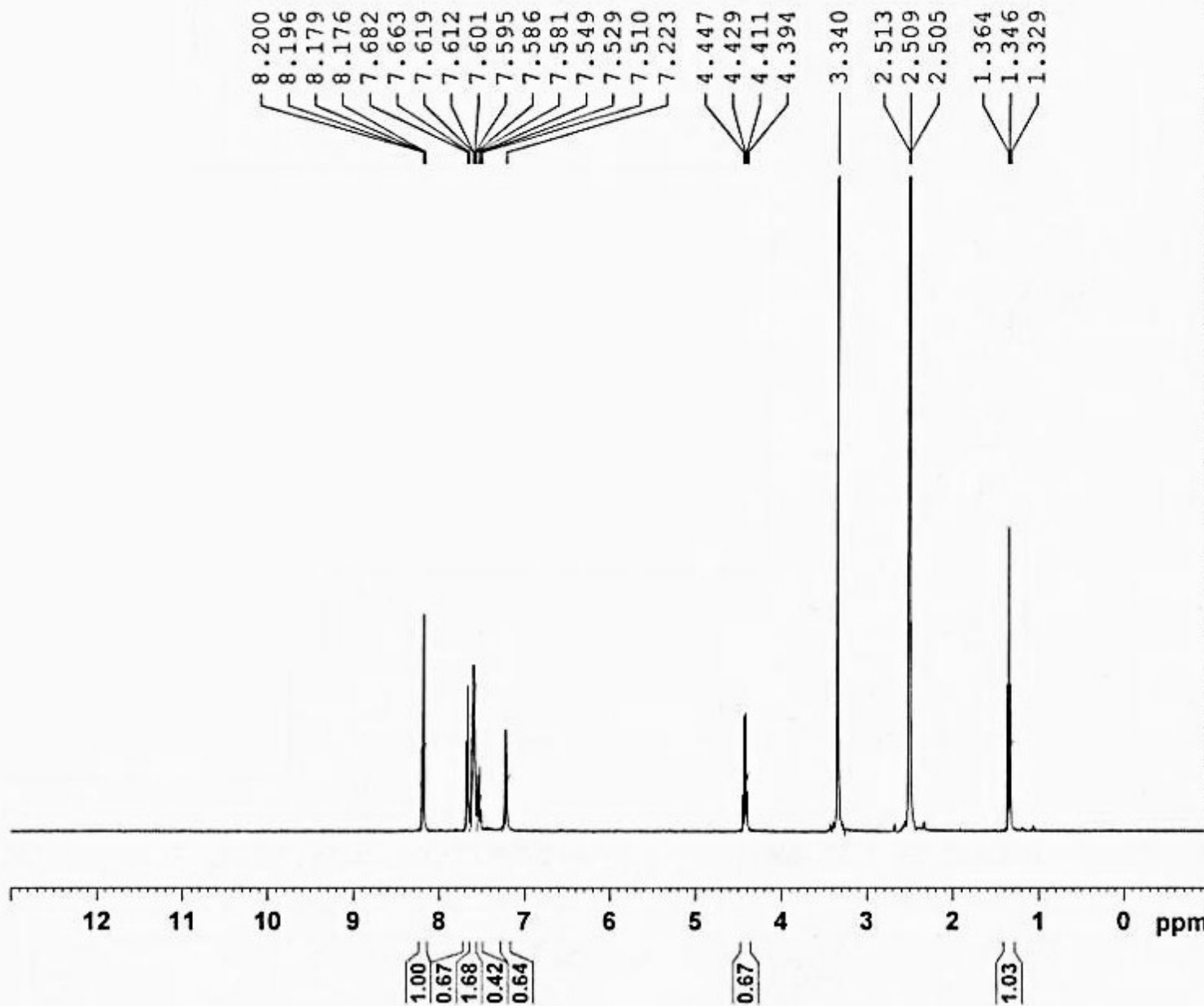


¹H spectra Mostafa MS Ph in DMSO



Current Data Parameters

NAME Ms Ph
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters

Date_ 20151204
Time_ 6.01
INSTRUM spect
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 812.7
DW 60.400 usec
DE 6.00 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

----- CHANNEL f1 -----

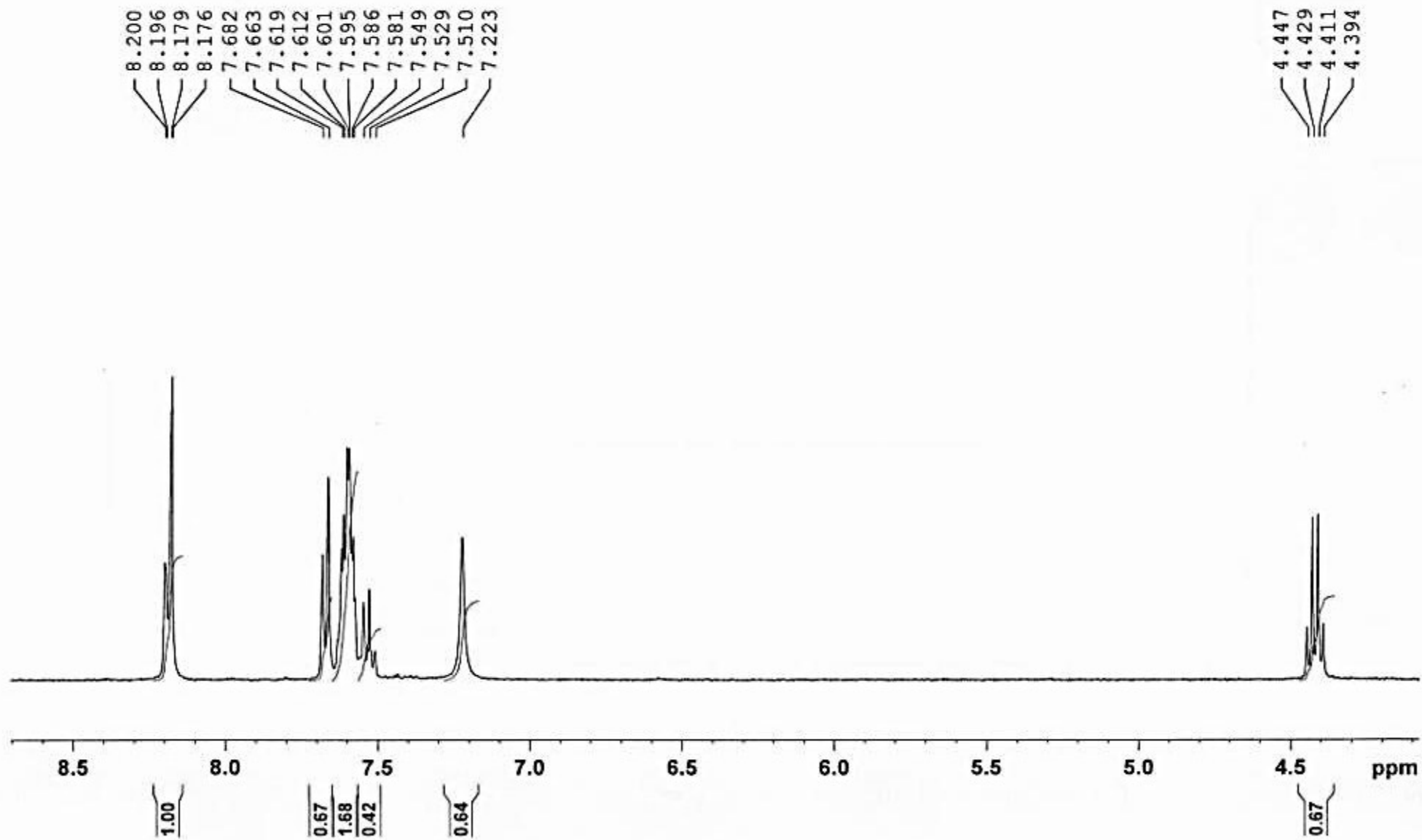
NUC1 1H
P1 10.40 usec
PL1 -2.00 dB
SFO1 400.1324710 MHz

F2 - Processing parameters

SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

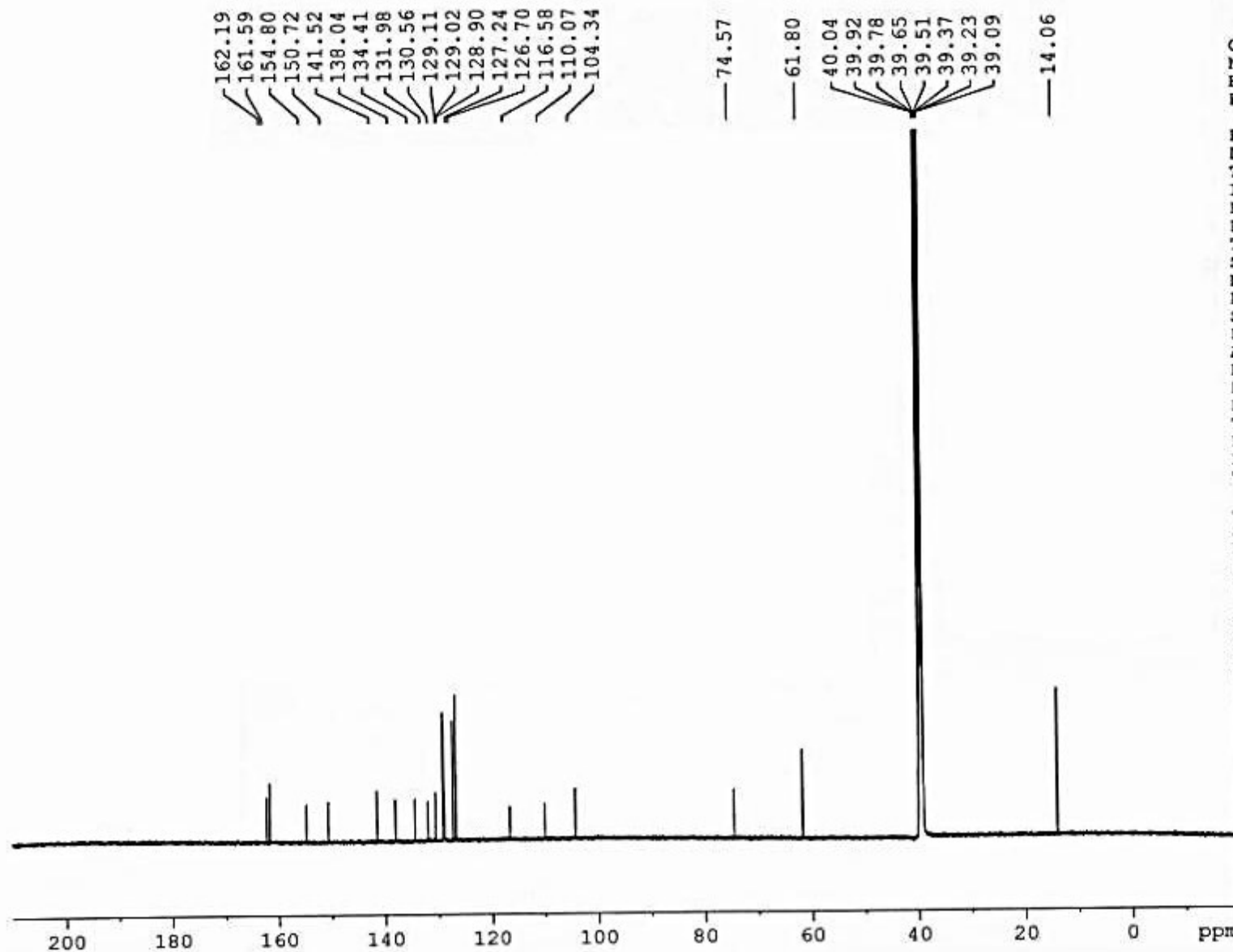
¹H NMR for the compound 9a

¹H spectra Mostafa MS Ph in DMSO



¹H NMR for the compound 9a

¹³C decoupled spectra Mostafa MsPh in DMSO



Current Data Parameters
 NAME MSPH-13C
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date 20160705
 Time 11.34
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 30720
 DS 4
 SWH 36057.691 Hz
 FIDRES 0.550197 Hz
 AQ 0.9087659 sec
 RG 203
 DW 13.867 usec
 DE 50.00 usec
 TE 298.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

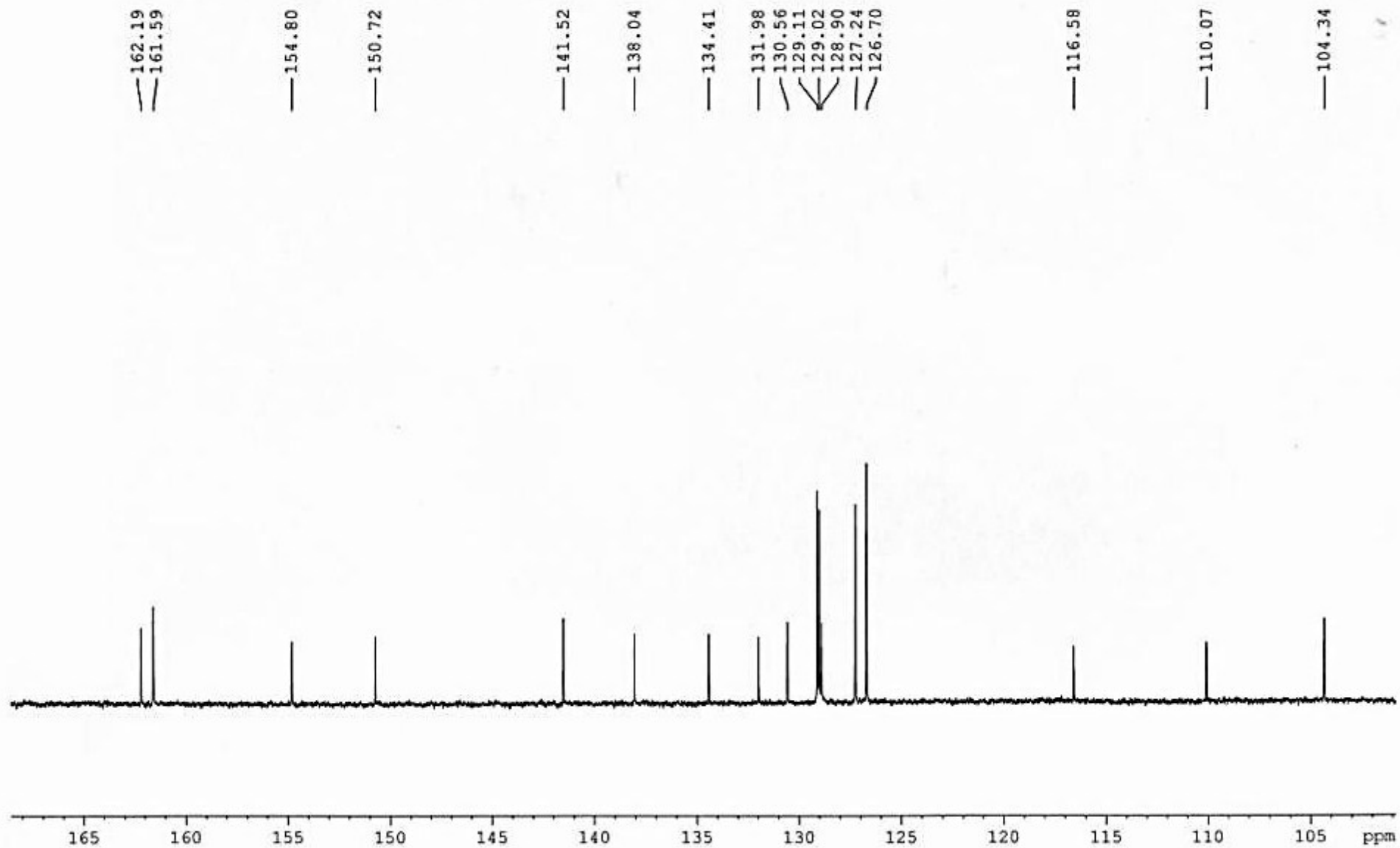
----- CHANNEL f1 -----
 SFO1 150.9178979 MHz
 NUC1 13C
 P1 8.80 usec
 PLW1 78.13500214 W

----- CHANNEL f2 -----
 SFO2 600.1324005 MHz
 NUC2 1H
 CPDPRG[2] waltz65
 PCPD2 70.00 usec
 PLW2 27.82500076 W
 PLW12 0.63804001 W
 PLW13 0.31264001 W

F2 - Processing parameters
 SI 32768
 SF 150.9028808 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

¹³C NMR for the compound 9a

^{13}C decoupled spectra Mostafa MsPh in DMSO



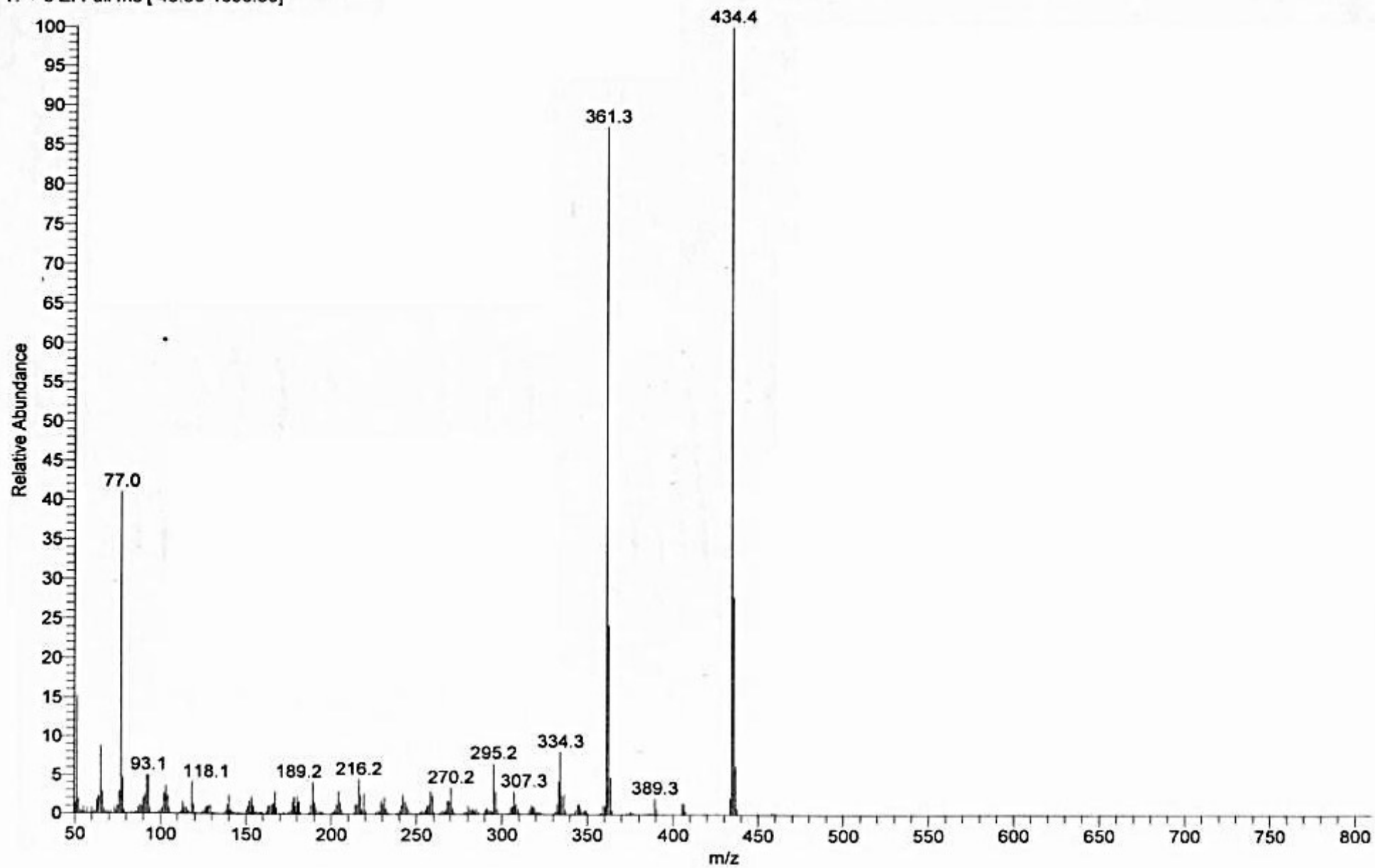
^{13}C NMR for the compound **9a**

C:\Xcalibur\Data\saleh\MS-Ph
11/4/2015 12:59:16 PM

GC MS DFS- Thermo
Project No: GS01/03

MS-Ph

MS-Ph #182 RT: 7.83 AV: 1 NL: 8.56E6
T: + c EI Full ms [49.50-1000.50]

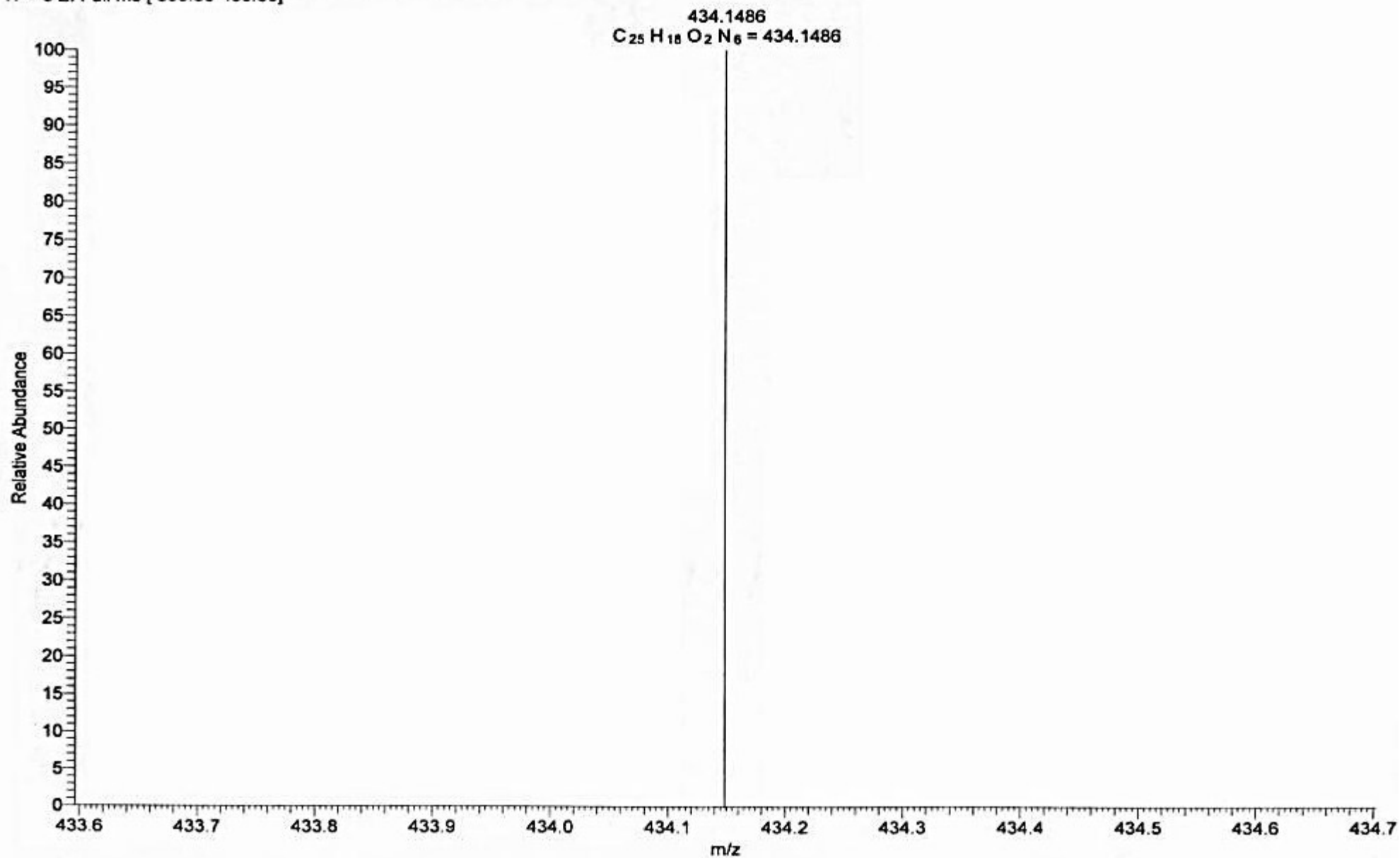


Mass spectra for the compound 9a

C:\Xcalibur\Data\saleh\HRMS-MSPH-c1
11/25/2015 8:46:57 AM

GC MS DFS- Thermo
Project No: GS01/03

HRMS-MSPH-c1 #46 RT: 8.24 AV: 1 NL: 7.39E5
T: + c EI Full ms [399.50-460.50]



High resolution mass spectra for compound 9a

¹H NMR spectra Dr.Saleh MS 5C1 in DMSO



8.197
8.182
8.118
7.685
7.671
7.648
7.633
7.598
7.585
7.572
7.530
7.517
7.506
7.000

4.453
4.441
4.429
4.417

3.131

2.500

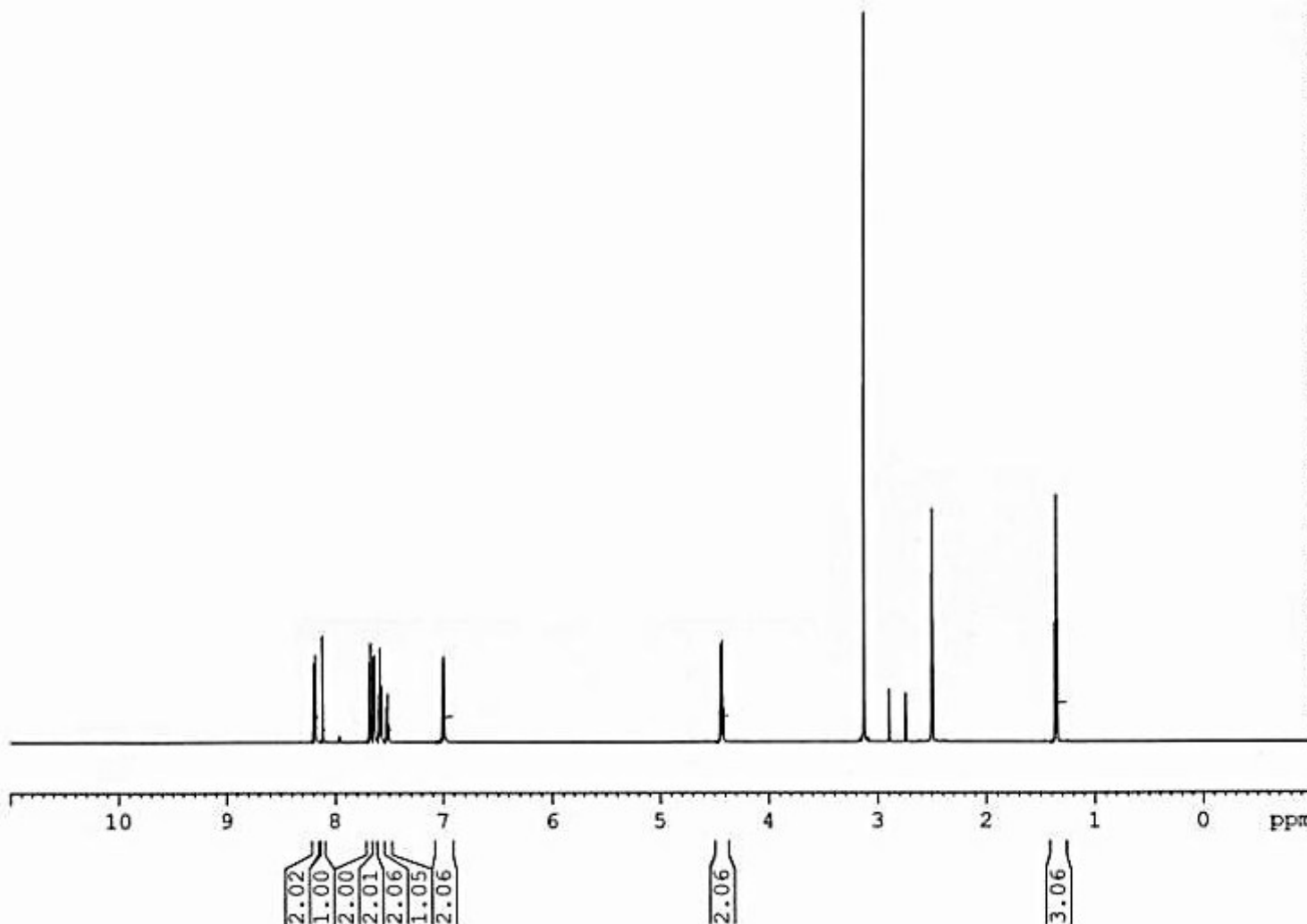
1.373
1.362
1.350

Current Data Parameters
NAME Ms-5C1-1H
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date 20160719
Time 9.50
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 12335.526 Hz
FIDRES 0.188225 Hz
AQ 2.6563926 sec
RG 203
DW 40.533 usec
DE 20.00 usec
TE 337.8 K
D1 1.00000000 sec
TDO 1

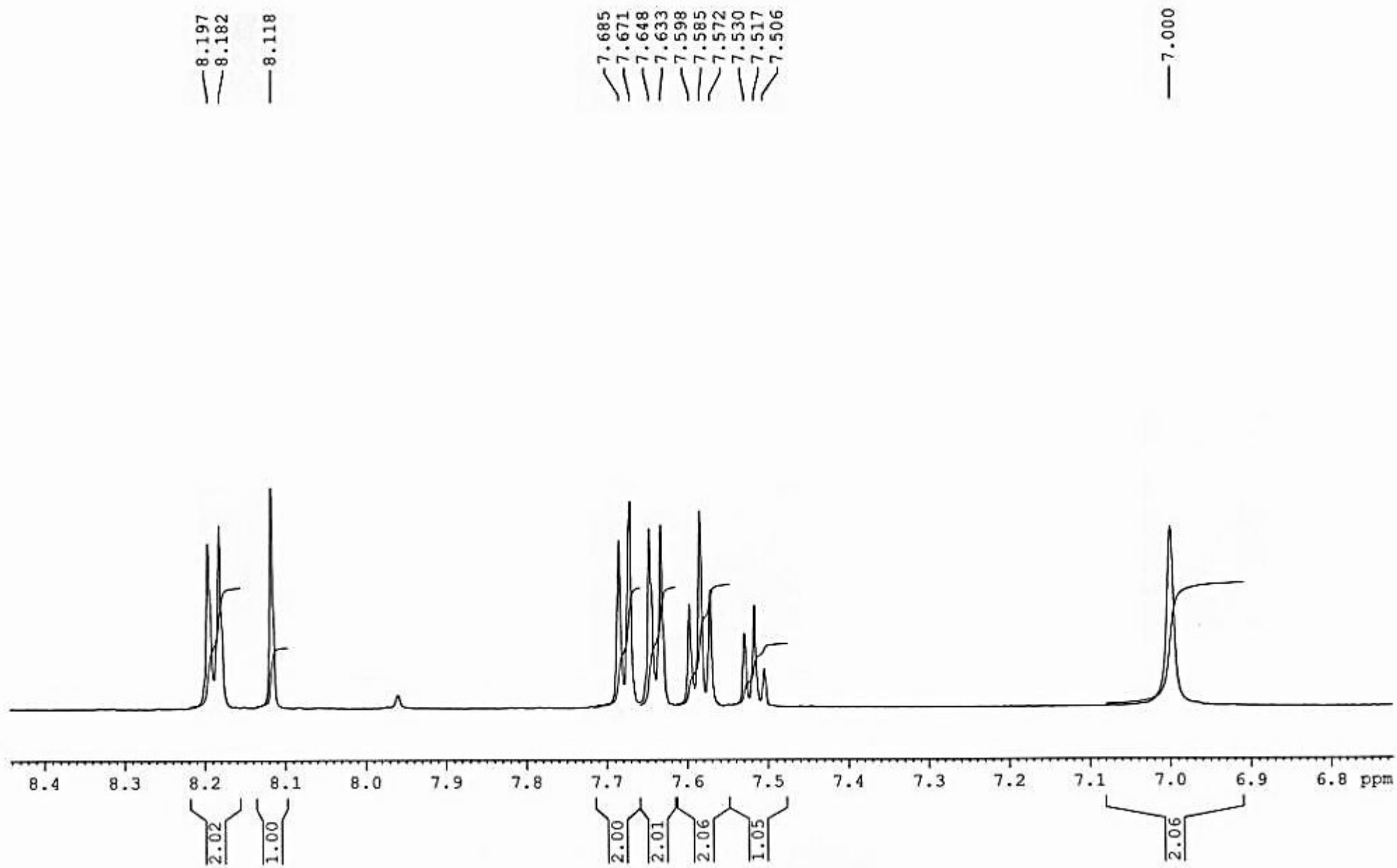
----- CHANNEL f1 -----
SFO1 600.1337060 MHz
NUC1 1H
P1 10.60 usec
PLW1 27.82500076 W

F2 - Processing parameters
SI 32768
SF 600.1300072 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



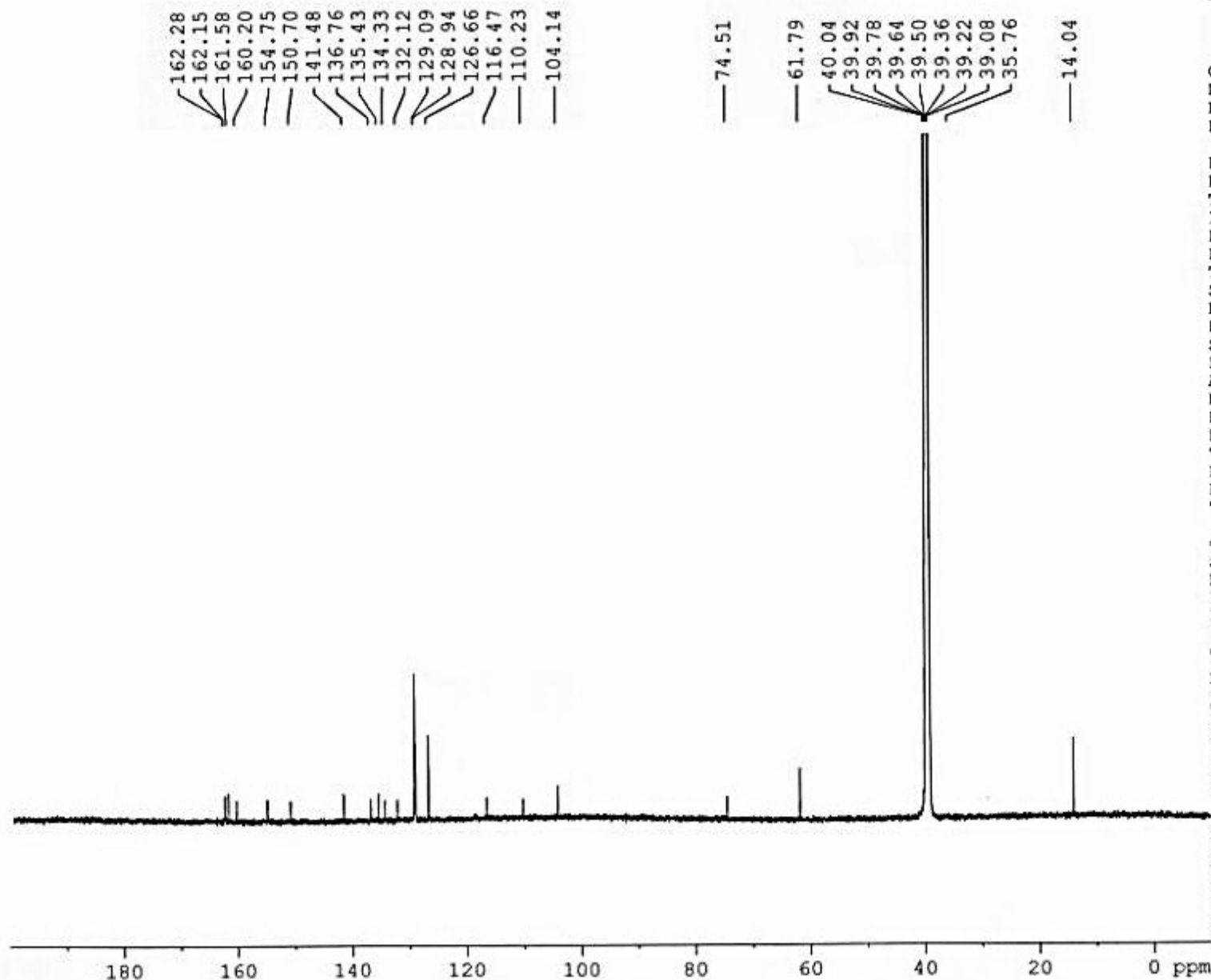
¹H NMR for the compound **9b**

^1H spectra Dr.Saleh MS 5Cl in DMSO



^1H NMR for the compound **9b**

¹³C decoupled spectra Dr.Saleh MS 5Cl in DMSO(30 hrs)



Current Data Parameters
 NAME Ms-5Cl-13C
 EXPNO 3
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20160722
 Time_ 19.38
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 30720
 DS 4
 SWH 36057.691 Hz
 FIDRES 0.550197 Hz
 AQ 0.9087659 sec
 RG 203
 DW 13.867 usec
 DE 50.00 usec
 TE 298.0 K
 D1 2.0000000 sec
 D11 0.03000000 sec
 TD0 1

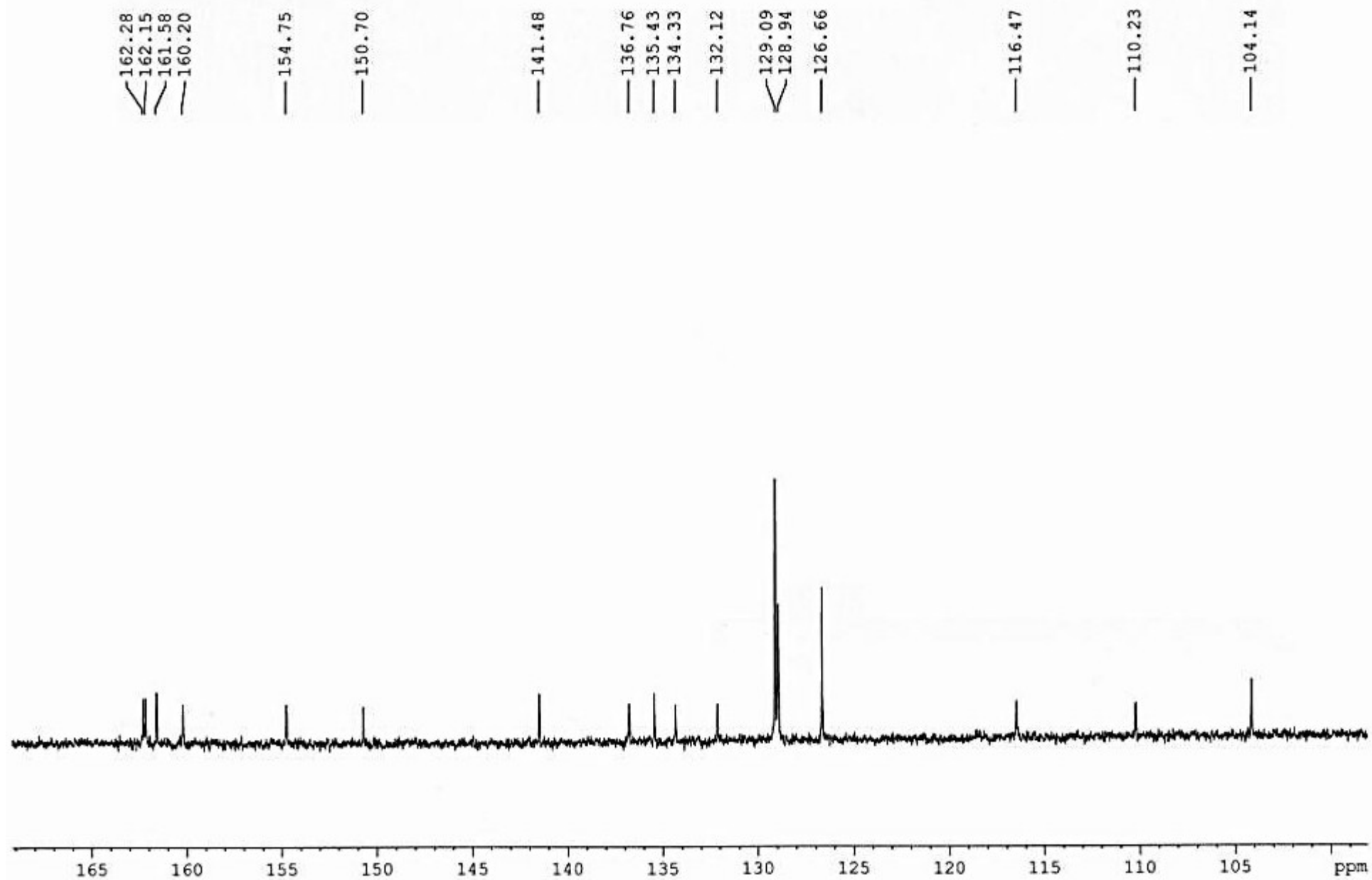
----- CHANNEL f1 -----
 SFO1 150.9178979 MHz
 NUC1 13C
 P1 8.80 usec
 PLW1 78.13500214 W

----- CHANNEL f2 -----
 SFO2 600.1324005 MHz
 NUC2 1H
 CPDPRG[2] waltz65
 PCPD2 70.00 usec
 PLW2 27.82500076 W
 PLW12 0.63804001 W
 PLW13 0.31264001 W

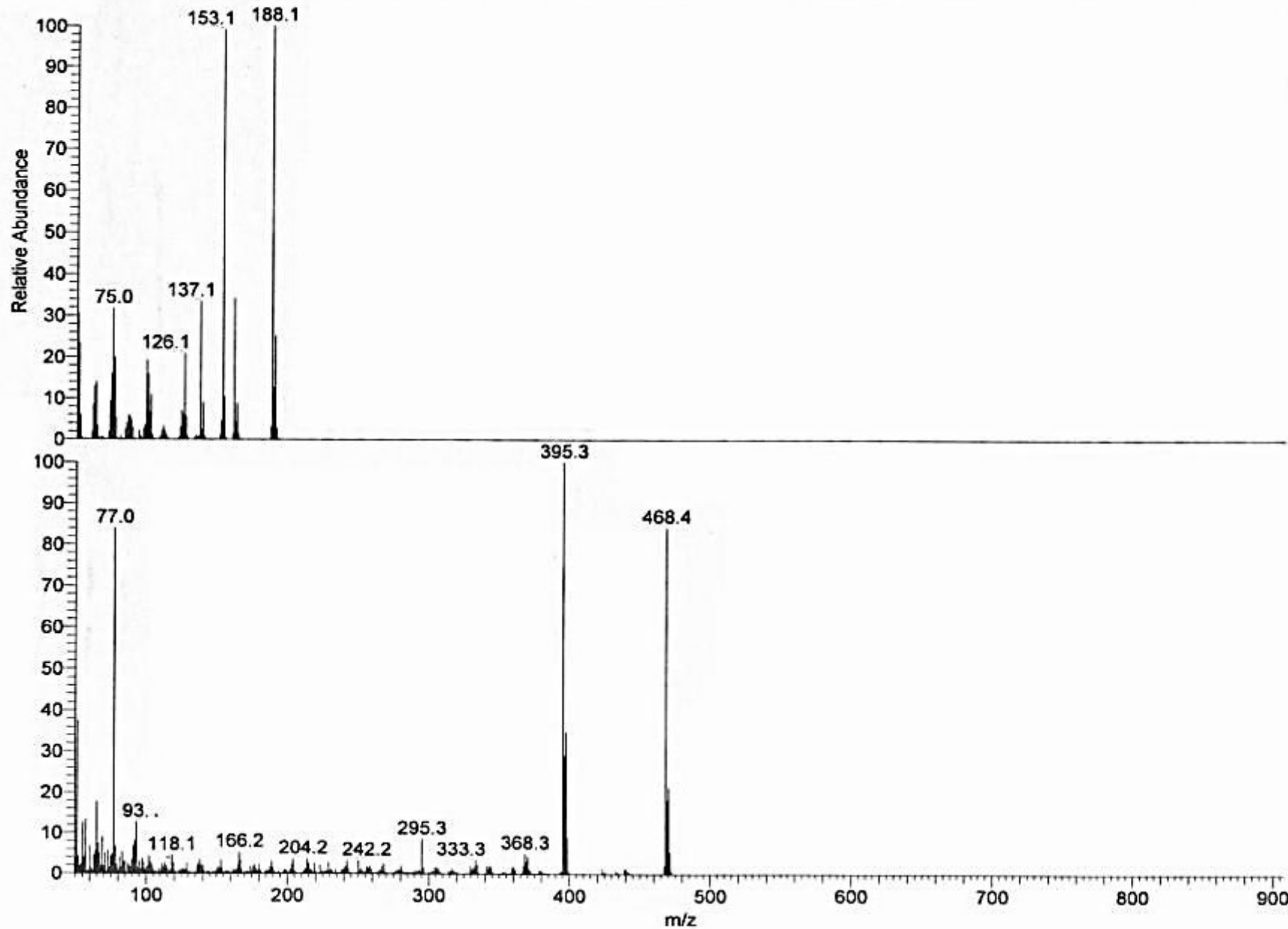
F2 - Processing parameters
 SI 32768
 SF 150.9028823 MHz
 WDW EM
 SSB 0
 LB 2.00 Hz
 GB 0
 PC 1.40

¹³C NMR for the compound **9b**

^{13}C decoupled spectra Dr.Saleh MS 5Cl in DMSO(30 hrs)



^{13}C NMR for the compound **9b**



NL:
3.17E6
MS-4CL#69
RT: 3.02 AV: 1
T: + c EI Full ms
[49.50-1000.50]

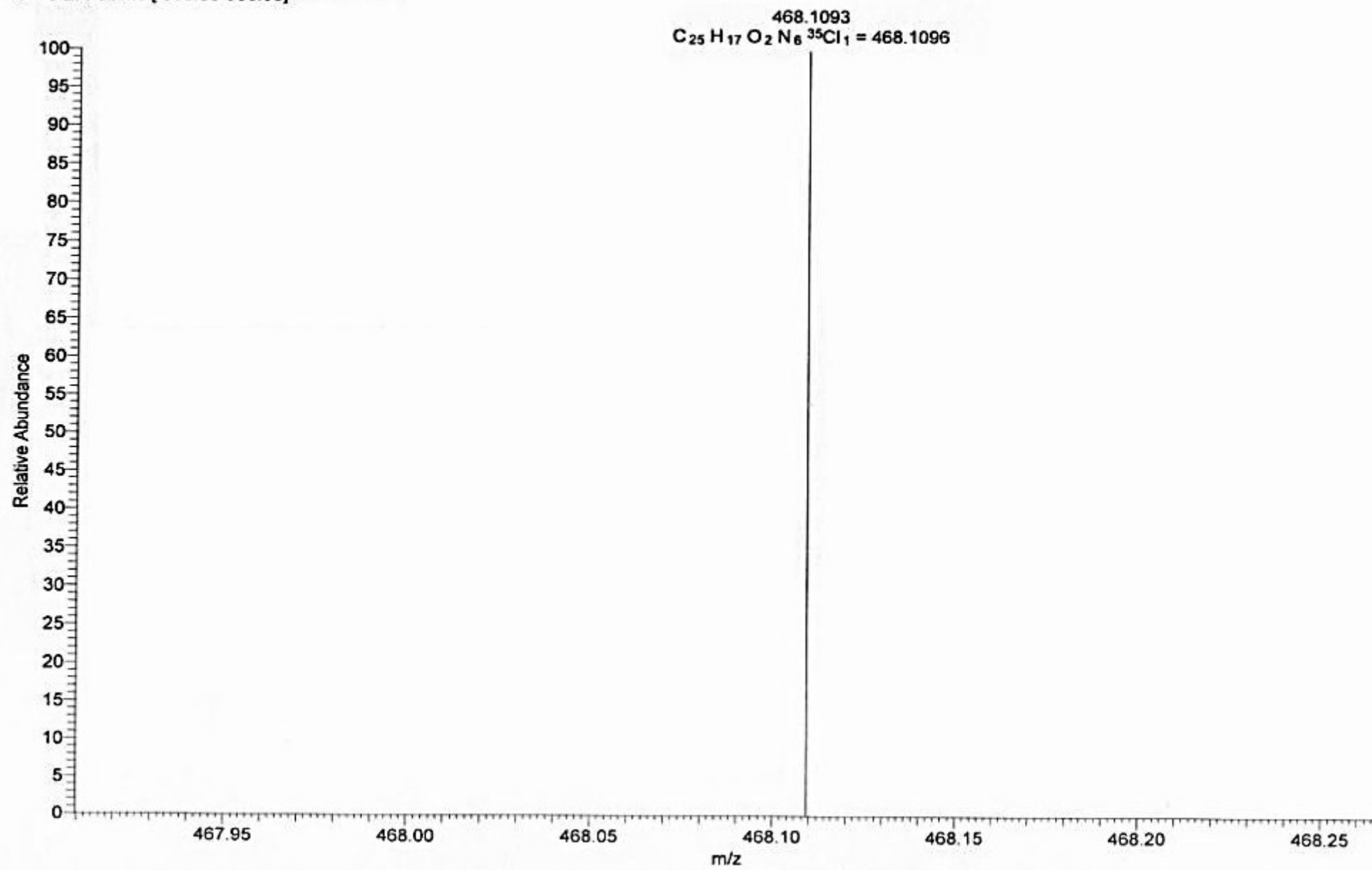
NL:
2.90E6
MS-4CL#178
RT: 8.02 AV: 1
T: + c EI Full ms
[49.50-1000.50]

Mass spectra for the compound 9b

C:\Xcalibur\Data\saleh\HRMS-MS4cl-c1
11/29/2015 2:20:43 PM

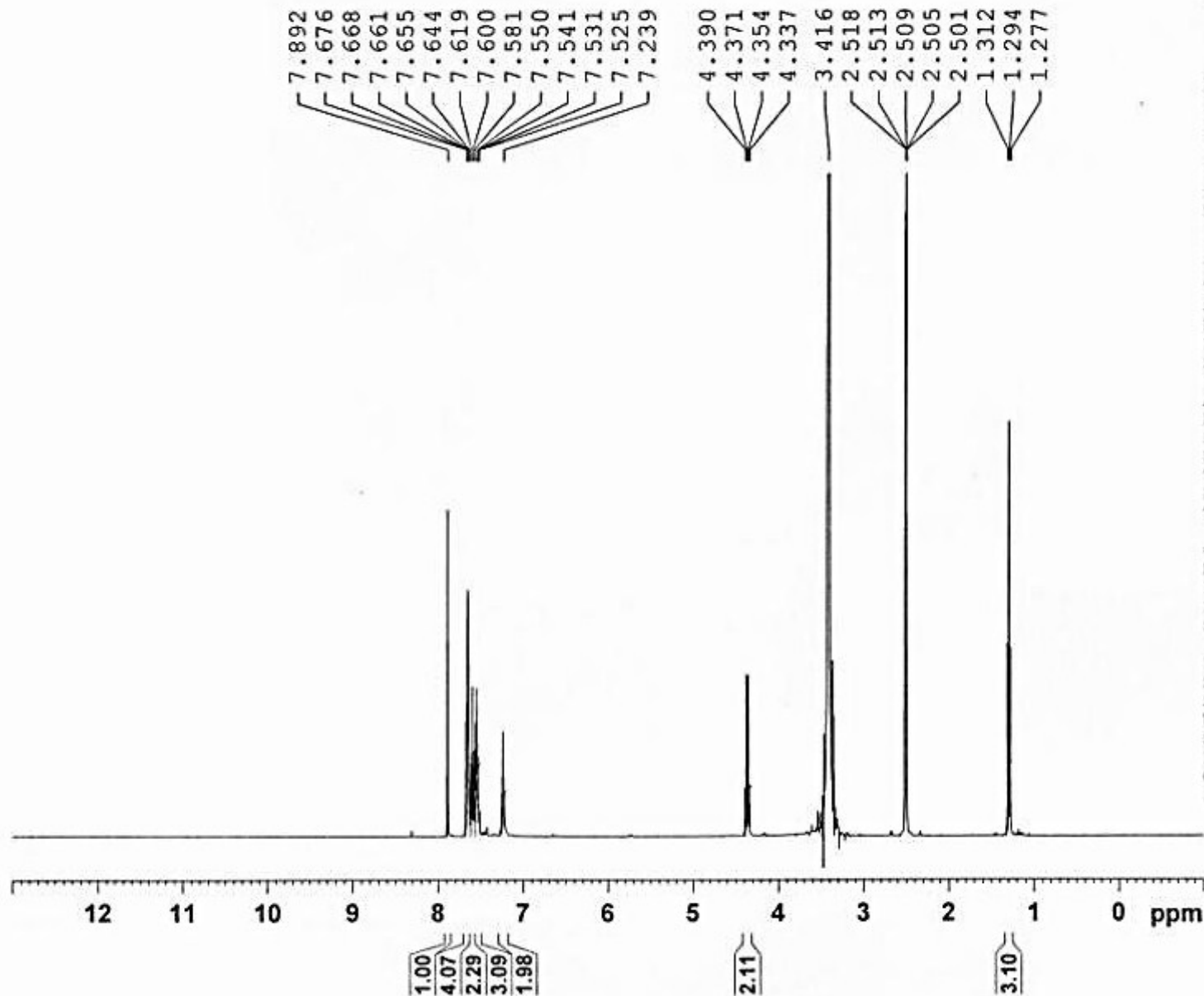
GC MS DFS- Thermo
Project No: GS01/03

HRMS-MS4cl-c1 #2 RT: 6.87 AV: 1 NL: 1.40E3
T: + c EI Full ms [399.50-500.50]



High resolution mass spectra for compound **9b**

¹H spectrum Moustafa MS 2CL in DMSO



Current Data Parameters
NAME MS2CL-1H
EXPNO 1
PROCNO 1

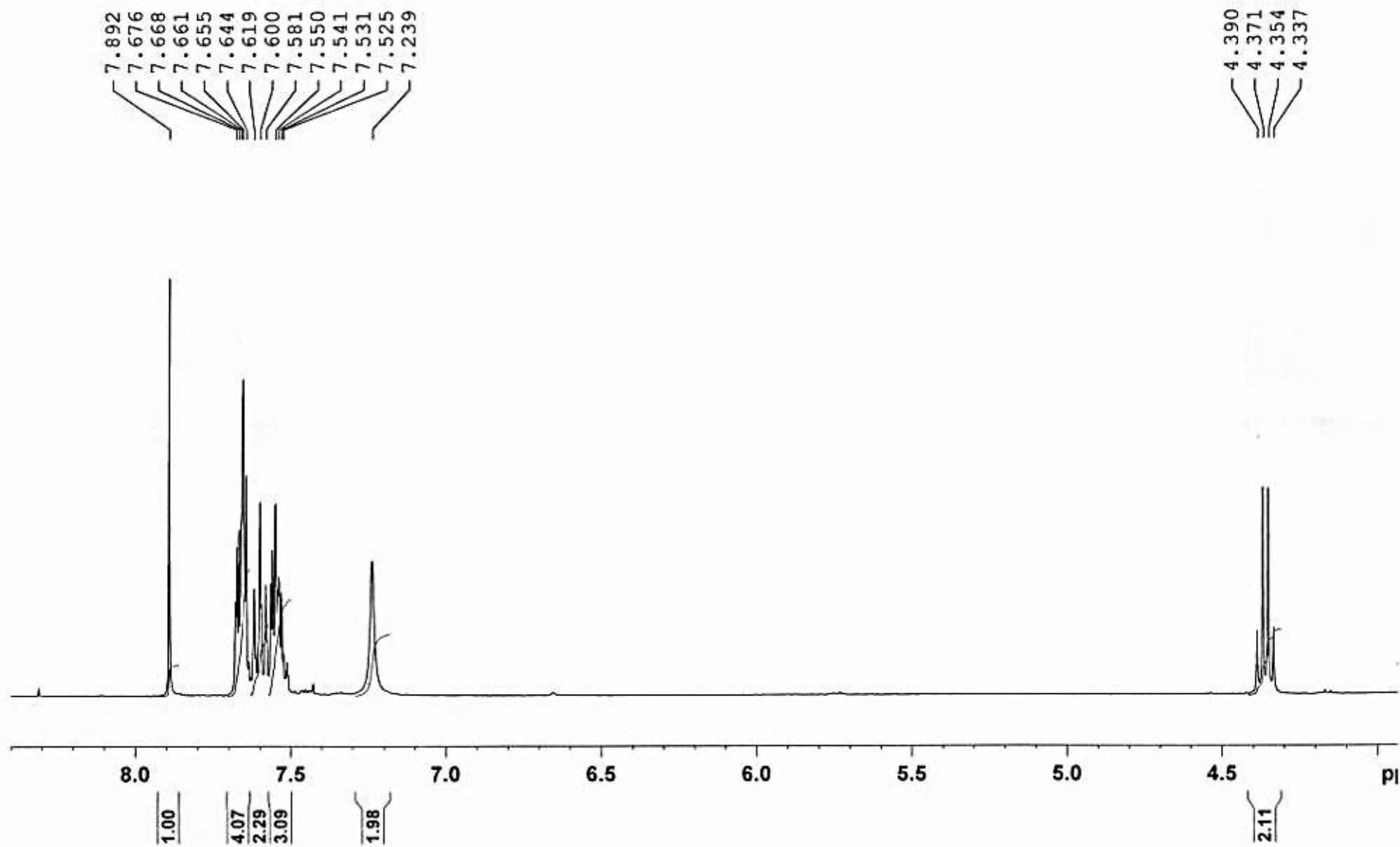
F2 - Acquisition Parameters
Date_ 20151203
Time_ 12.39
INSTRUM spect
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 161.3
DW 60.400 usec
DE 6.00 usec
TE 294.8 K
D1 1.00000000 sec
TD0 1

==== CHANNEL f1 =====
NUC1 1H
P1 10.40 usec
PL1 -2.00 dB
SFO1 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

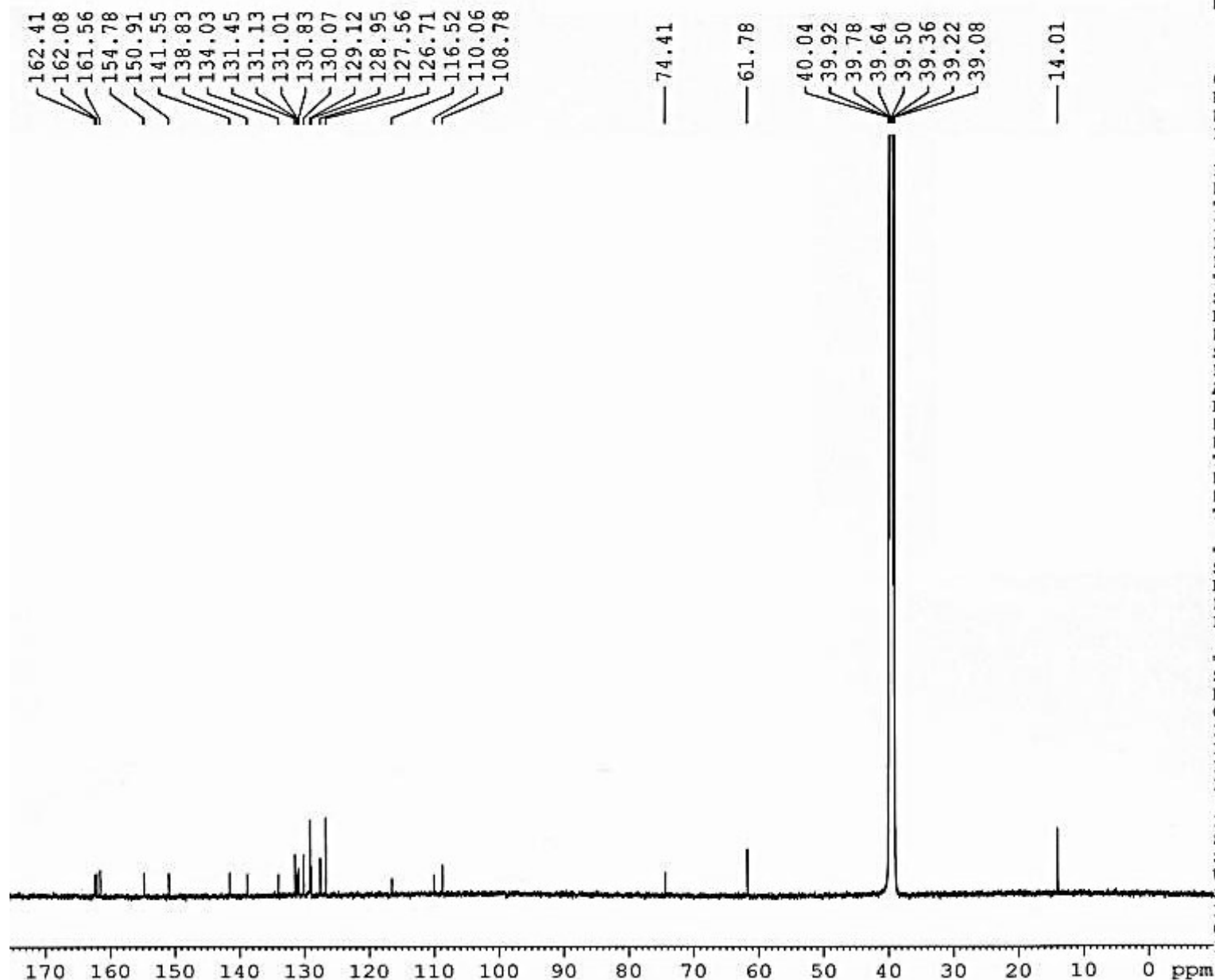
¹H NMR for the compound 9c

¹H spectrum Moustafa MS 2CL in DMSO



¹H NMR for the compound 9c

coupled spectra Mostafa Ms2Cl in DMSO(time: 25 hrs)



Current Data Parameters
NAME MS2CL-13C
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160706
Time_ 13.00
INSTRUM spect
PROBHD 5 mm FABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 30720
DS 4
SWH 36057.691 Hz
FIDRES 0.550197 Hz
AQ 0.9087659 sec
RG 203
DW 13.867 usec
DE 50.00 usec
TE 298.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

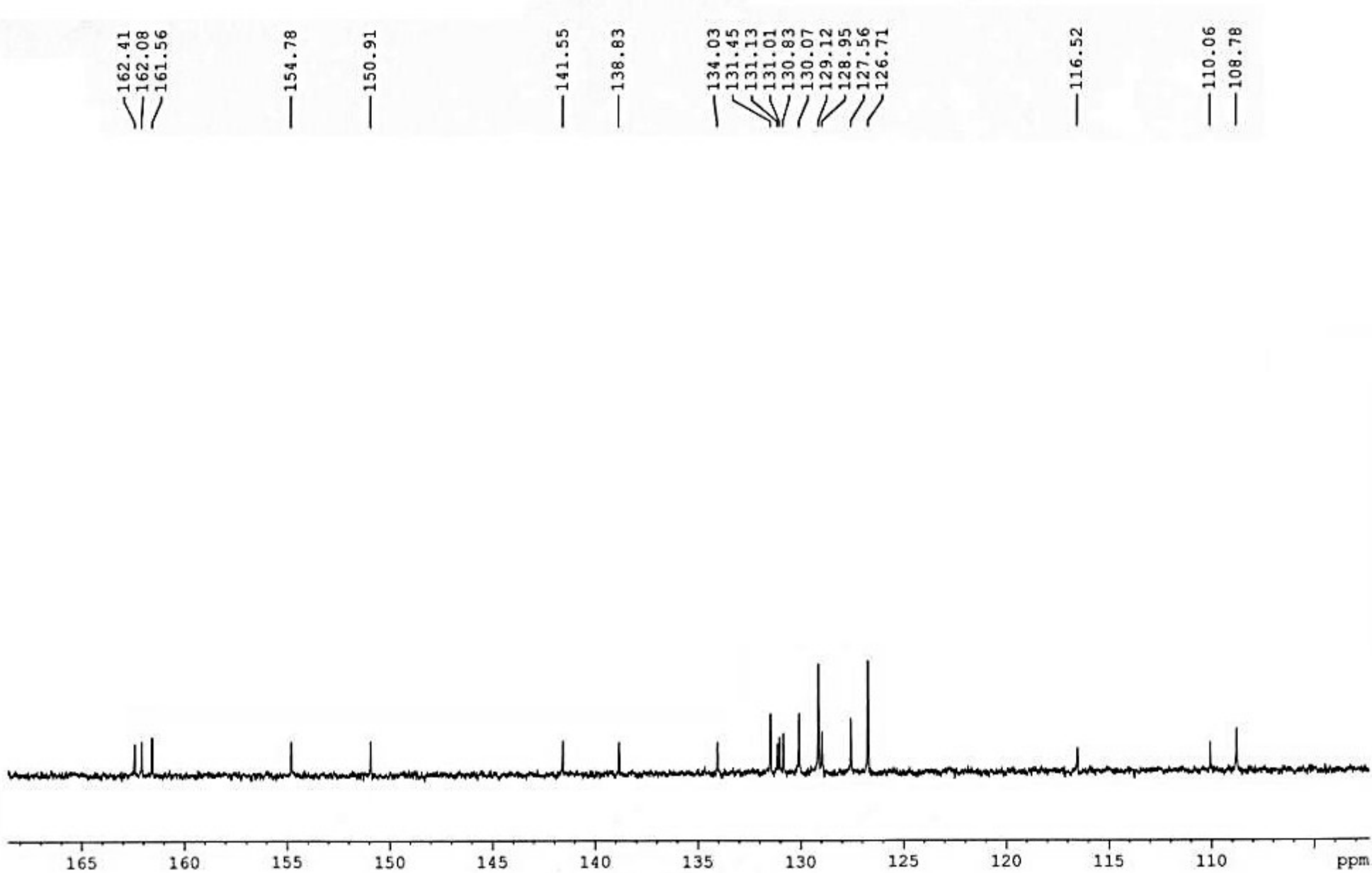
----- CHANNEL f1 -----
SFO1 150.9178979 MHz
NUC1 13C
P1 8.80 usec
PLW1 78.13500214 W

----- CHANNEL f2 -----
SFO2 600.1324005 MHz
NUC2 1H
CPDPRG[2] waltz65
PCPD2 70.00 usec
PLW2 27.82500076 W
PLW12 0.63804001 W
PLW13 0.31264001 W

F2 - Processing parameters
SI 32768
SF 150.9028826 MHz
WDW EM
SSB 0
LB 2.00 Hz
GB 0
PC 1.40

¹³C NMR for the compound 9c

¹³C decoupled spectra Mostafa Ms2C1 in DMSO(time: 25 hrs)



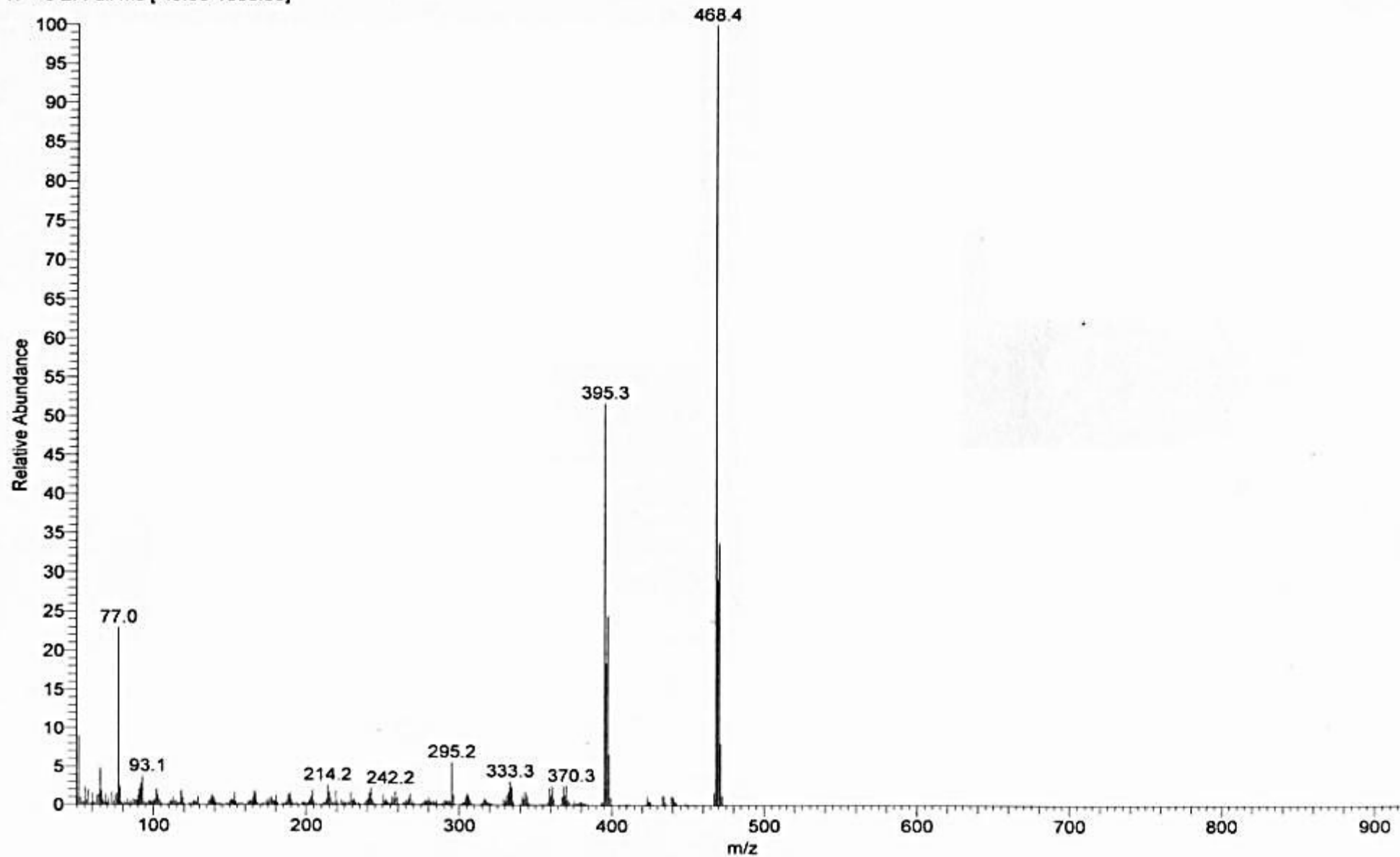
¹³C NMR for the compound **9c**

C:\Xcalibur\Data\saleh\MS-2CL
11/4/2015 2:16:40 PM

GC MS DFS- Thermo
Project No: GS01/03

MS-2CL

MS-2CL #219 RT: 8.40 AV: 1 NL: 3.91E6
T: + c EI Full ms [49.50-1000.50]

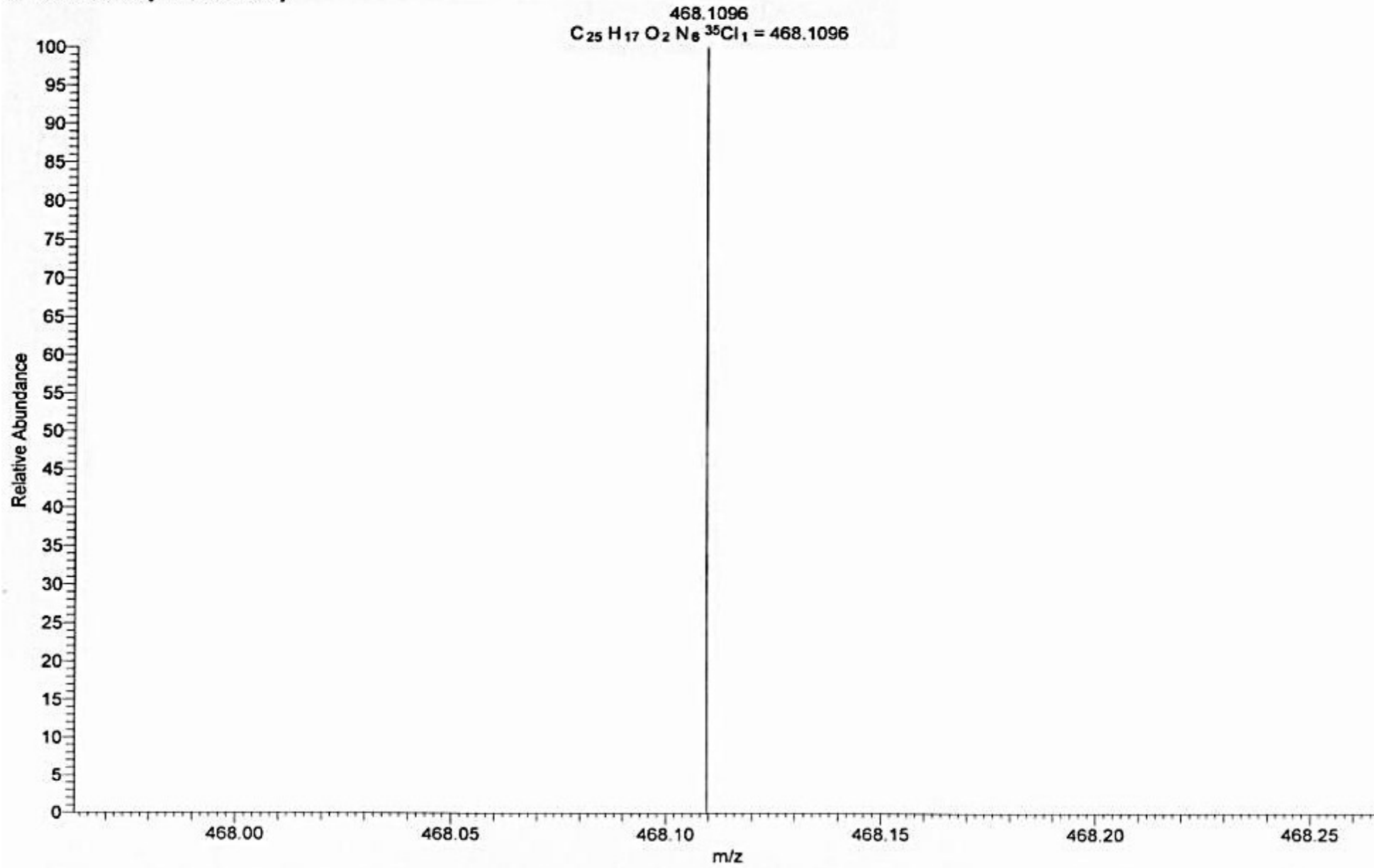


Mass spectra for the compound 9c

C:\Xcalibur\Data\saleh\HRMS-MS2Cl-c1
11/29/2015 2:19:11 PM

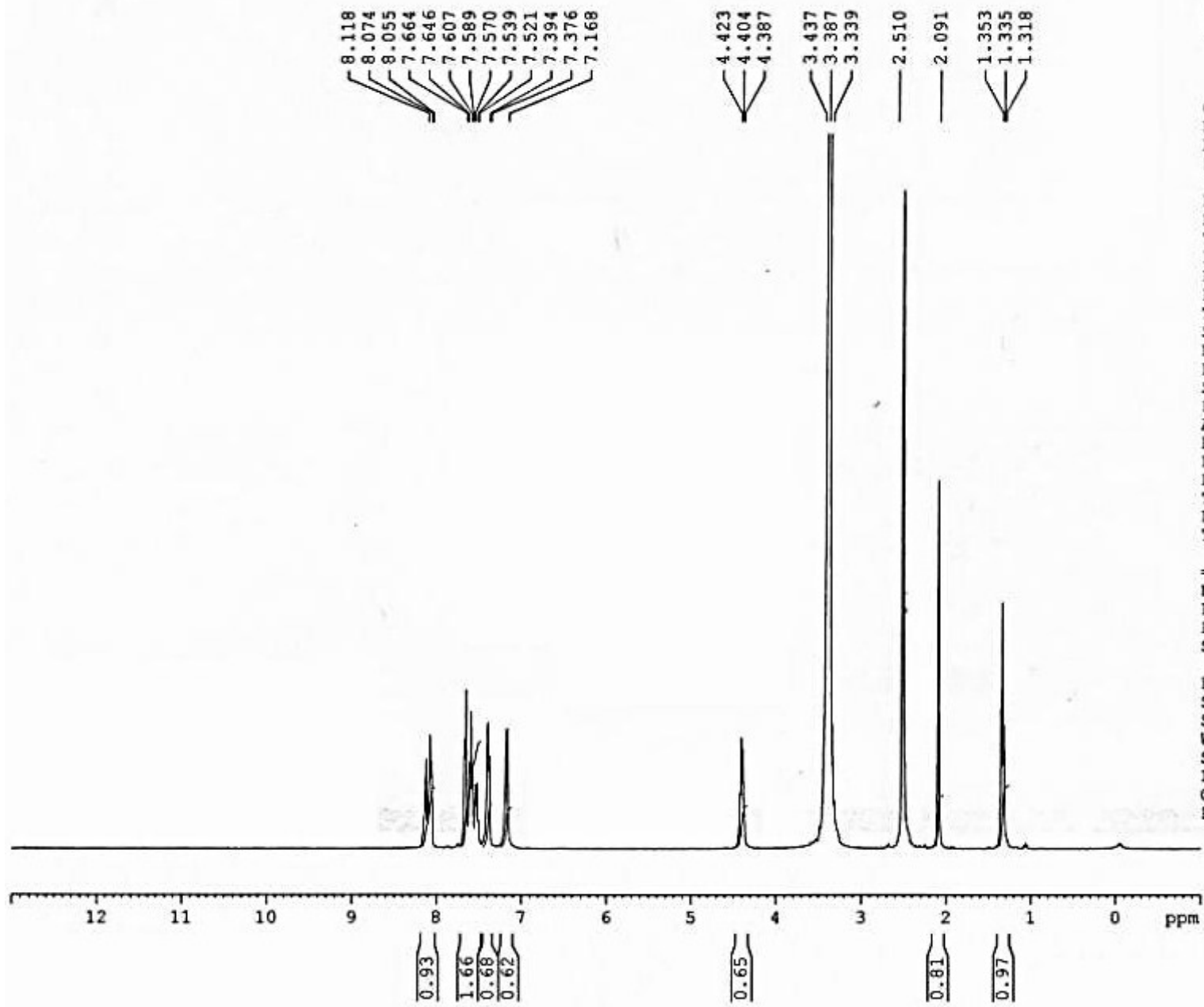
GC MS DFS- Thermo
Project No: GS01/03

HRMS-MS2Cl-c1 #55 RT: 8.98 AV: 1 NL: 2.90E4
T: + c EI Full ms [439.50-500.50]



High resolution mass spectra for compound 9c

¹H spectrum Moustafa MS4CH3 in DMSO



Current Data Parameters
 NAME MS4CH3-1H
 EXPNO 1
 PROCNO 1

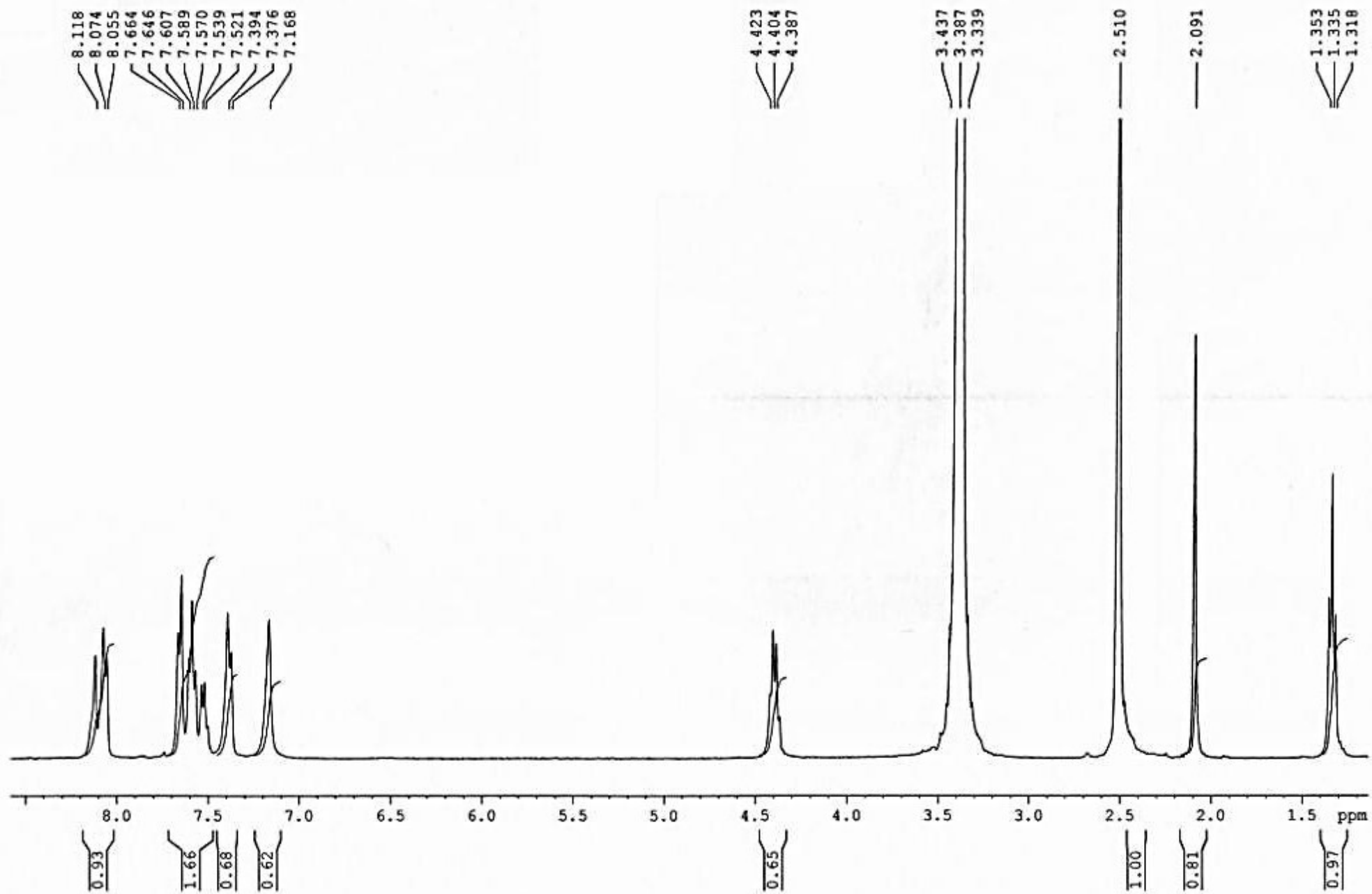
F2 - Acquisition Parameters
 Date_ 20151202
 Time_ 9.39
 INSTRUM spect
 PROBHD 5 mm QNP 1H/13
 PULPROG zg30
 TD 65536
 SOLVENT DMSO
 NS 16
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9584243 sec
 RG 181
 DW 60.400 usec
 DE 6.00 usec
 TE 295.4 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 NUC1 1H
 P1 10.40 usec
 PL1 -2.00 dB
 SFO1 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300000 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

¹H NMR for the compound **9d**

¹H spectrum Moustafa MS4CH3 in DMSO



¹H NMR for the compound **9d**

¹³C decoupled



162.16
161.54
161.48
154.75
150.63
141.50
140.47
135.21
134.38
131.85
129.57
129.06
128.83
127.13
126.66
116.59
109.84
103.92

74.54

61.73

40.03
39.92
39.78
39.64
39.50
39.36
39.22
39.08
20.96
20.29
14.03

Current Data Parameters
NAME 4CH3-13C
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160604
Time 1.00
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 5120
DS 4
SWH 36057.691 Hz
FIDRES 0.550197 Hz
AQ 0.9087659 sec
RG 203
DW 13.867 usec
DE 50.00 usec
TE 298.0 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1

==== CHANNEL f1 =====
SFO1 150.9178979 MHz
NUC1 13C
P1 8.80 usec
PLW1 78.13500214 W

==== CHANNEL f2 =====
SFO2 600.1324005 MHz
NUC2 1H
CPDPRG[2] waltz65
PCPD2 70.00 usec
PLW2 27.82500076 W
PLW12 0.63804001 W
PLW13 0.31264001 W

F2 - Processing parameters
SI 32768
SF 150.9028834 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

¹³C NMR for the compound 9d

¹³C decoupled spectra Dr.Saleh 4CH3 in DMSO



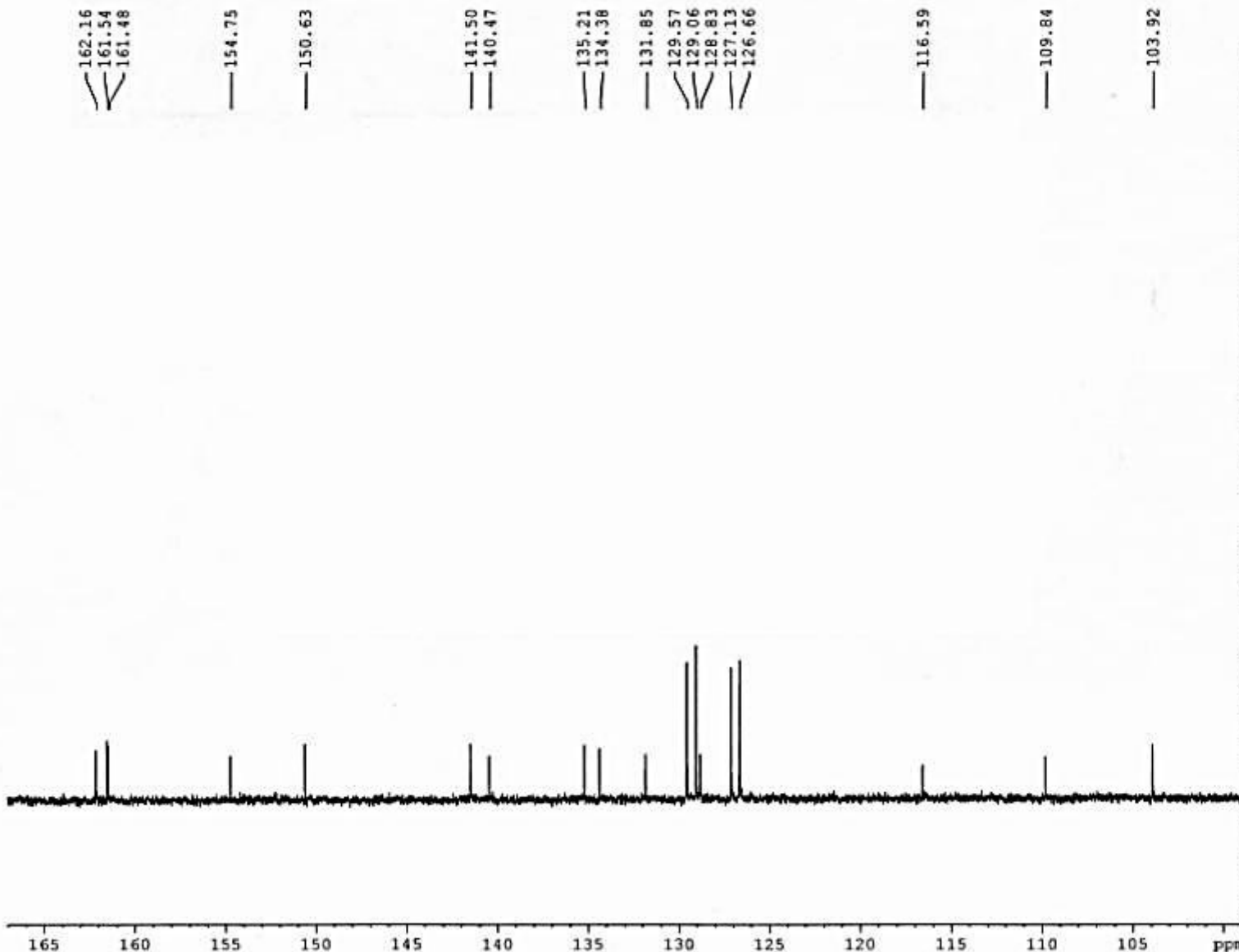
Current Data Parameters
 NAME 4CH3-13C
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date 20160604
 Time 1.00
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 5120
 DS 4
 SWH 36057.691 Hz
 FIDRES 0.550197 Hz
 AQ 0.9087659 sec
 RG 203
 DW 13.867 usec
 DE 50.00 usec
 TE 298.0 K
 D1 2.0000000 sec
 D11 0.0300000 sec
 TD0 1

----- CHANNEL f1 -----
 SFO1 150.9178979 MHz
 NUC1 13C
 P1 8.80 usec
 PLW1 78.13500214 W

----- CHANNEL f2 -----
 SFO2 600.1324005 MHz
 NUC2 1H
 CPDPRG2 waltz65
 PCPD2 70.00 usec
 PLW2 27.82500076 W
 PLW12 0.63804001 W
 PLW13 0.31264001 W

F2 - Processing parameters
 SI 32768
 SF 150.9028834 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



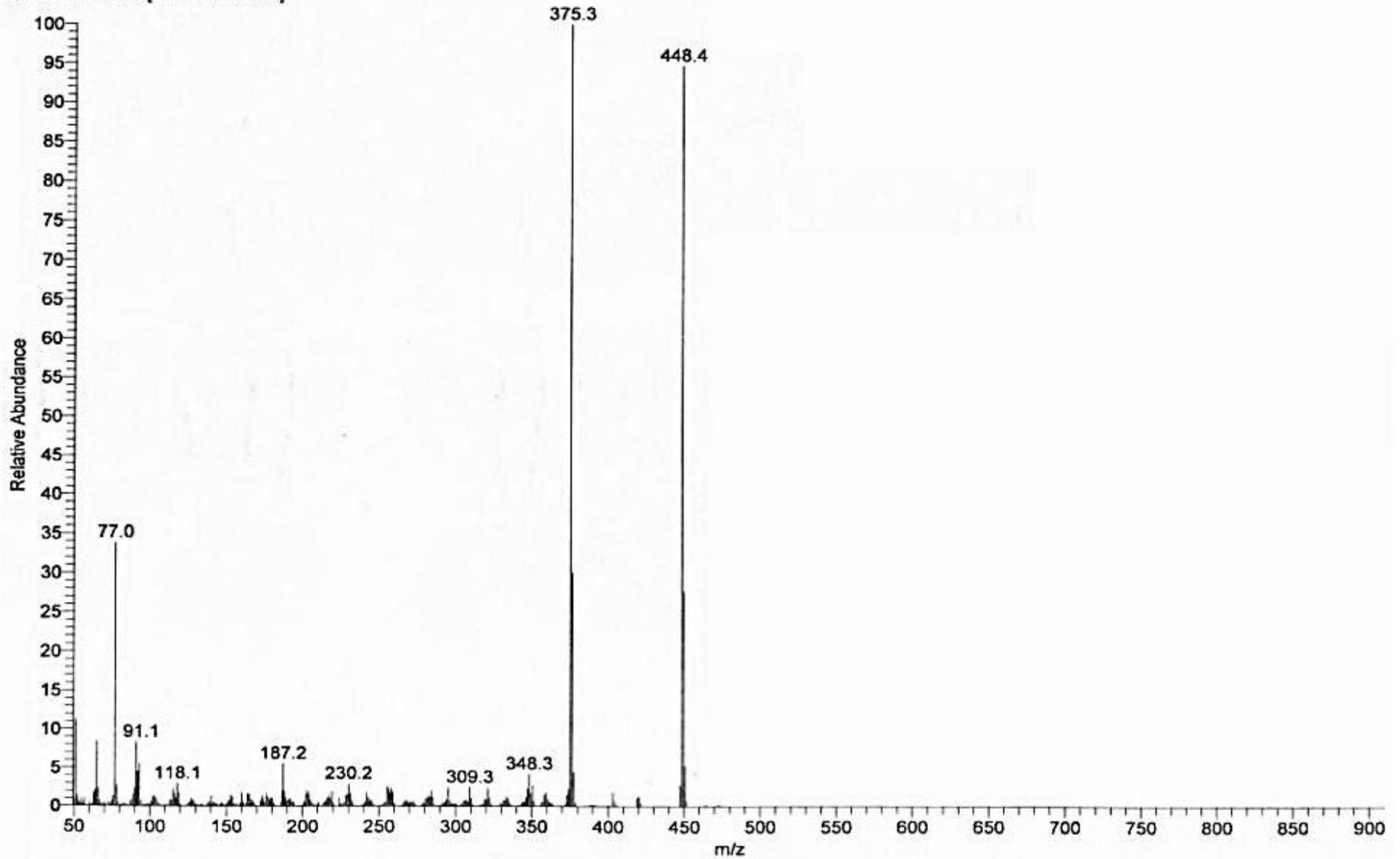
¹³C NMR for the compound **9d**

C:\Xcalibur\Data\saleh\MS-4CH3
11/4/2015 1:34:51 PM

GC MS DFS- Thermo
Project No: GS01/03

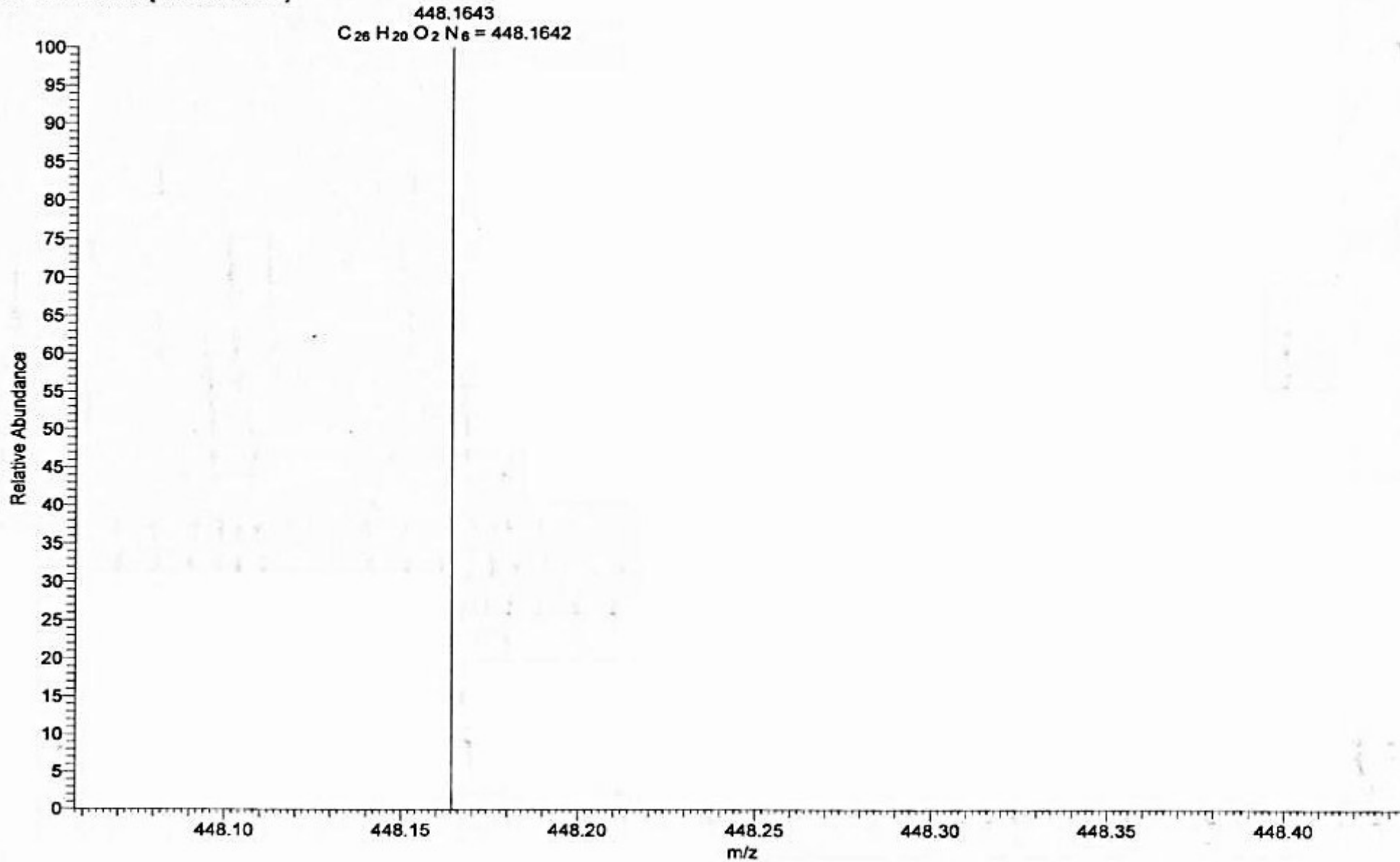
MS-4CH3

MS-4CH3 #216 RT: 9.76 AV: 1 NL: 1.26E7
T: + c EI Full ms [49.50-1000.50]



Mass spectra for the compound **9d**

HRMS-MS4CH3-c1 #97 RT: 8.62 AV: 1 NL: 4.23E6
T: + c EI Full ms [419.50-470.50]



High resolution mass spectra for compound **9d**

¹H spectra Dr.Saleh MS 2CH3 in DMSO



7.655
7.653
7.652
7.648
7.598
7.595
7.586
7.584
7.575
7.572
7.534
7.532
7.530
7.523
7.520
7.517
7.509
7.508
7.506
7.492
7.479
7.420
7.418
7.410
7.406
7.396
7.394
7.372
7.360
7.348
7.346
7.186
4.372
4.361
4.349
4.337
3.330
2.501
2.436

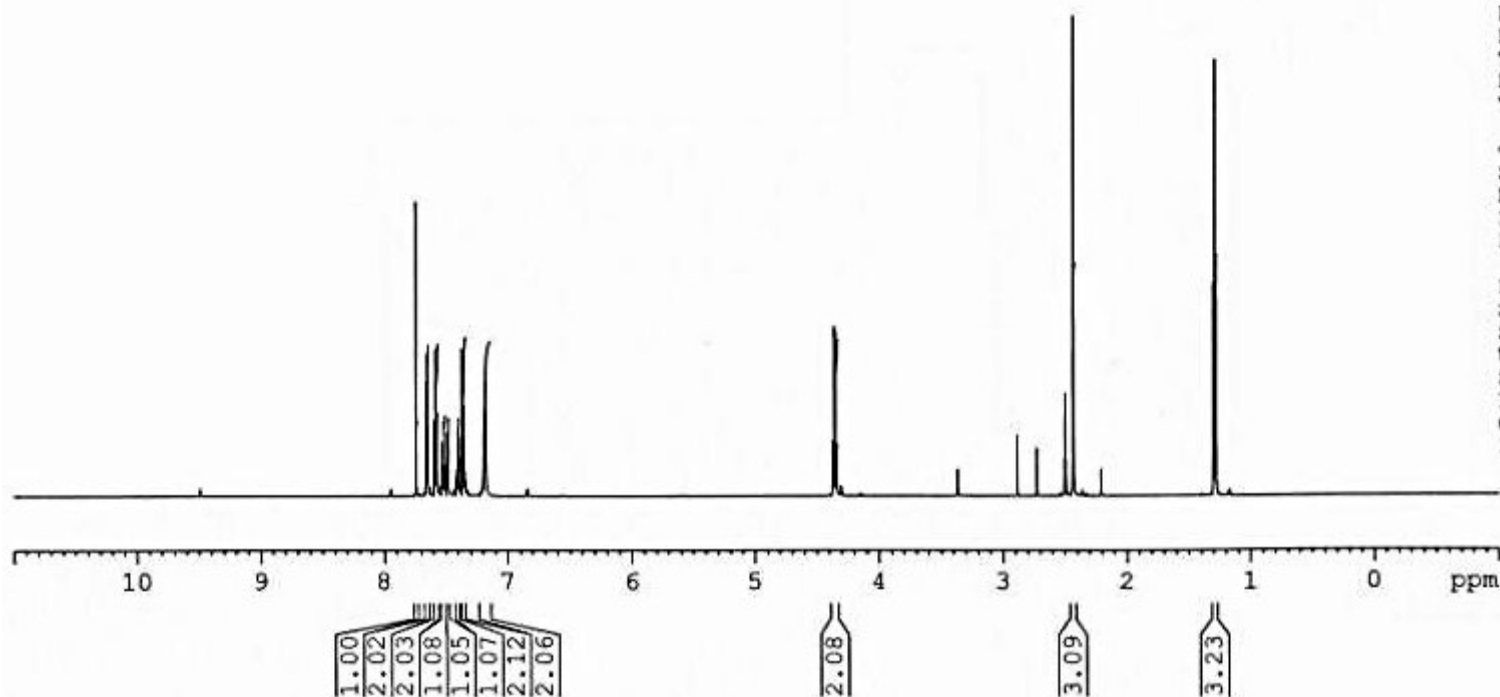
1.303
1.291
1.279

Current Data Parameters
NAME MS2CH3
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160724
Time 10.09
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 12335.526 Hz
FIDRES 0.188225 Hz
AQ 2.6563926 sec
RG 203
DW 40.533 usec
DE 20.00 usec
TE 298.0 K
DI 1.00000000 sec
TD0 1

----- CHANNEL f1 -----
SF01 600.1337060 MHz
NUC1 1H
P1 10.60 usec
PLW1 27.82500076 W

F2 - Processing parameters
SI 32768
SF 600.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

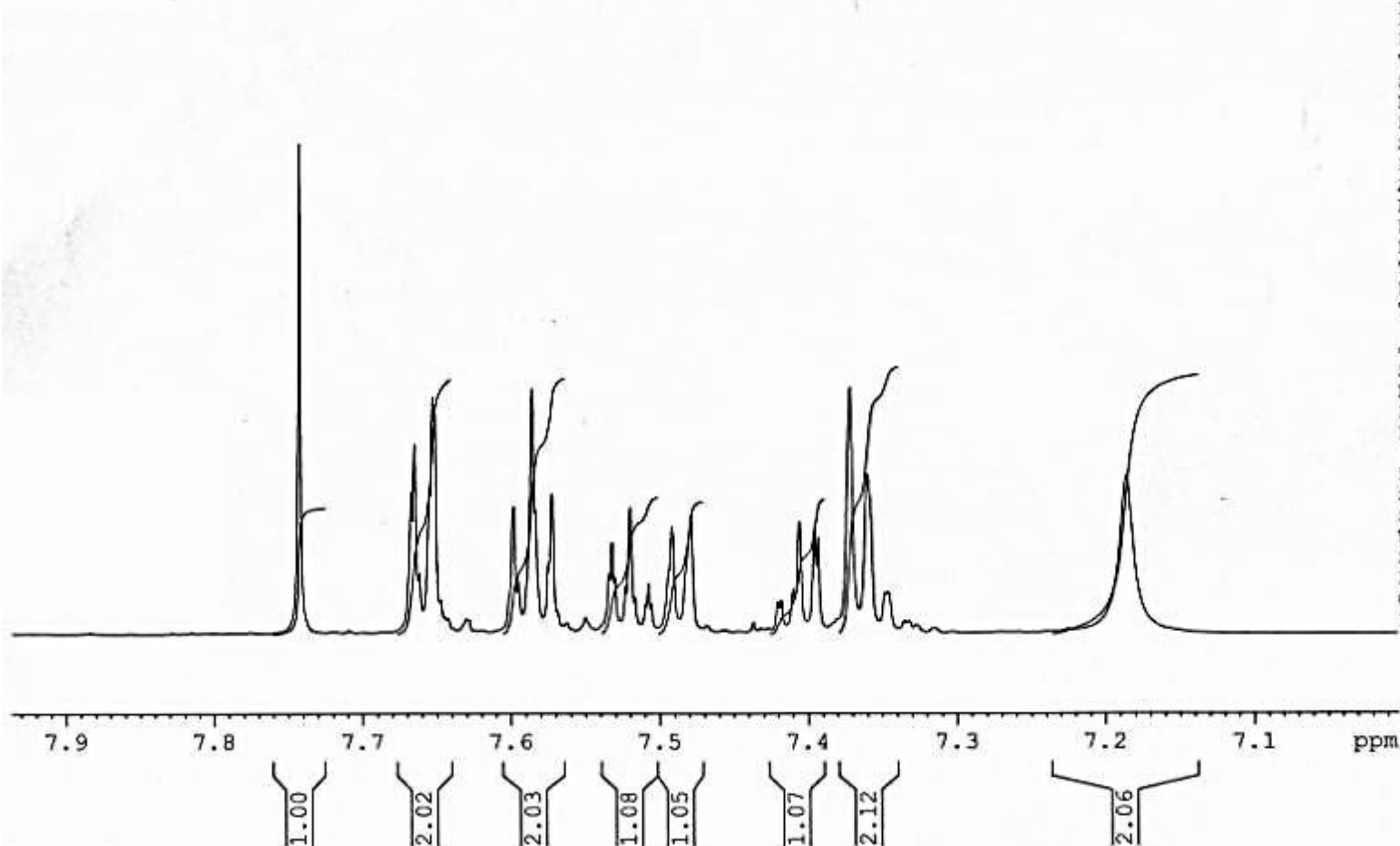


¹H NMR for the compound 9e

¹H spectra Dr.Saleh MS 2CH3 in DMSO



7.742
7.667
7.665
7.662
7.655
7.653
7.652
7.648
7.598
7.595
7.586
7.584
7.575
7.572
7.534
7.532
7.530
7.523
7.520
7.517
7.509
7.508
7.506
7.492
7.479
7.420
7.418
7.410
7.406
7.396
7.394
7.372
7.360
7.348
7.346
— 7.186



Current Data Parameters
NAME MS2CH3
EXPNO 4
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160724
Time_ 10.09
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 12335.526 Hz
FIDRES 0.188225 Hz
AQ 2.6563926 sec
RG 203
DW 40.533 usec
DE 20.00 usec
TE 298.0 K
D1 1.0000000 sec
TDO 1

----- CHANNEL f1 -----
SF01 600.1337060 MHz
NUC1 1H
P1 10.60 usec
PLW1 27.82500076 W

F2 - Processing parameters
SI 32768
SF 600.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

¹H NMR for the compound 9e

¹³C decoupled spectra Dr.Saleh MS 2CH3 in DMSO

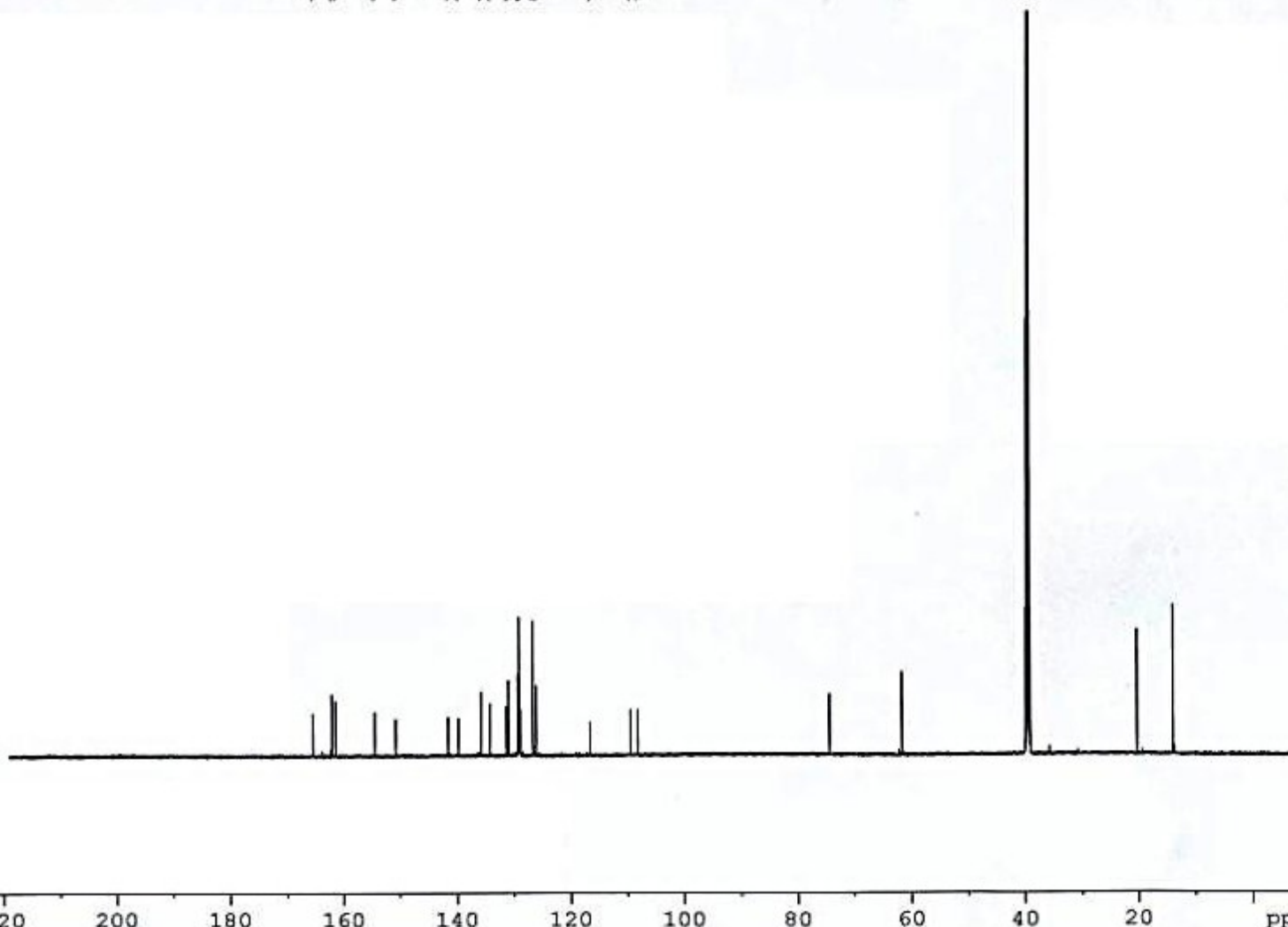


165.43
162.11
161.49
154.49
150.79
141.53
139.72
135.80
134.18
131.30
130.96
129.33
129.08
129.03
128.86
126.68
126.06
116.58
109.43
108.17

74.42

61.71

40.04
39.92
39.78
39.64
39.50
39.36
39.22
39.08
20.31
13.99



Current Data Parameters
NAME MS2CH3
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160724
Time_ 10.46
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 1069
DS 4
SWH 36057.691 Hz
FIDRES 0.550197 Hz
AQ 0.9087659 sec
RG 203
DW 13.867 usec
DE 50.00 usec
TE 298.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TDO 1

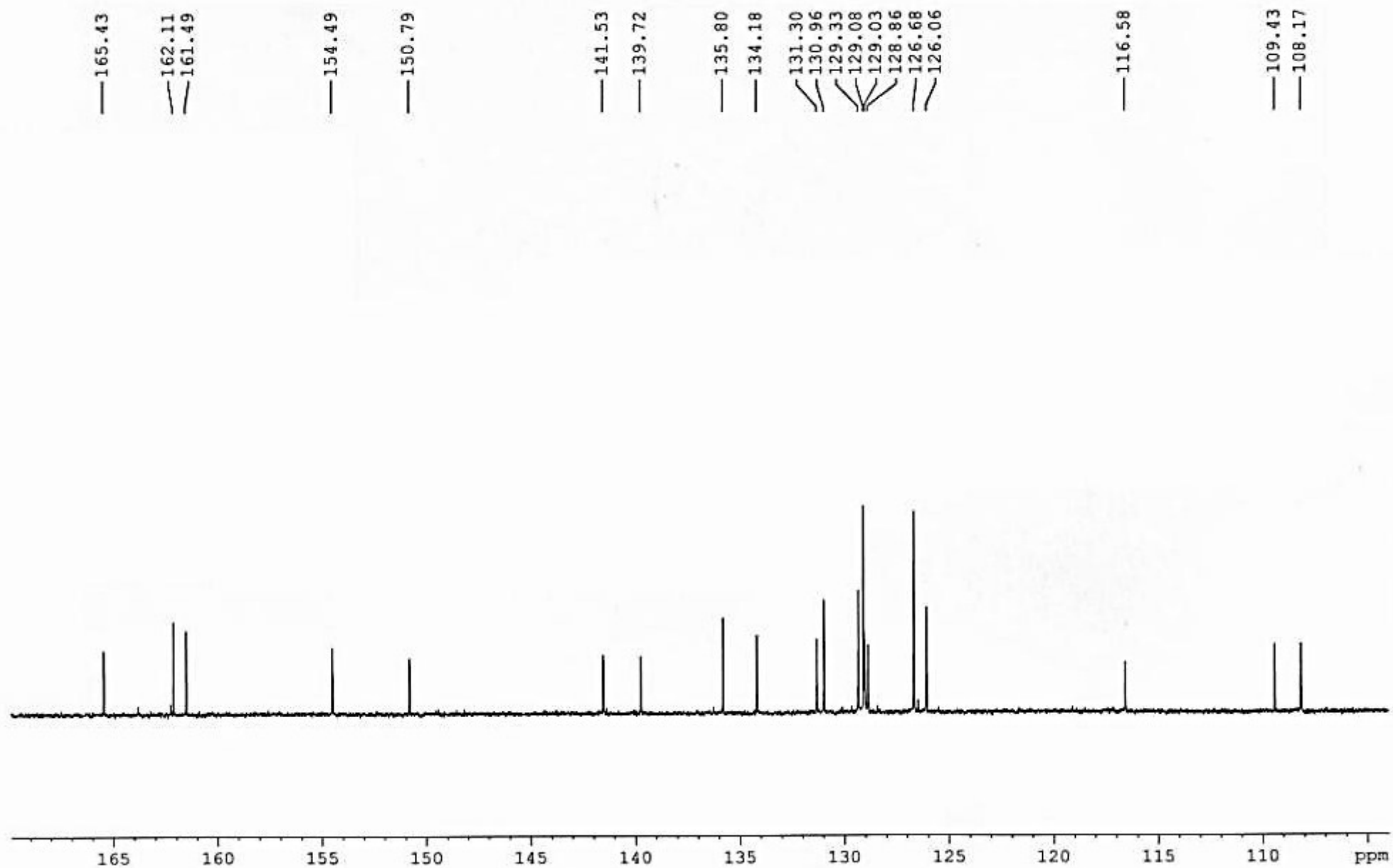
----- CHANNEL f1 -----
SFO1 150.9178979 MHz
NUC1 13C
P1 8.80 usec
PLW1 78.13500214 W

----- CHANNEL f2 -----
SFO2 600.1324005 MHz
NUC2 1H
CPDPRG[2] waltz65
PCPD2 70.00 usec
PLW2 27.82500076 W
PLW12 0.63804001 W
PLW13 0.31264001 W

F2 - Processing parameters
SI 32768
SF 150.9028830 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

¹³C NMR for the compound 9e

^{13}C decoupled spectra Dr.Saleh MS 2CH3 in DMSO



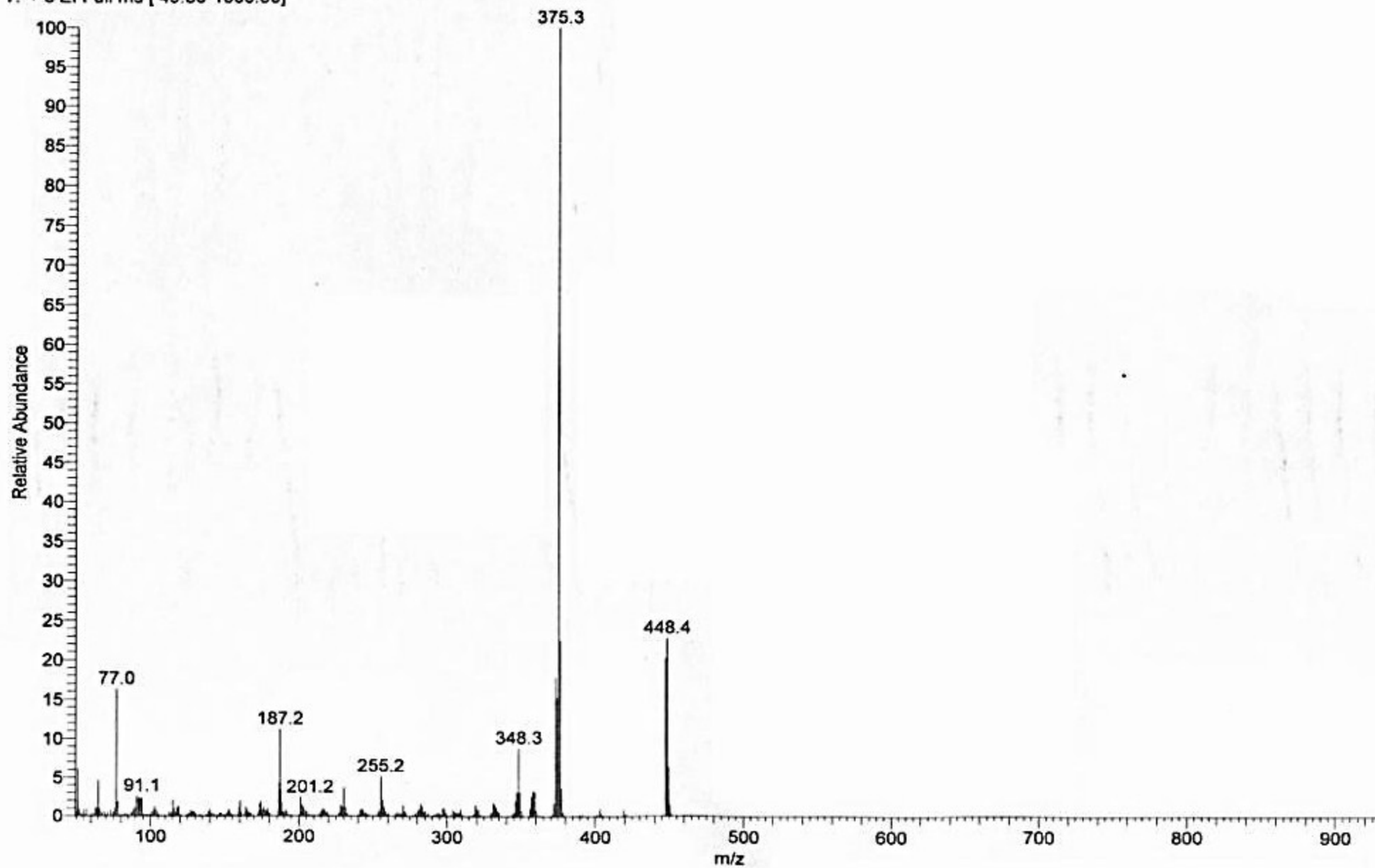
^{13}C NMR for the compound **9e**

C:\Xcalibur\Data\saleh\MS-2CH3
11/4/2015 1:13:09 PM

GC MS DFS- Thermo
Project No: GS01/03

MS-2CH3

MS-2CH3 #165 RT: 7.35 AV: 1 NL: 1.91E7
T: + c EI Full ms [49.50-1000.50]

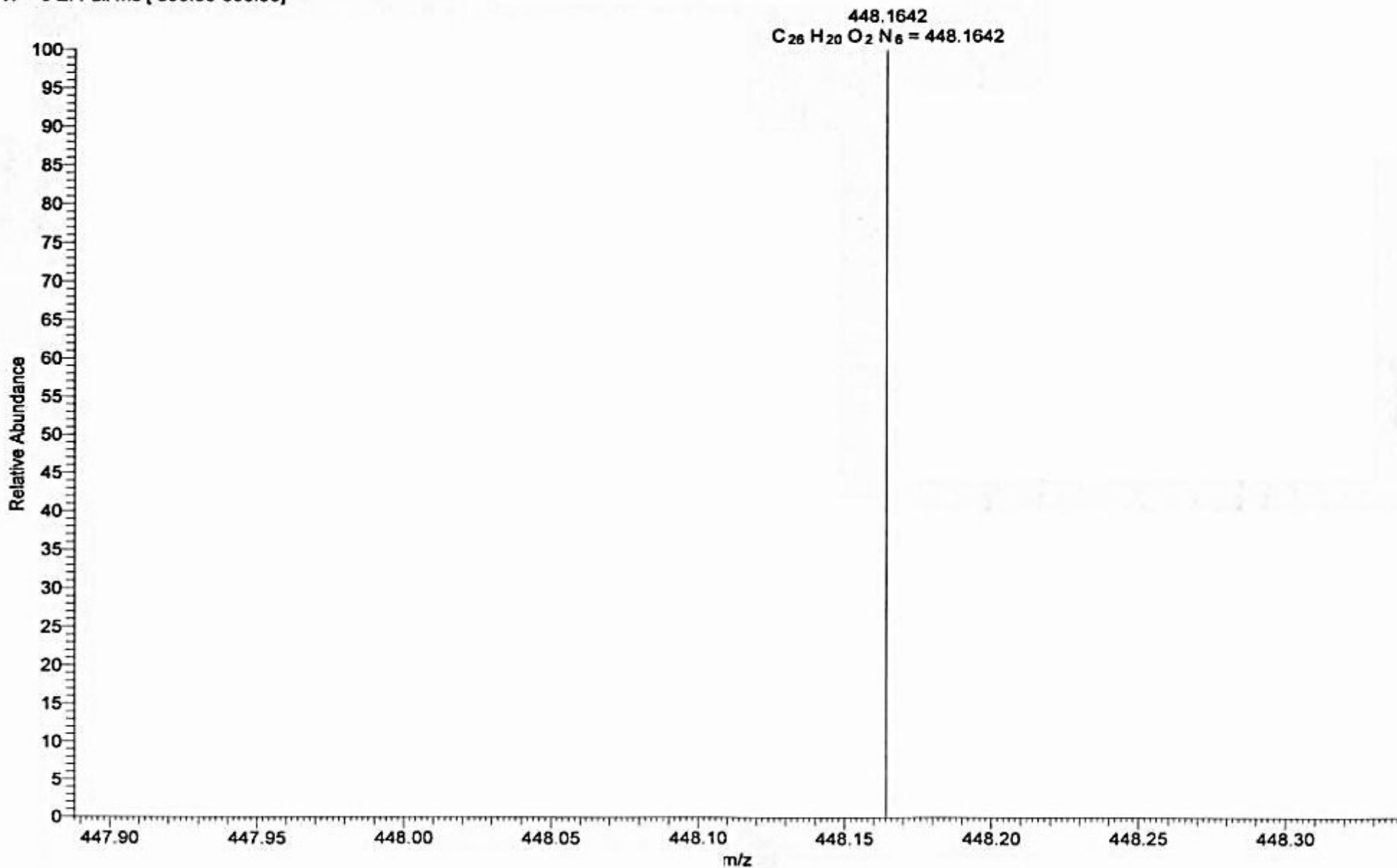


Mass spectra for the compound 9e

C:\Xcalibur\Data\saleh\HRMS-MS2CH3-c1
11/25/2015 9:19:56 AM

GC MS DFS- Thermo
Project No: GS01/03

HRMS-MS2CH3-c1 #12 RT: 7.17 AV: 1 NL: 1.76E3
T: + c EI Full ms [399.50-500.50]



High resolution mass spectra for compound 9e

¹H spectra Mostafa MS 4No2 in DMSO



8.466
8.449
8.443
8.427
8.421
8.404
8.257
7.688
7.684
7.665
7.623
7.605
7.601
7.585
7.555
7.536
7.520
7.320
4.452
4.434
4.416
4.400
3.339
2.518
2.513
2.509
2.505
2.500
1.366
1.348
1.330

Current Data Parameters
NAME Ms 4No2
EXPNO 3
PROCNO 1

F2 - Acquisition Parameters
Date_ 20151204
Time 0.59
INSTRUM spect
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 912.3
DW 60.400 usec
DE 6.00 usec
TE 295.6 K
D1 1.00000000 sec
TD0 1

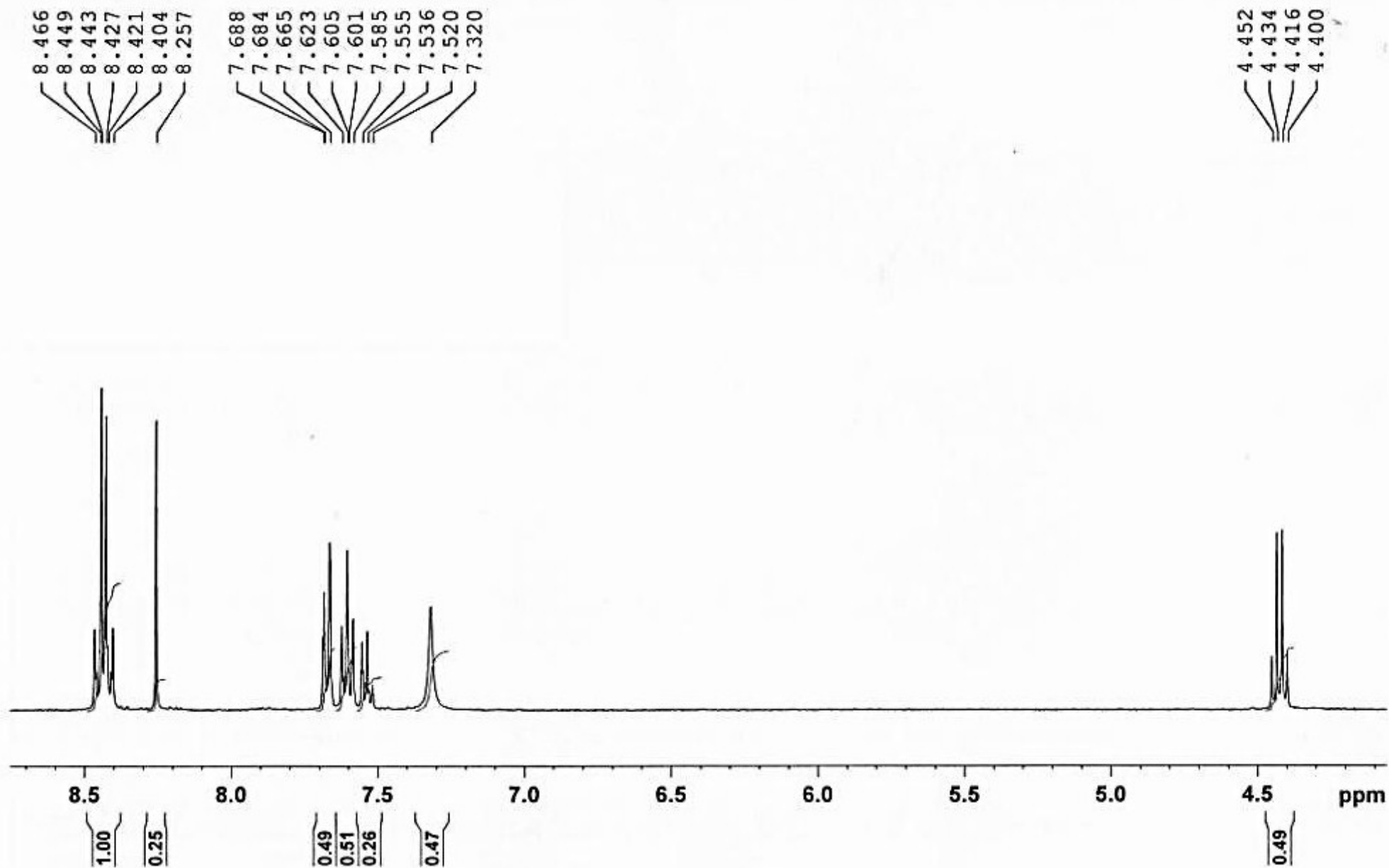
----- CHANNEL f1 -----
NUC1 1H
P1 10.40 usec
PL1 -2.00 dB
SF01 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



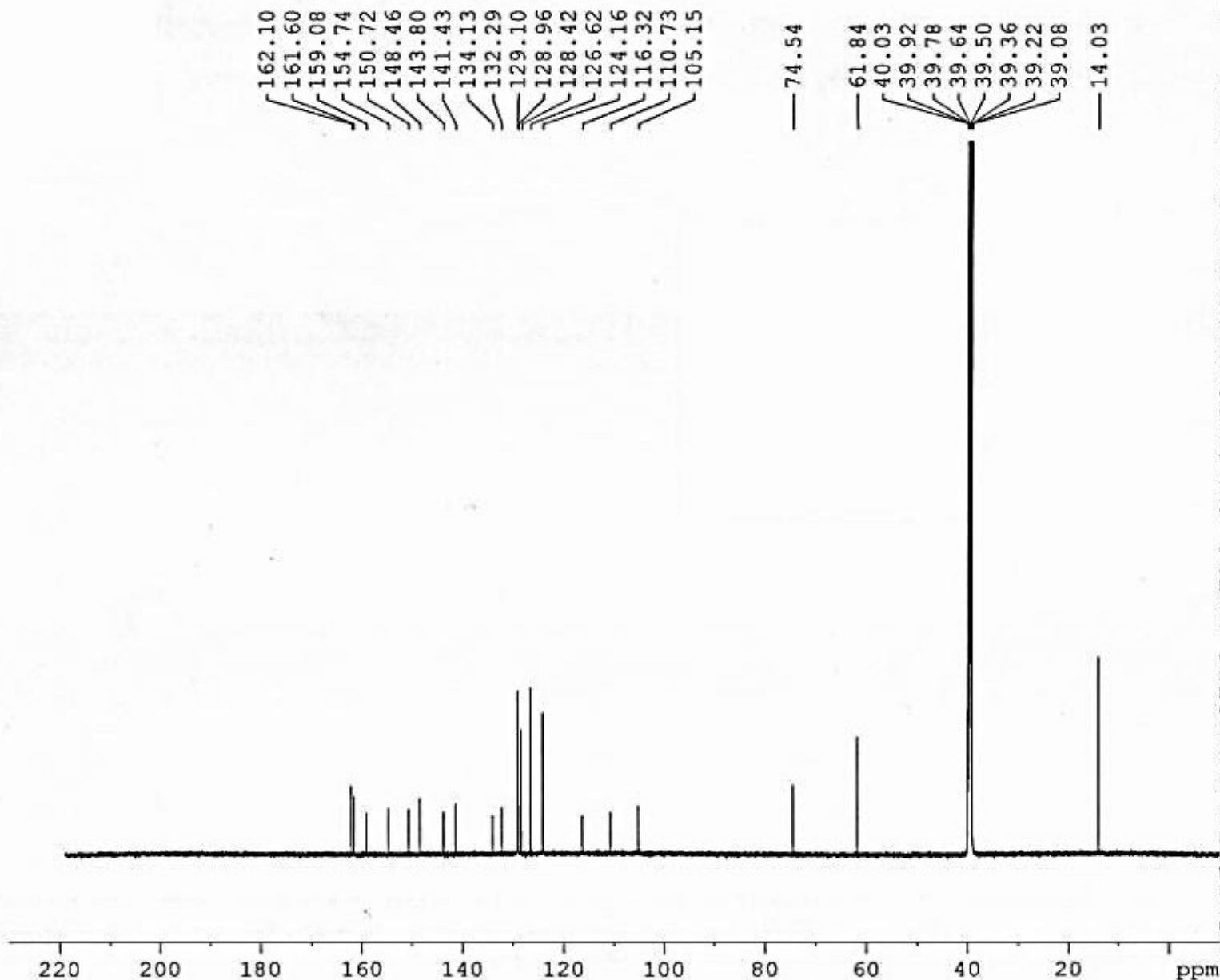
¹H NMR for the compound 9f

¹H spectra Mostafa MS 4No2 in DMSO



¹H NMR for the compound 9f

¹³C decoupled spectra Mostafa MSHNo2 in DMSO



162.10
161.60
159.08
154.74
150.72
148.46
143.80
141.43
134.13
132.29
129.10
128.96
128.42
126.62
124.16
116.32
110.73
105.15

74.54
61.84
40.03
39.92
39.78
39.64
39.50
39.36
39.22
39.08
14.03

Current Data Parameters
NAME MSHNo2-13C
EXPNO 1
PROCNO 1

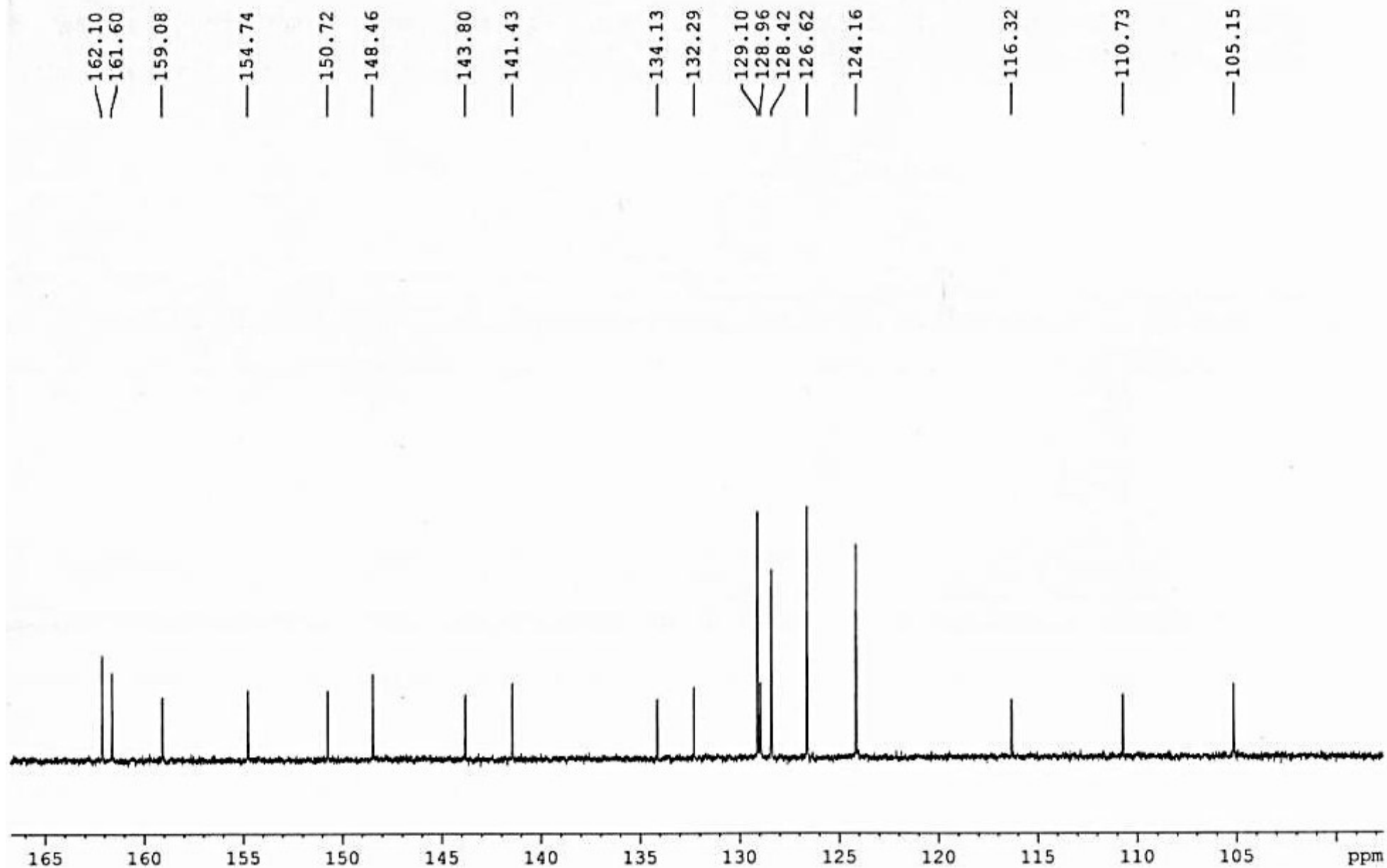
F2 - Acquisition Parameters
Date_ 20160607
Time_ 6.54
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 10240
DS 4
SWH 36057.691 Hz
FIDRES 0.550197 Hz
AQ 0.9087659 sec
RG 203
DW 13.867 usec
DE 50.00 usec
TE 298.0 K
D1 2.0000000 sec
D11 0.0300000 sec
TDO 1

----- CHANNEL f1 -----
SFO1 150.9178979 MHz
NUC1 13C
P1 8.80 usec
PLW1 78.13500214 W

----- CHANNEL f2 -----
SFO2 600.1324005 MHz
NUC2 1H
CPDPRG[2] waltz65
PCPD2 70.00 usec
PLW2 27.82500076 W
PLW12 0.63804001 W
PLW13 0.31264001 W

F2 - Processing parameters
SI 32768
SF 150.9028824 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

¹³C decoupled spectra Mostafa MSHNO2 in DMSO



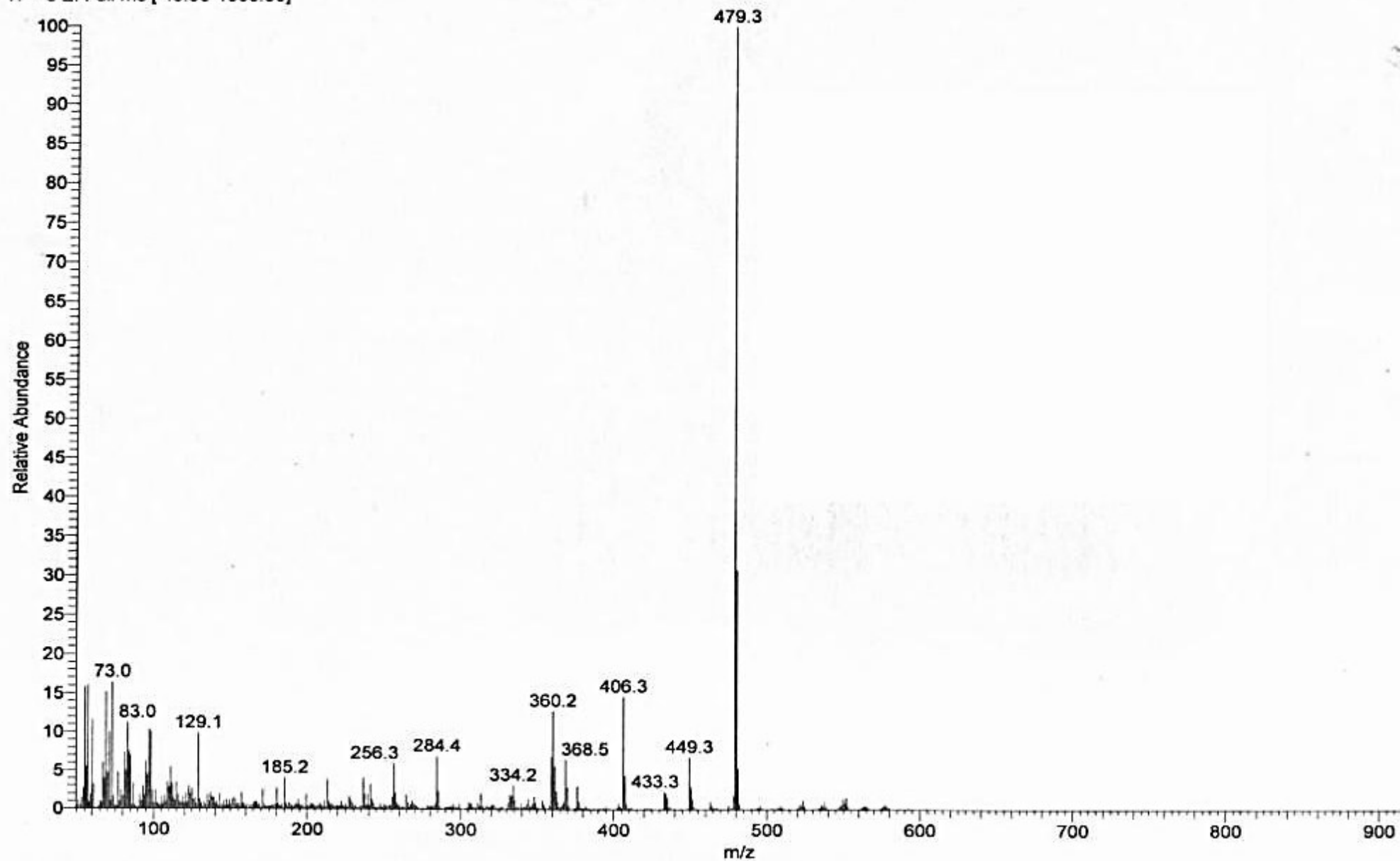
¹³C NMR for the compound **9f**

C:\Xcalibur\Data\saleh\MS-4NO2
11/8/2015 9:55:46 AM

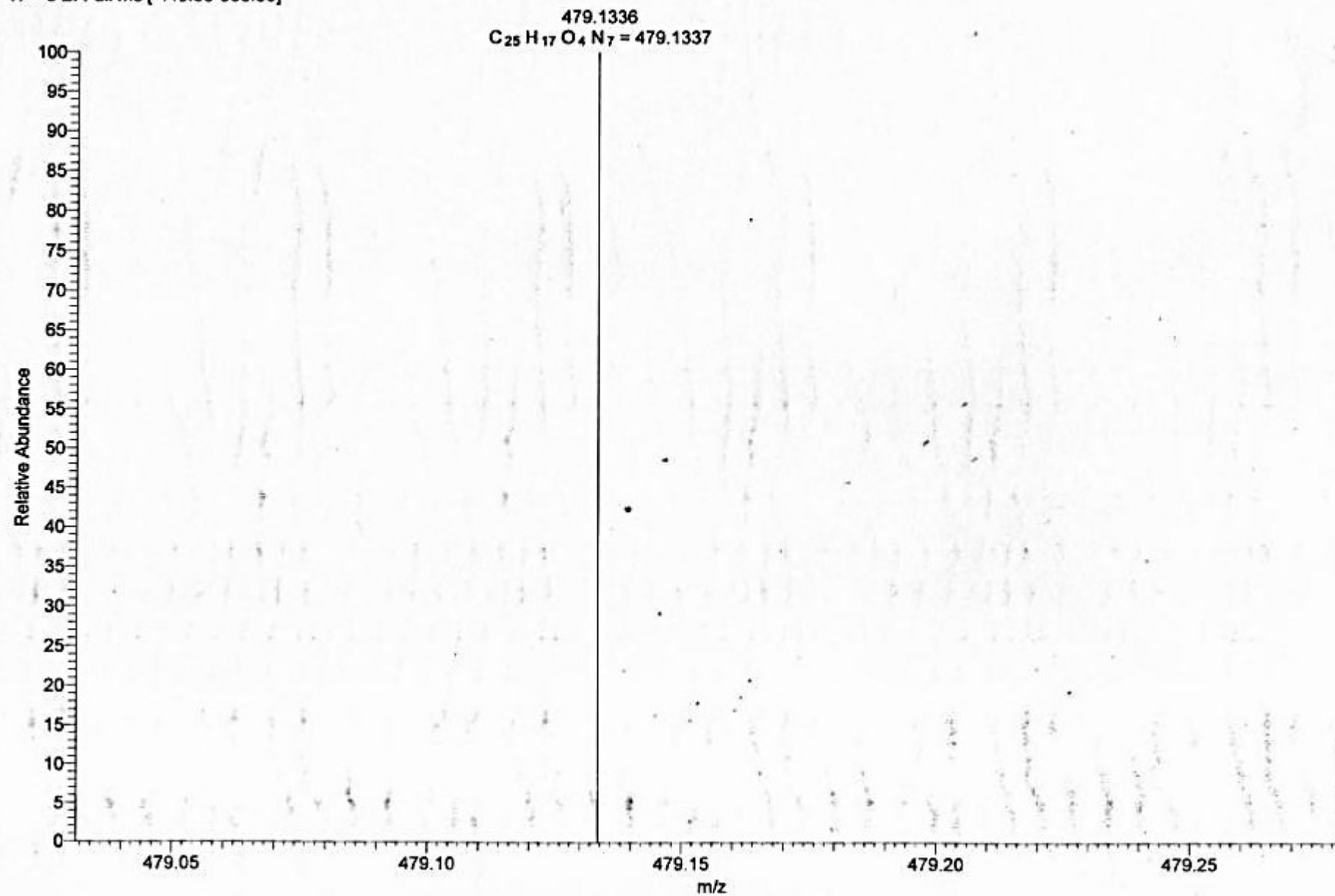
GC MS DFS- Thermo
Project No: GS01/03

MS-4NO2

MS-4NO2 #216 RT: 9.77 AV: 1 NL: 2.03E6
T: + c EI Full ms [49.50-1000.50]



Mass spectra for the compound 9f



High resolution mass spectra for compound 9f

¹H spectrum Moustafa MSfuran in DMSO

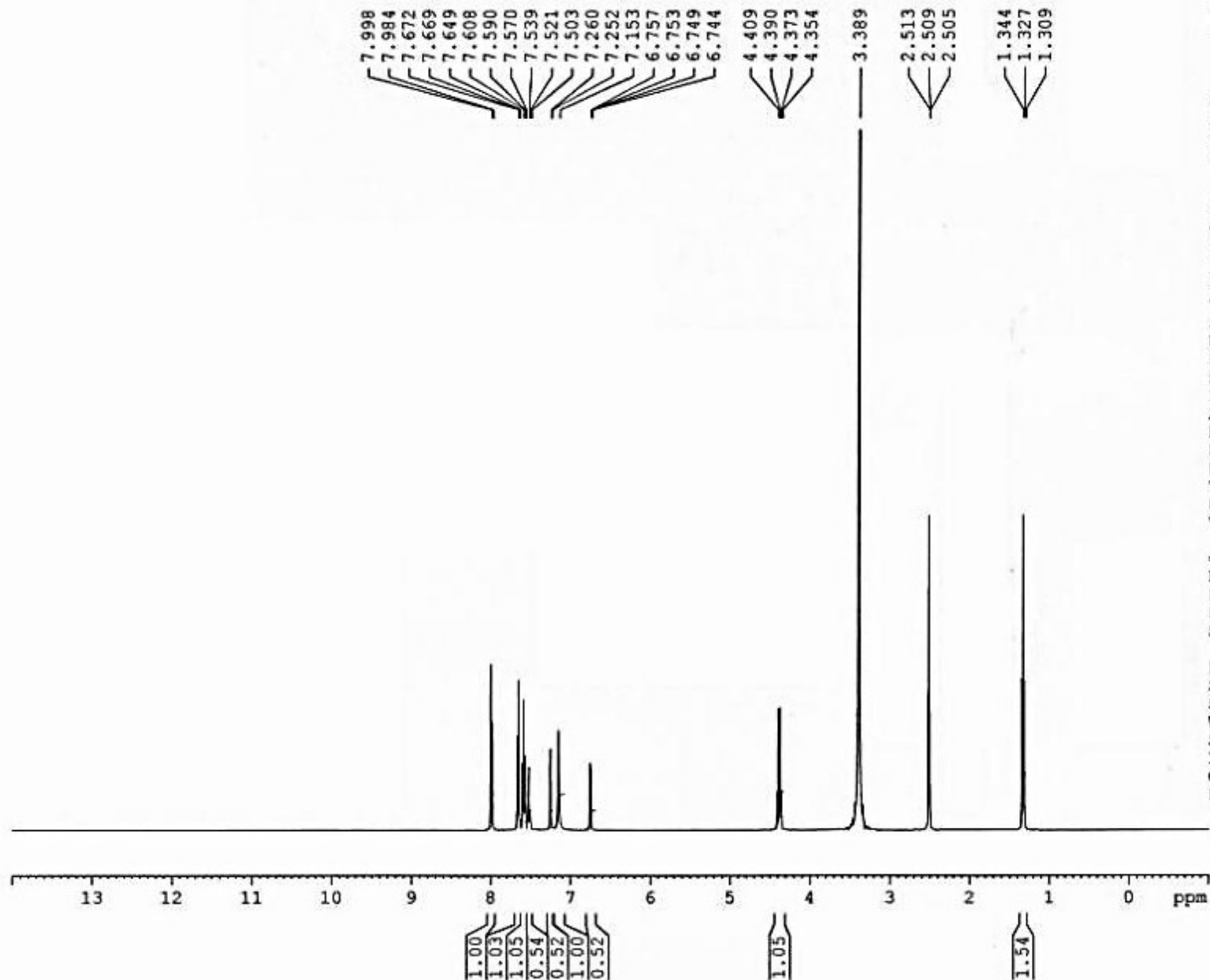


Current Data Parameters
 NAME MSfuran-1H
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20151202
 Time_ 9.52
 INSTRUM spect
 PROBHD 5 mm QNP 1H/13
 PULPROG zg30
 TD 65536
 SOLVENT DMSO
 NS 16
 DS 2
 SWH 8278.146 Hz
 FIDRES 0.126314 Hz
 AQ 3.9584243 sec
 RG 181
 DW 60.400 usec
 DE 6.00 usec
 TE 295.4 K
 D1 1.0000000 sec
 TD0 1

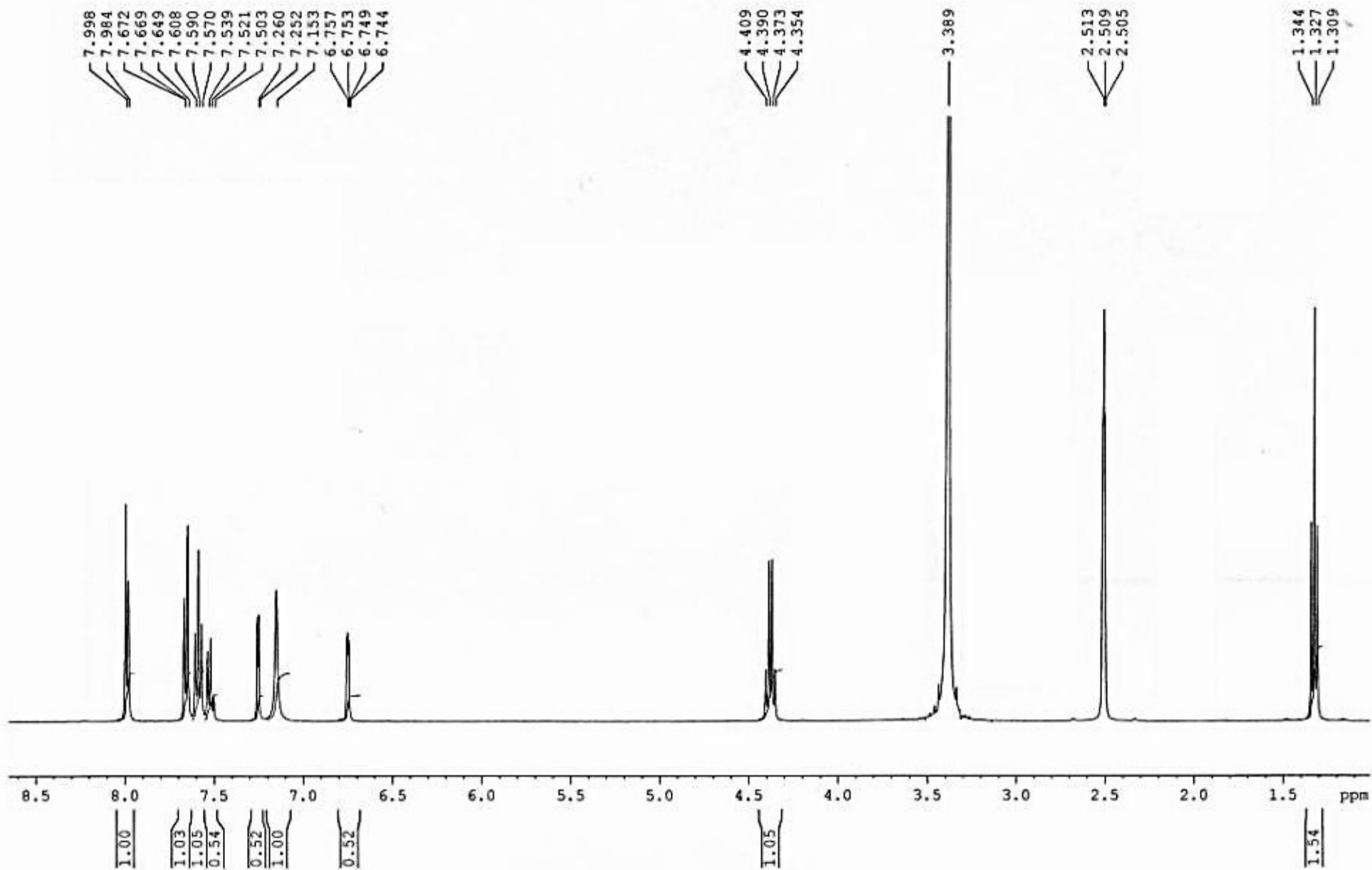
----- CHANNEL f1 -----
 NUC1 1H
 P1 10.40 usec
 PL1 -2.00 dB
 SFO1 400.1324710 MHz

F2 - Processing parameters
 SI 32768
 SF 400.1300000 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00



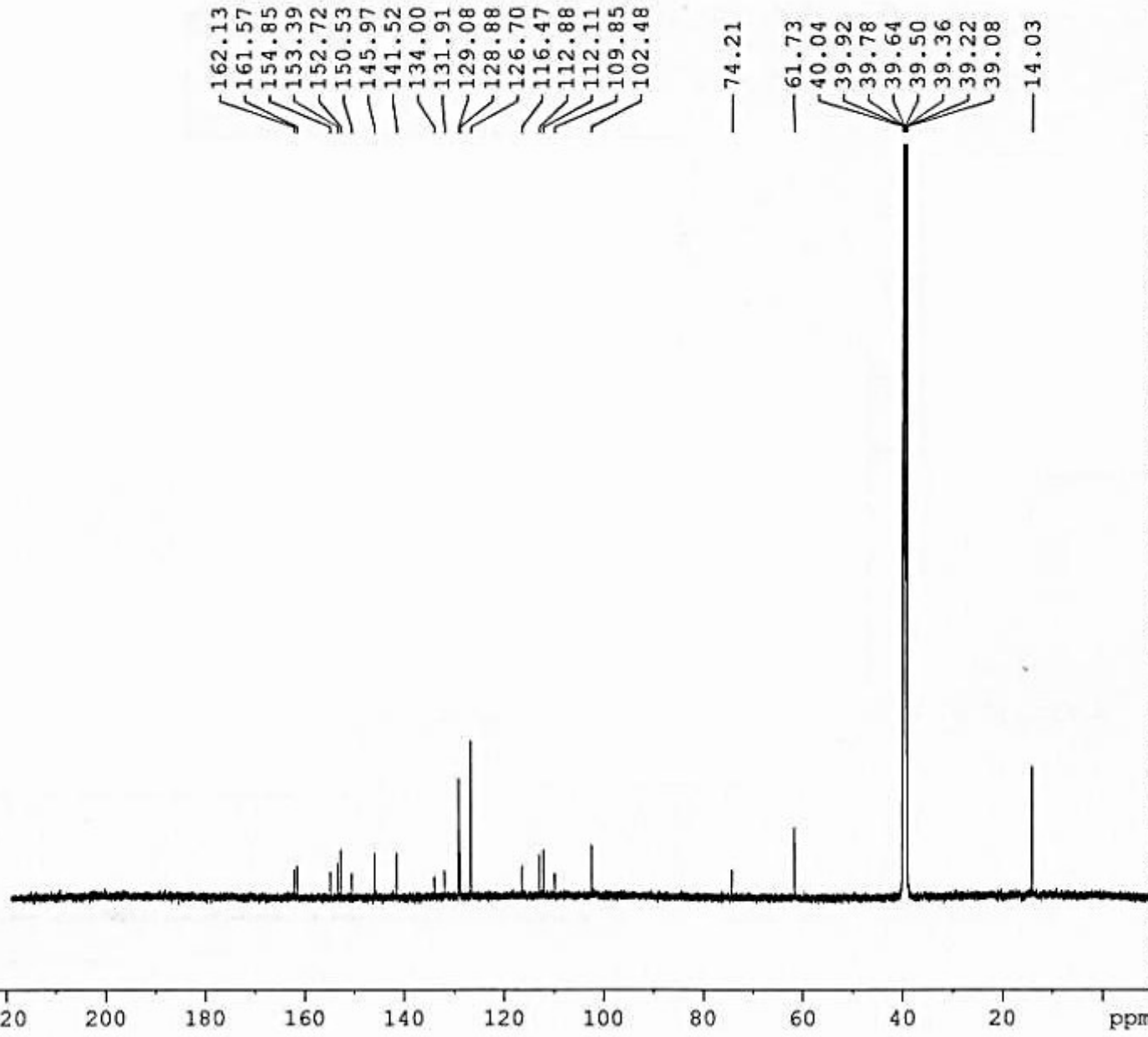
¹H NMR for the compound 9g

¹H spectrum Moustafa MSfuran in DMSO



¹H NMR for the compound 9g

¹³C decoupled spectra Mostafa Furan in DMSO



Current Data Parameters
 NAME Furan-13C
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20160606
 Time_ 22.21
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 10240
 DS 4
 SWH 36057.691 Hz
 FIDRES 0.550197 Hz
 AQ 0.9087659 sec
 RG 203
 DW 13.867 usec
 DE 50.00 usec
 TE 298.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TD0 1

===== CHANNEL f1 =====
 SFO1 150.9178979 MHz
 NUC1 13C
 P1 8.80 usec
 PLW1 78.13500214 W

===== CHANNEL f2 =====
 SFO2 600.1324005 MHz
 NUC2 1H
 CPDPRG[2] waltz65
 PCPD2 70.00 usec
 PLW2 27.82500076 W
 PLW12 0.63804001 W
 PLW13 0.31264001 W

F2 - Processing parameters
 SI 32768
 SF 150.9028827 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

¹³C NMR for the compound 9g

¹³C decoupled spectra Mostafa Furan in DMSO



162.13
161.57
154.85
153.39
152.72
150.53
145.97
141.52
134.00
131.91
129.08
128.88
126.70
116.47
112.88
112.11
109.85
102.48

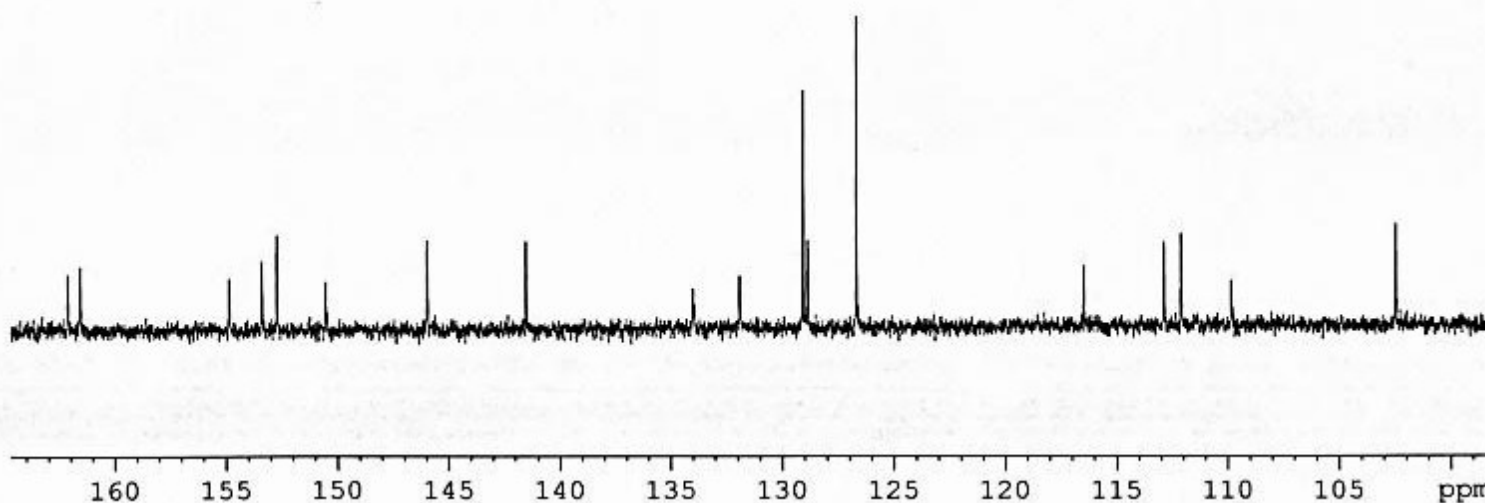
Current Data Parameters
NAME Furan-13C
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160606
Time_ 22.21
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 10240
DS 4
SWH 36057.691 Hz
FIDRES 0.550197 Hz
AQ 0.9087659 sec
RG 203
DW 13.867 usec
DE 50.00 usec
TE 298.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

==== CHANNEL f1 =====
SFO1 150.9178979 MHz
NUC1 13C
P1 8.80 usec
PLW1 78.13500214 W

==== CHANNEL f2 =====
SFO2 600.1324005 MHz
NUC2 1H
CPDPRG[2] waltz65
PCPD2 70.00 usec
PLW2 27.82500076 W
PLW12 0.63804001 W
PLW13 0.31264001 W

F2 - Processing parameters
SI 32768
SF 150.9028827 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40



¹³C NMR for the compound 9g

C:\Xcalibur\Data\saleh\MS-Furan

11/4/2015 2:34:08 PM

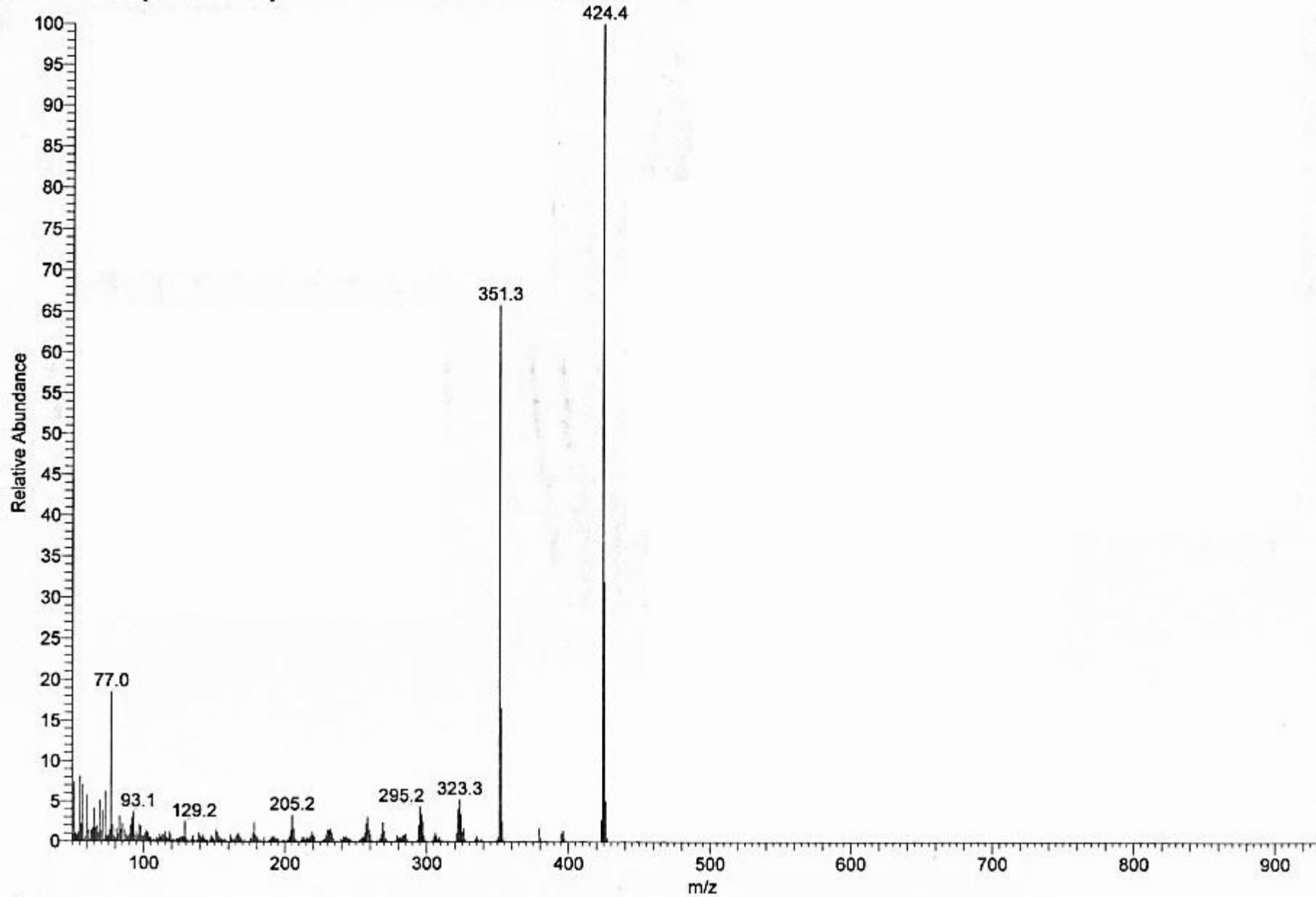
MS-Furan #183 RT: 7.58 AV: 1 NL: 4.76E6

T: + c EI Full ms [49.50-1000.50]

GC MS DFS- Thermo

Project No: GS01/03

MS-Furan



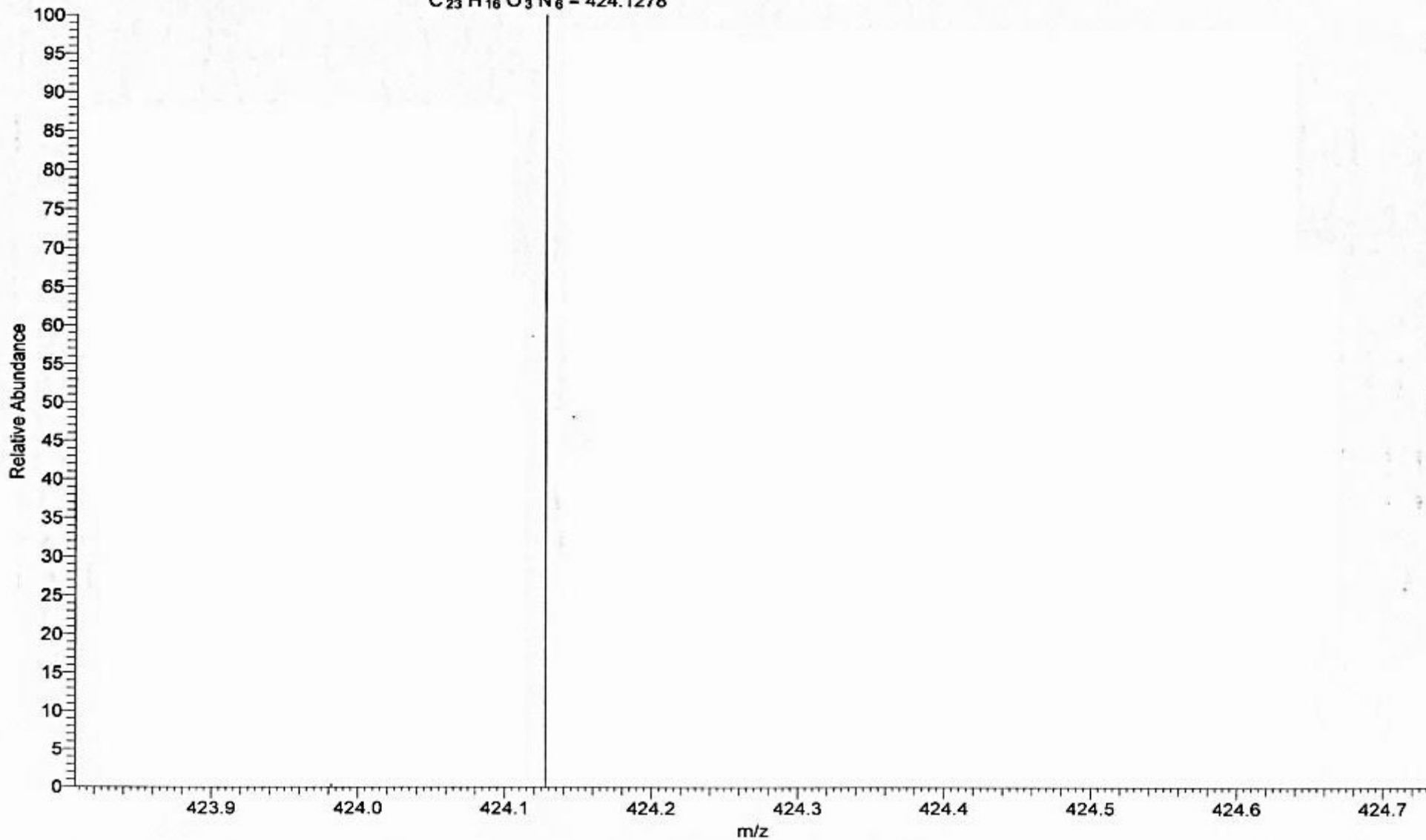
Mass spectra for the compound **9g**

C:\Xcalibur\Data\saleh\HRMS-MSfuran-c1
11/25/2015 9:04:14 AM

GC MS DFS- Thermo
Project No: GS01/03

HRMS-MSfuran-c1 #36 RT: 8.43 AV: 1 NL: 2.14E5
T: + c EI Full ms [399.50-460.50]

424.1278
 $C_{23}H_{16}O_3N_6 = 424.1278$



High resolution mass spectra for compound **9g**

¹H spectra Mostafa MS pyridine in DMSO



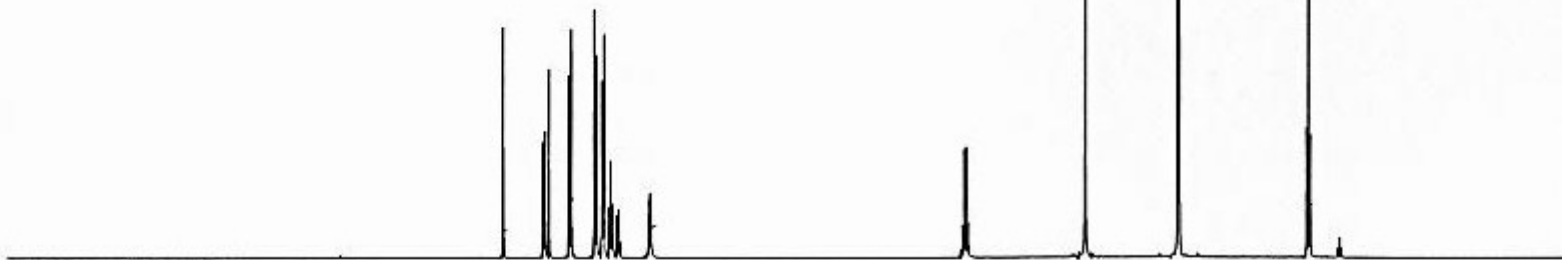
8.563
8.207
8.185
8.151
7.974
7.969
7.957
7.952
7.746
7.741
7.729
7.724
7.678
7.675
7.656
7.615
7.596
7.577
7.545
7.527
7.509
7.243
4.439
4.421
4.403
4.386
3.342
2.518
2.513
2.509
2.505
2.500
1.359
1.341
1.324

Current Data Parameters
NAME Ms 4C1
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20151203
Time_ 19.58
INSTRUM spect
PROBHD 5 mm QNP 1H/13
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 574.7
DW 60.400 usec
DE 6.00 usec
TE 295.4 K
D1 1.00000000 sec
TD0 1

----- CHANNEL f1 -----
NUC1 1H
P1 10.40 usec
PL1 -2.00 dB
SFO1 400.1324710 MHz

F2 - Processing parameters
SI 32768
SF 400.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



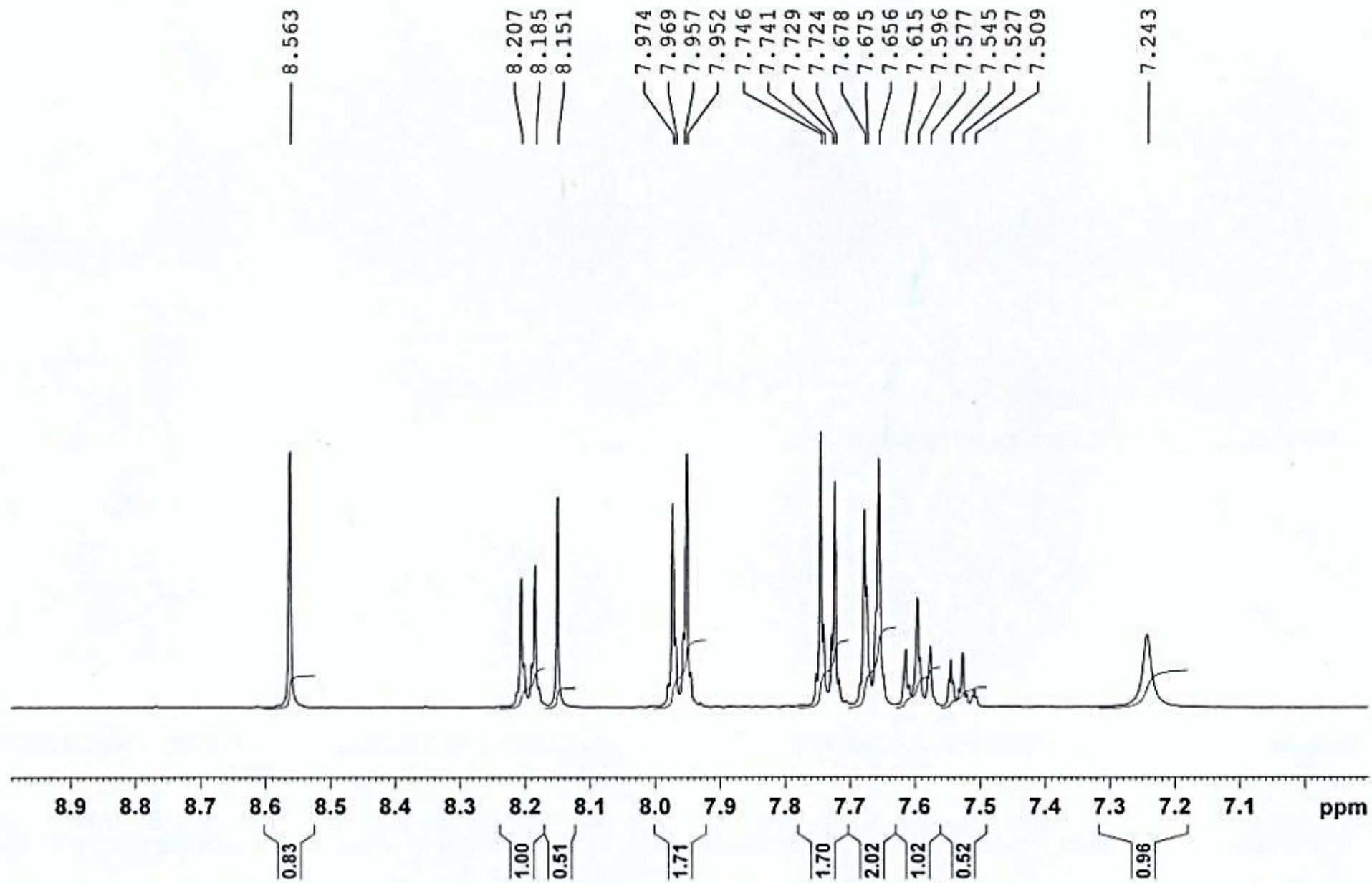
12 11 10 9 8 7 6 5 4 3 2 1 0 ppm

0.83
1.00
0.51
1.71
1.70
2.02
1.02
0.52
0.96

1.02

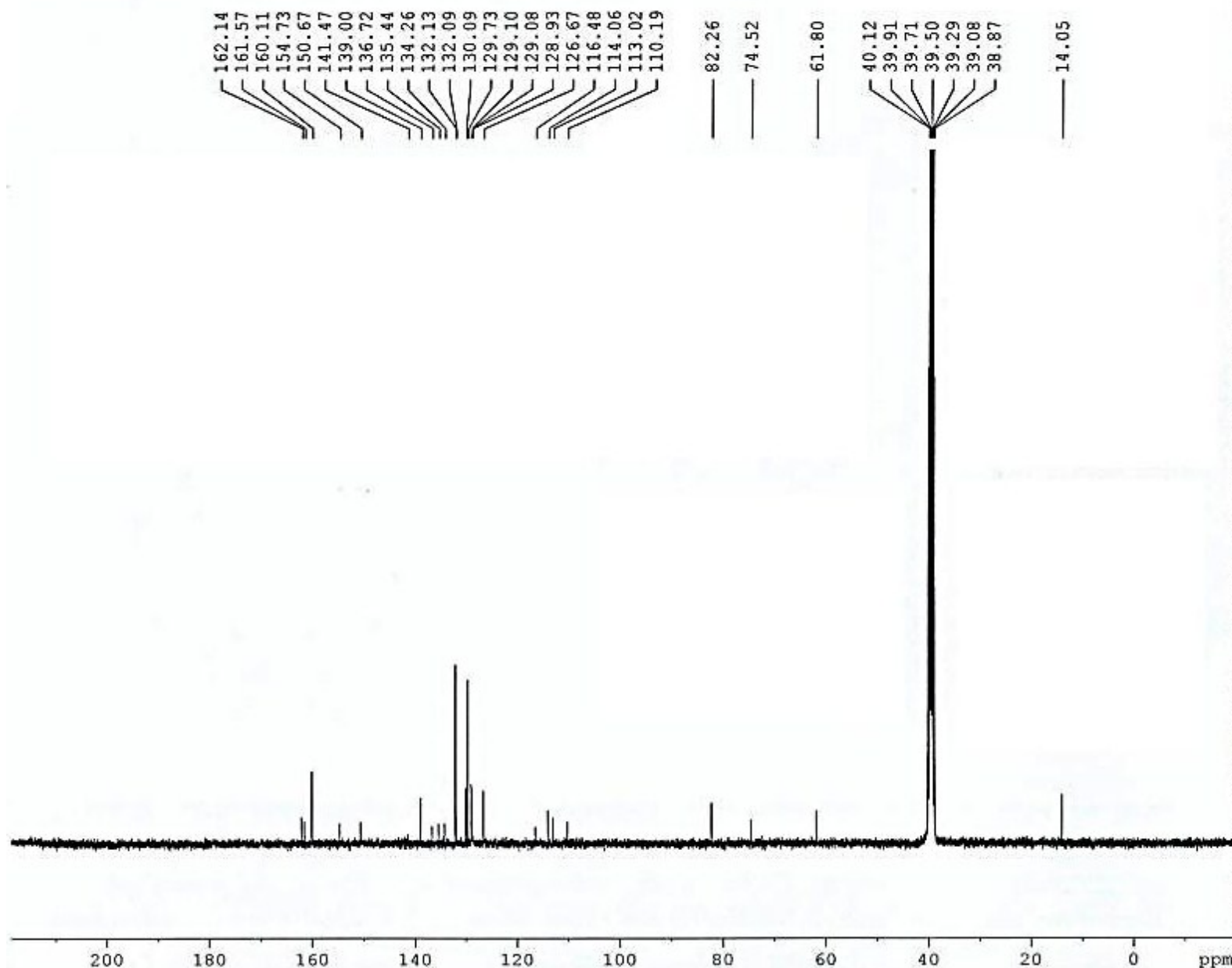
1.50

^1H spectra Mostafa MS pyridine in DMSO



^1H NMR for the compound 9h

¹³C decoupled spectra Mostafa MS pyridine in DMSO



162.14
161.57
160.11
154.73
150.67
141.47
139.00
136.72
135.44
134.26
132.13
132.09
130.09
129.73
129.10
129.08
128.93
126.67
116.48
114.06
113.02
110.19

82.26
74.52
61.80

40.12
39.91
39.71
39.50
39.29
39.08
38.87

14.05

Current Data Parameters
NAME Ms 4C1
EXPNO 2
PROCNO 1

F2 - Acquisition Parameters
Date_ 20151204
Time_ 0.54
INSTRUM spect
PROBHD 5 mm QNP 1H/13
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 5120
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 11585.2
DW 20.850 usec
DE 6.00 usec
TE 295.9 K
D1 2.00000000 sec
d11 0.03000000 sec
DELTA 1.89999998 sec
TD0 1

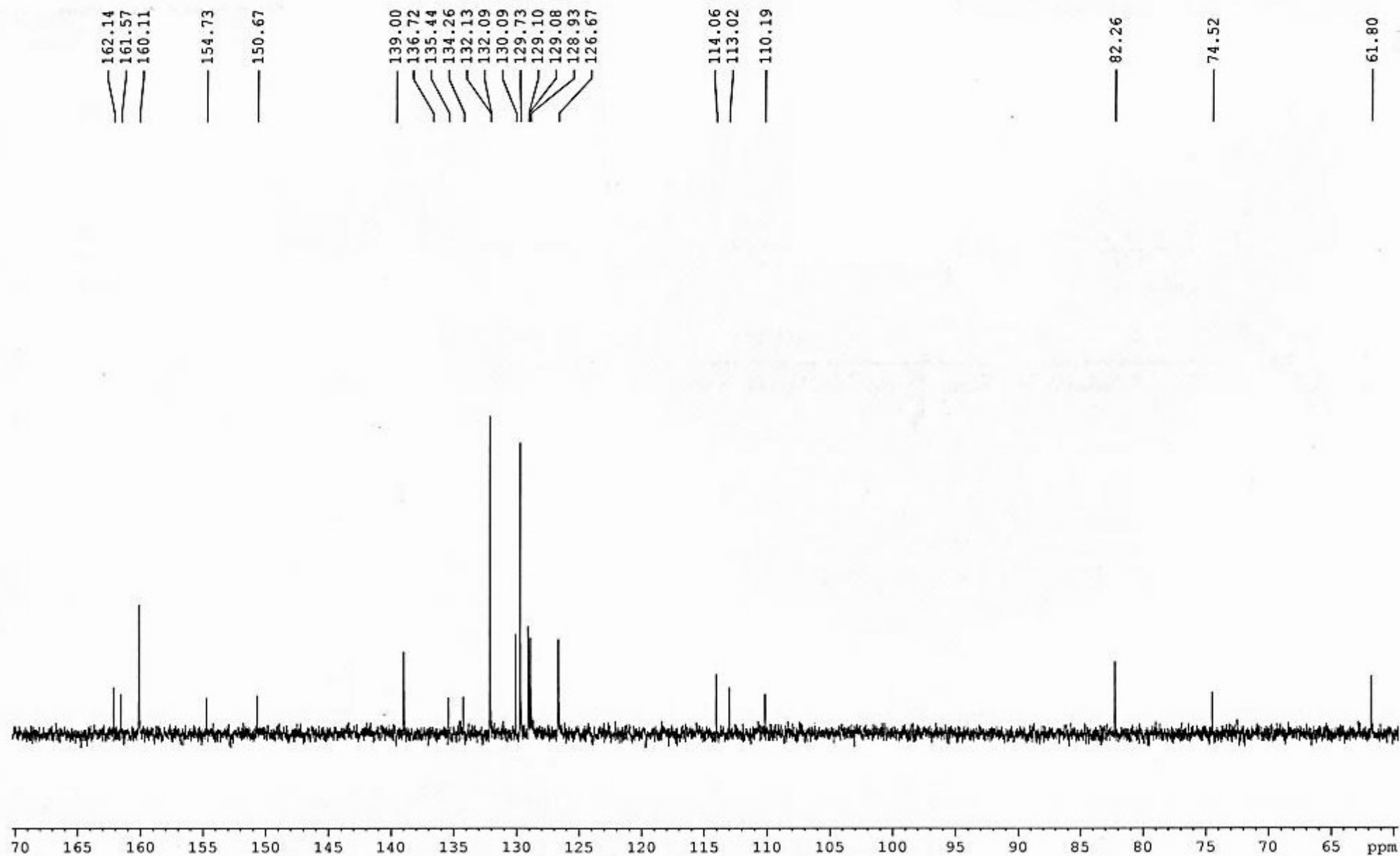
===== CHANNEL f1 =====
NUC1 13C
P1 7.00 usec
PL1 -6.00 dB
SFO1 100.6228298 MHz

===== CHANNEL f2 =====
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 -2.00 dB
PL12 15.50 dB
PL13 18.50 dB
SFO2 400.1316005 MHz

F2 - Processing parameters
SI 32768
SF 100.6128179 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

¹³C NMR for the compound 9h

¹³C decoupled spectra Mostafa MS pyridine in DMSO



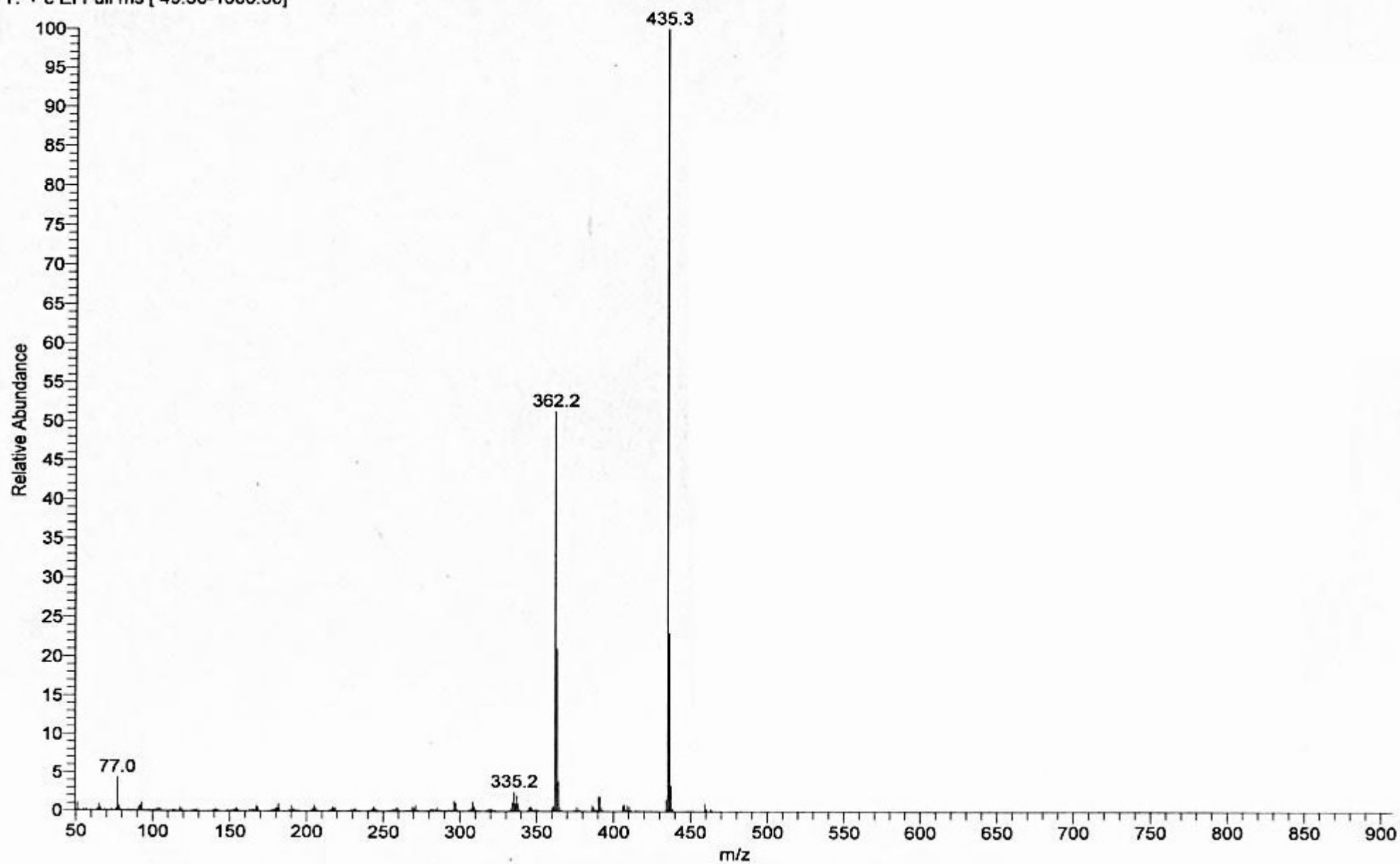
¹³C NMR for the compound **9h**

C:\Xcalibur\Data\saleh\MS-Pyridin
11/8/2015 9:33:07 AM

GC MS DFS- Thermo
Project No: GS01/03

MS-Pyridin

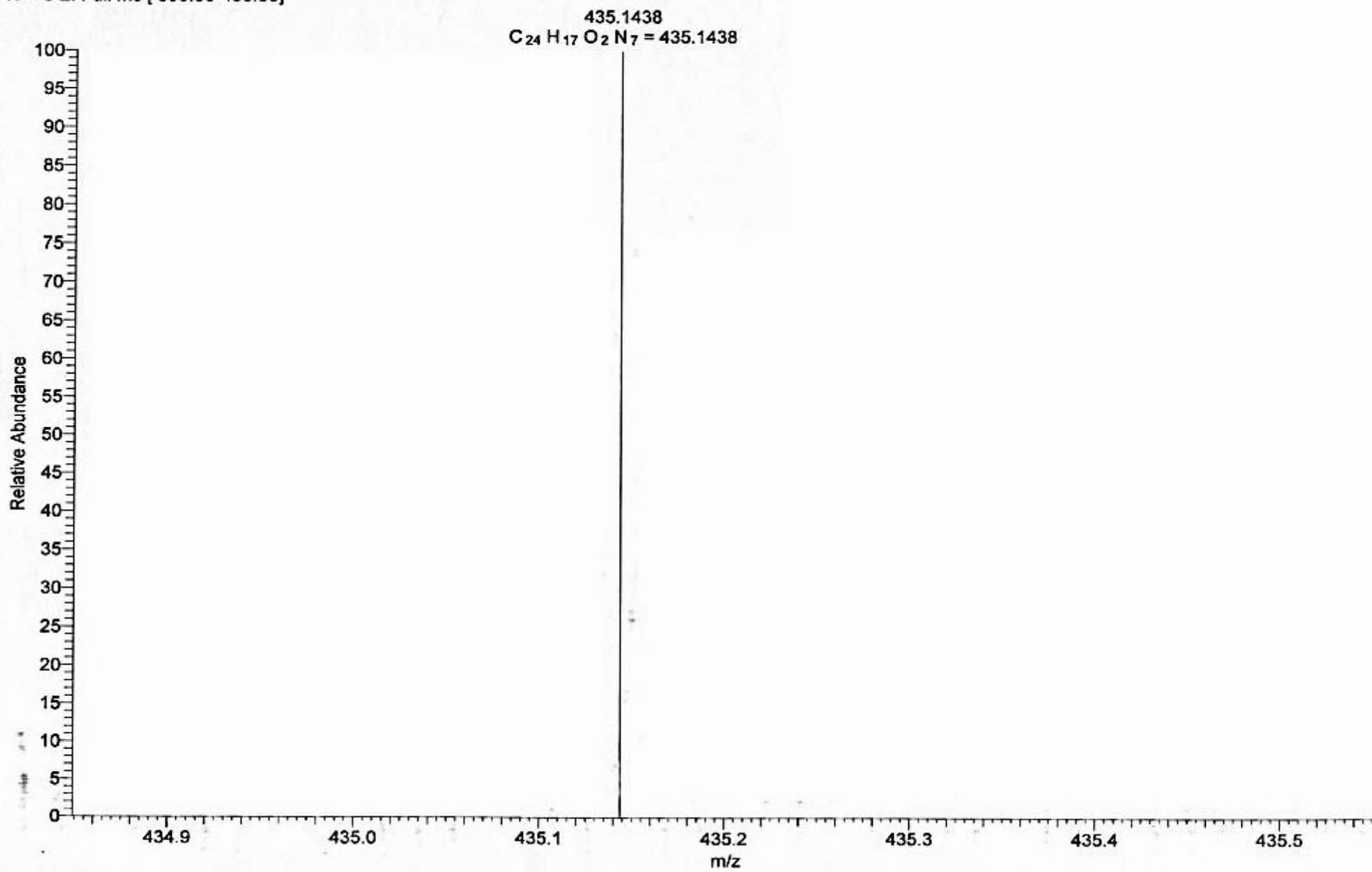
MS-Pyridin #262 RT: 11.94 AV: 1 NL: 5.50E7
T: + c EI Full ms [49.50-1000.50]



Mass spectra for the compound **9h**

HRMS-MSPyridin-c1 #23 RT: 8.55 AV: 1 NL: 8.89E5

T: + c EI Full ms [399.50-460.50]



High resolution mass spectra for compound 9h

¹H spectra Dr.Saleh 3H in DMSO

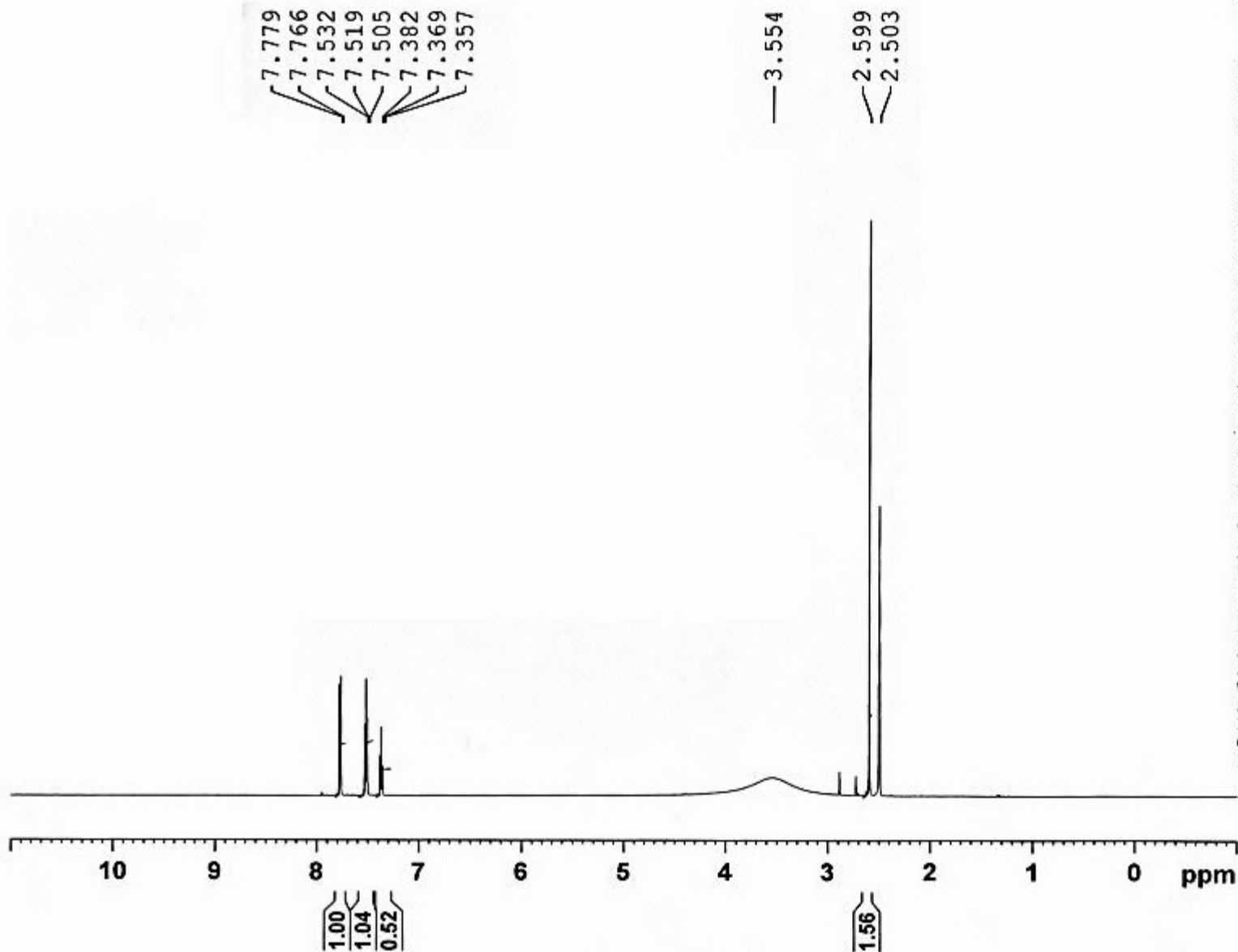


Current Data Parameters
NAME 3H-1H
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160726
Time 9.57
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 12335.526 Hz
FIDRES 0.188225 Hz
AQ 2.6563926 sec
RG 203
DW 40.533 usec
DE 20.00 usec
TE 298.0 K
D1 1.0000000 sec
TD0 1

----- CHANNEL f1 -----
SF01 600.1337060 MHz
NUC1 1H
P1 10.60 usec
PLW1 27.82500076 W

F2 - Processing parameters
SI 32768
SF 600.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



¹H NMR for the compound 20

¹H spectra Dr.Saleh 3H in DMSO



Current Data Parameters
NAME 3H-1H
EXPNO 1
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160726
Time 9.57
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zg30
TD 65536
SOLVENT DMSO
NS 16
DS 2
SWH 12335.526 Hz
FIDRES 0.188225 Hz
AQ 2.6563926 sec
RG 203
DW 40.533 usec
DE 20.00 usec
TE 298.0 K
D1 1.0000000 sec
TD0 1

----- CHANNEL f1 -----
SFO1 600.1337060 MHz
NUC1 1H
P1 10.60 usec
PLW1 27.82500076 W

F2 - Processing parameters
SI 32768
SF 600.1300000 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

7.779
7.766
7.532
7.519
7.505
7.382
7.369
7.357

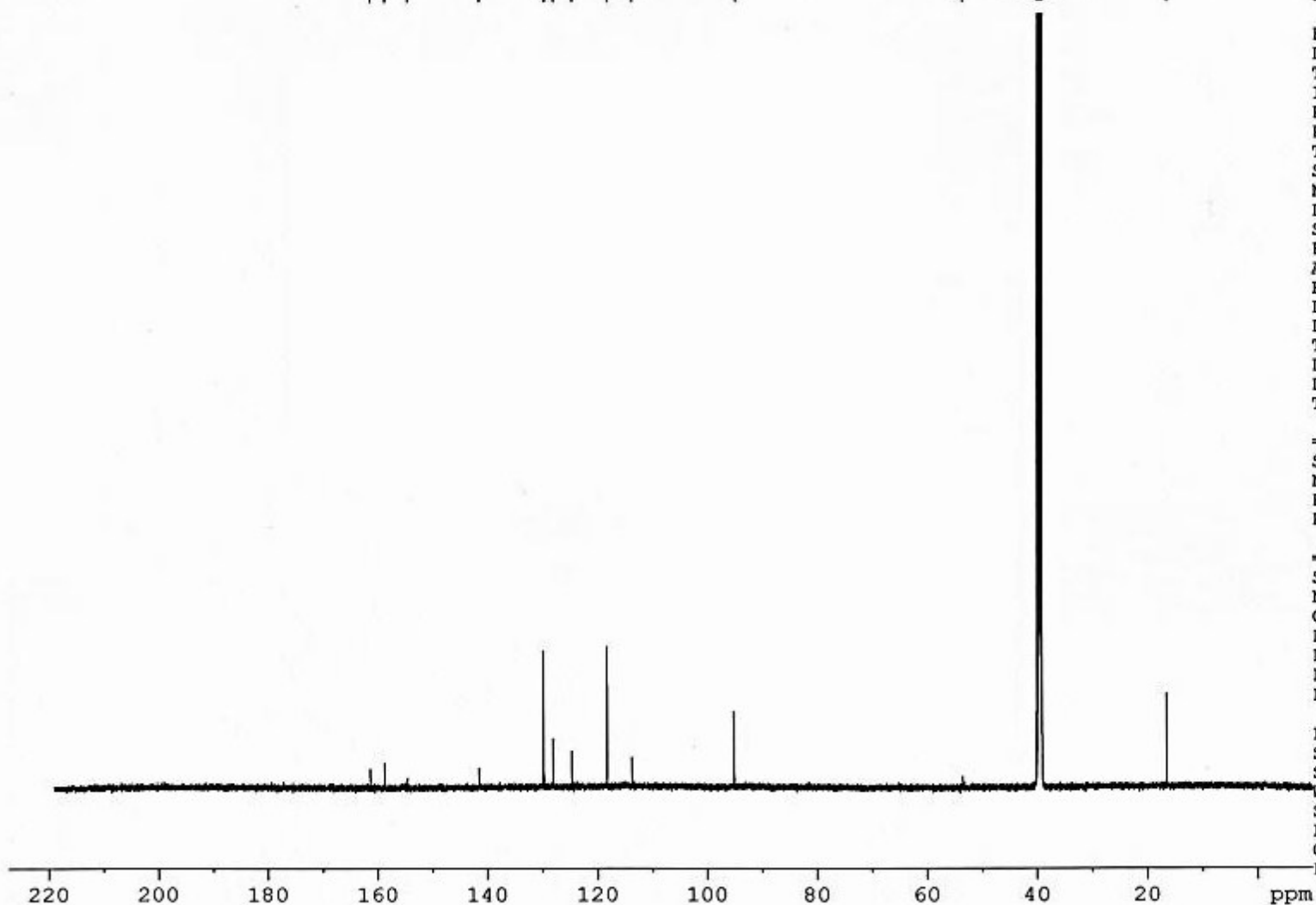


¹H NMR for the compound 20

¹³C decoupled spectra Dr.Saleh 3H in DMSO



161.40
158.77
154.59
141.51
129.84
129.69
128.07
124.67
118.34
113.81
94.80
53.52
40.02
39.90
39.76
39.62
39.48
39.34
39.20
39.06
16.50



Current Data Parameters
NAME 3H-13C
EXPNO 1
PROCNO 1

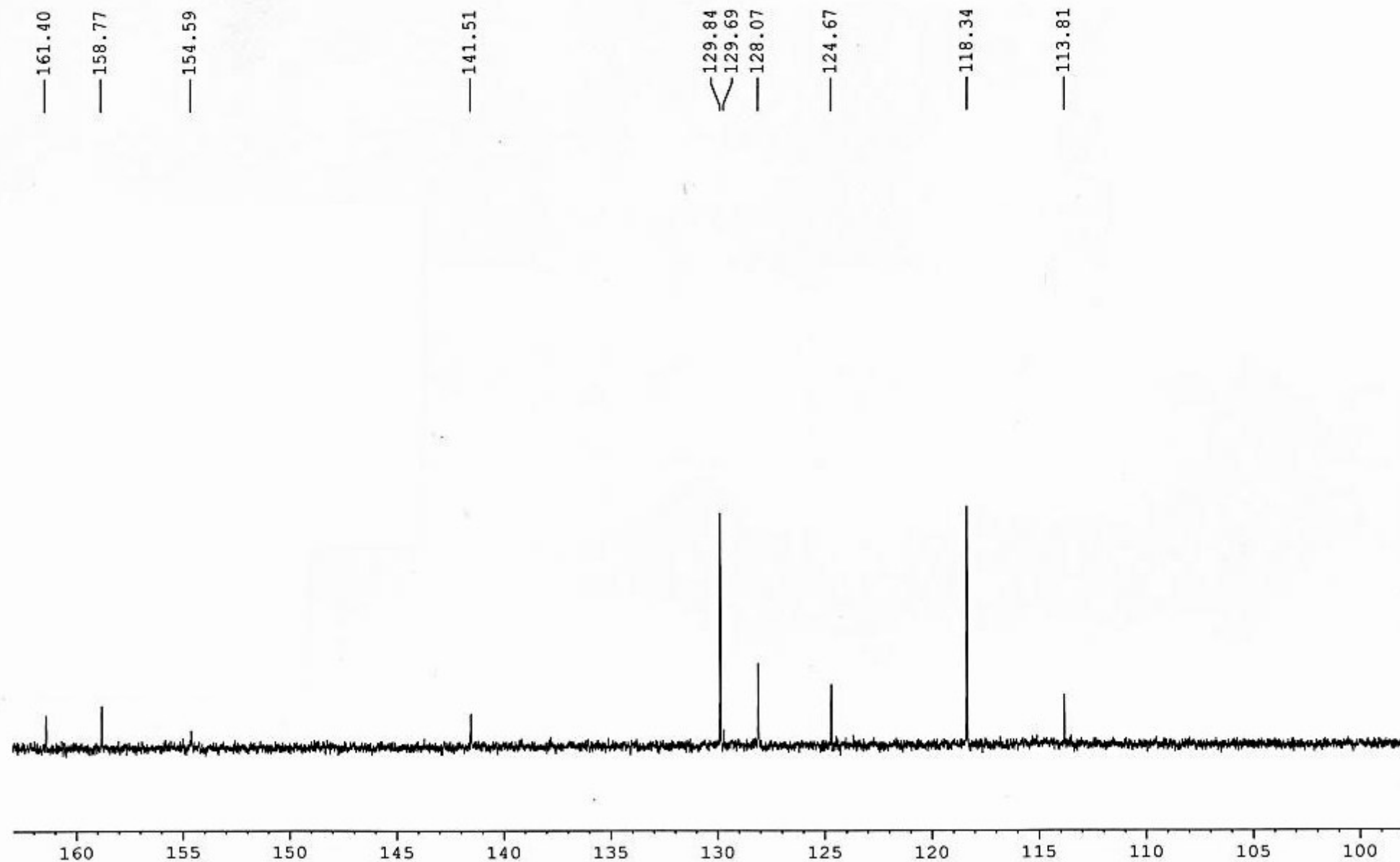
F2 - Acquisition Parameters
Date_ 20160728
Time 22.54
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 65536
SOLVENT DMSO
NS 10240
DS 4
SWH 36057.691 Hz
FIDRES 0.550197 Hz
AQ 0.9087659 sec
RG 203
DW 13.867 usec
DE 50.00 usec
TE 298.0 K
D1 2.00000000 sec
D11 0.03000000 sec
TD0 1

===== CHANNEL f1 =====
SFO1 150.9178979 MHz
NUC1 13C
P1 8.80 usec
PLW1 78.13500214 W

===== CHANNEL f2 =====
SFO2 600.1324005 MHz
NUC2 1H
CPDPRG[2] waltz65
PCPD2 70.00 usec
PLW2 27.82500076 W
PLW12 0.63804001 W
PLW13 0.31264001 W

F2 - Processing parameters
SI 32768
SF 150.9028834 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40

^{13}C decoupled spectra Dr.Saleh 3H in DMSO



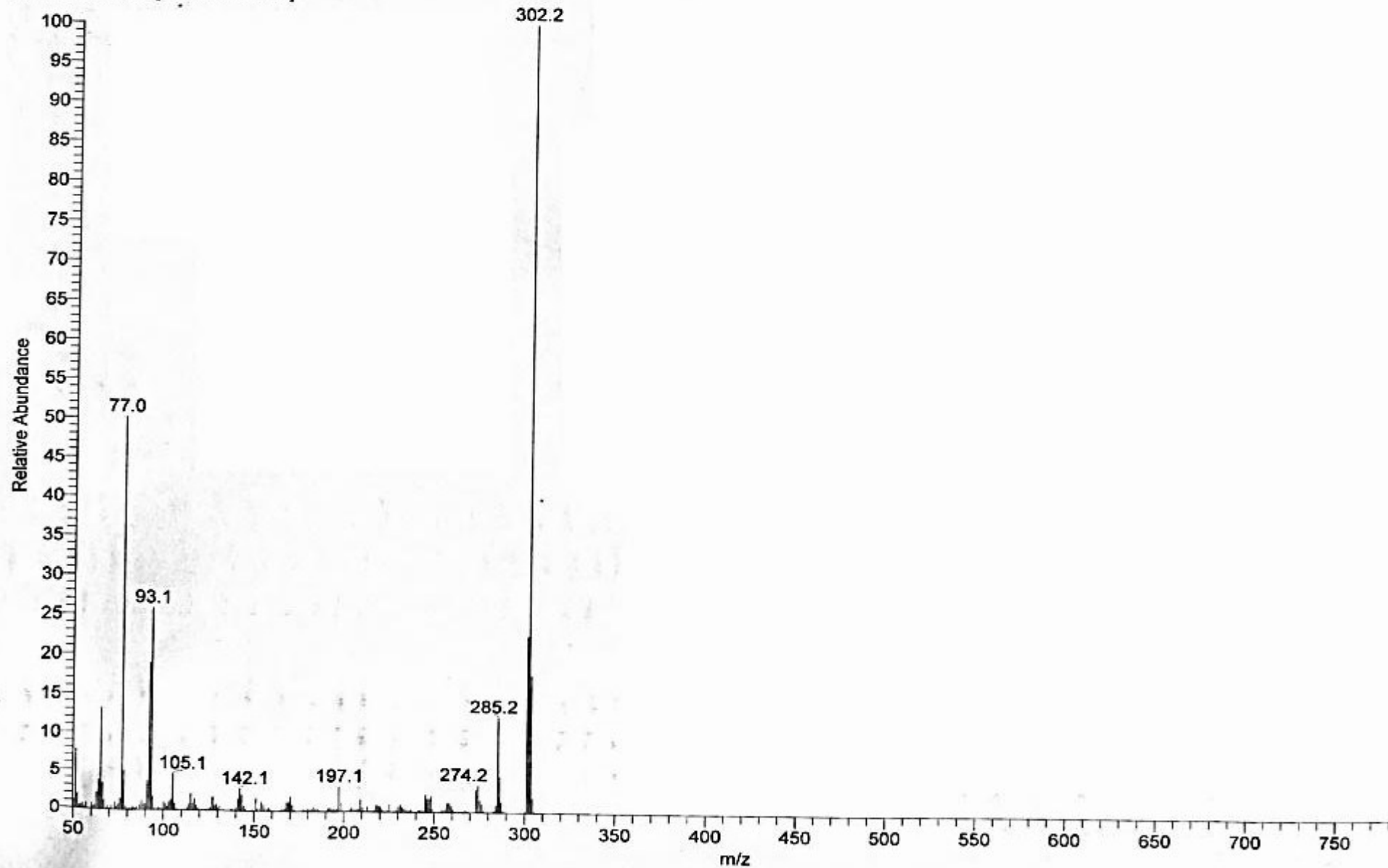
^{13}C NMR for the compound **20**

C:\Xcalibur\Data\saleh\ms-Acet2
11/23/2015 12:10:43 PM

GC MS DFS- Thermo
Project No: GS01/03

ms-Acet2

ms-Acet2 #210 RT: 9.46 AV: 1 NL: 2.28E7
T: + c EI Full ms [49.50-1000.50]

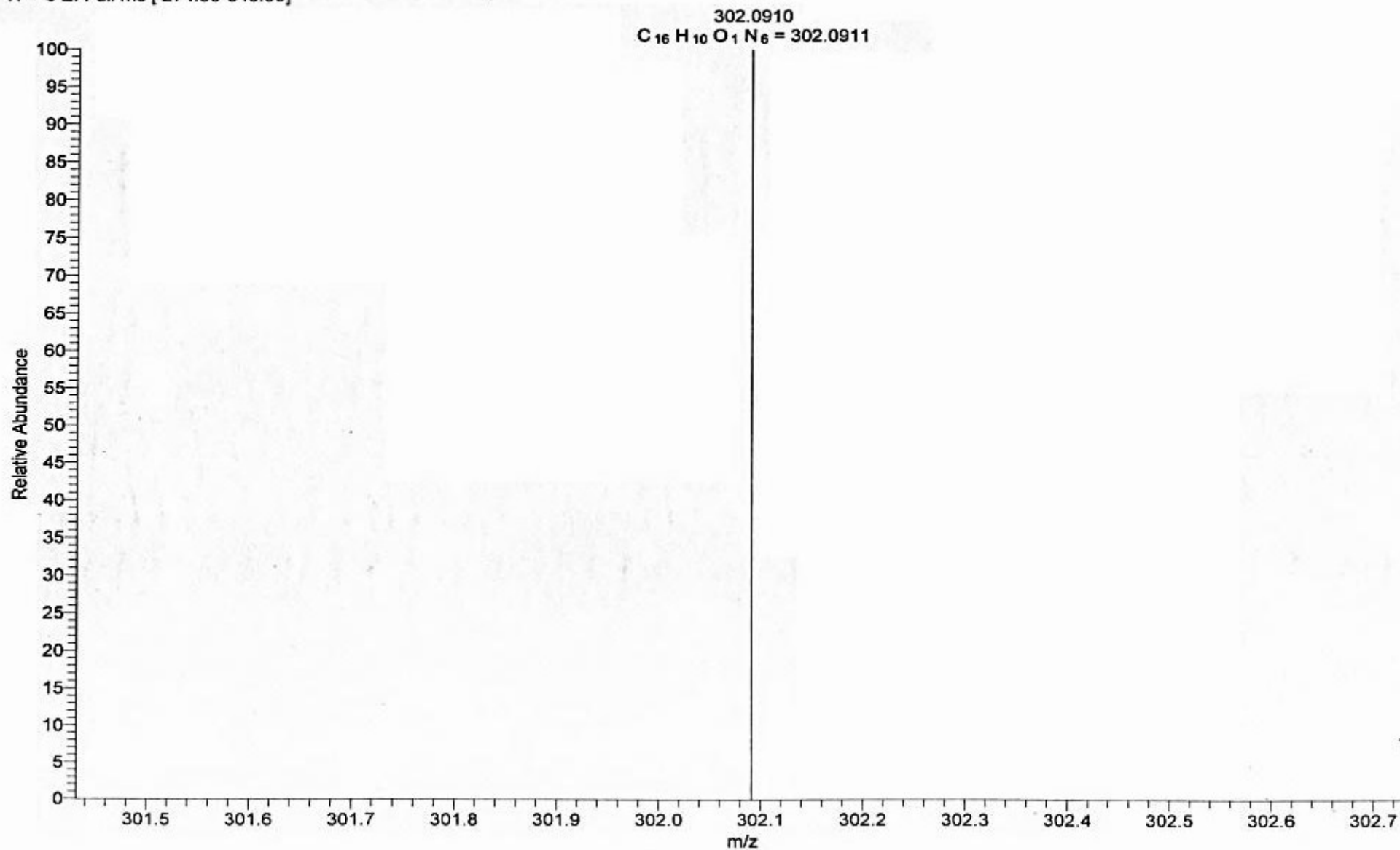


Mass spectra for the compound **20**

C:\Xcalibur\Data\saleh\HRMS-MSCYCHex-c4
11/29/2015 2:29:20 PM

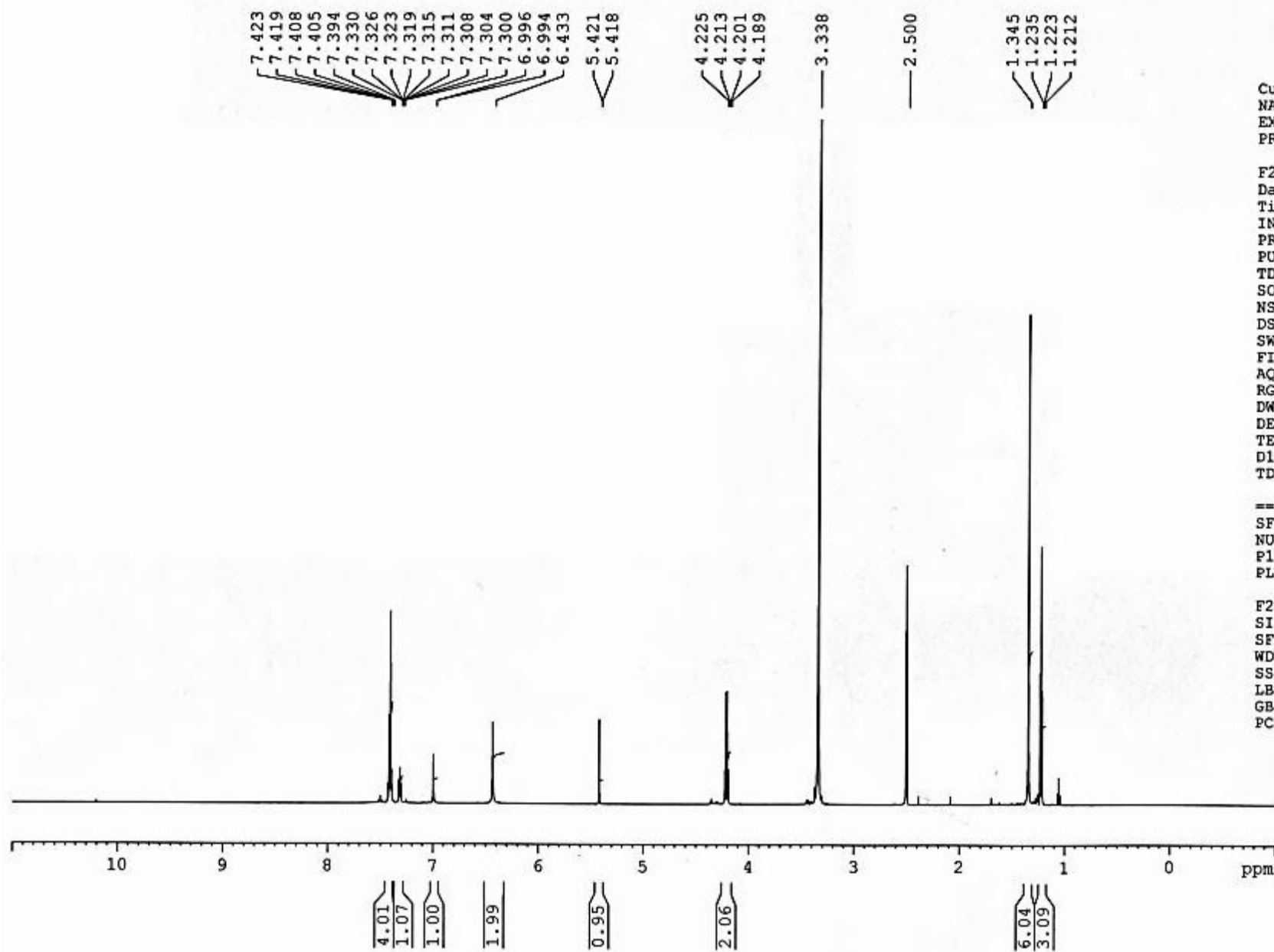
GC MS DFS- Thermo
Project No: GS01/03

HRMS-MSCYCHex-c4 #5 RT: 7.79 AV: 1 NL: 2.29E4
T: + c EI Full ms [274.50-340.50]



High resolution mass spectra for compound **20**

¹H spectra Mostafa MS Q acetone in DMSO



Current Data Parameters
 NAME MSQ acetone-13C
 EXPNO 2
 PROCNO 1

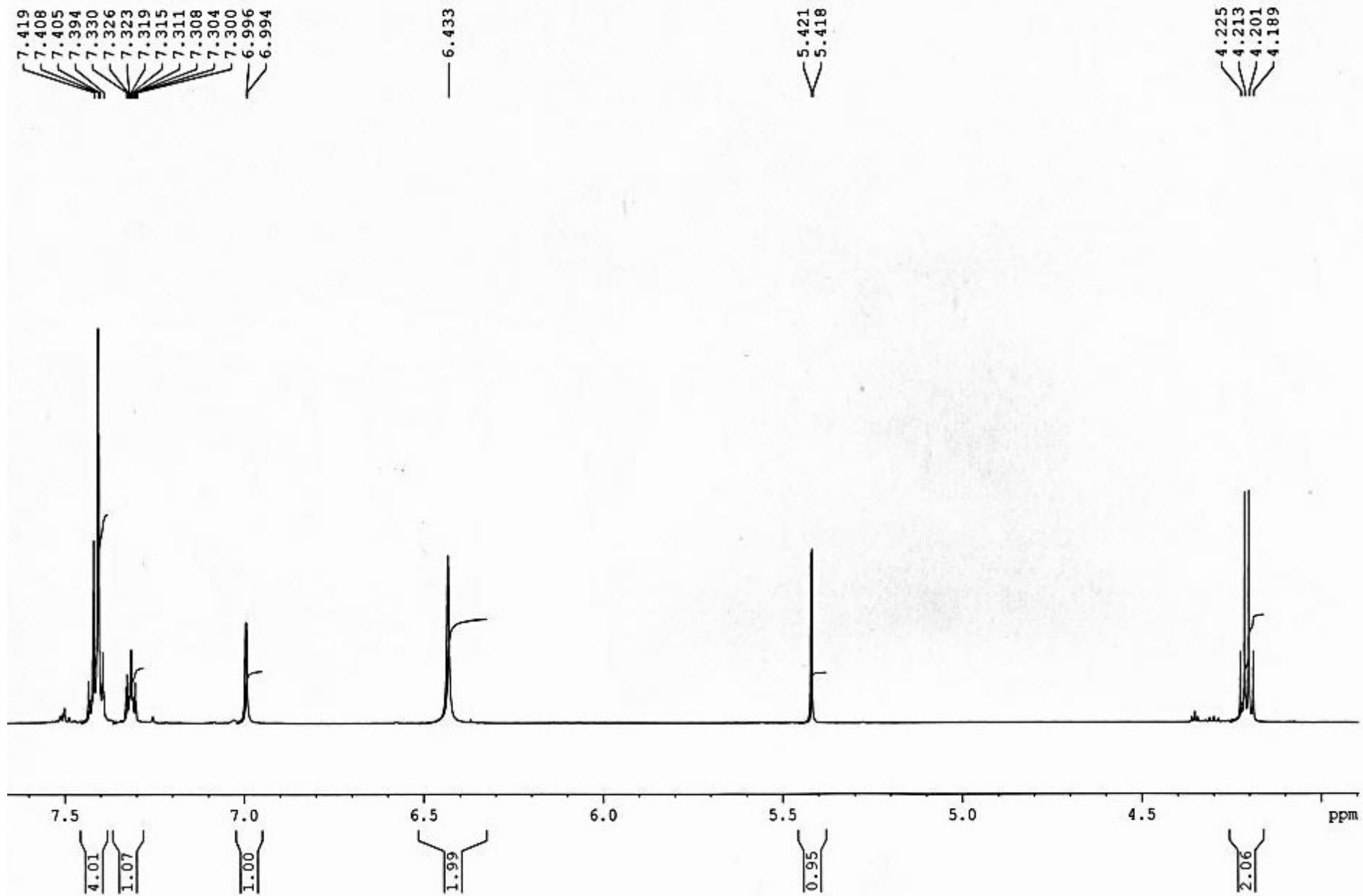
F2 - Acquisition Parameters
 Date_ 20160710
 Time_ 11.07
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zg30
 TD 65536
 SOLVENT DMSO
 NS 16
 DS 2
 SWH 12335.526 Hz
 FIDRES 0.188225 Hz
 AQ 2.6563926 sec
 RG 203
 DW 40.533 usec
 DE 20.00 usec
 TE 298.0 K
 D1 1.00000000 sec
 TD0 1

===== CHANNEL f1 =====
 SFO1 600.1337060 MHz
 NUC1 1H
 P1 10.60 usec
 PLW1 27.82500076 W

F2 - Processing parameters
 SI 32768
 SF 600.1300074 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

¹H NMR for the compound 22

¹H spectra Mostafa MS Q acetone in DMSO

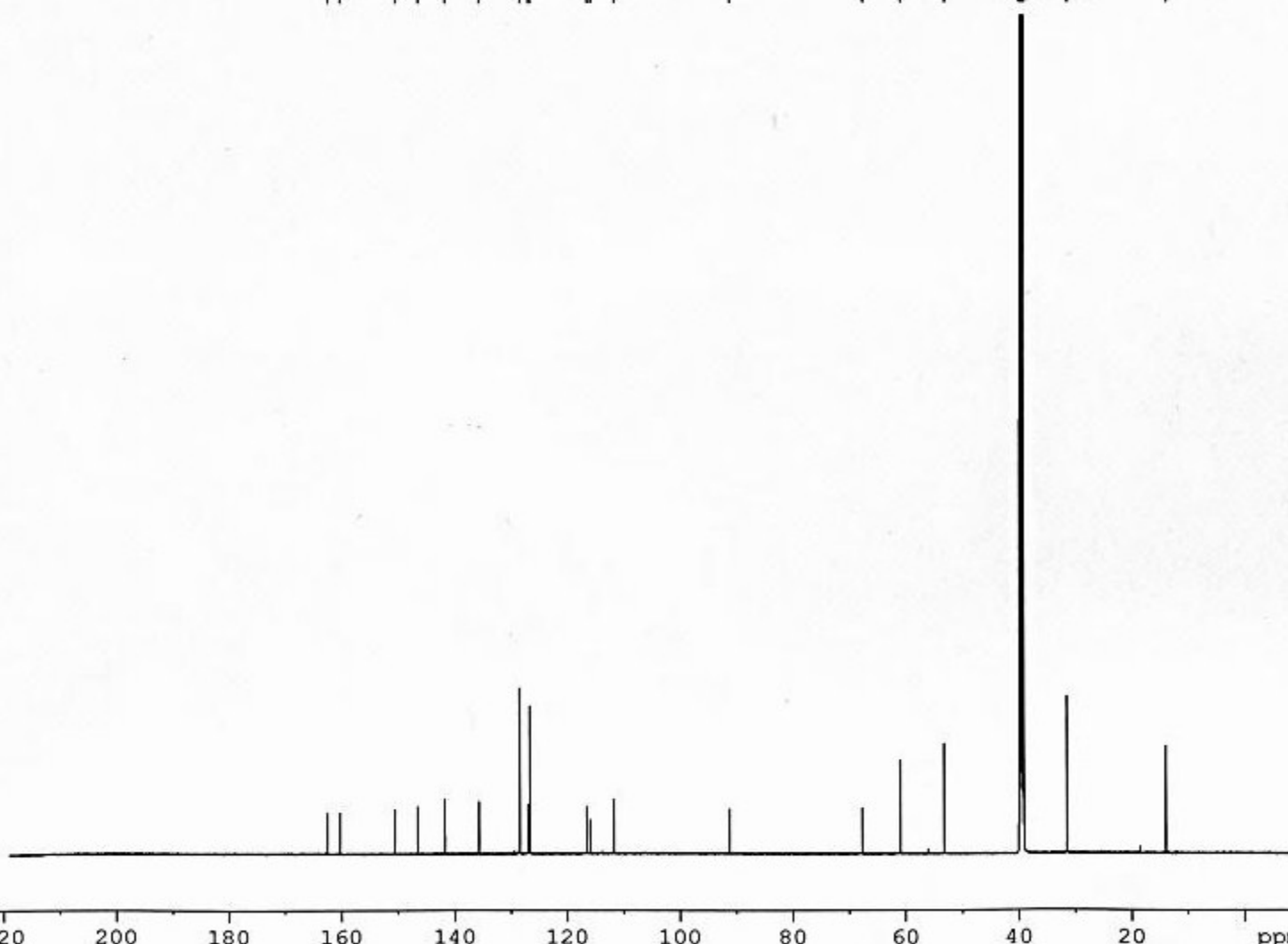


¹H NMR for the compound **22**

¹³C decoupled spectra Mostafa MS Q acetone in DMSO



162.50
 160.31
 150.56
 146.53
 141.78
 135.69
 128.42
 126.96
 126.62
 116.55
 115.95
 111.73
 91.26
 67.65
 60.93
 53.16
 40.03
 39.91
 39.78
 39.64
 39.50
 39.36
 39.22
 39.08
 31.47
 13.98



Current Data Parameters
 NAME MSQ acetone-13C
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20160701
 Time_ 23.47
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 20480
 DS 4
 SWH 36057.691 Hz
 FIDRES 0.550197 Hz
 AQ 0.9087659 sec
 RG 203
 DW 13.867 usec
 DE 50.00 usec
 TE 298.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
 SFO1 150.9178979 MHz
 NUC1 13C
 P1 8.80 usec
 PLW1 78.13500214 W

----- CHANNEL f2 -----
 SFO2 600.1324005 MHz
 NUC2 1H
 CPDPRG[2] waltz65
 PCPD2 70.00 usec
 PLW2 27.82500076 W
 PLW12 0.63804001 W
 PLW13 0.31264001 W

F2 - Processing parameters
 SI 32768
 SF 150.9028830 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40

¹³C NMR for the compound 22

¹³C decoupled spectra Mostafa MS Q acetone in DMSO



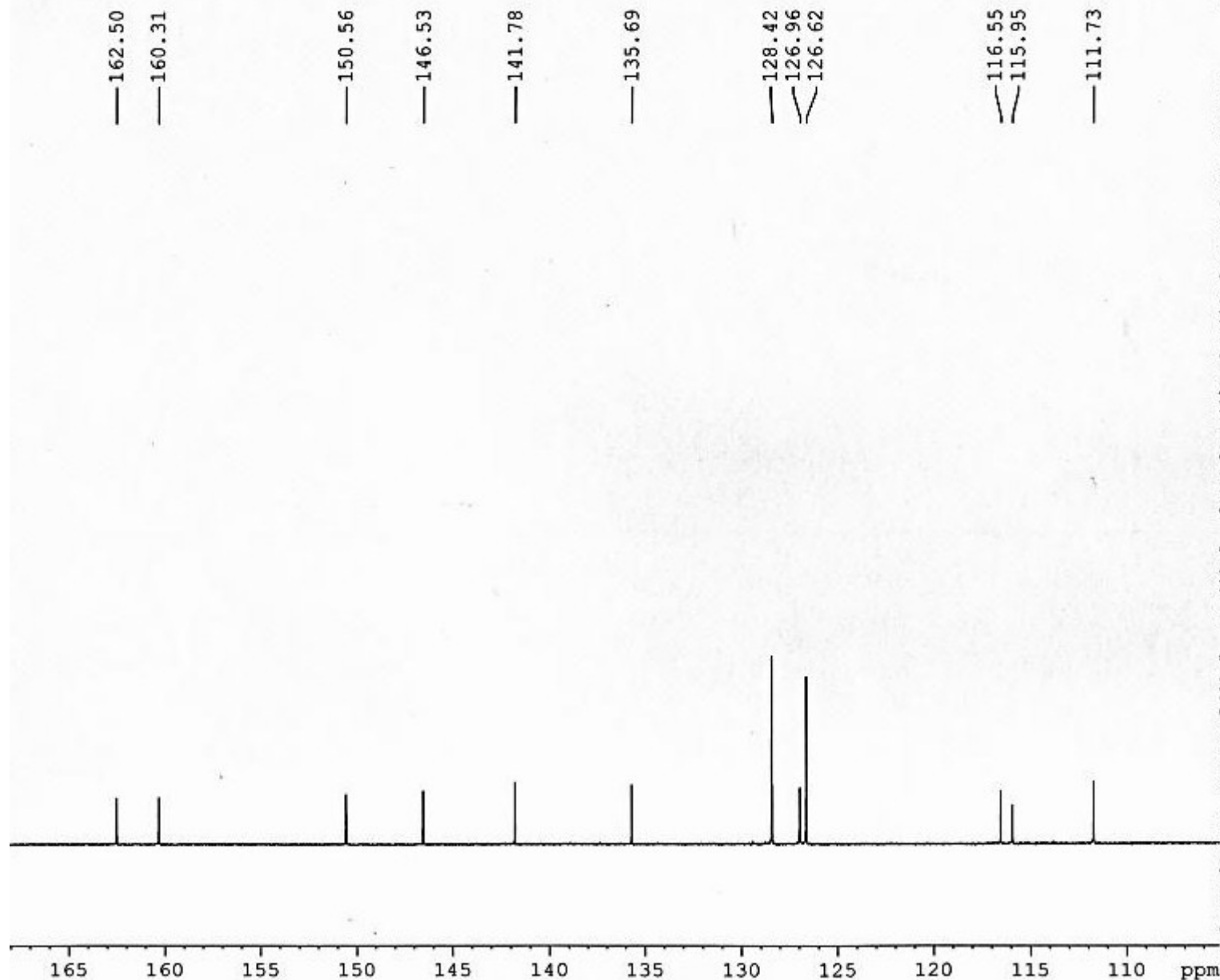
Current Data Parameters
 NAME MSQ acetone-13C
 EXPNO 1
 PROCNO 1

F2 - Acquisition Parameters
 Date_ 20160701
 Time_ 23.47
 INSTRUM spect
 PROBHD 5 mm PABBO BB-
 PULPROG zgpg30
 TD 65536
 SOLVENT DMSO
 NS 20480
 DS 4
 SWH 36057.691 Hz
 FIDRES 0.550197 Hz
 AQ 0.9087659 sec
 RG 203
 DW 13.867 usec
 DE 50.00 usec
 TE 298.0 K
 D1 2.00000000 sec
 D11 0.03000000 sec
 TDO 1

----- CHANNEL f1 -----
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 NUC1 13C
 P1 8.80 usec
 PLW1 78.13500214 W

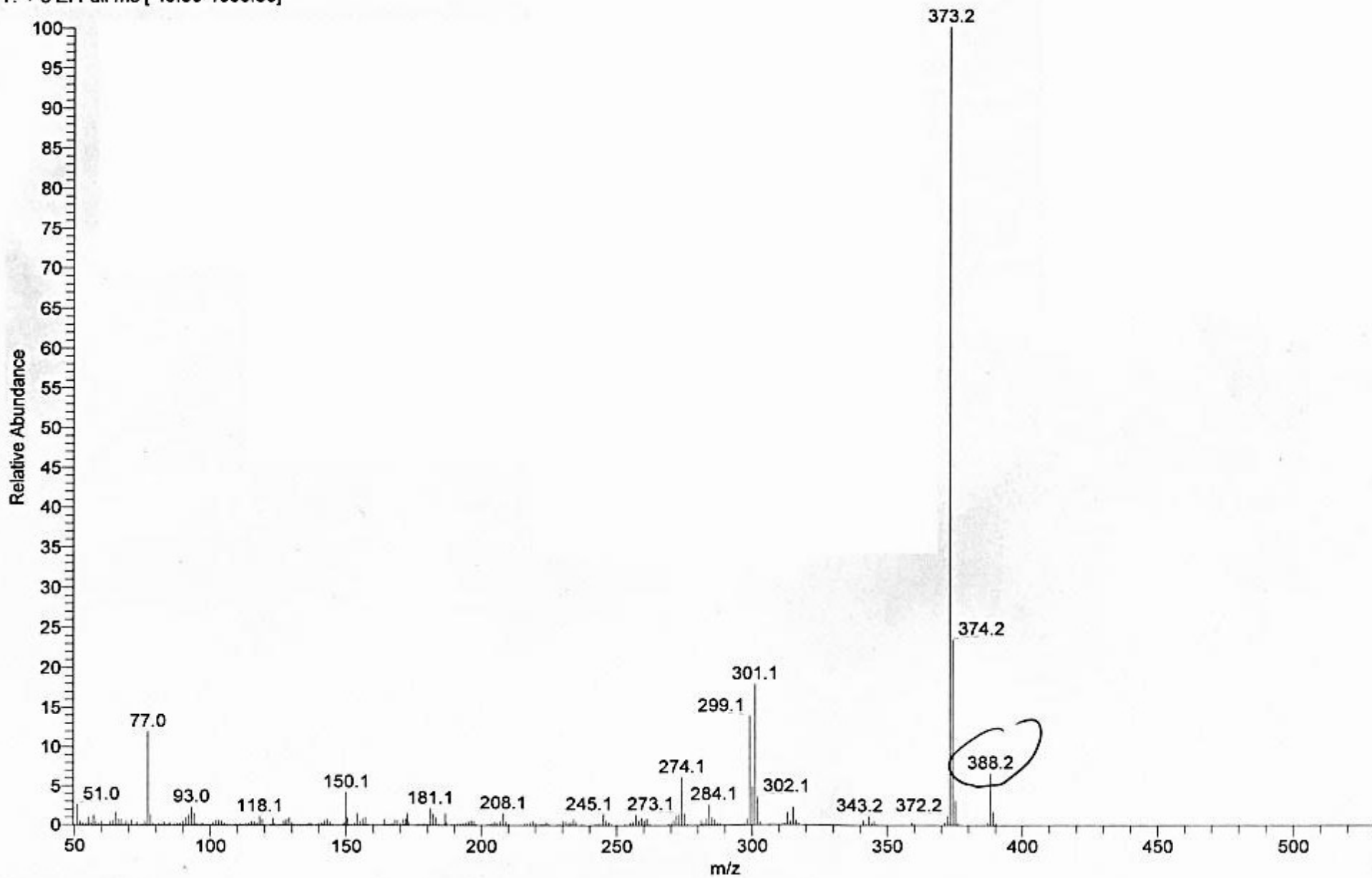
----- CHANNEL f2 -----
 SFO2 600.1324005 MHz
 NUC2 1H
 CPDPRG[2] waltz65
 PCPD2 70.00 usec
 PLW2 27.82500076 W
 PLW12 0.63804001 W
 PLW13 0.31264001 W

F2 - Processing parameters
 SI 32768
 SF 150.9028830 MHz
 WDW EM
 SSB 0
 LB 1.00 Hz
 GB 0
 PC 1.40



¹³C NMR for the compound 22

AcetoneQutub #149 RT: 6.76 AV: 1 NL: 2.70E6
T: + c EI Full ms [49.50-1000.50]



Mass spectra for the compound **22**