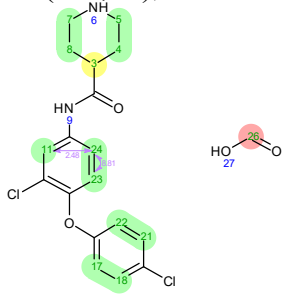
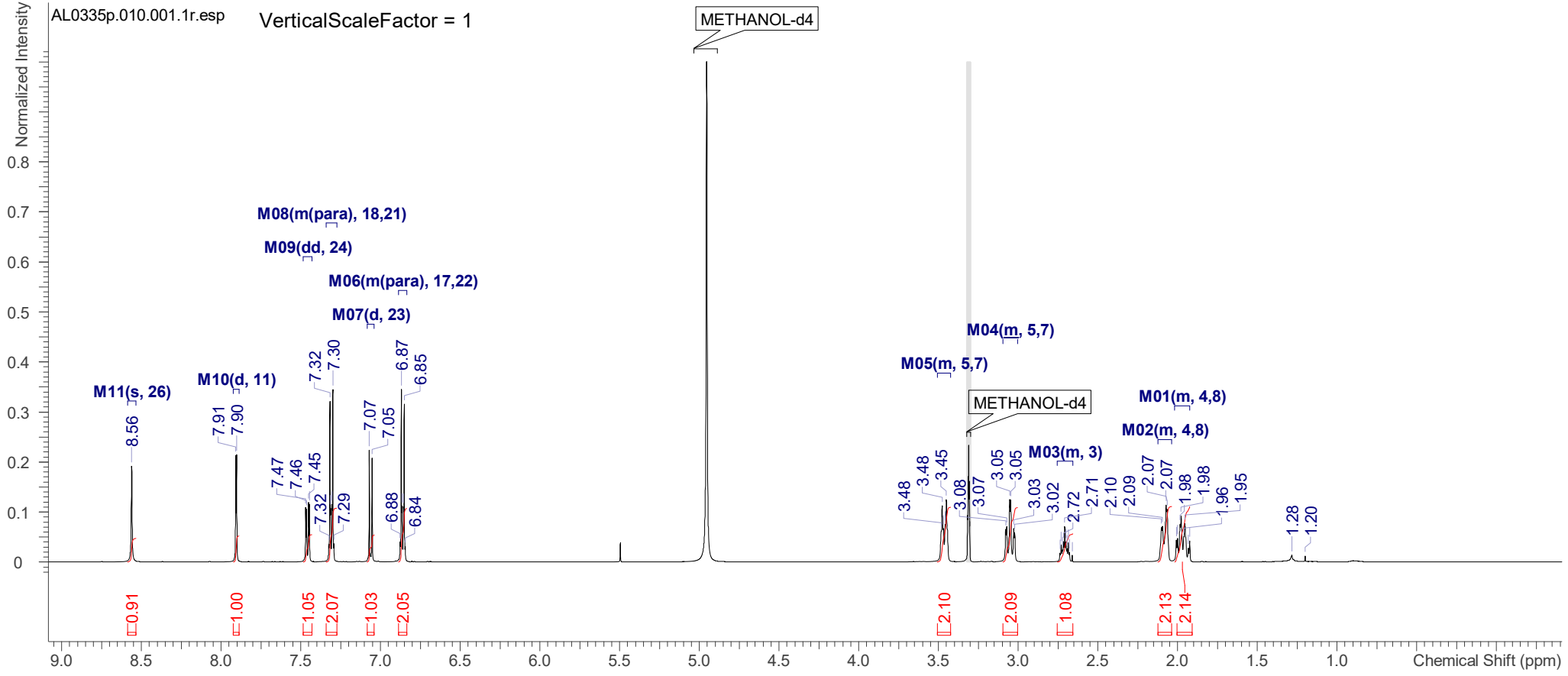
**Compound 1**

5/2/2022 9:59:07 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 17 H's / 20 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 17.66 |

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.56 (1 H, s), 7.91 (1 H, d, J = 2.44 Hz), 7.46 (1 H, dd, J = 8.77, 2.52 Hz), 7.34 – 7.27 (2 H, m), 7.06 (1 H, d, J = 8.85 Hz), 6.89 – 6.84 (2 H, m), 3.51 – 3.42 (2 H, m), 3.05 (2 H, m), 2.75 – 2.66 (1 H, m), 2.12 – 2.04 (2 H, m), 2.02 – 1.92 (2 H, m);



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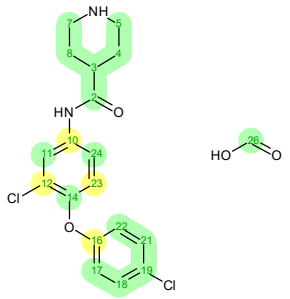
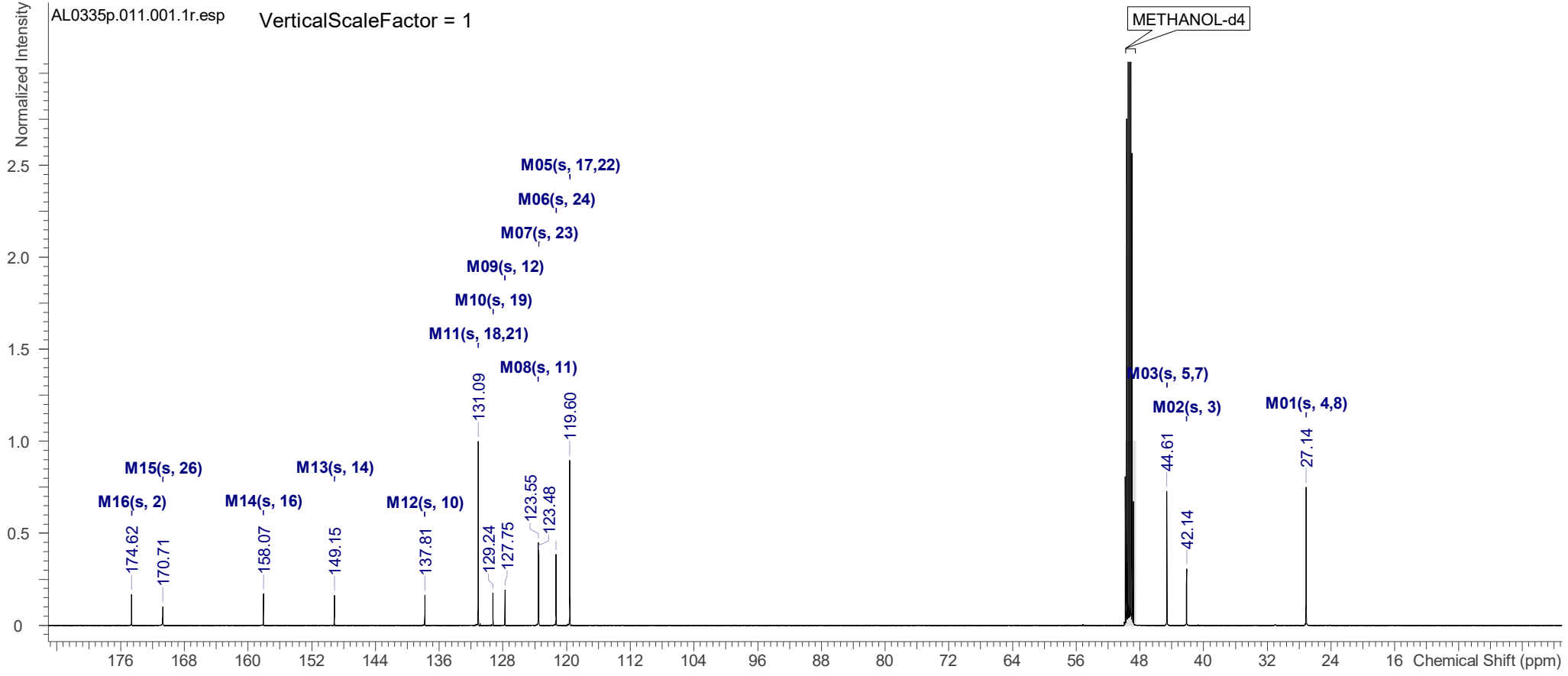
**Compound 1**

5/2/2022 9:59:13 AM

| ***Number of Nuclei*** 19 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 174.6 (1 C, s), 170.7 (1 C, s), 158.1 (1 C, s), 149.2 (1 C, s), 137.8 (1 C, s), 131.1 (2 C, s), 129.2 (1 C, s), 127.8 (1 C, s), 123.6 (1 C, s), 123.5 (1 C, s), 121.3 (1 C, s), 119.6 (2 C, s), 44.6 (2 C, s), 42.1 (1 C, s), 27.1 (2 C, s).

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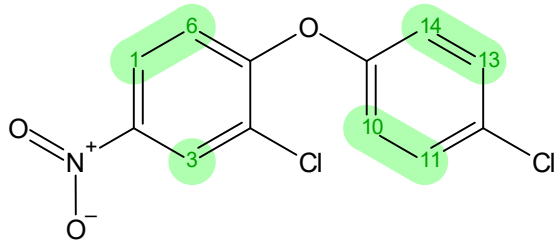
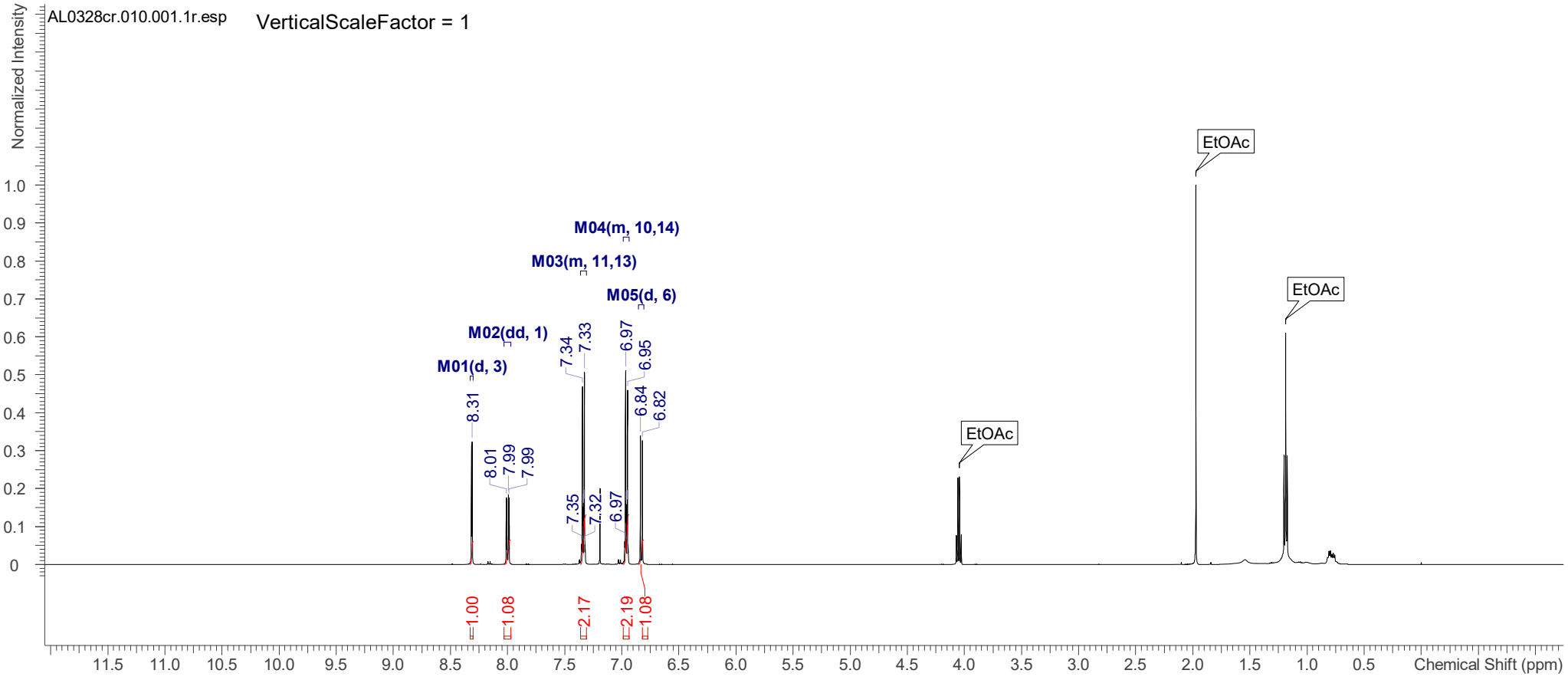
**Compound 4a**

4/2/2024 8:23:26 AM

| ***Number of Nuclei*** 7 H's / 7 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.52 |
|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.31 (1 H, d, J = 2.75 Hz), 8.00 (1 H, dd, J = 9.08, 2.67 Hz), 7.36 – 7.31 (2 H, m), 6.99 – 6.94 (2 H, m), 6.83 (1 H, d, J = 9.16 Hz);



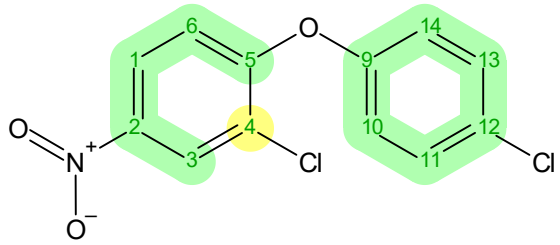

AL0328cr.010.001.1r.esp

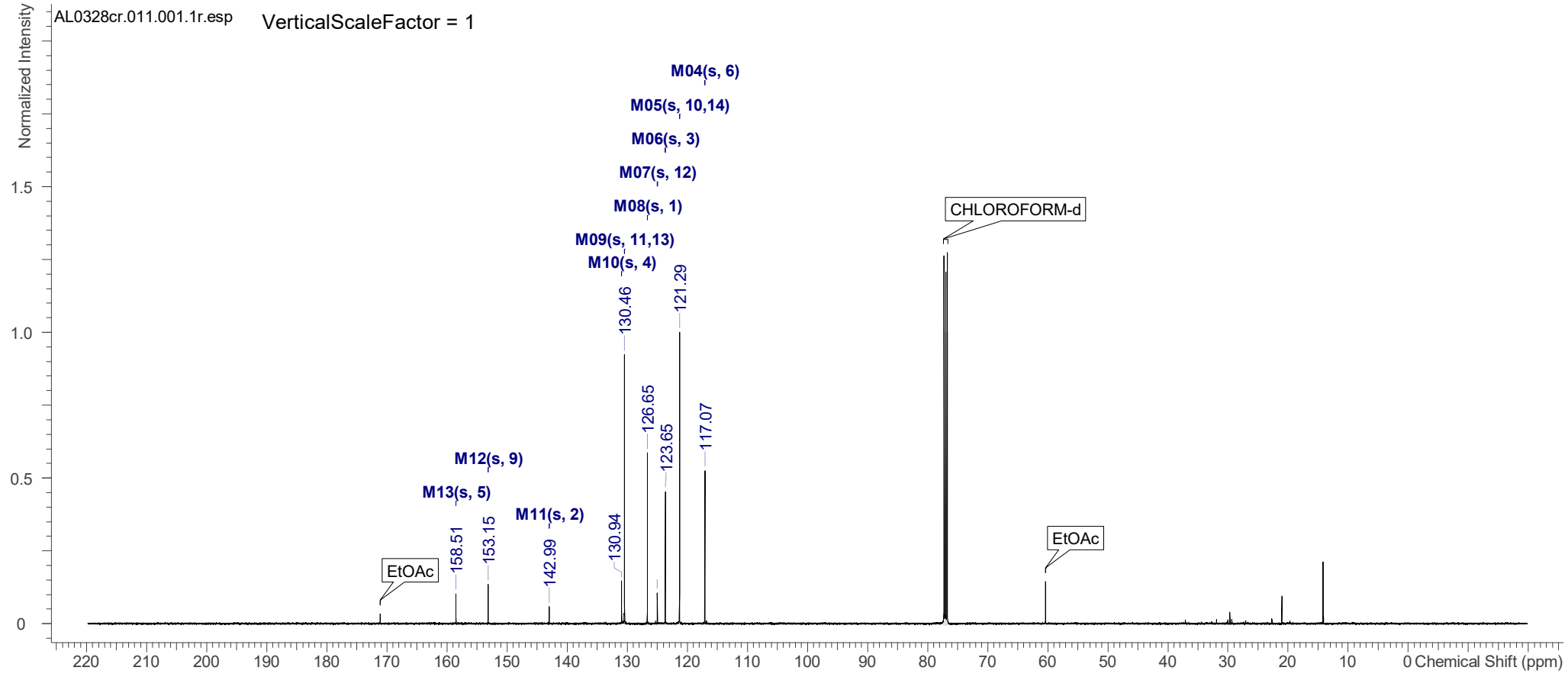
**Compound 4a**

4/2/2024 8:23:32 AM

| ***Number of Nuclei*** 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 158.5 (1 C, s), 153.2 (1 C, s), 143.0 (1 C, s), 130.9 (1 C, s), 130.5 (2 C, s), 126.7 (1 C, s), 125.0 (1 C, s), 123.7 (1 C, s), 121.3 (2 C, s), 117.1 (1 C, s)



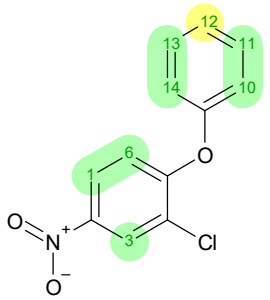

AL0328cr.011.001.1r.esp

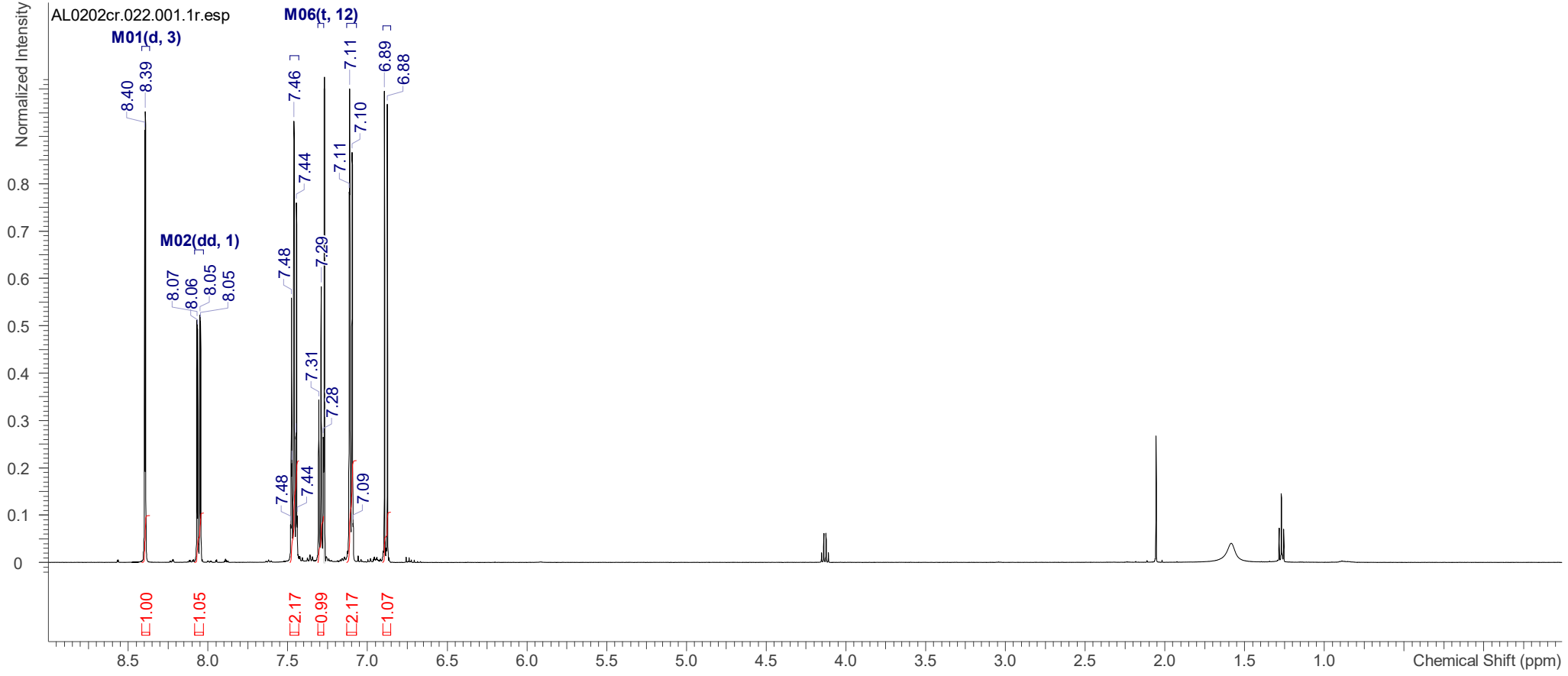
**Compound 4b**

1/5/2022 10:04:08 AM

| ***Number of Nuclei*** 8 H's / 8 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 8.45 |
|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.39 (1 H, d, J = 2.59 Hz), 8.06 (1 H, dd, J = 9.08, 2.67 Hz), 7.49 – 7.43 (2 H, m), 7.29 (1 H, t, J = 7.40 Hz), 7.10 (2 H, dd, J = 8.54, 0.76 Hz), 6.88 (1 H, d, J = 9.00 Hz);

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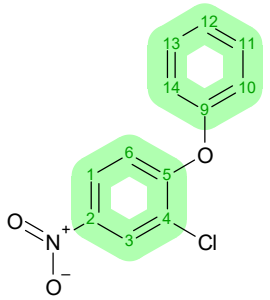
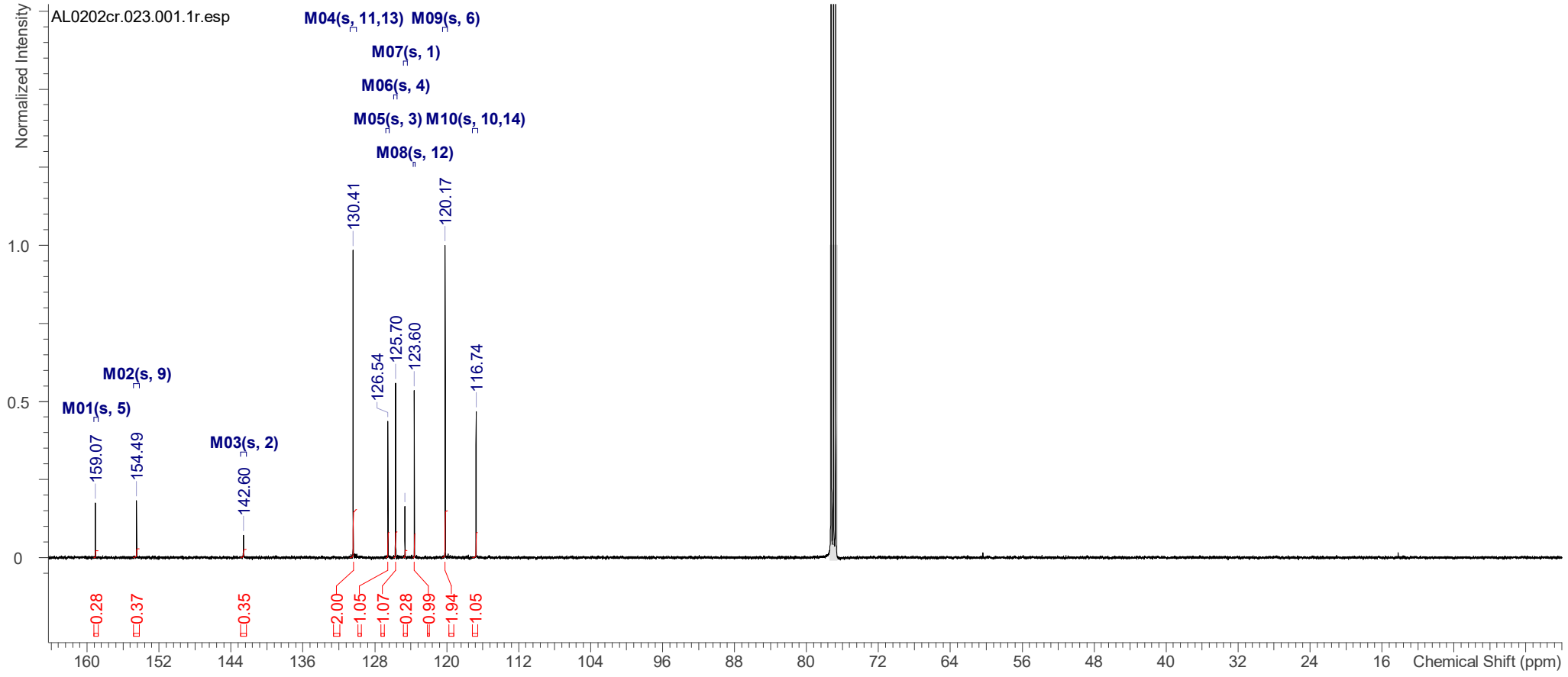
**Compound 4b**

1/5/2022 10:04:13 AM

| ***Number of Nuclei*** 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 9.39 |
|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 159.1 (1 C, s), 154.5 (1 C, s), 142.6 (1 C, s), 130.4 (2 C, s), 126.5 (1 C, s), 125.7 (1 C, s), 124.7 (1 C, s), 123.6 (1 C, s), 120.2 (1 C, s), 116.7 (2 C, s)

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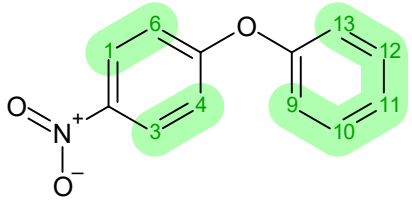
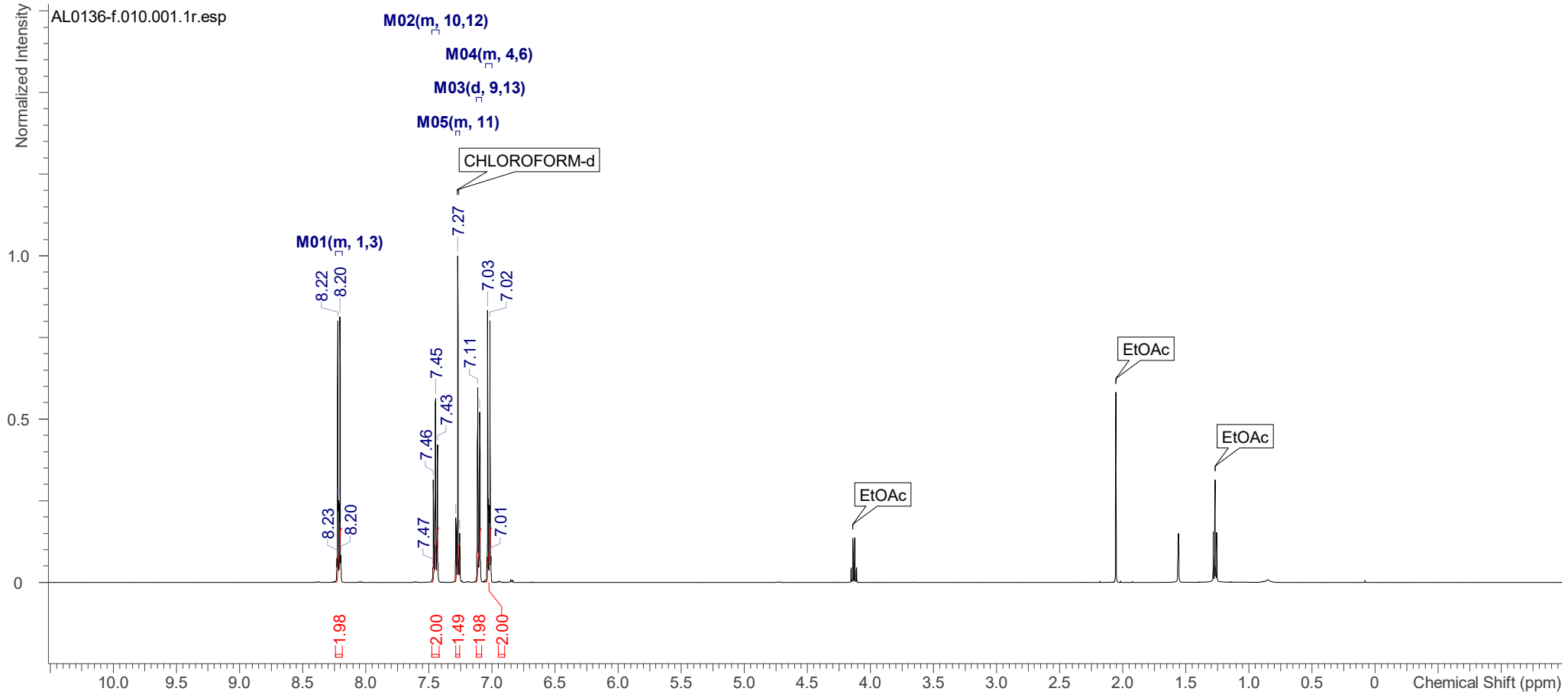
**Compound 4c**

4/1/2024 5:58:10 PM

| ***Number of Nuclei*** 9 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 9.45 |
|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.24 – 8.19 (2 H, m), 7.48 – 7.42 (2 H, m), 7.29 – 7.25 (1 H, m), 7.10 (2 H, d, J = 7.78 Hz), 7.05 – 7.00 (2 H, m);

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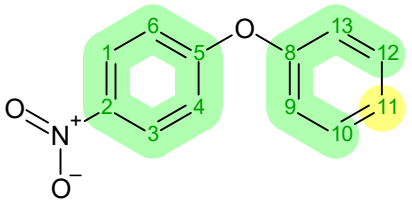
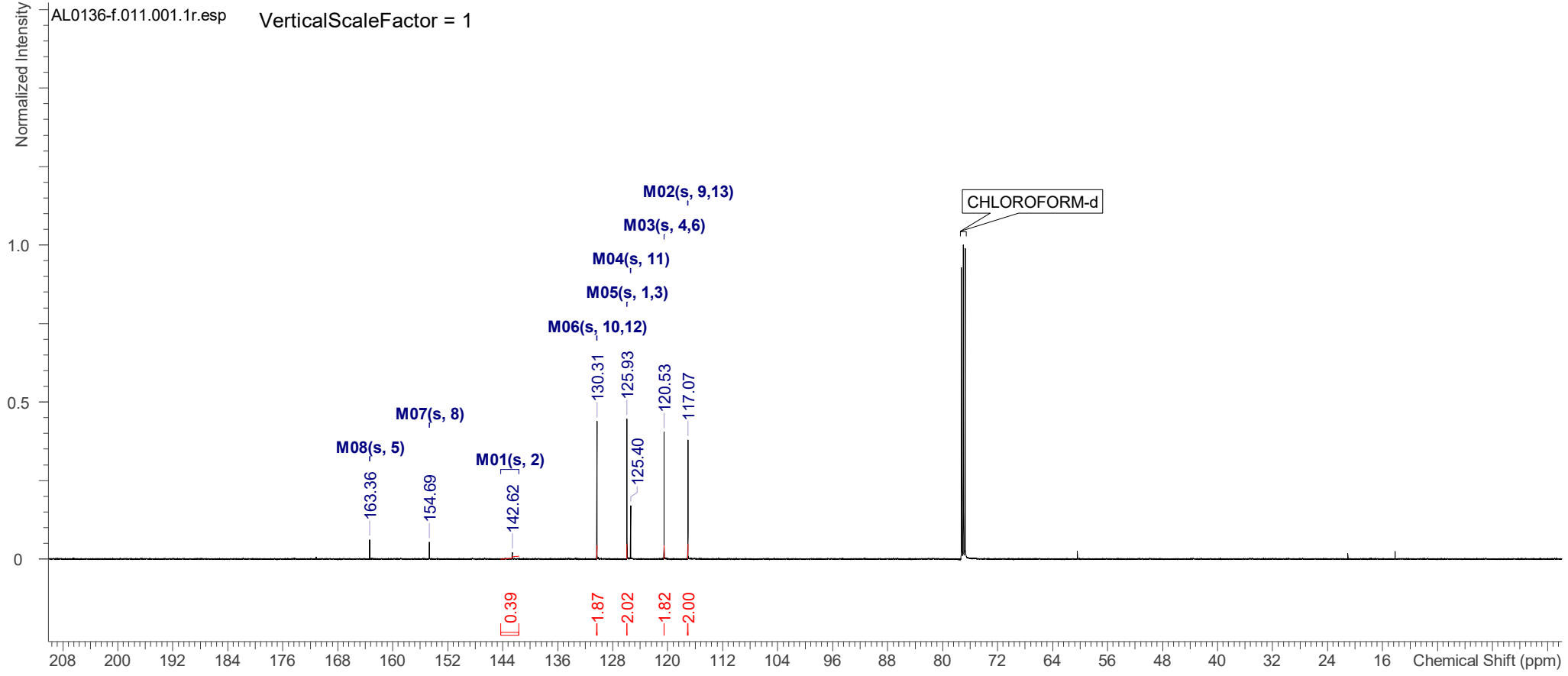
**Compound 4c**

4/1/2024 5:58:14 PM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 8.10 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 163.4 (1 C, s), 154.7 (1 C, s), 142.6 (1 C, s), 130.3 (2 C, s), 125.9 (2 C, s), 125.4 (1 C, s), 120.5 (2 C, s), 117.1 (2 C, s)

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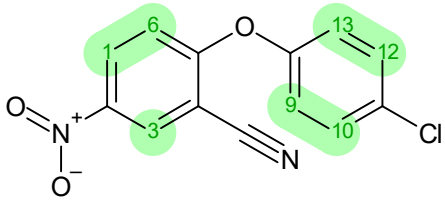
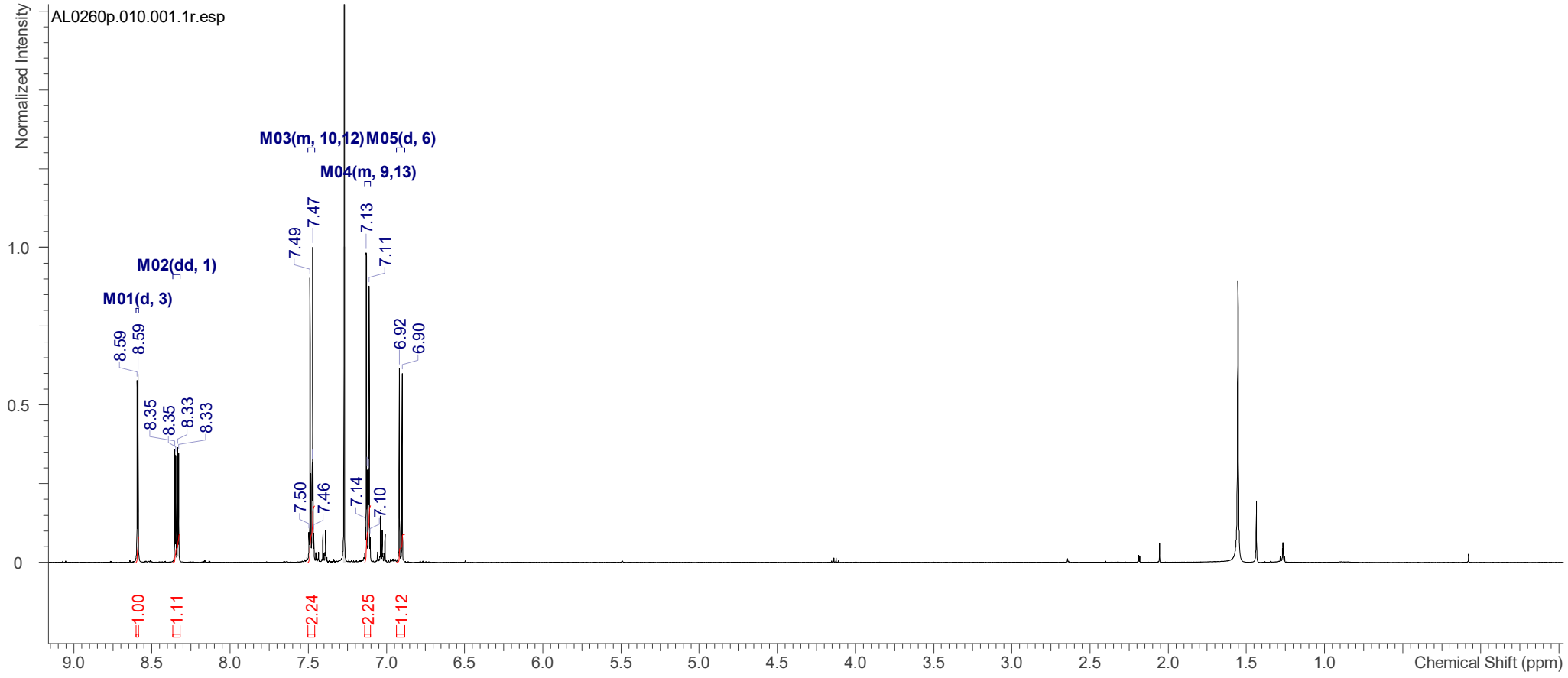
**Compound 4d**

2/17/2022 7:59:49 AM

| ***Number of Nuclei*** 7 H's / 7 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.72 |
|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.59 (1 H, d, J = 2.59 Hz), 8.34 (1 H, dd, J = 9.31, 2.75 Hz), 7.50 – 7.46 (2 H, m), 7.14 – 7.10 (2 H, m), 6.91 (1 H, d, J = 9.31 Hz);

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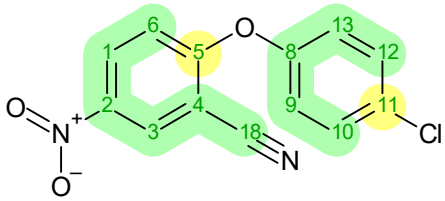
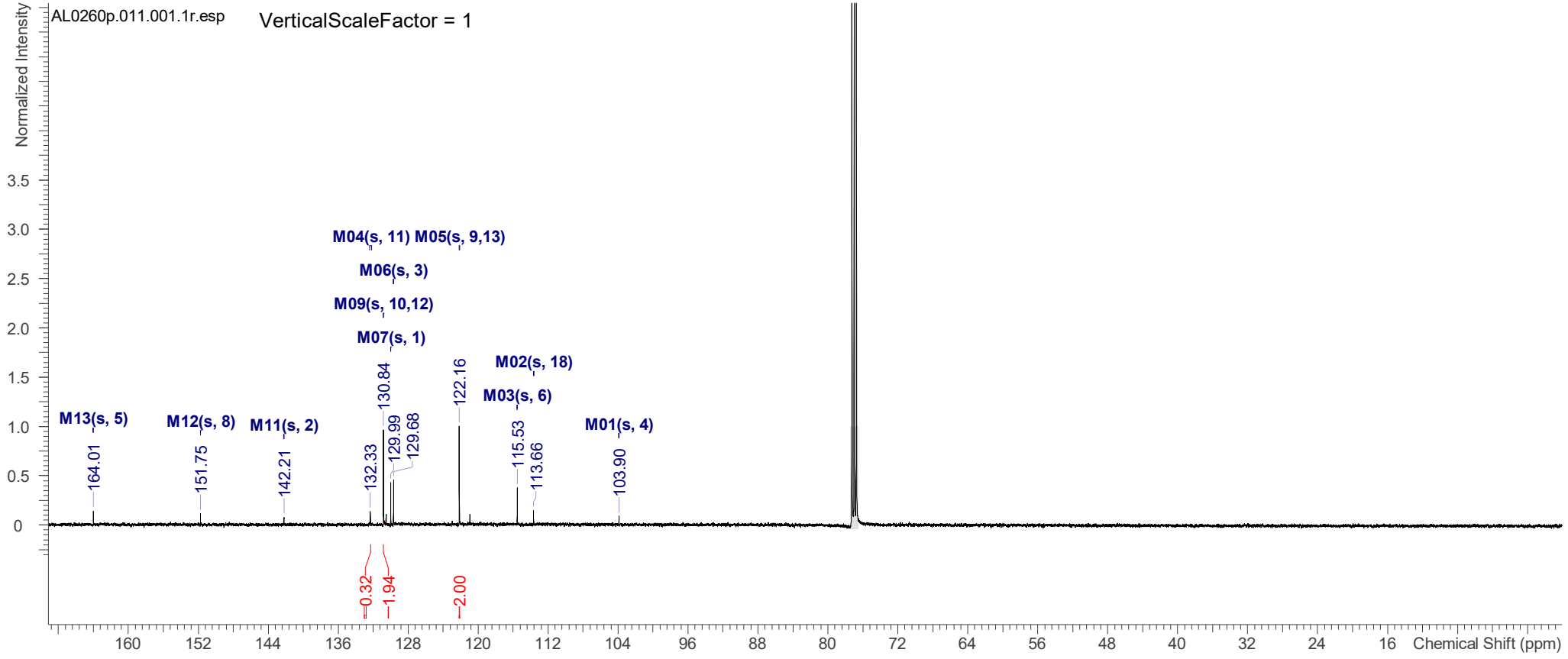
**Compound 4d**

2/17/2022 7:59:53 AM

| | | | | | |
|---|---|---|---|---|---|
| ***Number of Nuclei*** | 13 C's / 13 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 4.26 | ***Bad Phase or Baseline*** | True |
| ***Possible Impurity*** | True | | | | |

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 164.0 (1 C, s), 151.8 (1 C, s), 142.2 (1 C, s), 132.3 (1 C, s), 130.8 (2 C, s), 130.0 (1 C, s), 129.7 (1 C, s), 122.2 (2 C, s), 115.5 (1 C, s), 113.7 (1 C, s), 103.9 (1 C, s)

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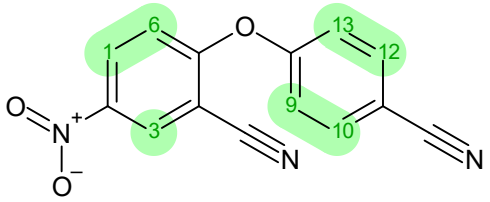
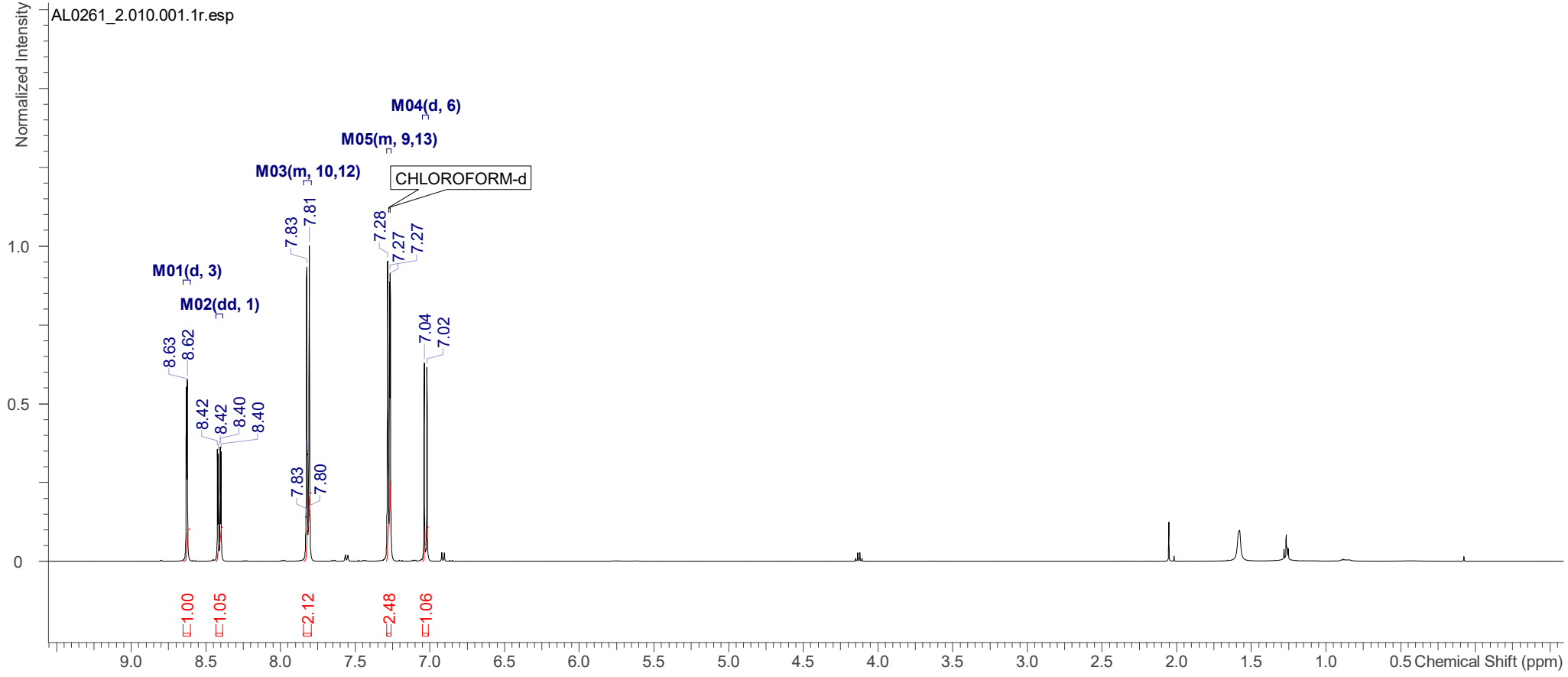
**Compound 4e**

4/6/2022 1:51:53 PM

| ***Number of Nuclei*** 7 H's / 7 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.72 |
|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.63 (1 H, d, J = 2.59 Hz), 8.41 (1 H, dd, J = 9.16, 2.75 Hz), 7.85 – 7.79 (2 H, m), 7.29 – 7.26 (2 H, m), 7.03 (1 H, d, J = 9.31 Hz);

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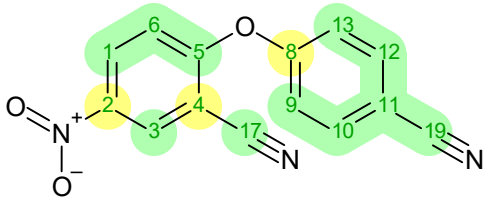
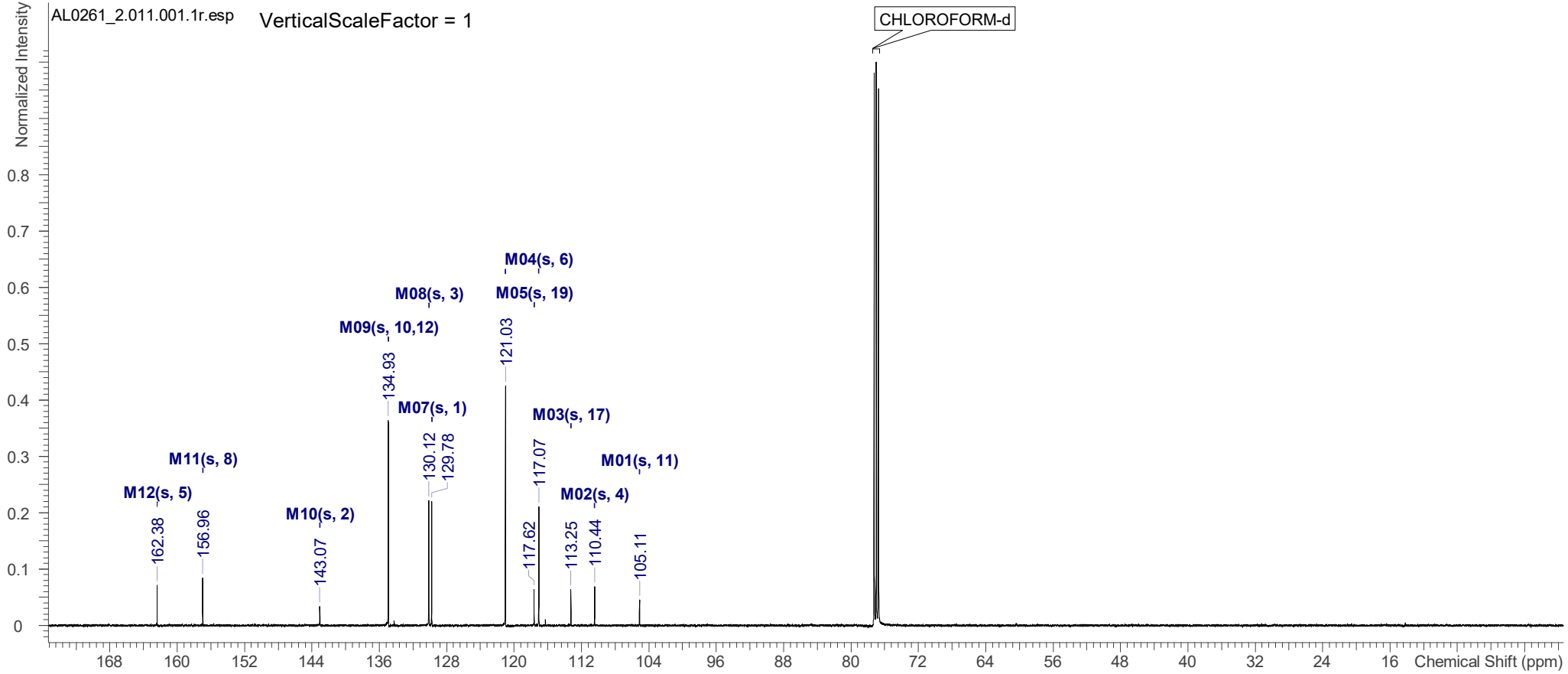
**Compound 4e**

4/6/2022 1:51:56 PM

| ***Number of Nuclei*** 14 C's / 14 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 162.4 (1 C, s), 157.0 (1 C, s), 143.1 (1 C, s), 134.9 (2 C, s), 130.1 (1 C, s), 129.8 (1 C, s), 121.0 (2 C, s), 117.6 (1 C, s), 117.1 (1 C, s), 113.3 (1 C, s), 110.4 (1 C, s), 105.1 (1 C, s)

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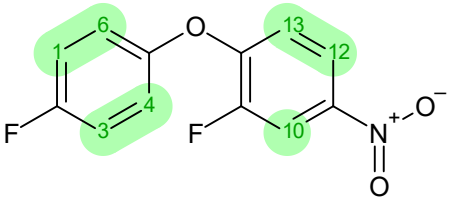
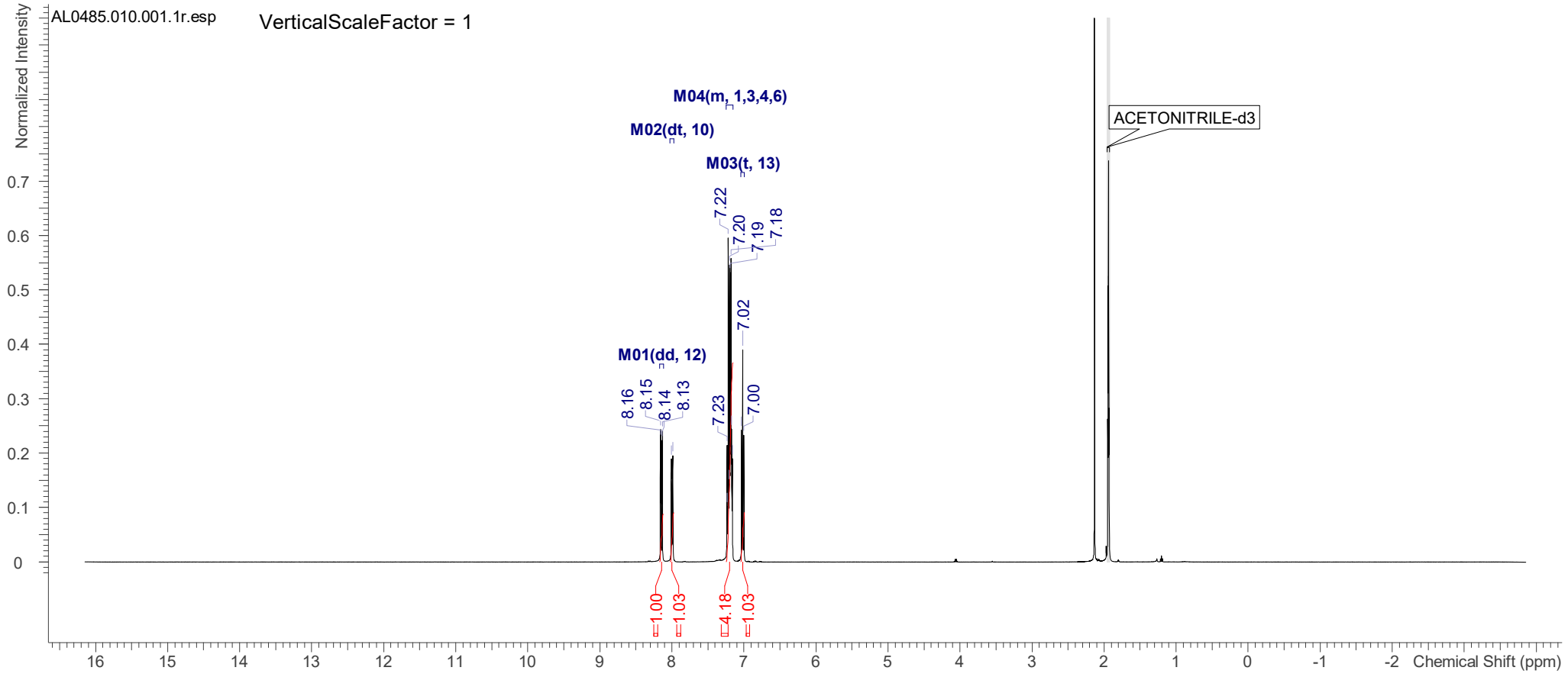
**Compound 4f**

4/2/2024 1:15:48 PM

| ***Number of Nuclei*** 7 H's / 7 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.24 |
|---|---|

$^{1}$H NMR (500 MHz, ACETONITRILE-$d_3$, ppm) δ= 8.15 (1 H, dd, J = 10.76, 2.67 Hz), 8.00 (1 H, dt, J = 9.12, 1.70 Hz), 7.24 – 7.15 (4 H, m), 7.02 (1 H, t, J = 8.70 Hz);



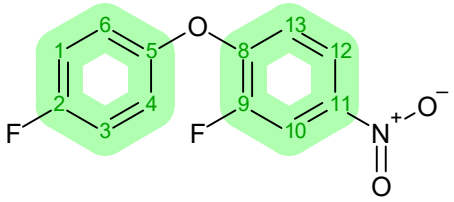

AL0485.010.001.1r.esp

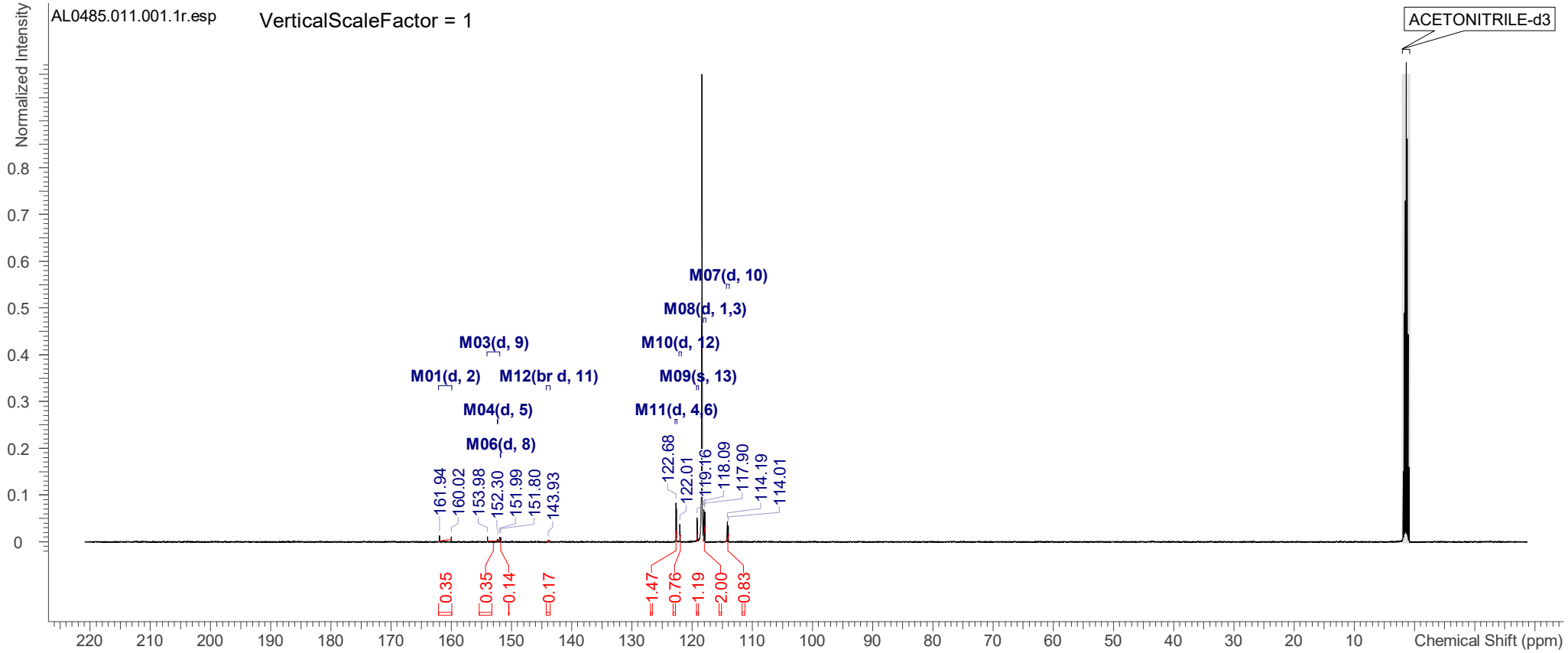
**Compound 4f**

4/2/2024 1:15:51 PM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.27 |
|---|---|---|

$^{13}$C NMR (126 MHz, ACETONITRILE-$d_3$, ppm) δ= 114.1 (1 C, d, J = 22.98 Hz), 118.0 (2 C, d, J = 23.90 Hz), 119.2 (1 C, s), 122.0 (1 C, d, J = 3.68 Hz), 122.6 (2 C, d, J = 9.19 Hz), 143.9 (1 C, br d, J = 8.27 Hz), 151.8 (1 C, d, J = 2.76 Hz), 153.0 (1 C, d, J = 250.02 Hz), 152.3 (1 C, d, J = 10.11 Hz), 161.0 (1 C, d, J = 241.75 Hz);



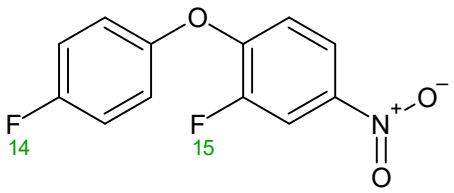

AL0485.011.001.1r.esp

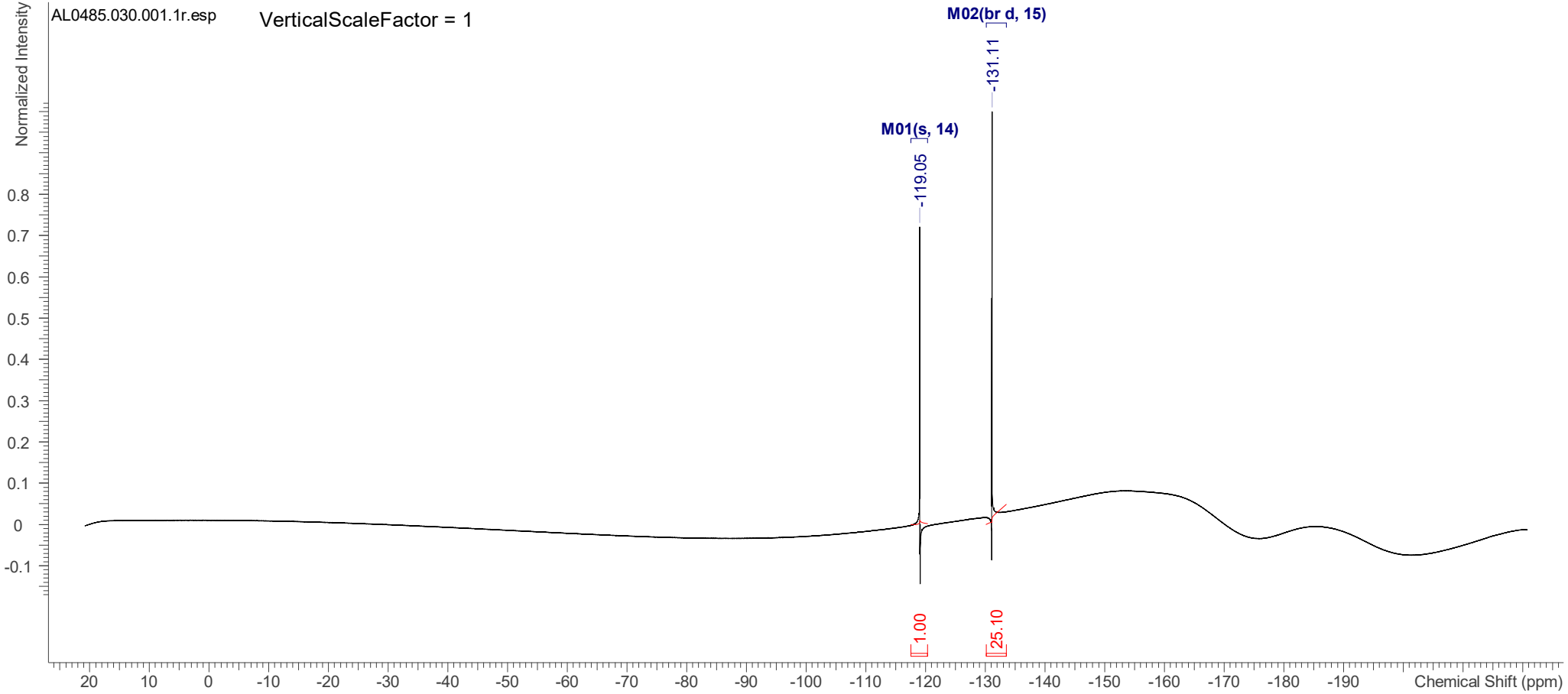
**Compound 4f**

4/2/2024 1:15:54 PM

| ***Number of Nuclei*** | 2 F's / 2 F's (spectrum / structure) | ***Multiplets Integrals Sum*** 26.10 |
|---|---|---|

$^{19}$F NMR (470 MHz, ACETONITRILE-$d_3$, ppm) δ= -131.1 (1 F, br d, J = 8.67 Hz), -119.0 (1 F, s)



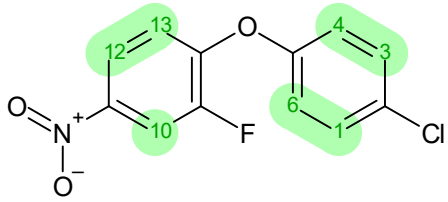

AL0485.030.001.1r.esp

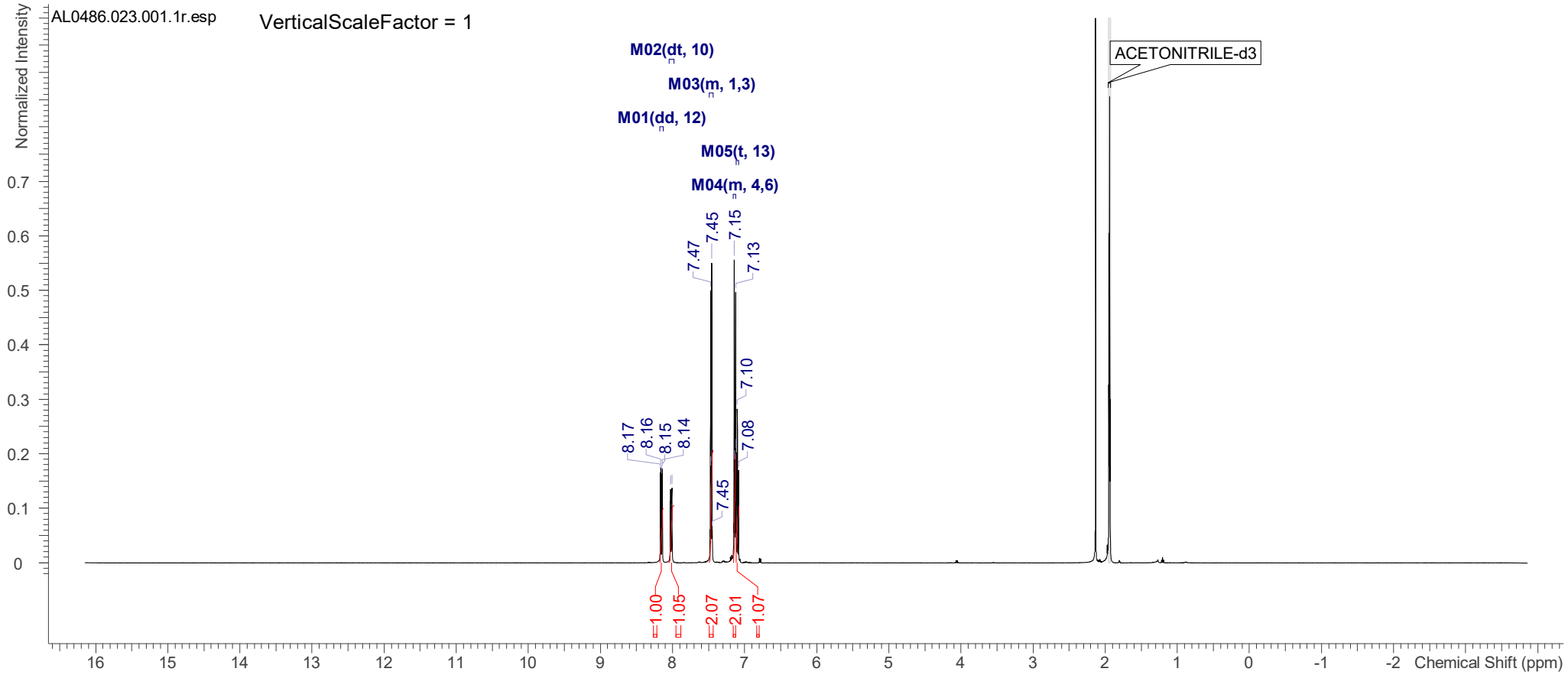
**Compound 4g**

4/2/2024 1:16:17 PM

***Multiplets Integrals Sum*** 7.19 ***Number of Nuclei*** 7 H's / 7 H's (spectrum / structure)

$^{1}$H NMR (500 MHz, ACETONITRILE-$d_3$, ppm) δ= 8.15 (1 H, dd, J = 10.68, 2.75 Hz), 8.02 (1 H, dt, J = 9.04, 1.81 Hz), 7.49 – 7.43 (2 H, m), 7.16 – 7.12 (2 H, m), 7.10 (1 H, t, J = 8.70 Hz);



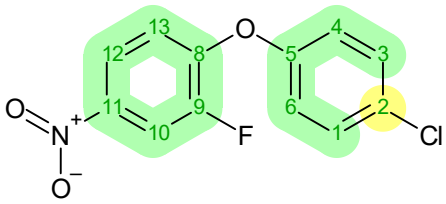

AL0486.023.001.1r.esp

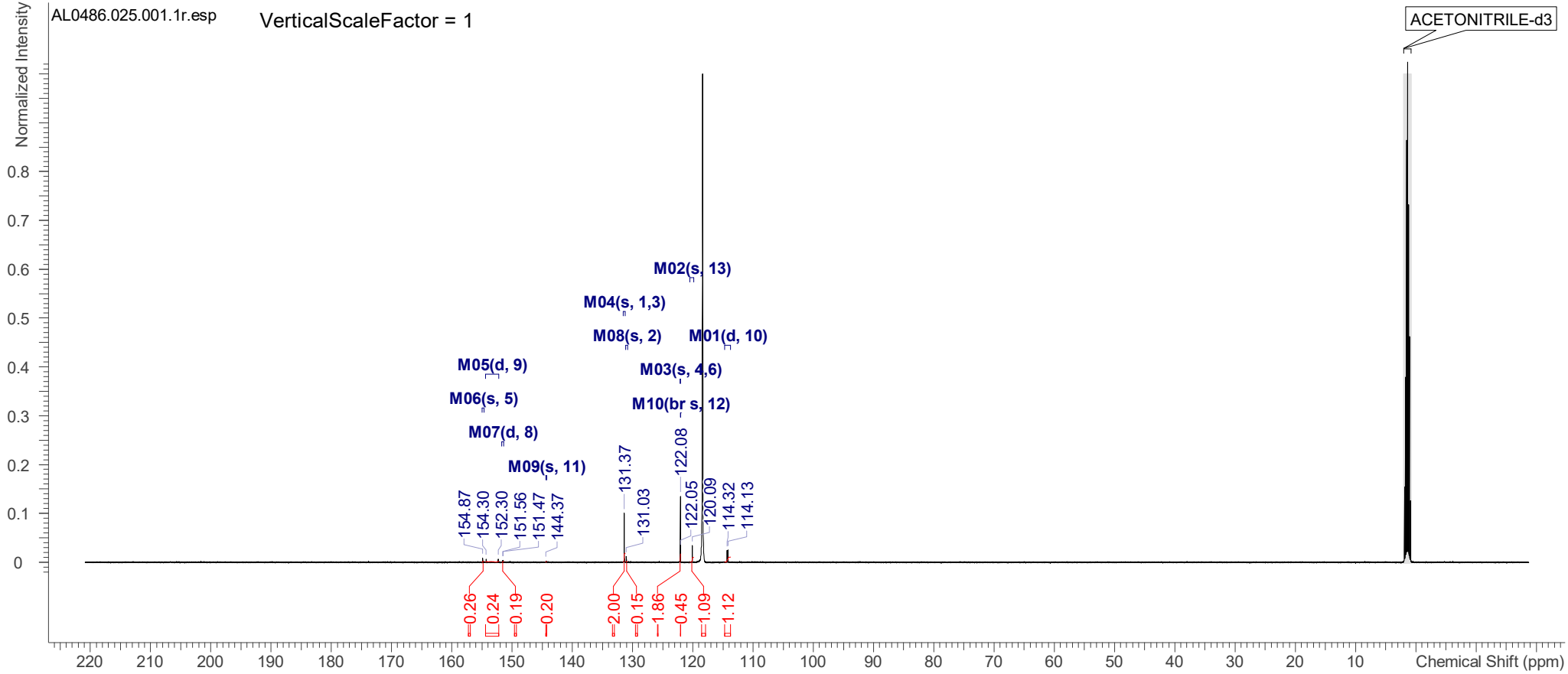
**Compound 4g**

4/2/2024 1:16:21 PM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.57 |
|---|---|---|

$^{13}$C NMR (126 MHz, ACETONITRILE-$d_3$, ppm) δ= 114.2 (1 C, d, J = 23.90 Hz), 120.1 (1 C, s), 122.1 (1 C, br s), 122.1 (2 C, s), 131.0 (1 C, s), 131.4 (2 C, s), 144.4 (1 C, s), 151.5 (1 C, d, J = 11.95 Hz), 153.3 (1 C, d, J = 250.94 Hz), 154.9 (1 C, s)



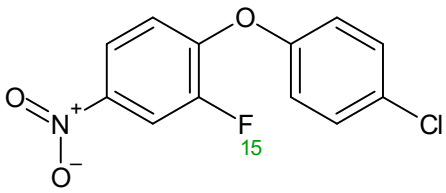

AL0486.025.001.1r.esp

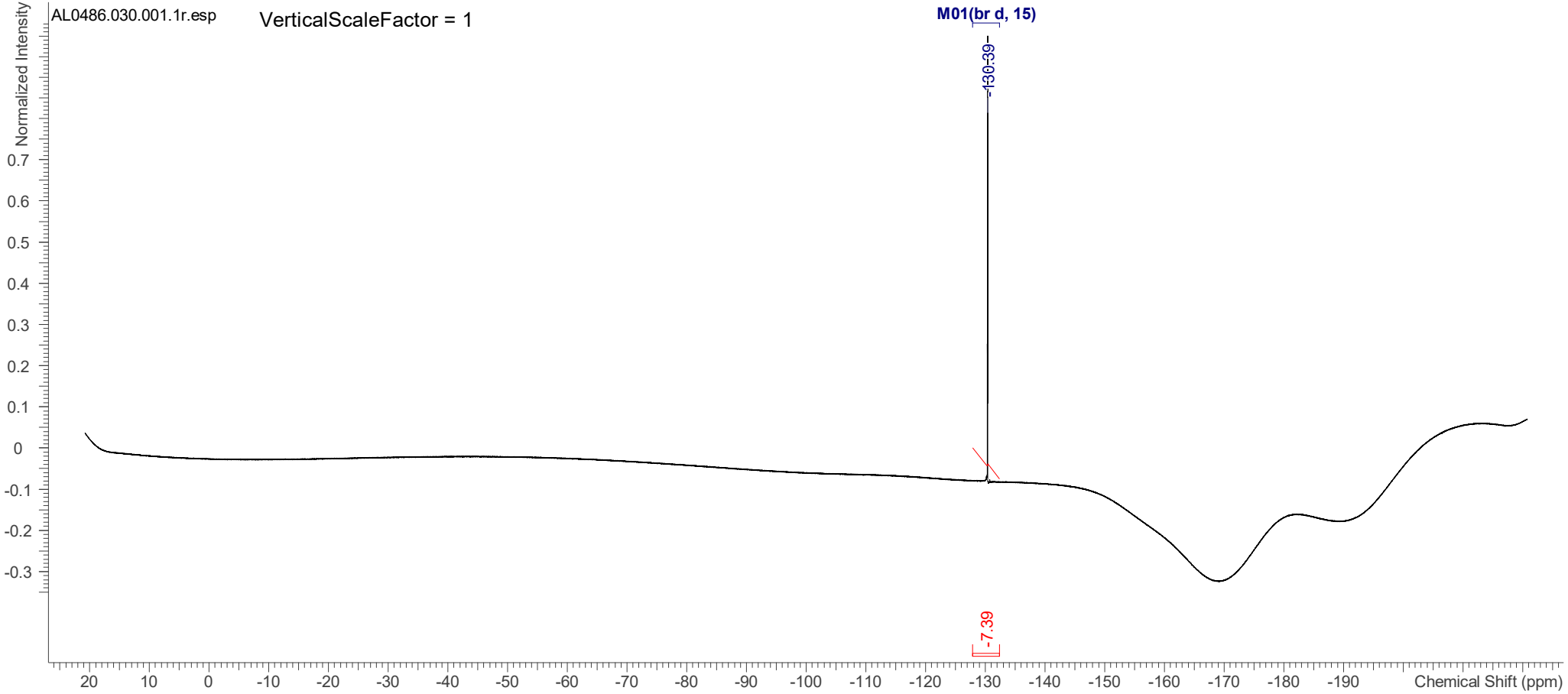
**Compound 4g**

4/2/2024 1:16:25 PM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** | -7.39 |

$^{19}$F NMR (470 MHz, ACETONITRILE-$d_3$, ppm) δ= -130.4 (1 F, br d, J = 8.68 Hz)



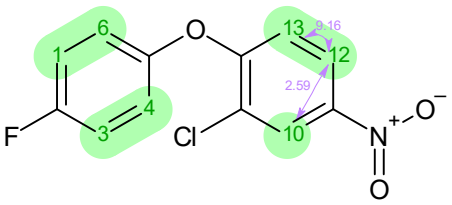

AL0486.030.001.1r.esp

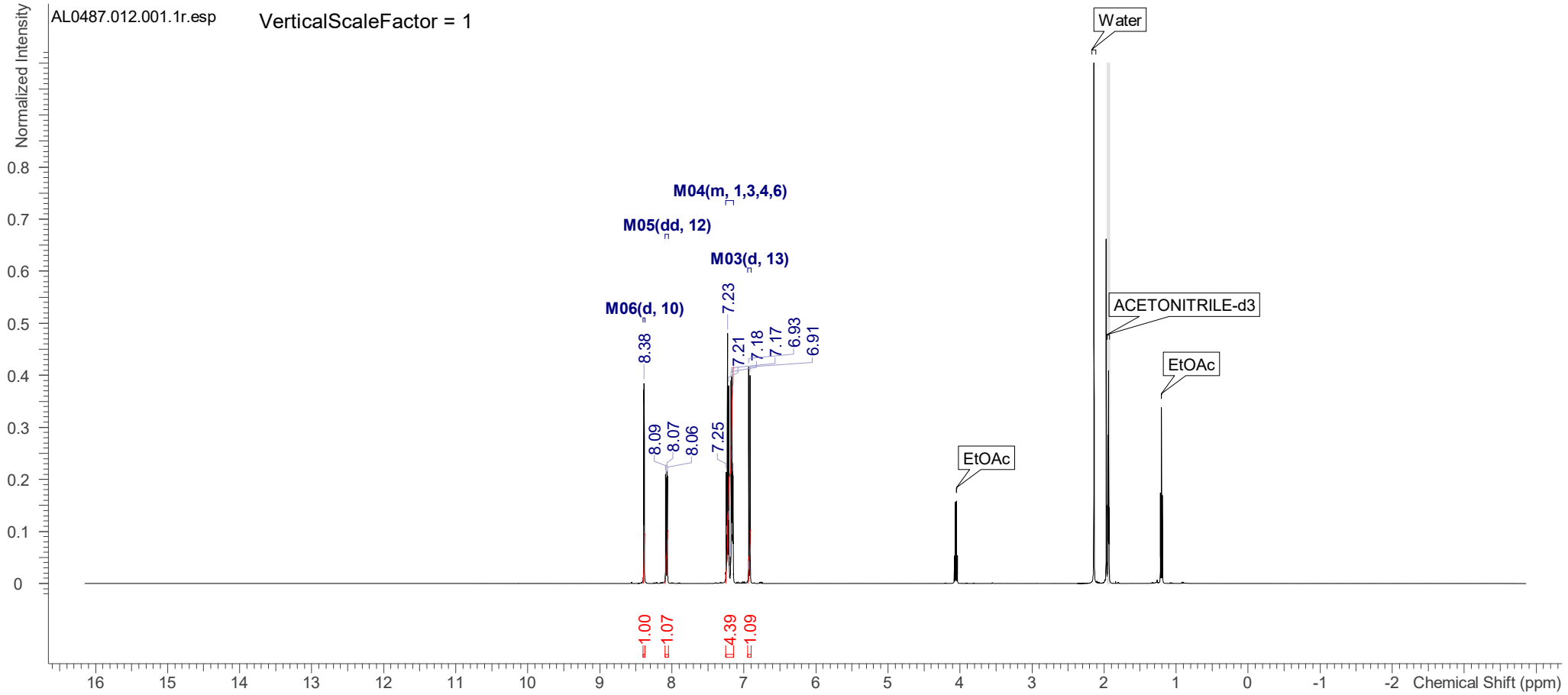
**Compound 4h**

4/2/2024 1:16:39 PM

***Multiplets Integrals Sum*** 7.55 ***Number of Nuclei*** 7 H's / 7 H's (spectrum / structure)

$^1$H NMR (500 MHz, ACETONITRILE-$d_3$, ppm) δ= 8.39 (1 H, d, J = 2.59 Hz), 8.07 (1 H, dd, J = 9.16, 2.59 Hz), 7.25 – 7.14 (4 H, m), 6.92 (1 H, d, J = 9.16 Hz);



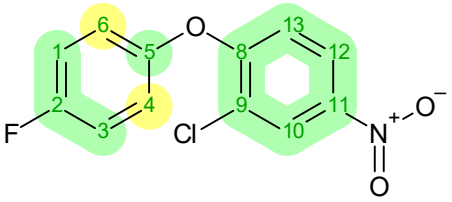

AL0487.012.001.1r.esp

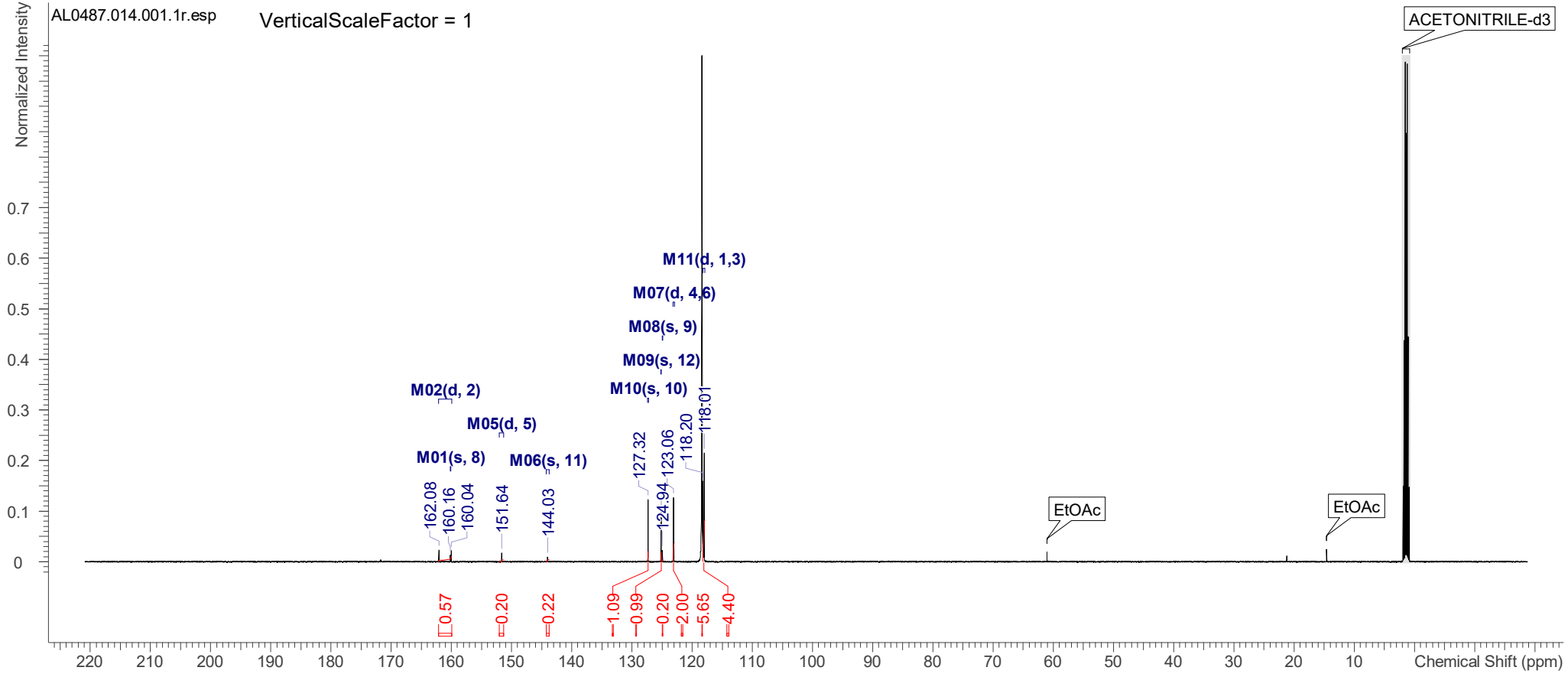
**Compound 4h**

4/2/2024 1:16:44 PM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 15.32 |

$^{13}$C NMR (126 MHz, ACETONITRILE-$d_3$, ppm) δ= 118.1 (2 C, d, J = 23.90 Hz), 118.3 – 118.4 (1 C, m), 123.1 (2 C, d, J = 8.27 Hz), 124.9 (1 C, s), 125.2 (1 C, s), 127.3 (1 C, s), 144.0 (1 C, s), 151.6 (1 C, d, J = 2.76 Hz), 161.1 (1 C, d, J = 256.46 Hz), 160.2 (1 C, s)



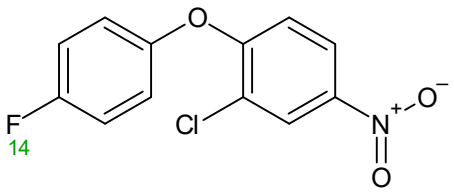

AL0487.014.001.1r.esp

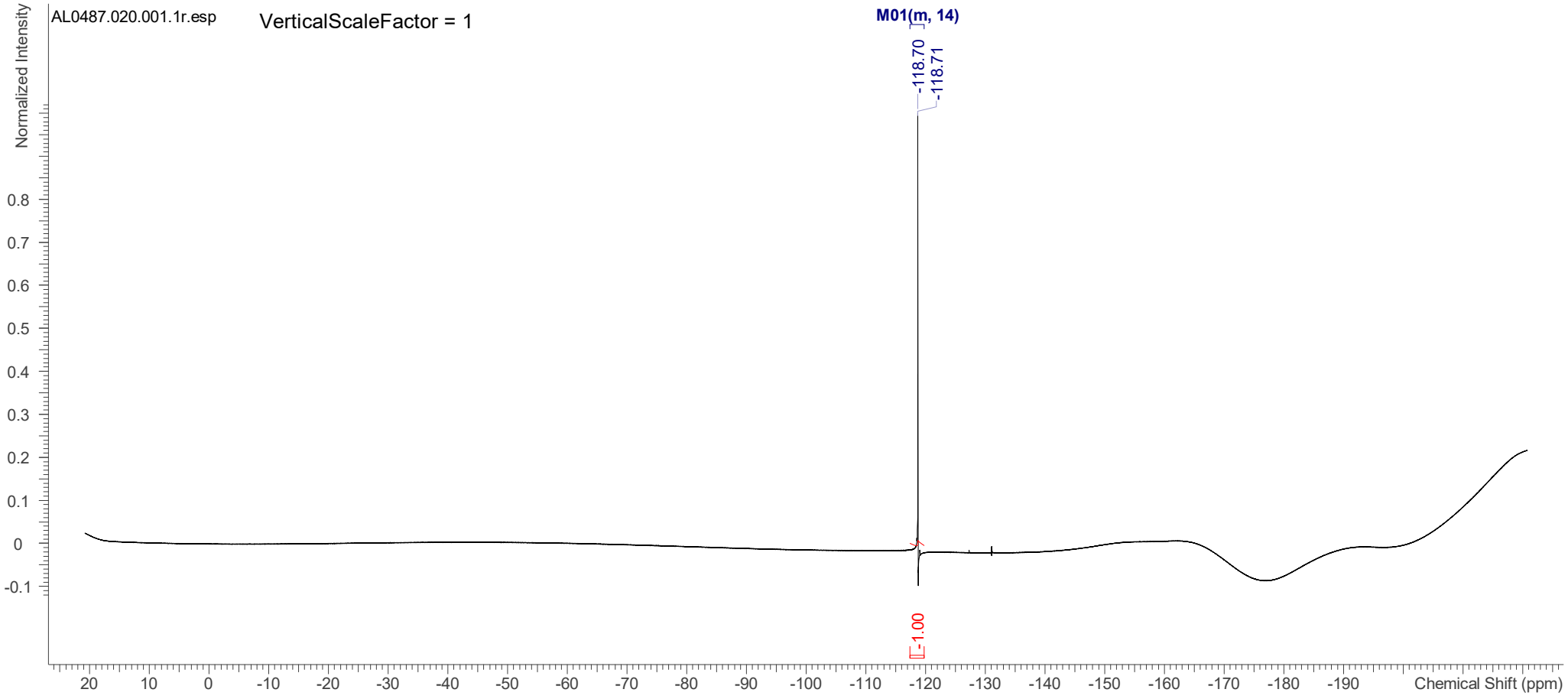
**Compound 4h**

4/2/2024 1:16:47 PM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** | -1.00 |

$^{19}$F NMR (470 MHz, ACETONITRILE-$d_3$) δ ppm -119.77 - -117.40 (1 F, m)



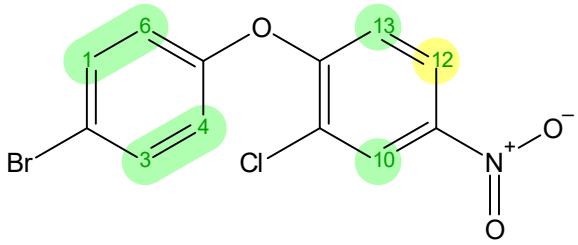

AL0487.020.001.1r.esp

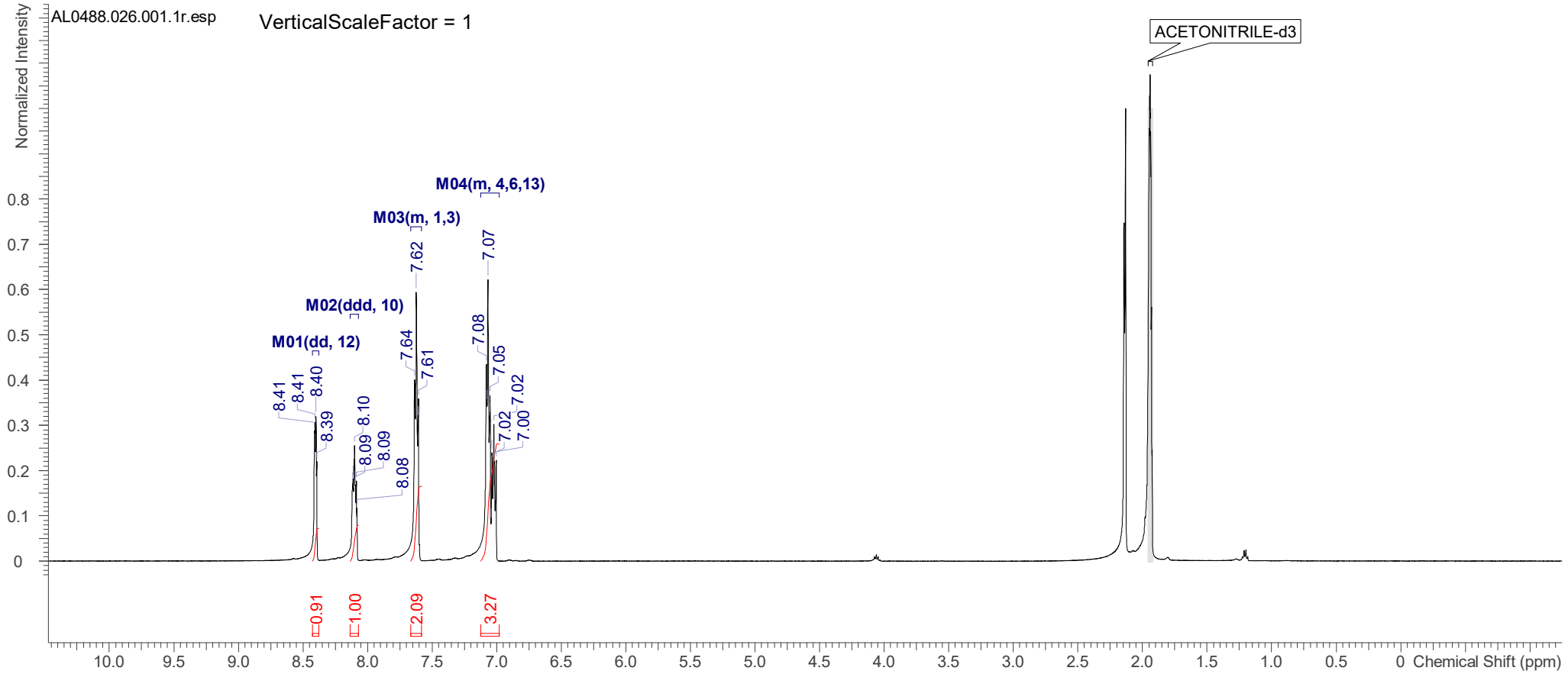
**Compound 4i**

4/2/2024 8:37:44 AM

| ***Number of Nuclei*** | 7 H's / 7 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.27 |
|---|---|---|

$^{1}$H NMR (500 MHz, ACETONITRILE-$d_3$, ppm) δ= 8.40 (1 H, dd, J = 5.87, 2.36 Hz), 8.10 (1 H, ddd, J = 8.89, 6.29, 2.52 Hz), 7.67 – 7.58 (2 H, m), 7.12 – 6.98 (3 H, m);



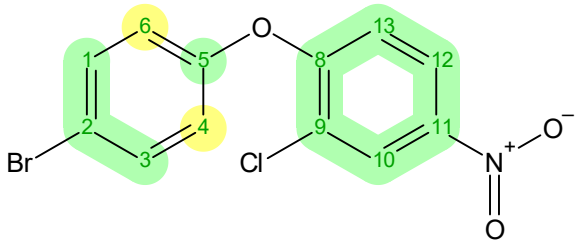

AL0488.026.001.1r.esp

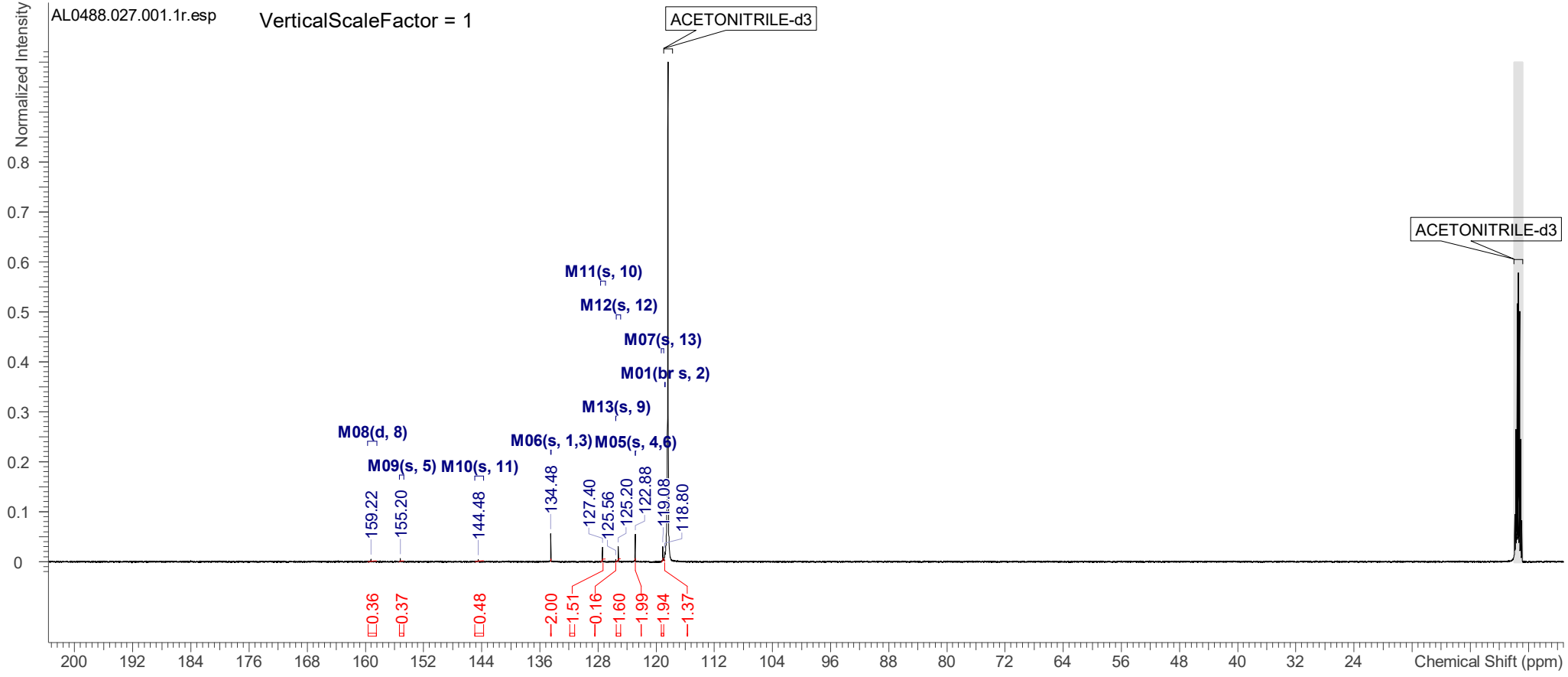
**Compound 4i**

4/2/2024 8:37:46 AM

| ***Number of Nuclei*** 12 C's / 12 C's (spectrum / structure) ***Multiplets Integrals Sum*** 11.78 ***Low Signal to Noise Ratio*** Possible | |
|---|---|

$^{13}$C NMR (126 MHz, ACETONITRILE-$d_3$, ppm) δ= 118.8 (1 C, br s), 119.1 (1 C, s), 122.9 (2 C, s), 125.2 (1 C, s), 125.6 (1 C, s), 127.4 (1 C, s), 134.5 (2 C, s), 144.5 (1 C, s), 155.2 (1 C, s), 159.2 (1 C, d, J = 1.84 Hz)



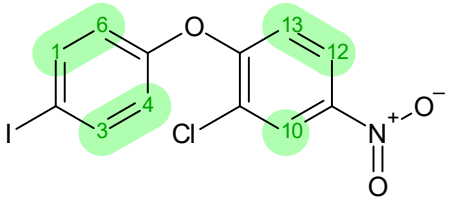

AL0488.027.001.1r.esp

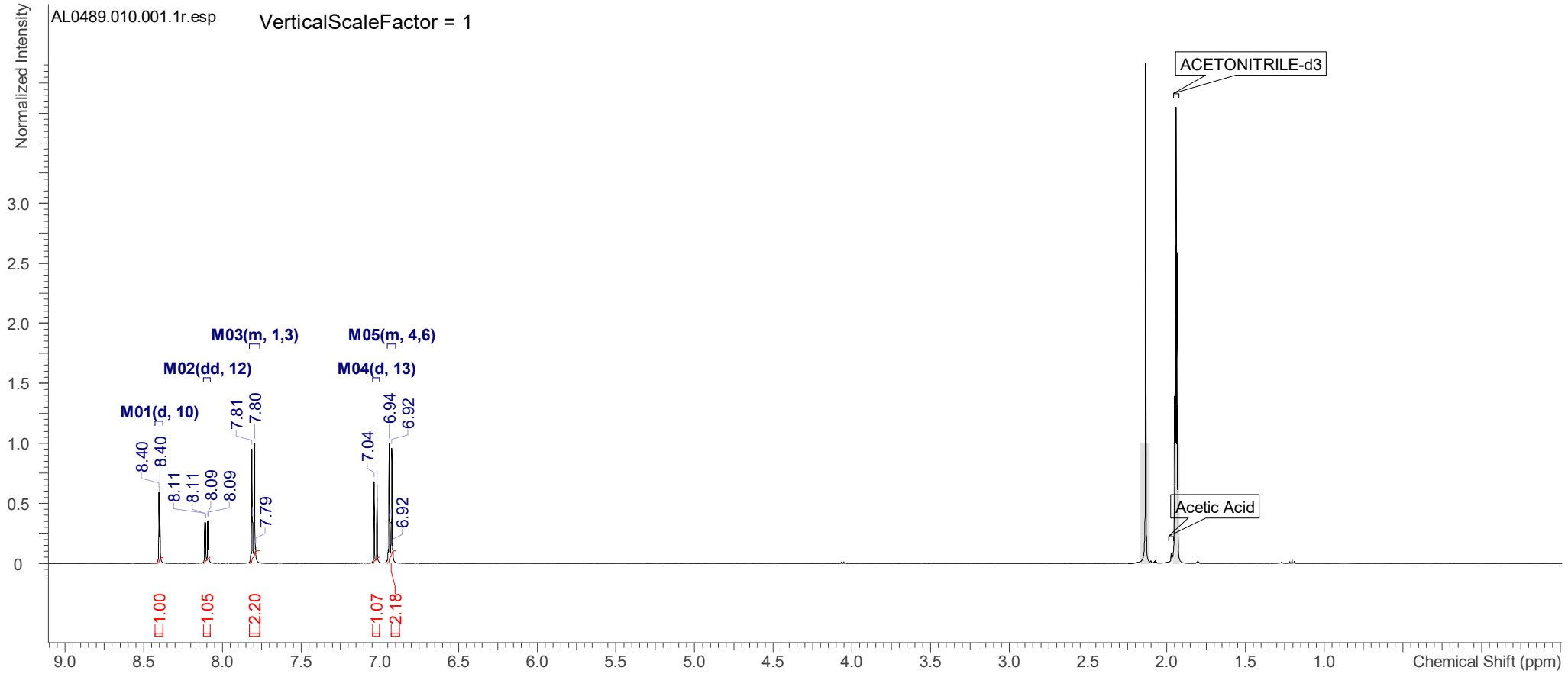
**Compound 4j**

7/6/2023 2:30:24 PM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 7 H's / 7 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 7.50 |

$^{1}$H NMR (500 MHz, ACETONITRILE-$d_3$, ppm) δ= 8.40 (1 H, d, J = 2.75 Hz), 8.10 (1 H, dd, J = 9.00, 2.75 Hz), 7.83 – 7.76 (2 H, m), 7.03 (1 H, d, J = 9.16 Hz), 6.95 – 6.90 (2 H, m);



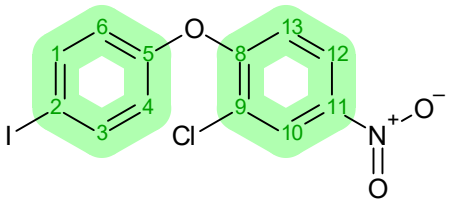

L:\NMR500\data\ddop\nmr\AL0489\AL0489.010.001.1r.esp

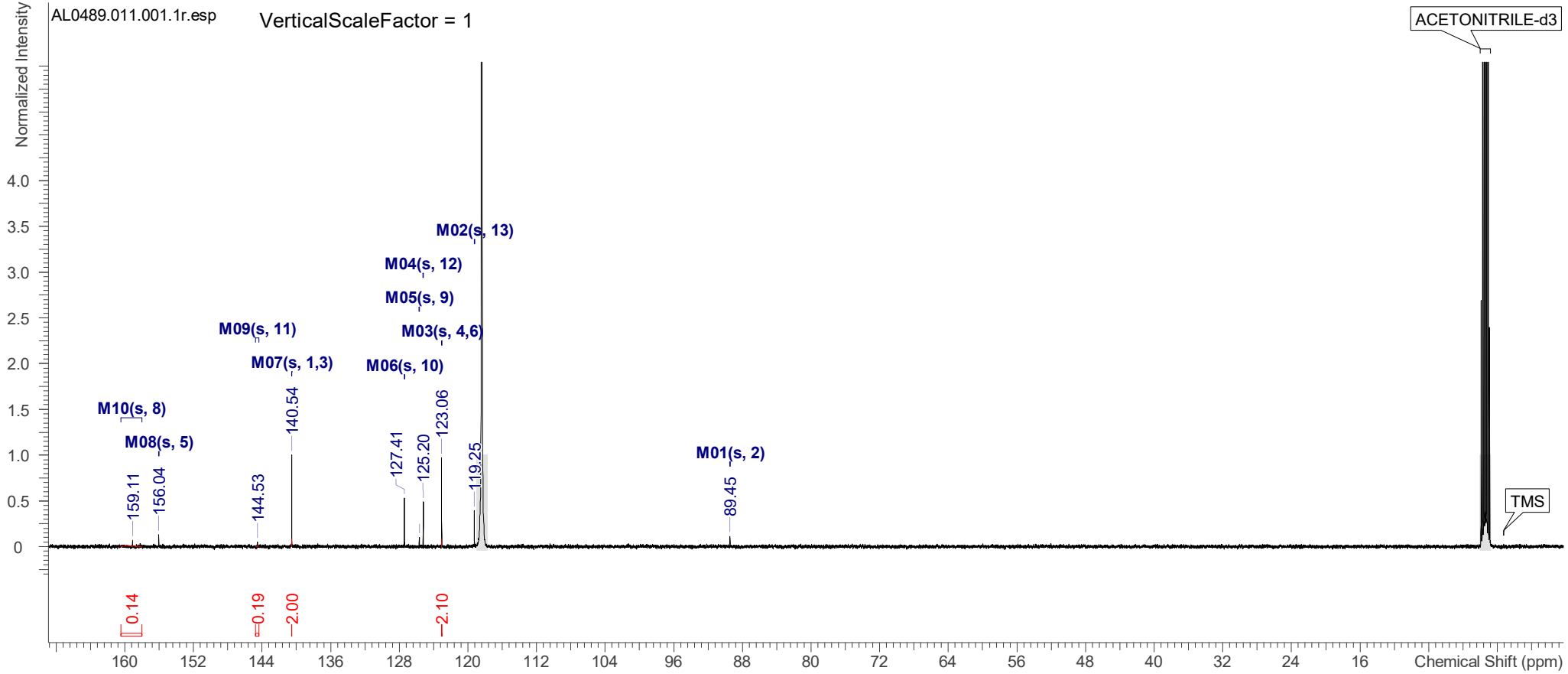
**Compound 4j**

7/6/2023 2:30:28 PM

***Number of Nuclei*** 12 C's / 12 C's (spectrum / structure) ***Multiplets Integrals Sum*** 4.43 ***Bad Phase or Baseline*** True

$^{13}$C NMR (126 MHz, ACETONITRILE-$d_3$, ppm) δ= 159.1 (1 C, s), 156.0 (1 C, s), 144.5 (1 C, s), 140.5 (2 C, s), 127.4 (1 C, s), 125.7 (1 C, s), 125.2 (1 C, s), 123.1 (2 C, s), 119.3 (1 C, s), 89.5 (1 C, s)



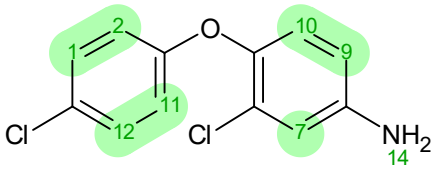

L:\NMR500\data\ddop\nmr\AL0489\AL0489.011.001.1r.esp

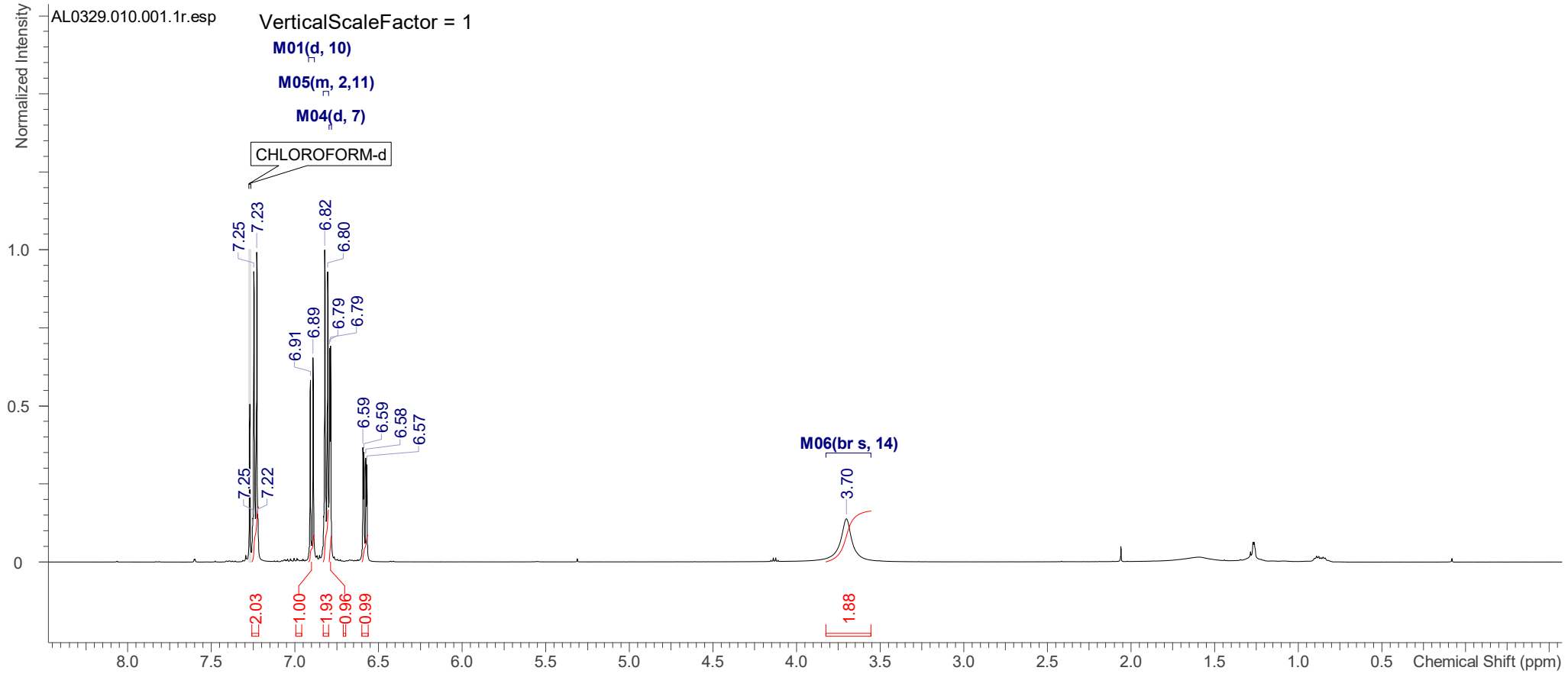
**Compound 5a**

4/27/2022 8:18:47 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 9 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 8.79 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.26 – 7.22 (2 H, m), 6.90 (1 H, d, J = 8.54 Hz), 6.84 – 6.80 (2 H, m), 6.78 (1 H, d, J = 2.75 Hz), 6.57 (1 H, dd, J = 8.54, 2.75 Hz), 3.69 (2 H, br s);



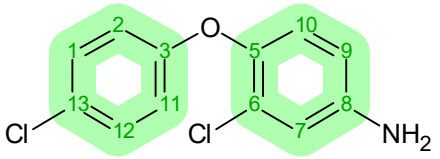

L:\NMR500\data\ddop\nmr\AL0329\AL0329.010.001.1r.esp

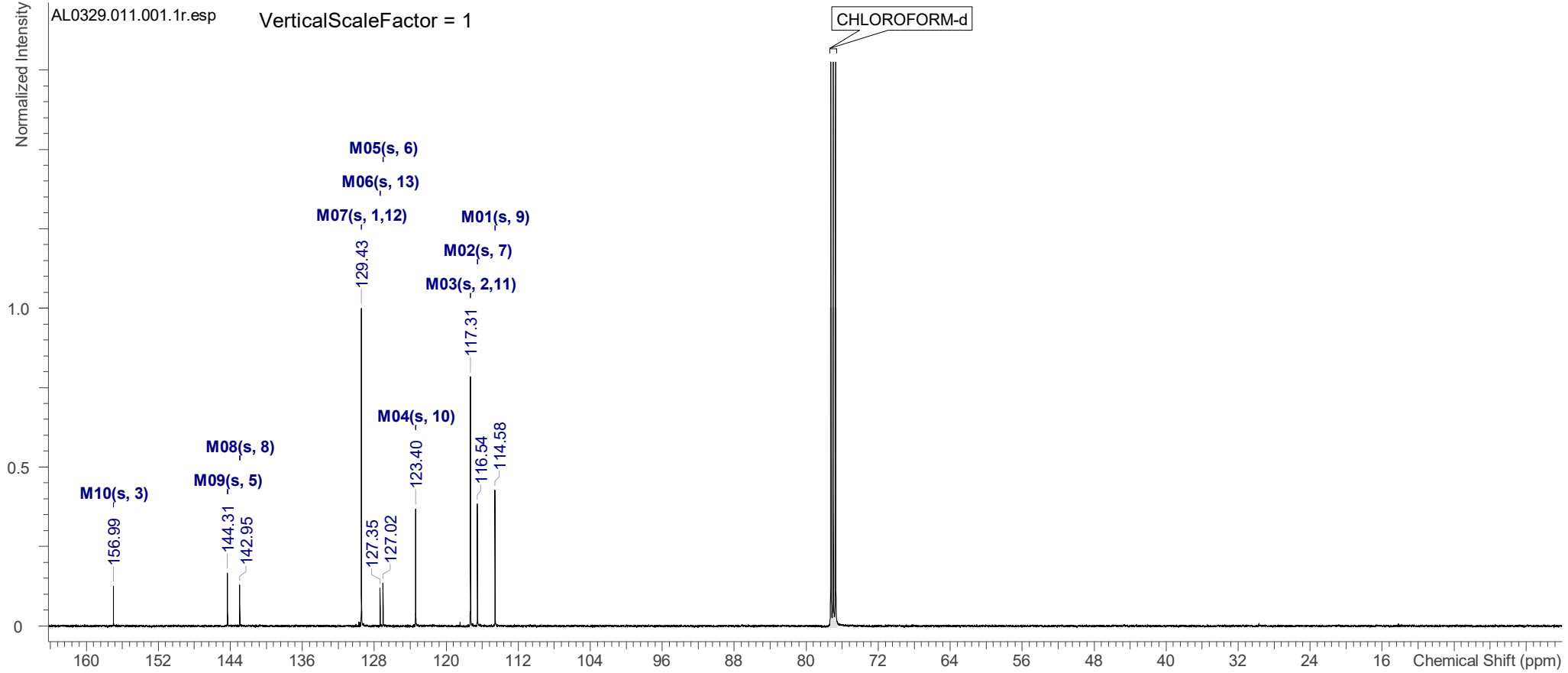
**Compound 5a**

4/27/2022 8:18:51 AM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 157.0 (1 C, s), 144.3 (1 C, s), 143.0 (1 C, s), 129.4 (2 C, s), 127.3 (1 C, s), 127.0 (1 C, s), 123.4 (1 C, s), 117.3 (2 C, s), 116.5 (1 C, s), 114.6 (1 C, s)

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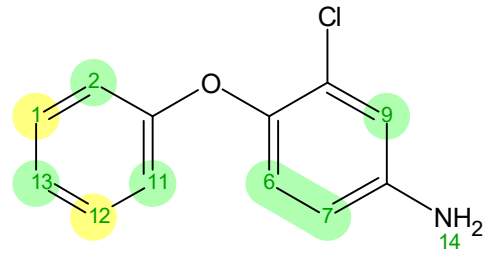
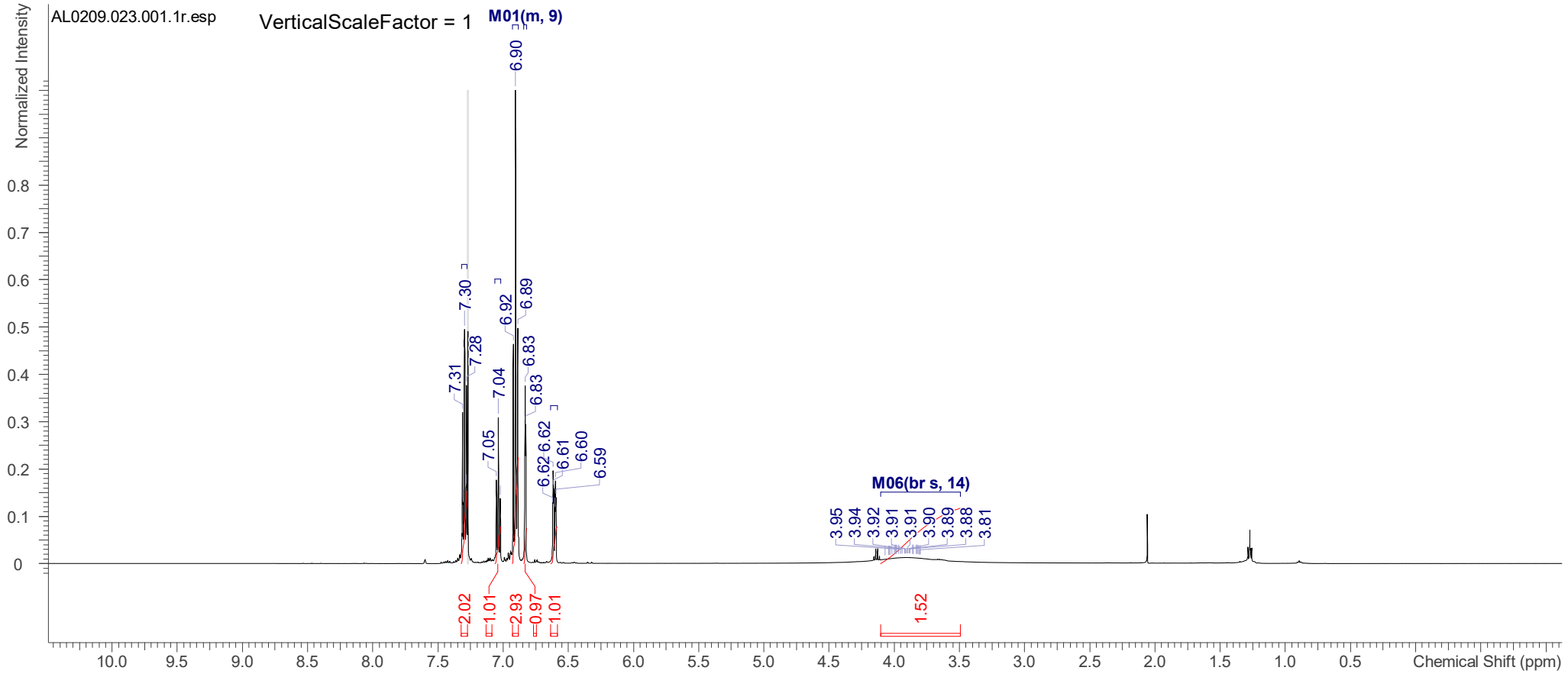
**Compound 5b**

4/2/2024 8:40:56 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 11 H's / 10 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 9.38 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.26 – 7.22 (2 H, m), 6.90 (1 H, d, J = 8.54 Hz), 6.84 – 6.80 (2 H, m), 6.78 (1 H, d, J = 2.75 Hz), 6.57 (1 H, dd, J = 8.54, 2.75 Hz), 3.69 (2 H, br s);



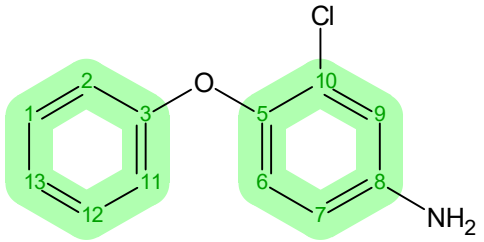

AL0209.023.001.1r.esp

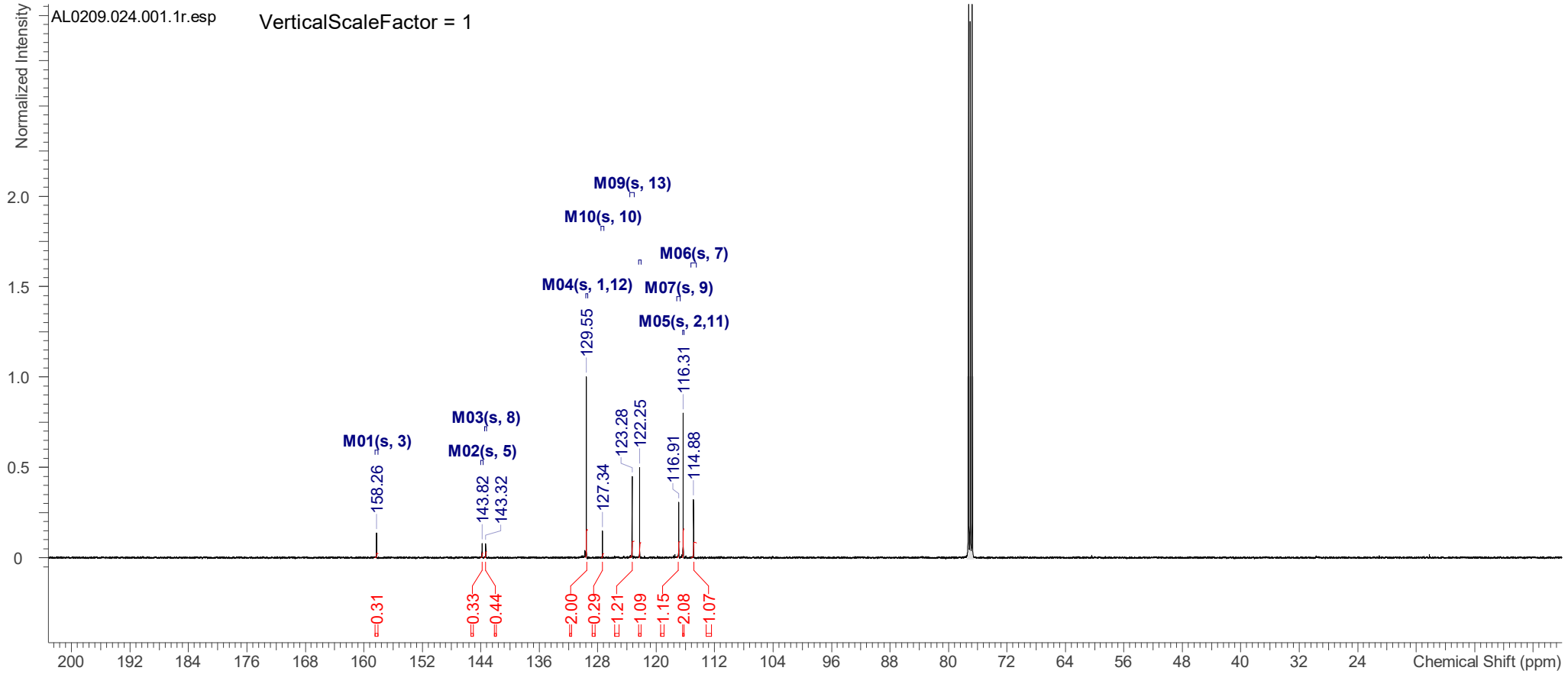
**Compound 5b**

4/2/2024 8:40:59 AM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 9.97 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 157.0 (1 C, s), 144.3 (1 C, s), 143.0 (1 C, s), 129.4 (2 C, s), 127.3 (1 C, s), 127.0 (1 C, s), 123.4 (1 C, s), 117.3 (2 C, s), 116.5 (1 C, s), 114.6 (1 C, s)



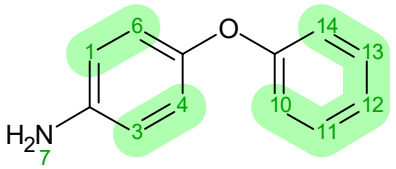

AL0209.024.001.1r.esp

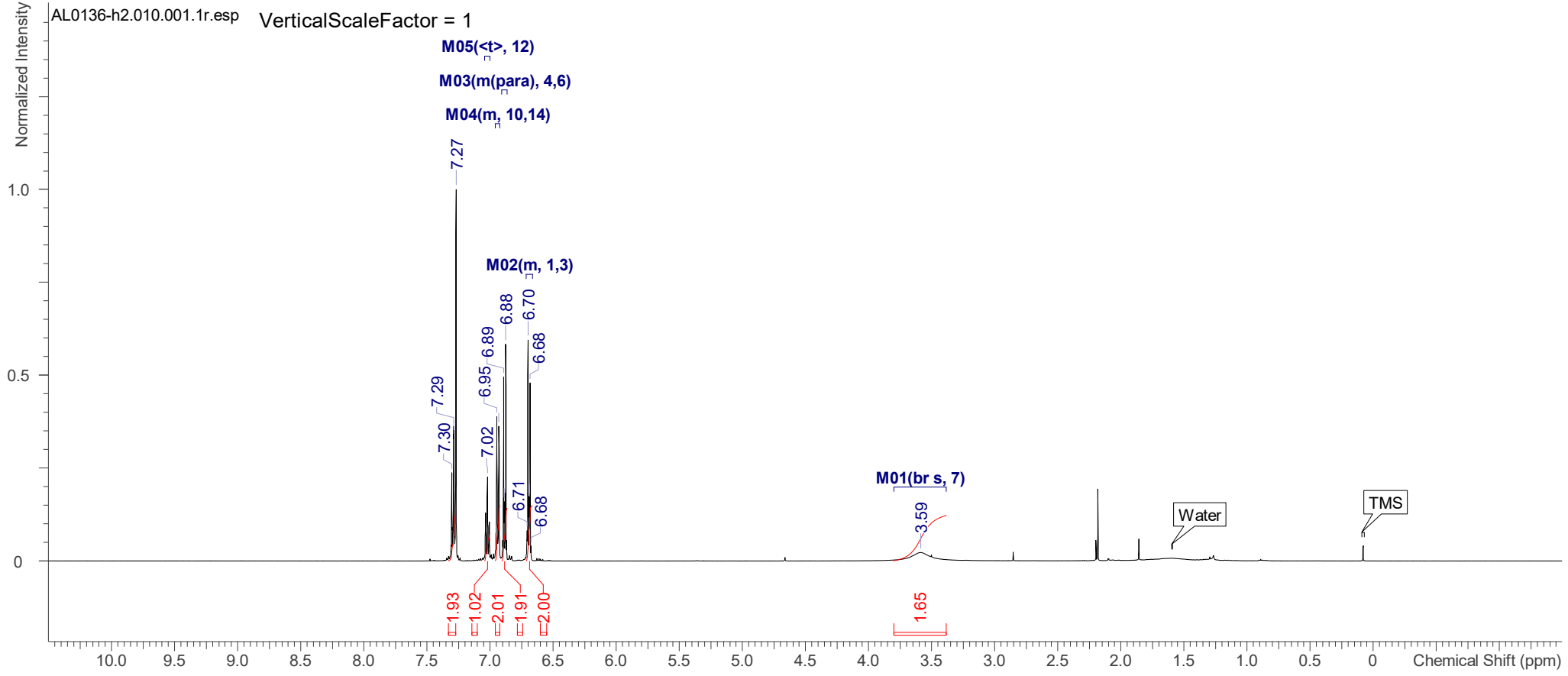
**Compound 5c**

4/1/2024 6:03:45 PM

| ***Multiplets Integrals Sum*** 10.53 | ***Number of Nuclei*** 11 H's / 11 H's (spectrum / structure) |
|---|---|

1H NMR (500 MHz, CHLOROFORM-d, ppm) δ= 7.33 – 7.27 (2 H, m), 7.02 (1 H, t, J = 7.32 Hz), 6.96 – 6.92 (2 H, m), 6.91 – 6.86 (2 H, m), 6.71 – 6.66 (2 H, m), 3.59 (2 H, br s);



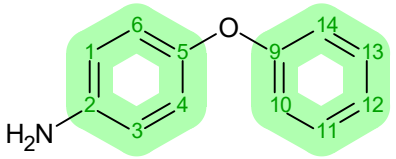

AL0136-h2.010.001.1r.esp

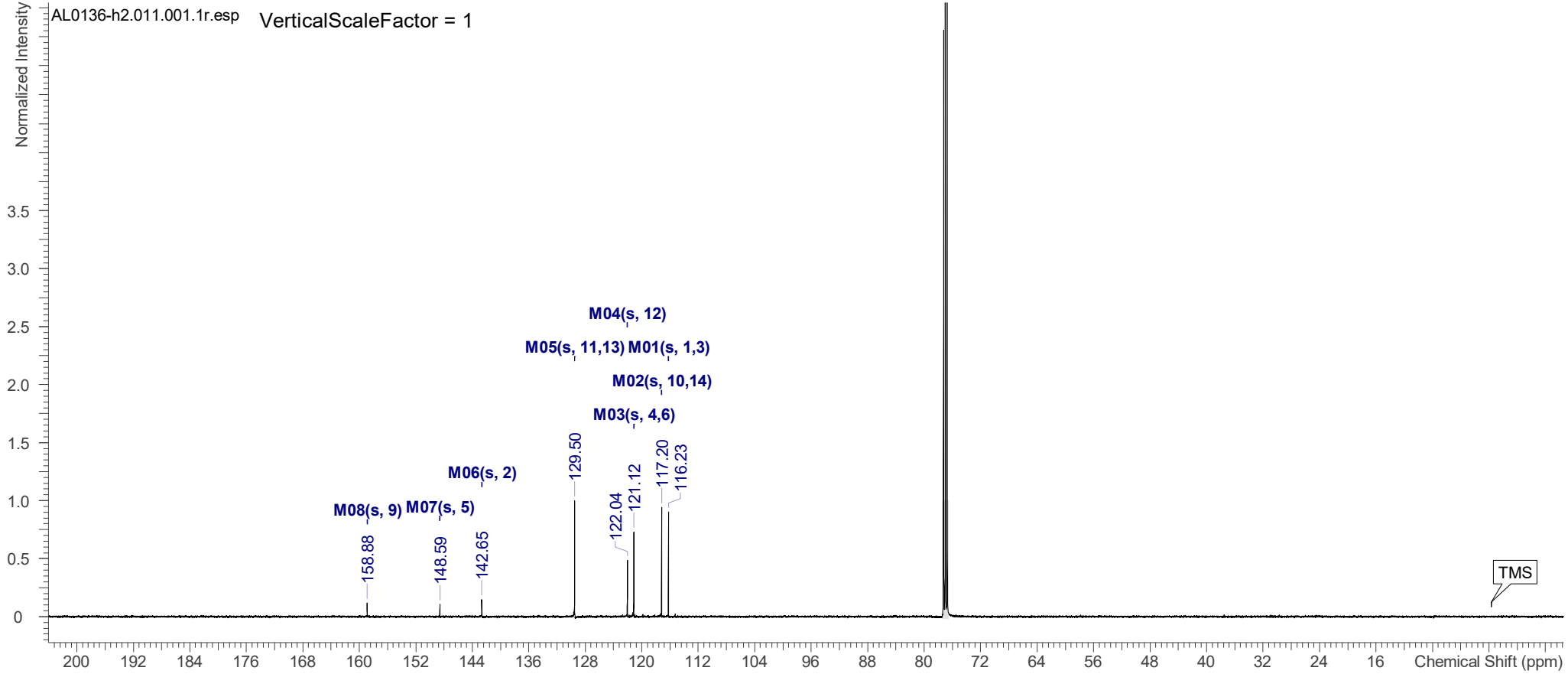
**Compound 5c**

4/1/2024 6:04:01 PM

| ***Multiplets Integrals Sum*** 0.00 | ***Number of Nuclei*** 12 C's / 12 C's (spectrum / structure) |
|---|---|

13C NMR (126 MHz, CHLOROFORM-d, ppm) δ= 158.9 (1 C, s), 148.6 (1 C, s), 142.7 (1 C, s), 129.0 (2 C, s), 122.0 (1 C, s), 121.1 (2 C, s), 117.2 (2 C, s), 116.2 (2 C, s)



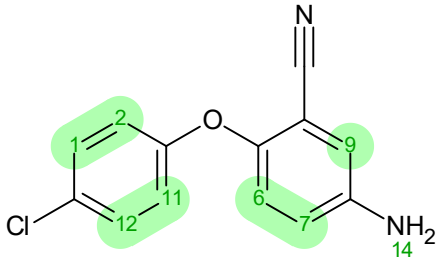

AL0136-h2.011.001.1r.esp

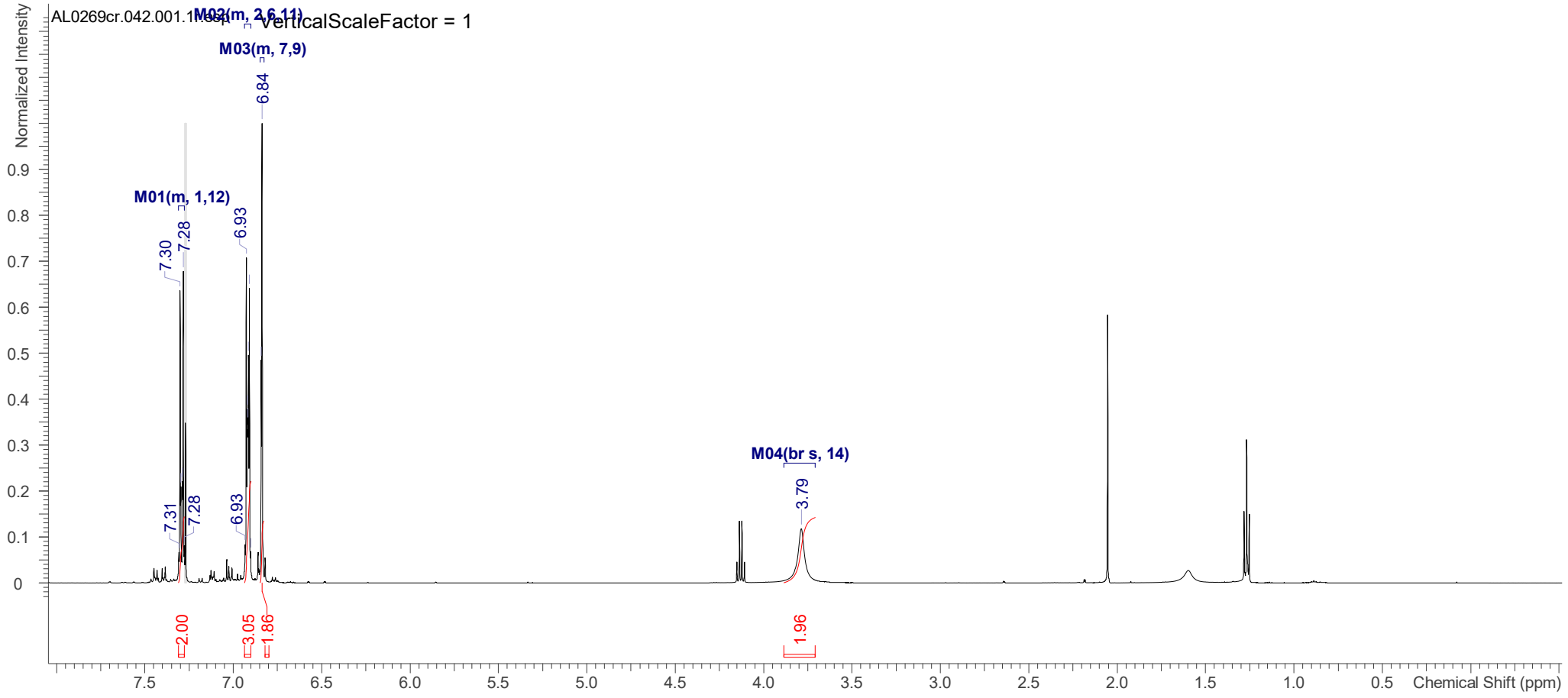
**Compound 5d**

2/28/2022 9:16:16 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 9 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 8.86 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.31 – 7.28 (2 H, m), 6.94 – 6.90 (3 H, m), 6.85 – 6.83 (2 H, m), 3.79 (2 H, br s);



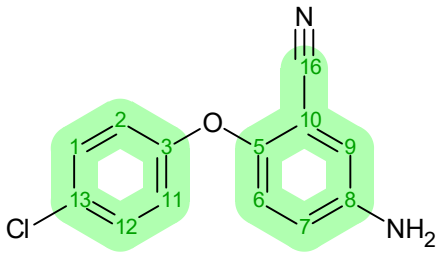

L:\NMR500\data\ddop\nmr\AL0269cr\AL0269cr.042.001.1r.esp

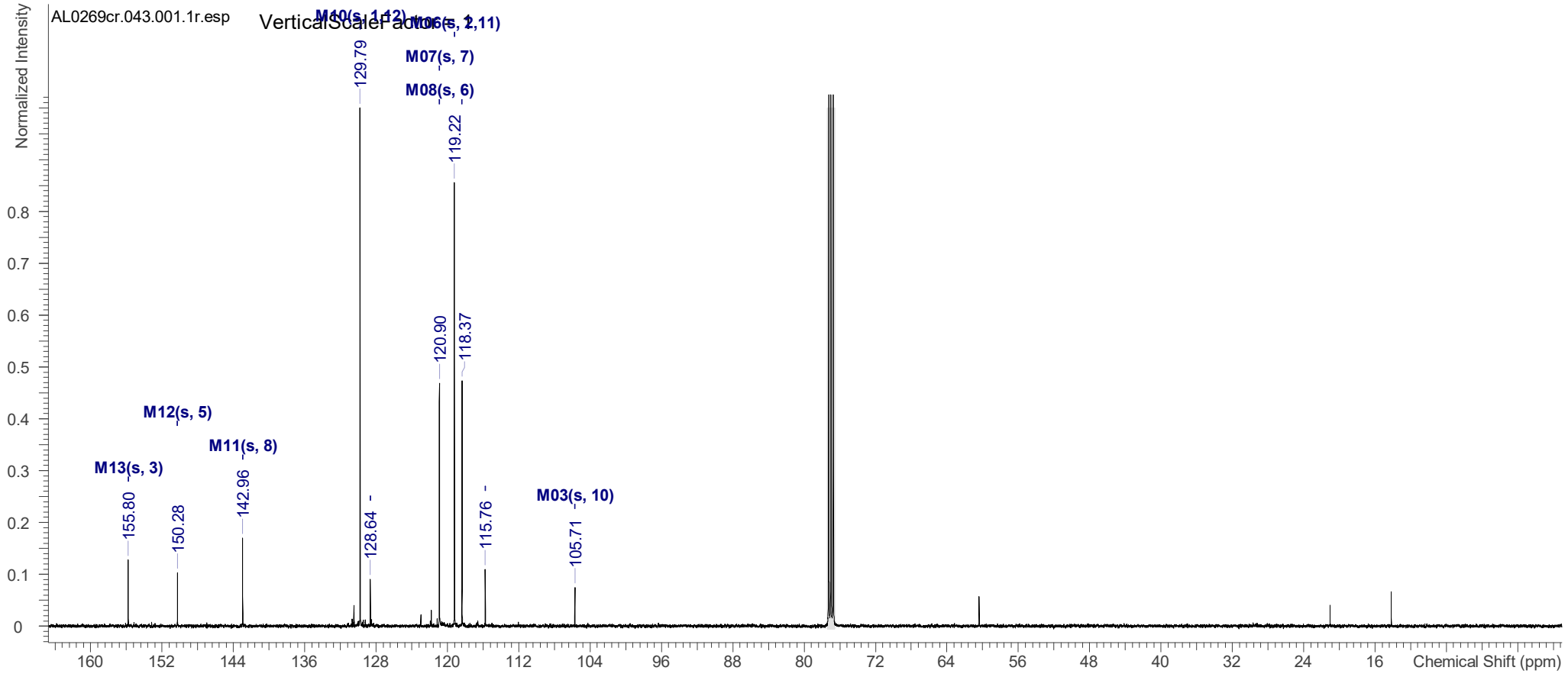
**Compound 5d**

2/28/2022 9:16:22 AM

| ***Number of Nuclei*** 13 C's / 13 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 155.8 (1 C, s), 150.3 (1 C, s), 143.0 (1 C, s), 129.8 (2 C, s), 128.6 (1 C, s), 120.9 (1 C, s), 120.9 (1 C, s), 119.2 (2 C, s), 118.4 (1 C, s), 115.8 (1 C, s), 105.7 (1 C, s)



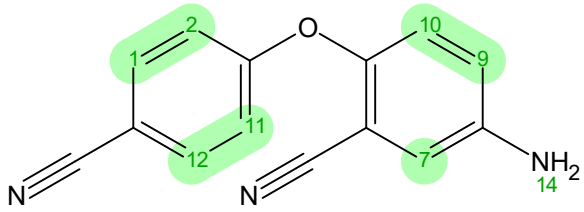

L:\NMR500\data\ddop\nmr\AL0269cr\AL0269cr.043.001.1r.esp

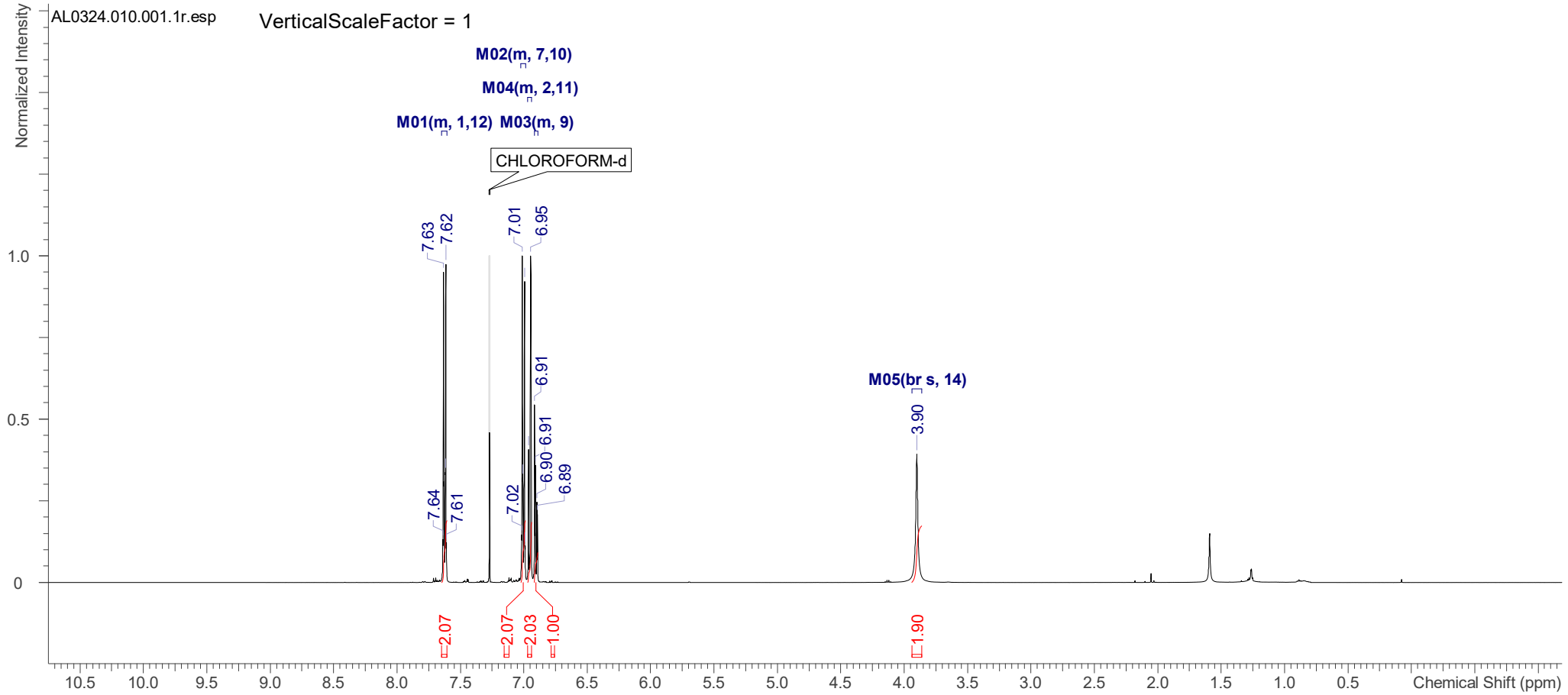
**Compound 5e**

4/2/2024 8:43:45 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 9 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 9.07 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.65 – 7.60 (2 H, m), 7.02 – 6.99 (2 H, m), 6.97 – 6.94 (2 H, m), 6.92 – 6.89 (1 H, m), 3.90 (2 H, br s);



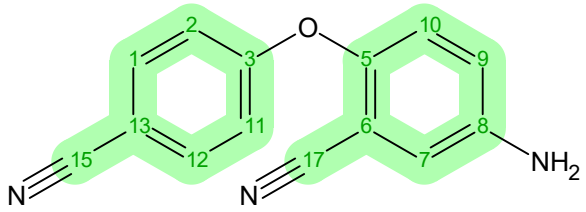

AL0324.010.001.1r.esp

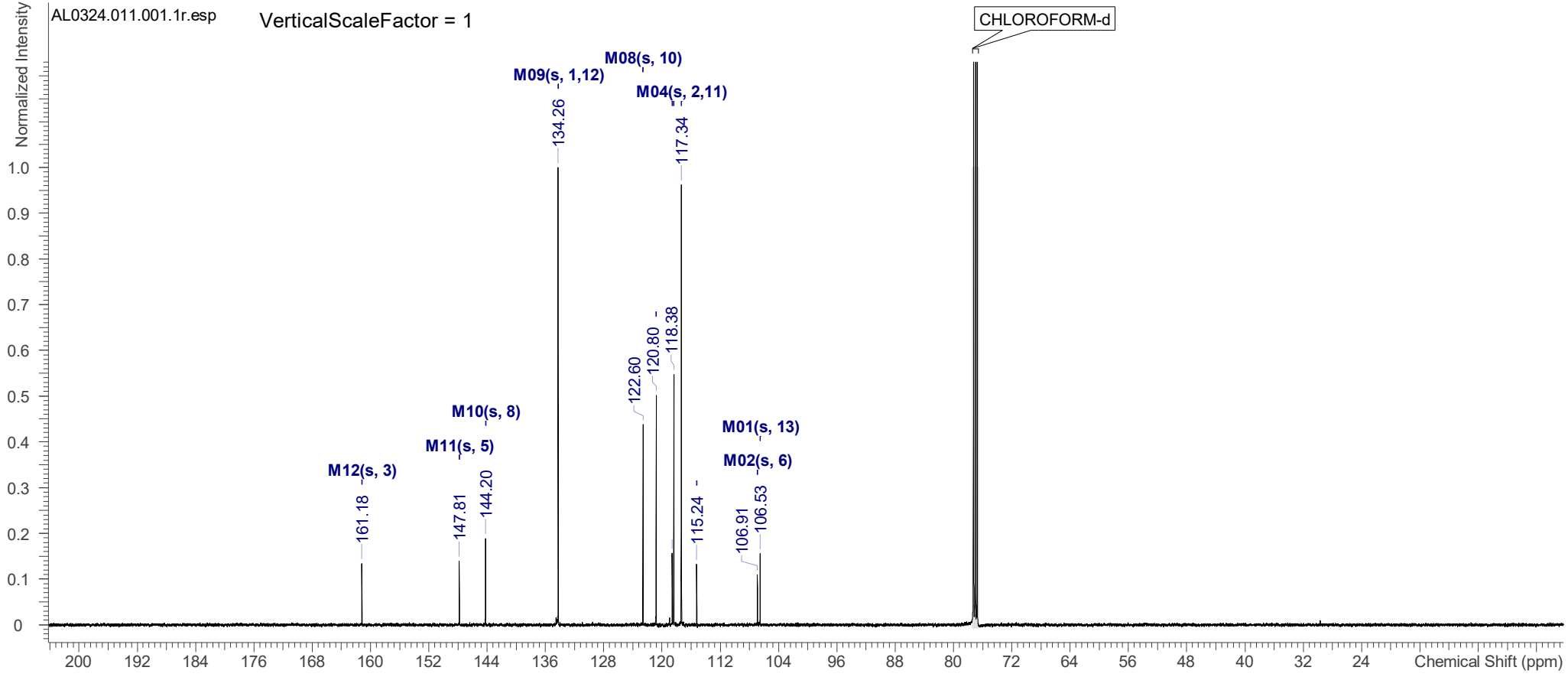
**Compound 5e**

4/2/2024 8:43:48 AM

| ***Number of Nuclei*** | 14 C's / 14 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 161.2 (1 C, s), 147.8 (1 C, s), 144.2 (1 C, s), 134.3 (2 C, s), 122.6 (1 C, s), 120.8 (1 C, s), 118.6 (1 C, s), 118.4 (1 C, s), 117.3 (2 C, s), 115.2 (1 C, s), 106.9 (1 C, s), 106.5 (1 C, s)



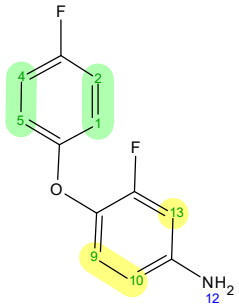

AL0324.011.001.1r.esp

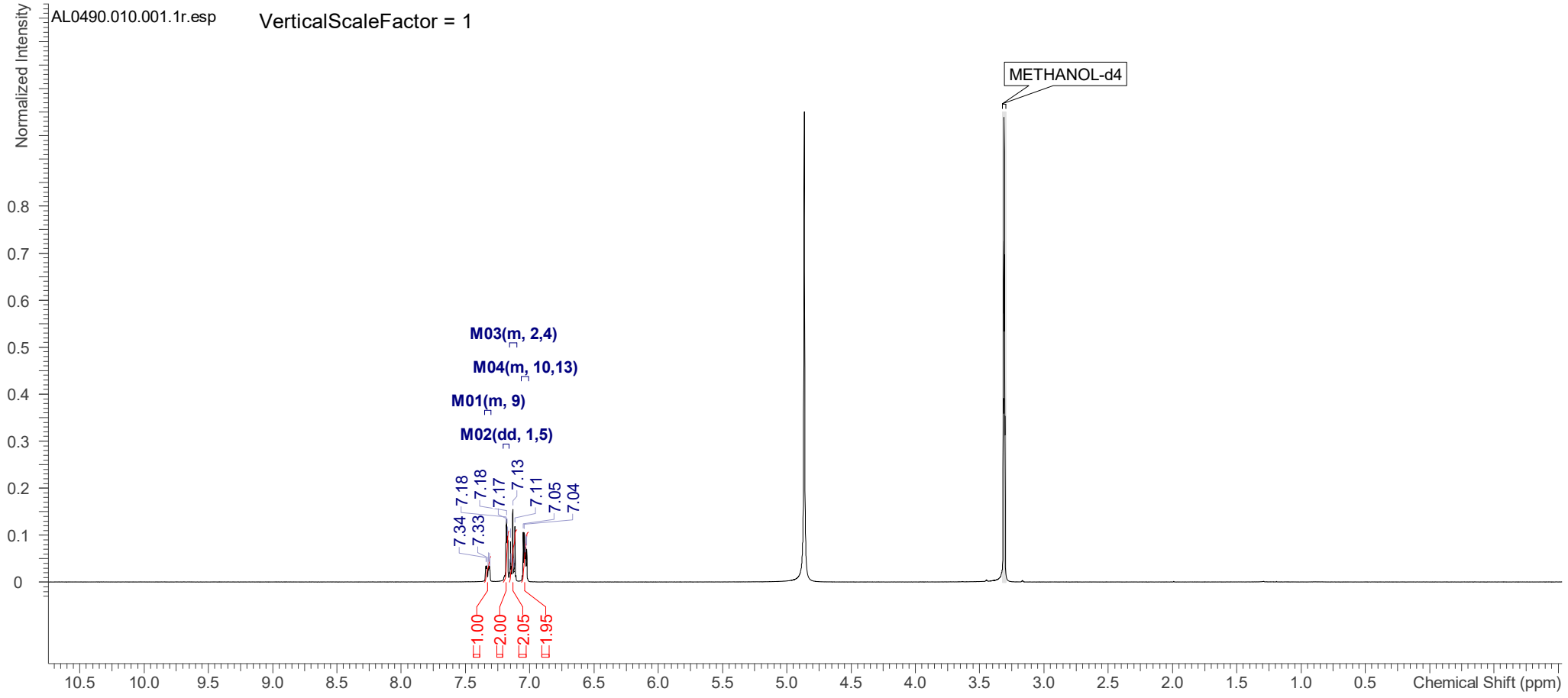
**Compound 5f**

4/2/2024 8:52:59 AM

| ***Number of Nuclei*** | 7 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 6.99 |
|---|---|---|---|

1H NMR (500 MHz, METHANOL-$d_4$ , ppm) δ= 7.35 – 7.30 (1 H, m), 7.18 (2 H, dd, J = 4.43, 1.83 Hz), 7.16 – 7.10 (2 H, m), 7.07 – 7.01 (2 H, m);



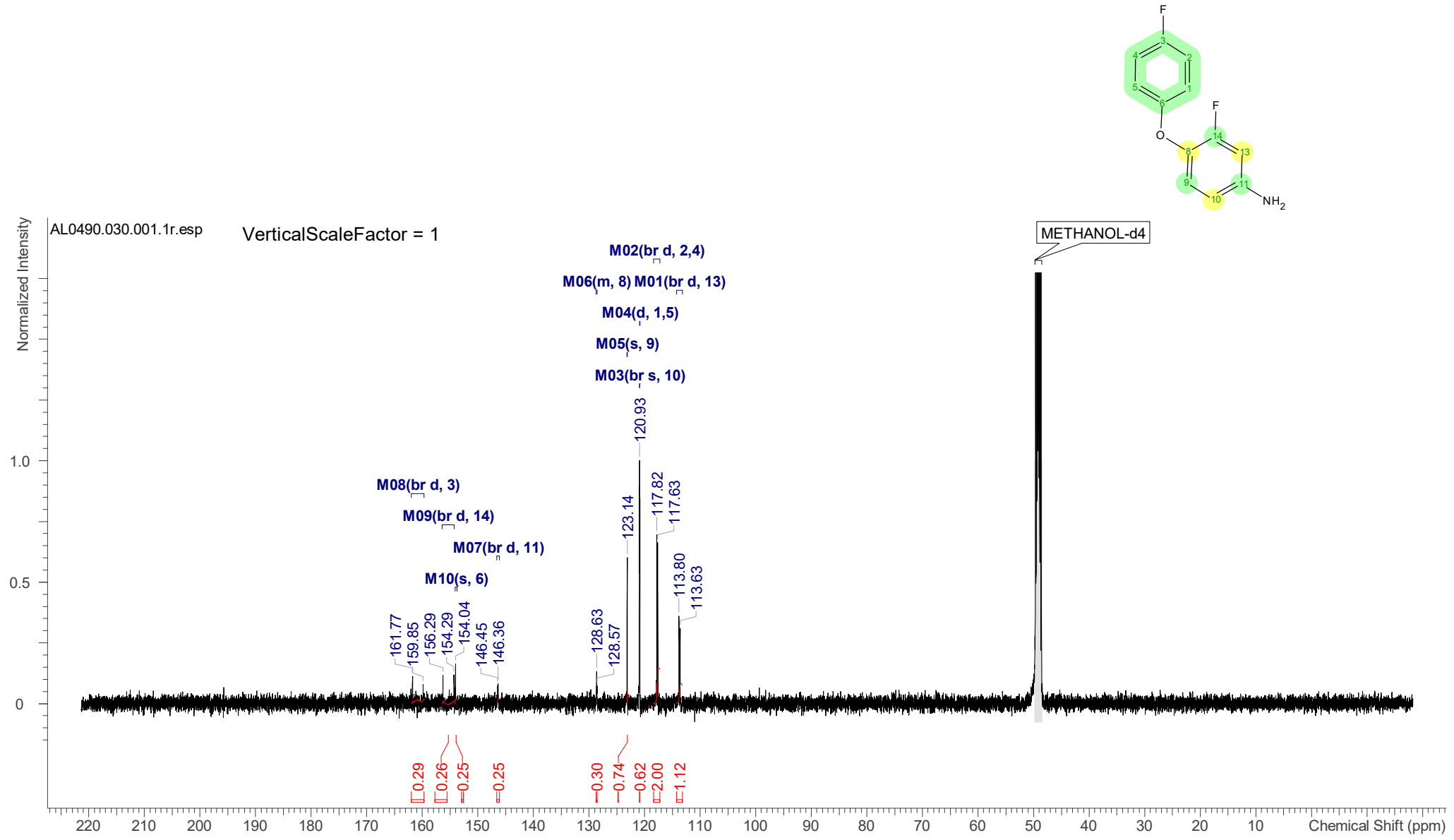

AL0490.010.001.1r.esp

**Compound 5f**

4/2/2024 8:53:03 AM

| ***Number of Nuclei*** 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 5.83 |
|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 113.7 (1 C, br d, J = 22.06 Hz), 117.7 (2 C, br d, J = 23.90 Hz), 120.9 (2 C, d, J = 8.27 Hz), 120.9 (1 C, br s), 123.1 (1 C, s), 128.5 – 128.7 (1 C, m), 146.4 (1 C, br d, J = 11.03 Hz), 154.0 (1 C, s), 155.3 (1 C, br d, J = 250.94 Hz), 160.8 (1 C, br d, J = 240.83 Hz)



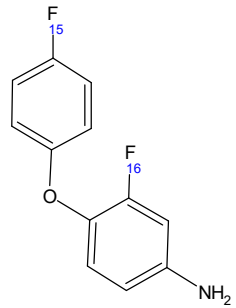

AL0490.030.001.1r.esp

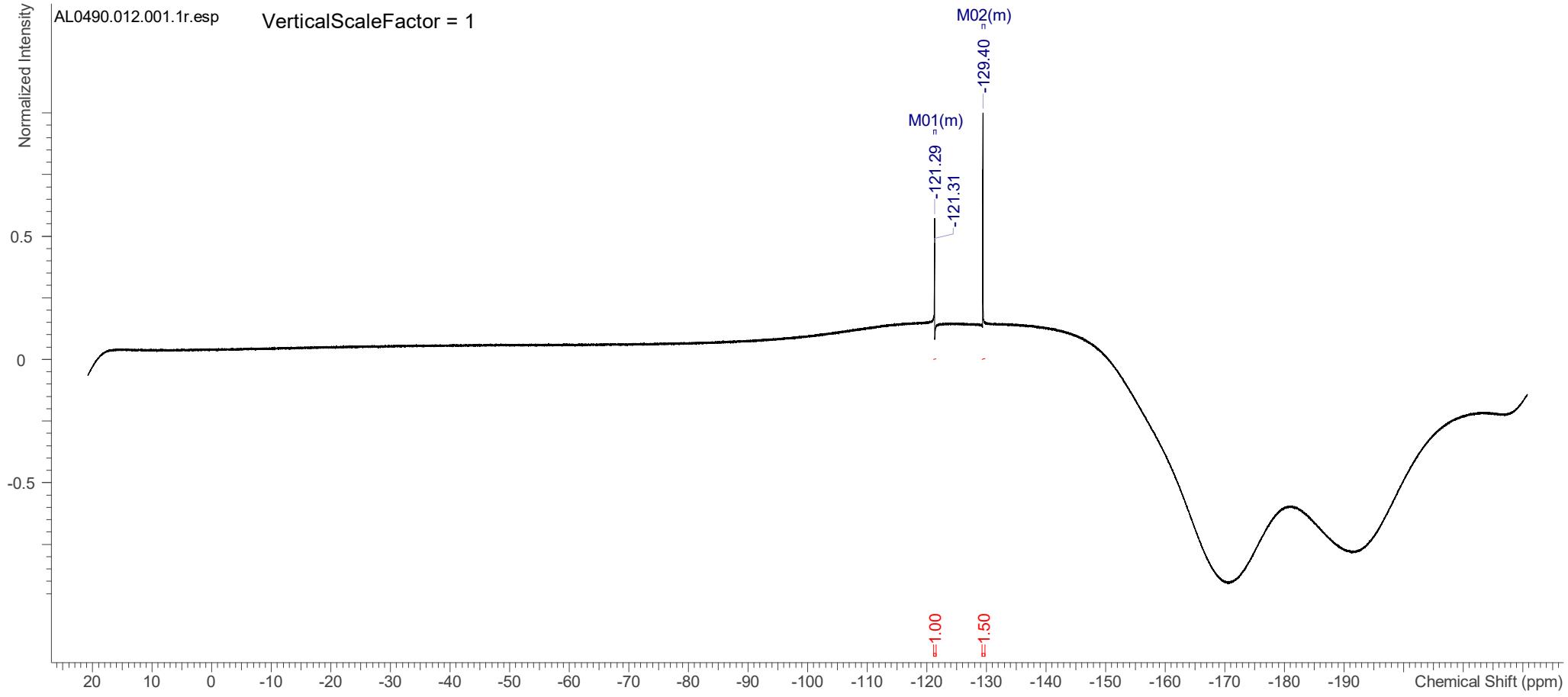
**Compound 5f**

4/2/2024 8:53:06 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 2 F's / 2 F's (spectrum / structure) | ***Multiplets Integrals Sum*** | 2.50 |

$^{19}$F NMR (470 MHz, METHANOL-$d_4$, ppm) δ= -129.8 – -129.3 (1 F, m), -121.5 – -121.1 (1 F, m)



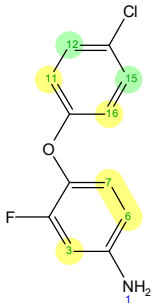

AL0490.012.001.1r.esp

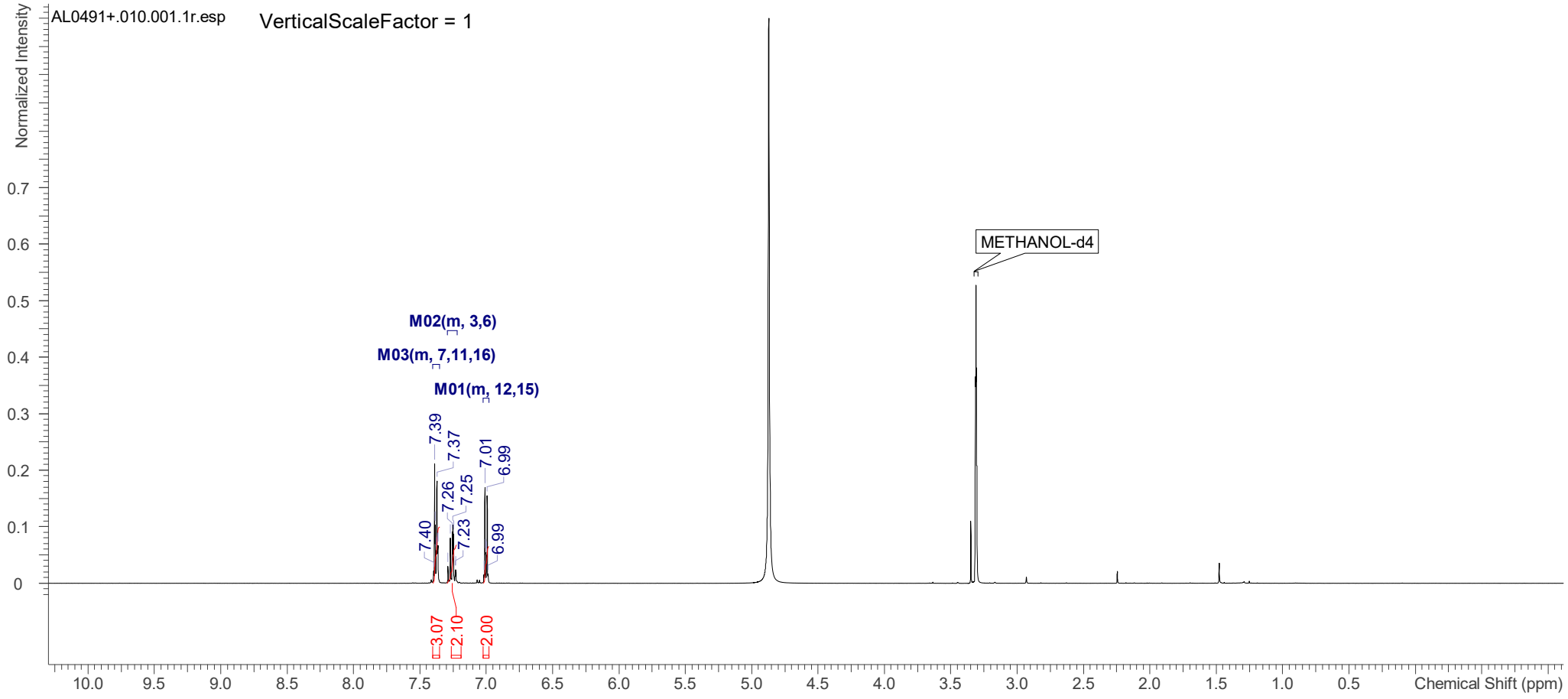
**Compound 5g**

4/2/2024 8:55:21 AM

| ***Number of Nuclei*** | 7 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 7.17 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.40 – 7.35 (3 H, m), 7.29 – 7.22 (2 H, m), 7.02 – 6.98 (2 H, m);



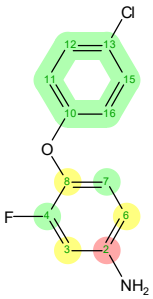

AL0491+.010.001.1r.esp

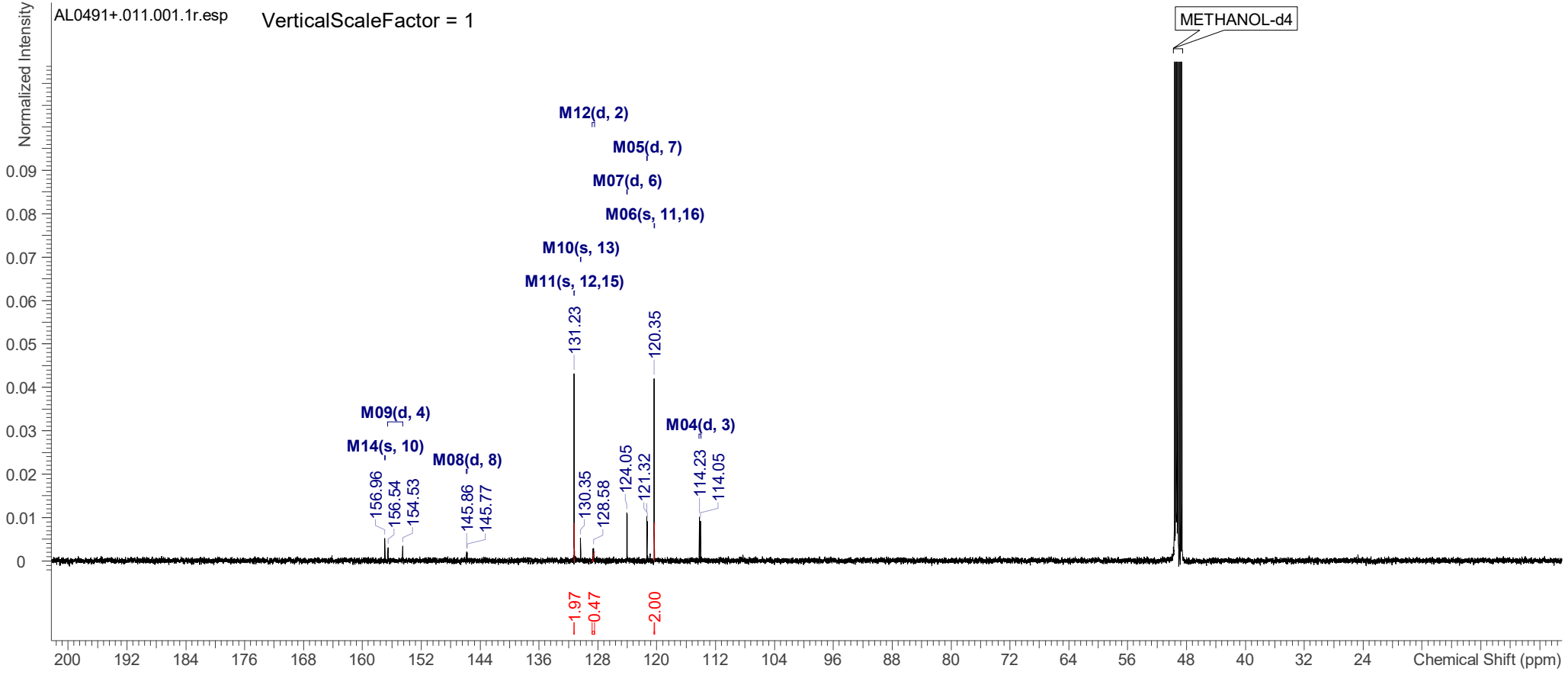
**Compound 5g**

4/2/2024 8:55:24 AM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 4.44 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 114.1 (1 C, d, J = 22.06 Hz), 120.4 (2 C, s), 121.3 (1 C, d, J = 3.68 Hz), 124.0 (1 C, d, J = 1.84 Hz), 128.6 (1 C, d, J = 8.27 Hz), 130.4 (1 C, s), 131.2 (2 C, s), 145.8 (1 C, d, J = 11.95 Hz), 155.5 (1 C, d, J = 251.86 Hz), 157.0 (1 C, s);



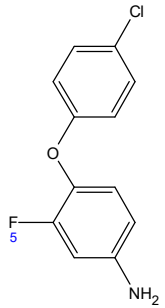

AL0491+.011.001.1r.esp

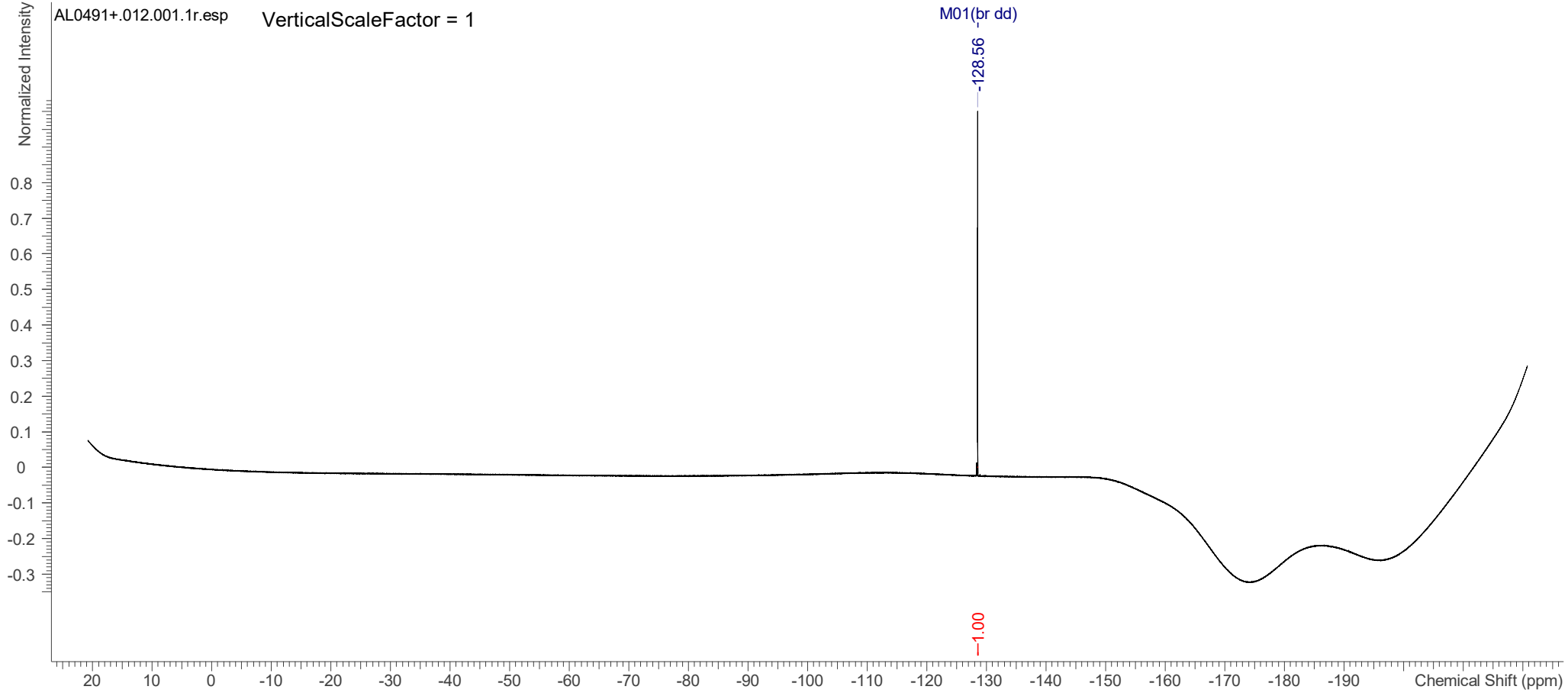
**Compound 5g**

4/2/2024 8:55:26 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** | 1.00 |

$^{19}$F NMR (470 MHz, METHANOL-$d_4$, ppm) δ= -128.5 (1 F, br dd, J = 10.41, 6.93 Hz)



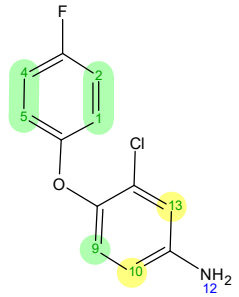

AL0491+.012.001.1r.esp

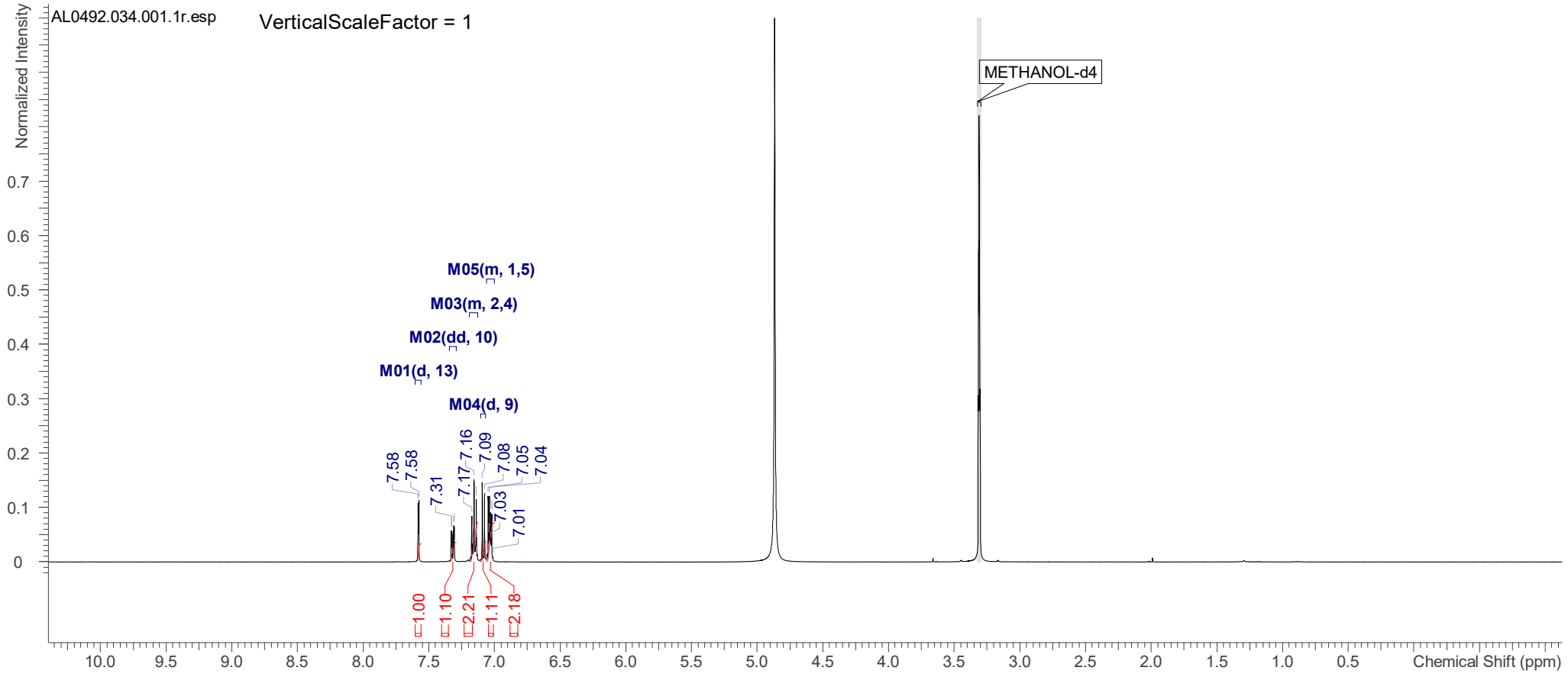
**Compound 5h**

4/2/2024 8:57:19 AM

| ***Number of Nuclei*** | 7 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 7.60 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.58 (1 H, d, J = 2.59 Hz), 7.32 (1 H, dd, J = 8.77, 2.67 Hz), 7.19 – 7.13 (2 H, m), 7.08 (1 H, d, J = 8.85 Hz), 7.06 – 7.00 (2 H, m);



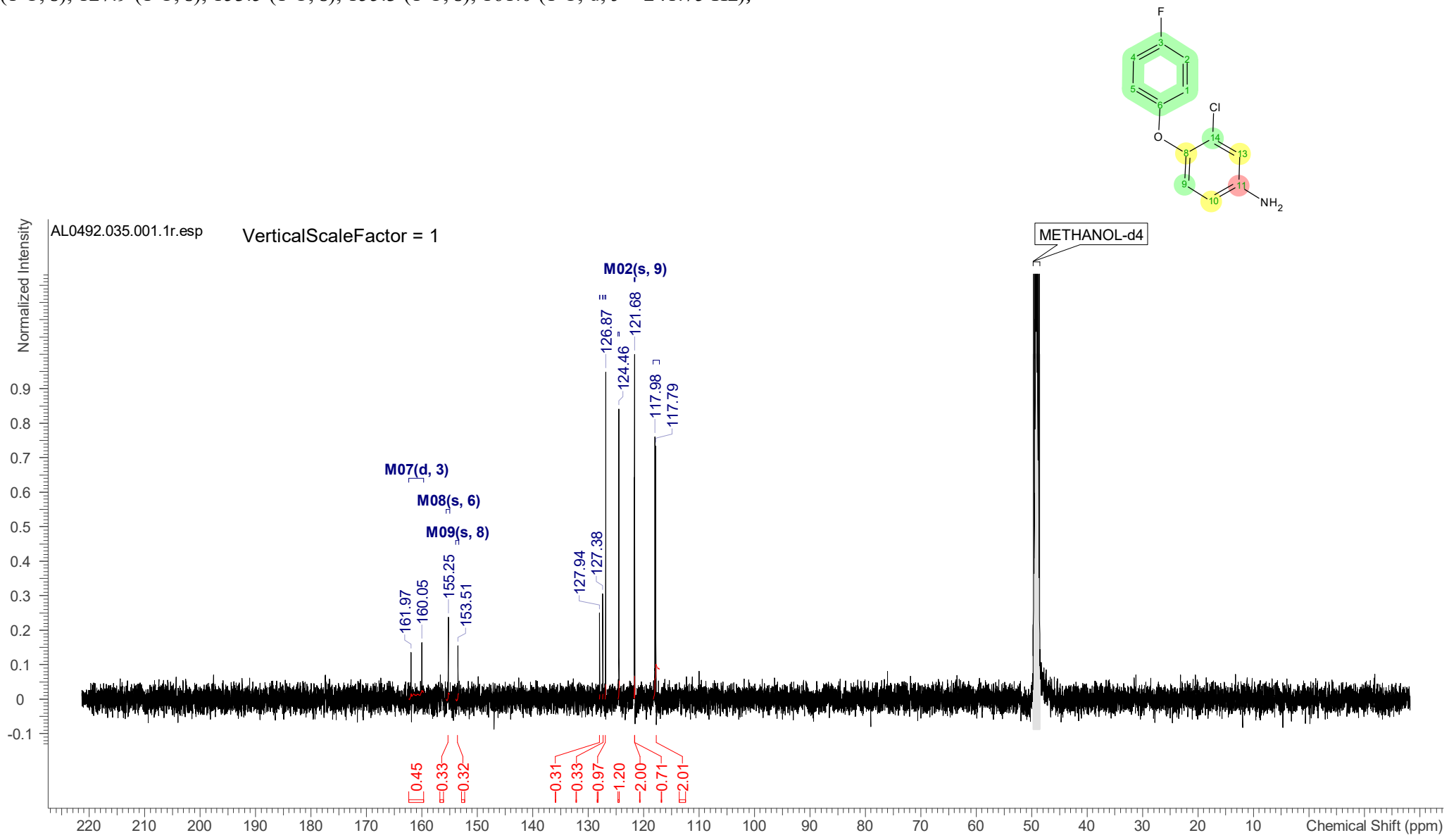

AL0492.034.001.1r.esp

**Compound 5h**

4/2/2024 8:57:21 AM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 8.62 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 117.9 (2 C, d, J = 23.90 Hz), 121.6 (1 C, s), 121.7 (2 C, d, J = 1.84 Hz), 124.5 (1 C, s), 126.9 (1 C, s), 127.4 (1 C, s), 127.9 (1 C, s), 153.5 (1 C, s), 155.3 (1 C, s), 161.0 (1 C, d, J = 241.75 Hz);



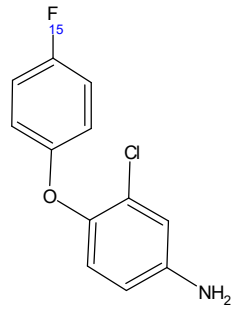

AL0492.035.001.1r.esp

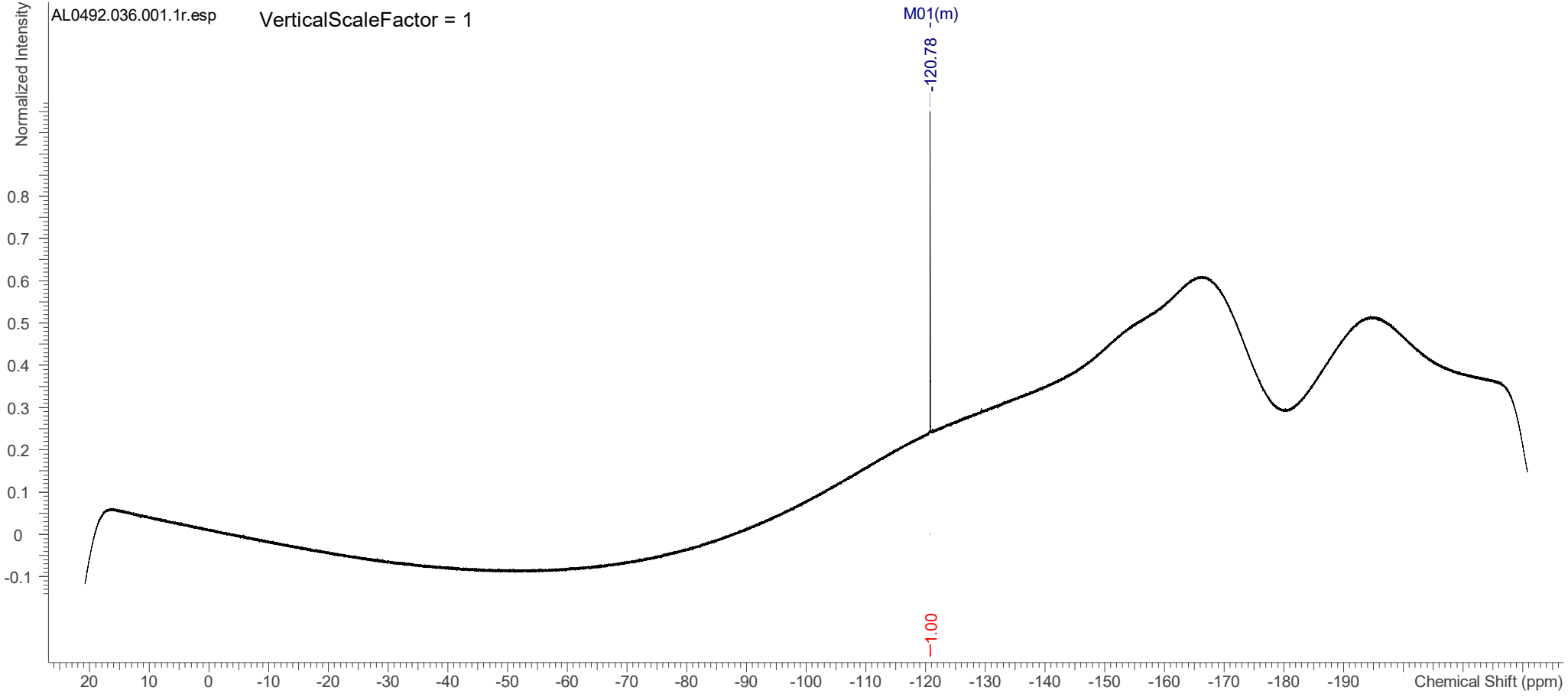
**Compound 5h**

4/2/2024 8:57:33 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** | 1.00 |

$^{19}$F NMR (470 MHz, METHANOL-$d_4$, ppm) δ= -120.8 – -120.7 (1 F, m)



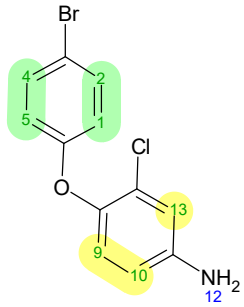

AL0492.036.001.1r.esp

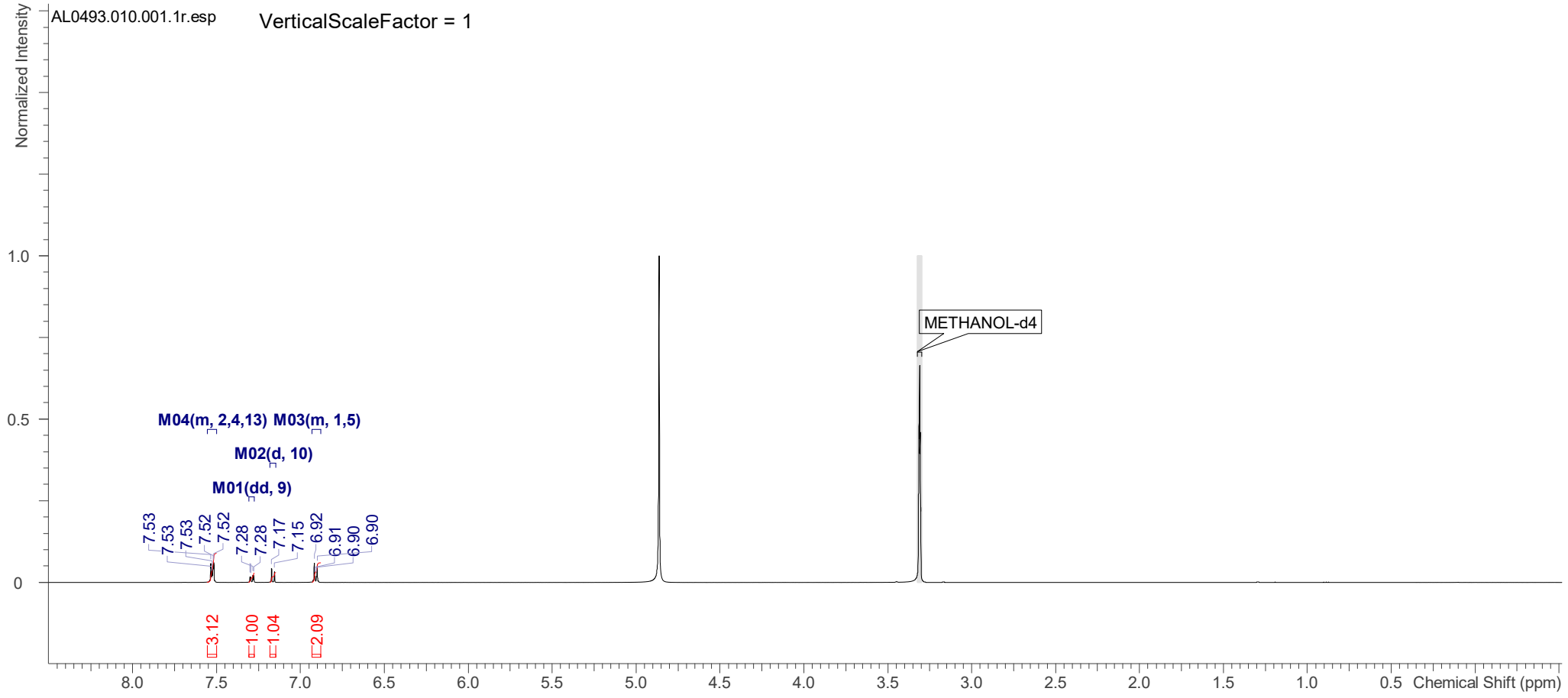
**Compound 5i**

7/10/2023 9:32:04 AM

| ***Number of Nuclei*** | 7 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 7.25 |
|---|---|---|---|

$^1$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.56 – 7.50 (3 H, m), 7.29 (1 H, dd, J = 8.77, 2.67 Hz), 7.16 (1 H, d, J = 8.70 Hz), 6.93 – 6.88 (2 H, m);



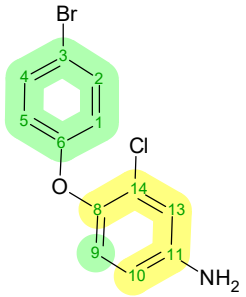

L:\NMR500\data\ddop\nmr\AL0493\AL0493.010.001.1r.esp

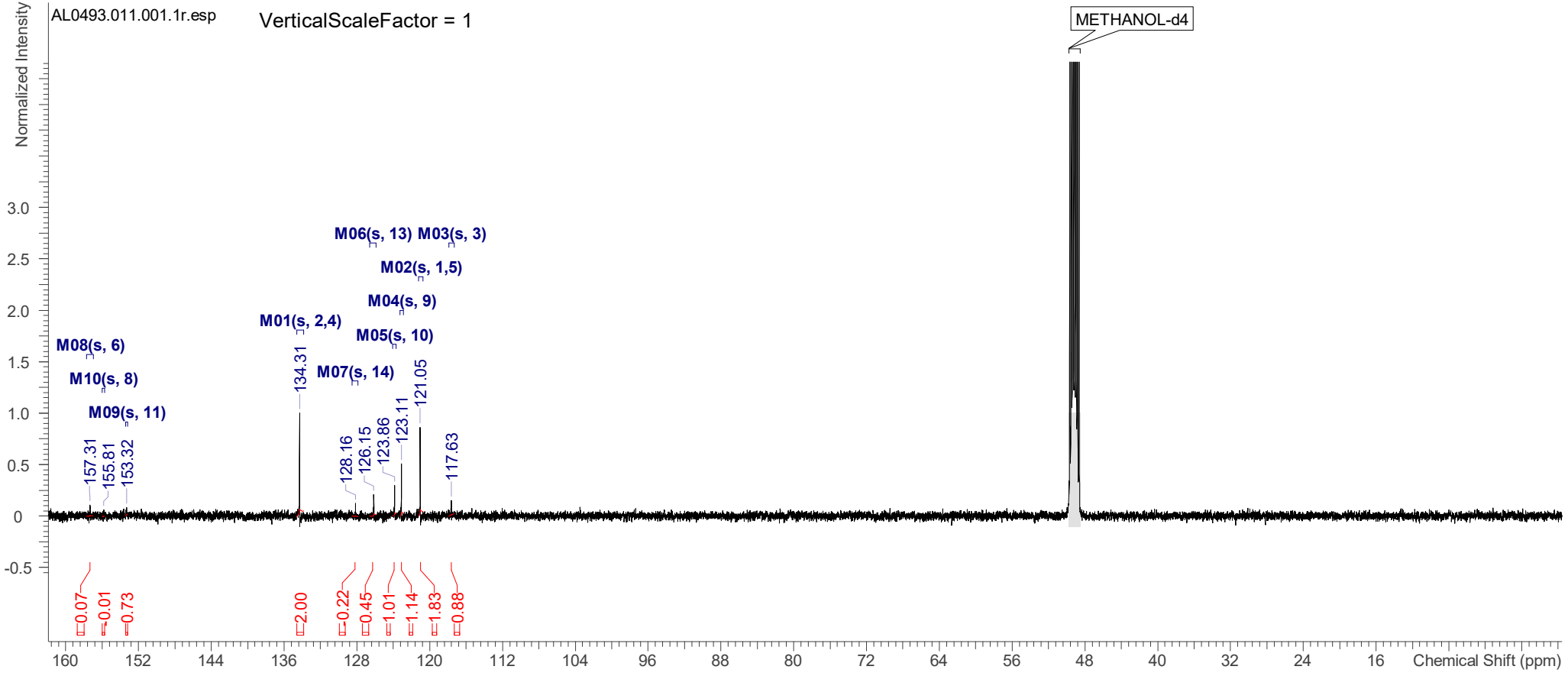
**Compound 5i**

7/10/2023 9:32:08 AM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 7.88 |
|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 157.3 (1 C, s), 155.8 (1 C, s), 153.3 (1 C, s), 134.3 (2 C, s), 128.2 (1 C, s), 126.2 (1 C, s), 123.9 (1 C, s), 123.1 (1 C, s), 121.1 (2 C, s), 117.6 (1 C, s)



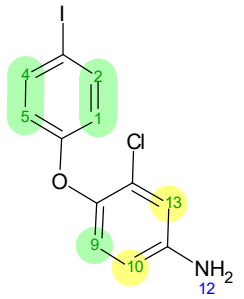

L:\NMR500\data\ddop\nmr\AL0493\AL0493.011.001.1r.esp

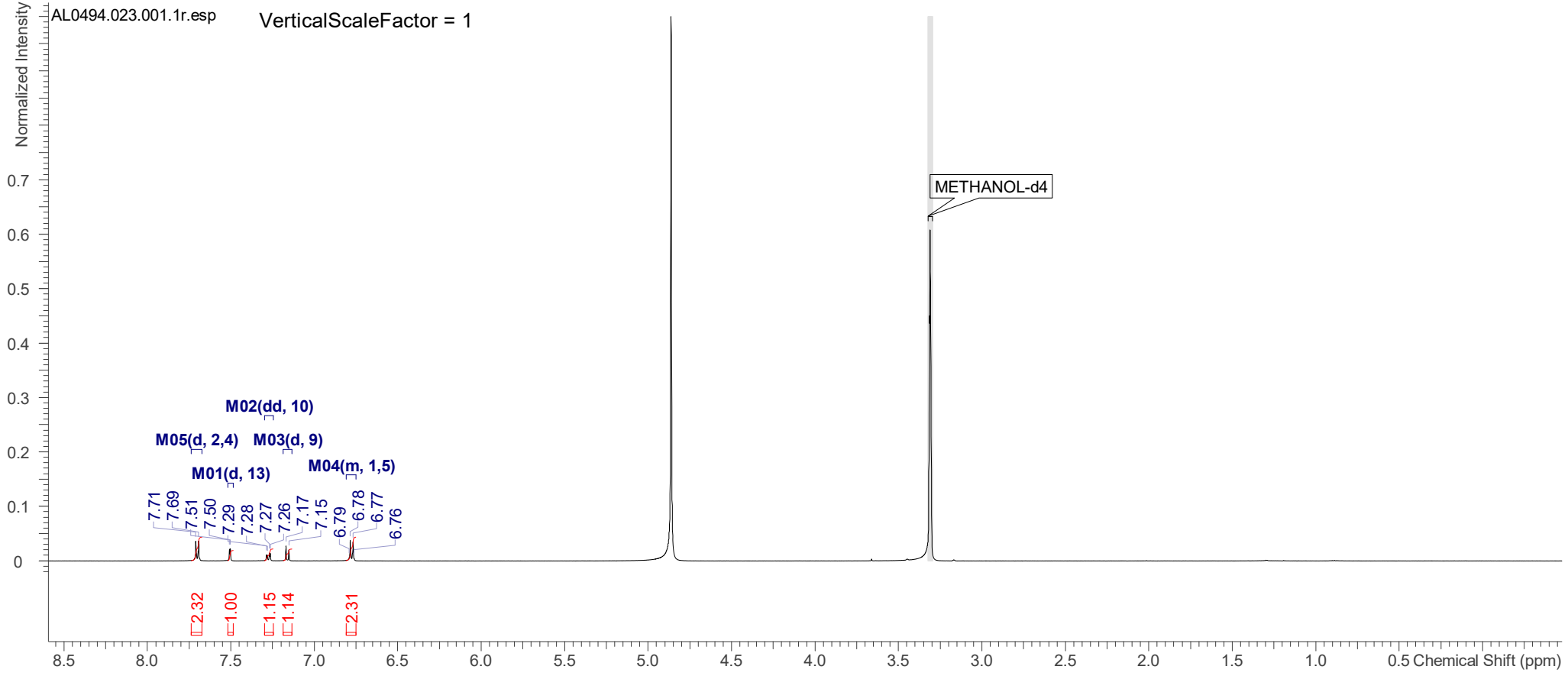
**Compound 5j**

7/10/2023 9:34:40 AM

| ***Number of Nuclei*** | 7 H's / 9 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 7.93 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.70 (2 H, d, J = 8.85 Hz), 7.51 (1 H, d, J = 2.59 Hz), 7.28 (1 H, dd, J = 8.77, 2.52 Hz), 7.16 (1 H, d, J = 8.70 Hz), 6.81 – 6.75 (2 H, m);



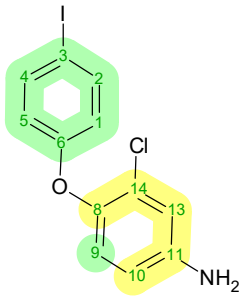

L:\NMR500\data\ddop\nmr\AL0494\AL0494.023.001.1r.esp

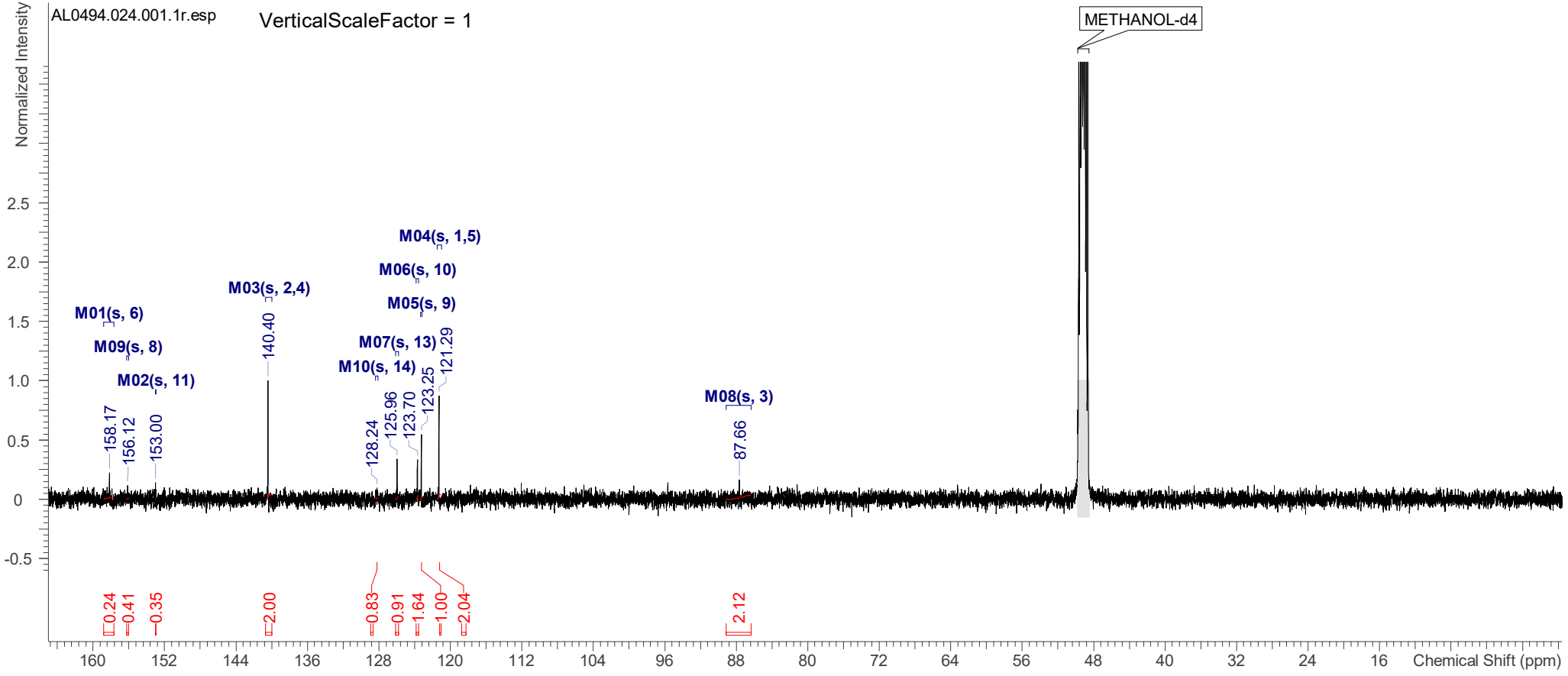
**Compound 5j**

7/10/2023 9:34:45 AM

| ***Number of Nuclei*** | 12 C's / 12 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 11.55 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 158.2 (1 C, s), 156.1 (1 C, s), 153.0 (1 C, s), 140.4 (2 C, s), 128.2 (1 C, s), 126.0 (1 C, s), 123.7 (1 C, s), 123.3 (1 C, s), 121.3 (2 C, s), 87.7 (1 C, s)



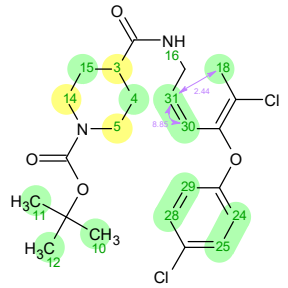

L:\NMR500\data\ddop\nmr\AL0494\AL0494.024.001.1r.esp

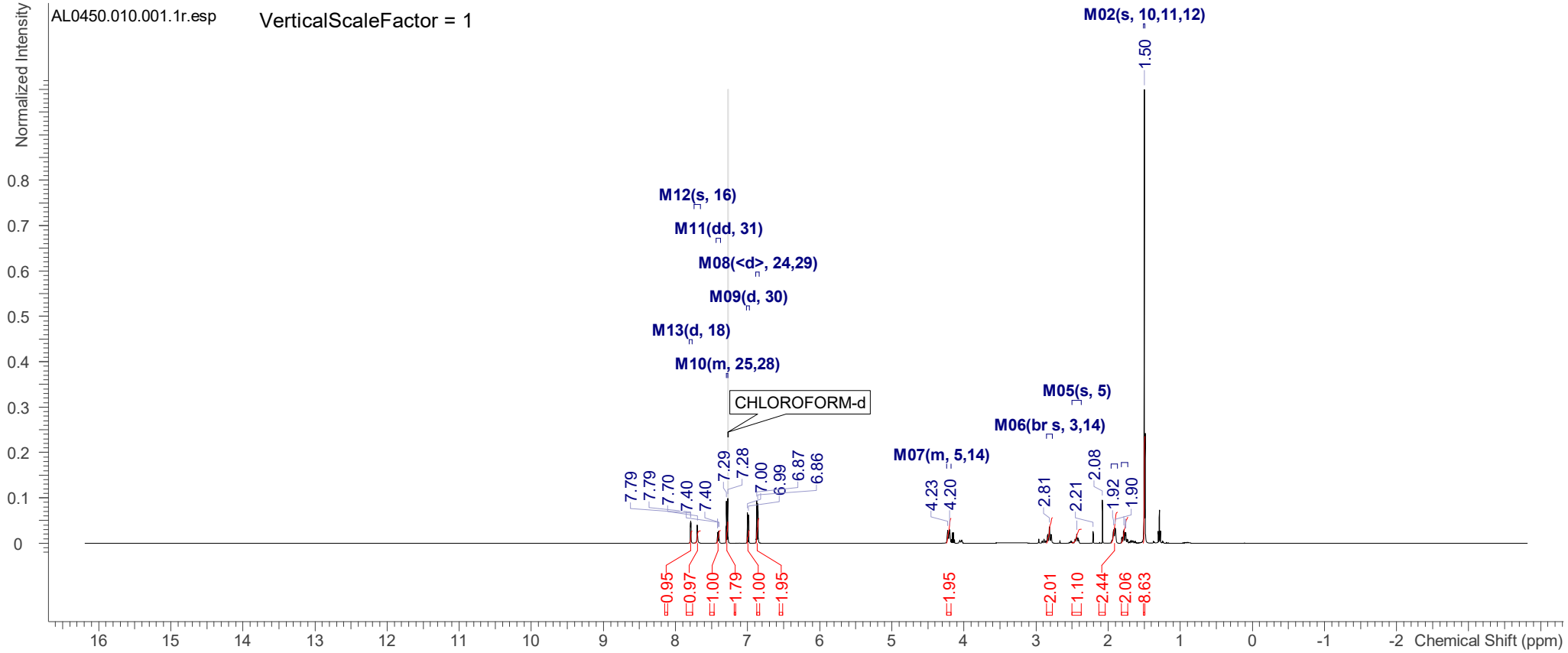
**Compound 6a**

11/29/2022 11:02:57 AM

| ***Number of Nuclei*** | 26 H's / 26 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 25.86 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.79 (1 H, d, J = 2.44 Hz), 7.70 (1 H, s), 7.41 (1 H, dd, J = 8.85, 2.44 Hz), 7.30 – 7.27 (2 H, m), 6.99 (1 H, d, J = 8.85 Hz), 6.87 (2 H, d, J = 8.20 Hz), 4.21 (2 H, m), 2.81 (2 H, br s), 2.44 (1 H, s), 1.91 (2 H, m), 1.77 (2 H, m), 1.50 (9 H, s);



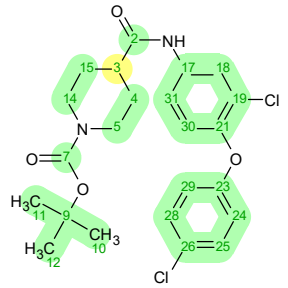

AL0450.010.001.1r.esp

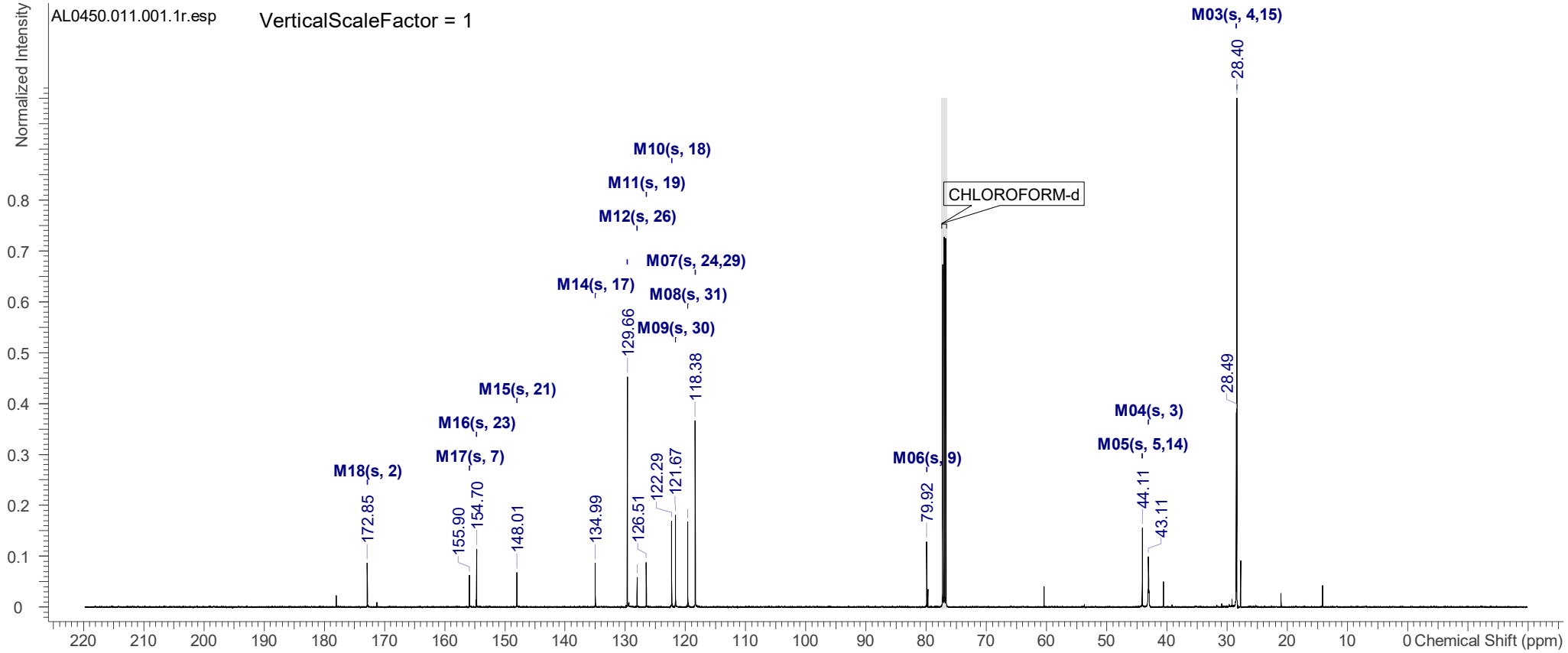
**Compound 6a**

11/29/2022 11:03:02 AM

| ***Number of Nuclei*** | 23 C's / 23 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 172.9 (1 C, s), 155.9 (1 C, s), 154.7 (1 C, s), 148.0 (1 C, s), 135.0 (1 C, s), 129.7 (2 C, s), 128.0 (1 C, s), 126.5 (1 C, s), 122.3 (1 C, s), 121.7 (1 C, s), 119.6 (1 C, s), 118.4 (2 C, s), 79.9 (1 C, s), 44.1 (2 C, s), 43.1 (1 C, s), 28.5 (2 C, s), 28.4 (3 C, s)



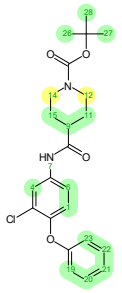

AL0450.011.001.1r.esp

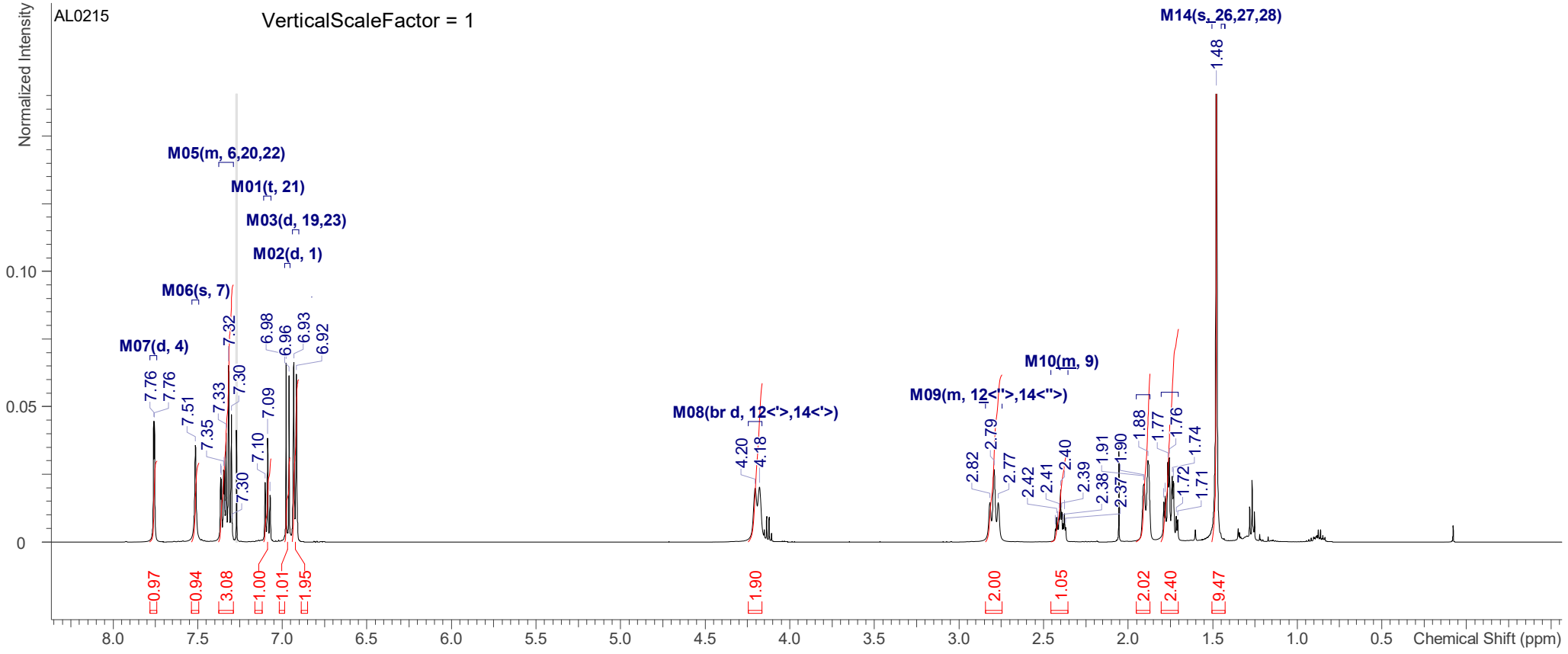
**Compound 6b**

1/21/2022 10:12:52 AM

| ***Number of Nuclei*** | 27 H's / 27 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 27.95 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.76 (1 H, d, J = 2.44 Hz), 7.51 (1 H, s), 7.38 – 7.29 (3 H, m), 7.09 (1 H, t, J = 7.40 Hz), 6.97 (1 H, d, J = 8.85 Hz), 6.92 (2 H, d, J = 7.93 Hz), 4.19 (2 H, m), 2.79 (2 H, m), 2.40 (1 H, m), 1.95 – 1.87 (2 H, m), 1.81 – 1.70 (2 H, m), 1.48 (9 H, s);





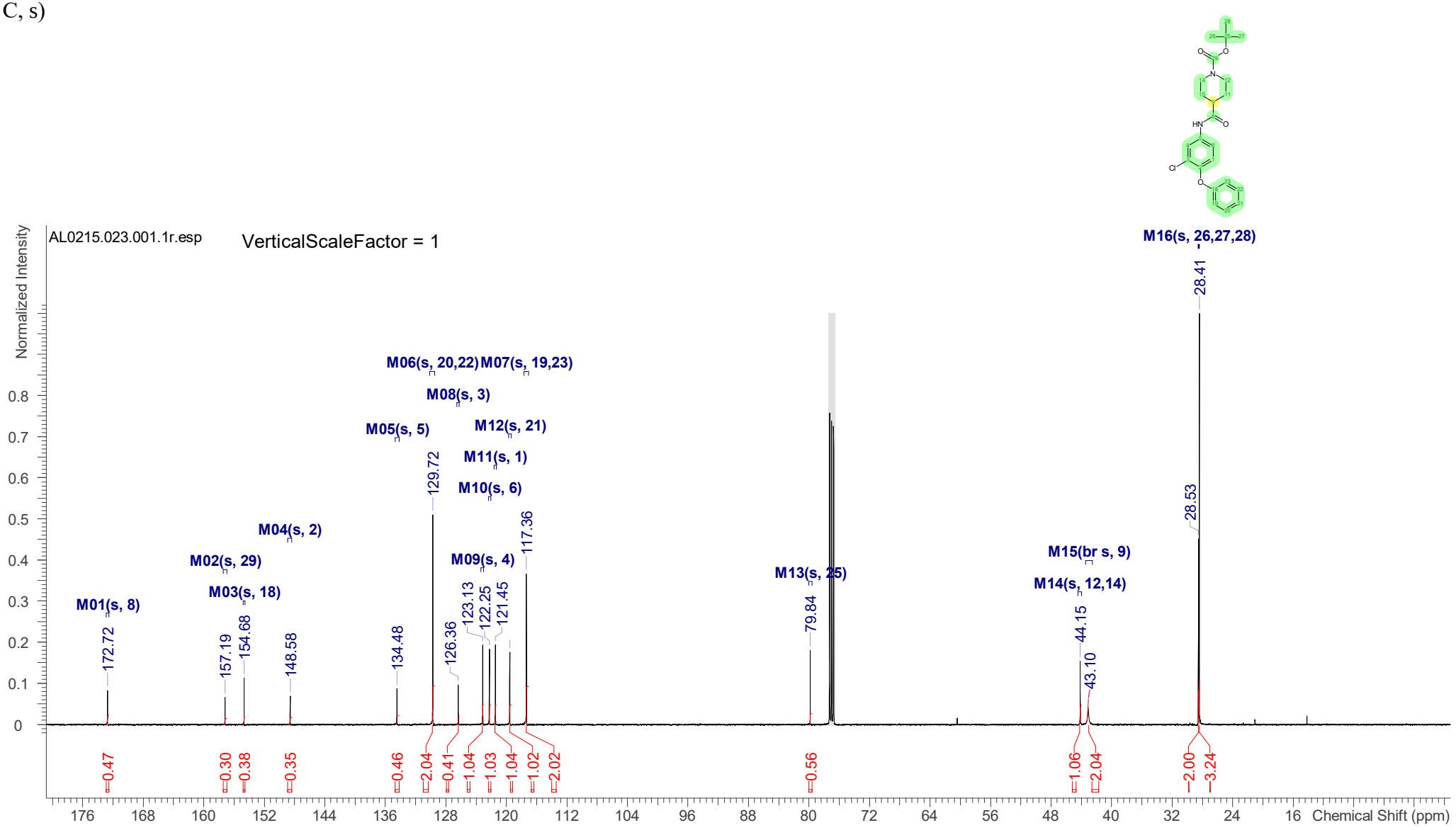

AL0215

**Compound 6b**

1/21/2022 10:12:56 AM

| ***Number of Nuclei*** | 23 C's / 23 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 19.48 |
|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 172.72 (1 C, s), 157.19 (1 C, s), 154.68 (1 C, s), 148.58 (1 C, s), 134.48 (1 C, s), 129.72 (2 C, s), 126.36 (1 C, s), 123.13 (1 C, s), 122.25 (1 C, s), 121.45 (1 C, s), 119.56 (1 C, s), 117.36 (2 C, s), 79.84 (1 C, s), 44.15 (2 C, s), 43.11 (1 C, br s), 28.53 (2 C, s), 28.41 (3 C, s)

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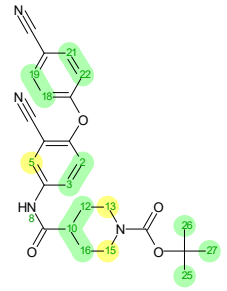
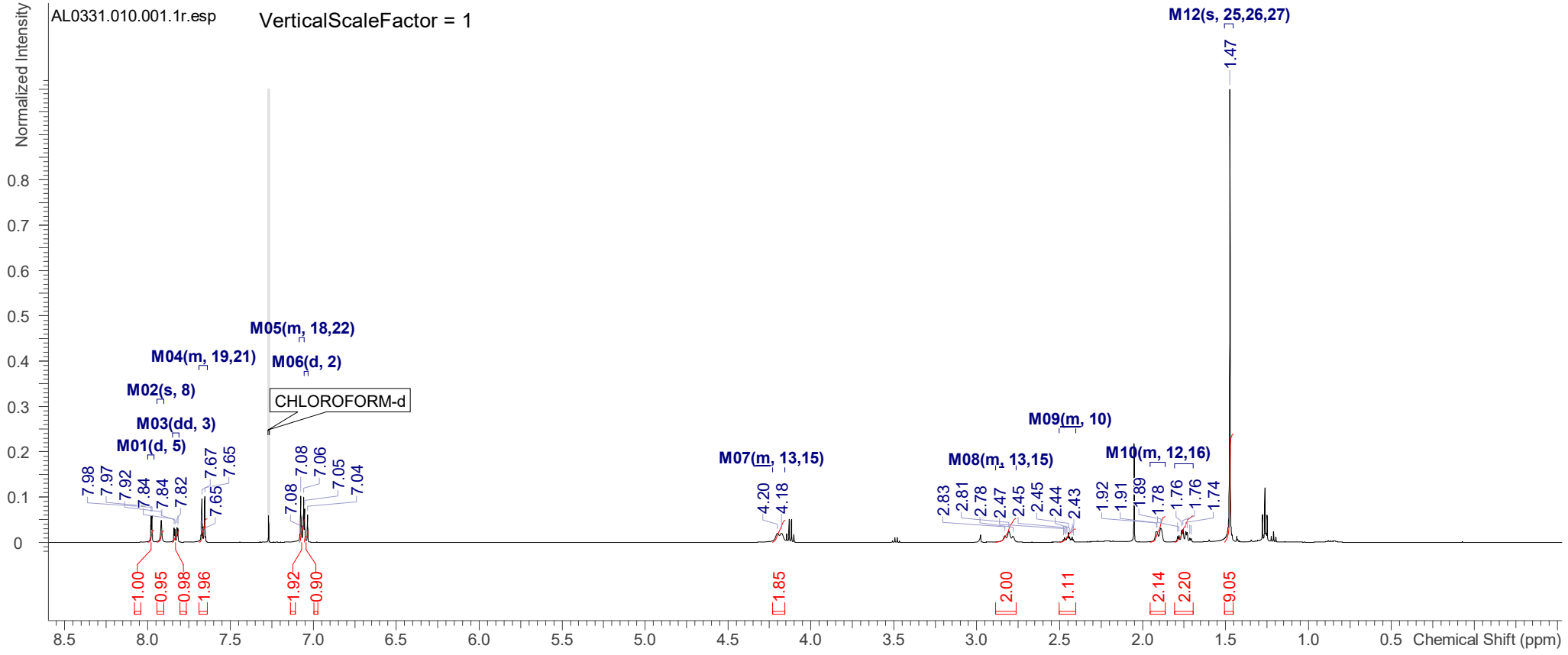
**Compound 6c**

4/12/2022 1:44:17 PM

| ***Number of Nuclei*** | 26 H's / 26 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 26.06 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.98 (1 H, d, J = 2.59 Hz), 7.92 (1 H, s), 7.83 (1 H, dd, J = 9.08, 2.67 Hz), 7.69 – 7.64 (2 H, m), 7.08 – 7.06 (2 H, m), 7.04 (1 H, d, J = 9.00 Hz), 4.19 (2 H, m), 2.81 (2 H, m), 2.45 (1 H, m), 1.95 – 1.86 (2 H, m), 1.75 (2 H, m), 1.47 (9 H, s);



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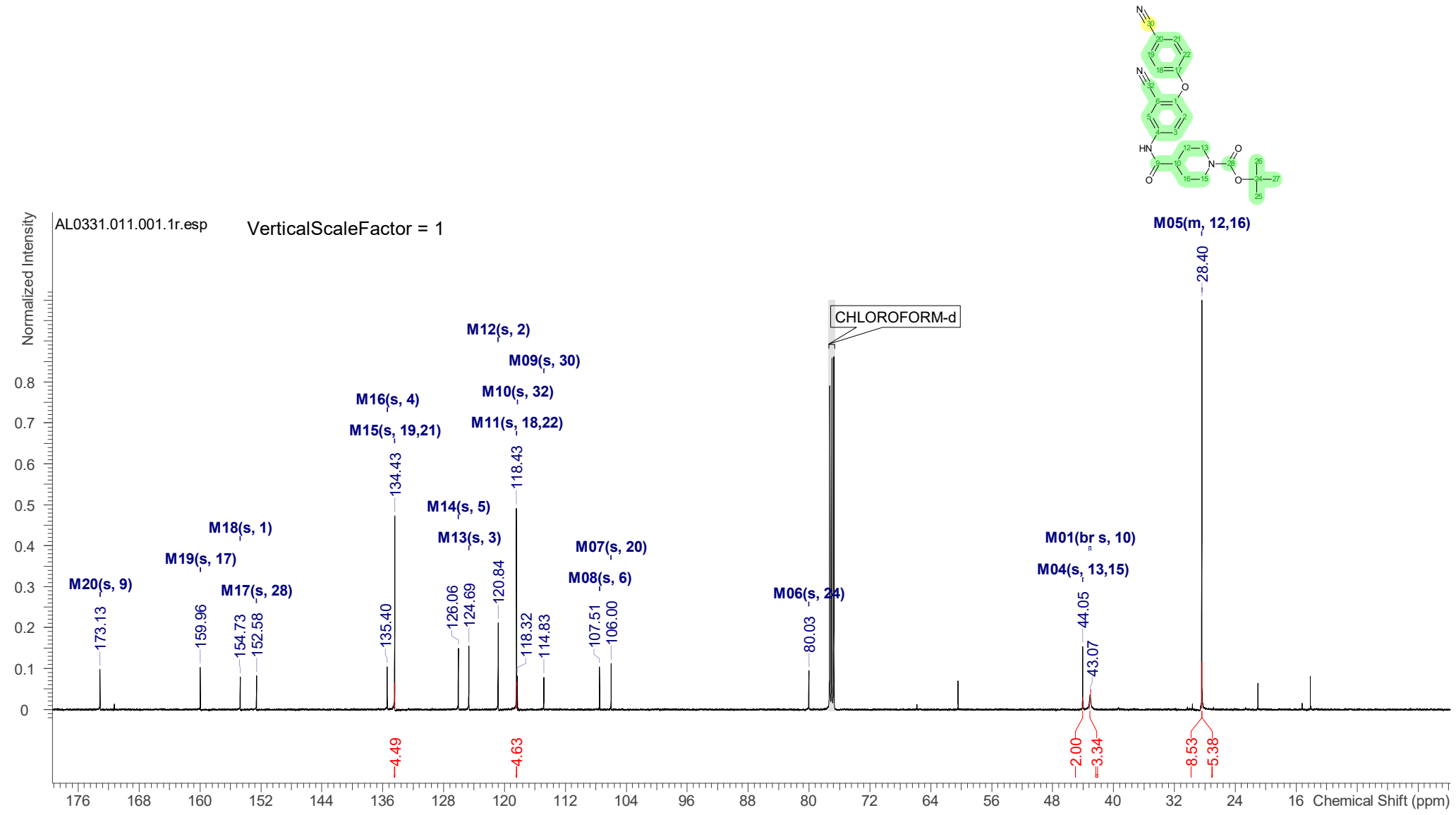
**Compound 6c**

4/12/2022 1:44:22 PM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 25 C's / 25 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 28.36 |

13C NMR (126 MHz, CHLOROFORM-d, ppm) δ= 173.1 (1 C, s), 158.0 (1 C, s), 154.7 (1 C, s), 152.6 (1 C, s), 135.4 (1 C, s), 134.4 (2 C, s), 126.1 (1 C, s), 124.7 (1 C, s), 120.8 (1 C, s), 118.4 (2 C, s), 118.3 (1 C, s), 114.8 (1 C, s), 107.5 (1 C, s), 106.0 (1 C, s), 80.0 (1 C, s), 44.1 (2 C, s), 43.1 (1 C, br s), 28.4 (3 C, s), 28.4 – 28.4 (2 C, m)



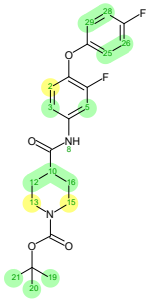

L:\NMR500\data\ddop\nmr\AL0331\AL0331.011.001.1r.esp

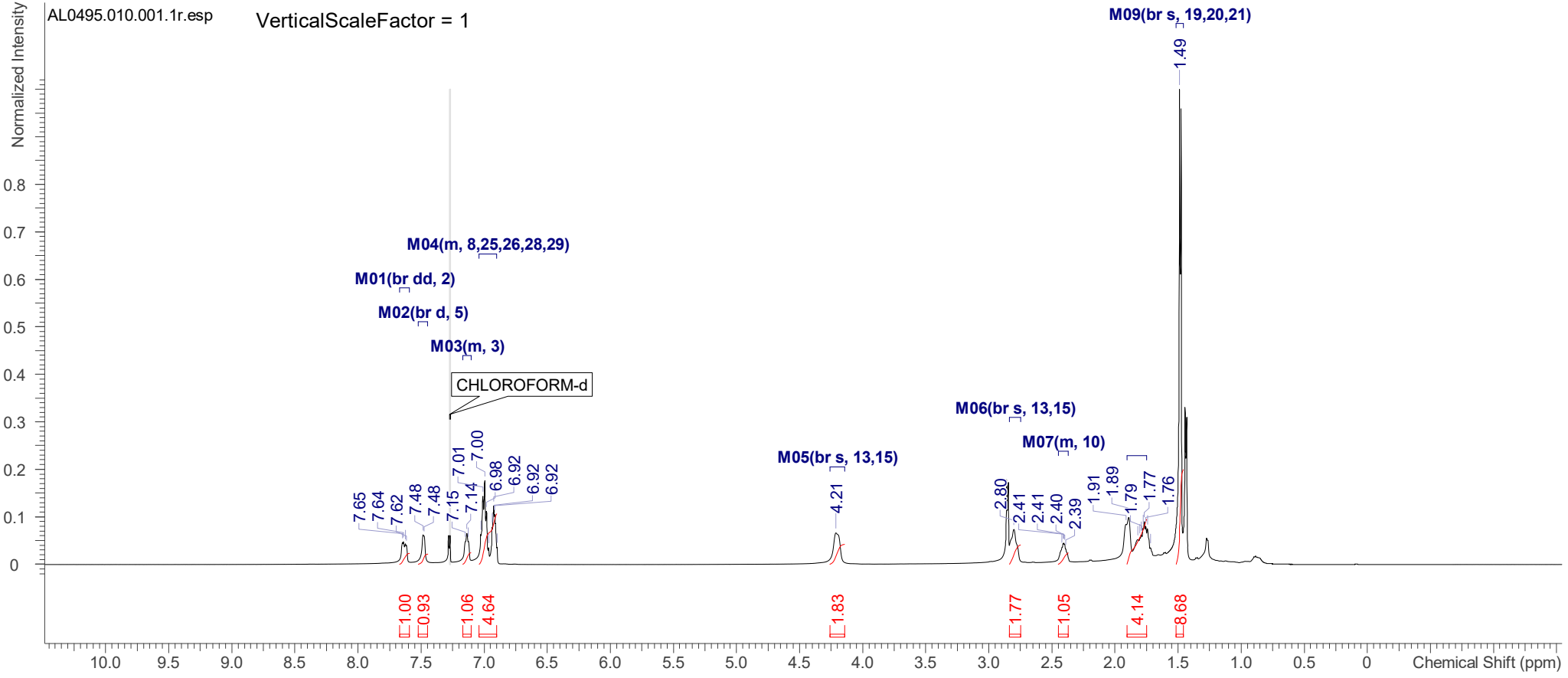
**Compound 6d**

4/2/2024 9:30:04 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 26 H's / 26 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 25.10 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.63 (1 H, br dd, J = 12.13, 4.04 Hz), 7.48 (1 H, br d, J = 3.81 Hz), 7.17 – 7.10 (1 H, m), 7.04 – 6.90 (5 H, m), 4.21 (2 H, br s), 2.80 (2 H, br s), 2.45 – 2.37 (1 H, m), 1.91 – 1.75 (4 H, m), 1.48 (9 H, s);





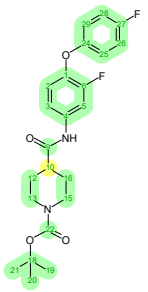

AL0495.010.001.1r.esp

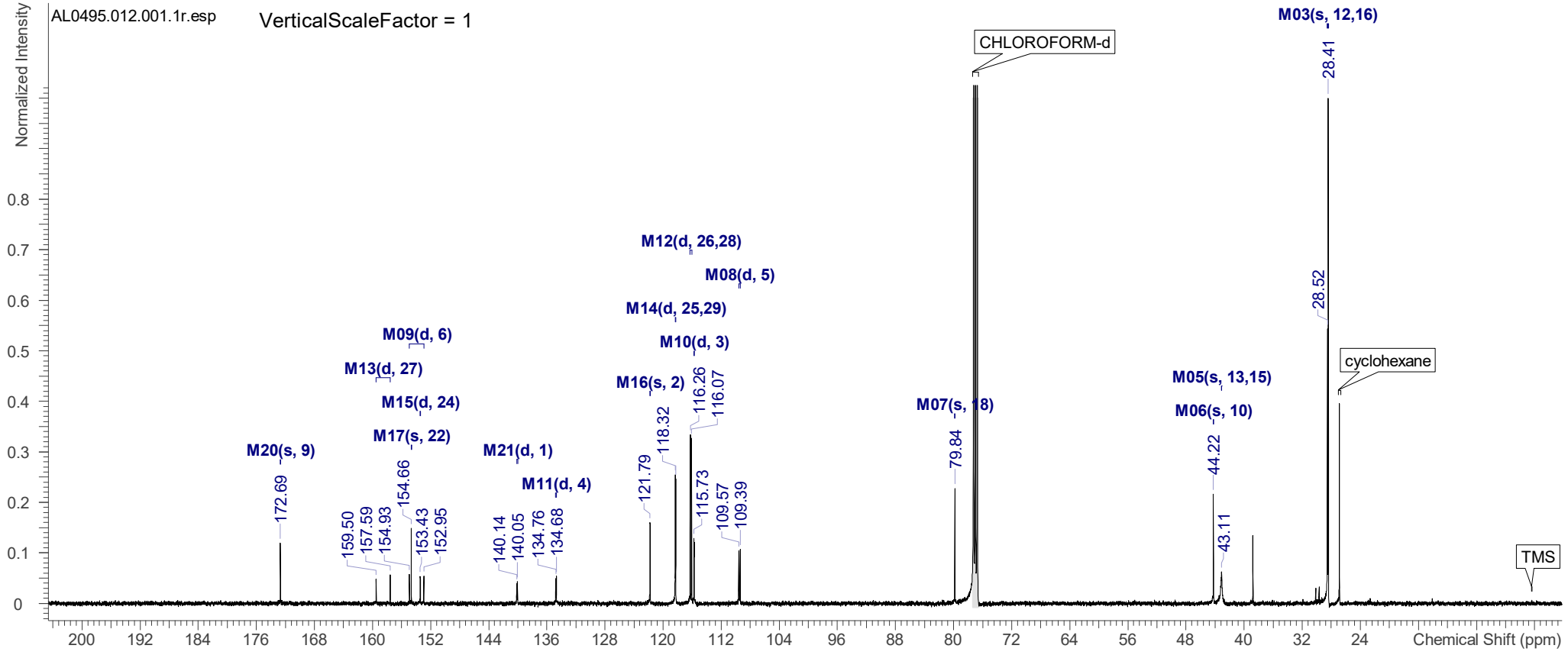
**Compound 6d**

4/2/2024 9:30:08 AM

| ***Number of Nuclei*** | 23 C's / 23 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 28.4 (3 C, s), 28.5 (2 C, s), 43.1 (2 C, s), 44.2 (1 C, s), 79.8 (1 C, s), 109.5 (1 C, d, J = 22.98 Hz), 115.7 (1 C, d, J = 3.68 Hz), 116.2 (2 C, d, J = 23.90 Hz), 118.3 (2 C, d, J = 8.27 Hz), 121.8 (1 C, s), 134.7 (1 C, d, J = 10.11 Hz), 140.1 (1 C, d, J = 11.03 Hz), 153.9 (1 C, d, J = 249.10 Hz), 153.4 (1 C, d, J = 1.84 Hz), 154.7 (1 C, s), 158.5 (1 C, d, J = 240.83 Hz), 172.7 (1 C, s);





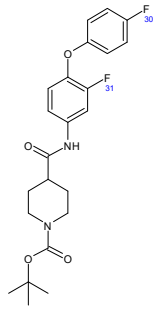

AL0495.012.001.1r.esp

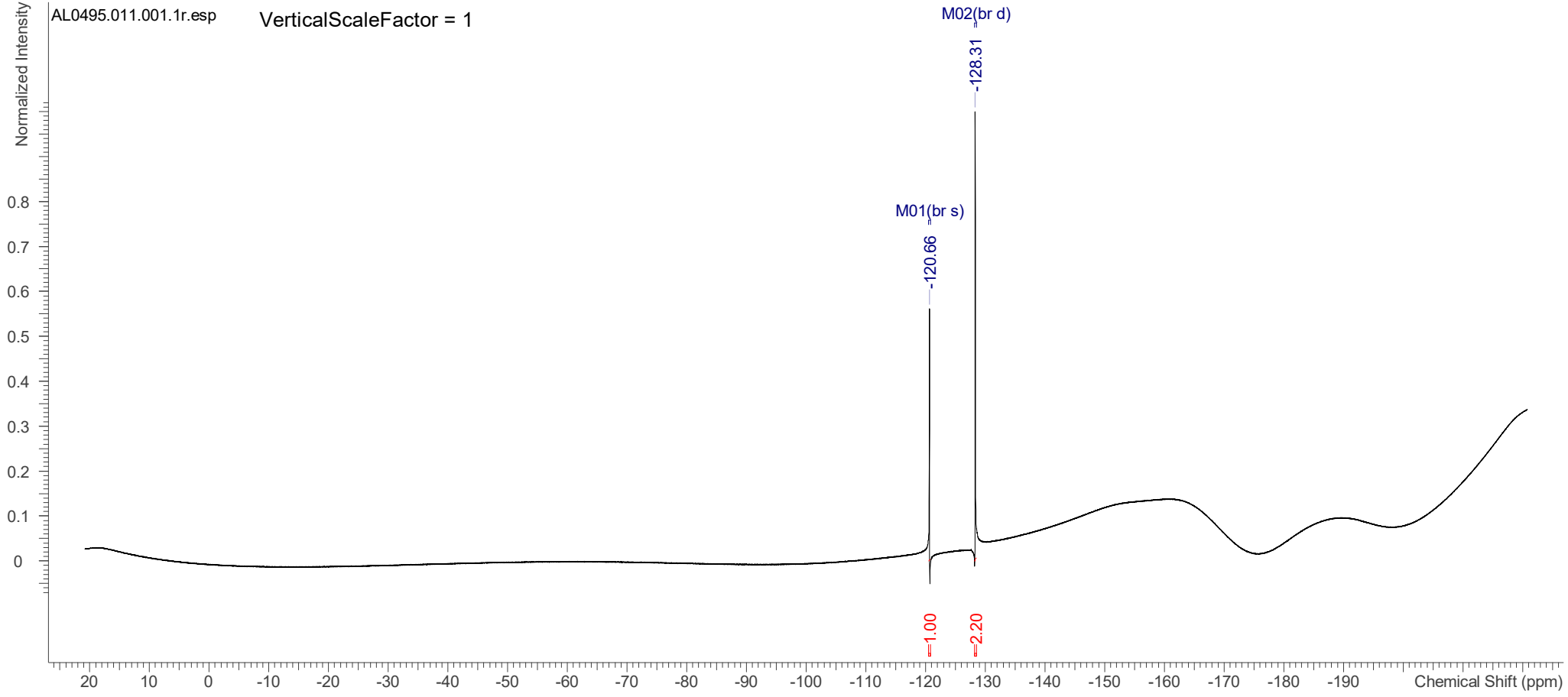
**Compound 6d**

4/2/2024 9:30:11 AM

| | |
|---|---|
| ***Number of Nuclei*** 2 F's / 2 F's (spectrum / structure) | ***Multiplets Integrals Sum*** 3.20 |

$^{19}$F NMR (470 MHz, CHLOROFORM-*d*, ppm) δ= -128.3 (1 F, br d, J = 12.14 Hz), -120.7 (1 F, br s)



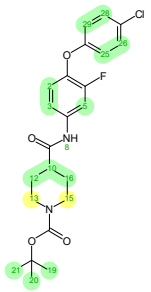

AL0495.011.001.1r.esp

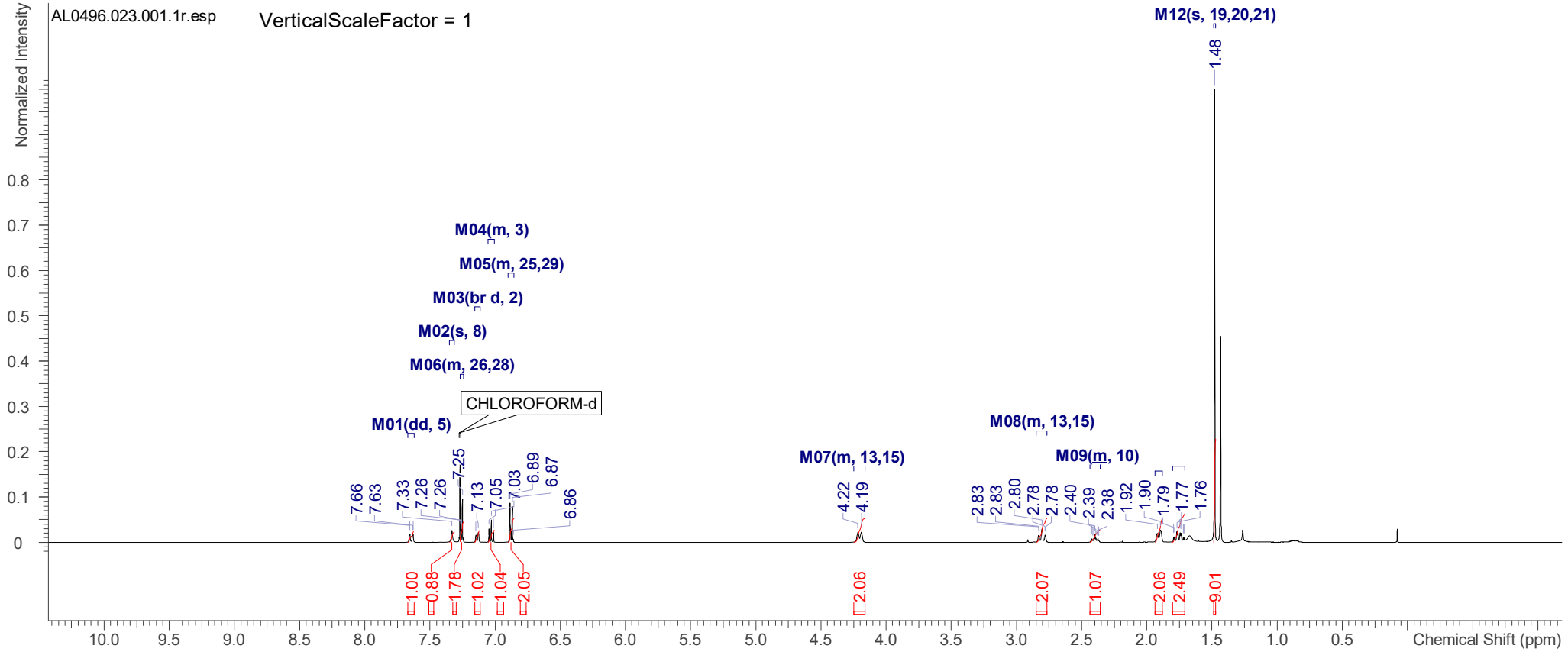
**Compound 6e**

4/2/2024 9:30:39 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 26 H's / 26 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 26.55 |

1H NMR (500 MHz, CHLOROFORM-d, ppm) δ= 7.64 (1 H, dd, J = 12.21, 2.29 Hz), 7.33 (1 H, s), 7.27 – 7.24 (2 H, m), 7.14 (1 H, br d, J = 8.85 Hz), 7.05 – 7.01 (1 H, m), 6.90 – 6.85 (2 H, m), 4.20 (2 H, m), 2.85 – 2.77 (2 H, m), 2.40 (1 H, m), 1.94 – 1.88 (2 H, m), 1.75 (2 H, m), 1.48 (9 H, s);





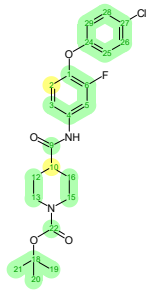

AL0496.023.001.1r.esp

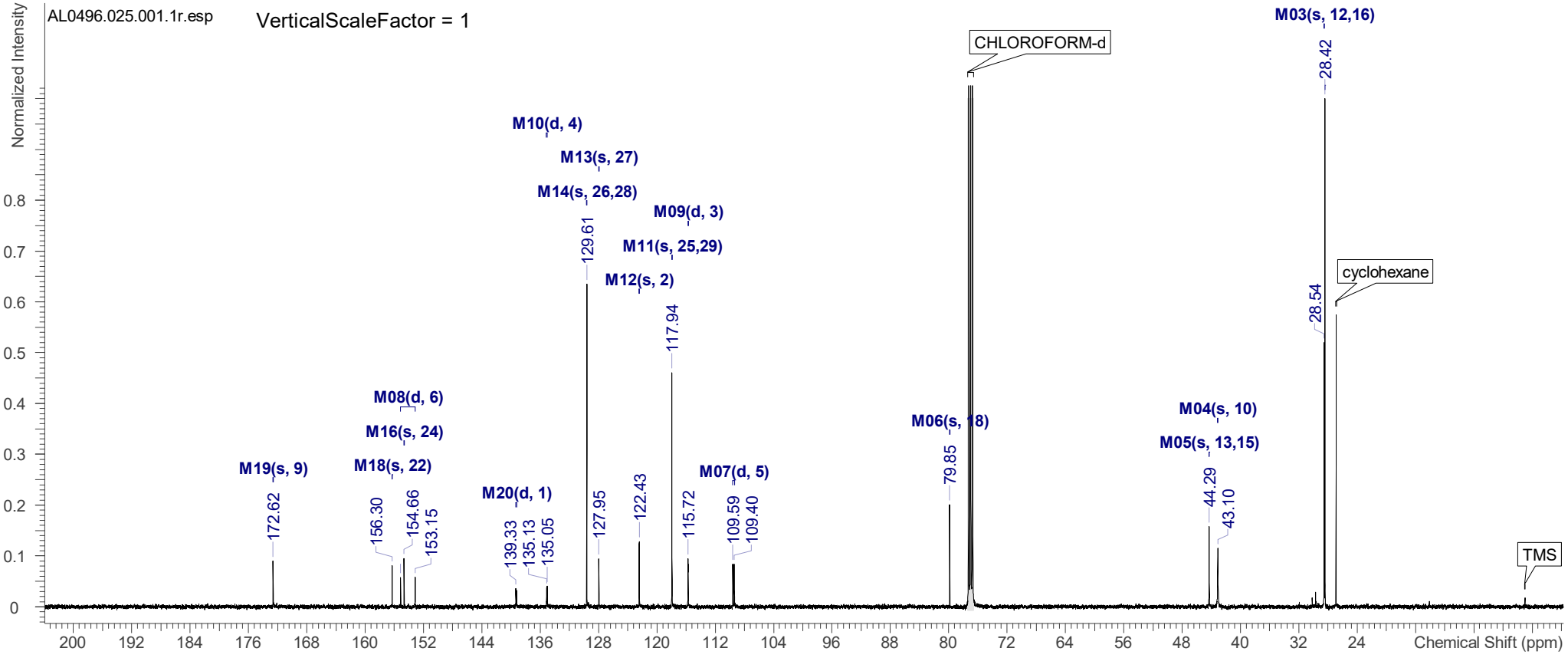
**Compound 6e**

4/2/2024 9:30:43 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 23 C's / 23 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |

13C NMR (126 MHz, CHLOROFORM-d, ppm) δ= 28.4 (3 C, s), 28.5 (2 C, s), 43.1 (1 C, s), 44.3 (2 C, s), 79.9 (1 C, s), 109.5 (1 C, d, J = 22.98 Hz), 115.7 (1 C, d, J = 2.76 Hz), 117.9 (2 C, s), 122.4 (1 C, s), 128.0 (1 C, s), 129.6 (2 C, s), 135.1 (1 C, d, J = 10.11 Hz), 139.3 (1 C, d, J = 11.95 Hz), 154.2 (1 C, d, J = 249.10 Hz), 154.7 (1 C, s), 156.3 (1 C, s), 172.6 (1 C, s);





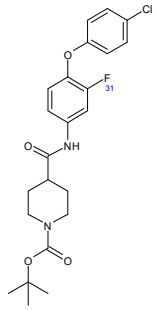

AL0496.025.001.1r.esp

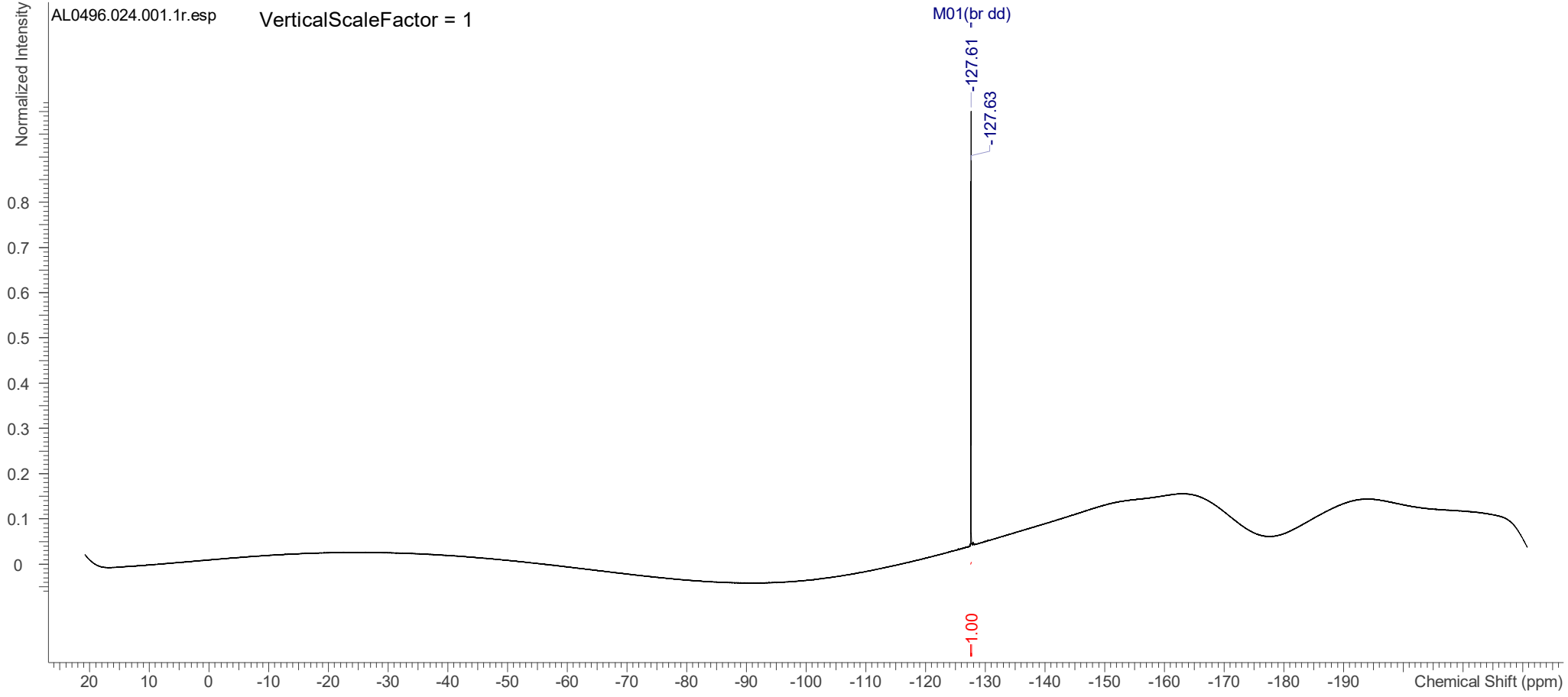
**Compound 6e**

4/2/2024 9:30:46 AM

| ***Number of Nuclei*** 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** 1.00 |
|---|---|

19F NMR (470 MHz, CHLOROFORM-d, ppm) δ= -127.6 (1 F, br dd, J = 12.14, 8.67 Hz)



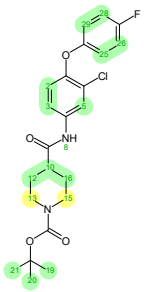

AL0496.024.001.1r.esp

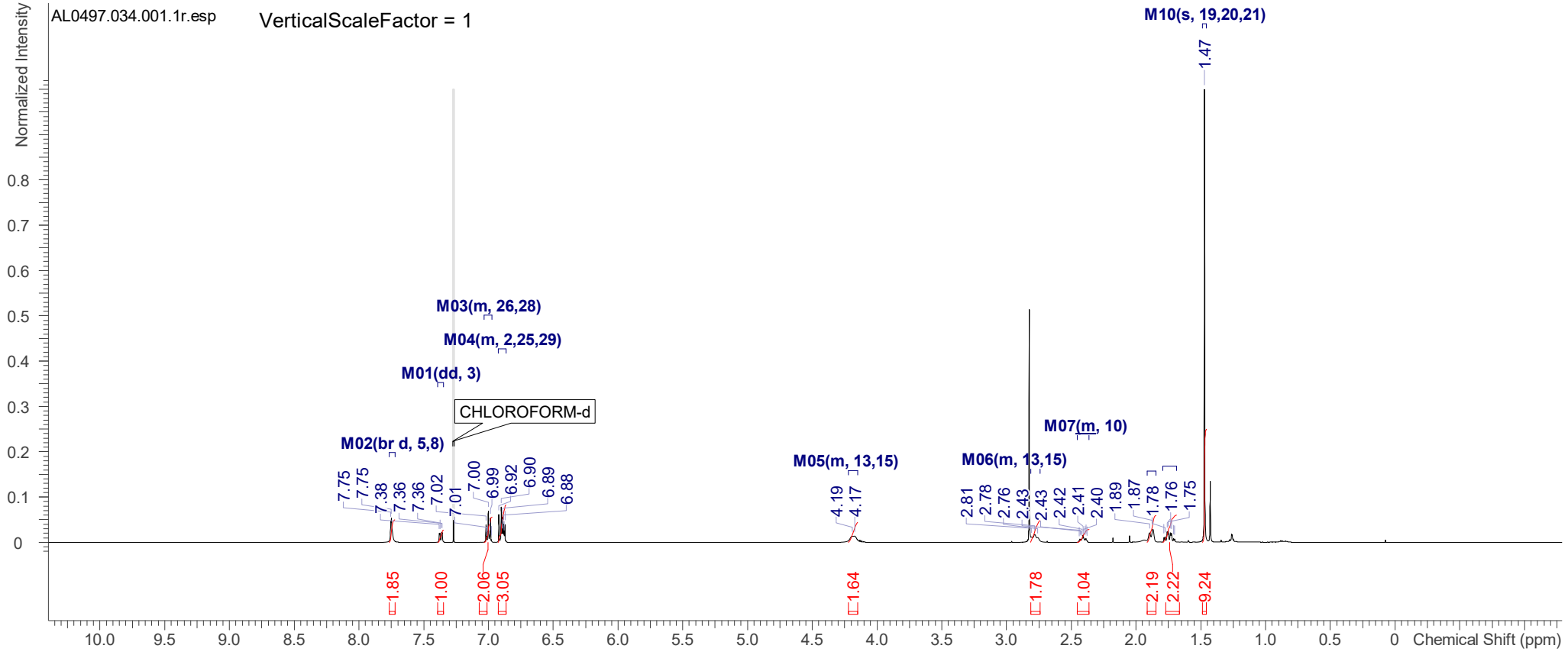
**Compound 6f**

4/2/2024 9:31:01 AM

| ***Number of Nuclei*** | 26 H's / 26 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 26.07 |
|---|---|---|---|

1H NMR (500 MHz, CHLOROFORM-d, ppm) δ= 7.75 (2 H, br d, J = 2.29 Hz), 7.37 (1 H, dd, J = 8.85, 2.29 Hz), 7.03 – 6.97 (2 H, m), 6.93 – 6.86 (3 H, m), 4.18 (2 H, m), 2.78 (2 H, m), 2.41 (1 H, m), 1.88 (2 H, m), 1.74 (2 H, m), 1.47 (9 H, s);





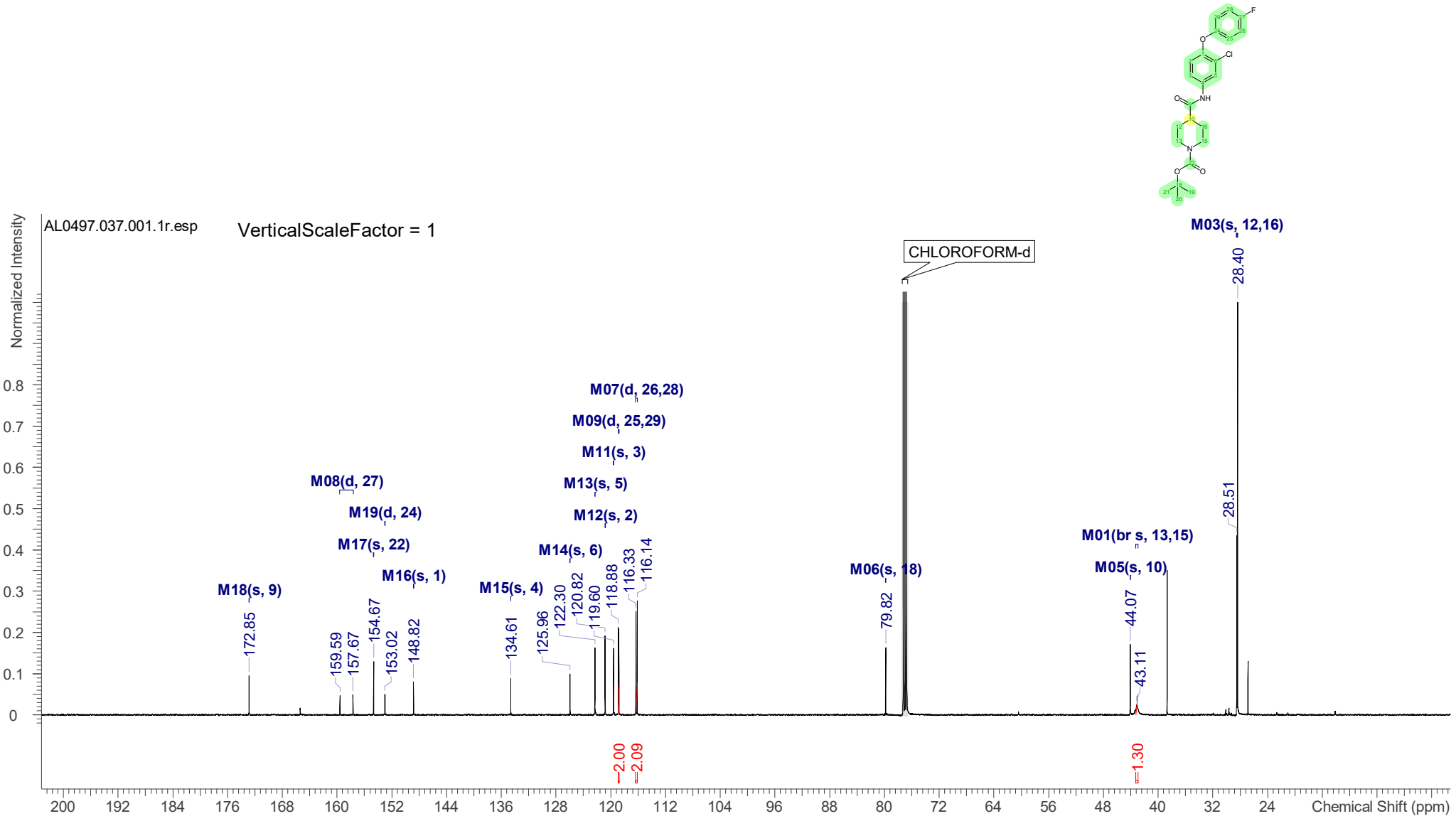

AL0497.034.001.1r.esp

**Compound 6f**

4/2/2024 9:31:05 AM

| ***Number of Nuclei*** | 19 C's / 23 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 5.40 |
|---|---|---|---|

13C NMR (126 MHz, CHLOROFORM-d, ppm) δ= 28.4 (1 C, s), 28.5 (1 C, s), 43.1 (1 C, br s), 44.1 (1 C, s), 79.8 (1 C, s), 116.2 (2 C, d, J = 23.90 Hz), 118.9 (2 C, d, J = 8.27 Hz), 119.6 (1 C, s), 120.8 (1 C, s), 122.3 (1 C, s), 126.0 (1 C, s), 134.6 (1 C, s), 148.8 (1 C, s), 153.0 (1 C, d, J = 2.76 Hz), 154.7 (1 C, s), 158.6 (1 C, d, J = 241.75 Hz), 172.9 (1 C, s);



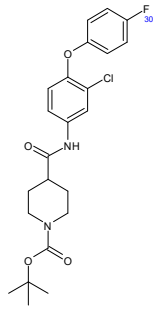

AL0497.037.001.1r.esp

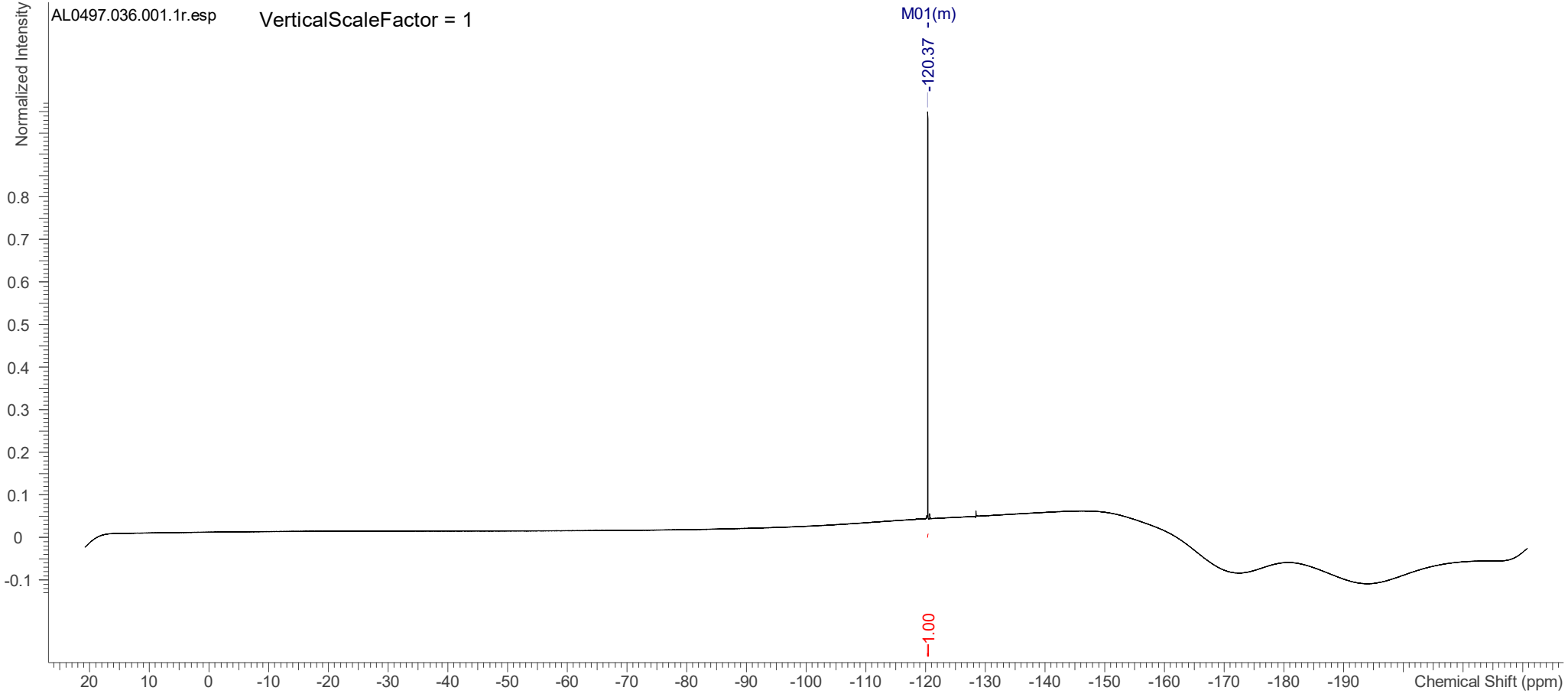
**Compound 6f**

4/2/2024 9:31:08 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** | 1.00 |

19F NMR (470 MHz, CHLOROFORM-d, ppm) δ= -120.4 – -120.3 (1 F, m)



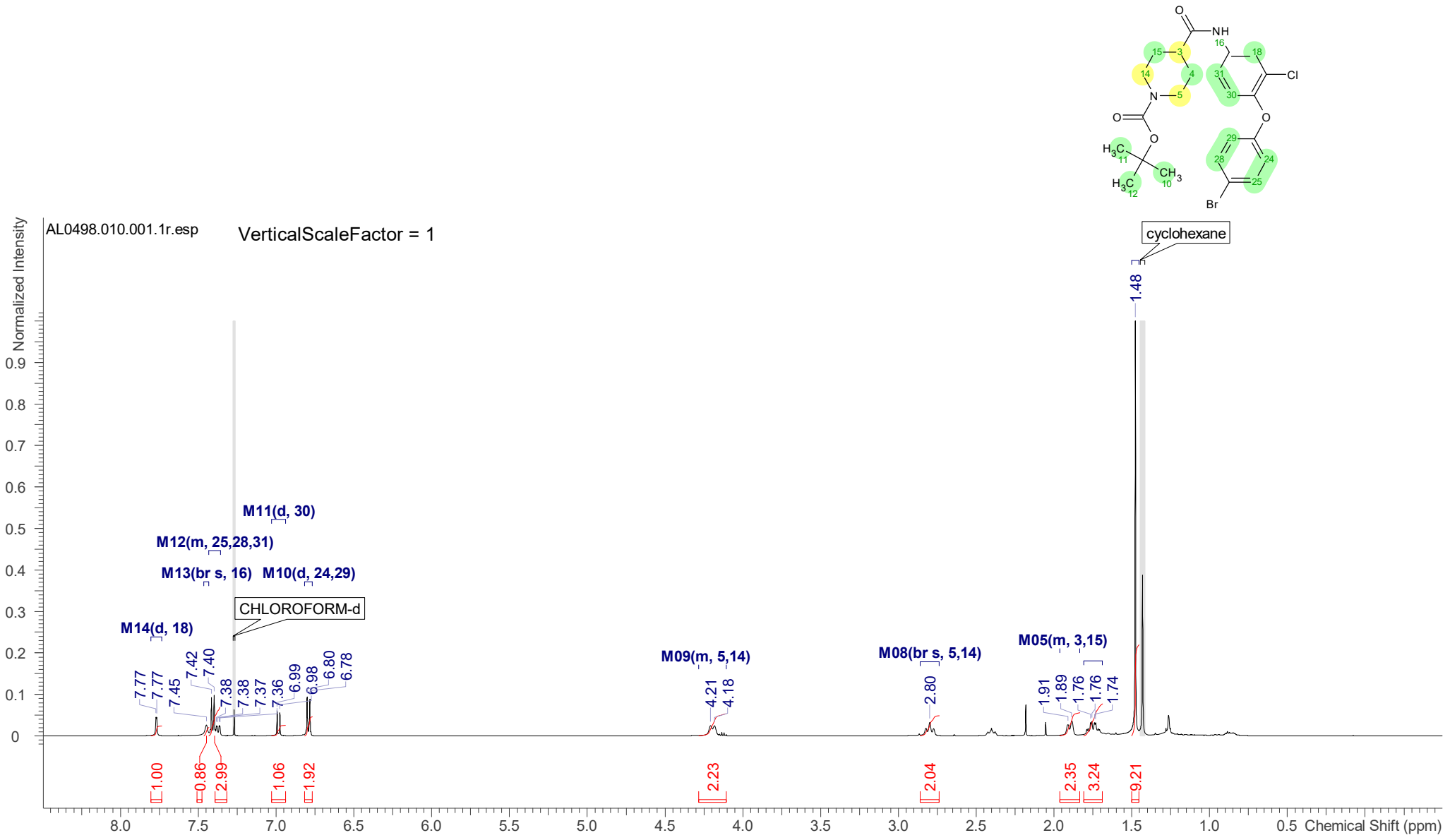

AL0497.036.001.1r.esp

**Compound 6g**

7/19/2023 8:33:41 AM

| ***Multiplets Integrals Sum*** 26.92 | ***Number of Nuclei*** 26 H's / 26 H's (spectrum / structure) |
|---|---|

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.77 (1 H, d, J = 1.98 Hz), 7.45 (1 H, br s), 7.43 – 7.36 (3 H, m), 6.98 (1 H, d, J = 8.85 Hz), 6.79 (2 H, d, J = 8.85 Hz), 4.20 (2 H, m), 2.80 (2 H, br s), 1.90 (2 H, m), 1.75 (3 H, m), 1.48 (9 H, s);



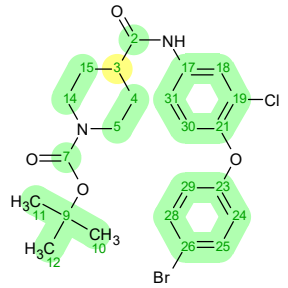

L:\NMR500\data\ddop\nmr\AL0498\AL0498.010.001.1r.esp

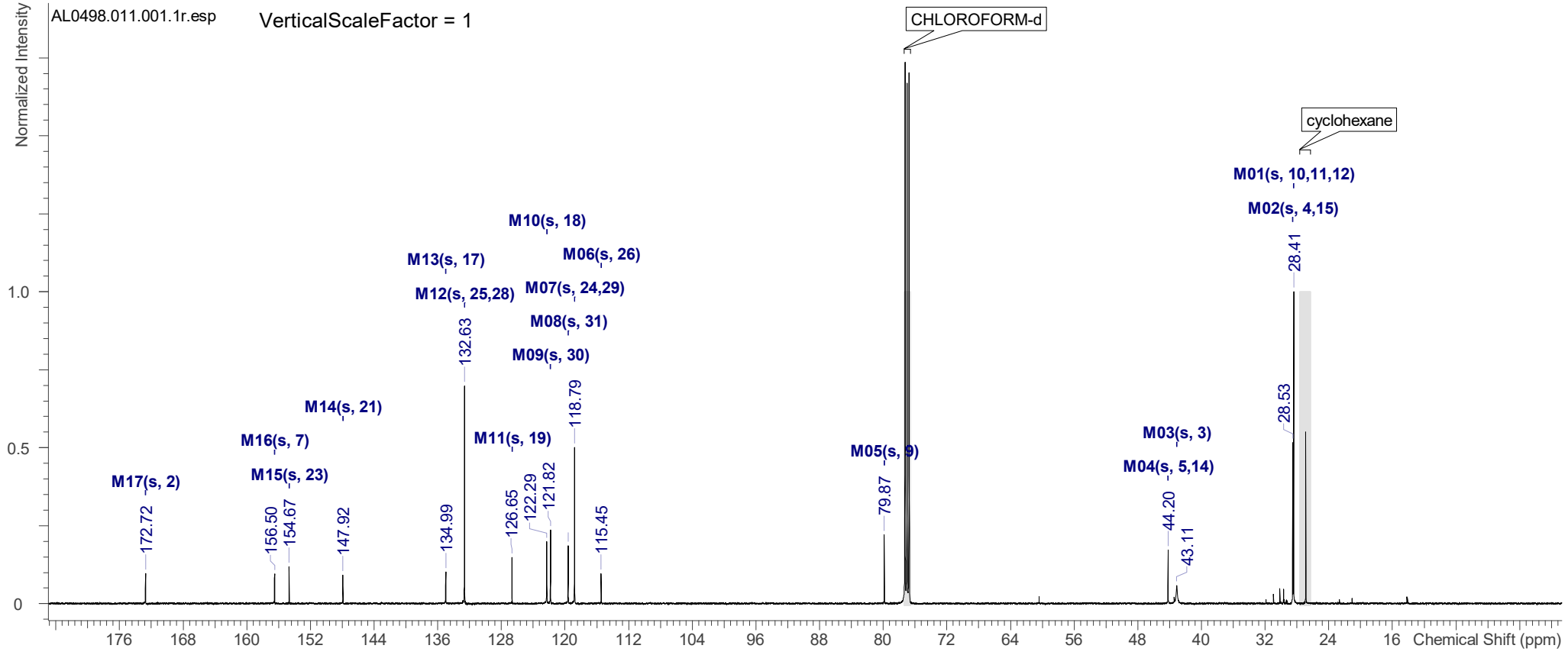
**Compound 6g**

7/19/2023 8:33:44 AM

| ***Multiplets Integrals Sum*** 0.00 | ***Number of Nuclei*** 23 C's / 23 C's (spectrum / structure) |
|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 172.7 (1 C, s), 156.5 (1 C, s), 154.7 (1 C, s), 147.9 (1 C, s), 135.0 (1 C, s), 132.6 (2 C, s), 126.7 (1 C, s), 122.3 (1 C, s), 121.8 (1 C, s), 119.6 (1 C, s), 118.8 (2 C, s), 115.5 (1 C, s), 79.9 (1 C, s), 44.2 (2 C, s), 43.1 (1 C, s), 28.5 (2 C, s), 28.4 (3 C, s)



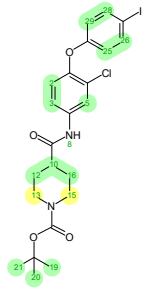

L:\NMR500\data\ddop\nmr\AL0498\AL0498.011.001.1r.esp

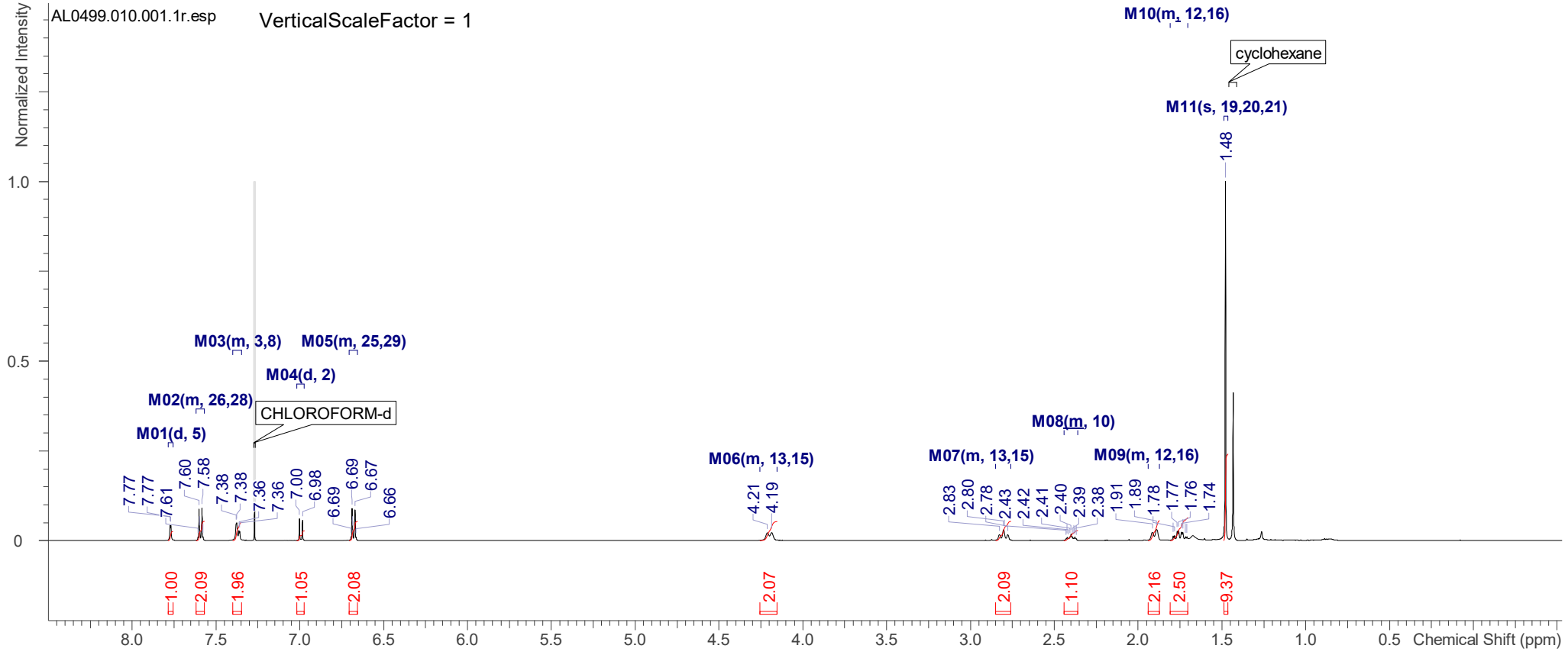
**Compound 6h**

7/19/2023 8:32:54 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 26 H's / 26 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 27.48 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.77 (1 H, d, J = 2.29 Hz), 7.62 – 7.57 (2 H, m), 7.40 – 7.35 (2 H, m), 6.99 (1 H, d, J = 8.85 Hz), 6.70 – 6.66 (2 H, m), 4.20 (2 H, m), 2.80 (2 H, m), 2.40 (1 H, m), 1.90 (2 H, m), 1.75 (2 H, m), 1.48 (9 H, s);





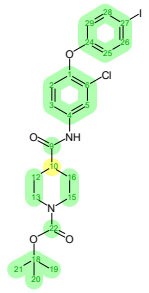

L:\NMR500\data\ddop\nmr\AL0499\AL0499.010.001.1r.esp

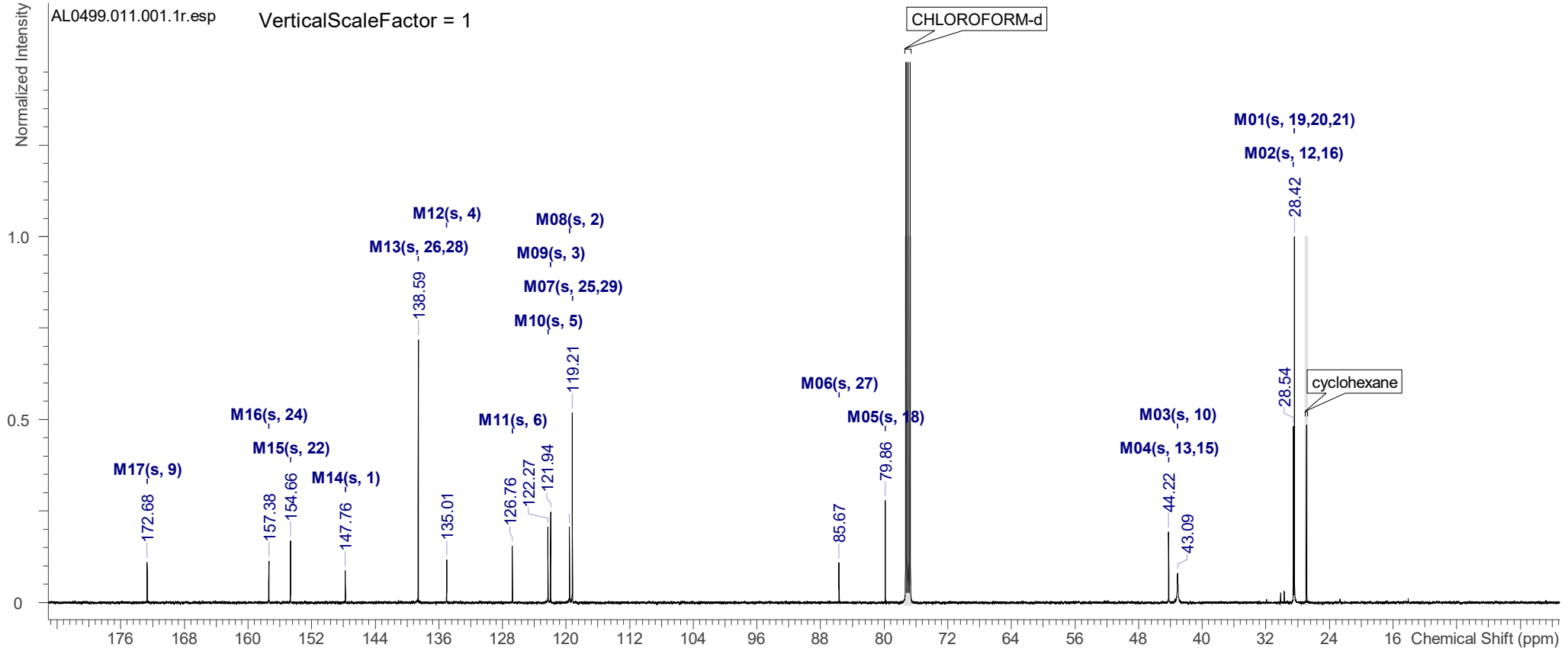
**Compound 6h**

7/19/2023 8:32:58 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 23 C's / 23 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 172.7 (1 C, s), 157.4 (1 C, s), 154.7 (1 C, s), 147.8 (1 C, s), 138.6 (2 C, s), 135.0 (1 C, s), 126.8 (1 C, s), 122.3 (1 C, s), 121.9 (1 C, s), 119.6 (1 C, s), 119.2 (2 C, s), 85.7 (1 C, s), 79.9 (1 C, s), 44.2 (2 C, s), 43.1 (1 C, s), 28.5 (2 C, s), 28.4 (3 C, s)





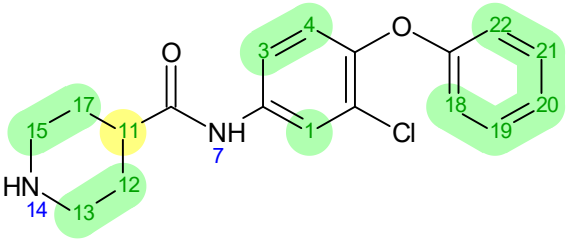

L:\NMR500\data\ddop\nmr\AL0499\AL0499.011.001.1r.esp

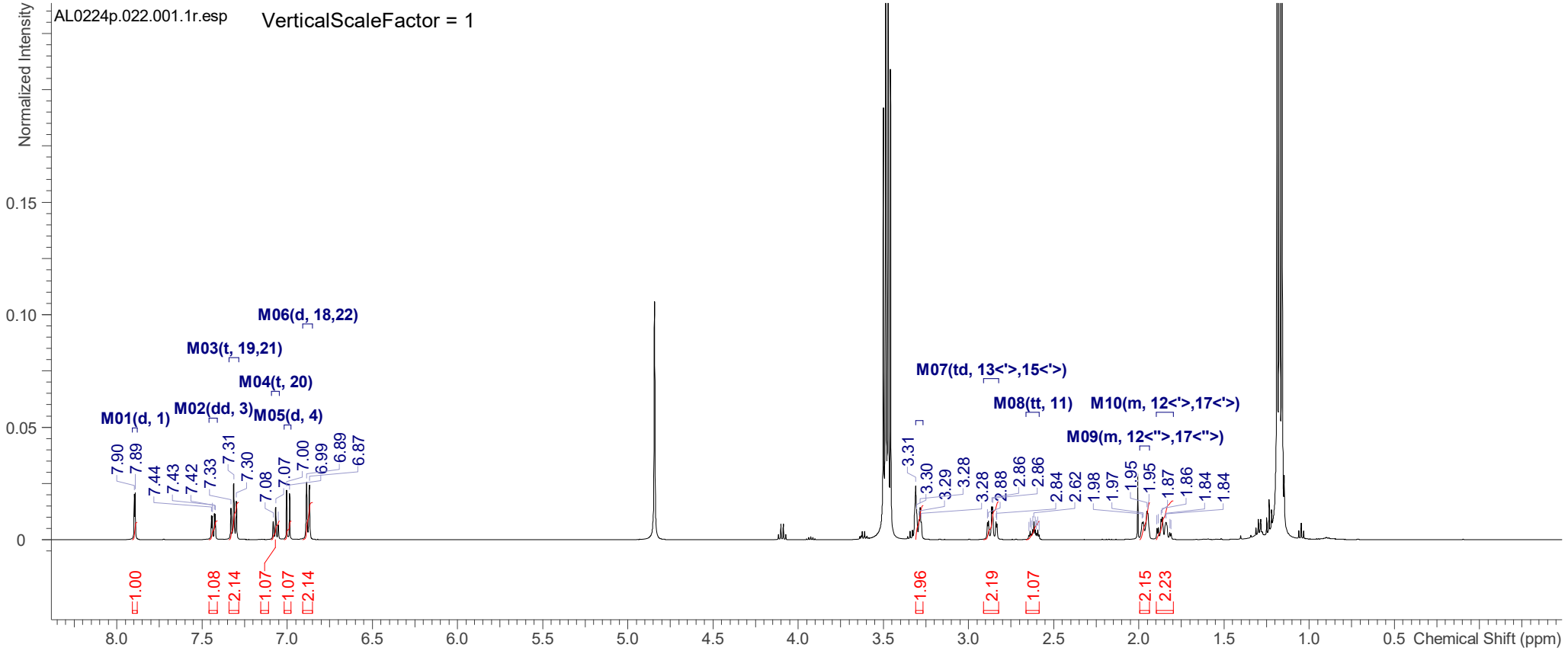
**Compound 7a**

1/27/2022 8:49:51 AM

***Multiplets Integrals Sum*** 18.11 ***Number of Nuclei*** 17 H's / 19 H's (spectrum / structure)

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.89 (1 H, d, J = 2.44 Hz), 7.43 (1 H, dd, J = 8.77, 2.52 Hz), 7.31 (2 H, t, J = 7.86 Hz), 7.07 (1 H, t, J = 7.32 Hz), 6.99 (1 H, d, J = 8.85 Hz), 6.88 (2 H, d, J = 8.54 Hz), 3.31 – 3.27 (2 H, m), 2.86 (2 H, m), 2.62 (1 H, m), 1.99 – 1.94 (2 H, m), 1.90 – 1.80 (2 H, m);



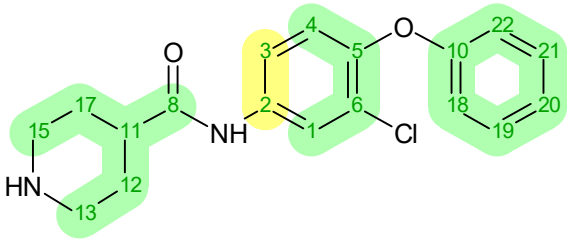

L:\NMR500\data\ddop\nmr\AL0224p\AL0224p.022.001.1r.esp

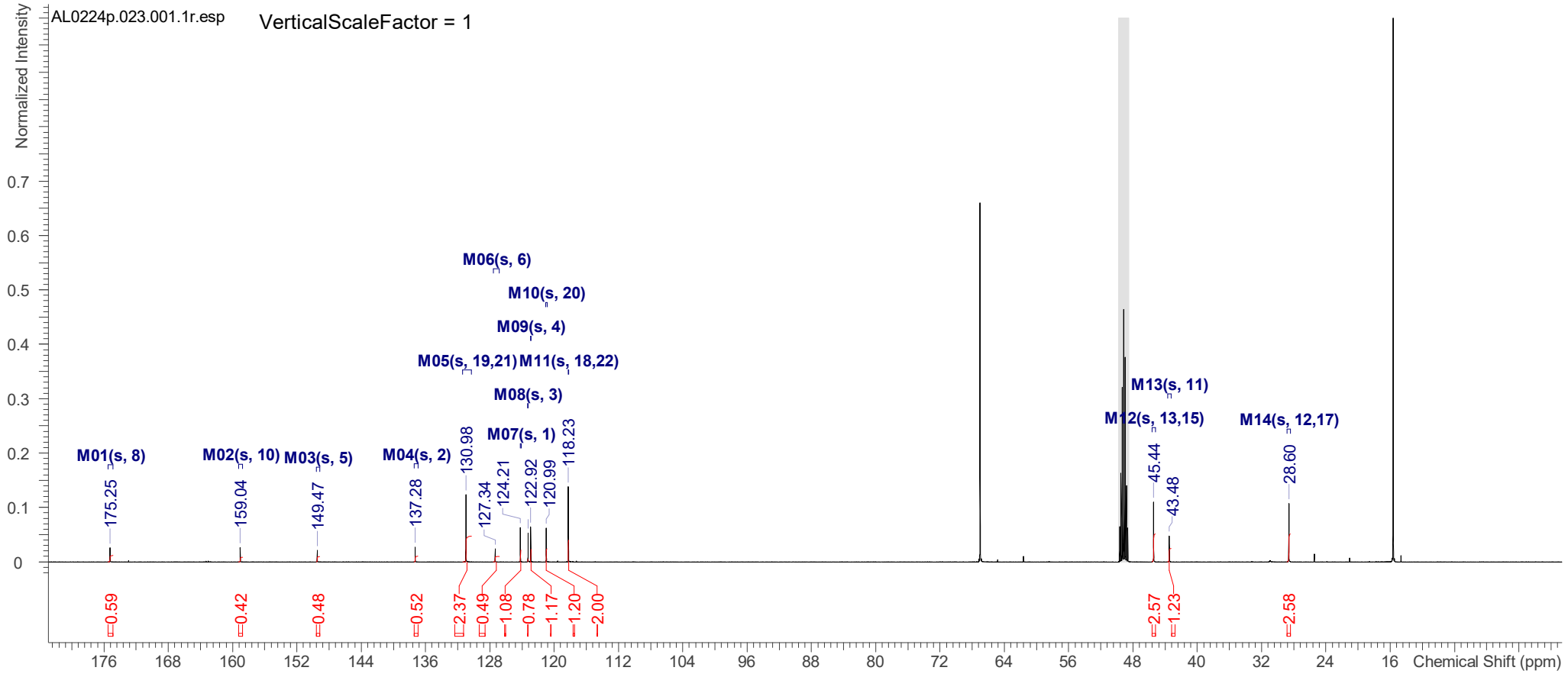
**Compound 7a**

1/27/2022 8:49:59 AM

| ***Number of Nuclei*** | 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 17.48 |
|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 175.3 (1 C, s), 159.0 (1 C, s), 149.5 (1 C, s), 137.3 (1 C, s), 131.0 (2 C, s), 127.3 (1 C, s), 124.2 (1 C, s), 123.3 (1 C, s), 122.9 (1 C, s), 121.0 (1 C, s), 118.2 (2 C, s), 45.4 (2 C, s), 43.5 (1 C, s), 28.6 (2 C, s).



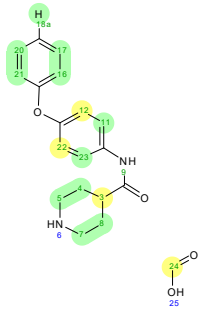



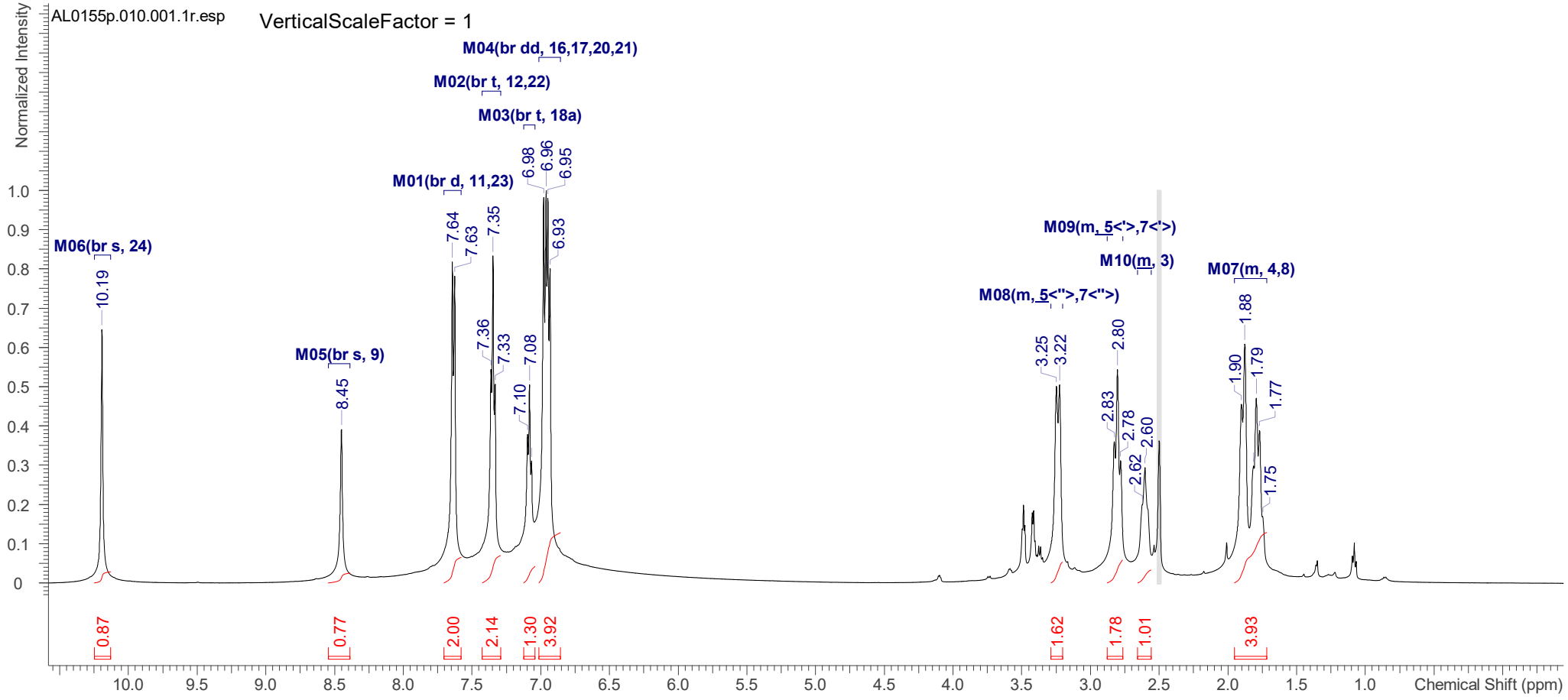

L:\NMR500\data\ddop\nmr\AL0224p\AL0224p.023.001.1r.esp

**Compound 7b**

12/10/2021 9:28:44 AM

$^1$H NMR (500 MHz, DMSO-$d_6$, ppm) δ= 10.19 (1 H, br s), 8.45 (1 H, br s), 7.63 (2 H, br d, J = 8.54 Hz), 7.35 (2 H, br t, J = 7.63 Hz), 7.08 (1 H, br t, J = 7.17 Hz), 6.96 (4 H, br dd, J = 14.80, 8.39 Hz), 3.24 (2 H, m), 2.80 (2 H, m), 2.61 (1 H, m), 1.95 – 1.72 (4 H, m);



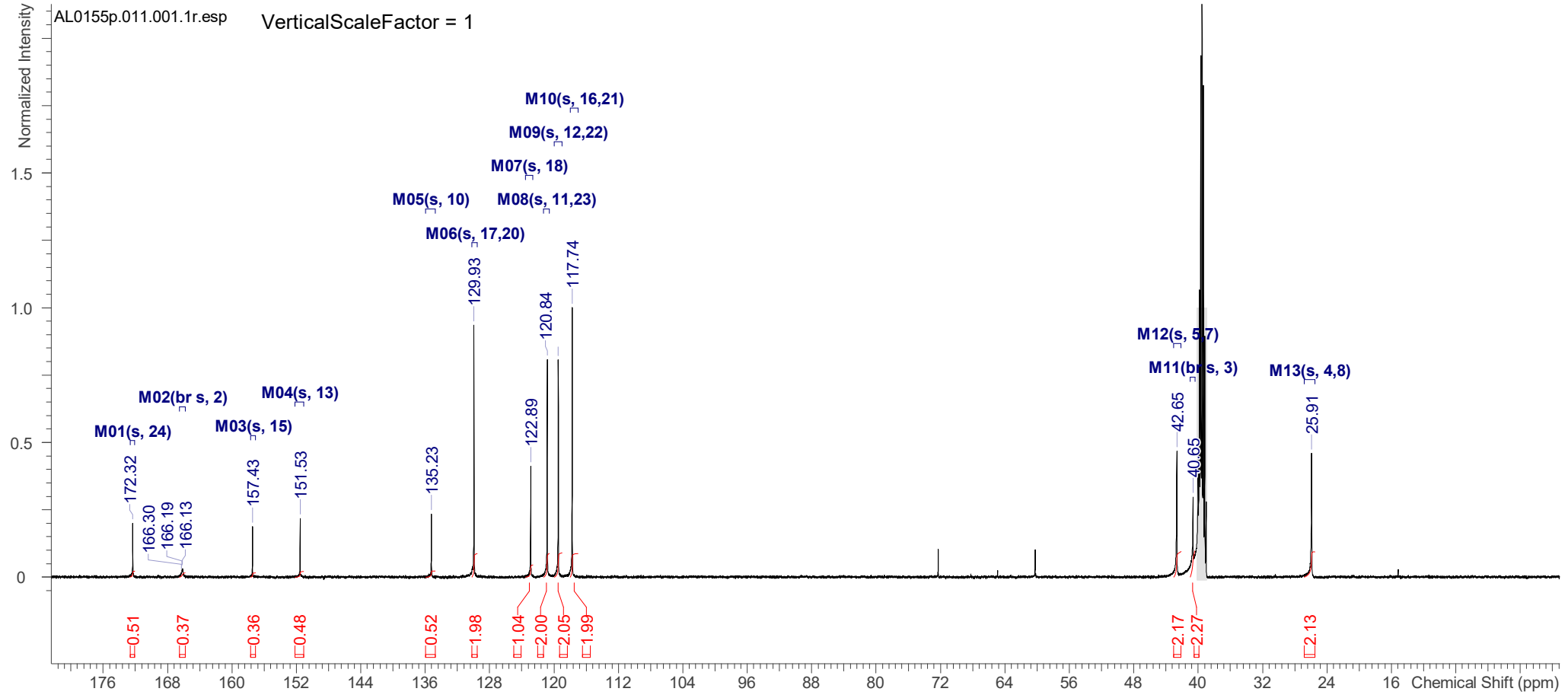



L:\NMR500\data\ddop\nmr\AL0155p\AL0155p.010.001.1r.esp

**Compound 7b**

12/10/2021 9:28:51 AM

$^{13}$C NMR (126 MHz, DMSO-$d_6$, ppm) δ= 172.3 (1 C, s), 166.2 (1 C, br s), 157.4 (1 C, s), 151.5 (1 C, s), 135.2 (1 C, s), 129.9 (2 C, s), 122.9 (1 C, s), 120.8 (2 C, s), 119.5 (2 C, s), 117.7 (2 C, s), 42.7 (2 C, s), 40.7 (1 C, br s), 25.9 (2 C, s).



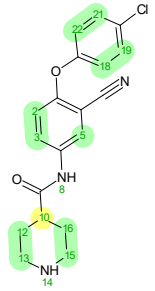

L:\NMR500\data\ddop\nmr\AL0155p\AL0155p.011.001.1r.esp

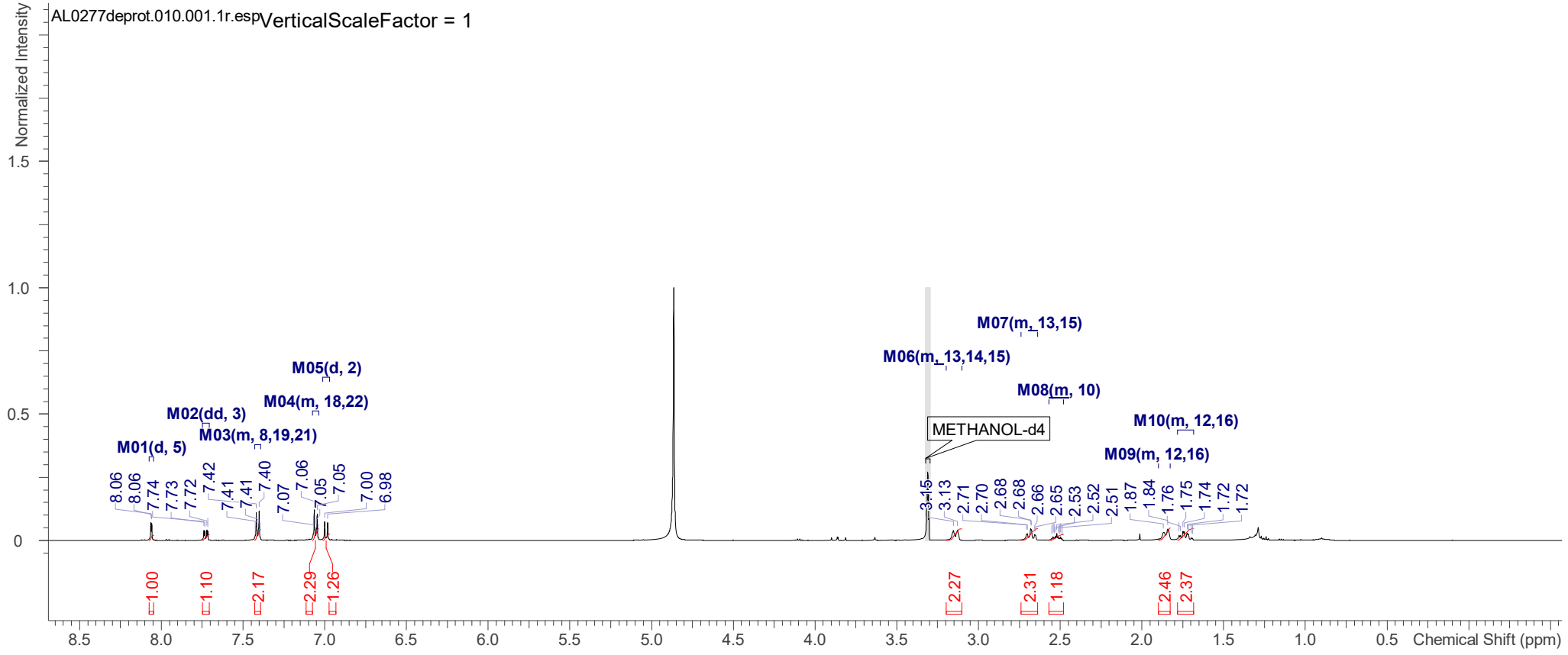
**Compound 7c**

4/9/2022 2:27:53 PM

| | |
|---|---|
| ***Number of Nuclei*** 16 H's / 18 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 18.42 |

$^1$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.06 (1 H, d, J = 2.59 Hz), 7.73 (1 H, dd, J = 9.16, 2.59 Hz), 7.43 – 7.39 (2 H, m), 7.08 – 7.04 (2 H, m), 6.99 (1 H, d, J = 9.00 Hz), 3.14 (2 H, m), 2.68 (2 H, m), 2.52 (1 H, m), 1.85 (2 H, m), 1.78 – 1.68 (2 H, m);

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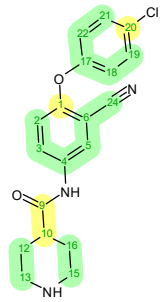
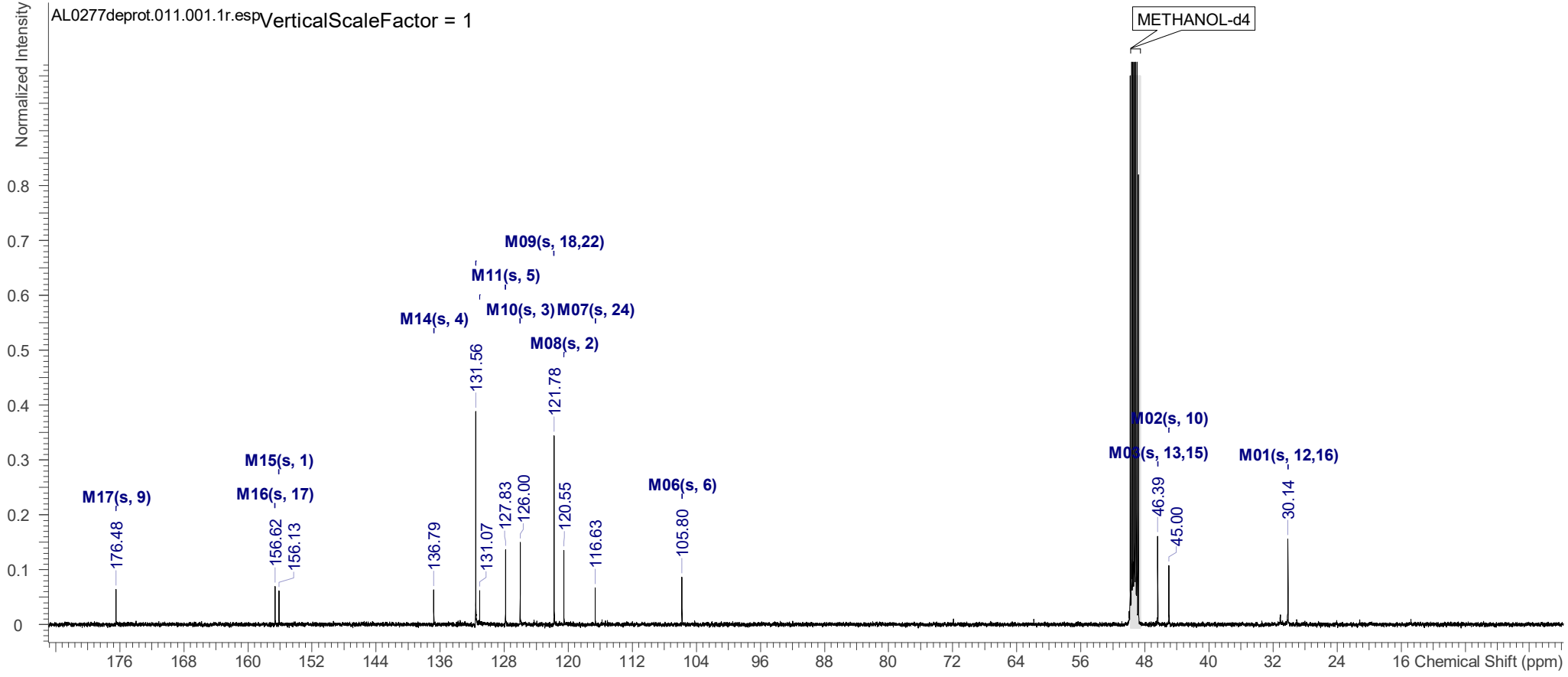
**Compound 7c**

4/9/2022 2:27:56 PM

| ***Number of Nuclei*** | 19 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 176.5 (1 C, s), 156.6 (1 C, s), 156.1 (1 C, s), 136.8 (1 C, s), 131.6 (2 C, s), 131.1 (1 C, s), 127.8 (1 C, s), 126.0 (1 C, s), 121.8 (2 C, s), 120.6 (1 C, s), 116.6 (1 C, s), 105.8 (1 C, s), 46.4 (2 C, s), 45.0 (1 C, s), 30.1 (2 C, s).

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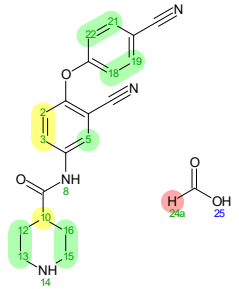
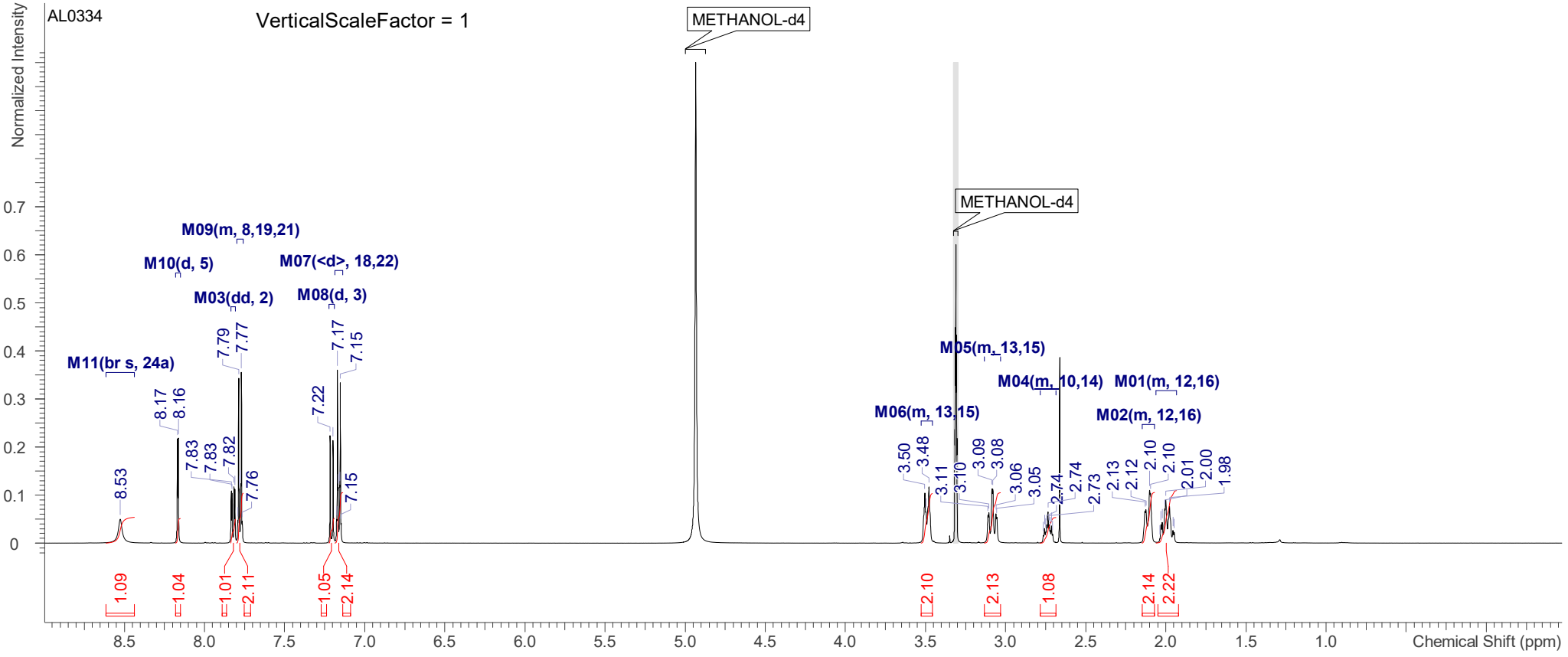
**Compound 7d**

4/29/2022 9:05:07 AM

| ***Number of Nuclei*** | 17 H's / 20 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 18.12 |
|---|---|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.53 (1 H, br s), 8.17 (1 H, d, J = 2.59 Hz), 7.82 (1 H, dd, J = 9.00, 2.59 Hz), 7.80 – 7.76 (2 H, m), 7.21 (1 H, d, J = 9.00 Hz), 7.16 (2 H, d, J = 7.86 Hz), 3.53 – 3.46 (2 H, m), 3.08 (2 H, m), 2.74 (1 H, m), 2.15 – 2.07 (2 H, m), 2.06 – 1.93 (2 H, m);





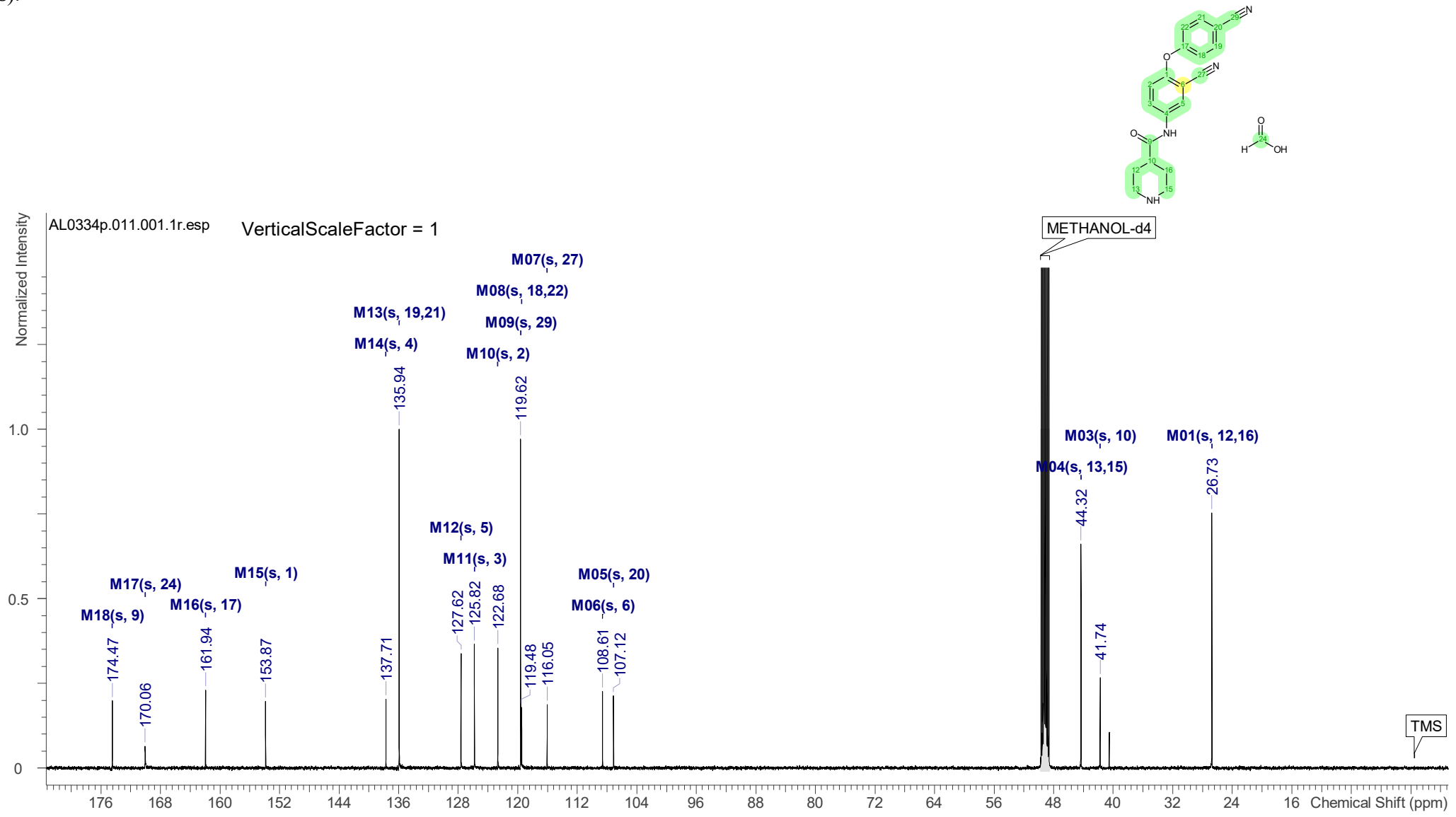

AL0334

**Compound 7d**

4/29/2022 9:05:11 AM

| ***Number of Nuclei*** | 21 C's / 21 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 174.5 (1 C, s), 170.1 (1 C, s), 161.9 (1 C, s), 153.9 (1 C, s), 137.7 (1 C, s), 135.9 (2 C, s), 127.6 (1 C, s), 125.8 (1 C, s), 122.7 (1 C, s), 119.6 (1 C, s), 119.5 (2 C, s), 116.1 (1 C, s), 108.6 (1 C, s), 107.1 (1 C, s), 44.3 (2 C, s), 41.7 (1 C, s), 26.7 (2 C, s).

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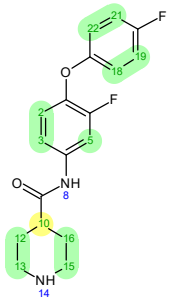
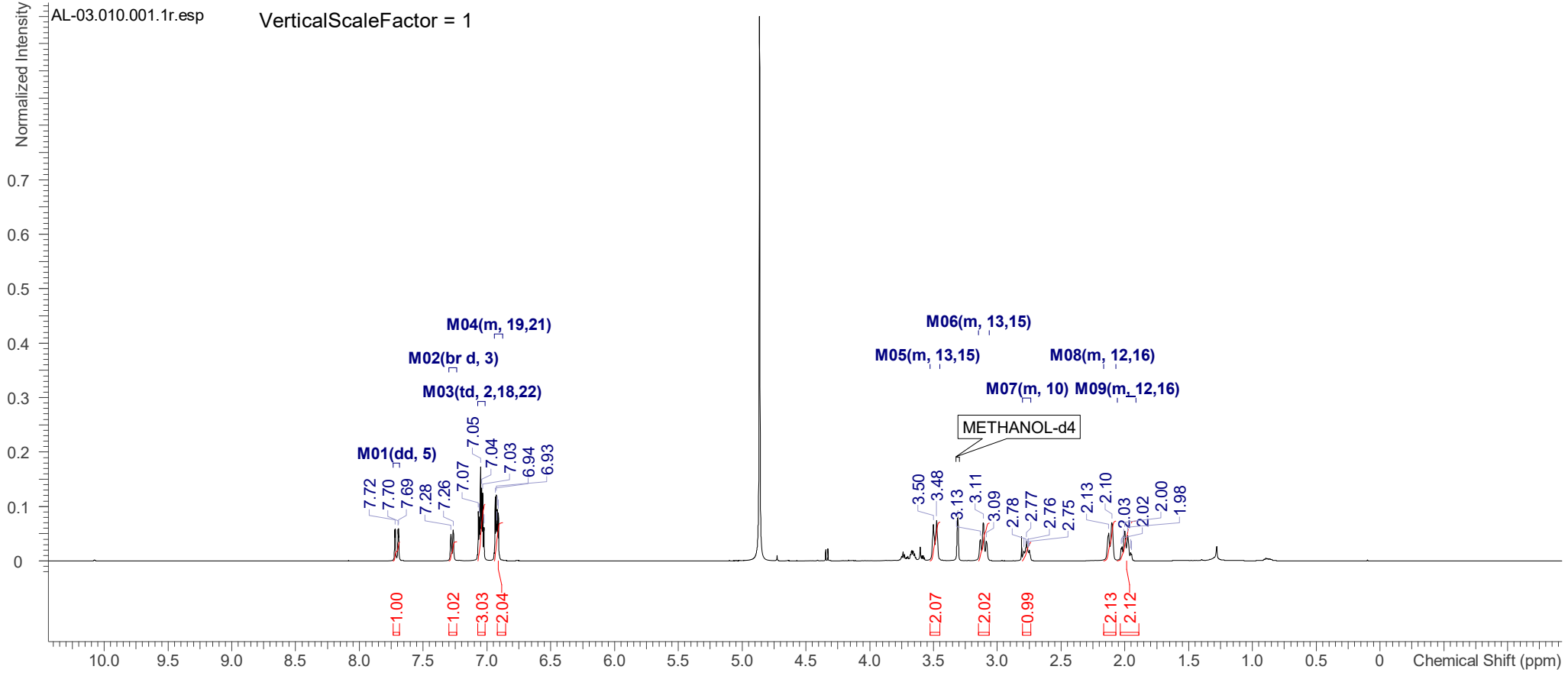
**Compound 7e**

4/2/2024 10:02:03 AM

| ***Number of Nuclei*** 16 H's / 18 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 16.42 |
|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.71 (1 H, dd, J = 12.89, 2.21 Hz), 7.27 (1 H, br d, J = 8.70 Hz), 7.05 (3 H, td, J = 8.77, 4.43 Hz), 6.94 – 6.88 (2 H, m), 3.49 (2 H, m), 3.11 (2 H, m), 2.80 – 2.74 (1 H, m), 2.11 (2 H, m), 2.06 – 1.91 (2 H, m);



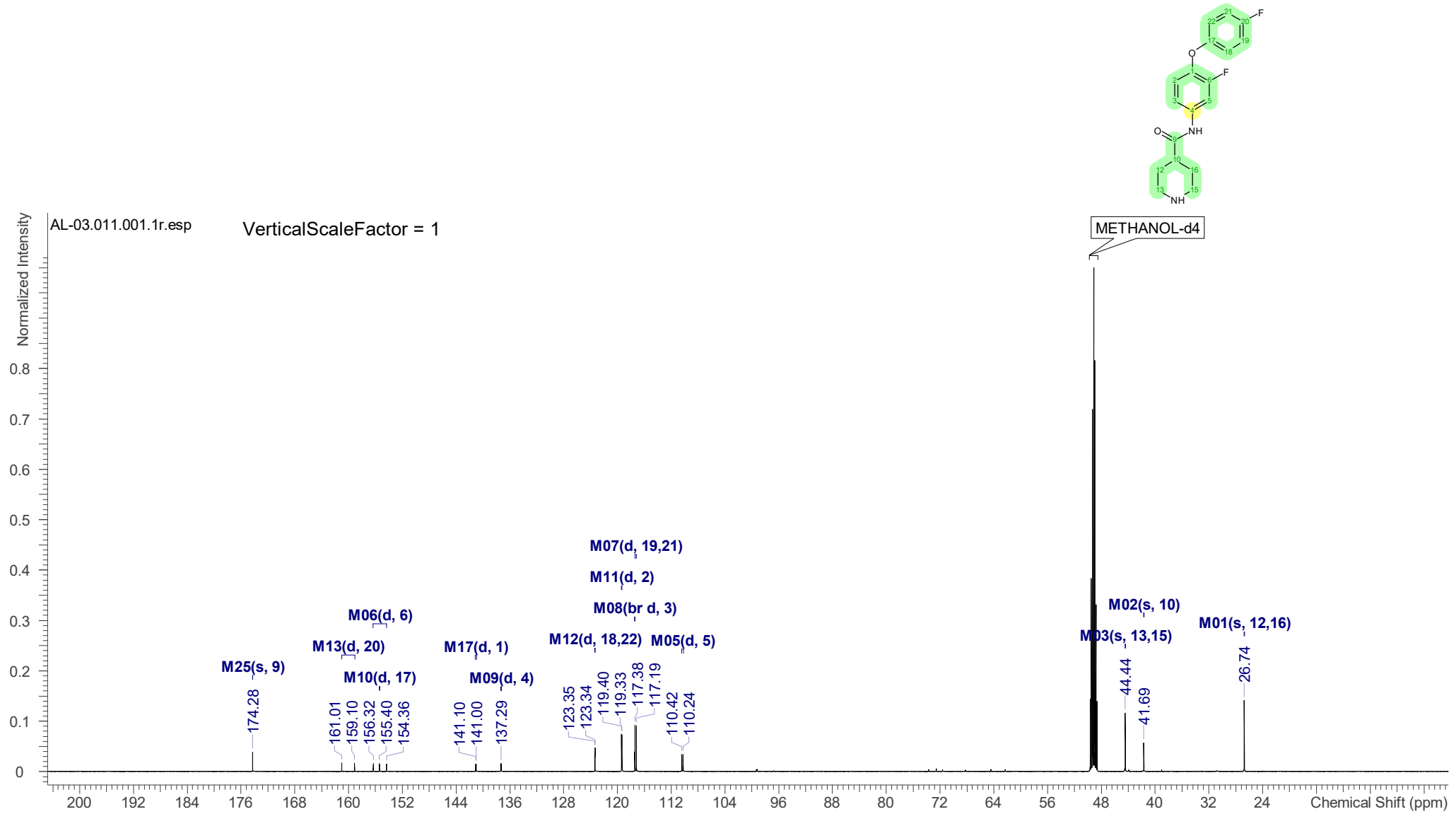

AL-03.010.001.1r.esp

**Compound 7e**

4/2/2024 10:02:07 AM

| ***Number of Nuclei*** | 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 26.7 (2 C, s), 41.7 (1 C, s), 44.4 (2 C, s), 110.3 (1 C, d, J = 22.98 Hz), 117.3 (2 C, d, J = 23.90 Hz), 117.4 (1 C, br d, J = 3.68 Hz), 119.4 (1 C, d, J = 8.27 Hz), 123.3 (2 C, d, J = 1.84 Hz), 137.3 (1 C, d, J = 9.19 Hz), 141.1 (1 C, d, J = 11.95 Hz), 155.3 (1 C, d, J = 246.35 Hz), 155.4 (1 C, d, J = 1.84 Hz), 160.1 (1 C, d, J = 239.91 Hz), 174.3 (1 C, s);



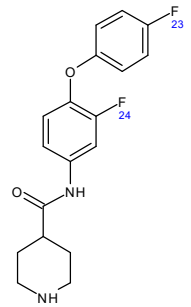

AL-03.011.001.1r.esp

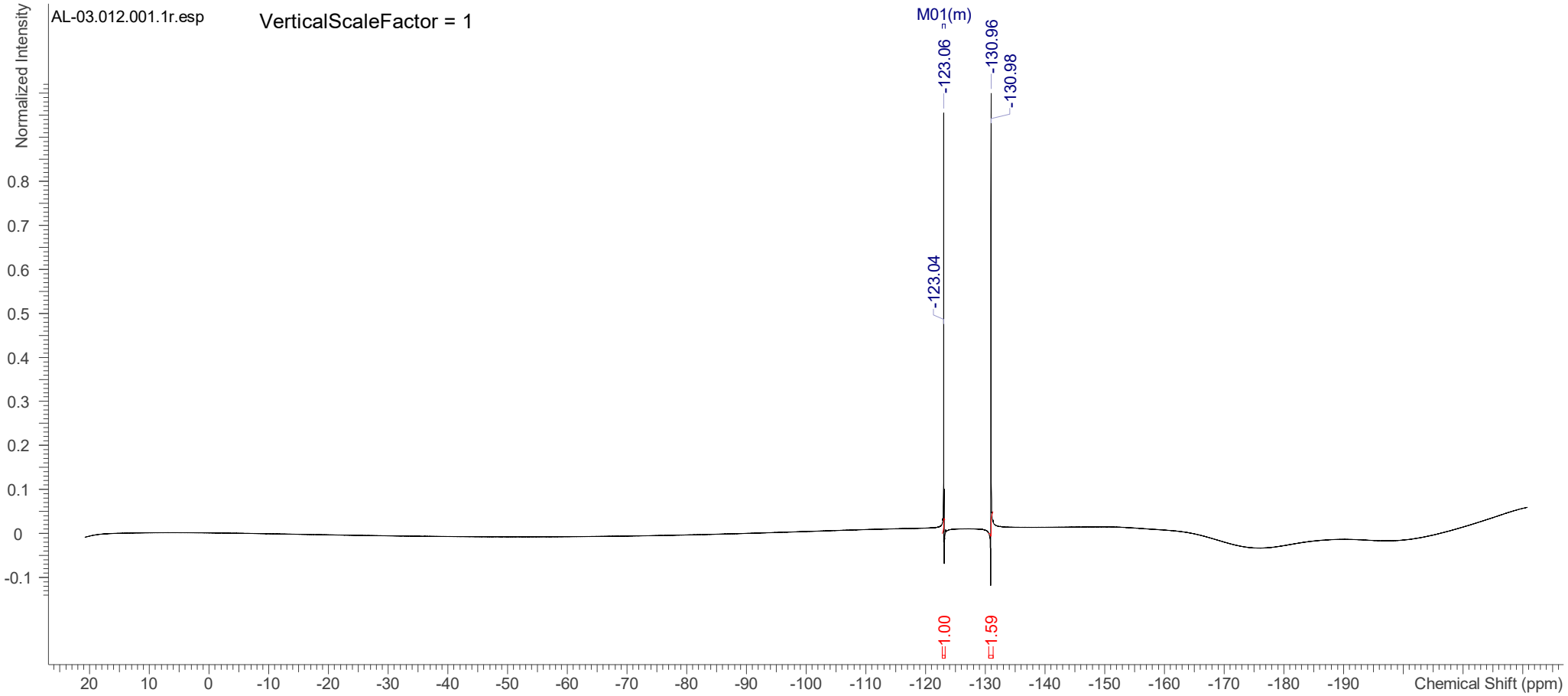
**Compound 7e**

4/2/2024 10:02:11 AM

| ***Number of Nuclei*** 2 F's / 2 F's (spectrum / structure) | ***Multiplets Integrals Sum*** 2.59 |
|---|---|

$^{19}$F NMR (470 MHz, METHANOL-$d_4$, ppm) δ= -130.9 (1 F, br dd, J = 12.14, 8.67 Hz), -123.2 – -122.8 (1 F, m).



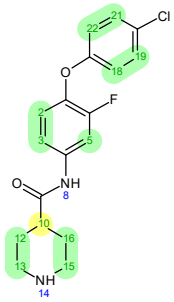

AL-03.012.001.1r.esp

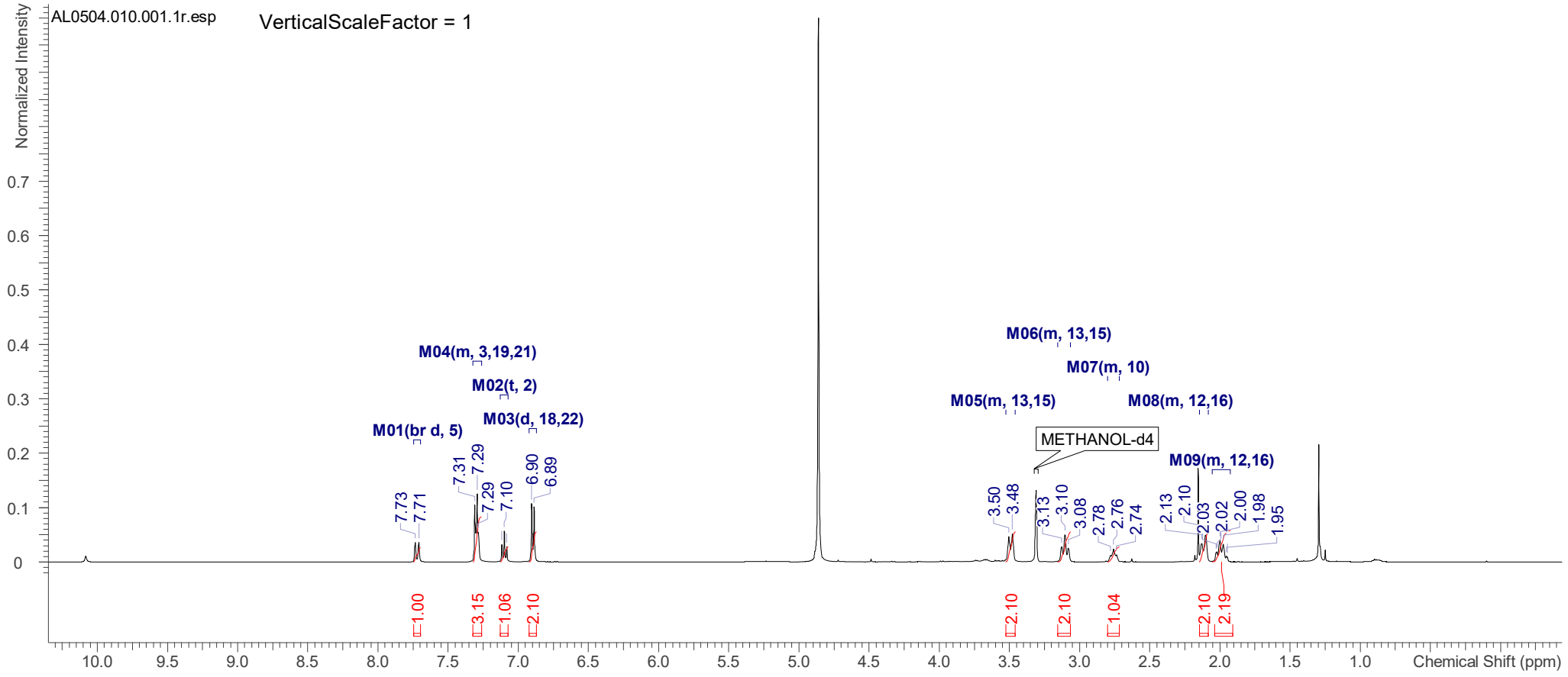
**Compound 7f**

4/2/2024 10:02:31 AM

***Multiplets Integrals Sum*** 16.85 ***Number of Nuclei*** 16 H's / 18 H's (spectrum / structure)

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.72 (1 H, br d, J = 12.66 Hz), 7.32 – 7.26 (3 H, m), 7.10 (1 H, t, J = 8.85 Hz), 6.90 (2 H, d, J = 8.70 Hz), 3.49 (2 H, m), 3.10 (2 H, m), 2.76 (1 H, m), 2.12 (2 H, m), 2.05 – 1.92 (2 H, m);



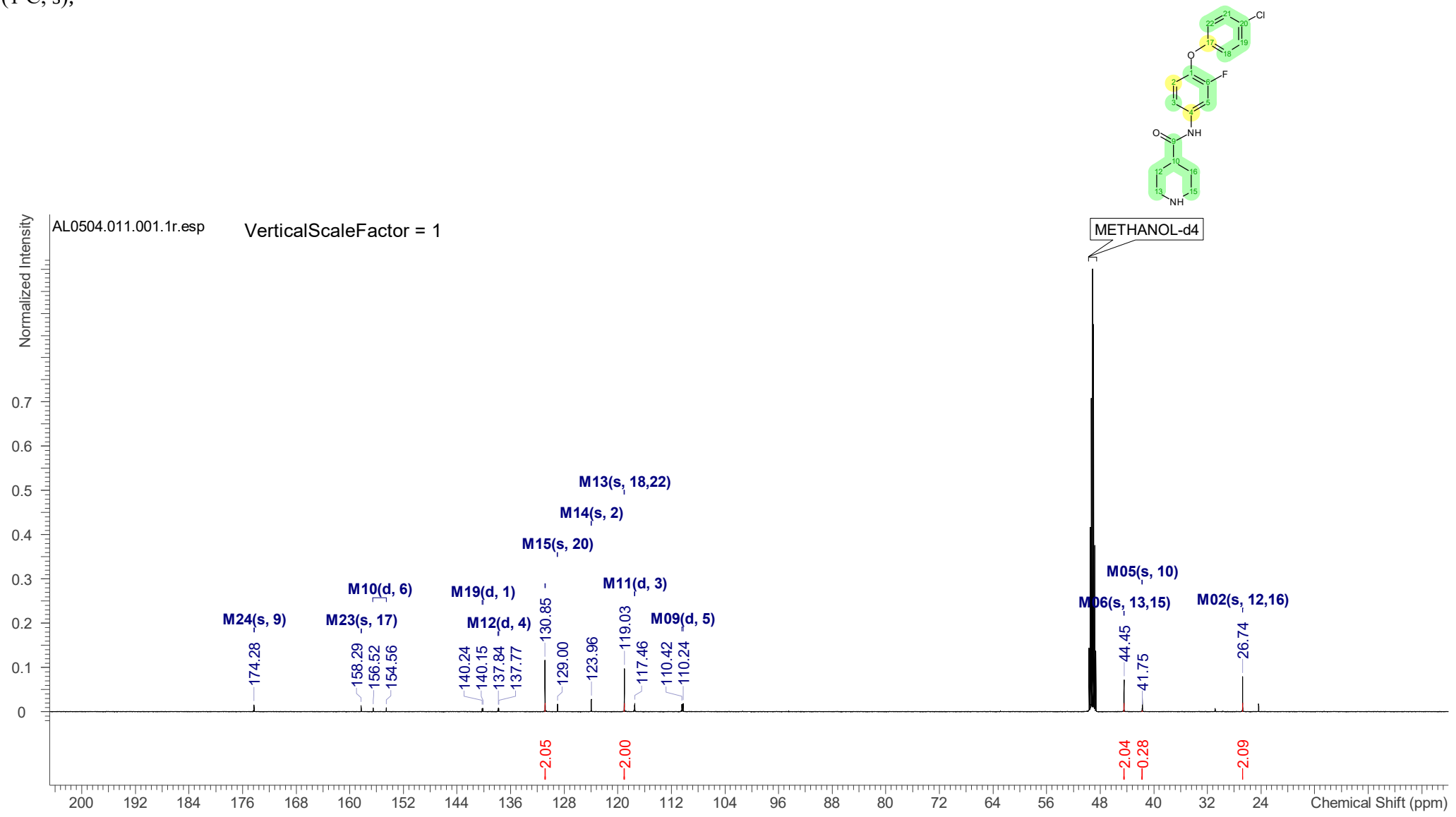

AL0504.010.001.1r.esp

**Compound 7f**

4/2/2024 10:02:34 AM

***Multiplets Integrals Sum*** 8.46 ***Number of Nuclei*** 18 C's / 18 C's (spectrum / structure)

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 26.7 (2 C, s), 41.8 (1 C, s), 44.5 (2 C, s), 110.3 (1 C, d, J = 22.98 Hz), 117.8 (1 C, d, J = 3.68 Hz), 119.0 (2 C, s), 124.0 (1 C, s), 129.0 (1 C, s), 130.9 (2 C, s), 137.8 (1 C, d, J = 9.19 Hz), 140.2 (1 C, d, J = 11.95 Hz), 155.5 (1 C, d, J = 247.27 Hz), 158.3 (1 C, s), 174.3 (1 C, s);



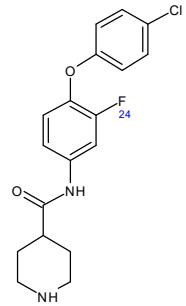

AL0504.011.001.1r.esp

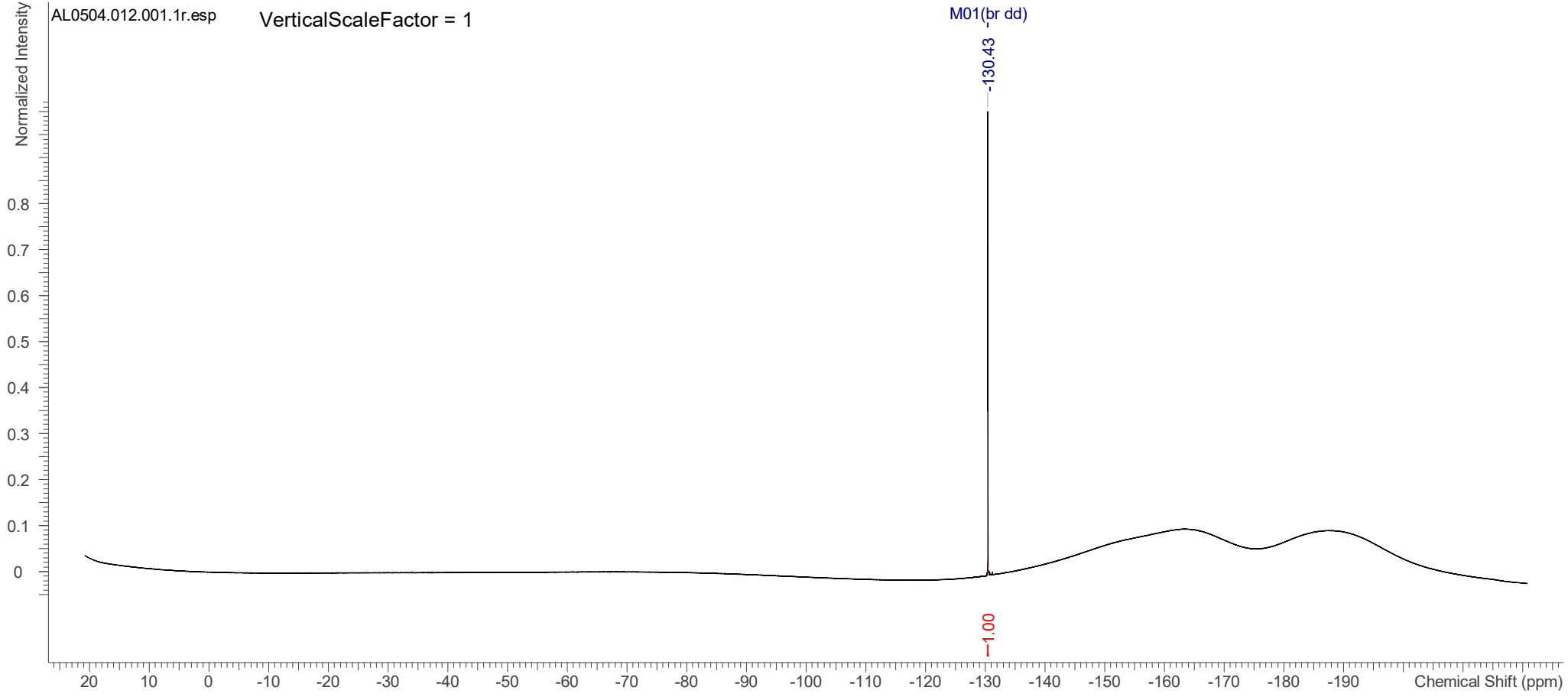
**Compound 7f**

4/2/2024 10:02:37 AM

| ***Number of Nuclei*** 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** 1.00 |
|---|---|

$^{19}$F NMR (470 MHz, METHANOL-$d_4$, ppm) δ= -130.4 (1 F, br dd, J = 12.14, 8.67 Hz).



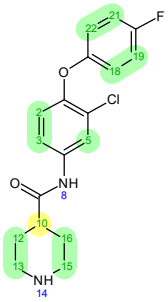

AL0504.012.001.1r.esp

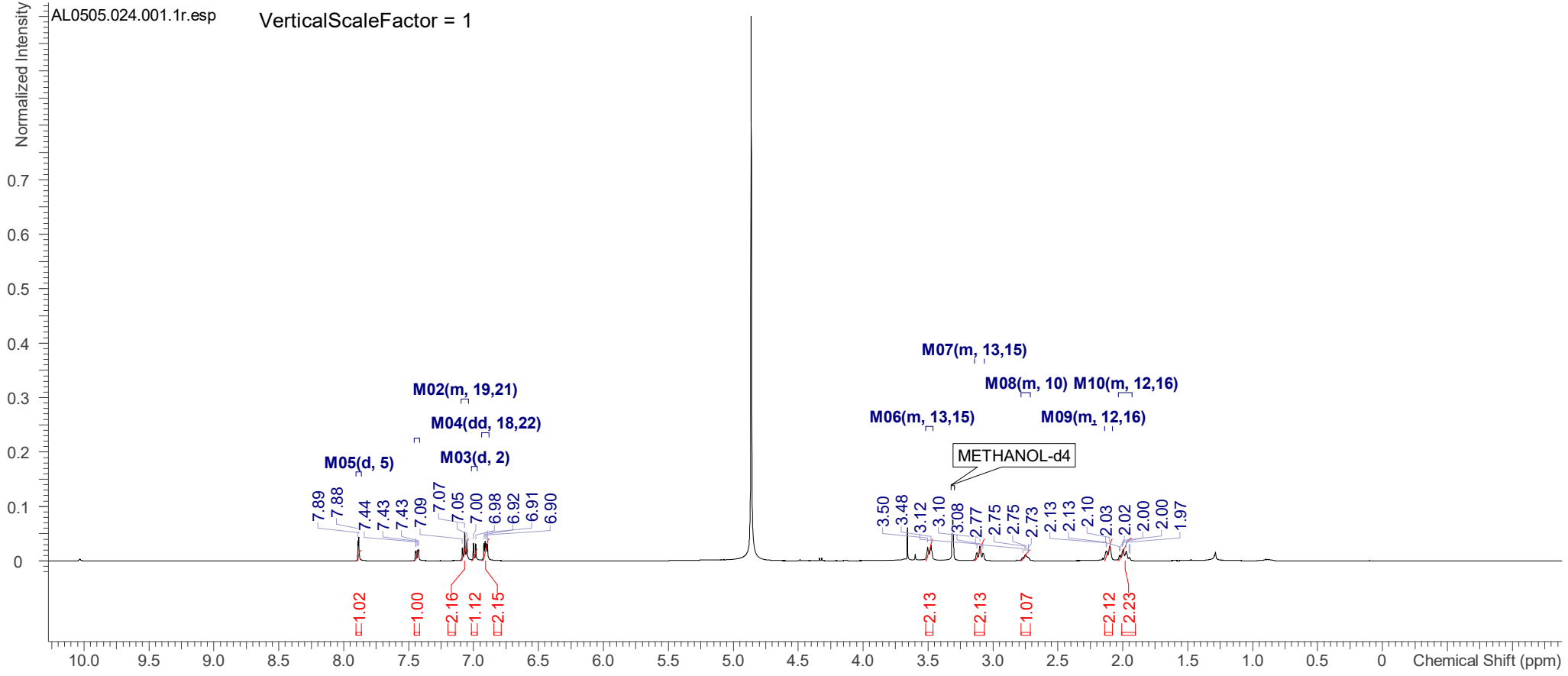
**Compound 7g**

4/2/2024 10:02:54 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 16 H's / 18 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 17.14 |

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.89 (1 H, d, J = 2.44 Hz), 7.44 (1 H, dd, J = 8.77, 2.21 Hz), 7.10 – 7.04 (2 H, m), 6.99 (1 H, d, J = 8.70 Hz), 6.91 (2 H, dd, J = 9.00, 4.27 Hz), 3.49 (2 H, m), 3.10 (2 H, m), 2.78 – 2.71 (1 H, m), 2.14 – 2.08 (2 H, m), 2.03 – 1.93 (2 H, m);



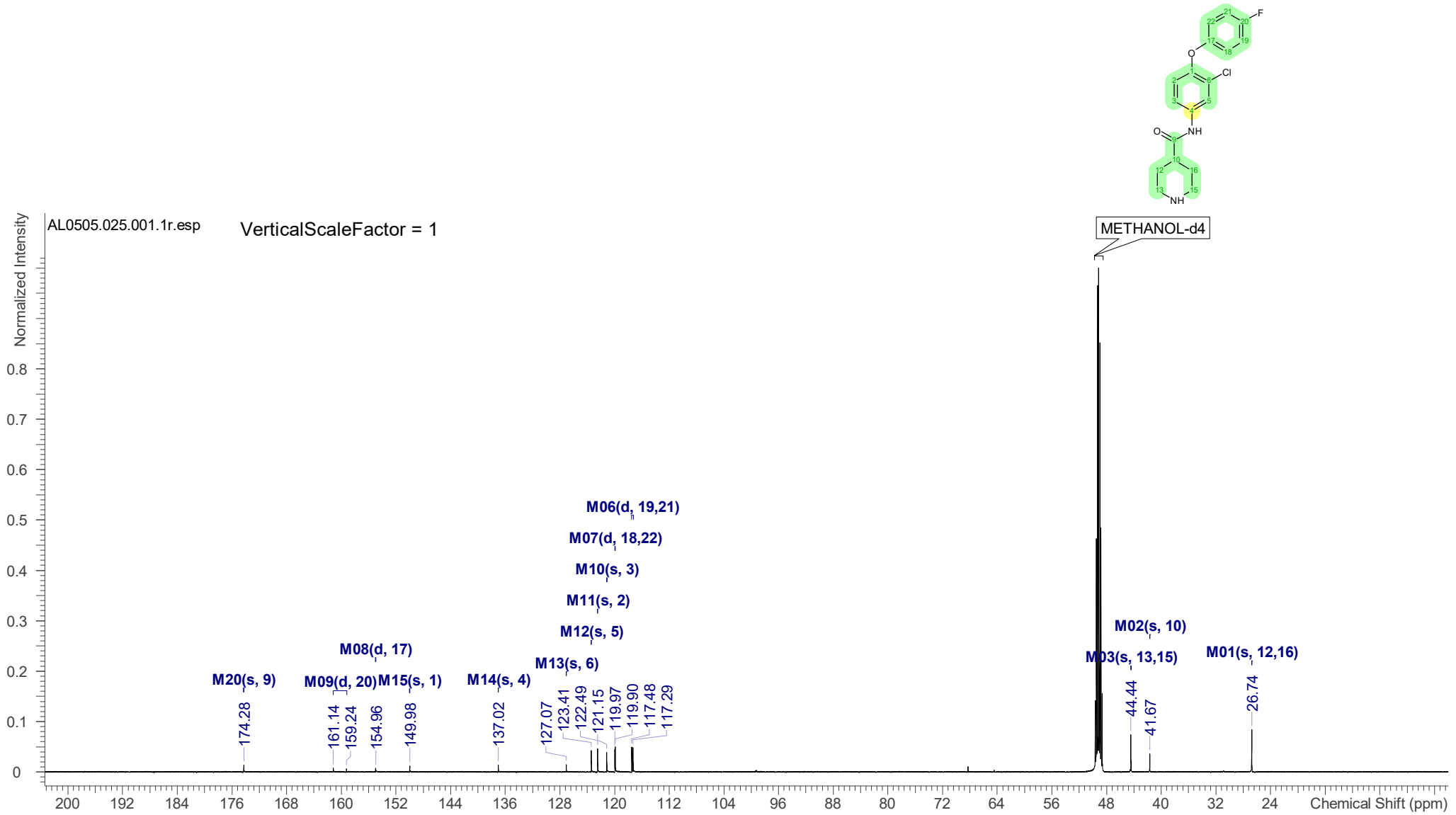

AL0505.024.001.1r.esp

**Compound 7g**

4/2/2024 10:02:58 AM

| ***Number of Nuclei*** | 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 26.7 (2 C, s), 41.7 (1 C, s), 44.4 (2 C, s), 117.4 (2 C, d, J = 23.90 Hz), 119.9 (2 C, d, J = 8.27 Hz), 121.2 (1 C, s), 122.5 (1 C, s), 123.4 (1 C, s), 127.1 (1 C, s), 137.0 (1 C, s), 150.0 (1 C, s), 155.0 (1 C, d, J = 1.84 Hz), 160.2 (1 C, d, J = 239.91 Hz), 174.3 (1 C, s);



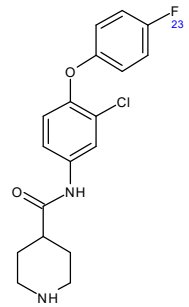

AL0505.025.001.1r.esp

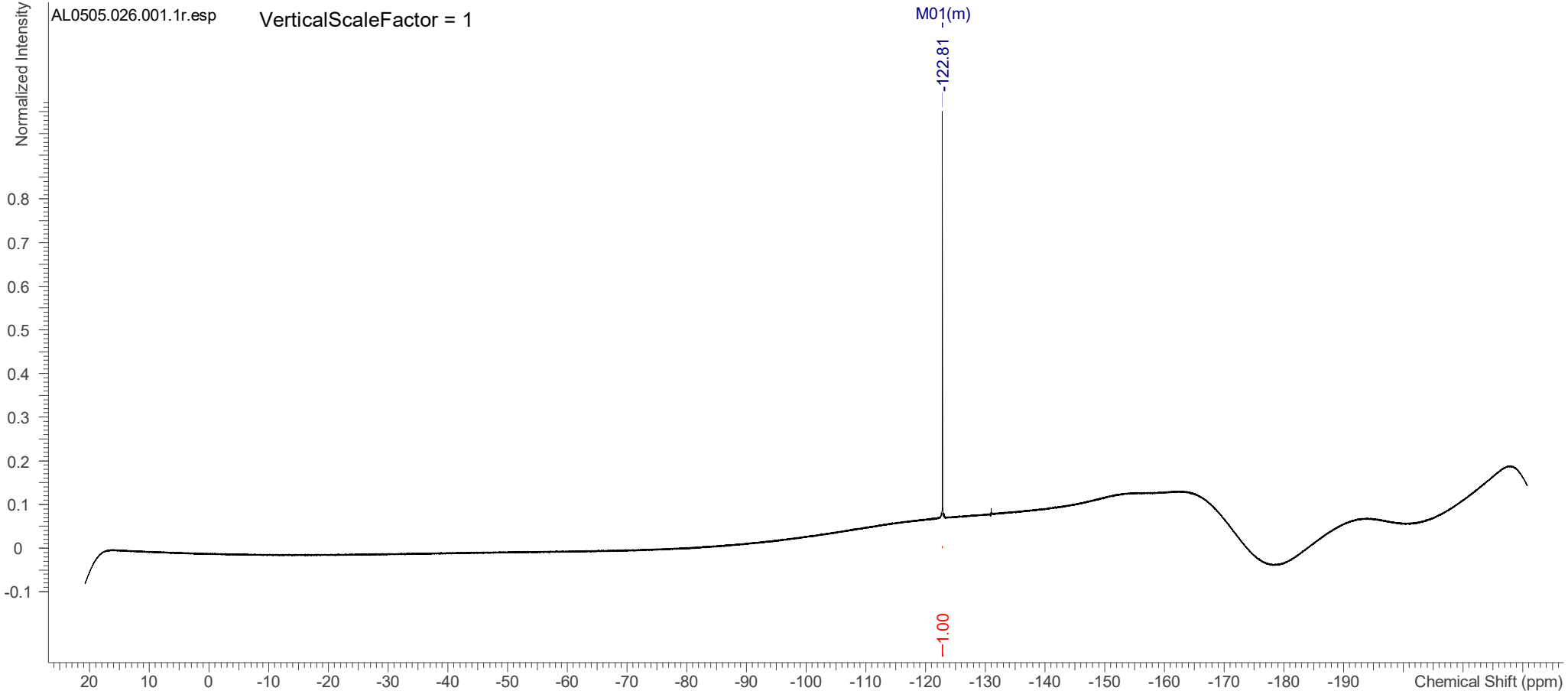
**Compound 7g**

4/2/2024 10:03:01 AM

| | |
|---|---|
| ***Number of Nuclei*** 1 F's / 1 F's (spectrum / structure) | ***Multiplets Integrals Sum*** 1.00 |

$^{19}$F NMR (470 MHz, METHANOL-$d_4$, ppm) δ= -122.8 – -122.7 (1 F, m).



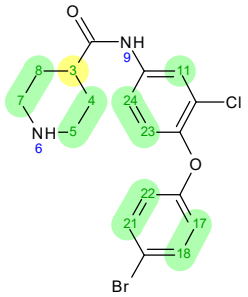

AL0505.026.001.1r.esp

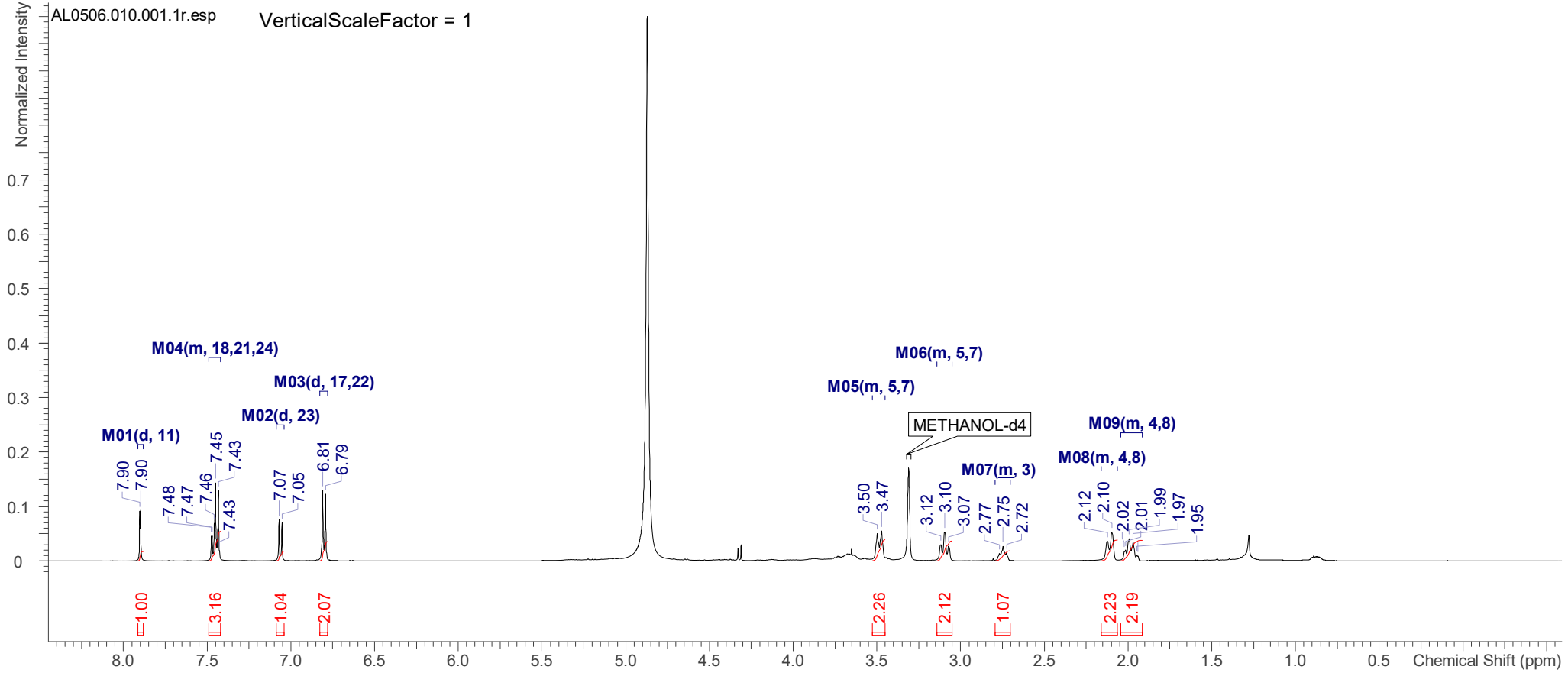
**Compound 7h**

7/25/2023 9:27:42 AM

***Multiplets Integrals Sum*** 17.14 ***Number of Nuclei*** 16 H's / 18 H's (spectrum / structure)

$^1$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.90 (1 H, d, J = 2.44 Hz), 7.49 – 7.42 (3 H, m), 7.06 (1 H, d, J = 8.85 Hz), 6.80 (2 H, d, J = 8.70 Hz), 3.48 (2 H, m), 3.09 (2 H, m), 2.75 (1 H, m), 2.11 (2 H, m), 2.04 – 1.91 (2 H, m);

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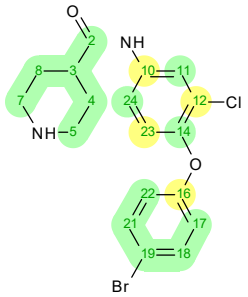
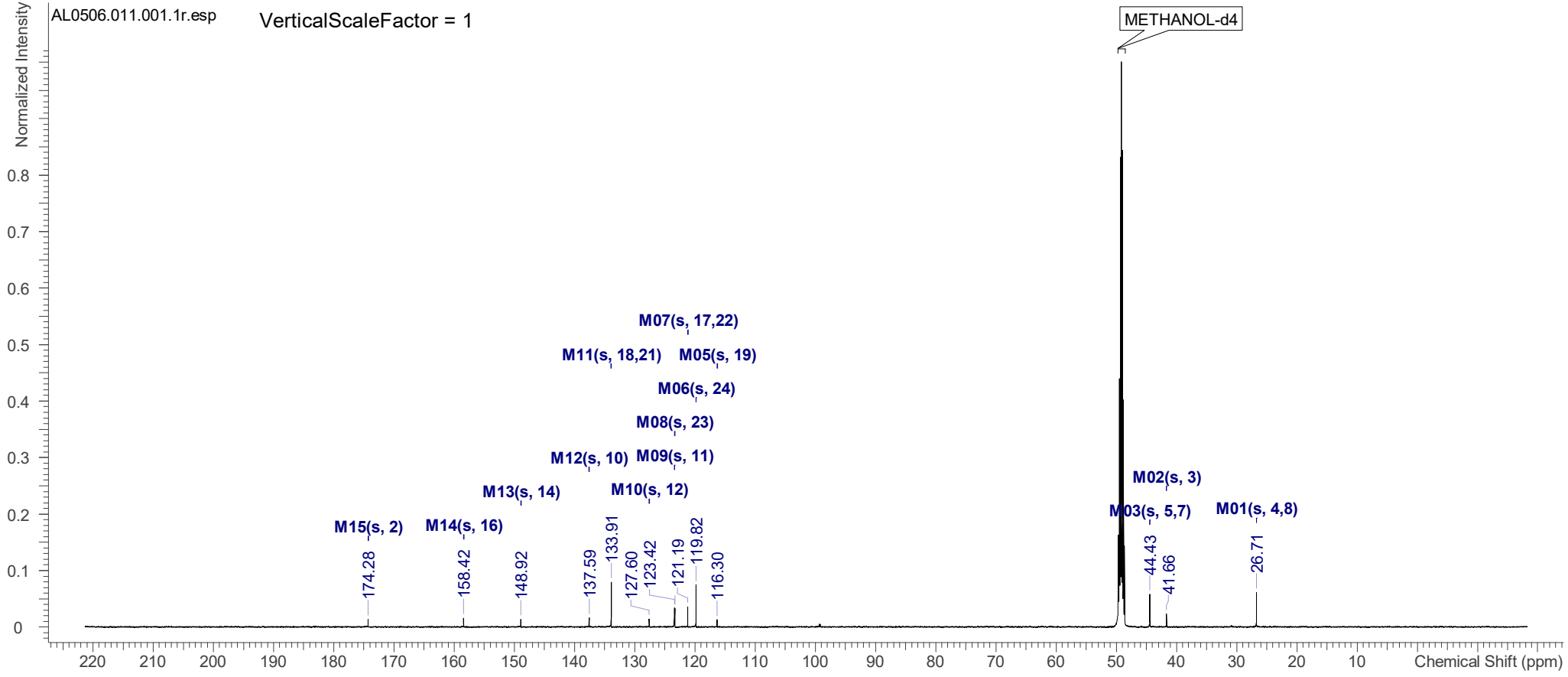
**Compound 7h**

7/25/2023 9:27:48 AM

| ***Number of Nuclei*** 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 174.3 (1 C, s), 158.4 (1 C, s), 148.9 (1 C, s), 137.6 (1 C, s), 133.9 (2 C, s), 127.6 (1 C, s), 123.4 (1 C, s), 123.4 (1 C, s), 121.2 (2 C, s), 119.8 (1 C, s), 116.3 (1 C, s), 44.4 (2 C, s), 41.7 (1 C, s), 26.7 (2 C, s).

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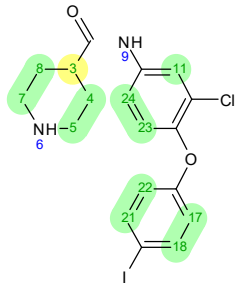
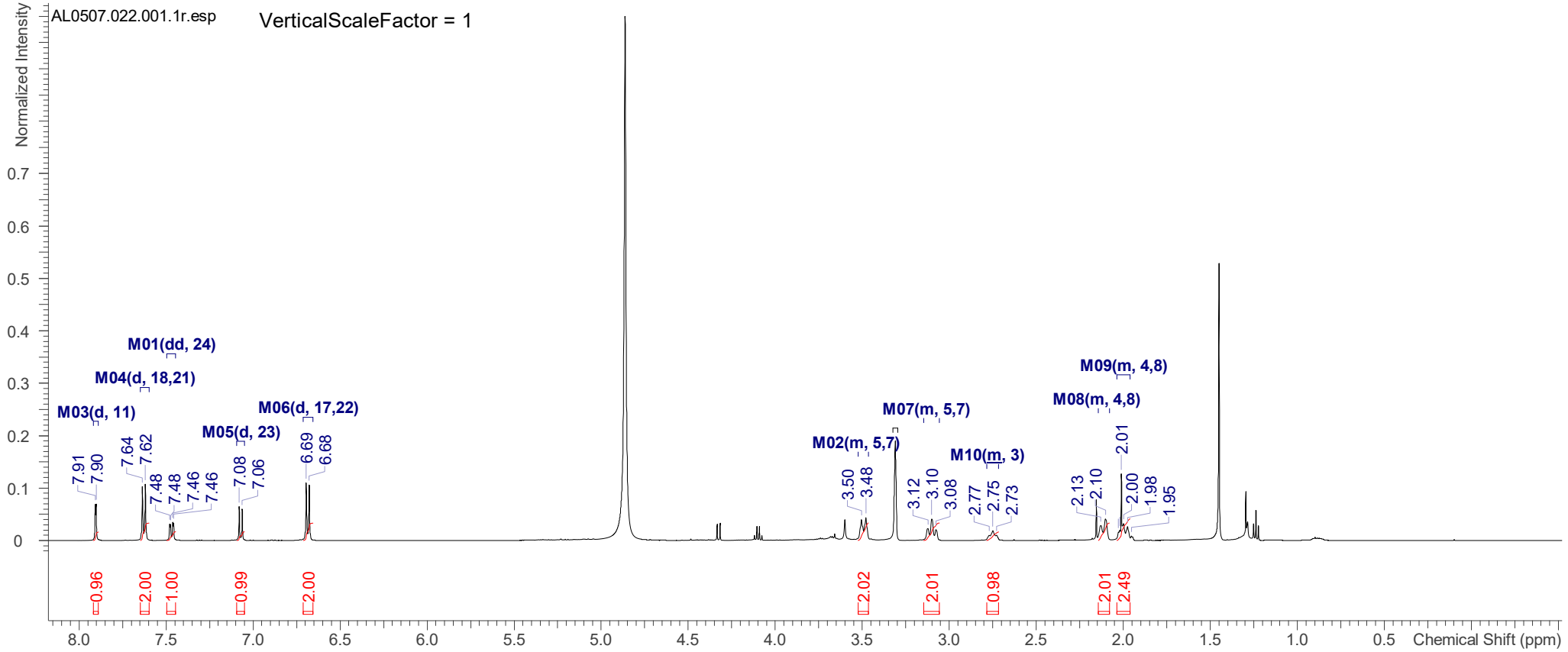
**Compound 7i**

7/25/2023 9:28:05 AM

***Multiplets Integrals Sum*** 16.45 ***Number of Nuclei*** 16 H's / 18 H's (spectrum / structure)

$^1$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.90 (1 H, d, J = 2.29 Hz), 7.63 (2 H, d, J = 8.70 Hz), 7.47 (1 H, dd, J = 8.85, 2.29 Hz), 7.07 (1 H, d, J = 8.85 Hz), 6.69 (2 H, d, J = 8.70 Hz), 3.49 (2 H, m), 3.10 (2 H, m), 2.75 (1 H, m), 2.12 (2 H, m), 2.04 – 1.96 (2 H, m);

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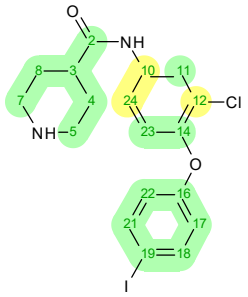
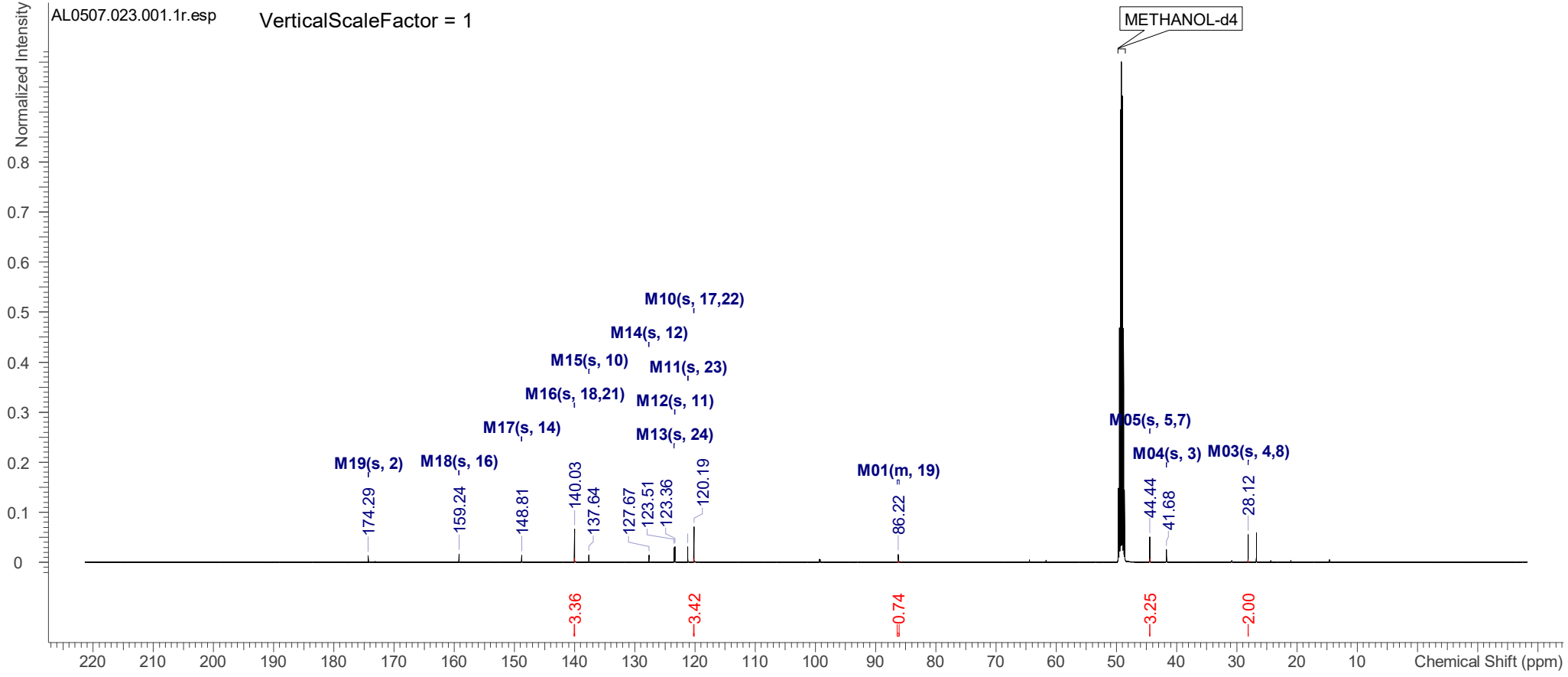
**Compound 7i**

7/25/2023 9:28:11 AM

| ***Number of Nuclei*** 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 12.77 |
|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 174.3 (1 C, s), 159.2 (1 C, s), 148.8 (1 C, s), 140.0 (2 C, s), 137.6 (1 C, s), 127.7 (1 C, s), 123.5 (1 C, s), 123.4 (1 C, s), 121.2 (1 C, s), 120.2 (2 C, s), 86.3 (1 C, s), 44.4 (2 C, s), 41.7 (1 C, s), 28.1 (2 C, s).

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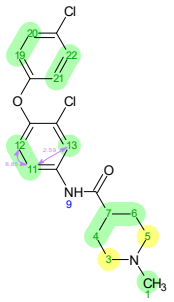
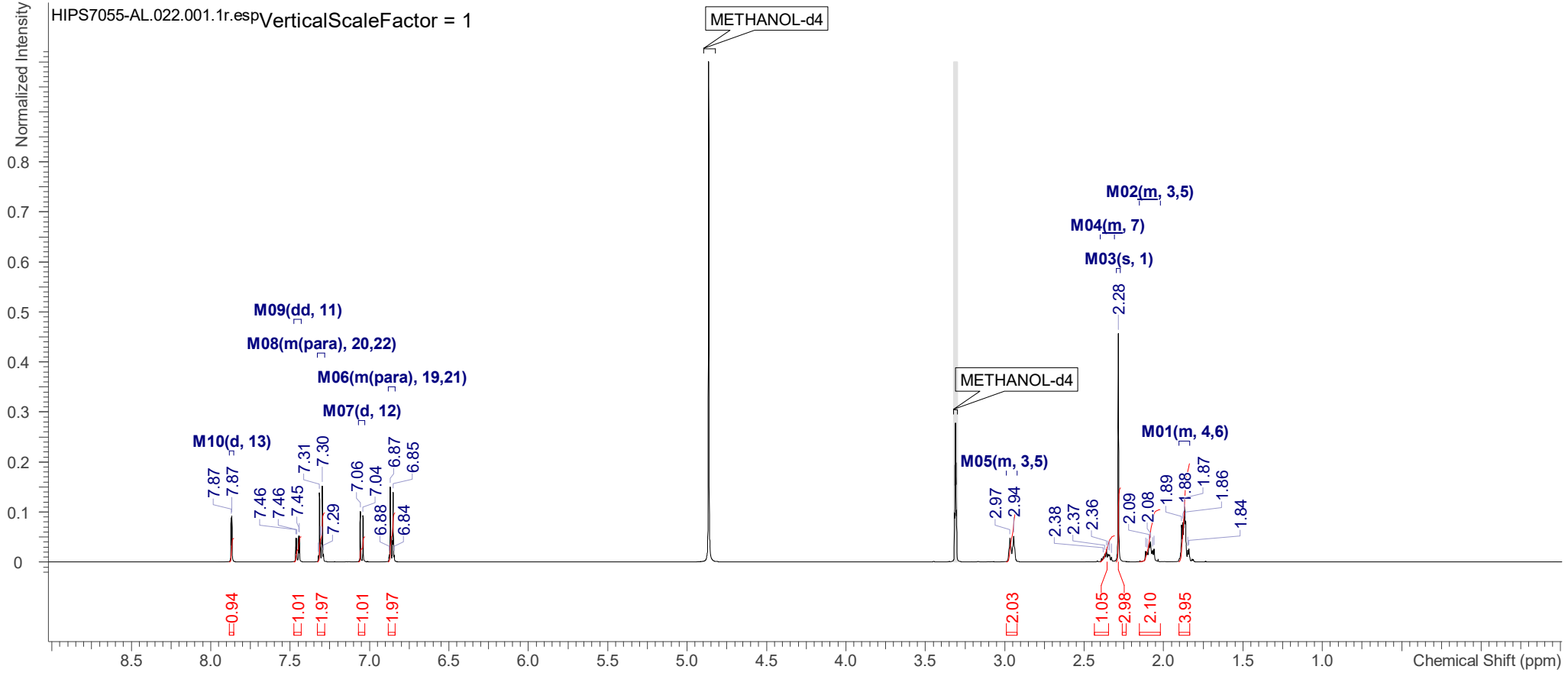
**Compound 8**

8/16/2022 10:15:54 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 19 H's / 20 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 19.02 |

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.87 (1 H, d, J = 2.59 Hz), 7.45 (1 H, dd, J = 8.85, 2.59 Hz), 7.33 – 7.28 (2 H, m), 7.05 (1 H, d, J = 8.85 Hz), 6.88 – 6.84 (2 H, m), 2.96 (2 H, m), 2.35 (1 H, m), 2.28 (3 H, s), 2.09 (2 H, m), 1.90 – 1.84 (4 H, m);

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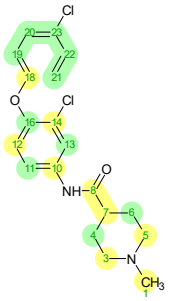
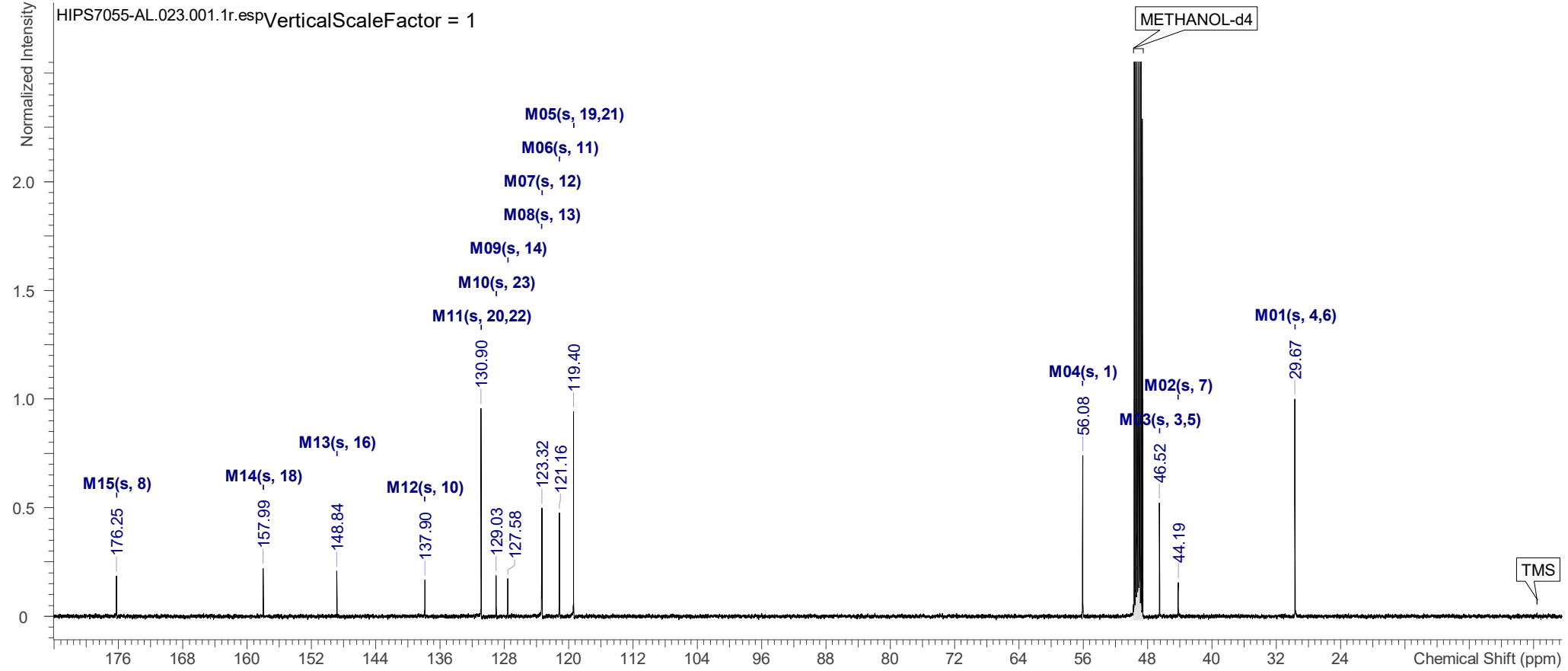
**Compound 8**

8/16/2022 10:15:59 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 17 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 176.3 (1 C, s), 158.0 (1 C, s), 148.8 (1 C, s), 137.9 (1 C, s), 130.9 (2 C, s), 129.0 (1 C, s), 127.6 (1 C, s), 123.4 (1 C, s), 123.3 (1 C, s), 121.2 (1 C, s), 119.4 (2 C, s), 56.1 (1 C, s), 46.5 (1 C, s), 44.2 (1 C, s), 29.7 (1 C, s).



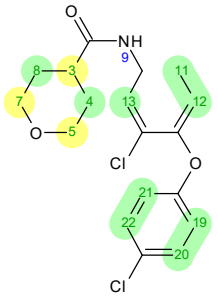

L:\NMR500\data\ddop\nmr\HIPS7055-AL\HIPS7055-AL.023.001.1r.esp

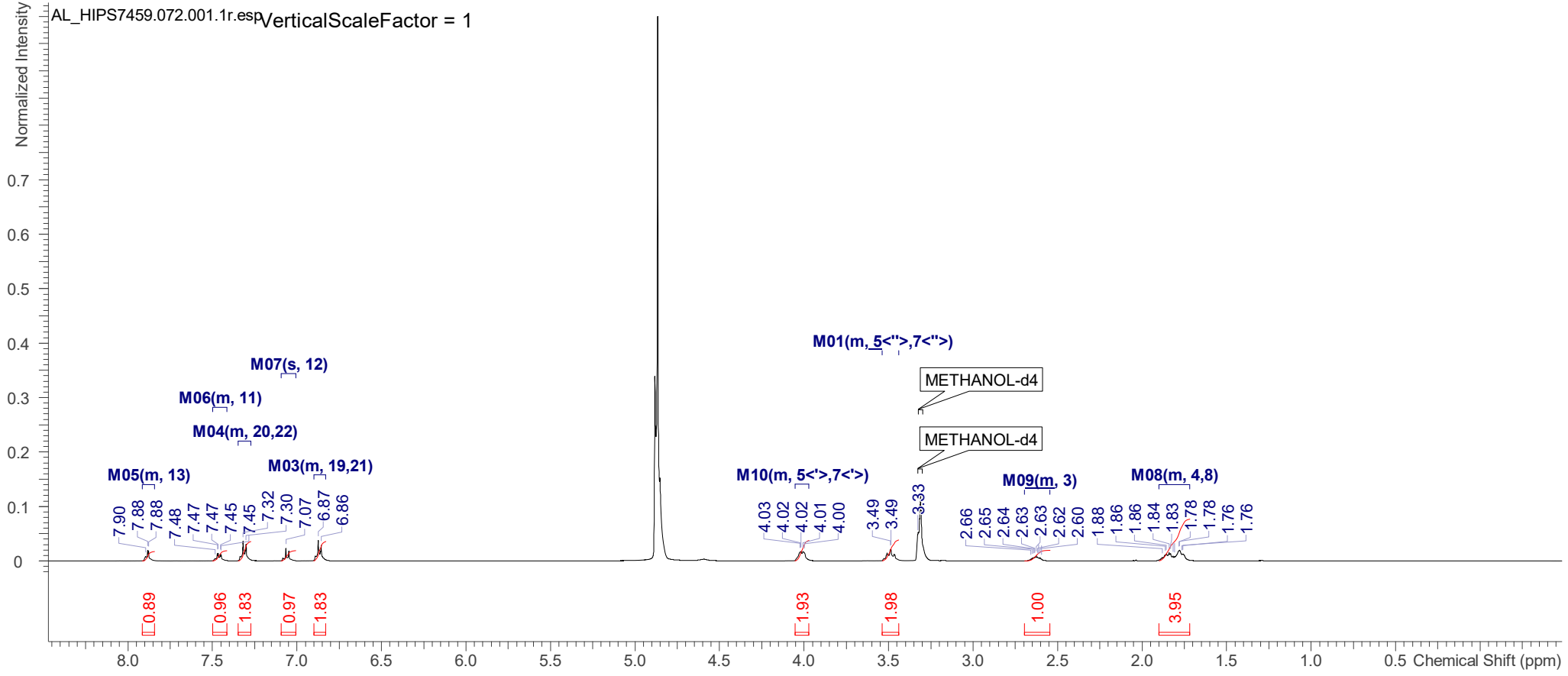
**Compound 9**

10/25/2023 10:15:55 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 16 H's / 17 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 15.35 |

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.91 – 7.84 (1 H, m), 7.50 – 7.41 (1 H, m), 7.35 – 7.27 (2 H, m), 7.07 (1 H, s), 6.90 – 6.83 (2 H, m), 4.05 – 3.97 (2 H, m), 3.49 (2 H, m), 2.63 (1 H, m), 1.90 – 1.72 (4 H, m);



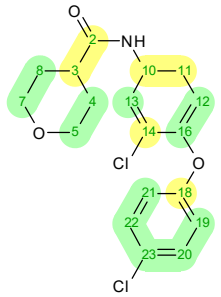

U:\HIPS6017_series\DXS Paper\NMR\AL_HIPS7459\AL_HIPS7459.072.001.1r.esp

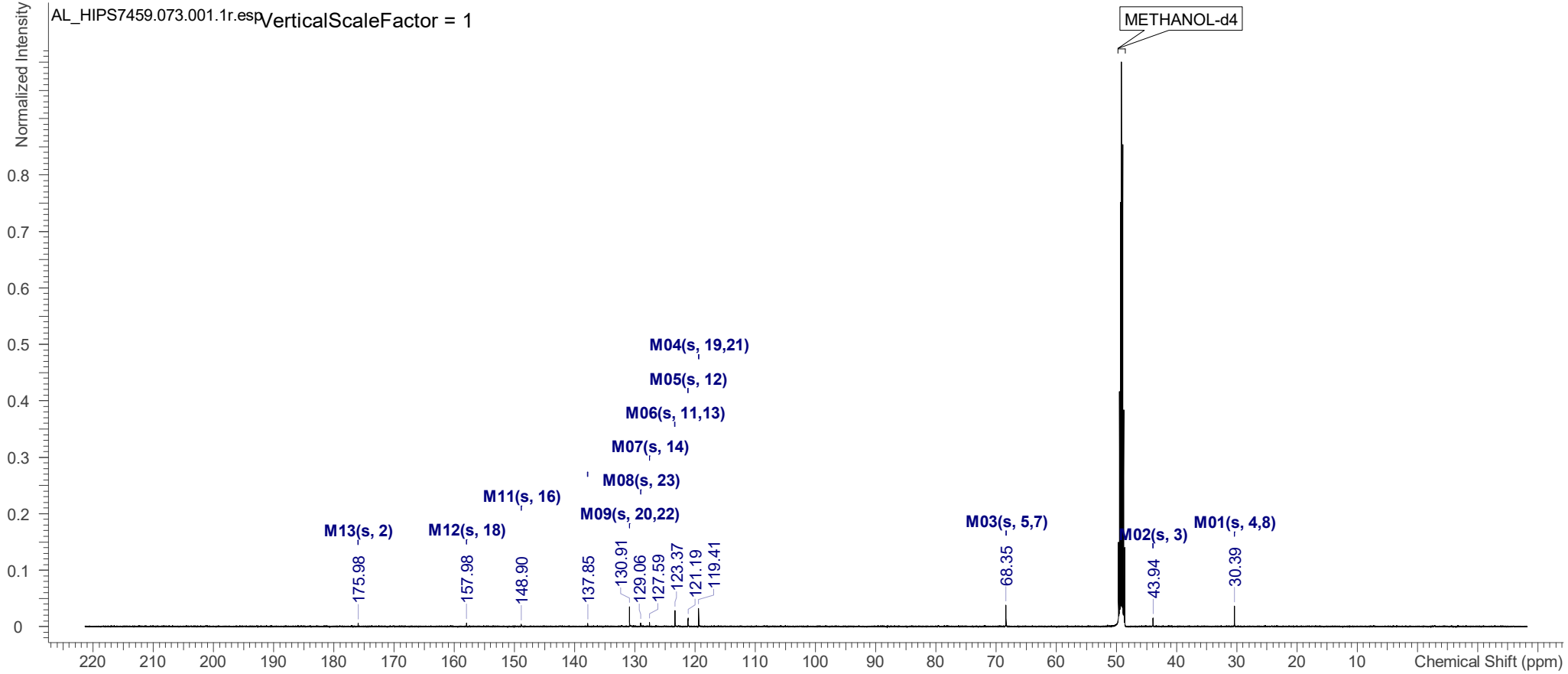
**Compound 9**

10/25/2023 10:15:59 AM

| ***Number of Nuclei*** 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 176.0 (1 C, s), 158.0 (1 C, s), 148.9 (1 C, s), 137.9 (1 C, s), 130.9 (2 C, s), 129.1 (1 C, s), 127.6 (1 C, s), 123.4 (2 C, s), 121.2 (1 C, s), 119.4 (2 C, s), 68.4 (2 C, s), 43.9 (1 C, s), 30.4 (2 C, s).



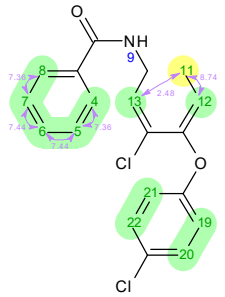

U:\HIPS6017_series\DXS Paper\NMR\AL_HIPS7459\AL_HIPS7459.073.001.1r.esp

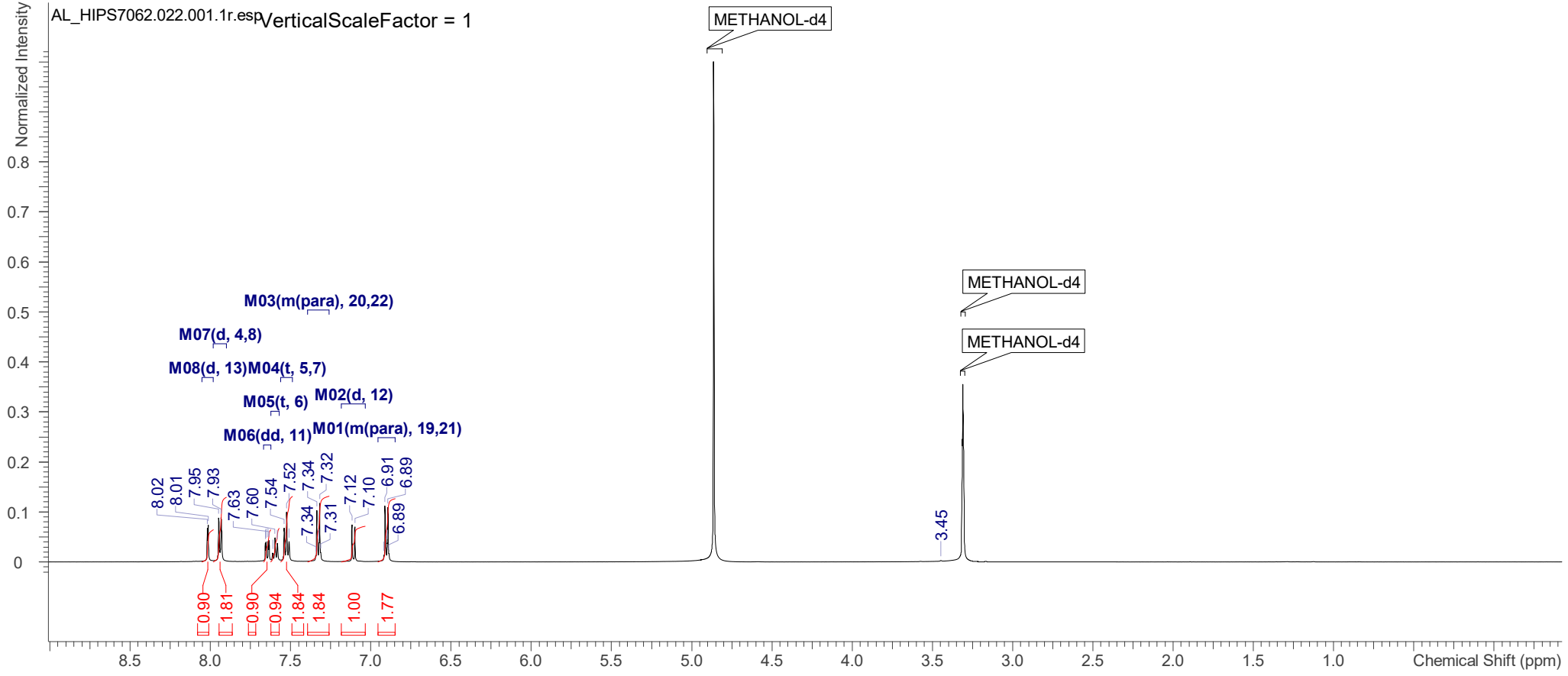
**Compound 10**

10/18/2023 10:12:34 AM

| ***Number of Nuclei*** 12 H's / 13 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 11.01 |
|---|---|

$^1$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.02 (1 H, d, J = 2.44 Hz), 7.94 (2 H, d, J = 7.17 Hz), 7.65 (1 H, dd, J = 8.77, 2.52 Hz), 7.60 (1 H, t, J = 7.32 Hz), 7.52 (2 H, t, J = 7.55 Hz), 7.39 – 7.26 (2 H, m), 7.11 (1 H, d, J = 8.70 Hz), 6.96 – 6.85 (2 H, m);



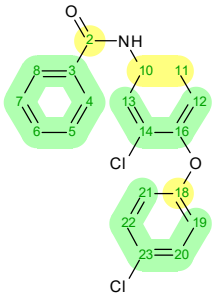

U:\HIPS6017_series\DXS Paper\NMR\AL_HIPS7062\AL_HIPS7062.022.001.1r.esp

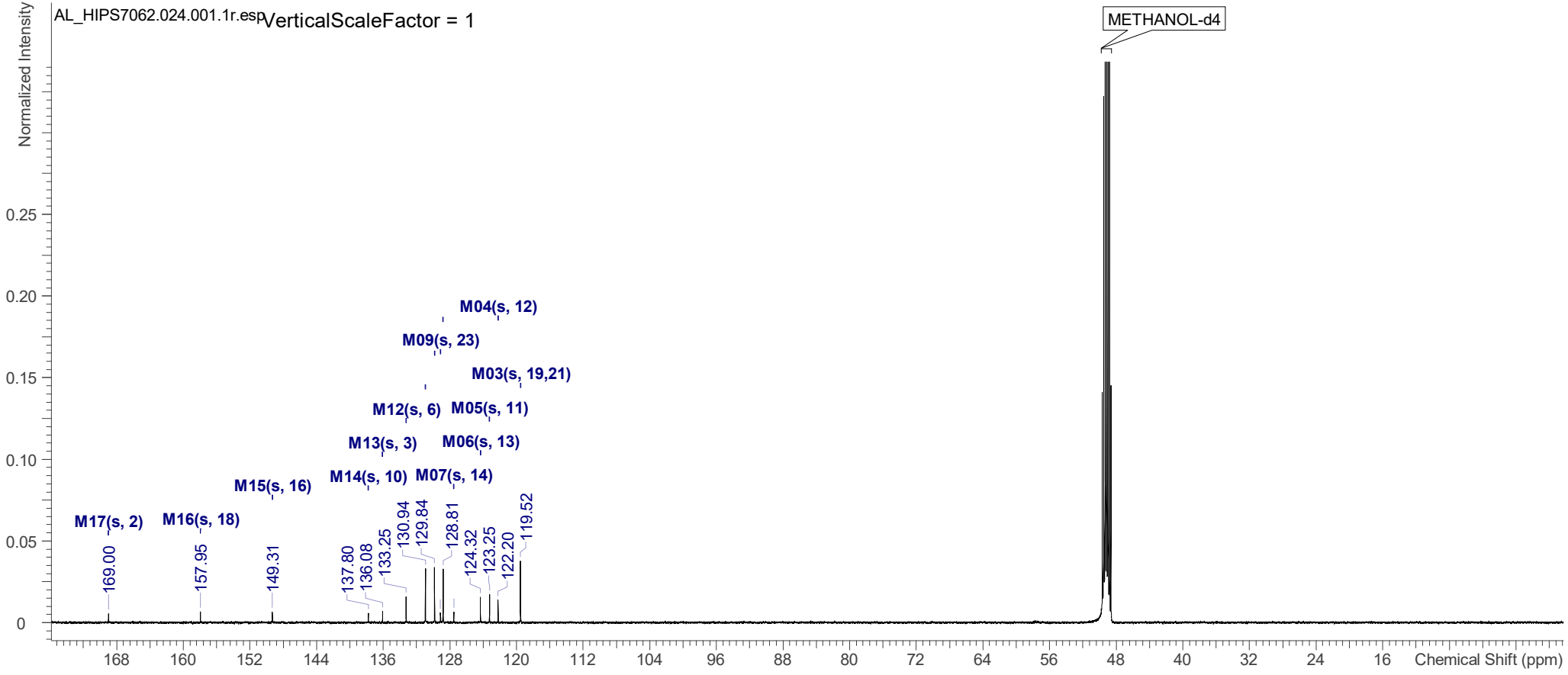
**Compound 10**

10/18/2023 10:12:37 AM

| ***Number of Nuclei*** | 19 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 169.0 (1 C, s), 158.0 (1 C, s), 149.3 (1 C, s), 137.8 (1 C, s), 136.1 (1 C, s), 133.3 (1 C, s), 130.9 (2 C, s), 129.8 (2 C, s), 129.1 (1 C, s), 128.8 (2 C, s), 127.5 (1 C, s), 124.3 (1 C, s), 123.3 (1 C, s), 122.2 (1 C, s), 119.5 (2 C, s).



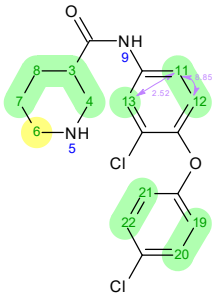

U:\HIPS6017_series\DXS Paper\NMR\AL_HIPS7062\AL_HIPS7062.024.001.1r.esp

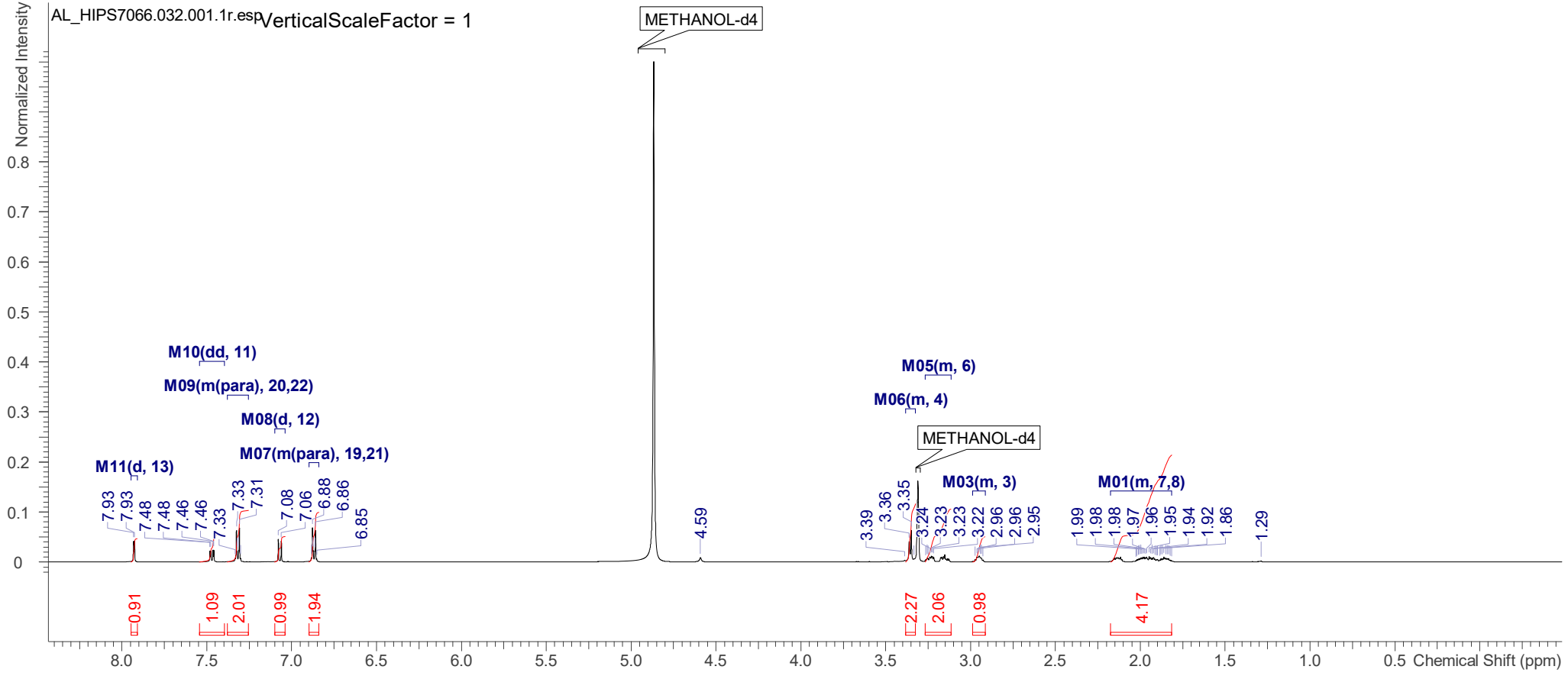
**Compound 11**

10/25/2023 9:42:16 AM

| ***Number of Nuclei*** 16 H's / 18 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 16.42 |
|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.93 (1 H, d, J = 2.59 Hz), 7.47 (1 H, dd, J = 8.85, 2.44 Hz), 7.38 – 7.25 (2 H, m), 7.07 (1 H, d, J = 8.85 Hz), 6.90 – 6.84 (2 H, m), 3.38 – 3.32 (2 H, m), 3.27 – 3.12 (2 H, m), 2.99 – 2.91 (1 H, m), 2.18 – 1.81 (4 H, m);



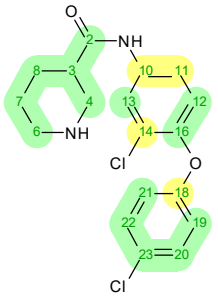

AL_HIPS7066.032.001.1r.esp

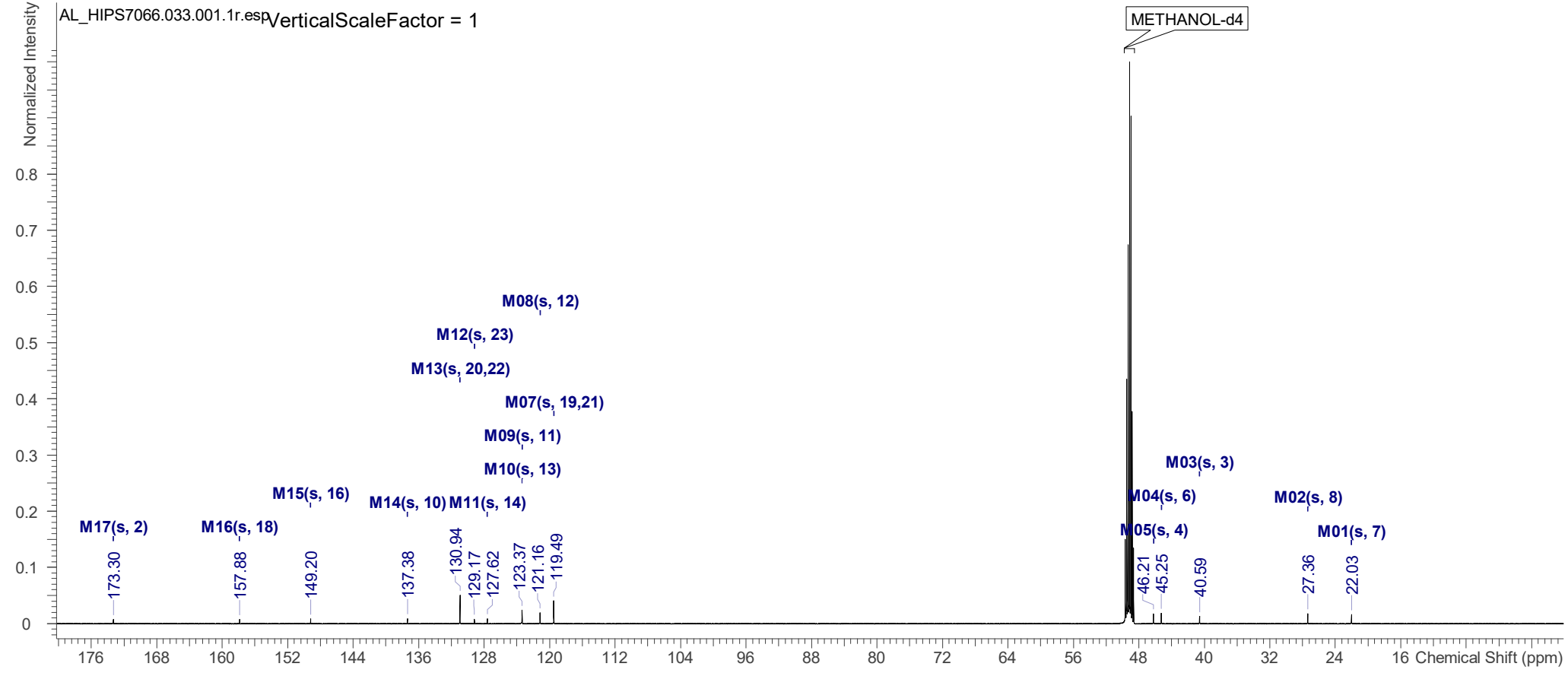
**Compound 11**

10/25/2023 9:42:20 AM

| ***Number of Nuclei*** | 18 C's / 18 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 173.3 (1 C, s), 157.9 (1 C, s), 149.2 (1 C, s), 137.4 (1 C, s), 130.9 (2 C, s), 129.2 (1 C, s), 127.6 (1 C, s), 123.4 (1 C, s), 123.4 (1 C, s), 121.2 (1 C, s), 119.5 (2 C, s), 46.2 (1 C, s), 45.3 (1 C, s), 40.6 (1 C, s), 27.4 (1 C, s), 22.0 (1 C, s).



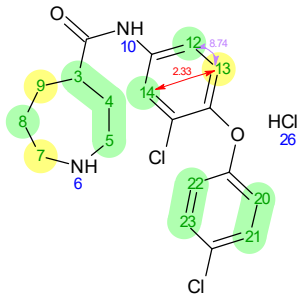

AL_HIPS7066.033.001.1r.esp

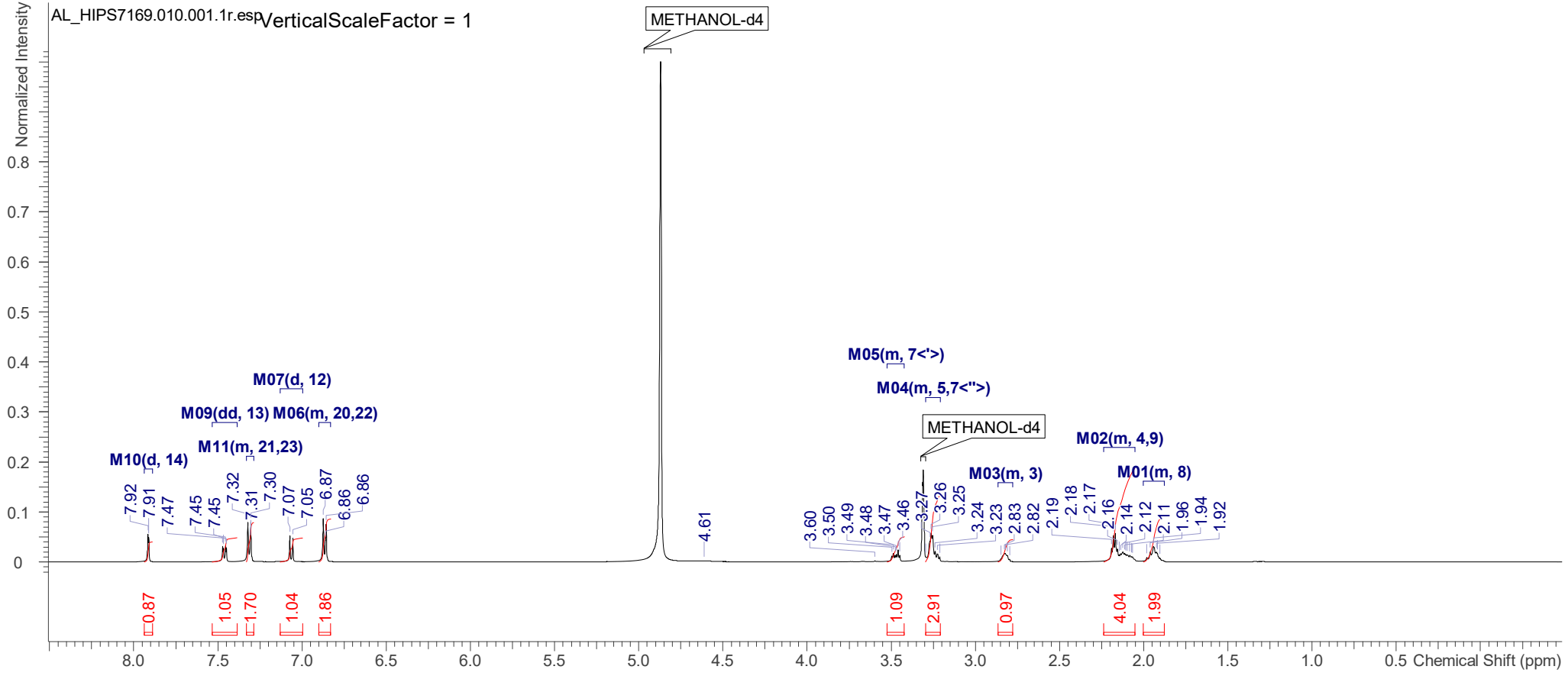
**Compound 12**

10/25/2023 9:51:34 AM

| ***Number of Nuclei*** | 19 H's / 21 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 17.53 |
|---|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 7.91 (1 H, d, J = 2.29 Hz), 7.46 (1 H, dd, J = 8.77, 2.37 Hz), 7.33 – 7.29 (2 H, m), 7.06 (1 H, d, J = 8.70 Hz), 6.90 – 6.83 (2 H, m), 3.52 – 3.42 (2 H, m), 3.30 – 3.21 (3 H, m), 2.87 – 2.78 (1 H, m), 2.24 – 2.05 (4 H, m), 2.00 – 1.88 (2 H, m);



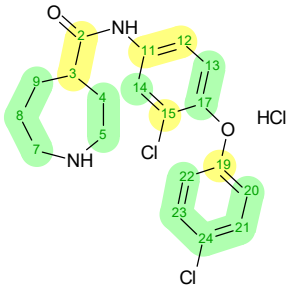

AL_HIPS7169.010.001.1r.esp

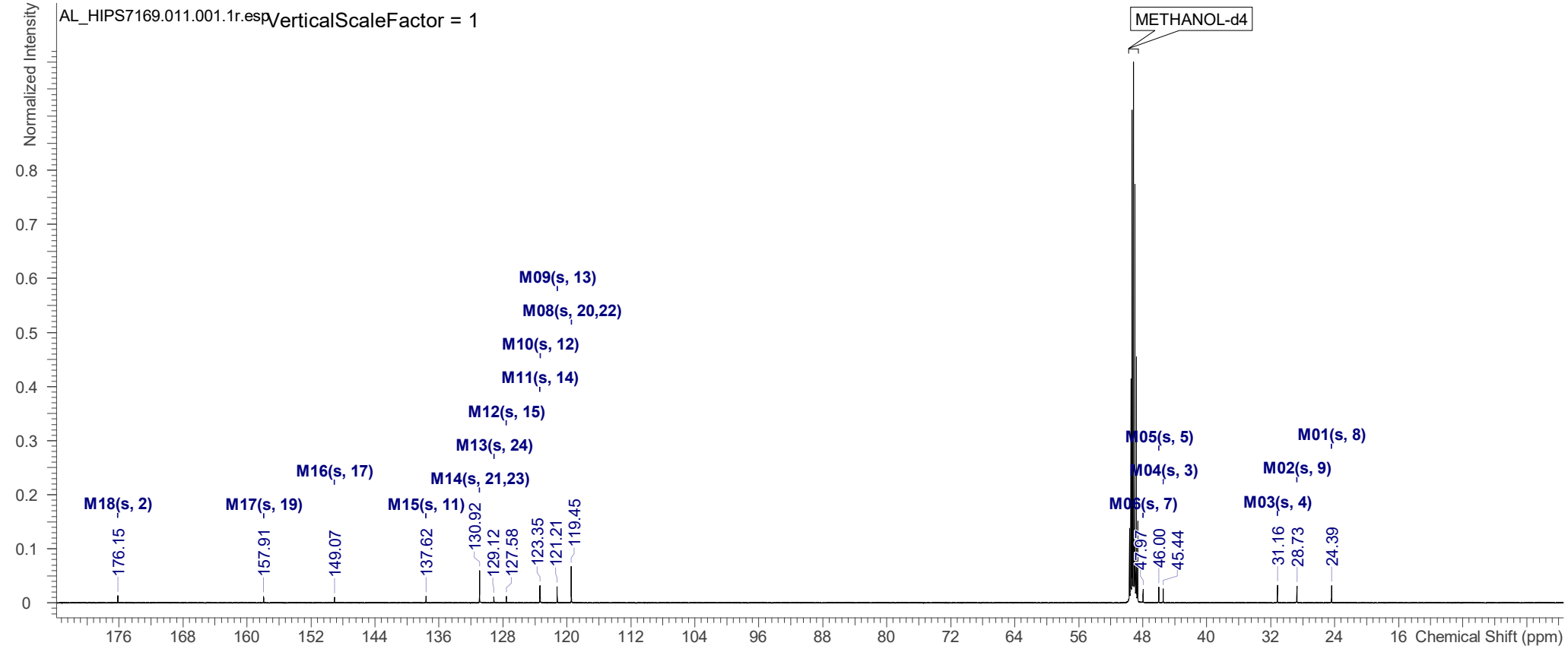
**Compound 12**

10/25/2023 9:51:37 AM

| ***Number of Nuclei*** | 19 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 176.2 (1 C, s), 157.9 (1 C, s), 149.1 (1 C, s), 137.6 (1 C, s), 130.9 (2 C, s), 129.1 (1 C, s), 127.6 (1 C, s), 123.4 (1 C, s), 123.4 (1 C, s), 121.2 (1 C, s), 119.5 (2 C, s), 48.0 (1 C, s), 46.0 (1 C, s), 45.4 (1 C, s), 31.2 (1 C, s), 28.7 (1 C, s), 24.4 (1 C, s).



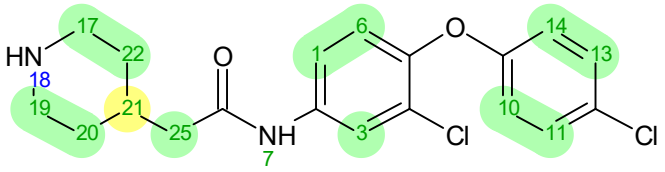

AL_HIPS7169.011.001.1r.esp

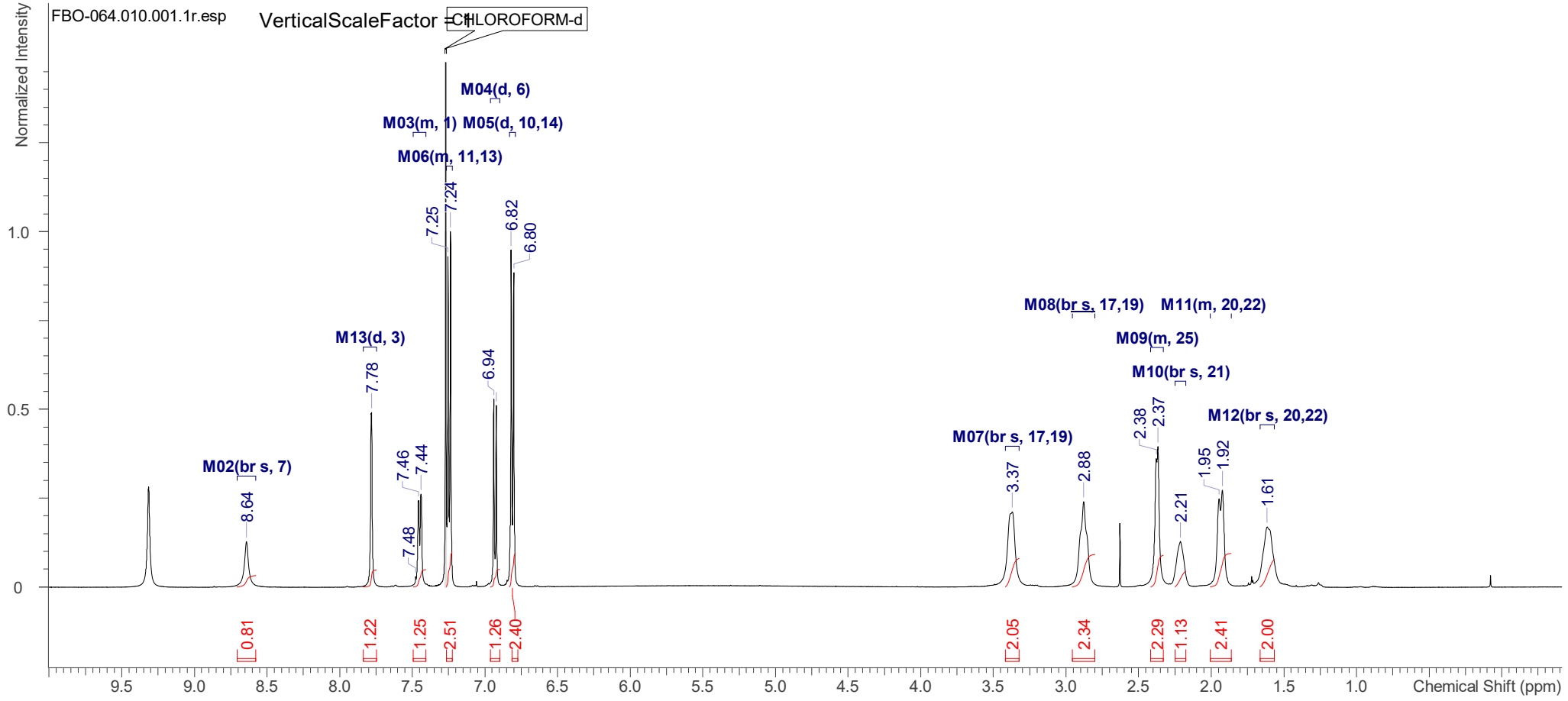
**Compound 13**

24.05.2024 16:58:35

| | |
|---|---|
| ***Multiplets Integrals Sum*** 21.66 | ***Number of Nuclei*** 20 H's / 20 H's (spectrum / structure) |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.64 (br s, 1 H), 7.78 (d, J = 1.22 Hz, 1 H), 7.49 – 7.41 (m, 1 H), 7.26 – 7.23 (m, 3 H), 6.93 (d, J = 8.70 Hz, 1 H), 6.81 (d, J = 8.85 Hz, 2 H), 3.37 (br s, 2 H), 2.88 (br s, 2 H), 2.42 – 2.33 (m, 2 H), 2.21 (br s, 1 H), 1.93 (br d, 2 H), 1.61 (br s, 2 H);



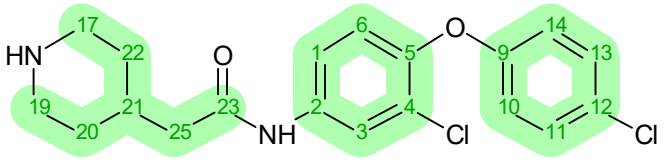



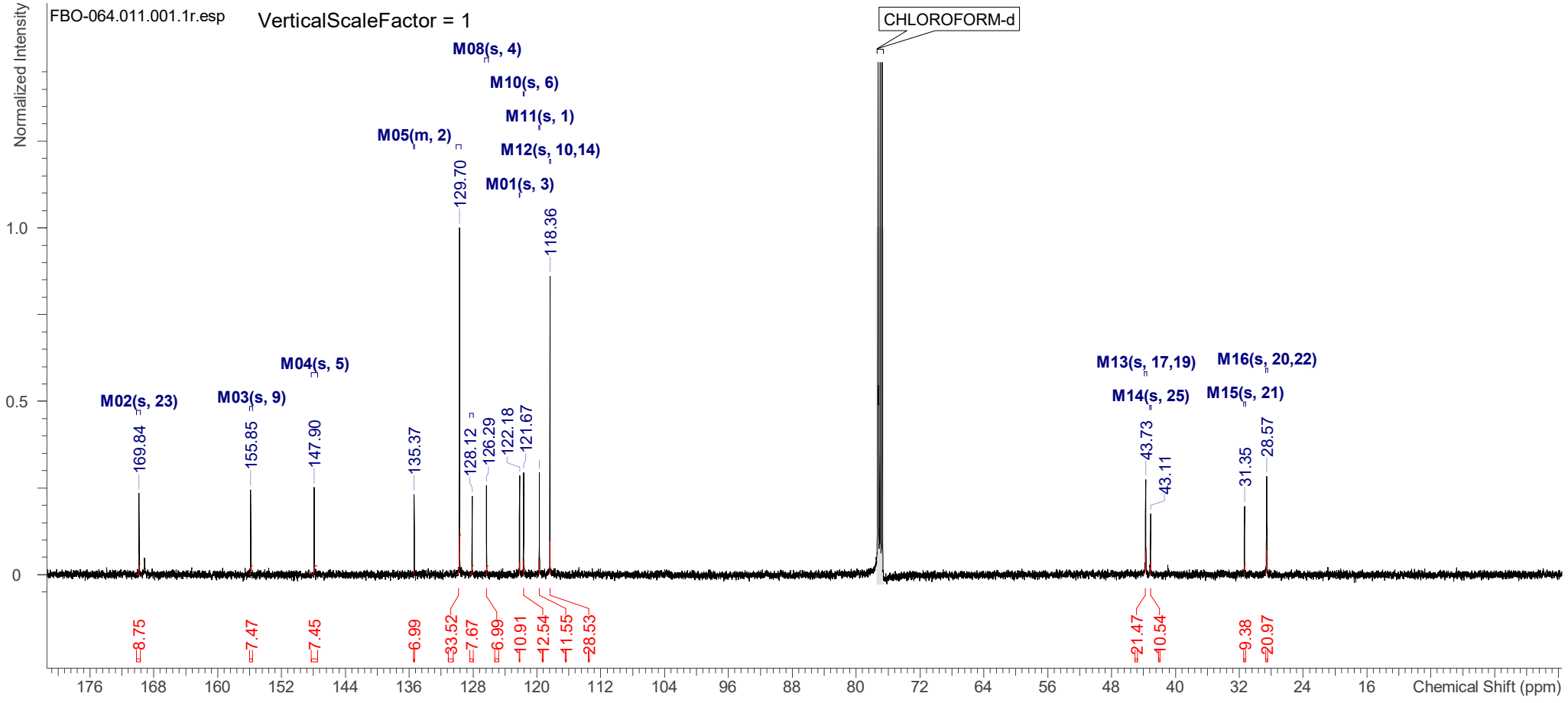
**Compound 13**

24.05.2024 16:58:41

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 19 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 204.73 |

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 169.8 (s, 1 C), 155.9 (s, 1 C), 147.9 (s, 1 C), 135.4 (s, 1 C), 129.7 (s, 2 C), 128.1 (s, 1 C), 126.3 (s, 1 C), 122.2 (s, 1 C), 121.7 (s, 1 C), 119.7 (s, 1 C), 118.4 (s, 2 C), 43.7 (s, 2 C), 43.1 (s, 1 C), 31.4 (s, 1 C), 28.6 (s, 2 C).



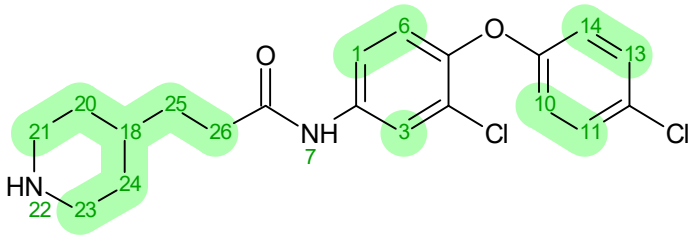



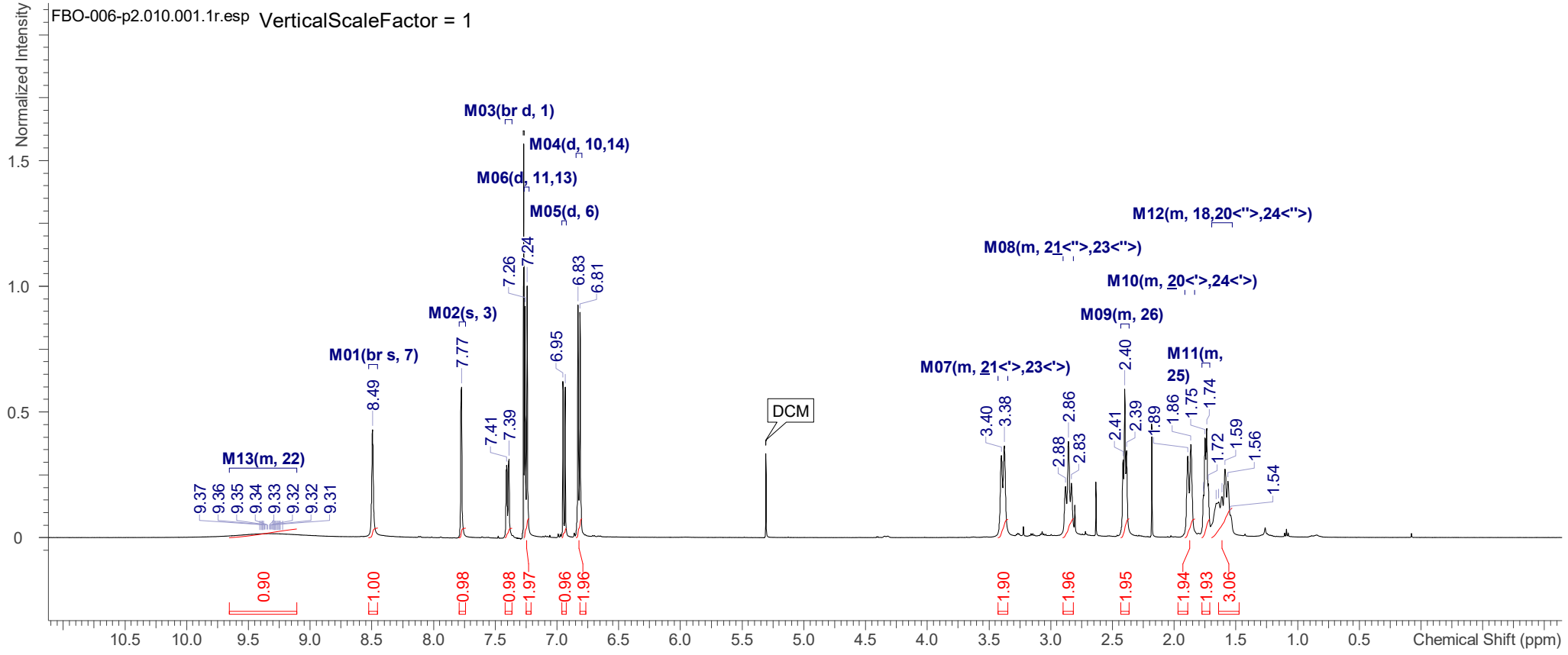
**Compound 14**

4/4/2024 8:44:36 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 22 H's / 22 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 21.49 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 9.65 – 9.11 (1 H, m), 8.49 (1 H, br s), 7.77 (1 H, s), 7.40 (1 H, br d, J = 8.70 Hz), 7.25 (2 H, d, J = 8.70 Hz), 6.94 (1 H, d, J = 8.85 Hz), 6.82 (2 H, d, J = 8.70 Hz), 3.39 (2 H, m), 2.86 (2 H, m), 2.40 (2 H, m), 1.88 (2 H, m), 1.74 (2 H, m), 1.70 – 1.53 (3 H, m);



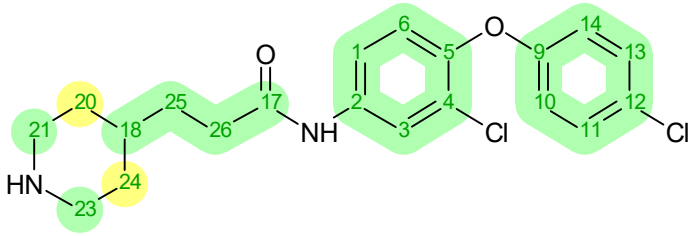

FBO-006-p2.010.001.1r.esp

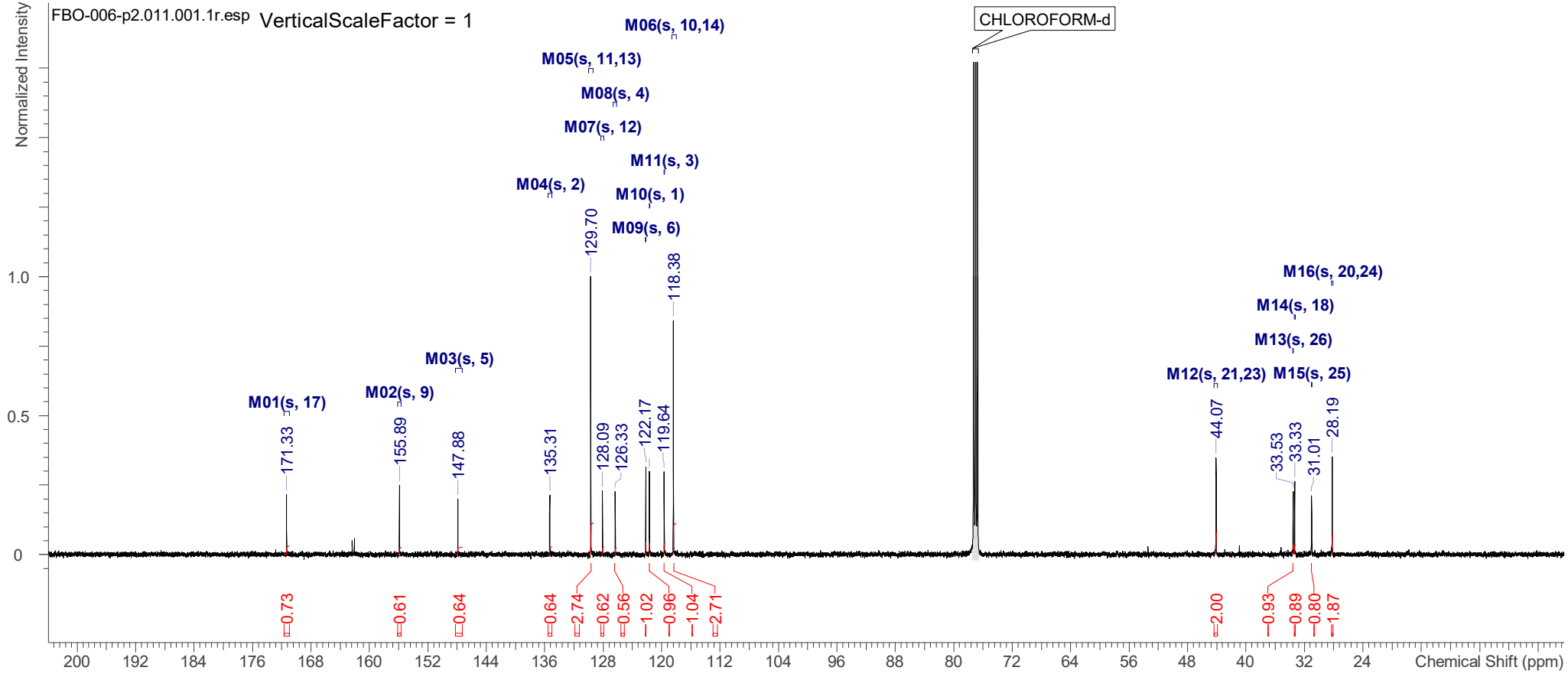
**Compound 14**

4/4/2024 8:44:41 AM

| ***Number of Nuclei*** | 20 C's / 20 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 18.76 |
|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 171.3 (1 C, s), 155.9 (1 C, s), 147.9 (1 C, s), 135.3 (1 C, s), 129.7 (2 C, s), 128.1 (1 C, s), 126.3 (1 C, s), 122.2 (1 C, s), 121.7 (1 C, s), 119.6 (1 C, s), 118.4 (2 C, s), 44.1 (2 C, s), 33.5 (1 C, s), 33.3 (1 C, s), 31.0 (1 C, s), 28.2 (2 C, s).



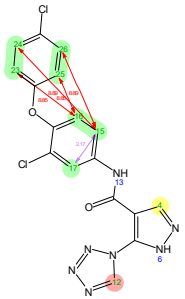

FBO-006-p2.011.001.1r.esp

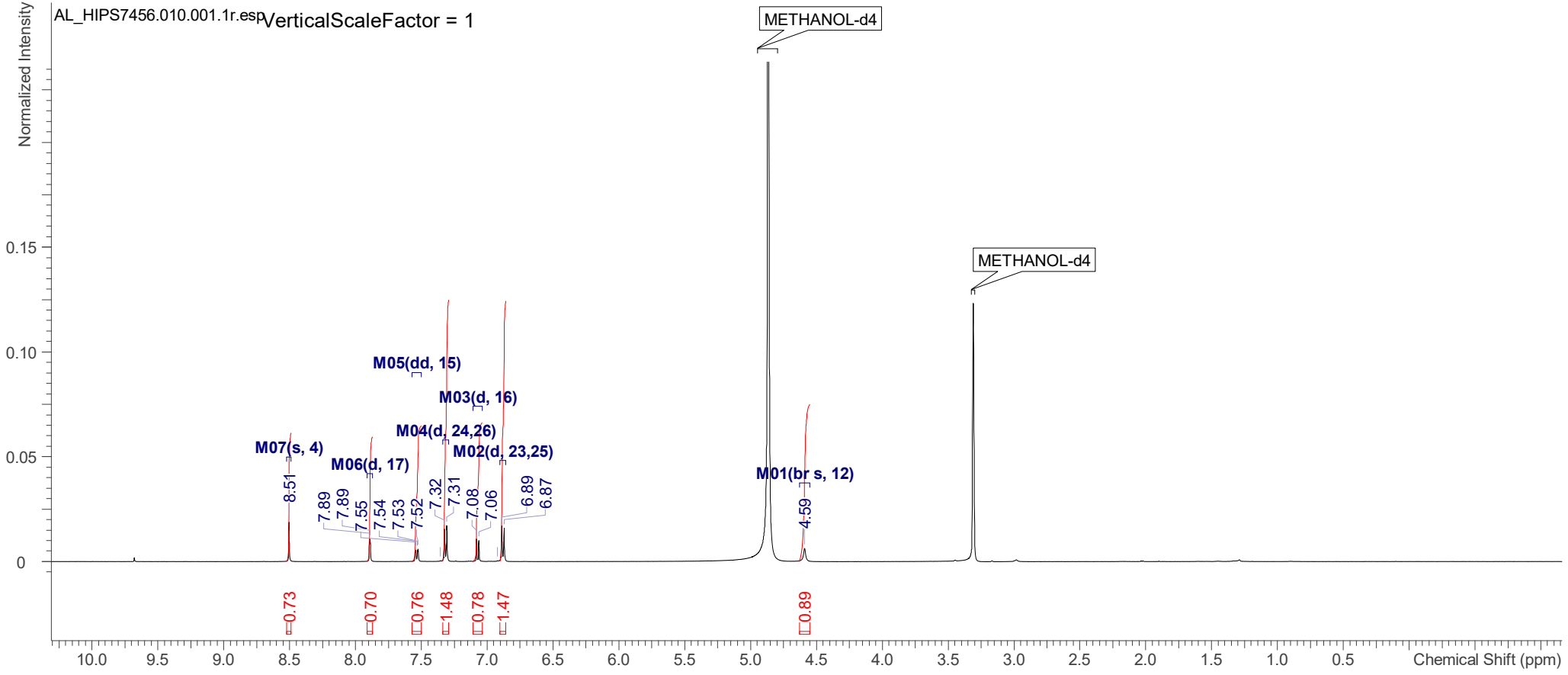
**Compound 15**

4/3/2024 4:13:05 PM

| ***Number of Nuclei*** | 7 H's / 11 H's (spectrum / structure) | ***Multiplets Integrals Sum*** 6.81 |
|---|---|---|

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.51 (1 H, s), 7.89 (1 H, d, J = 2.14 Hz), 7.54 (1 H, dd, J = 8.77, 2.21 Hz), 7.32 (1 H, d, J = 9.00 Hz), 7.07 (1 H, d, J = 8.85 Hz), 6.88 (1 H, d, J = 8.85 Hz), 4.59 (1 H, br s);





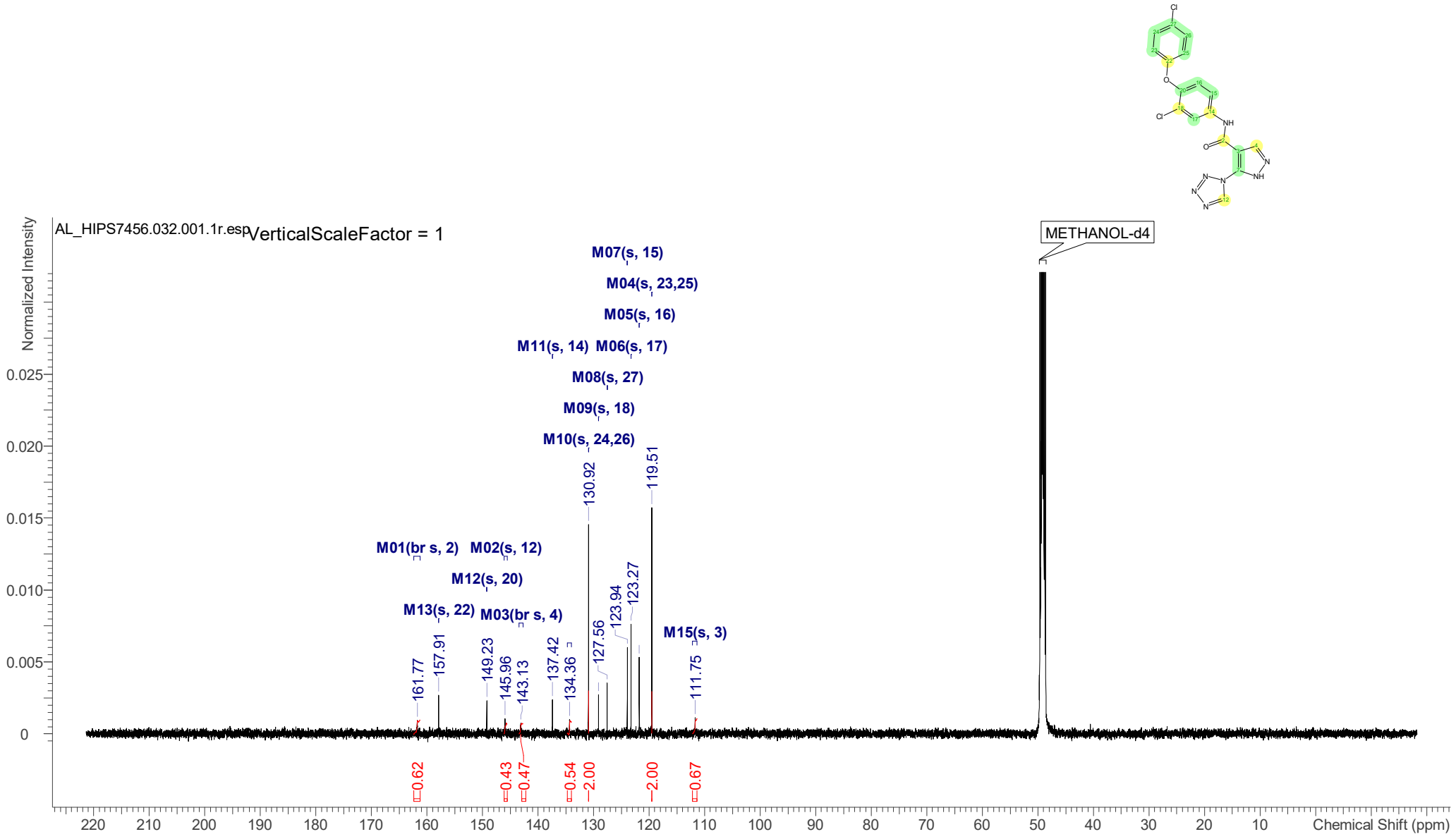

AL_HIPS7456.010.001.1r.esp

**Compound 15**

4/3/2024 4:13:10 PM

***Multiplets Integrals Sum*** 6.73 ***Number of Nuclei*** 17 C's / 17 C's (spectrum / structure)

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 161.7 (1 C, br s), 157.9 (1 C, s), 149.2 (1 C, s), 145.9 (1 C, s), 143.1 (1 C, br s), 137.4 (1 C, s), 134.3 (1 C, br s), 130.9 (2 C, s), 129.1 (1 C, s), 127.5 (1 C, s), 123.9 (1 C, s), 123.3 (1 C, s), 121.8 (1 C, s), 119.5 (2 C, s), 111.7 (1 C, s).



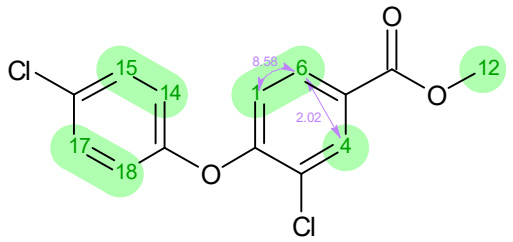

AL_HIPS7456.032.001.1r.esp

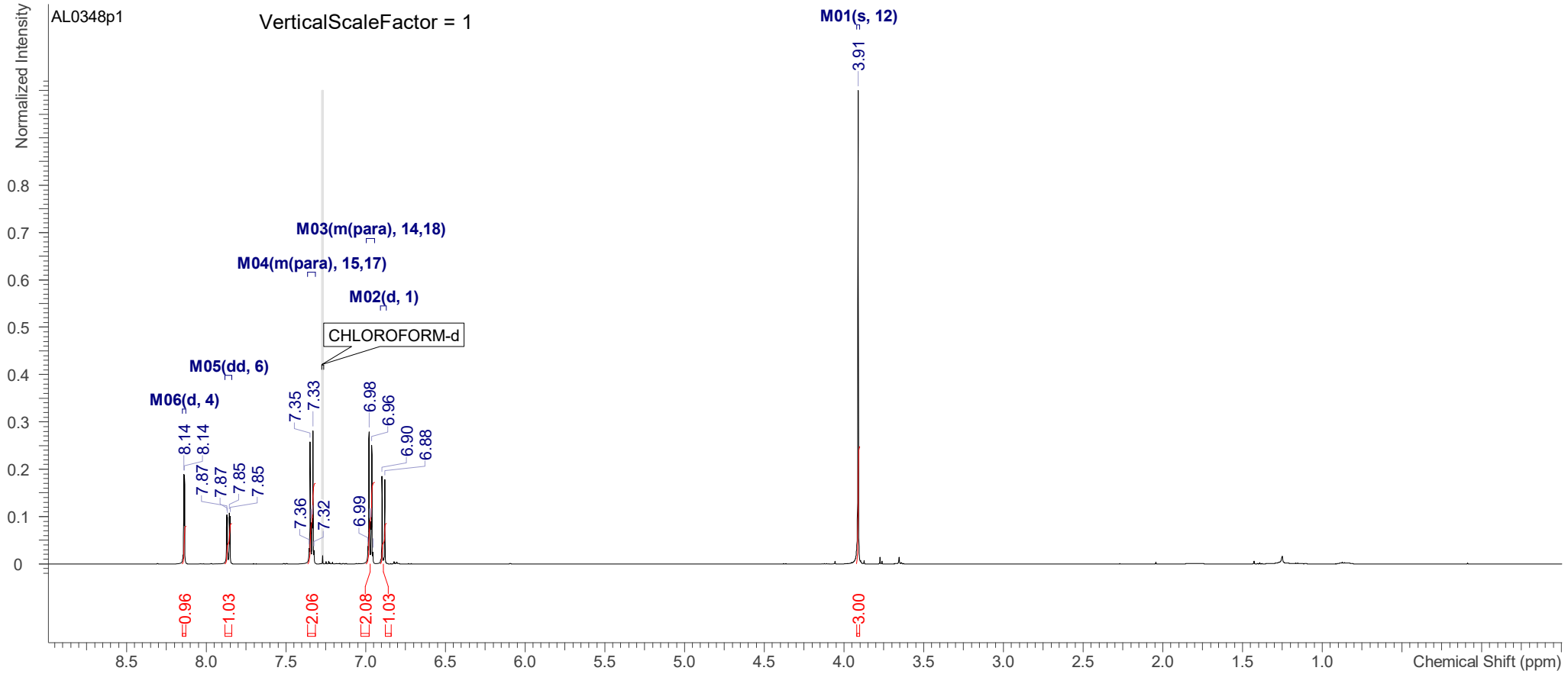
**Compound 18**

5/10/2022 7:56:03 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 10 H's / 10 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 10.17 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 8.14 (1 H, d, J = 1.98 Hz), 7.86 (1 H, dd, J = 8.62, 2.06 Hz), 7.36 – 7.32 (2 H, m), 7.00 – 6.94 (2 H, m), 6.89 (1 H, d, J = 8.54 Hz), 3.91 (3 H, s);



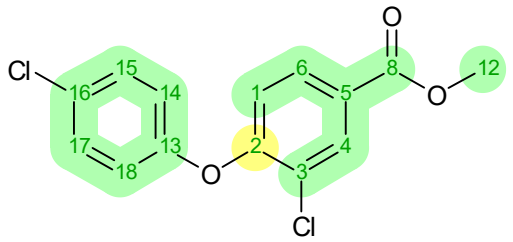

AL0348p1

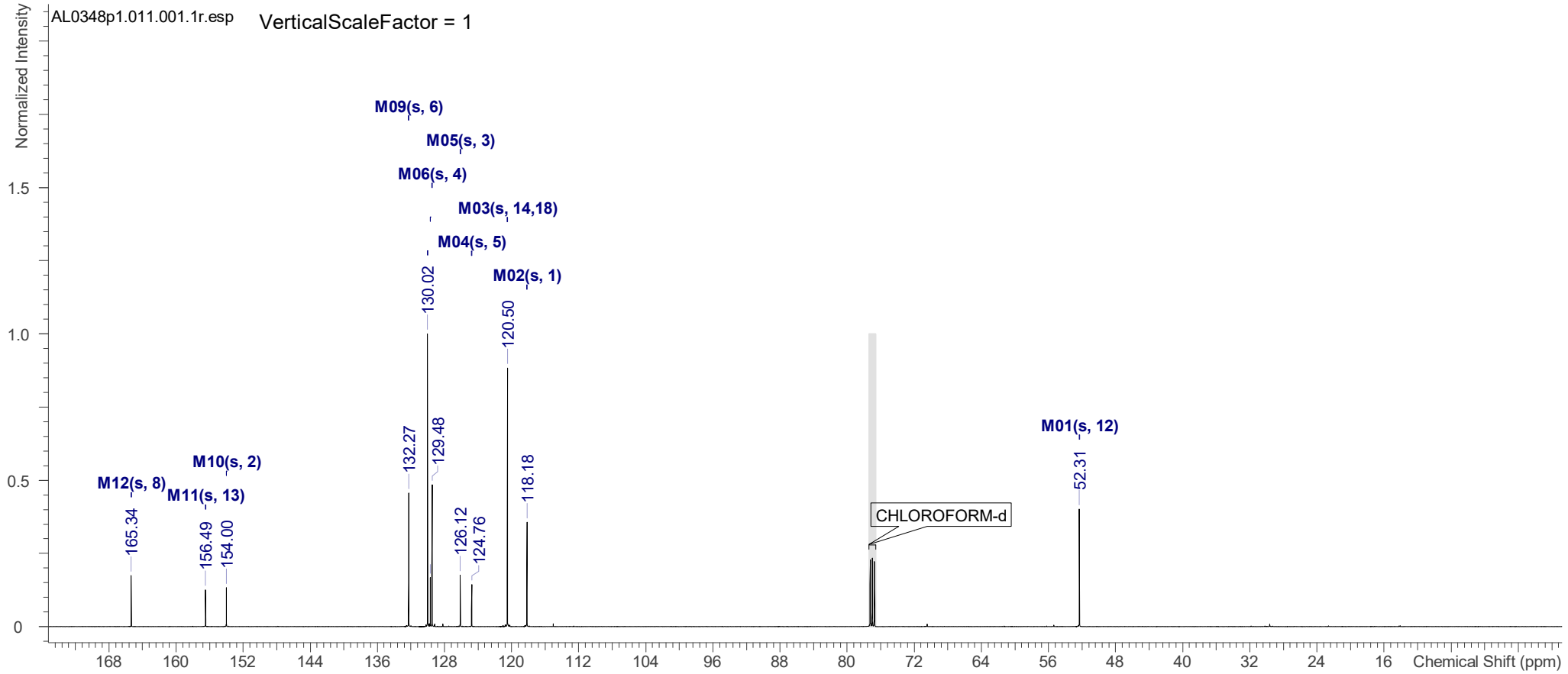
**Compound 18**

5/10/2022 7:56:09 AM

| ***Number of Nuclei*** | 14 C's / 14 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 165.3 (1 C, s), 156.5 (1 C, s), 154.0 (1 C, s), 132.3 (1 C, s), 130.0 (2 C, s), 129.7 (1 C, s), 129.5 (1 C, s), 126.1 (1 C, s), 124.8 (1 C, s), 120.5 (2 C, s), 118.9 (1 C, s), 52.3 (1 C, s)



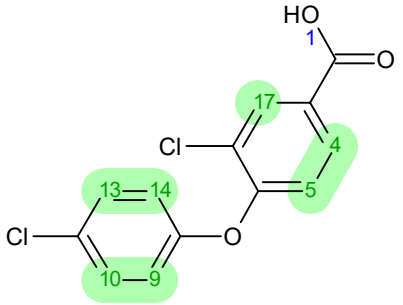

L:\NMR500\data\ddop\nmr\AL0348p1\AL0348p1.011.001.1r.esp

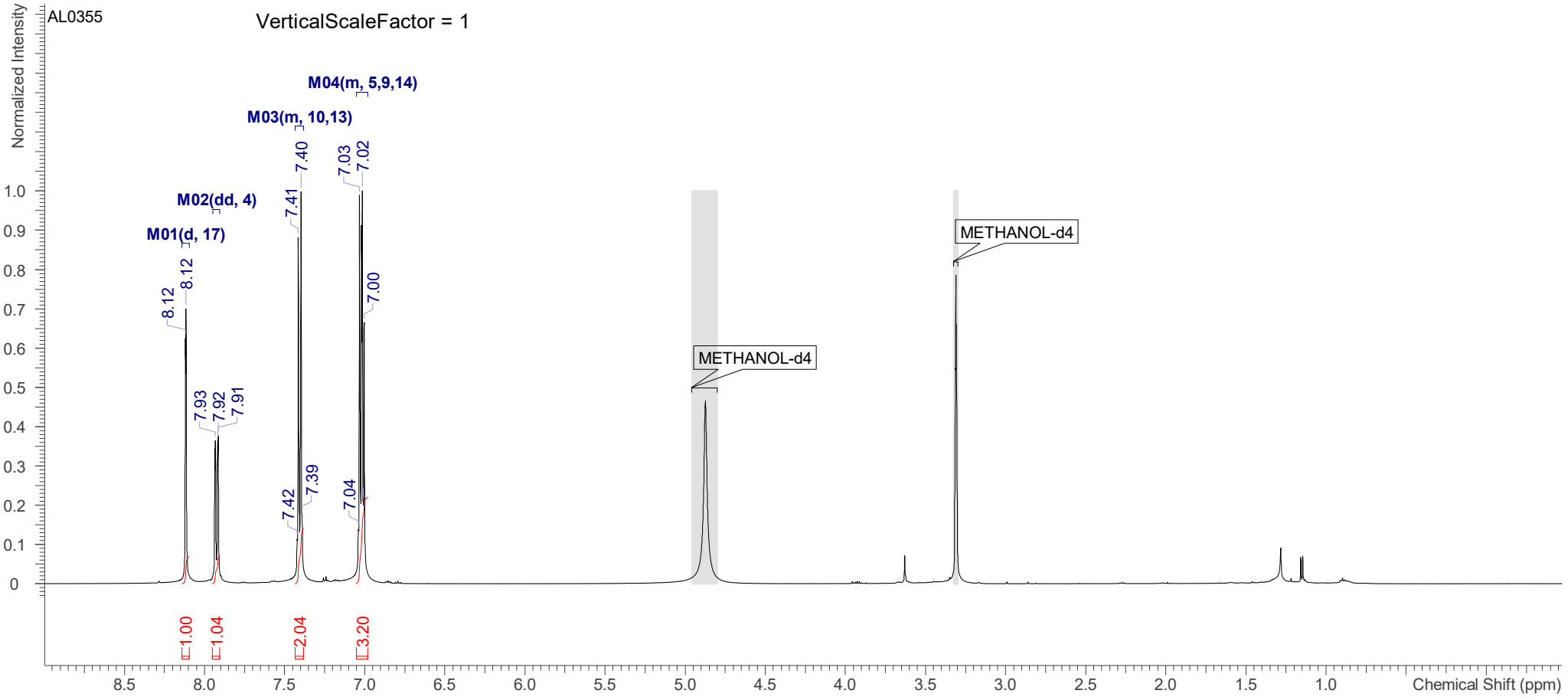
**Compound 19**

5/17/2022 8:22:02 AM

***Multiplets Integrals Sum*** 7.28 ***Number of Nuclei*** 7 H's / 8 H's (spectrum / structure)

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.12 (1 H, d, J = 1.98 Hz), 7.92 (1 H, dd, J = 8.54, 1.98 Hz), 7.43 – 7.38 (2 H, m), 7.05 – 6.98 (3 H, m);



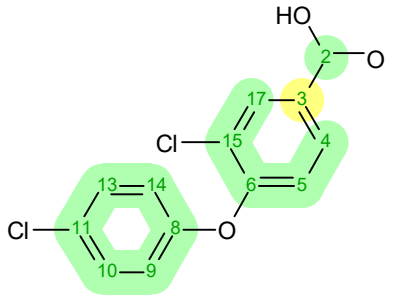

AL0355

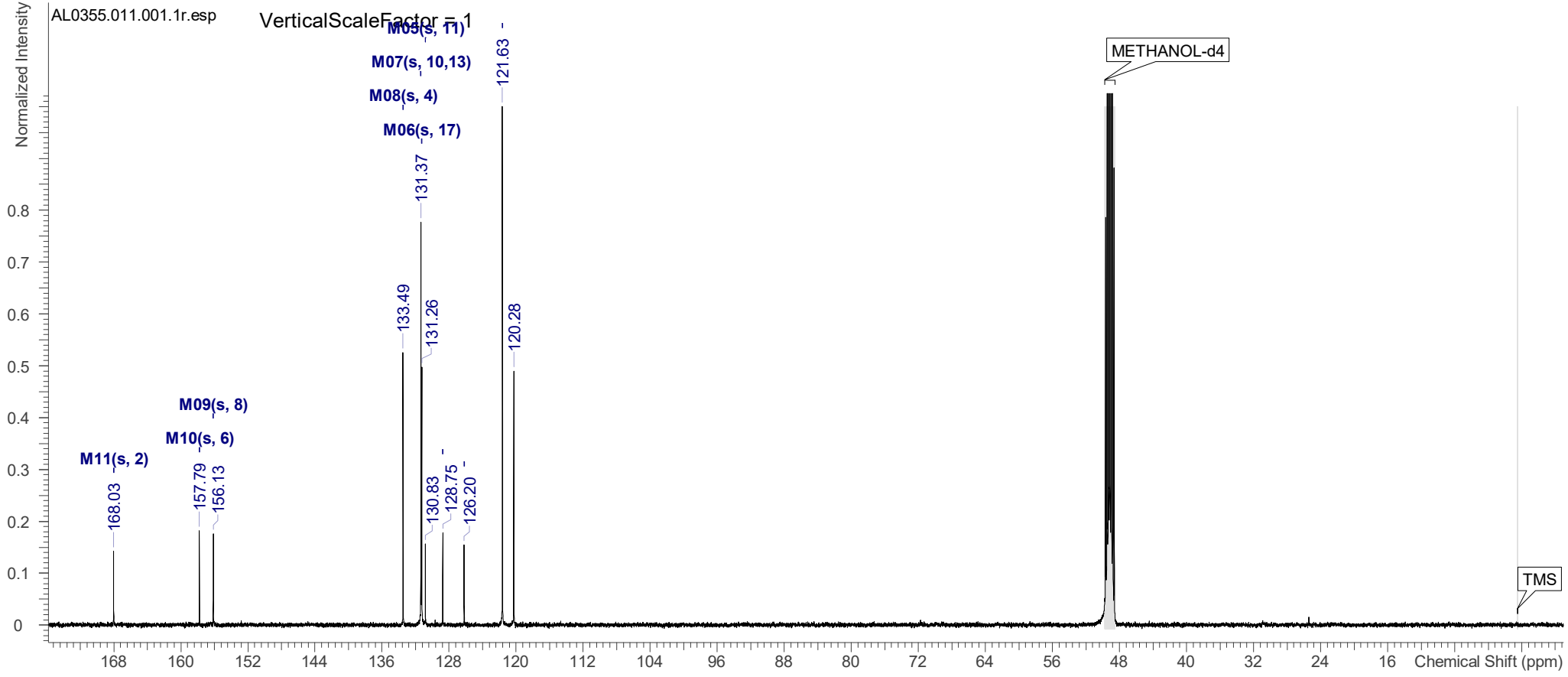
**Compound 19**

5/17/2022 8:22:08 AM

| ***Number of Nuclei*** | 13 C's / 13 C's (spectrum / structure) | ***Multiplets Integrals Sum*** | 0.00 |
|---|---|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 168.0 (1 C, s), 157.8 (1 C, s), 156.1 (1 C, s), 133.5 (1 C, s), 131.4 (2 C, s), 131.3 (1 C, s), 130.8 (1 C, s), 128.8 (1 C, s), 126.2 (1 C, s), 121.6 (2 C, s), 120.9 (1 C, s)

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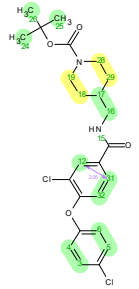
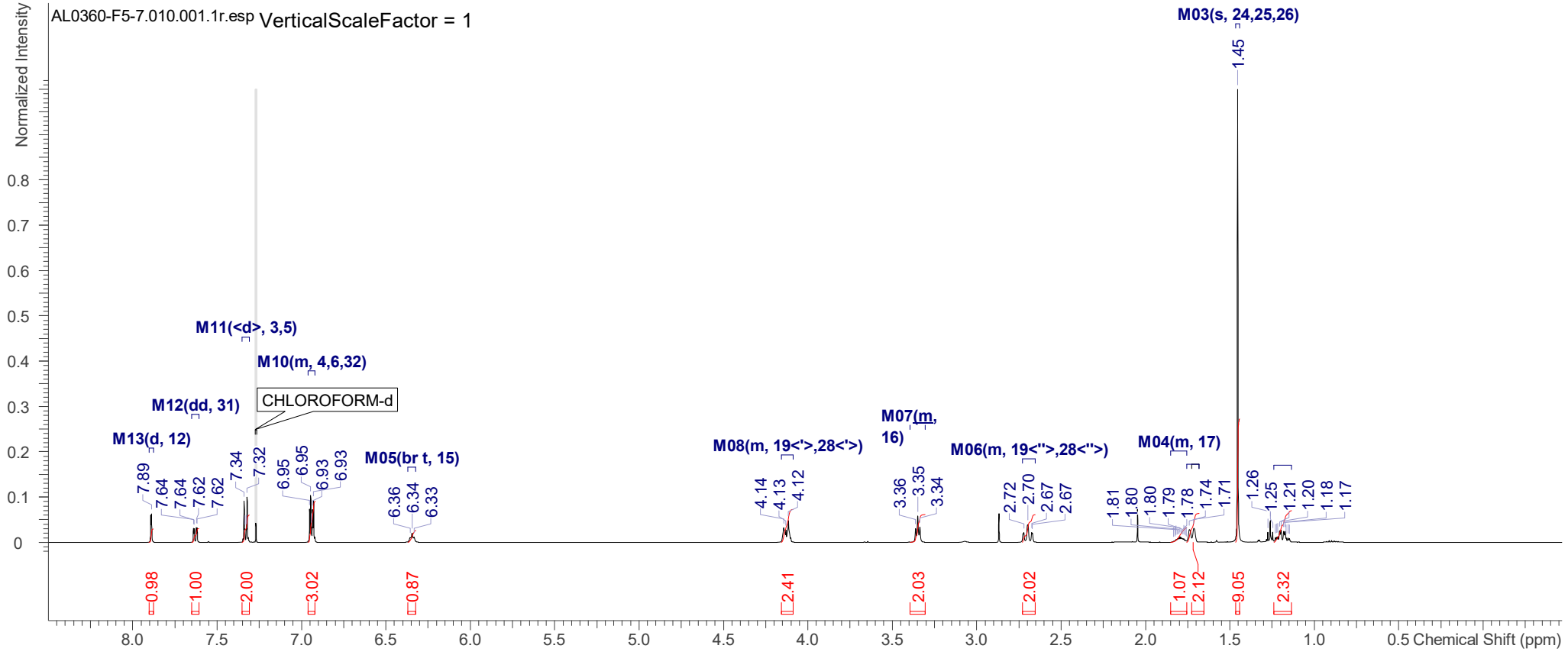
**Compound 20**

6/2/2022 8:40:47 AM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 28 H's / 28 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 28.89 |

$^{1}$H NMR (500 MHz, CHLOROFORM-*d*, ppm) δ= 7.89 (1 H, d, J = 1.98 Hz), 7.63 (1 H, dd, J = 8.54, 2.14 Hz), 7.33 (2 H, d, J = 7.72 Hz), 6.96 – 6.92 (3 H, m), 6.34 (1 H, br t, J = 5.87 Hz), 4.16 – 4.09 (2 H, m), 3.35 (2 H, m), 2.73 – 2.65 (2 H, m), 1.85 – 1.76 (1 H, m), 1.73 (2 H, m), 1.45 (9 H, s), 1.24 – 1.13 (2 H, m);



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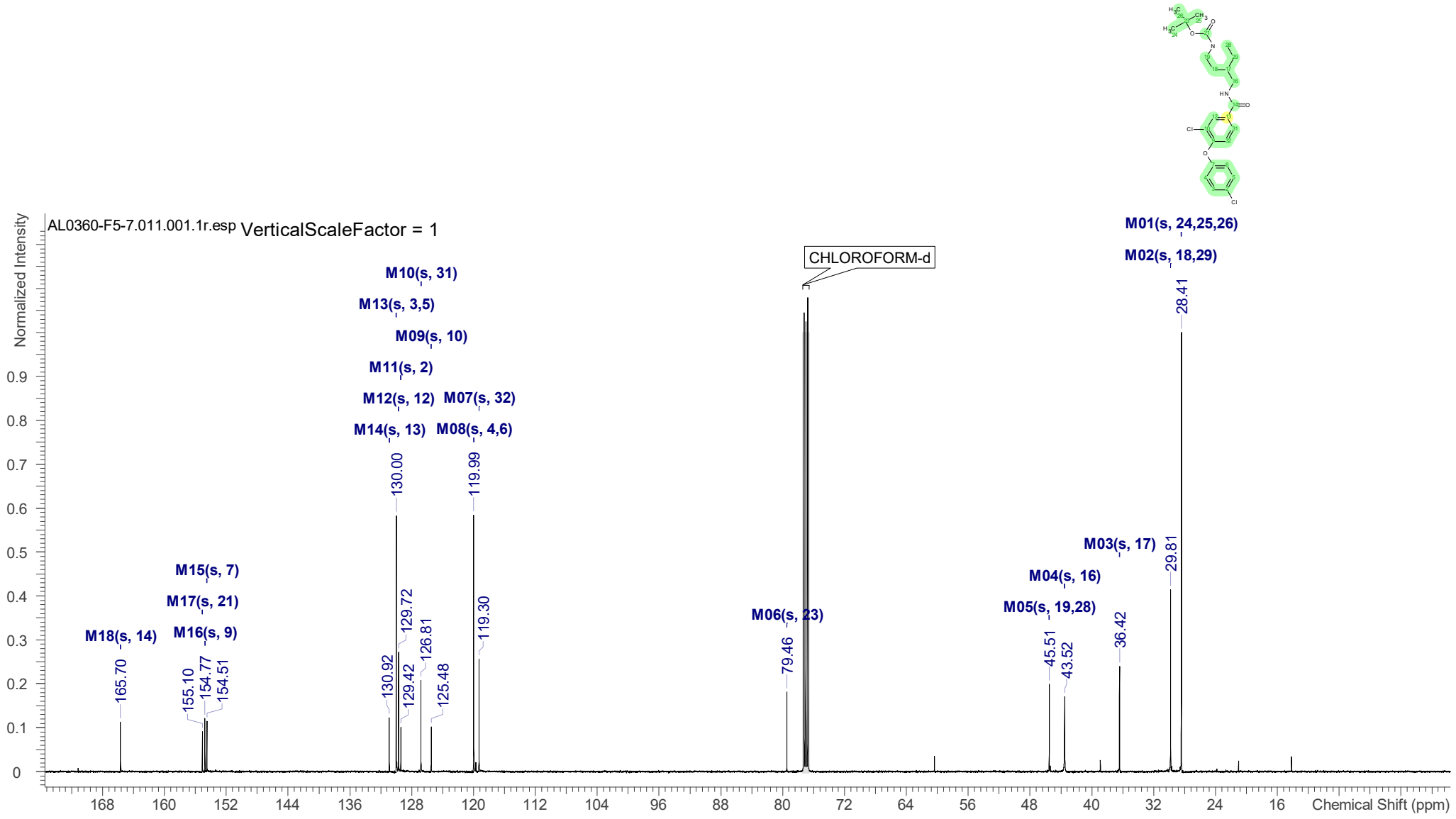
**Compound 20**

6/2/2022 8:40:53 AM

| ***Number of Nuclei*** | 24 C's / 24 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|---|

$^{13}$C NMR (126 MHz, CHLOROFORM-*d*, ppm) δ= 165.7 (1 C, s), 155.1 (1 C, s), 154.8 (1 C, s), 154.5 (1 C, s), 130.9 (1 C, s), 130.0 (2 C, s), 129.7 (1 C, s), 129.4 (1 C, s), 126.8 (1 C, s), 125.5 (1 C, s), 120.0 (2 C, s), 119.3 (1 C, s), 79.5 (1 C, s), 45.5 (2 C, s), 43.5 (1 C, s), 36.4 (1 C, s), 29.8 (2 C, s), 28.4 (3 C, s)

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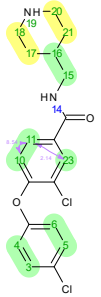
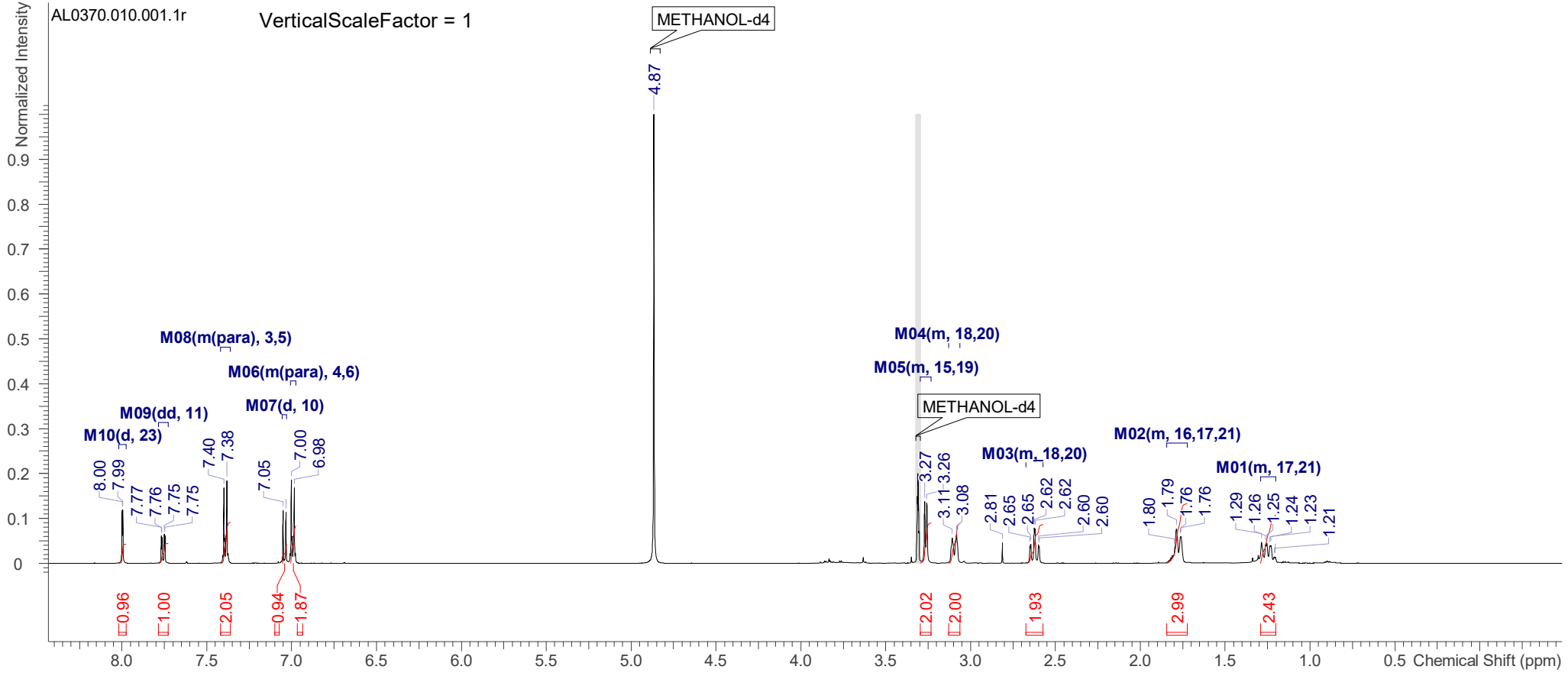
**Compound 21**

7/21/2022 5:43:44 PM

| | | | |
|---|---|---|---|
| ***Number of Nuclei*** | 18 H's / 20 H's (spectrum / structure) | ***Multiplets Integrals Sum*** | 18.19 |

$^{1}$H NMR (500 MHz, METHANOL-$d_4$, ppm) δ= 8.00 (1 H, d, J = 2.14 Hz), 7.76 (1 H, dd, J = 8.54, 2.14 Hz), 7.42 – 7.36 (2 H, m), 7.04 (1 H, d, J = 8.54 Hz), 7.01 – 6.98 (2 H, m), 3.30 – 3.23 (2 H, m), 3.10 (2 H, m), 2.62 (2 H, m), 1.84 – 1.72 (3 H, m), 1.29 – 1.20 (2 H, m);



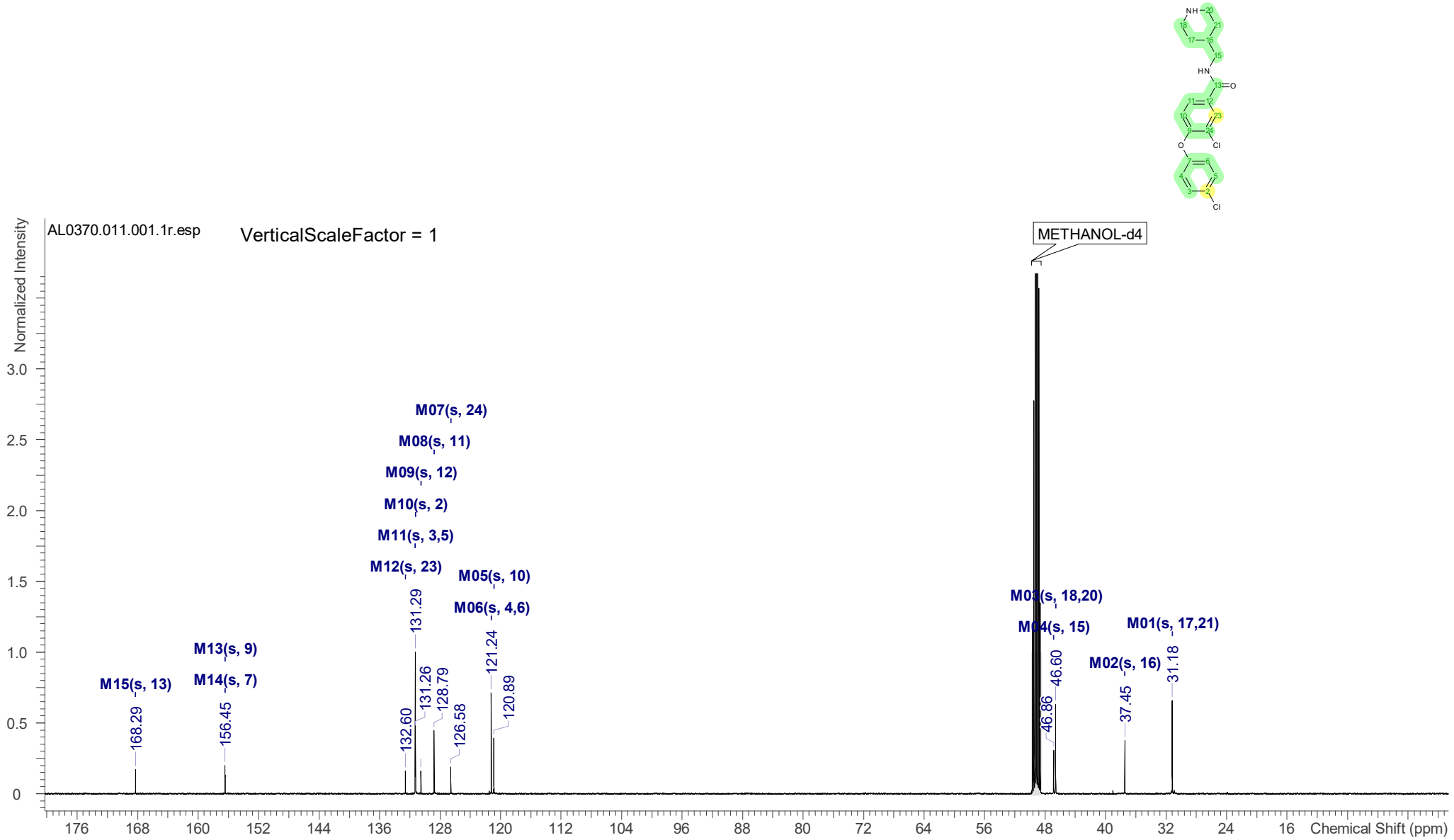

AL0370.010.001.1r

**Compound 21**

7/21/2022 5:43:48 PM

| ***Number of Nuclei*** 19 C's / 19 C's (spectrum / structure) | ***Multiplets Integrals Sum*** 0.00 |
|---|---|

$^{13}$C NMR (126 MHz, METHANOL-$d_4$, ppm) δ= 168.3 (1 C, s), 156.4 (1 C, s), 156.4 (1 C, s), 132.6 (1 C, s), 131.3 (1 C, s), 131.3 (2 C, s), 130.5 (1 C, s), 128.8 (1 C, s), 126.6 (1 C, s), 121.2 (2 C, s), 120.9 (1 C, s), 46.9 (1 C, s), 46.6 (2 C, s), 37.5 (1 C, s), 31.2 (2 C, s).

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