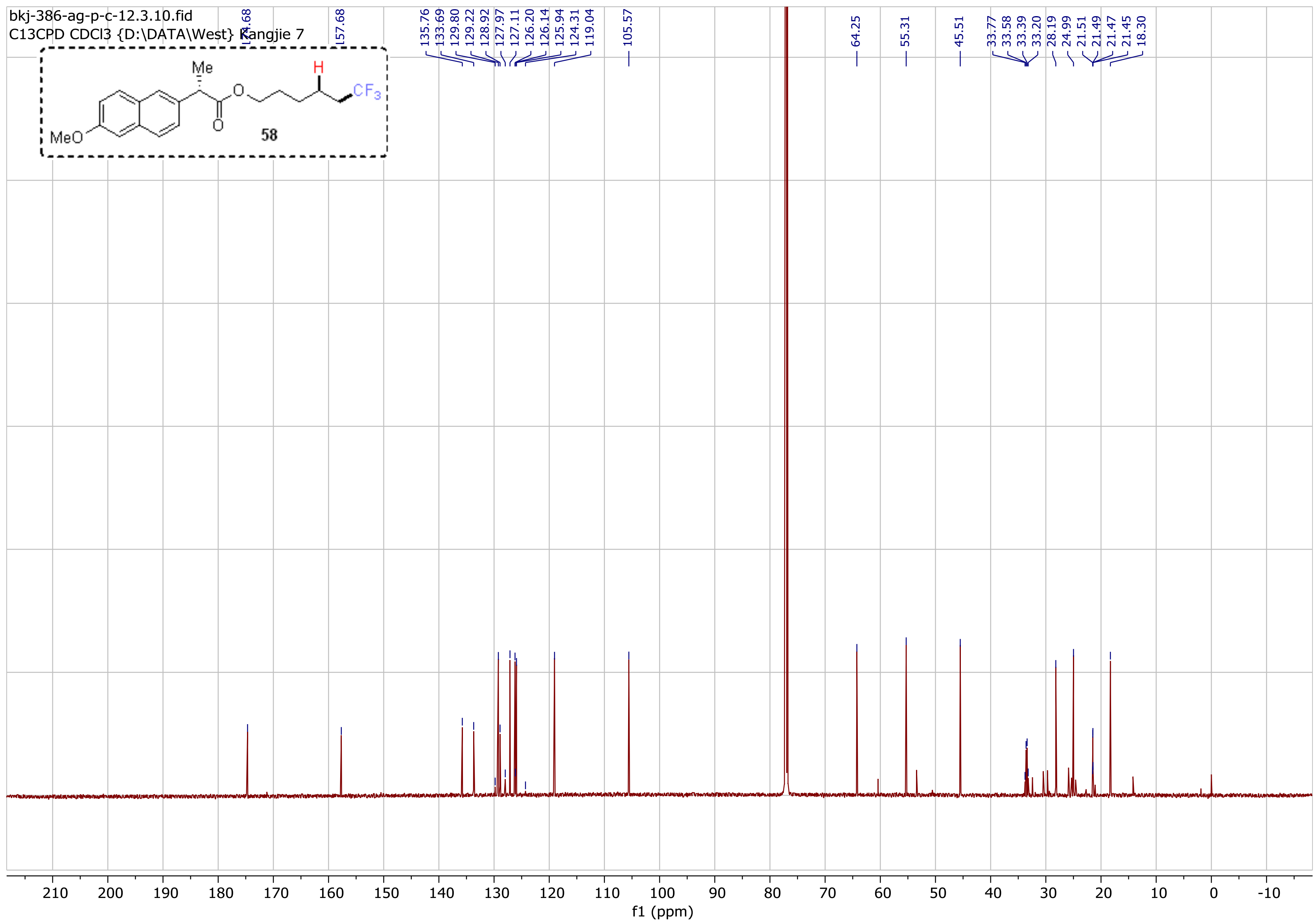
bkj-459-d-p-6.5.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 7
57
3.00
1.00
3.16
3.27
1.64
0.00
f1 (ppm)

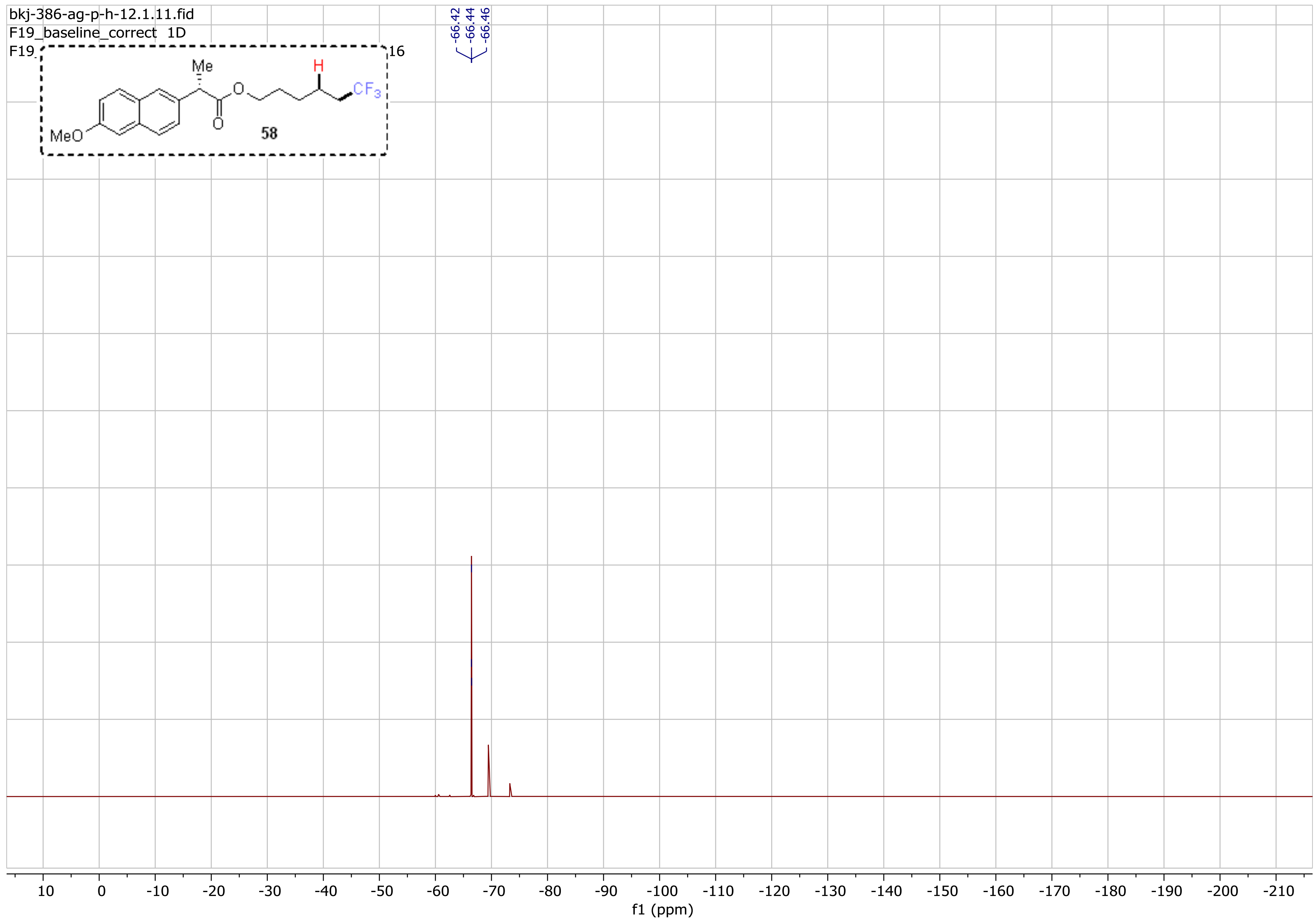

bkj-459-d-p-6.5.2.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 7
57
Me
CF_3
172.71
151.80
135.70
132.29
129.26
128.81
126.98
125.15
123.65
123.32
84.08
29.41
29.39
29.36
29.34
28.53
28.33
28.13
27.92
22.25
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

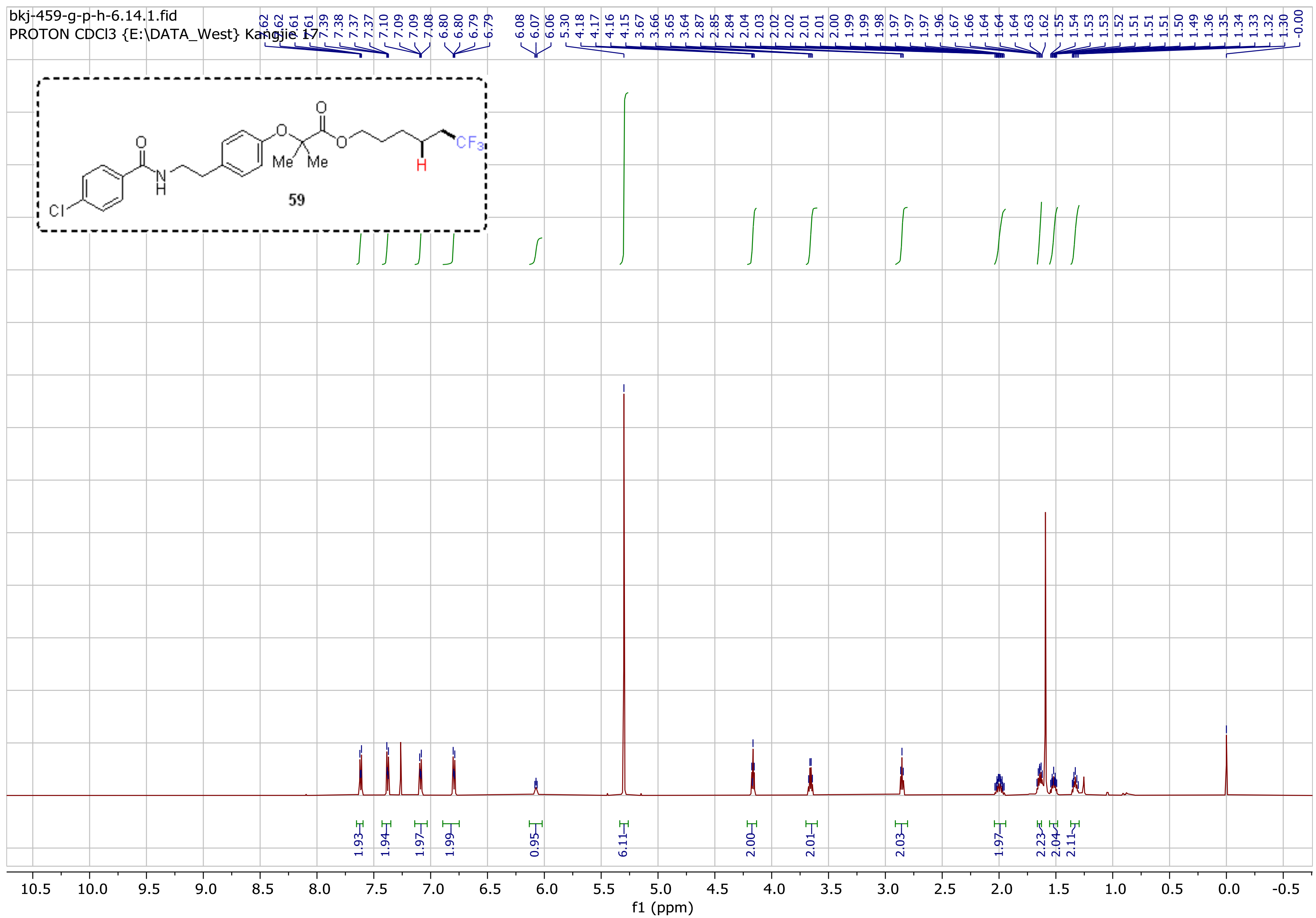

bkj-459-d-p-f-6.6.30.fid
F19
CM(angjie 14
57
-66.38
-66.40
-66.41
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)



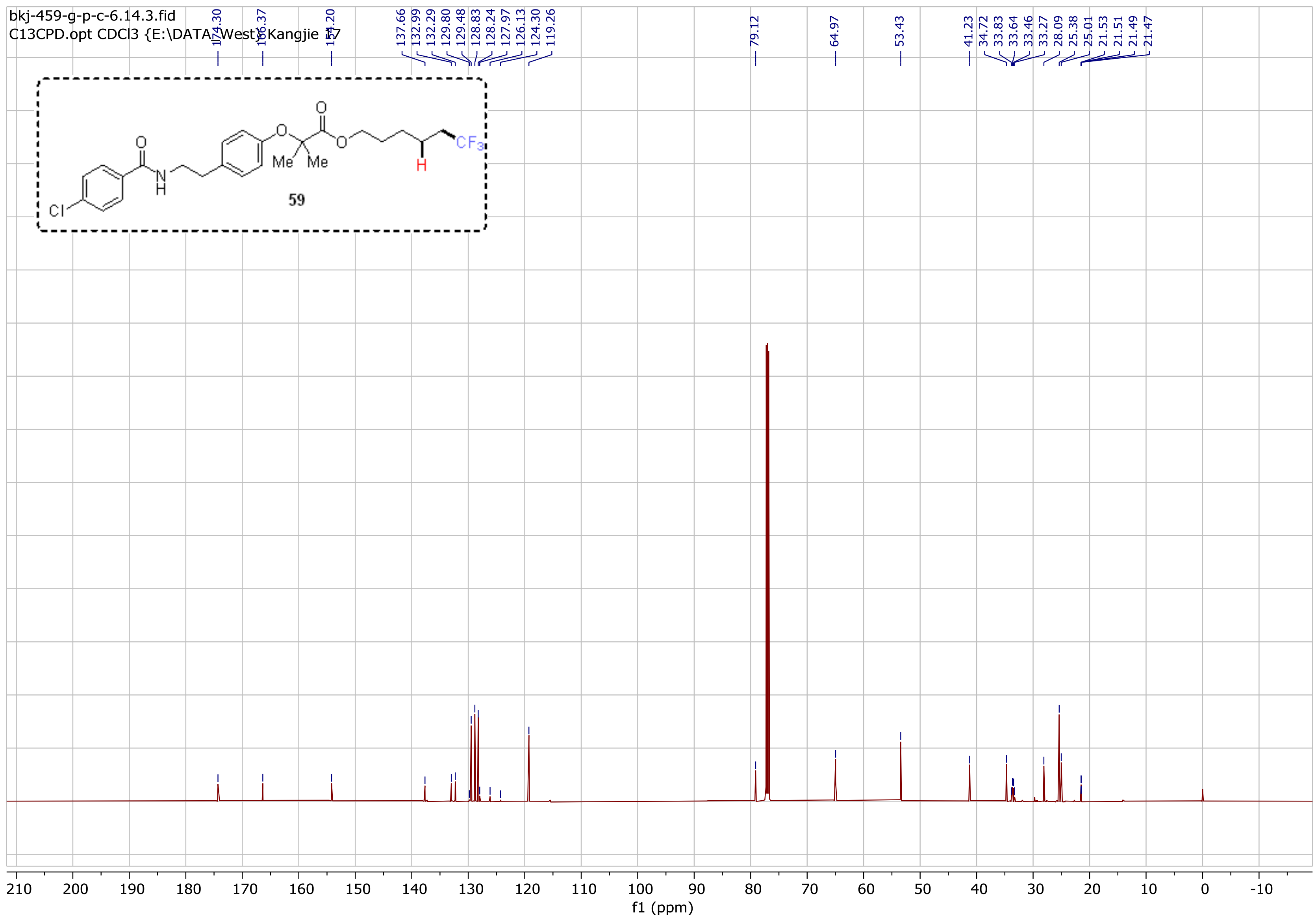
bkj-386-ag-p-h-12.1.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 16
Me
H
CF3
MeO
O
O
58
f1 (ppm)


bkj-386-ag-p-c-12.3.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
MeO
Me
O
O
H
CF3
58
174.68
157.68
135.76
133.69
129.80
129.22
128.92
127.97
127.11
126.20
126.14
125.94
124.31
119.04
105.57
64.25
55.31
45.51
33.77
33.58
33.39
33.20
28.19
24.99
21.51
21.49
21.47
21.45
18.30
f1 (ppm)

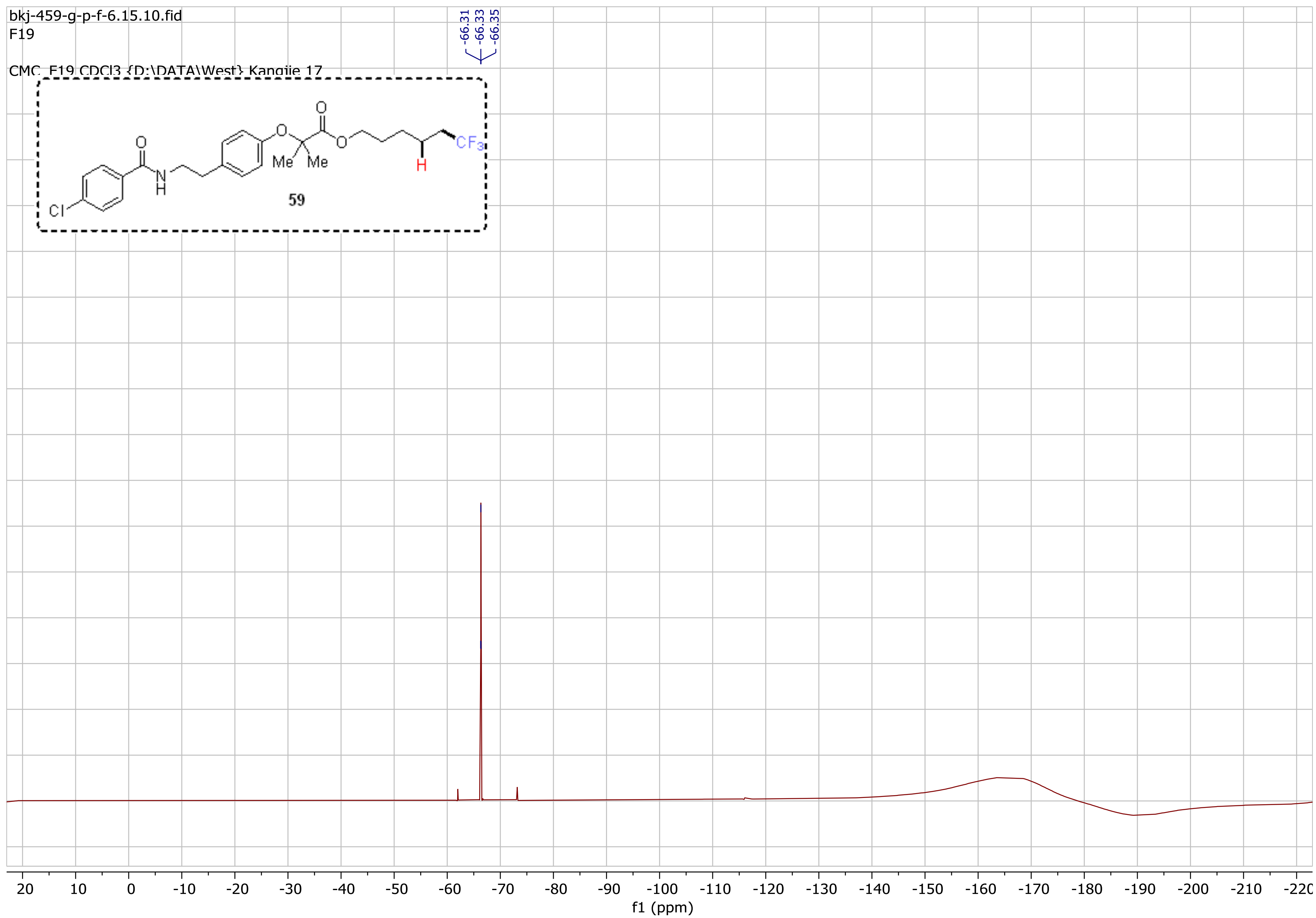

bkj-386-ag-p-h-12.1.11.fid
F19_baseline_correct 1D
F19
16
Me
MeO
O
O
H
CF3
58
-66.42
-66.44
-66.46
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)



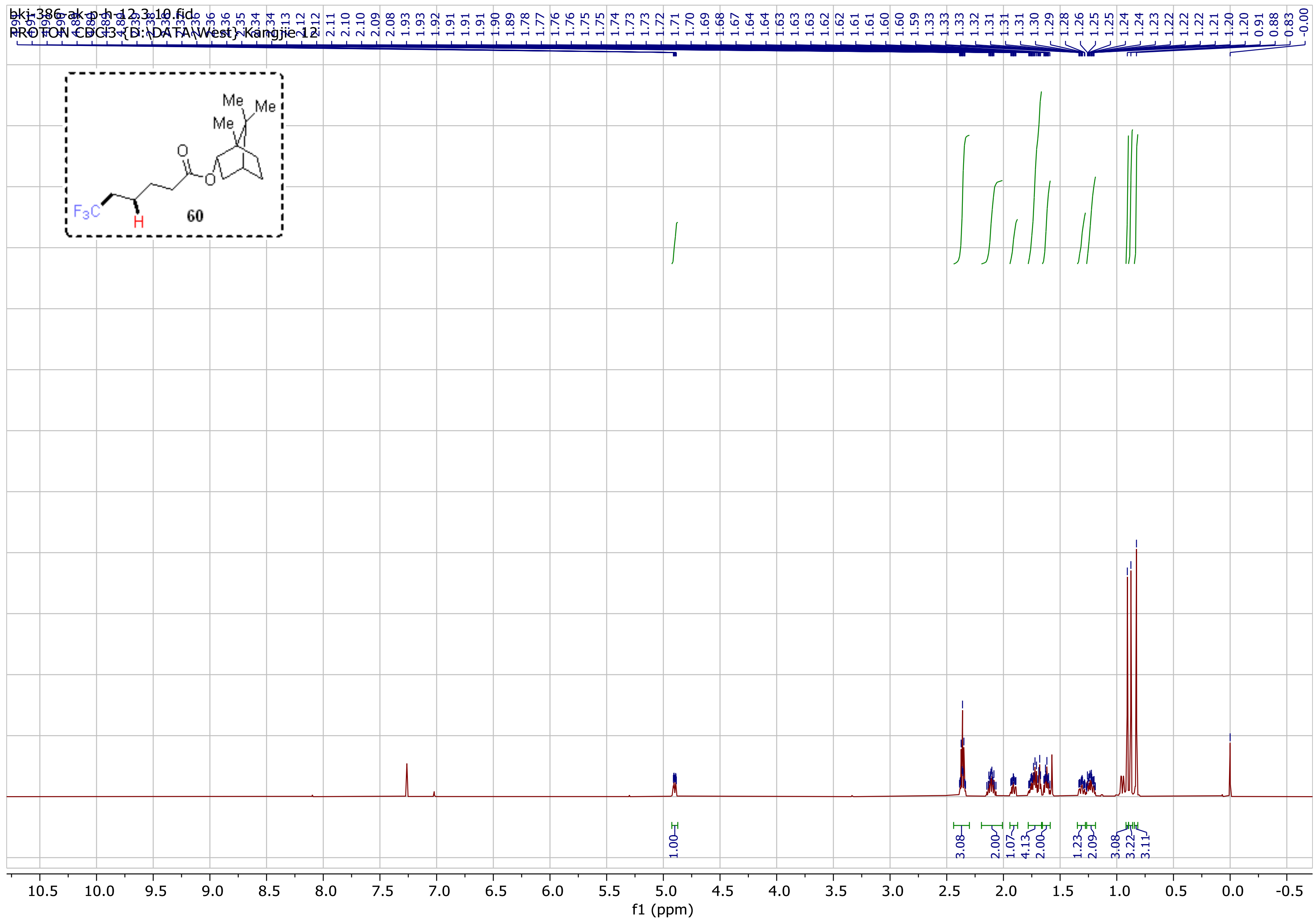
bkj-459-g-p-h-6.14.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 17
7.62 7.62 7.61 7.61 7.39 7.38 7.37 7.37 7.10 7.09 7.09 7.08 6.80 6.80 6.79 6.79 6.08 6.07 6.06 5.30 4.18 4.17 4.16 4.15 3.67 3.66 3.65 3.64 2.87 2.85 2.84 2.04 2.03 2.02 2.02 2.01 2.01 2.00 1.99 1.99 1.98 1.97 1.97 1.97 1.96 1.67 1.66 1.64 1.64 1.64 1.63 1.62 1.55 1.54 1.53 1.53 1.52 1.51 1.51 1.51 1.50 1.49 1.36 1.35 1.34 1.33 1.32 1.30 -0.00
Cl
O
N
H
O
Me
Me
O
O
H
CF3
59
1.93
1.94
1.97
1.99
0.95
6.11
2.00
2.01
2.03
1.97
2.23
2.04
2.11
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

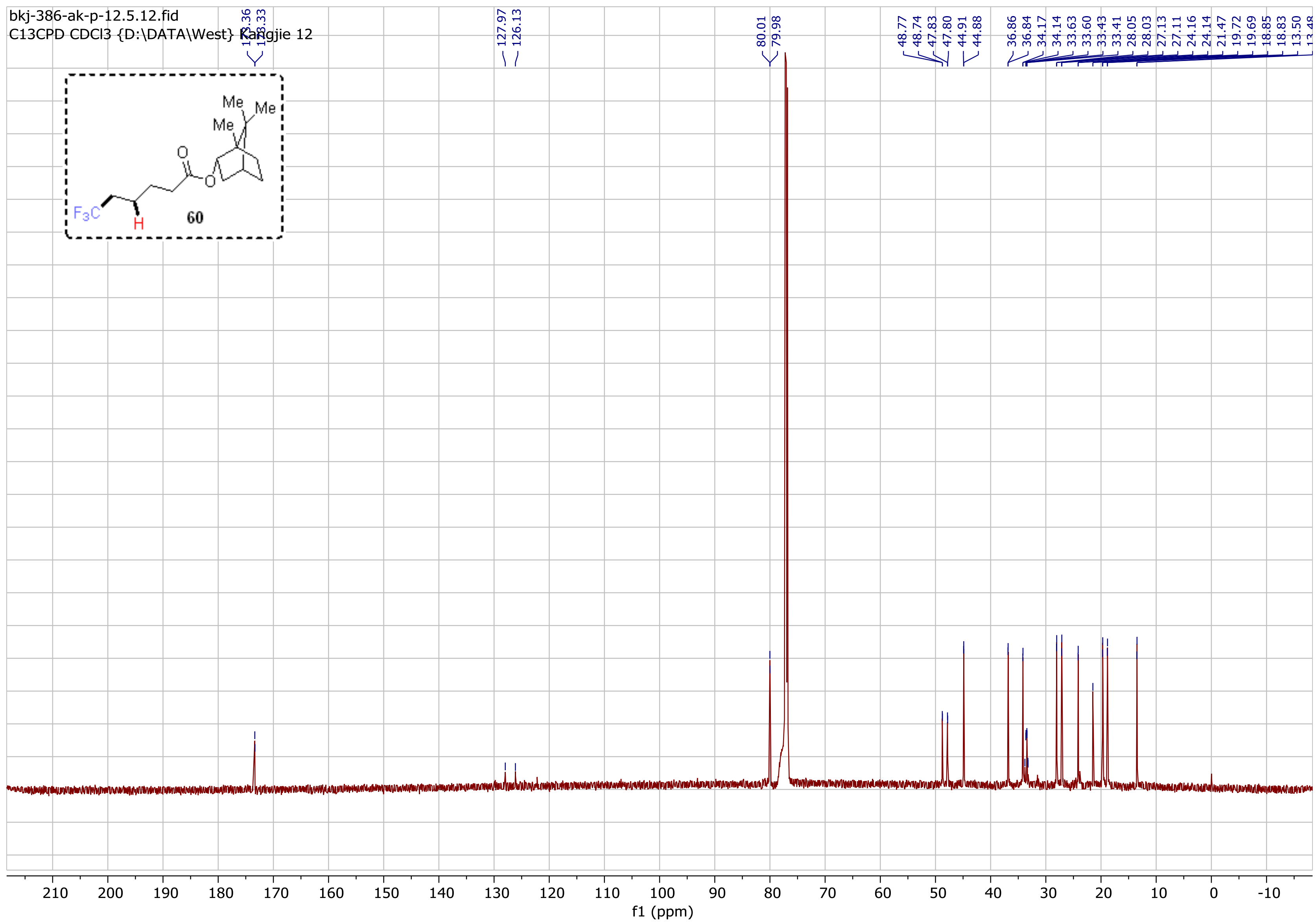


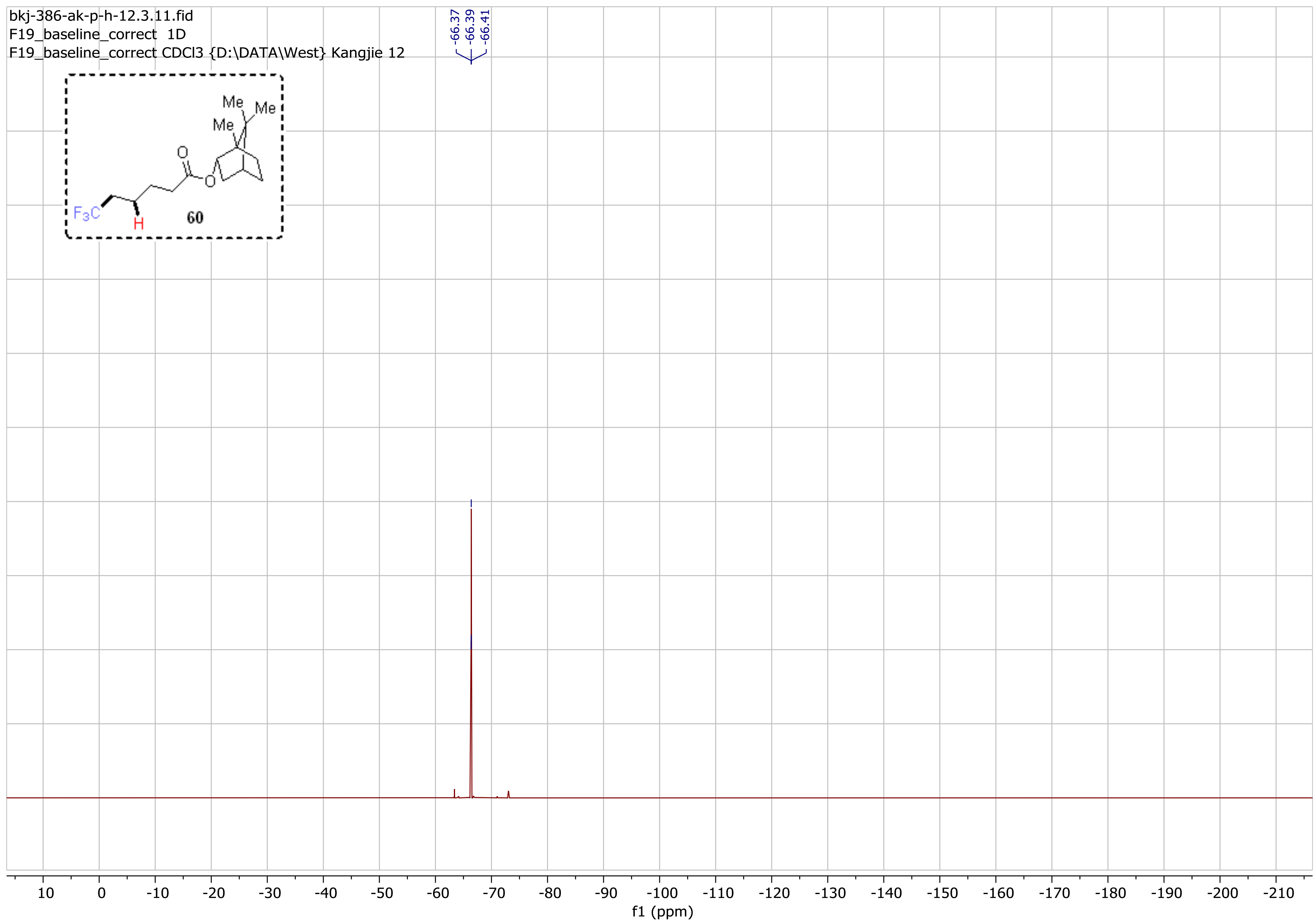
bkj-459-g-p-c-6.14.3.fid
C13CPD.opt CDCl3 {E:\DATA\West\Kangjie 17
174.30
166.37
154.20
137.66
132.99
132.29
129.80
129.48
128.83
128.24
127.97
126.13
124.30
119.26
79.12
64.97
53.43
41.23
34.72
33.83
33.64
33.46
33.27
28.09
25.38
25.01
21.53
21.51
21.49
21.47
Cl
O
N
H
O
Me
Me
O
O
H
CF3
59
f1 (ppm)

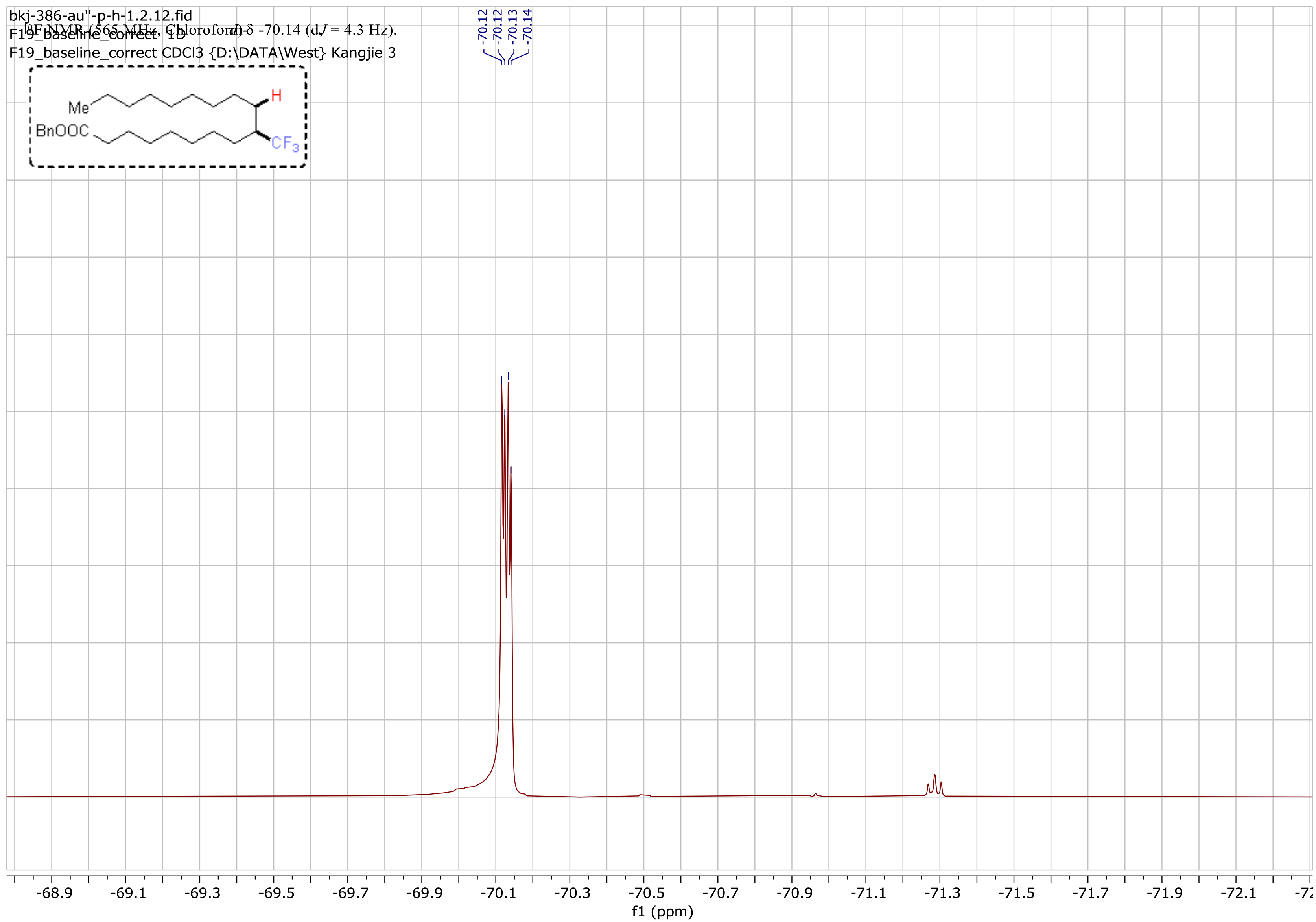


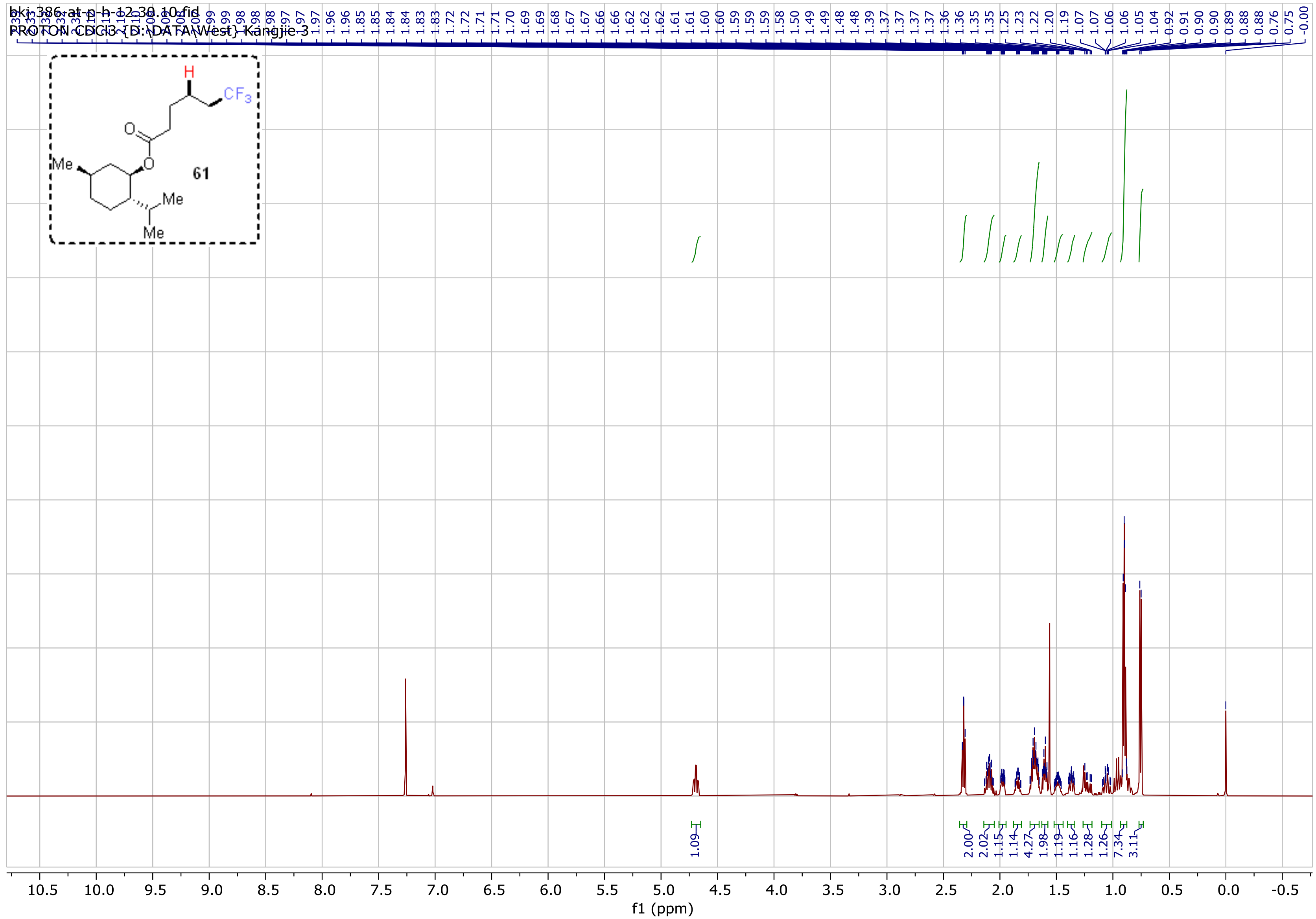
bkj-459-g-p-f-6.15.10.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 17
-66.31
-66.33
-66.35
Cl
O
N
H
O
O
Me
Me
O
H
CF3
59
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
f1 (ppm)


bki-386-ak-p-h-12-3-10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 12
F3C
H
60
O
O
Me
Me
Me
1.00
3.08
2.00
1.07
4.13
2.00
1.23
2.09
3.08
3.22
3.11
f1 (ppm)

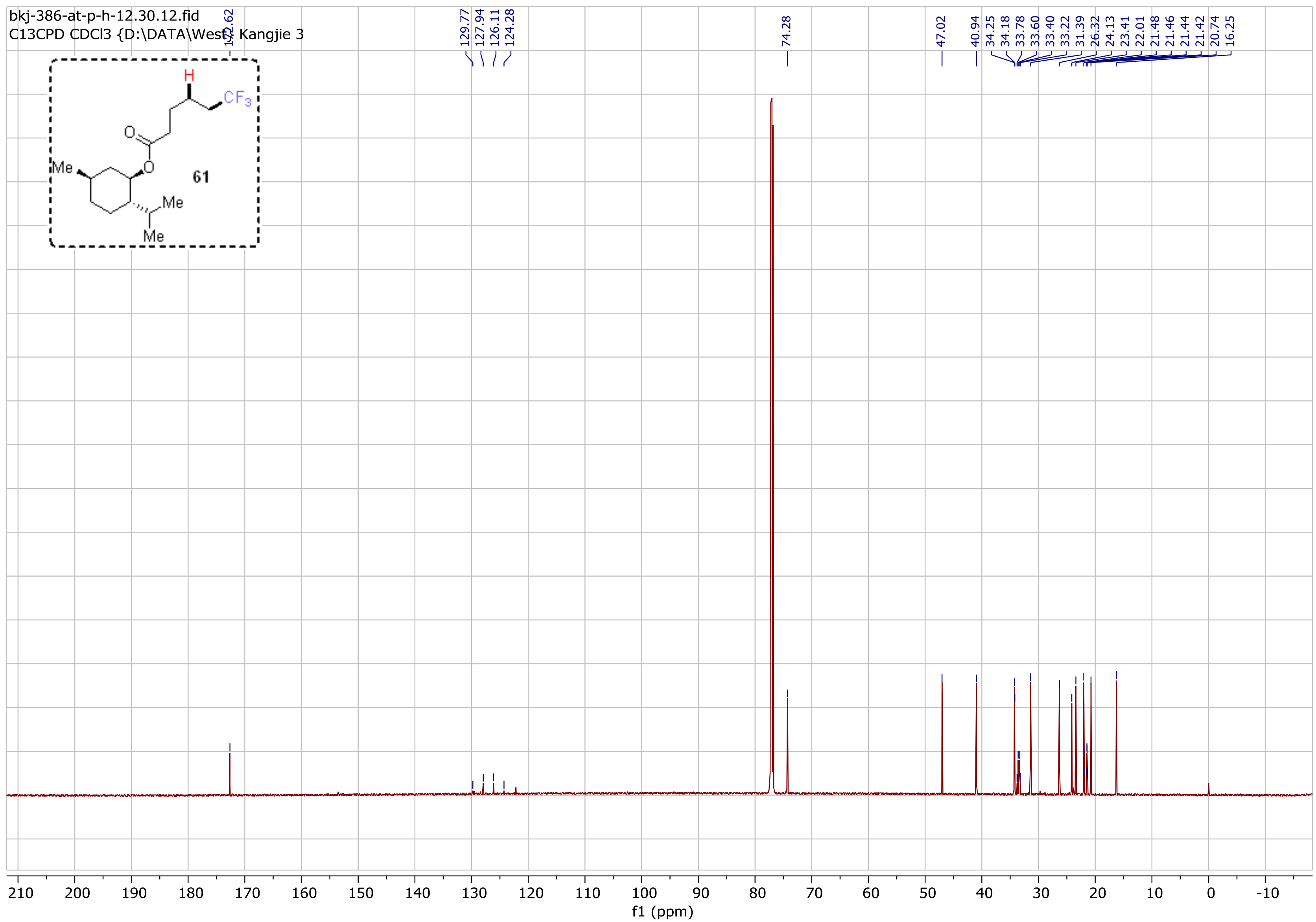

bkj-386-ak-p-12.5.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 12
173.36
173.33
127.97
126.13
80.01
79.98
48.77
48.74
47.83
47.80
44.91
44.88
36.86
36.84
34.17
34.14
33.63
33.60
33.43
33.41
28.05
28.03
27.13
27.11
24.16
24.14
21.47
19.72
19.69
18.85
18.83
13.50
Me
Me
Me
O
O
F3C
H
60
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

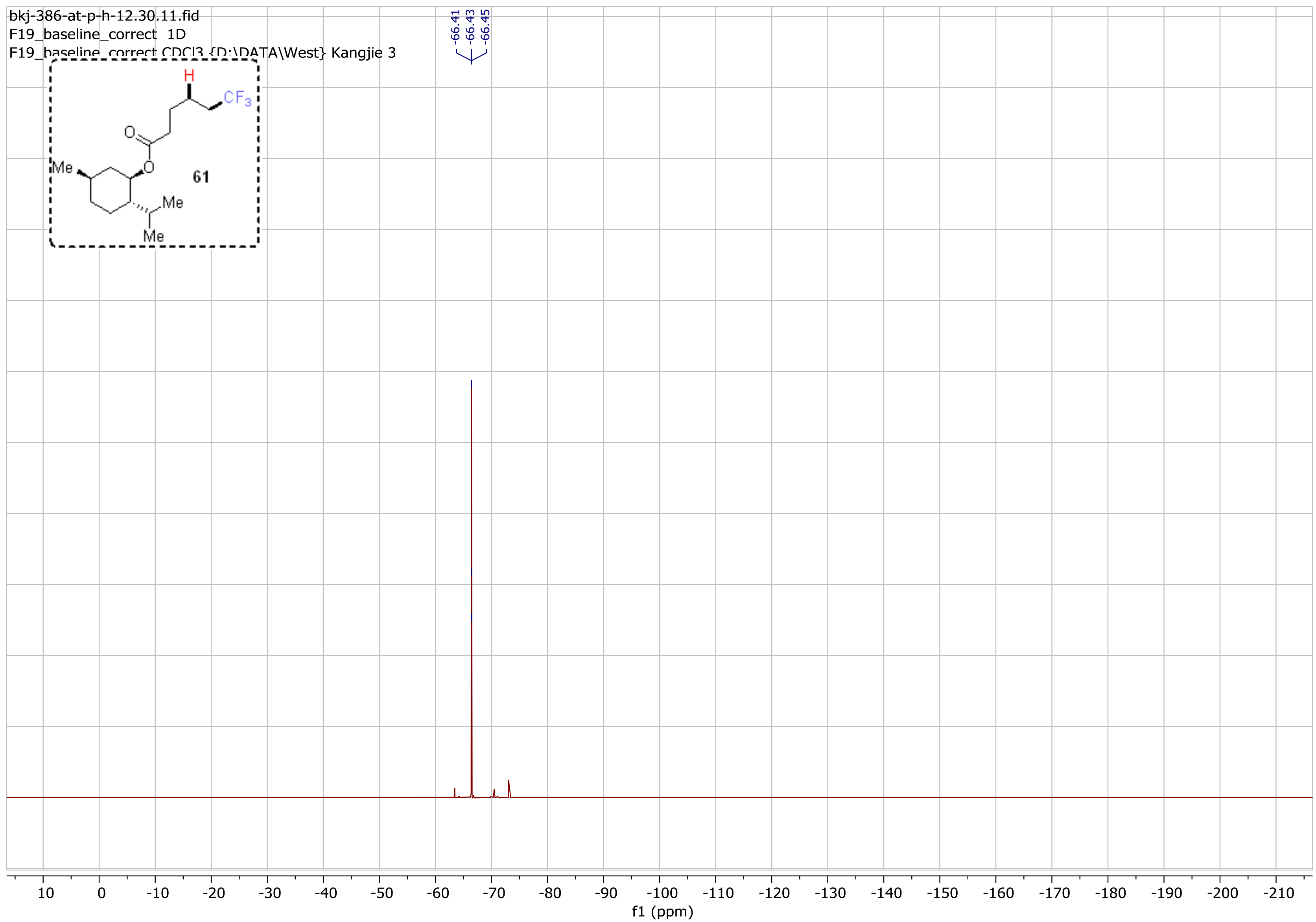

bkj-386-ak-p-h-12.3.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 12
-66.37
-66.39
-66.41
Me
Me
Me
O
O
F3C
H
60
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)


bkj-386-au"-p-h-1.2.12.fid
F19_baseline_correct 1D
19F NMR (565 MHz, Chloroform-d) δ -70.14 (d, J = 4.3 Hz).
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
Me
BnOOC
H
CF3
-70.12
-70.12
-70.13
-70.14
-68.9
-69.1
-69.3
-69.5
-69.7
-69.9
-70.1
-70.3
-70.5
-70.7
-70.9
-71.1
-71.3
-71.5
-71.7
-71.9
-72.1
f1 (ppm)

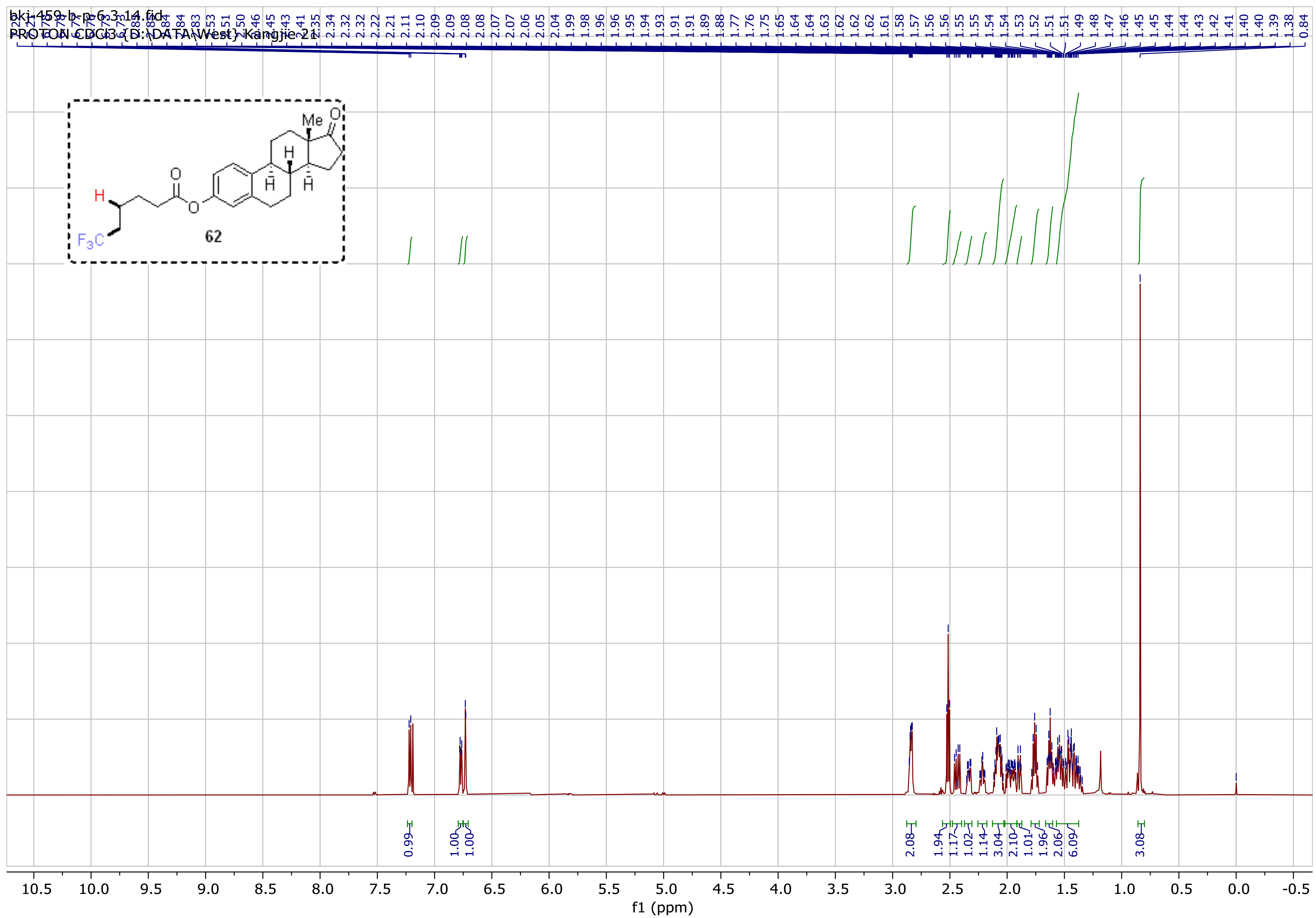


bki-386-at-p-h-12-30.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie-3
61
Me
O
H
CF3
f1 (ppm)
1.09
2.00
2.02
1.15
1.14
4.27
1.98
1.19
1.16
1.28
1.26
7.34
3.11

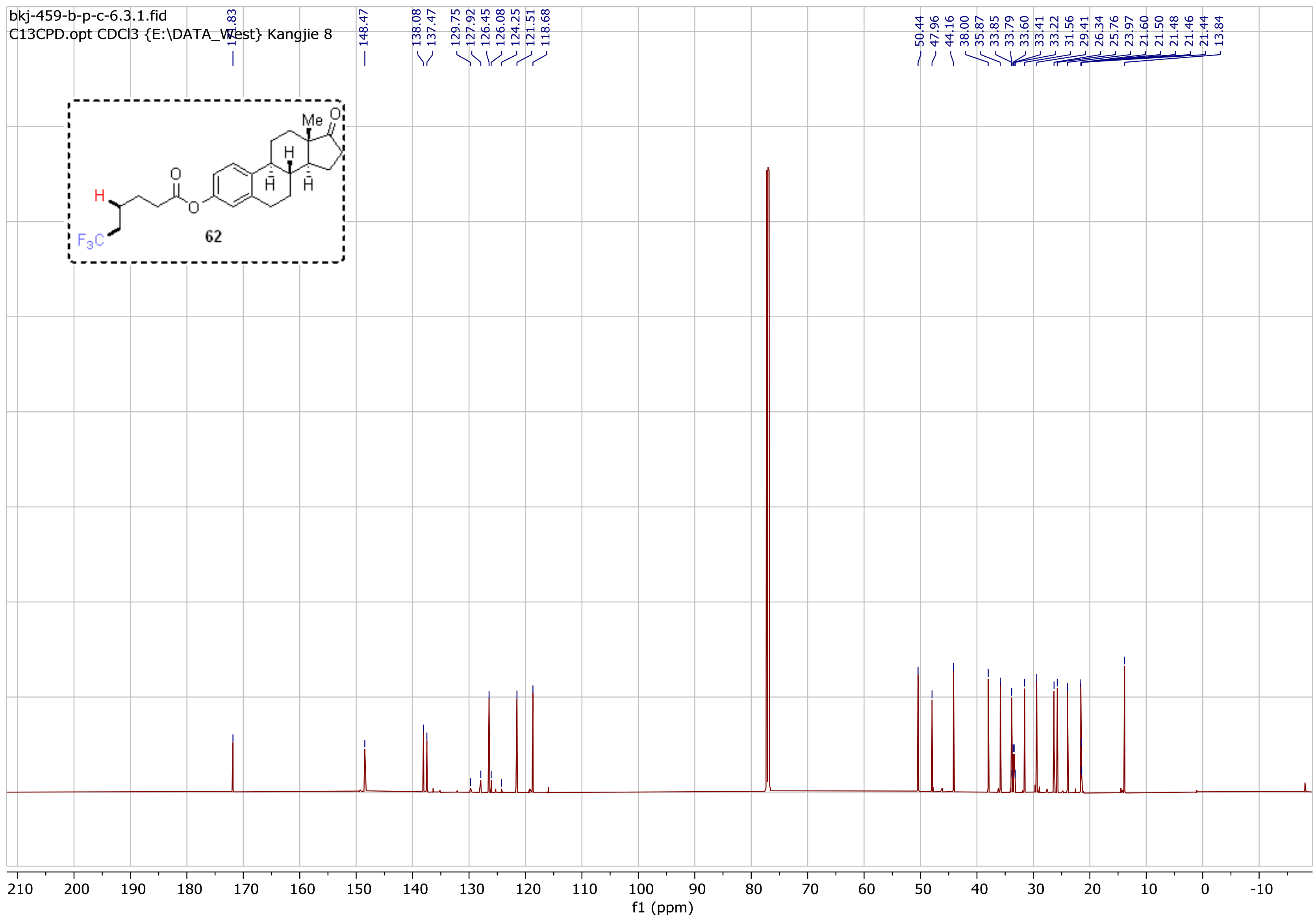

bkj-386-at-p-h-12.30.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 3
172.62
129.77
127.94
126.11
124.28
74.28
47.02
40.94
34.25
34.18
33.78
33.60
33.40
33.22
31.39
26.32
24.13
23.41
22.01
21.48
21.46
21.44
21.42
20.74
16.25
H
CF3
O
O
Me
Me
Me
61
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

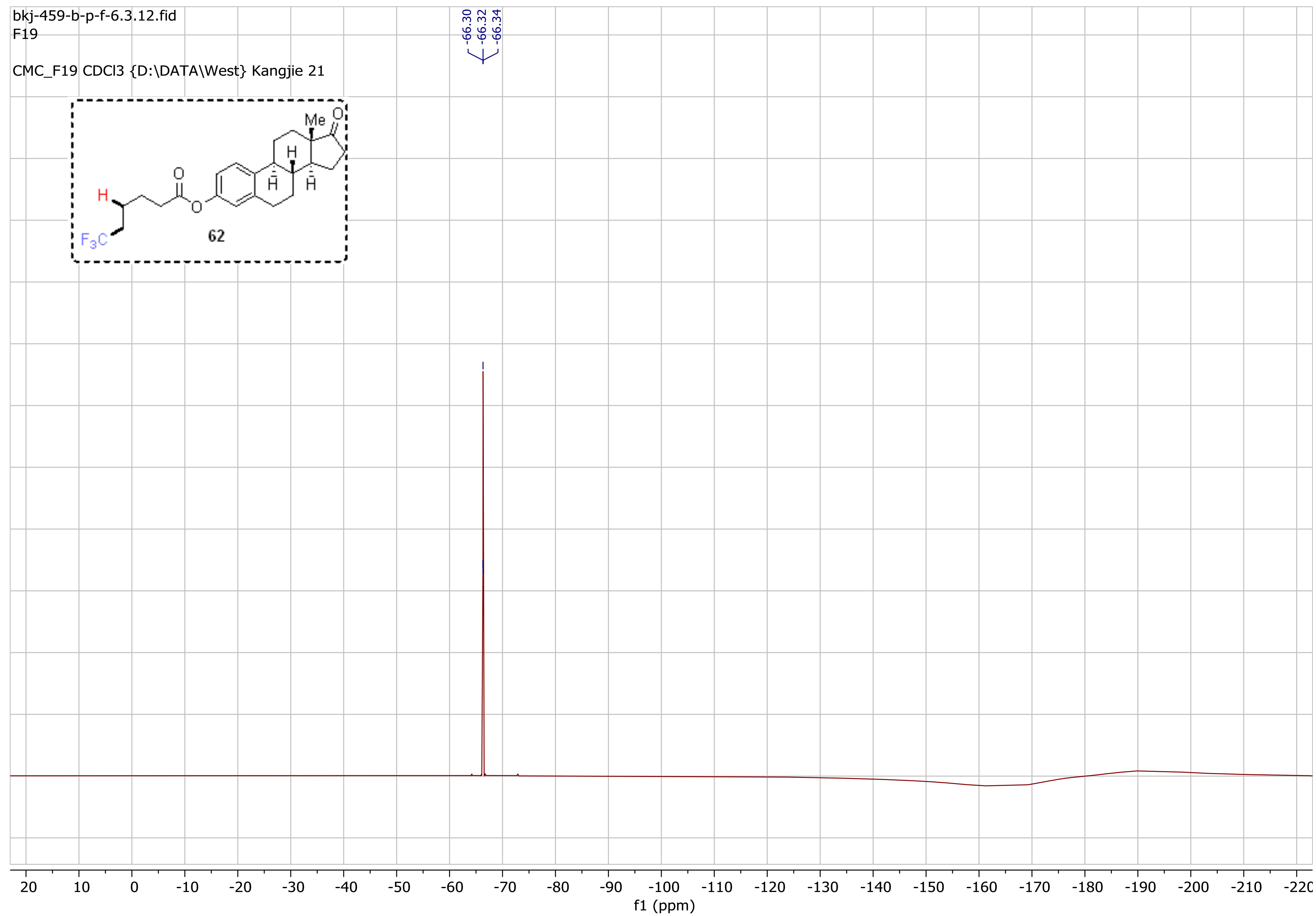


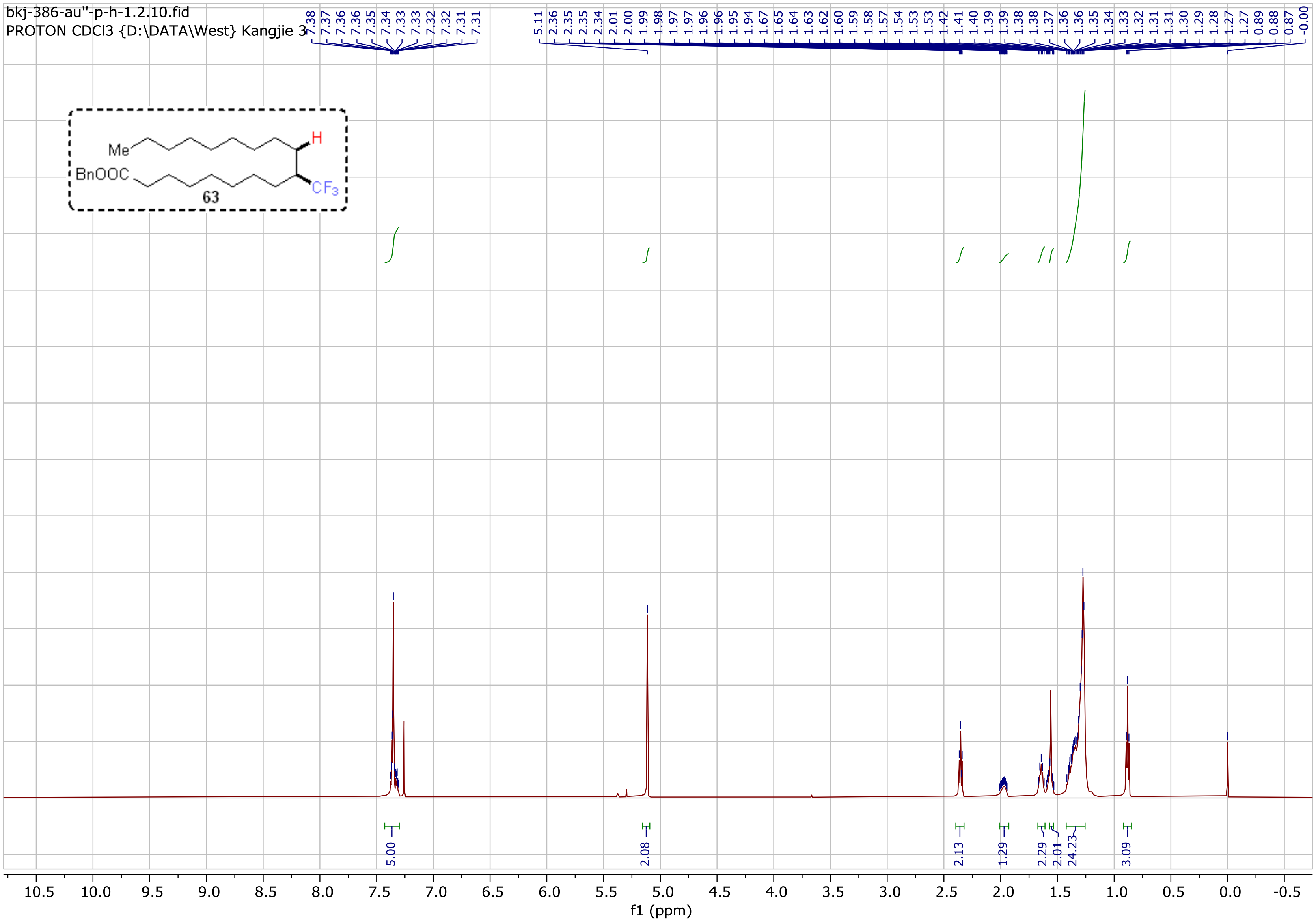
bkj-386-at-p-h-12.30.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
-66.41
-66.43
-66.45
H
CF3
O
O
Me
Me
Me
61
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

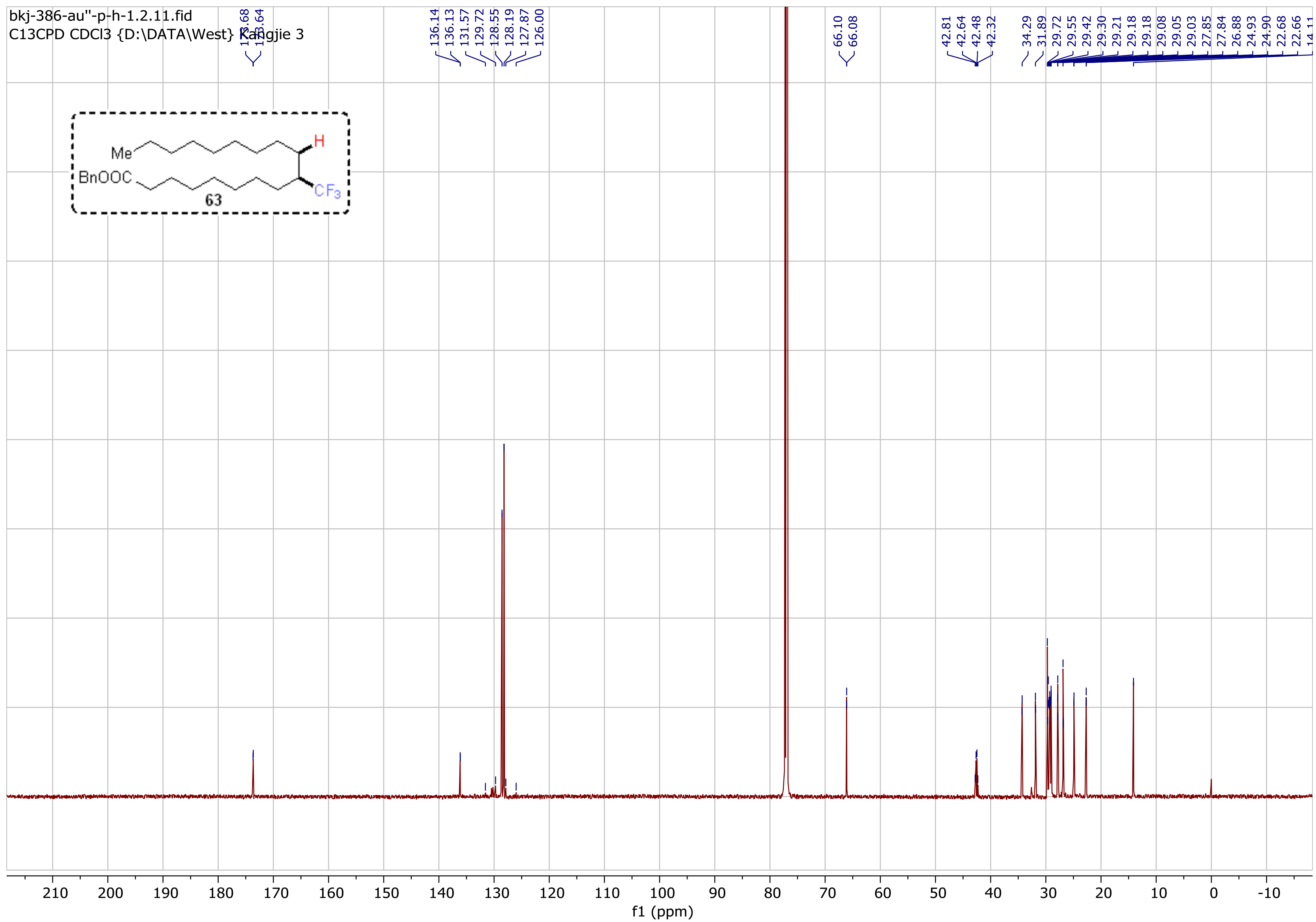


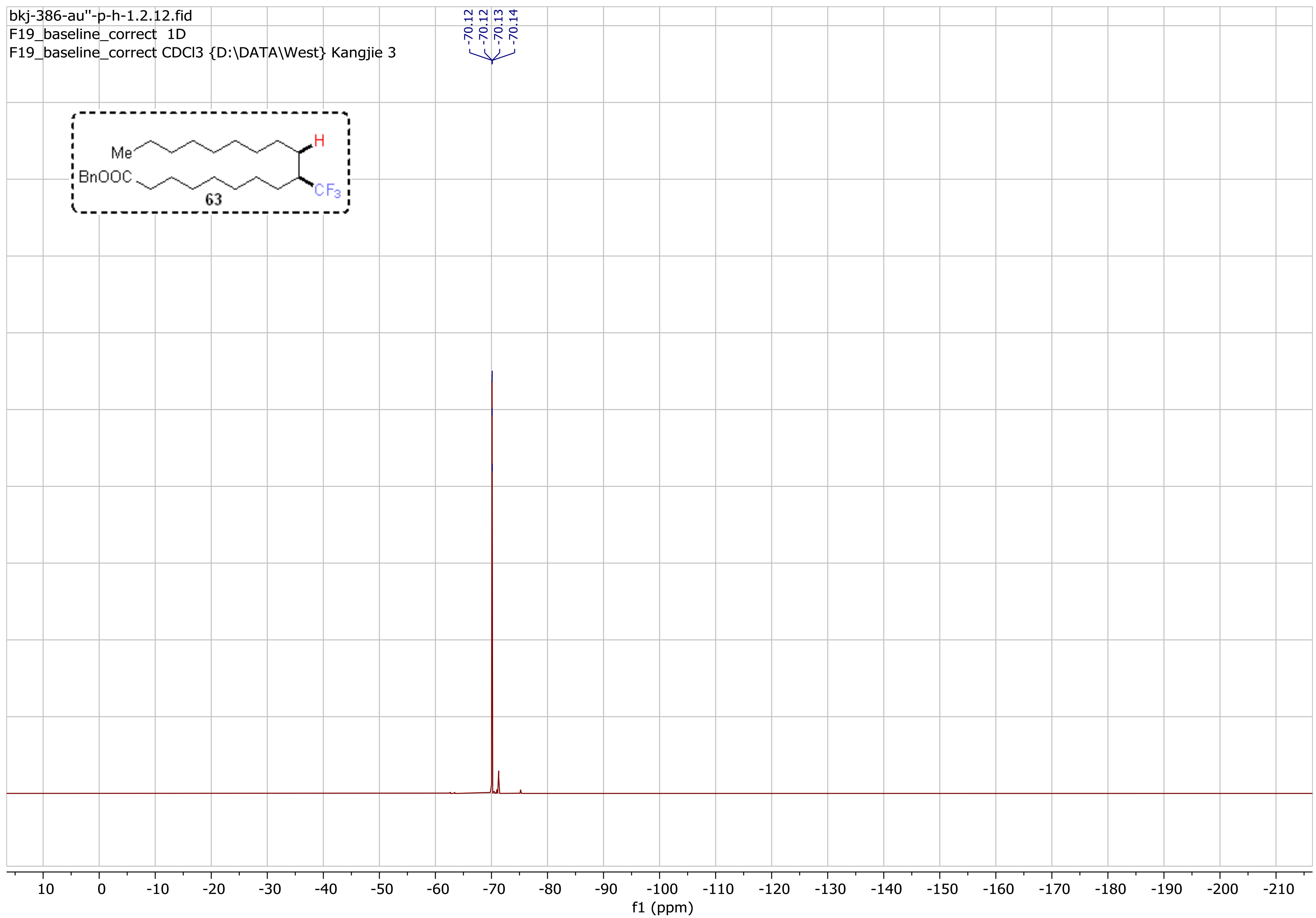
bki-459-b-p-6-3-14.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 21
62
Me
O
H
F3C
0.99
1.00
1.00
2.08
1.94
1.17
1.02
1.14
3.04
2.10
1.01
1.96
2.06
6.09
3.08
f1 (ppm)

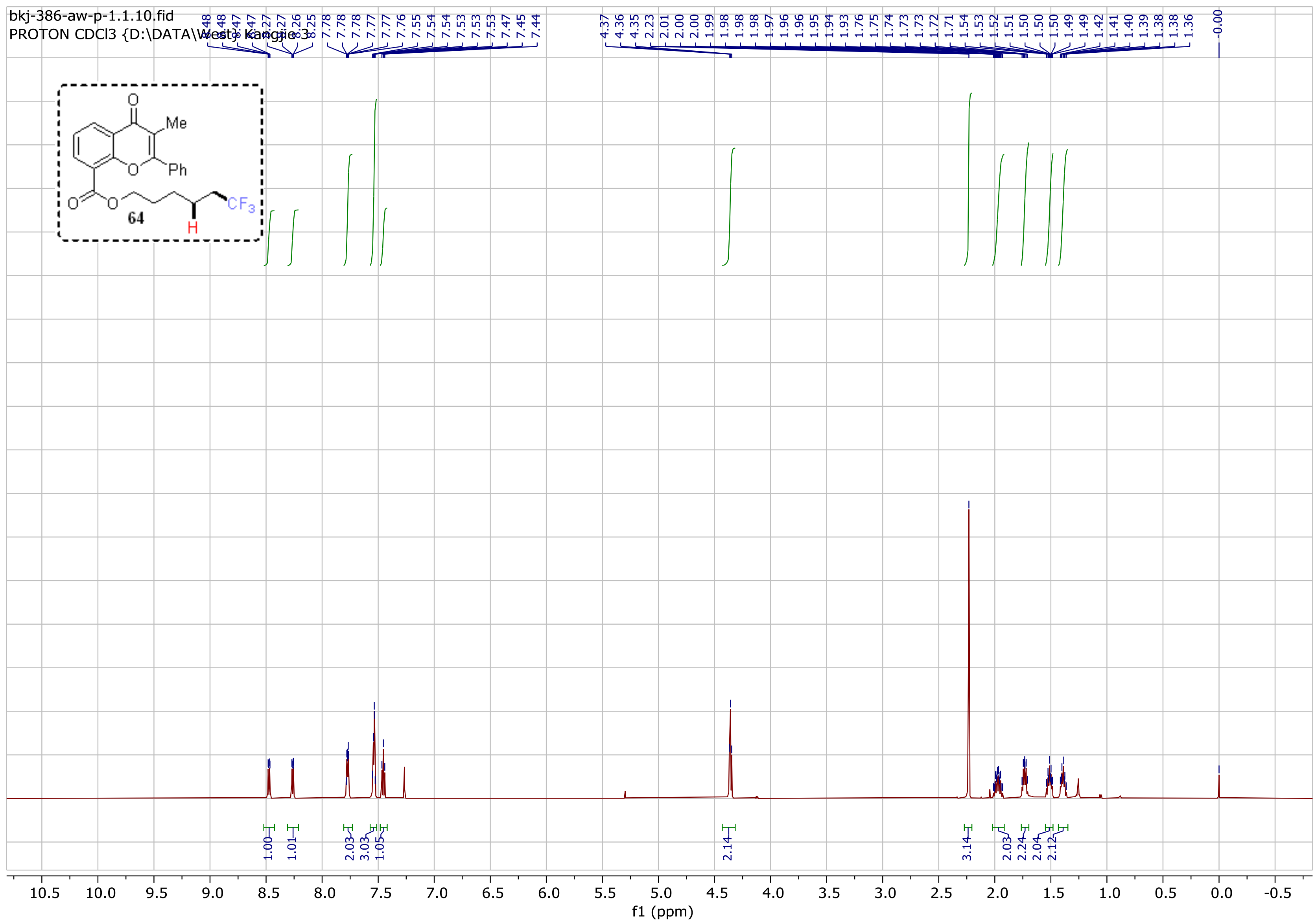

bkj-459-b-p-c-6.3.1.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 8
171.83
148.47
138.08
137.47
129.75
127.92
126.45
126.08
124.25
121.51
118.68
50.44
47.96
44.16
38.00
35.87
33.85
33.79
33.60
33.41
33.22
31.56
29.41
26.34
25.76
23.97
21.60
21.50
21.48
21.46
21.44
13.84
Me
O
H
F3C
62
f1 (ppm)

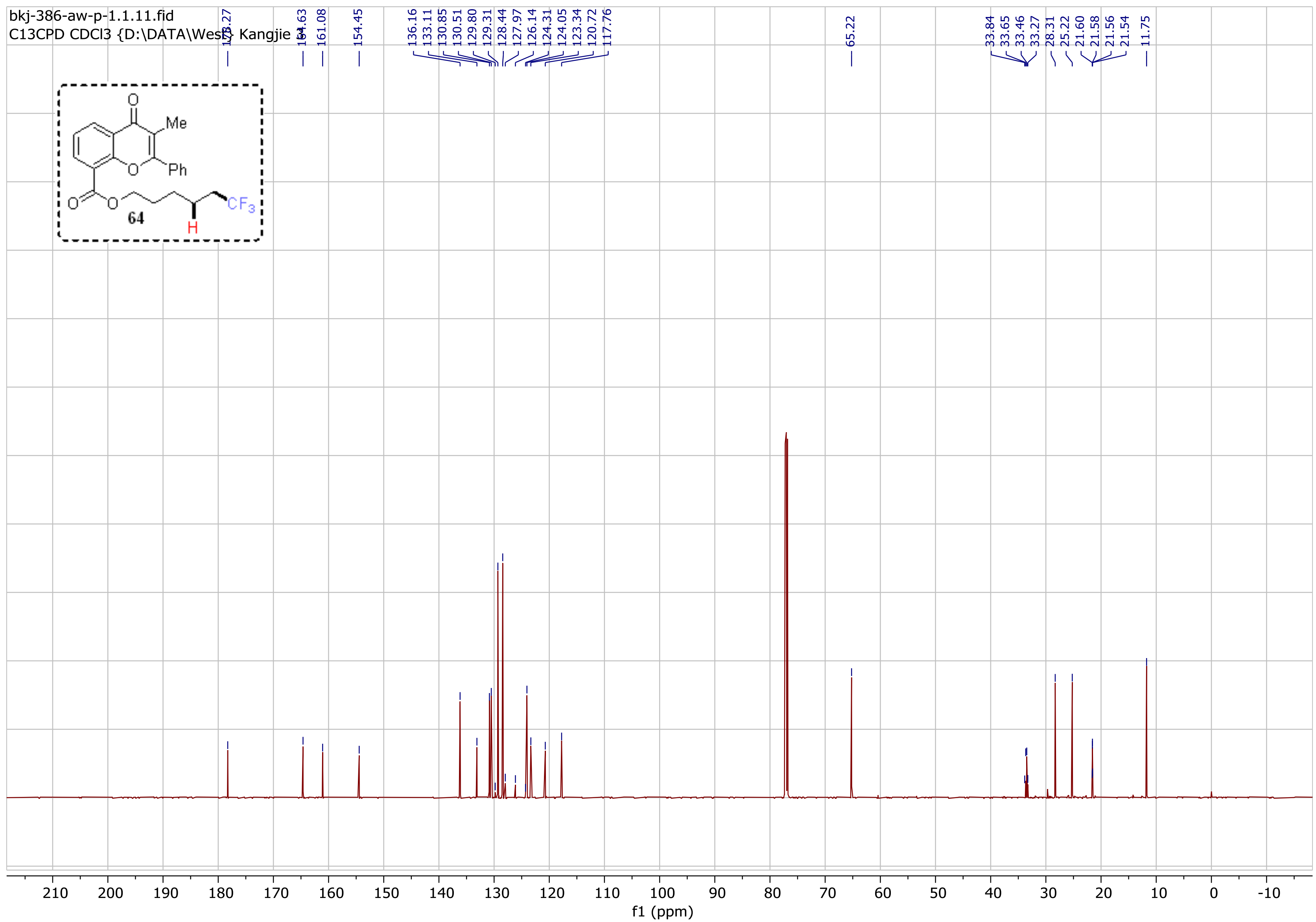

bkj-459-b-p-f-6.3.12.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 21
-66.30
-66.32
-66.34
Me
O
H
62
f1 (ppm)


bkj-386-au"-p-h-1.2.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 3
7.38 7.37 7.36 7.36 7.35 7.34 7.33 7.33 7.32 7.32 7.31 7.31
5.11 2.36 2.35 2.35 2.34 2.01 2.00 1.99 1.98 1.97 1.97 1.96 1.96 1.95 1.94 1.67 1.65 1.64 1.63 1.62 1.60 1.59 1.58 1.57 1.54 1.53 1.53 1.42 1.41 1.40 1.39 1.39 1.38 1.38 1.37 1.36 1.36 1.35 1.34 1.33 1.32 1.31 1.31 1.30 1.29 1.28 1.27 1.27 0.89 0.88 0.87 -0.00
Me
BnOOC
H
CF3
63
5.00
2.08
2.13
1.29
2.29
2.01
24.23
3.09
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

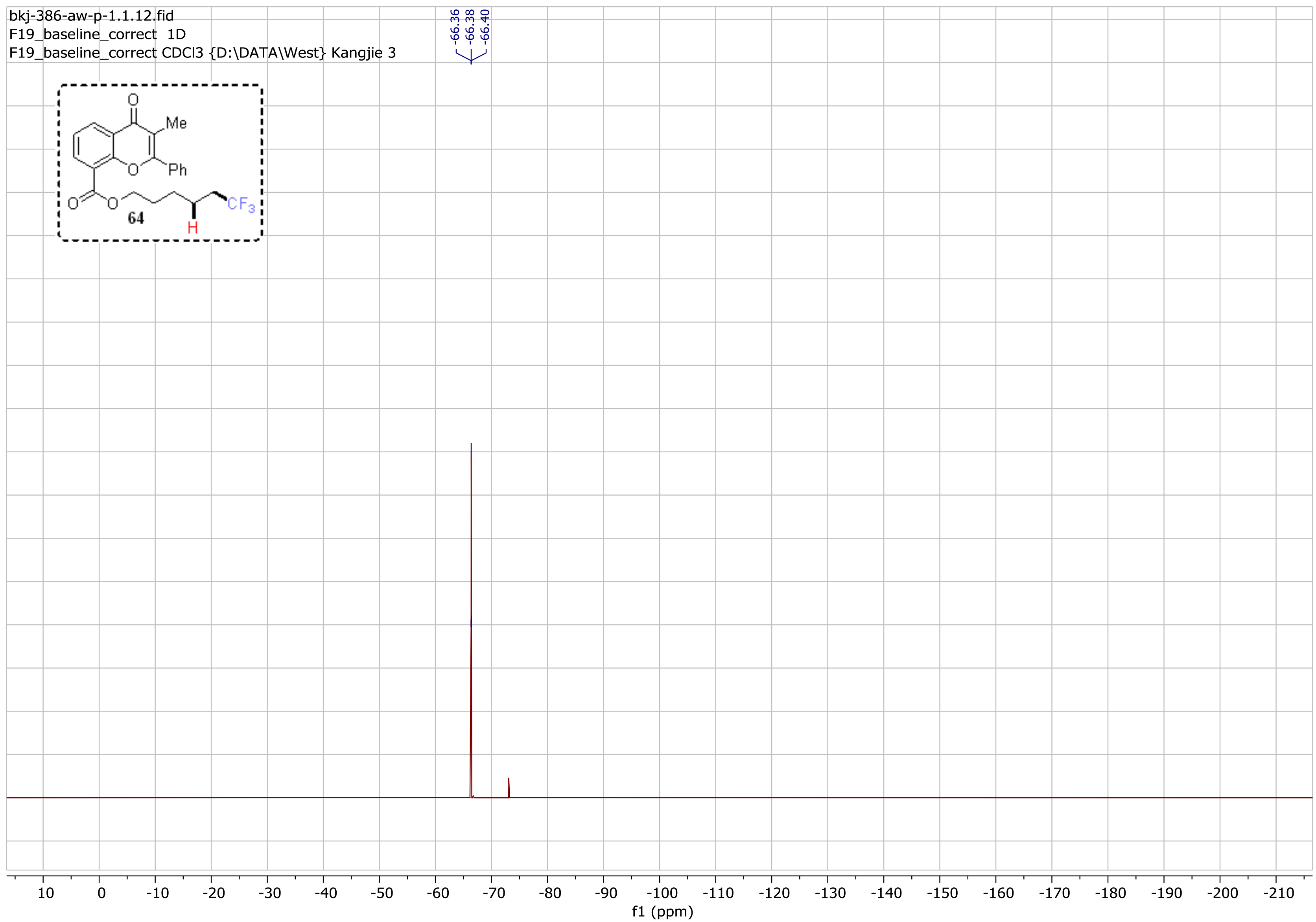

bkj-386-au''-p-h-1.2.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 3
173.68
173.64
136.14
136.13
131.57
129.72
128.55
128.19
127.87
126.00
66.10
66.08
42.81
42.64
42.48
42.32
34.29
31.89
29.72
29.55
29.42
29.30
29.21
29.18
29.18
29.08
29.05
29.03
27.85
27.84
26.88
24.93
24.90
22.68
22.66
14.11
Me
BnOOC
H
CF3
63
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-386-au''-p-h-1.2.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
-70.12
-70.12
-70.13
-70.14
Me
H
BnOOC
CF3
63
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

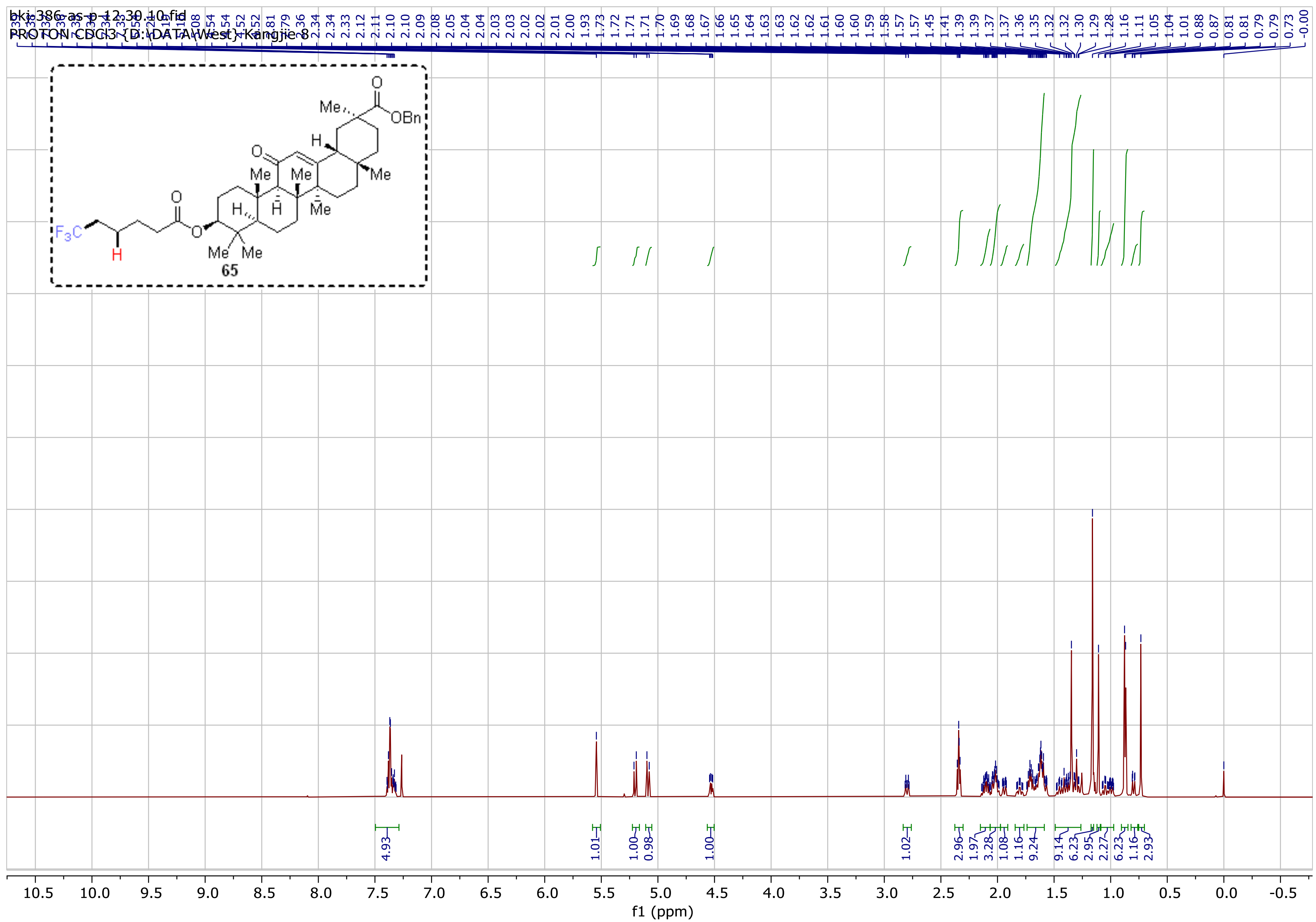

bkj-386-aw-p-1.1.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 3
64
Me
Ph
CF3
H
f1 (ppm)

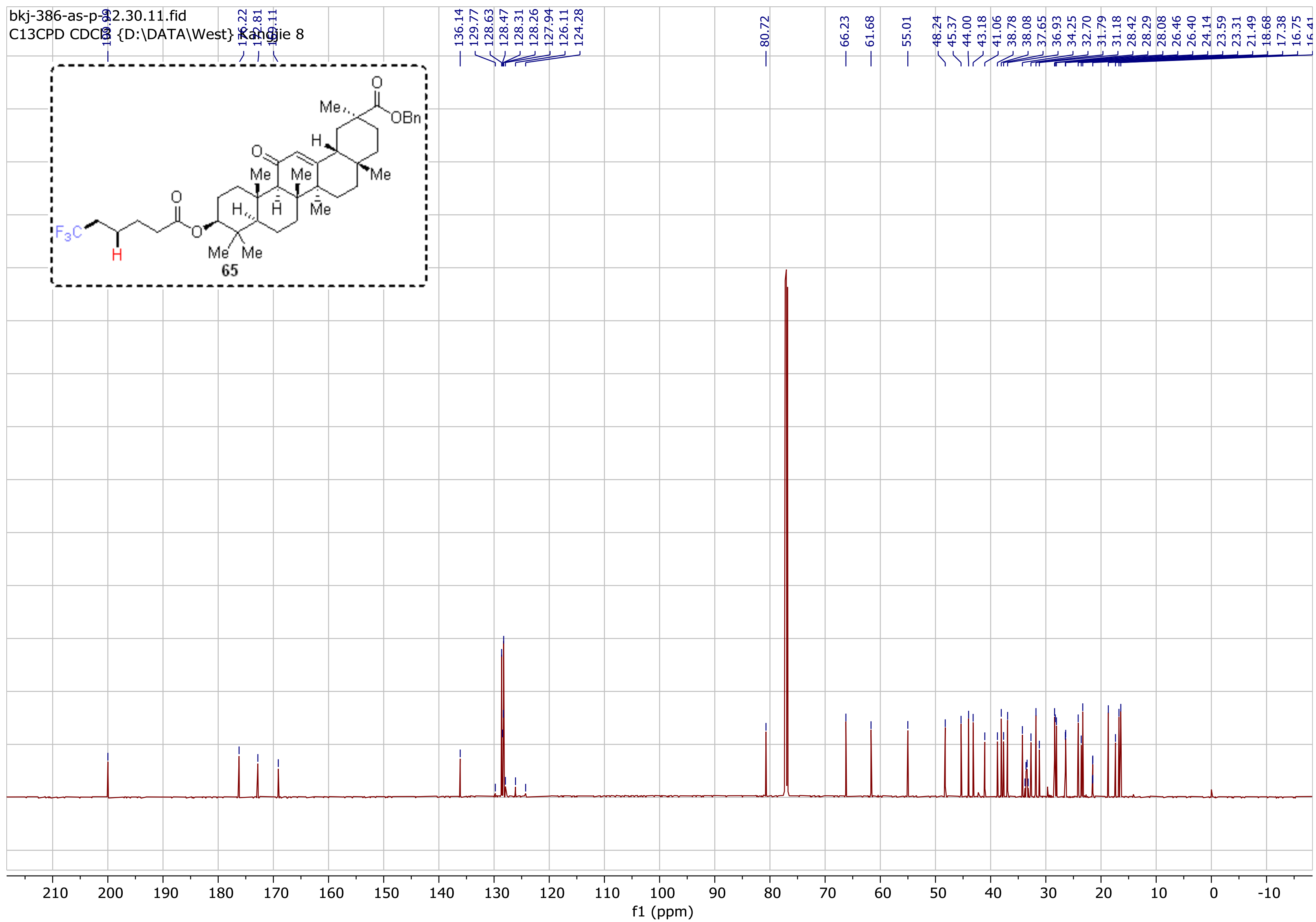


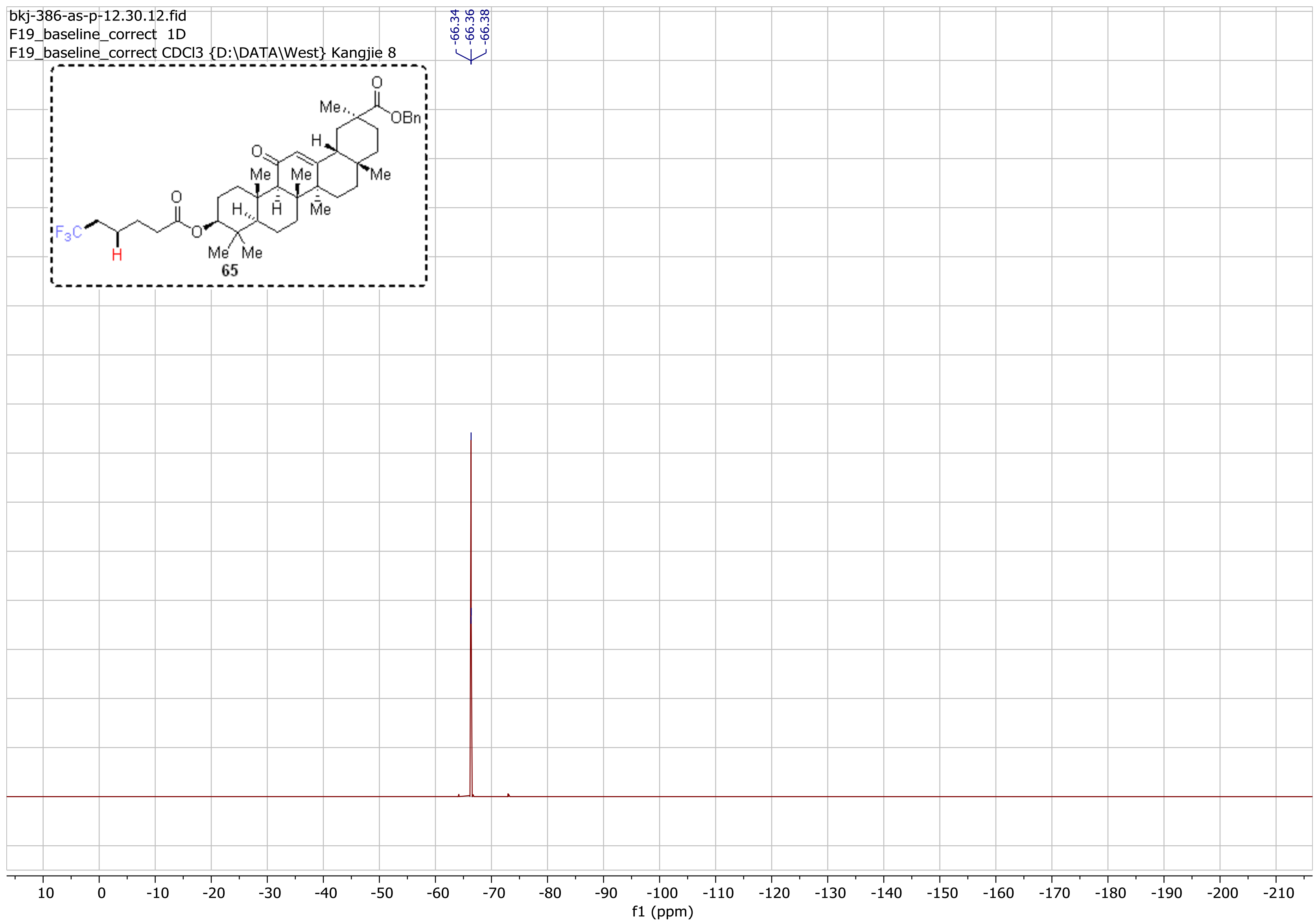
bkj-386-aw-p-1.1.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 34
178.27
164.63
161.08
154.45
136.16
133.11
130.85
130.51
129.80
129.31
128.44
127.97
126.14
124.31
124.05
123.34
120.72
117.76
65.22
33.84
33.65
33.46
33.27
28.31
25.22
21.60
21.58
21.56
21.54
11.75
O
Me
Ph
O
O
O
64
H
CF3
f1 (ppm)

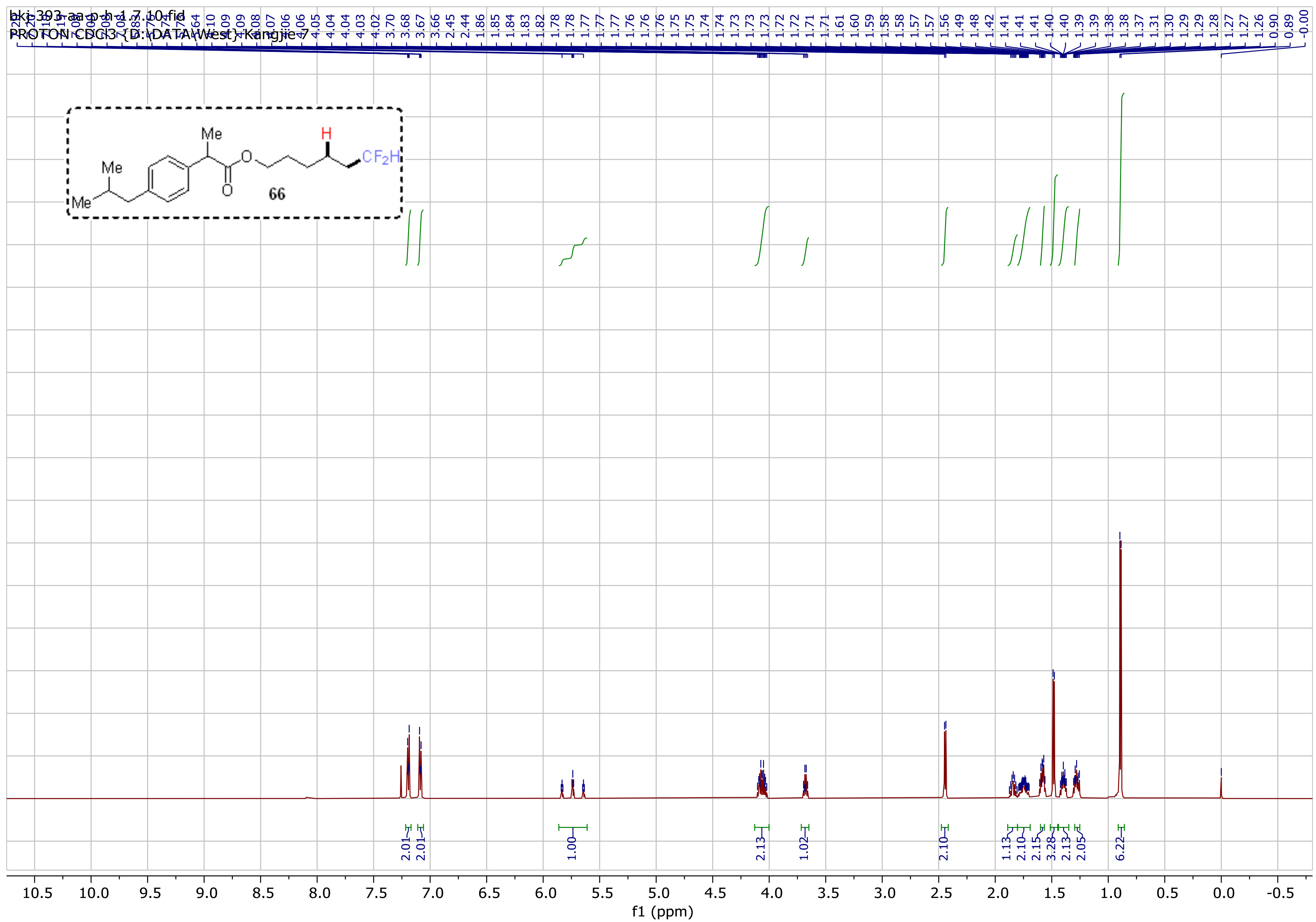


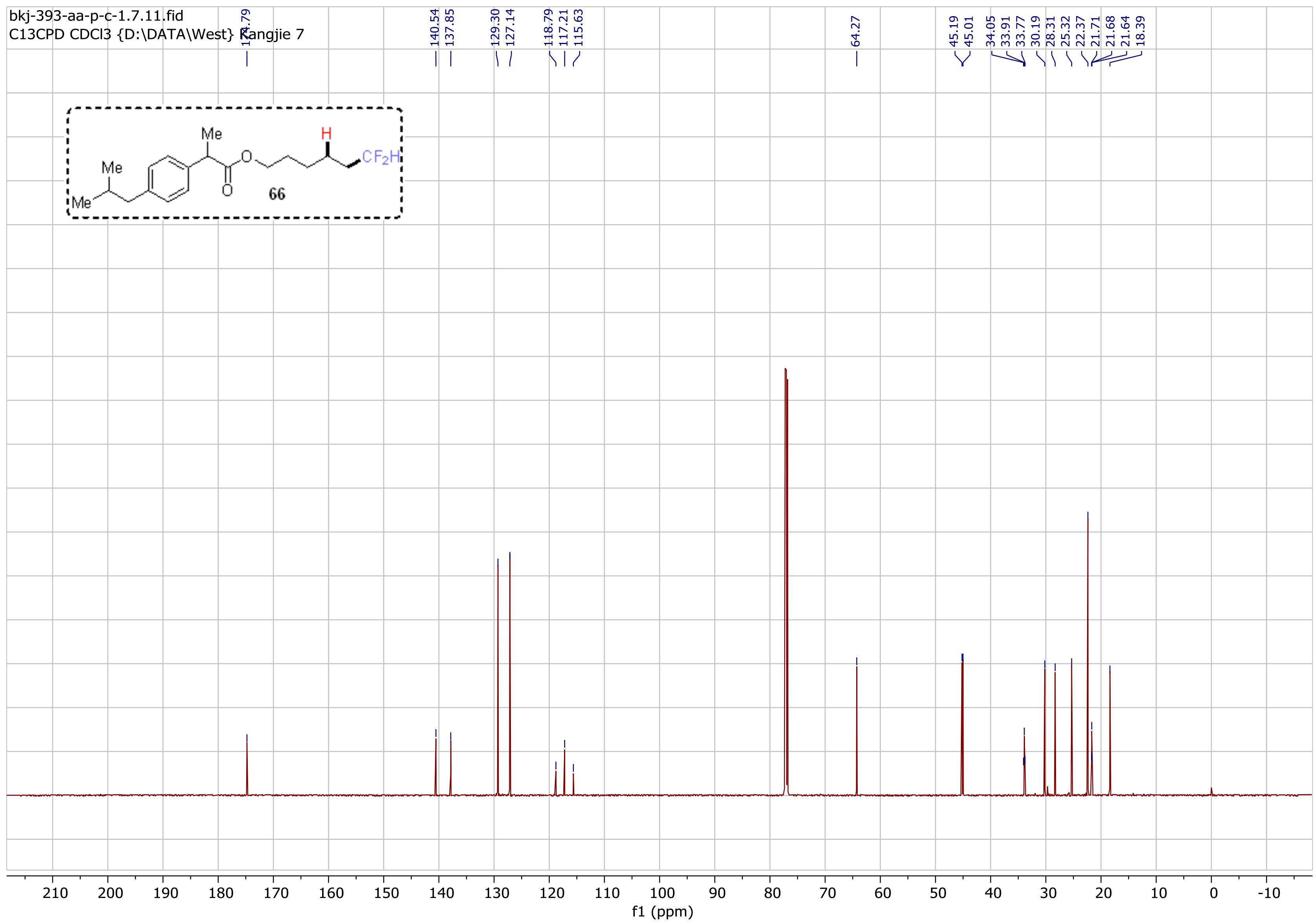
bkj-386-aw-p-1.1.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
-66.36
-66.38
-66.40
O
Me
Ph
O
O
O
CF3
H
64
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

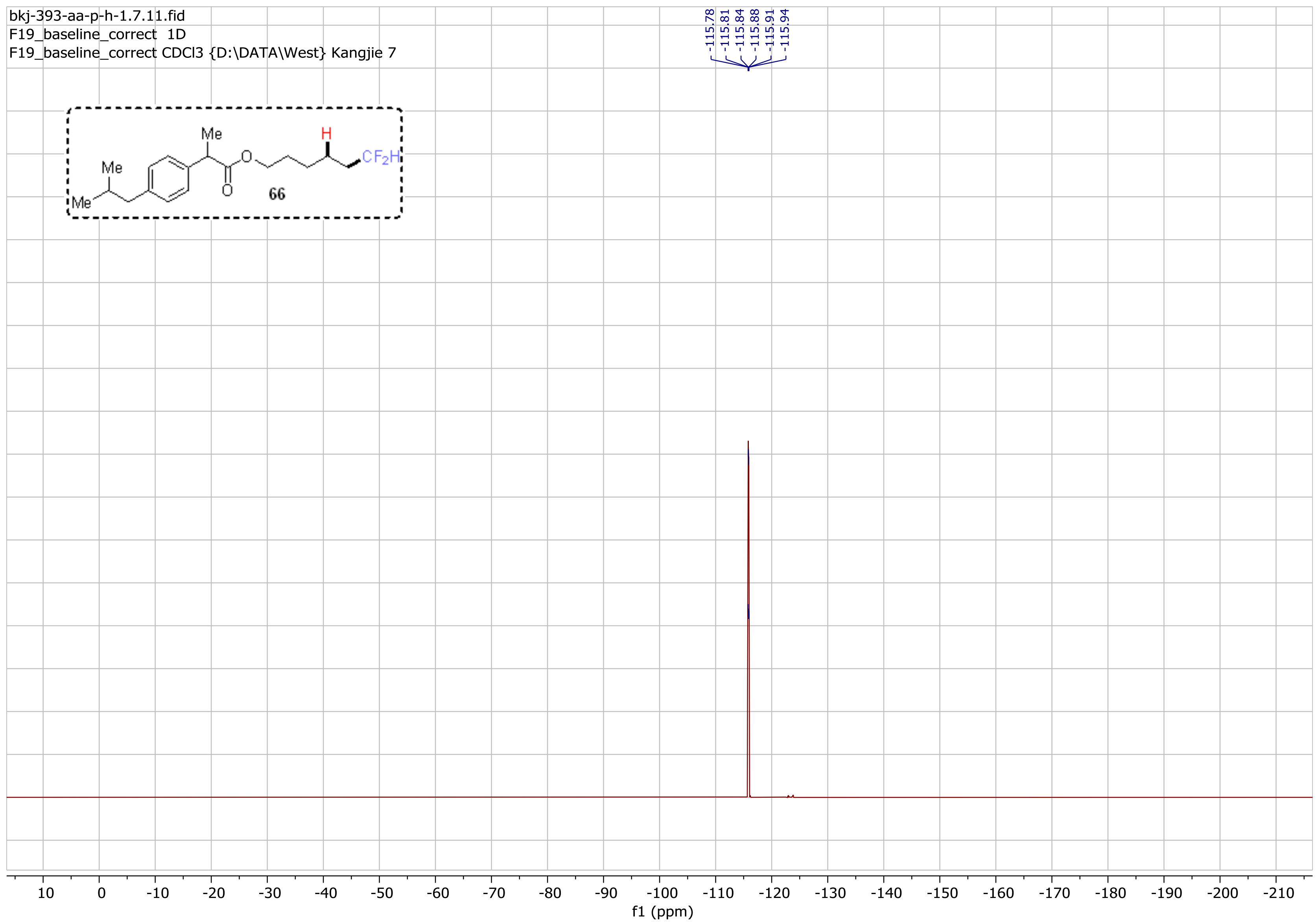

bki-386-as-p-12-30-10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 8
65
f1 (ppm)

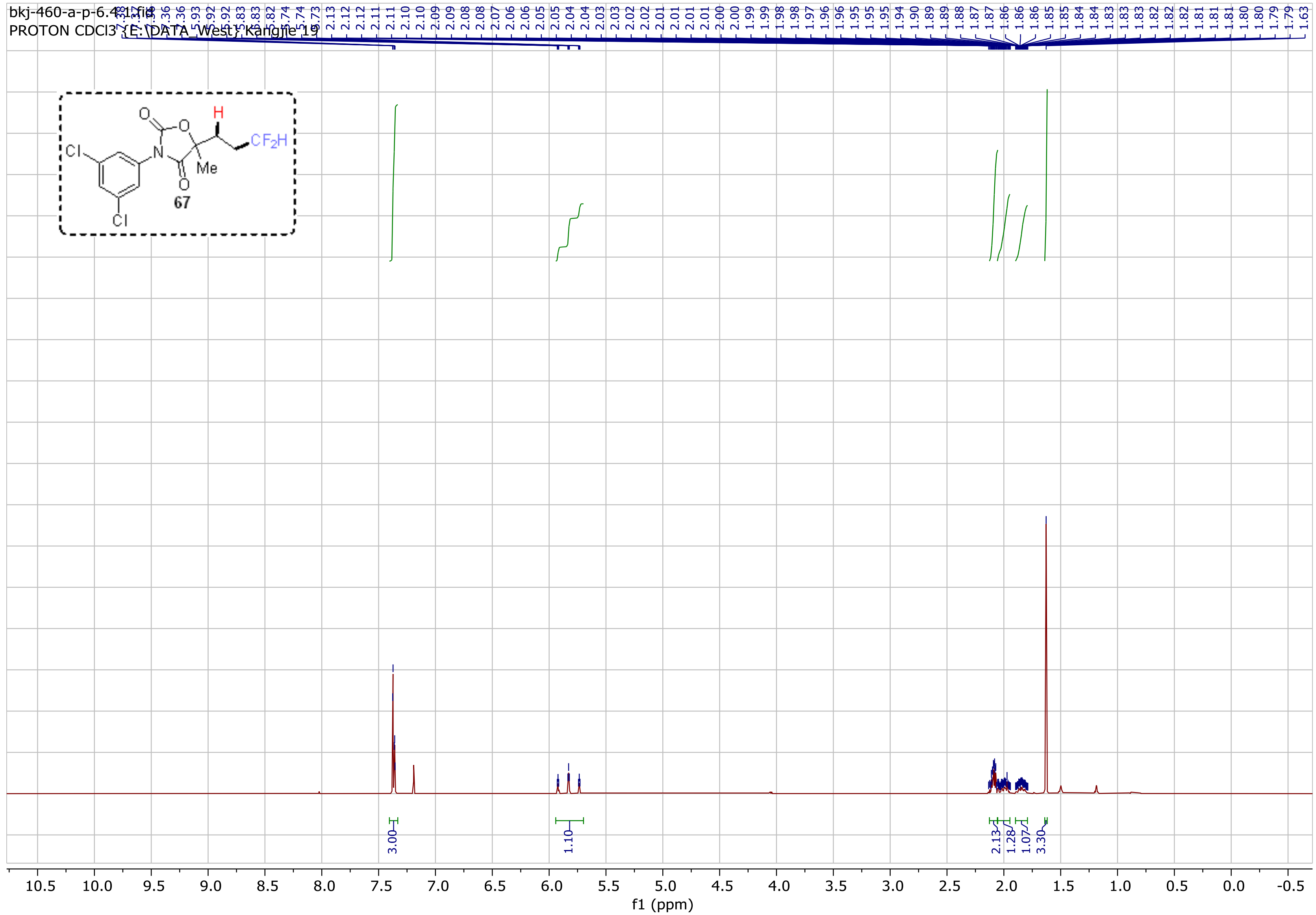

bkj-386-as-p-92.30.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 8
199.99
176.22
172.81
169.11
136.14
129.77
128.63
128.47
128.31
128.26
127.94
126.11
124.28
80.72
66.23
61.68
55.01
48.24
45.37
44.00
43.18
41.06
38.78
38.08
37.65
36.93
34.25
32.70
31.79
31.18
28.42
28.29
28.08
26.46
26.40
24.14
23.59
23.31
21.49
18.68
17.38
16.75
16.41
F3C
H
O
O
Me
Me
65
H
H
Me
O
Me
H
Me
Me
O
OBn
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

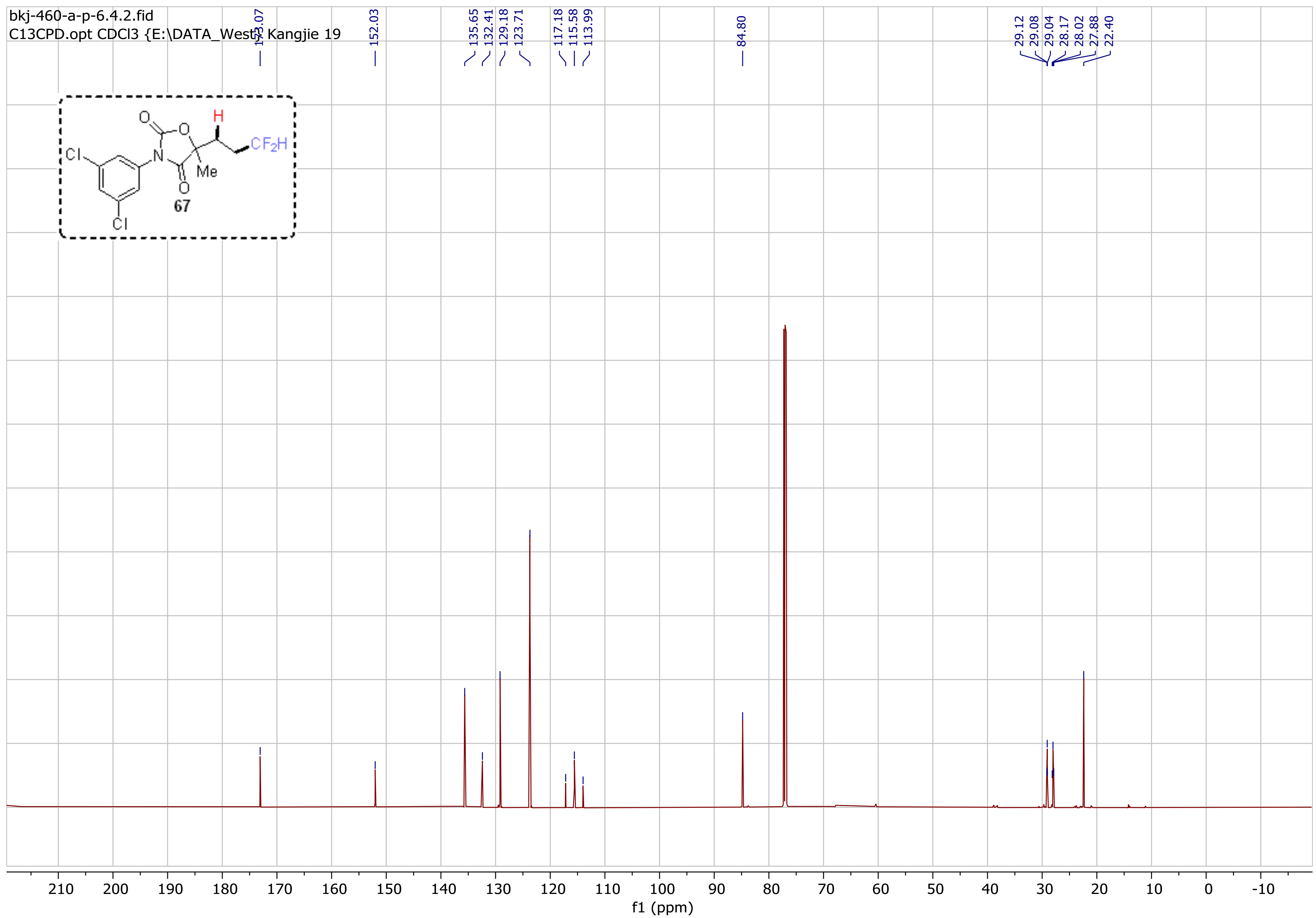

bkj-386-as-p-12.30.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 8
-66.34
-66.36
-66.38
F3C
H
O
O
Me
Me
65
H
H
Me
Me
O
Me
H
Me
O
OBn
Me
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

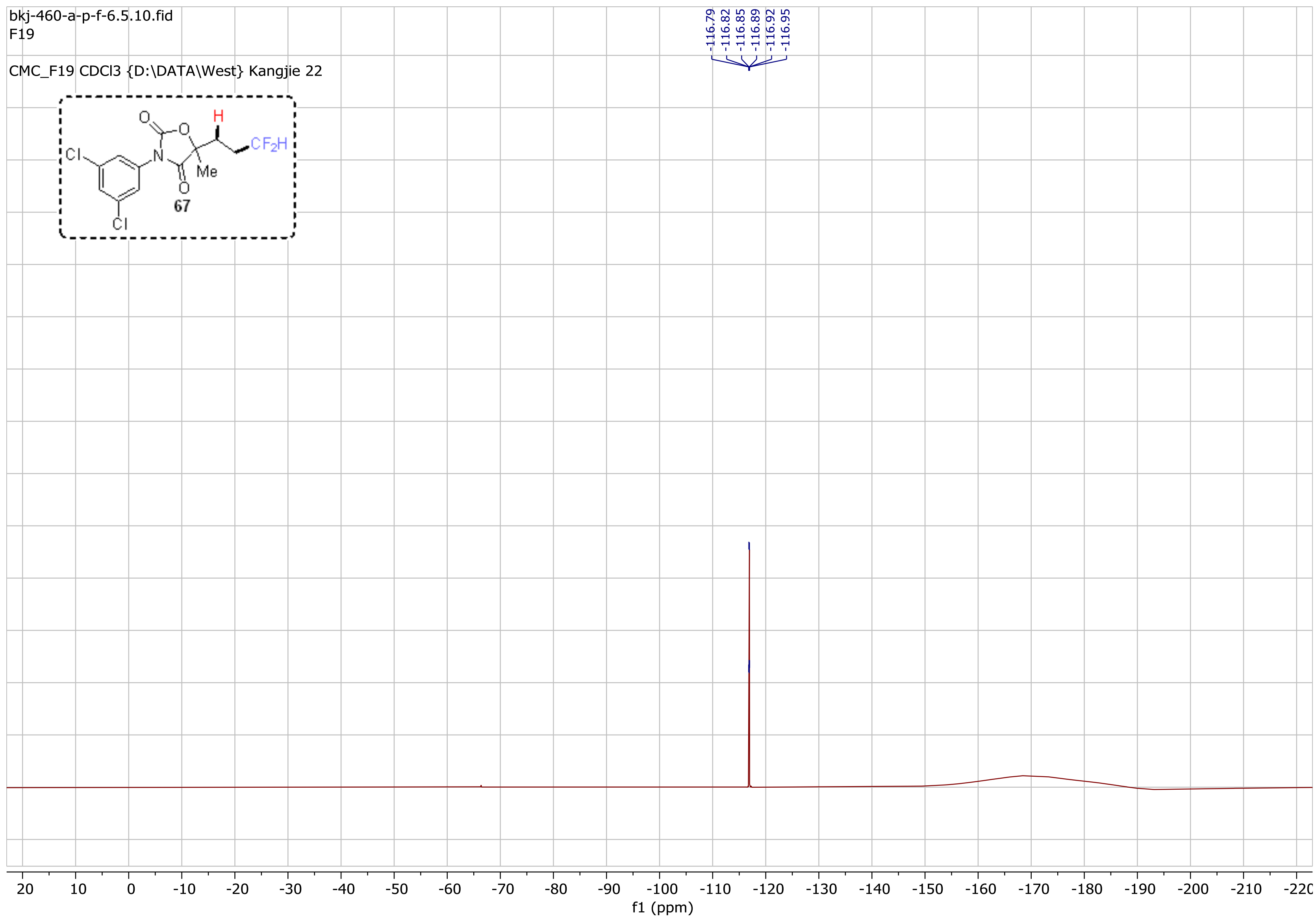

bki-393-aa-p-h-1.7.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
Me
Me
Me
O
O
H
CF2H
66
2.01
2.01
1.00
2.13
1.02
2.10
1.13
2.10
2.15
3.28
2.13
2.05
6.22
f1 (ppm)


bkj-393-aa-p-c-1.7.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
174.79
140.54
137.85
129.30
127.14
118.79
117.21
115.63
64.27
45.19
45.01
34.05
33.91
33.77
30.19
28.31
25.32
22.37
21.71
21.68
21.64
18.39
Me
Me
Me
O
O
H
CF2H
66
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

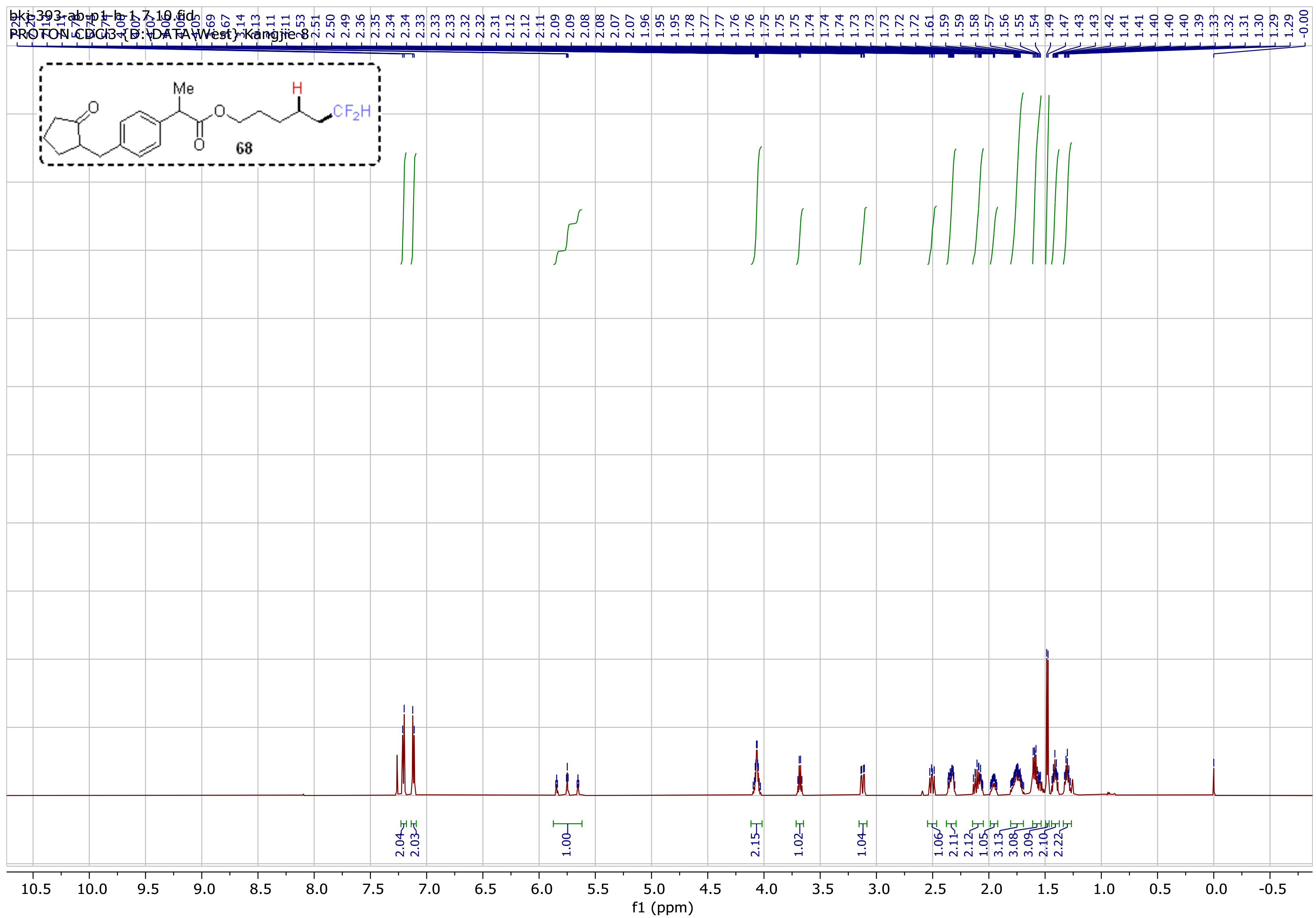

bkj-393-aa-p-h-1.7.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 7
Me
Me
Me
O
O
H
CF2H
66
-115.78
-115.81
-115.84
-115.88
-115.91
-115.94
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

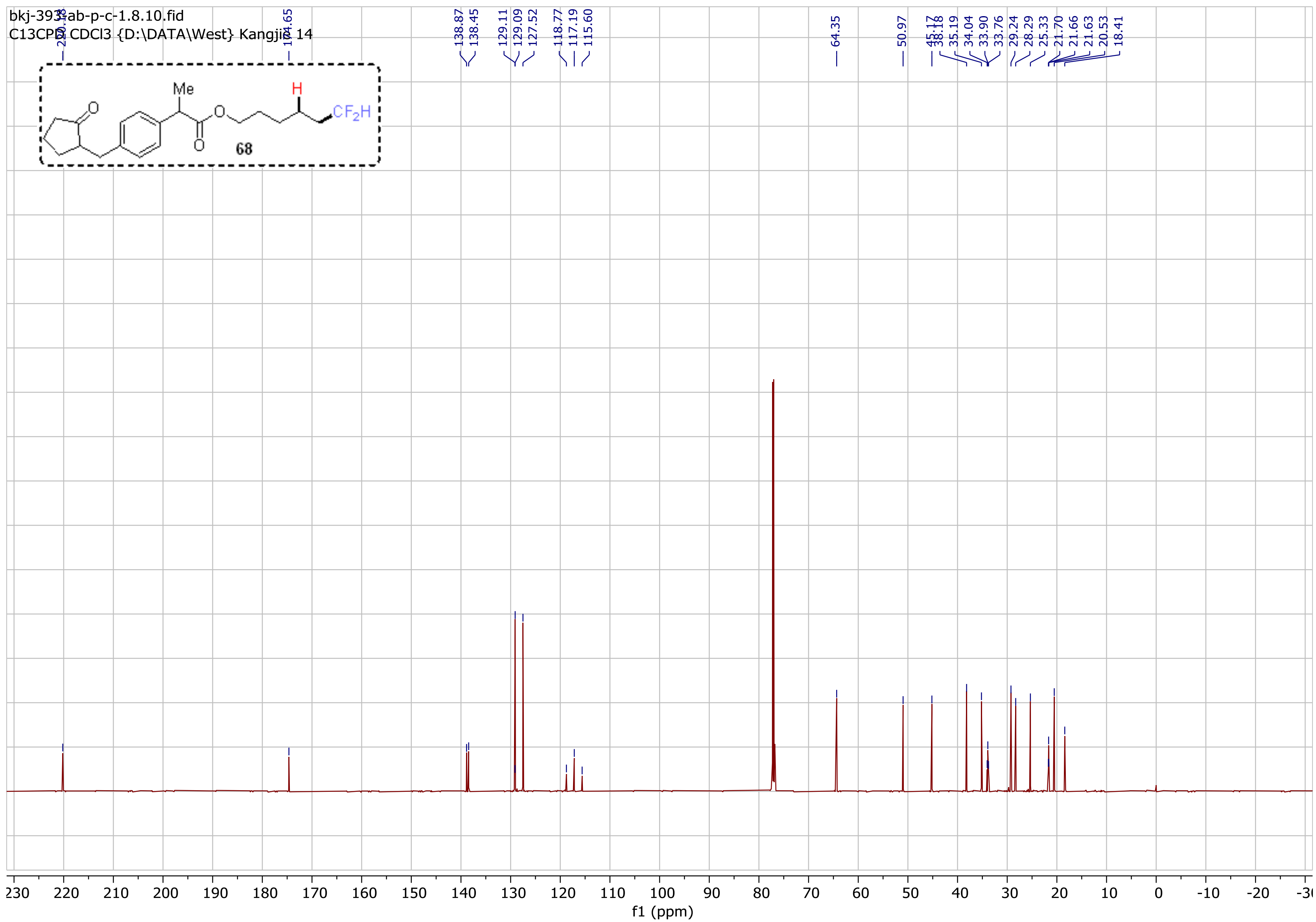

bkj-460-a-p-6.4.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 19
67
f1 (ppm)

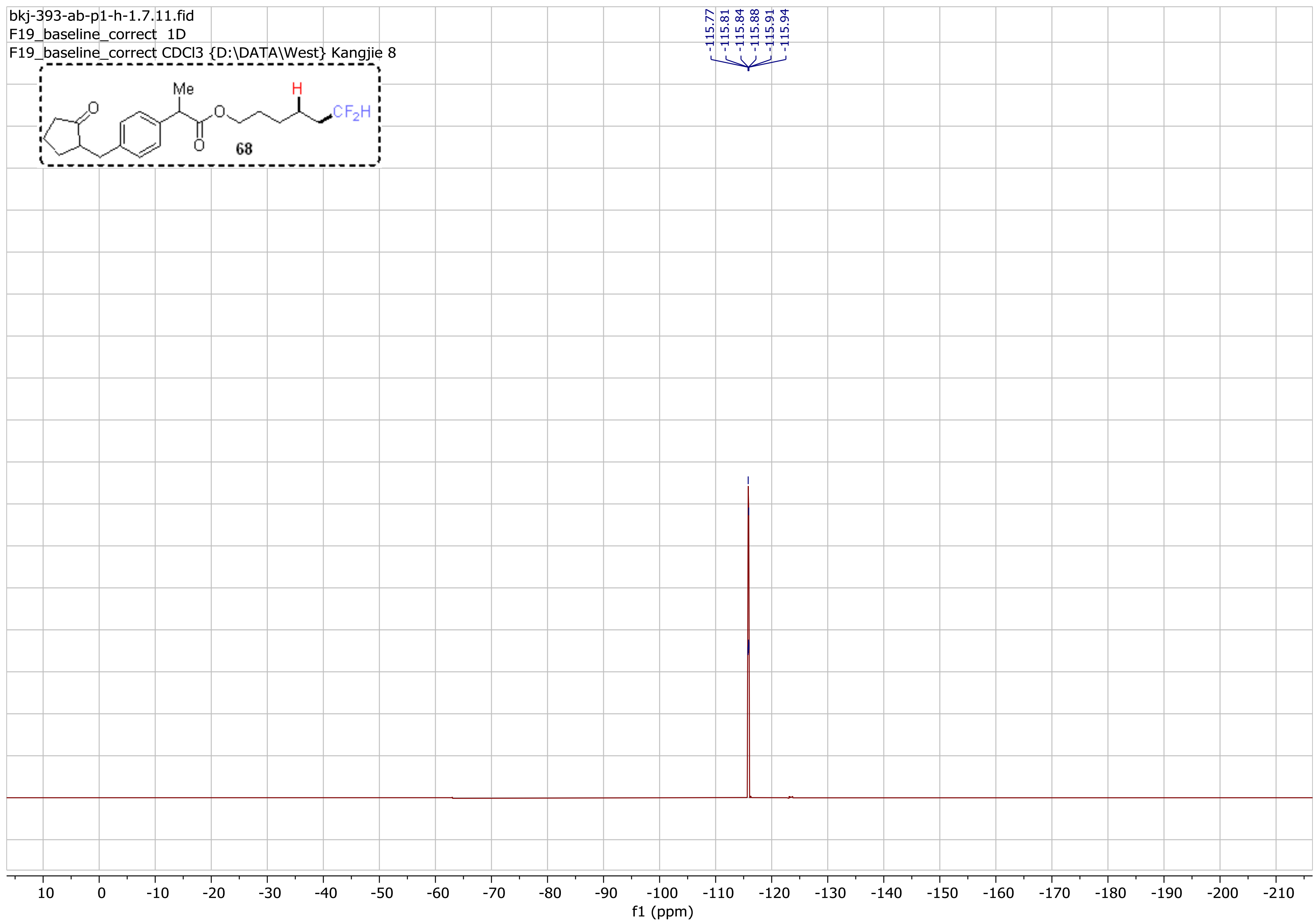

bkj-460-a-p-6.4.2.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 19
173.07
152.03
135.65
132.41
129.18
123.71
117.18
115.58
113.99
84.80
29.12
29.08
29.04
28.17
28.02
27.88
22.40
67
f1 (ppm)

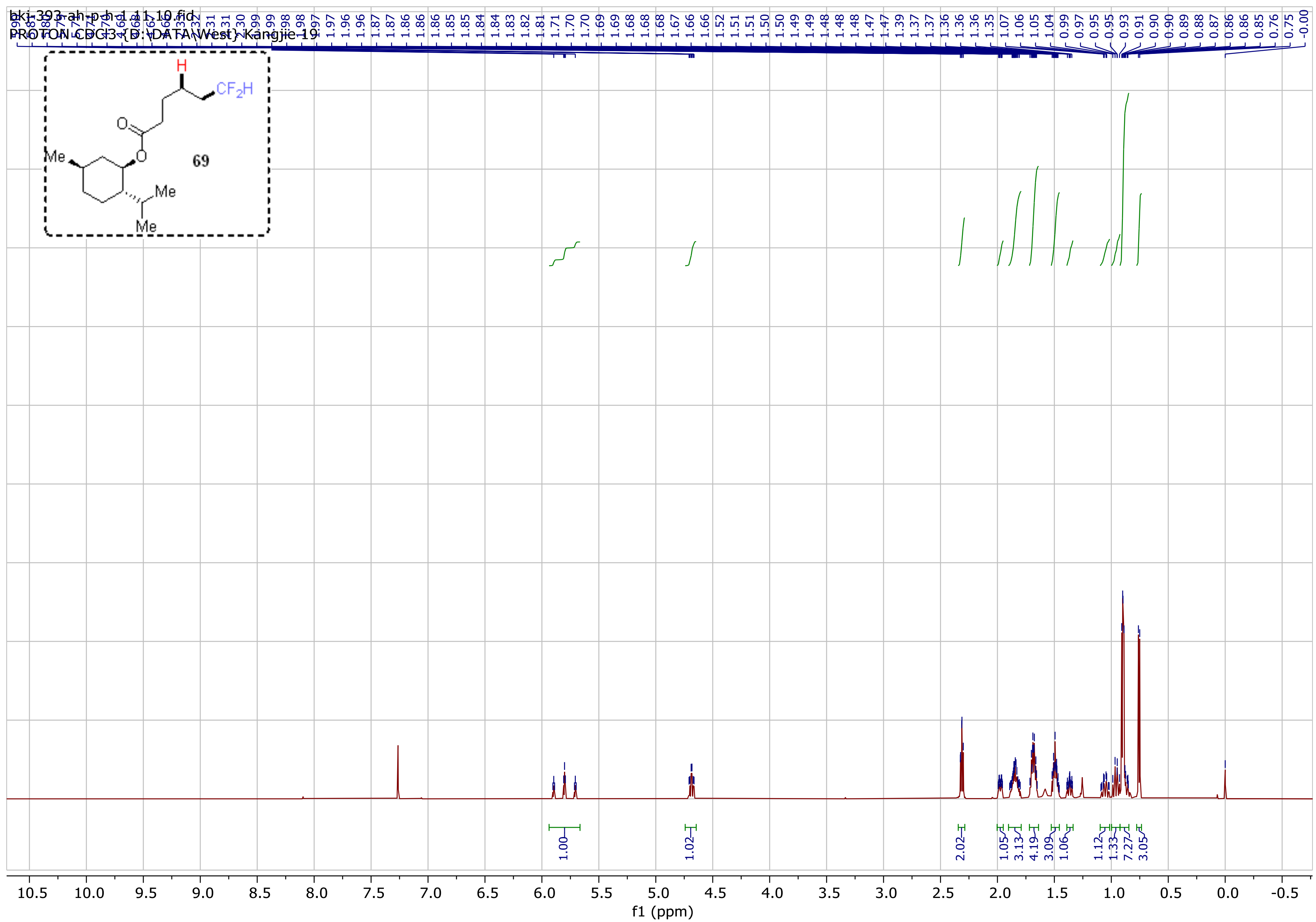


bkj-460-a-p-f-6.5.10.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 22
67
Me
CF2H
-116.79
-116.82
-116.85
-116.89
-116.92
-116.95
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)

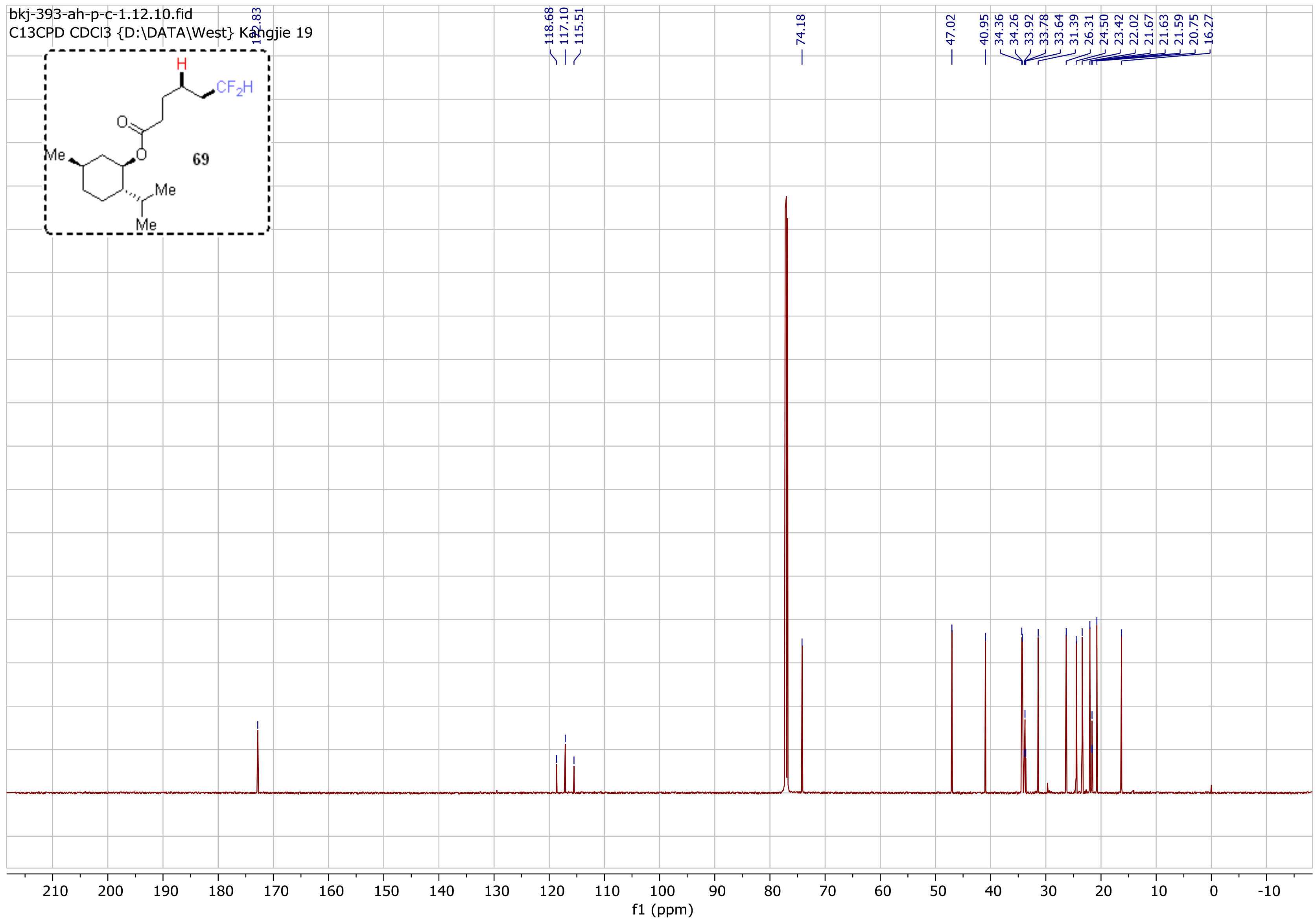

bkj-393-ab-p1-b-1.7.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 8
Me
H
CF2H
68
2.04
2.03
1.00
2.15
1.02
1.04
1.06
2.11
2.12
1.05
3.13
3.08
3.09
2.10
2.22
f1 (ppm)

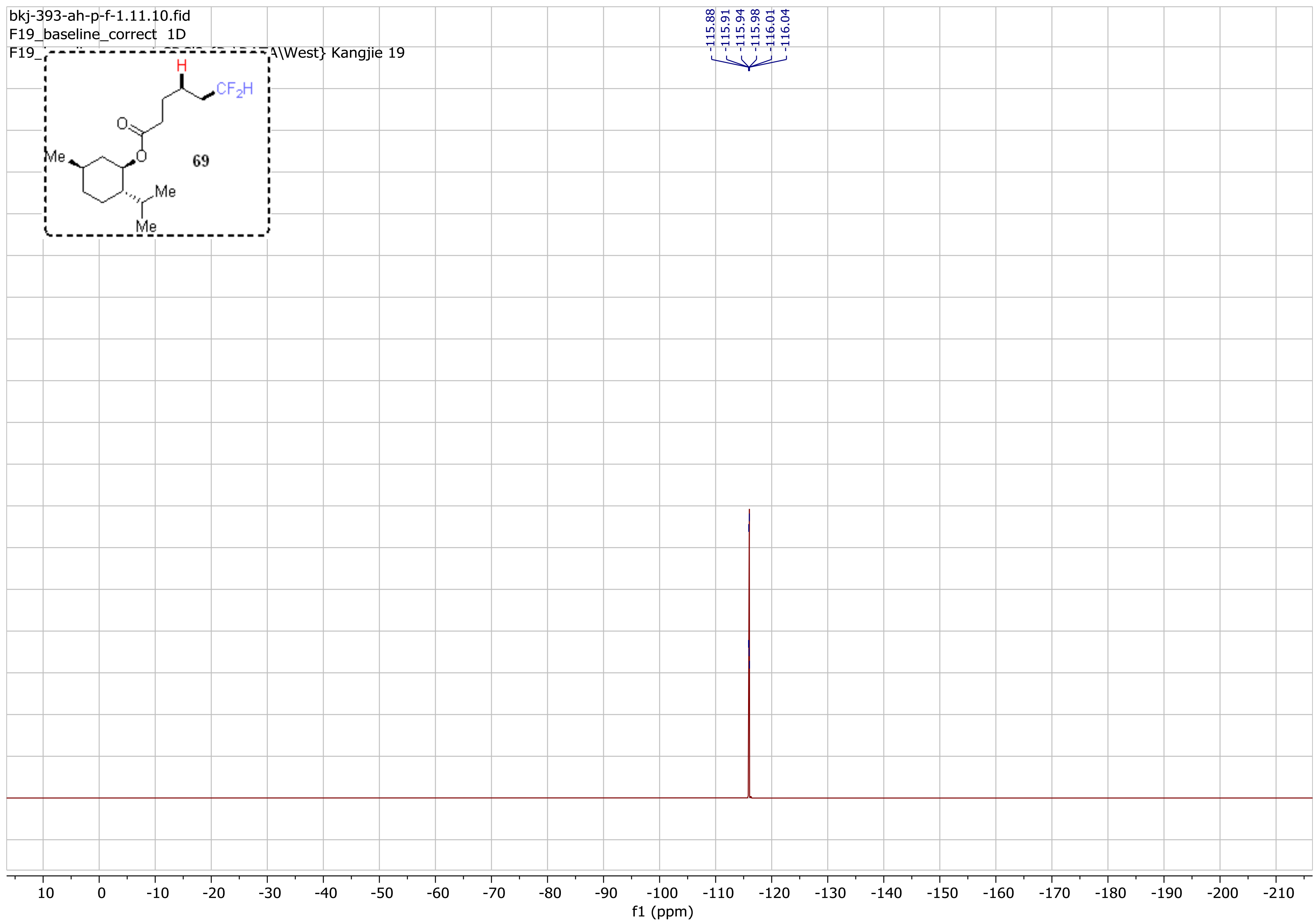

bkj-393-ab-p-c-1.8.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 14
220.18
174.65
138.87
138.45
129.11
129.09
127.52
118.77
117.19
115.60
64.35
50.97
45.17
38.18
35.19
34.04
33.90
33.76
29.24
28.29
25.33
21.70
21.66
21.63
20.53
18.41
Me
H
O
CF2H
68
f1 (ppm)

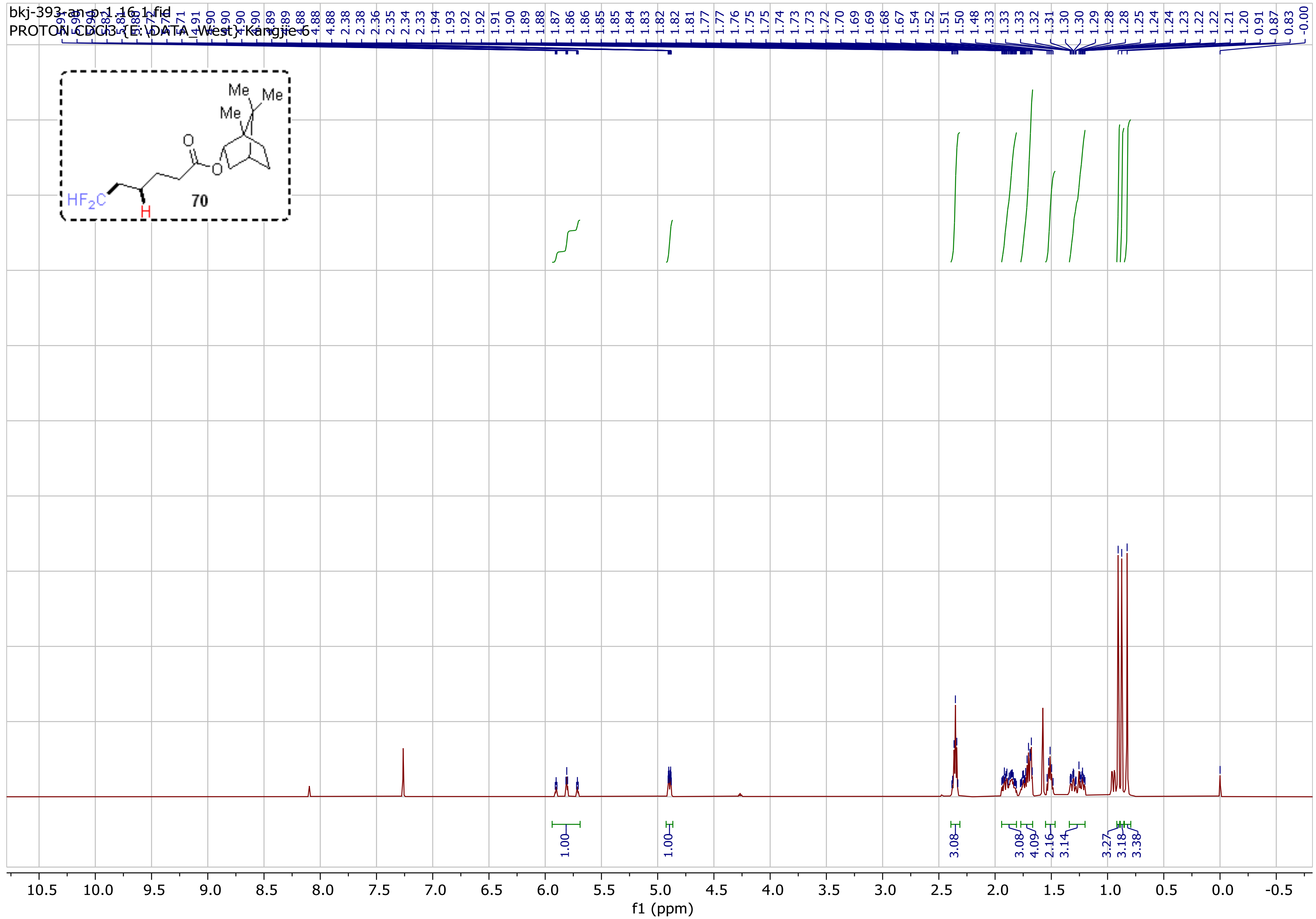

bkj-393-ab-p1-h-1.7.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 8
Me
O
O
O
H
CF2H
68
-115.77
-115.81
-115.84
-115.88
-115.91
-115.94
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

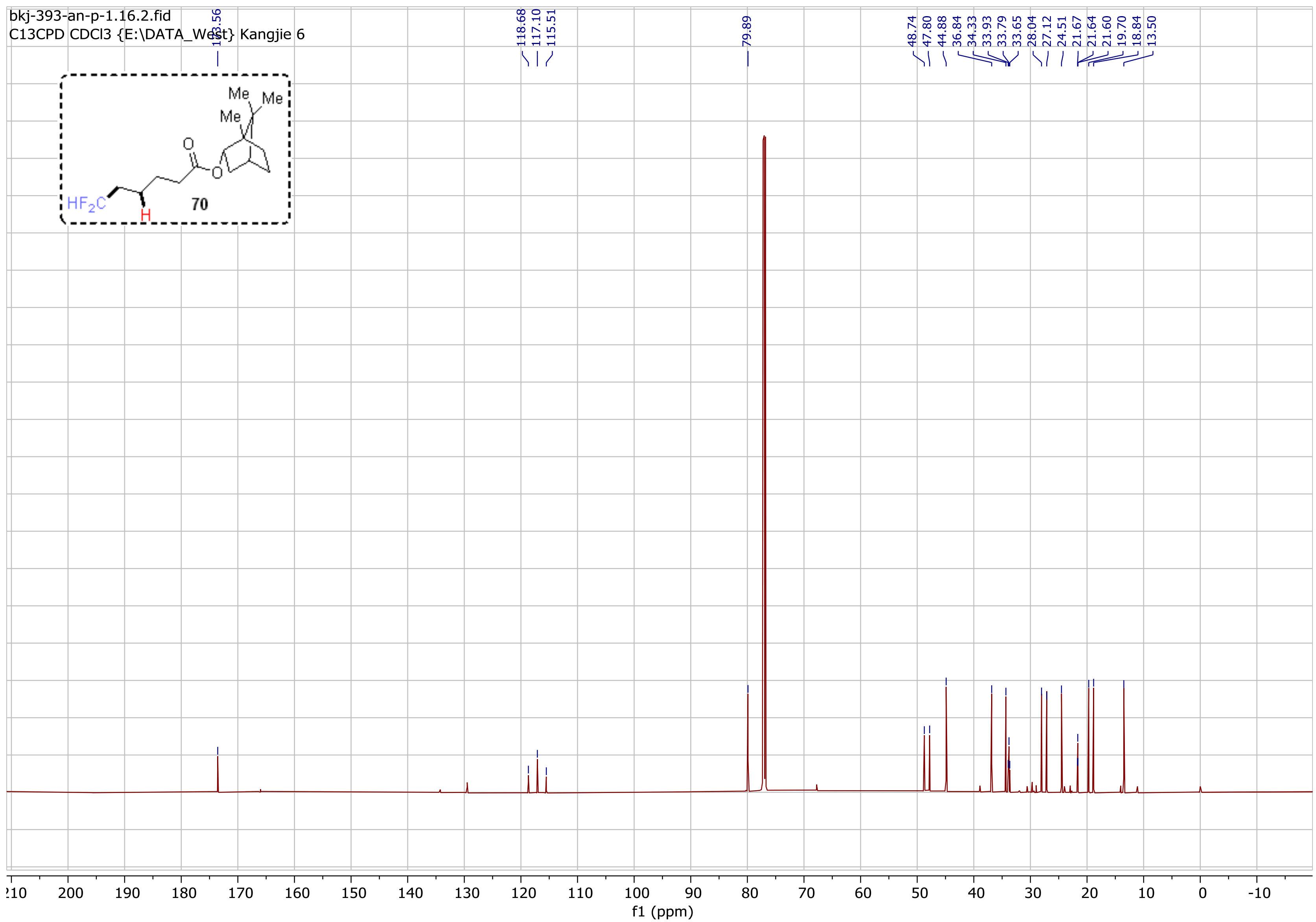

bkj-393-ah-p-h-1.11.19.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 19
1.00
1.02
2.02
1.05
3.13
4.19
3.09
1.06
1.12
1.33
7.27
3.05
f1 (ppm)

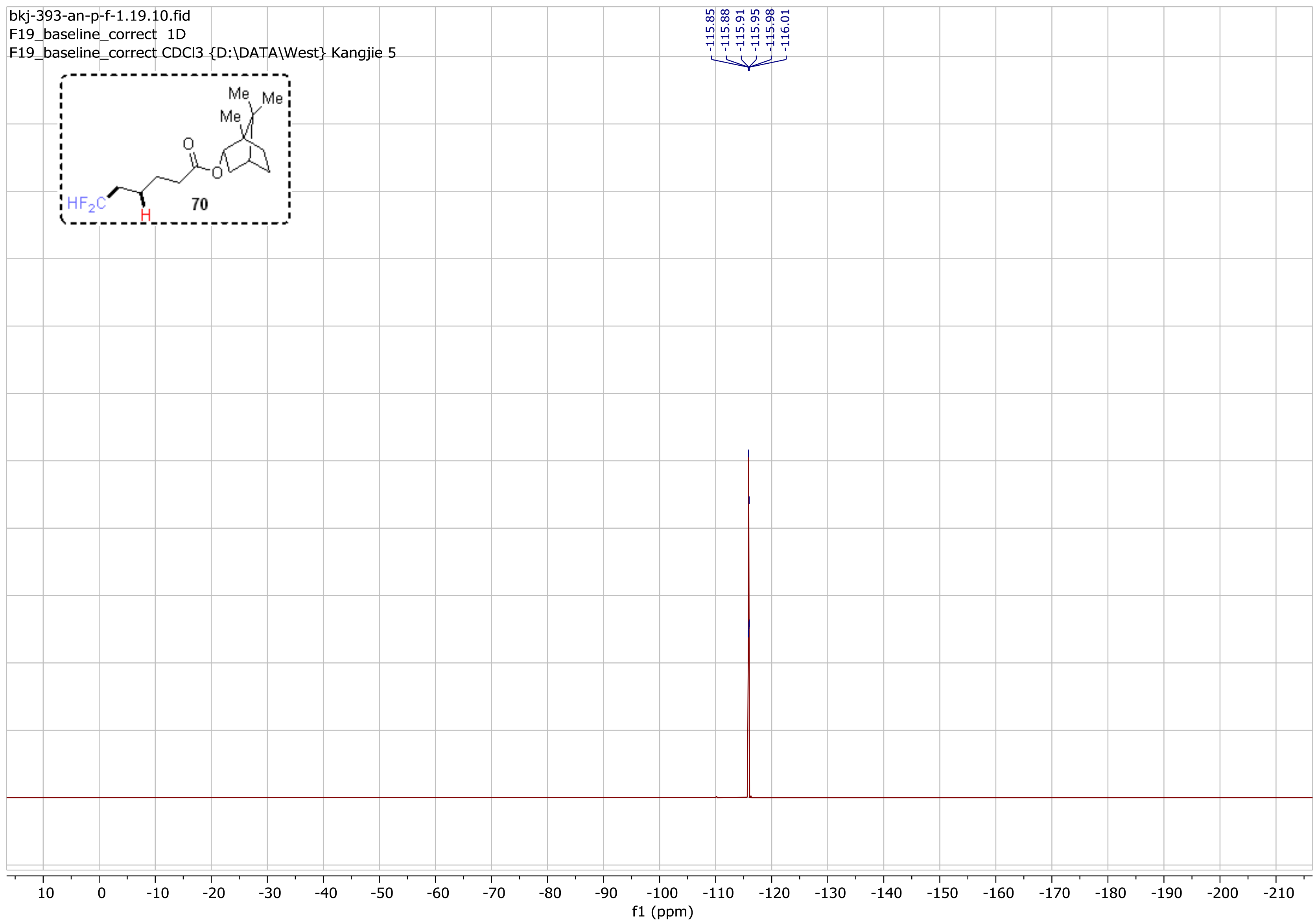
69

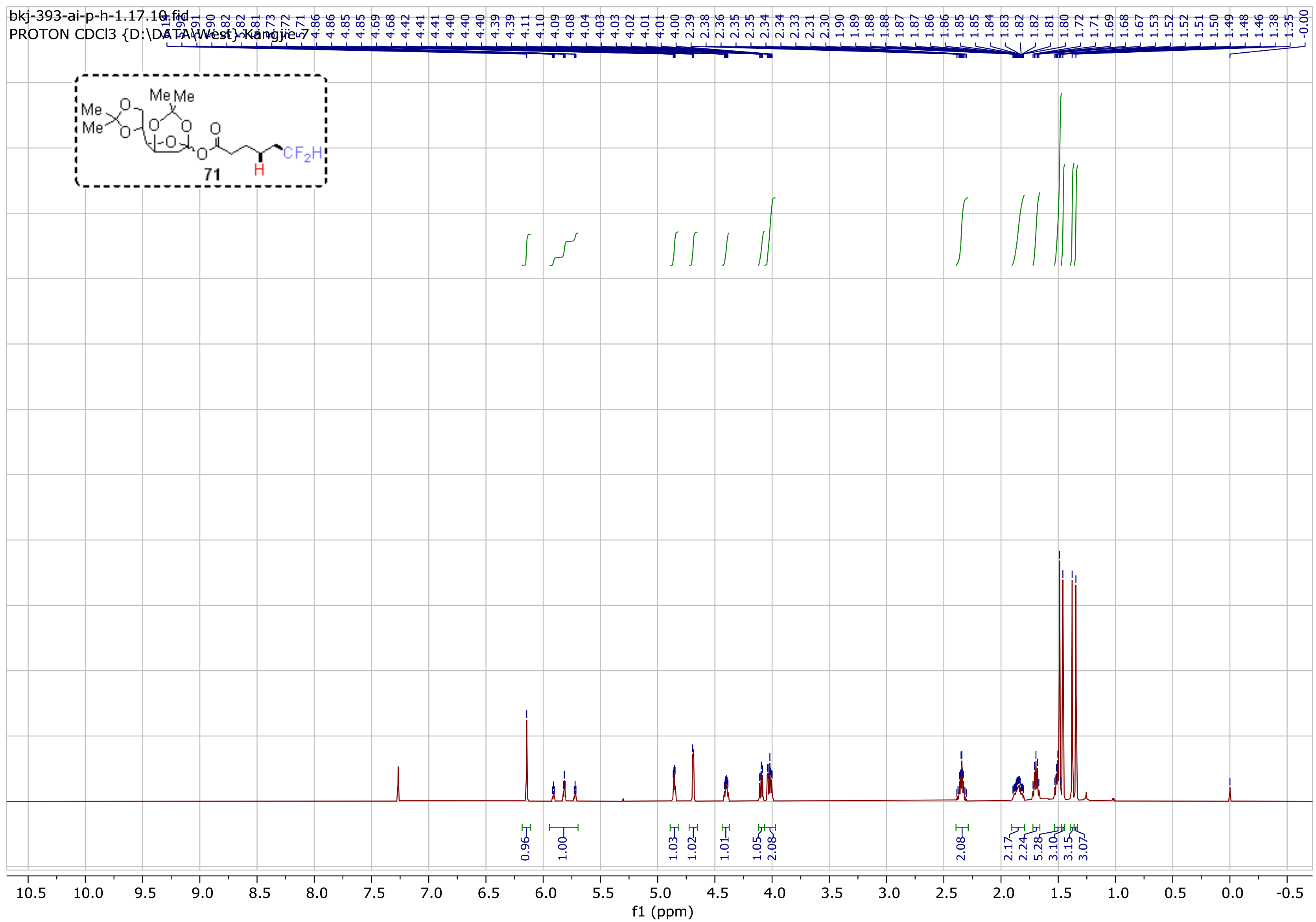

bkj-393-ah-p-c-1.12.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 19
172.83
118.68
117.10
115.51
74.18
47.02
40.95
34.36
34.26
33.92
33.78
33.64
31.39
26.31
24.50
23.42
22.02
21.67
21.63
21.59
20.75
16.27
H
CF2H
O
O
Me
Me
Me
69
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

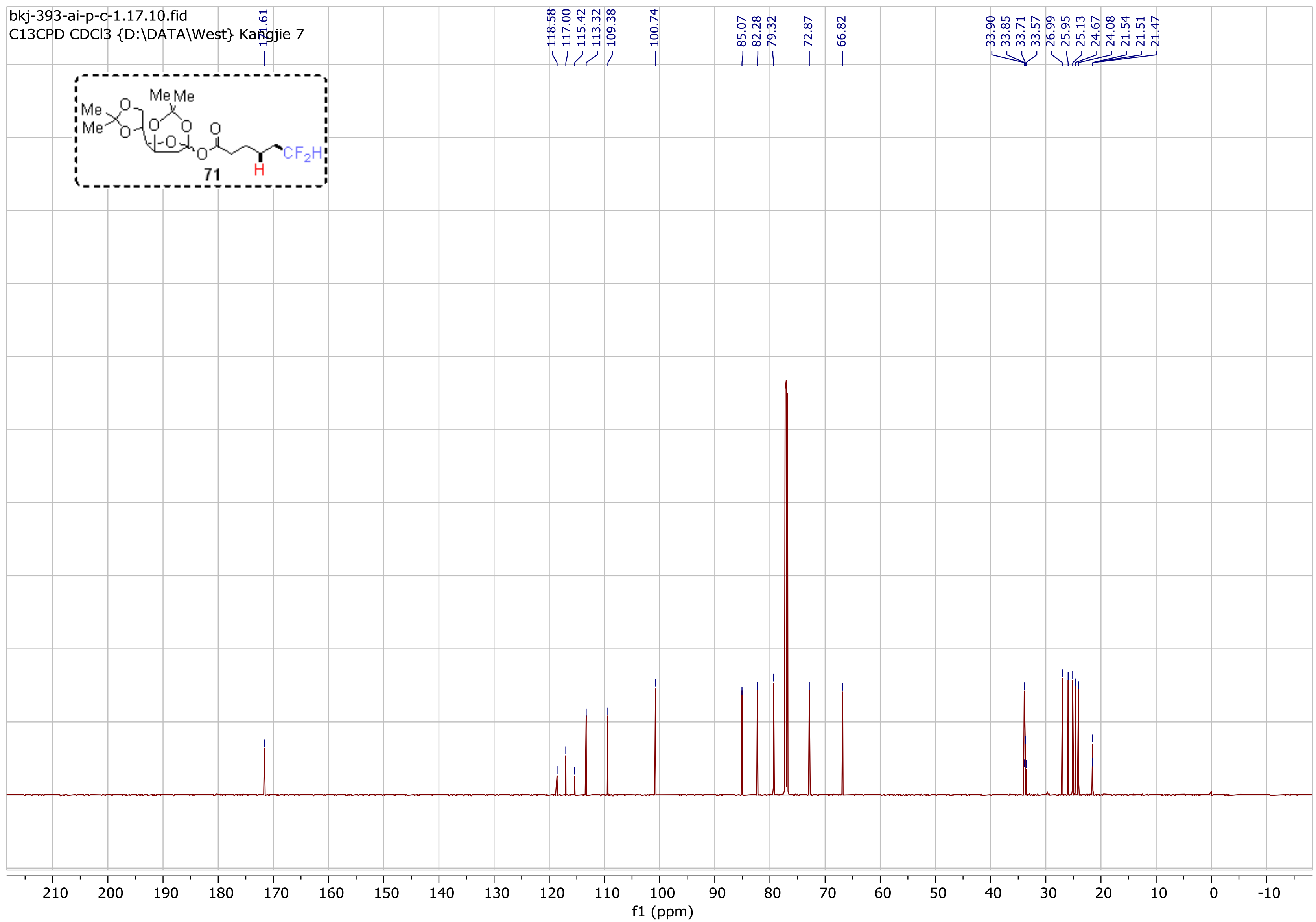

bkj-393-ah-p-f-1.11.10.fid
F19_baseline_correct 1D
F19_ A\West} Kangjie 19
H
CF2H
O
O
Me
Me
Me
69
-115.88
-115.91
-115.94
-115.98
-116.01
-116.04
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

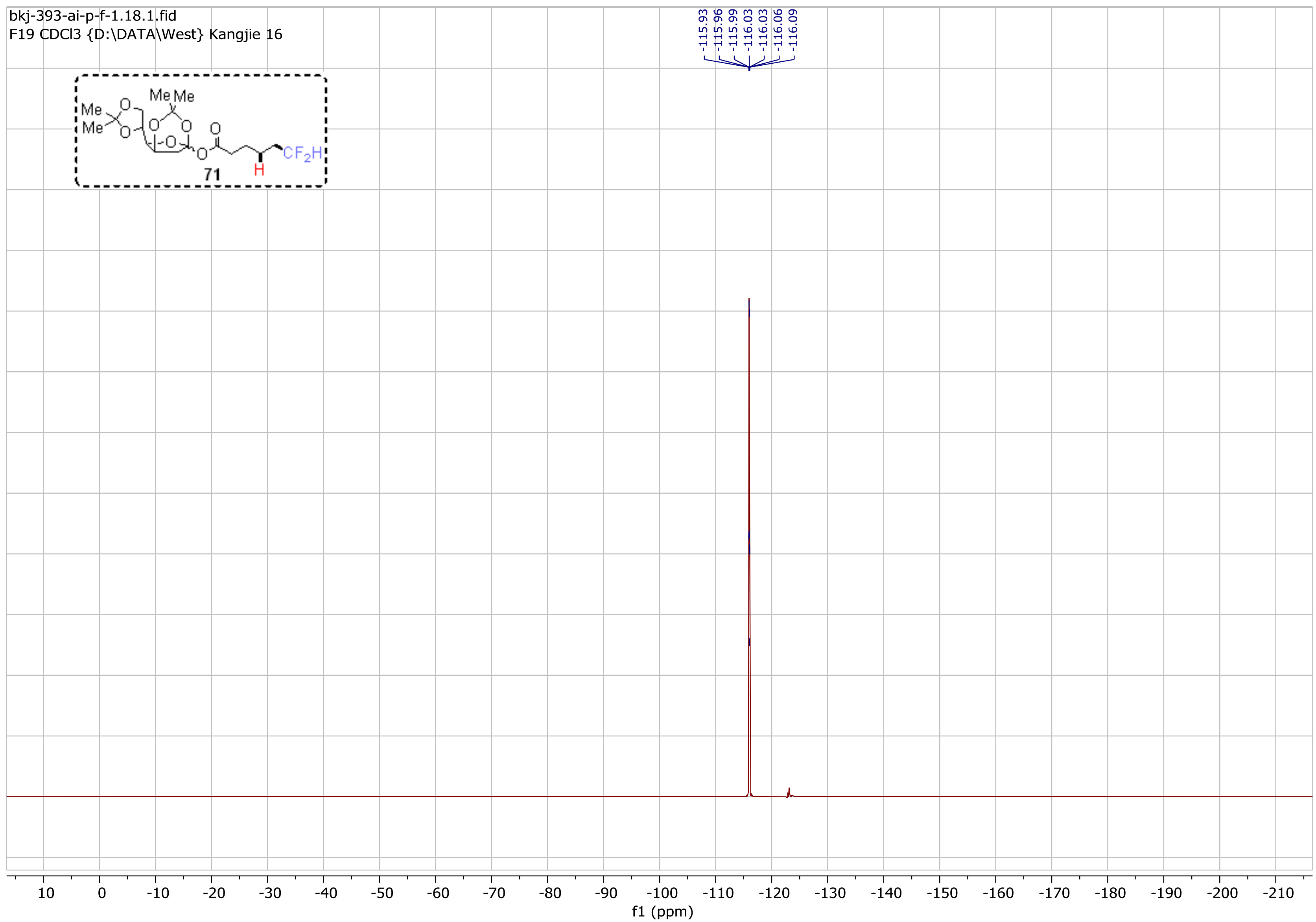

bkj-393-an-p-1.16.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 6
HF2C
H
70
Me
Me
Me
O
O
1.00
1.00
3.08
3.08
4.09
2.16
3.14
3.27
3.18
3.38
f1 (ppm)

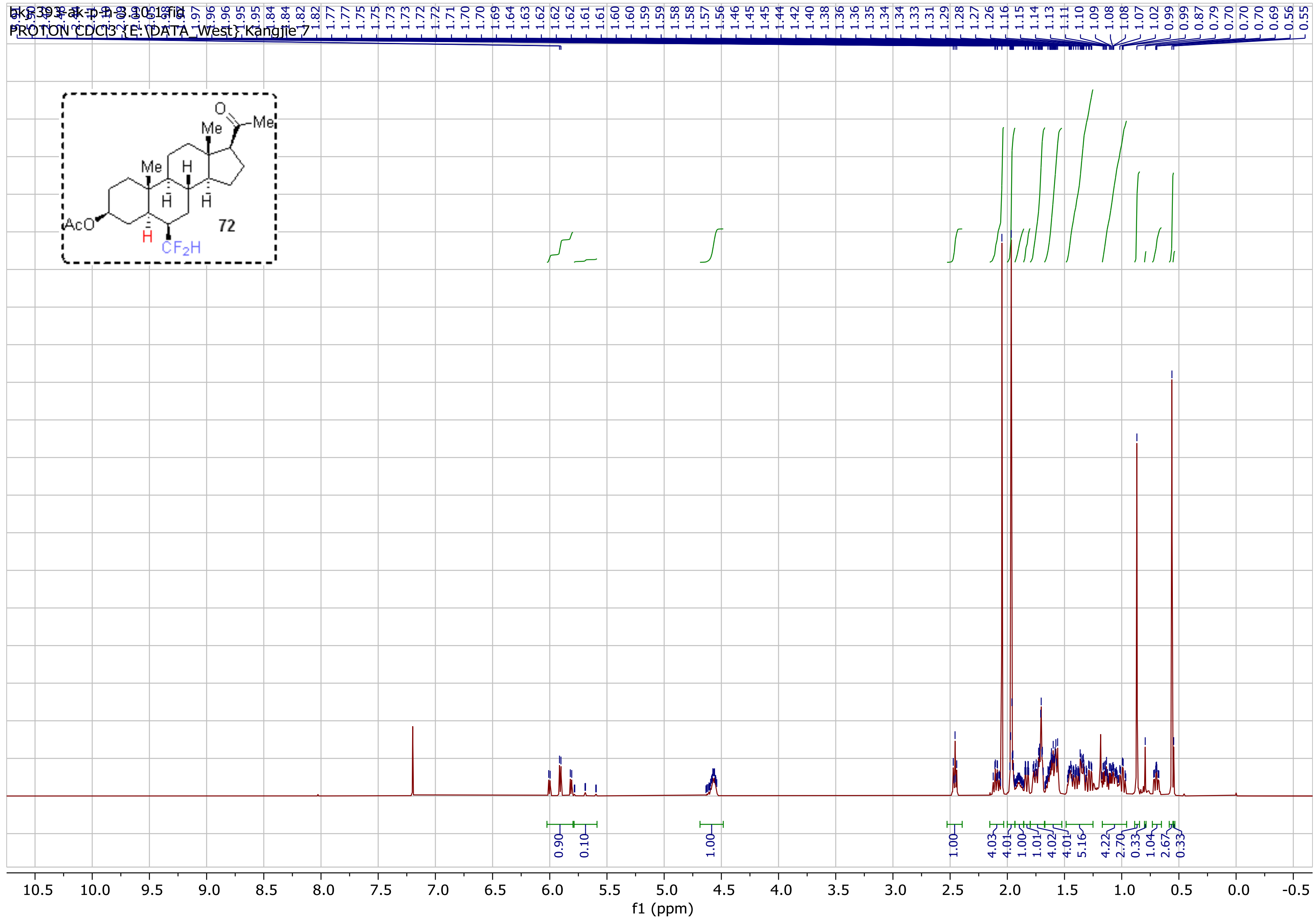

bkj-393-an-p-1.16.2.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 6
173.56
118.68
117.10
115.51
79.89
48.74
47.80
44.88
36.84
34.33
33.93
33.79
33.65
28.04
27.12
24.51
21.67
21.64
21.60
19.70
18.84
13.50
Me
Me
Me
O
O
HF2C
H
70
f1 (ppm)


bkj-393-an-p-f-1.19.10.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 5
-115.85
-115.88
-115.91
-115.95
-115.98
-116.01
Me
Me
Me
O
O
HF2C
H
70
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

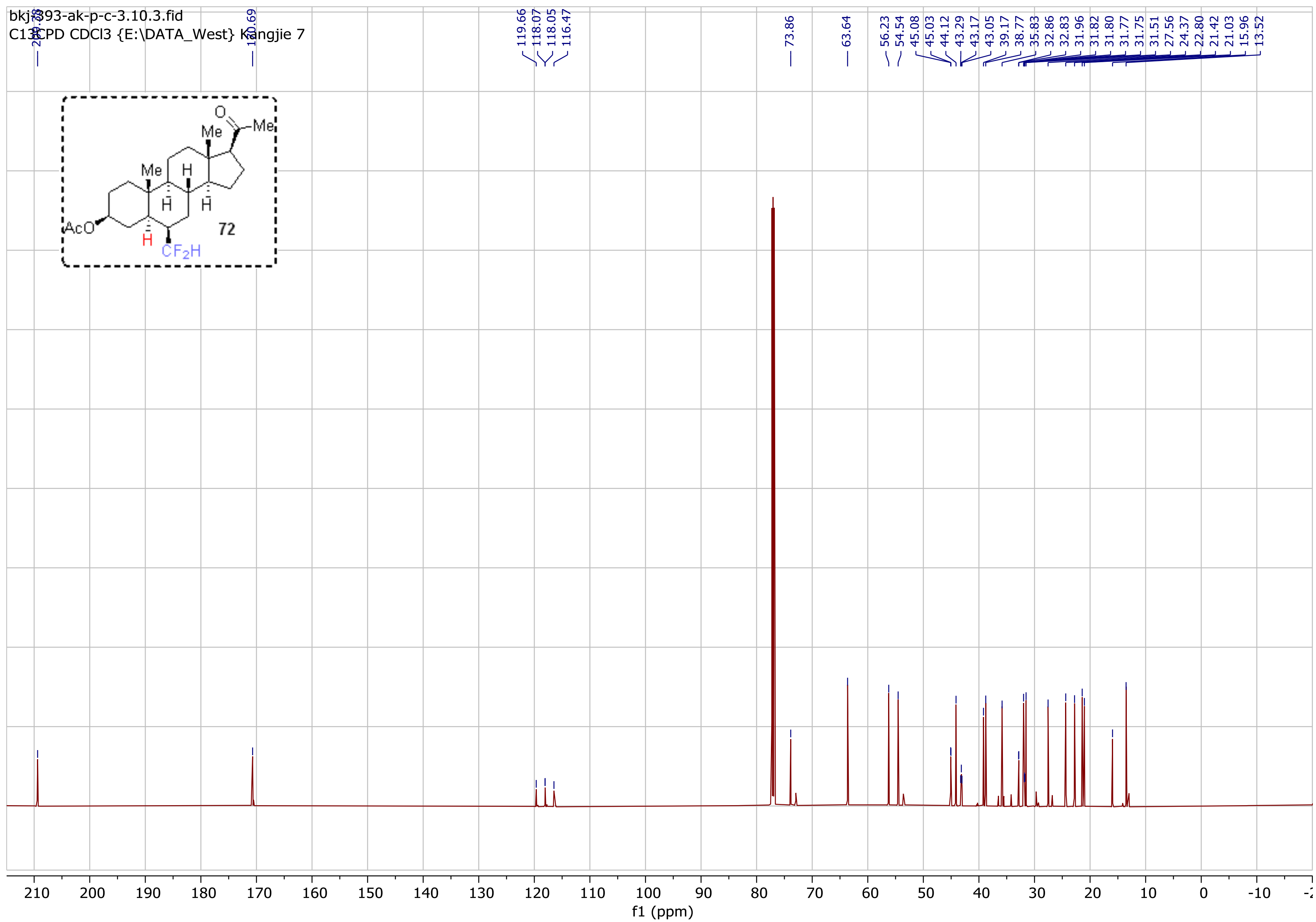

bkj-393-ai-p-h-1.17.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 7
71
f1 (ppm)

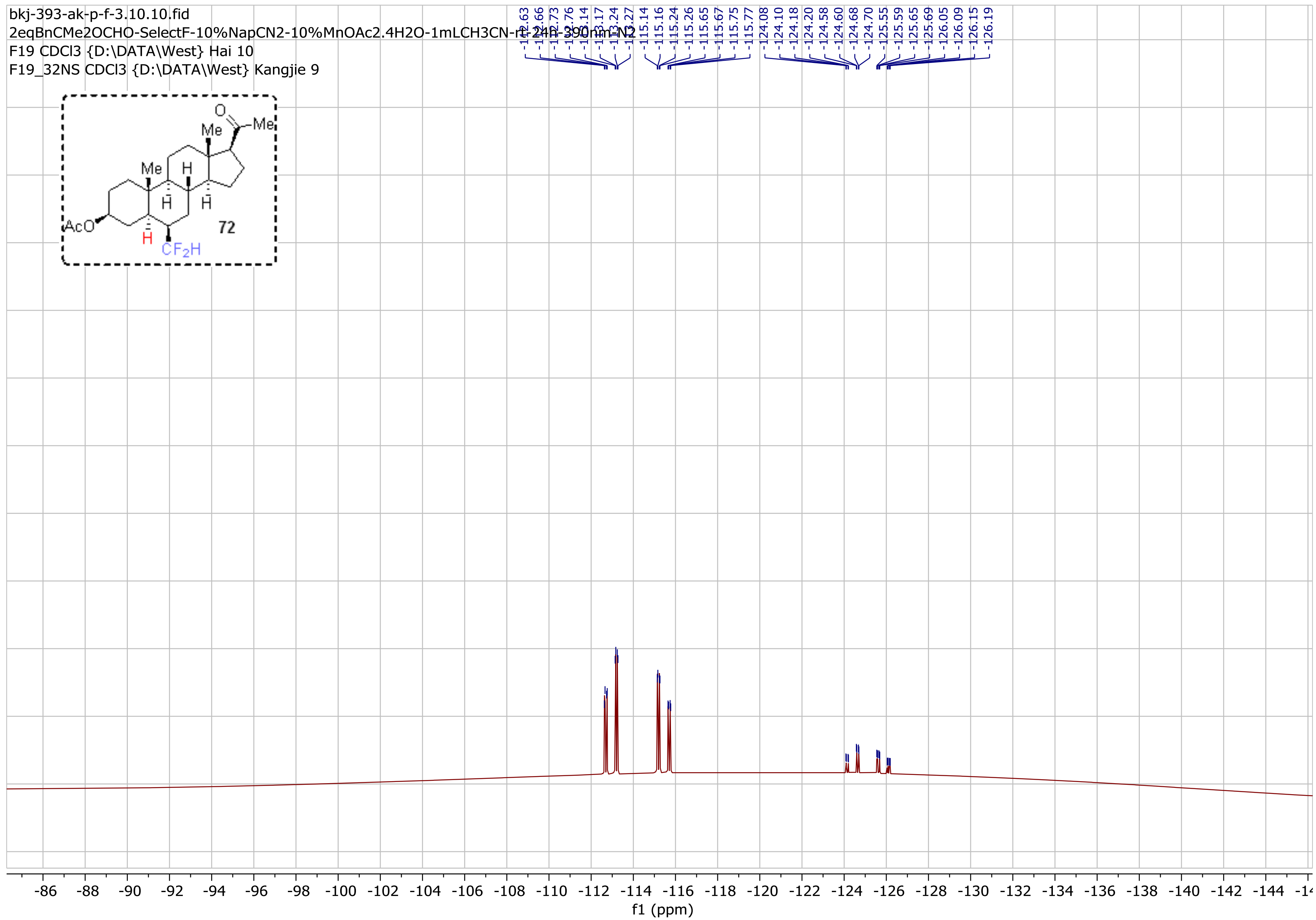

bkj-393-ai-p-c-1.17.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 7
171.61
118.58
117.00
115.42
113.32
109.38
100.74
85.07
82.28
79.32
72.87
66.82
33.90
33.85
33.71
33.57
26.99
25.95
25.13
24.67
24.08
21.54
21.51
21.47
Me
Me
Me Me
O
CF2H
H
71
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

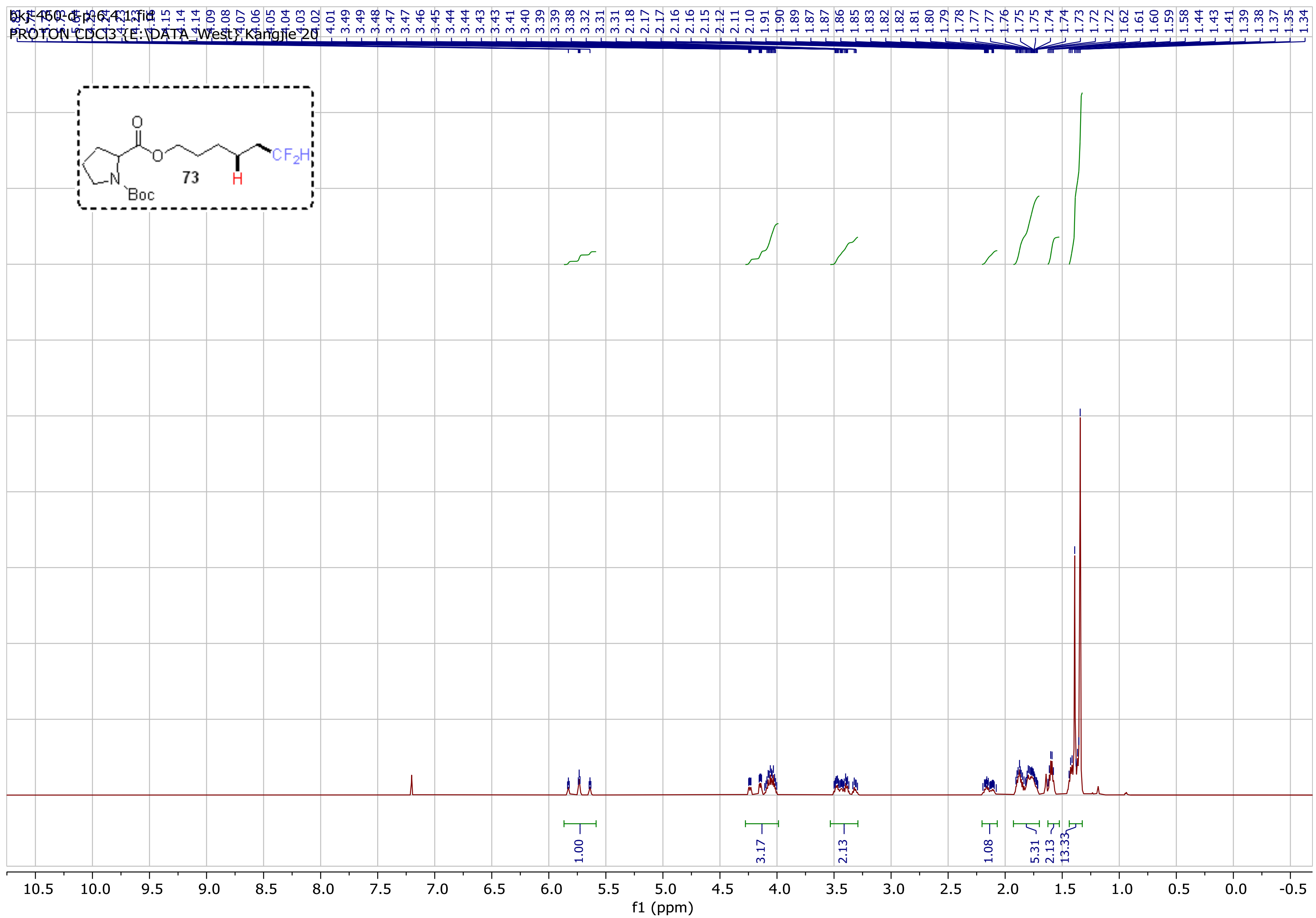

bkj-393-ai-p-f-1.18.1.fid
F19 CDCl3 {D:\DATA\West} Kangjie 16
Me
Me
Me Me
O
71
H
CF2H
-115.93
-115.96
-115.99
-116.03
-116.03
-116.06
-116.09
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

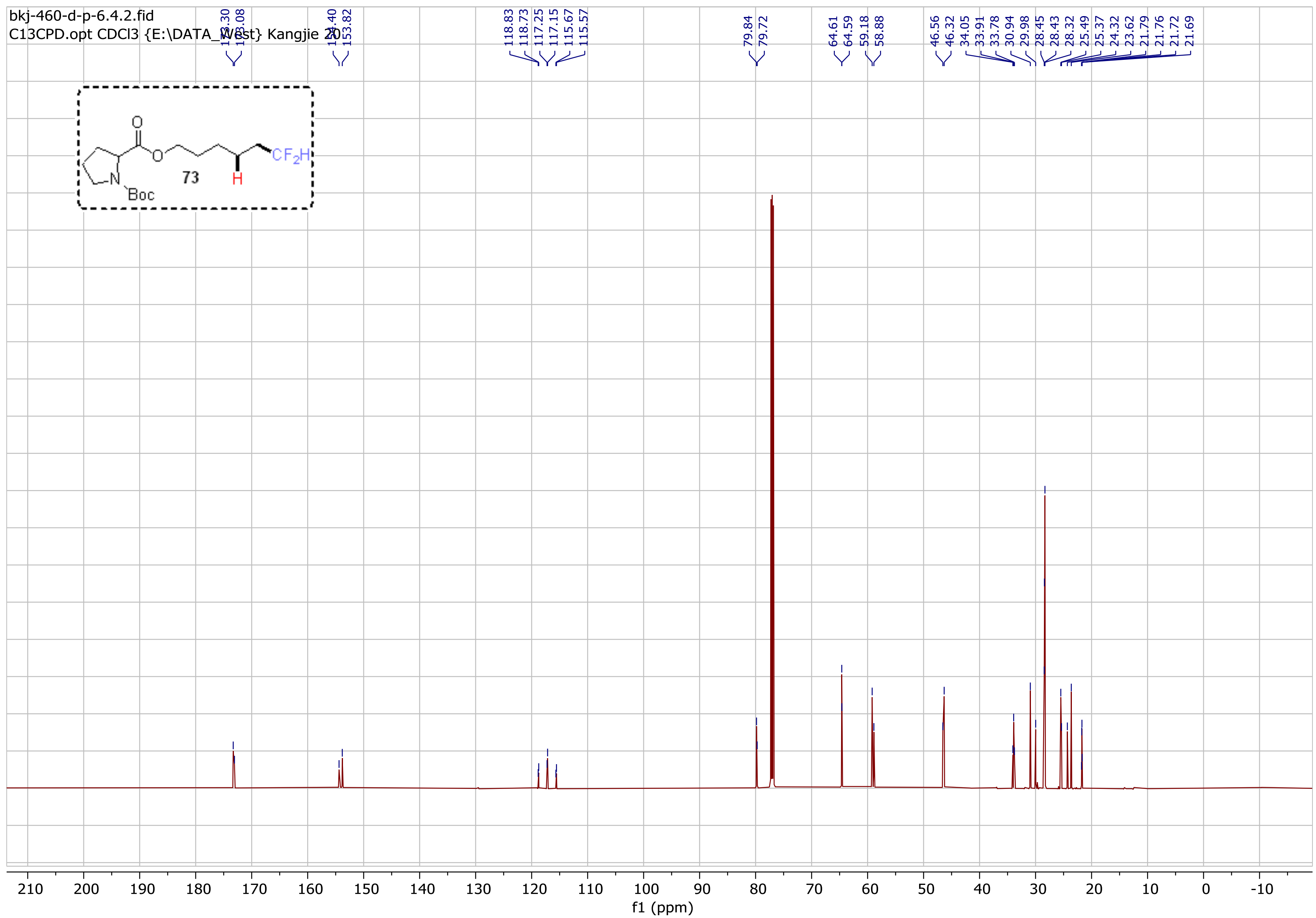


PROTON CDCl3 {E:\DATA_West} Kangjie 7
AcO
Me
H
CF2H
72
O
0.90
0.10
1.00
1.00
4.03
4.01
1.00
1.01
4.02
4.01
5.16
4.22
2.70
0.33
1.04
2.67
0.33
f1 (ppm)

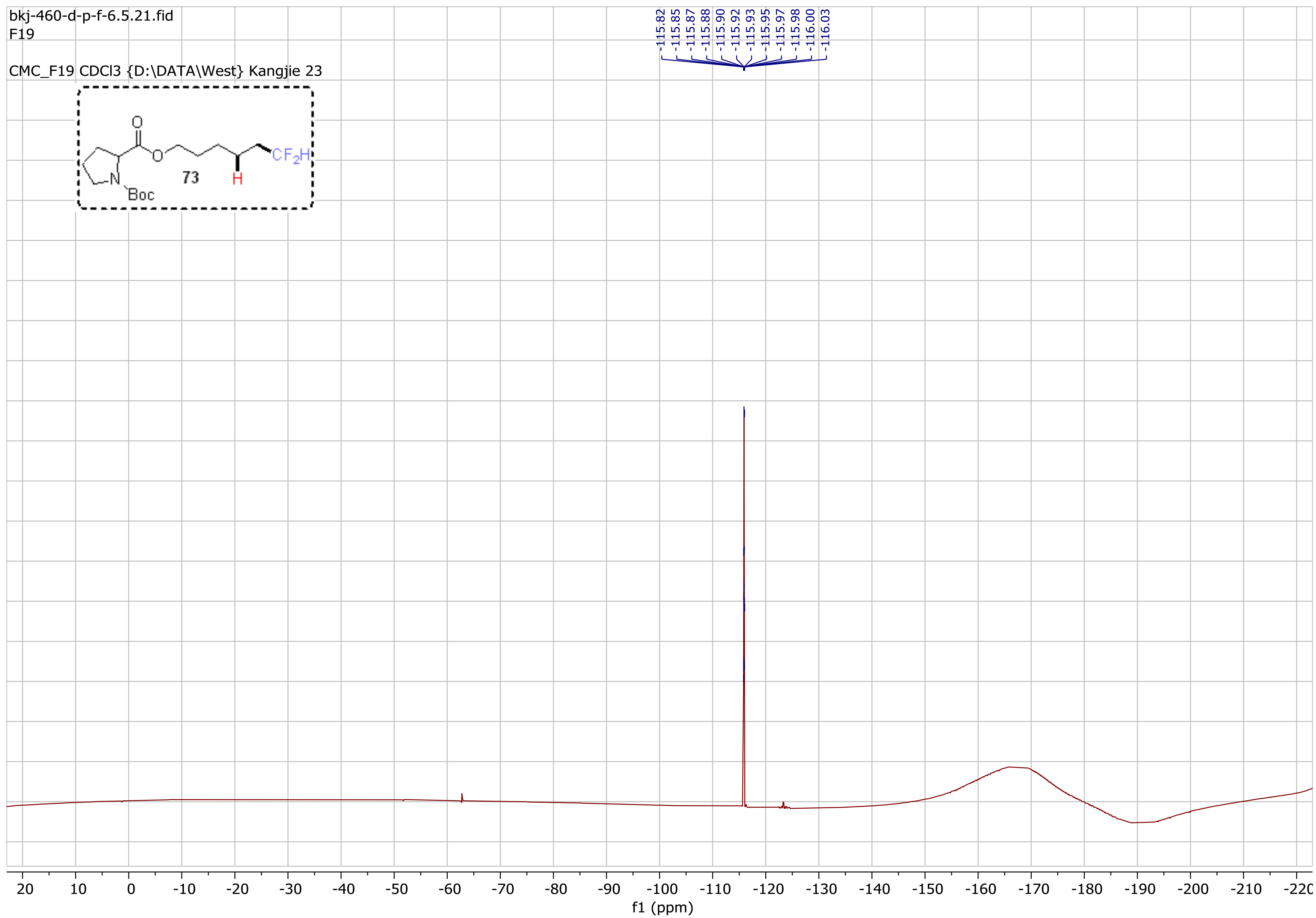

bkj393-ak-p-c-3.10.3.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 7
209.78
170.69
119.66
118.07
118.05
116.47
73.86
63.64
56.23
54.54
45.08
45.03
44.12
43.29
43.17
43.05
39.17
38.77
35.83
32.86
32.83
31.96
31.82
31.80
31.77
31.75
31.51
27.56
24.37
22.80
21.42
21.03
15.96
13.52
AcO
Me
H
CF2H
72
f1 (ppm)

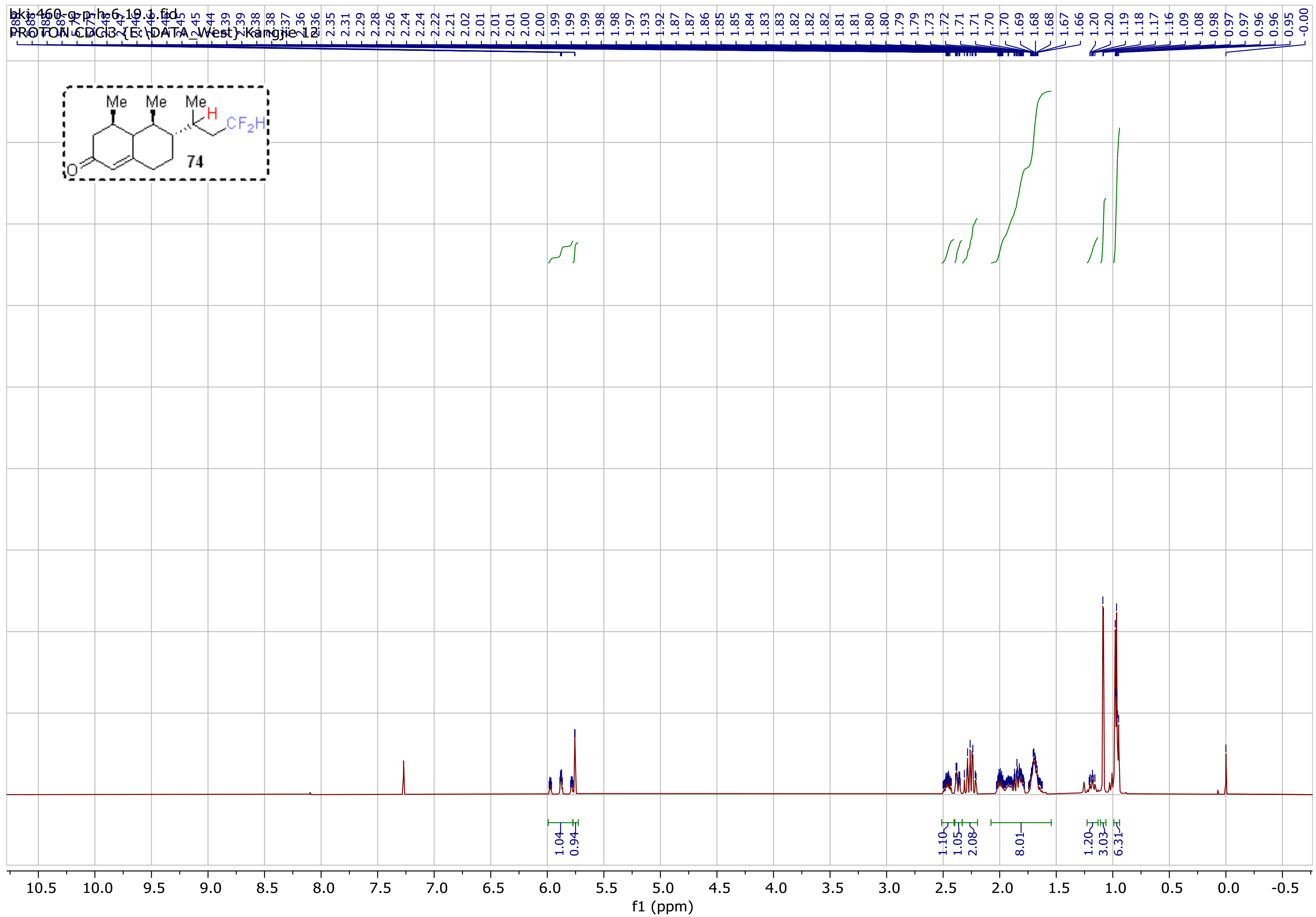

bkj-393-ak-p-f-3.10.10.fid
2eqBnCMe2OCHO-SelectF-10%NapCN2-10%MnOAc2.4H2O-1mLCH3CN-rt-24h-390nm-N2
F19 CDCl3 {D:\DATA\West} Hai 10
F19_32NS CDCl3 {D:\DATA\West} Kangjie 9
AcO
Me
H
Me
O
Me
H
CF2H
72
-112.63
-112.66
-112.73
-112.76
-113.14
-113.17
-113.24
-113.27
-115.14
-115.16
-115.24
-115.26
-115.65
-115.67
-115.75
-115.77
-124.08
-124.10
-124.18
-124.20
-124.58
-124.60
-124.68
-124.70
-125.55
-125.59
-125.65
-125.69
-126.05
-126.09
-126.15
-126.19
f1 (ppm)


PROTON CDCl3 {E:\DATA_West} Kangjie 20
73
Boc
CF2H
H
1.00
3.17
2.13
1.08
5.31
2.13
13.33
f1 (ppm)

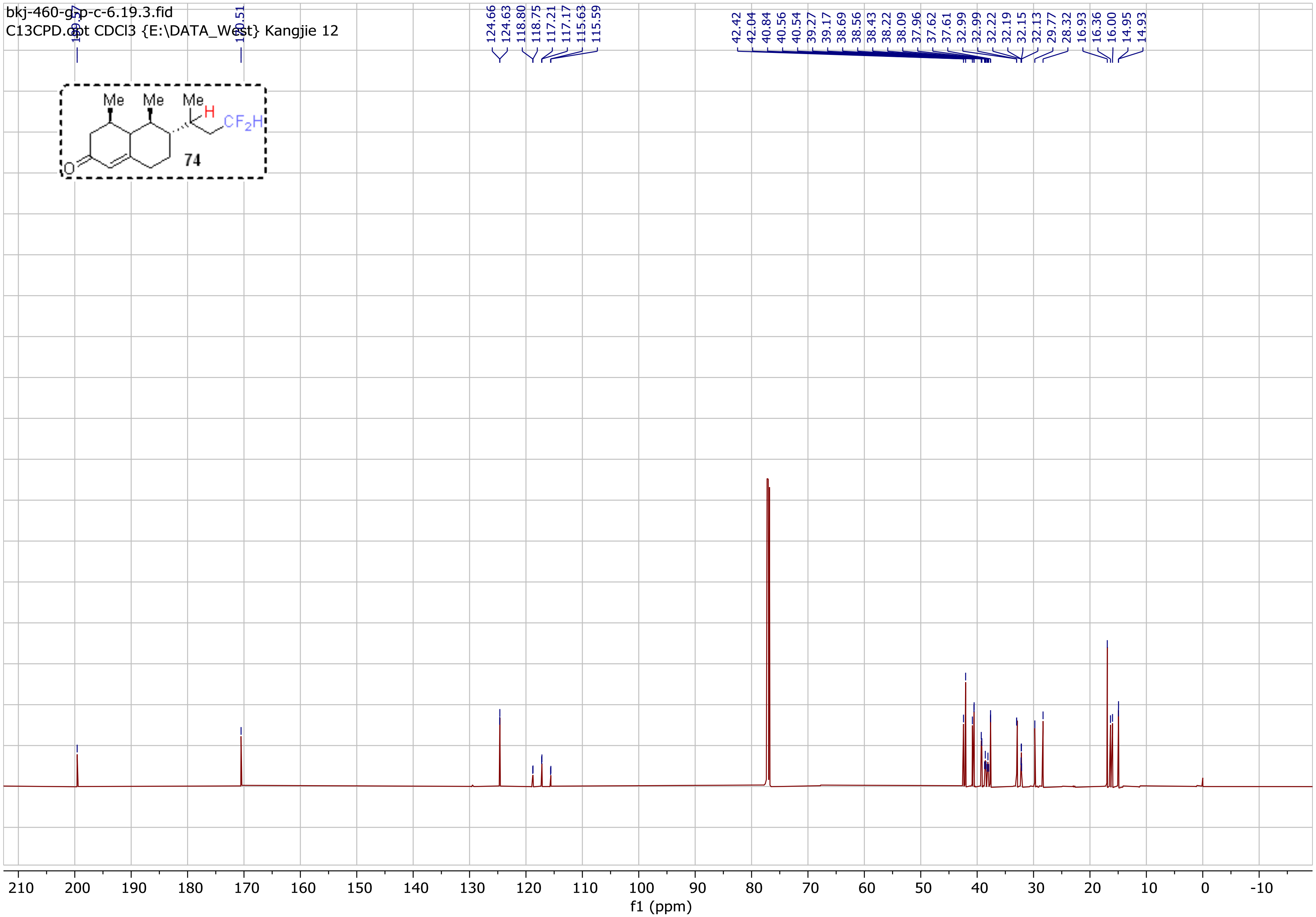


bkj-460-d-p-6.4.2.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 20
173.30
173.08
154.40
153.82
118.83
118.73
117.25
117.15
115.67
115.57
79.84
79.72
64.61
64.59
59.18
58.88
46.56
46.32
34.05
33.91
33.78
30.94
29.98
28.45
28.43
28.32
25.49
25.37
24.32
23.62
21.79
21.76
21.72
21.69
73
Boc
N
O
CF2H
H
f1 (ppm)

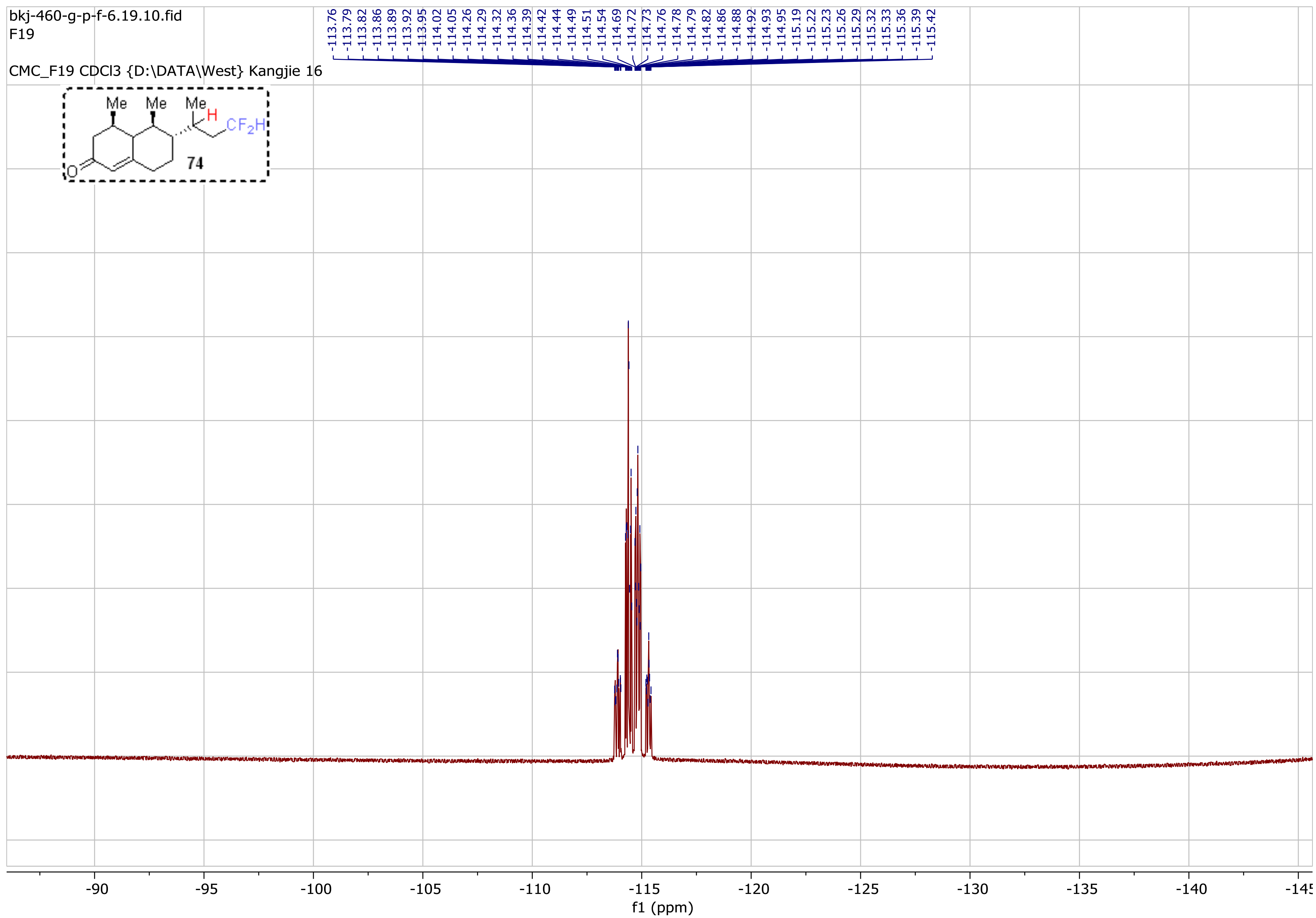

bkj-460-d-p-f-6.5.21.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 23
73
Boc
N
O
O
H
CF2H
-115.82
-115.85
-115.87
-115.88
-115.90
-115.92
-115.93
-115.95
-115.97
-115.98
-116.00
-116.03
20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220
f1 (ppm)

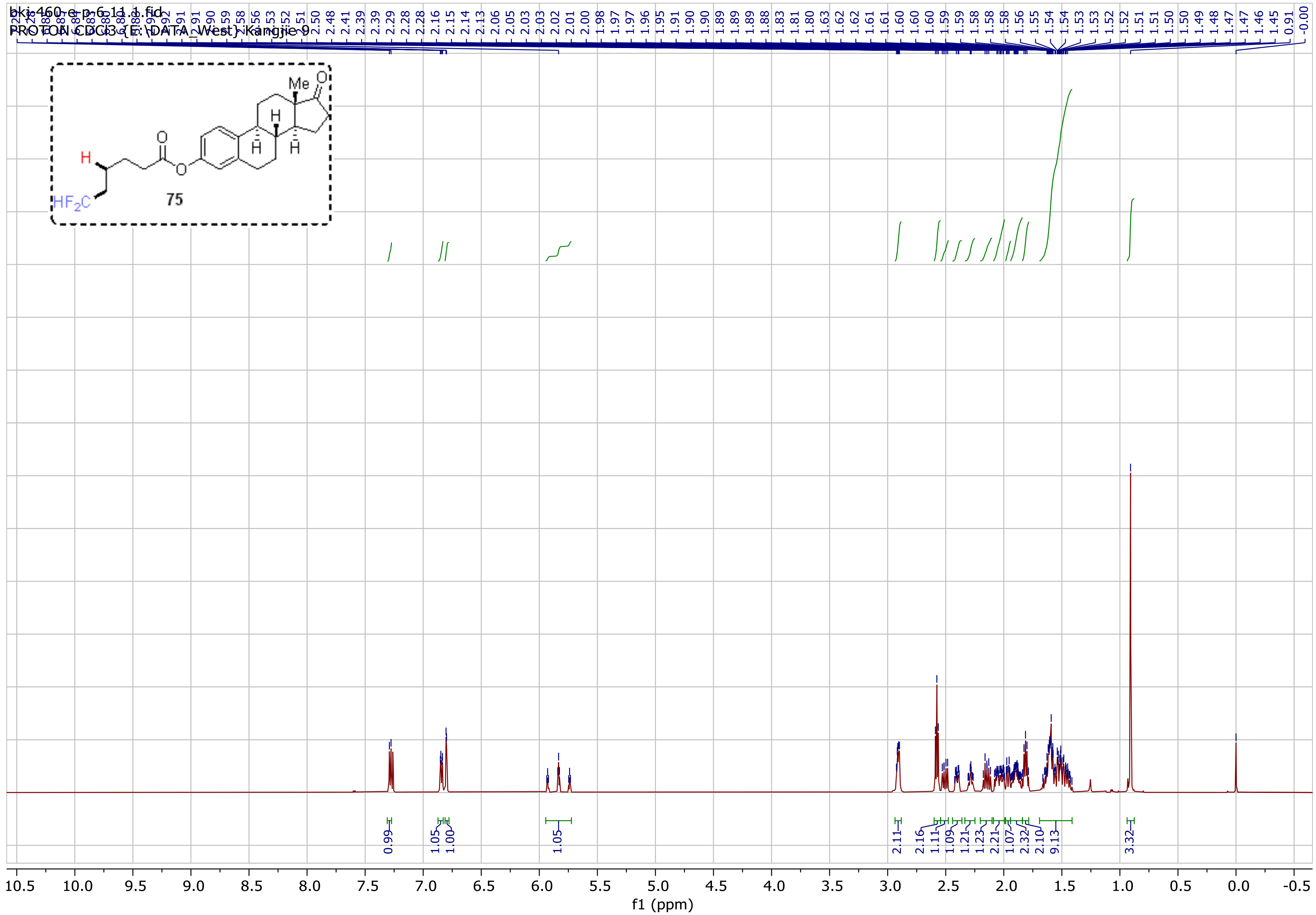

bki-460-c-p-h-6.19.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 12
Me
Me
Me
H
CF2H
O
74
1.04
0.94
1.10
1.05
2.08
8.01
1.20
3.03
6.31
f1 (ppm)

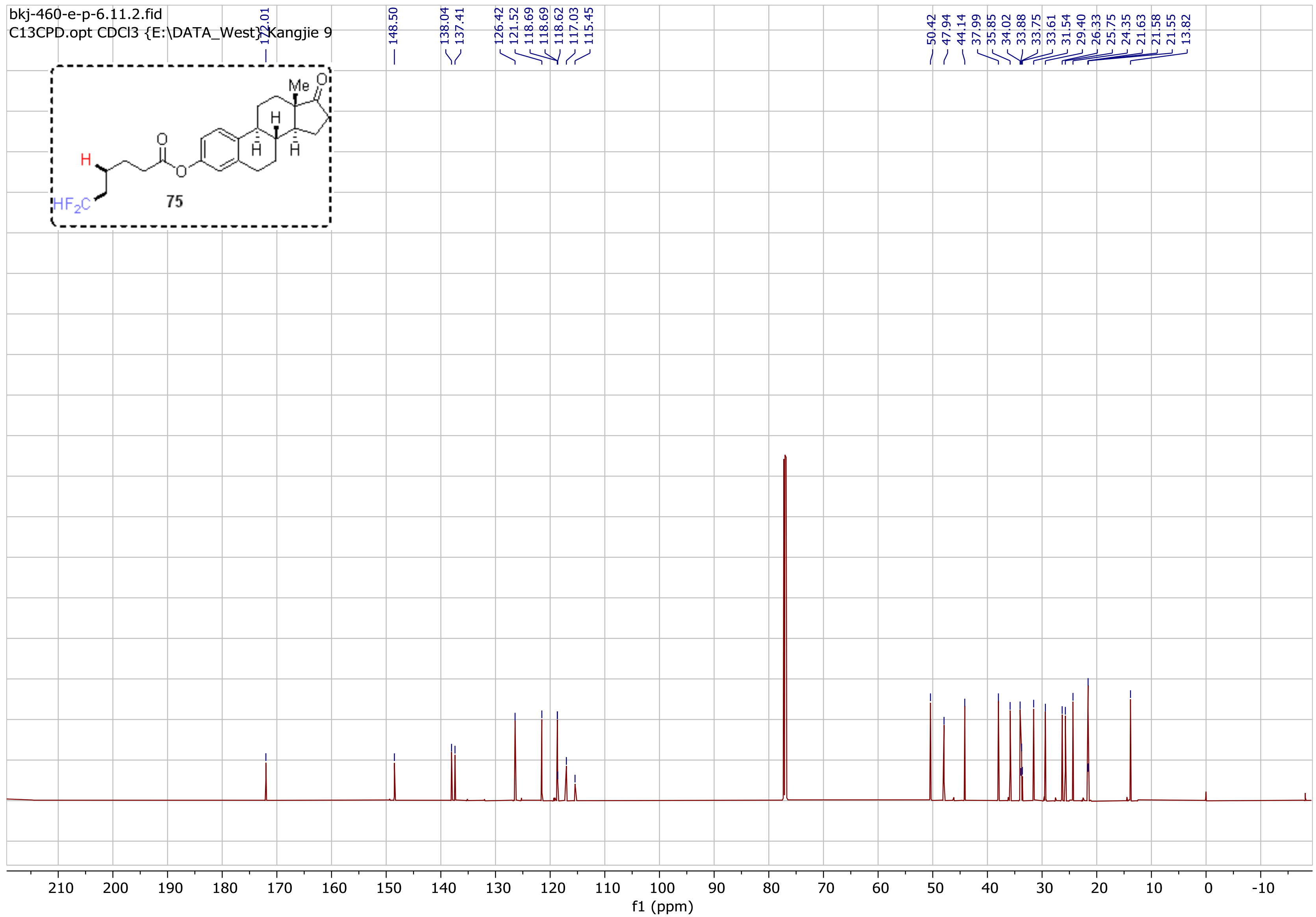
bkj-460-g-p-c-6.19.3.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 12



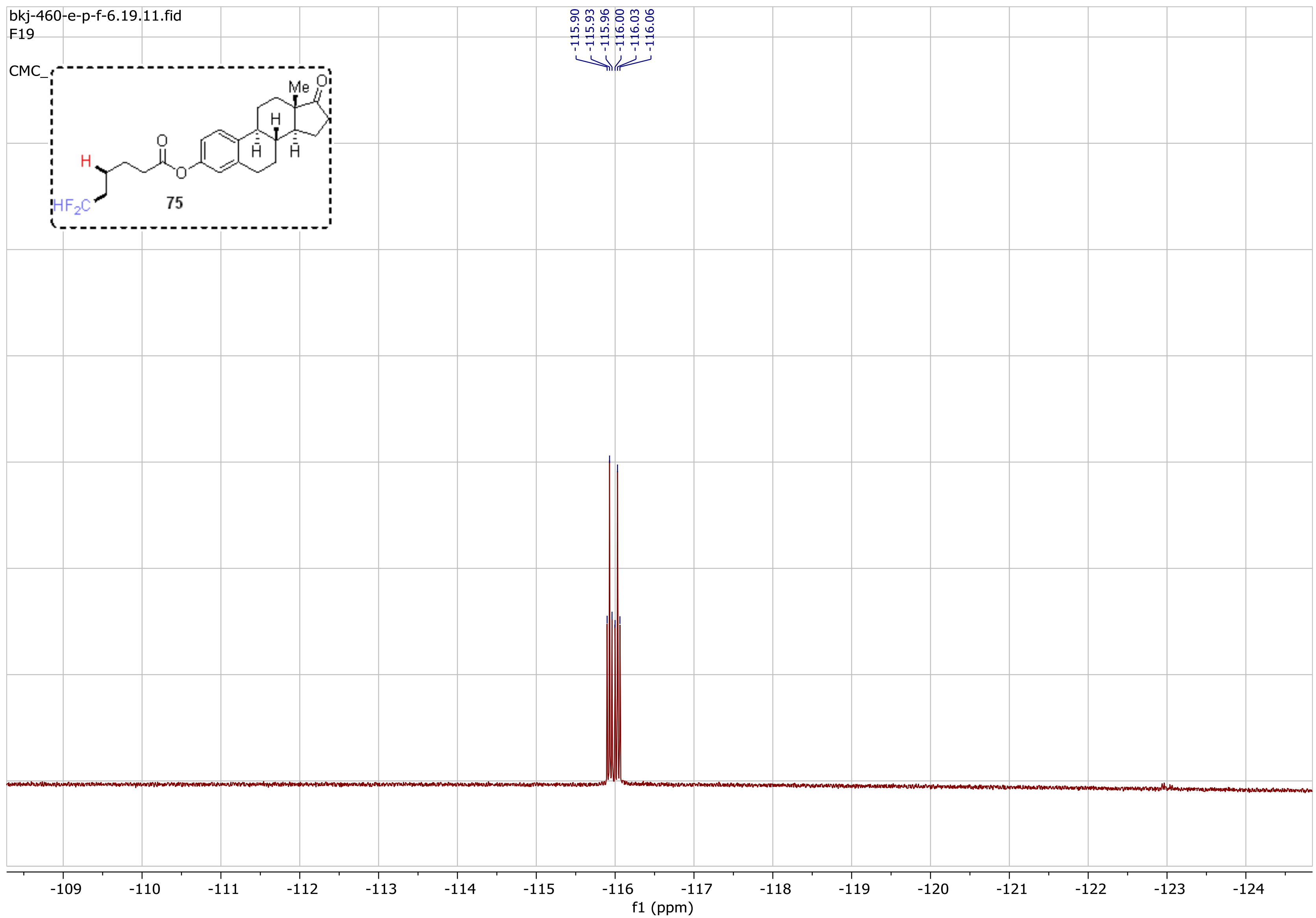
74

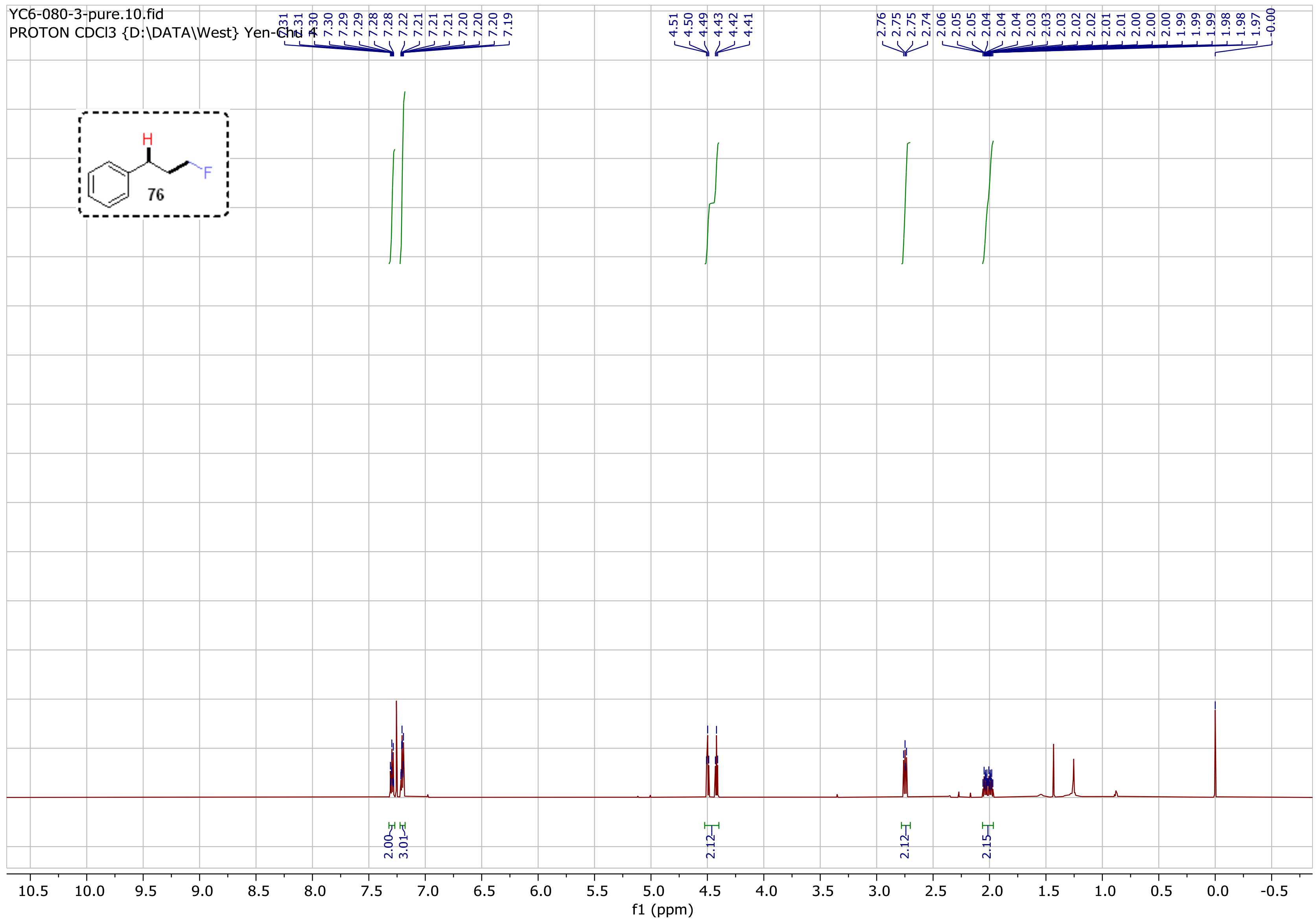

bkj-460-g-p-f-6.19.10.fid
F19
CMC_F19 CDCl3 {D:\DATA\West} Kangjie 16
Me
Me
Me
H
CF2H
O
74
-113.76
-113.79
-113.82
-113.86
-113.89
-113.92
-113.95
-114.02
-114.05
-114.26
-114.29
-114.32
-114.36
-114.39
-114.42
-114.44
-114.49
-114.51
-114.54
-114.69
-114.72
-114.73
-114.76
-114.78
-114.79
-114.82
-114.86
-114.88
-114.92
-114.93
-114.95
-115.19
-115.22
-115.23
-115.26
-115.29
-115.32
-115.33
-115.36
-115.39
-115.42
-90
-95
-100
-105
-110
-115
-120
-125
-130
-135
-140
f1 (ppm)

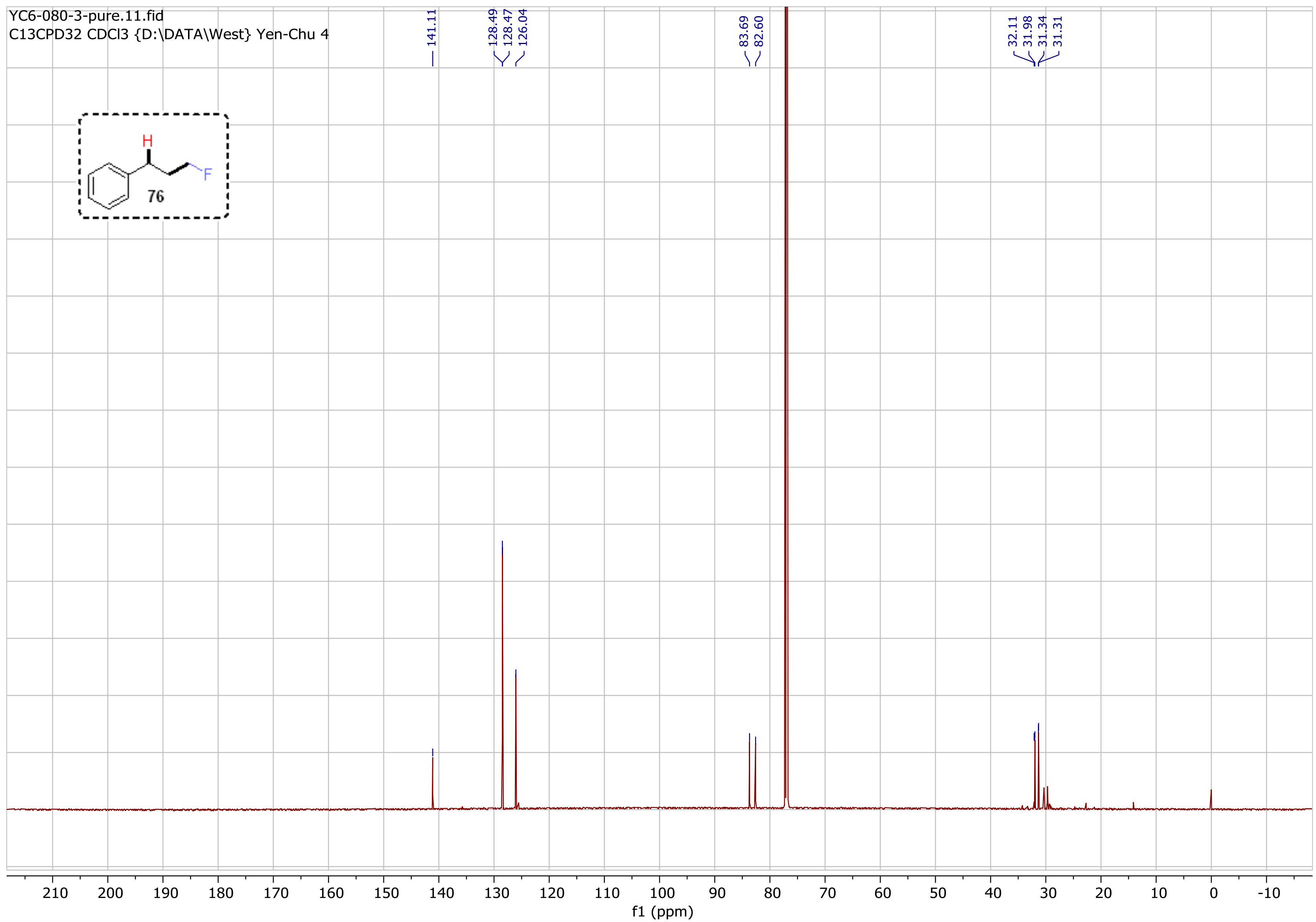

bki-460-e-p-6-11.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 9
Me
O
H
H
H
O
O
H
HF2C
75
0.99
1.05
1.00
1.05
2.11
2.16
1.11
1.09
1.21
1.23
2.21
1.07
2.32
2.10
9.13
3.32
f1 (ppm)

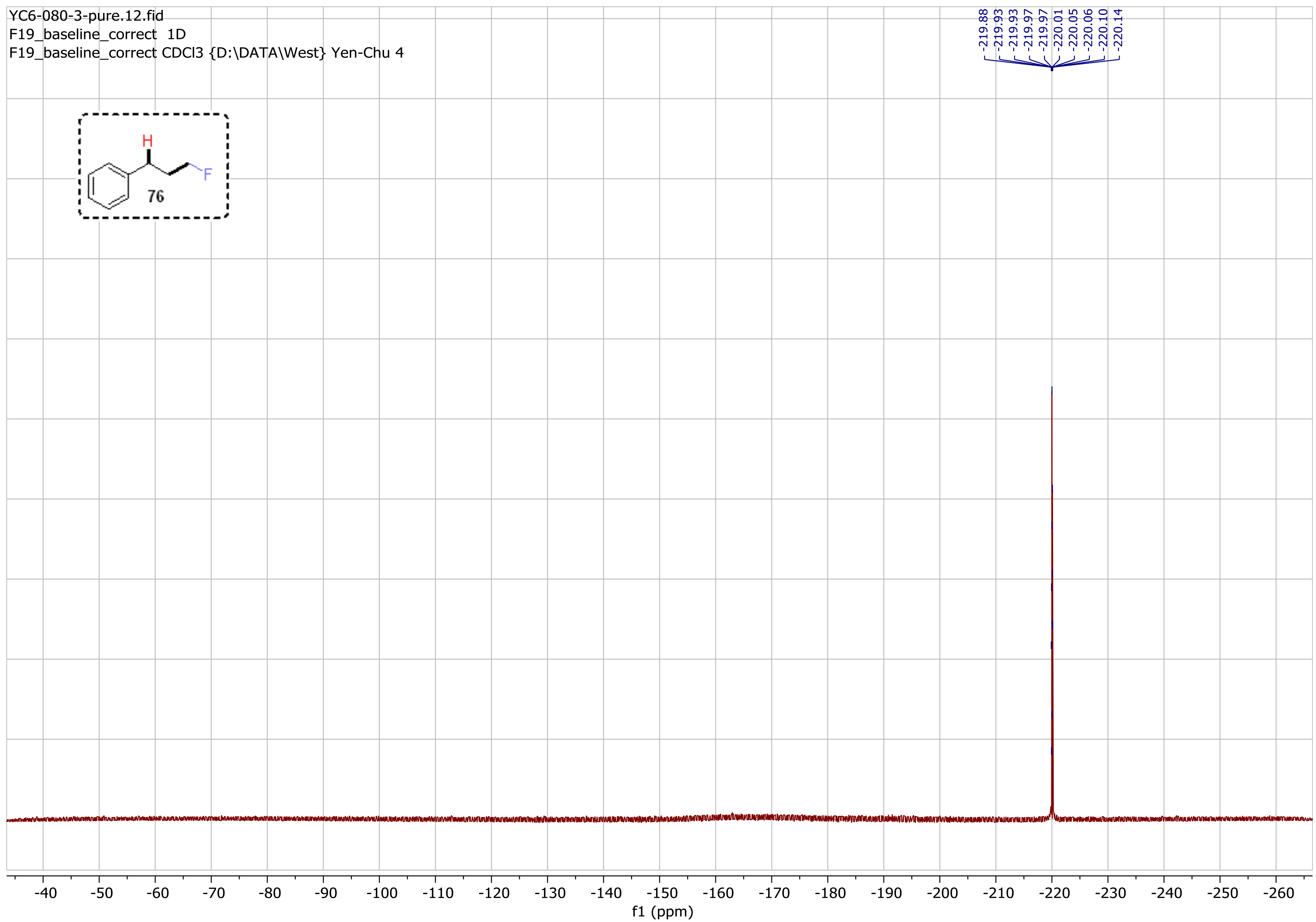


bkj-460-e-p-6.11.2.fid
C13CPD.opt CDCl3 {E:\DATA_West} Kangjie 9
Me
O
H
H
H
O
O
H
HF2C
75
172.01
148.50
138.04
137.41
126.42
121.52
118.69
118.69
118.62
117.03
115.45
50.42
47.94
44.14
37.99
35.85
34.02
33.88
33.75
33.61
31.54
29.40
26.33
25.75
24.35
21.63
21.58
21.55
13.82
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

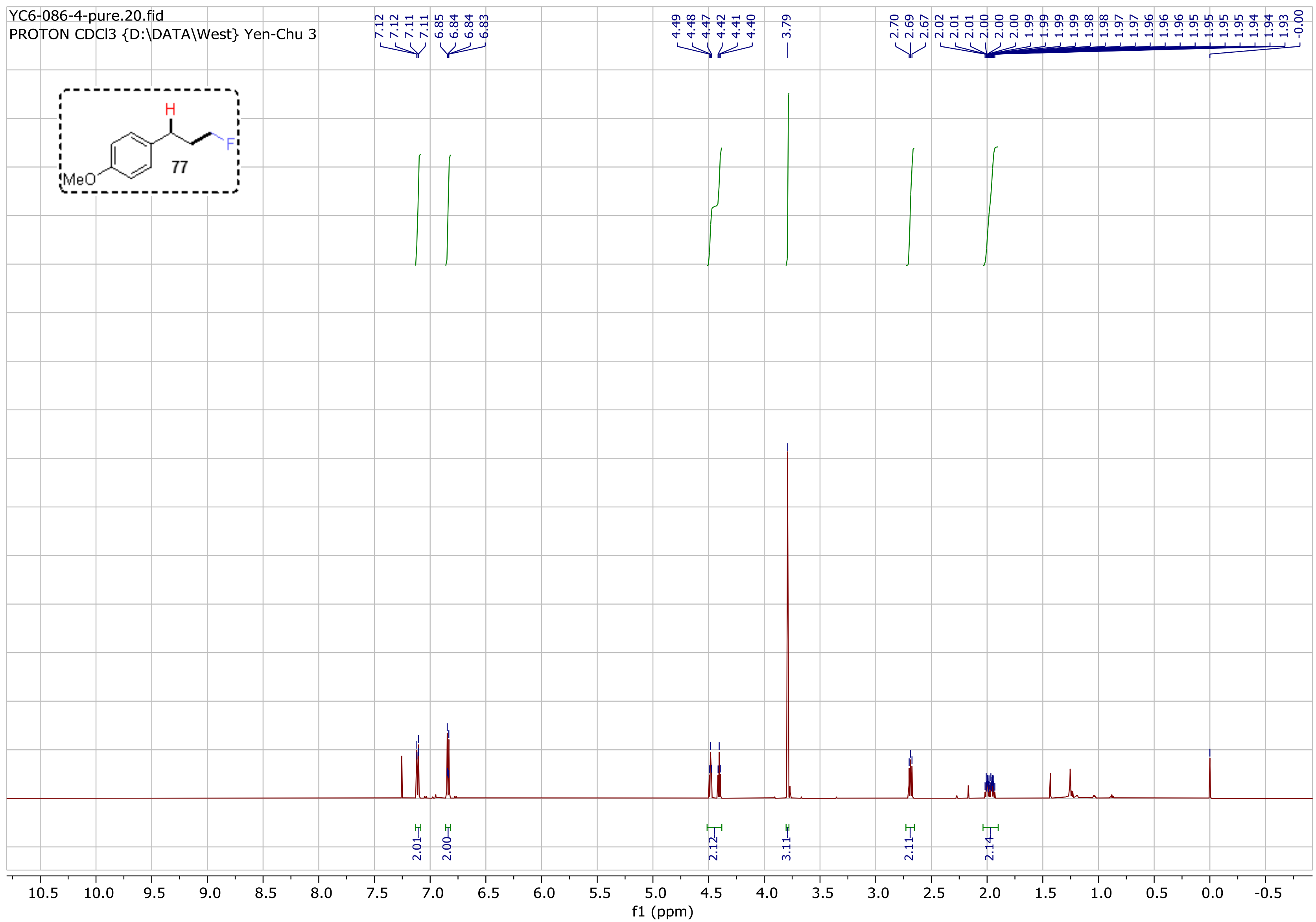

bkj-460-e-p-f-6.19.11.fid
F19
CMC_
Me
O
H
H
H
O
O
H
HF2C
75
-115.90
-115.93
-115.96
-116.00
-116.03
-116.06
-109
-110
-111
-112
-113
-114
-115
-116
-117
-118
-119
-120
-121
-122
-123
-124
f1 (ppm)


YC6-080-3-pure.10.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 4
7.31
7.31
7.30
7.30
7.29
7.29
7.28
7.28
7.22
7.21
7.21
7.21
7.20
7.20
7.20
7.19
4.51
4.50
4.49
4.43
4.42
4.41
2.76
2.75
2.75
2.74
2.06
2.05
2.05
2.04
2.04
2.04
2.03
2.03
2.03
2.02
2.02
2.01
2.01
2.00
2.00
2.00
1.99
1.99
1.99
1.98
1.98
1.97
-0.00
H
F
76
2.00
3.01
2.12
2.12
2.15
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

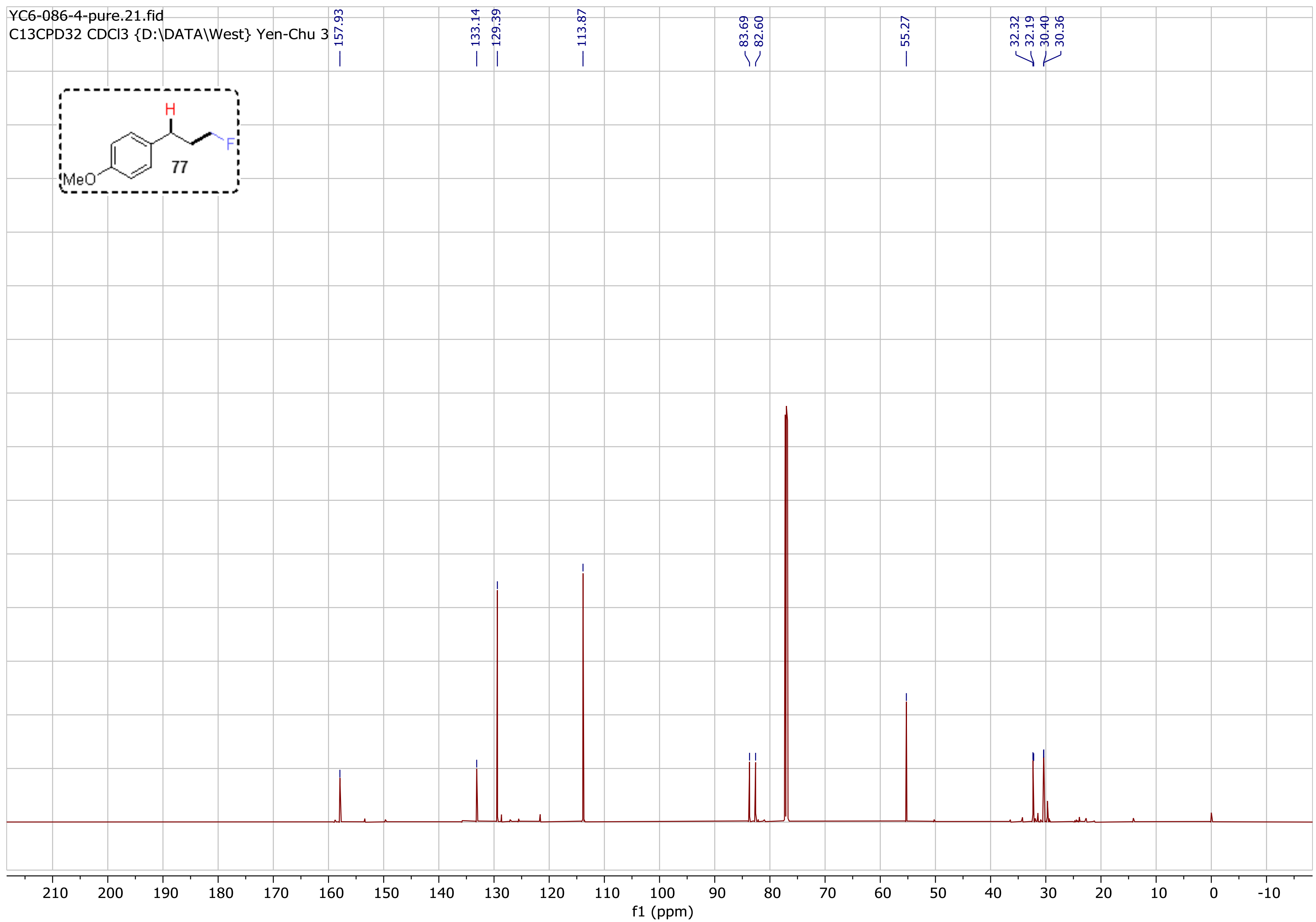

YC6-080-3-pure.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 4
141.11
128.49
128.47
126.04
83.69
82.60
32.11
31.98
31.34
31.31
H
F
76
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

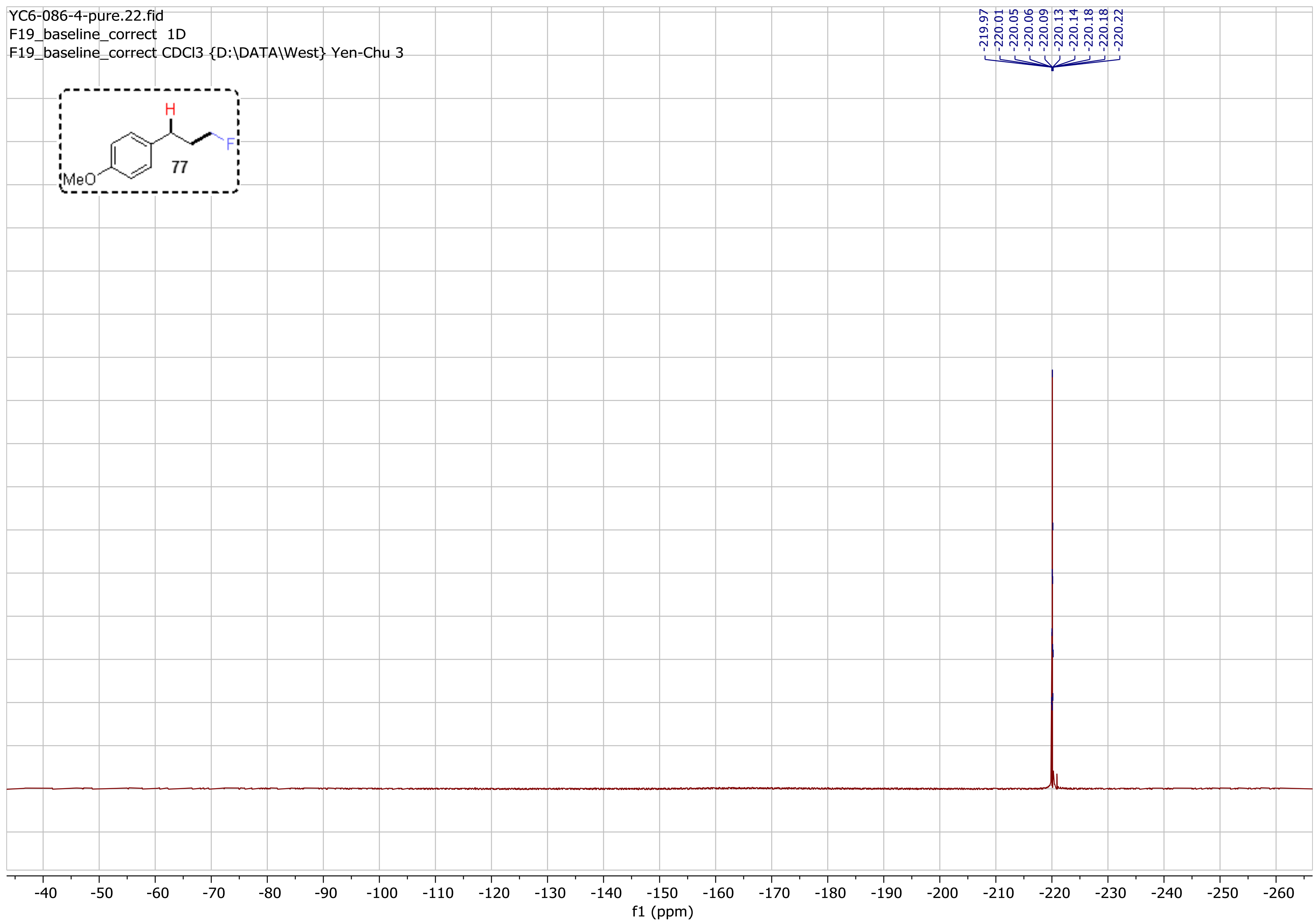


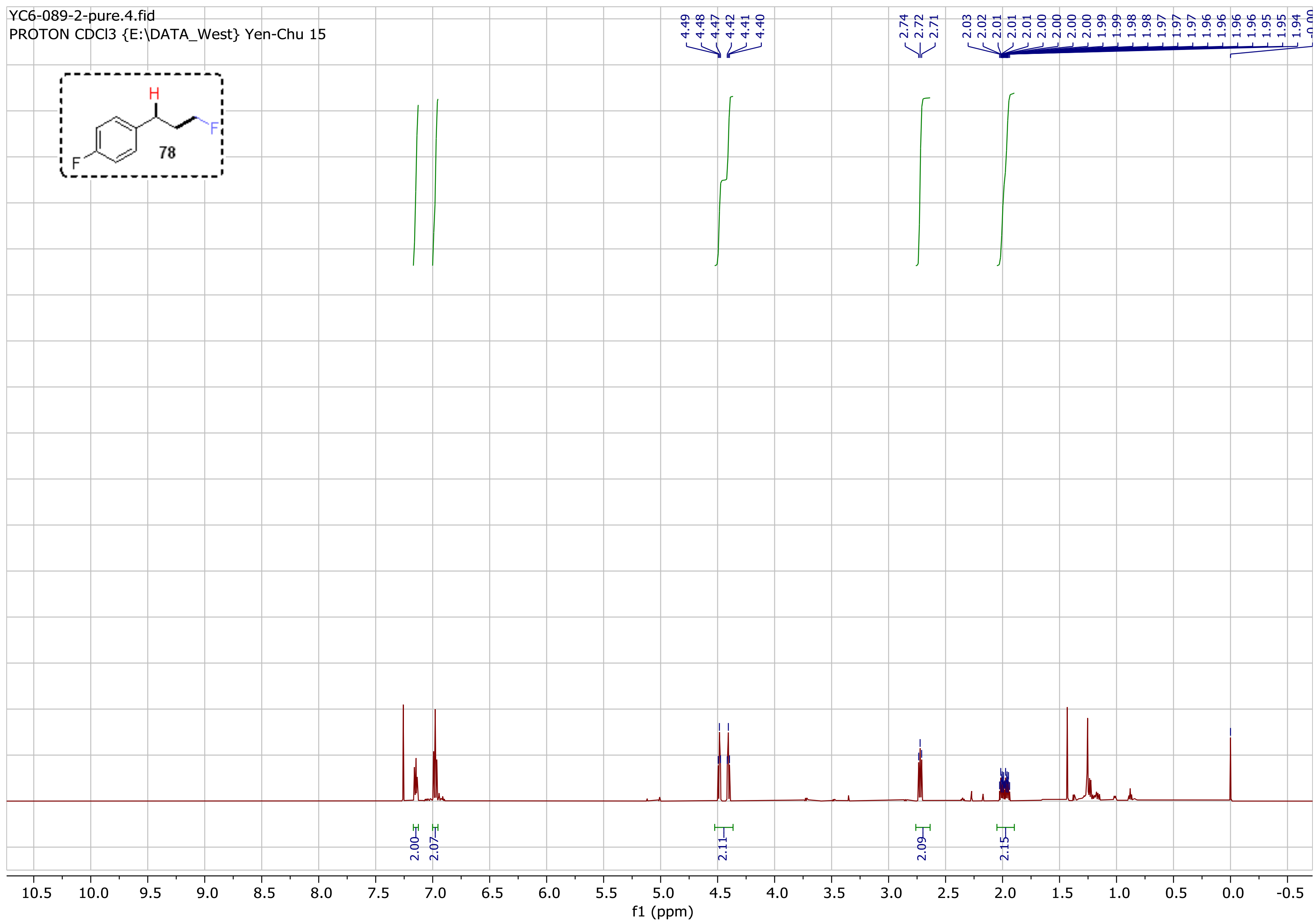
YC6-080-3-pure.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 4
76
H
F
-219.88
-219.93
-219.93
-219.97
-219.97
-220.01
-220.05
-220.06
-220.10
-220.14
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)



YC6-086-4-pure.20.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 3
MeO
H
F
77
7.12
7.12
7.11
7.11
6.85
6.84
6.84
6.83
4.49
4.48
4.47
4.42
4.41
4.40
3.79
2.70
2.69
2.67
2.02
2.01
2.01
2.00
2.00
2.00
1.99
1.99
1.99
1.99
1.98
1.98
1.97
1.97
1.96
1.96
1.96
1.95
1.95
1.95
1.95
1.94
1.94
1.93
-0.00
2.01
2.00
2.12
3.11
2.11
2.14
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


YC6-086-4-pure.21.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 3
157.93
133.14
129.39
113.87
83.69
82.60
55.27
32.32
32.19
30.40
30.36
H
F
MeO
77
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


YC6-086-4-pure.22.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 3
MeO
H
F
77
-219.97
-220.01
-220.05
-220.06
-220.09
-220.13
-220.14
-220.18
-220.18
-220.22
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)


YC6-089-2-pure.4.fid
PROTON CDCl3 {E:\DATA_West} Yen-Chu 15
78
4.49
4.48
4.47
4.42
4.41
4.40
2.74
2.72
2.71
2.03
2.02
2.01
2.01
2.01
2.00
2.00
2.00
2.00
1.99
1.99
1.98
1.98
1.97
1.97
1.97
1.96
1.96
1.96
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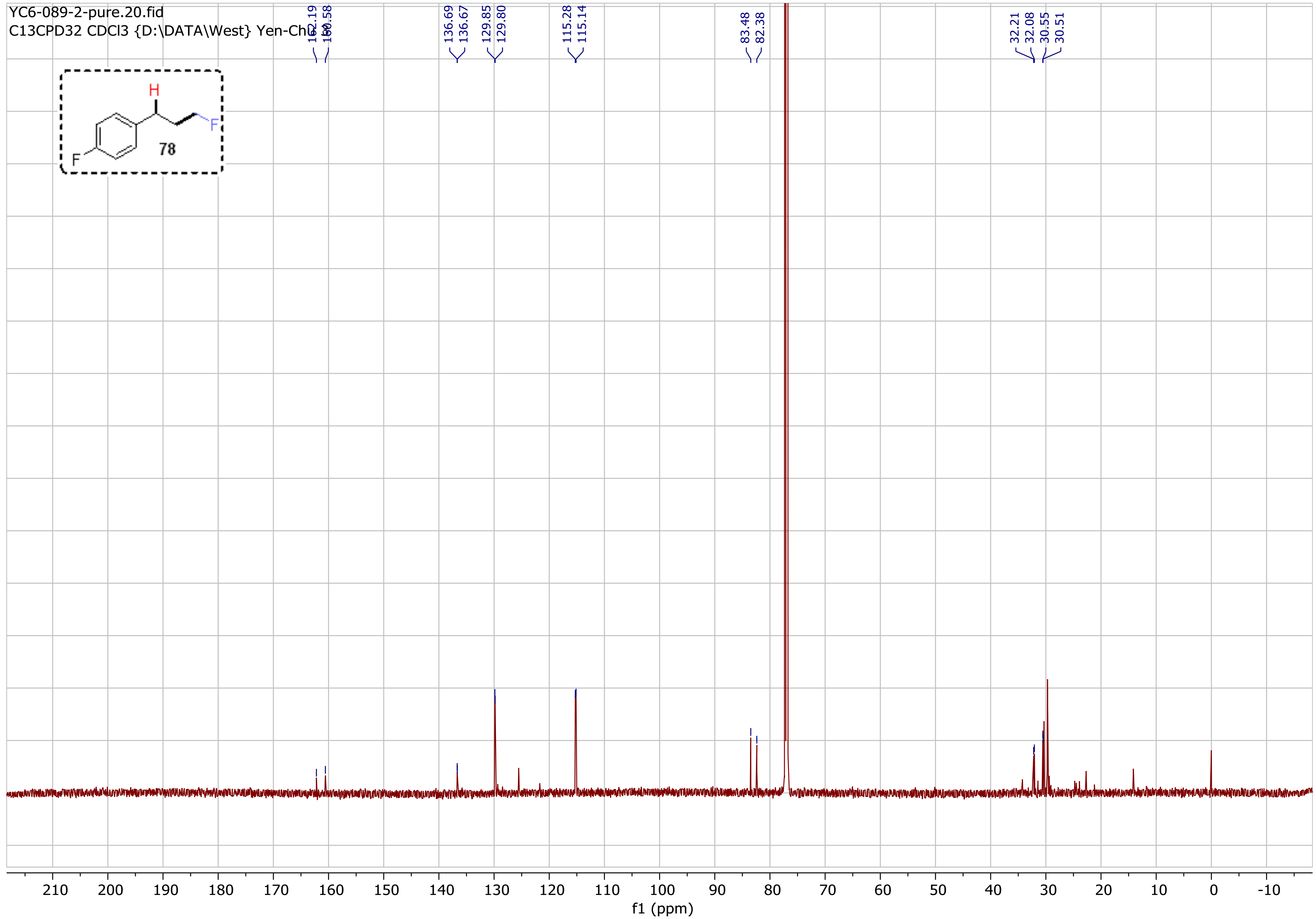
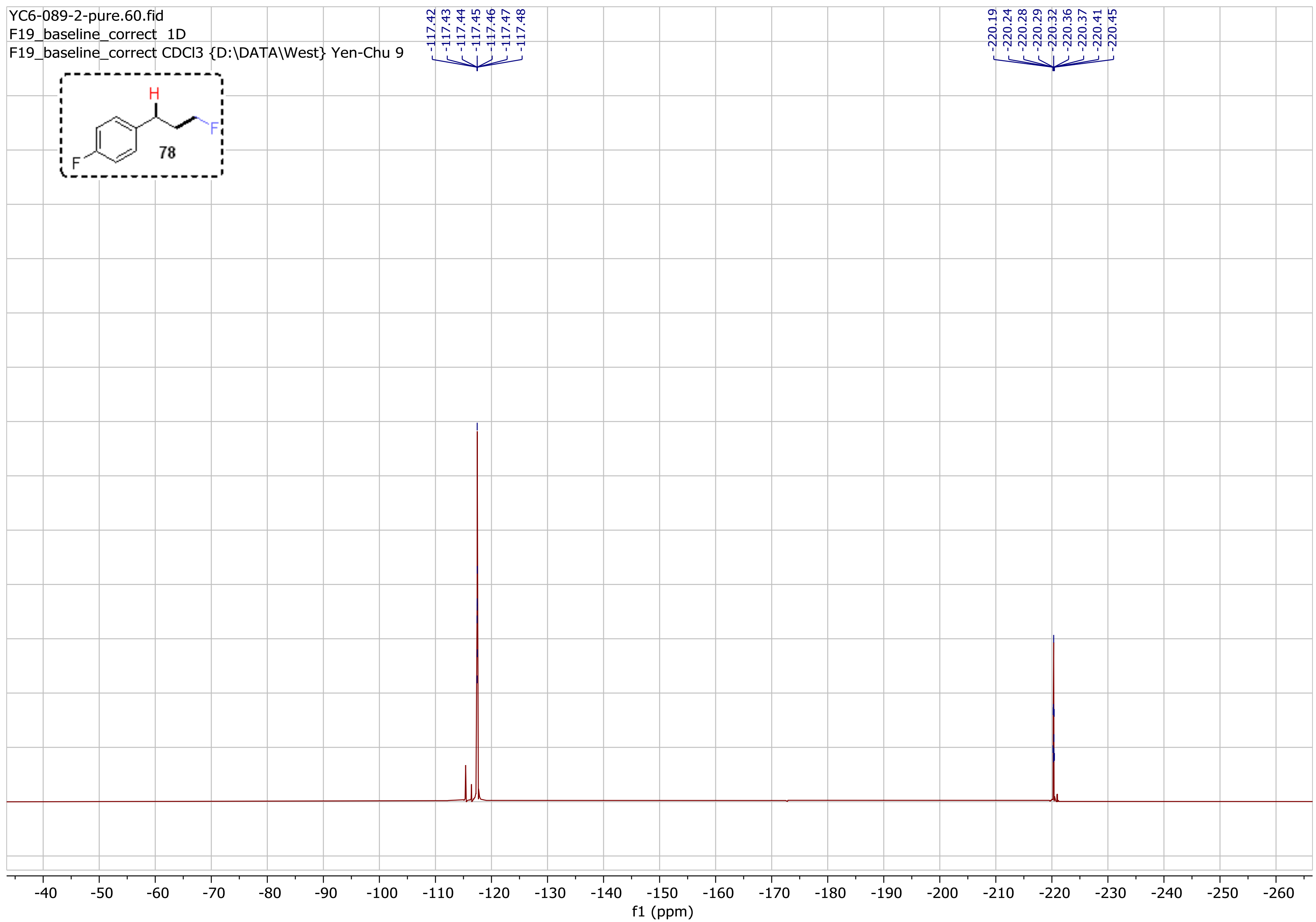
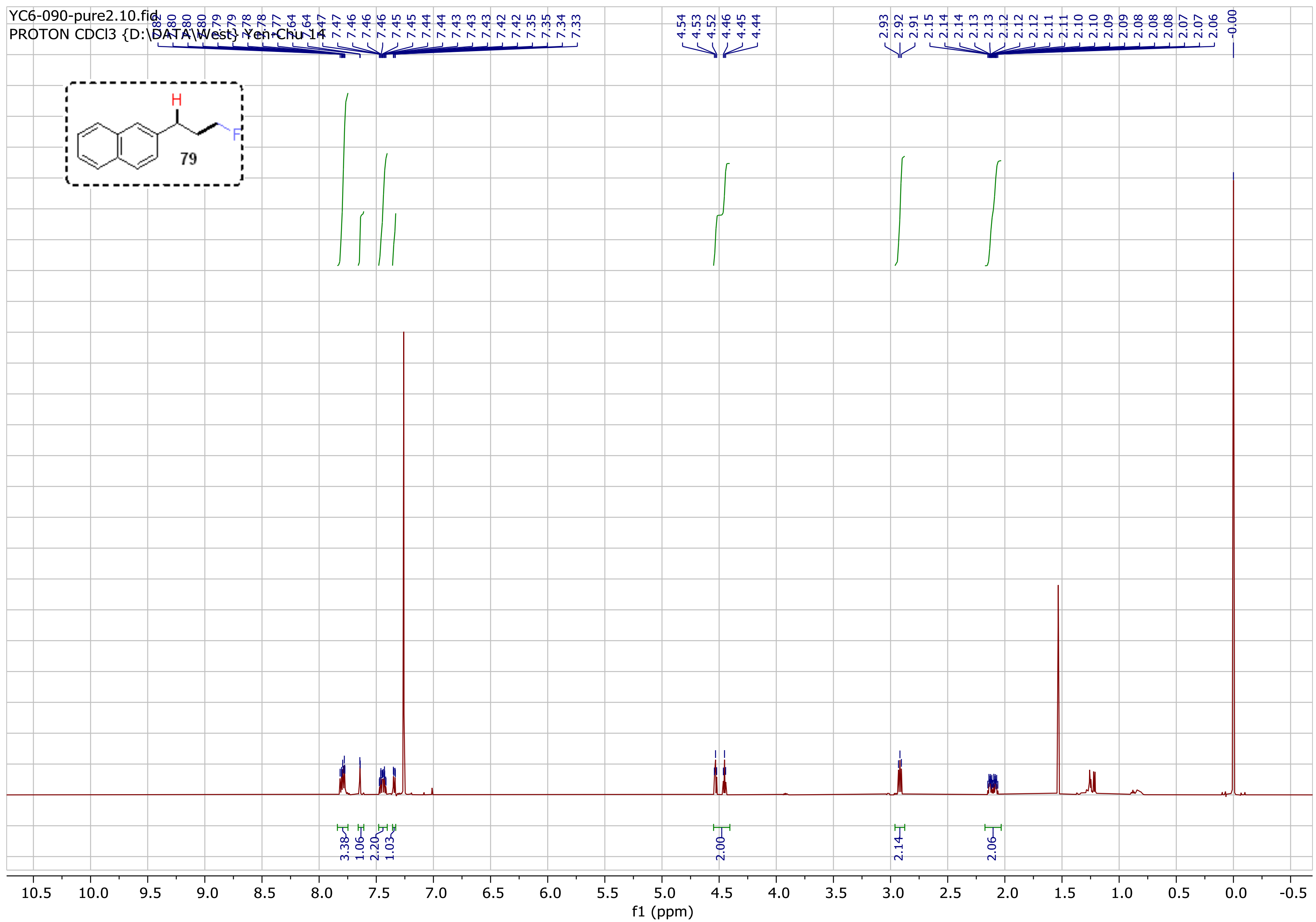
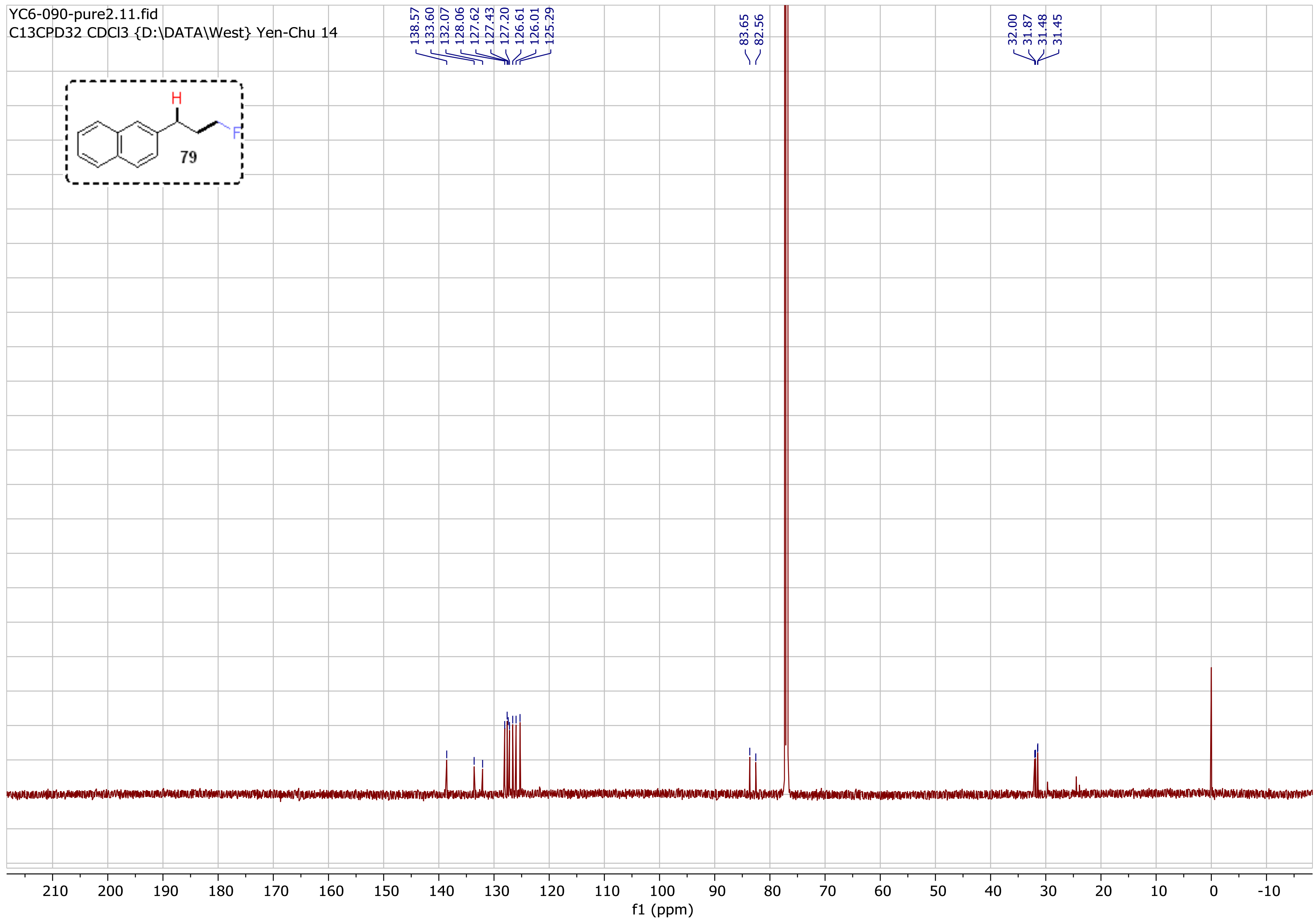
1.95
1.95
1.94
2.00
2.07
2.11
2.09
2.15
f1 (ppm)

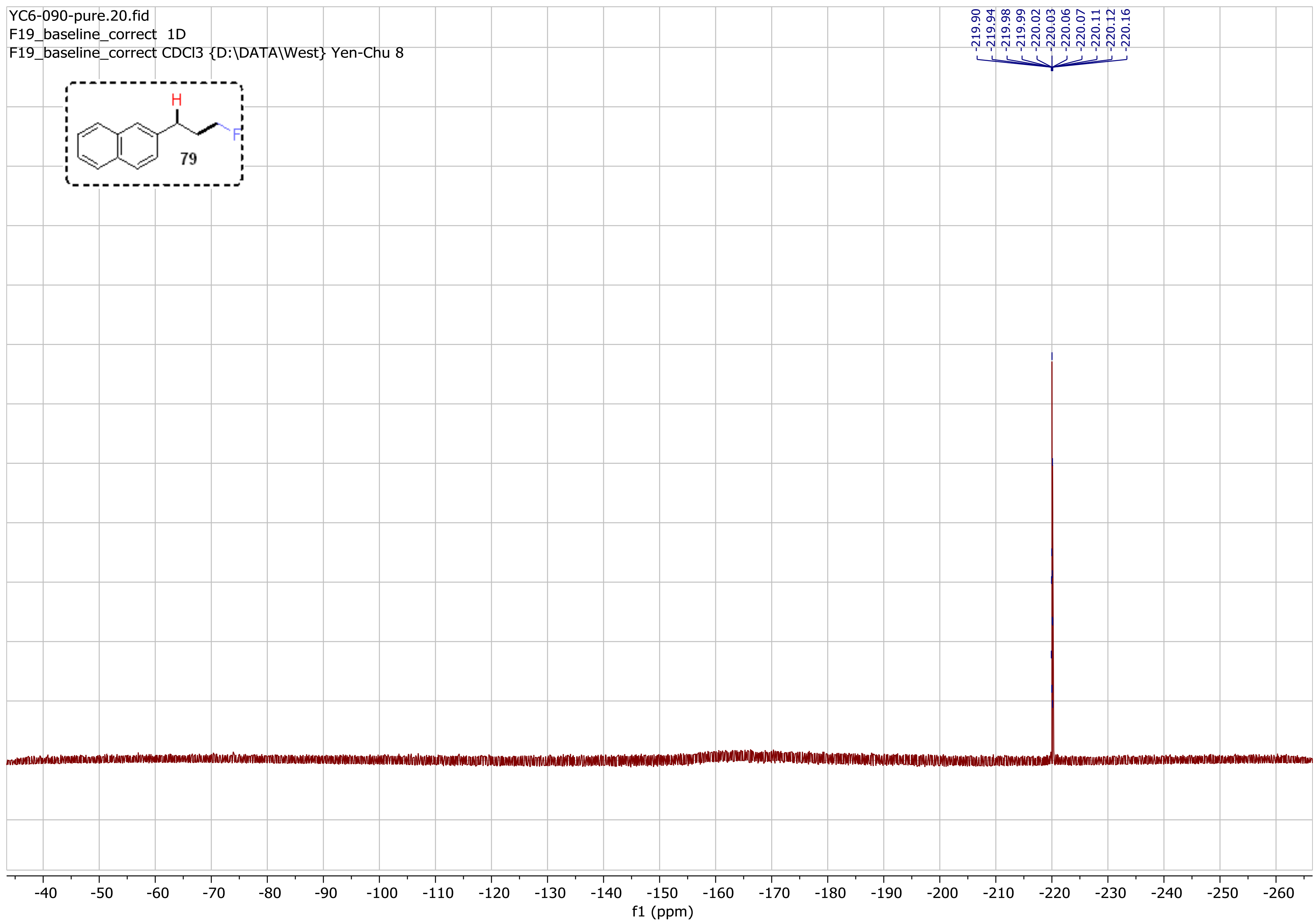

YC6-089-2-pure.20.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu
162.19
160.58
136.69
136.67
129.85
129.80
115.28
115.14
83.48
82.38
32.21
32.08
30.55
30.51
H
F
F
78
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


YC6-089-2-pure.60.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 9
-117.42
-117.43
-117.44
-117.45
-117.46
-117.47
-117.48
-220.19
-220.24
-220.28
-220.29
-220.32
-220.36
-220.37
-220.41
-220.45
H
F
F
78
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

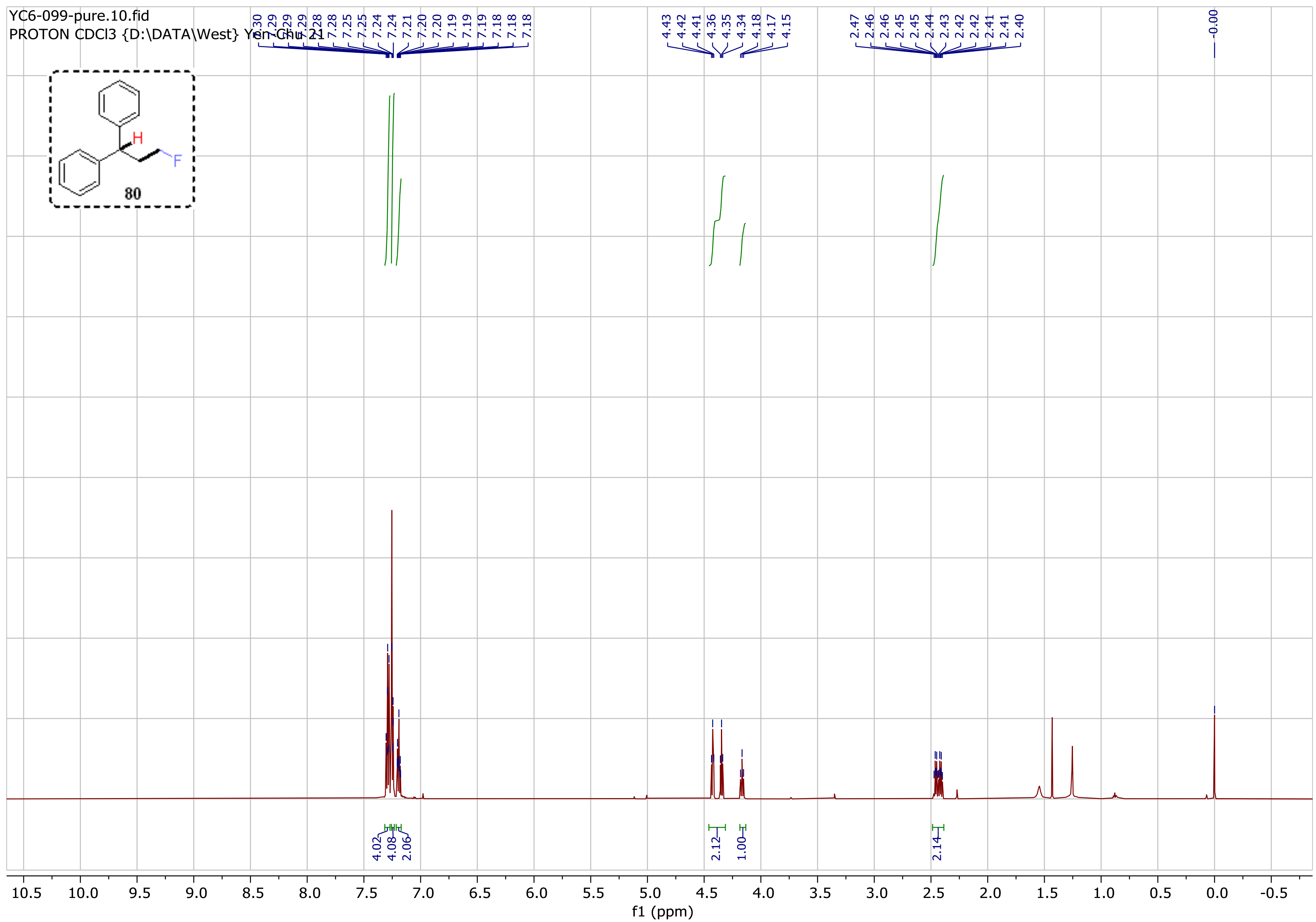


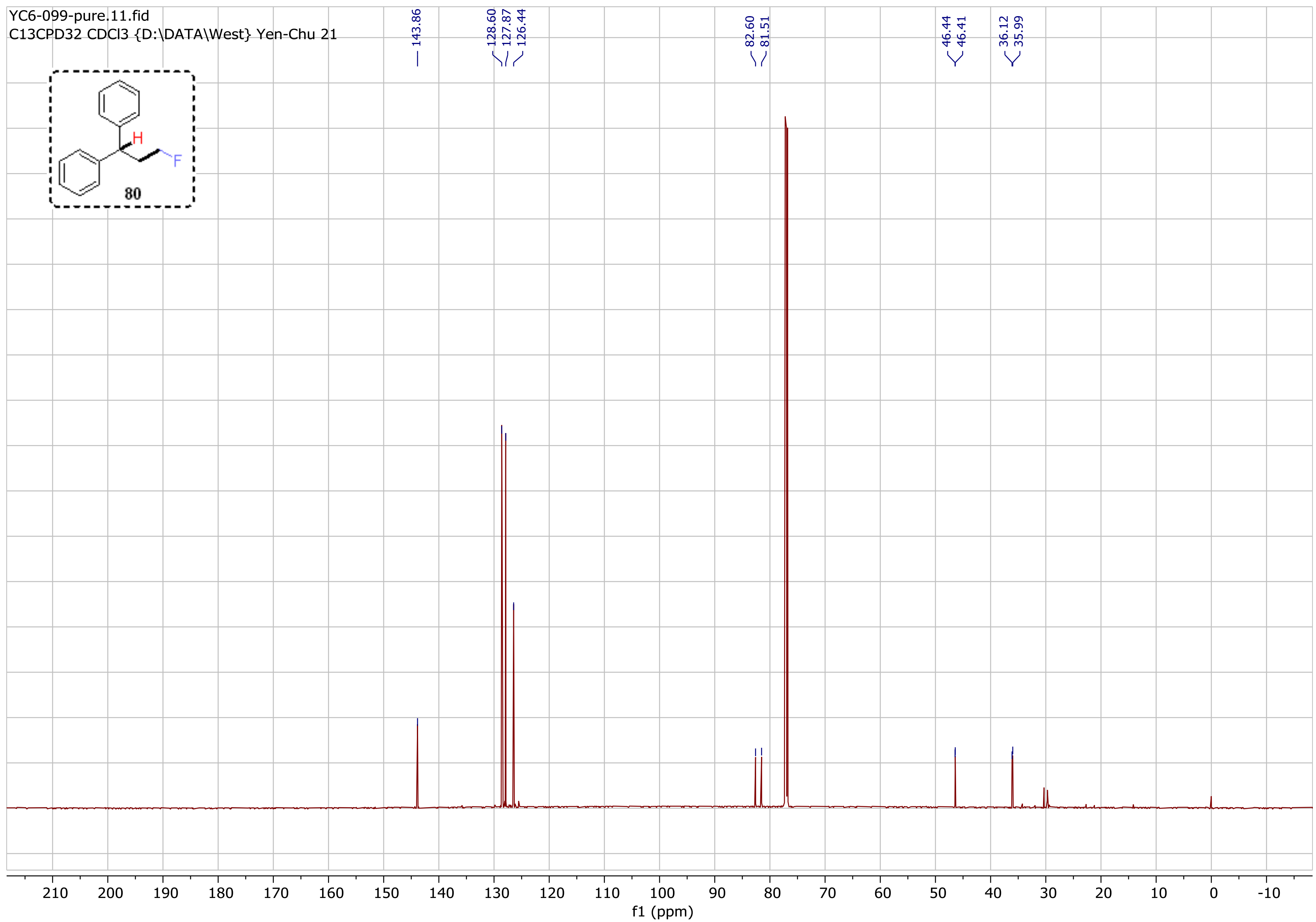
YC6-090-pure2.10.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 14
7.82 7.80 7.80 7.80 7.79 7.79 7.78 7.78 7.77 7.64 7.64 7.47 7.47 7.46 7.46 7.46 7.45 7.45 7.44 7.44 7.43 7.43 7.43 7.42 7.42 7.35 7.35 7.34 7.33
4.54 4.53 4.52 4.46 4.45 4.44
2.93 2.92 2.91 2.15 2.14 2.14 2.13 2.13 2.12 2.12 2.12 2.11 2.11 2.10 2.10 2.09 2.09 2.08 2.08 2.08 2.07 2.07 2.06
-0.00
79
3.38 1.06 2.20 1.03 2.00 2.14 2.06
f1 (ppm)

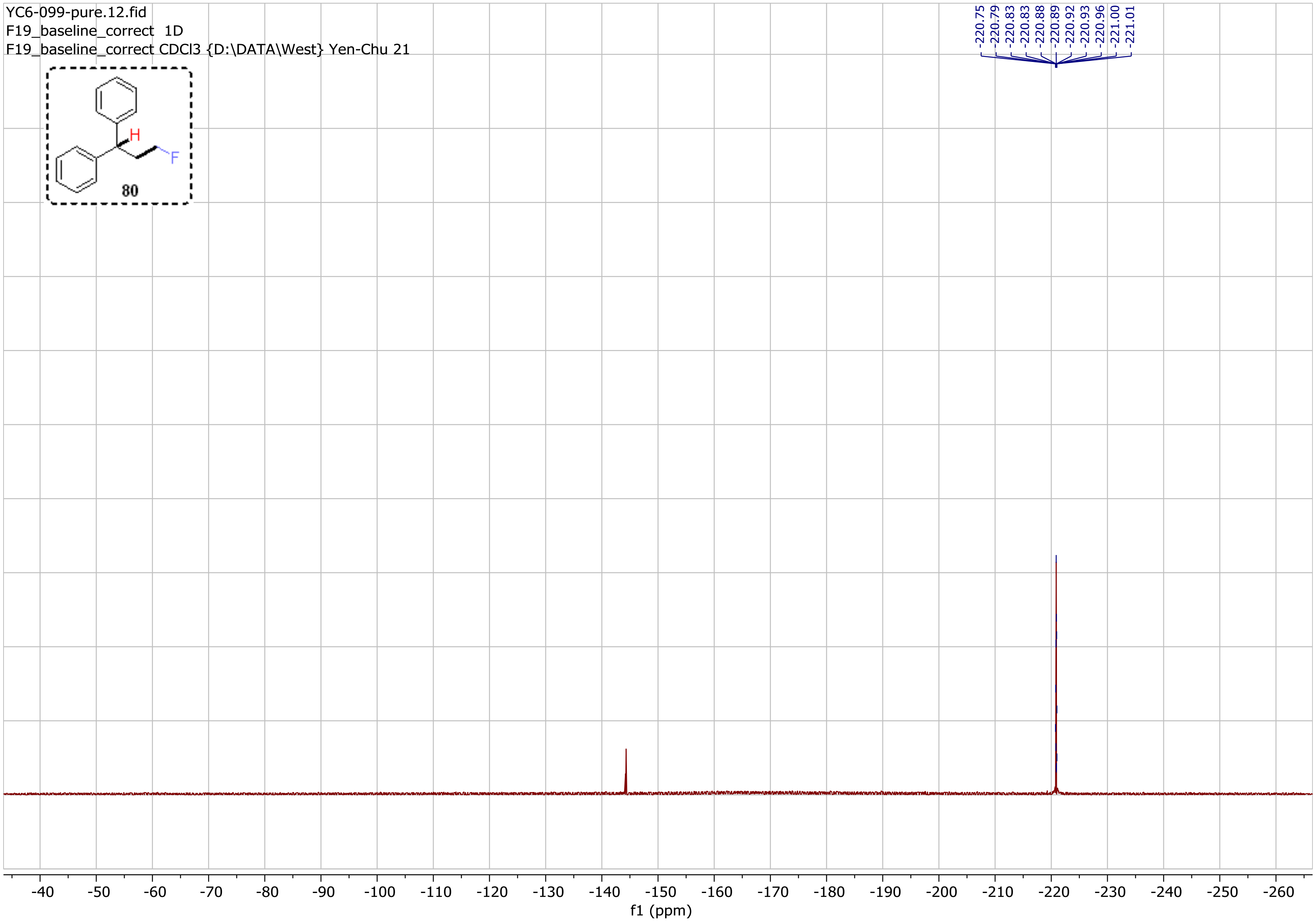

YC6-090-pure2.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 14
H
F
79
138.57
133.60
132.07
128.06
127.62
127.43
127.20
126.61
126.01
125.29
83.65
82.56
32.00
31.87
31.48
31.45
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

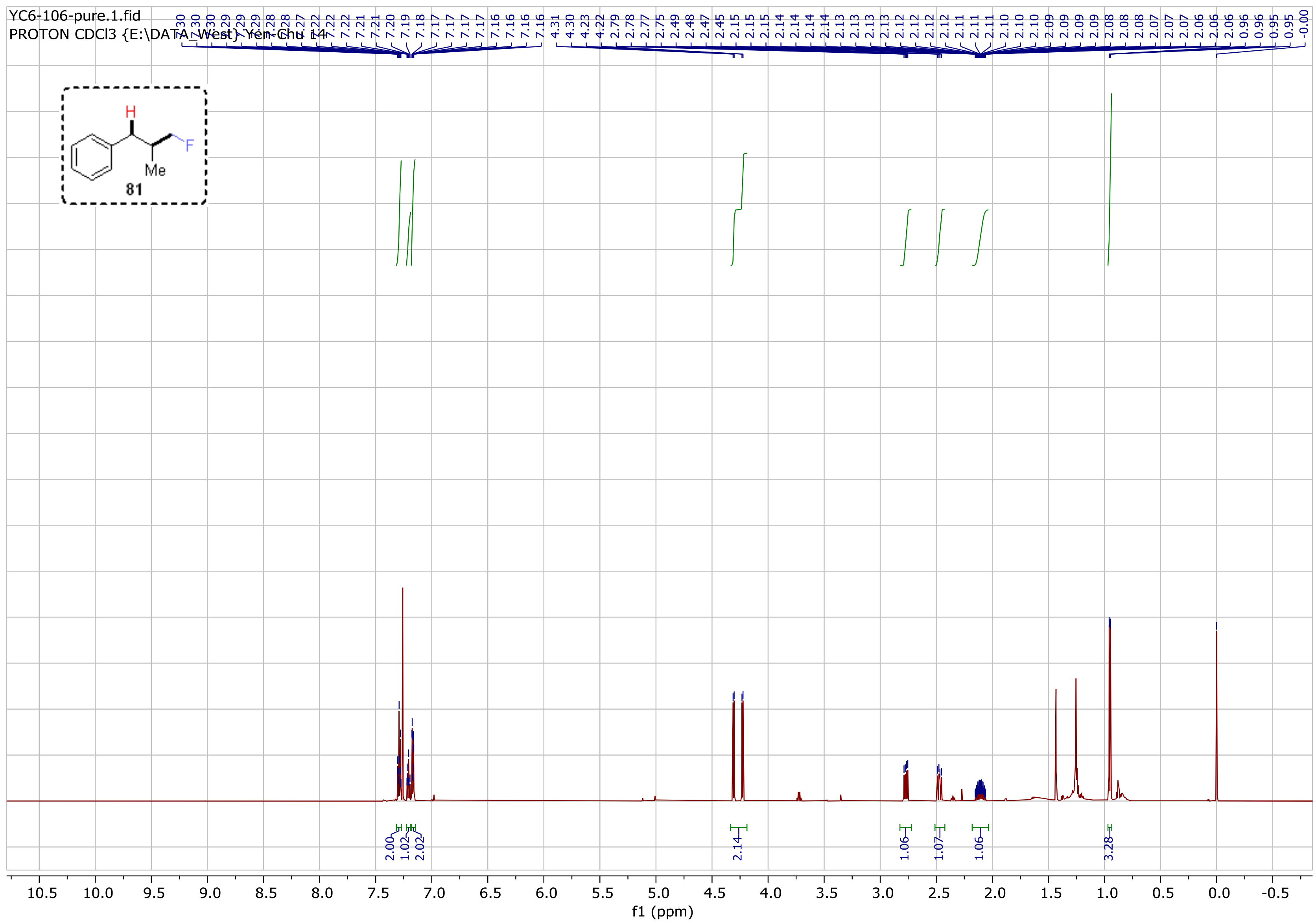


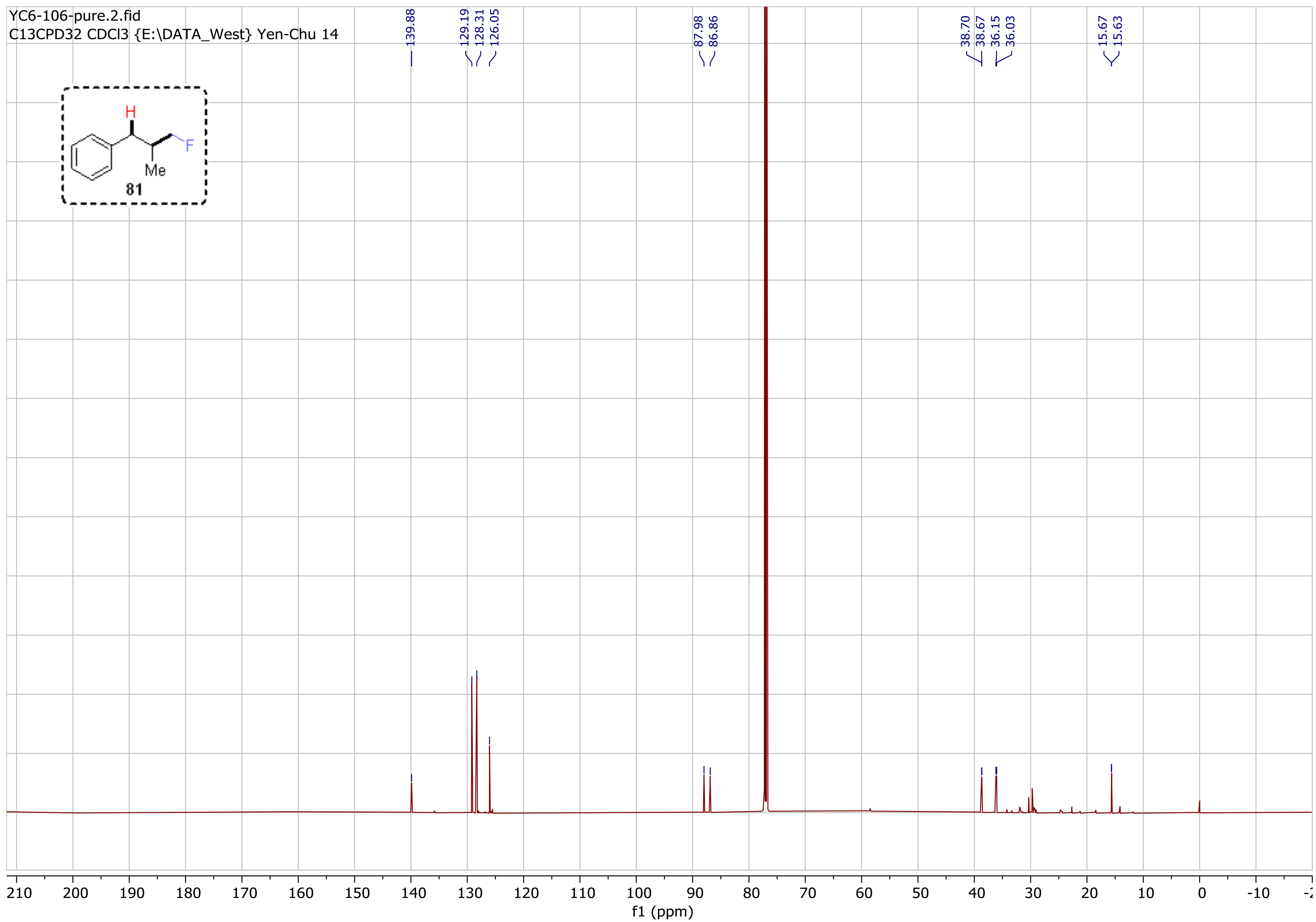
YC6-090-pure.20.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 8
H
F
79
-219.90
-219.94
-219.98
-219.99
-220.02
-220.03
-220.06
-220.07
-220.11
-220.12
-220.16
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

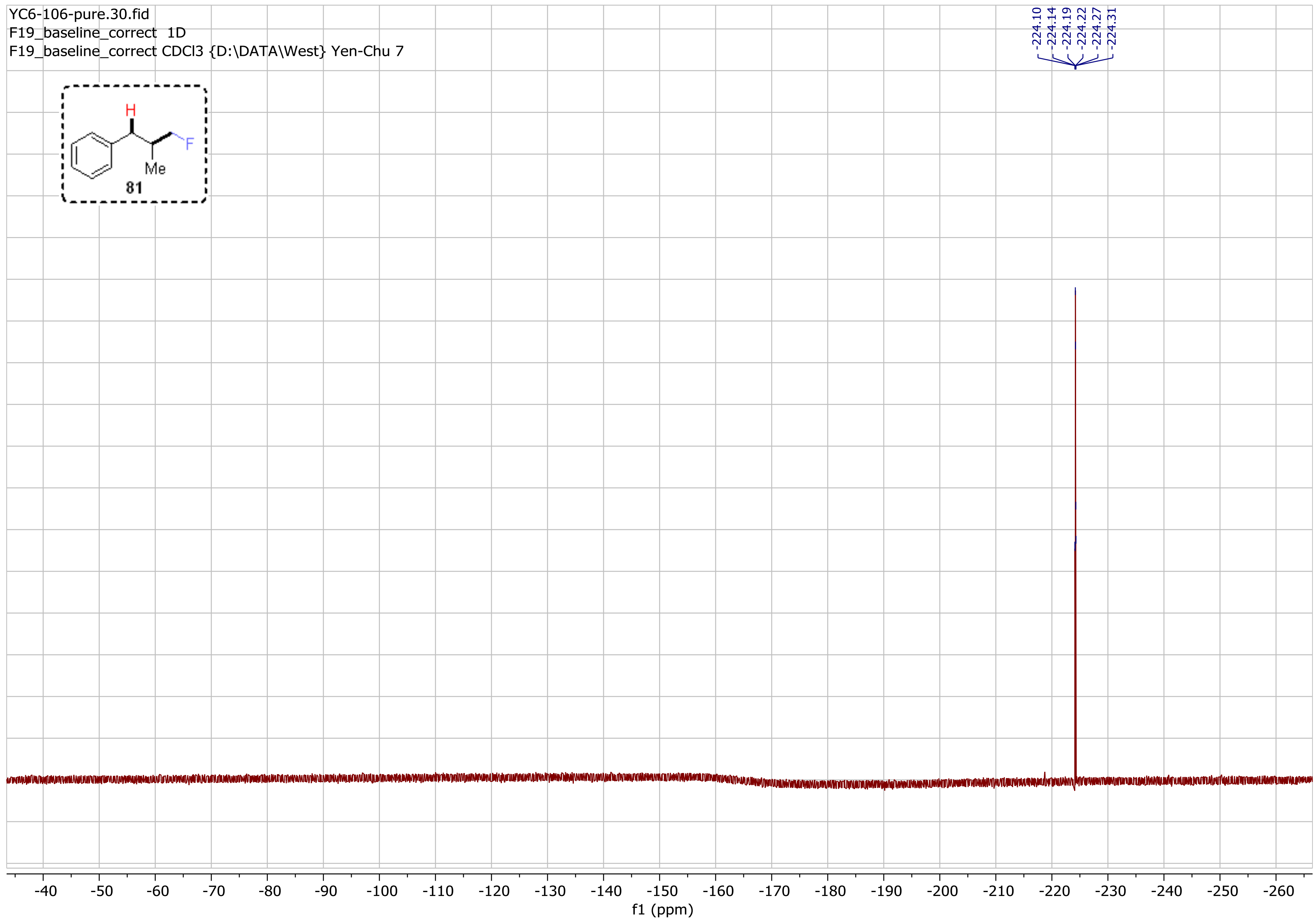

YC6-099-pure.10.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 21
80
H
F
7.30 7.29 7.29 7.29 7.28 7.28 7.25 7.25 7.24 7.24 7.21 7.20 7.20 7.19 7.19 7.19 7.18 7.18 7.18
4.43 4.42 4.41 4.36 4.35 4.34 4.18 4.17 4.15
2.47 2.46 2.46 2.45 2.45 2.44 2.43 2.42 2.42 2.41 2.41 2.40
-0.00
4.02 4.08 2.06
2.12 1.00
2.14
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

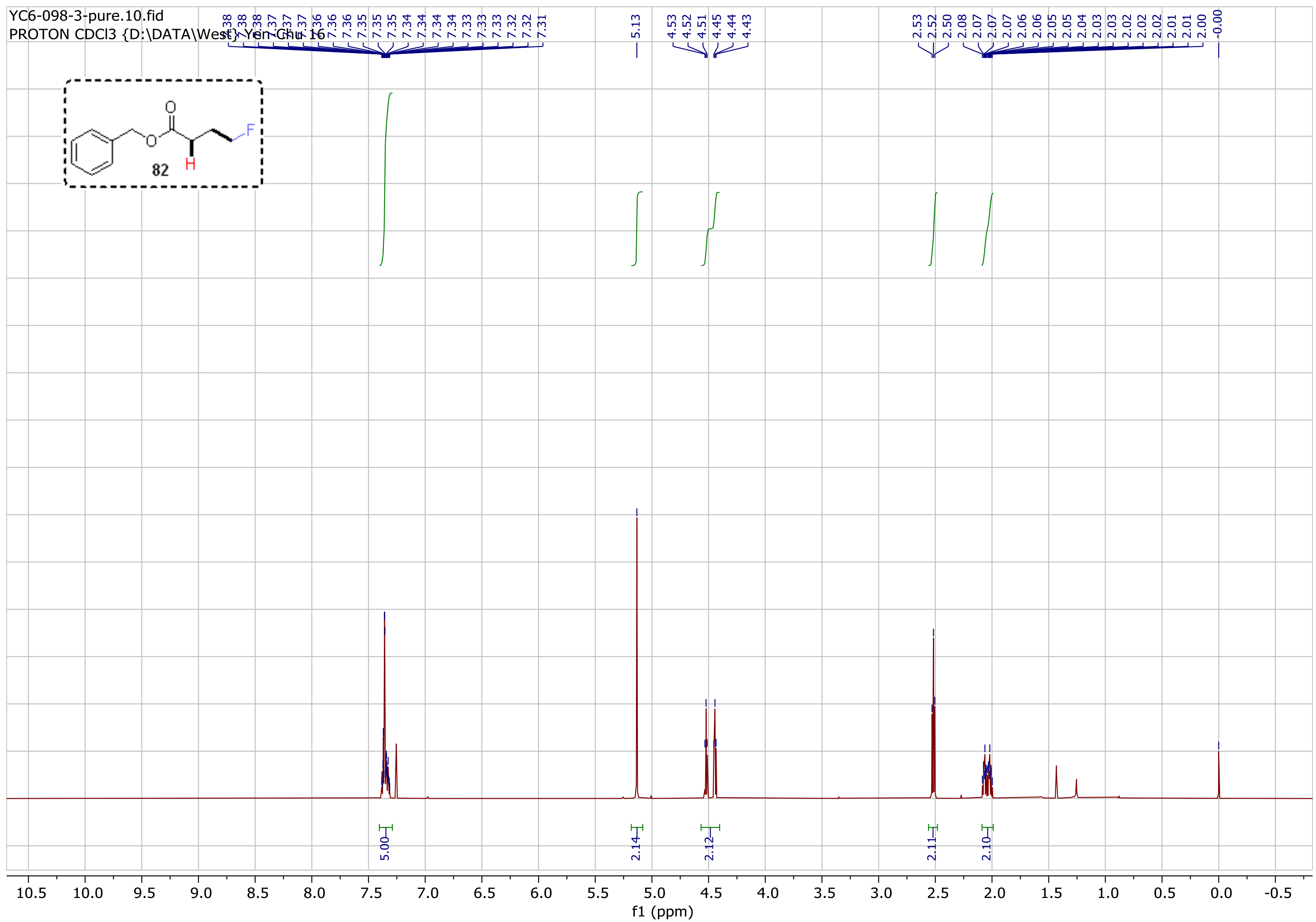

YC6-099-pure.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 21
80
H
F
143.86
128.60
127.87
126.44
82.60
81.51
46.44
46.41
36.12
35.99
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


YC6-099-pure.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 21
H
F
80
-220.75
-220.79
-220.83
-220.83
-220.88
-220.89
-220.92
-220.93
-220.96
-221.00
-221.01
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

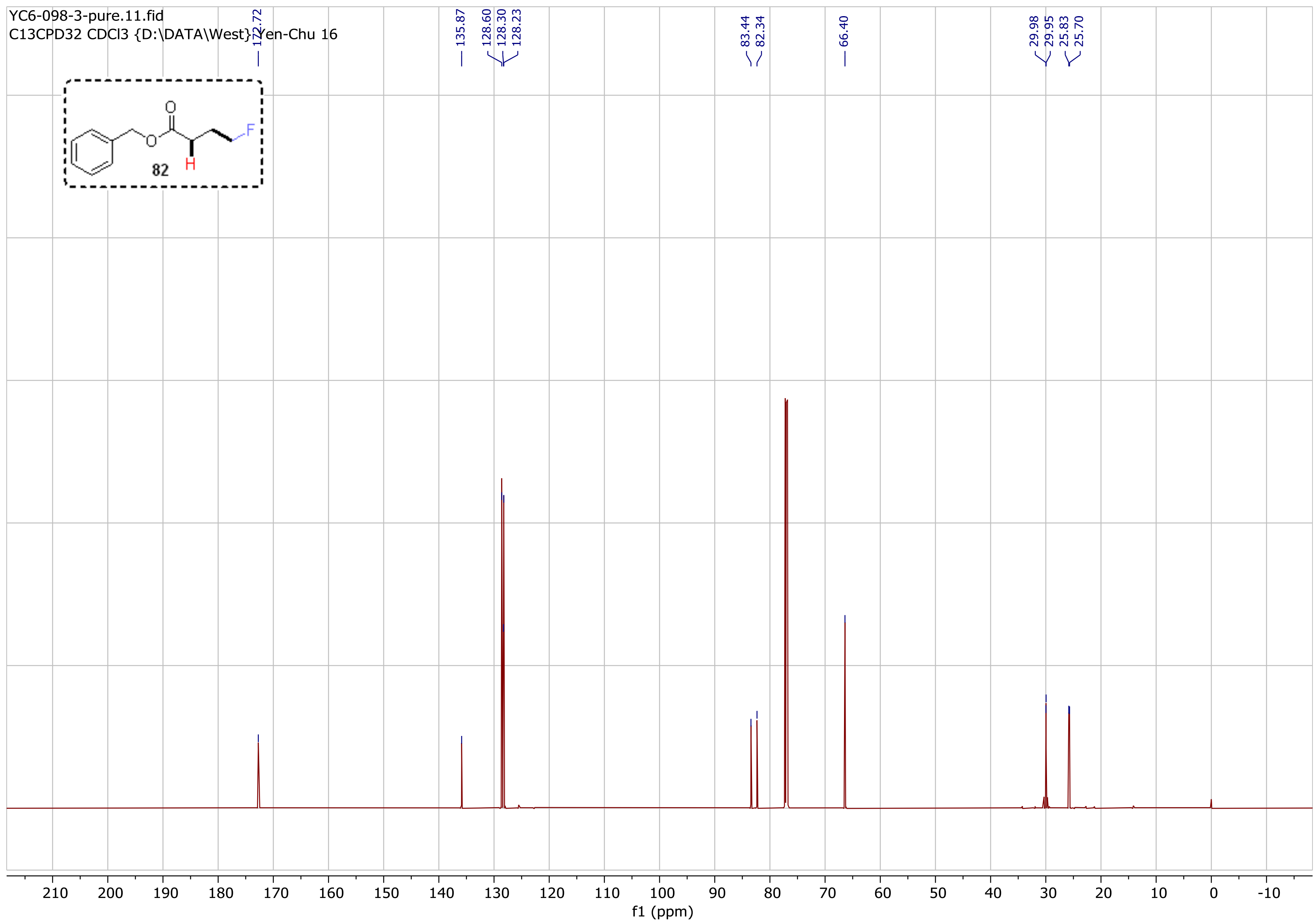

YC6-106-pure.1.fid
PROTON CDCl3 {E:\DATA_West} Yen-Chu 14
7.30
7.30
7.30
7.29
7.29
7.29
7.28
7.28
7.27
7.22
7.22
7.22
7.21
7.21
7.20
7.19
7.18
7.17
7.17
7.17
7.17
7.16
7.16
7.16
7.16
4.31
4.30
4.23
4.22
2.79
2.78
2.77
2.75
2.49
2.48
2.47
2.45
2.15
2.15
2.15
2.14
2.14
2.14
2.14
2.13
2.13
2.13
2.13
2.12
2.12
2.12
2.12
2.11
2.11
2.11
2.10
2.10
2.10
2.09
2.09
2.09
2.09
2.08
2.08
2.08
2.07
2.07
2.07
2.06
2.06
2.06
0.96
0.96
0.95
0.95
-0.00
H
F
Me
81
2.00
1.02
2.02
2.14
1.06
1.07
1.06
3.28
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

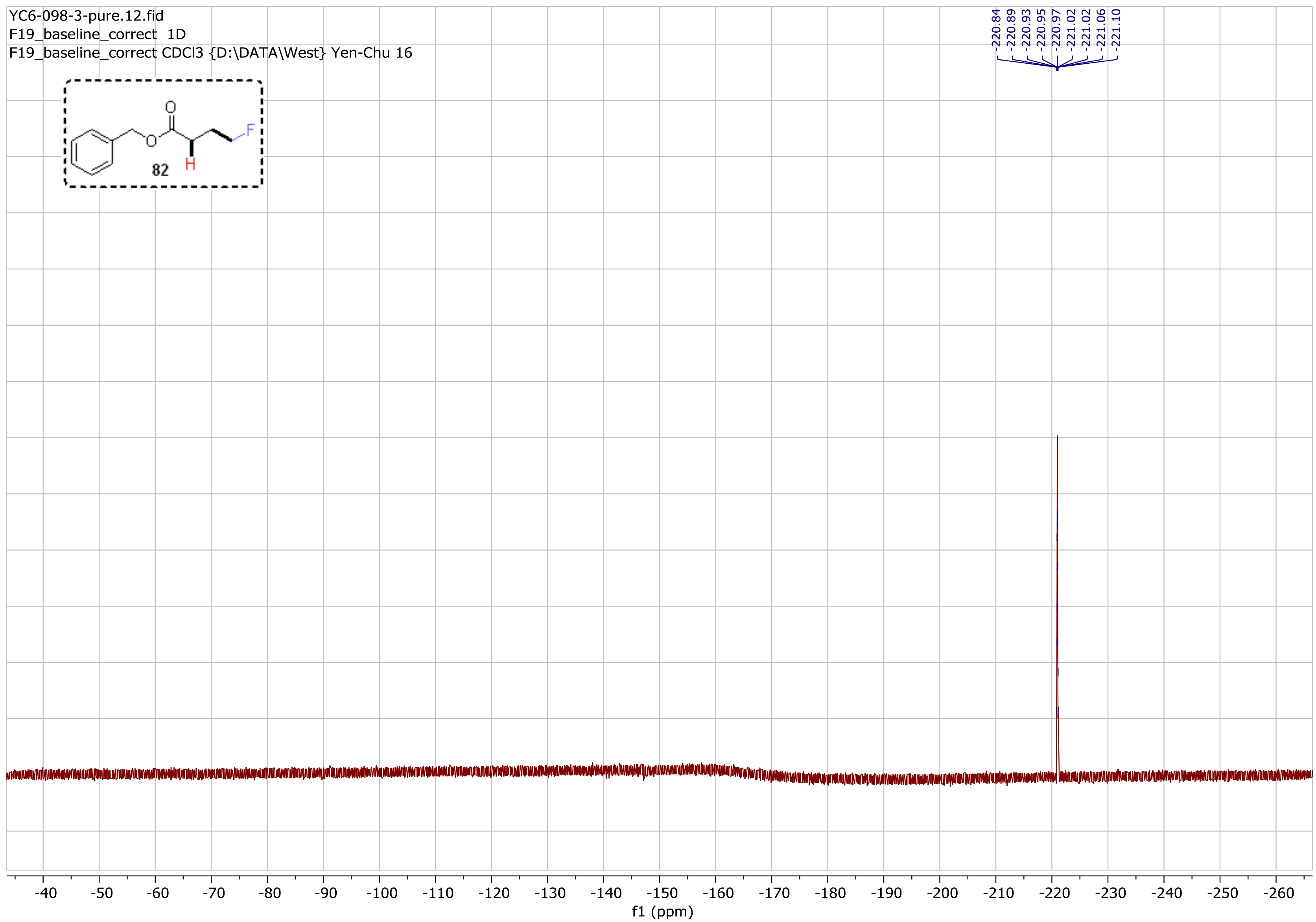

YC6-106-pure.2.fid
C13CPD32 CDCl3 {E:\DATA_West} Yen-Chu 14
H
F
Me
81
139.88
129.19
128.31
126.05
87.98
86.86
38.70
38.67
36.15
36.03
15.67
15.63
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

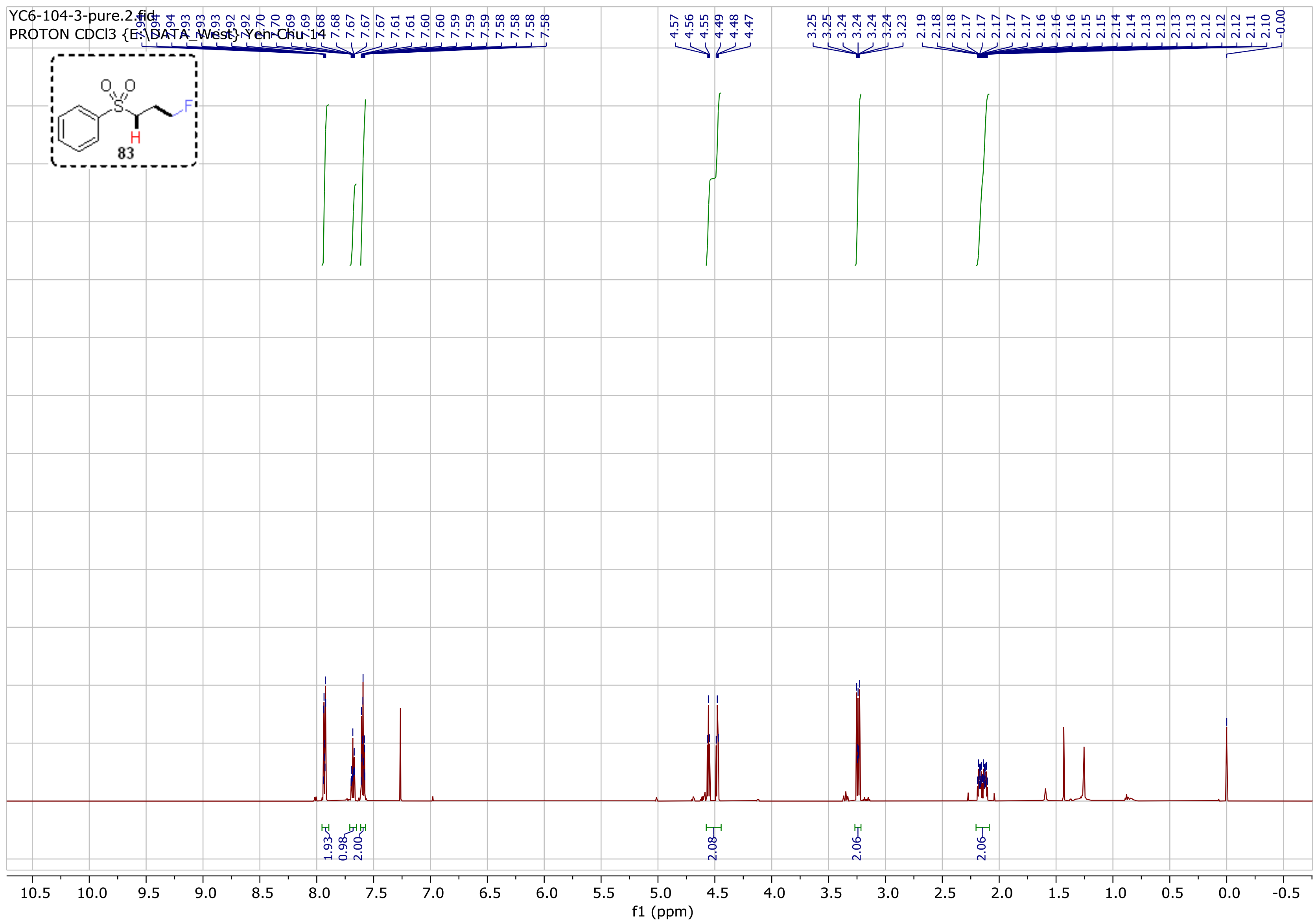

YC6-106-pure.30.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 7
H
F
Me
81
-224.10
-224.14
-224.19
-224.22
-224.27
-224.31
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

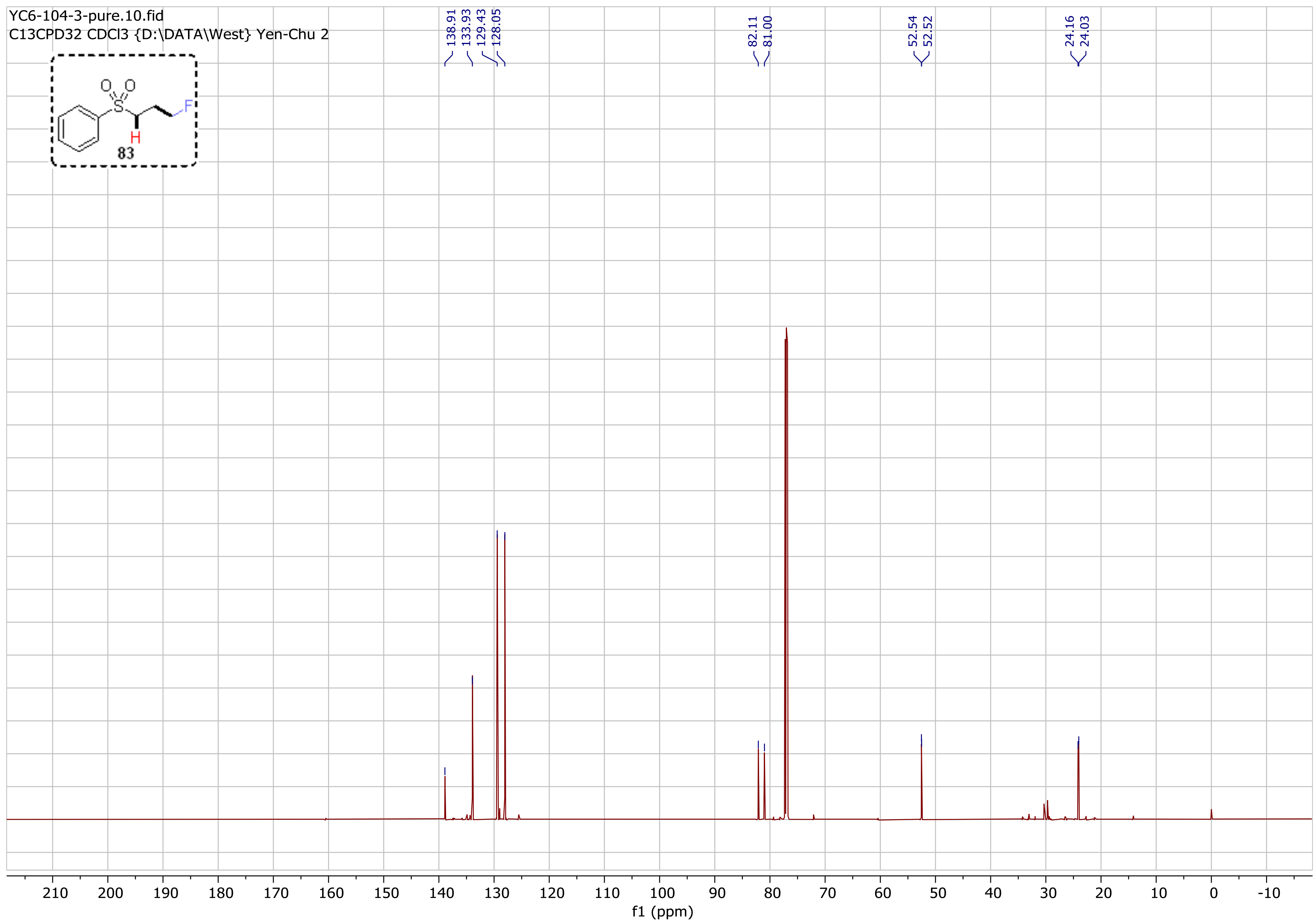


YC6-098-3-pure.10.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 16
82
O
O
H
F
7.38
7.38
7.38
7.37
7.37
7.37
7.36
7.36
7.36
7.35
7.35
7.35
7.34
7.34
7.34
7.34
7.33
7.33
7.33
7.32
7.32
7.31
5.13
4.53
4.52
4.51
4.45
4.44
4.43
2.53
2.52
2.50
2.08
2.07
2.07
2.07
2.06
2.06
2.05
2.05
2.04
2.03
2.03
2.02
2.02
2.02
2.01
2.01
2.00
-0.00
5.00
2.14
2.12
2.11
2.10
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

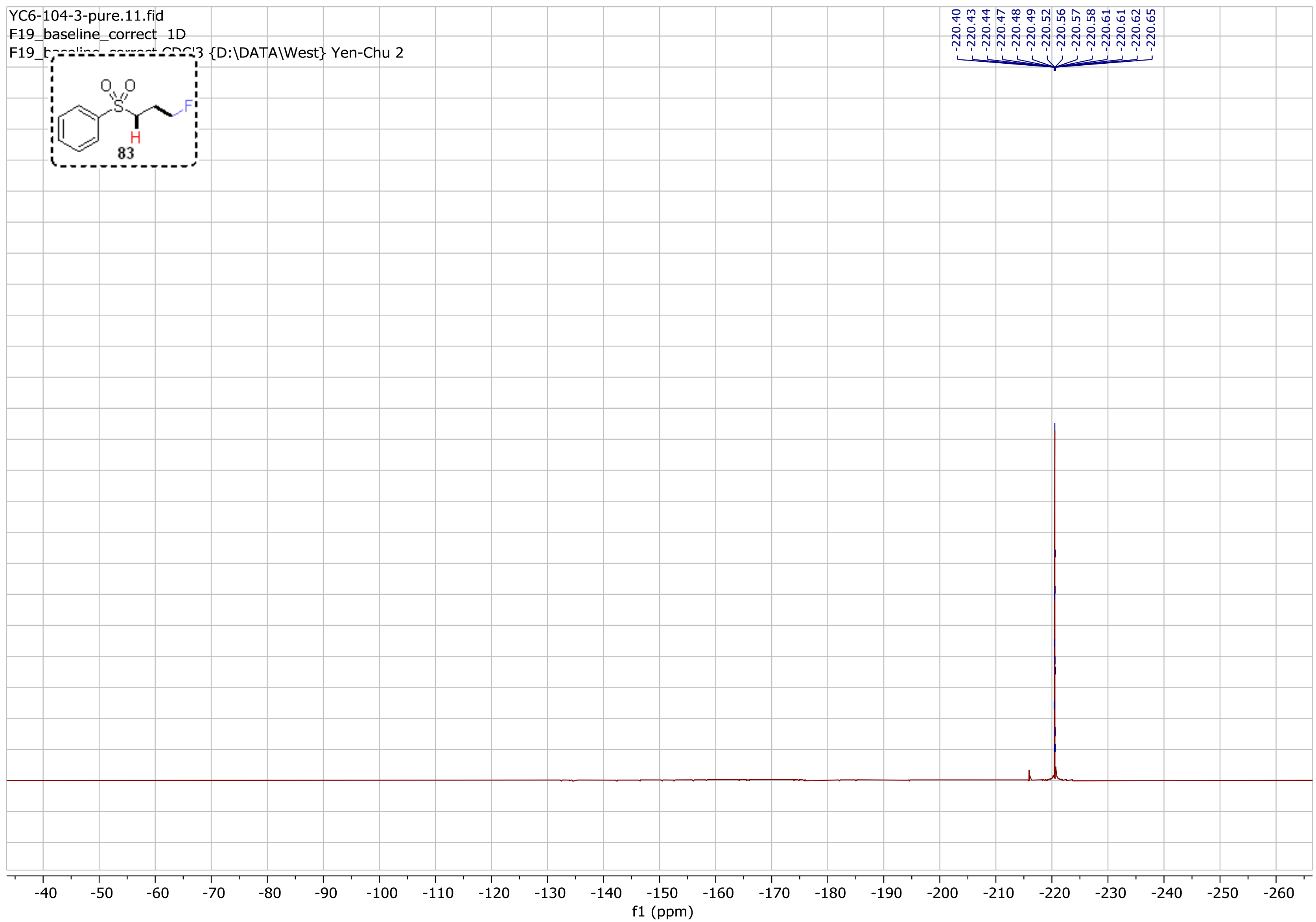

YC6-098-3-pure.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 16
172.72
135.87
128.60
128.30
128.23
83.44
82.34
66.40
29.98
29.95
25.83
25.70
O
O
F
H
82
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


YC6-098-3-pure.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 16
O
O
F
H
82
-220.84
-220.89
-220.93
-220.95
-220.97
-221.02
-221.02
-221.06
-221.10
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
-230
-240
-250
-260
f1 (ppm)

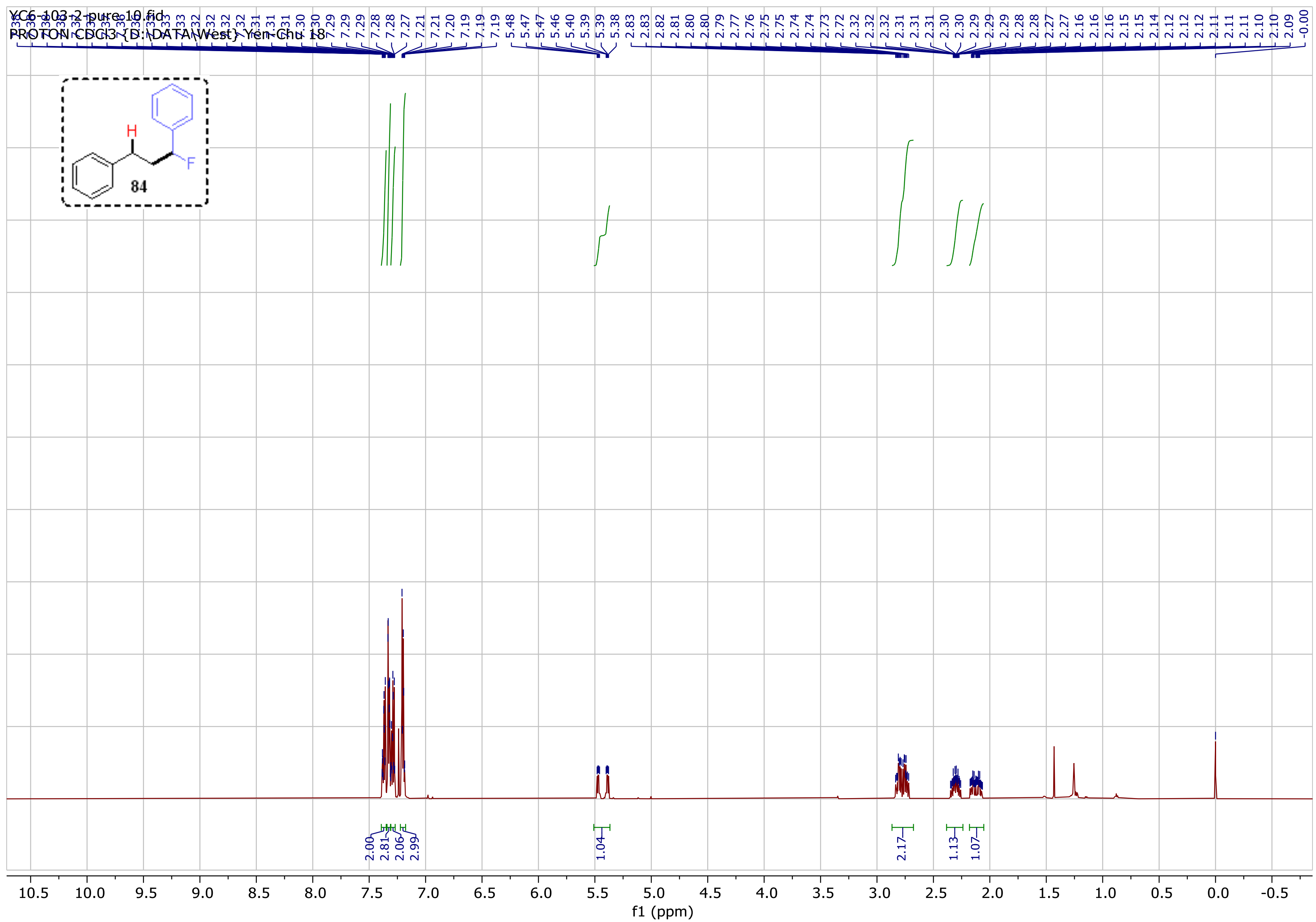

YC6-104-3-pure.2.fid
PROTON CDCl3 {E:\DATA_West} Yen-Chu 14
83
f1 (ppm)

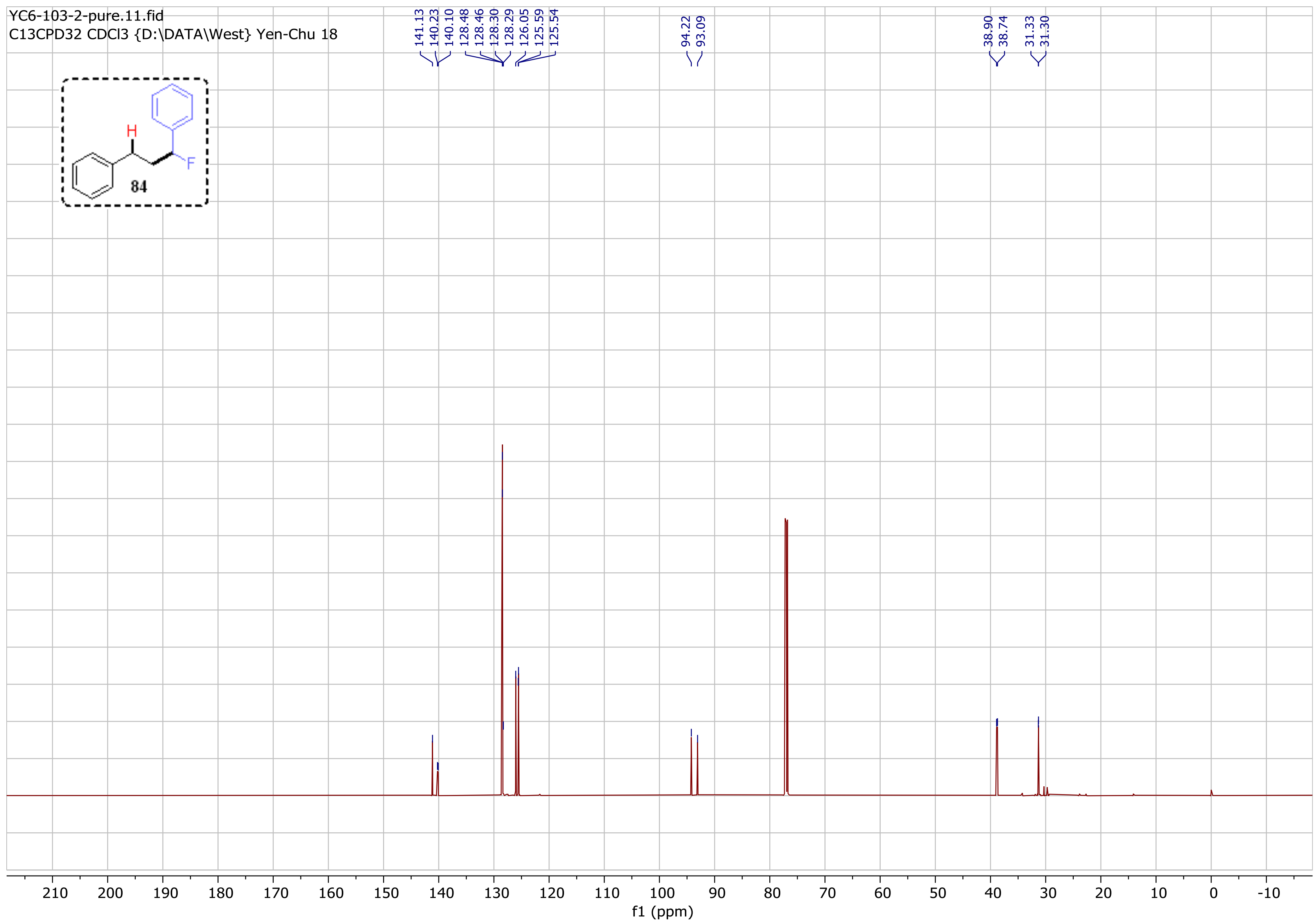


YC6-104-3-pure.10.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 2
83
138.91
133.93
129.43
128.05
82.11
81.00
52.54
52.52
24.16
24.03
f1 (ppm)

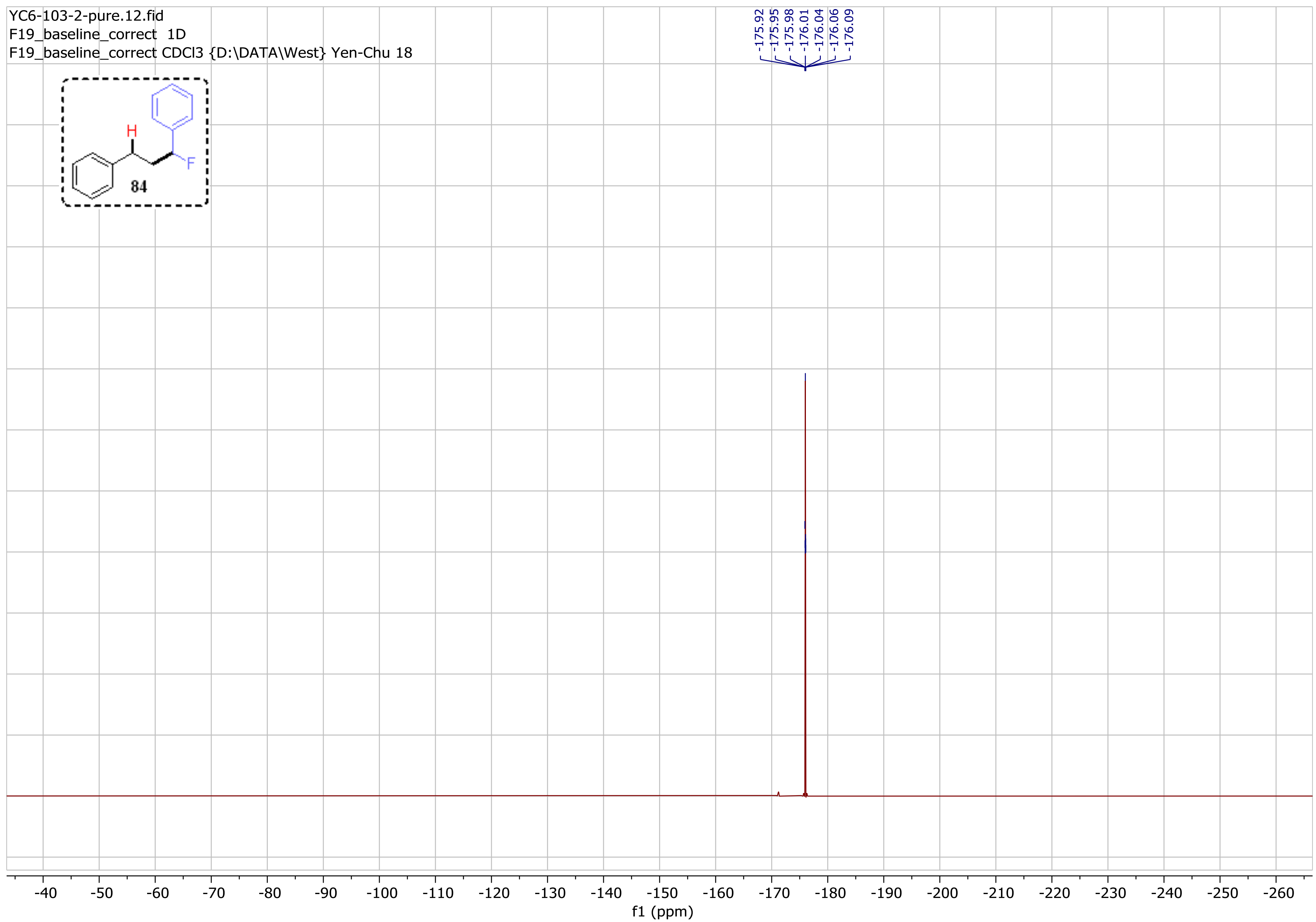


YC6-104-3-pure.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 2
83
-220.40
-220.43
-220.44
-220.47
-220.48
-220.49
-220.52
-220.56
-220.57
-220.58
-220.61
-220.61
-220.62
-220.65
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
-230
-240
-250
-260
f1 (ppm)

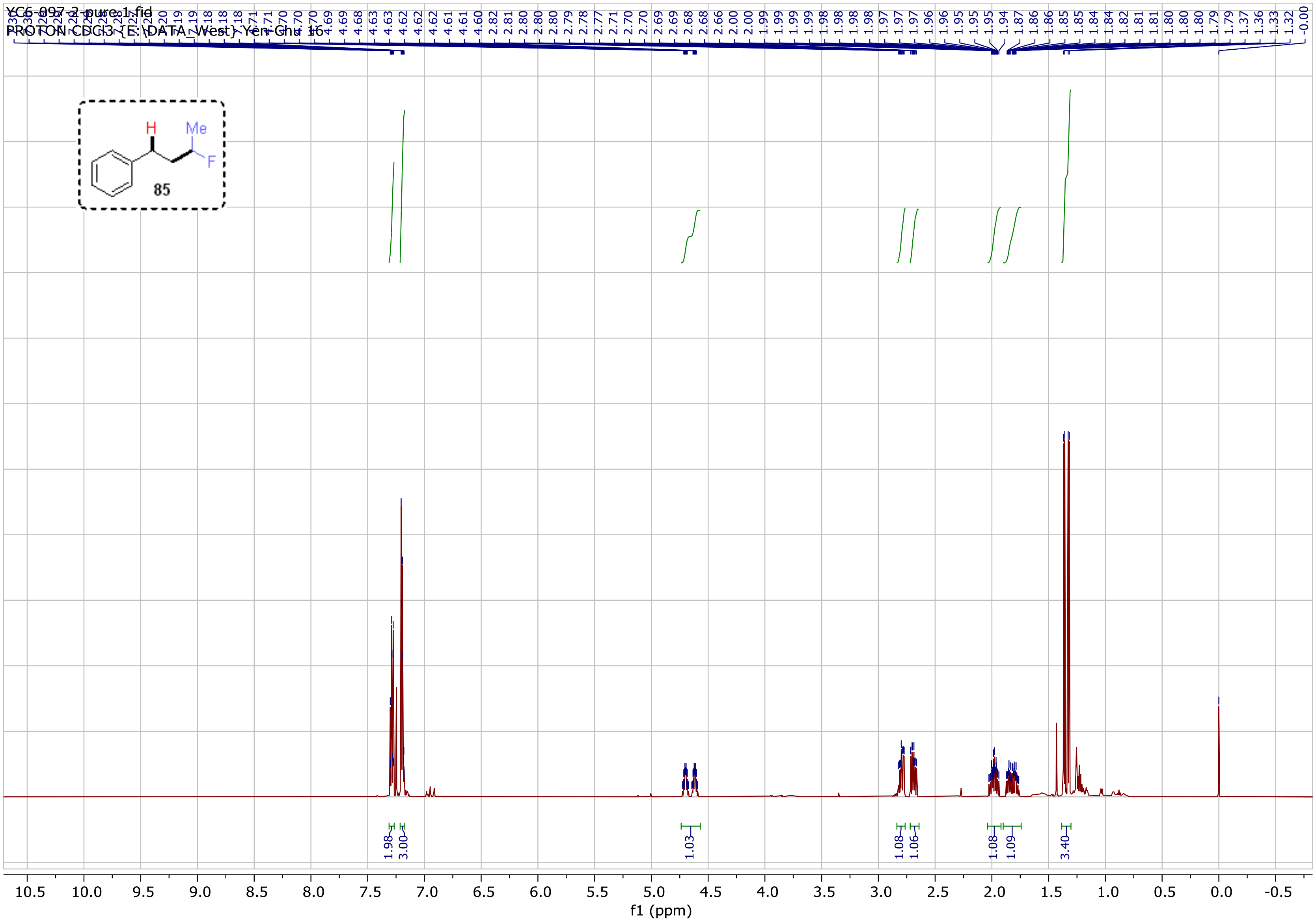

YC6-103-2-pure.10.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 18
84
H
F
2.00
2.81
2.06
2.99
1.04
2.17
1.13
1.07
f1 (ppm)

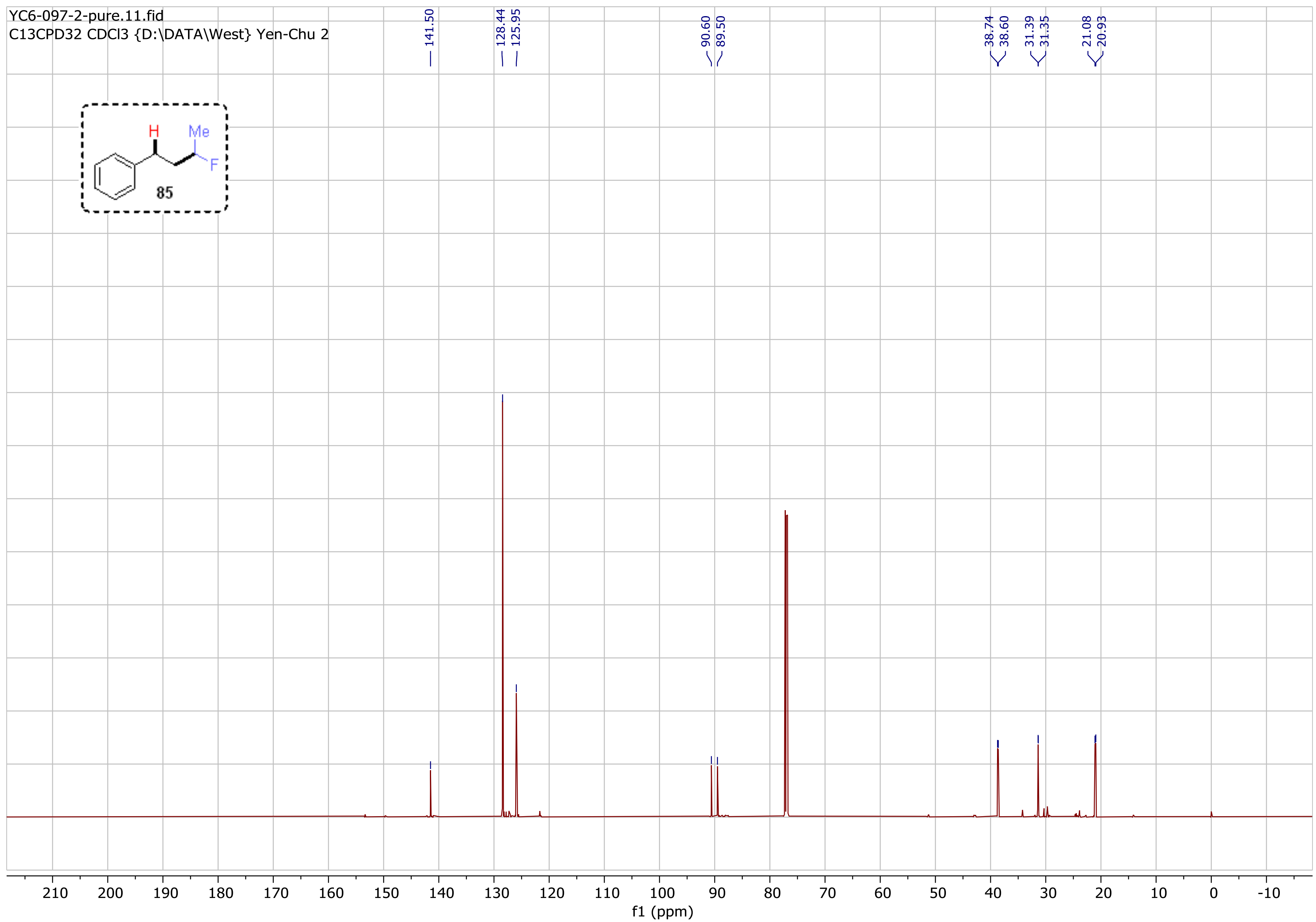


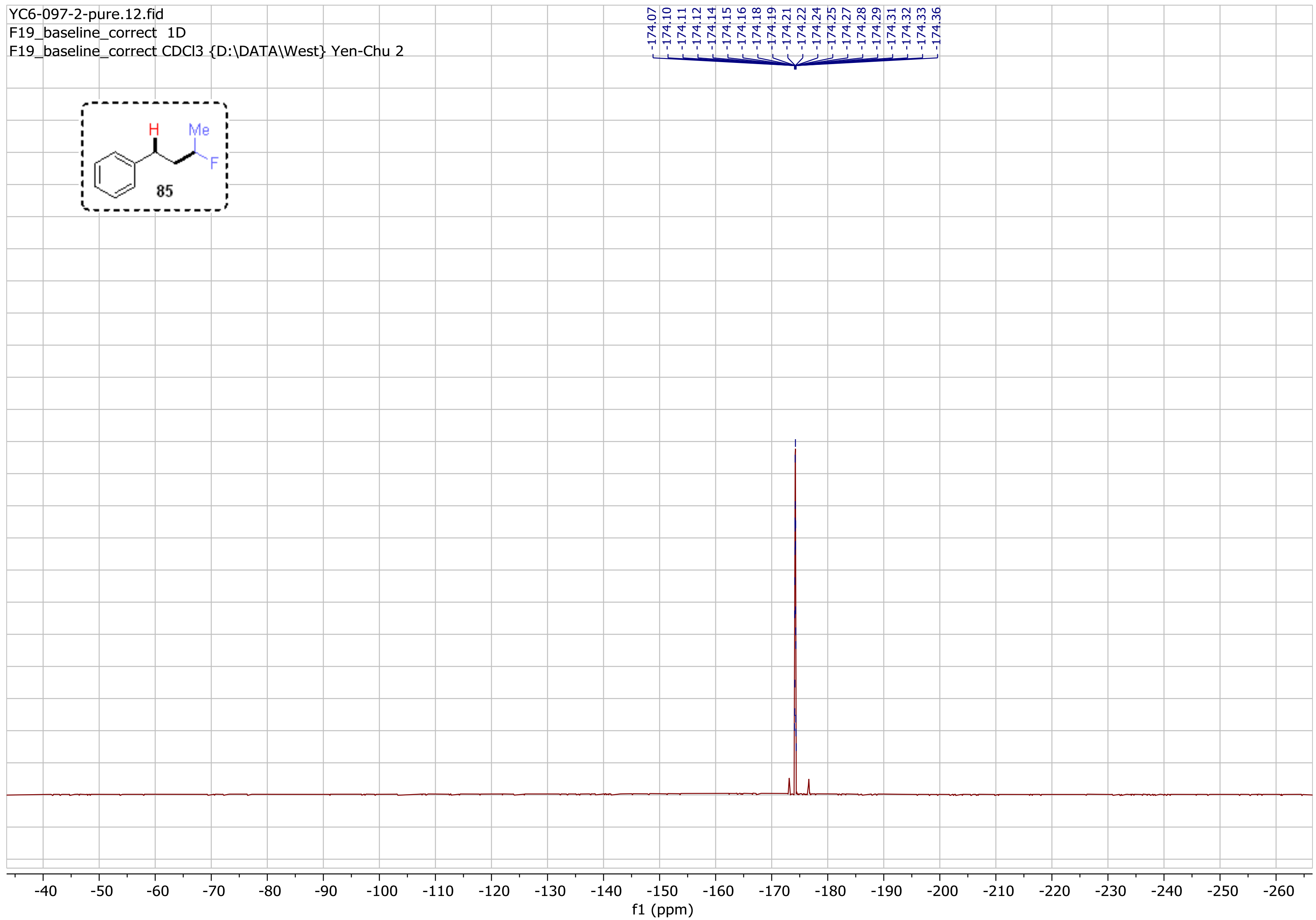
YC6-103-2-pure.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 18
141.13
140.23
140.10
128.48
128.46
128.30
128.29
126.05
125.59
125.54
94.22
93.09
38.90
38.74
31.33
31.30
H
F
84
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

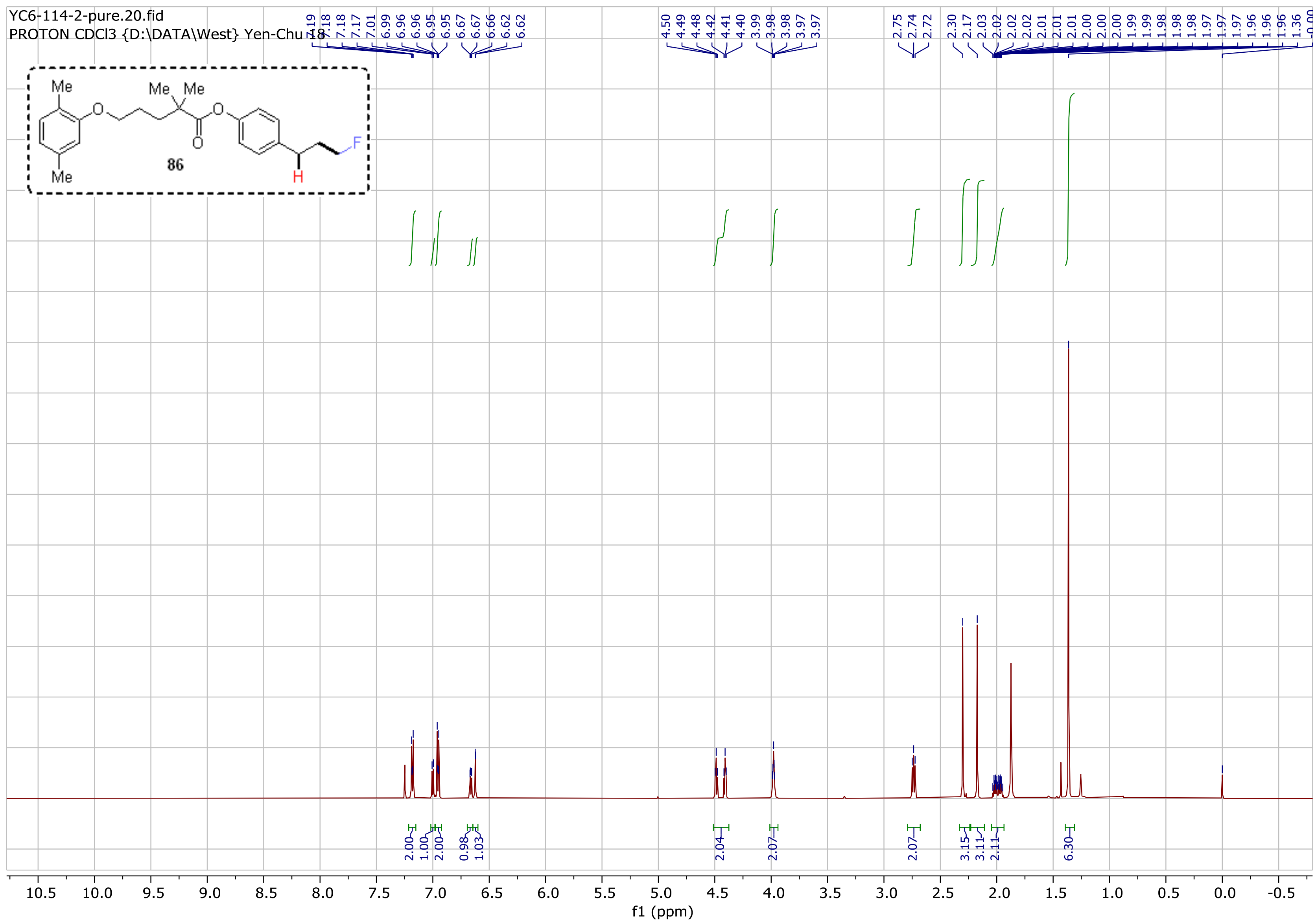


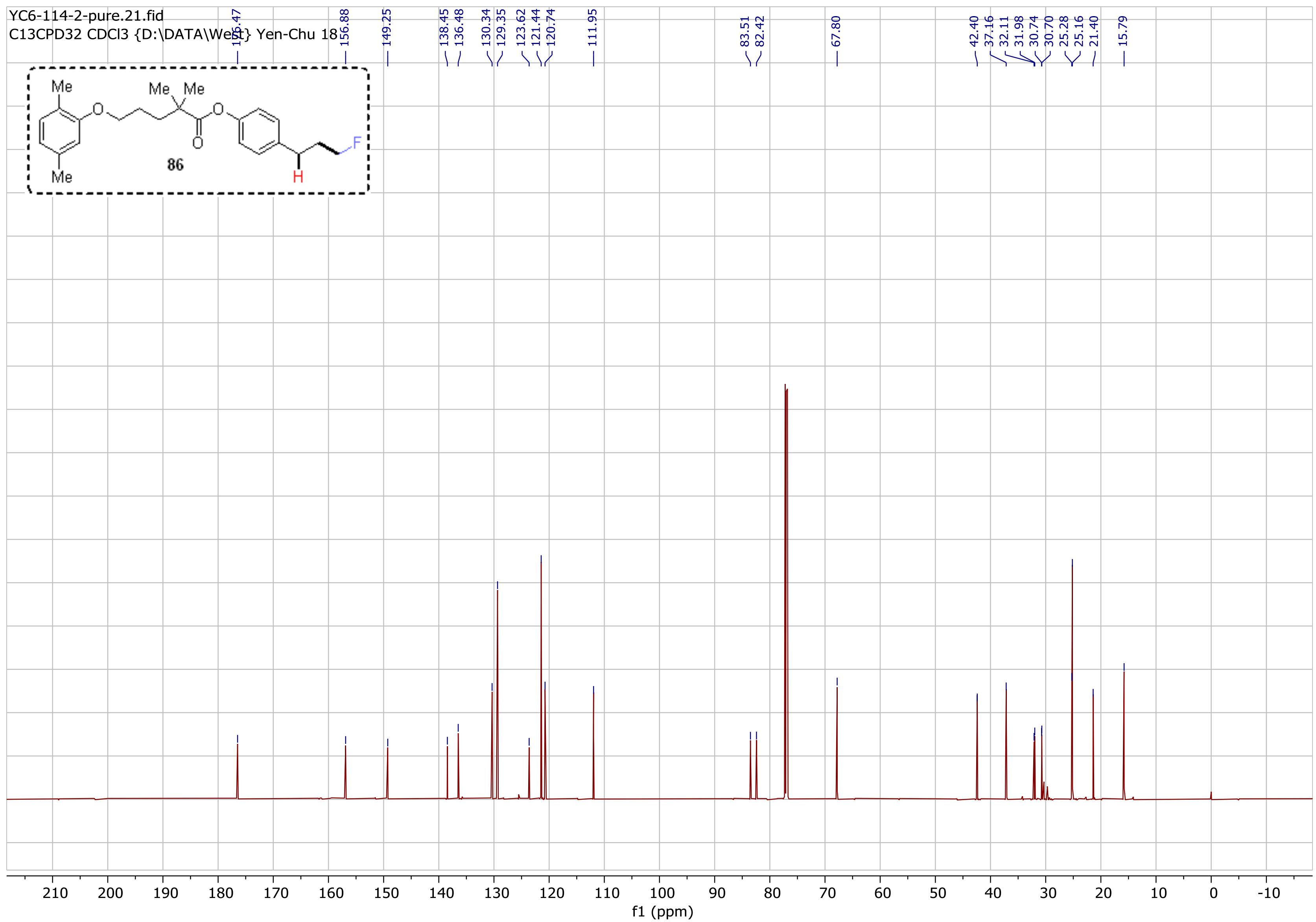
YC6-103-2-pure.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 18
84
H
F
-175.92
-175.95
-175.98
-176.01
-176.04
-176.06
-176.09
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
-230
-240
-250
-260
f1 (ppm)


YC6-097-2-pure.1.fid
PROTON CDCl3 {E:\DATA_West} Yen-Chu 16
4.71
4.71
4.70
4.70
4.70
4.69
4.69
4.68
4.63
4.63
4.62
4.62
4.62
4.61
4.61
4.60
2.82
2.81
2.80
2.80
2.80
2.79
2.78
2.77
2.71
2.70
2.70
2.69
2.69
2.68
2.68
2.66
2.00
2.00
1.99
1.99
1.99
1.99
1.98
1.98
1.98
1.98
1.97
1.97
1.97
1.96
1.96
1.95
1.95
1.95
1.94
1.87
1.86
1.86
1.85
1.85
1.84
1.84
1.82
1.81
1.81
1.80
1.80
1.80
1.79
1.79
1.37
1.36
1.33
1.32
-0.00
H
Me
F
85
1.98
3.00
1.03
1.08
1.06
1.08
1.09
3.40
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)

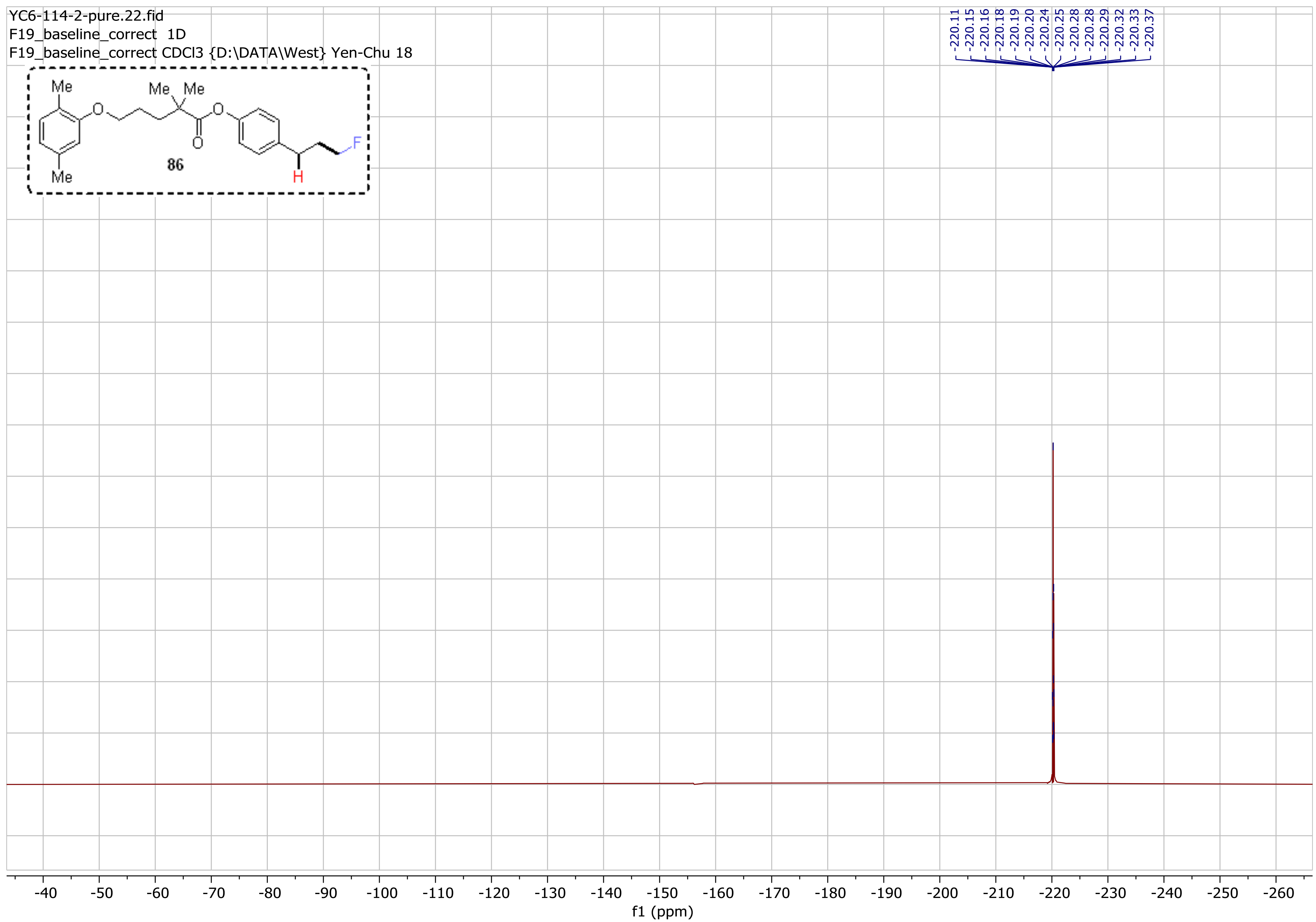

YC6-097-2-pure.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 2
141.50
128.44
125.95
90.60
89.50
38.74
38.60
31.39
31.35
21.08
20.93
H
Me
F
85
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

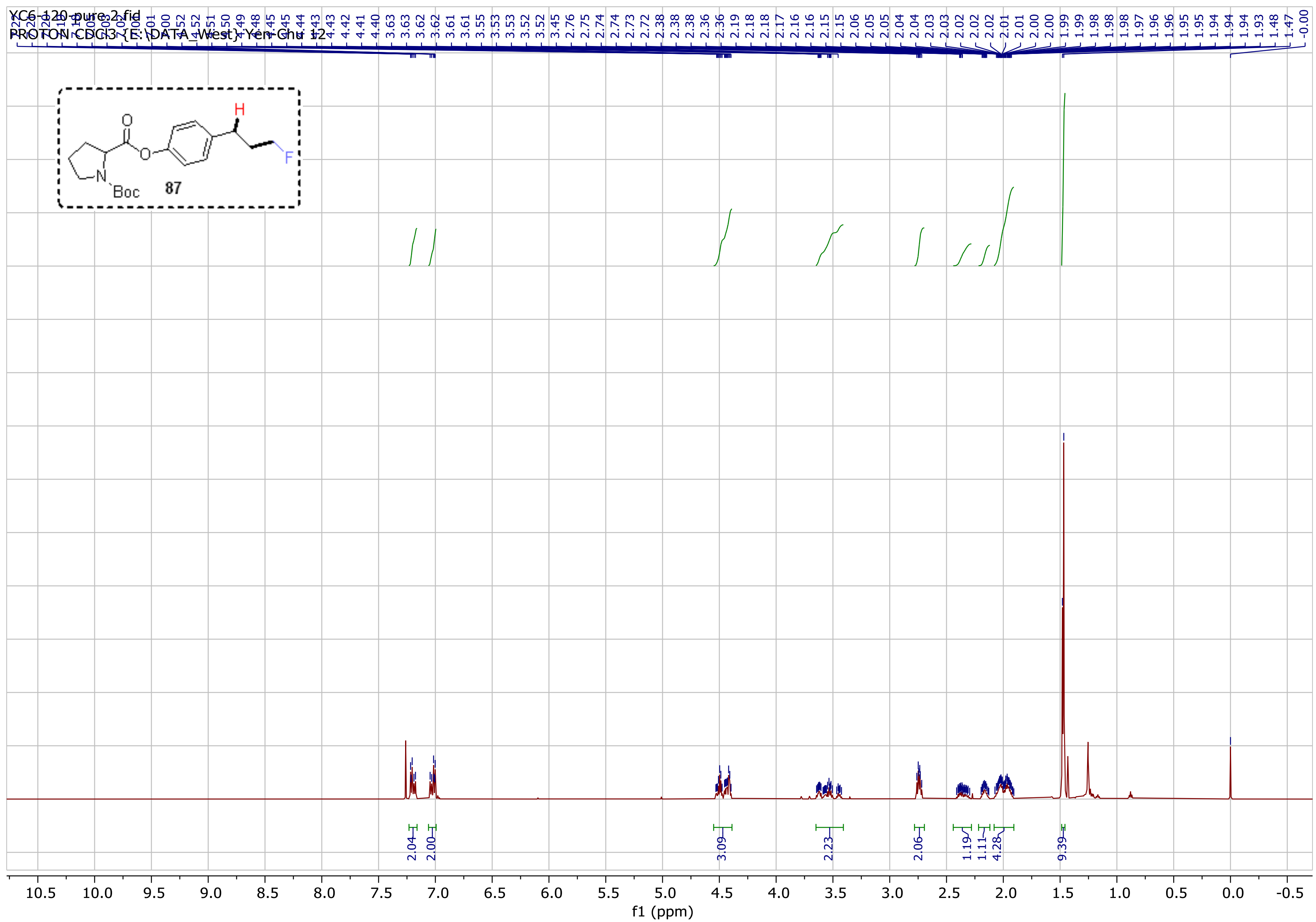

YC6-097-2-pure.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 2
-174.07
-174.10
-174.11
-174.12
-174.14
-174.15
-174.16
-174.18
-174.19
-174.21
-174.22
-174.24
-174.25
-174.27
-174.28
-174.29
-174.31
-174.32
-174.33
-174.36
H
Me
F
85
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

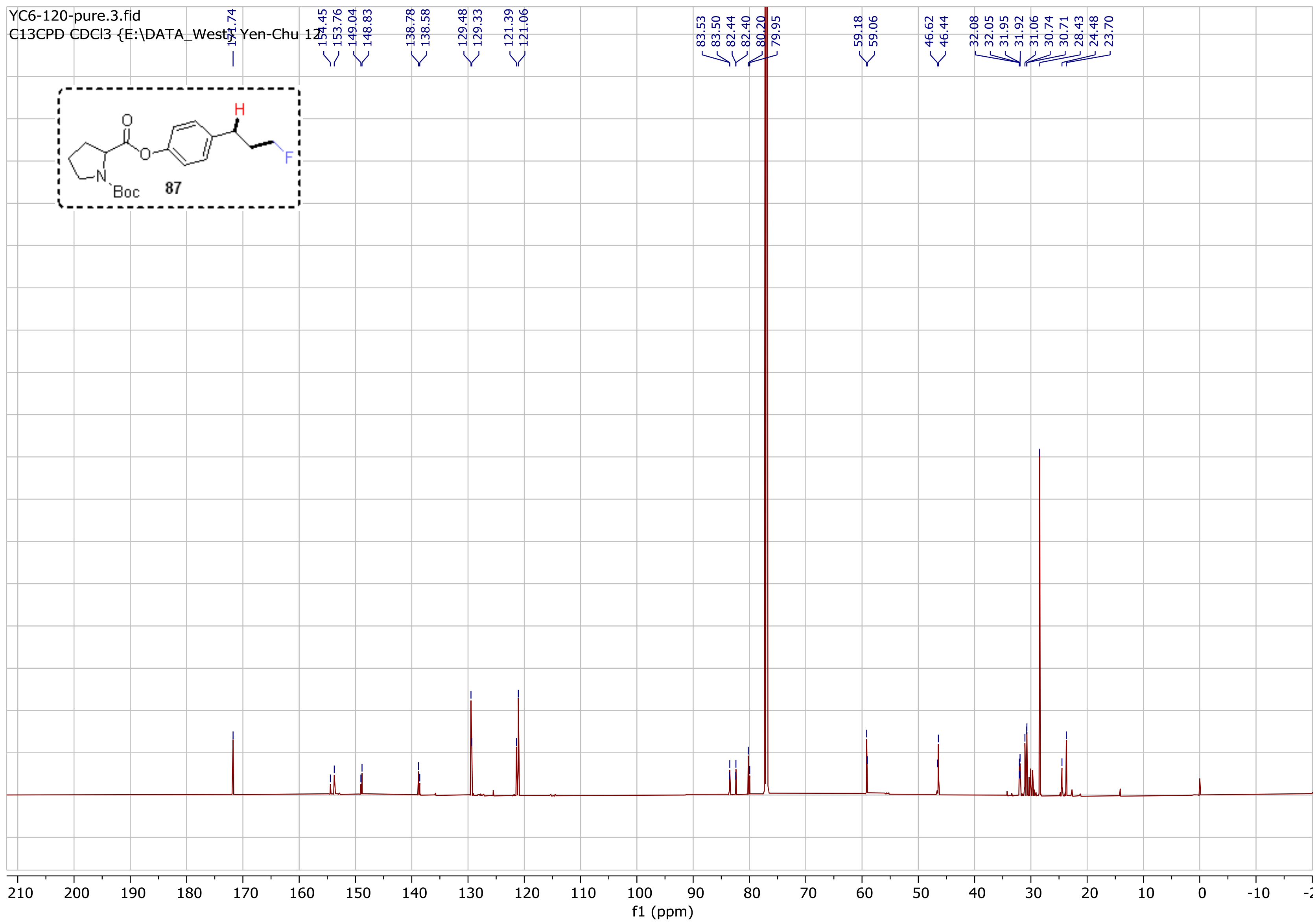

YC6-114-2-pure.20.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 18
86
f1 (ppm)

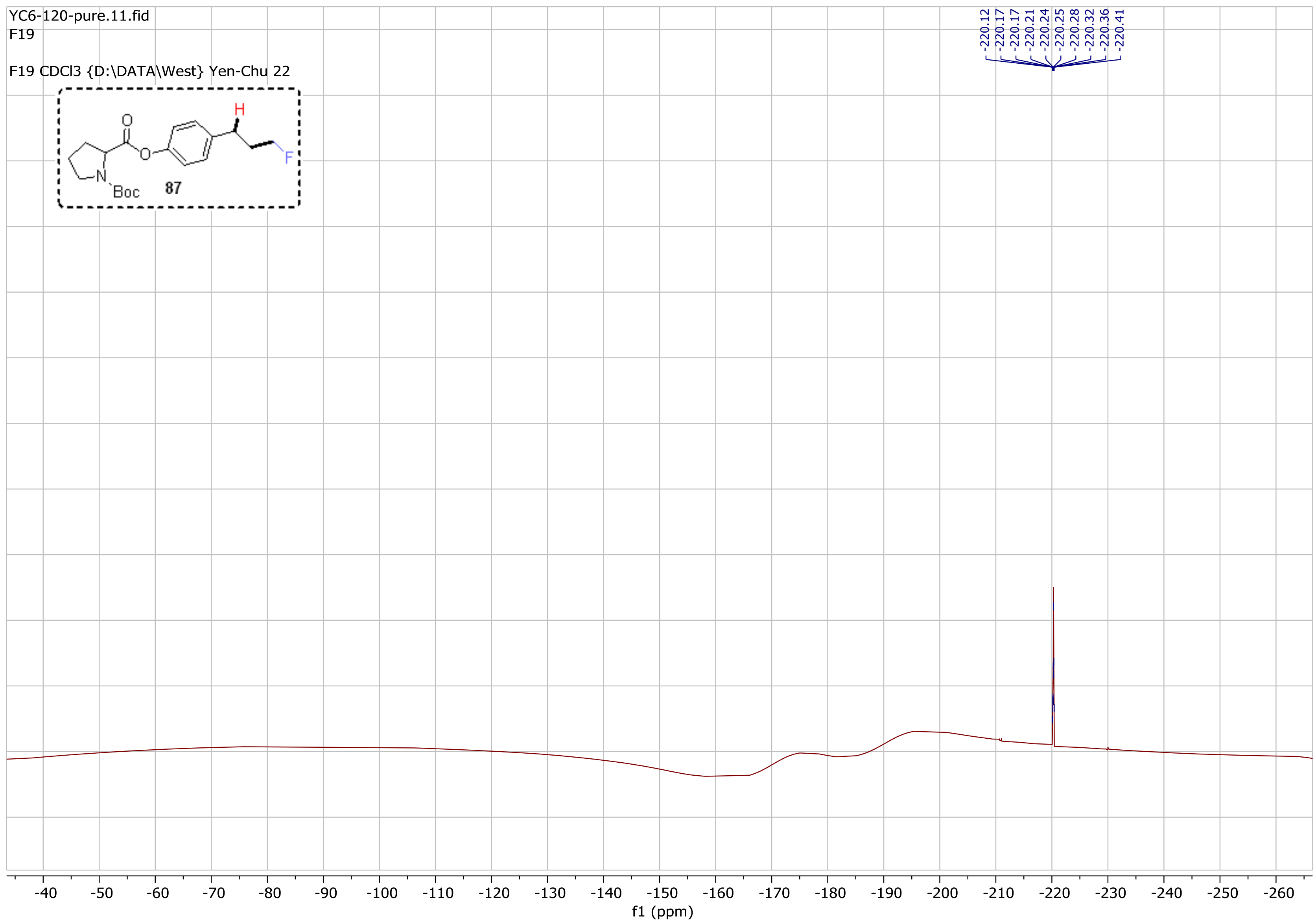


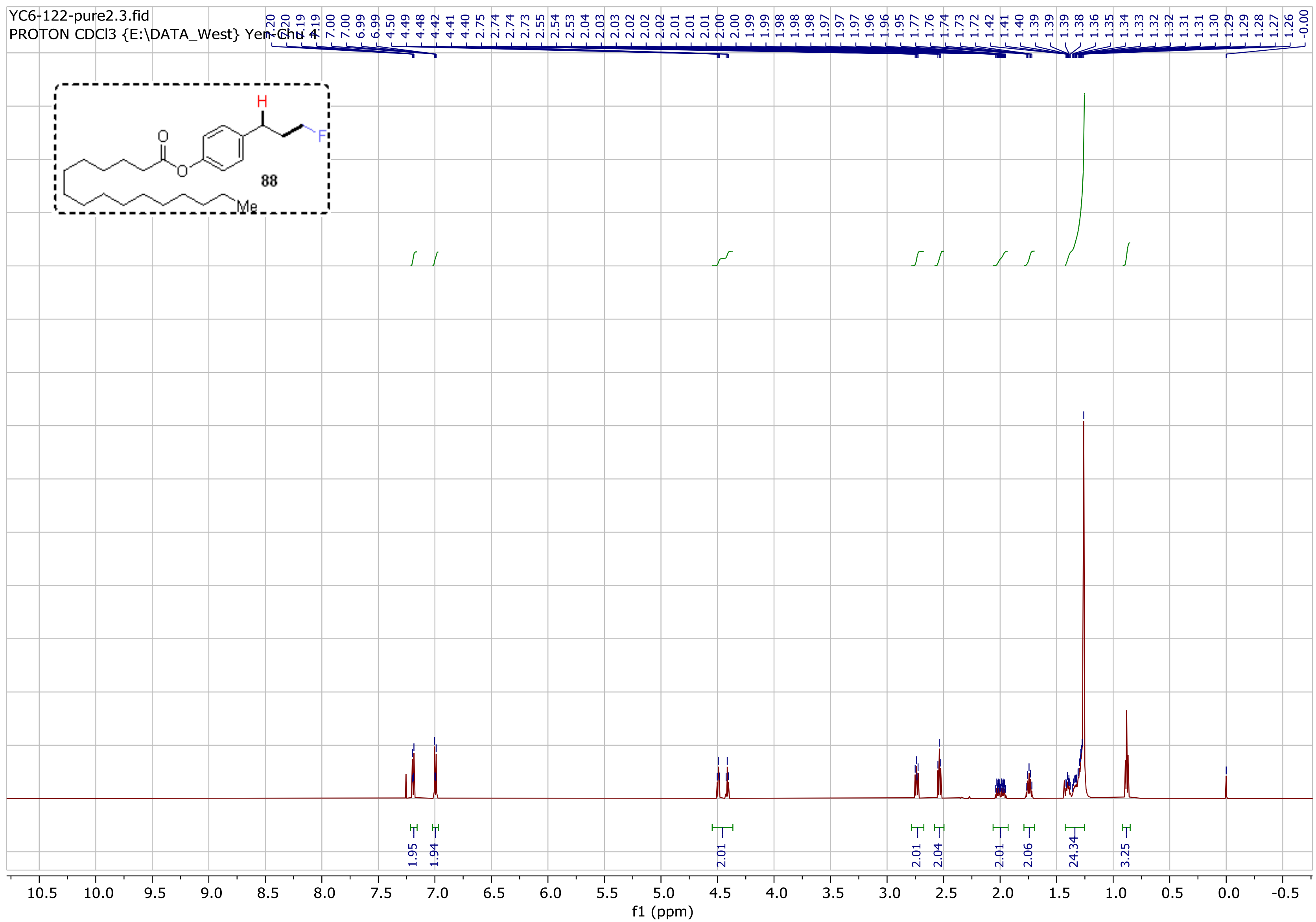
YC6-114-2-pure.21.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 18
1…6.47
156.88
149.25
138.45
136.48
130.34
129.35
123.62
121.44
120.74
111.95
83.51
82.42
67.80
42.40
37.16
32.11
31.98
30.74
30.70
25.28
25.16
21.40
15.79
Me
Me
Me
Me
O
O
O
F
H
86
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

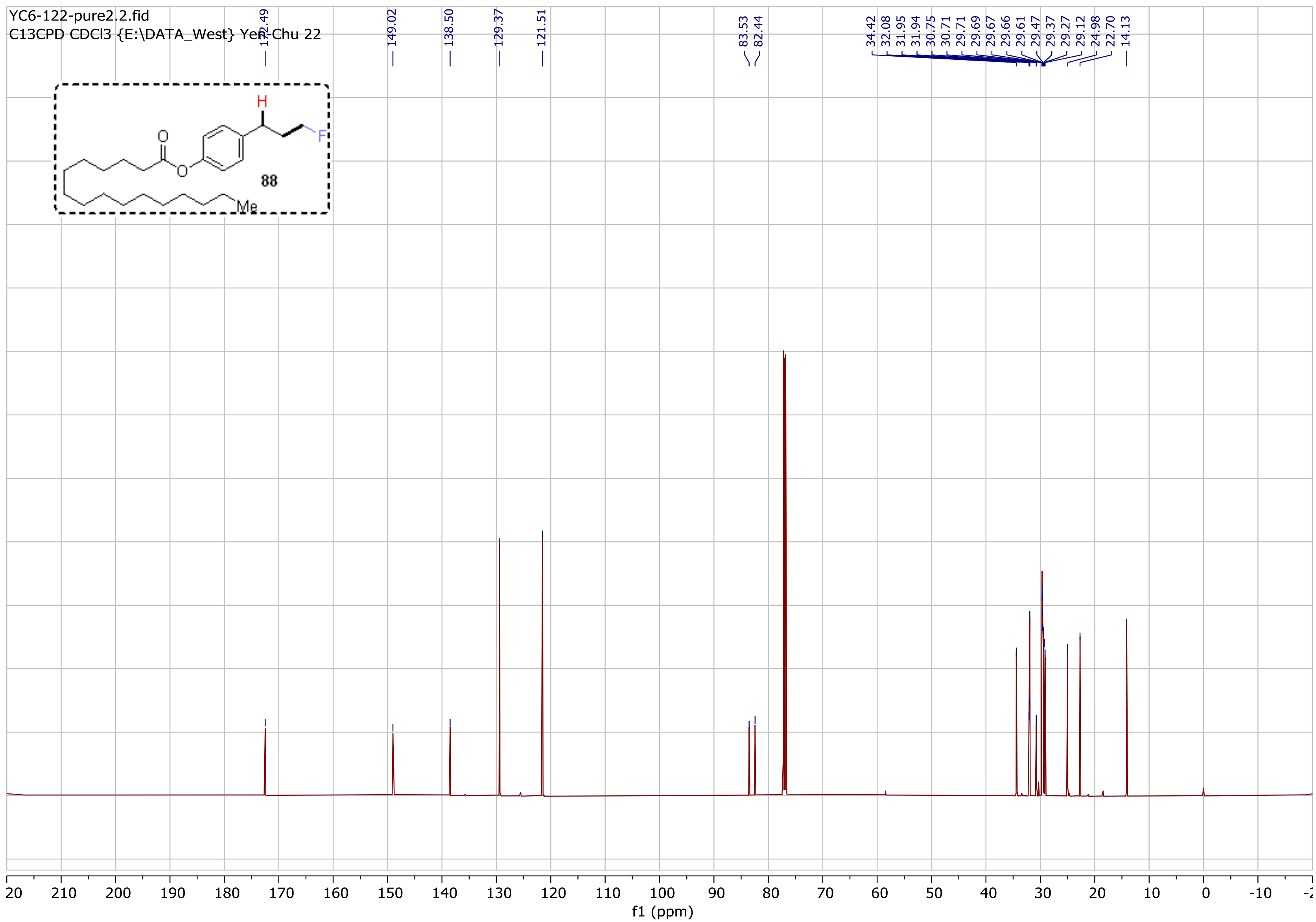

YC6-114-2-pure.22.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 18
Me
Me
Me
Me
O
O
O
F
H
86
-220.11
-220.15
-220.16
-220.18
-220.19
-220.20
-220.24
-220.25
-220.28
-220.28
-220.29
-220.32
-220.33
-220.37
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

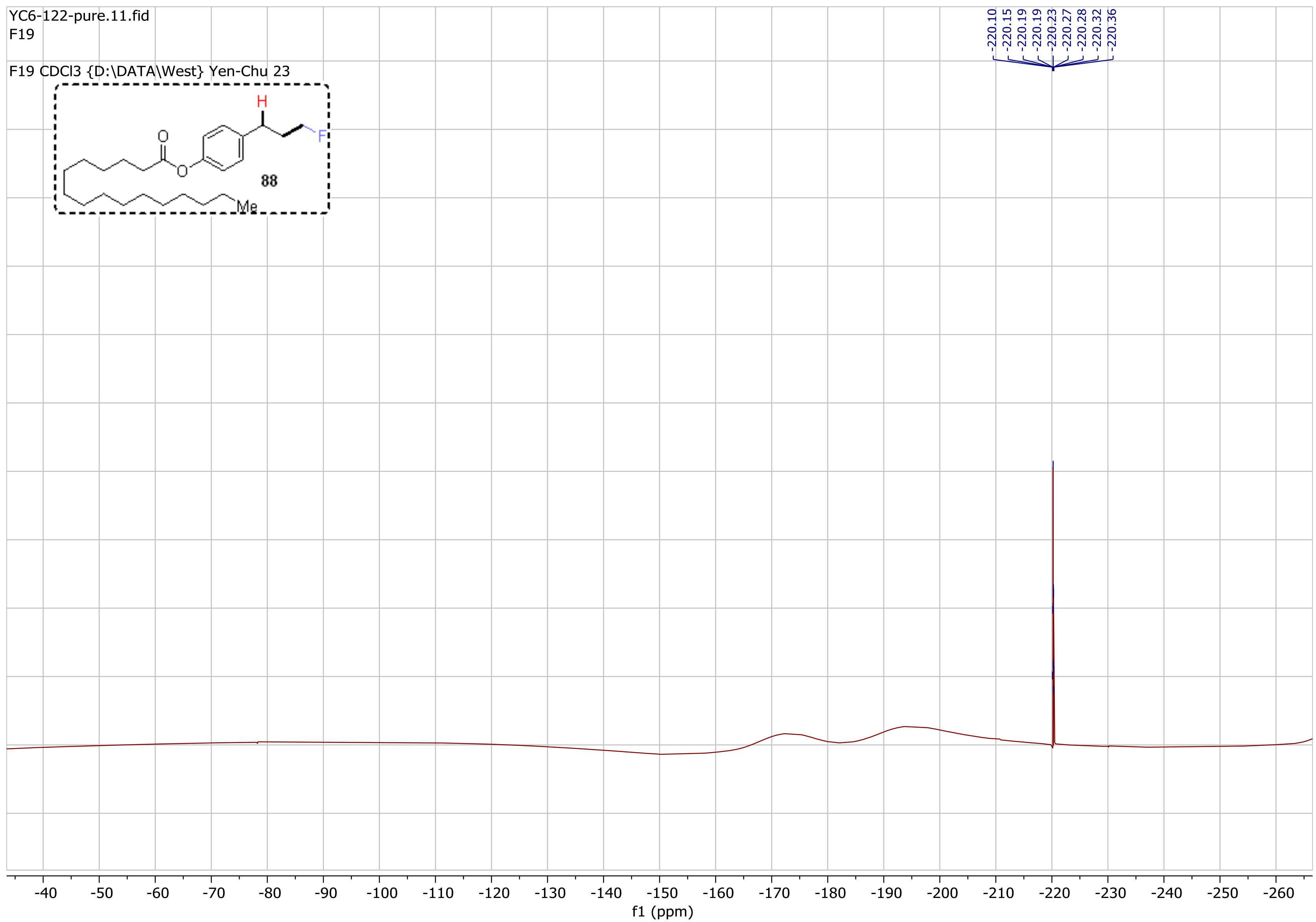

YC6-120-pure-2.fid
PROTON CDCl3 {E:\DATA_West} Yen-Chu 12
87
Boc
2.04
2.00
3.09
2.23
2.06
1.19
1.11
4.28
9.39
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

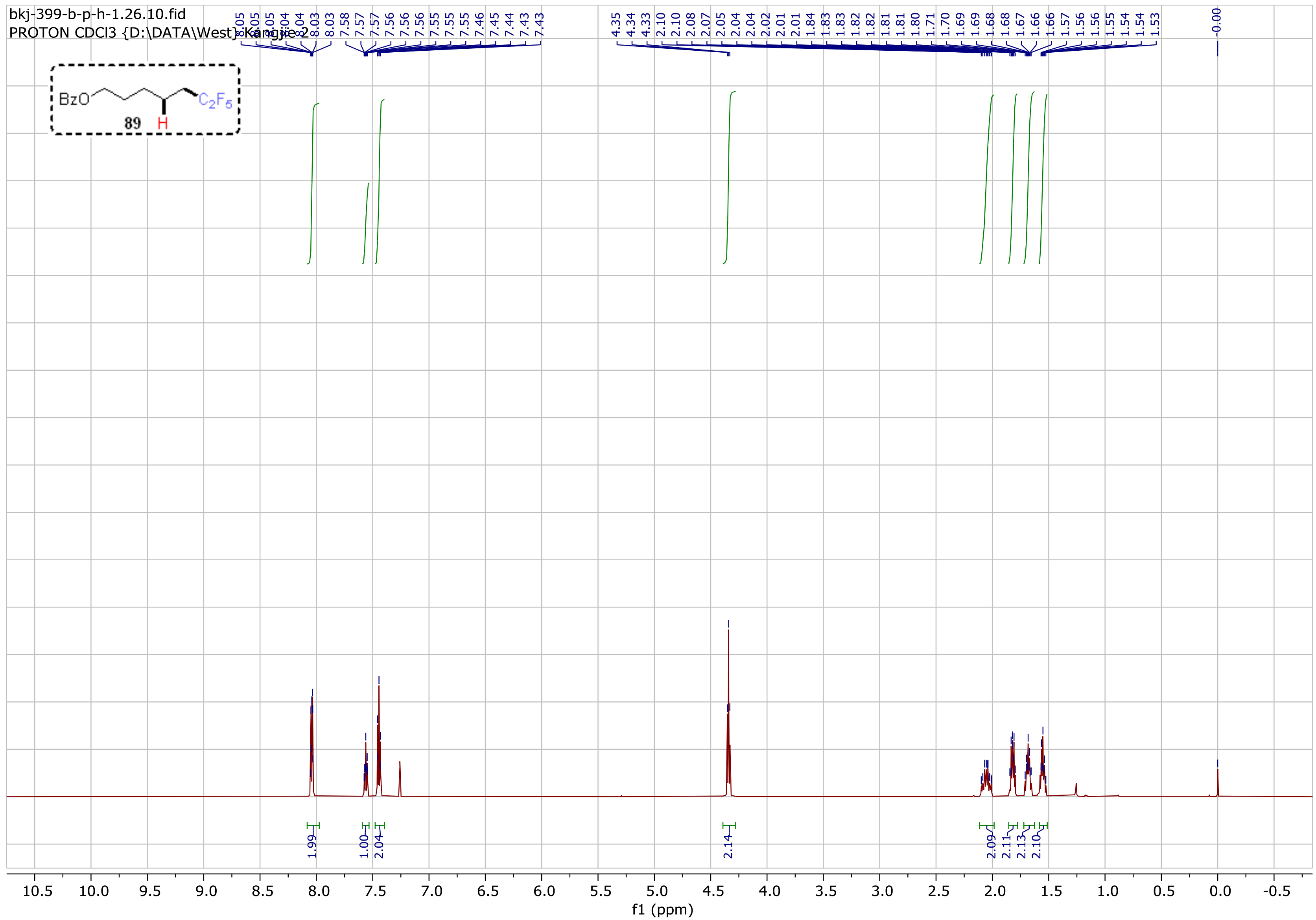

YC6-120-pure.3.fid
C13CPD CDCl3 {E:\DATA_West} Yen-Chu 12
171.74
154.45
153.76
149.04
148.83
138.78
138.58
129.48
129.33
121.39
121.06
83.53
83.50
82.44
82.40
80.20
79.95
59.18
59.06
46.62
46.44
32.08
32.05
31.95
31.92
31.06
30.74
30.71
28.43
24.48
23.70
O
O
N
Boc
H
F
87
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

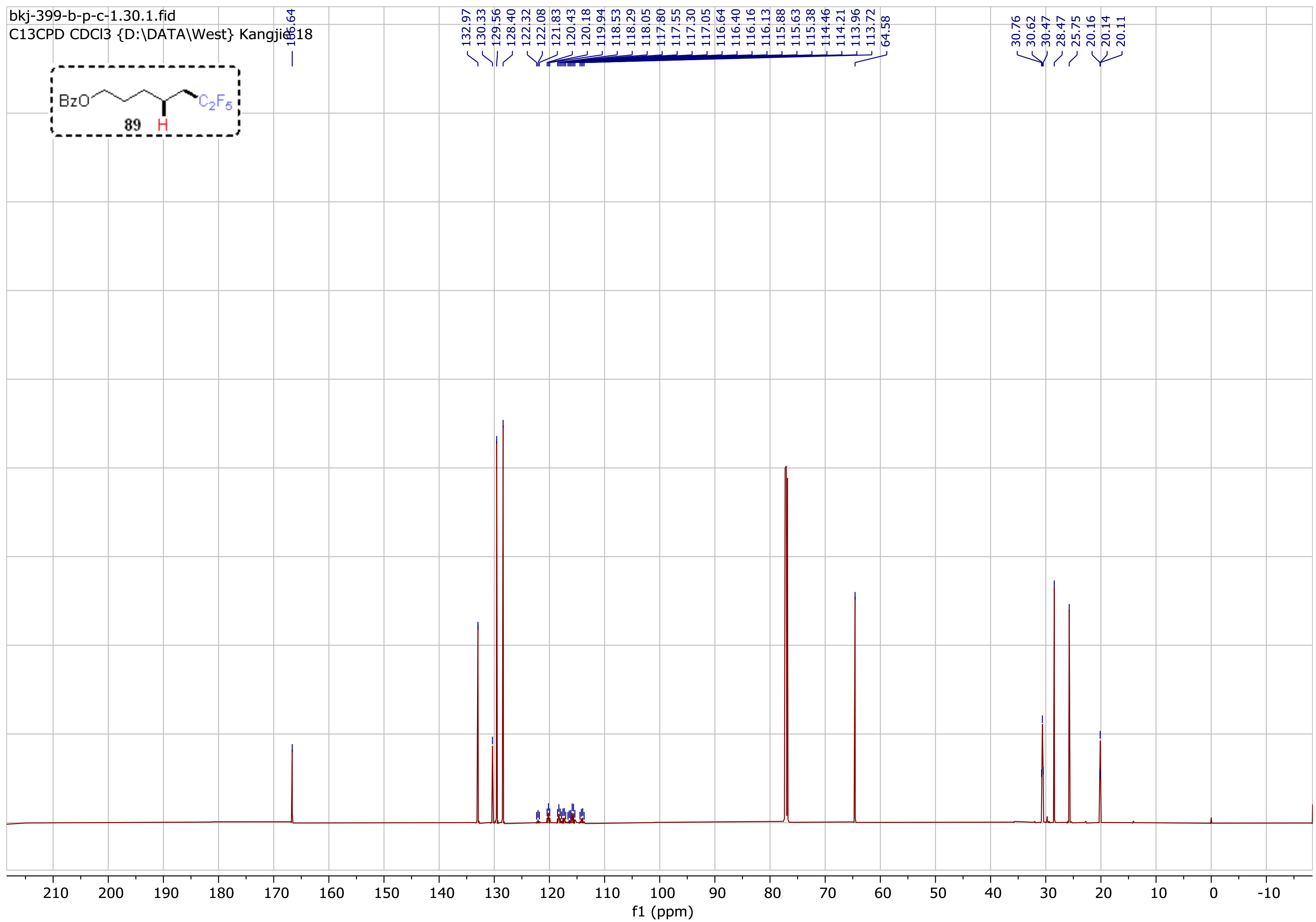

YC6-120-pure.11.fid
F19
F19 CDCl3 {D:\DATA\West} Yen-Chu 22
O
O
H
F
N
Boc
87
-220.12
-220.17
-220.17
-220.21
-220.24
-220.25
-220.28
-220.32
-220.36
-220.41
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)


YC6-122-pure2.3.fid
PROTON CDCl3 {E:\DATA_West} Yen-Chu 4
7.20 7.20 7.19 7.19 7.00 7.00 7.00 6.99 6.99 4.50 4.49 4.48 4.42 4.41 4.40 2.75 2.74 2.74 2.73 2.55 2.54 2.53 2.04 2.03 2.03 2.02 2.02 2.02 2.01 2.01 2.01 2.00 2.00 1.99 1.99 1.98 1.98 1.98 1.97 1.97 1.97 1.96 1.96 1.95 1.77 1.76 1.74 1.73 1.72 1.42 1.41 1.40 1.39 1.39 1.39 1.38 1.36 1.35 1.34 1.33 1.32 1.32 1.31 1.31 1.30 1.29 1.29 1.28 1.27 1.26 -0.00
H
O
O
F
88
Me
1.95
1.94
2.01
2.01
2.04
2.01
2.06
24.34
3.25
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

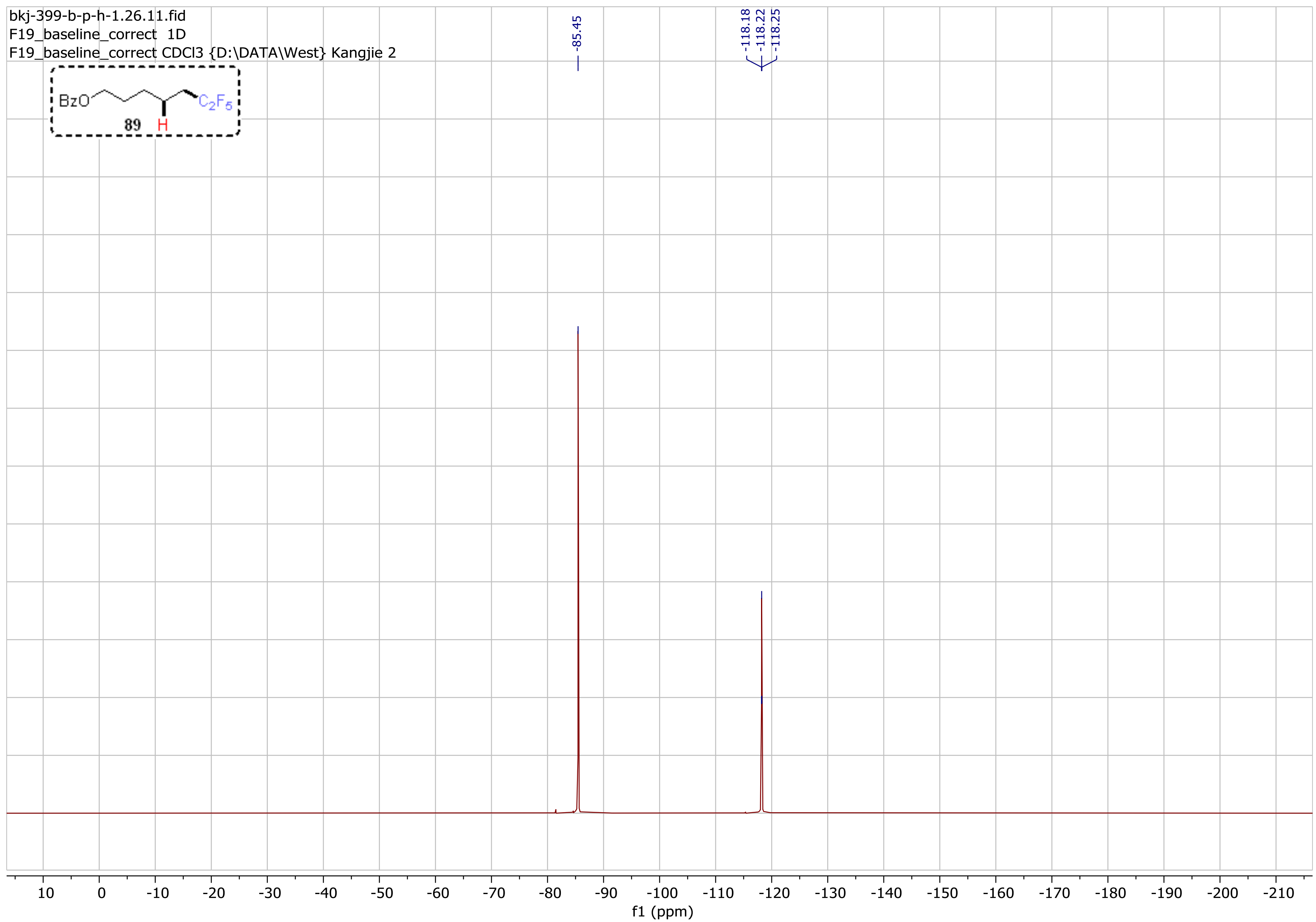

YC6-122-pure2.2.fid
C13CPD CDCl3 {E:\DATA_West} Yen-Chu 22
172.49
149.02
138.50
129.37
121.51
83.53
82.44
34.42
32.08
31.95
31.94
30.75
30.71
29.71
29.69
29.67
29.66
29.61
29.47
29.37
29.27
29.12
24.98
22.70
14.13
O
O
H
F
Me
88
f1 (ppm)


YC6-122-pure.11.fid
F19
F19 CDCl3 {D:\DATA\West} Yen-Chu 23
H
O
O
F
88
Me
-220.10
-220.15
-220.19
-220.19
-220.23
-220.27
-220.28
-220.32
-220.36
-40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230 -240 -250 -260
f1 (ppm)

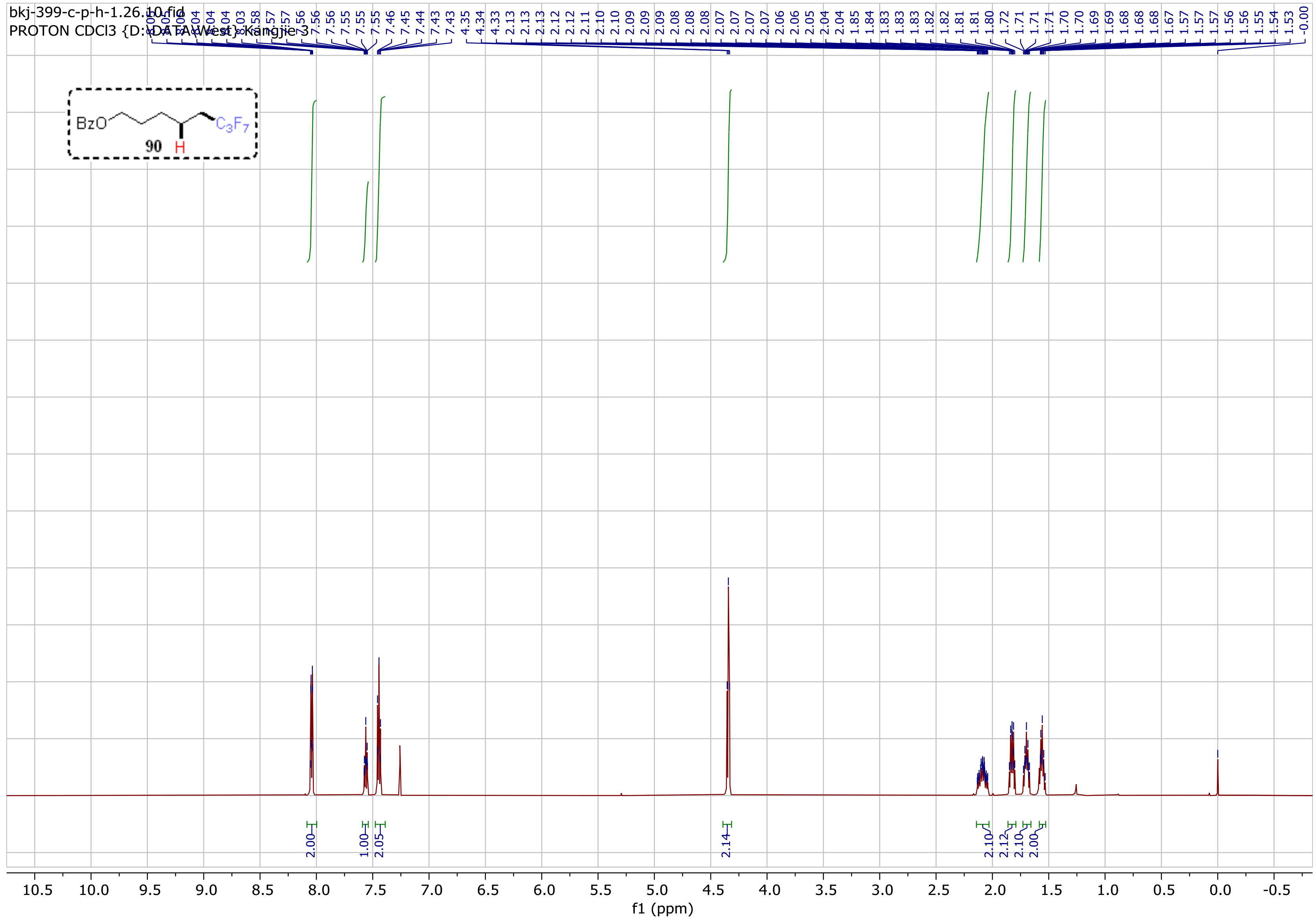

bkj-399-b-p-h-1.26.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 2
BzO
89
H
C2F5
8.05 8.05 8.05 8.04 8.04 8.03 8.03
7.58 7.57 7.57 7.56 7.56 7.56 7.55 7.55 7.55 7.46 7.45 7.44 7.43 7.43
4.35 4.34 4.33 2.10 2.10 2.08 2.07 2.05 2.04 2.04 2.02 2.01 2.01 1.84 1.83 1.83 1.82 1.82 1.81 1.81 1.80 1.71 1.70 1.69 1.69 1.68 1.68 1.67 1.66 1.66 1.57 1.56 1.56 1.55 1.54 1.54 1.53
-0.00
1.99
1.00
2.04
2.14
2.09
2.11
2.13
2.10
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

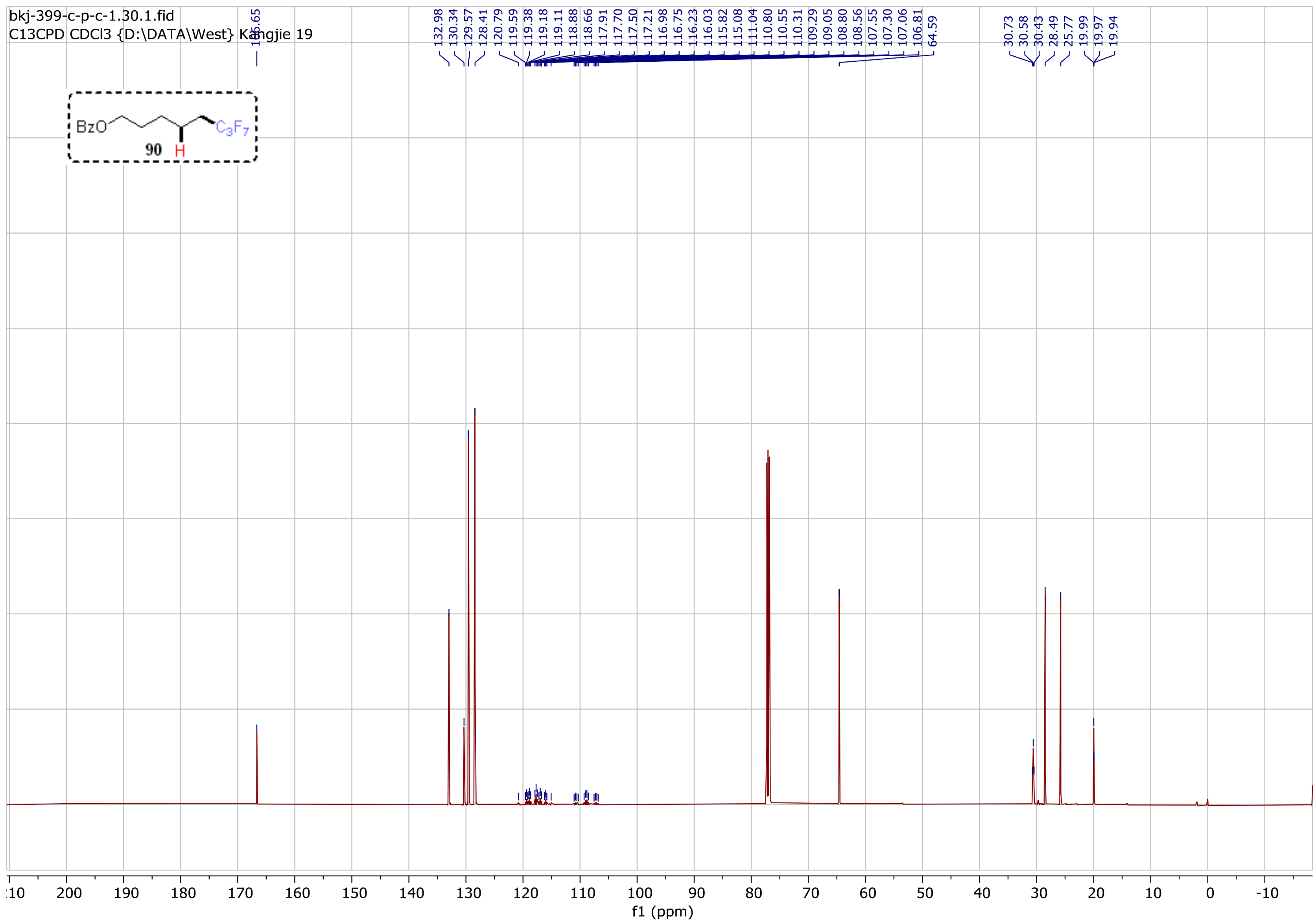


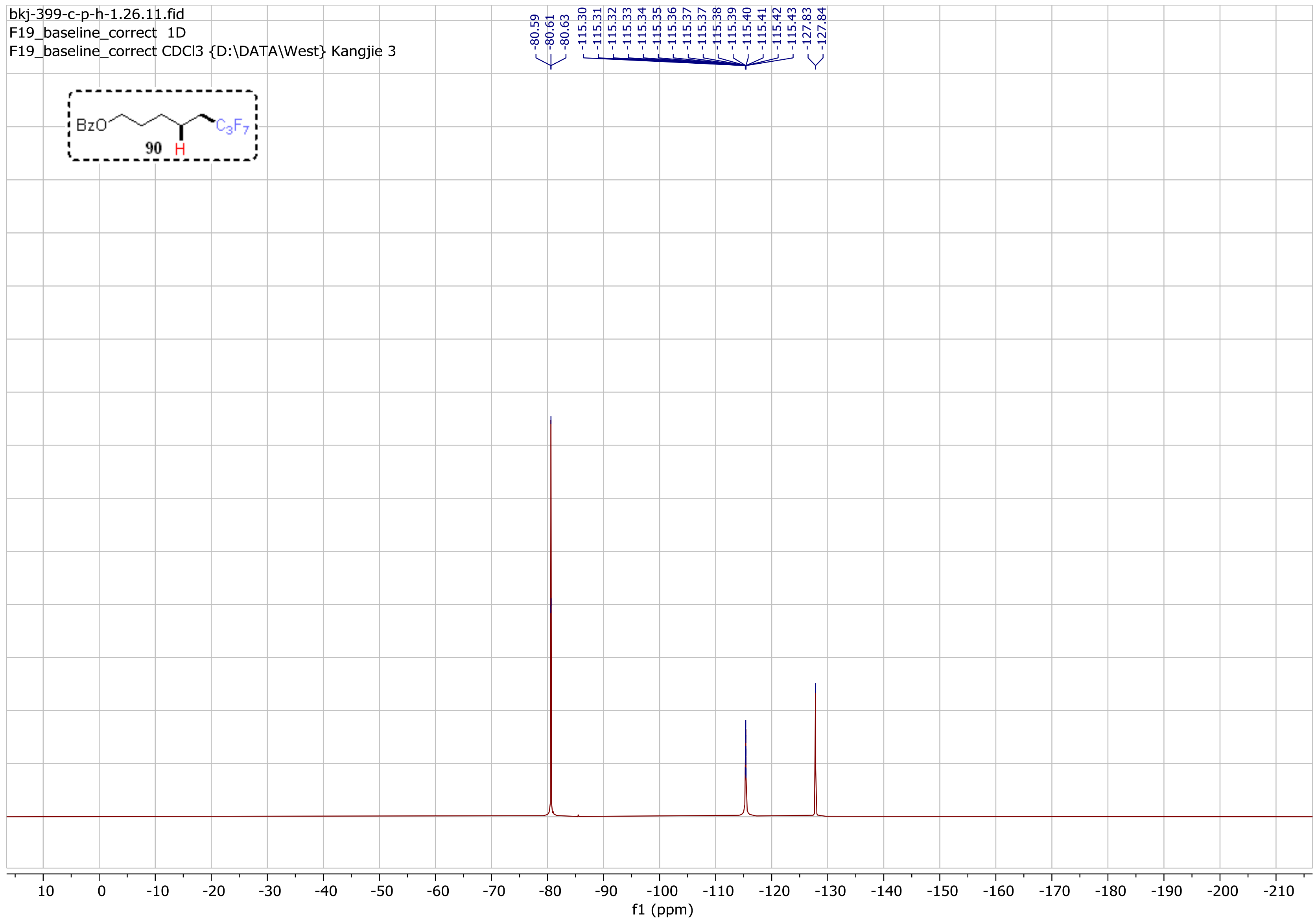
bkj-399-b-p-c-1.30.1.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 18
BzO
89
H
C2F5
166.64
132.97
130.33
129.56
128.40
122.32
122.08
121.83
120.43
120.18
119.94
118.53
118.29
118.05
117.80
117.55
117.30
117.05
116.64
116.40
116.16
116.13
115.88
115.63
115.38
114.46
114.21
113.96
113.72
64.58
30.76
30.62
30.47
28.47
25.75
20.16
20.14
20.11
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)



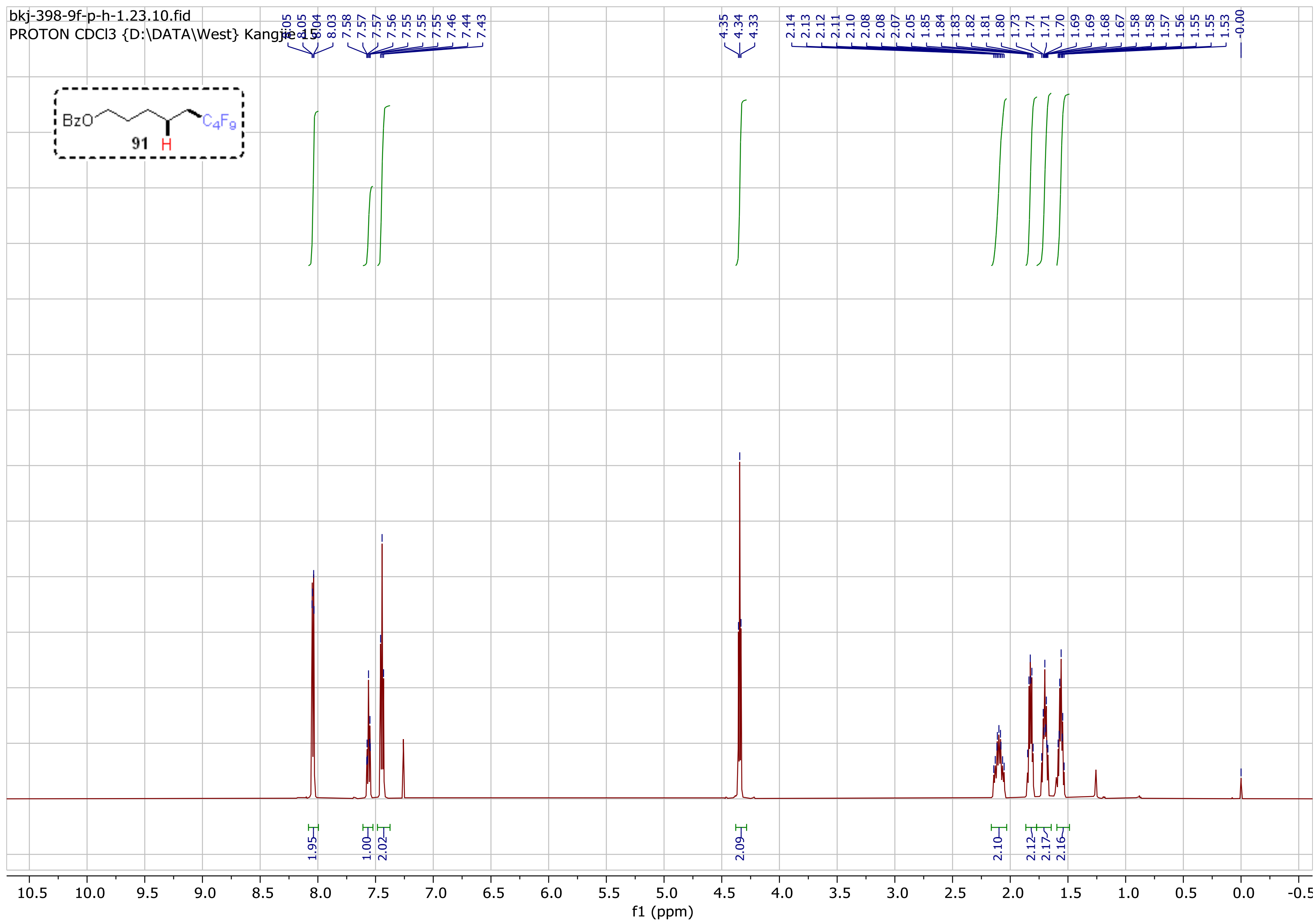
bkj-399-b-p-h-1.26.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 2
BzO
C2F5
H
89
-85.45
-118.18
-118.22
-118.25
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

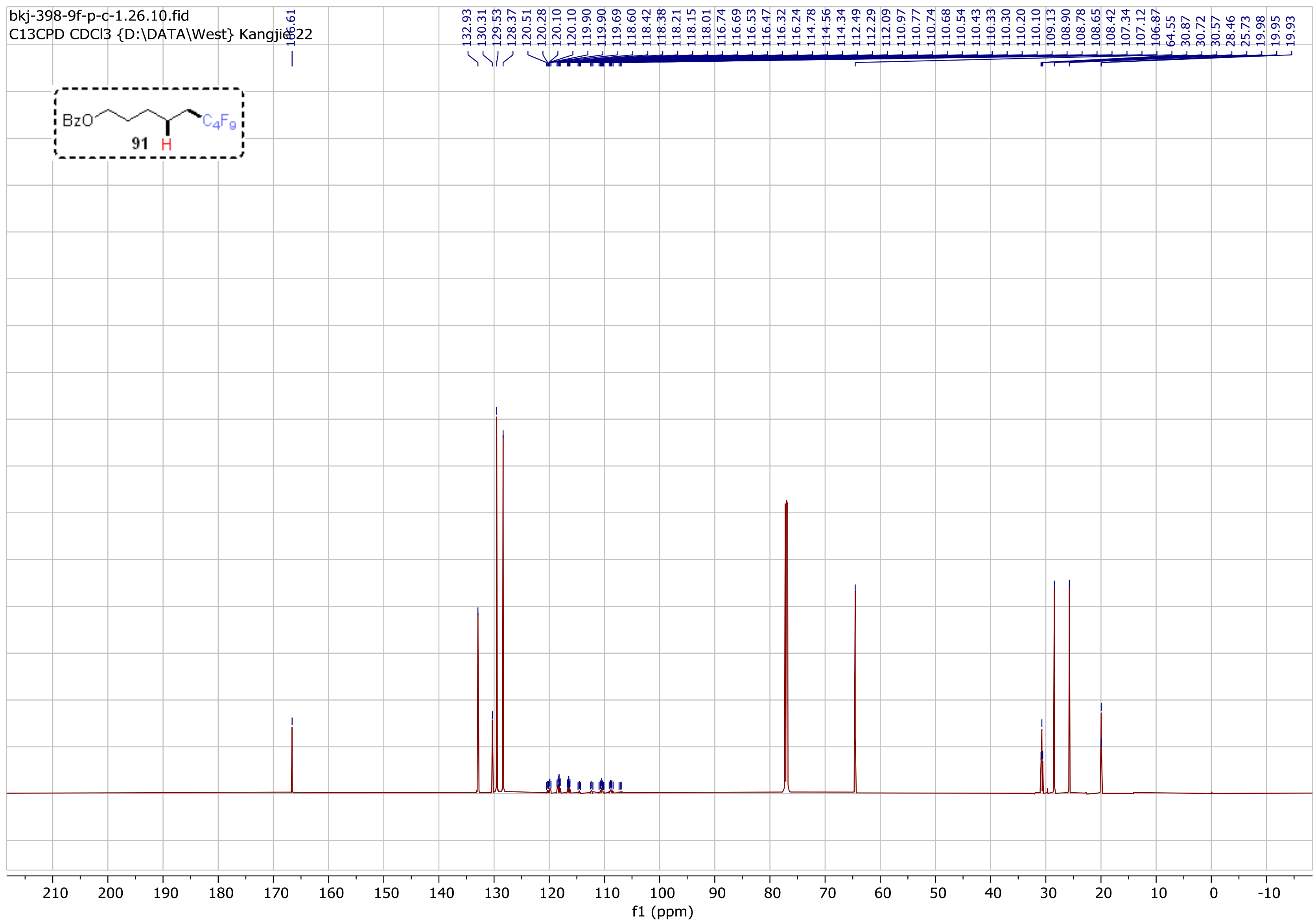

bkj-399-c-p-h-1.26.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 3
BzO
C3F7
90
H
2.00
1.00
2.05
2.14
2.10
2.12
2.10
2.00
f1 (ppm)

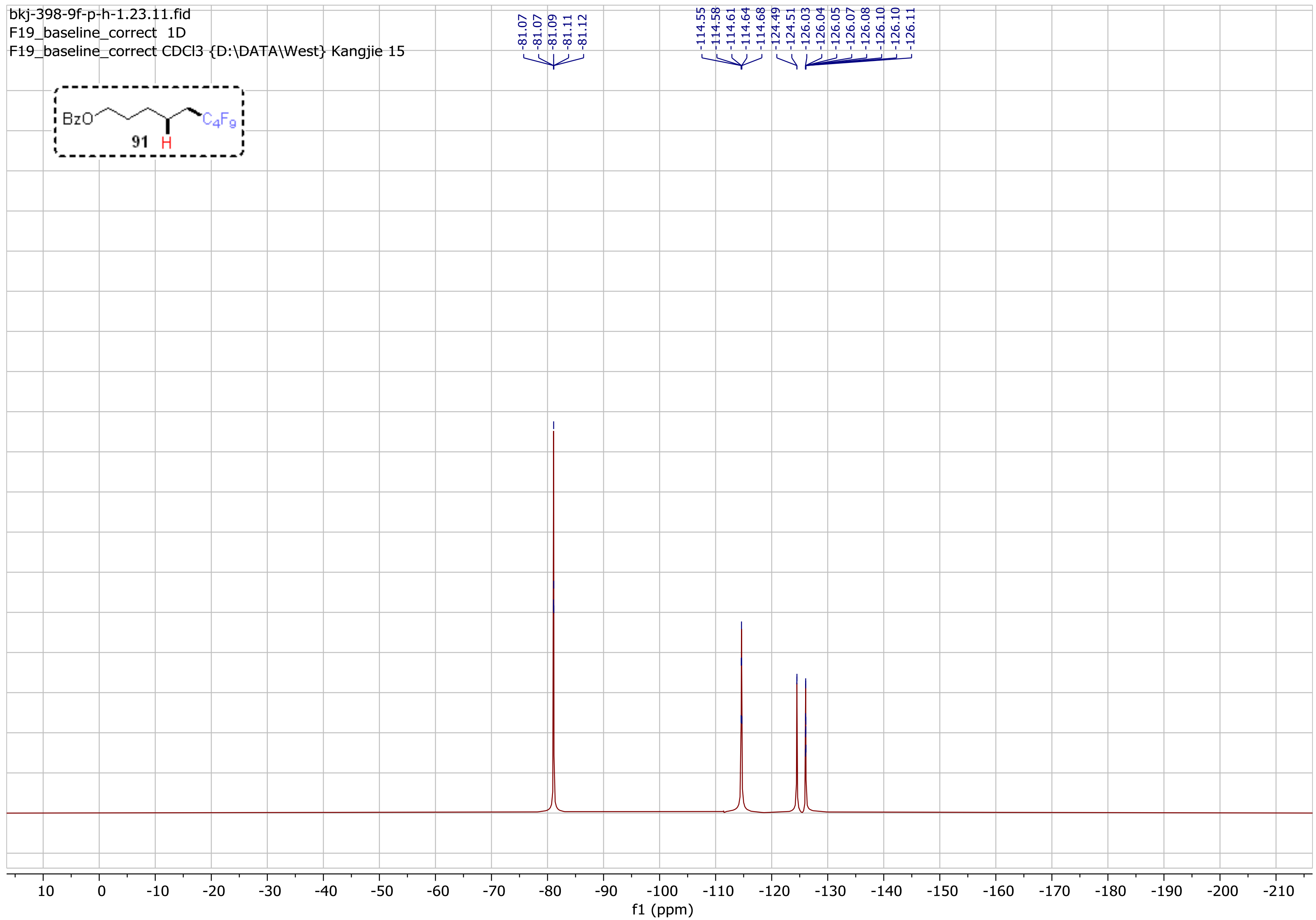

bkj-399-c-p-c-1.30.1.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 19
166.65
132.98
130.34
129.57
128.41
120.79
119.59
119.38
119.18
119.11
118.88
118.66
117.91
117.70
117.50
117.21
116.98
116.75
116.23
116.03
115.82
115.08
111.04
110.80
110.55
110.31
109.29
109.05
108.80
108.56
107.55
107.30
107.06
106.81
64.59
30.73
30.58
30.43
28.49
25.77
19.99
19.97
19.94
BzO
90
H
C_3F_7
f1 (ppm)

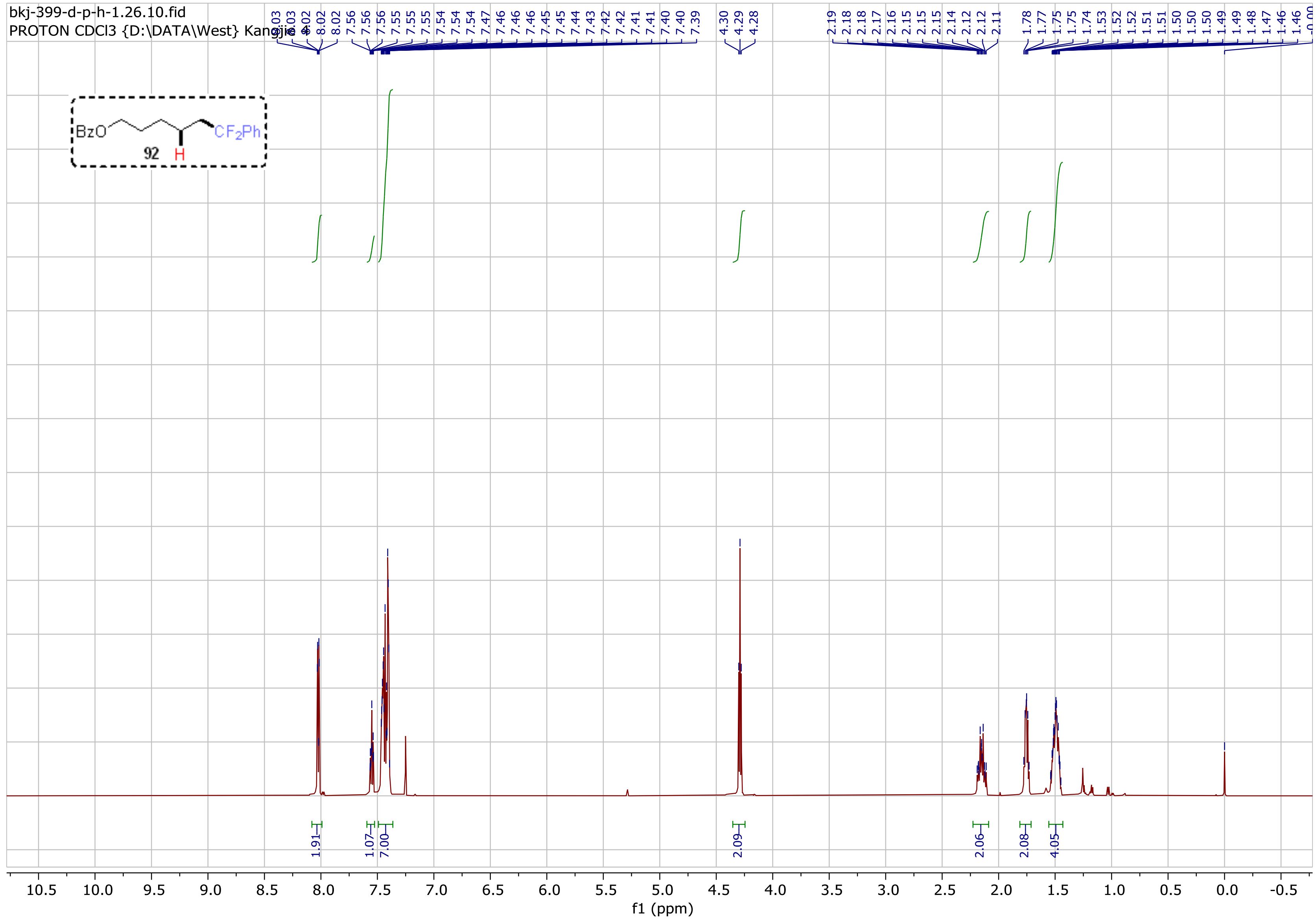


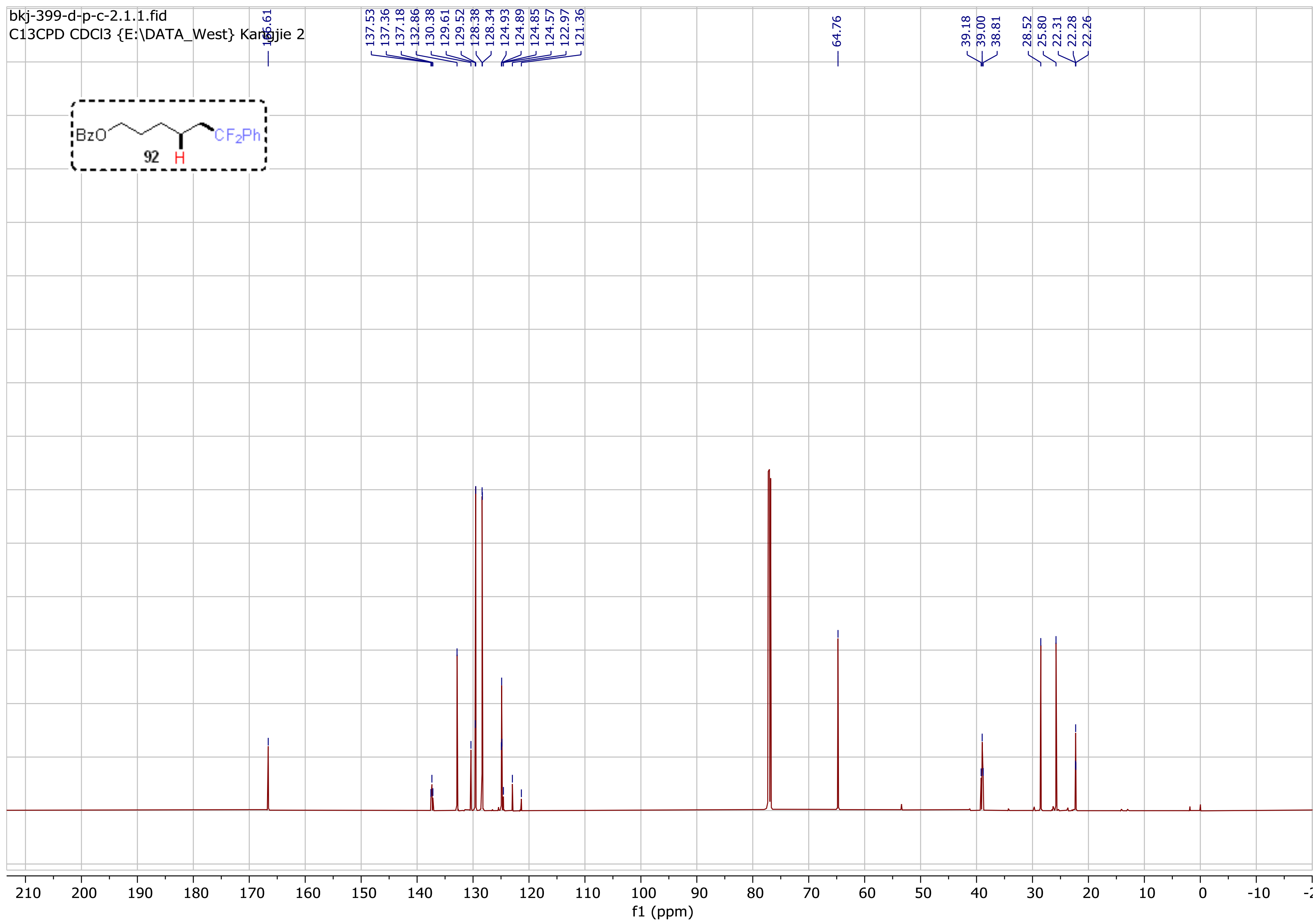
bkj-399-c-p-h-1.26.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 3
BzO
C3F7
H
90
-80.59
-80.61
-80.63
-115.30
-115.31
-115.32
-115.33
-115.34
-115.35
-115.36
-115.37
-115.37
-115.38
-115.39
-115.40
-115.41
-115.42
-115.43
-127.83
-127.84
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

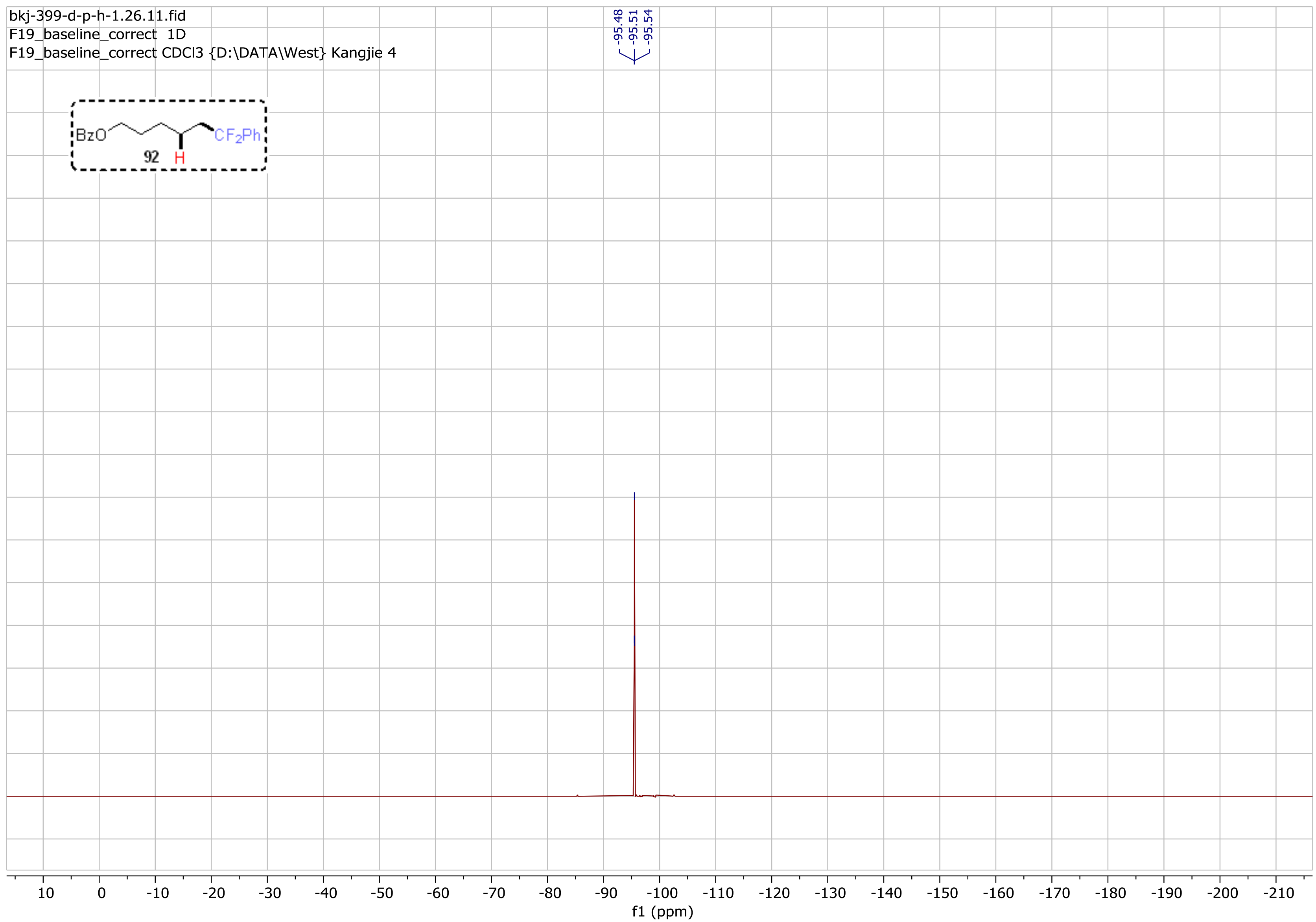

bkj-398-9f-p-h-1.23.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 15
BzO
91
H
C_4F_9
8.05
8.05
8.04
8.03
7.58
7.57
7.57
7.56
7.55
7.55
7.55
7.46
7.44
7.43
4.35
4.34
4.33
2.14
2.13
2.12
2.11
2.10
2.08
2.08
2.07
2.05
1.85
1.84
1.83
1.82
1.81
1.80
1.73
1.71
1.71
1.70
1.69
1.69
1.68
1.67
1.58
1.58
1.57
1.56
1.55
1.55
1.53
-0.00
1.95
1.00
2.02
2.09
2.10
2.12
2.17
2.16
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


bkj-398-9f-p-c-1.26.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 22
BzO
91
H
C4F9
166.61
132.93
130.31
129.53
128.37
120.51
120.28
120.10
120.10
119.90
119.90
119.69
118.60
118.42
118.38
118.21
118.15
118.01
116.74
116.69
116.53
116.47
116.32
116.24
114.78
114.56
114.34
112.49
112.29
112.09
110.97
110.77
110.74
110.68
110.54
110.43
110.33
110.30
110.20
110.10
109.13
108.90
108.78
108.65
108.42
107.34
107.12
106.87
64.55
30.87
30.72
30.57
28.46
25.73
19.98
19.95
19.93
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-398-9f-p-h-1.23.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 15
BzO
91
H
C4F9
-81.07
-81.07
-81.09
-81.11
-81.12
-114.55
-114.58
-114.61
-114.64
-114.68
-124.49
-124.51
-126.03
-126.04
-126.05
-126.07
-126.08
-126.10
-126.10
-126.11
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bkj-399-d-p-h-1.26.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 4
BzO
92
H
CF2Ph
8.03
8.03
8.02
8.02
8.02
7.56
7.56
7.56
7.55
7.55
7.55
7.54
7.54
7.54
7.47
7.46
7.46
7.46
7.45
7.45
7.44
7.43
7.42
7.42
7.41
7.41
7.40
7.40
7.39
4.30
4.29
4.28
2.19
2.18
2.18
2.17
2.16
2.15
2.15
2.15
2.14
2.12
2.12
2.11
1.78
1.77
1.75
1.75
1.74
1.53
1.52
1.52
1.51
1.51
1.50
1.50
1.50
1.49
1.49
1.48
1.47
1.46
1.46
-0.00
1.91
1.07
7.00
2.09
2.06
2.08
4.05
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


bkj-399-d-p-c-2.1.1.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 2
166.61
137.53
137.36
137.18
132.86
130.38
129.61
129.52
128.38
128.34
124.93
124.89
124.85
124.57
122.97
121.36
64.76
39.18
39.00
38.81
28.52
25.80
22.31
22.28
22.26
BzO
CF2Ph
H
92
f1 (ppm)


bkj-399-d-p-h-1.26.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 4
BzO
CF2Ph
H
92
-95.48
-95.51
-95.54
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
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-180
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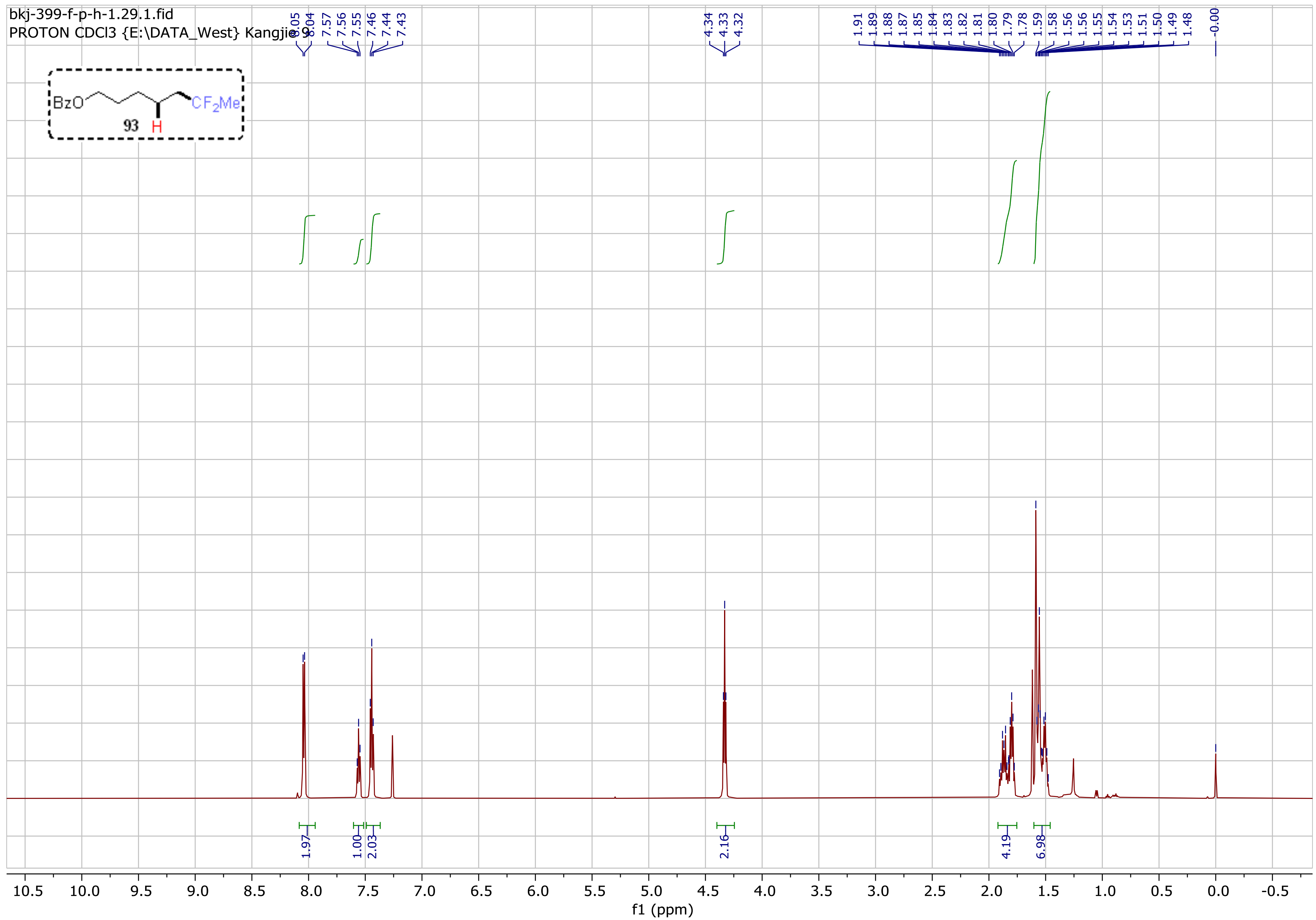
-200
-210
f1 (ppm)


bkj-399-f-p-h-1.29.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 9
BzO
93
H
CF2Me
8.05
8.04
7.57
7.56
7.55
7.46
7.44
7.43
4.34
4.33
4.32
1.91
1.89
1.88
1.87
1.85
1.84
1.83
1.82
1.81
1.80
1.79
1.78
1.59
1.58
1.56
1.56
1.55
1.54
1.53
1.51
1.50
1.49
1.48
-0.00
1.97
1.00
2.03
2.16
4.19
6.98
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
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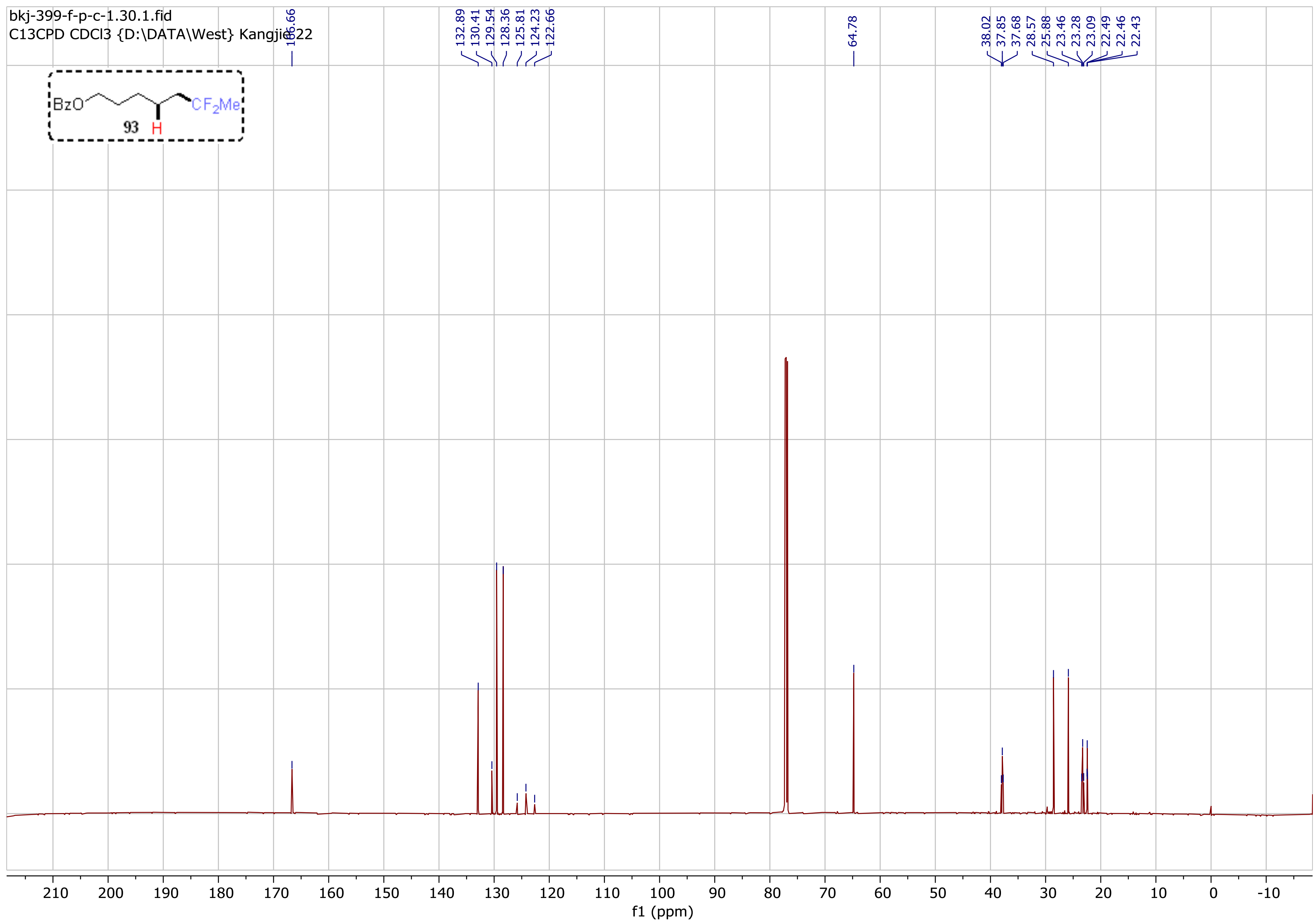
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


bkj-399-f-p-c-1.30.1.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 22
BzO
93
H
CF2Me
166.66
132.89
130.41
129.54
128.36
125.81
124.23
122.66
64.78
38.02
37.85
37.68
28.57
25.88
23.46
23.28
23.09
22.49
22.46
22.43
210
200
190
180
170
160
150
140
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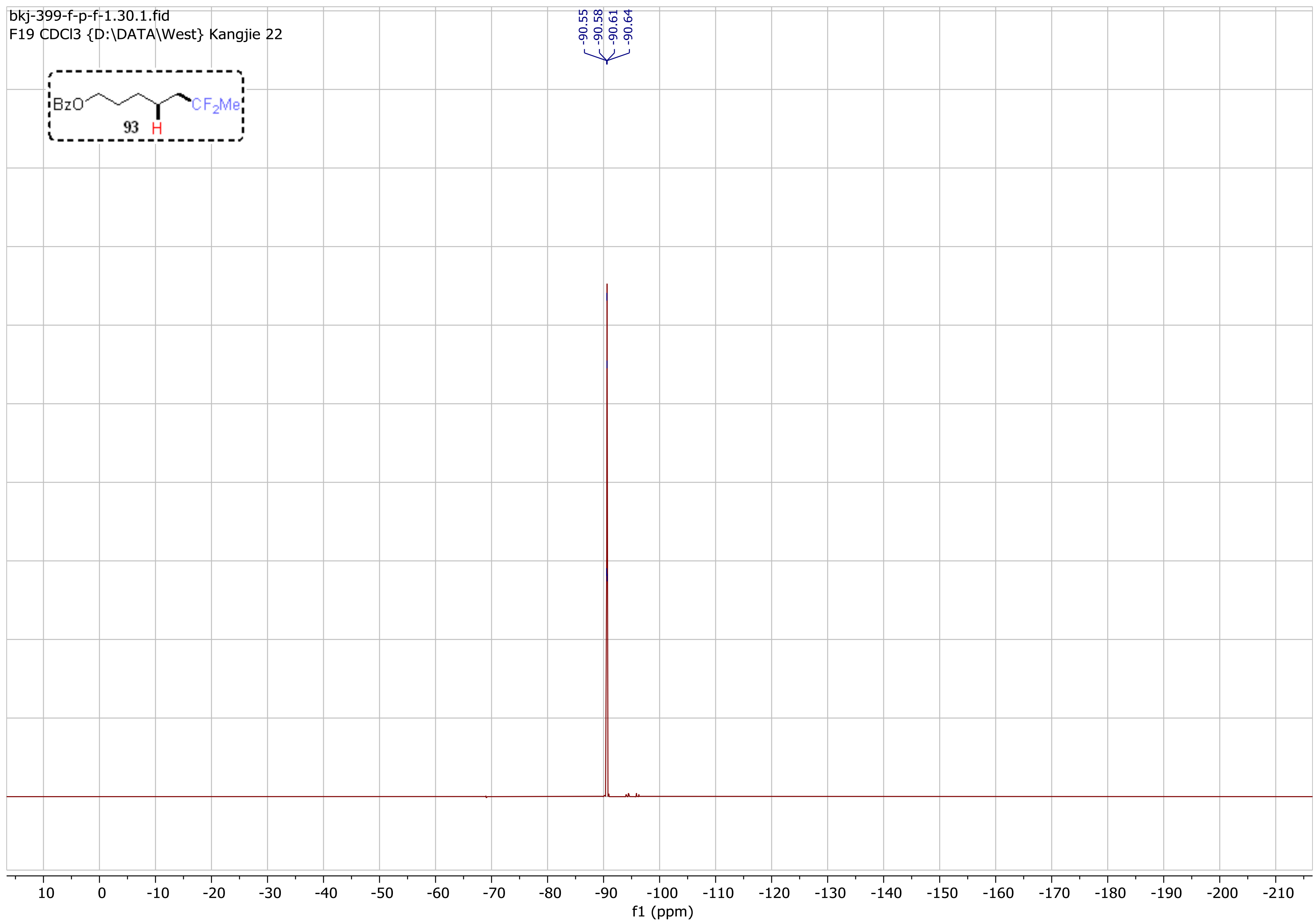
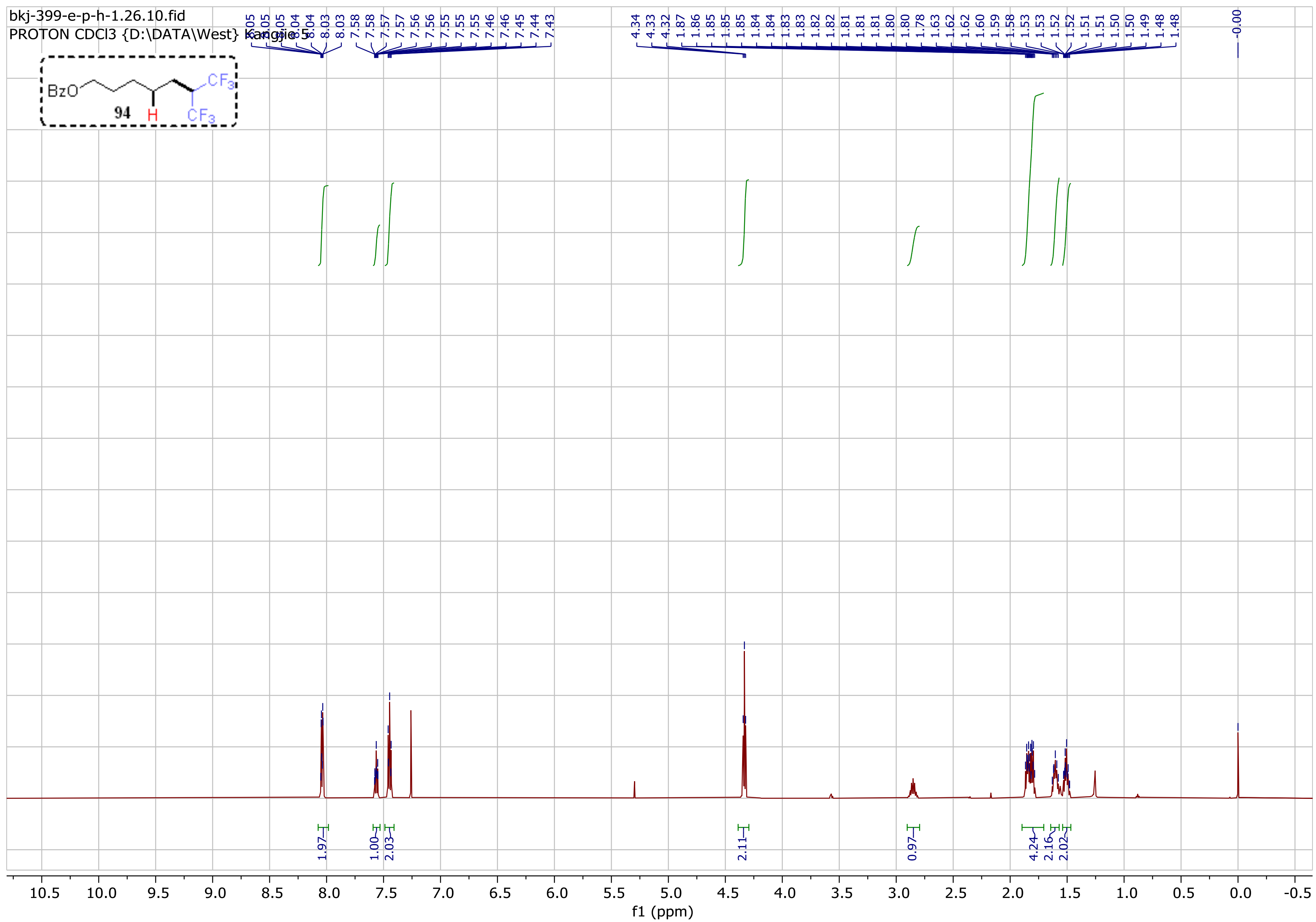
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)


bkj-399-f-p-f-1.30.1.fid
F19 CDCl3 {D:\DATA\West} Kangjie 22
BzO
CF2Me
93
H
-90.55
-90.58
-90.61
-90.64
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)


bkj-399-e-p-h-1.26.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 5
BzO
94
H
CF3
CF3
8.05
8.05
8.05
8.04
8.04
8.03
8.03
7.58
7.58
7.57
7.57
7.56
7.56
7.55
7.55
7.55
7.46
7.46
7.45
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7.43
4.34
4.33
4.32
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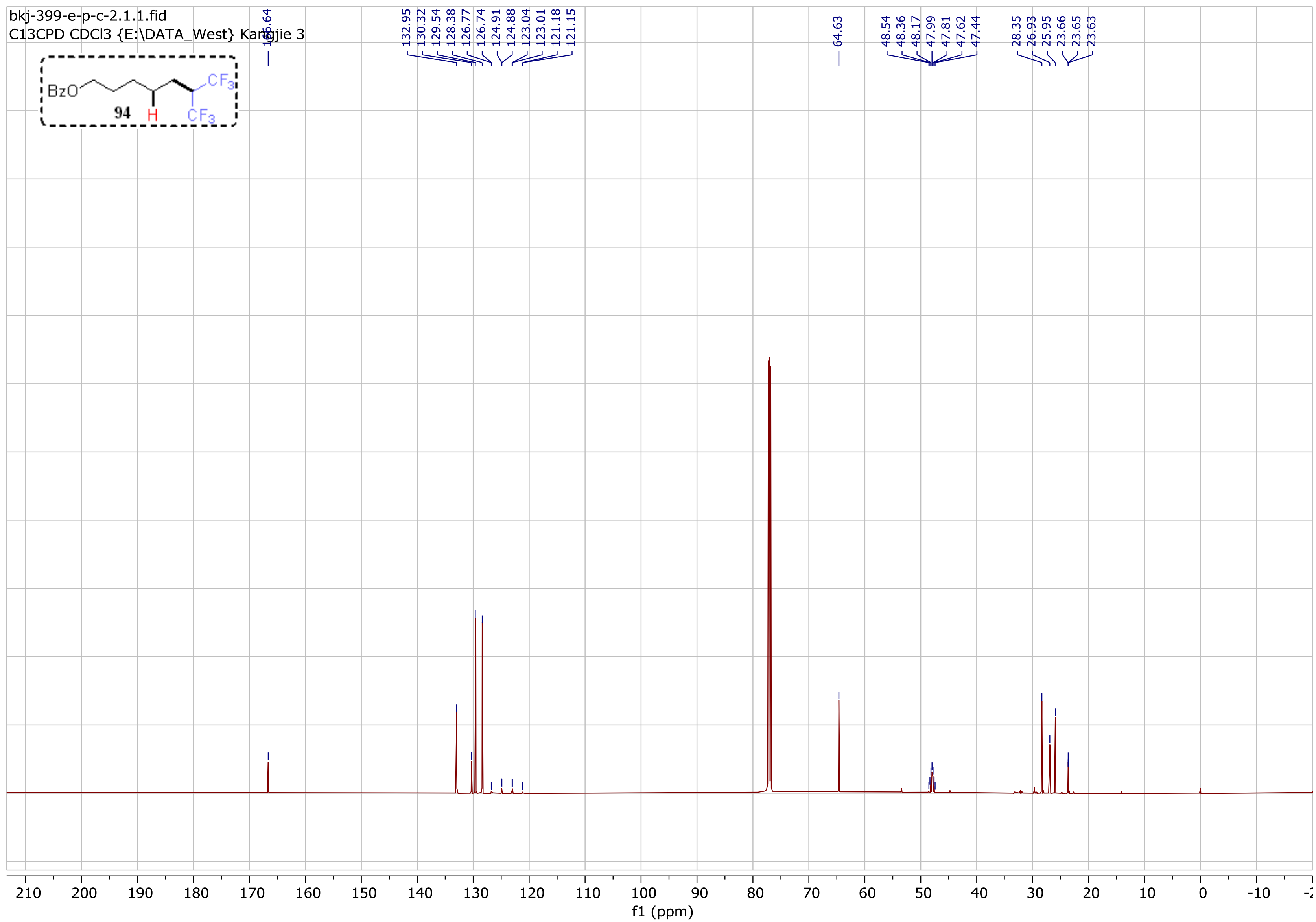
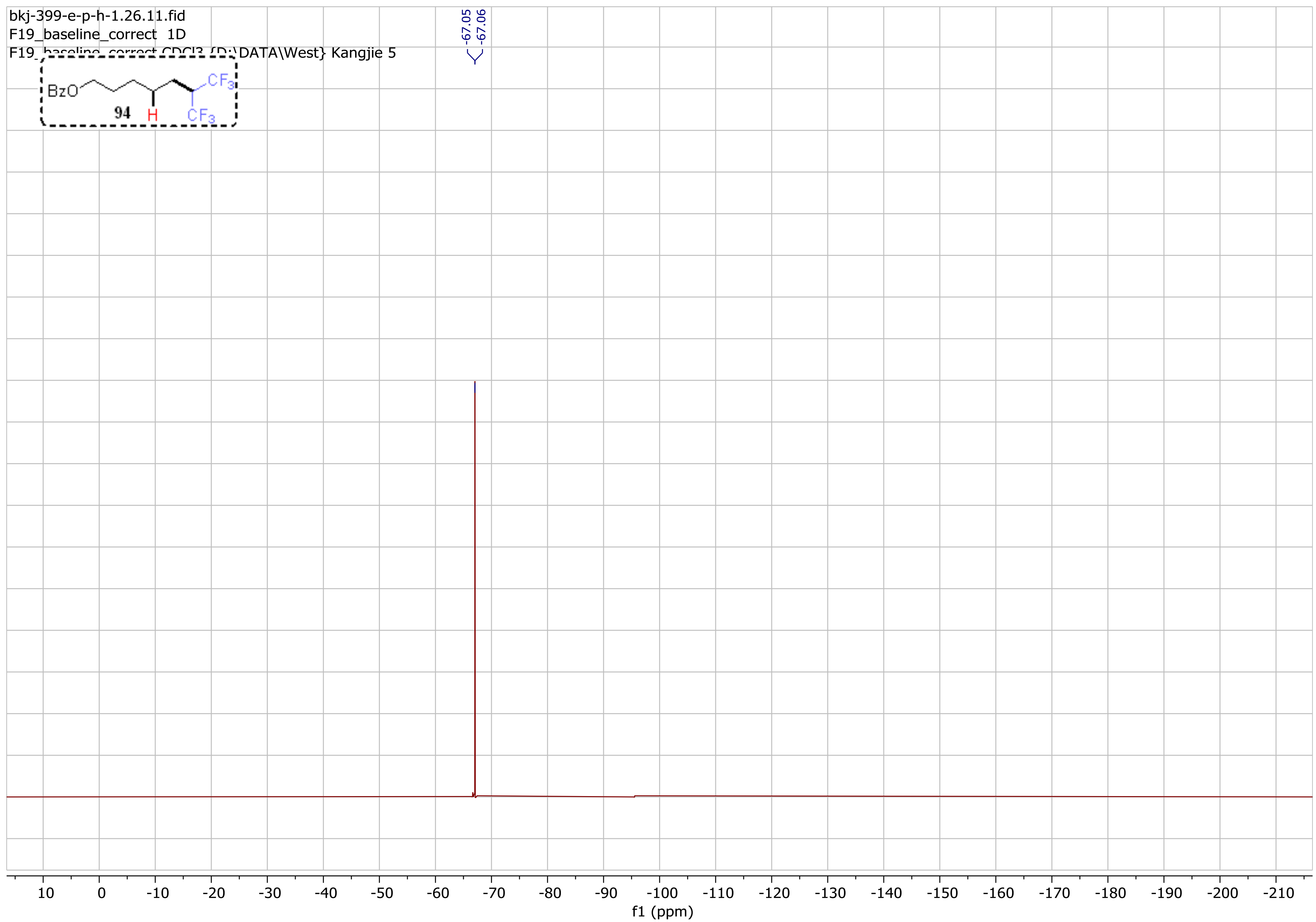
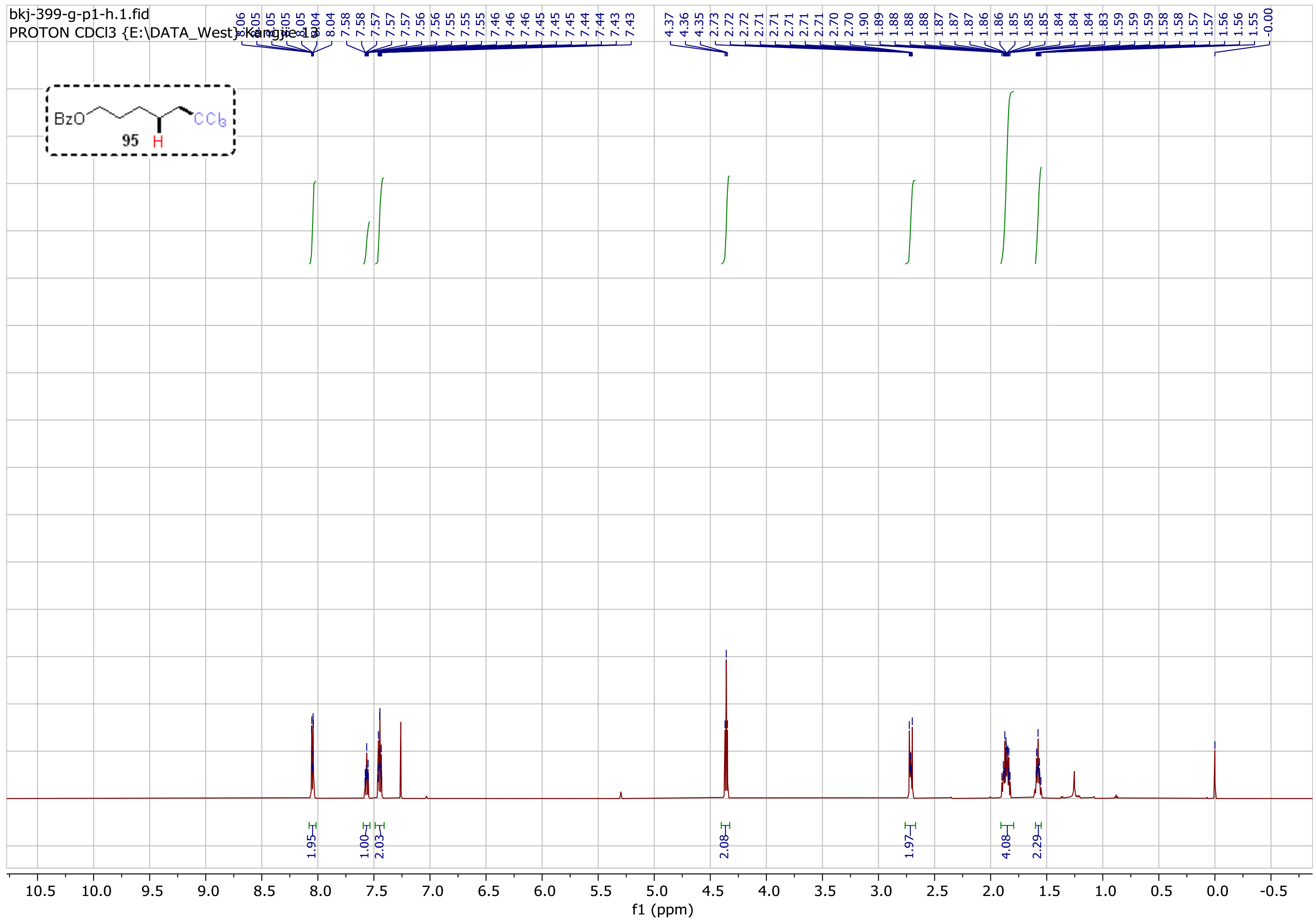
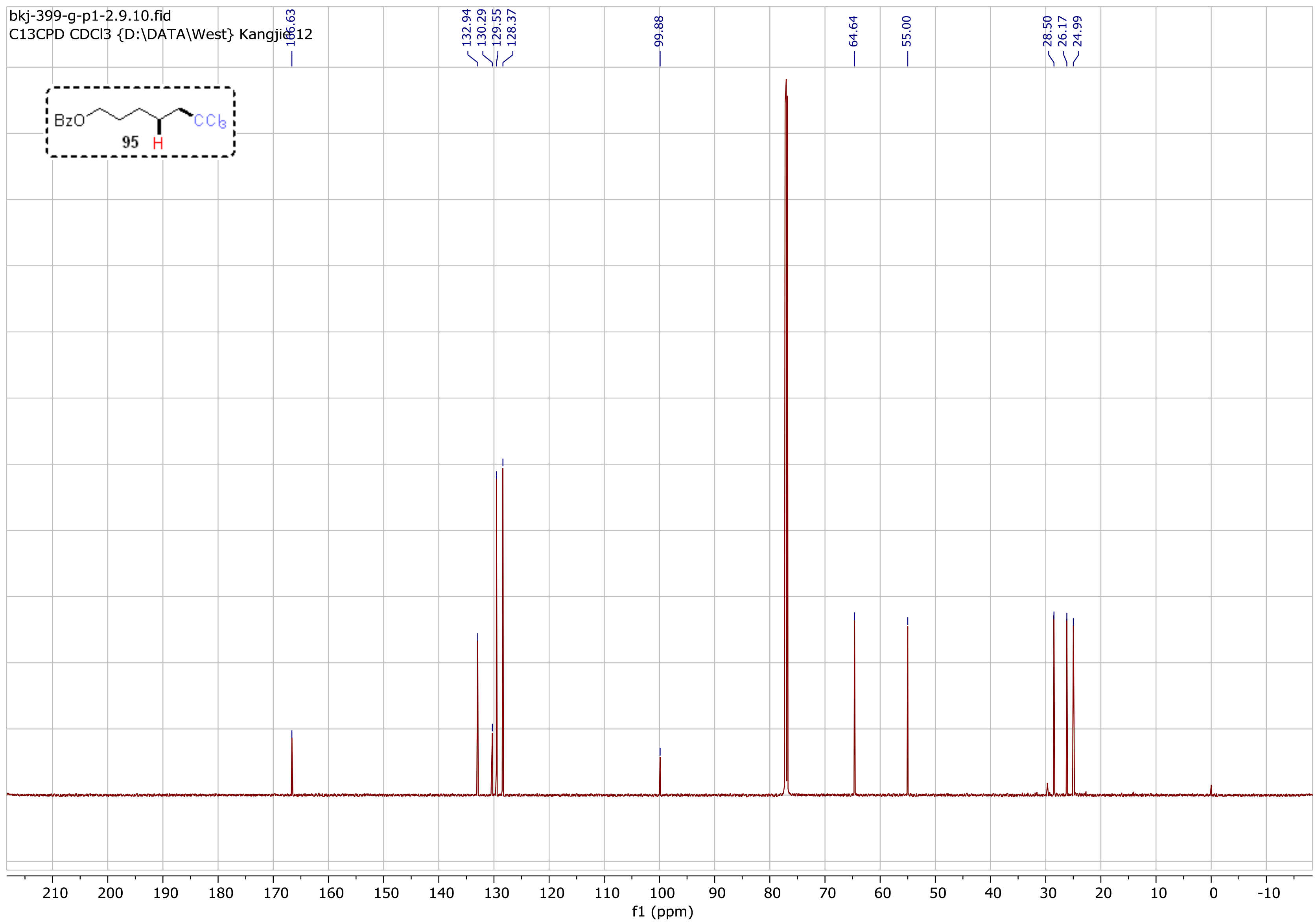
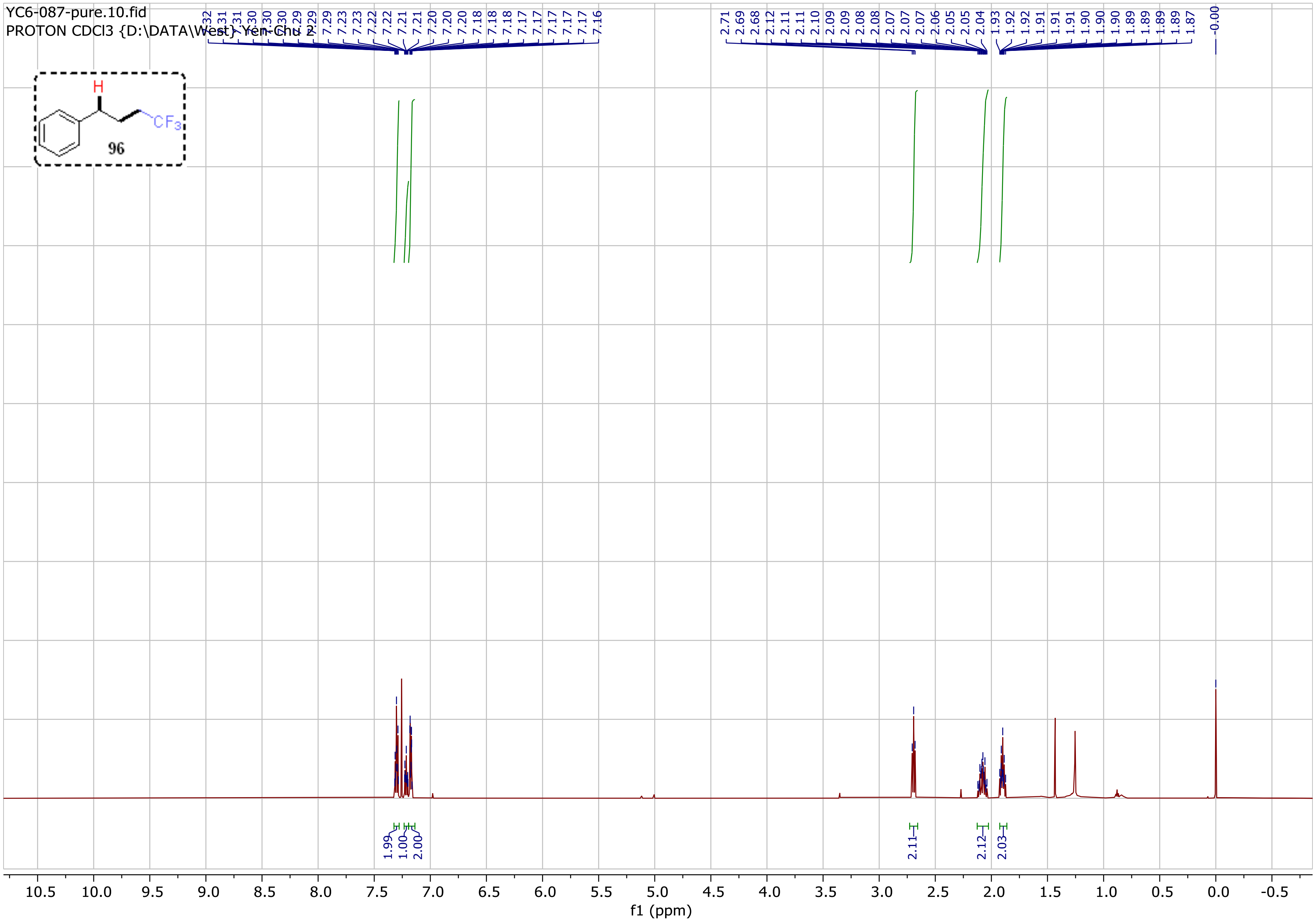
1.51
1.51
1.50
1.50
1.49
1.48
1.48
-0.00
1.97
1.00
2.03
2.11
0.97
4.24
2.16
2.02
10.5
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
f1 (ppm)


bkj-399-e-p-c-2.1.1.fid
C13CPD CDCl3 {E:\DATA_West} Kangjie 3
BzO
94
H
CF3
CF3
166.64
132.95
130.32
129.54
128.38
126.77
126.74
124.91
124.88
123.04
123.01
121.18
121.15
64.63
48.54
48.36
48.17
47.99
47.81
47.62
47.44
28.35
26.93
25.95
23.66
23.65
23.63
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

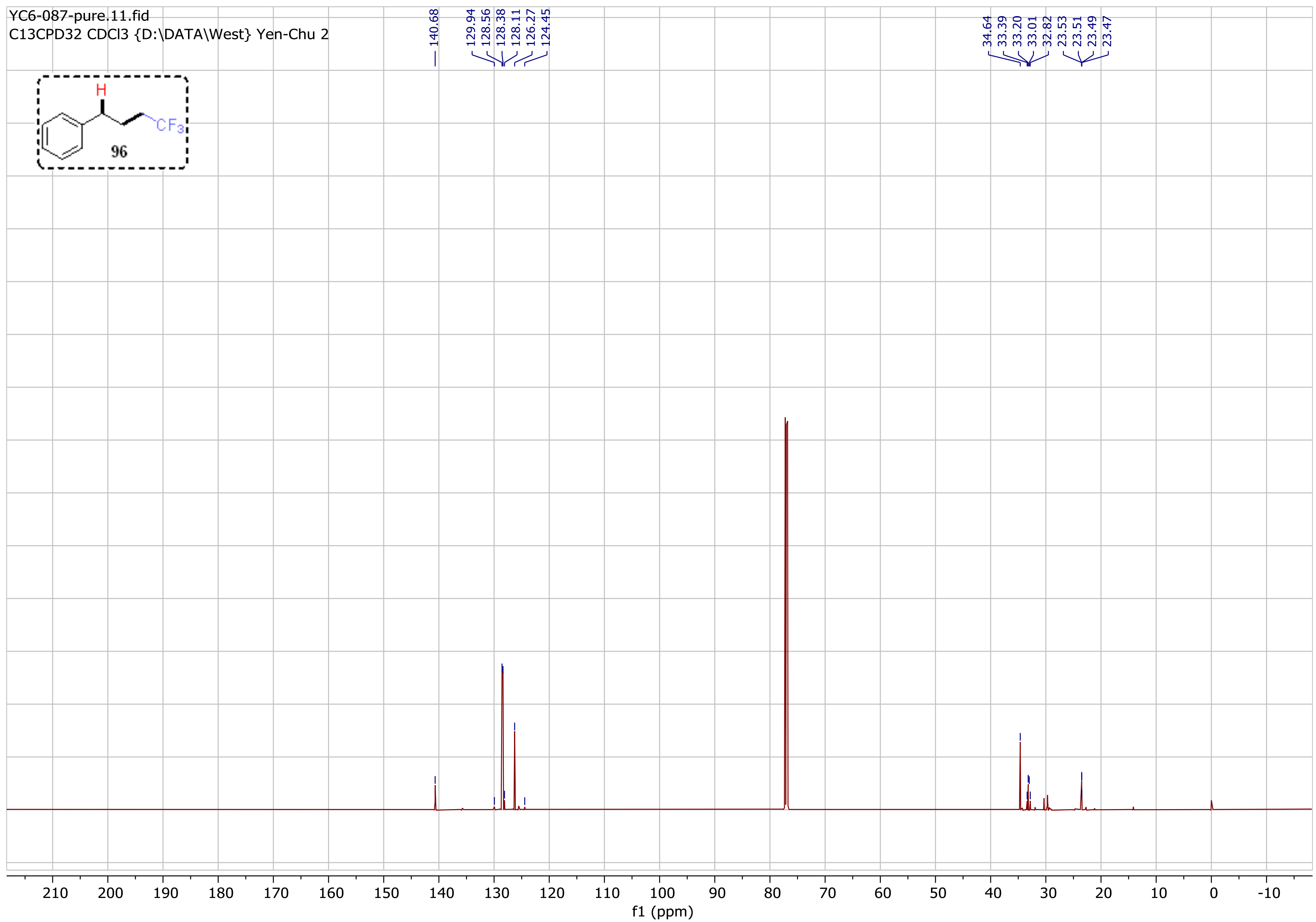

bkj-399-e-p-h-1.26.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 5
BzO
94
H
CF3
CF3
-67.05
-67.06
10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210
f1 (ppm)

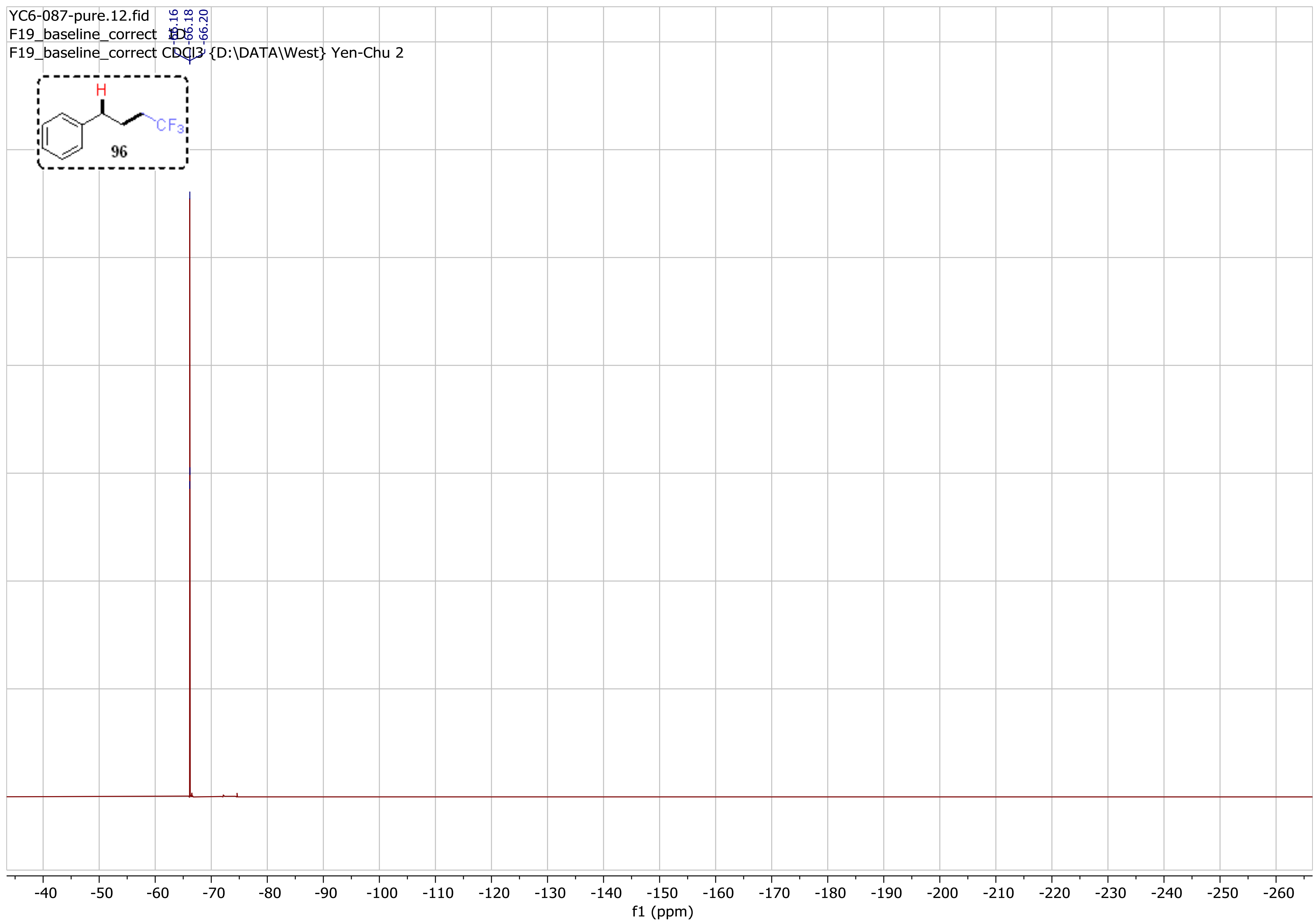

bkj-399-g-p1-h.1.fid
PROTON CDCl3 {E:\DATA_West} Kangjie 13
BzO
95
H
CCl3
8.06 8.05 8.05 8.05 8.05 8.04 8.04 7.58 7.58 7.57 7.57 7.57 7.56 7.56 7.55 7.55 7.55 7.46 7.46 7.46 7.45 7.45 7.45 7.44 7.44 7.43 7.43
4.37 4.36 4.35 2.73 2.72 2.72 2.71 2.71 2.71 2.71 2.71 2.70 2.70 1.90 1.89 1.88 1.88 1.88 1.87 1.87 1.87 1.86 1.86 1.85 1.85 1.85 1.84 1.84 1.84 1.83 1.59 1.59 1.59 1.58 1.58 1.57 1.57 1.56 1.56 1.55 -0.00
1.95
1.00
2.03
2.08
1.97
4.08
2.29
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)

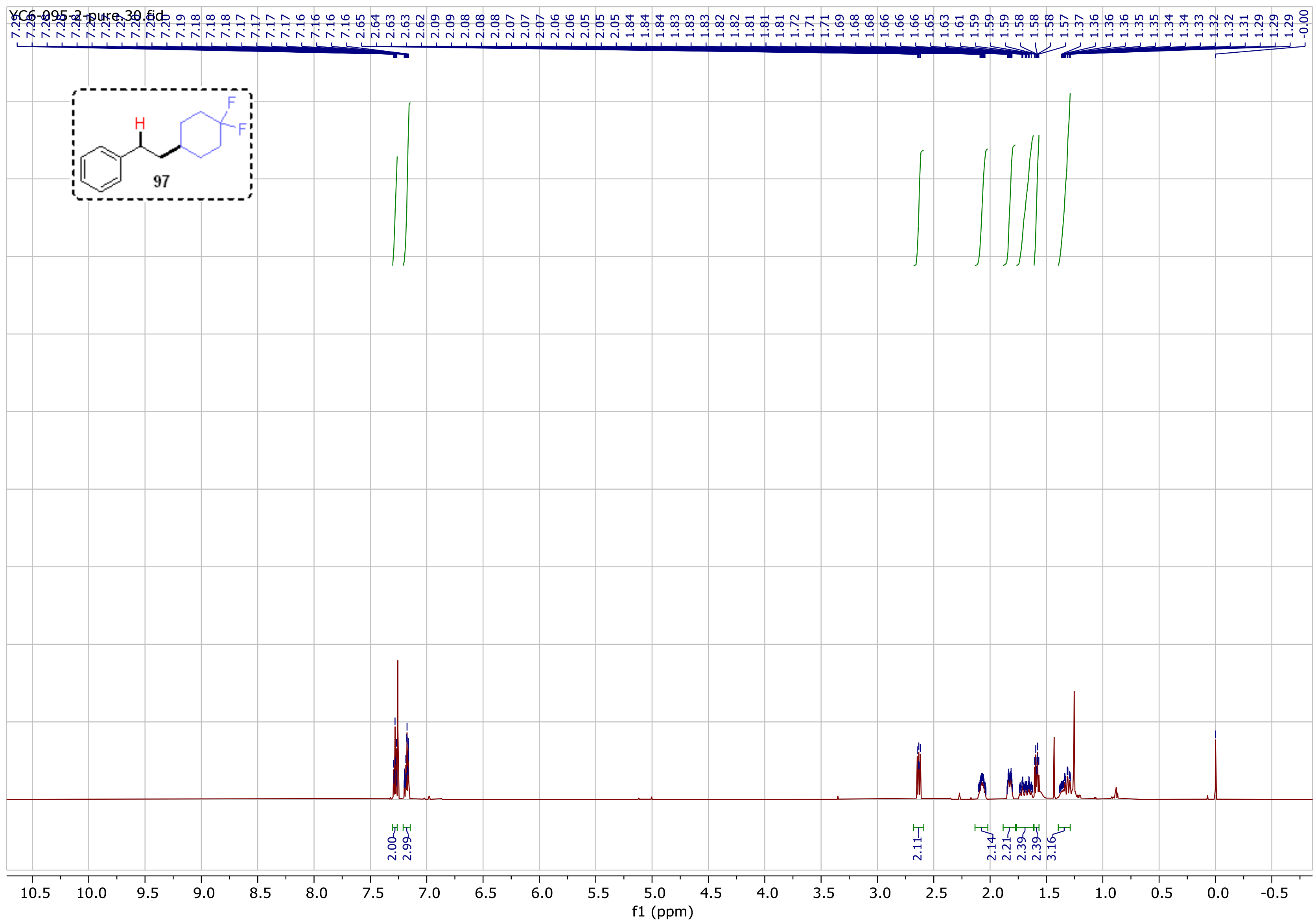

bkj-399-g-p1-2.9.10.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 12
166.63
132.94
130.29
129.55
128.37
99.88
64.64
55.00
28.50
26.17
24.99
BzO
95
H
CCl3
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

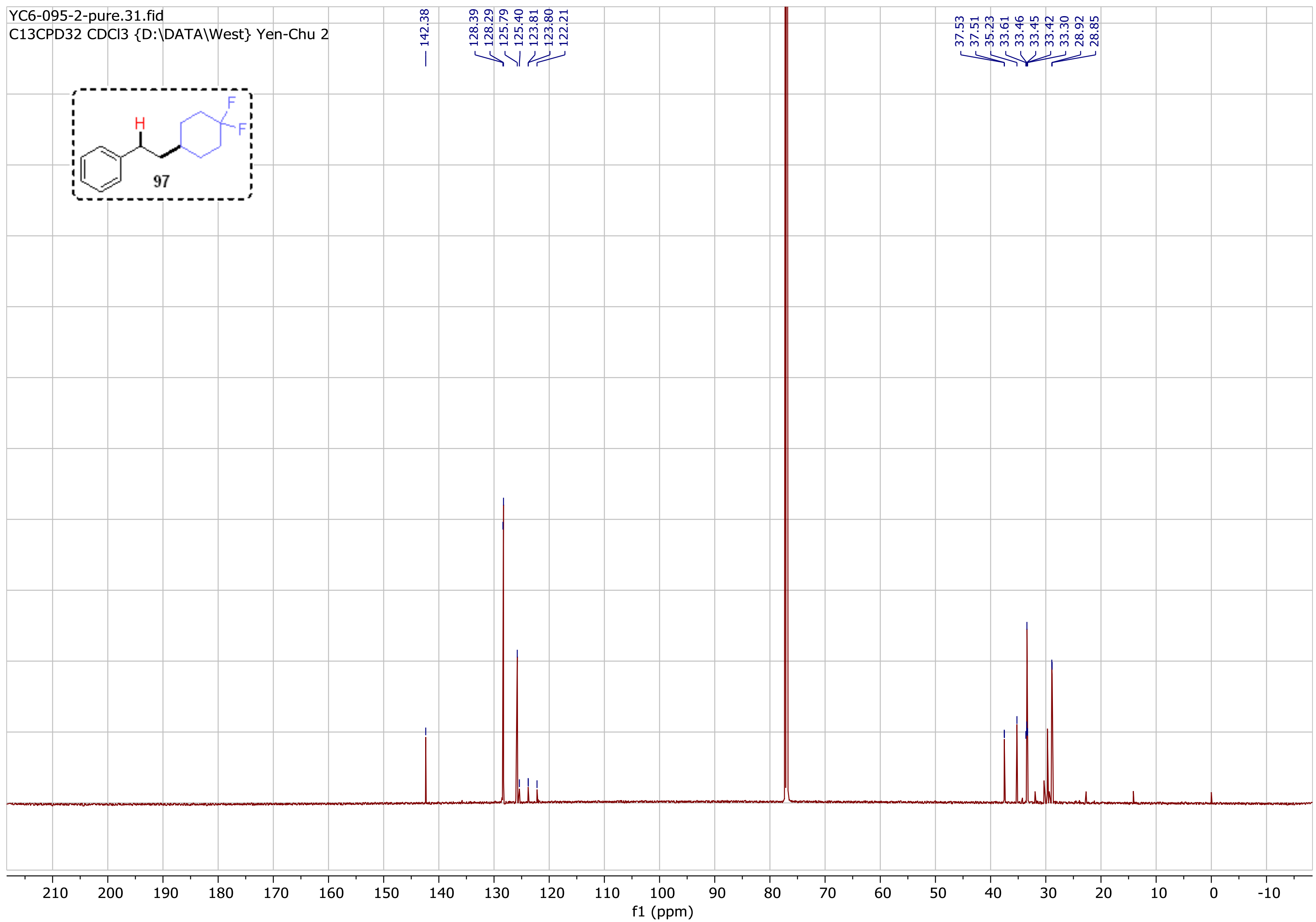


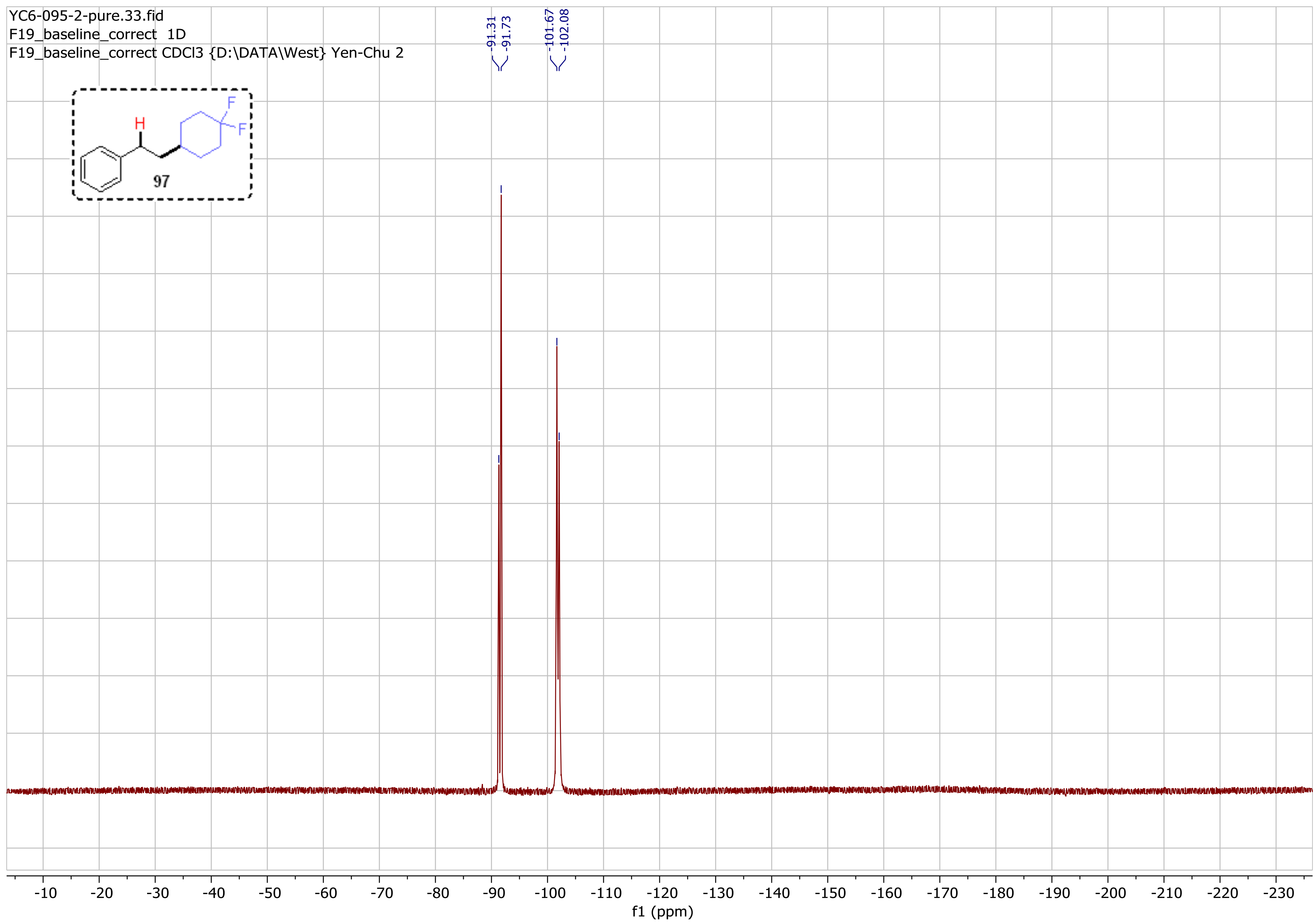
YC6-087-pure.10.fid
PROTON CDCl3 {D:\DATA\West} Yen-Chu 2
96
7.32 7.31 7.31 7.30 7.30 7.30 7.29 7.29 7.29 7.23 7.23 7.22 7.22 7.21 7.21 7.20 7.20 7.20 7.18 7.18 7.18 7.17 7.17 7.17 7.17 7.17 7.16
2.71 2.69 2.68 2.12 2.11 2.11 2.10 2.09 2.09 2.08 2.08 2.07 2.07 2.07 2.06 2.05 2.05 2.04 1.93 1.92 1.92 1.91 1.91 1.91 1.90 1.90 1.90 1.89 1.89 1.89 1.89 1.87
-0.00
1.99 1.00 2.00 2.11 2.12 2.03
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


YC6-087-pure.11.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 2
H
CF3
96
140.68
129.94
128.56
128.38
128.11
126.27
124.45
34.64
33.39
33.20
33.01
32.82
23.53
23.51
23.49
23.47
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)

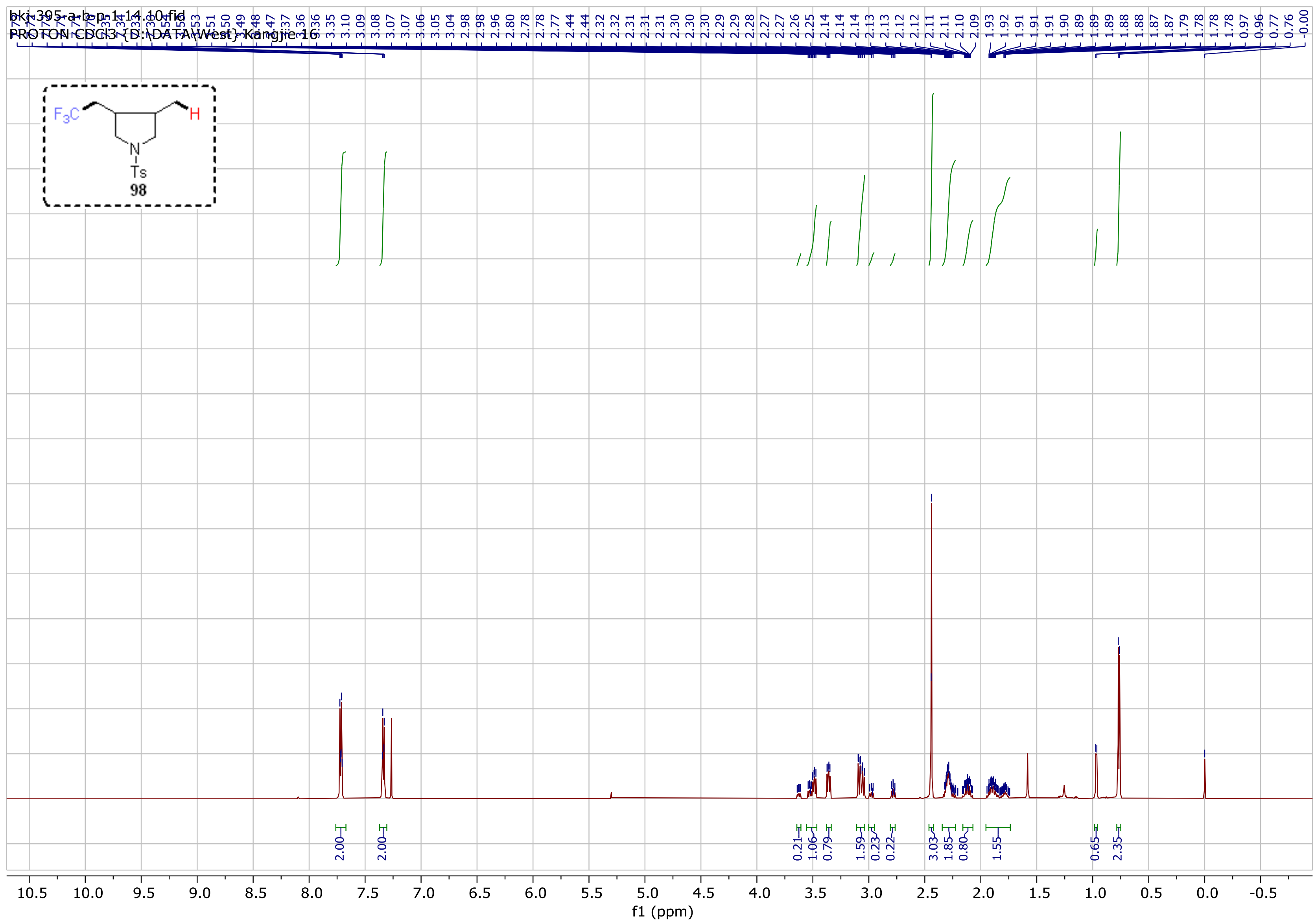

YC6-087-pure.12.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 2
-66.16
-66.18
-66.20
H
CF3
96
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
-220
-230
-240
-250
-260
f1 (ppm)

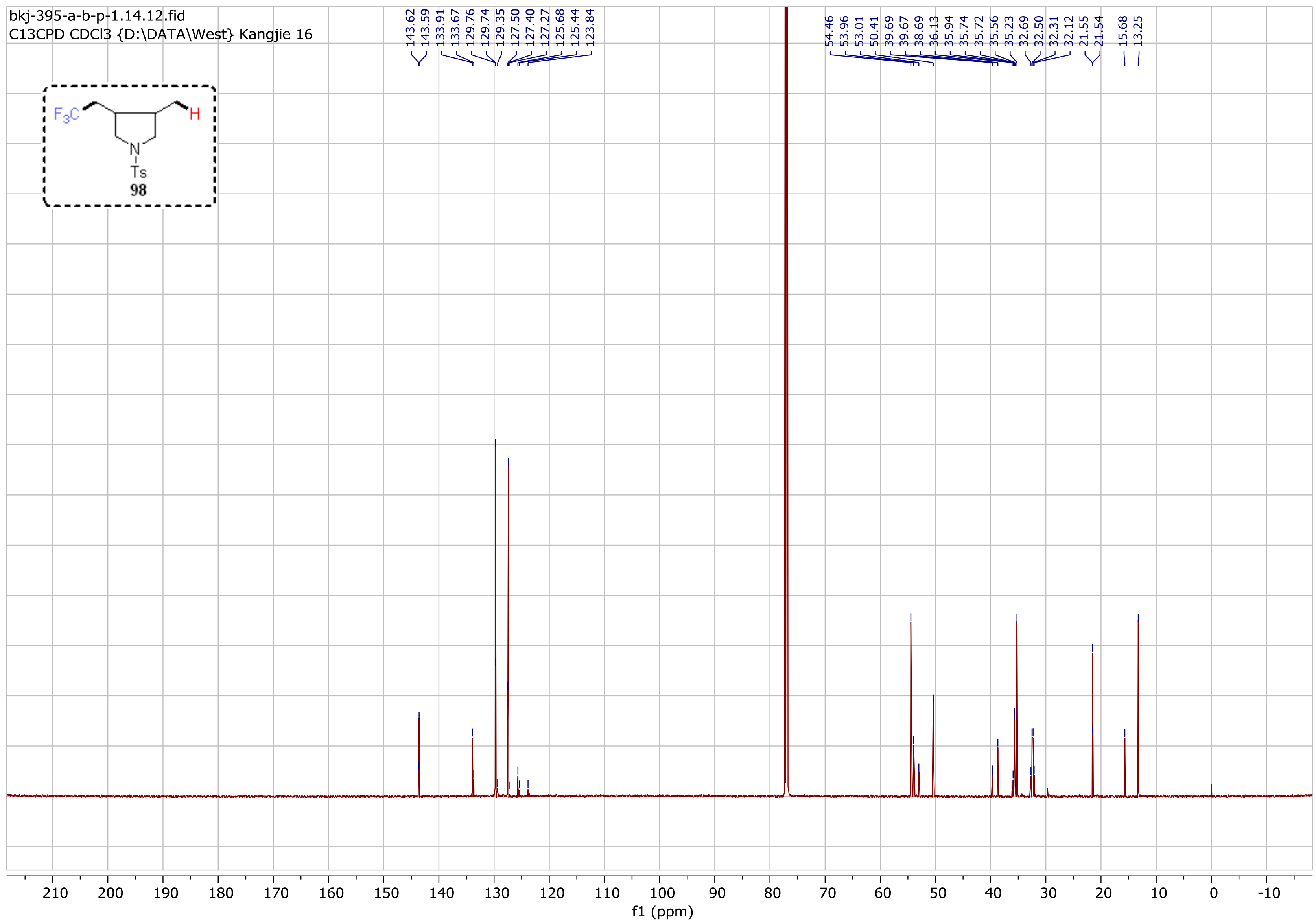

YC6-095-2-pure.30.fid
97
F
F
H
2.00
2.99
2.11
2.14
2.21
2.39
2.39
3.16
f1 (ppm)

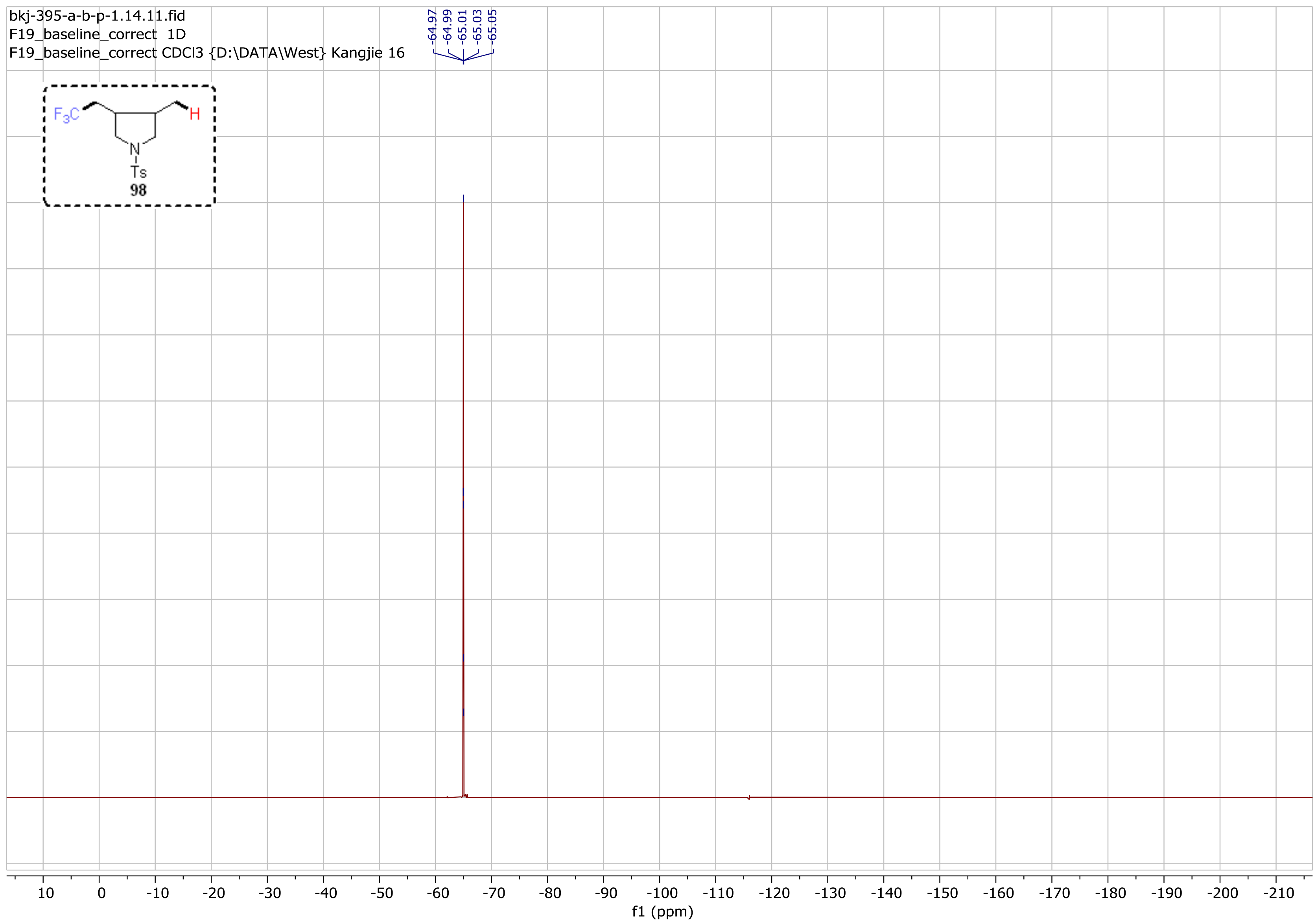

YC6-095-2-pure.31.fid
C13CPD32 CDCl3 {D:\DATA\West} Yen-Chu 2
H
F
F
97
142.38
128.39
128.29
125.79
125.40
123.81
123.80
122.21
37.53
37.51
35.23
33.61
33.46
33.45
33.42
33.30
28.92
28.85
210
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
f1 (ppm)



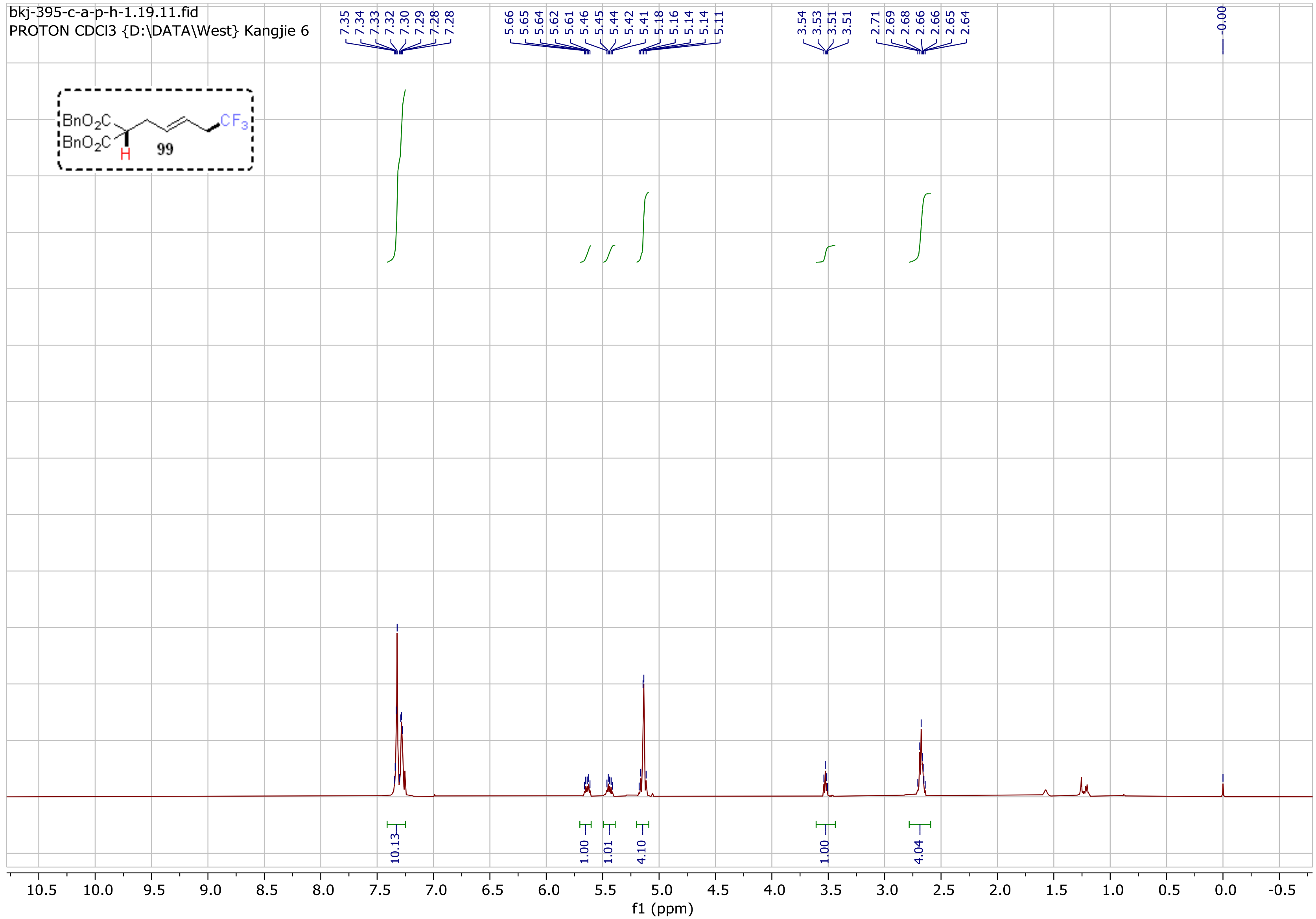
YC6-095-2-pure.33.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Yen-Chu 2
H
F
F
97
-91.31
-91.73
-101.67
-102.08
-10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140 -150 -160 -170 -180 -190 -200 -210 -220 -230
f1 (ppm)


bkj-395-a-b-p-1-14.10.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 16
F3C
N
Ts
98
H
2.00
2.00
0.21
1.06
0.79
1.59
0.23
0.22
3.03
1.85
0.80
1.55
0.65
2.35
f1 (ppm)

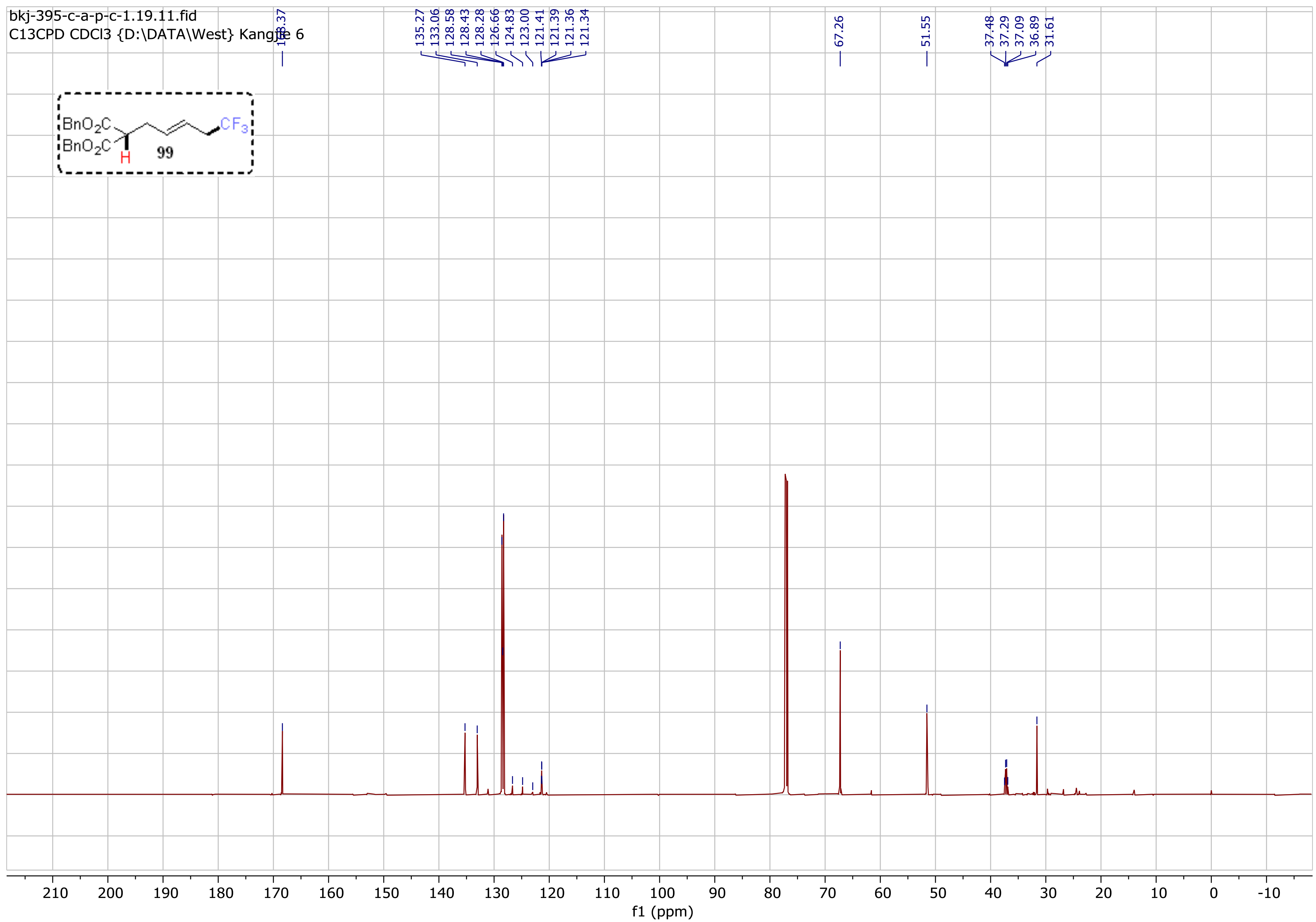

bkj-395-a-b-p-1.14.12.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 16
F3C
N
Ts
98
H
143.62
143.59
133.91
133.67
129.76
129.74
129.35
127.50
127.40
127.27
125.68
125.44
123.84
54.46
53.96
53.01
50.41
39.69
39.67
38.69
36.13
35.94
35.74
35.72
35.56
35.23
32.69
32.50
32.31
32.12
21.55
21.54
15.68
13.25
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)

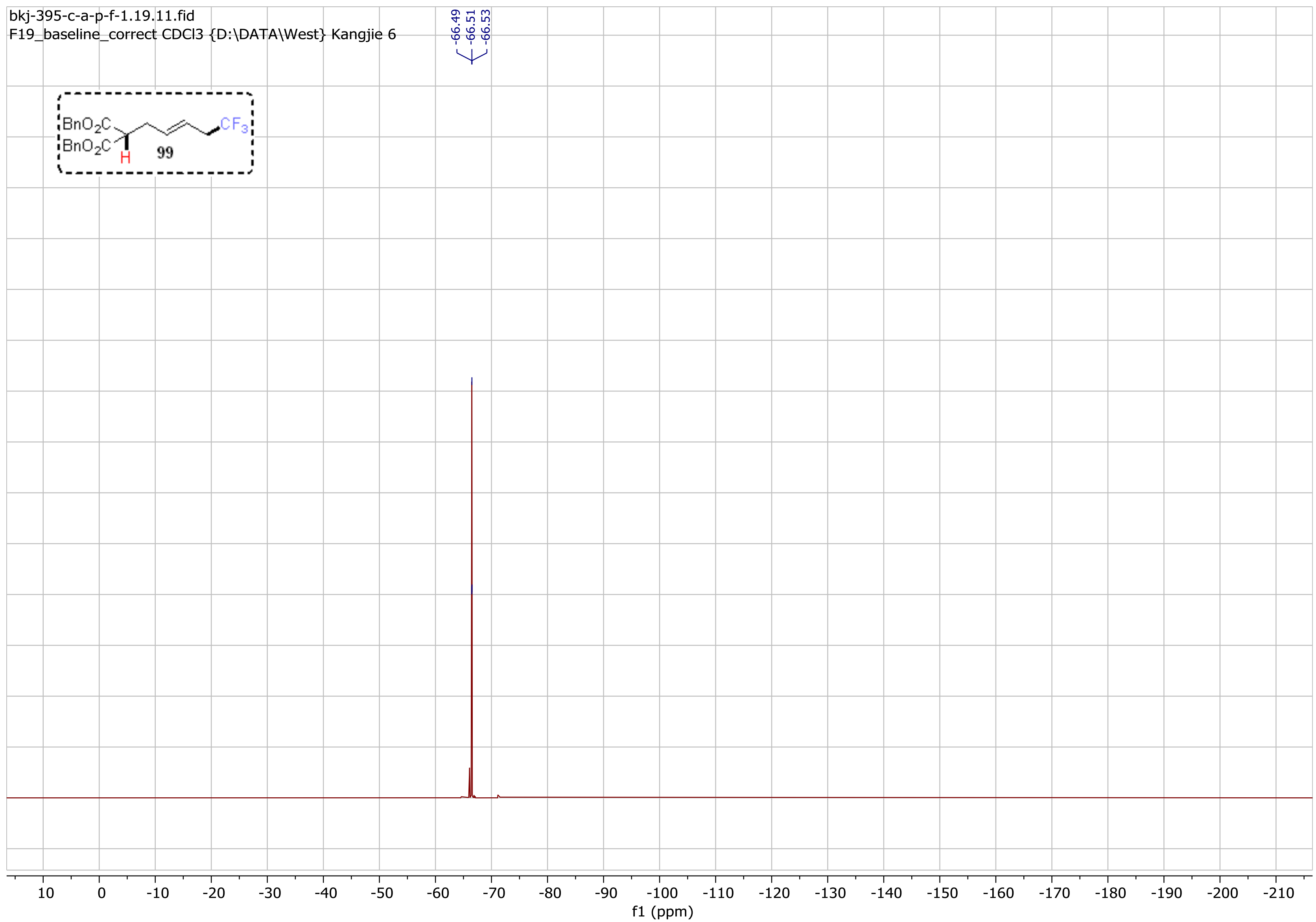


bkj-395-a-b-p-1.14.11.fid
F19_baseline_correct 1D
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 16
-64.97
-64.99
-65.01
-65.03
-65.05
F3C
N
Ts
98
H
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)



bkj-395-c-a-p-h-1.19.11.fid
PROTON CDCl3 {D:\DATA\West} Kangjie 6
BnO2C
BnO2C
H
99
CF3
7.35
7.34
7.33
7.32
7.30
7.29
7.28
7.28
5.66
5.65
5.64
5.62
5.61
5.46
5.45
5.44
5.42
5.41
5.18
5.16
5.14
5.14
5.11
3.54
3.53
3.51
3.51
2.71
2.69
2.68
2.66
2.66
2.65
2.64
-0.00
10.13
1.00
1.01
4.10
1.00
4.04
10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0 -0.5
f1 (ppm)


bkj-395-c-a-p-c-1.19.11.fid
C13CPD CDCl3 {D:\DATA\West} Kangjie 6
BnO2C
BnO2C
H
CF3
99
168.37
135.27
133.06
128.58
128.43
128.28
126.66
124.83
123.00
121.41
121.39
121.36
121.34
67.26
51.55
37.48
37.29
37.09
36.89
31.61
210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 -10
f1 (ppm)


bkj-395-c-a-p-f-1.19.11.fid
F19_baseline_correct CDCl3 {D:\DATA\West} Kangjie 6
-66.49
-66.51
-66.53
BnO2C
BnO2C
H
CF3
99
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
-130
-140
-150
-160
-170
-180
-190
-200
-210
f1 (ppm)

IV. Supplemental Reference

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