



# UNIVERSITAT DE BARCELONA

## Chemical approaches to the study of the ceramide synthase activity

Eduardo Izquierdo García

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# **SUPPLEMENTARY MATERIAL II**

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Nuclear Magnetic Resonance spectra



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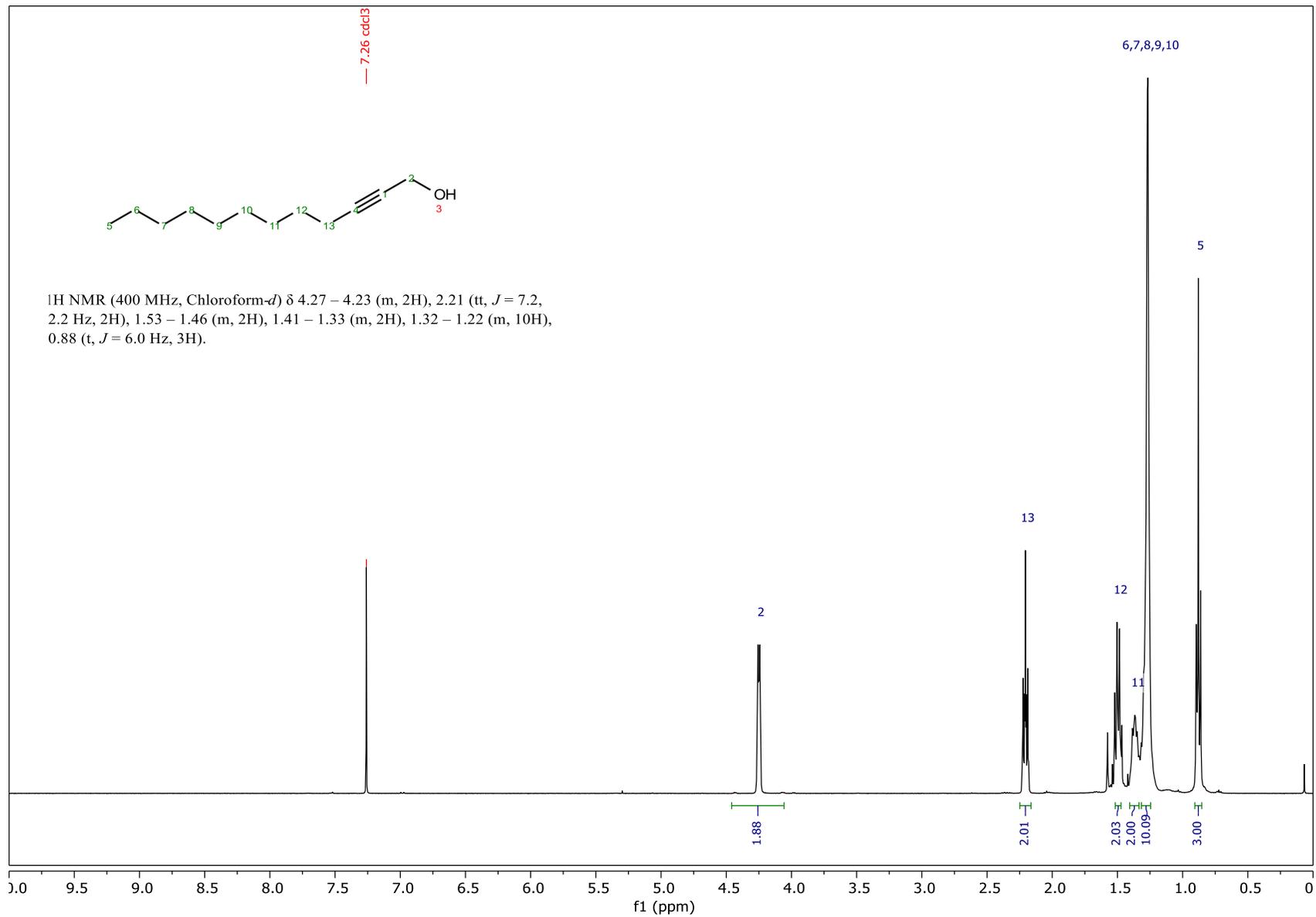
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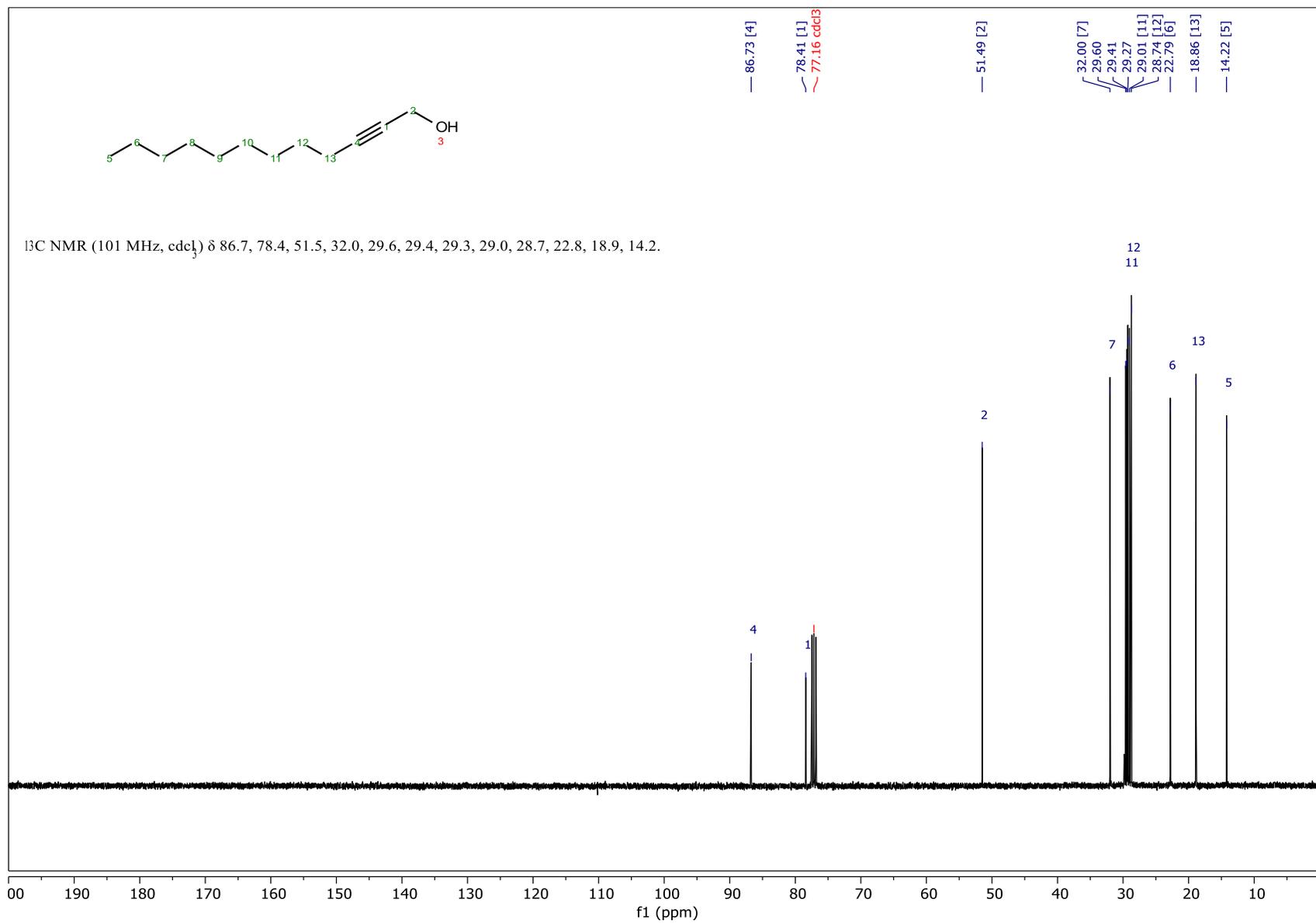
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# Compound RBM5-001

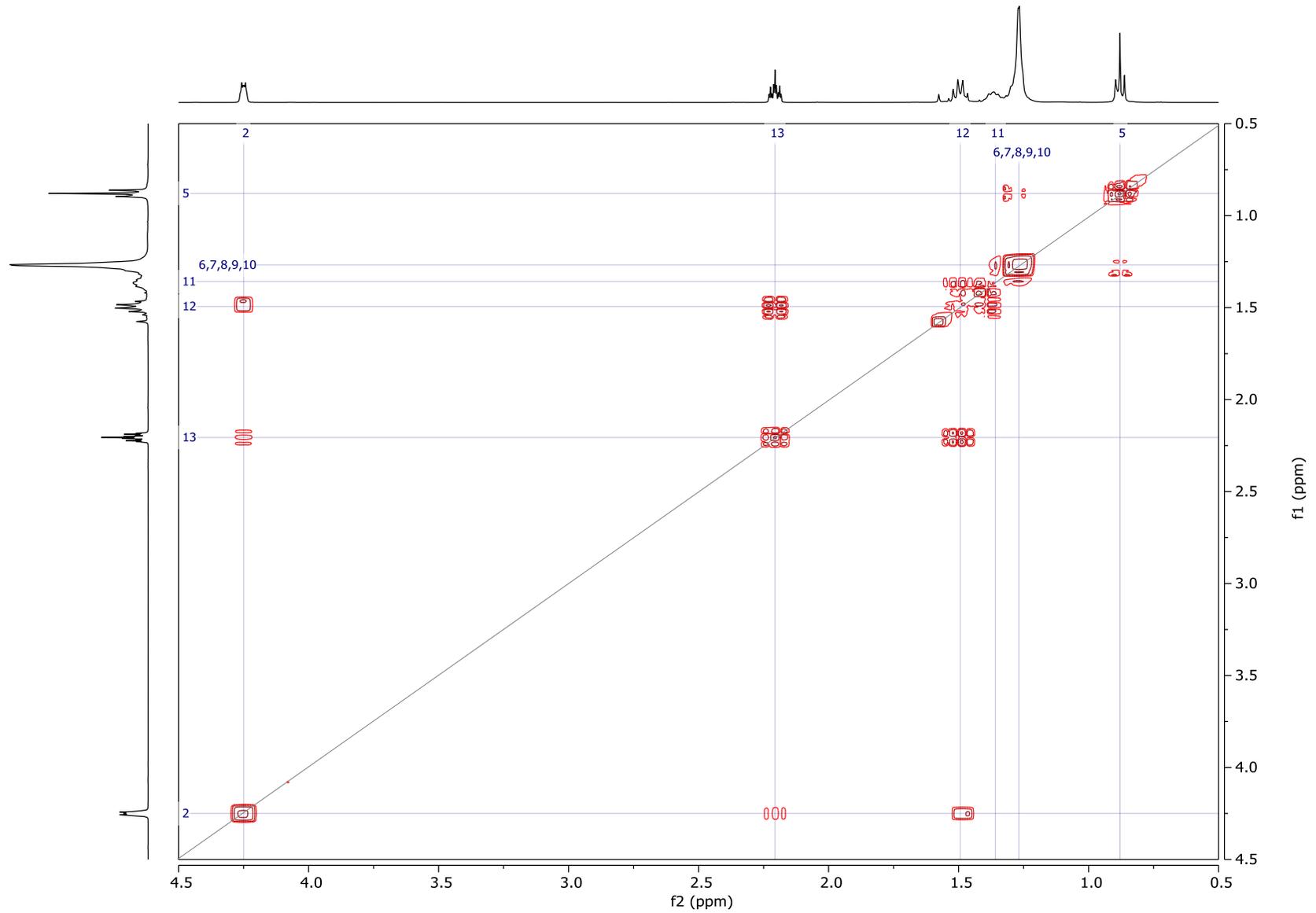
$^1\text{H}$  NMR



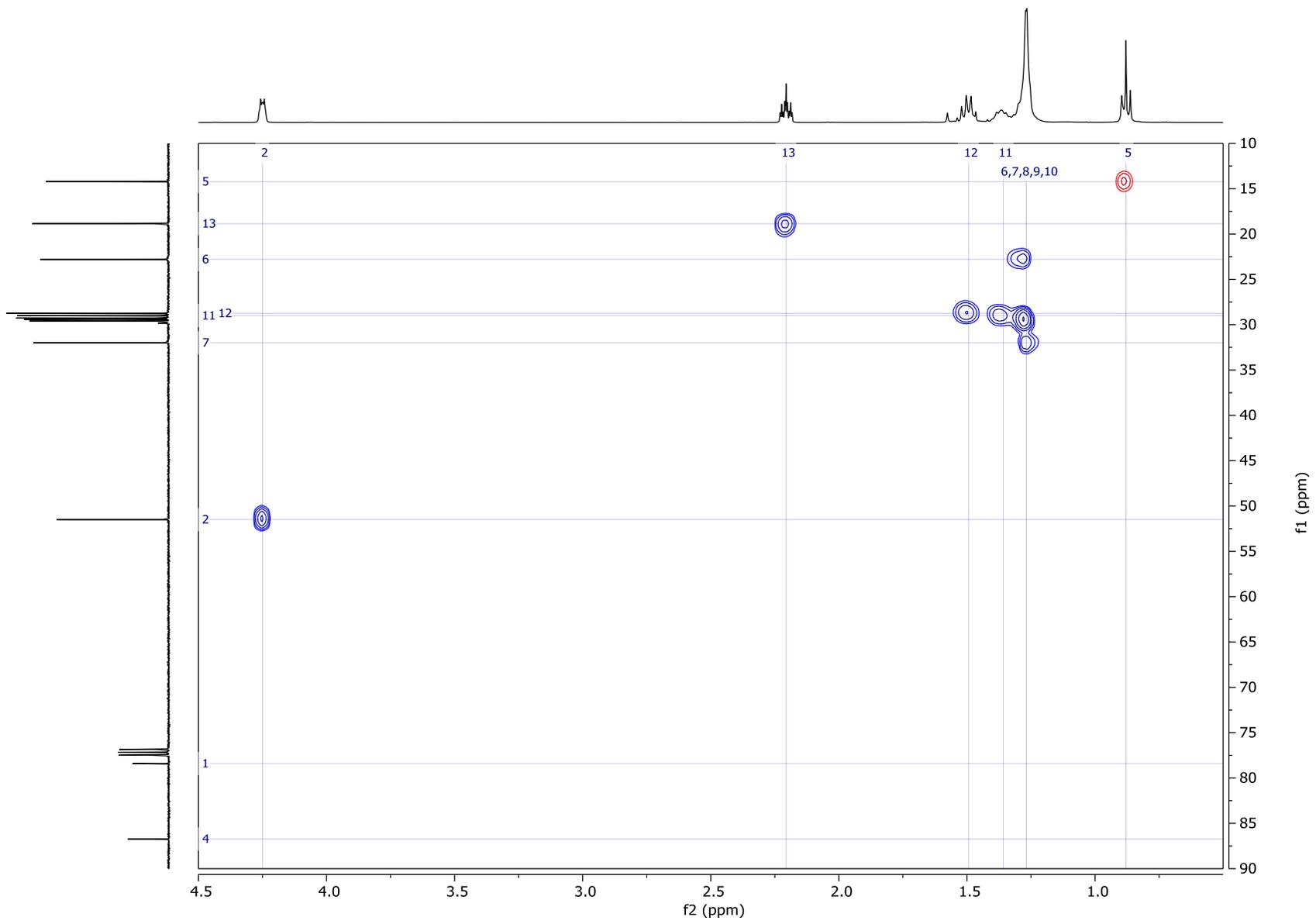
# <sup>13</sup>C NMR



COSY NMR

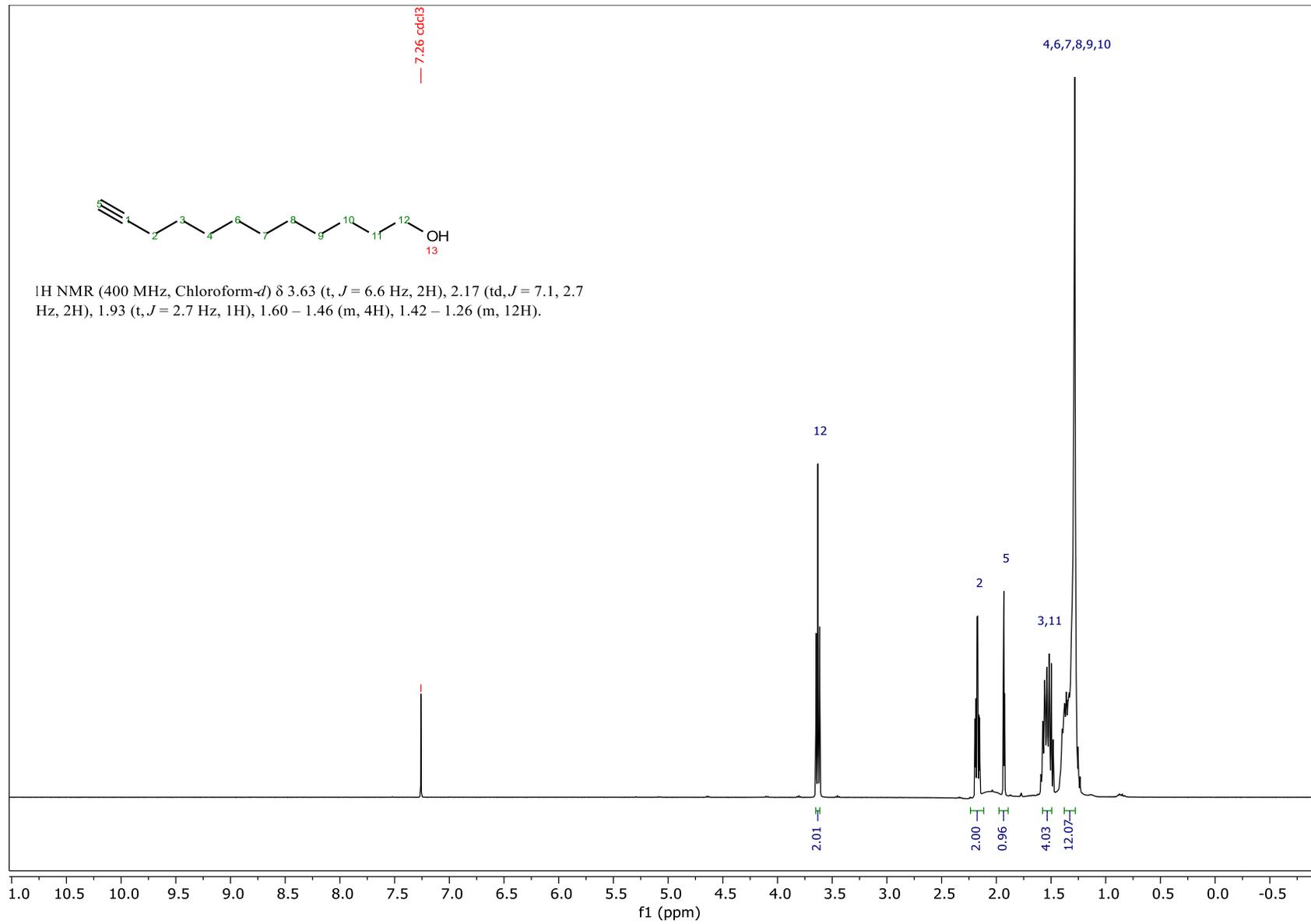


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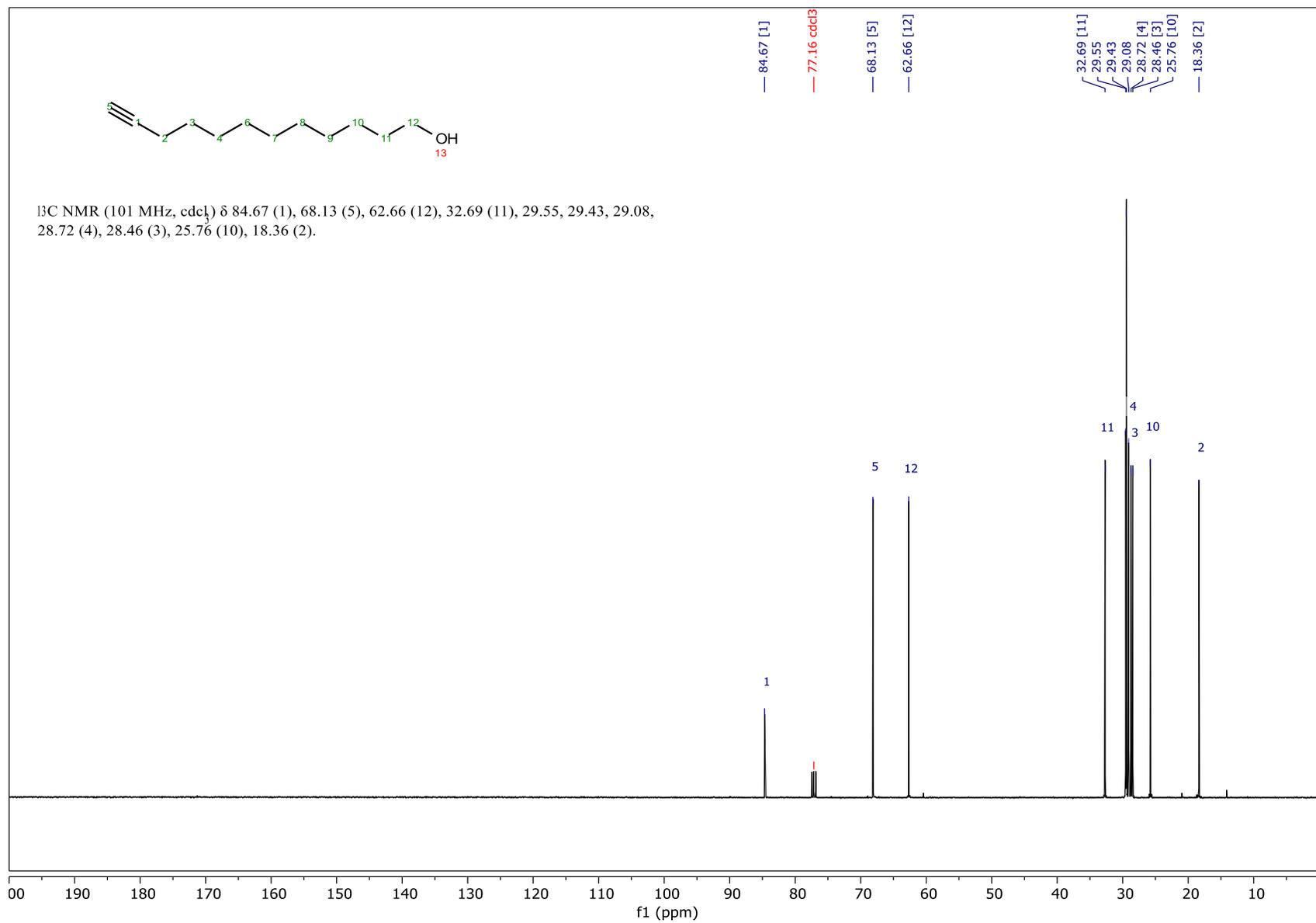


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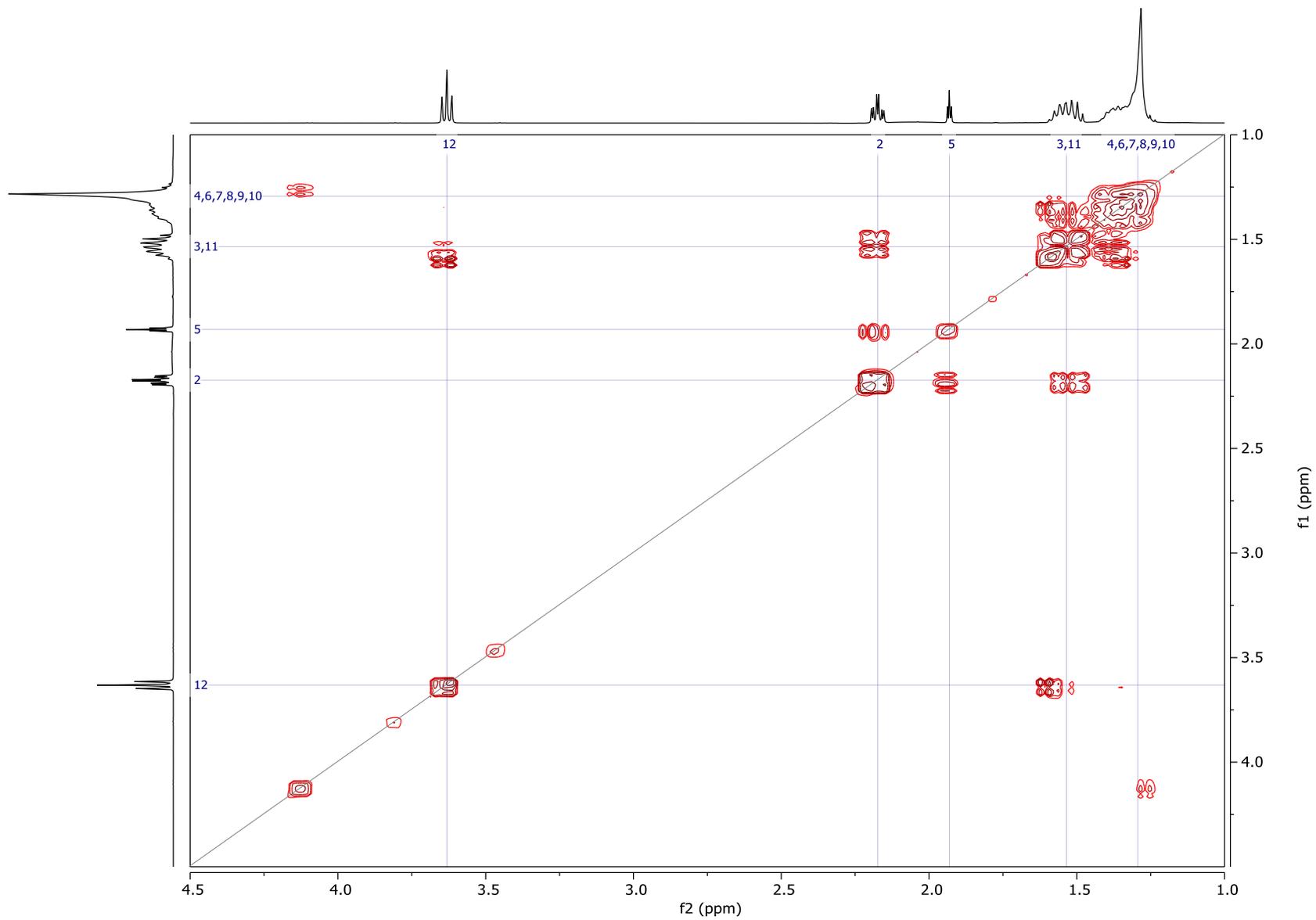
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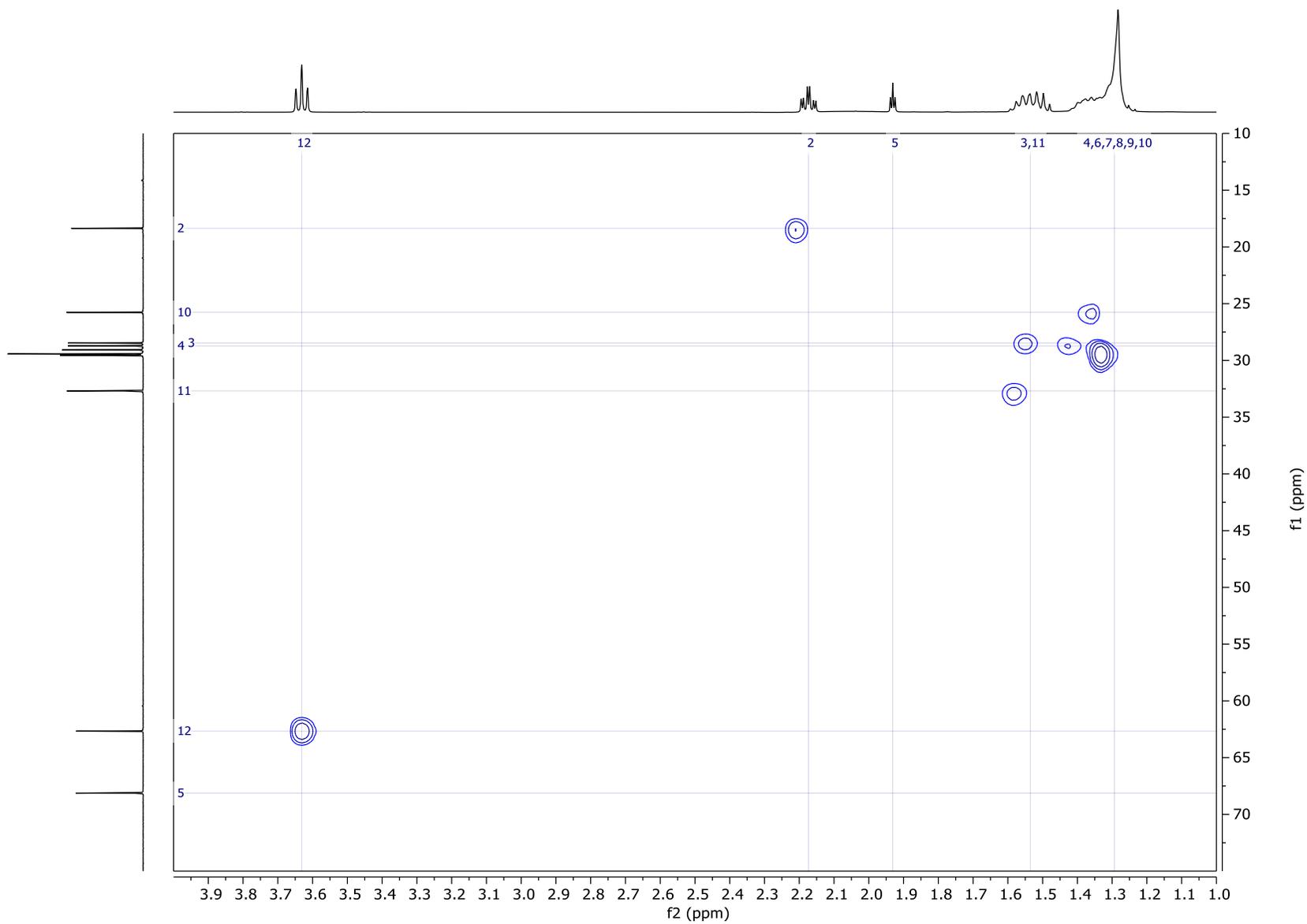
<sup>13</sup>C NMR



COSY NMR

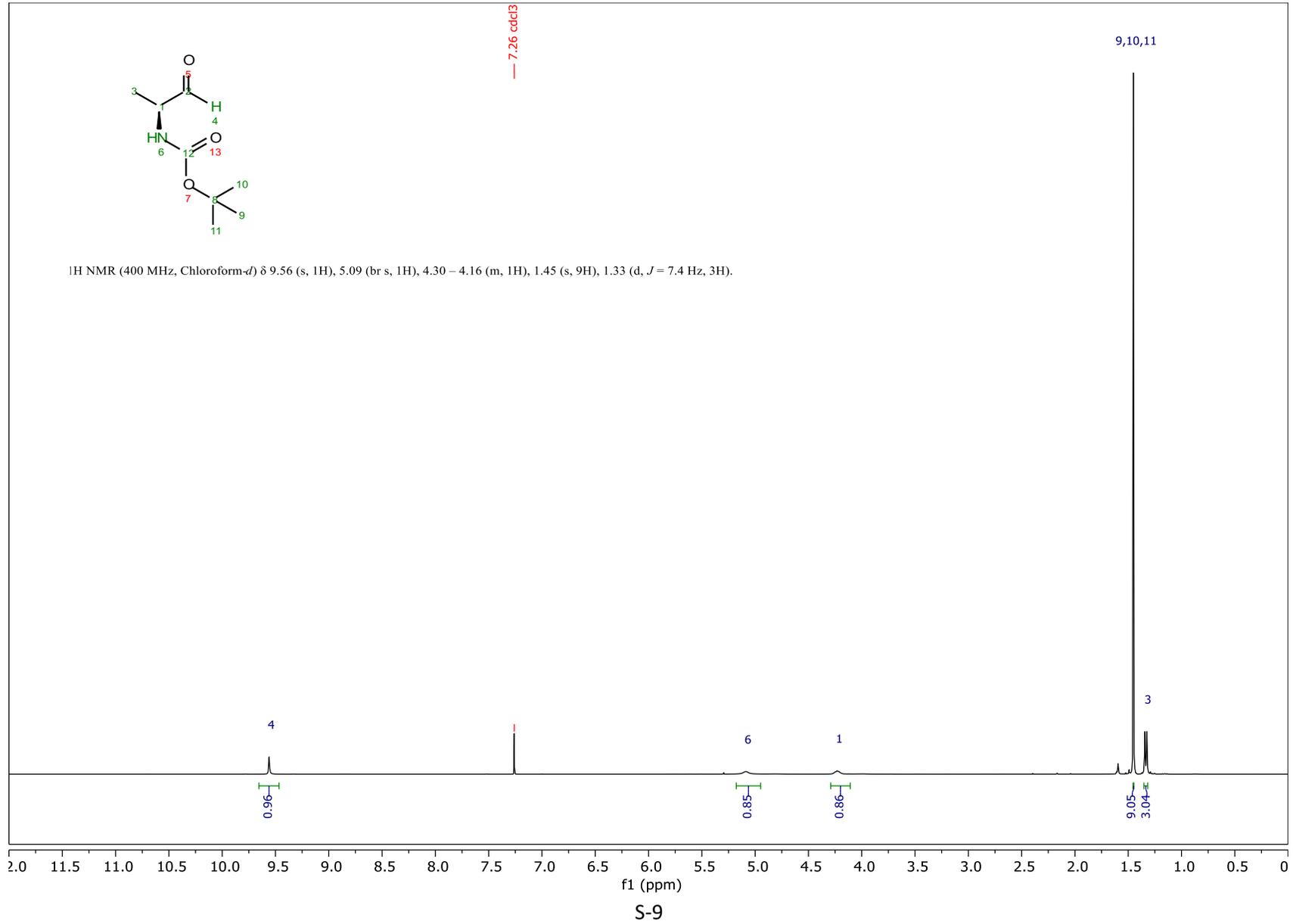


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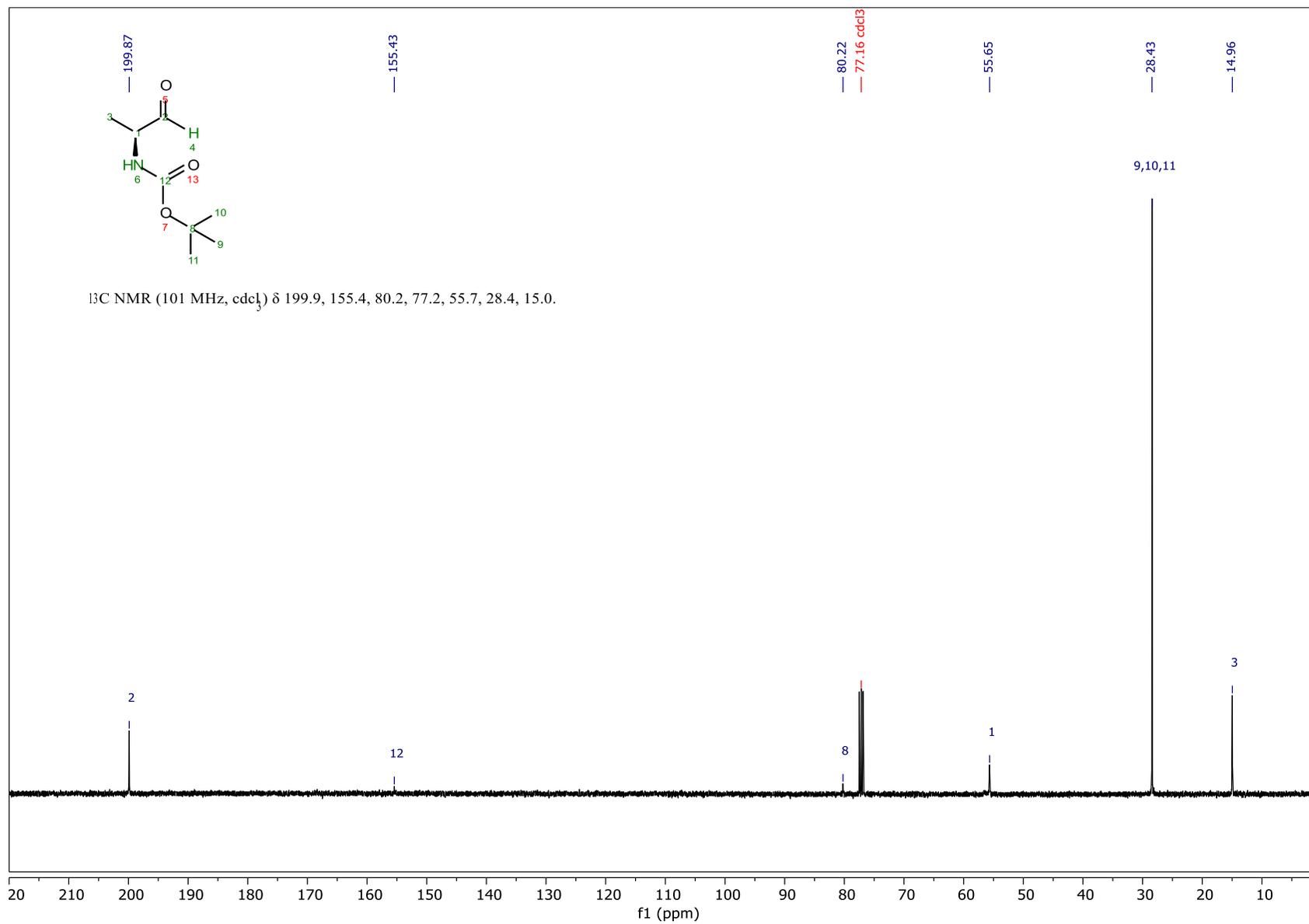


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$^1\text{H}$  NMR

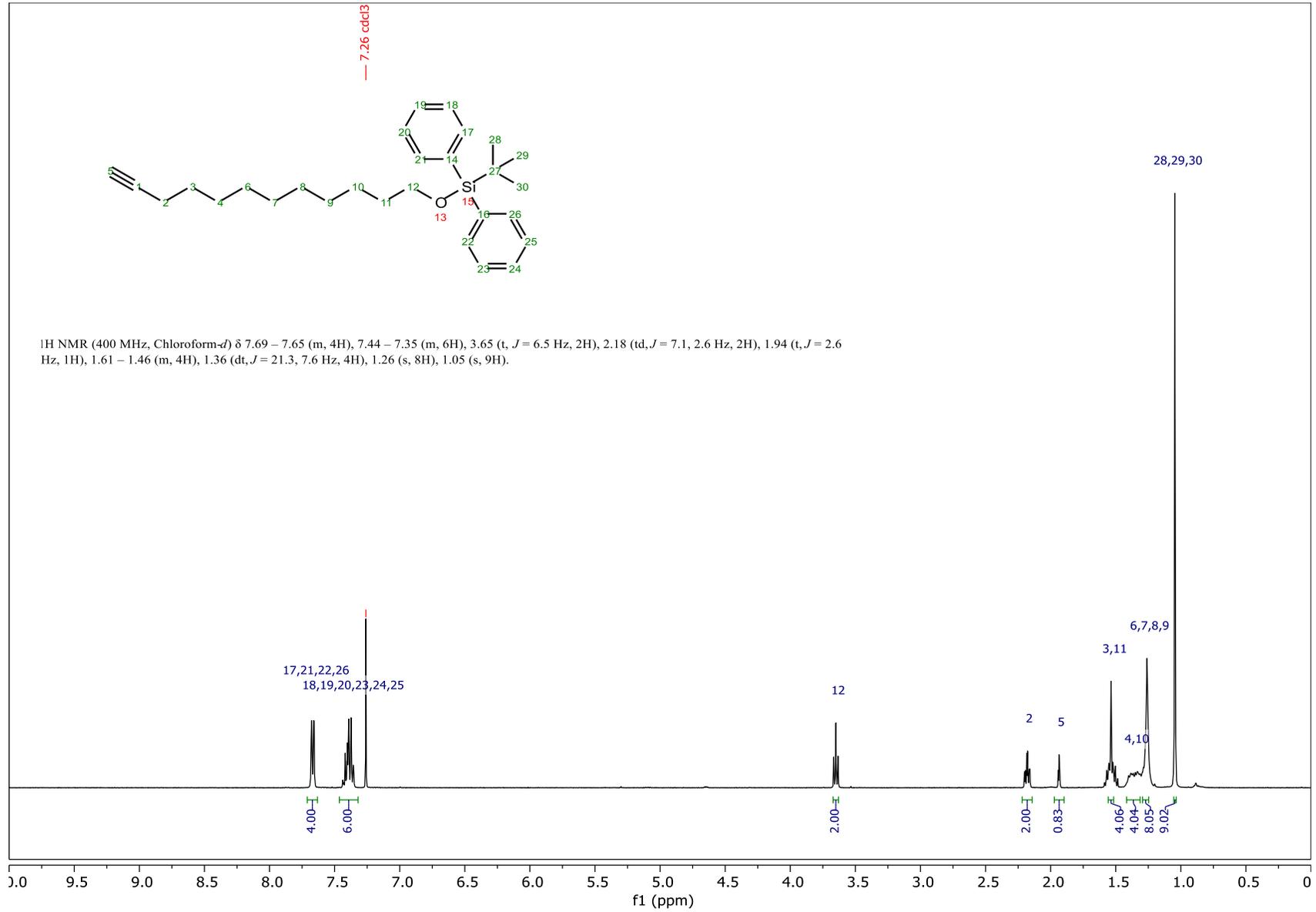


<sup>13</sup>C NMR

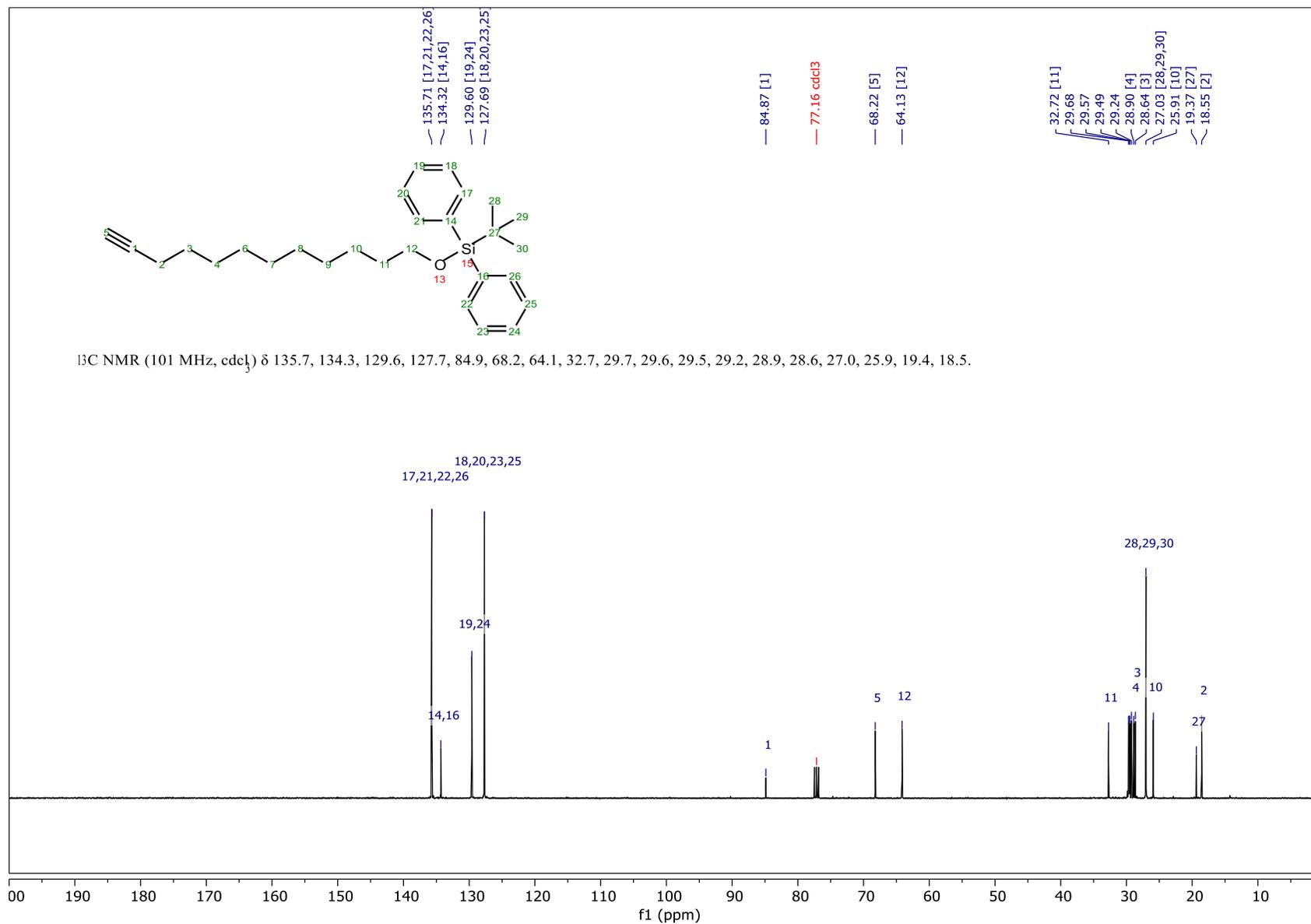


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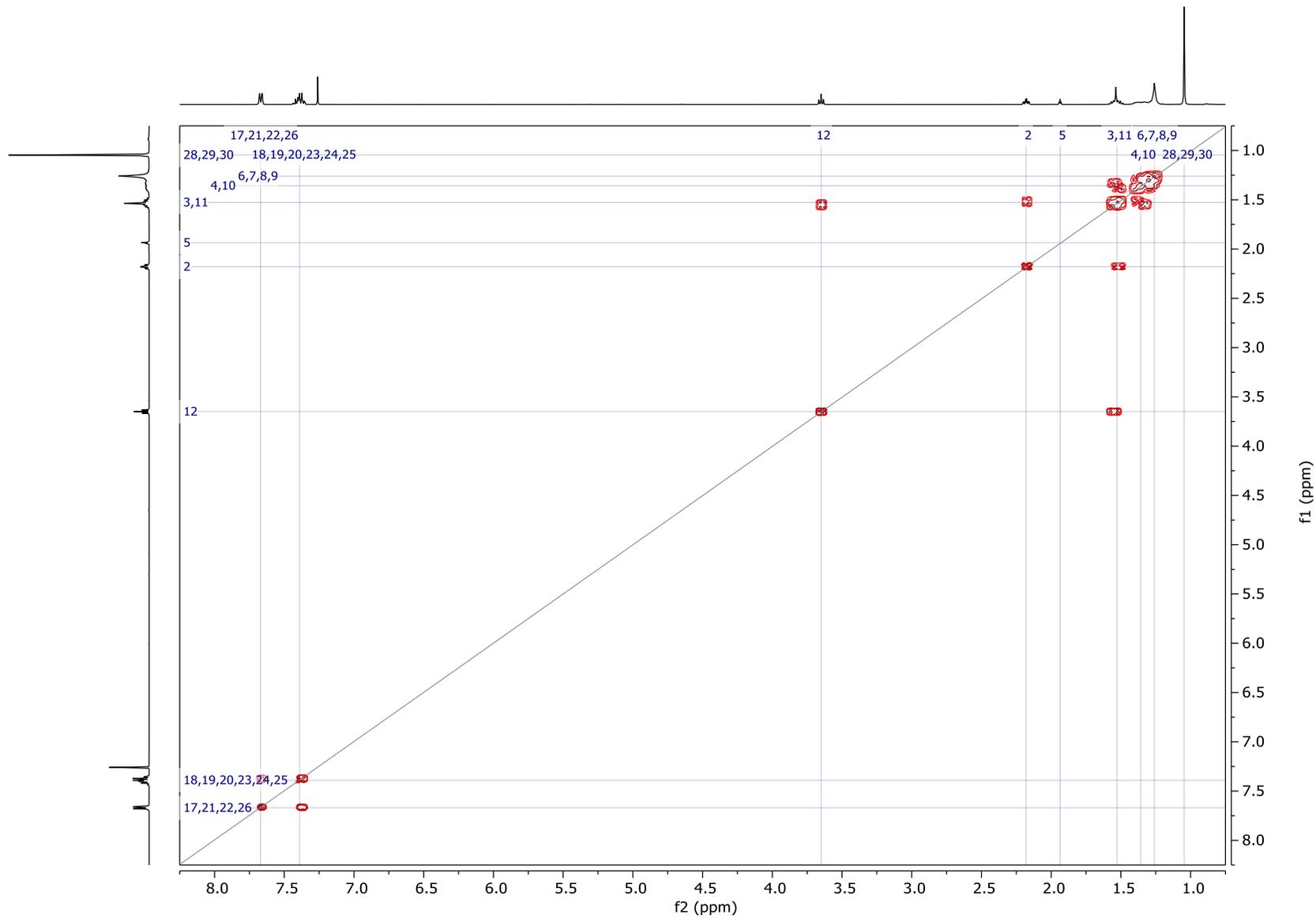
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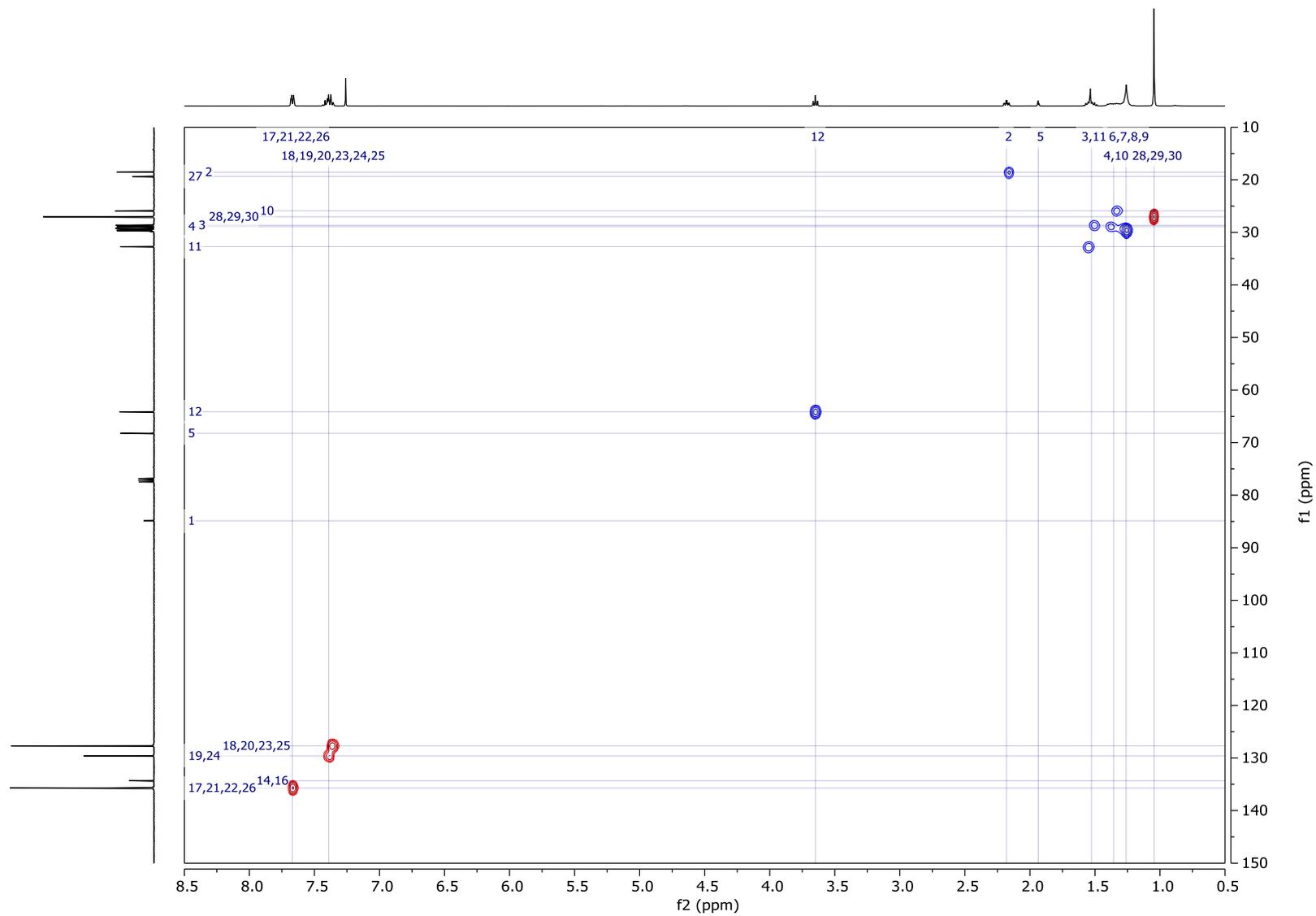
<sup>13</sup>C NMR



# COSY NMR

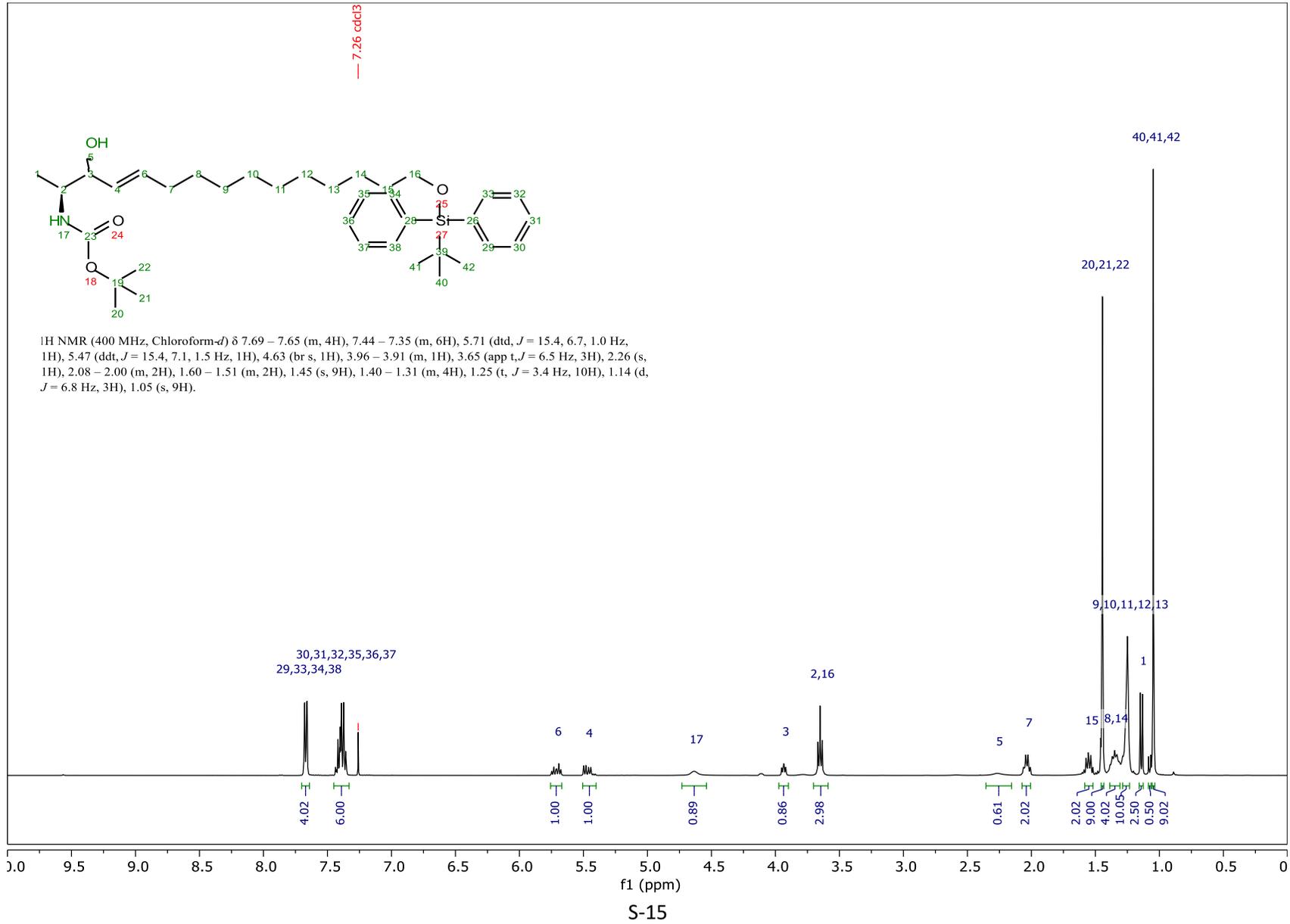


# HSQC NMR

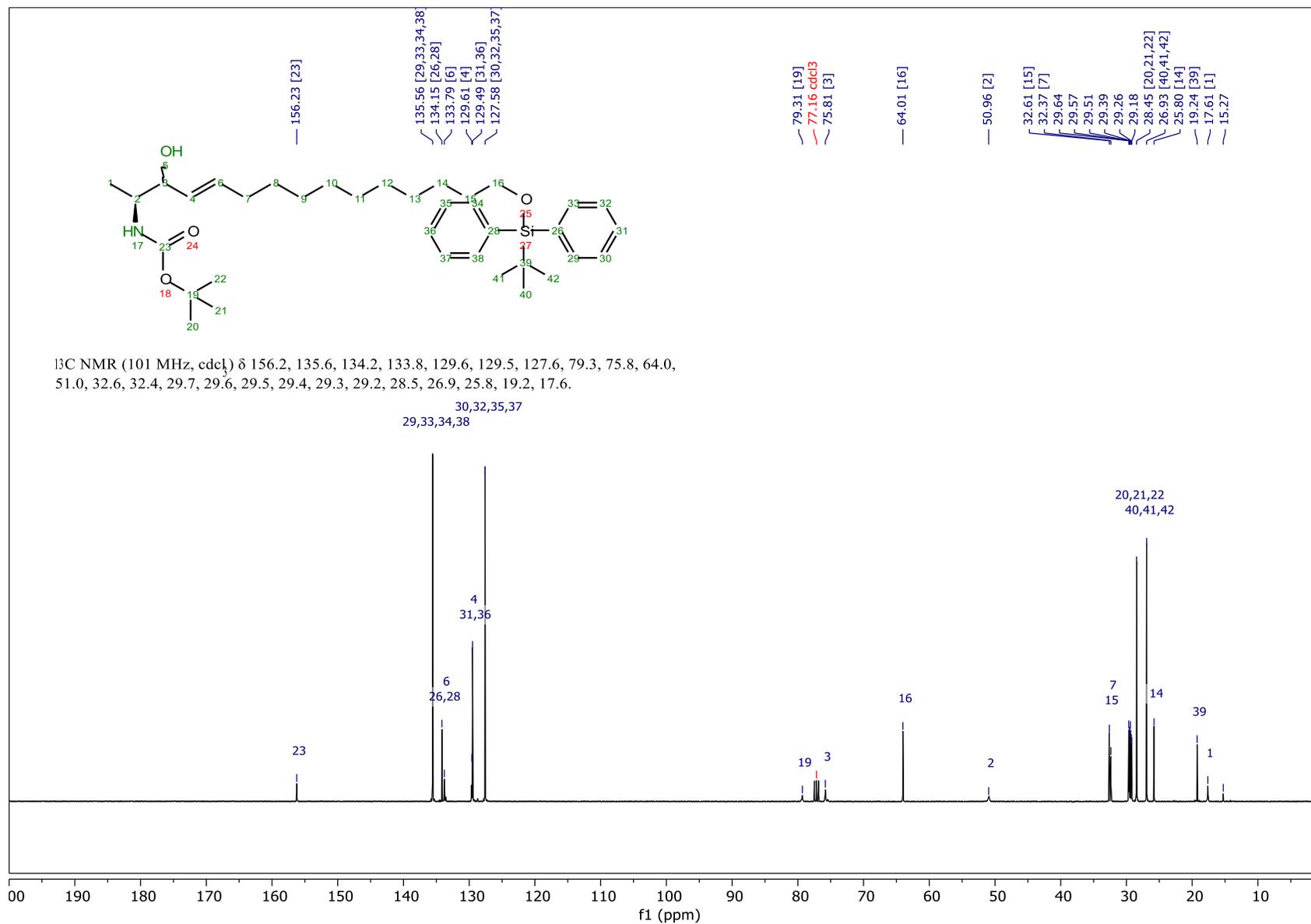


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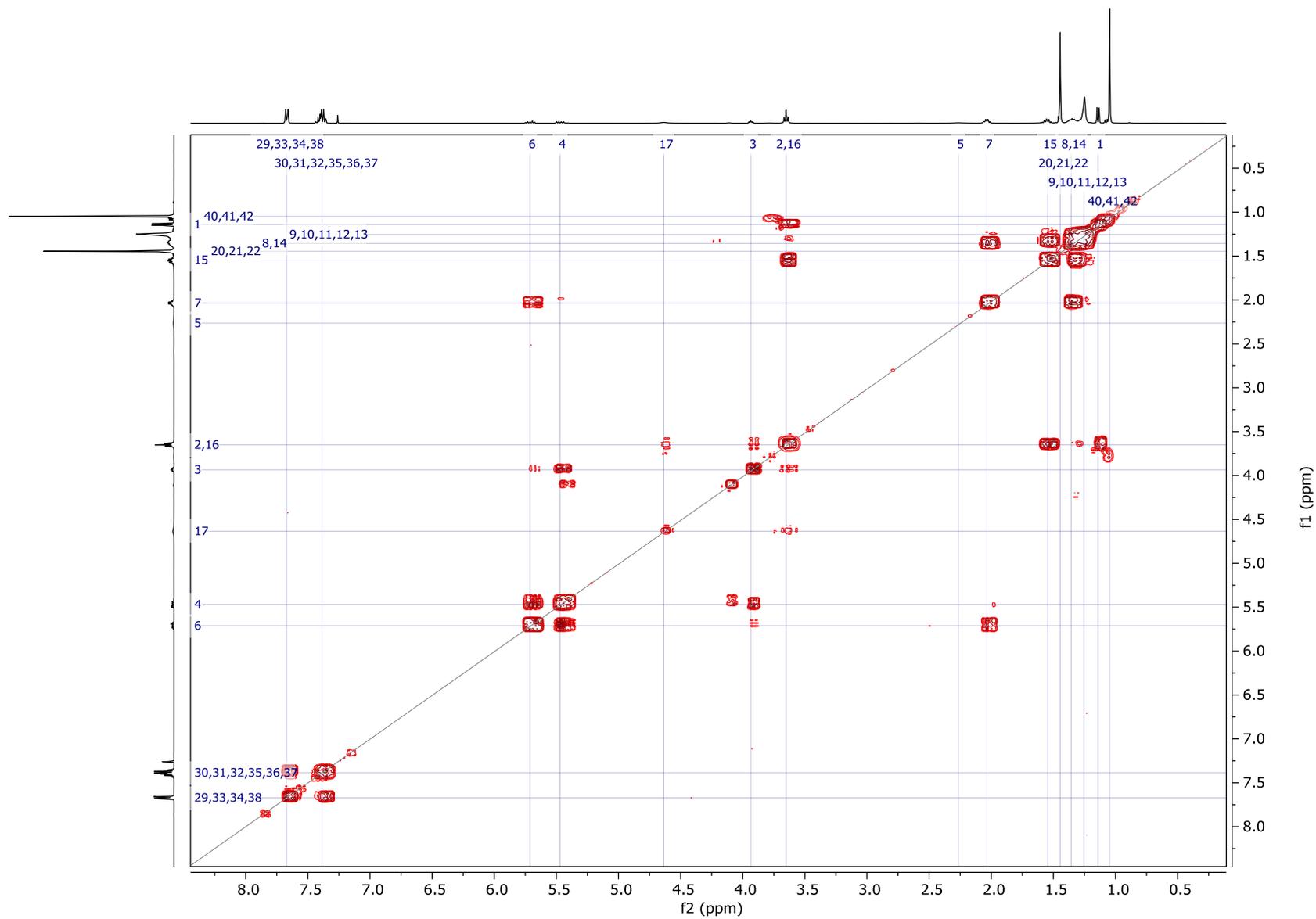
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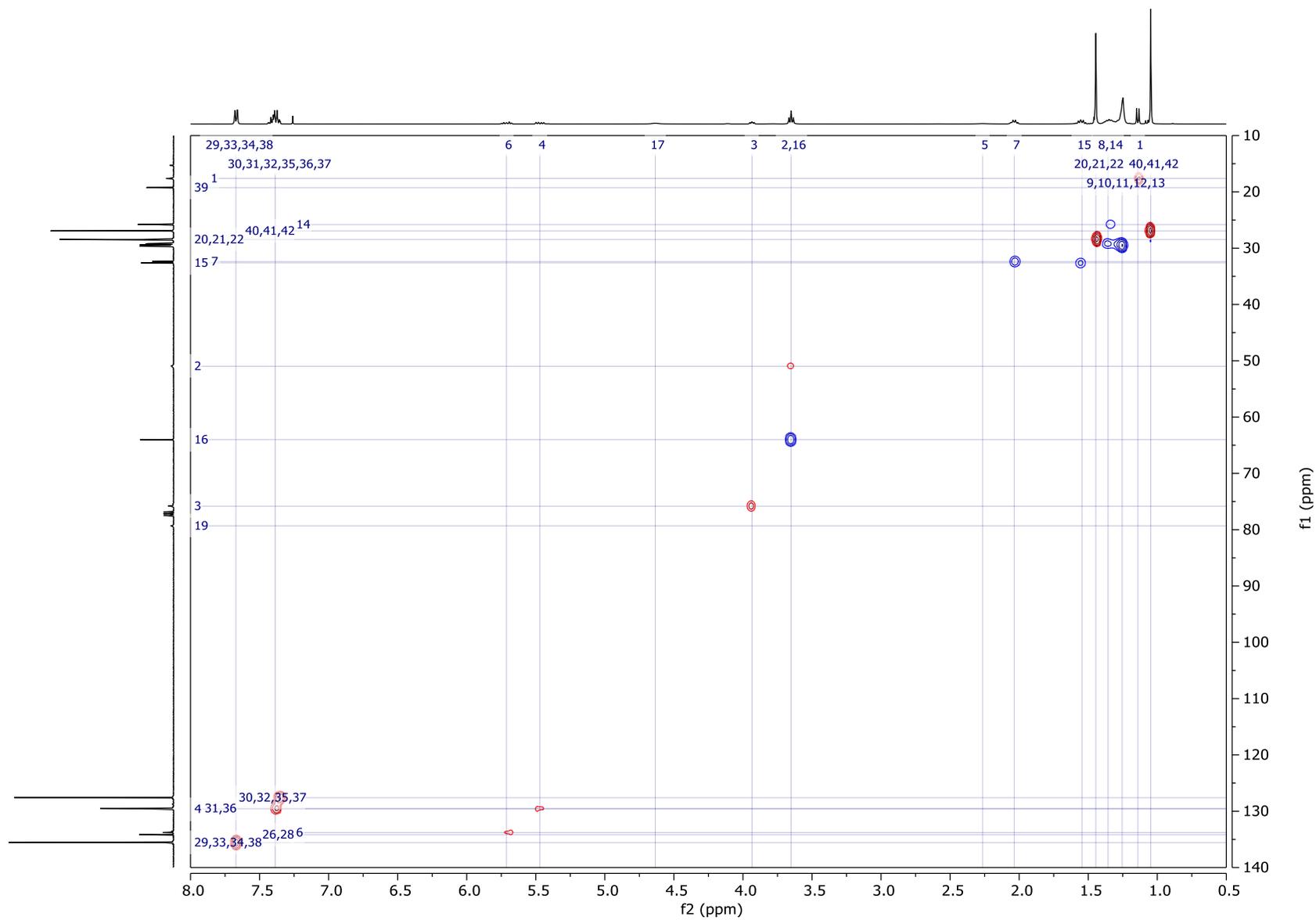
<sup>13</sup>C NMR



# COSY NMR

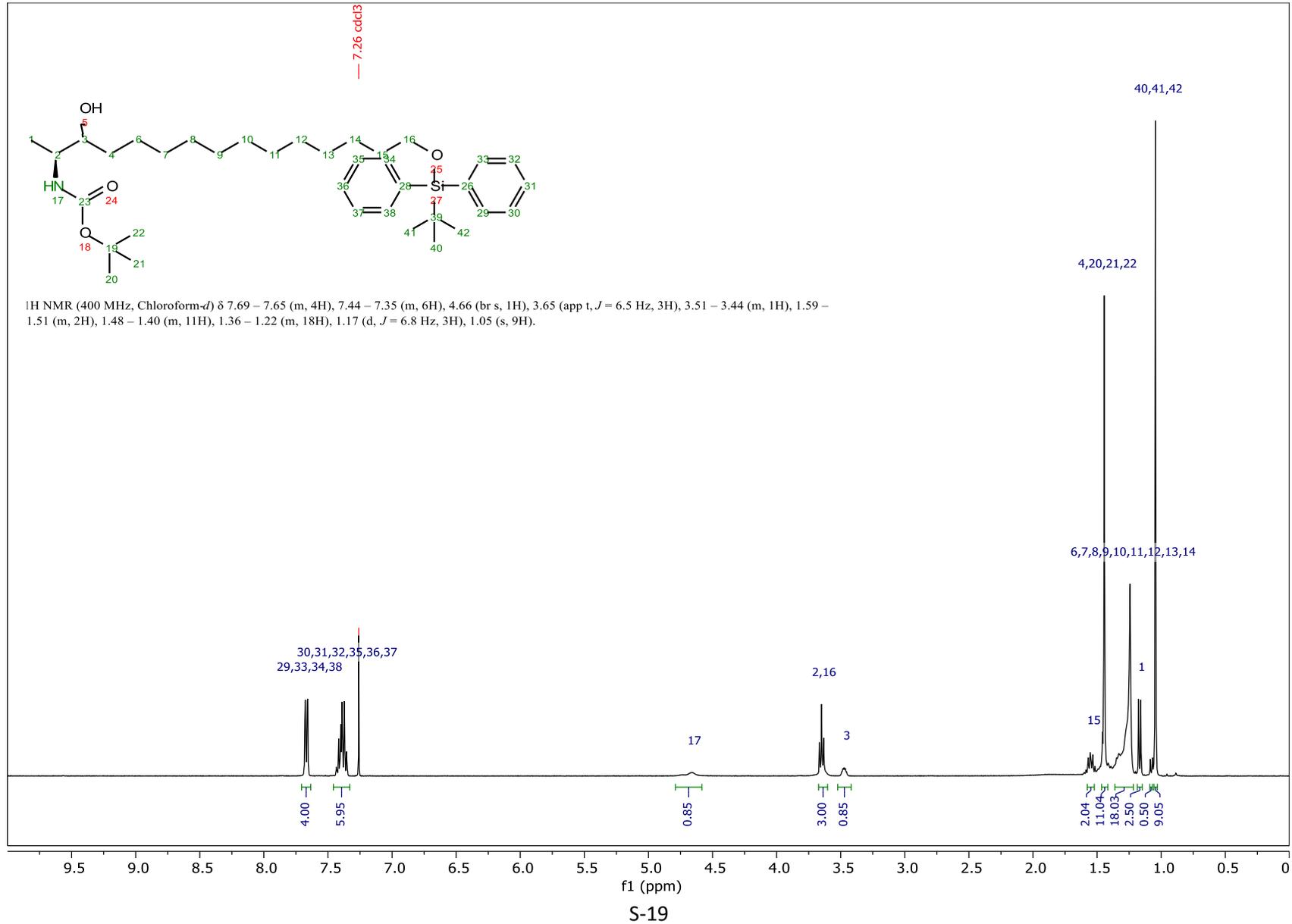


# HSQC NMR

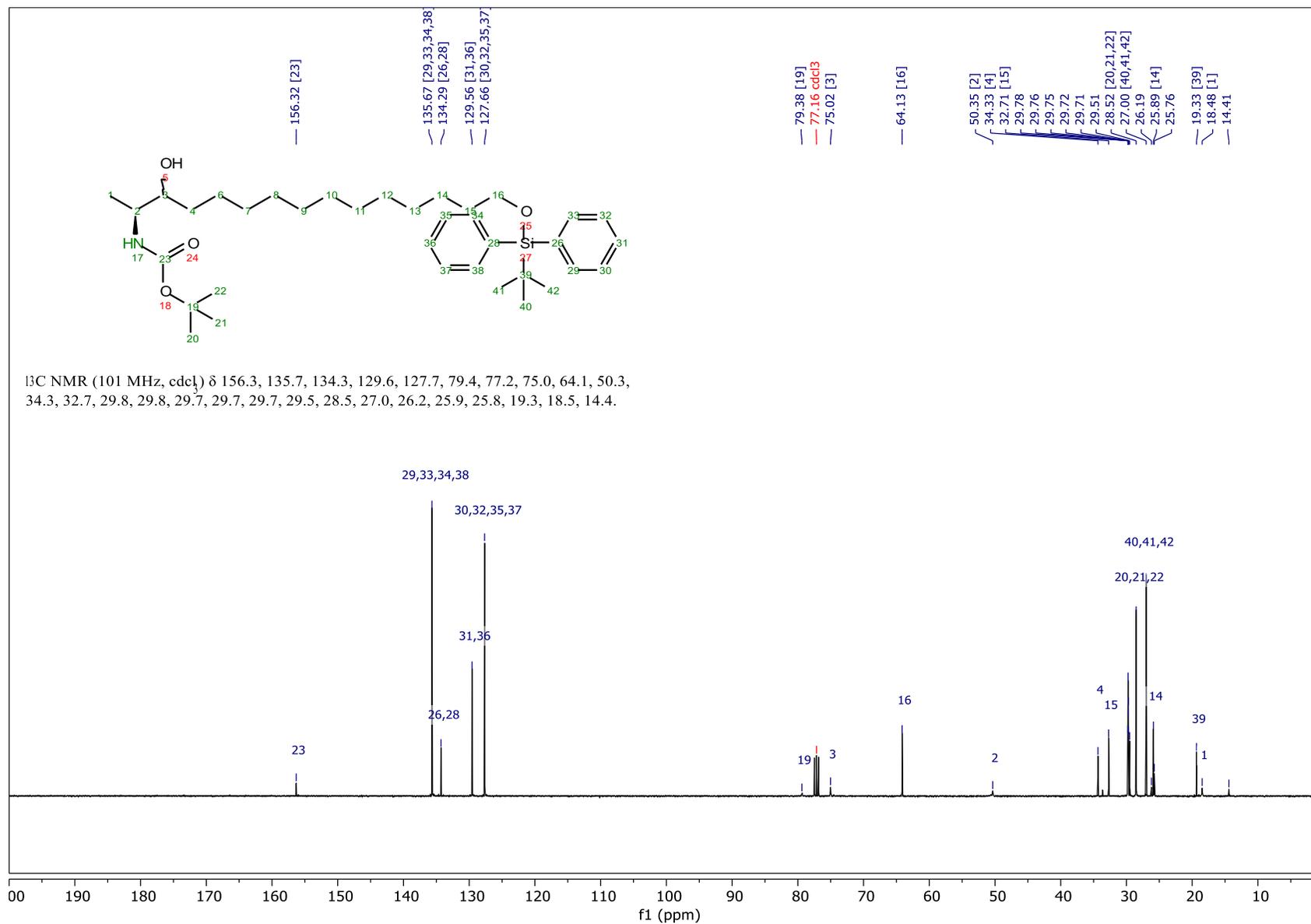


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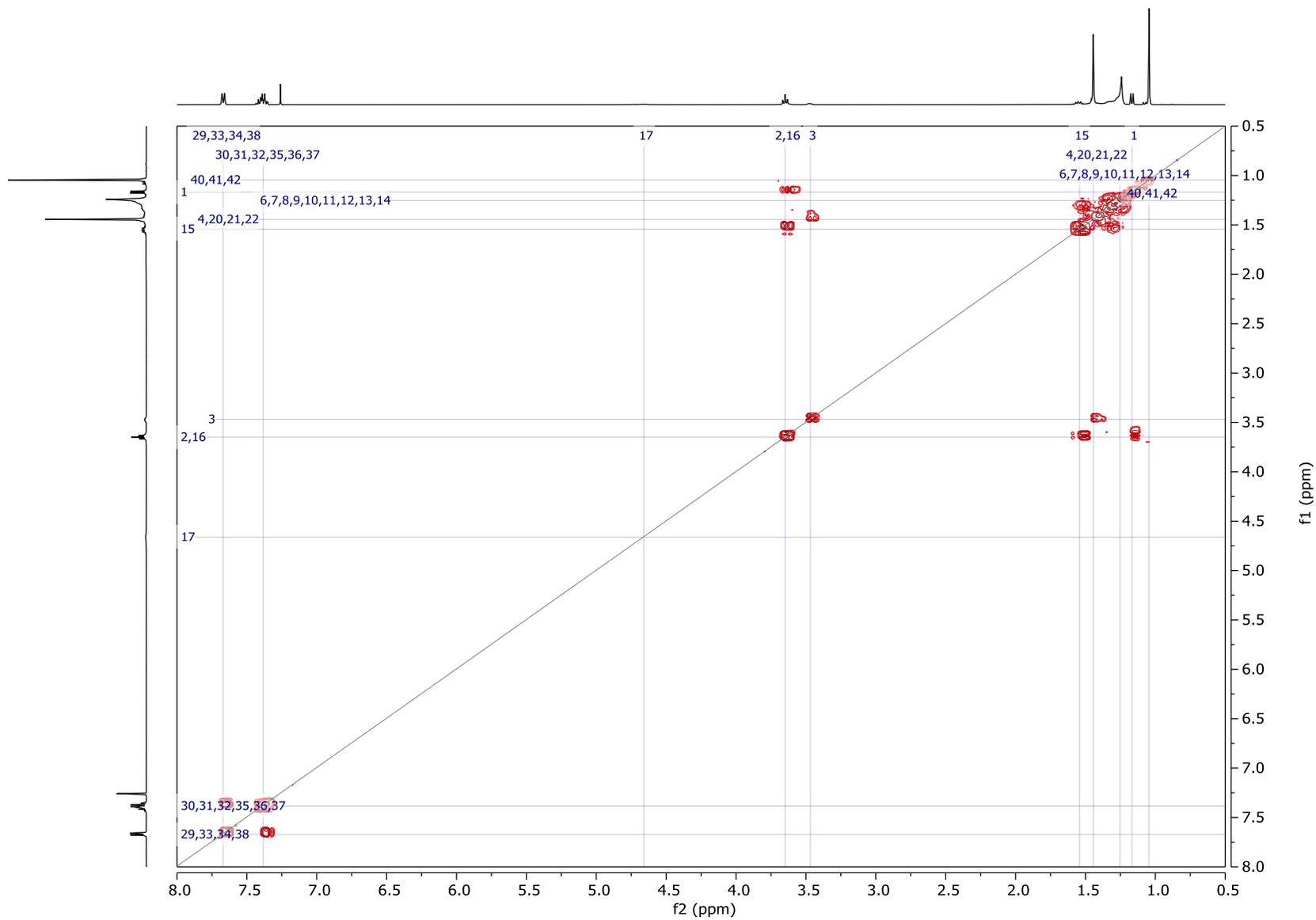
<sup>1</sup>H NMR



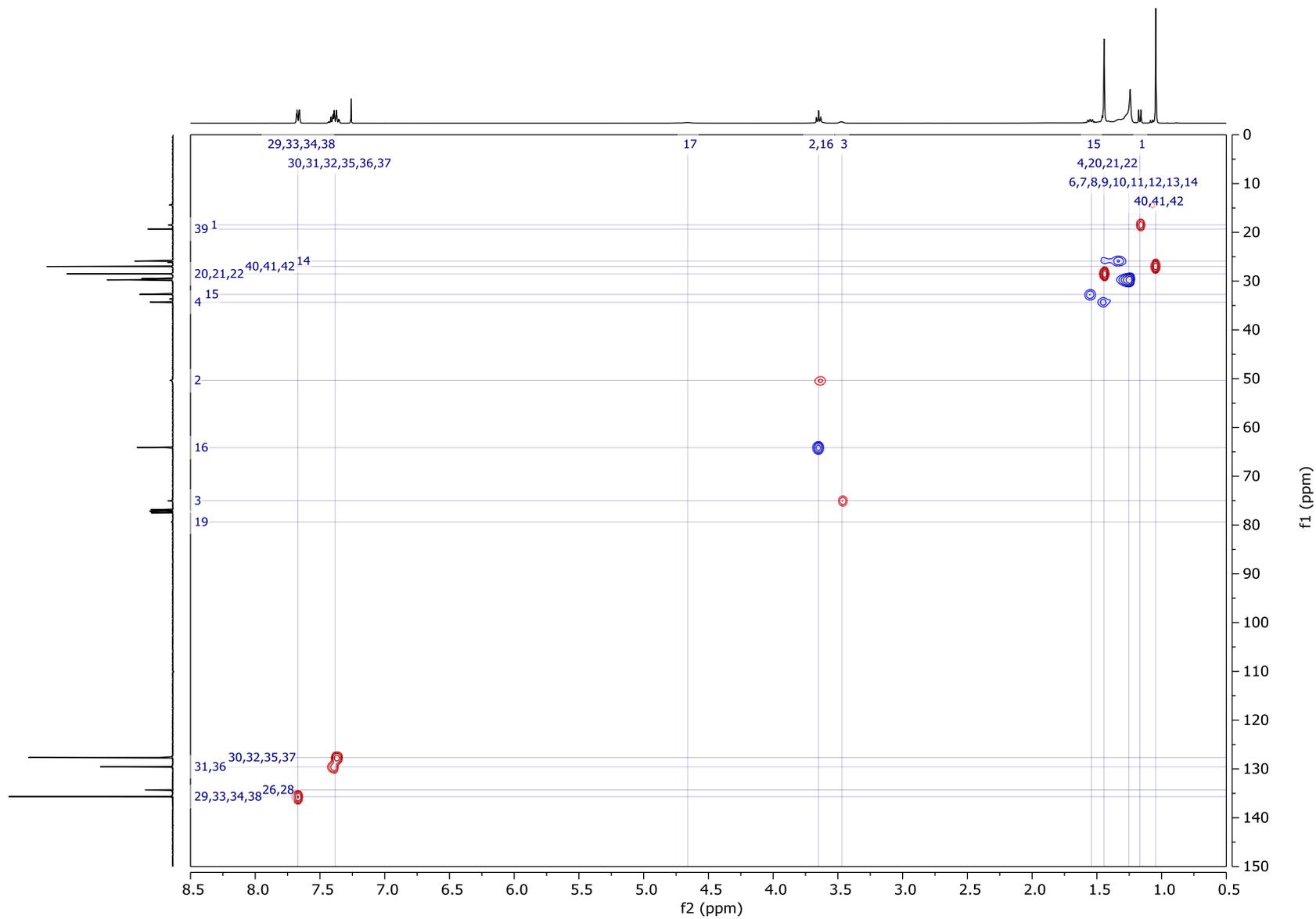
<sup>13</sup>C NMR



# COSY NMR

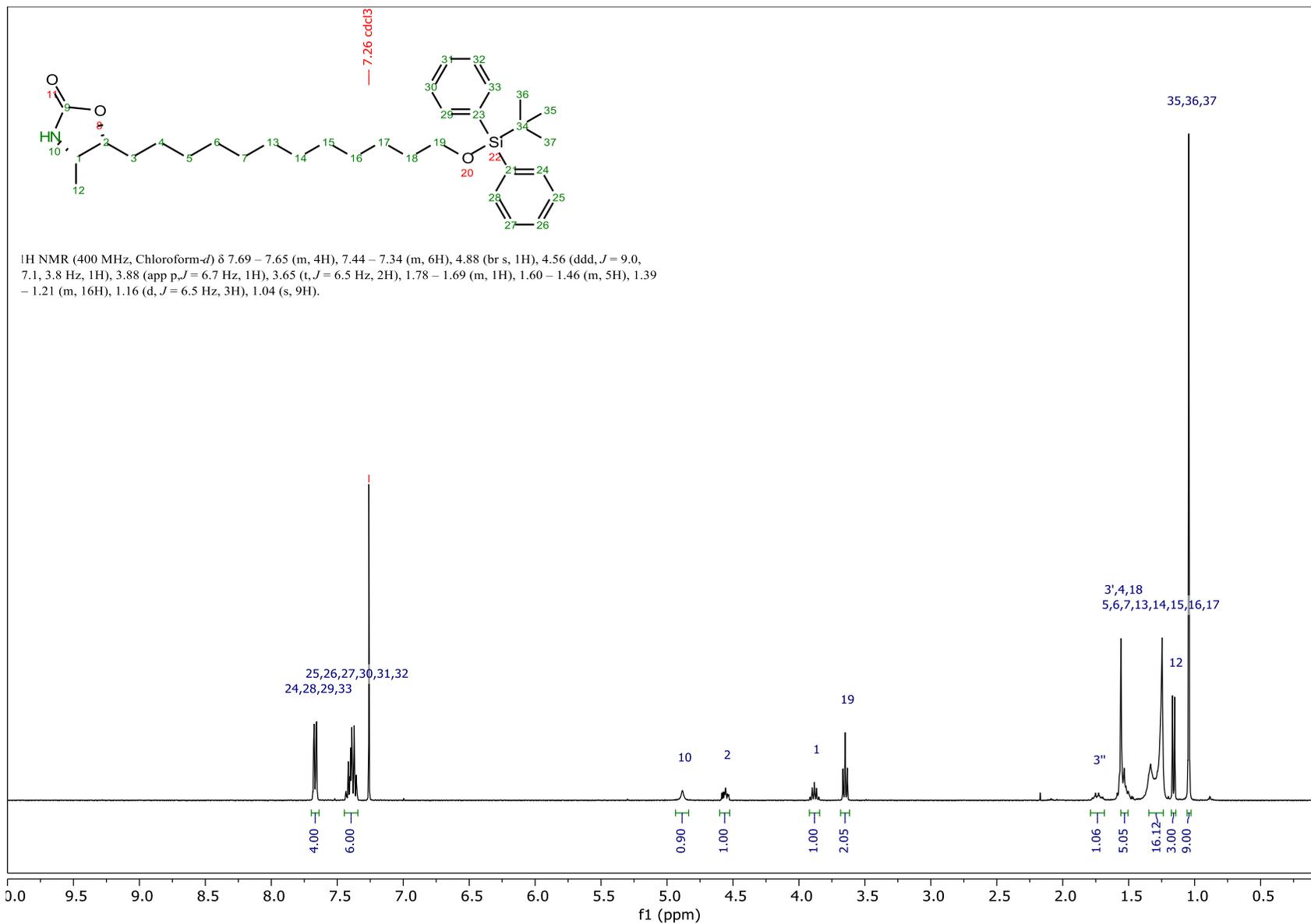


# HSQC NMR

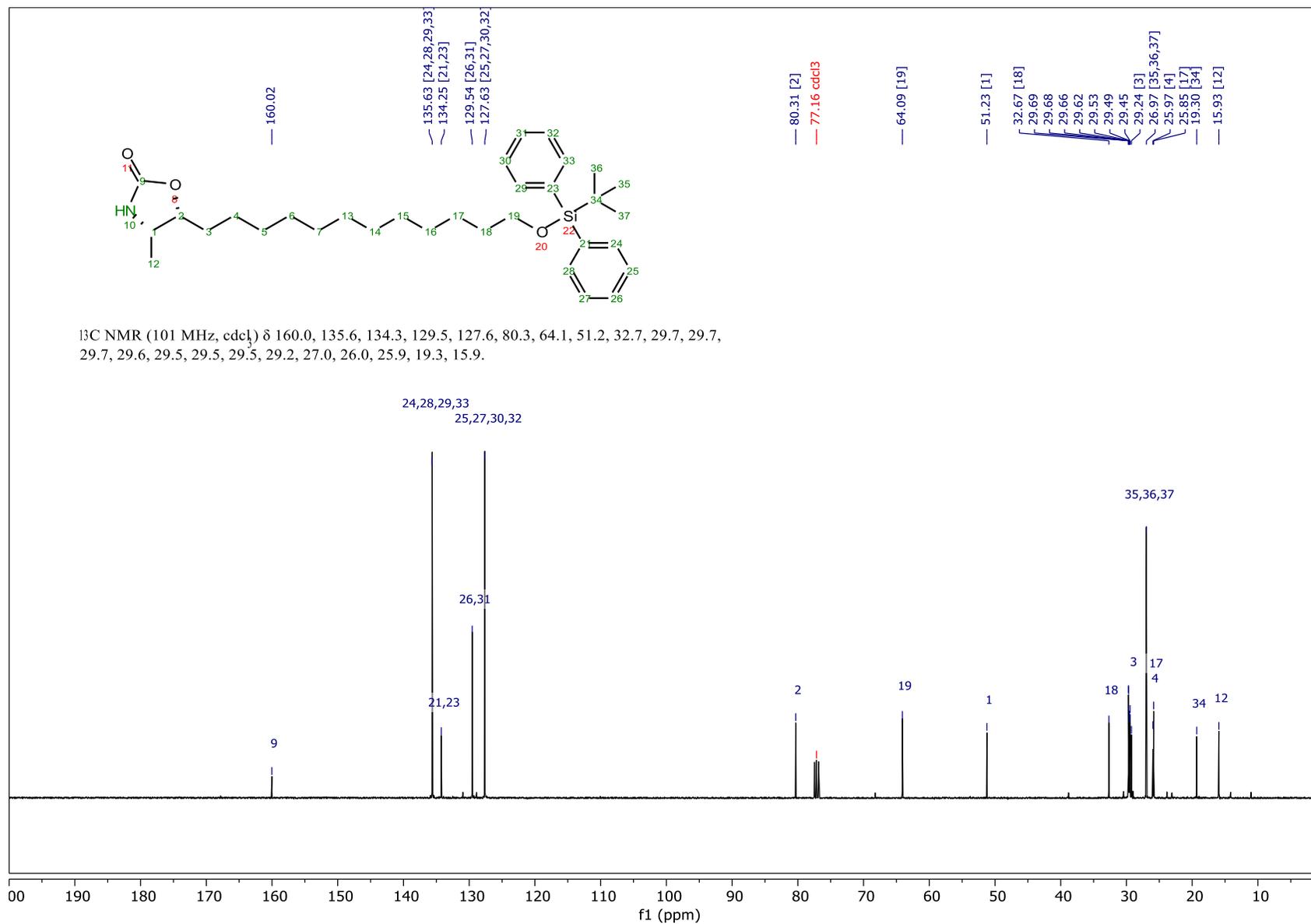


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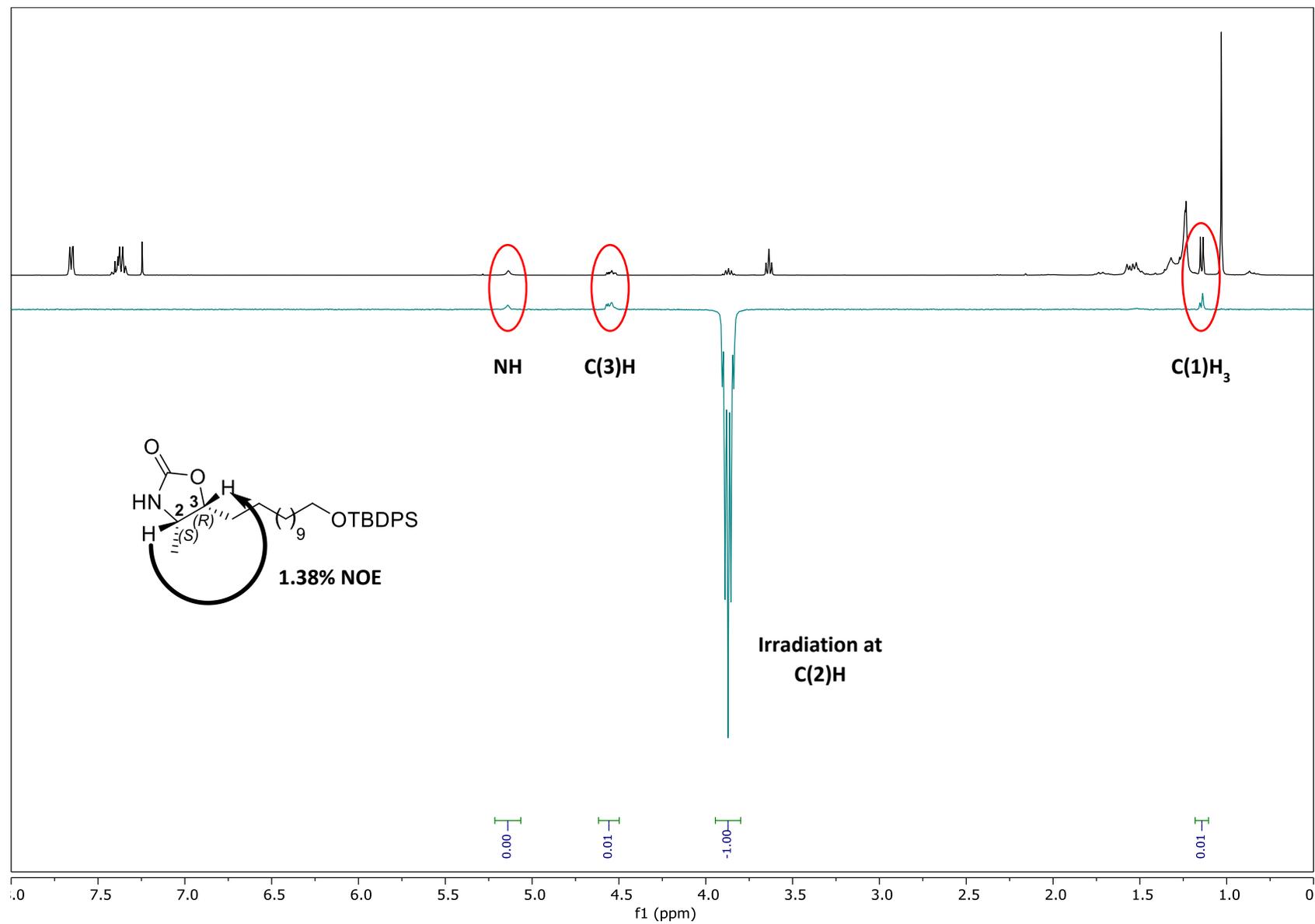
<sup>1</sup>H NMR



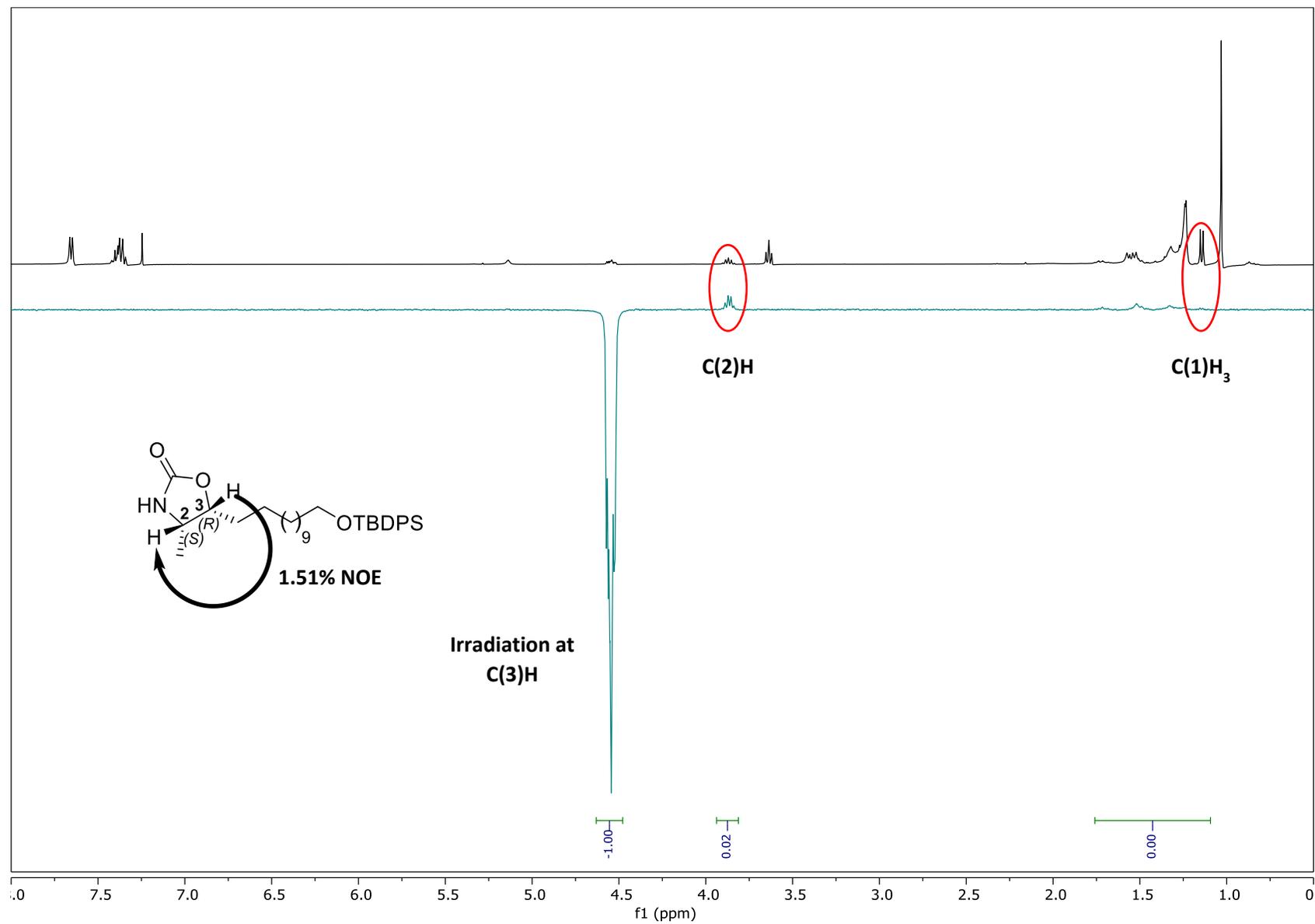
<sup>13</sup>C NMR



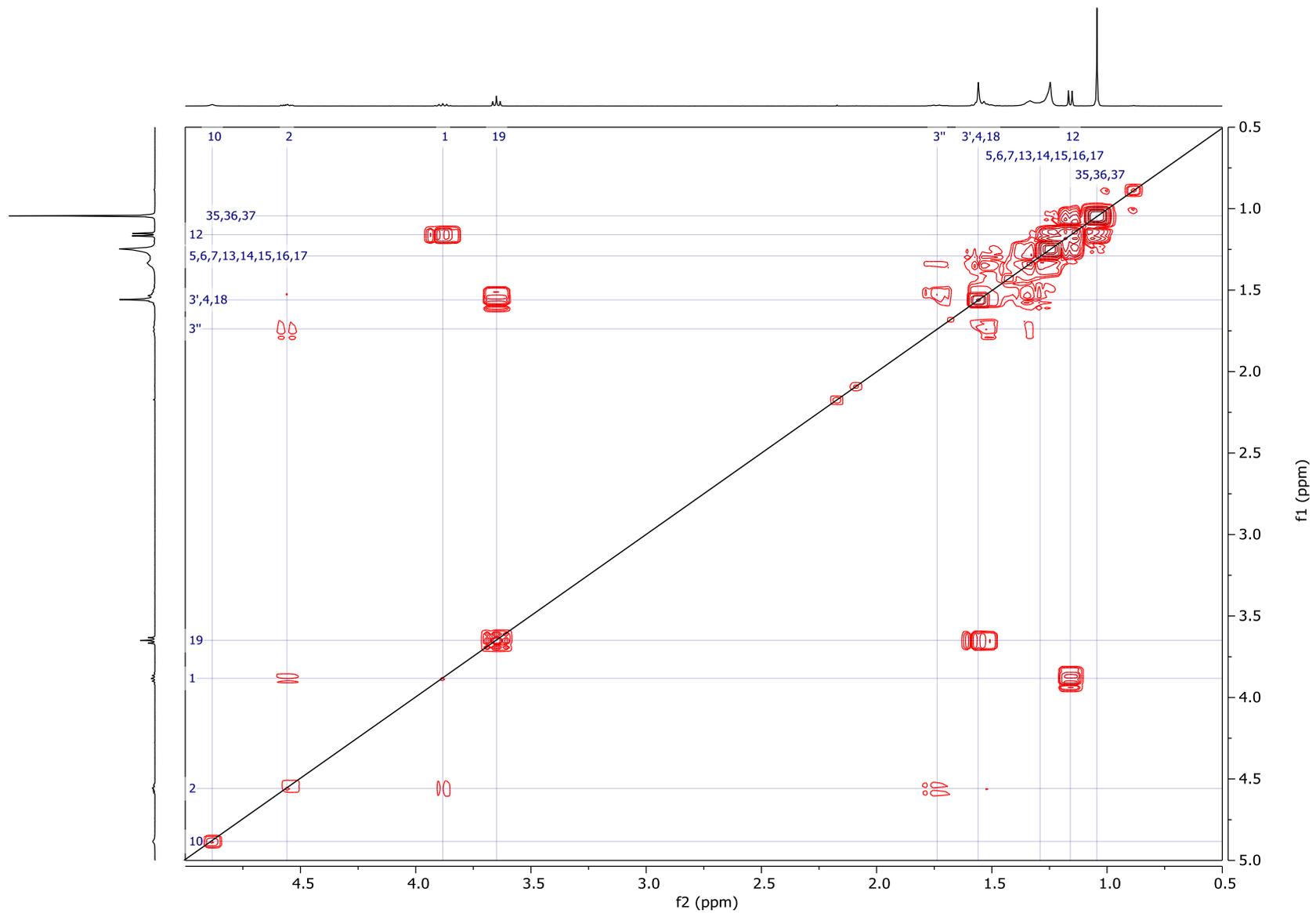
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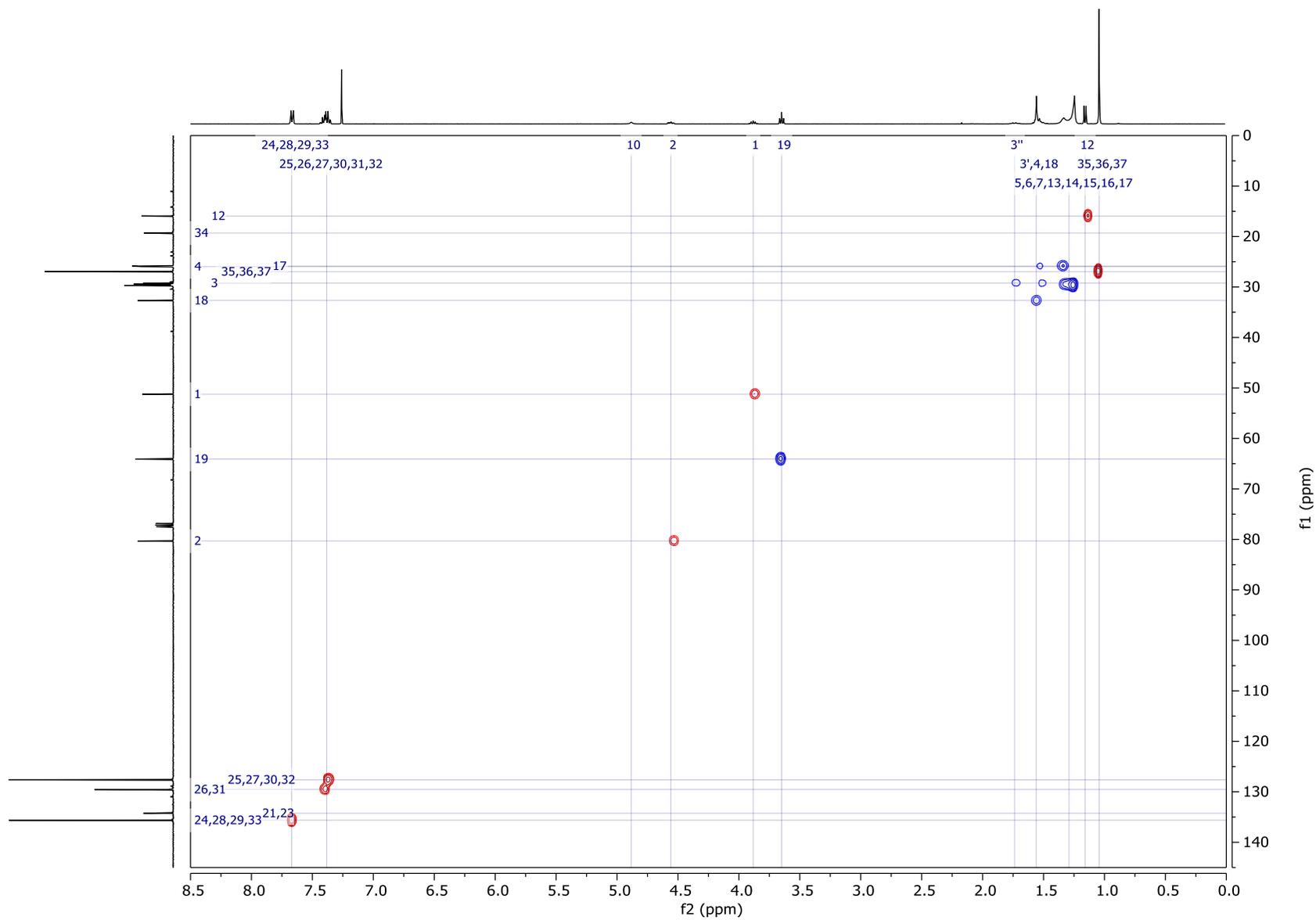
1D-NOESY(2) NMR



# COSY NMR

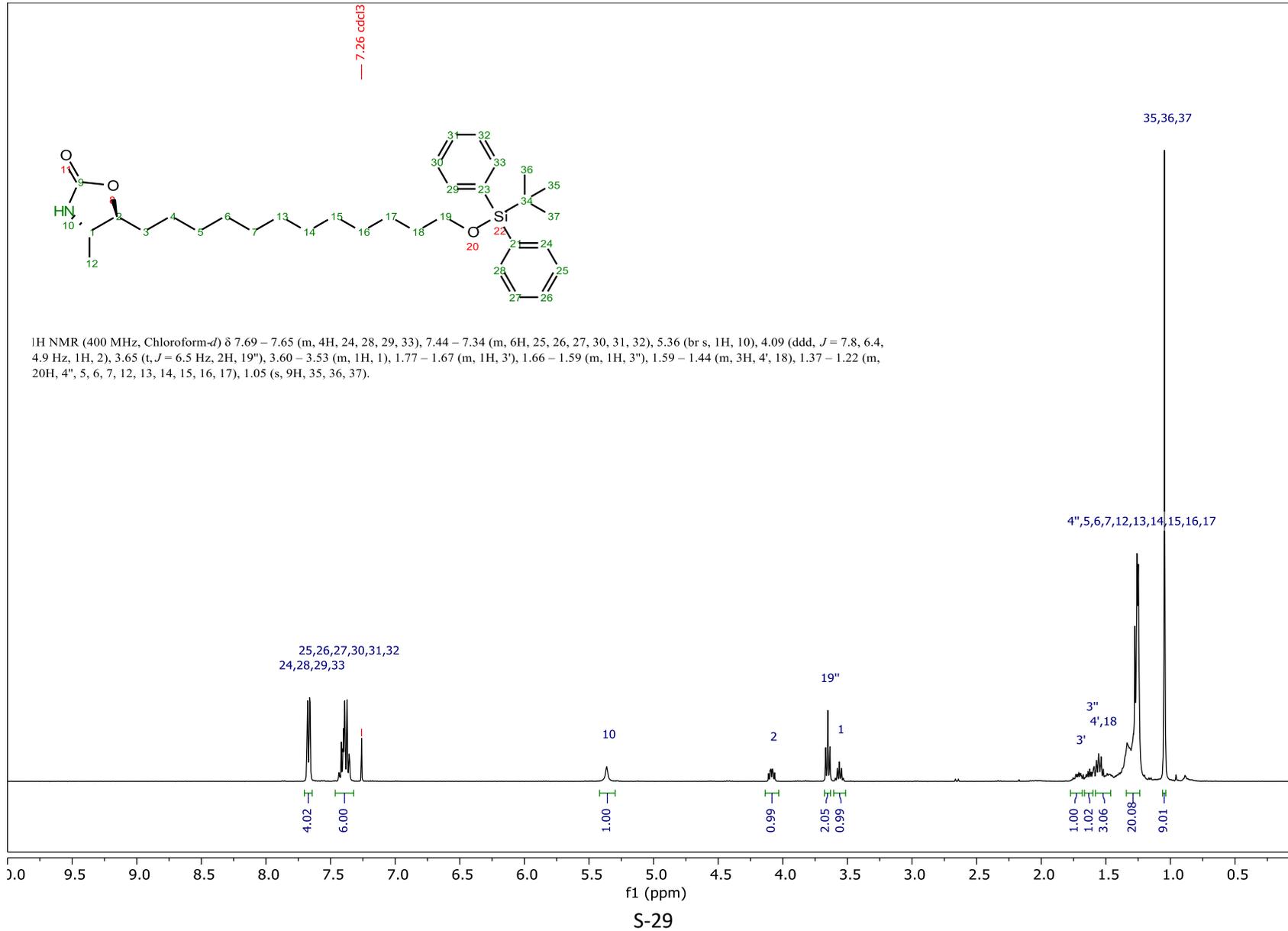


# HSQC NMR

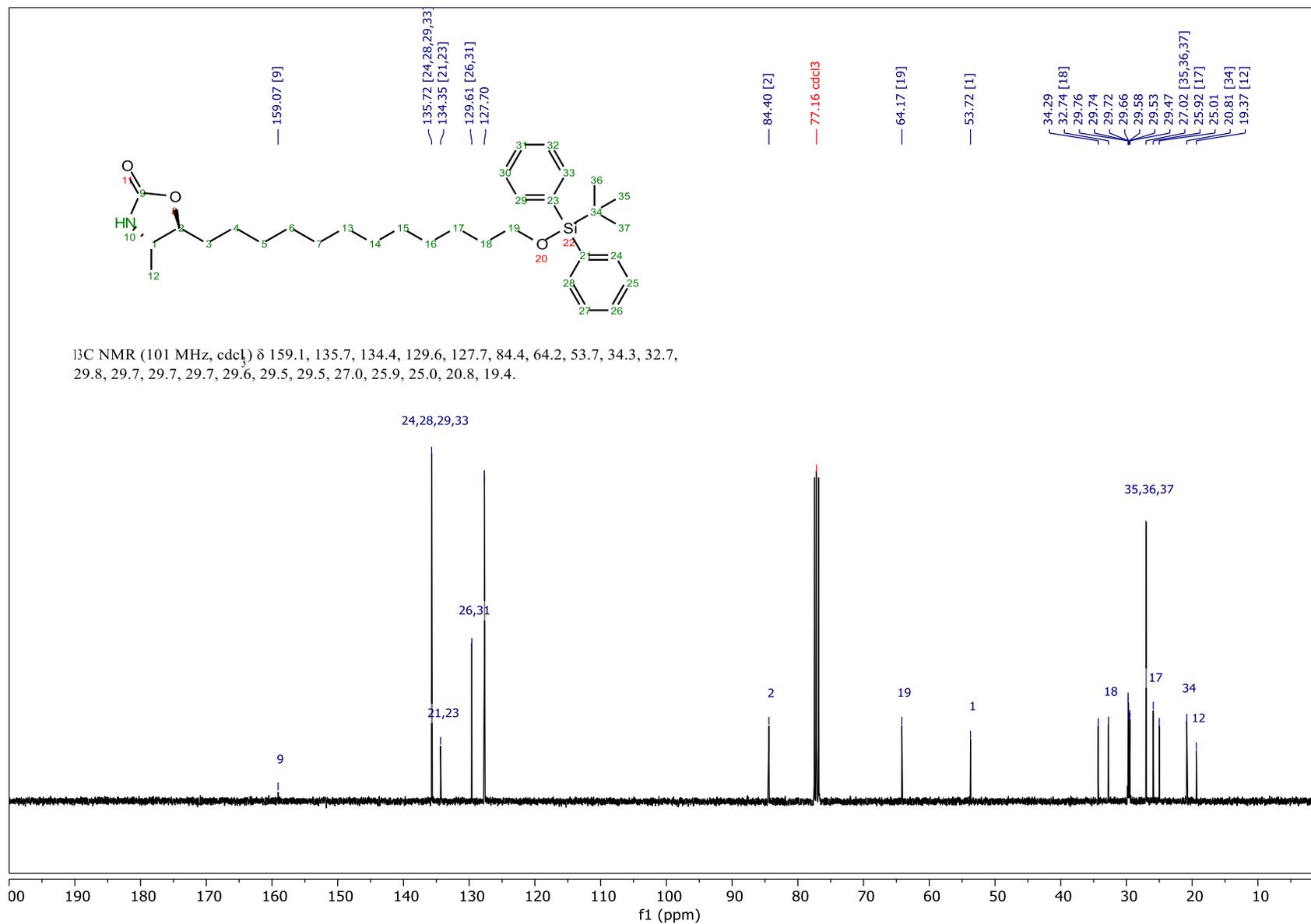


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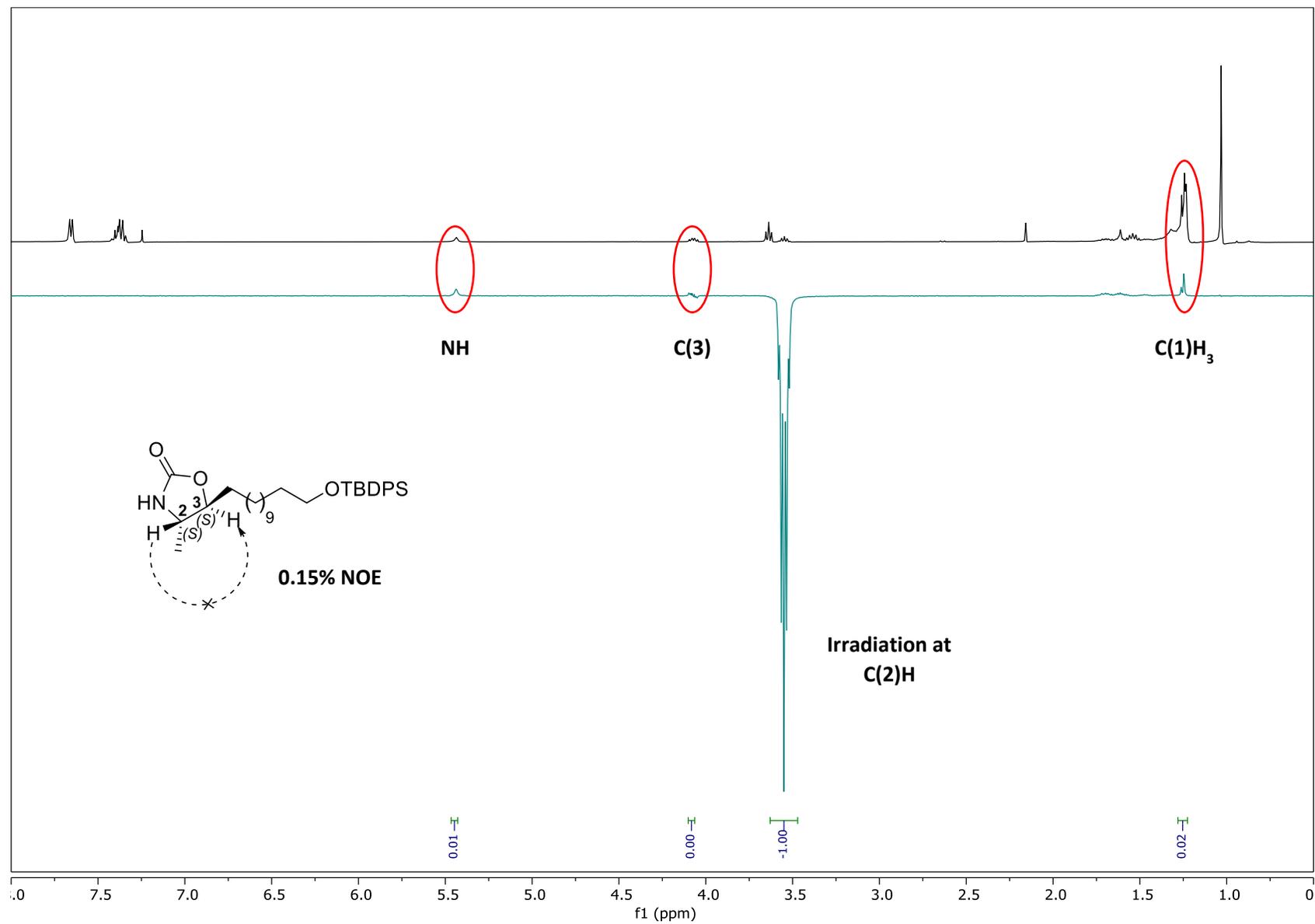
$^1\text{H NMR}$



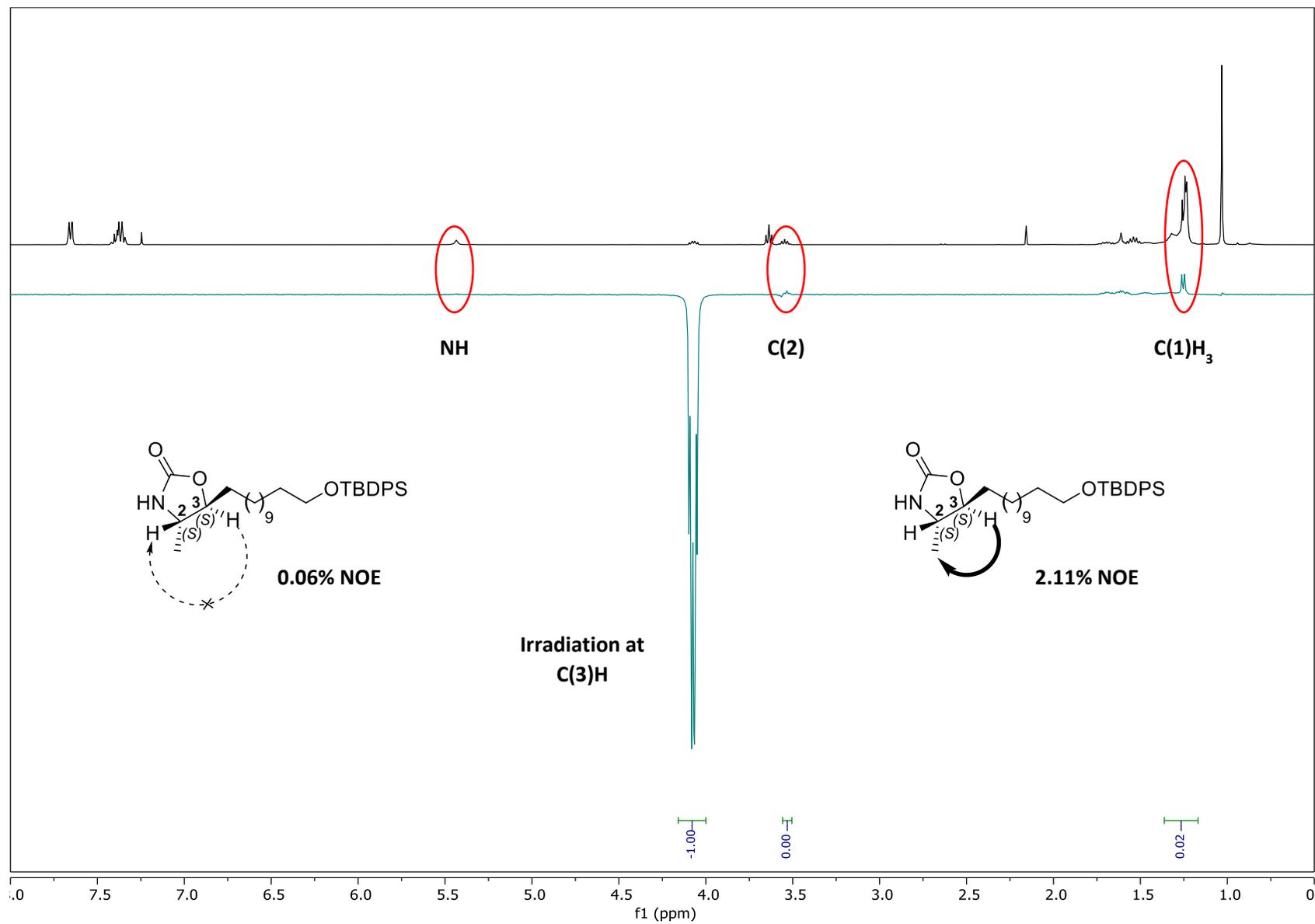
# <sup>13</sup>C NMR



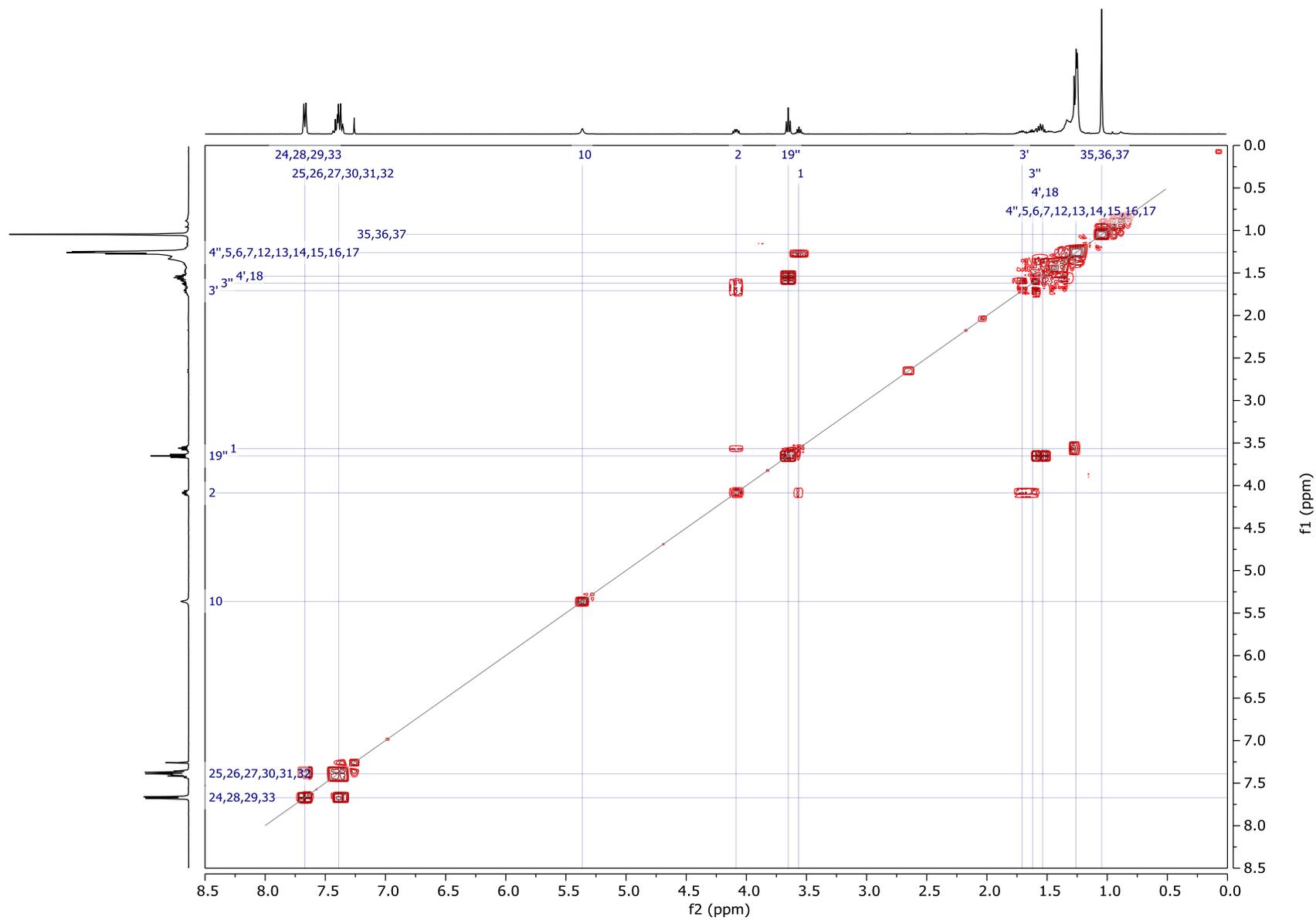
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1D-NOESY(2) NMR

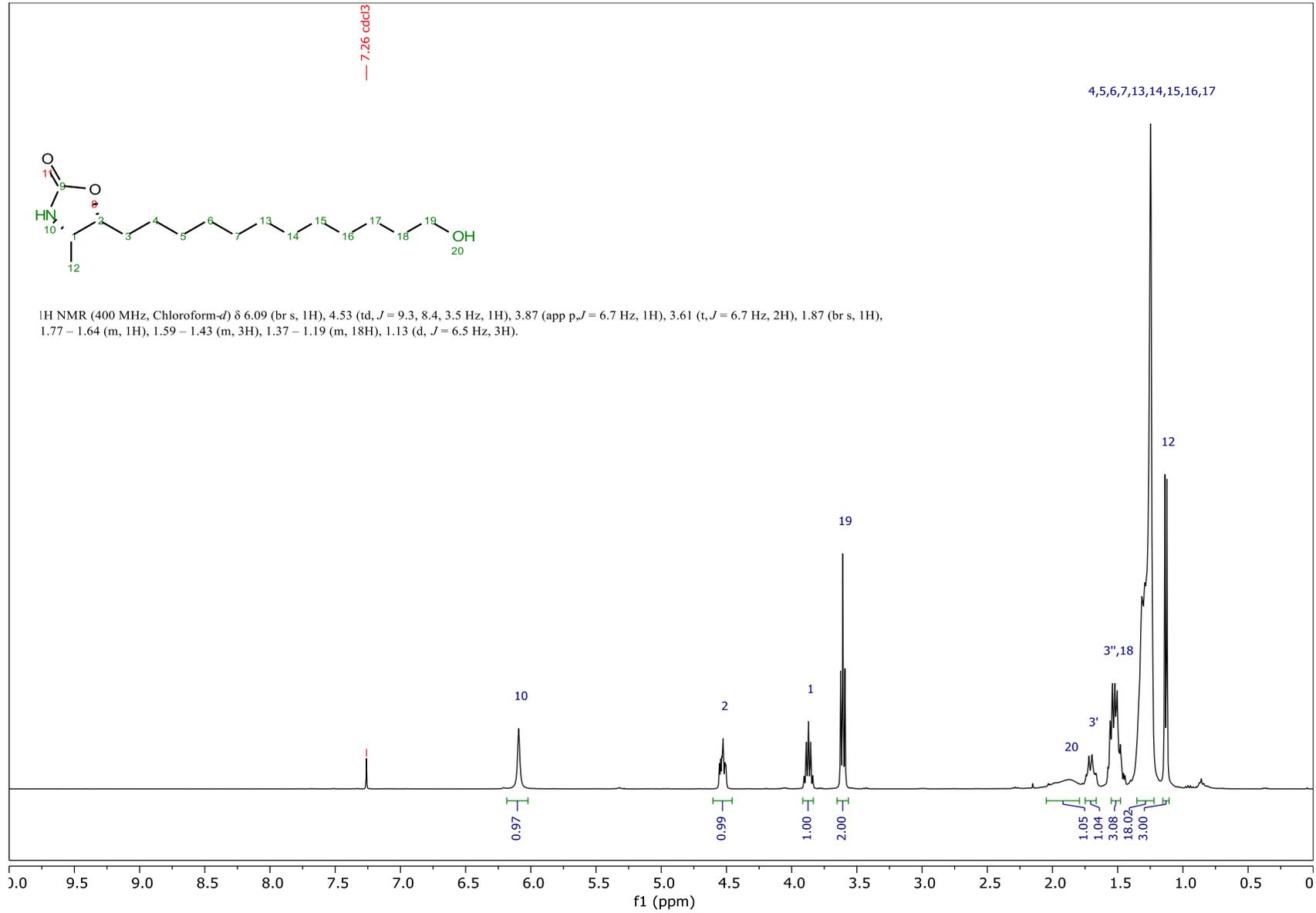


# COSY NMR

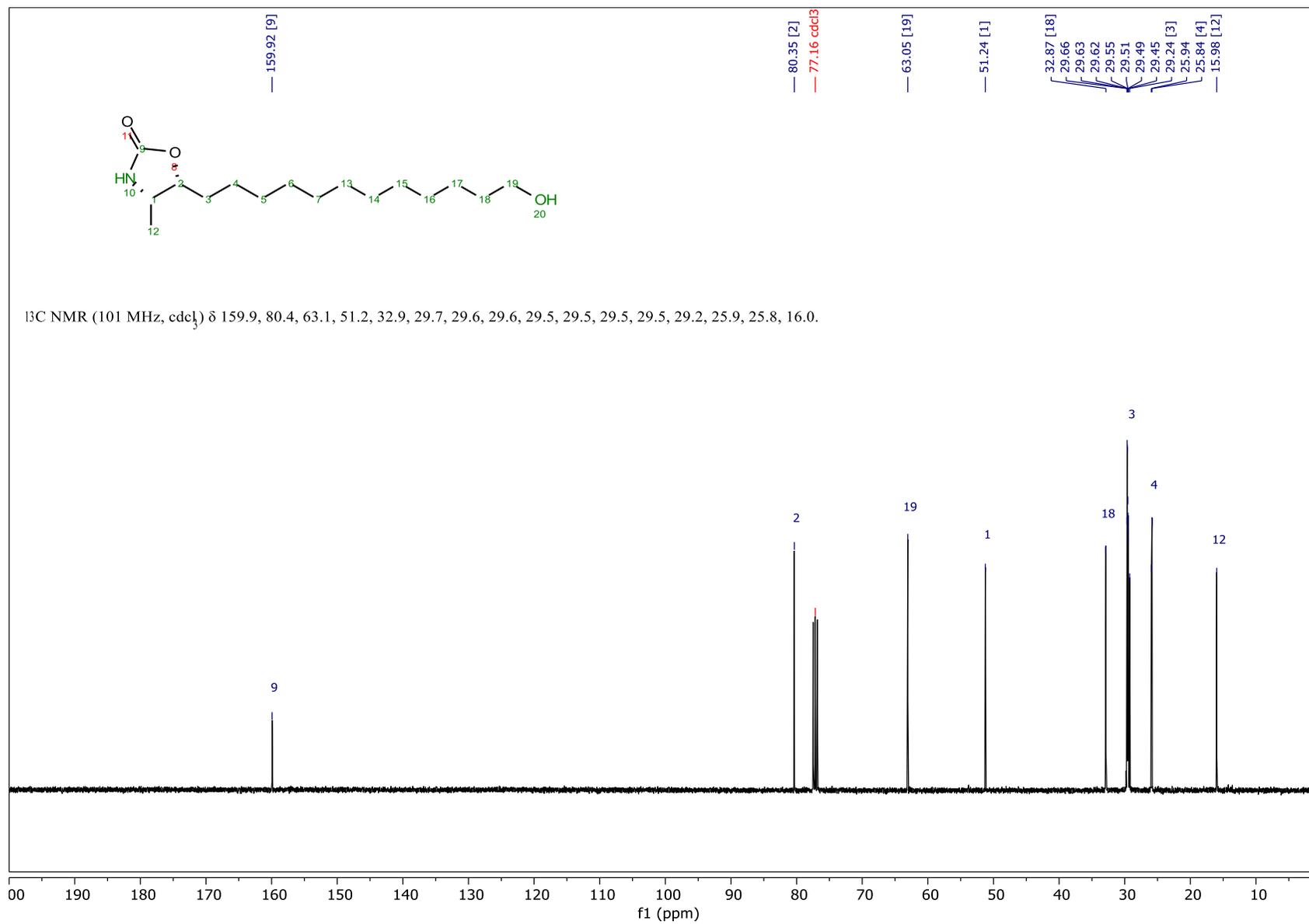


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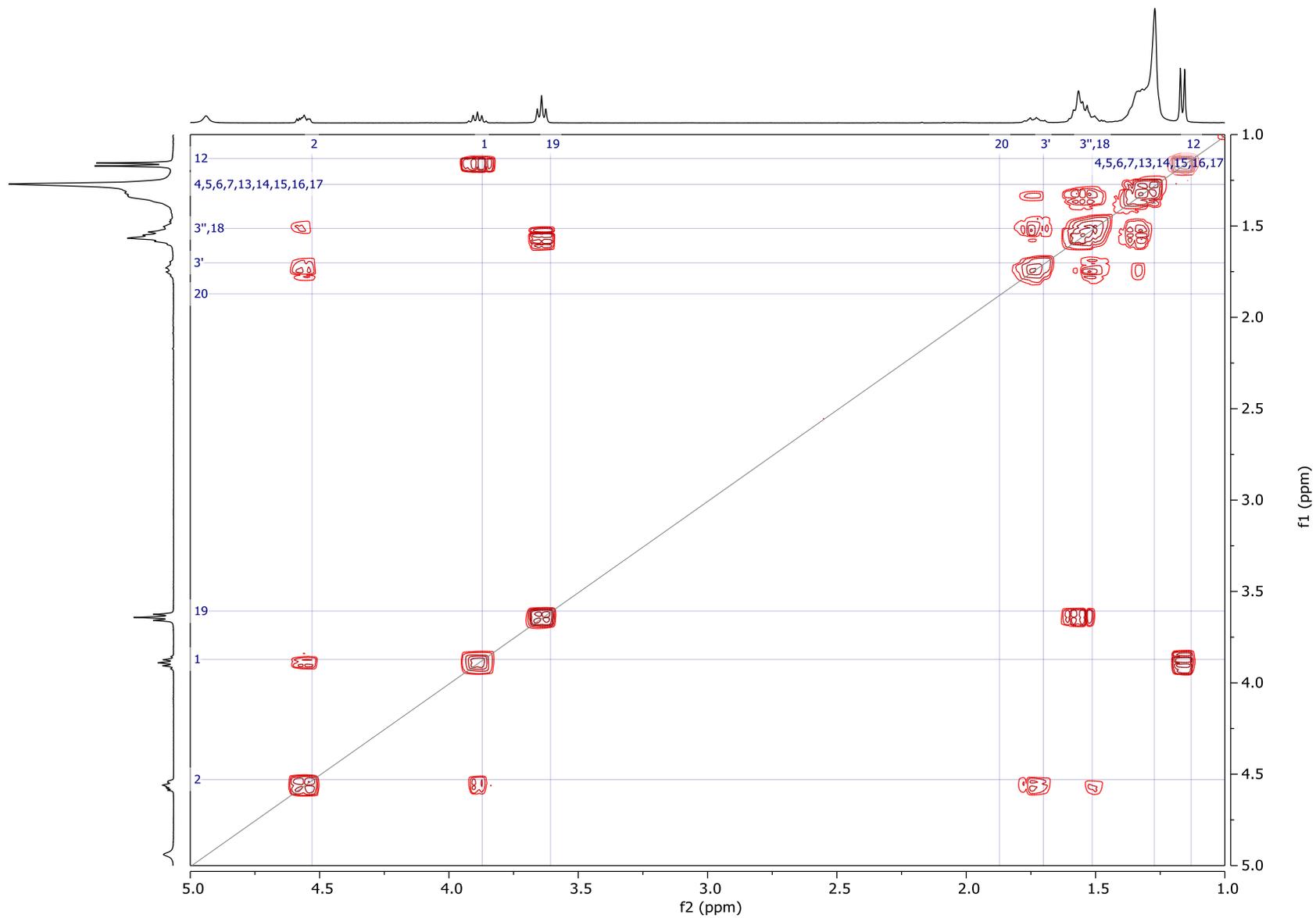
$^1\text{H NMR}$



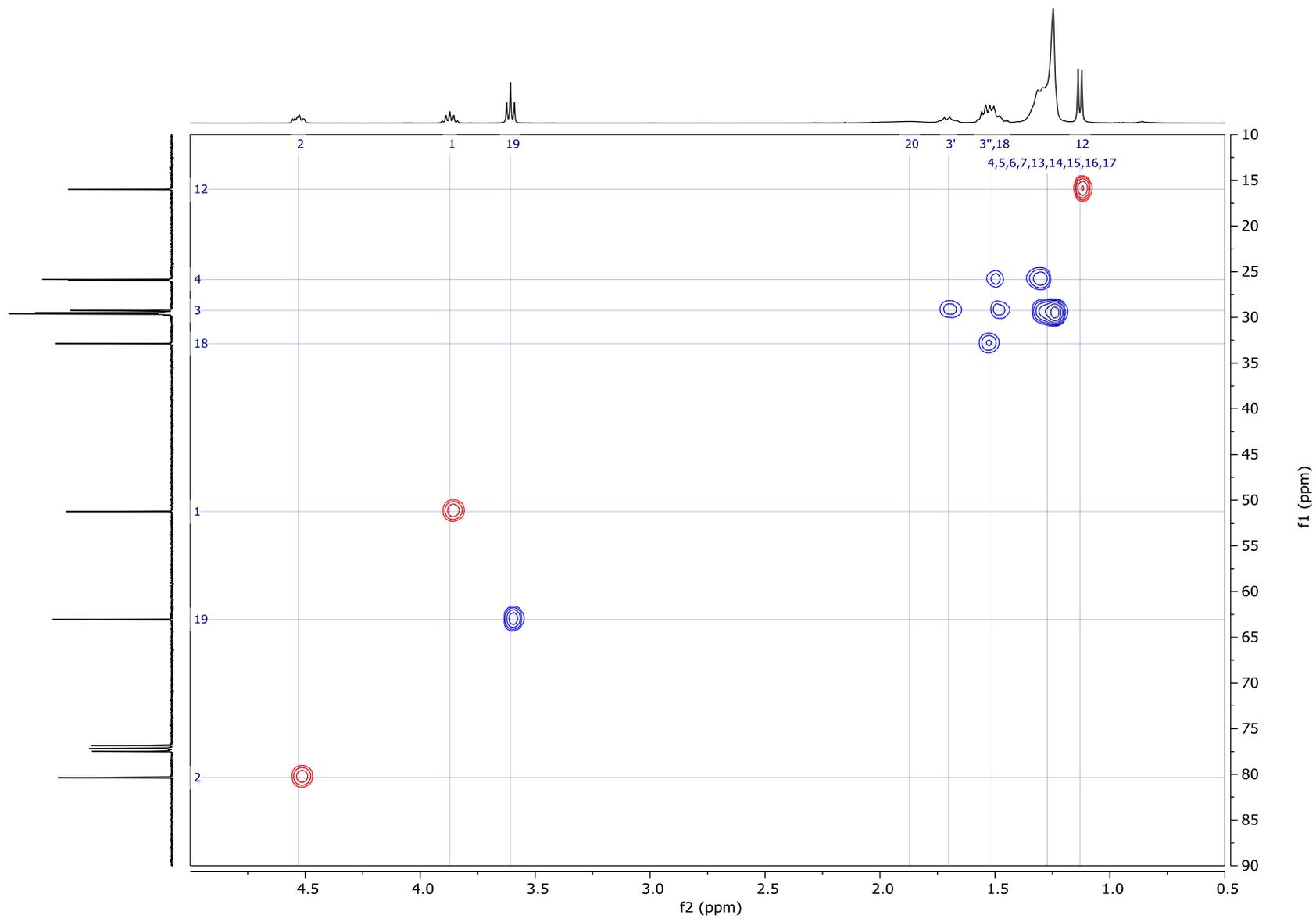
<sup>13</sup>C NMR



COSY NMR

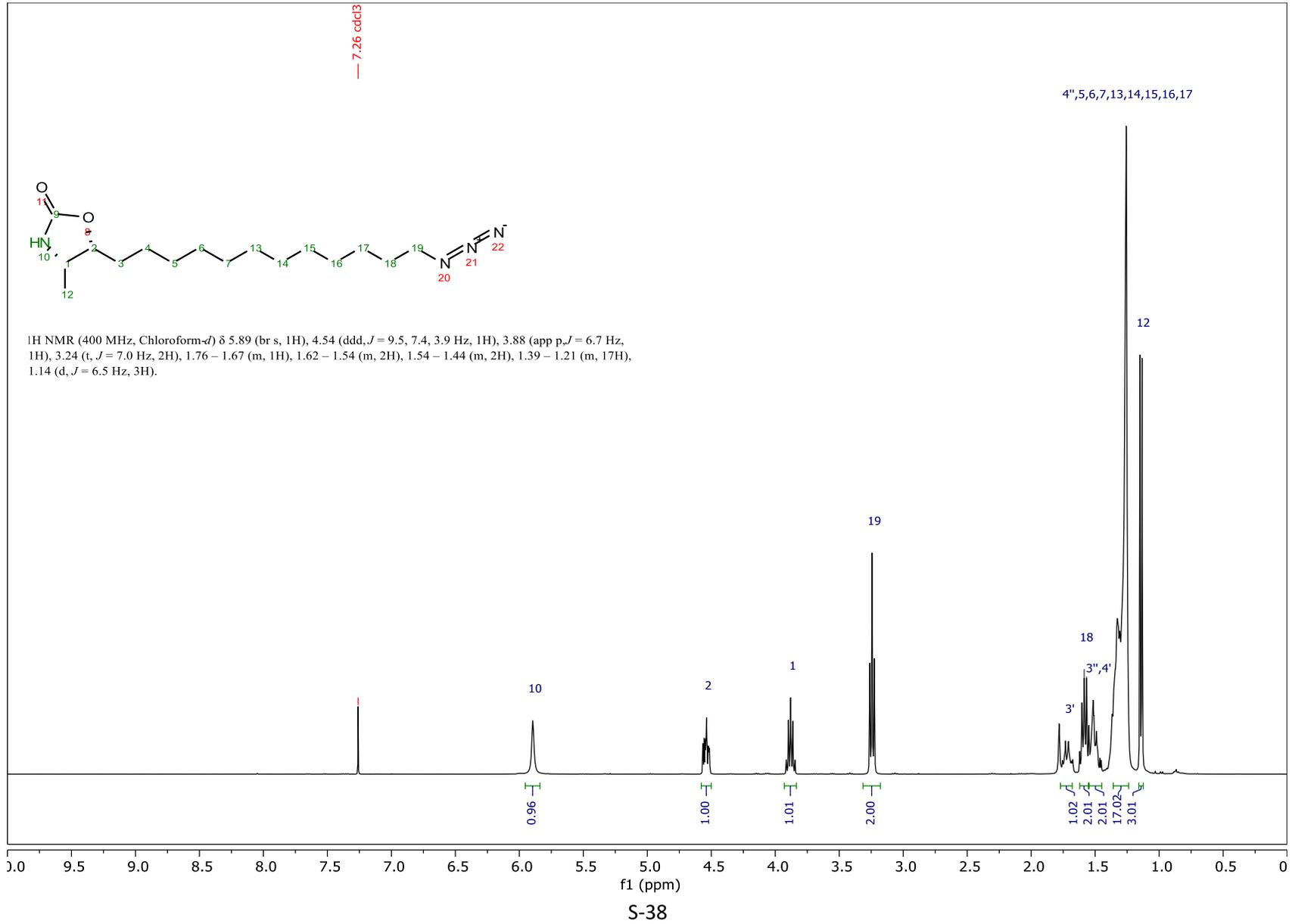


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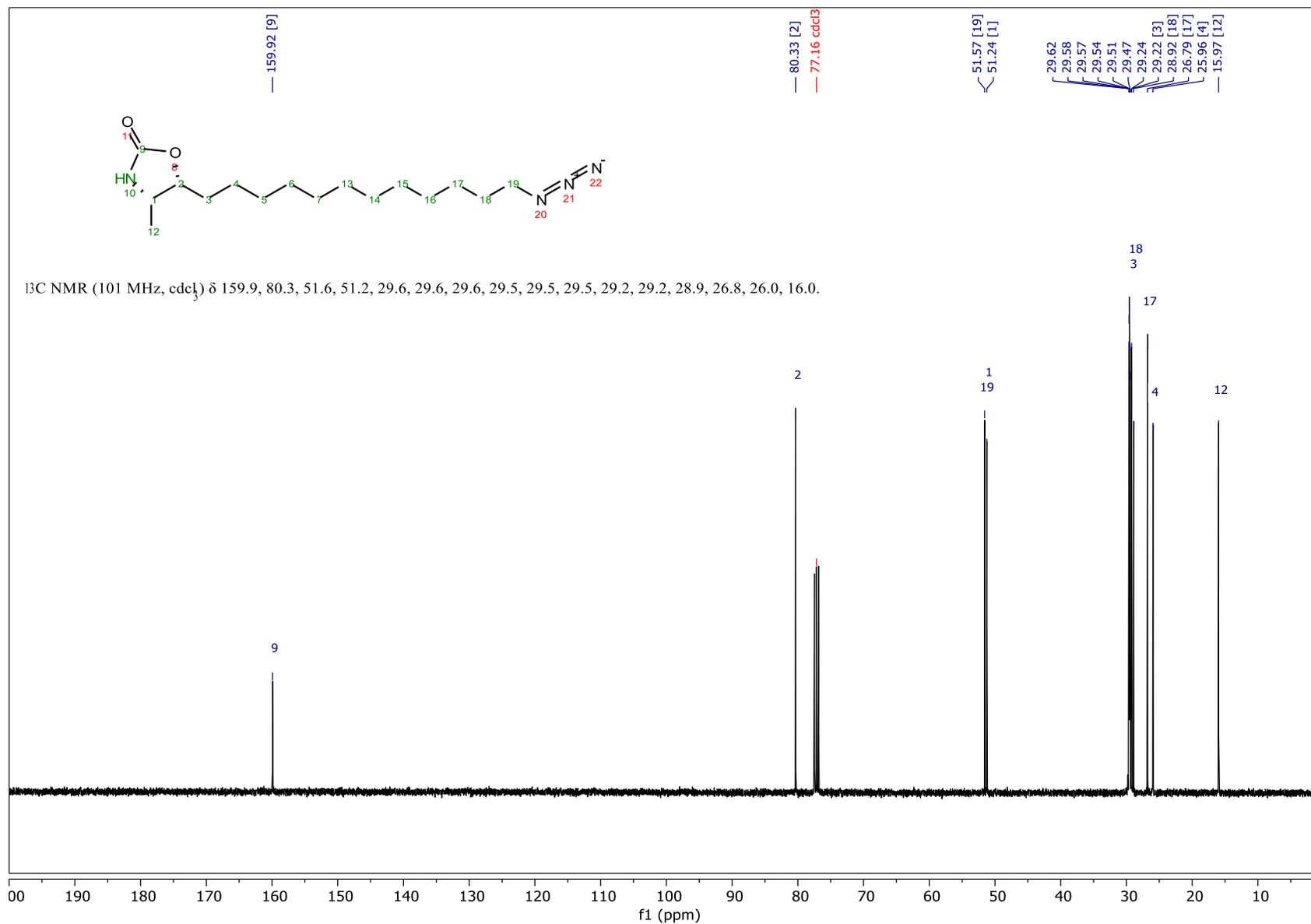


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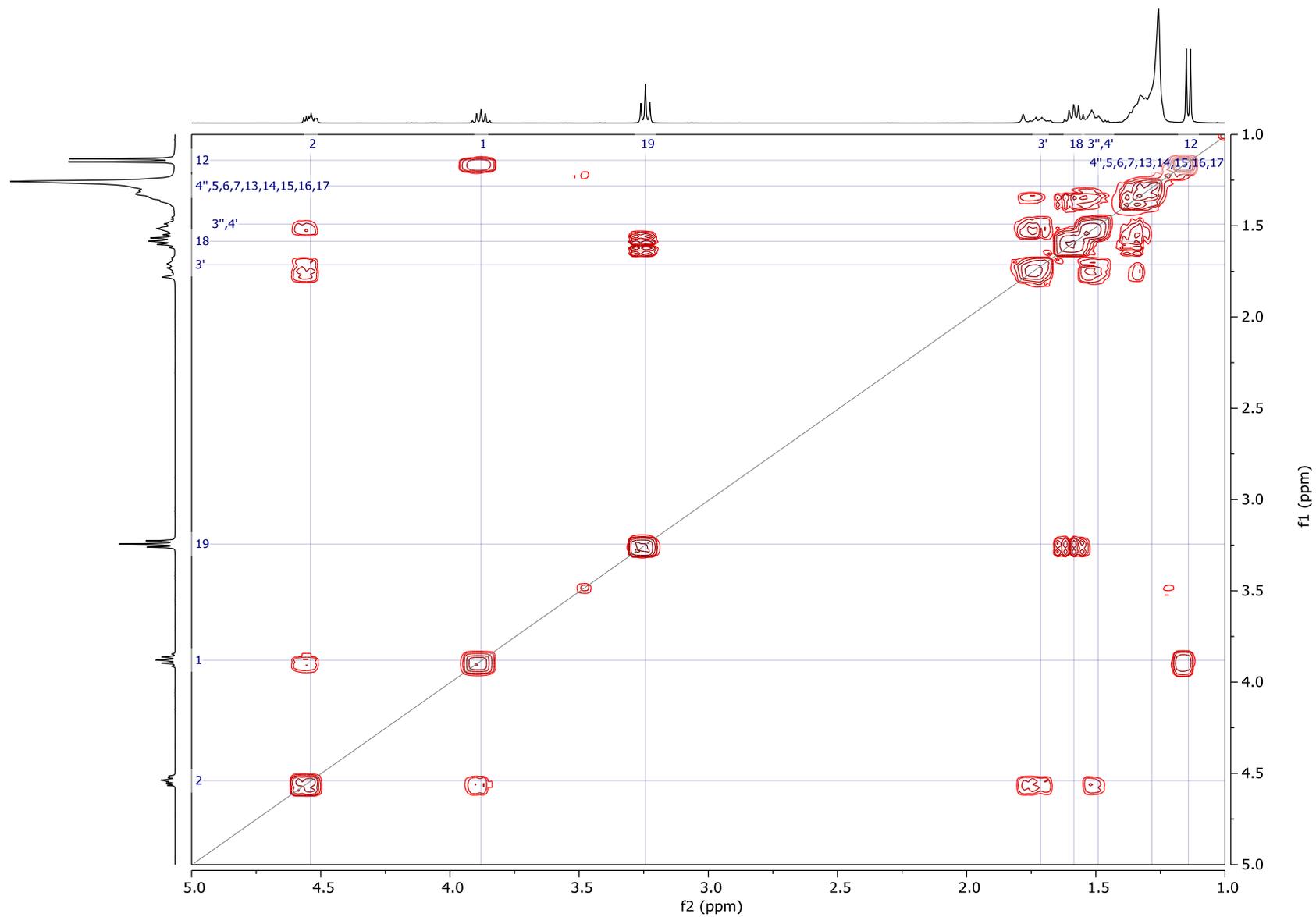
$^1\text{H}$  NMR



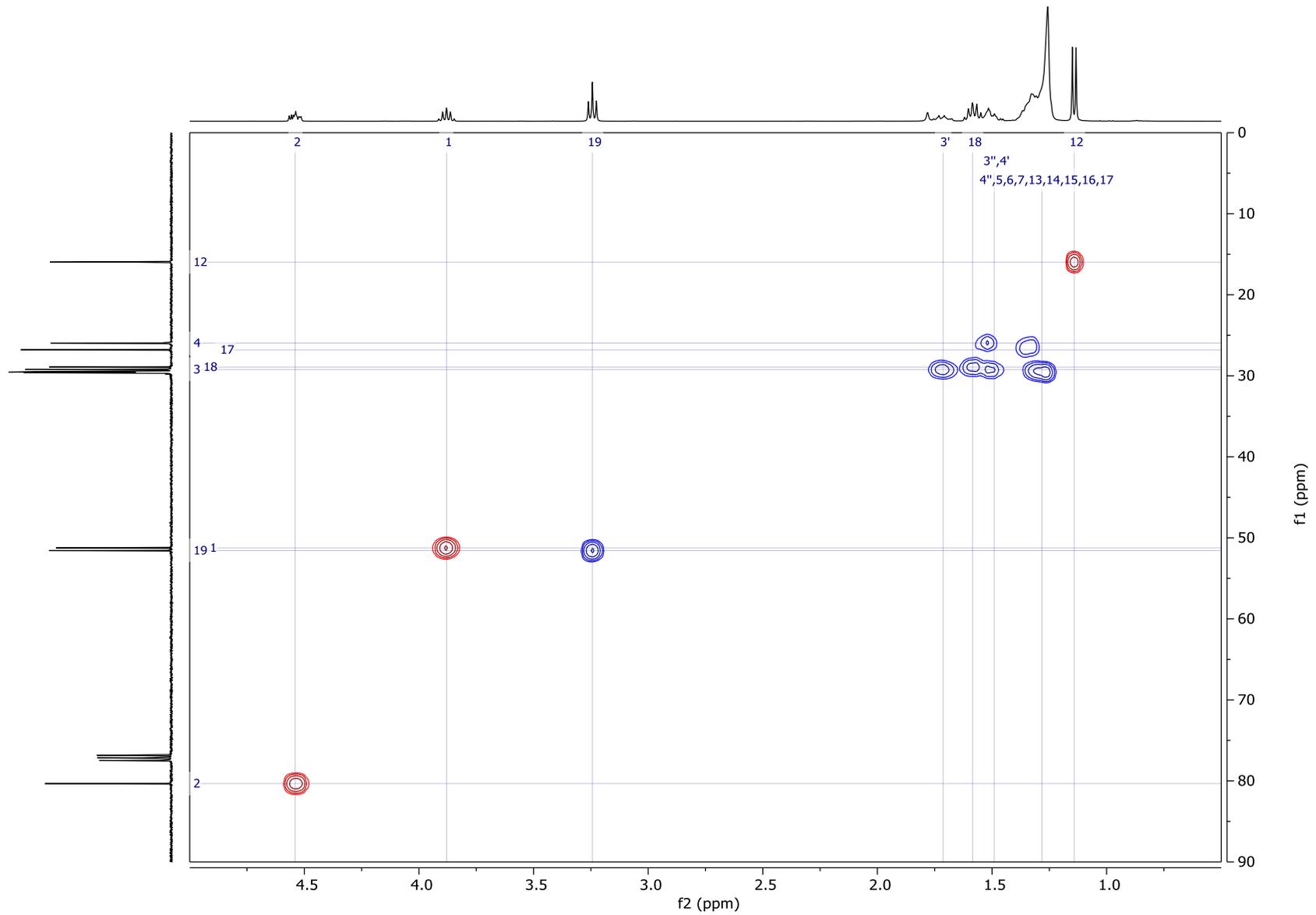
<sup>13</sup>C NMR



# COSY NMR

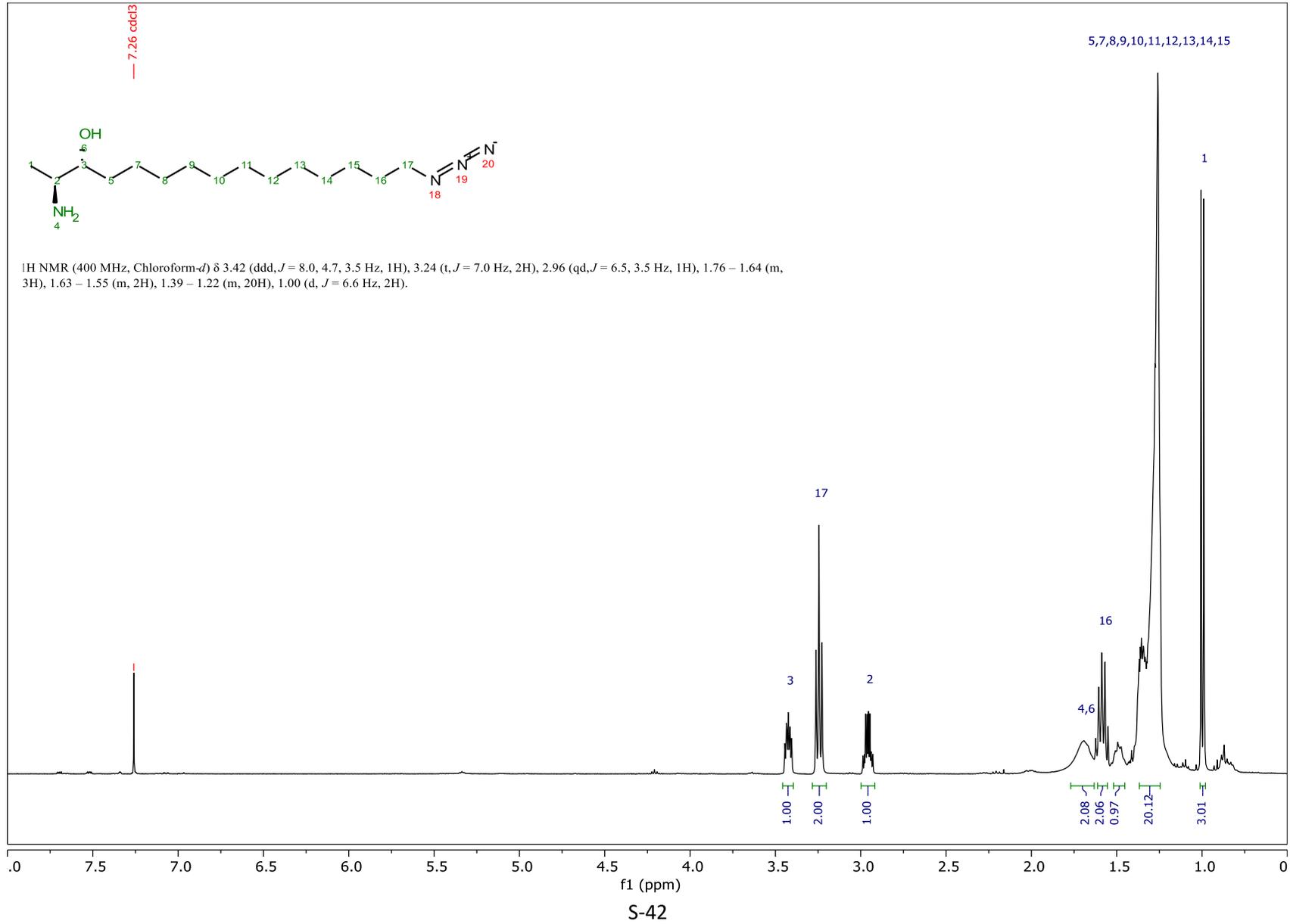


# HSQC NMR

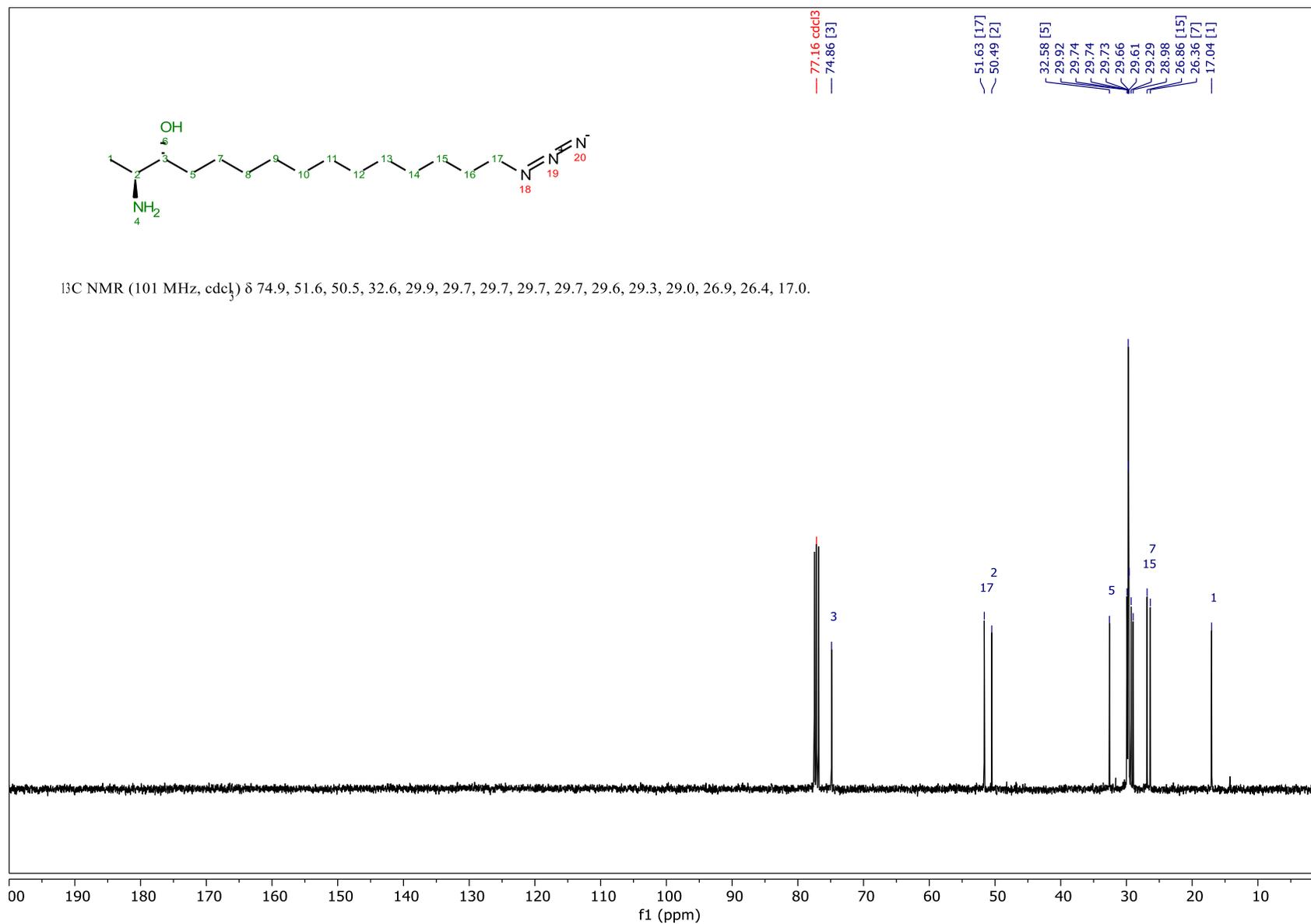


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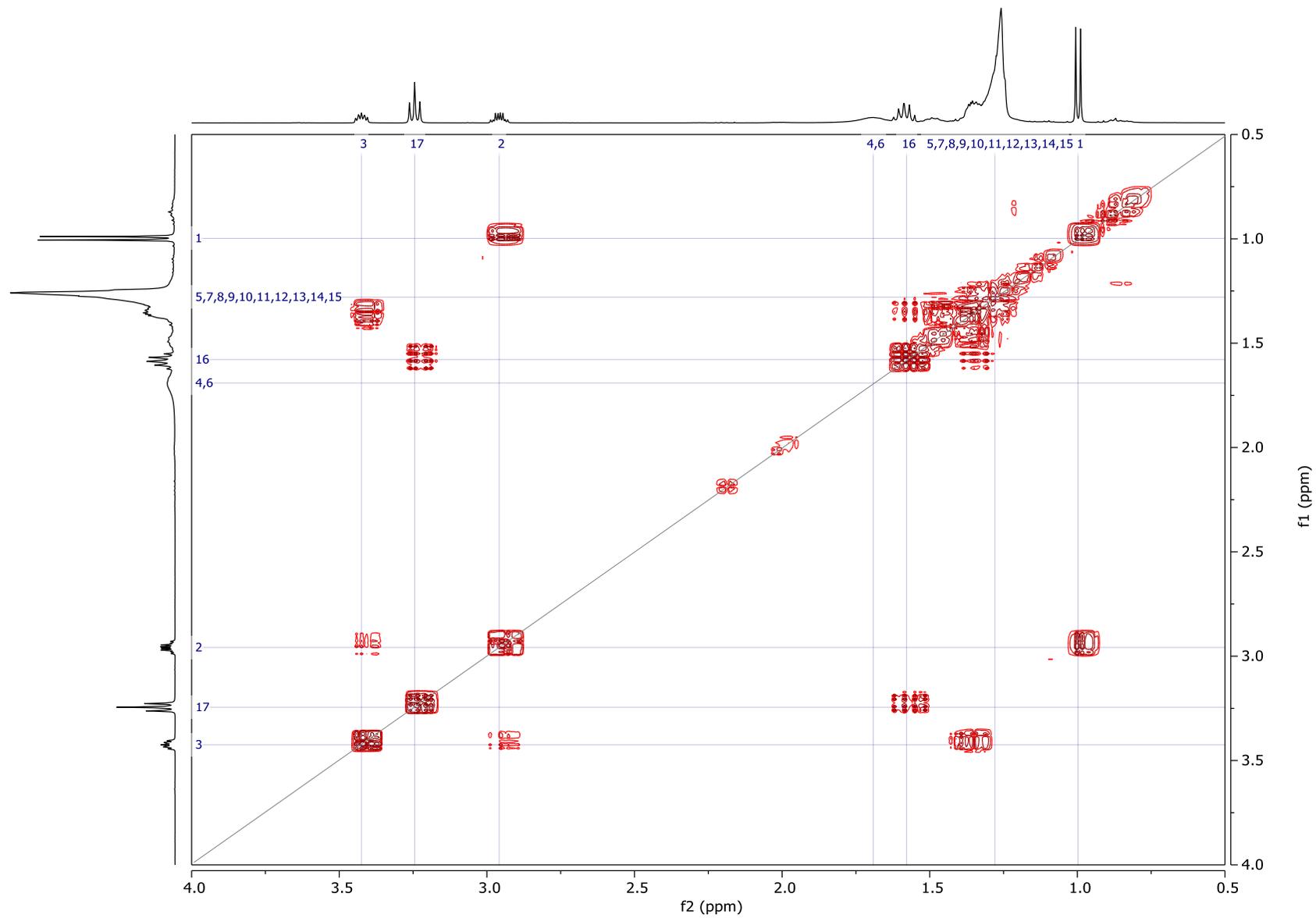
$^1\text{H}$  NMR



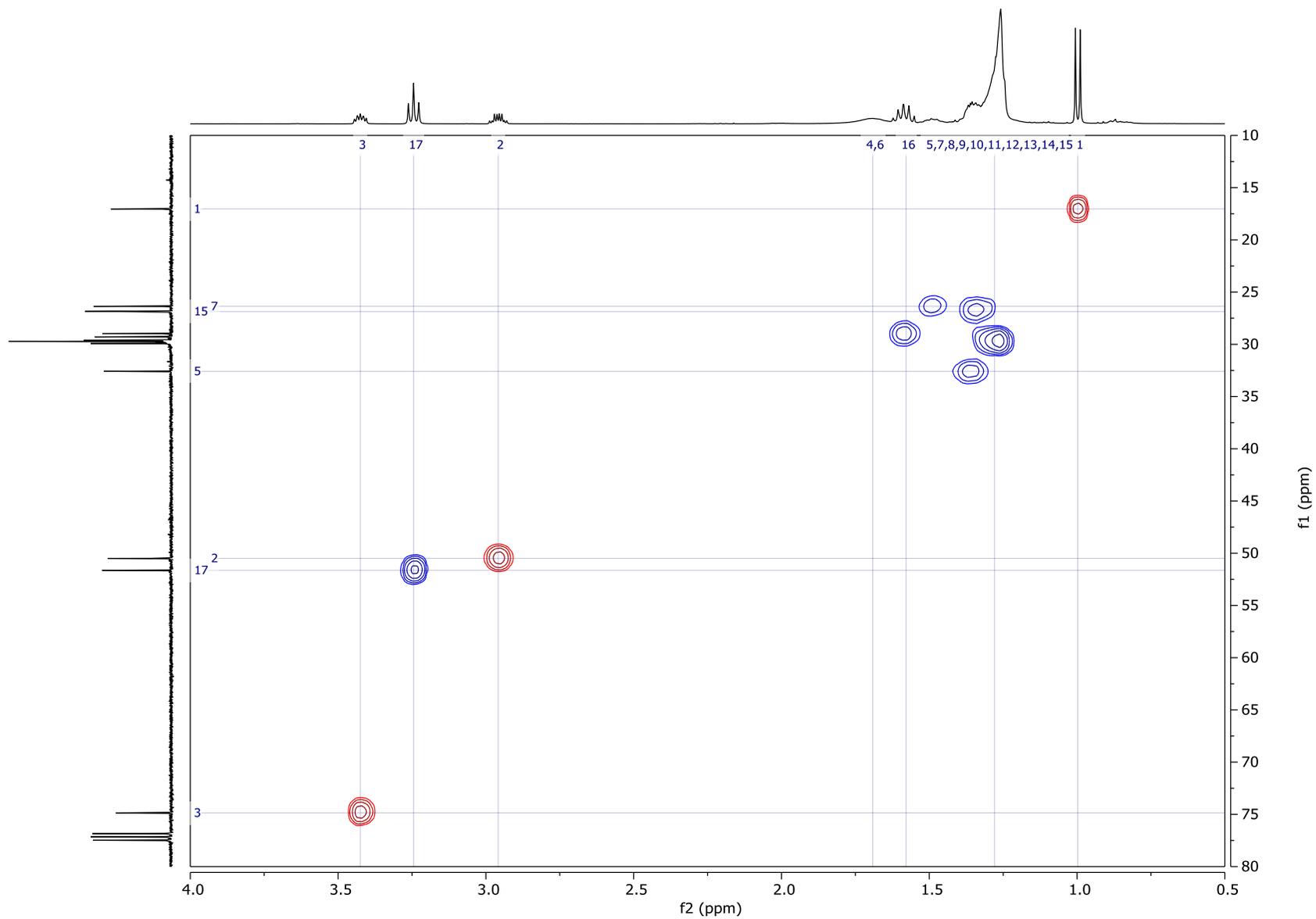
$^{13}\text{C}$  NMR



# COSY NMR

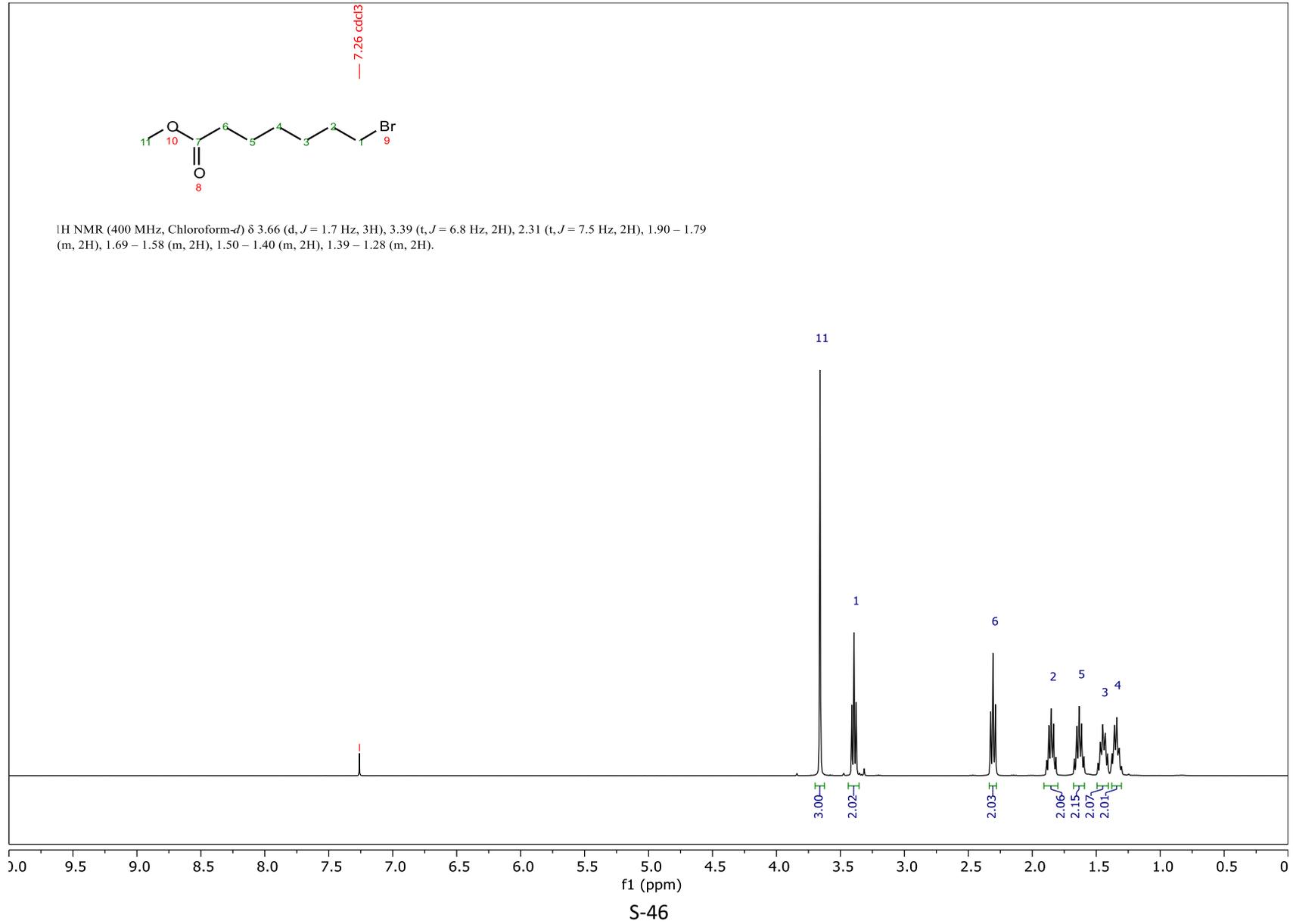


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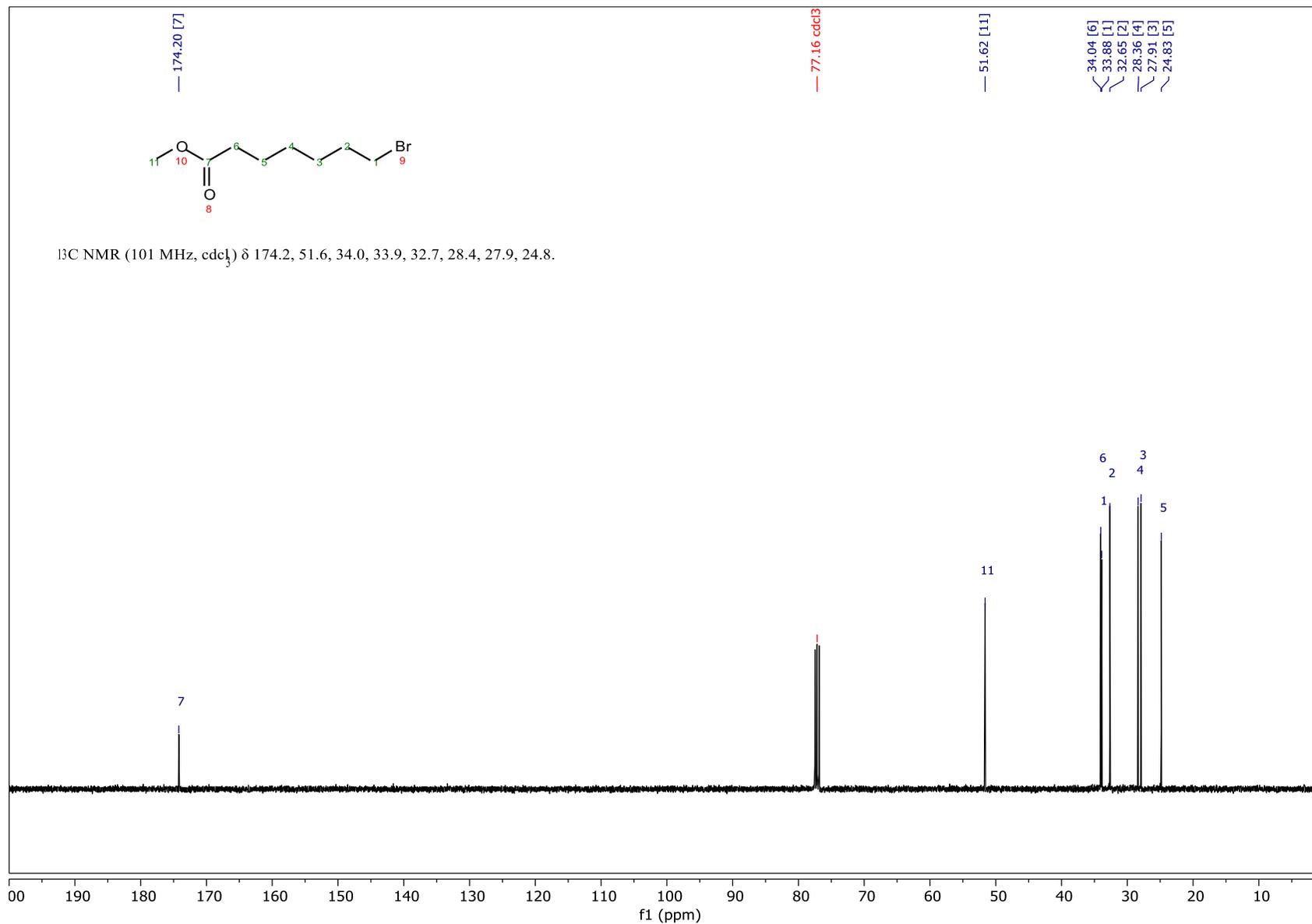


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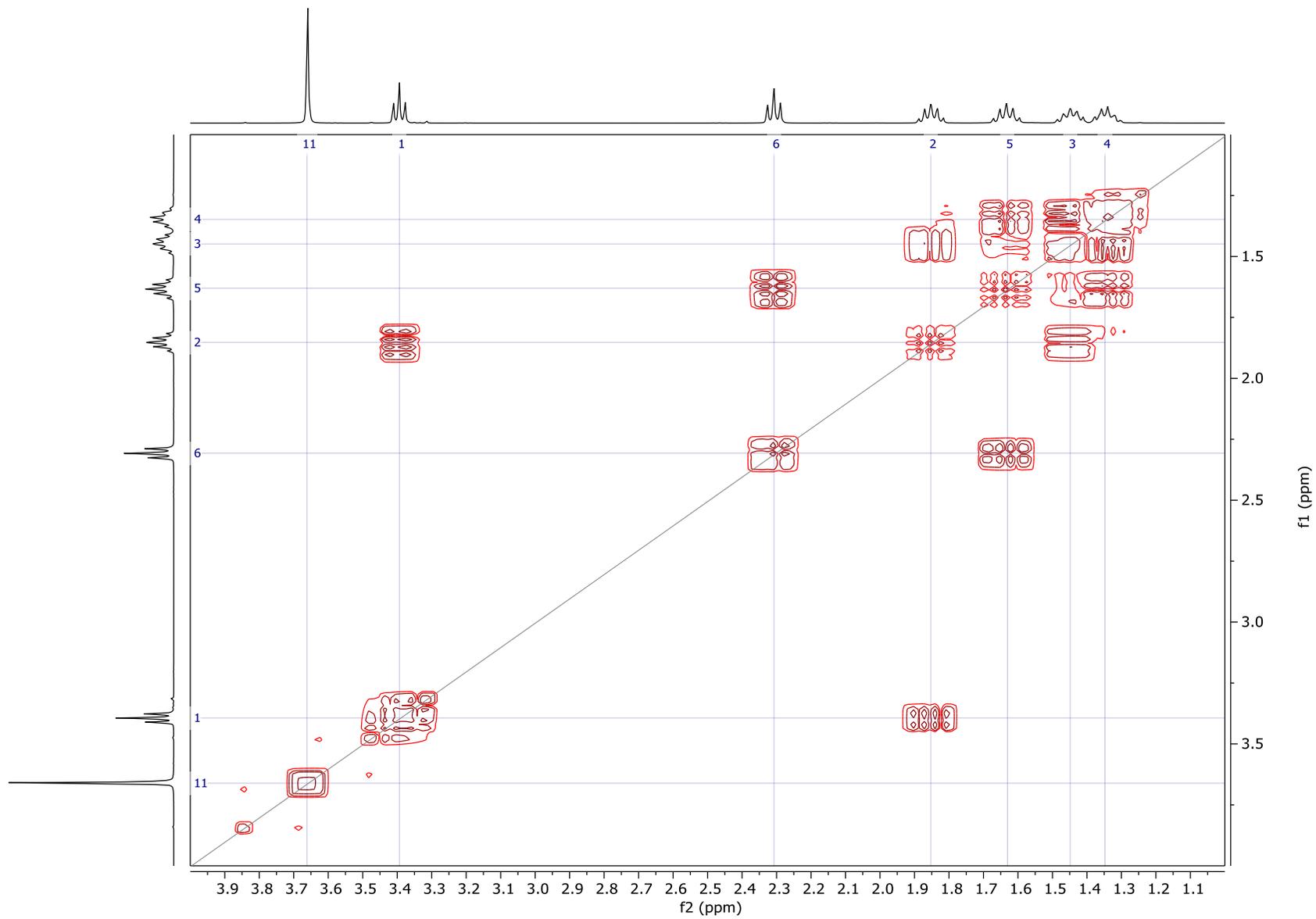
$^1\text{H}$  NMR



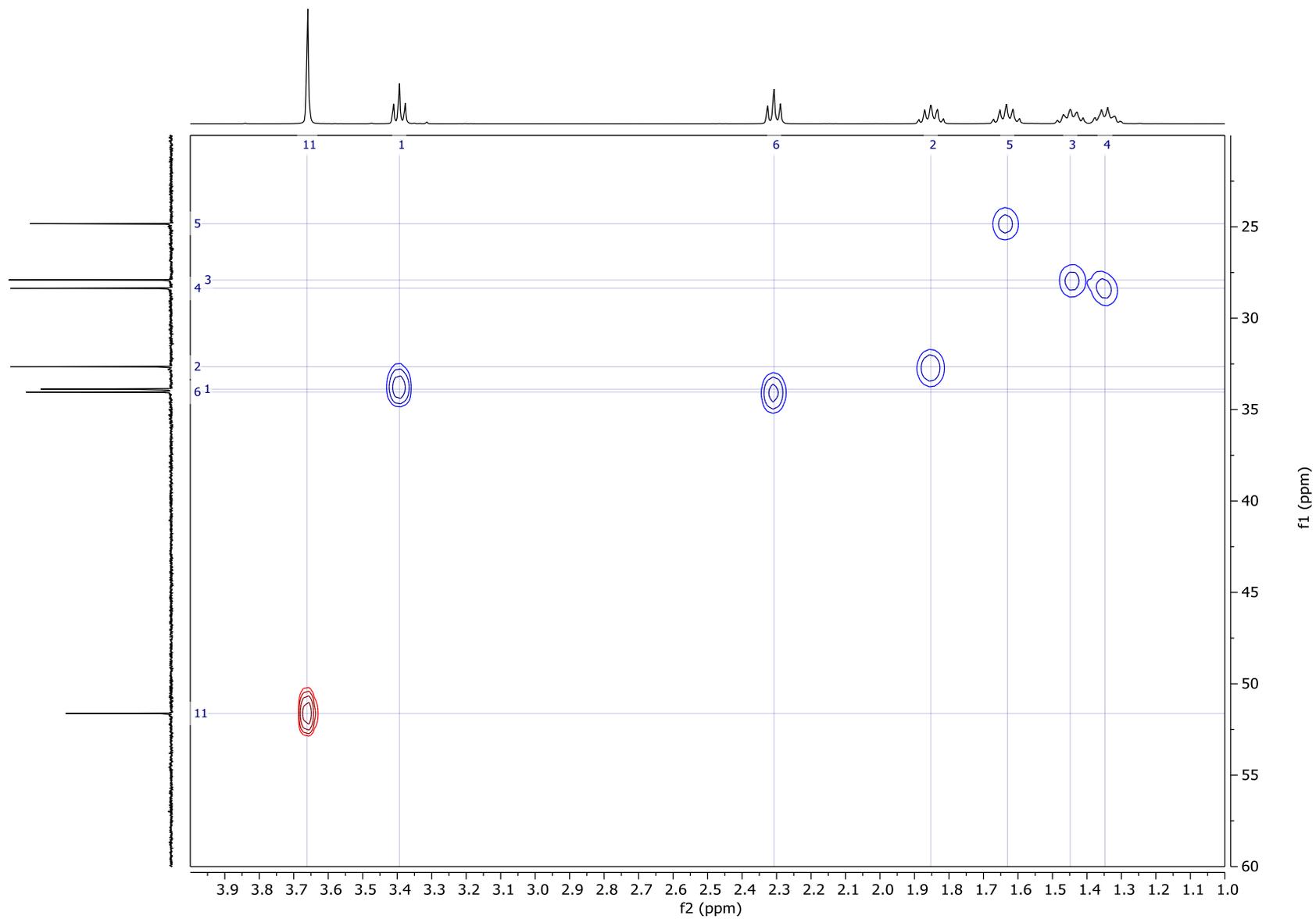
<sup>13</sup>C NMR



COSY NMR

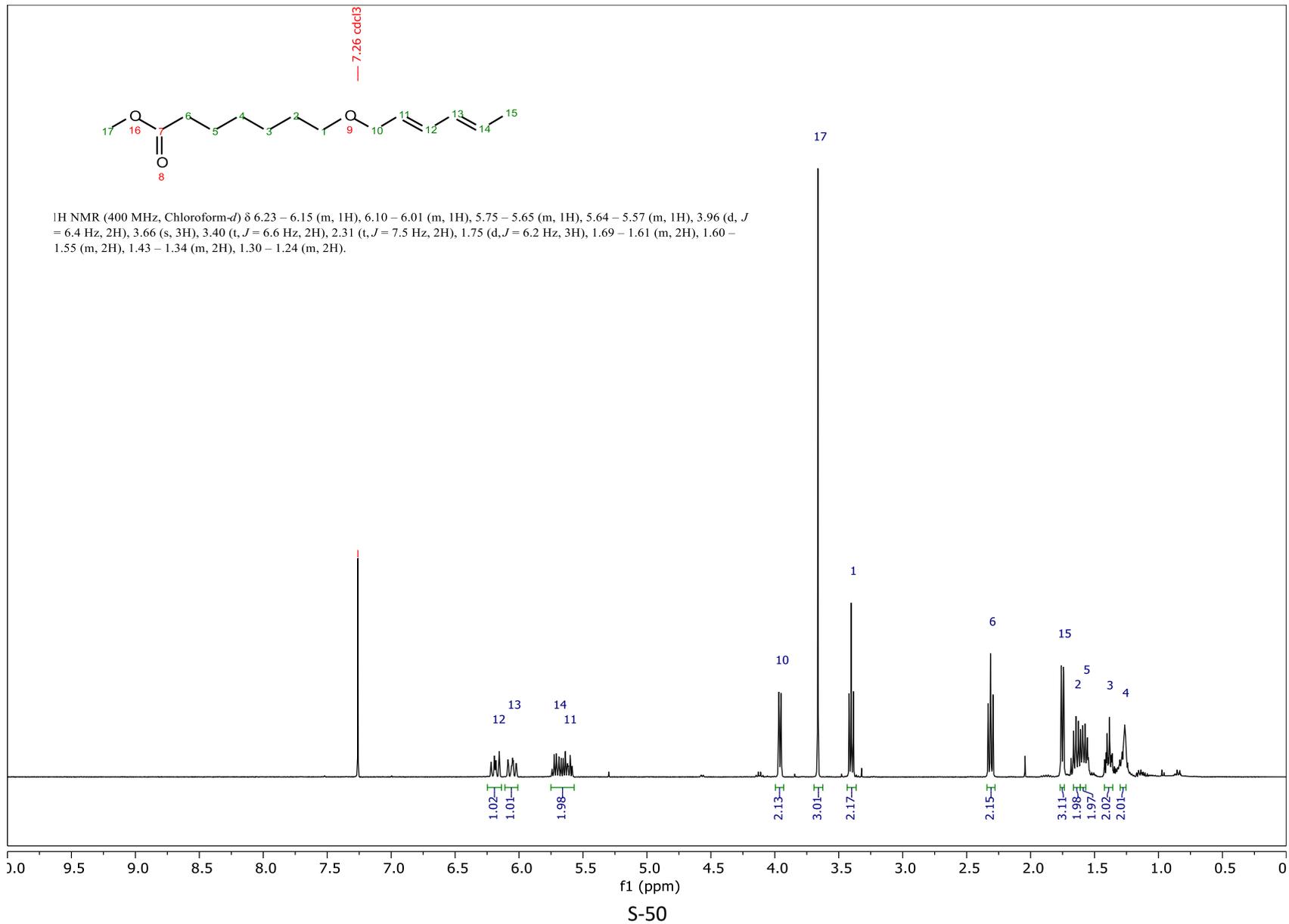


# HSQC NMR



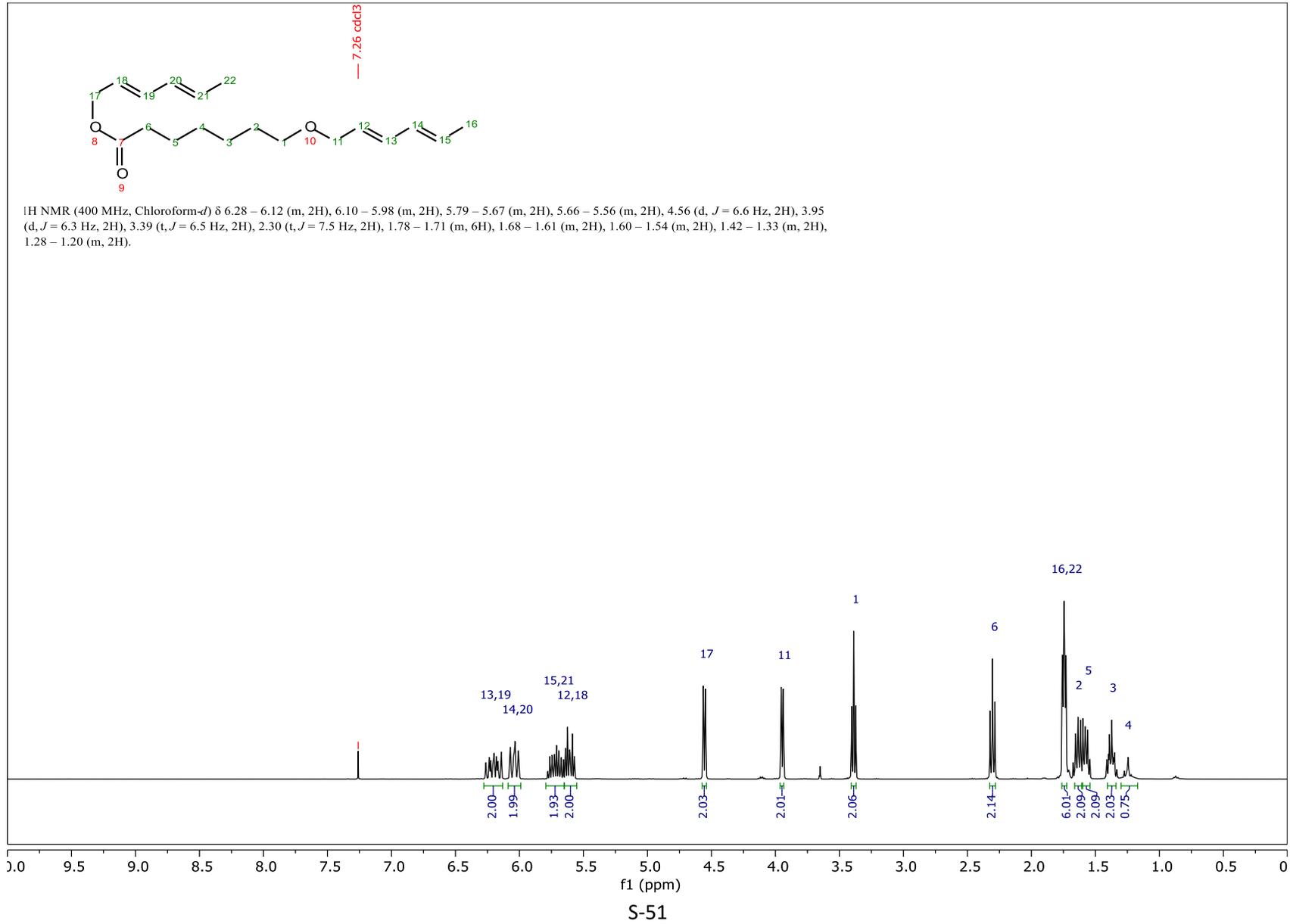
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<sup>1</sup>H NMR



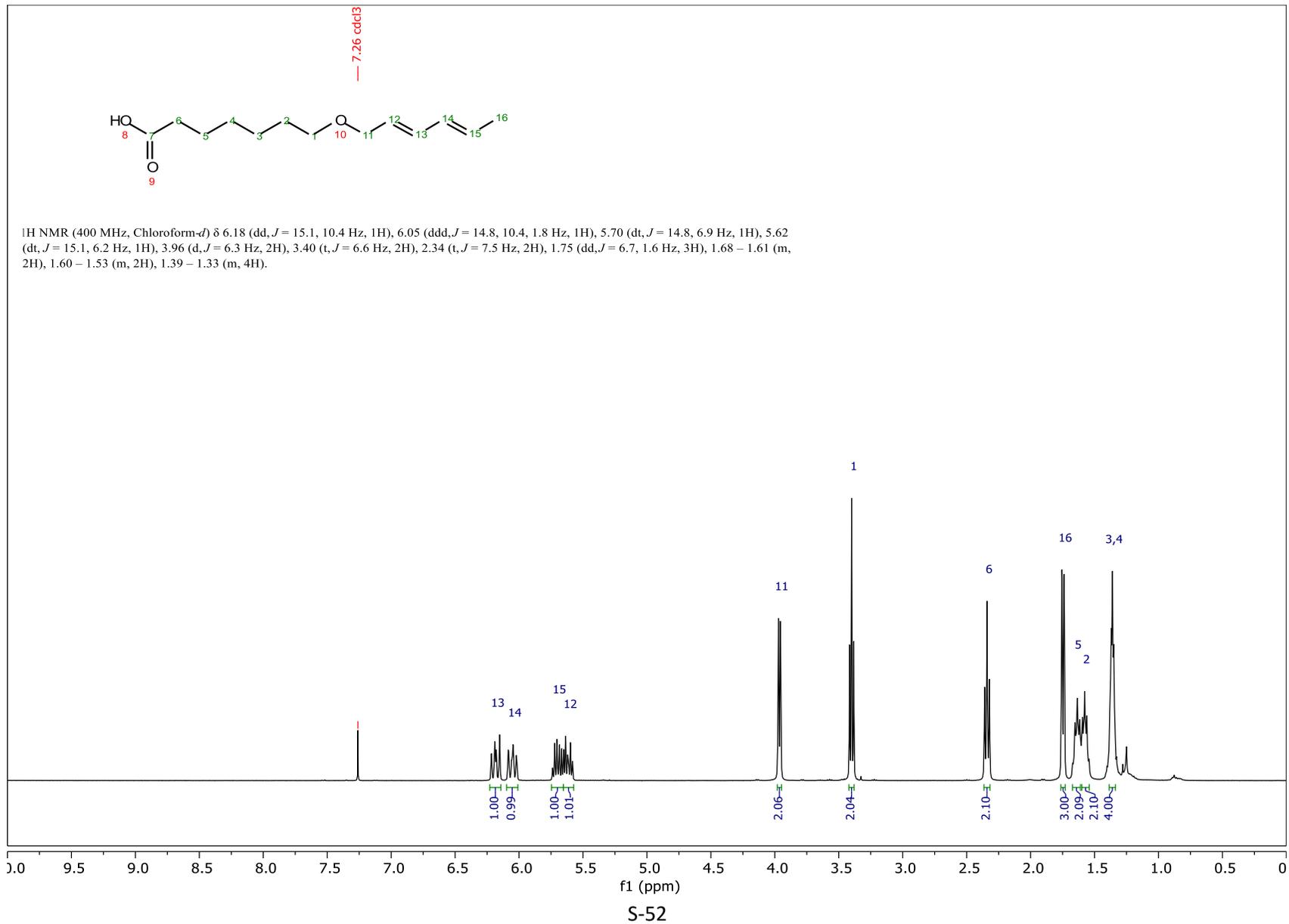
# Compound RBM5-028b

<sup>1</sup>H NMR

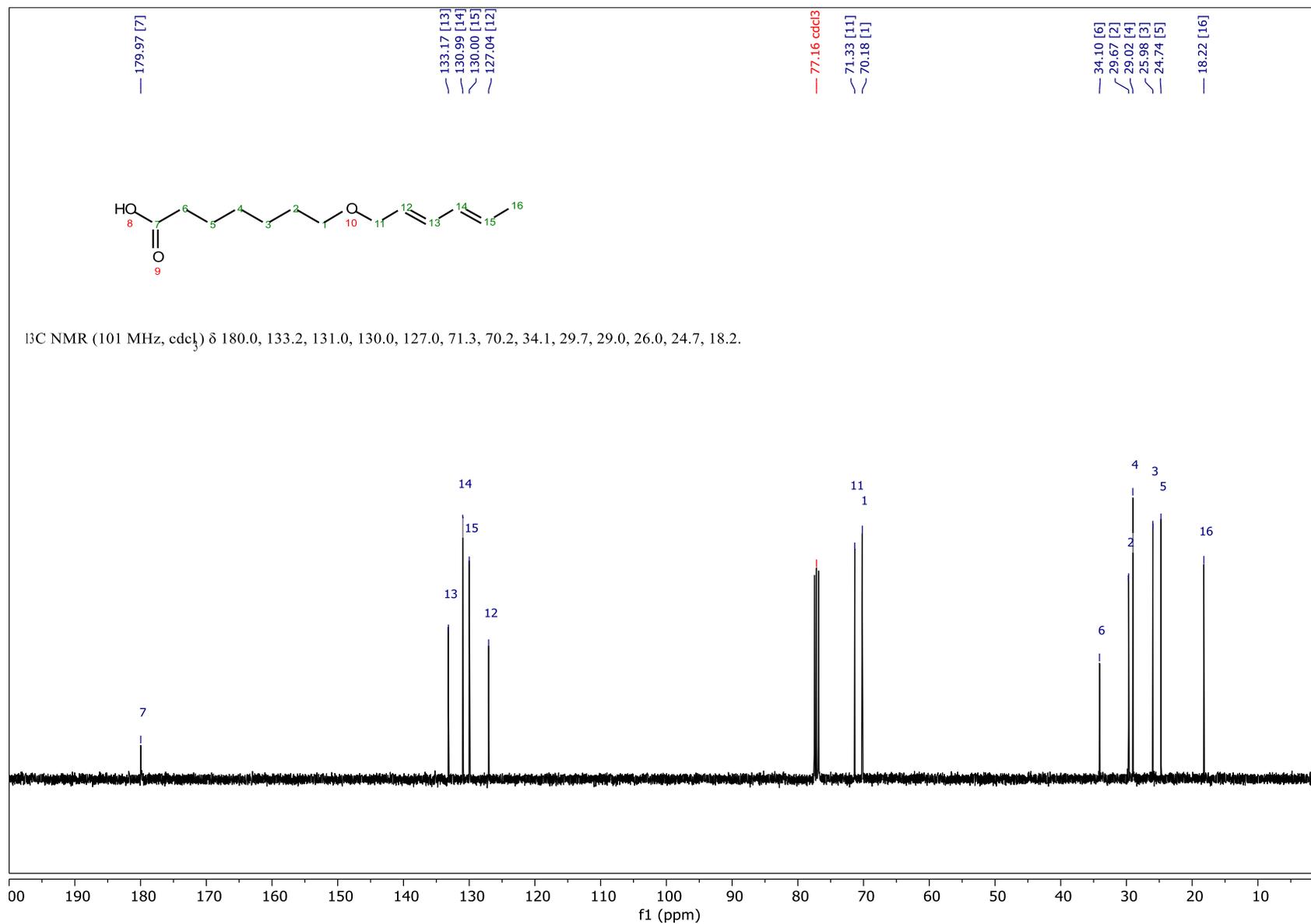


# Compound RBM5-029

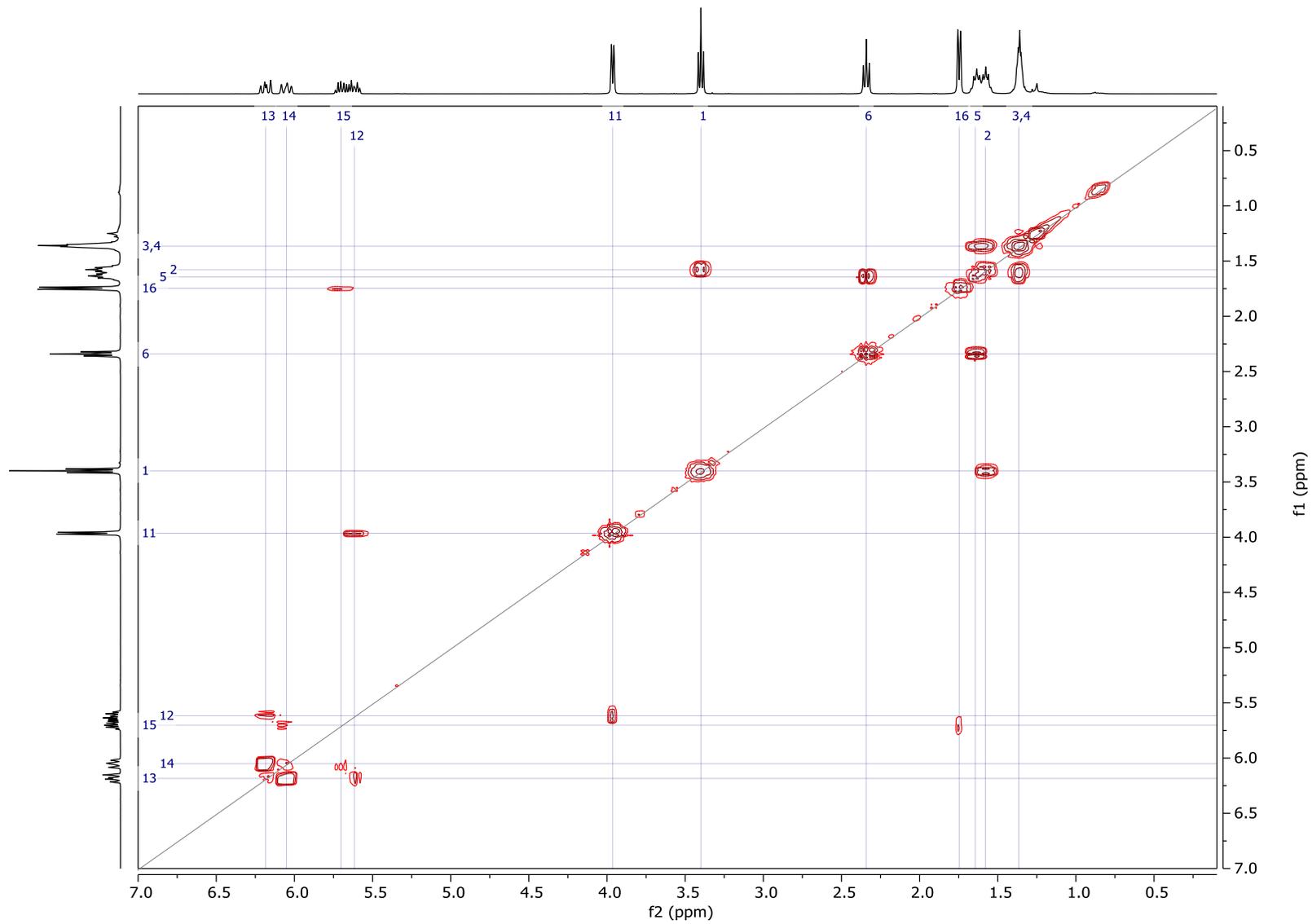
$^1\text{H}$  NMR



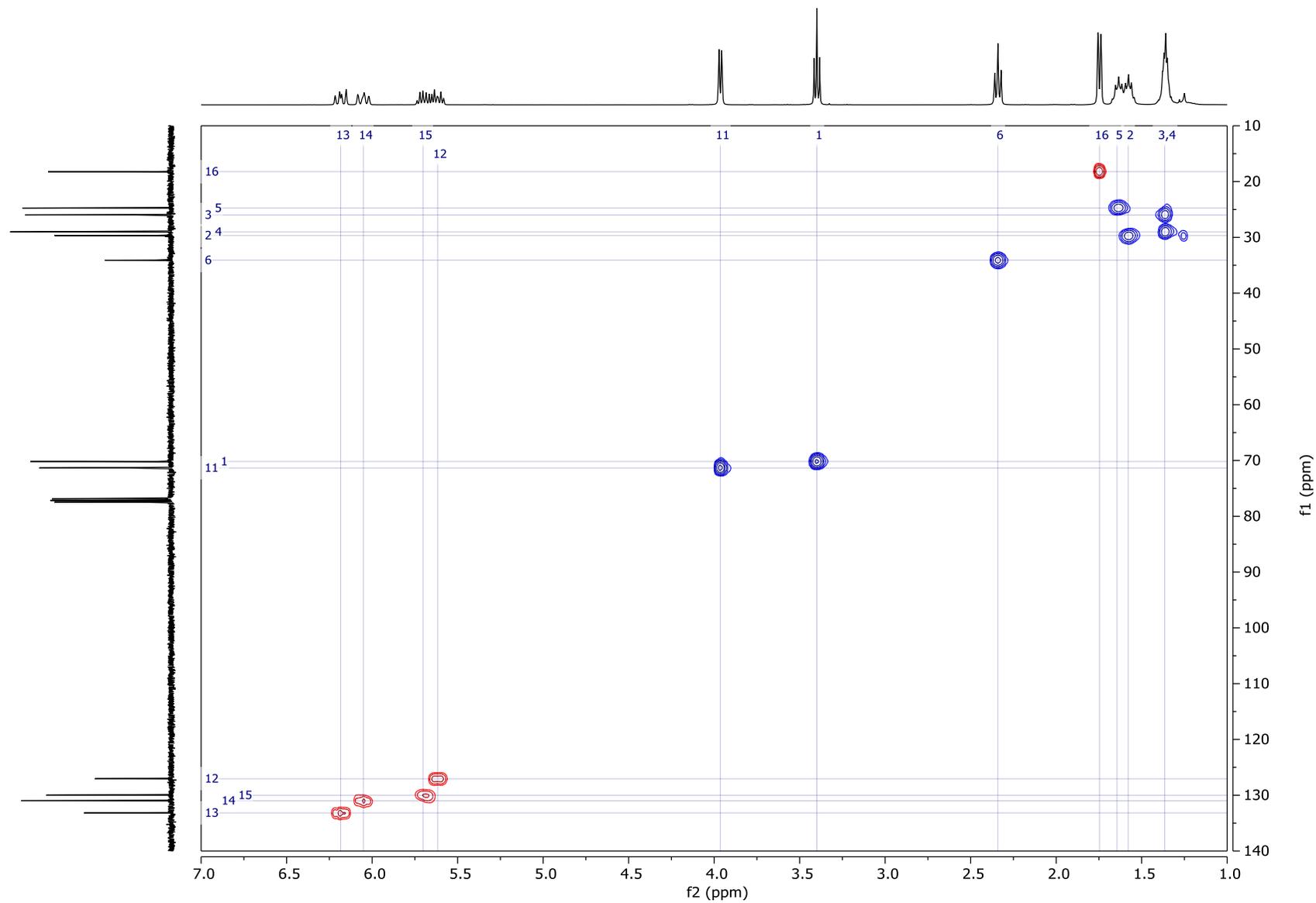
# <sup>13</sup>C NMR



# COSY NMR

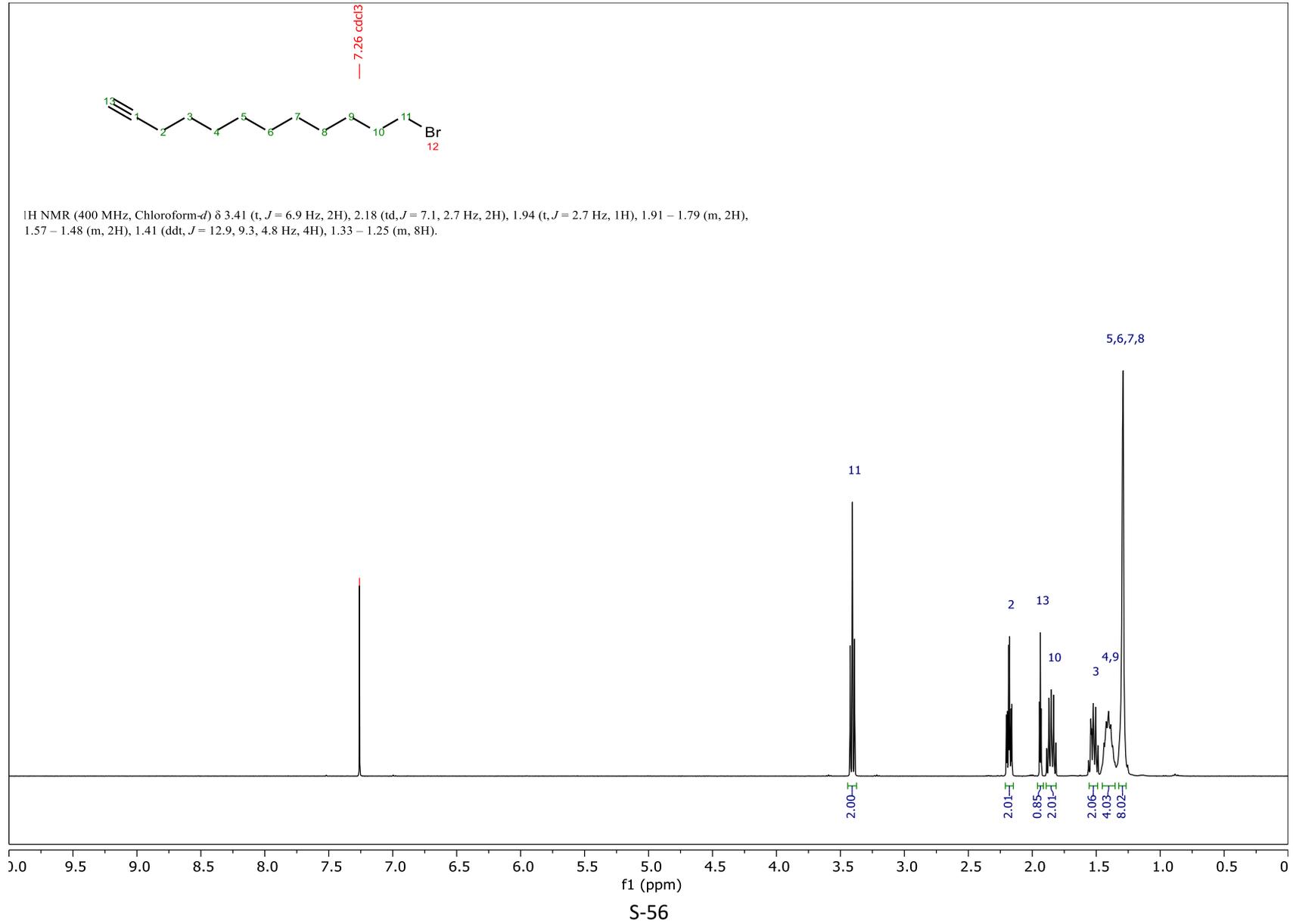


# HSQC NMR

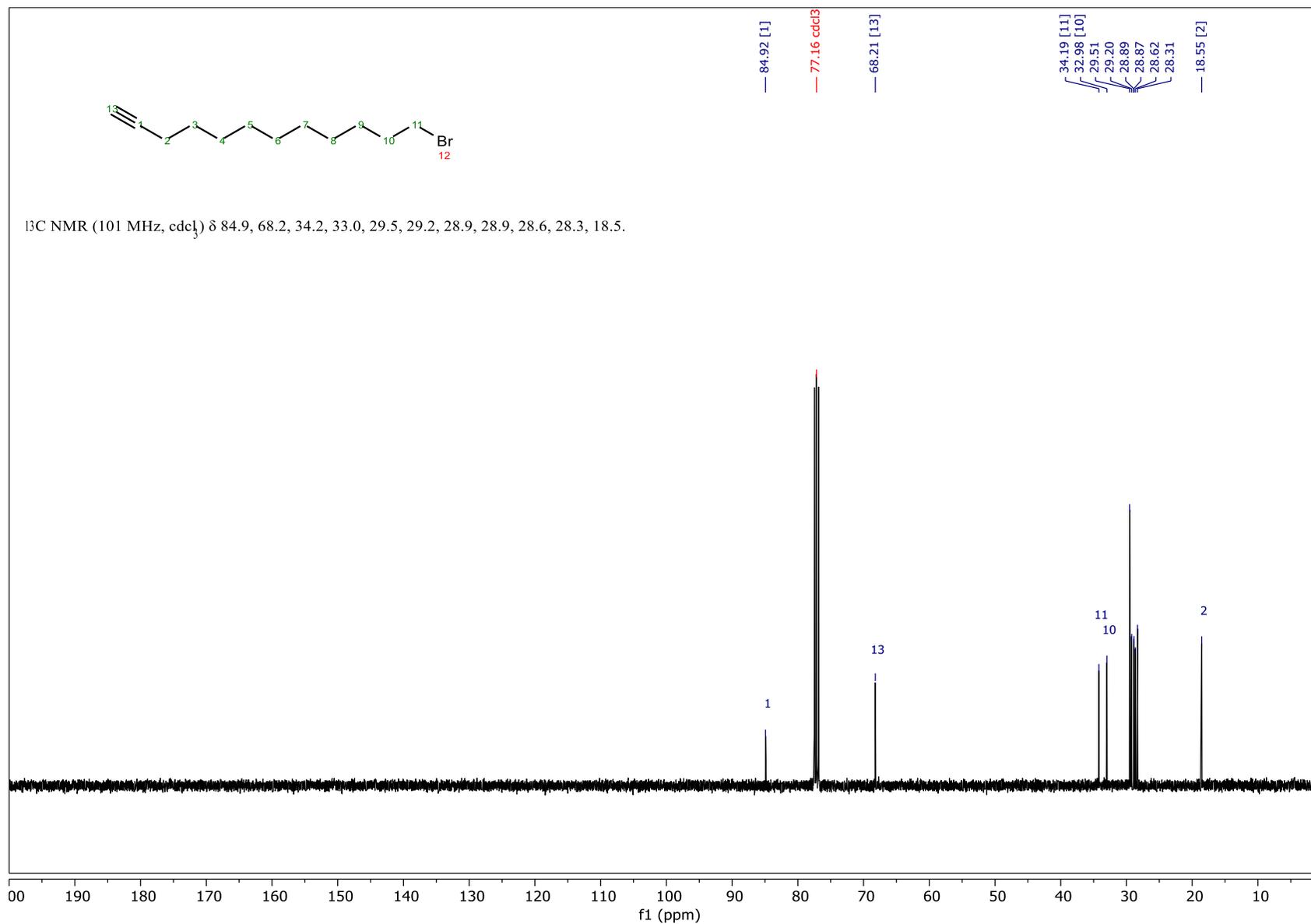


# Compound RBM5-031

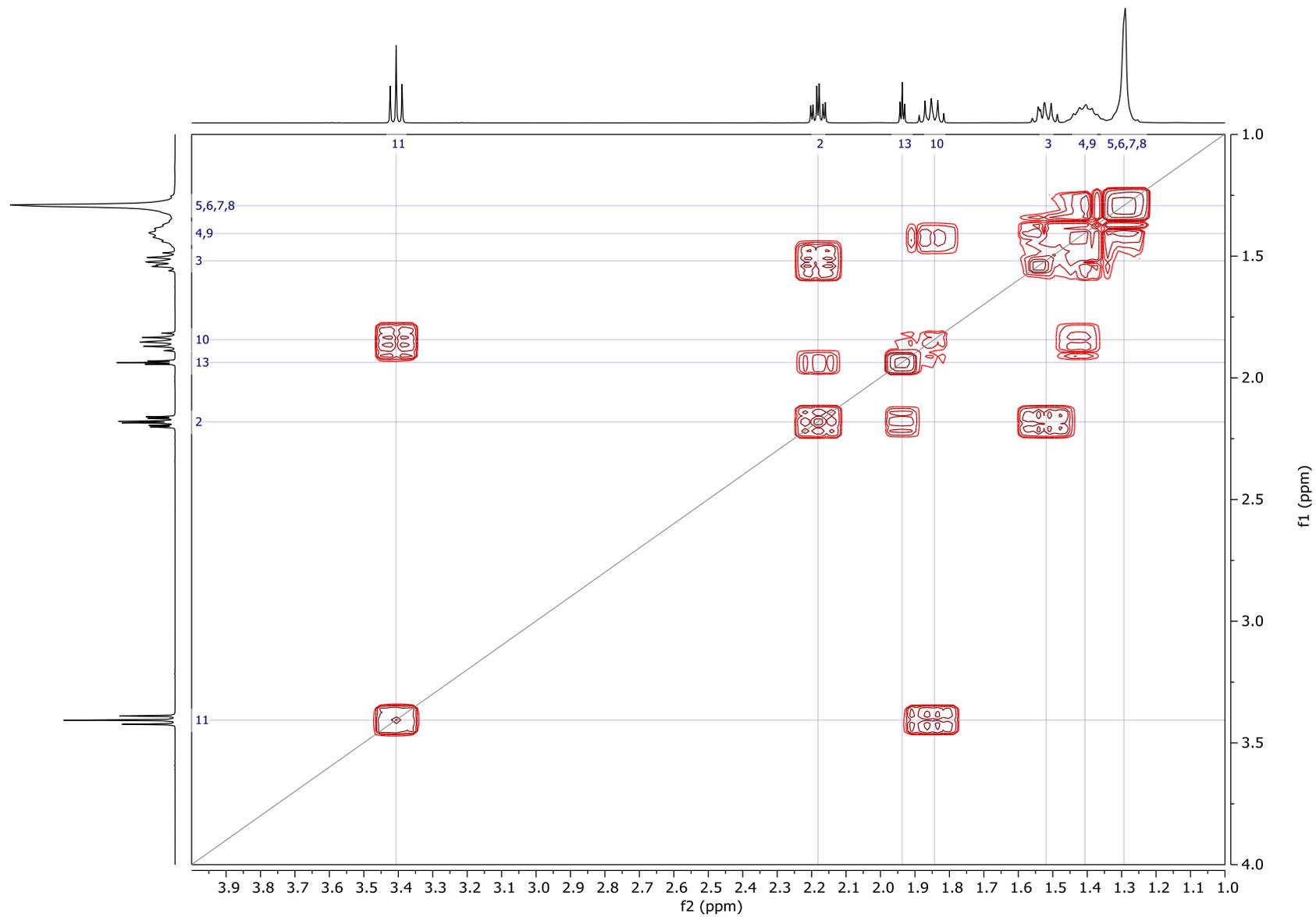
$^1\text{H}$  NMR



<sup>13</sup>C NMR

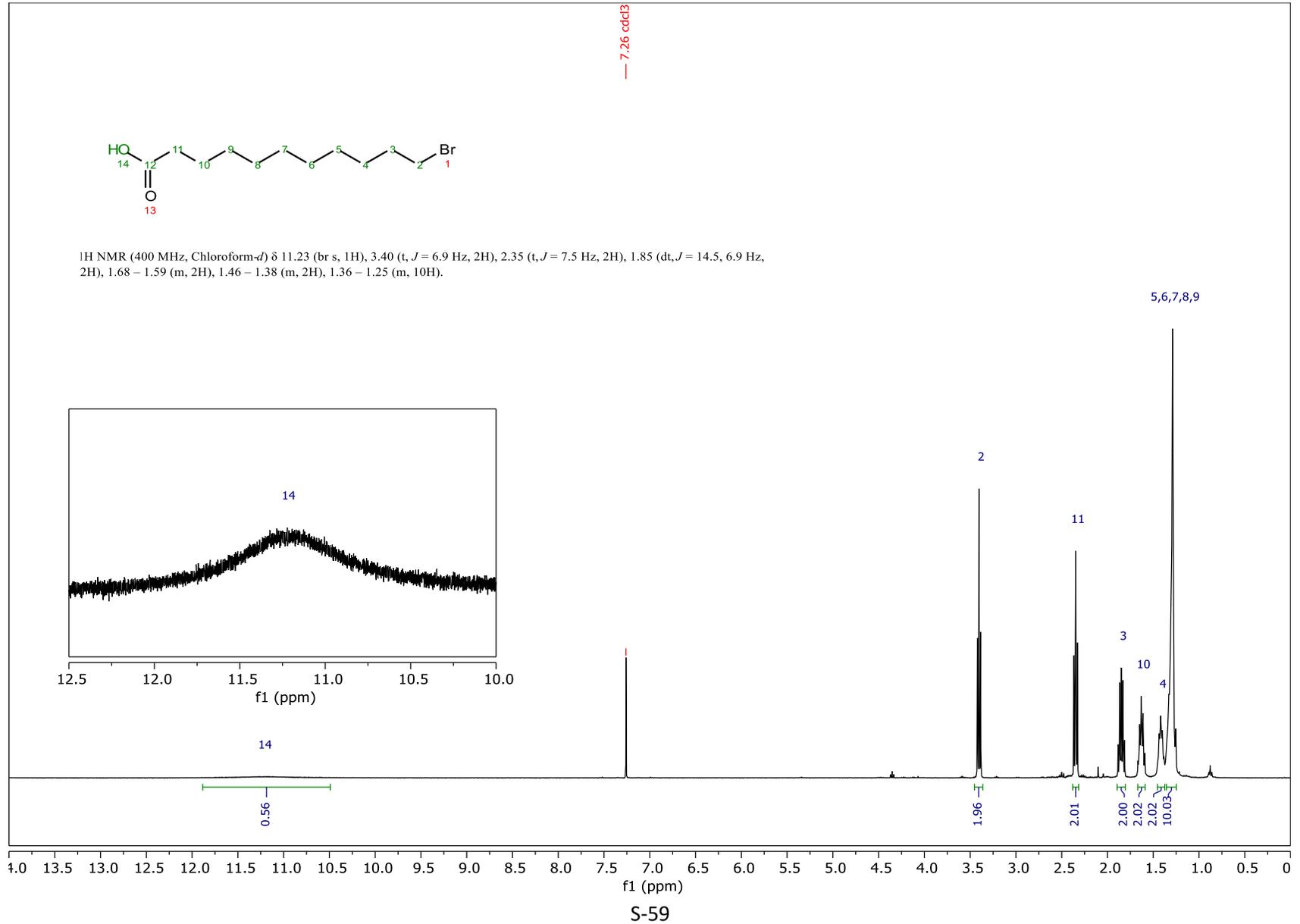


COSY NMR

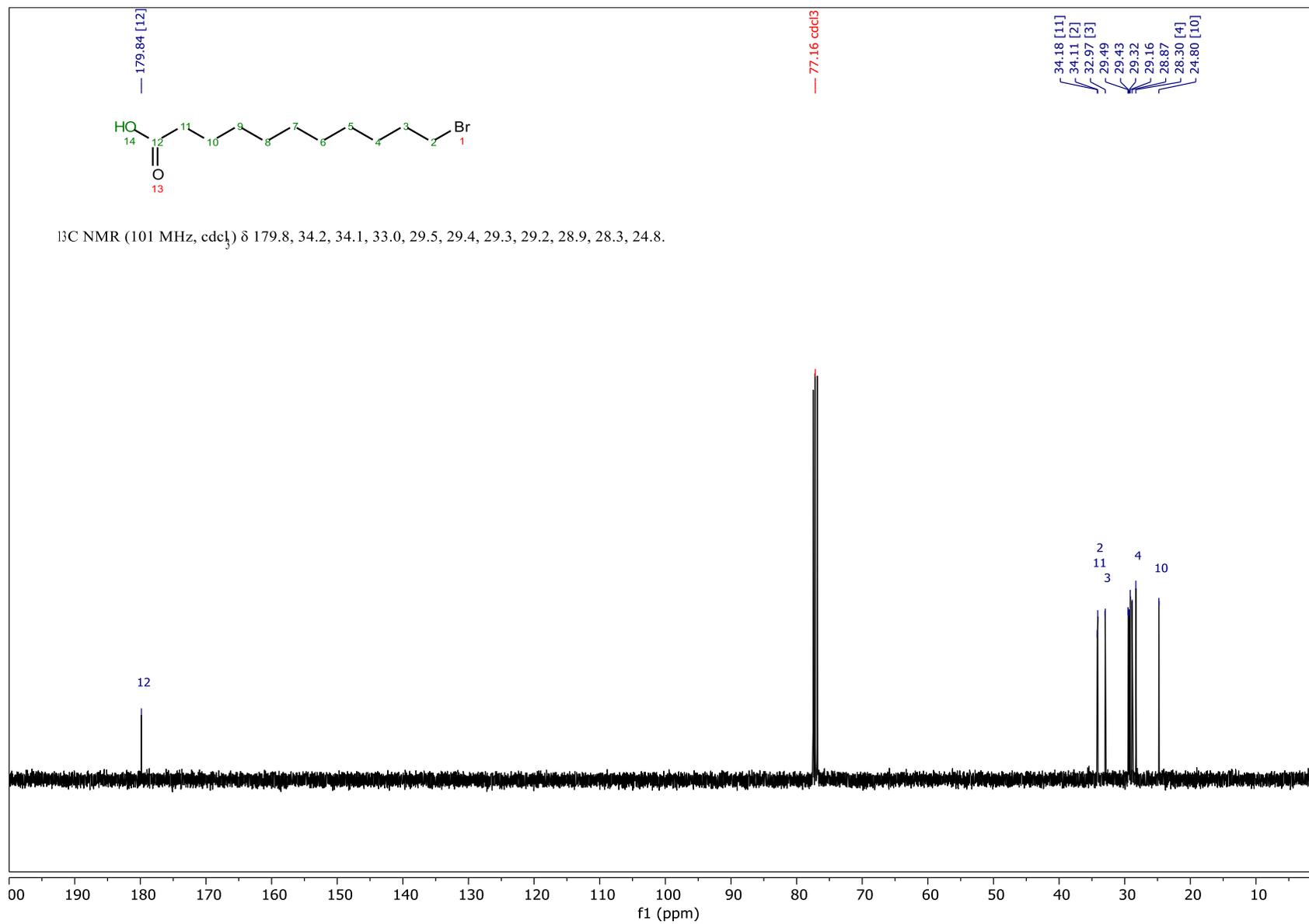


# Compound RBM5-032

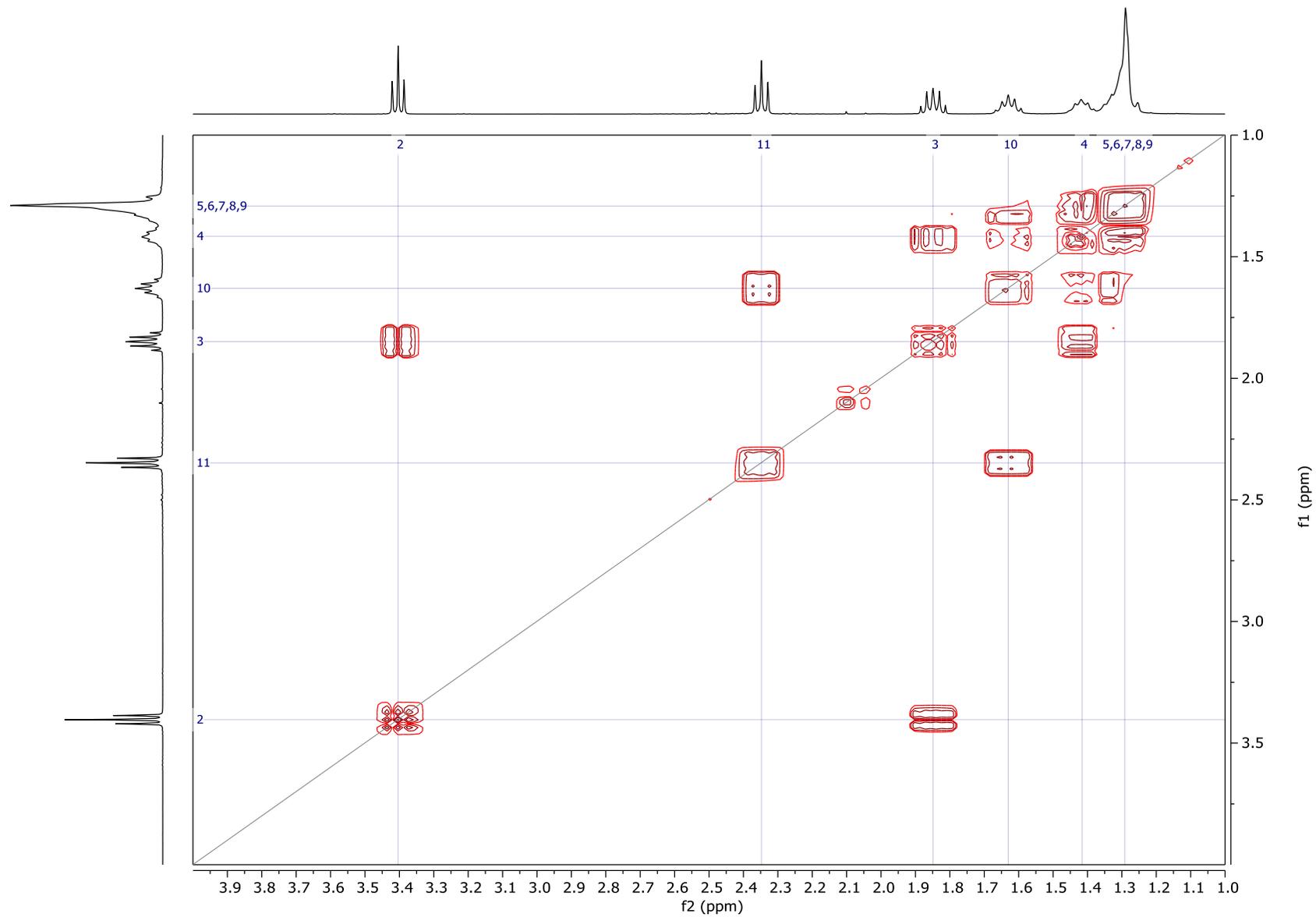
$^1\text{H}$  NMR



# <sup>13</sup>C NMR

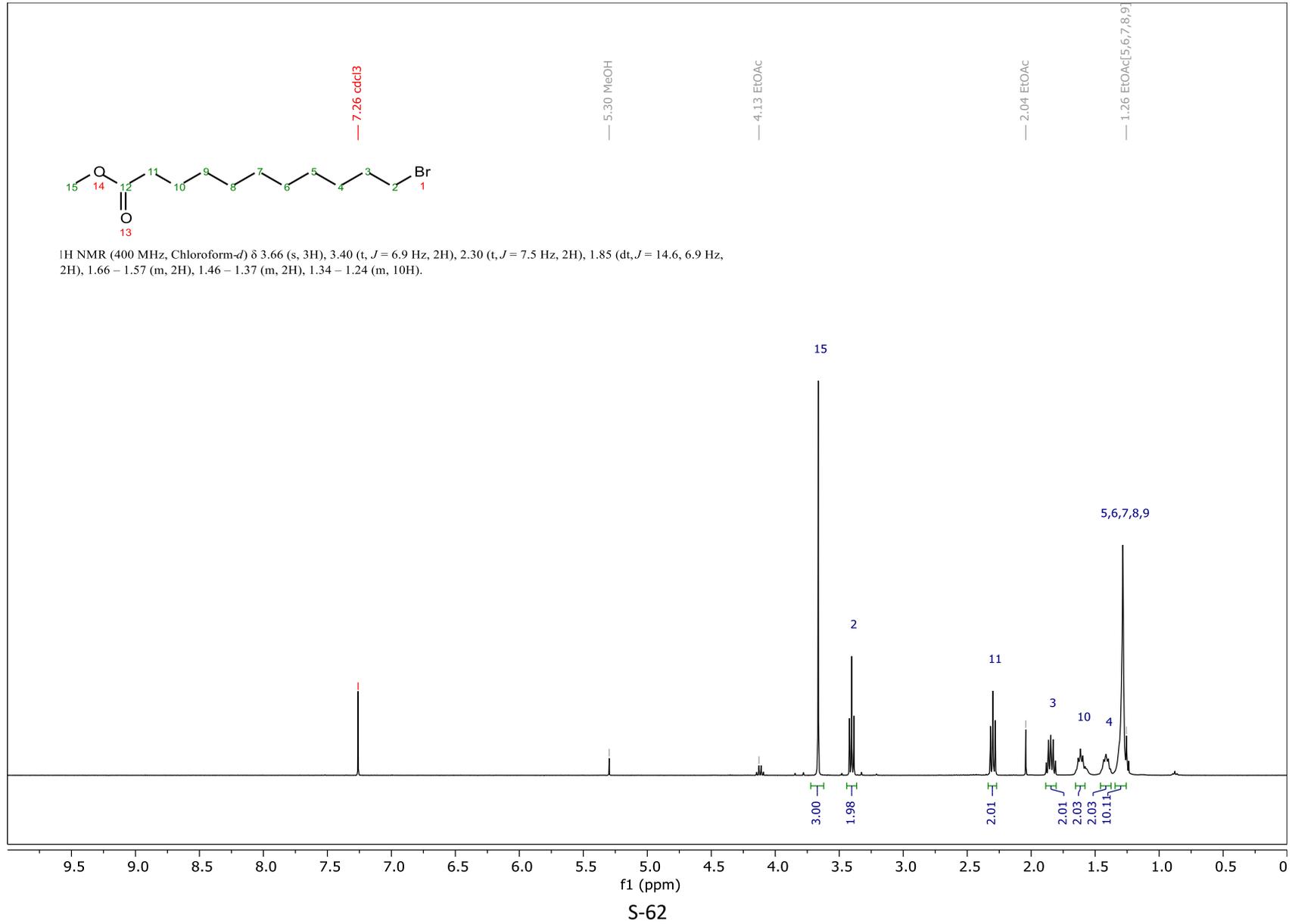


COSY NMR

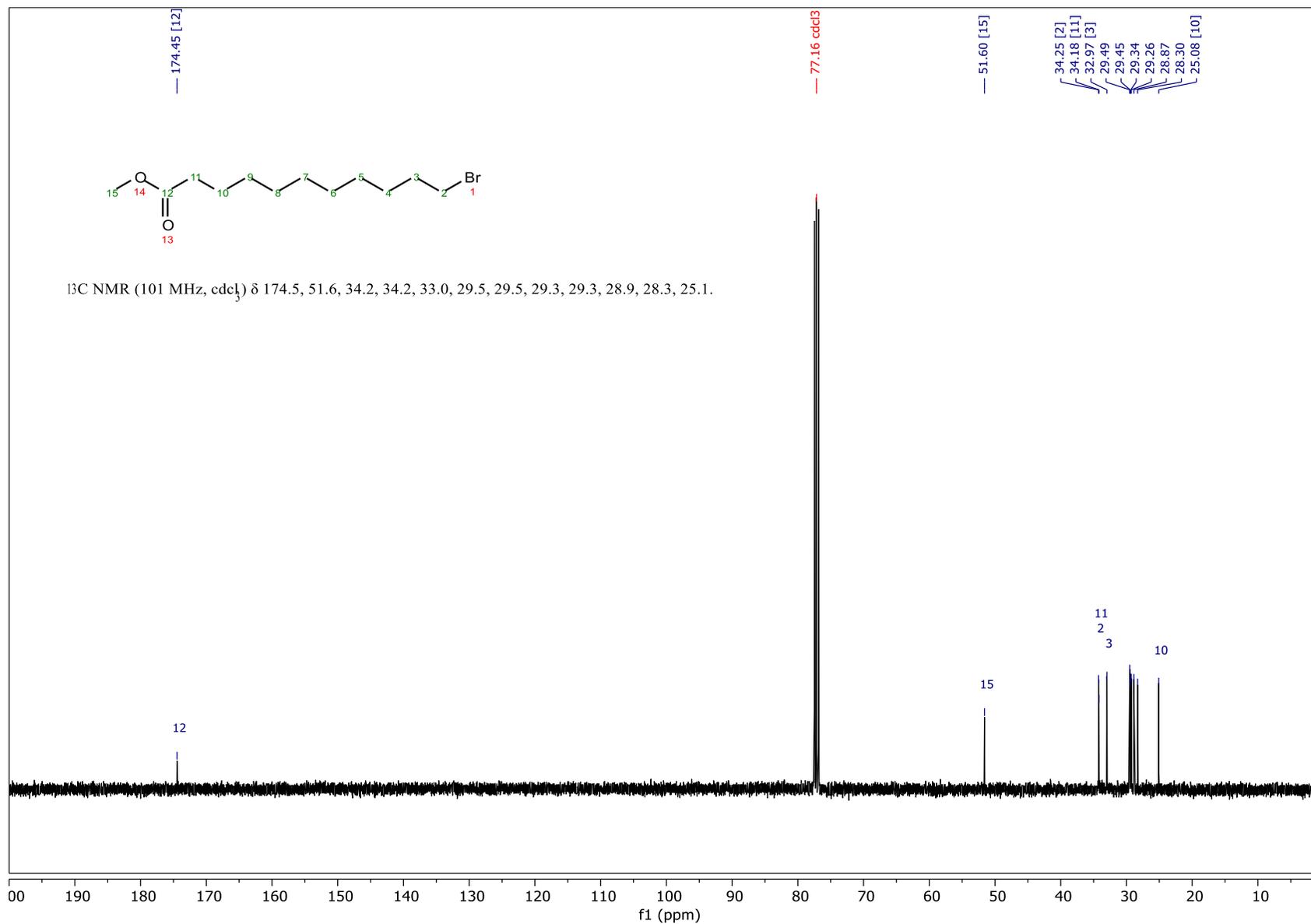


# Compound RBM5-033

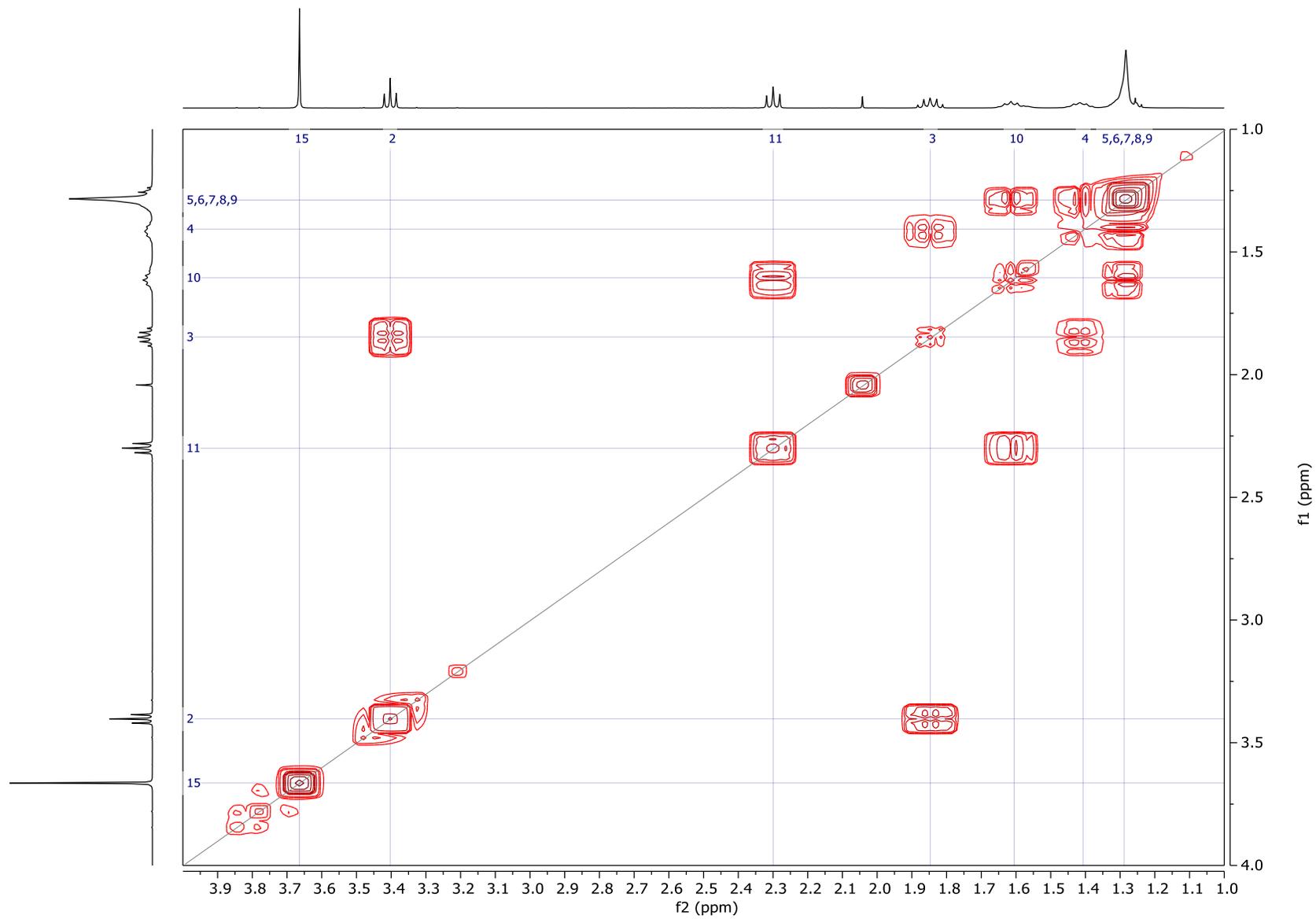
<sup>1</sup>H NMR



<sup>13</sup>C NMR

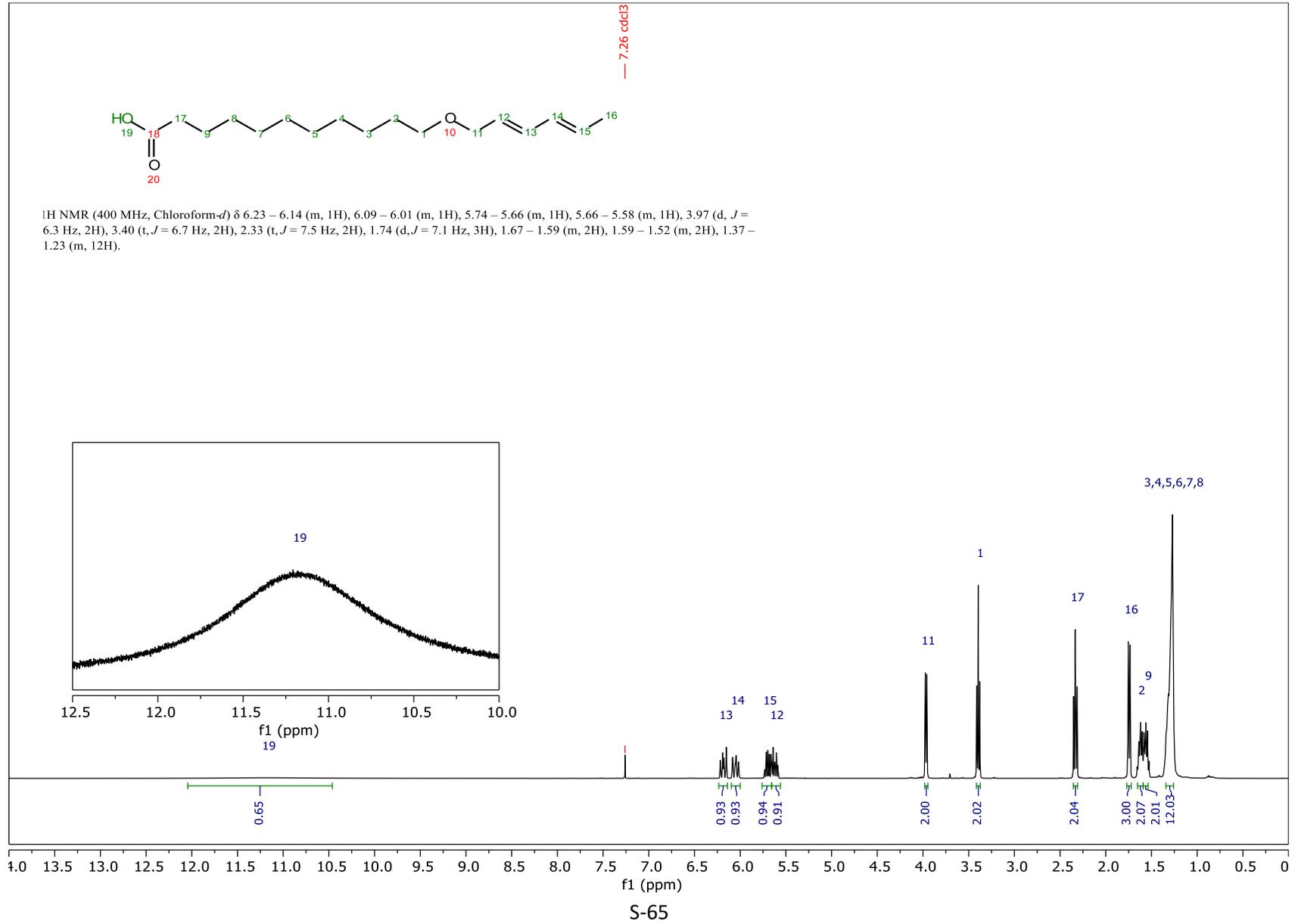


# COSY NMR

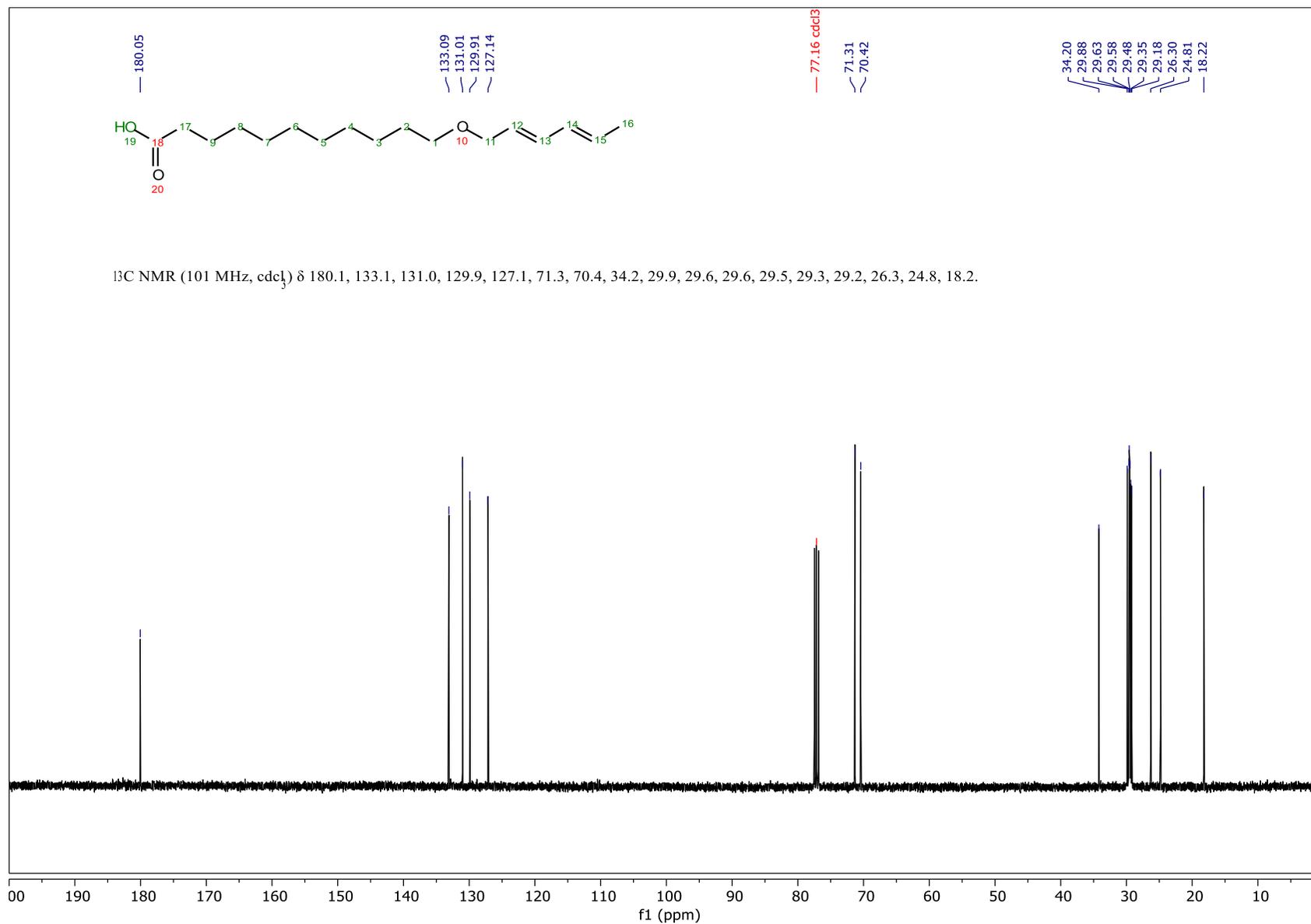


# Compound RBM5-035

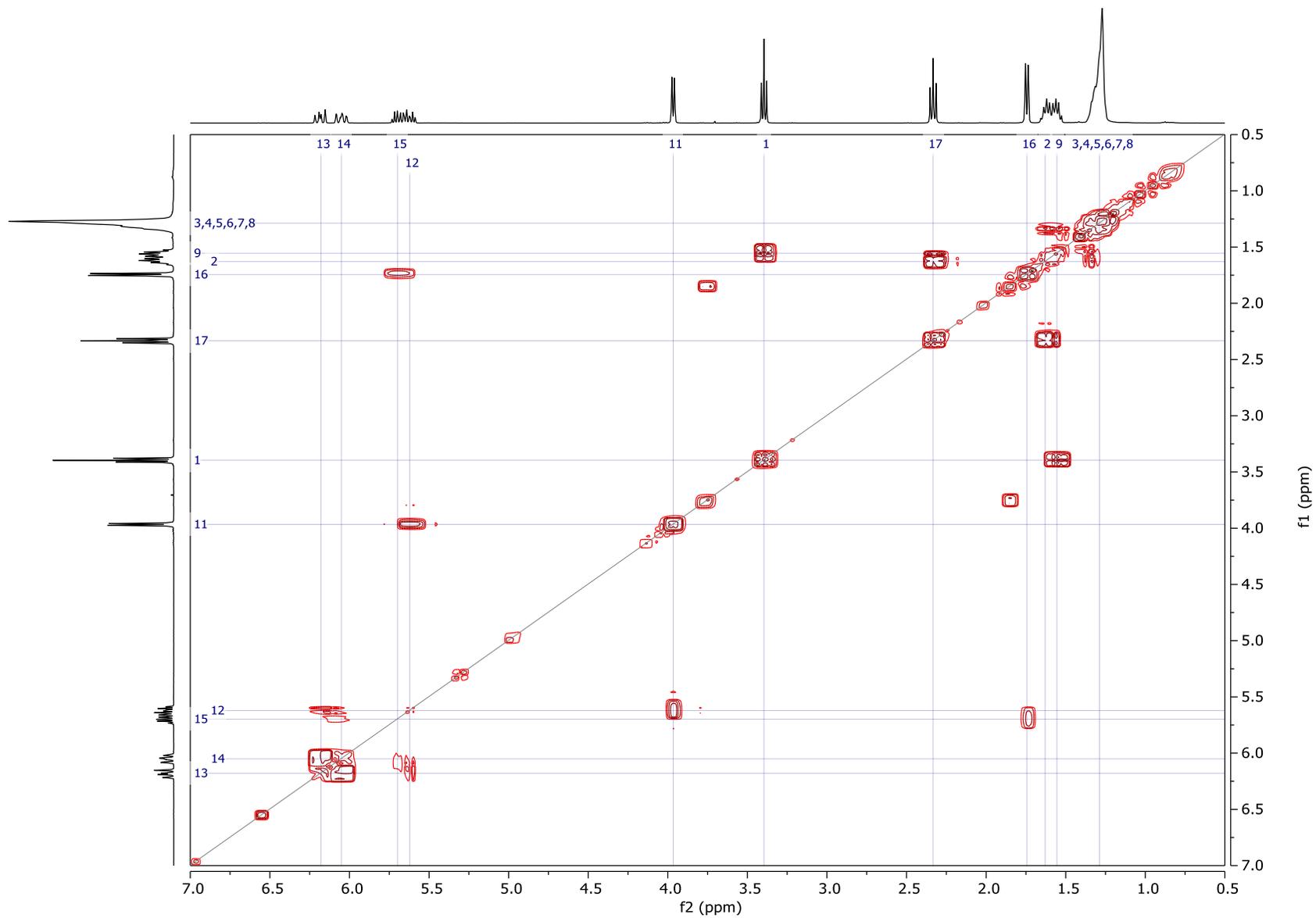
$^1\text{H}$  NMR



# <sup>13</sup>C NMR



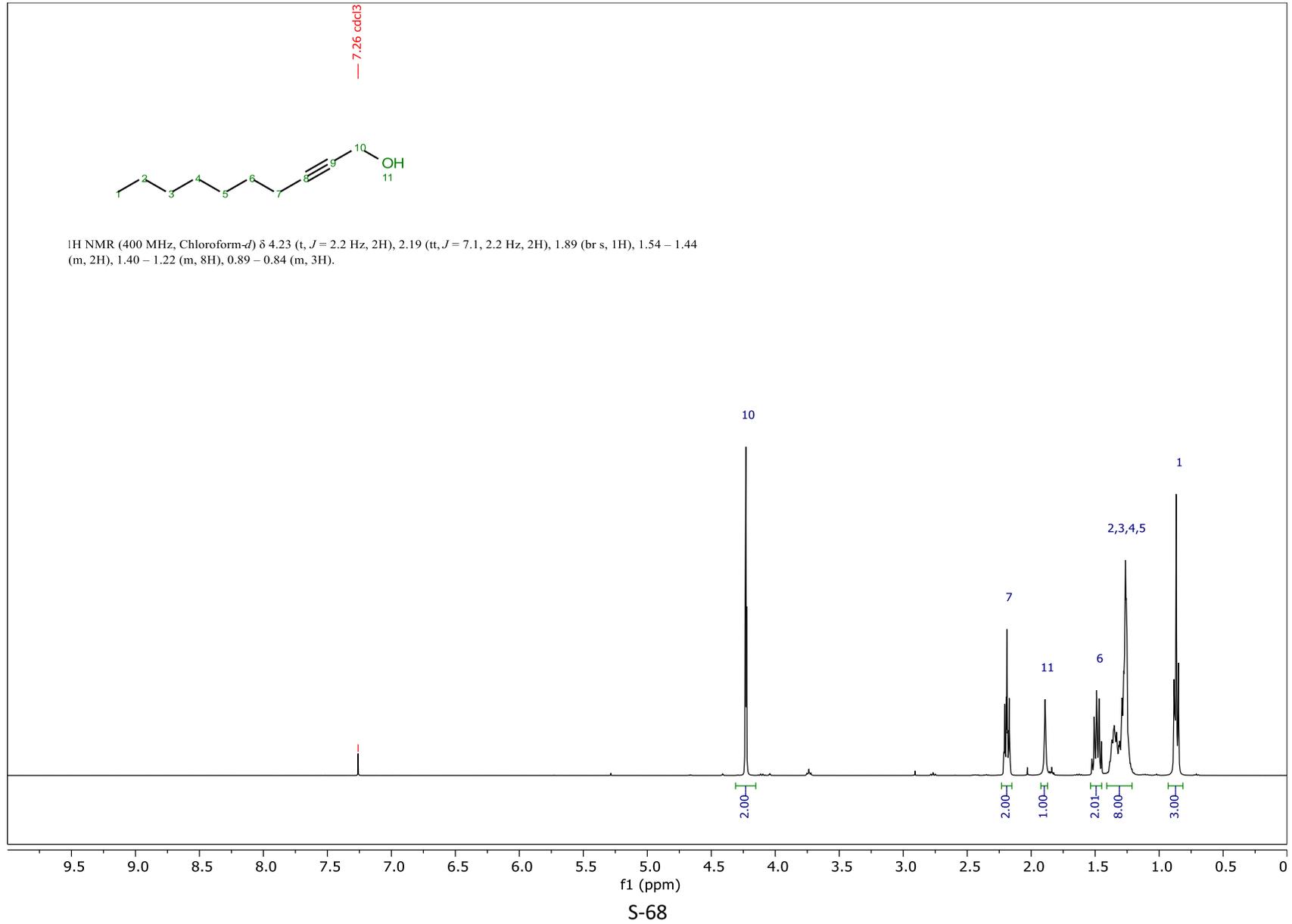
# COSY NMR



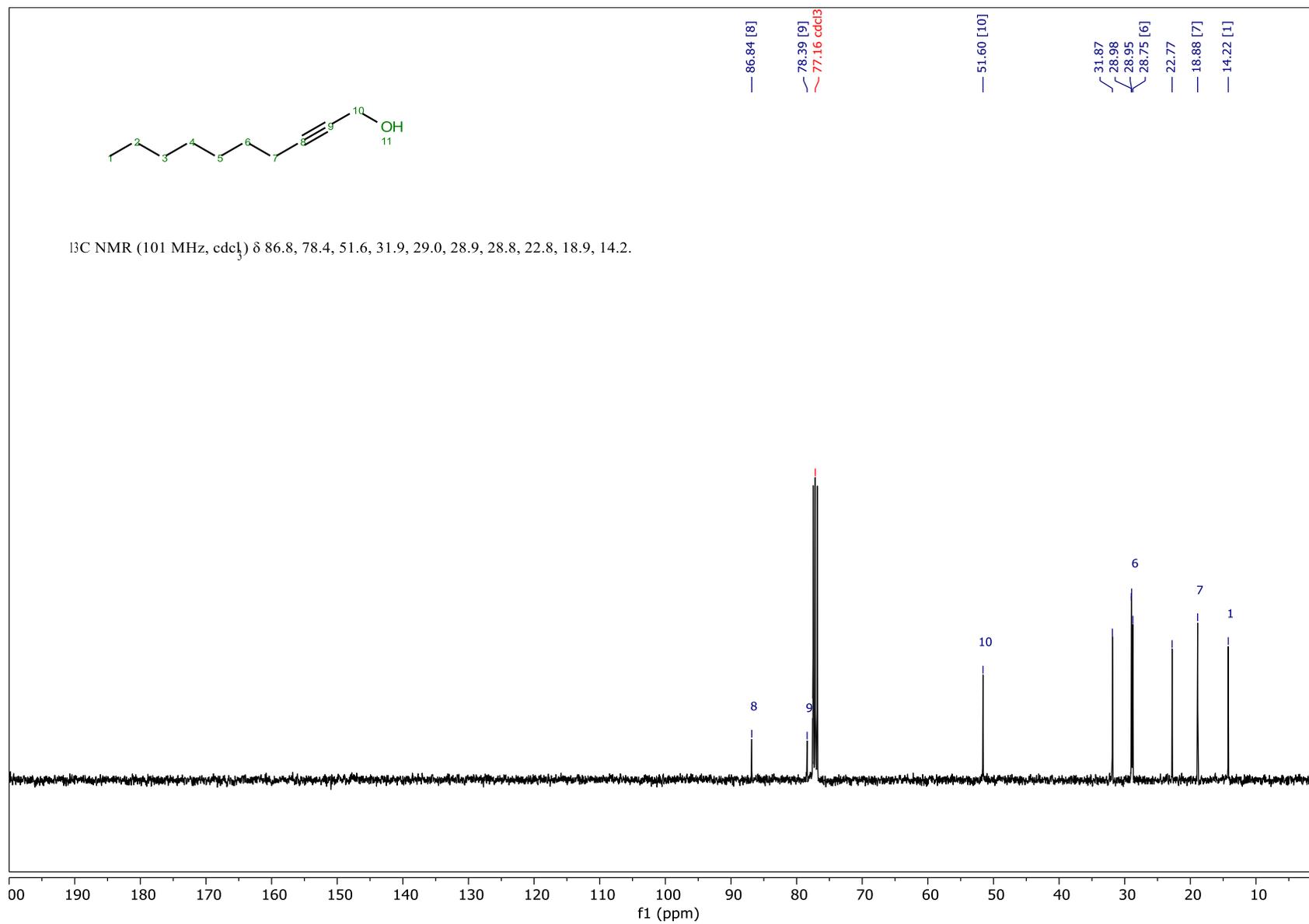
S-67

# Compound RBM5-036

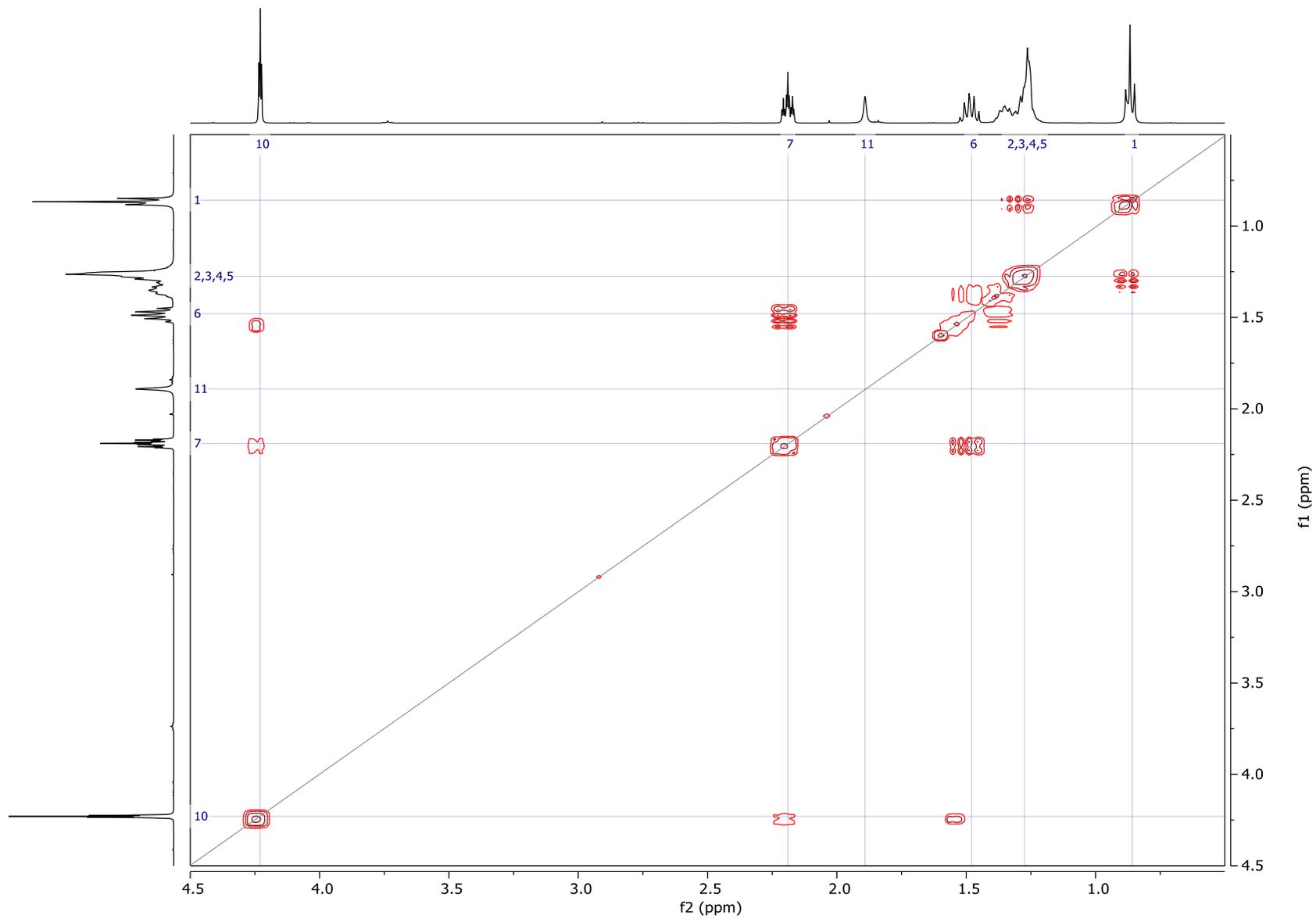
$^1\text{H}$  NMR



<sup>13</sup>C NMR

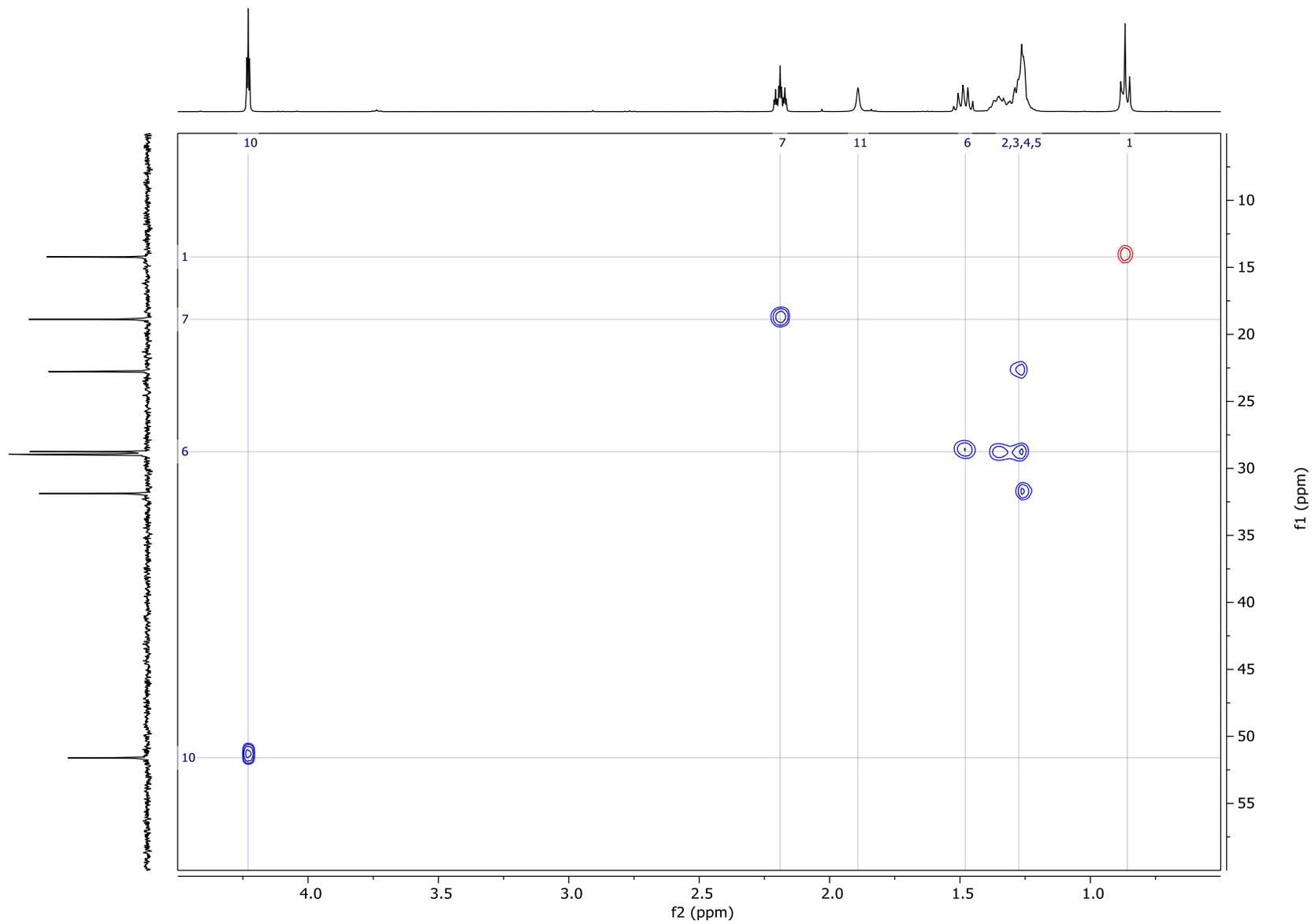


COSY NMR



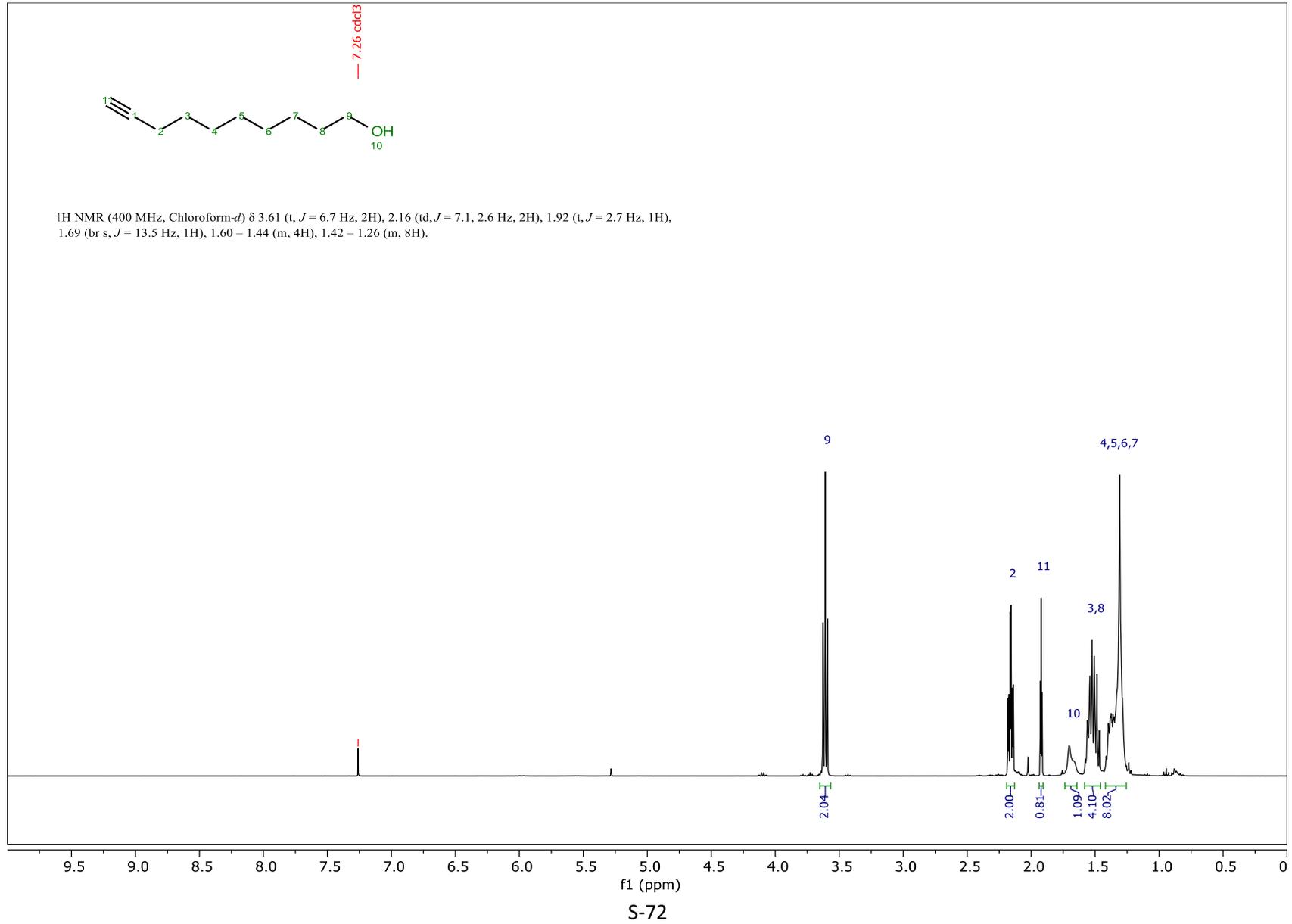
S-70

# HSQC NMR

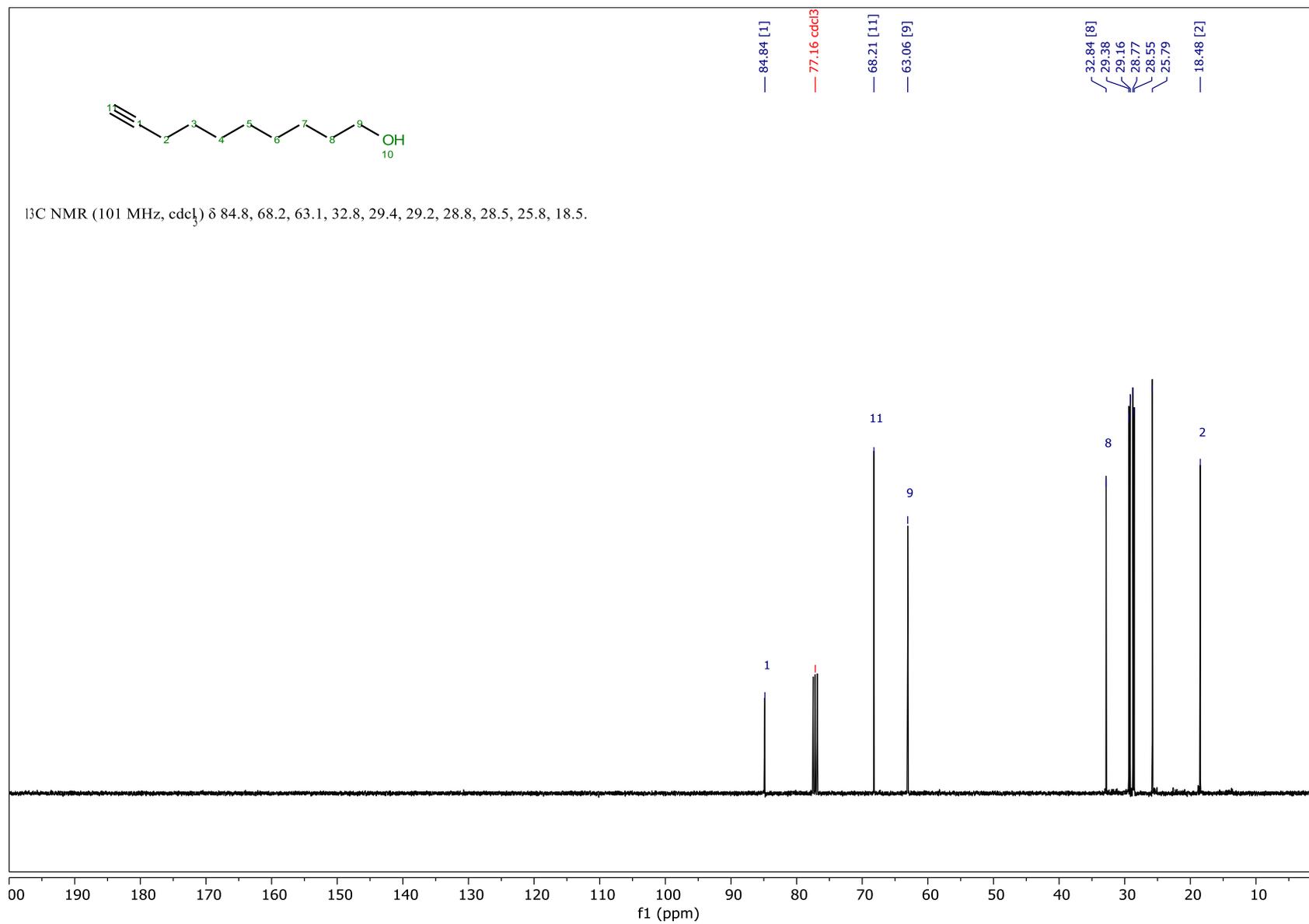


# Compound RBM5-038

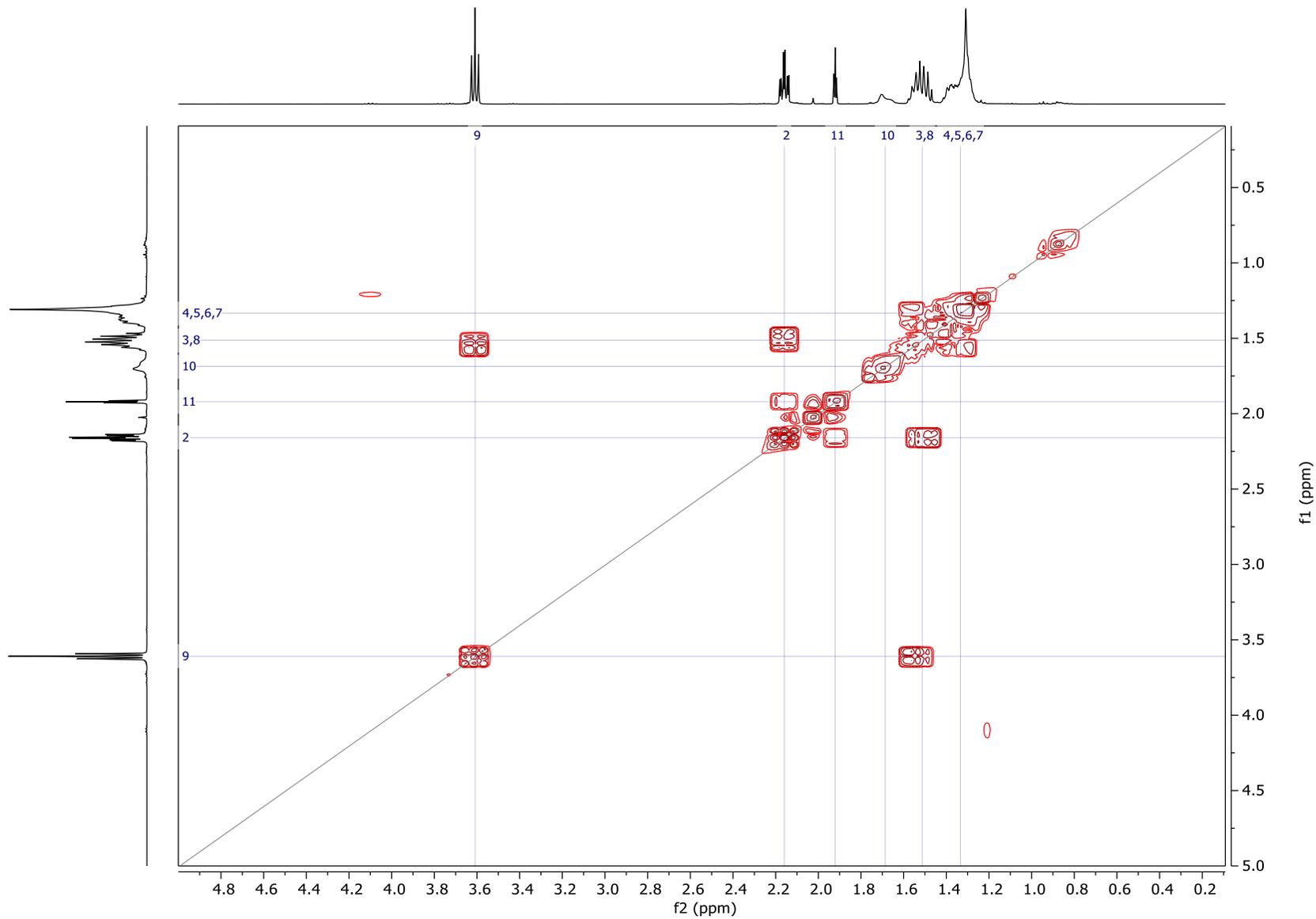
$^1\text{H}$  NMR



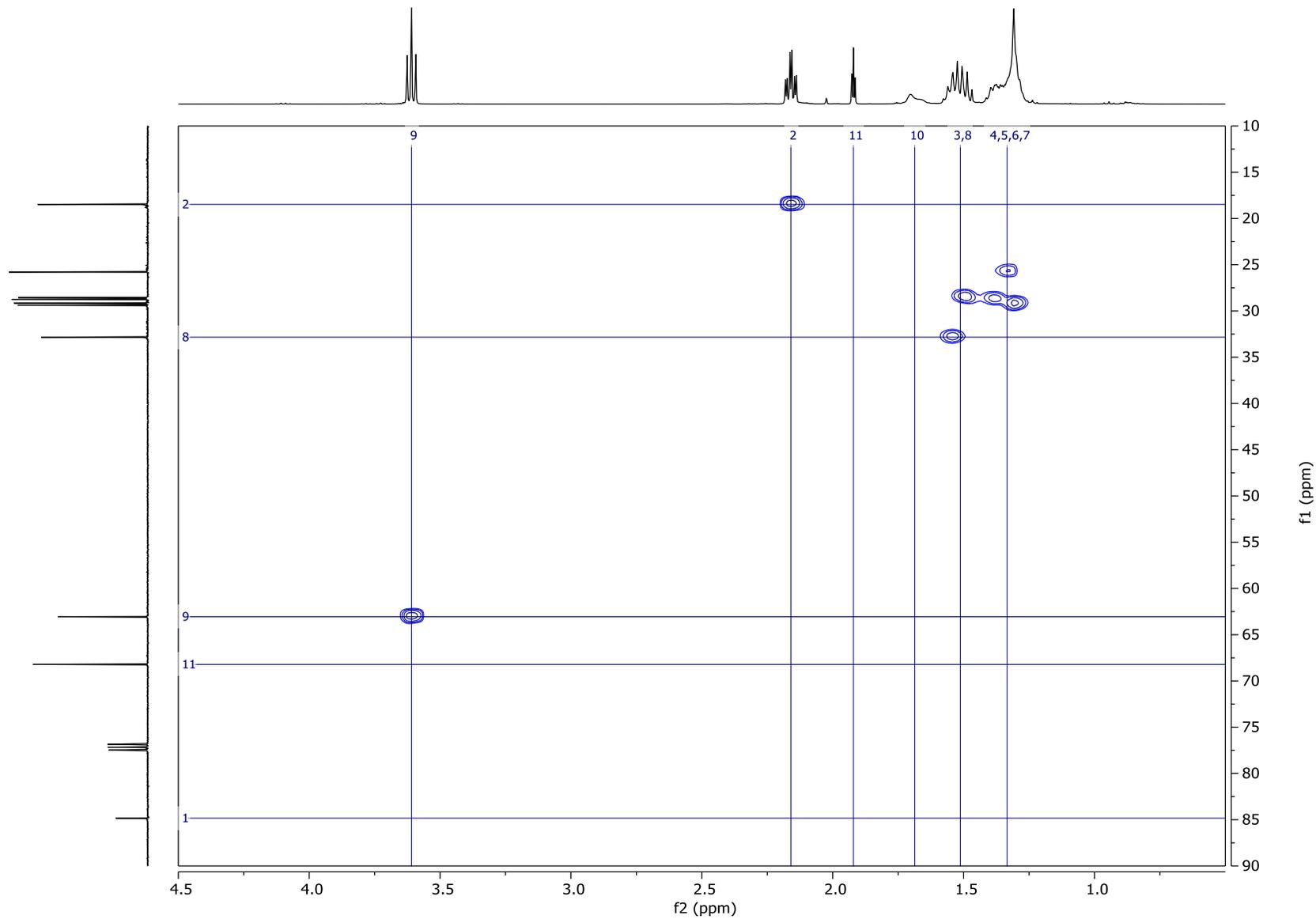
<sup>13</sup>C NMR



# COSY NMR

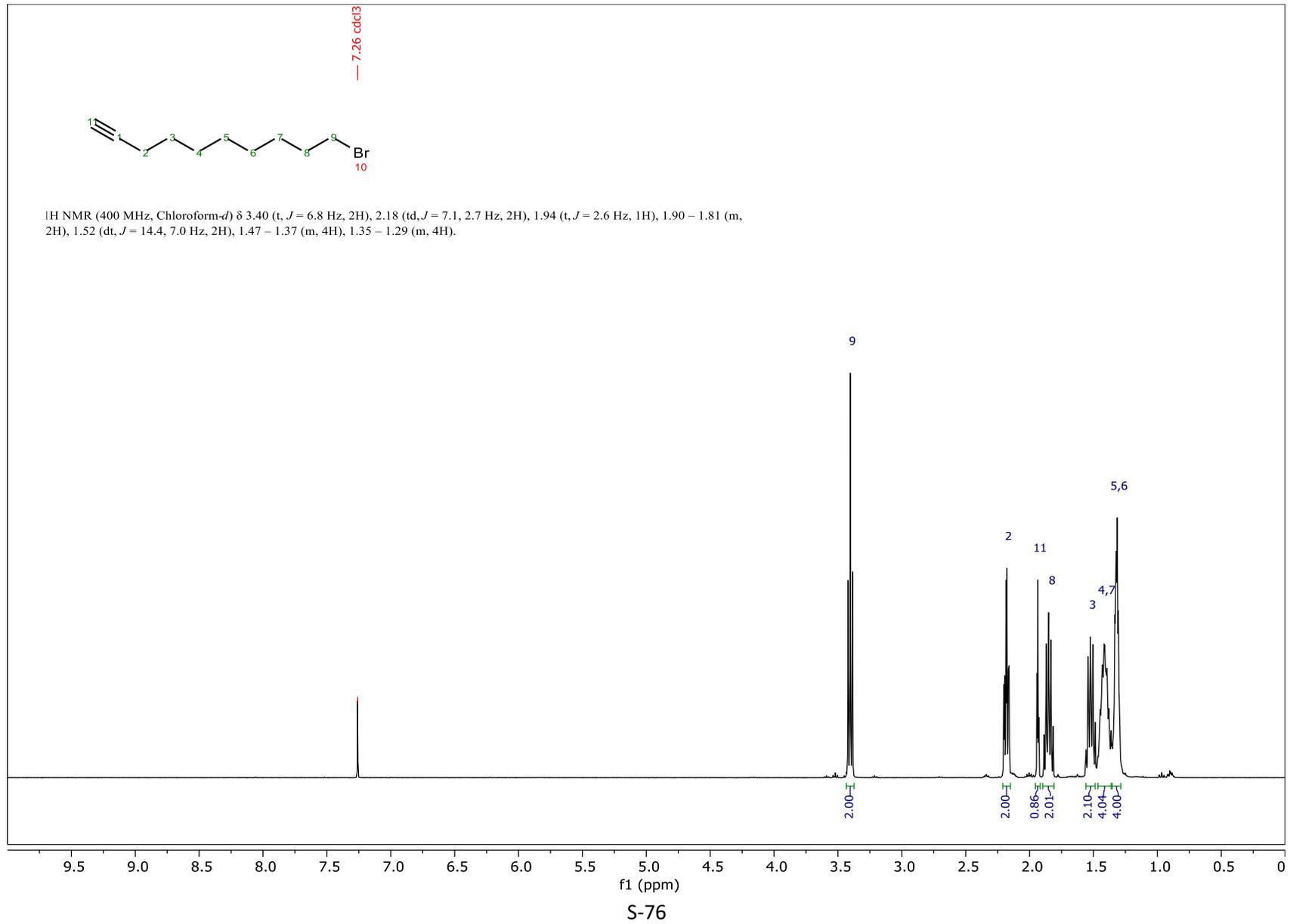


# HSQC NMR

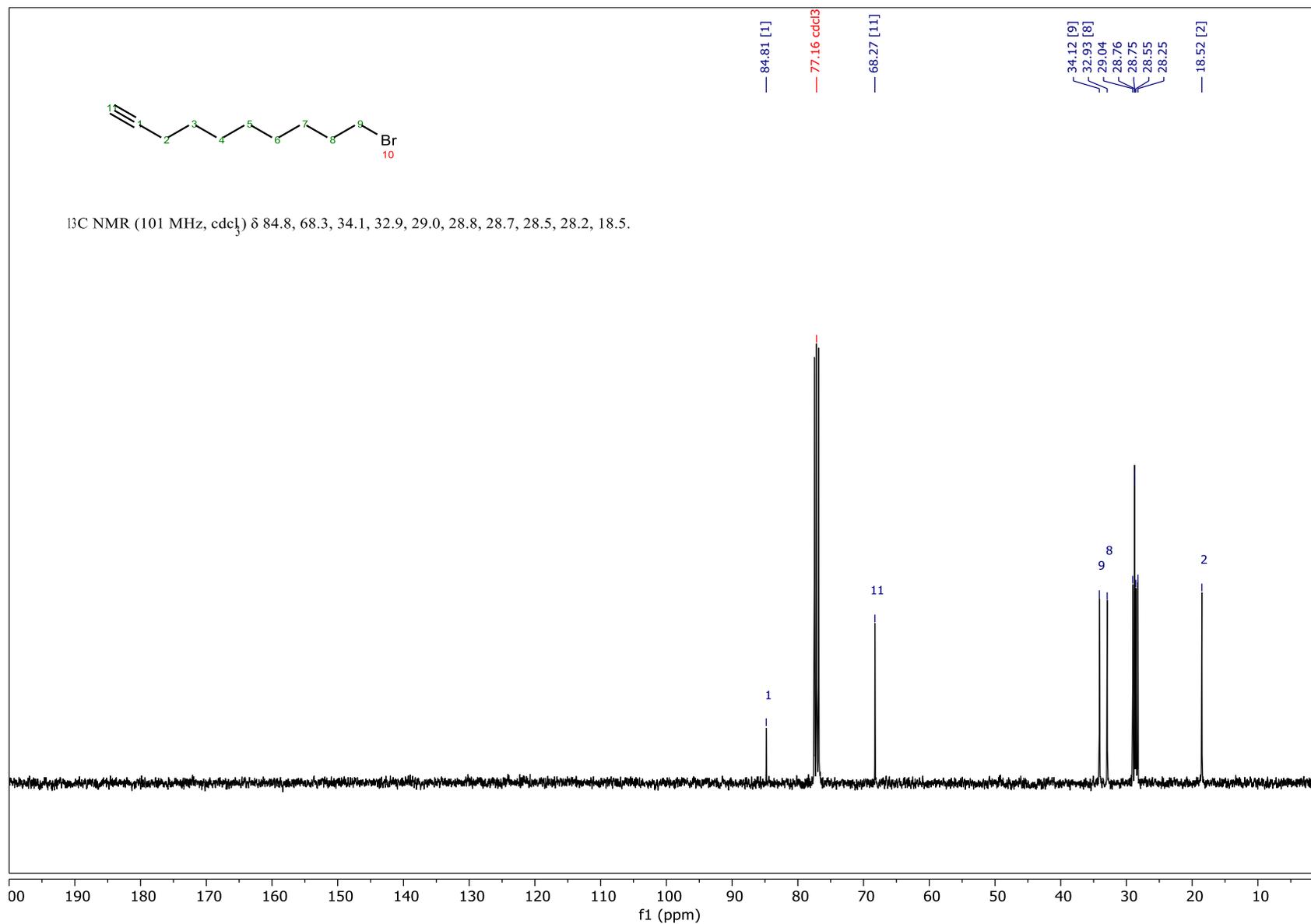


# Compound RBM5-040

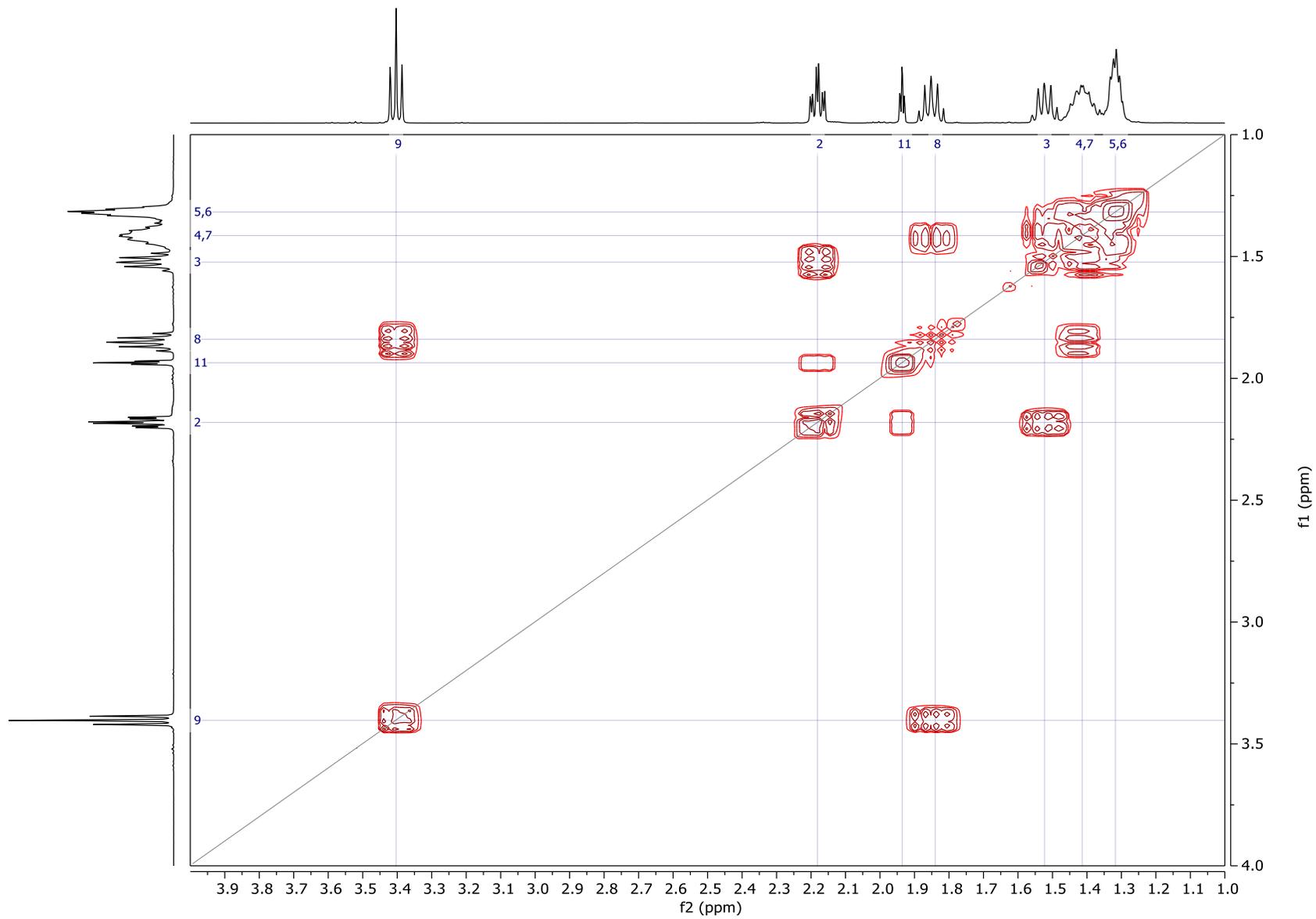
$^1\text{H}$  NMR



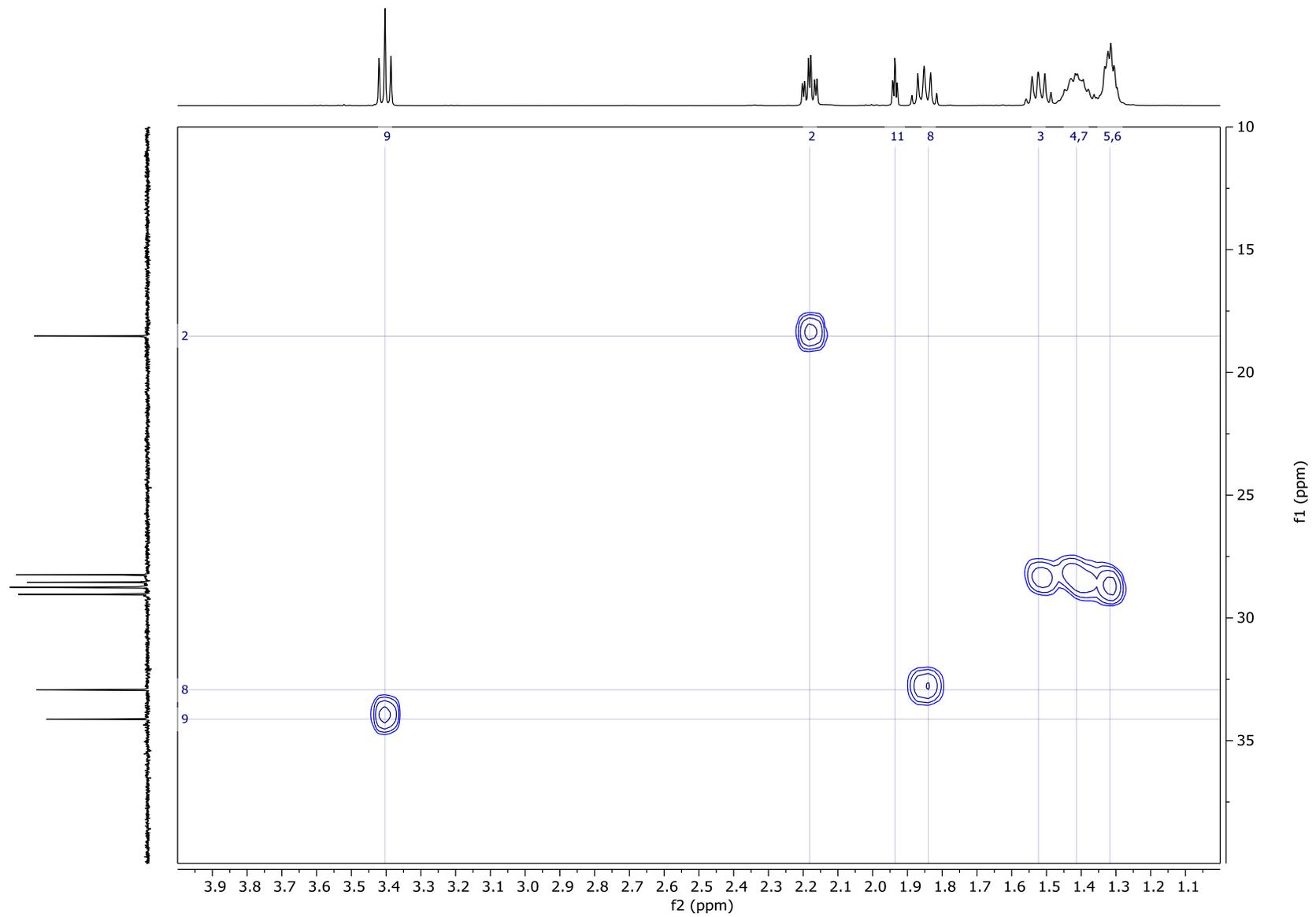
<sup>13</sup>C NMR



# COSY NMR

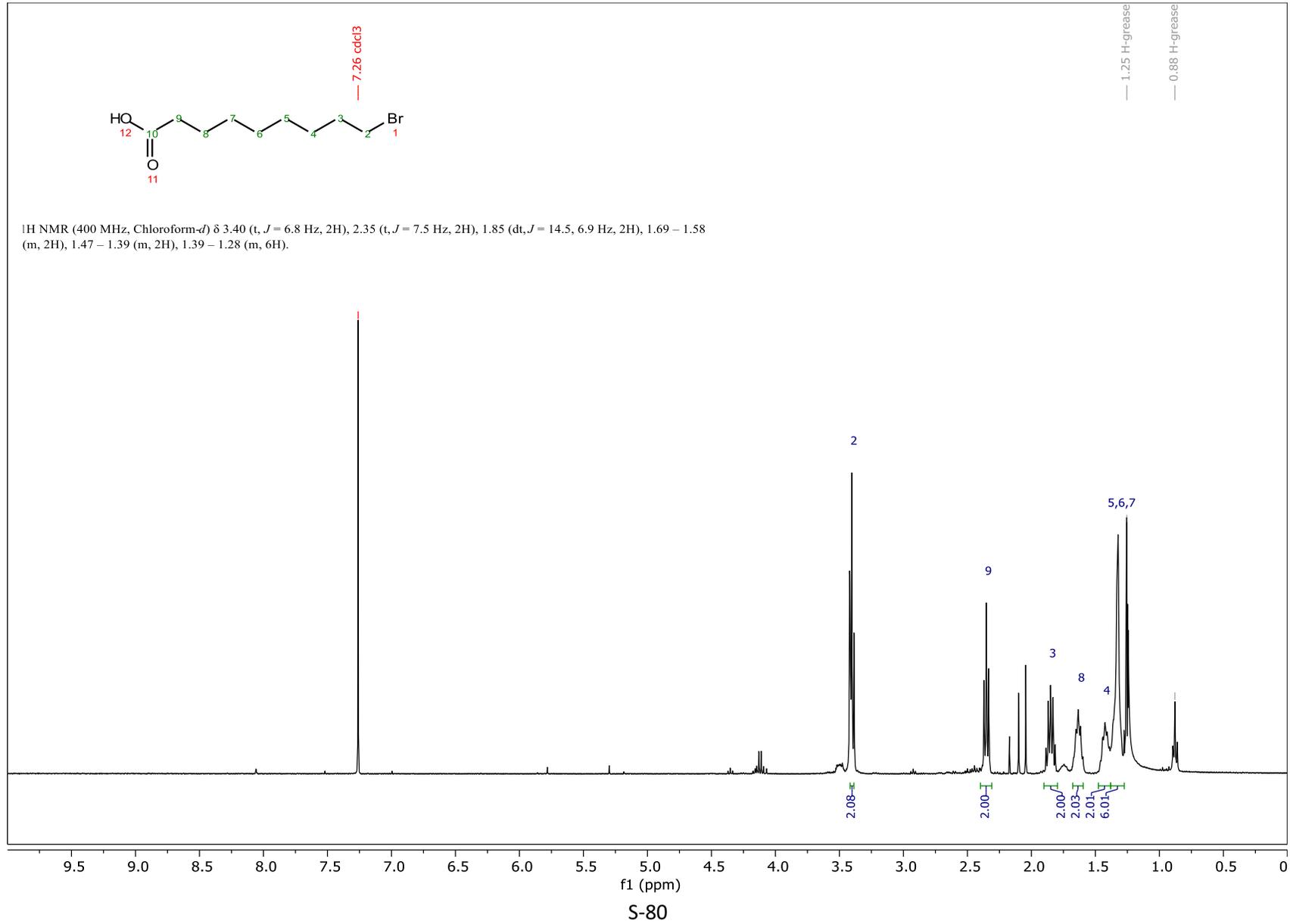


# HSQC NMR

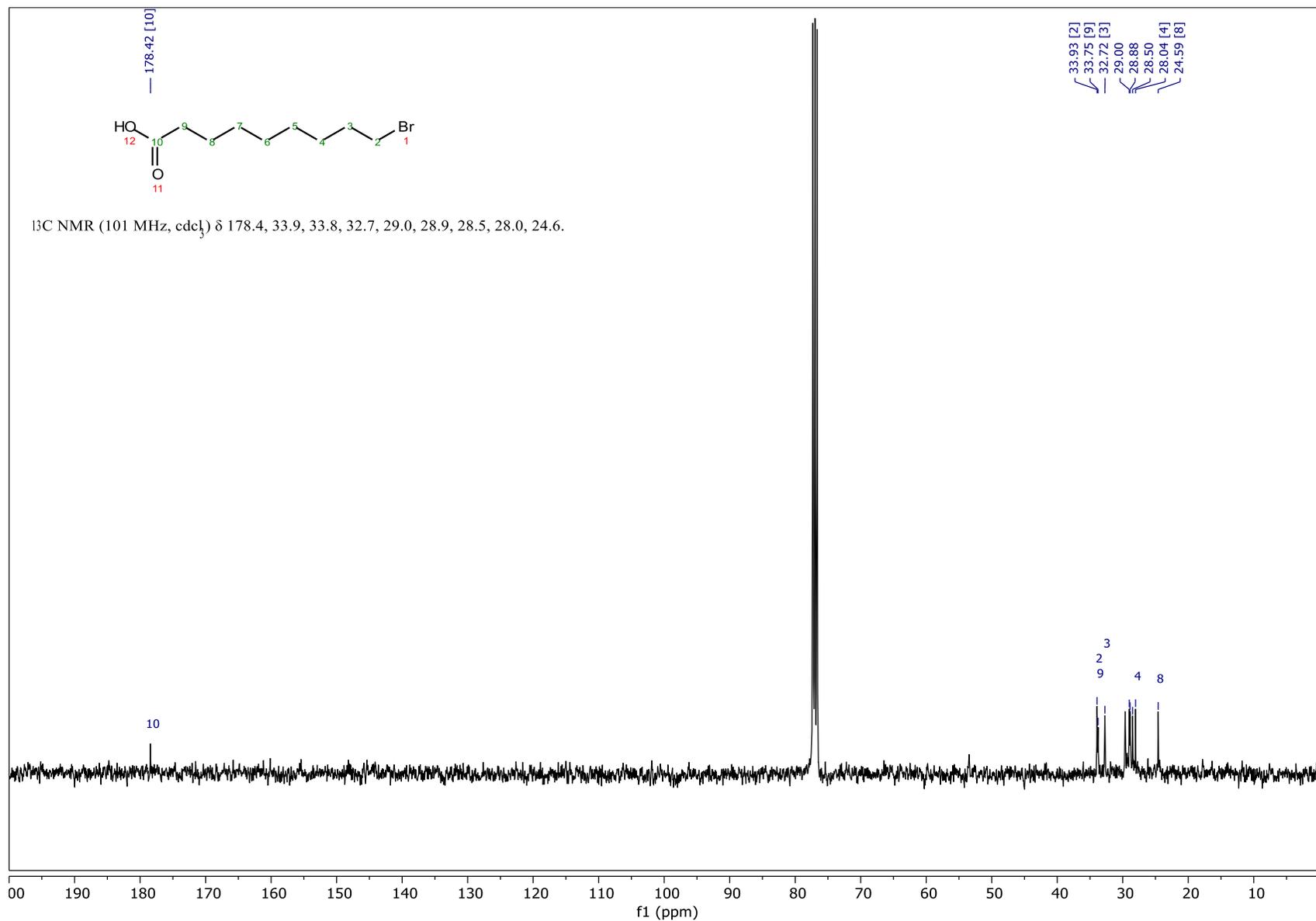


# Compound RBM5-041

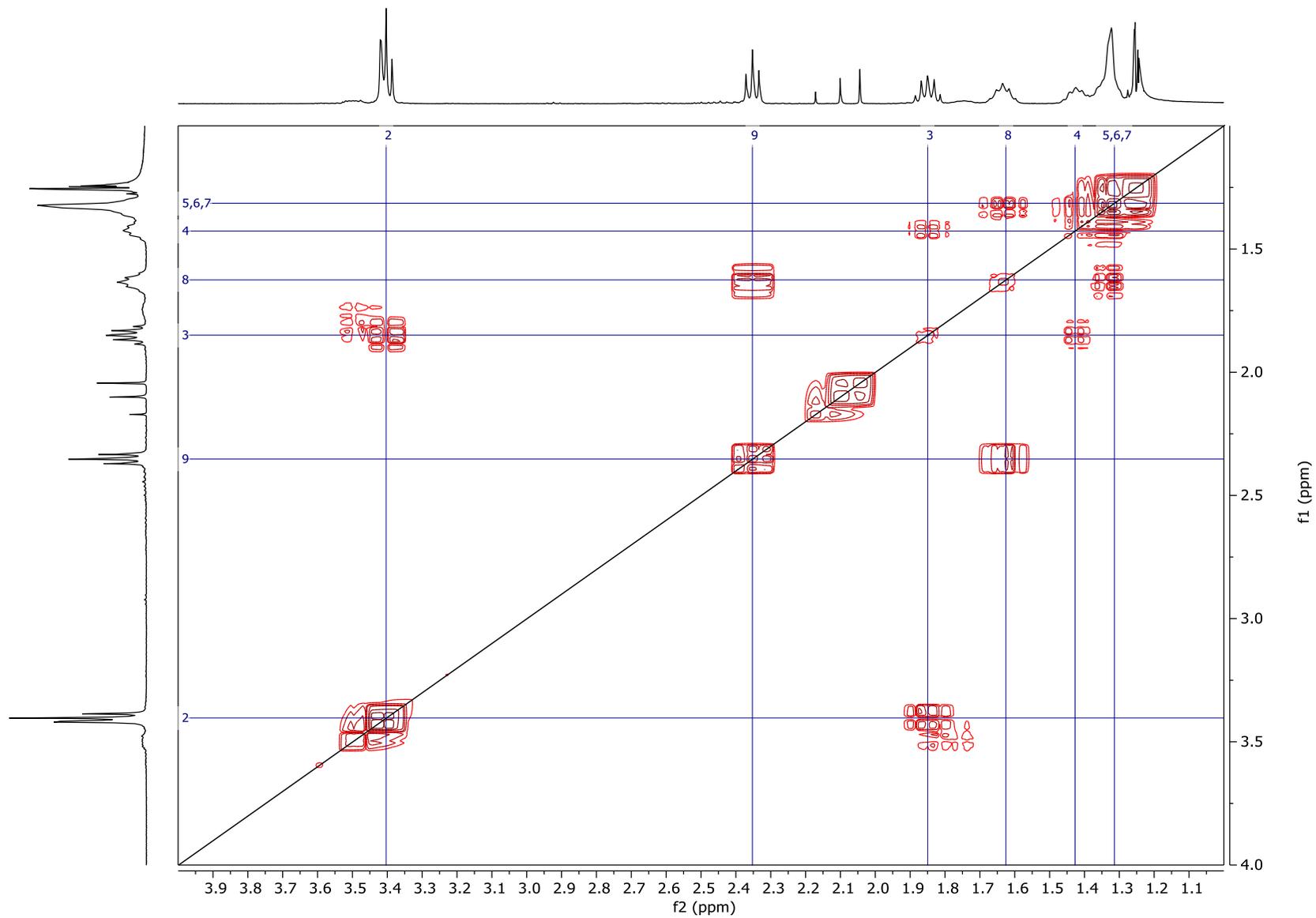
$^1\text{H}$  NMR



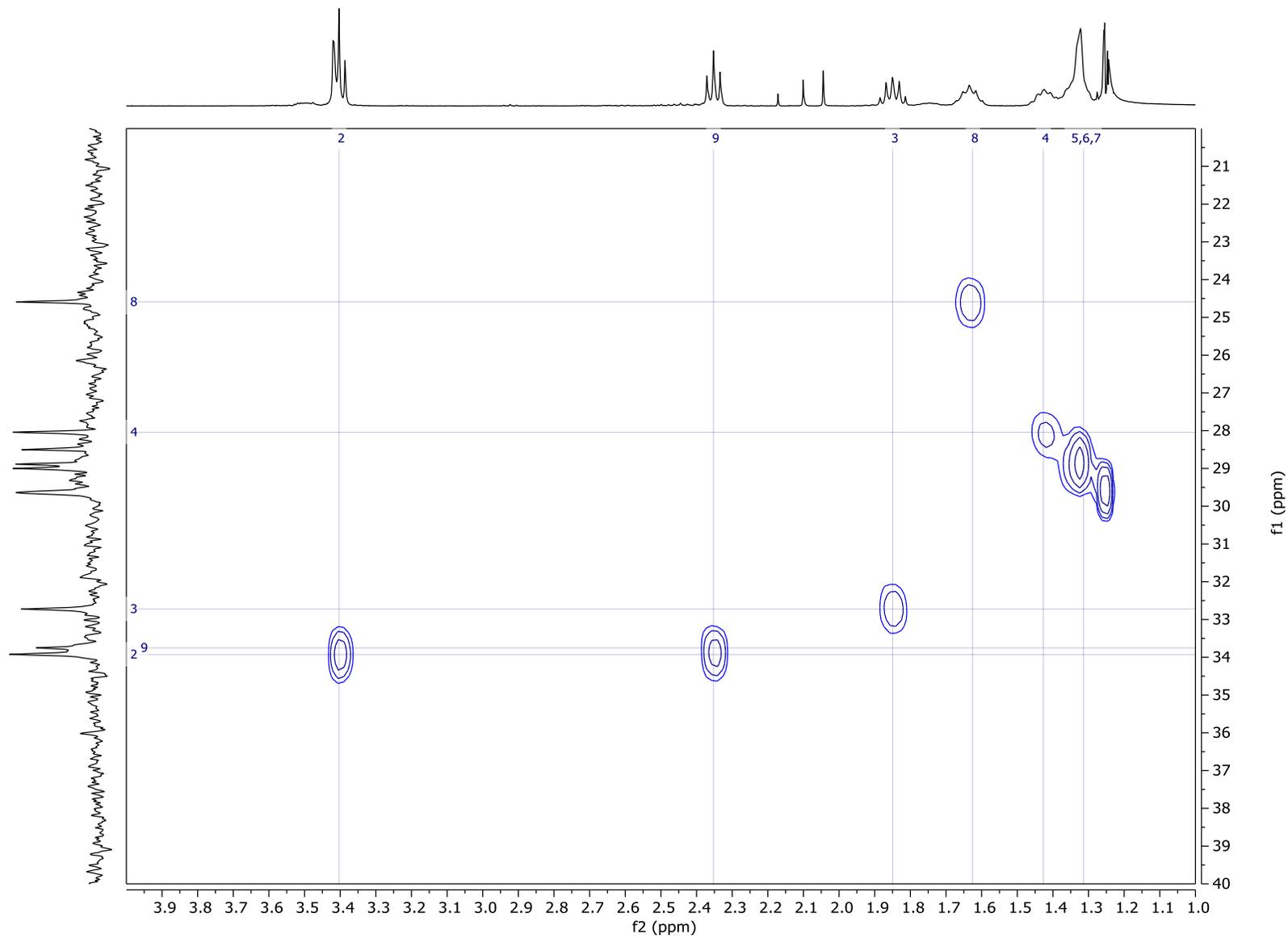
$^{13}\text{C}$  NMR



COSY NMR

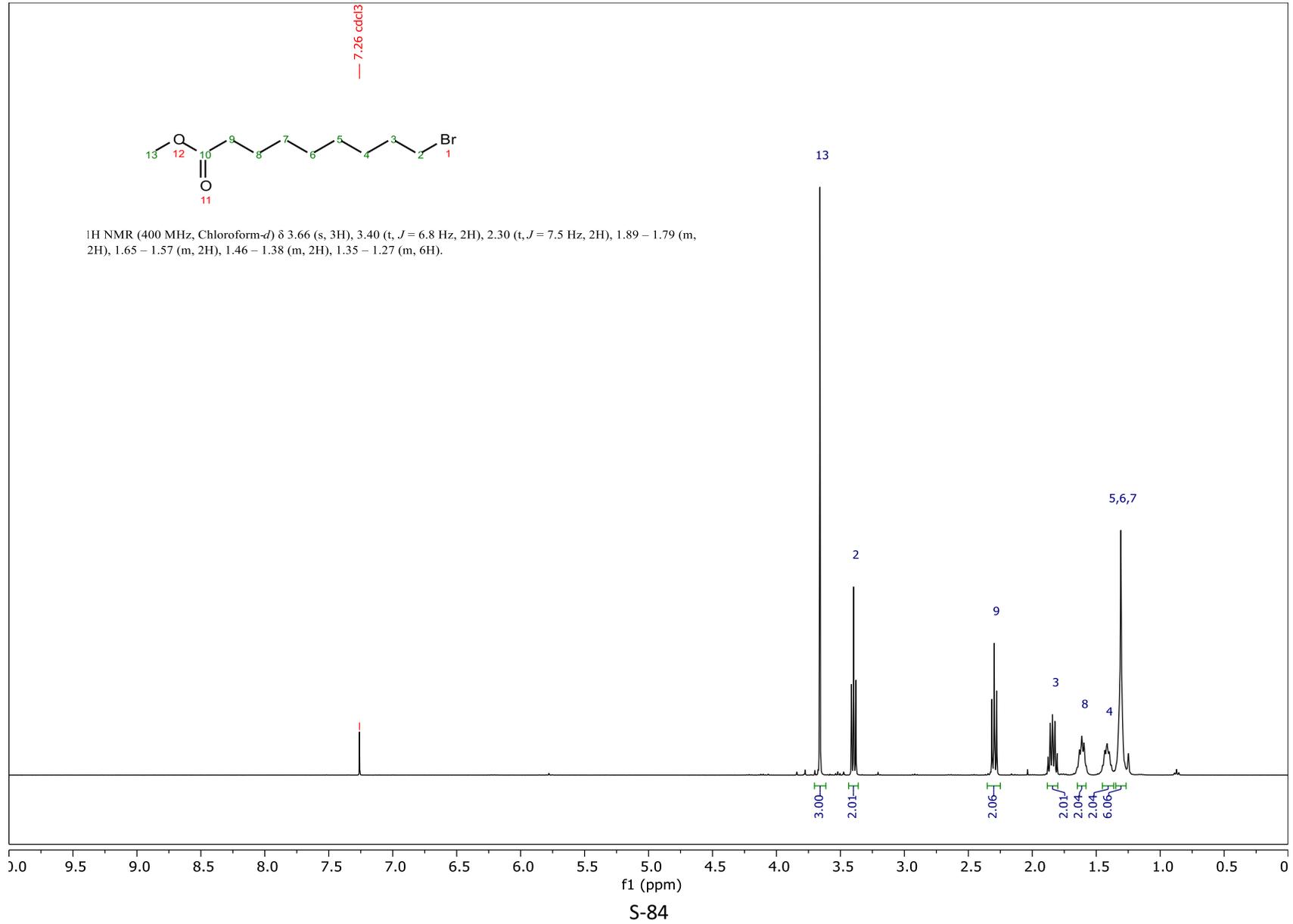


# HSQC NMR

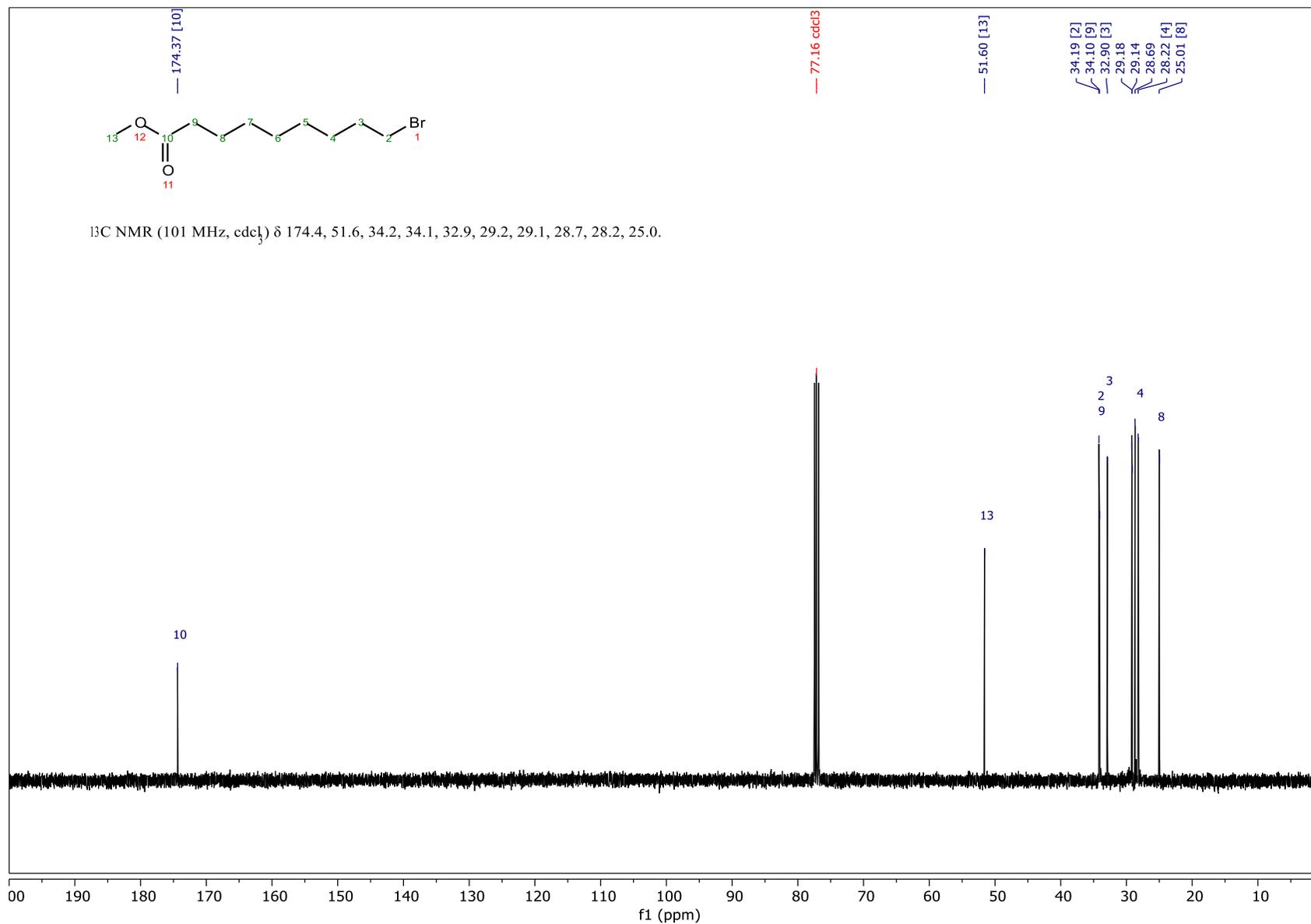


# Compound RBM5-042

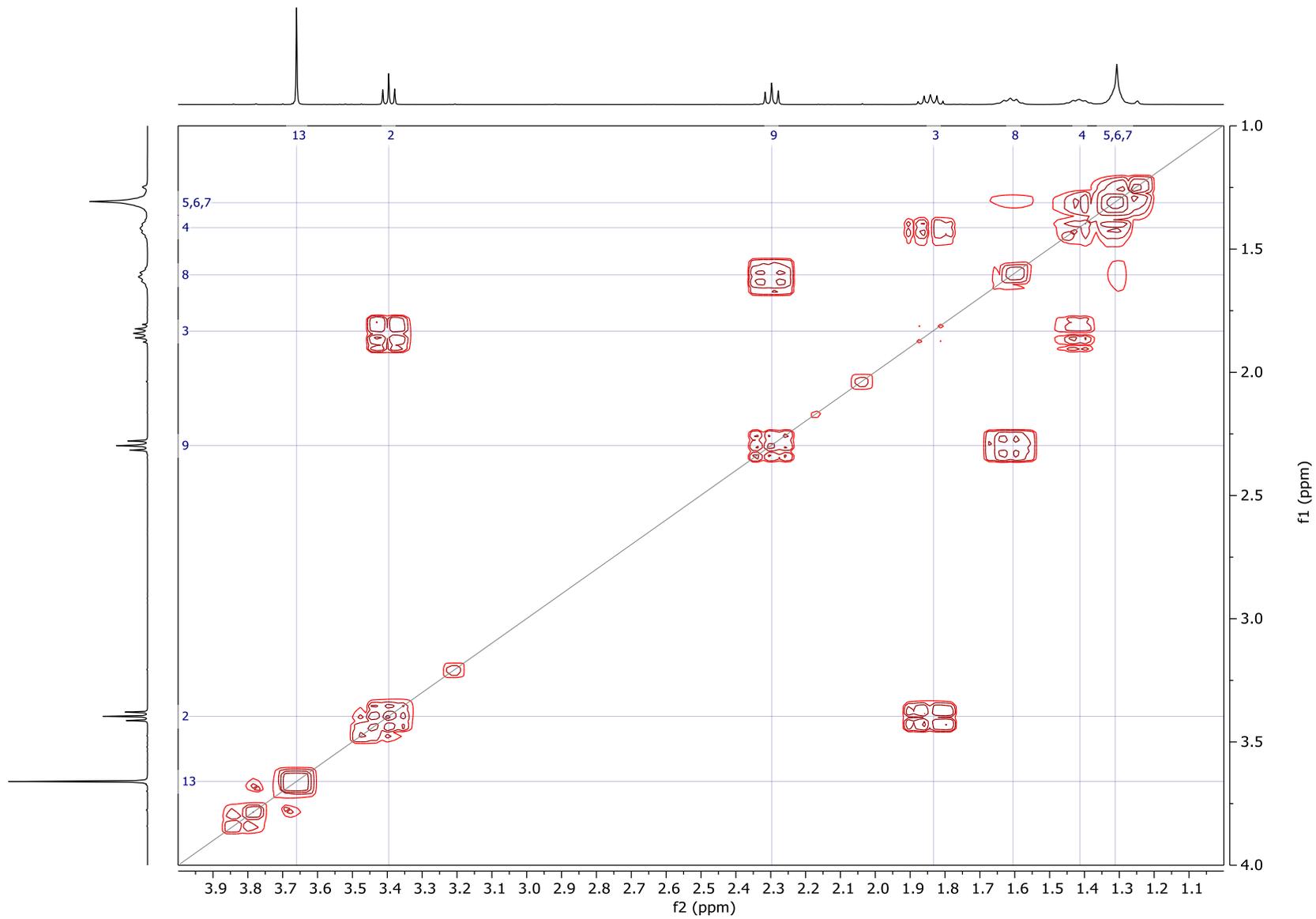
<sup>1</sup>H NMR



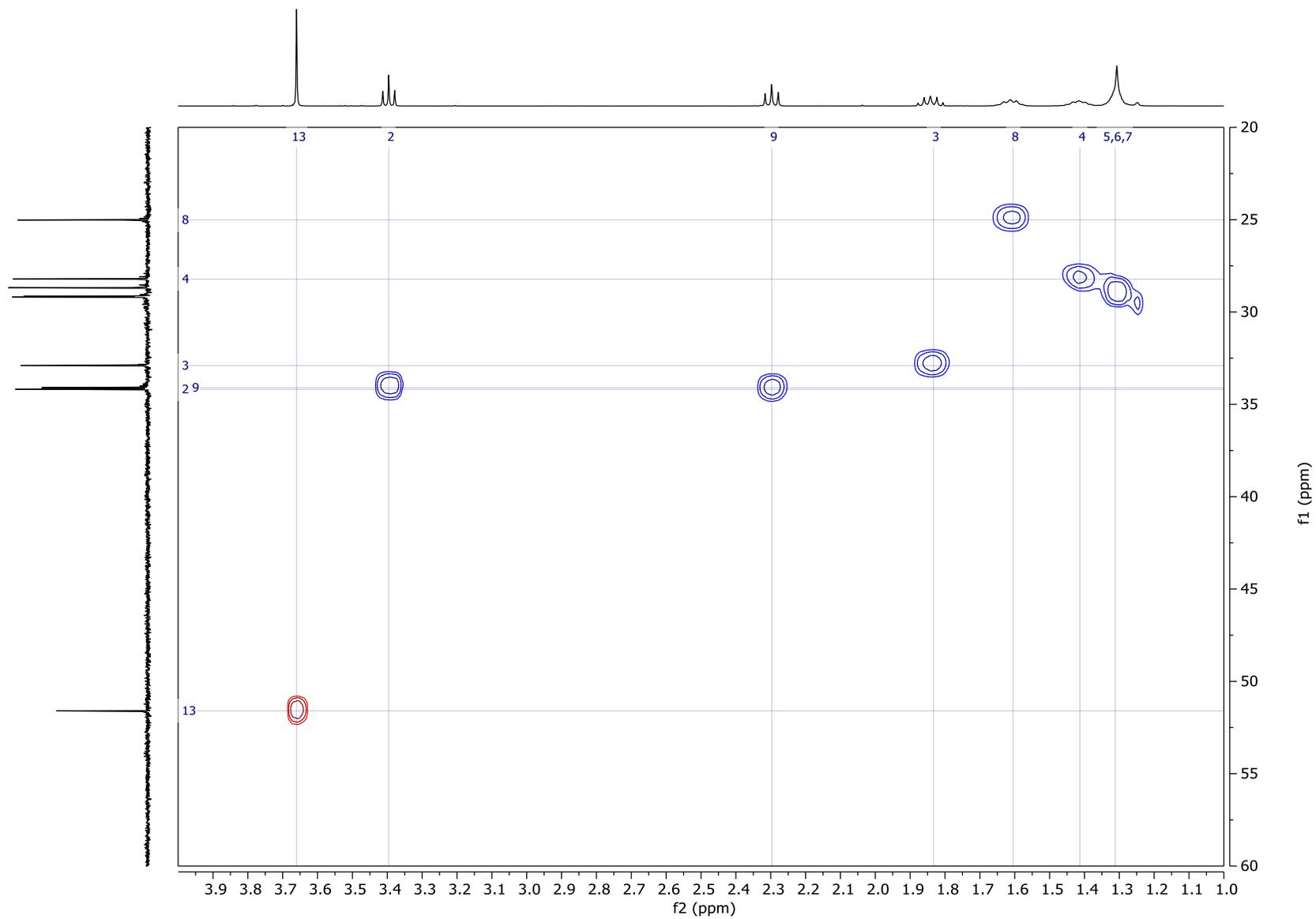
<sup>13</sup>C NMR



# COSY NMR

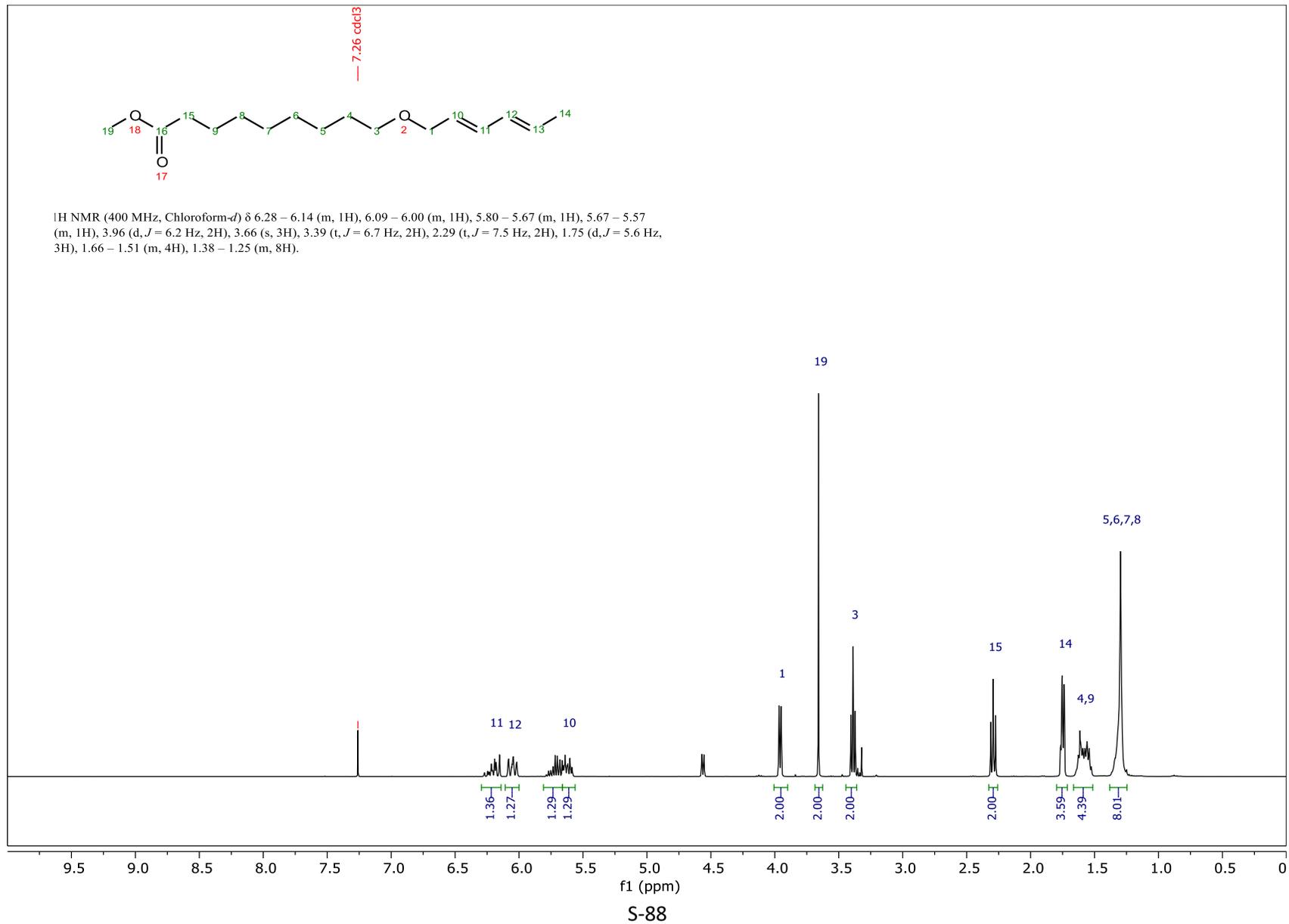


# HSQC NMR

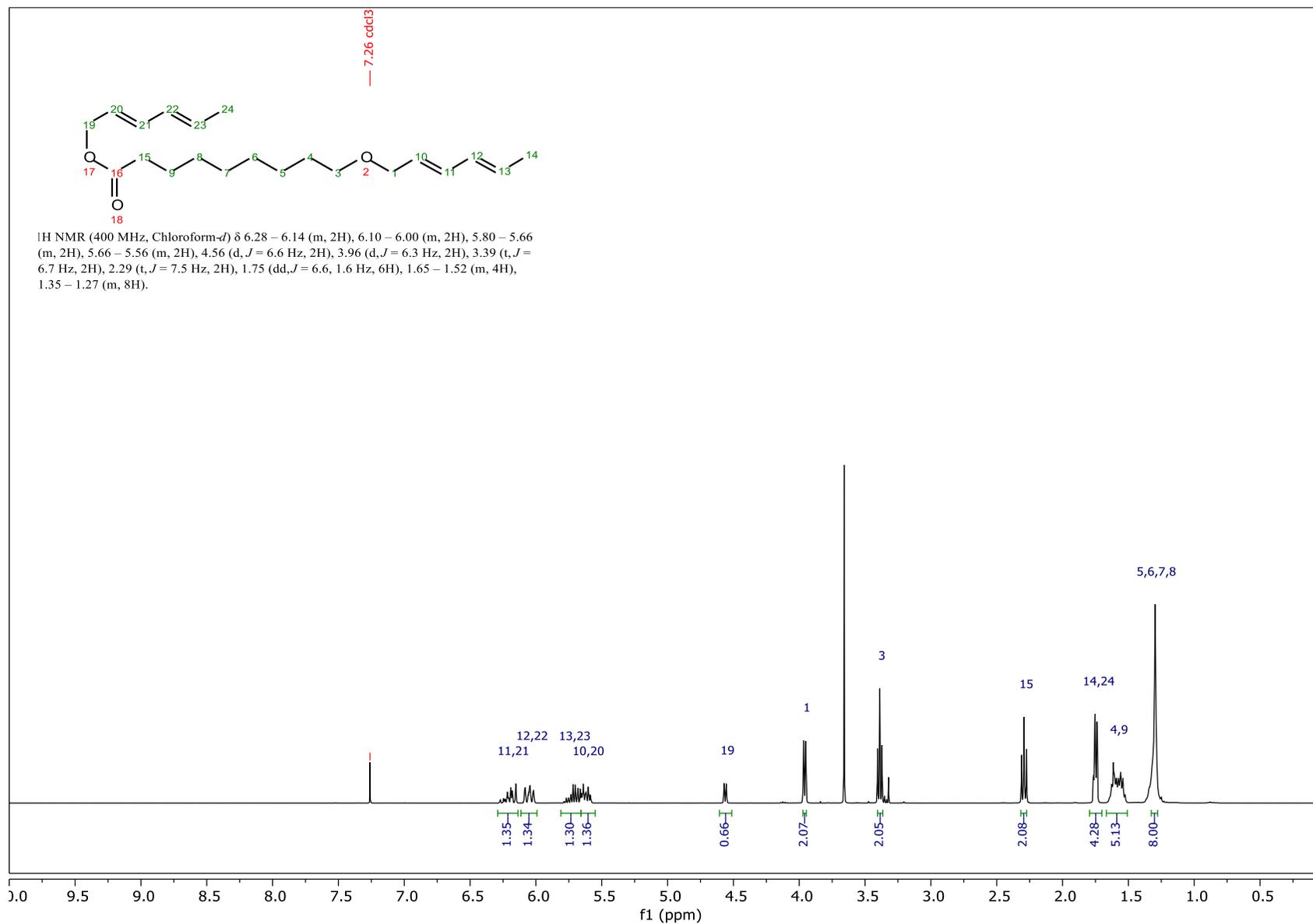


# Compound RBM5-043a,b

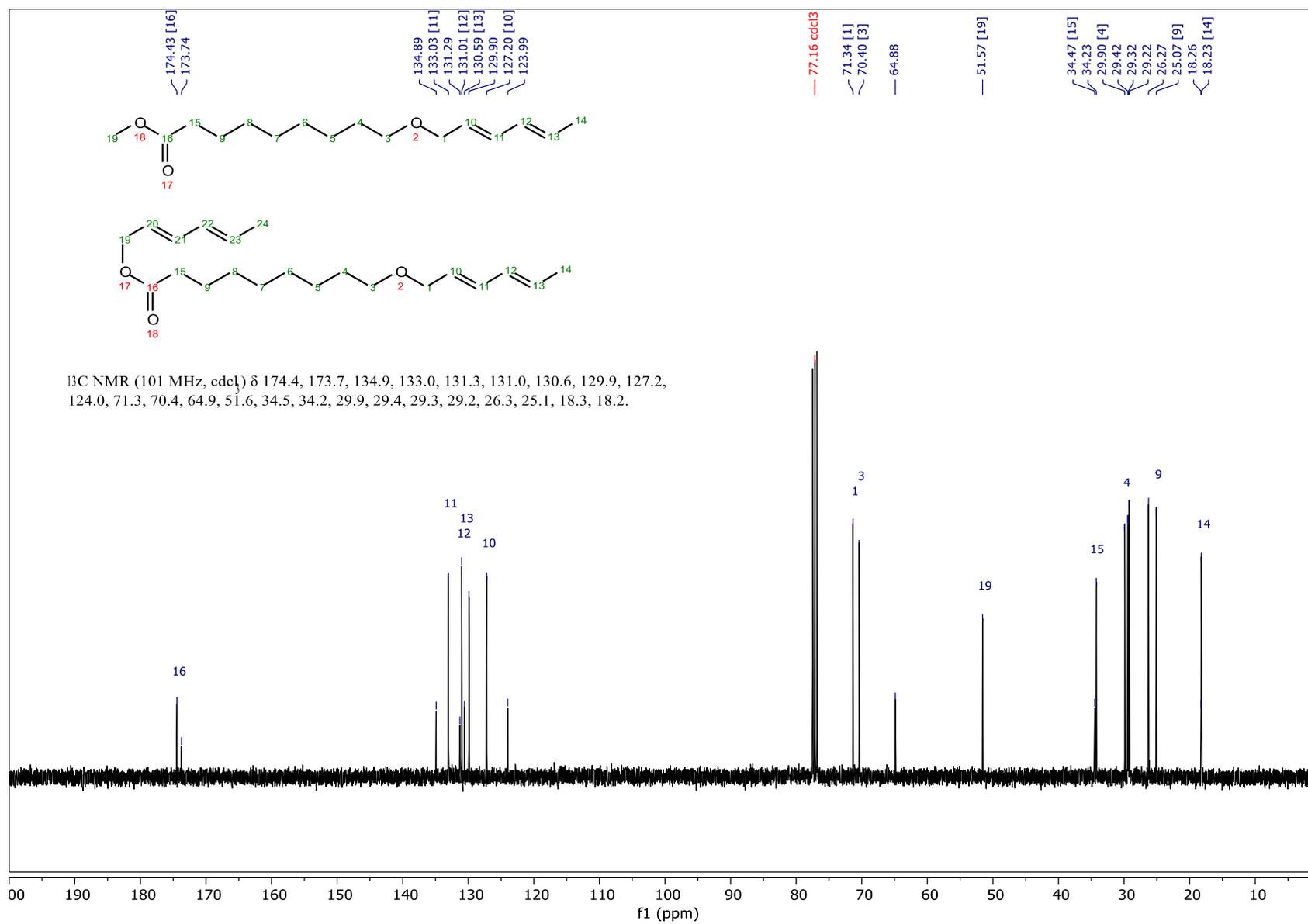
<sup>1</sup>H NMR (RBM5-043a)



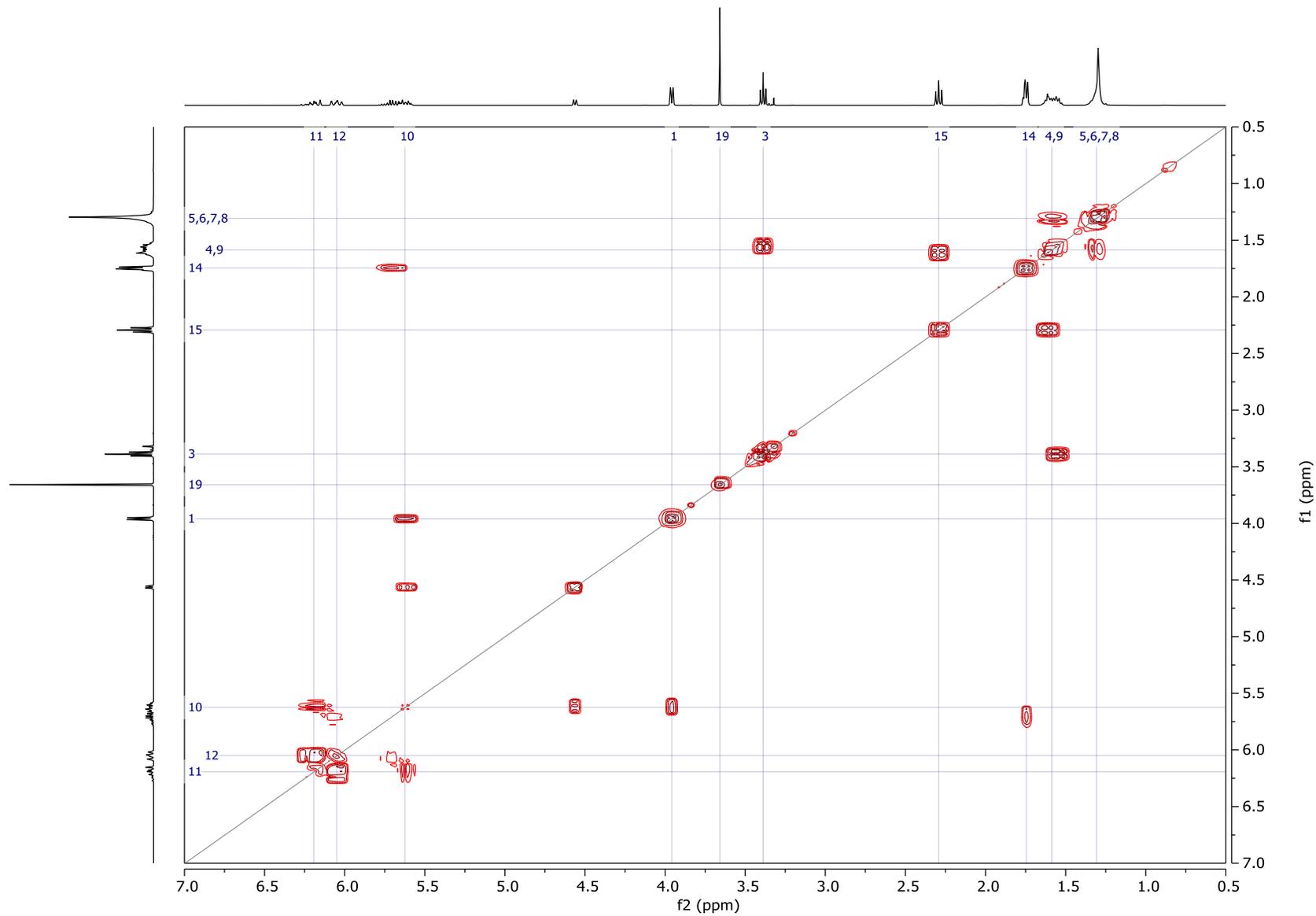
<sup>1</sup>H NMR (RBM5-043b)



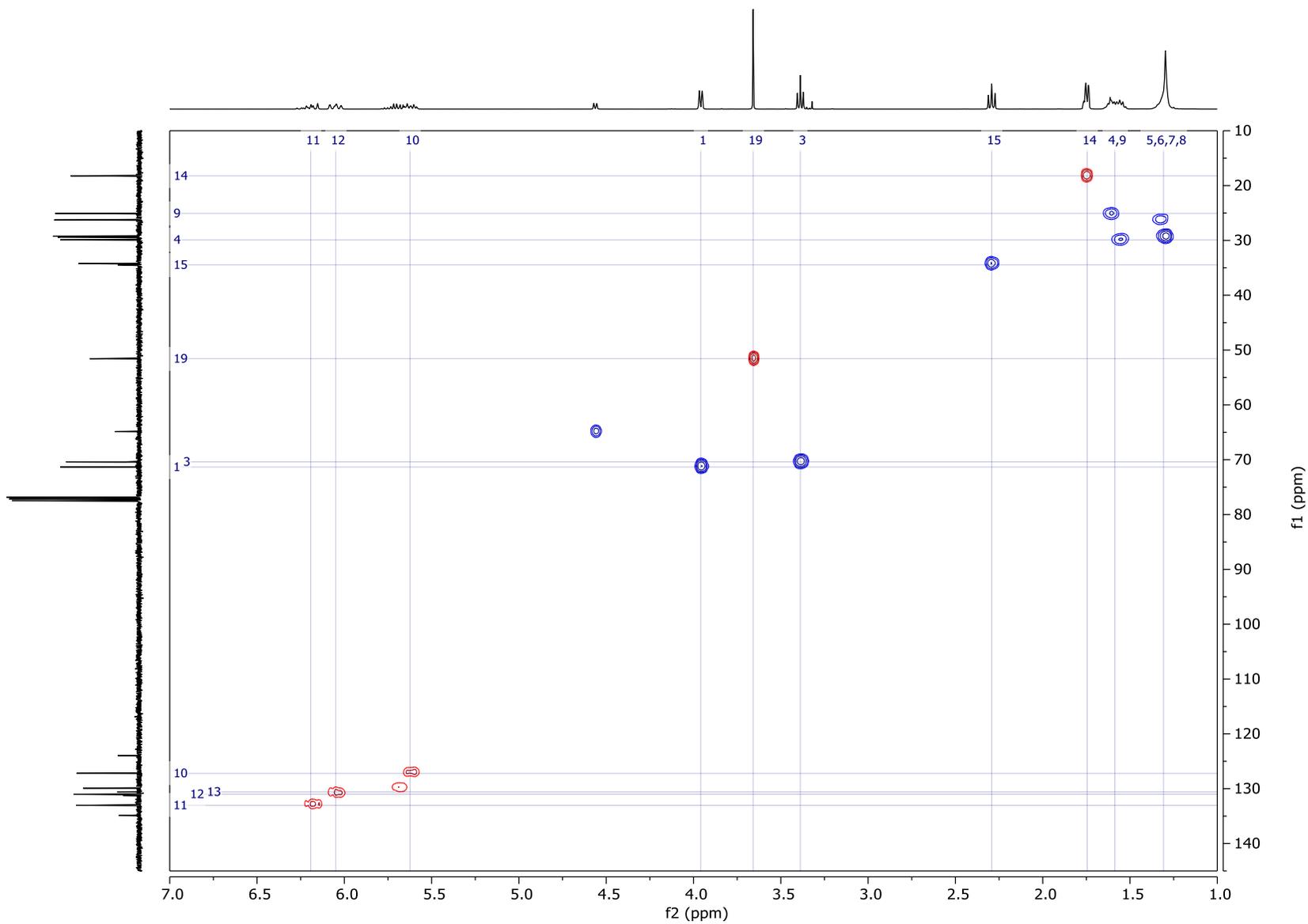
# $^{13}\text{C}$ NMR



# COSY NMR

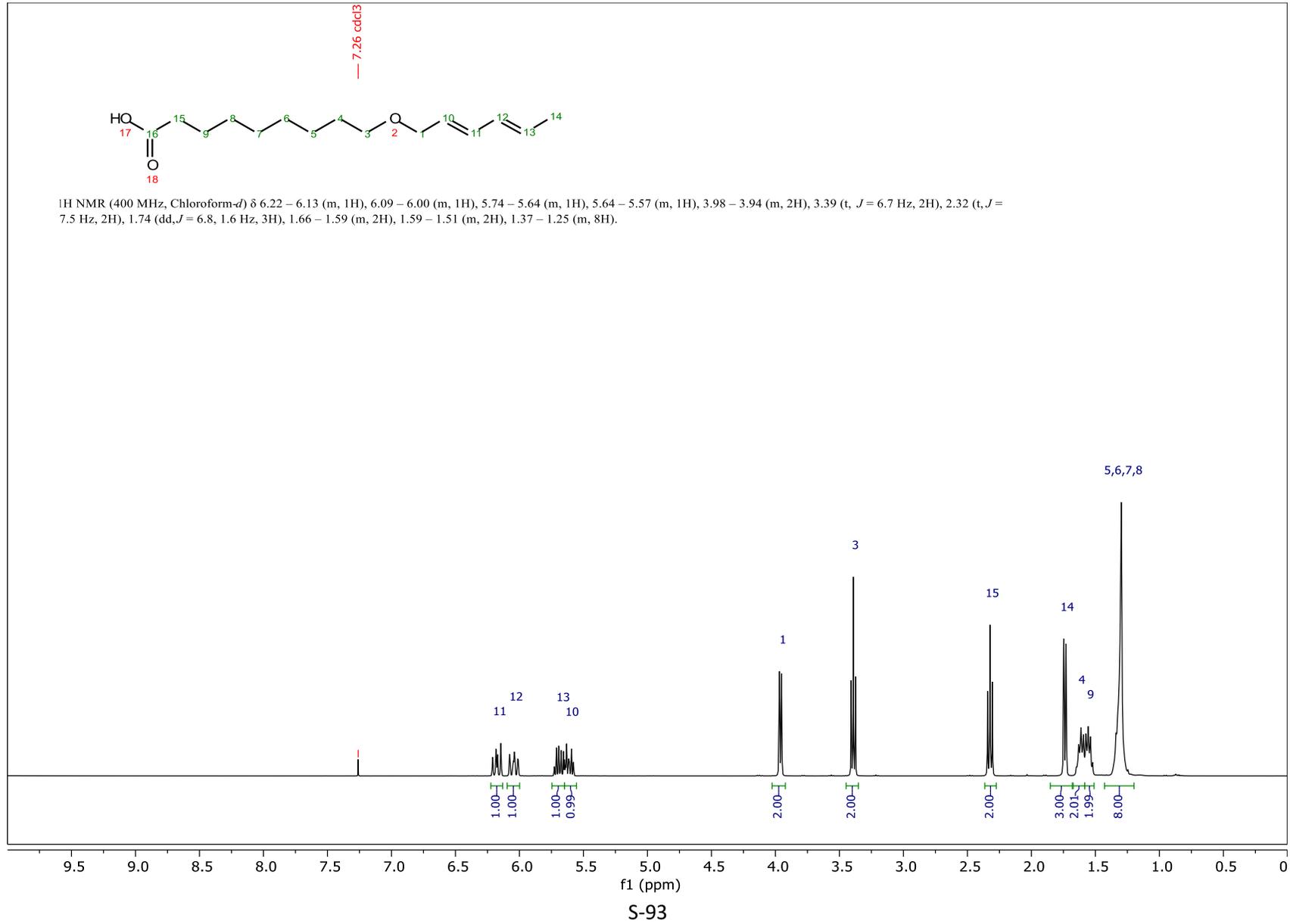


# HSQC NMR

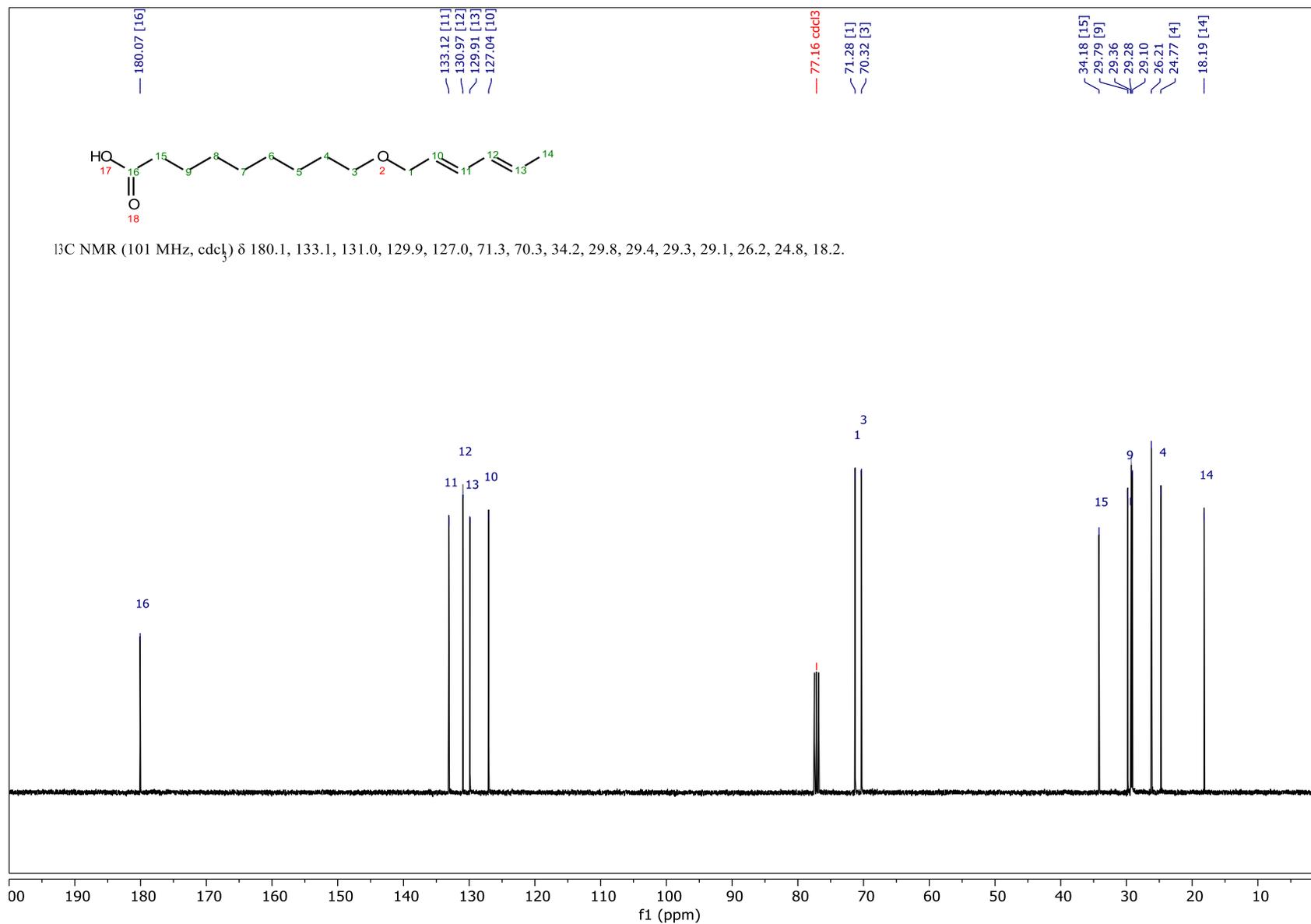


# Compound RBM5-044

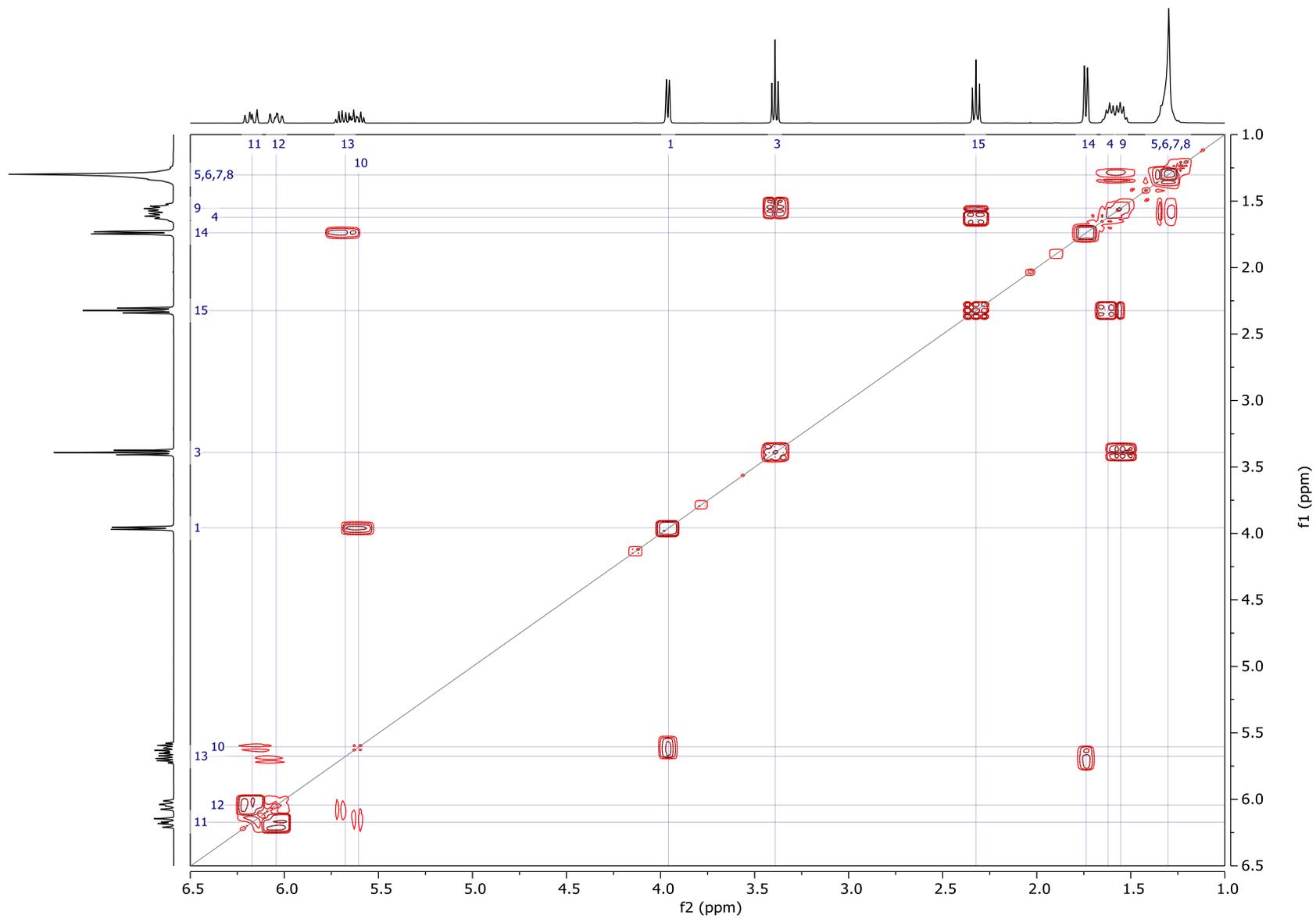
$^1\text{H NMR}$



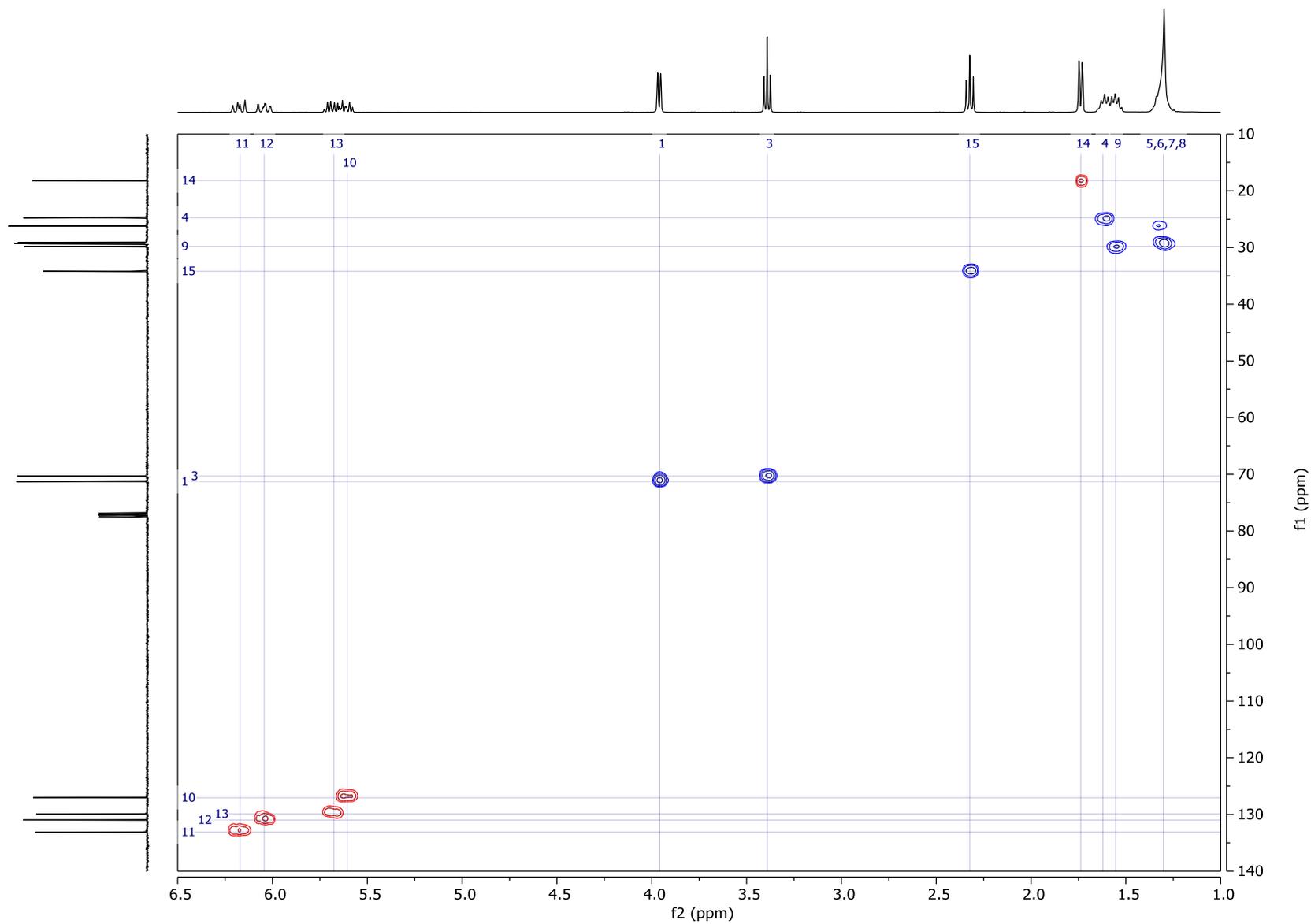
# <sup>13</sup>C NMR



# COSY NMR

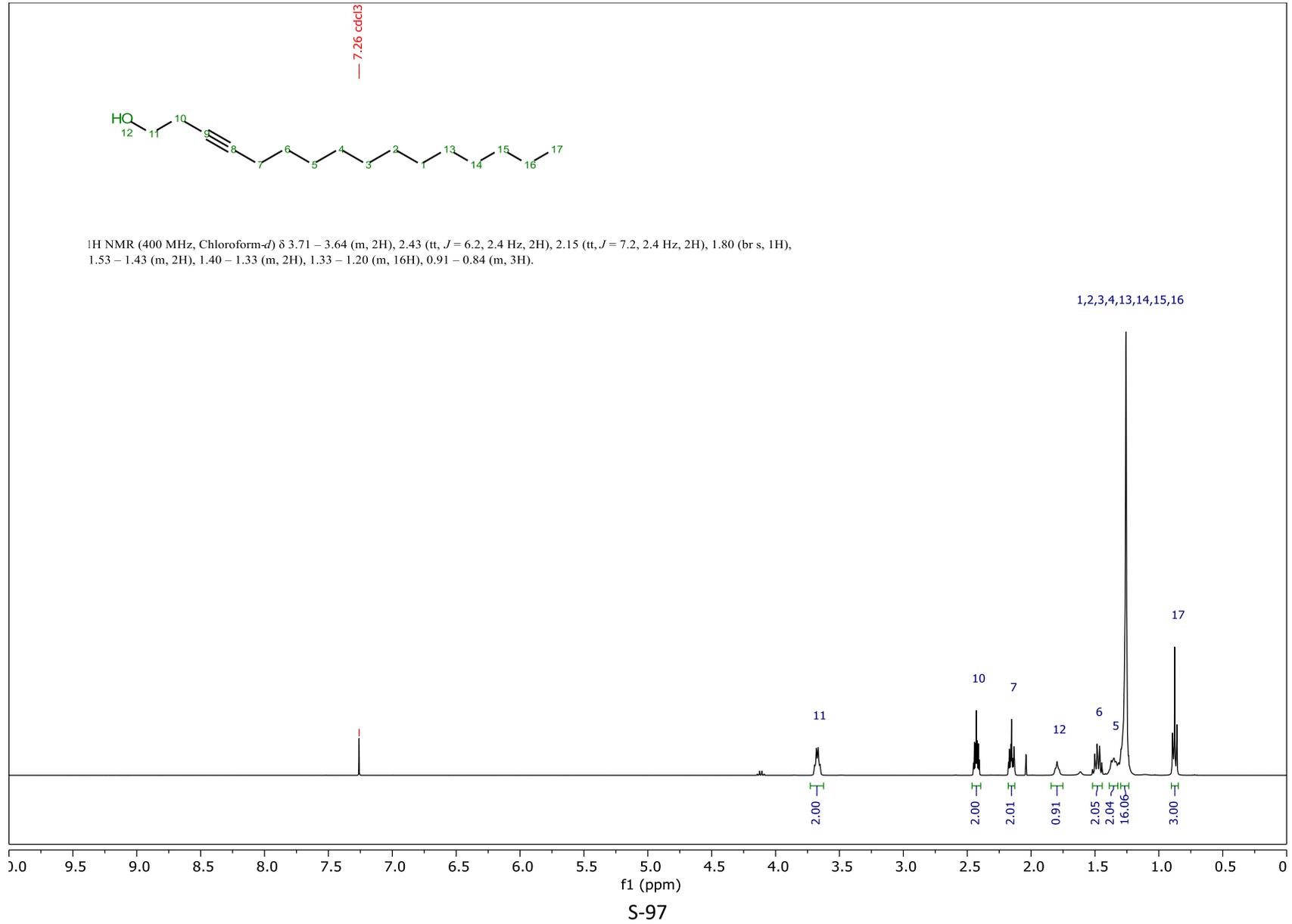


# HSQC NMR

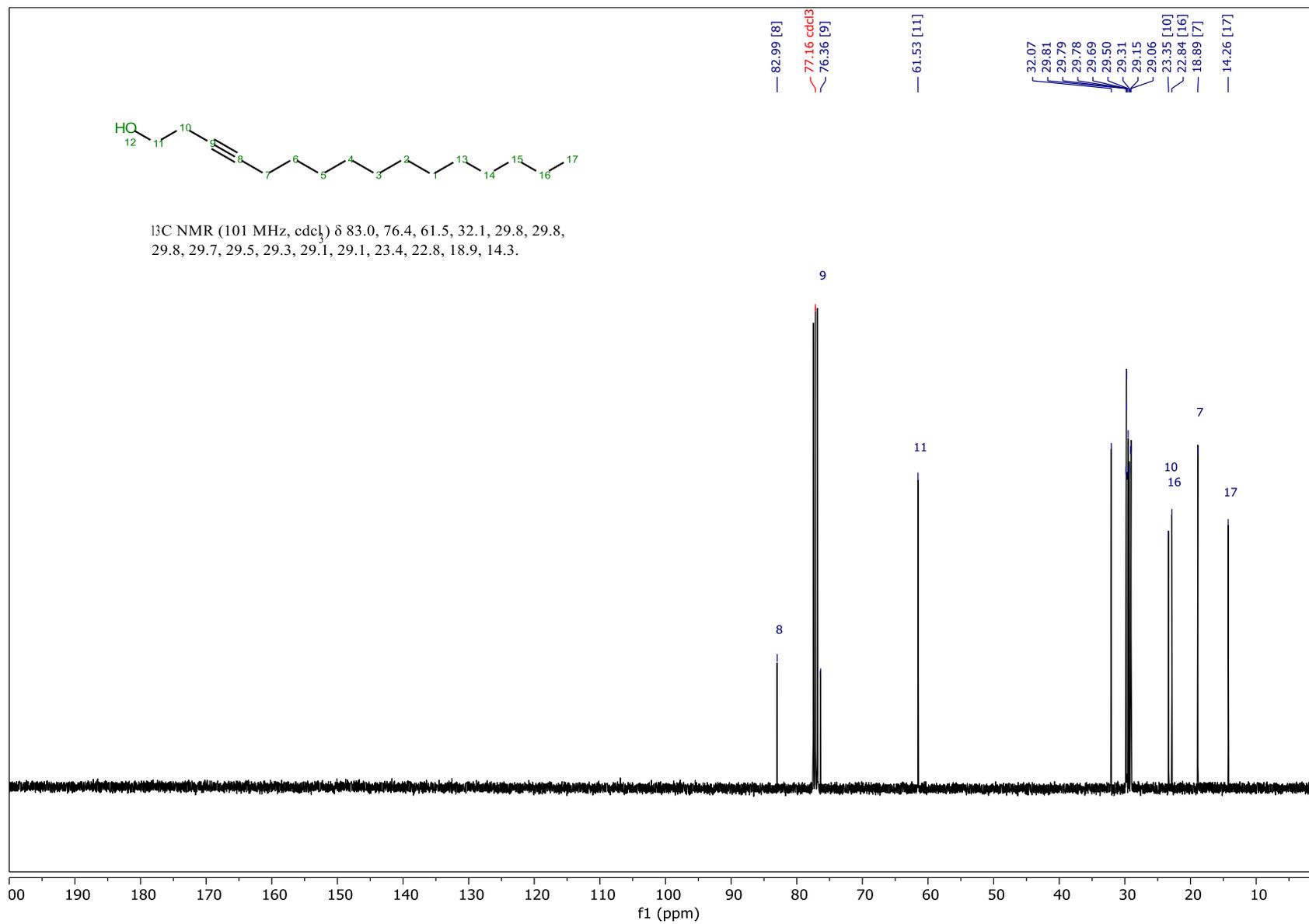


# Compound RBM5-051

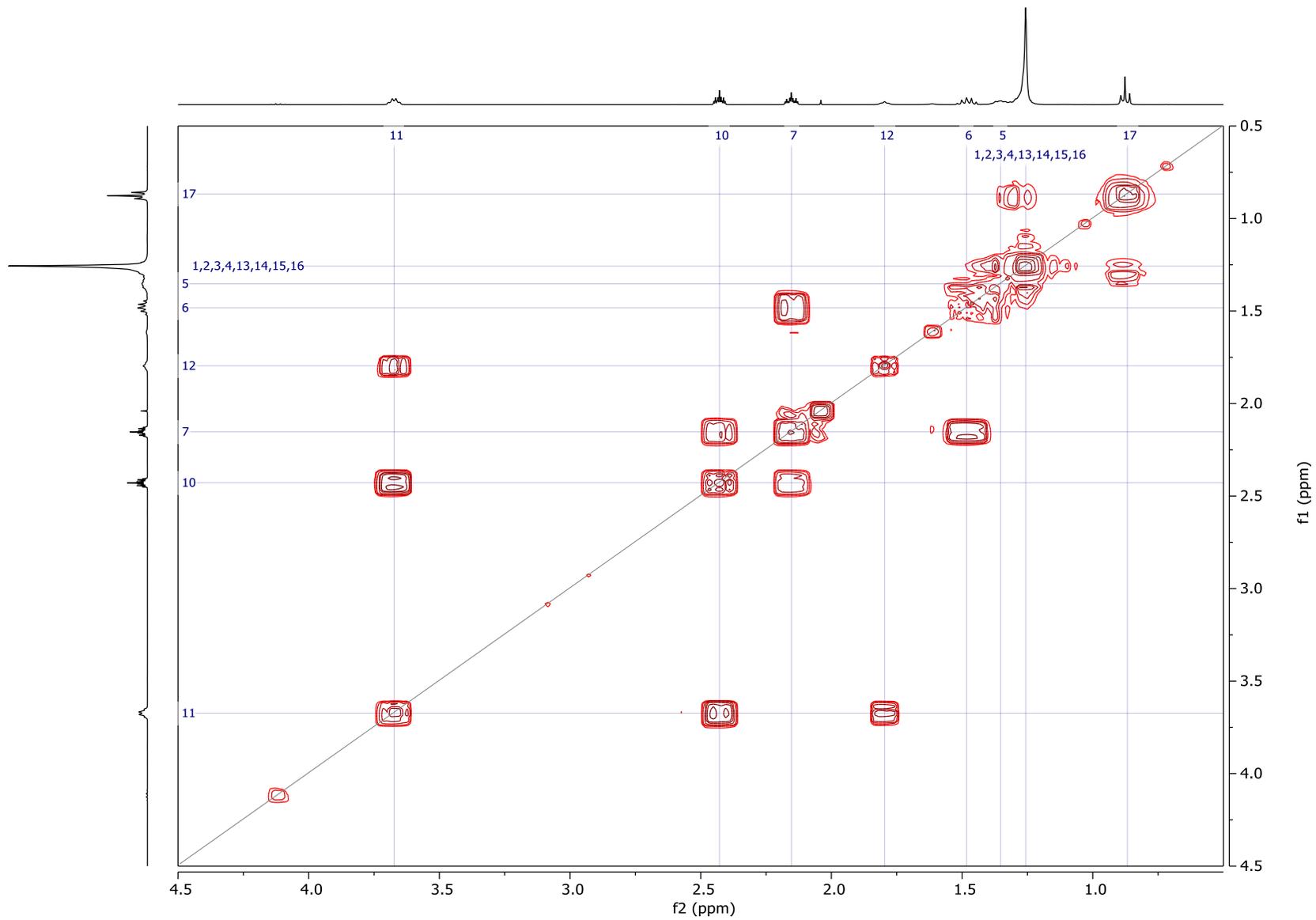
<sup>1</sup>H NMR



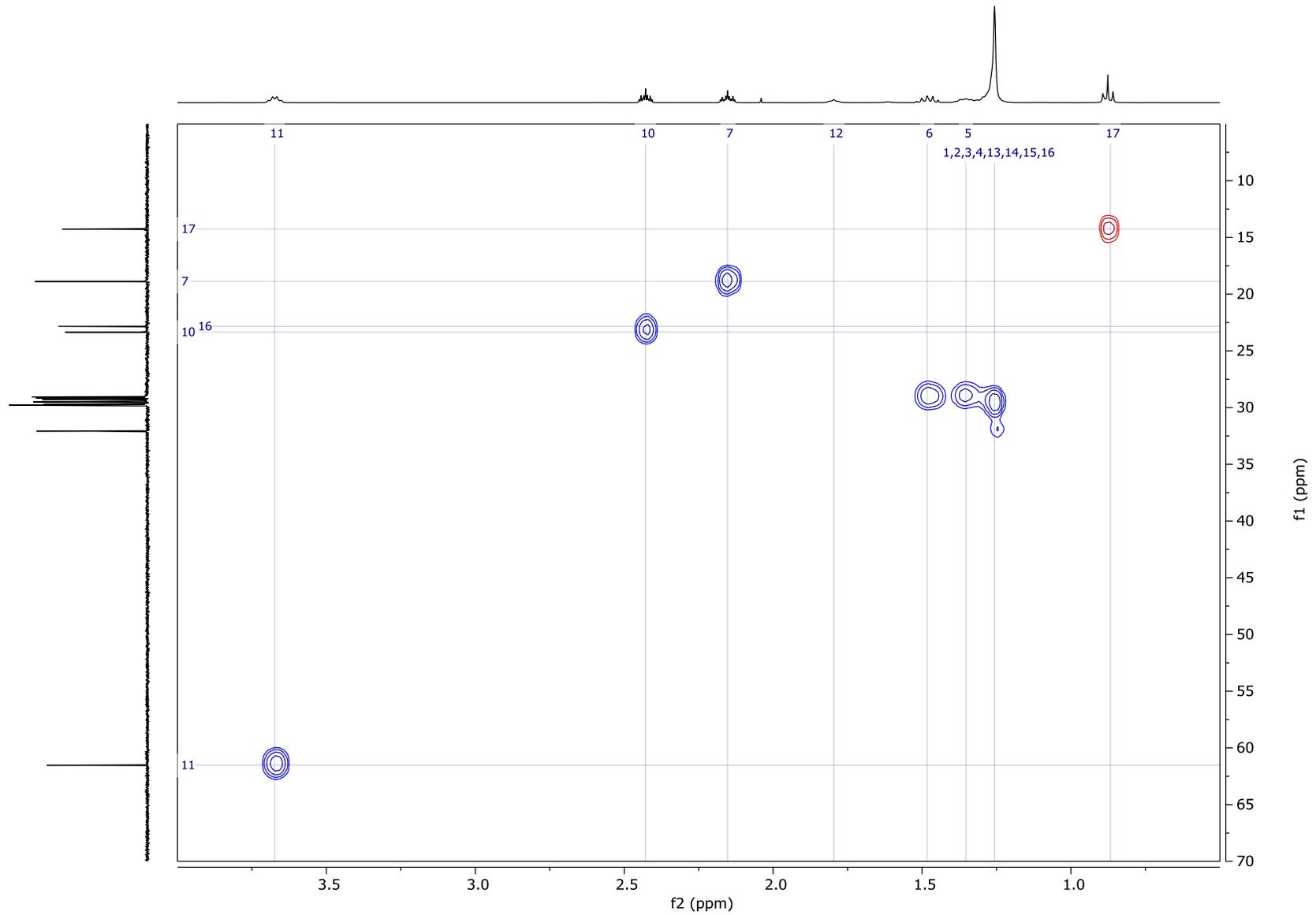
<sup>13</sup>C NMR



# COSY NMR



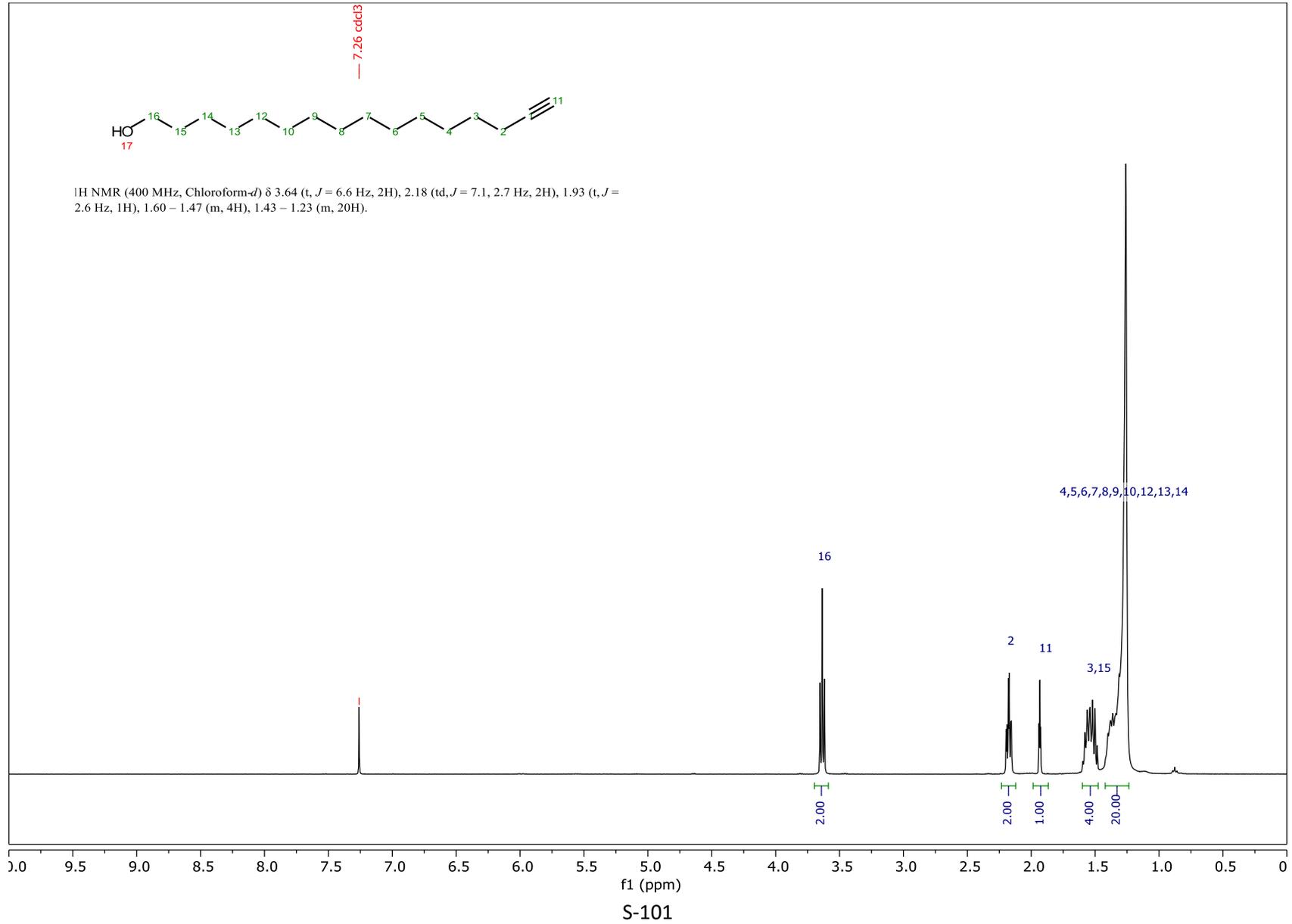
# HSQC NMR



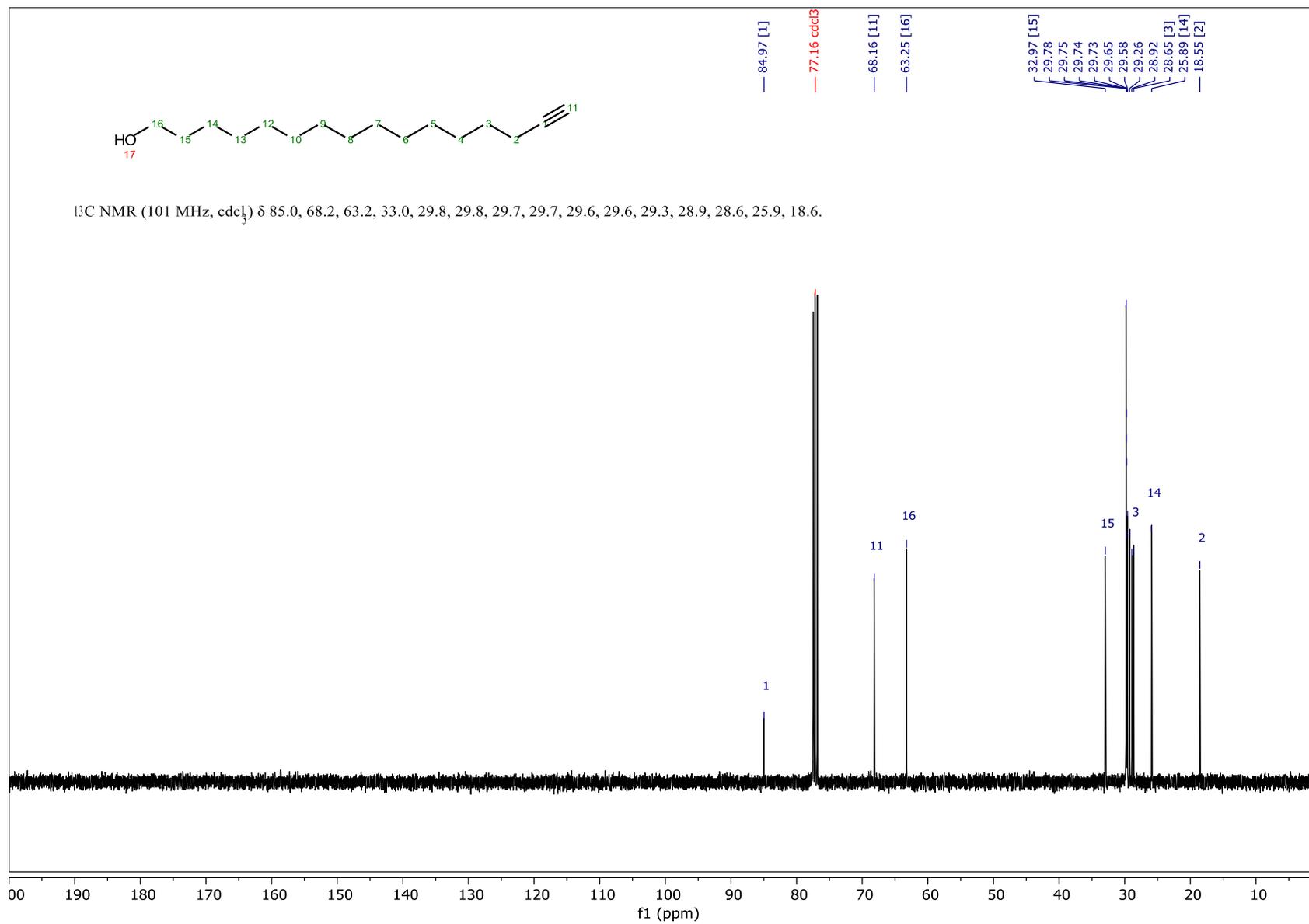
S-100

# Compound RBM5-052

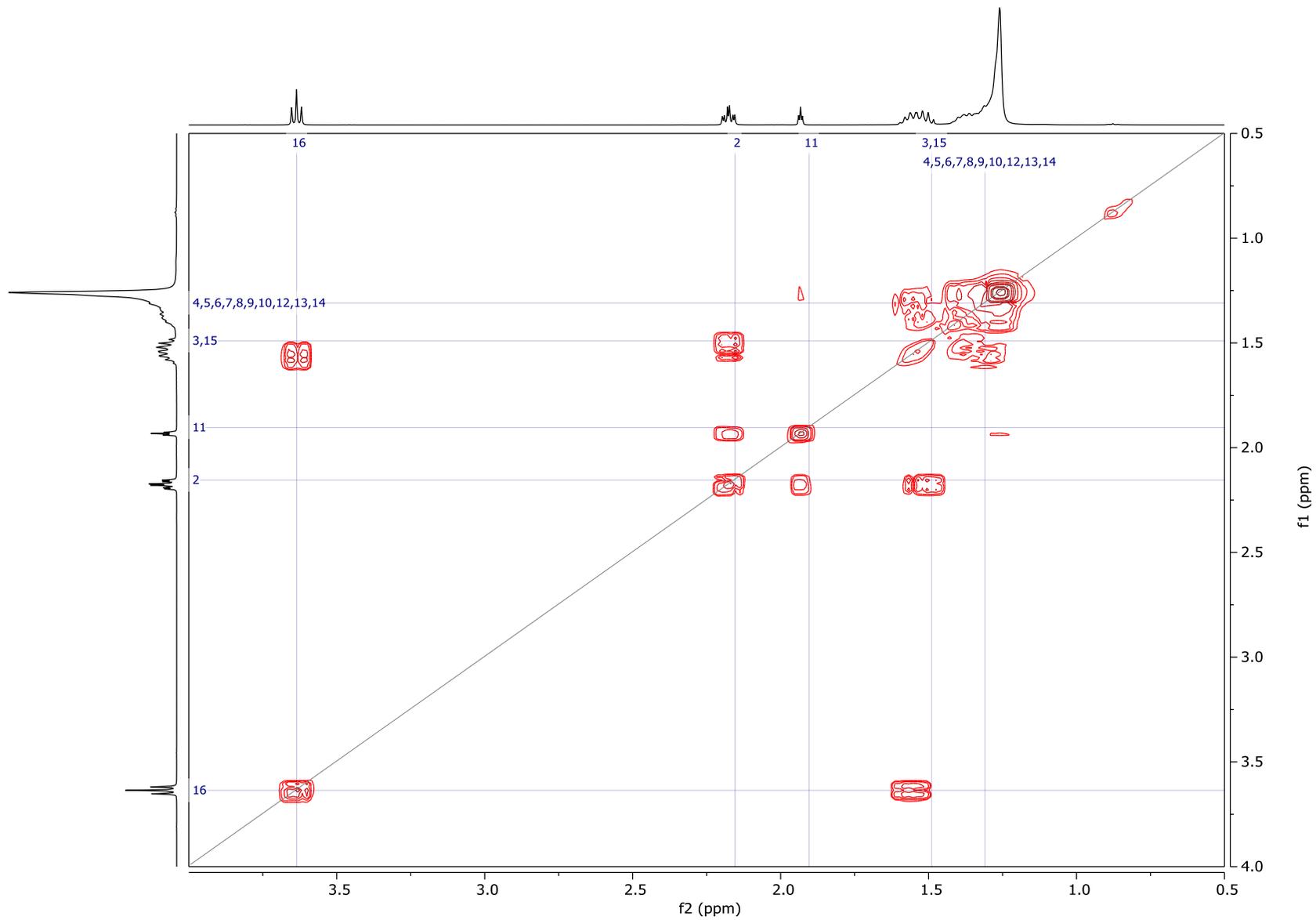
$^1\text{H}$  NMR



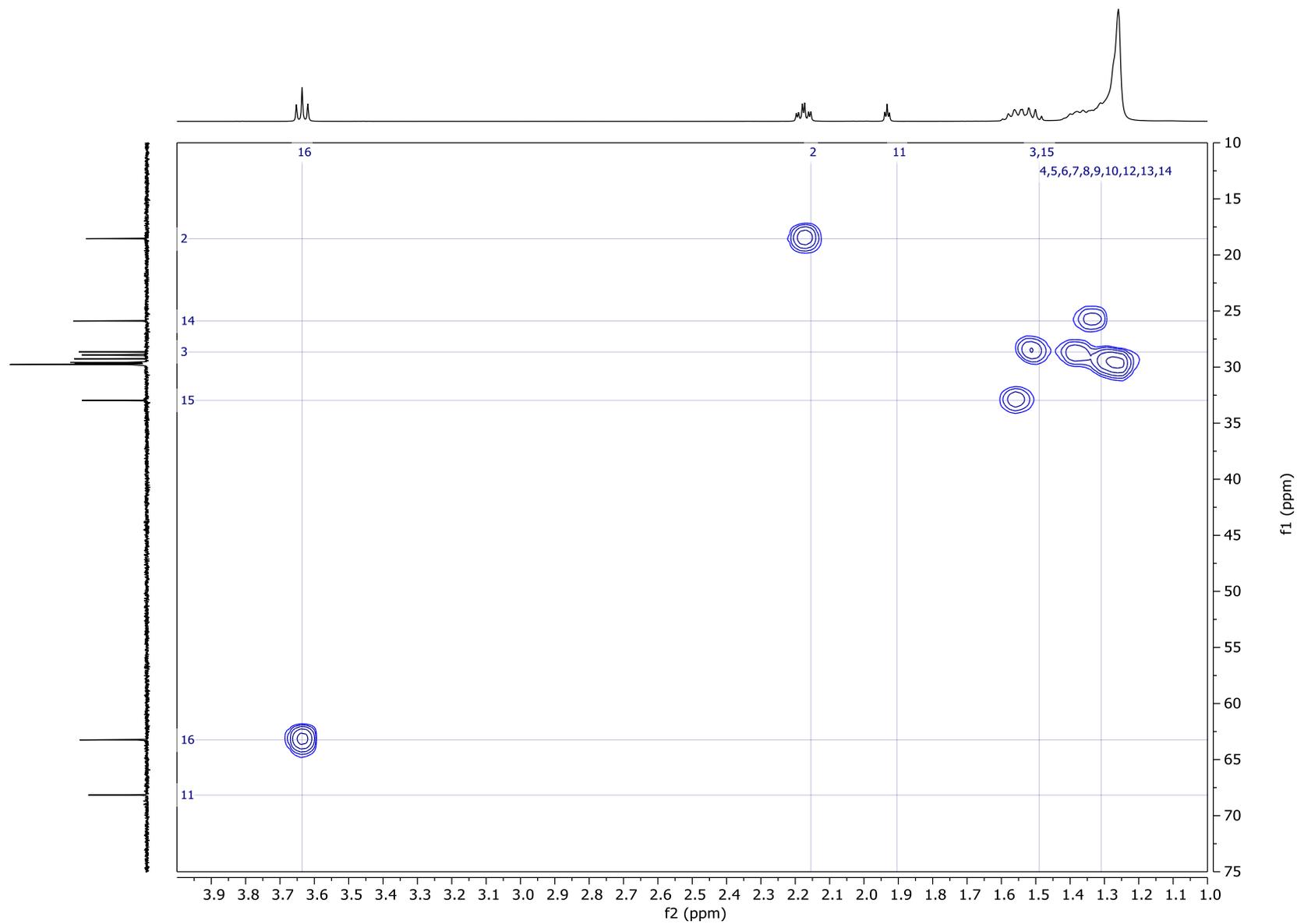
<sup>13</sup>C NMR



COSY NMR

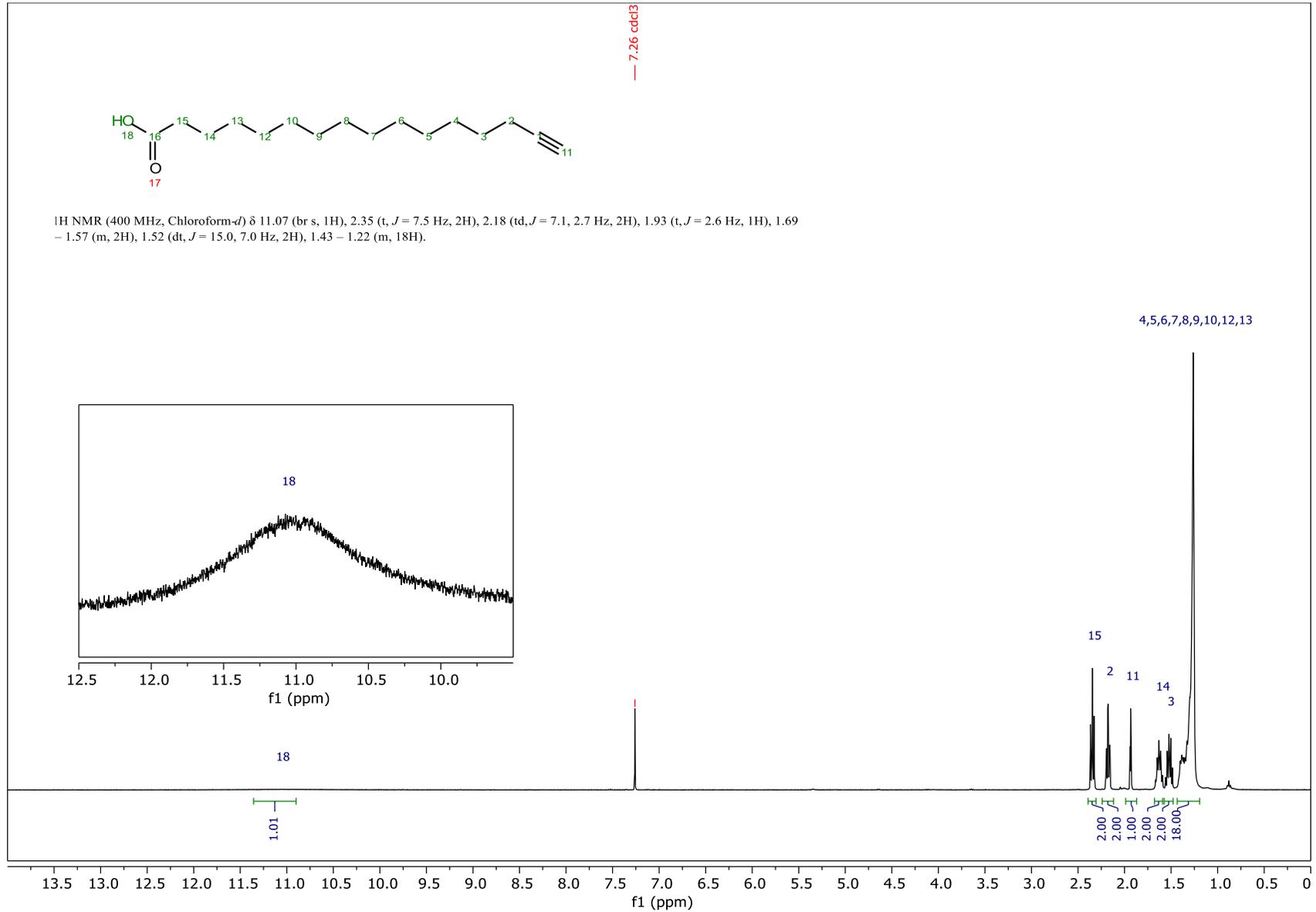


# HSQC NMR

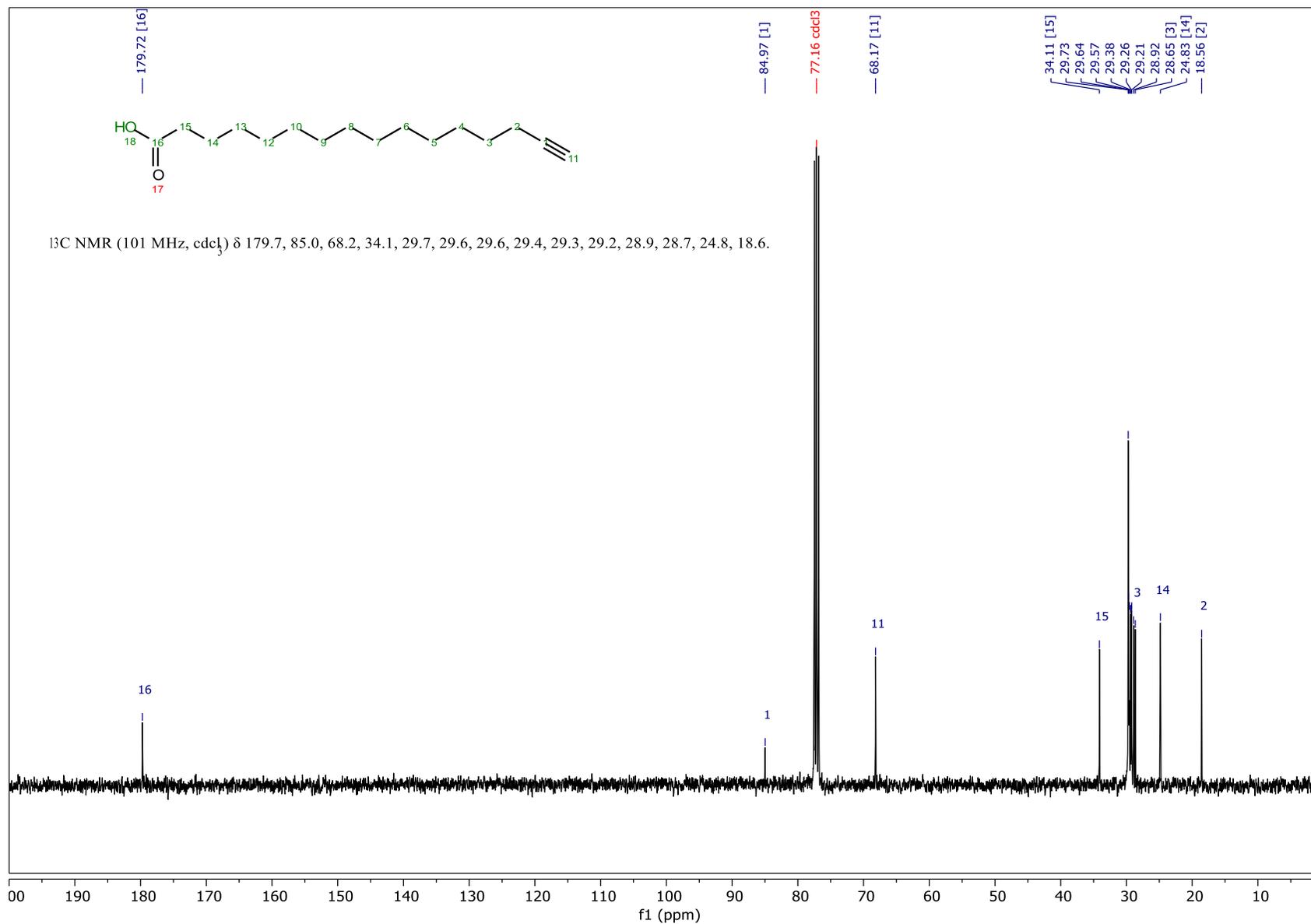


# Compound RBM5-053

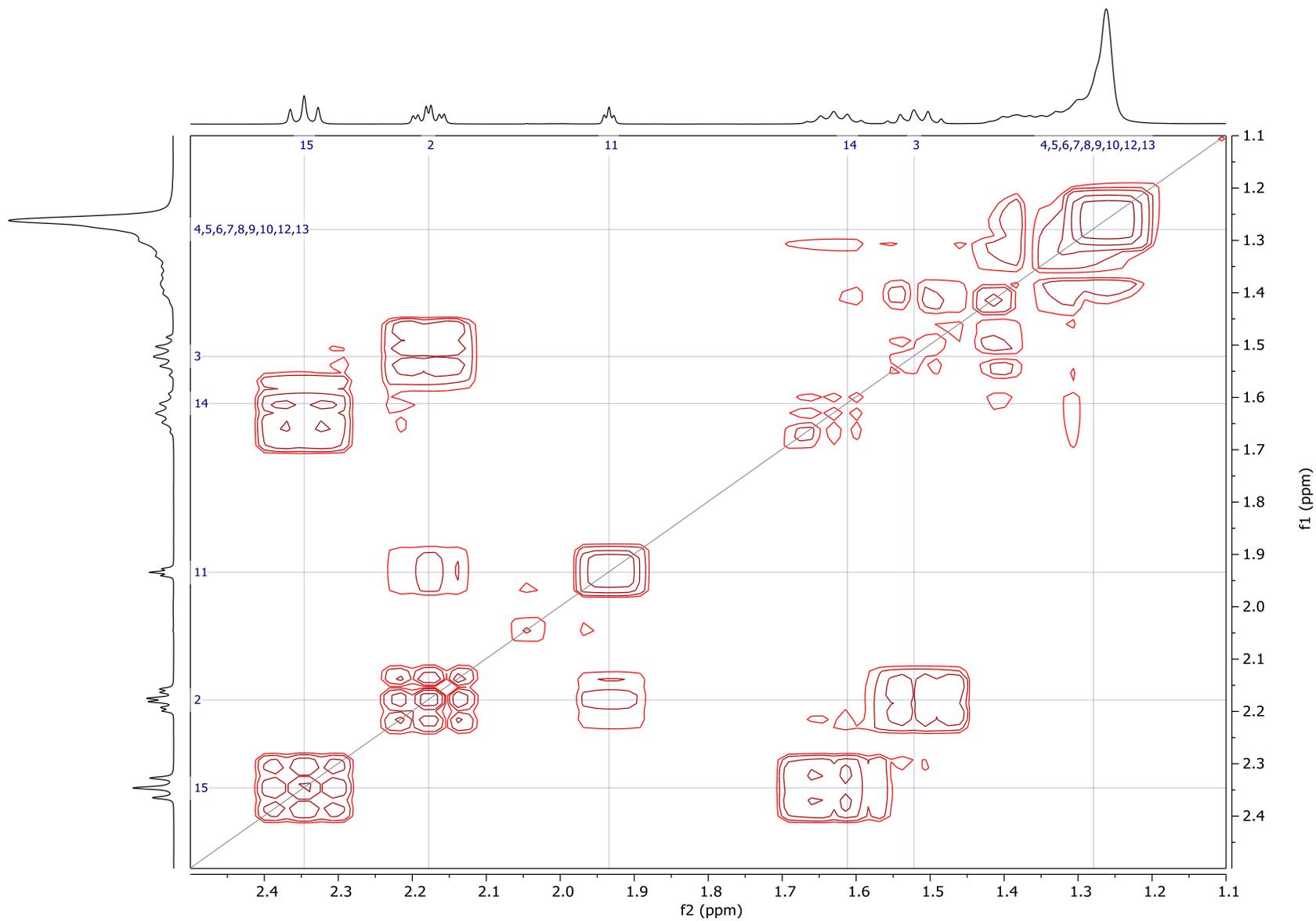
$^1\text{H}$  NMR



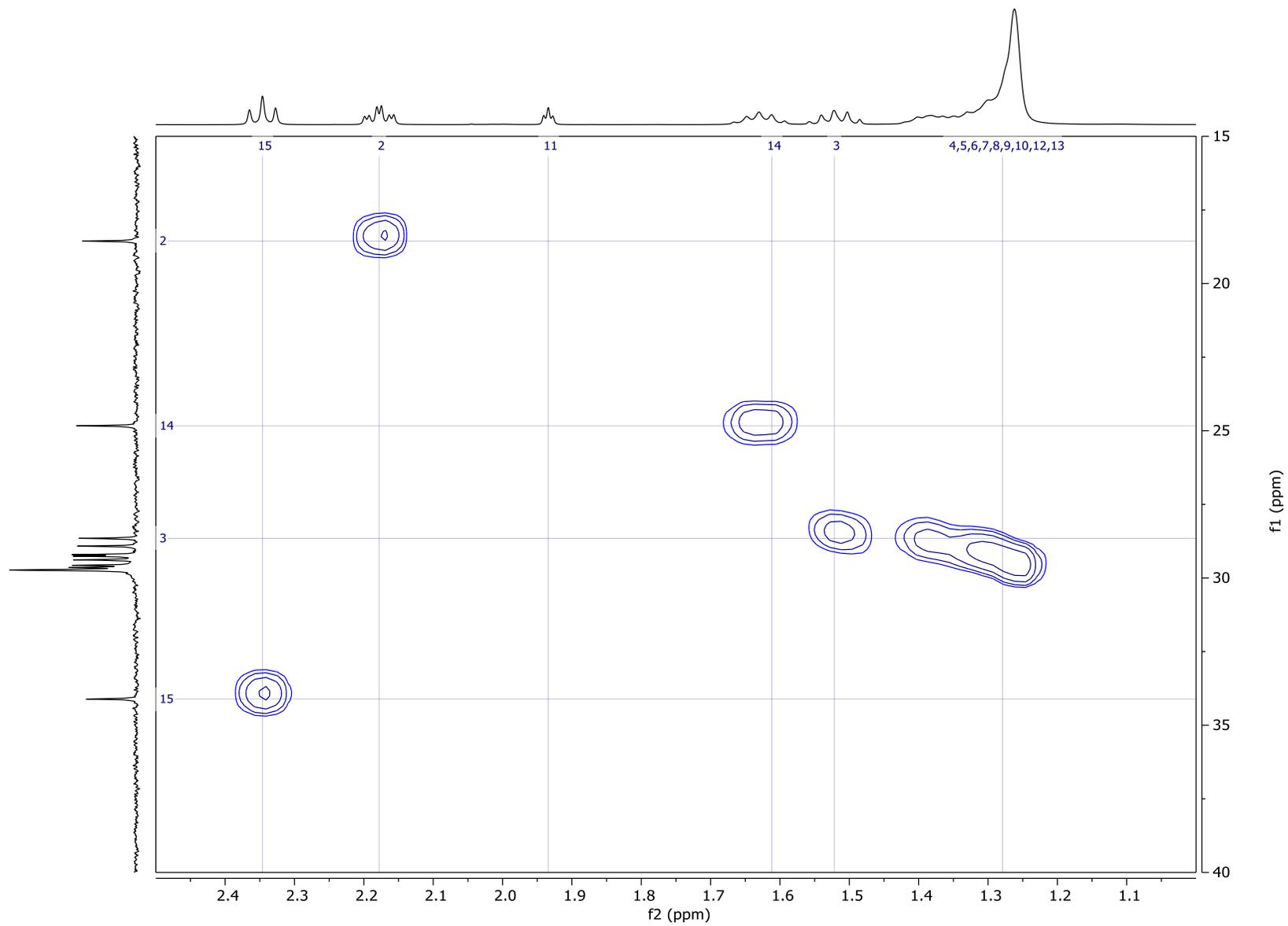
# <sup>13</sup>C NMR



# COSY NMR

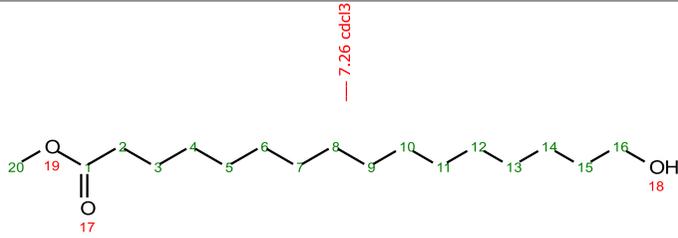


# HSQC NMR

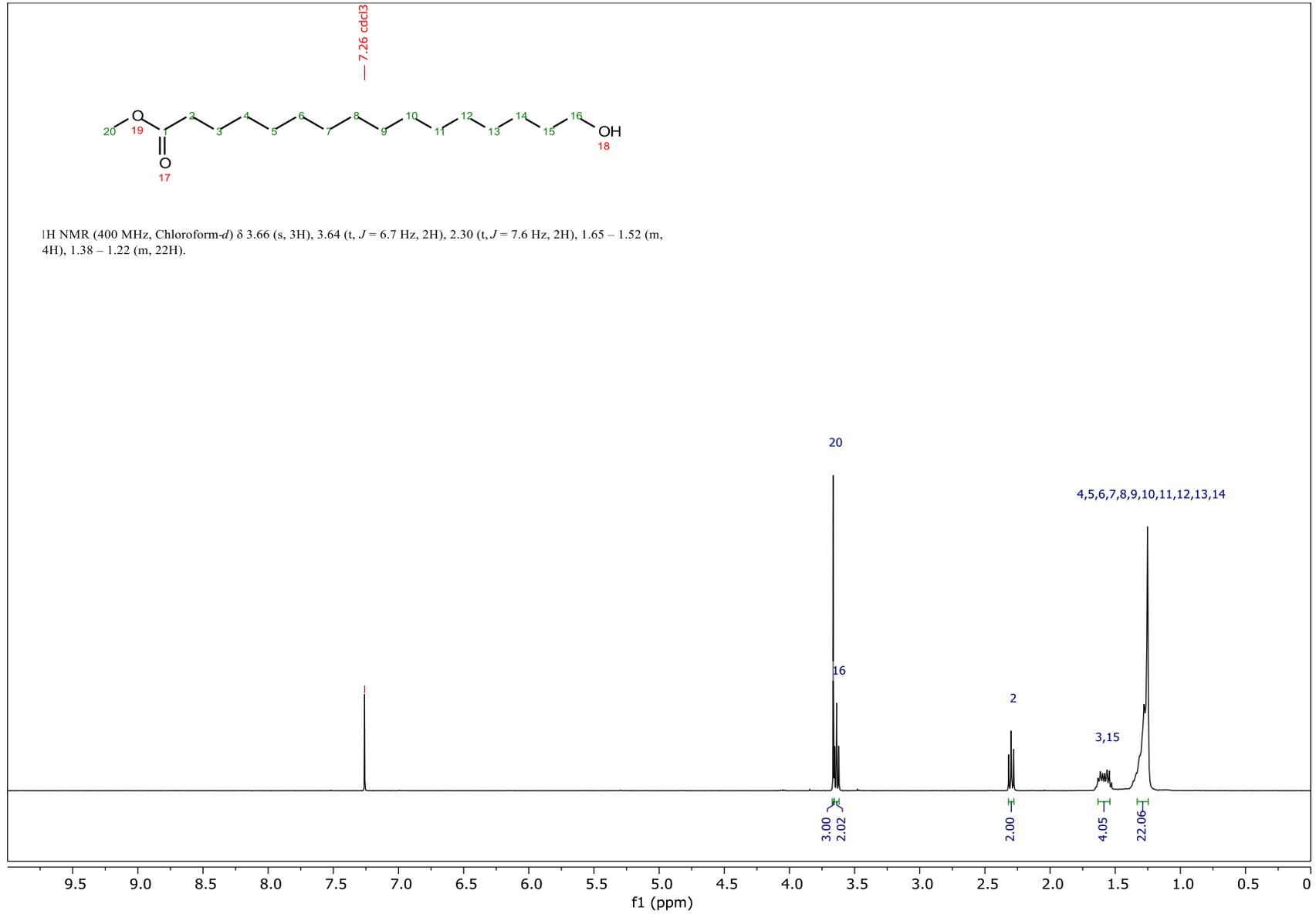


# Compound RBM5-063

$^1\text{H}$  NMR

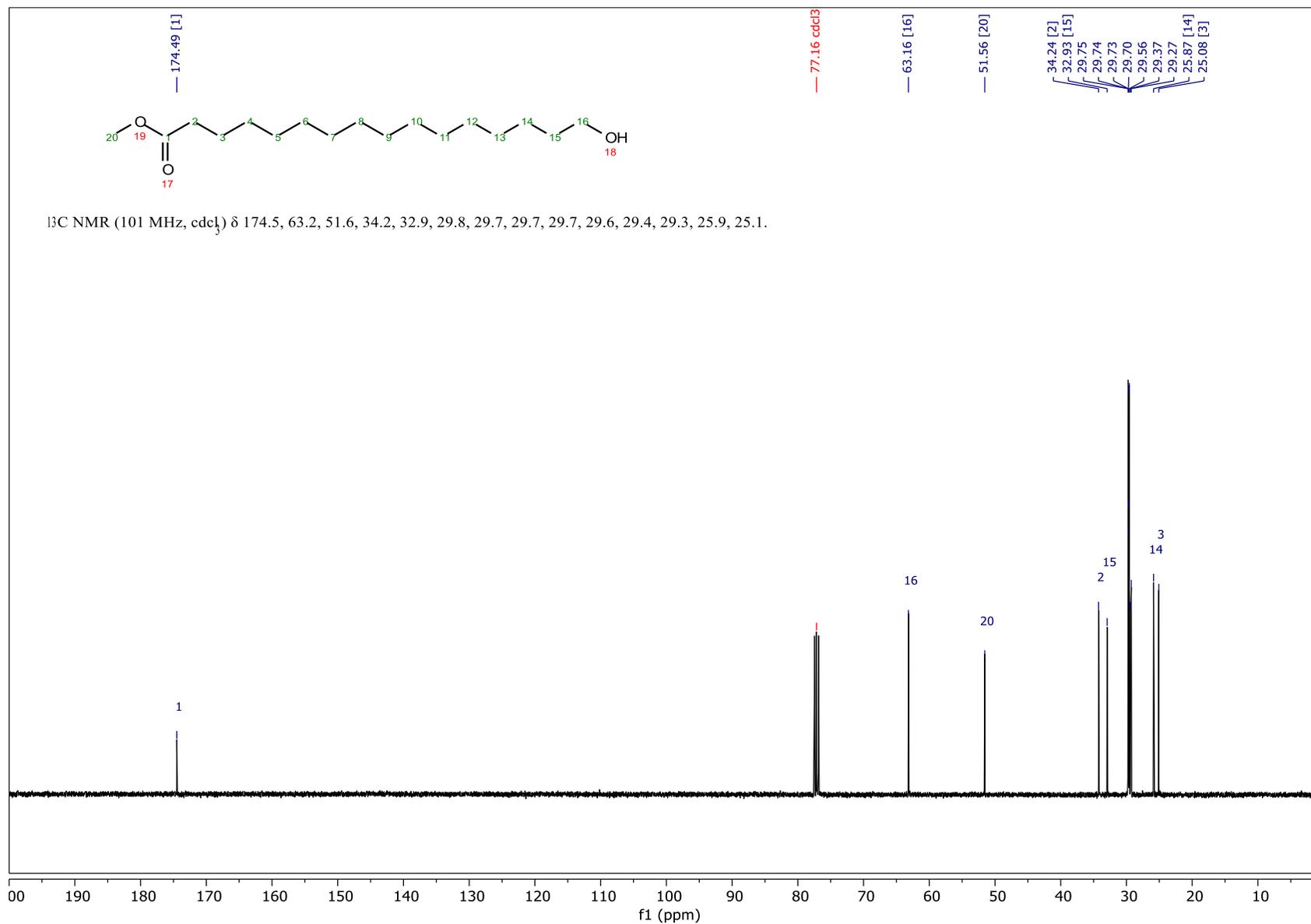


$^1\text{H}$  NMR (400 MHz, Chloroform-*d*)  $\delta$  3.66 (s, 3H), 3.64 (t,  $J = 6.7$  Hz, 2H), 2.30 (t,  $J = 7.6$  Hz, 2H), 1.65 – 1.52 (m, 4H), 1.38 – 1.22 (m, 22H).

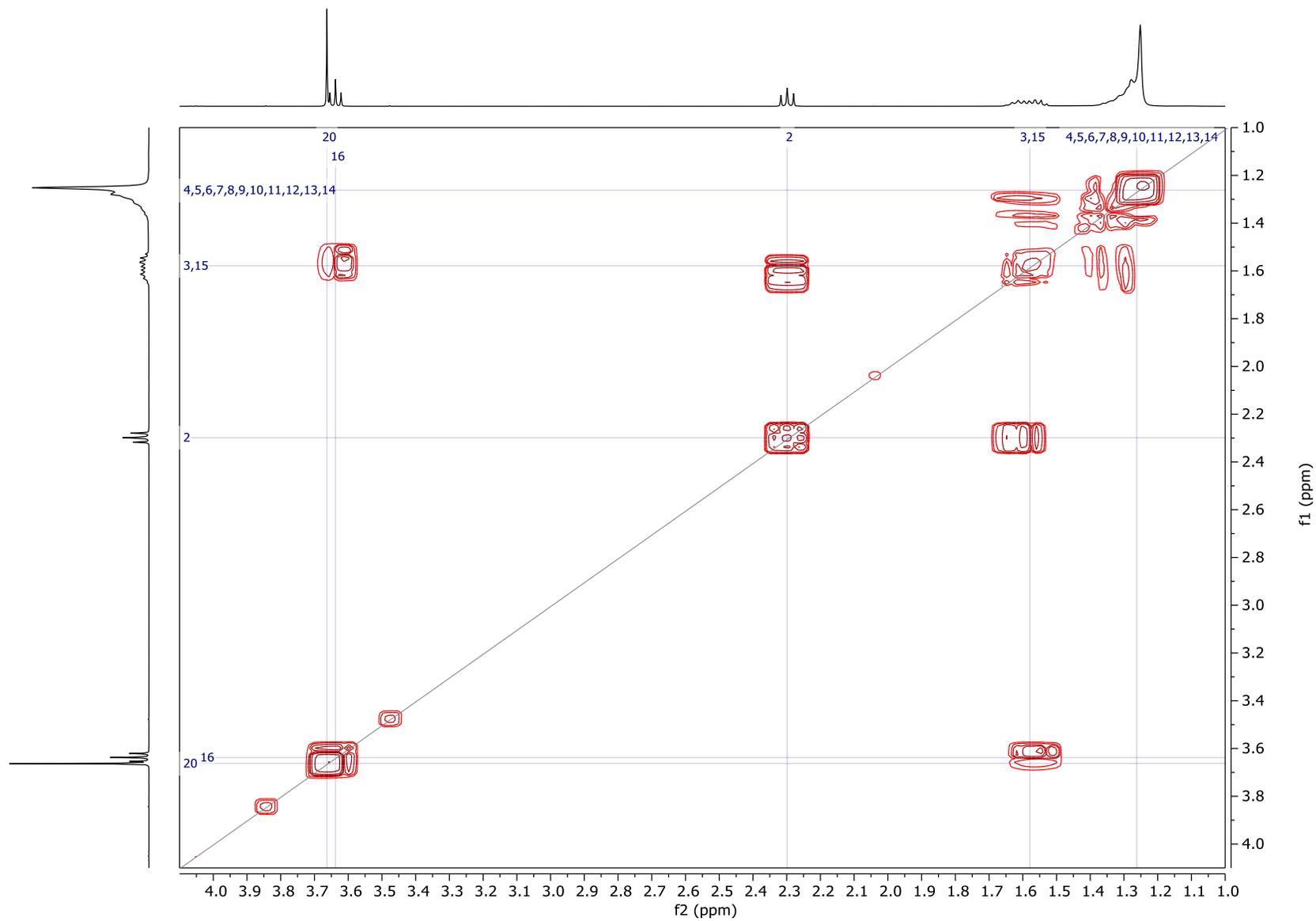


S-109

$^{13}\text{C}$  NMR

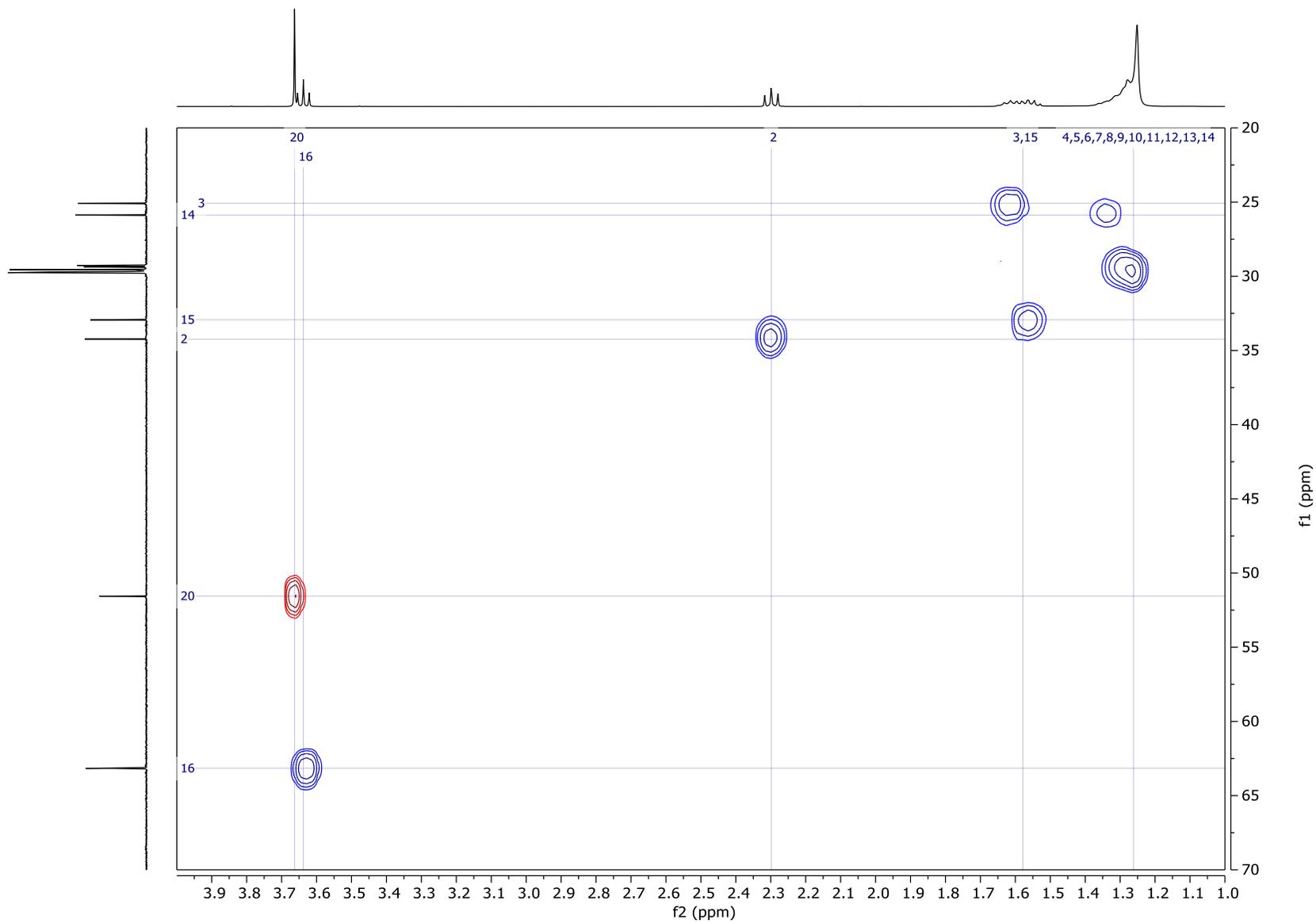


# COSY NMR



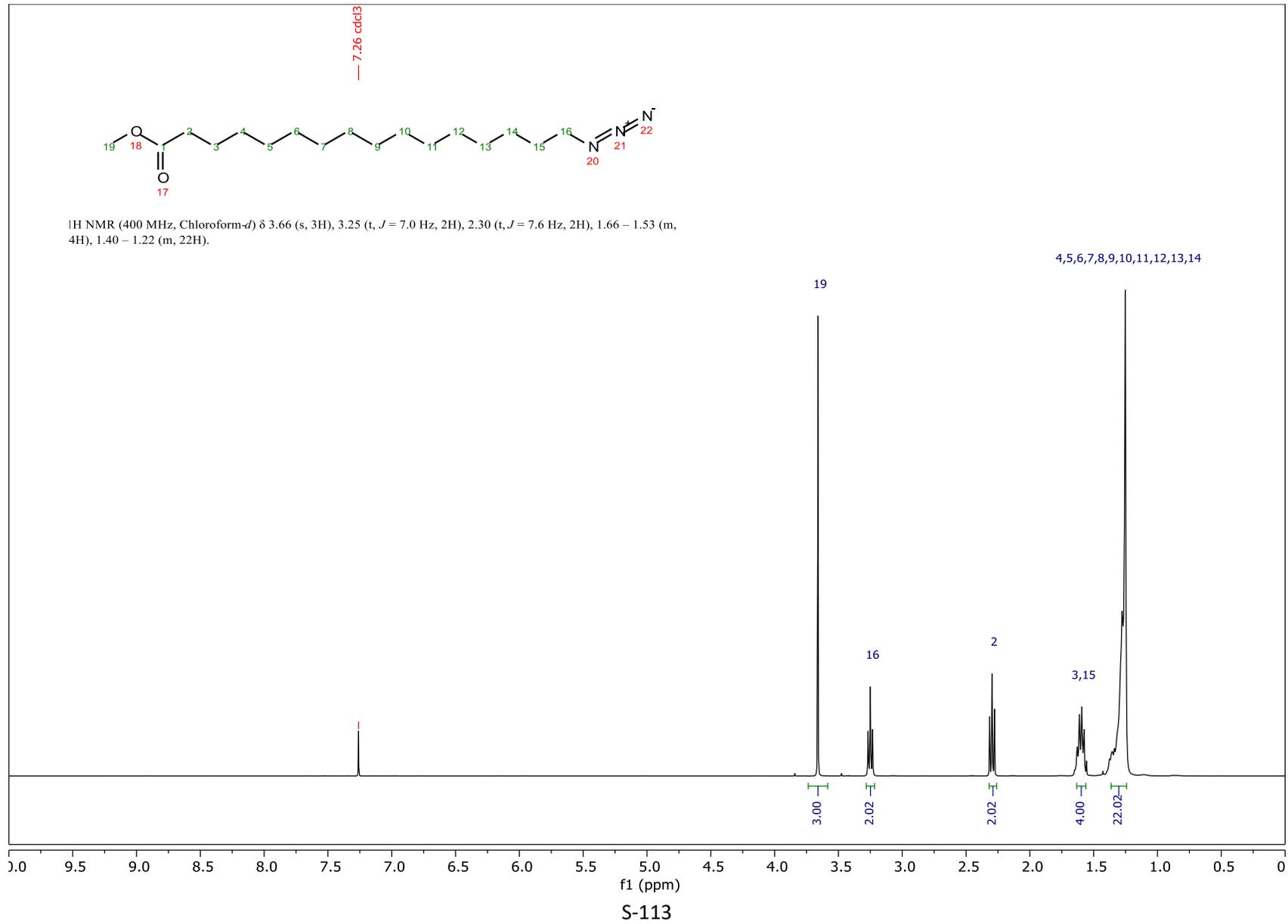
S-111

# HSQC NMR

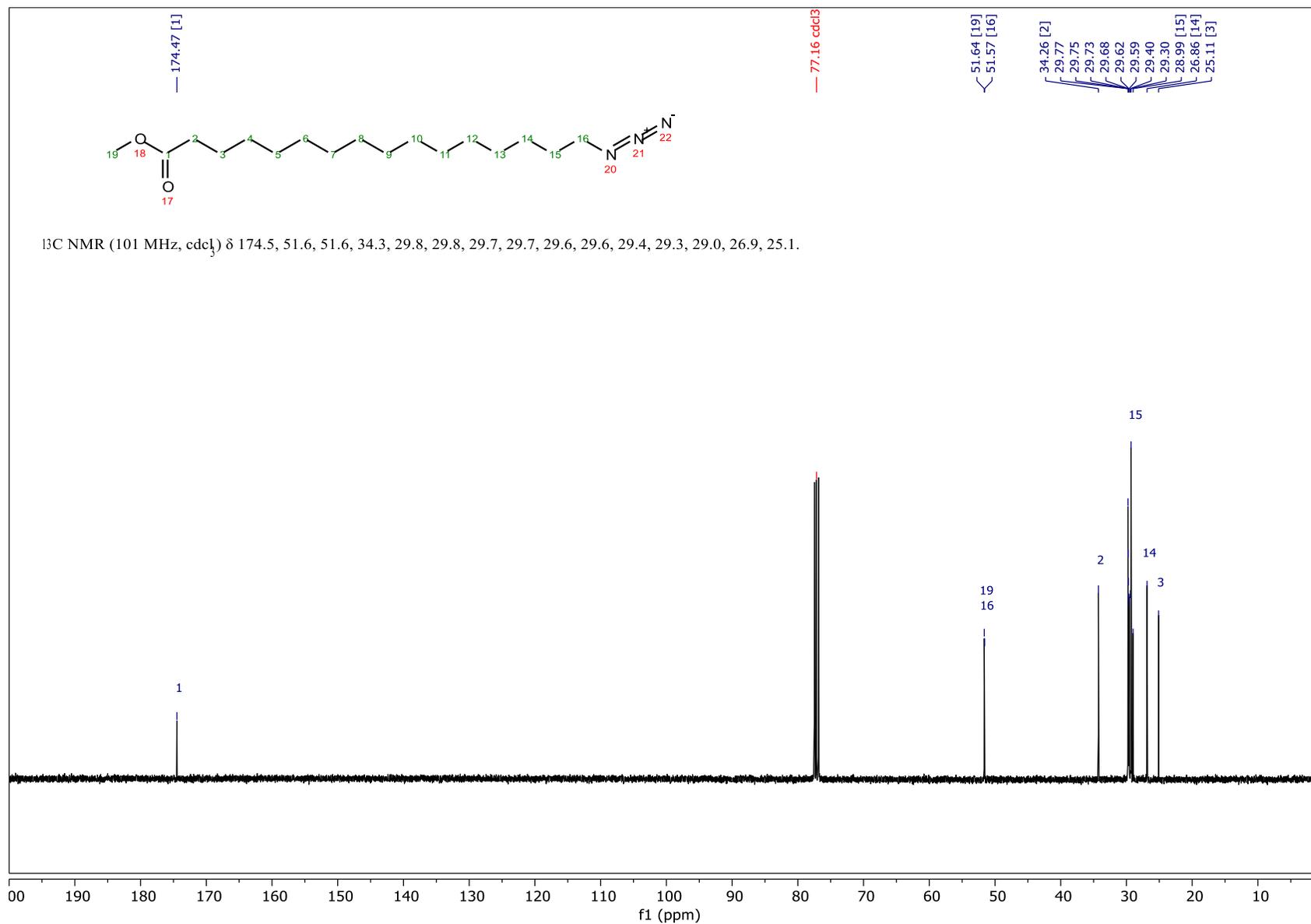


# Compound RBM5-064

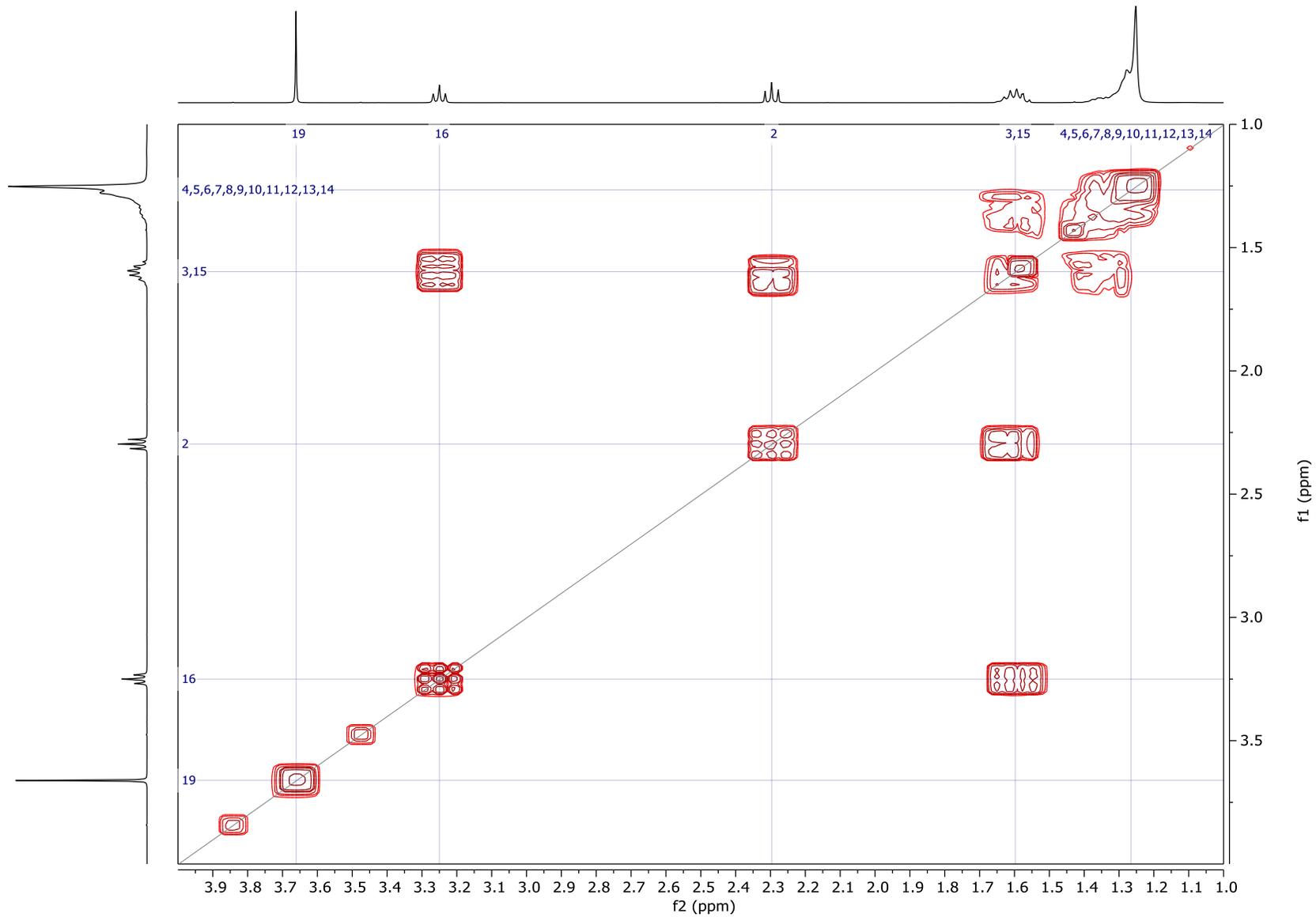
$^1\text{H}$  NMR



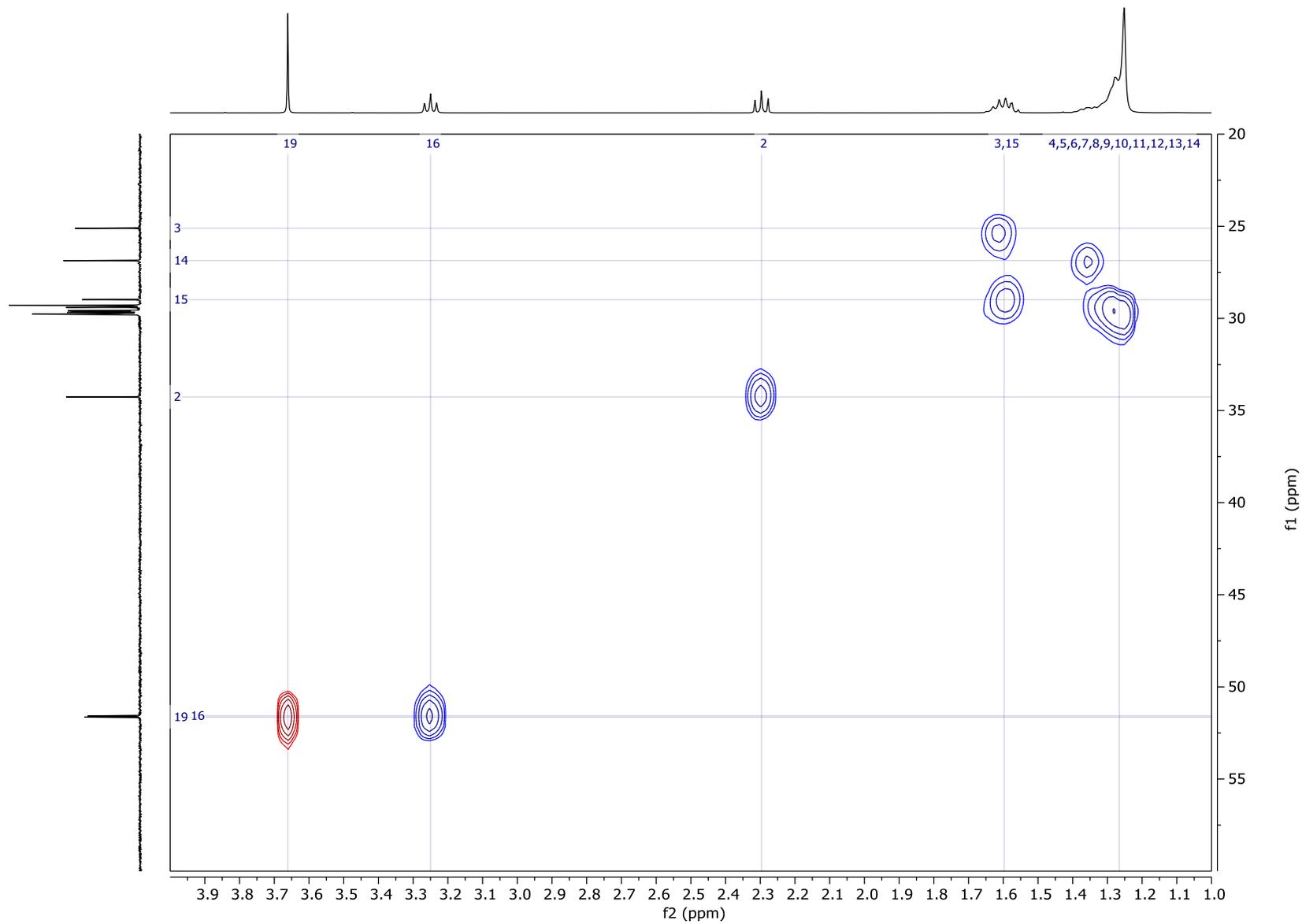
<sup>13</sup>C NMR



# COSY NMR

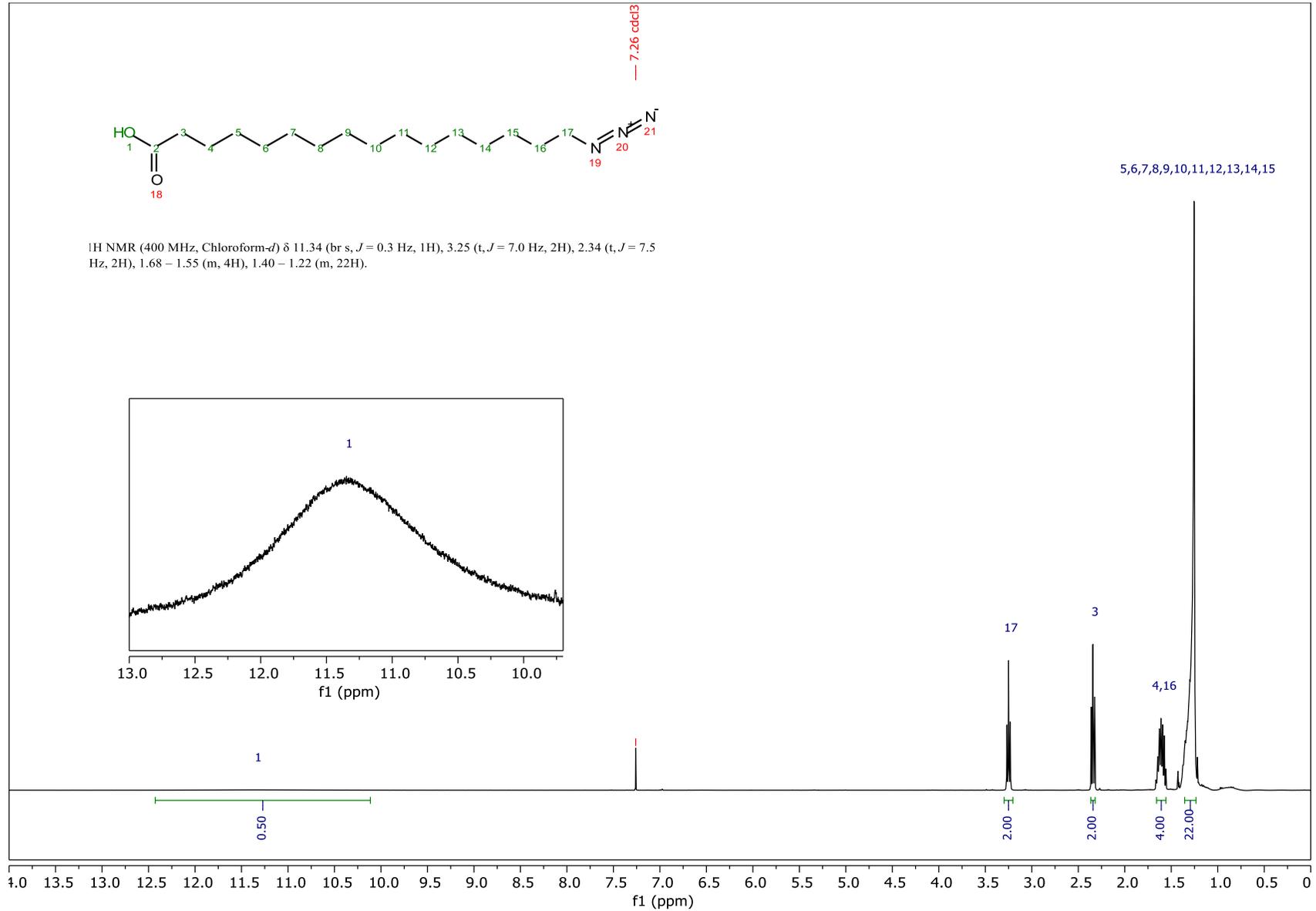


# HSQC NMR



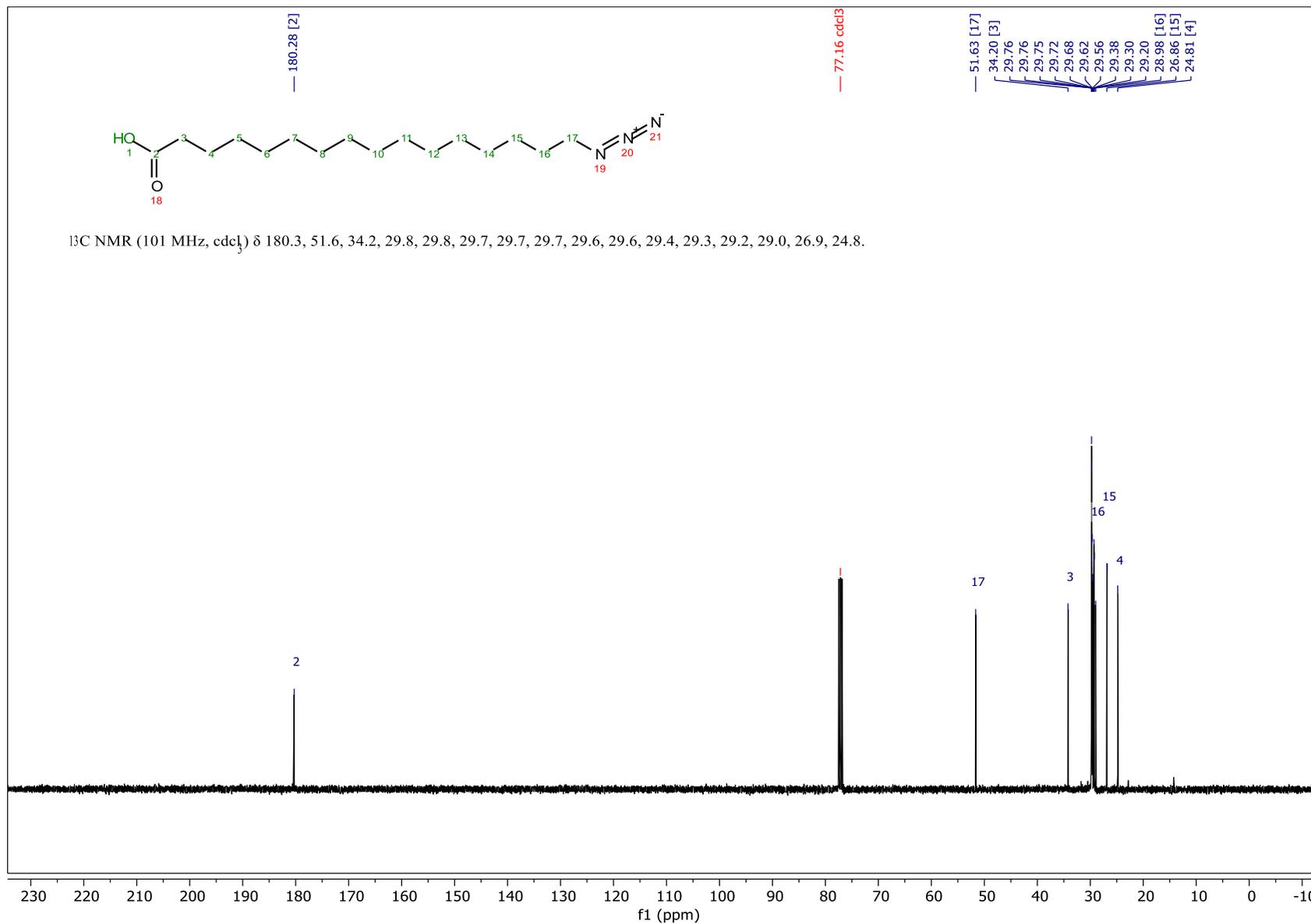
# Compound RBM5-065

<sup>1</sup>H NMR

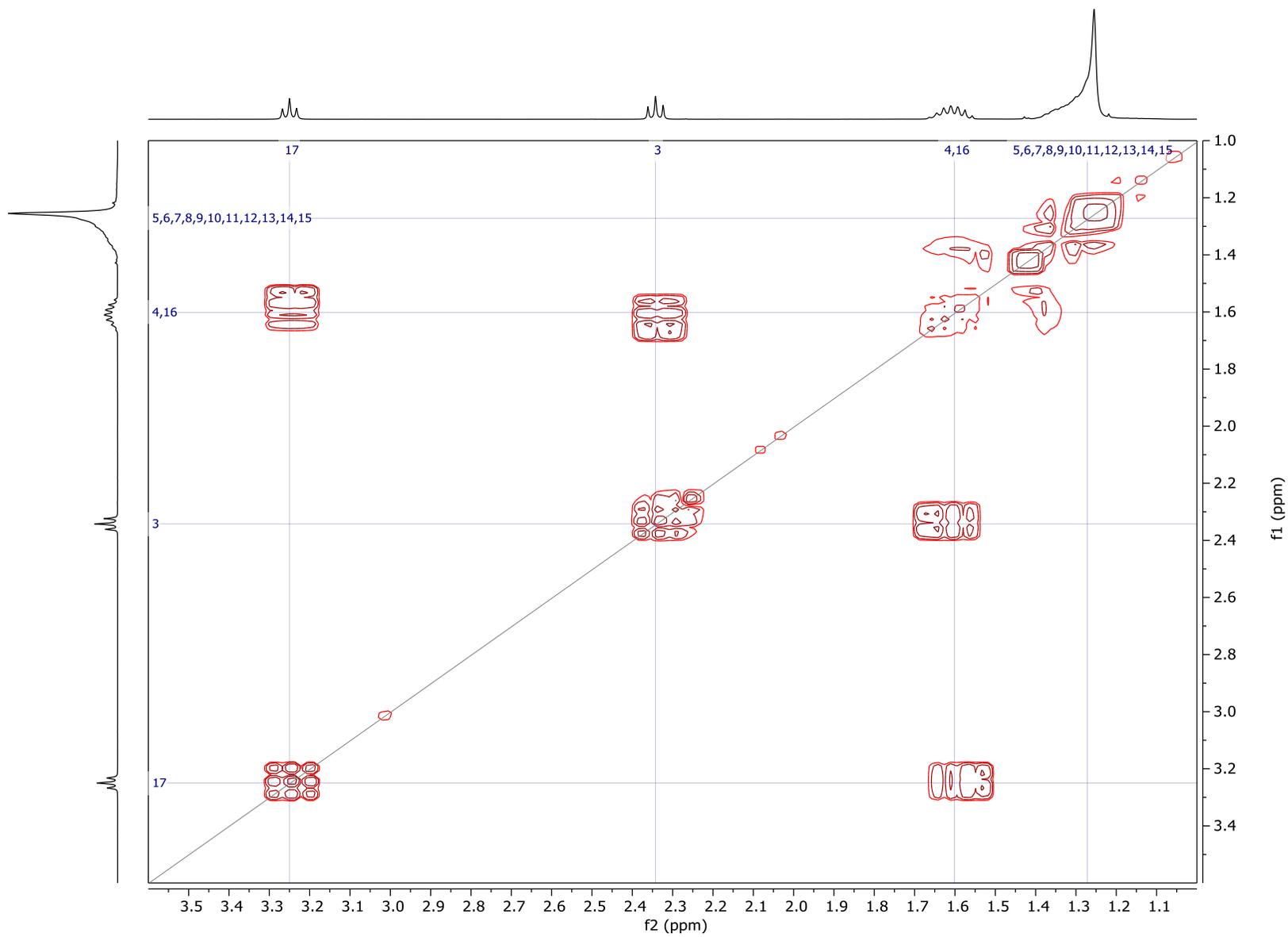


S-117

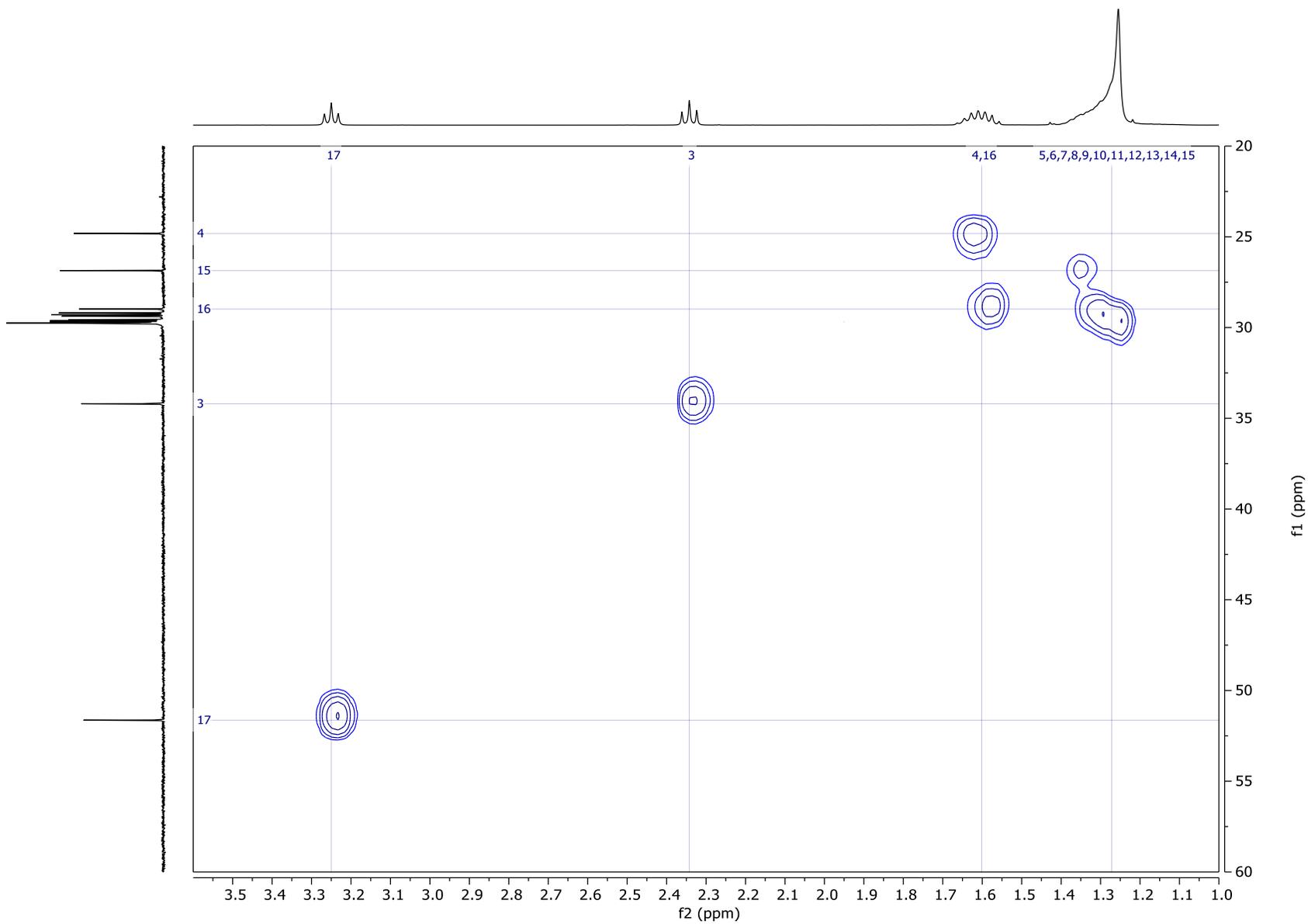
<sup>13</sup>C NMR



# COSY NMR

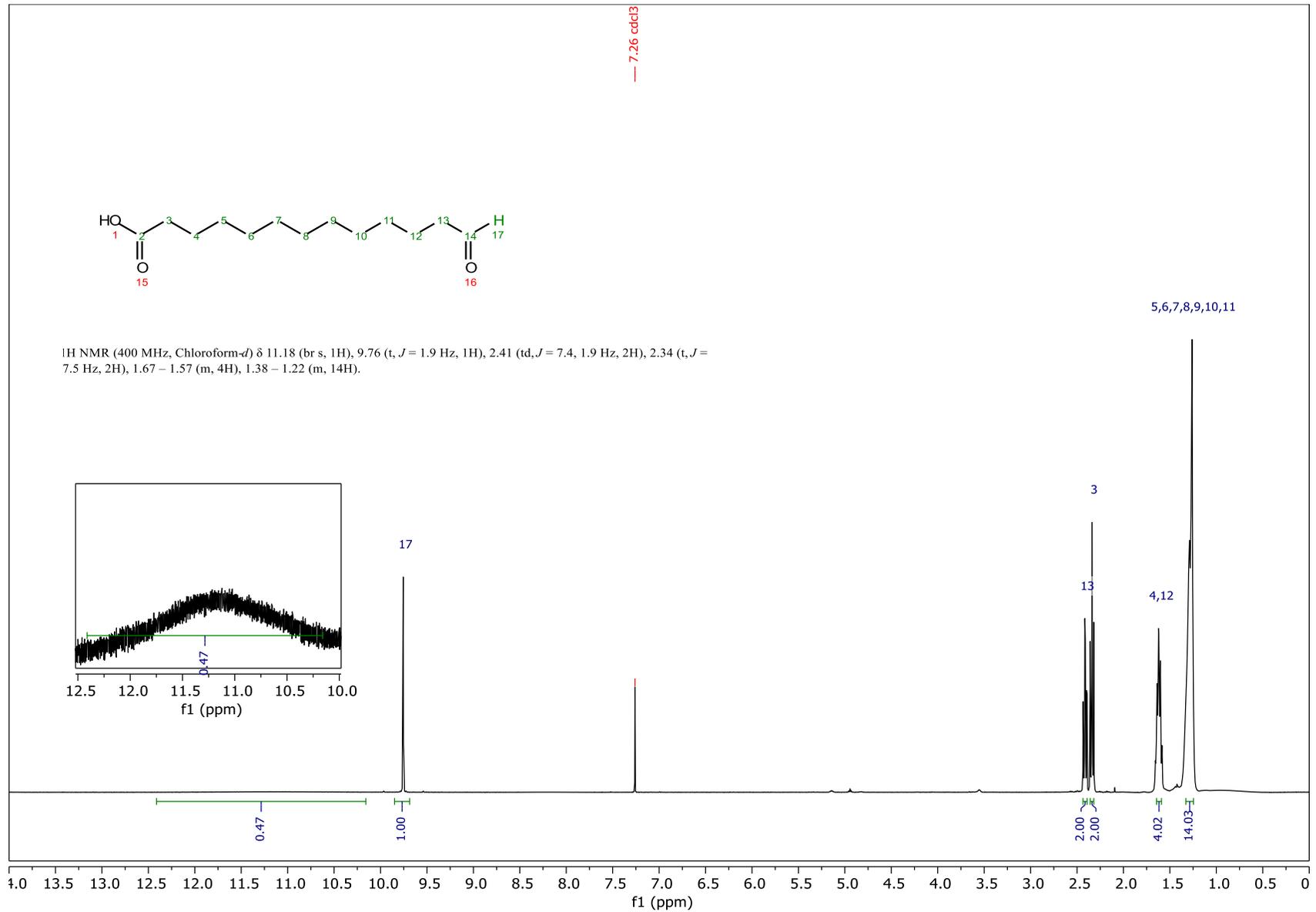


# HSQC NMR

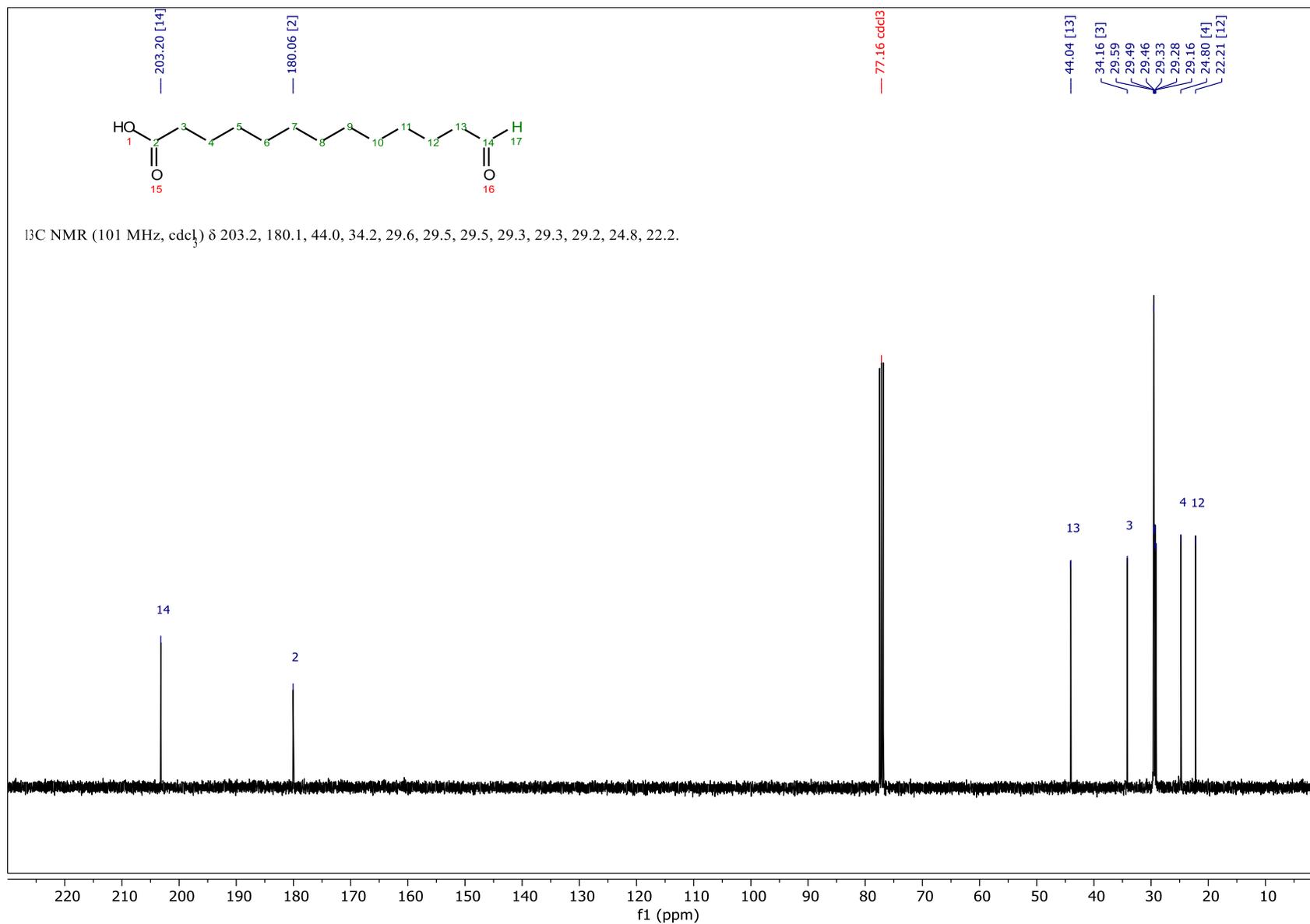


# Compound RBM5-066

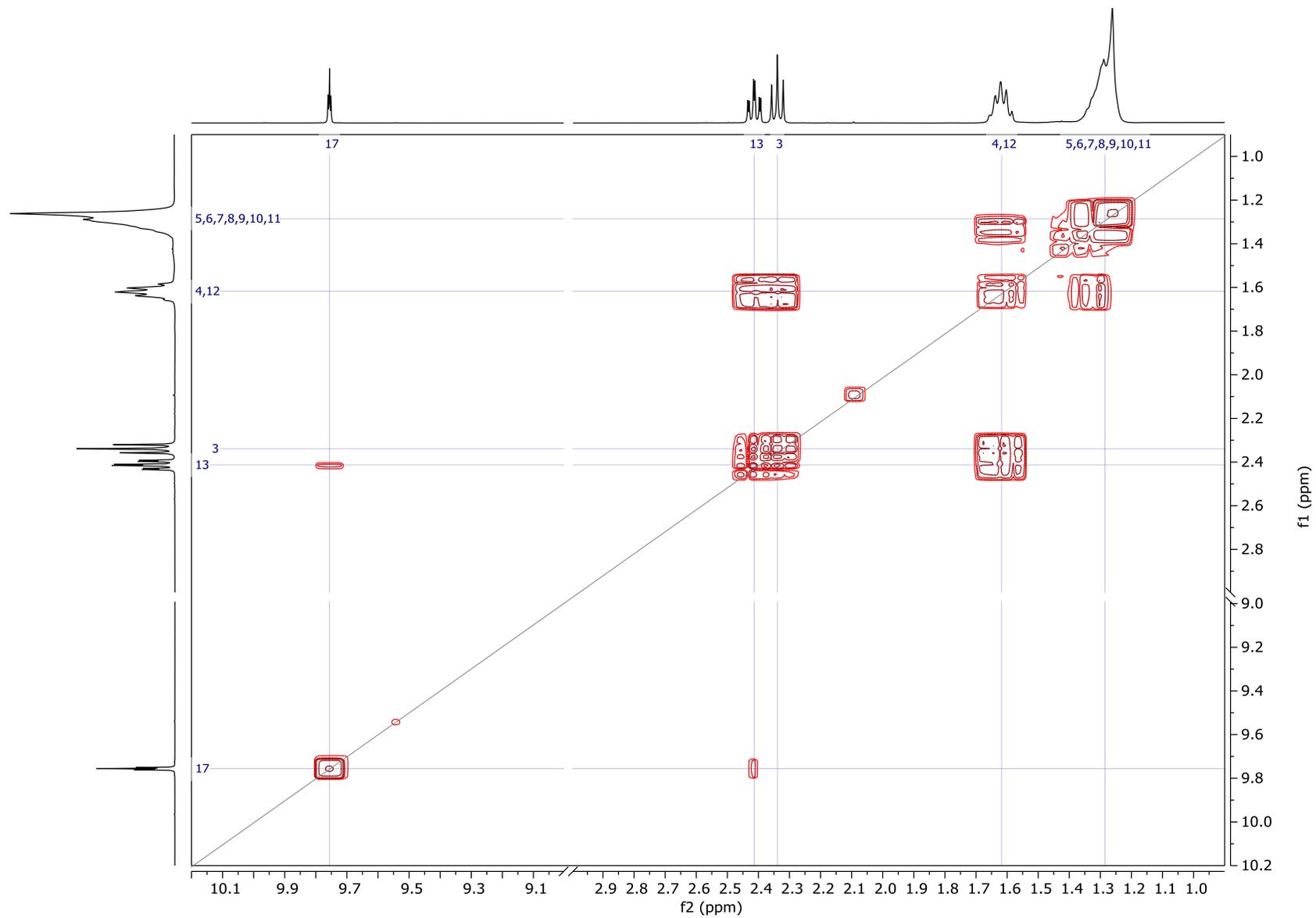
$^1\text{H}$  NMR



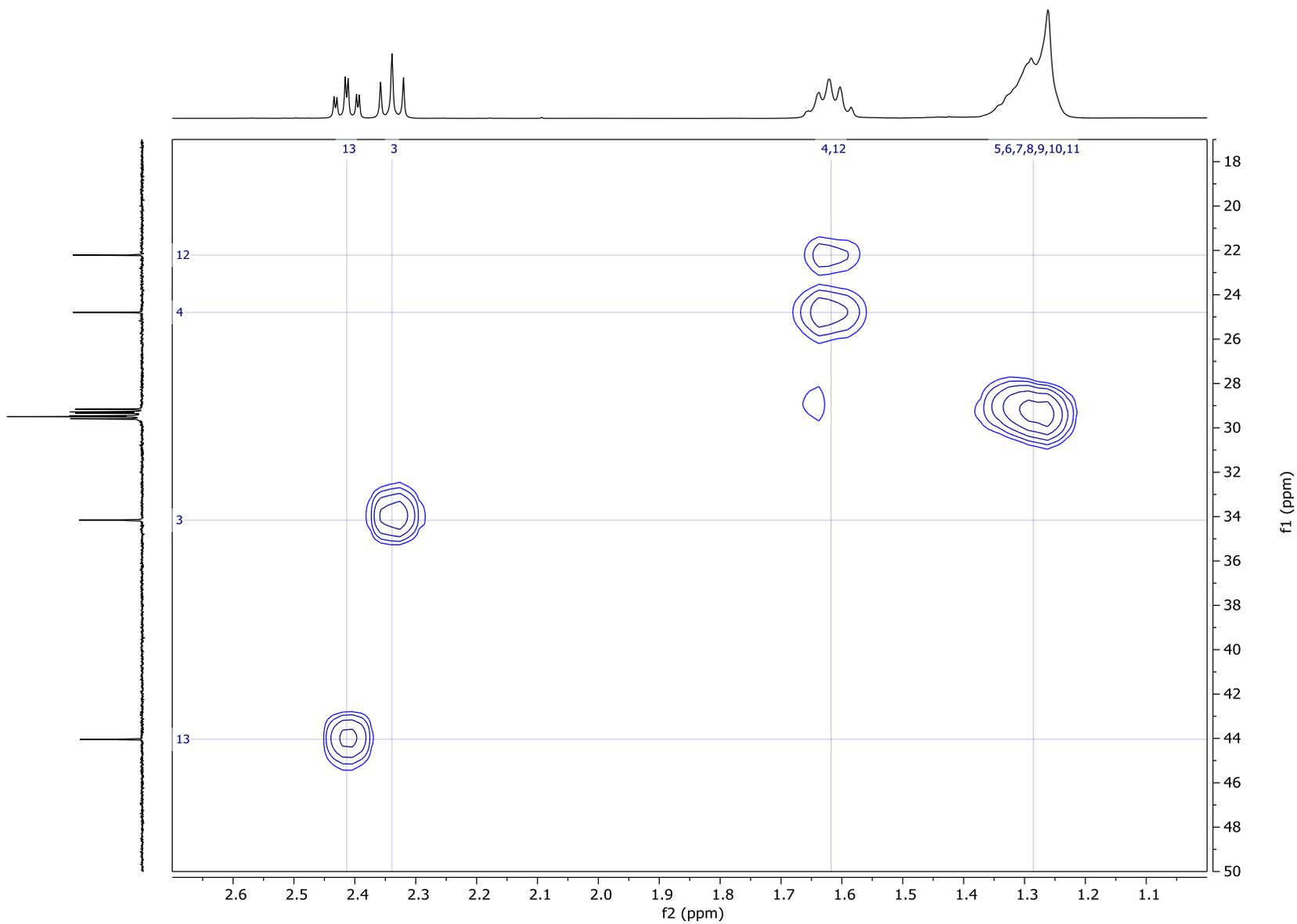
# $^{13}\text{C}$ NMR



# COSY NMR

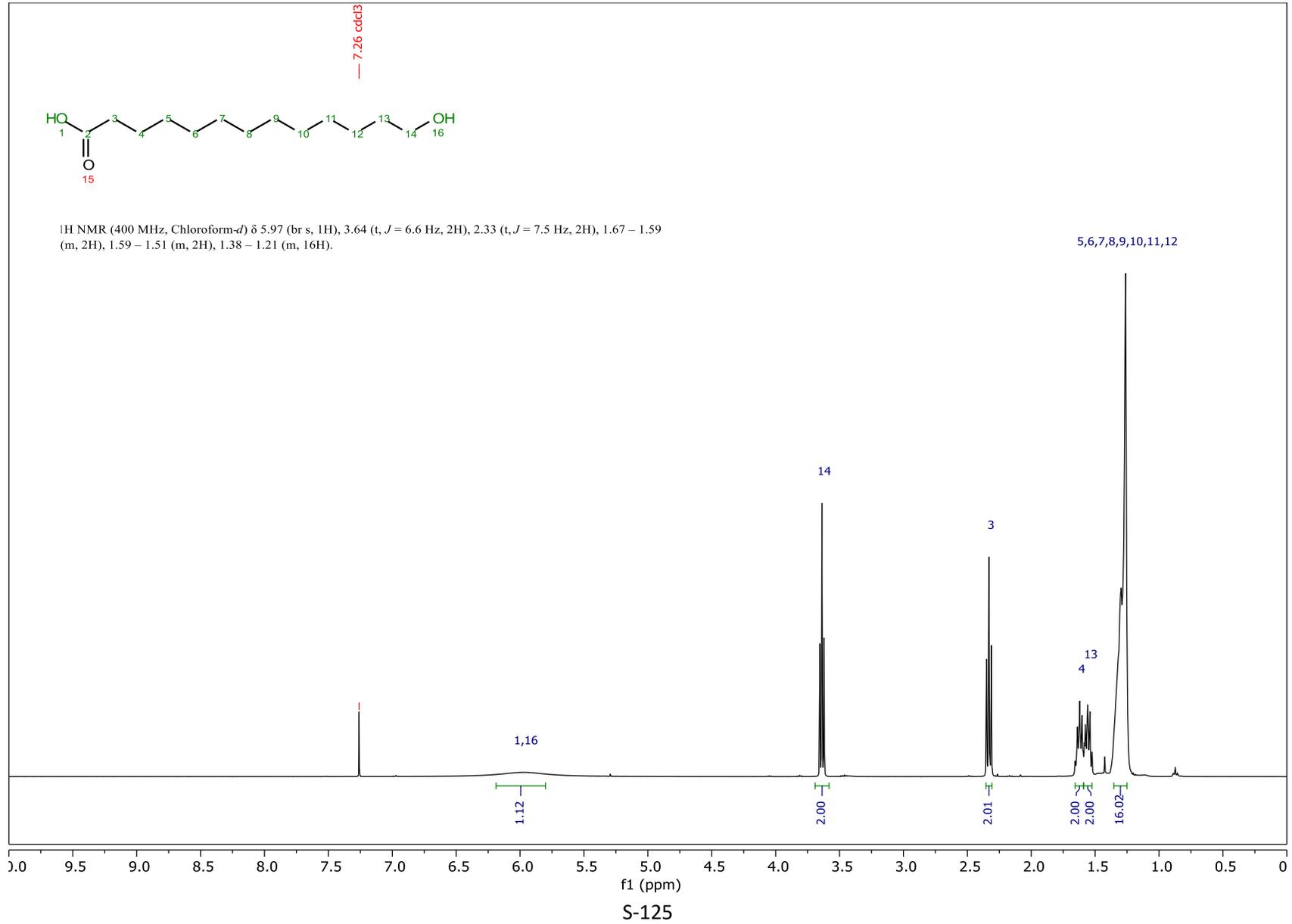


# HSQC NMR

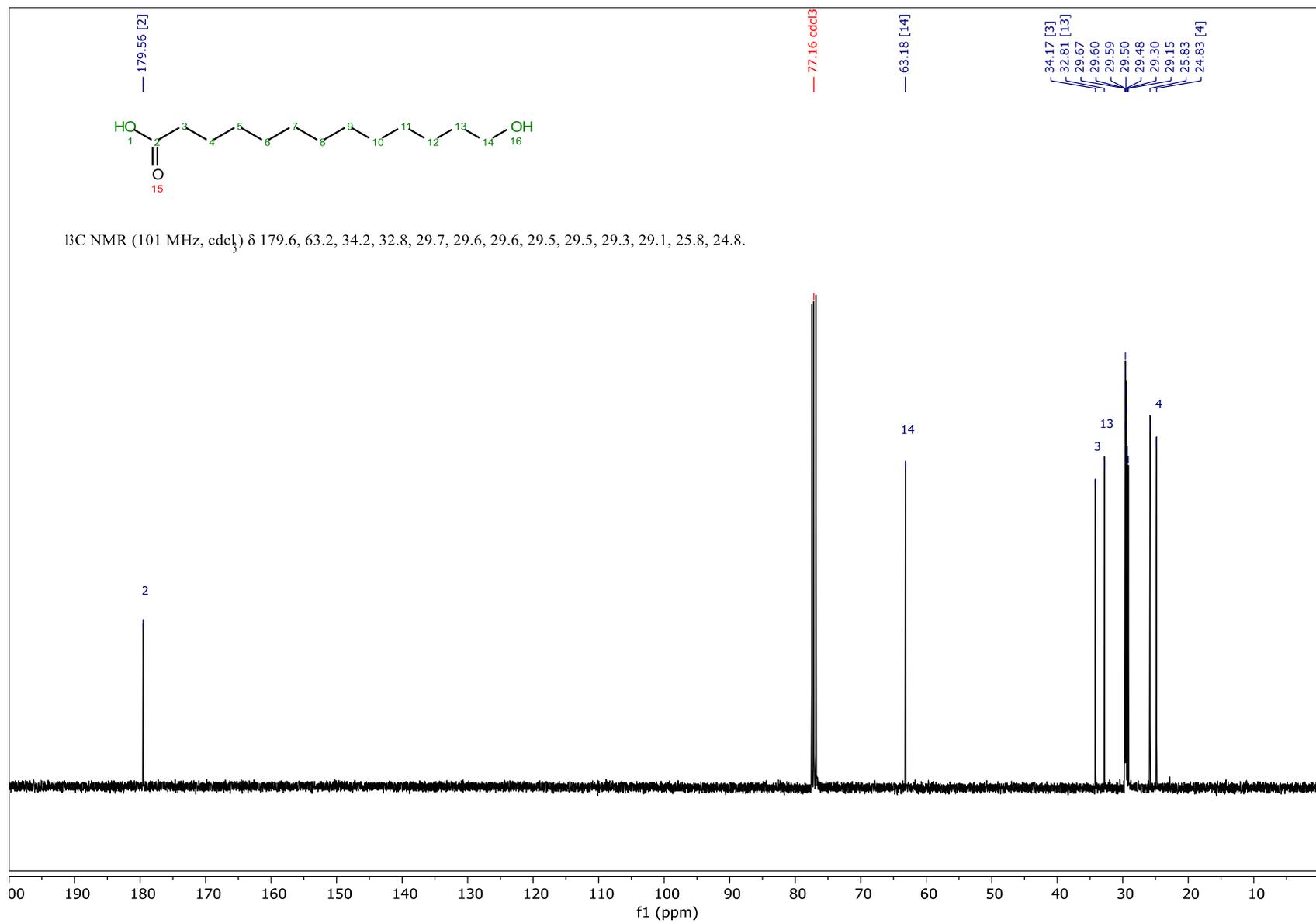


# Compound RBM5-067

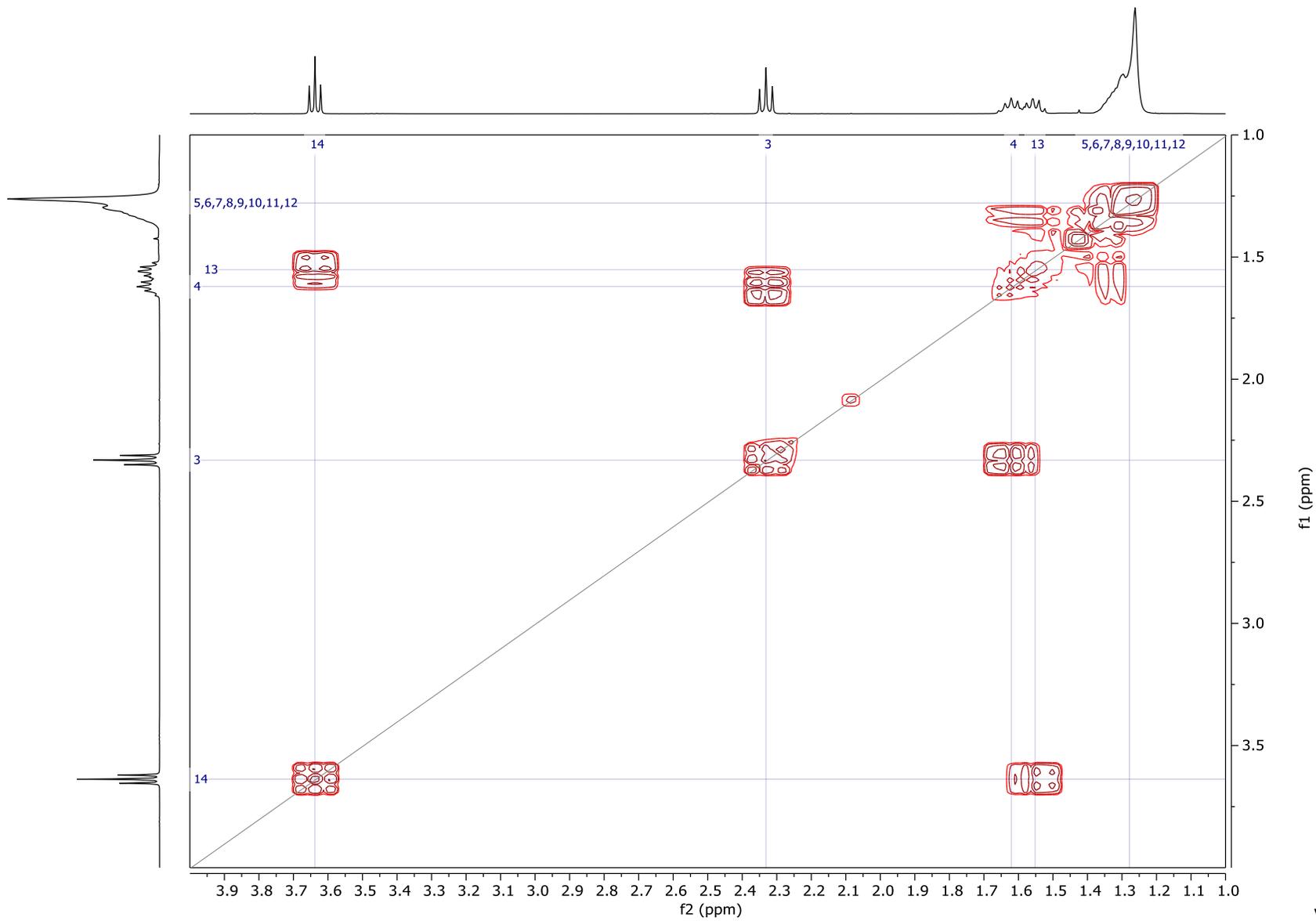
$^1\text{H}$  NMR



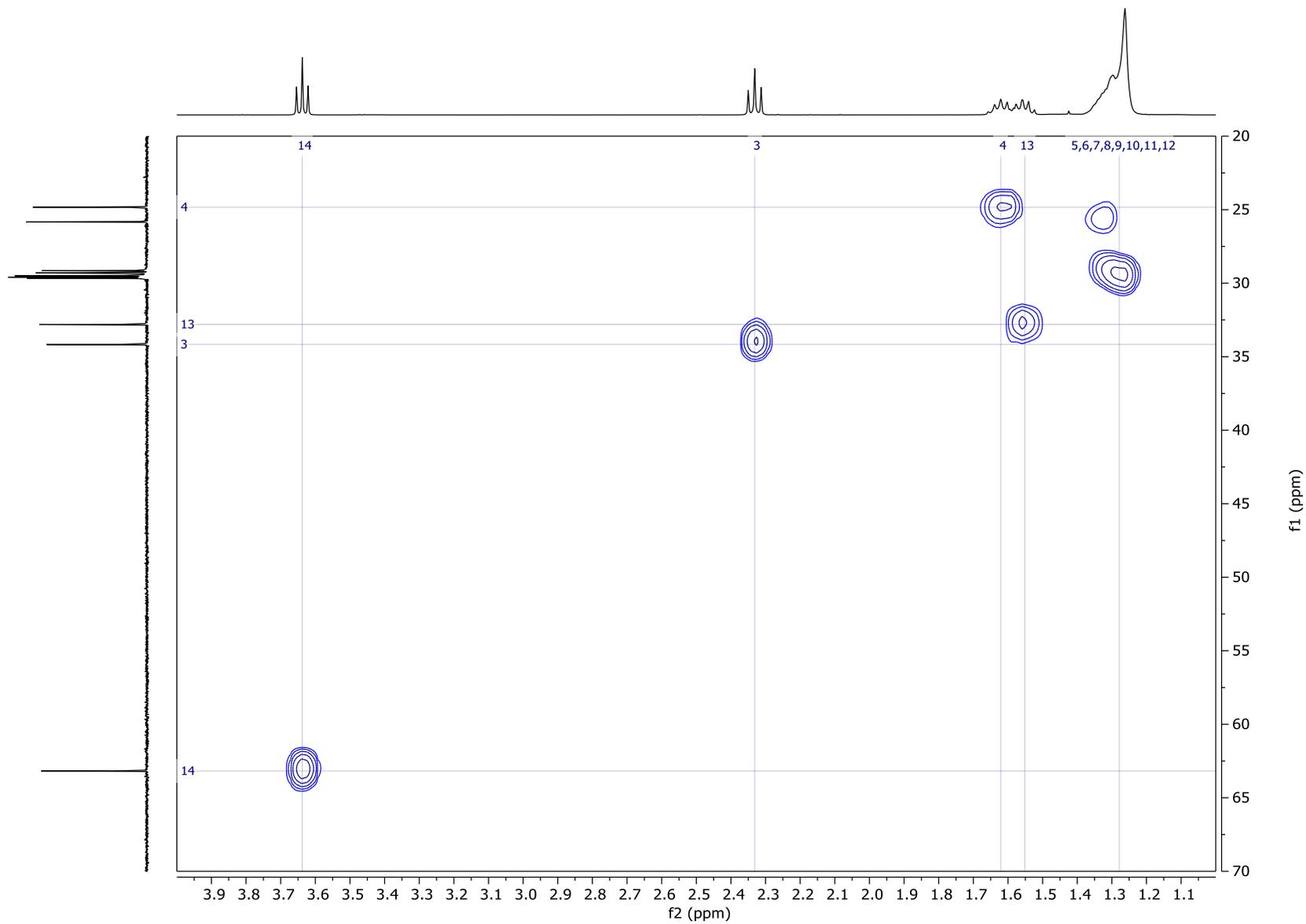
# <sup>13</sup>C NMR



# COSY NMR

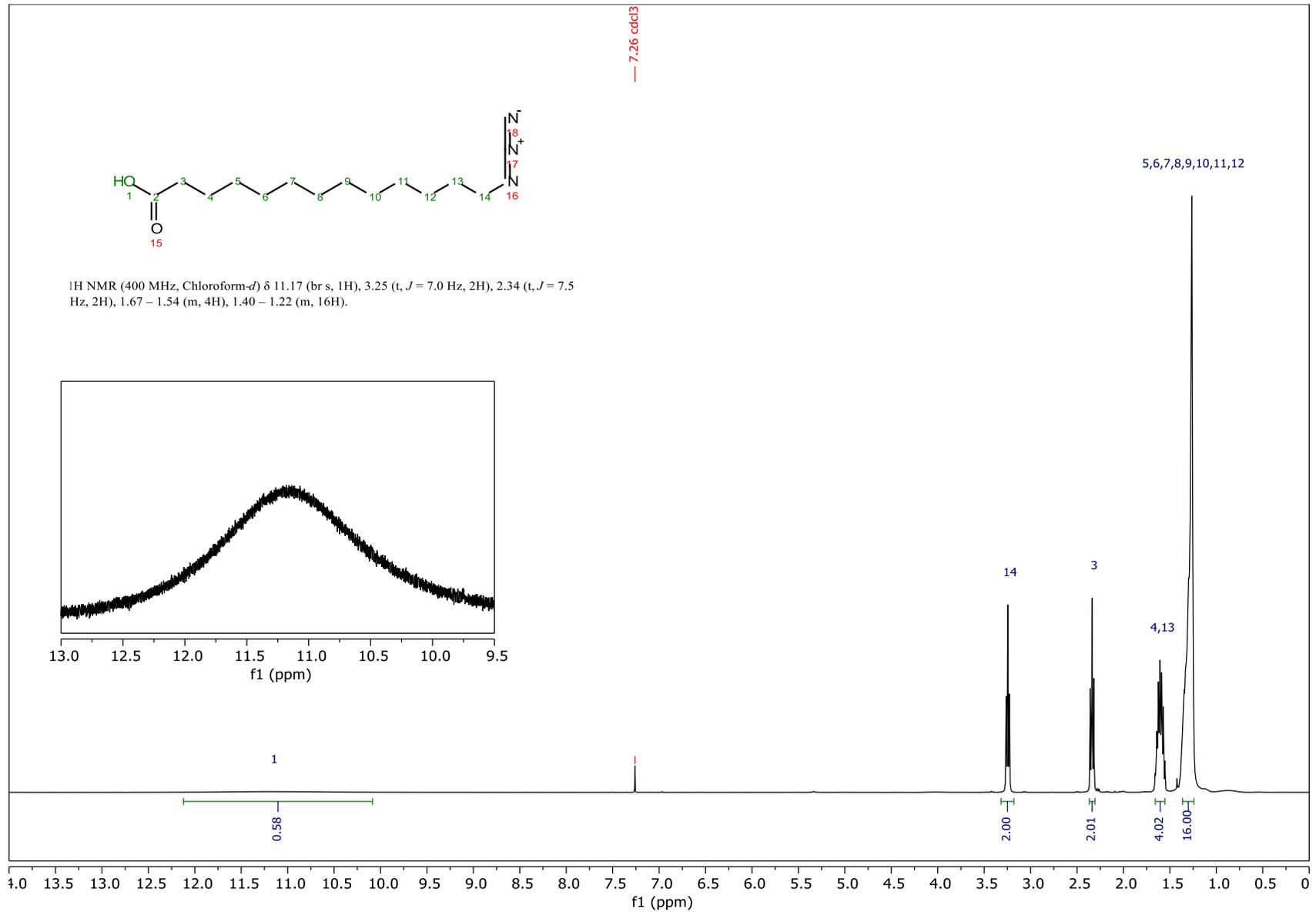


# HSQC NMR

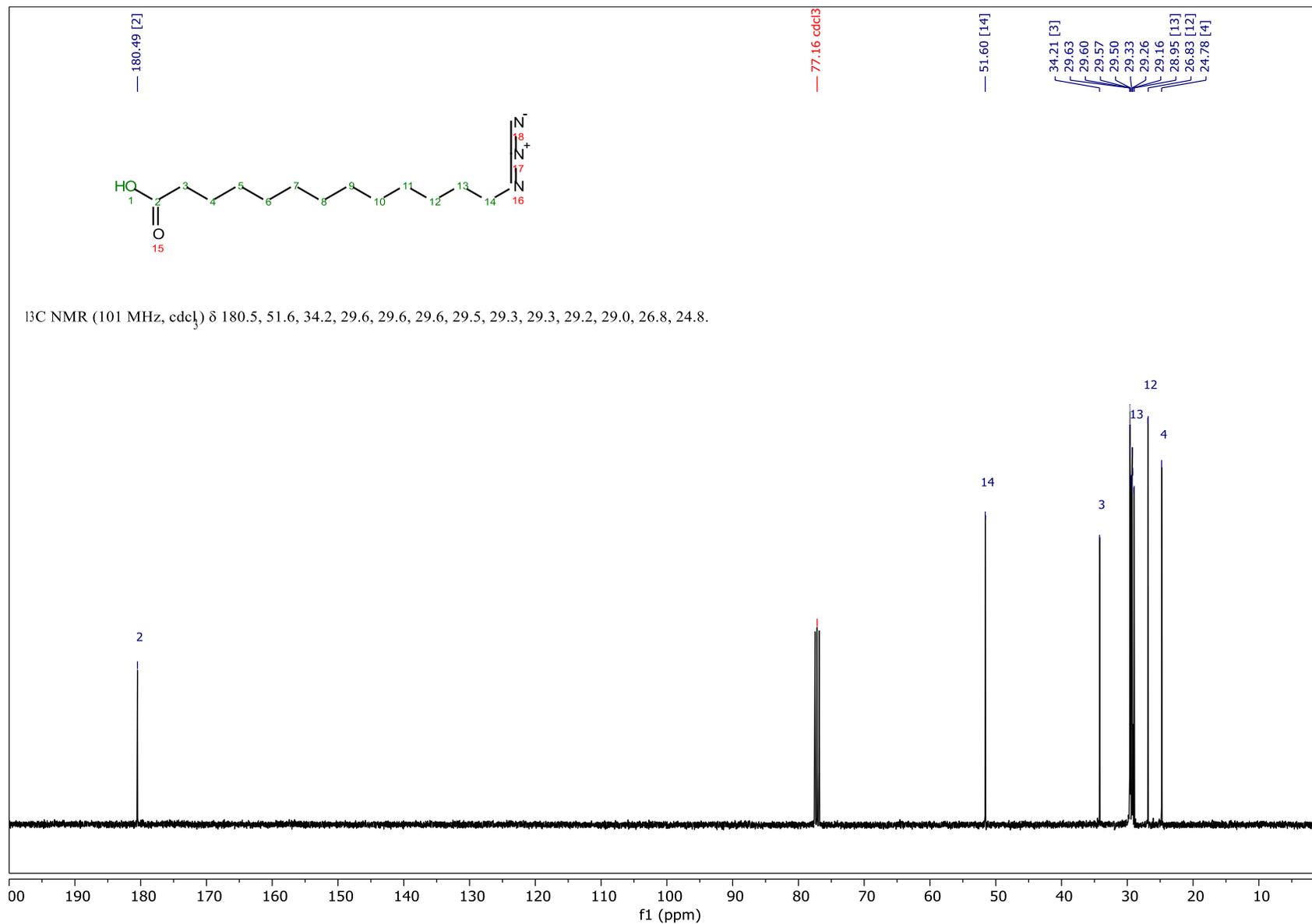


# Compound RBM5-068

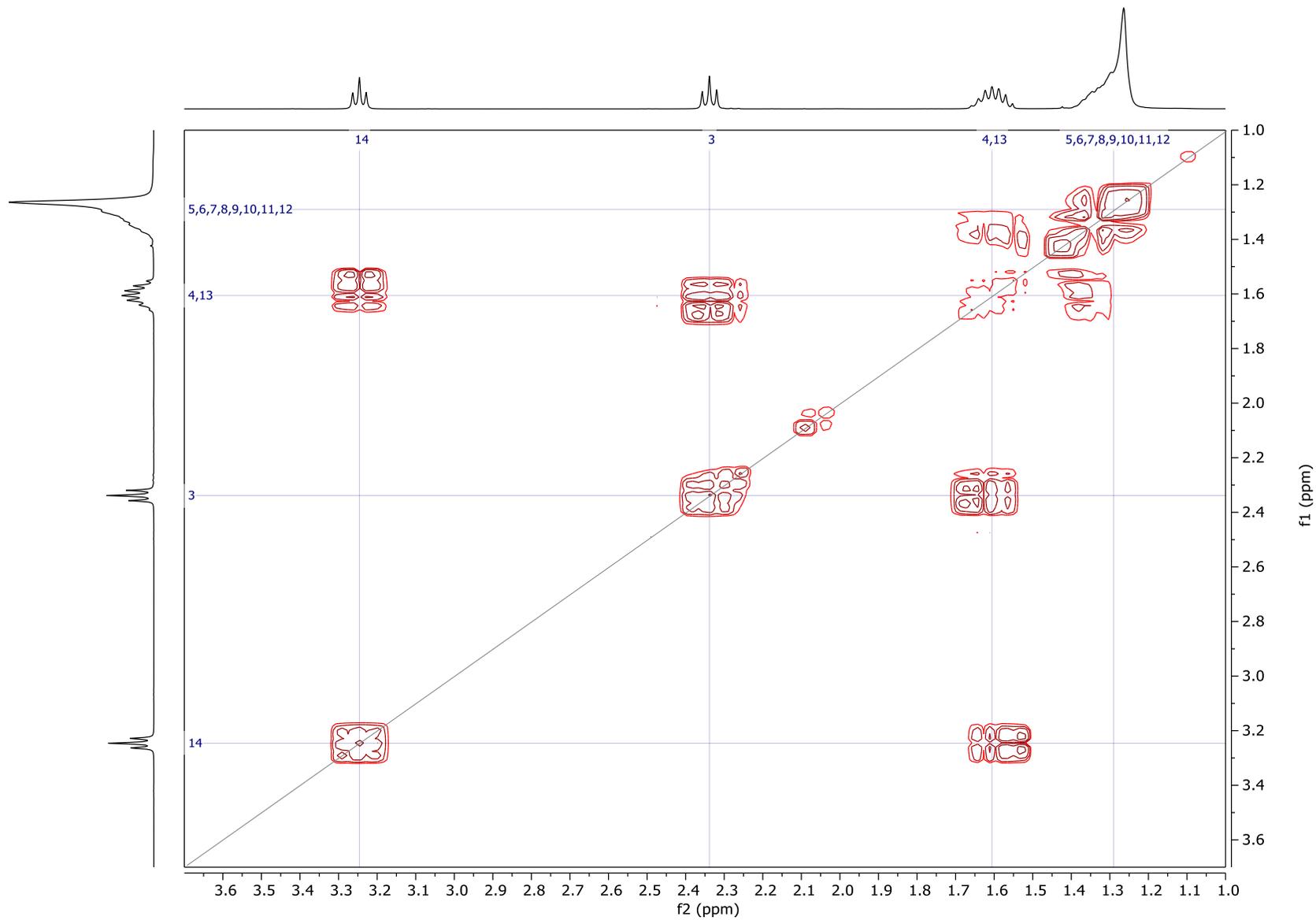
<sup>1</sup>H NMR



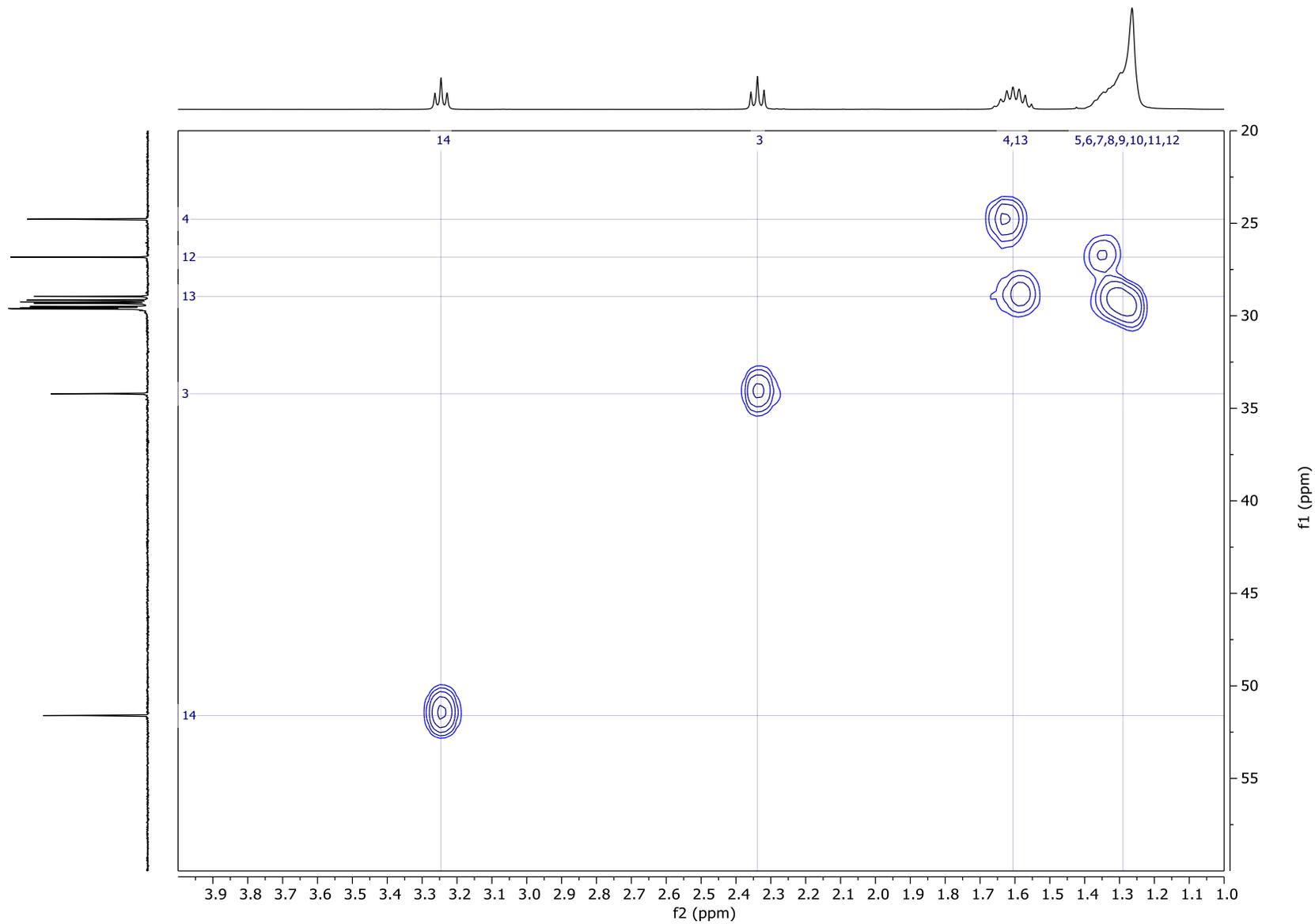
<sup>13</sup>C NMR



# COSY NMR

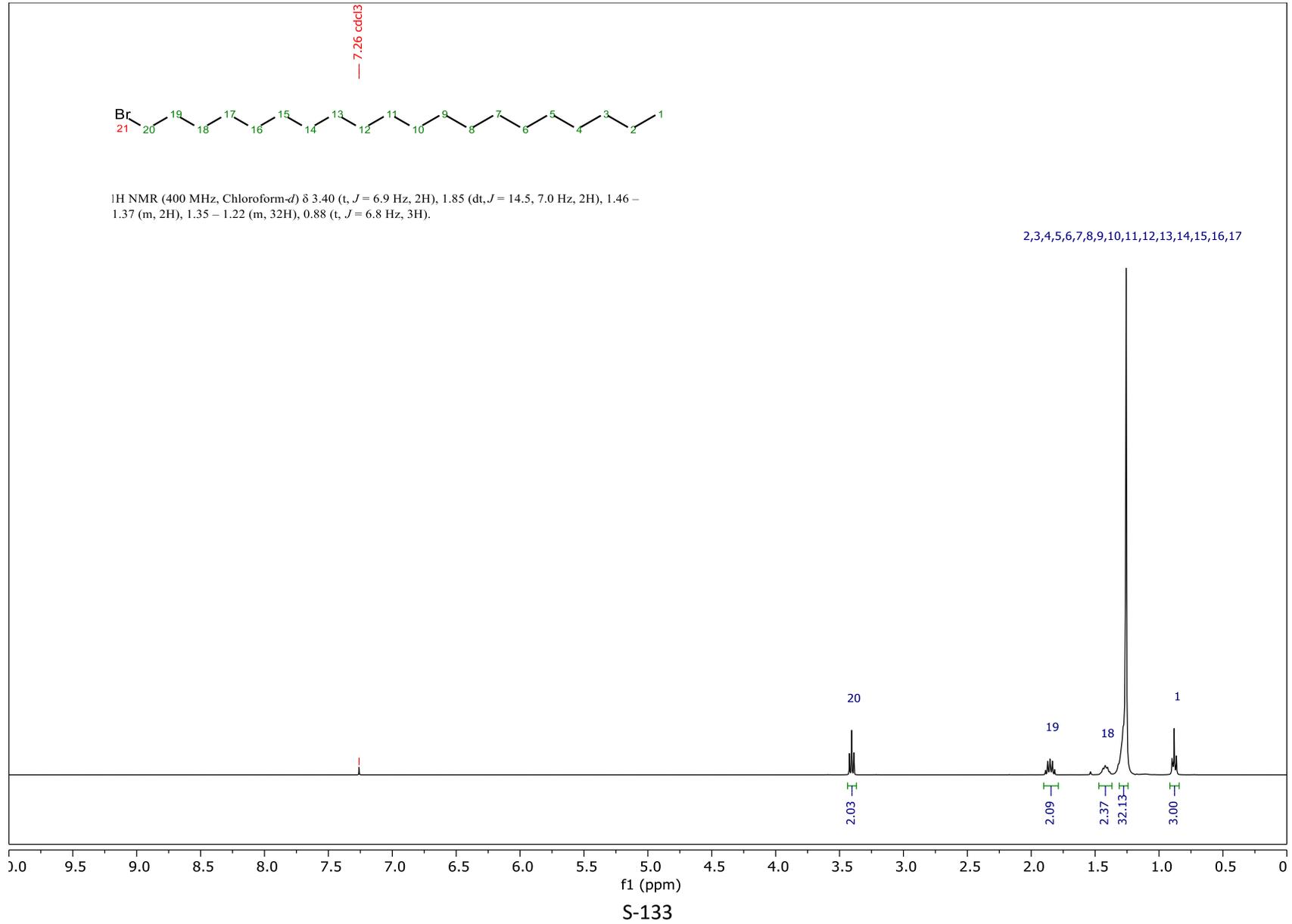


# HSQC NMR

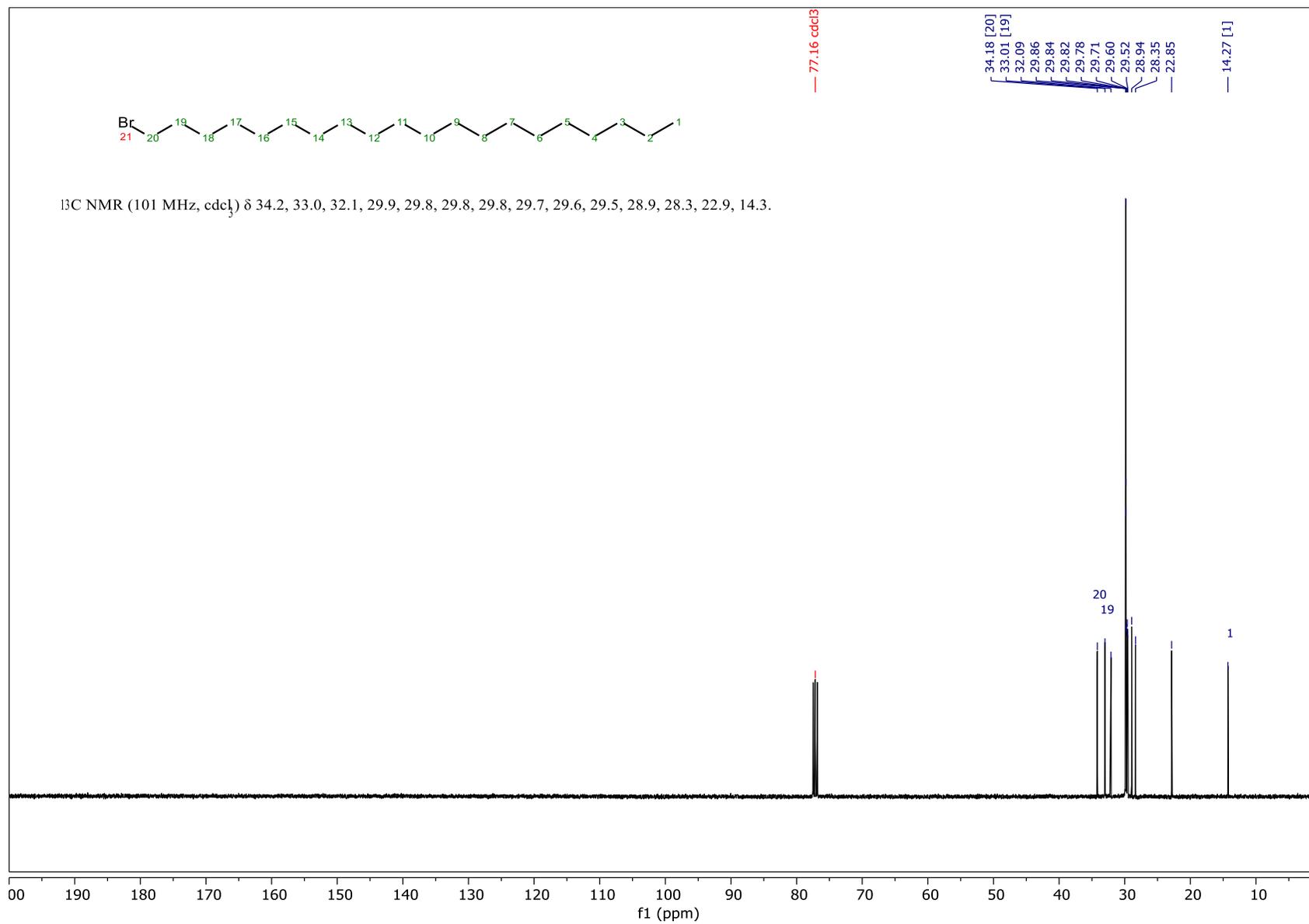


# Compound RBM5-069

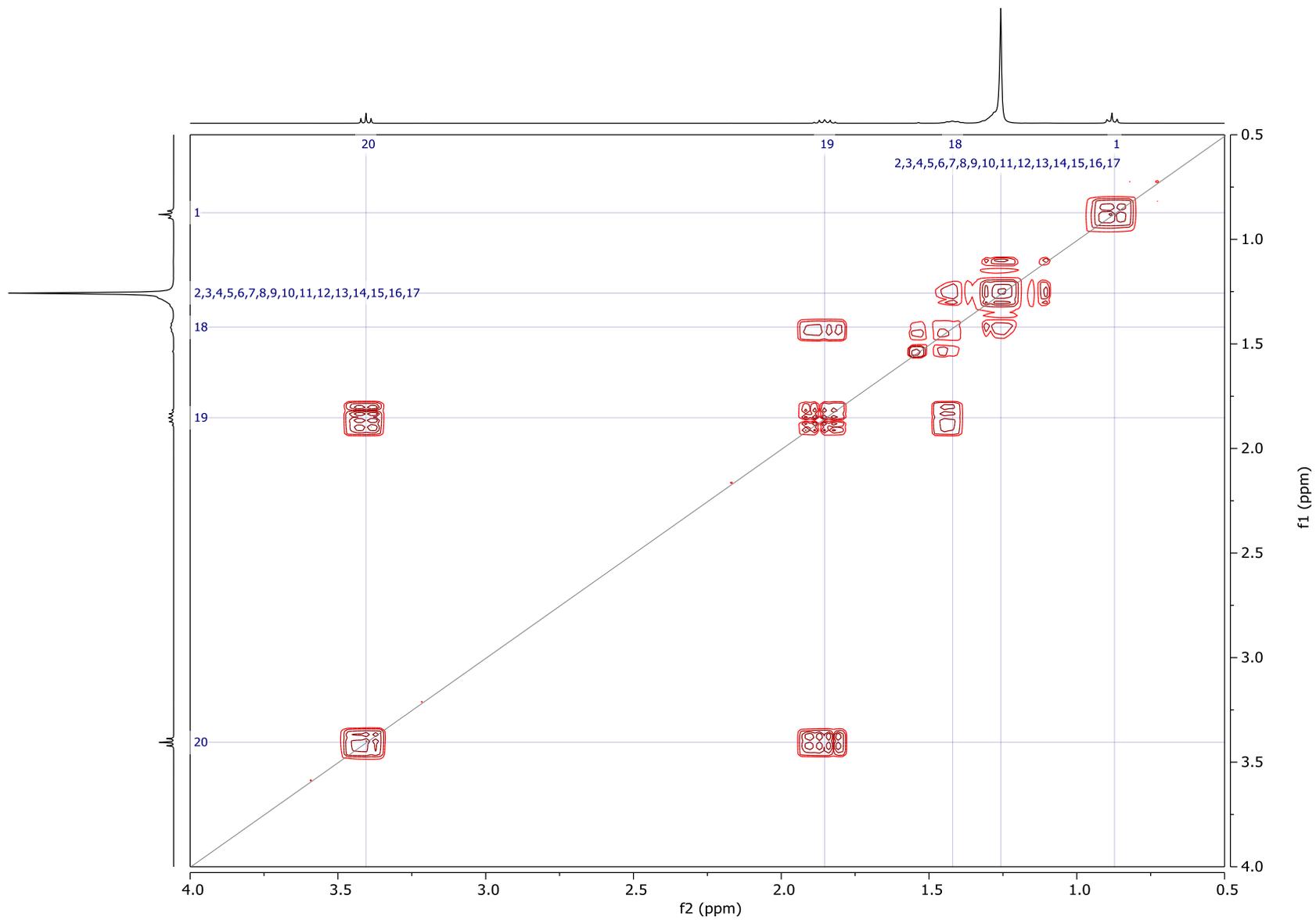
$^1\text{H}$  NMR



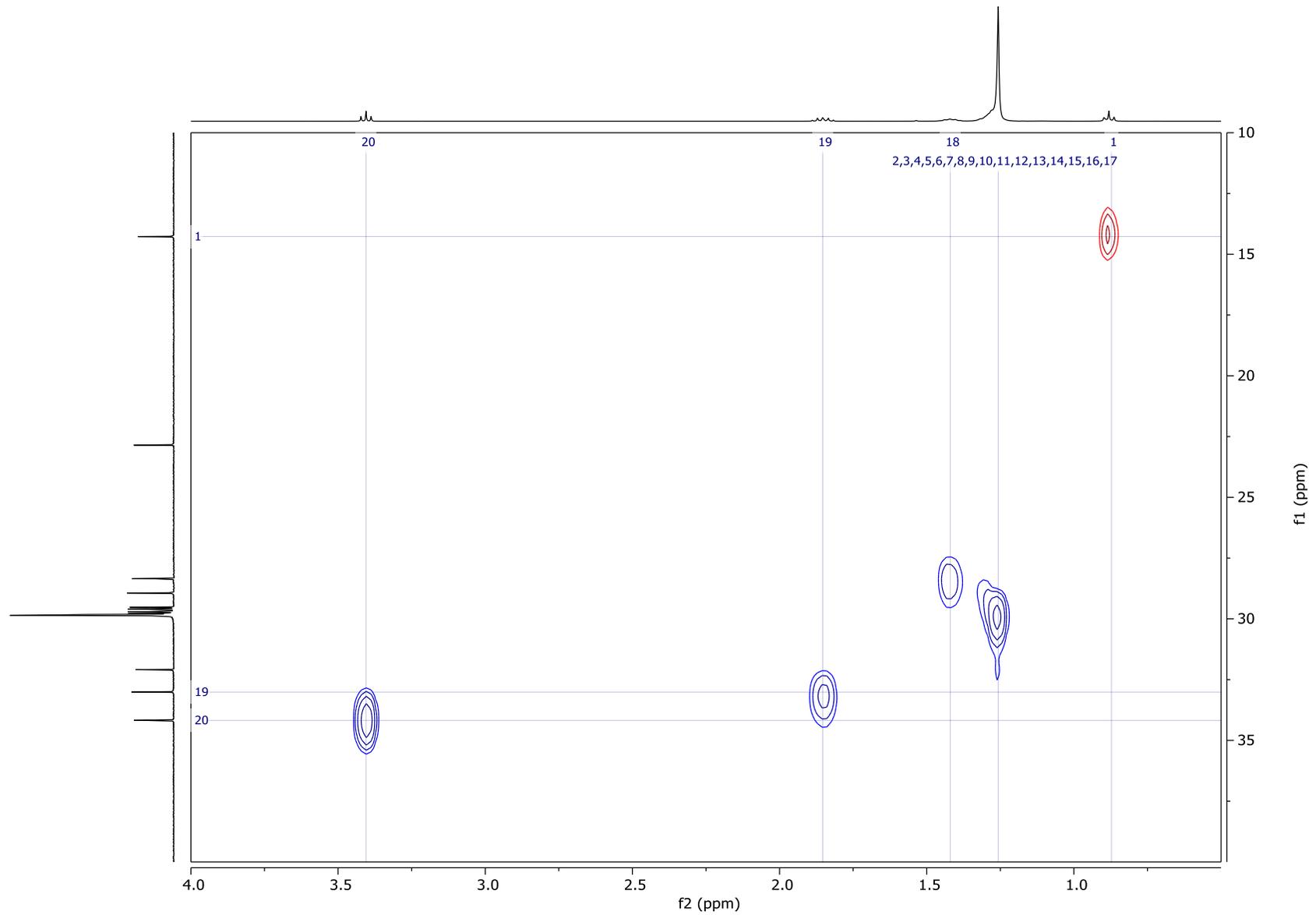
<sup>13</sup>C NMR



# COSY NMR

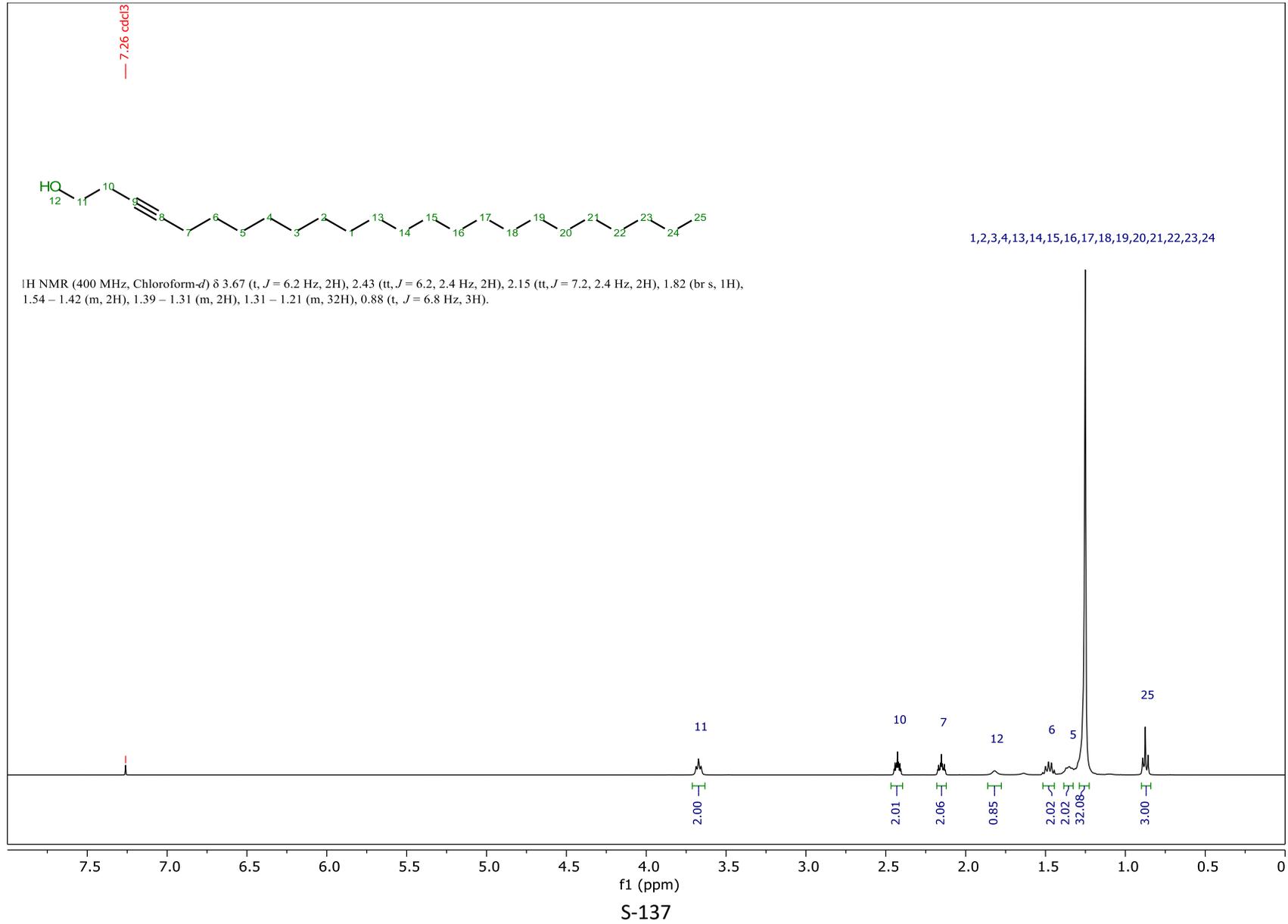


HSQC NMR

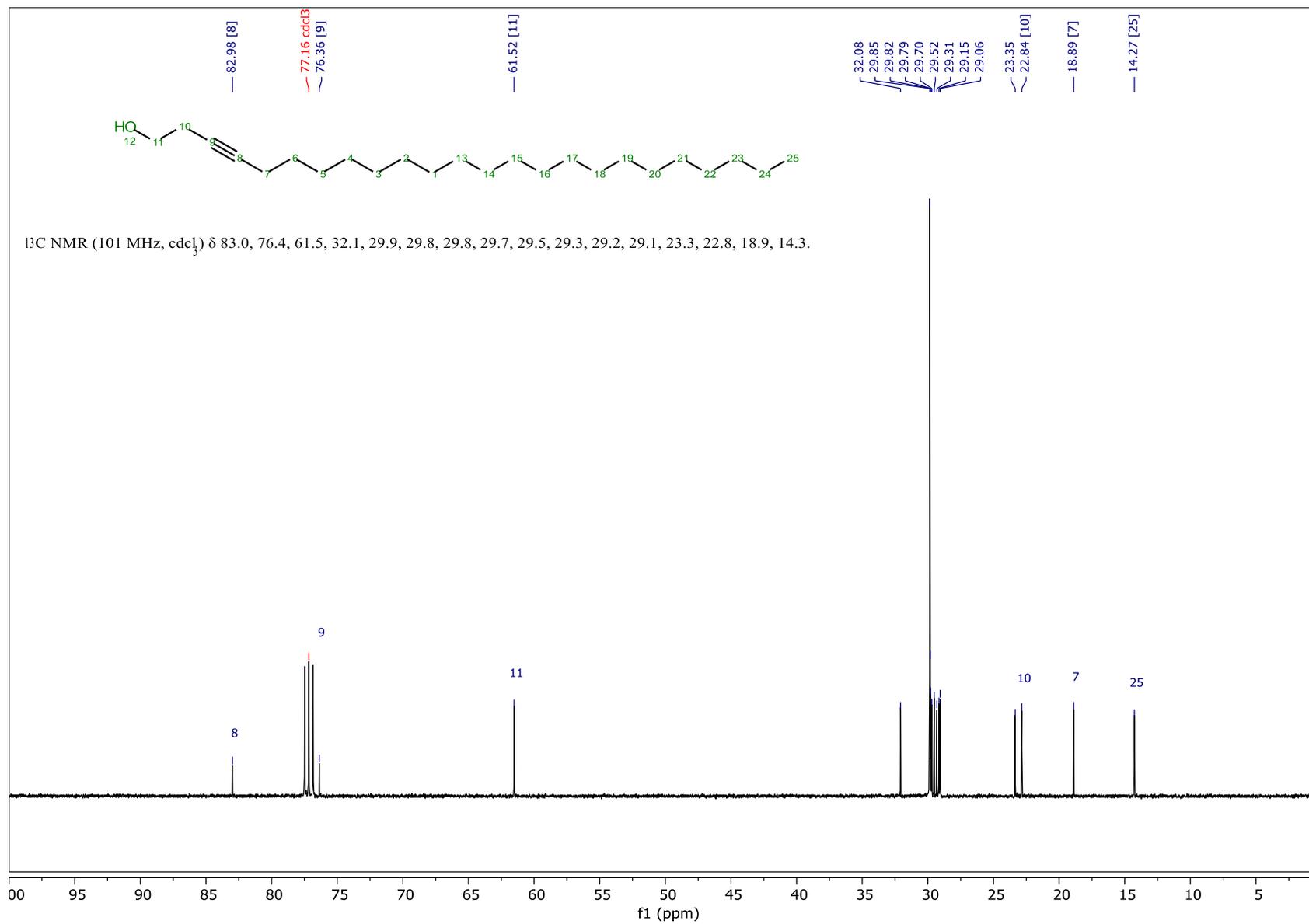


# Compound RBM5-070

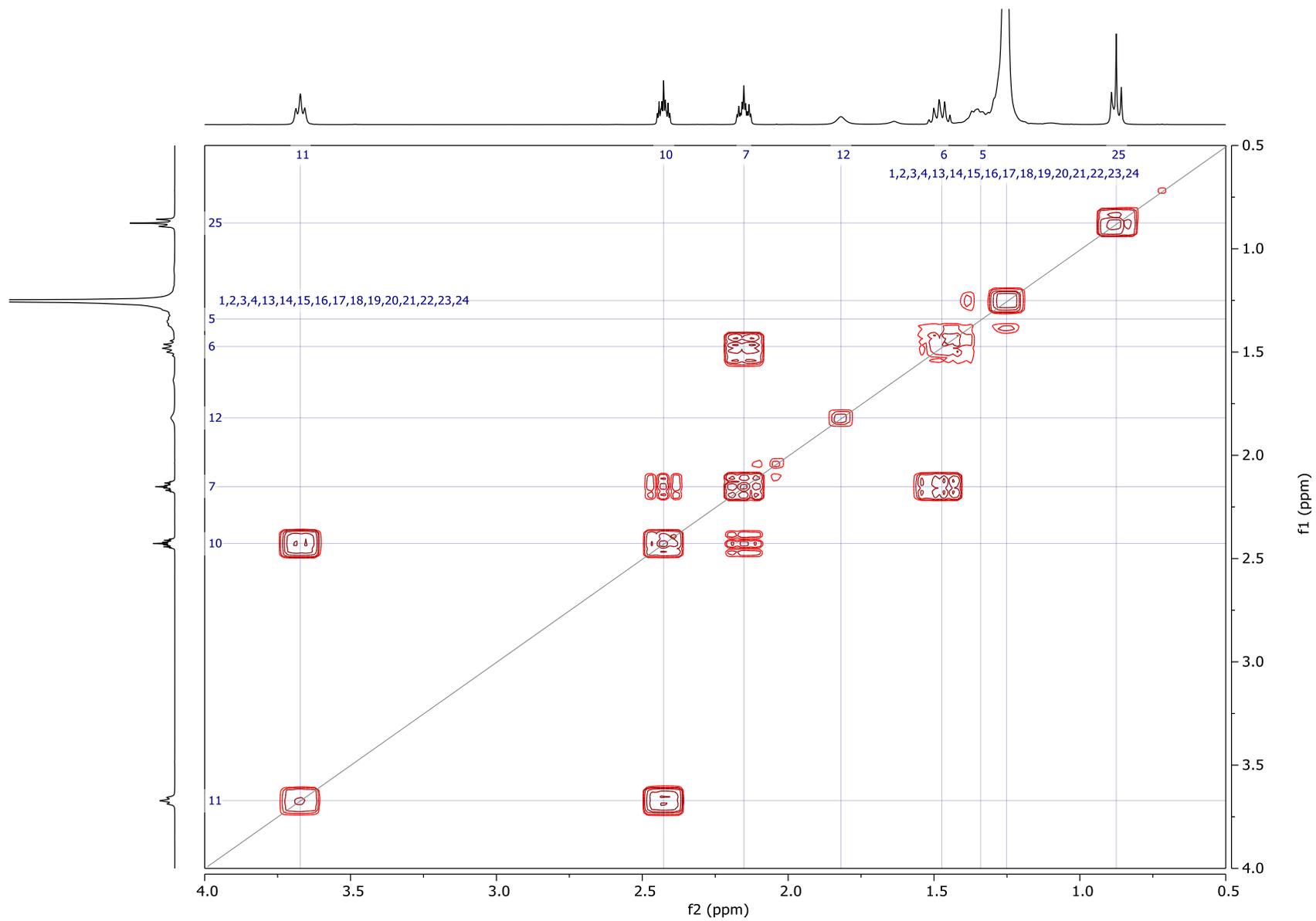
<sup>1</sup>H NMR



<sup>13</sup>C NMR

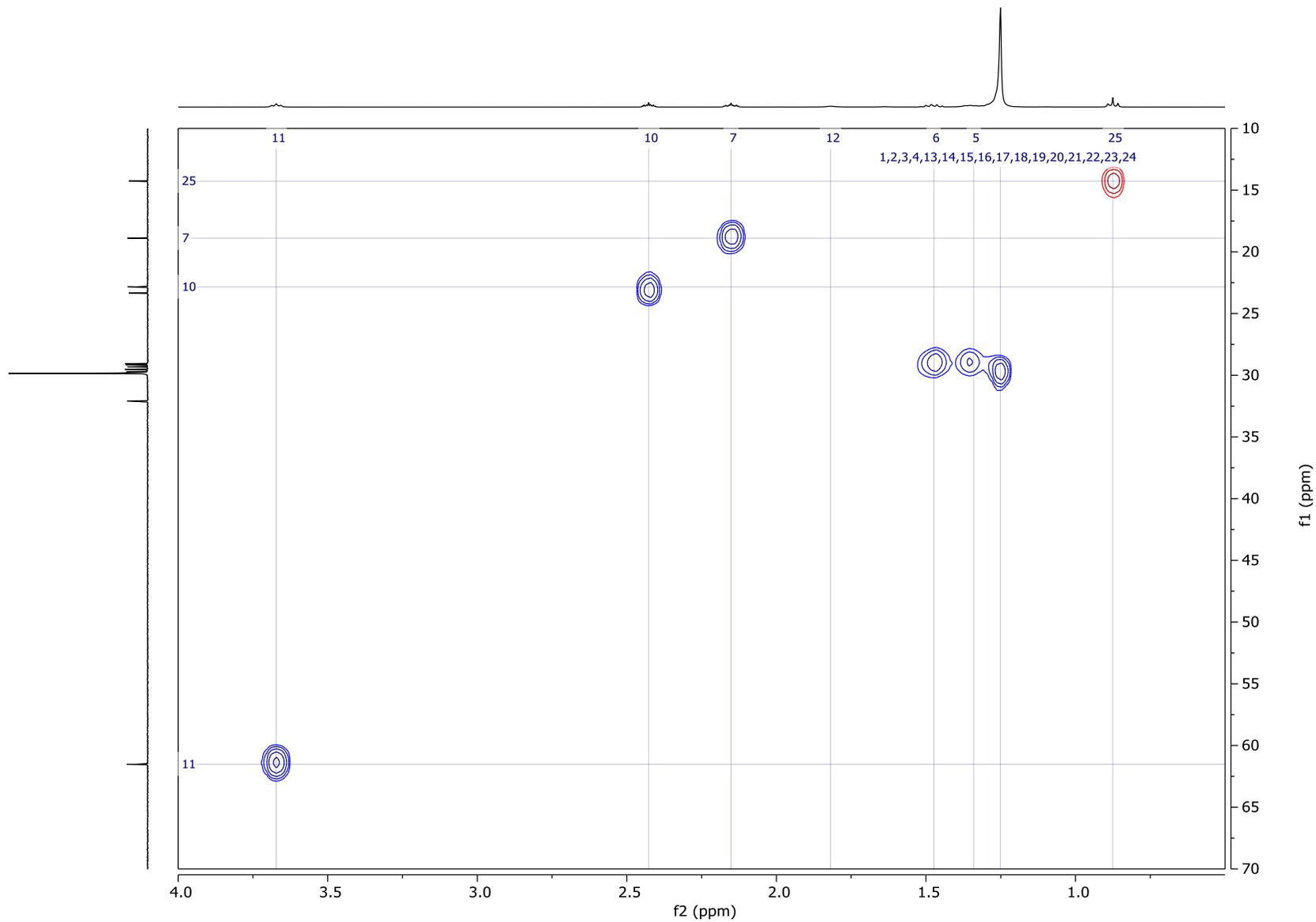


# COSY NMR



S-139

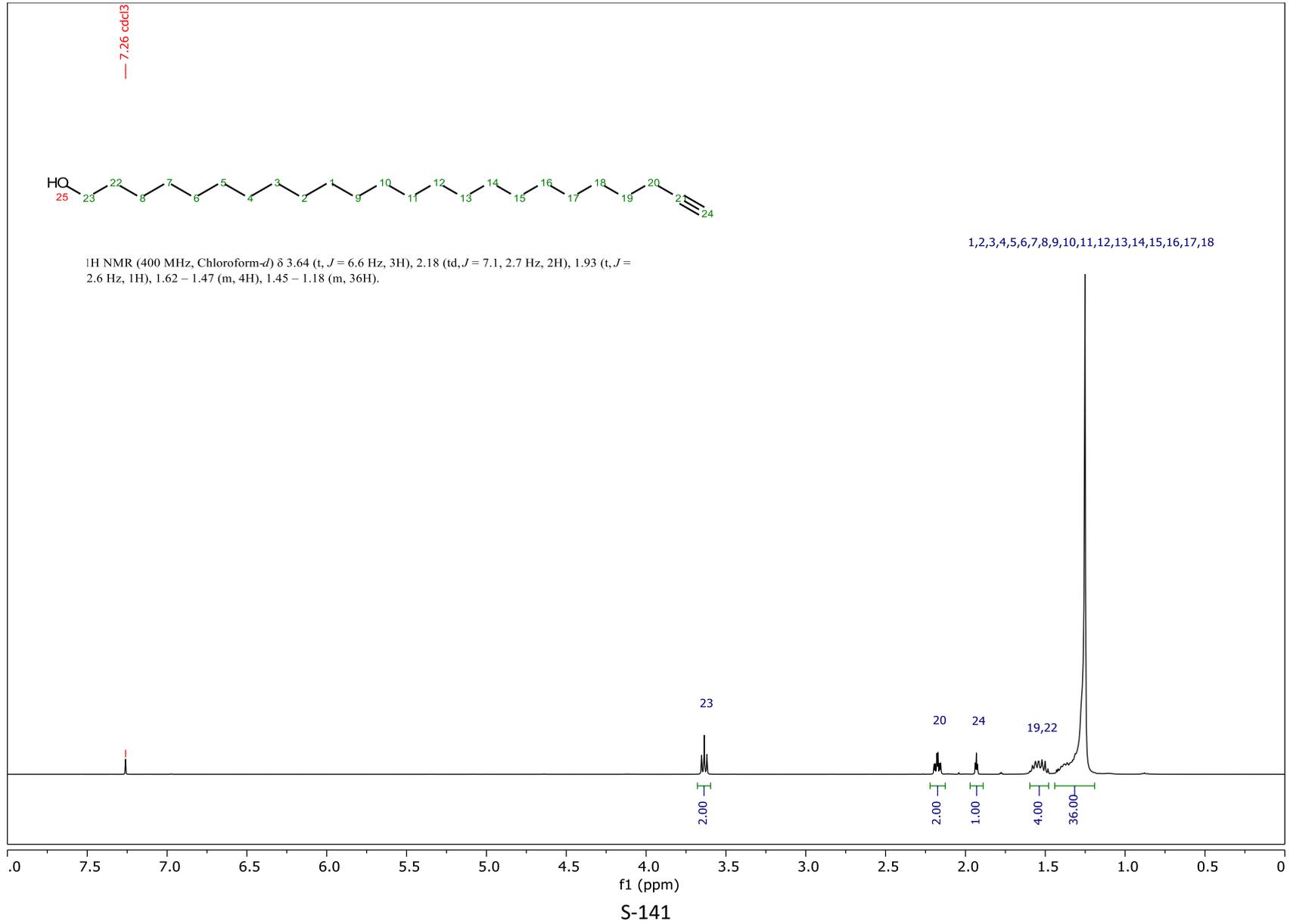
# HSQC NMR



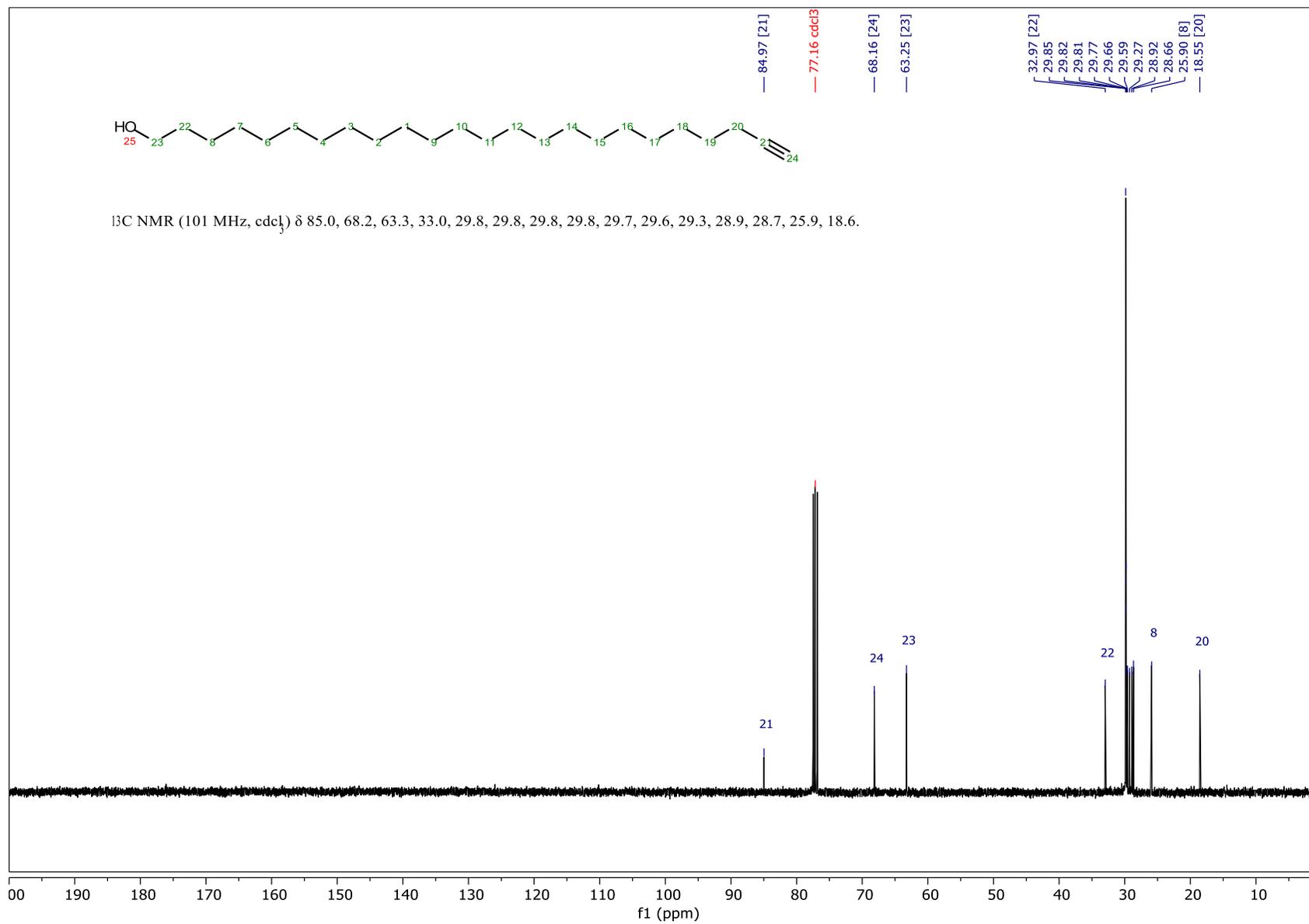
S-140

# Compound RBM5-071

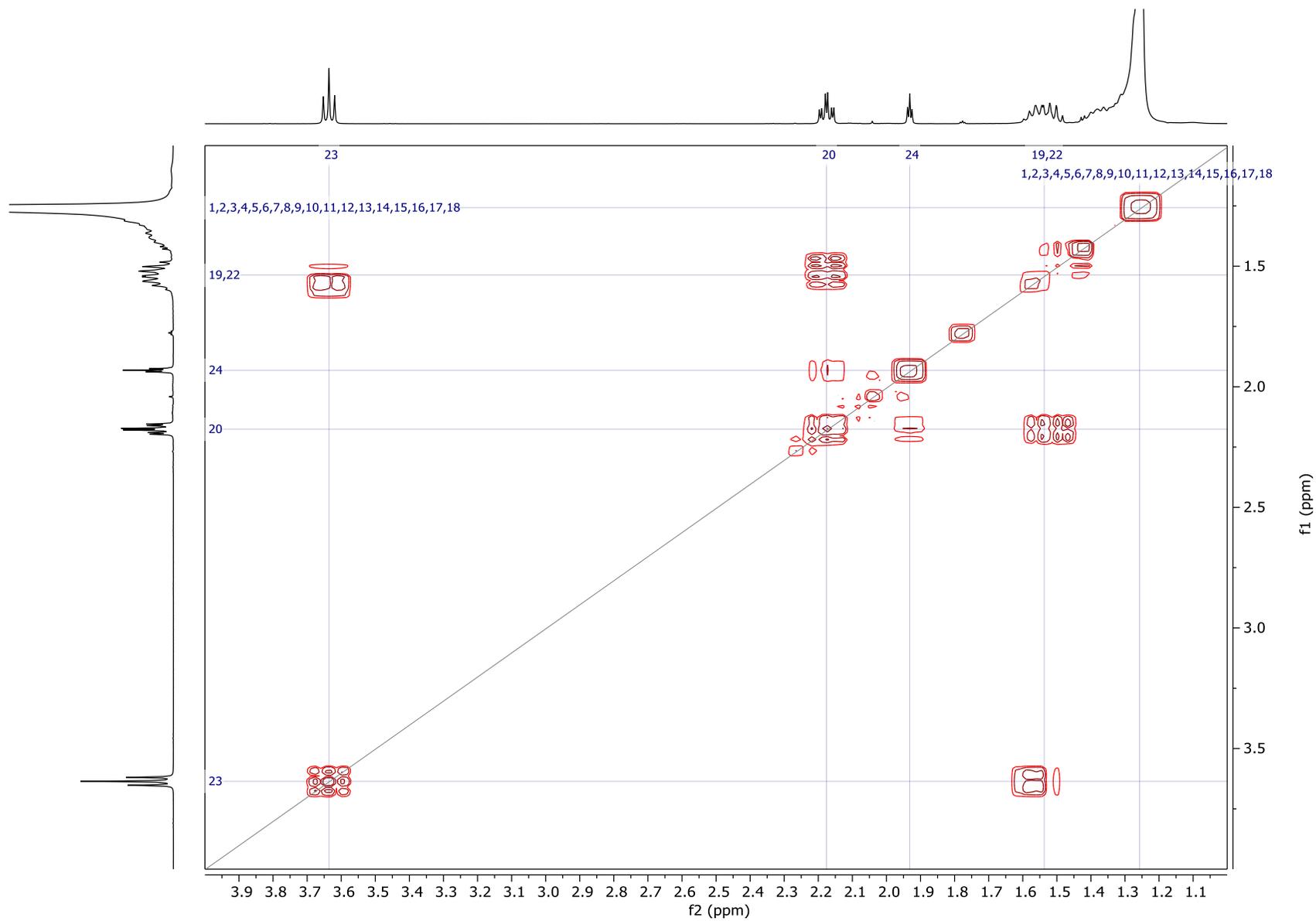
$^1\text{H}$  NMR



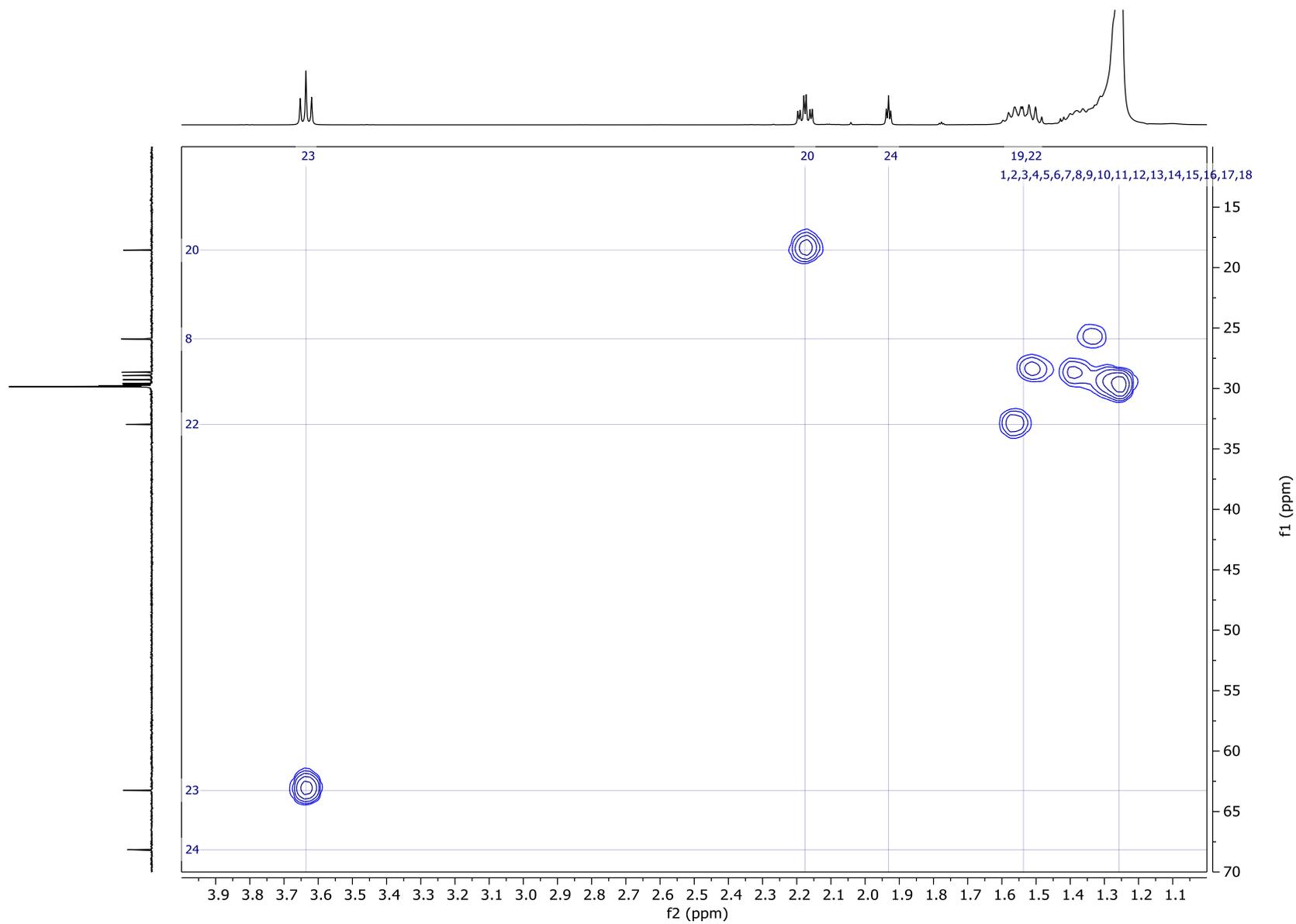
<sup>13</sup>C NMR



COSY NMR

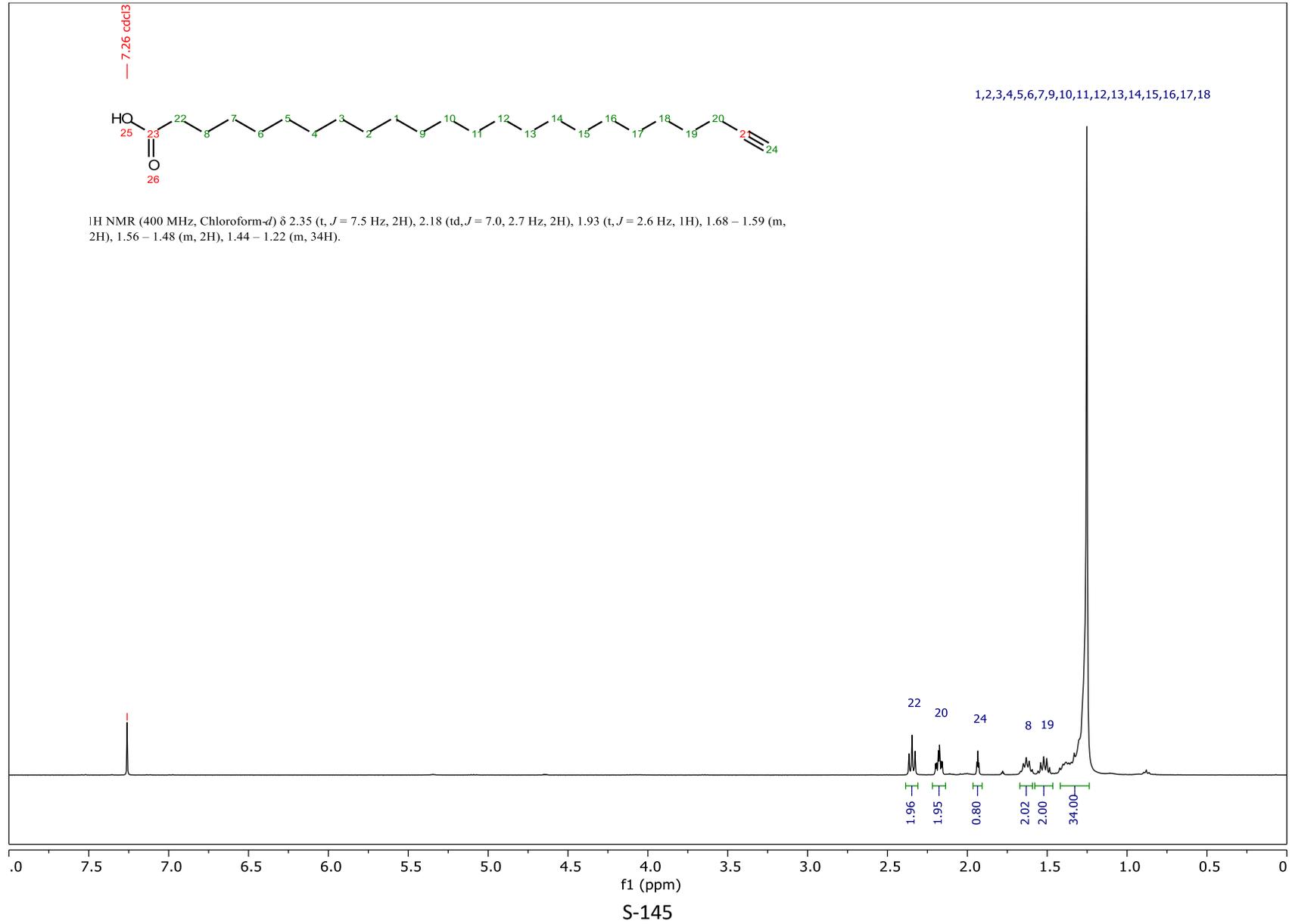


# HSQC NMR

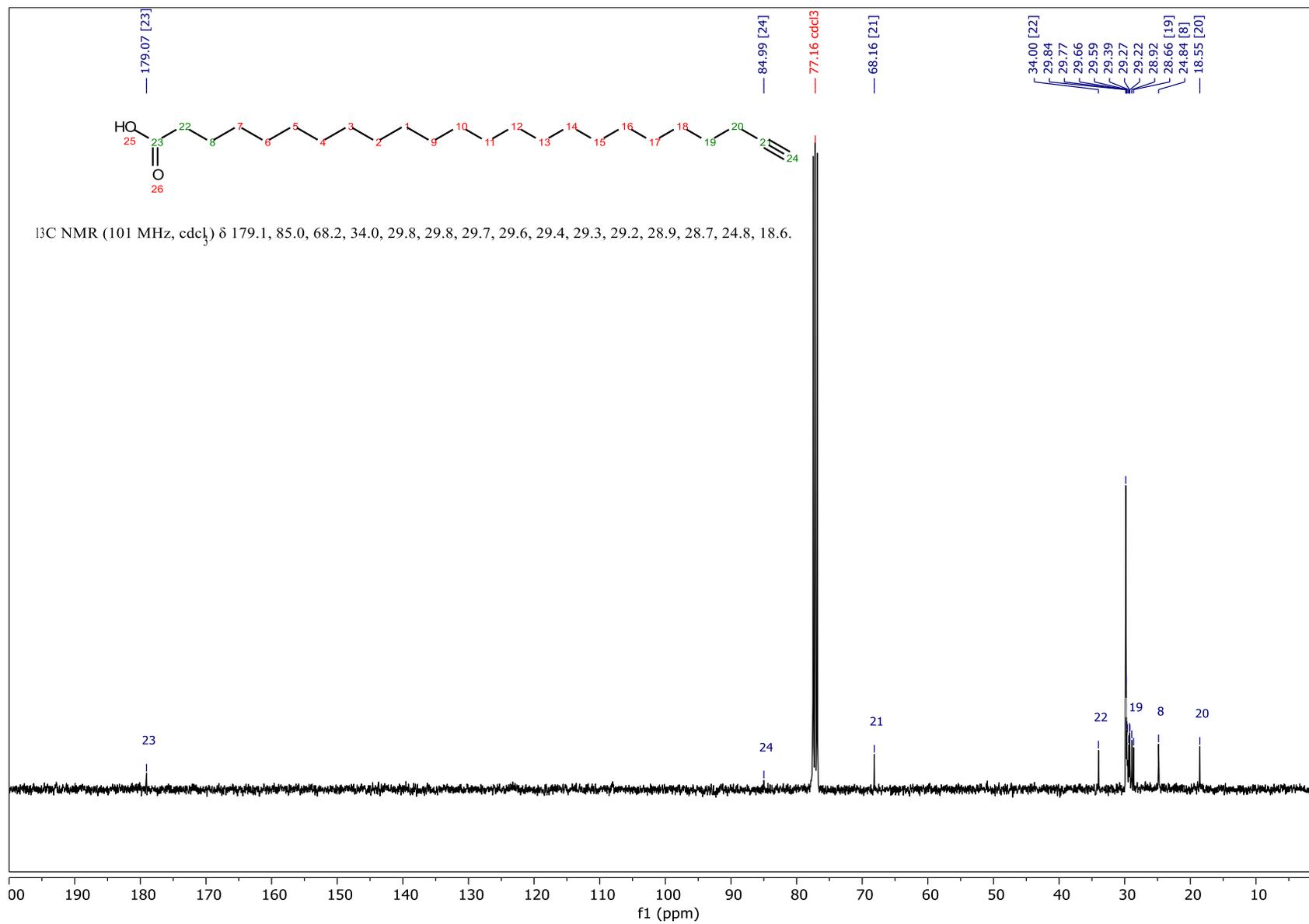


# Compound RBM5-072

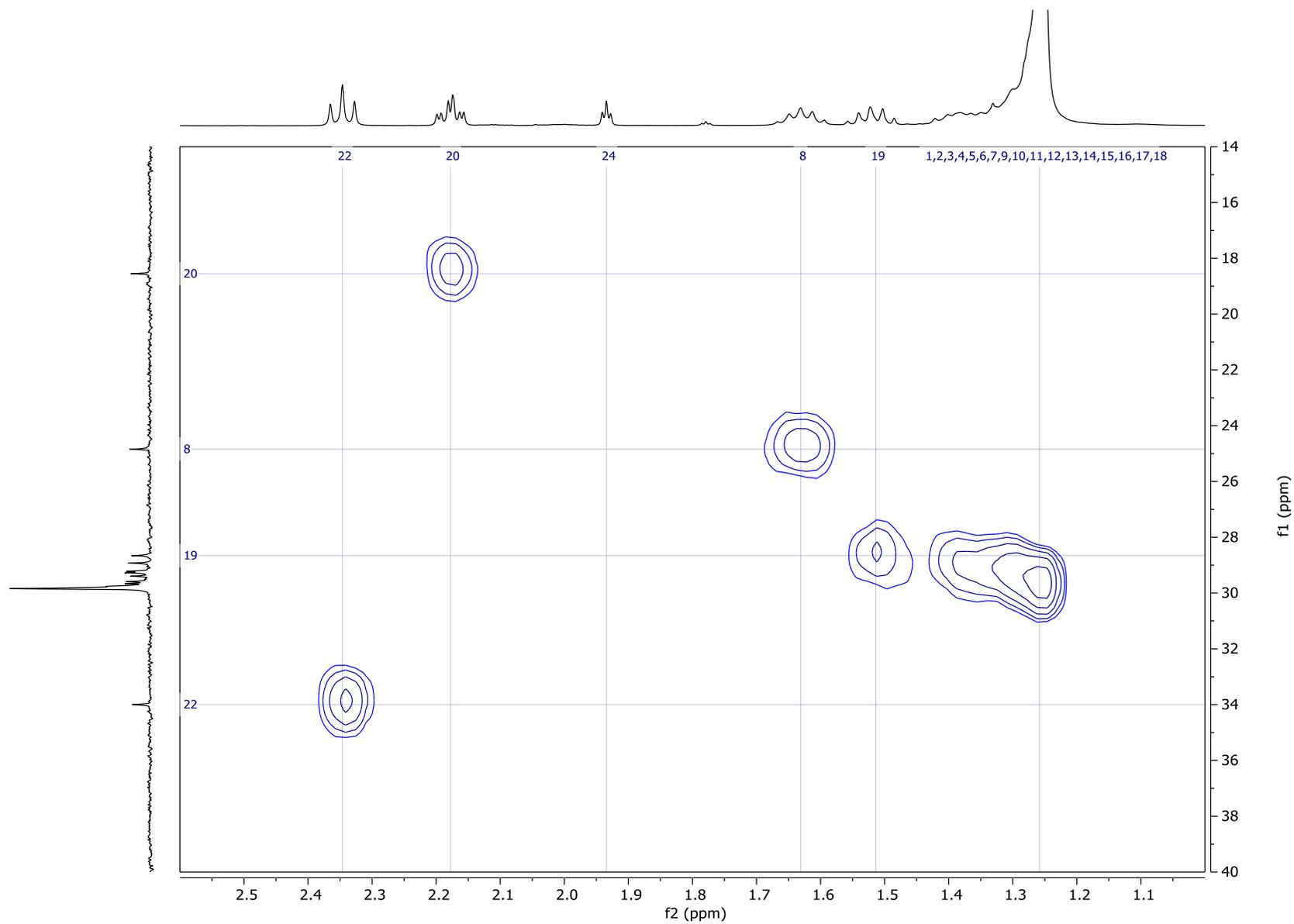
$^1\text{H NMR}$



# <sup>13</sup>C NMR



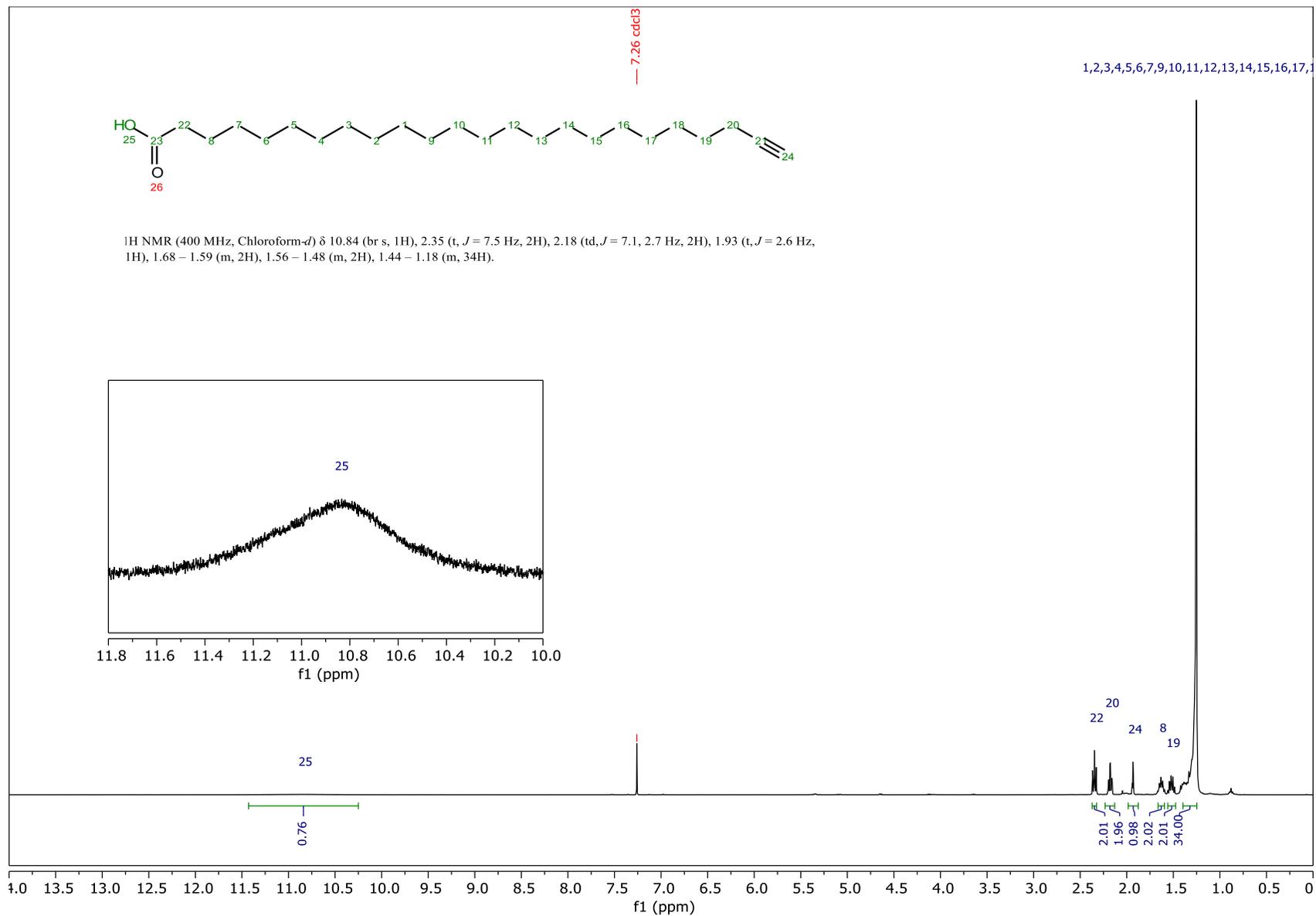
# HSQC NMR



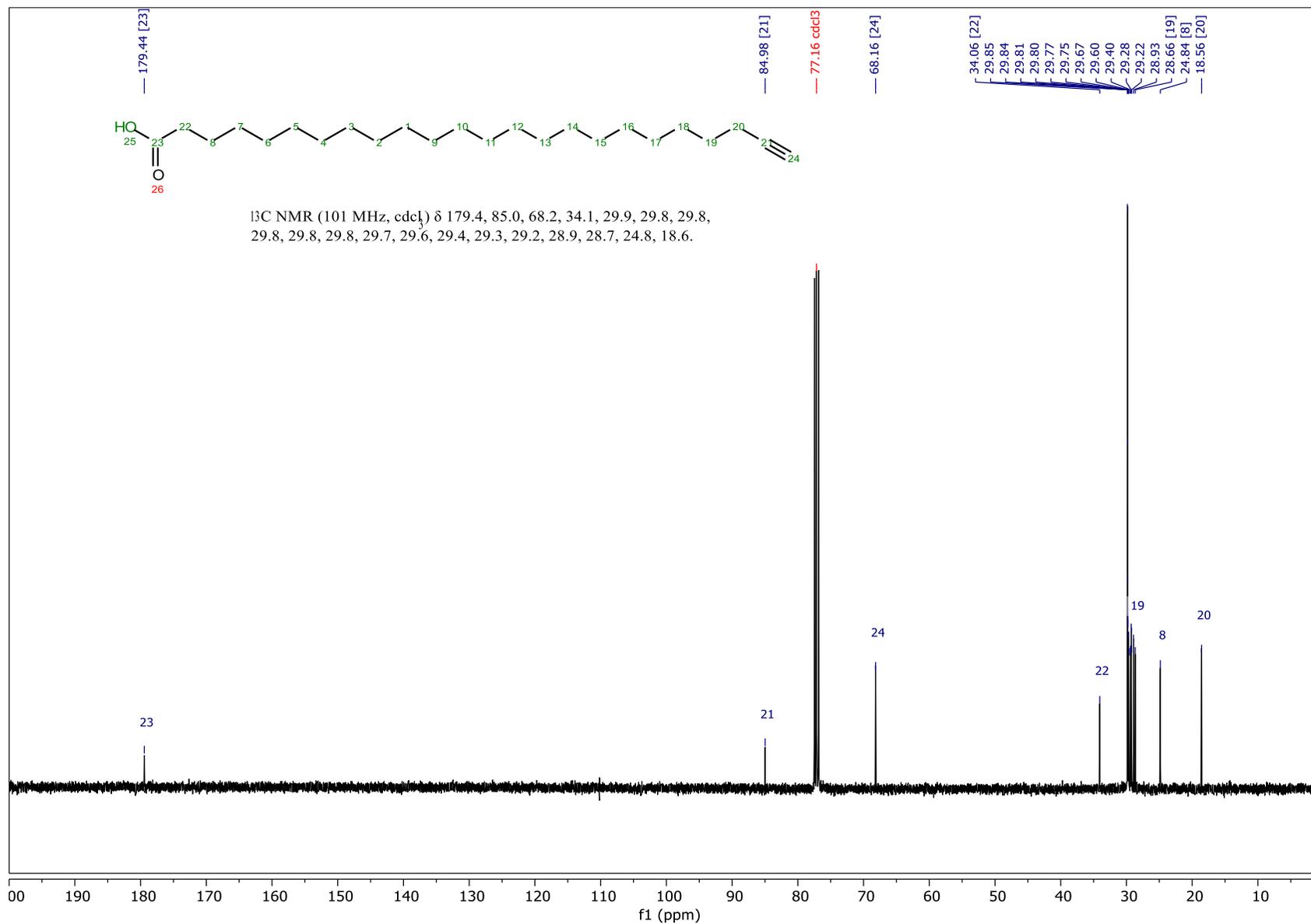
S-147

# Compound RBM5-072 alternative route

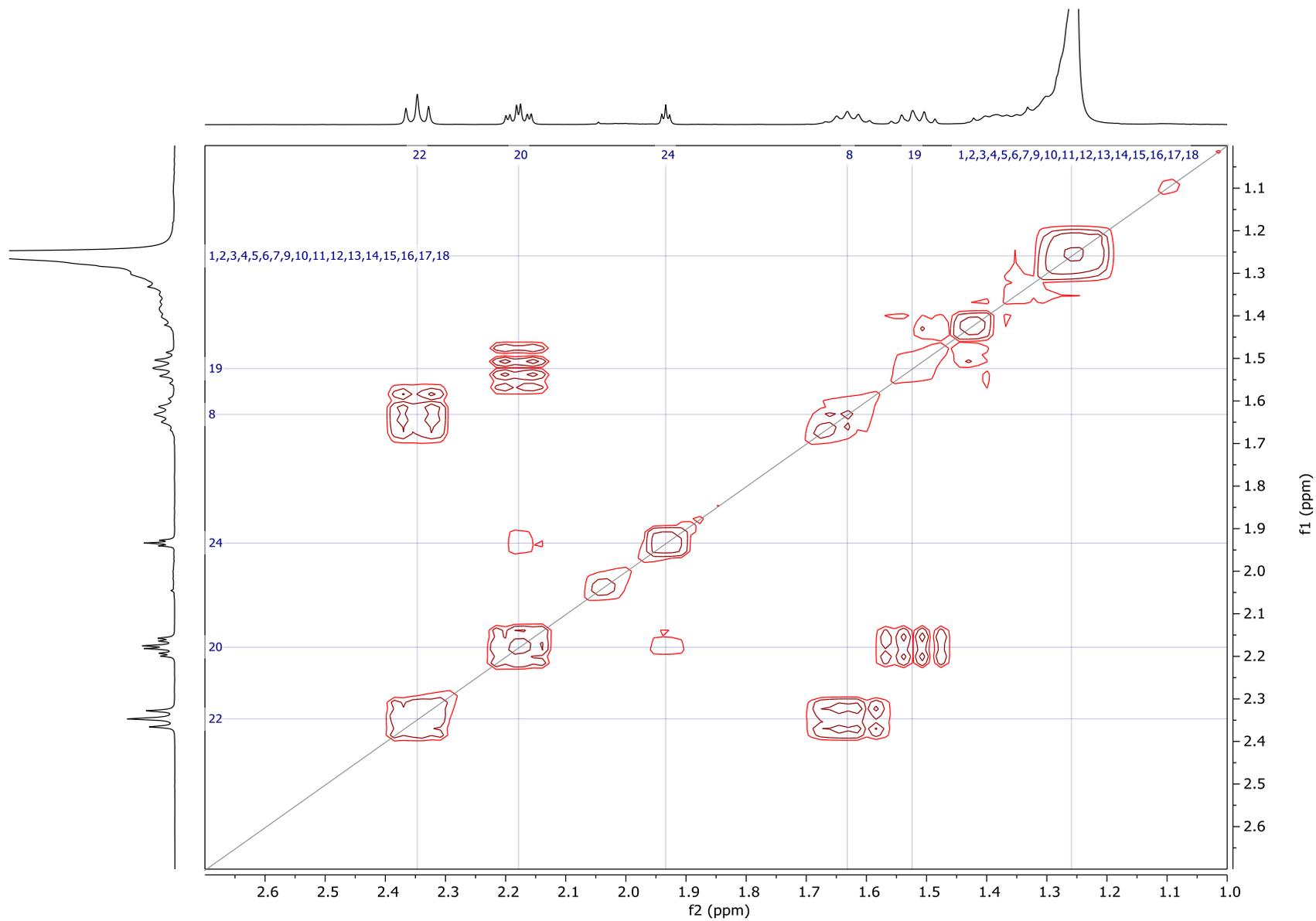
$^1\text{H NMR}$



# <sup>13</sup>C NMR

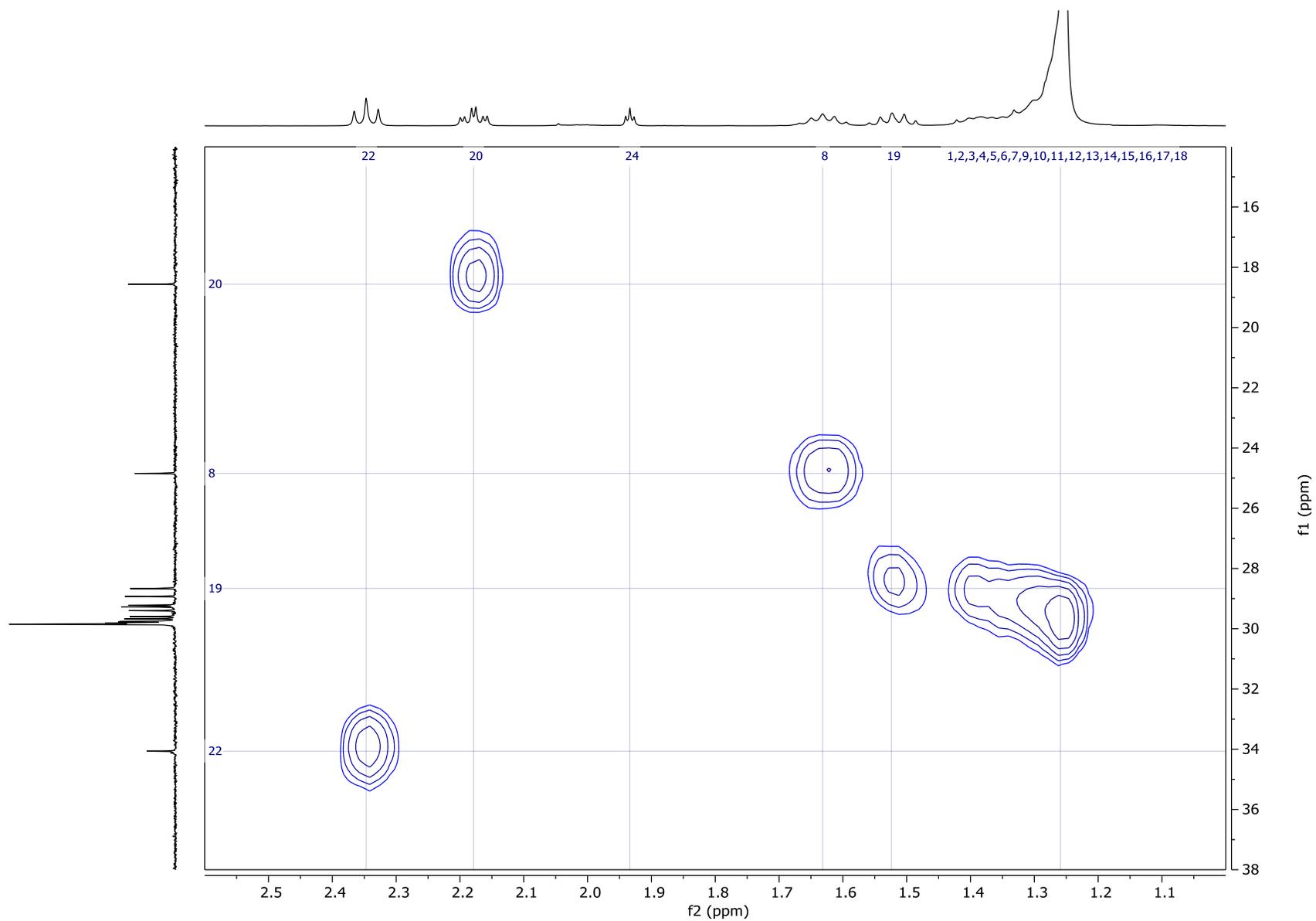


# COSY NMR



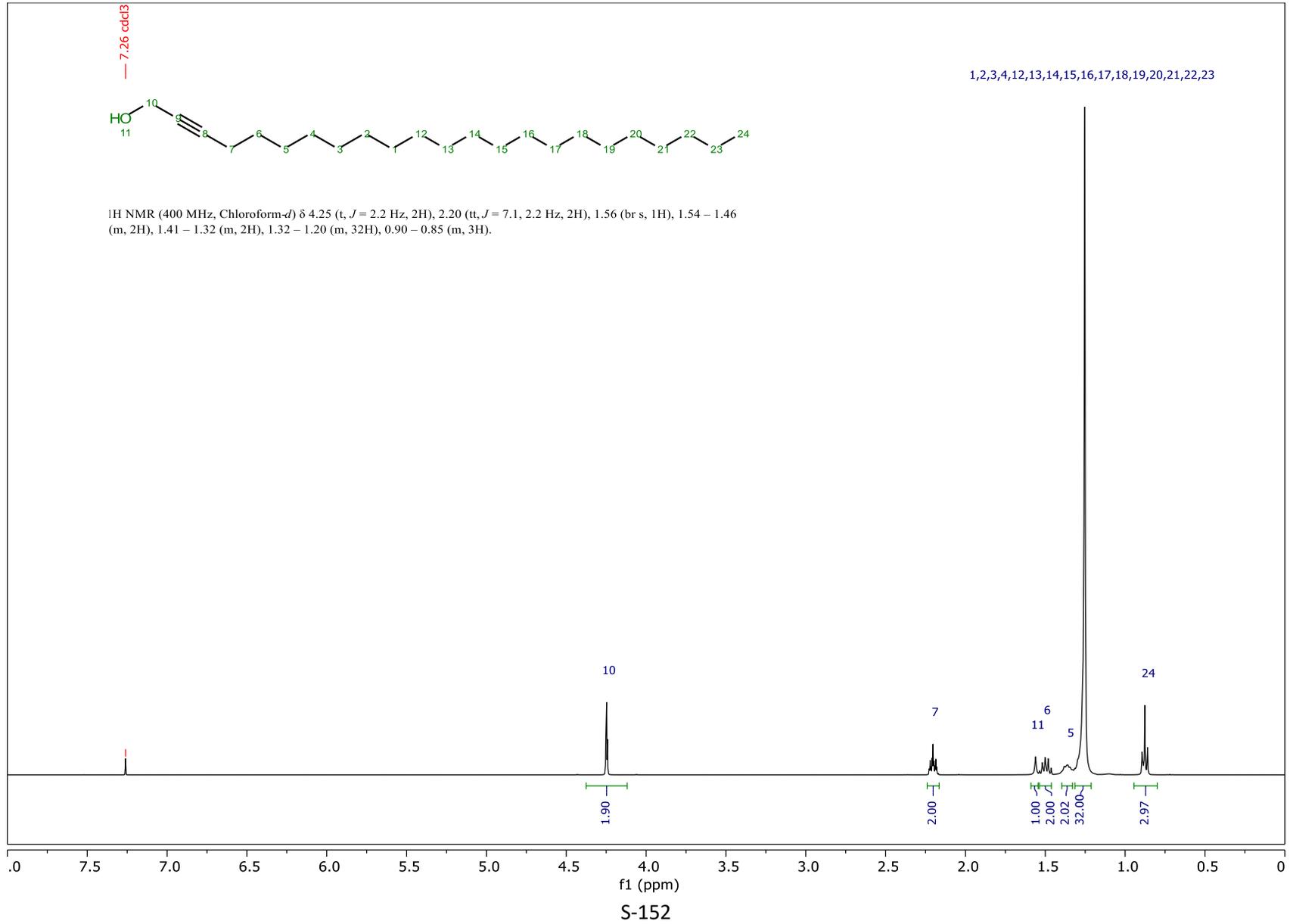
S-150

# HSQC NMR

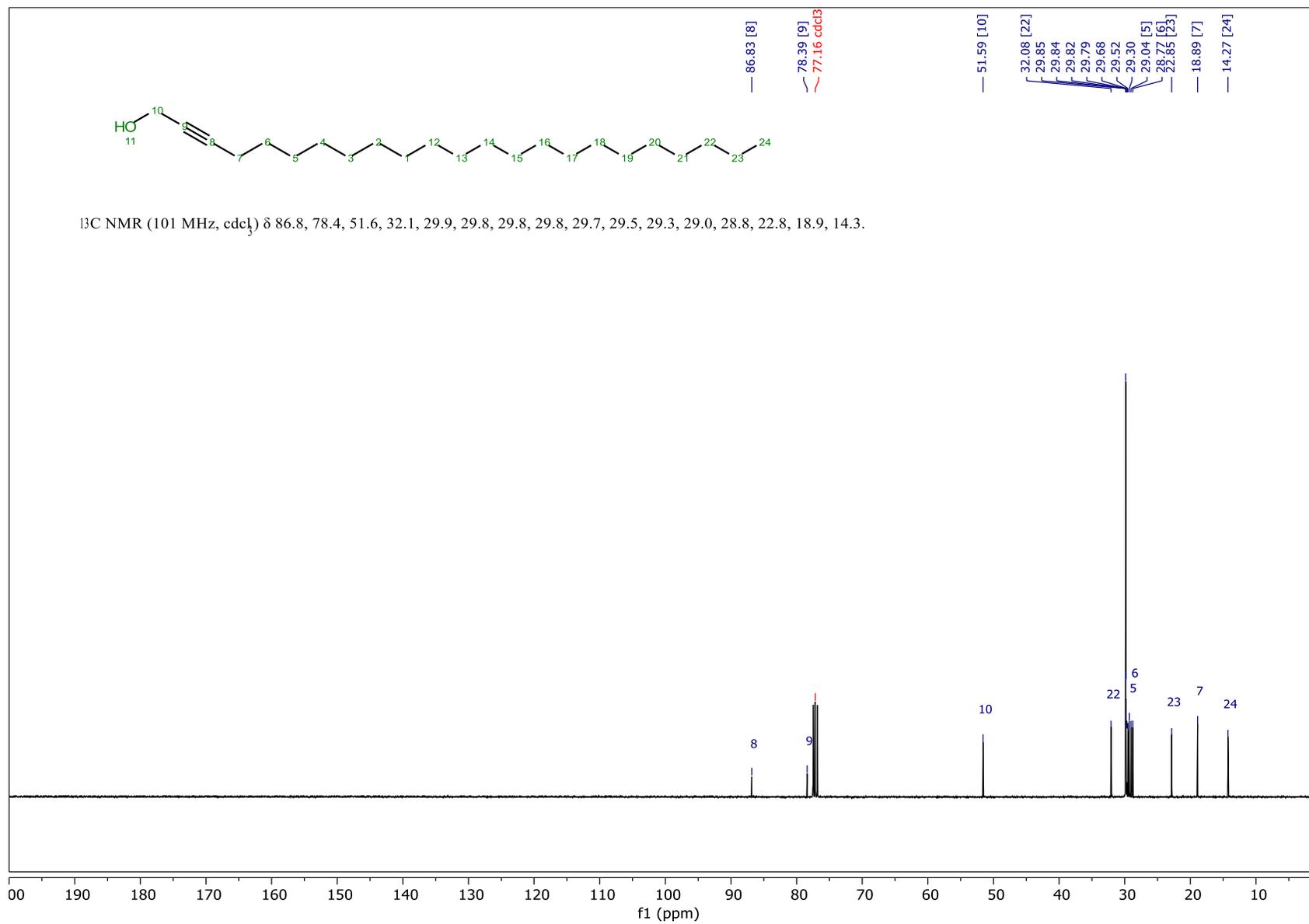


# Compound RBM5-073

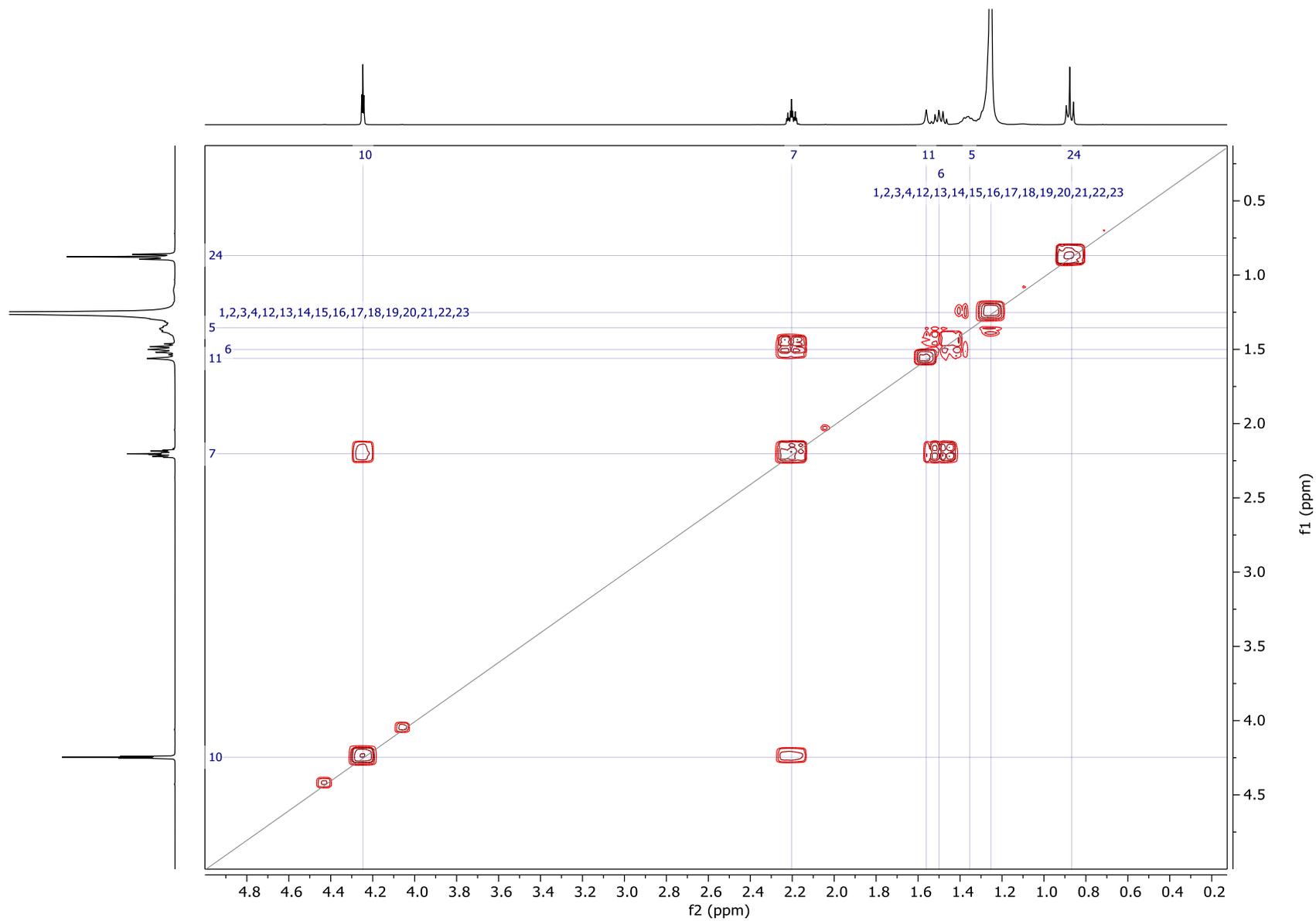
$^1\text{H}$  NMR



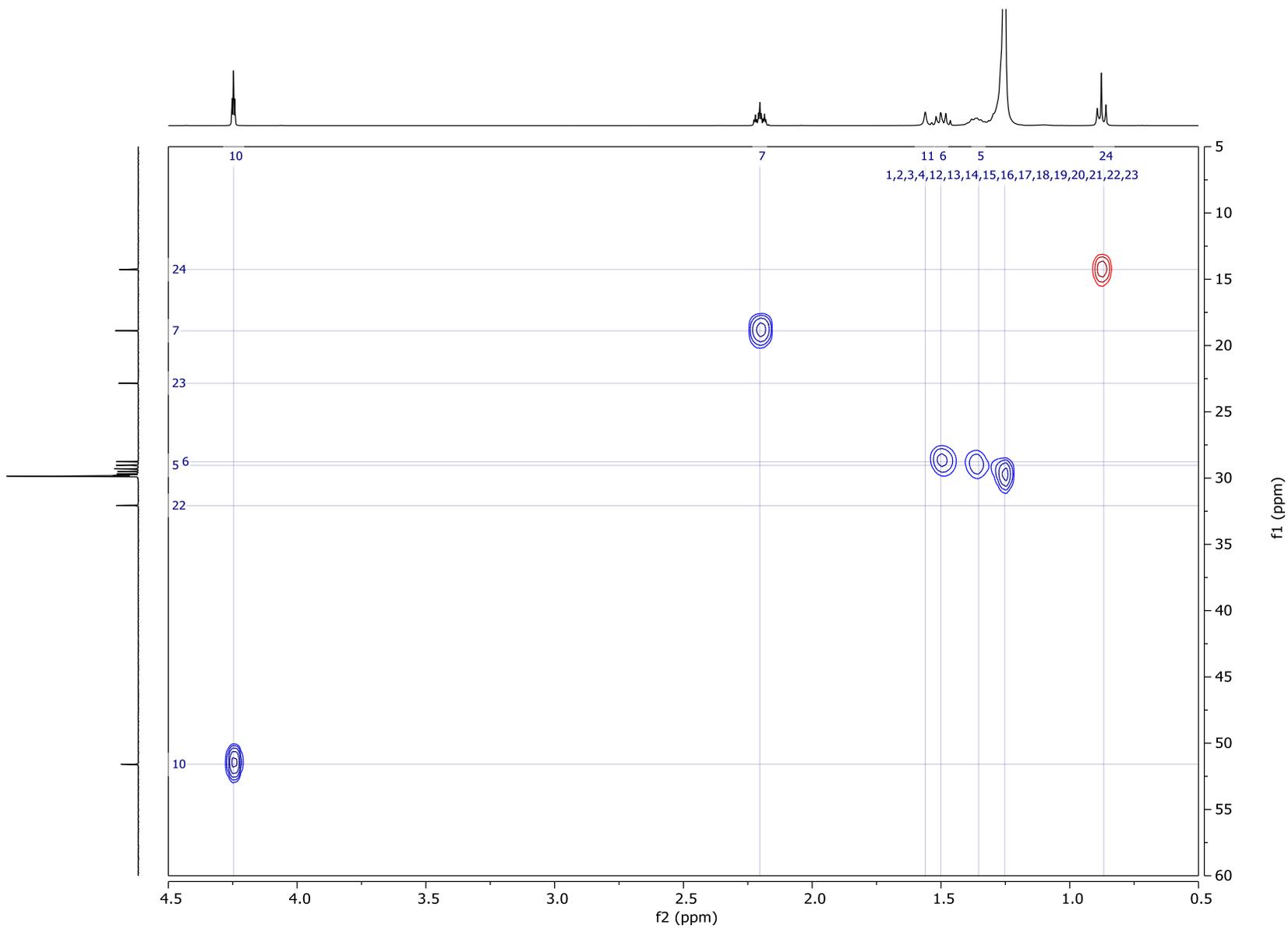
<sup>13</sup>C NMR



# COSY NMR



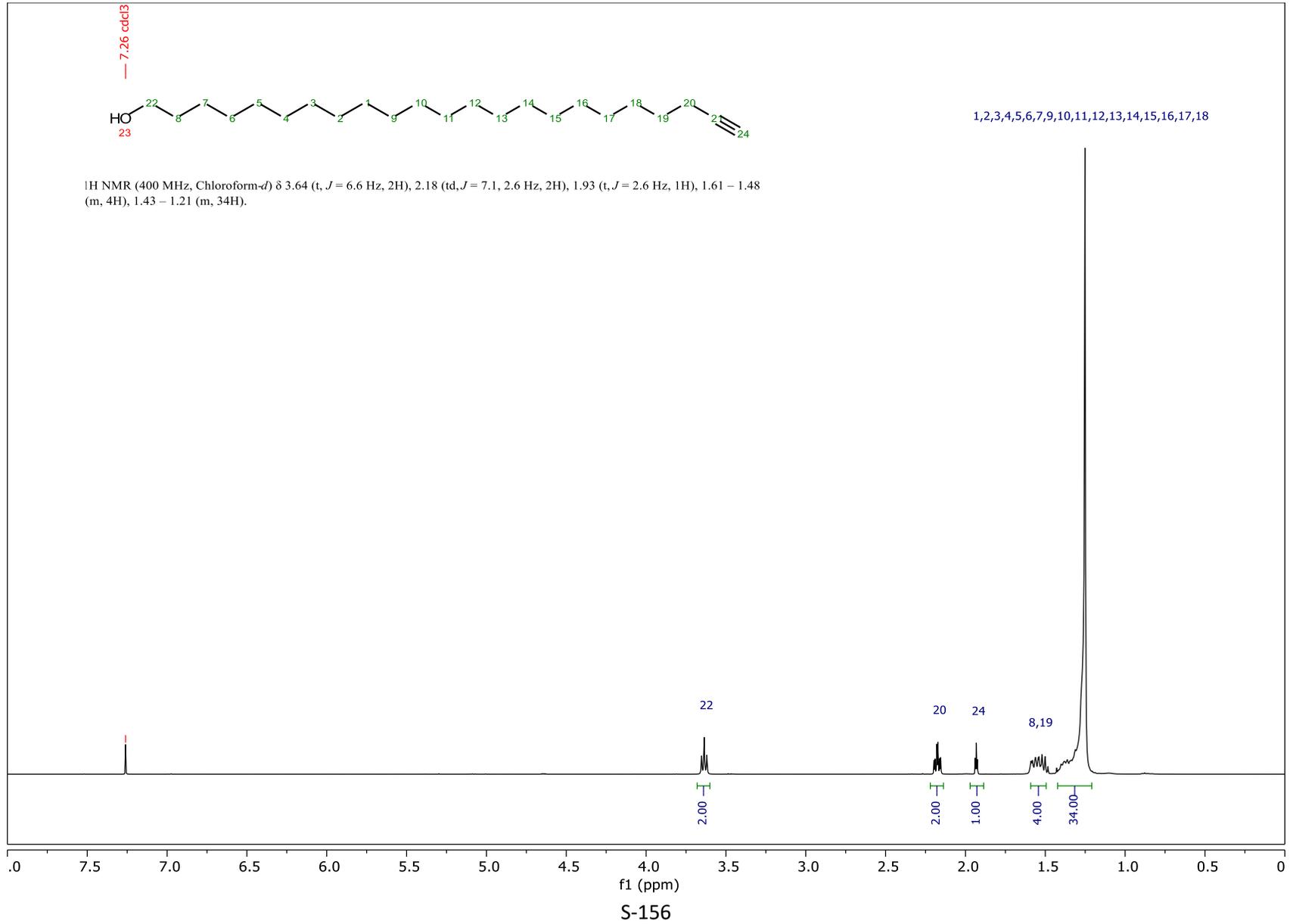
HSQC NMR



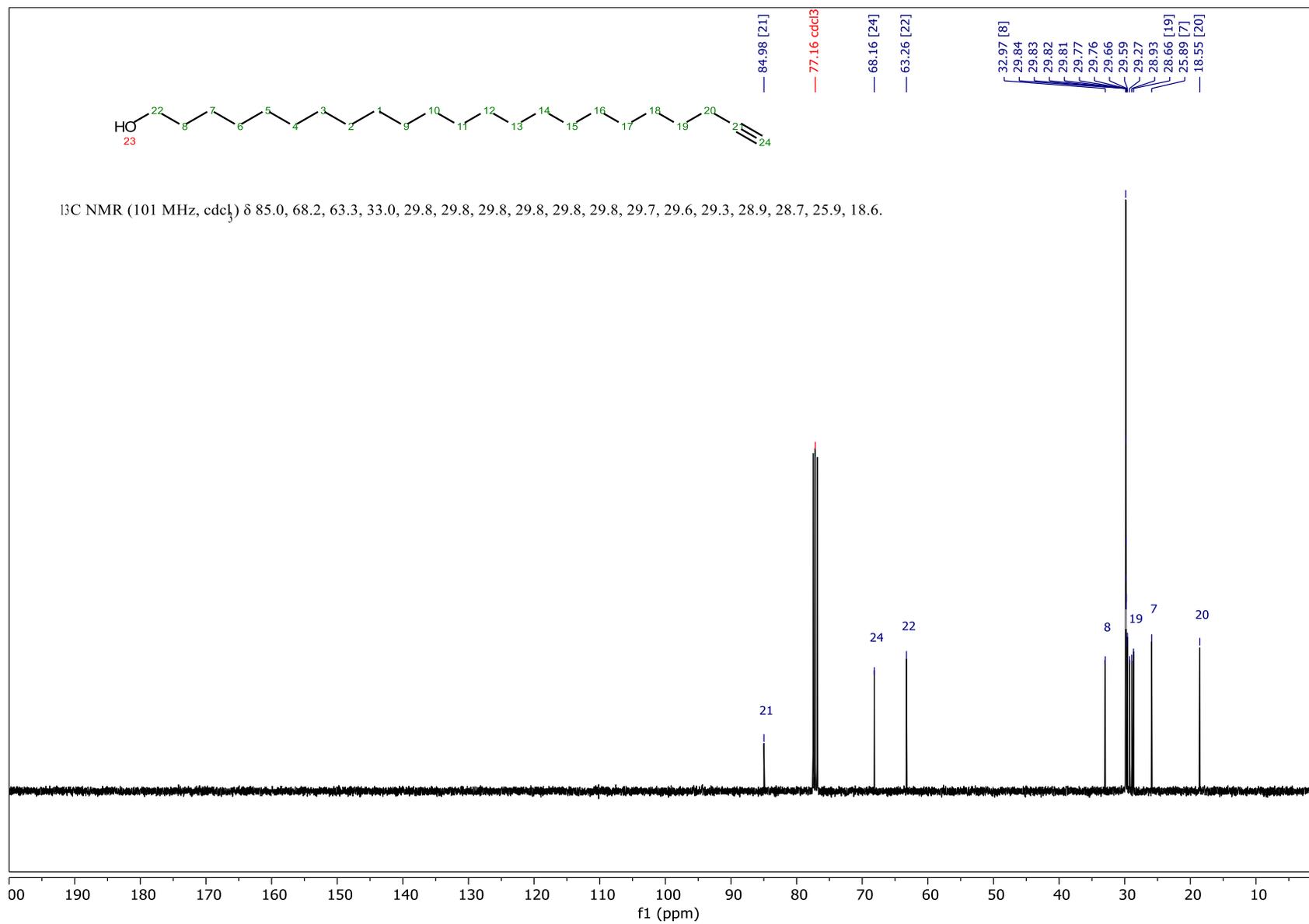
S-155

# Compound RBM5-074

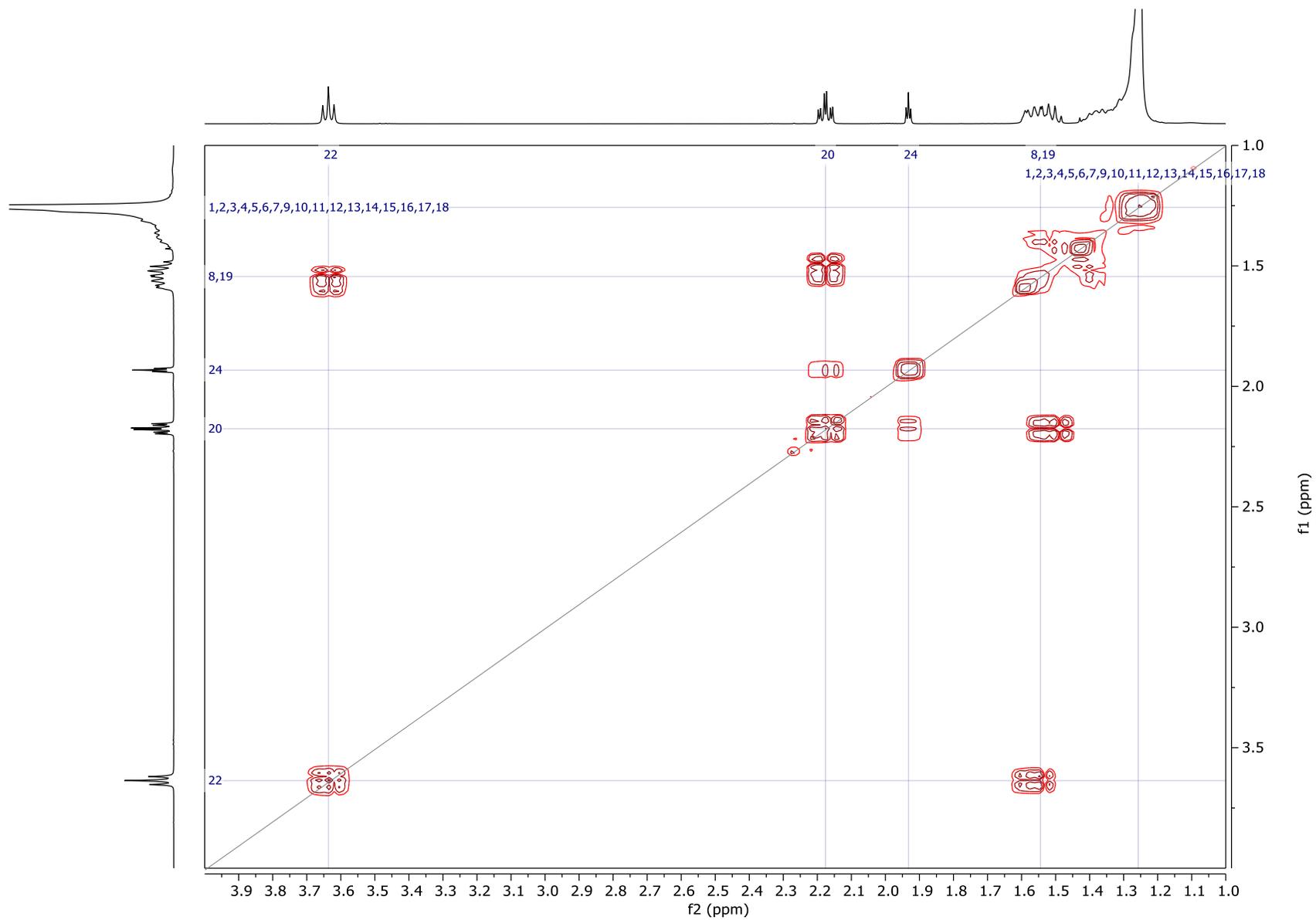
$^1\text{H}$  NMR



<sup>13</sup>C NMR

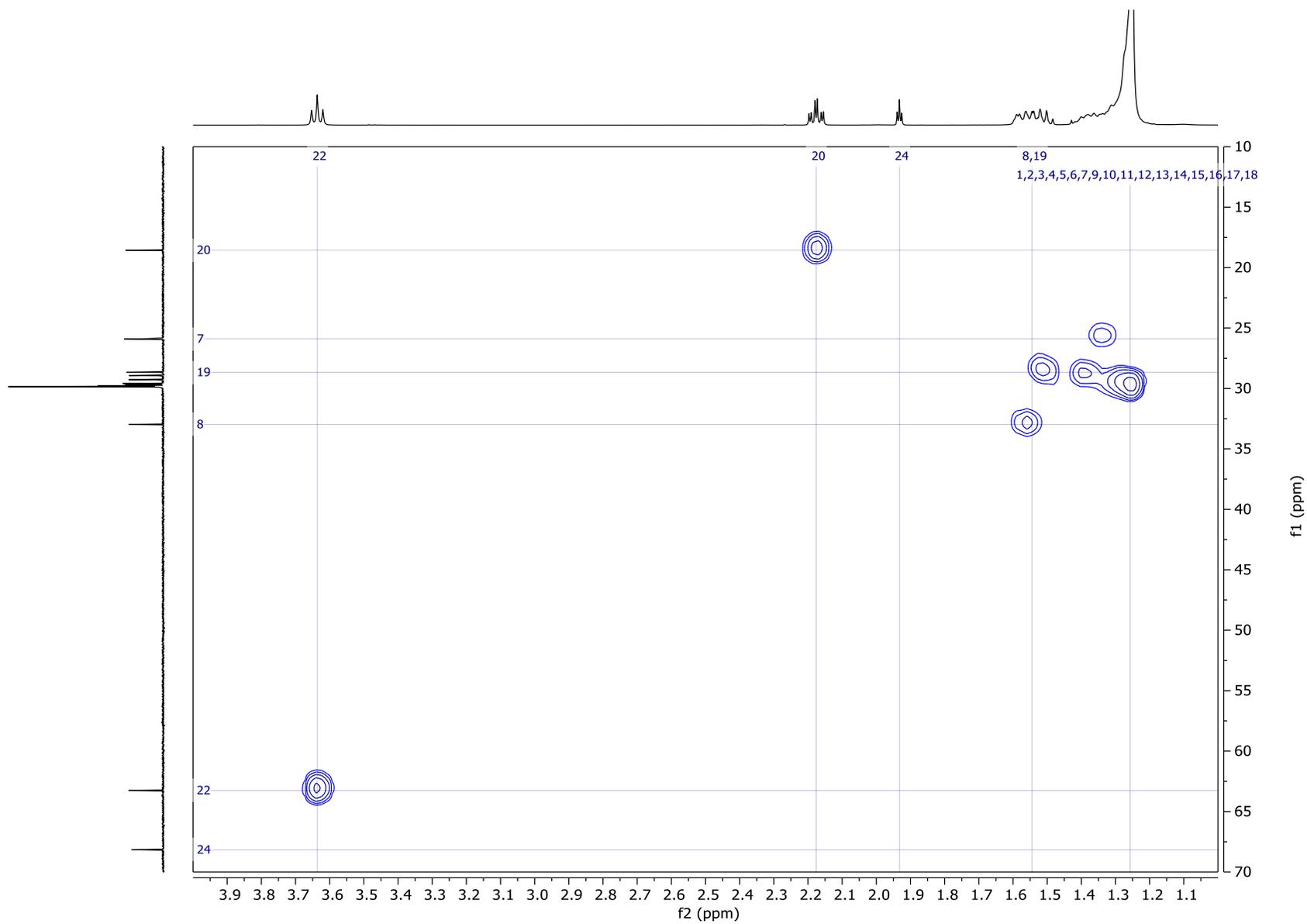


# COSY NMR



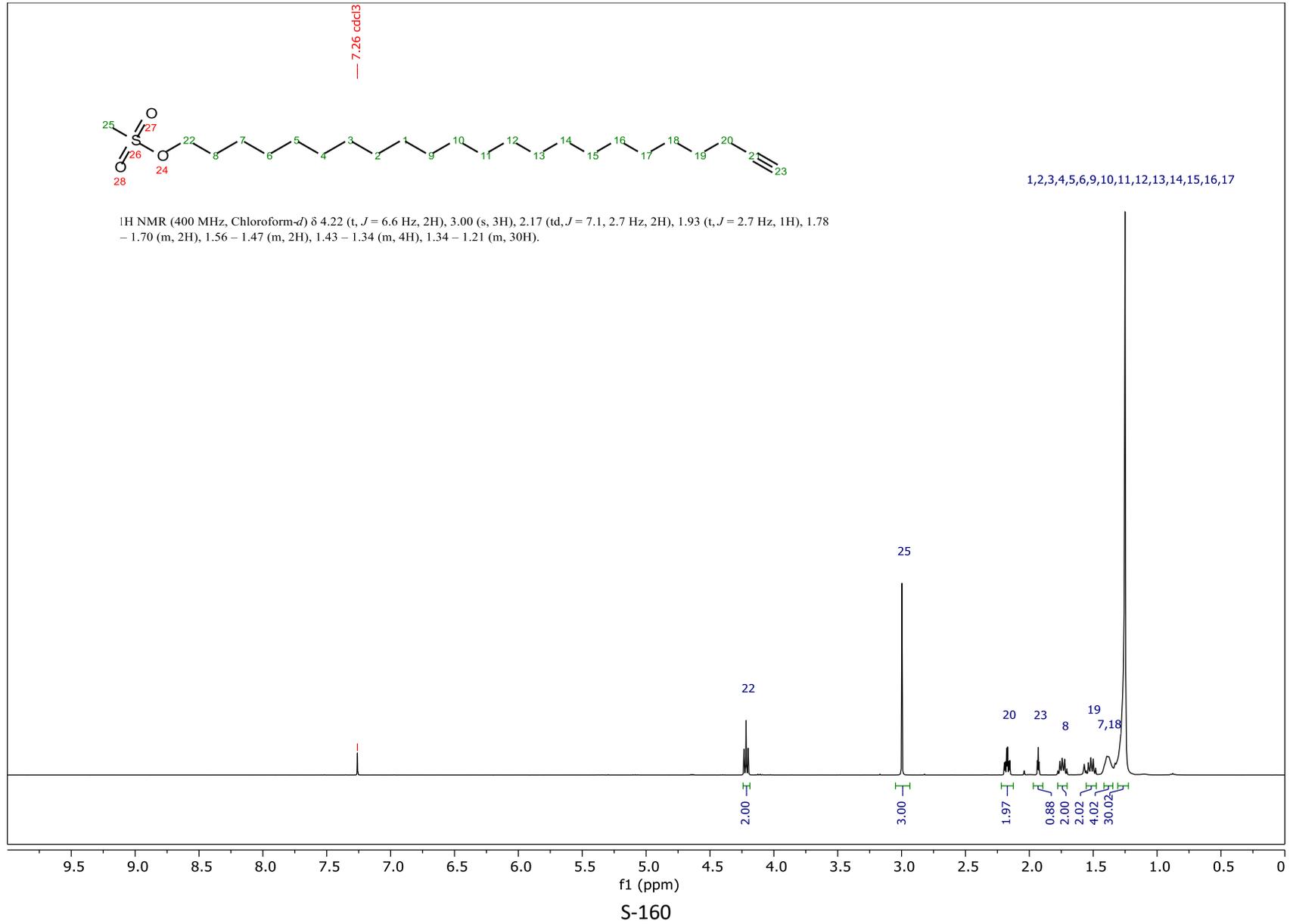
S-158

# HSQC NMR

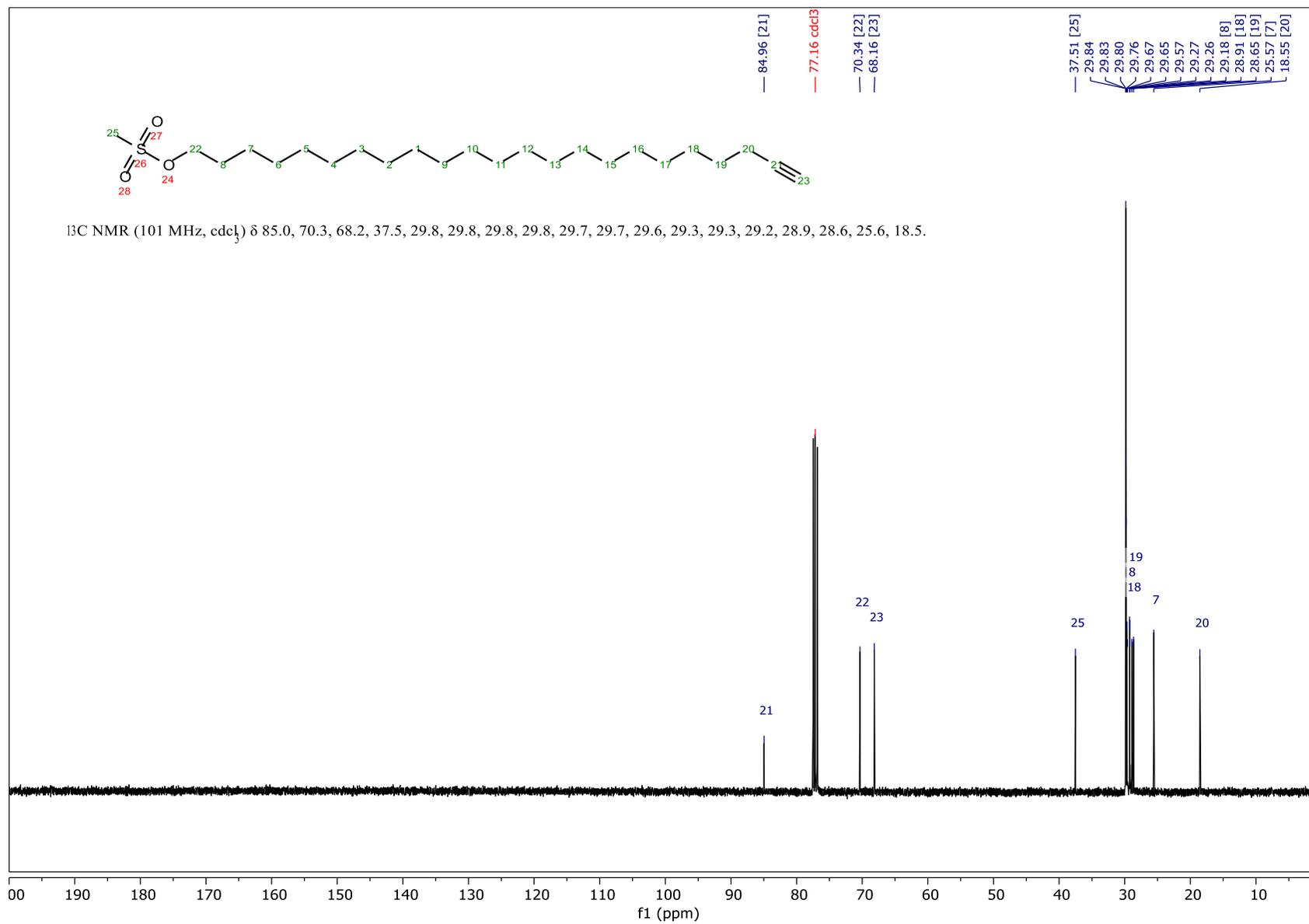


# Compound RBM5-075

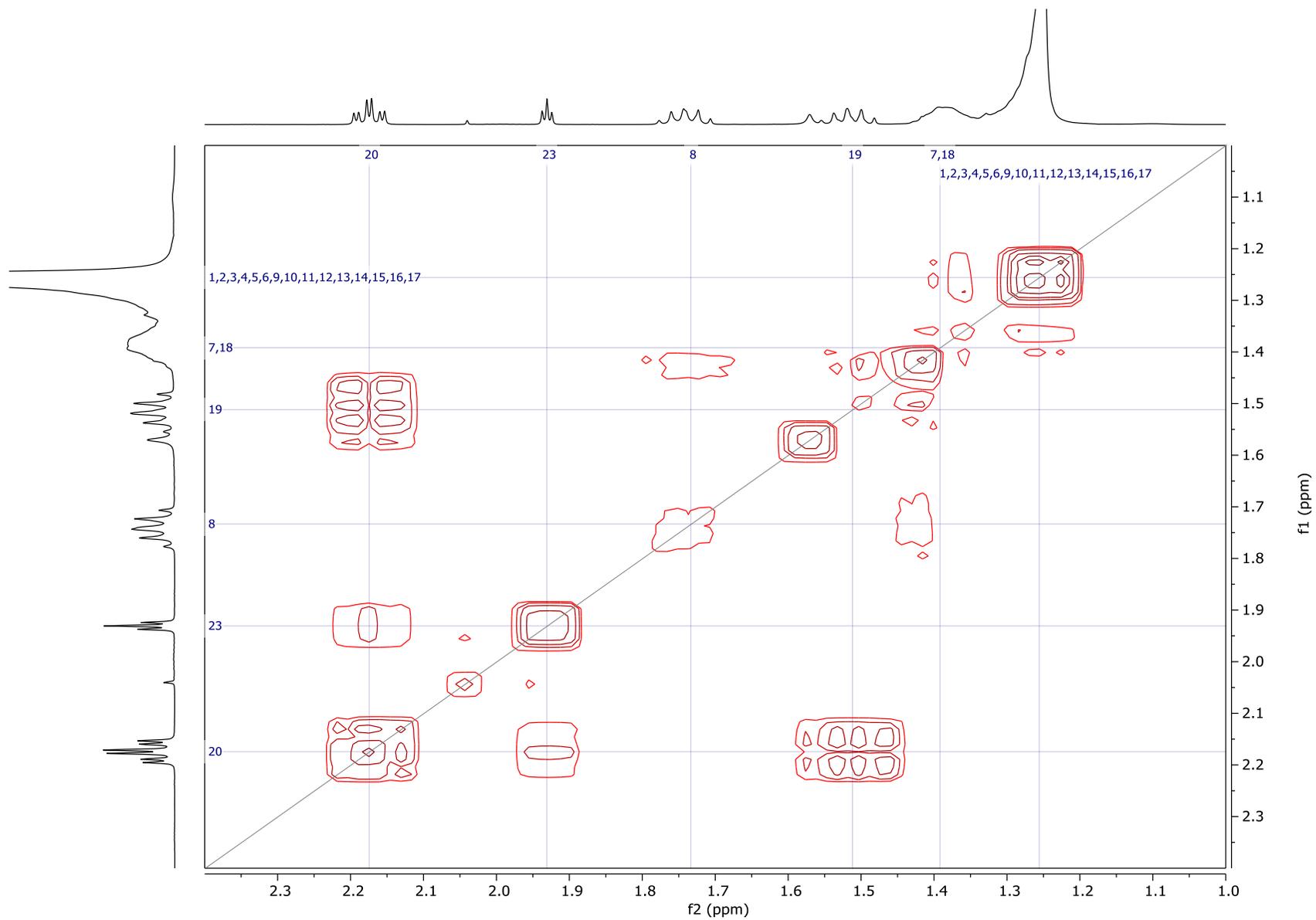
$^1\text{H}$  NMR



<sup>13</sup>C NMR

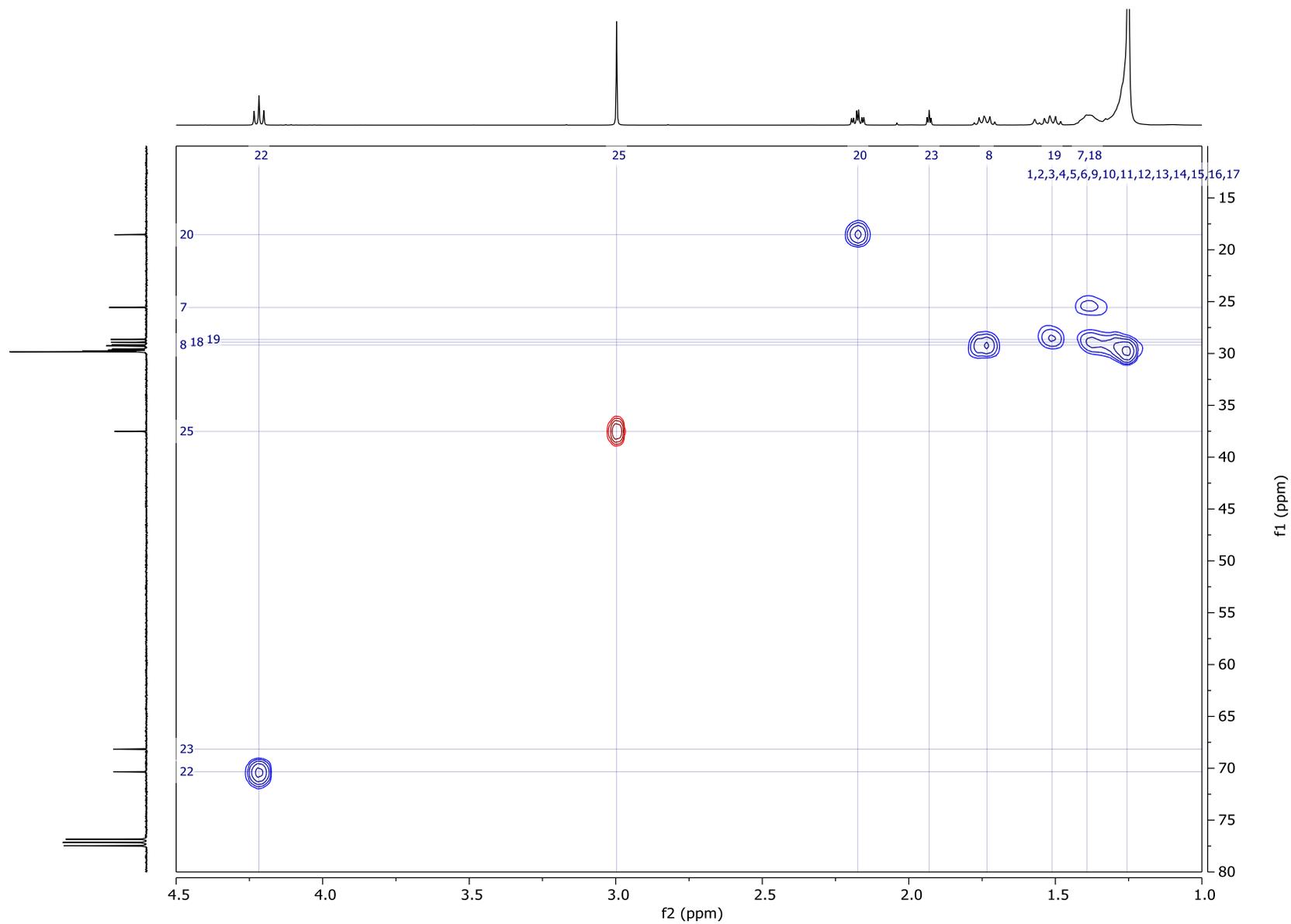


# COSY NMR



S-162

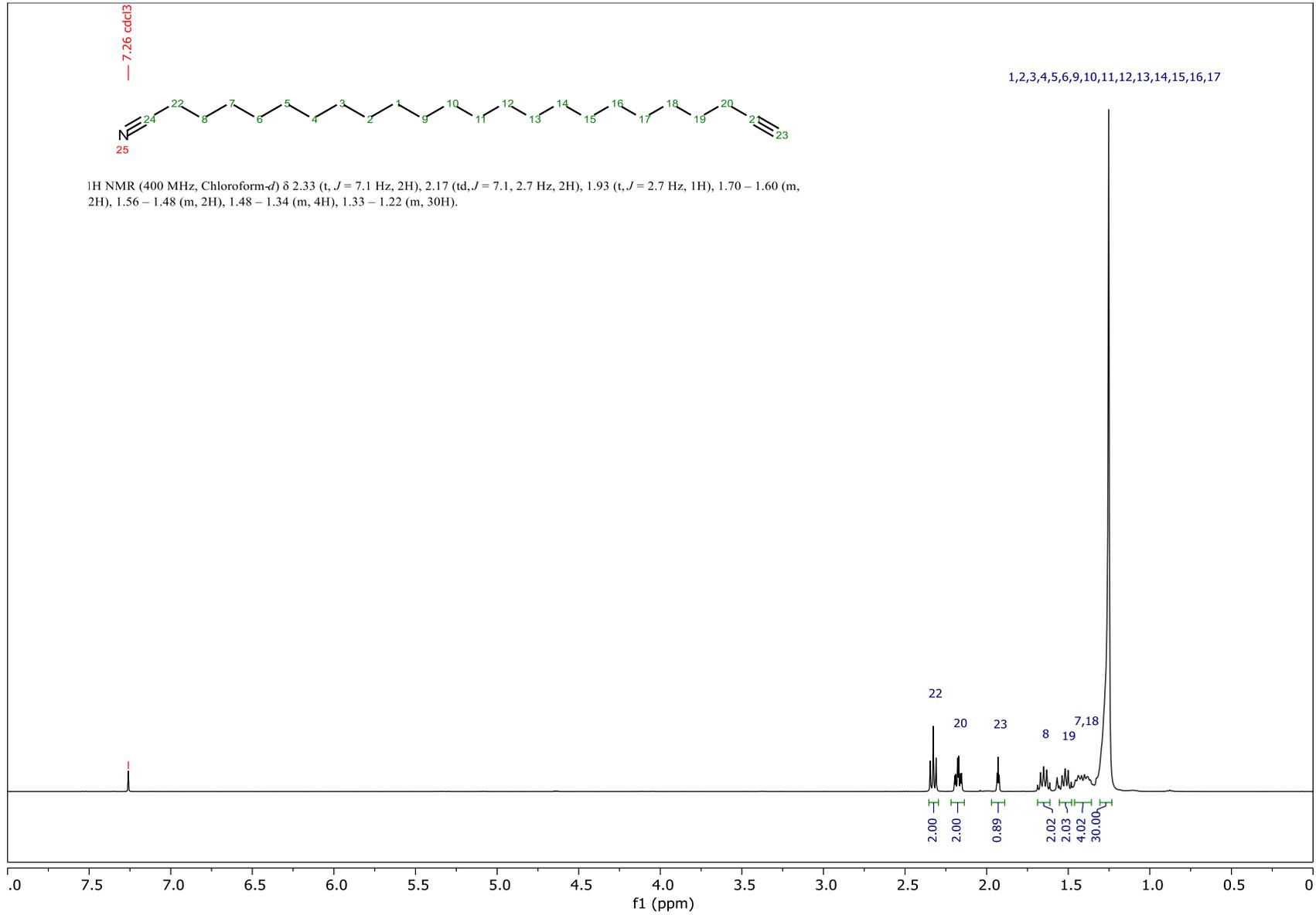
# HSQC NMR



S-163

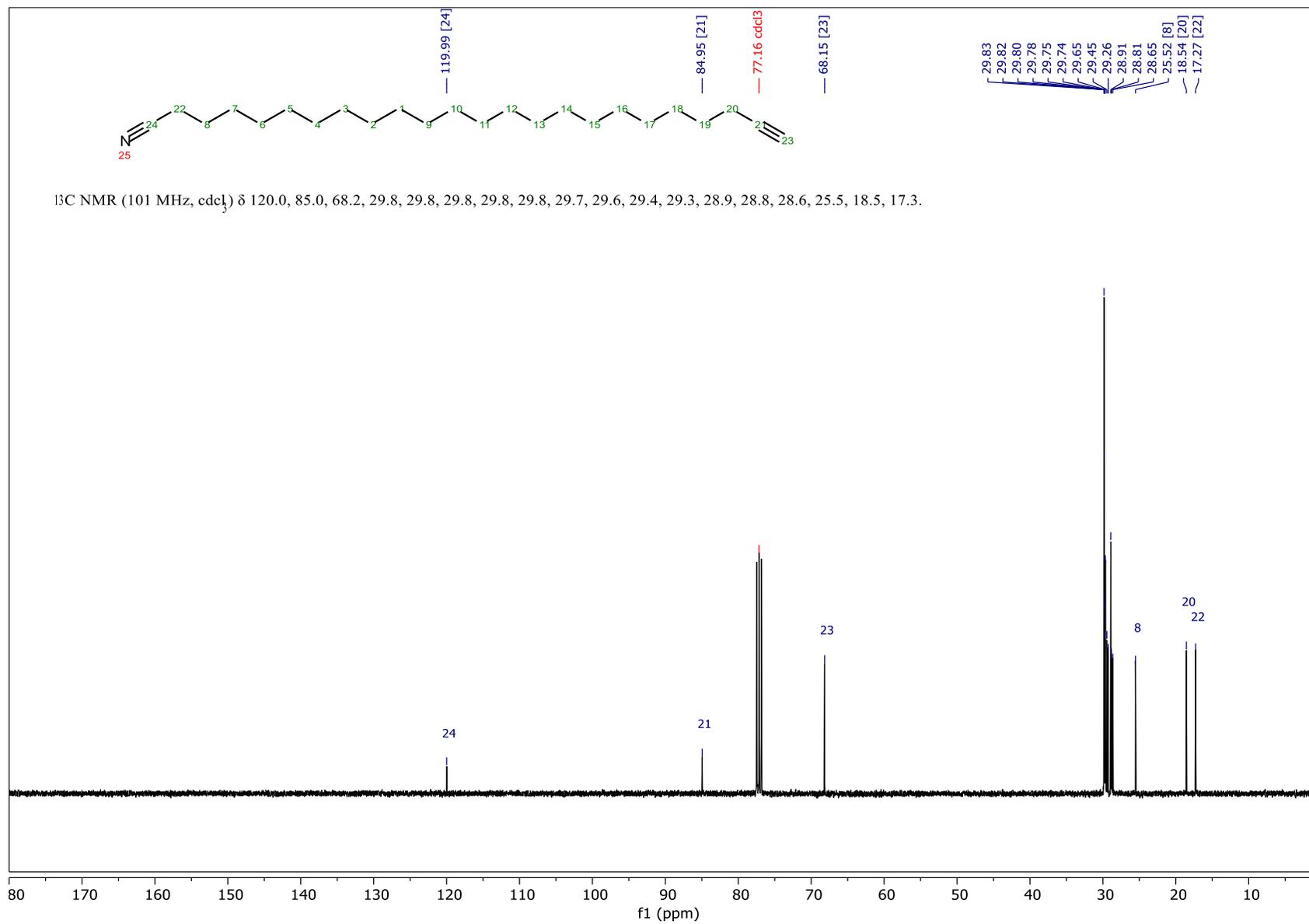
# Compound RBM5-076

$^1\text{H}$  NMR

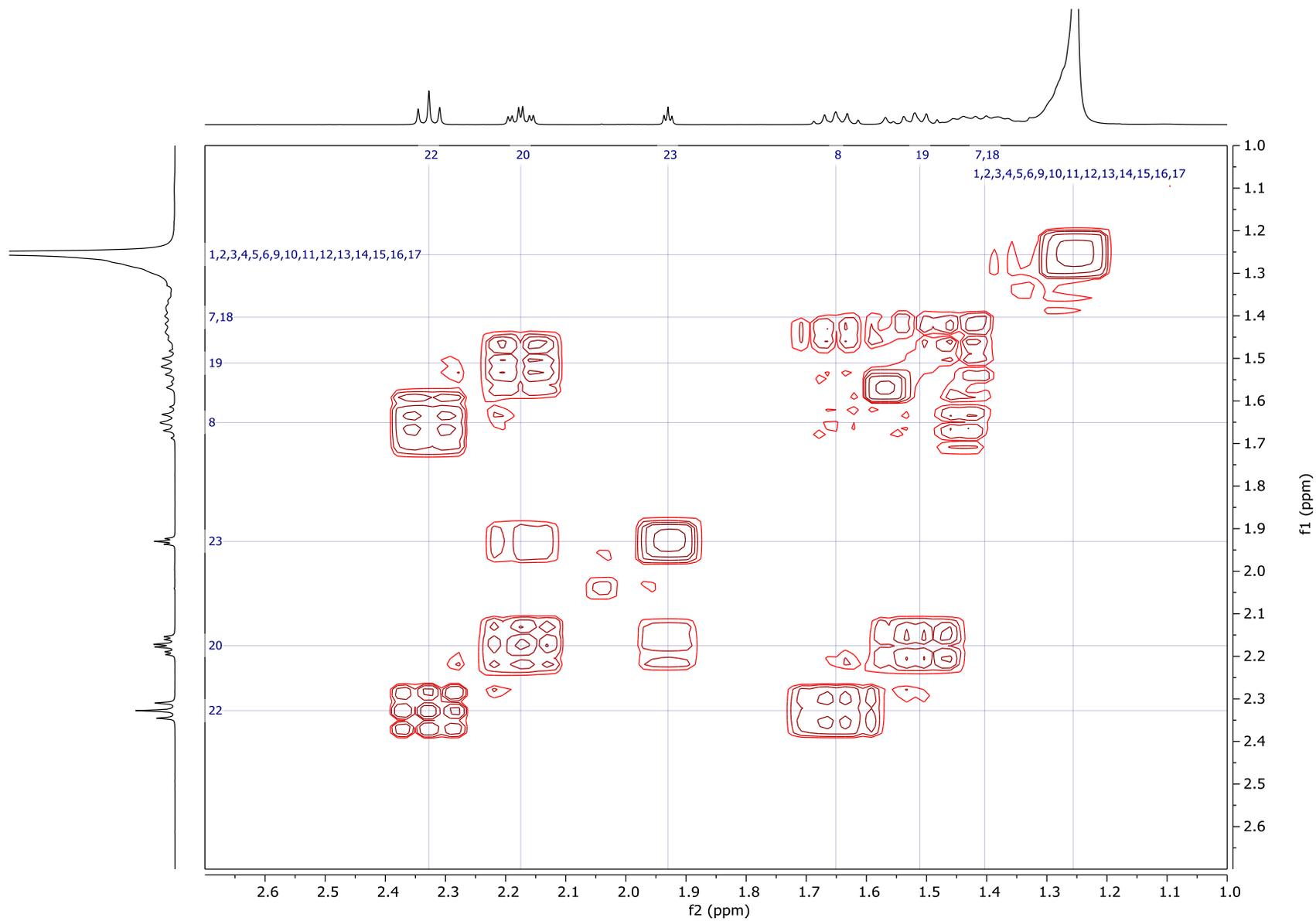


S-164

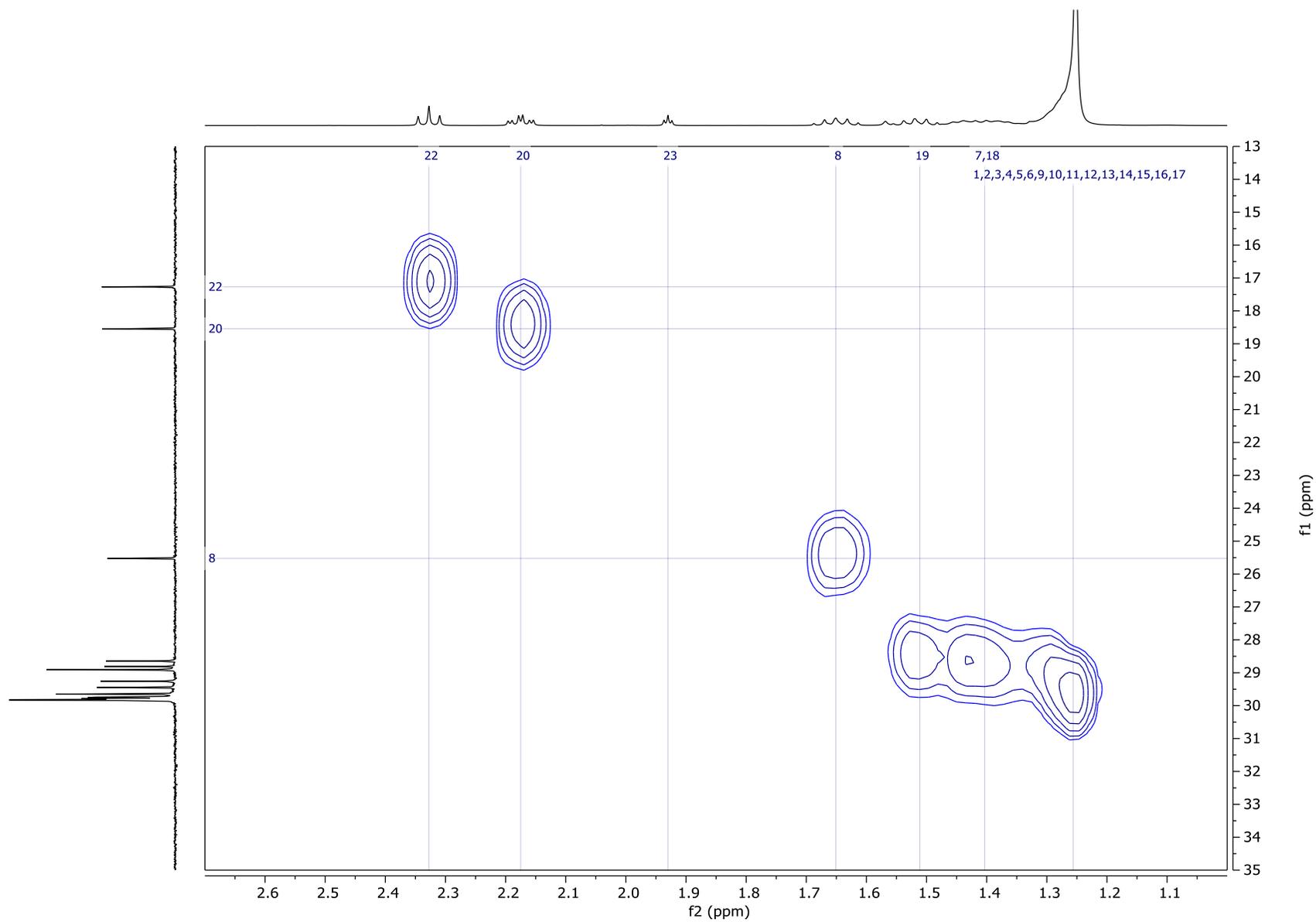
<sup>13</sup>C NMR



# COSY NMR

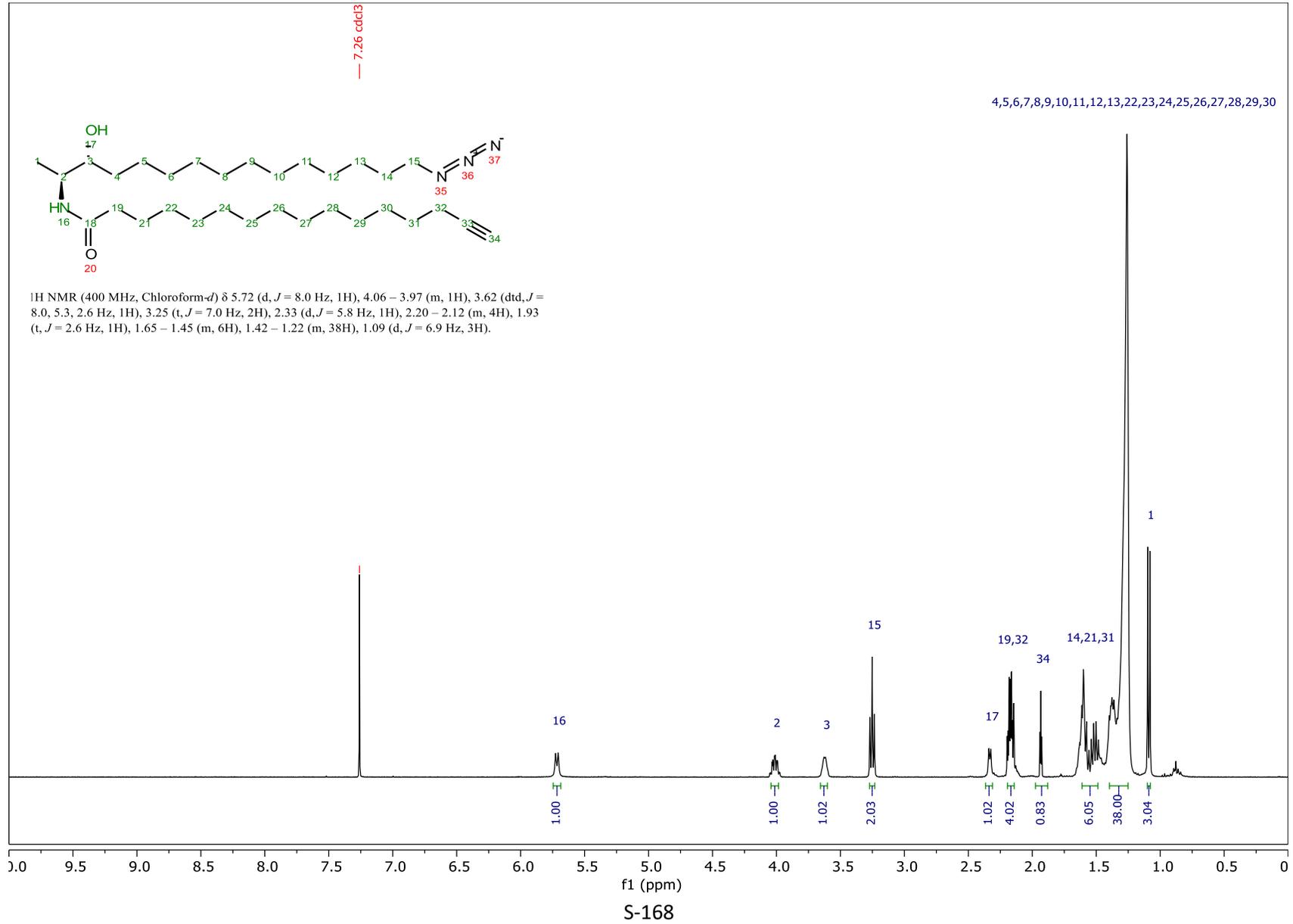


# HSQC NMR

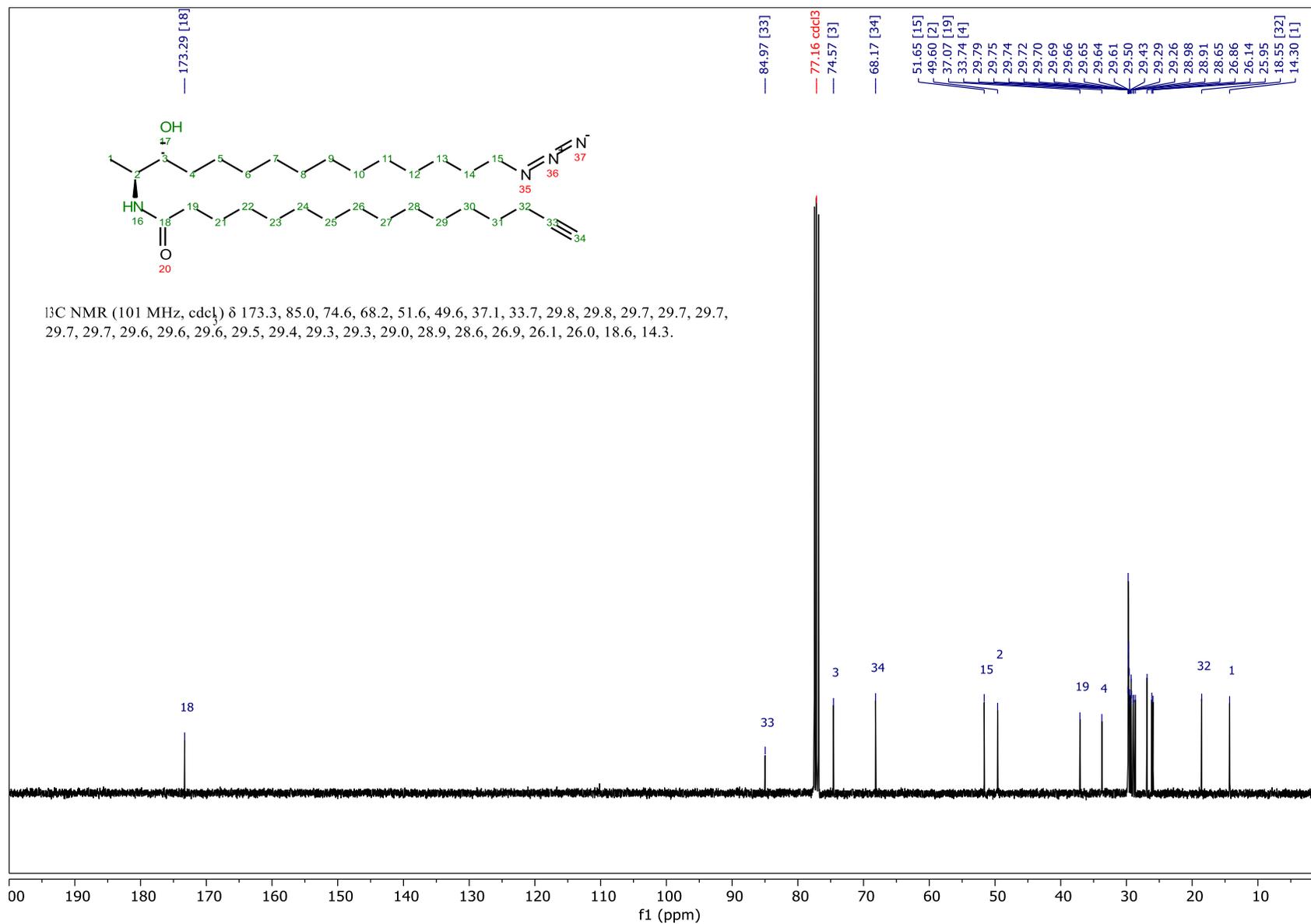


# Compound RBM5-077

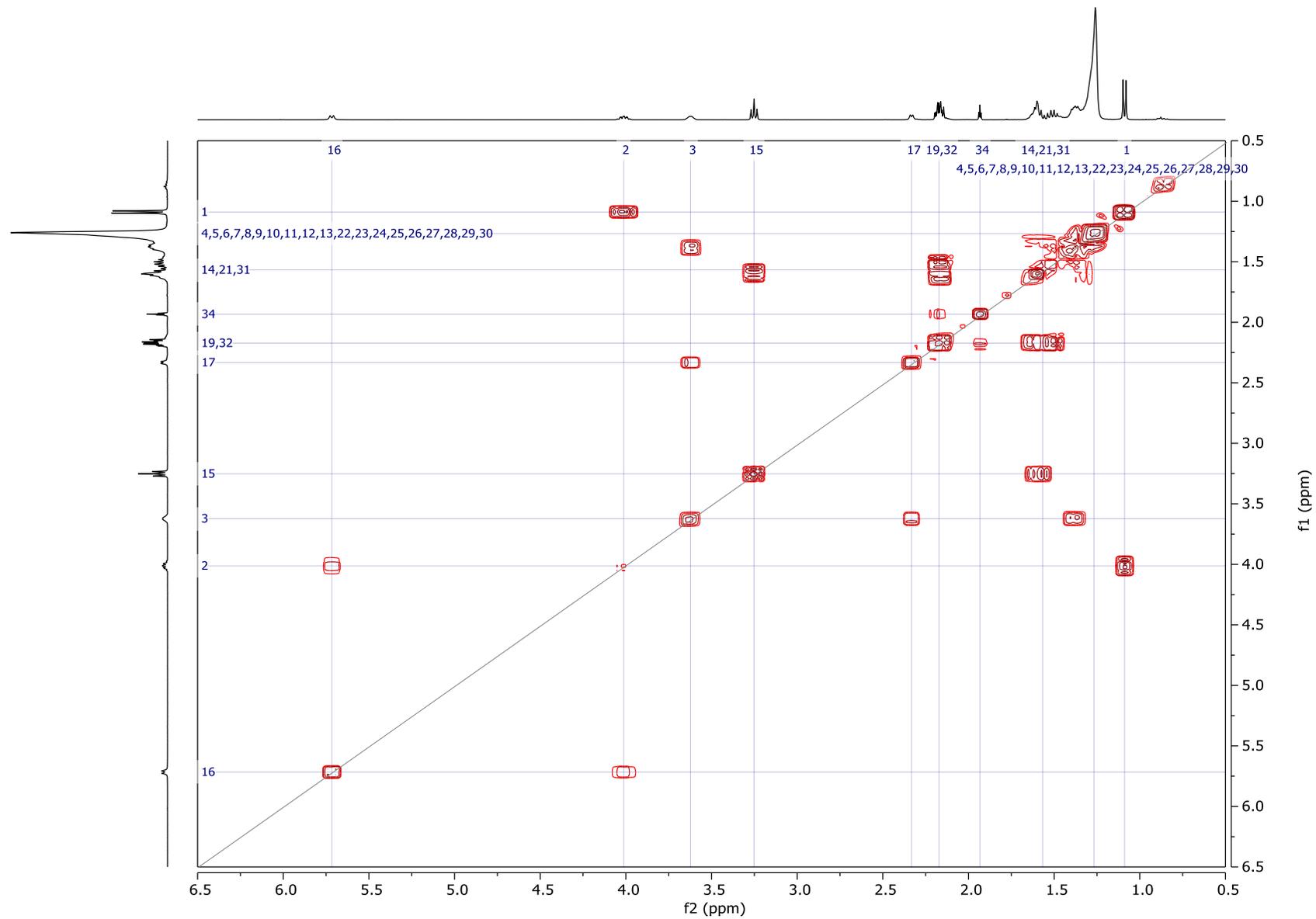
$^1\text{H}$  NMR



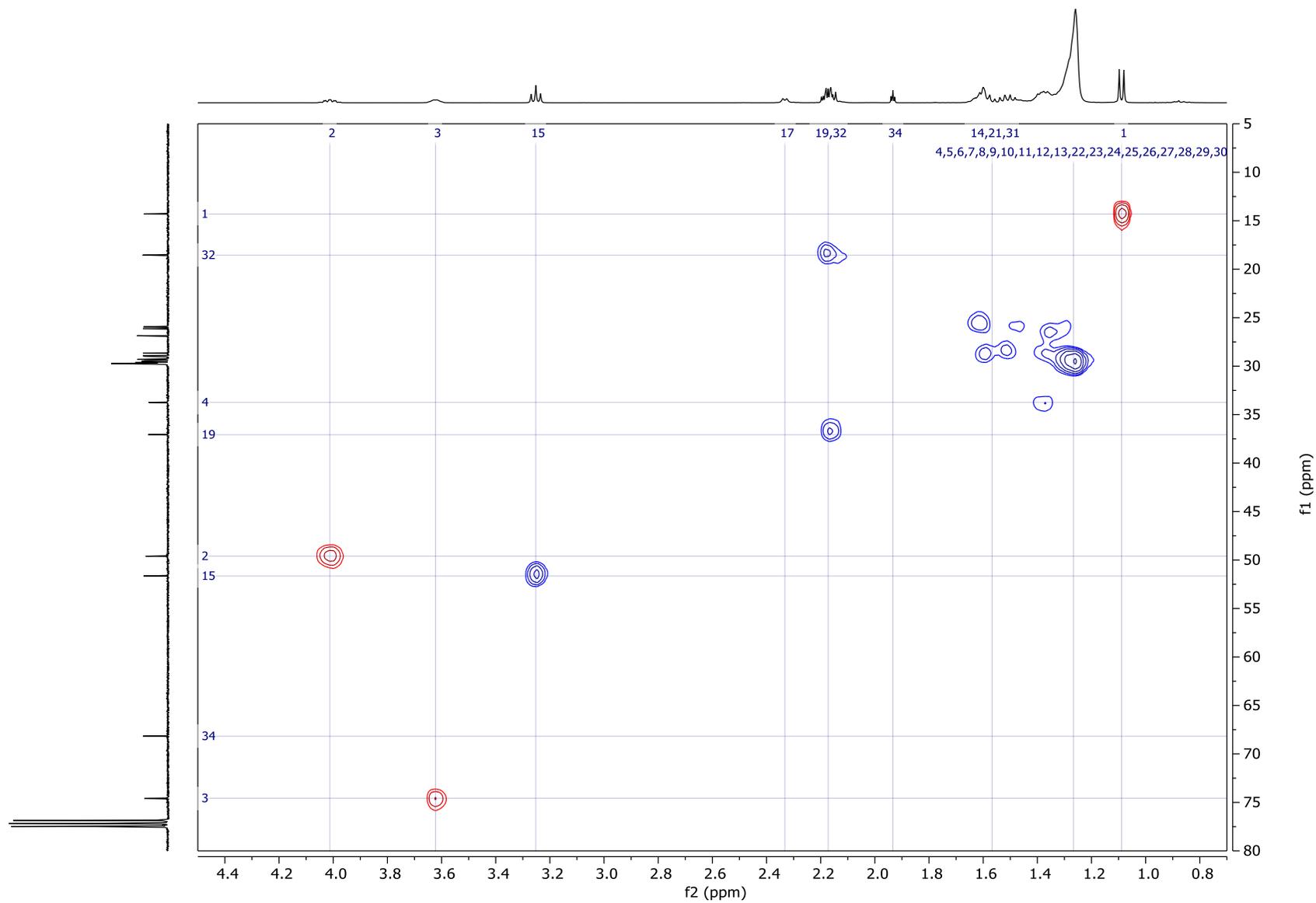
# <sup>13</sup>C NMR



# COSY NMR

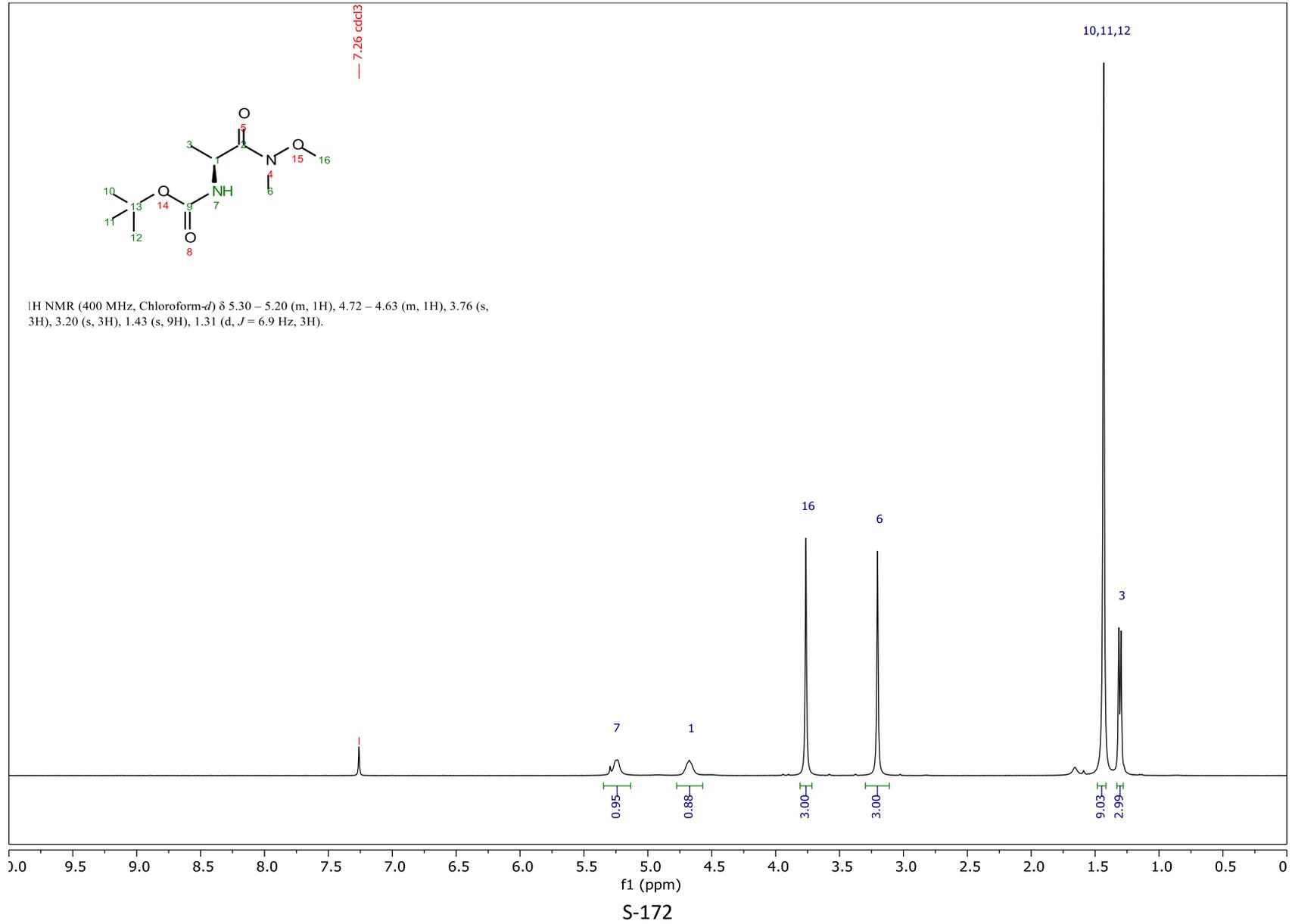


# HSQC NMR

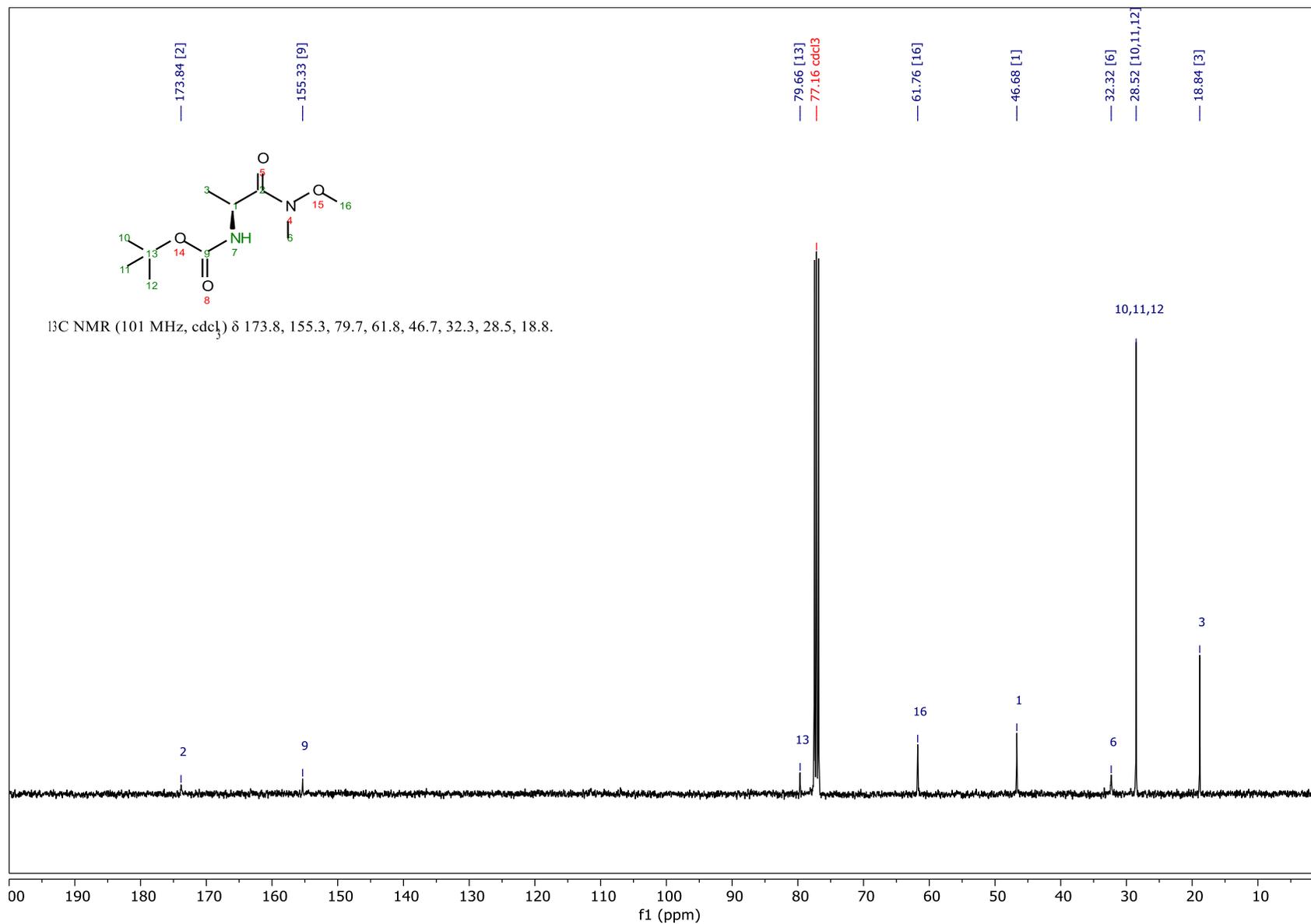


# Compound RBM5-080

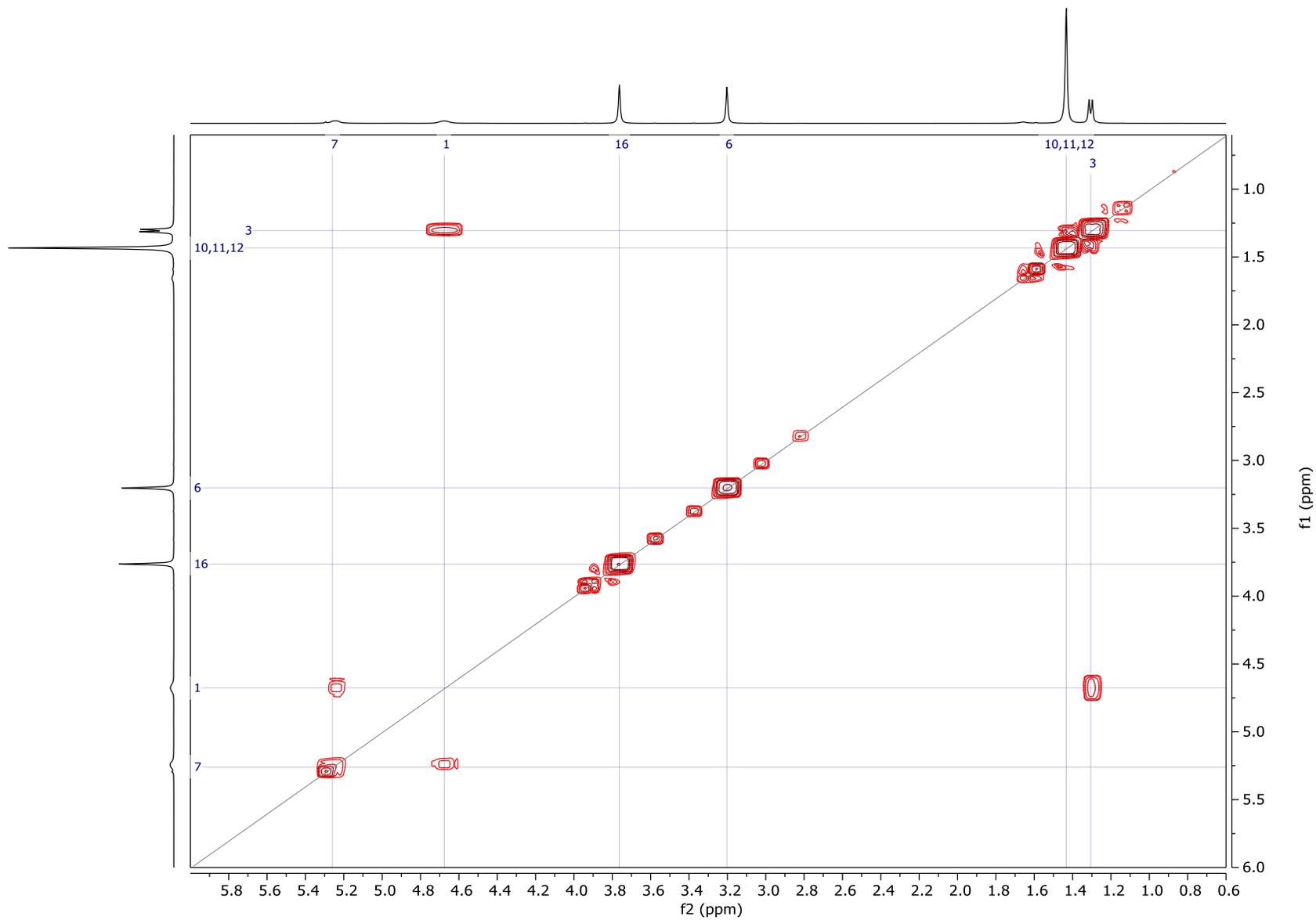
<sup>1</sup>H NMR



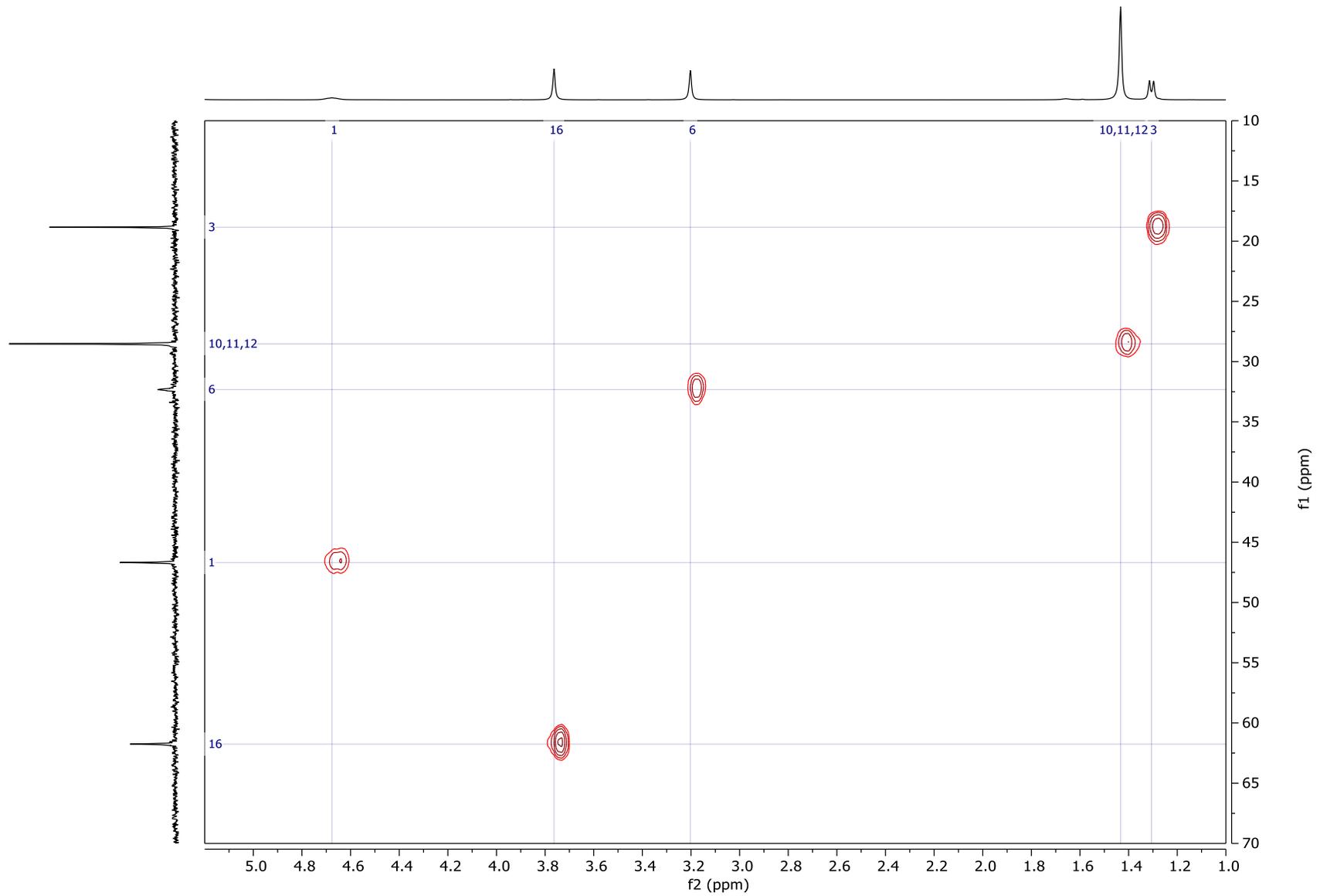
<sup>13</sup>C NMR



# COSY NMR



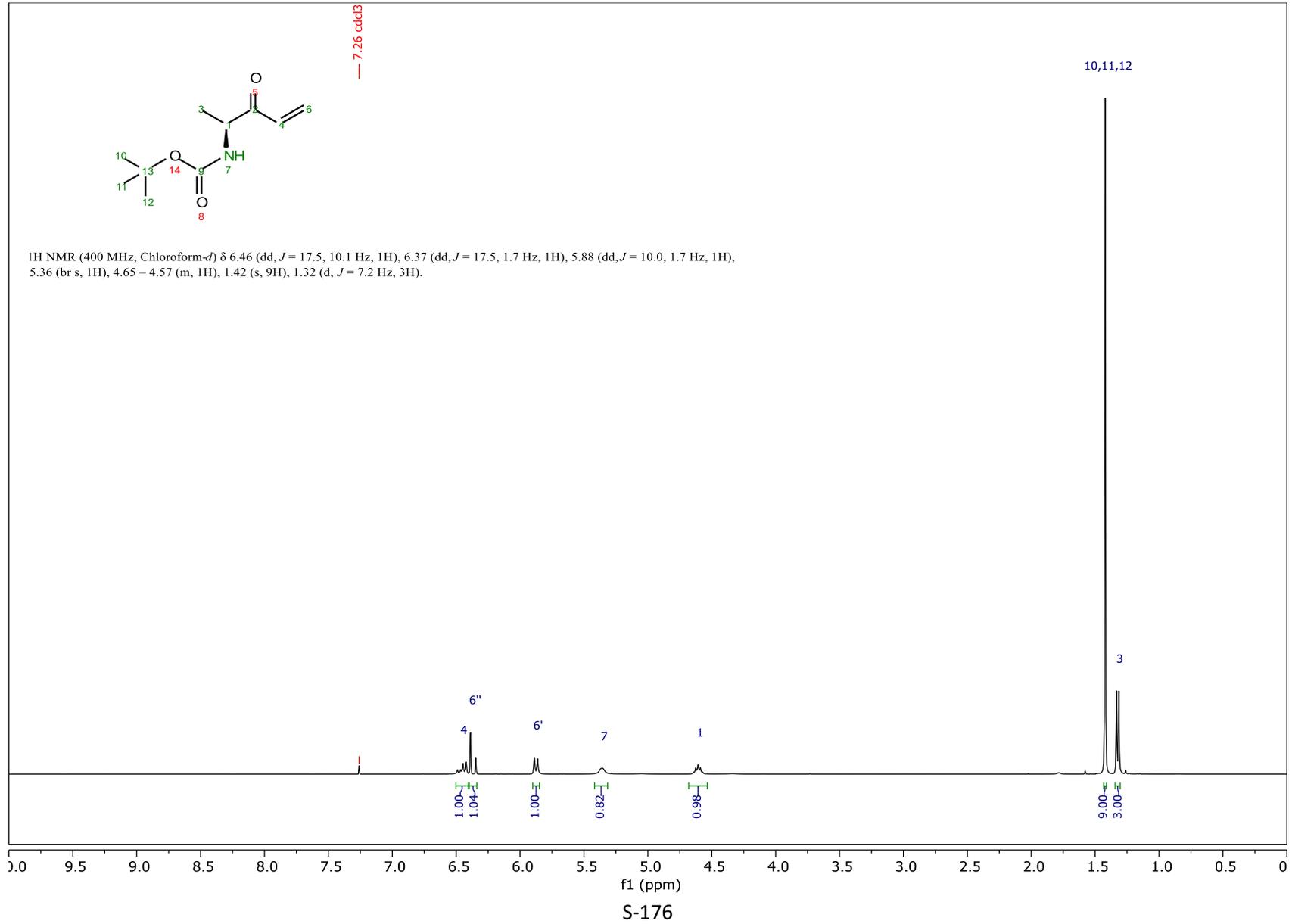
# HSQC NMR



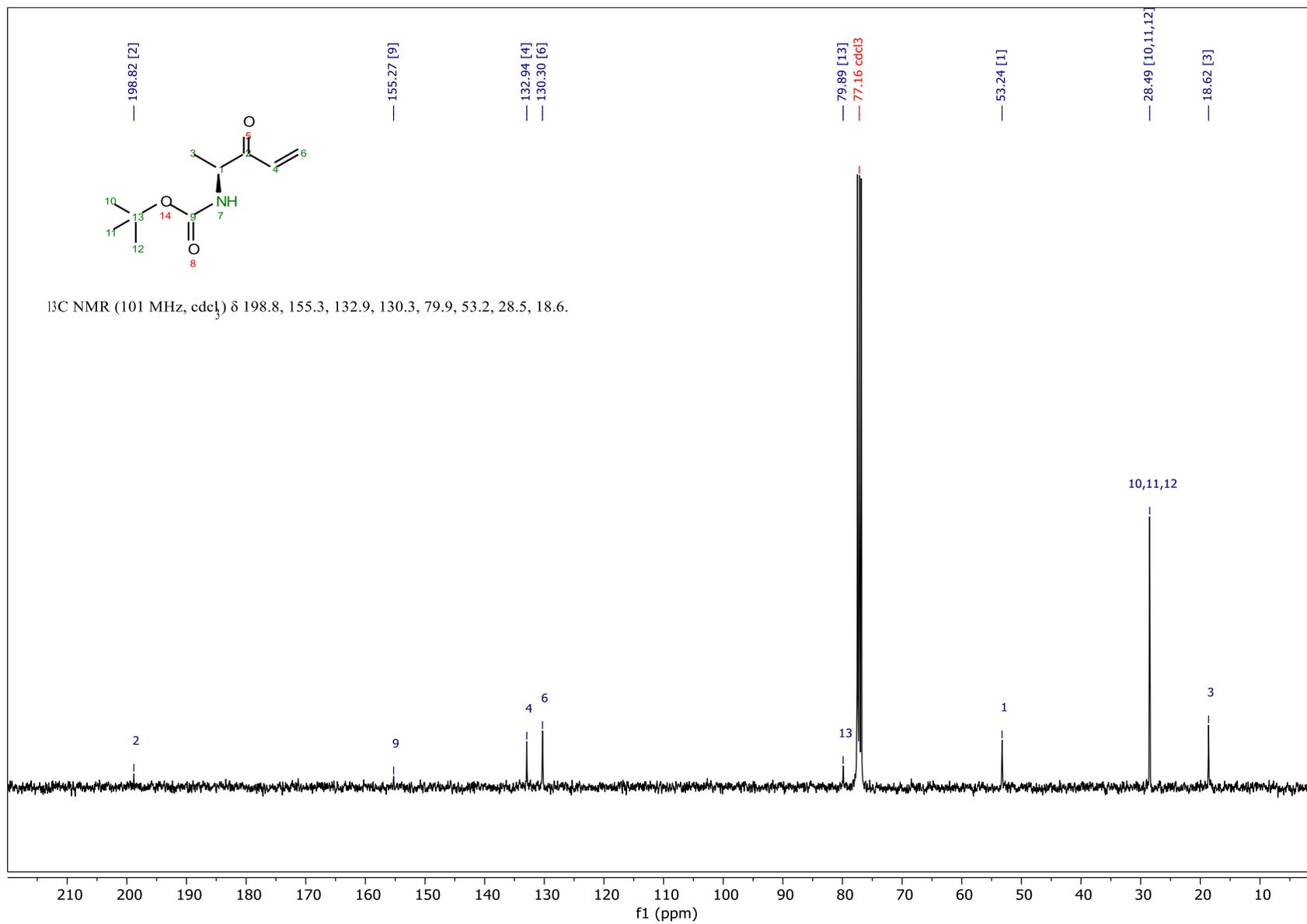
S-175

# Compound RBM5-082

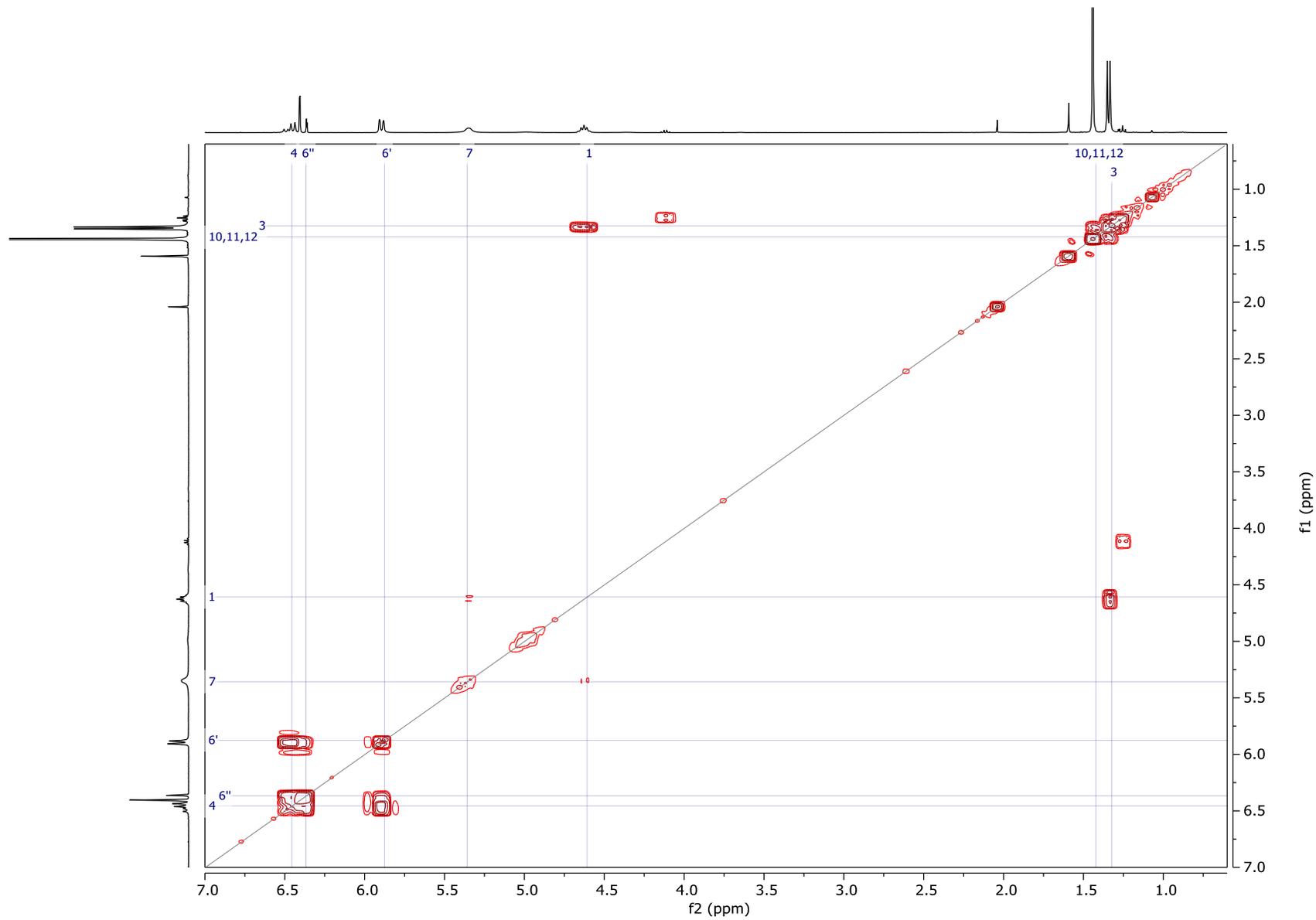
<sup>1</sup>H NMR



# $^{13}\text{C}$ NMR

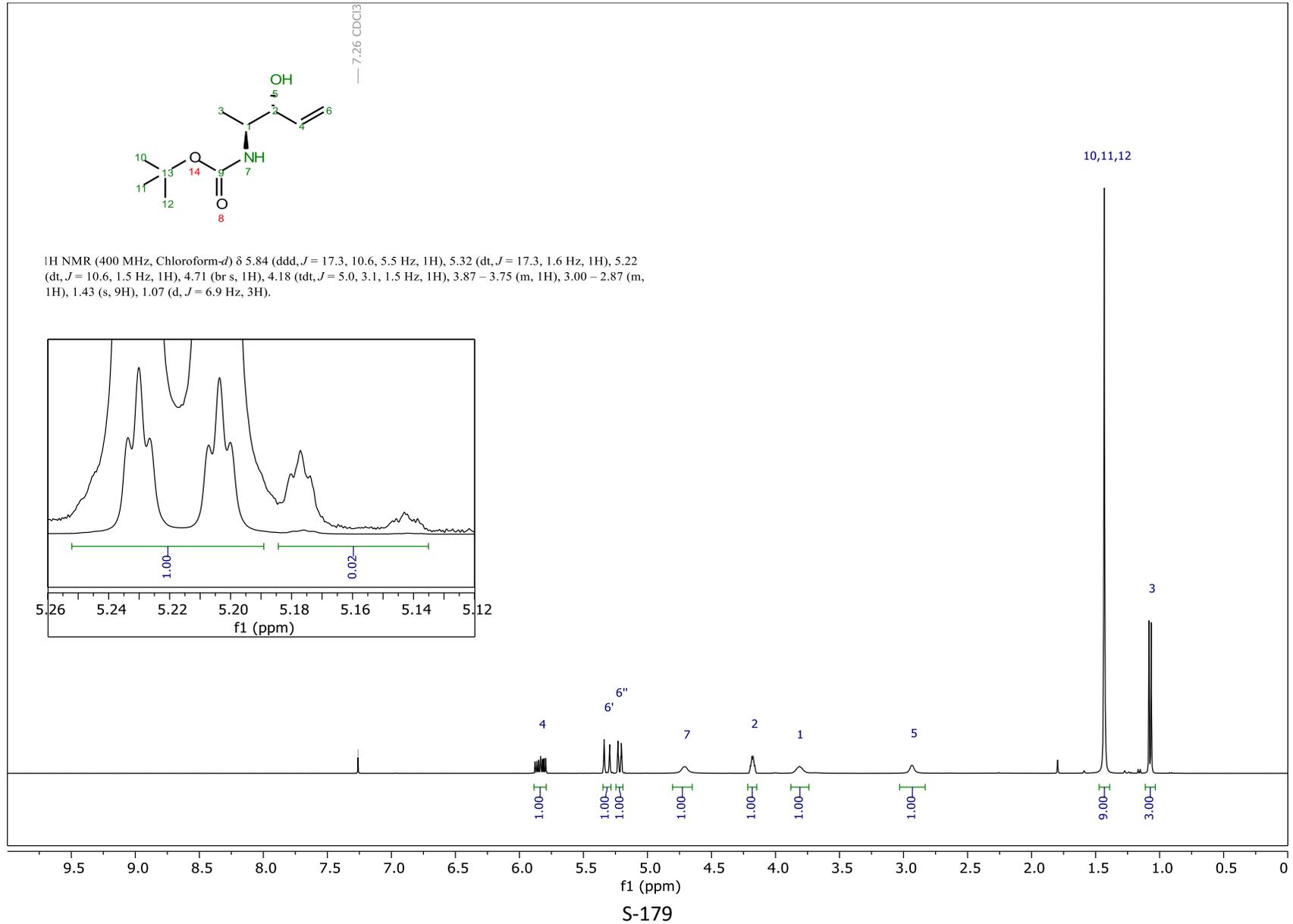


COSY NMR

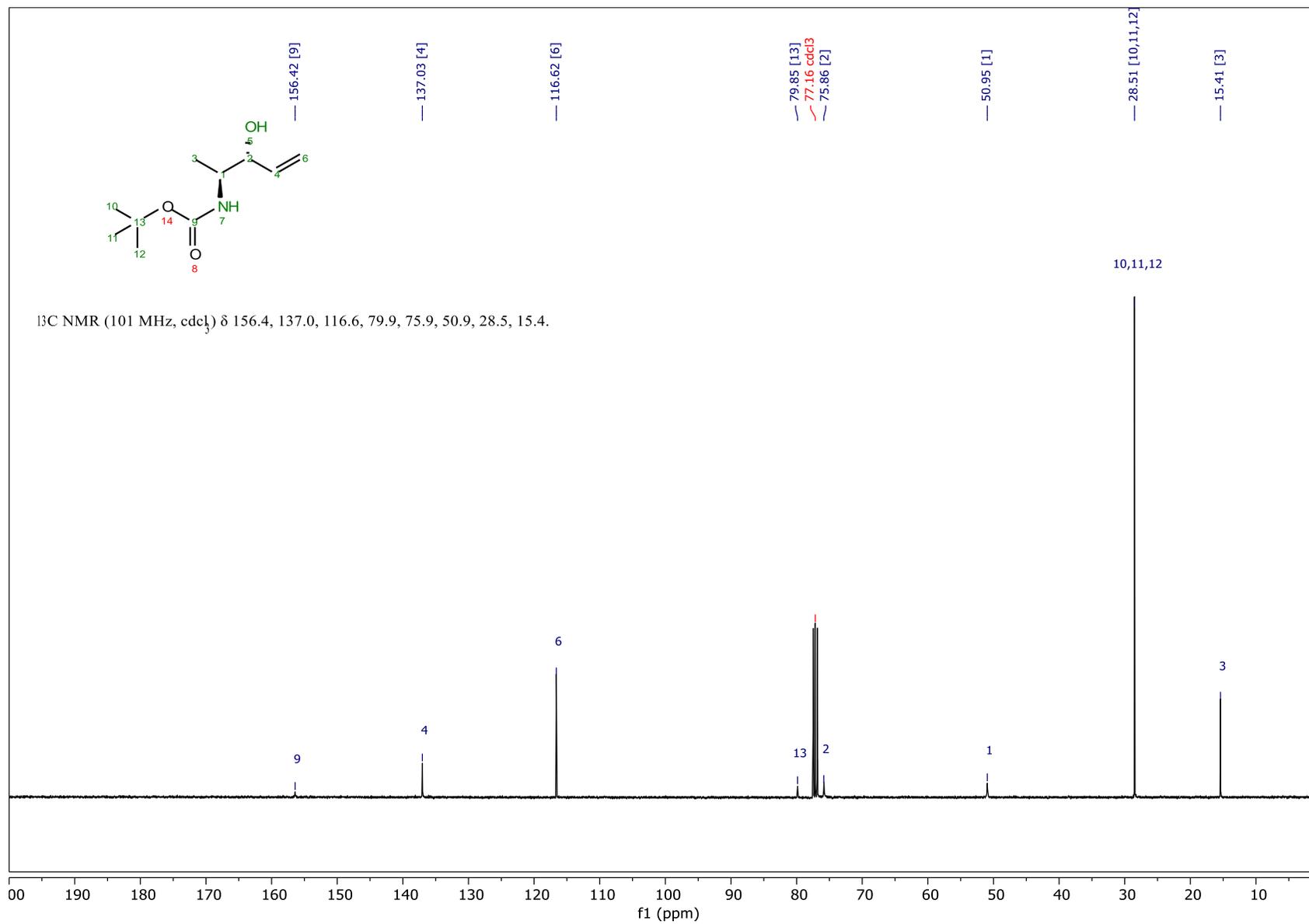


# Compound RBM5-084

$^1\text{H}$  NMR

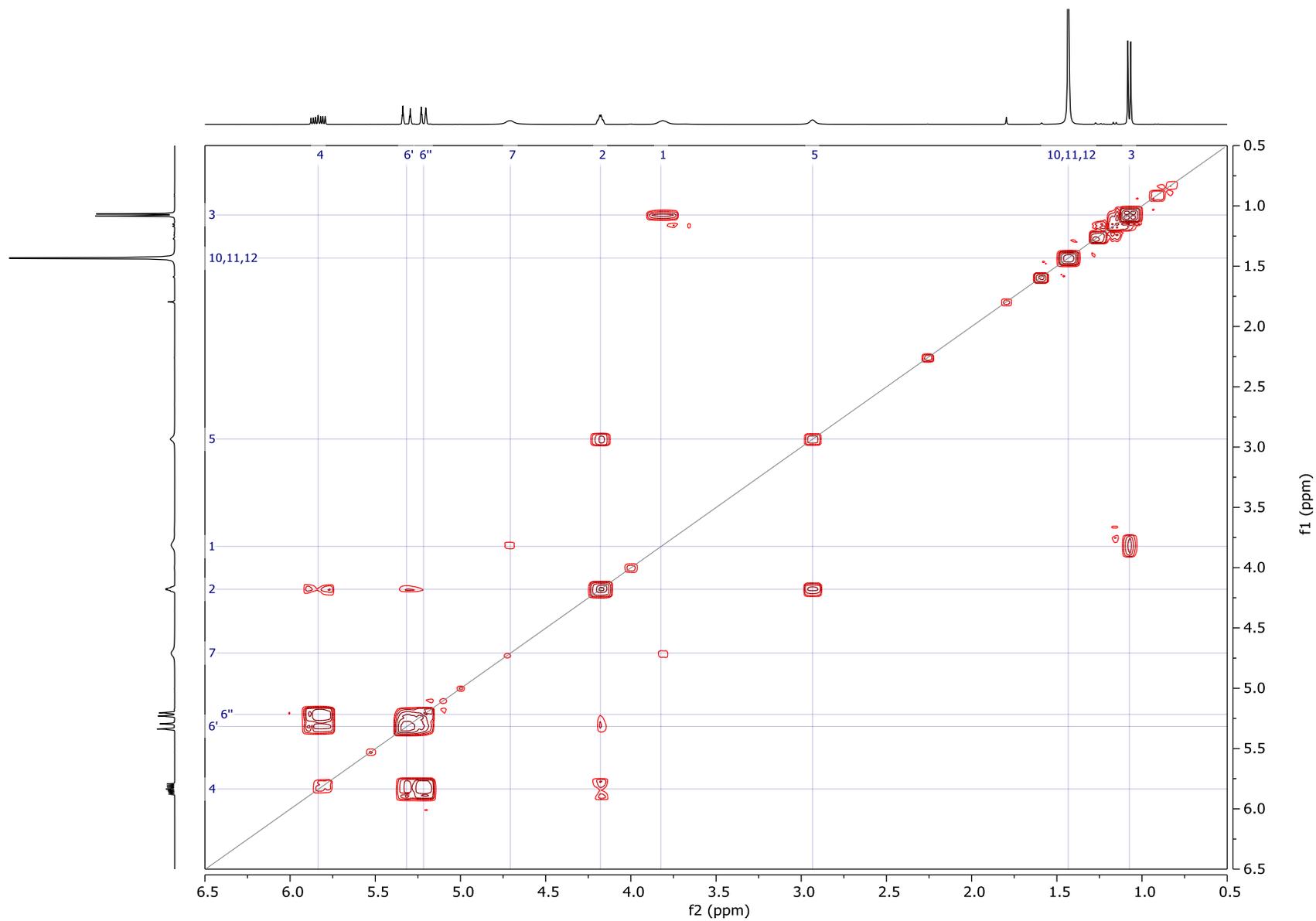


<sup>13</sup>C NMR



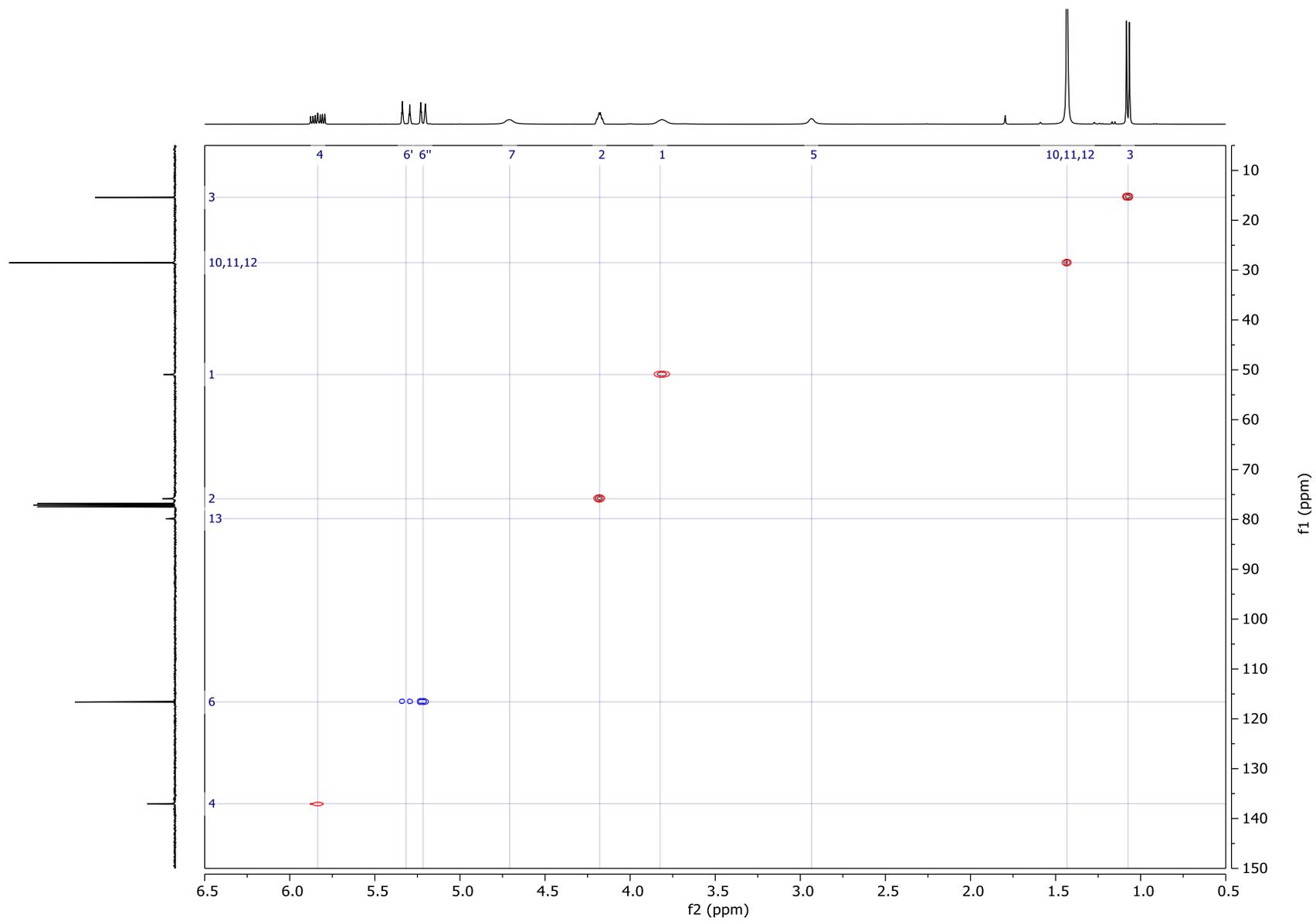
<sup>13</sup>C NMR (101 MHz, cdcl<sub>3</sub>) δ 156.4, 137.0, 116.6, 79.9, 75.9, 50.9, 28.5, 15.4.

COSY NMR



S-181

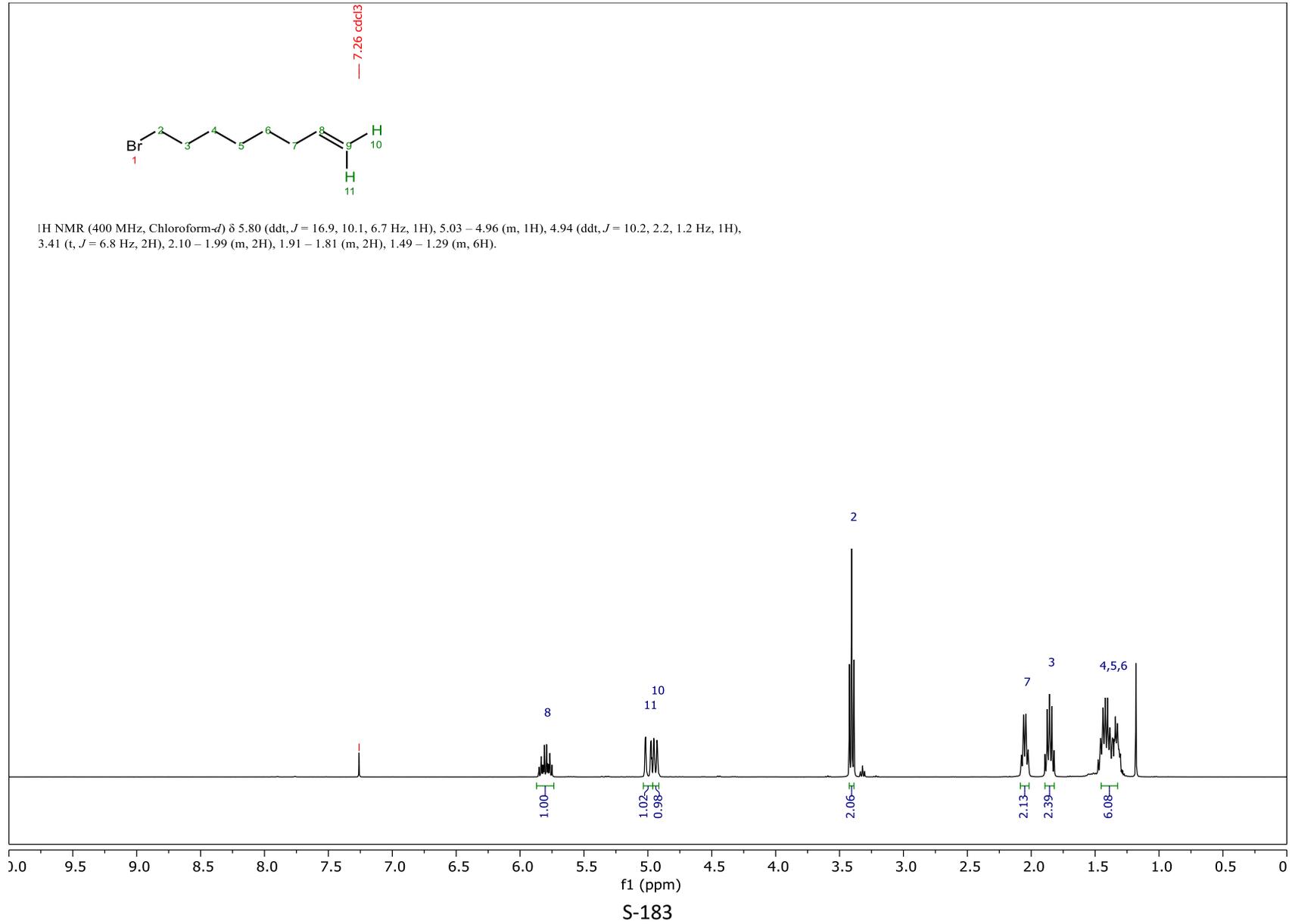
# HSQC NMR



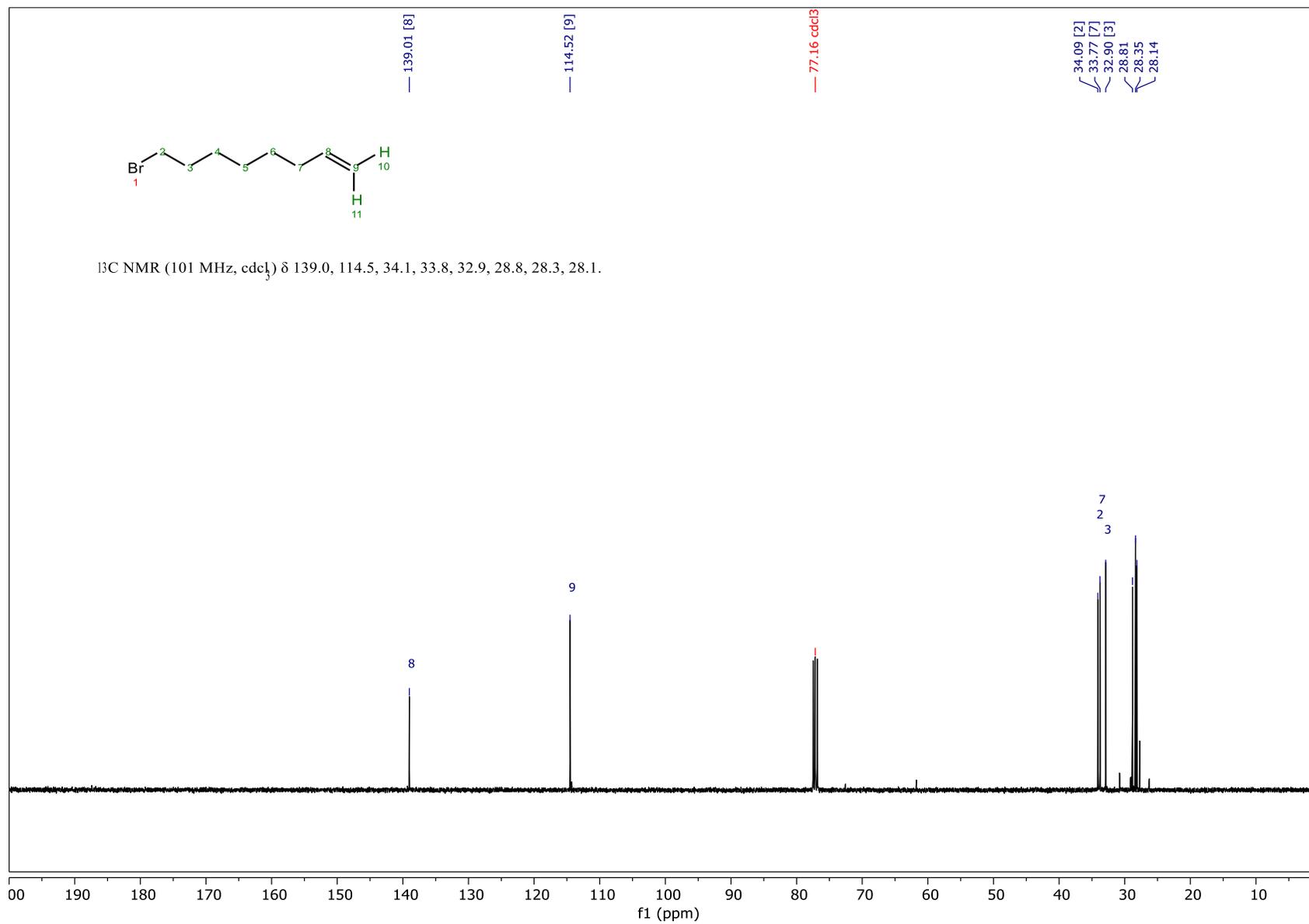
S-182

# Compound RBM5-092

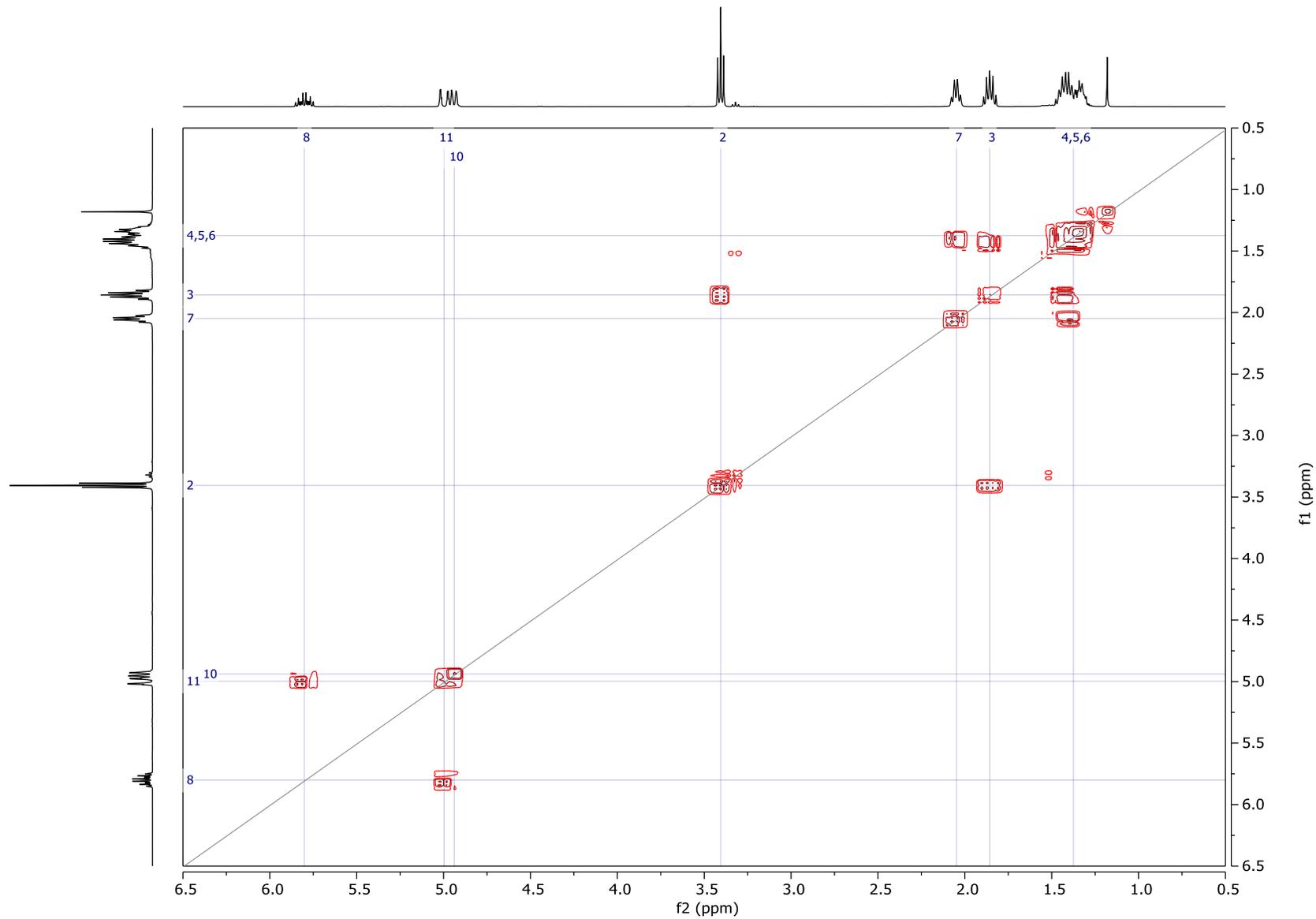
$^1\text{H}$  NMR



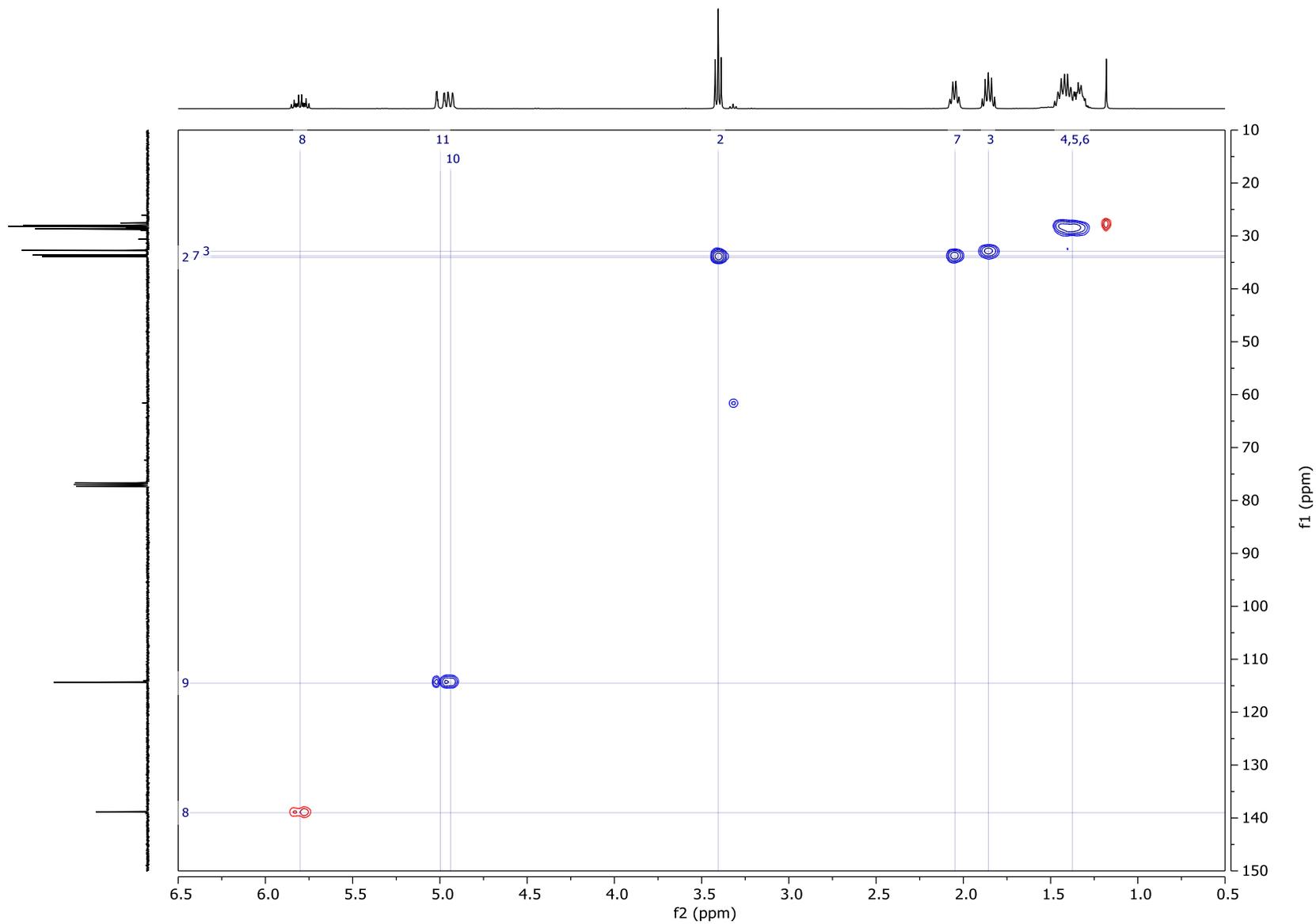
<sup>13</sup>C NMR



COSY NMR



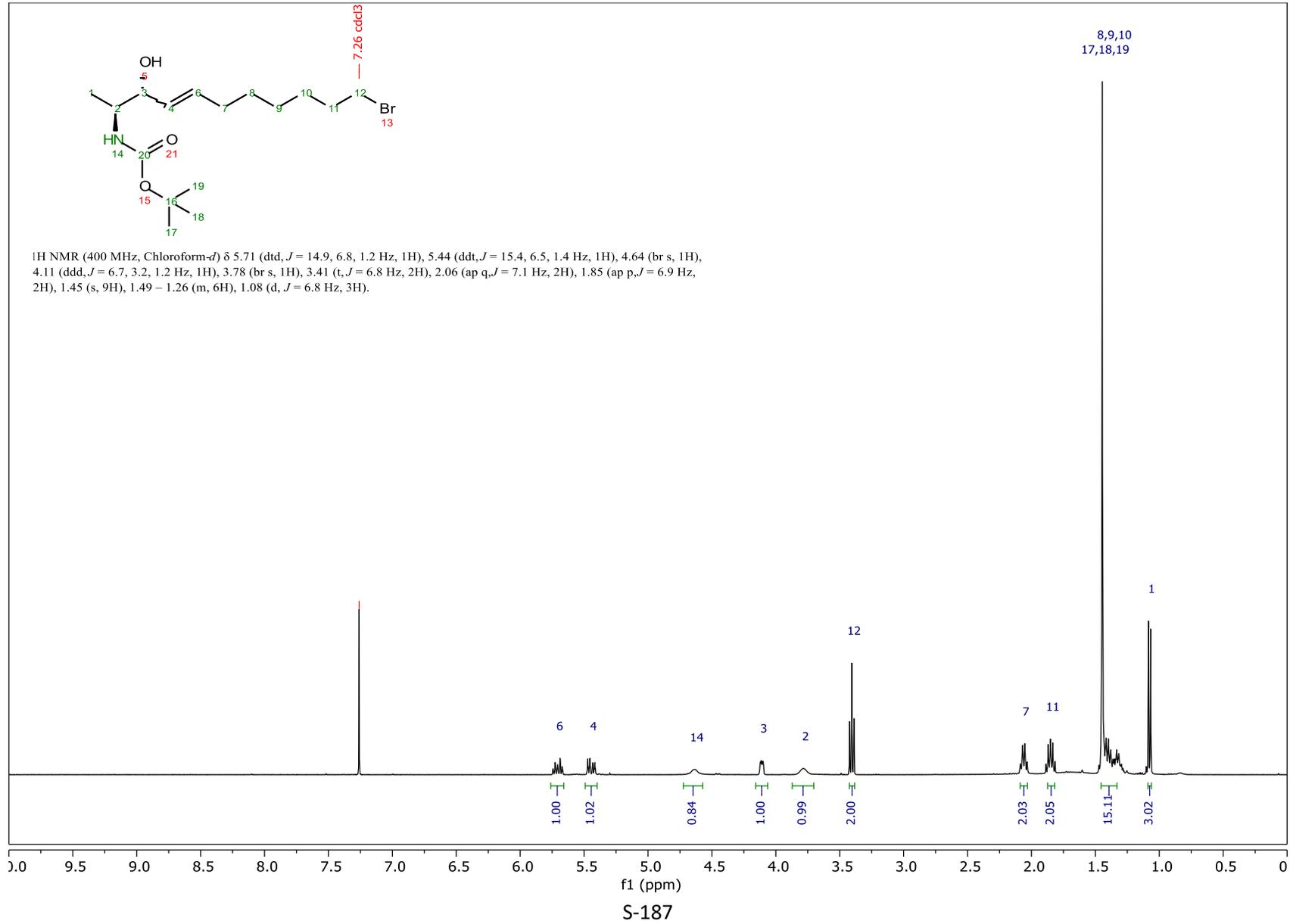
# HSQC NMR



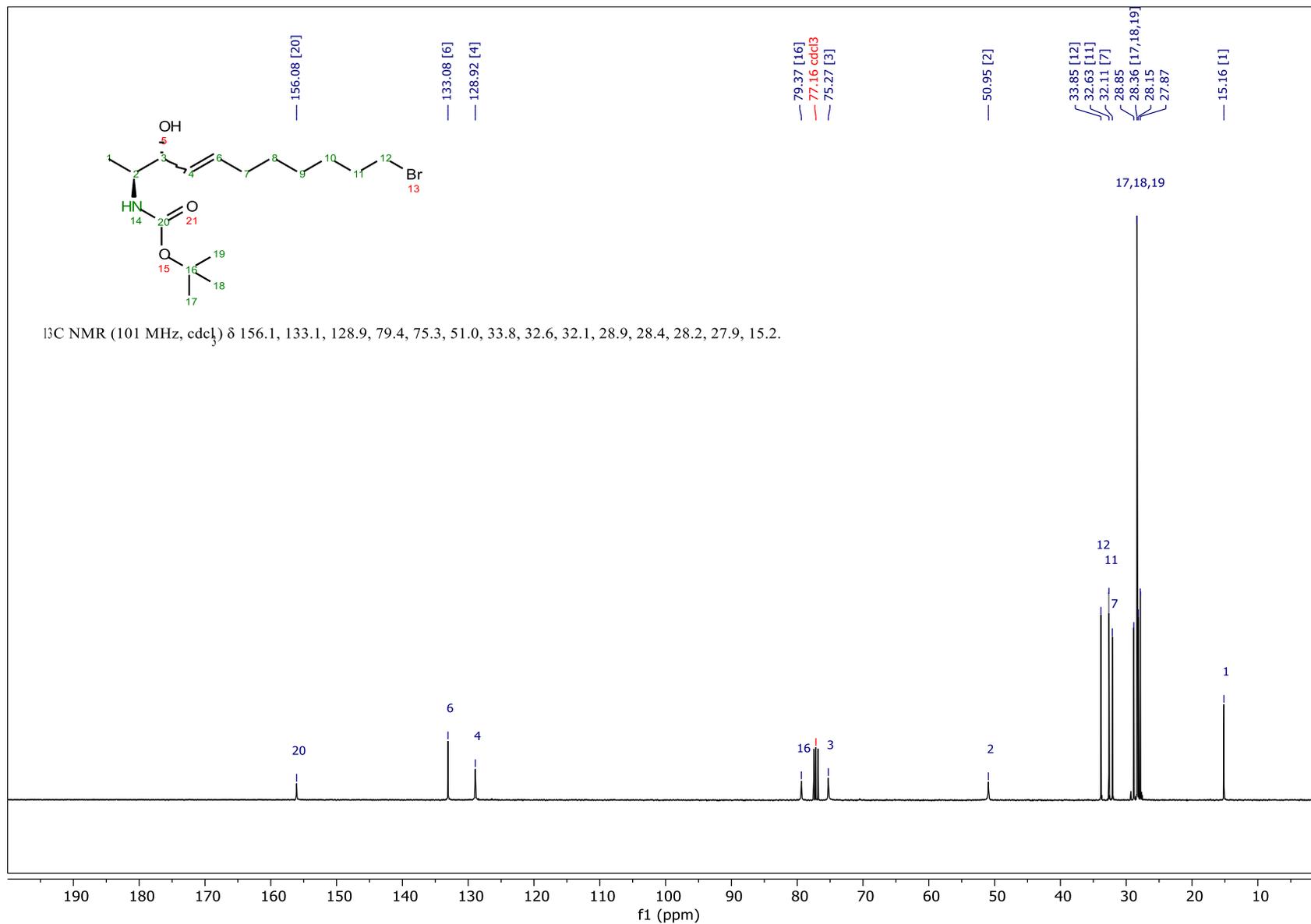
S-186

# Compound RBM5-093

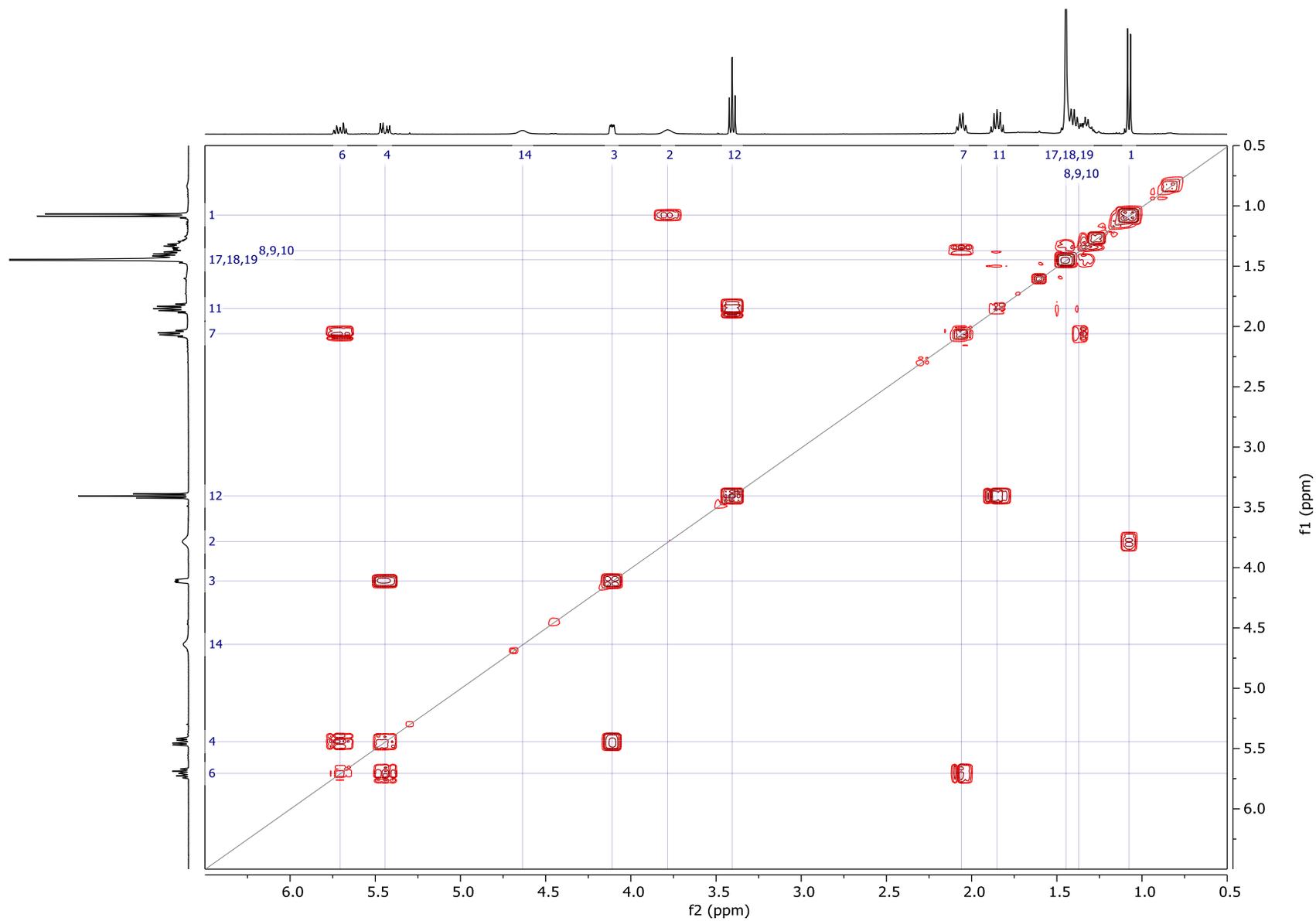
<sup>1</sup>H NMR



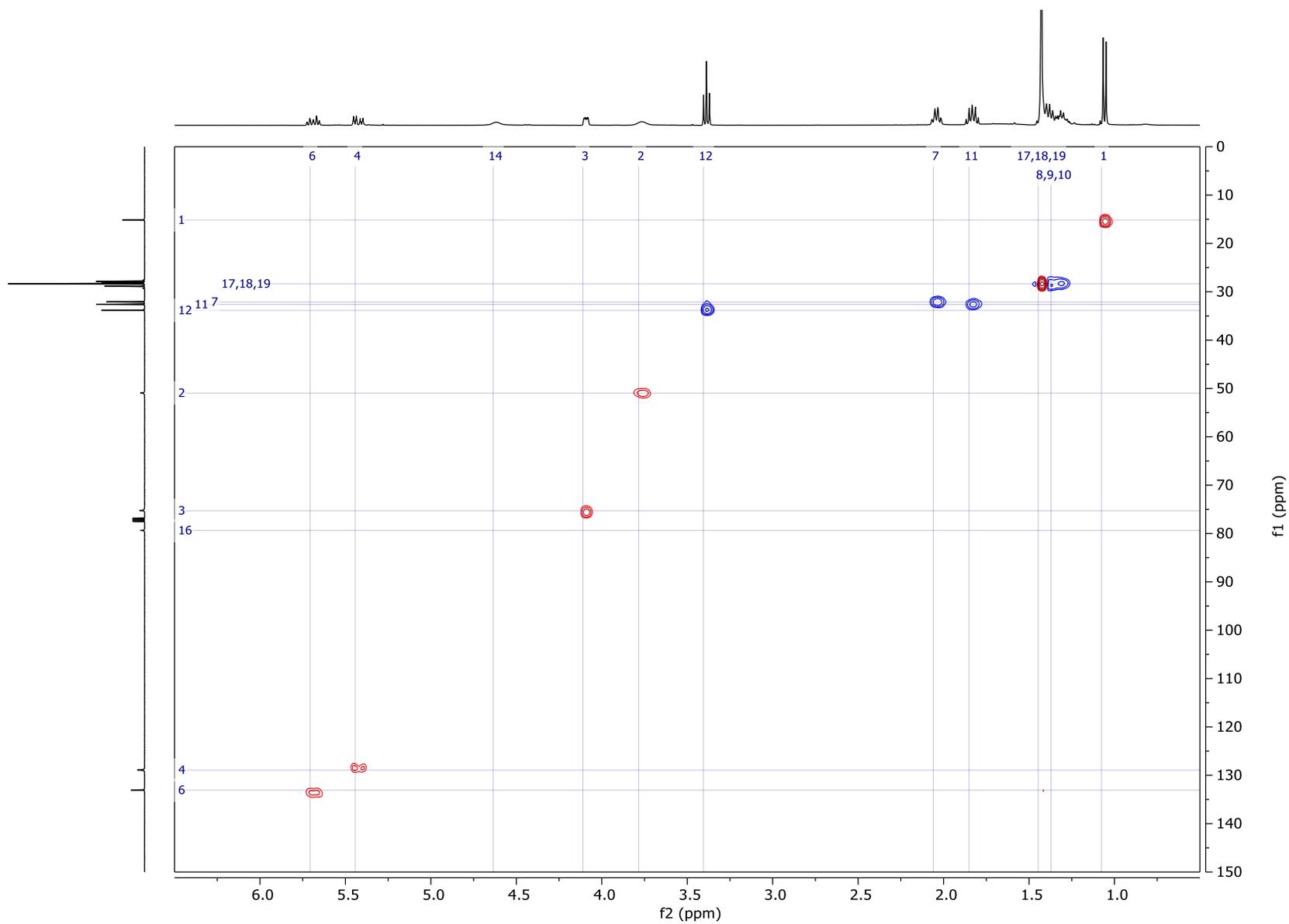
<sup>13</sup>C NMR



# COSY NMR

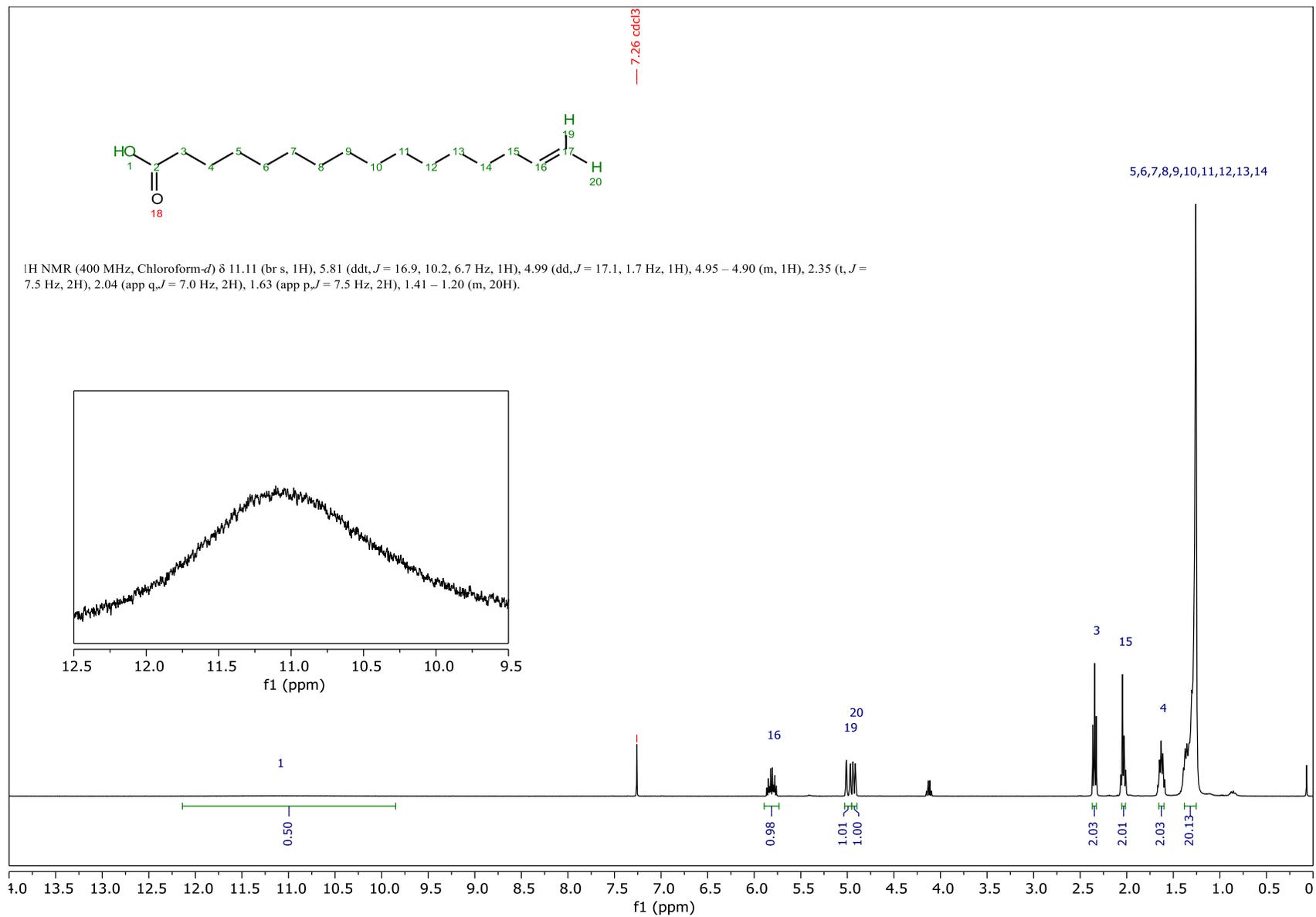


# HSQC NMR

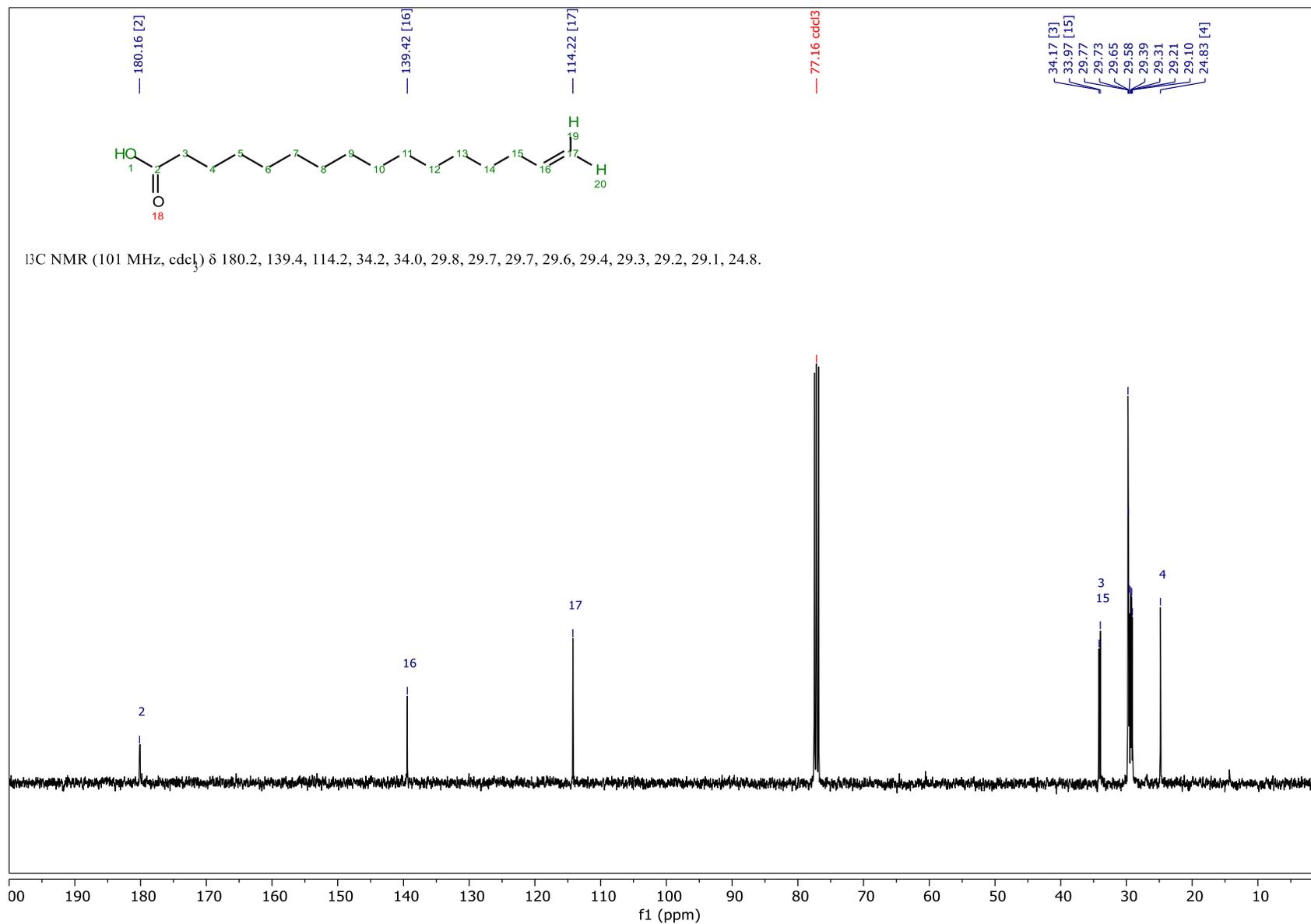


# Compound RBM5-097

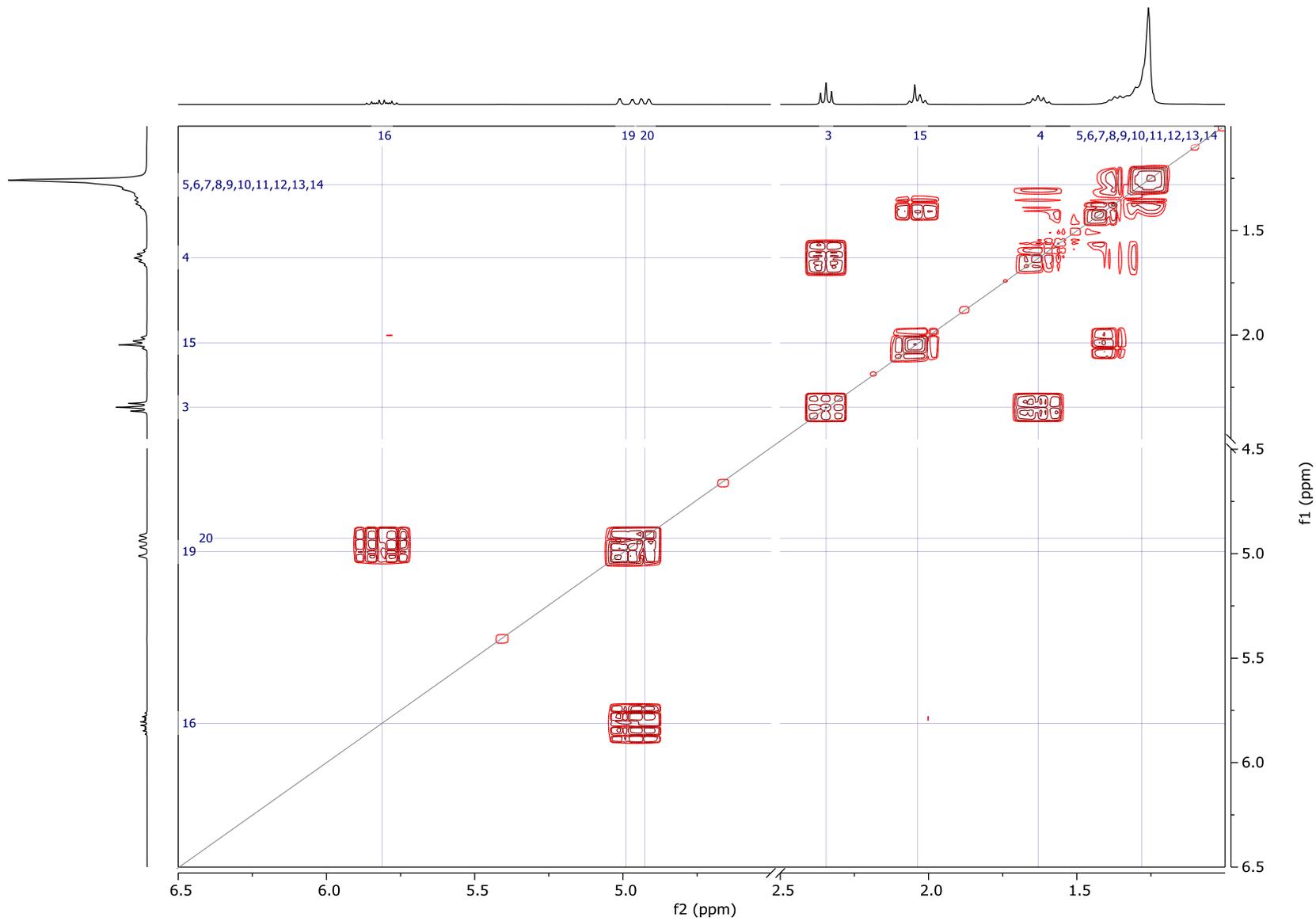
<sup>1</sup>H NMR



<sup>13</sup>C NMR

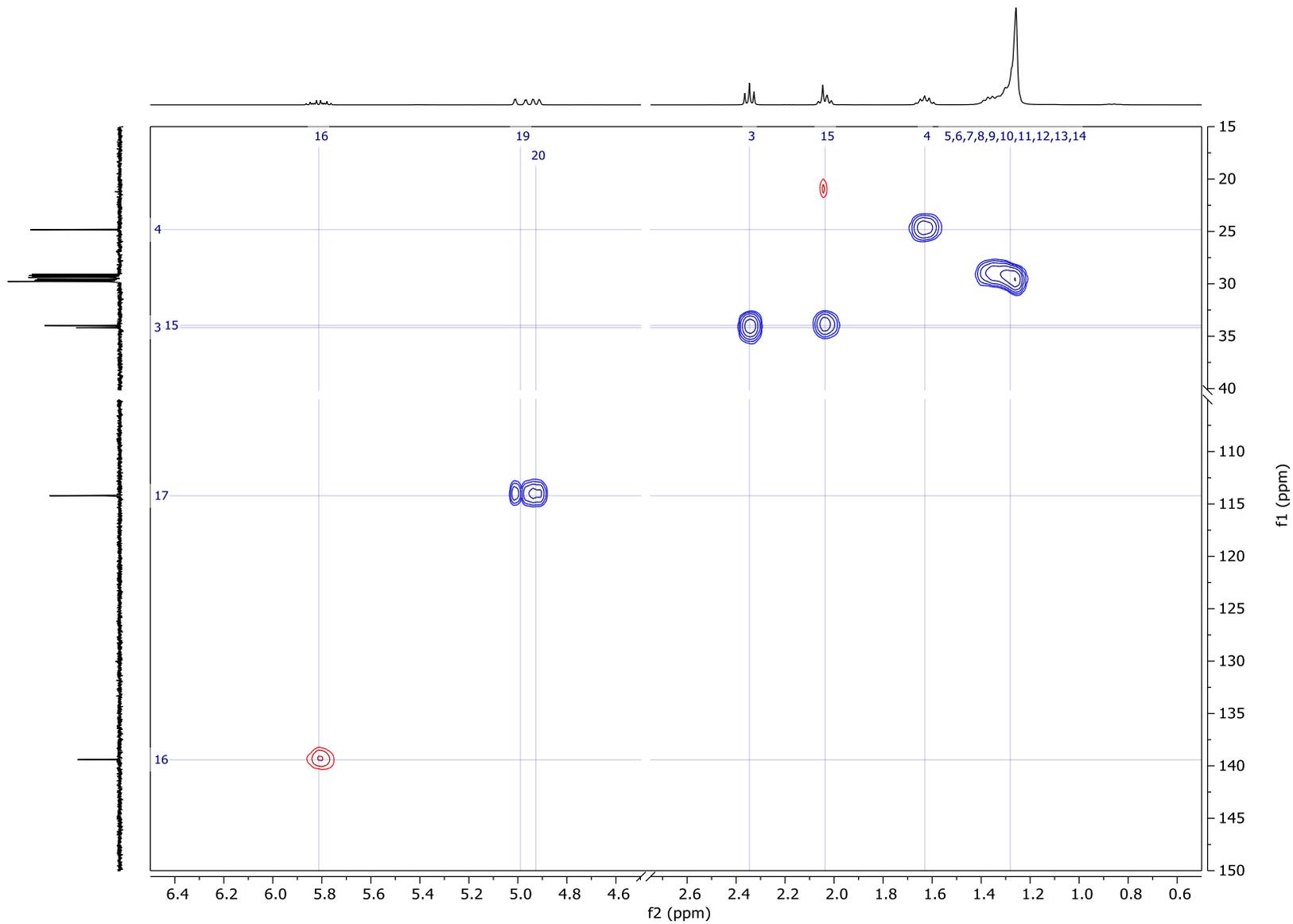


# COSY NMR



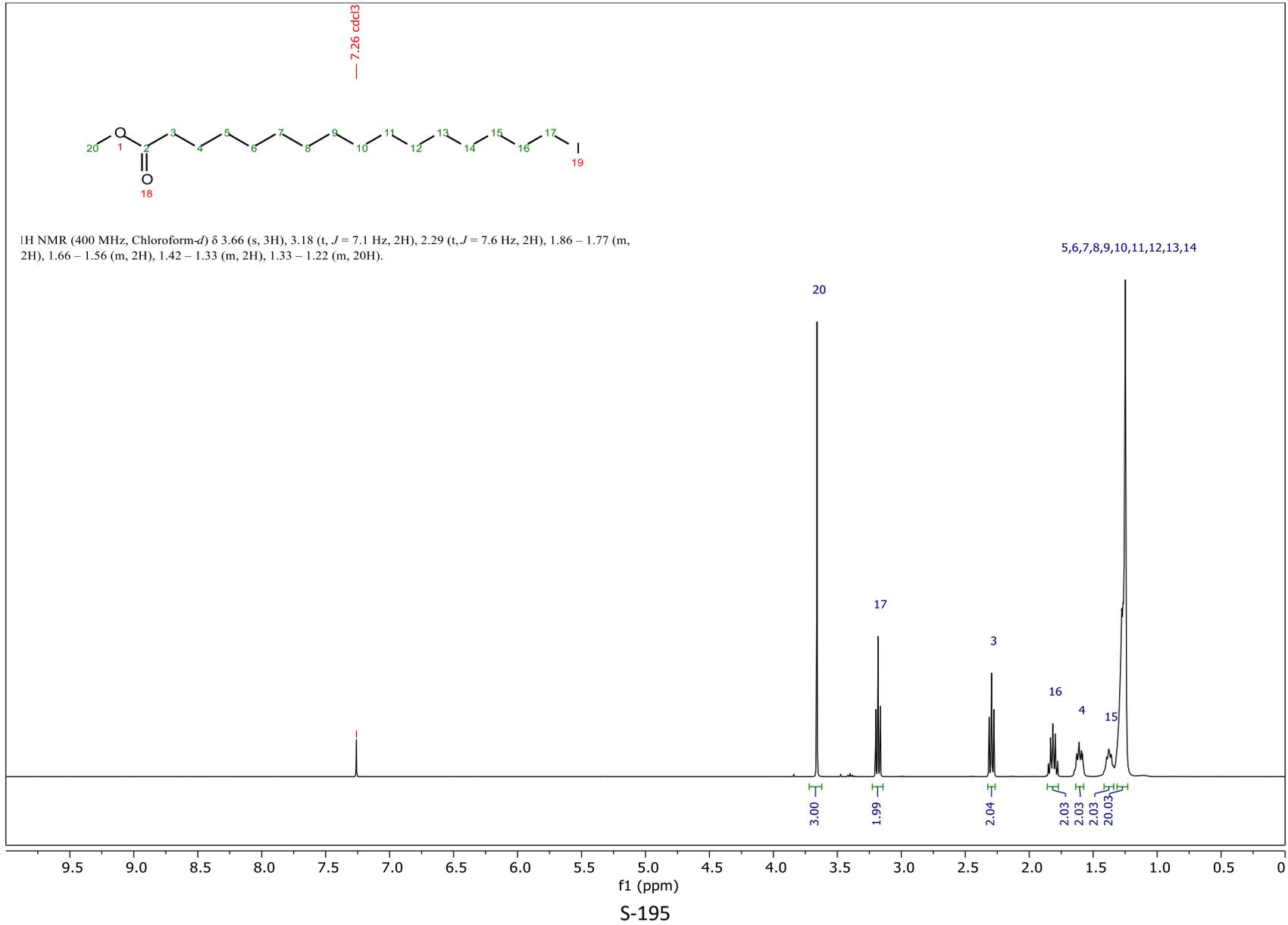
S-193

# HSQC NMR

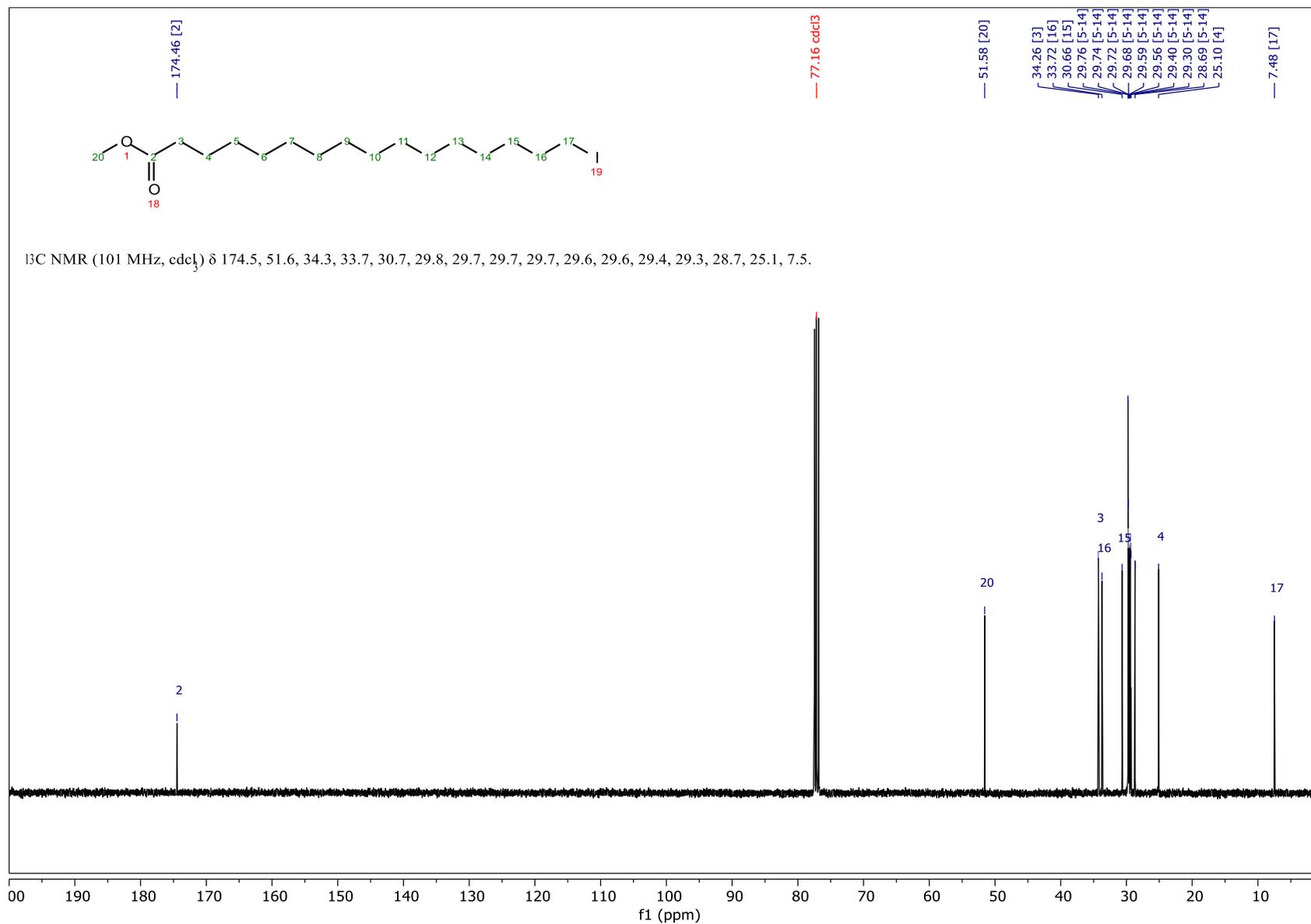


# Compound RBM5-098

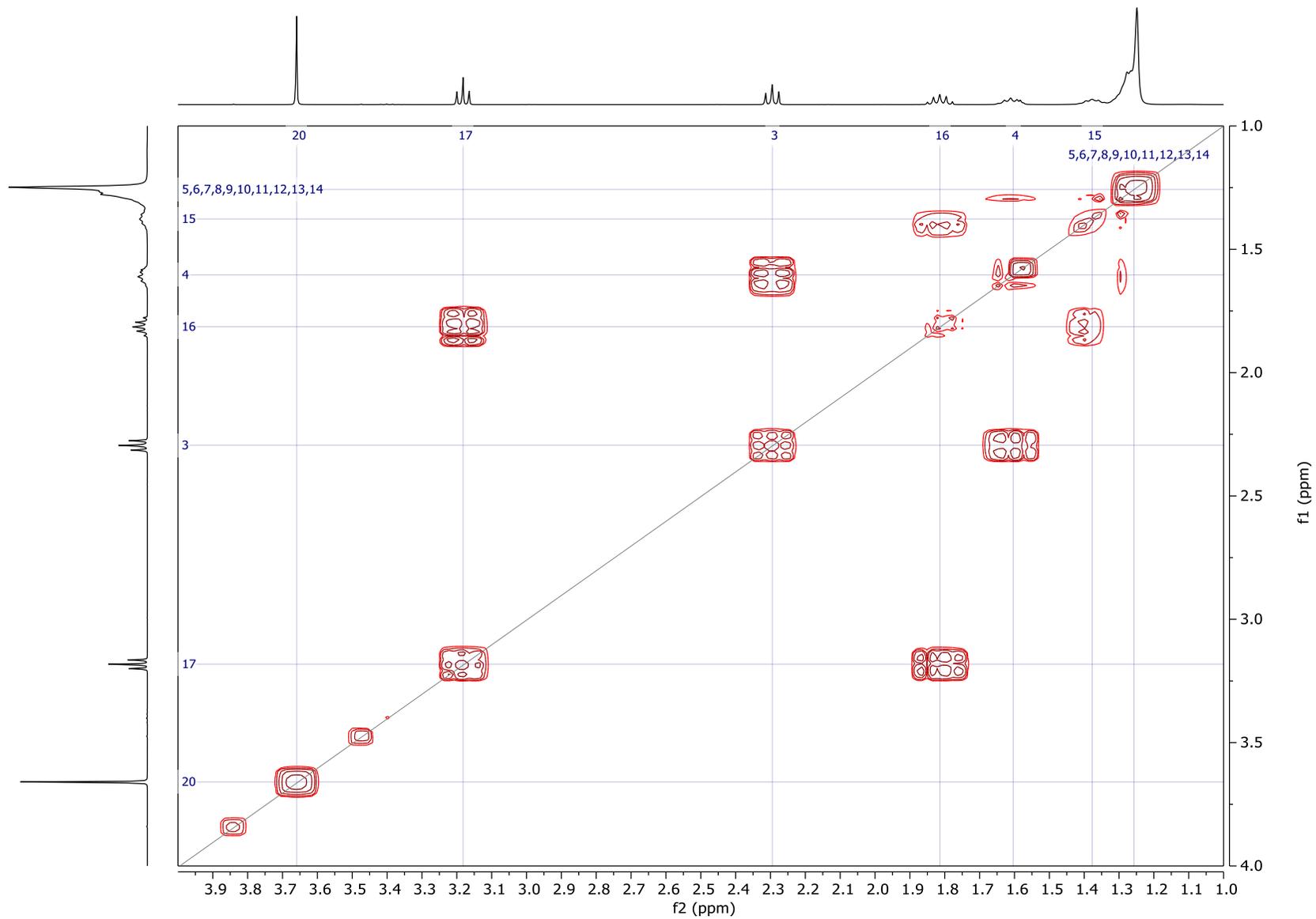
$^1\text{H}$  NMR



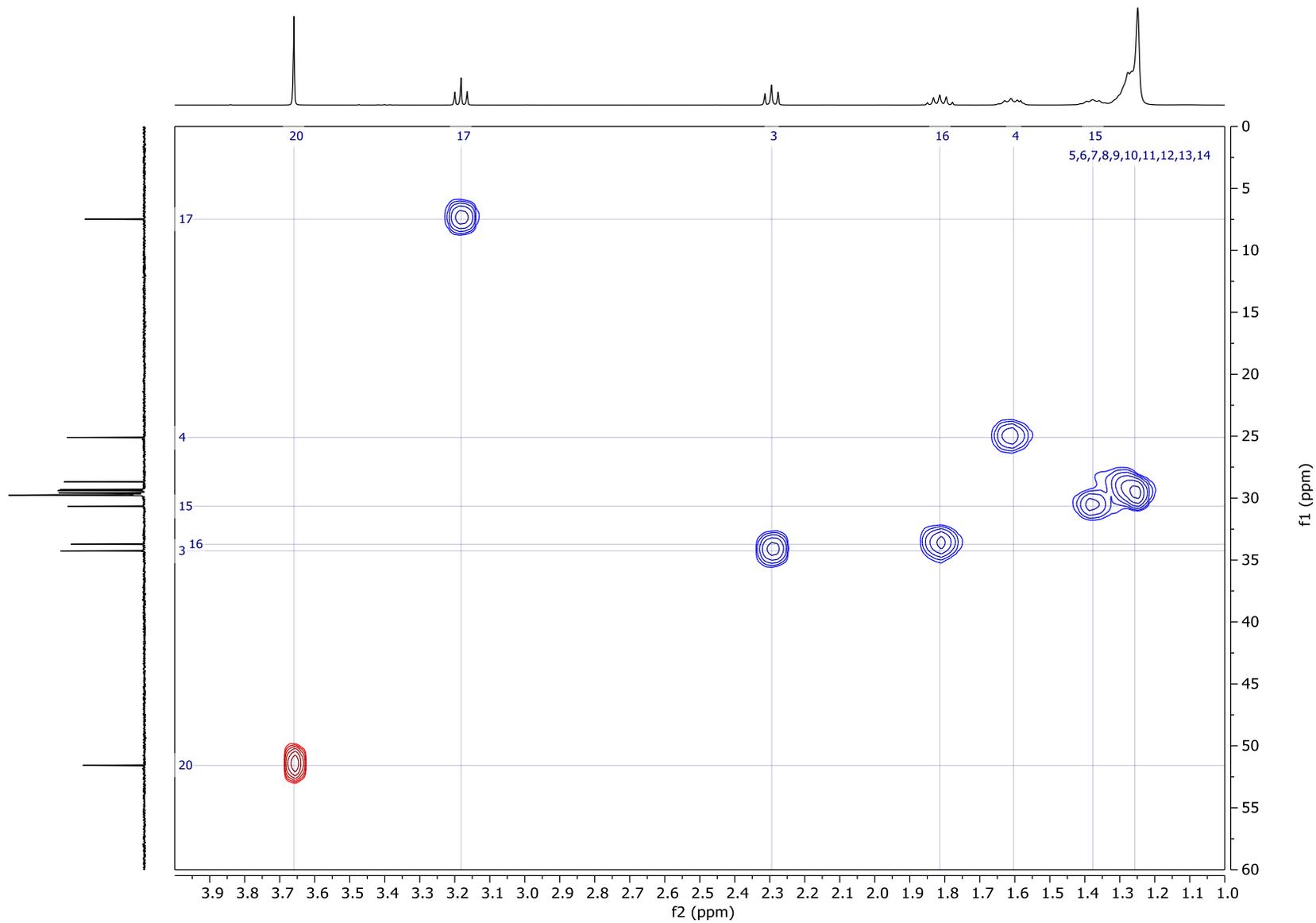
<sup>13</sup>C NMR



# COSY NMR

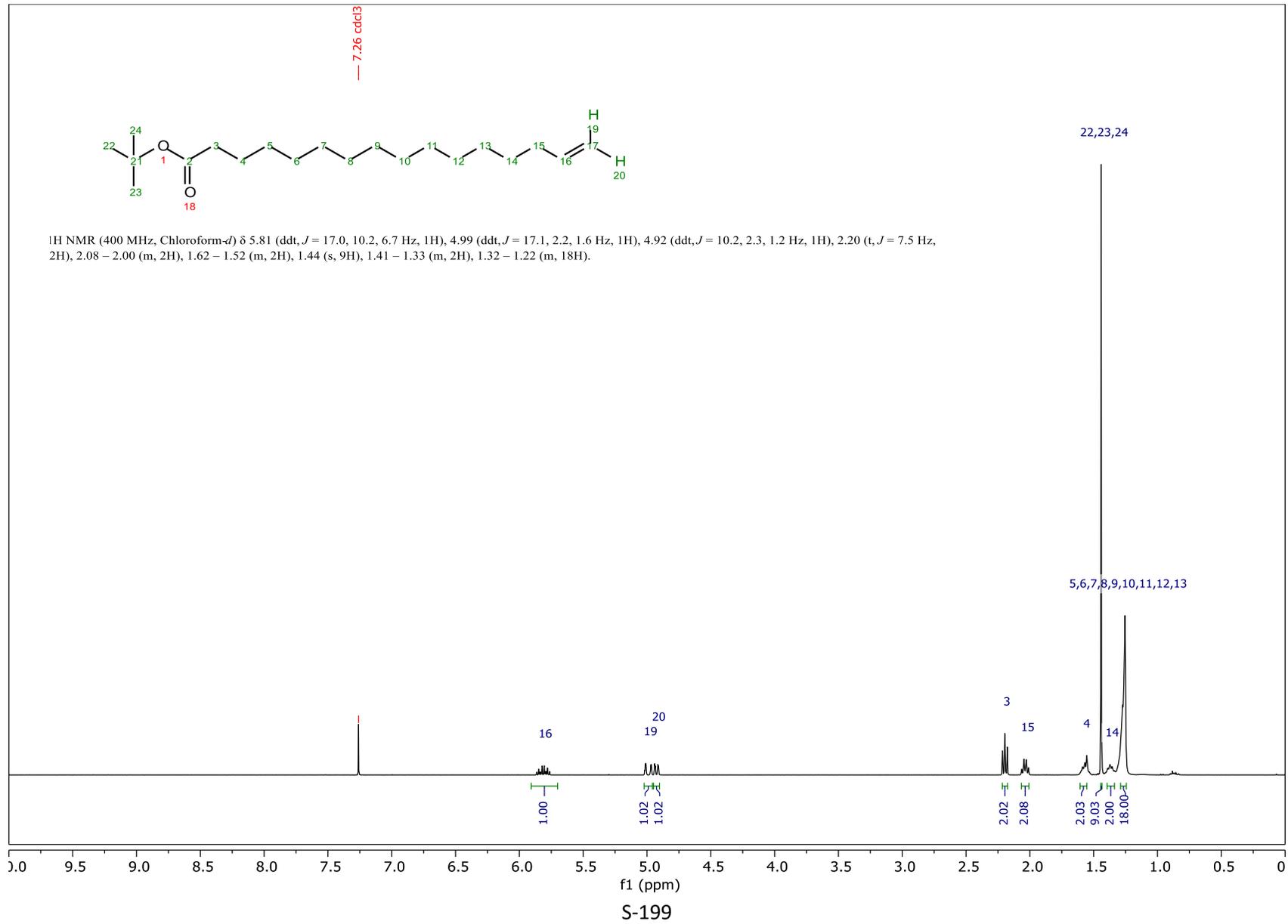


# HSQC NMR

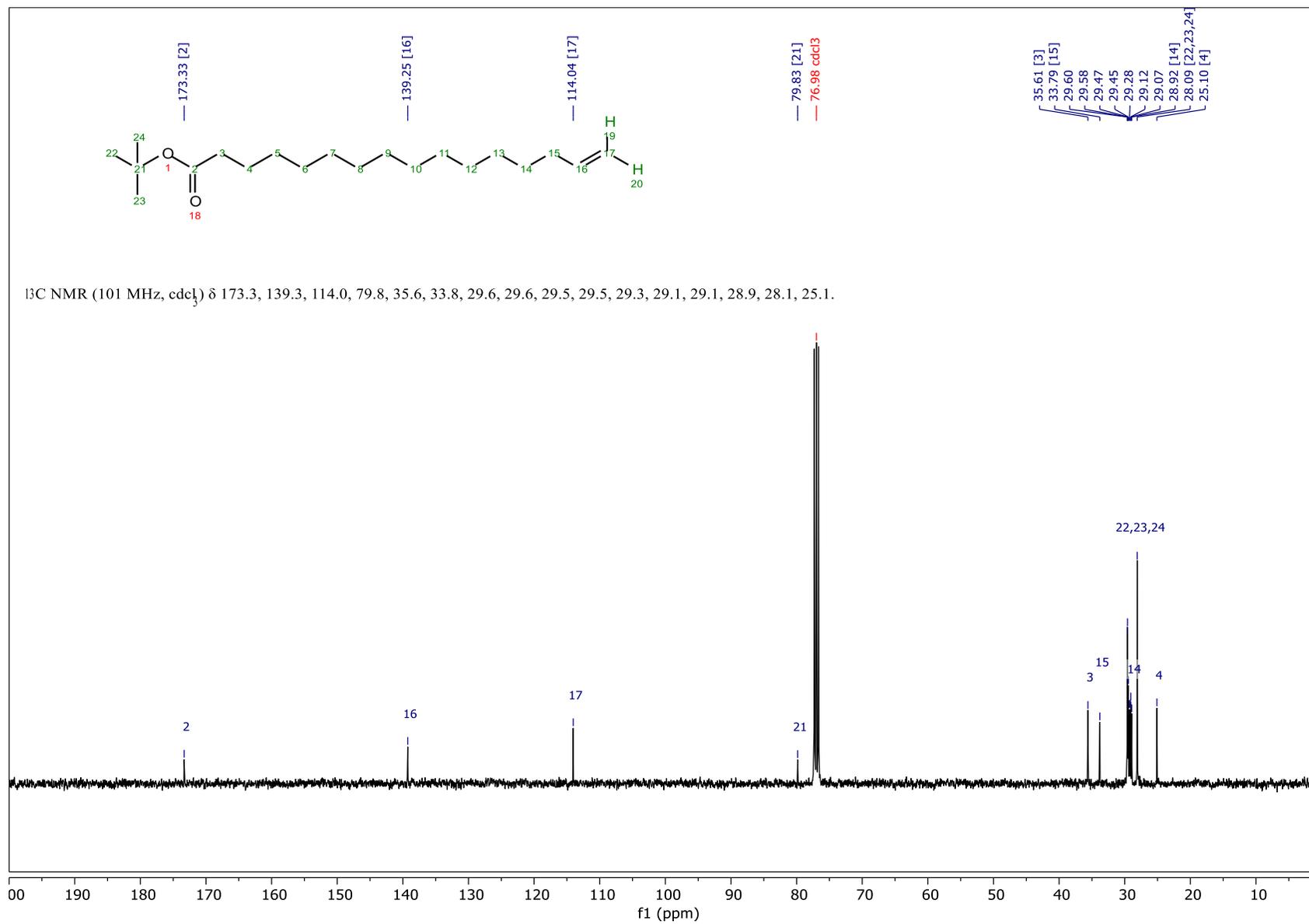


# Compound RBM5-099

$^1\text{H}$  NMR

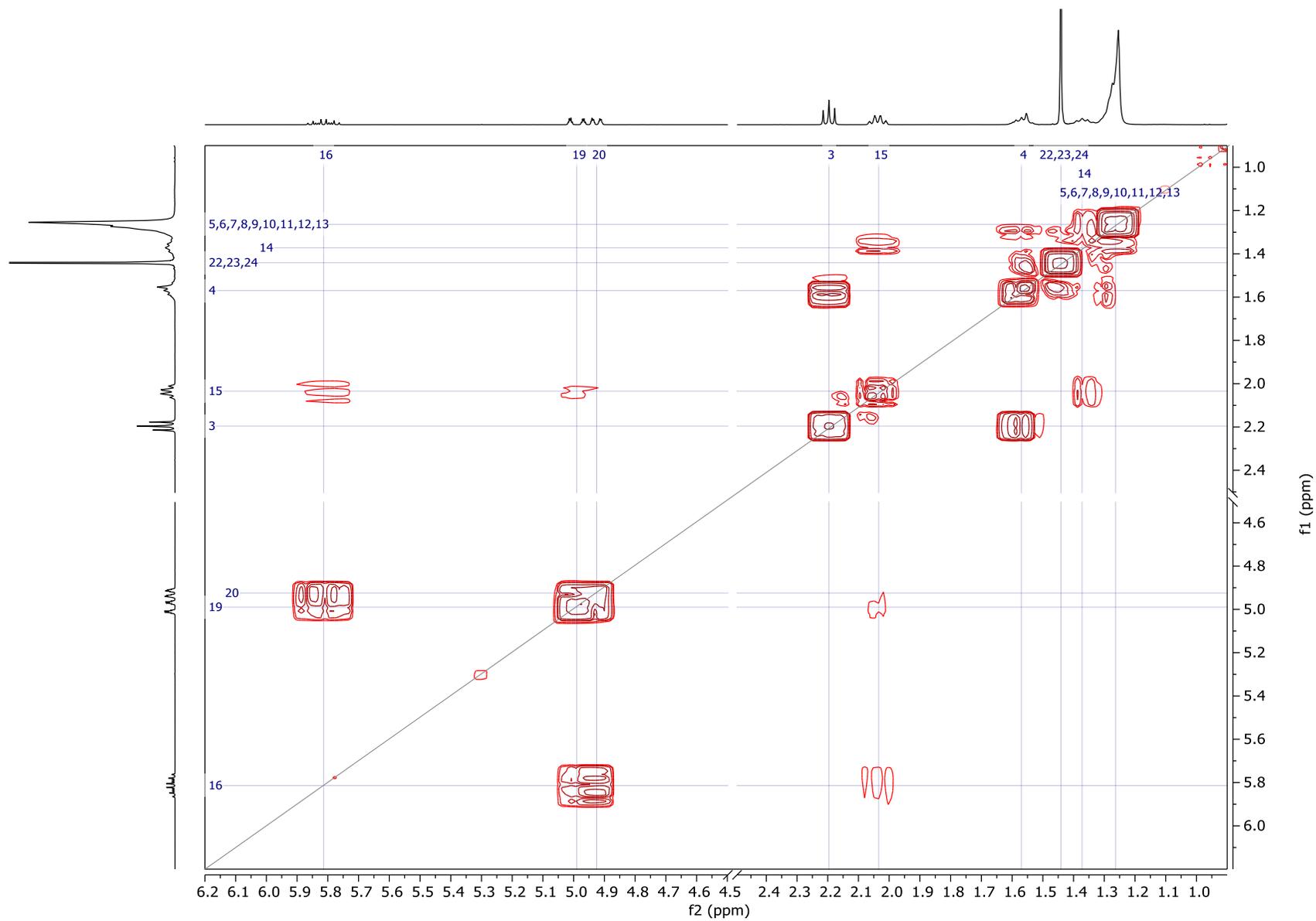


# <sup>13</sup>C NMR

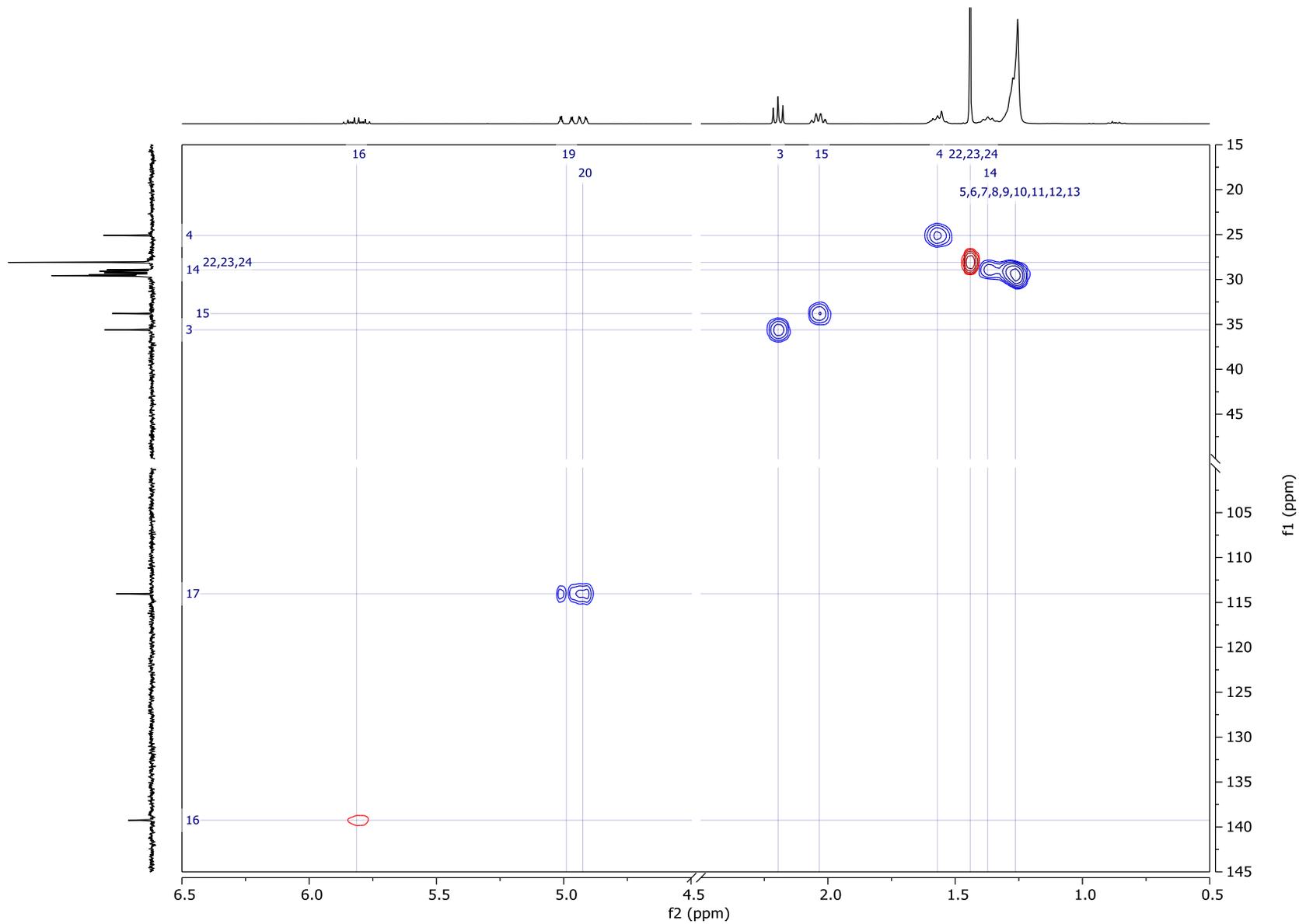


<sup>13</sup>C NMR (101 MHz, cdcl<sub>3</sub>) δ 173.3, 139.3, 114.0, 79.8, 35.6, 33.8, 29.6, 29.6, 29.5, 29.5, 29.3, 29.1, 29.1, 28.9, 28.1, 25.1.

# COSY NMR



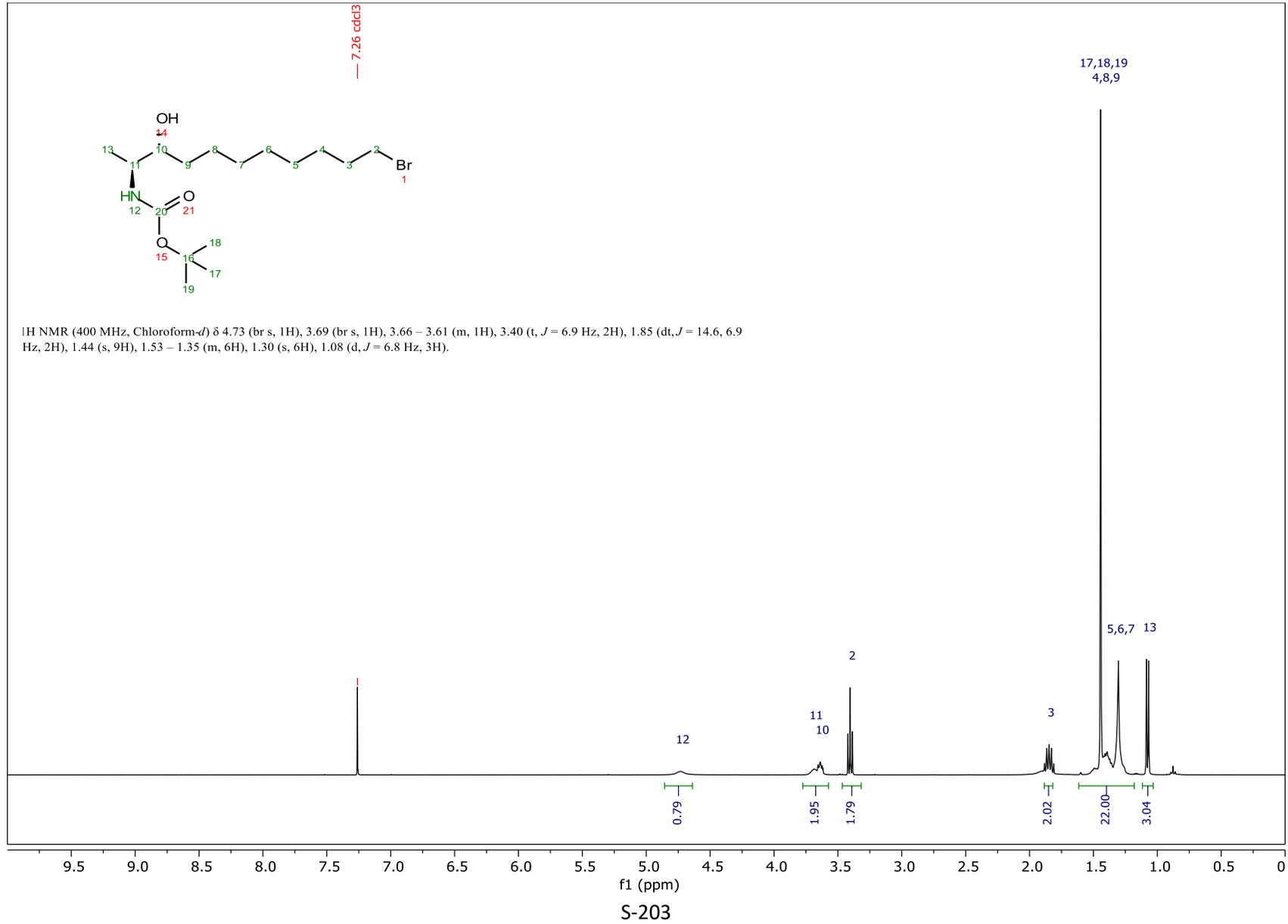
# HSQC NMR



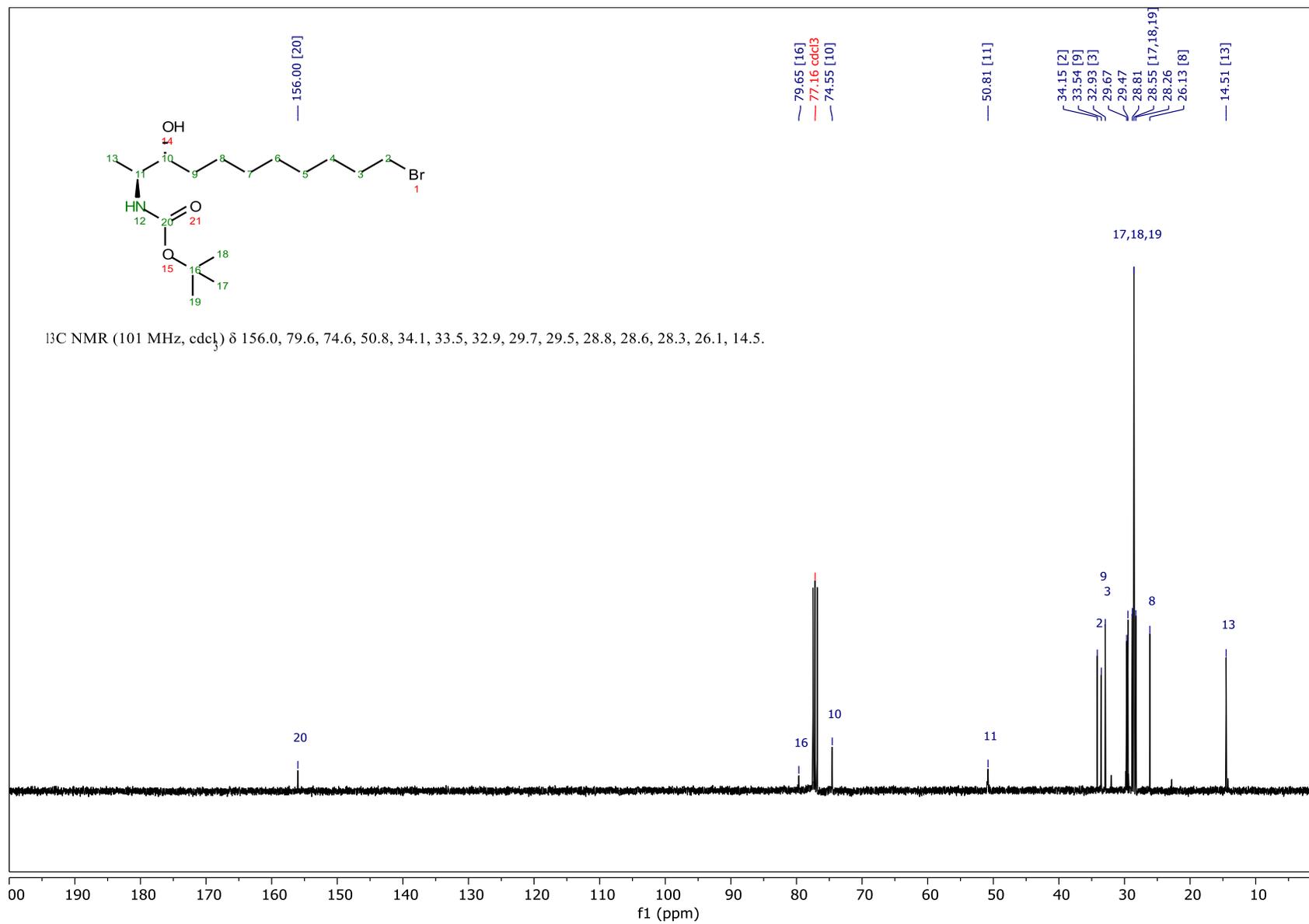
S-202

# Compound RBM5-104

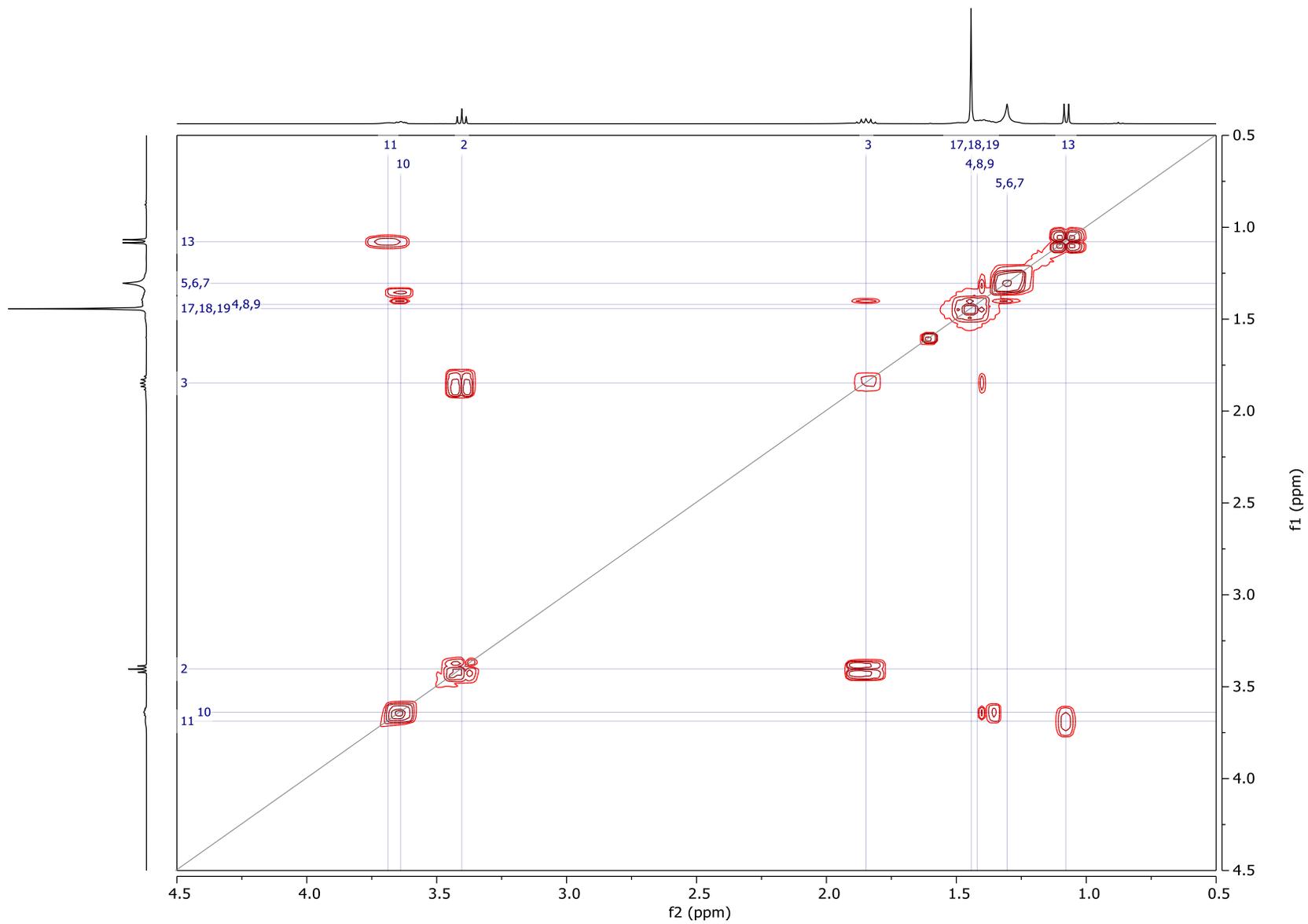
$^1\text{H NMR}$



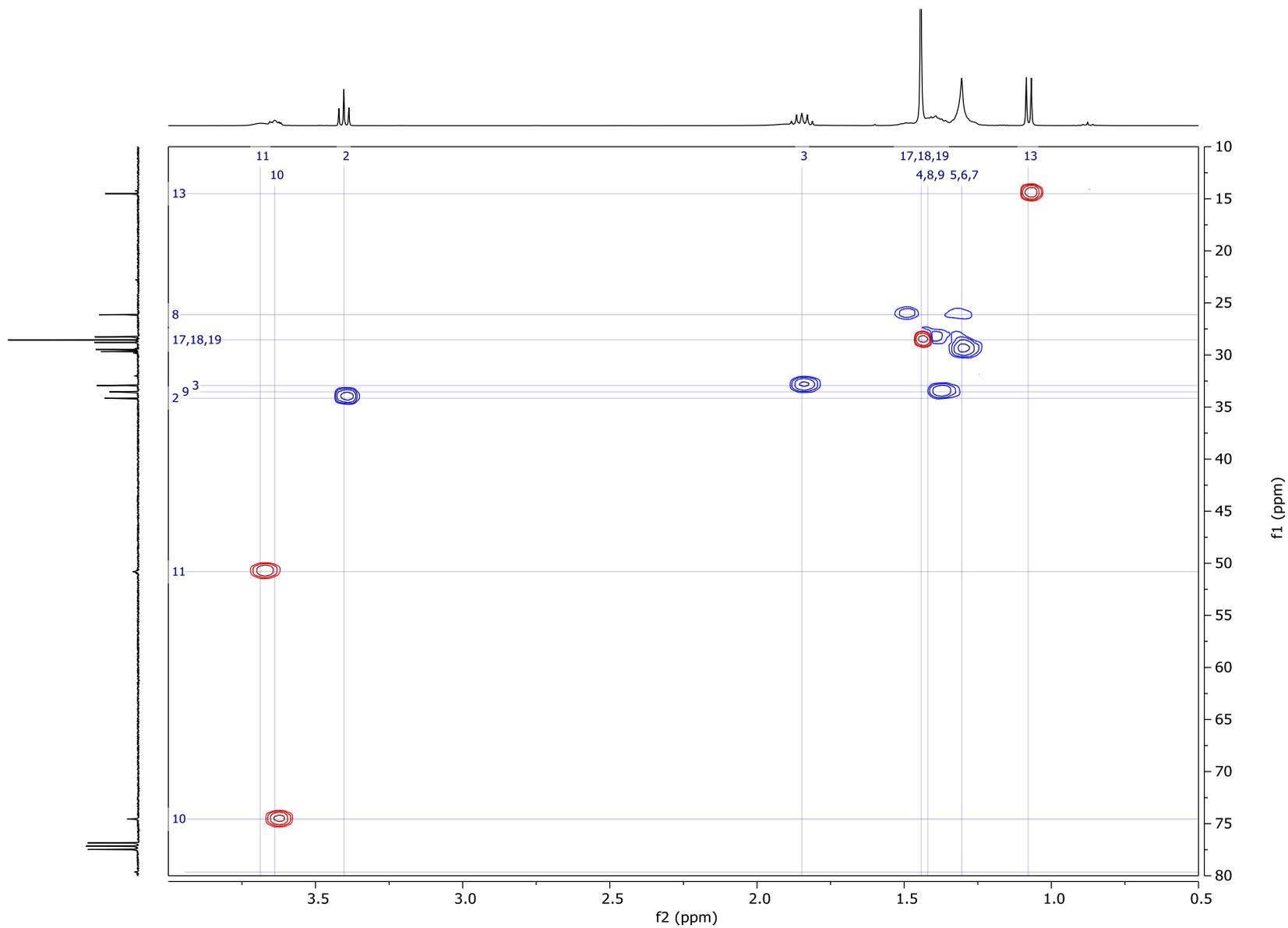
<sup>13</sup>C NMR



# COSY NMR

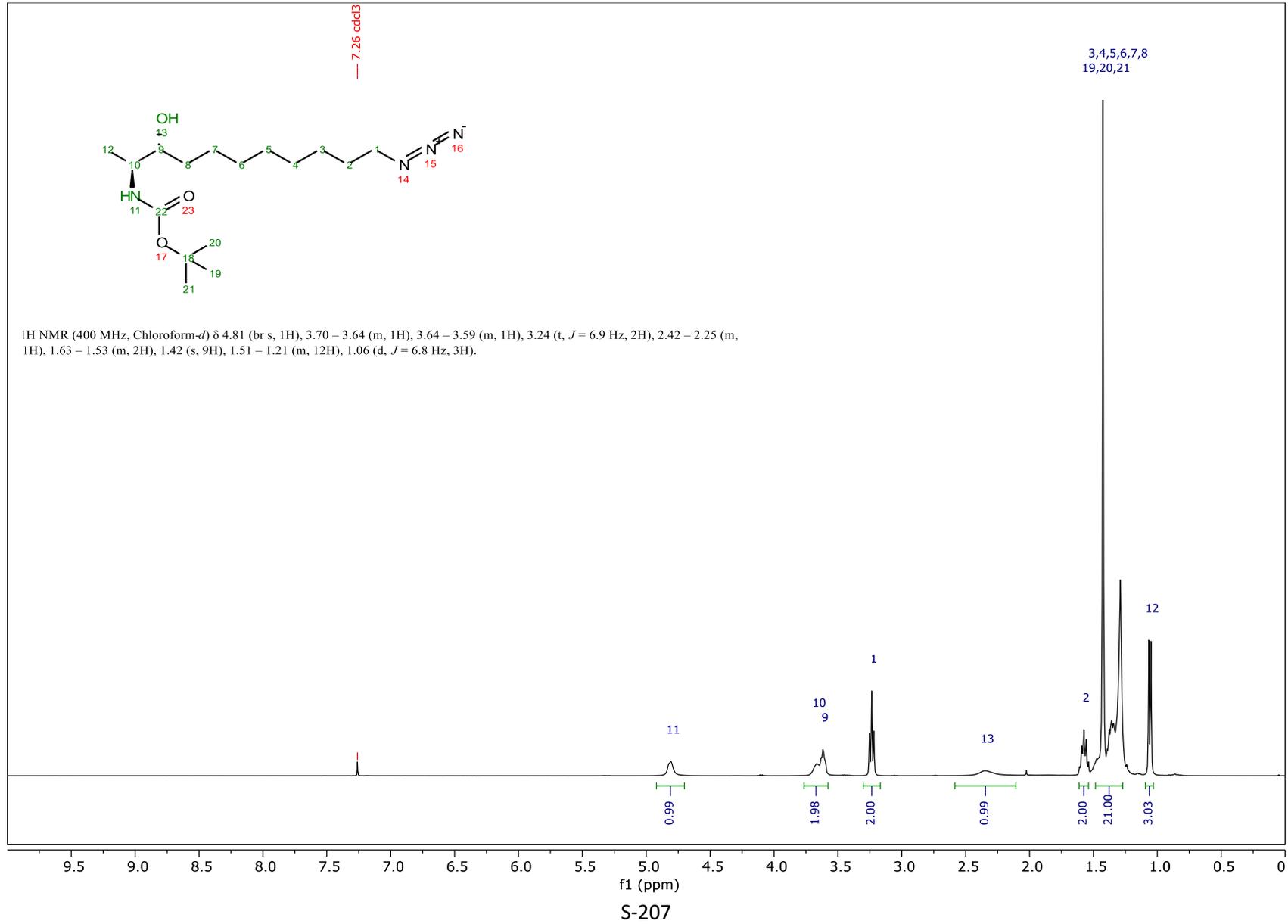


# HSQC NMR

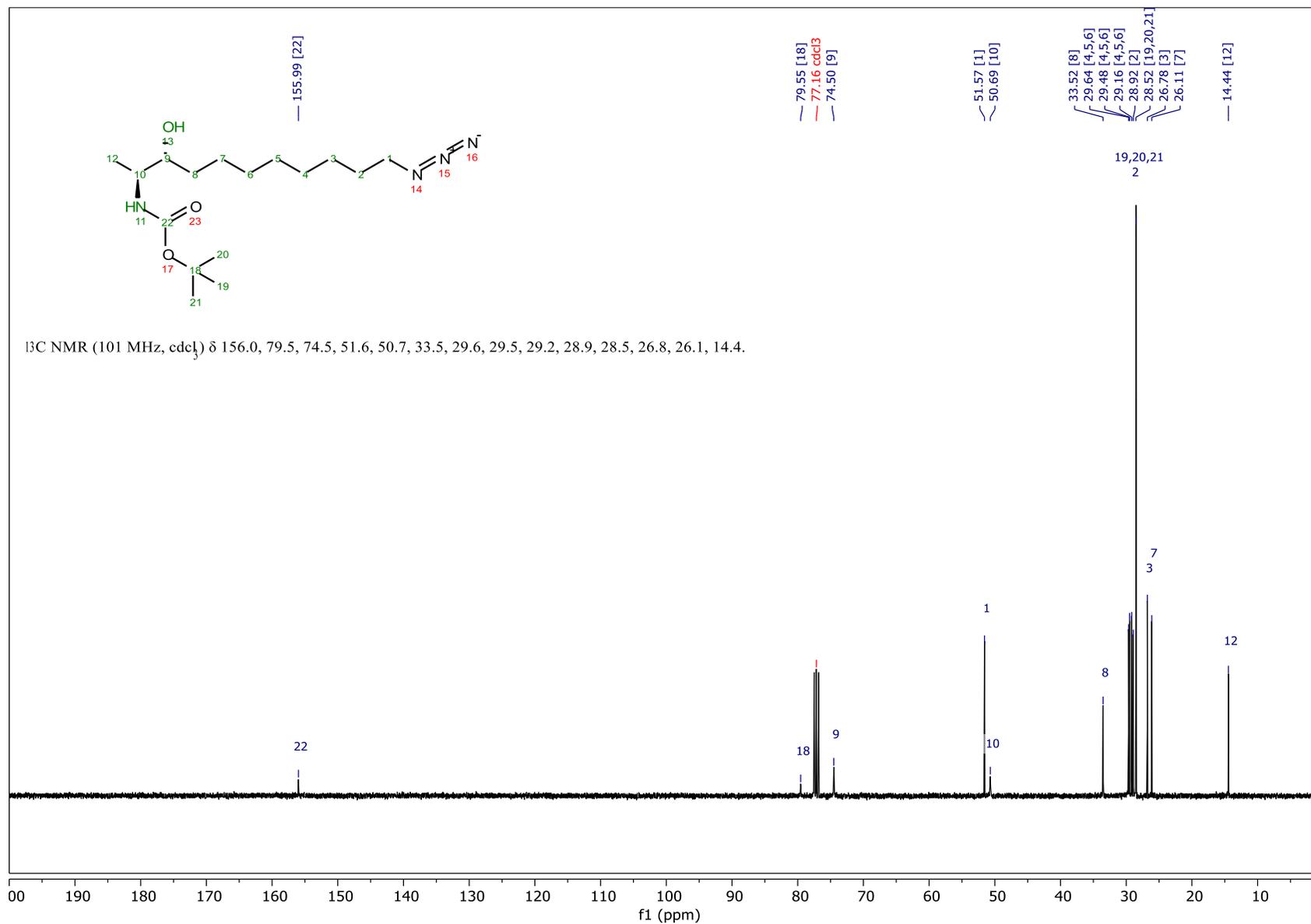


# Compound RBM5-105

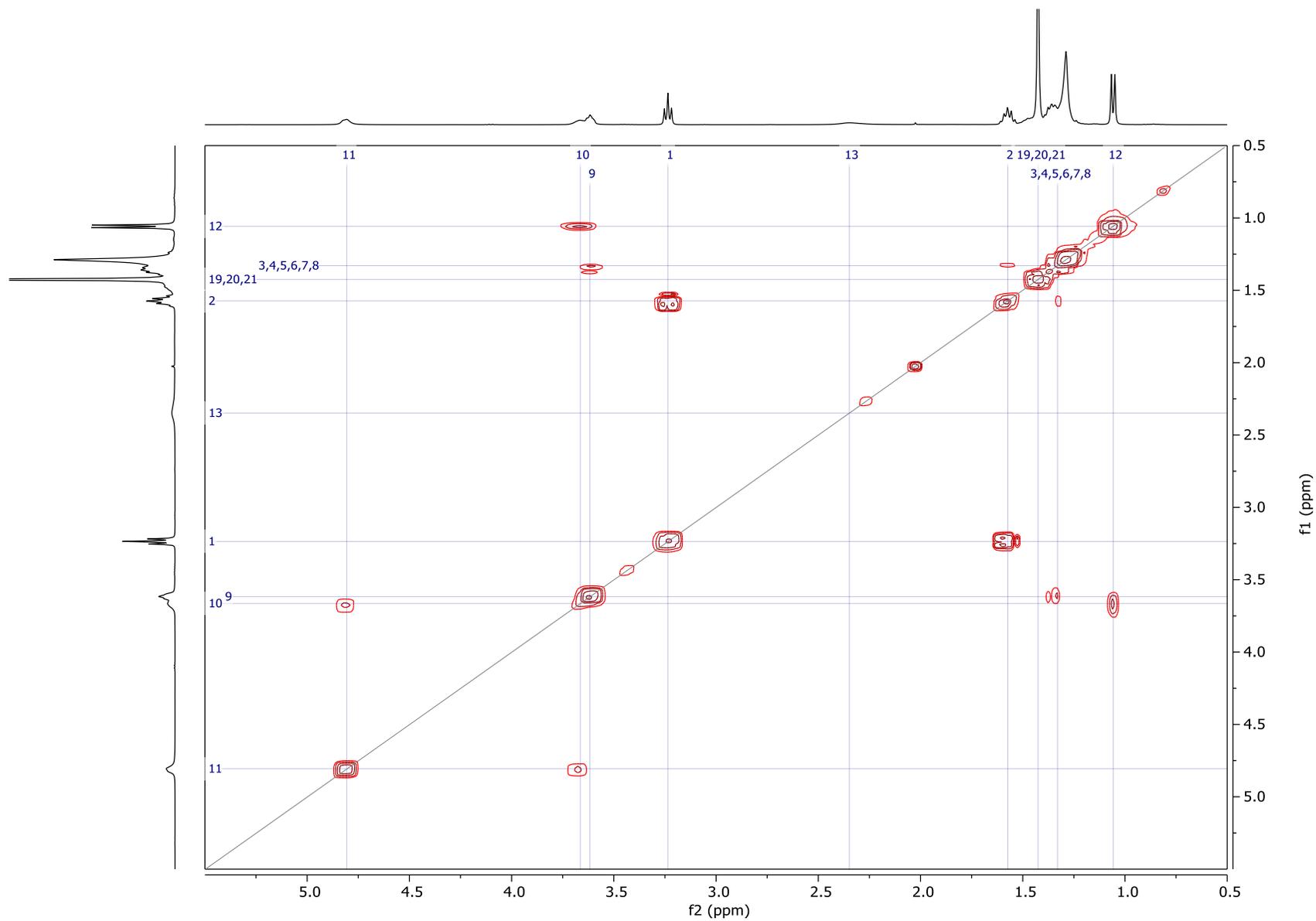
$^1\text{H}$  NMR



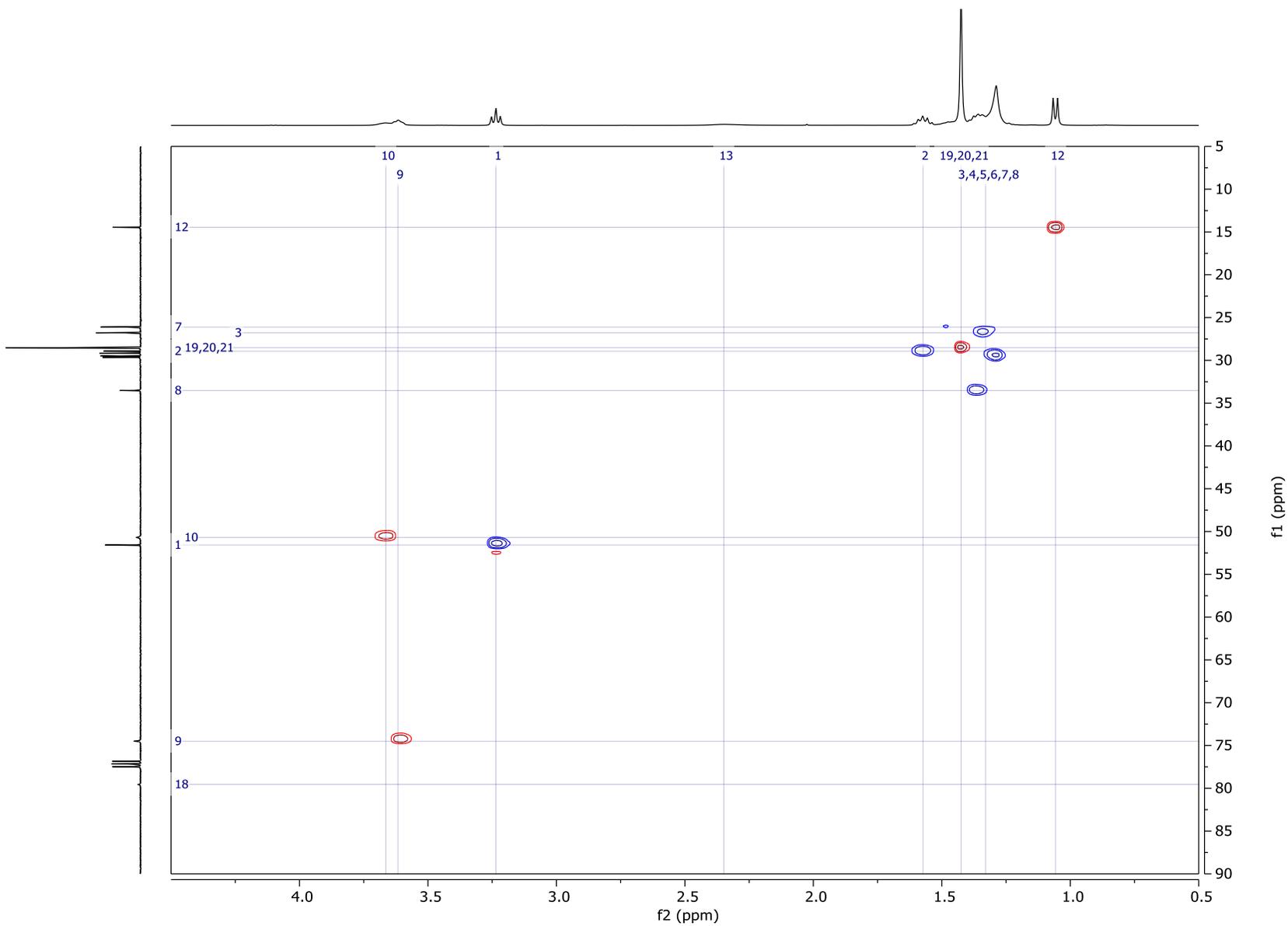
<sup>13</sup>C NMR



# COSY NMR



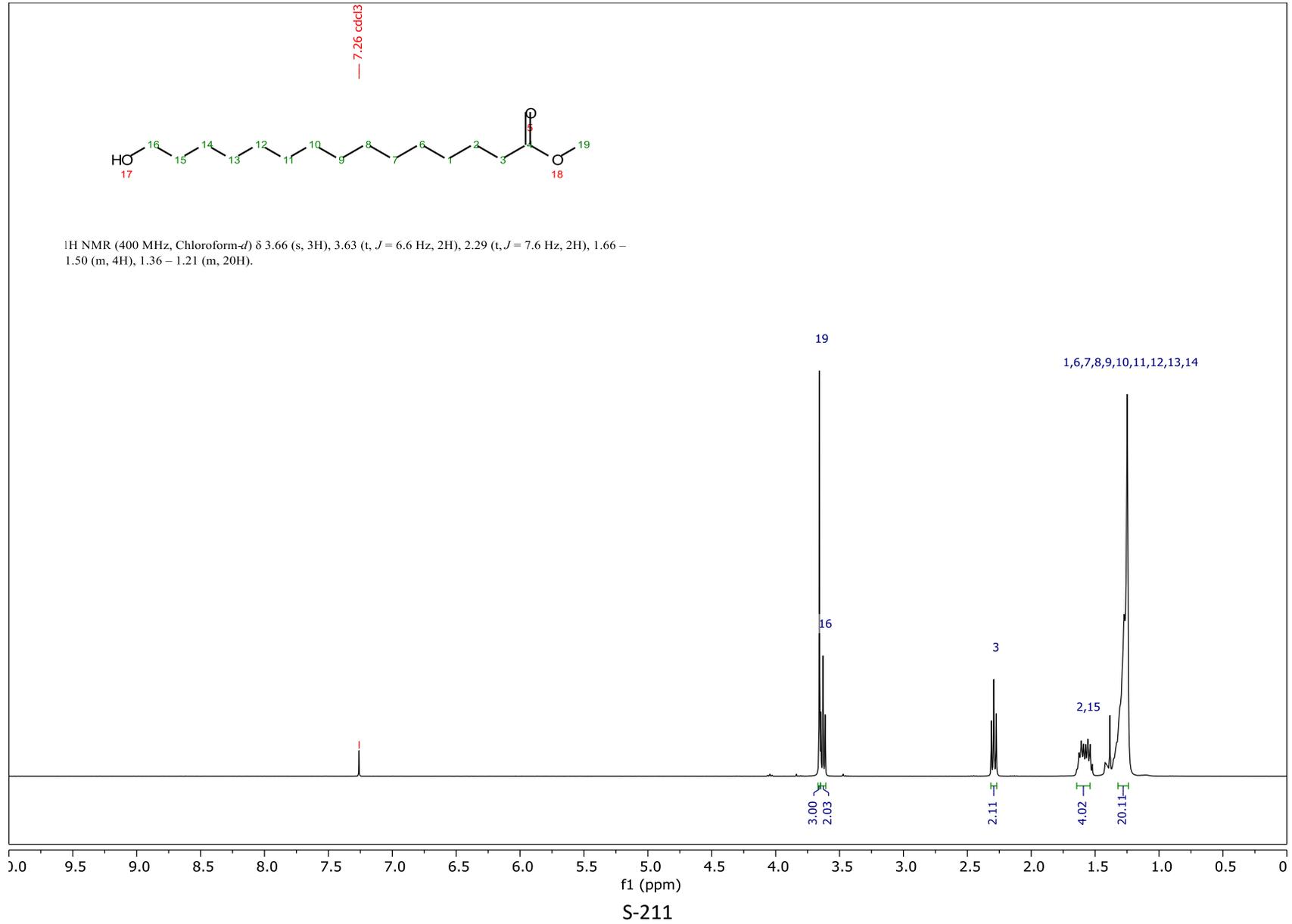
# HSQC NMR



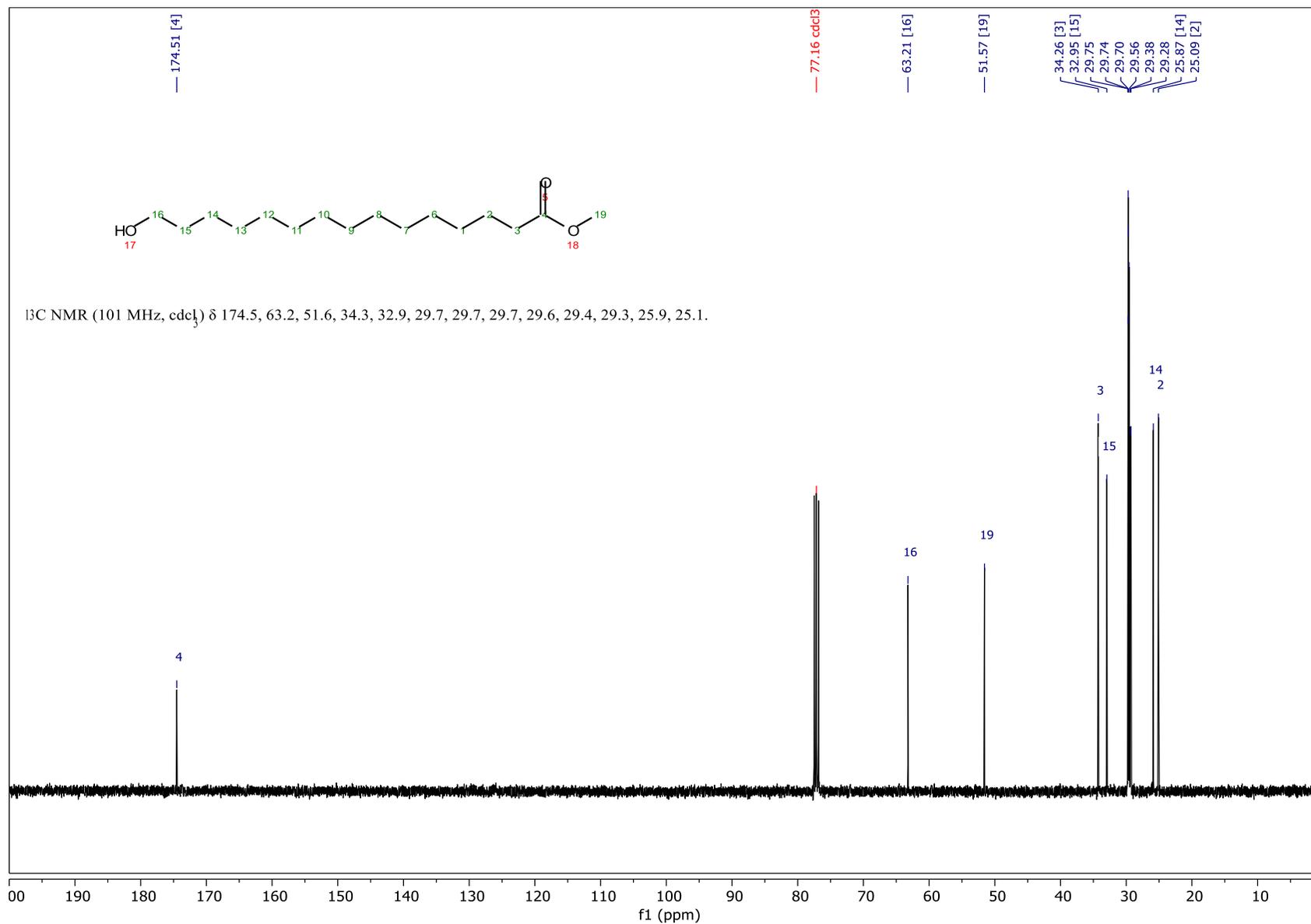
S-210

# Compound RBM5-110

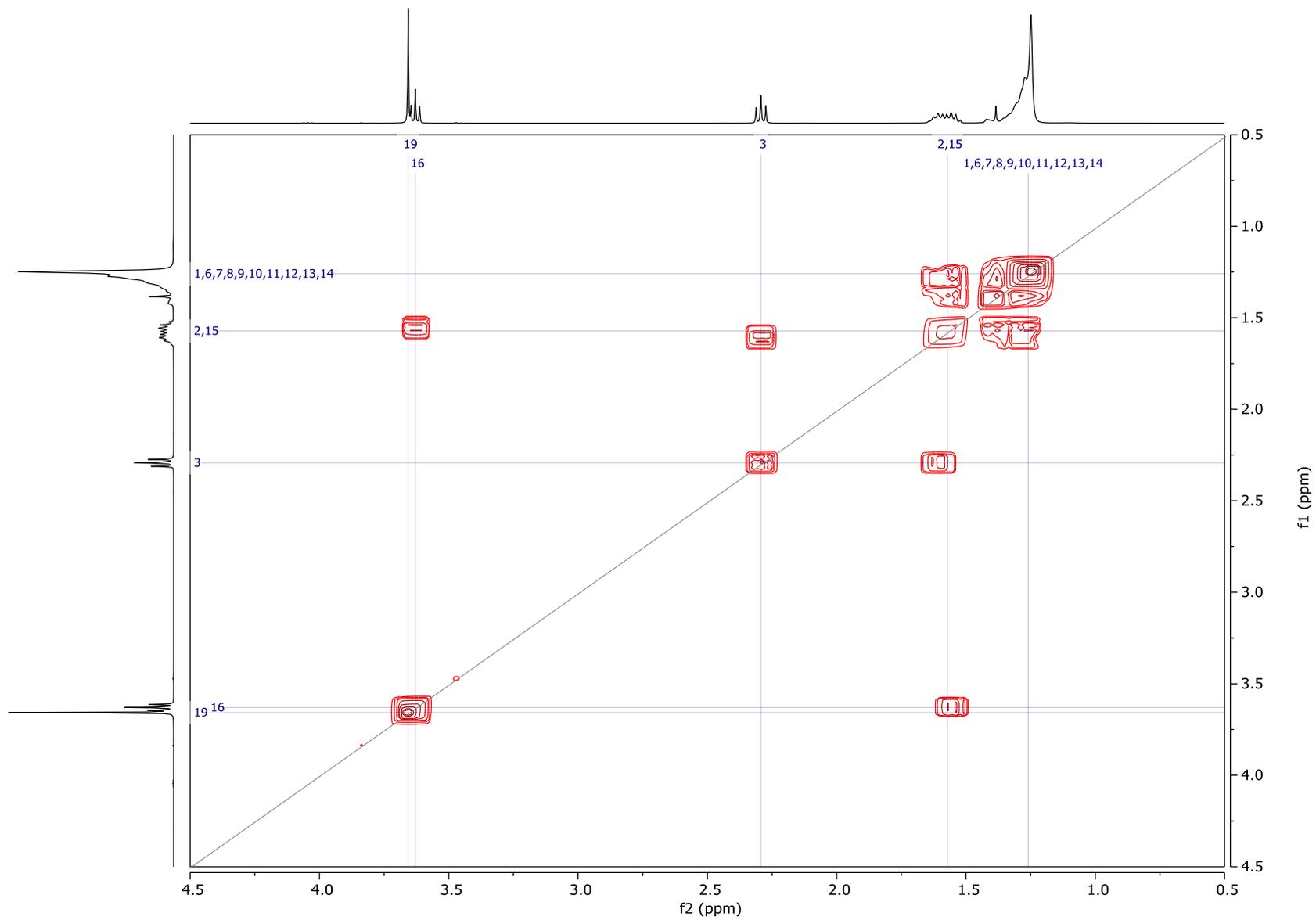
$^1\text{H}$  NMR



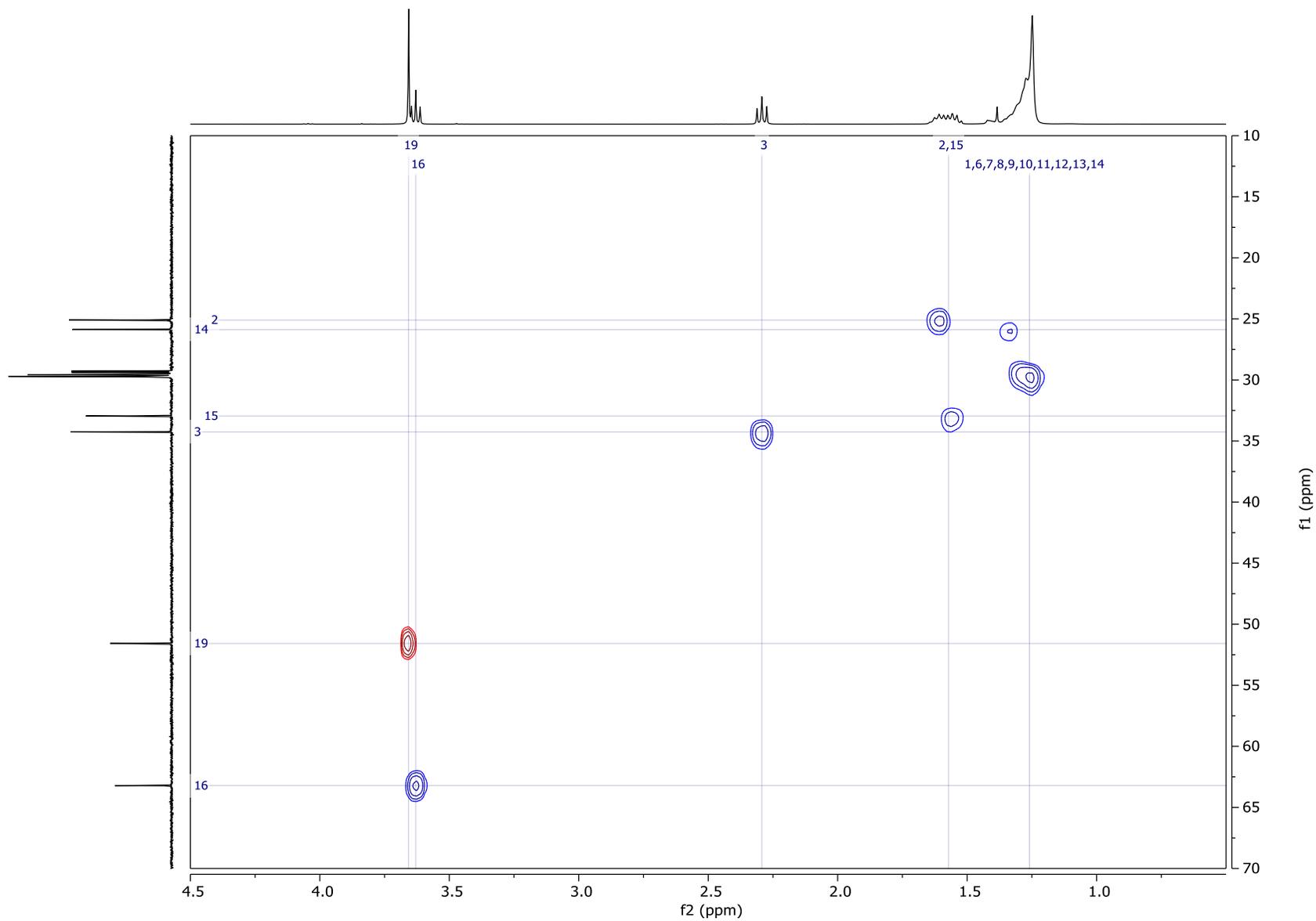
<sup>13</sup>C NMR



COSY NMR



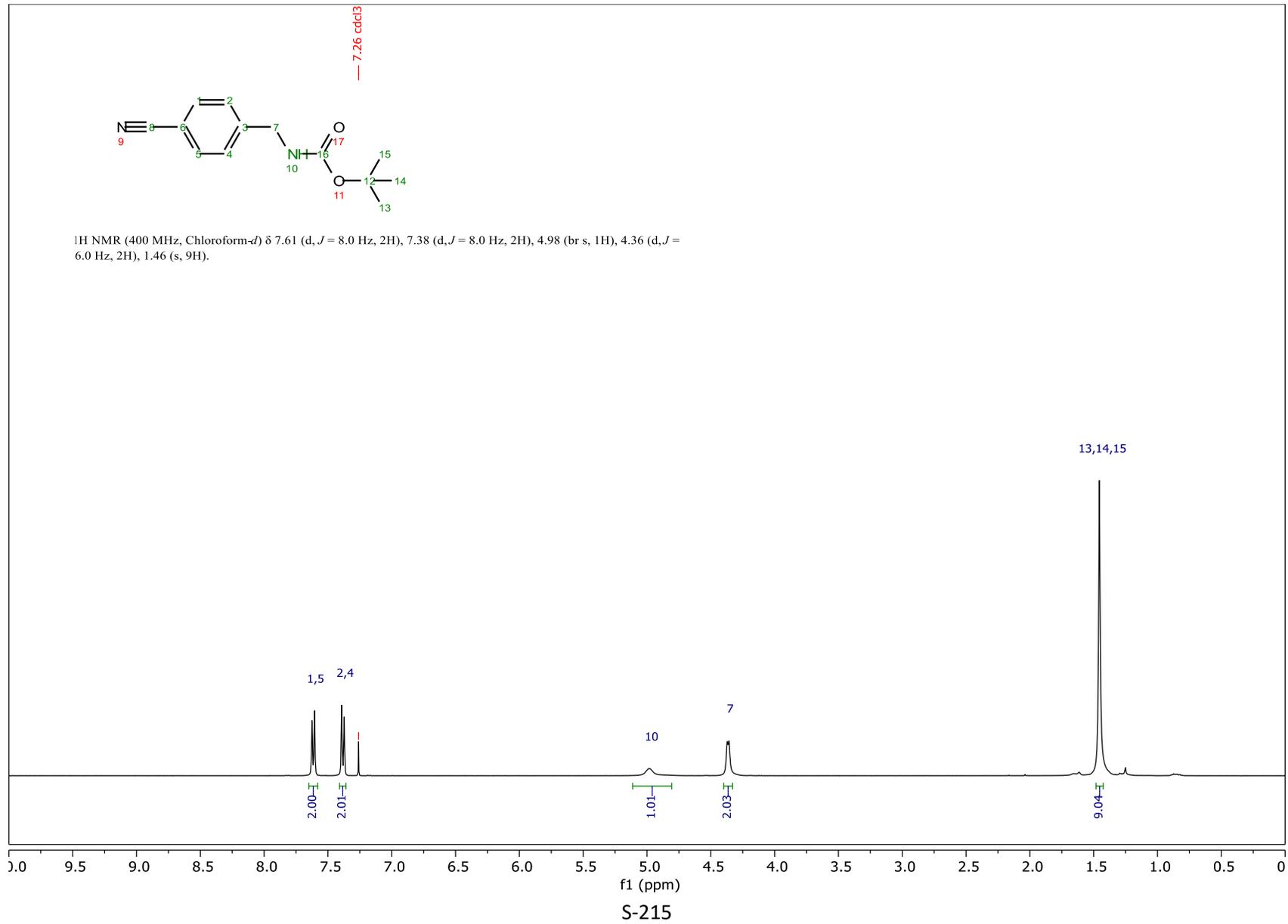
# HSQC NMR



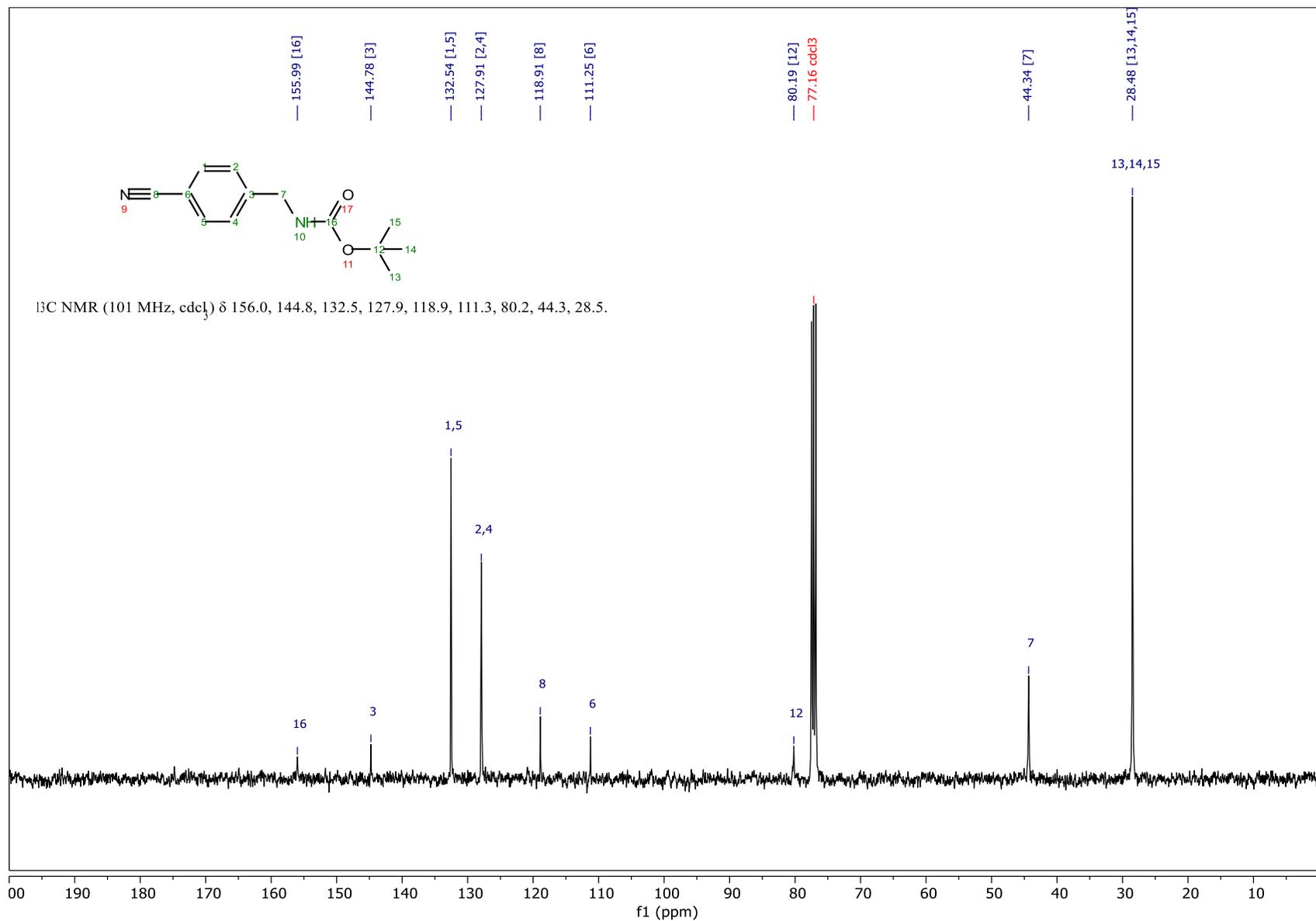
S-214

# Compound RBM5-116

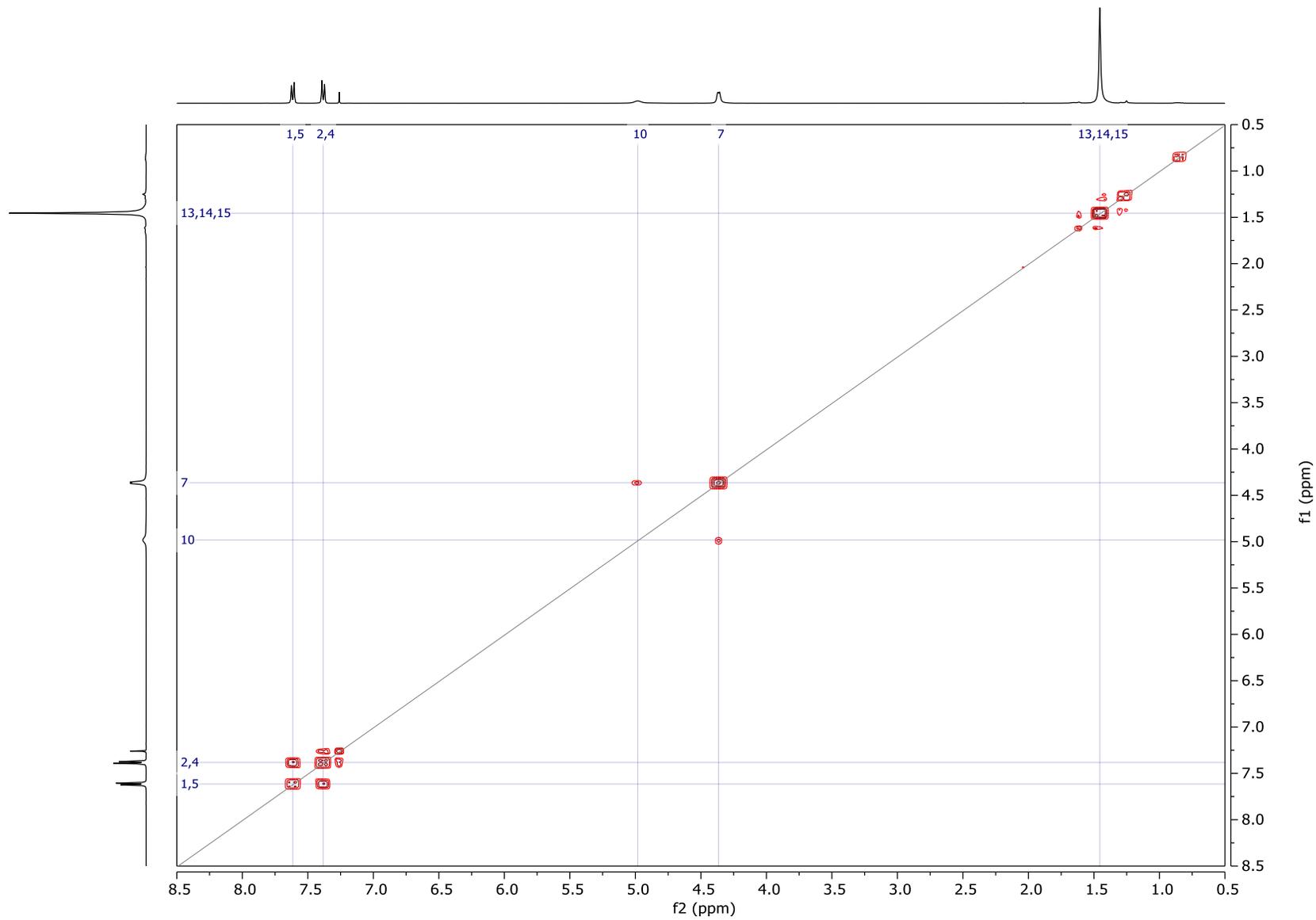
<sup>1</sup>H NMR



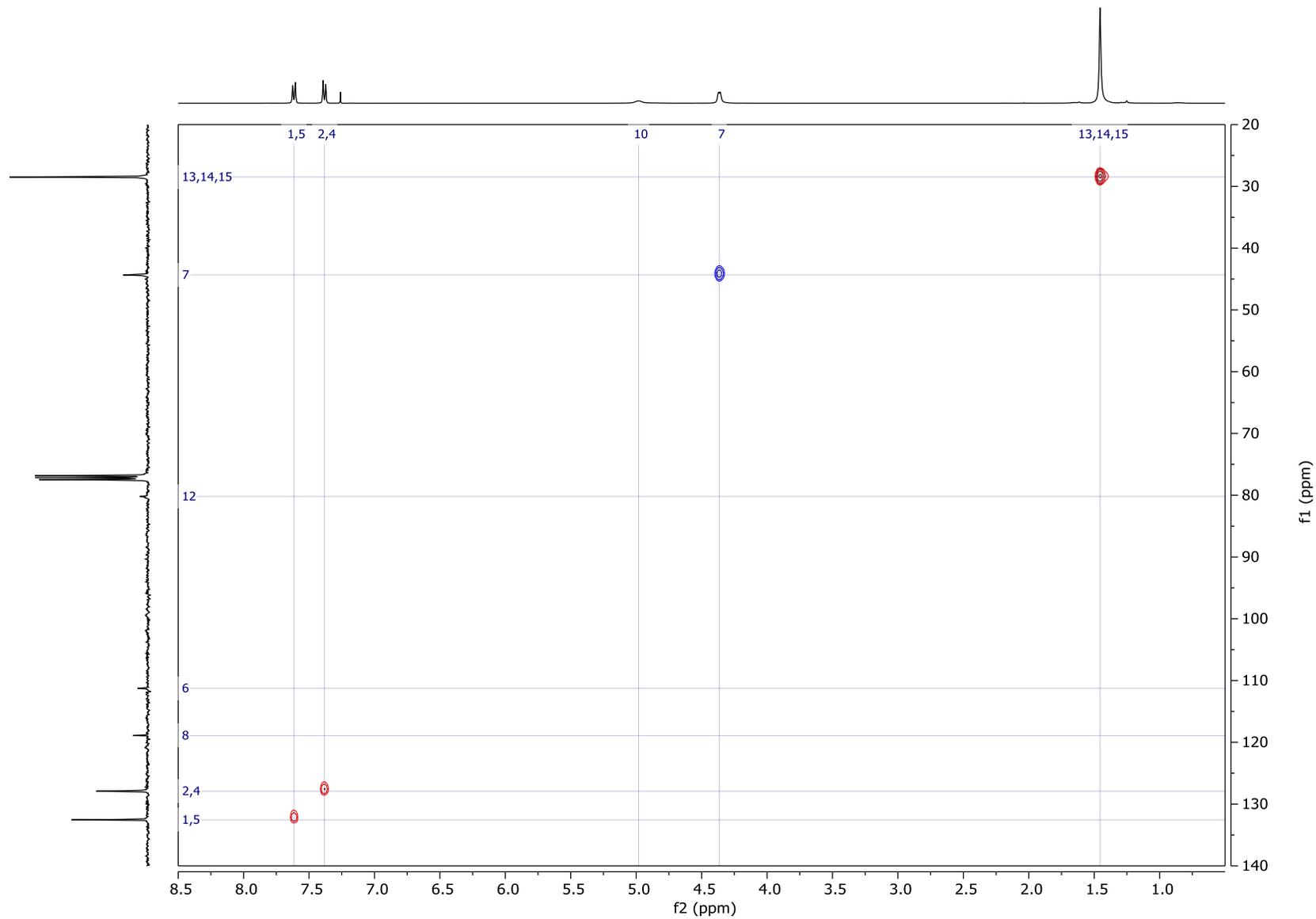
# $^{13}\text{C}$ NMR



COSY NMR

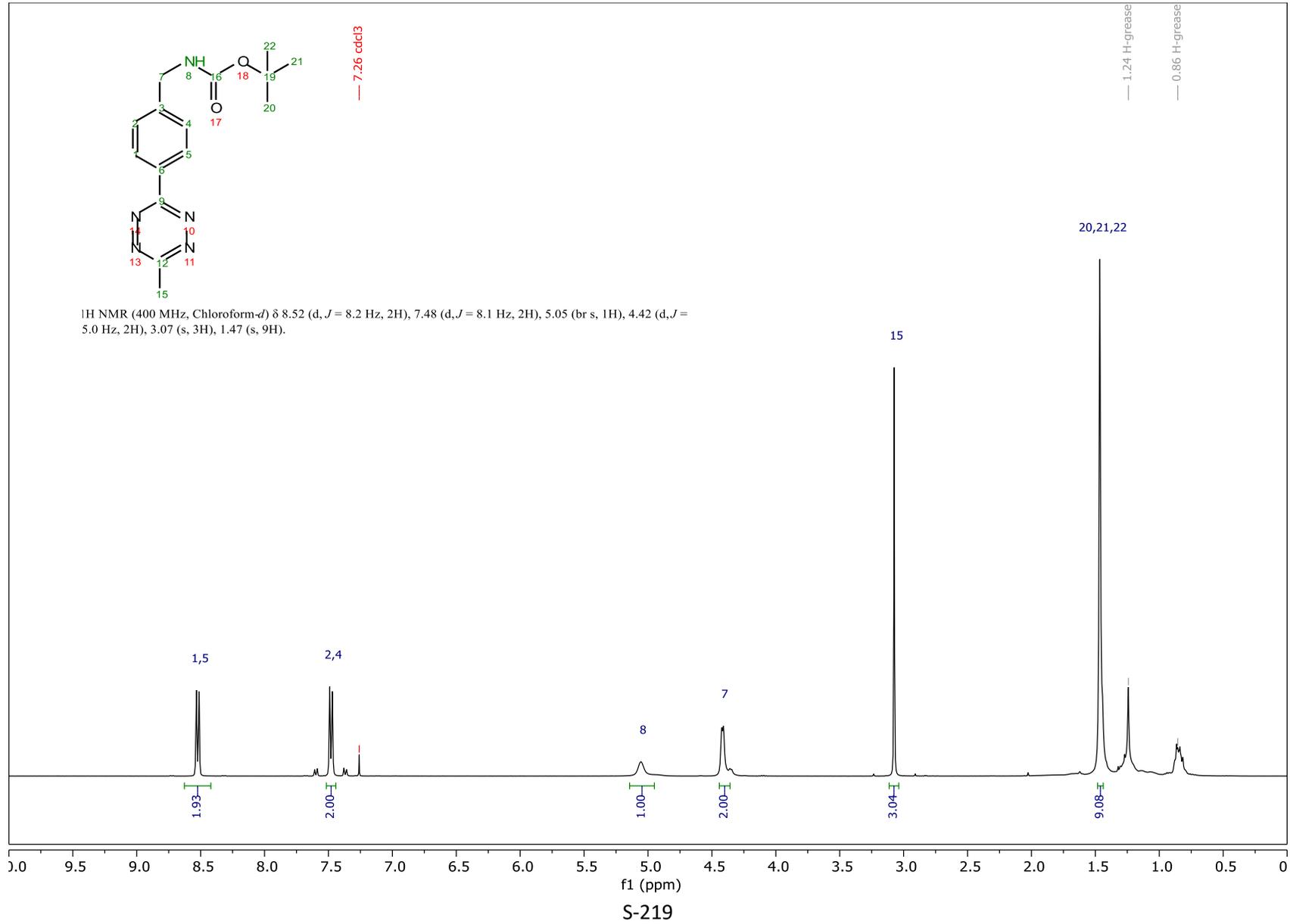


# HSQC NMR

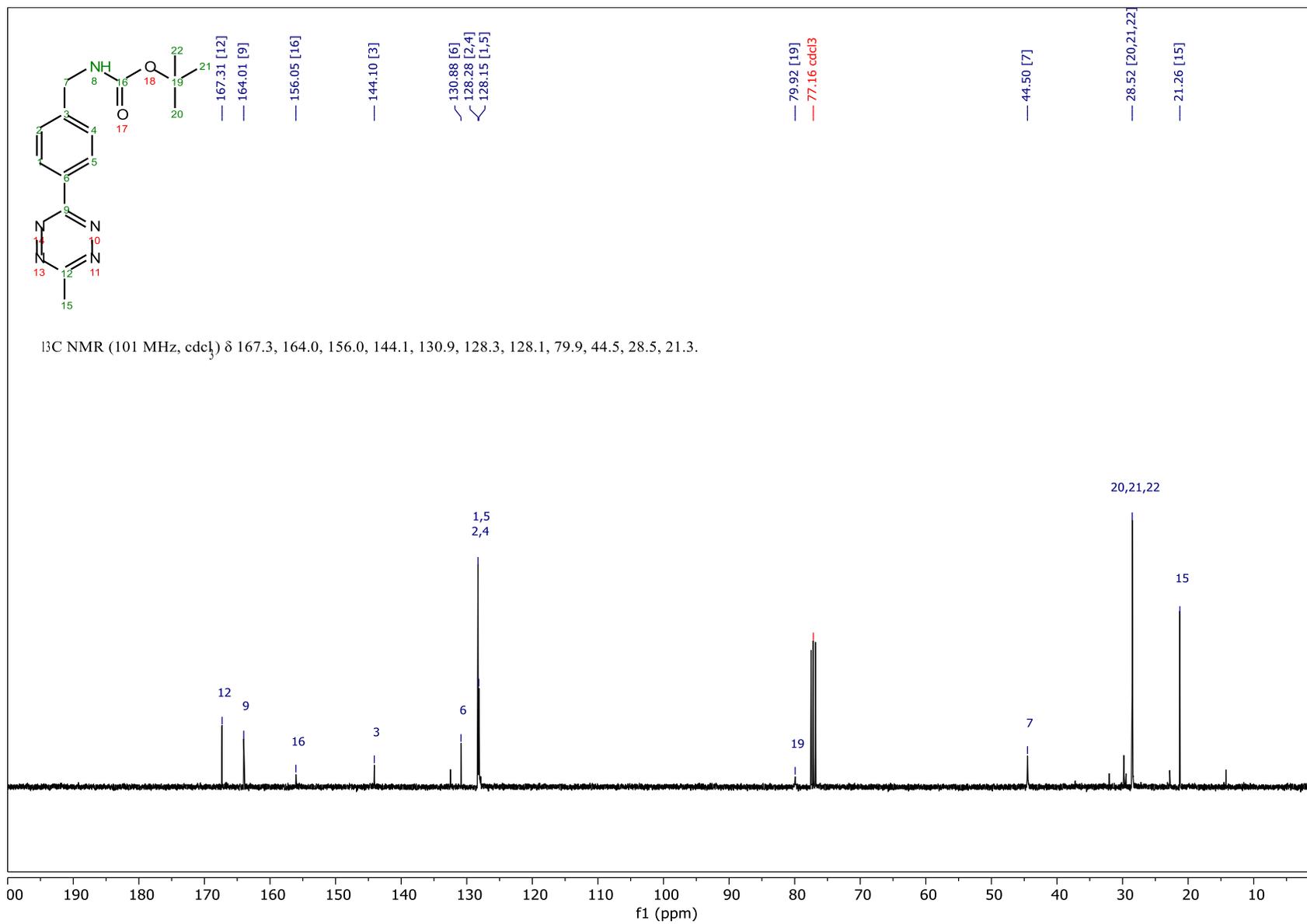


# Compound RBM5-117

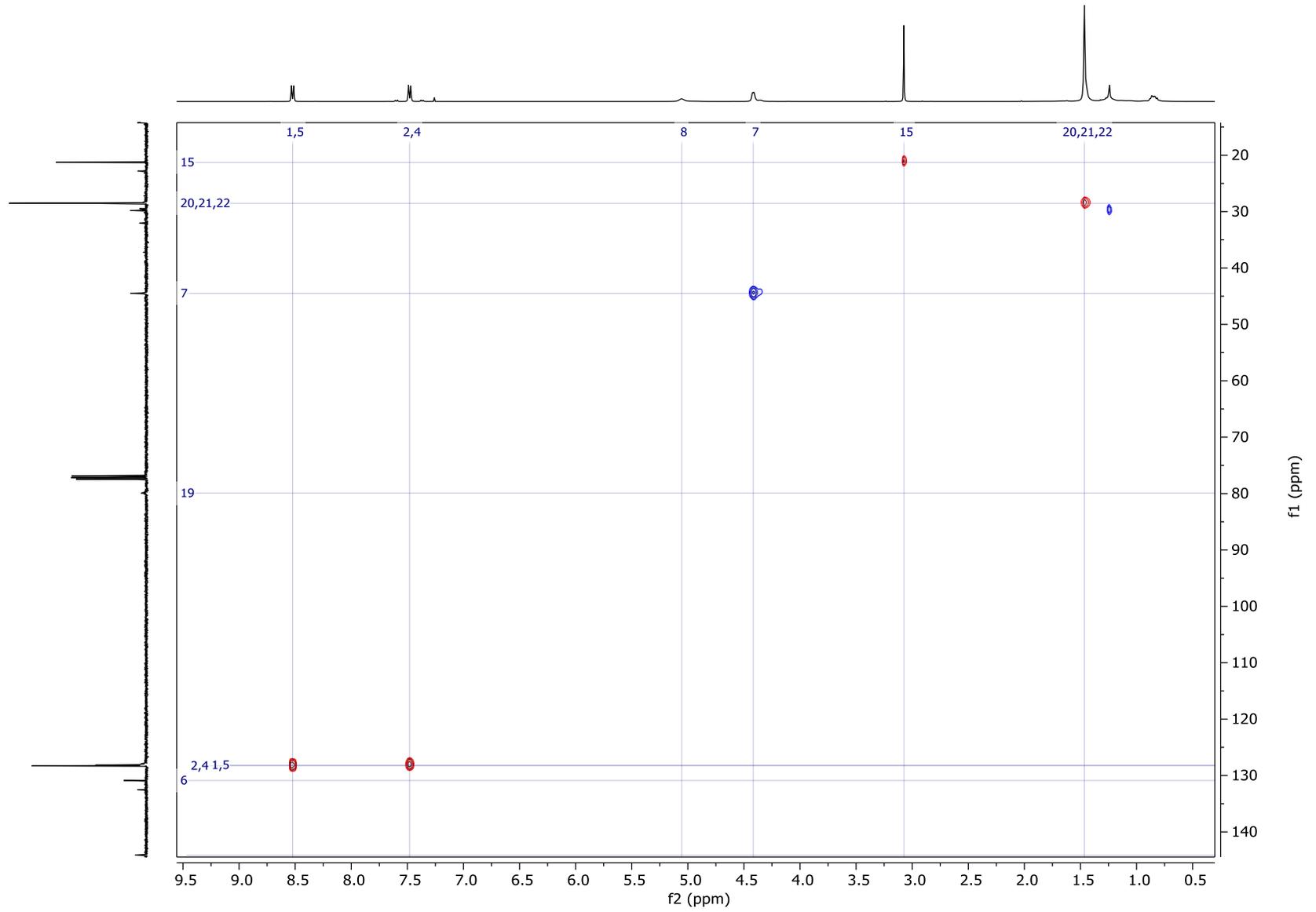
<sup>1</sup>H NMR



# <sup>13</sup>C NMR



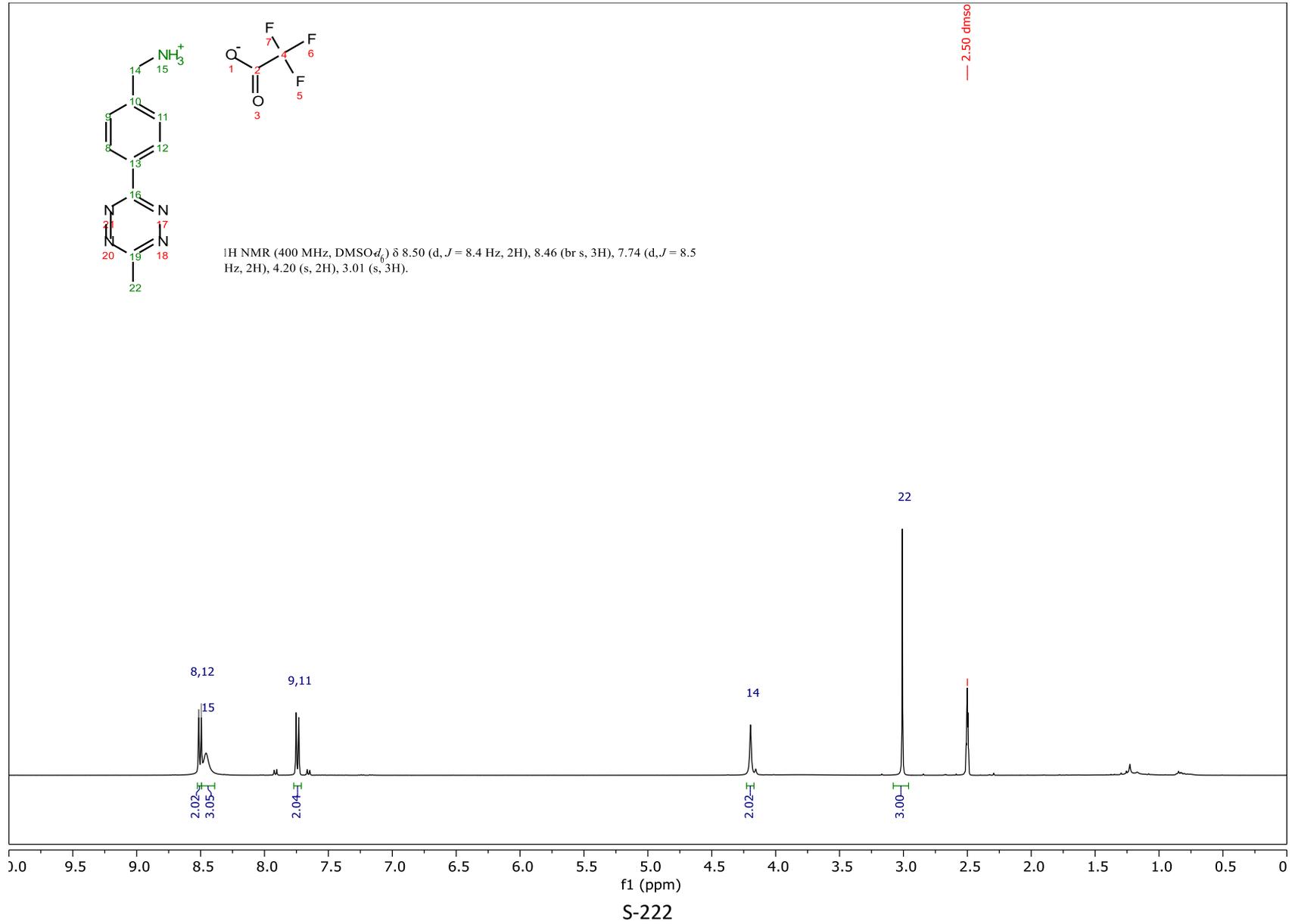
# HSQC NMR



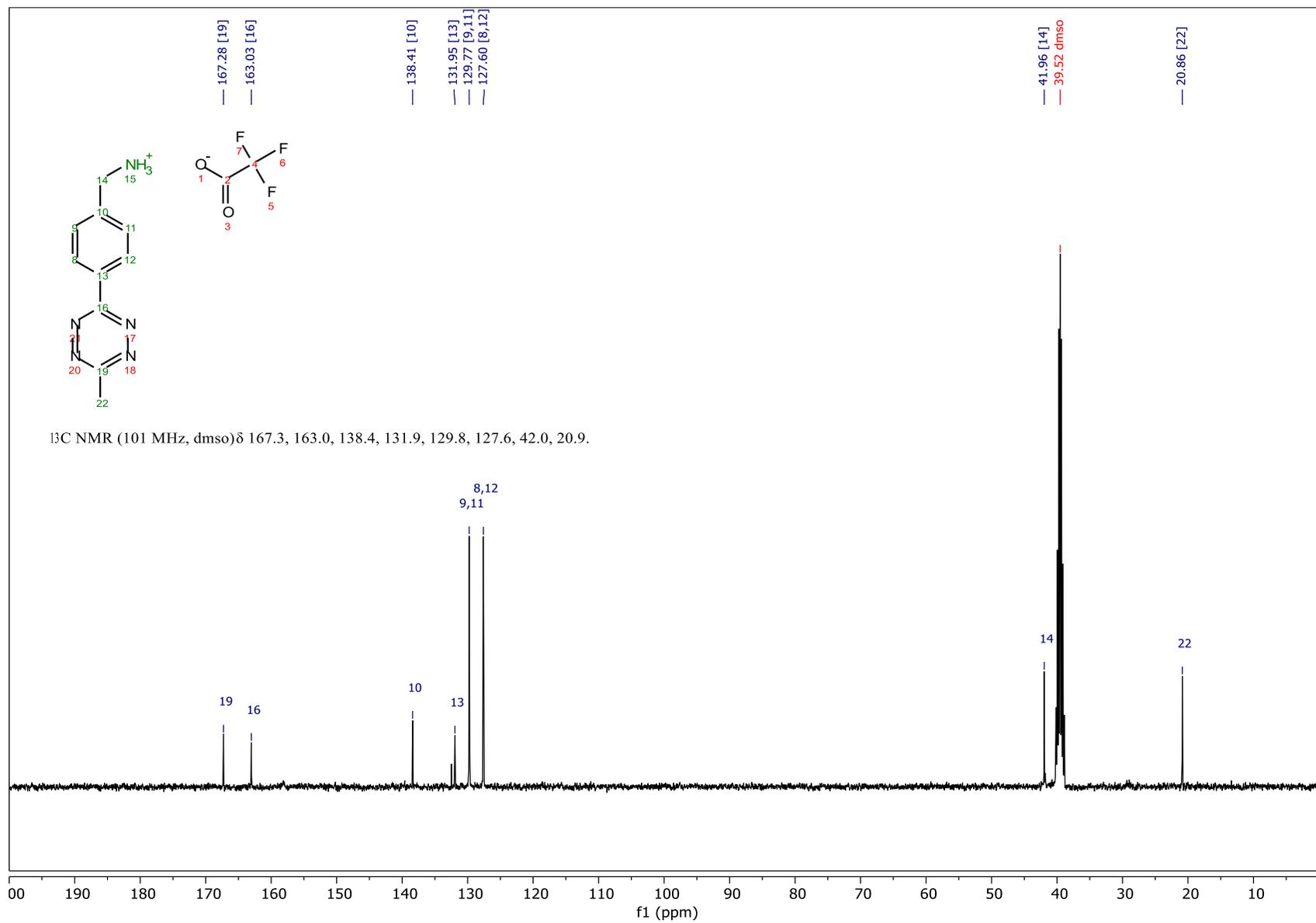
S-221

# Compound RBM5-118

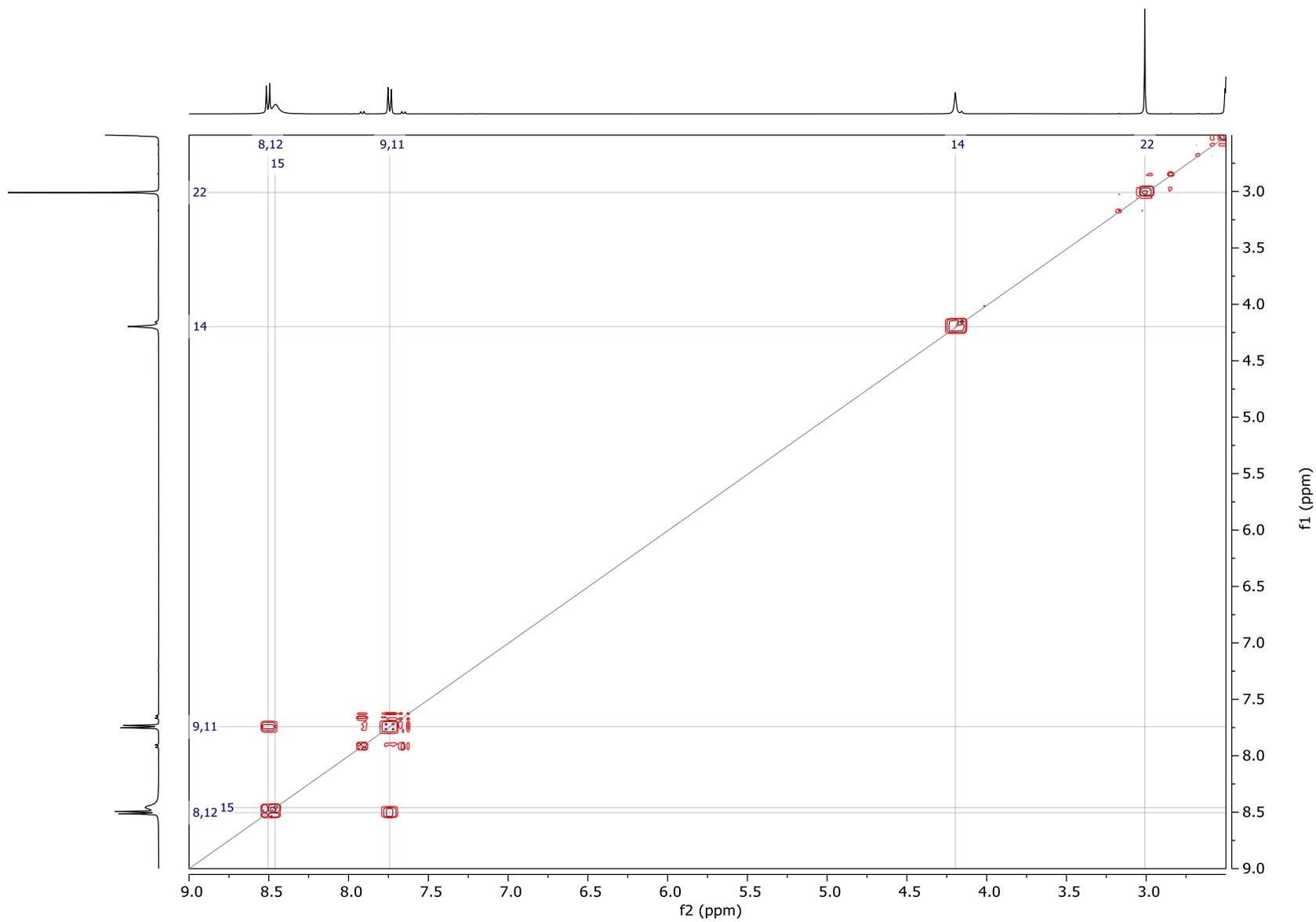
<sup>1</sup>H NMR



# $^{13}\text{C}$ NMR

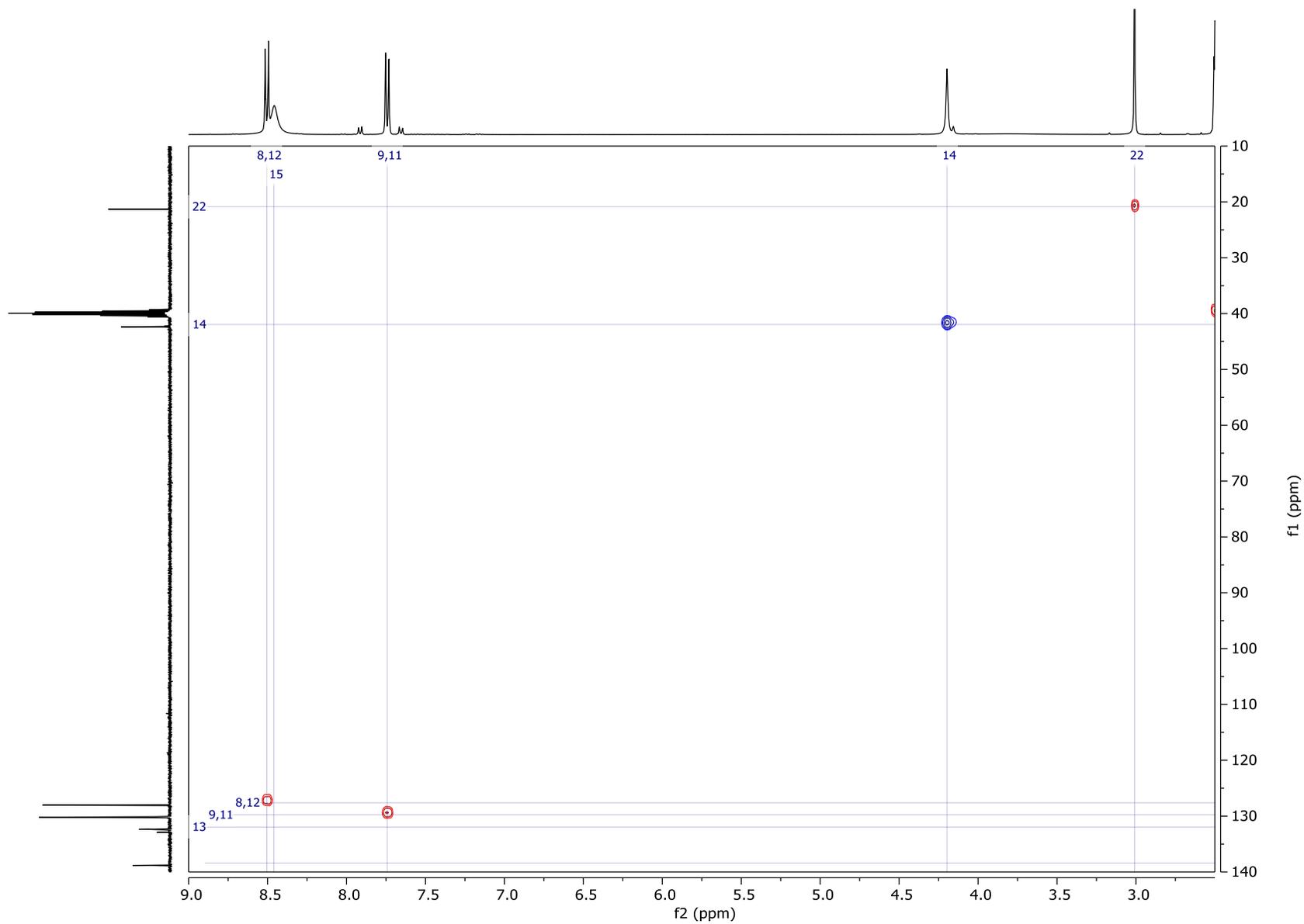


# COSY NMR



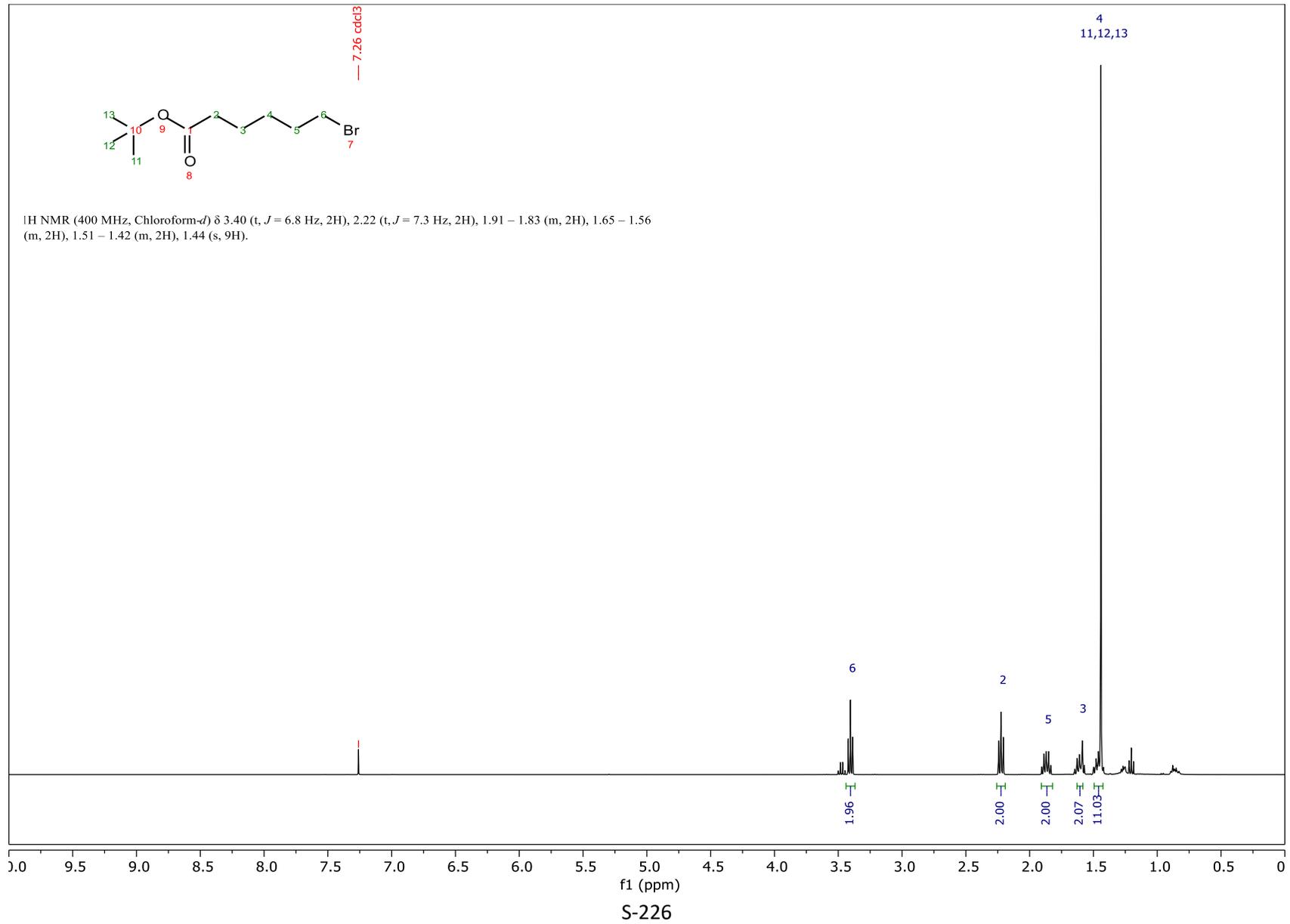
S-224

HSQC NMR

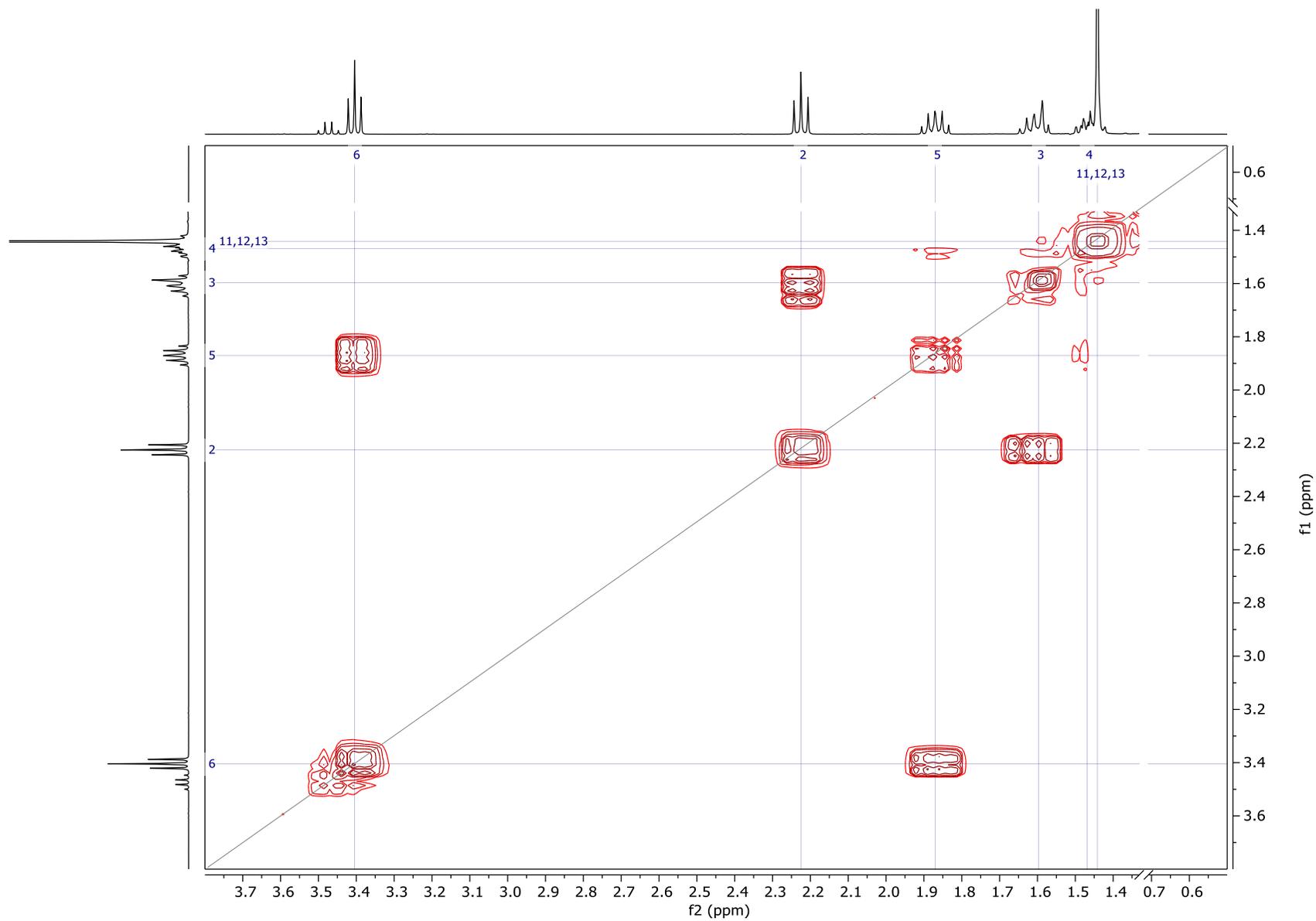


# Compound RBM5-119

$^1\text{H}$  NMR

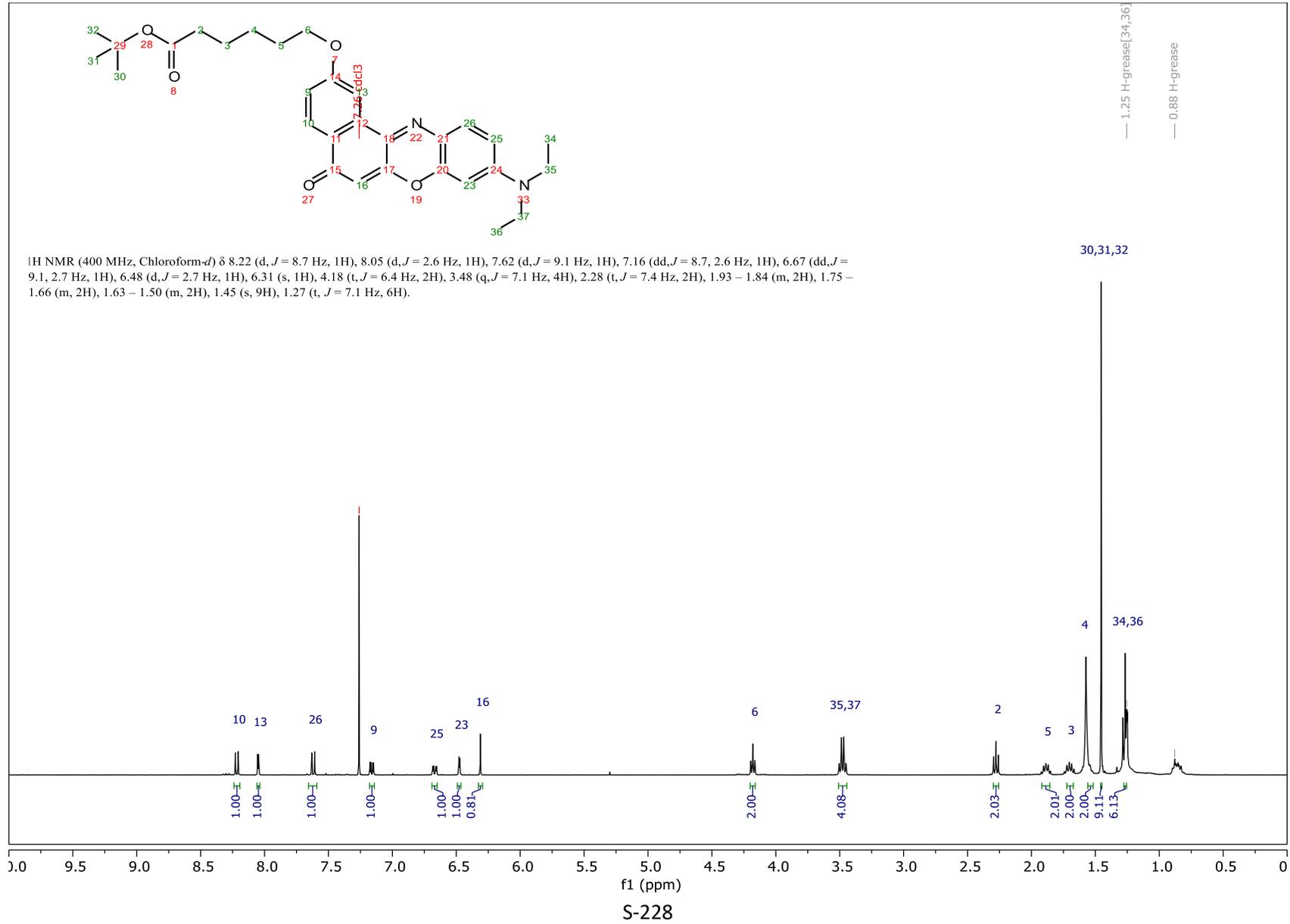


$^{13}\text{C}$  NMR



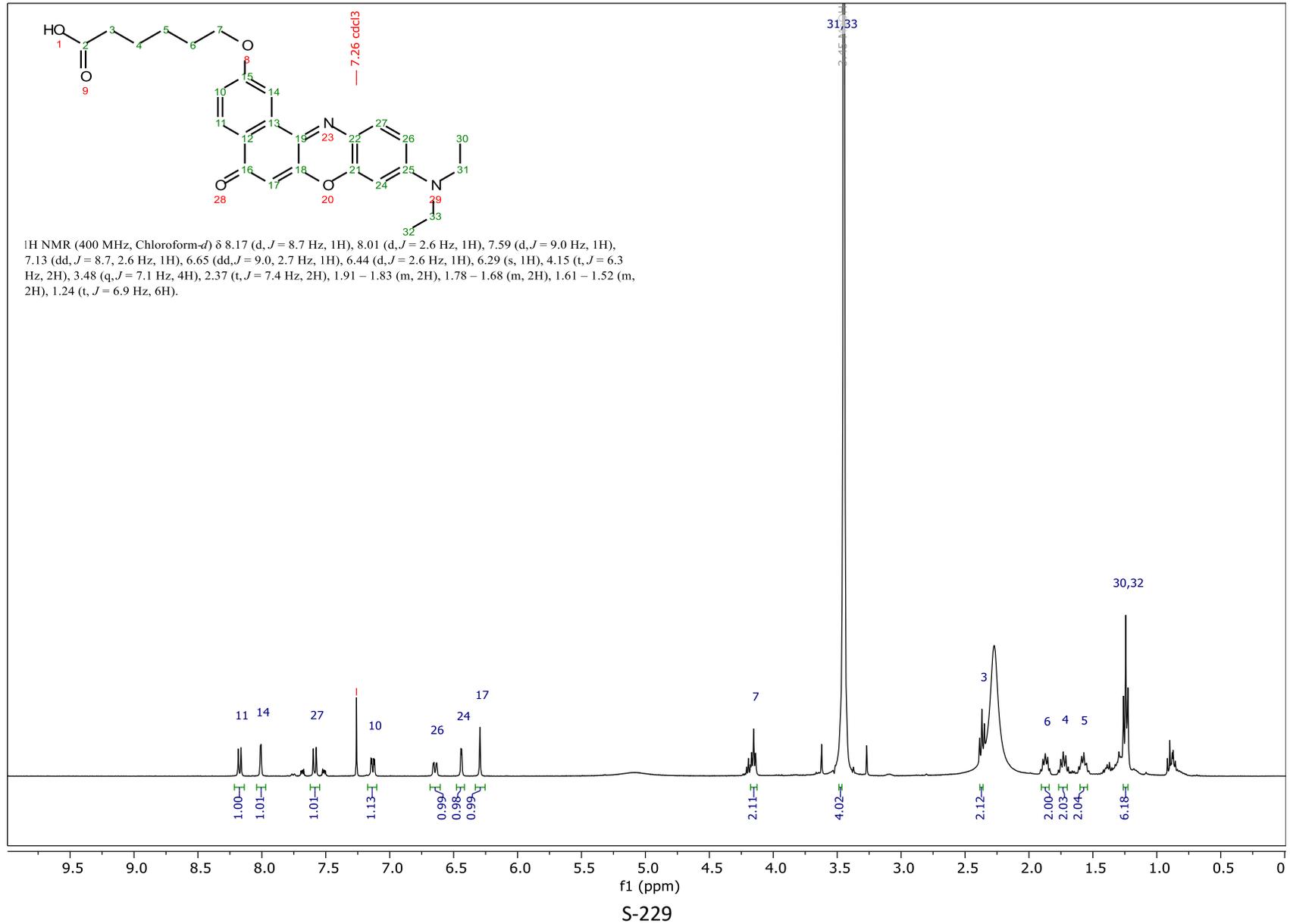
# Compound RBM5-120

$^1\text{H NMR}$

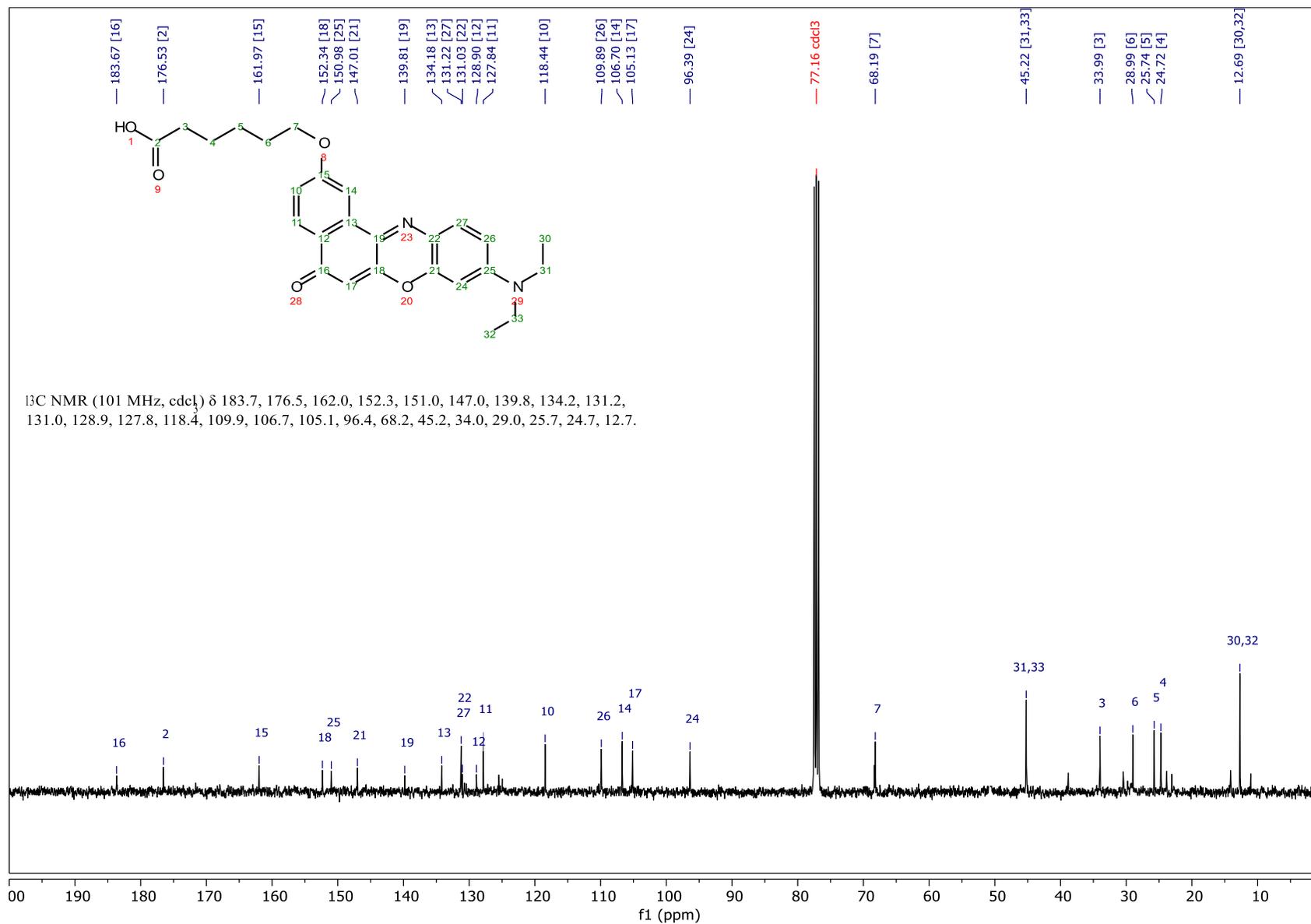


# Compound RBM5-121

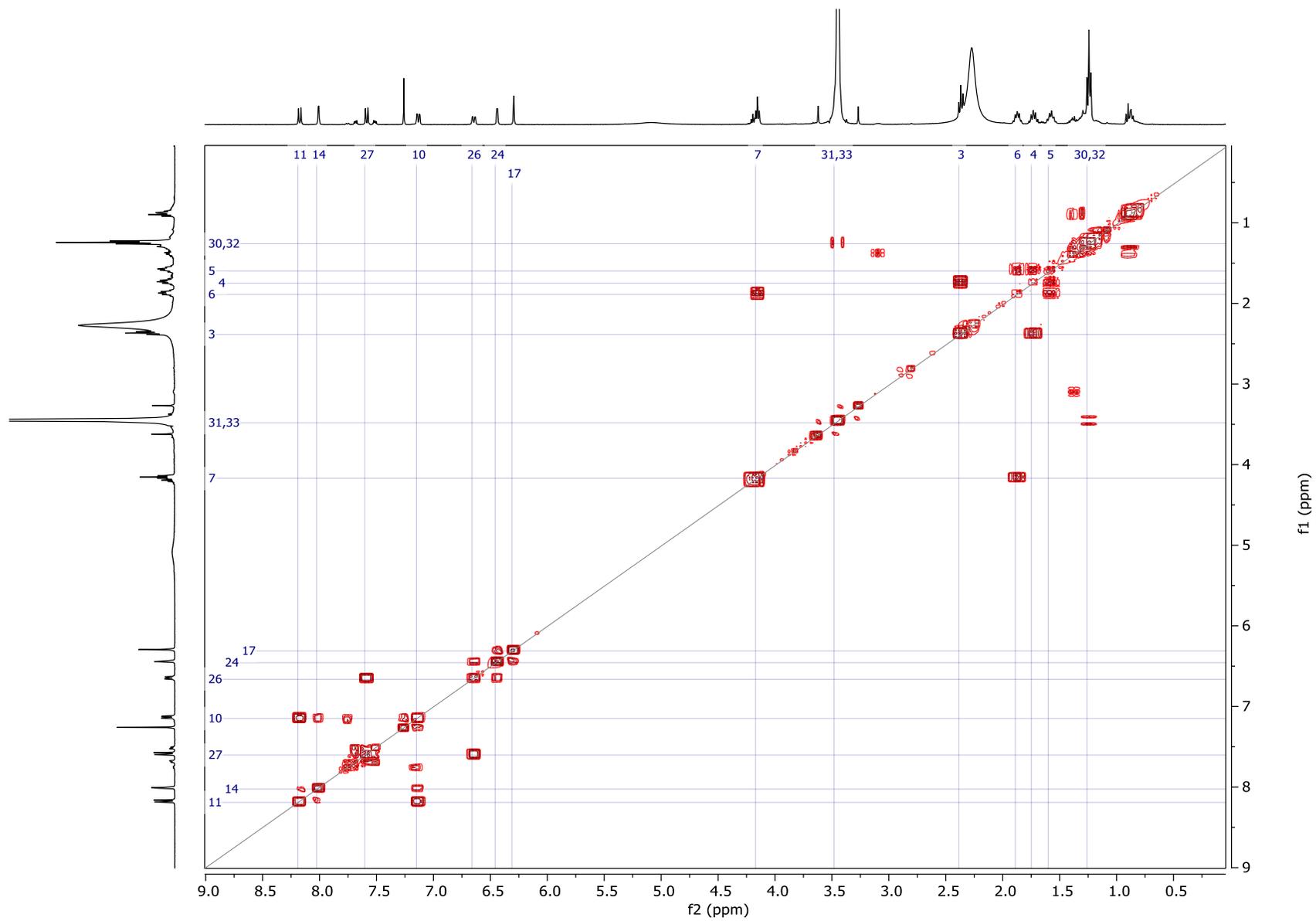
<sup>1</sup>H NMR



<sup>13</sup>C NMR

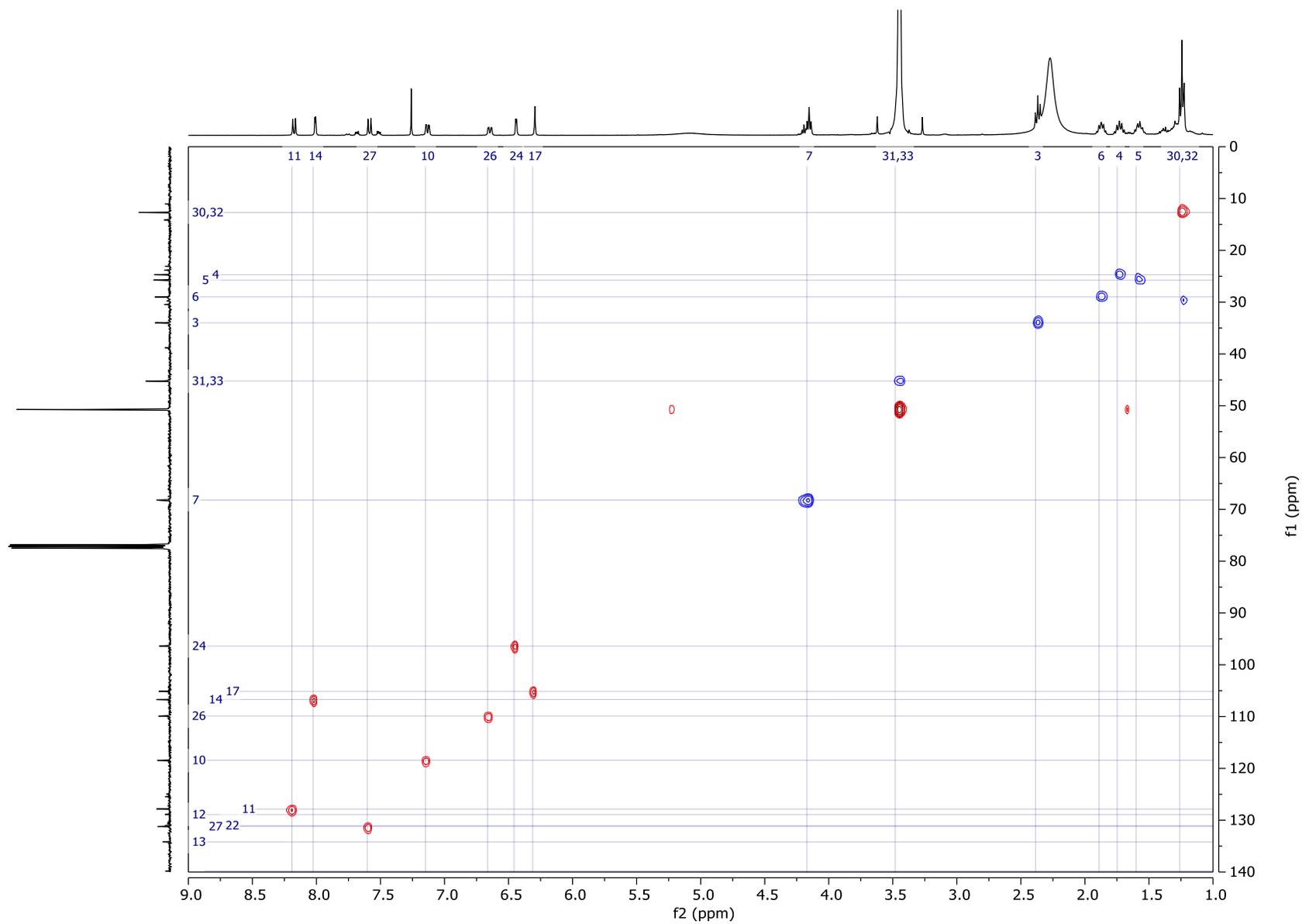


# COSY NMR



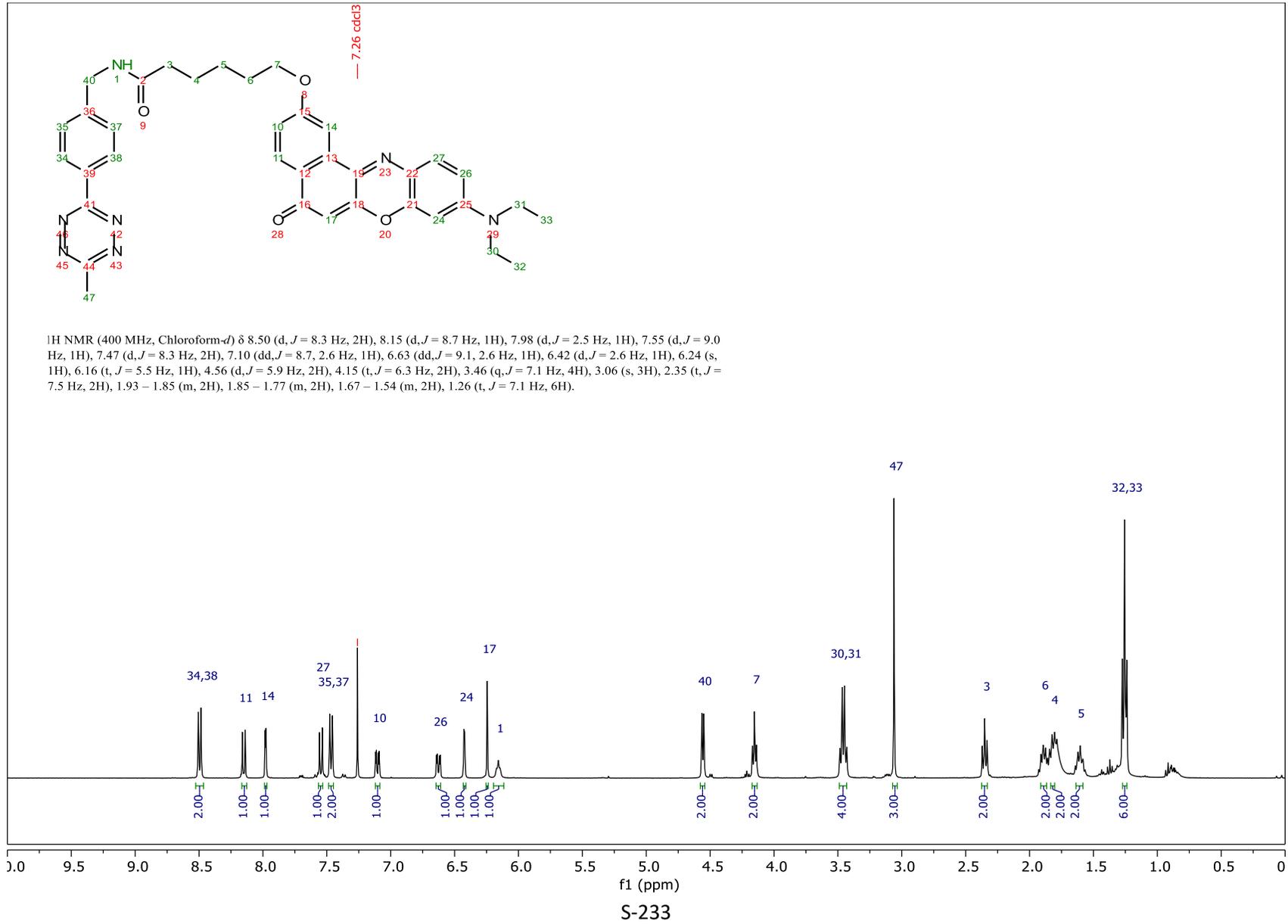
S-231

# HSQC NMR

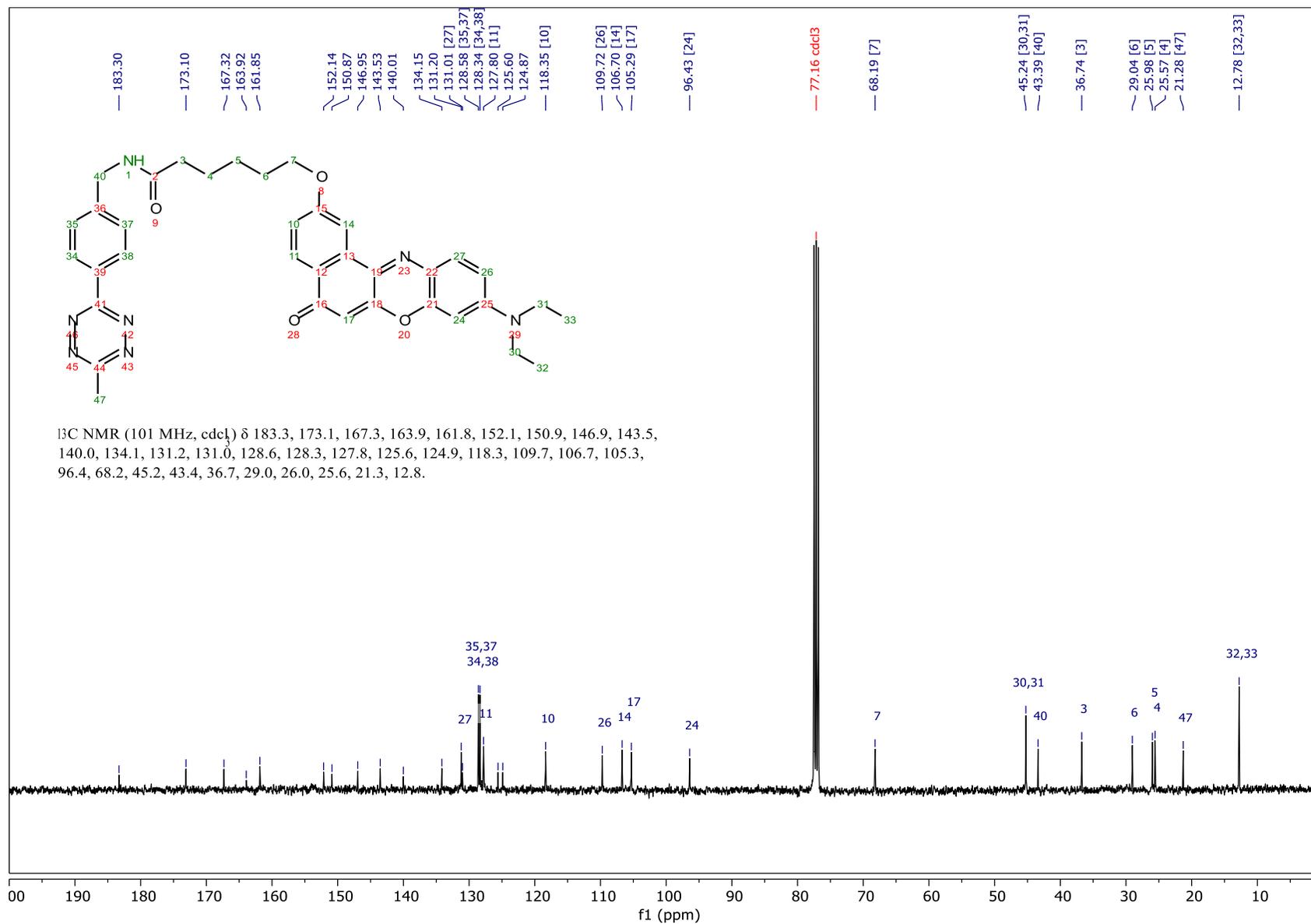


# Compound RBM5-122

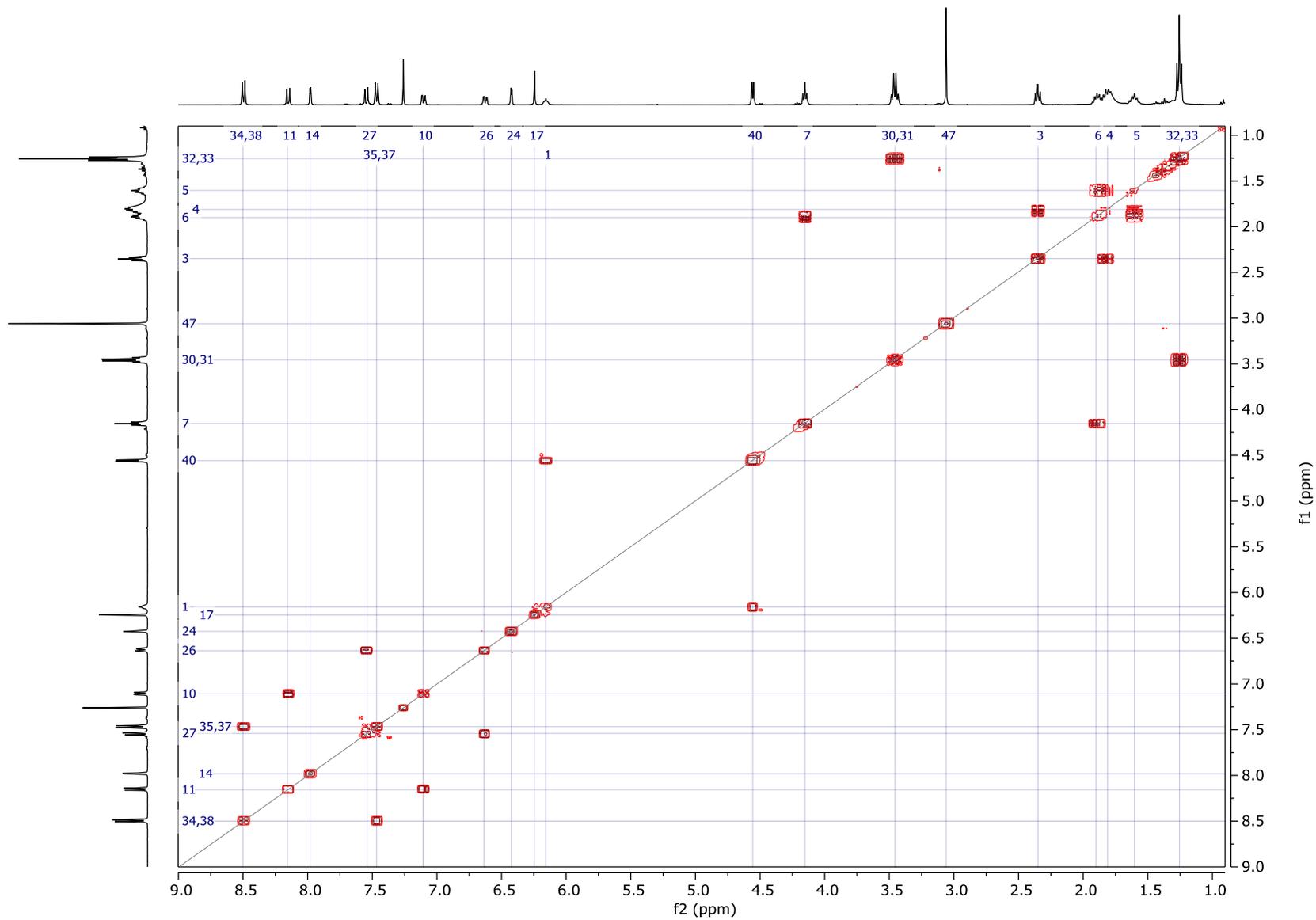
$^1\text{H}$  NMR



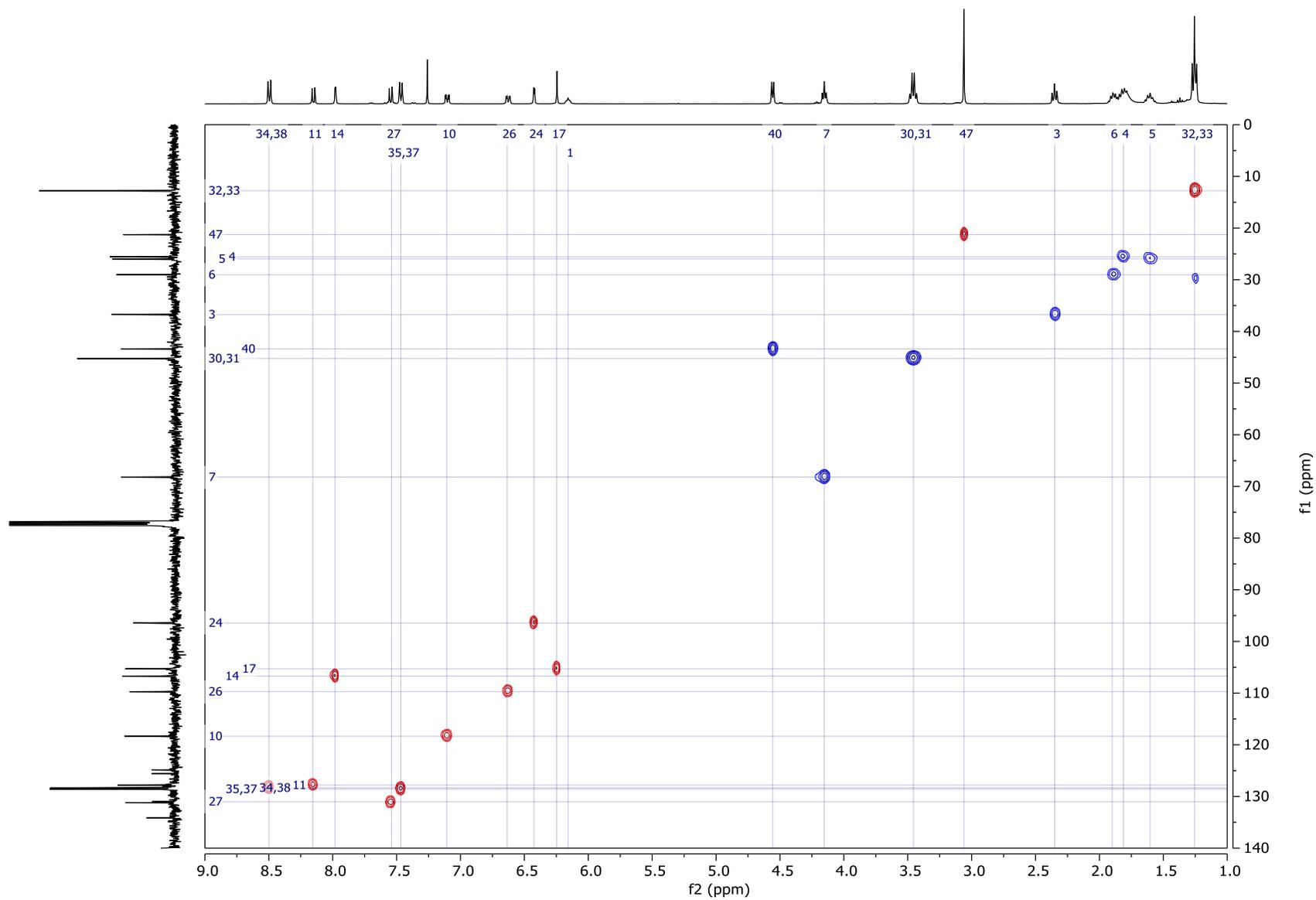
# <sup>13</sup>C NMR



# COSY NMR

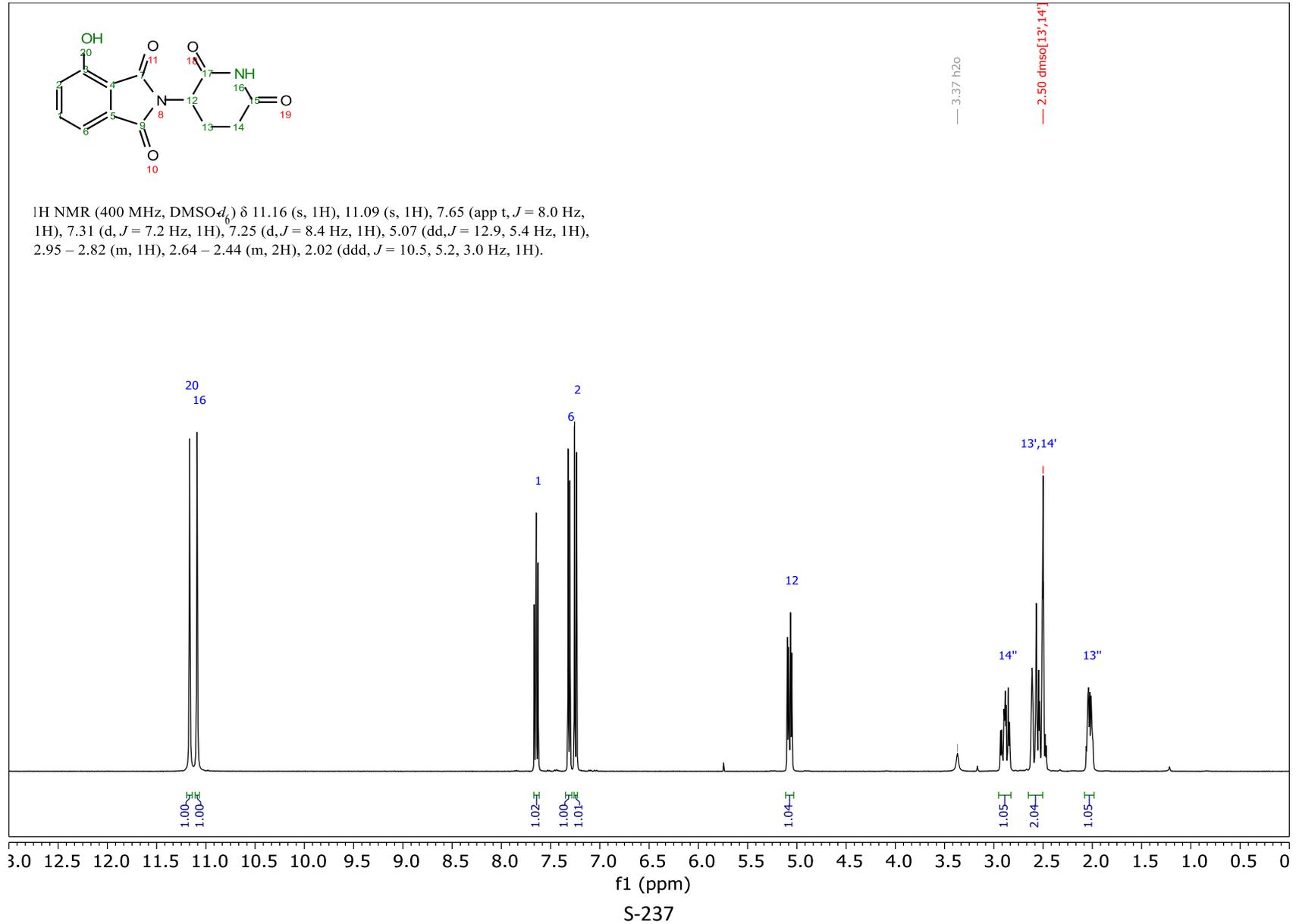


# HSQC NMR

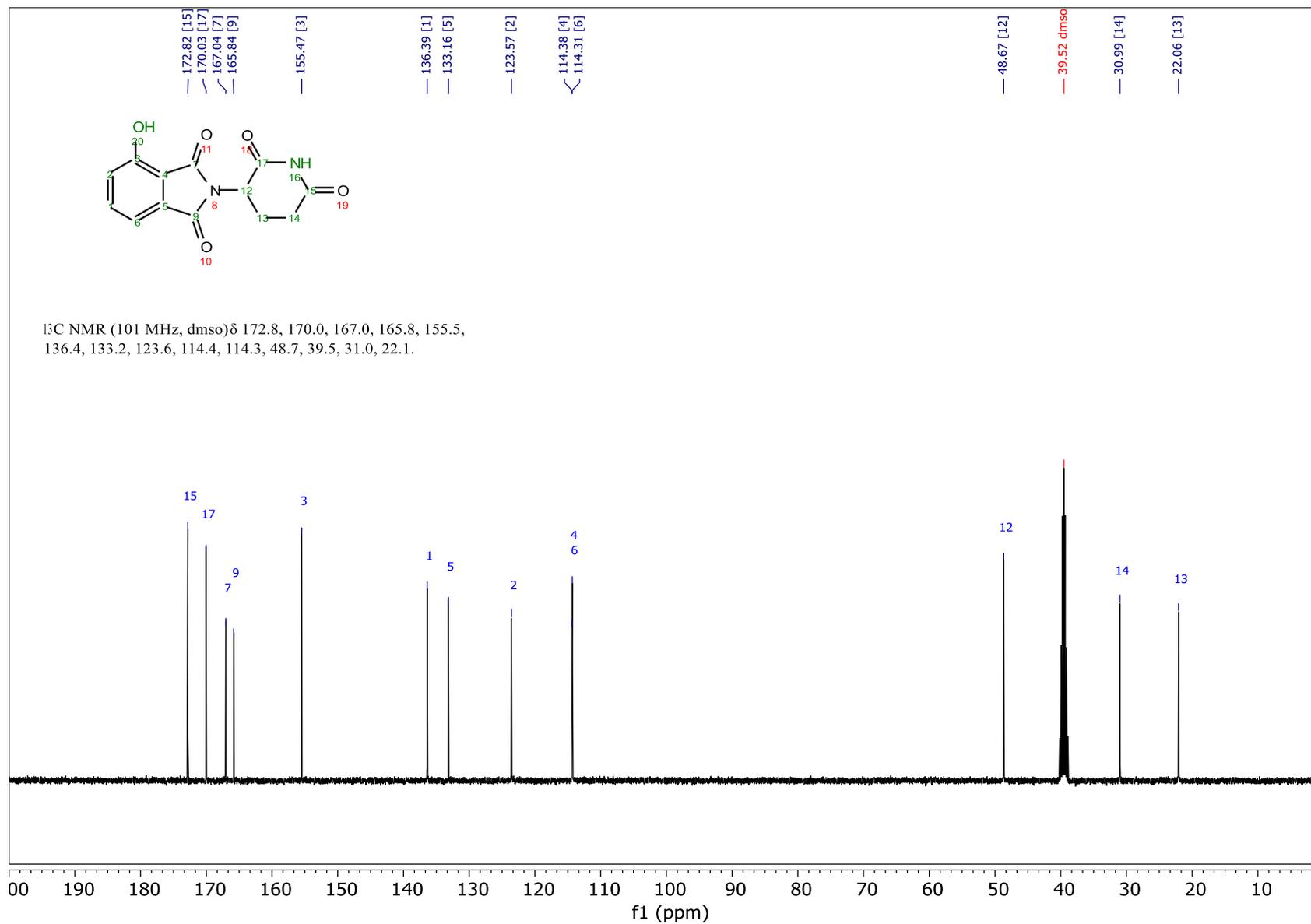


# Compound RBM5-123

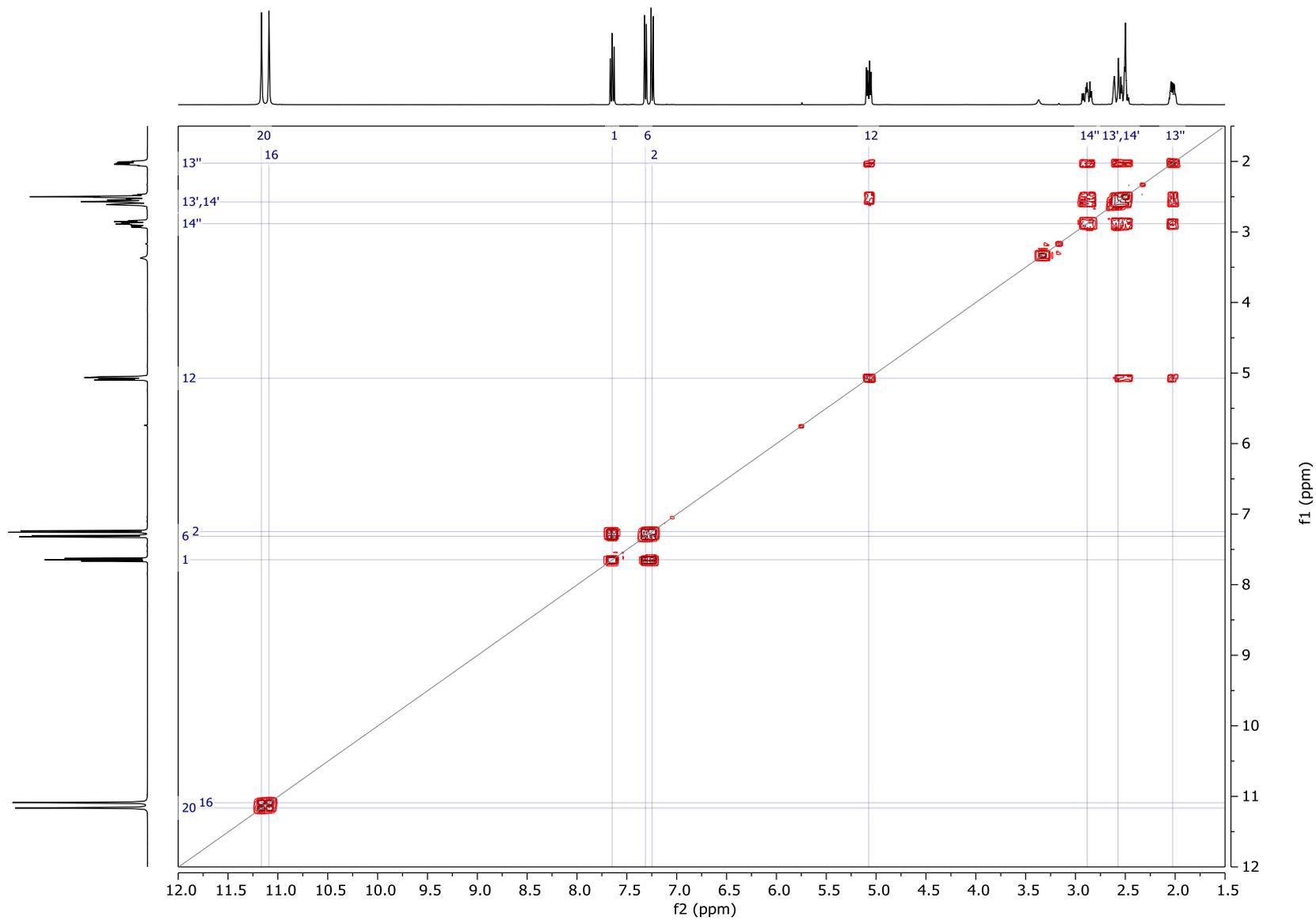
<sup>1</sup>H NMR



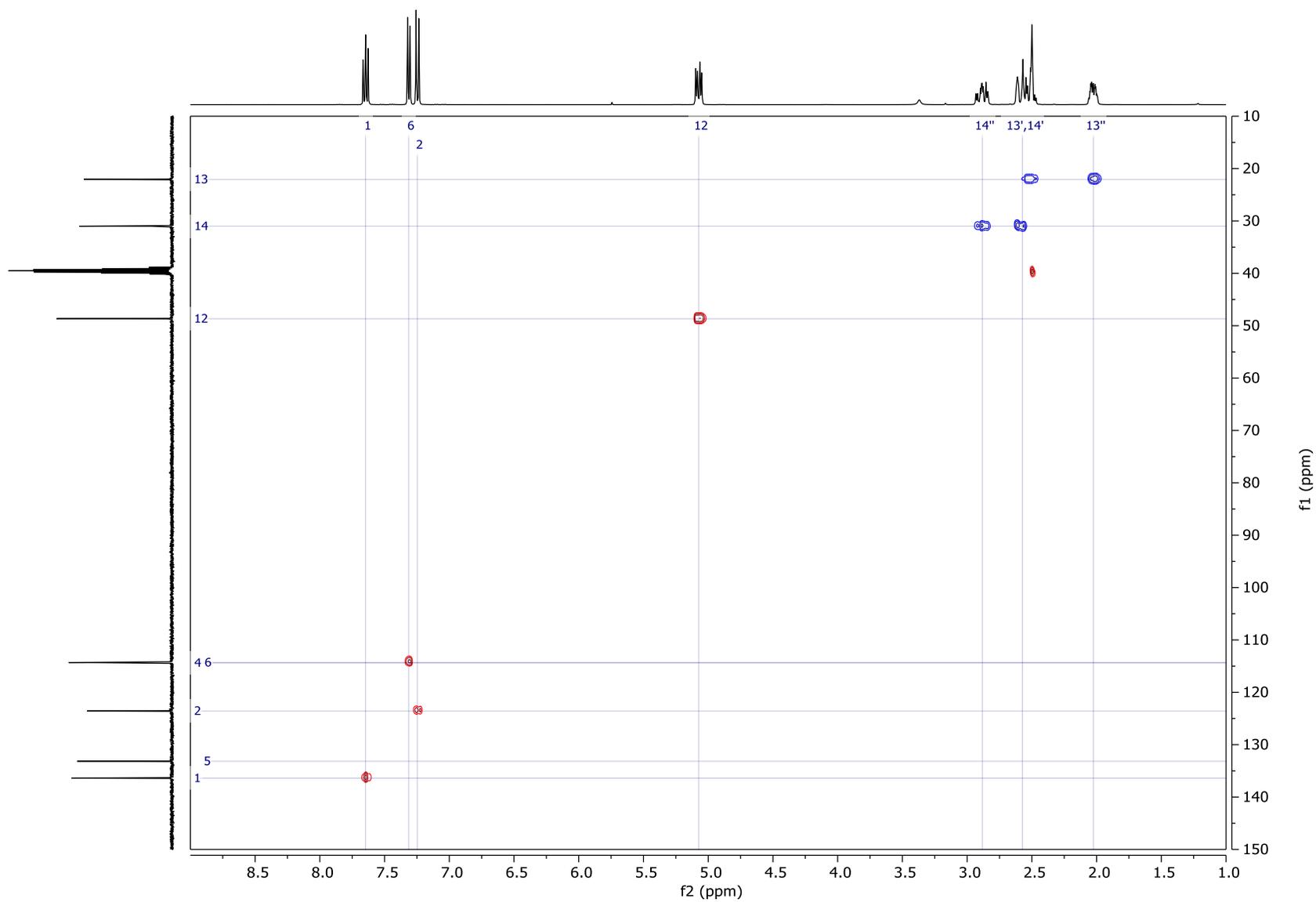
<sup>13</sup>C NMR



# COSY NMR

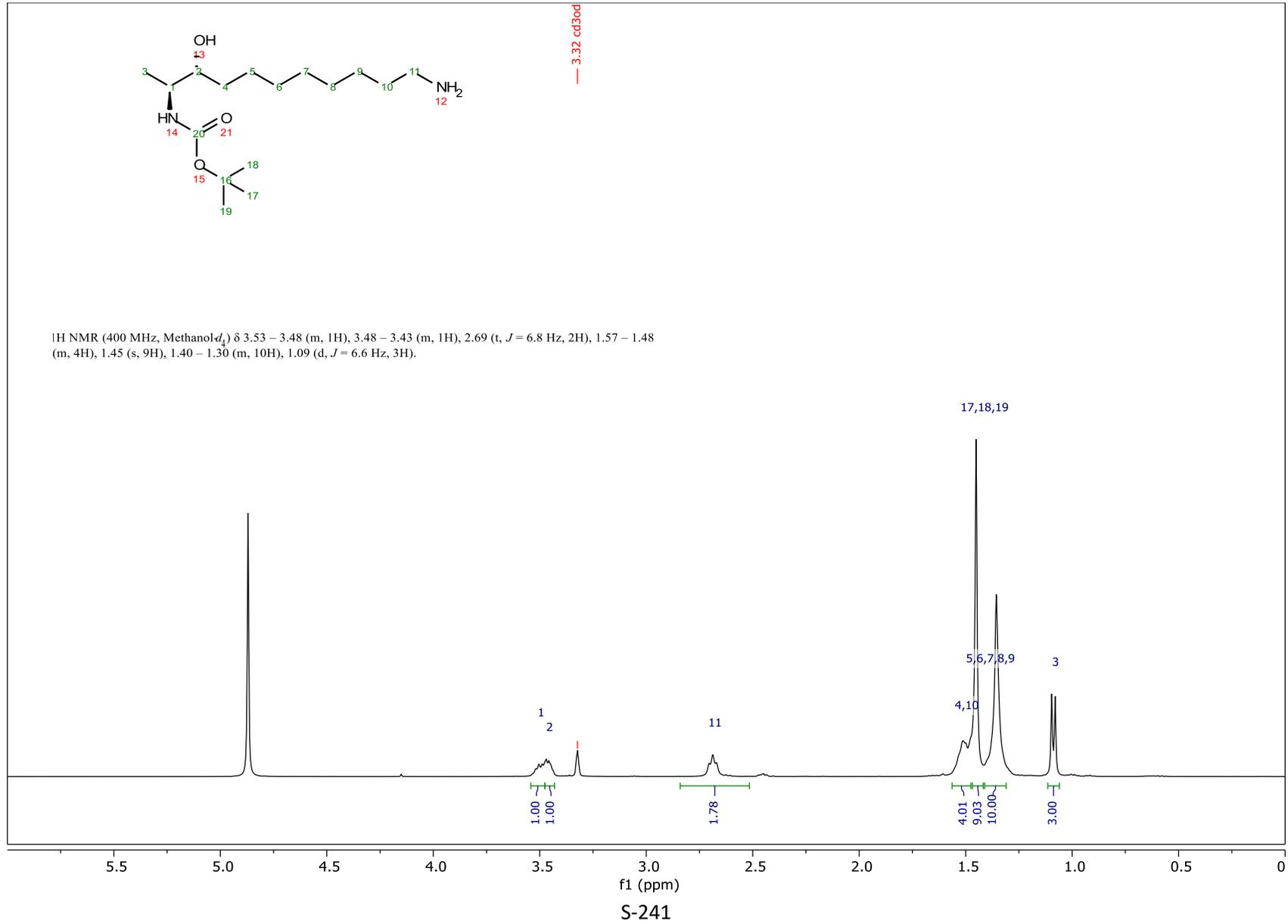


# HSQC NMR

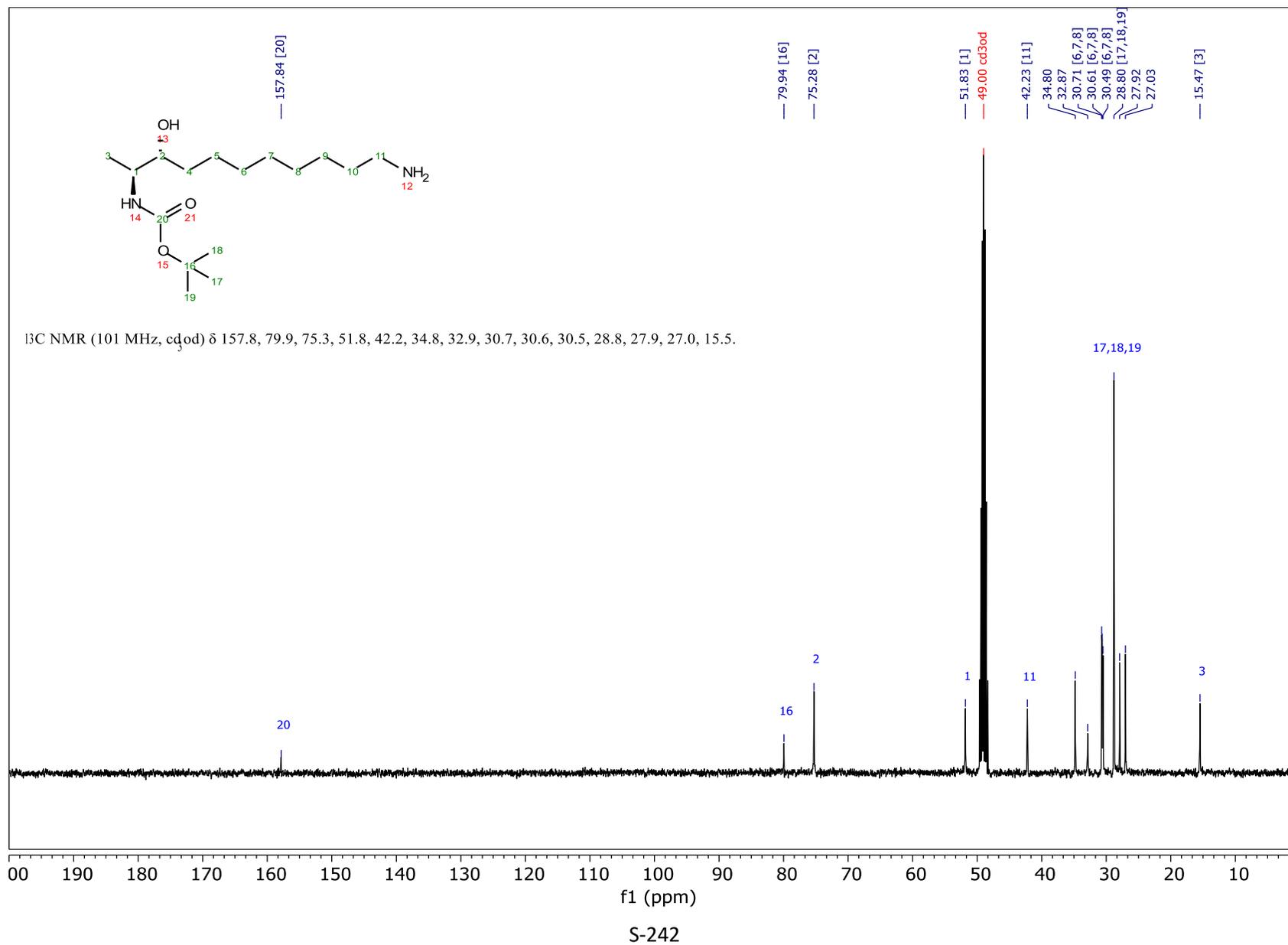


# Compound RBM5-127

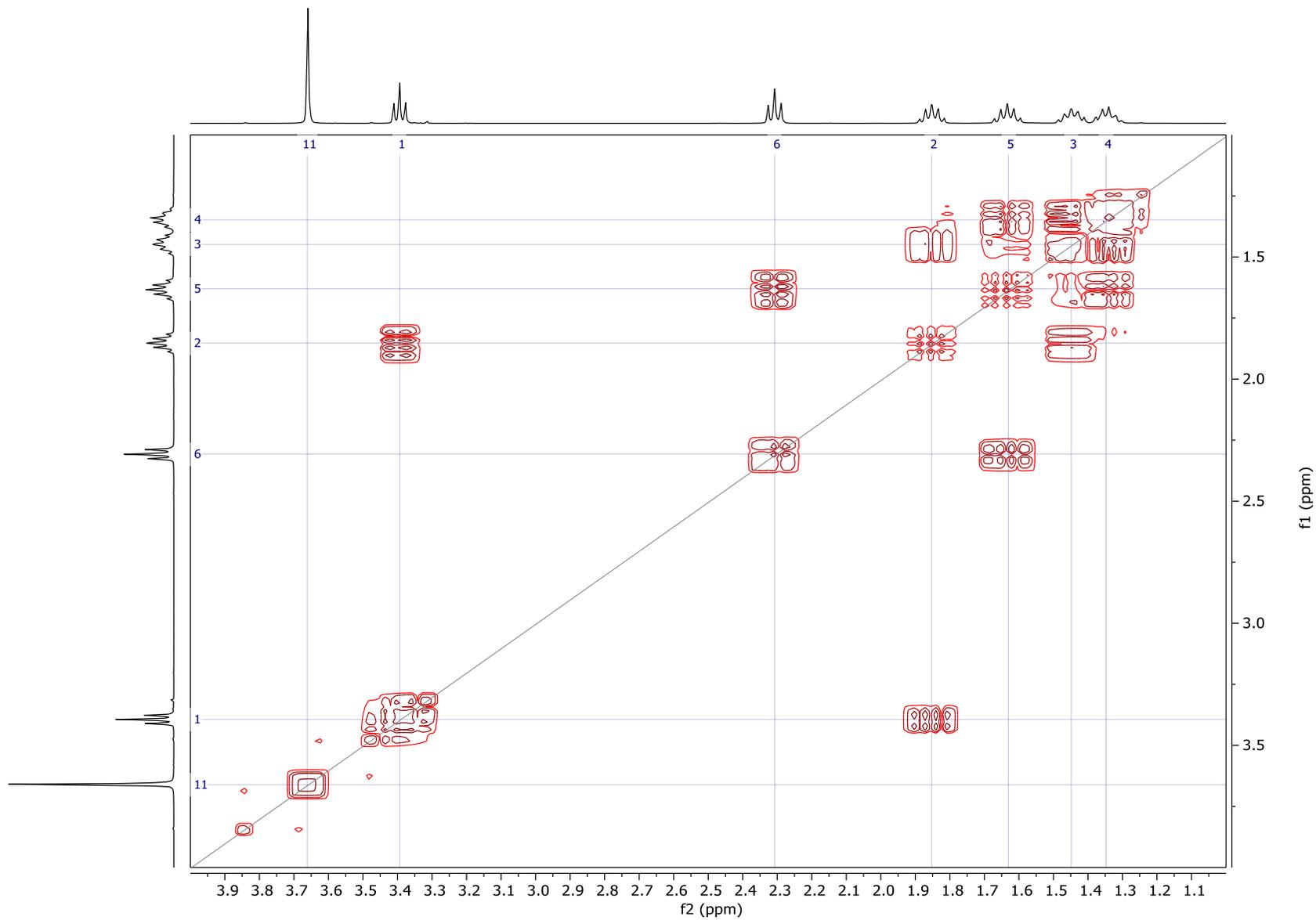
$^1\text{H}$  NMR



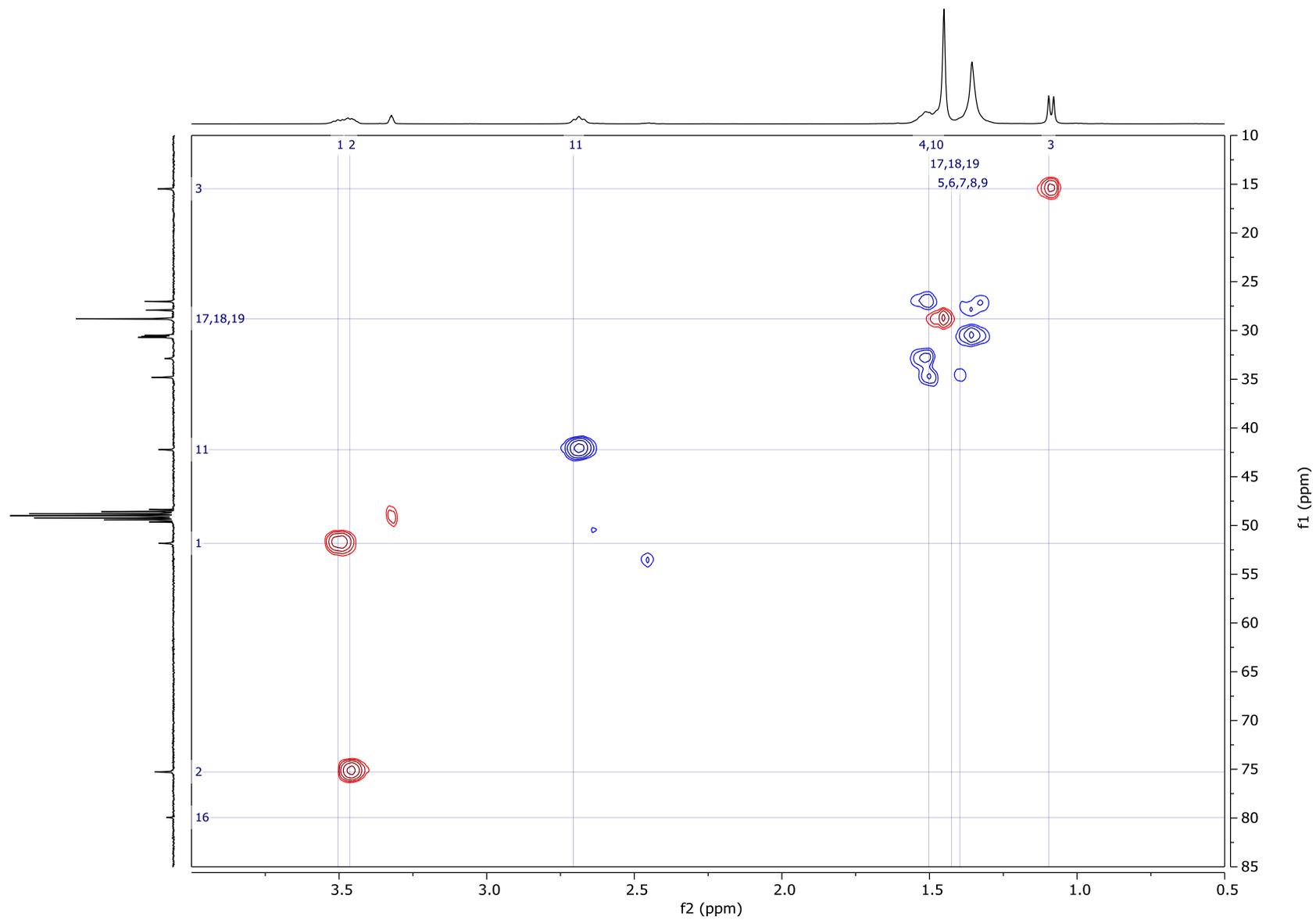
# <sup>13</sup>C NMR



# COSY NMR



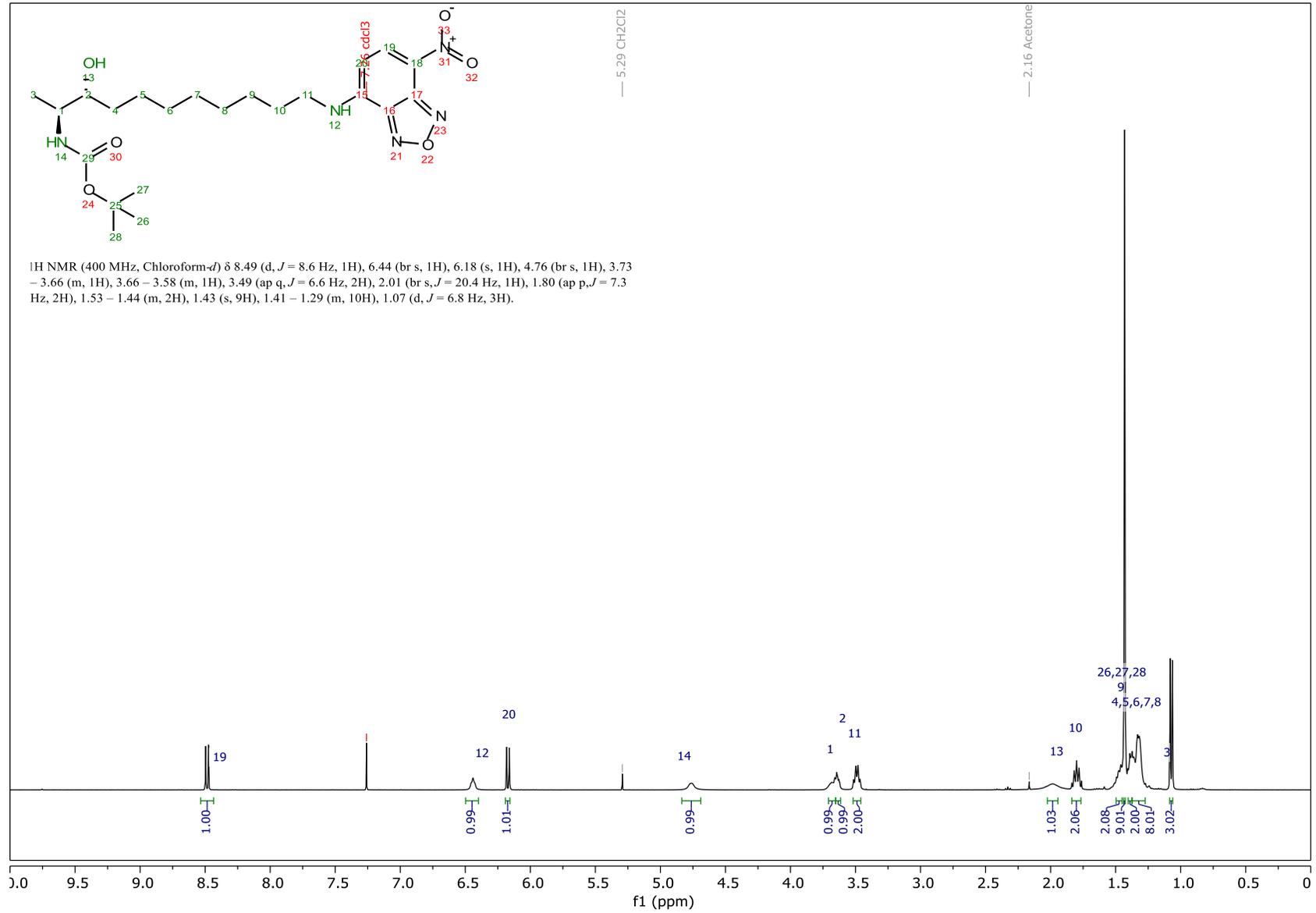
# HSQC NMR



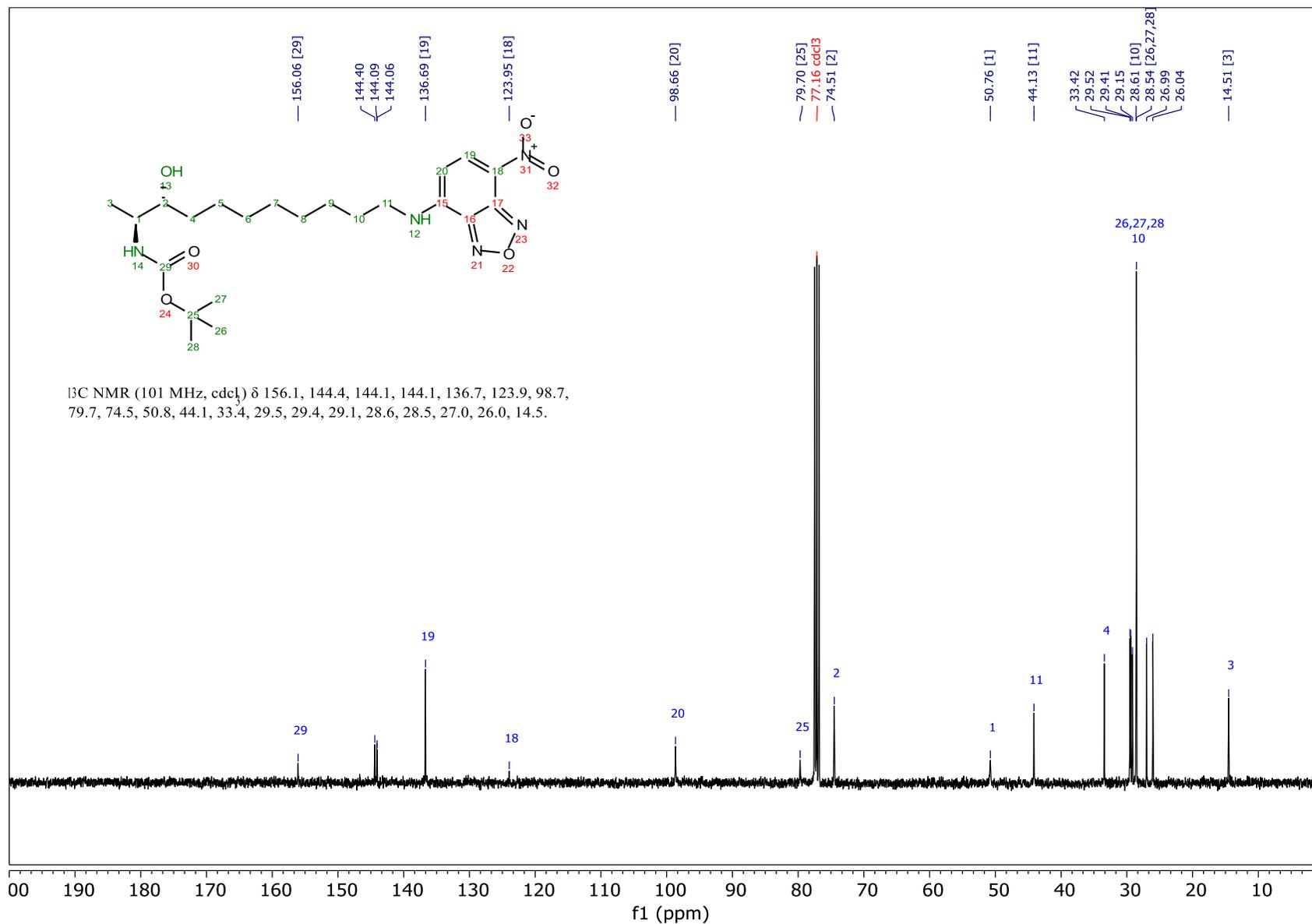
S-244

# Compound RBM5-128

<sup>1</sup>H NMR

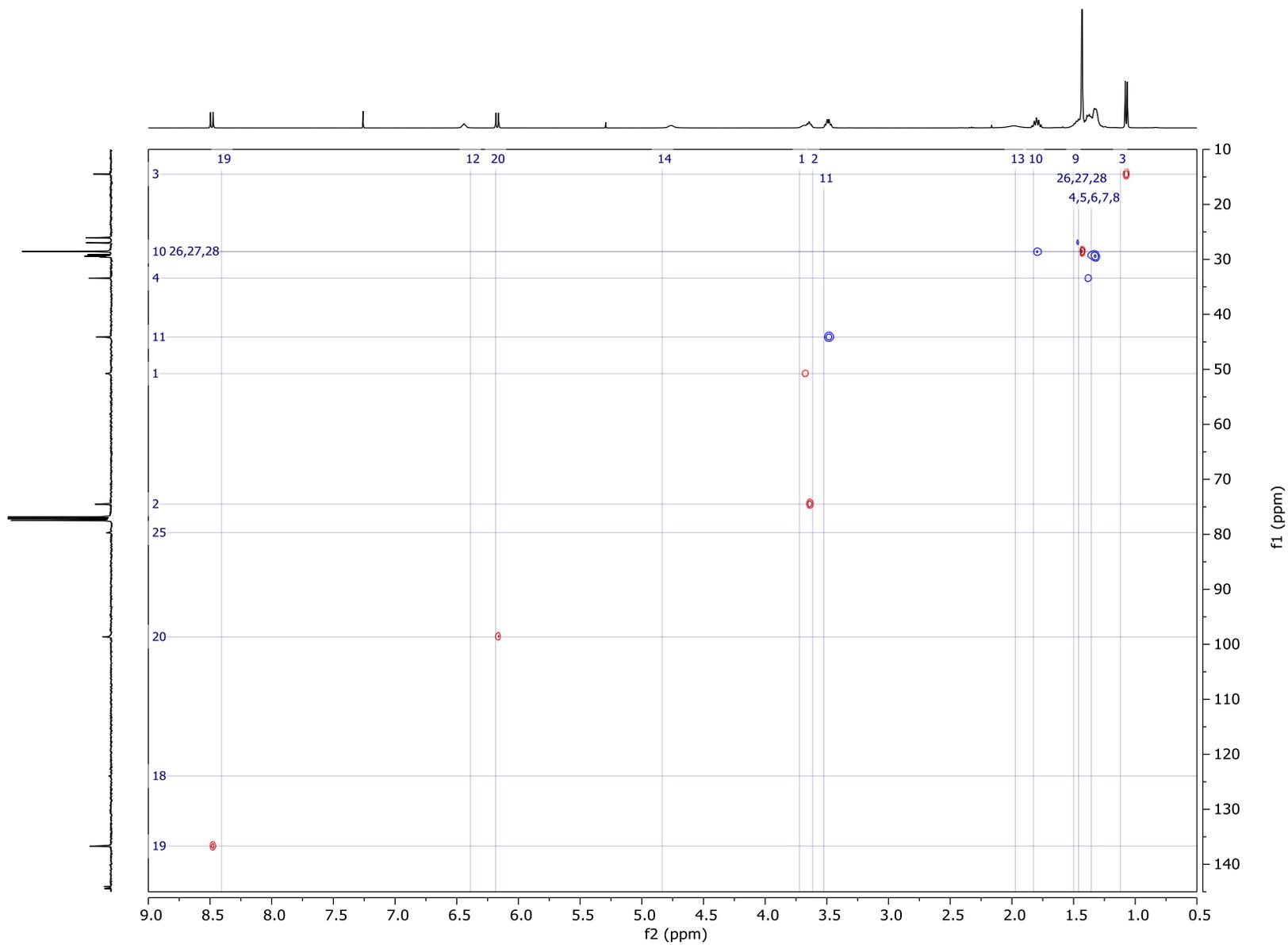


<sup>13</sup>C NMR





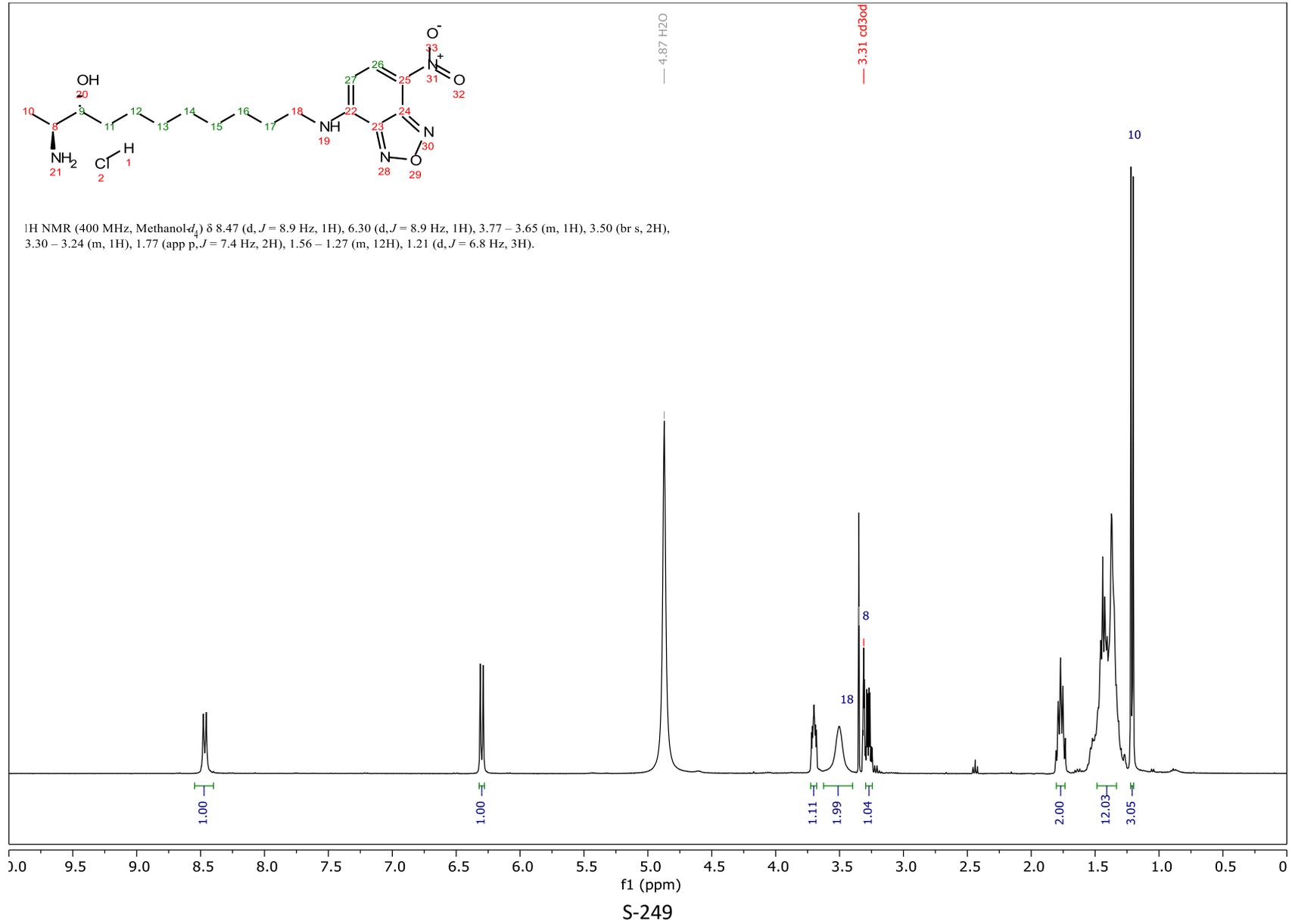
# HSQC NMR



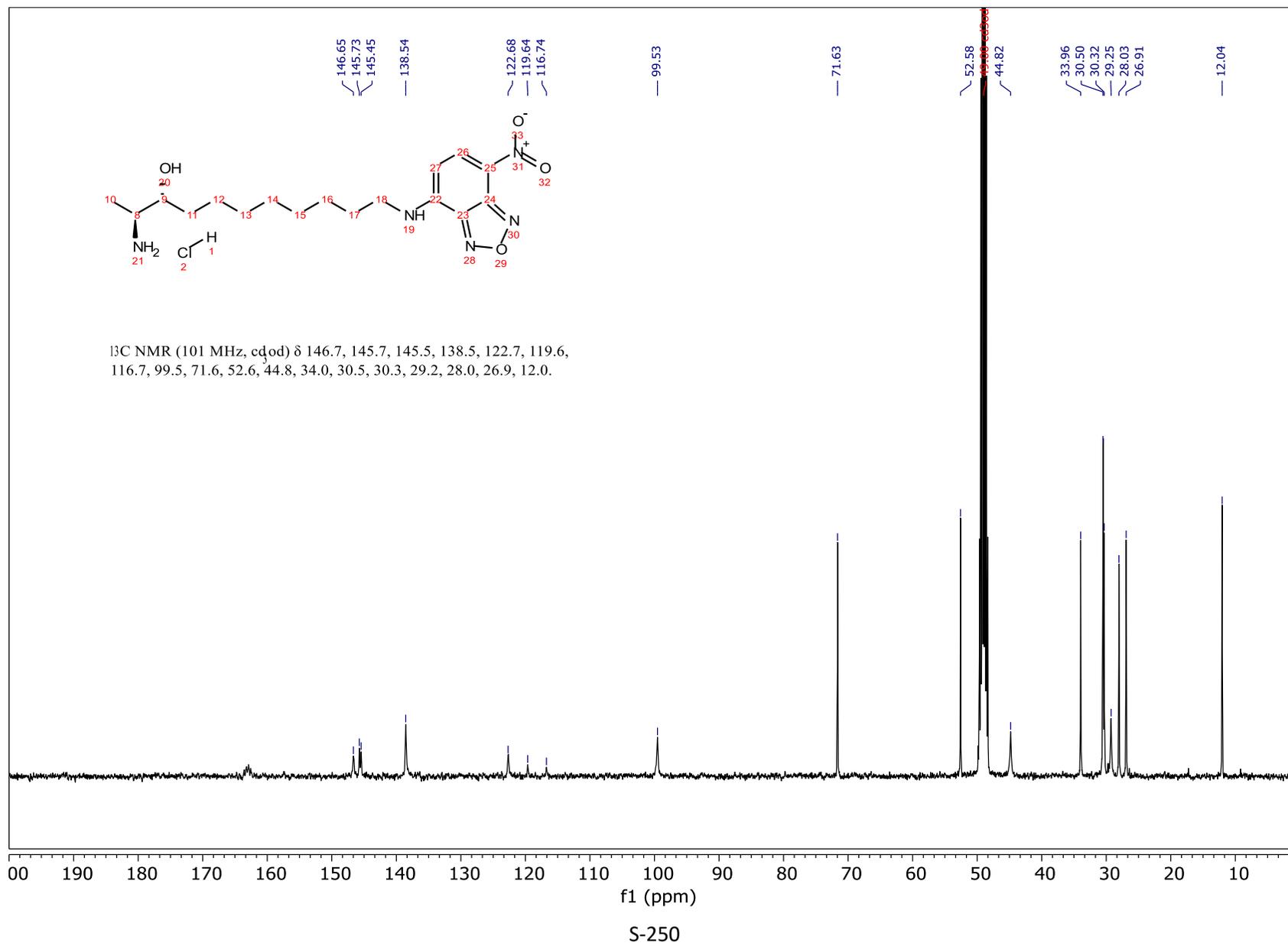
S-248

# Compound RBM5-129

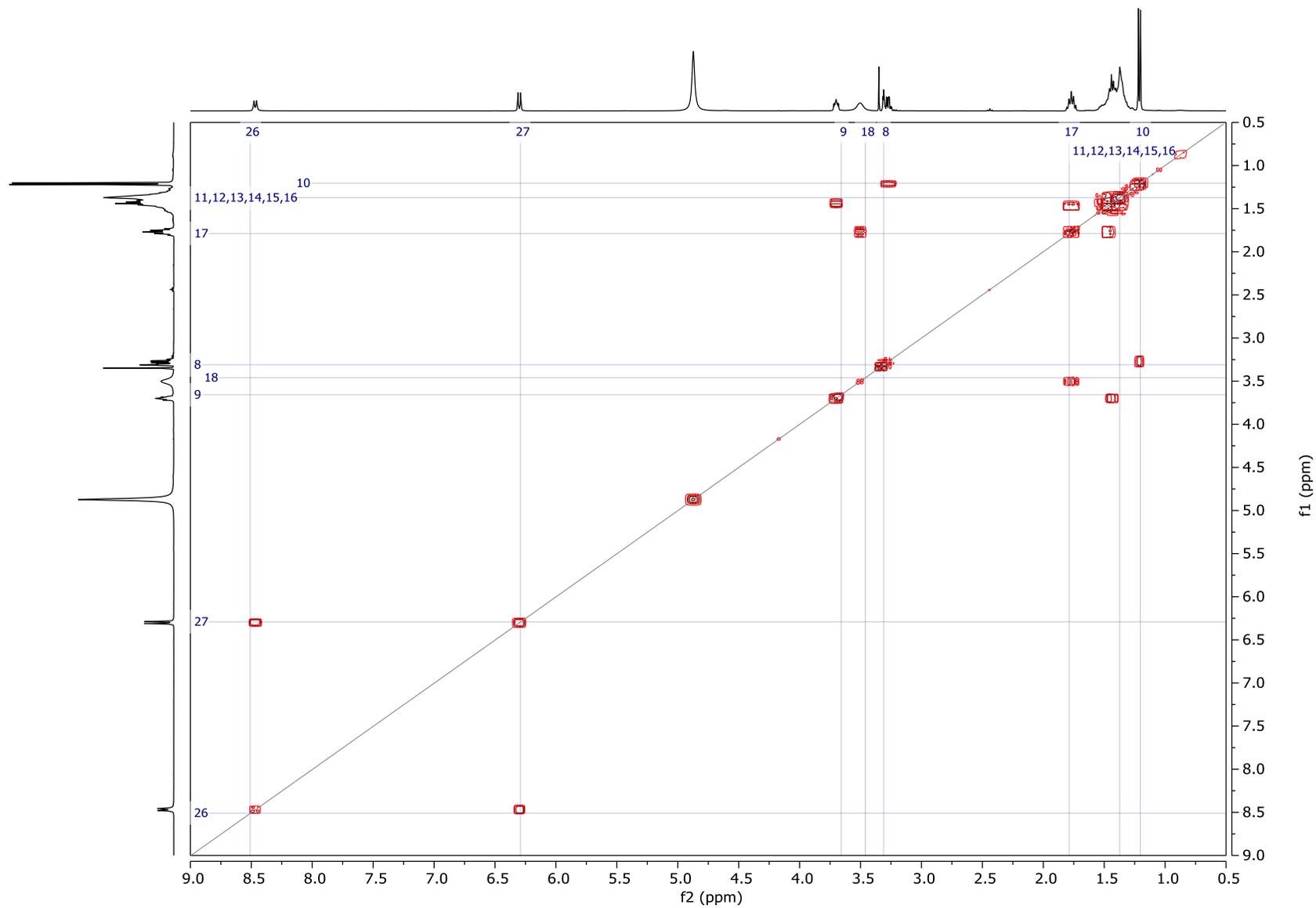
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

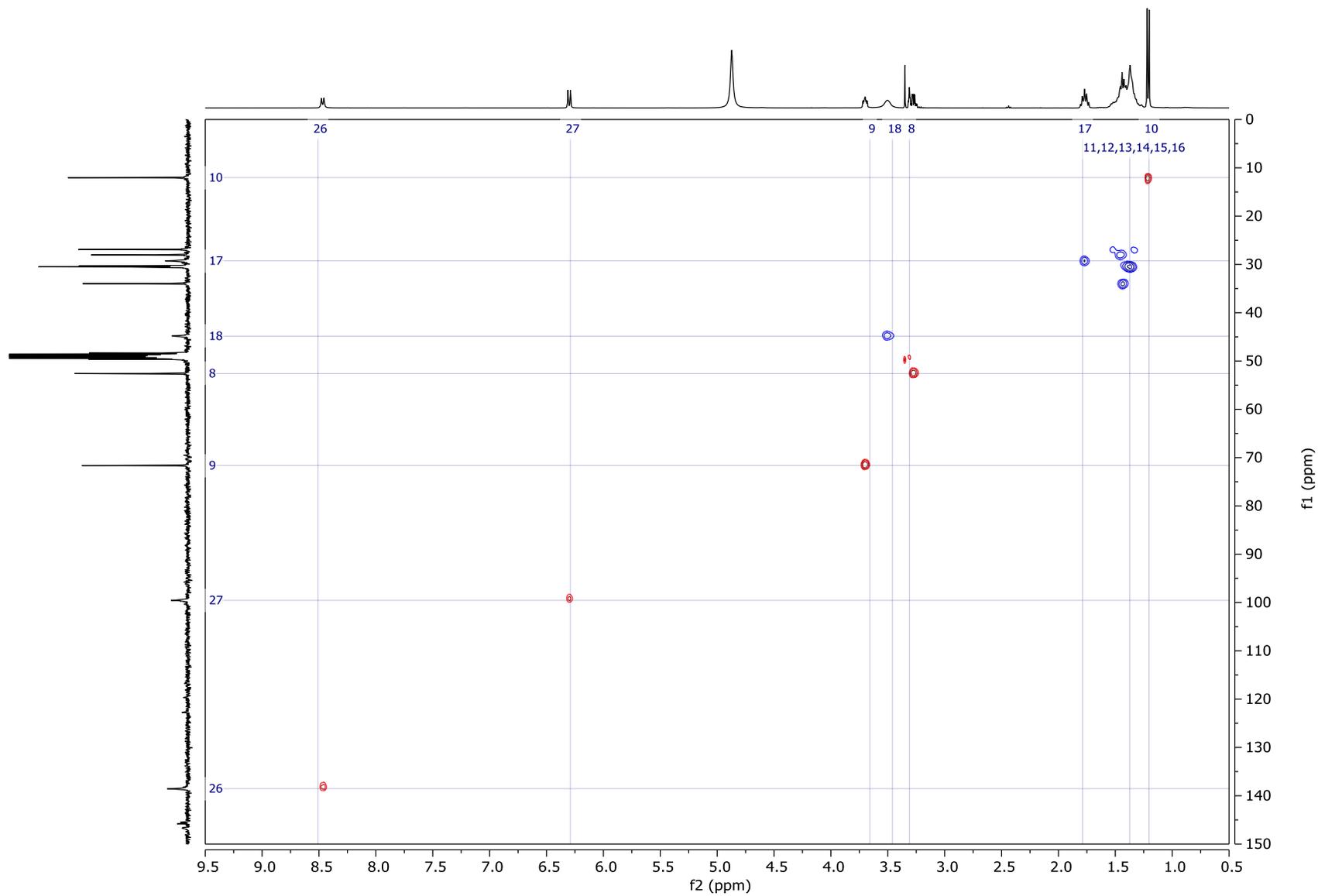


# COSY NMR



S-251

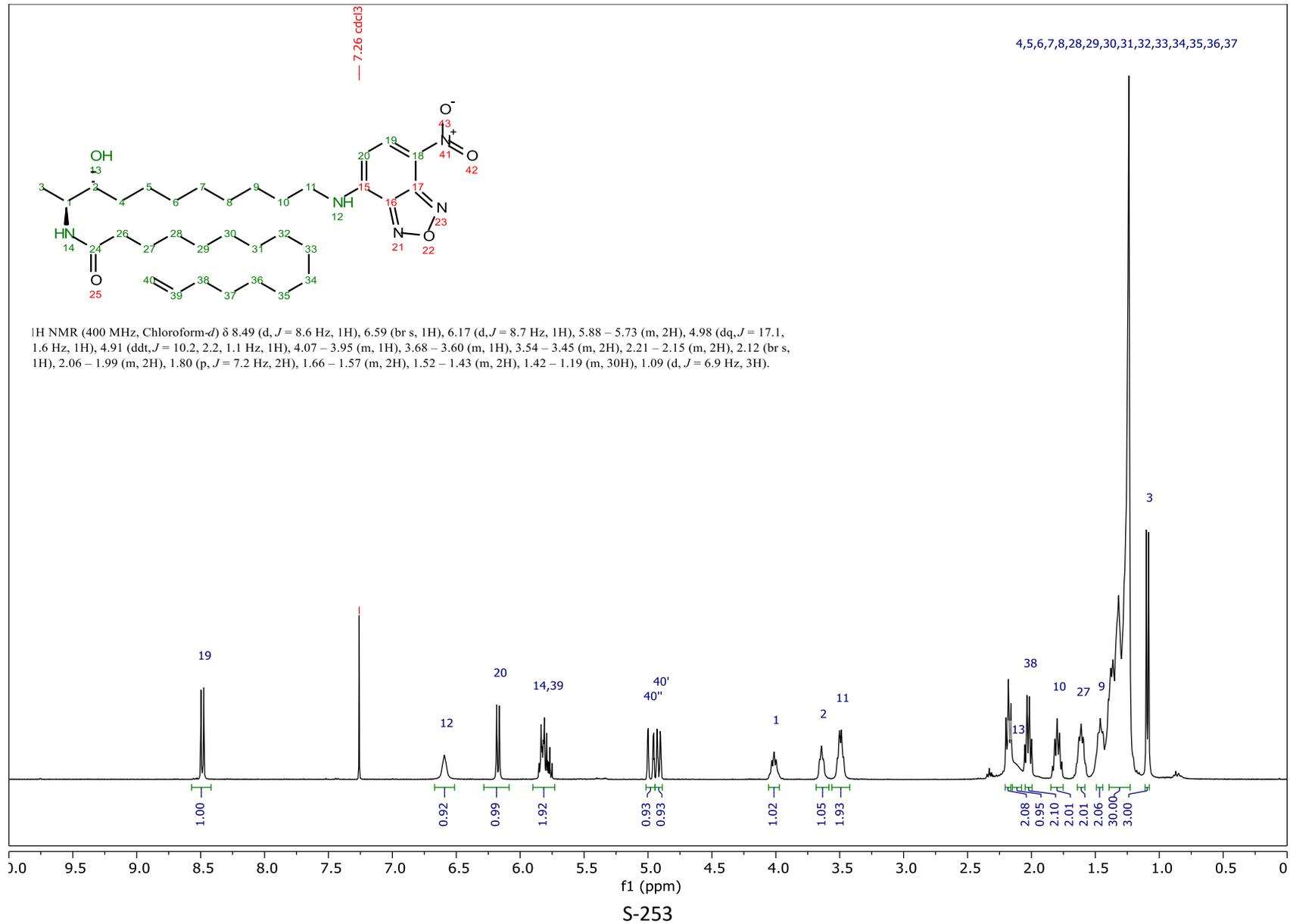
# HSQC NMR



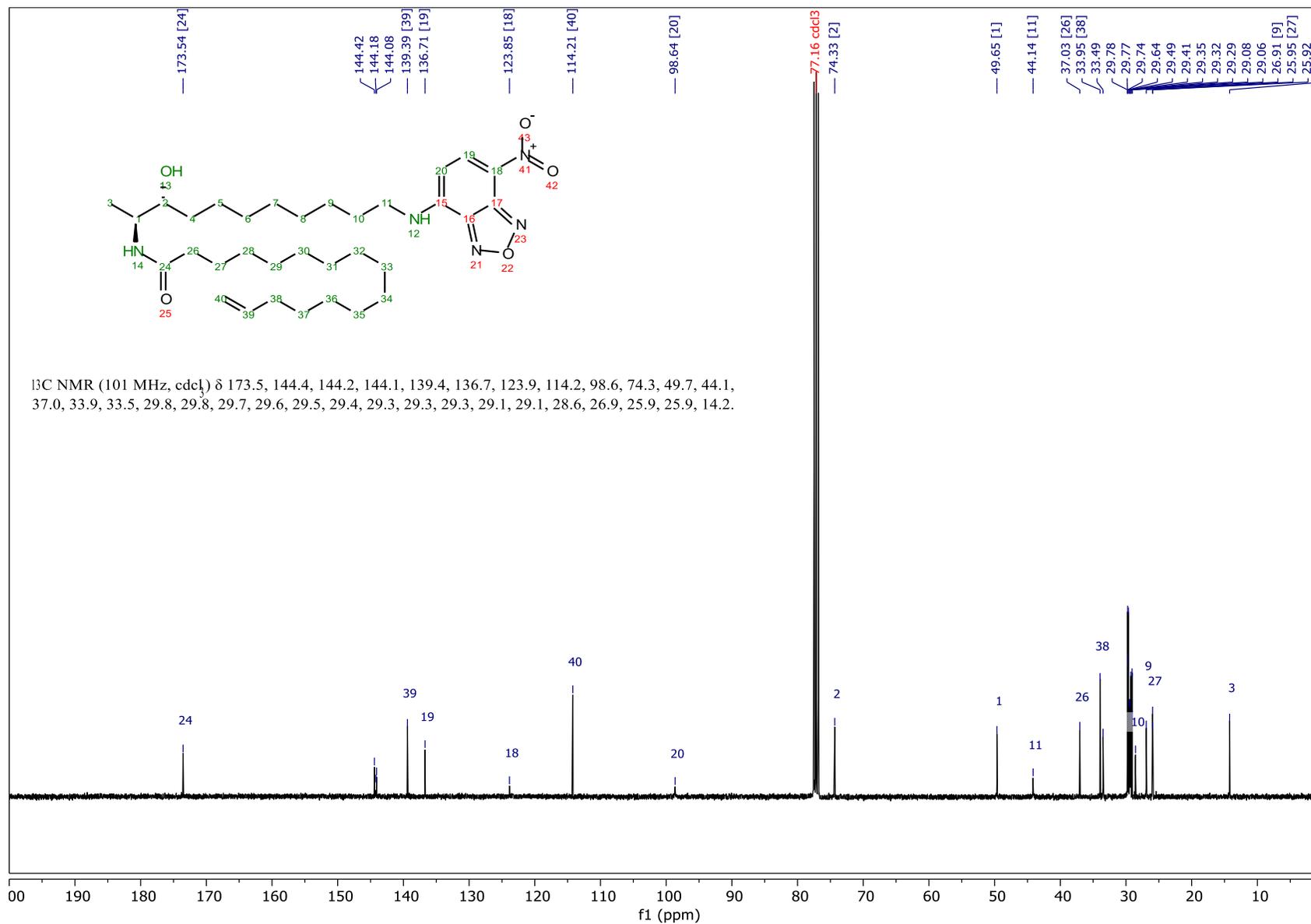
S-252

# Compound RBM5-130

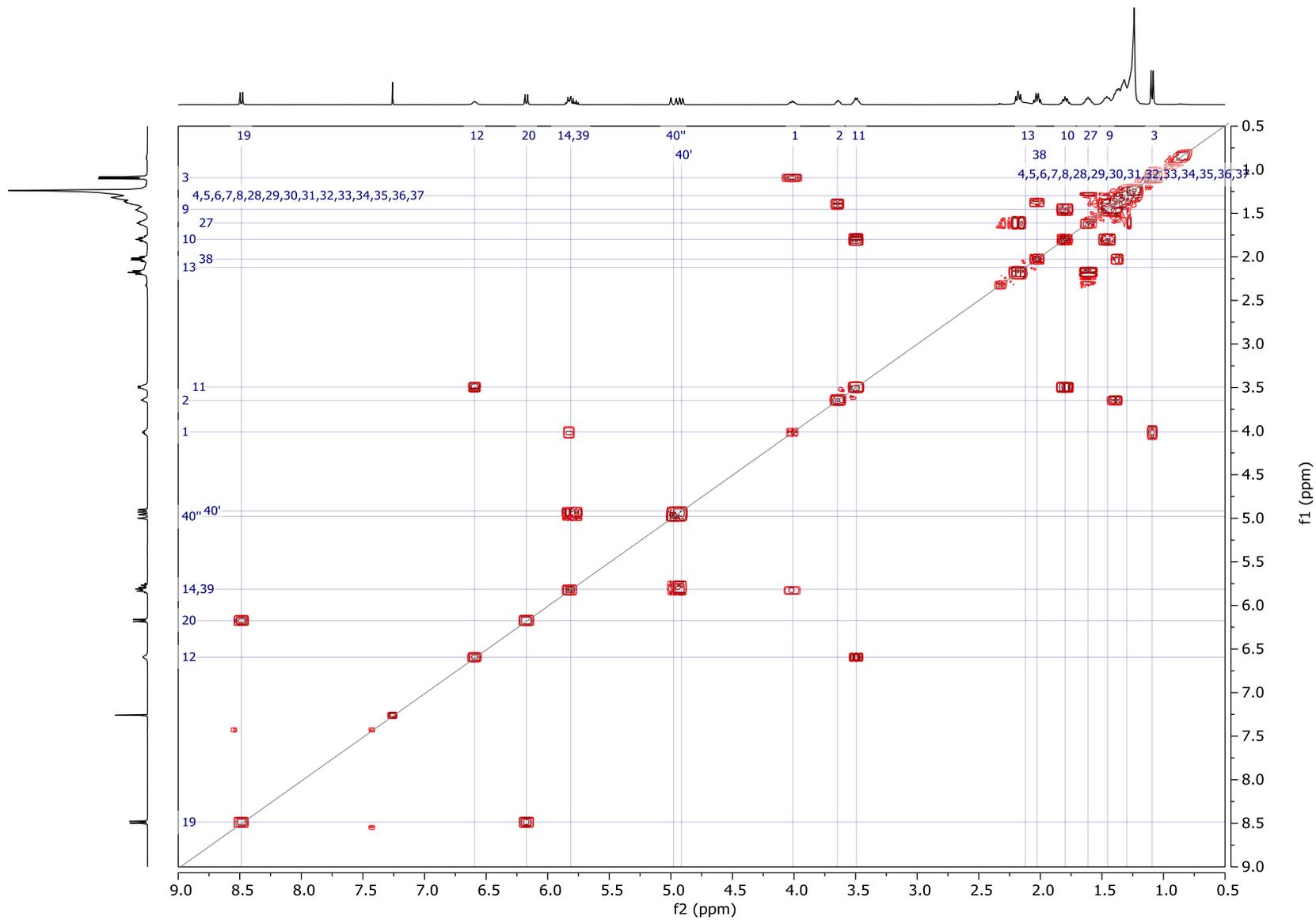
$^1\text{H NMR}$



<sup>13</sup>C NMR

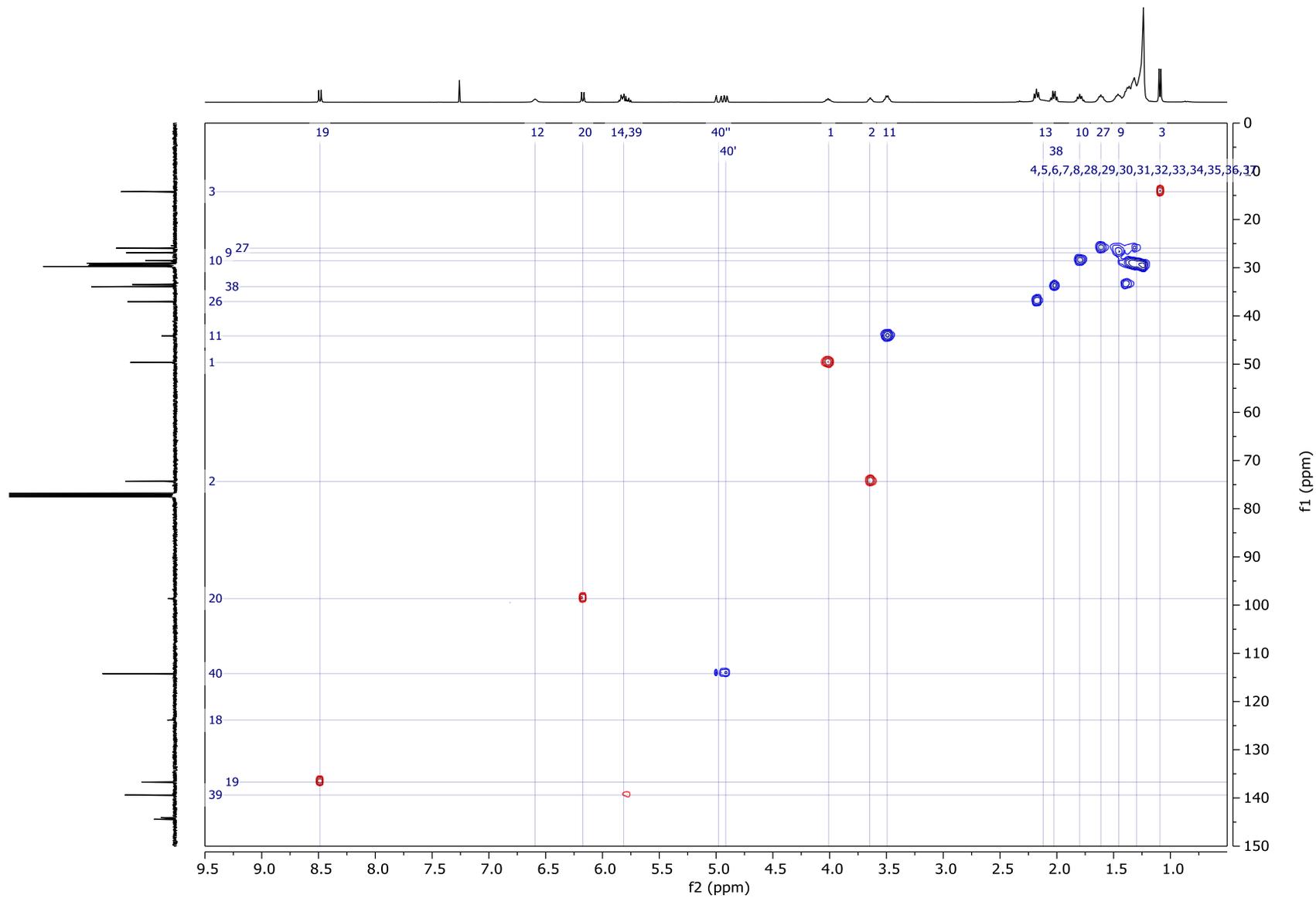


# COSY NMR



S-255

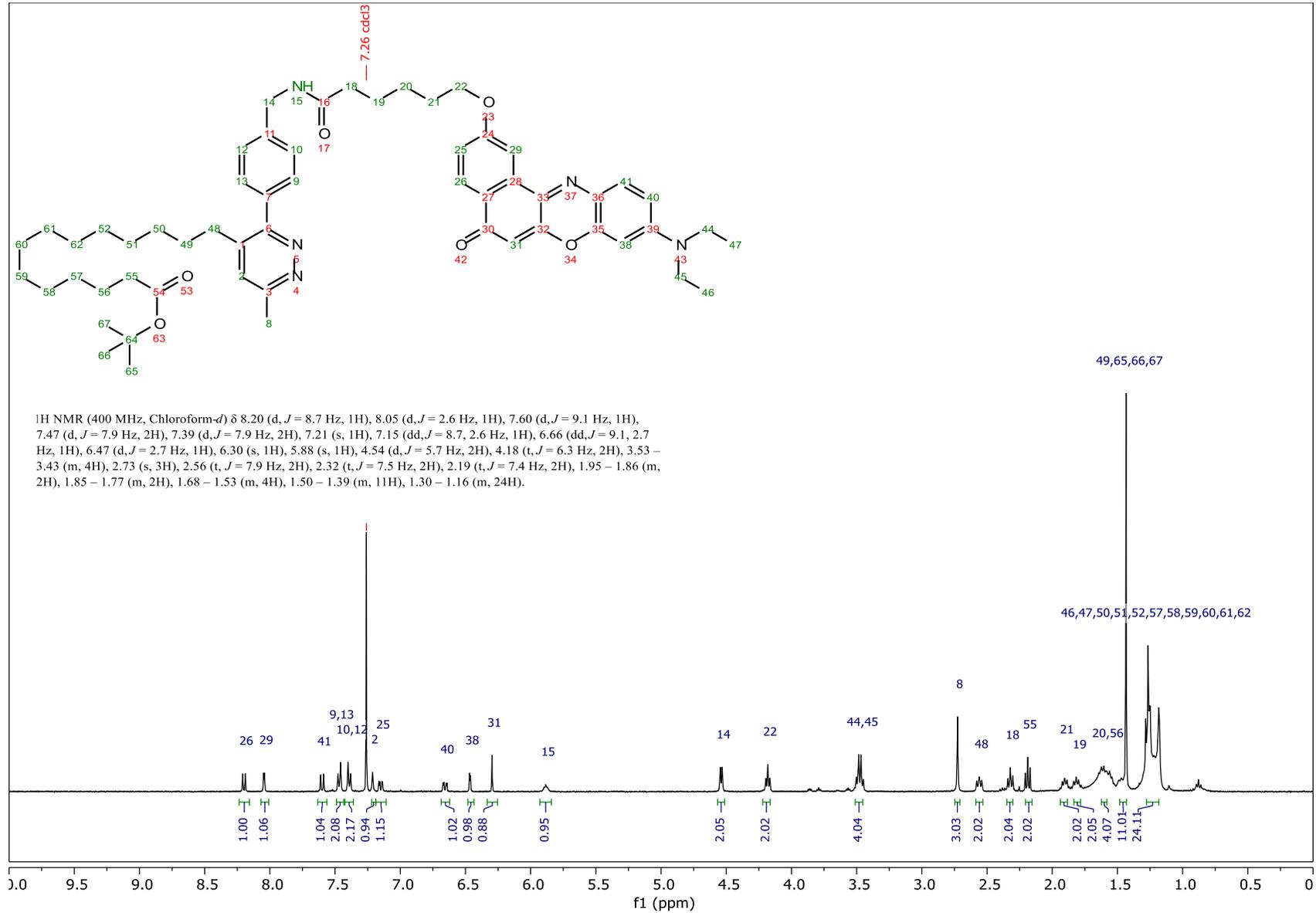
# HSQC NMR



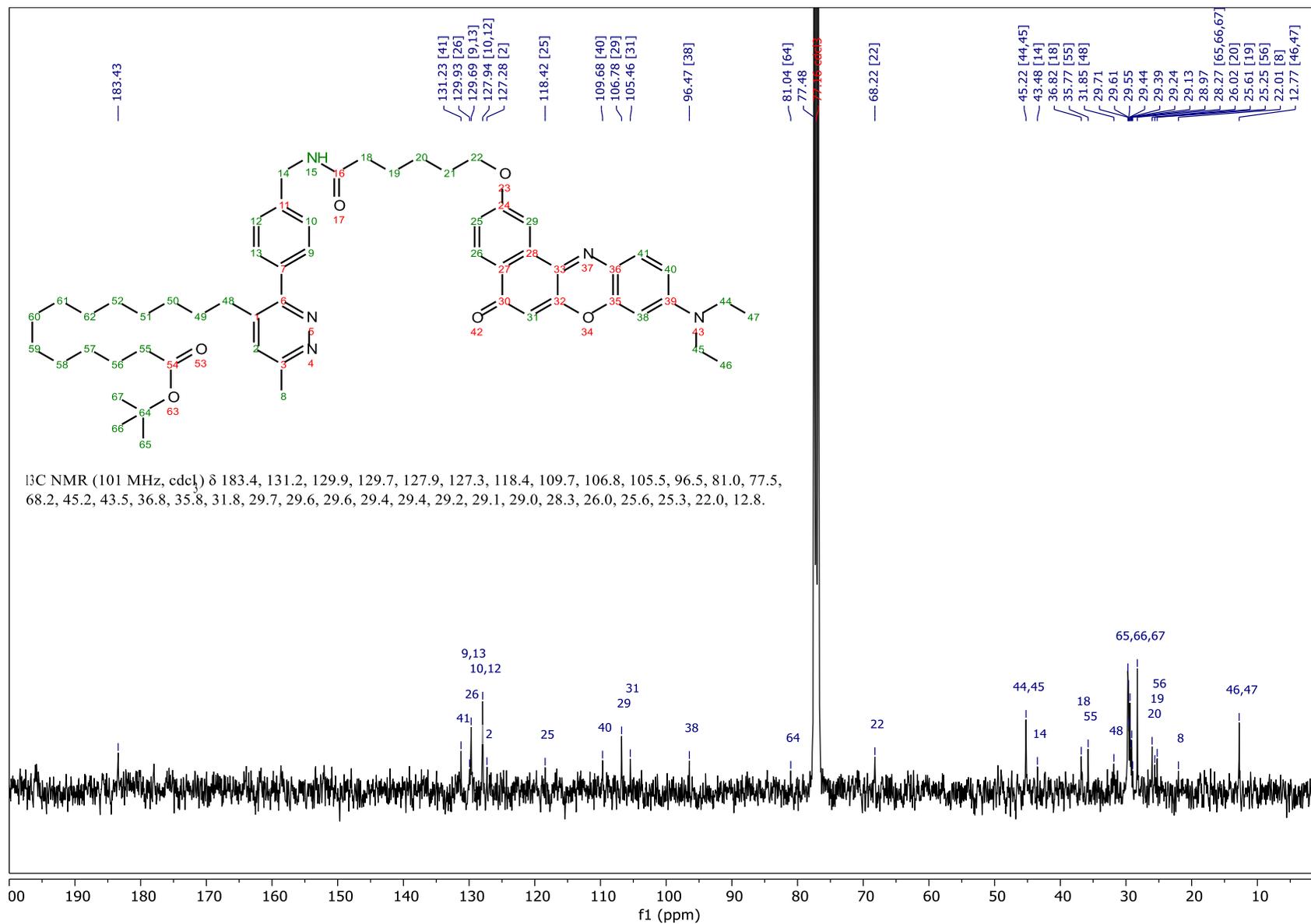
S-256

# Compound RBM5-131

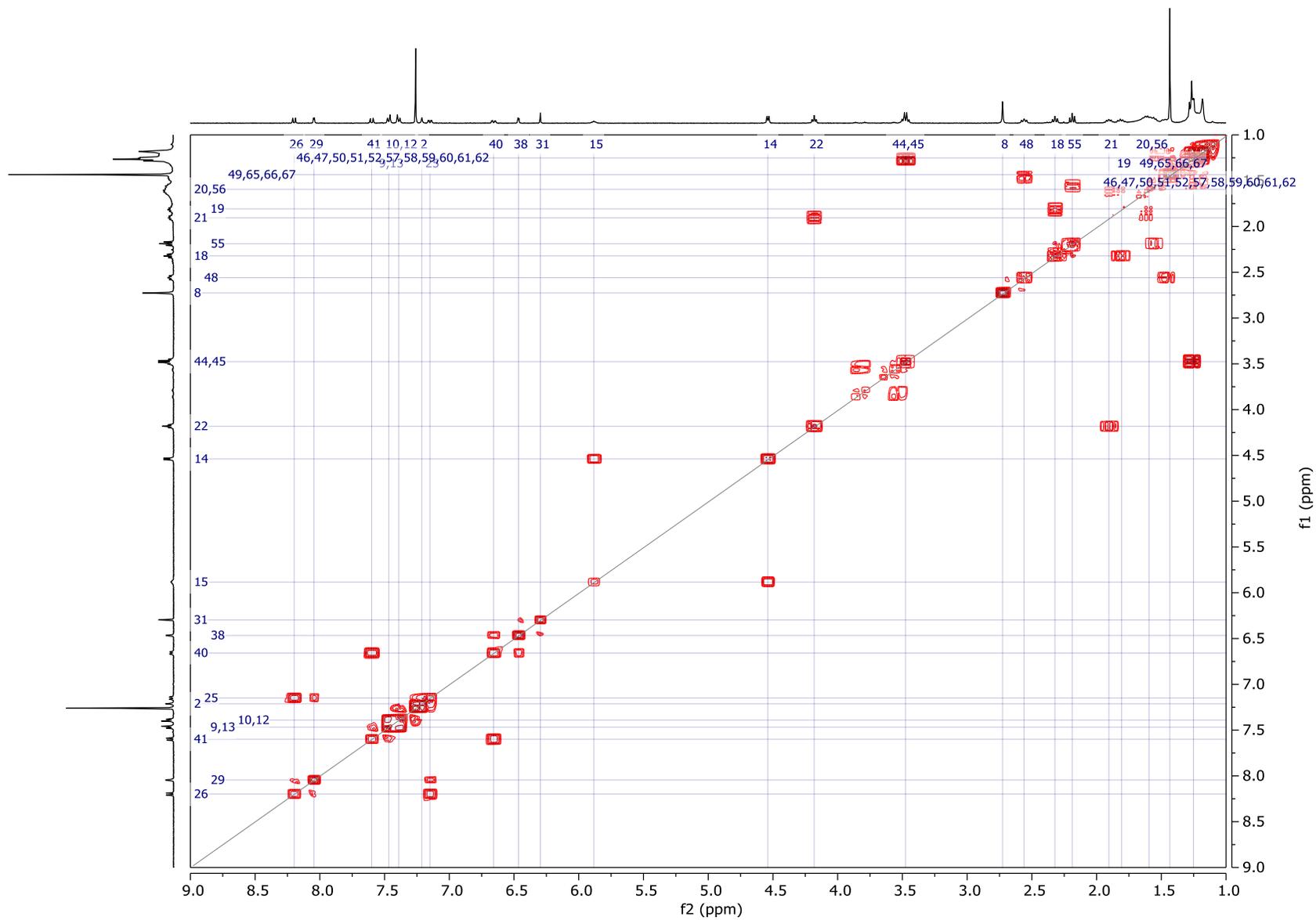
<sup>1</sup>H NMR



<sup>13</sup>C NMR

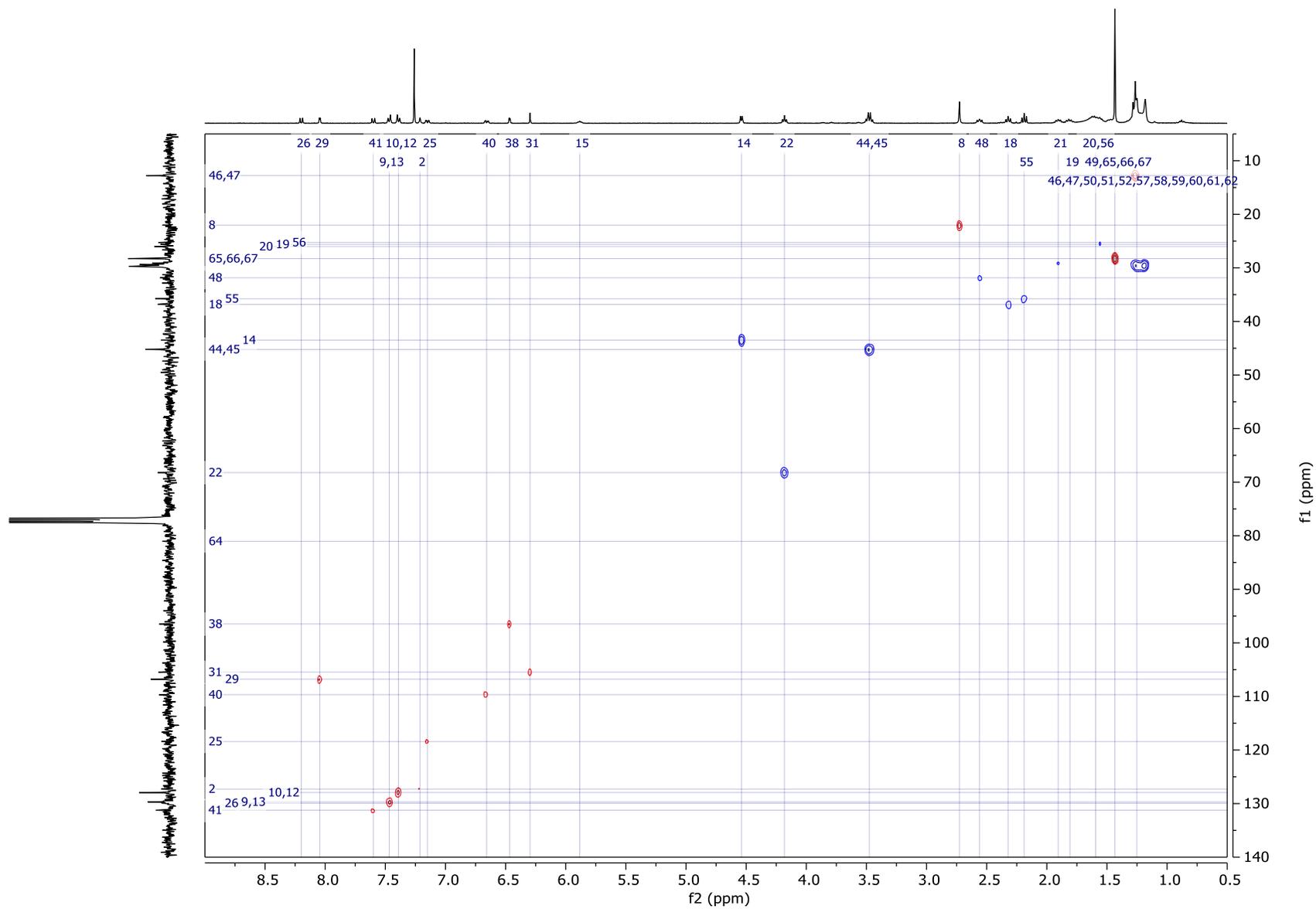


# COSY NMR



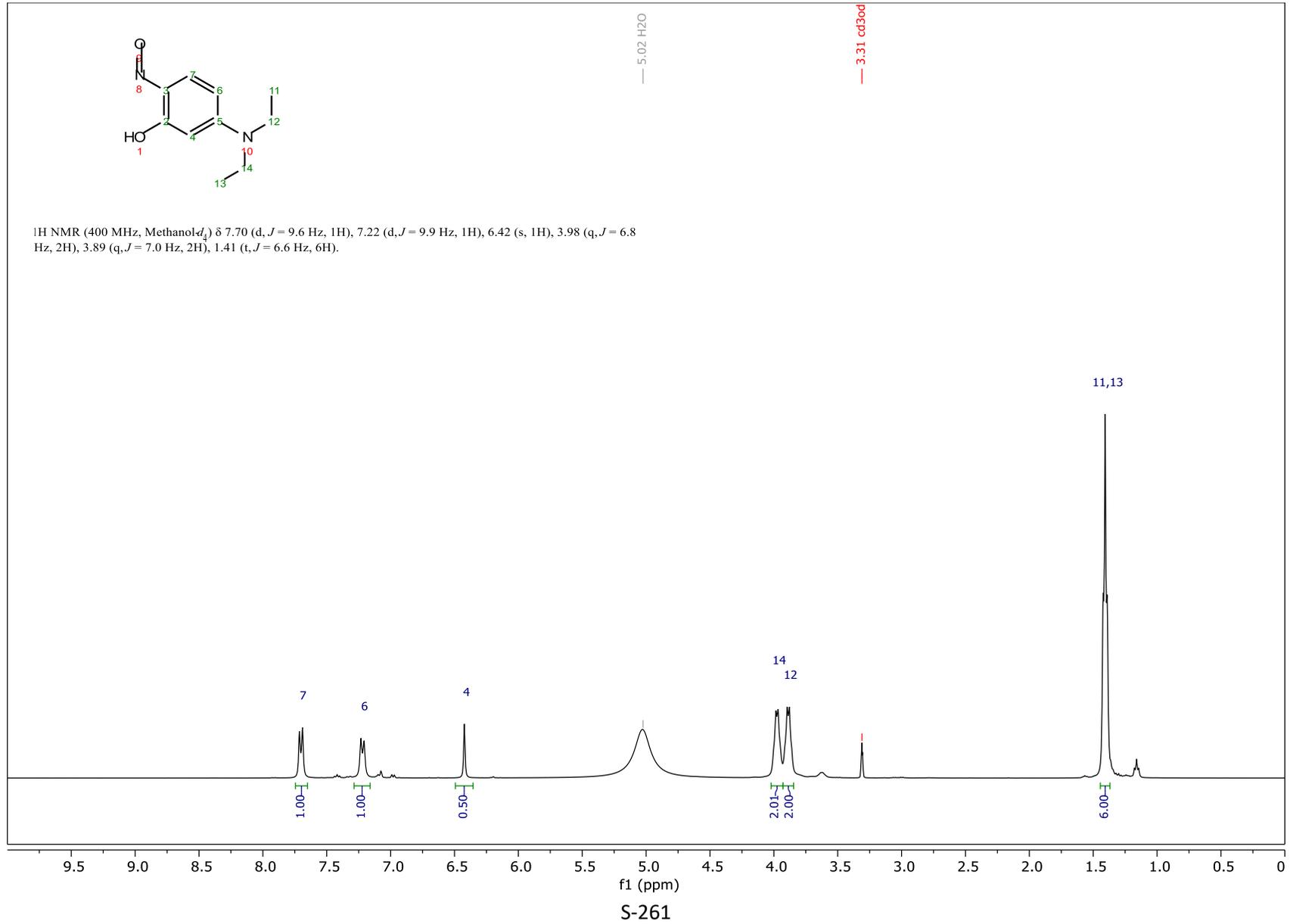
S-259

# HSQC NMR

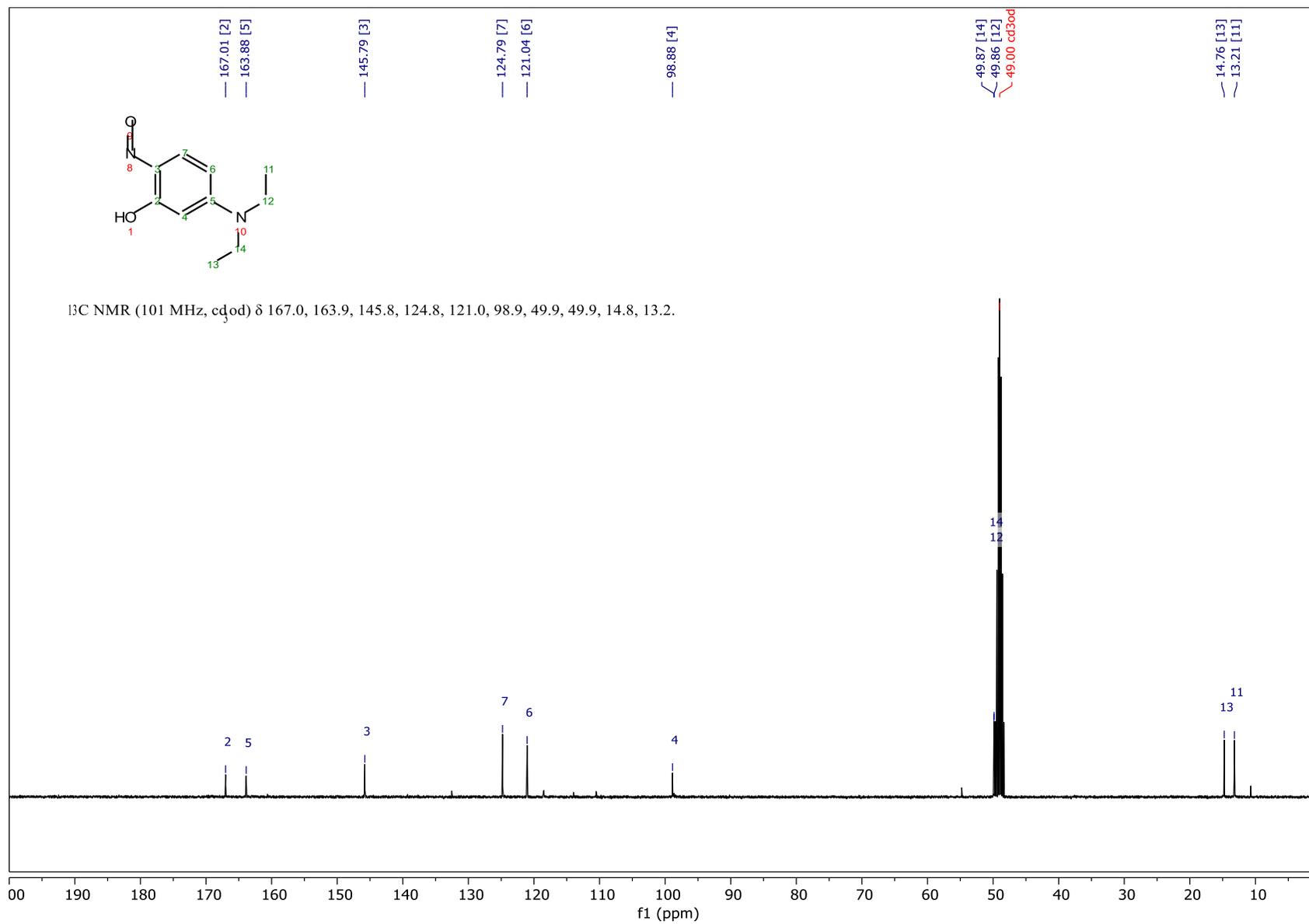


# Compound RBM5-132

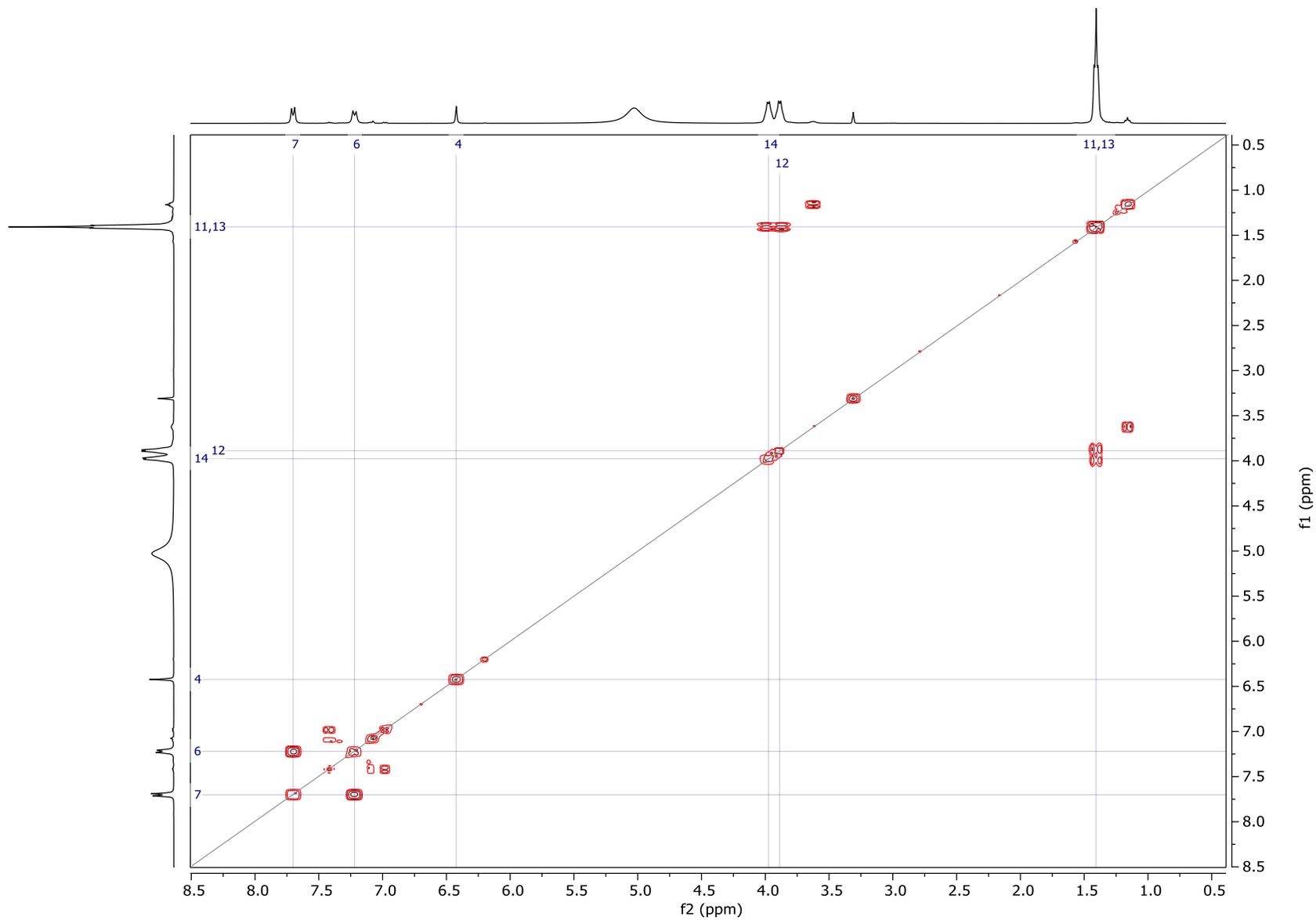
$^1\text{H NMR}$



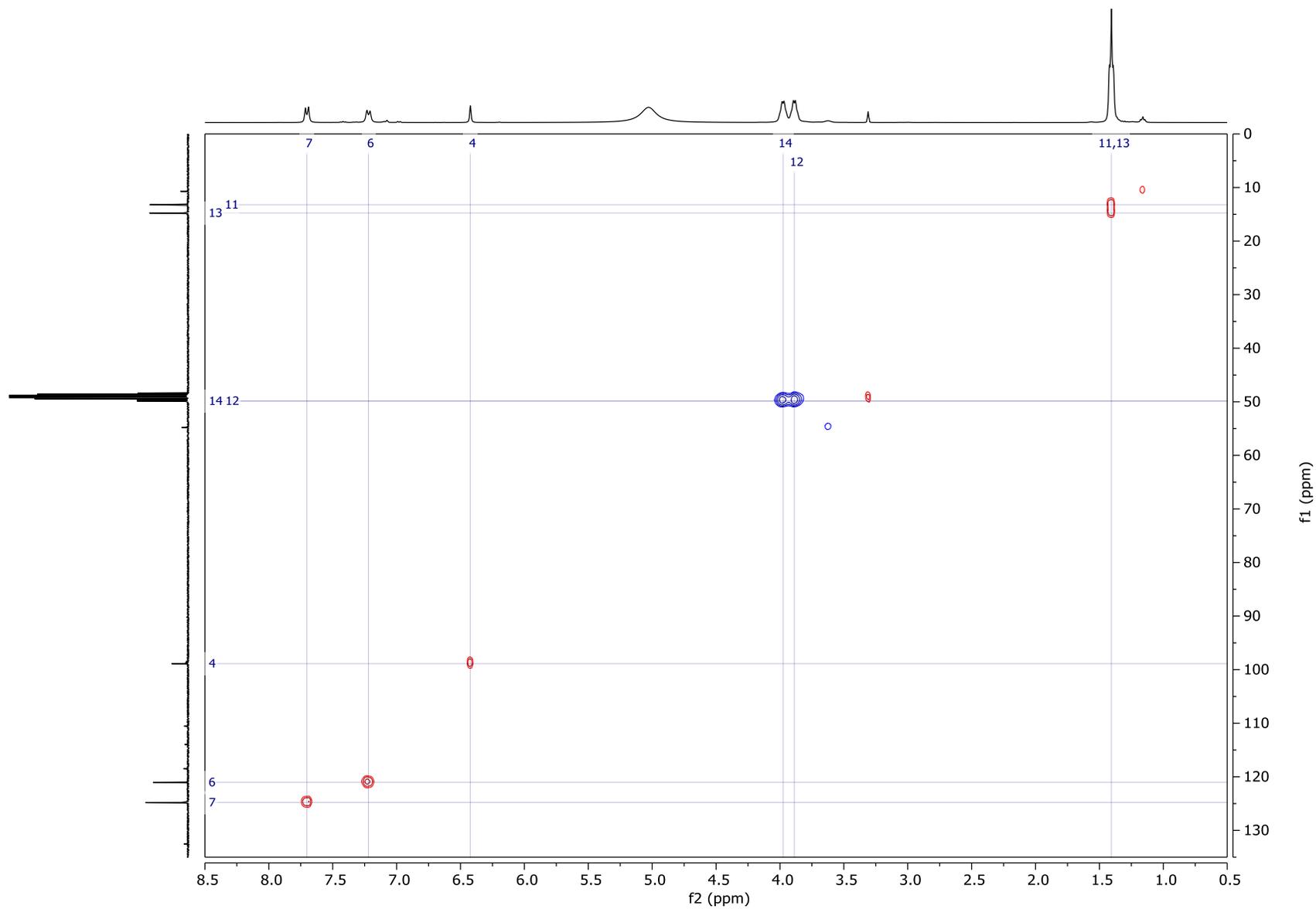
<sup>13</sup>C NMR



COSY NMR

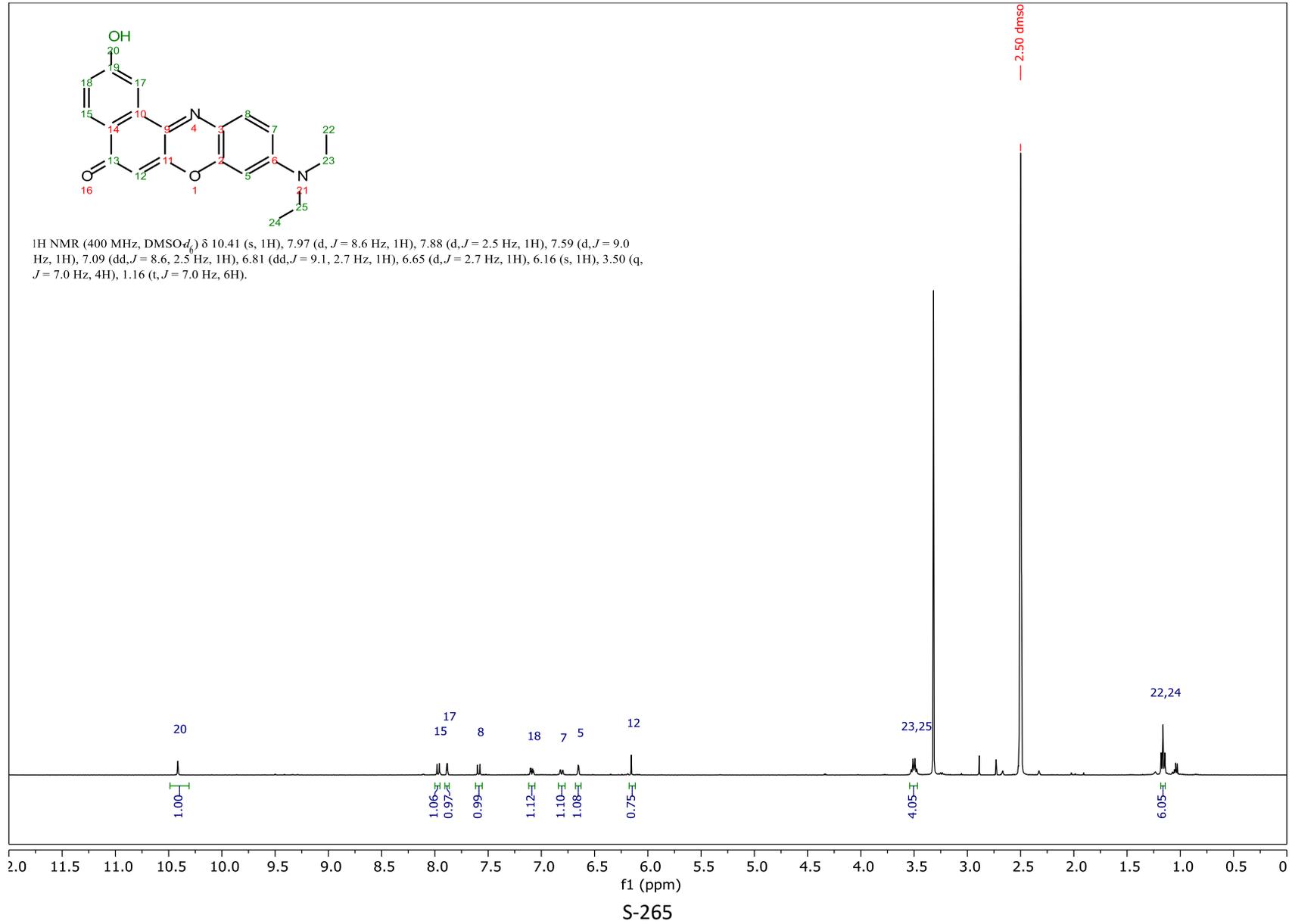


# HSQC NMR

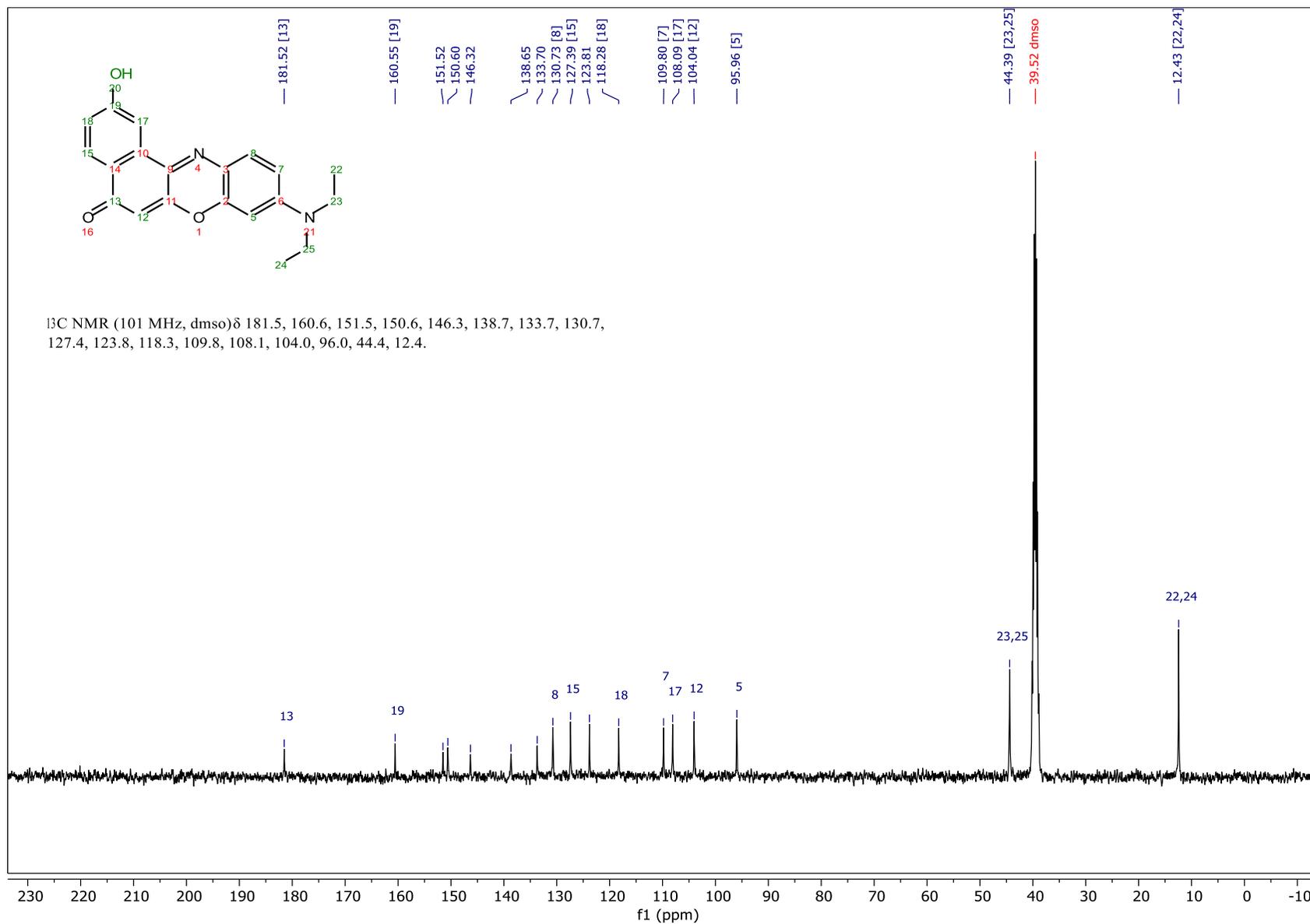


# Compound RBM5-133

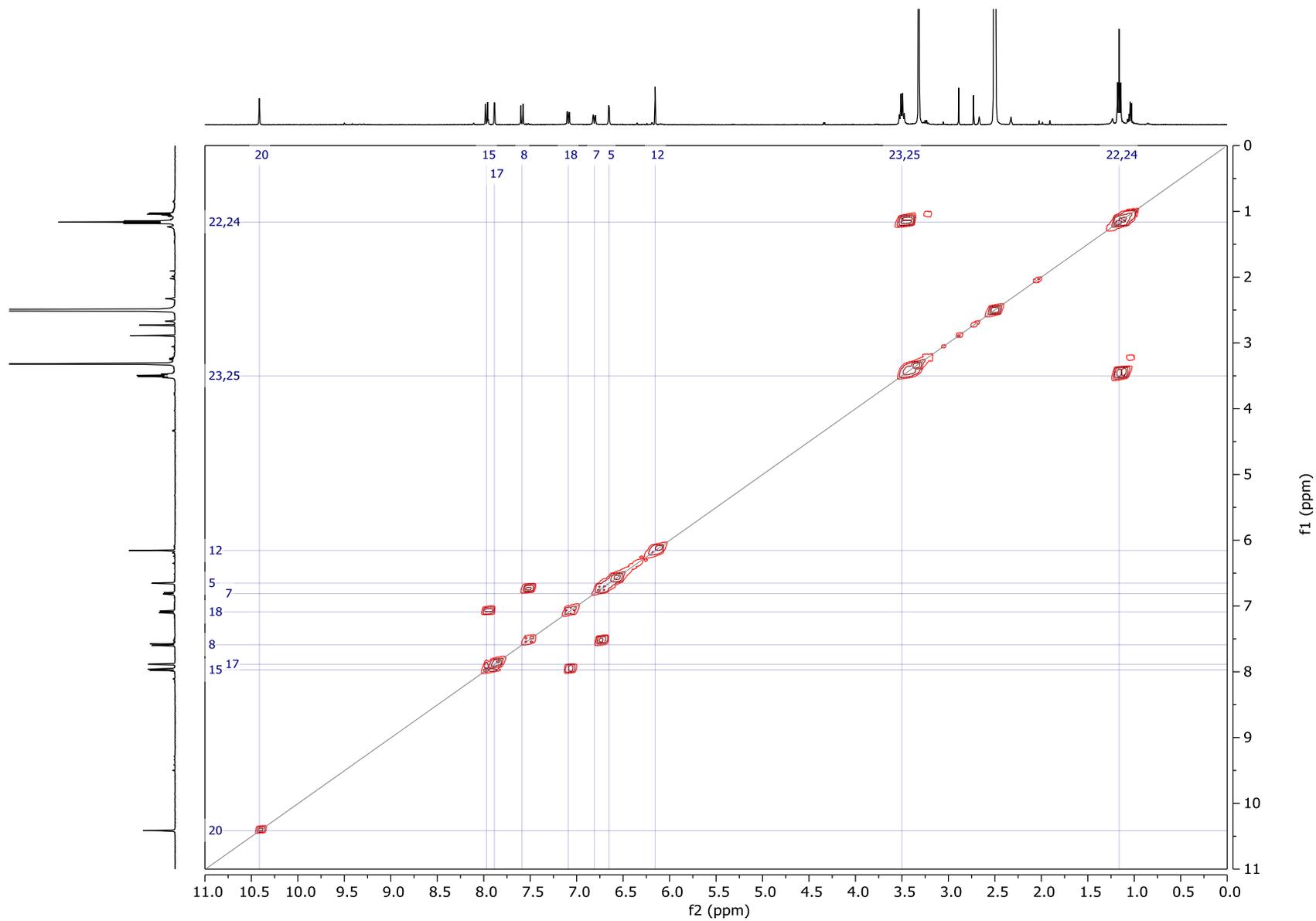
$^1\text{H}$  NMR



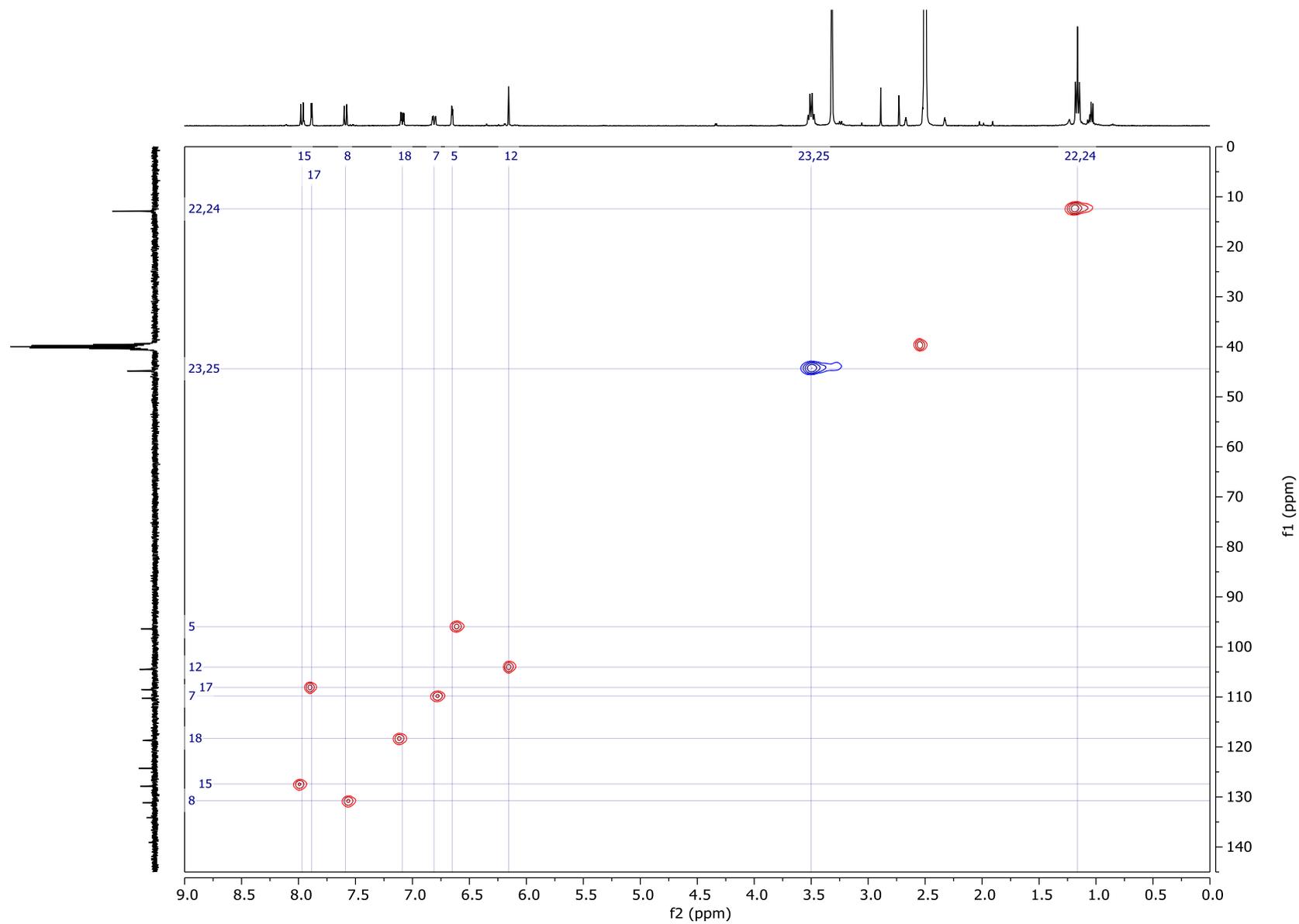
<sup>13</sup>C NMR



COSY NMR

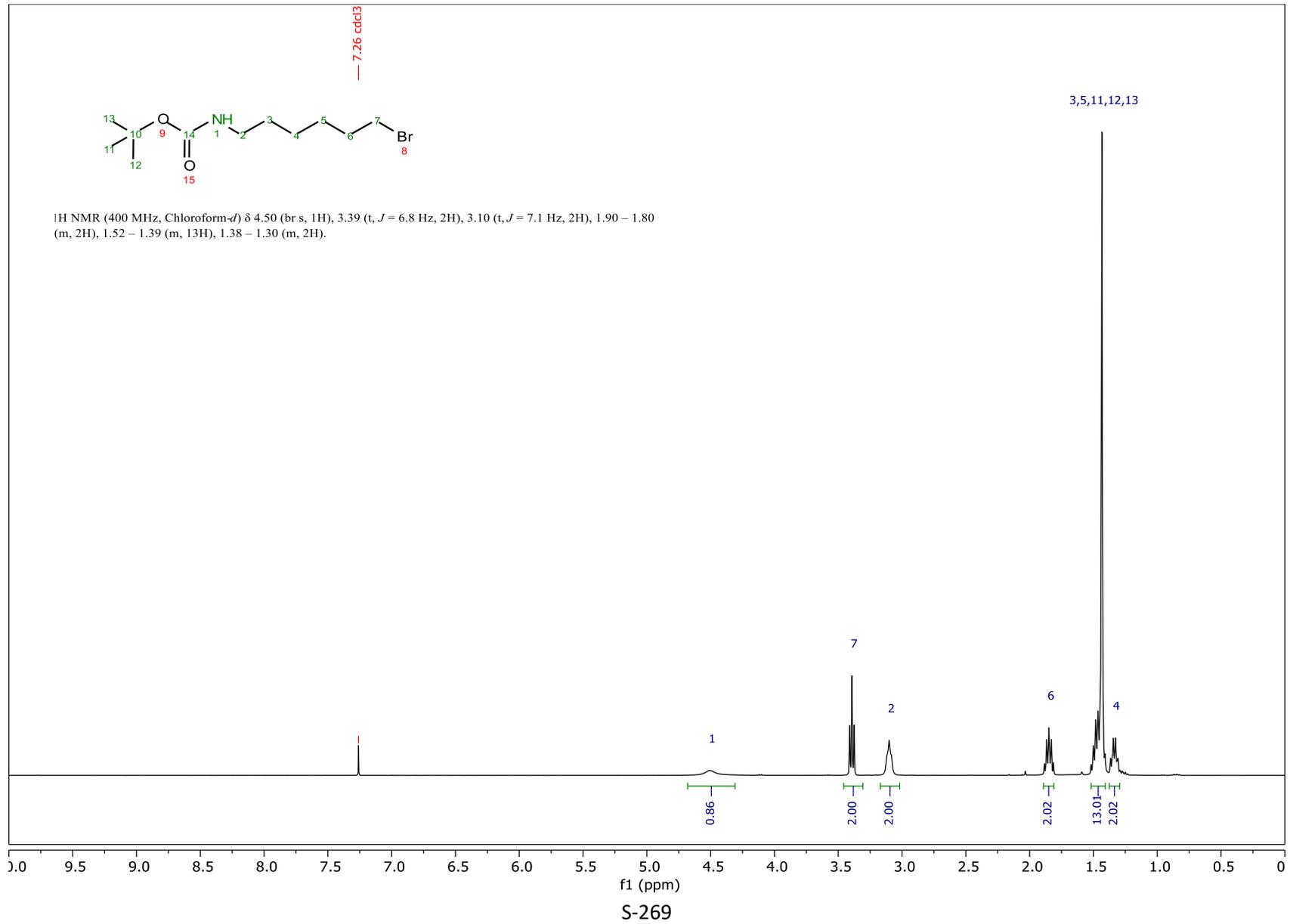


# HSQC NMR

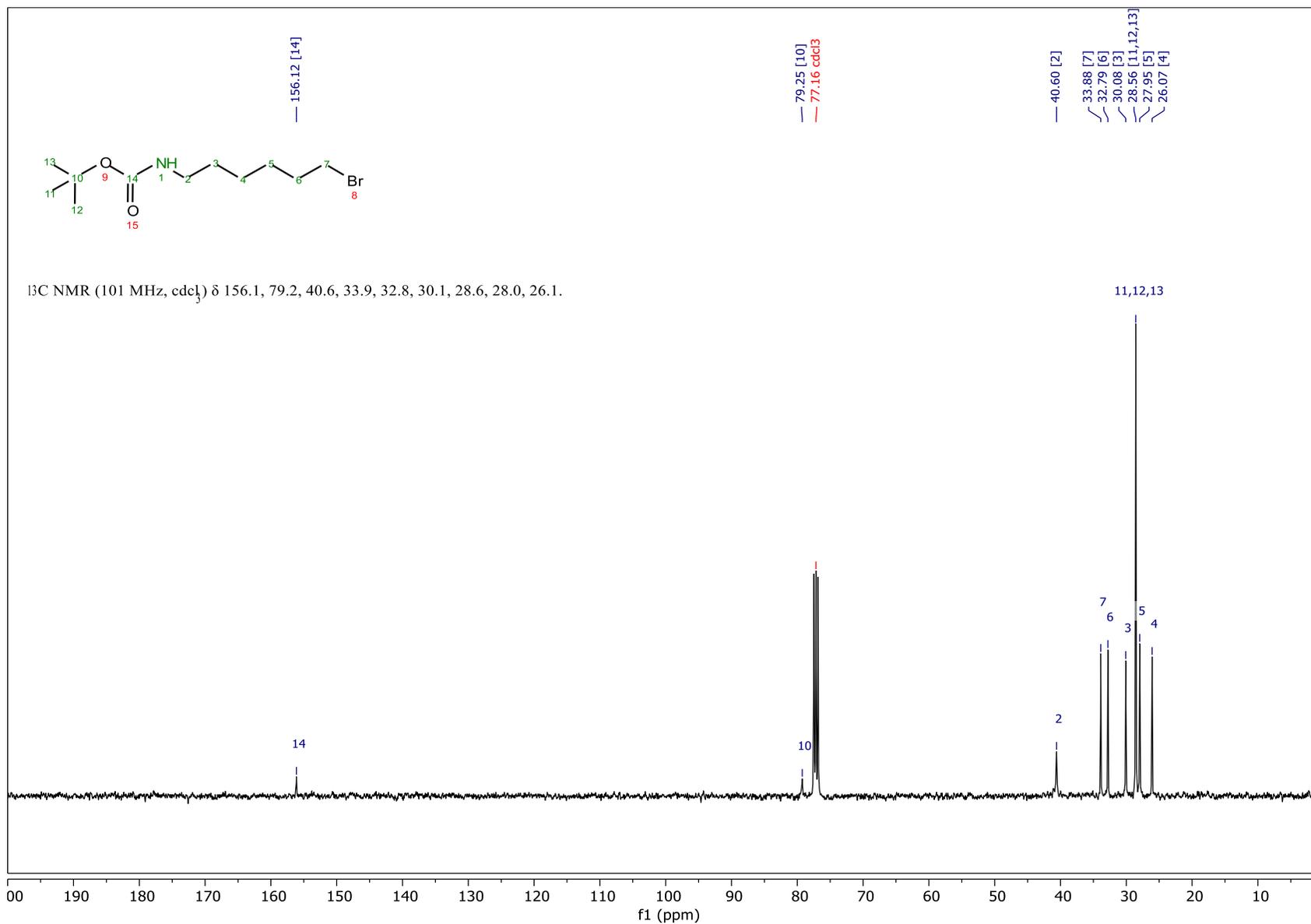


# Compound RBM5-134

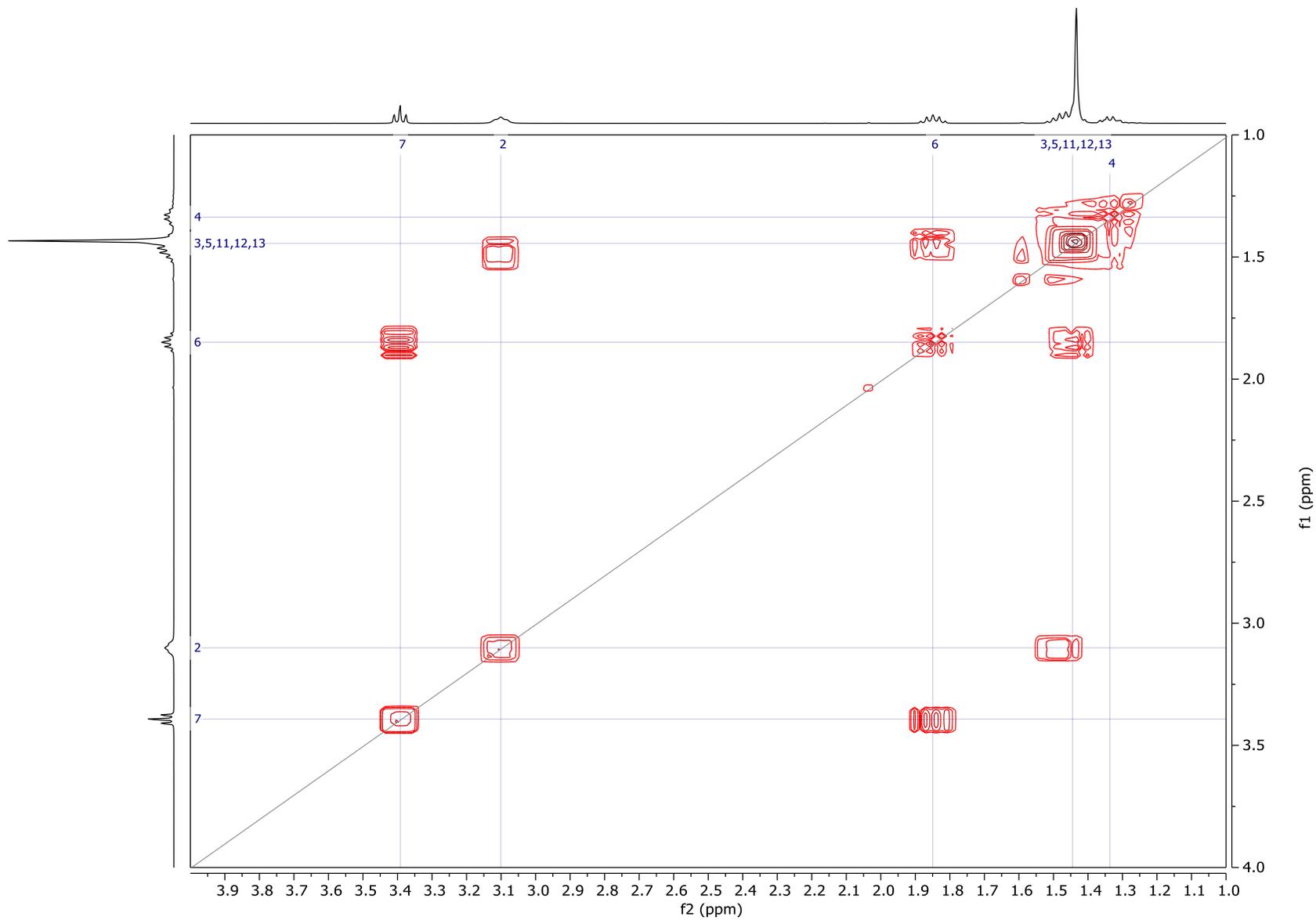
$^1\text{H}$  NMR



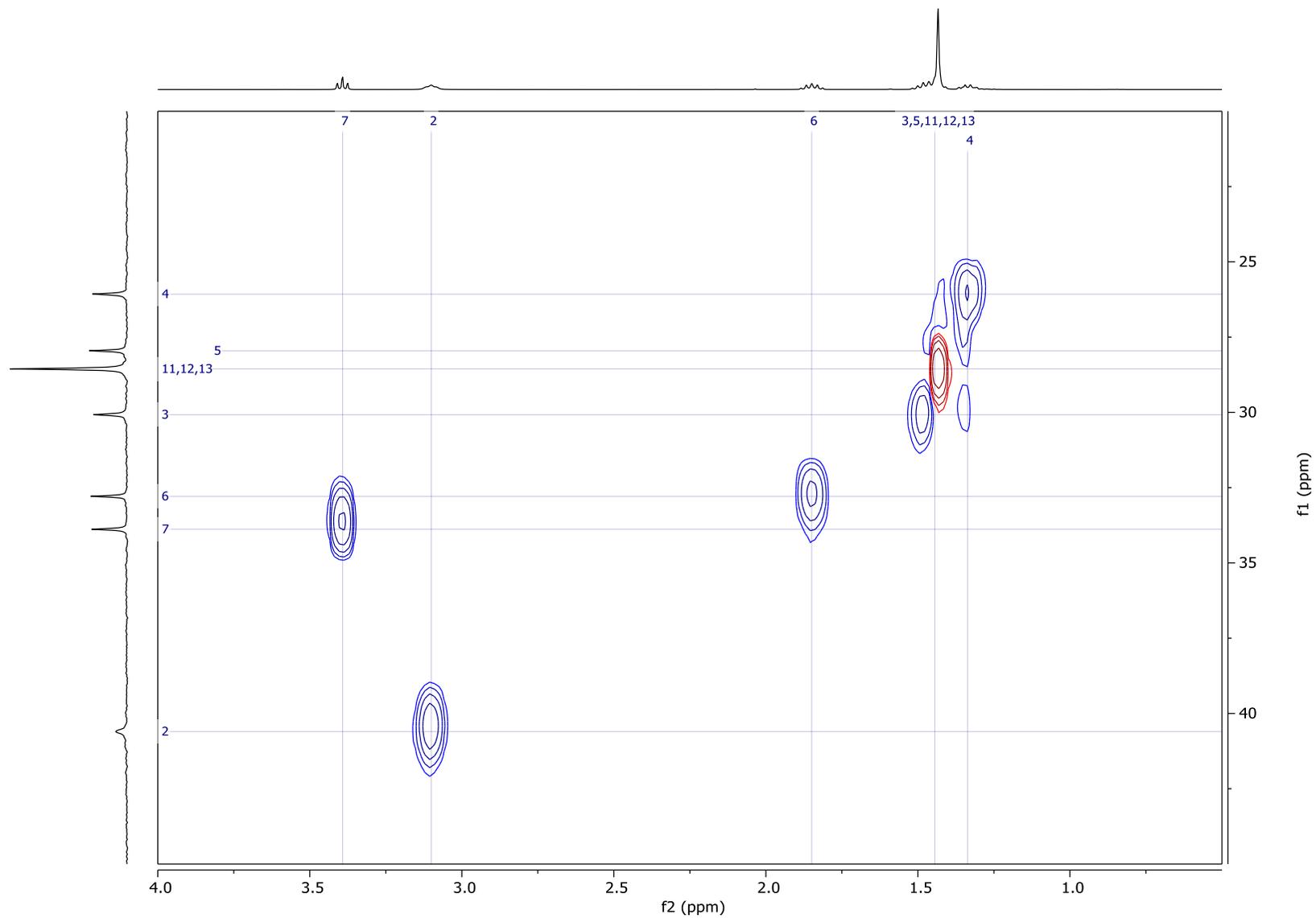
<sup>13</sup>C NMR



COSY NMR

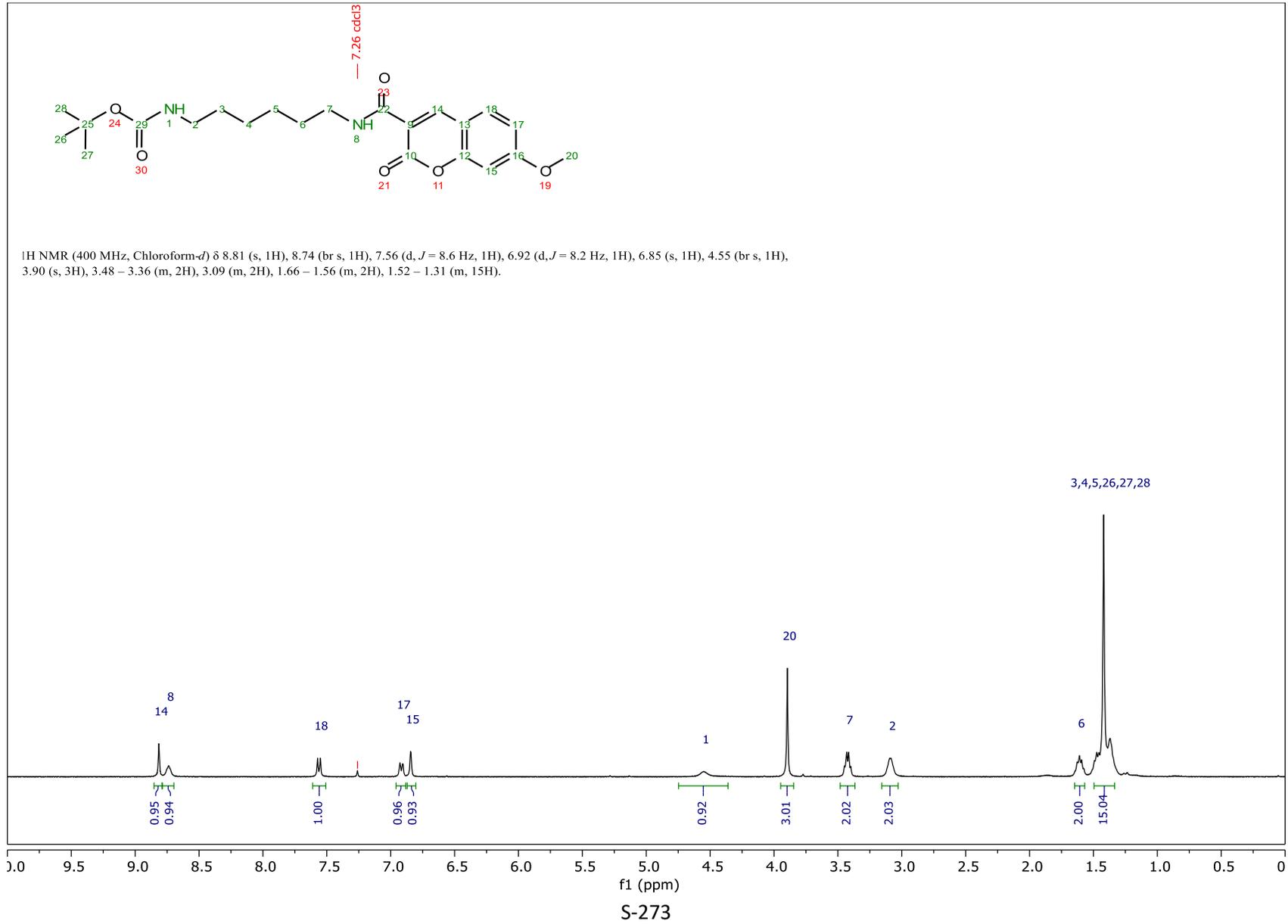


# HSQC NMR

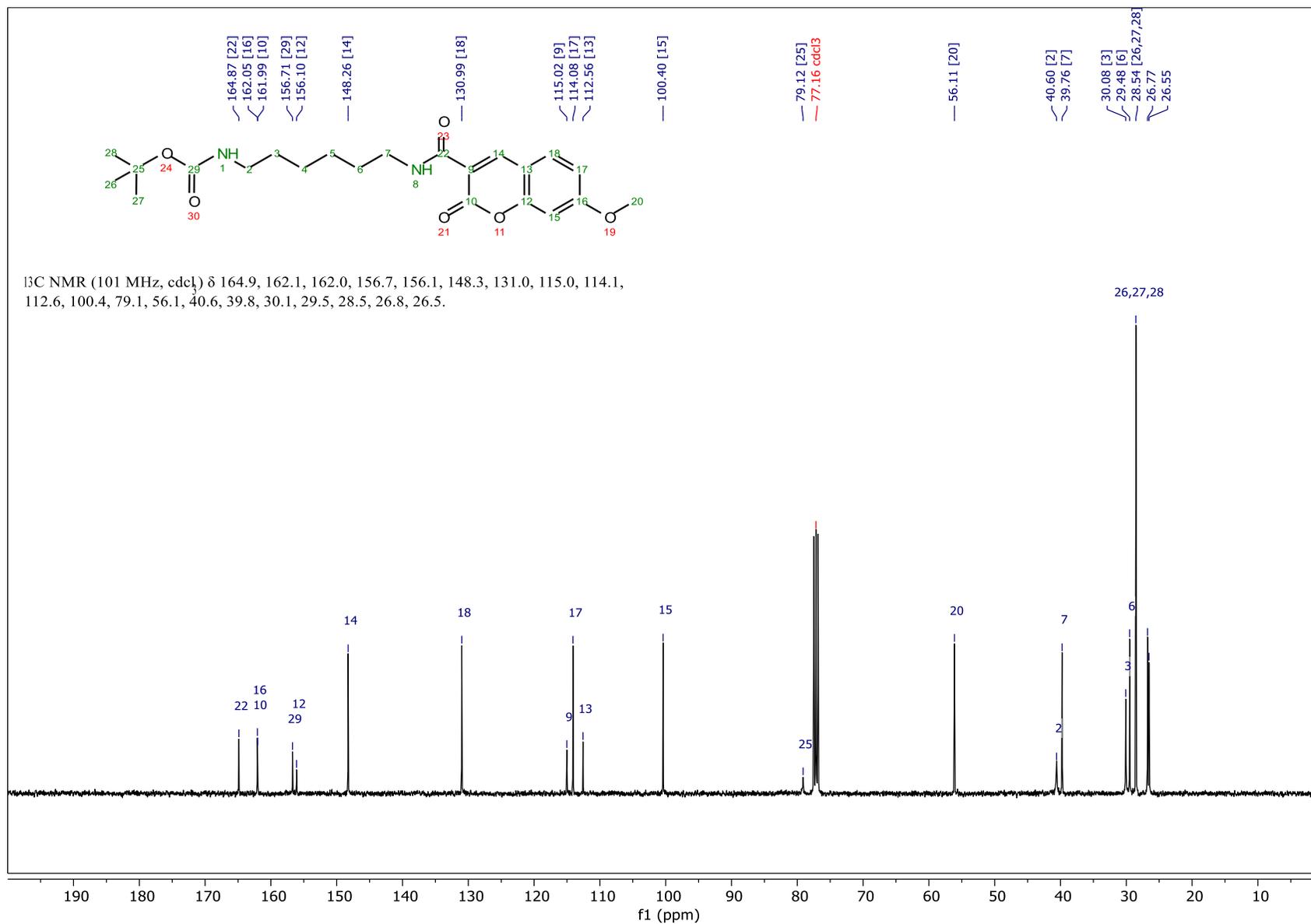


# Compound RBM5-135

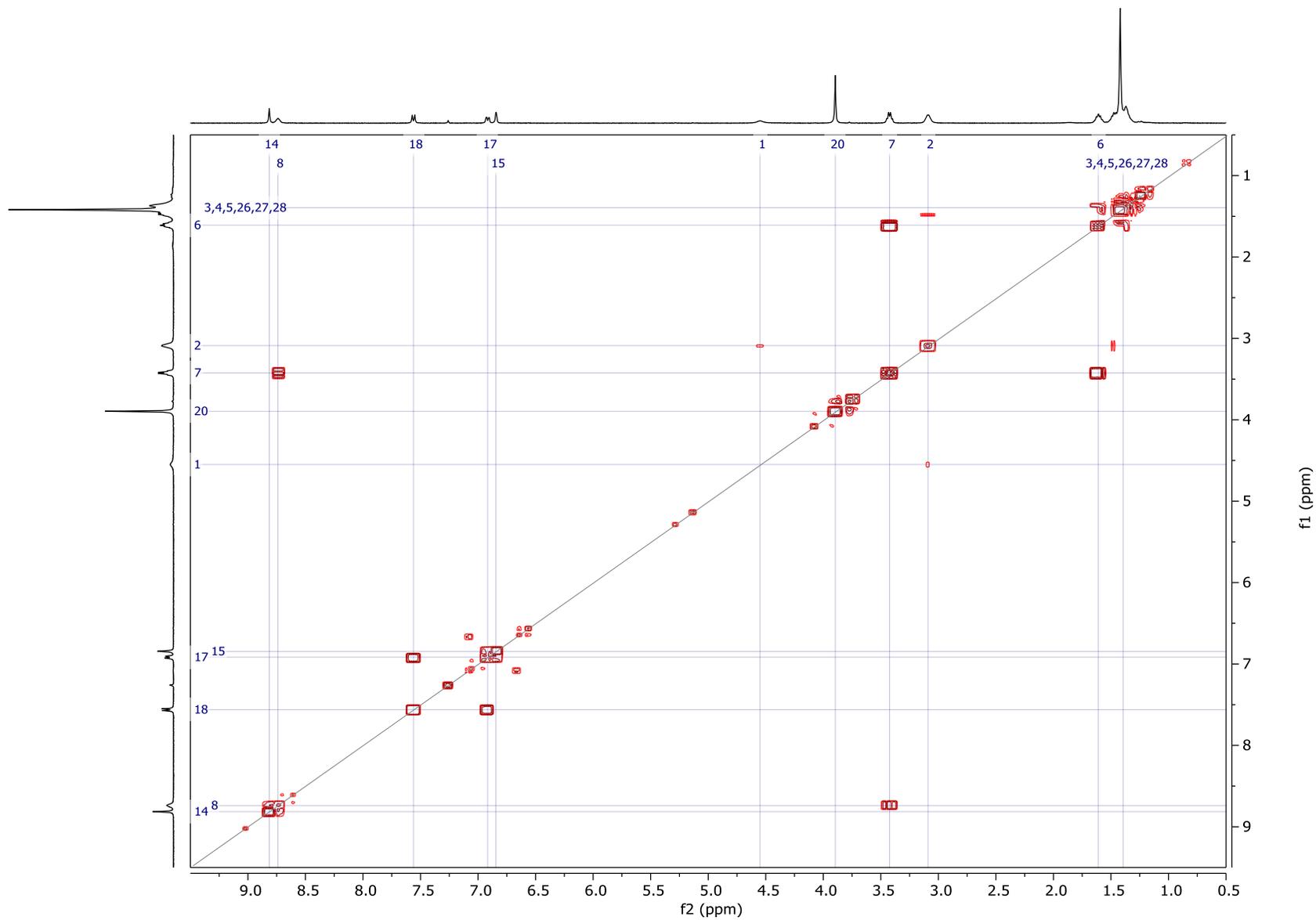
<sup>1</sup>H NMR



# $^{13}\text{C}$ NMR

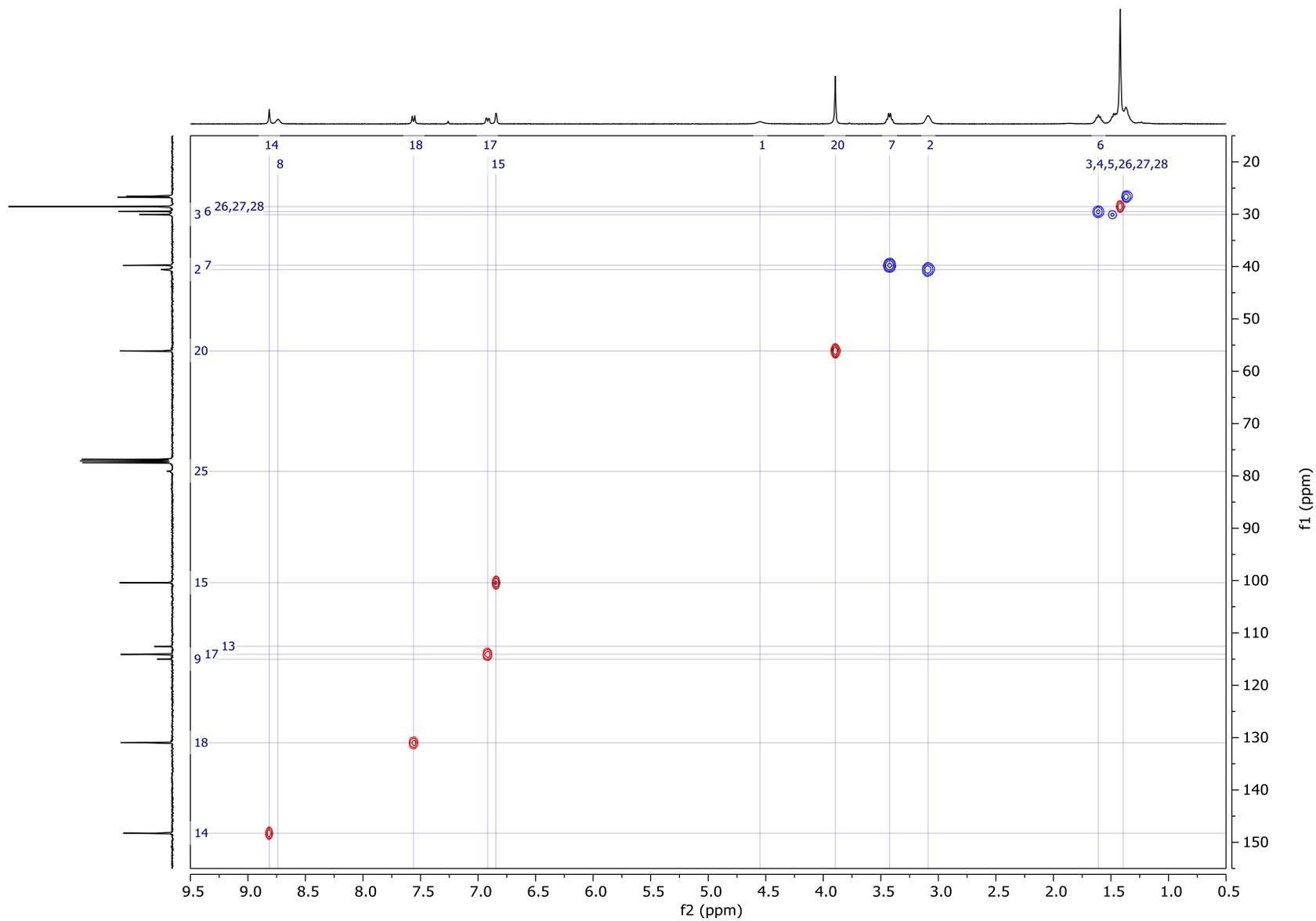


# COSY NMR



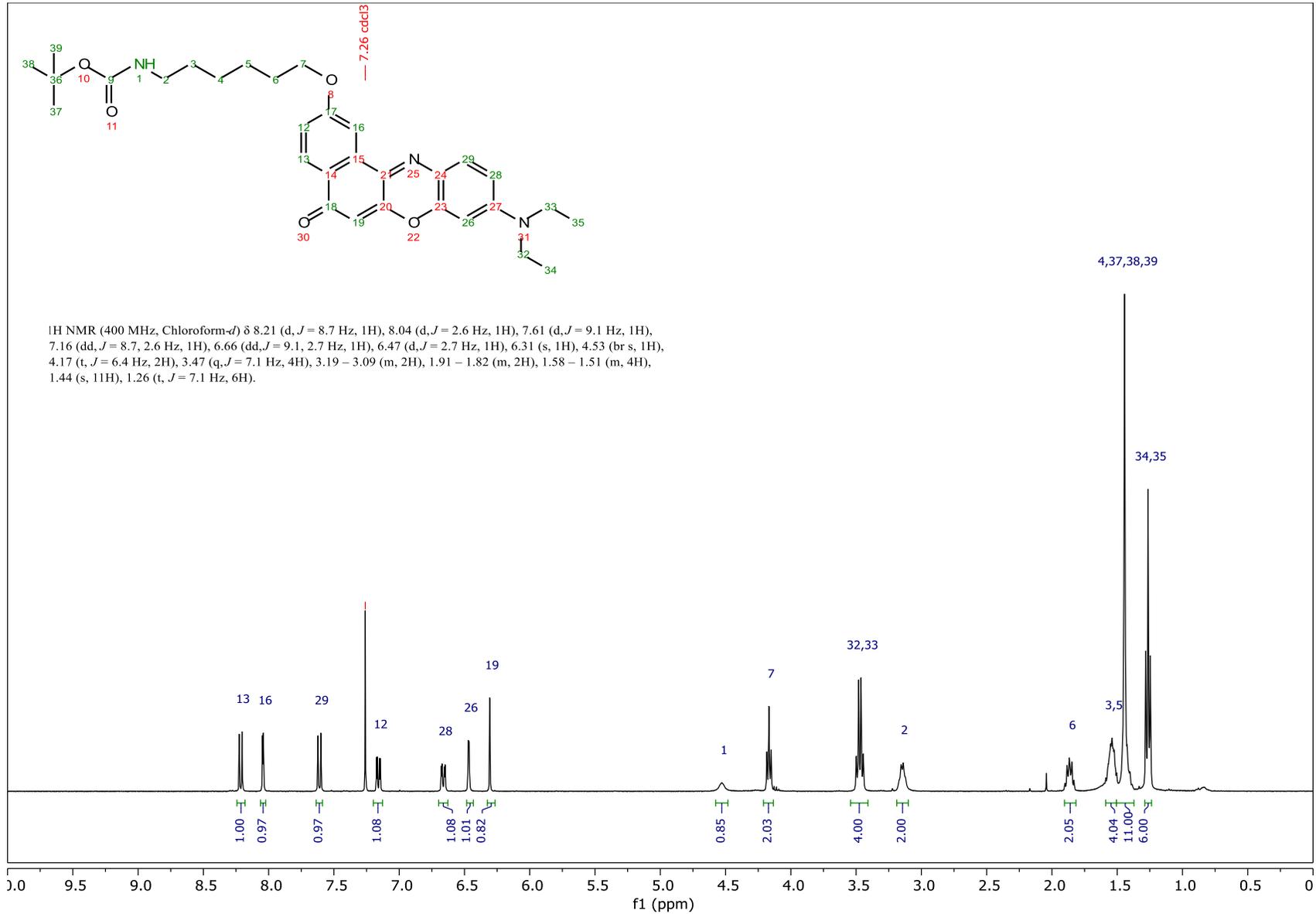
S-275

# HSQC NMR

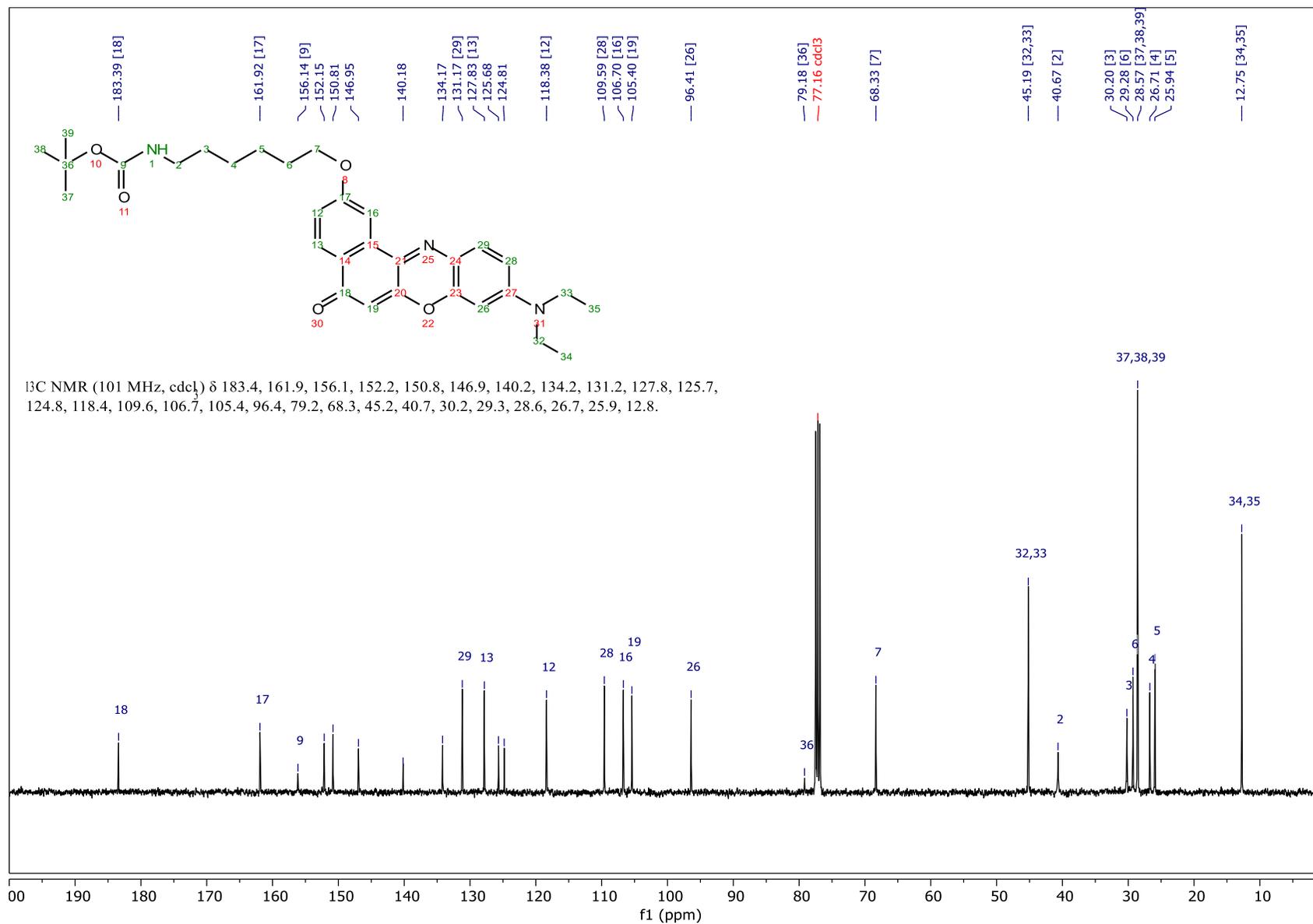


# Compound RBM5-136

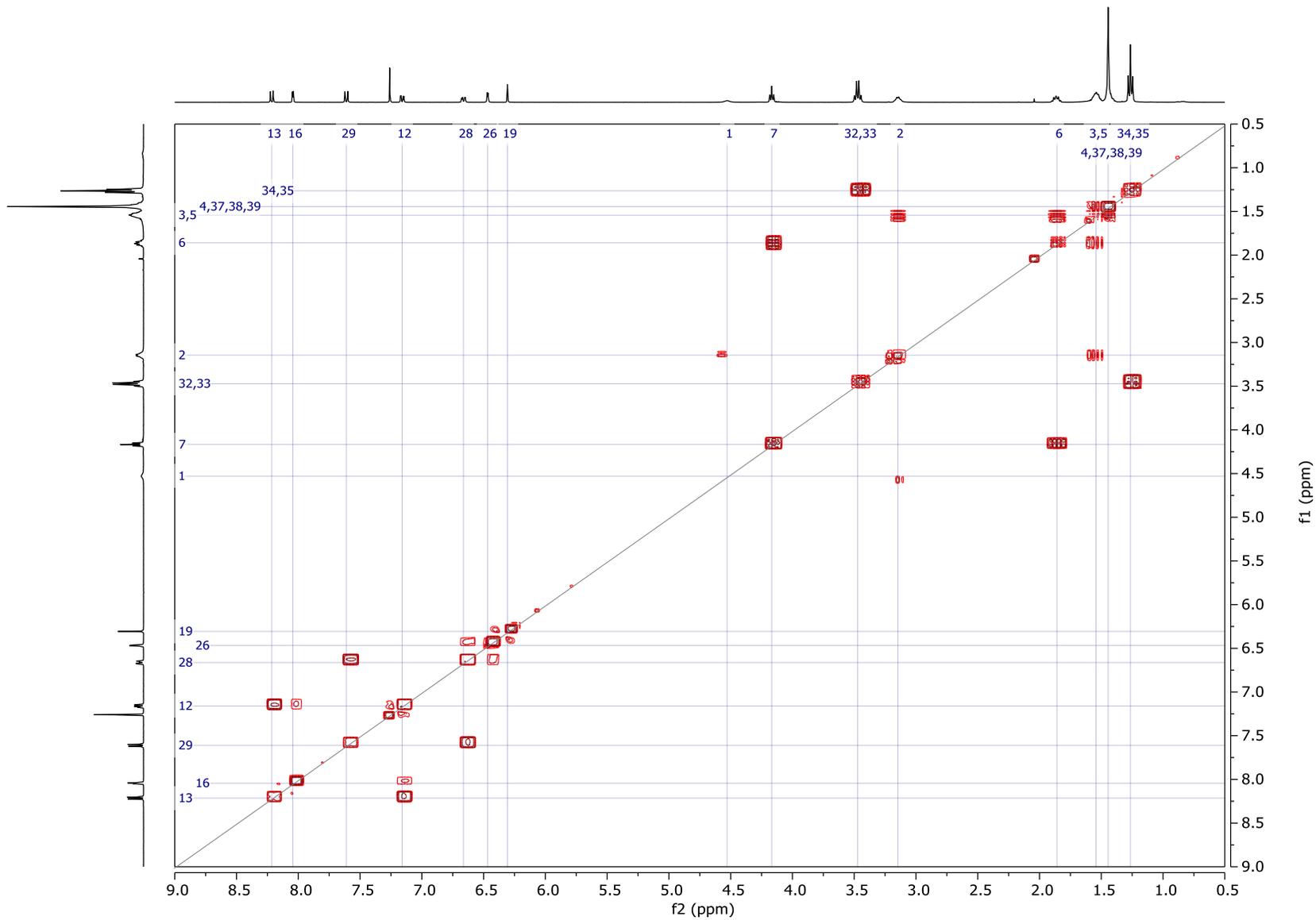
<sup>1</sup>H NMR



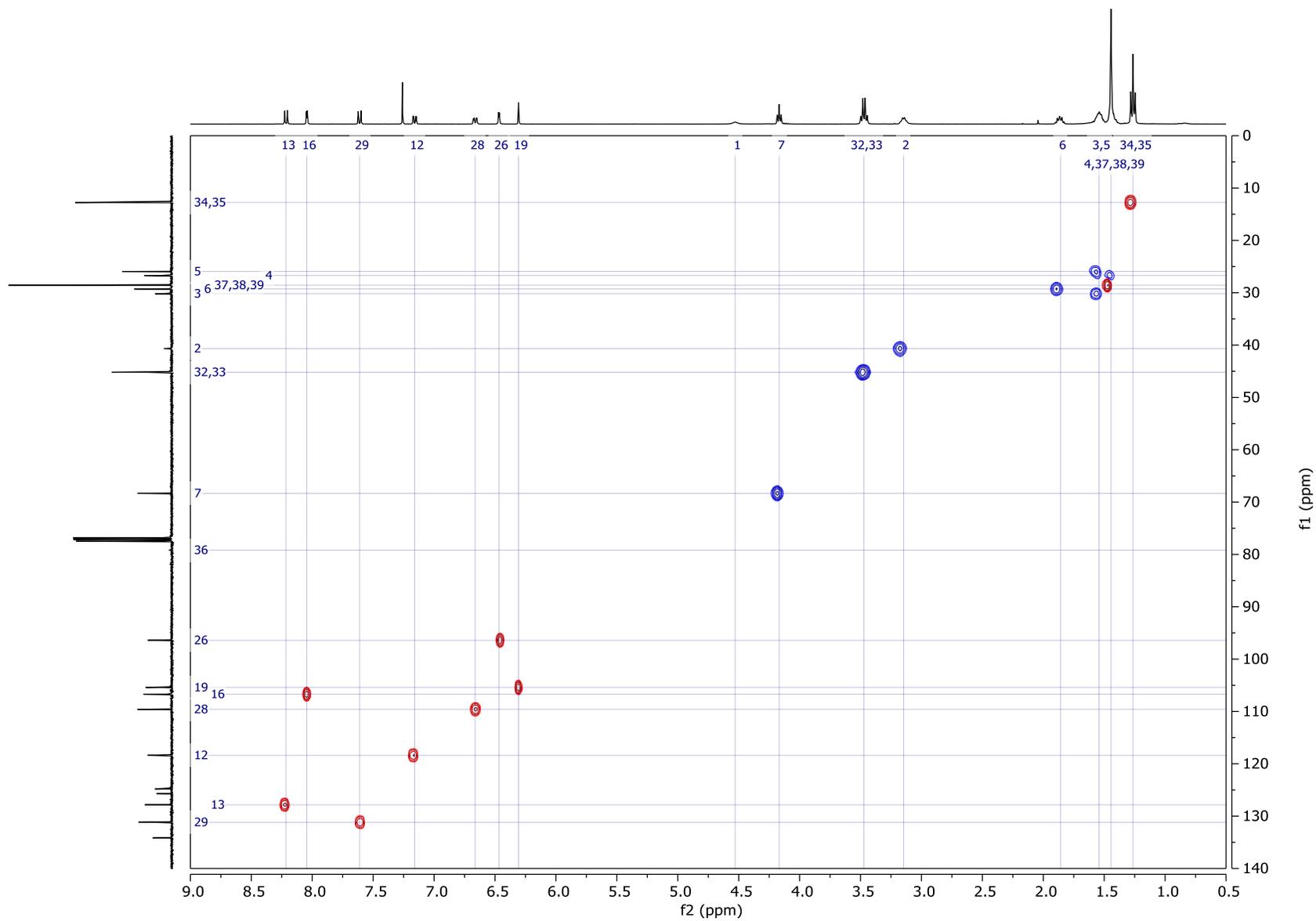
<sup>13</sup>C NMR



# COSY NMR

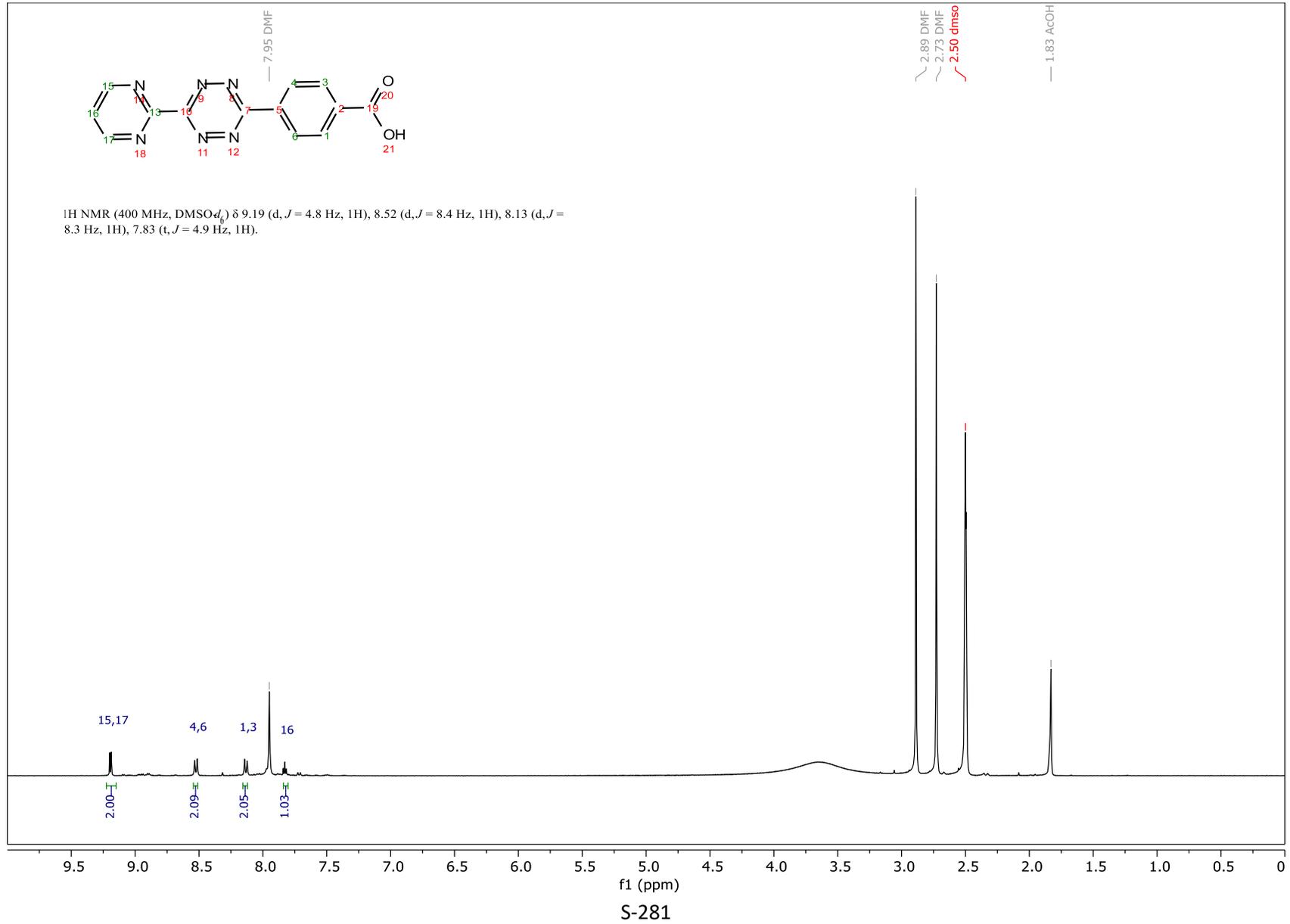


# HSQC NMR

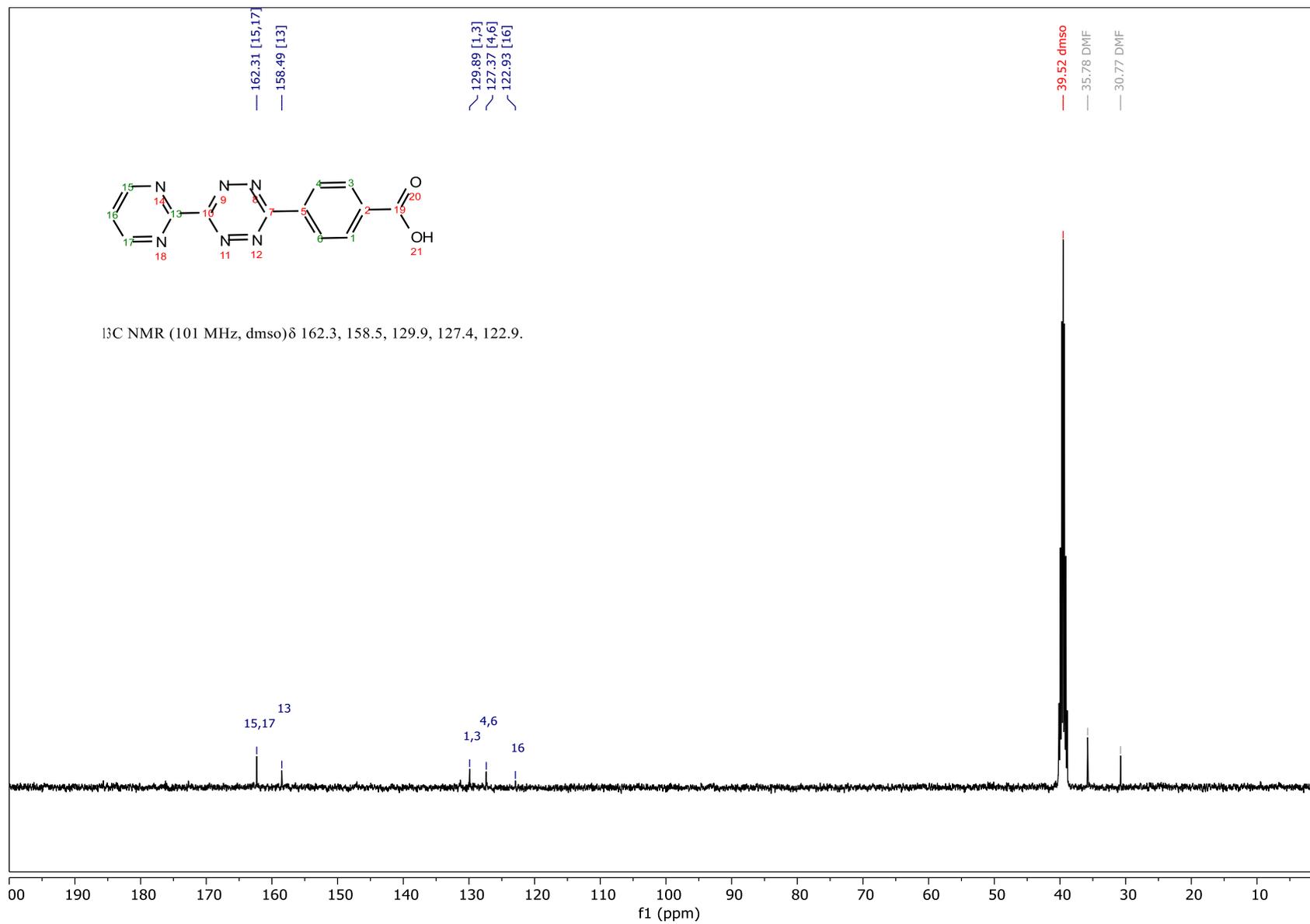


# Compound RBM5-137

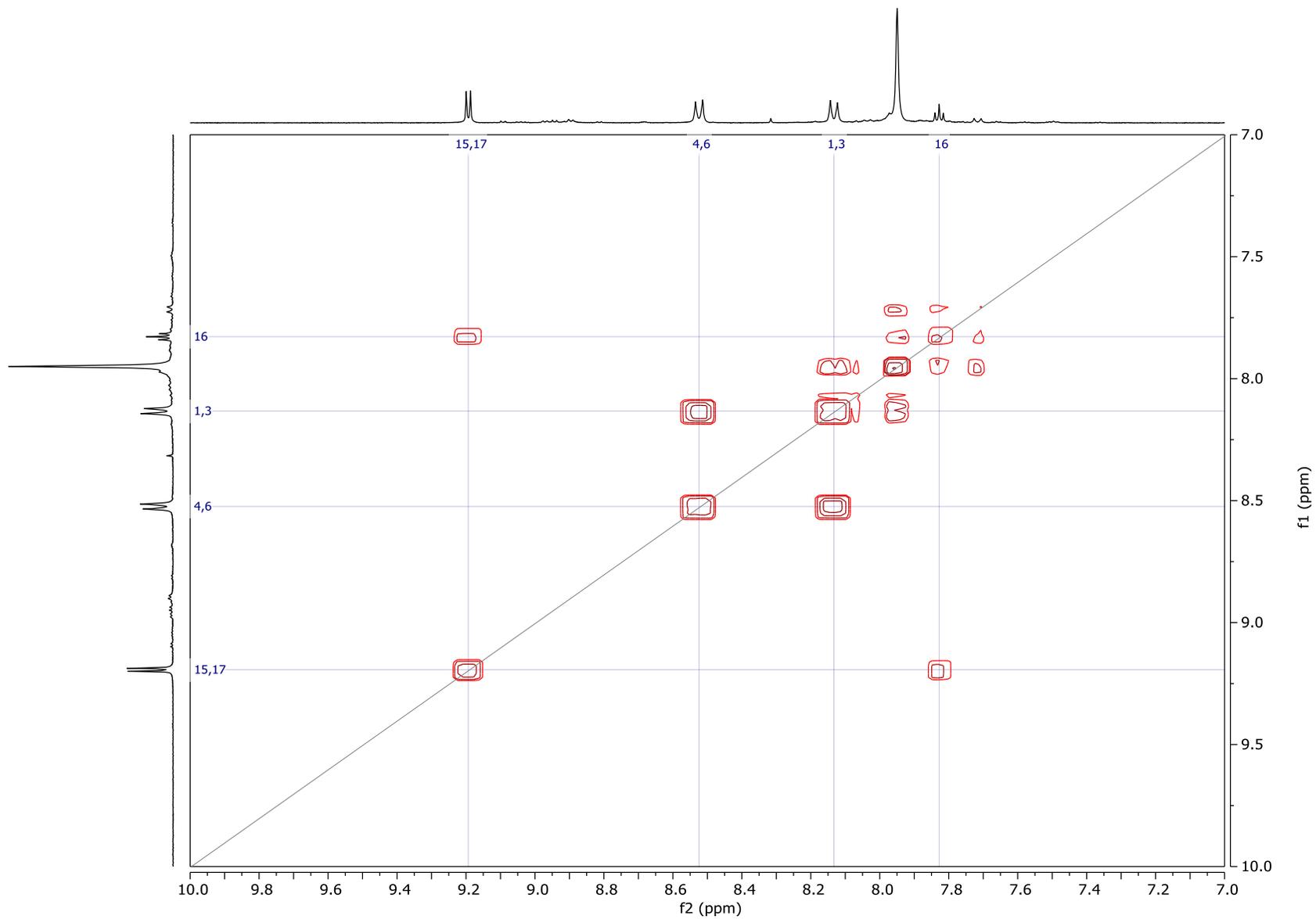
$^1\text{H}$  NMR



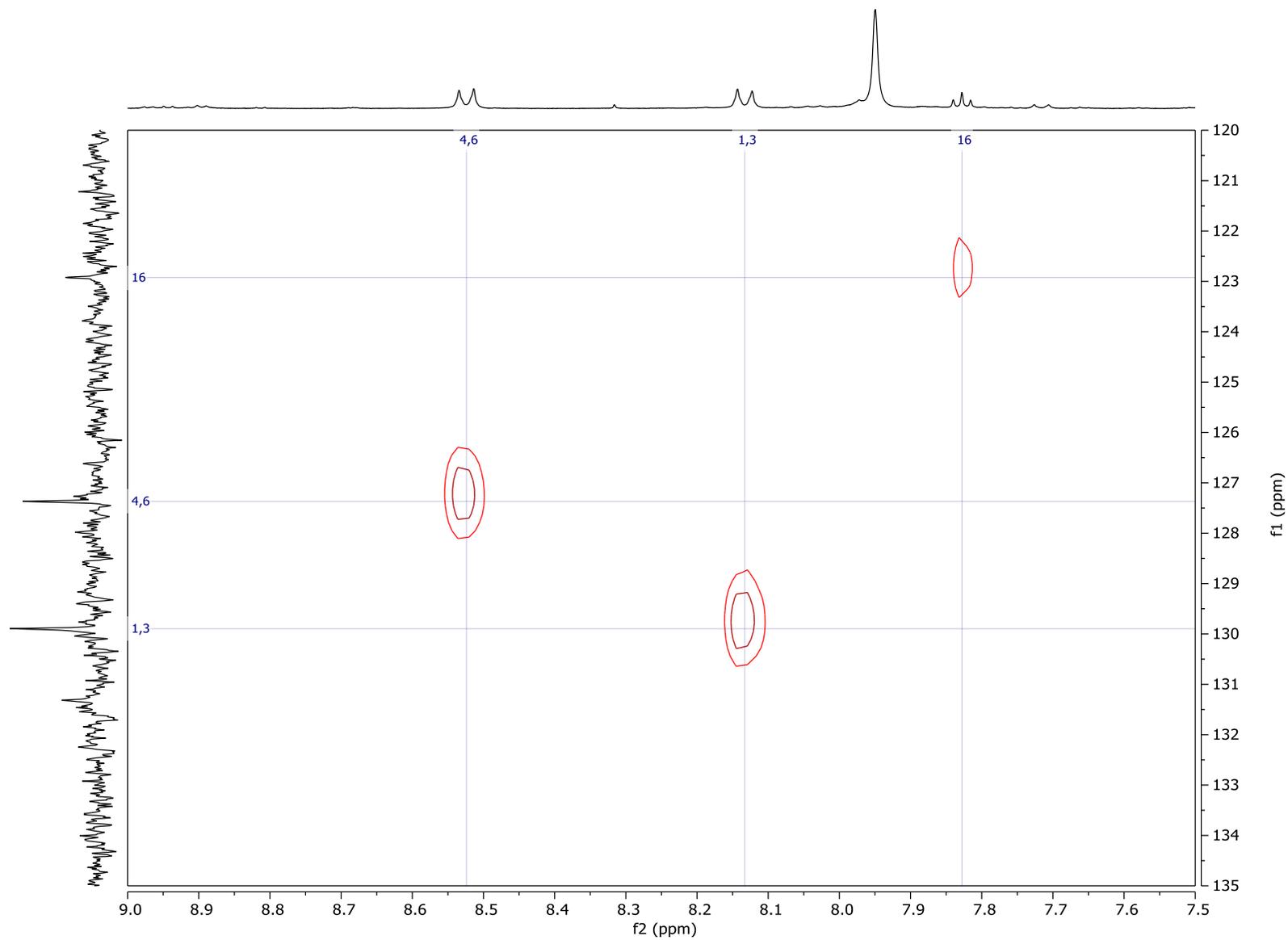
<sup>13</sup>C NMR



COSY NMR



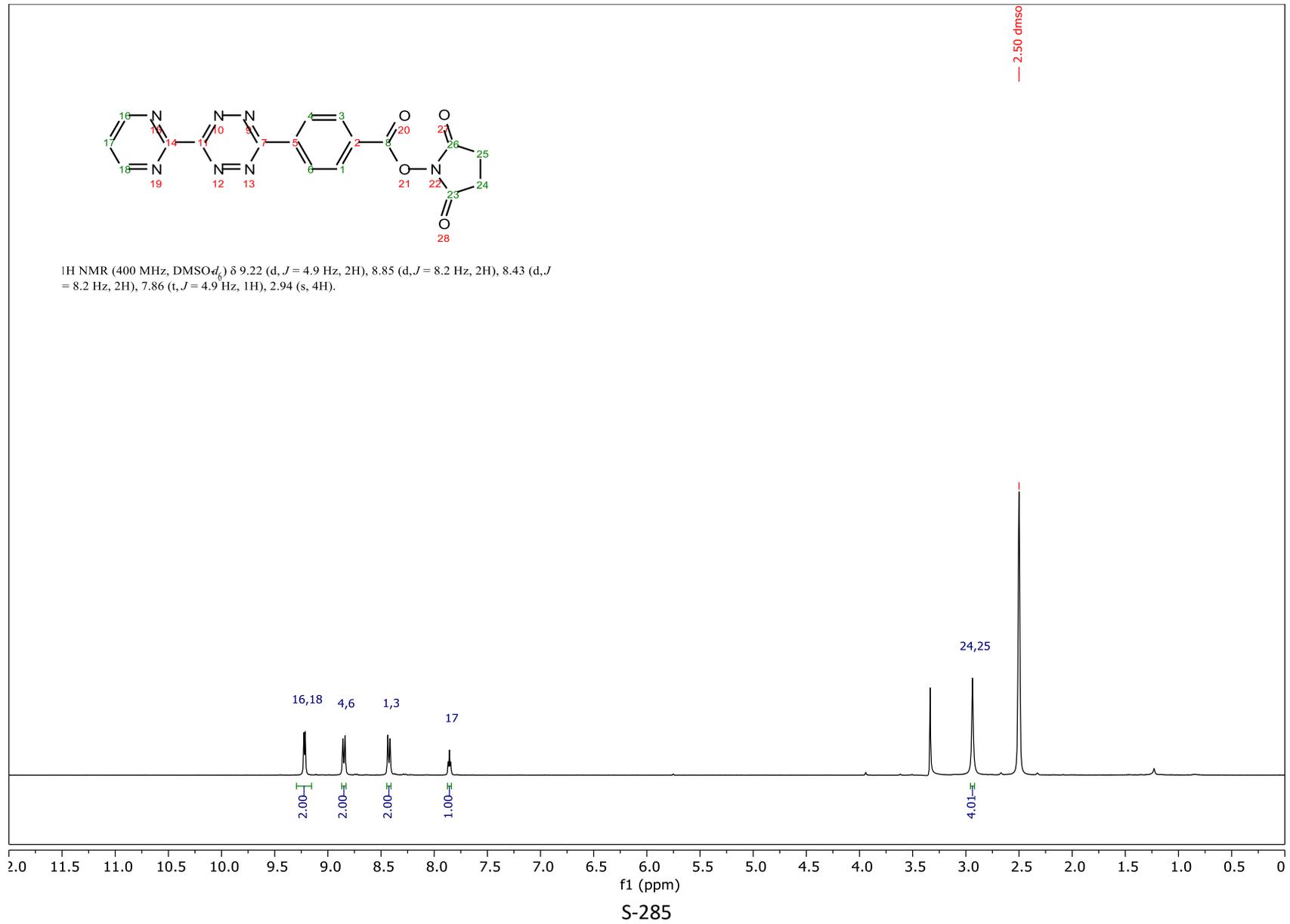
# HSQC NMR



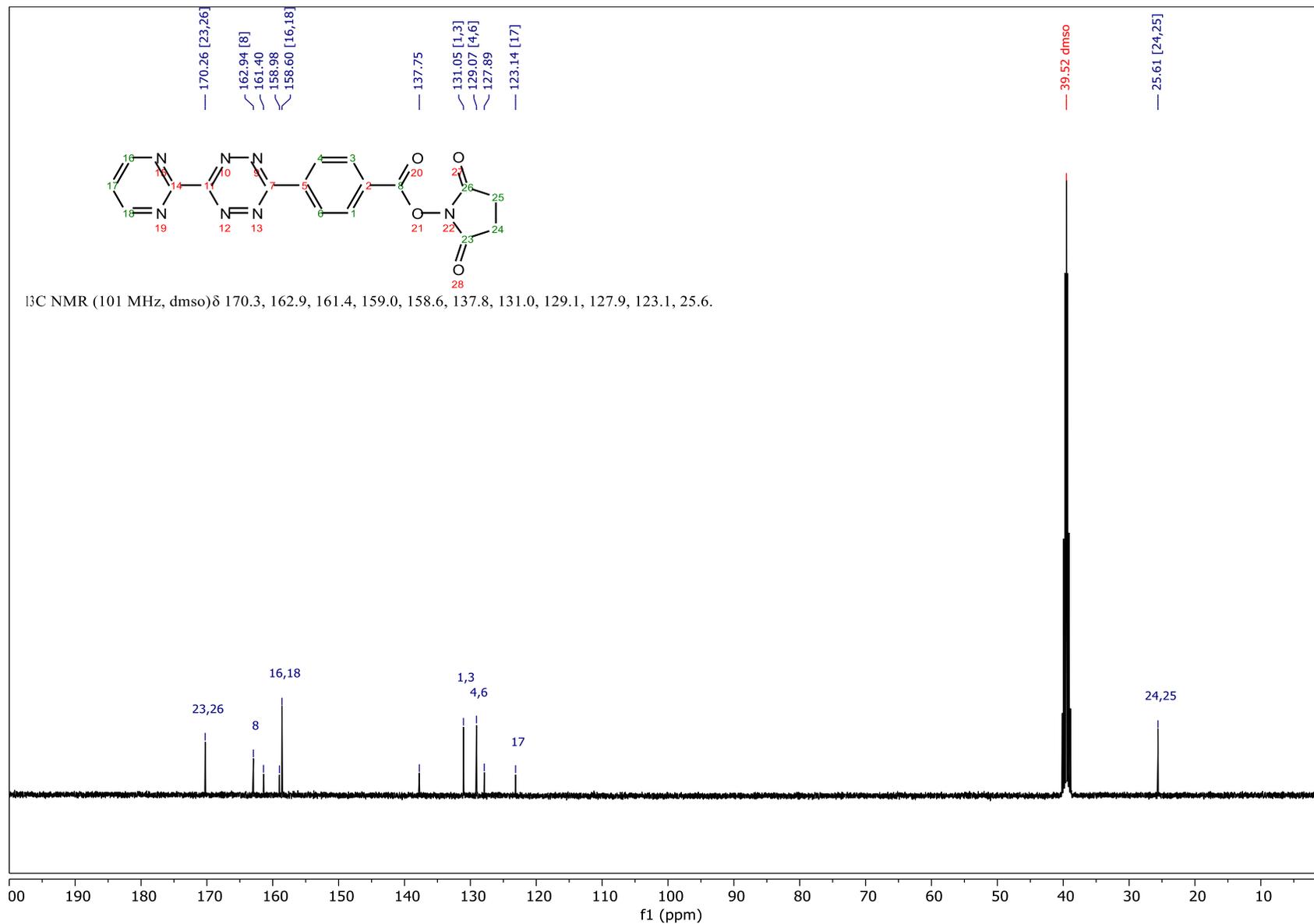
S-284

# Compound RBM5-138

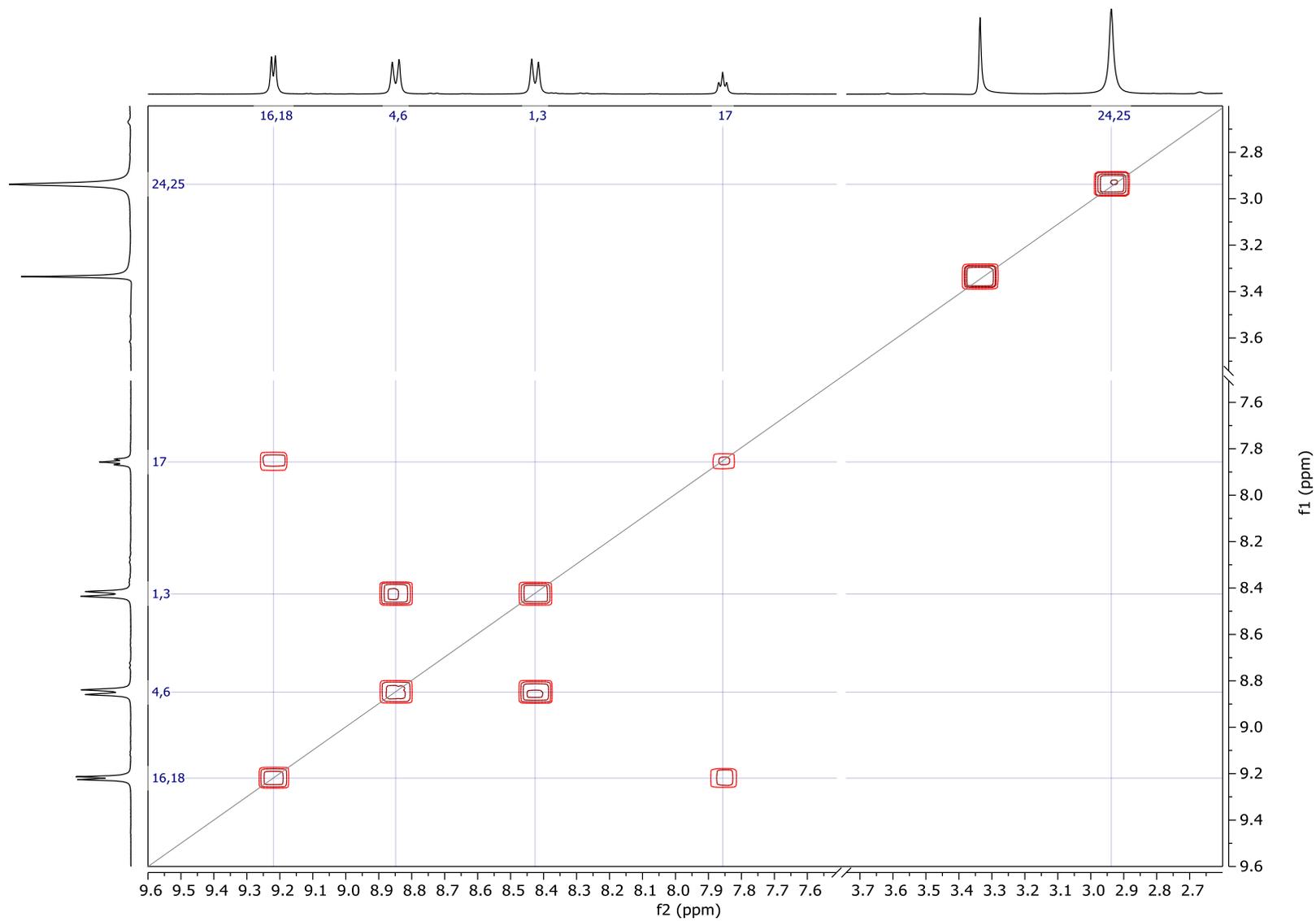
<sup>1</sup>H NMR



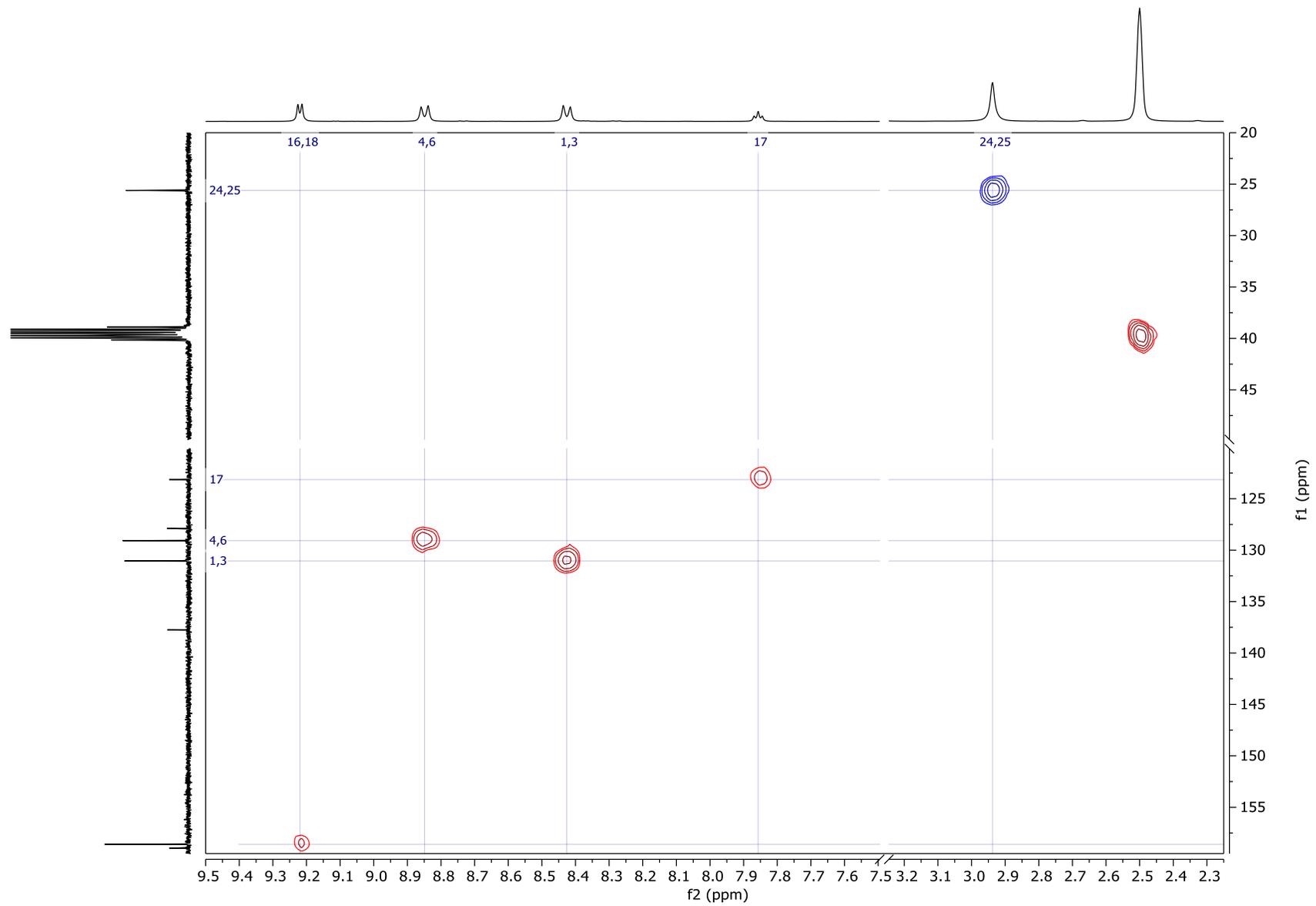
# <sup>13</sup>C NMR



# COSY NMR



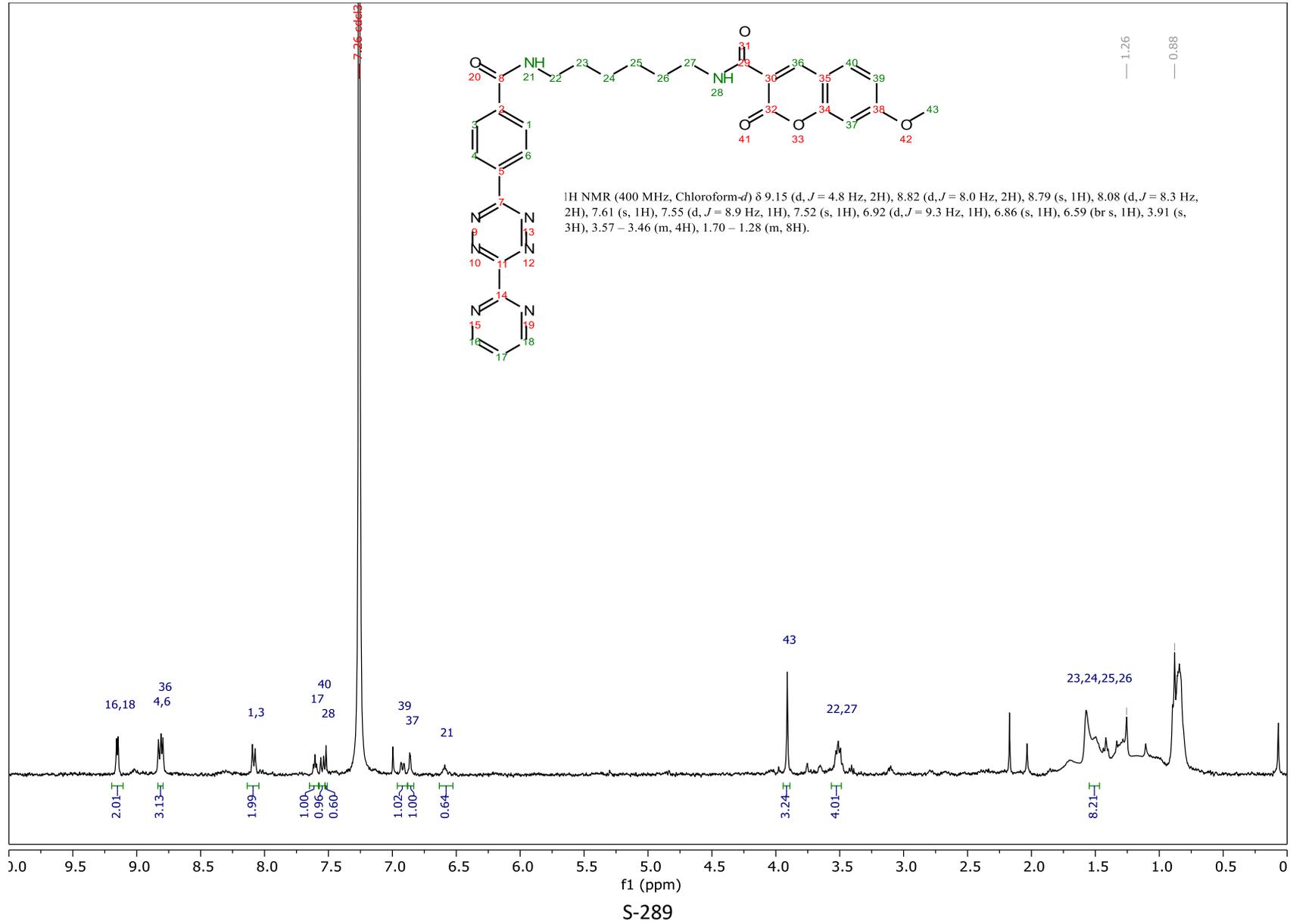
# HSQC NMR



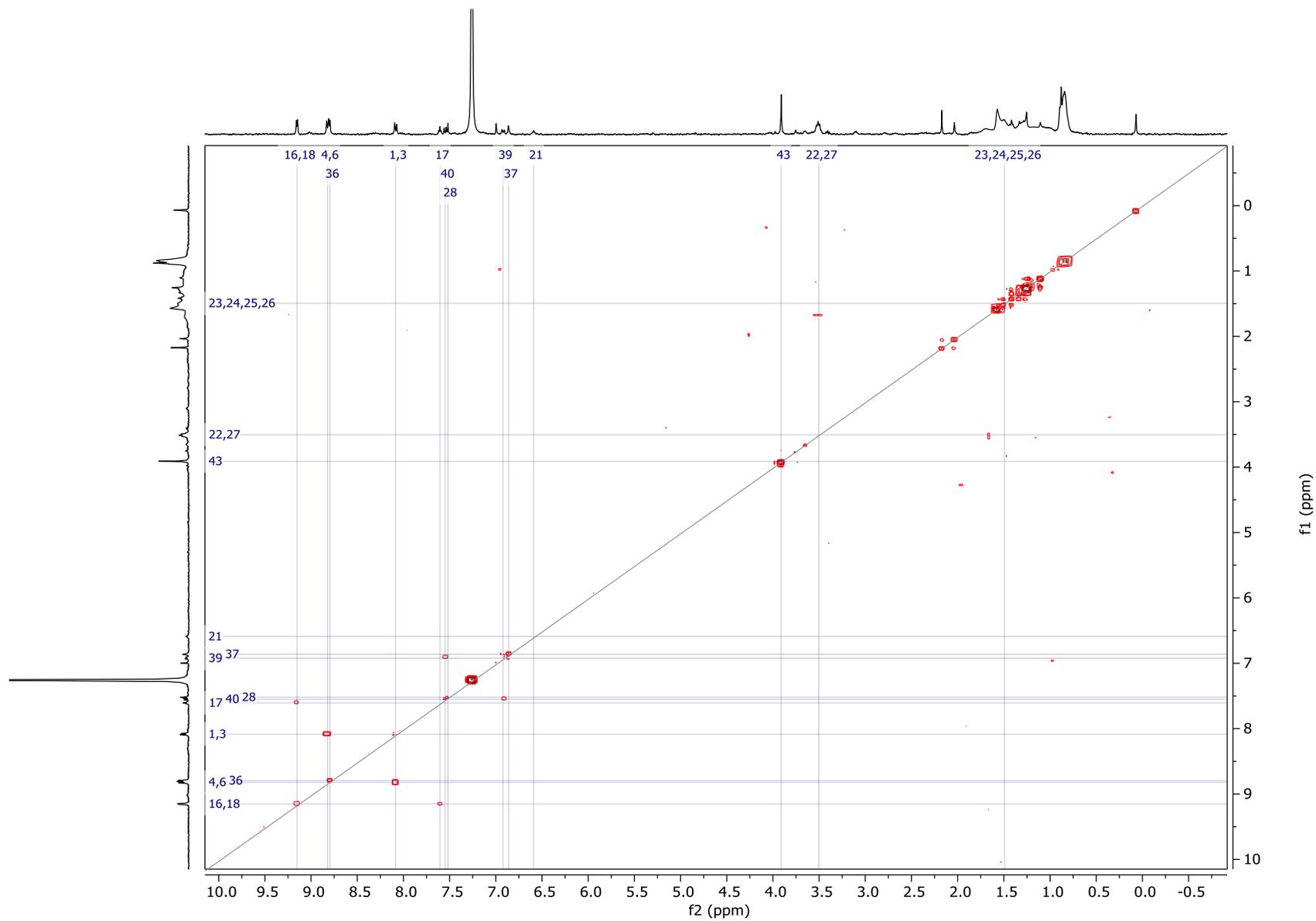
S-288

# Compound RBM5-139

<sup>1</sup>H NMR

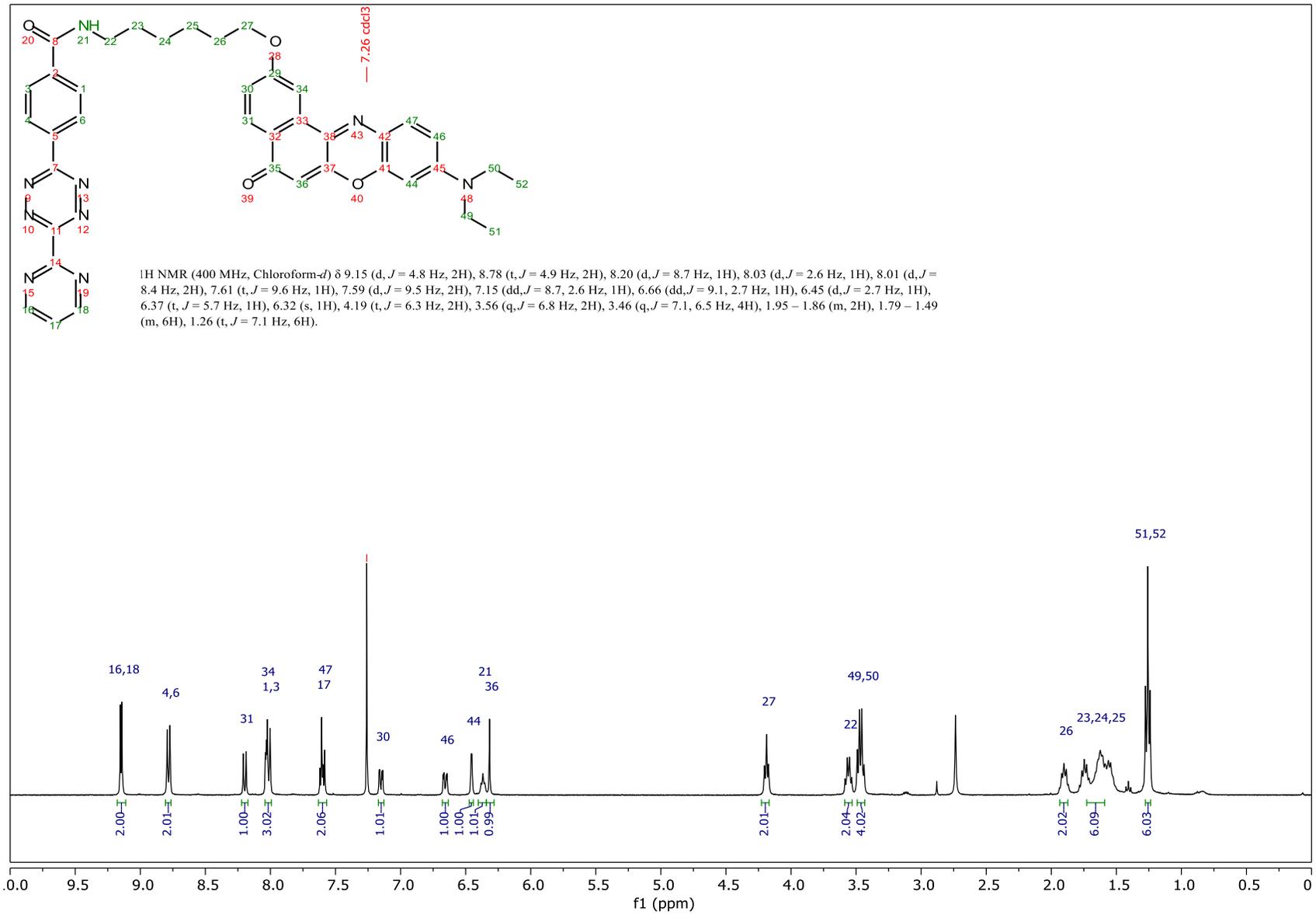


# COSY NMR

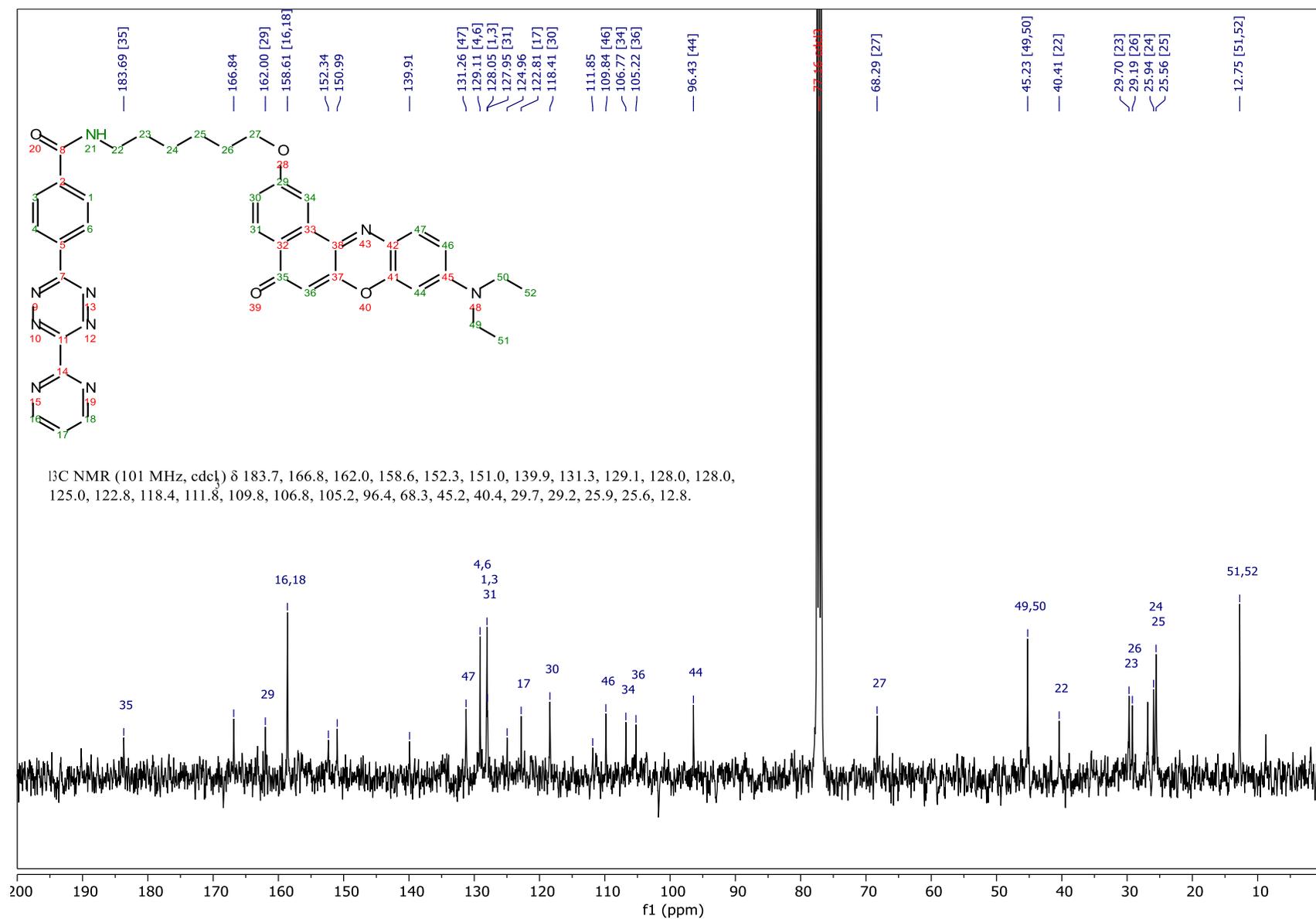


# Compound RBM5-140

<sup>1</sup>H NMR

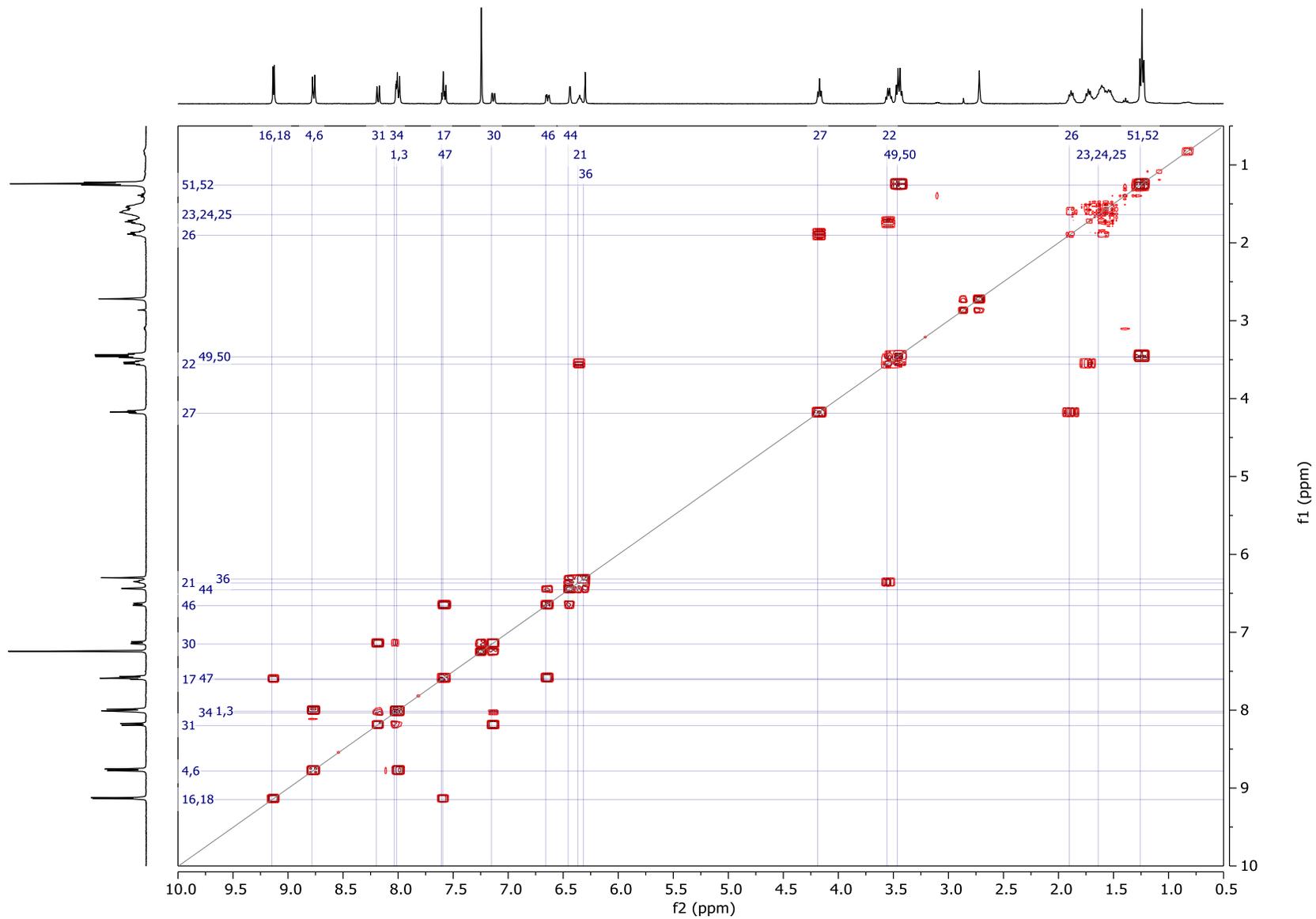


# <sup>13</sup>C NMR

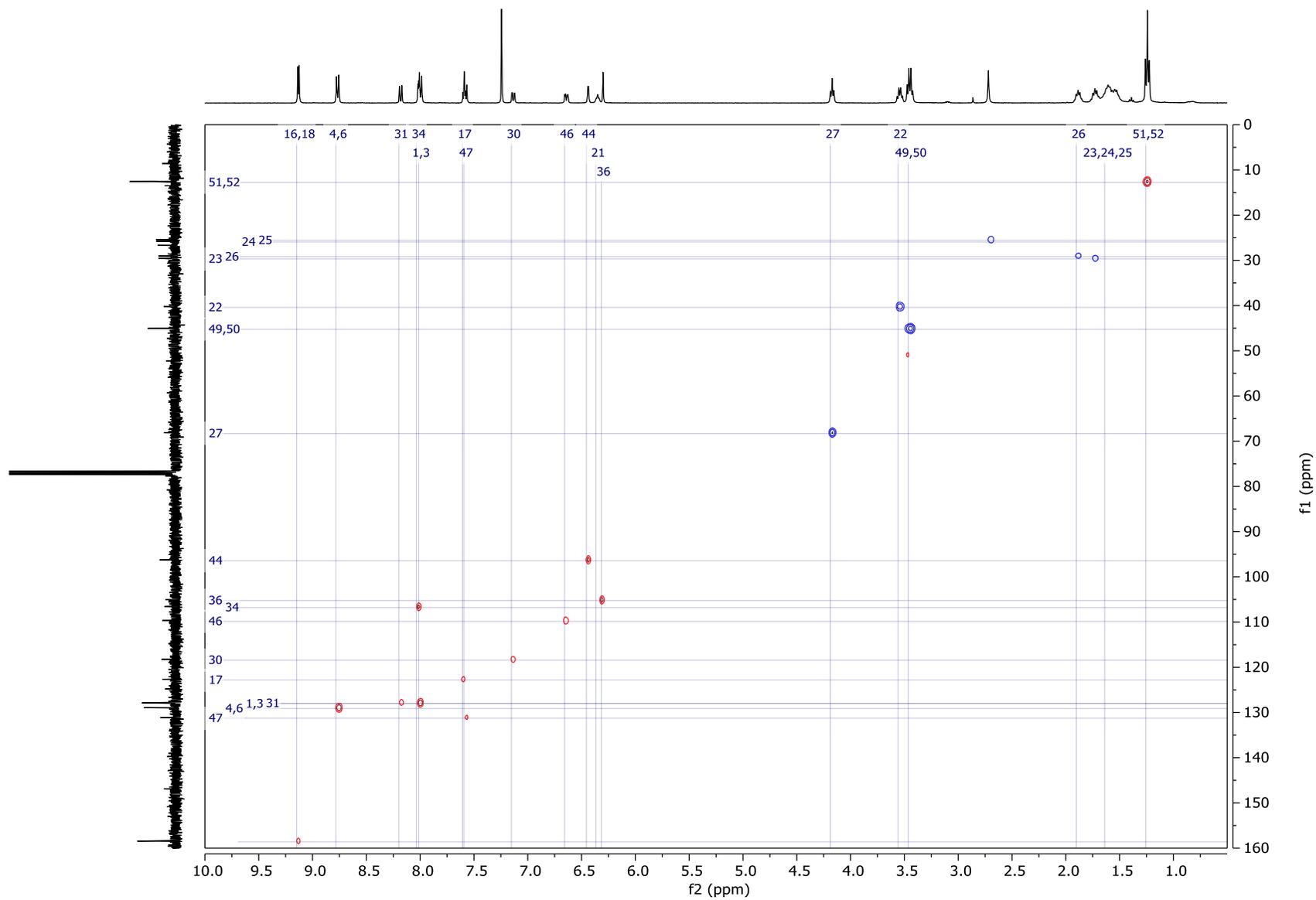


<sup>13</sup>C NMR (101 MHz, cdCl<sub>3</sub>) δ 183.7, 166.8, 162.0, 158.6, 152.3, 151.0, 139.9, 131.3, 129.1, 128.0, 128.0, 125.0, 122.8, 118.4, 111.8, 109.8, 106.8, 105.2, 96.4, 68.3, 45.2, 40.4, 29.7, 29.2, 25.9, 25.6, 12.8.

# COSY NMR

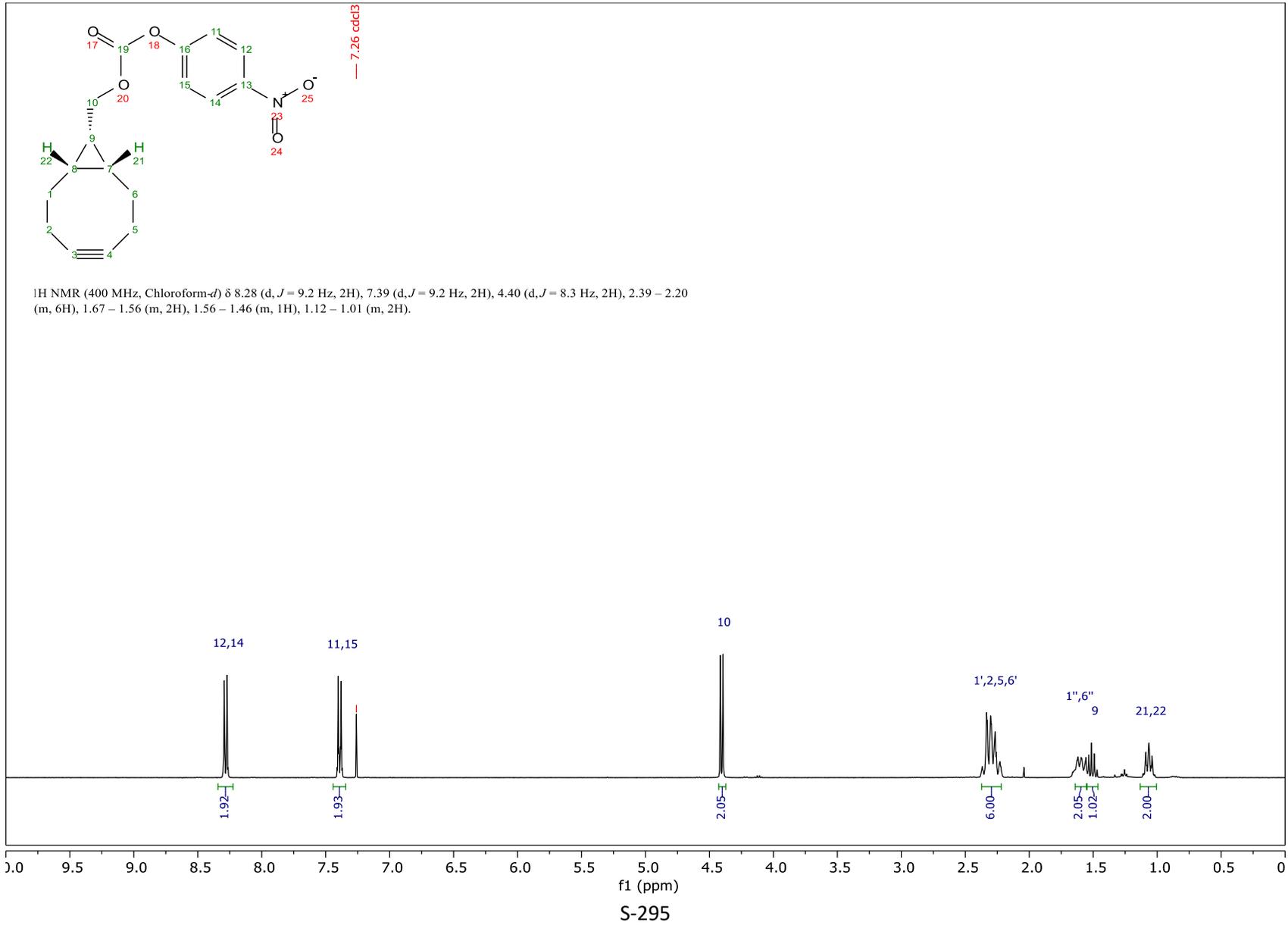


# HSQC NMR

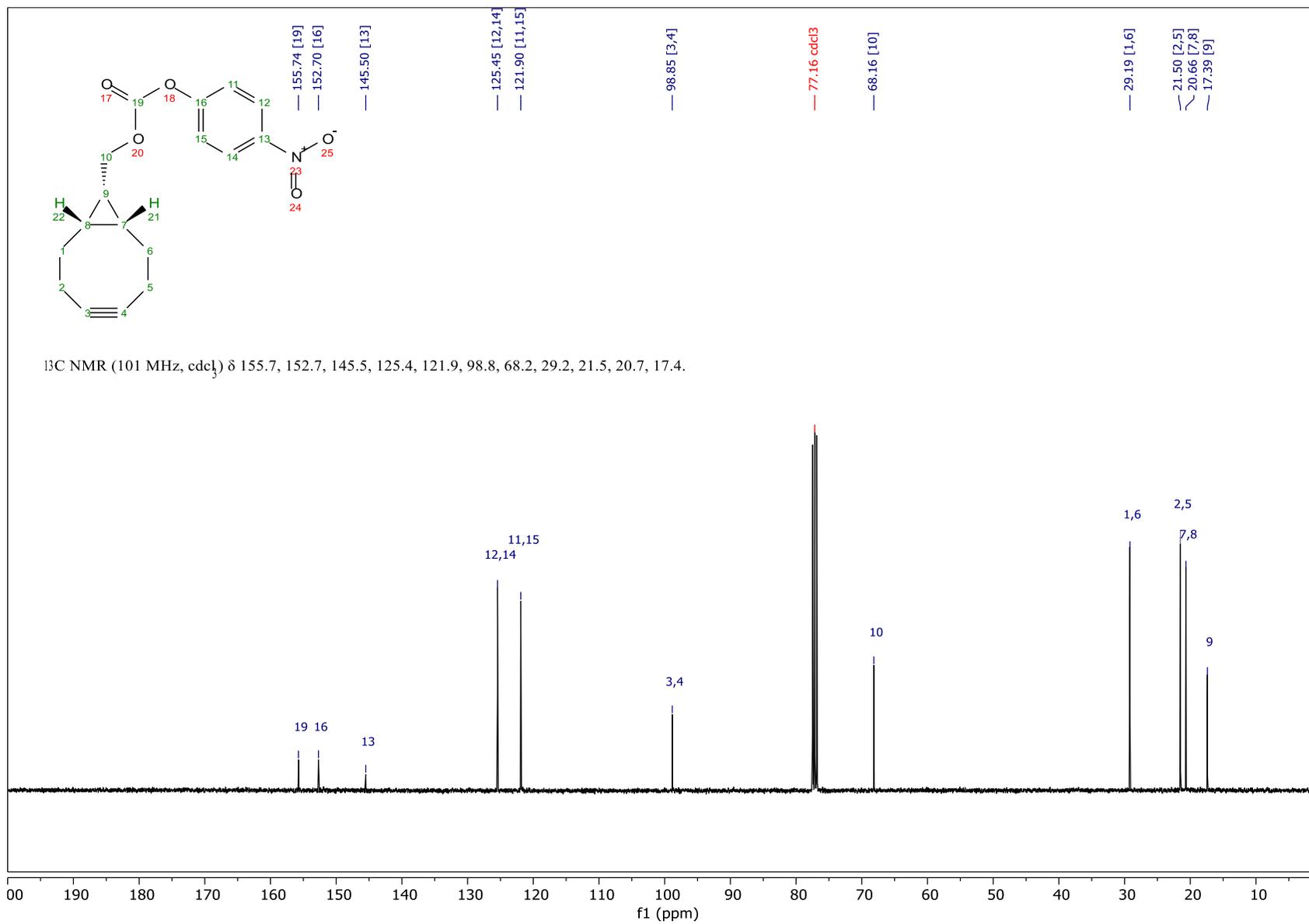


# Compound RBM5-141

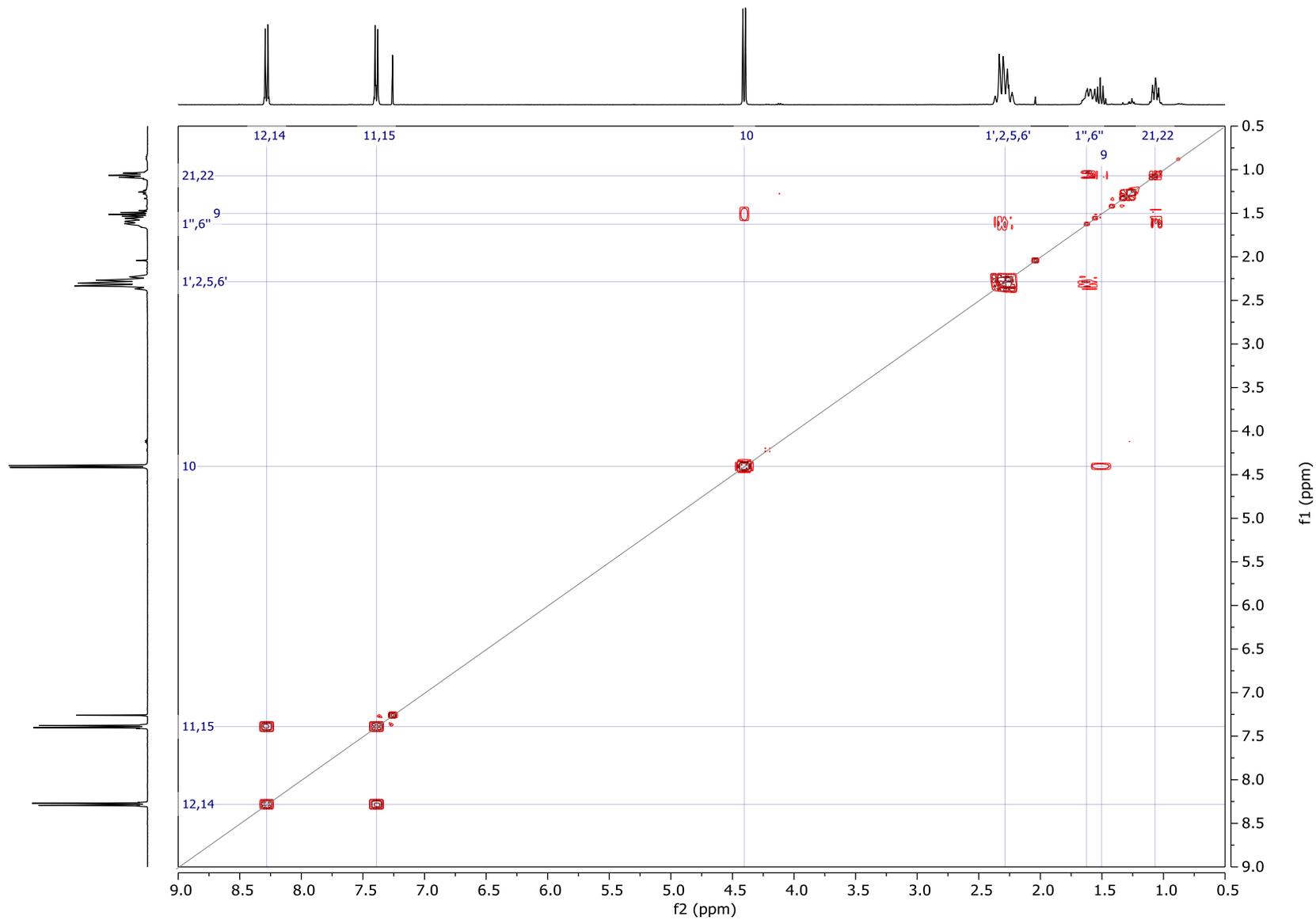
## $^1\text{H}$ NMR



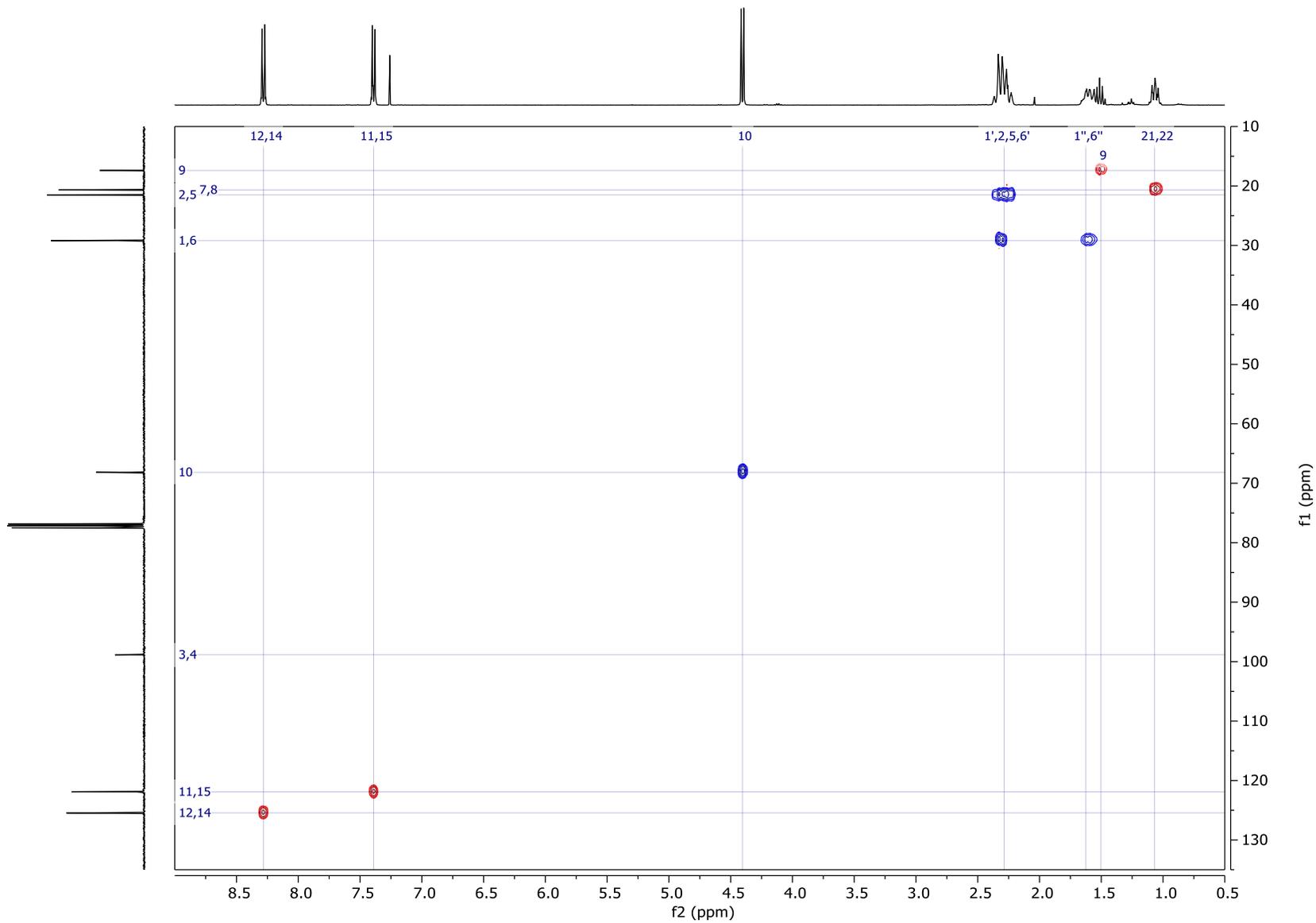
# <sup>13</sup>C NMR



# COSY NMR

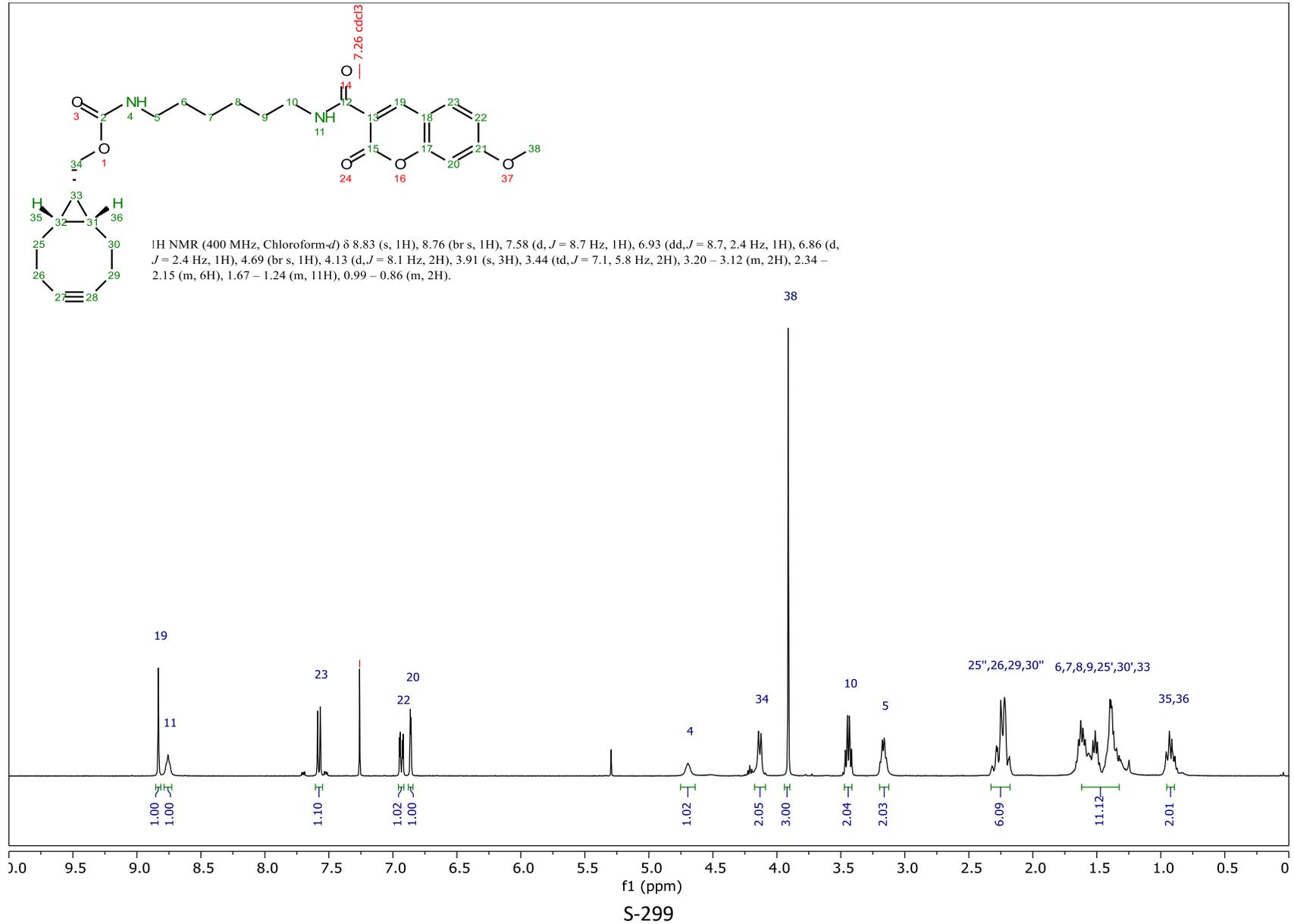


# HSQC NMR

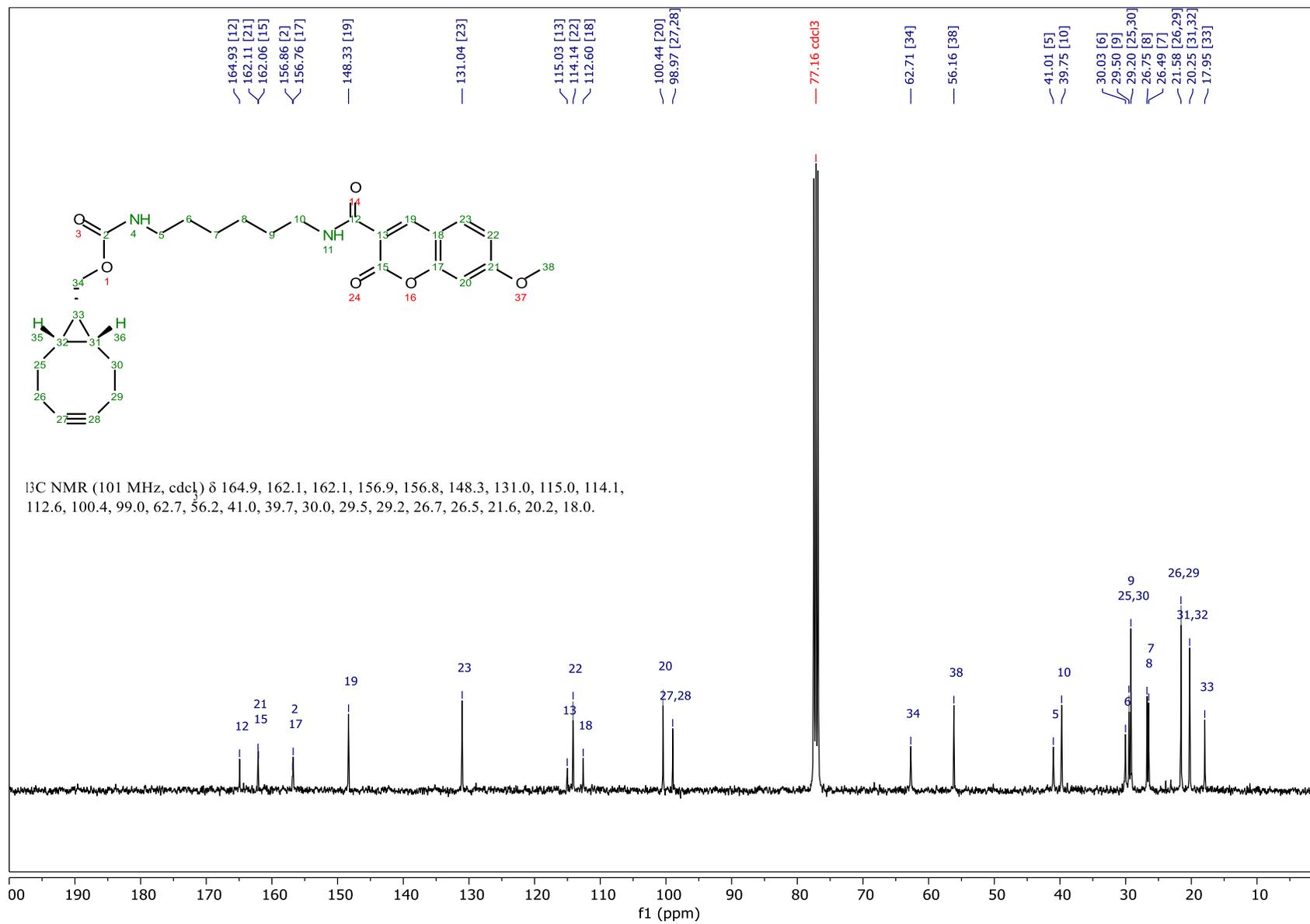


# Compound RBM5-142

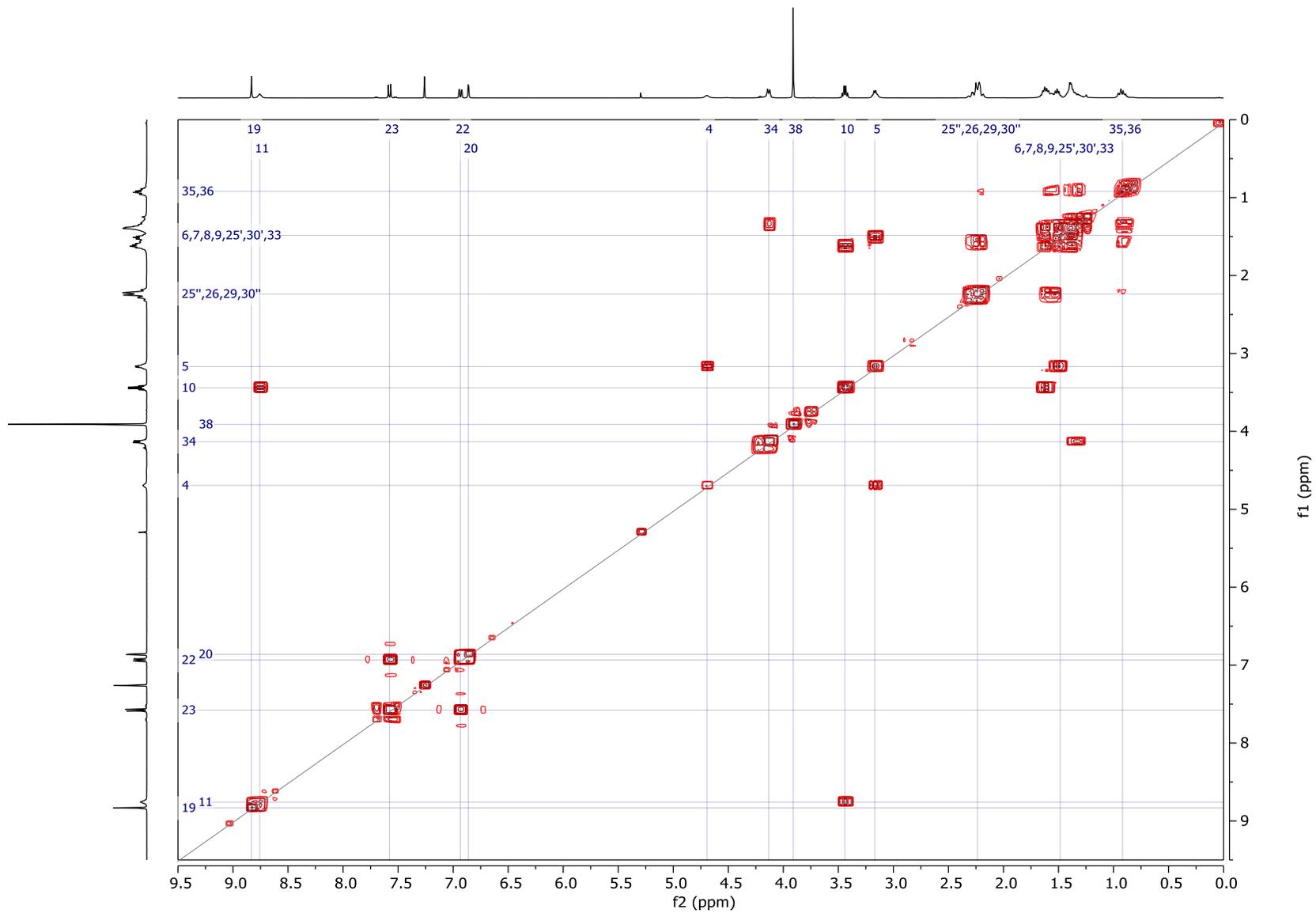
$^1\text{H}$  NMR



# <sup>13</sup>C NMR

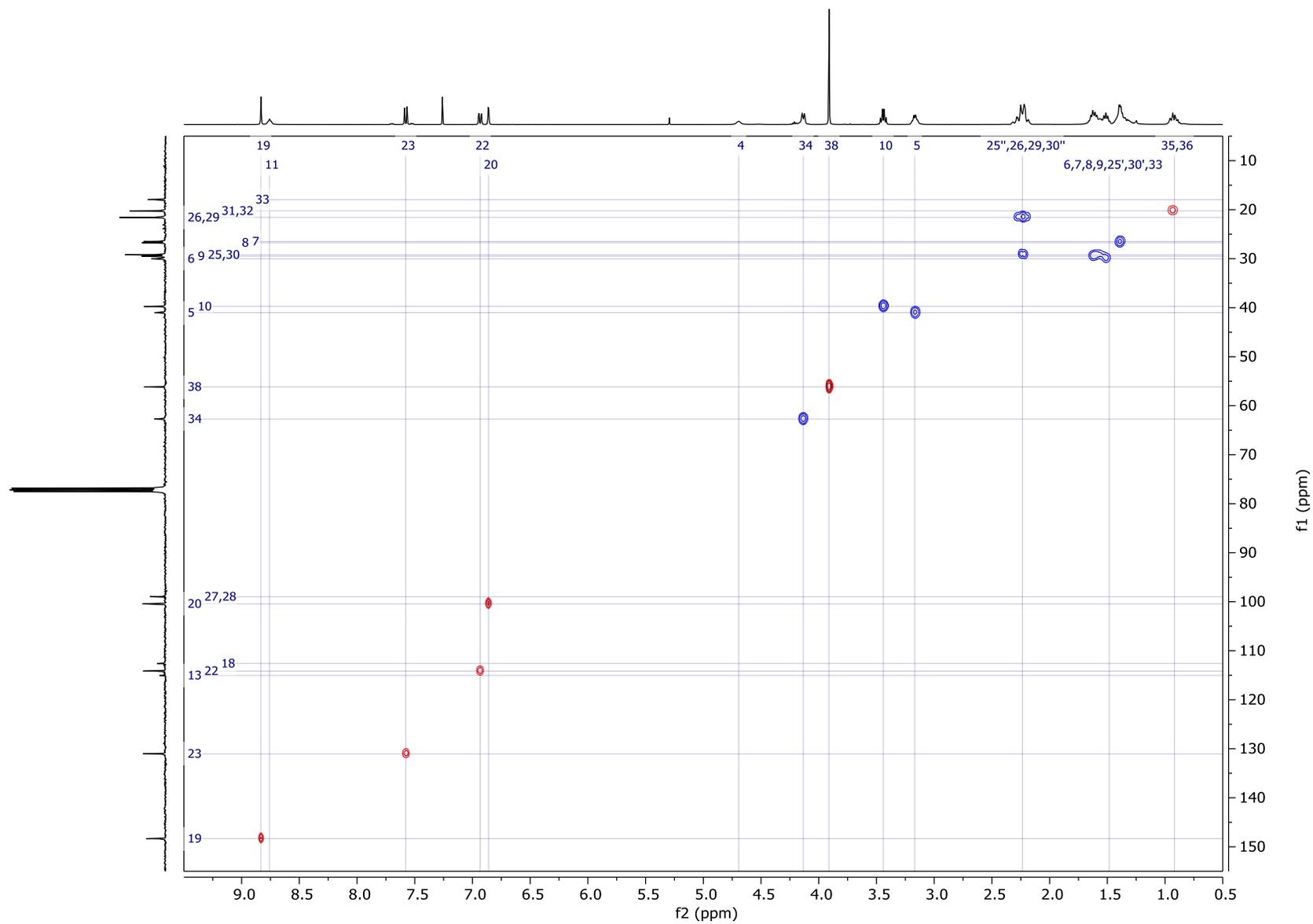


# COSY NMR



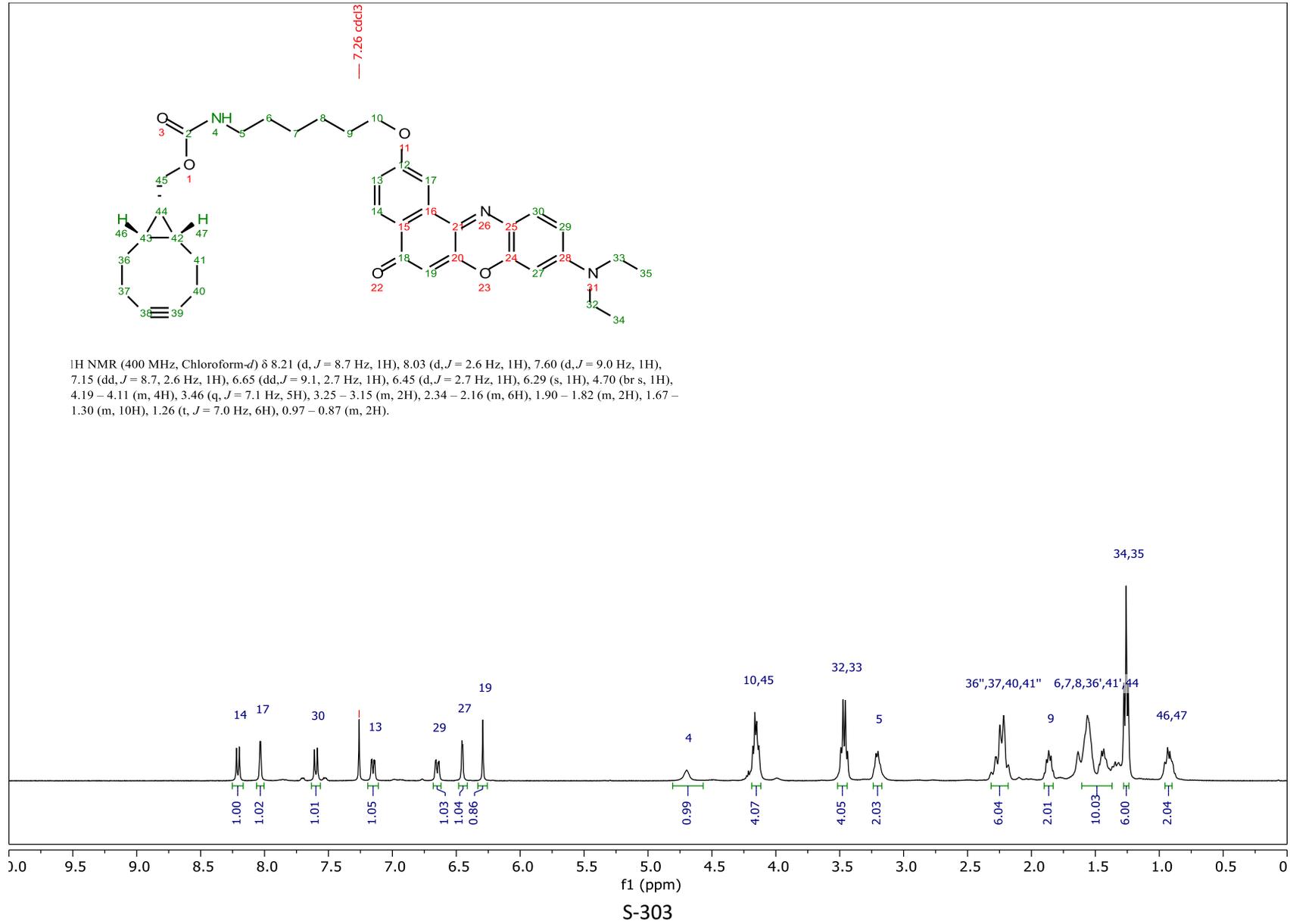
S-301

# HSQC NMR

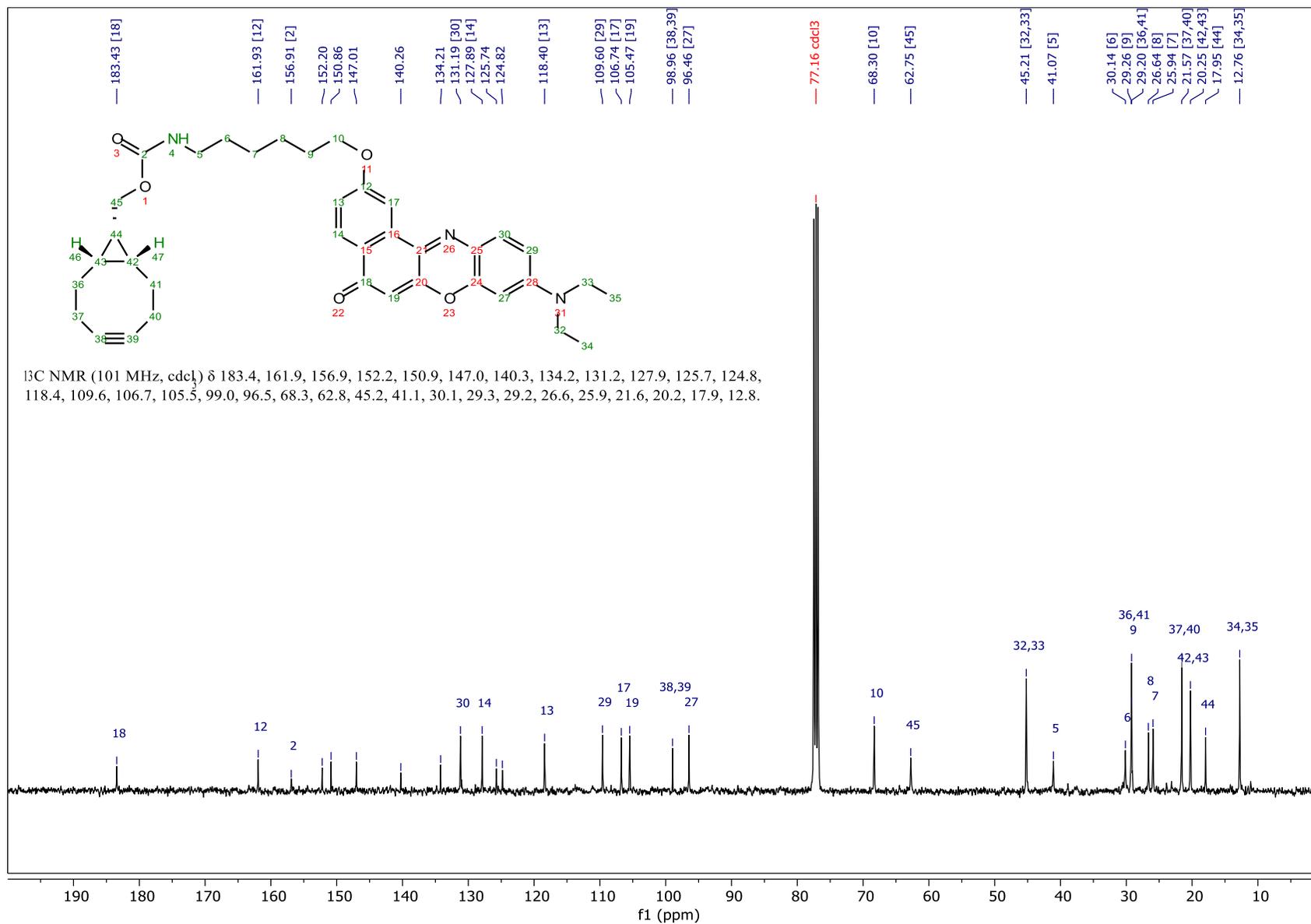


# Compound RBM5-143

$^1\text{H}$  NMR

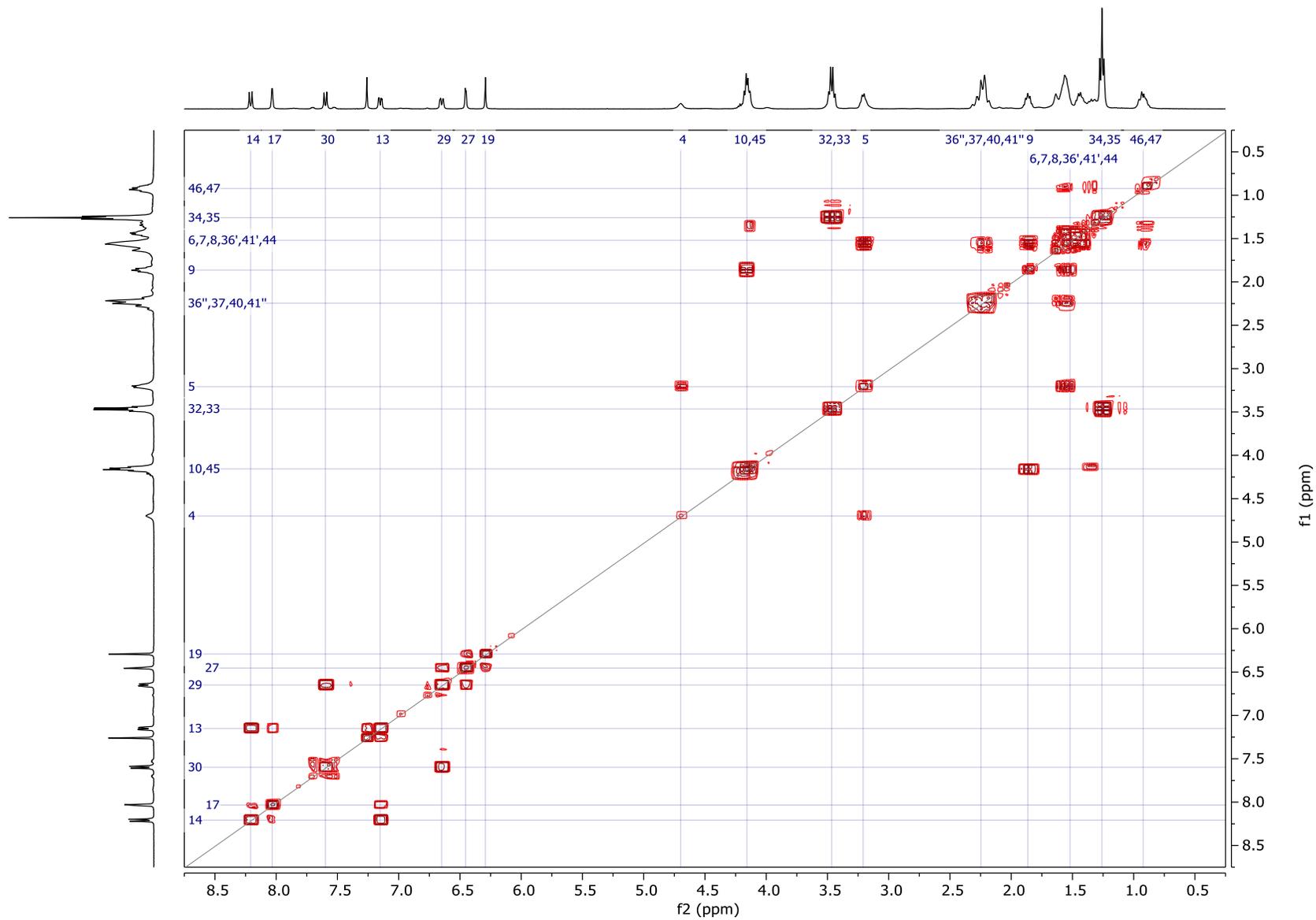


# <sup>13</sup>C NMR

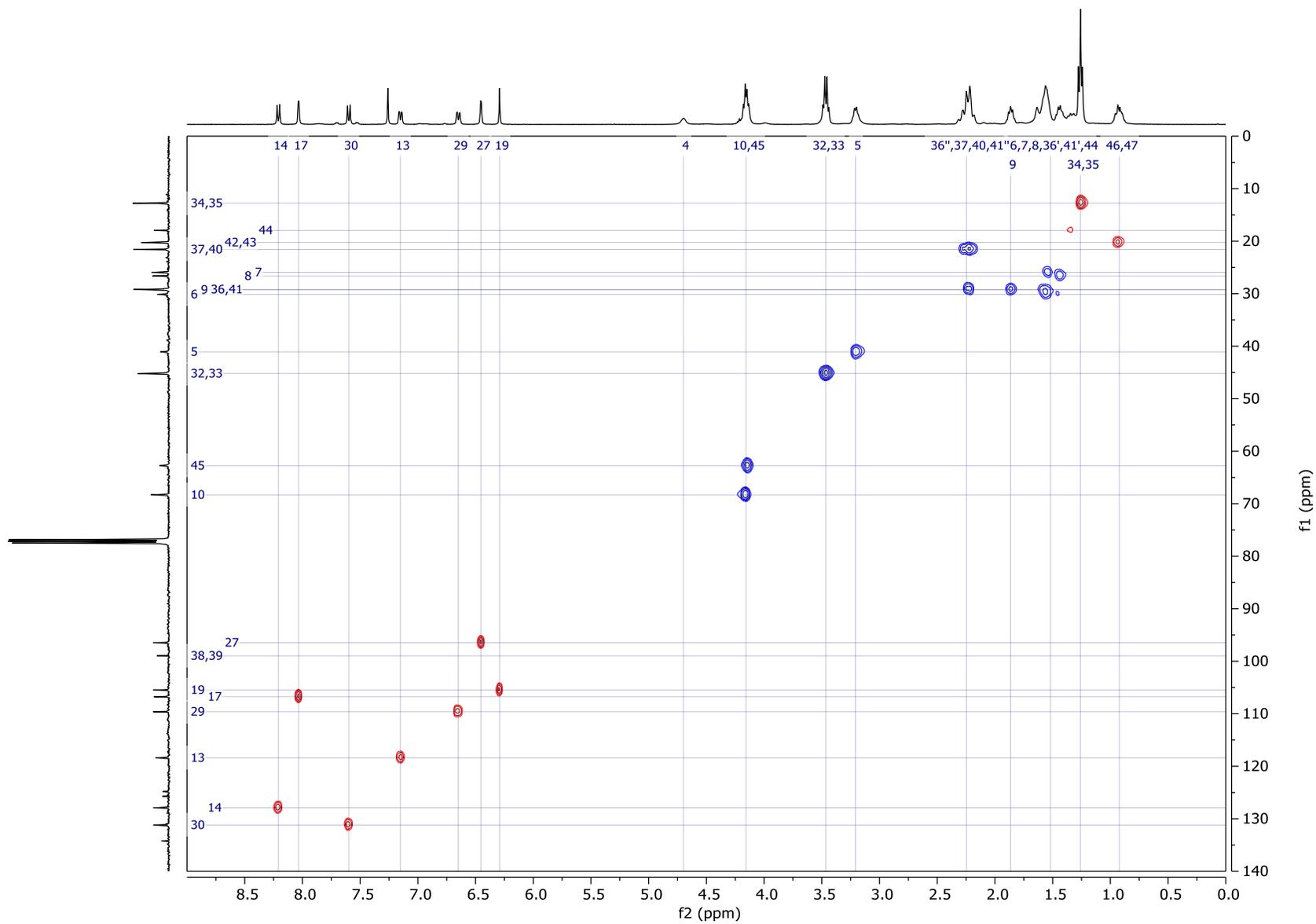


<sup>13</sup>C NMR (101 MHz, cdCl<sub>3</sub>) δ 183.4, 161.9, 156.9, 152.2, 150.9, 147.0, 140.3, 134.2, 131.2, 127.9, 125.7, 124.8, 118.4, 109.6, 106.7, 105.5, 99.0, 96.5, 68.3, 62.8, 45.2, 41.1, 30.1, 29.3, 29.2, 26.6, 25.9, 21.6, 20.2, 17.9, 12.8.

# COSY NMR



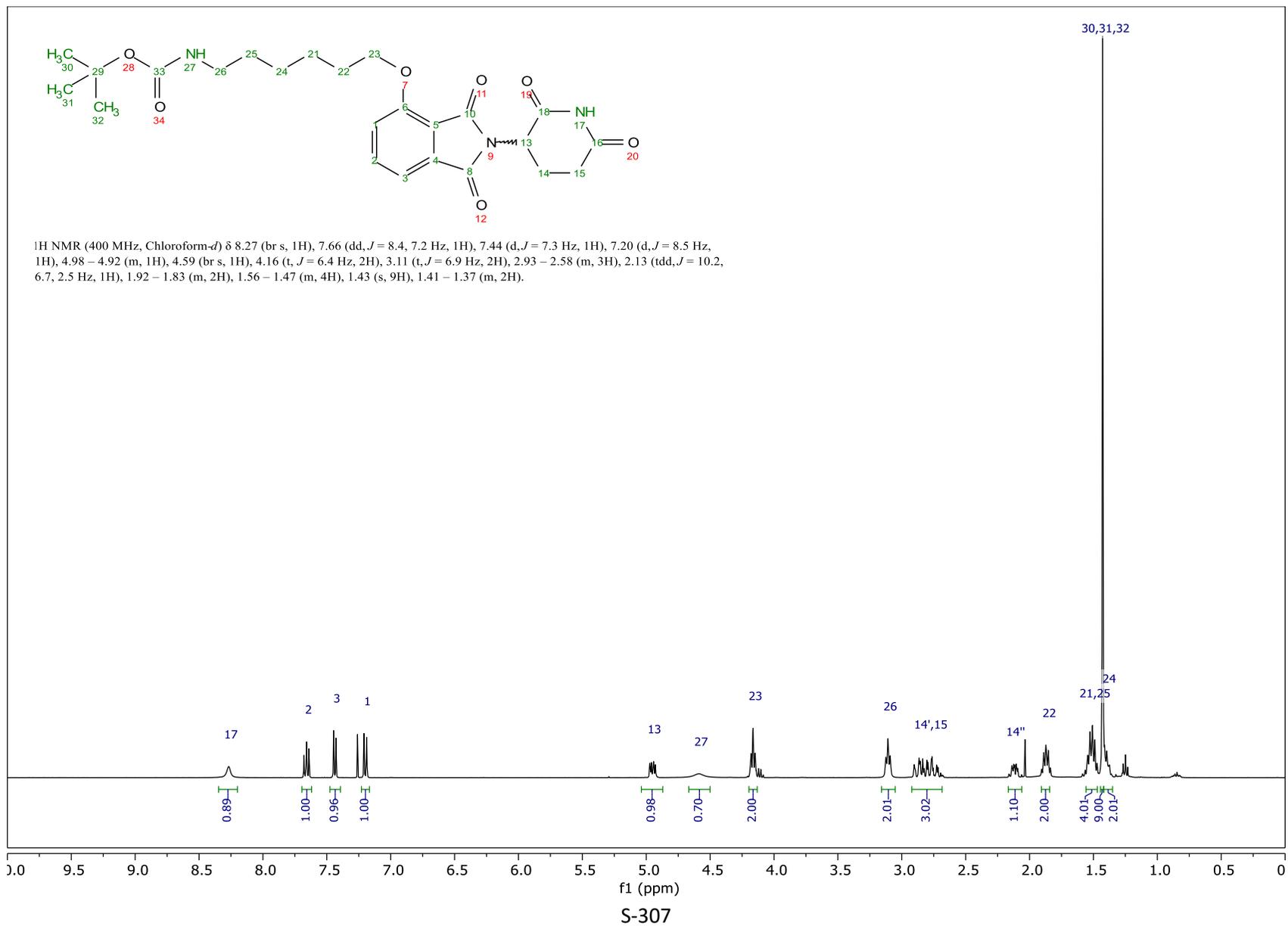
# HSQC NMR



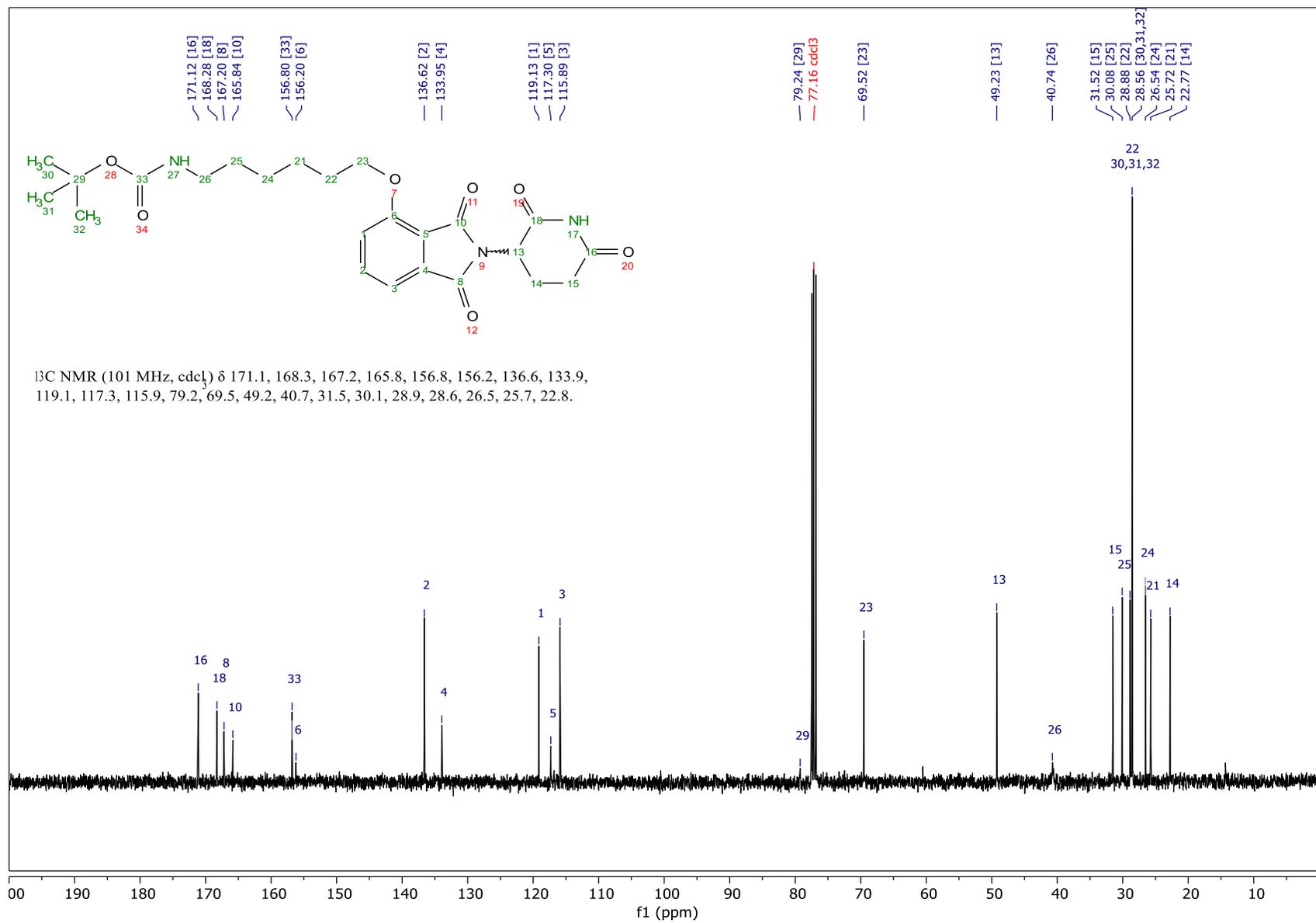
S-306

# Compound RBM5-144mono

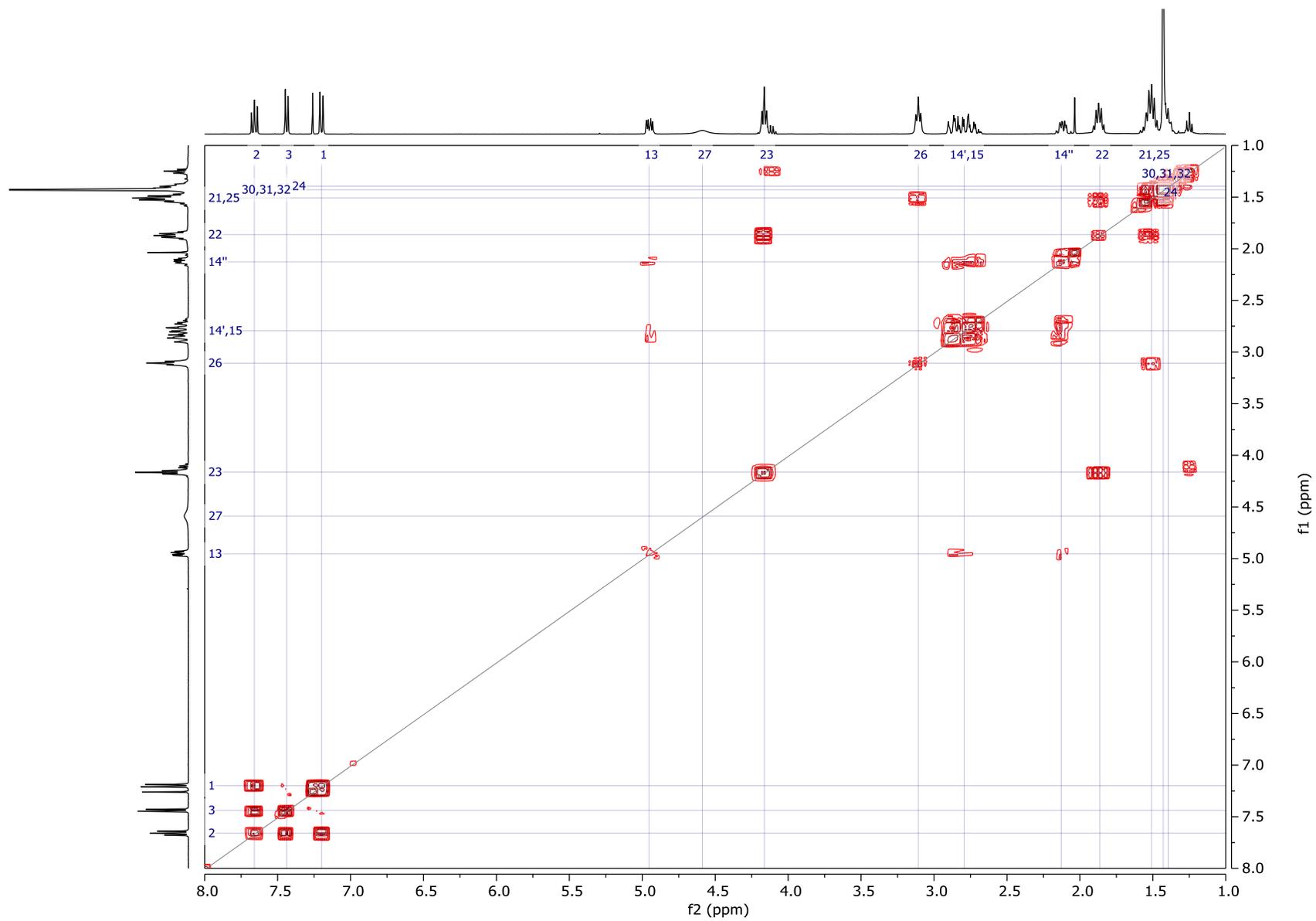
<sup>1</sup>H NMR



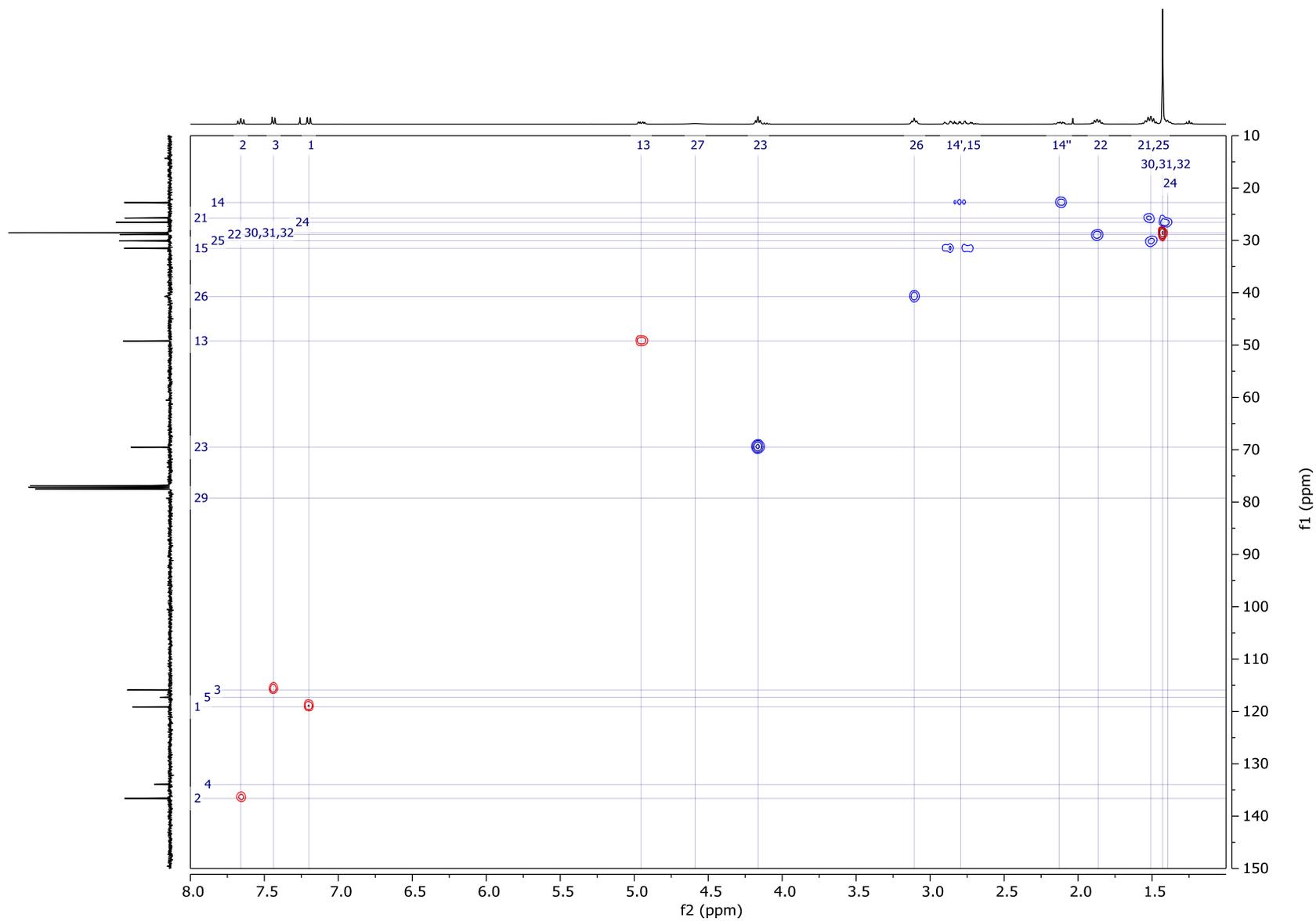
# <sup>13</sup>C NMR



COSY NMR



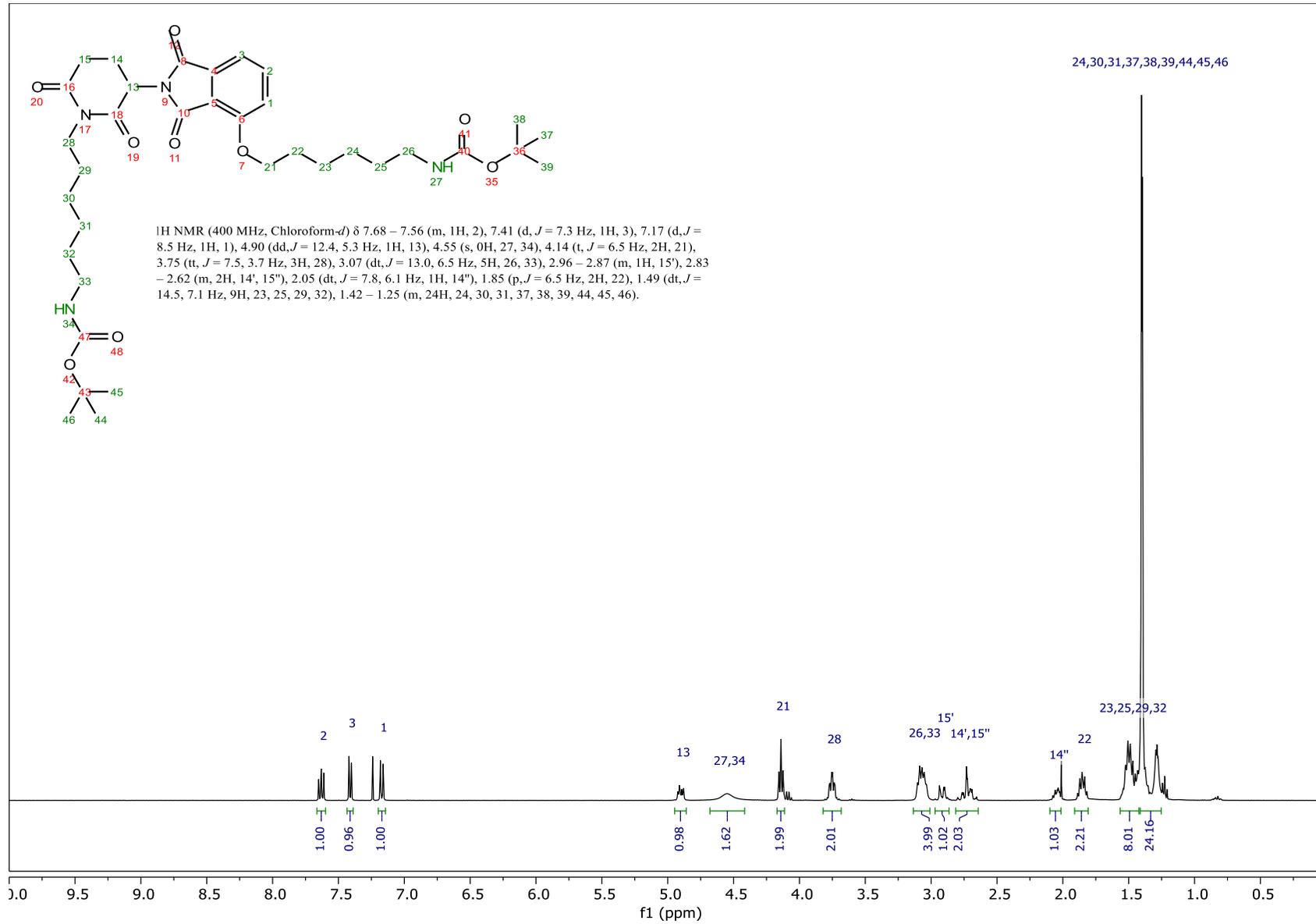
# HSQC NMR



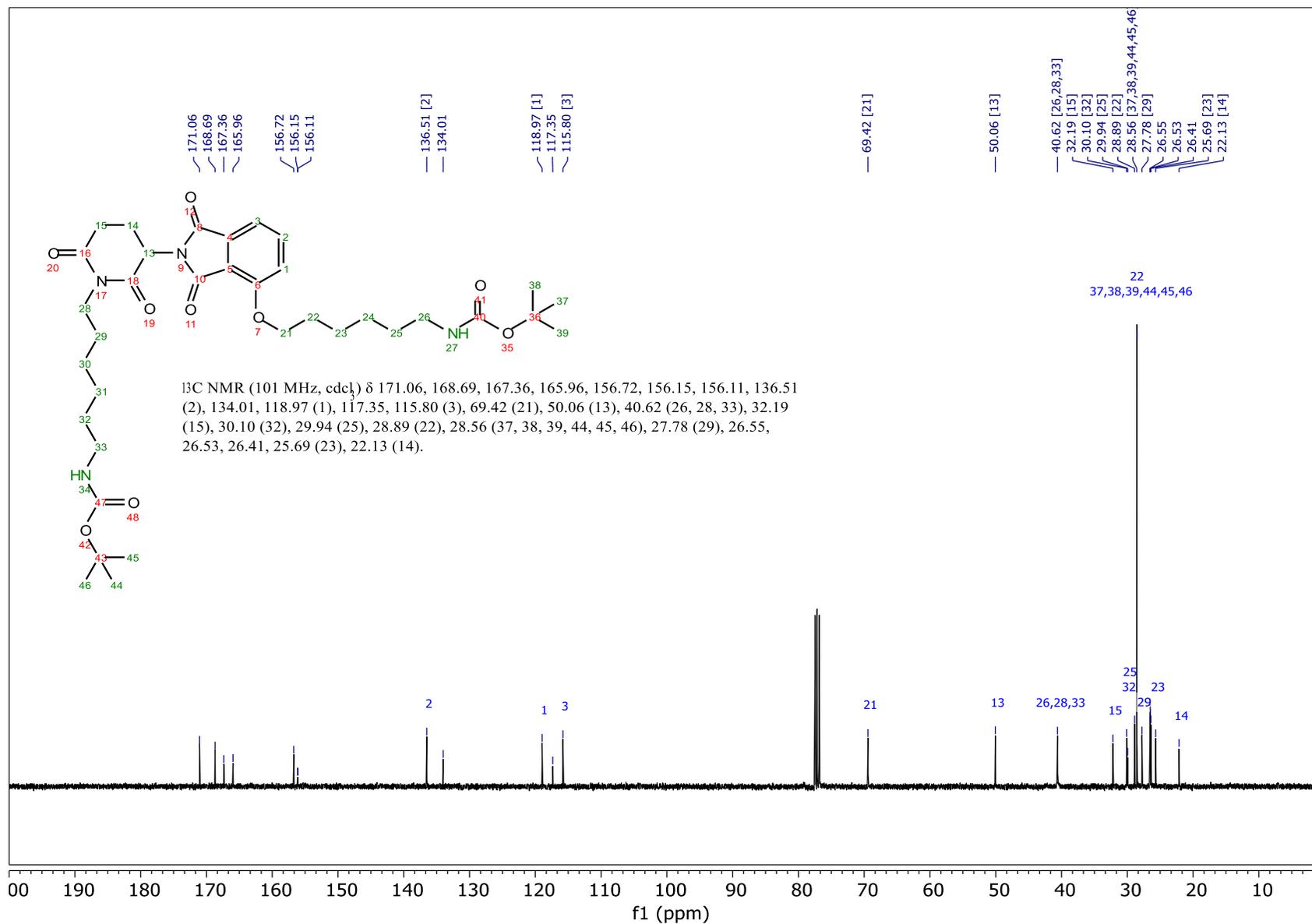
S-310

# Compound RBM5-144bis

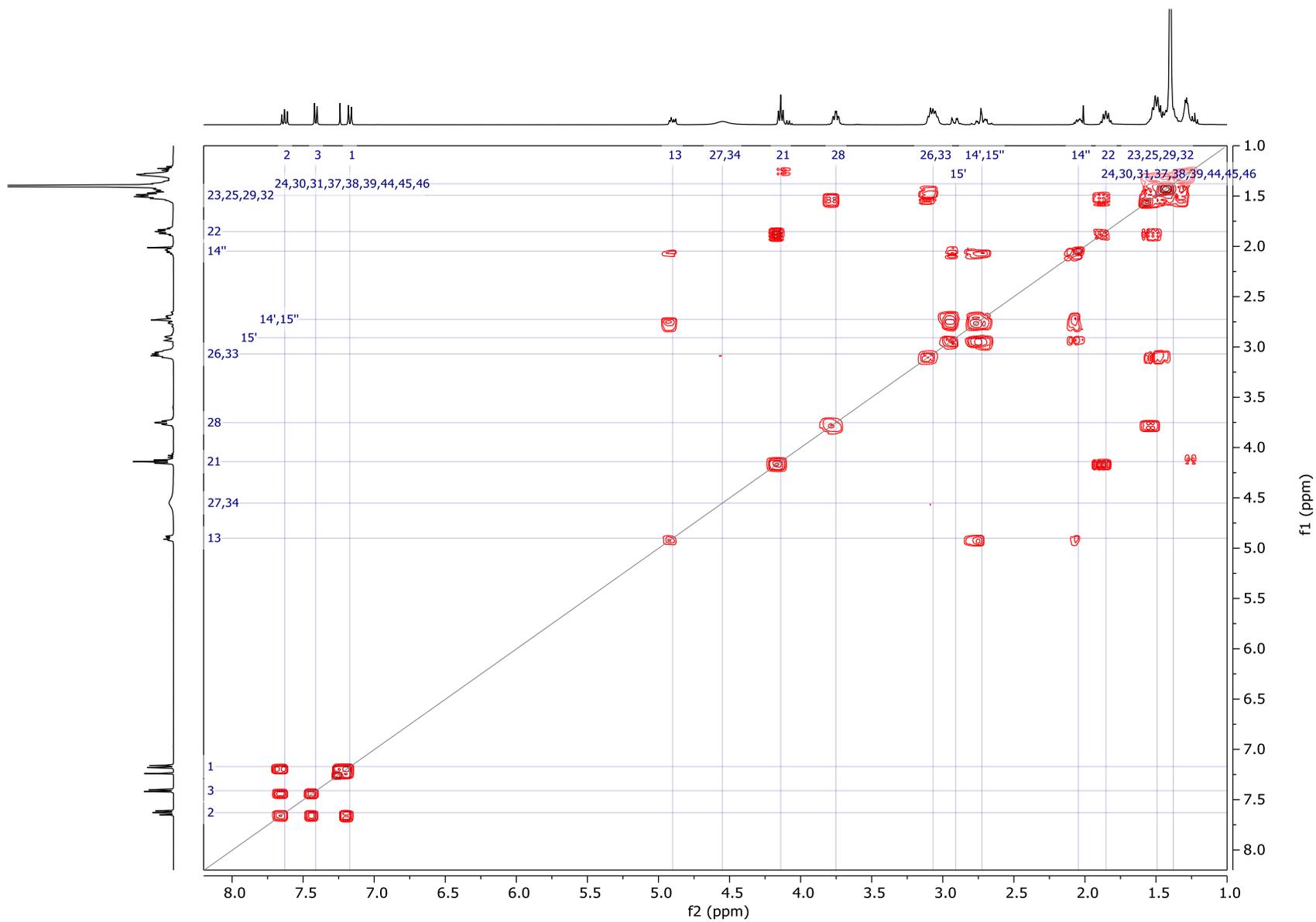
<sup>1</sup>H NMR



<sup>13</sup>C NMR

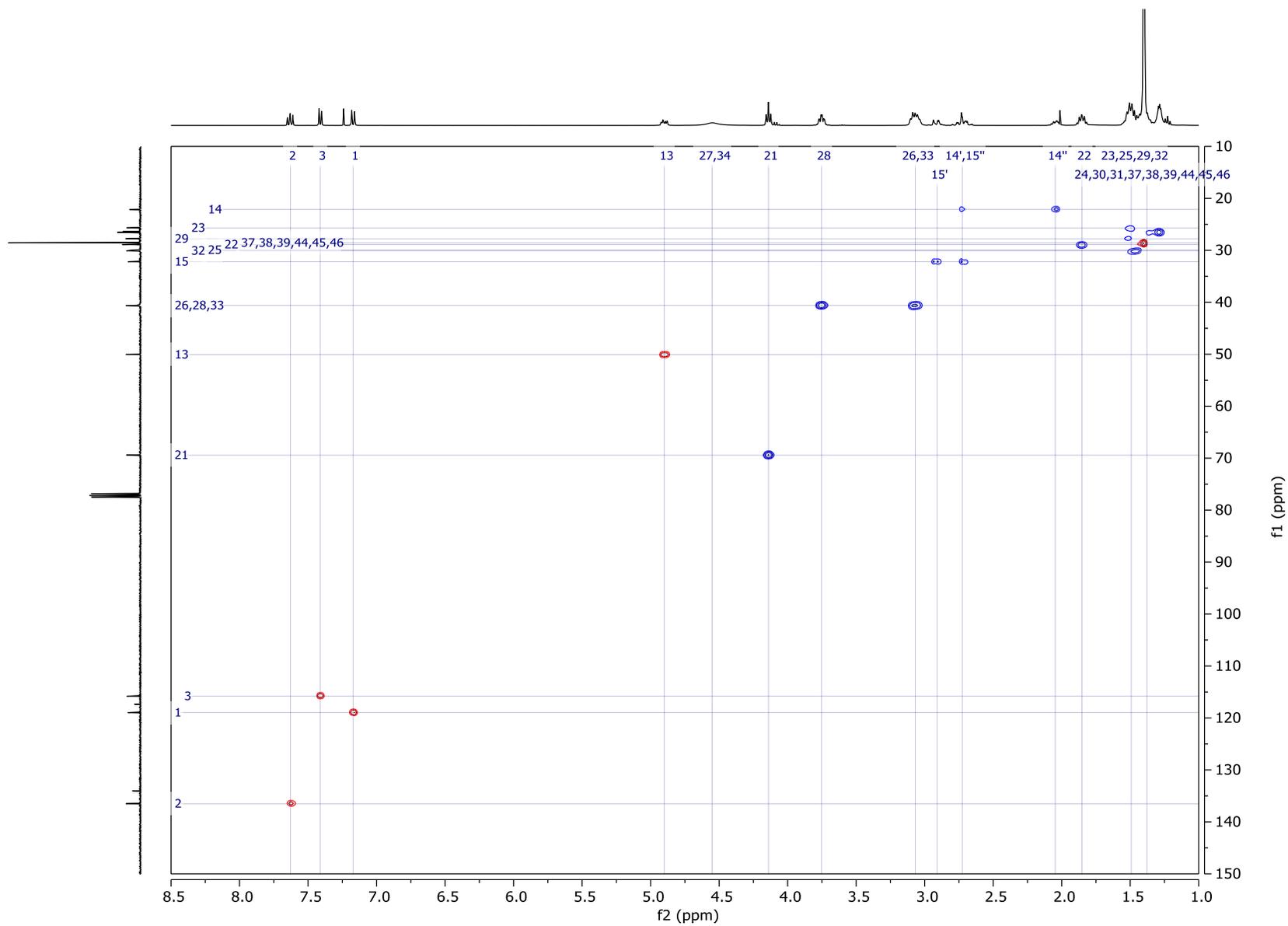


# COSY NMR



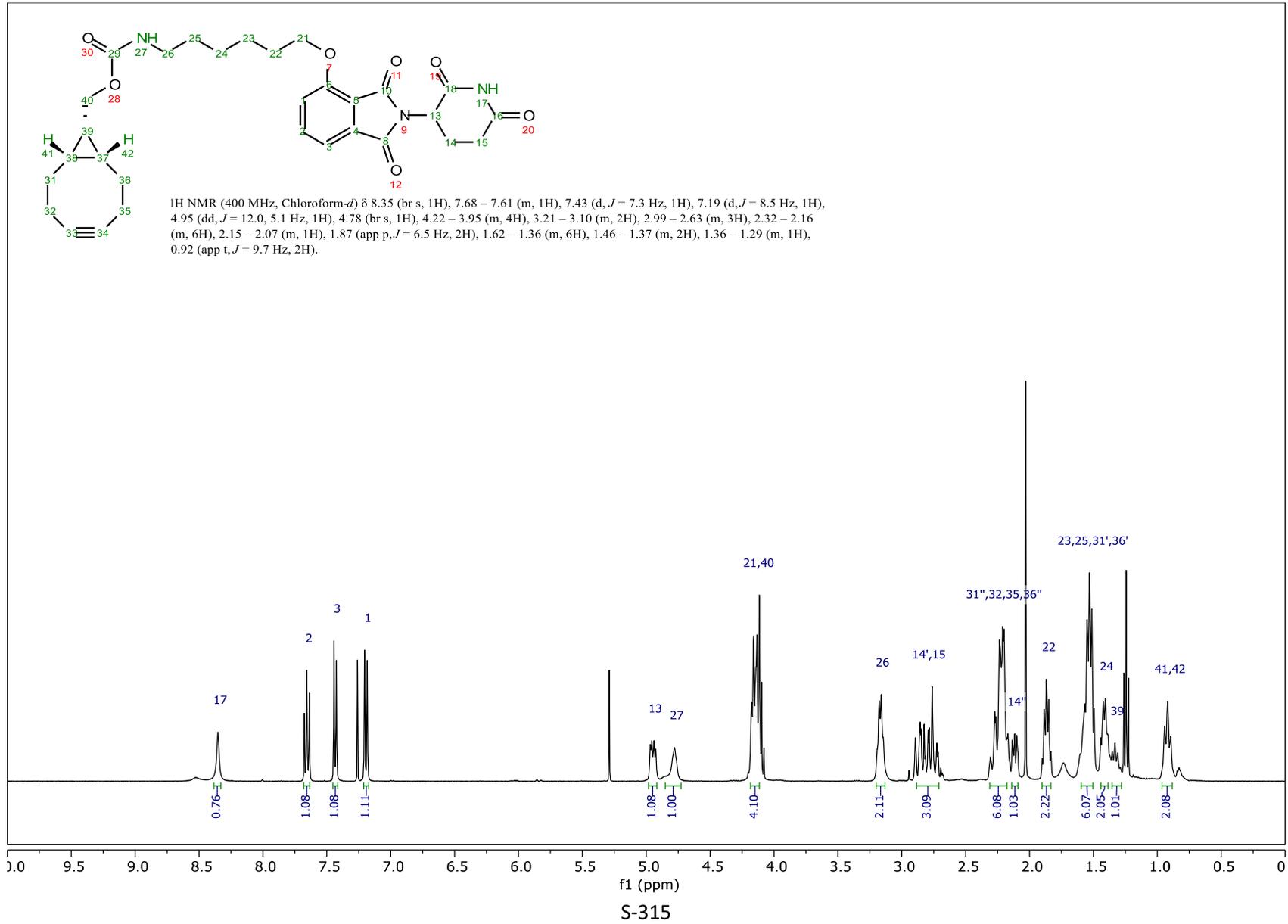
S-313

# HSQC NMR

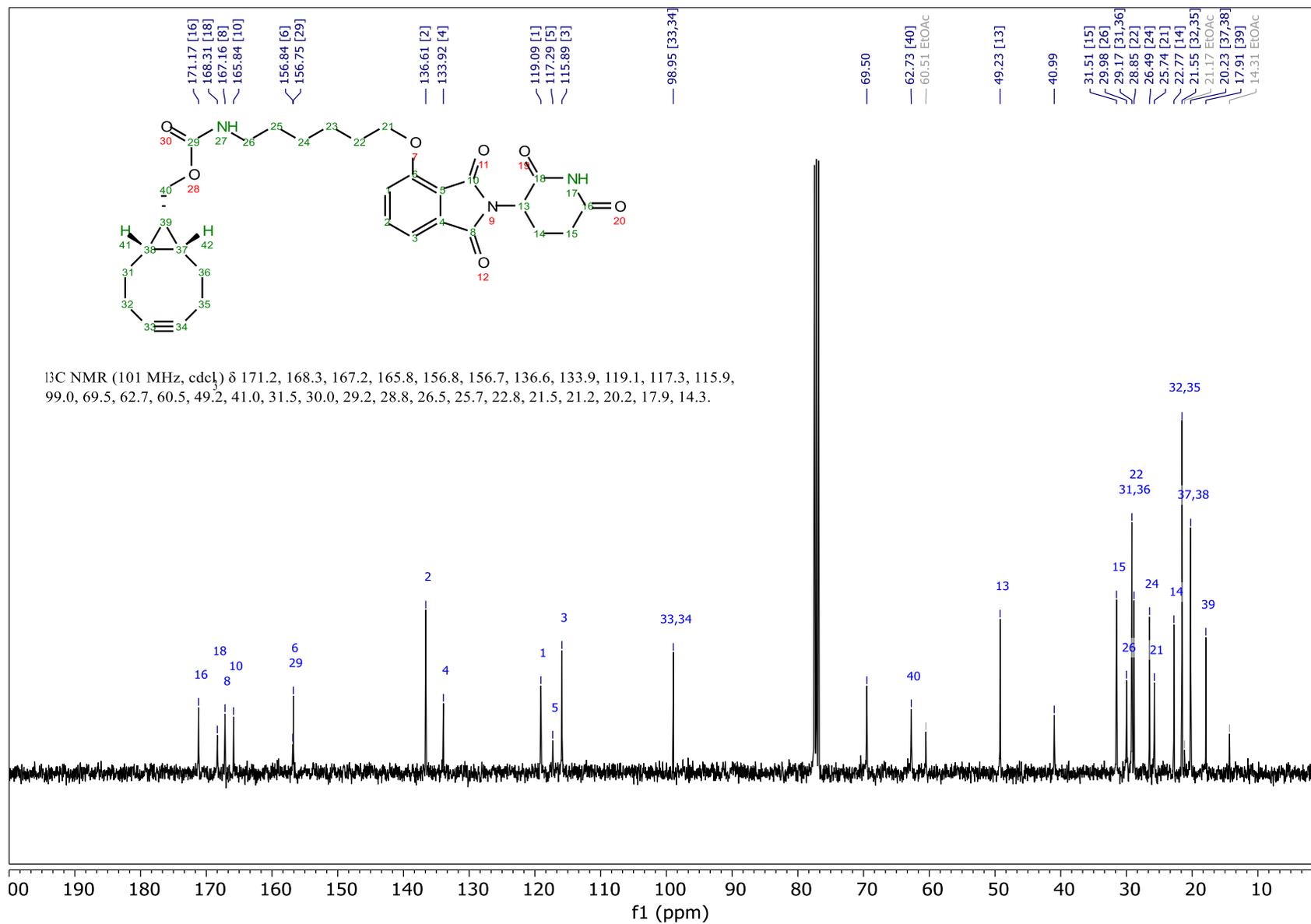


# Compound RBM5-145

<sup>1</sup>H NMR

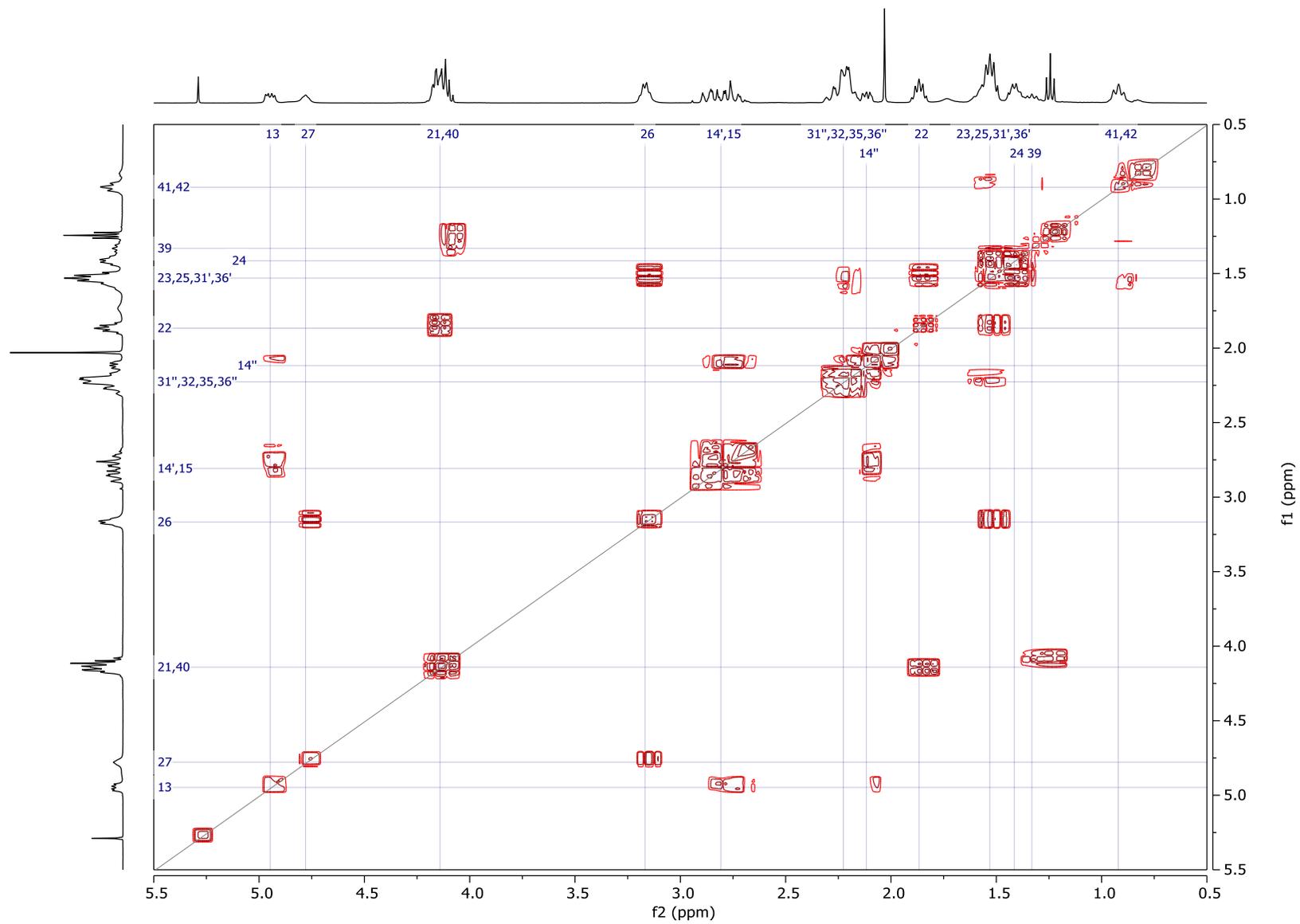


# <sup>13</sup>C NMR



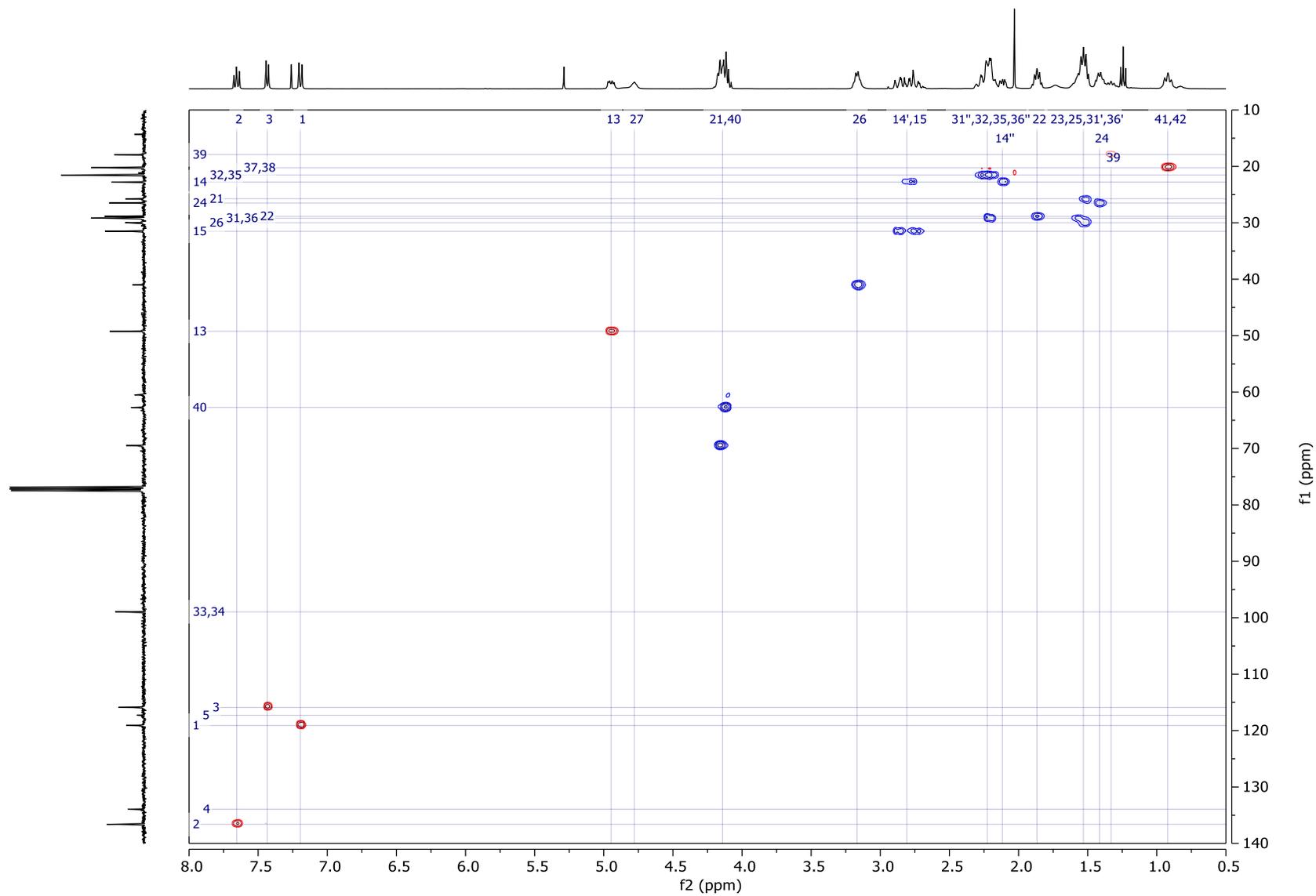
<sup>13</sup>C NMR (101 MHz, cdCl<sub>3</sub>) δ 171.2, 168.3, 167.2, 165.8, 156.8, 156.7, 136.6, 133.9, 119.1, 117.3, 115.9, 99.0, 69.5, 62.7, 60.5, 49.2, 41.0, 31.5, 30.0, 29.2, 28.8, 26.5, 25.7, 22.8, 21.5, 21.2, 20.2, 17.9, 14.3.

# COSY NMR



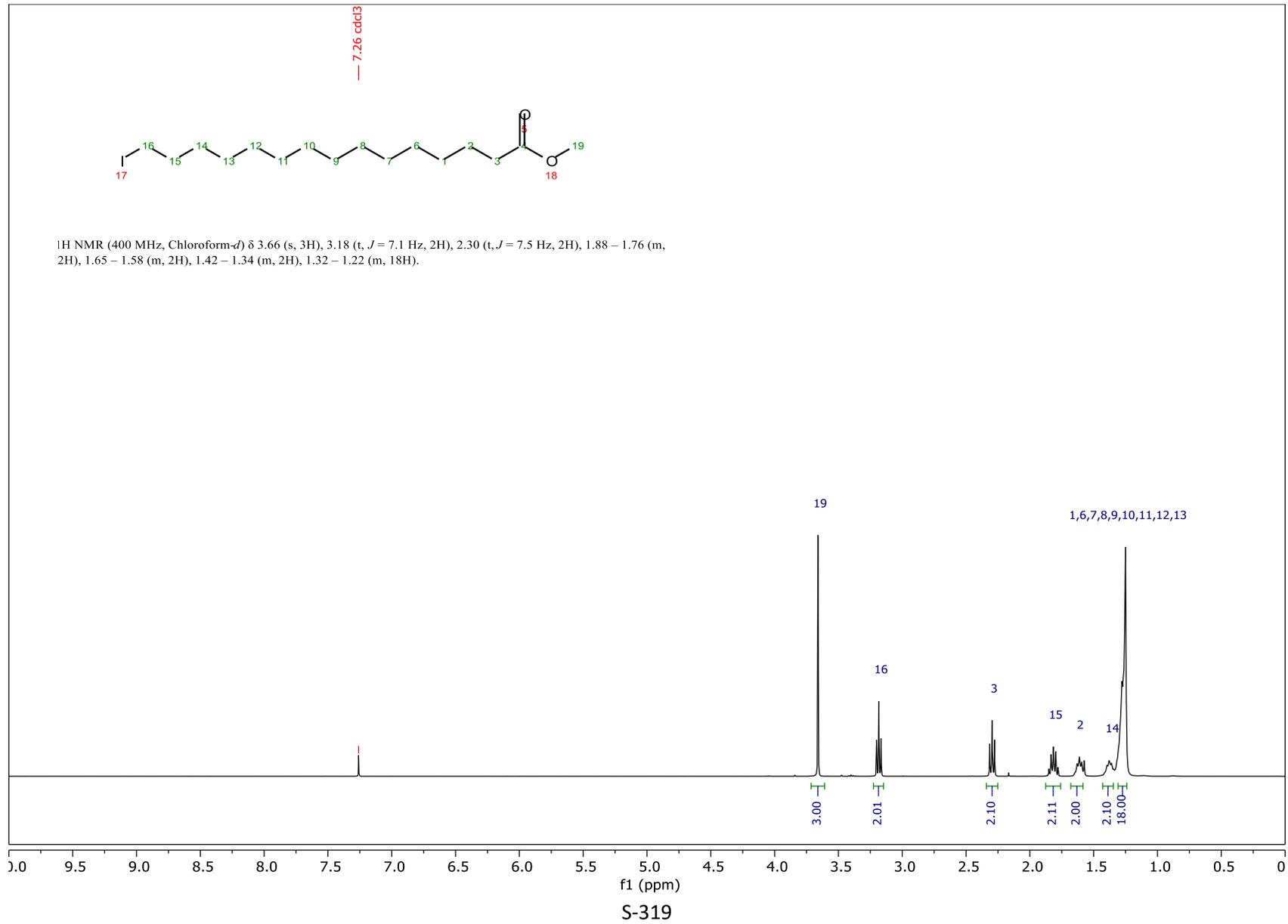
S-317

# HSQC NMR

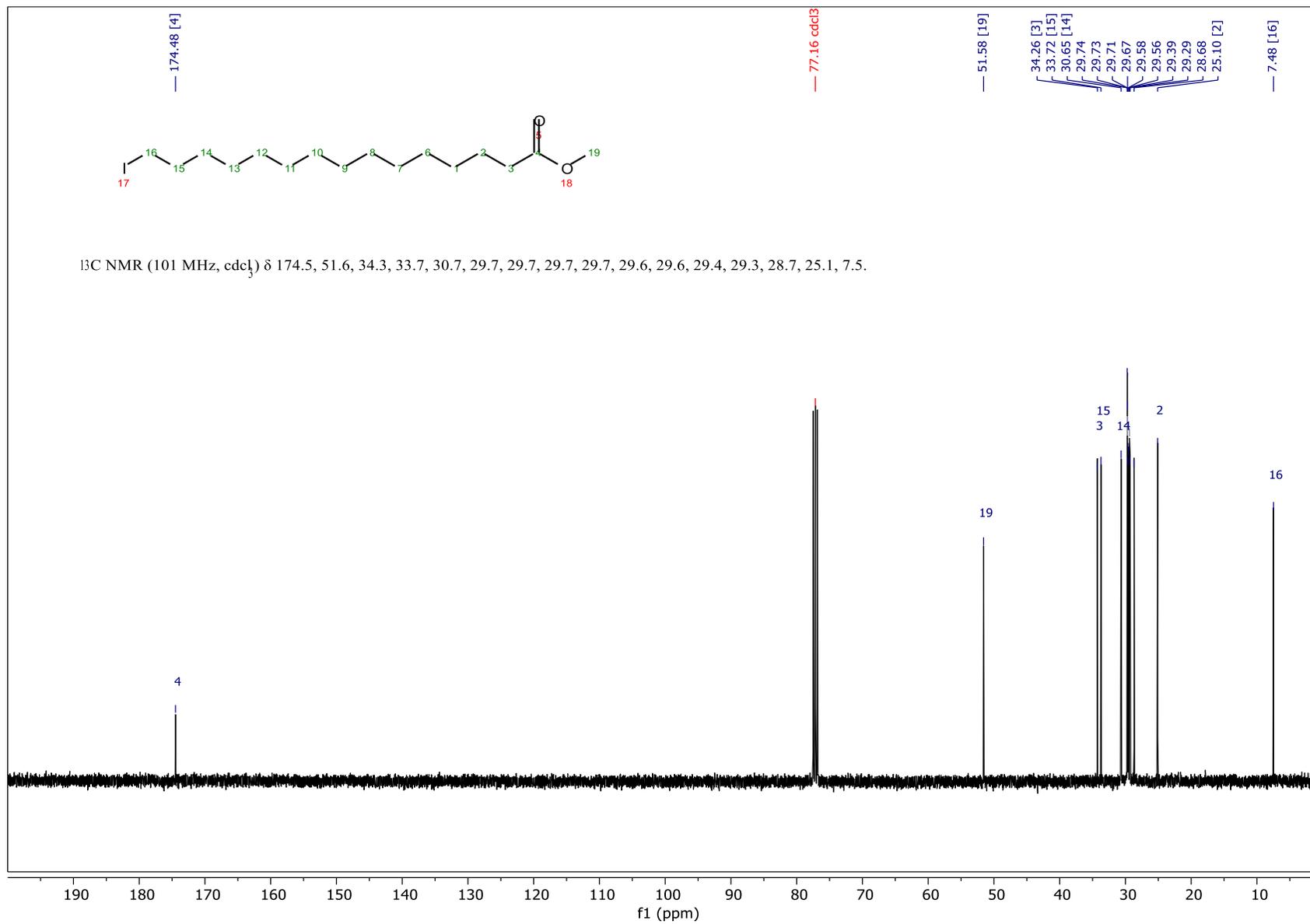


# Compound RBM5-146

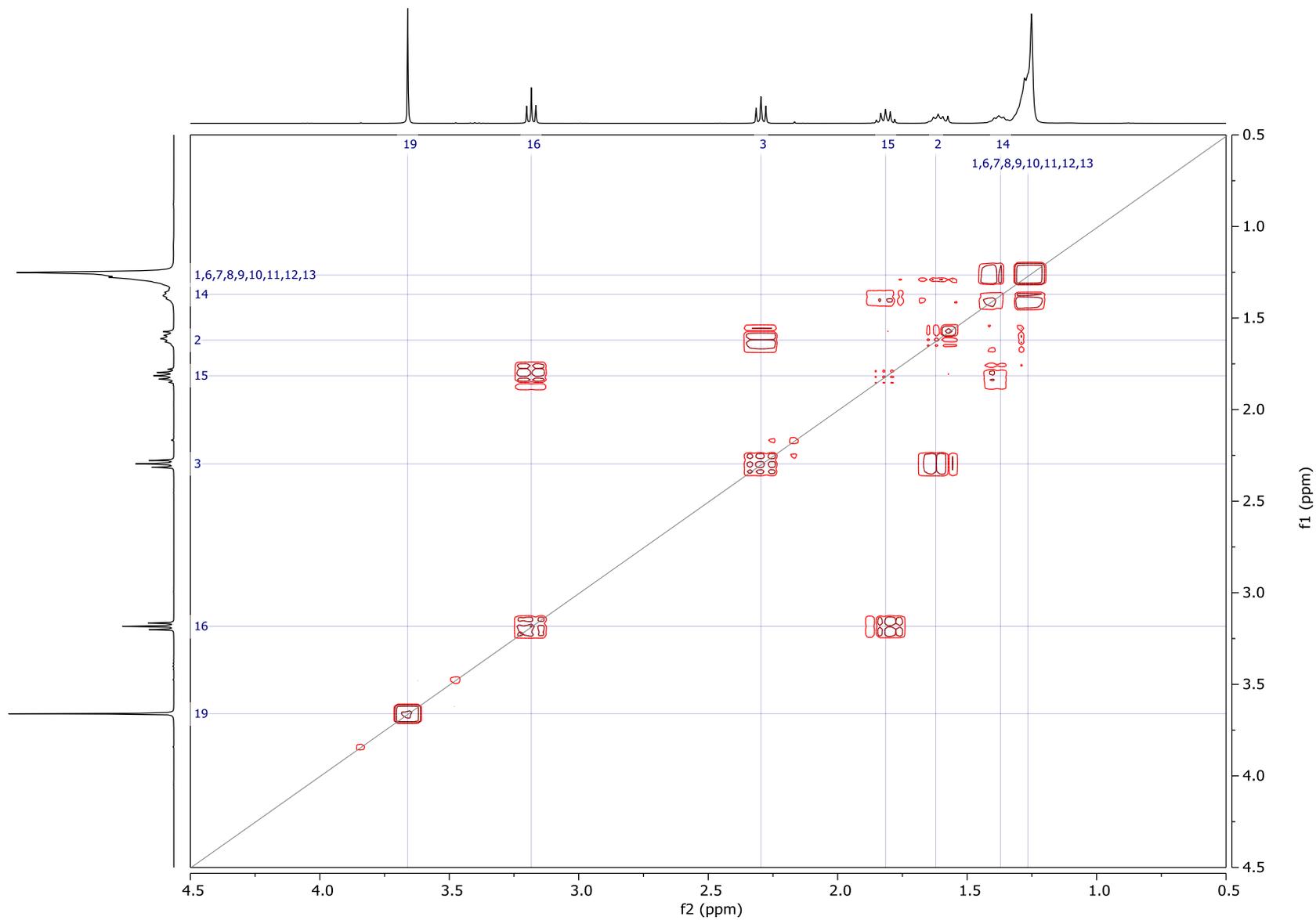
<sup>1</sup>H NMR



<sup>13</sup>C NMR

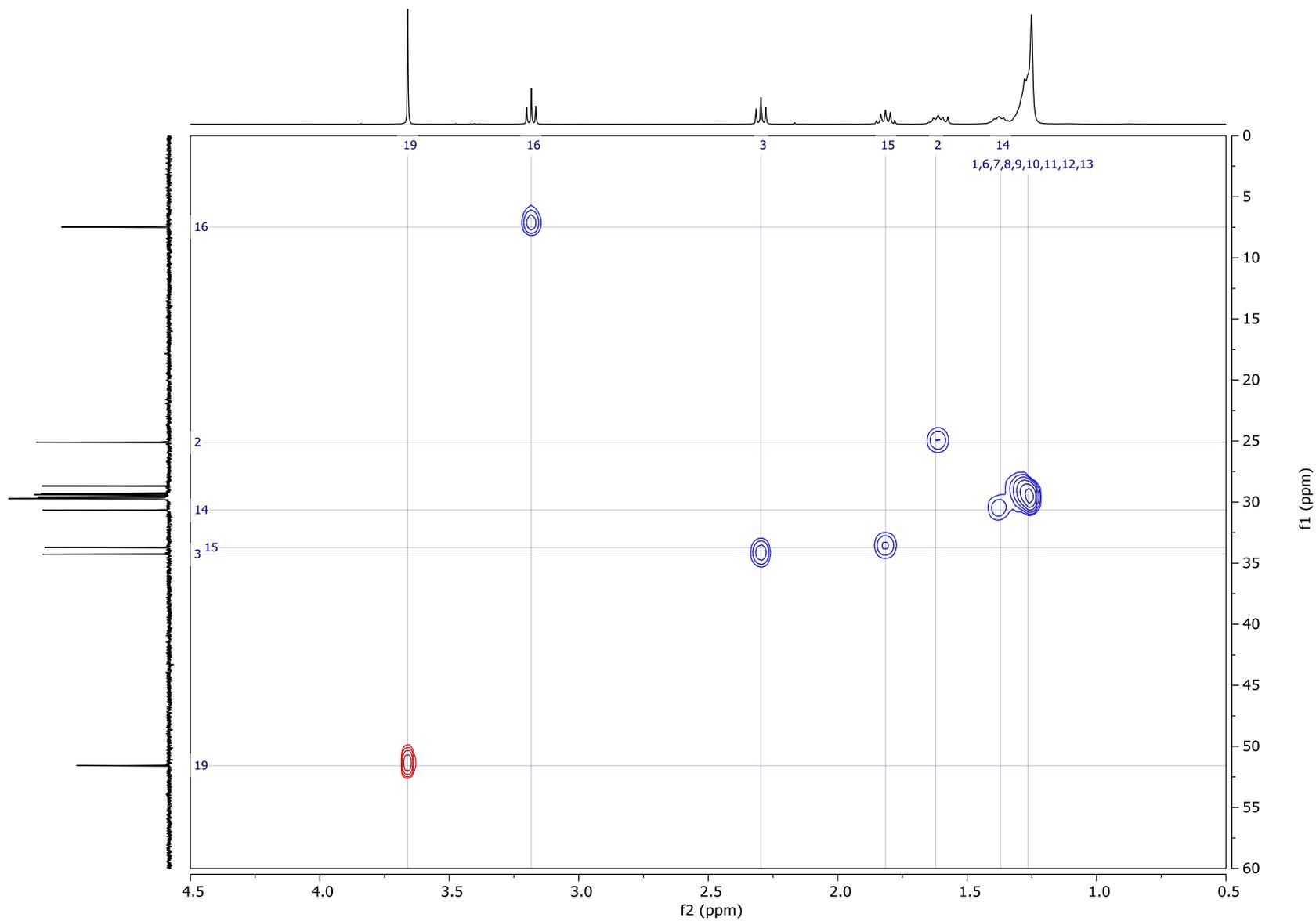


# COSY NMR



S-321

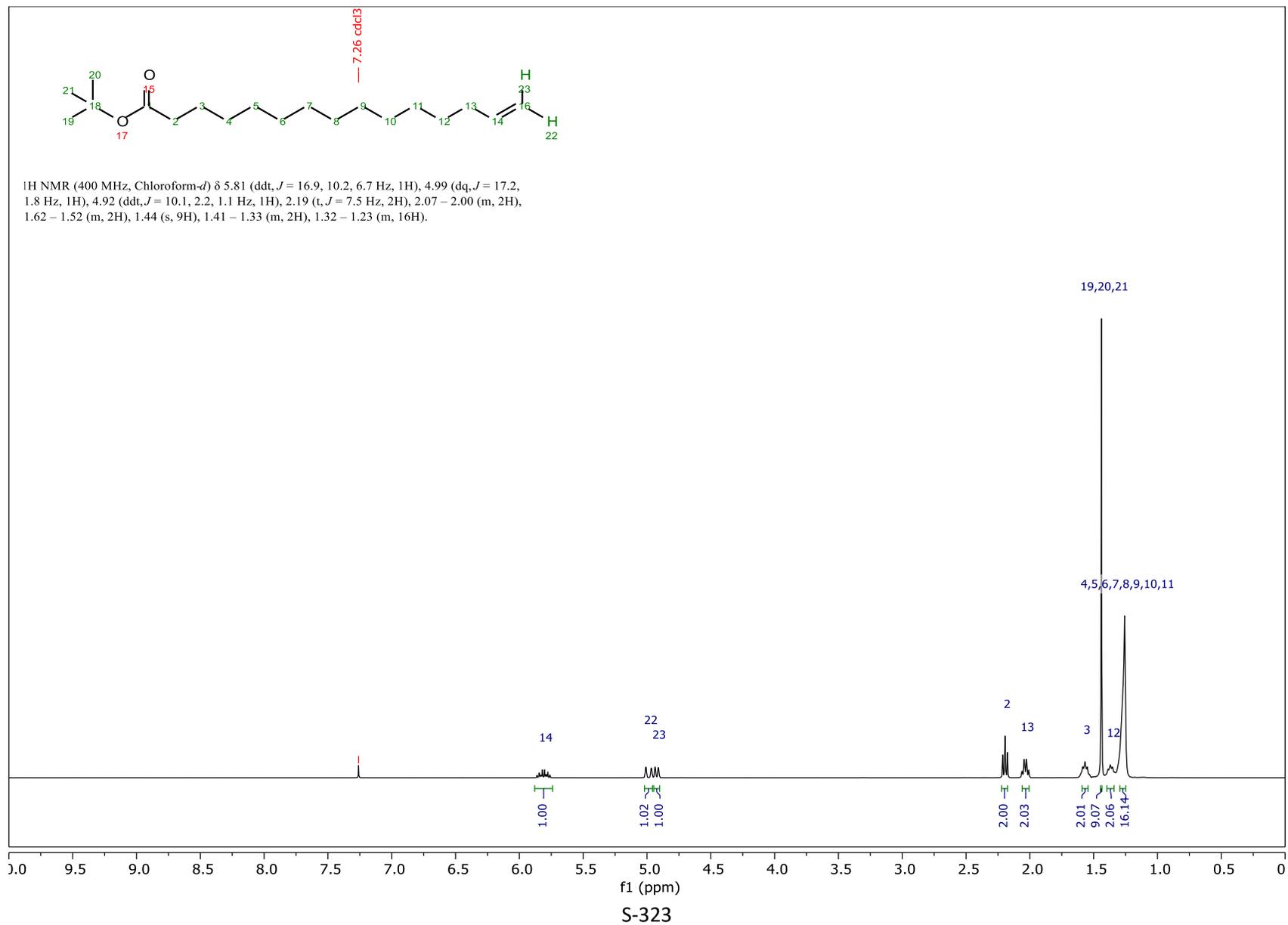
# HSQC NMR



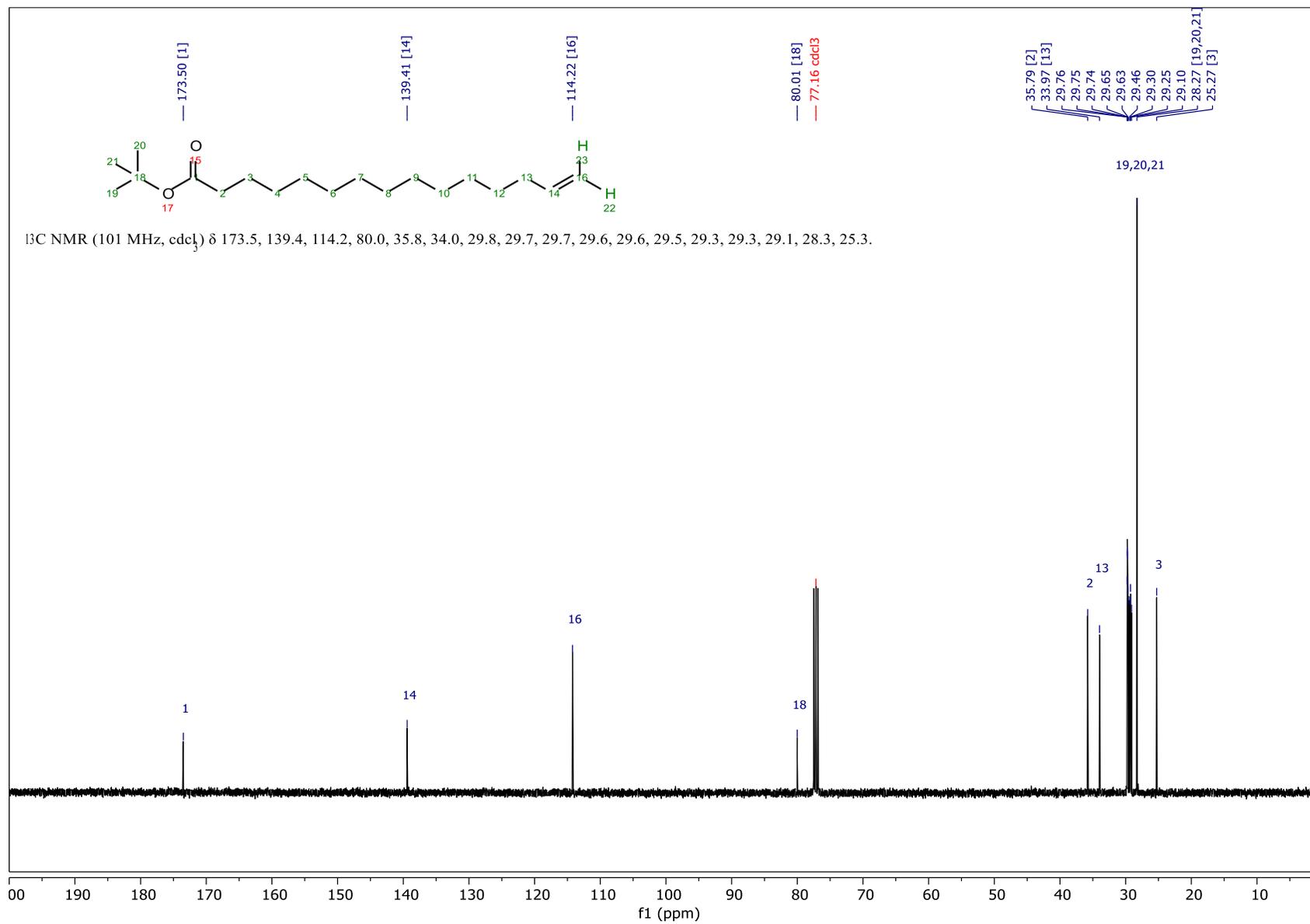
S-322

# Compound RBM5-147a

<sup>1</sup>H NMR

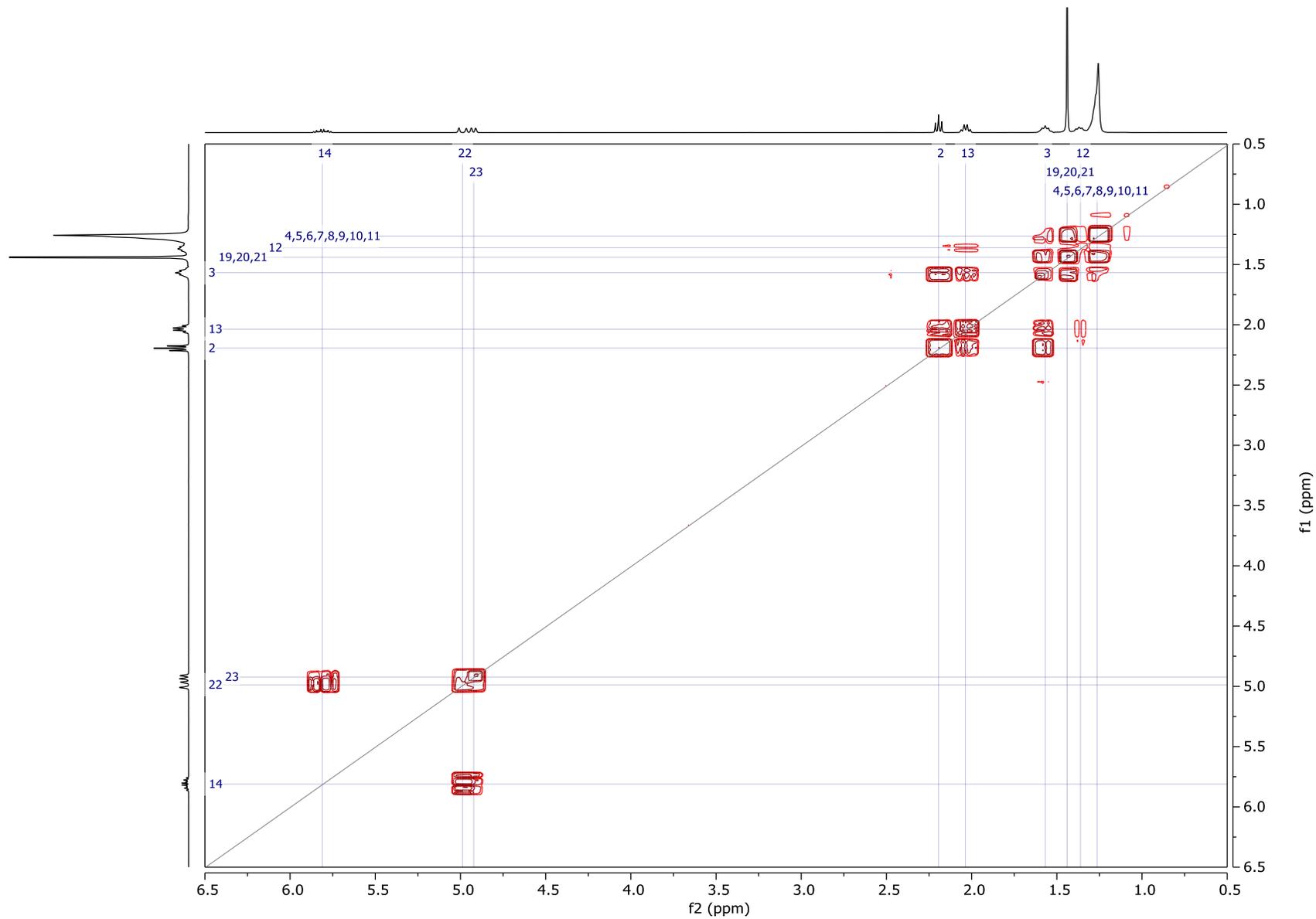


<sup>13</sup>C NMR

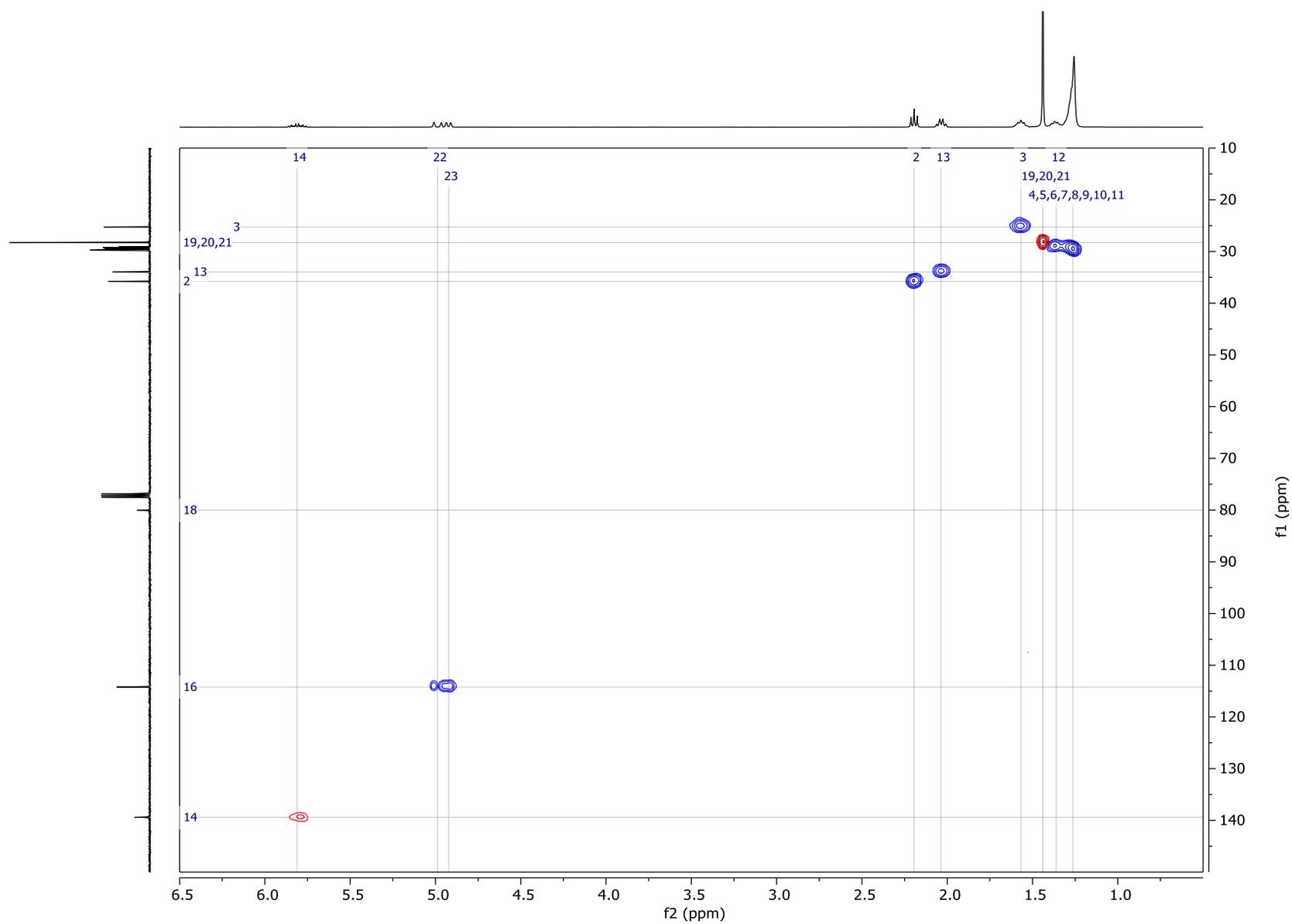


<sup>13</sup>C NMR (101 MHz, cdcl<sub>3</sub>) δ 173.5, 139.4, 114.2, 80.0, 35.8, 34.0, 29.8, 29.7, 29.7, 29.6, 29.6, 29.5, 29.3, 29.3, 29.1, 28.3, 25.3.

COSY NMR



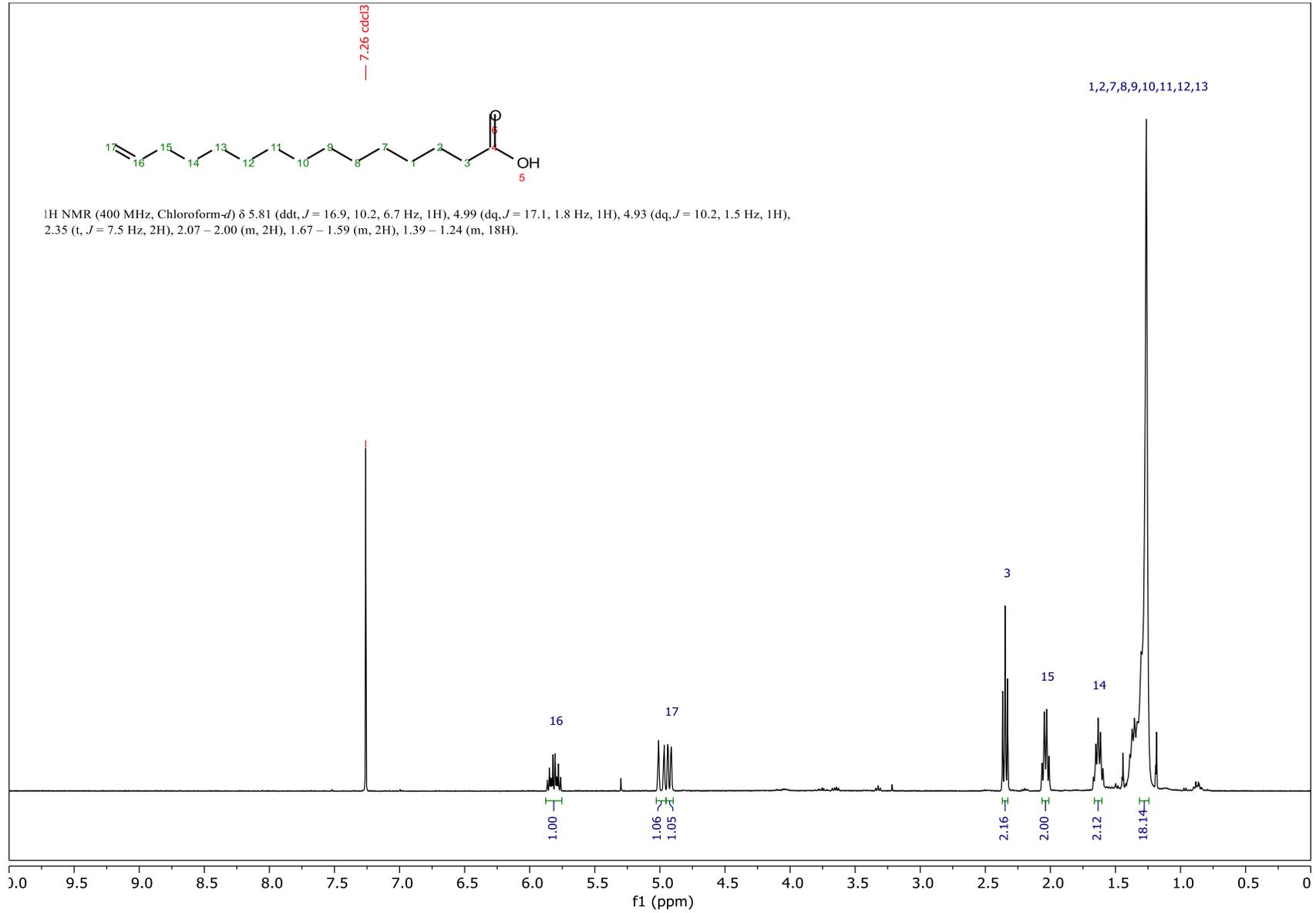
# HSQC NMR



S-326

# Compound RBM5-147b

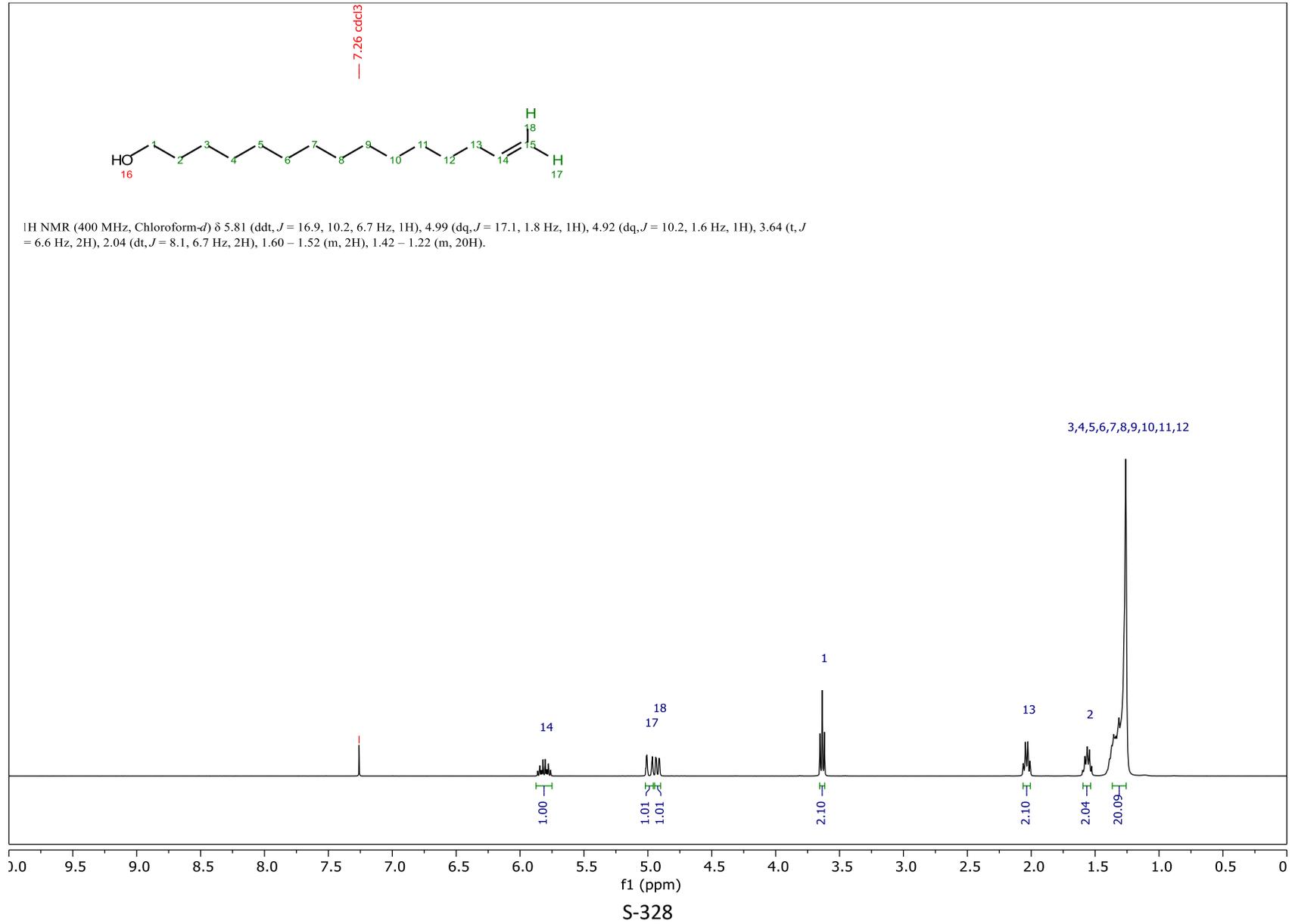
$^1\text{H NMR}$



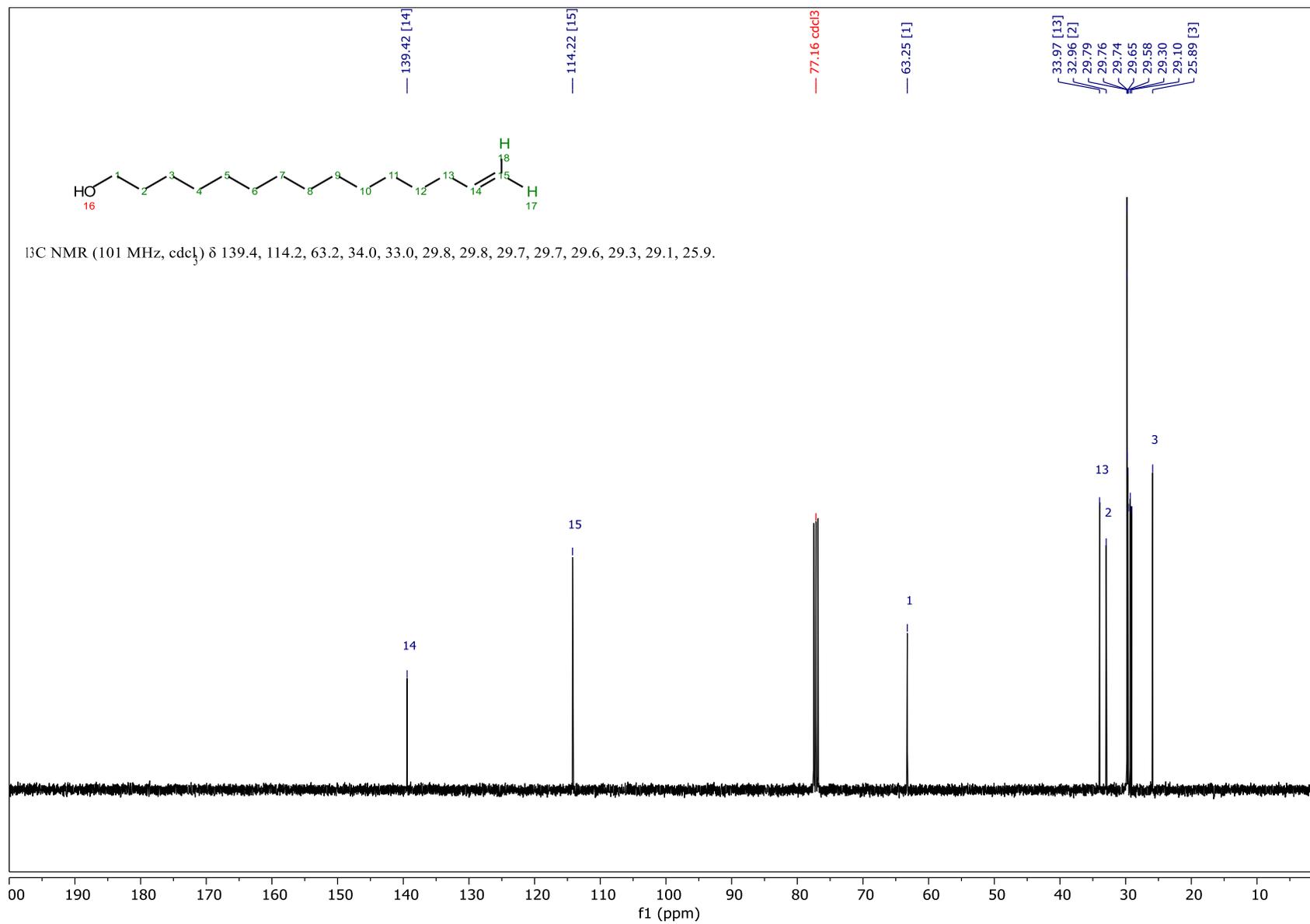
S-327

# Compound RBM5-148

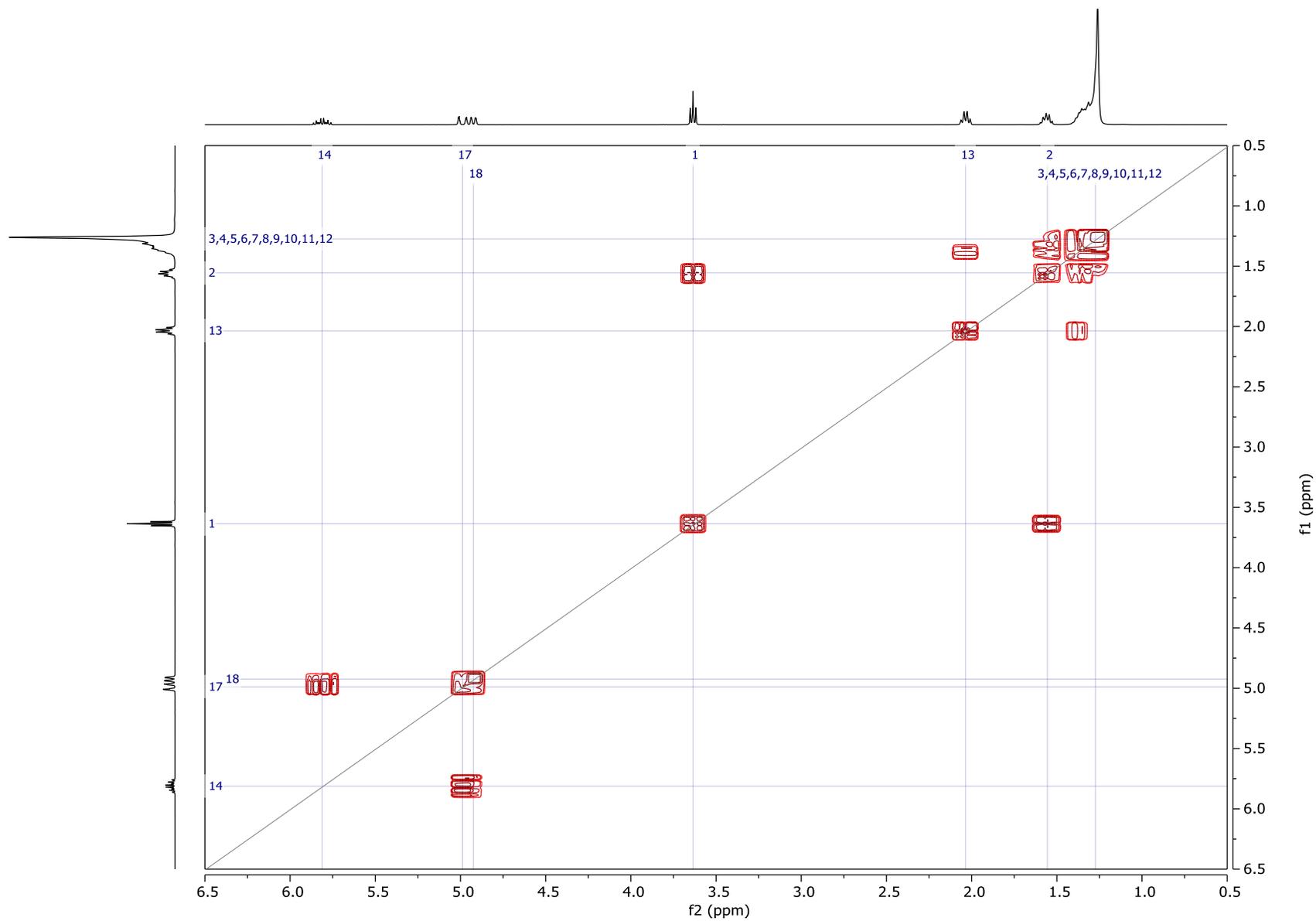
$^1\text{H}$  NMR



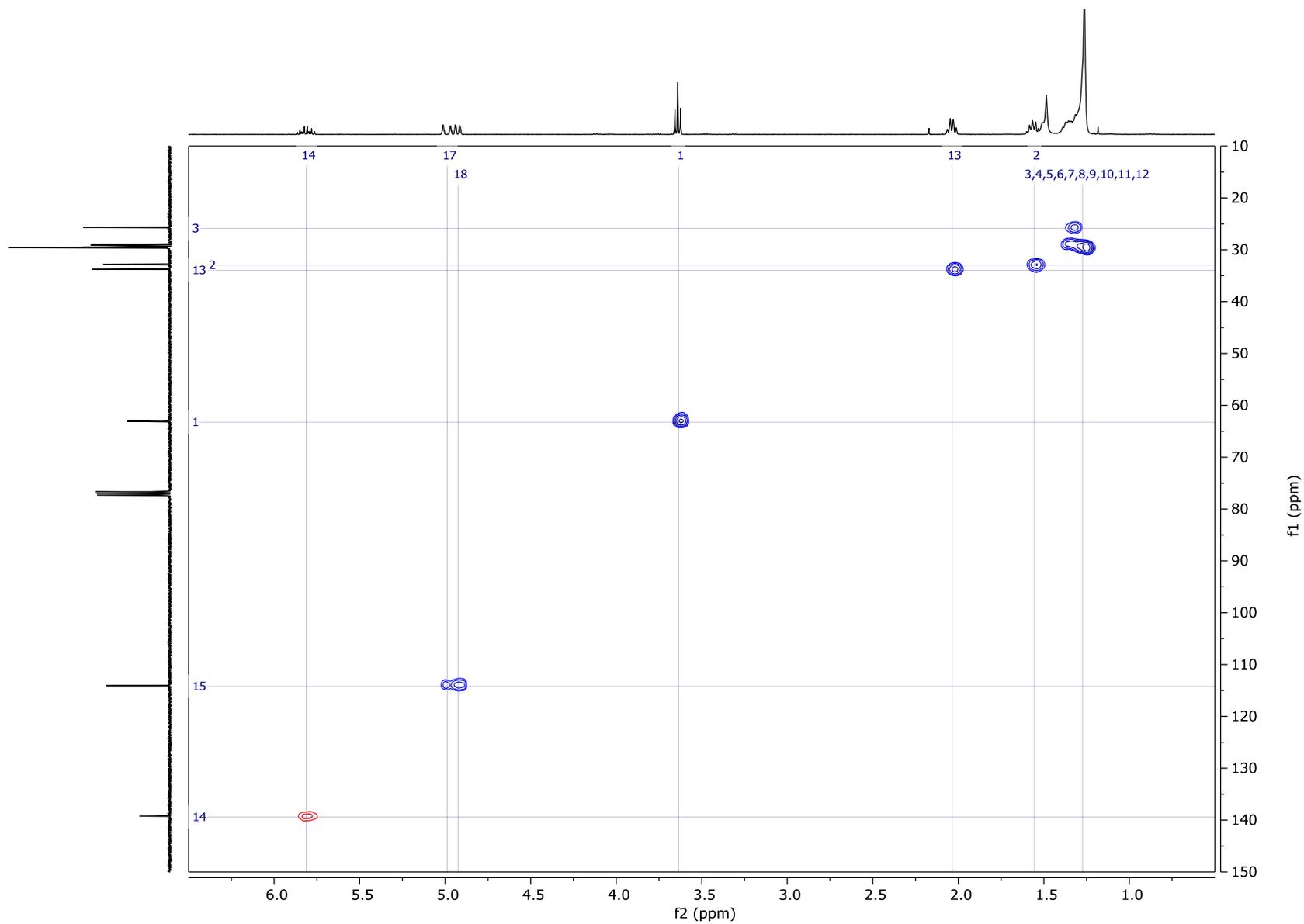
<sup>13</sup>C NMR



# COSY NMR

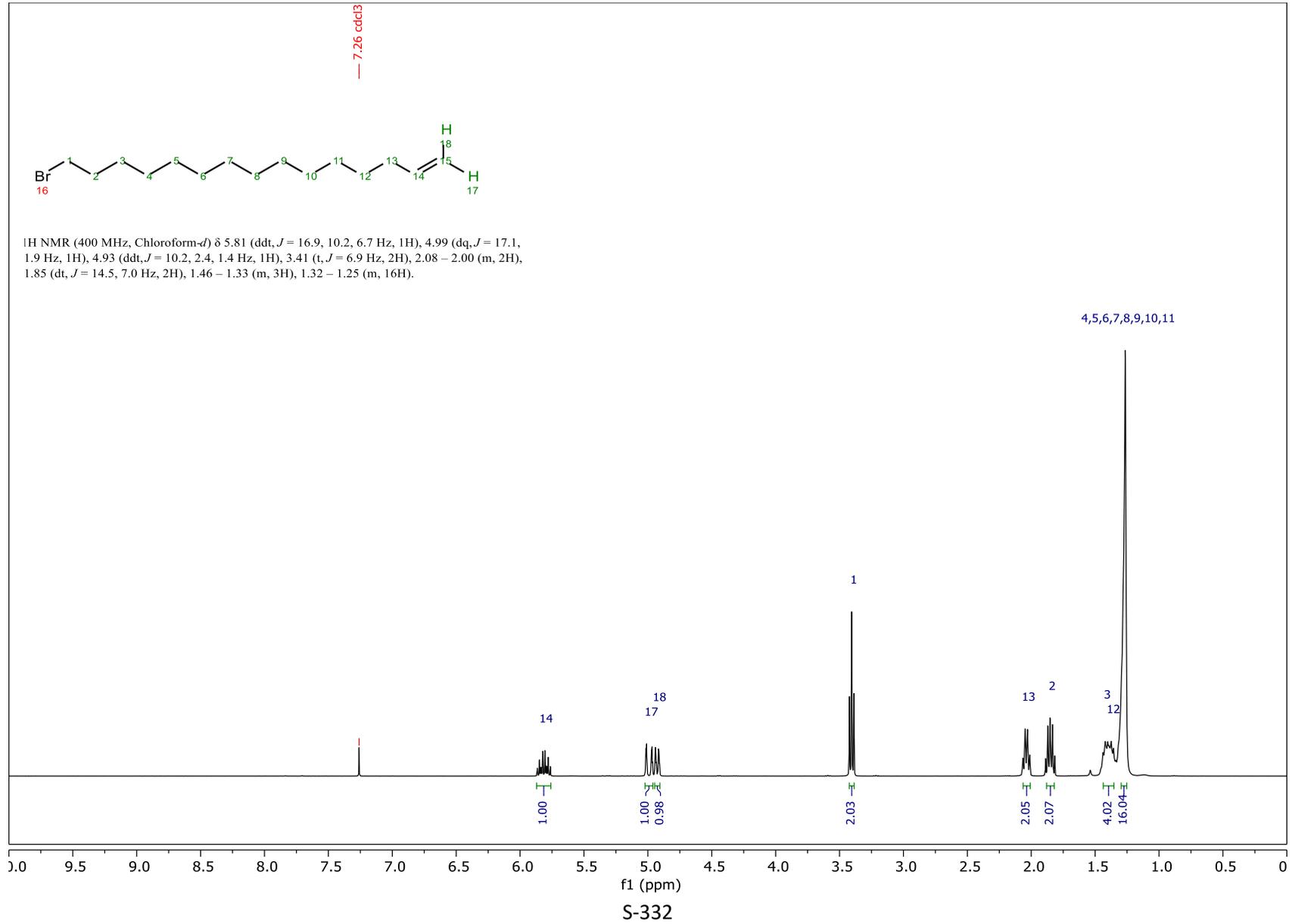


# HSQC NMR

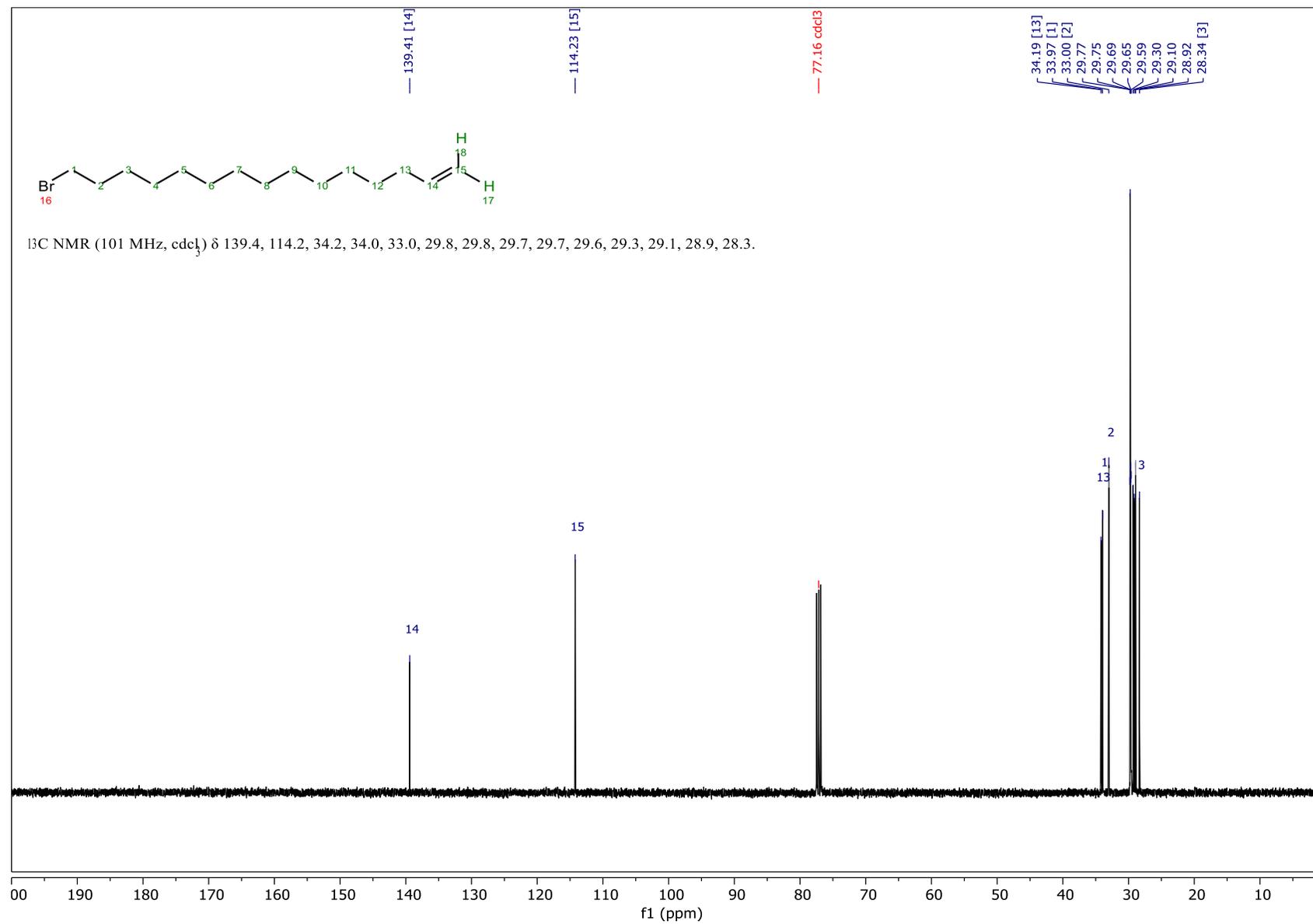


# Compound RBM5-149

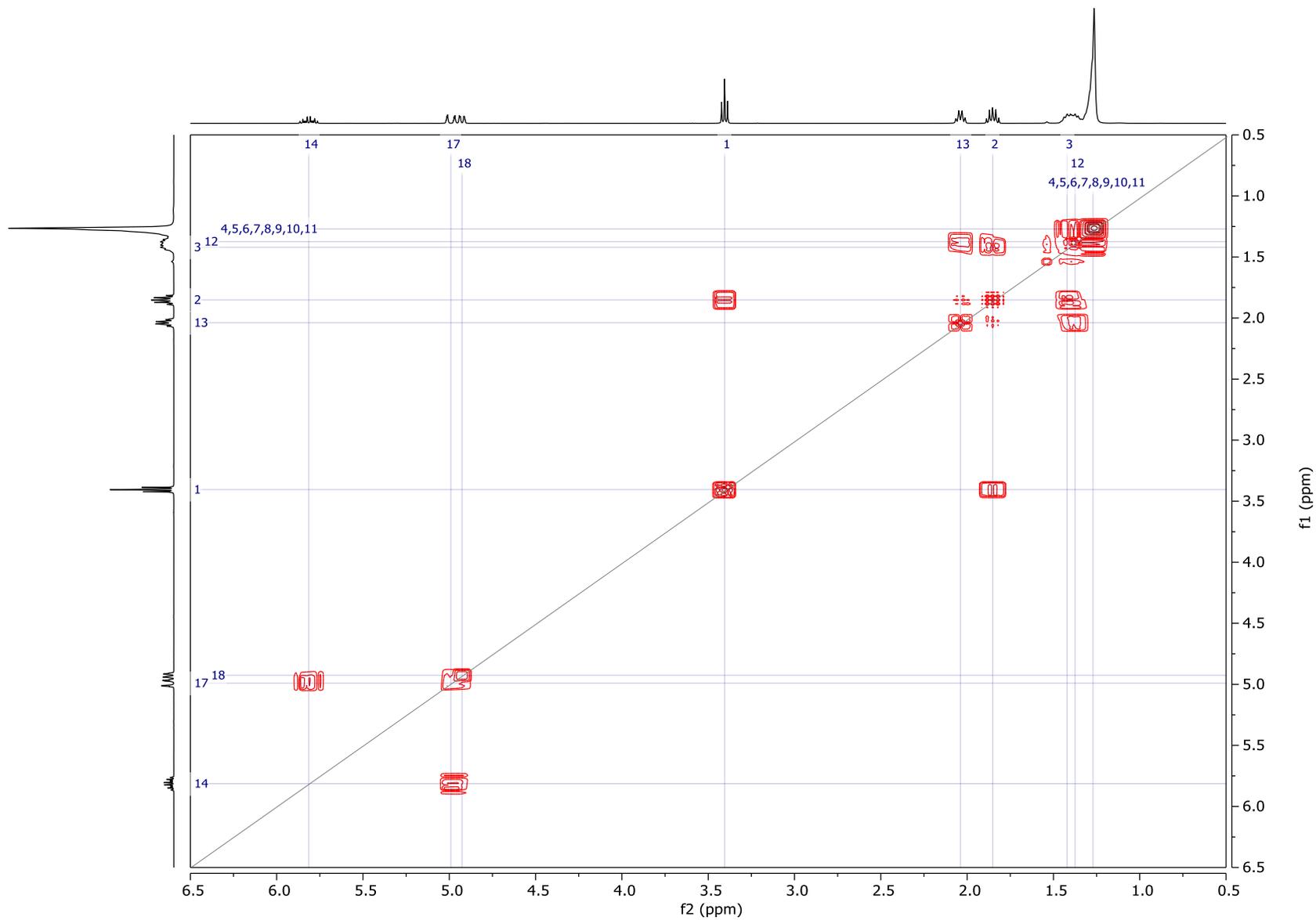
$^1\text{H}$  NMR



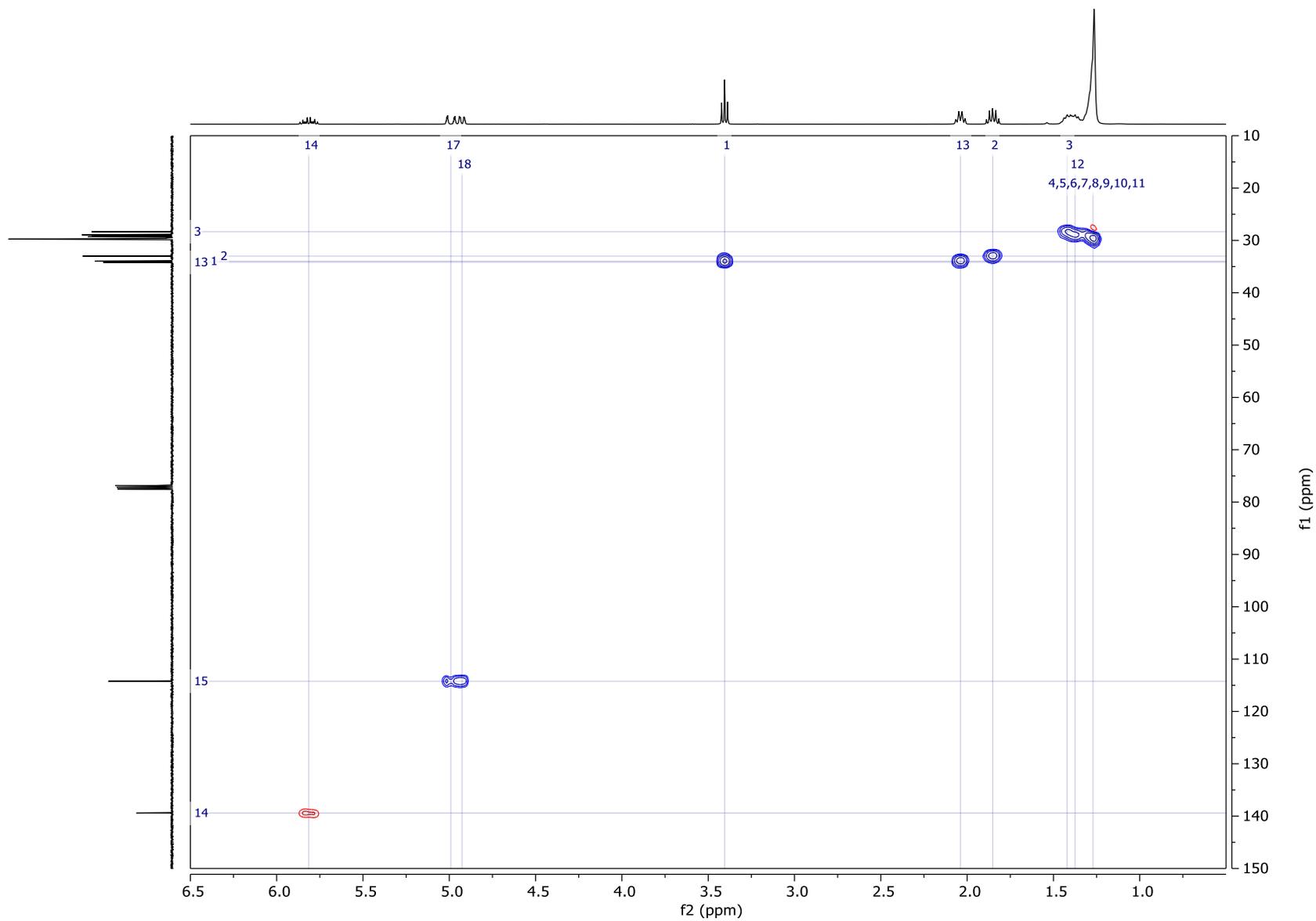
<sup>13</sup>C NMR



# COSY NMR

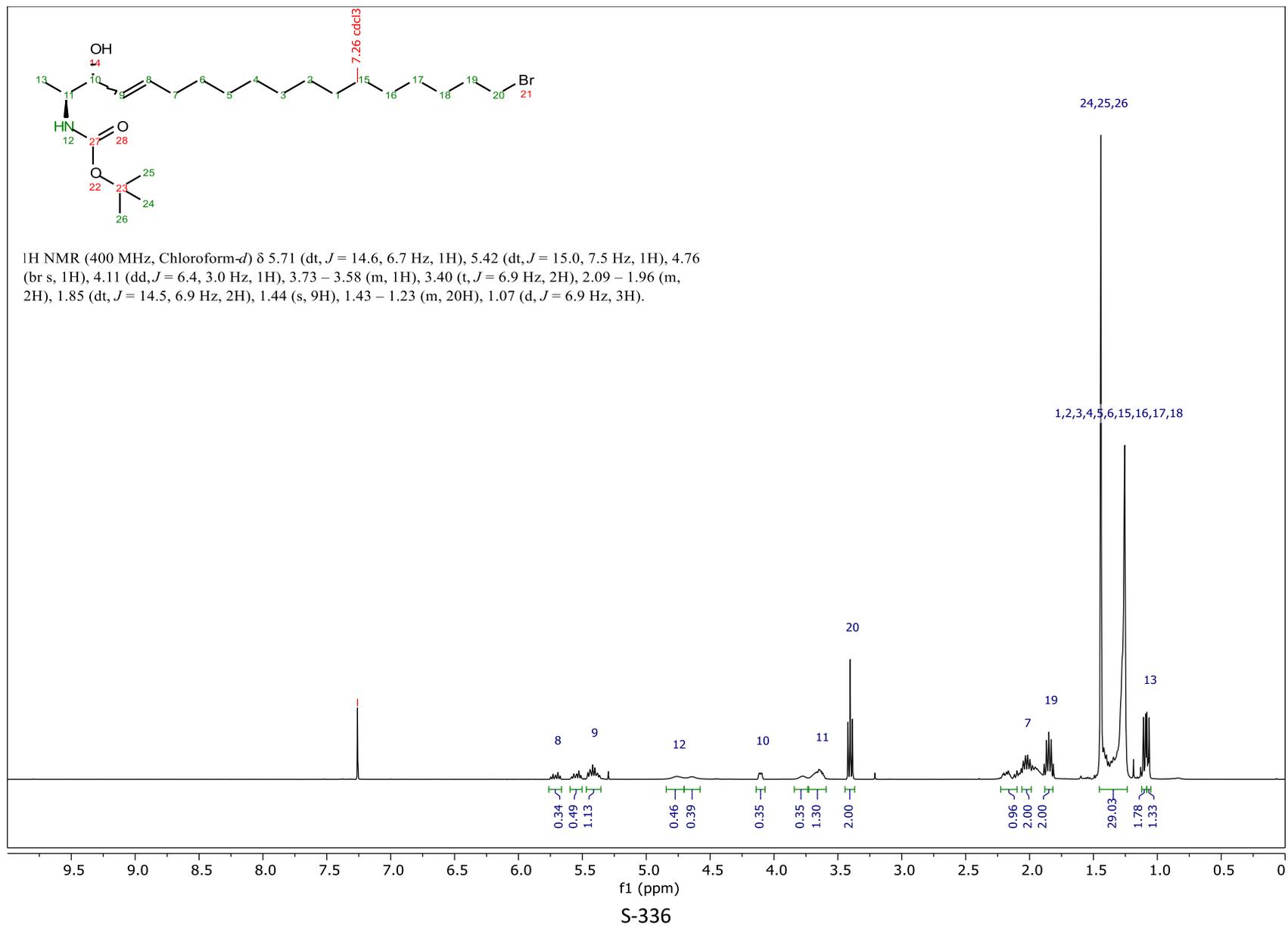


# HSQC NMR

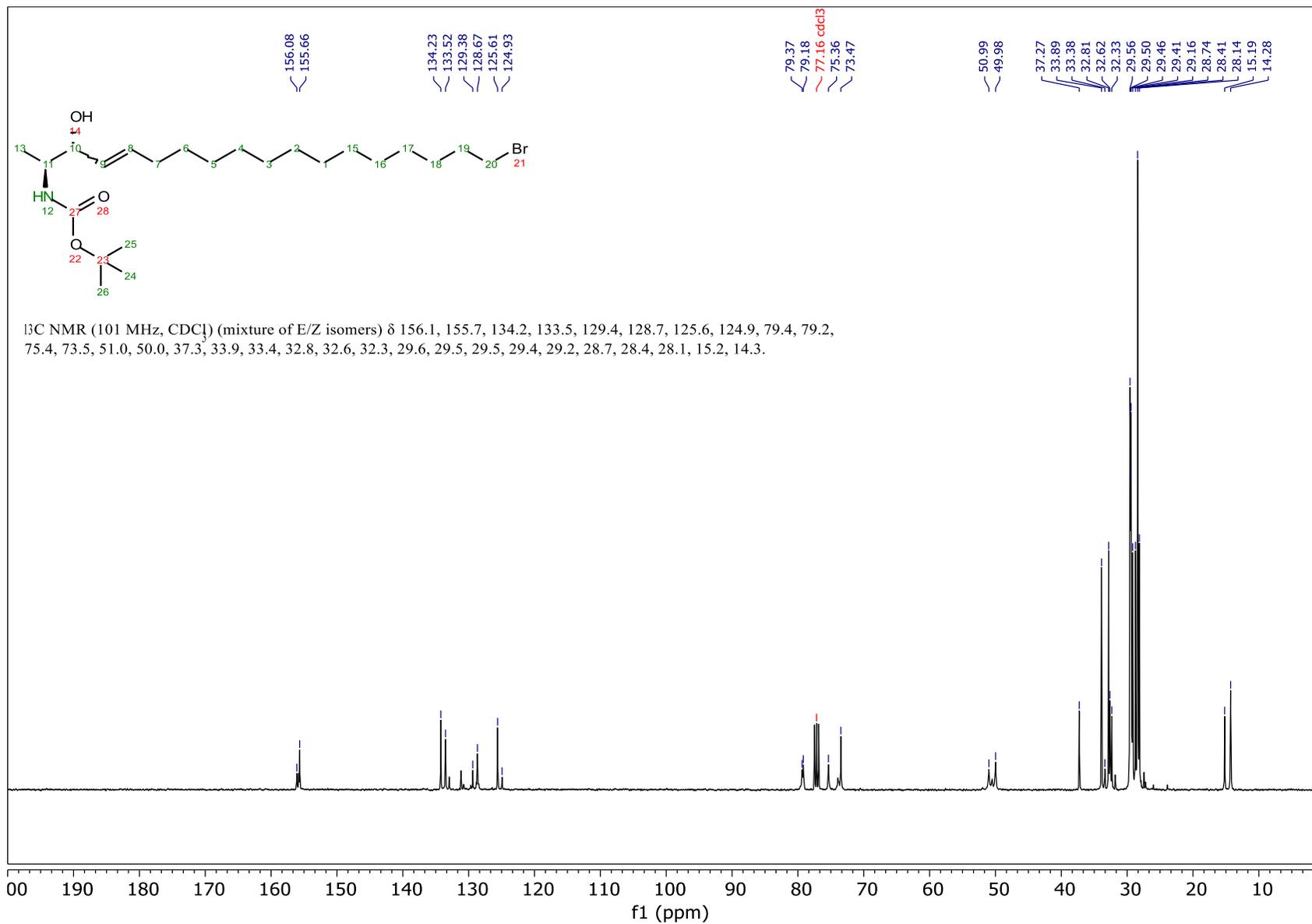


# Compound RBM5-150

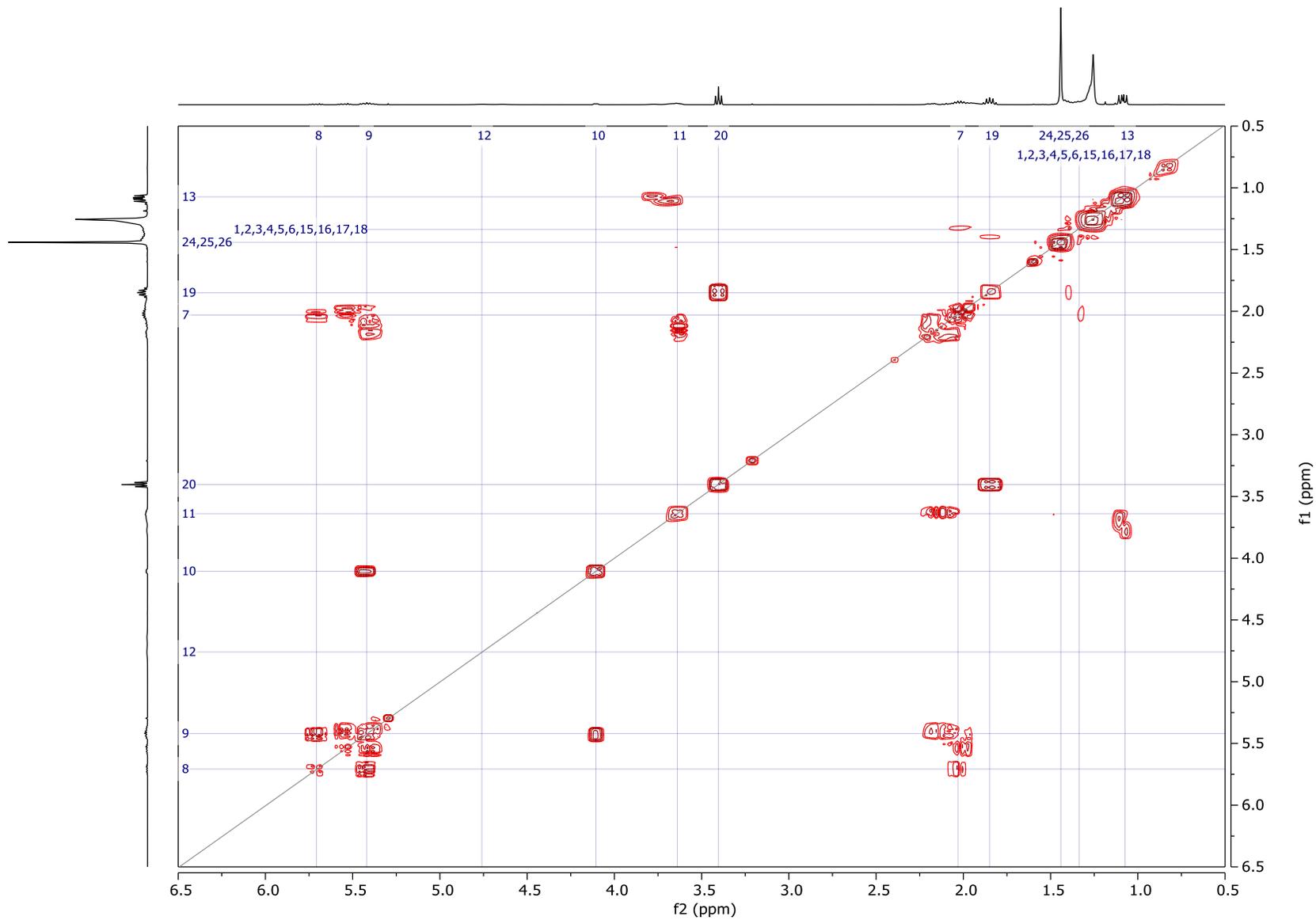
$^1\text{H}$  NMR



<sup>13</sup>C NMR

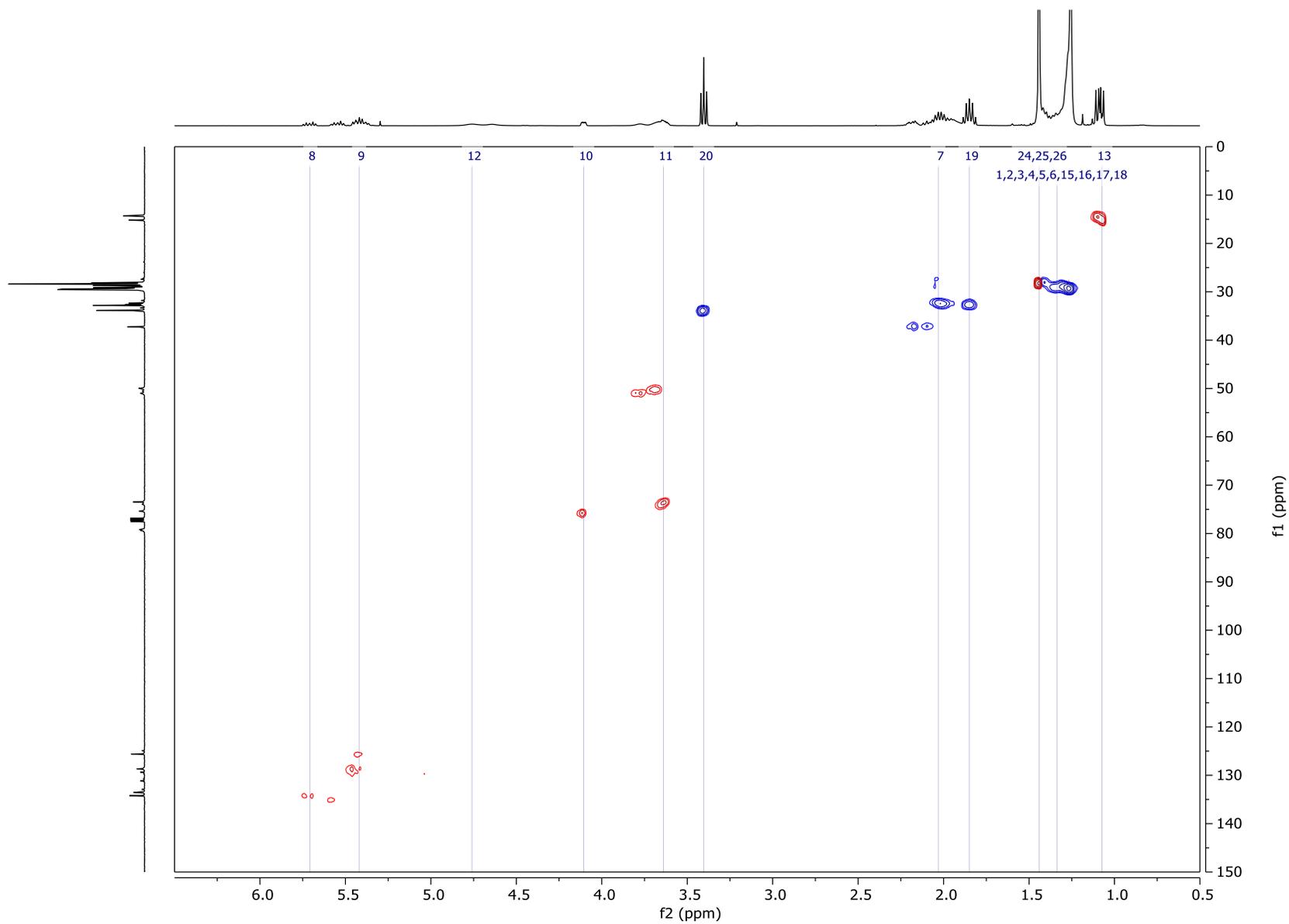


# COSY NMR



S-338

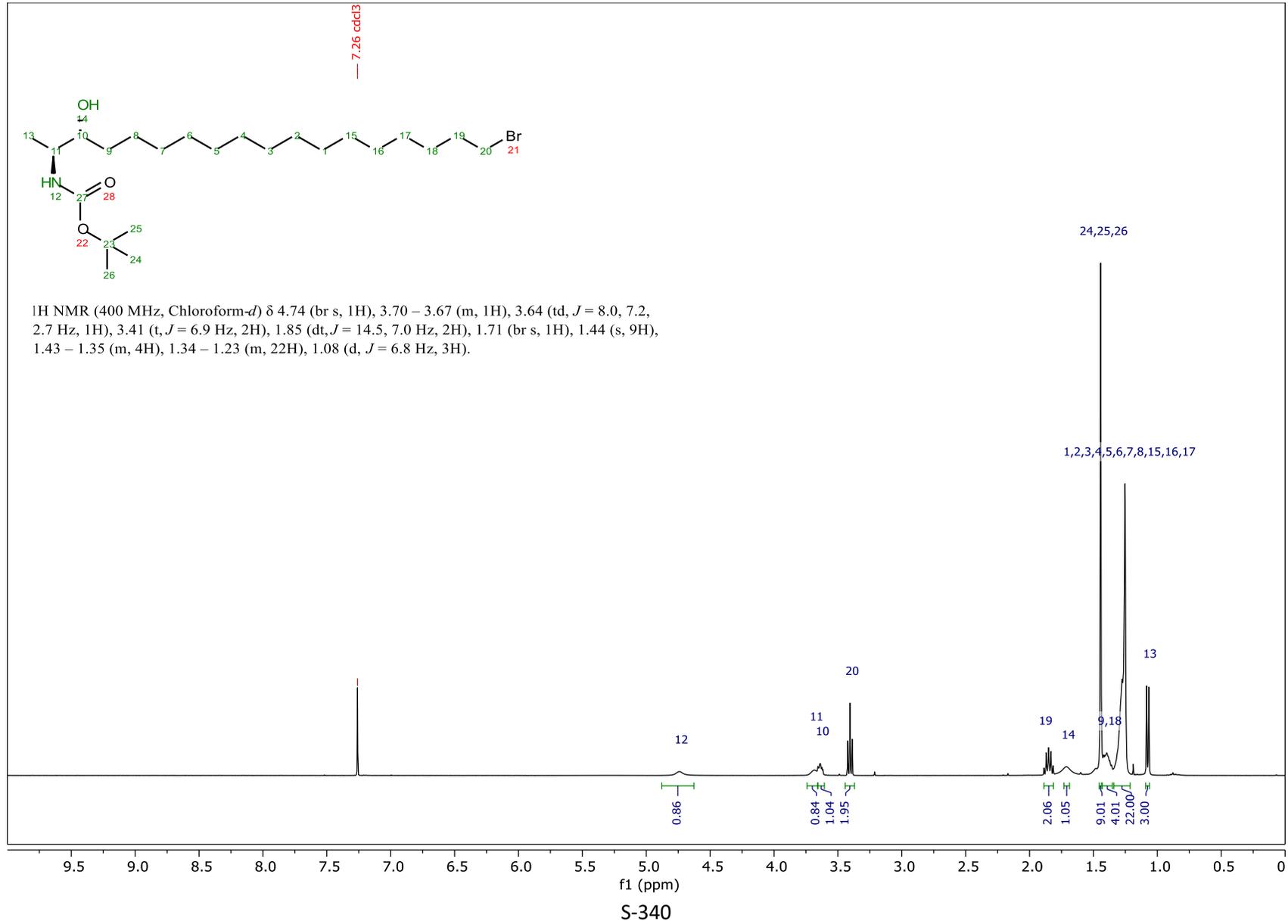
# HSQC NMR



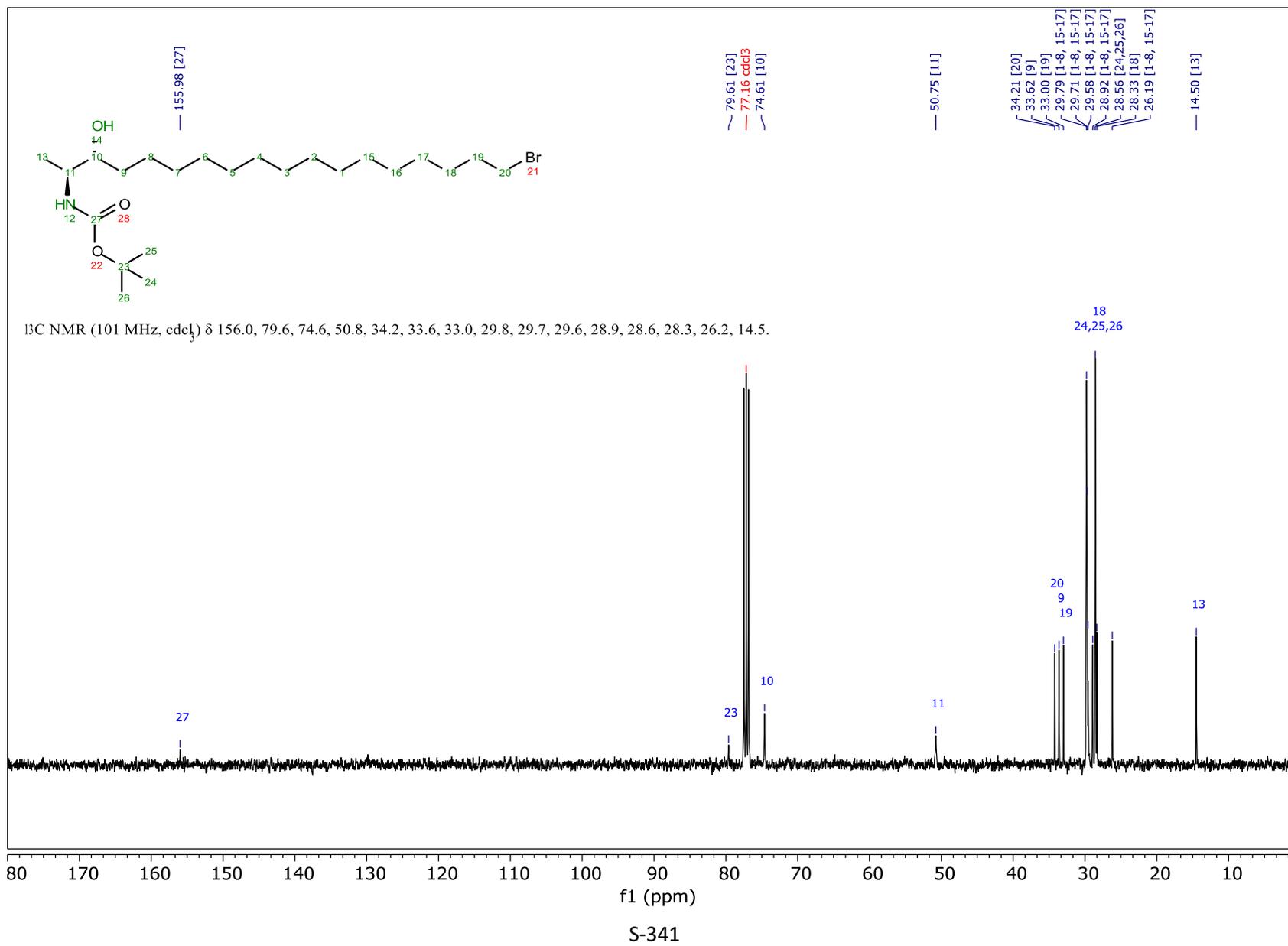
S-339

# Compound RBM5-151

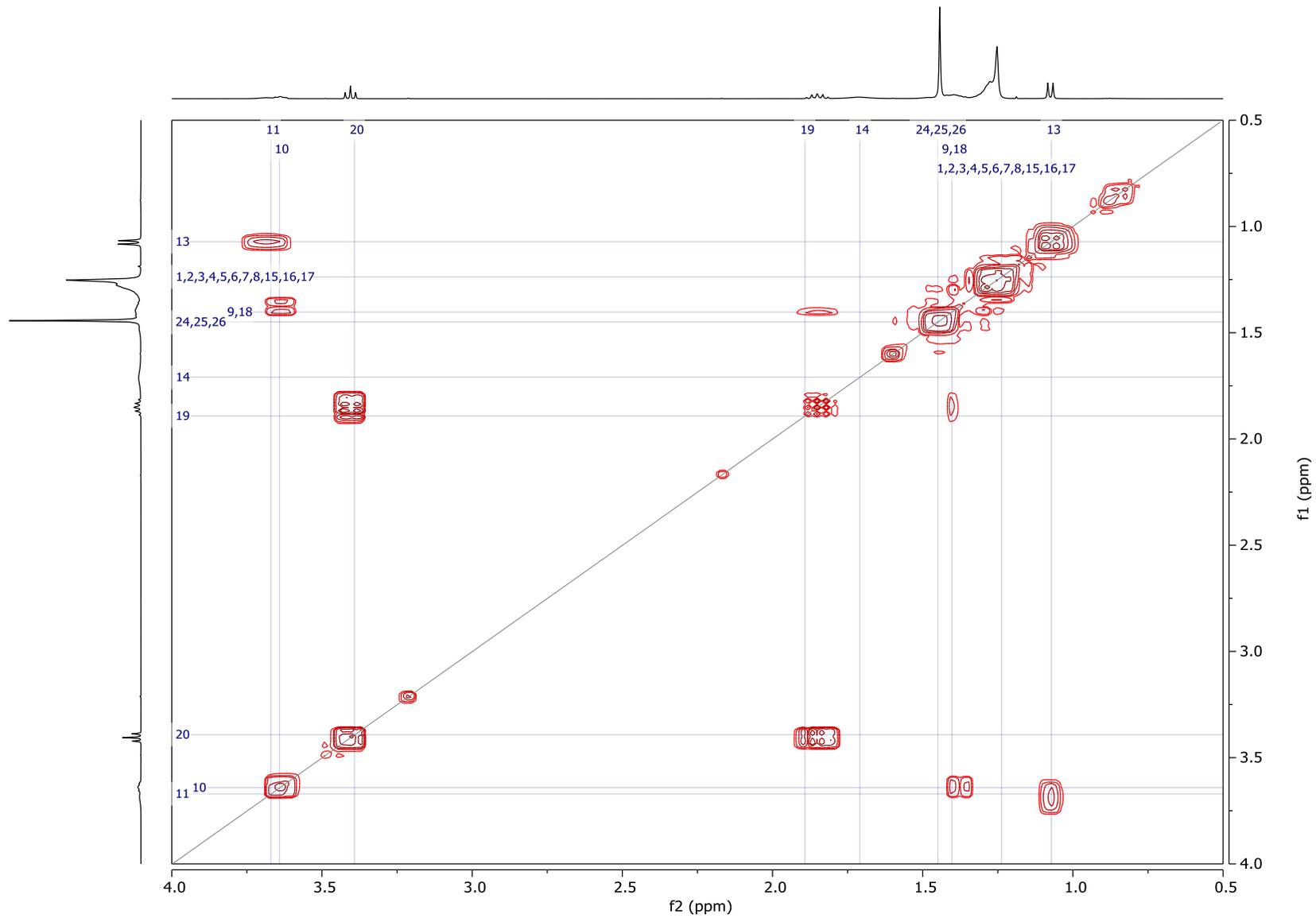
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

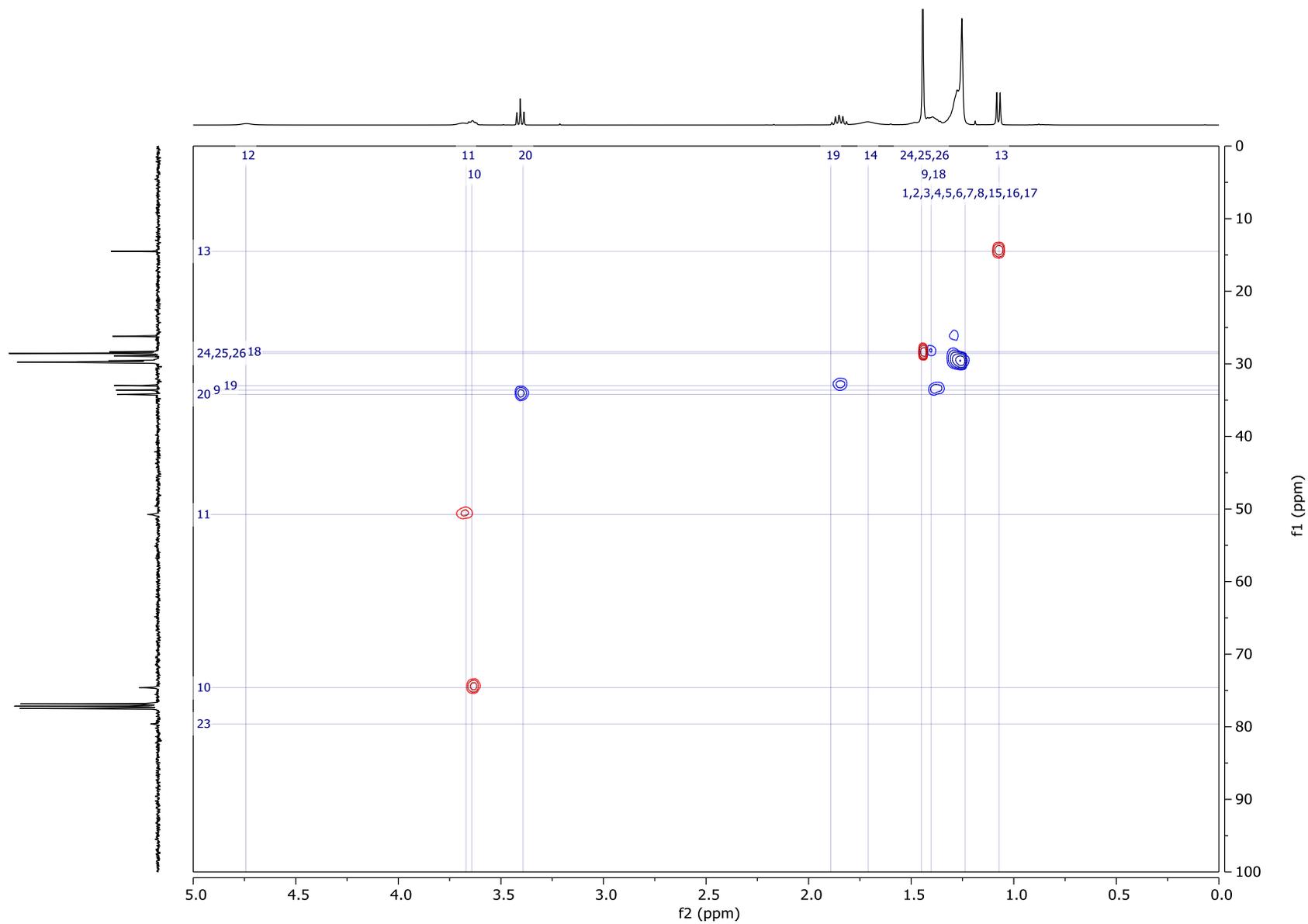


# COSY NMR



S-342

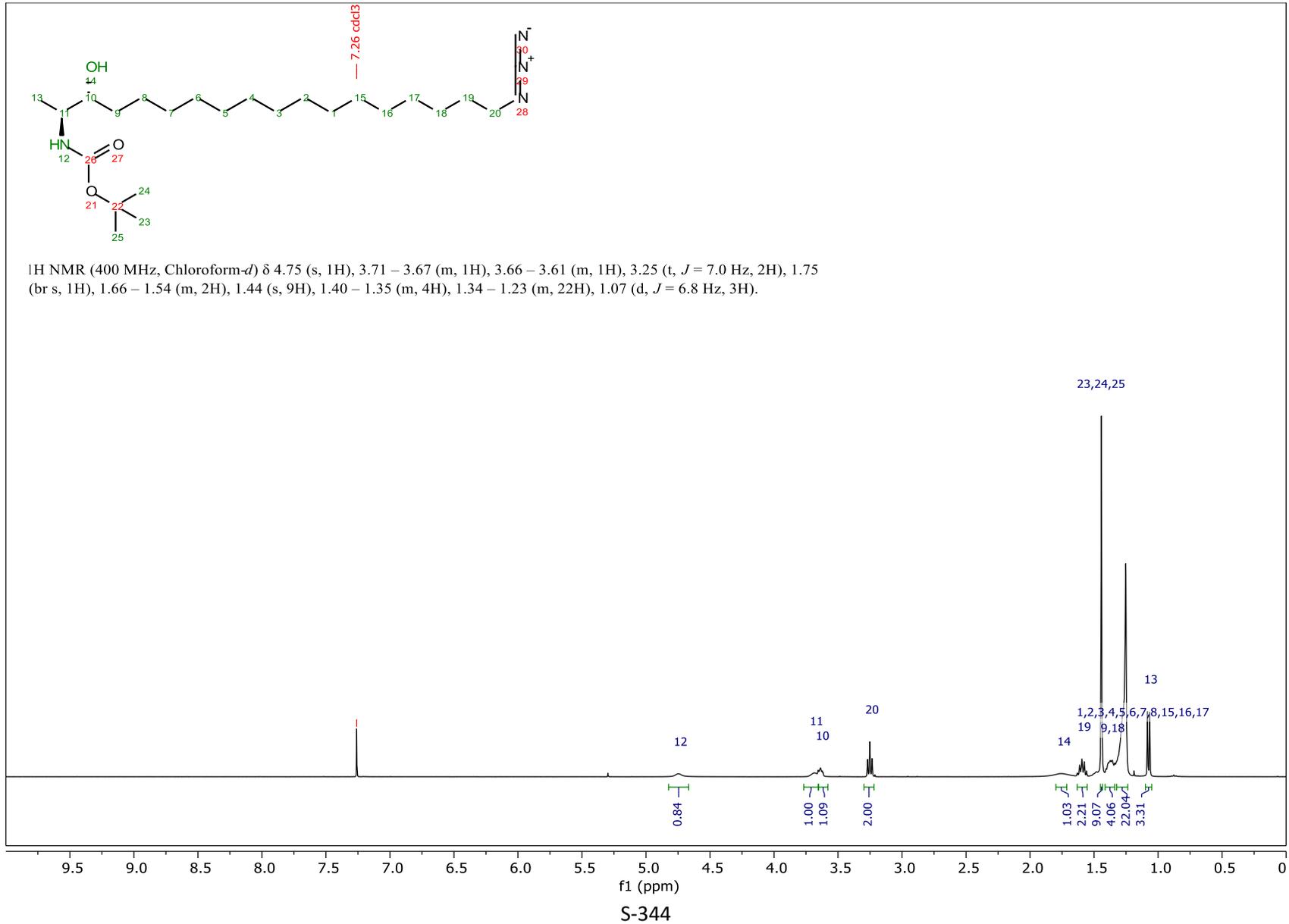
# HSQC NMR



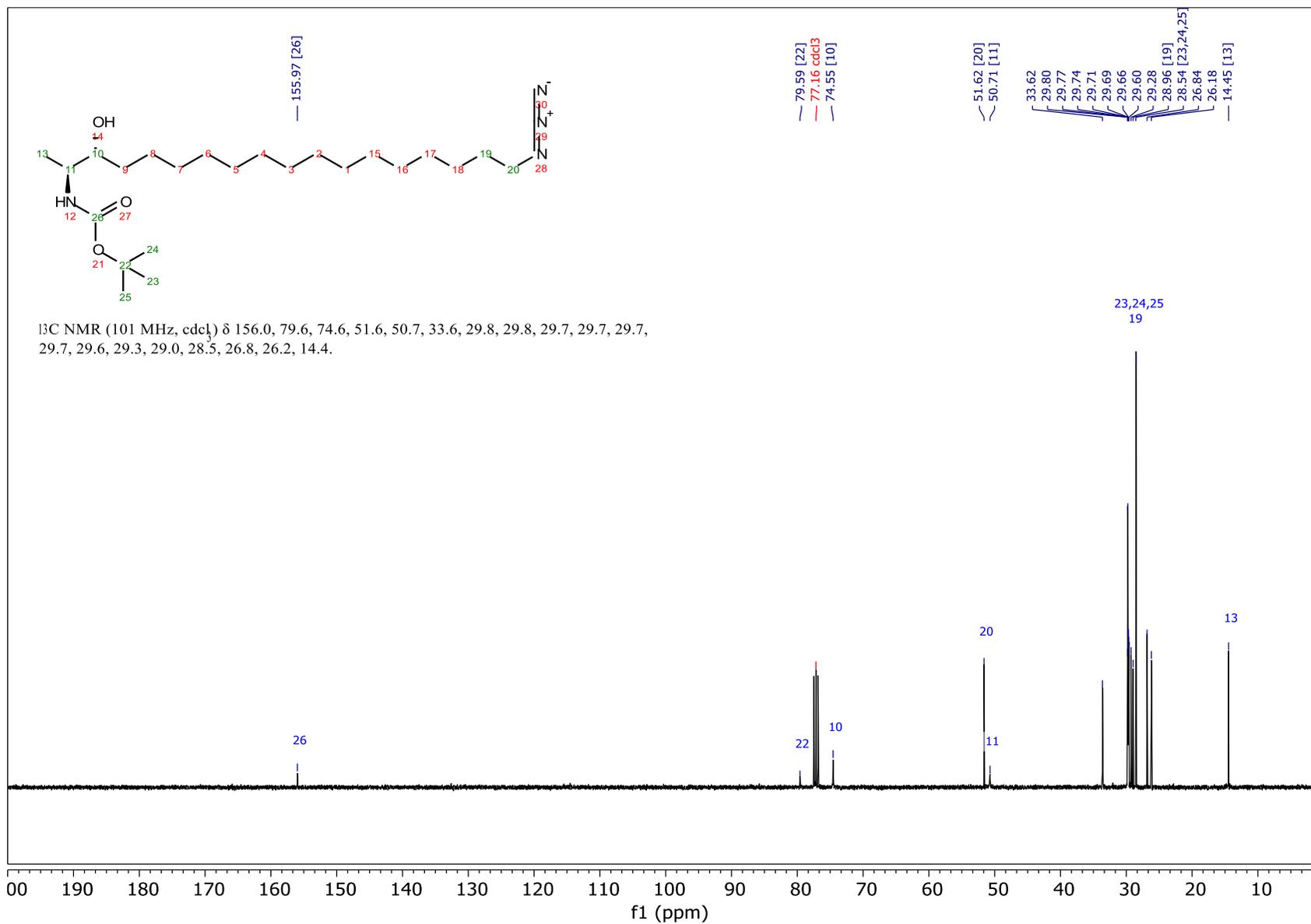
S-343

# Compound RBM5-152

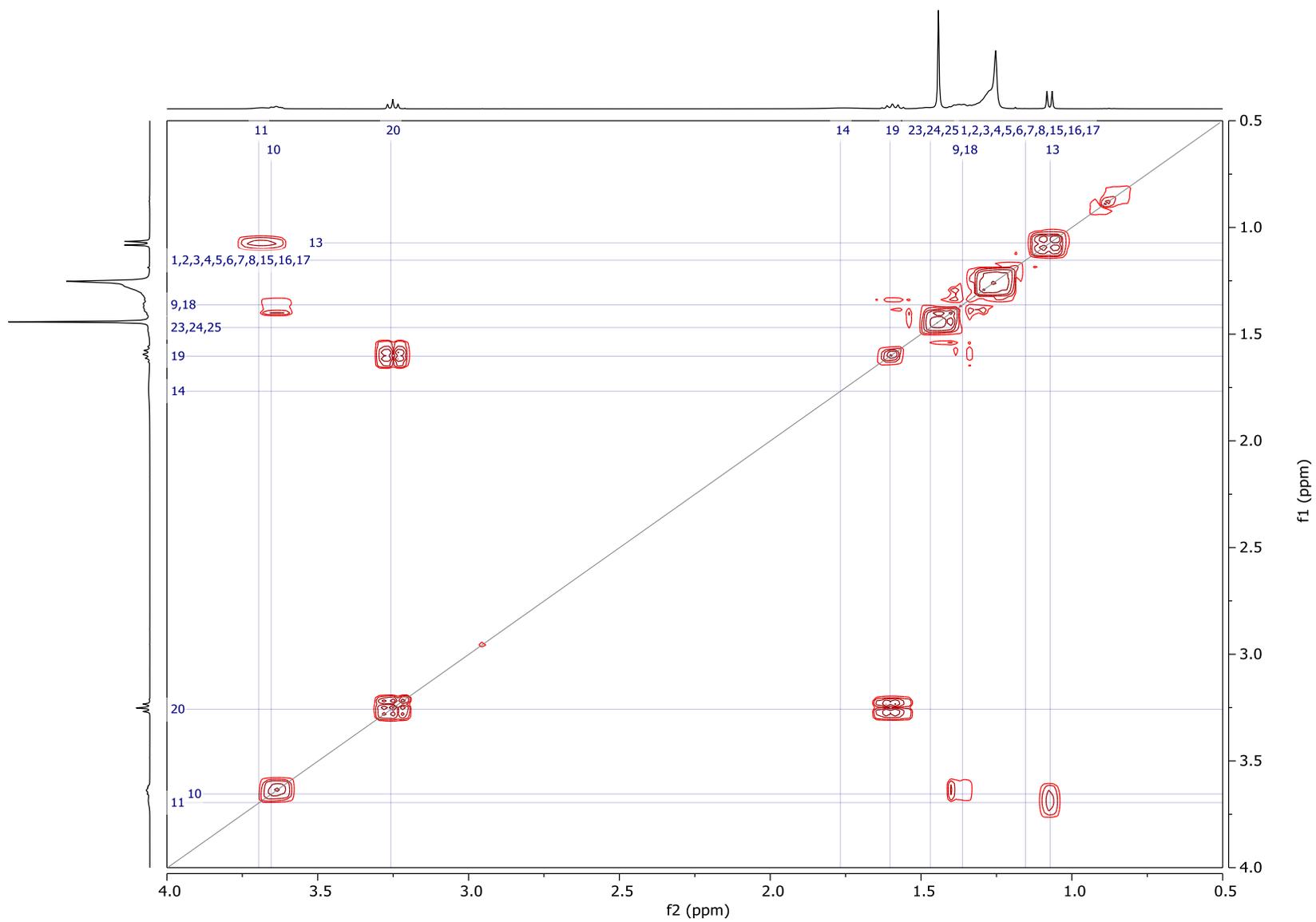
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

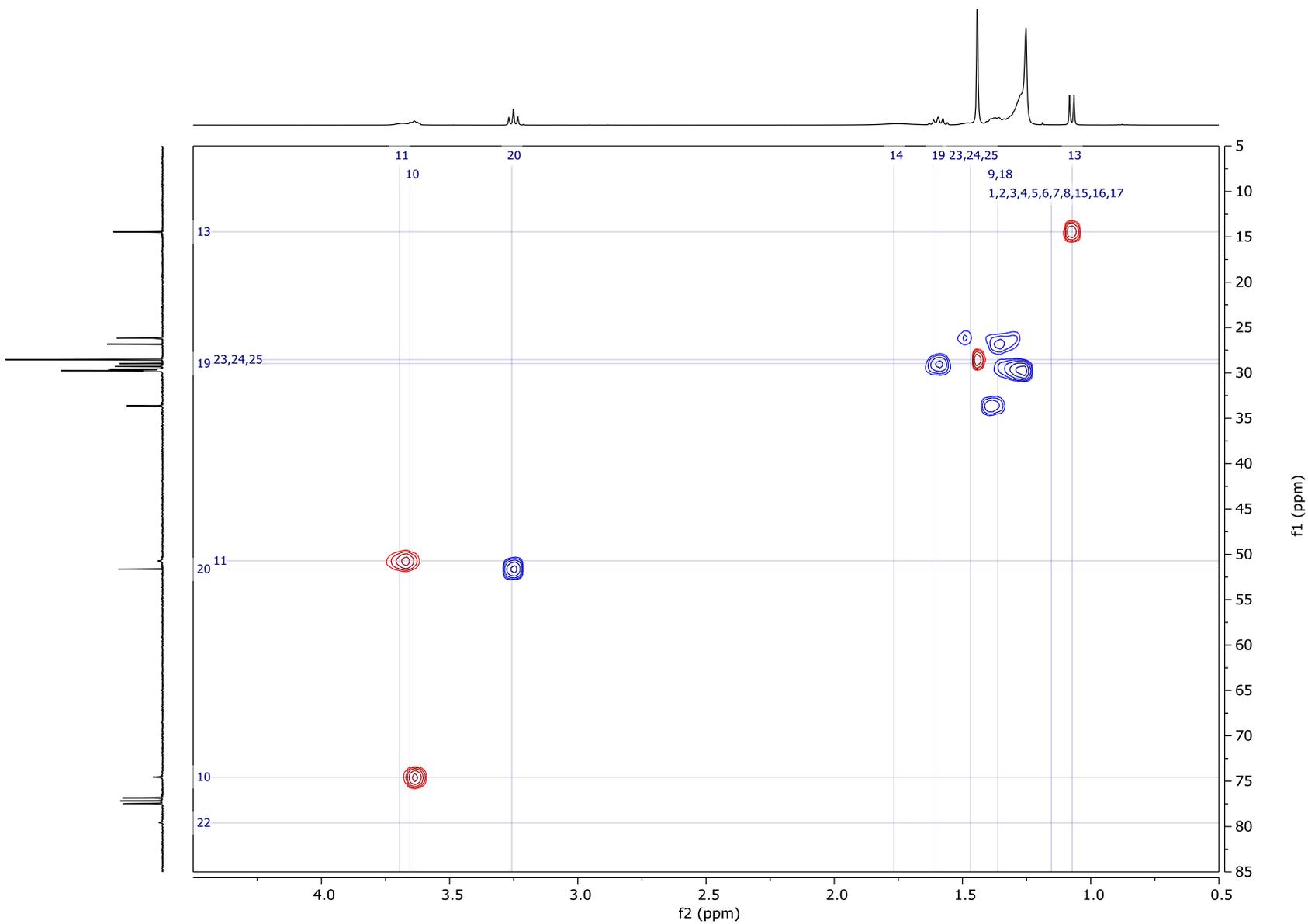


# COSY NMR



S-346

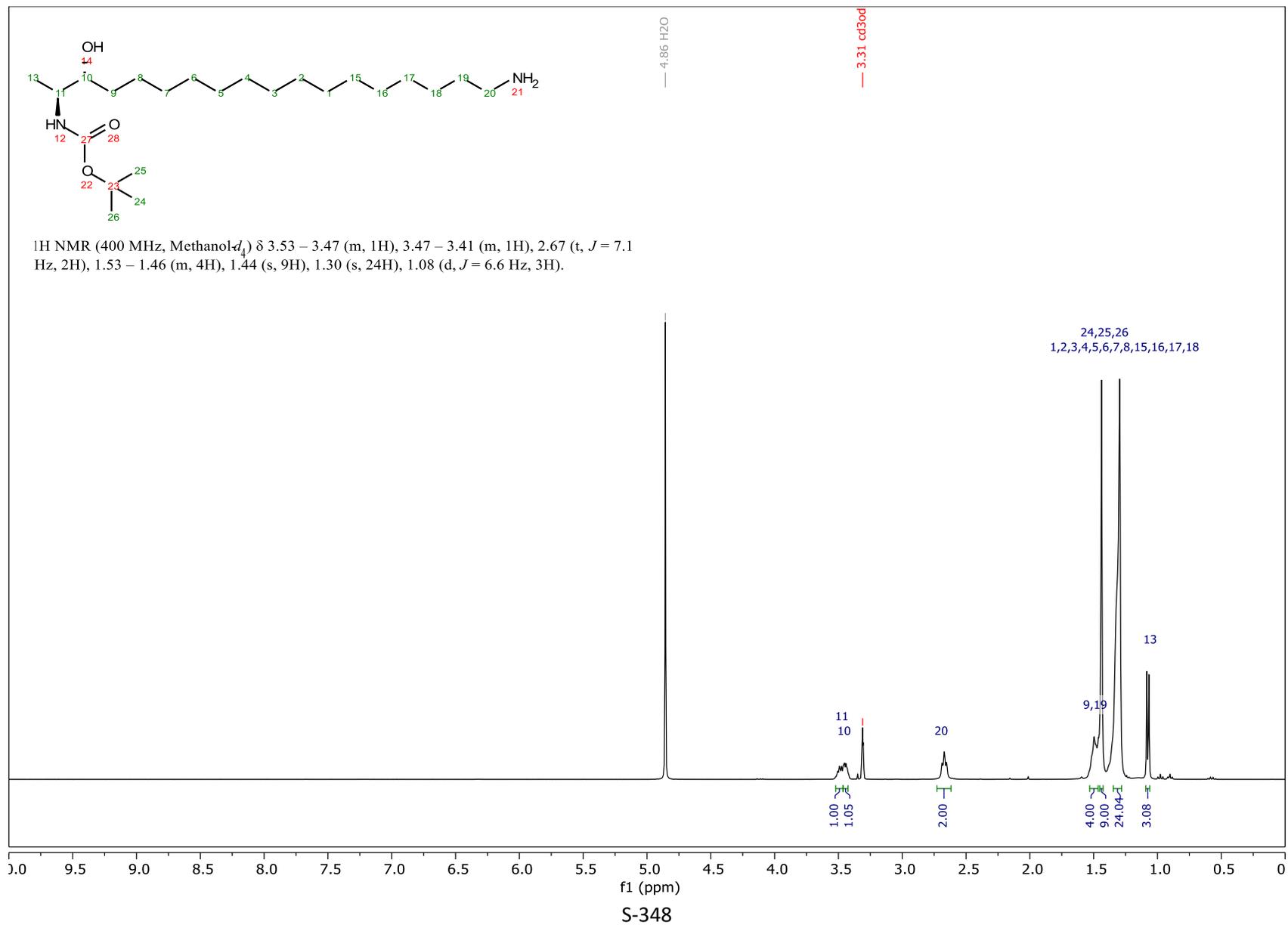
# HSQC NMR



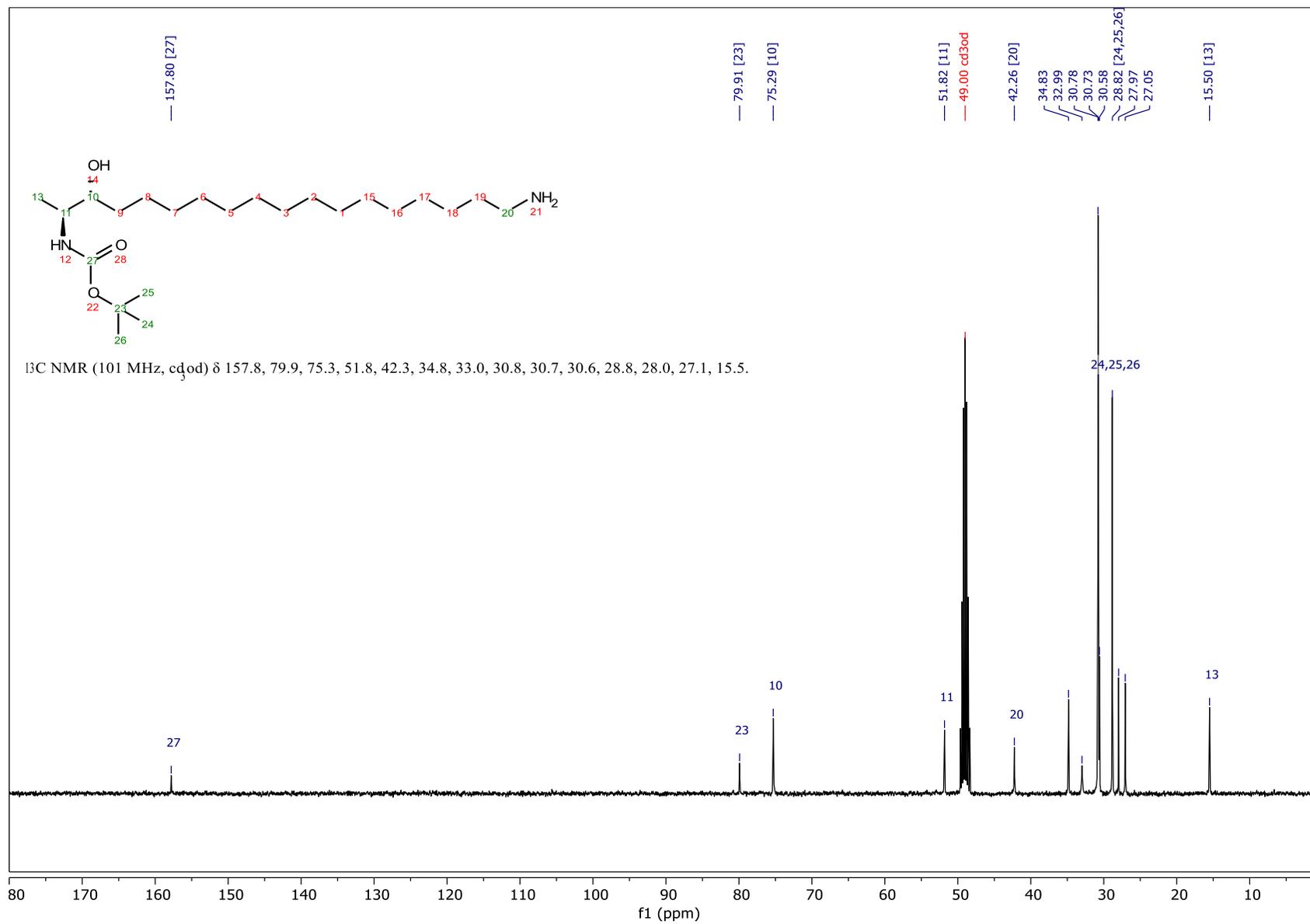
S-347

# Compound RBM5-153

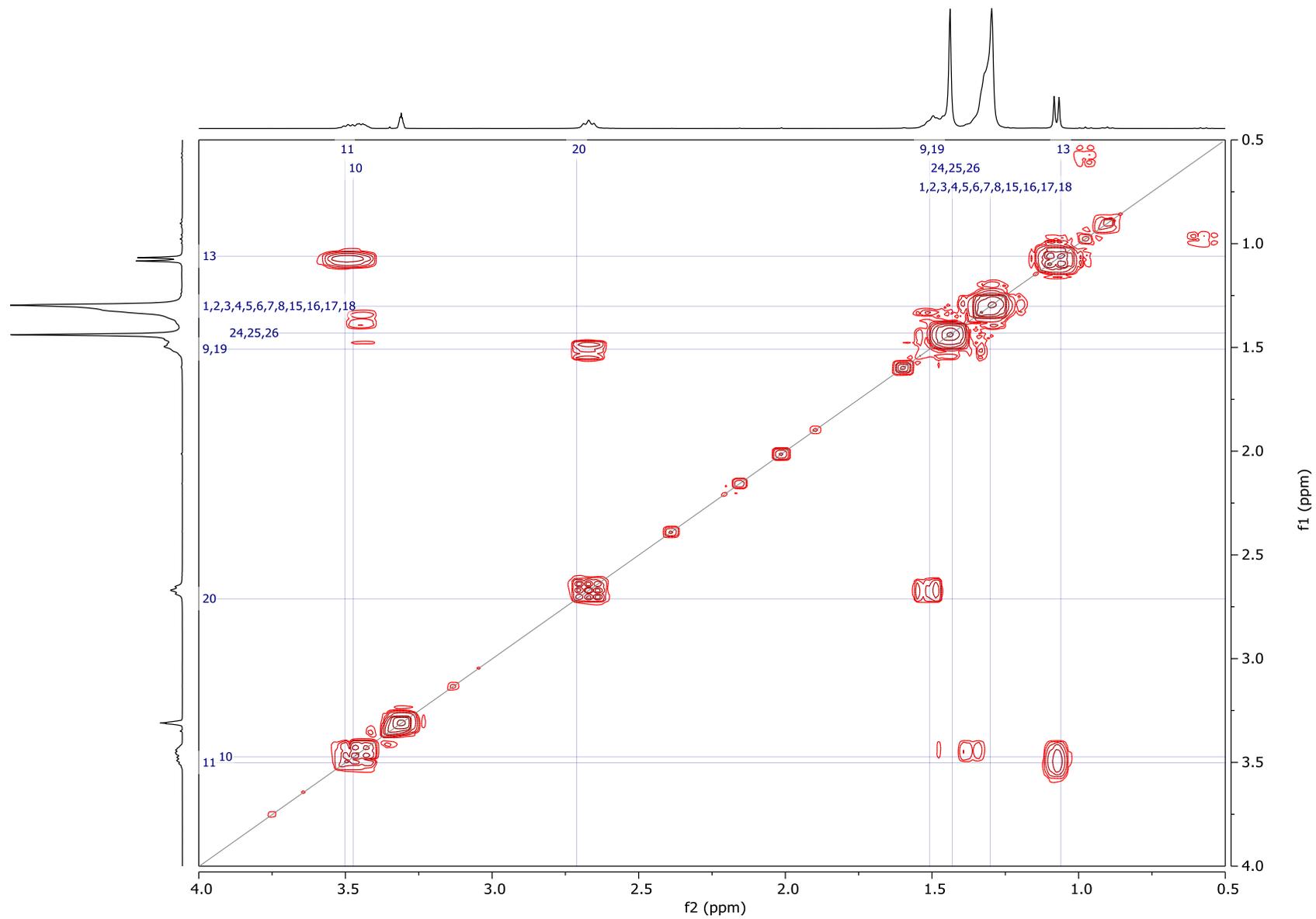
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

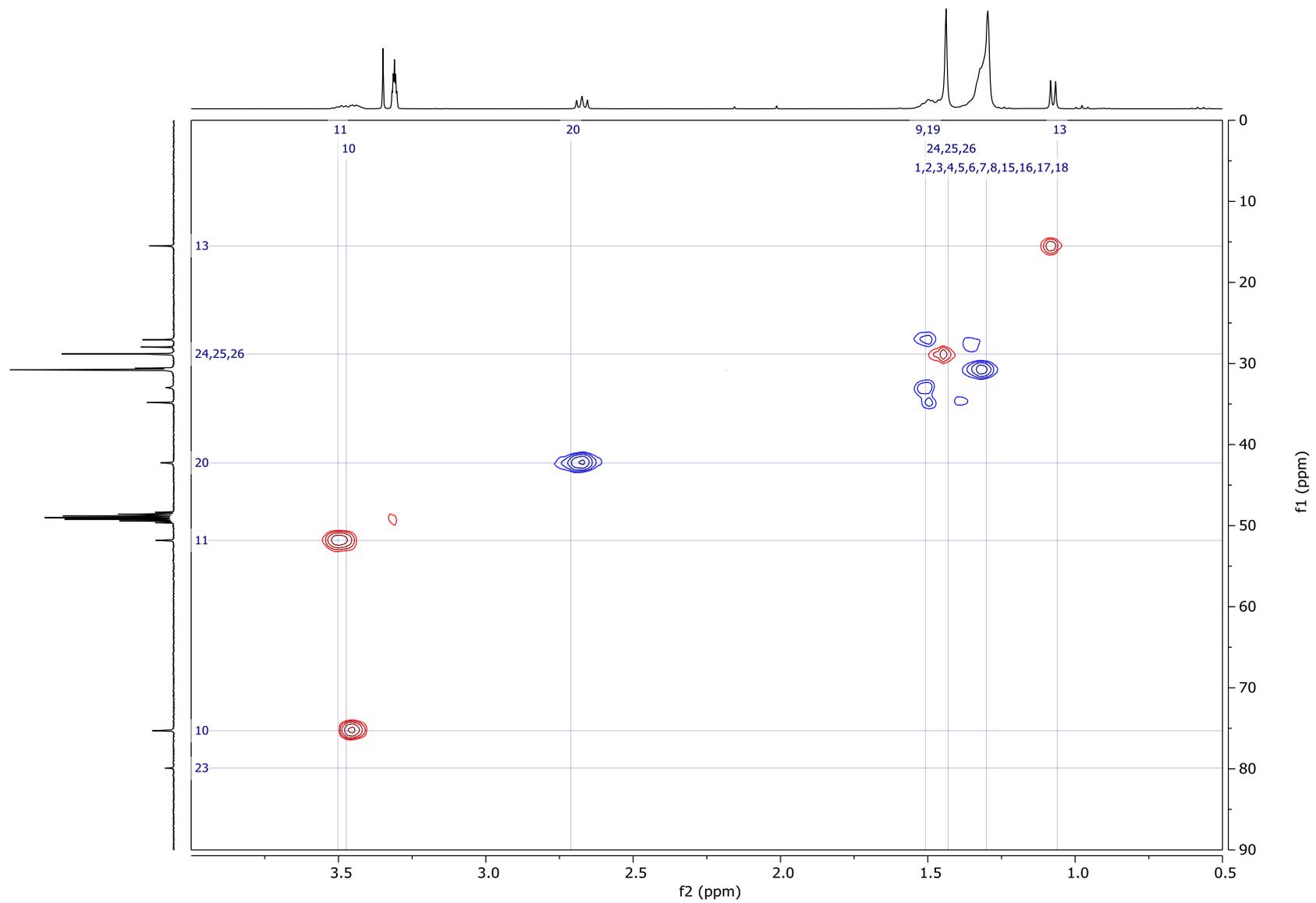


# COSY NMR



S-350

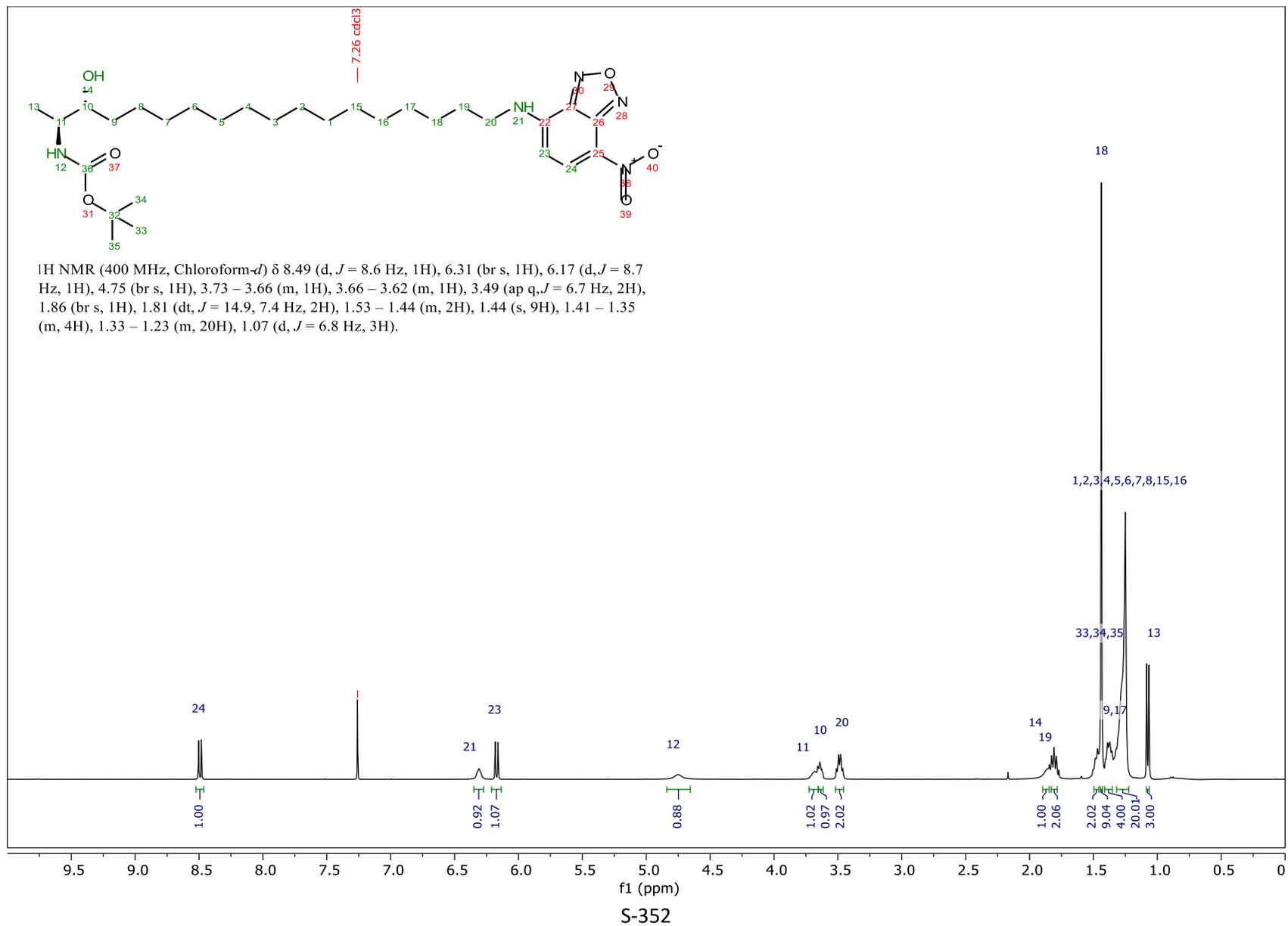
# HSQC NMR



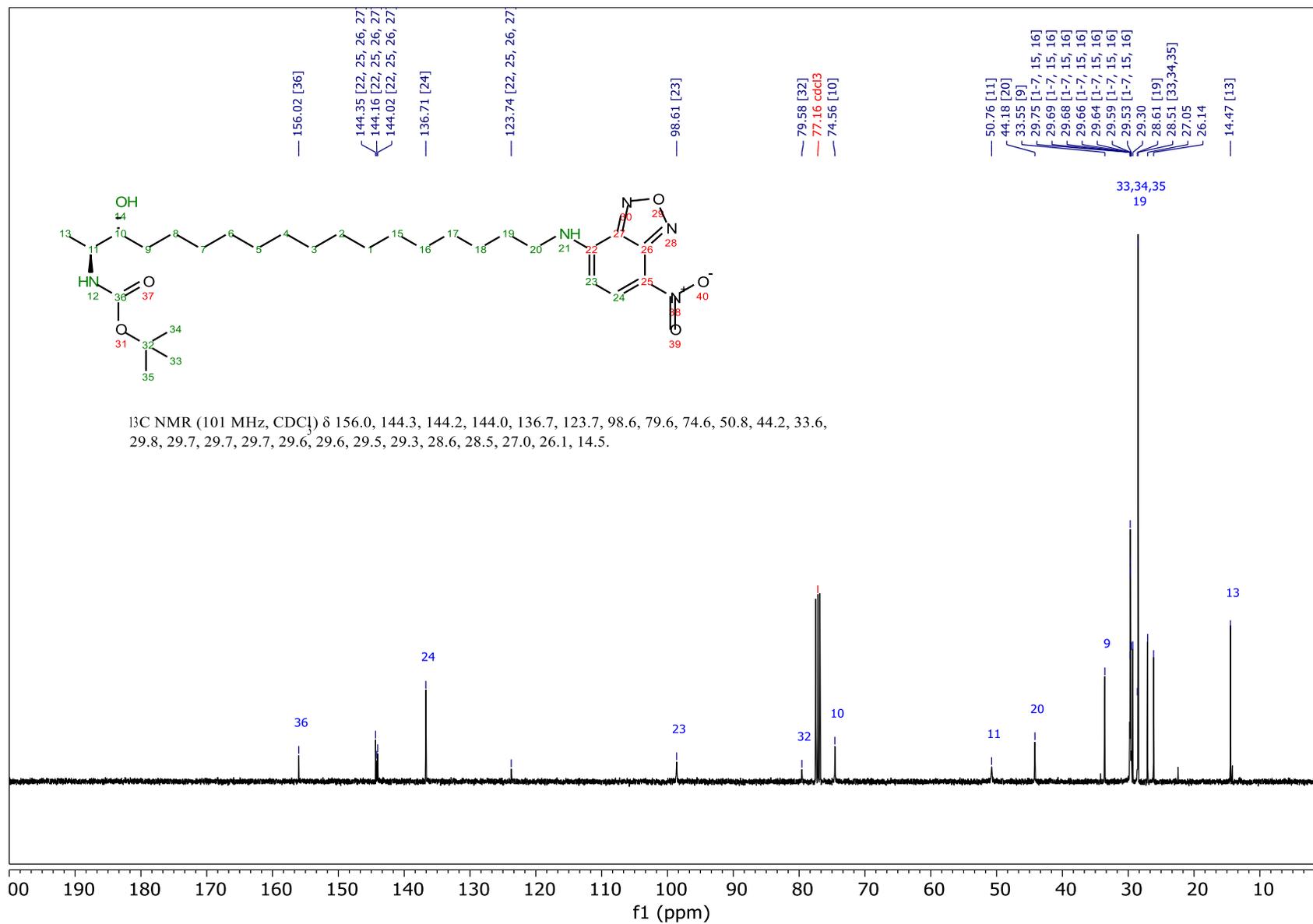
S-351

# Compound RBM5-154

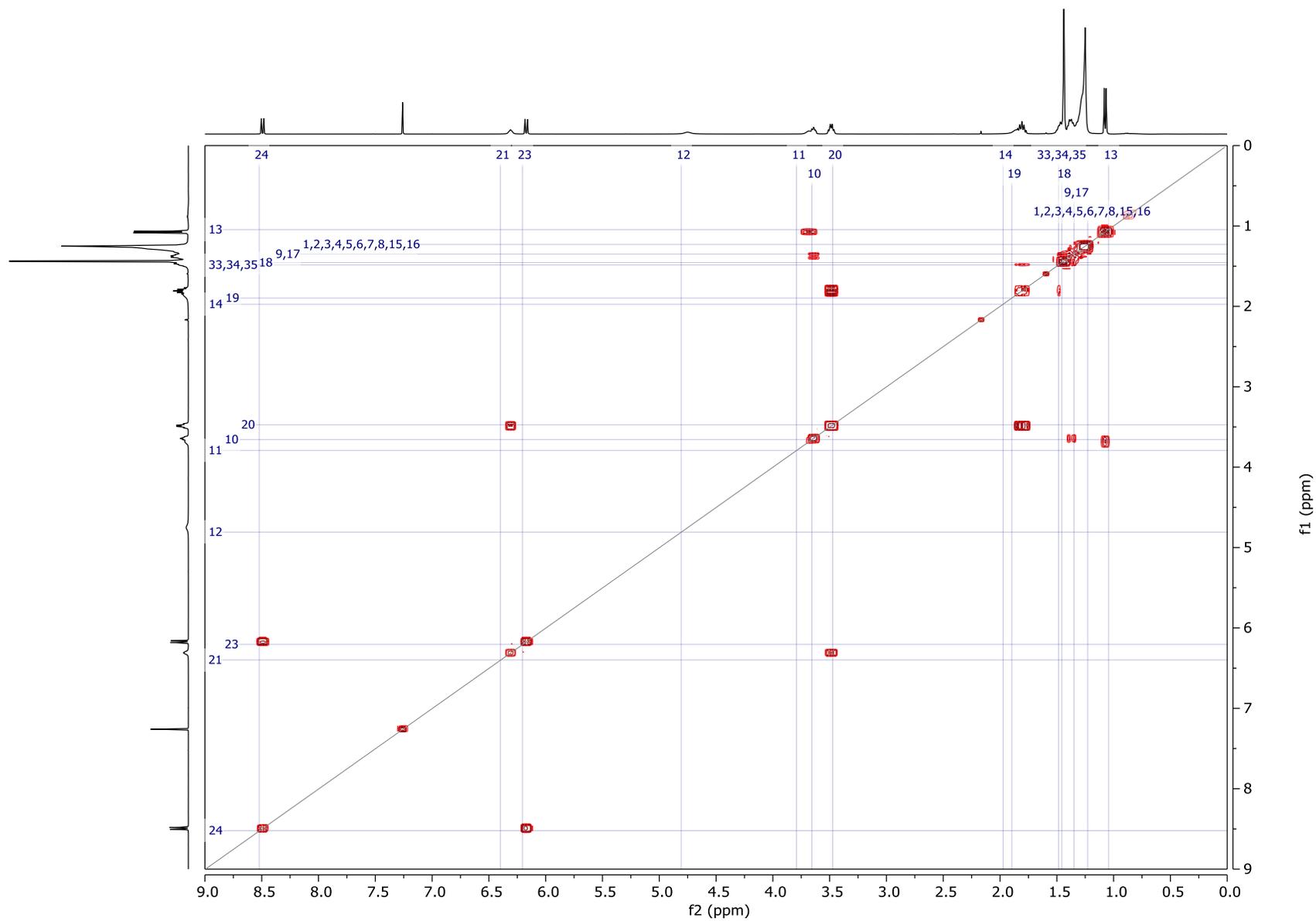
<sup>1</sup>H NMR



<sup>13</sup>C NMR

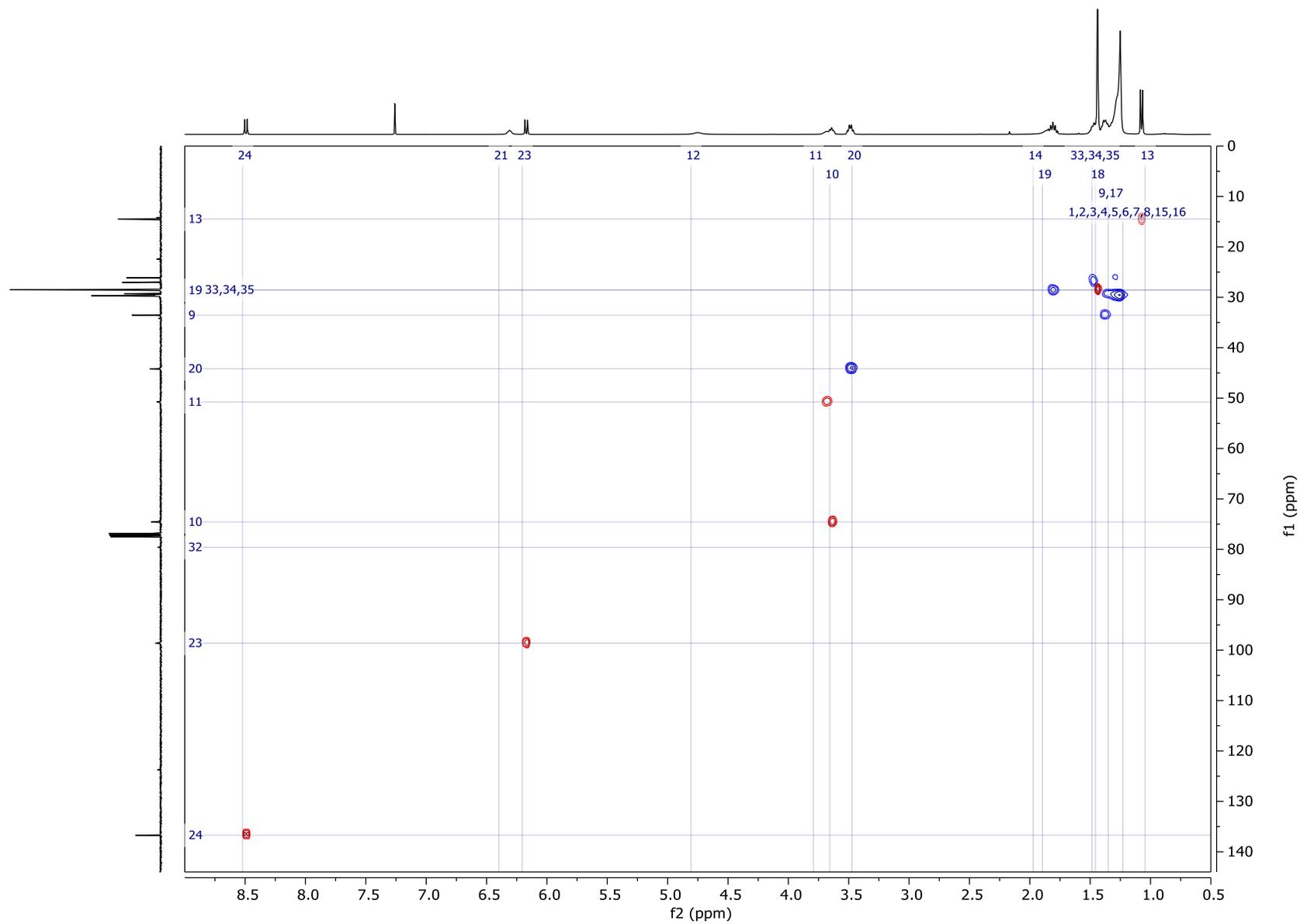


# COSY NMR



S-354

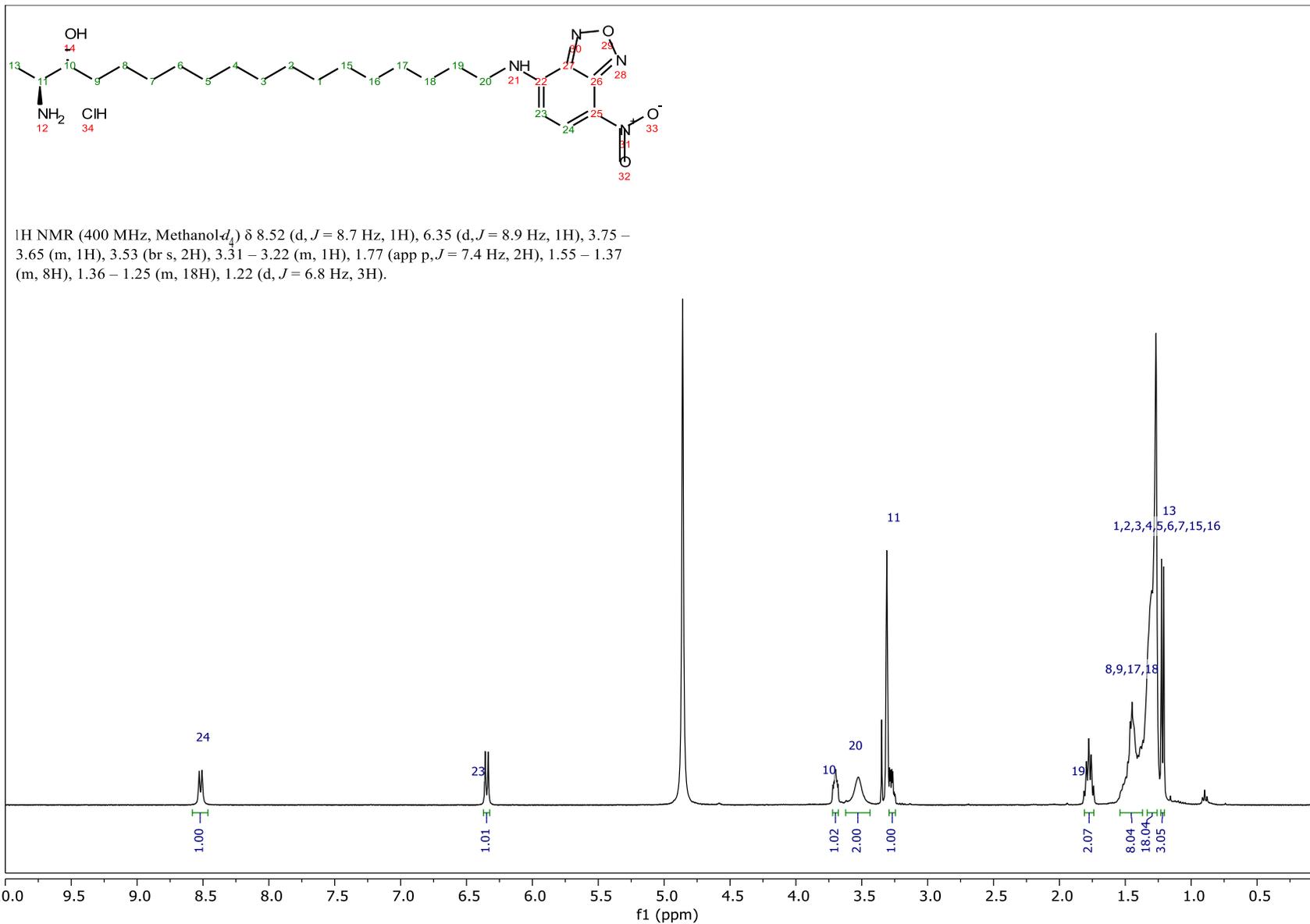
# HSQC NMR



S-355

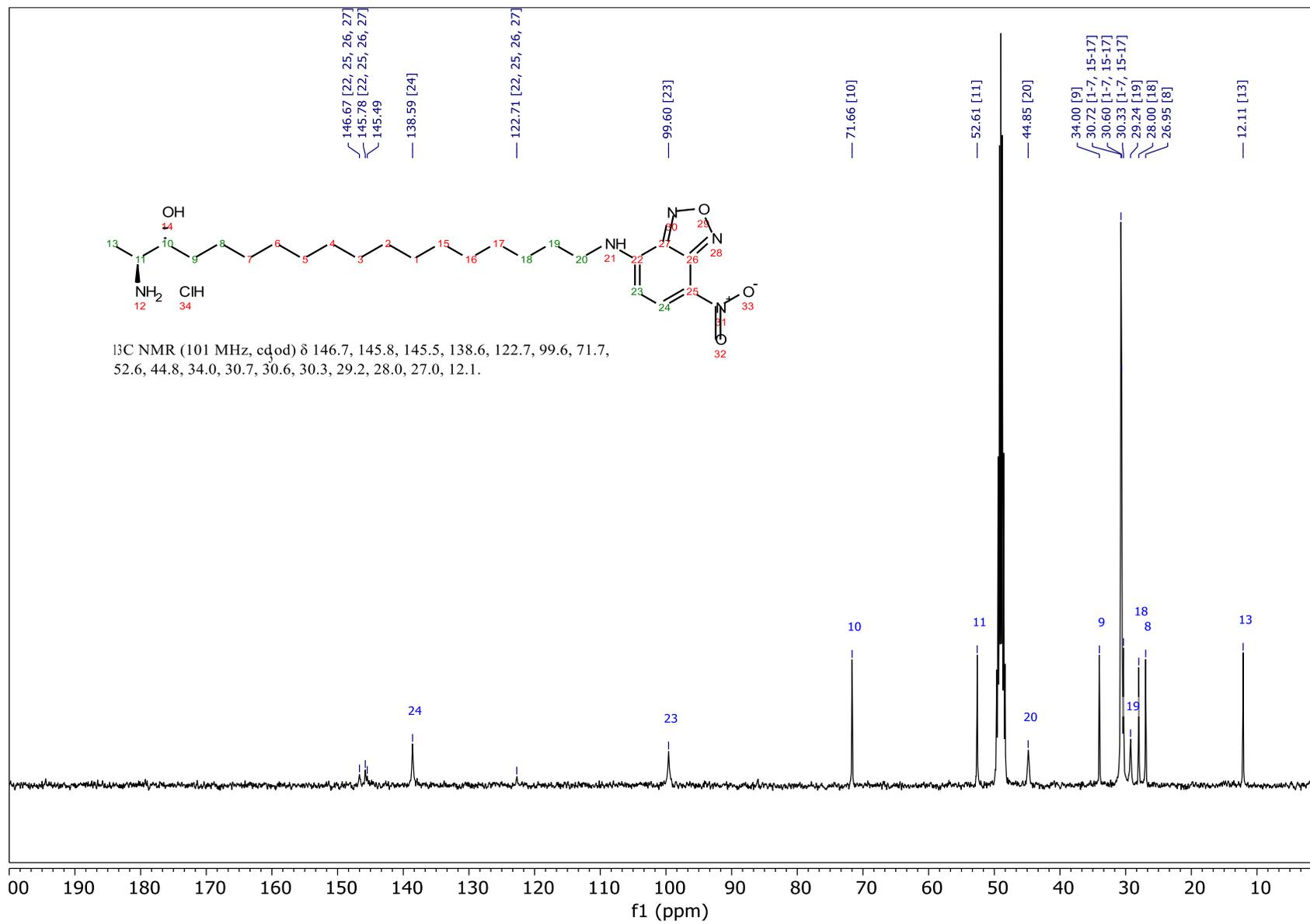
# Compound RBM5-155

$^1\text{H}$  NMR

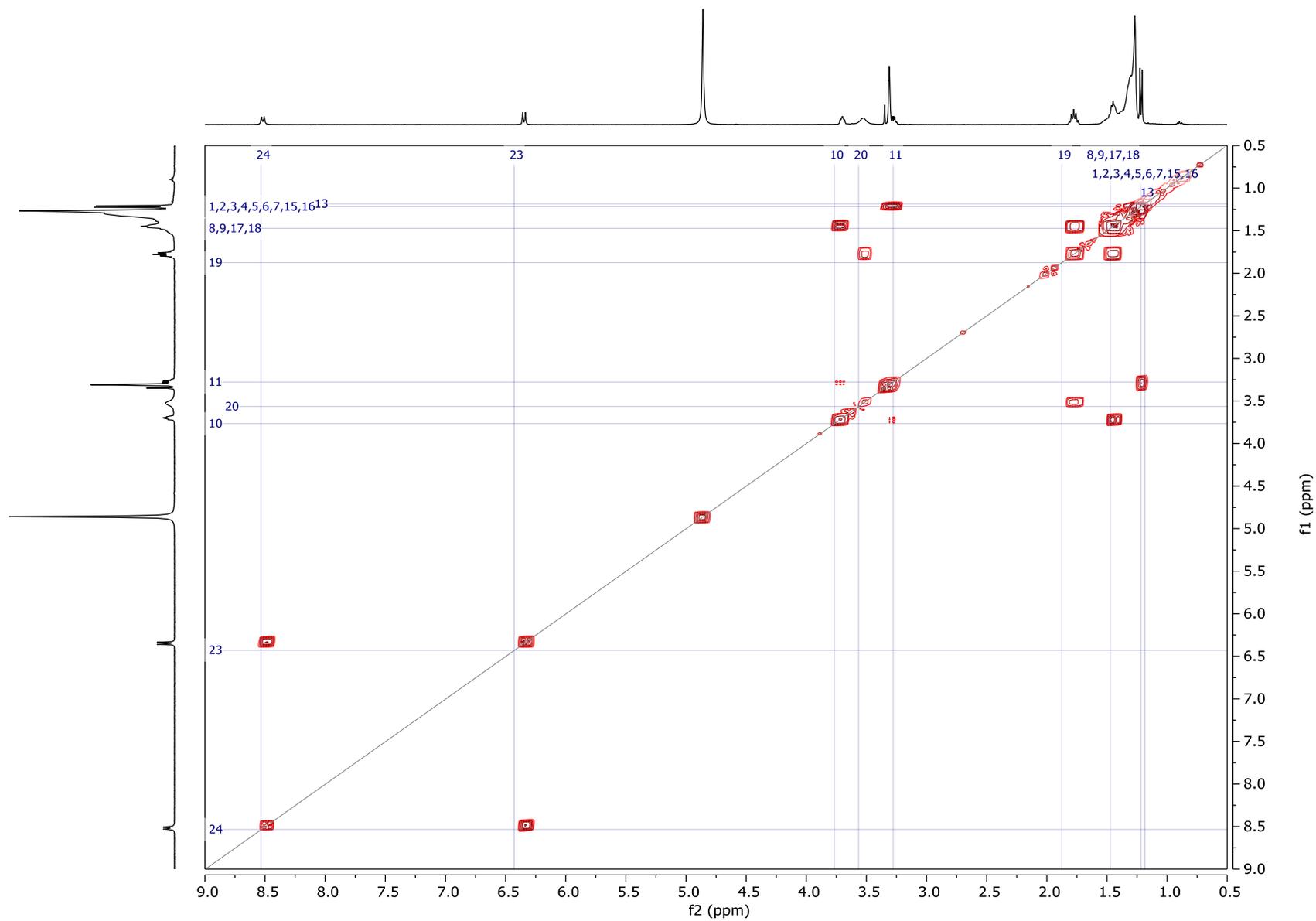


S-356

<sup>13</sup>C NMR

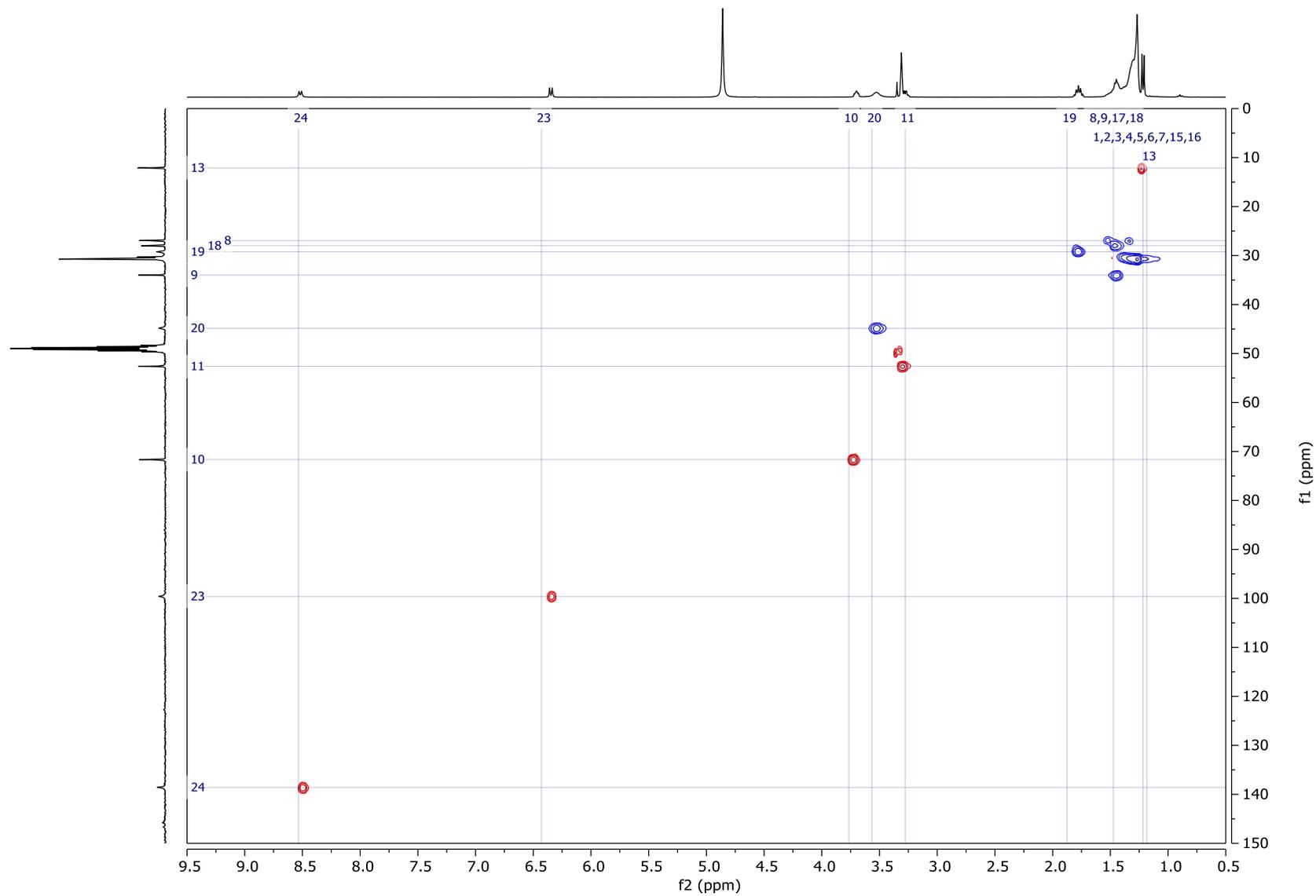


# COSY NMR



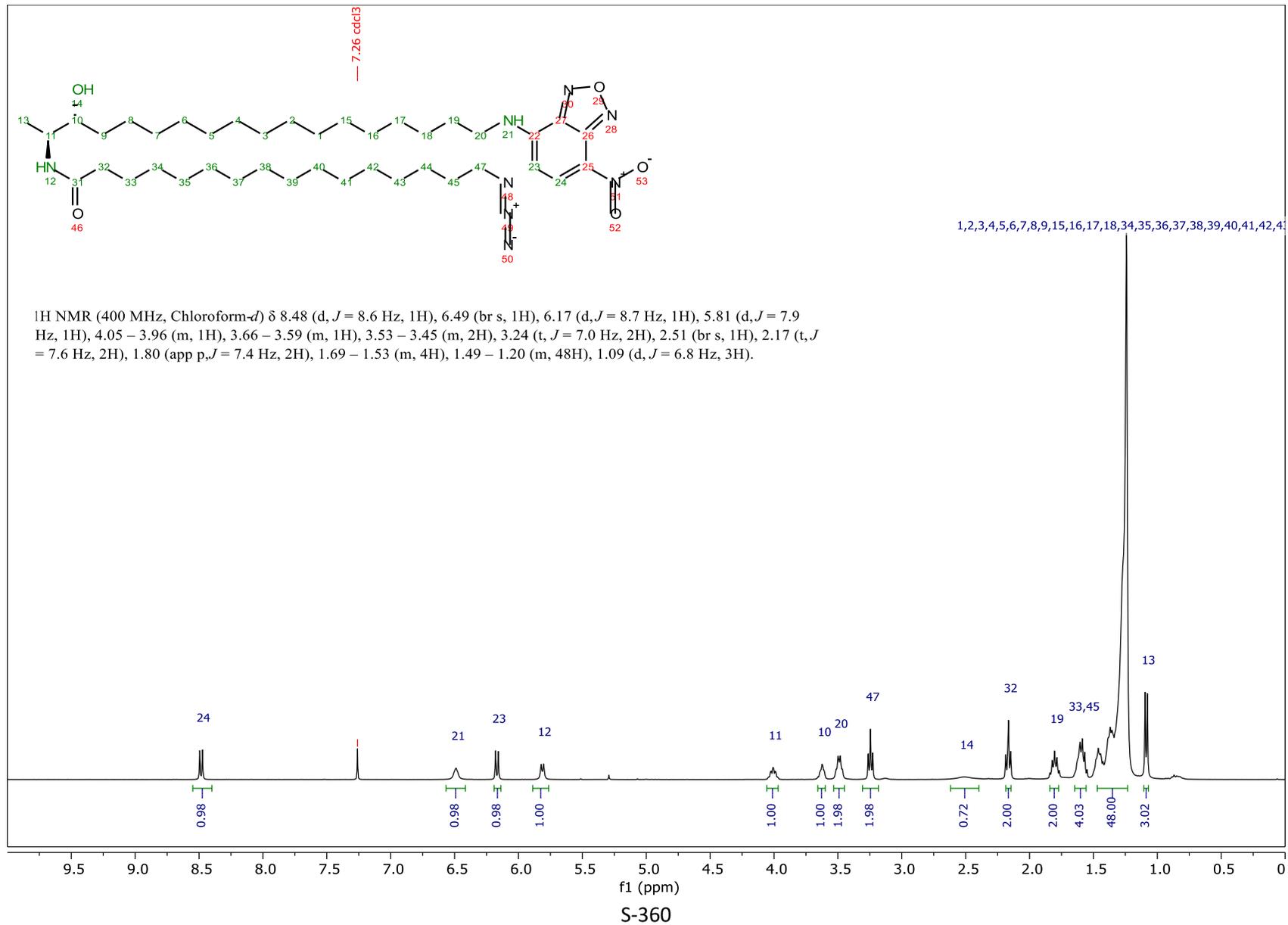
S-358

# HSQC NMR

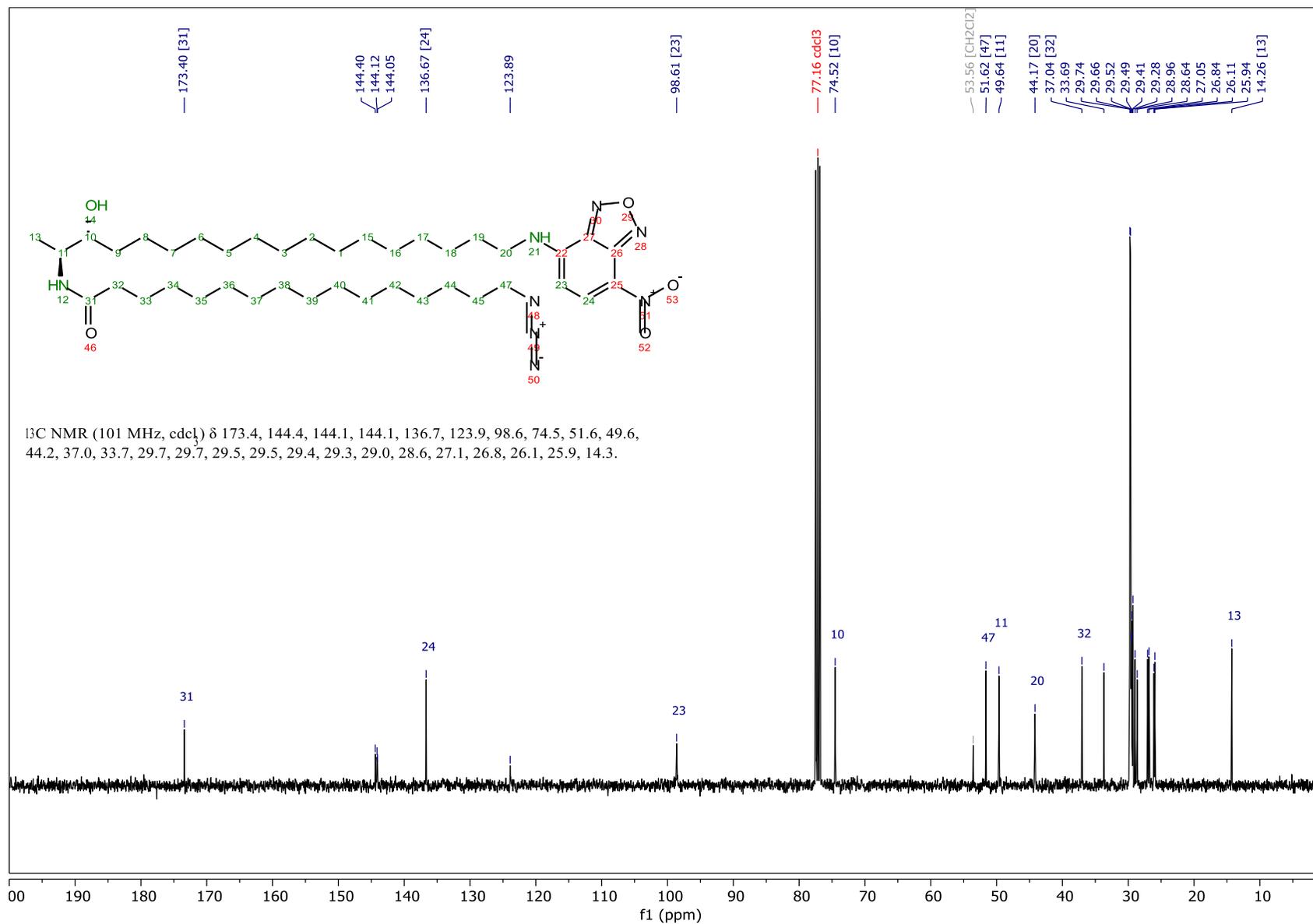


# Compound RBM5-159

$^1\text{H NMR}$

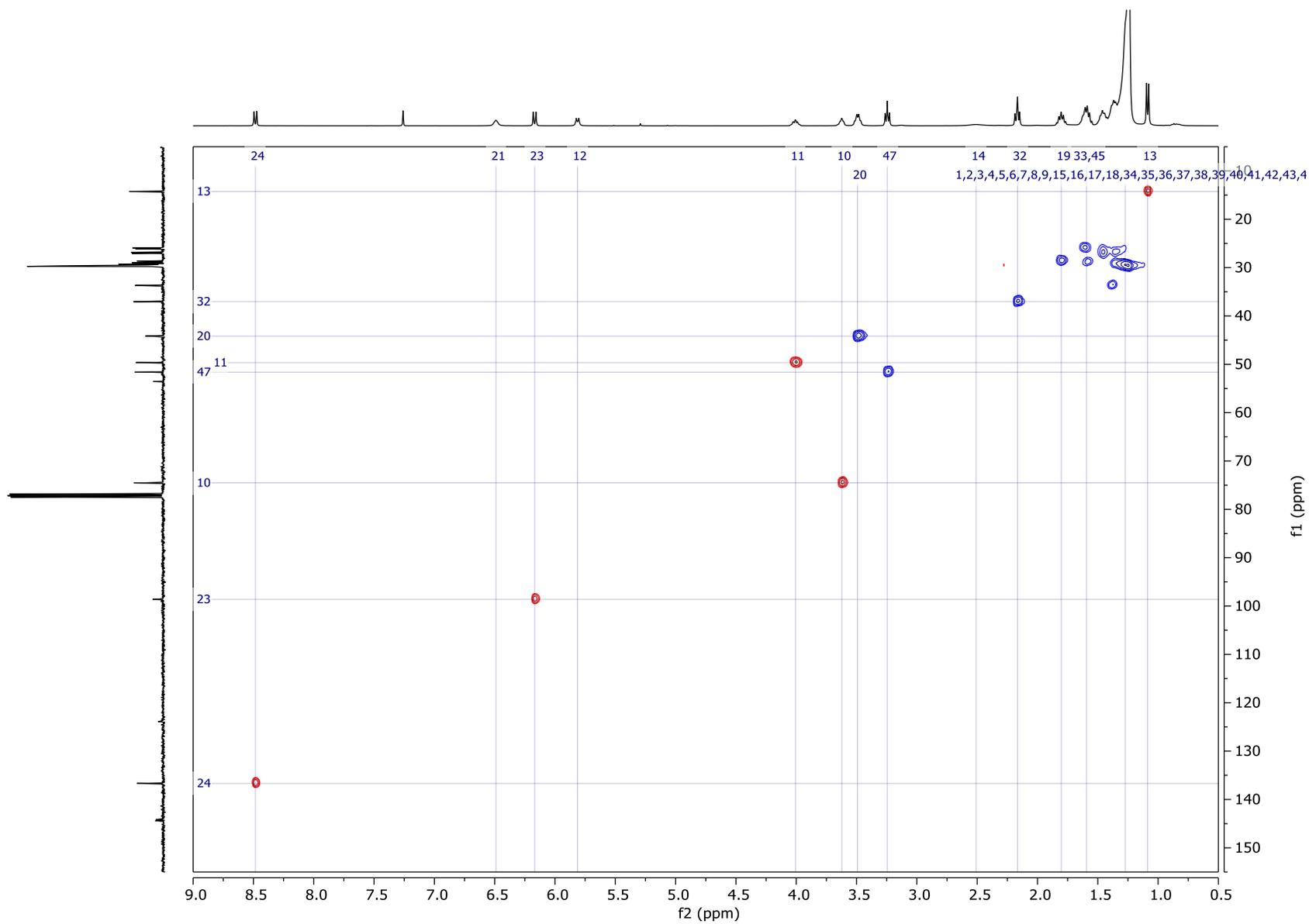


<sup>13</sup>C NMR





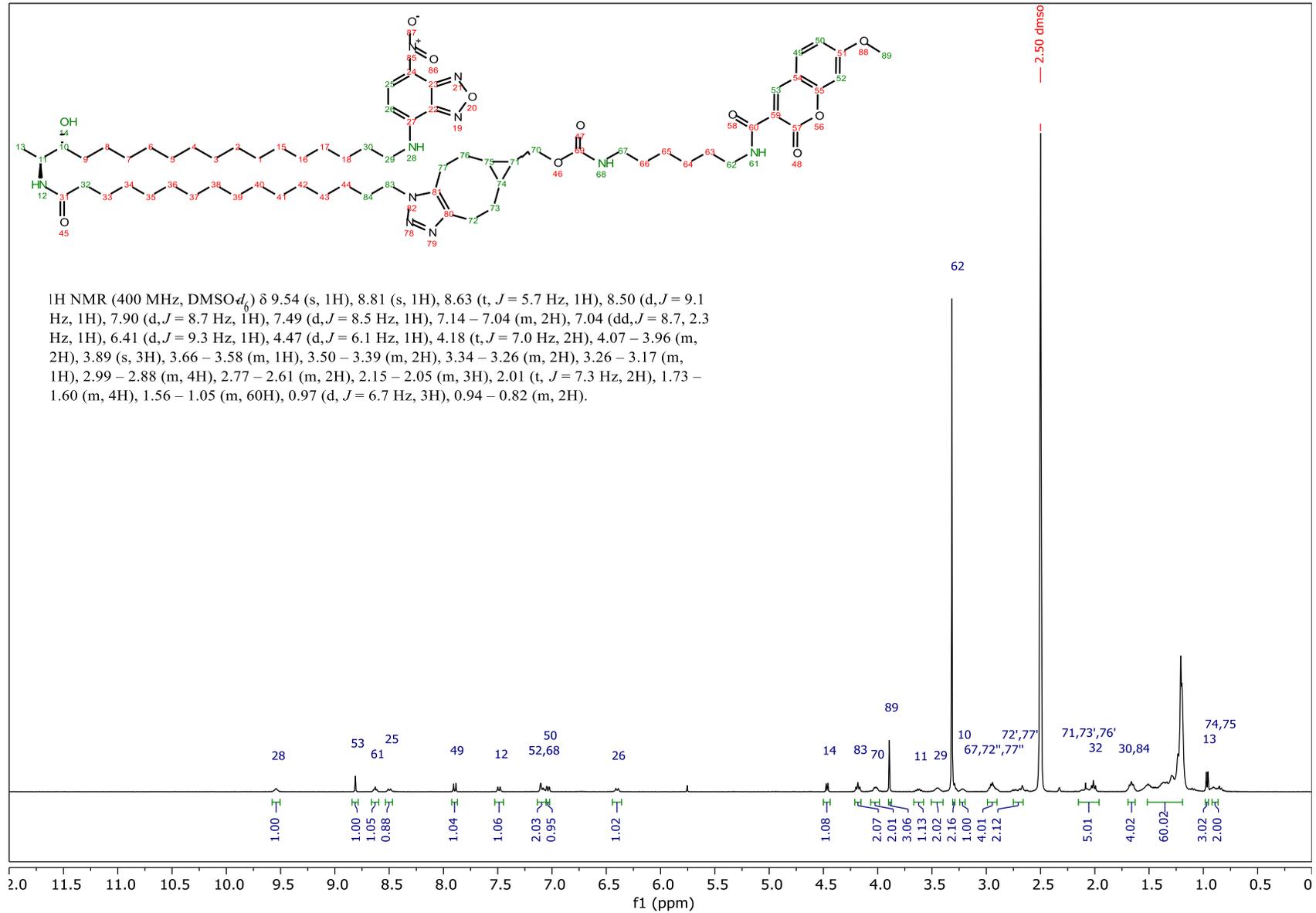
# HSQC NMR



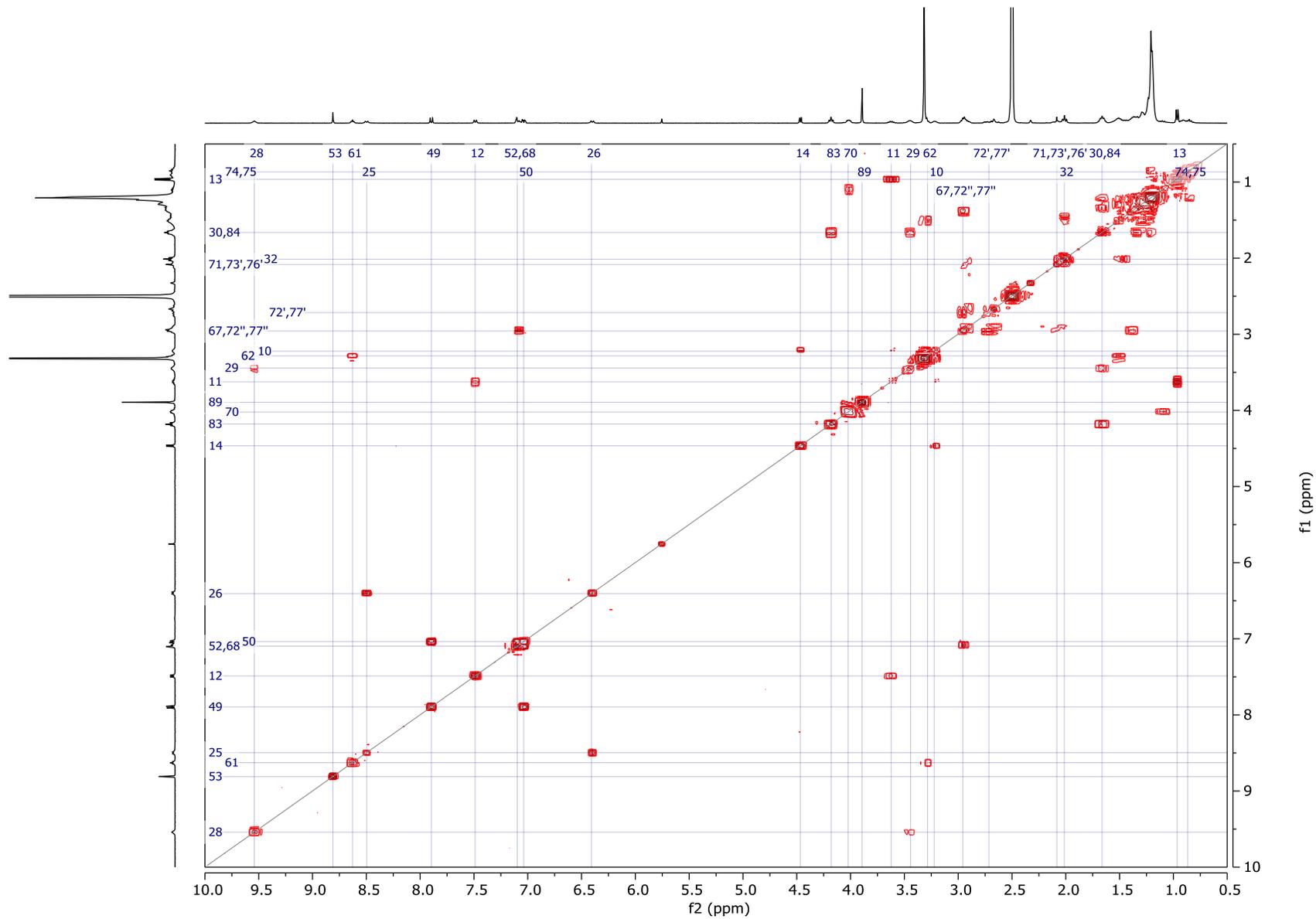
S-363

# Compound RBM5-160

$^1\text{H NMR}$



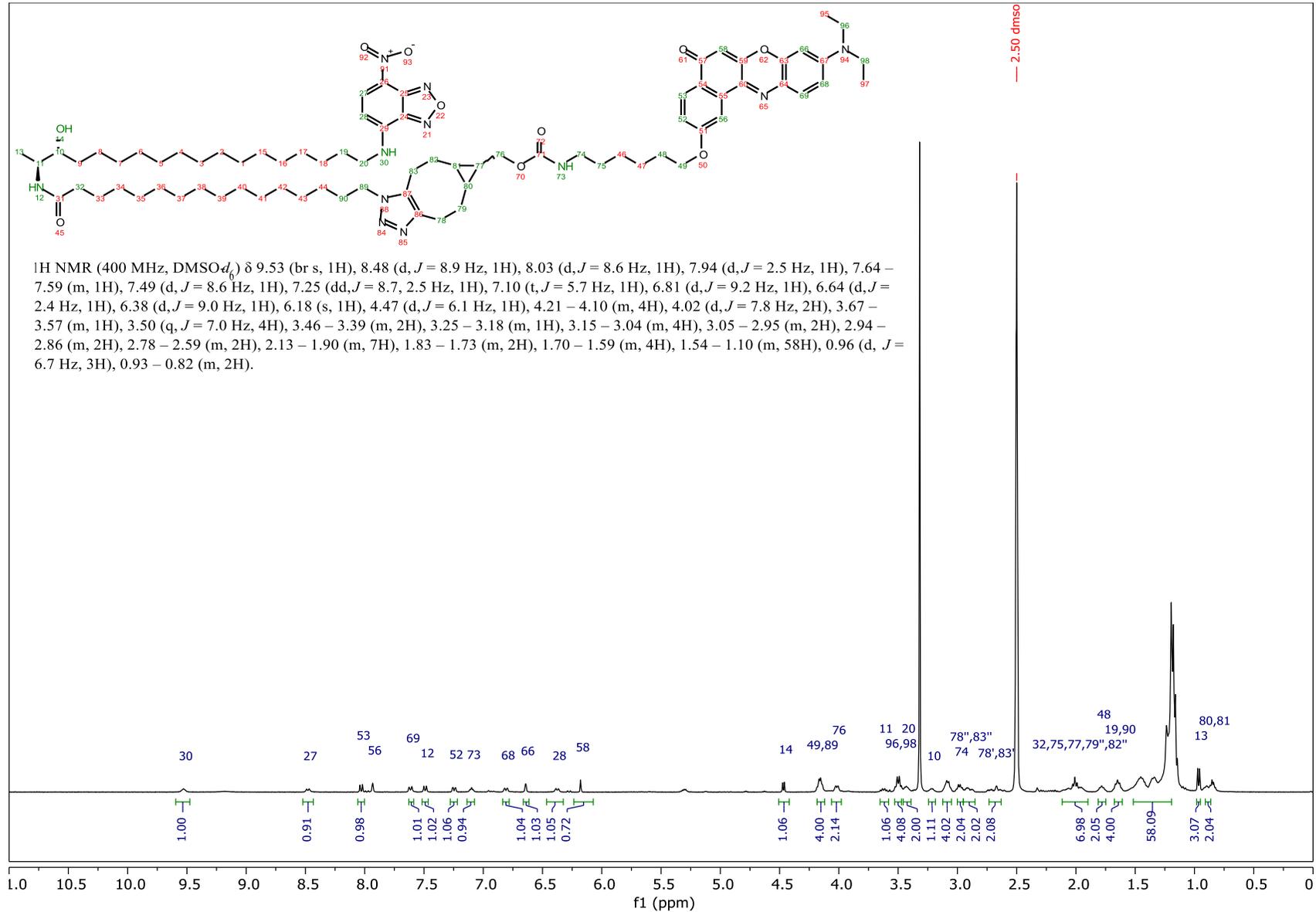
# COSY NMR



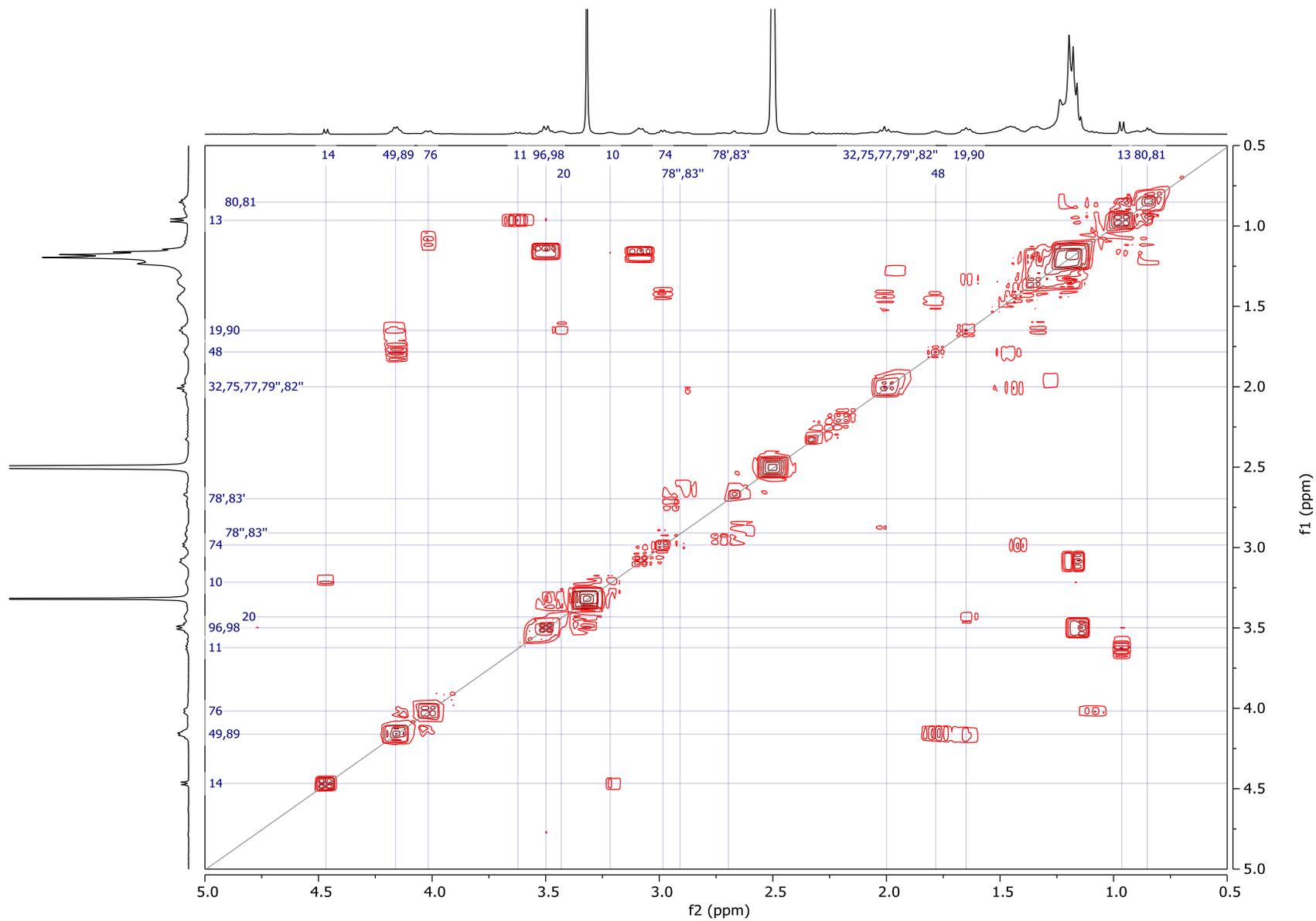
S-365

# Compound RBM5-161

$^1\text{H NMR}$



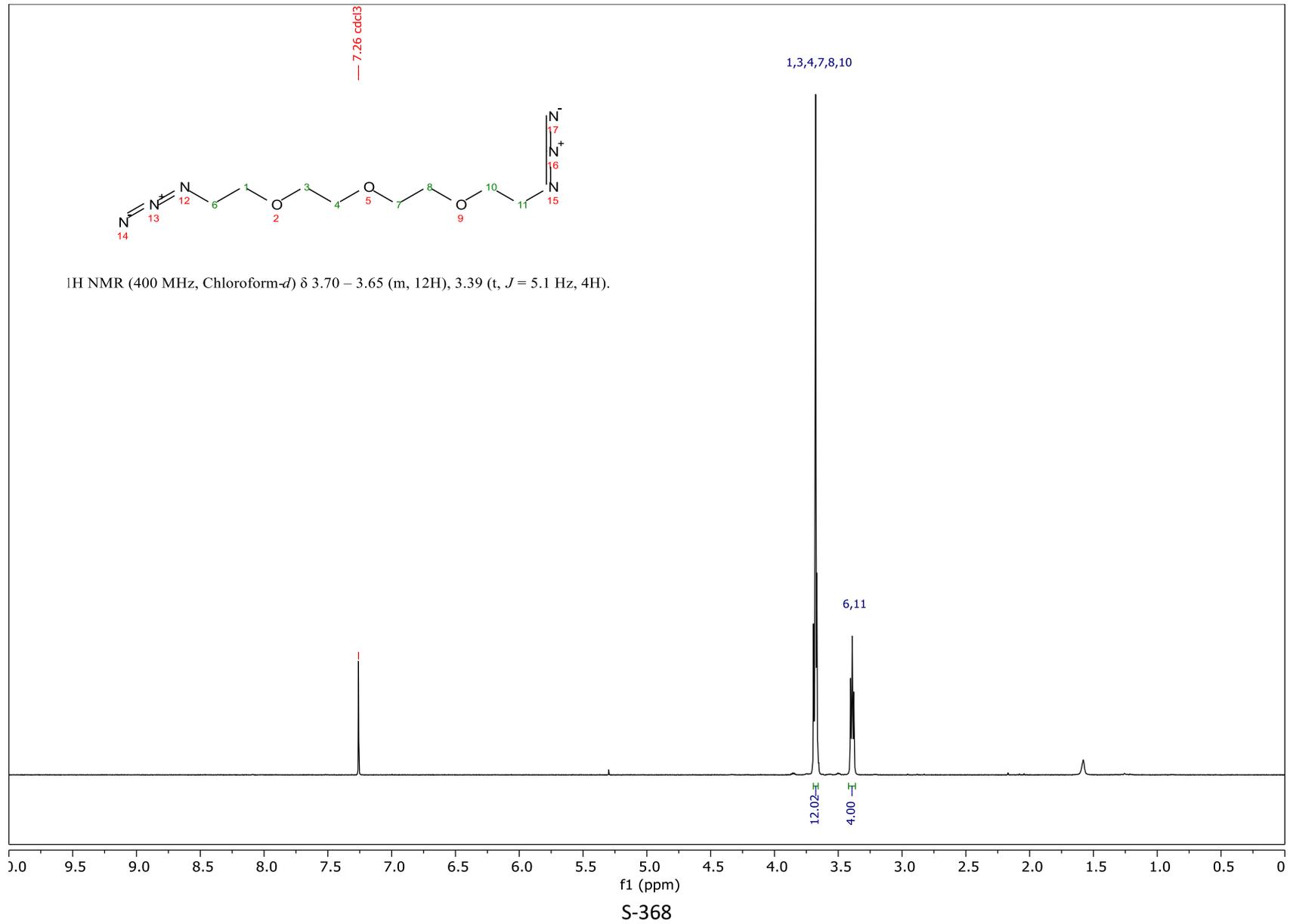
# COSY NMR



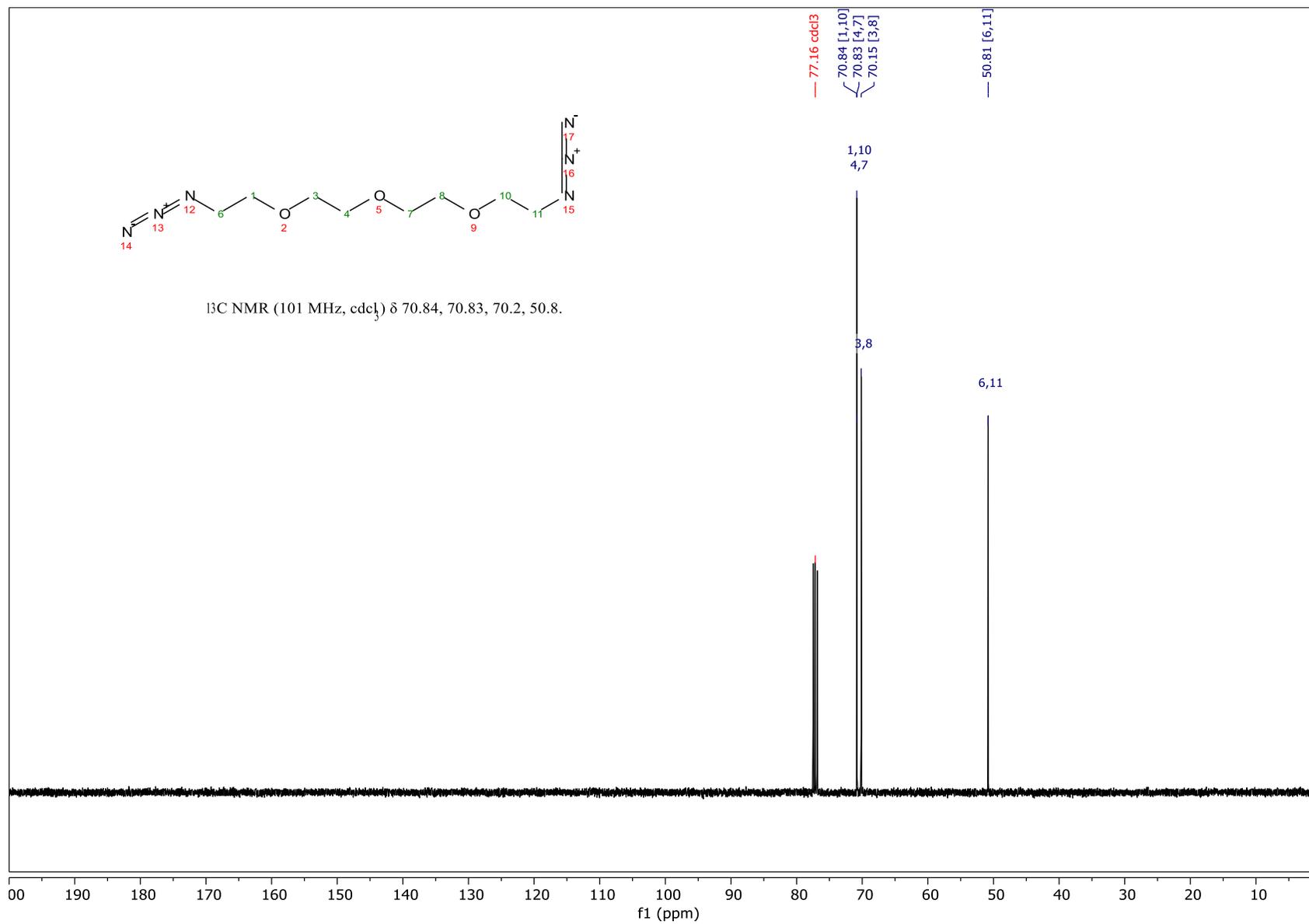
S-367

# Compound RBM5-162

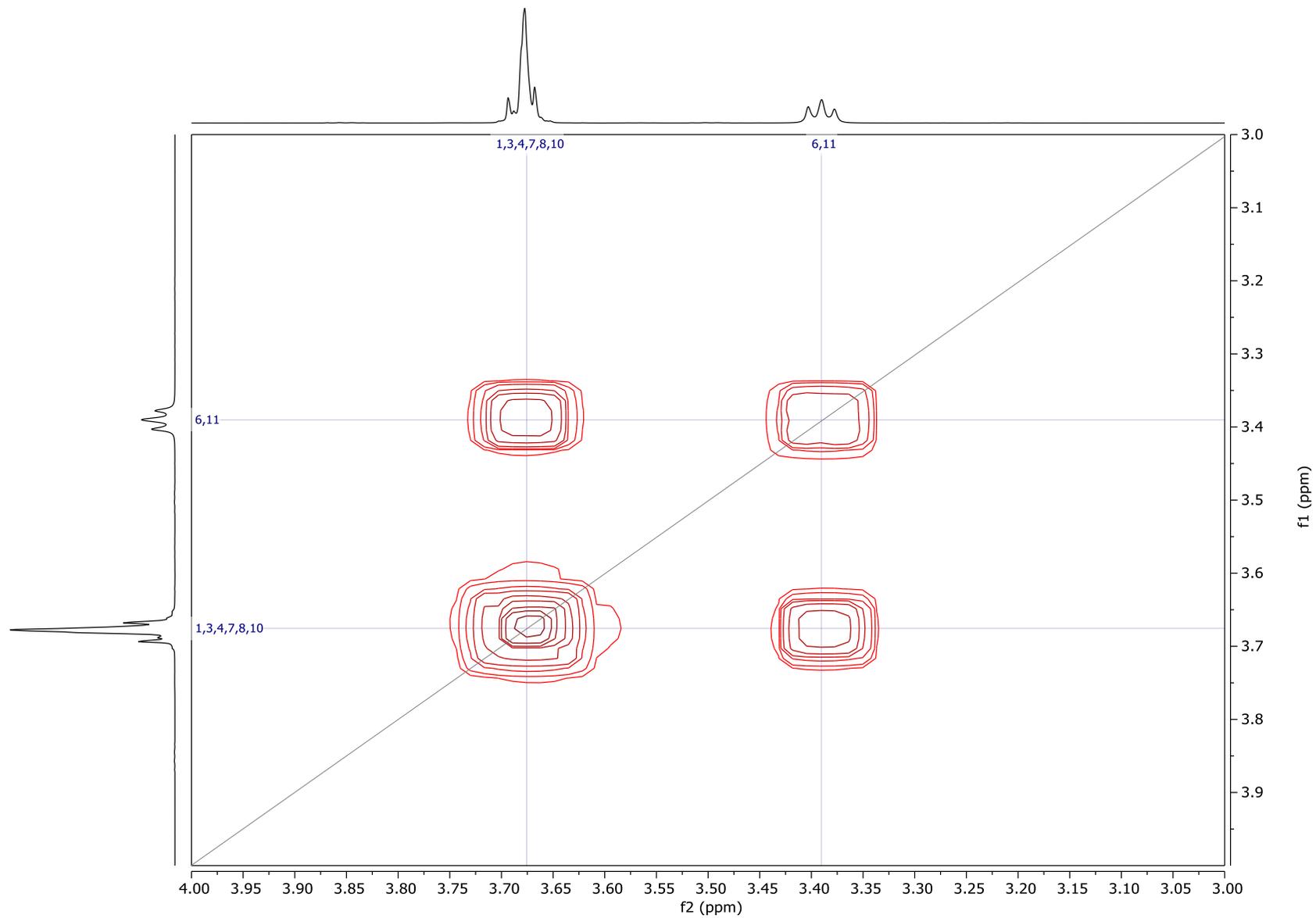
$^1\text{H}$  NMR



$^{13}\text{C}$  NMR

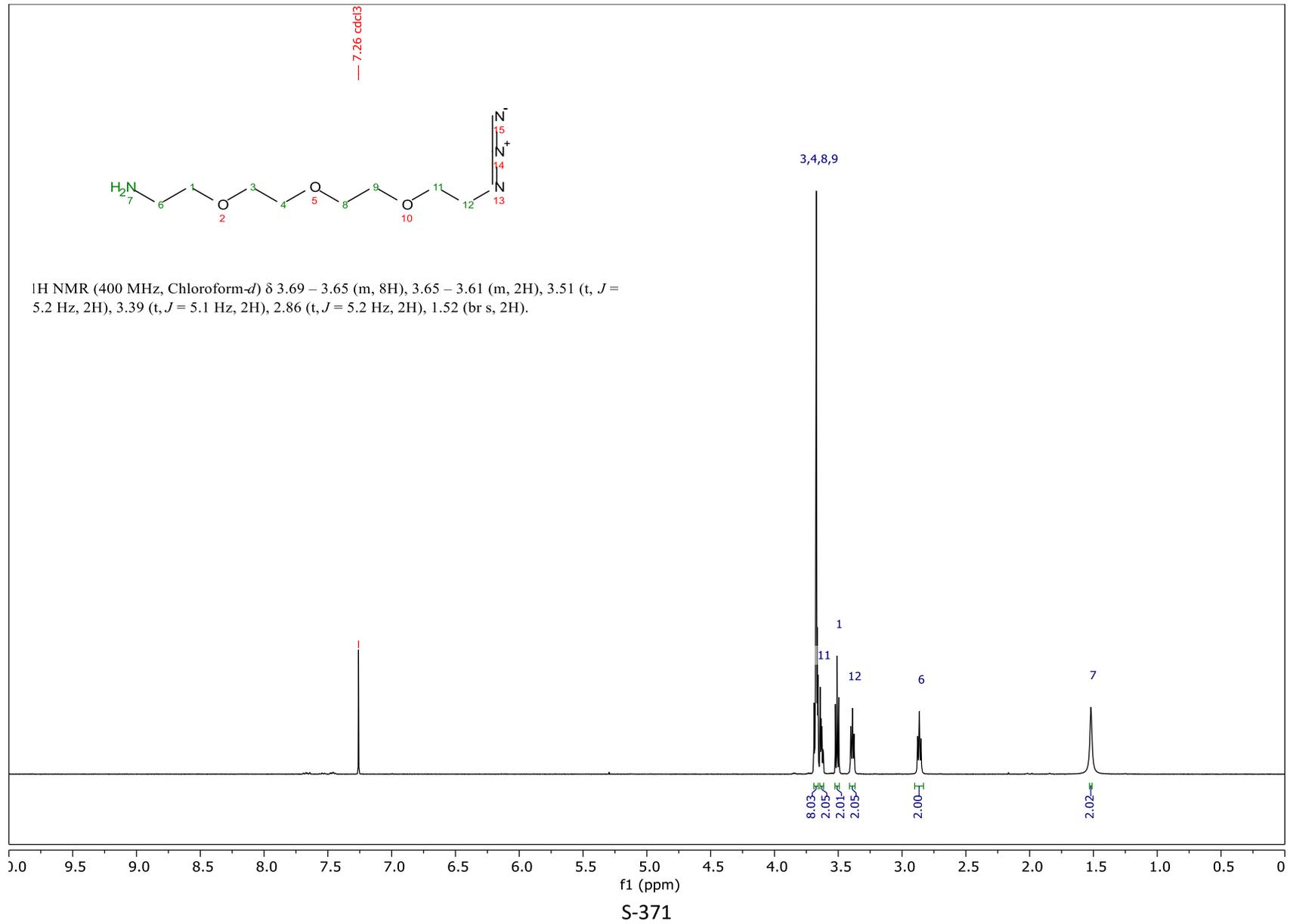


COSY NMR

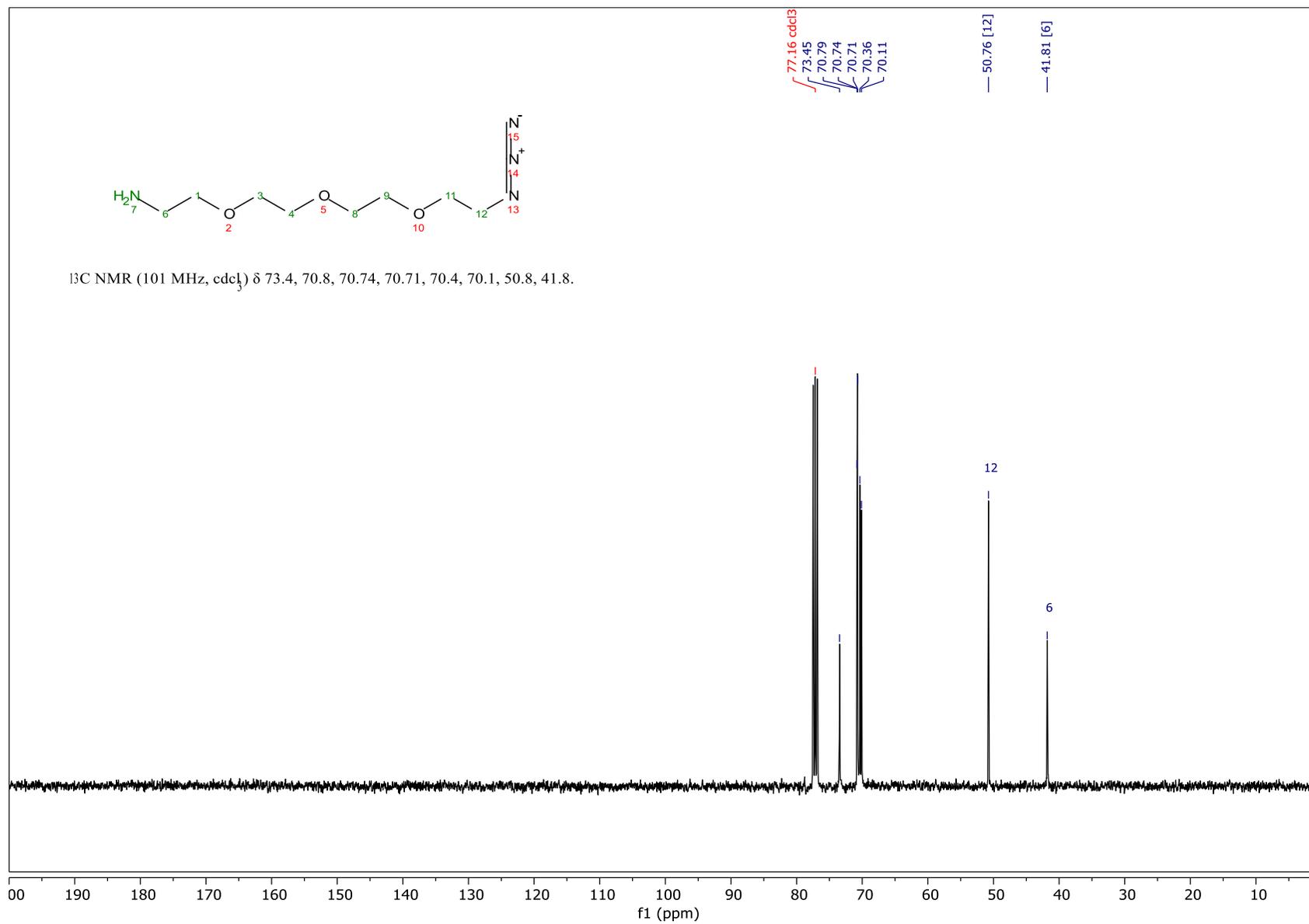


# Compound RBM5-163

$^1\text{H}$  NMR

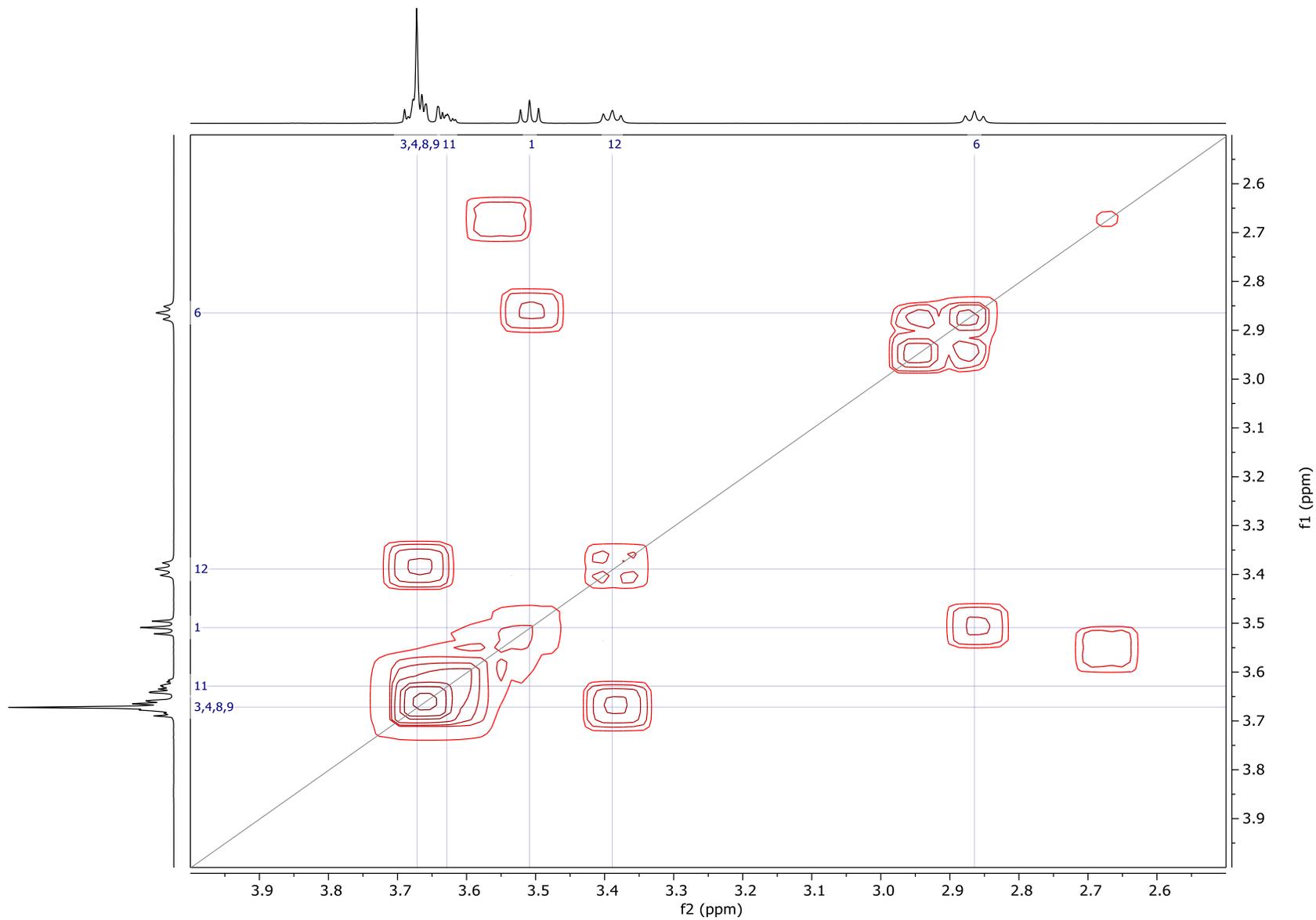


$^{13}\text{C}$  NMR



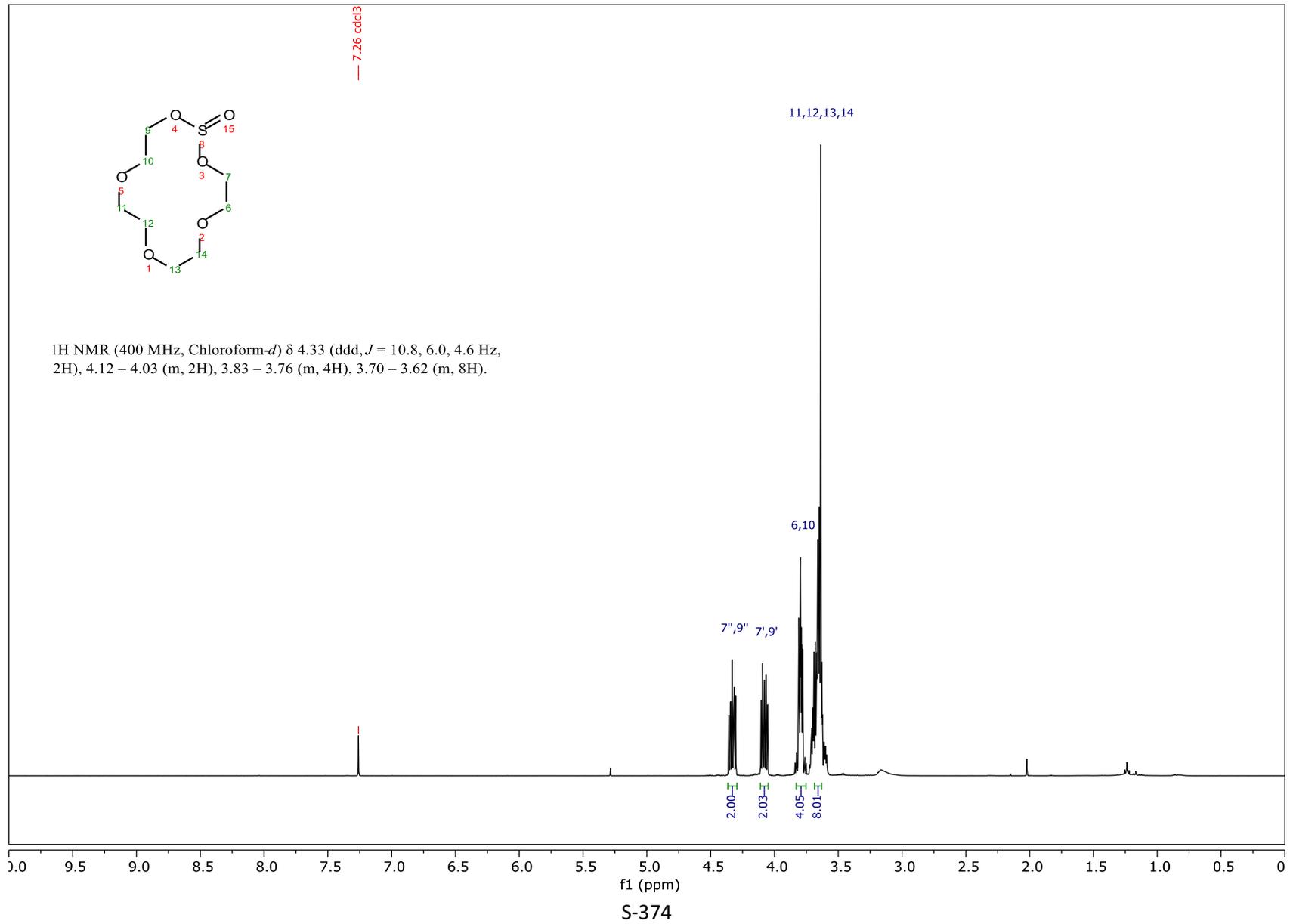
$^{13}\text{C}$  NMR (101 MHz,  $\text{cdCl}_3$ )  $\delta$  73.4, 70.8, 70.74, 70.71, 70.4, 70.1, 50.8, 41.8.

COSY NMR

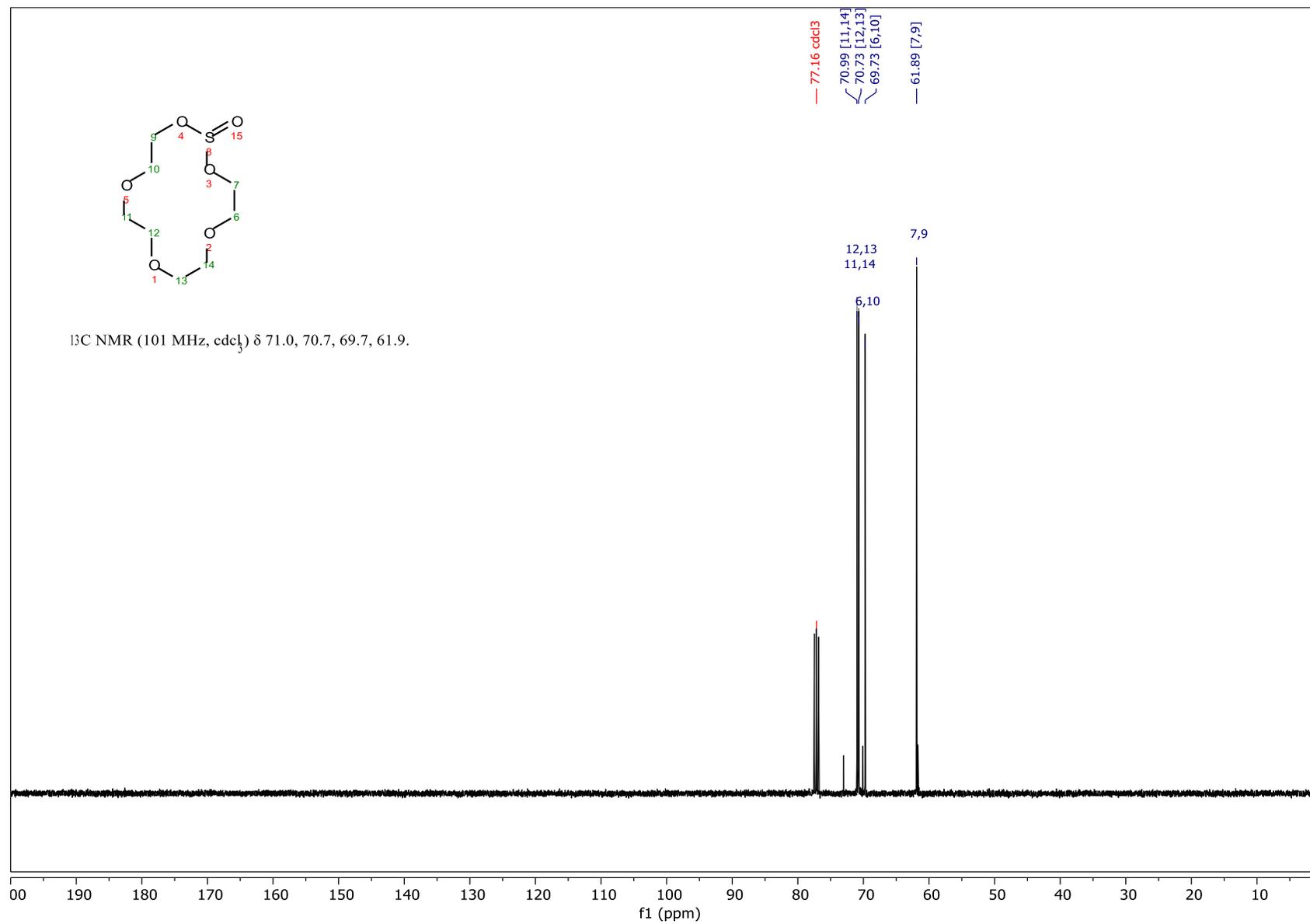


# Compound RBM5-168

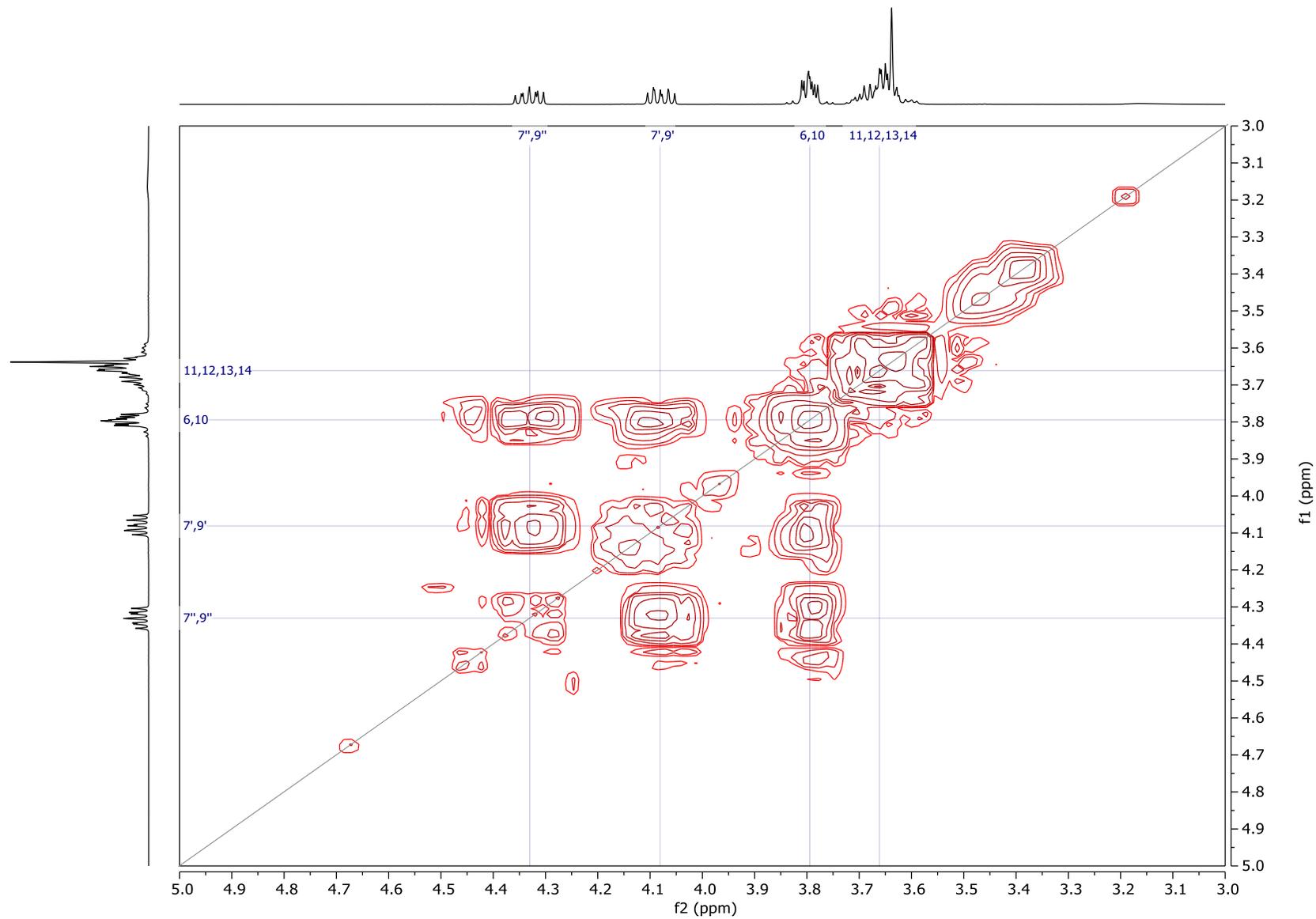
$^1\text{H}$  NMR



<sup>13</sup>C NMR

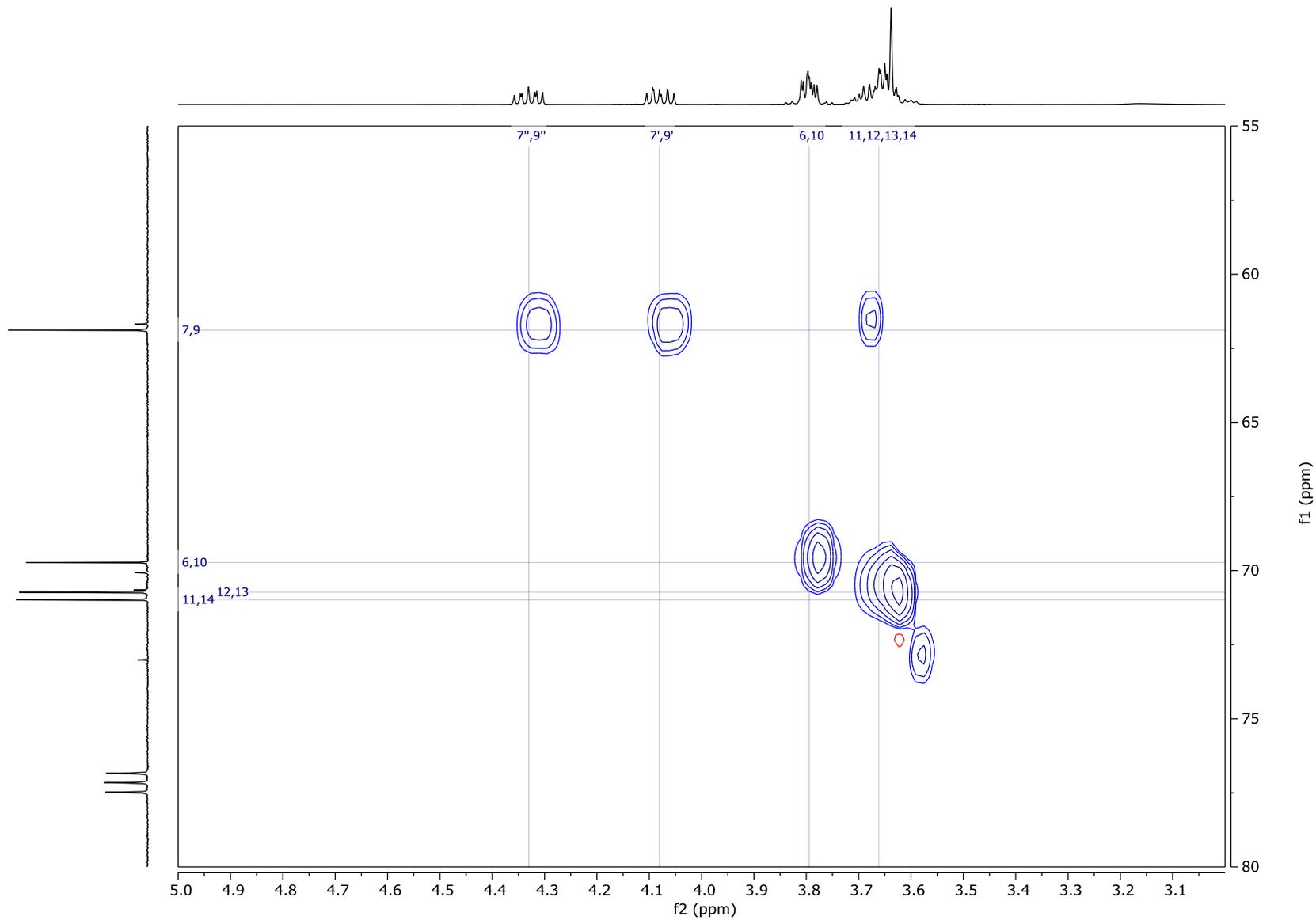


# COSY NMR



S-376

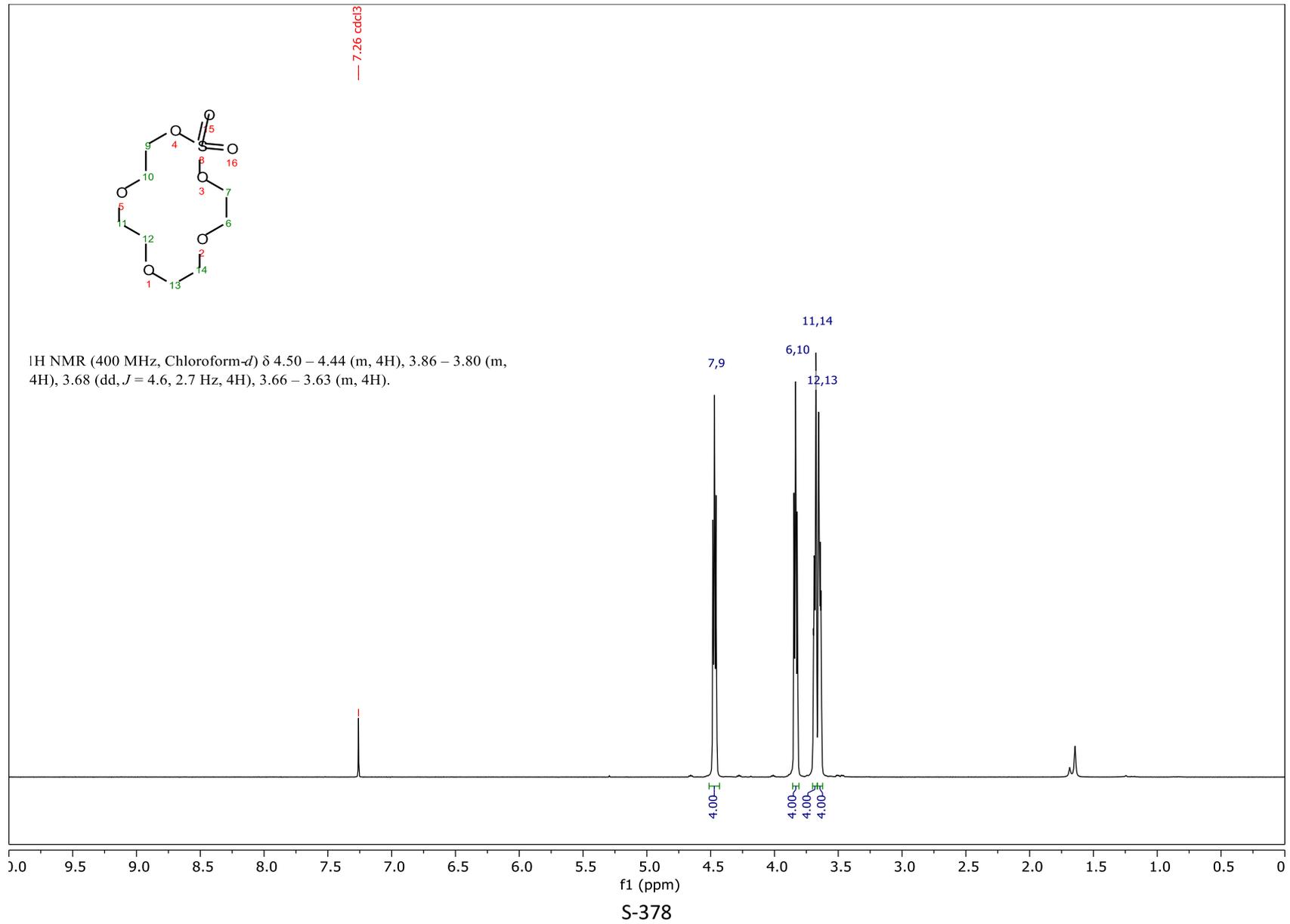
HSQC NMR



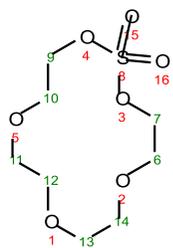
S-377

# Compound RBM5-169

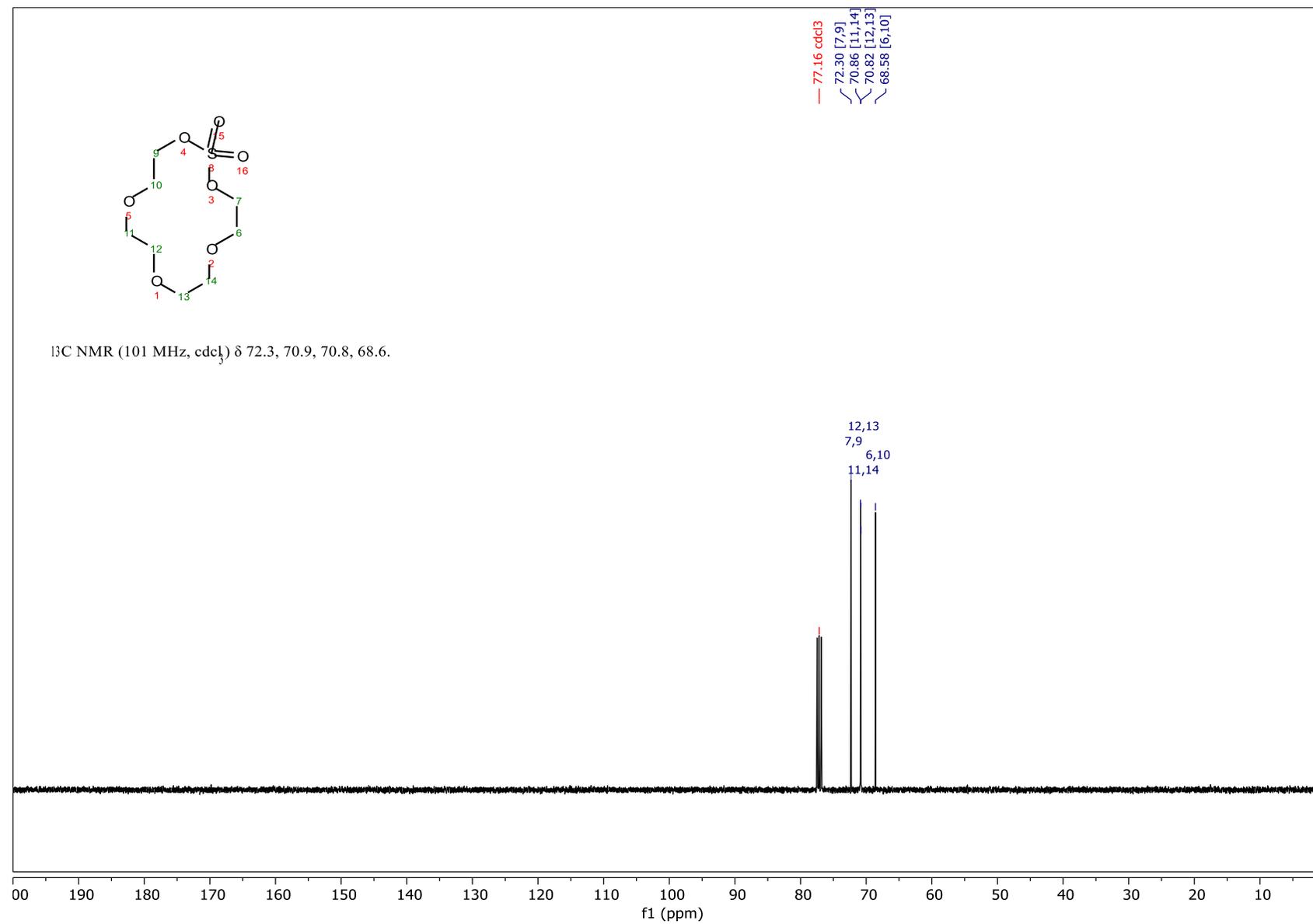
$^1\text{H}$  NMR



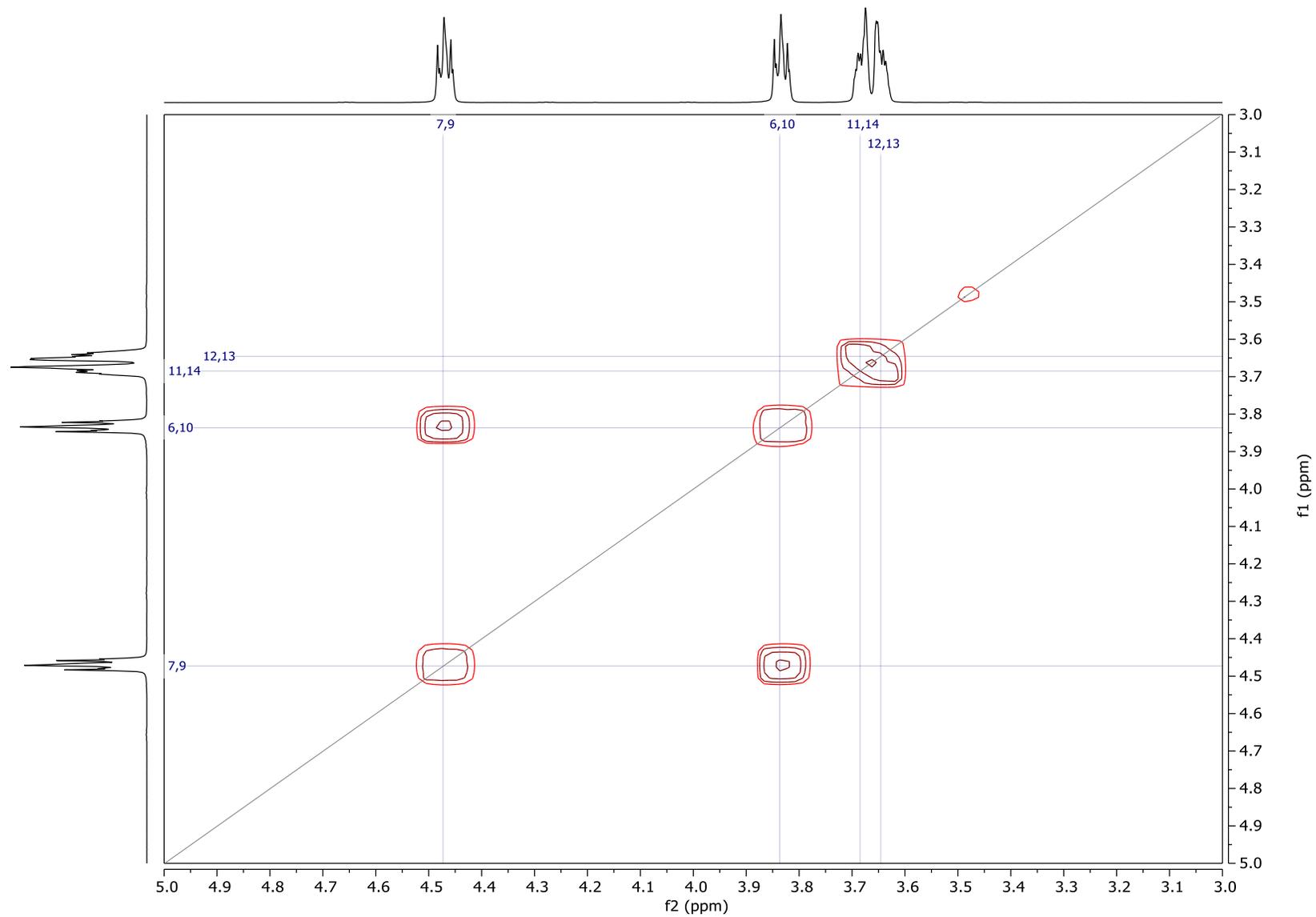
<sup>13</sup>C NMR



<sup>13</sup>C NMR (101 MHz, cdcl<sub>3</sub>) δ 72.3, 70.9, 70.8, 68.6.

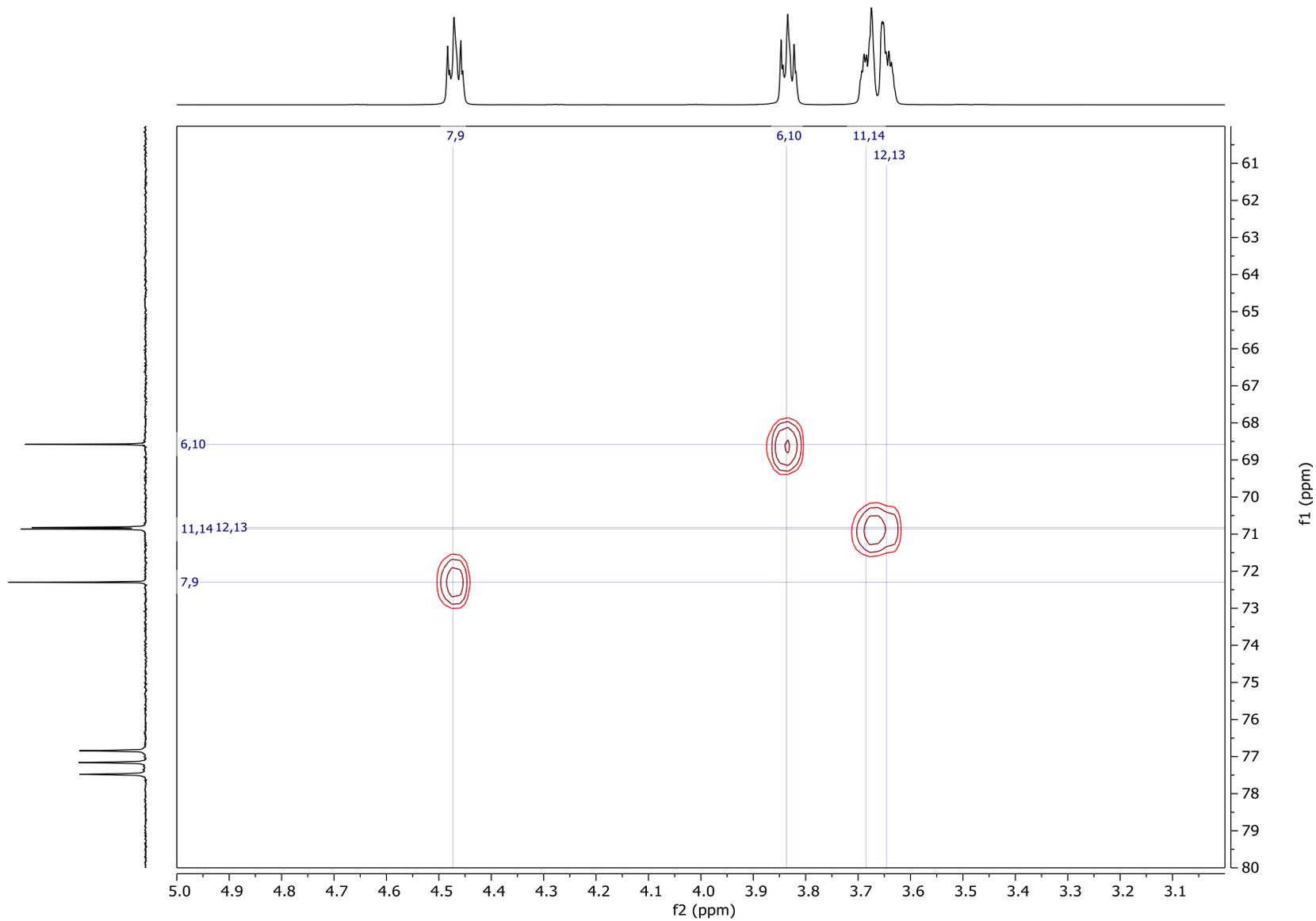


COSY NMR



S-380

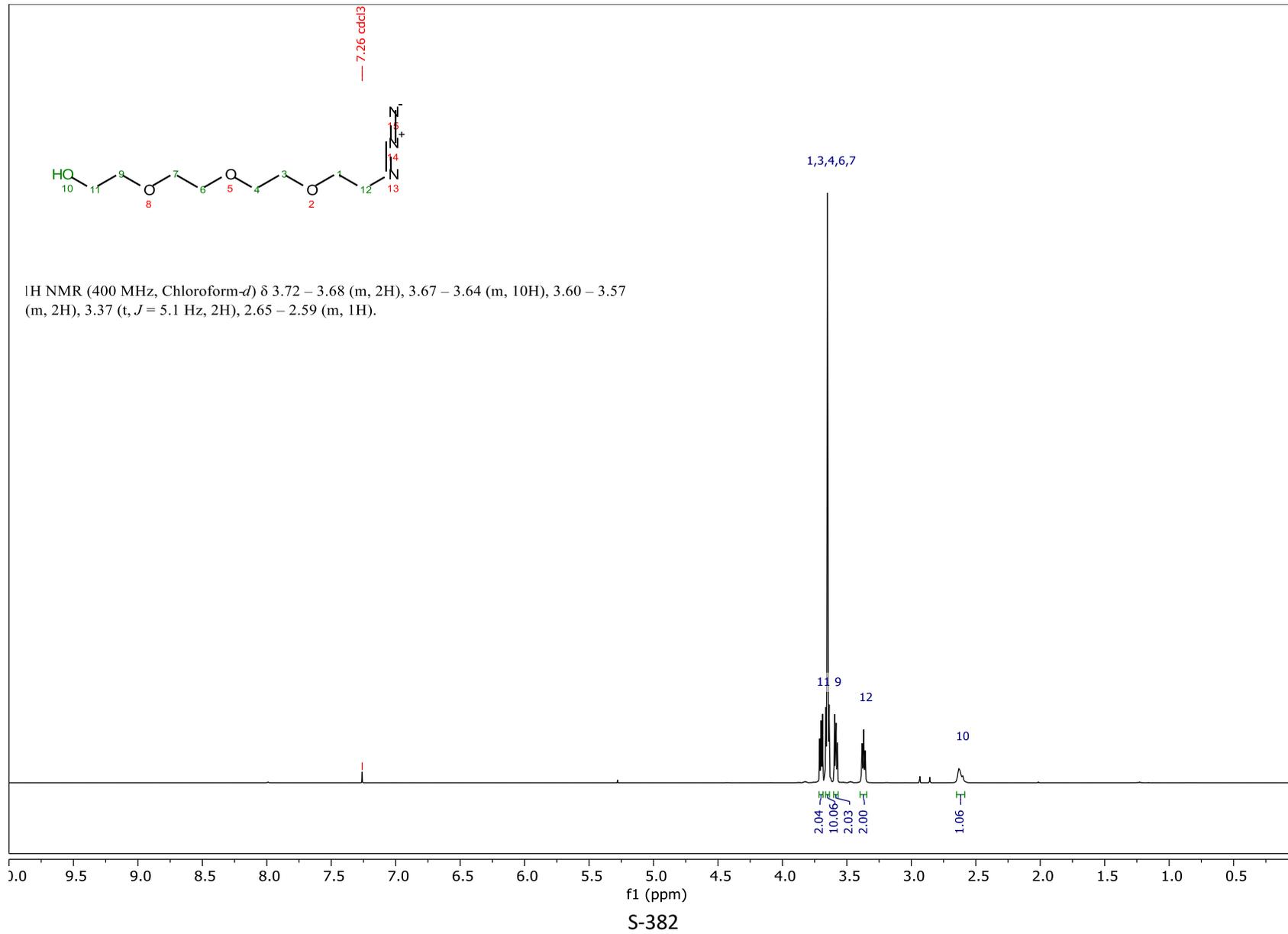
# HSQC NMR



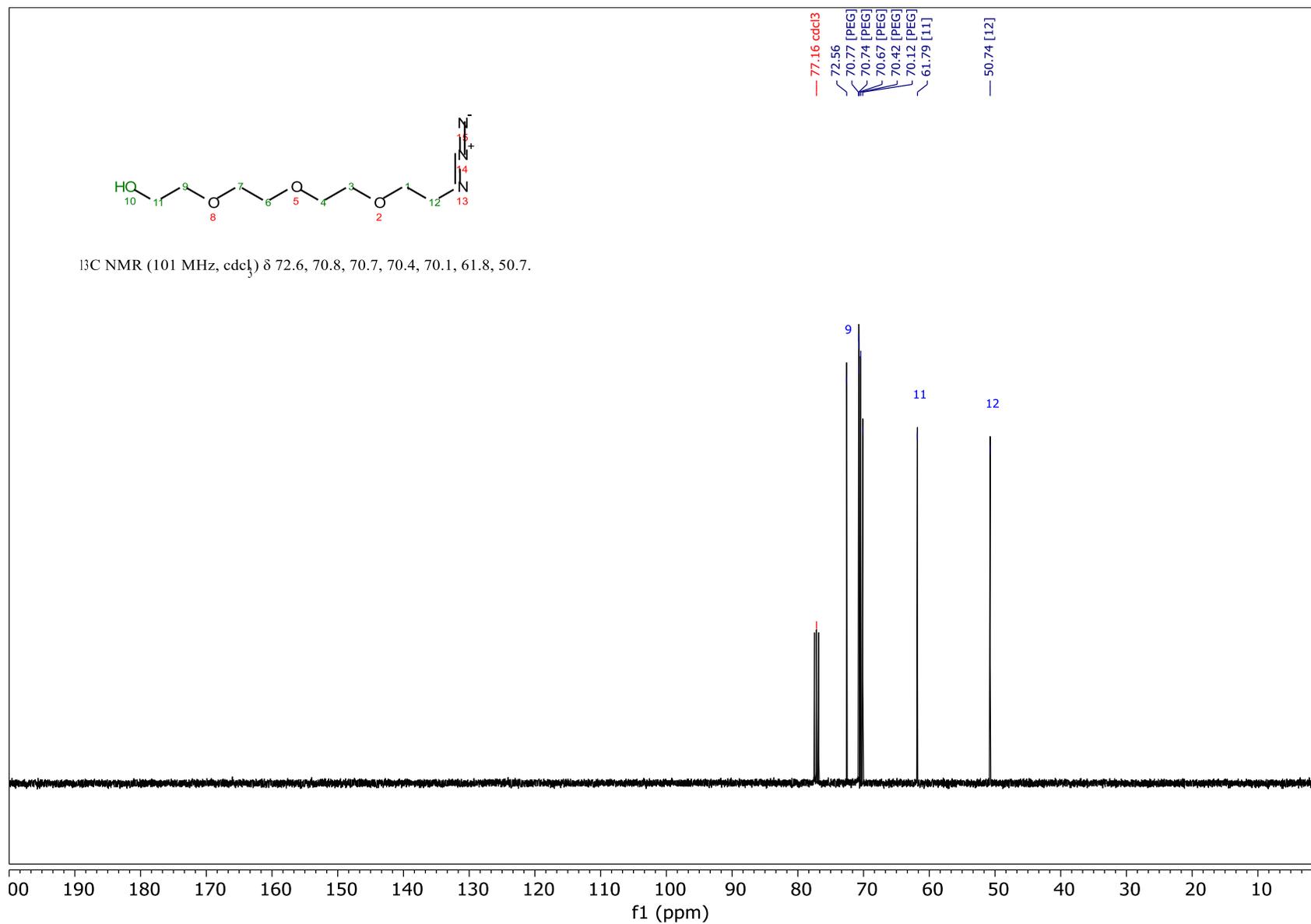
S-381

# Compound RBM5-170

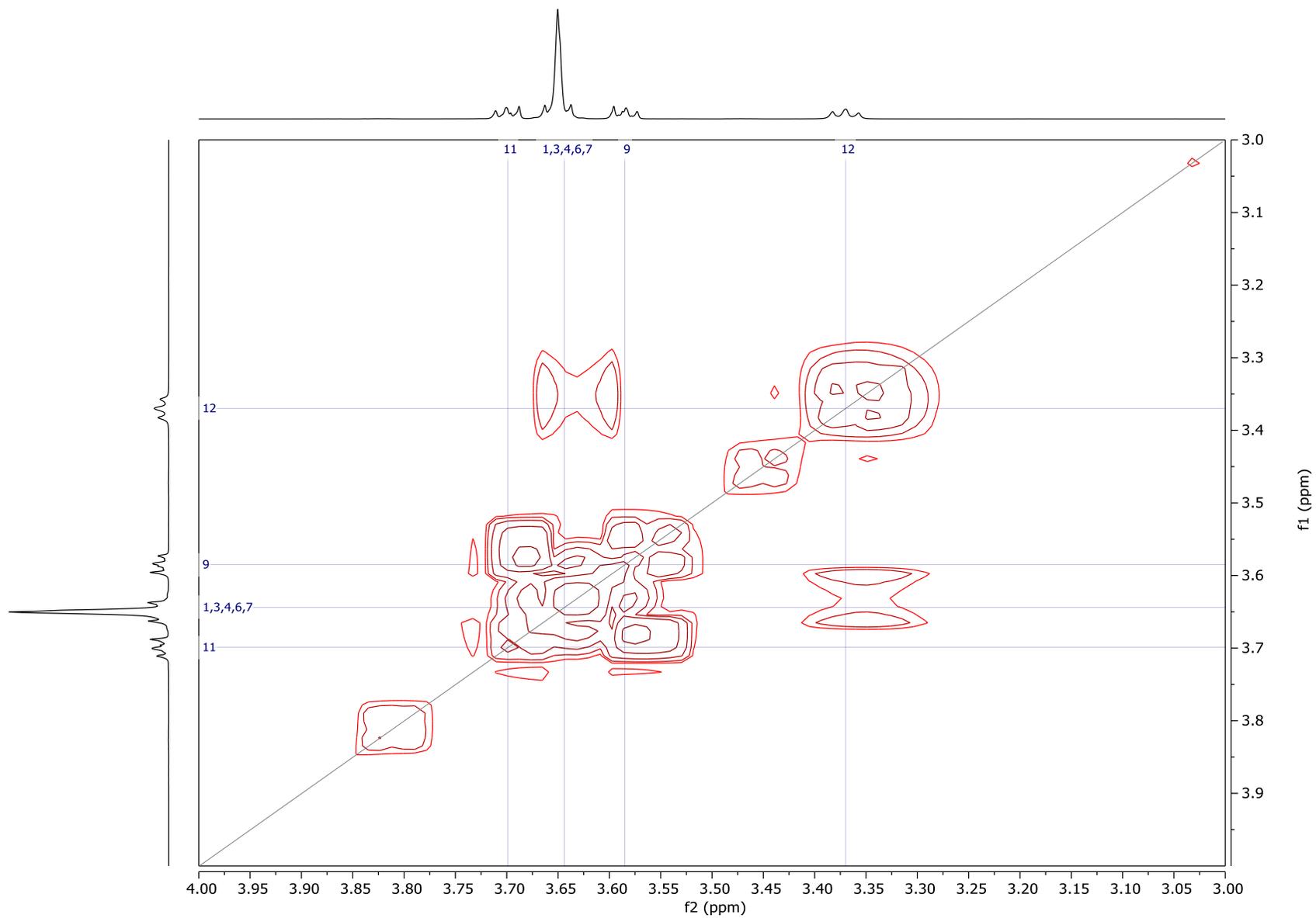
<sup>1</sup>H NMR



# $^{13}\text{C}$ NMR

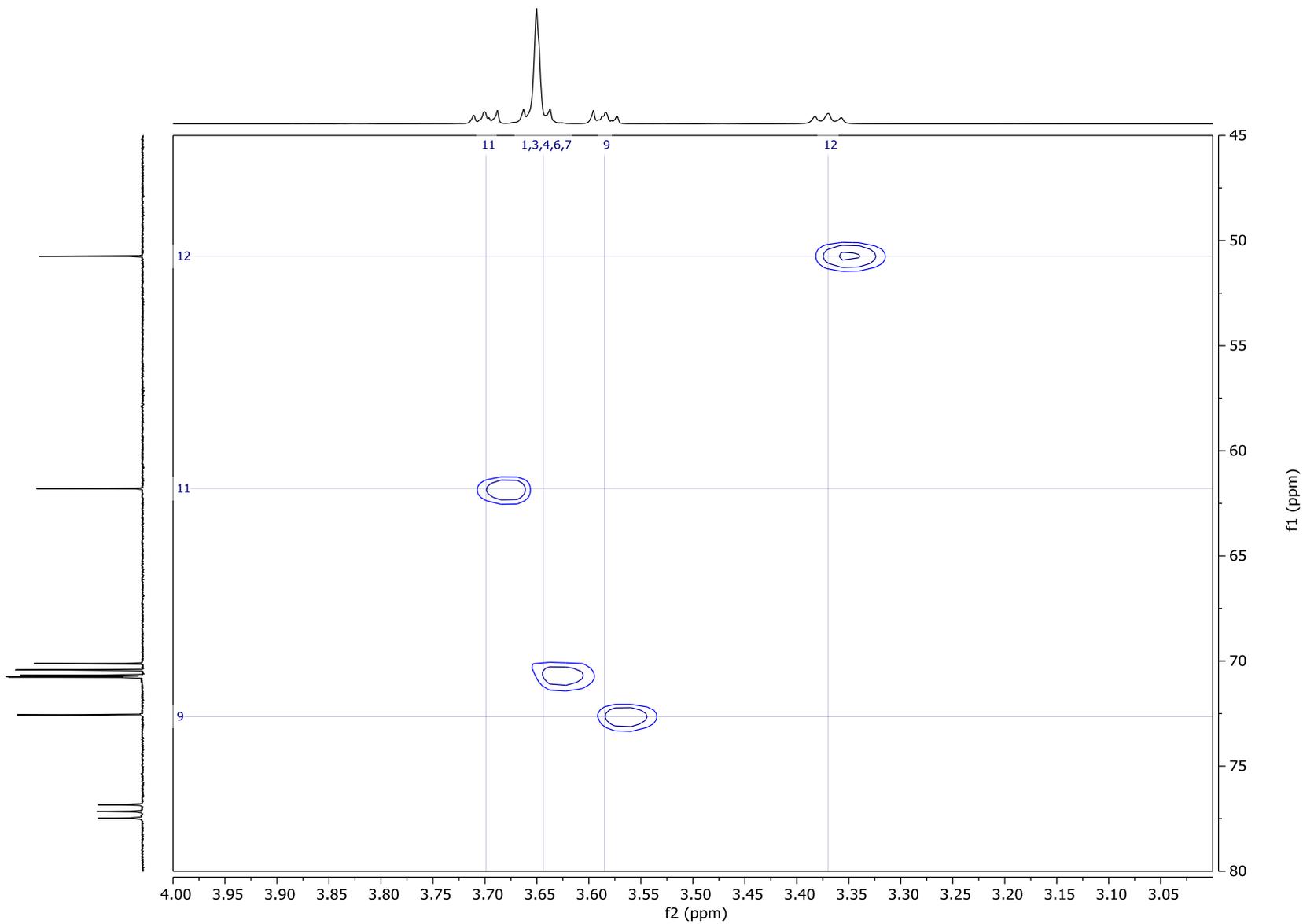


COSY NMR



S-384

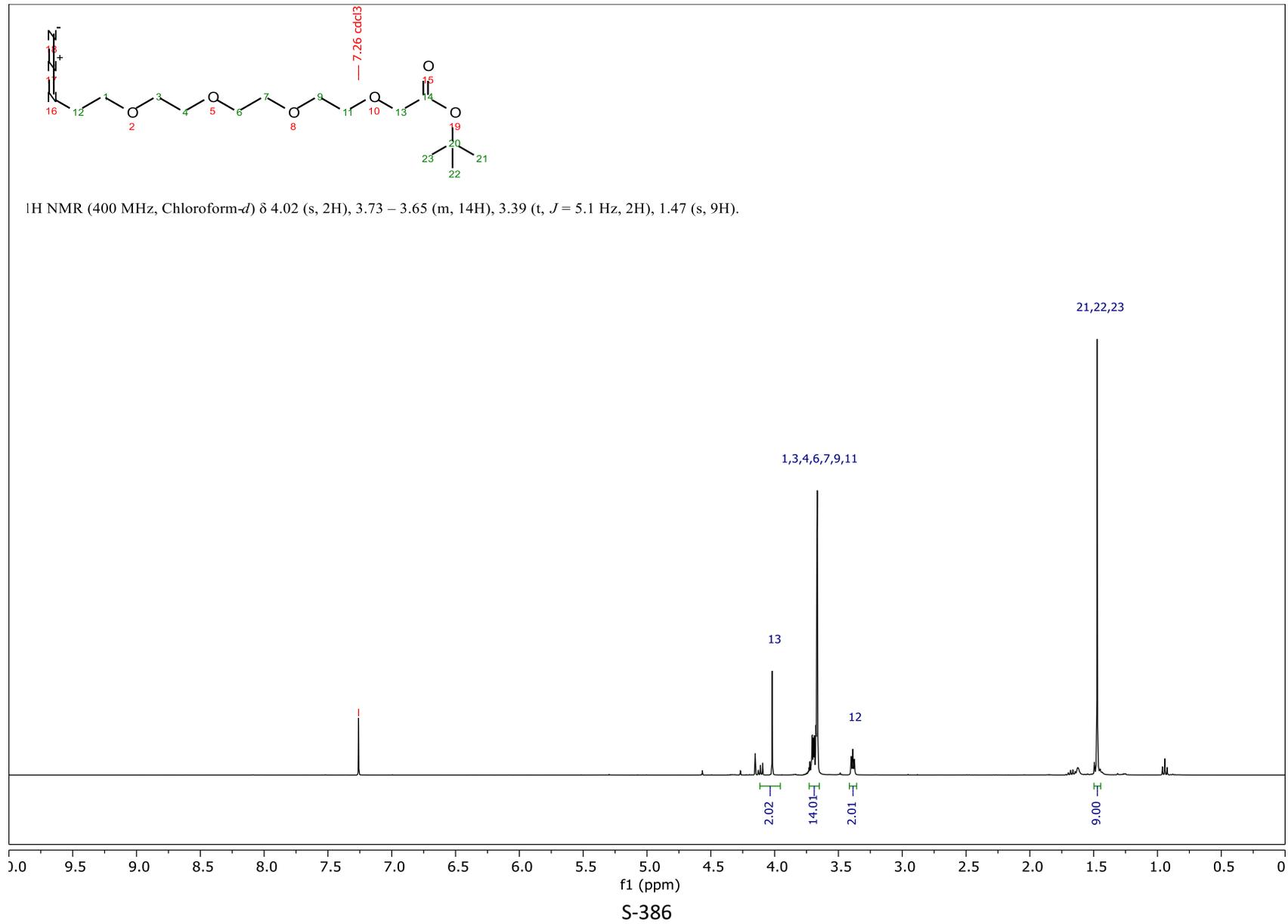
# HSQC NMR



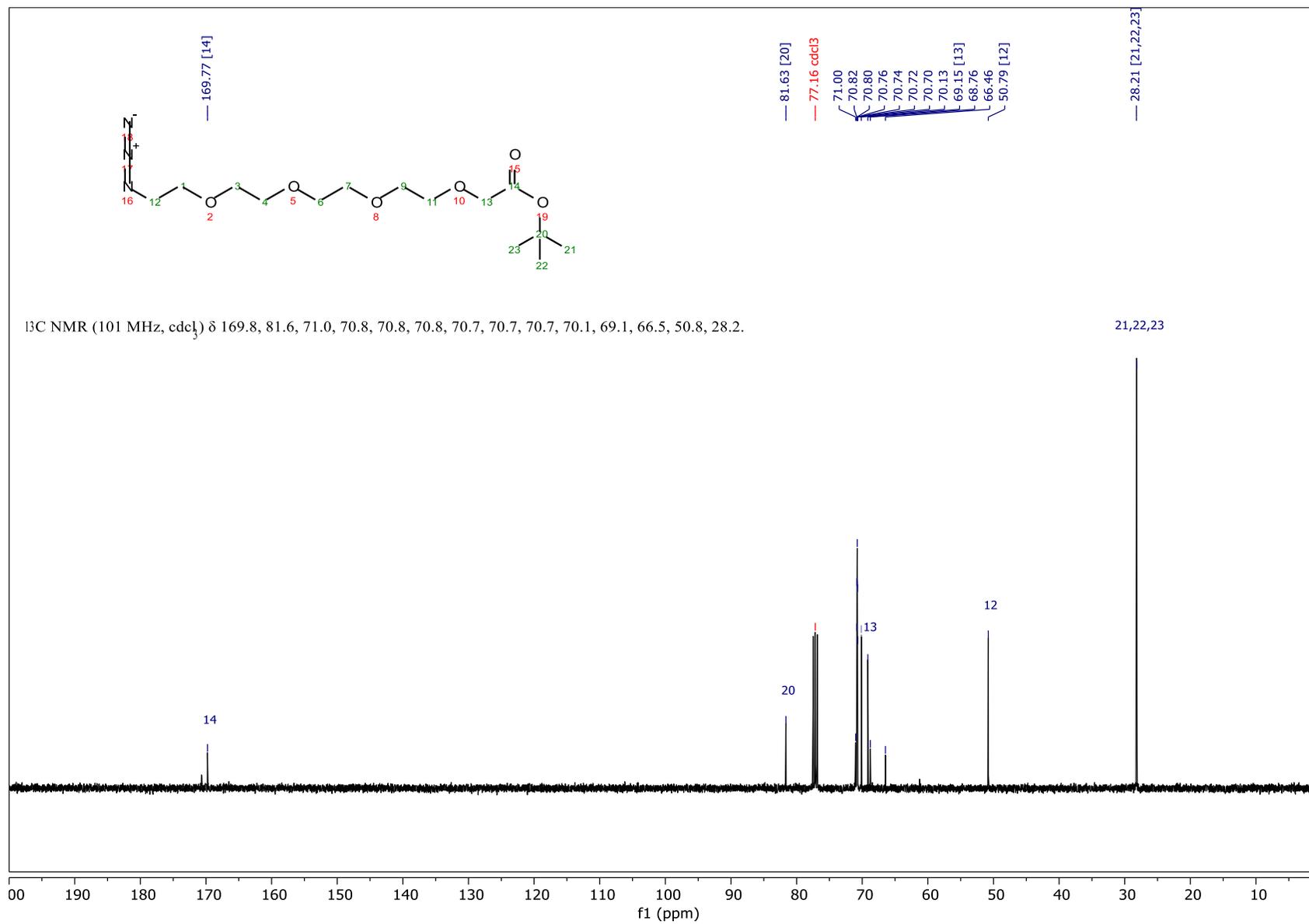
S-385

# Compound RBM5-171

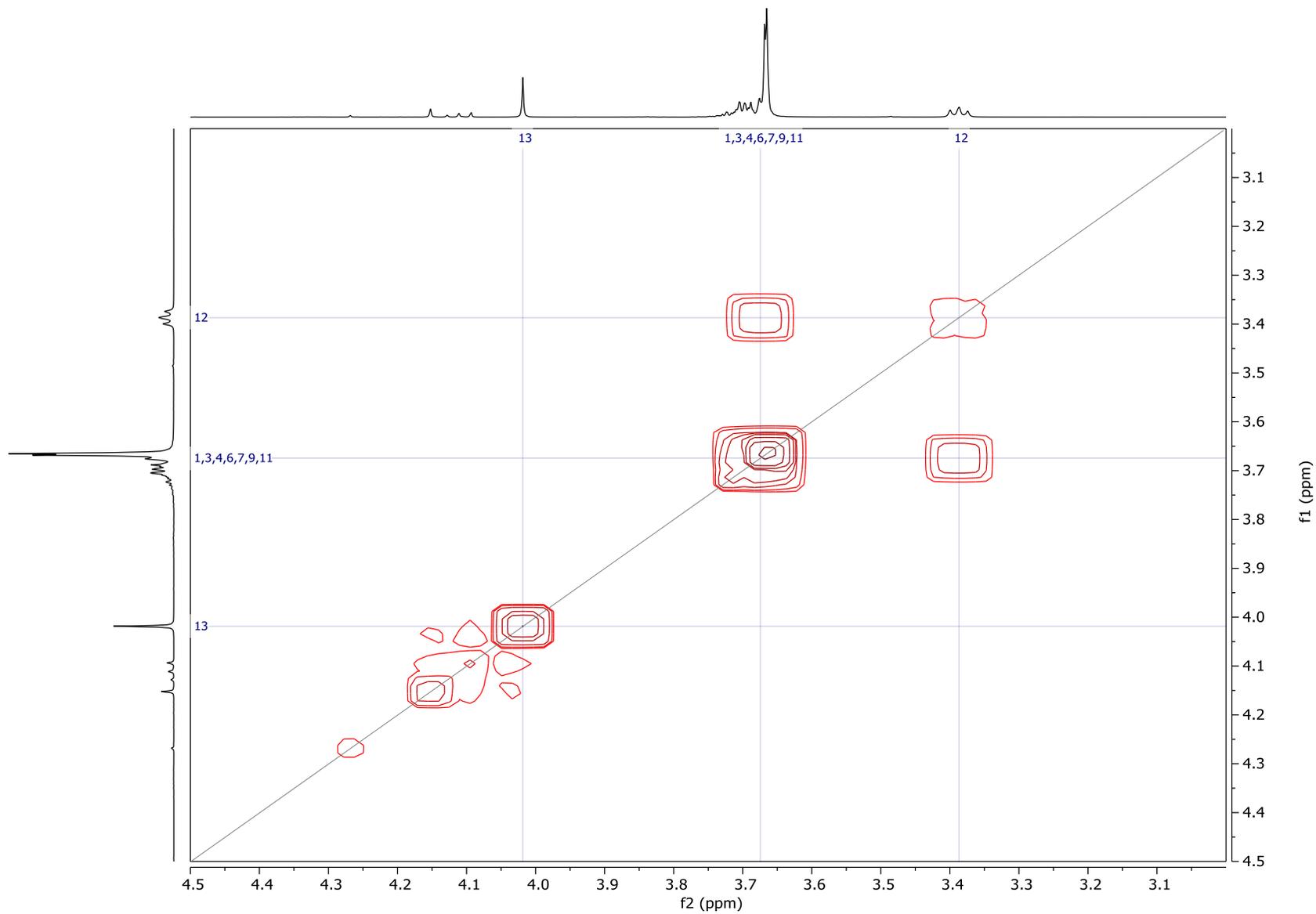
$^1\text{H}$  NMR



<sup>13</sup>C NMR

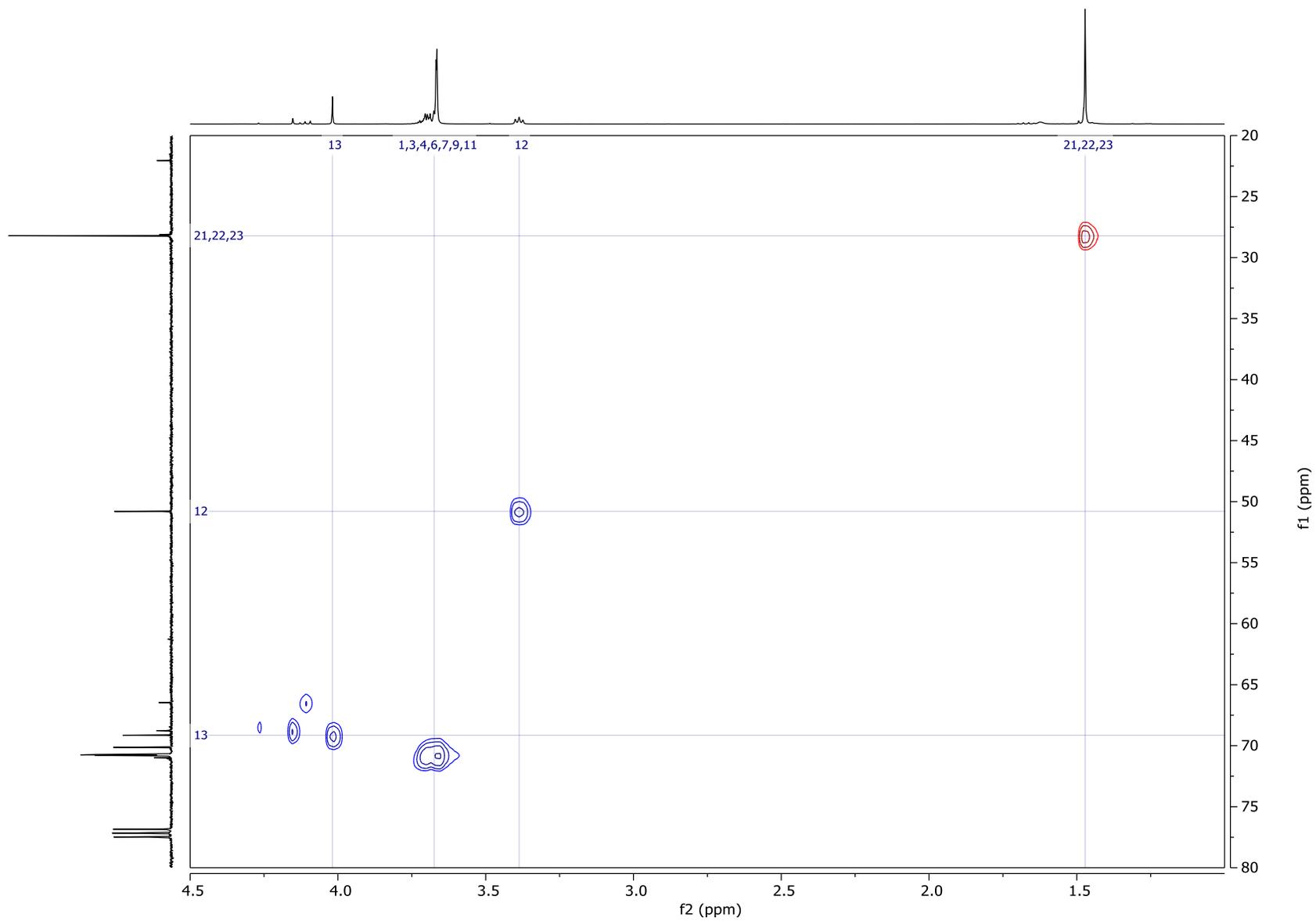


COSY NMR



S-388

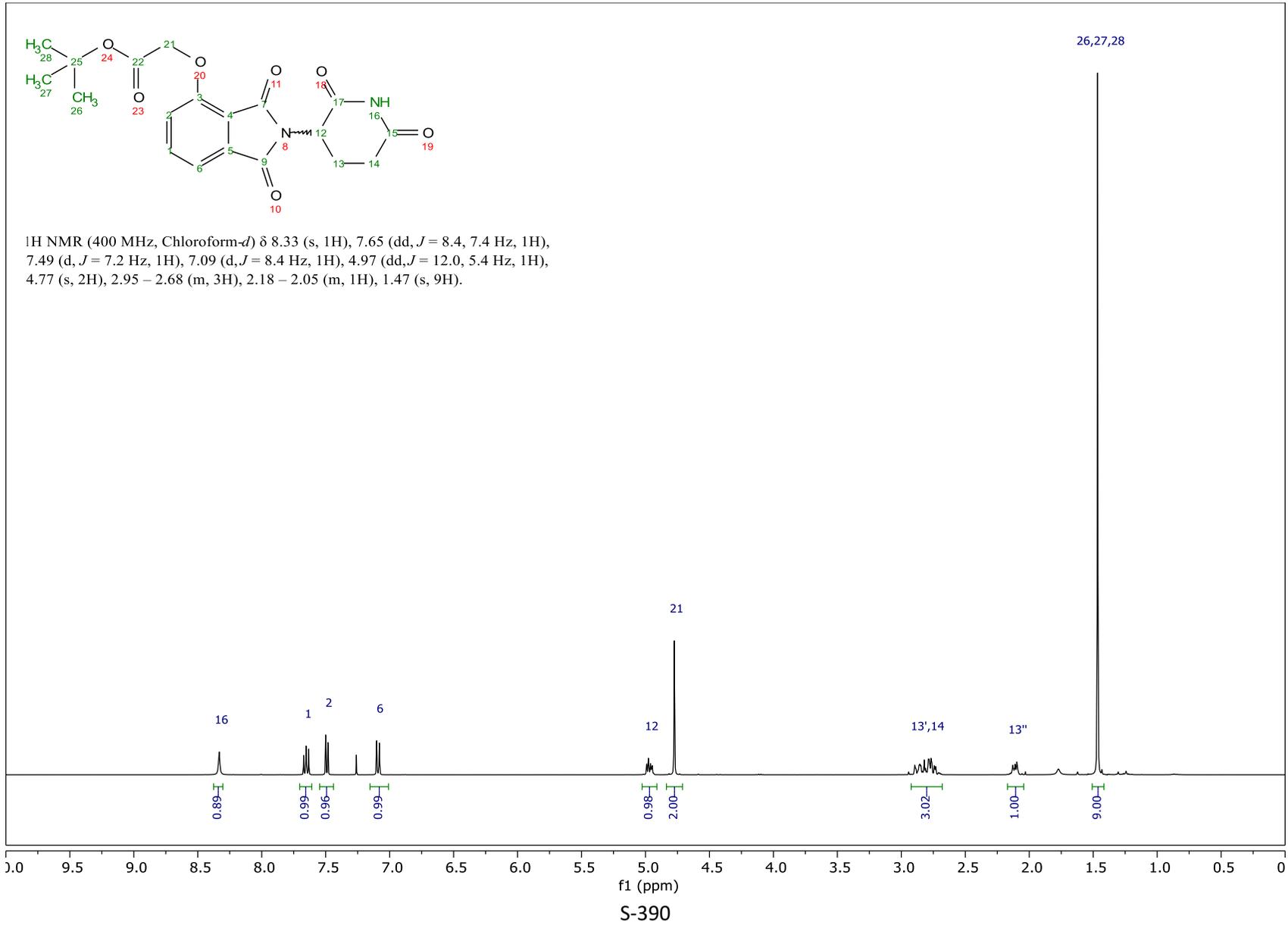
# HSQC NMR



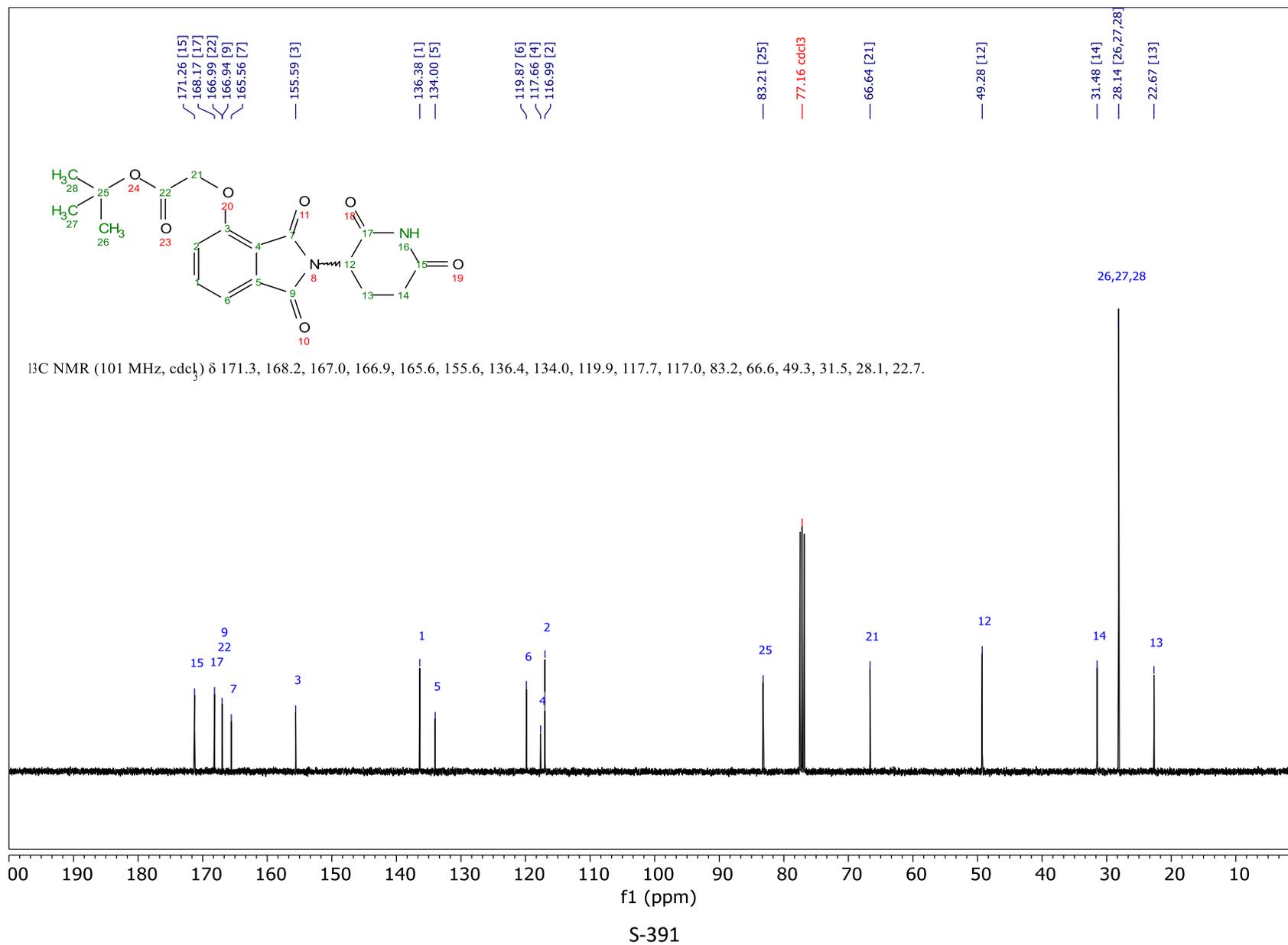
S-389

# Compound RBM5-172

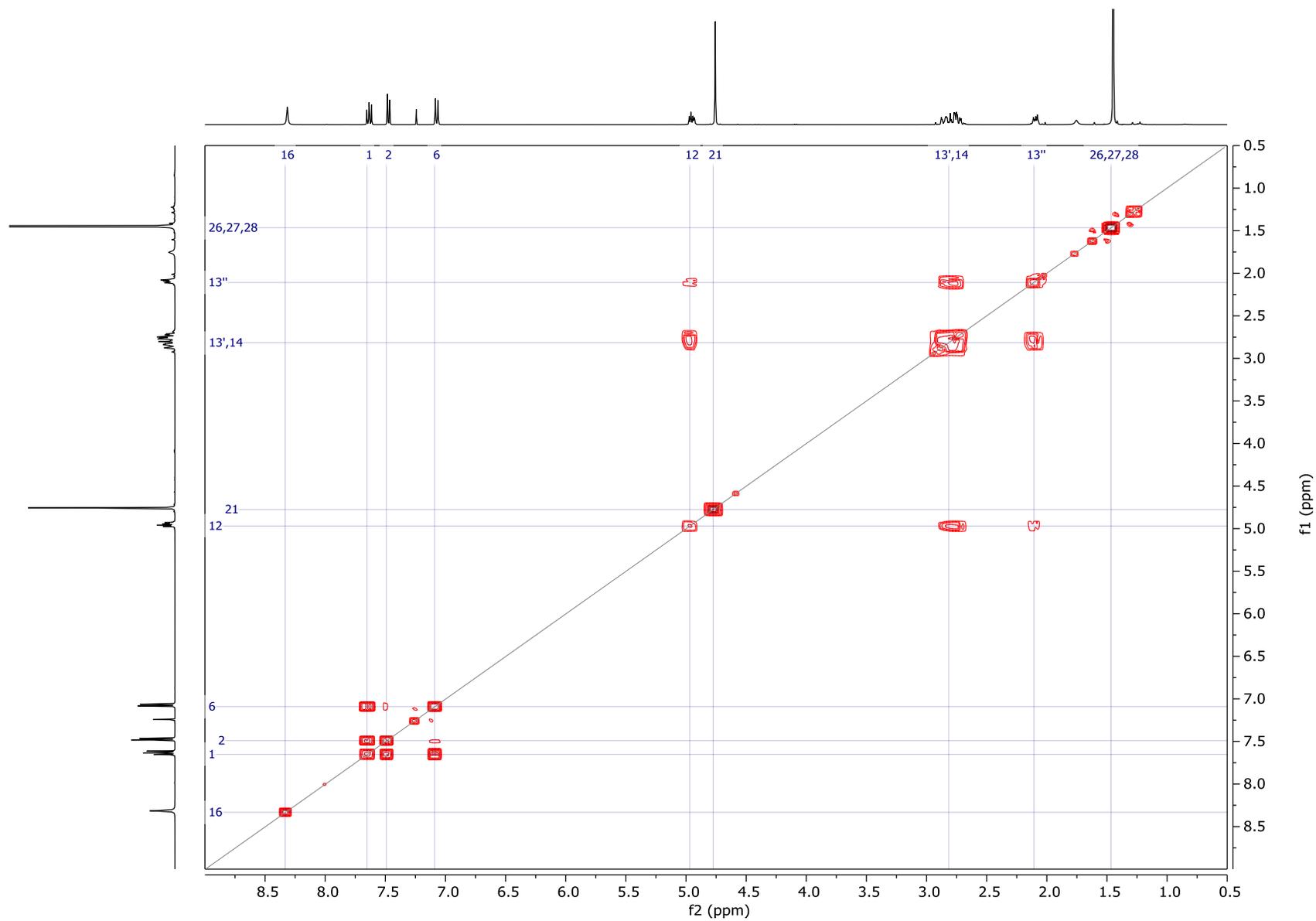
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

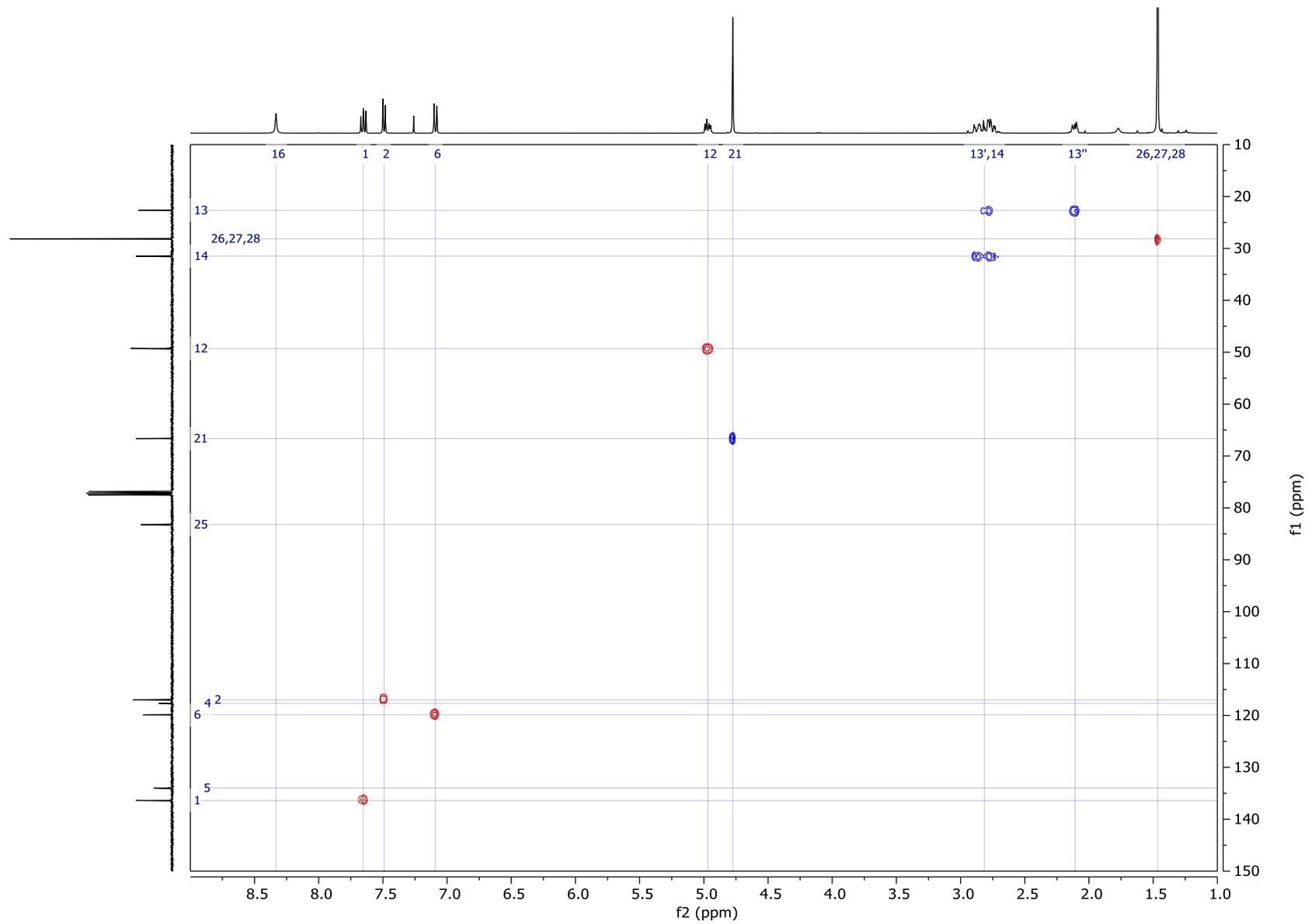


# COSY NMR



S-392

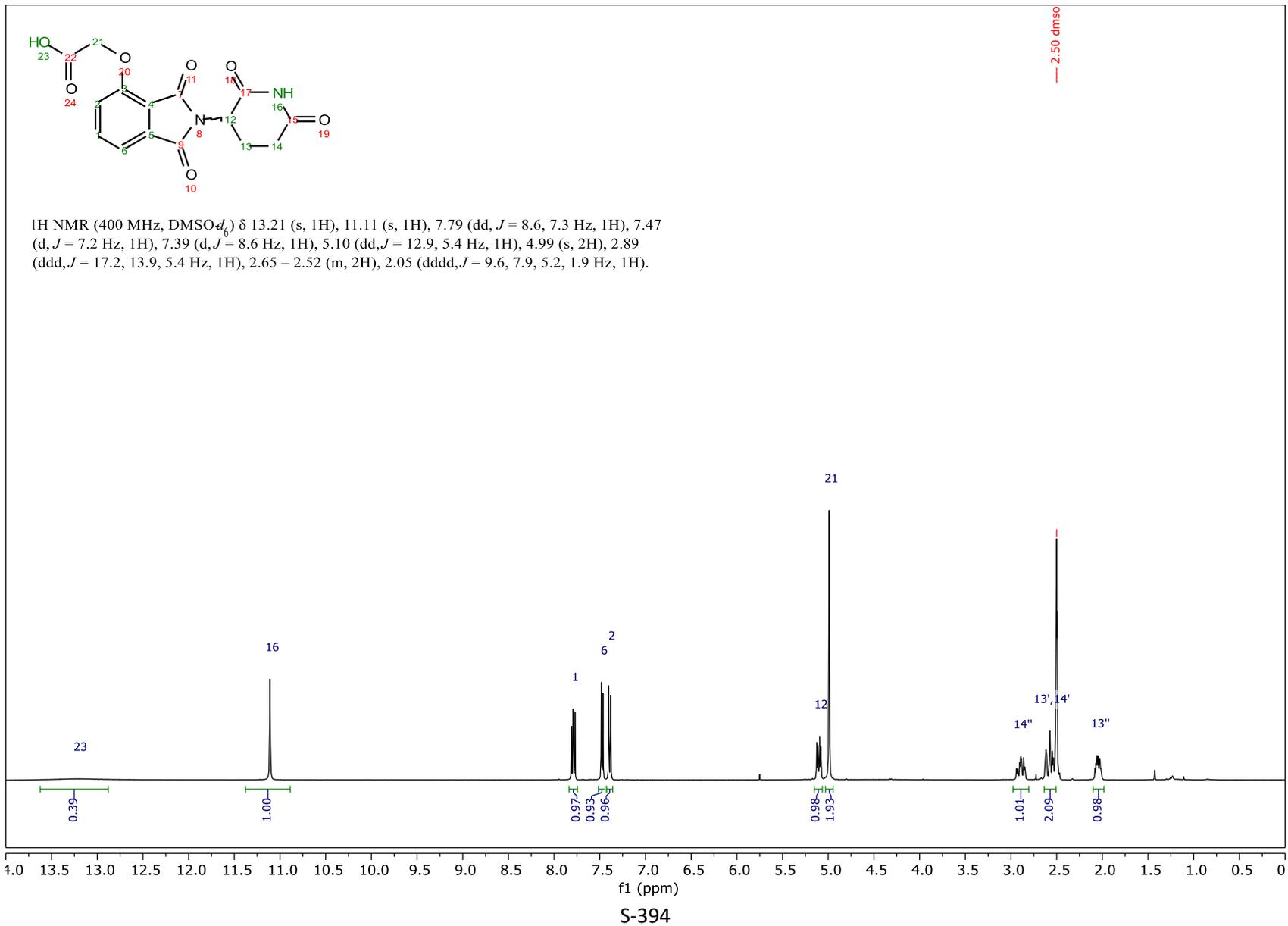
# HSQC NMR



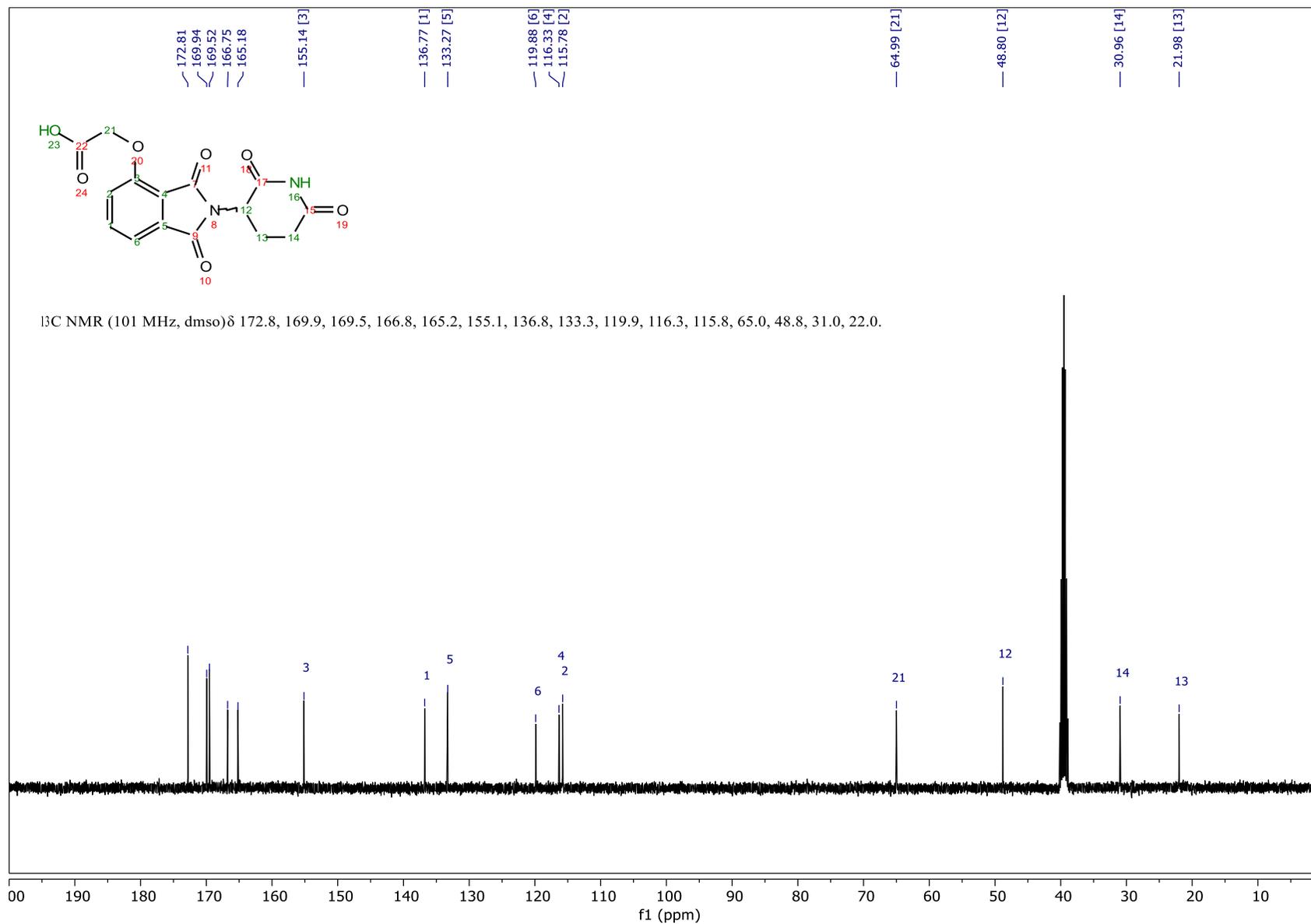
S-393

# Compound RBM5-173

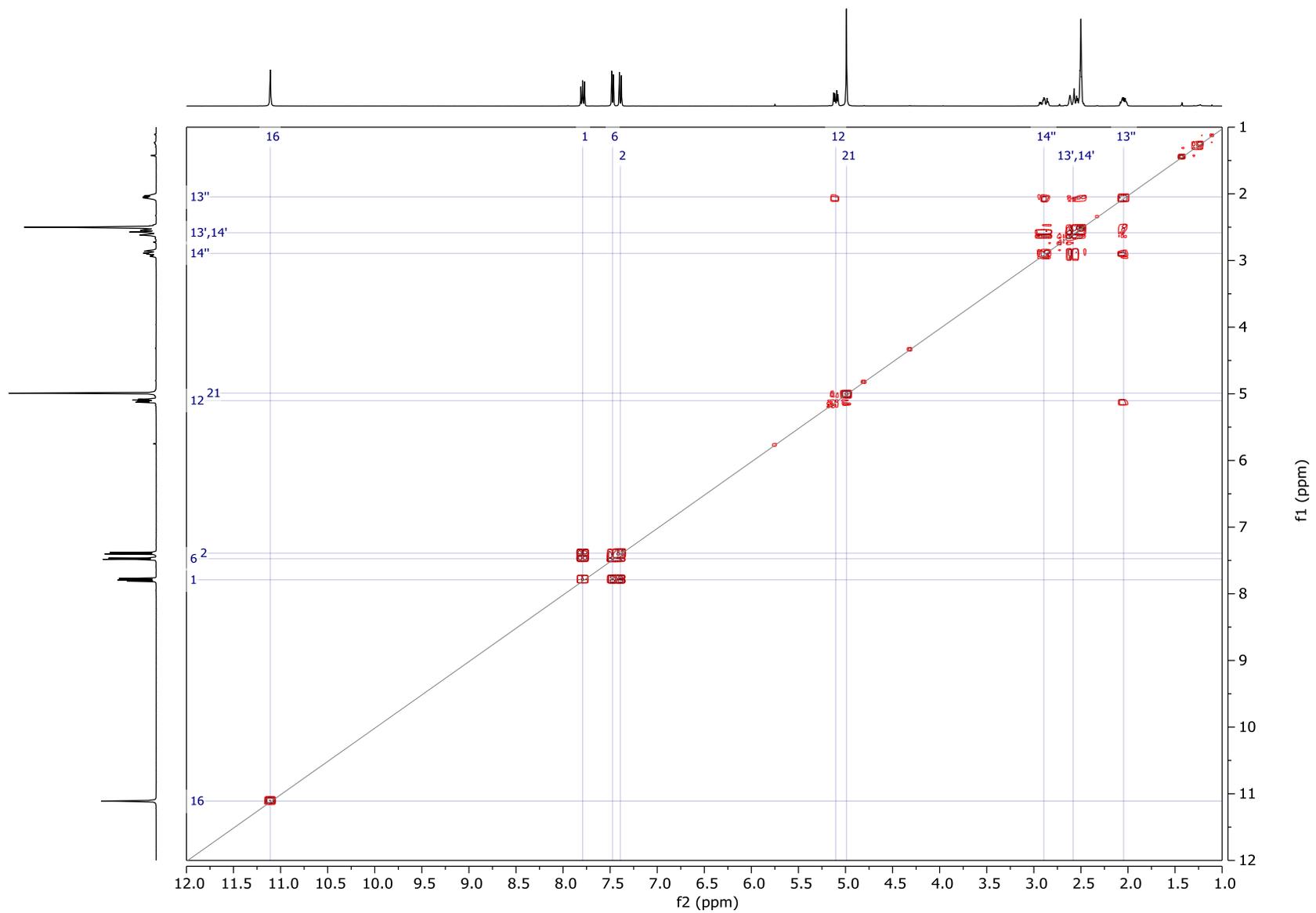
$^1\text{H NMR}$



# <sup>13</sup>C NMR

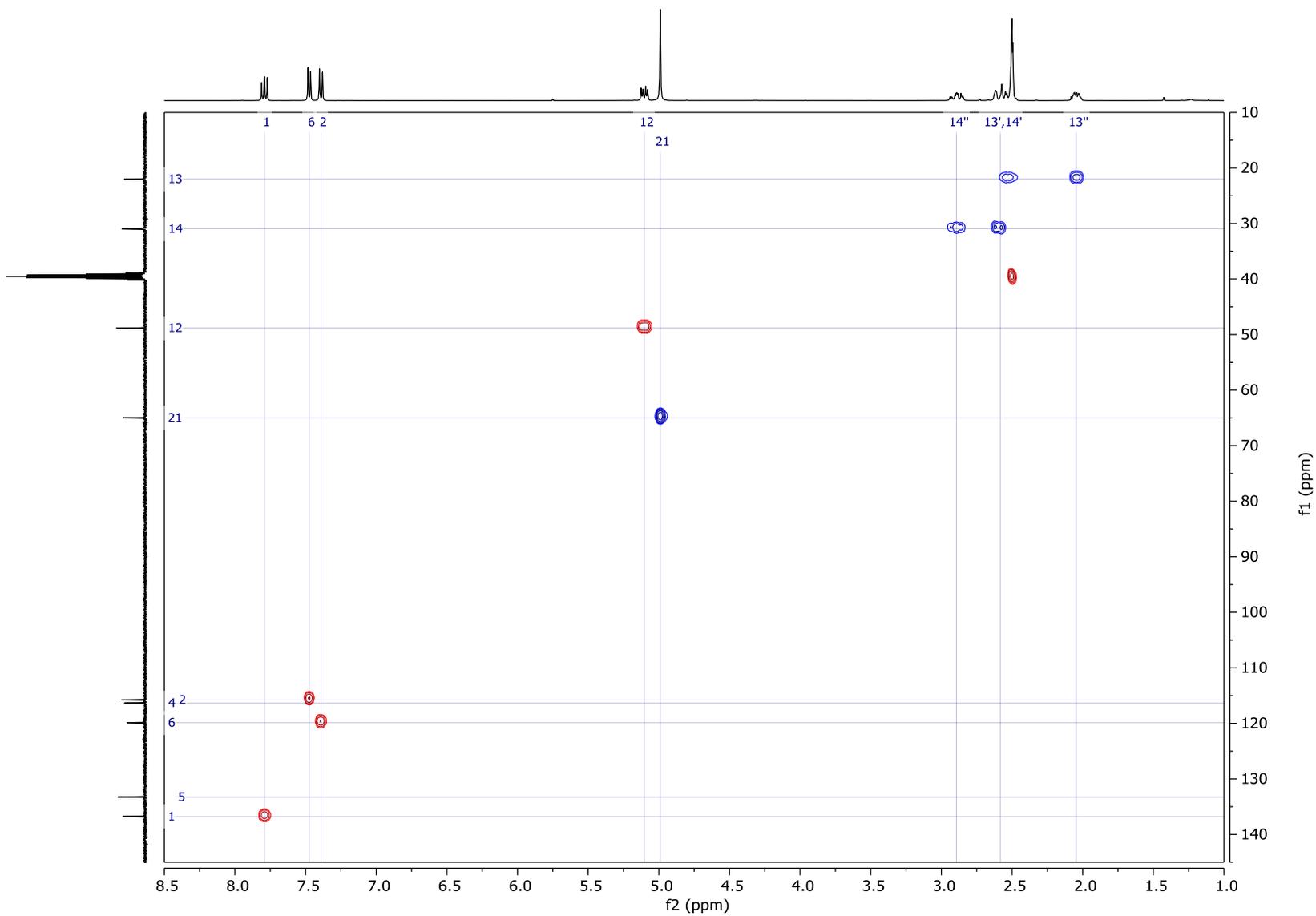


COSY NMR



S-396

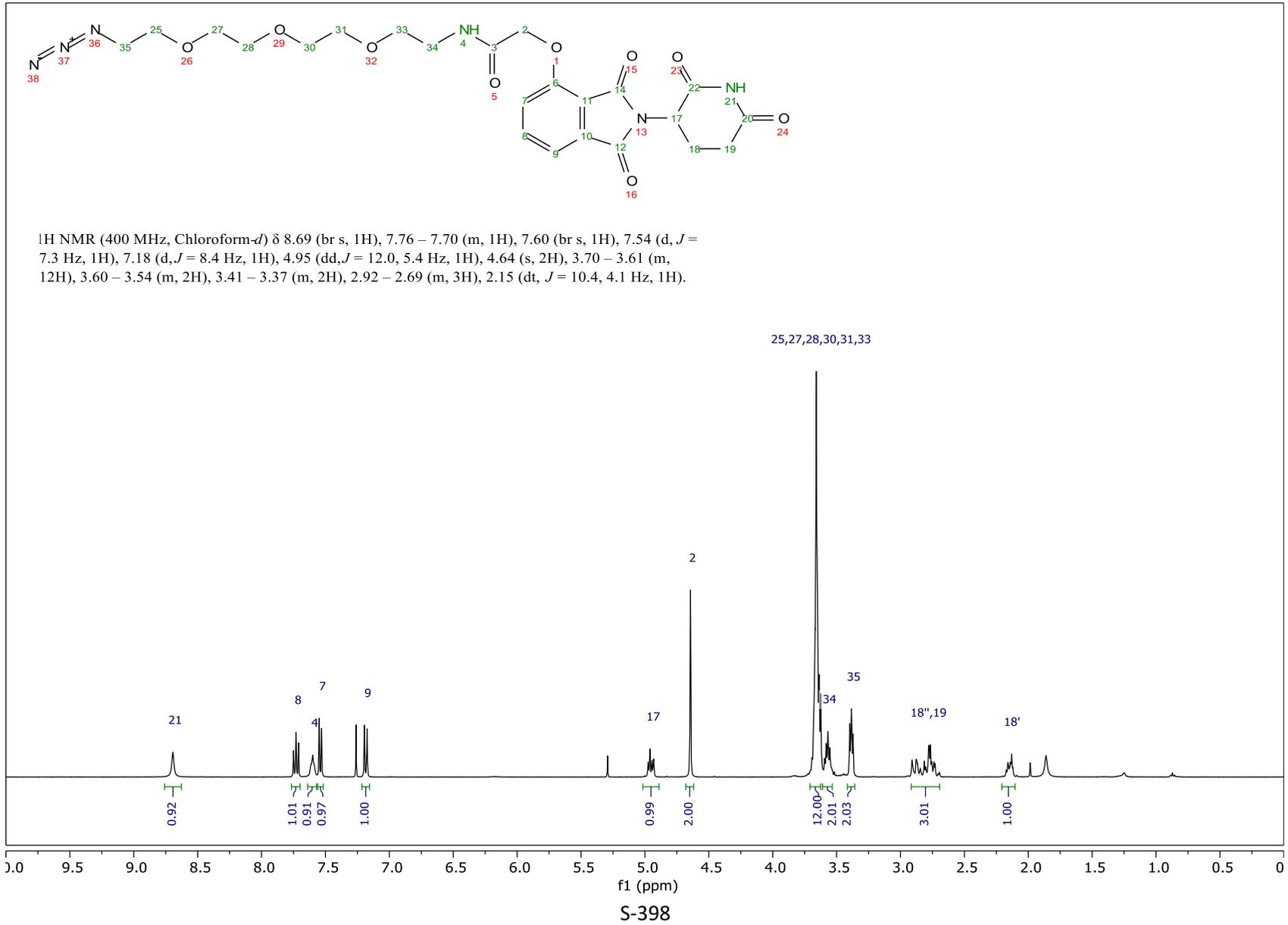
# HSQC NMR



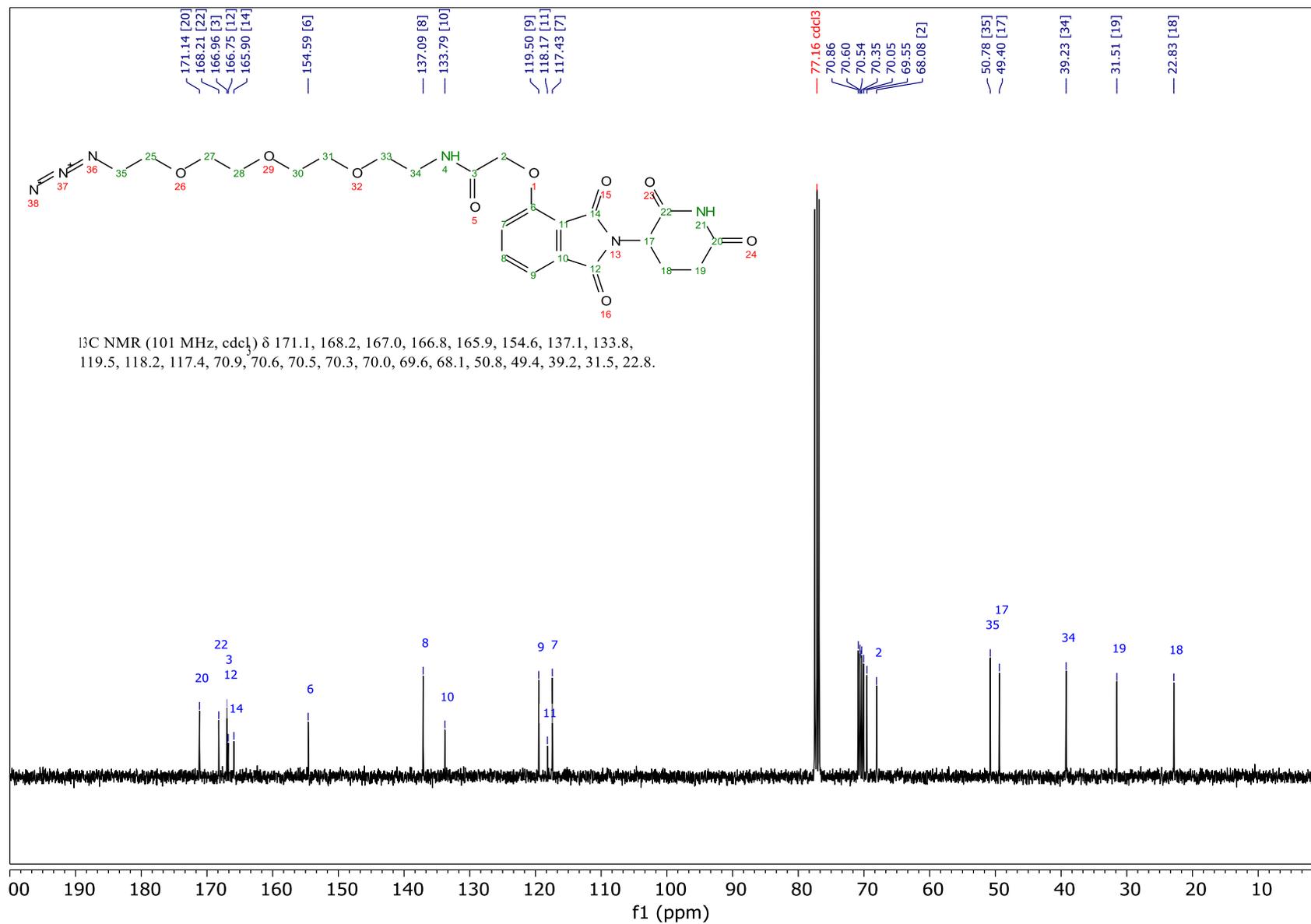
S-397

# Compound RBM5-174

$^1\text{H}$  NMR

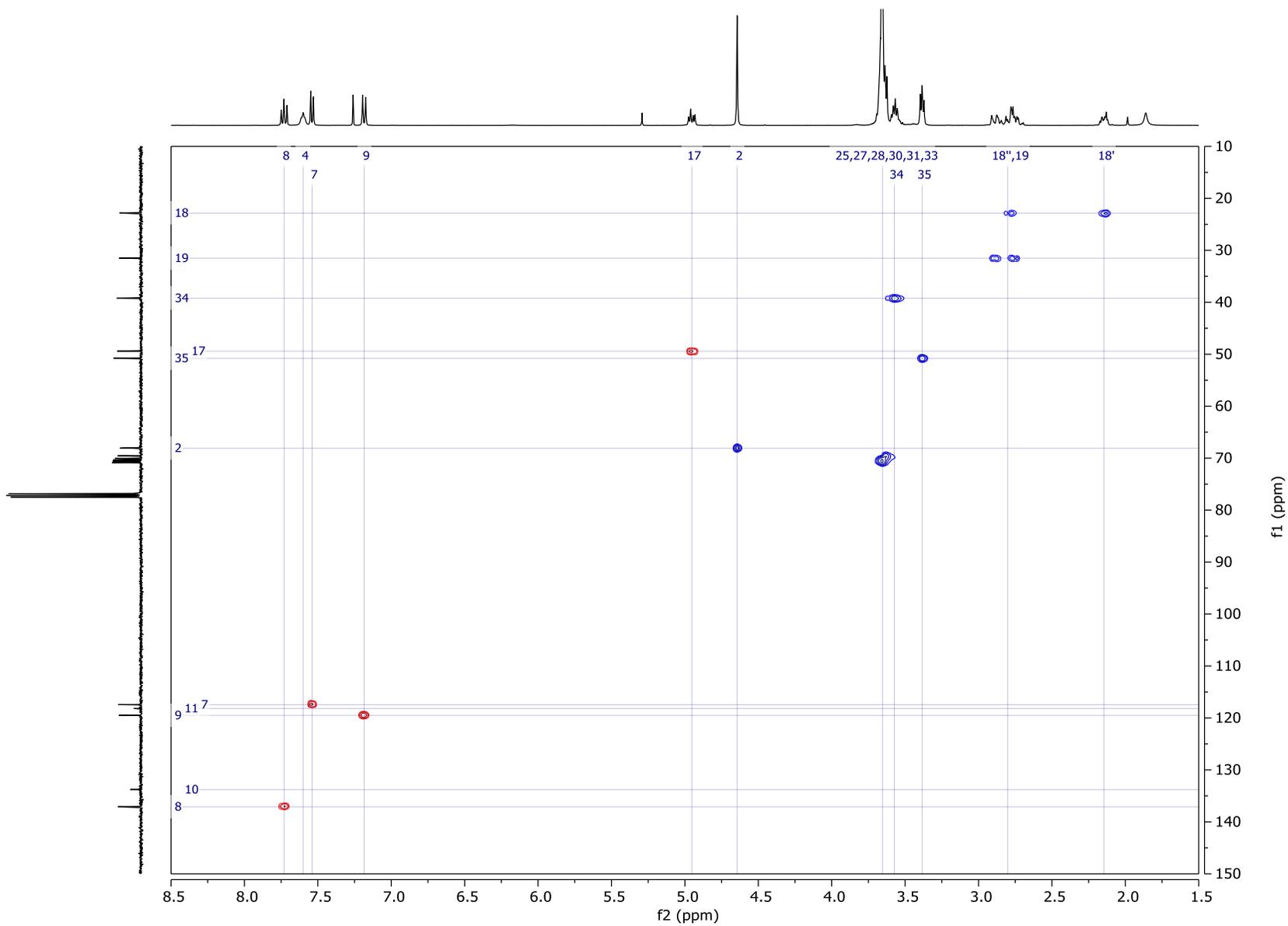


<sup>13</sup>C NMR





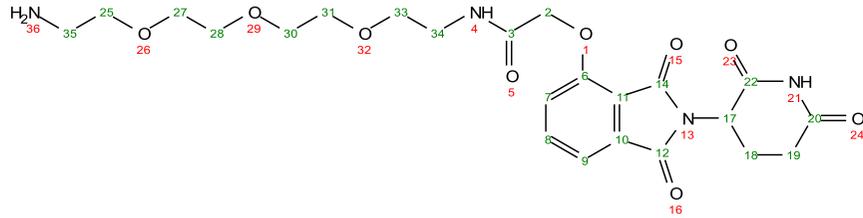
# HSQC NMR



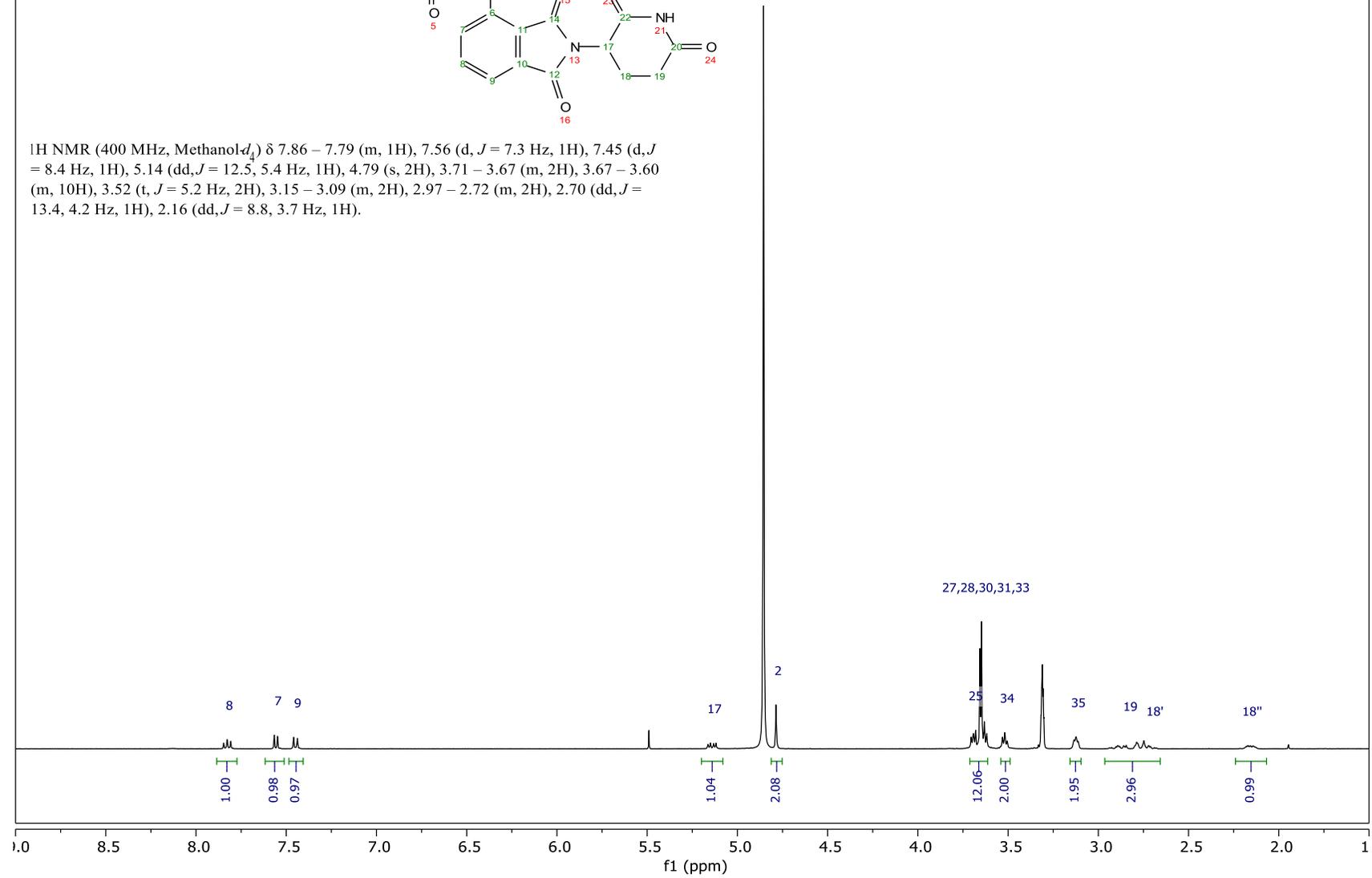
S-401

# Compound RBM5-175

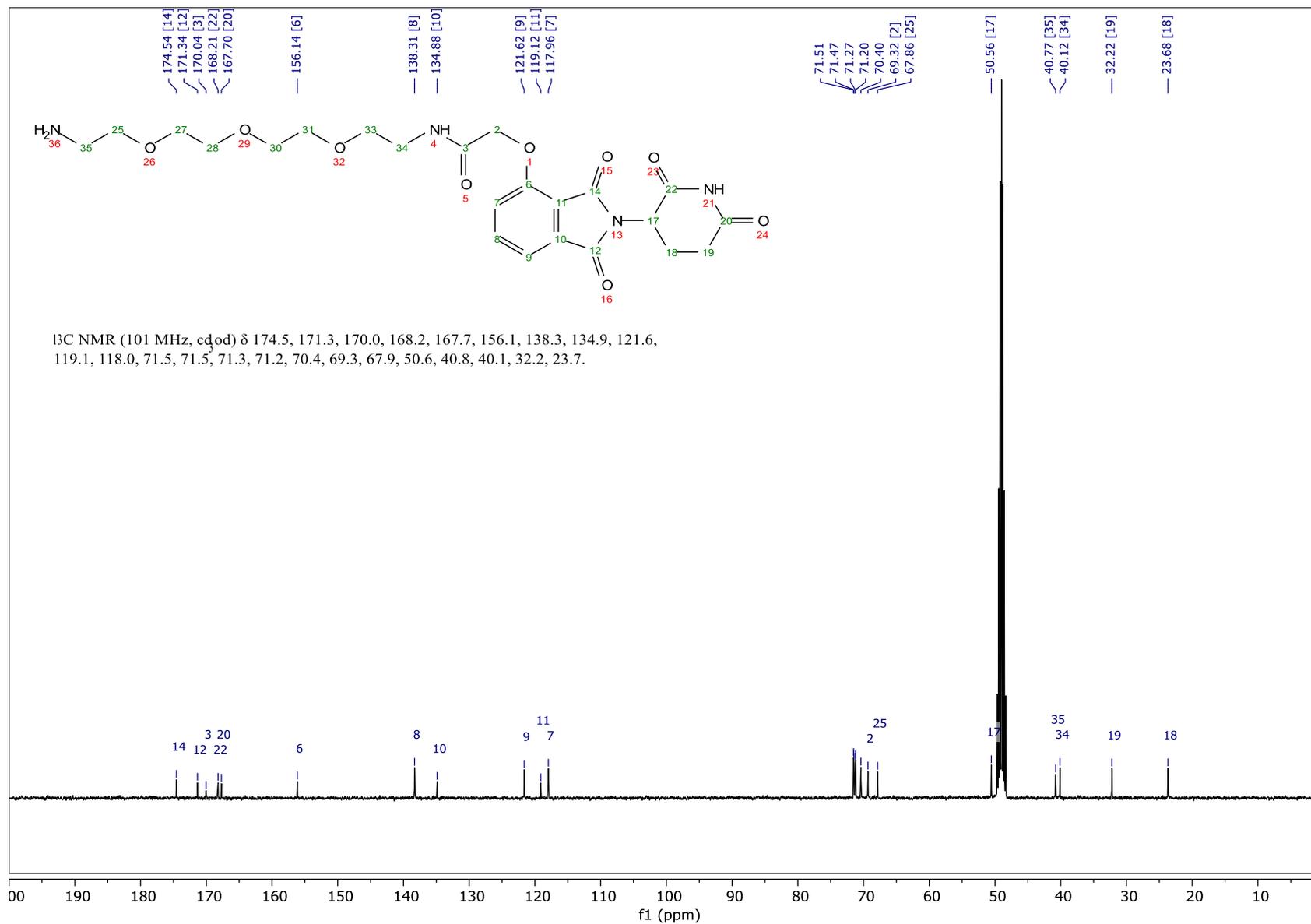
$^1\text{H}$  NMR



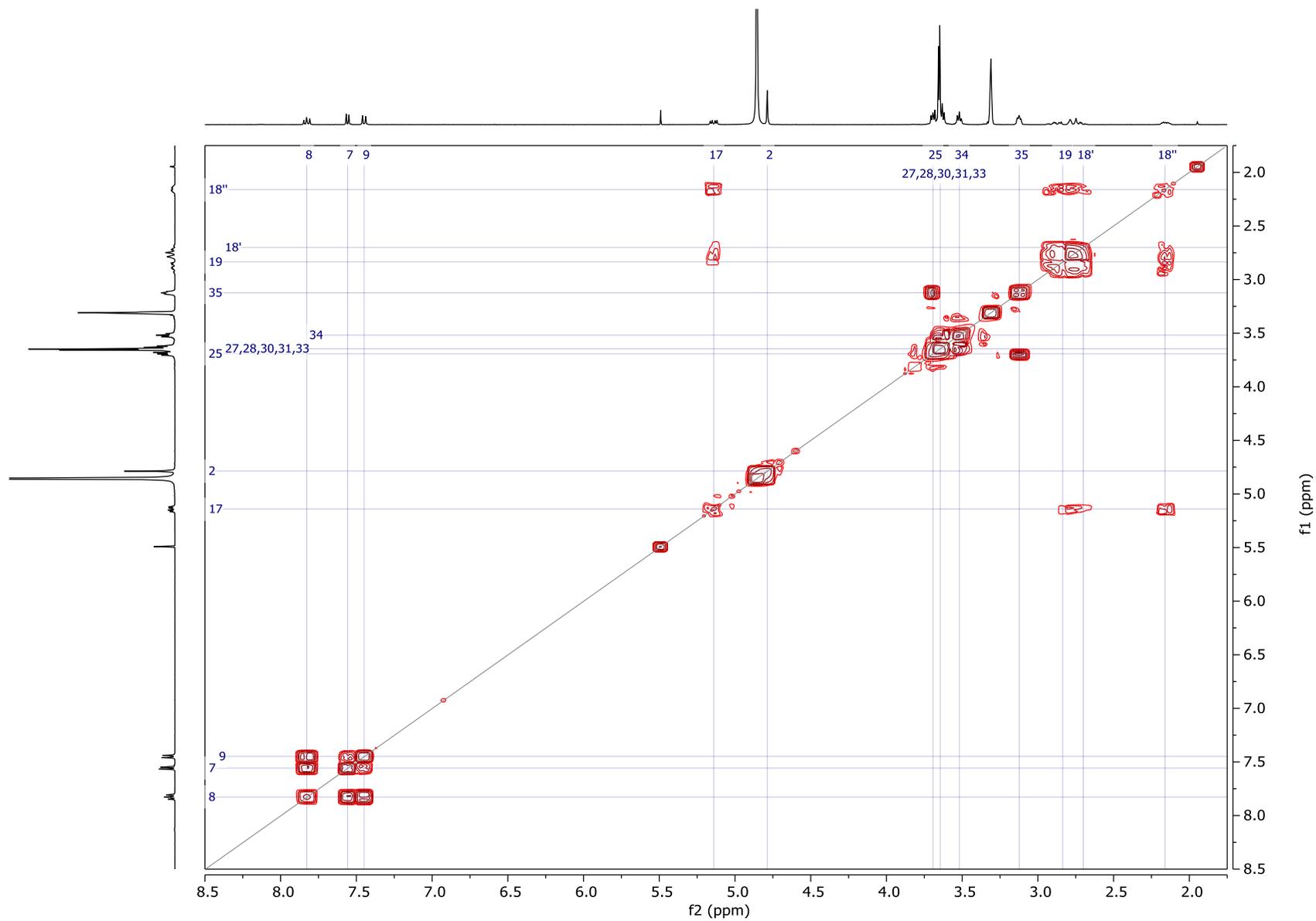
$^1\text{H}$  NMR (400 MHz, Methanol- $d_4$ )  $\delta$  7.86 – 7.79 (m, 1H), 7.56 (d,  $J$  = 7.3 Hz, 1H), 7.45 (d,  $J$  = 8.4 Hz, 1H), 5.14 (dd,  $J$  = 12.5, 5.4 Hz, 1H), 4.79 (s, 2H), 3.71 – 3.67 (m, 2H), 3.67 – 3.60 (m, 10H), 3.52 (t,  $J$  = 5.2 Hz, 2H), 3.15 – 3.09 (m, 2H), 2.97 – 2.72 (m, 2H), 2.70 (dd,  $J$  = 13.4, 4.2 Hz, 1H), 2.16 (dd,  $J$  = 8.8, 3.7 Hz, 1H).



<sup>13</sup>C NMR

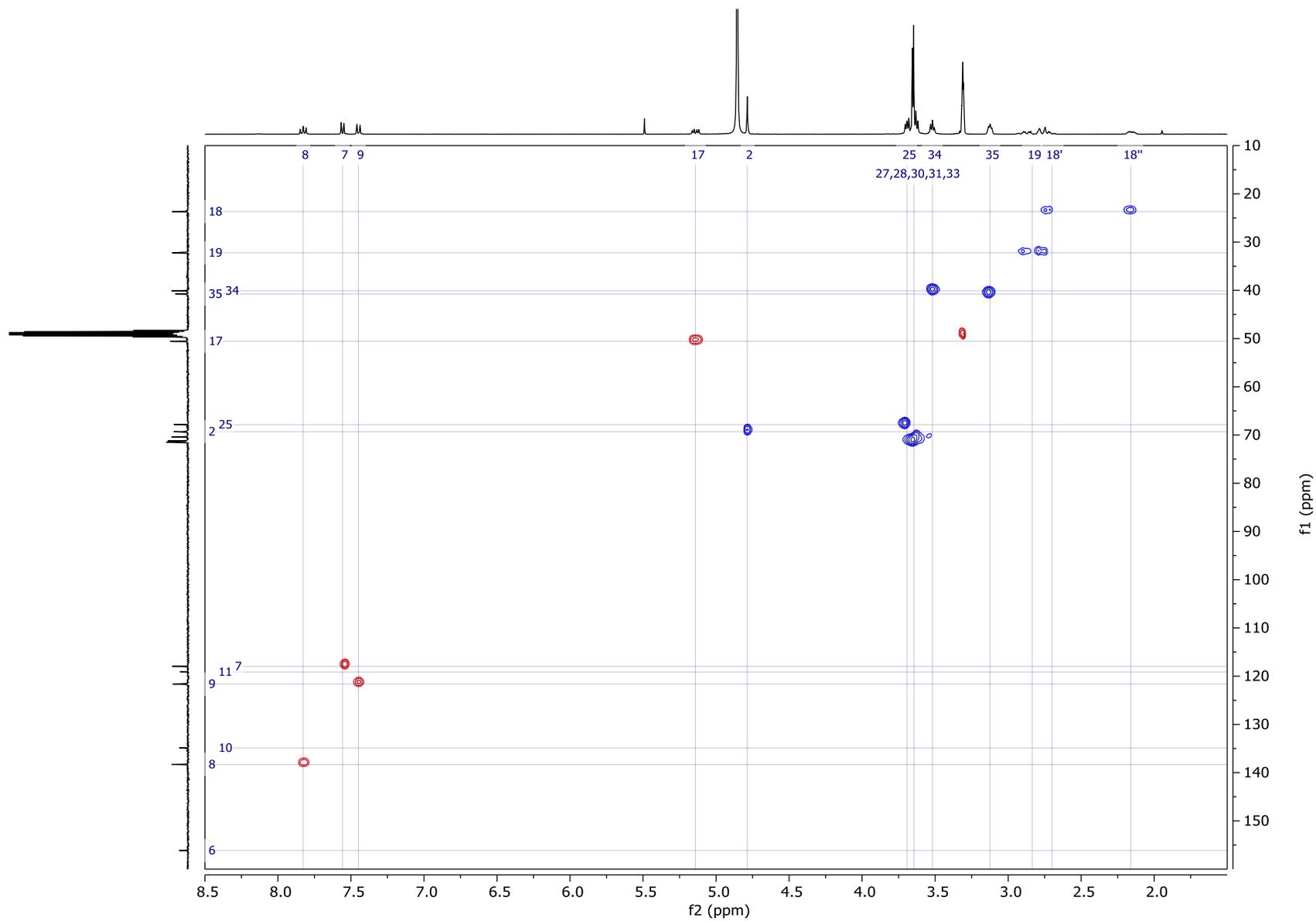


# COSY NMR



S-404

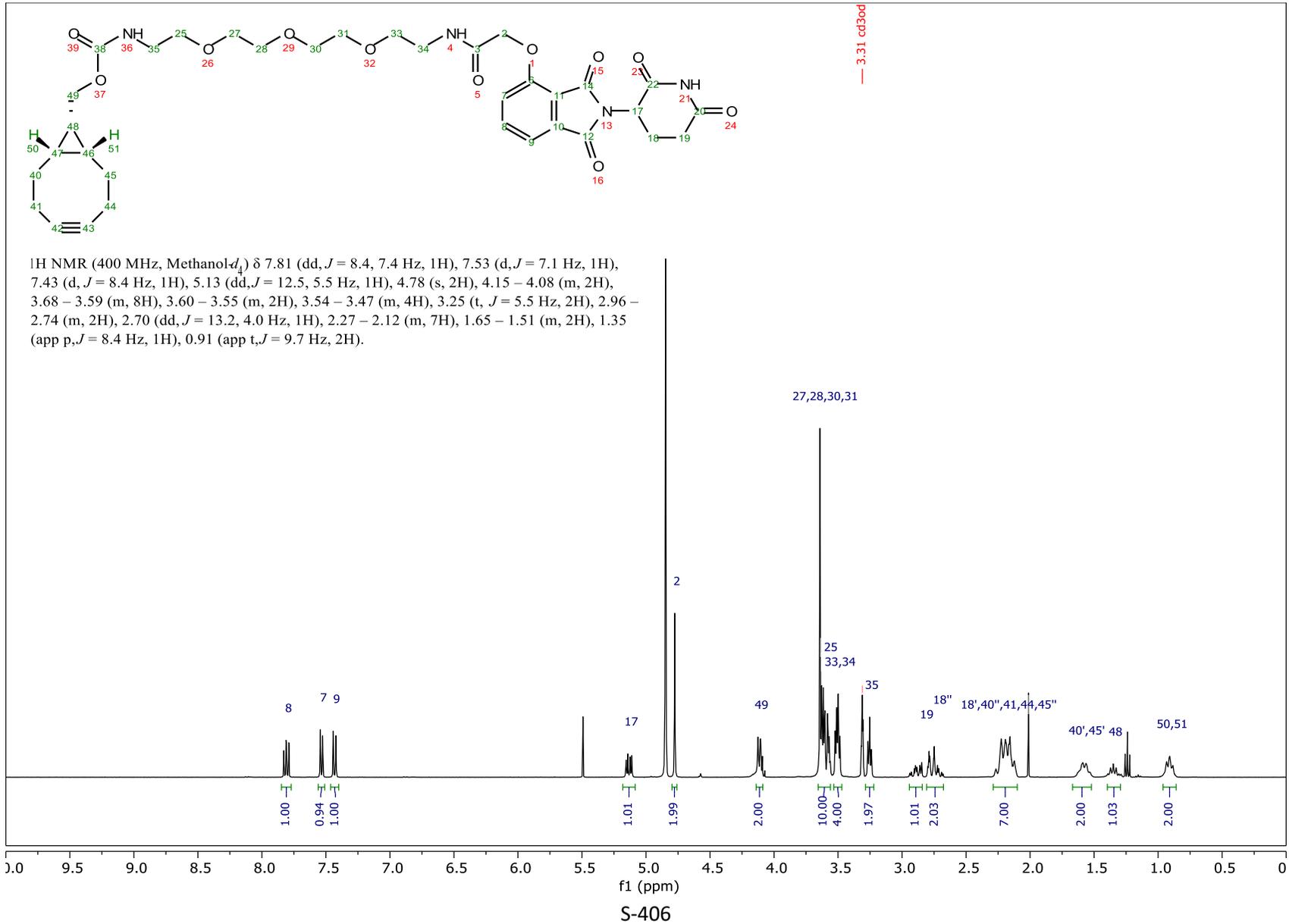
# HSQC NMR



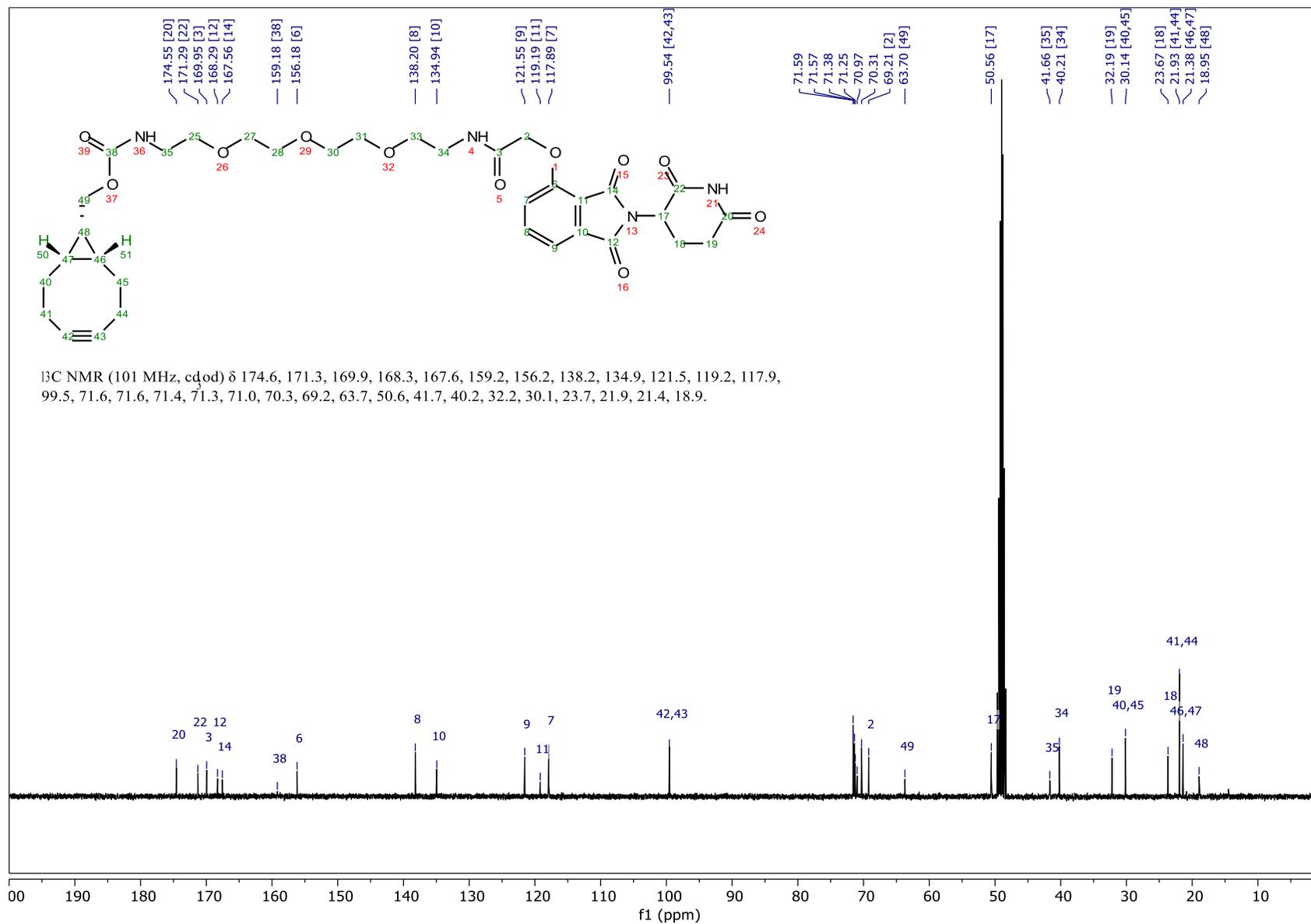
S-405

# Compound RBM5-176

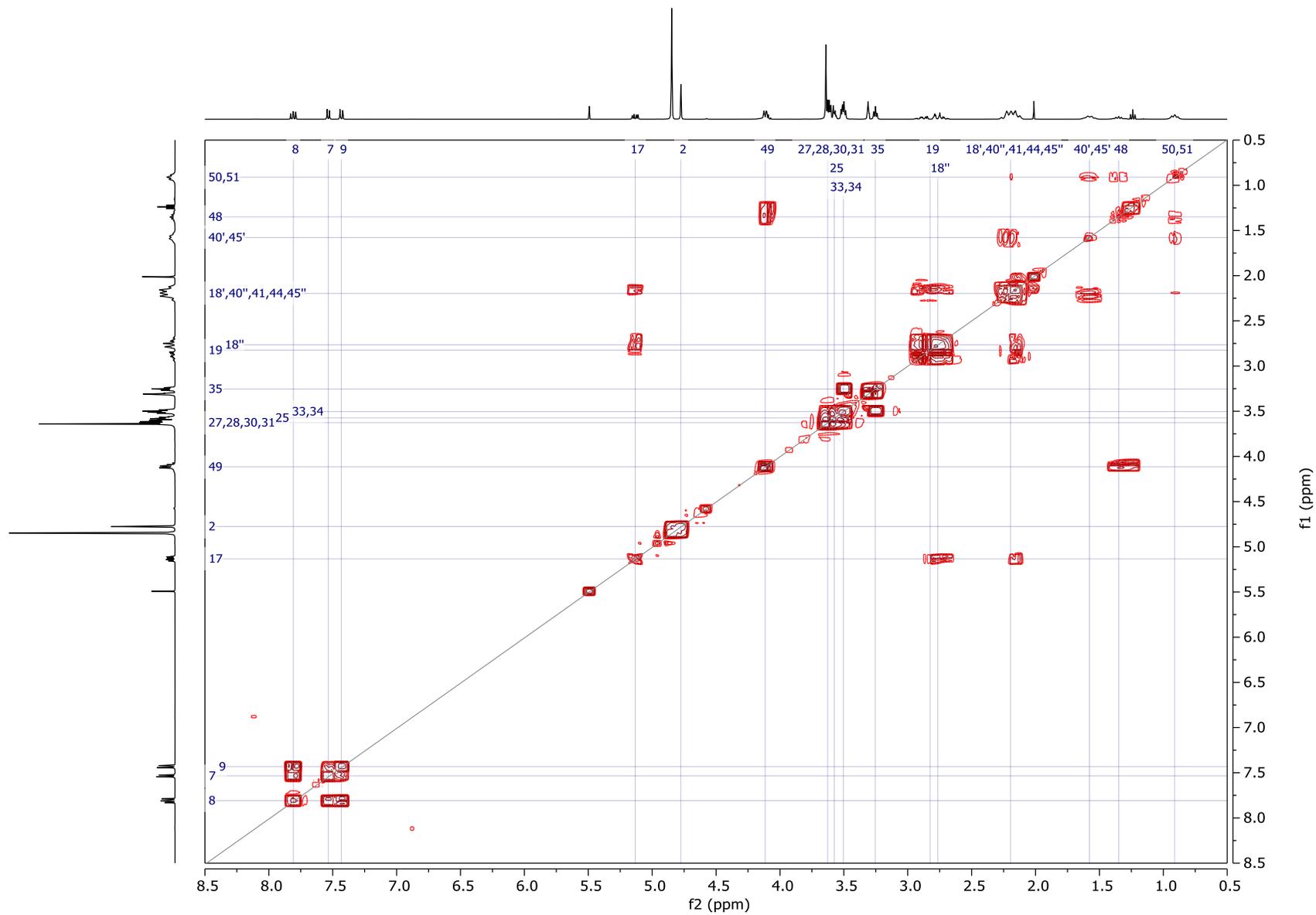
$^1\text{H}$  NMR



# <sup>13</sup>C NMR

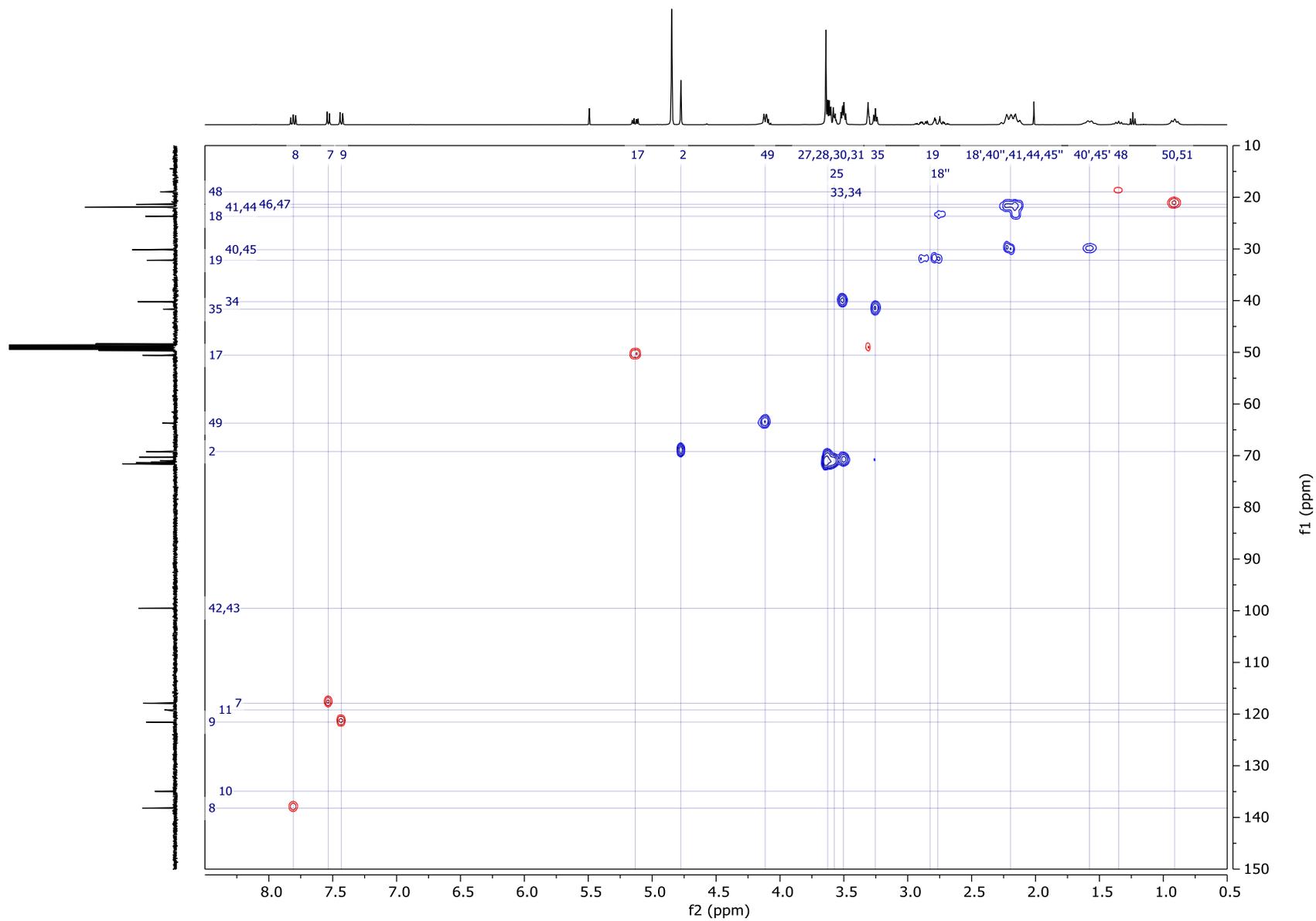


# COSY NMR



S-408

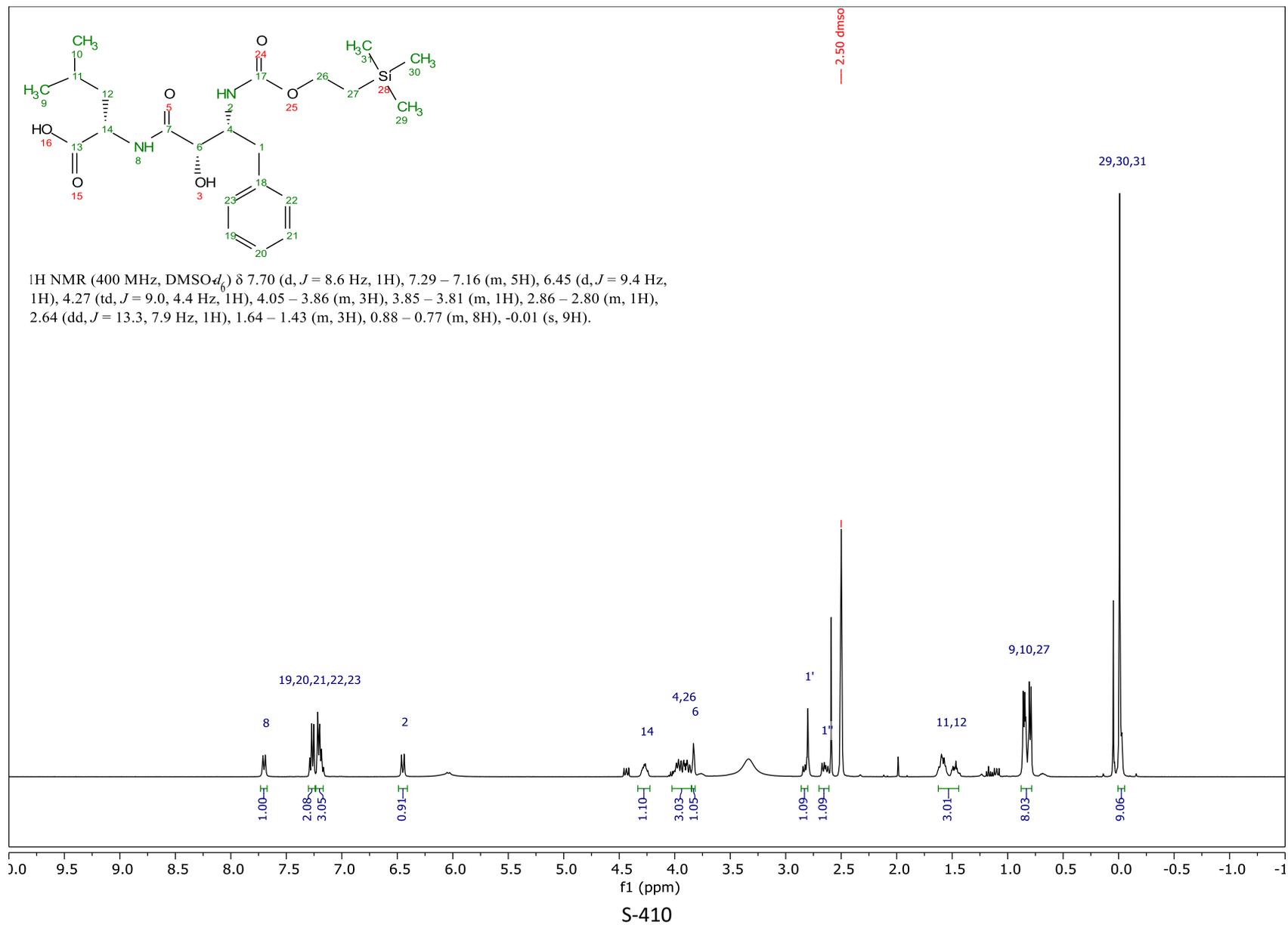
# HSQC NMR



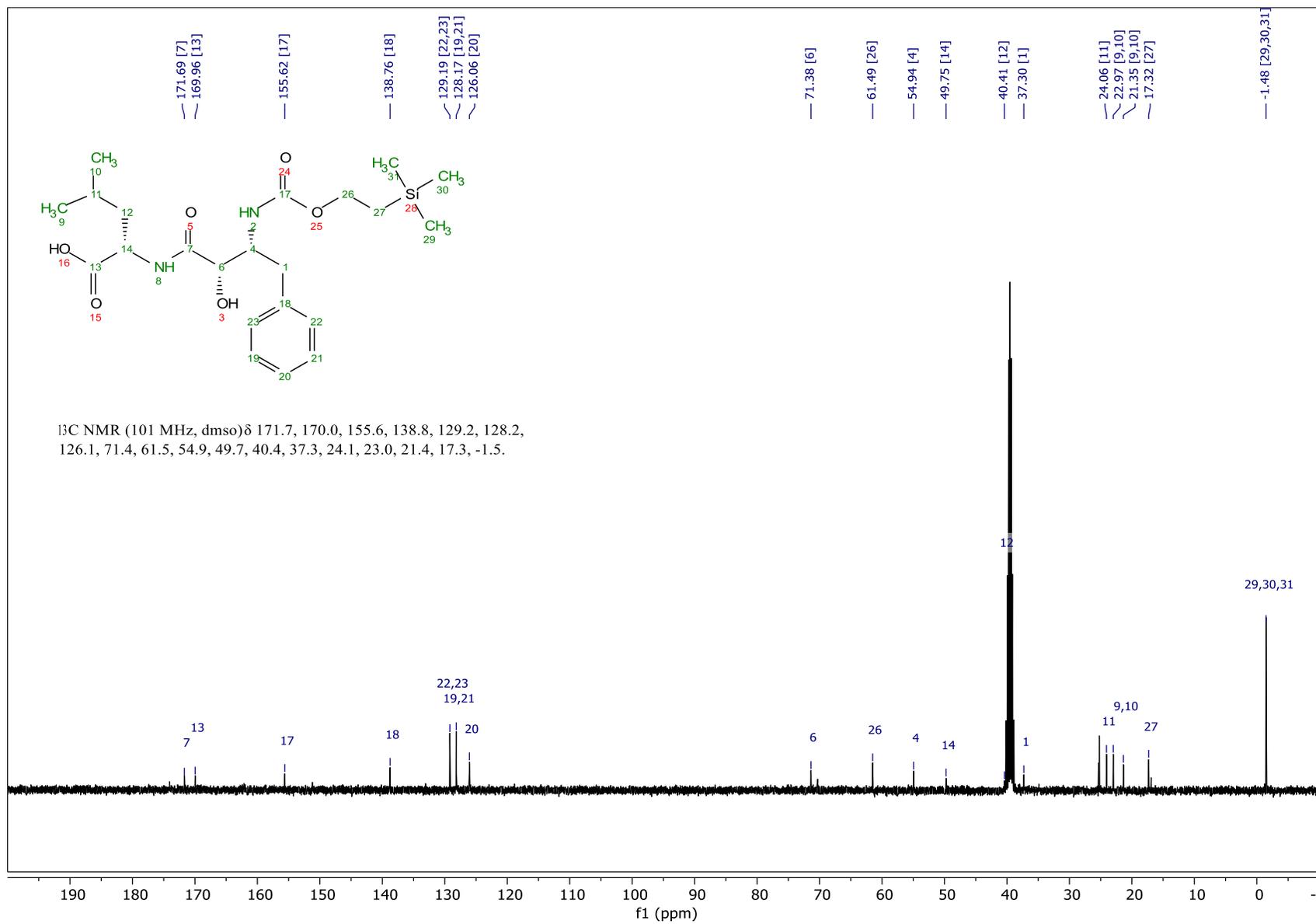
S-409

# Compound RBM5-178

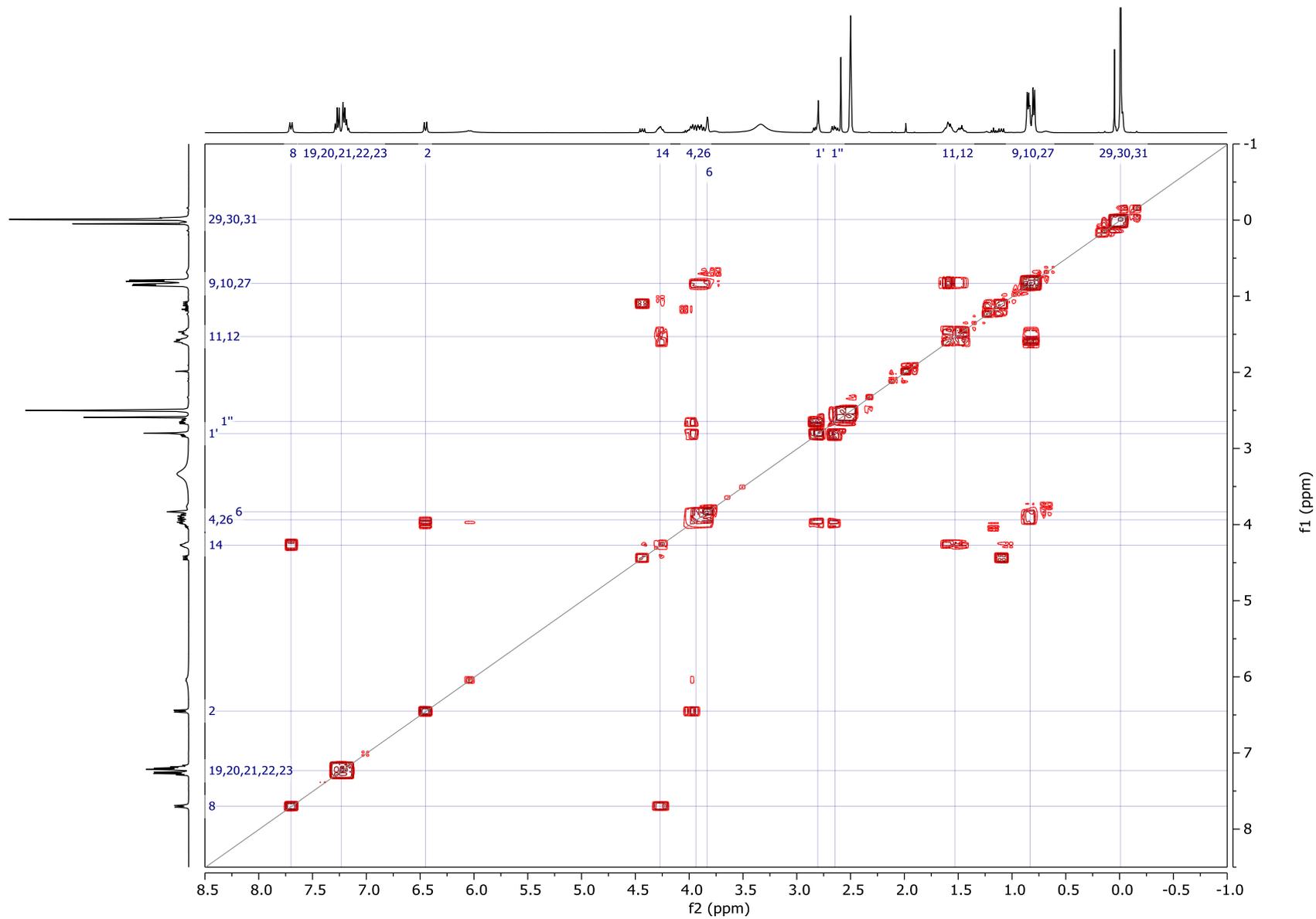
$^1\text{H}$  NMR



<sup>13</sup>C NMR

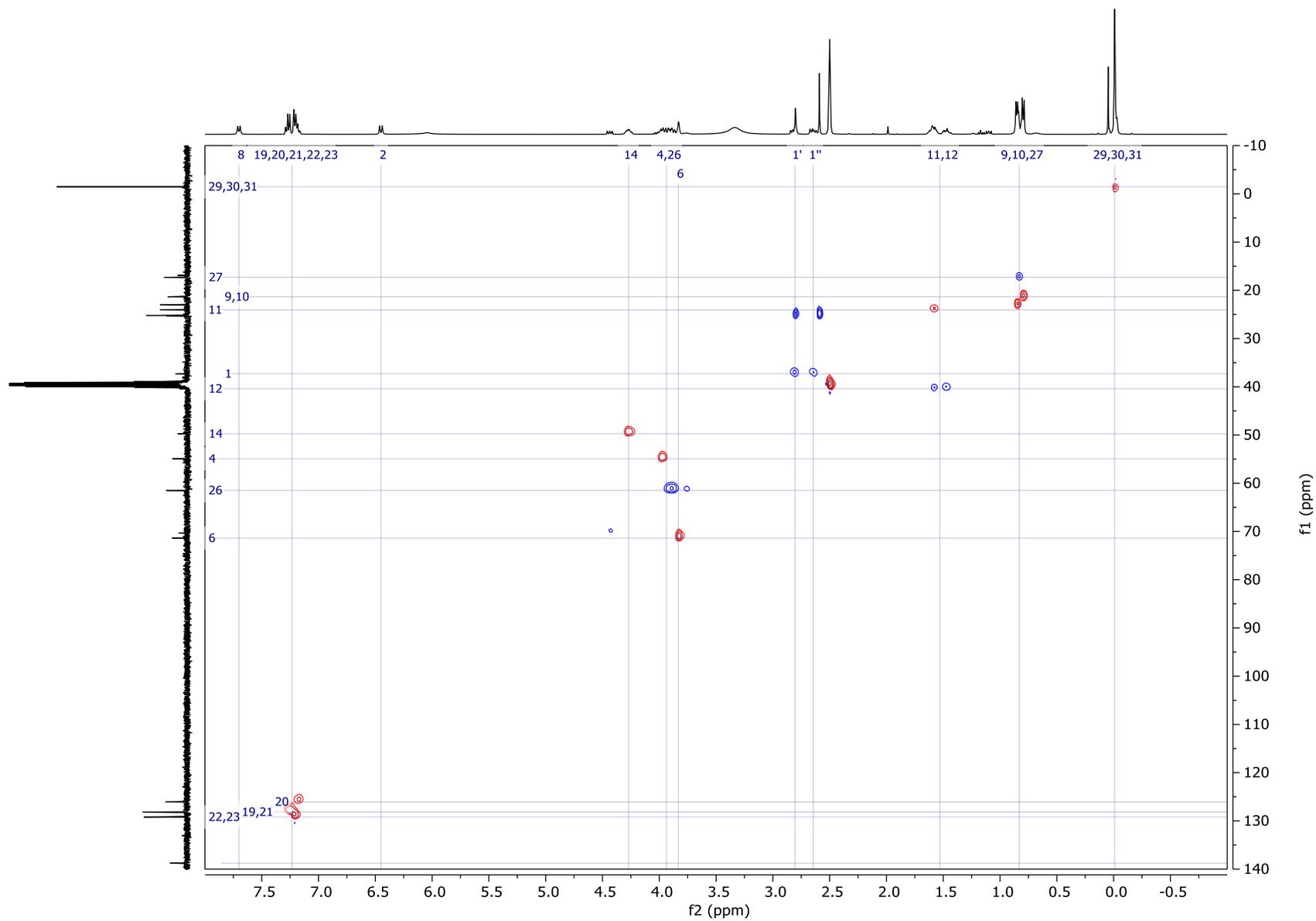


# COSY NMR



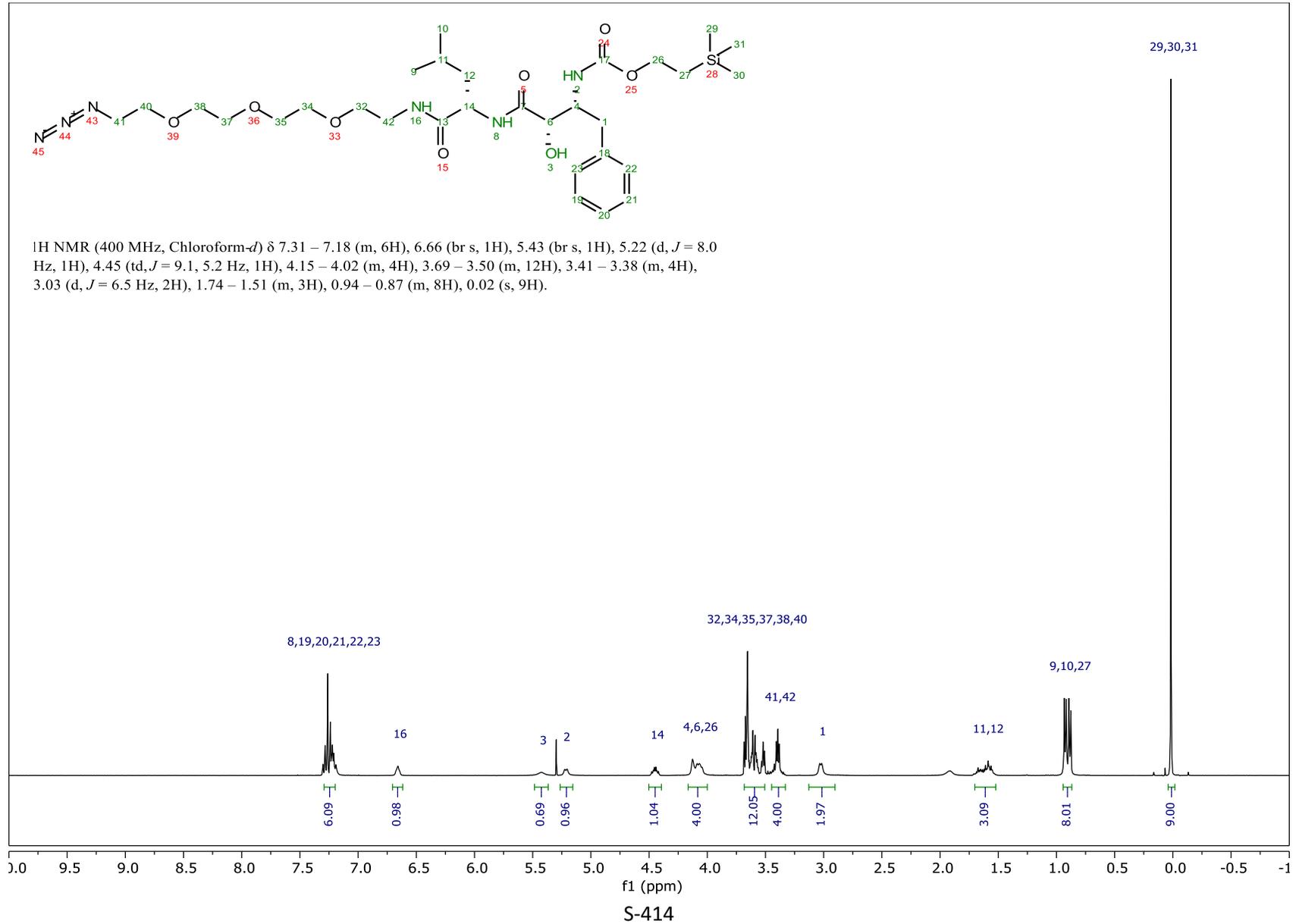
S-412

# HSQC NMR

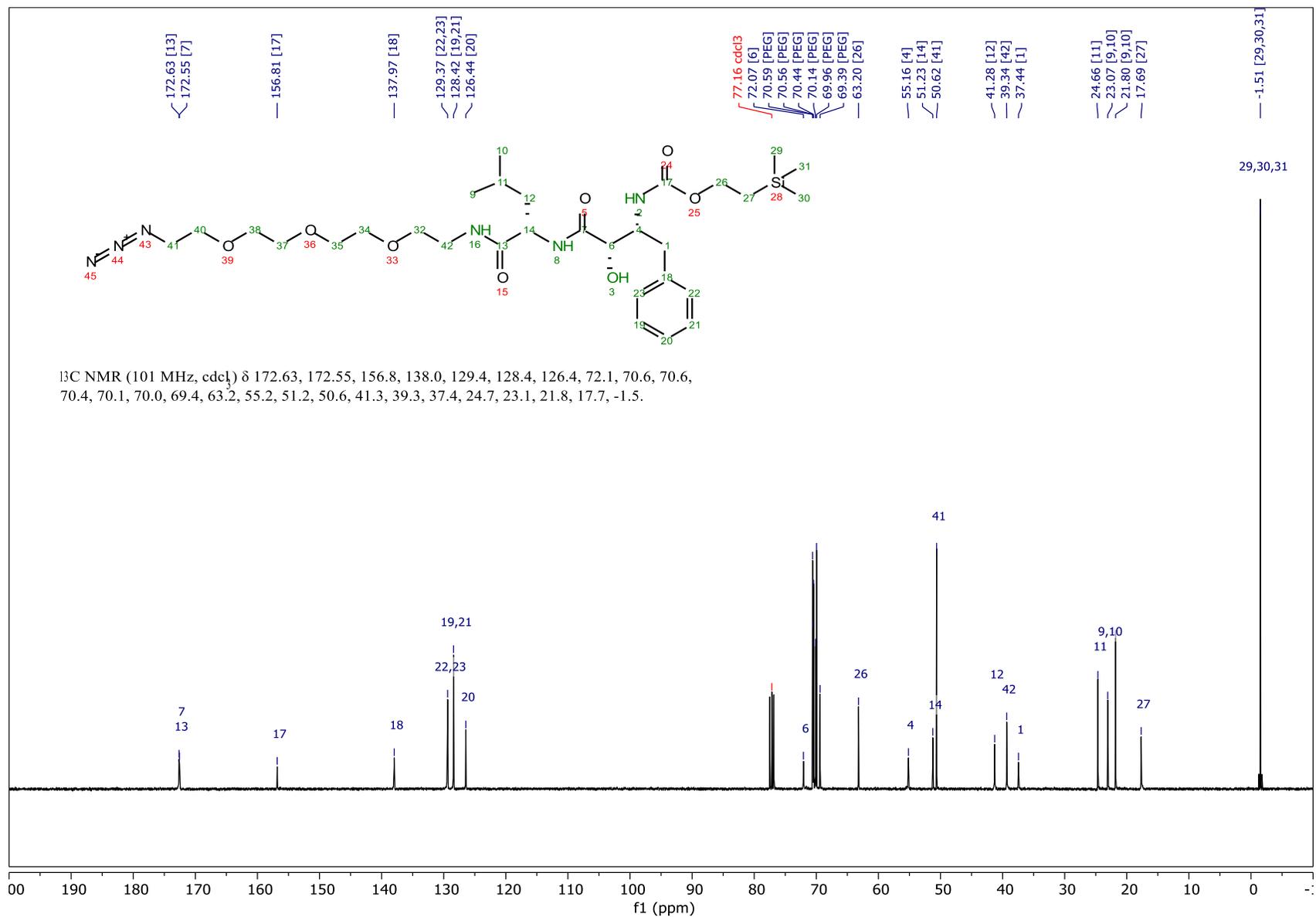


# Compound RBM5-179

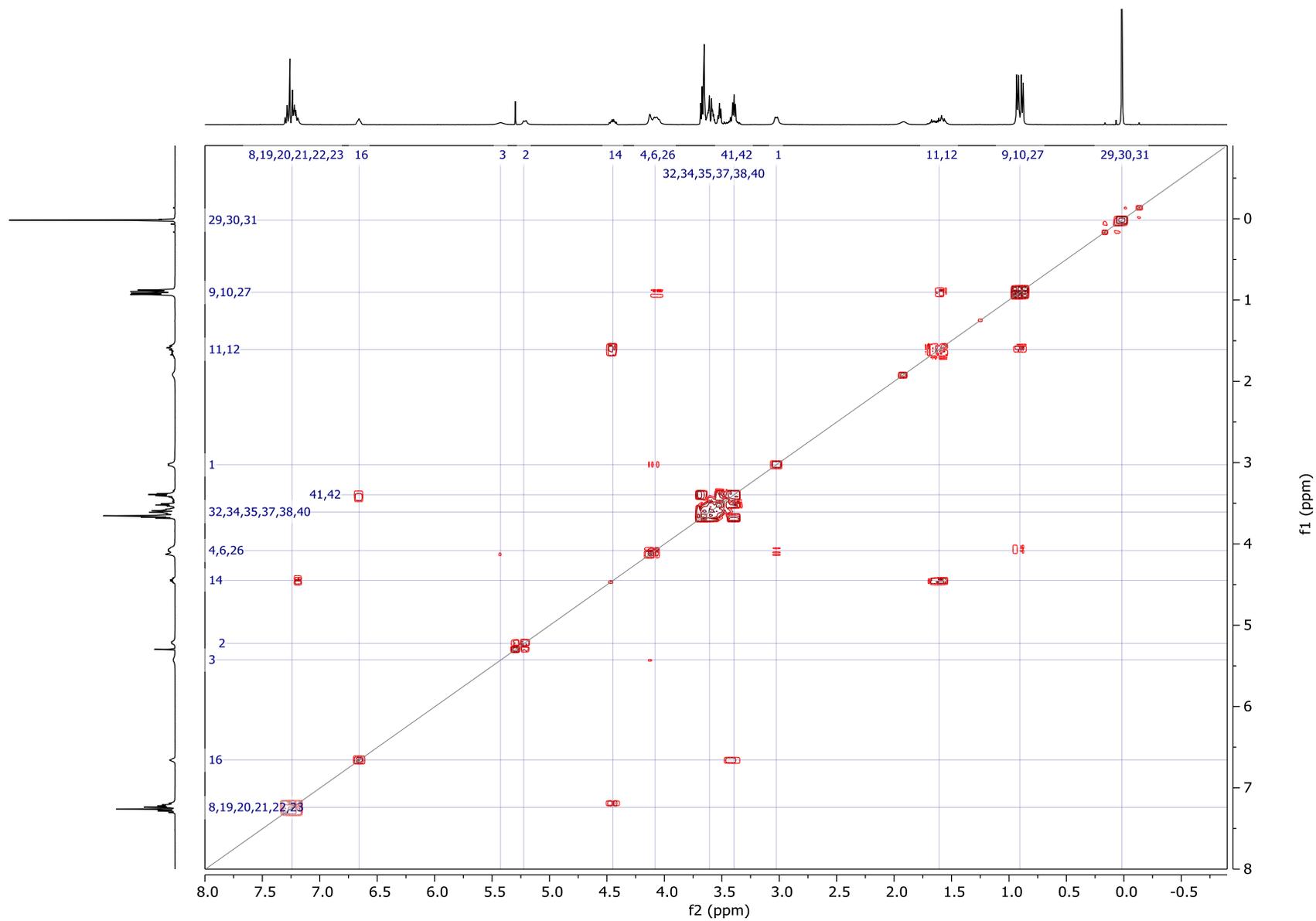
$^1\text{H}$  NMR



<sup>13</sup>C NMR

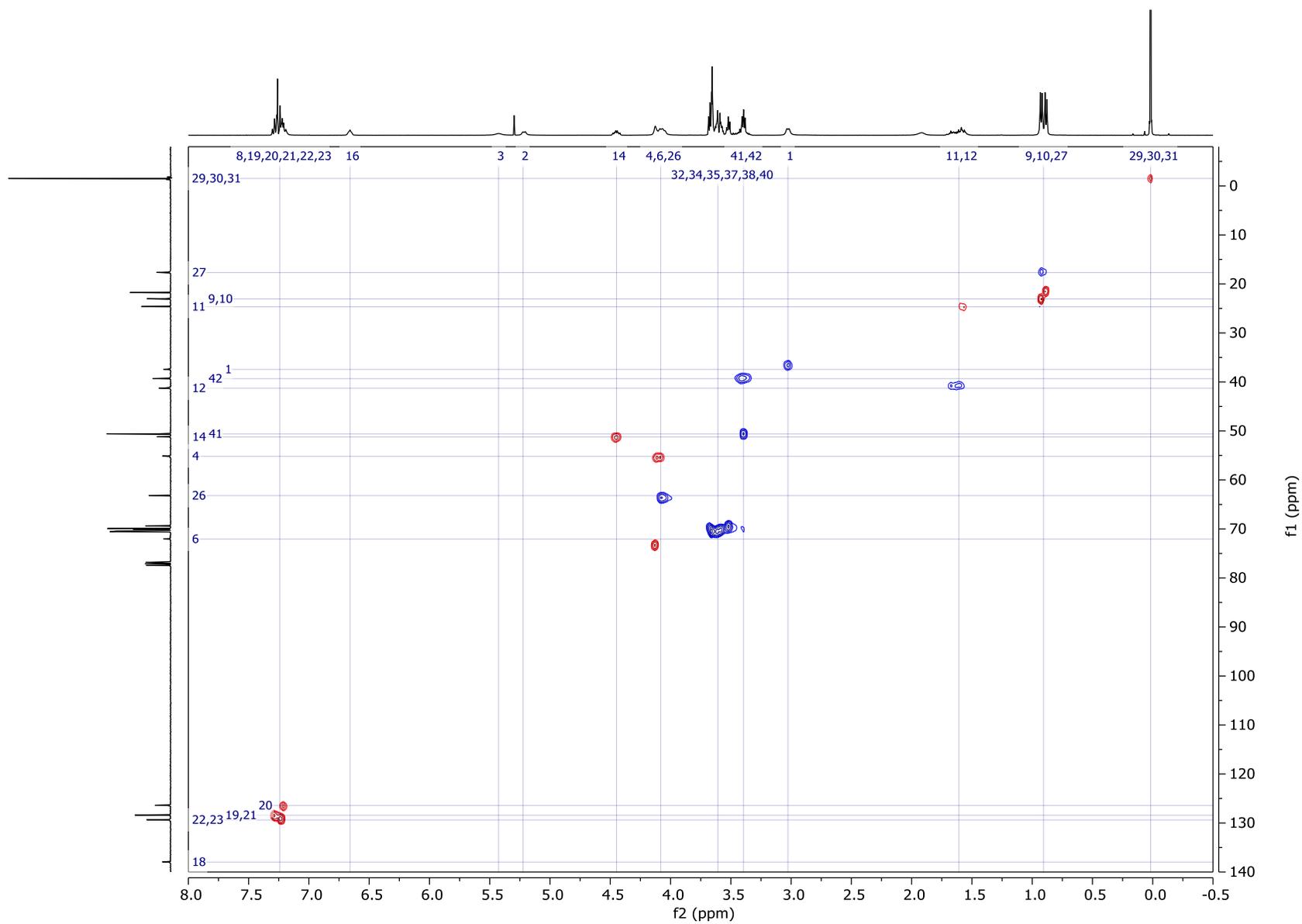


# COSY NMR



S-416

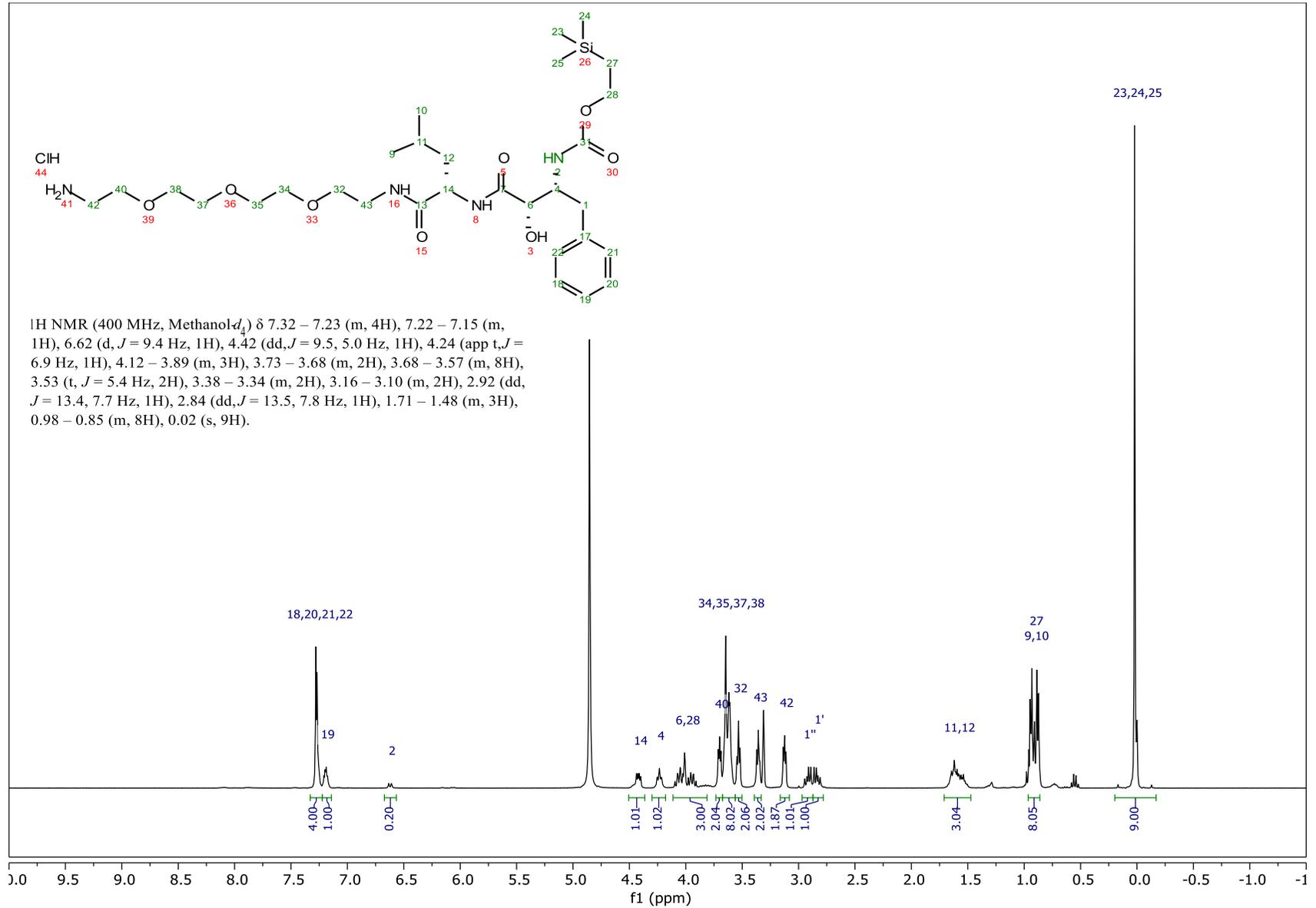
# HSQC NMR



S-417

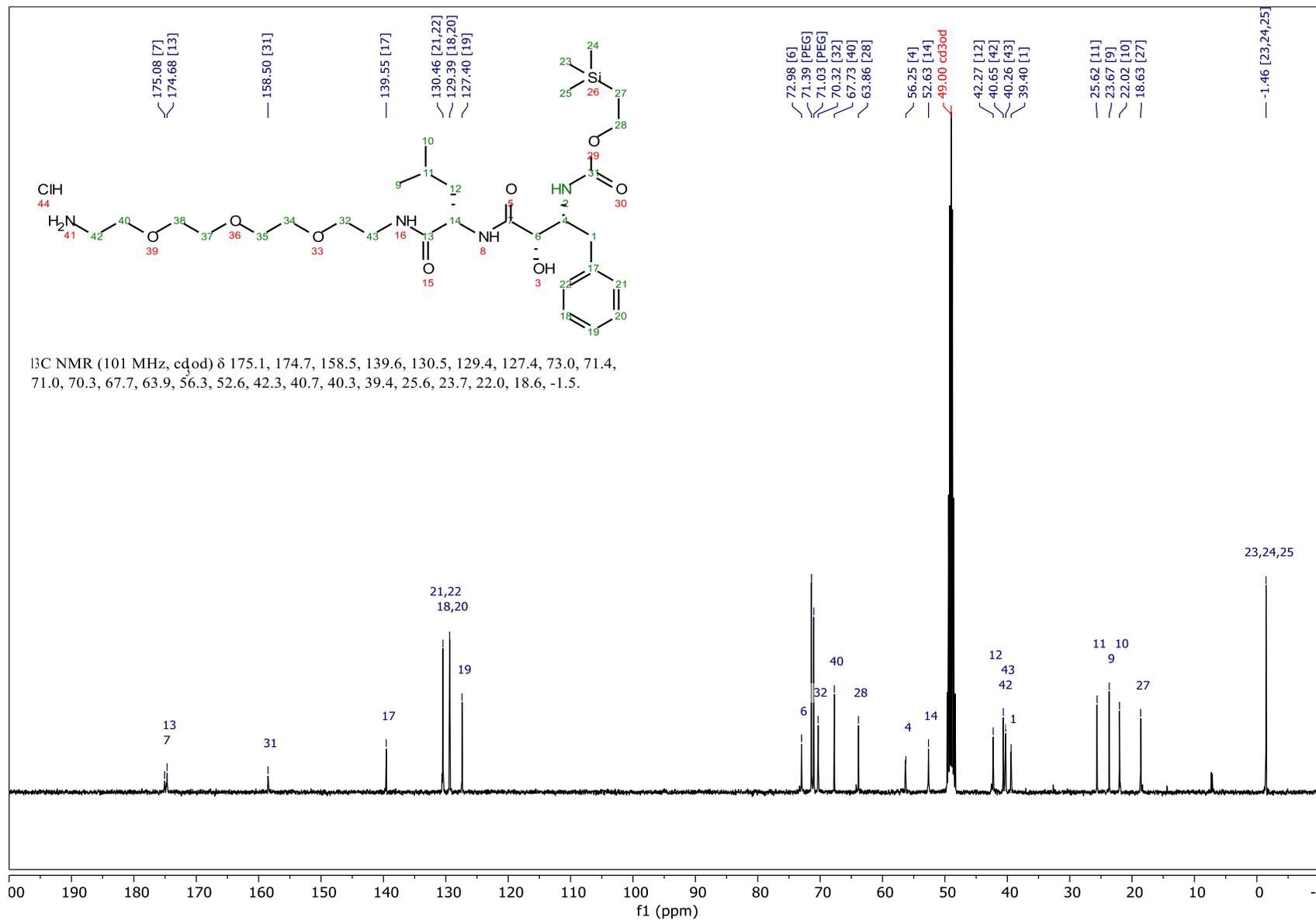
# Compound RBM5-180

<sup>1</sup>H NMR



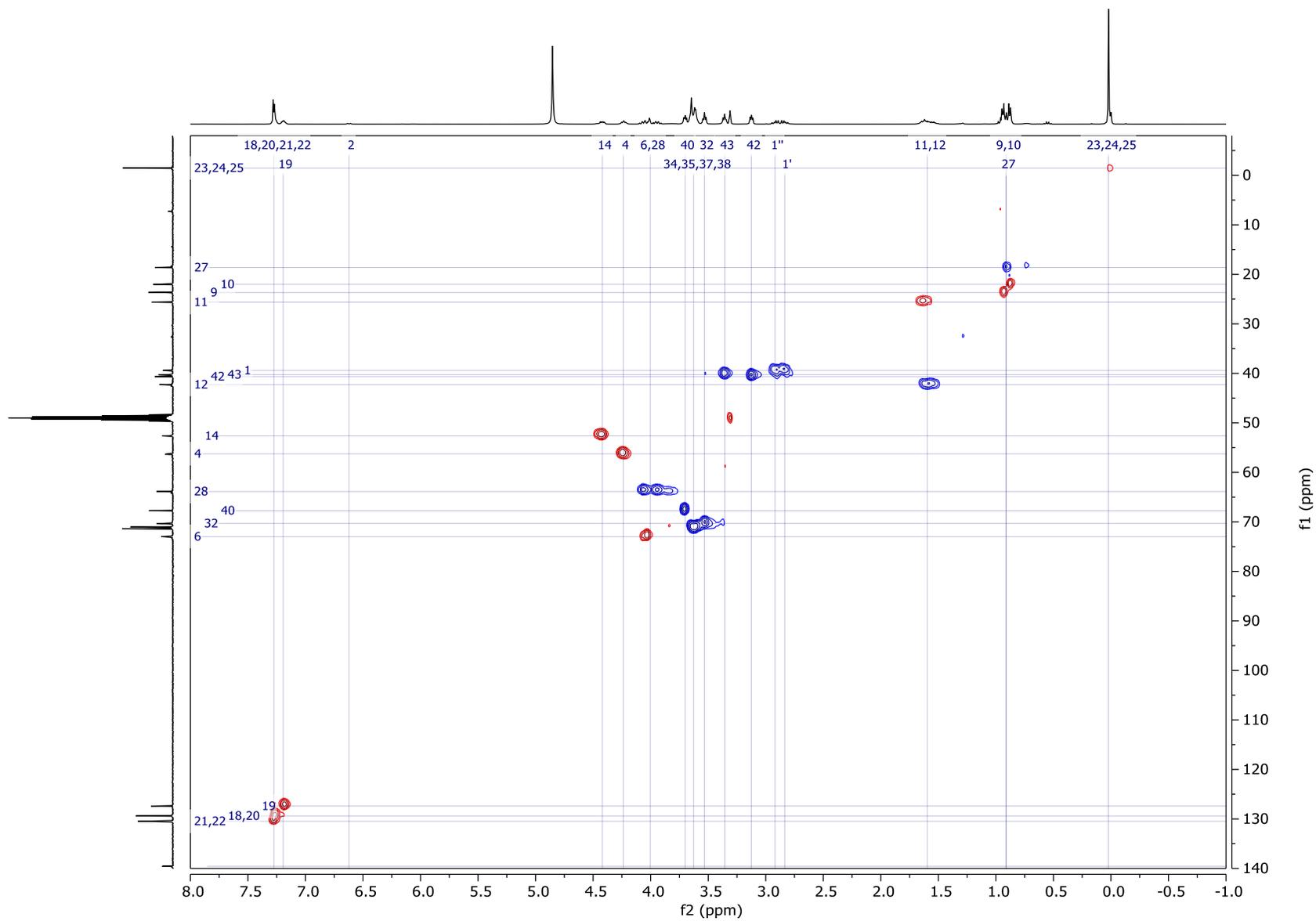
S-418

<sup>13</sup>C NMR





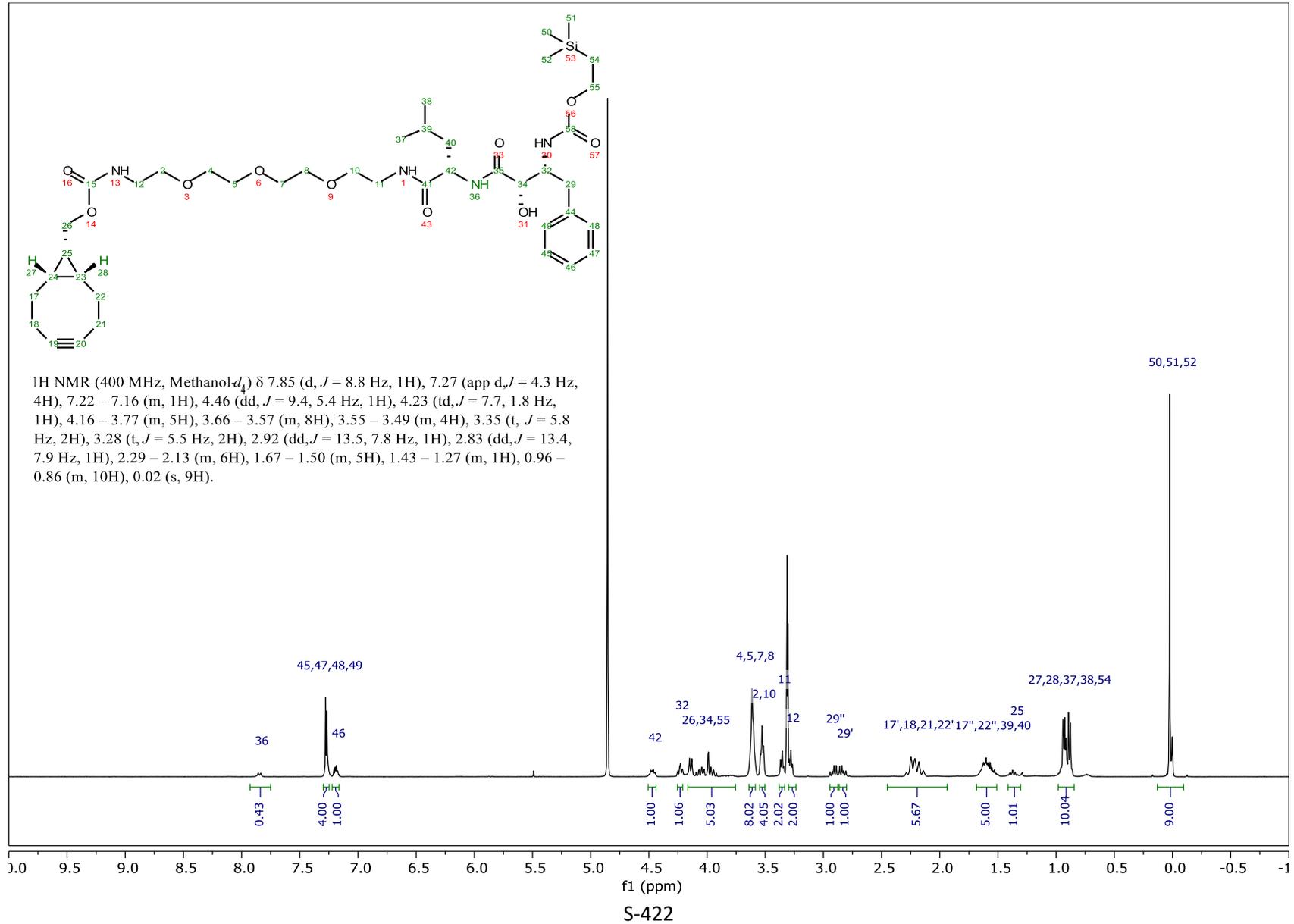
# HSQC NMR



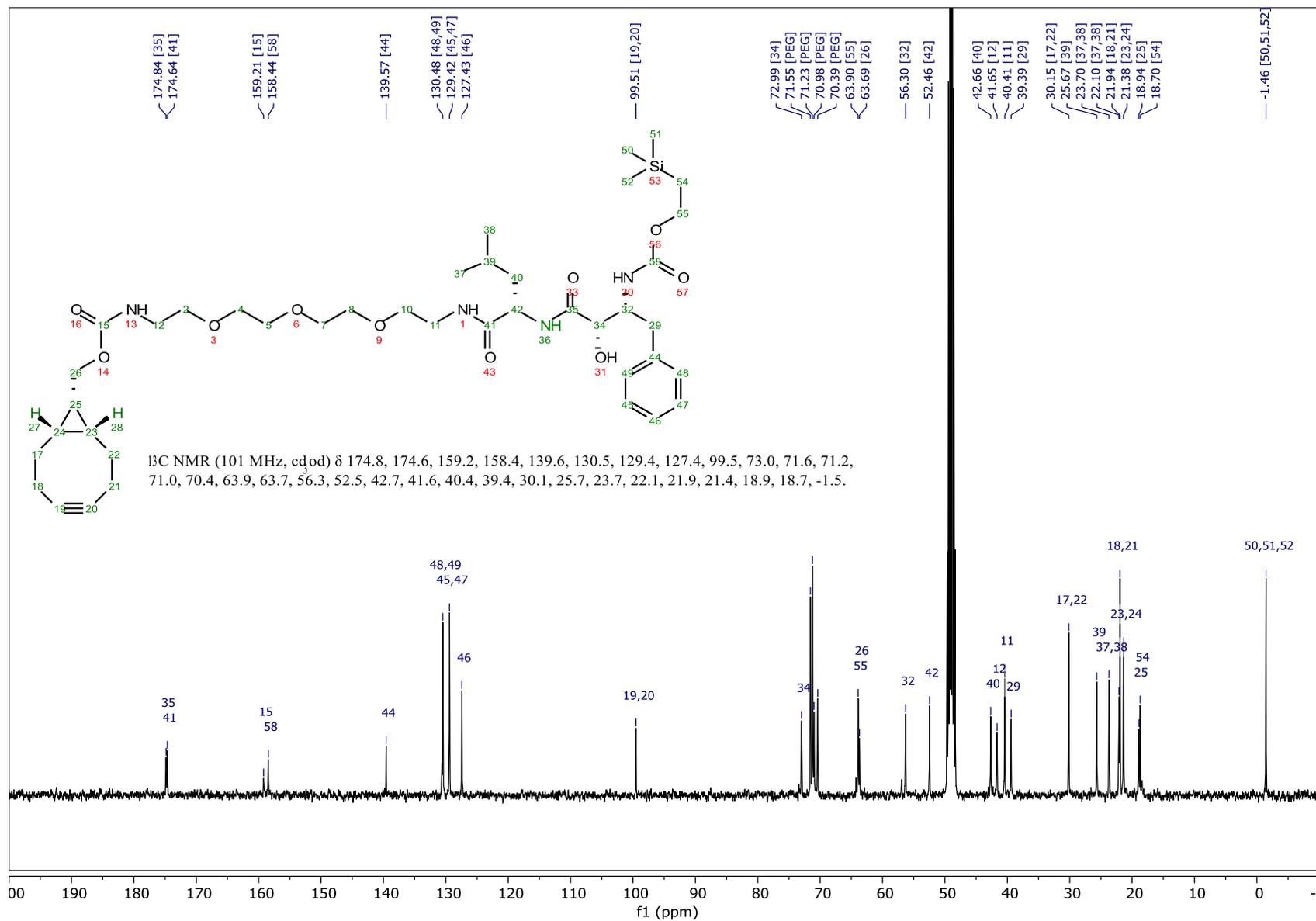
S-421

# Compound RBM5-181

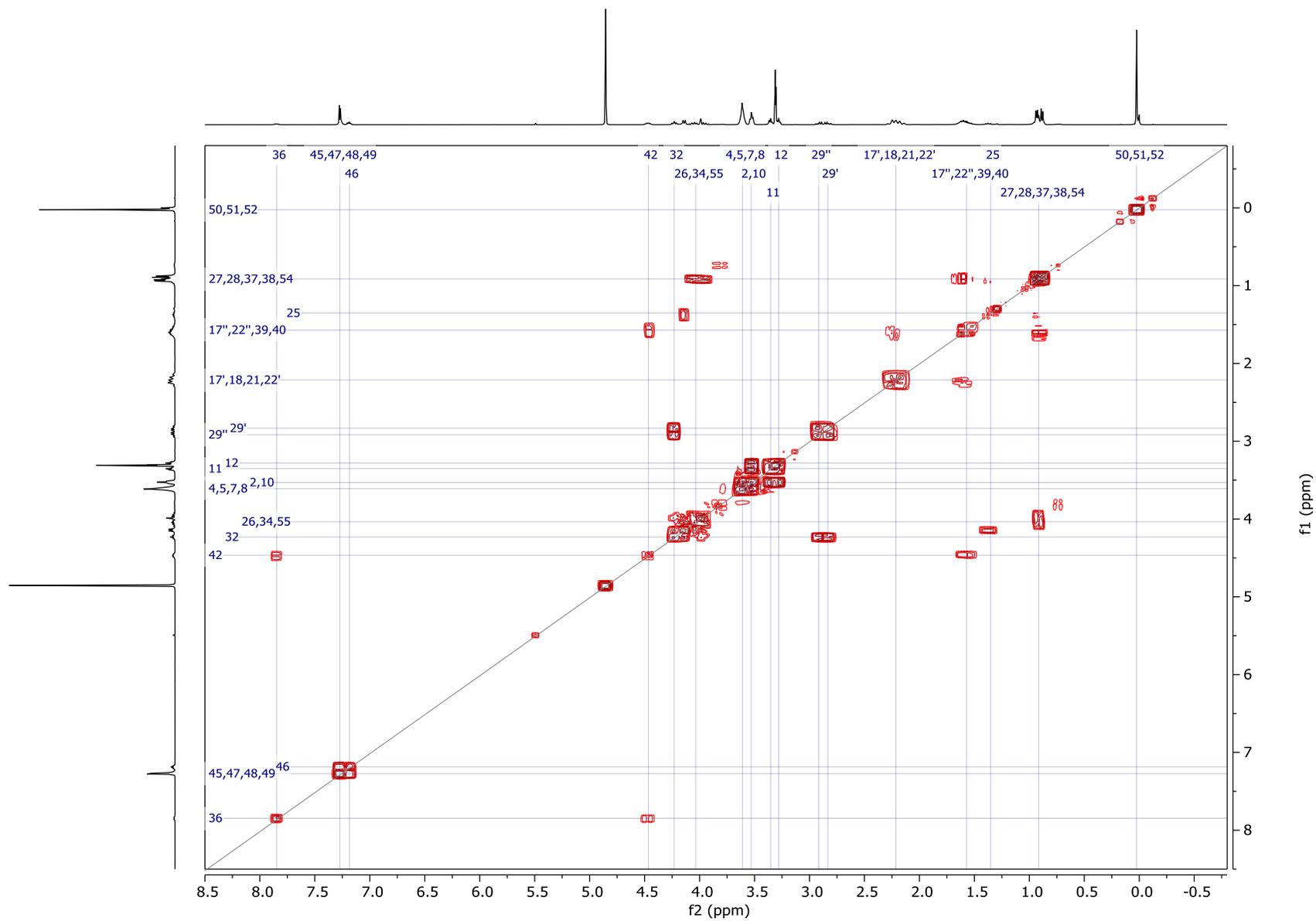
$^1\text{H}$  NMR



<sup>13</sup>C NMR

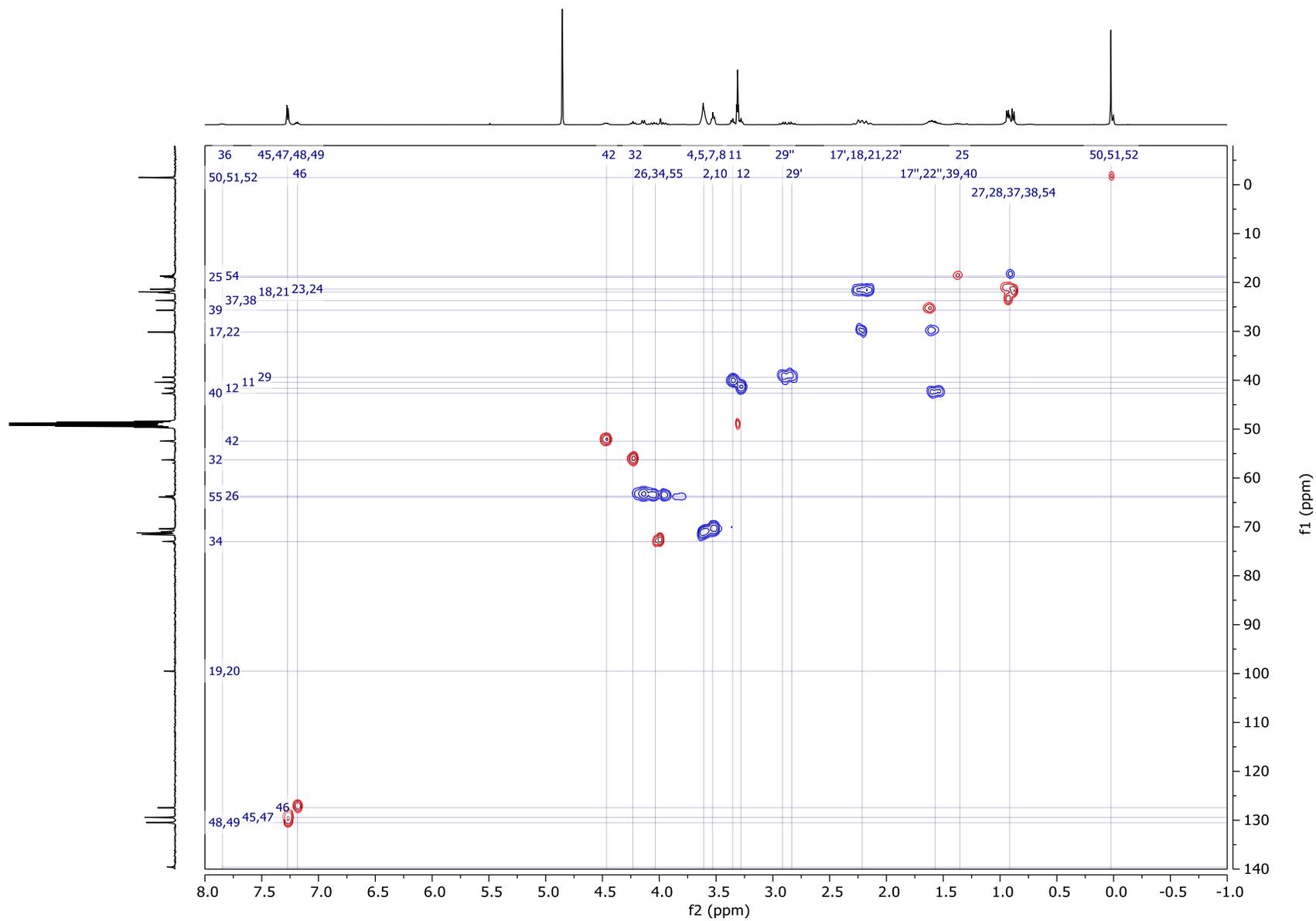


# COSY NMR



S-424

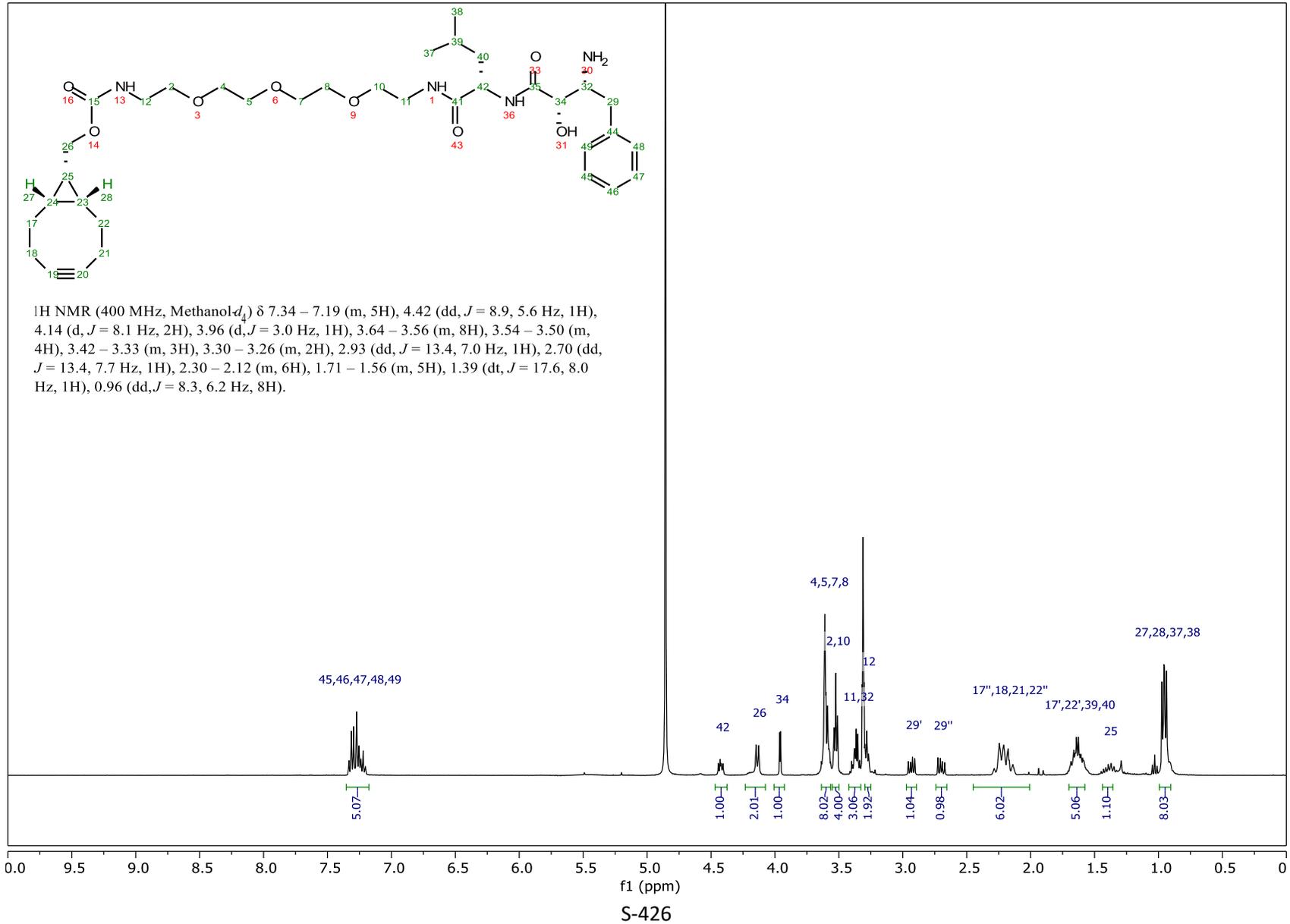
# HSQC NMR



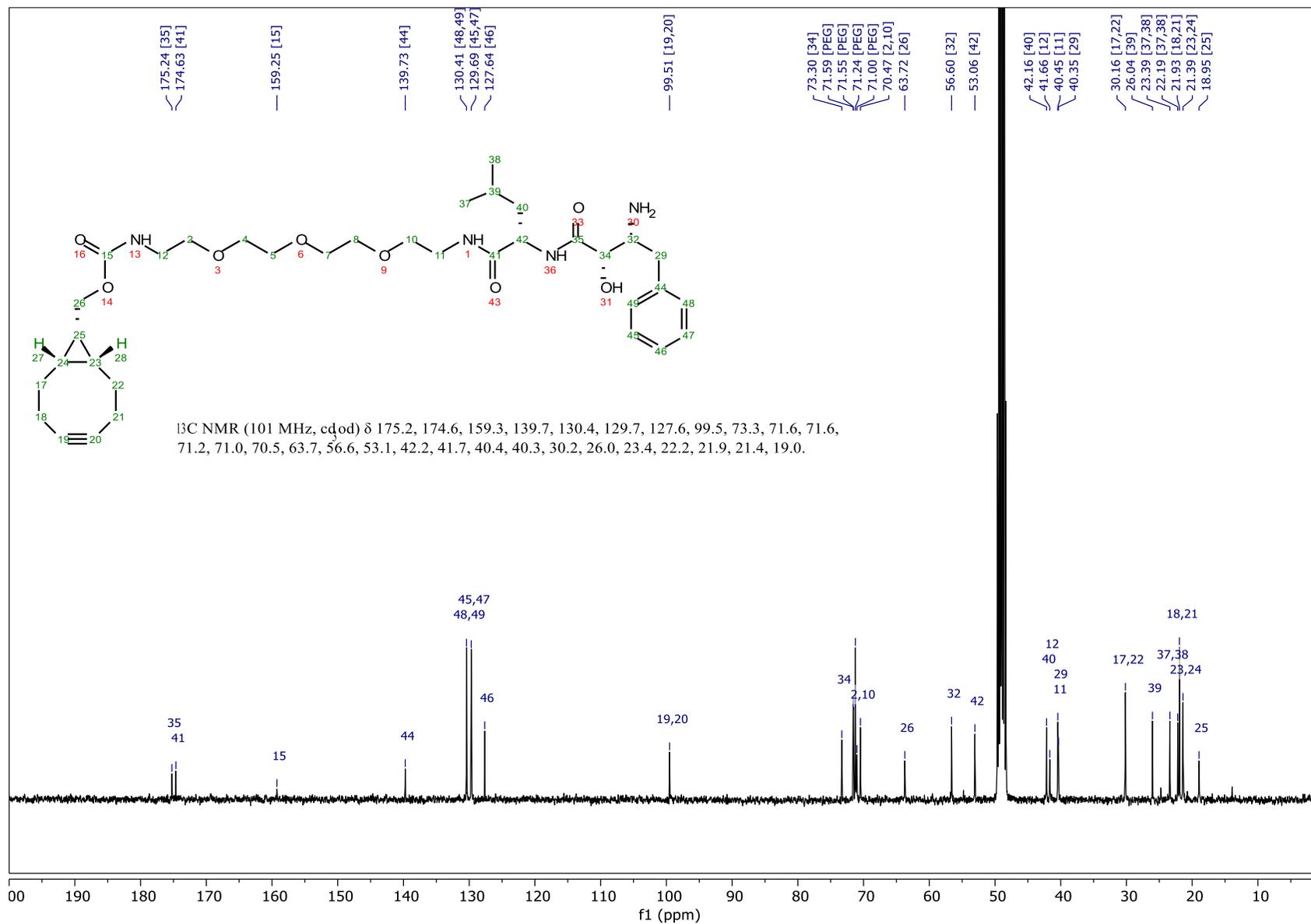
S-425

# Compound RBM5-182

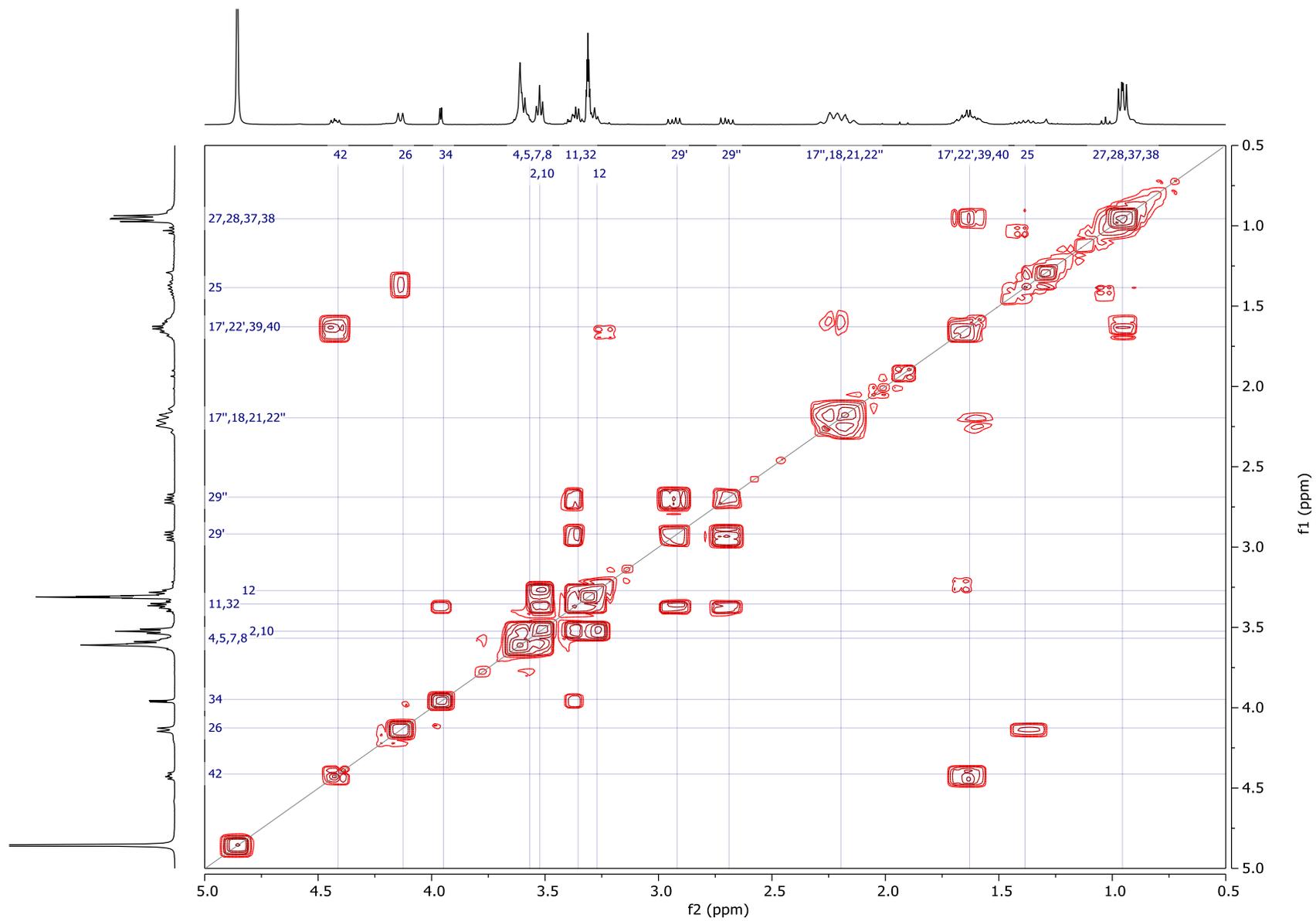
$^1\text{H}$  NMR



<sup>13</sup>C NMR

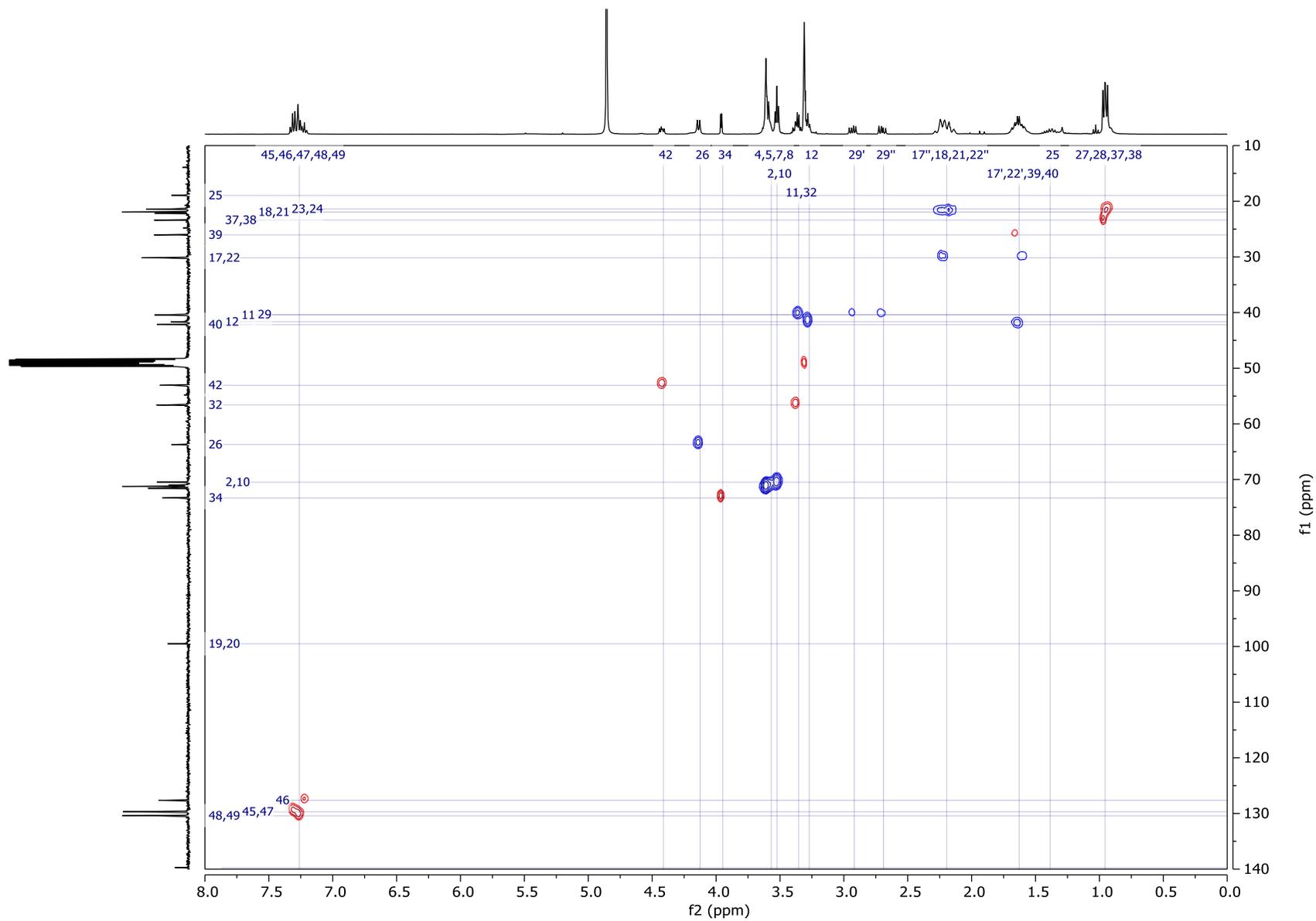


# COSY NMR



S-428

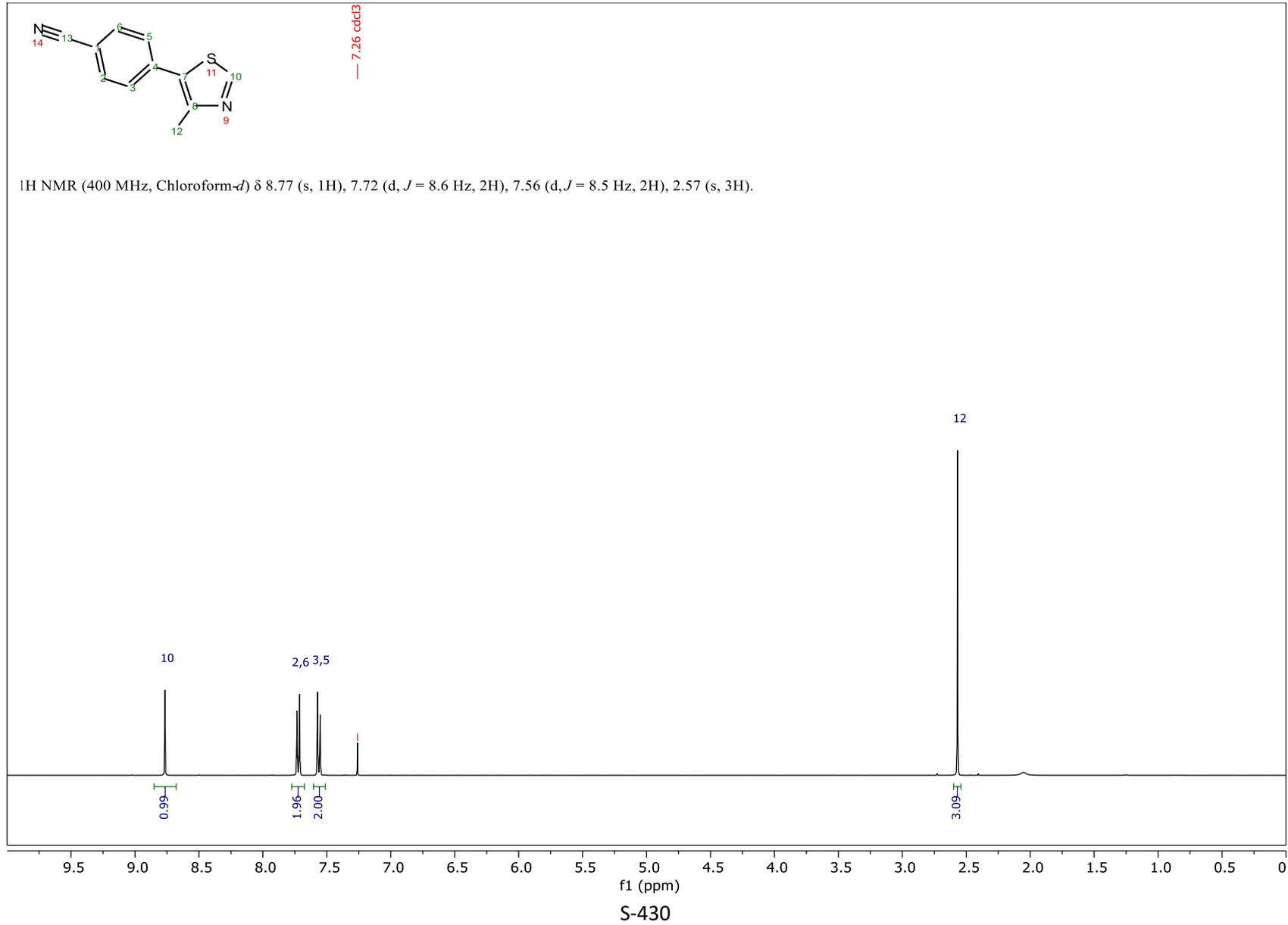
# HSQC NMR



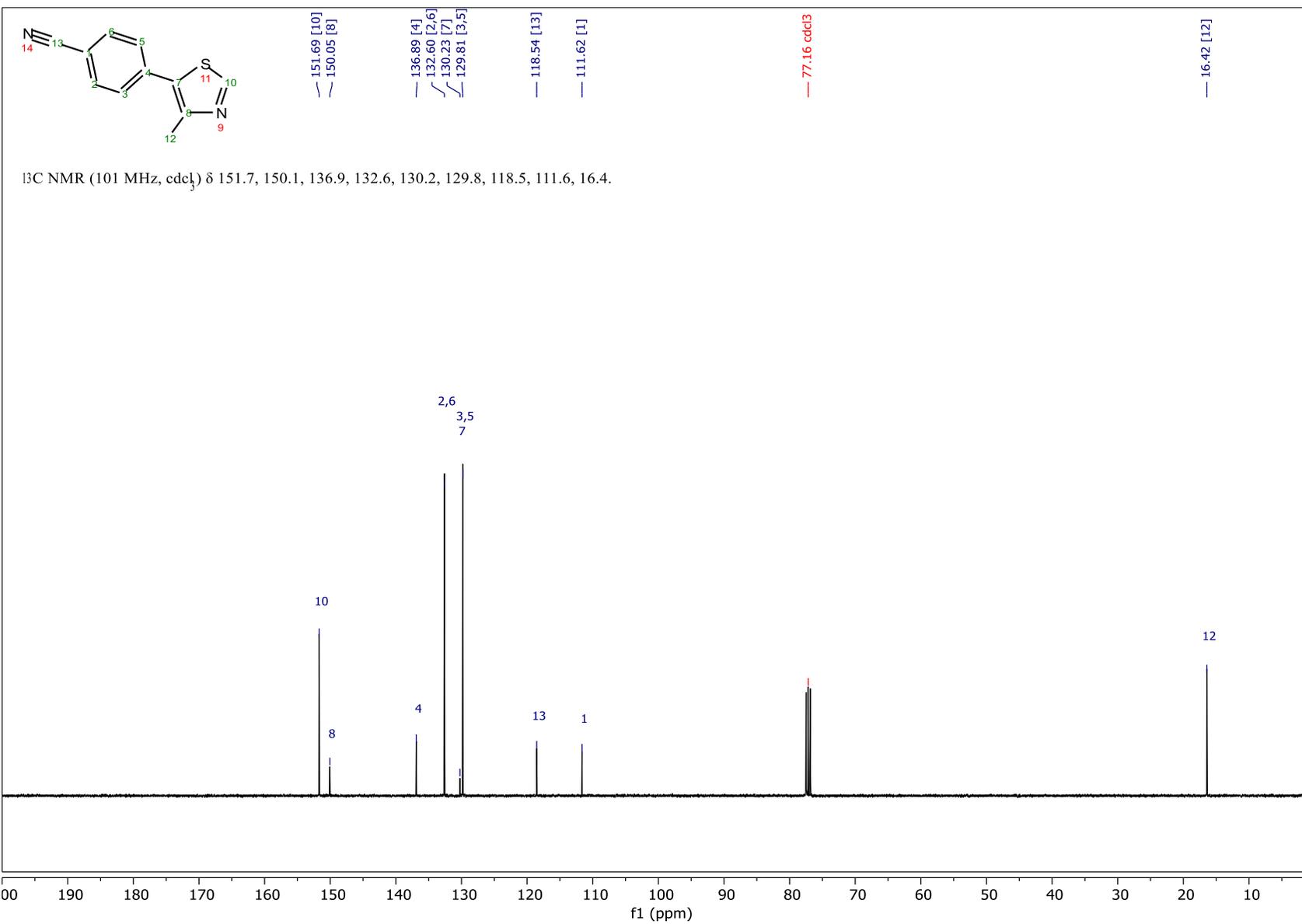
S-429

# Compound RBM5-183

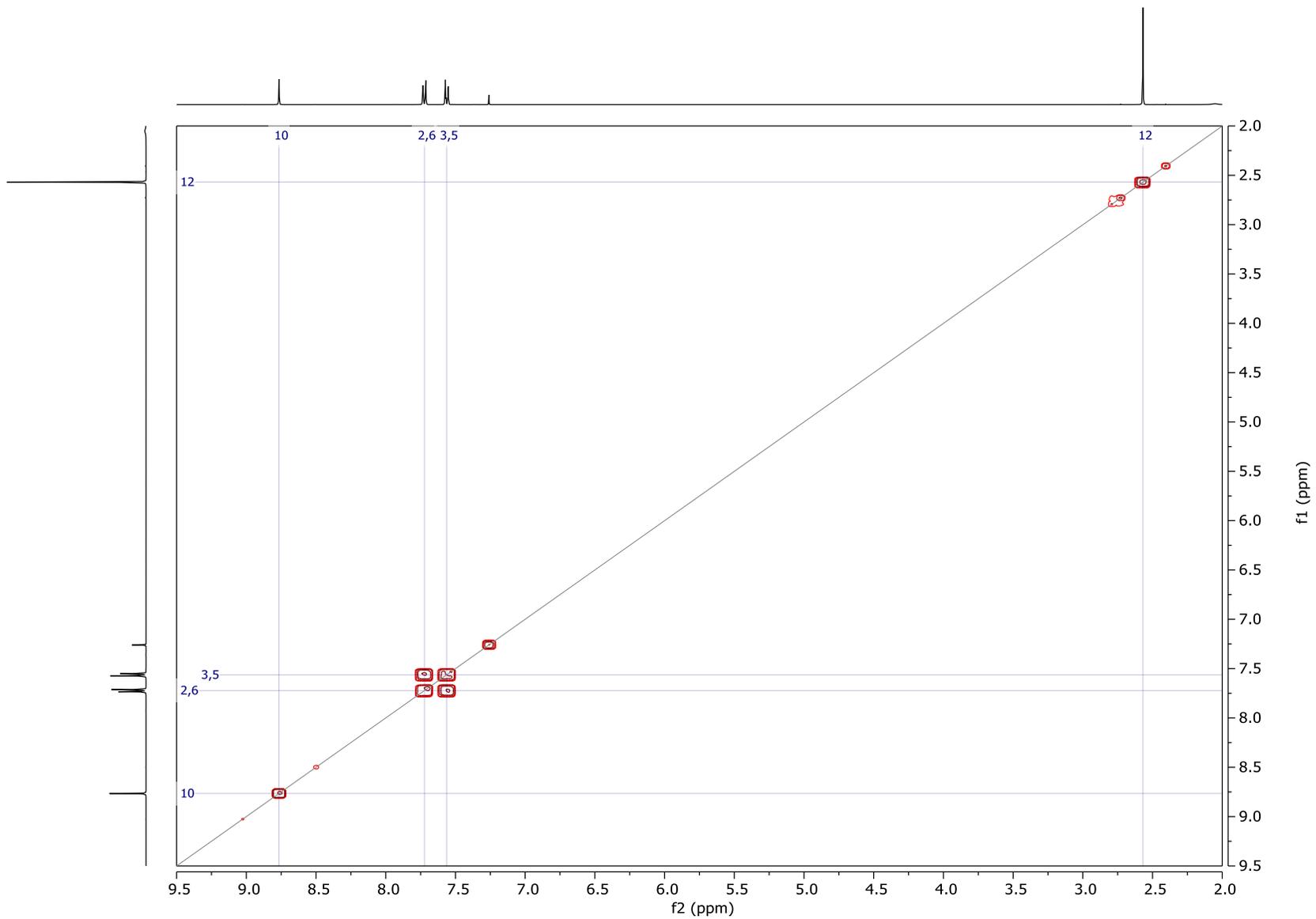
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

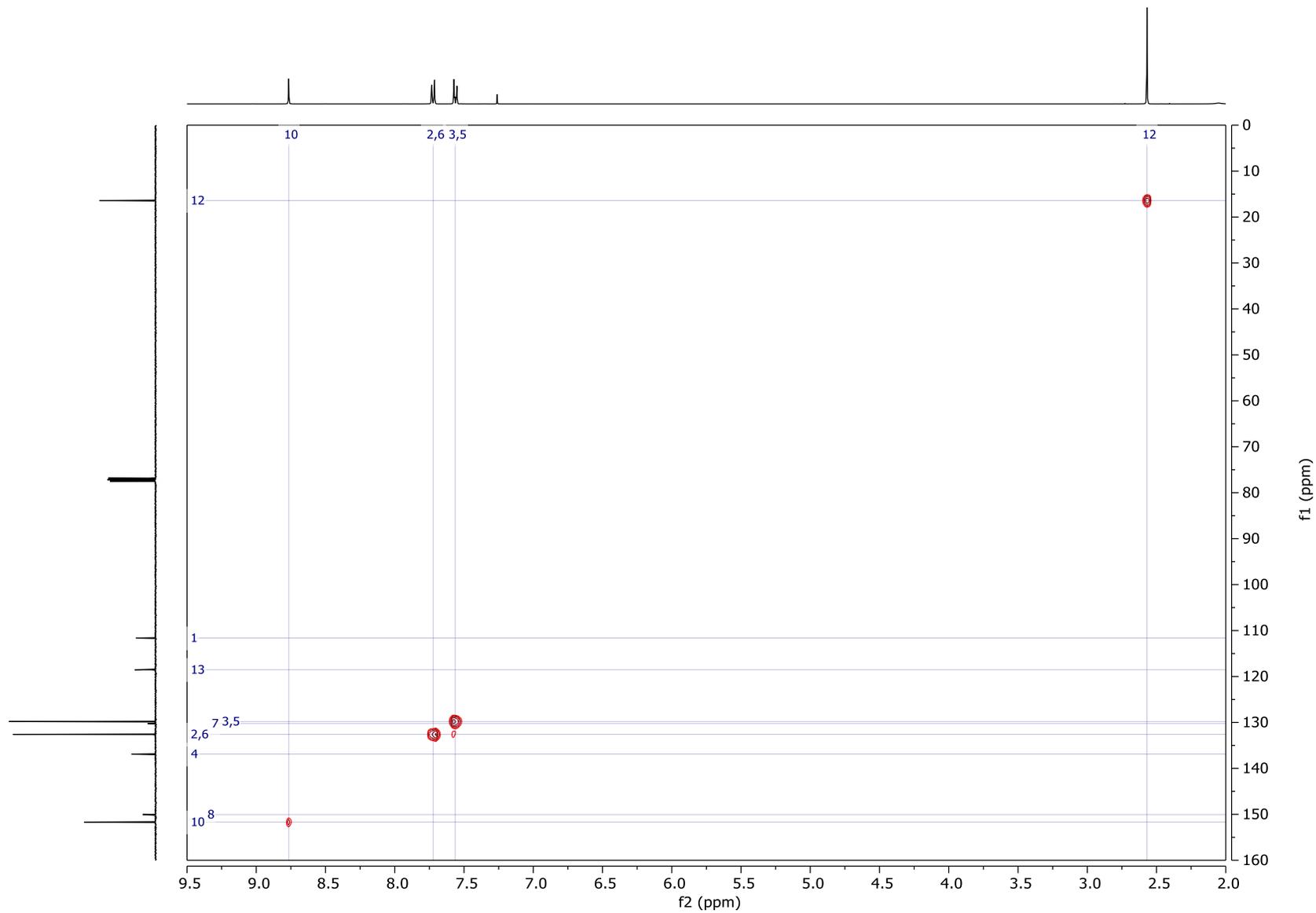


# COSY NMR



S-432

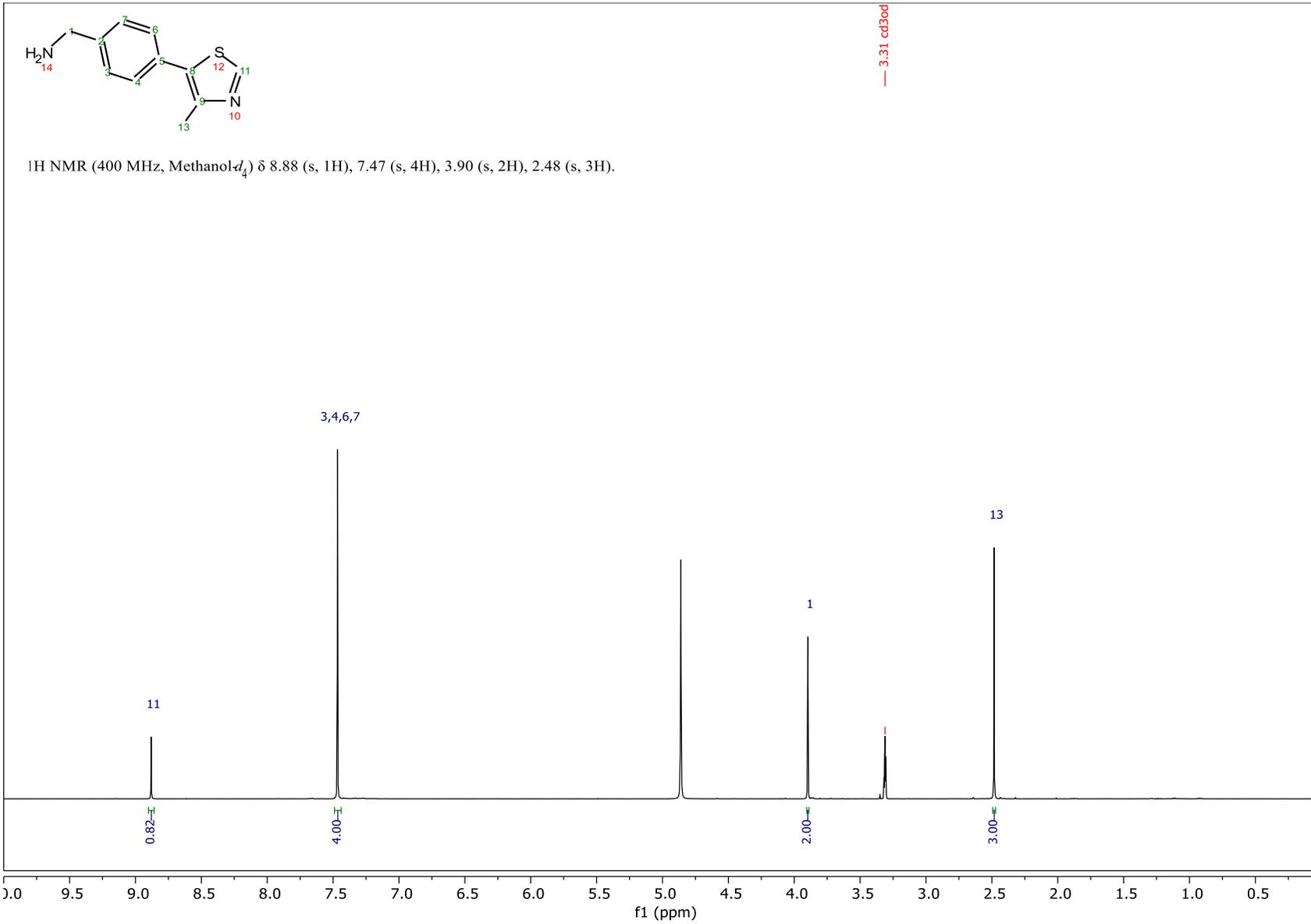
# HSQC NMR



S-433

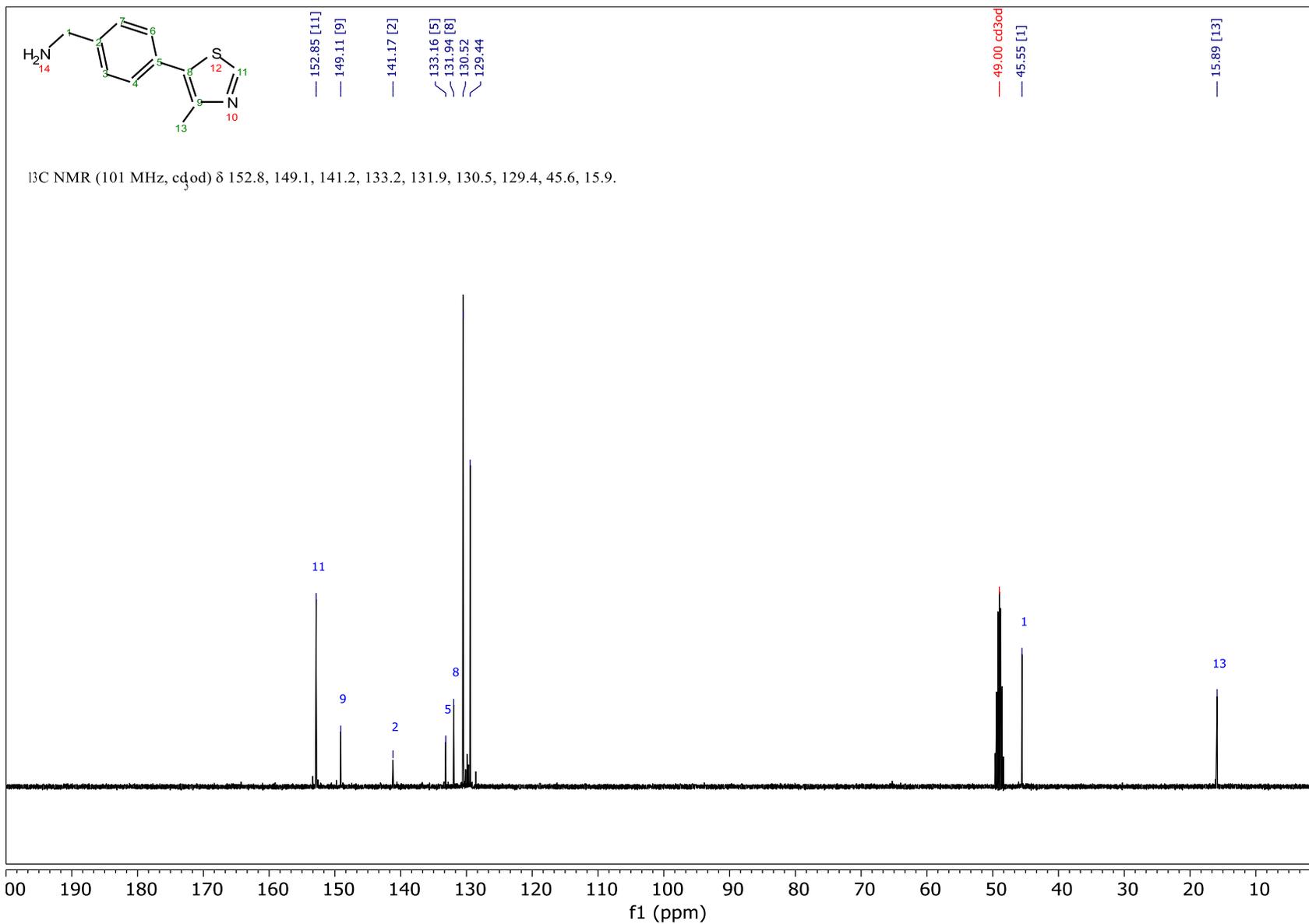
# Compound RBM5-184

$^1\text{H NMR}$

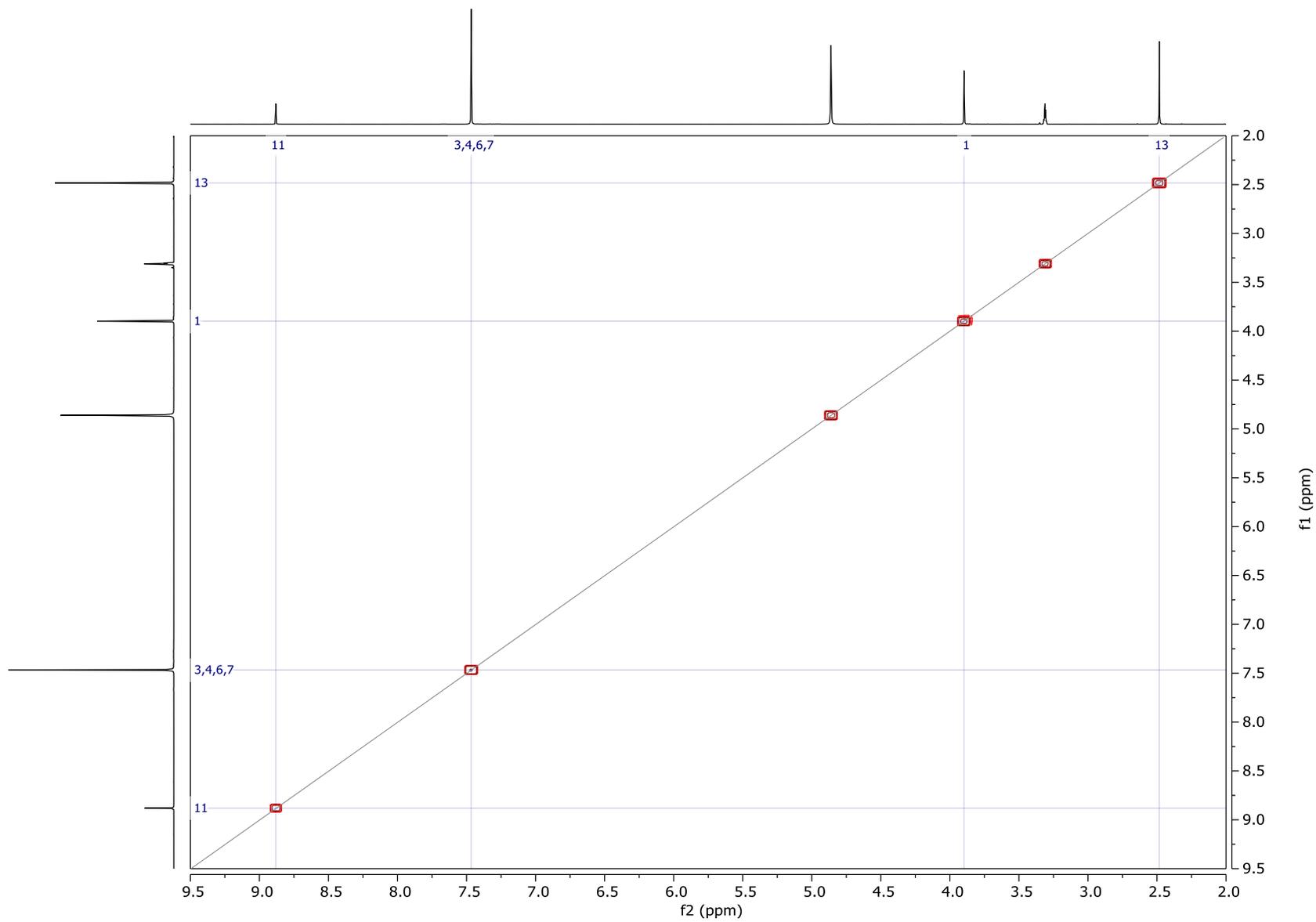


S-434

# <sup>13</sup>C NMR

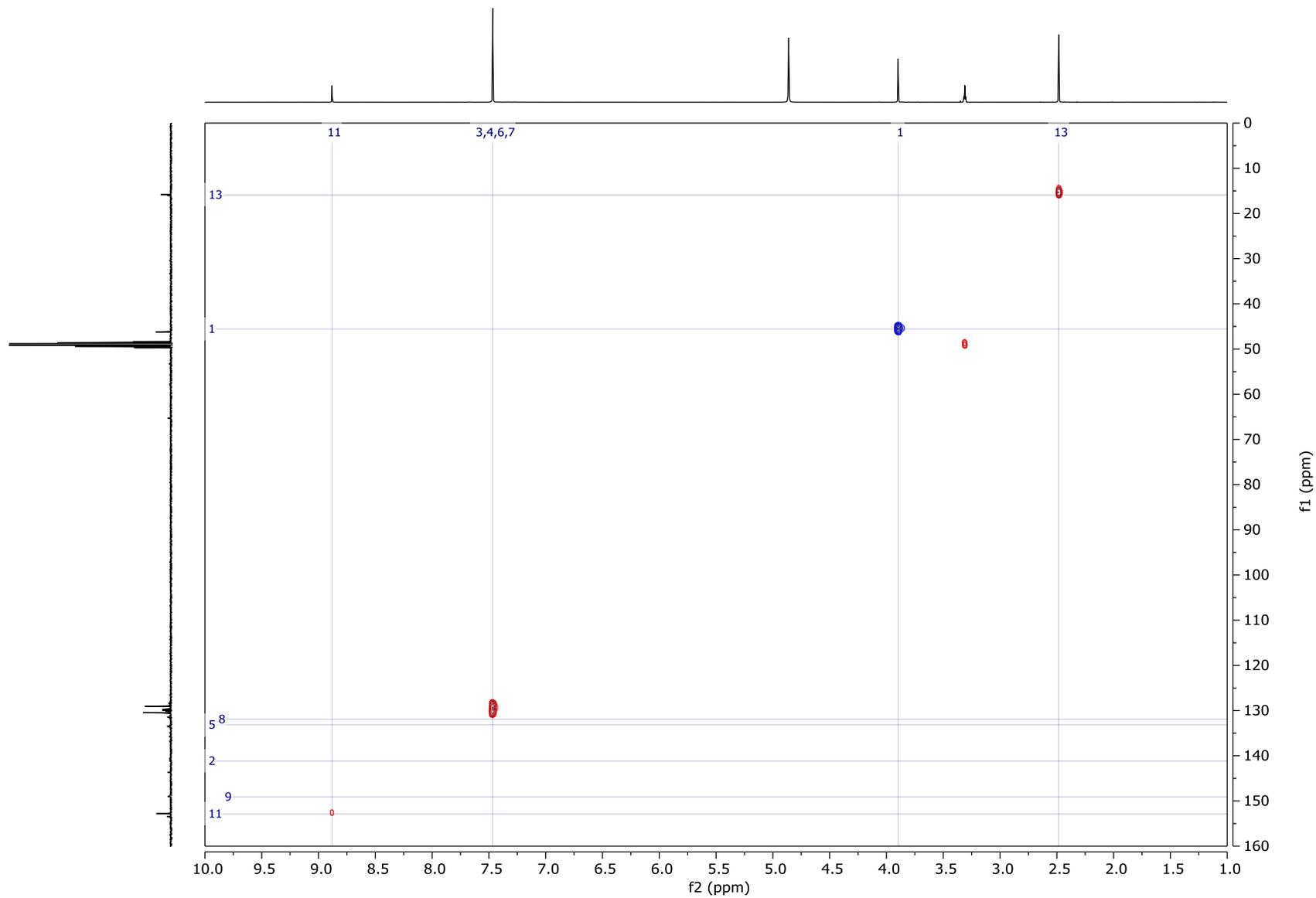


# COSY NMR



S-436

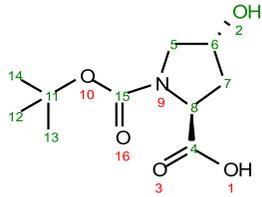
# HSQC NMR



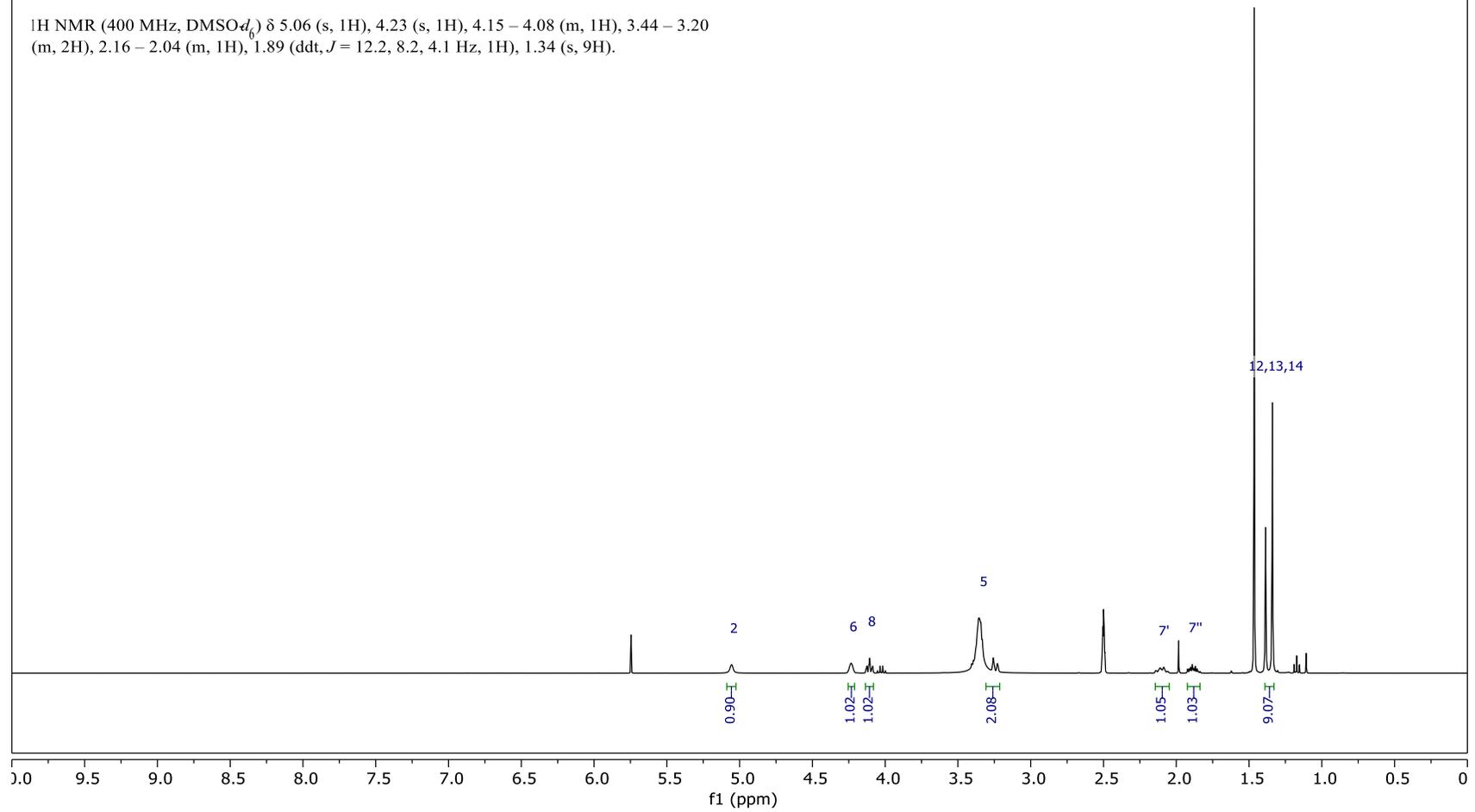
S-437

# Compound RBM5-185

$^1\text{H}$  NMR

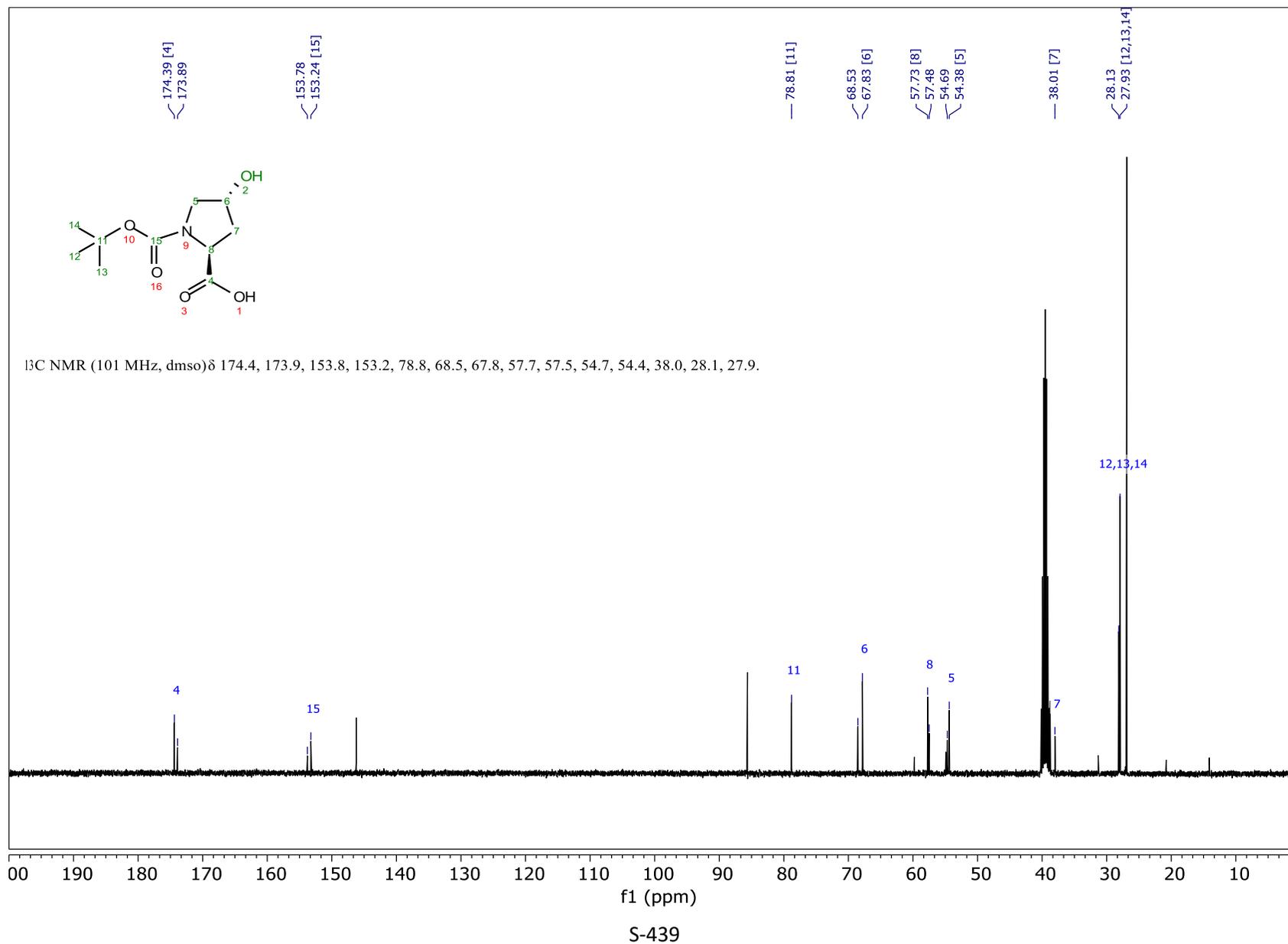


$^1\text{H}$  NMR (400 MHz,  $\text{DMSO-}d_6$ )  $\delta$  5.06 (s, 1H), 4.23 (s, 1H), 4.15 – 4.08 (m, 1H), 3.44 – 3.20 (m, 2H), 2.16 – 2.04 (m, 1H), 1.89 (ddt,  $J = 12.2, 8.2, 4.1$  Hz, 1H), 1.34 (s, 9H).

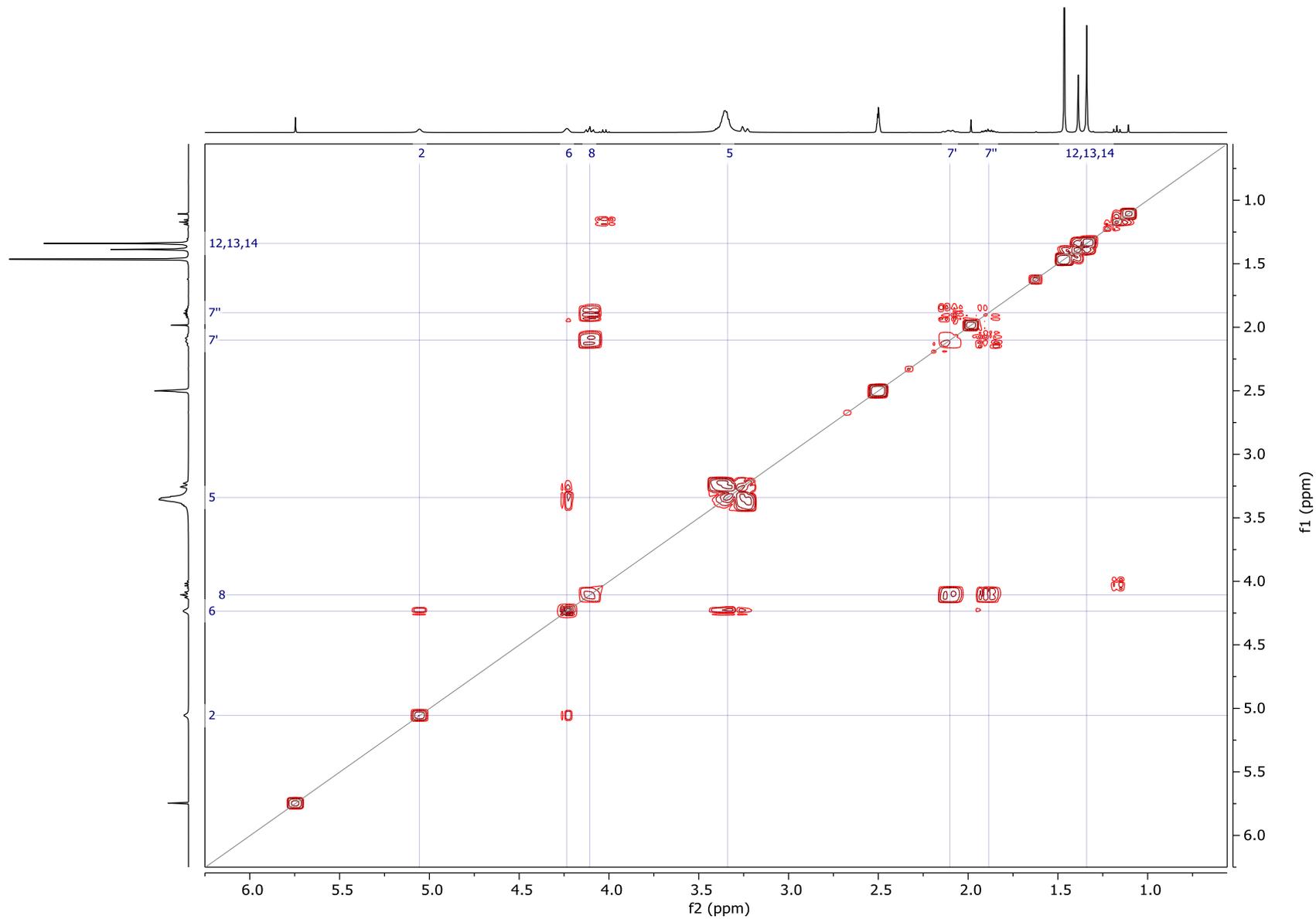


S-438

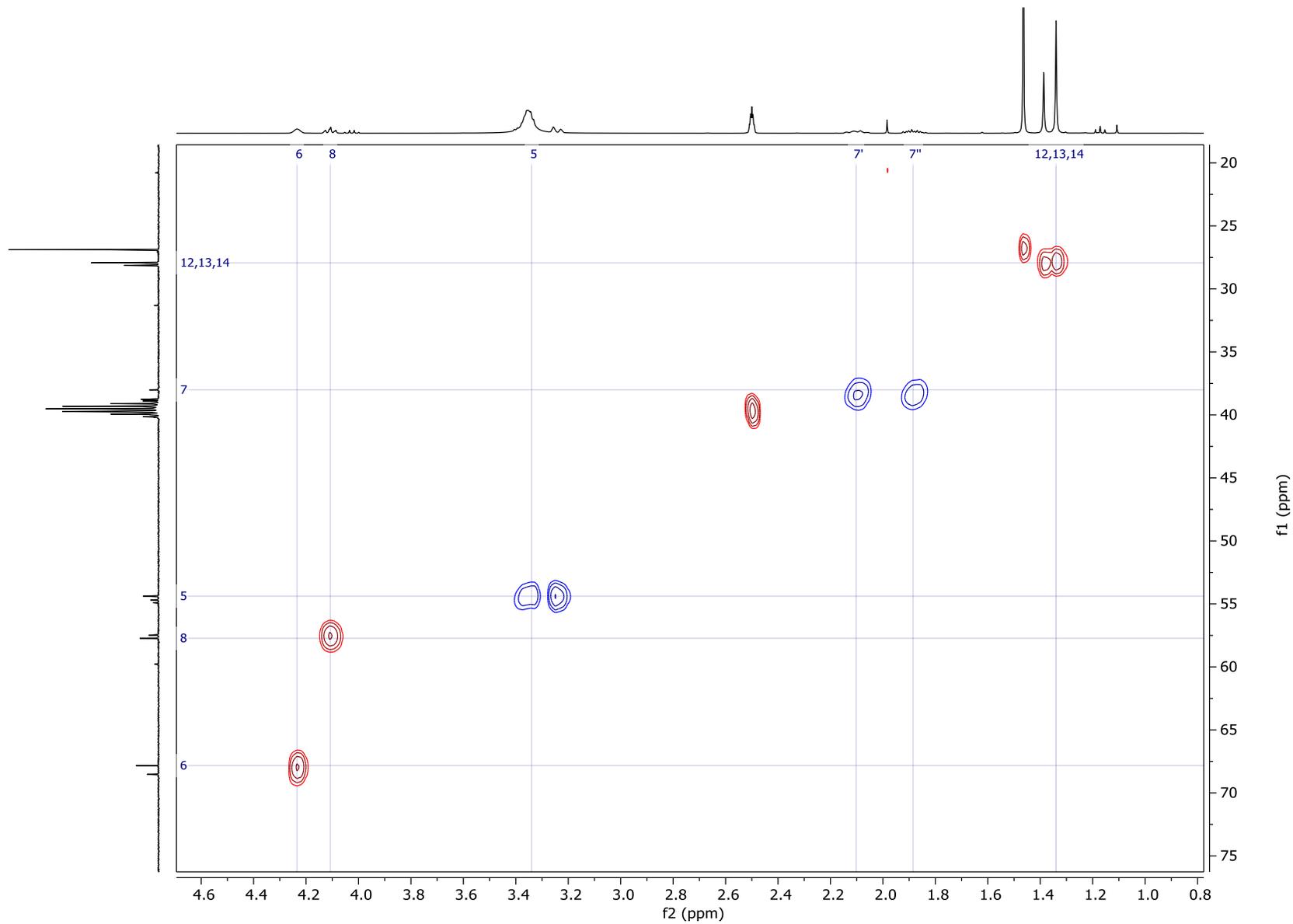
<sup>13</sup>C NMR



COSY NMR



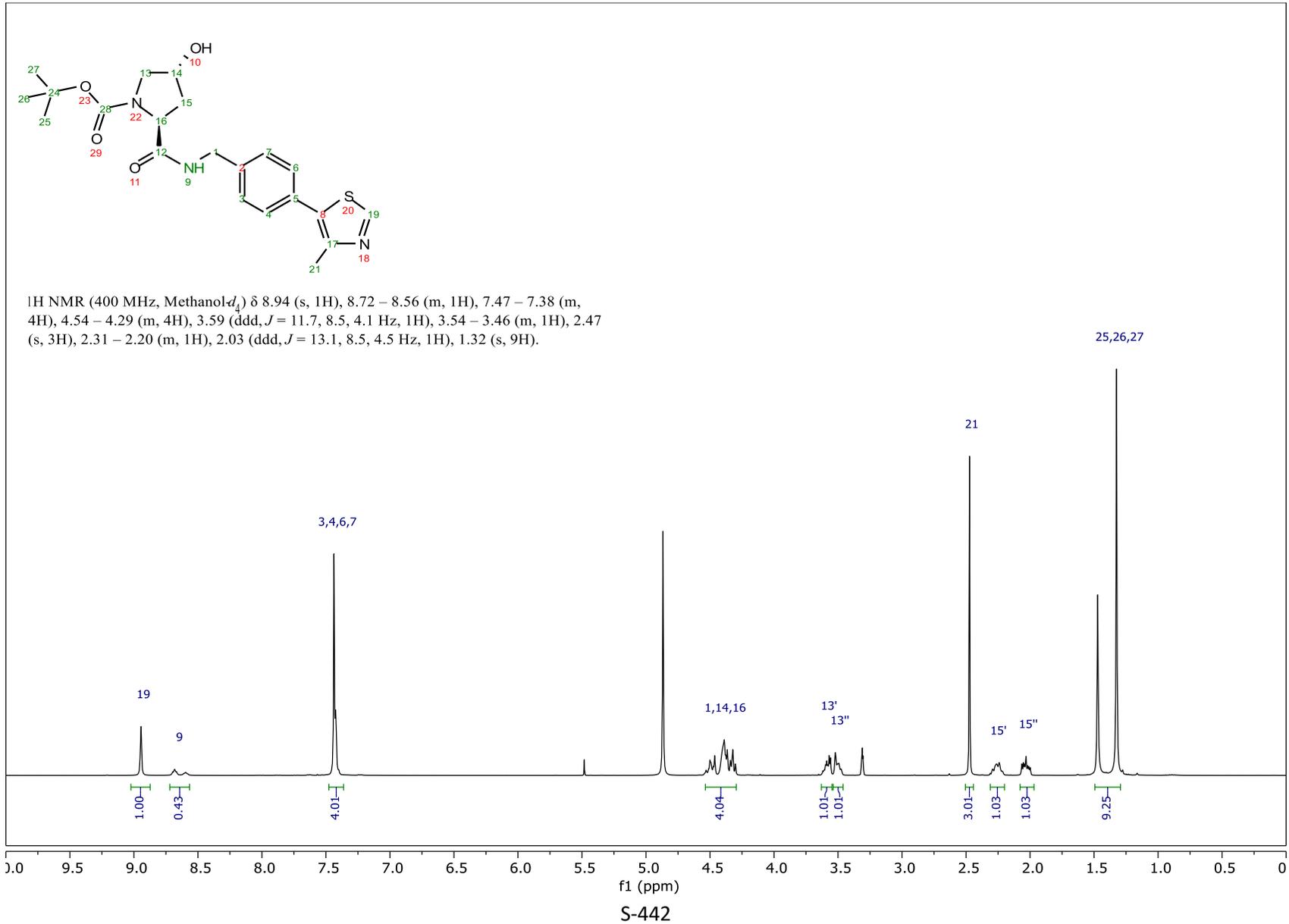
HSQC NMR



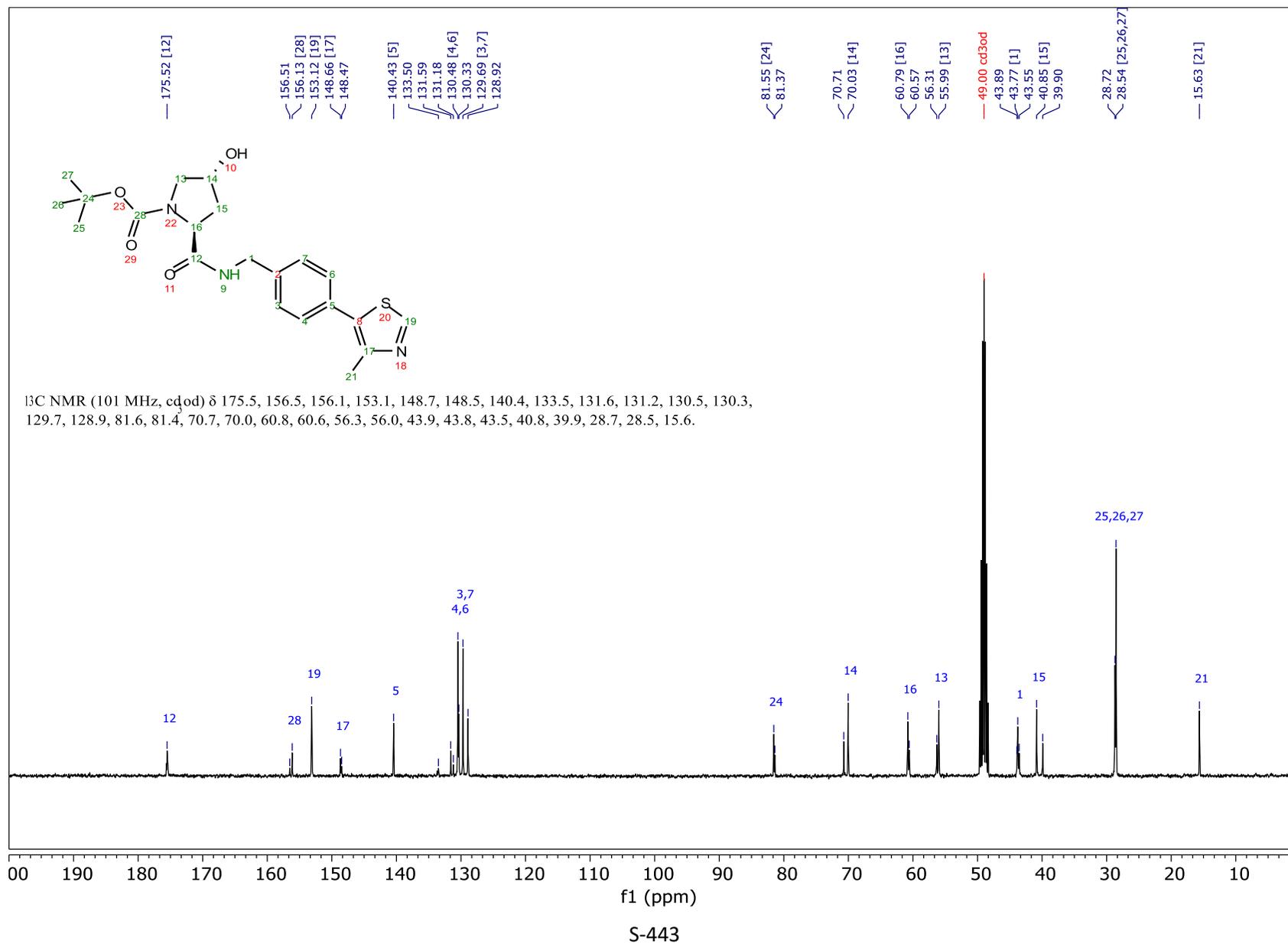
S-441

# Compound RBM5-186

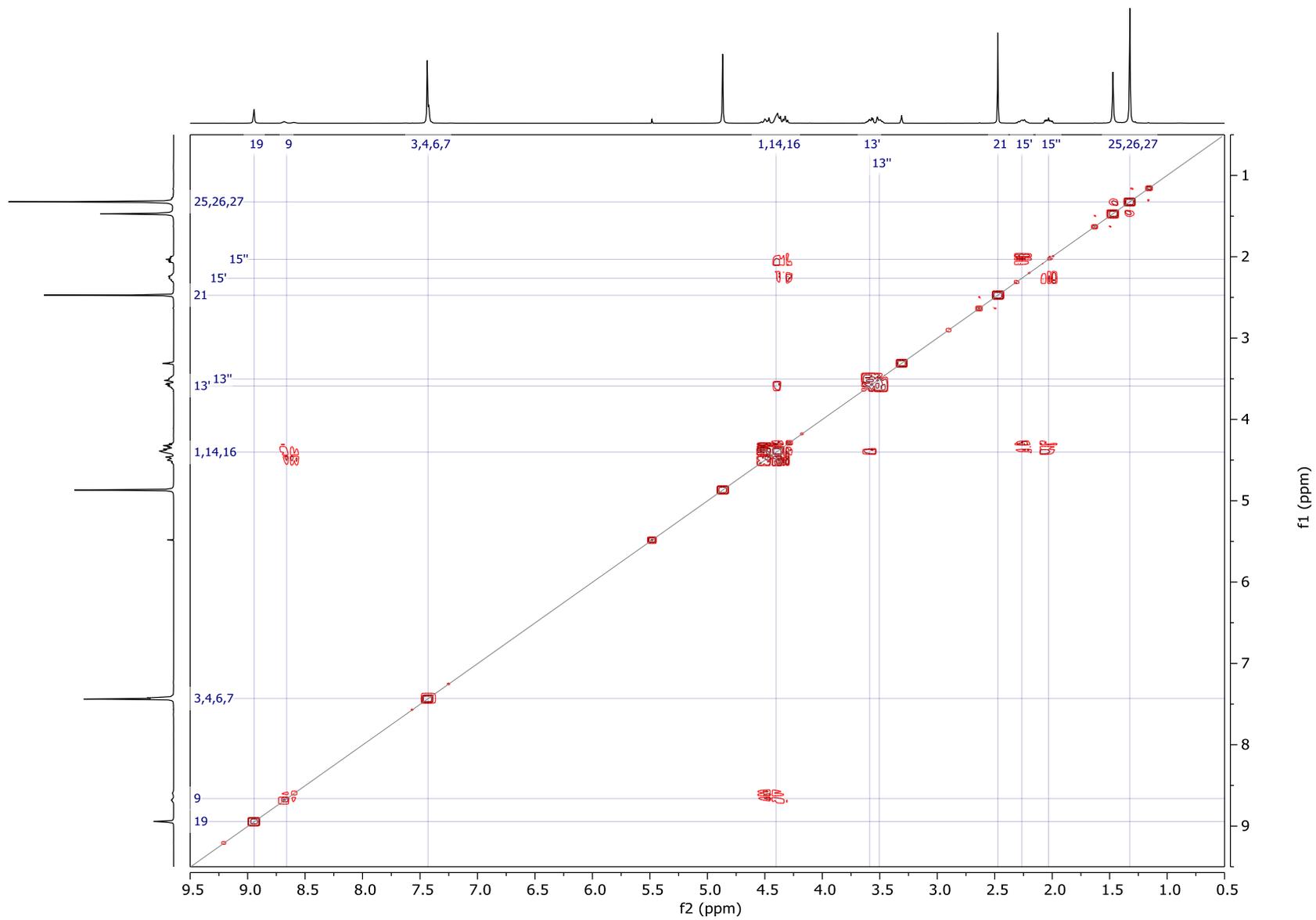
$^1\text{H}$  NMR



# <sup>13</sup>C NMR

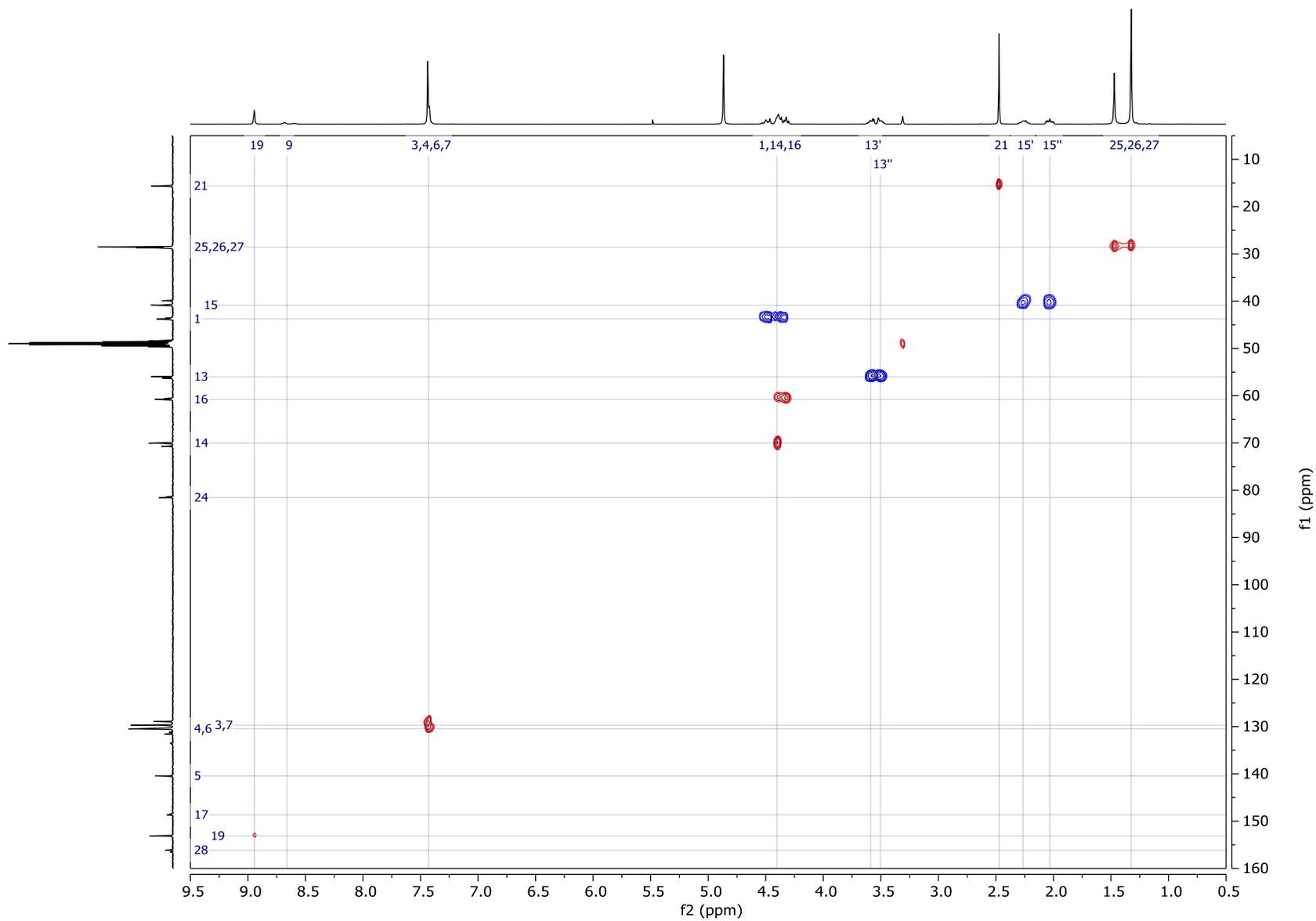


# COSY NMR



S-444

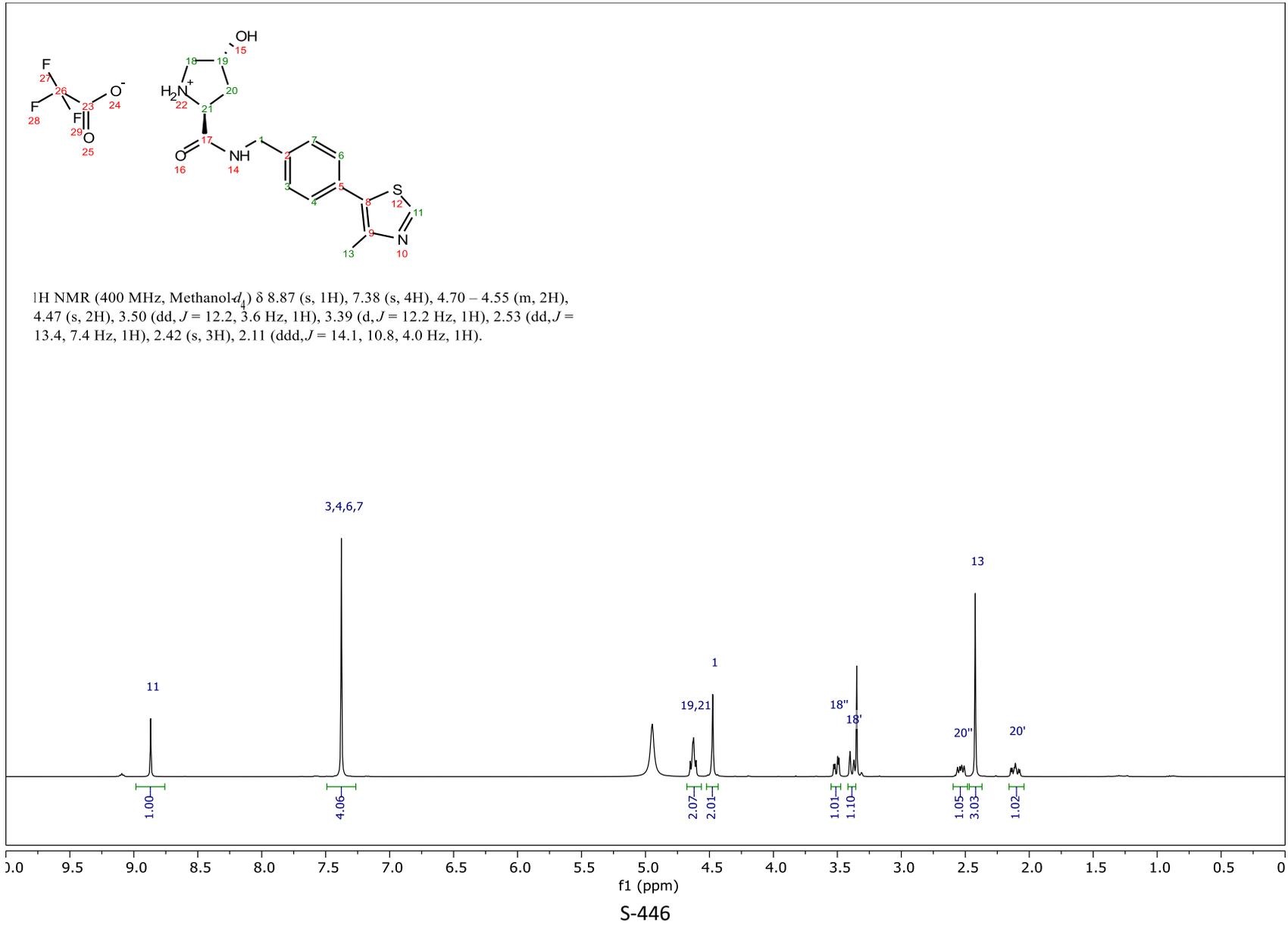
# HSQC NMR



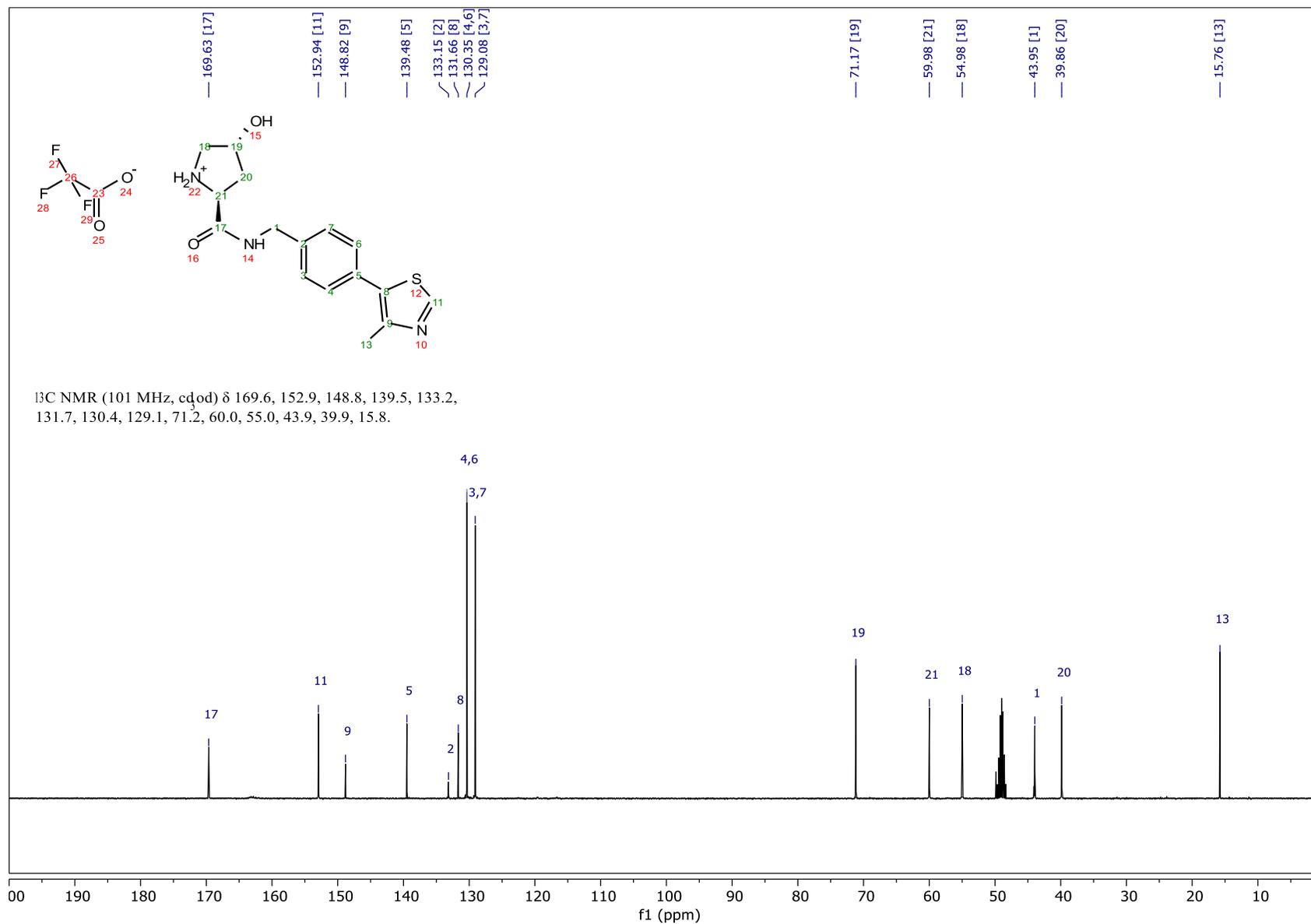
S-445

# Compound RBM5-187

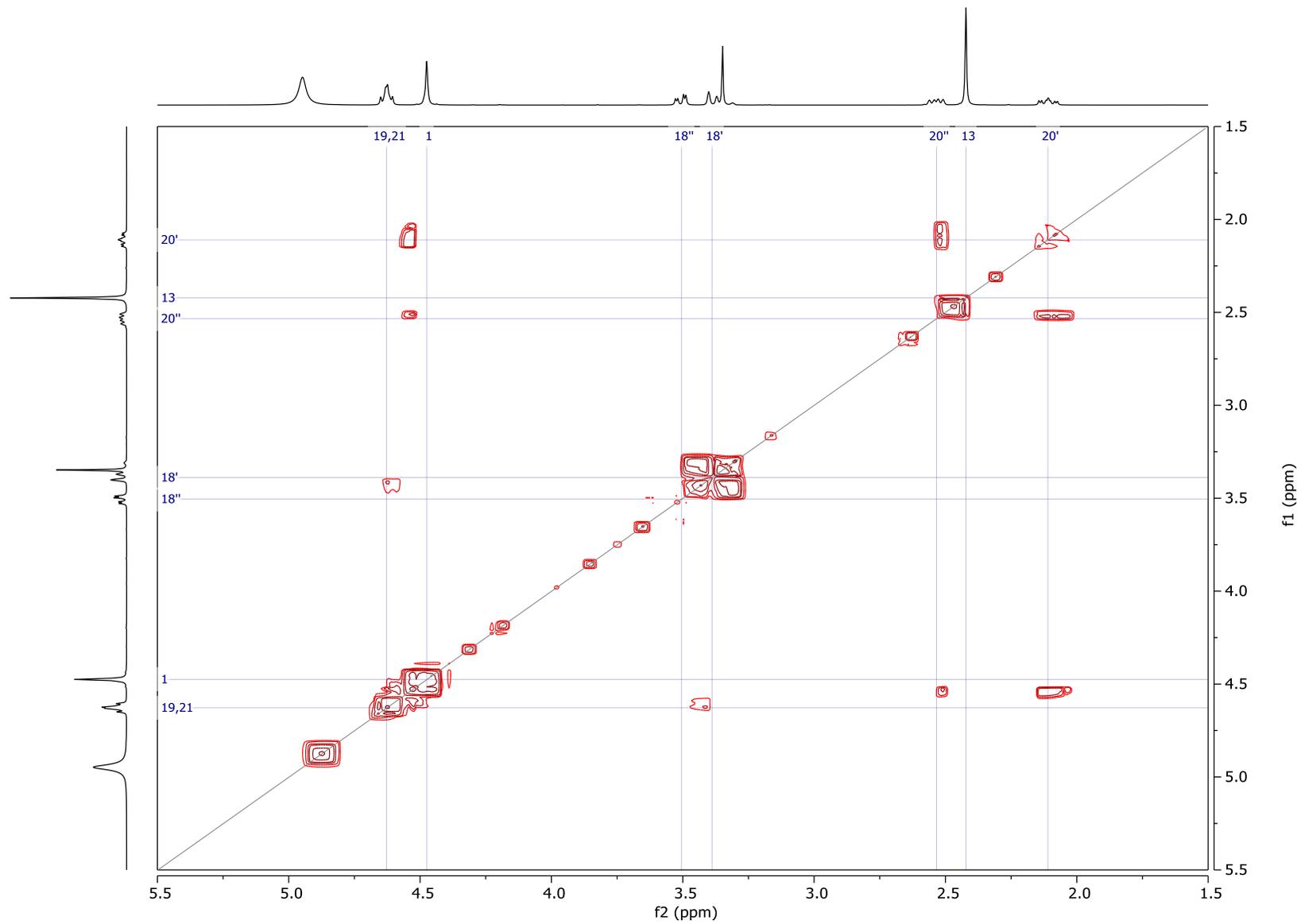
$^1\text{H}$  NMR



# <sup>13</sup>C NMR

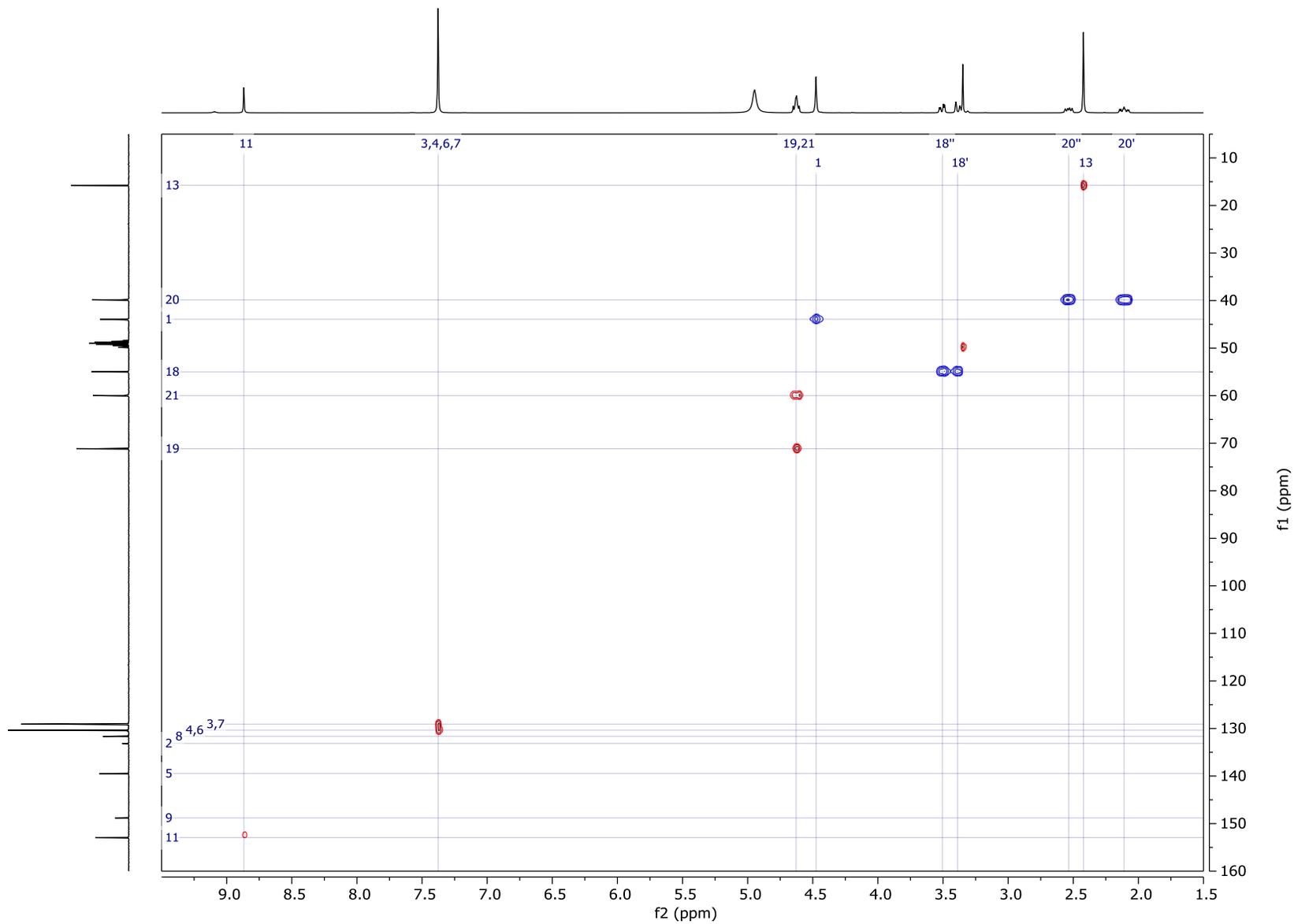


# COSY NMR



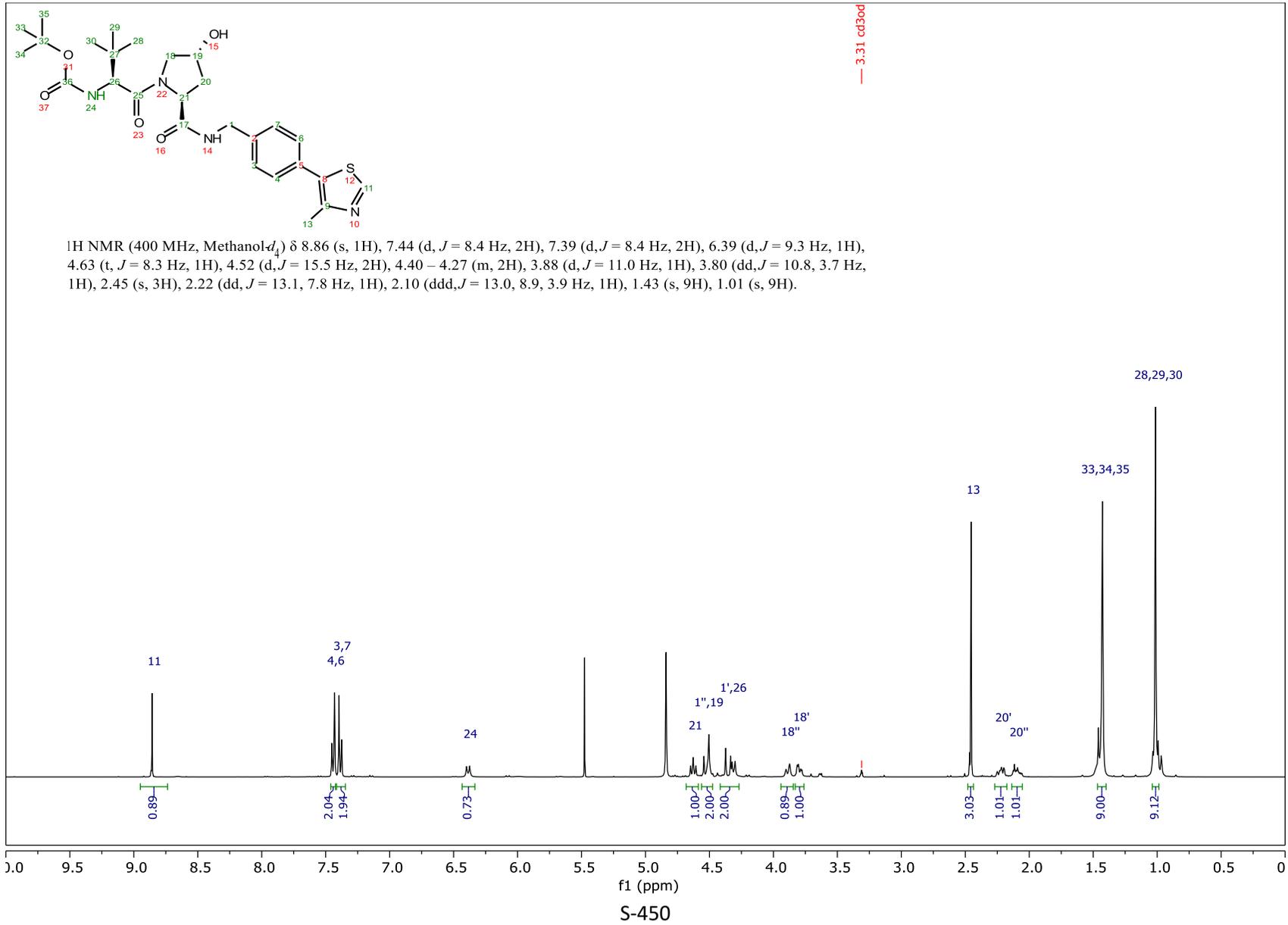
S-448

# HSQC NMR

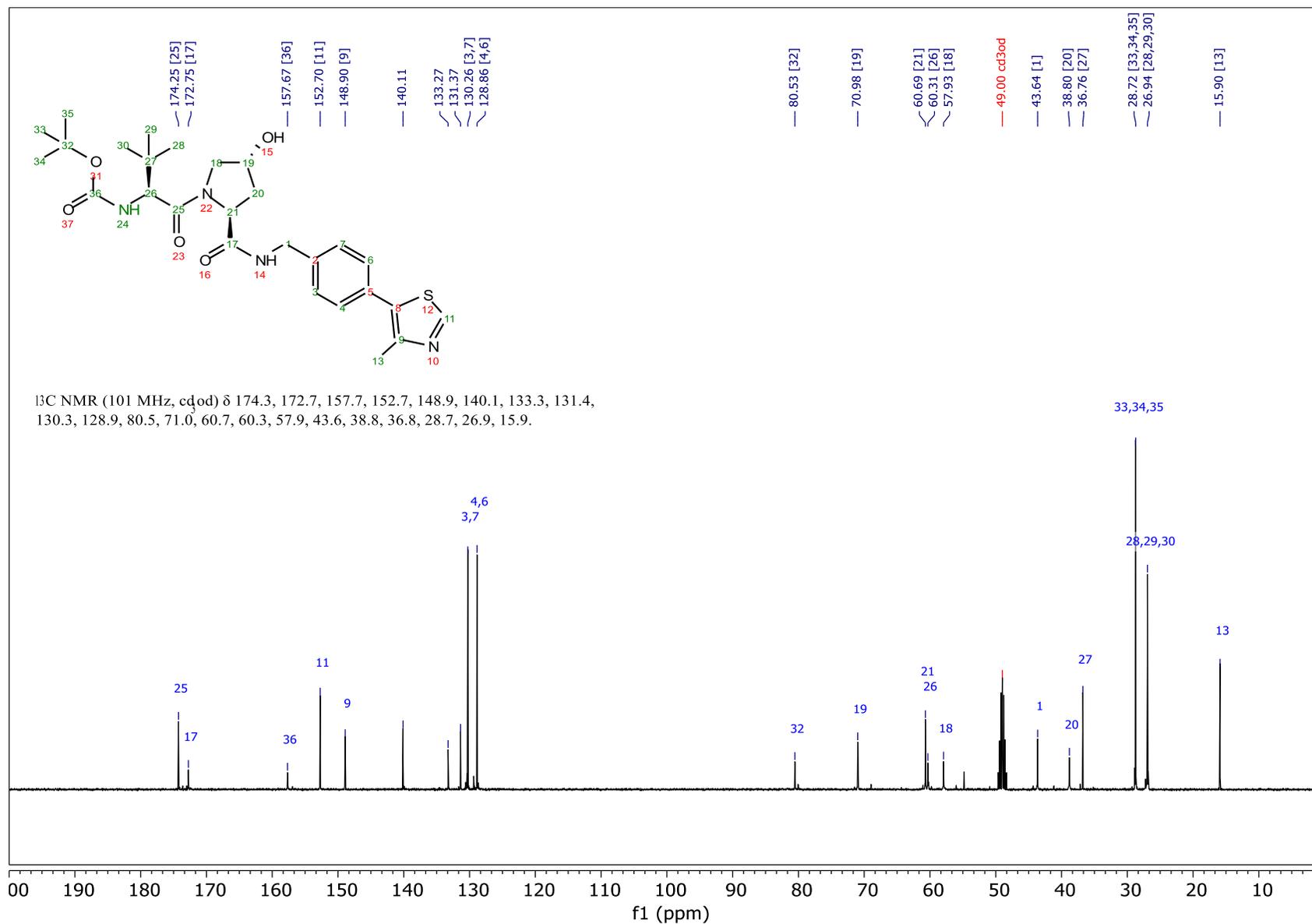


# Compound RBM5-188

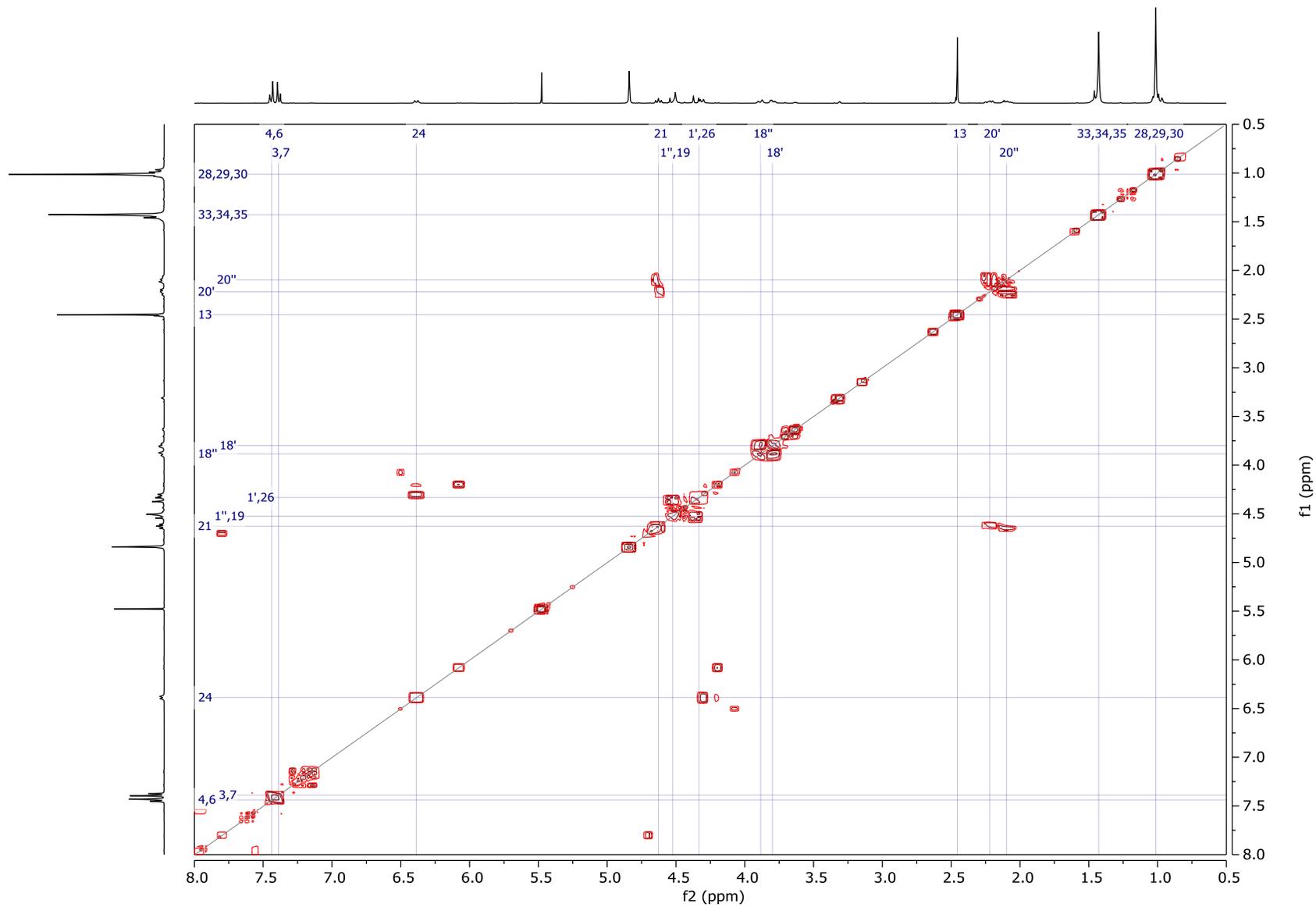
$^1\text{H}$  NMR



# $^{13}\text{C}$ NMR

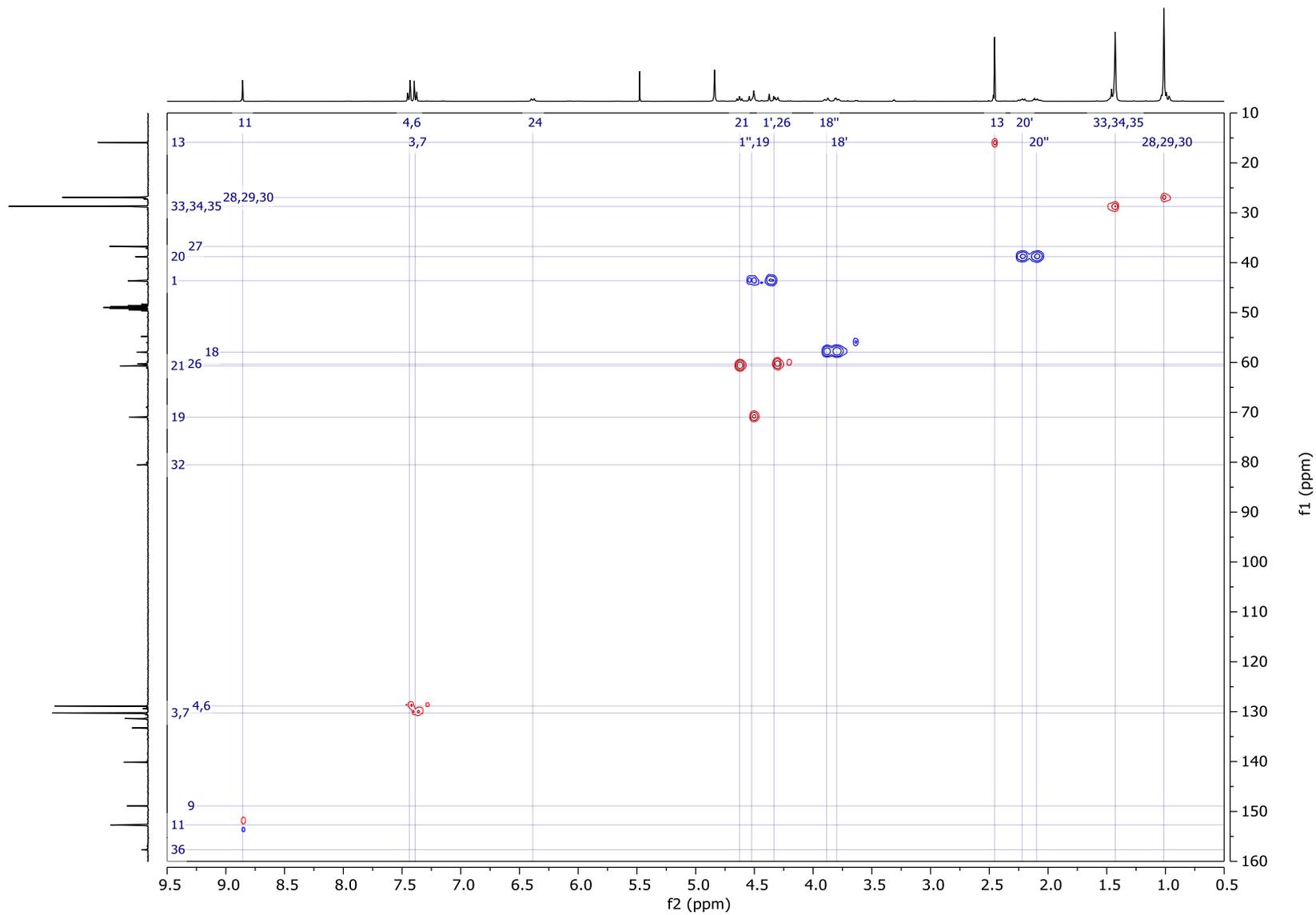


# COSY NMR



S-452

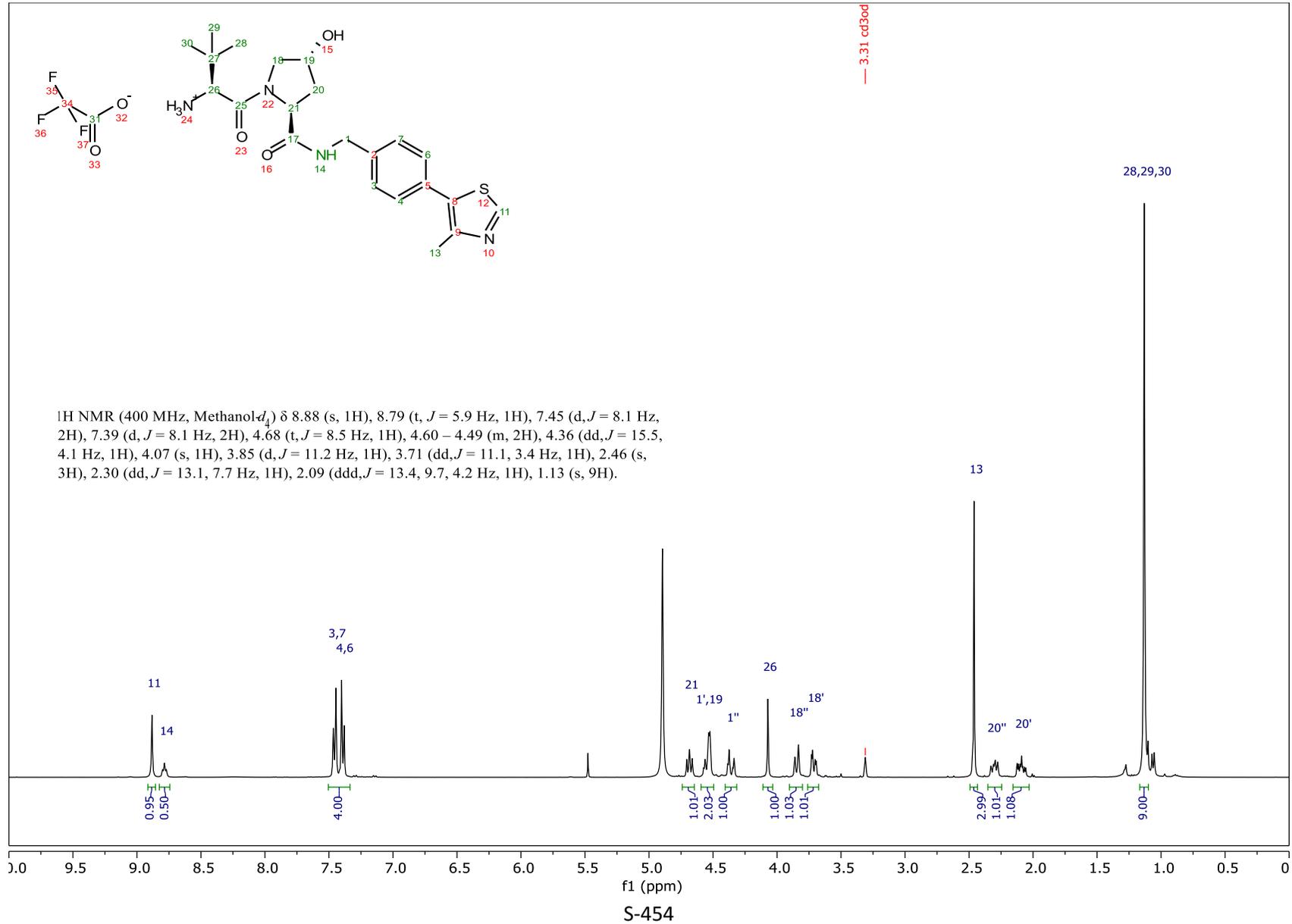
# HSQC NMR



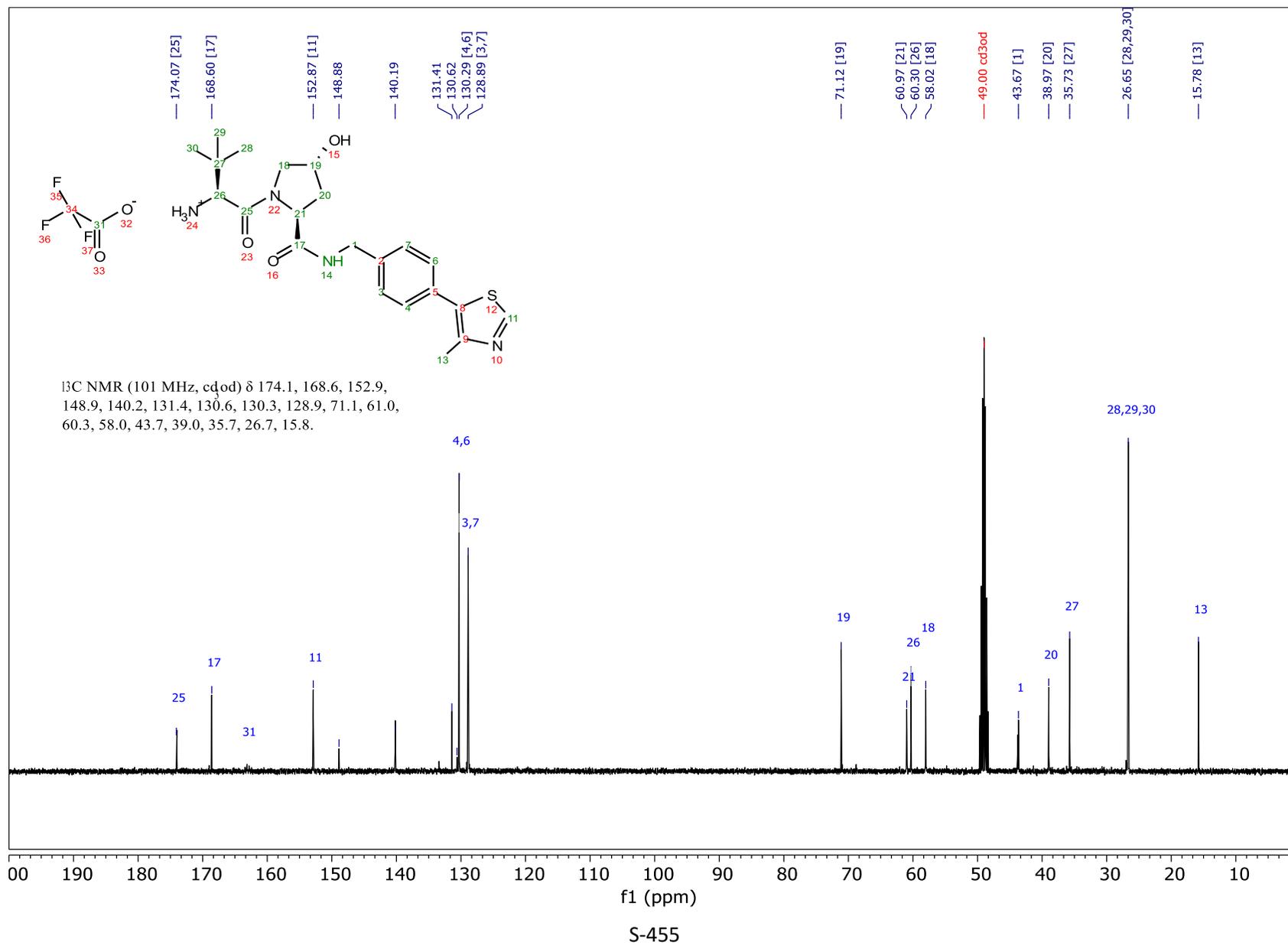
S-453

# Compound RBM5-189

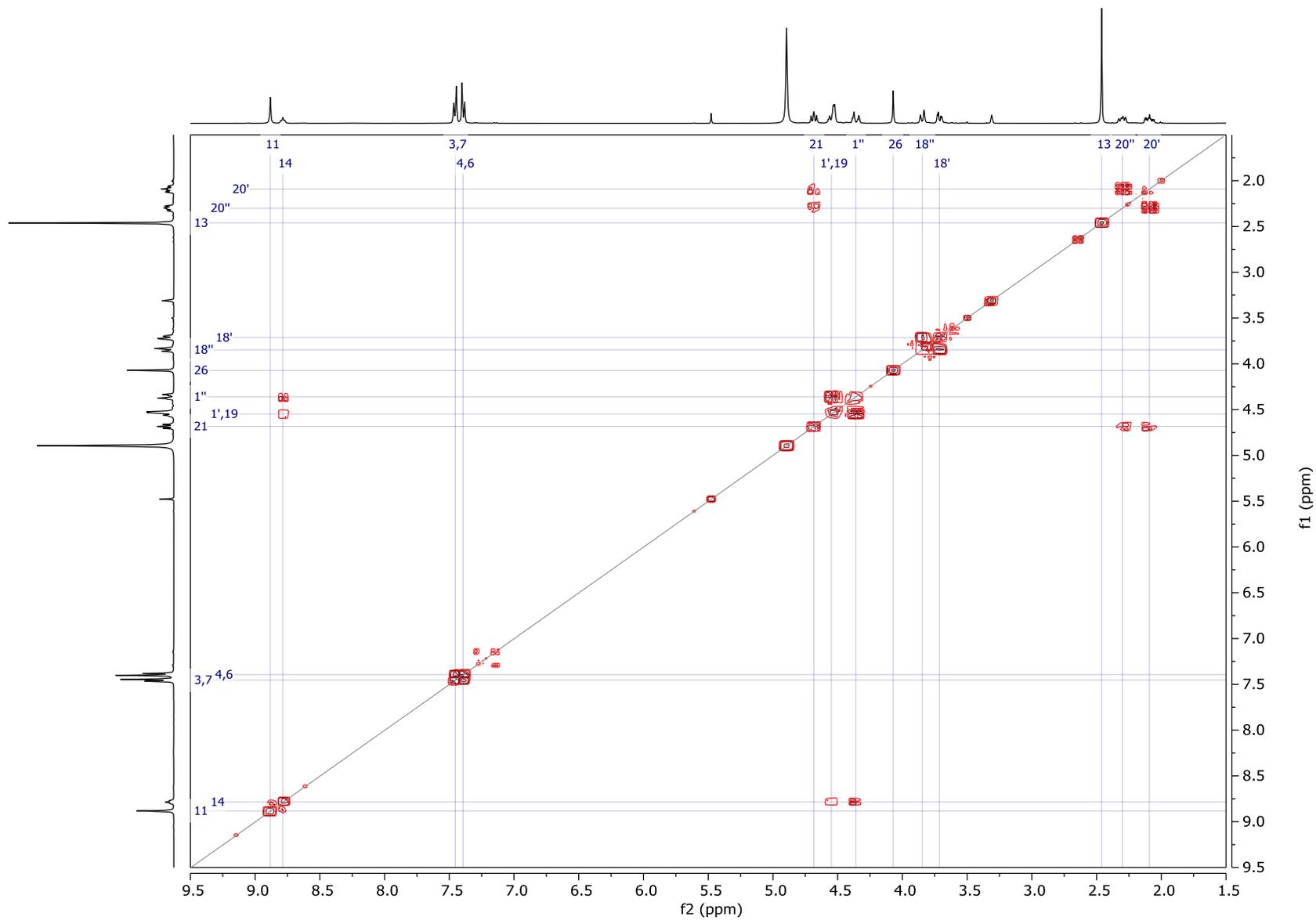
$^1\text{H NMR}$



# <sup>13</sup>C NMR

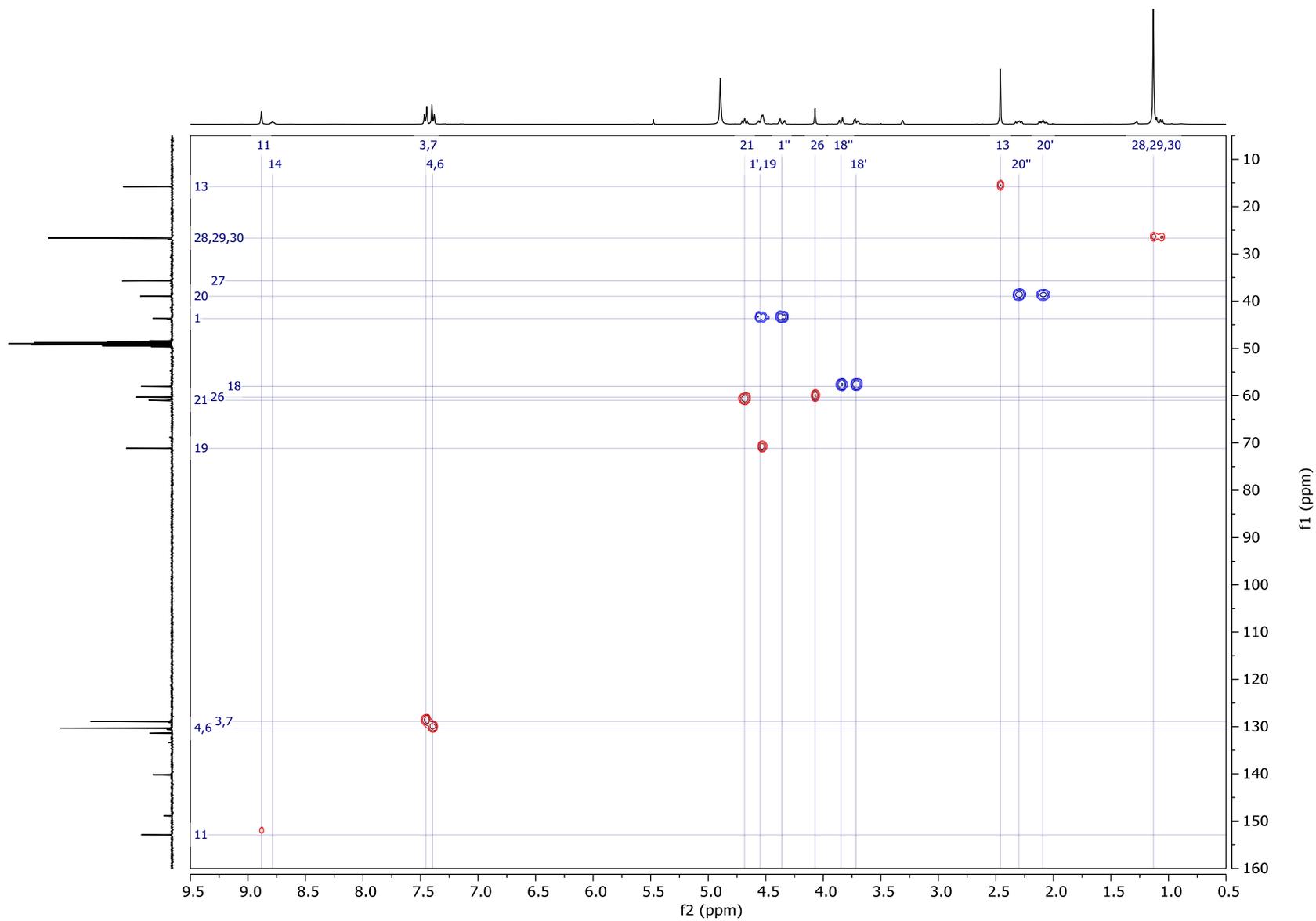


# COSY NMR



S-456

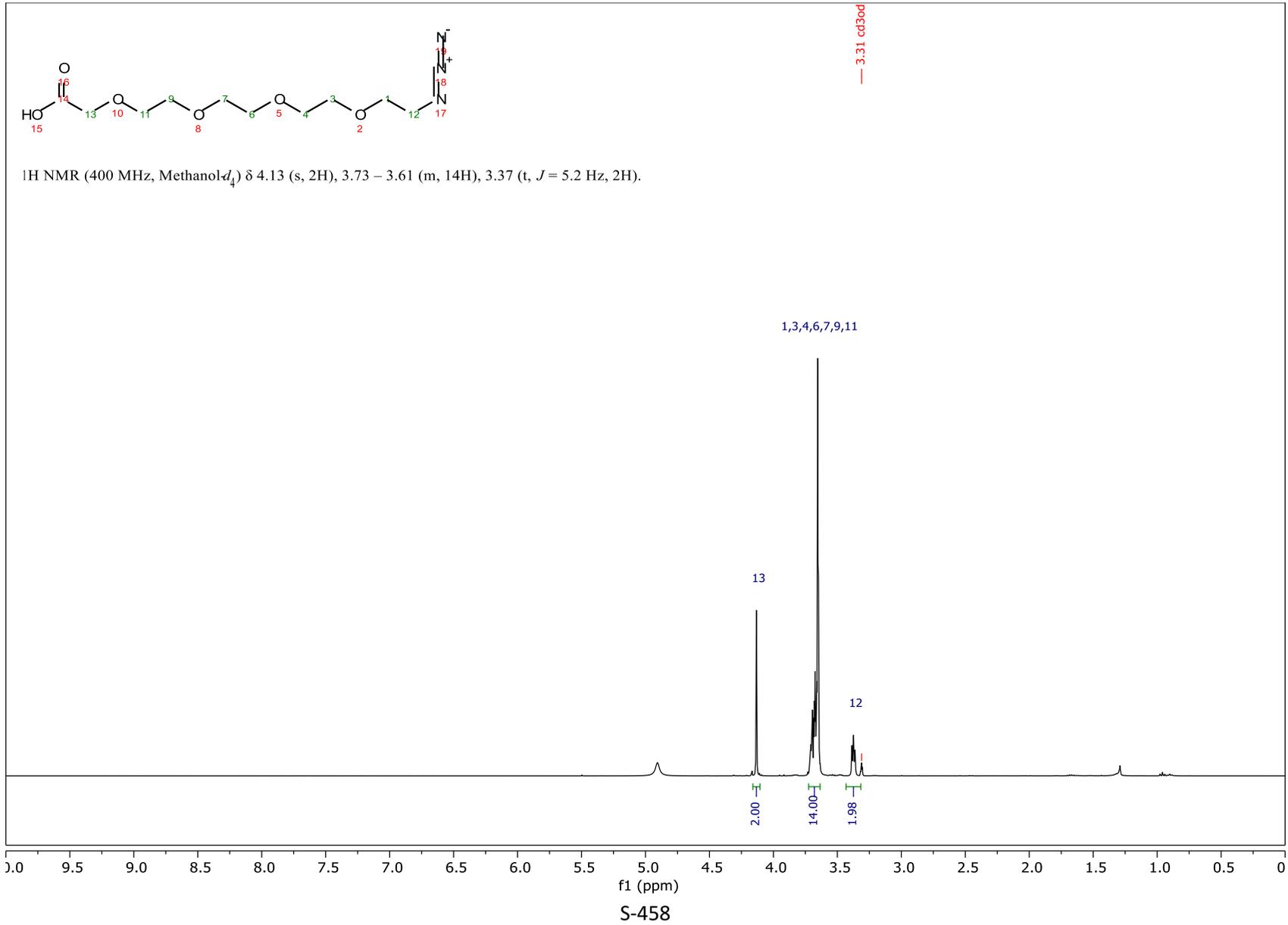
# HSQC NMR



S-457

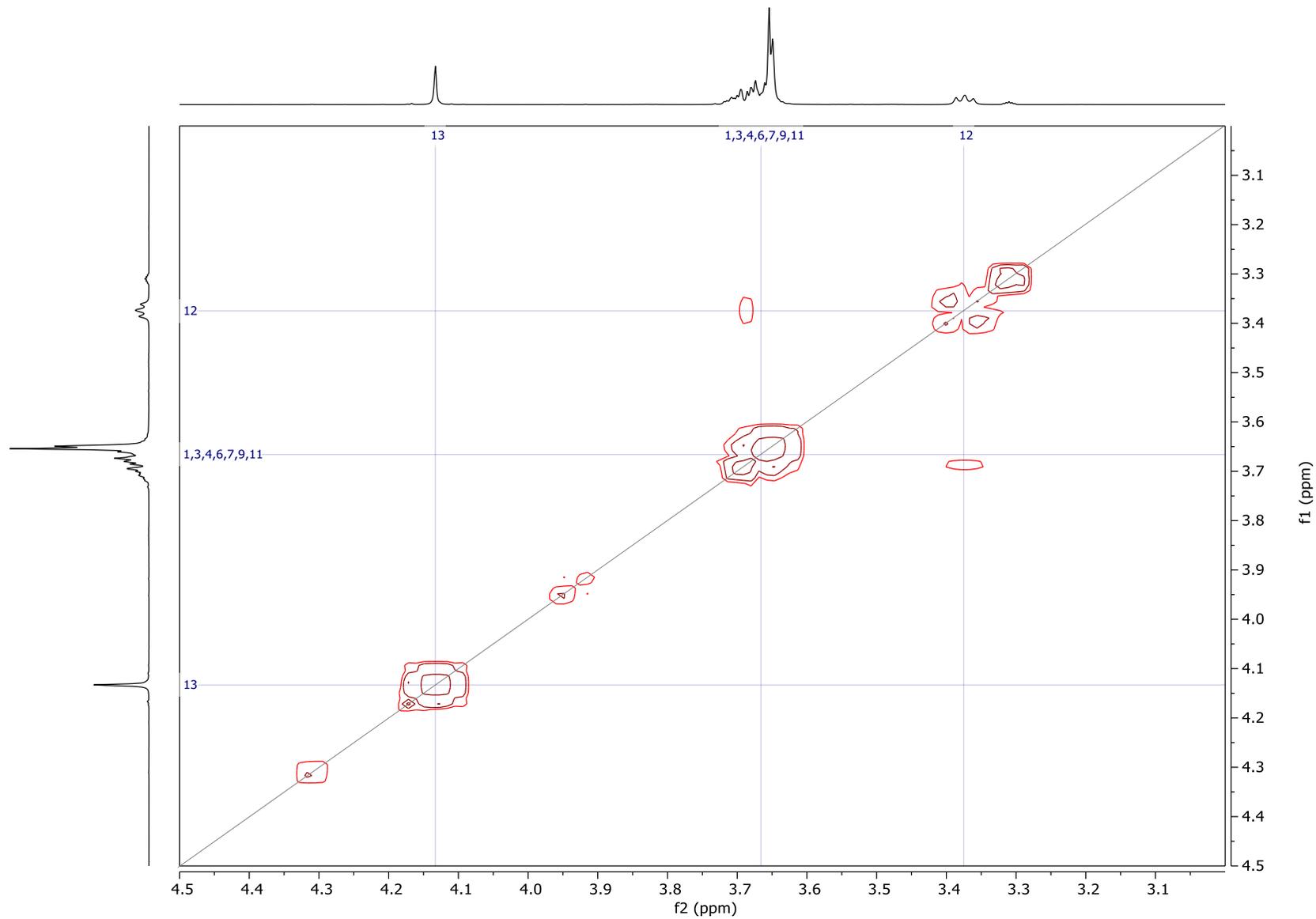
# Compound RBM5-190

$^1\text{H NMR}$



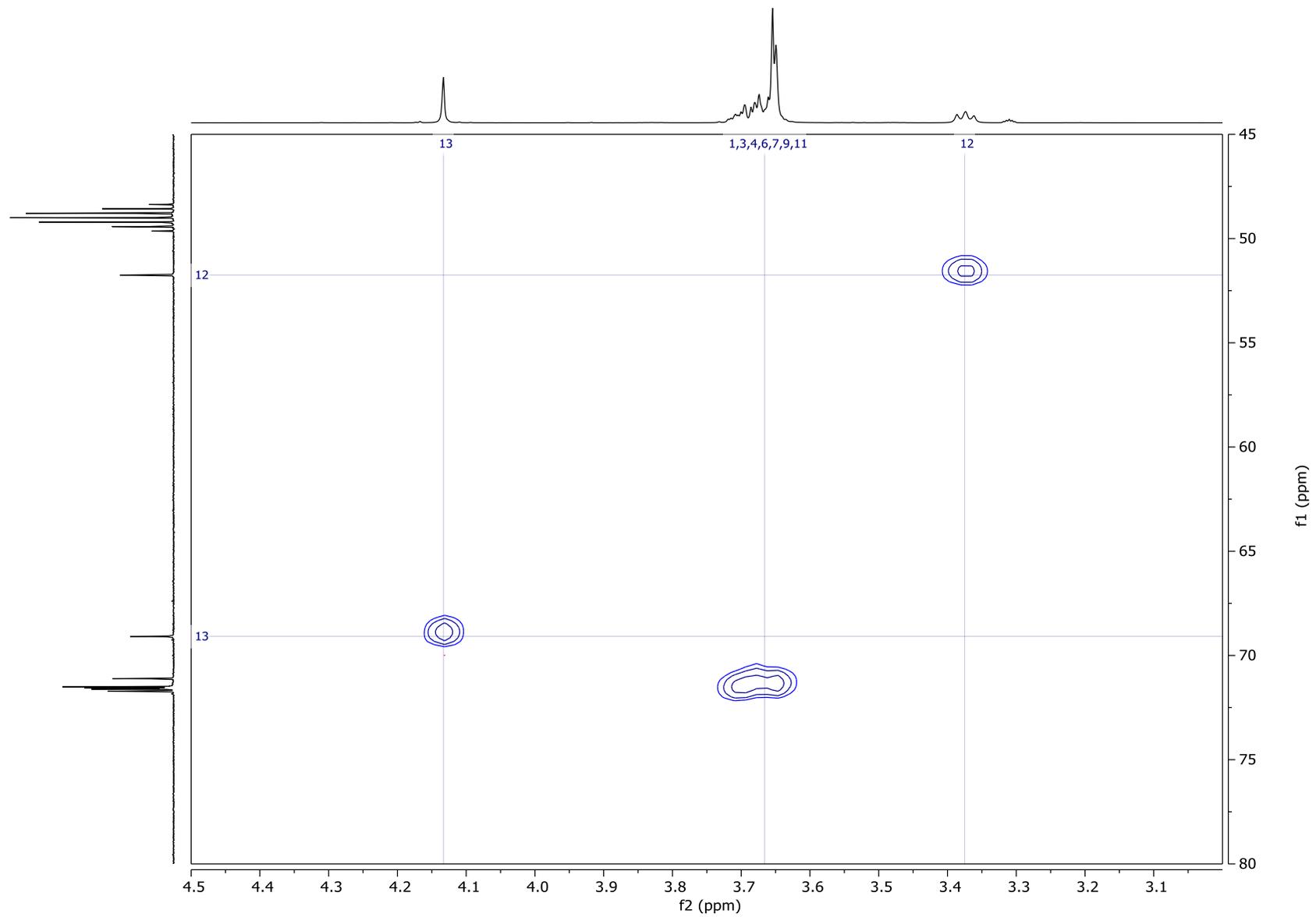


# COSY NMR



S-460

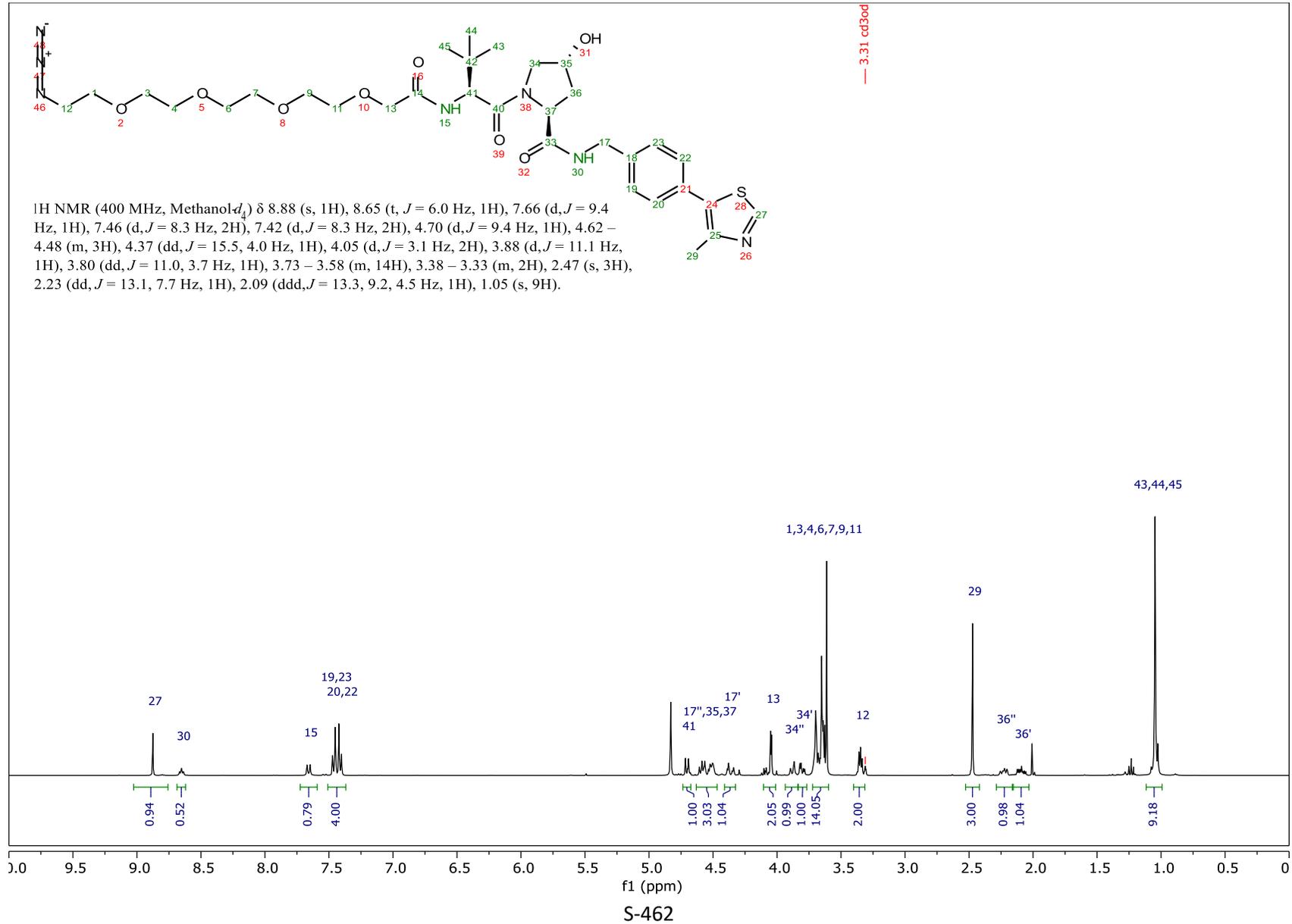
# HSQC NMR



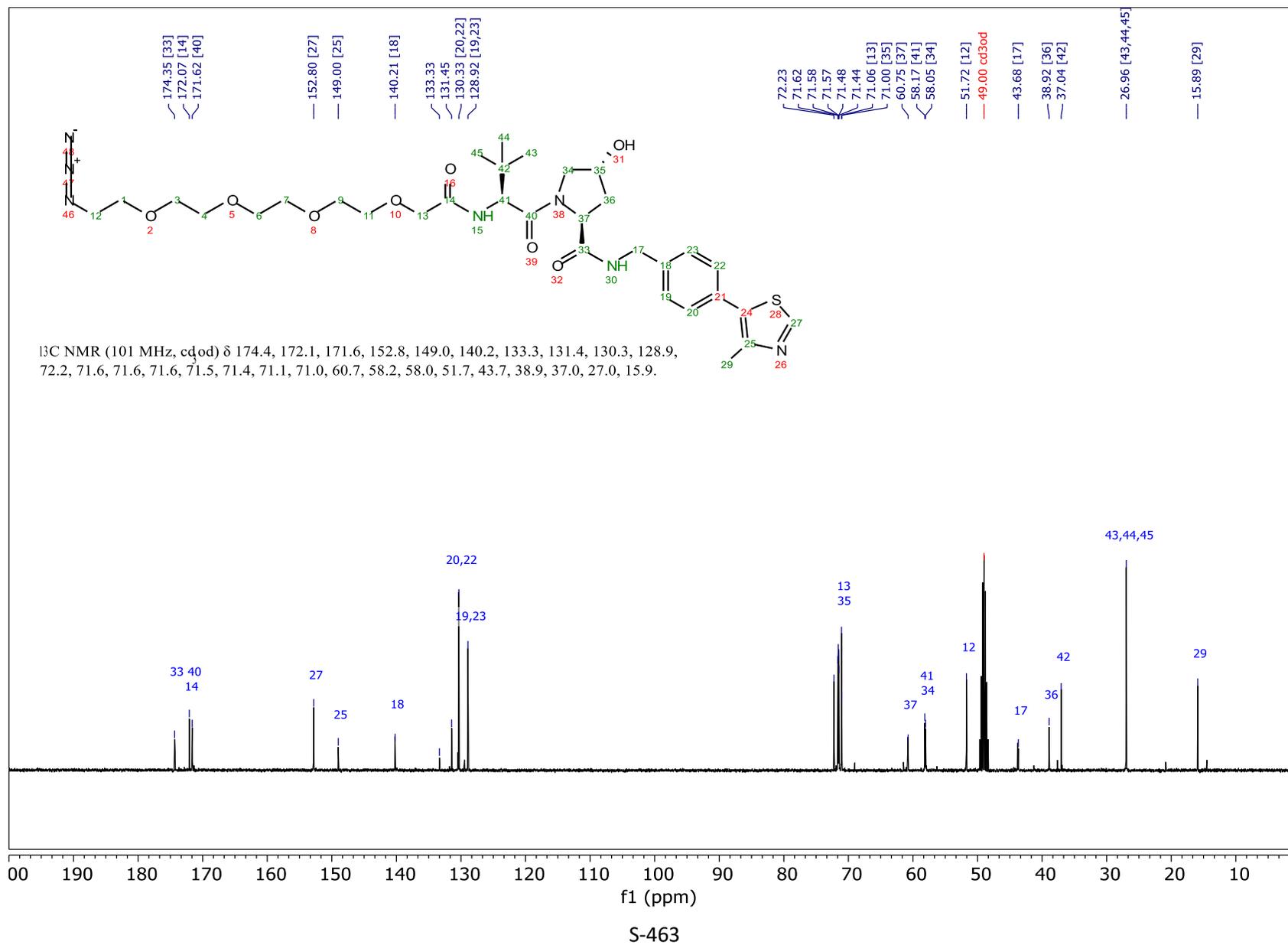
S-461

# Compound RBM5-191

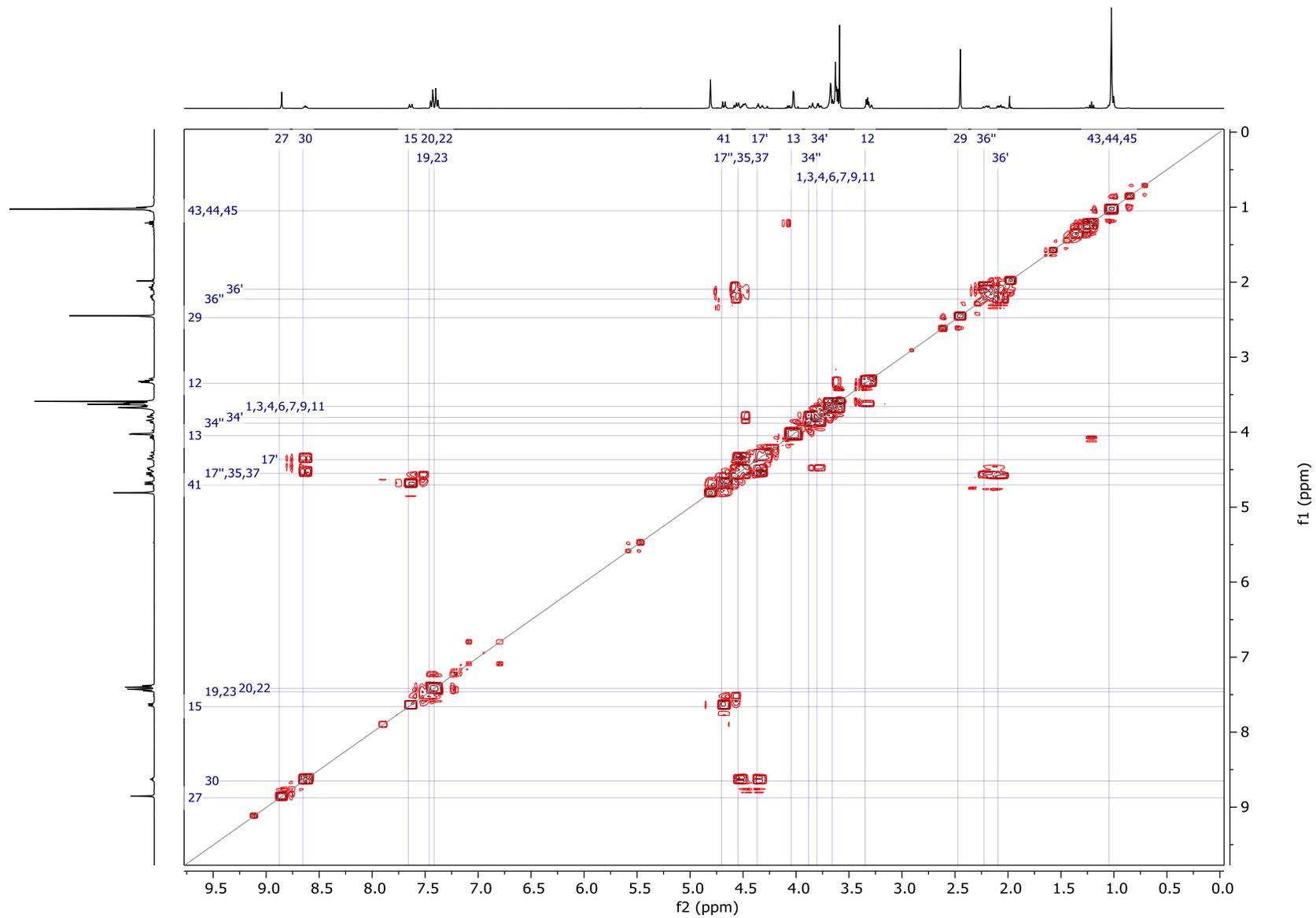
<sup>1</sup>H NMR



<sup>13</sup>C NMR

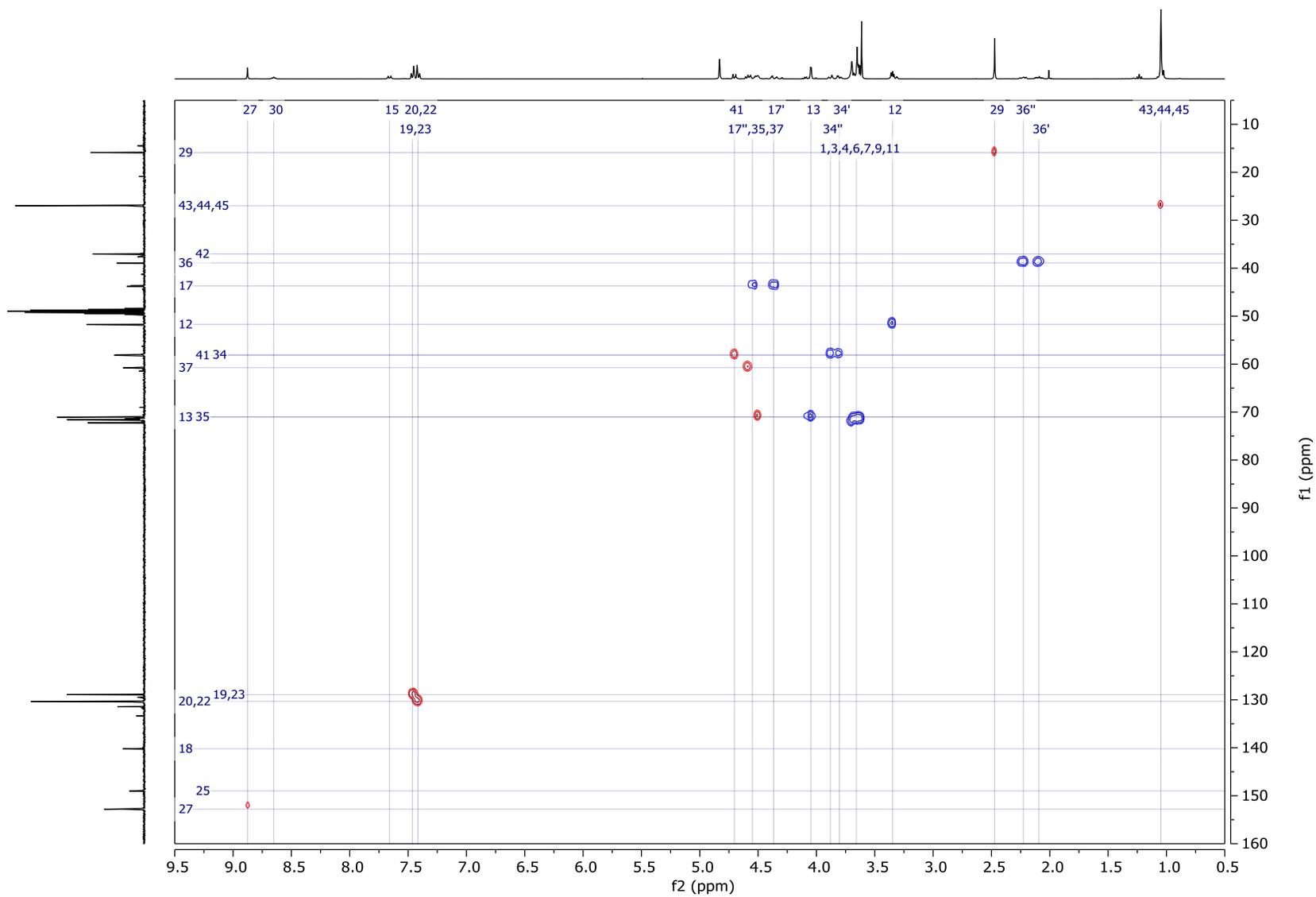


# COSY NMR



S-464

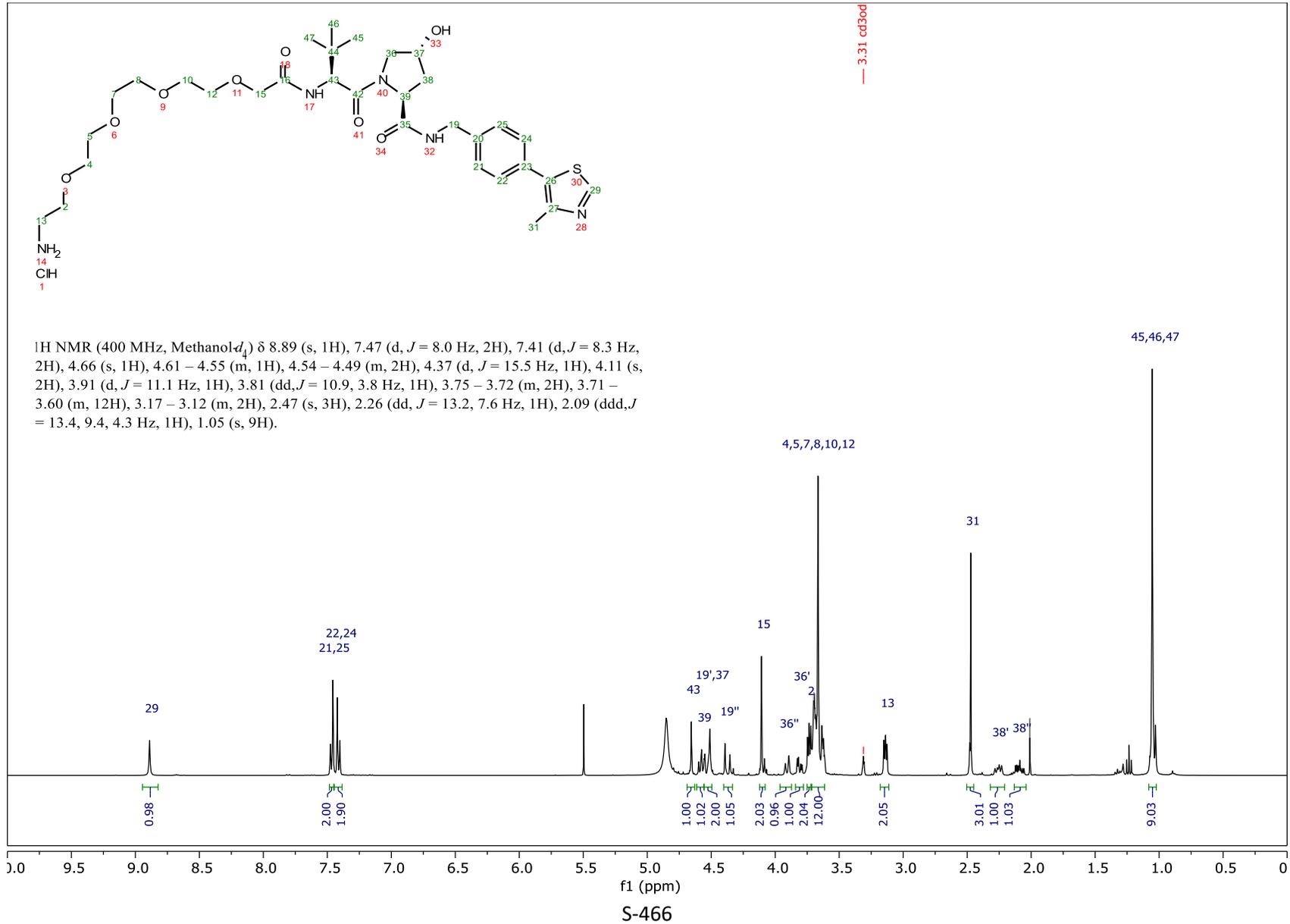
# HSQC NMR



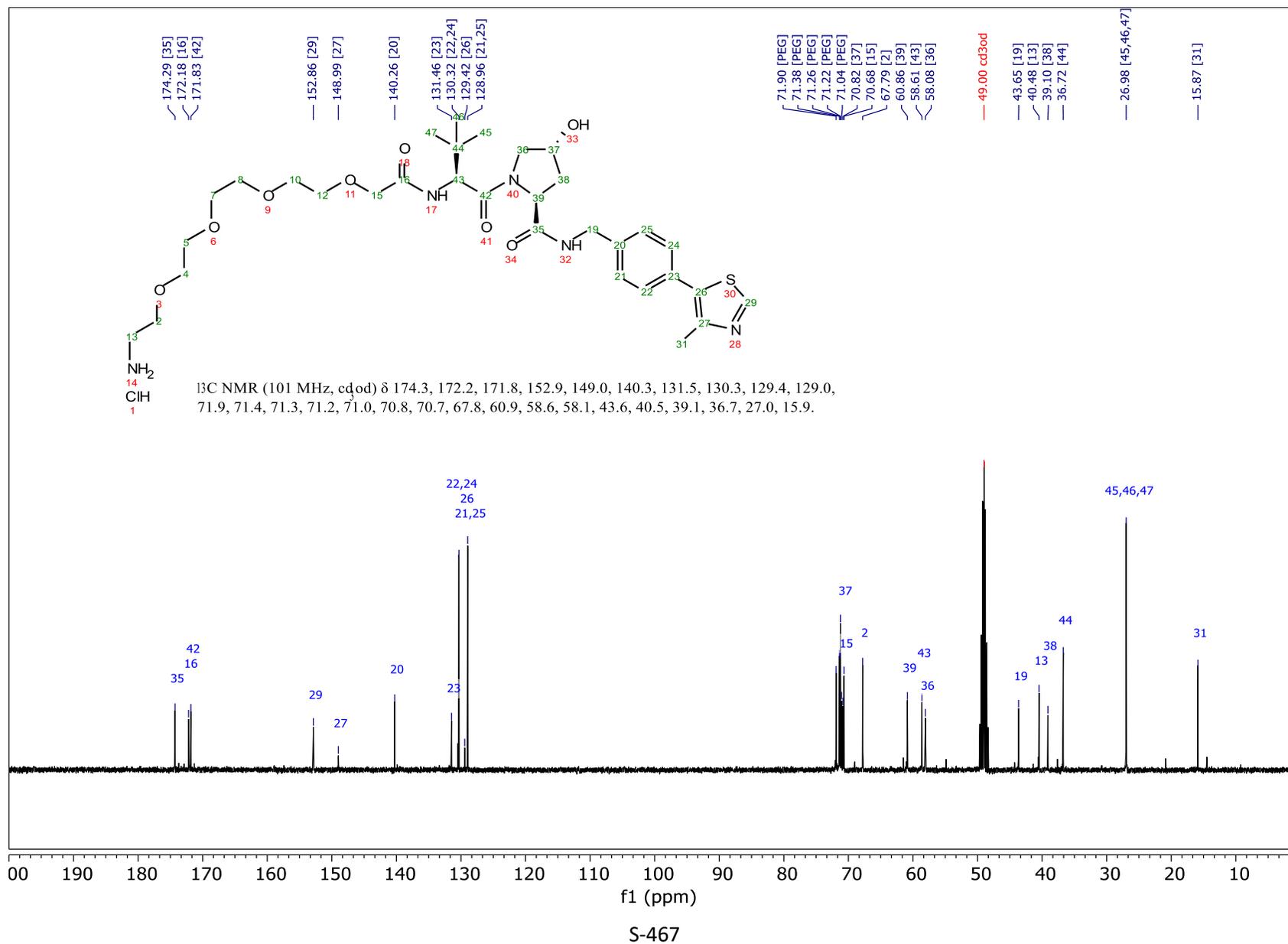
S-465

# Compound RBM5-192

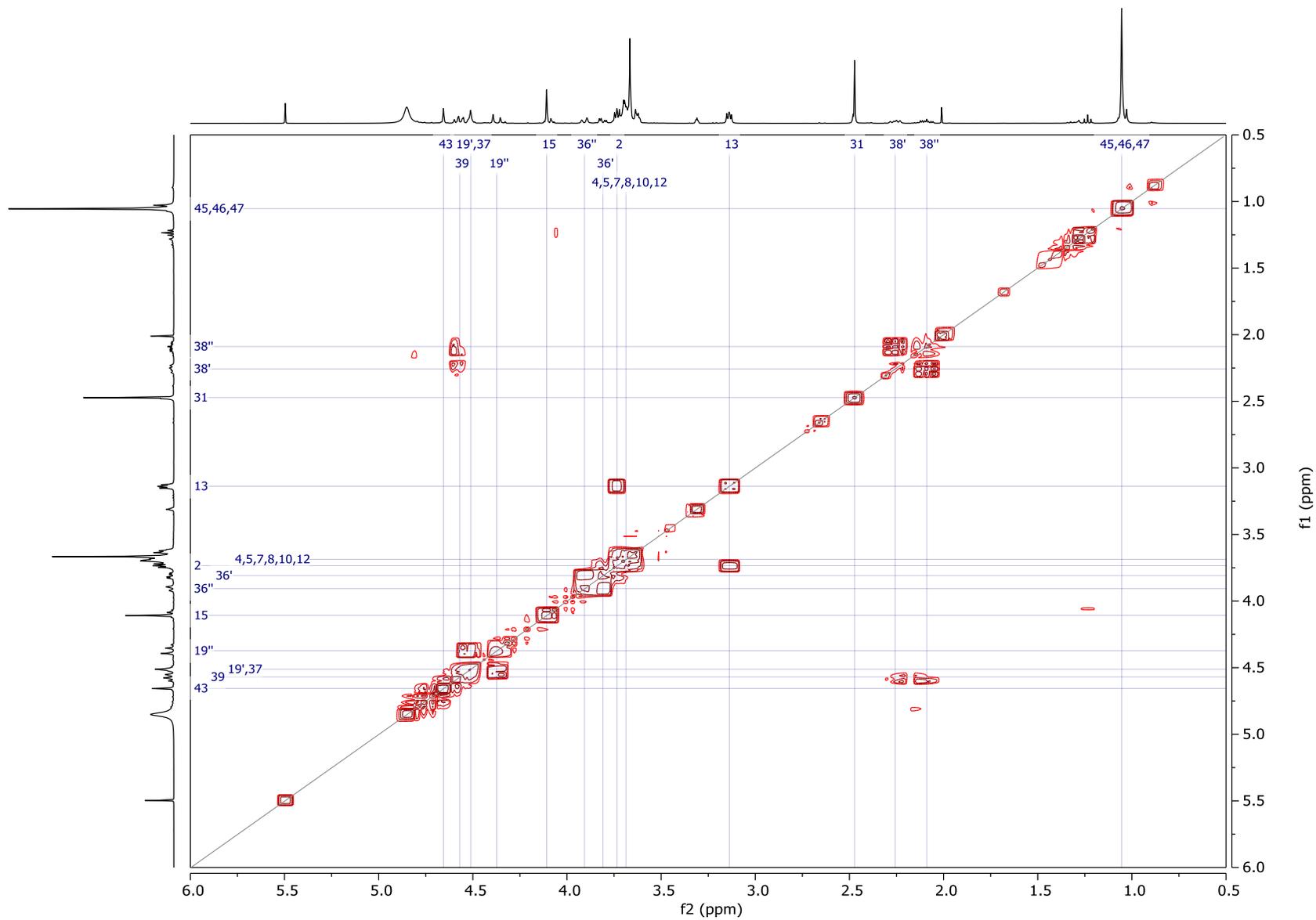
$^1\text{H NMR}$



<sup>13</sup>C NMR

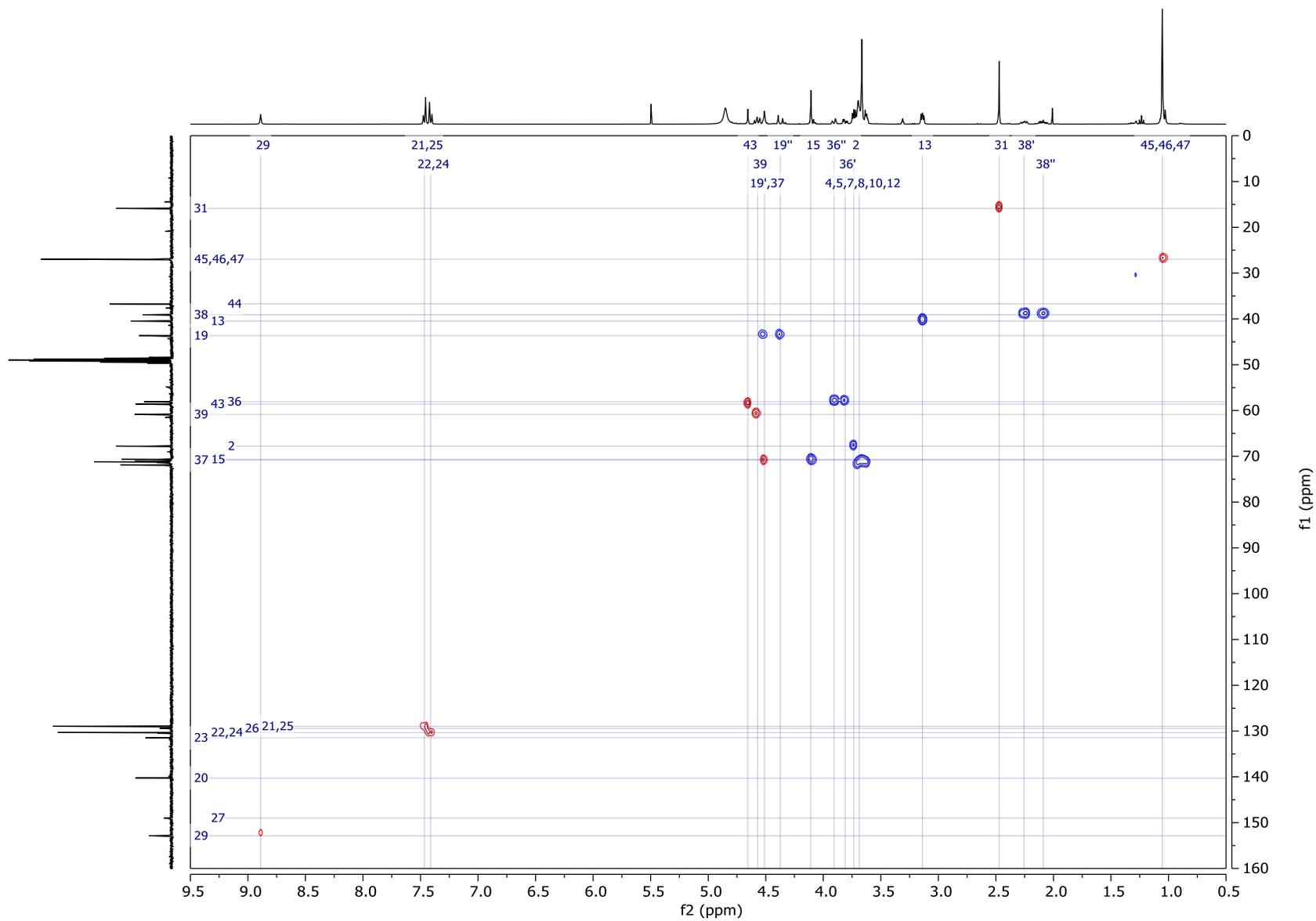


COSY NMR



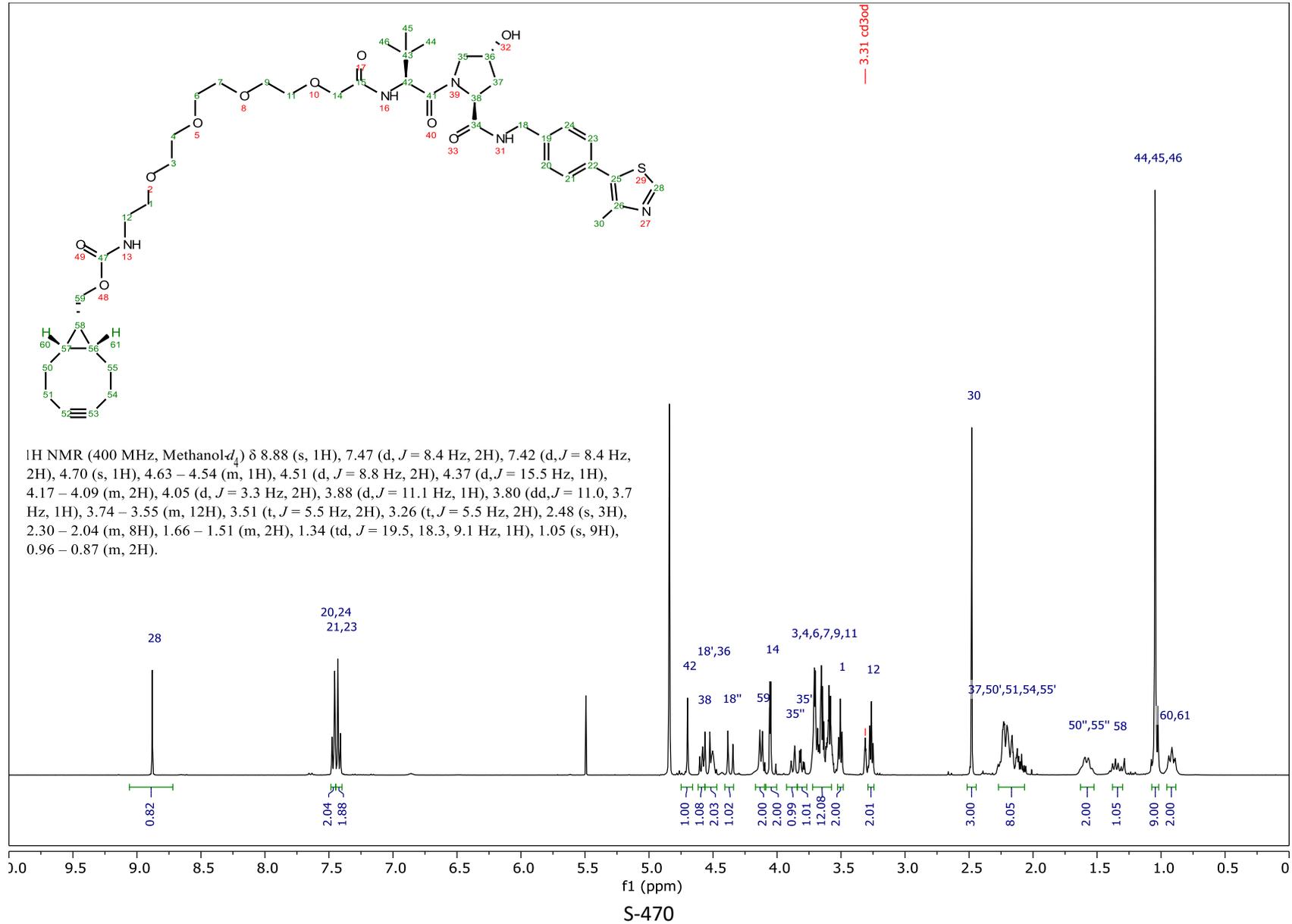
S-468

# HSQC NMR

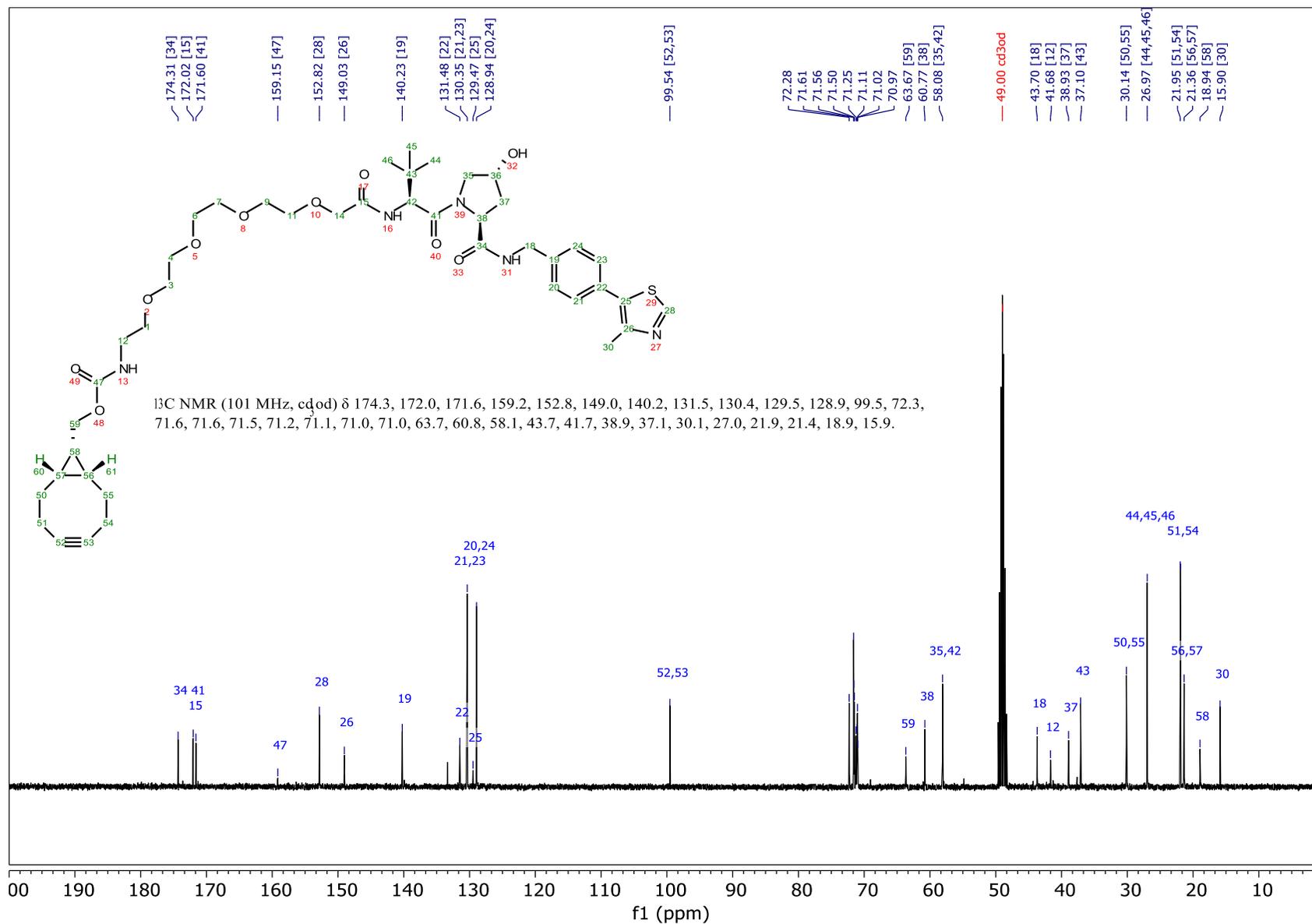


# Compound RBM5-193

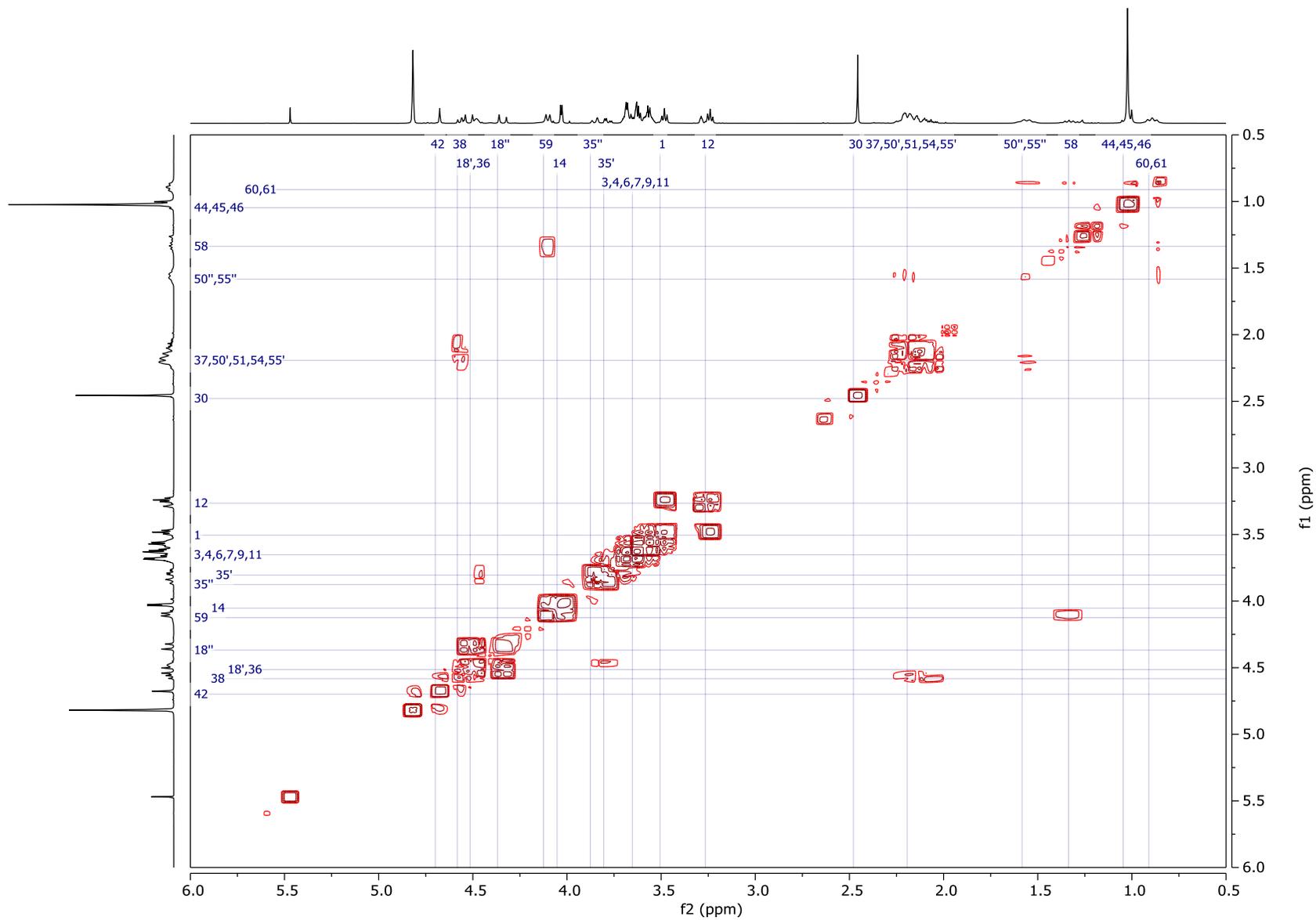
$^1\text{H NMR}$



<sup>13</sup>C NMR

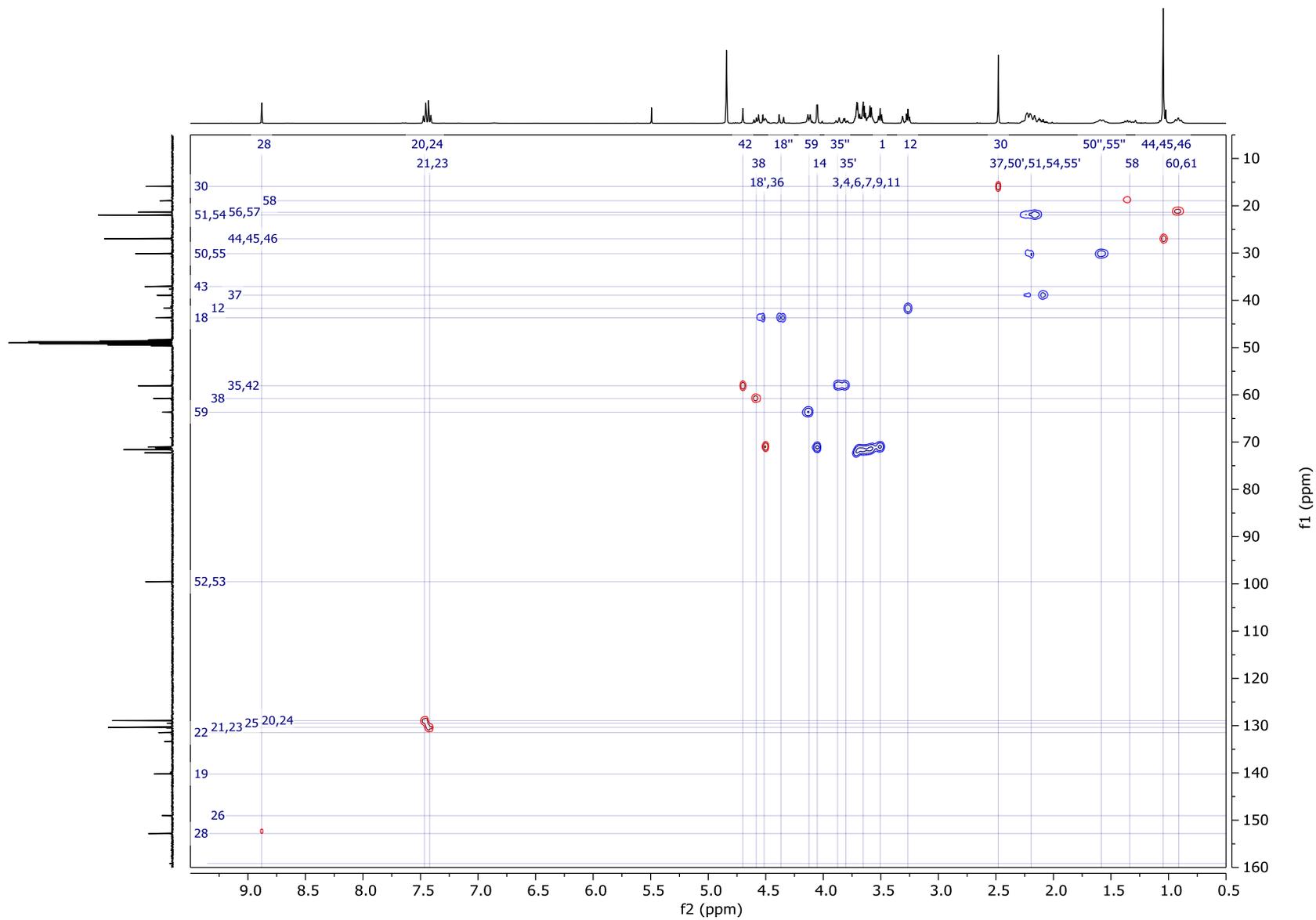


COSY NMR



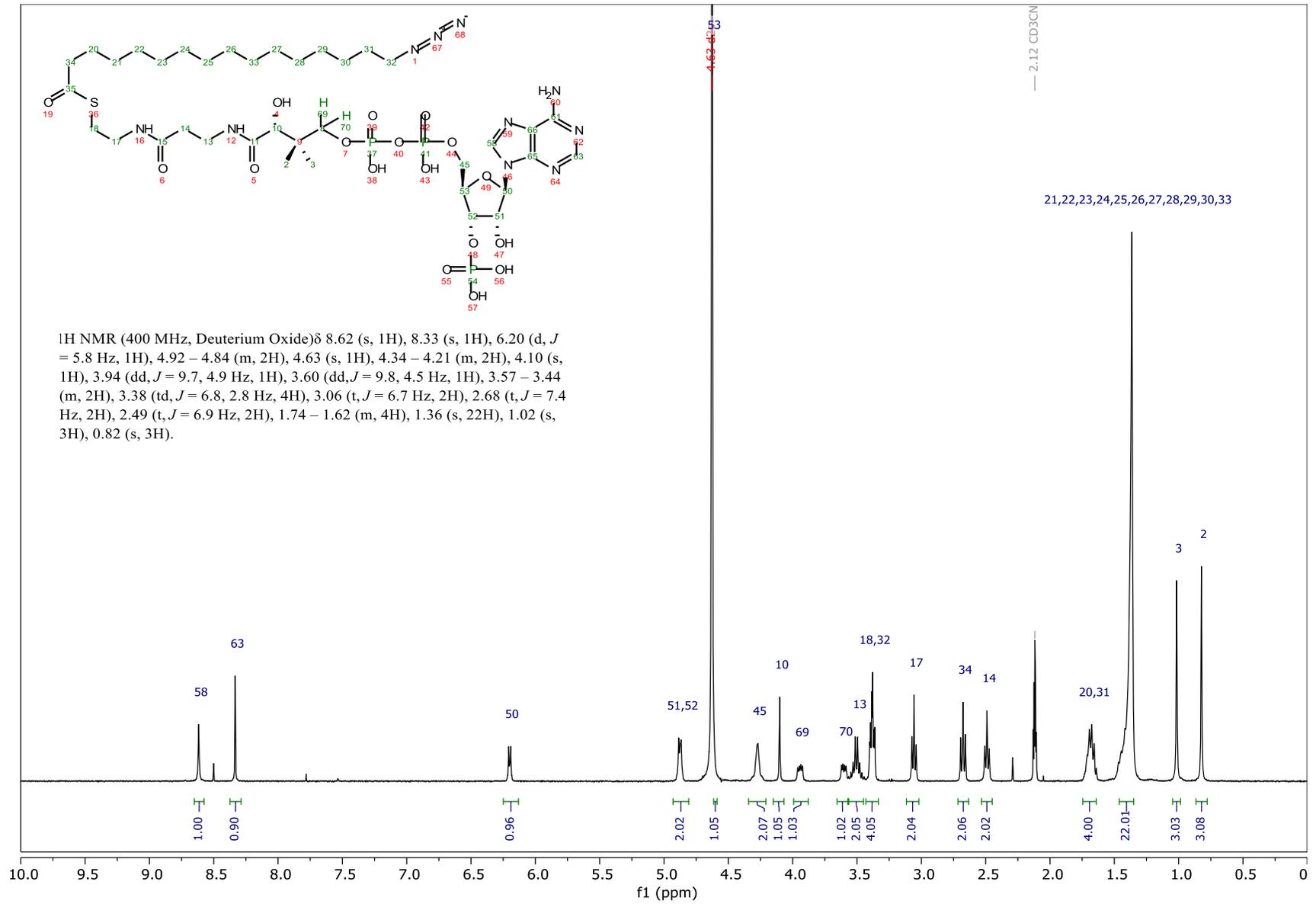
S-472

# HSQC NMR



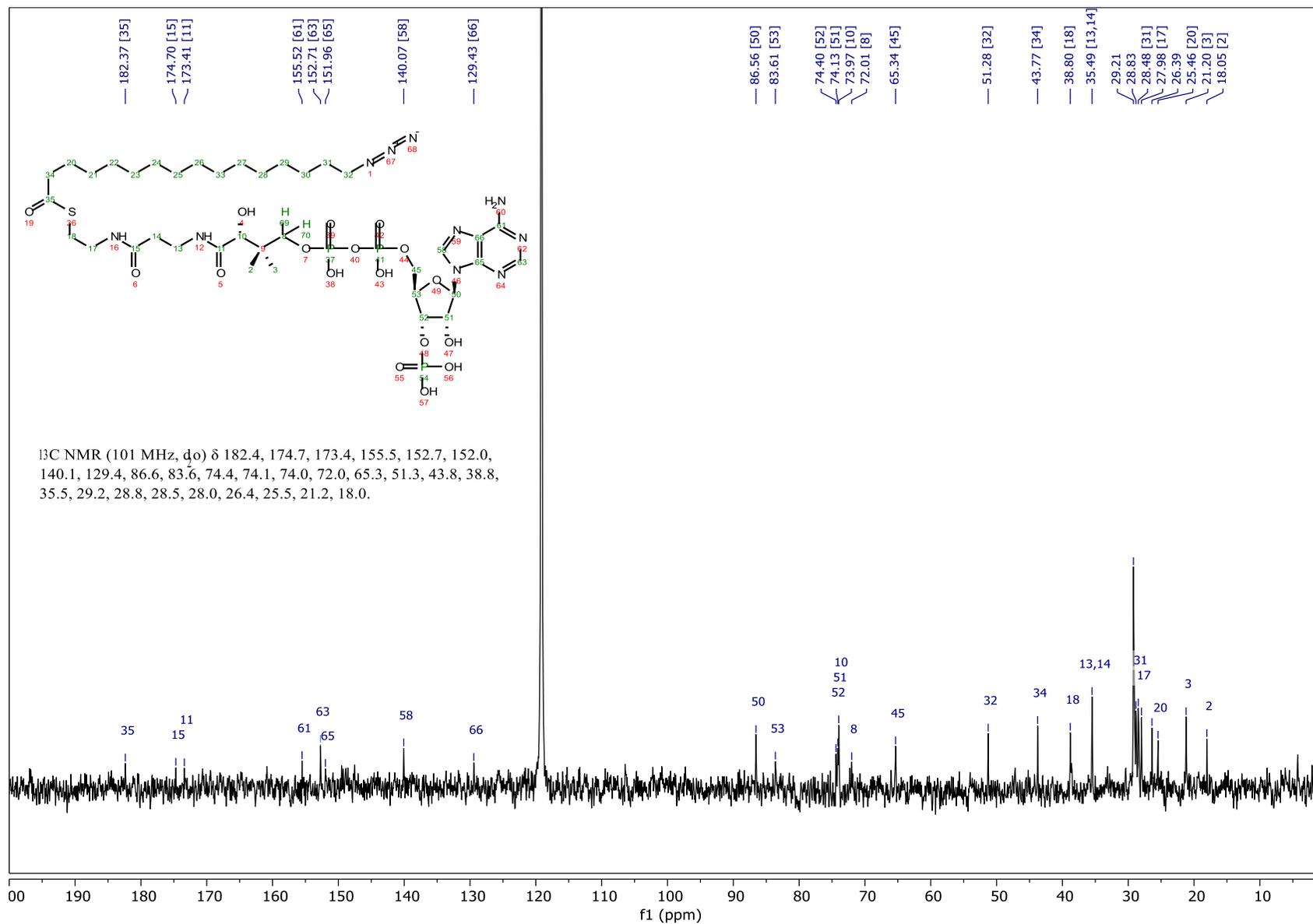
# Compound RBM5-194

<sup>1</sup>H NMR

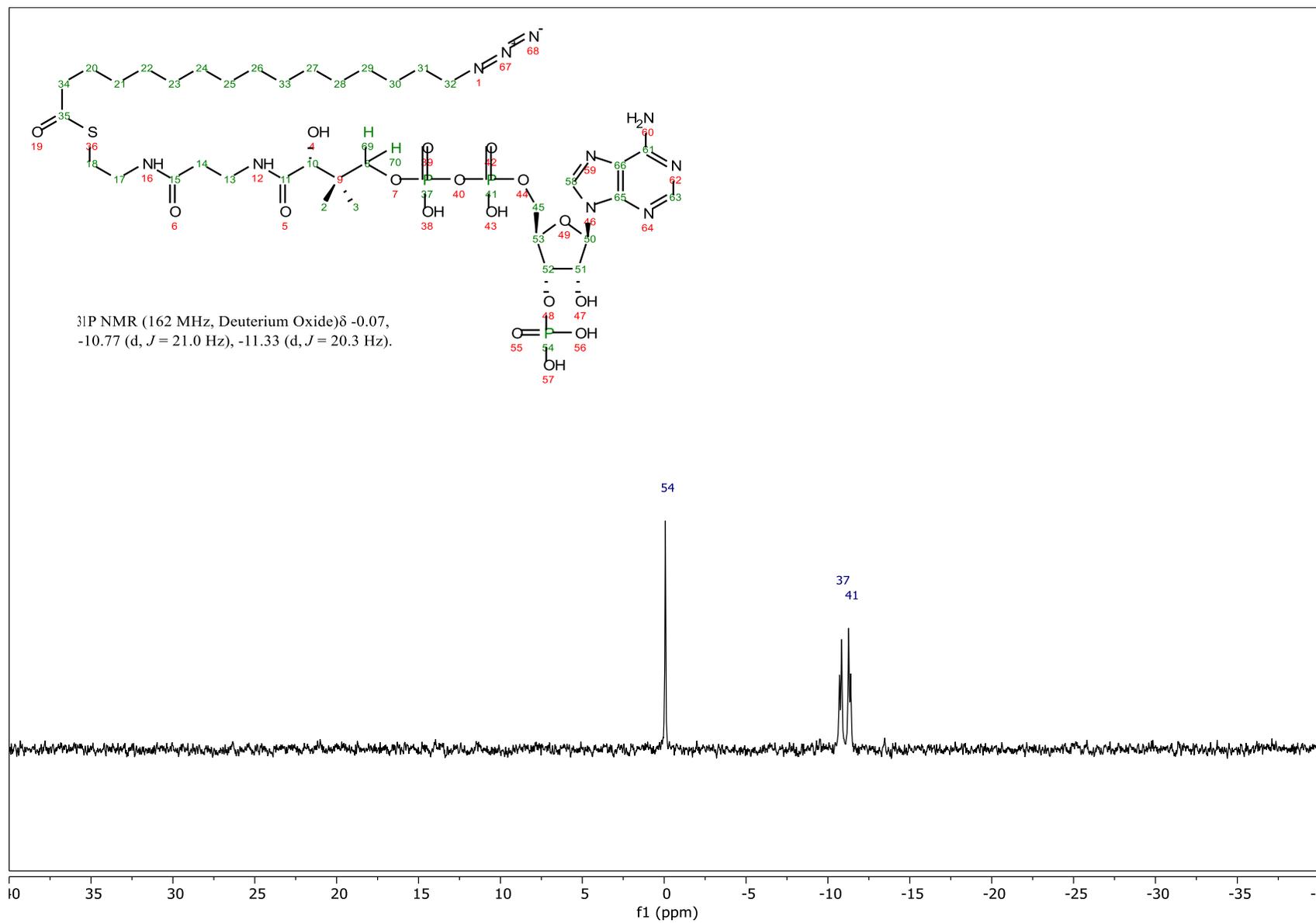


S-474

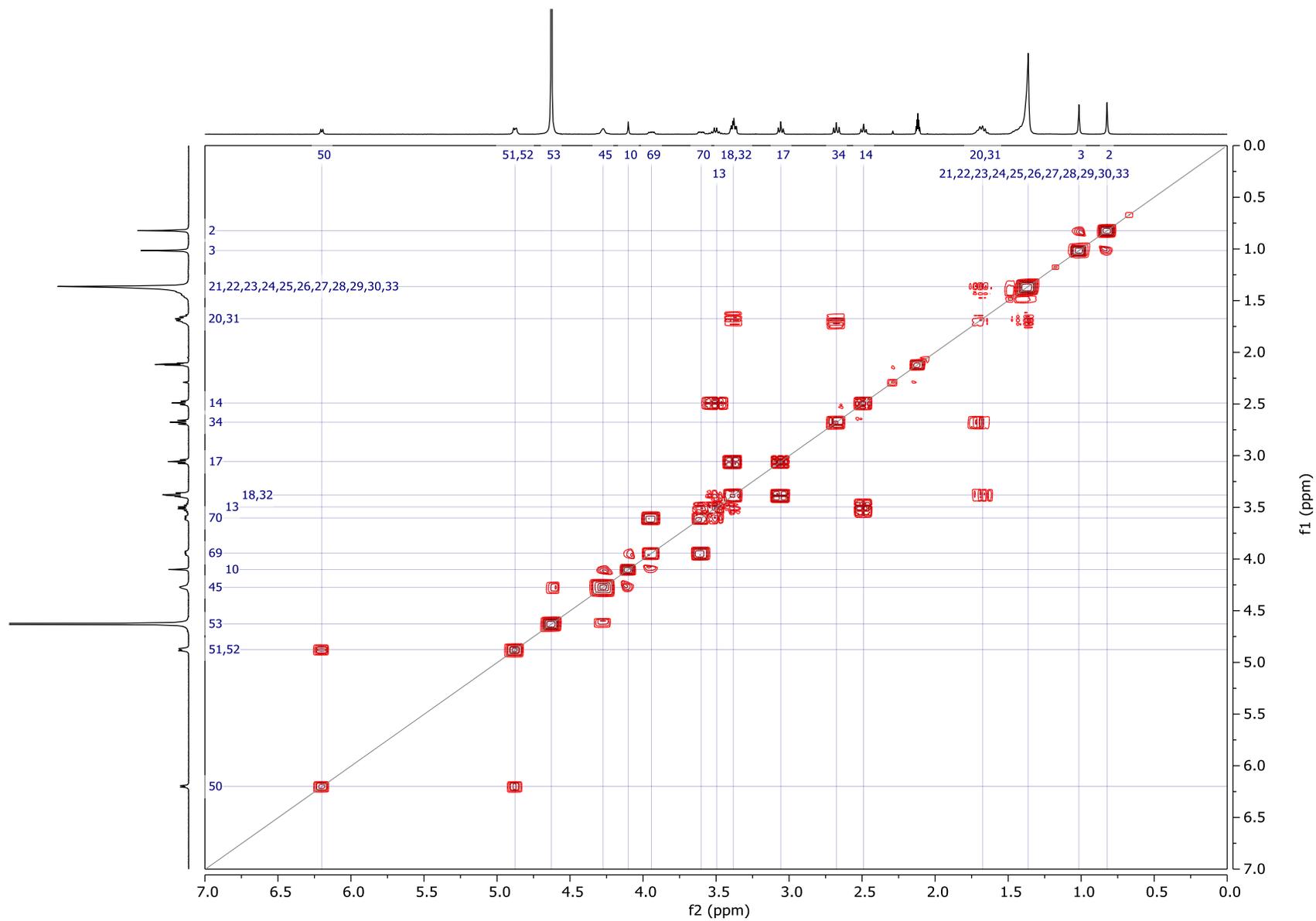
<sup>13</sup>C NMR



# $^{31}\text{P}$ NMR

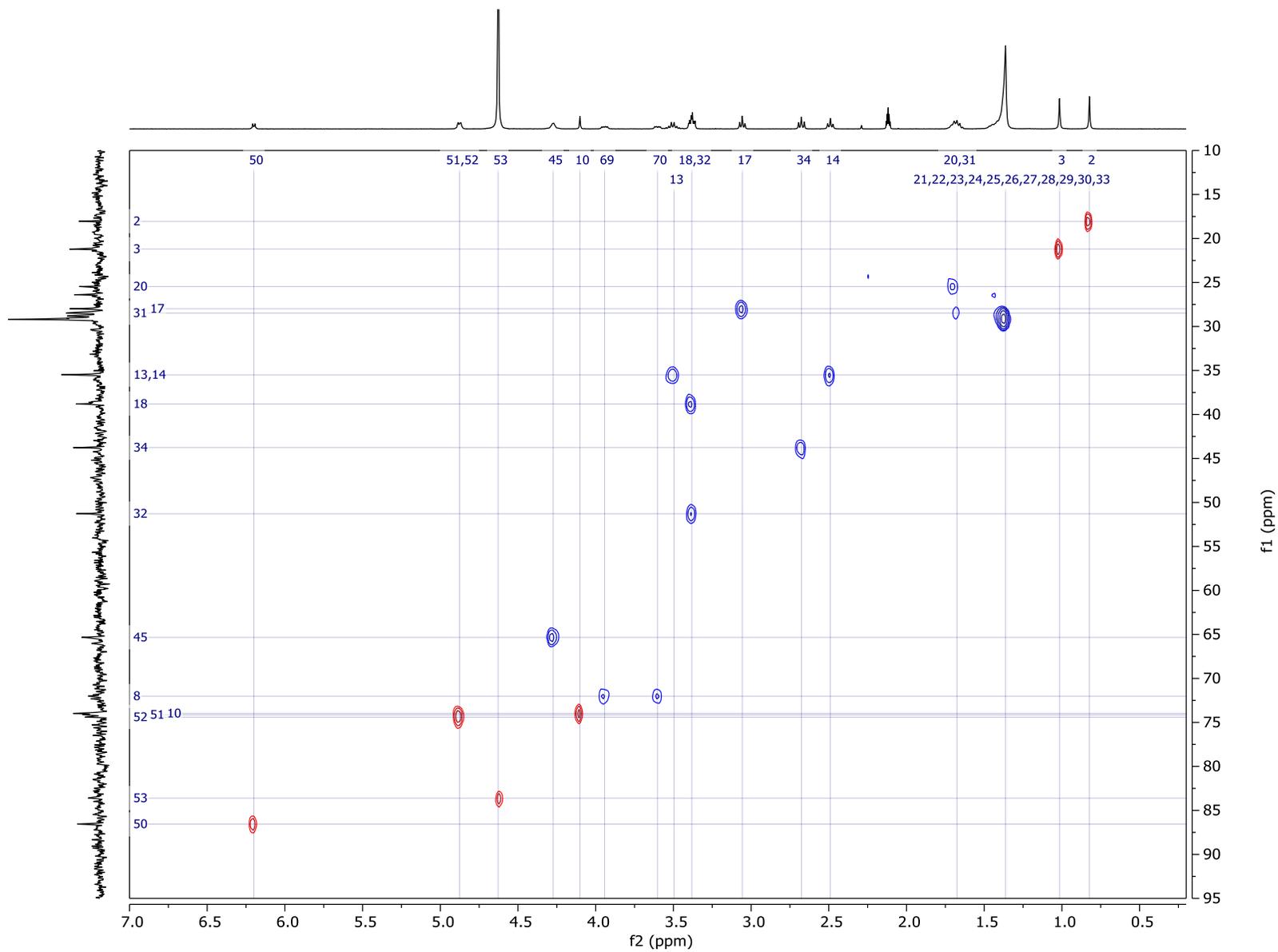


# COSY NMR



S-477

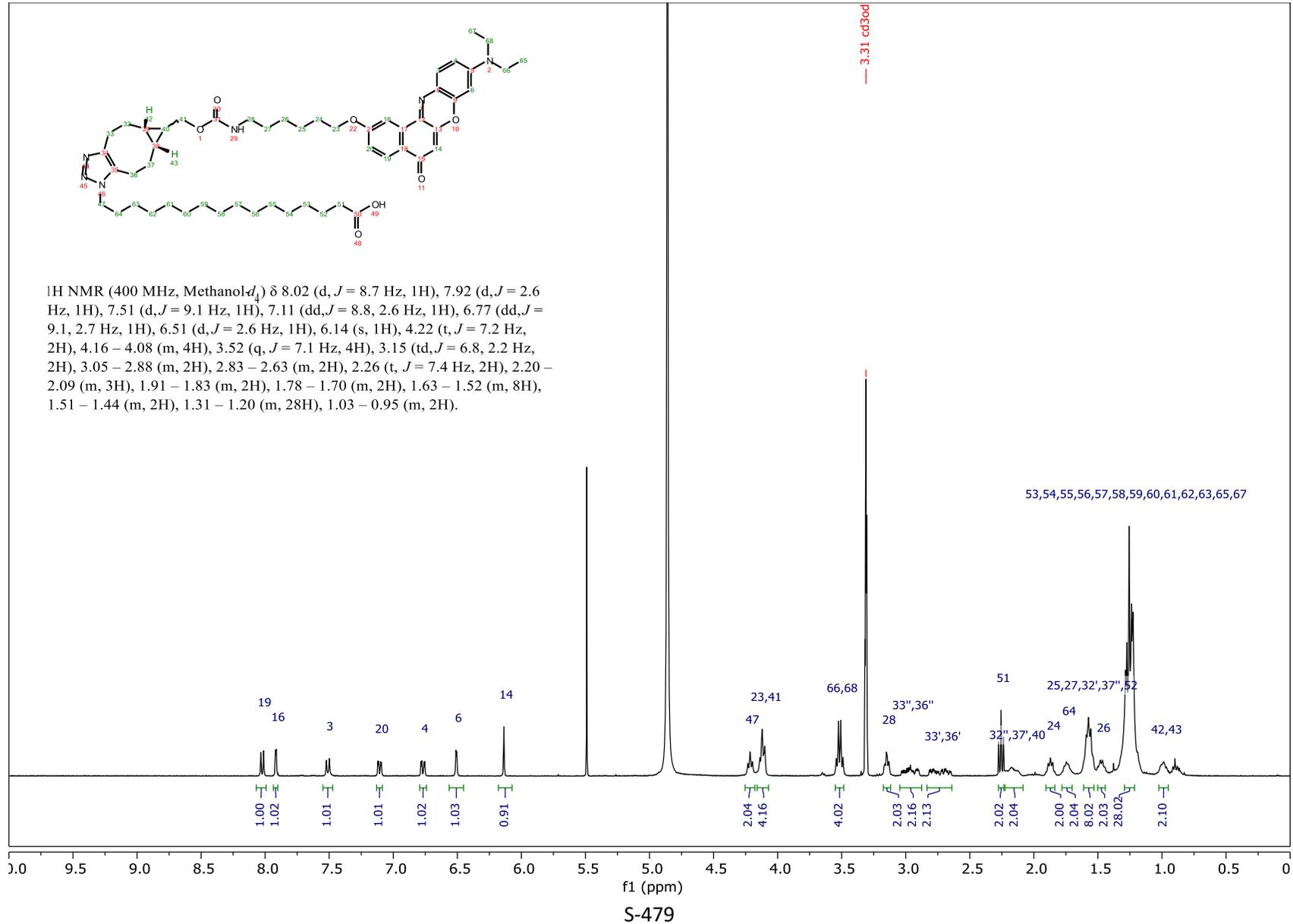
# HSQC NMR



S-478

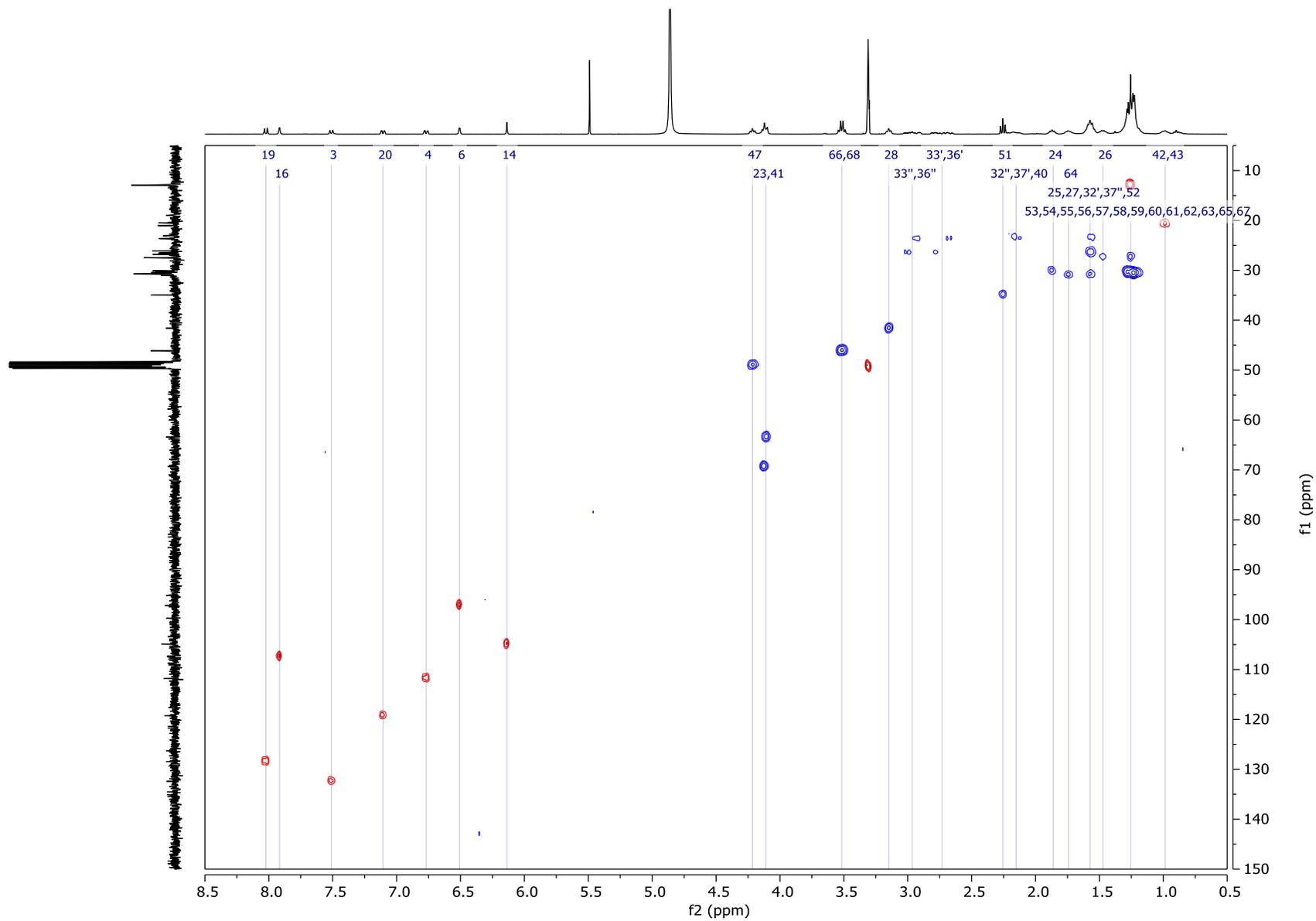
# Compound RBM5-196

<sup>1</sup>H NMR





# HSQC NMR



S-481



