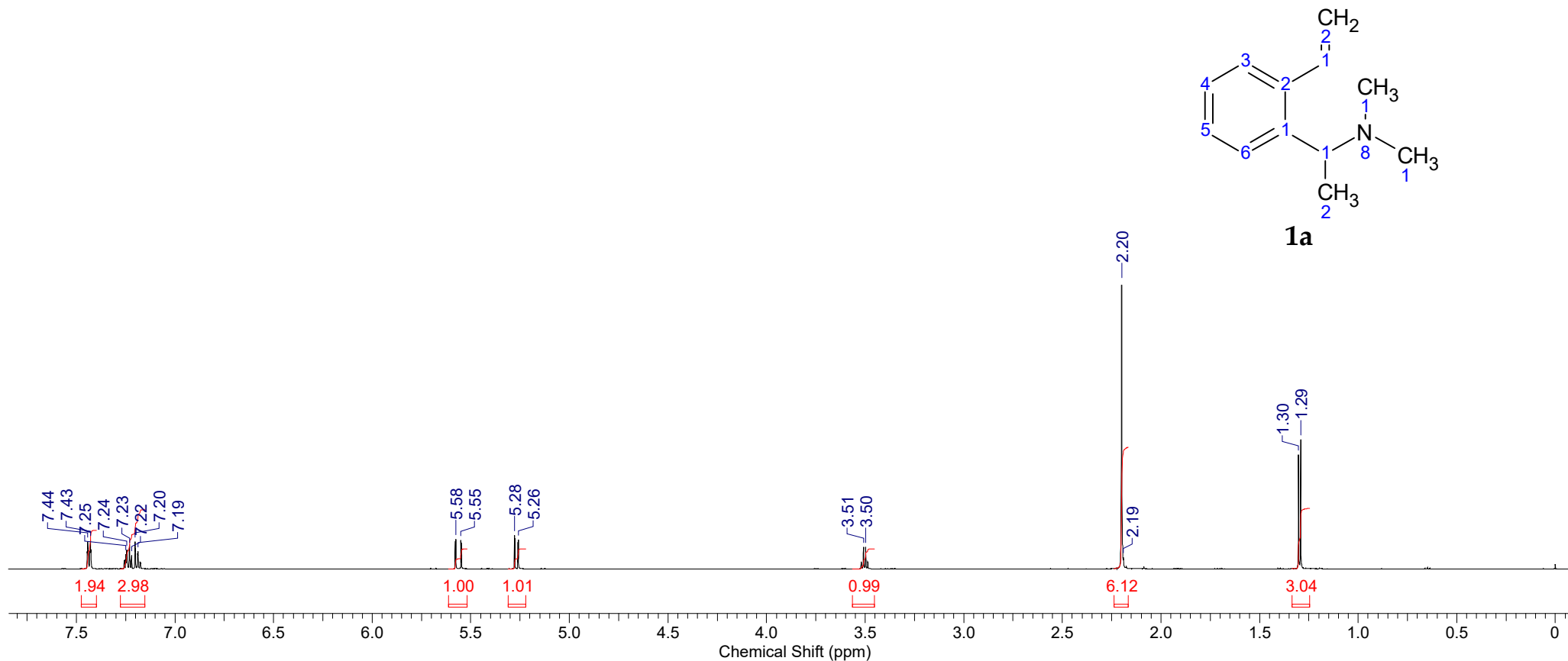


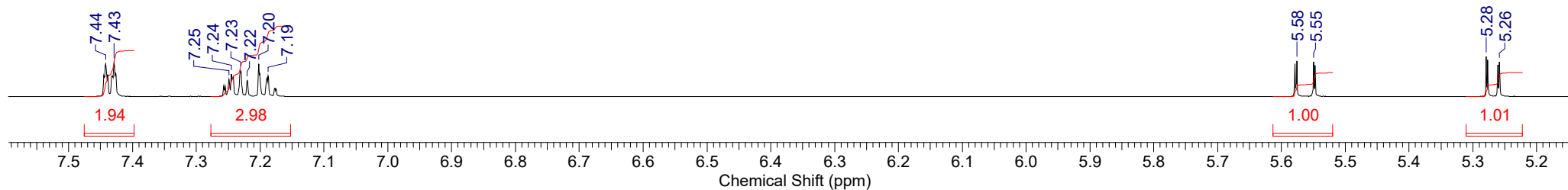
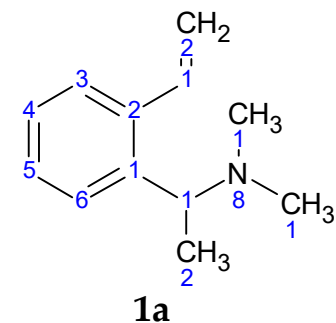
# $^1\text{H}$ NMR spectrum of compound **1a**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	22.00
Temperature (degree C)	21.600			Spectrum Offset (Hz)	5388.4248
				Sweep Width (Hz)	16534.39



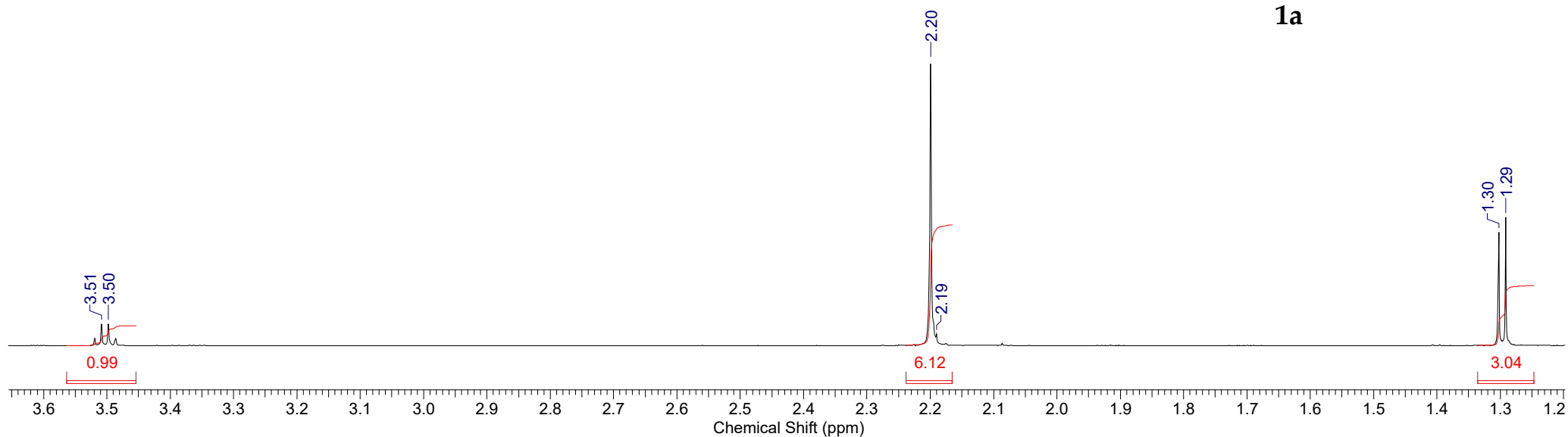
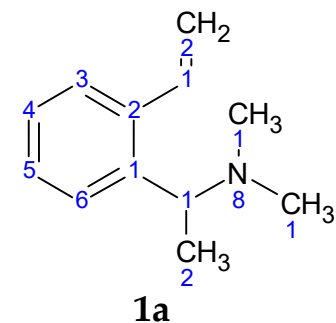
# <sup>1</sup>H NMR spectrum of compound **1a**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	1H	Number of Transients	8	Origin	ECA 600
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	22.00
Temperature (degree C)	21.600			Spectrum Offset (Hz)	5388.4248
				Sweep Width (Hz)	16534.39



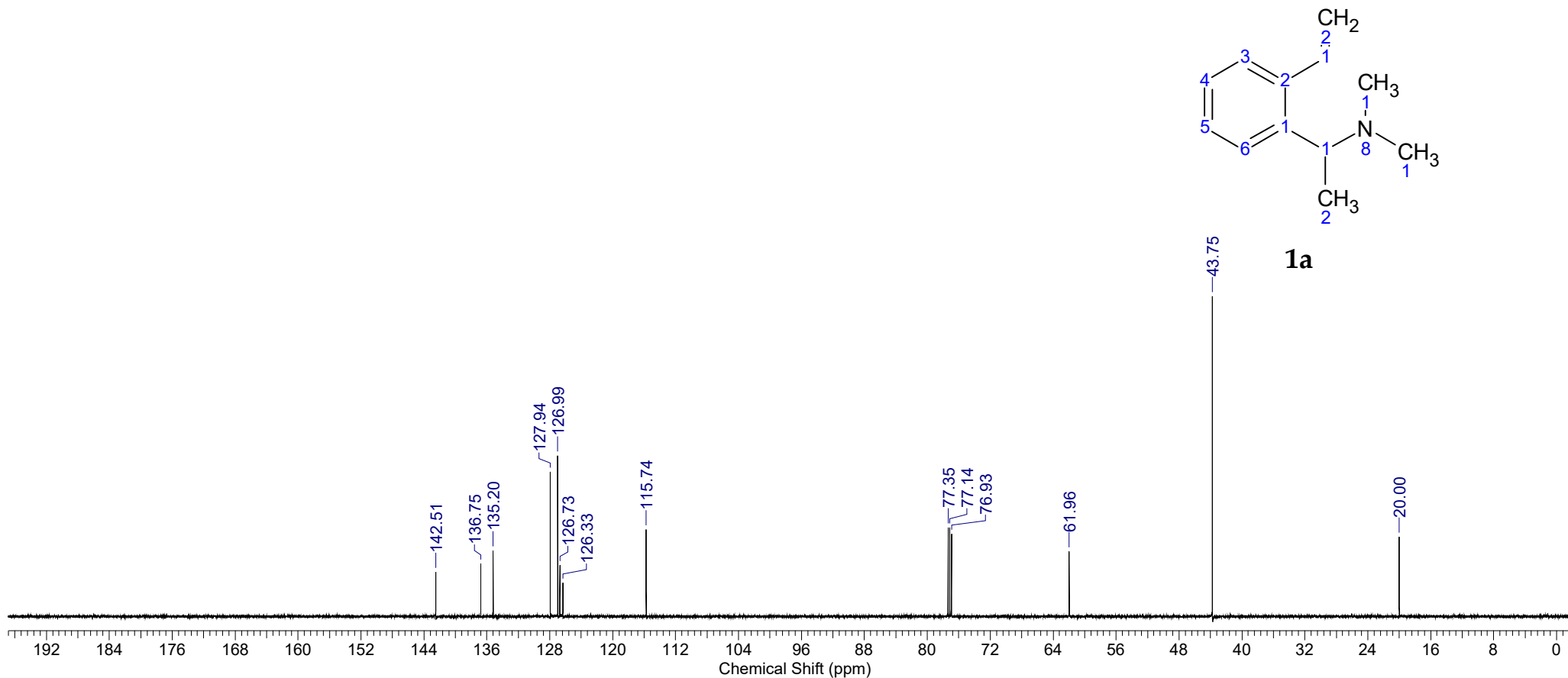
# $^1\text{H}$ NMR spectrum of compound **1a**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	22.00
Temperature (degree C)	21.600			Spectrum Offset (Hz)	5388.4248
				Sweep Width (Hz)	16534.39



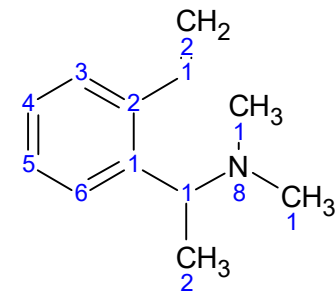
# $^{13}\text{C}$ NMR spectrum of compound **1a**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date
Date Stamp					
File Name			Frequency (MHz)		
Nucleus	$^{13}\text{C}$	Number of Transients	81	Origin	ECA 600
Owner	delta	Points Count	32768	Pulse Sequence	single pulse dec
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49
			Receiver Gain		
			Temperature (degree C)		

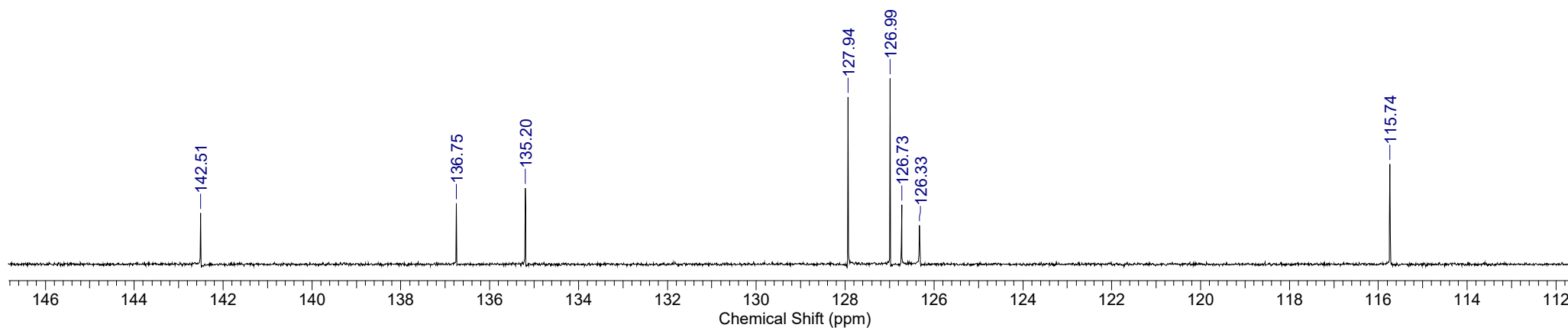


# $^{13}\text{C}$ NMR spectrum of compound **1a**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE			Date	
Date Stamp							
File Name					Frequency (MHz)	150.91	
Nucleus	13C	Number of Transients	81	Origin	ECA 600	Original Points Count	32768
Owner	delta	Points Count	32768	Pulse Sequence	single pulse dec	Receiver Gain	52.00
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49	Temperature (degree C)	22.900

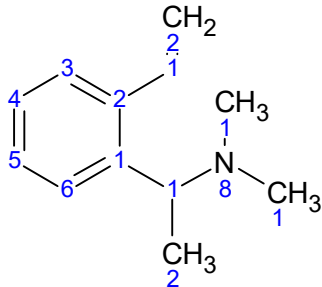


**1a**

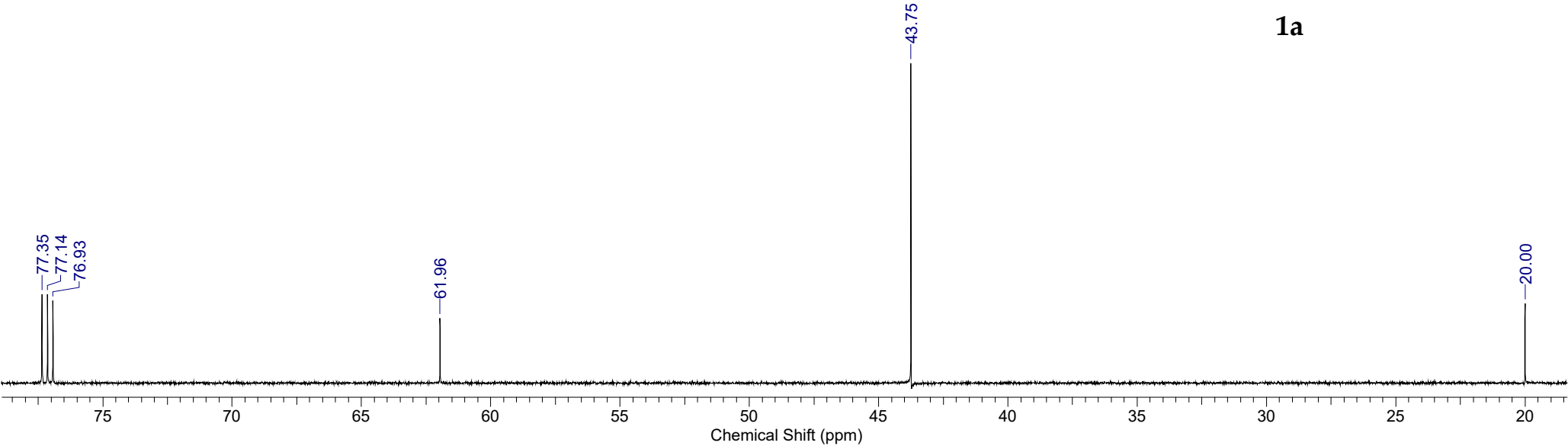


$^{13}\text{C}$  NMR spectrum of compound **1a**

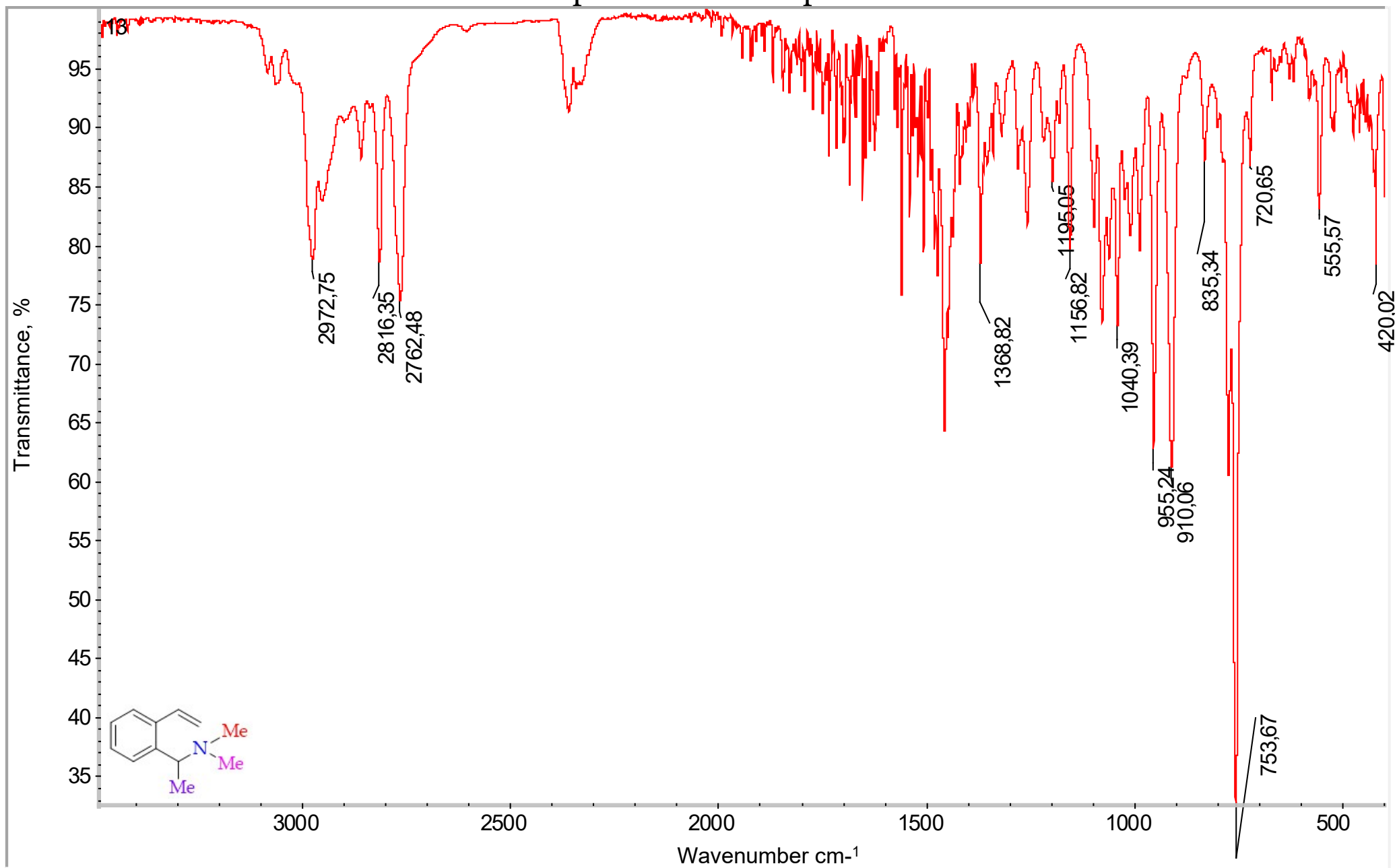
Acquisition Time (sec)		0.6921		Comment		single pulse decoupled gated NOE		Date			
Date Stamp											
File Name								Frequency (MHz)		150.91	
Nucleus		13C		Number of Transients		81		Origin		ECA 600	
Owner		delta		Points Count		32768		Pulse Sequence		single pulse dec	
Solvent		CHLOROFORM-d		Spectrum Offset (Hz)		15091.3428		Sweep Width (Hz)		47348.49	
								Temperature (degree C)		22.900	



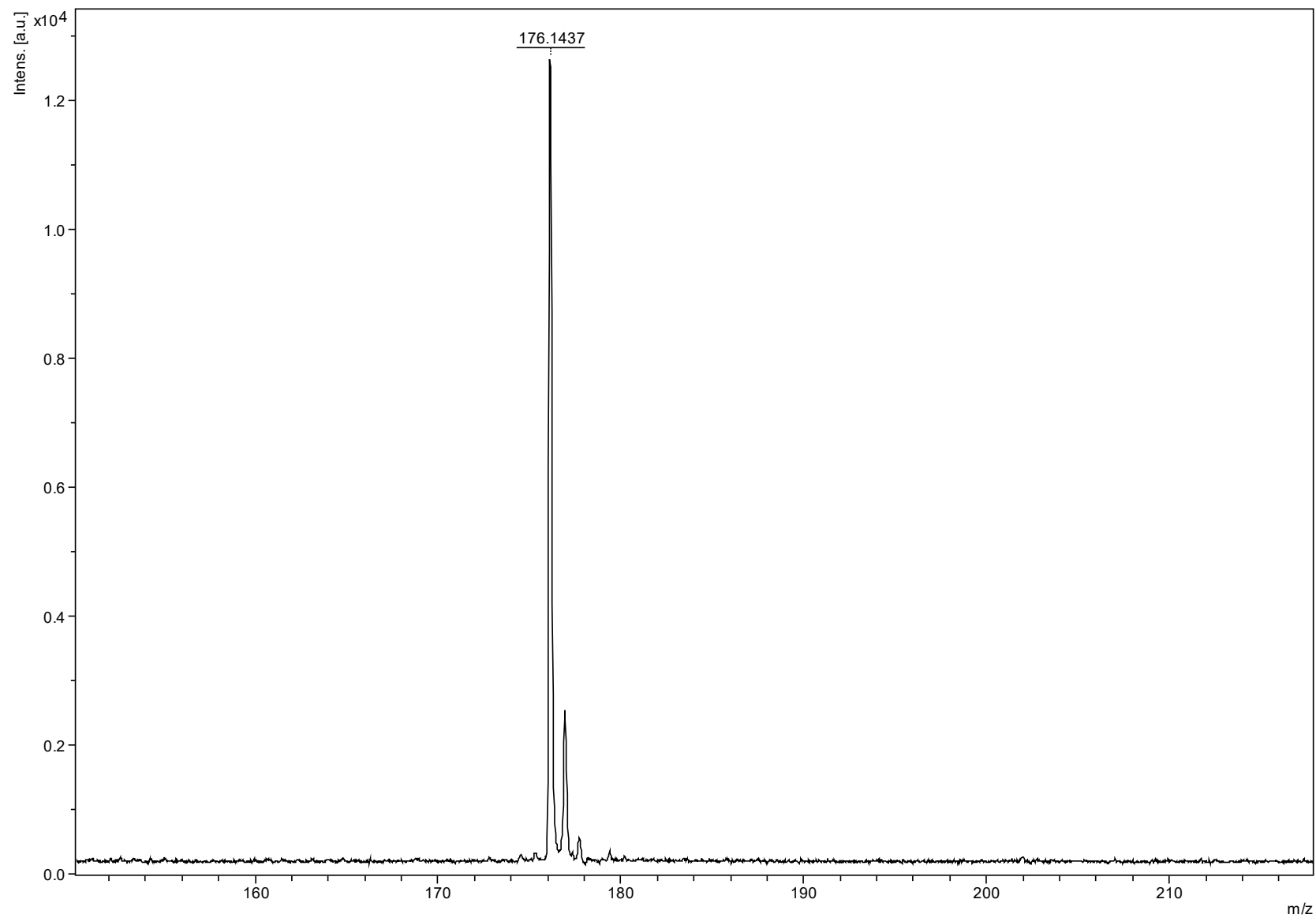
1a



IR spectrum of compound **1a**



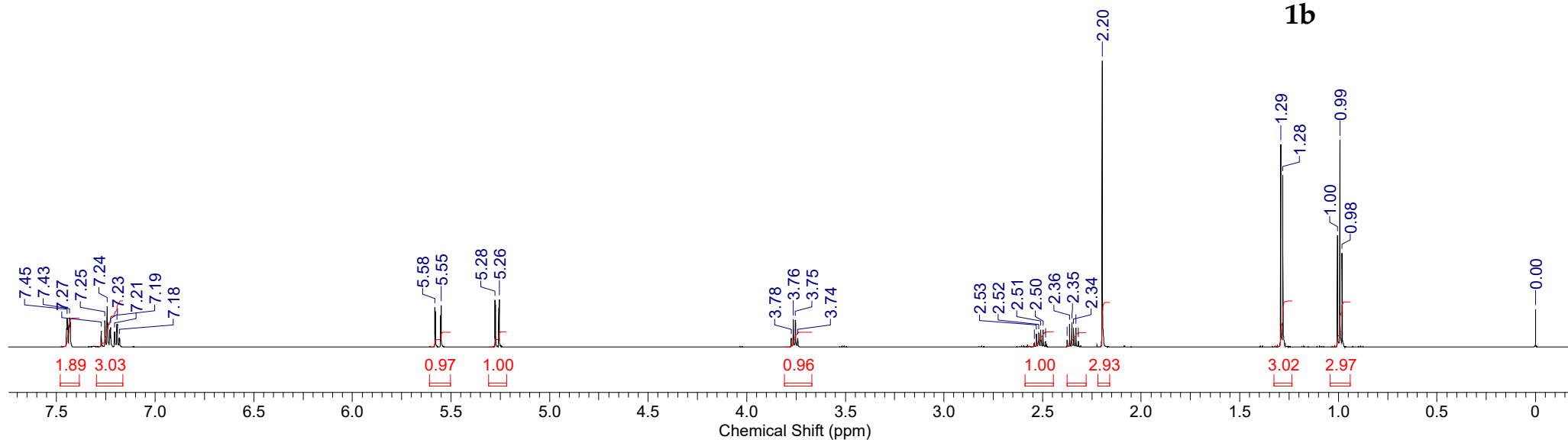
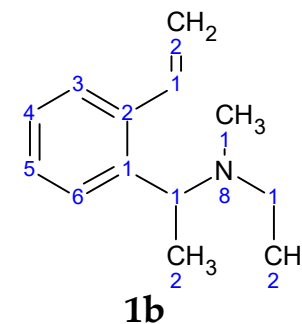
# HRMS (MALDI-TOF) spectrum of compound **1a**





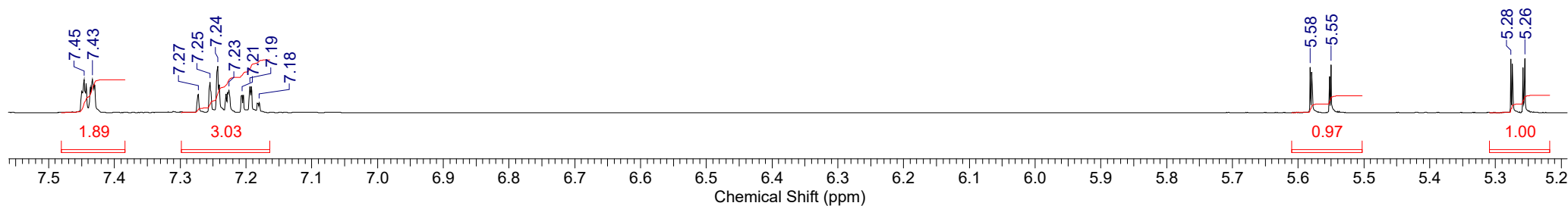
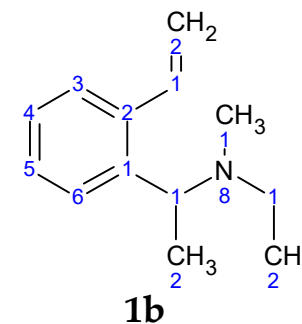
# $^1\text{H}$ NMR spectrum of compound **1b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
				Original Points Count	32768
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse.ex2
				Receiver Gain	30.00
Solvent	CHLOROFORM-d			Spectrum Offset (Hz)	5398.5166
				Sweep Width (Hz)	16534.39
Temperature (degree C)	25.000				



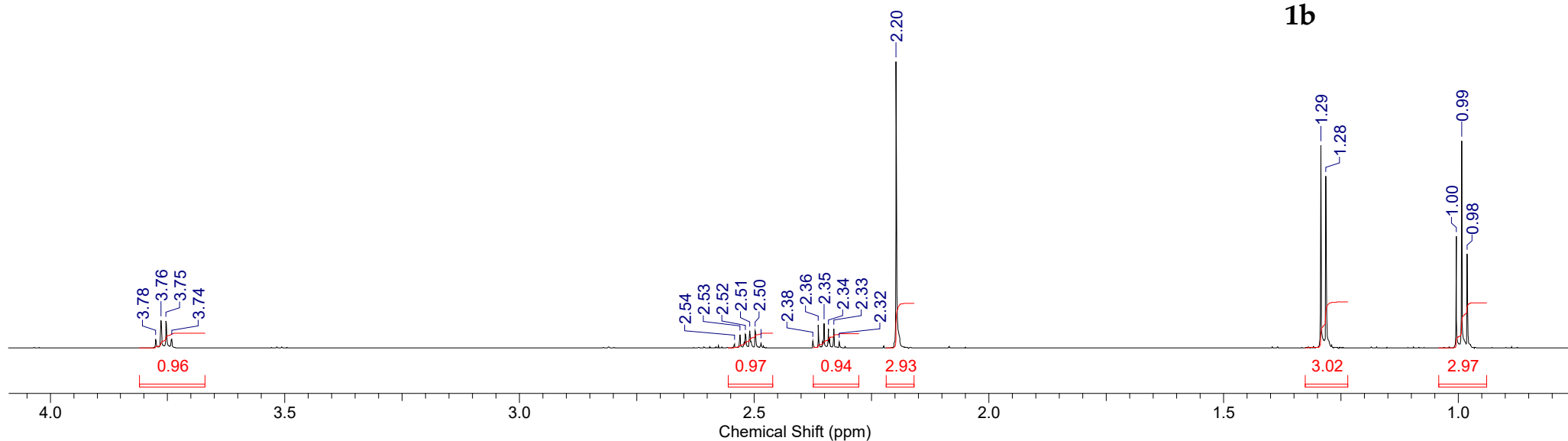
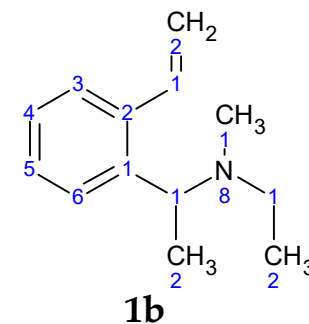
# <sup>1</sup>H NMR spectrum of compound **1b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	1H	Number of Transients	8	Origin	ECA 600
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d			Receiver Gain	30.00
				Spectrum Offset (Hz)	5398.5166
				Sweep Width (Hz)	16534.39
Temperature (degree C)	25.000				



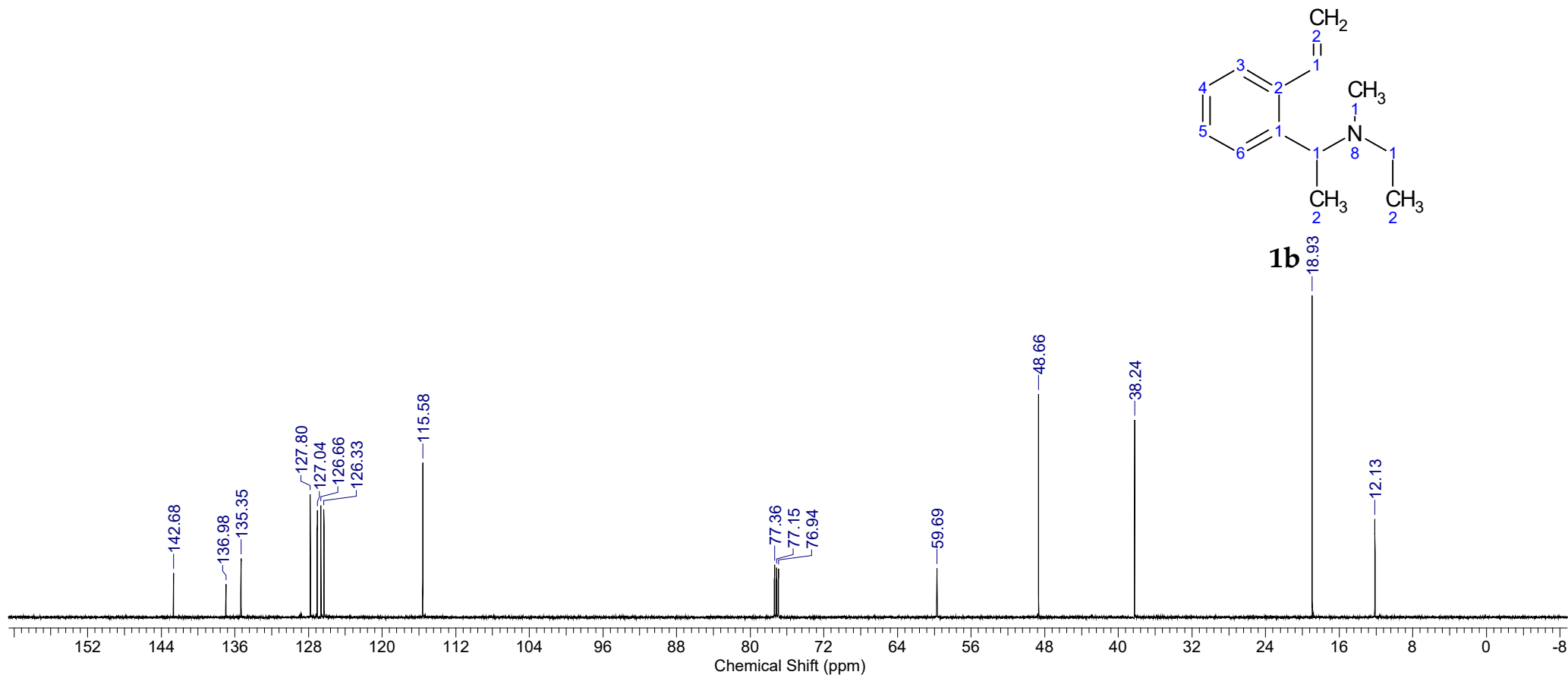
# $^1\text{H}$ NMR spectrum of compound **1b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)		Receiver Gain	30.00
Temperature (degree C)		5398.5166		Sweep Width (Hz)	16534.39



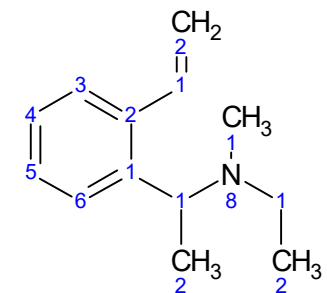
# $^{13}\text{C}$ NMR spectrum of compound **1b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE			Date	
Date Stamp							
File Name					Frequency (MHz)	150.91	
Nucleus	13C	Number of Transients	301	Origin	ECA 600	Original Points Count	32768
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse_dec	Receiver Gain	56.00
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49	Temperature (degree C)	22.400

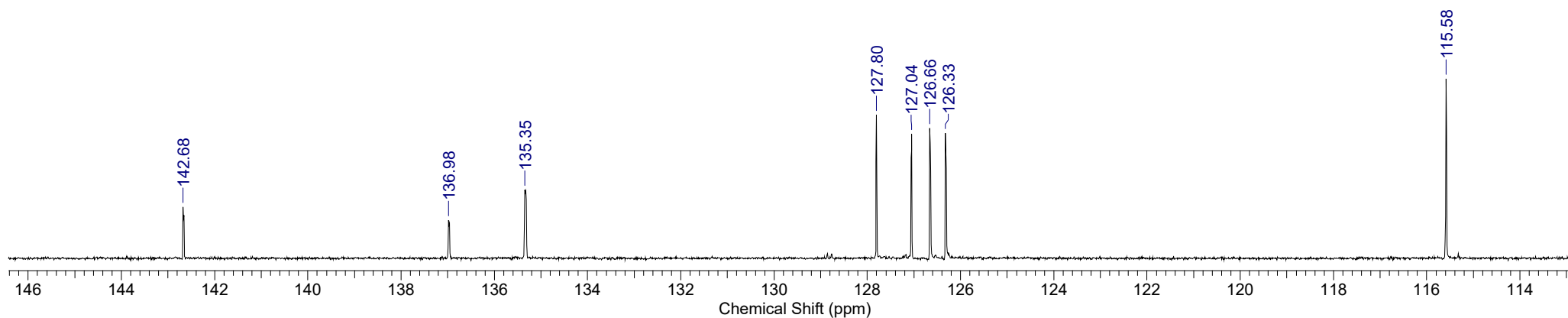


# $^{13}\text{C}$ NMR spectrum of compound **1b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE			Date	
Date Stamp							
File Name					Frequency (MHz)	150.91	
Nucleus	13C	Number of Transients	301	Origin	ECA 600	Original Points Count	32768
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse_dec	Receiver Gain	56.00
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49	Temperature (degree C)	22.400

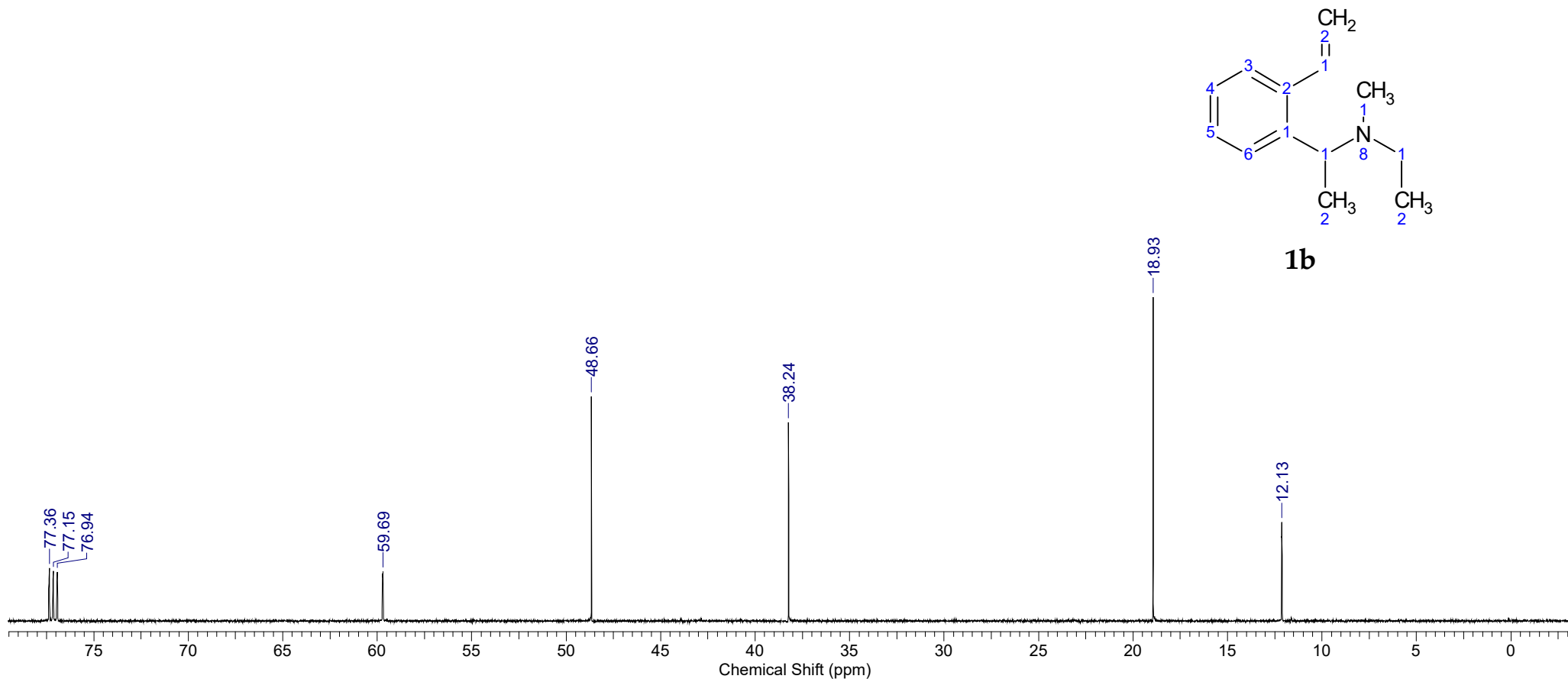


**1b**

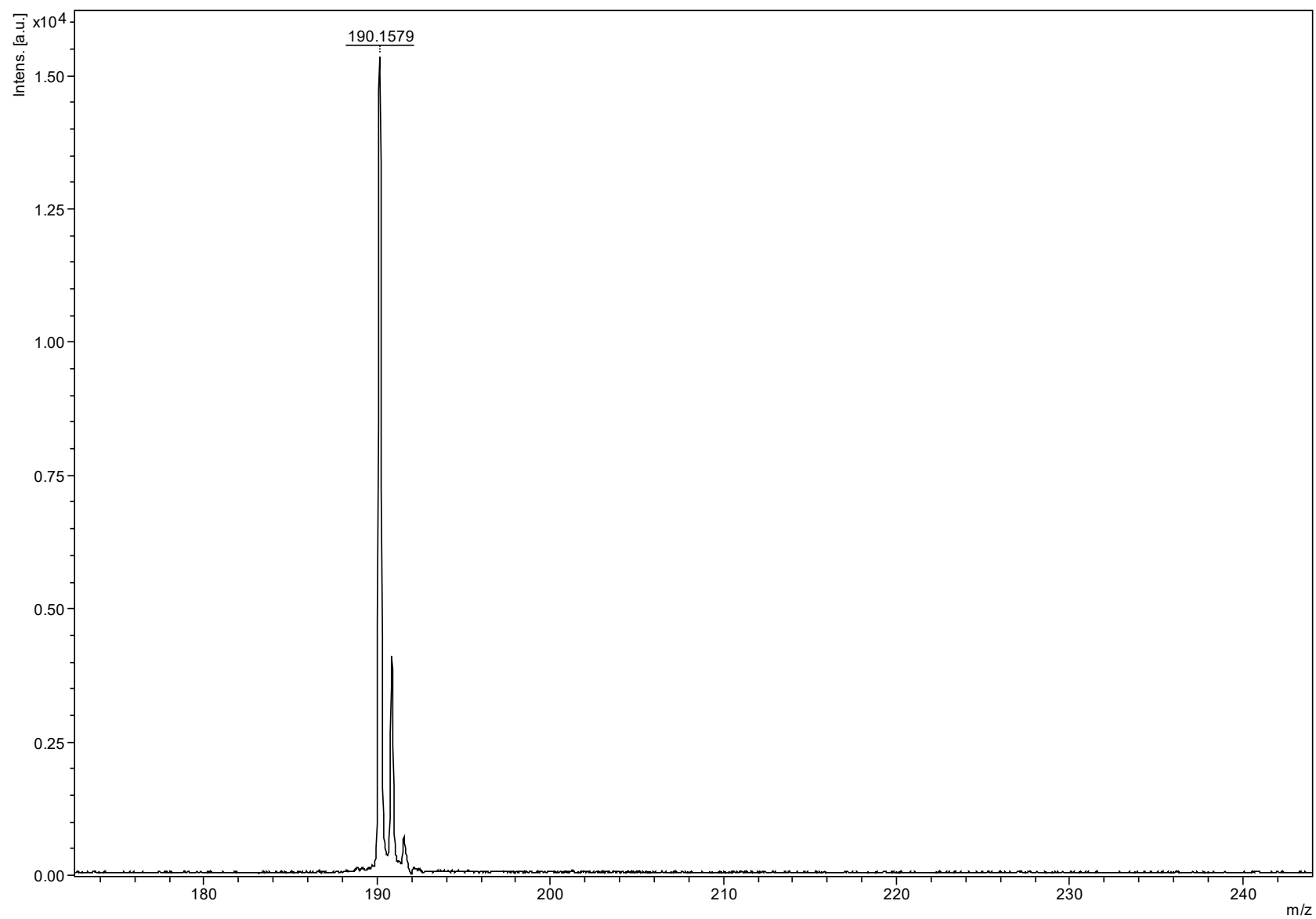


# $^{13}\text{C}$ NMR spectrum of compound **1b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE			Date	
Date Stamp							
File Name					Frequency (MHz)	150.91	
Nucleus	13C	Number of Transients	301	Origin	ECA 600	Original Points Count	32768
Owner	delta	Points Count	32768	Pulse Sequence	single_pulse_dec	Receiver Gain	56.00
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49	Temperature (degree C)	22.400

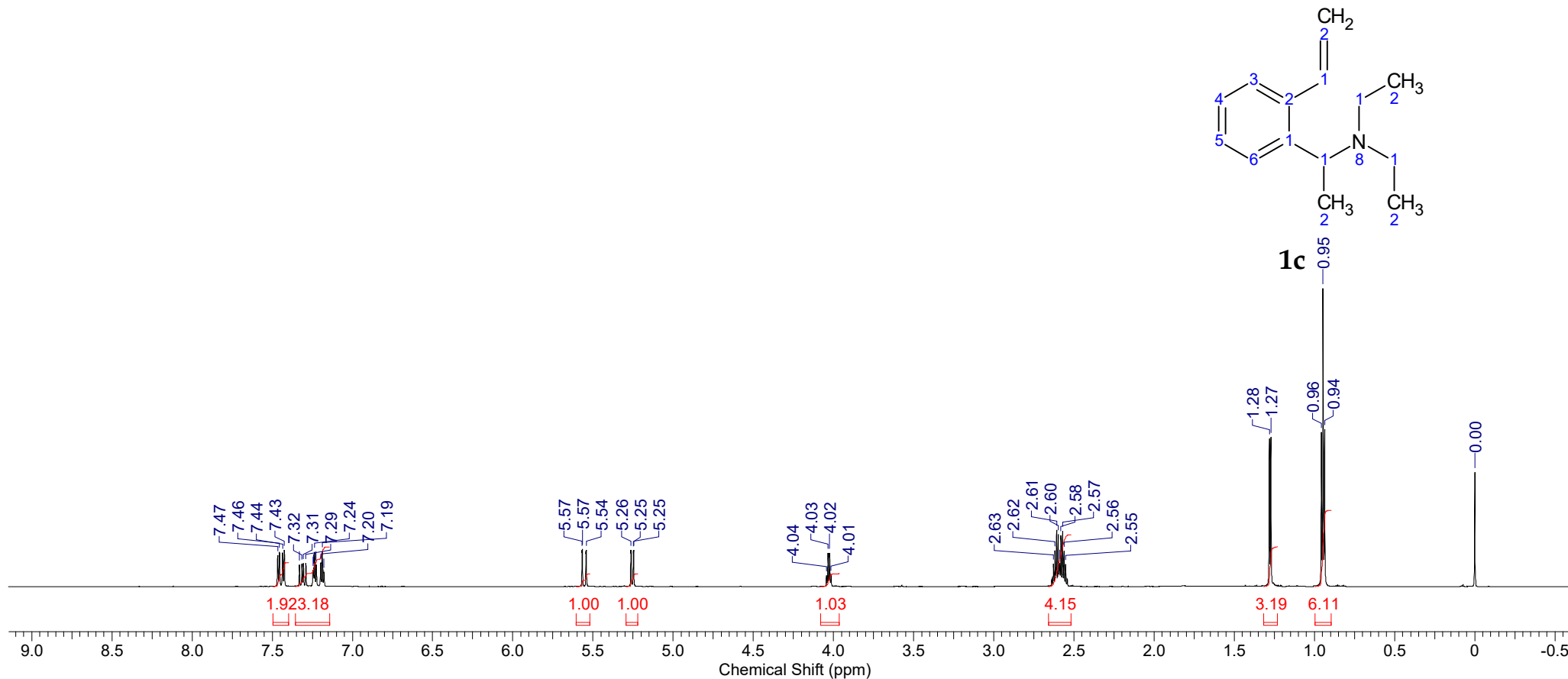


# HRMS (MALDI-TOF) spectrum of compound **1b**



# <sup>1</sup>H NMR spectrum of compound **1c**

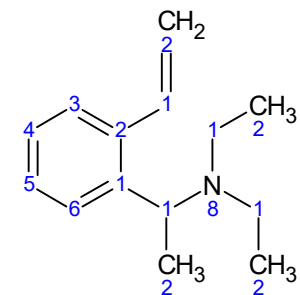
Acquisition Time (sec)	2.0972	Date				Date Stamp	
File Name							
Frequency (MHz)	700.17	Nucleus	1H	Number of Transients	8	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	65536	Pulse Sequence	zg30
Receiver Gain	17.21	SW(cyclical) (Hz)	15625.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	6272.3657	Sweep Width (Hz)	15624.76	Temperature (degree C)	24.988		



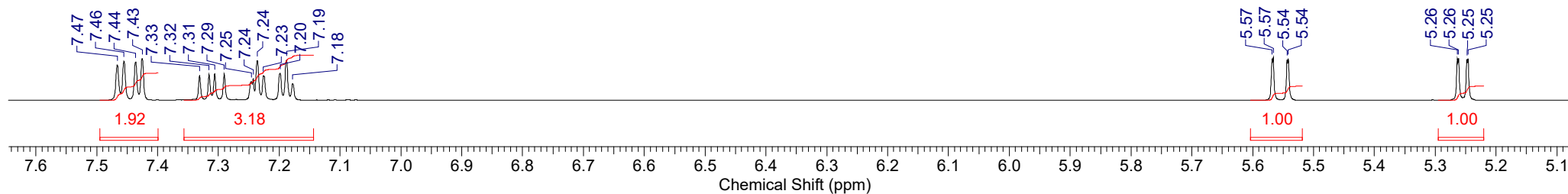


# $^1\text{H}$ NMR spectrum of compound **1c**

Acquisition Time (sec)	2.0972	Date				Date Stamp	
File Name							
Frequency (MHz)	700.17	Nucleus	1H	Number of Transients	8	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	65536	Pulse Sequence	zg30
Receiver Gain	17.21	SW(cyclical) (Hz)	15625.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	6272.3657	Sweep Width (Hz)	15624.76	Temperature (degree C)	24.988		

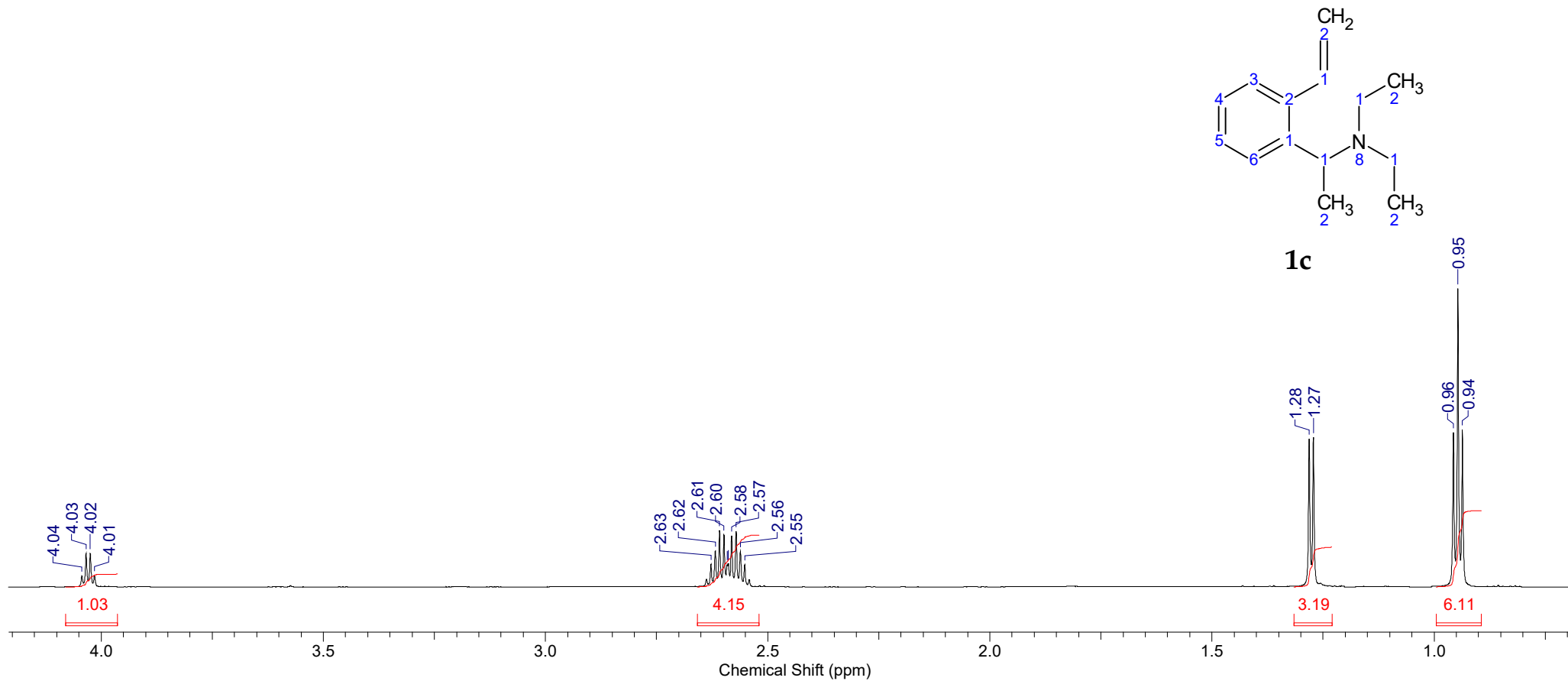


**1c**



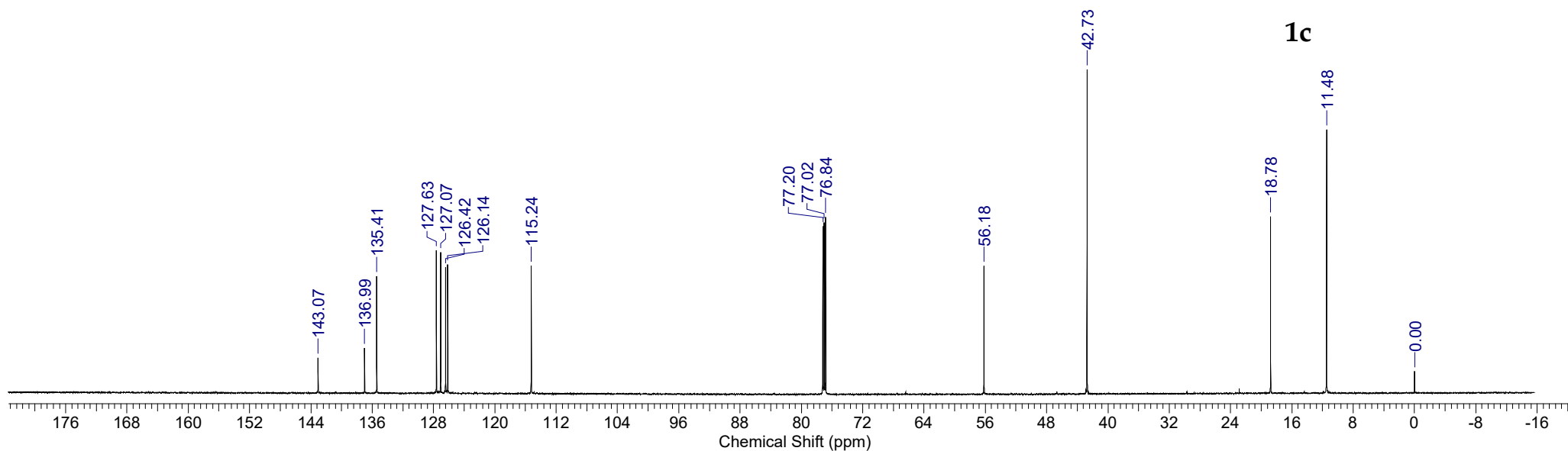
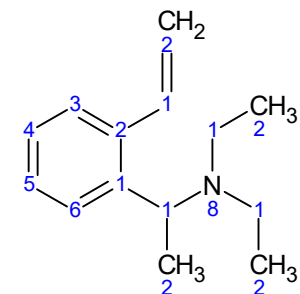
# <sup>1</sup>H NMR spectrum of compound **1c**

Acquisition Time (sec)	2.0972	Date				Date Stamp	
File Name							
Frequency (MHz)	700.17	Nucleus	1H	Number of Transients	8	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	65536	Pulse Sequence	zg30
Receiver Gain	17.21	SW(cyclical) (Hz)	15625.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	6272.3657	Sweep Width (Hz)	15624.76	Temperature (degree C)	24.988		



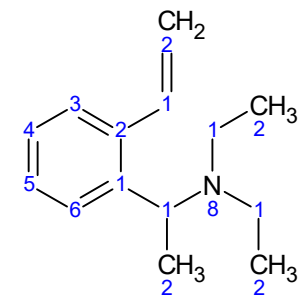
# $^{13}\text{C}$ NMR spectrum of compound **1c**

Acquisition Time (sec)		0.7406		Date		Date Stamp	
File Name							
Frequency (MHz)		176.06		Nucleus		13C	
Original Points Count		32768		Number of Transients		400	
Receiver Gain		101.00		Owner		nmr	
Sweep Width (Hz)		44246.44		Points Count		32768	
				SW(cyclical) (Hz)		44247.79	
				Solvent		CHLOROFORM-d	
				Spectrum Offset (Hz)		19362.2637	
				Temperature (degree C)		24.995	

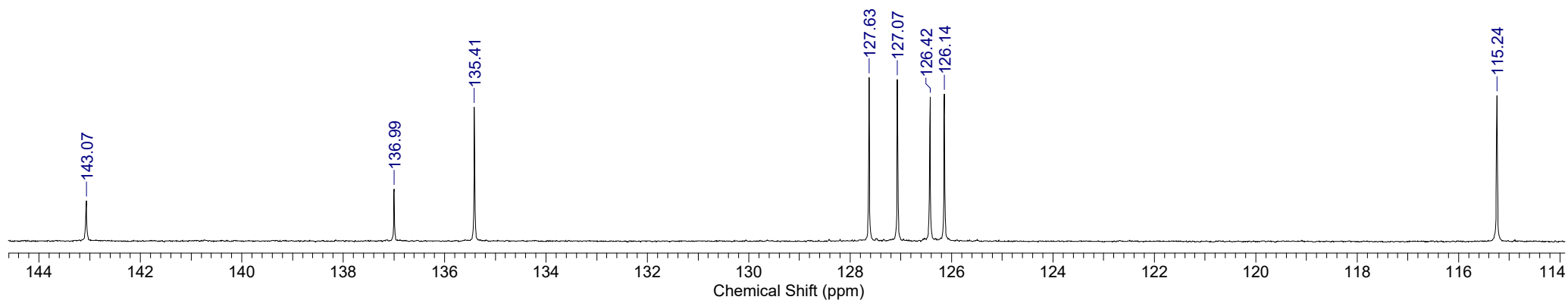


# $^{13}\text{C}$ NMR spectrum of compound **1c**

Acquisition Time (sec)	0.7406	Date				Date Stamp	
File Name							
Frequency (MHz)	176.06	Nucleus	13C	Number of Transients	400	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	101.00	SW(cyclical) (Hz)	44247.79	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	19362.2637
Sweep Width (Hz)	44246.44	Temperature (degree C)	24.995				

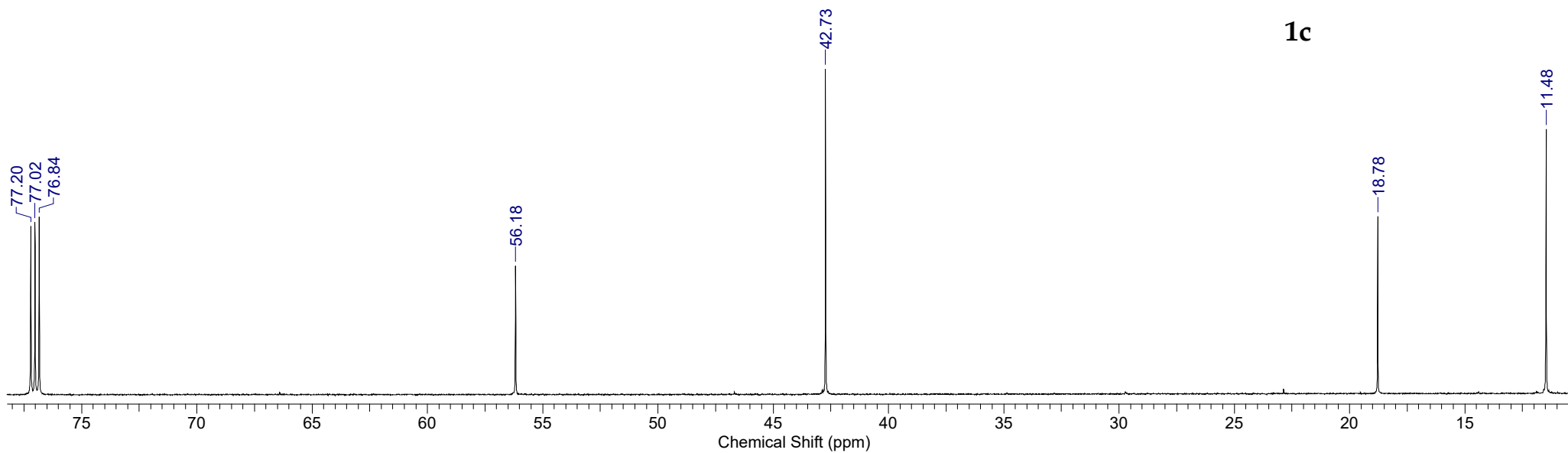
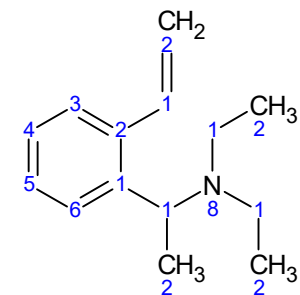


**1c**

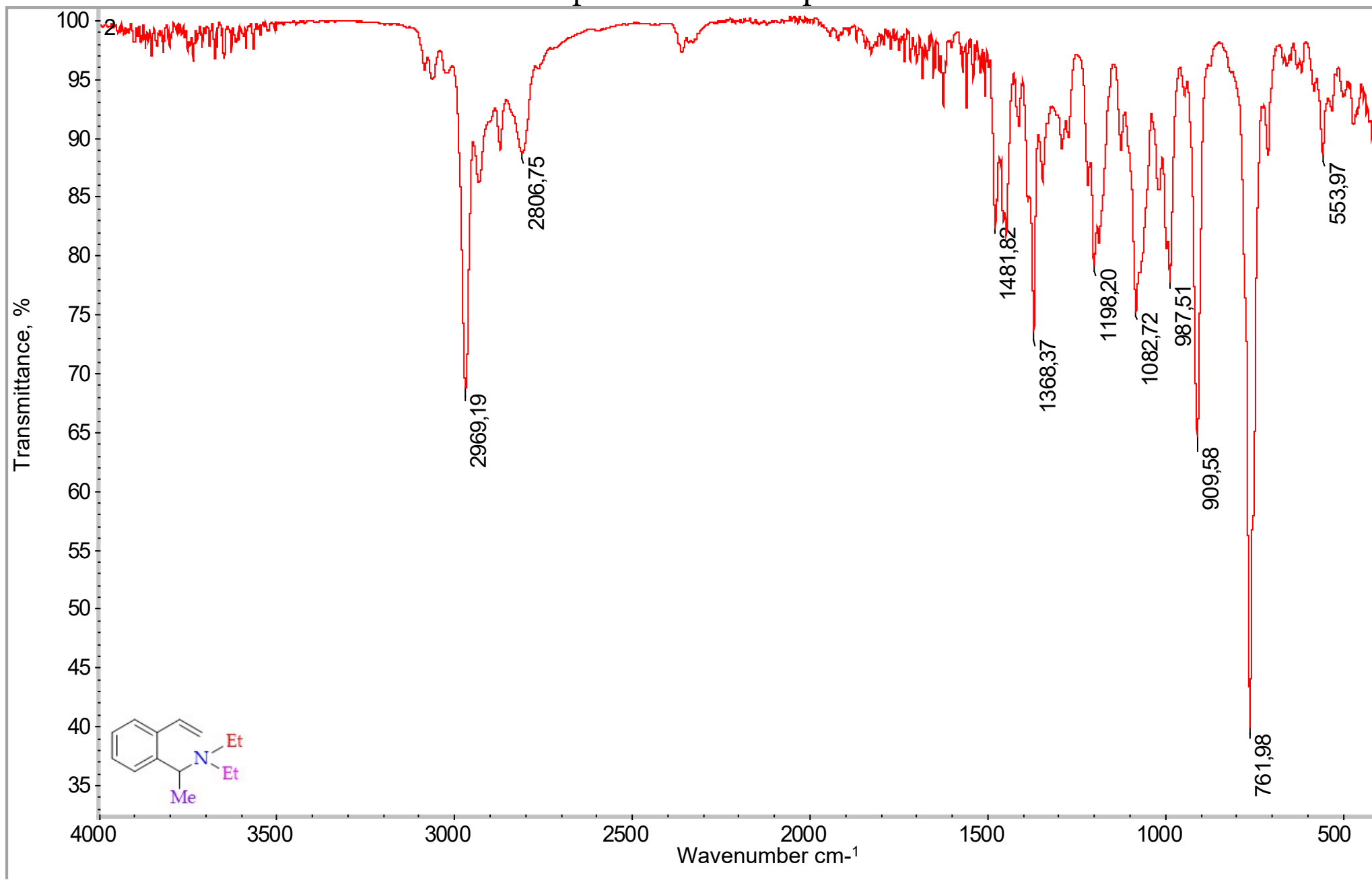


# $^{13}\text{C}$ NMR spectrum of compound **1c**

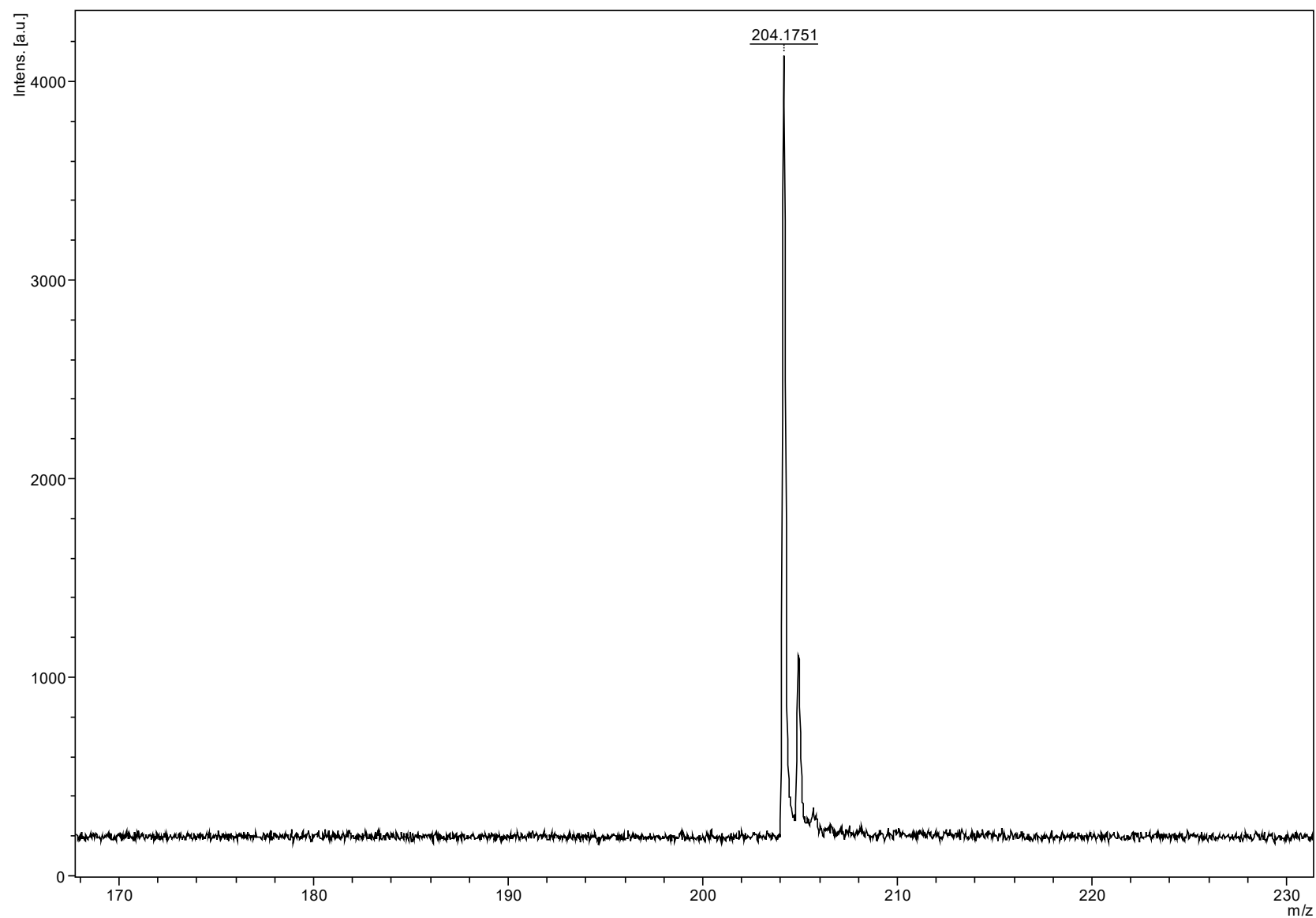
Acquisition Time (sec)	0.7406	Date				Date Stamp	
File Name							
Frequency (MHz)	176.06	Nucleus	13C	Number of Transients	400	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	101.00	SW(cyclical) (Hz)	44247.79	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	19362.2637
Sweep Width (Hz)	44246.44	Temperature (degree C)	24.995				



IR spectrum of compound **1c**

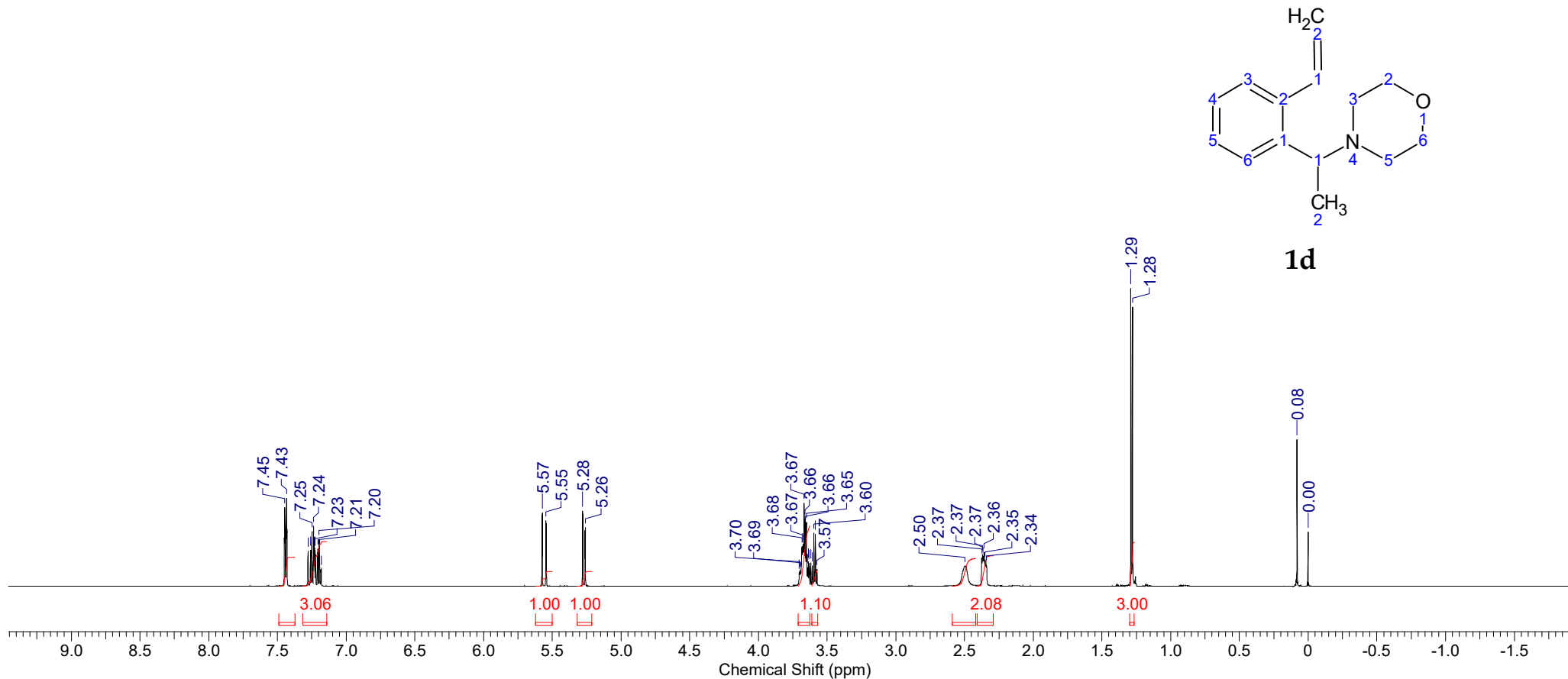


# HRMS (MALDI-TOF) spectrum of compound **1c**



# $^1\text{H}$ NMR spectrum of compound **1d**

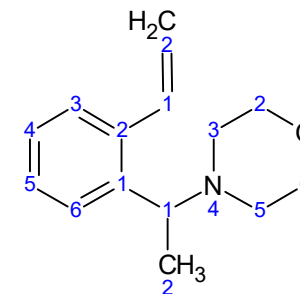
<b>Acquisition Time (sec)</b> 1.9818		<b>Comment</b> single pulse		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b> 600.17	
<b>Nucleus</b> 1H		<b>Number of Transients</b> 8		<b>Origin</b> ECA 600	
				<b>Original Points Count</b> 32768	
<b>Owner</b> CKP		<b>Points Count</b> 32768		<b>Pulse Sequence</b> single_pulse.ex2	
				<b>Receiver Gain</b> 24.00	
<b>Solvent</b> CHLOROFORM-d		<b>Spectrum Offset (Hz)</b> 5394.4800		<b>Sweep Width (Hz)</b> 16534.39	



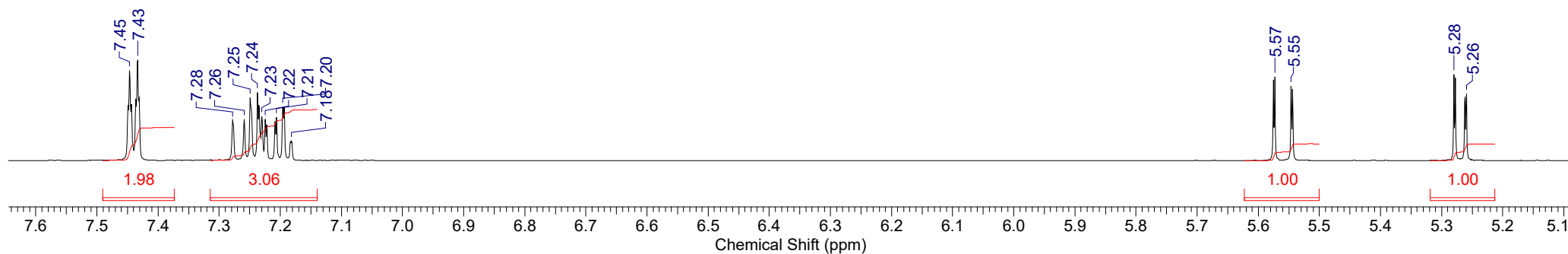


# $^1\text{H}$ NMR spectrum of compound **1d**

<b>Acquisition Time (sec)</b> 1.9818		<b>Comment</b> single pulse	<b>Date</b>	
<b>Date Stamp</b>				
<b>File Name</b>			<b>Frequency (MHz)</b> 600.17	
<b>Nucleus</b> $^1\text{H}$		<b>Number of Transients</b> 8	<b>Origin</b> ECA 600	<b>Original Points Count</b> 32768
<b>Owner</b> CKP		<b>Points Count</b> 32768	<b>Pulse Sequence</b> single_pulse.ex2	<b>Receiver Gain</b> 24.00
<b>Solvent</b> CHLOROFORM-d		<b>Spectrum Offset (Hz)</b> 5394.4800	<b>Sweep Width (Hz)</b> 16534.39	

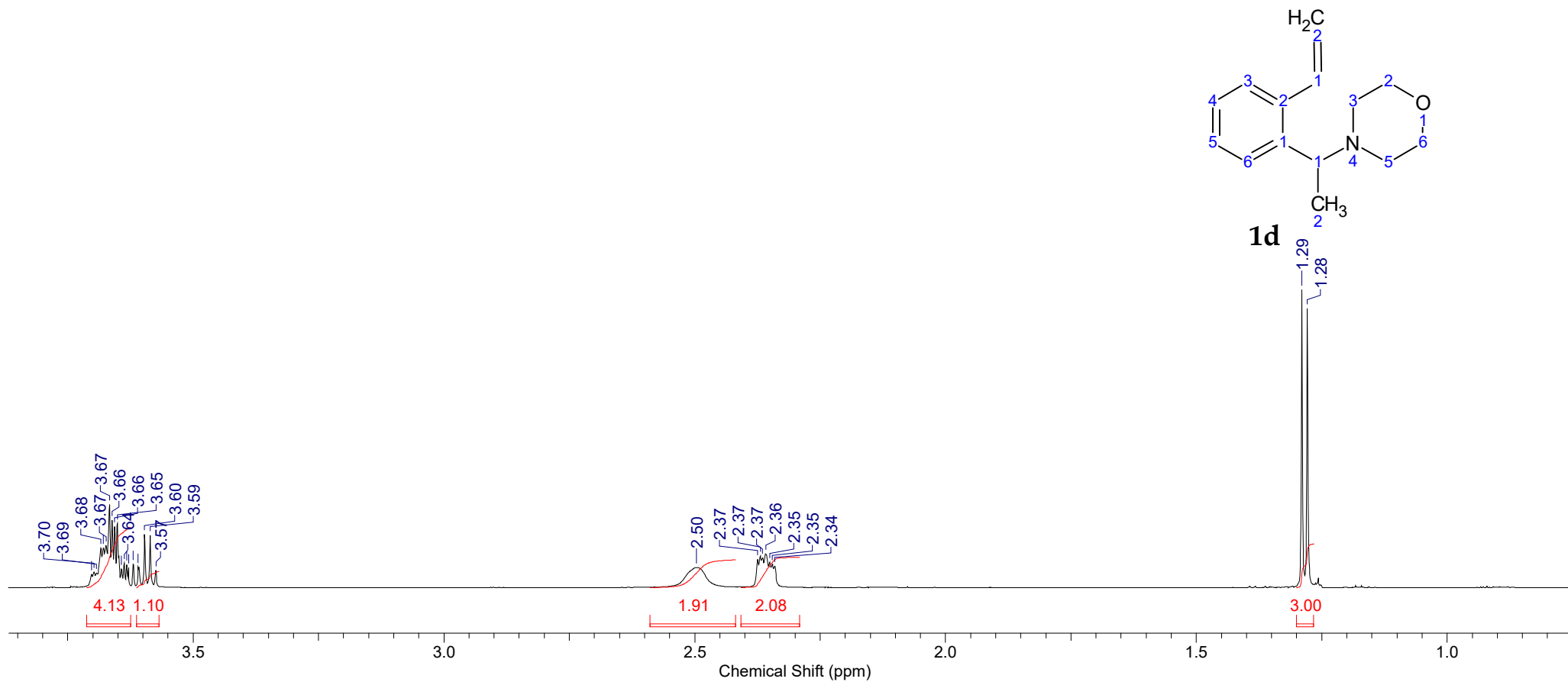


**1d**



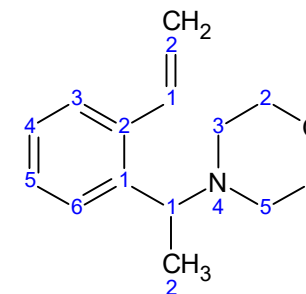
# $^1\text{H}$ NMR spectrum of compound **1d**

<b>Acquisition Time (sec)</b> 1.9818		<b>Comment</b> single pulse	<b>Date</b>	
<b>Date Stamp</b>				
<b>File Name</b>			<b>Frequency (MHz)</b> 600.17	
<b>Nucleus</b> $^1\text{H}$		<b>Number of Transients</b> 8	<b>Origin</b> ECA 600	<b>Original Points Count</b> 32768
<b>Owner</b> CKP		<b>Points Count</b> 32768	<b>Pulse Sequence</b> single_pulse.ex2	<b>Receiver Gain</b> 24.00
<b>Solvent</b> CHLOROFORM-d		<b>Spectrum Offset (Hz)</b> 5394.4800	<b>Sweep Width (Hz)</b> 16534.39	

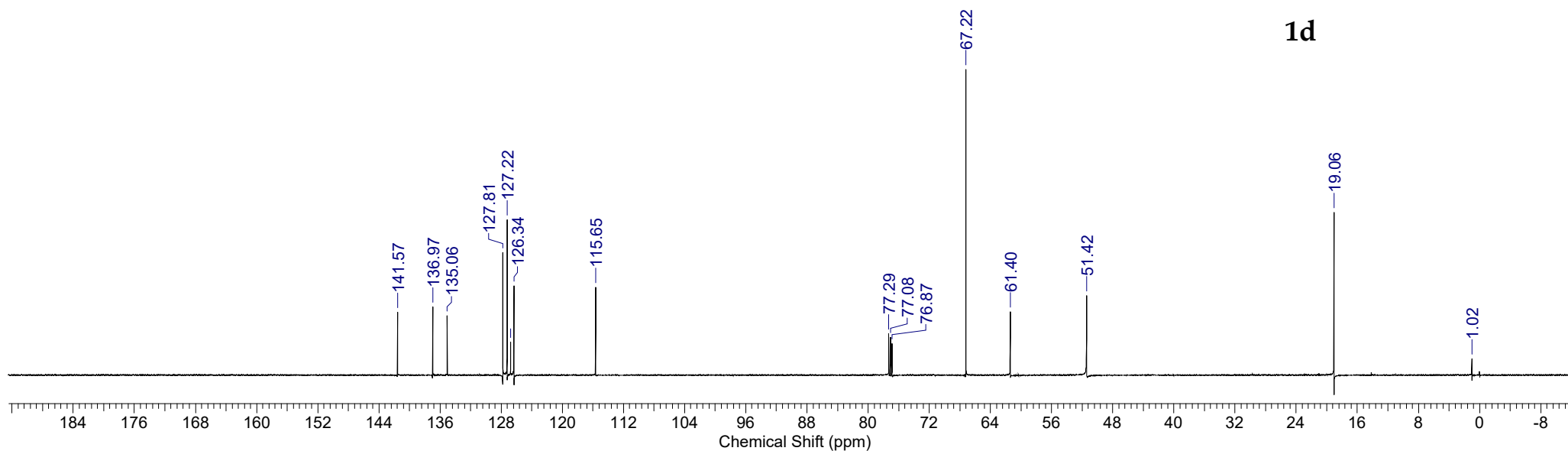


# $^{13}\text{C}$ NMR spectrum of compound **1d**

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
				<b>Original Points Count</b>	32768
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
				<b>Receiver Gain</b>	58.00
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15072.1279	<b>Sweep Width (Hz)</b>	47348.49

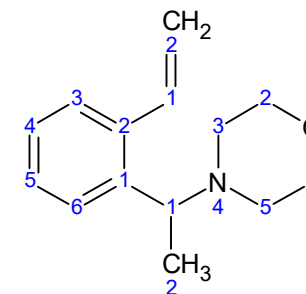


**1d**

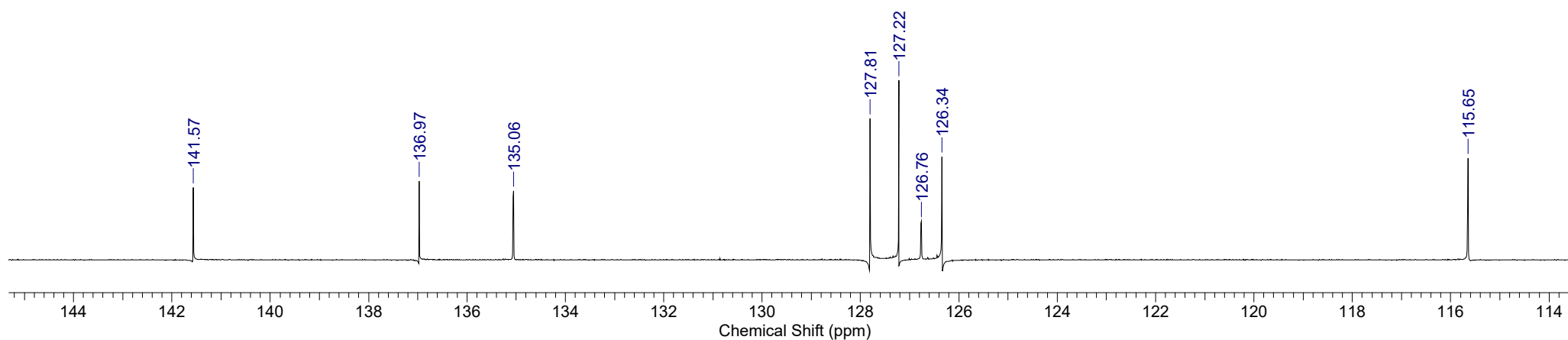


# $^{13}\text{C}$ NMR spectrum of compound **1d**

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
		<b>Original Points Count</b>	32768		
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
		<b>Receiver Gain</b>	58.00		
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15072.1279	<b>Sweep Width (Hz)</b>	47348.49

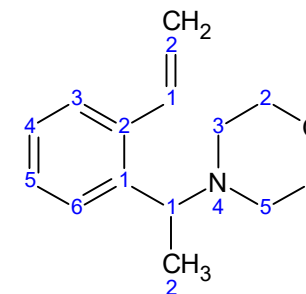


**1d**

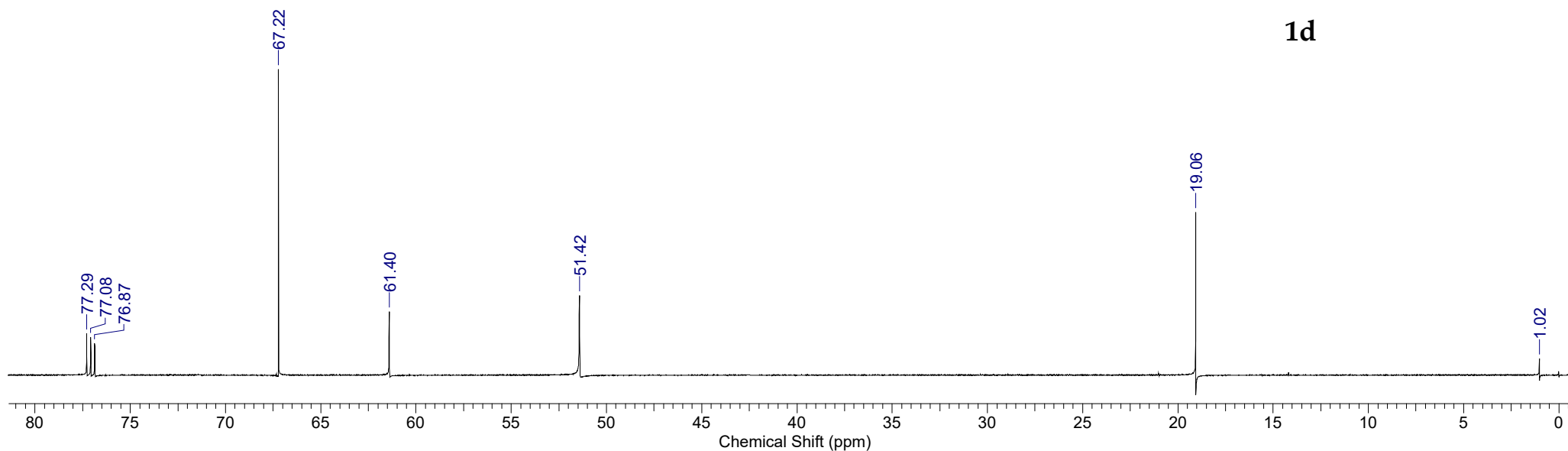


# $^{13}\text{C}$ NMR spectrum of compound **1d**

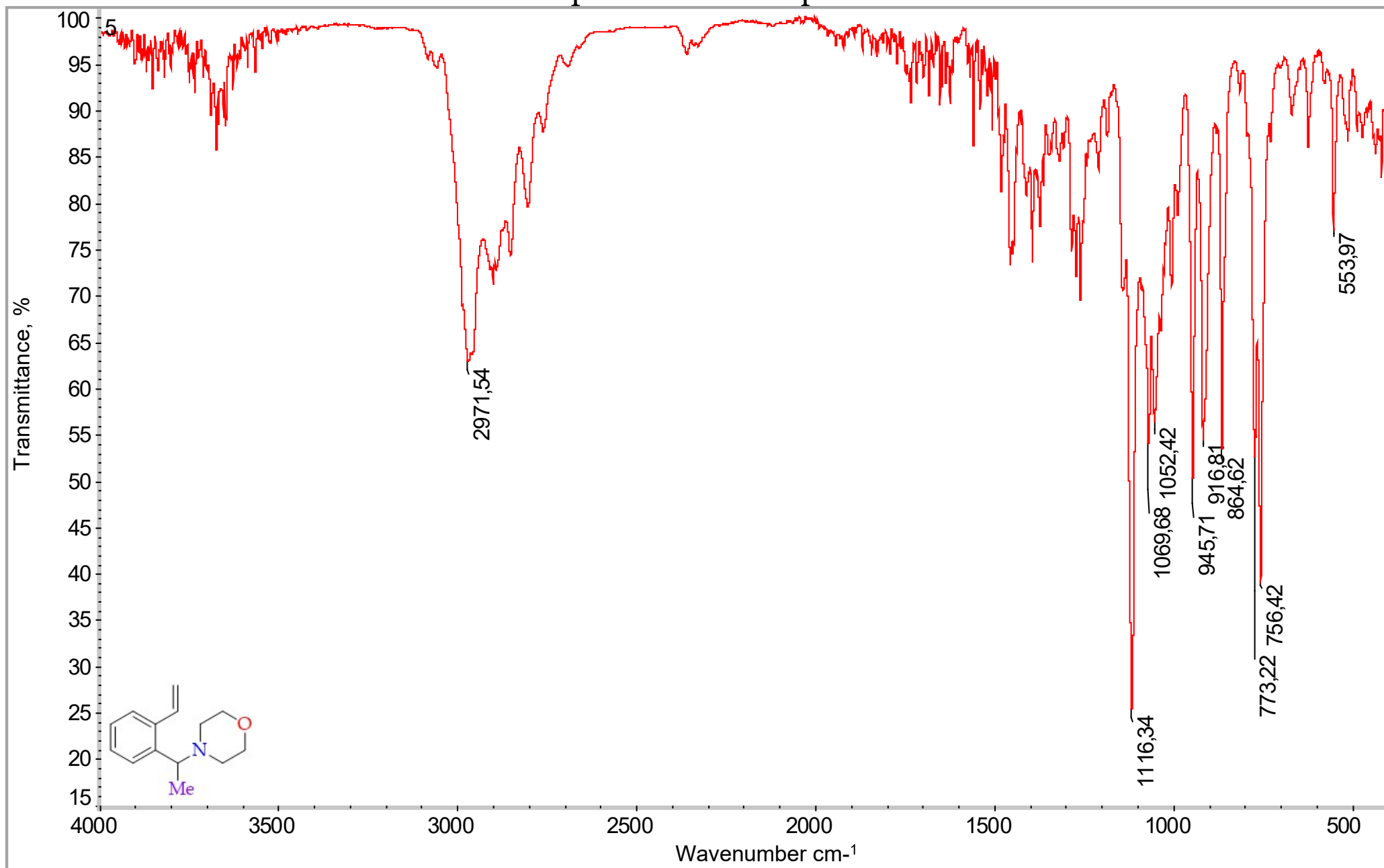
<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
				<b>Original Points Count</b>	32768
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
				<b>Receiver Gain</b>	58.00
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15072.1279	<b>Sweep Width (Hz)</b>	47348.49



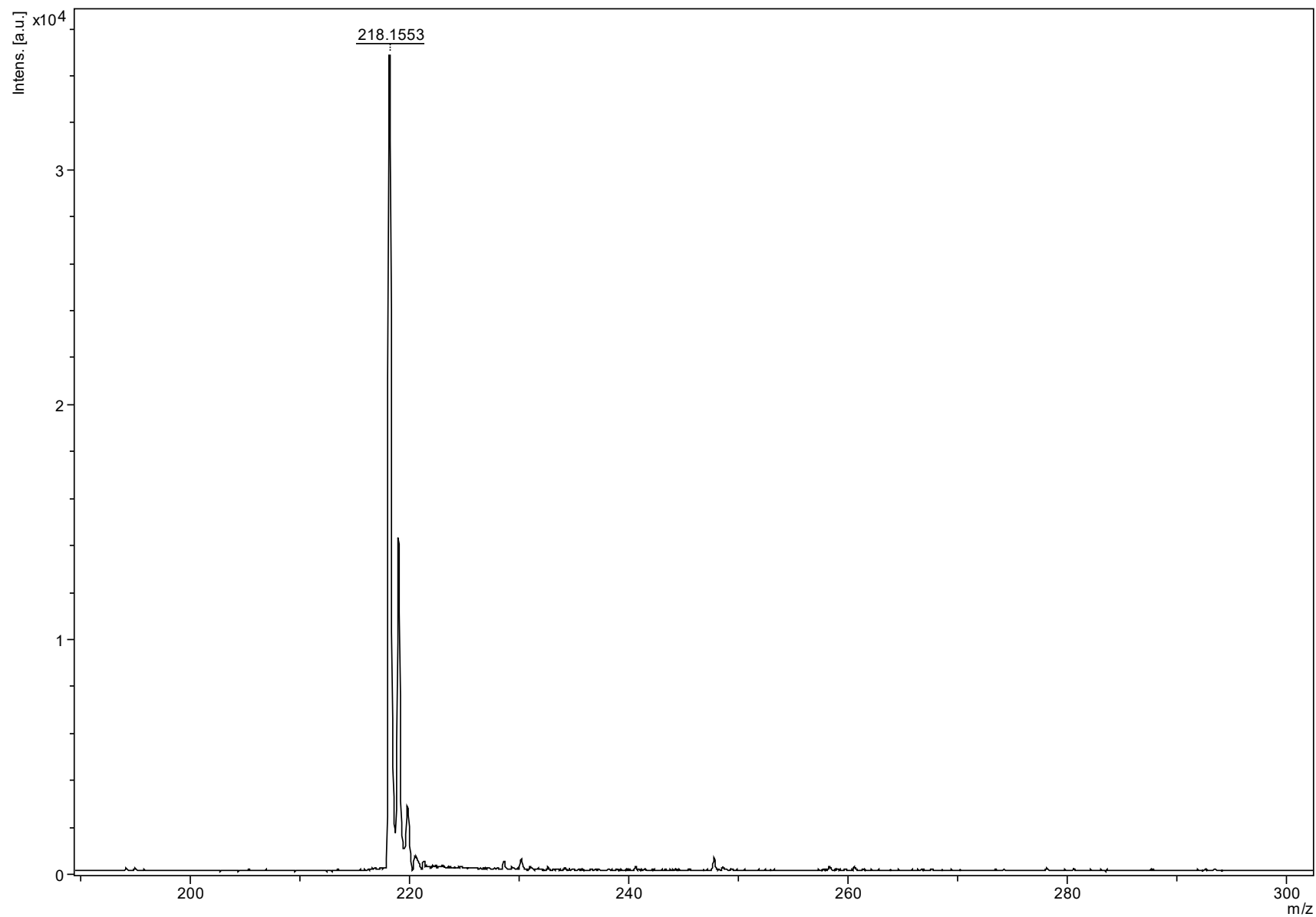
**1d**



# IR spectrum of compound **1d**

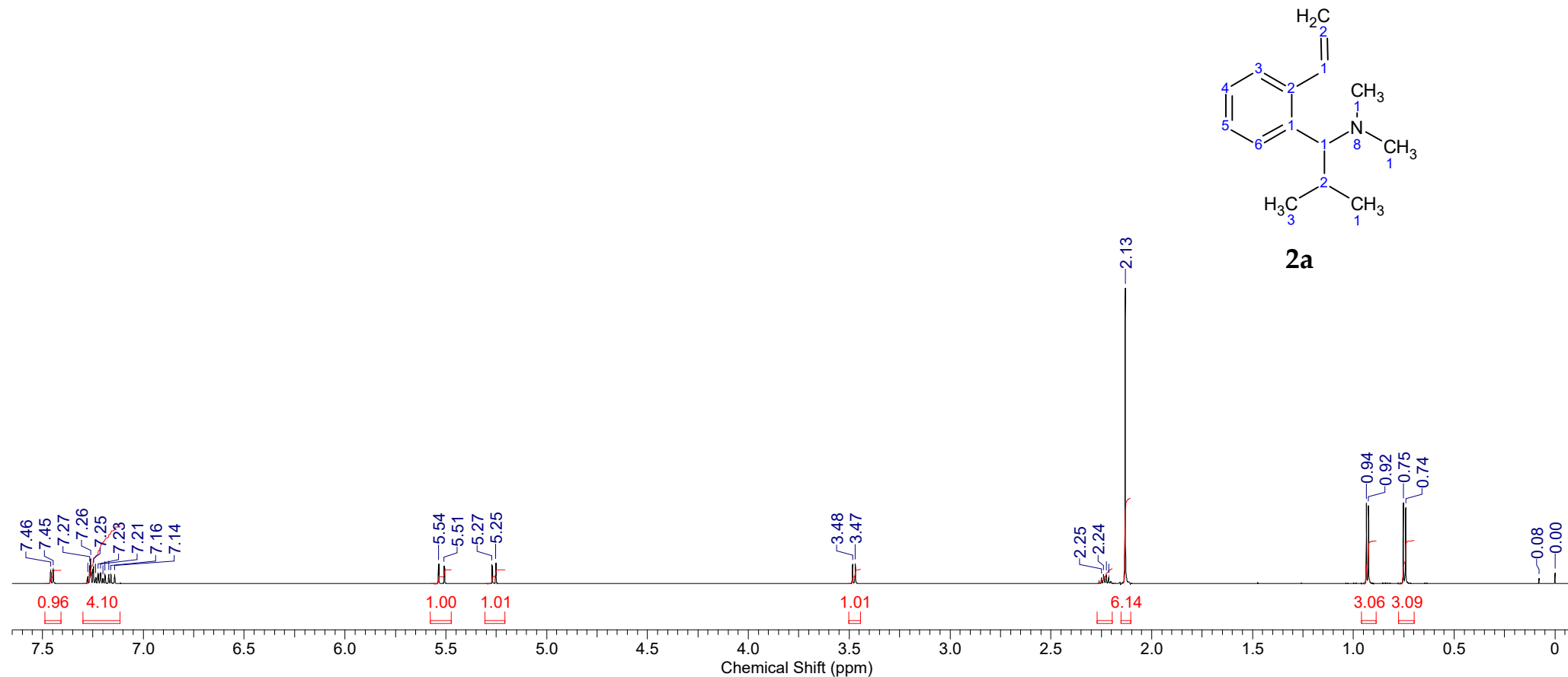


# HRMS (MALDI-TOF) spectrum of compound **1d**



# <sup>1</sup>H NMR spectrum of compound 2a

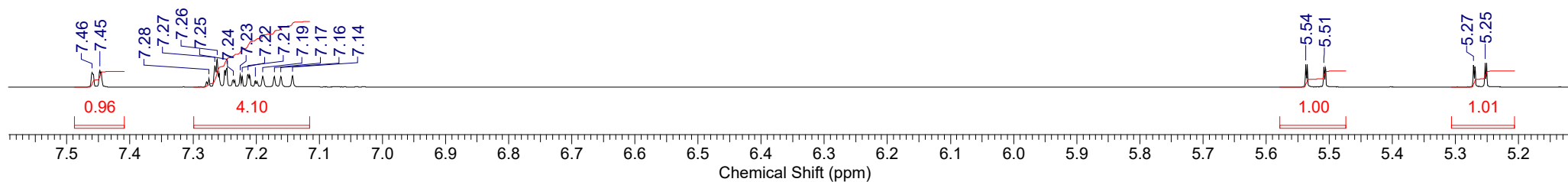
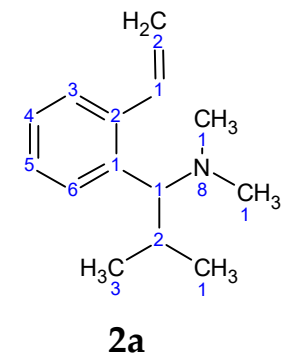
Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name					
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	4
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	26.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	4521.0088
				Origin	ECA 600
				Pulse Sequence	single_pulse.ex2
				Sweep Width (Hz)	16534.39





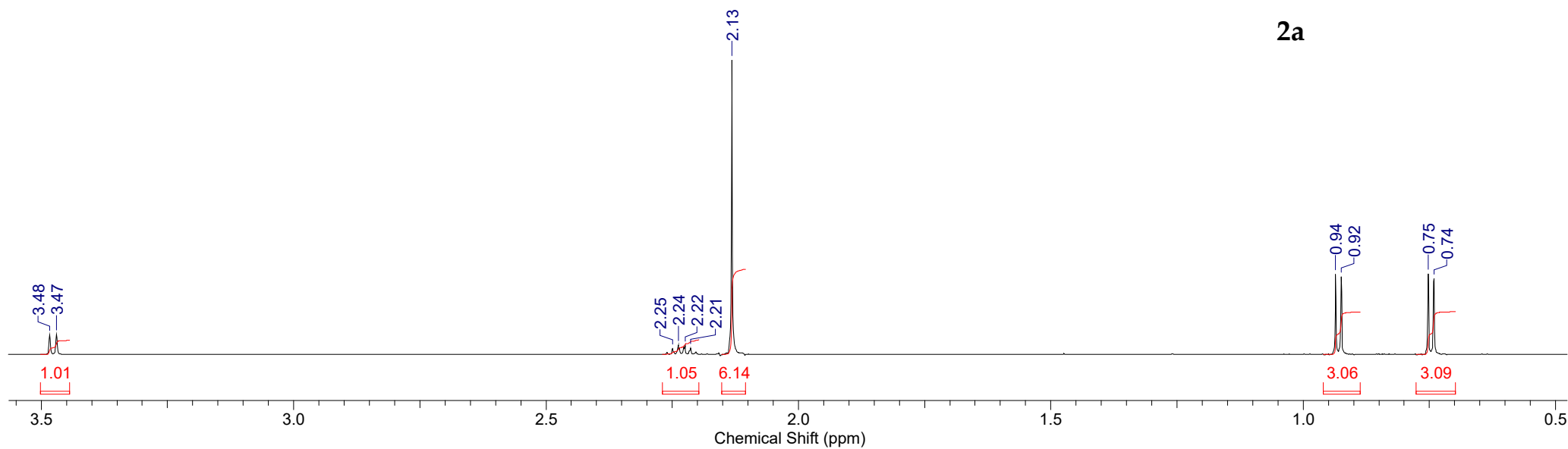
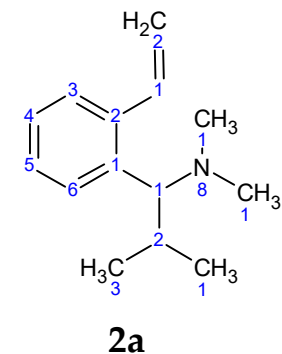
# <sup>1</sup>H NMR spectrum of compound 2a

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name					
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	4
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	26.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	4521.0088
				Origin	ECA 600
				Pulse Sequence	single_pulse.ex2
				Sweep Width (Hz)	16534.39



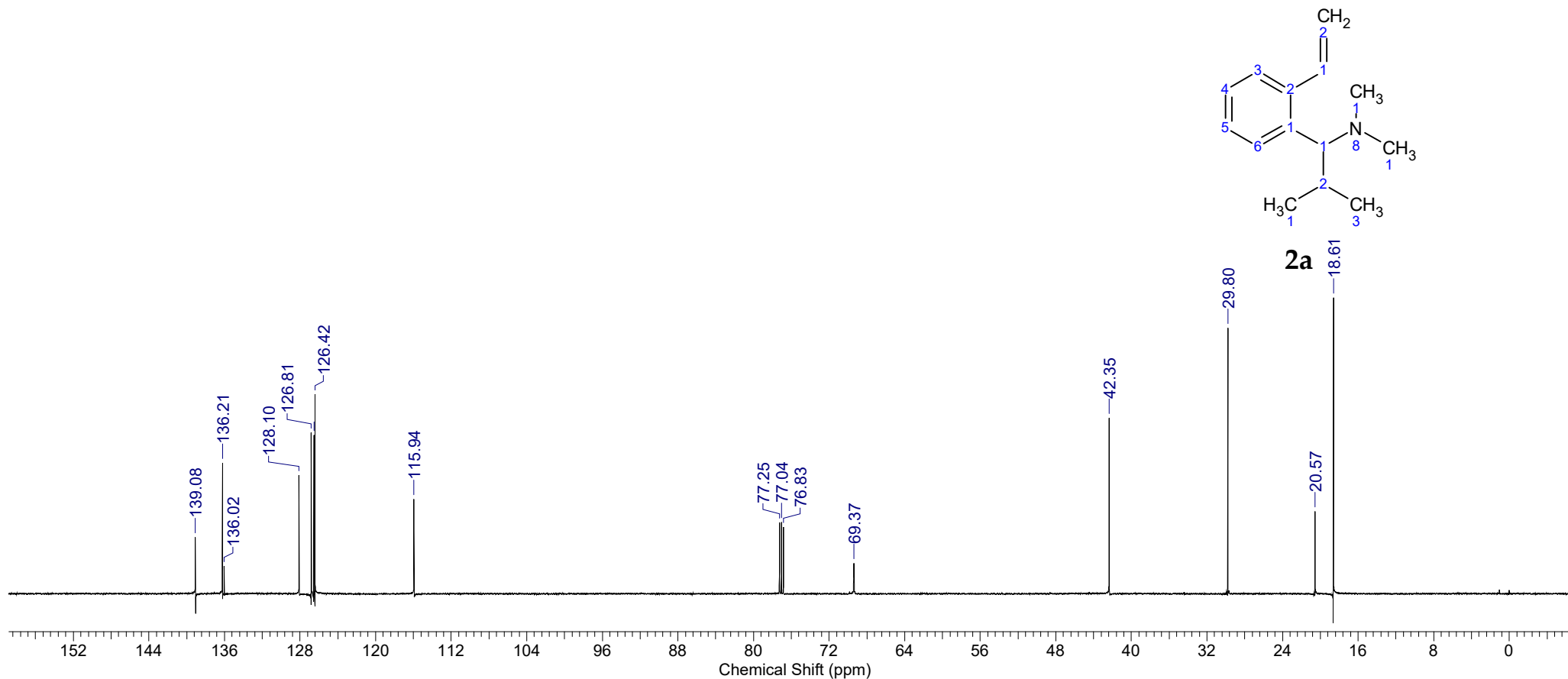
# $^1\text{H}$ NMR spectrum of compound **2a**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date			
Date Stamp							
File Name							
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	4	Origin	ECA 600
Original Points Count	32768	Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Receiver Gain	26.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	4521.0088	Sweep Width (Hz)	16534.39



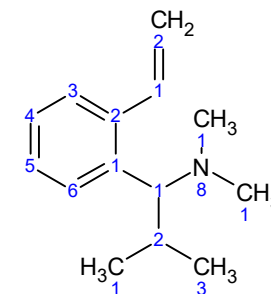
# $^{13}\text{C}$ NMR spectrum of compound 2a

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
		<b>Original Points Count</b>	32768		
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single_pulse_dec
		<b>Receiver Gain</b>	54.00		
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15076.4629	<b>Sweep Width (Hz)</b>	47348.49

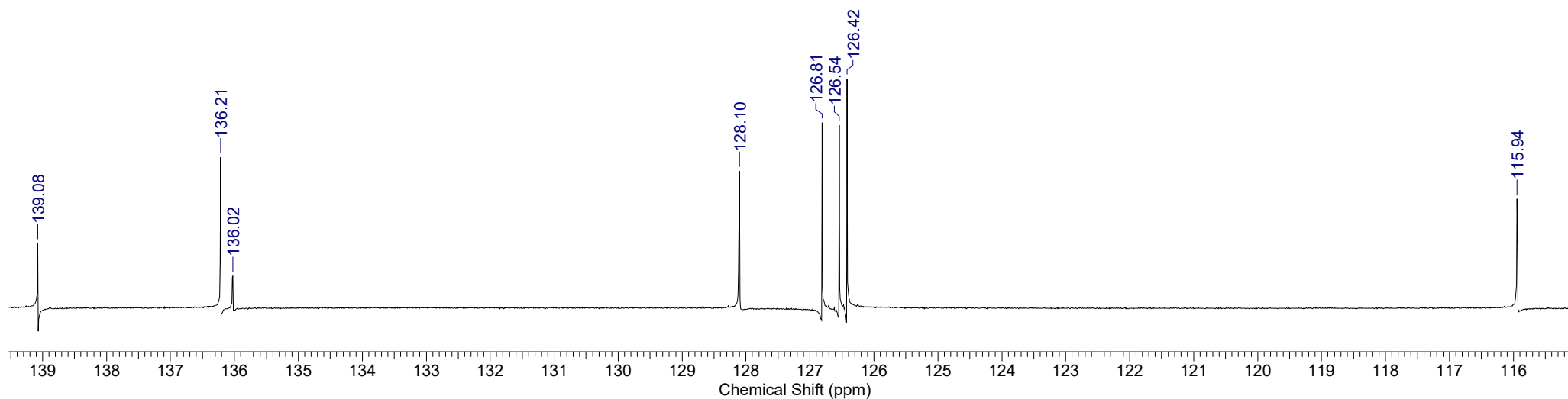


# $^{13}\text{C}$ NMR spectrum of compound 2a

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE			<b>Date</b>	
<b>Date Stamp</b>						
<b>File Name</b>					<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600	<b>Original Points Count</b> 32768
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single_pulse_dec	<b>Receiver Gain</b> 54.00
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15076.4629	<b>Sweep Width (Hz)</b>	47348.49	

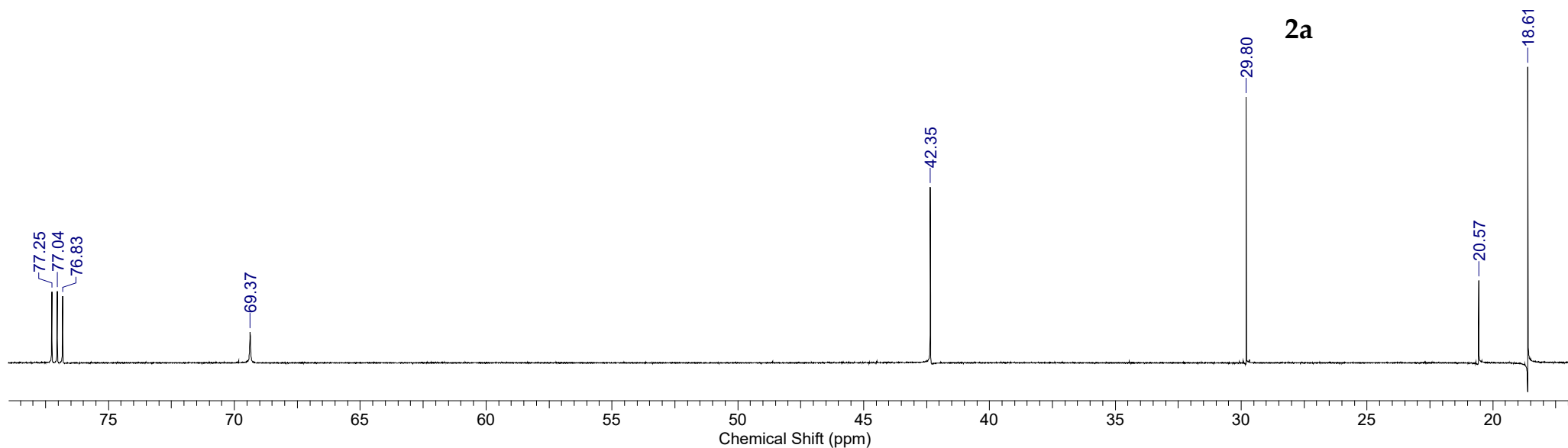
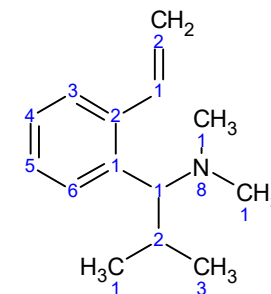


2a

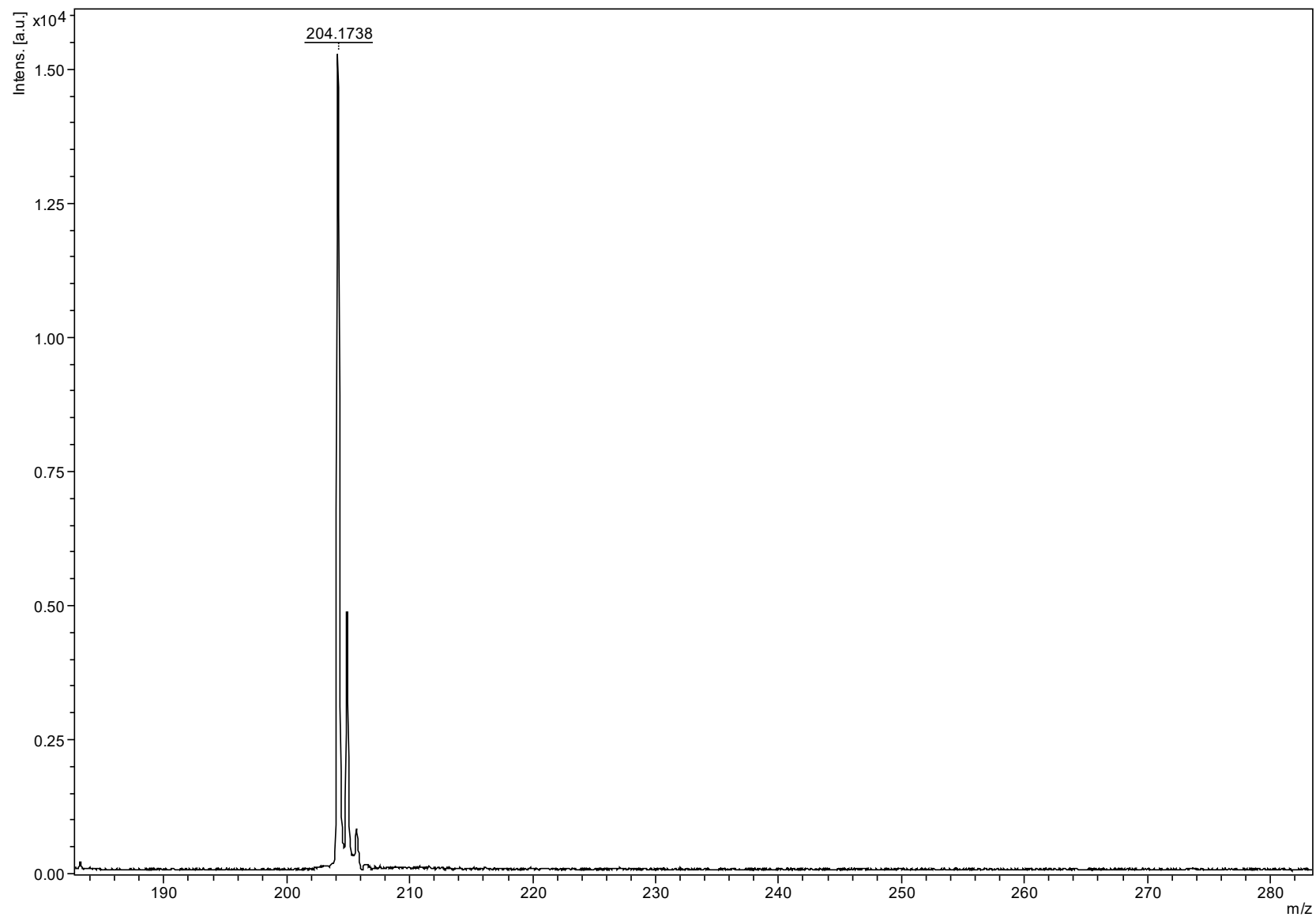


# $^{13}\text{C}$ NMR spectrum of compound **2a**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date
Date Stamp					
File Name			Frequency (MHz)		
Nucleus	$^{13}\text{C}$	Number of Transients	1000	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15076.4629	Sweep Width (Hz)	47348.49
			Original Points Count	32768	
			Receiver Gain	54.00	

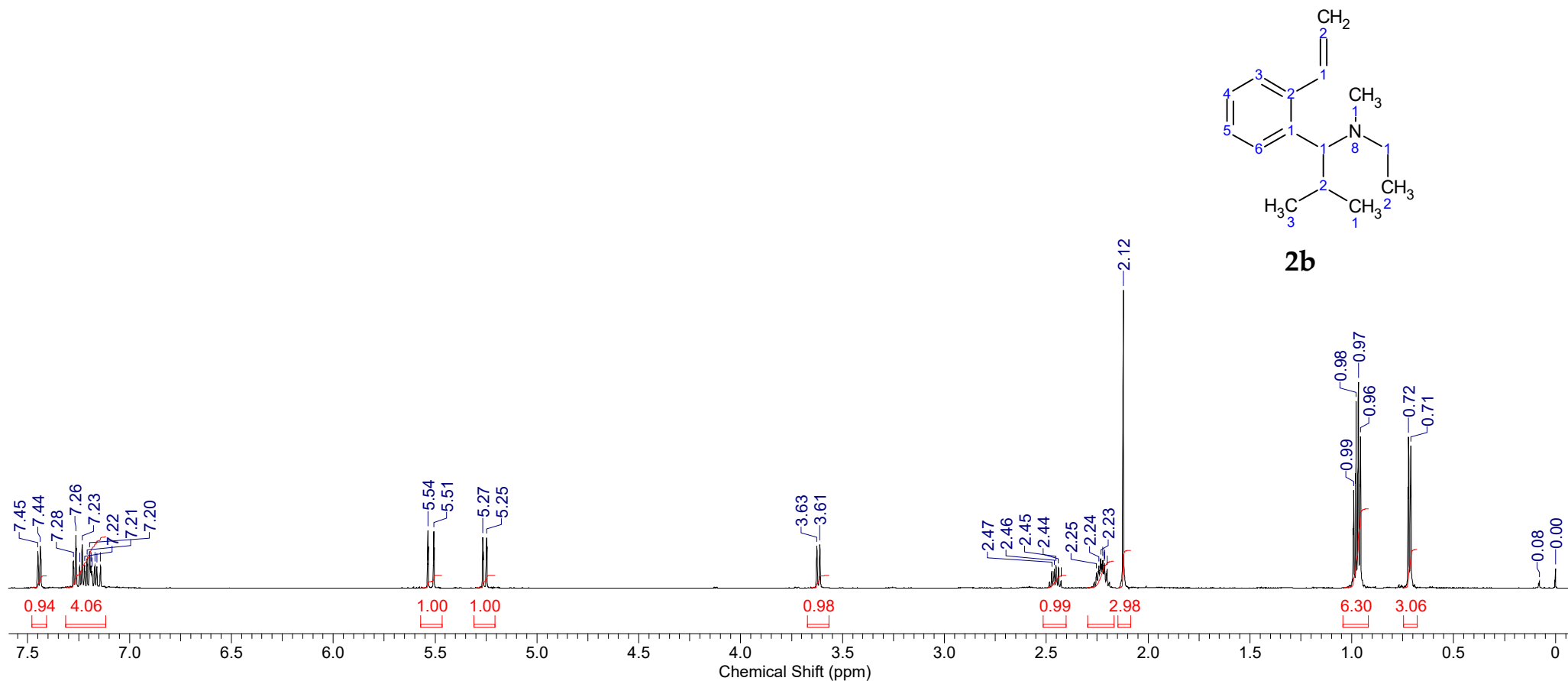


# HRMS (MALDI-TOF) spectrum of compound **2a**



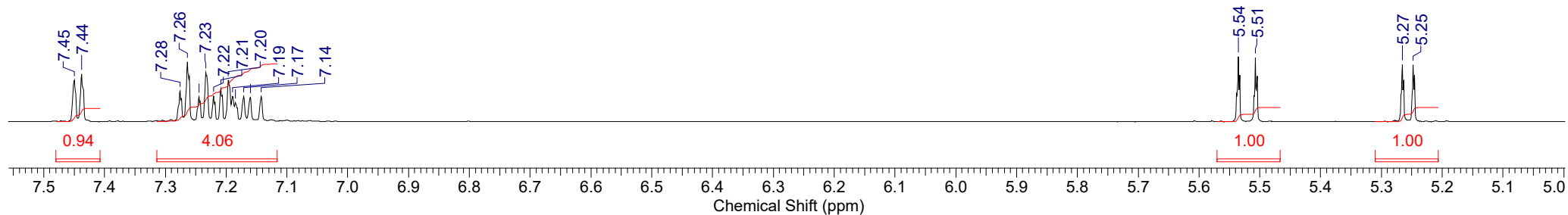
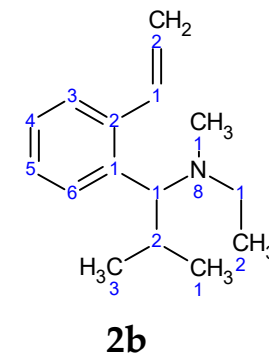
# <sup>1</sup>H NMR spectrum of compound **2b**

Acquisition Time (sec)	1.9818	Comment	single_pulse	Date	
Date Stamp					
File Name					
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	24.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5390.9478
				Origin	ECA 600
				Pulse Sequence	single_pulse.ex2
				Sweep Width (Hz)	16534.39



# $^1\text{H}$ NMR spectrum of compound **2b**

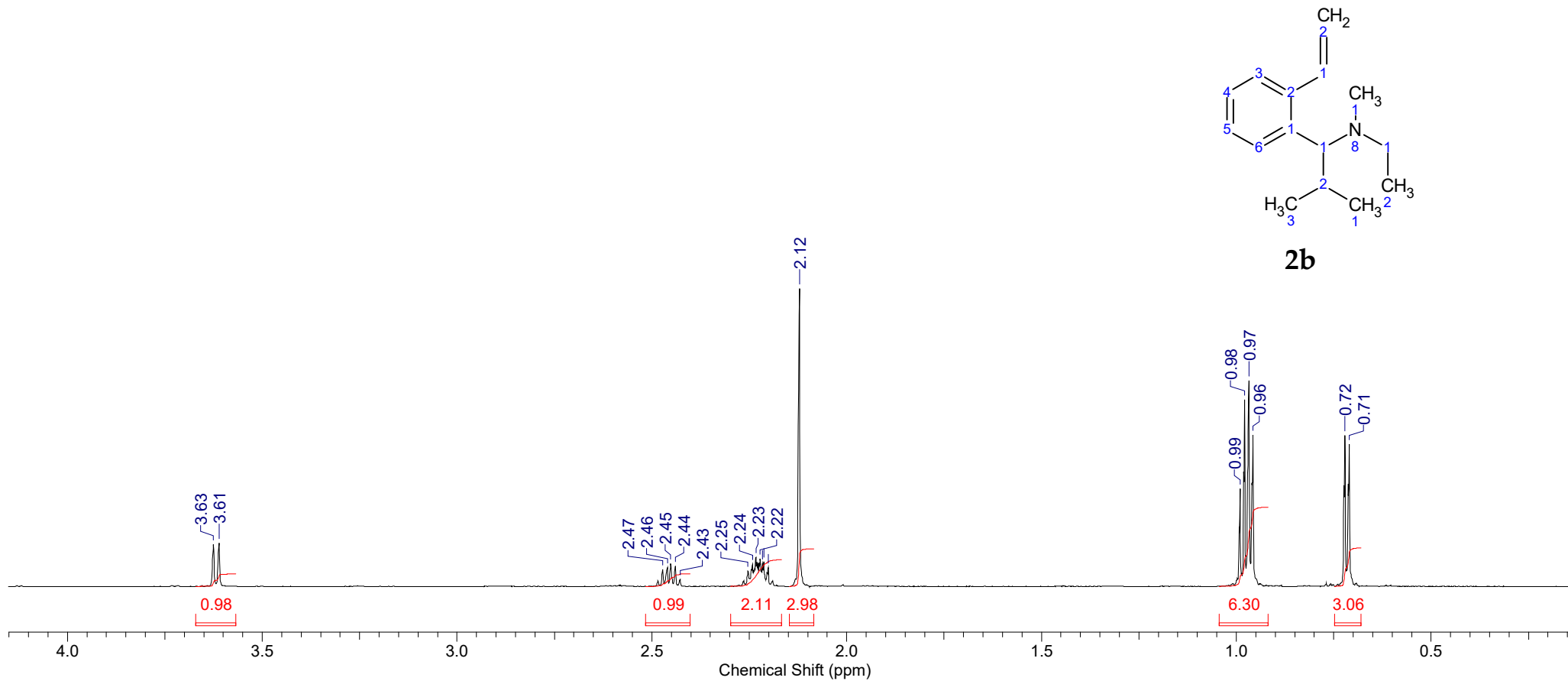
Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name					
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	24.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5390.9478
				Sweep Width (Hz)	16534.39





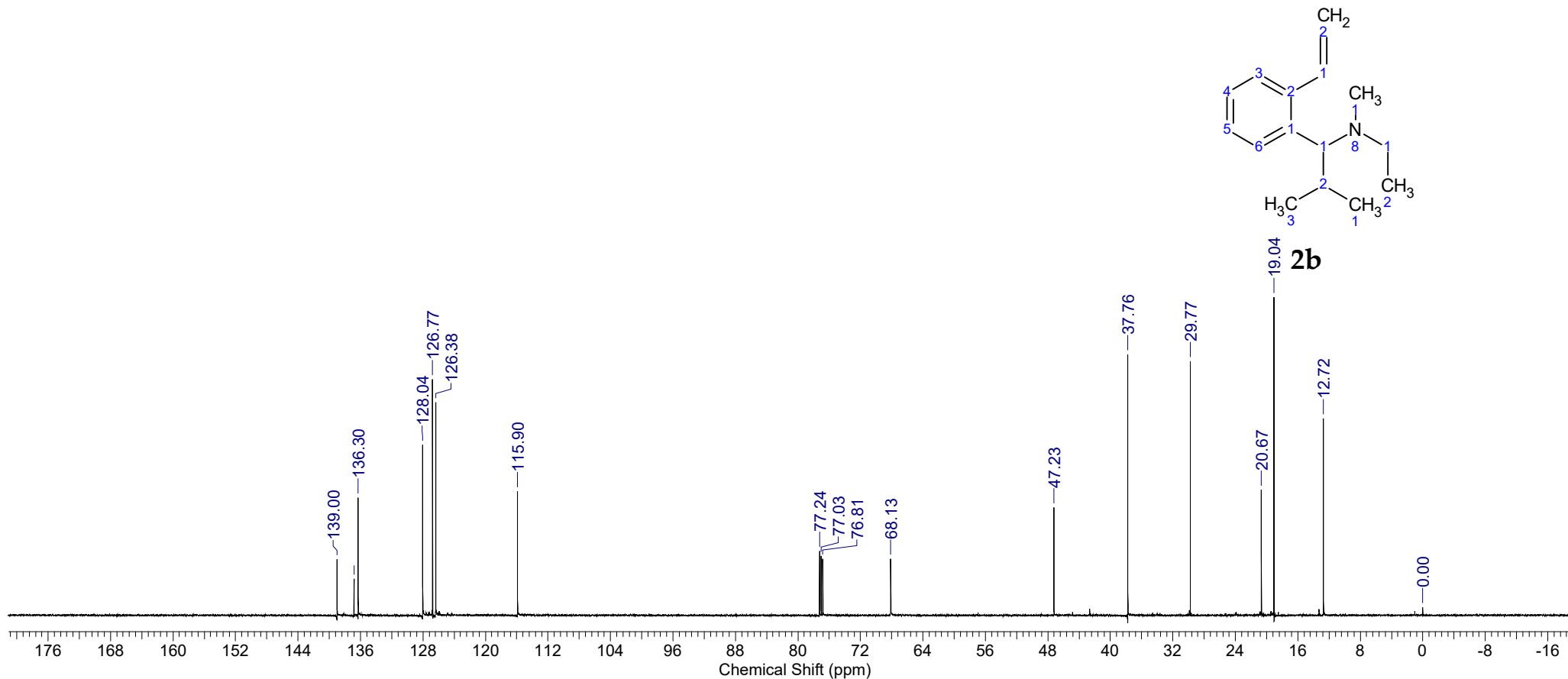
# $^1\text{H}$ NMR spectrum of compound **2b**

Acquisition Time (sec)	1.9818	Comment	single_pulse	Date	
Date Stamp					
File Name					
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	24.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5390.9478
				Sweep Width (Hz)	16534.39



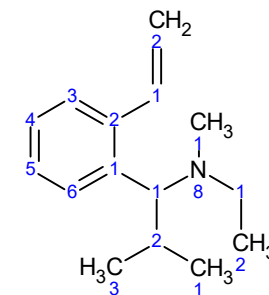
# $^{13}\text{C}$ NMR spectrum of compound **2b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date		
Date Stamp							
File Name							
Frequency (MHz)	150.91	Nucleus	13C	Number of Transients	800	Origin	ECA 600
Original Points Count	32768	Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Receiver Gain	54.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15075.0176	Sweep Width (Hz)	47348.49

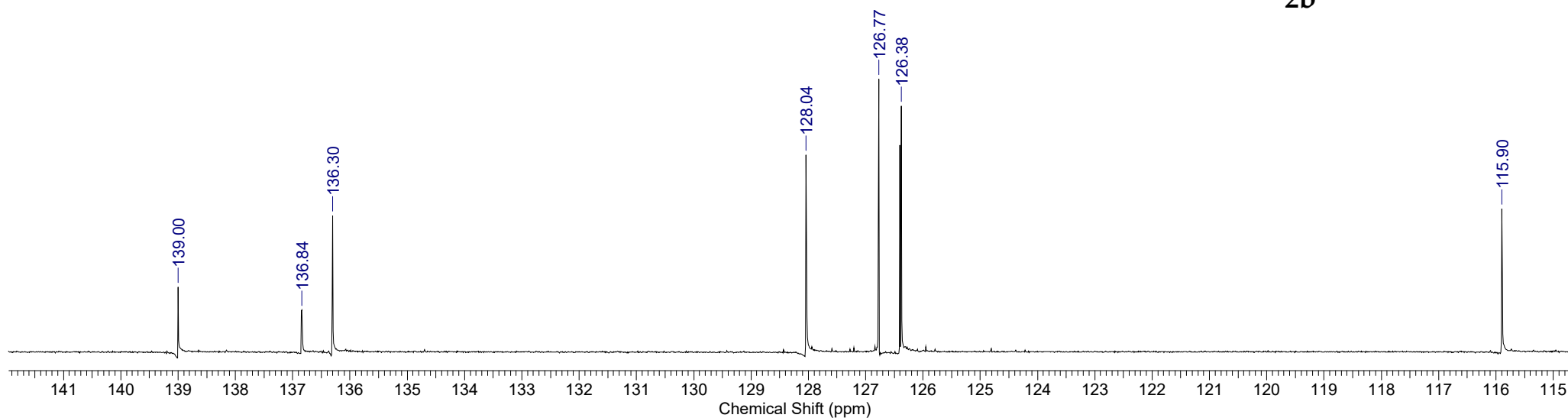


# $^{13}\text{C}$ NMR spectrum of compound **2b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date		
Date Stamp							
File Name							
Frequency (MHz)	150.91	Nucleus	13C	Number of Transients	800	Origin	ECA 600
Original Points Count	32768	Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Receiver Gain	54.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15075.0176	Sweep Width (Hz)	47348.49

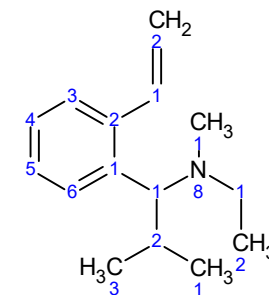


**2b**

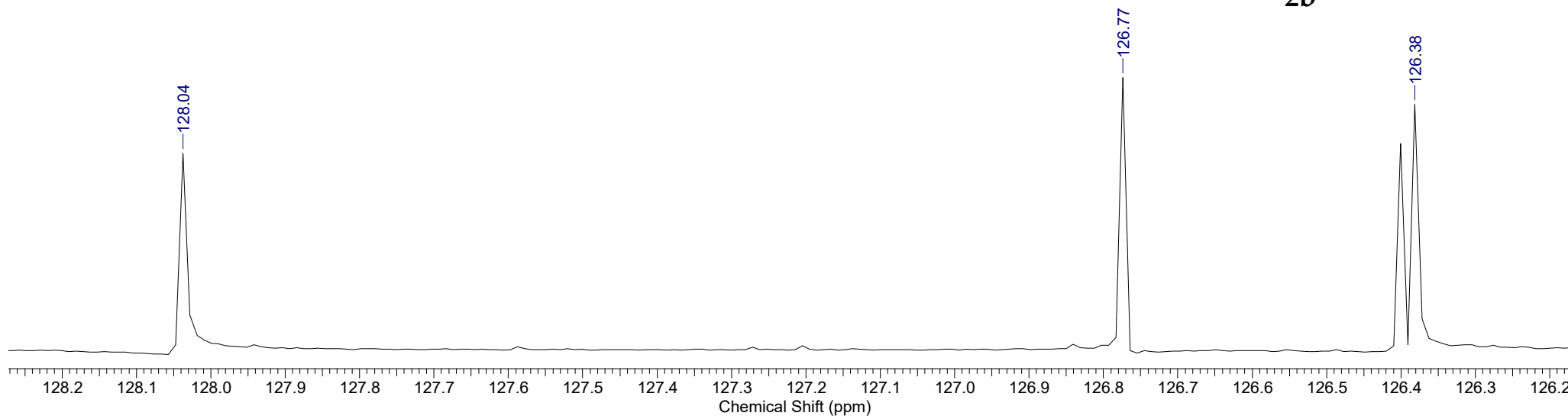


# $^{13}\text{C}$ NMR spectrum of compound **2b**

<b>Acquisition Time (sec)</b>	0.6921	<b>Comment</b>	single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>						
<b>File Name</b>						
<b>Frequency (MHz)</b>	150.91	<b>Nucleus</b>	13C	<b>Number of Transients</b>	800	<b>Origin</b> ECA 600
<b>Original Points Count</b>	32768	<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b> single pulse dec
<b>Receiver Gain</b>	54.00	<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15075.0176	<b>Sweep Width (Hz)</b> 47348.49

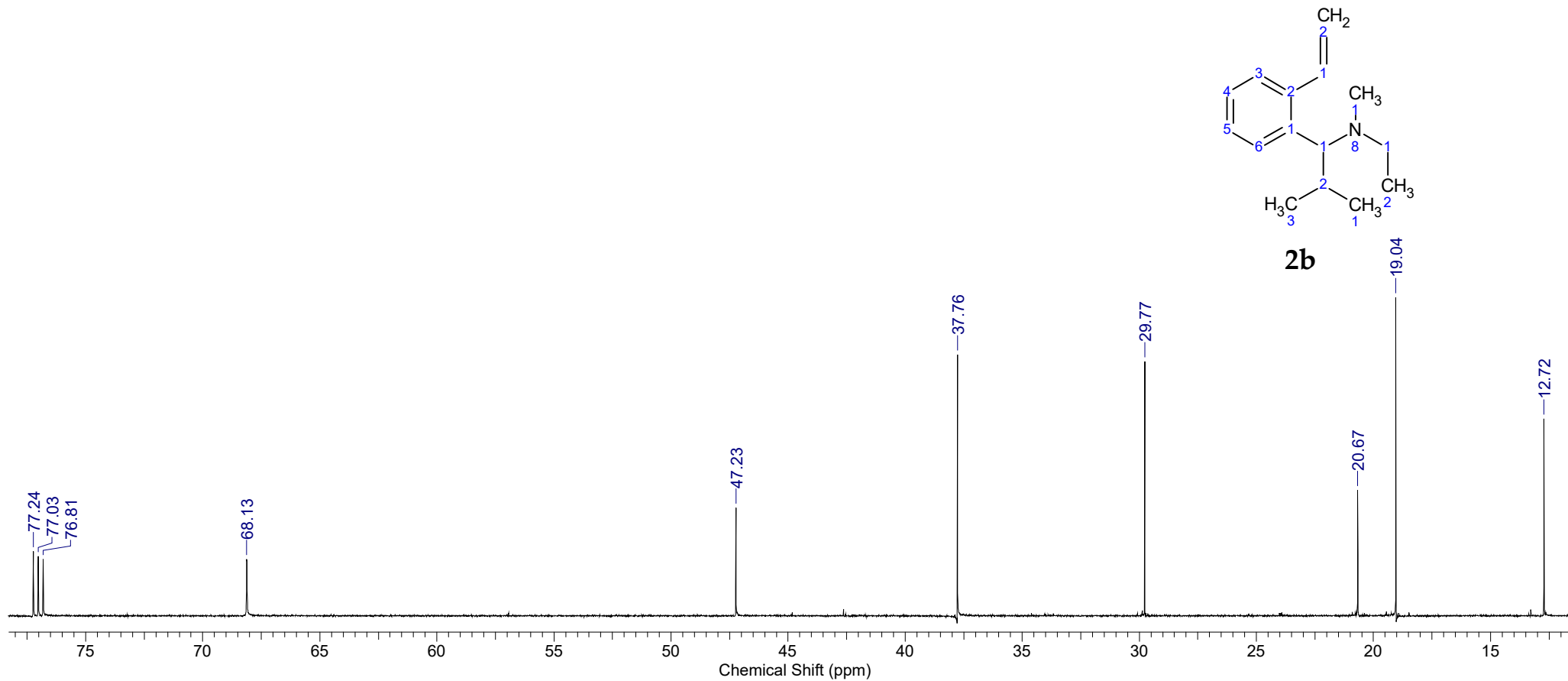


**2b**

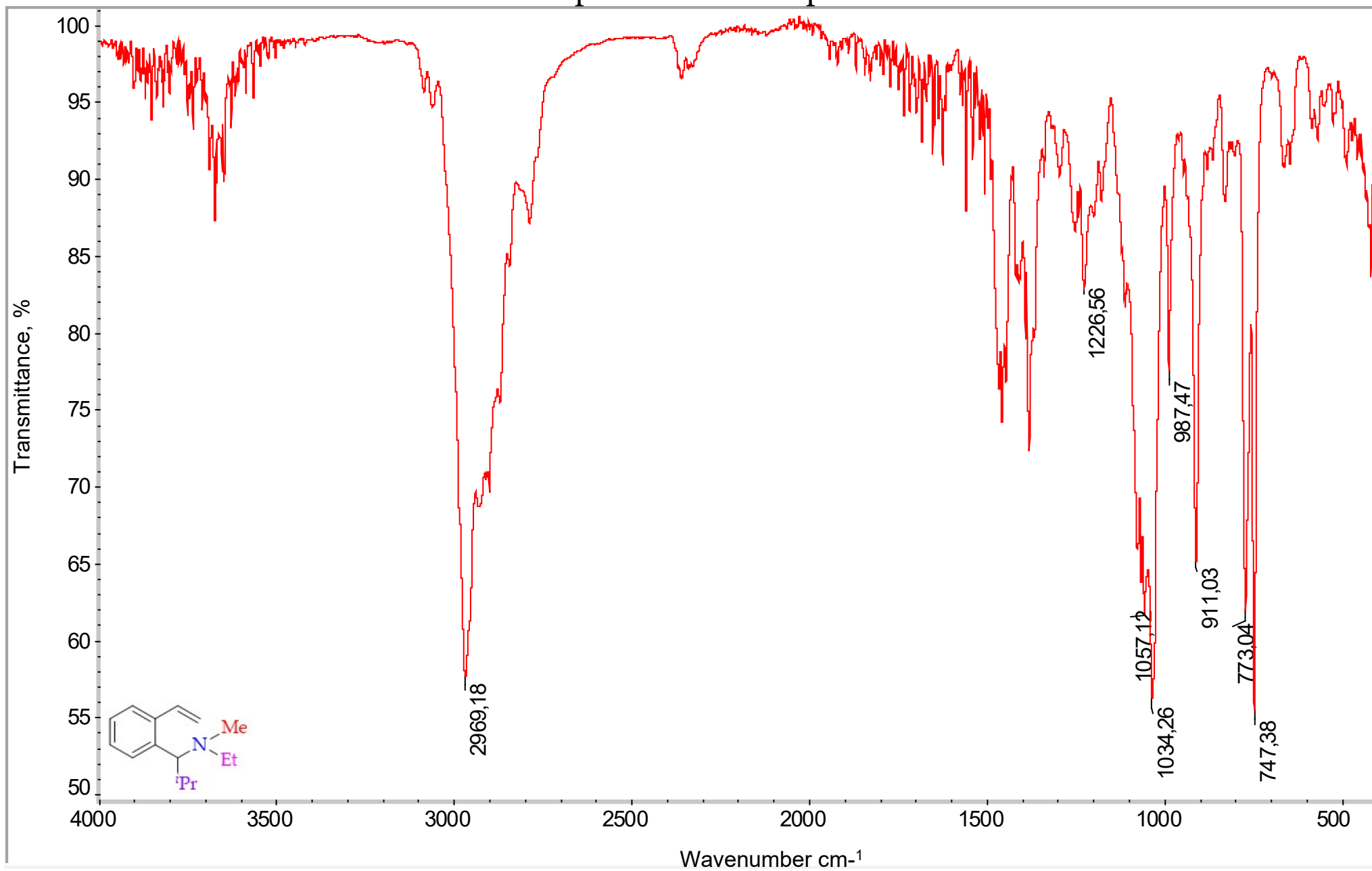


# $^{13}\text{C}$ NMR spectrum of compound **2b**

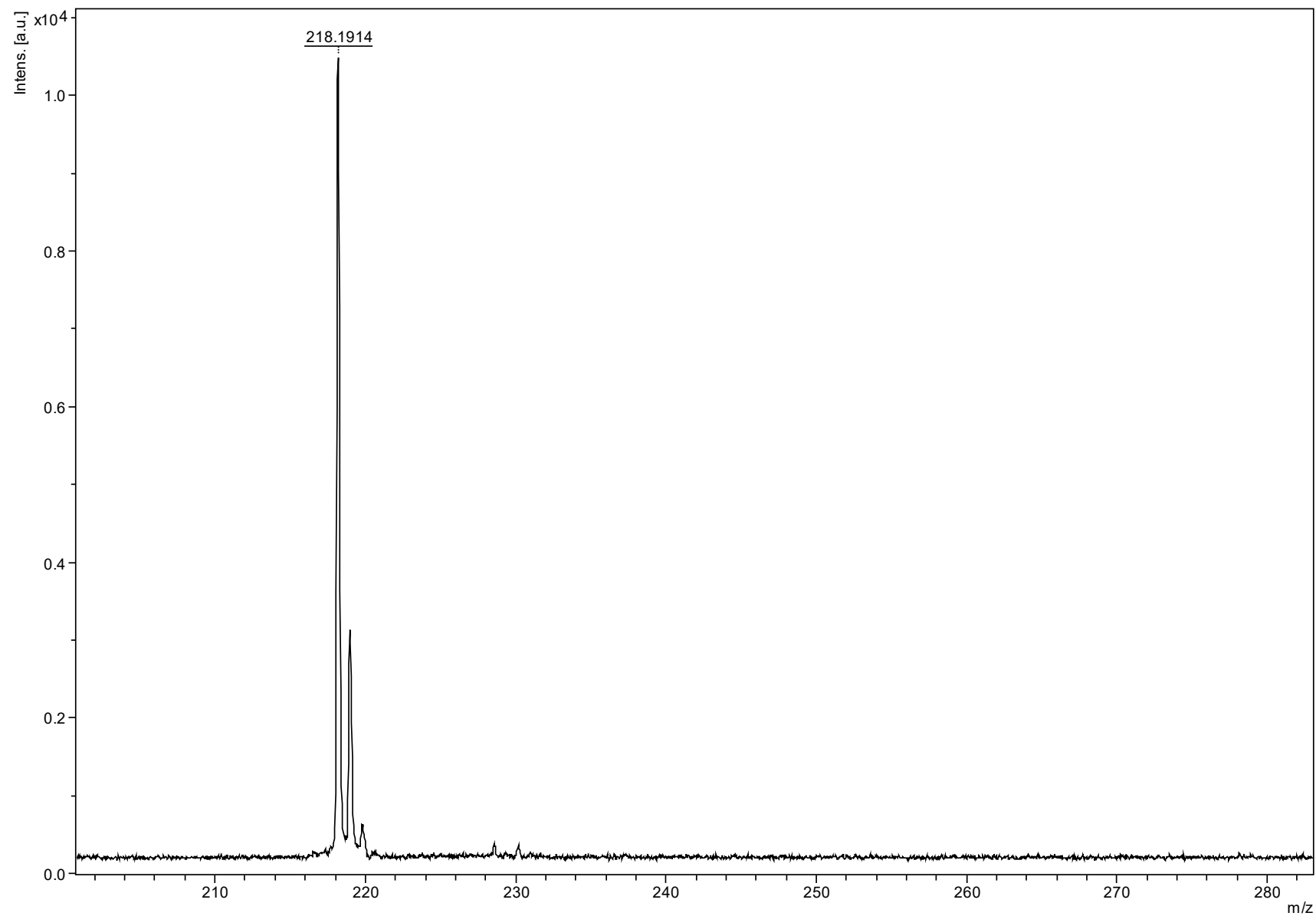
Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date		
Date Stamp							
File Name							
Frequency (MHz)	150.91	Nucleus	13C	Number of Transients	800	Origin	ECA 600
Original Points Count	32768	Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Receiver Gain	54.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15075.0176	Sweep Width (Hz)	47348.49



IR spectrum of compound **2b**

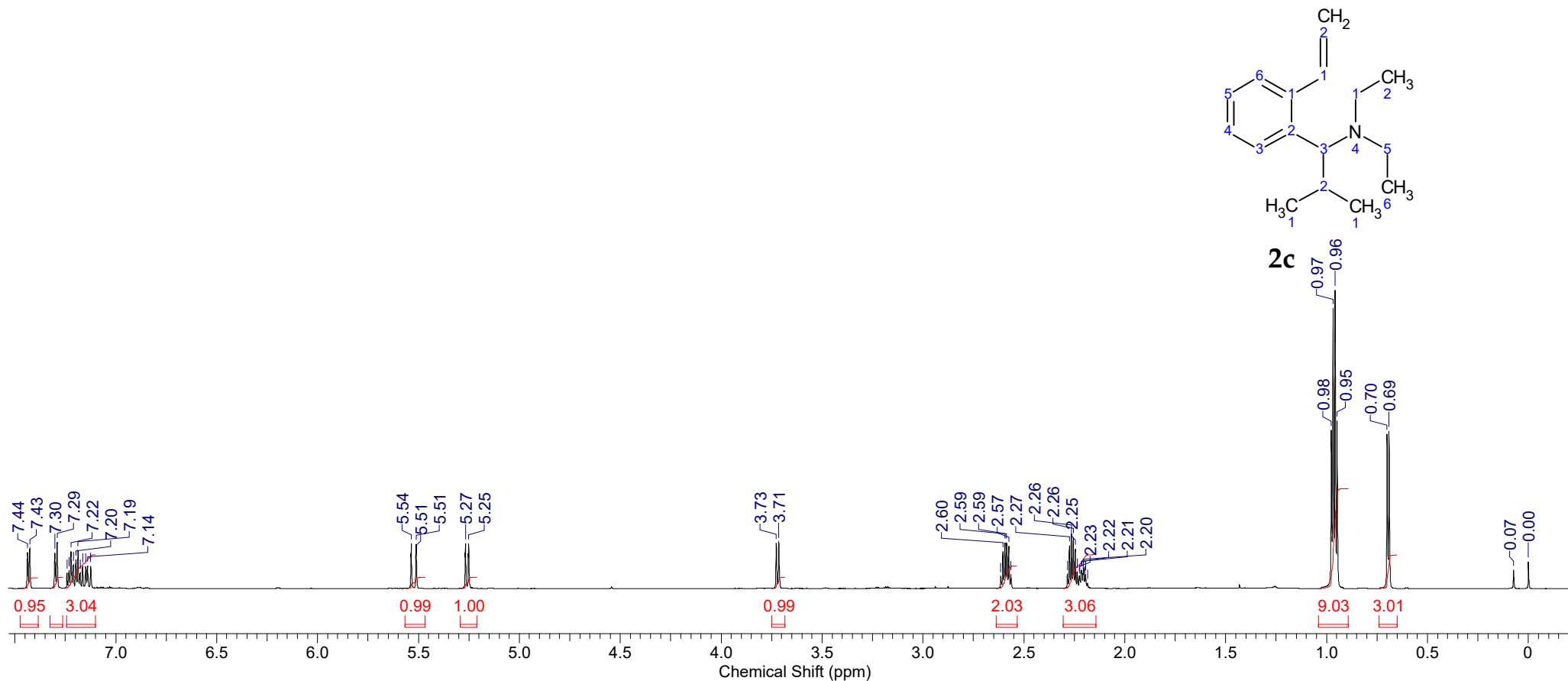


# HRMS (MALDI-TOF) spectrum of compound **2b**



# $^1\text{H}$ NMR spectrum of compound 2c

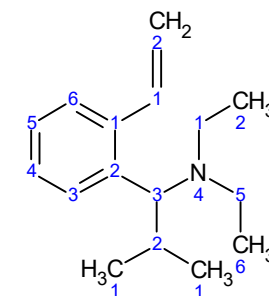
Acquisition Time (sec)	2.0972	Date				Date Stamp	
File Name							
Frequency (MHz)	700.17	Nucleus	1H	Number of Transients	8	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	65536	Pulse Sequence	zg30
Receiver Gain	15.57	SW(cyclical) (Hz)	15625.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	6271.2432	Sweep Width (Hz)	15624.76	Temperature (degree C)	24.997		



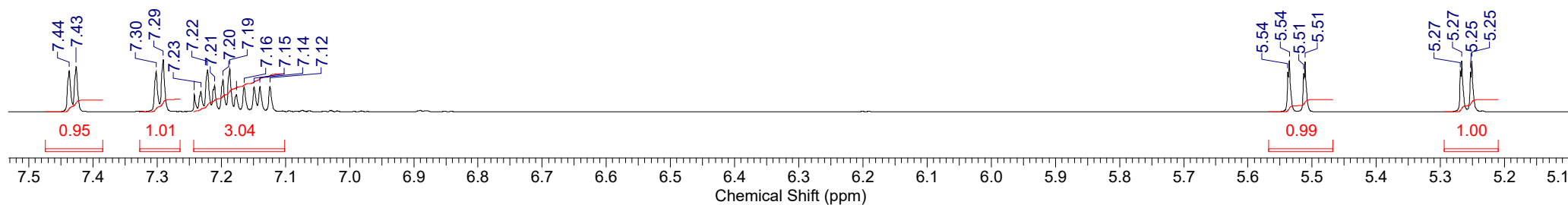


# $^1\text{H}$ NMR spectrum of compound 2c

Acquisition Time (sec)	2.0972	Date				Date Stamp	
File Name							
Frequency (MHz)	700.17	Nucleus	1H	Number of Transients	8	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	65536	Pulse Sequence	zg30
Receiver Gain	15.57	SW(cyclical) (Hz)	15625.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	6271.2432	Sweep Width (Hz)	15624.76	Temperature (degree C)	24.997		

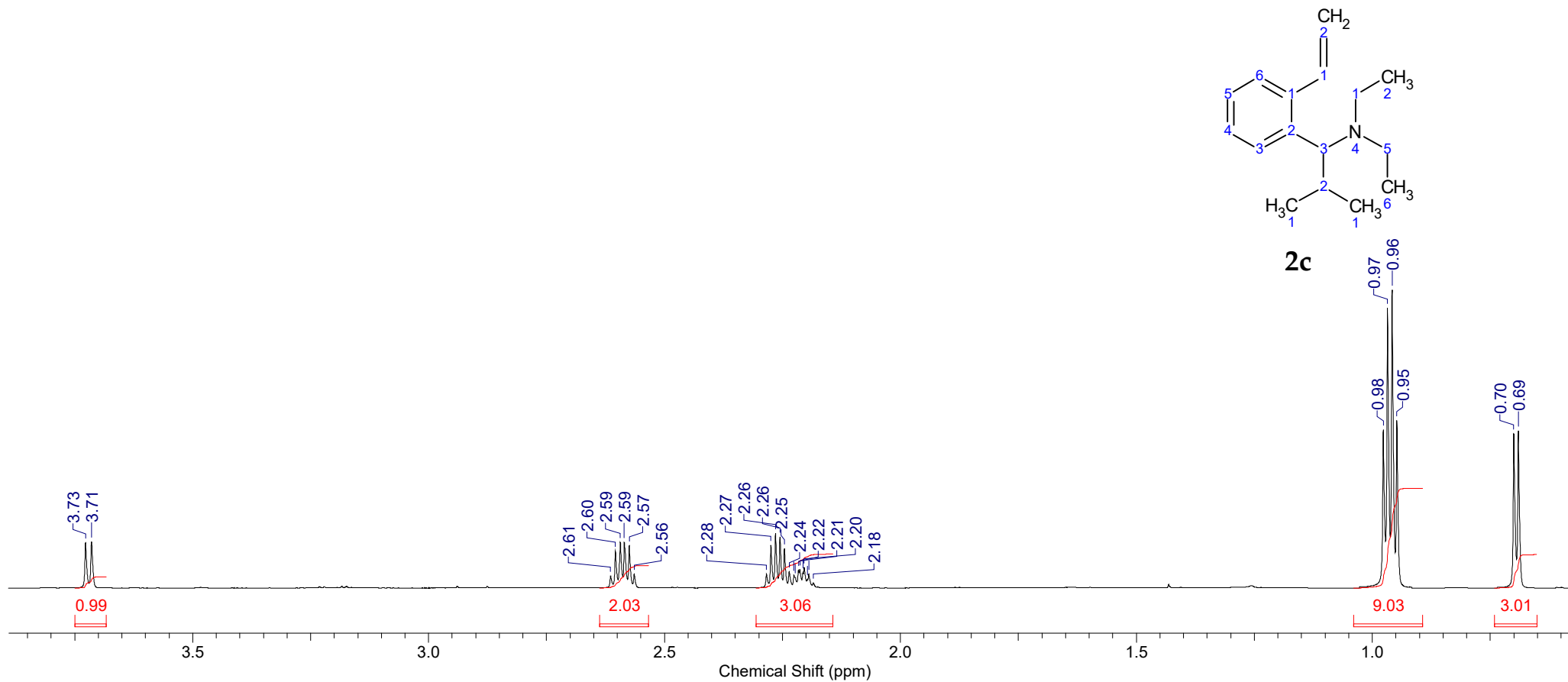


2c



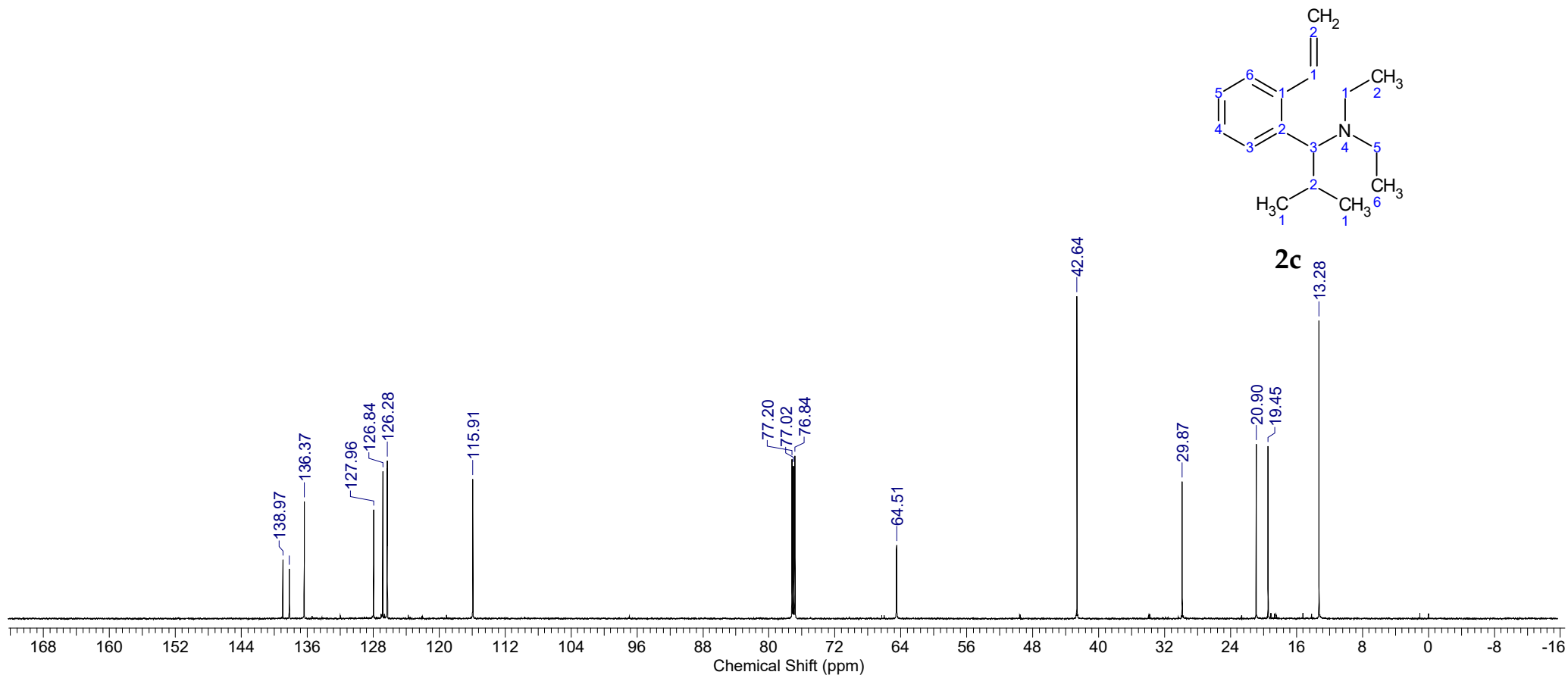
# $^1\text{H}$ NMR spectrum of compound 2c

Acquisition Time (sec)	2.0972	Date				Date Stamp	
File Name							
Frequency (MHz)	700.17	Nucleus	1H	Number of Transients	8	Origin	Avance
Original Points Count	32768	Owner	nmr	Points Count	65536	Pulse Sequence	zg30
Receiver Gain	15.57	SW(cyclical) (Hz)	15625.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	6271.2432	Sweep Width (Hz)	15624.76	Temperature (degree C)	24.997		



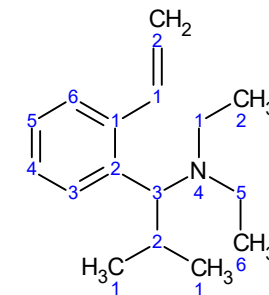
# $^{13}\text{C}$ NMR spectrum of compound **2c**

Acquisition Time (sec)	0.7406	Date			Date Stamp
File Name					176.06
Nucleus	$^{13}\text{C}$	Number of Transients	400	Origin	Avance
Owner	nmr	Points Count	32768	Pulse Sequence	zgpg30
SW(cyclical) (Hz)	44247.79	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	
Sweep Width (Hz)	44246.44	Temperature (degree C)	24.990		

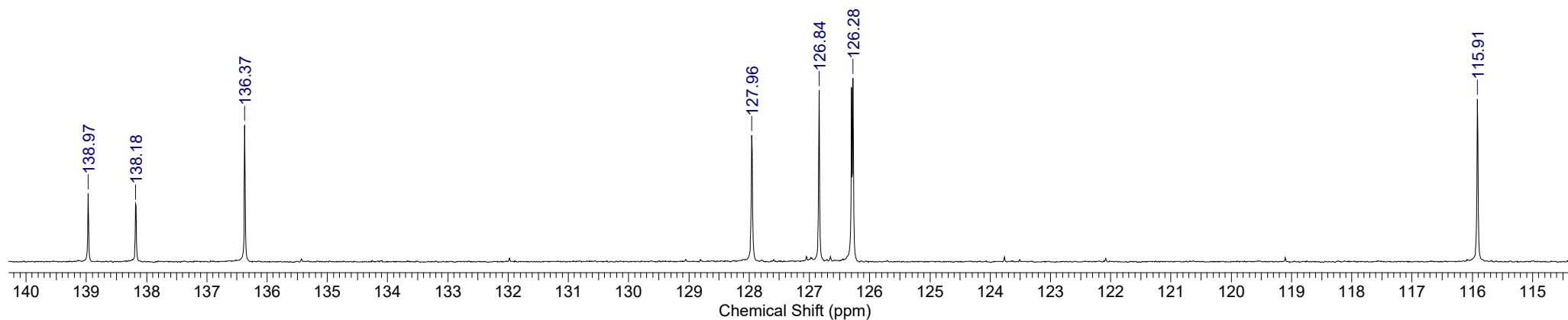


# $^{13}\text{C}$ NMR spectrum of compound **2c**

Acquisition Time (sec)	0.7406	Date			Date Stamp
File Name					176.06
Nucleus	$^{13}\text{C}$	Number of Transients	400	Origin	Avance
Owner	nmr	Points Count	32768	Pulse Sequence	zgpg30
SW(cyclical) (Hz)	44247.79	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	
Sweep Width (Hz)	44246.44	Temperature (degree C)	24.990		

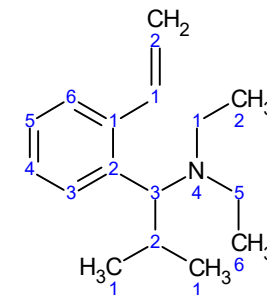


**2c**

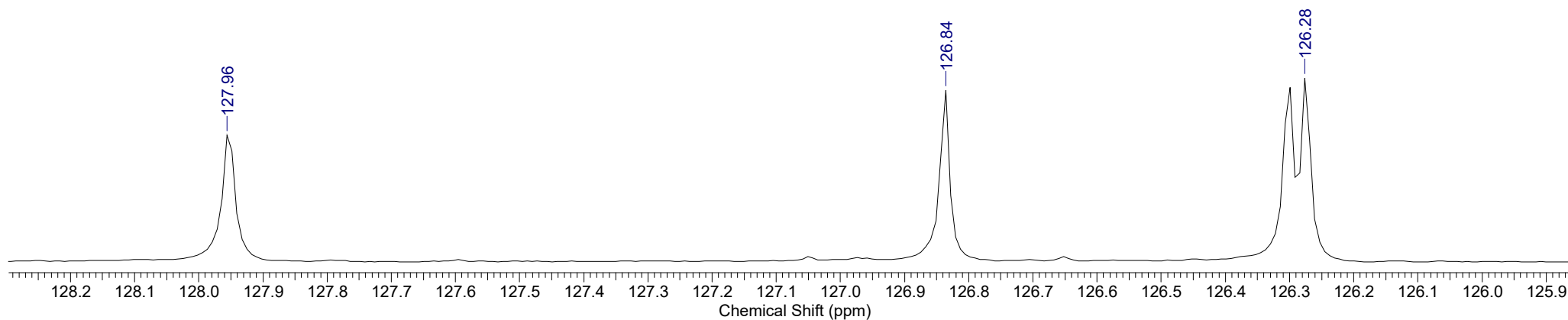


# $^{13}\text{C}$ NMR spectrum of compound **2c**

Acquisition Time (sec) 0.7406		Date		Date Stamp	
File Name				176.06	
Nucleus	13C	Number of Transients 400	Origin	Avance	Original Points Count 32768
Owner	nmr	Points Count 32768	Pulse Sequence	zgpg30	Receiver Gain 101.00
SW(cyclical) (Hz) 44247.79		Solvent CHLOROFORM-d			Spectrum Offset (Hz) 19363.1328
Sweep Width (Hz) 44246.44		Temperature (degree C) 24.990			

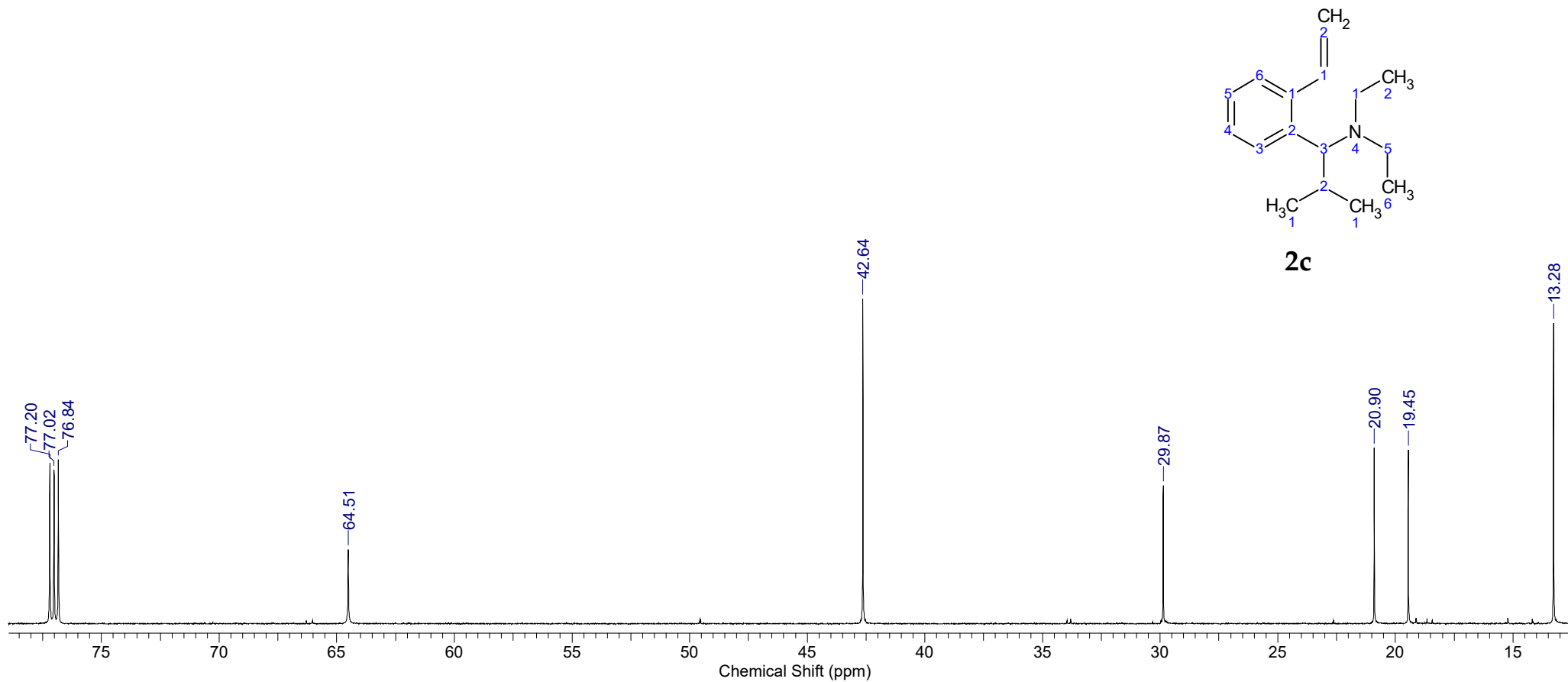


**2c**

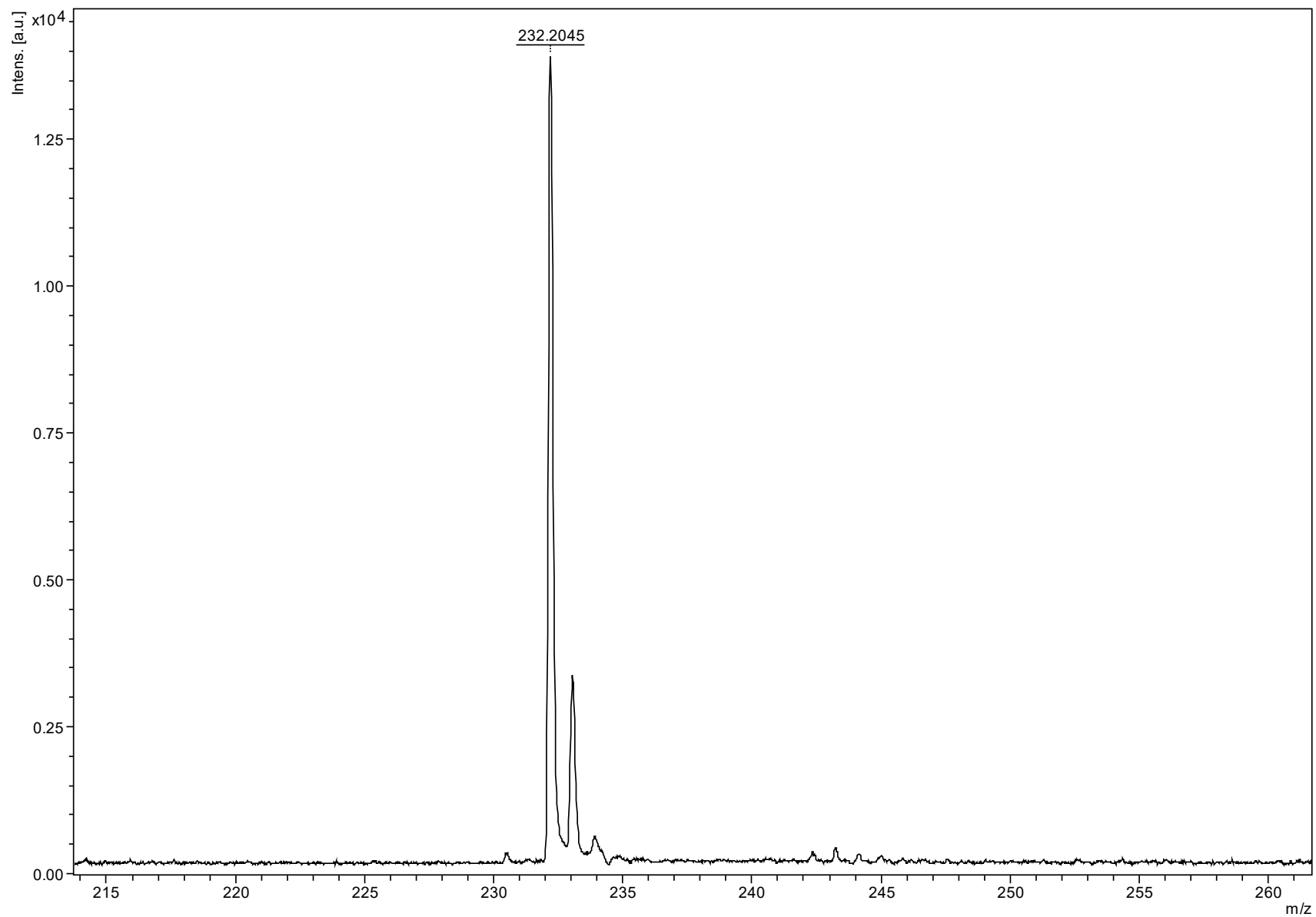


# $^{13}\text{C}$ NMR spectrum of compound **2c**

Acquisition Time (sec)	0.7406	Date			Date Stamp
File Name				176.06	
Nucleus	13C	Number of Transients	400	Origin	Avance
Owner	nmr	Points Count	32768	Pulse Sequence	zgpg30
SW(cyclical) (Hz)	44247.79	Solvent	CHLOROFORM-d		Spectrum Offset (Hz)
Sweep Width (Hz)	44246.44	Temperature (degree C)	24.990		

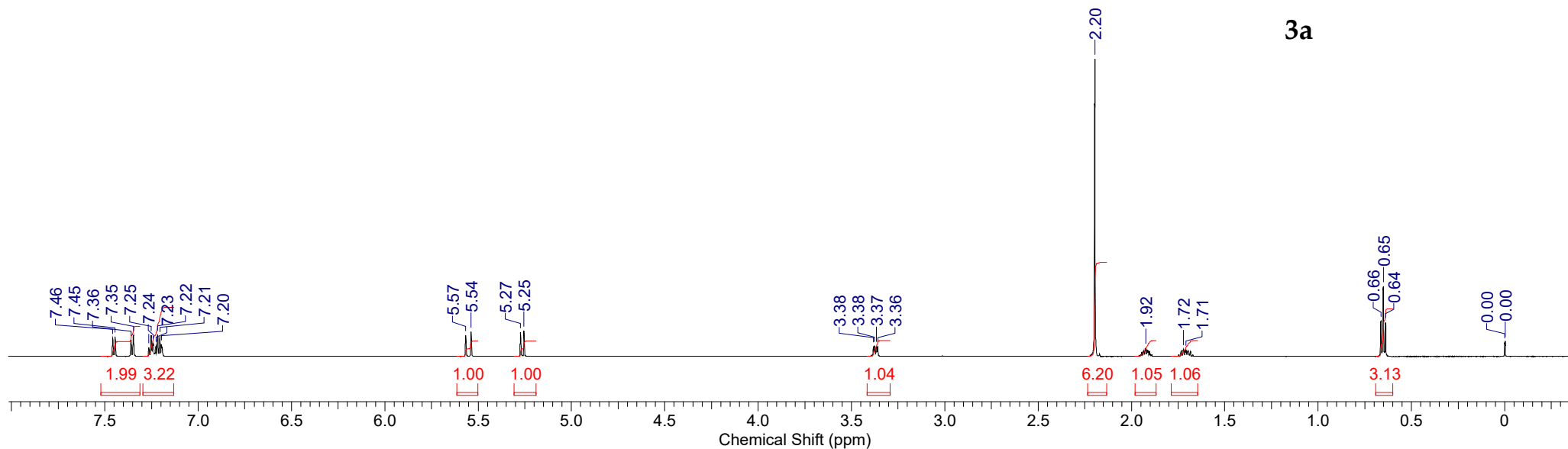
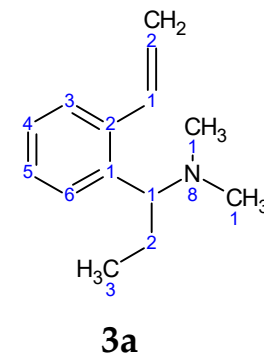


# HRMS (MALDI-TOF) spectrum of compound **2c**



# <sup>1</sup>H NMR spectrum of compound 3a

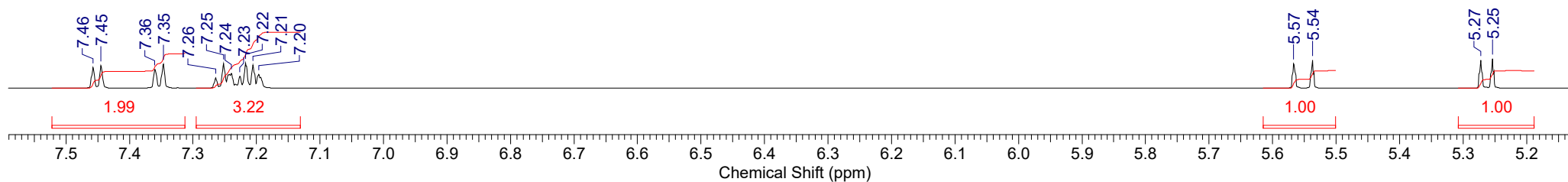
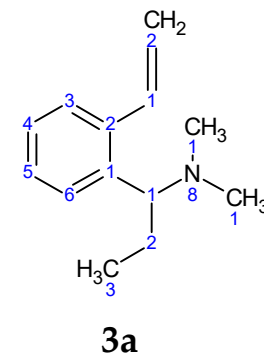
Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	1H	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5401.5503	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	28.00





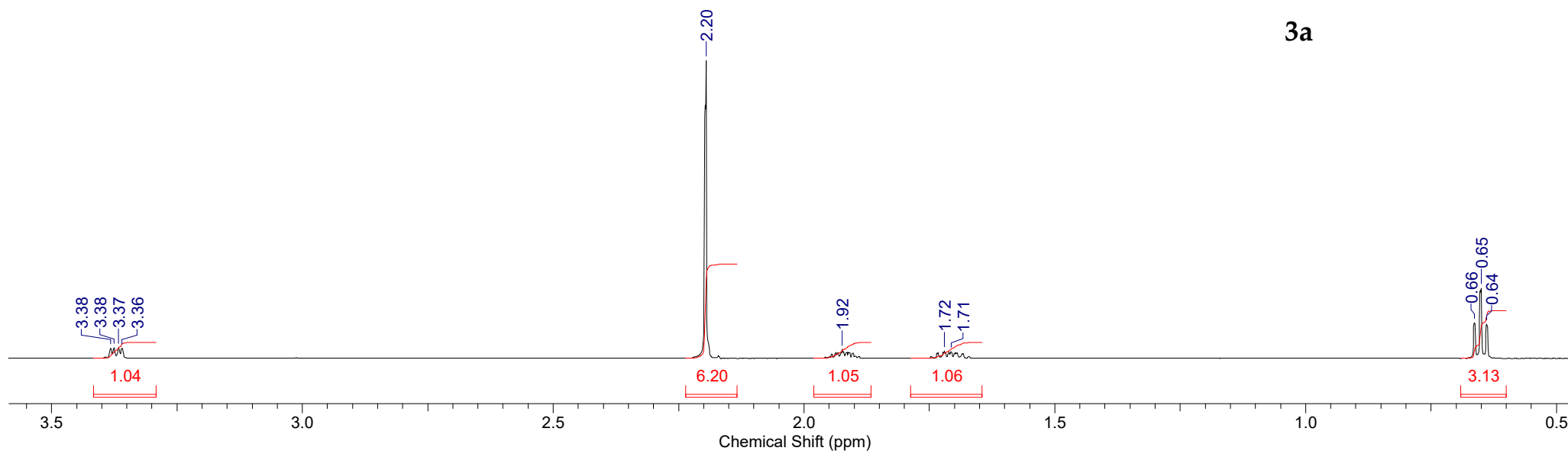
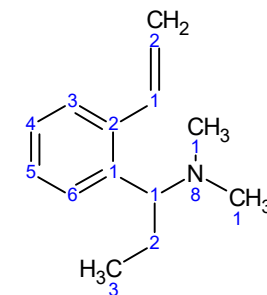
# $^1\text{H}$ NMR spectrum of compound **3a**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5401.5503	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	28.00



# $^1\text{H}$ NMR spectrum of compound **3a**

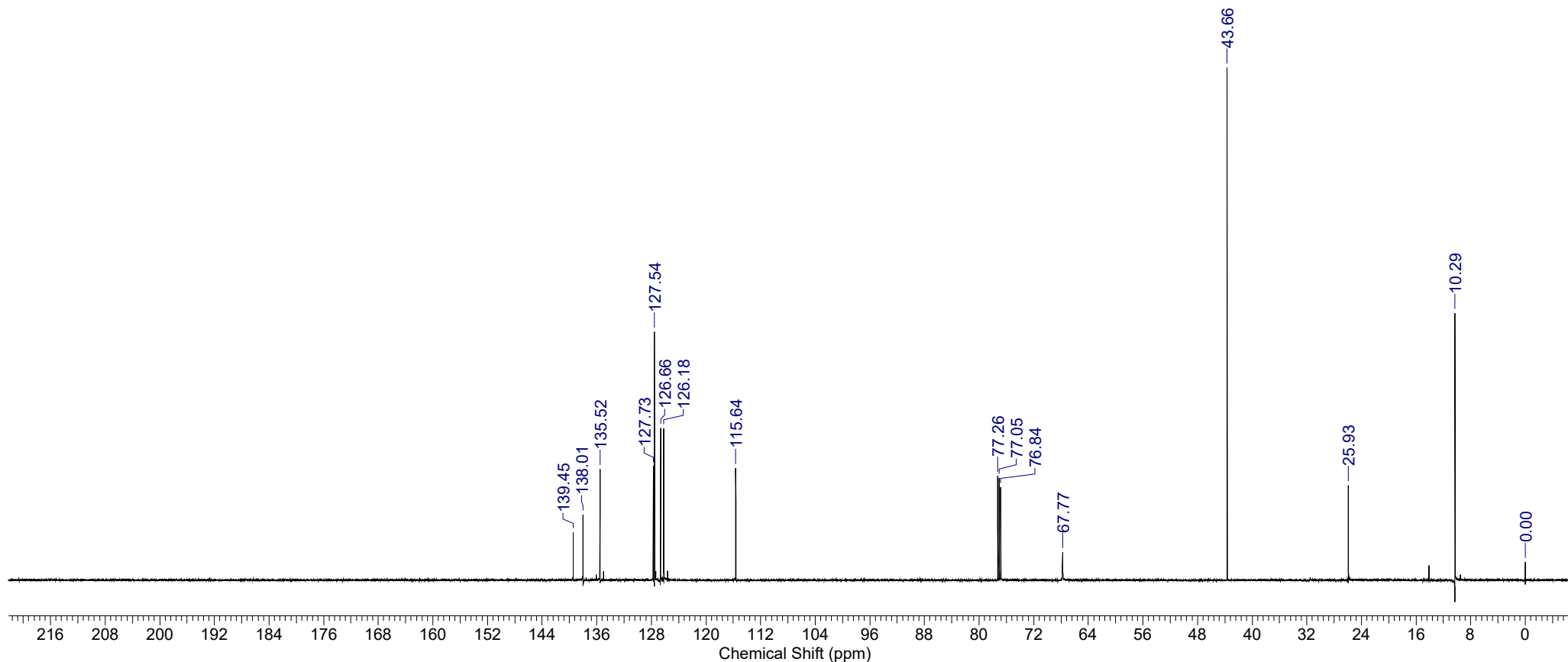
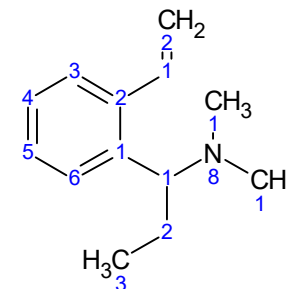
Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5401.5503	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	28.00



# $^{13}\text{C}$ NMR spectrum of compound 3a

<b>Formula</b>	$\text{C}_{13}\text{H}_{19}\text{N}$	<b>FW</b>	189.2967
----------------	--------------------------------------	-----------	----------

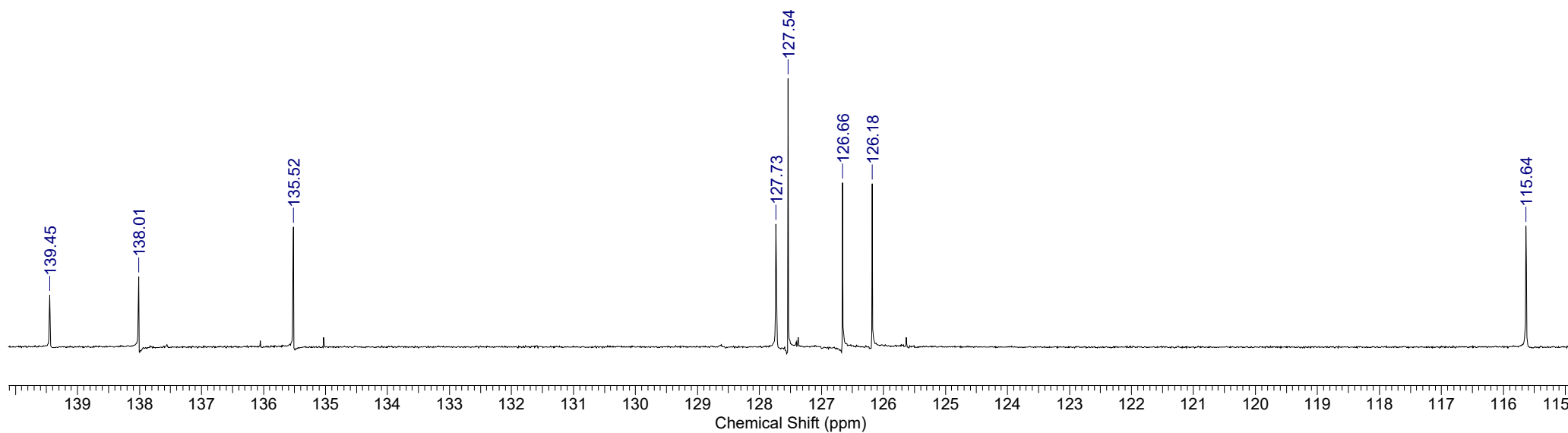
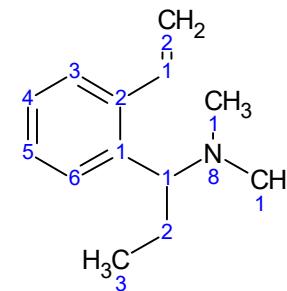
<b>Acquisition Time (sec)</b>	0.6921	<b>Comment</b>	single pulse decoupled gated NOE	<b>Date</b>	07 Oct 2022 11:01:59
<b>Date Stamp</b>	07 Oct 2022 10:47:14				
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	$^{13}\text{C}$	<b>Number of Transients</b>	1000	<b>Original Points Count</b>	32768
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single_pulse_dec
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15077.9072	<b>Receiver Gain</b>	54.00
		<b>Sweep Width (Hz)</b>	47348.49		



# <sup>13</sup>C NMR spectrum of compound 3a

<b>Formula</b>	C H N	<b>FW</b>	189.2967
----------------	-------	-----------	----------

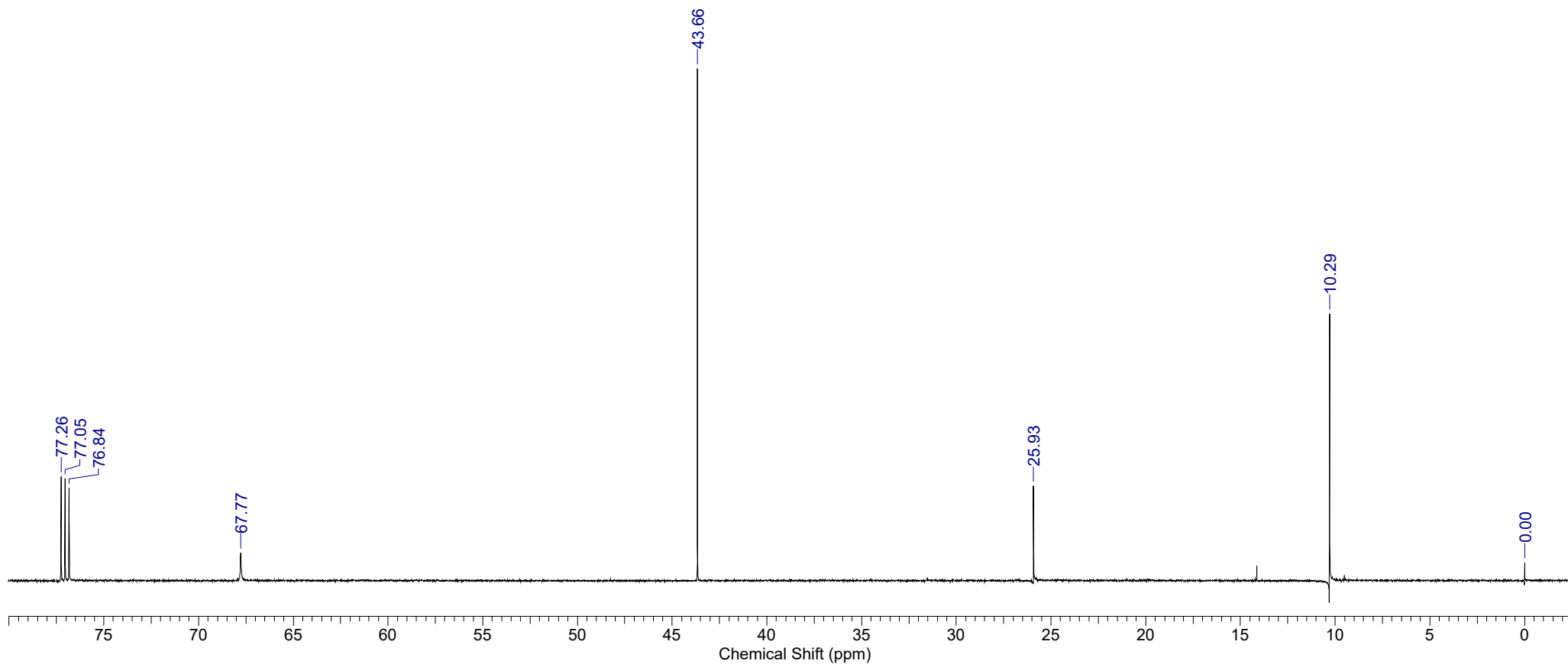
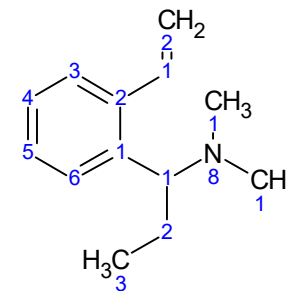
<b>Acquisition Time (sec)</b>	0.6921	<b>Comment</b>	single pulse decoupled gated NOE	<b>Date</b>	07 Oct 2022 11:01:59
<b>Date Stamp</b>	07 Oct 2022 10:47:14				
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	<sup>13</sup> C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15077.9072	<b>Sweep Width (Hz)</b>	47348.49
				<b>Original Points Count</b>	32768
				<b>Receiver Gain</b>	54.00



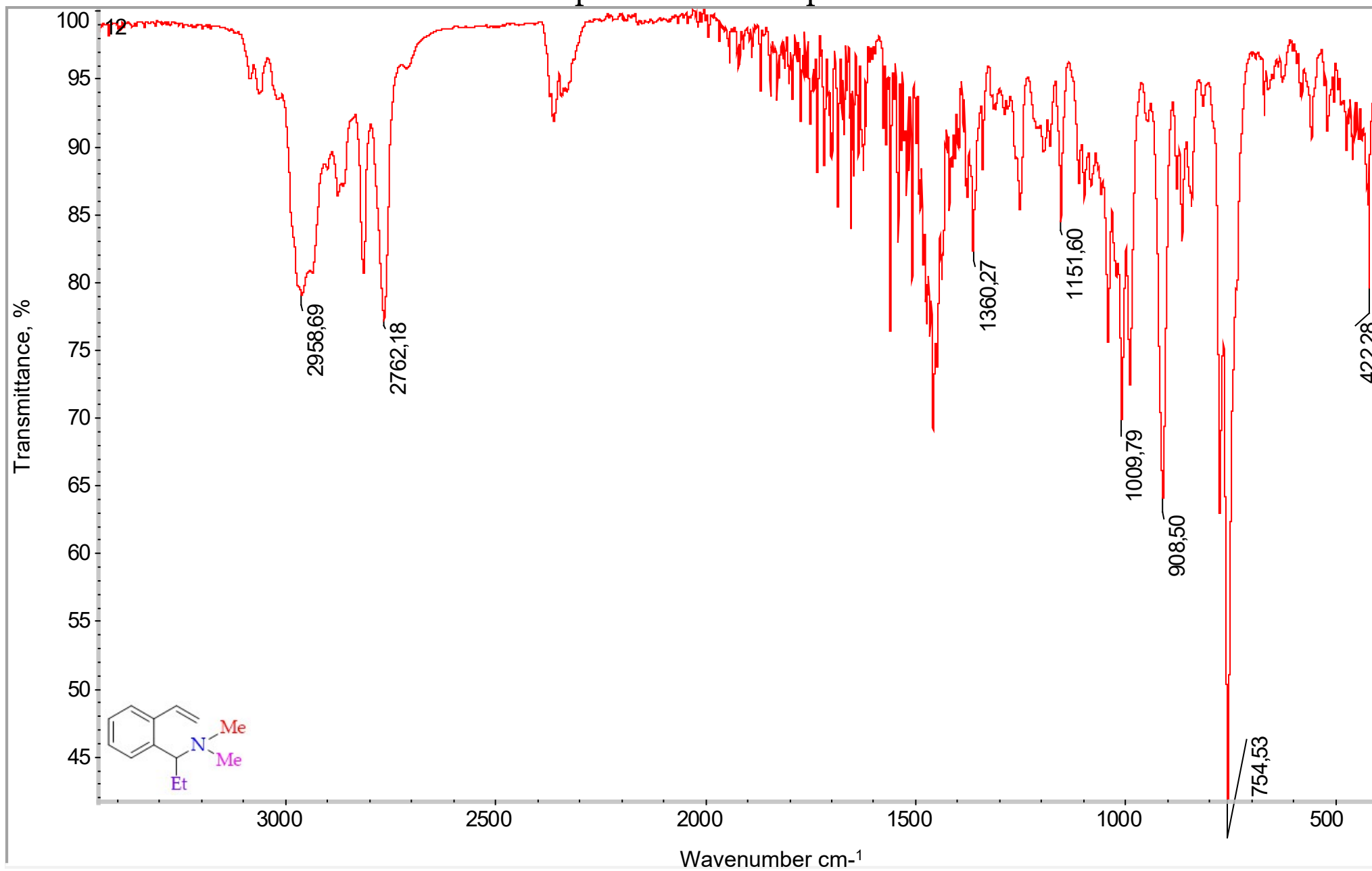
$^{13}\text{C}$  NMR spectrum of compound **3a**

<b>Formula</b> C <sub>12</sub> H <sub>10</sub> N	<b>FW</b> 189.2967
--	--------------------

<b>Acquisition Time (sec)</b>	0.6921	<b>Comment</b>	single pulse decoupled gated NOE		<b>Date</b>	07 Oct 2022 11:01:59	
<b>Date Stamp</b>	07 Oct 2022 10:47:14						
<b>File Name</b>					<b>Frequency (MHz)</b>	150.91	
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600	<b>Original Points Count</b>	32768
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec	<b>Receiver Gain</b>	54.00
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15077.9072	<b>Sweep Width (Hz)</b>	47348.49		

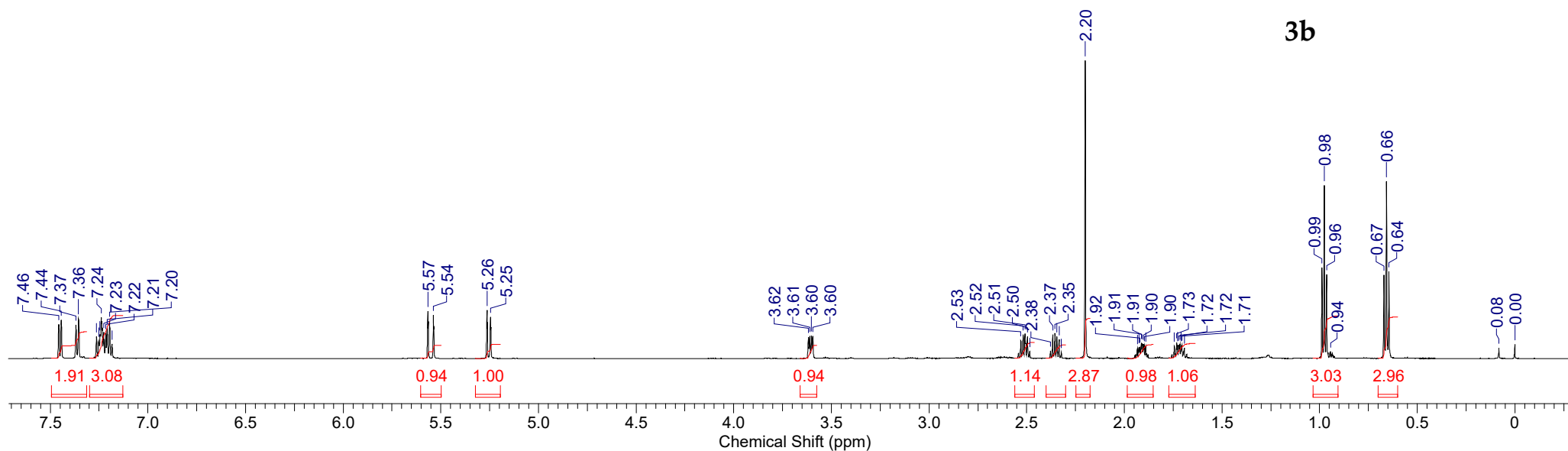
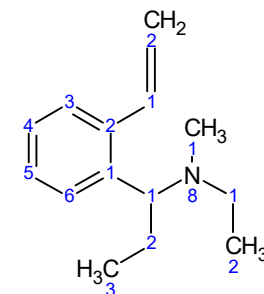


IR spectrum of compound 3a



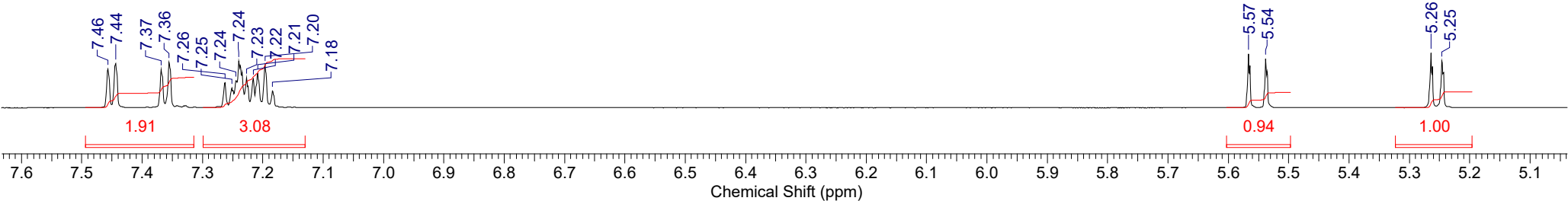
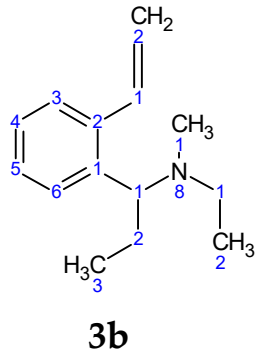
# $^1\text{H}$ NMR spectrum of compound **3b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5392.4614	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	24.00



<sup>1</sup>H NMR spectrum of compound **3b**

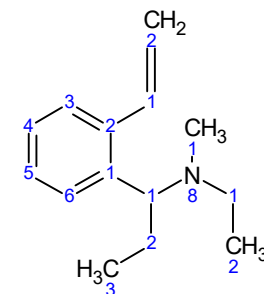
Acquisition Time (sec)		1.9818	Comment		single_pulse	Date					
Date Stamp											
File Name								Frequency (MHz)		600.17	
Nucleus		1H	Number of Transients		8	Origin		ECA 600	Original Points Count		32768
Owner		CKP	Points Count		32768	Pulse Sequence		single_pulse.ex2	Receiver Gain		24.00
Solvent		CHLOROFORM-d	Spectrum Offset (Hz)		5392.4614	Sweep Width (Hz)		16534.39			



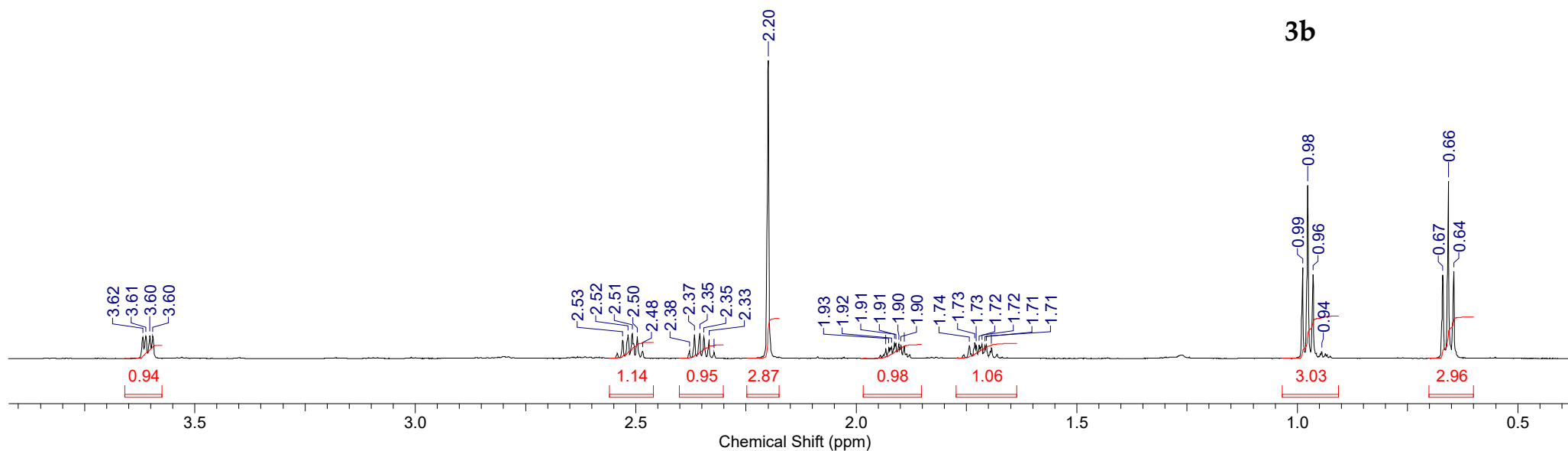


# $^1\text{H}$ NMR spectrum of compound **3b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5392.4614	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	24.00

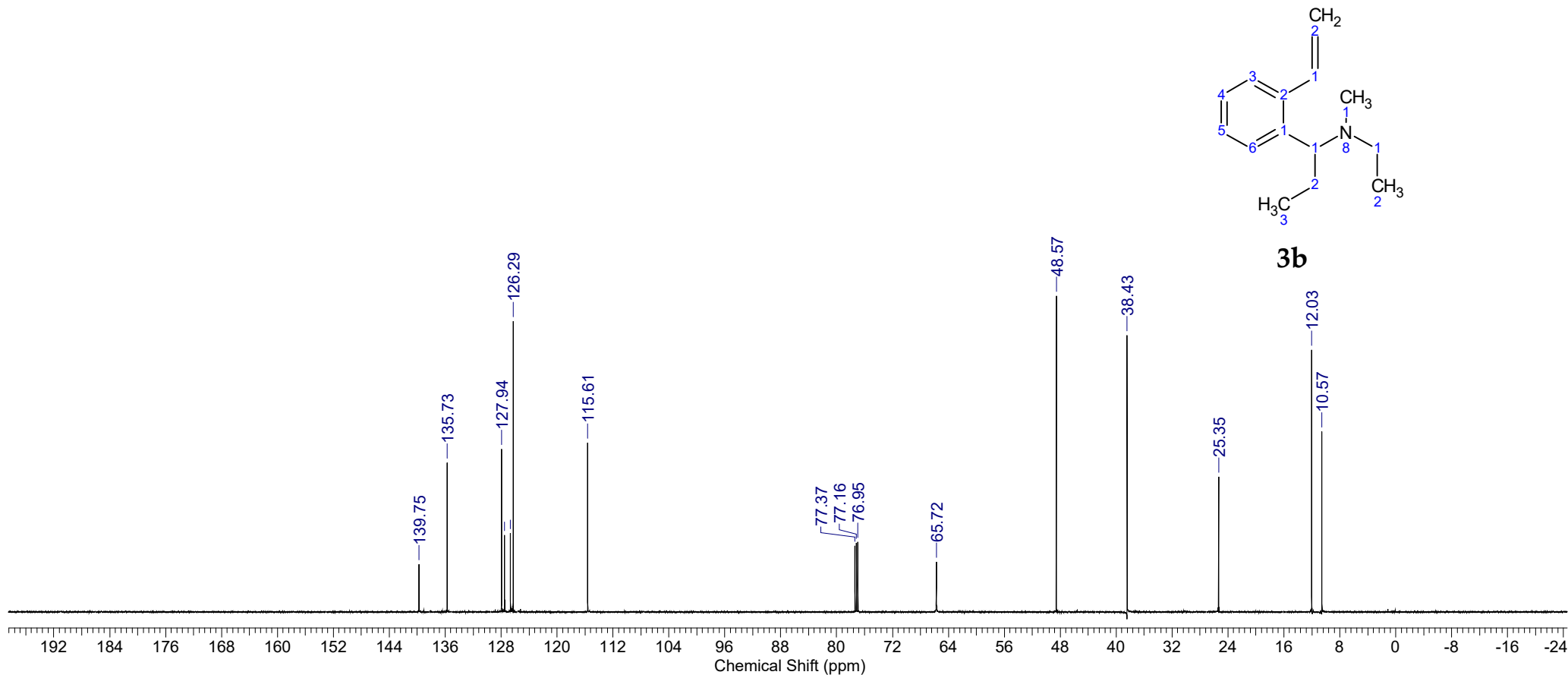


**3b**



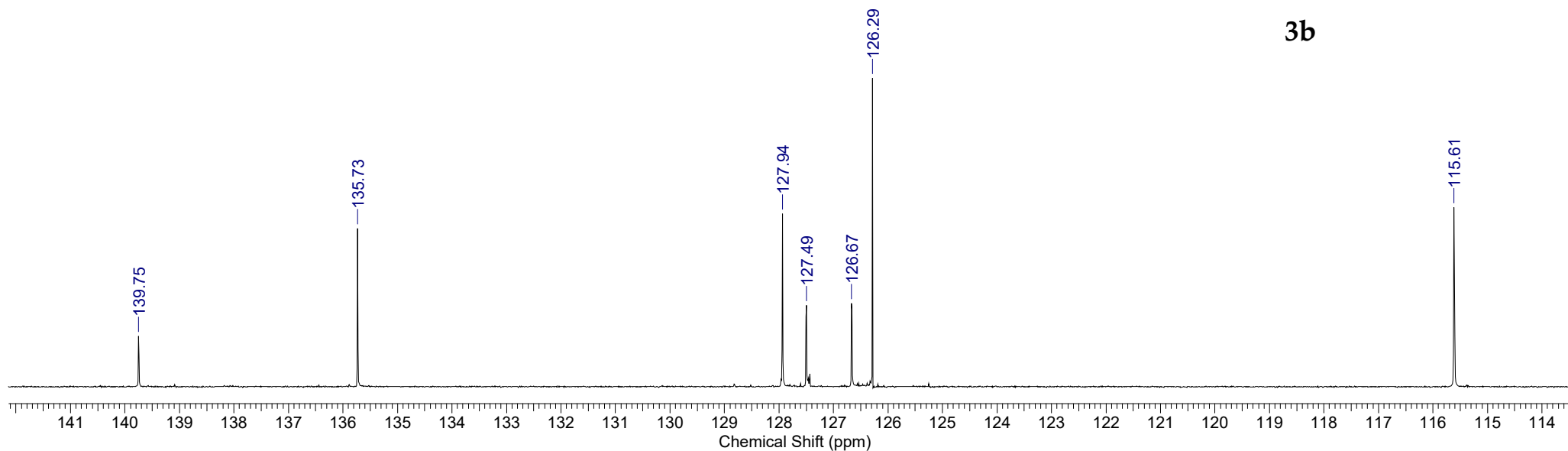
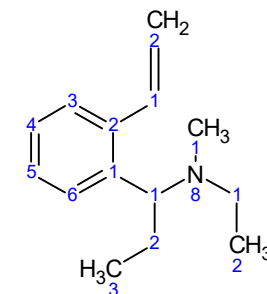
# $^{13}\text{C}$ NMR spectrum of compound **3b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date
Date Stamp					
File Name			Frequency (MHz)		
Nucleus	$^{13}\text{C}$	Number of Transients	1000	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49
			Original Points Count		
			Receiver Gain		



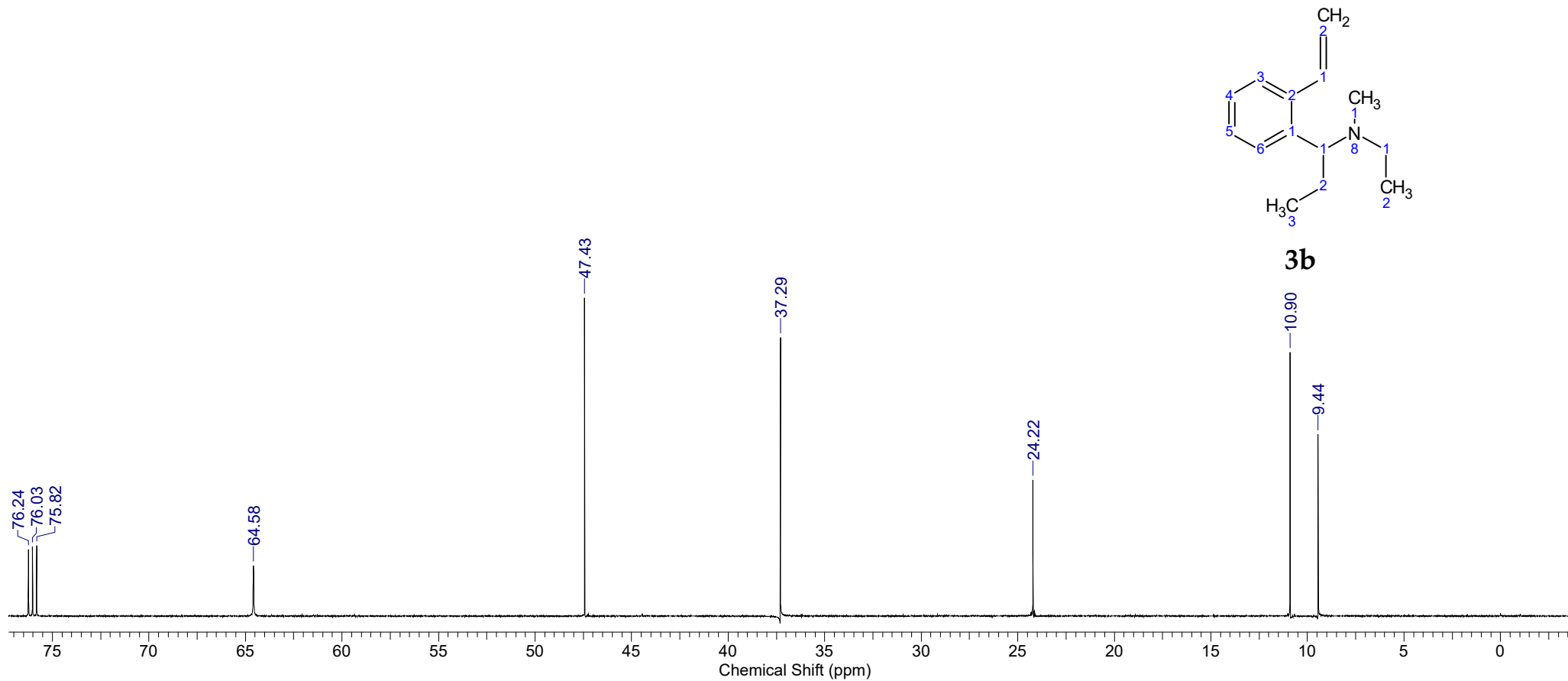
# $^{13}\text{C}$ NMR spectrum of compound **3b**

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date
Date Stamp					
File Name			Frequency (MHz)		
Nucleus	$^{13}\text{C}$	Number of Transients	1000	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49
			Original Points Count		
			Receiver Gain		

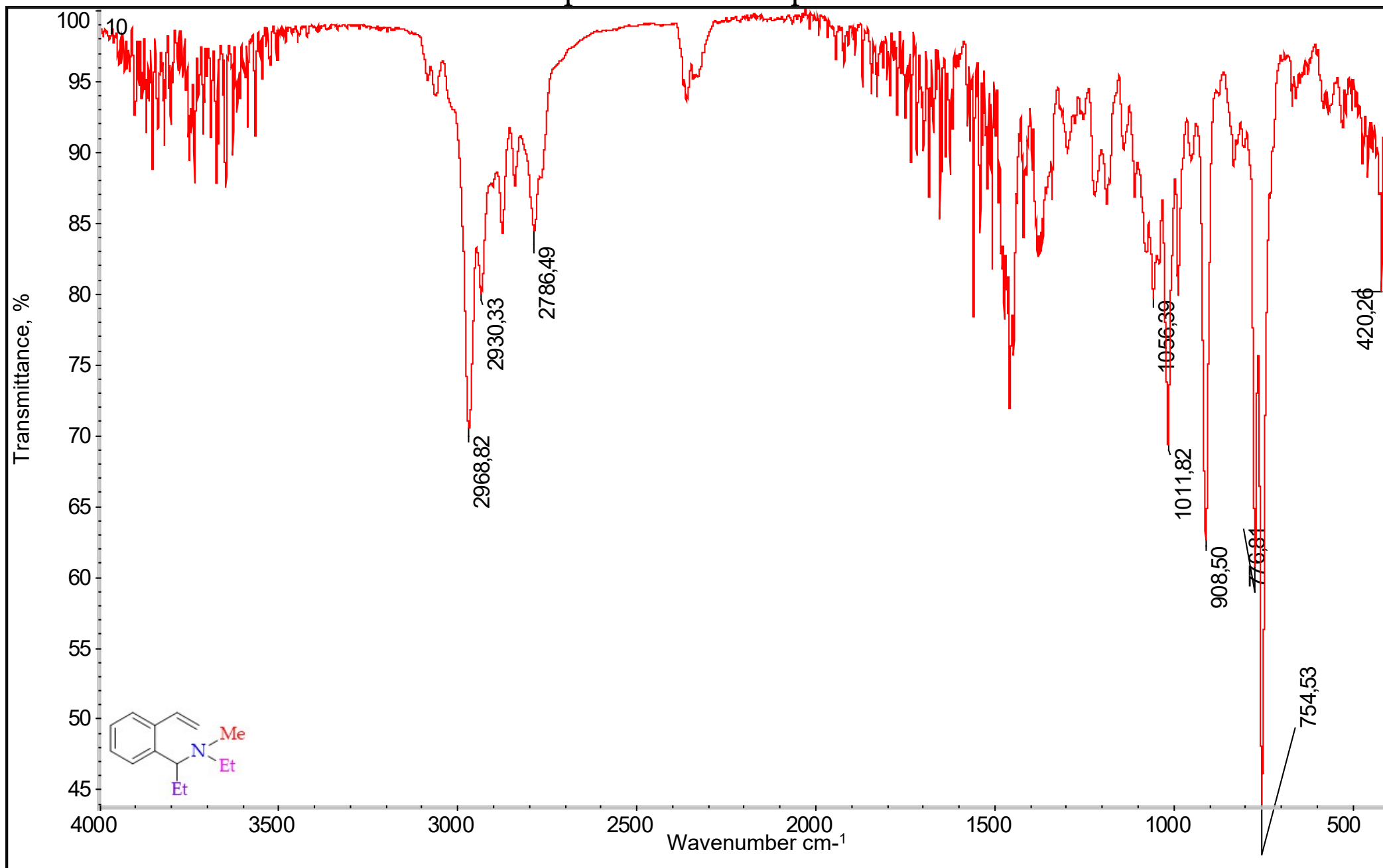


# $^{13}\text{C}$ NMR spectrum of compound **3b**

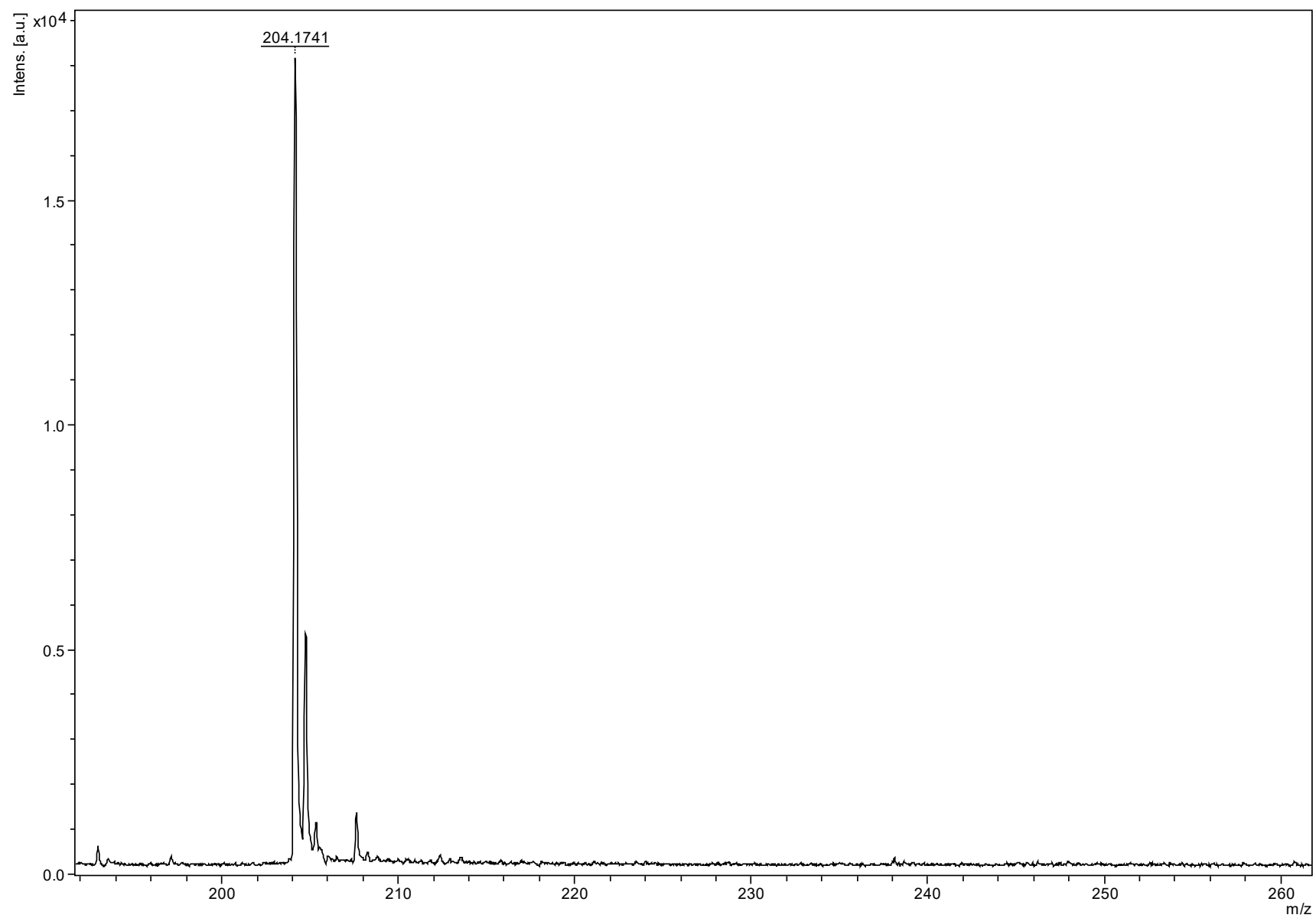
Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date
Date Stamp					
File Name			Frequency (MHz)		
Nucleus	$^{13}\text{C}$	Number of Transients	1000	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single pulse dec
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	14920.4023	Sweep Width (Hz)	47348.49
			Original Points Count		
			Receiver Gain		



IR spectrum of compound **3b**

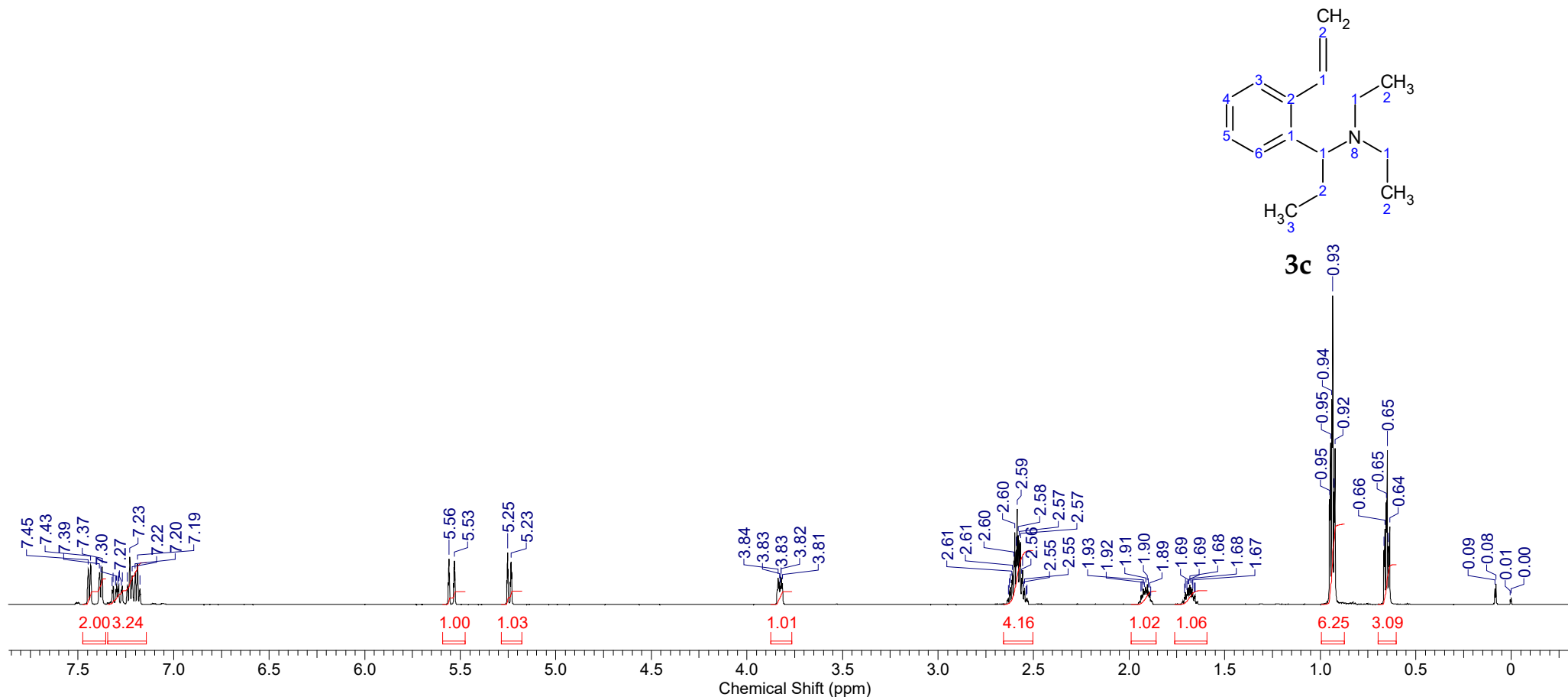


# HRMS (MALDI-TOF) spectrum of compound **3b**



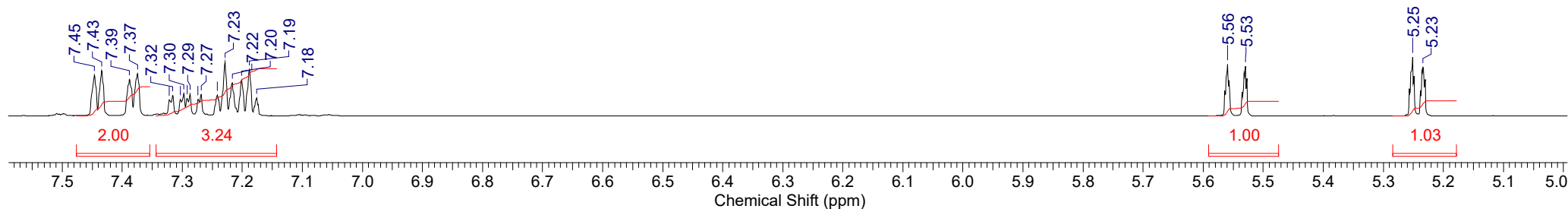
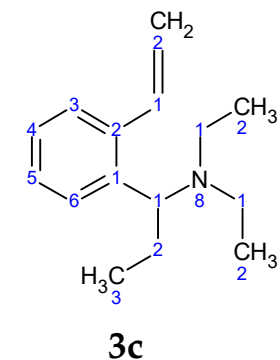
# $^1\text{H}$ NMR spectrum of compound **3c**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp				File Name	
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	20.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5388.4248
				Sweep Width (Hz)	16534.39



# $^1\text{H}$ NMR spectrum of compound **3c**

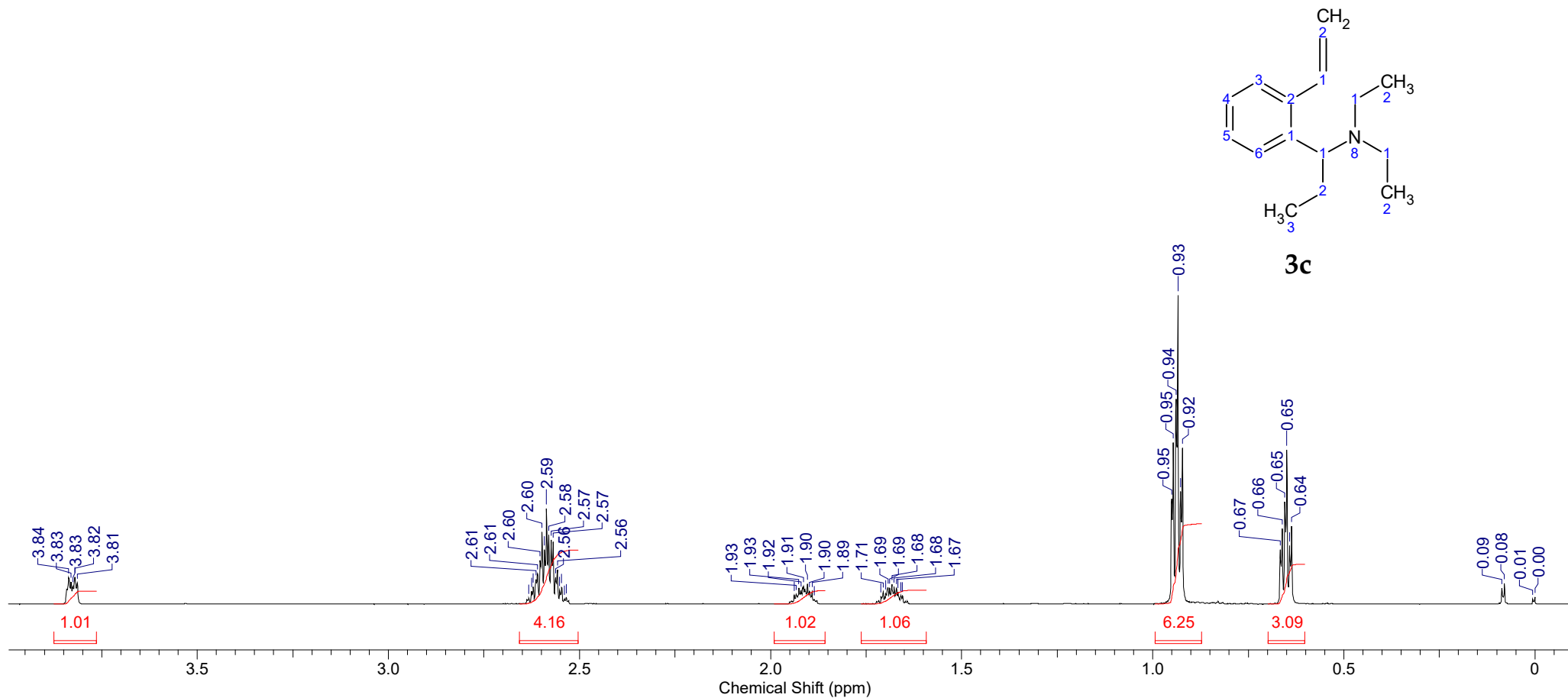
Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp				File Name	
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	20.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5388.4248
				Sweep Width (Hz)	16534.39





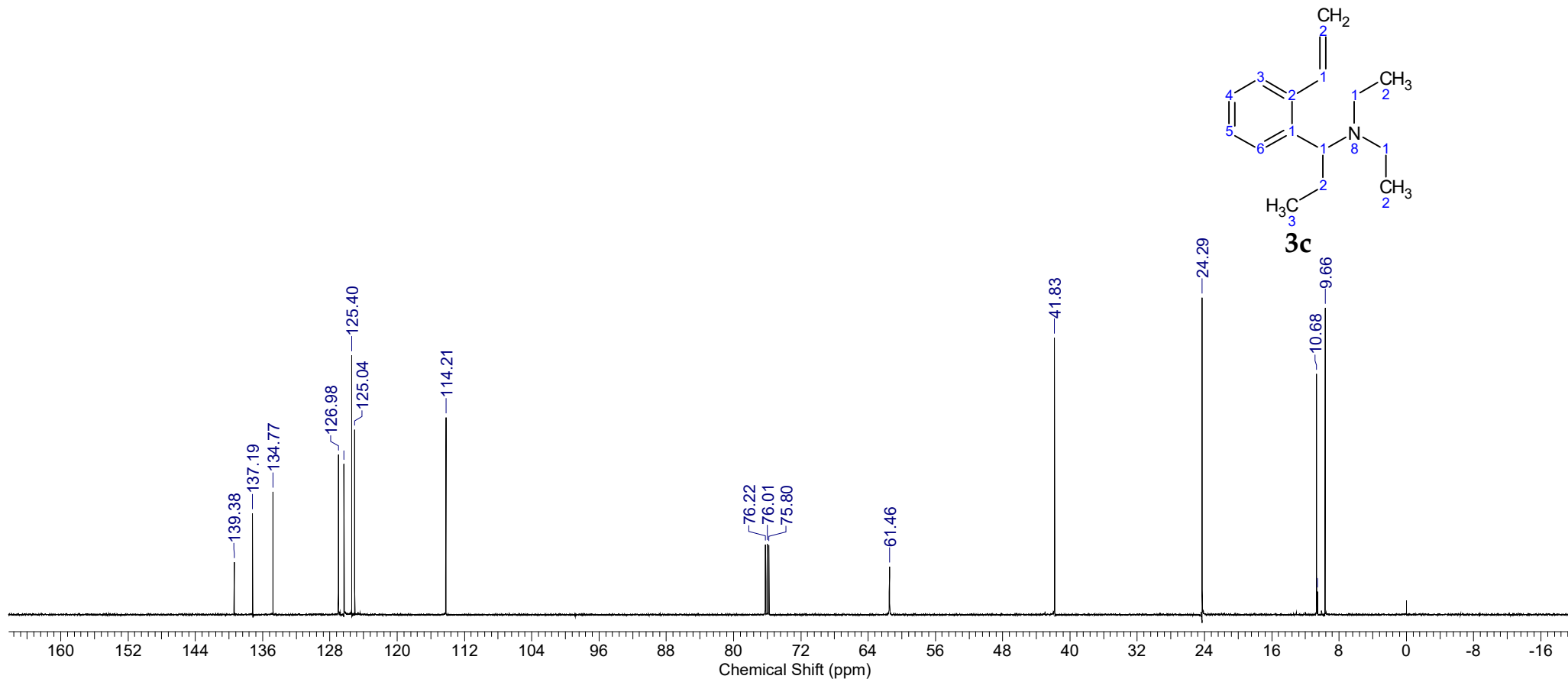
# <sup>1</sup>H NMR spectrum of compound 3c

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp				File Name	
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	20.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5388.4248
				Sweep Width (Hz)	16534.39



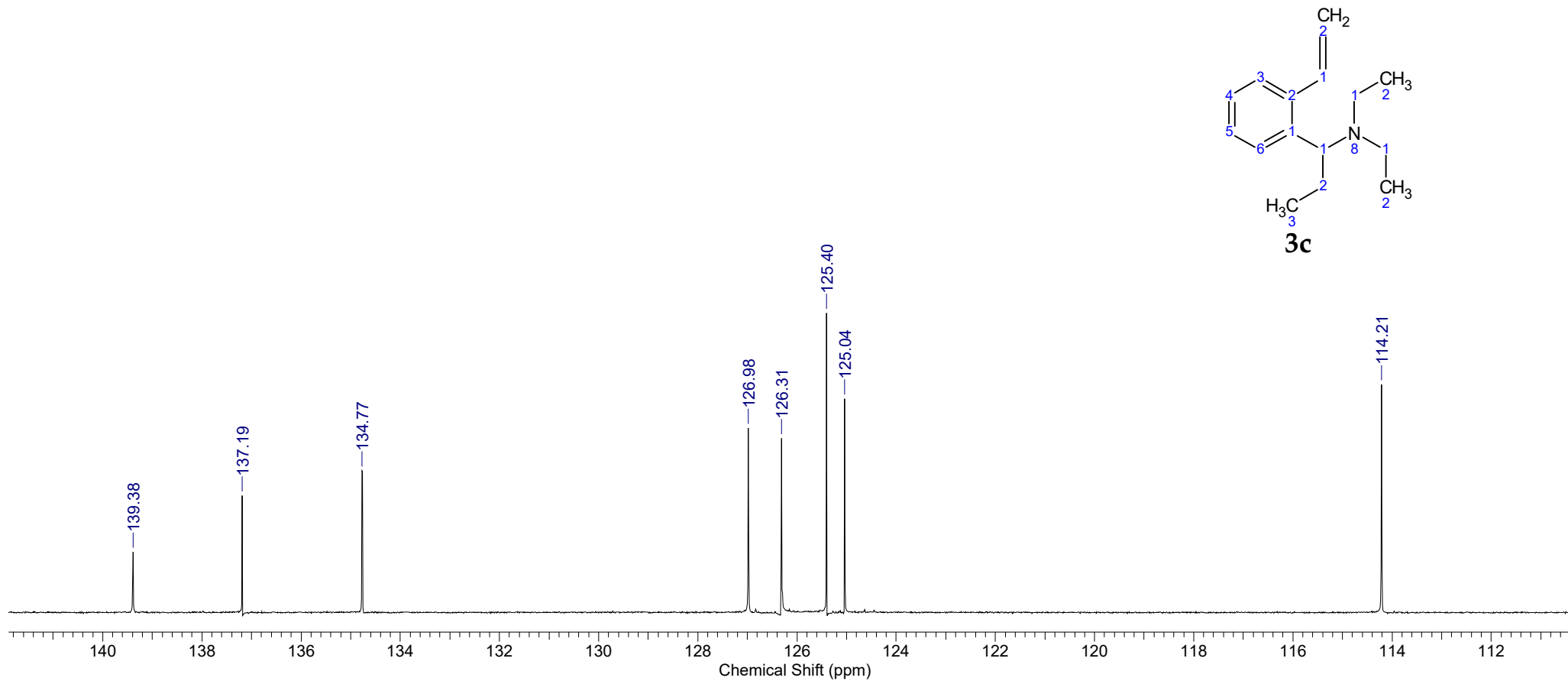
# $^{13}\text{C}$ NMR spectrum of compound 3c

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b> 150.91	
<b>Nucleus</b> 13C	<b>Number of Transients</b> 1000		<b>Origin</b> ECA 600	<b>Original Points Count</b> 32768	
<b>Owner</b> CKP	<b>Points Count</b> 32768		<b>Pulse Sequence</b> single pulse dec	<b>Receiver Gain</b> 56.00	
<b>Solvent</b> CHLOROFORM-d	<b>Spectrum Offset (Hz)</b> 14918.9570		<b>Sweep Width (Hz)</b> 47348.49		



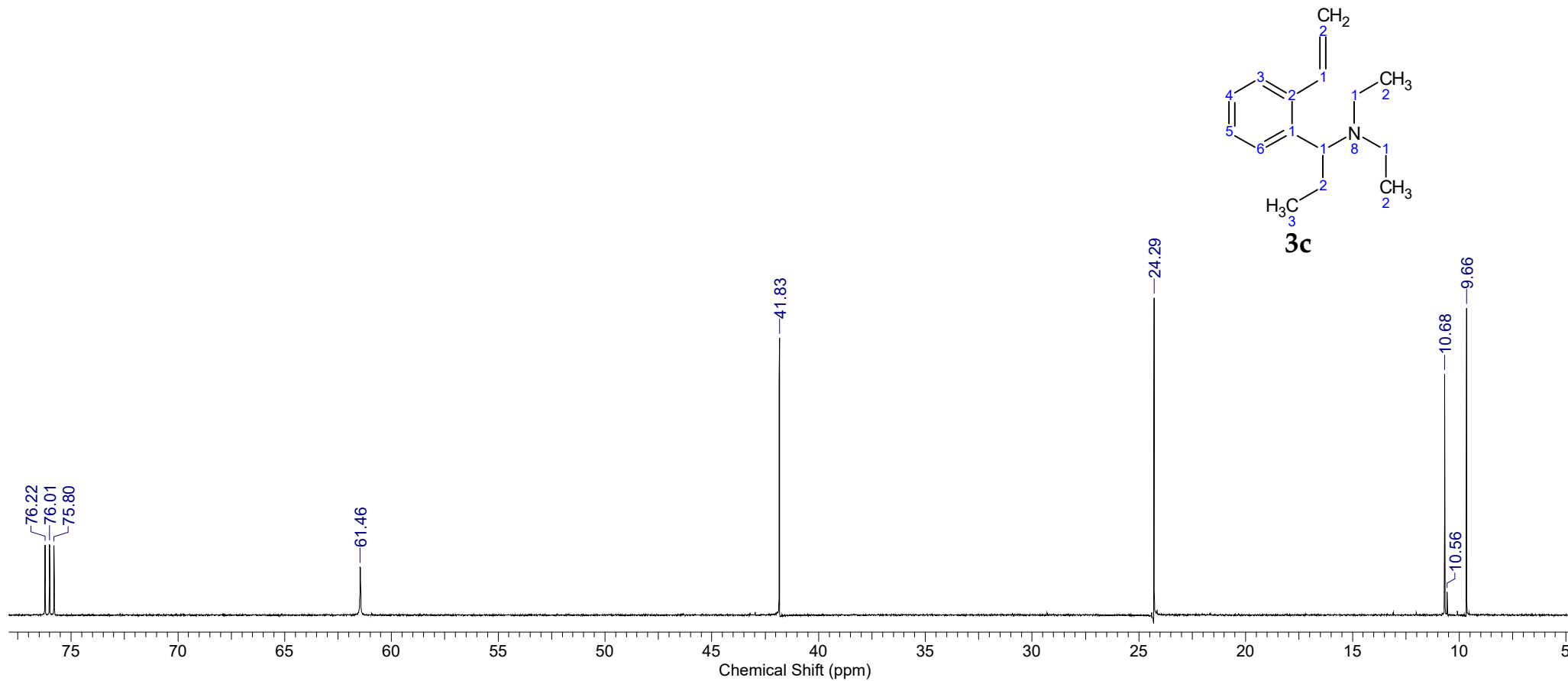
# $^{13}\text{C}$ NMR spectrum of compound 3c

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b> 150.91	
<b>Nucleus</b> 13C	<b>Number of Transients</b> 1000	<b>Origin</b> ECA 600		<b>Original Points Count</b> 32768	
<b>Owner</b> CKP	<b>Points Count</b> 32768	<b>Pulse Sequence</b> single pulse dec		<b>Receiver Gain</b> 56.00	
<b>Solvent</b> CHLOROFORM-d	<b>Spectrum Offset (Hz)</b> 14918.9570	<b>Sweep Width (Hz)</b> 47348.49			

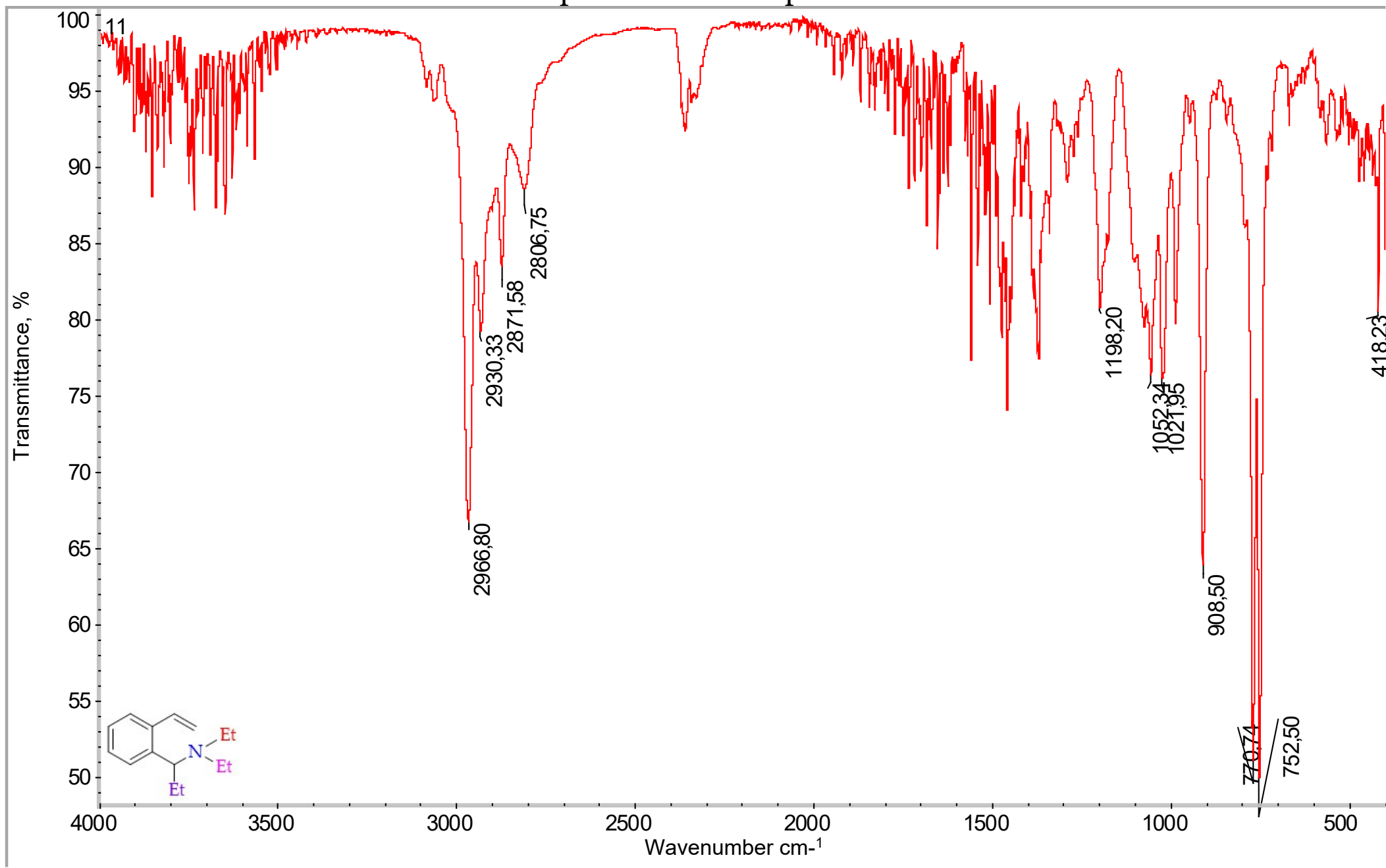


# $^{13}\text{C}$ NMR spectrum of compound 3c

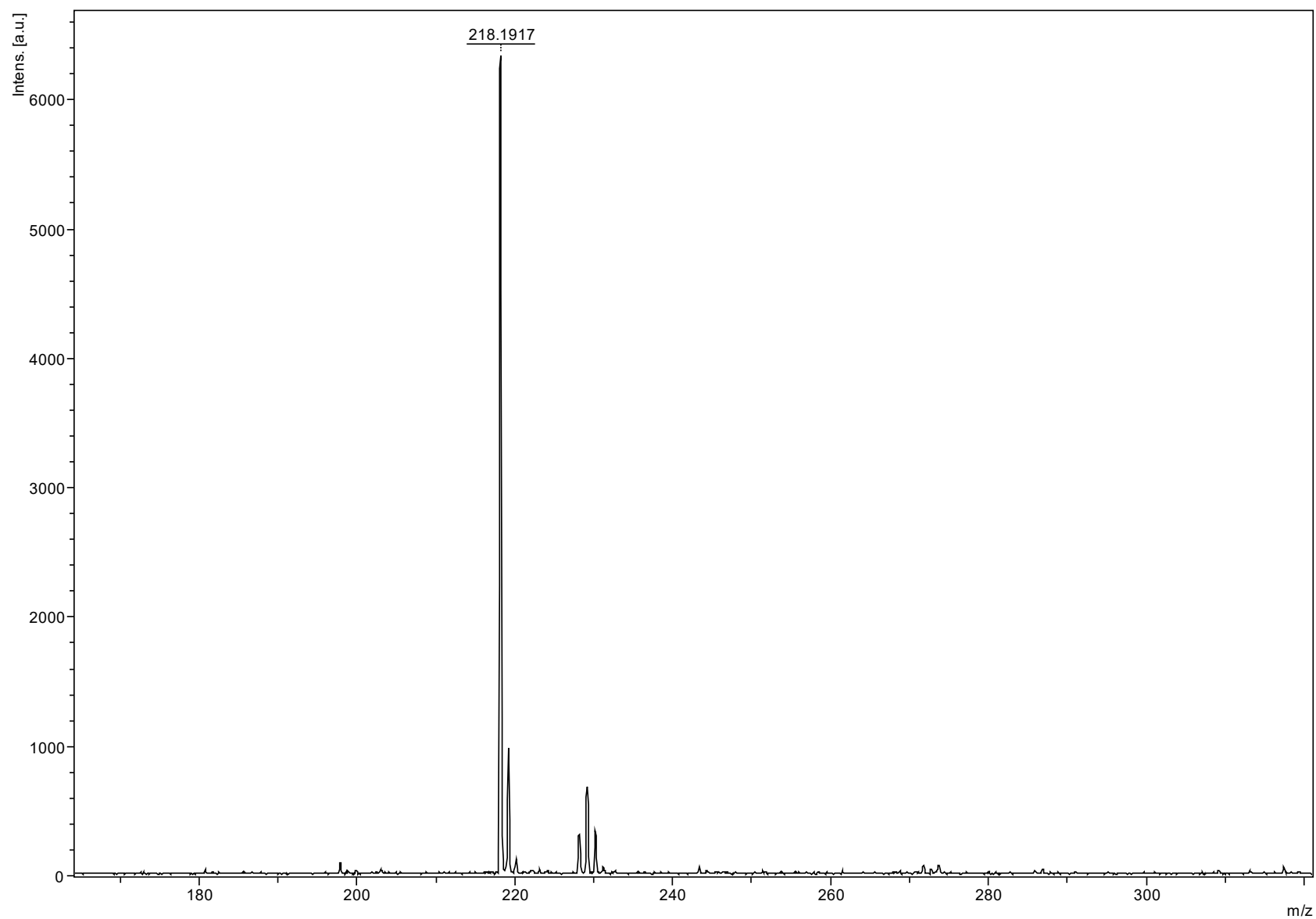
<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b> 150.91	
<b>Nucleus</b> 13C	<b>Number of Transients</b> 1000		<b>Origin</b> ECA 600	<b>Original Points Count</b> 32768	
<b>Owner</b> CKP	<b>Points Count</b> 32768		<b>Pulse Sequence</b> single pulse dec	<b>Receiver Gain</b> 56.00	
<b>Solvent</b> CHLOROFORM-d	<b>Spectrum Offset (Hz)</b> 14918.9570		<b>Sweep Width (Hz)</b> 47348.49		



IR spectrum of compound 3c

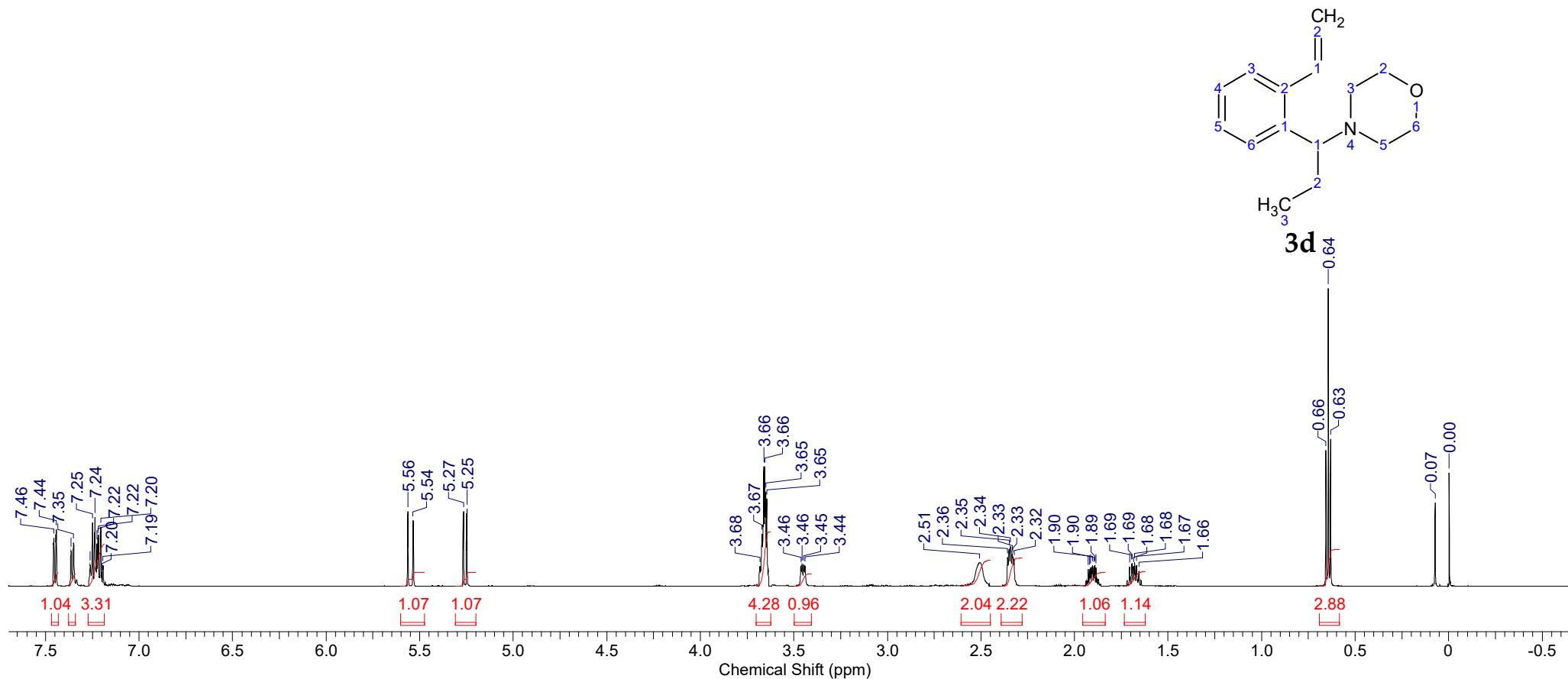


# HRMS (MALDI-TOF) spectrum of compound **3c**



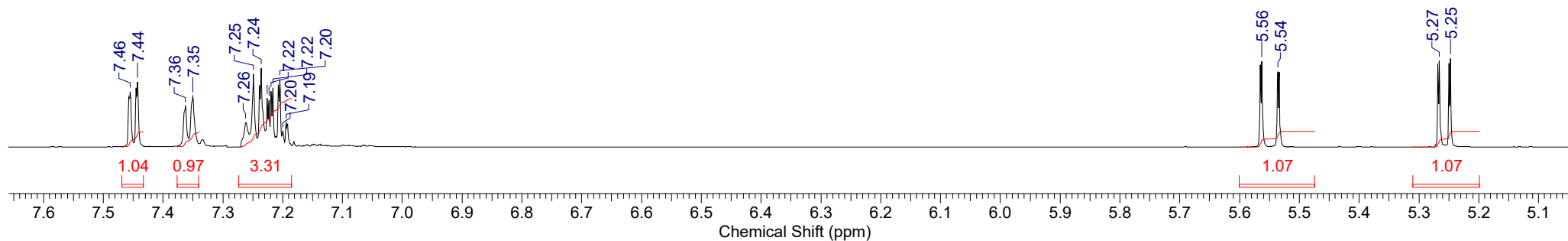
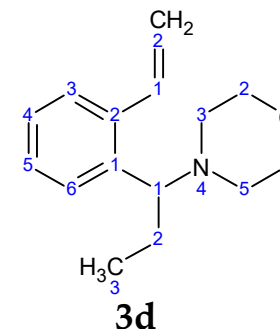
# <sup>1</sup>H NMR spectrum of compound 3d

Acquisition Time (sec) 1.9818		Comment single pulse		Date	
Date Stamp					
File Name				Frequency (MHz) 600.17	
Nucleus 1H	Number of Transients 8		Origin ECA 600		Original Points Count 32768
Owner CKP	Points Count 32768		Pulse Sequence single_pulse.ex2		Receiver Gain 28.00
Solvent CHLOROFORM-d	Spectrum Offset (Hz) 5401.5503		Sweep Width (Hz) 16534.39		



# <sup>1</sup>H NMR spectrum of compound 3d

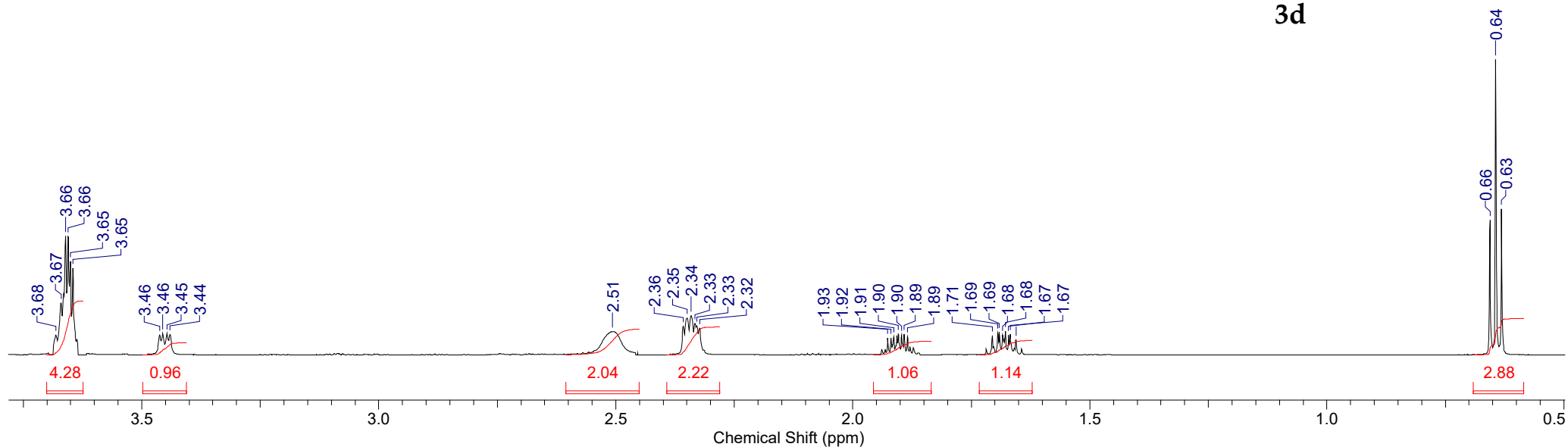
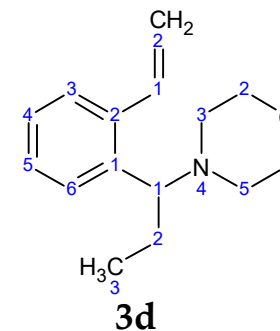
<b>Acquisition Time (sec)</b> 1.9818		<b>Comment</b> single pulse	<b>Date</b>	
<b>Date Stamp</b>				
<b>File Name</b>			<b>Frequency (MHz)</b> 600.17	
<b>Nucleus</b> 1H		<b>Number of Transients</b> 8	<b>Origin</b> ECA 600	<b>Original Points Count</b> 32768
<b>Owner</b> CKP		<b>Points Count</b> 32768	<b>Pulse Sequence</b> single_pulse.ex2	<b>Receiver Gain</b> 28.00
<b>Solvent</b> CHLOROFORM-d		<b>Spectrum Offset (Hz)</b> 5401.5503	<b>Sweep Width (Hz)</b> 16534.39	





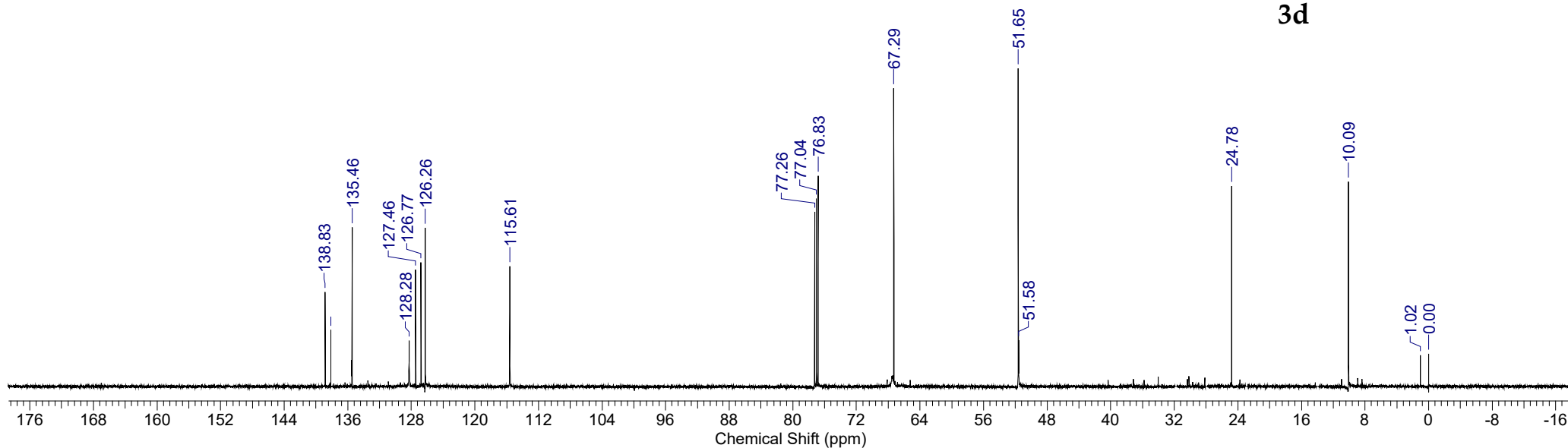
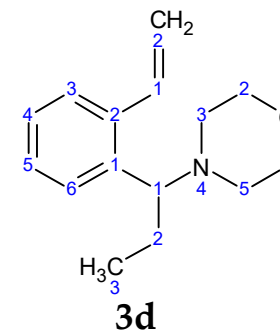
# $^1\text{H}$ NMR spectrum of compound **3d**

<b>Acquisition Time (sec)</b> 1.9818		<b>Comment</b> single pulse	<b>Date</b>	
<b>Date Stamp</b>				
<b>File Name</b>			<b>Frequency (MHz)</b> 600.17	
<b>Nucleus</b> $^1\text{H}$		<b>Number of Transients</b> 8	<b>Origin</b> ECA 600	<b>Original Points Count</b> 32768
<b>Owner</b> CKP		<b>Points Count</b> 32768	<b>Pulse Sequence</b> single_pulse.ex2	<b>Receiver Gain</b> 28.00
<b>Solvent</b> CHLOROFORM-d		<b>Spectrum Offset (Hz)</b> 5401.5503	<b>Sweep Width (Hz)</b> 16534.39	



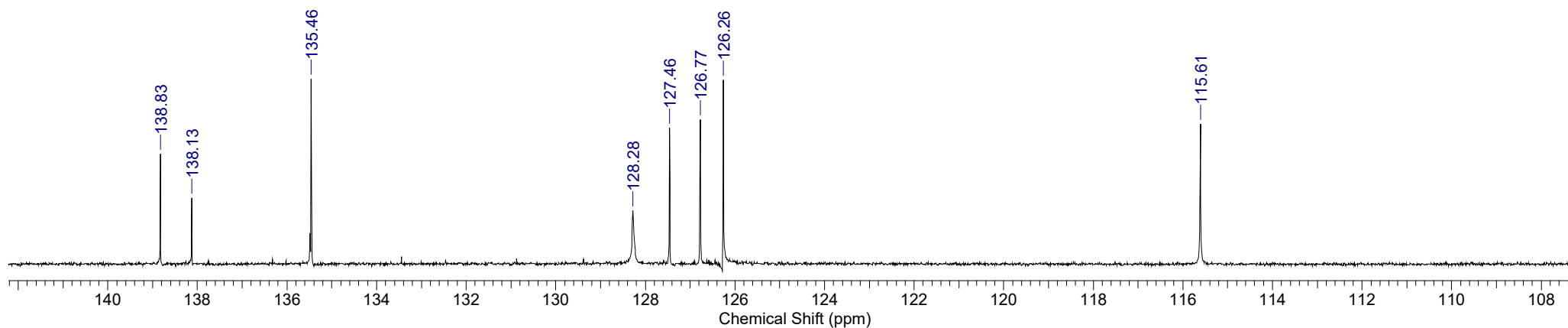
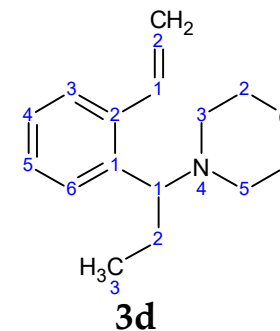
# $^{13}\text{C}$ NMR spectrum of compound 3d

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15076.4629	<b>Sweep Width (Hz)</b>	47348.49
				<b>Original Points Count</b>	32768
				<b>Receiver Gain</b>	56.00



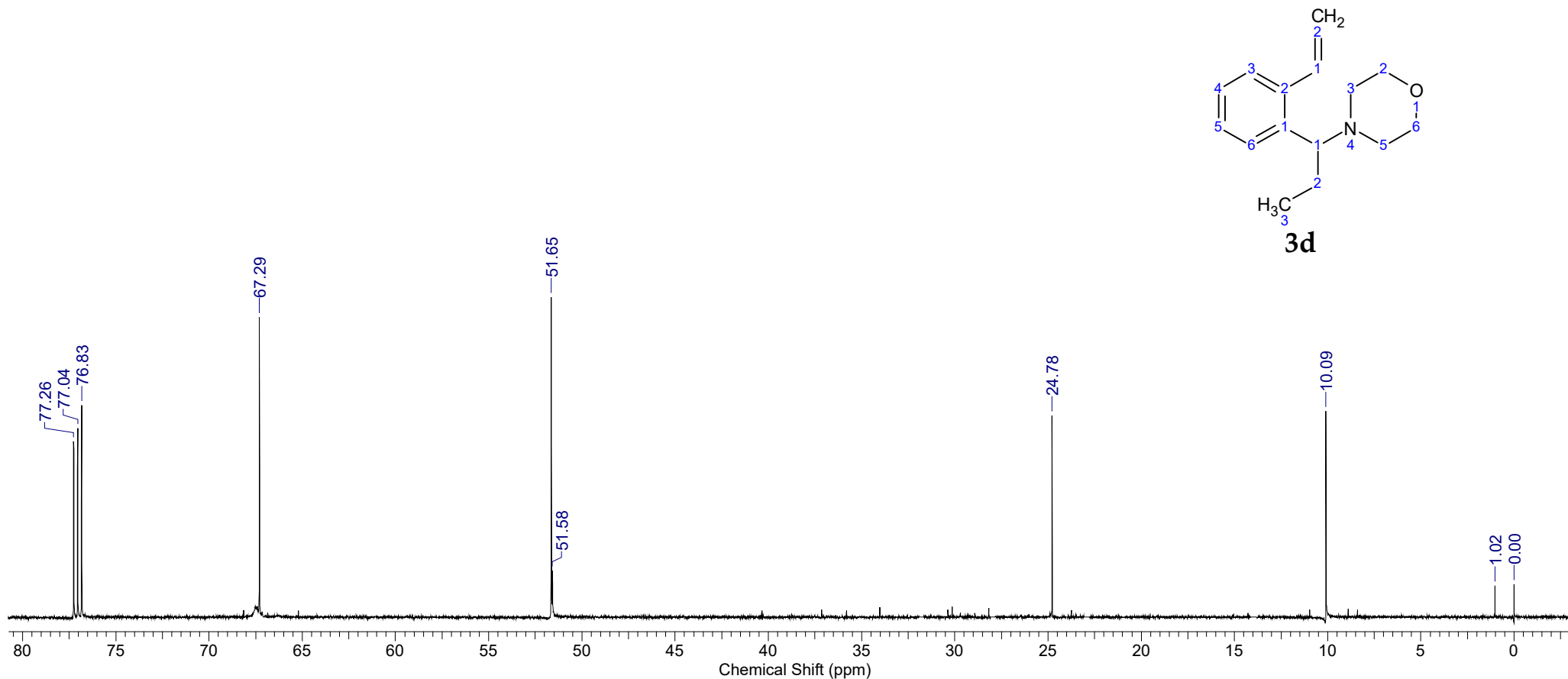
# $^{13}\text{C}$ NMR spectrum of compound 3d

<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b> 150.91	
<b>Nucleus</b> 13C	<b>Number of Transients</b> 1000		<b>Origin</b> ECA 600		<b>Original Points Count</b> 32768
<b>Owner</b> CKP	<b>Points Count</b> 32768		<b>Pulse Sequence</b> single pulse dec		<b>Receiver Gain</b> 56.00
<b>Solvent</b> CHLOROFORM-d	<b>Spectrum Offset (Hz)</b> 15076.4629		<b>Sweep Width (Hz)</b> 47348.49		

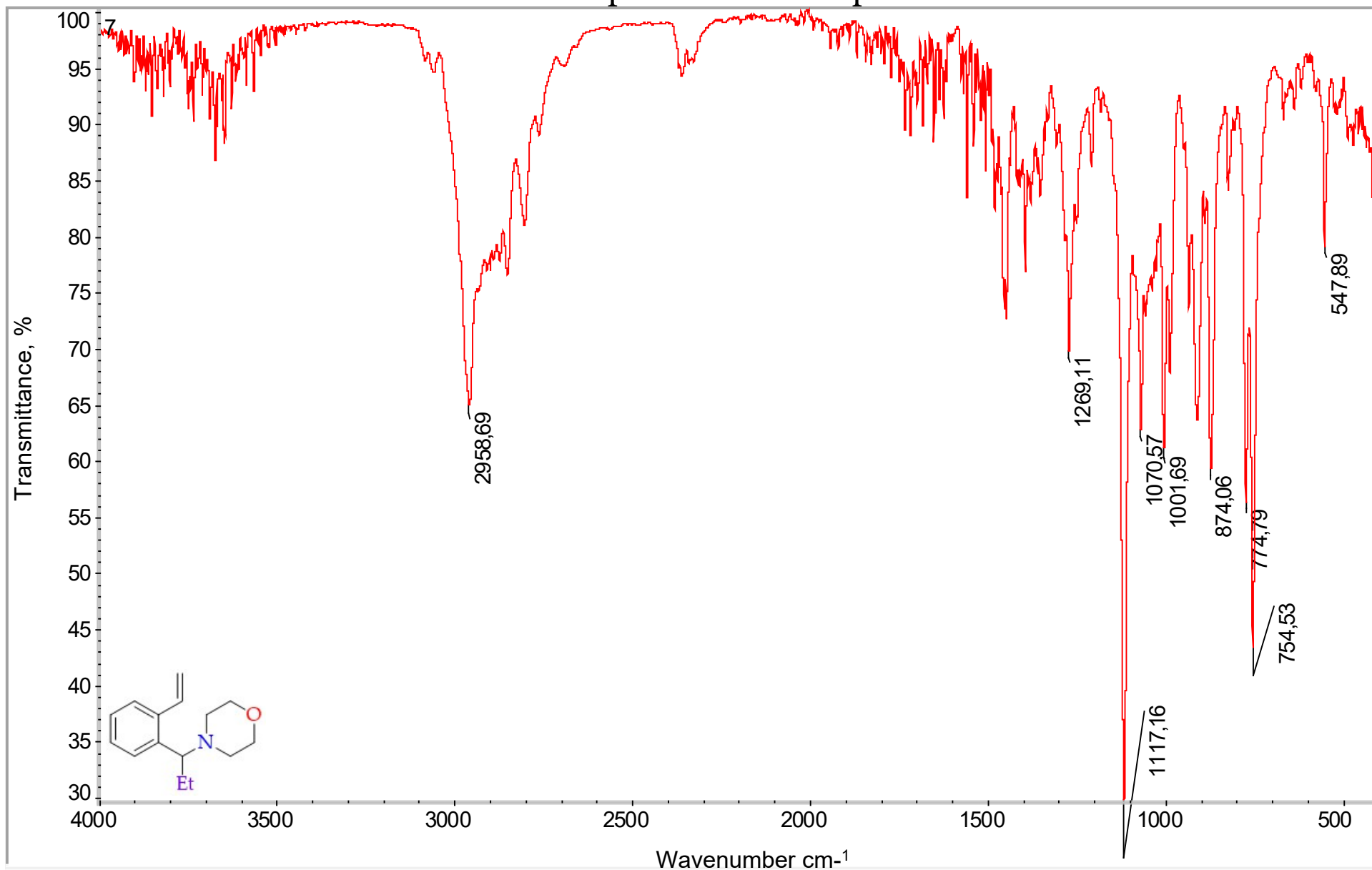


# $^{13}\text{C}$ NMR spectrum of compound 3d

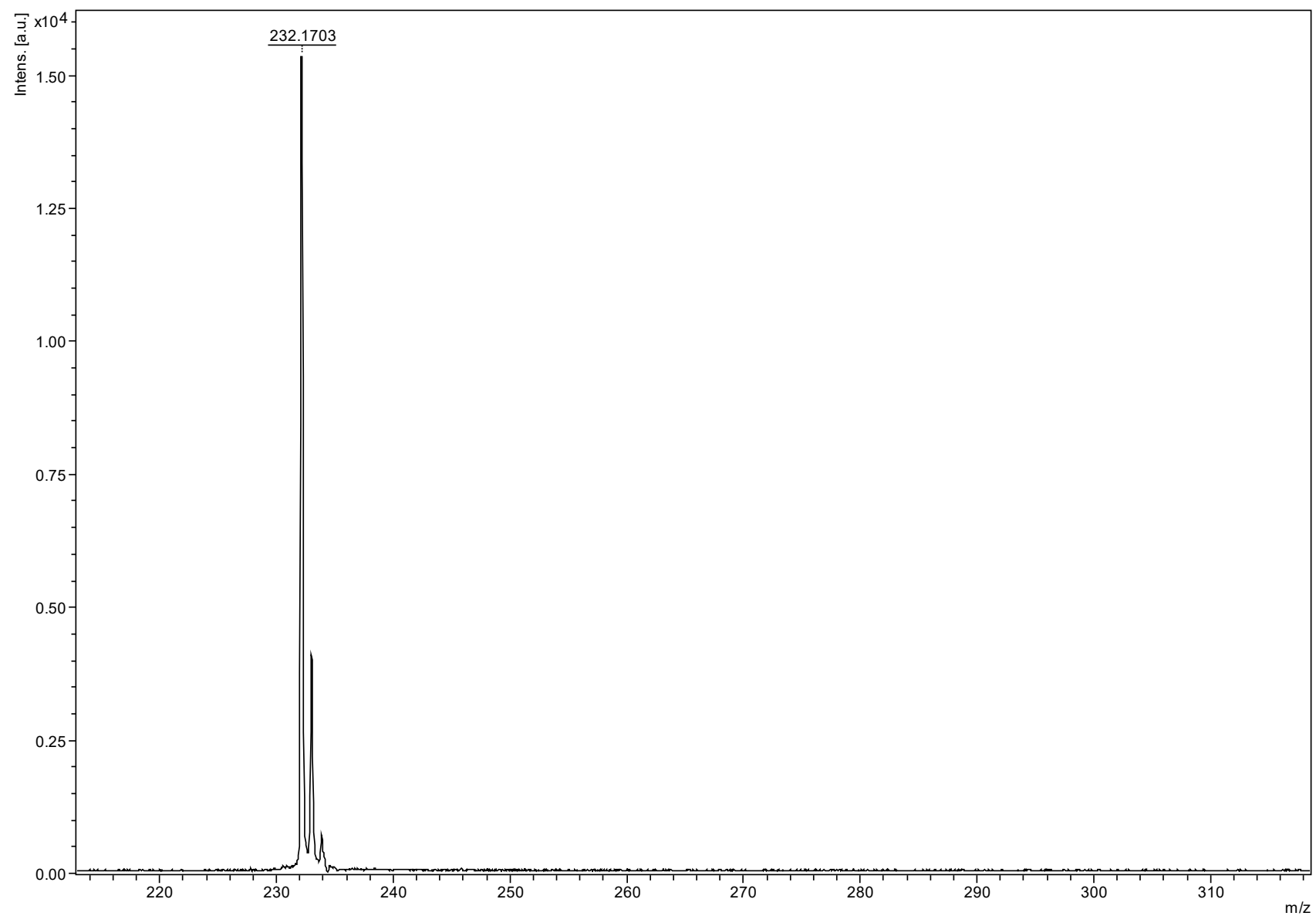
<b>Acquisition Time (sec)</b> 0.6921		<b>Comment</b> single pulse decoupled gated NOE		<b>Date</b>	
<b>Date Stamp</b>					
<b>File Name</b>				<b>Frequency (MHz)</b>	150.91
<b>Nucleus</b>	13C	<b>Number of Transients</b>	1000	<b>Origin</b>	ECA 600
<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
<b>Solvent</b>	CHLOROFORM-d	<b>Spectrum Offset (Hz)</b>	15076.4629	<b>Sweep Width (Hz)</b>	47348.49
				<b>Original Points Count</b>	32768
				<b>Receiver Gain</b>	56.00



# IR spectrum of compound 3d



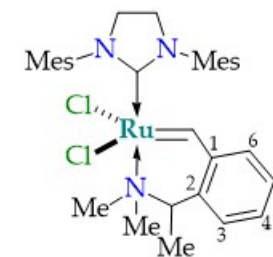
# HRMS (MALDI-TOF) spectrum of compound **3d**



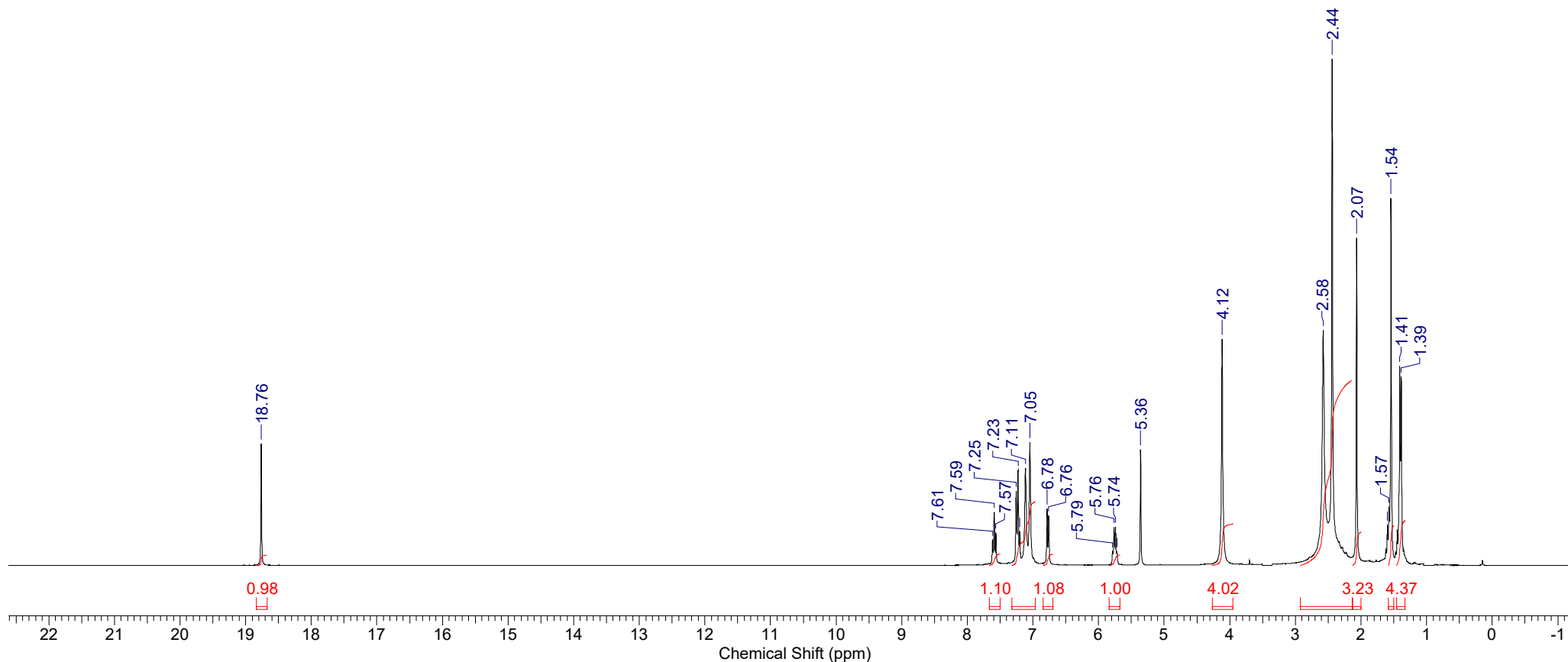
# <sup>1</sup>H spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 2.5690	<b>Comment</b> FZ_Grubbs_7-K8 in CD2Cl2	<b>Date</b> 30 Apr 2019 10:22:56
<b>Date Stamp</b> 30 Apr 2019 10:22:56	<b>File Name</b>	
<b>Frequency (MHz)</b> 300.13	<b>Nucleus</b> 1H	<b>Number of Transients</b> 64
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 80.39	<b>SW(cyclical) (Hz)</b> 25510.20	<b>Pulse Sequence</b> zg
<b>Spectrum Offset (Hz)</b> 1350.5919	<b>Sweep Width (Hz)</b> 25510.11	<b>Solvent</b> DICHLOROMETHANE-d2
	<b>Temperature (degree C)</b> 30.000	



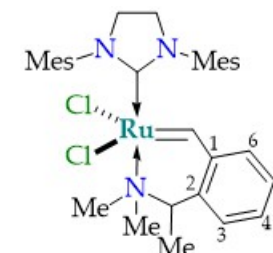
4a



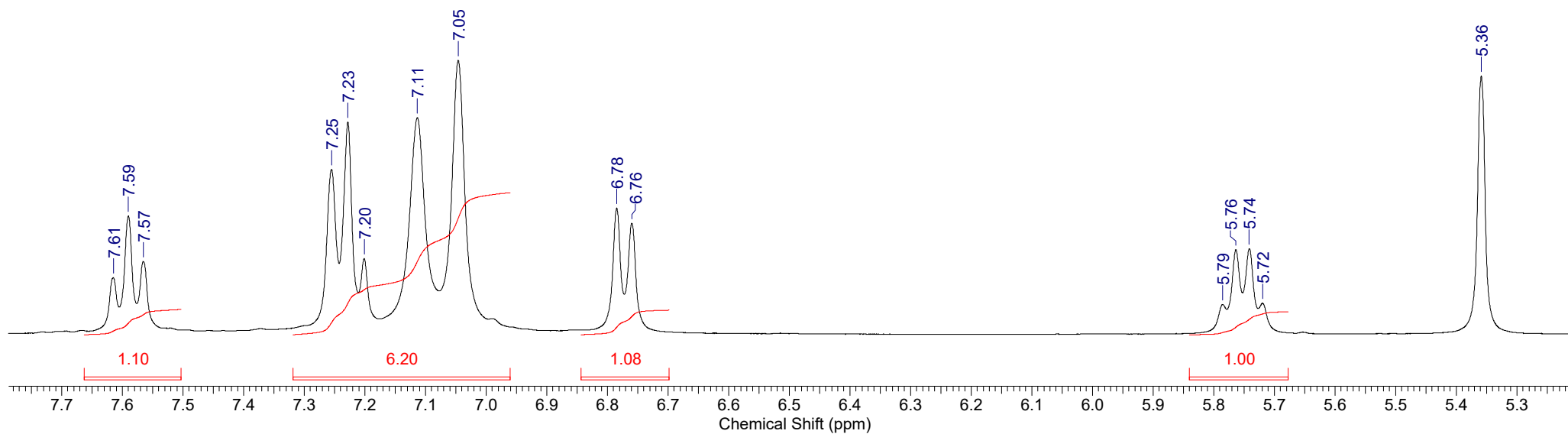
# $^1\text{H}$ spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 2.5690	<b>Comment</b> FZ_Grubbs_7-K8 in CD <sub>2</sub> Cl <sub>2</sub>	<b>Date</b> 30 Apr 2019 10:22:56
<b>Date Stamp</b> 30 Apr 2019 10:22:56	<b>File Name</b>	
<b>Frequency (MHz)</b> 300.13	<b>Nucleus</b> $^1\text{H}$	<b>Number of Transients</b> 64
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 80.39	<b>SW(cyclical) (Hz)</b> 25510.20	<b>Pulse Sequence</b> zg
<b>Spectrum Offset (Hz)</b> 1350.5919	<b>Sweep Width (Hz)</b> 25510.11	<b>Solvent</b> DICHLOROMETHANE-d <sub>2</sub>
	<b>Temperature (degree C)</b> 30.000	



**4a**

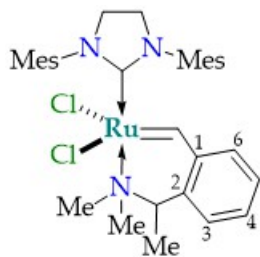




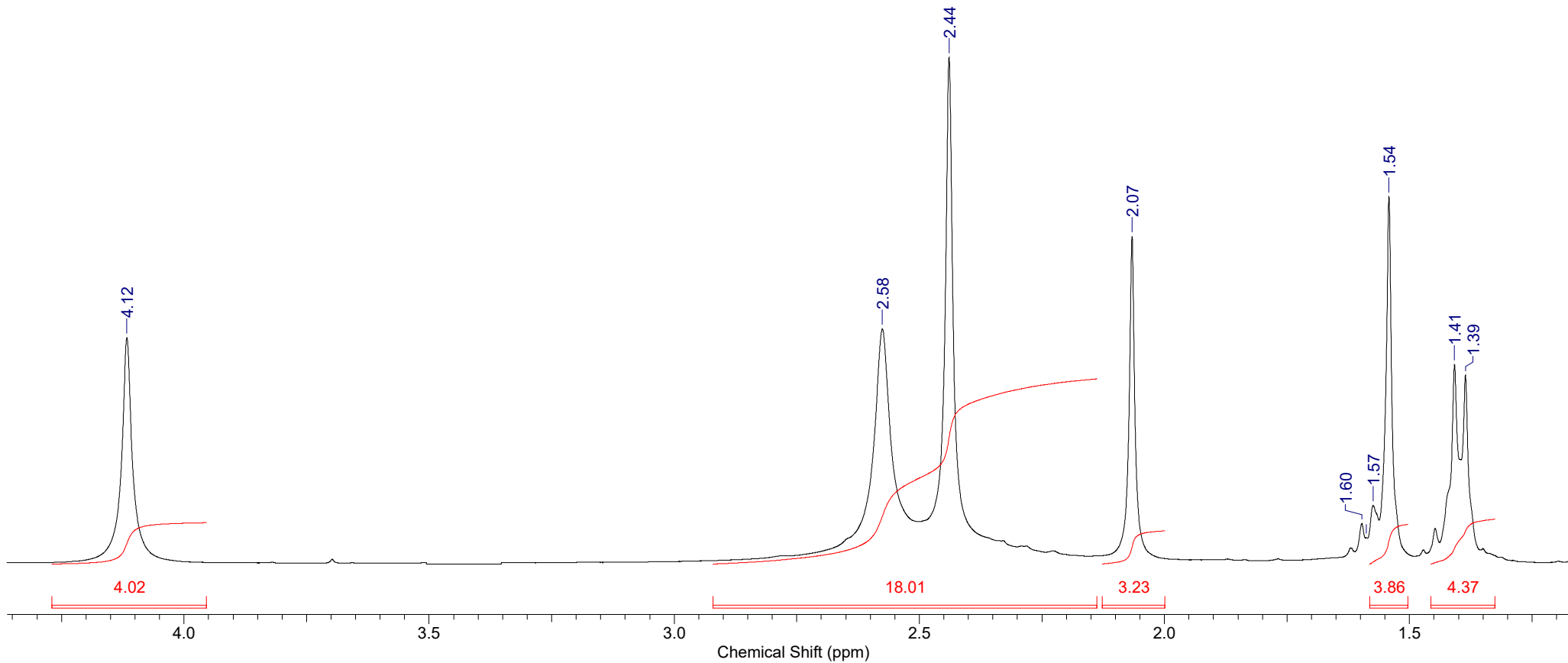
### <sup>1</sup>H spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>3</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b>	2.5690	<b>Comment</b>	FZ Grubbs 7-K8 in CD2Cl2		<b>Date</b>	30 Apr 2019 10:22:56
<b>Date Stamp</b>	30 Apr 2019 10:22:56		<b>File Name</b>			
<b>Frequency (MHz)</b>	300.13	<b>Nucleus</b>	1H	<b>Number of Transients</b>	64	<b>Origin</b> spect
<b>Original Points Count</b>	65536	<b>Owner</b>	nmr	<b>Points Count</b>	262144	<b>Pulse Sequence</b> zg
<b>Receiver Gain</b>	80.39	<b>SW(cyclical) (Hz)</b>	25510.20	<b>Solvent</b>	DICHLOROMETHANE-d2	
<b>Spectrum Offset (Hz)</b>	1350.5919	<b>Sweep Width (Hz)</b>	25510.11	<b>Temperature (degree C)</b>	30.000	



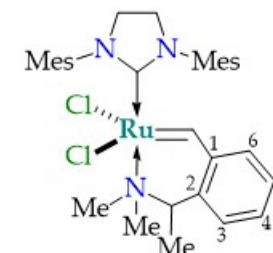
**4a**



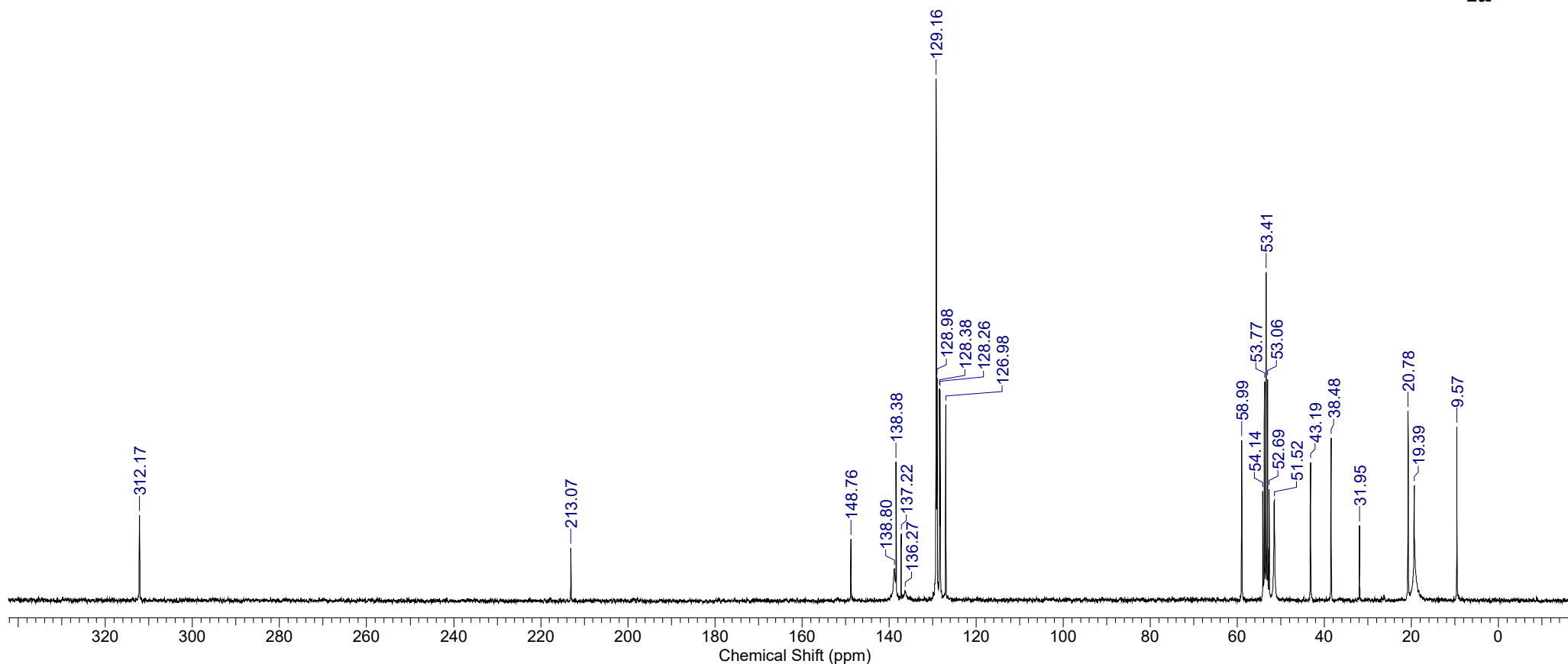
# $^{13}\text{C}$ spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 1.1010	<b>Comment</b> FZ Grubbs 7-K8-C13dec [hp-dec]	<b>Date</b> 30 Apr 2019 12:39:28
<b>Date Stamp</b> 30 Apr 2019 12:39:28	<b>File Name</b>	
<b>Frequency (MHz)</b> 75.47	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 2224
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 202.48	<b>SW(cyclical) (Hz)</b> 59523.81	<b>Pulse Sequence</b> zgpg
<b>Spectrum Offset (Hz)</b> 7546.7783	<b>Sweep Width (Hz)</b> 59523.58	<b>Solvent</b> DICHLOROMETHANE-d <sub>2</sub>
	<b>Temperature (degree C)</b> 29.987	



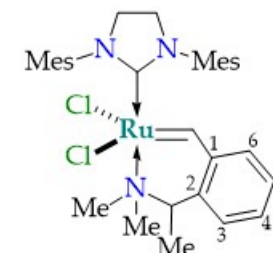
4a



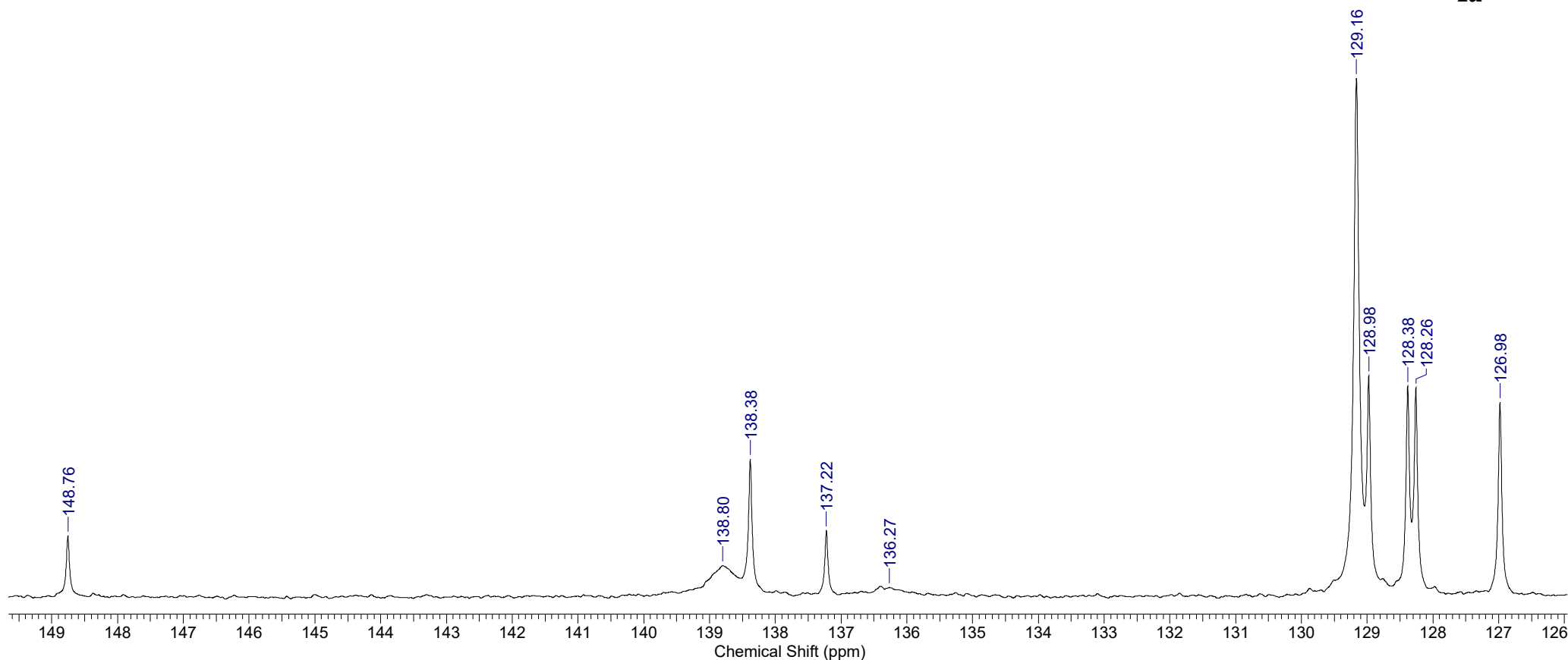
# $^{13}\text{C}$ spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 1.1010	<b>Comment</b> FZ Grubbs 7-K8-C13dec [hp-dec]	<b>Date</b> 30 Apr 2019 12:39:28
<b>Date Stamp</b> 30 Apr 2019 12:39:28	<b>File Name</b>	
<b>Frequency (MHz)</b> 75.47	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 2224
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 202.48	<b>SW(cyclical) (Hz)</b> 59523.81	<b>Pulse Sequence</b> zgpg
<b>Spectrum Offset (Hz)</b> 7546.7783	<b>Solvent</b> DICHLOROMETHANE-d <sub>2</sub>	
	<b>Sweep Width (Hz)</b> 59523.58	<b>Temperature (degree C)</b> 29.987



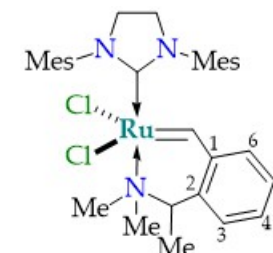
4a



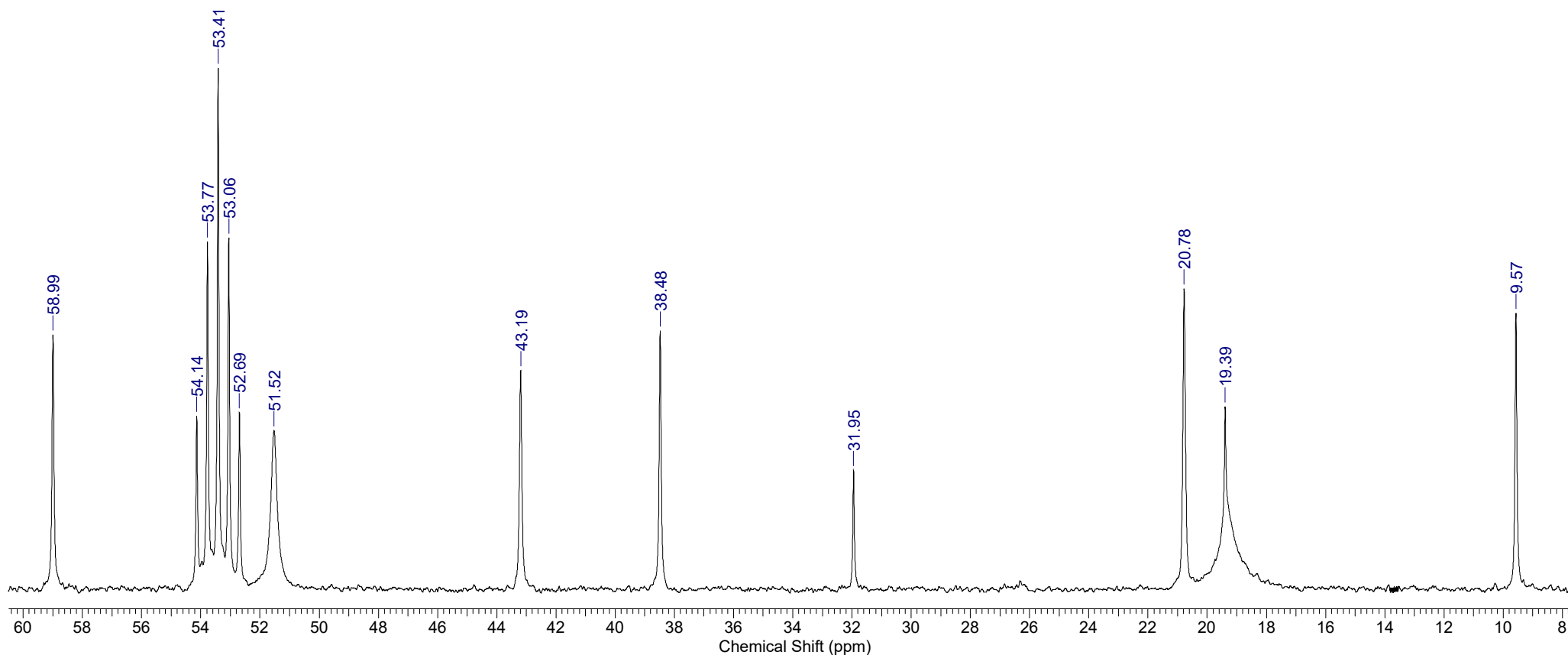
# $^{13}\text{C}$ spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 1.1010	<b>Comment</b> FZ Grubbs 7-K8-C13dec [hp-dec]	<b>Date</b> 30 Apr 2019 12:39:28
<b>Date Stamp</b> 30 Apr 2019 12:39:28	<b>File Name</b>	
<b>Frequency (MHz)</b> 75.47	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 2224
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 202.48	<b>SW(cyclical) (Hz)</b> 59523.81	<b>Solvent</b> DICHLOROMETHANE-d <sub>2</sub>
<b>Spectrum Offset (Hz)</b> 7546.7783	<b>Sweep Width (Hz)</b> 59523.58	<b>Temperature (degree C)</b> 29.987



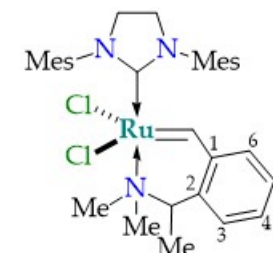
4a



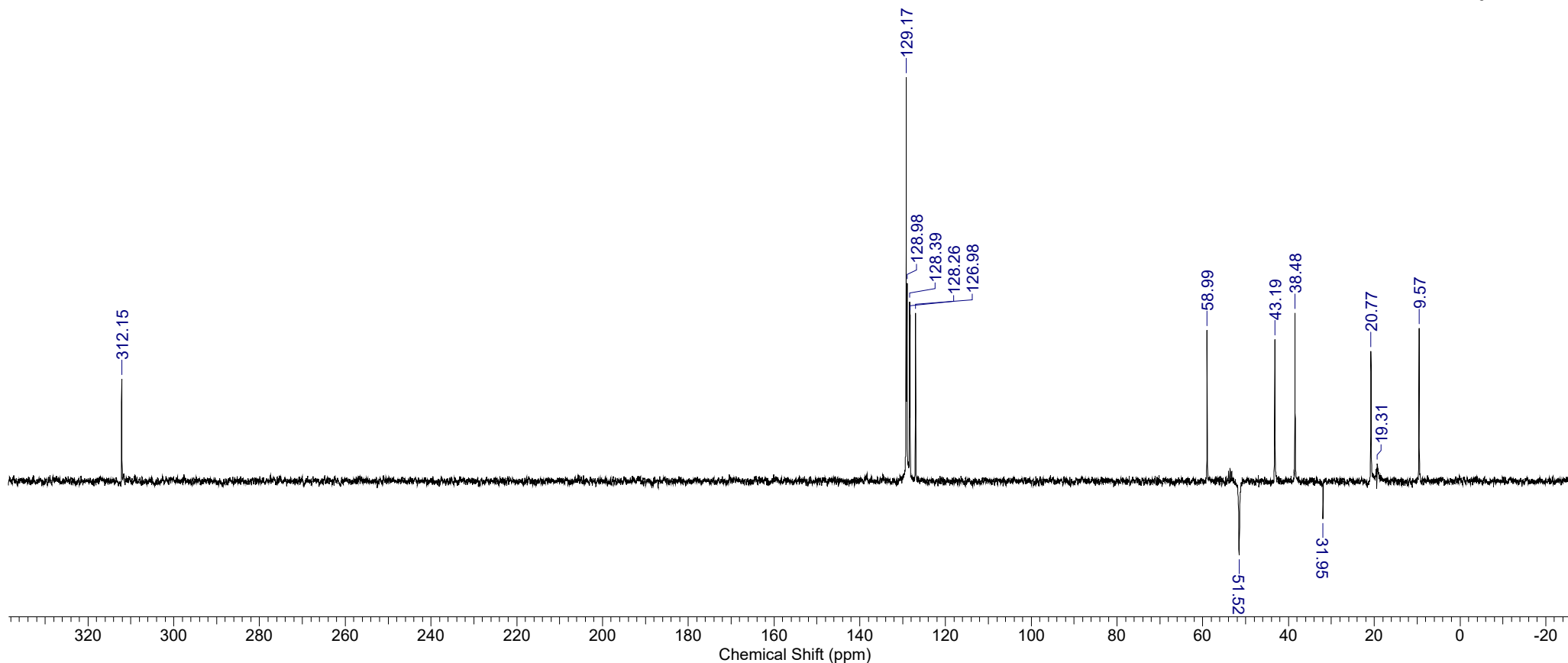
# DEPT-135 spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 1.1010	<b>Comment</b> FZ_Grubbs_7-K8-dept135 [hp-dec]	<b>Date</b> 30 Apr 2019 10:40:00
<b>Date Stamp</b> 30 Apr 2019 10:40:00	<b>File Name</b>	
<b>Frequency (MHz)</b> 75.47	<b>Nucleus</b> <sup>13</sup> C	<b>Number of Transients</b> 632
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 202.48	<b>SW(cyclical) (Hz)</b> 59523.81	<b>Pulse Sequence</b> dept135
<b>Spectrum Offset (Hz)</b> 7546.7783	<b>Sweep Width (Hz)</b> 59523.58	<b>Solvent</b> DICHLOROMETHANE-d <sub>2</sub>
	<b>Temperature (degree C)</b> 29.976	



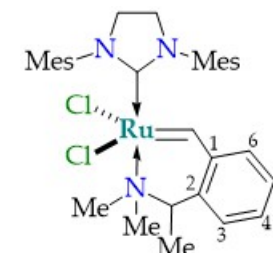
**4a**



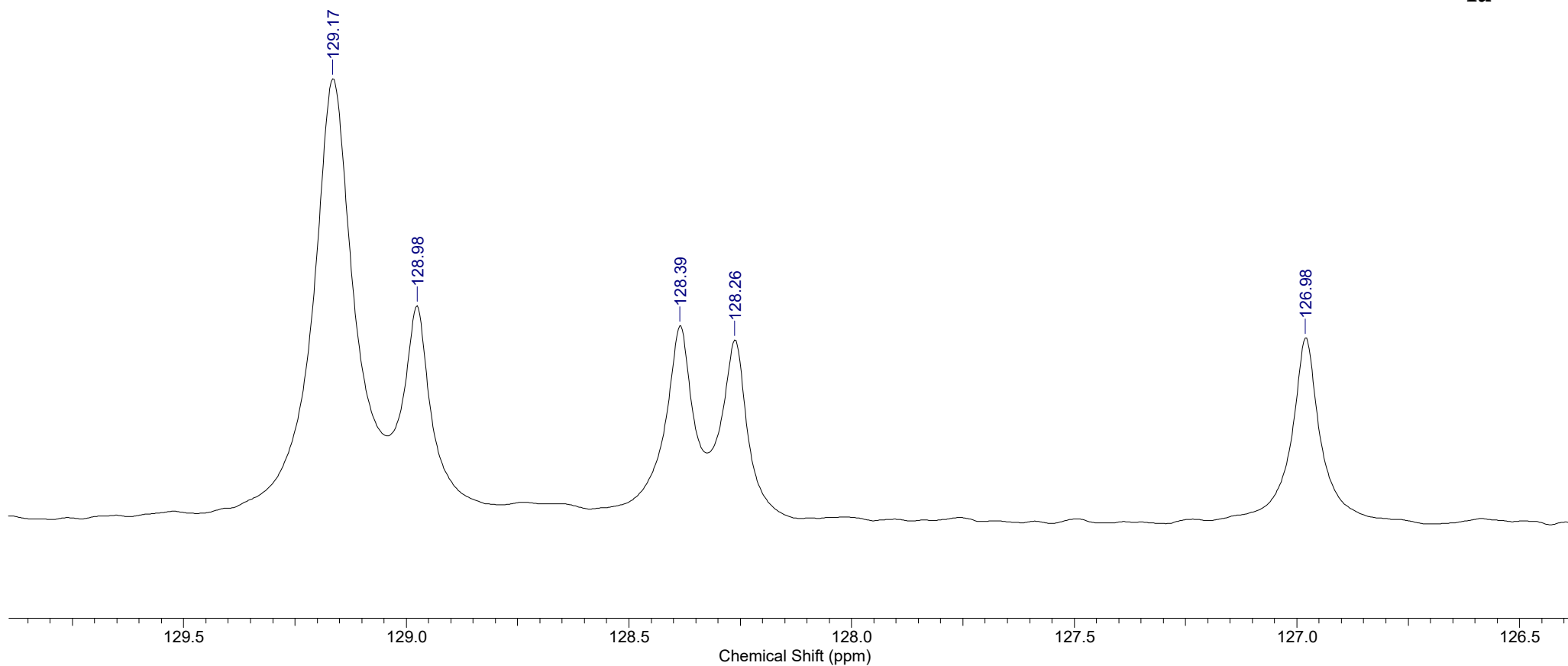
# DEPT-135 spectrum of compound 4a

<b>Formula</b> C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 1.1010	<b>Comment</b> FZ_Grubbs_7-K8-dept135 [hp-dec]	<b>Date</b> 30 Apr 2019 10:40:00
<b>Date Stamp</b> 30 Apr 2019 10:40:00	<b>File Name</b>	
<b>Frequency (MHz)</b> 75.47	<b>Nucleus</b> <sup>13</sup> C	<b>Number of Transients</b> 632
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 202.48	<b>SW(cyclical) (Hz)</b> 59523.81	<b>Pulse Sequence</b> dept135
<b>Spectrum Offset (Hz)</b> 7546.7783	<b>Sweep Width (Hz)</b> 59523.58	<b>Solvent</b> DICHLOROMETHANE-d2
	<b>Temperature (degree C)</b> 29.976	



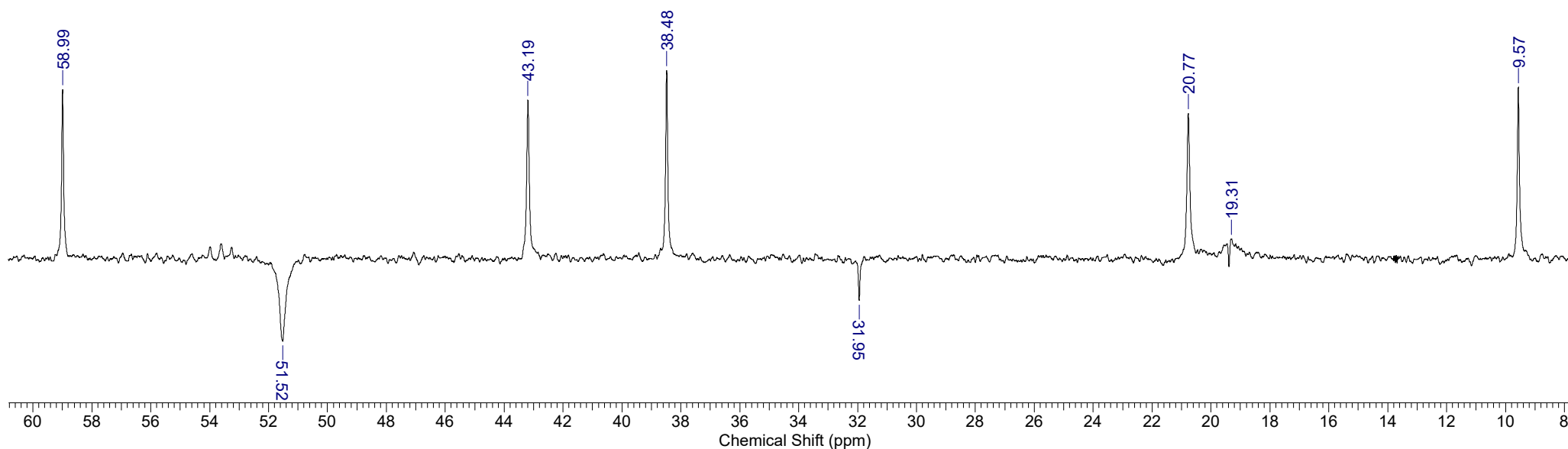
**4a**



# DEPT-135 spectrum of compound 4a

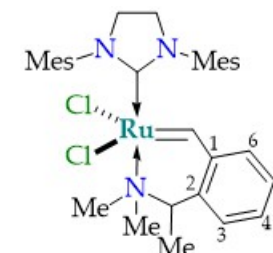
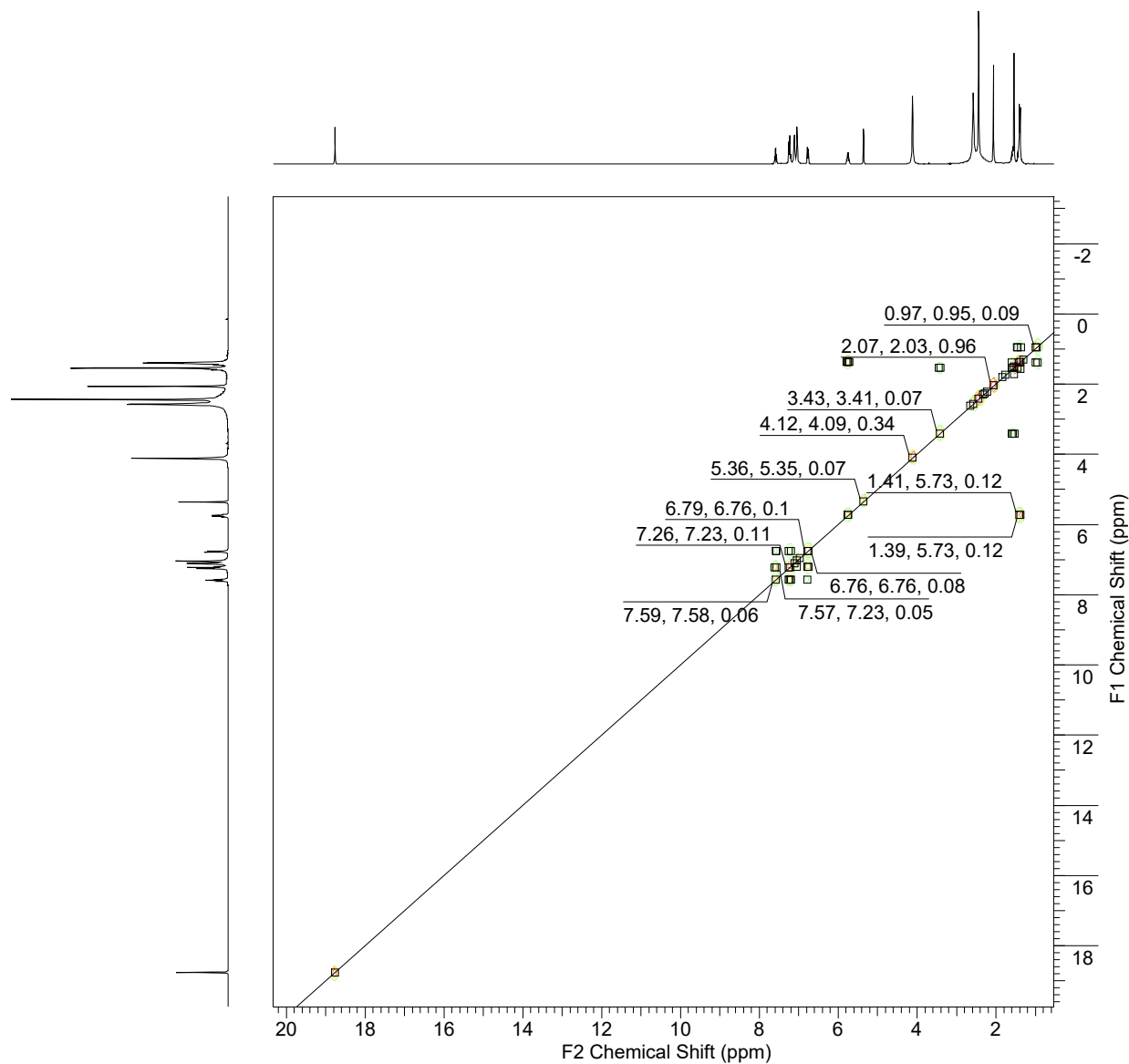
<b>Formula</b> C <sub>32</sub> H <sub>41</sub> ClN <sub>2</sub> Ru	<b>FW</b> 639.6629
--	--------------------

<b>Acquisition Time (sec)</b> 1.1010	<b>Comment</b> FZ Grubbs 7-K8-dept135 [hp-dec]	<b>Date</b> 30 Apr 2019 10:40:00
<b>Date Stamp</b> 30 Apr 2019 10:40:00	<b>File Name</b>	
<b>Frequency (MHz)</b> 75.47	<b>Nucleus</b> 13C	<b>Number of Transients</b> 632
<b>Original Points Count</b> 65536	<b>Owner</b> nmr	<b>Points Count</b> 262144
<b>Receiver Gain</b> 202.48	<b>SW(cyclical) (Hz)</b> 59523.81	<b>Pulse Sequence</b> dept135
<b>Spectrum Offset (Hz)</b> 7546.7783	<b>Sweep Width (Hz)</b> 59523.58	<b>Solvent</b> DICHLOROMETHANE-d2
	<b>Temperature (degree C)</b> 29.976	



# COSY spectrum of compound 4a

<b>Acquisition Time (sec)</b>	(0.3408, 0.0426)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:10:26
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\11\data\12rr			<b>Frequency (MHz)</b>	(300.13, 300.13)
<b>Nucleus</b>	(1H, 1H)	<b>Number of Transients</b>	1	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	cosygpgf
<b>Sweep Width (Hz)</b>	(9014.42, 9009.01)	<b>Temperature (degree C)</b>	30.007	<b>Title</b>	FZ_Grubbs_7-K8-COSY
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629		

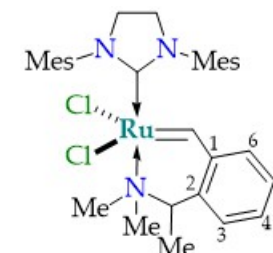
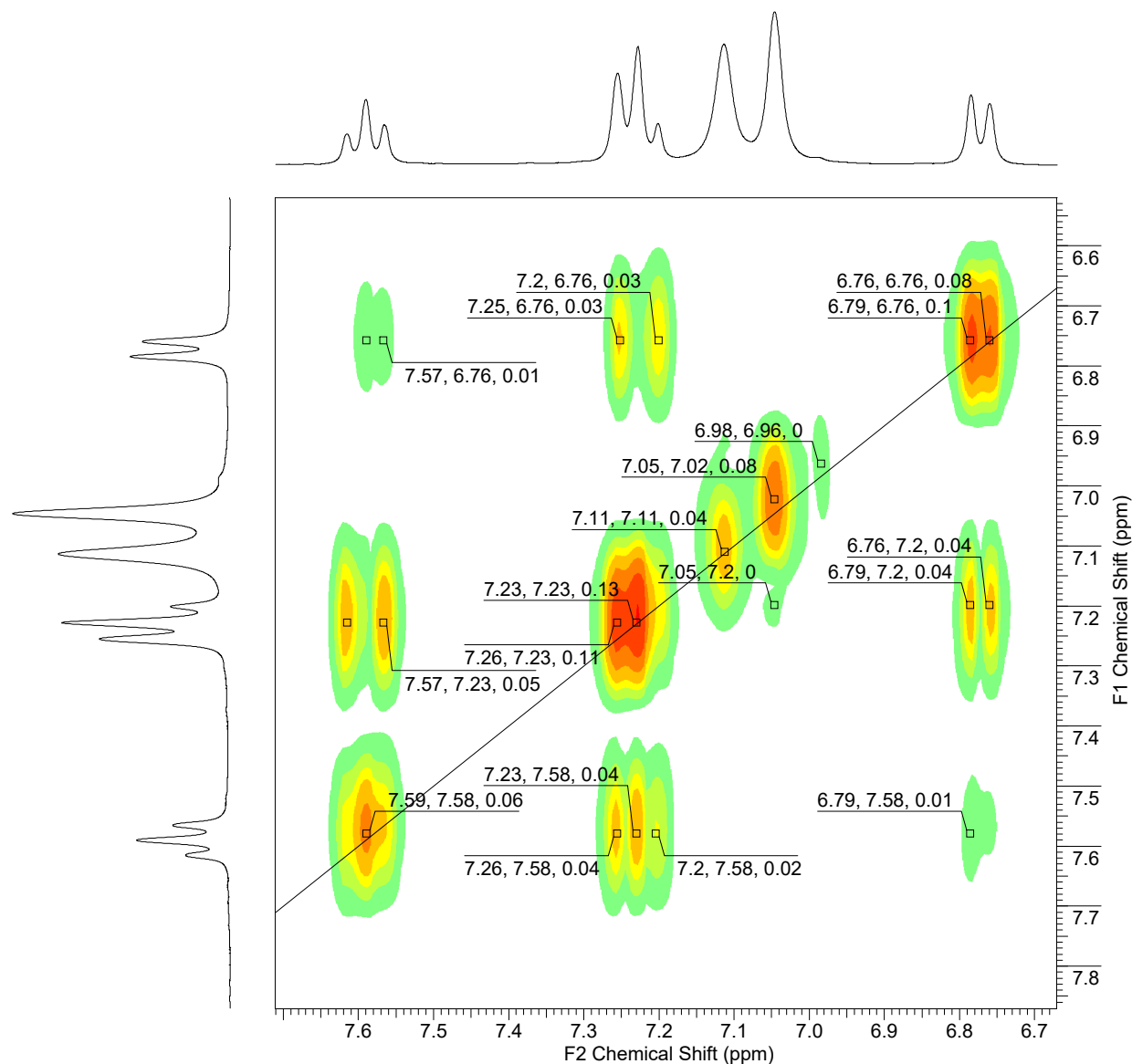


**4a**



# COSY spectrum of compound 4a

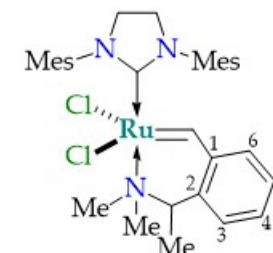
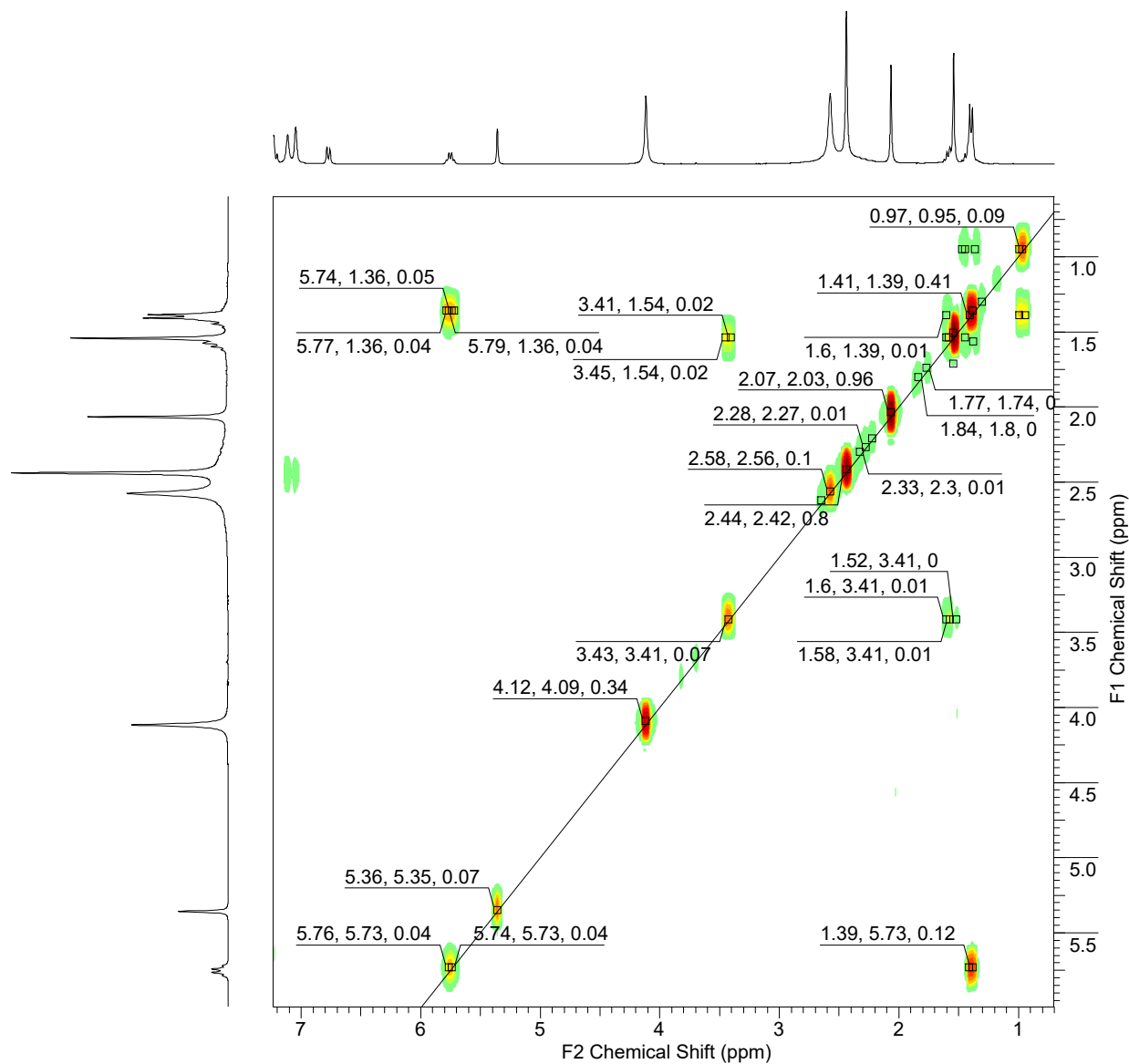
<b>Acquisition Time (sec)</b>	(0.3408, 0.0426)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:10:26
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\11\data\1\2rr			<b>Frequency (MHz)</b>	(300.13, 300.13)
<b>Nucleus</b>	(1H, 1H)	<b>Number of Transients</b>	1	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	cosygpgf
<b>Sweep Width (Hz)</b>	(9014.42, 9009.01)	<b>Temperature (degree C)</b>	30.007	<b>Title</b>	FZ_Grubbs_7-K8-COSY
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629		



**4a**

# COSY spectrum of compound 4a

<b>Acquisition Time (sec)</b>	(0.3408, 0.0426)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:10:26
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\11\data\12rr	<b>Frequency (MHz)</b>	(300.13, 300.13)	<b>Original Points Count</b>	(3072, 384)
<b>Nucleus</b>	(1H, 1H)	<b>Number of Transients</b>	1	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	cosygpgf
<b>Sweep Width (Hz)</b>	(9014.42, 9009.01)	<b>Temperature (degree C)</b>	30.007	<b>Solvent</b>	CD2Cl2
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629	<b>Title</b>	FZ_Grubbs_7-K8-COSY

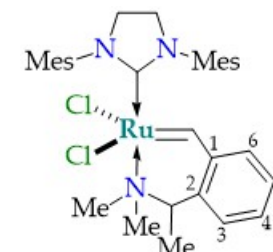
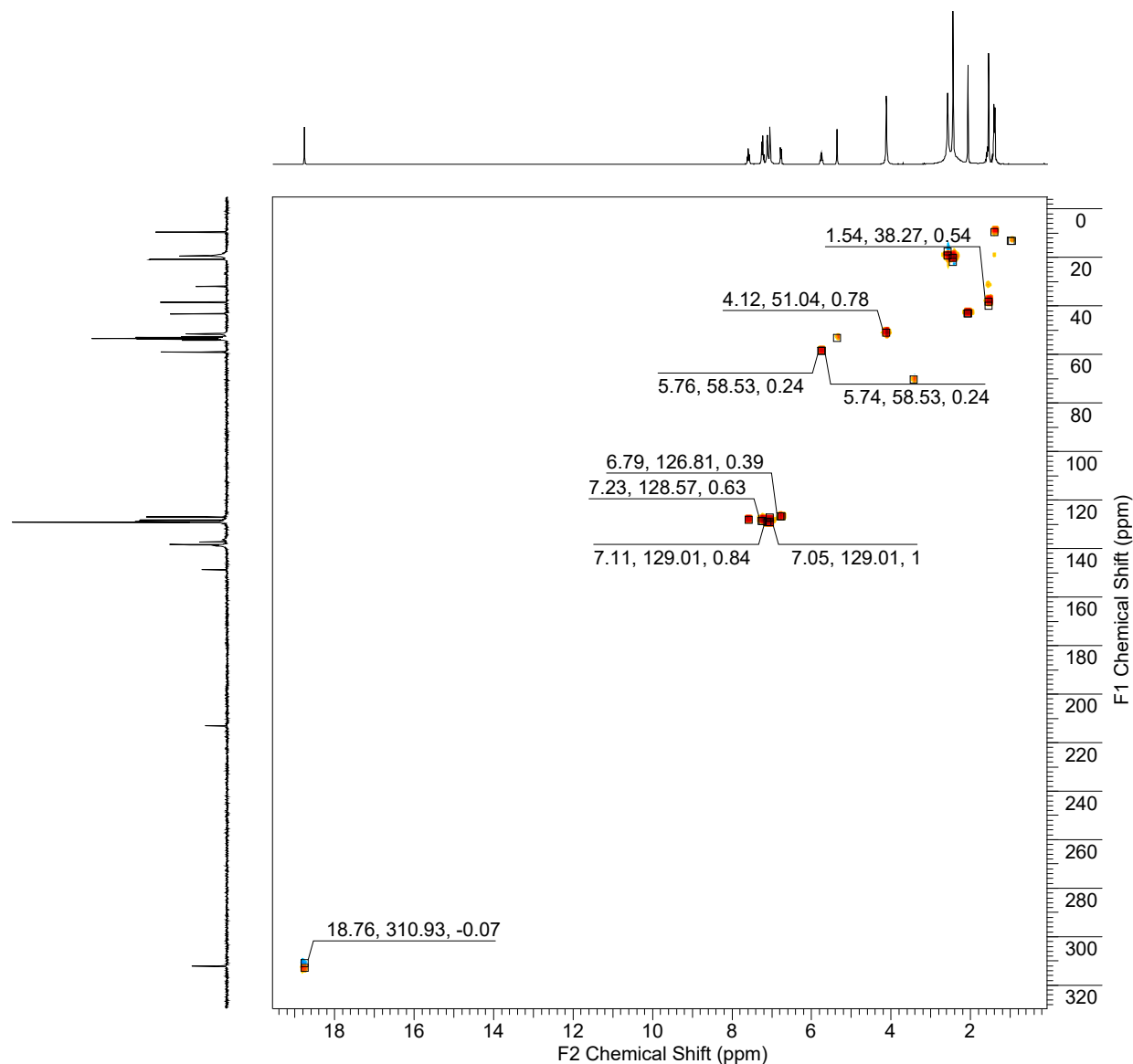


**4a**

# HSQC spectrum of compound 4a

<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:07:58
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\113\data\1\2rr	<b>Frequency (MHz)</b>	(300.13, 75.48)	<b>Original Points Count</b>	(3072, 304)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	2	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hsqcetgp
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	30.070	<b>Solvent</b>	CD2Cl2
<b>Title</b>	FZ_Grubbs_7-K8-HSQC [hp-dec]				

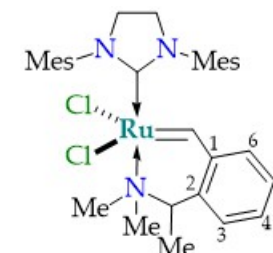
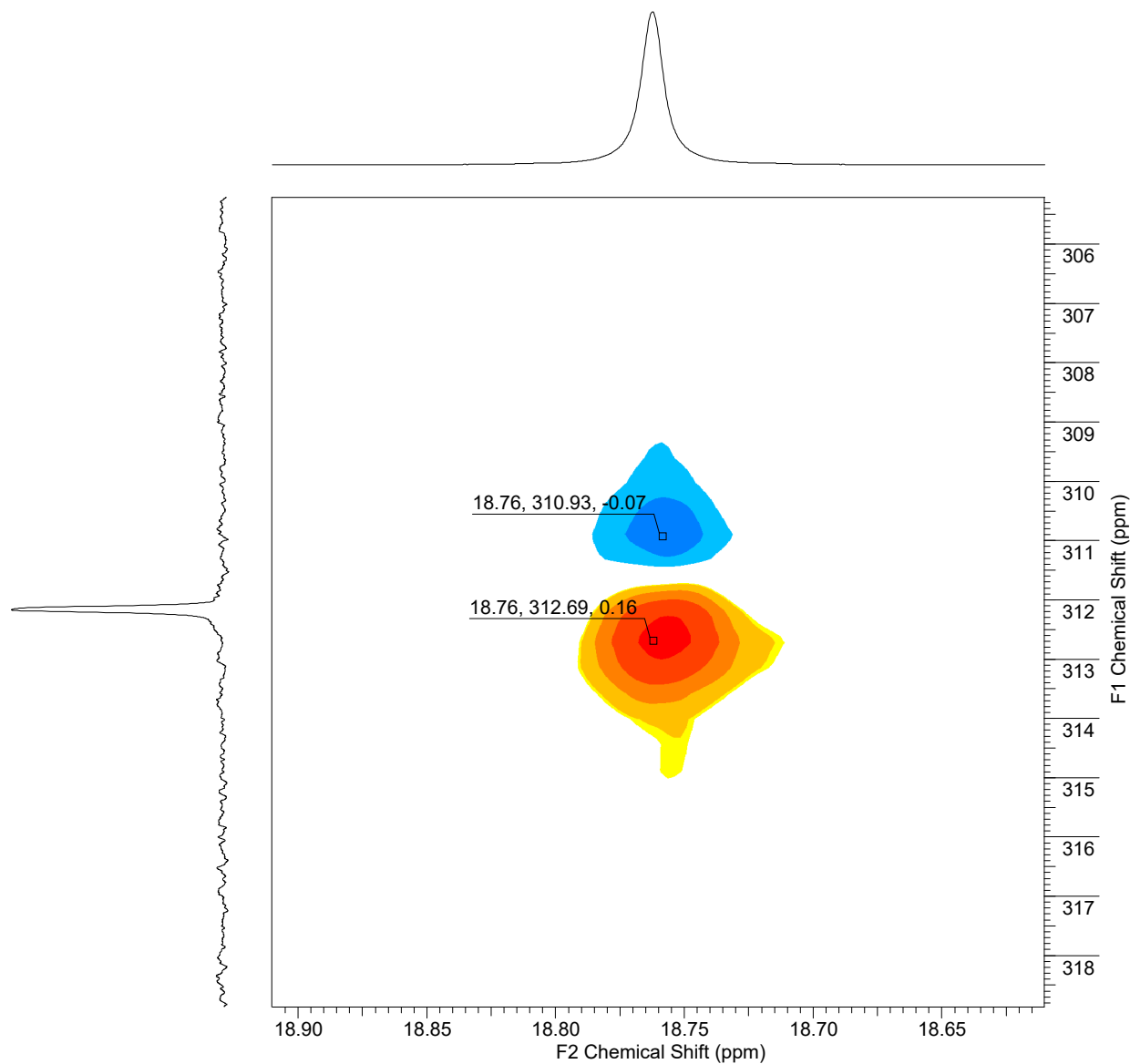
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629
----------------	---	-----------	----------



4a

# HSQC spectrum of compound 4a

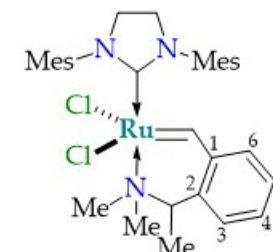
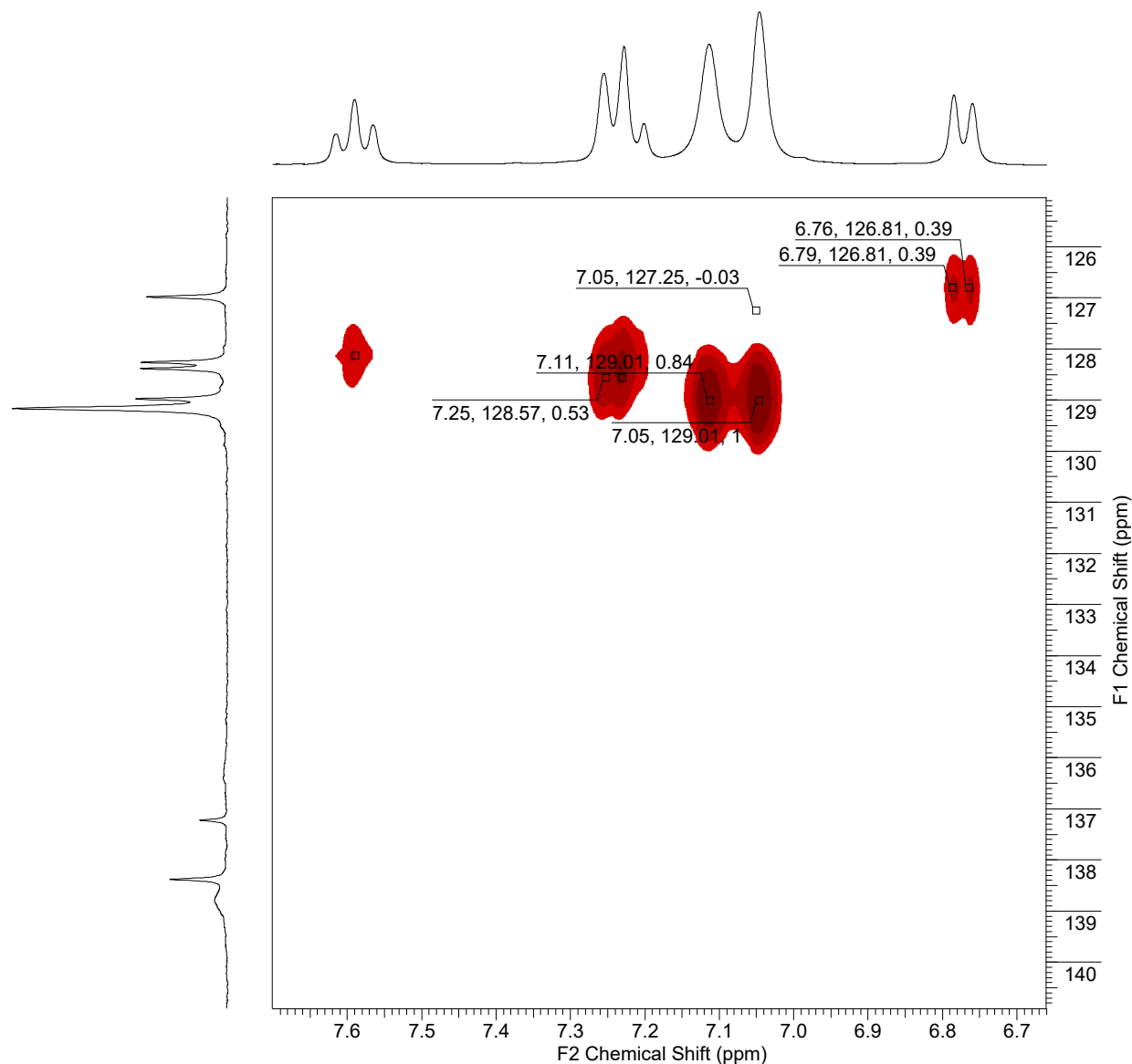
<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:07:58
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\113\data\1\2rr			<b>Frequency (MHz)</b>	(300.13, 75.48)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	2	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hsqcetgp
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	30.070	<b>Solvent</b>	CD2Cl2
				<b>Title</b>	FZ_Grubbs_7-K8-HSQC [hp-dec]
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629		



**4a**

# HSQC spectrum of compound 4a

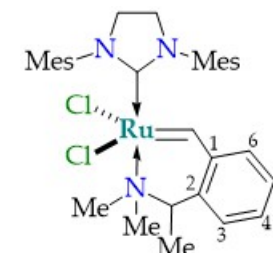
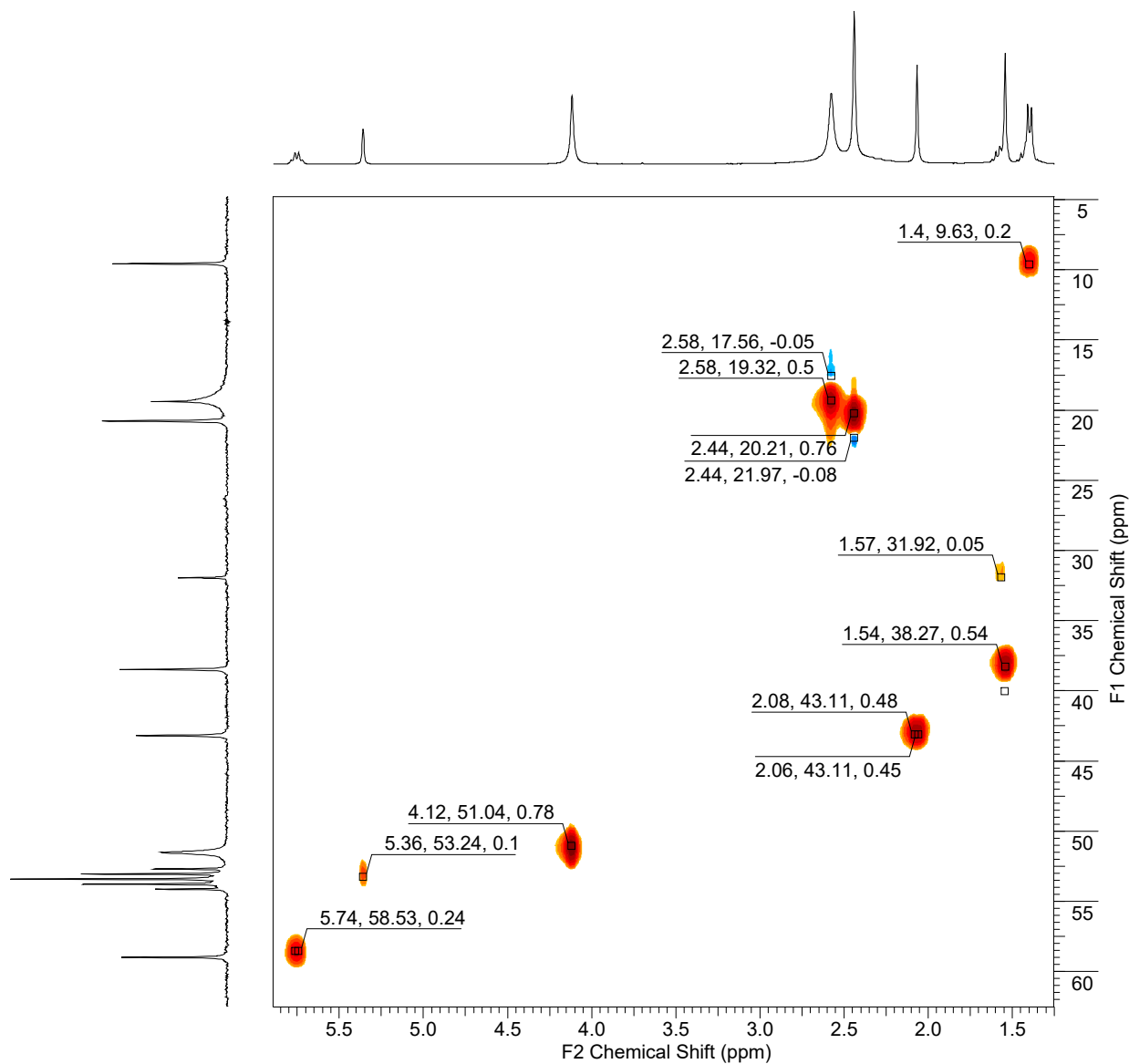
<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:07:58
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\113\pdata\1\2rr	<b>Frequency (MHz)</b>	(300.13, 75.48)	<b>Original Points Count</b>	(3072, 304)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	2	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hsqcetgp
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	30.070	<b>Solvent</b>	CD2Cl2
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629	<b>Title</b>	FZ_Grubbs_7-K8-HSQC [hp-dec]



**4a**

# HSQC spectrum of compound 4a

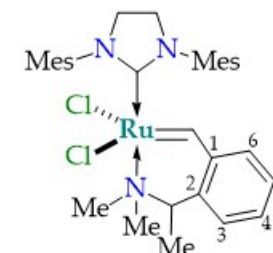
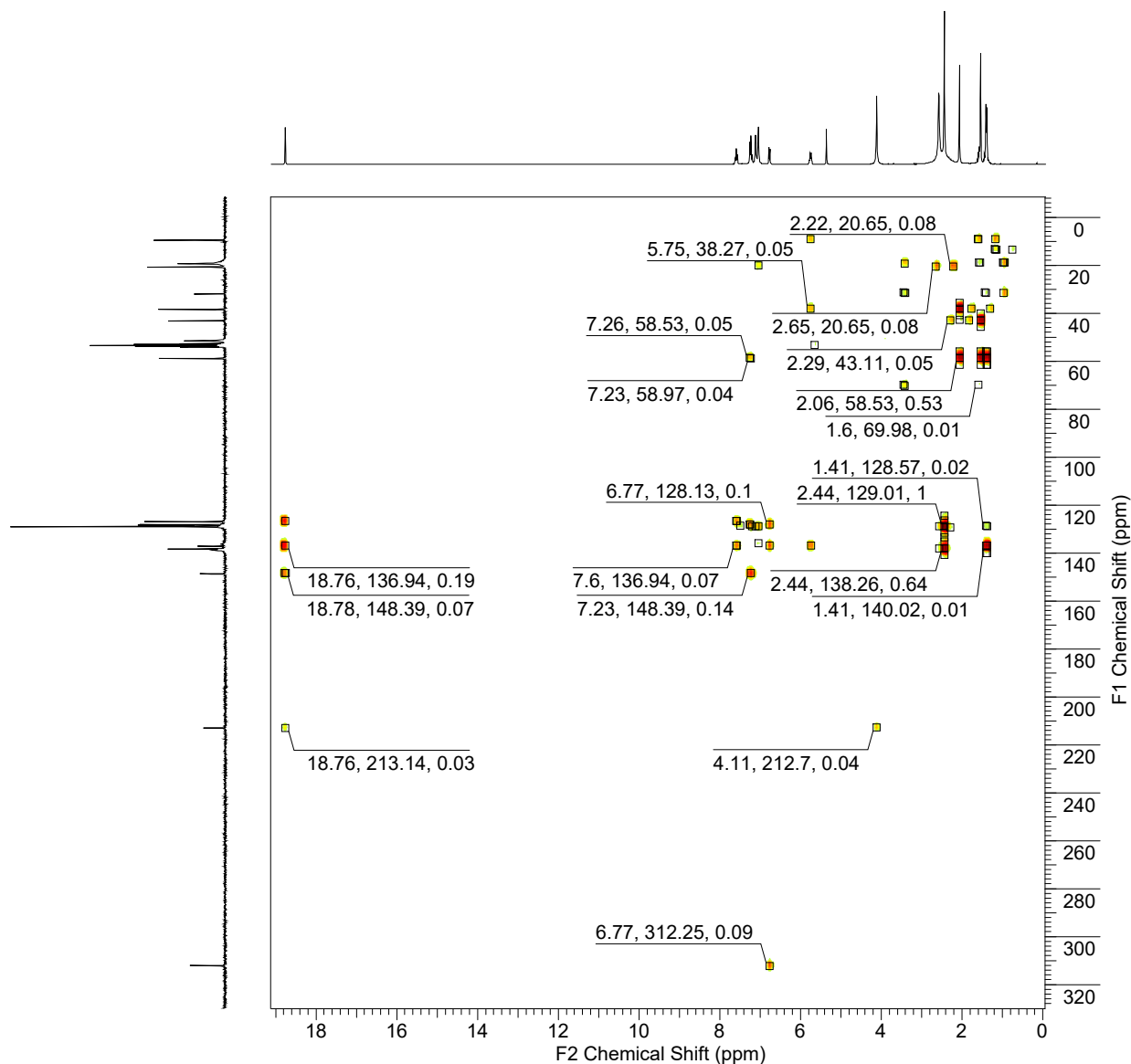
<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:07:58
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\113\data\1\2rr	<b>Frequency (MHz)</b>	(300.13, 75.48)	<b>Original Points Count</b>	(3072, 304)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	2	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hsqcetgp
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	30.070	<b>Solvent</b>	CD2Cl2
<b>Title</b>	FZ_Grubbs_7-K8-HSQC [hp-dec]				
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629		



**4a**

# HMBC spectrum of compound 4a

<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:09:48
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\213\data\1\2rr			<b>Frequency (MHz)</b>	(300.13, 75.48)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	4	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hmbcgp1pndqf
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	29.520	<b>Title</b>	FZ_Grubbs_7-K8-HMBC
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629		

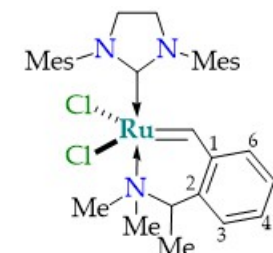
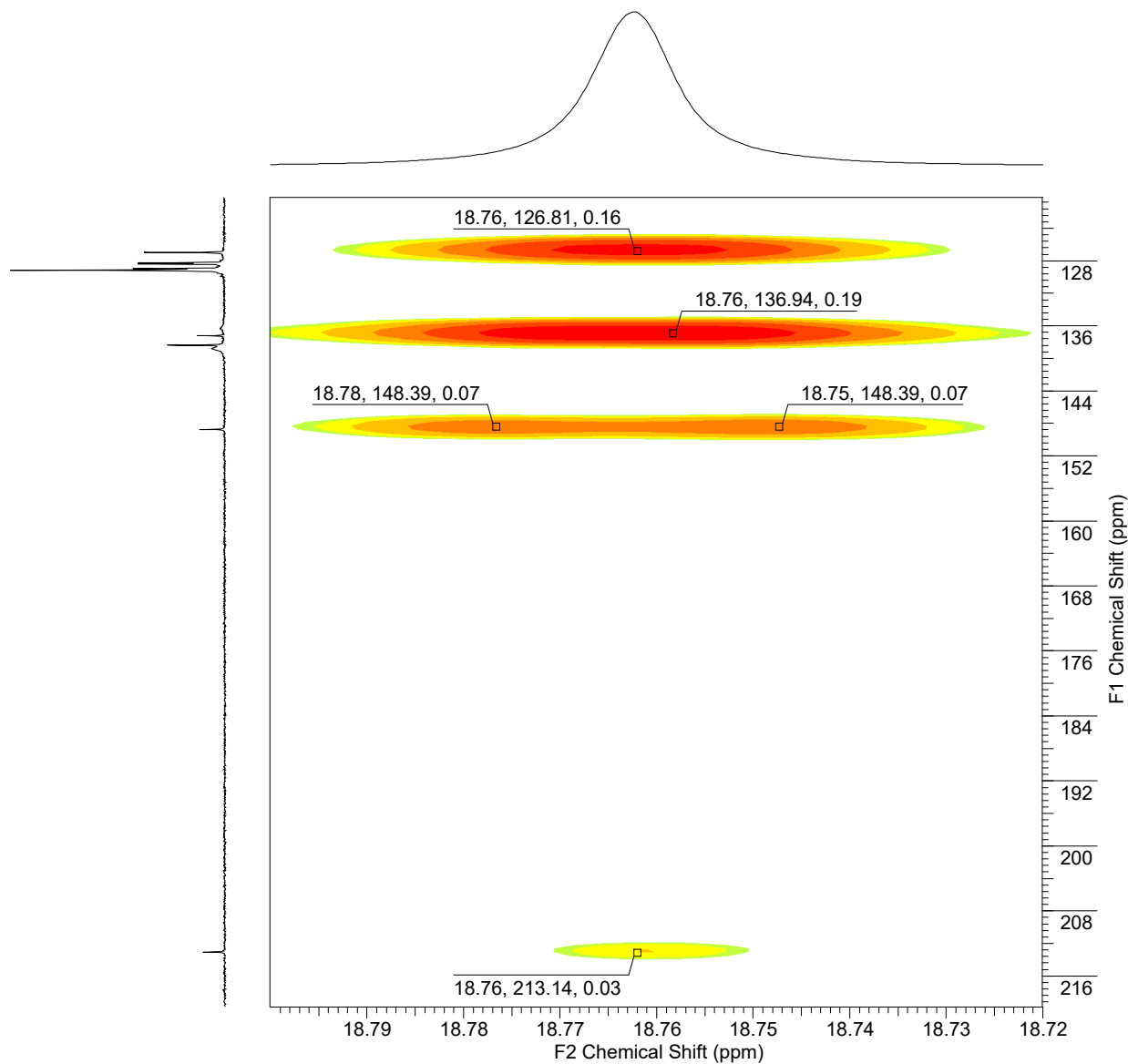


4a

# HMBC spectrum of compound 4a

<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:09:48
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\213\pdata\1\2rr			<b>Frequency (MHz)</b>	(300.13, 75.48)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	4	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hmbcgplpndqf
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	29.520	<b>Title</b>	FZ_Grubbs_7-K8-HMBC

<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629
----------------	---	-----------	----------



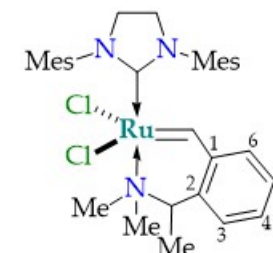
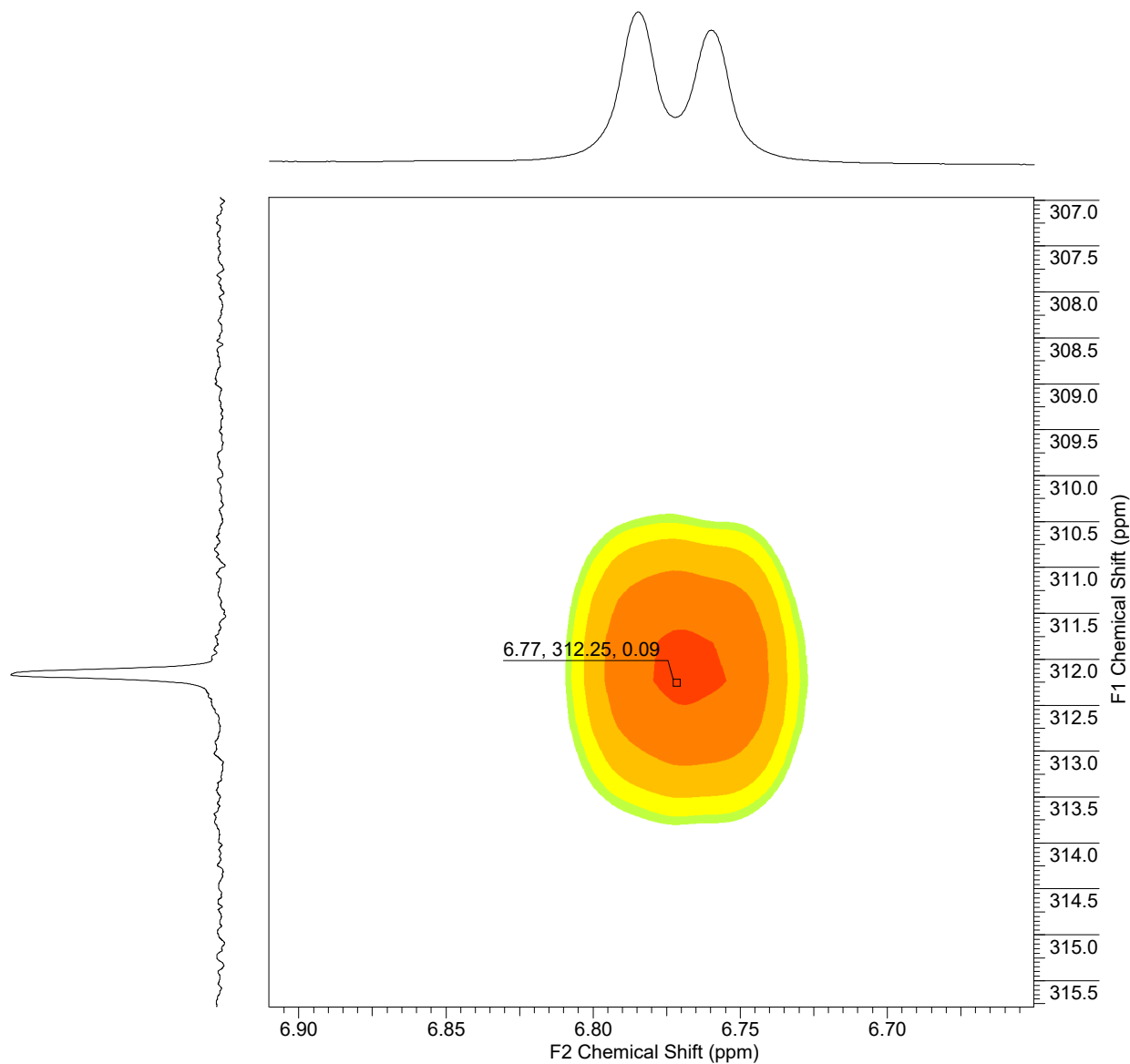
**4a**



# HMBC spectrum of compound 4a

Acquisition Time (sec)	(0.3408, 0.0089)	Comment	5 mm PABBO BB-1H/D Z-GRD Z104275/0345		Date	30 Apr 2019 17:09:48	
File Name	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\213\data\1\2rr				Frequency (MHz)	(300.13, 75.48)	
Nucleus	(1H, 13C)	Number of Transients	4	Origin	spect	Original Points Count	(3072, 304)
Owner	nmr	Points Count	(8192, 1024)	Pulse Sequence	hmbcgplpndqf	Solvent	CD2Cl2
Sweep Width (Hz)	(9014.42, 34013.61)	Temperature (degree C)	29.520	Title	FZ_Grubbs_7-K8-HMBC		

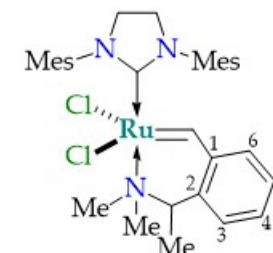
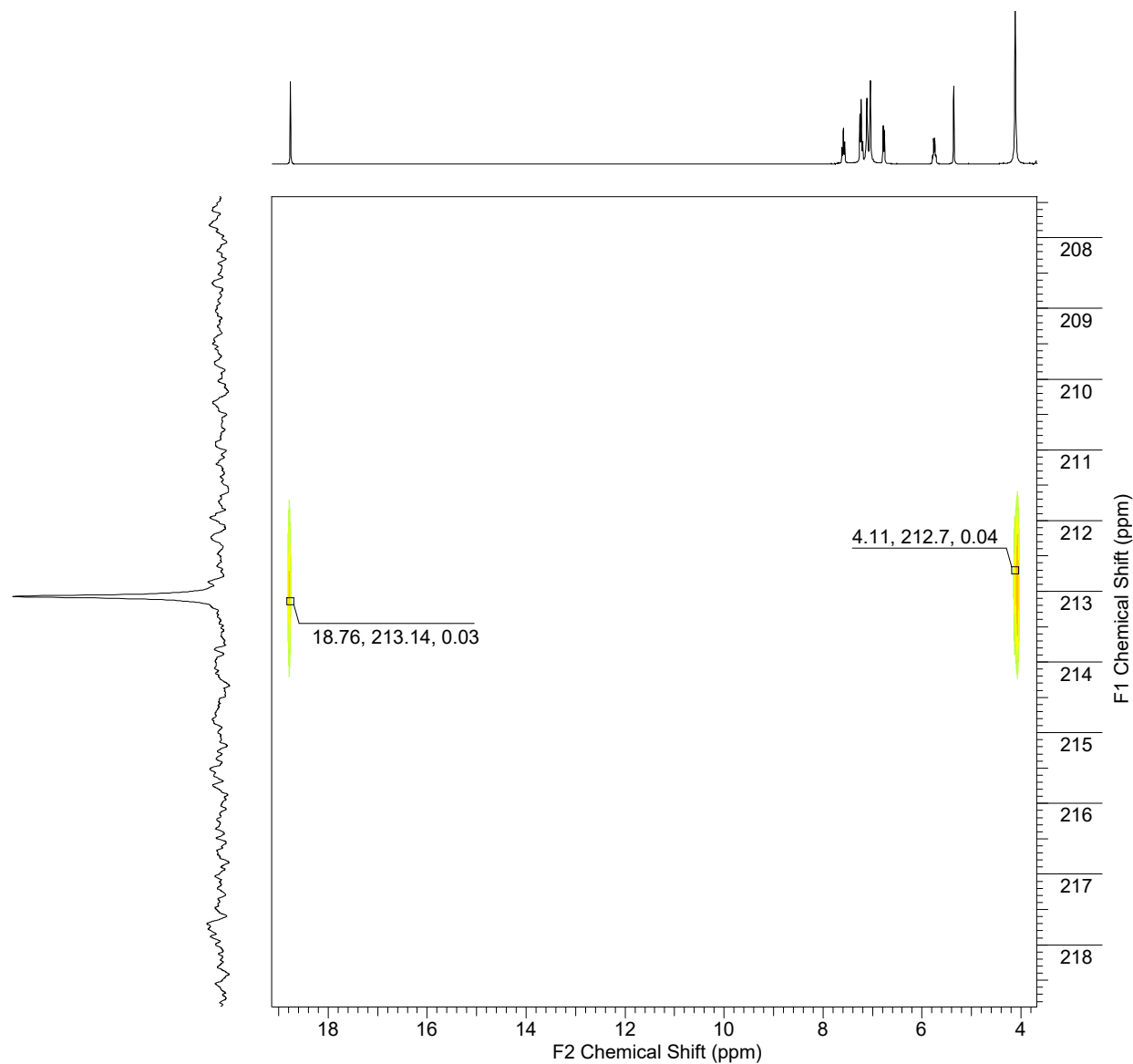
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629
----------------	---	-----------	----------



**4a**

# HMBC spectrum of compound 4a

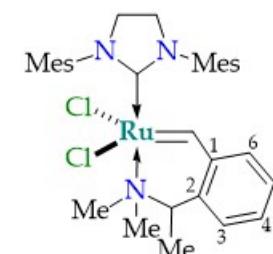
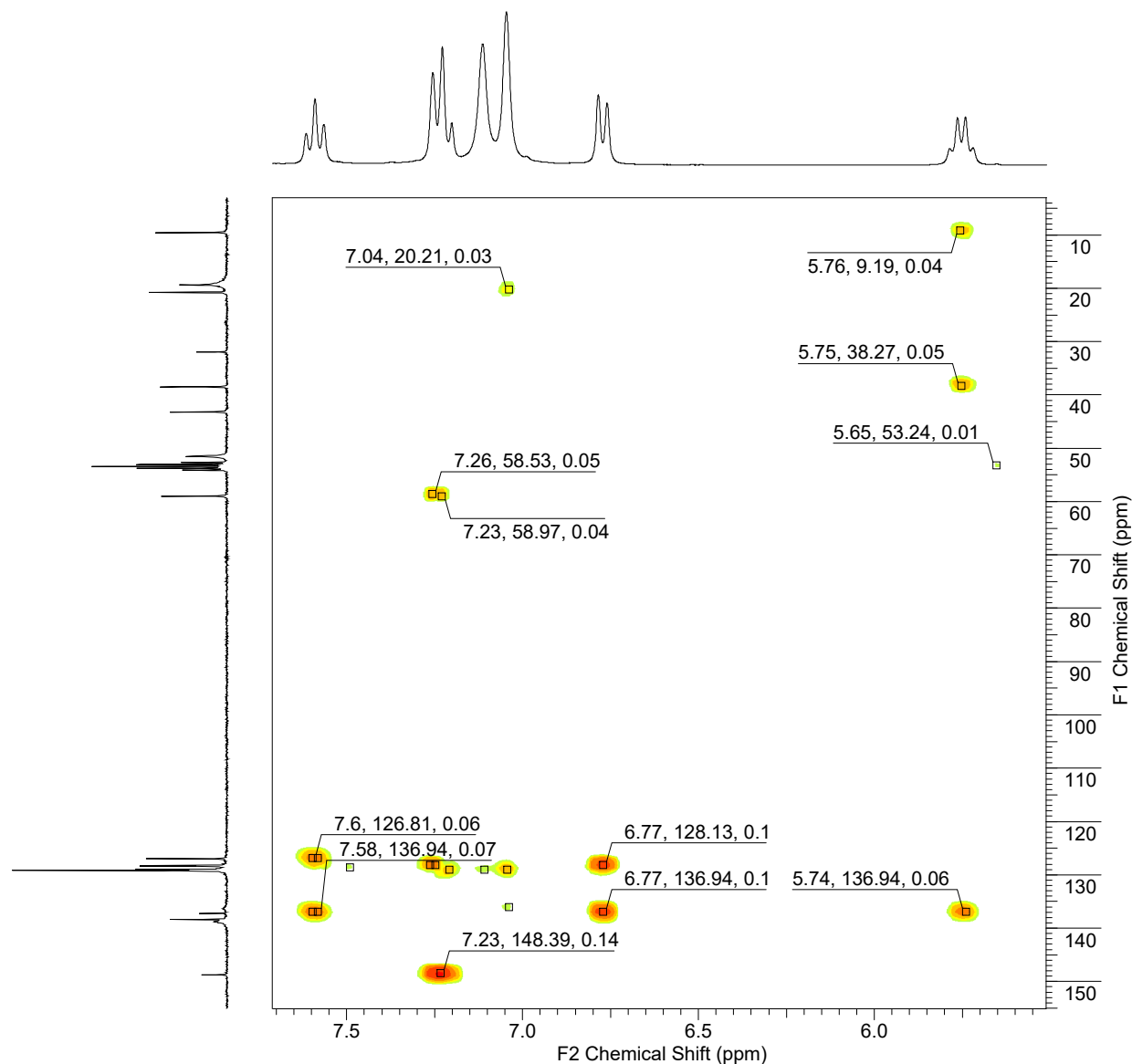
Acquisition Time (sec)	(0.3408, 0.0089)	Comment	5 mm PABBO BB-1H/D Z-GRD Z104275/0345		Date	30 Apr 2019 17:09:48	
File Name	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\213\pdata\1\2rr				Frequency (MHz)	(300.13, 75.48)	
Nucleus	(1H, 13C)	Number of Transients	4	Origin	spect	Original Points Count	(3072, 304)
Owner	nmr	Points Count	(8192, 1024)	Pulse Sequence	hmbcgplpndqf	Solvent	CD2Cl2
Sweep Width (Hz)	(9014.42, 34013.61)	Temperature (degree C)	29.520	Title	FZ_Grubbs_7-K8-HMBC		
Formula	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	FW	639.6629				



**4a**

# HMBC spectrum of compound 4a

<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:09:48
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\213\data\1\2rr			<b>Frequency (MHz)</b>	(300.13, 75.48)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	4	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hmbcgp1pndqf
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	29.520	<b>Solvent</b>	CD2Cl2
<b>Title</b>	FZ_Grubbs_7-K8-HMBC				
<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru		<b>FW</b>	639.6629	

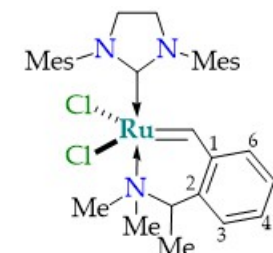
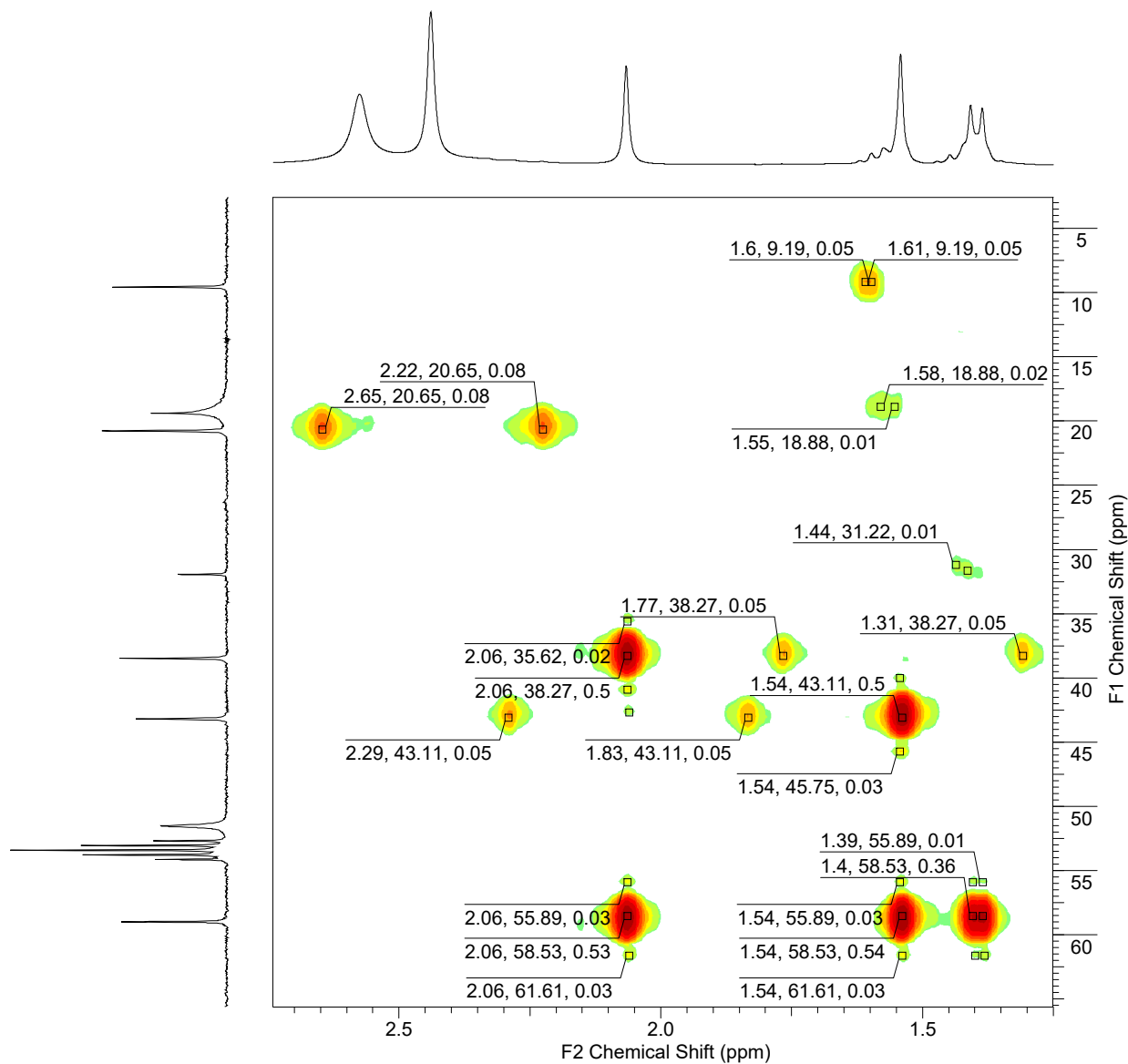


**4a**

# HMBC spectrum of compound 4a

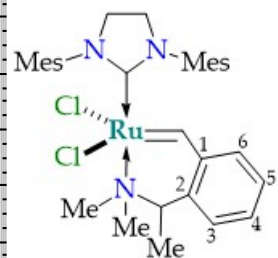
<b>Acquisition Time (sec)</b>	(0.3408, 0.0089)	<b>Comment</b>	5 mm PABBO BB-1H/D Z-GRD Z104275/0345	<b>Date</b>	30 Apr 2019 17:09:48
<b>File Name</b>	C:\Users\Fedor\Desktop\Новые катализаторы от Ромы\FZ_Grubbs_7-K8\213\data\1\2rr			<b>Frequency (MHz)</b>	(300.13, 75.48)
<b>Nucleus</b>	(1H, 13C)	<b>Number of Transients</b>	4	<b>Origin</b>	spect
<b>Owner</b>	nmr	<b>Points Count</b>	(8192, 1024)	<b>Pulse Sequence</b>	hmbcgplpndqf
<b>Sweep Width (Hz)</b>	(9014.42, 34013.61)	<b>Temperature (degree C)</b>	29.520	<b>Title</b>	FZ_Grubbs_7-K8-HMBC

<b>Formula</b>	C <sub>32</sub> H <sub>41</sub> Cl <sub>2</sub> N <sub>2</sub> Ru	<b>FW</b>	639.6629
----------------	---	-----------	----------



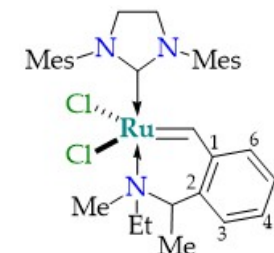
4a

IR spectrum of compound **6**. The plot shows Transmittance (%) on the y-axis (52 to 92) versus Wavenumber (cm<sup>-1</sup>) on the x-axis (4000 to 500). The spectrum is a red line with several sharp absorption peaks. Key peaks are labeled with their wavenumbers: 2899.94, 1394.71, 1254.40, 1181.99, 1042.21, and 576.25. An inset in the bottom left corner shows the chemical structure of compound **6**, which is a ruthenium complex. It features a central Ru atom coordinated by two chlorine atoms (Cl), a 1,3-dimethyl-4,5-dihydroimidazol-2-ylidene ligand, and a 2-methyl-2-phenyl-1,3-dimethyl-4,5-dihydroimidazol-2-ylidene ligand. The phenyl ring is numbered 1 to 6.

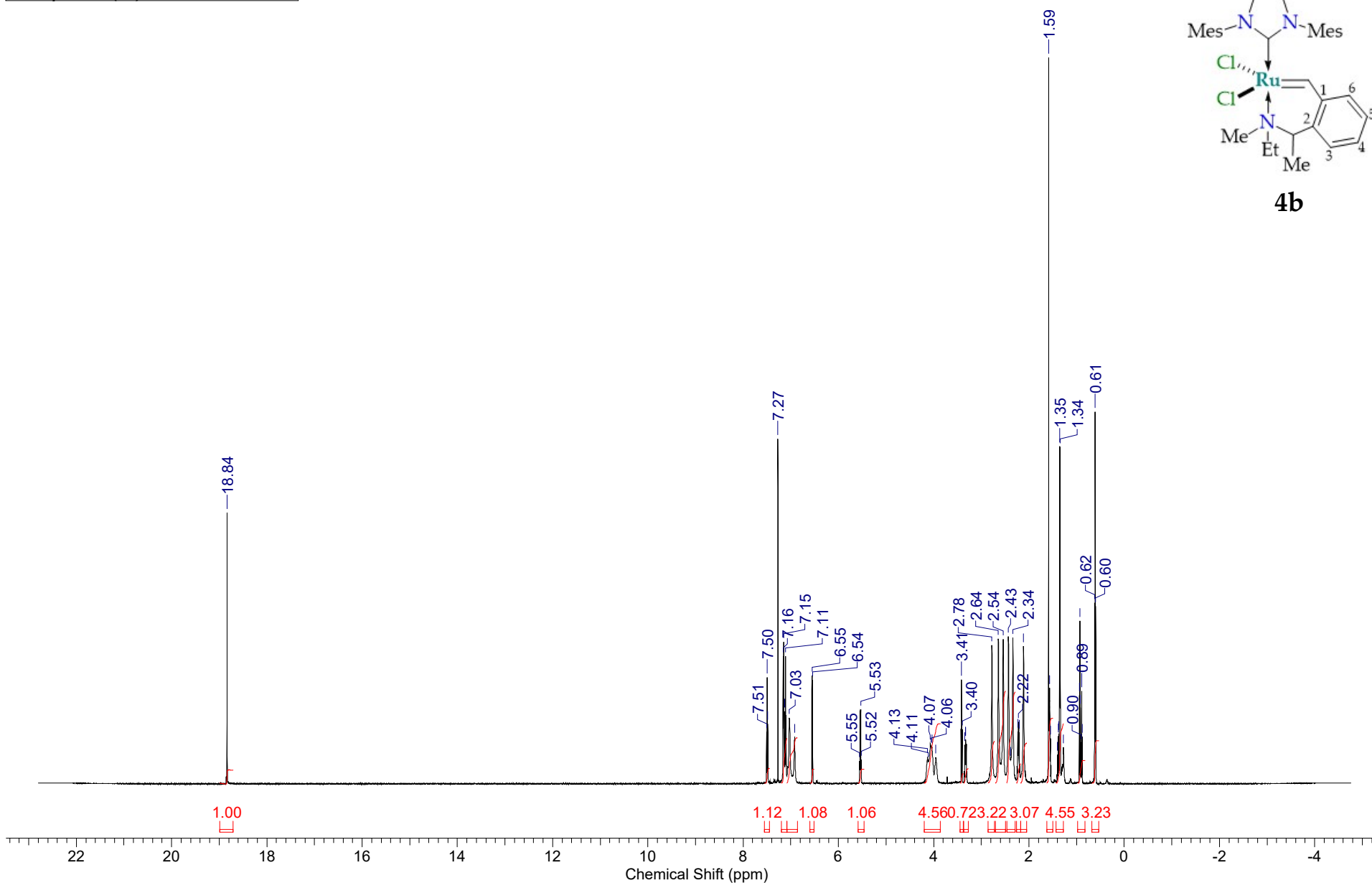


# $^1\text{H}$ spectrum of compound **4b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	14 Sep 2022 16:08:34
Date Stamp	14 Sep 2022 15:53:41	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	44.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5413.0830

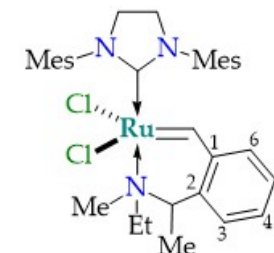


**4b**

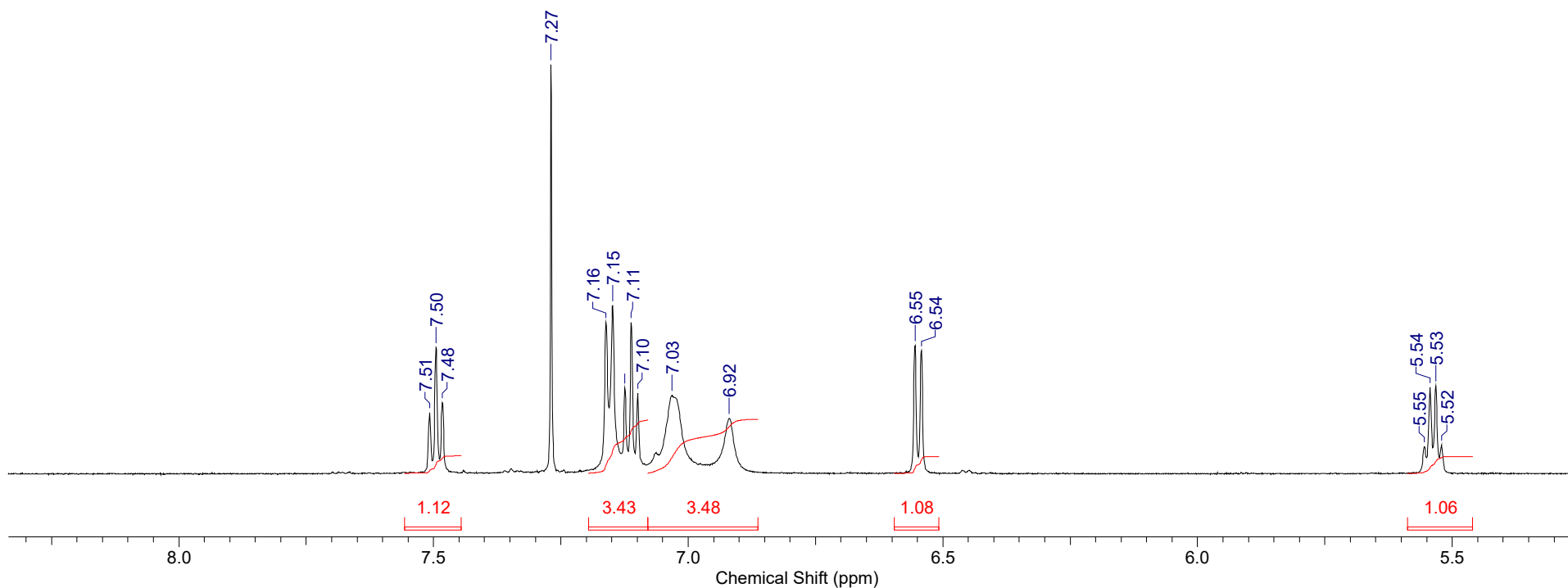


# $^1\text{H}$ spectrum of compound **4b**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	14 Sep 2022 16:08:34
Date Stamp	14 Sep 2022 15:53:41	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	44.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5413.0830

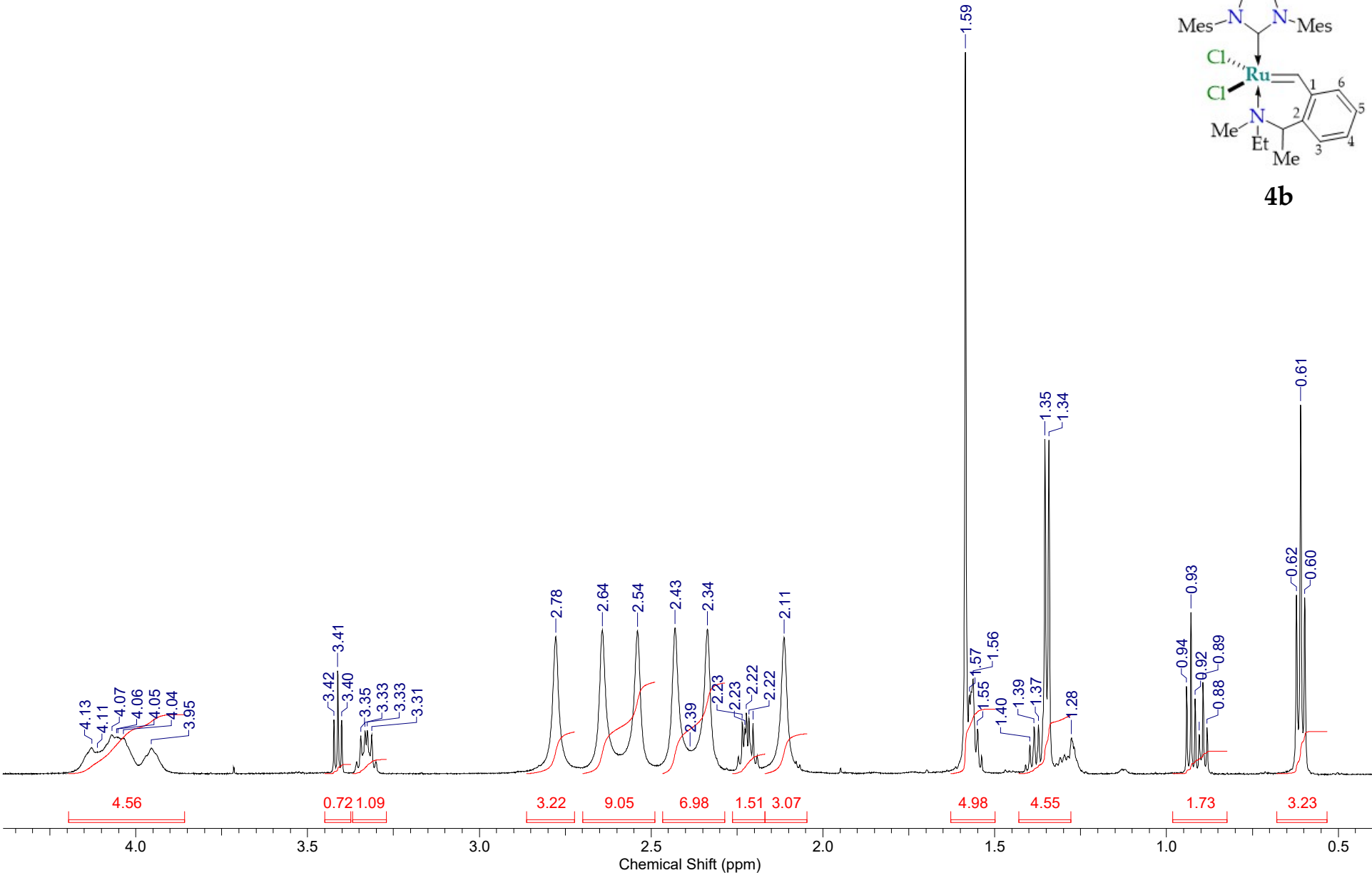
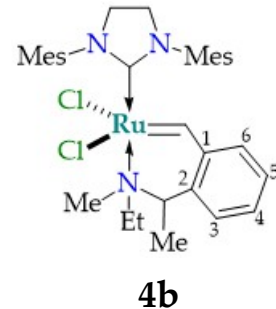


**4b**



### <sup>1</sup>H spectrum of compound **4b**

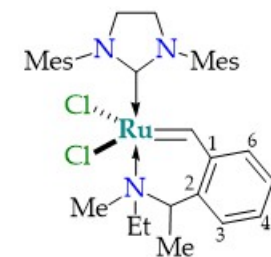
<b>Acquisition Time (sec)</b>	1.9818	<b>Comment</b>	single_pulse	<b>Date</b>	14 Sep 2022 16:08:34		
<b>Date Stamp</b>	14 Sep 2022 15:53:41			<b>File Name</b>			
<b>Frequency (MHz)</b>	600.17	<b>Nucleus</b>	1H	<b>Number of Transients</b>	8	<b>Origin</b>	ECA 600
<b>Original Points Count</b>	32768	<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single_pulse.ex2
<b>Receiver Gain</b>	44.00	<b>Solvent</b>	CHLOROFORM-d			<b>Spectrum Offset (Hz)</b>	5413.0830
<b>Sweep Width (Hz)</b>	16534.39						



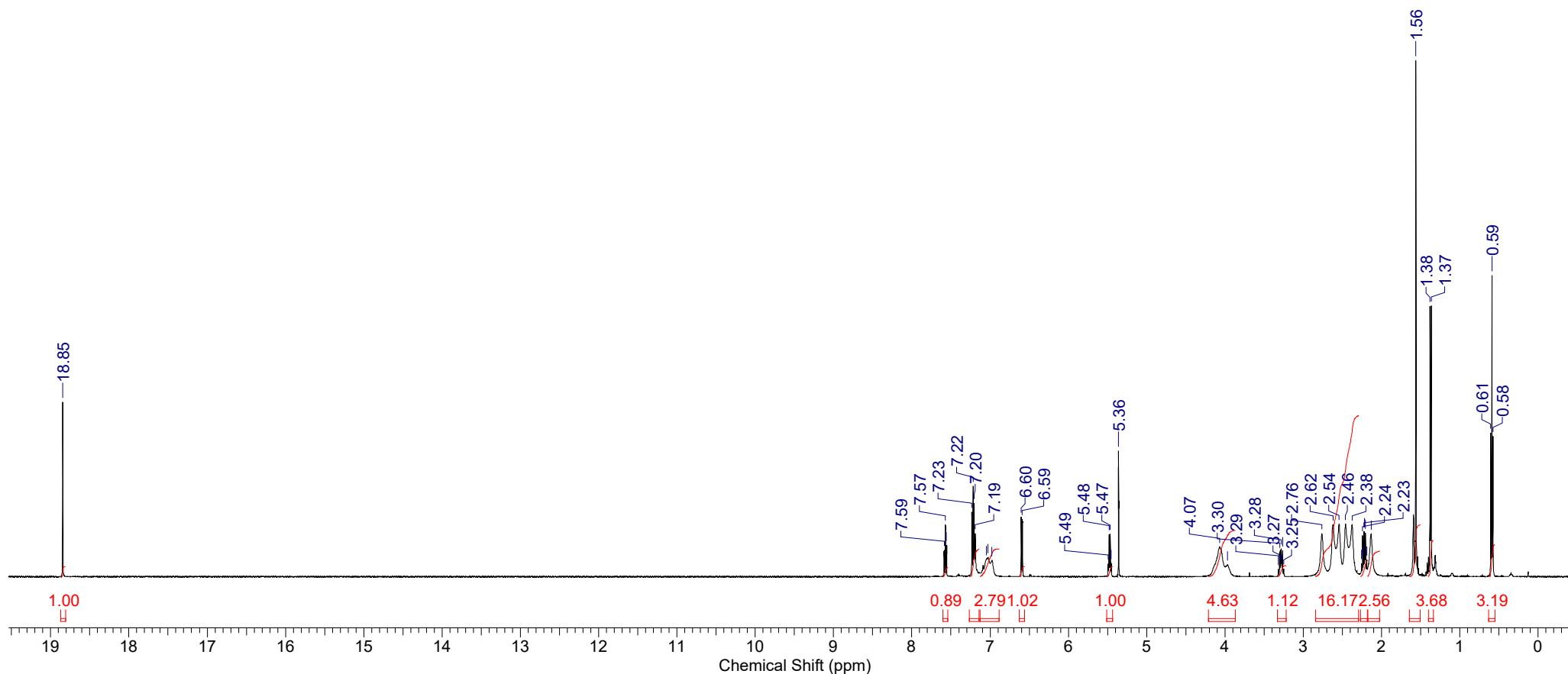


# <sup>1</sup>H spectrum of compound 4b

Acquisition Time (sec)	2.1845	Comment	5 mm CPPBBO BB-1H/19F/D Z-GRD Z125869/0025		Date	07 Mar 2017 11:35:28	
Date Stamp	07 Mar 2017 11:35:28						
File Name							
Frequency (MHz)	500.13	Nucleus	1H	Number of Transients	1	Origin	spect
Original Points Count	32768	Owner	nmrsu	Points Count	262144	Pulse Sequence	zg
Receiver Gain	31.21	SW(cyclical) (Hz)	15000.00	Solvent	DICHLOROMETHANE-d2		
Spectrum Offset (Hz)	3088.5078	Sweep Width (Hz)	14999.94	Temperature (degree C)	25.072		

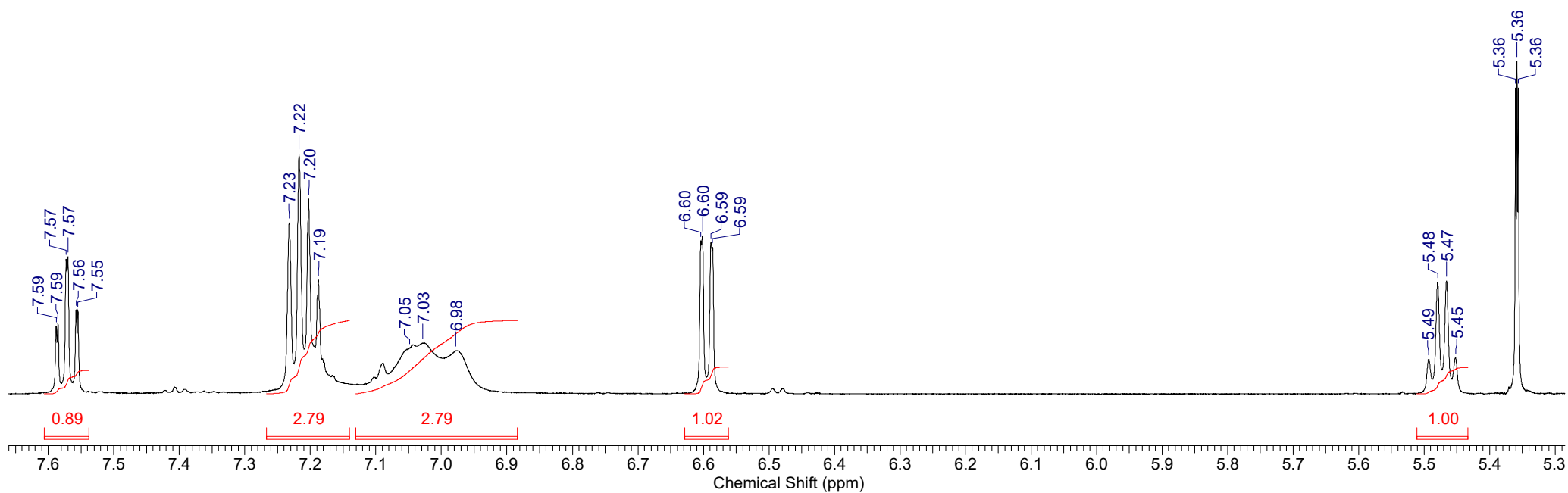
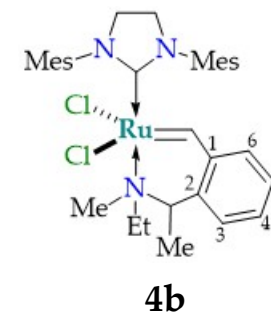


4b



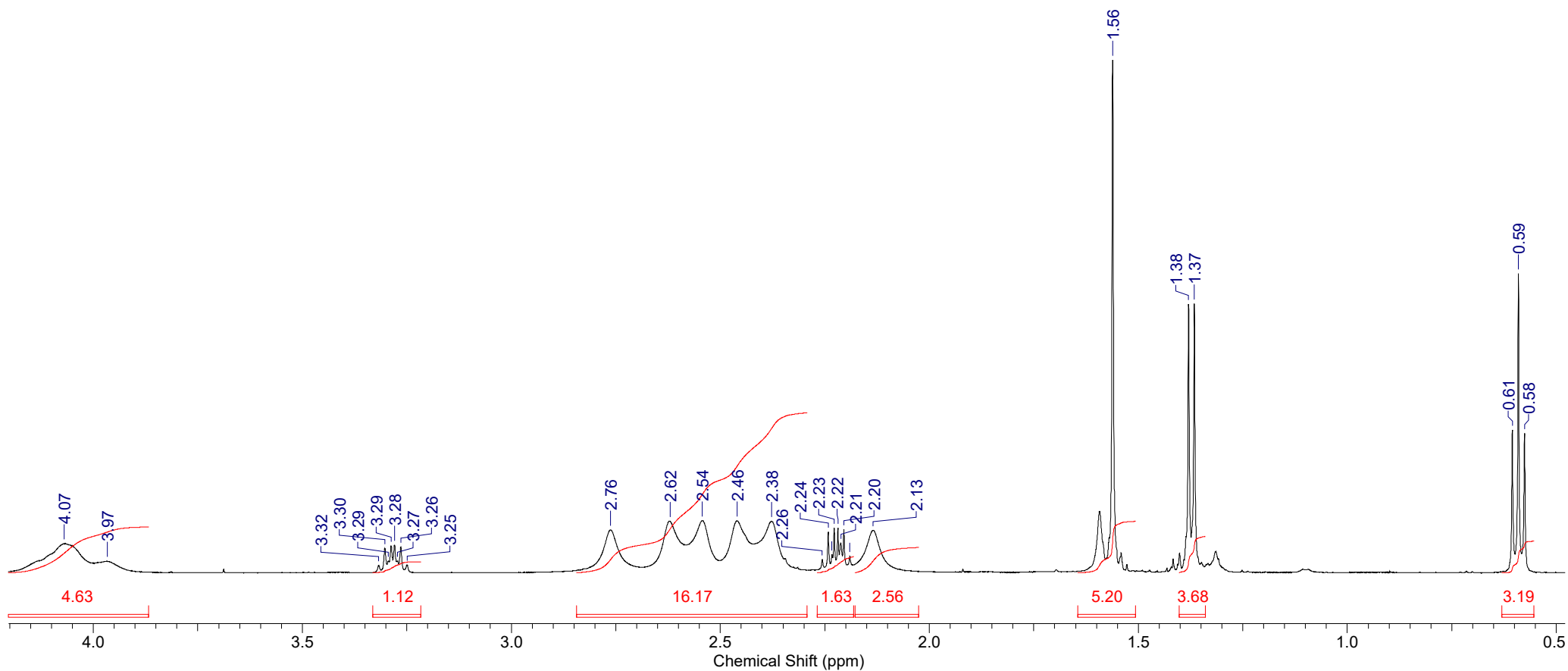
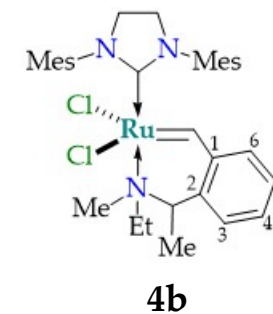
# $^1\text{H}$ spectrum of compound **4b**

Acquisition Time (sec)	2.1845	Comment	5 mm CPPBBO BB-1H/19F/D Z-GRD Z125869/0025		Date	07 Mar 2017 11:35:28	
Date Stamp	07 Mar 2017 11:35:28						
File Name							
Frequency (MHz)	500.13	Nucleus	1H	Number of Transients	1	Origin	spect
Original Points Count	32768	Owner	nmrsu	Points Count	262144	Pulse Sequence	zg
Receiver Gain	31.21	SW(cyclical) (Hz)	15000.00	Solvent	DICHLOROMETHANE-d2		
Spectrum Offset (Hz)	3088.5078	Sweep Width (Hz)	14999.94	Temperature (degree C)	25.072		



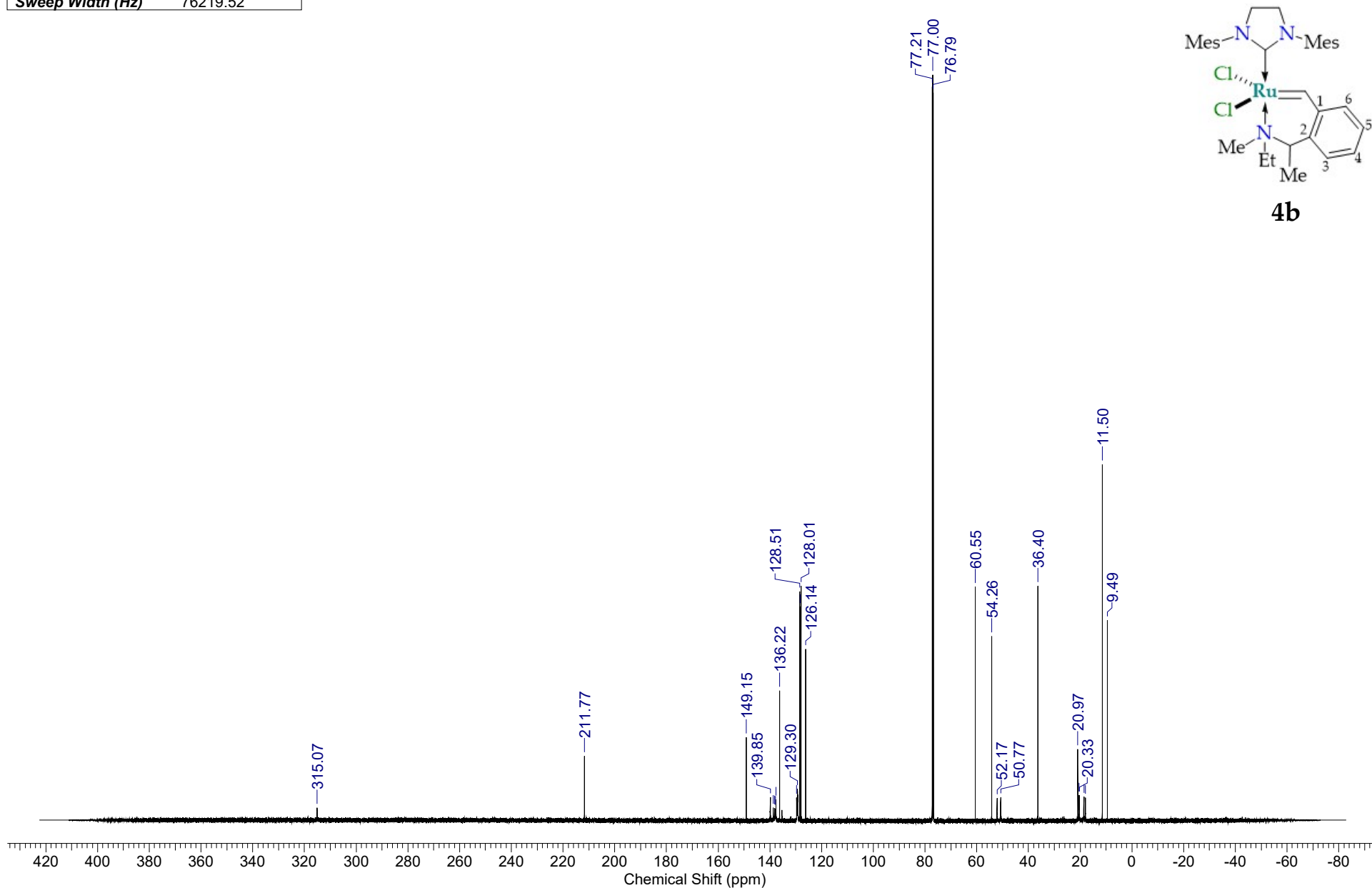
### <sup>1</sup>H spectrum of compound **4b**

Acquisition Time (sec)	2.1845	Comment	5 mm CPPBBO BB-1H/19F/D Z-GRD Z125869/0025		Date	07 Mar 2017 11:35:28	
Date Stamp	07 Mar 2017 11:35:28						
File Name							
Frequency (MHz)	500.13	Nucleus	1H	Number of Transients	1	Origin	spect
Original Points Count	32768	Owner	nmrsu	Points Count	262144	Pulse Sequence	zg
Receiver Gain	31.21	SW(cyclical) (Hz)	15000.00	Solvent	DICHLOROMETHANE-d2		
Spectrum Offset (Hz)	3088.5078	Sweep Width (Hz)	14999.94	Temperature (degree C)	25.072		



# $^{13}\text{C}$ spectrum of compound **4b**

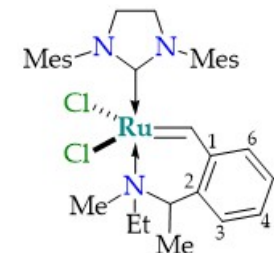
Acquisition Time (sec) 1.7197		Comment single pulse decoupled gated NOE		Date 19 Jan 2023 06:46:31	
Date Stamp 19 Jan 2023 05:44:01			File Name		
Frequency (MHz) 150.91		Nucleus 13C		Number of Transients 4000	
Original Points Count 131072		Owner CKP		Points Count 131072	
Receiver Gain 56.00		Solvent CHLOROFORM-d		Pulse Sequence single pulse dec	
Sweep Width (Hz) 76219.52				Spectrum Offset (Hz) 25629.8613	



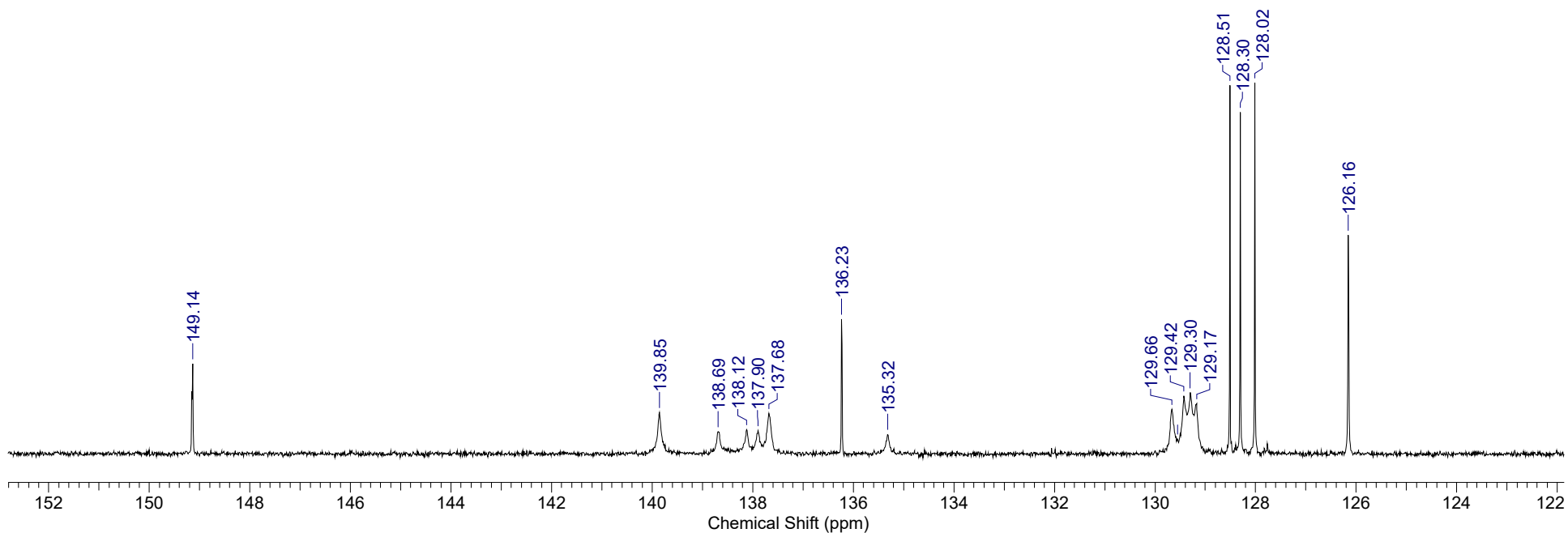
### $^{13}\text{C}$ spectrum of compound **4b**

<b>Formula</b> C <sub>15</sub> H <sub>22</sub> Cl N Ru?	<b>FW</b> 416.3313+?
---	----------------------

<b>Acquisition Time (sec)</b>	0.6921	<b>Comment</b>	single pulse decoupled gated NOE		<b>Date</b>	12 Jan 2023 09:51:21	
<b>Date Stamp</b>	12 Jan 2023 08:48:40	<b>File Name</b>	C:\USERS\ALEXA\DESKTOP\4B 13CFZ1444-2 (2).JDF				
<b>Frequency (MHz)</b>	150.91	<b>Nucleus</b>	13C	<b>Number of Transients</b>	3401	<b>Origin</b>	ECA 600
<b>Original Points Count</b>	32768	<b>Owner</b>	CKP	<b>Points Count</b>	32768	<b>Pulse Sequence</b>	single pulse dec
<b>Receiver Gain</b>	56.00	<b>Solvent</b>	CHLOROFORM-d		<b>Spectrum Offset (Hz)</b>	15065.9502	
<b>Sweep Width (Hz)</b>	47348.49						



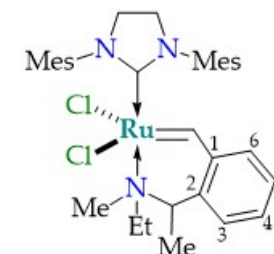
**4b**



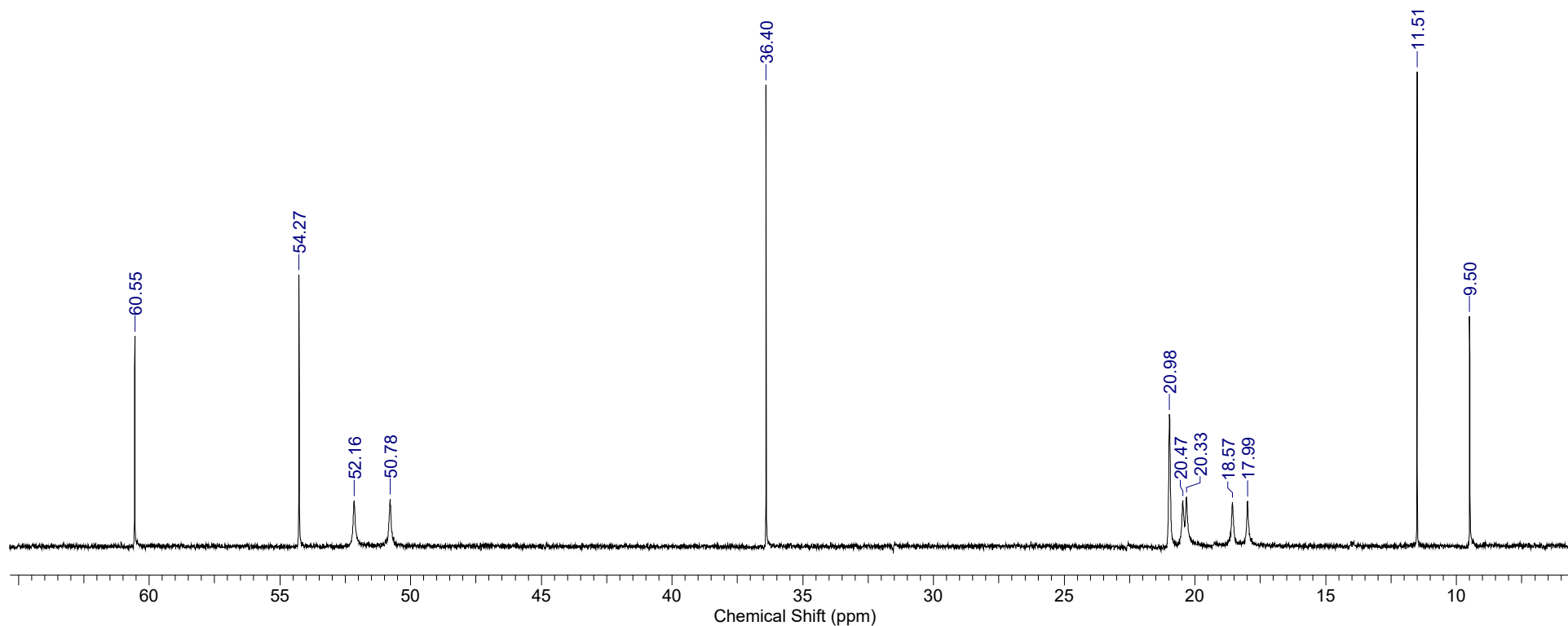
# $^{13}\text{C}$ spectrum of compound **4b**

<b>Formula</b> $\text{C}_{15}\text{H}_{22}\text{Cl}_2\text{N}_3\text{Ru}$	<b>FW</b> 416.3313+?
---	----------------------

<b>Acquisition Time (sec)</b> 0.6921	<b>Comment</b> single pulse decoupled gated NOE	<b>Date</b> 12 Jan 2023 09:51:21
<b>Date Stamp</b> 12 Jan 2023 08:48:40	<b>File Name</b> C:\USERS\ALEXA\DESKTOP\4B 13CFZ1444-2 (2).JDF	
<b>Frequency (MHz)</b> 150.91	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 3401
<b>Original Points Count</b> 32768	<b>Owner</b> CKP	<b>Points Count</b> 32768
<b>Receiver Gain</b> 56.00	<b>Solvent</b> CHLOROFORM-d	<b>Pulse Sequence</b> single pulse dec
<b>Sweep Width (Hz)</b> 47348.49		<b>Spectrum Offset (Hz)</b> 15065.9502

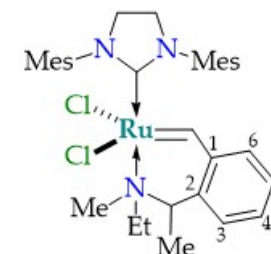


**4b**



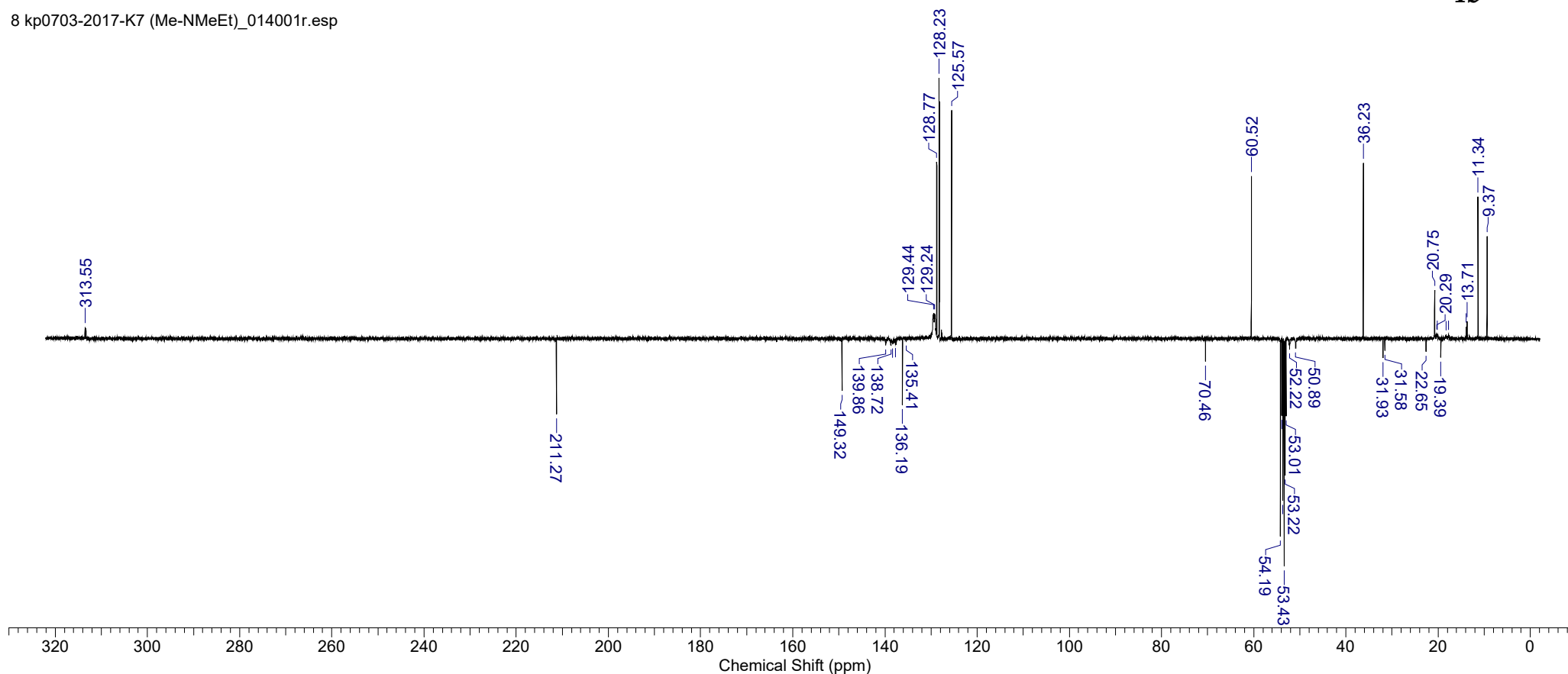
# DEPT-135 spectrum of compound 4b

Acquisition Time (sec)	0.8039	Comment	5 mm CPPBBO BB-1H/19F/D Z-GRD Z125869/0025		Date	07 Mar 2017 12:18:08	
Date Stamp	07 Mar 2017 12:18:08						
File Name							
Frequency (MHz)	125.76	Nucleus	13C	Number of Transients	571	Origin	spect
Original Points Count	32768	Owner	nmrsu	Points Count	32768	Pulse Sequence	jmod
Receiver Gain	189.77	SW(cyclical) (Hz)	40760.87	Solvent	DICHLOROMETHANE-d2		
Spectrum Offset (Hz)	20121.2441	Sweep Width (Hz)	40759.63	Temperature (degree C)	25.087		



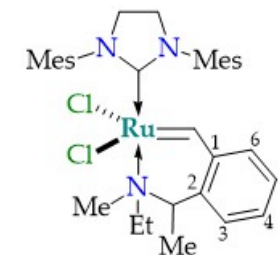
4b

8 kp0703-2017-K7 (Me-NMeEt)\_014001r.esp



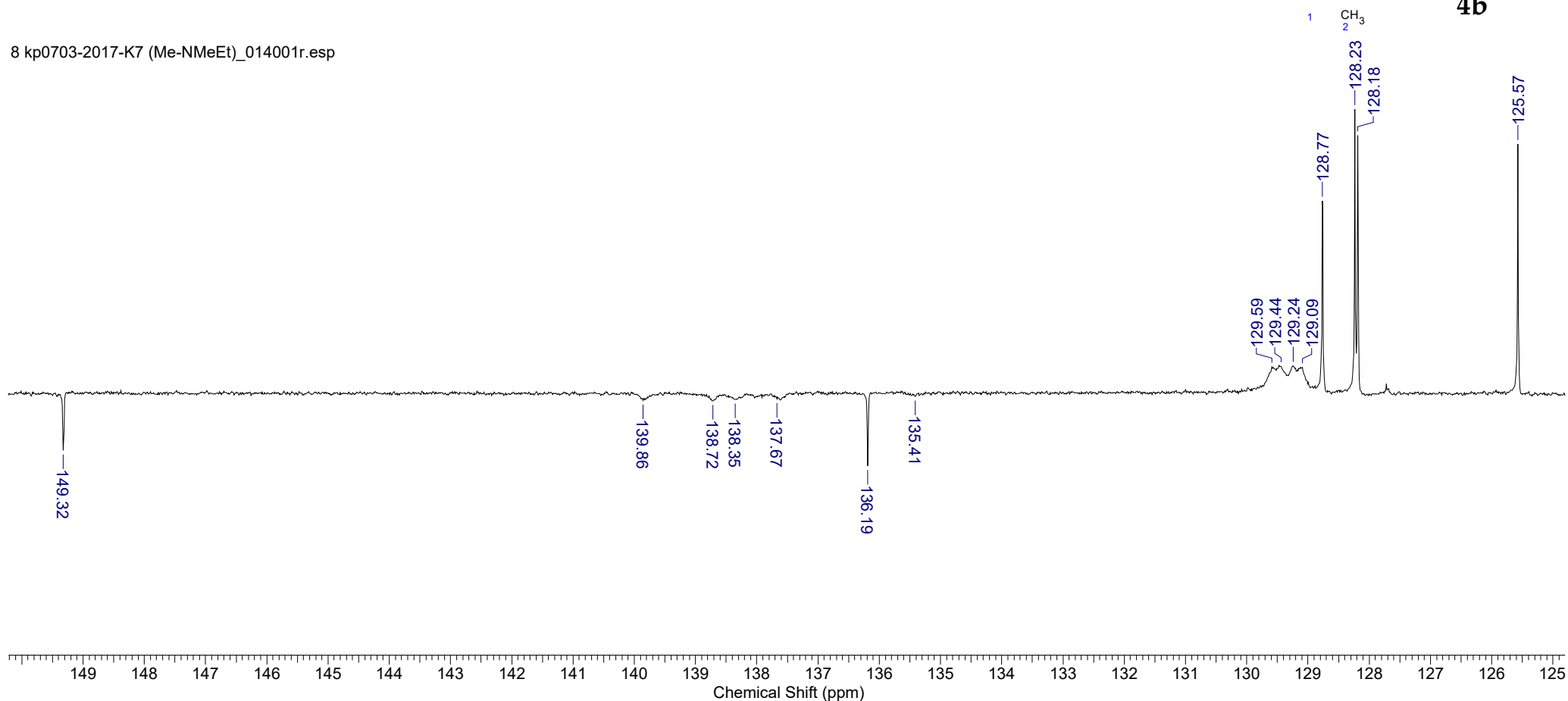
# DEPT-135 spectrum of compound **4b**

Acquisition Time (sec)	0.8039	Comment	5 mm CPPBBO BB-1H/19F/D Z-GRD Z125869/0025		Date	07 Mar 2017 12:18:08	
Date Stamp	07 Mar 2017 12:18:08						
File Name							
Frequency (MHz)	125.76	Nucleus	13C	Number of Transients	571	Origin	spect
Original Points Count	32768	Owner	nrmrsu	Points Count	32768	Pulse Sequence	jmod
Receiver Gain	189.77	SW(cyclical) (Hz)	40760.87	Solvent	DICHLOROMETHANE-d2		
Spectrum Offset (Hz)	20121.2441	Sweep Width (Hz)	40759.63	Temperature (degree C)	25.087		



**4b**

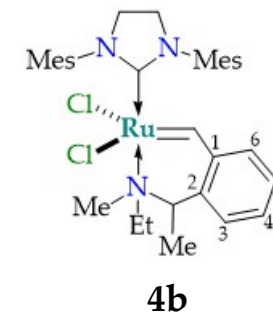
8 kp0703-2017-K7 (Me-NMeEt)\_014001r.esp



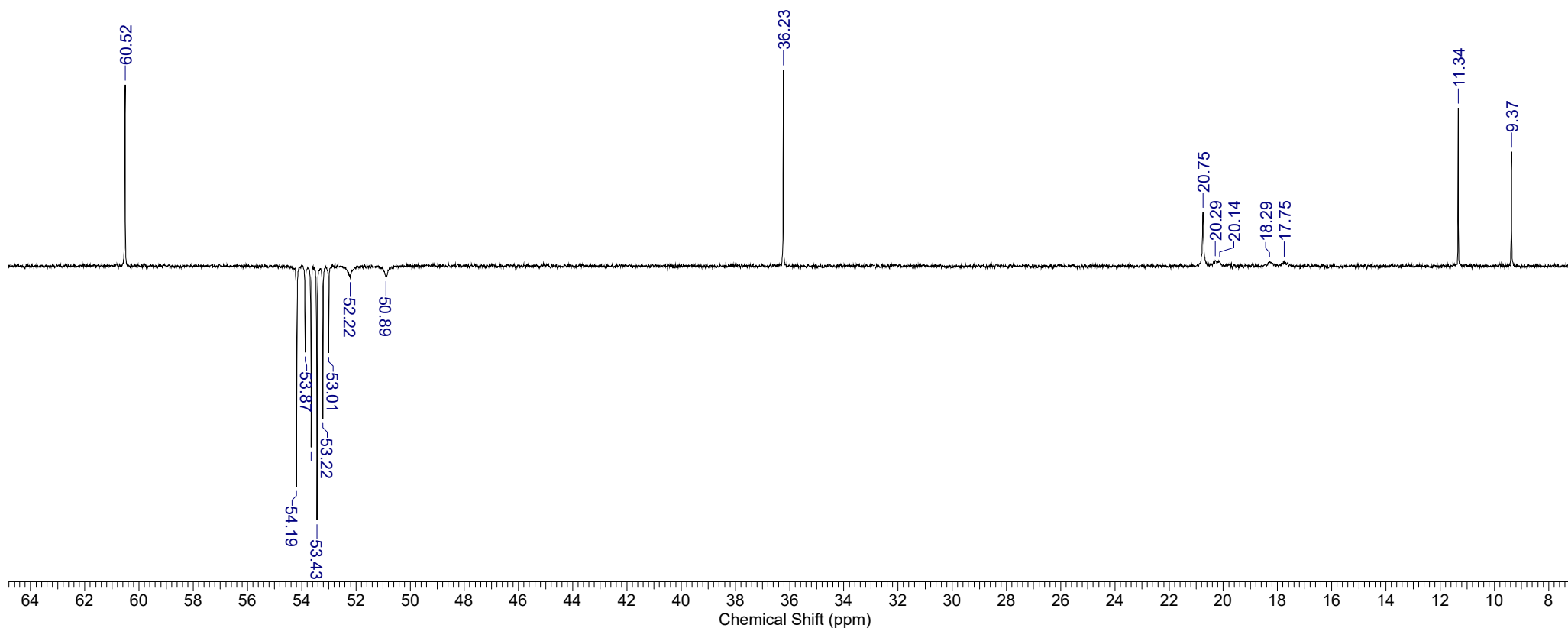


# DEPT-135 spectrum of compound **4b**

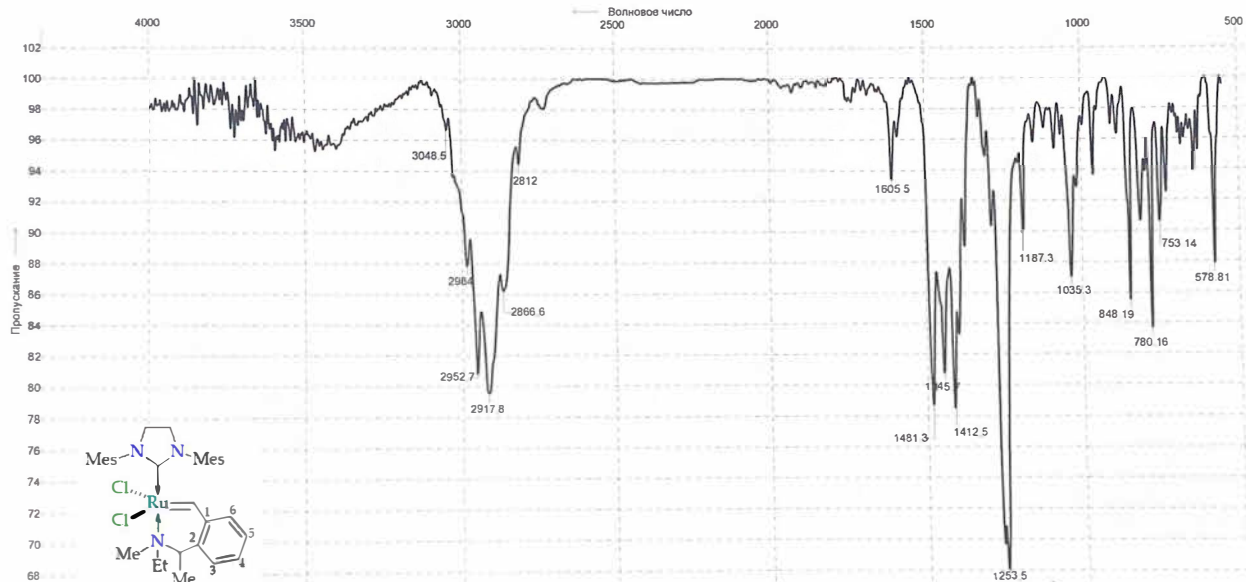
Acquisition Time (sec)	0.8039	Comment	5 mm CPPBBO BB-1H/19F/D Z-GRD Z125869/0025		Date	07 Mar 2017 12:18:08	
Date Stamp	07 Mar 2017 12:18:08						
File Name							
Frequency (MHz)	125.76	Nucleus	13C	Number of Transients	571	Origin	spect
Original Points Count	32768	Owner	nmrsu	Points Count	32768	Pulse Sequence	jmod
Receiver Gain	189.77	SW(cyclical) (Hz)	40760.87	Solvent	DICHLOROMETHANE-d2		
Spectrum Offset (Hz)	20121.2441	Sweep Width (Hz)	40759.63	Temperature (degree C)	25.087		



8 kp0703-2017-K7 (Me-NMeEt)\_014001r.esp

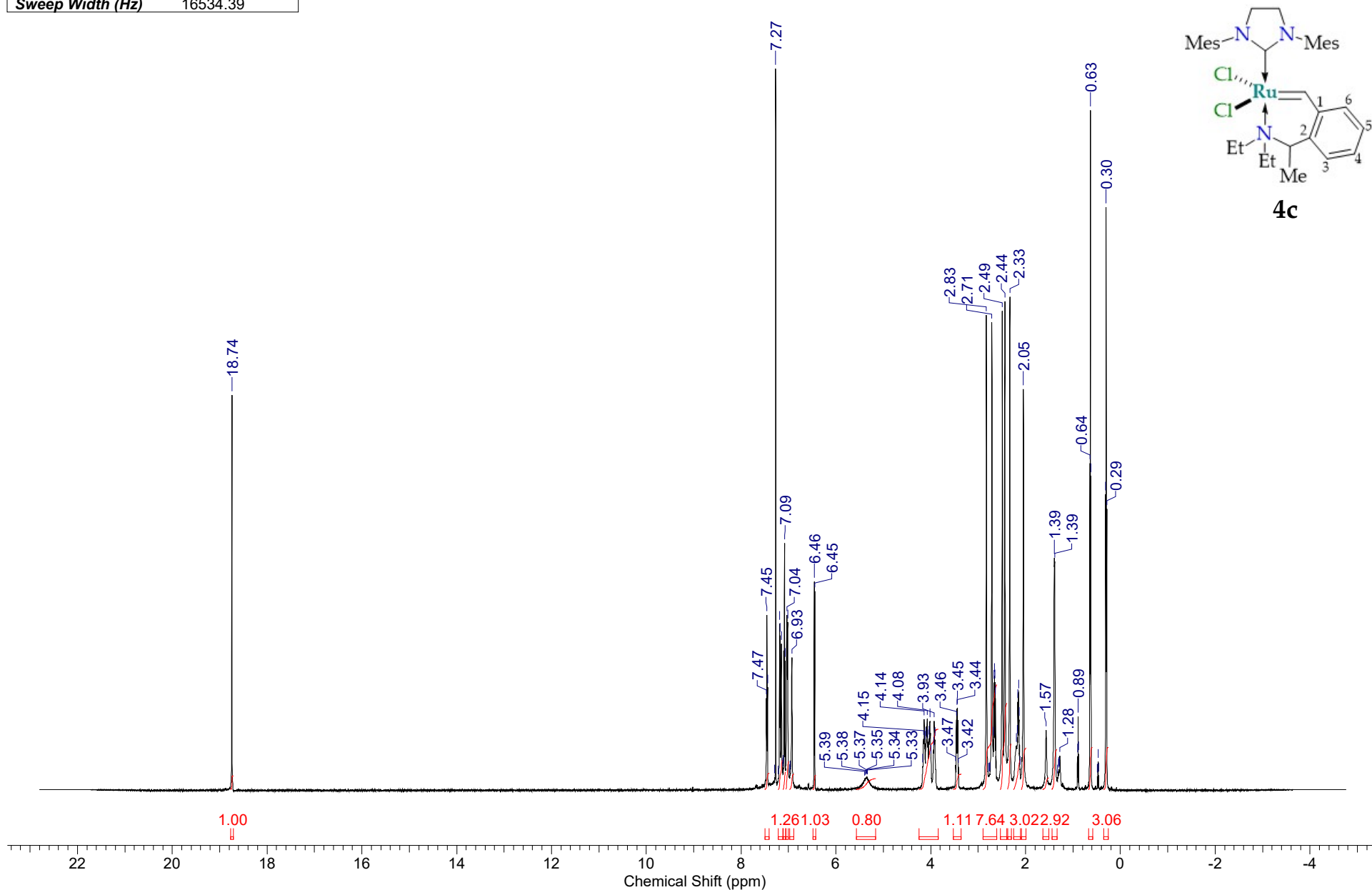


# IR spectrum of compound 4b



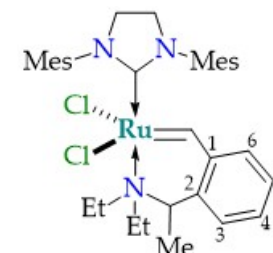
# $^1\text{H}$ spectrum of compound **4c**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	14 Sep 2022 15:40:30
Date Stamp	14 Sep 2022 15:25:37	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	42.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5413.5879

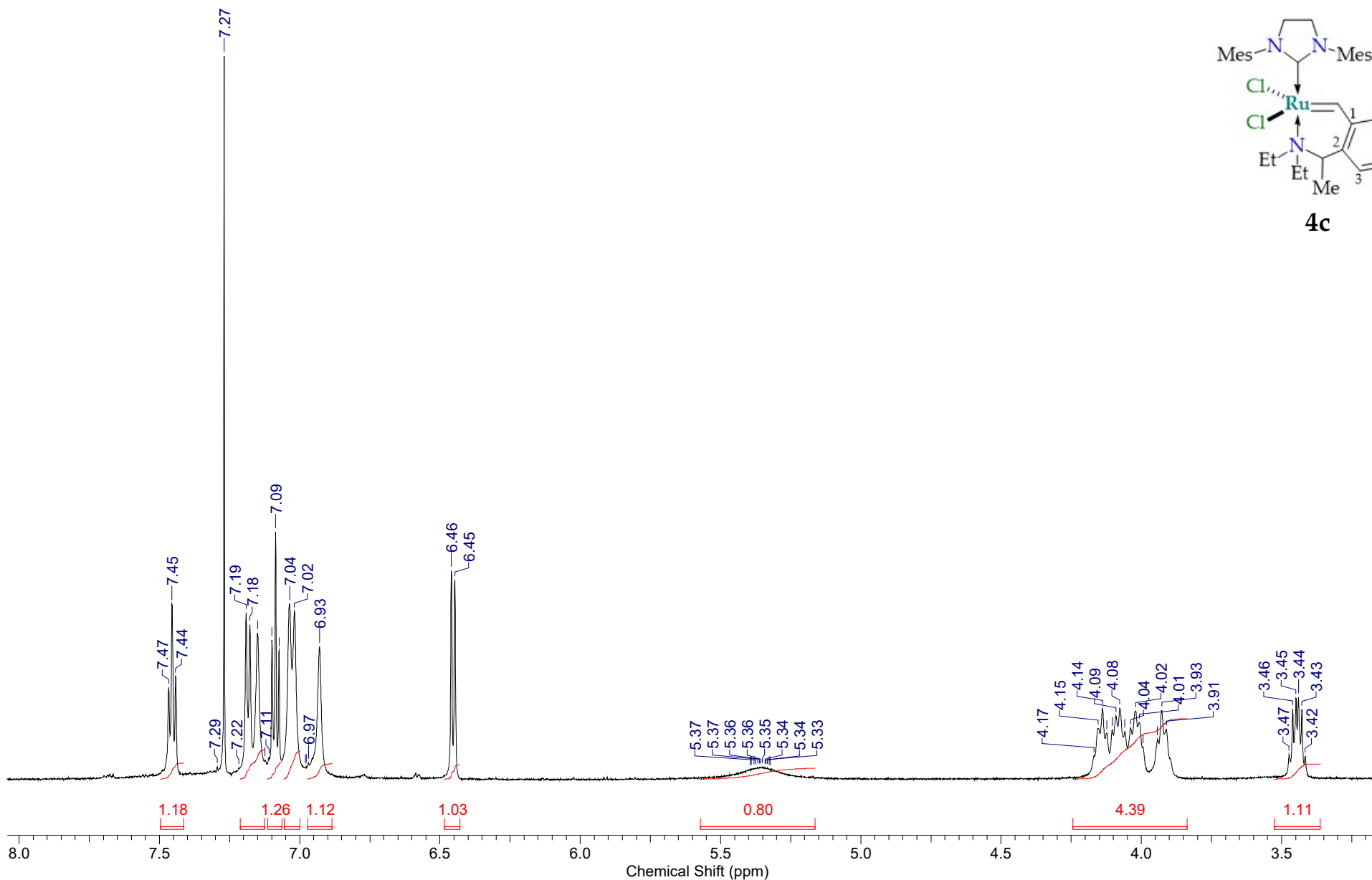


# $^1\text{H}$ spectrum of compound **4c**

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	14 Sep 2022 15:40:30
Date Stamp	14 Sep 2022 15:25:37	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	42.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5413.5879

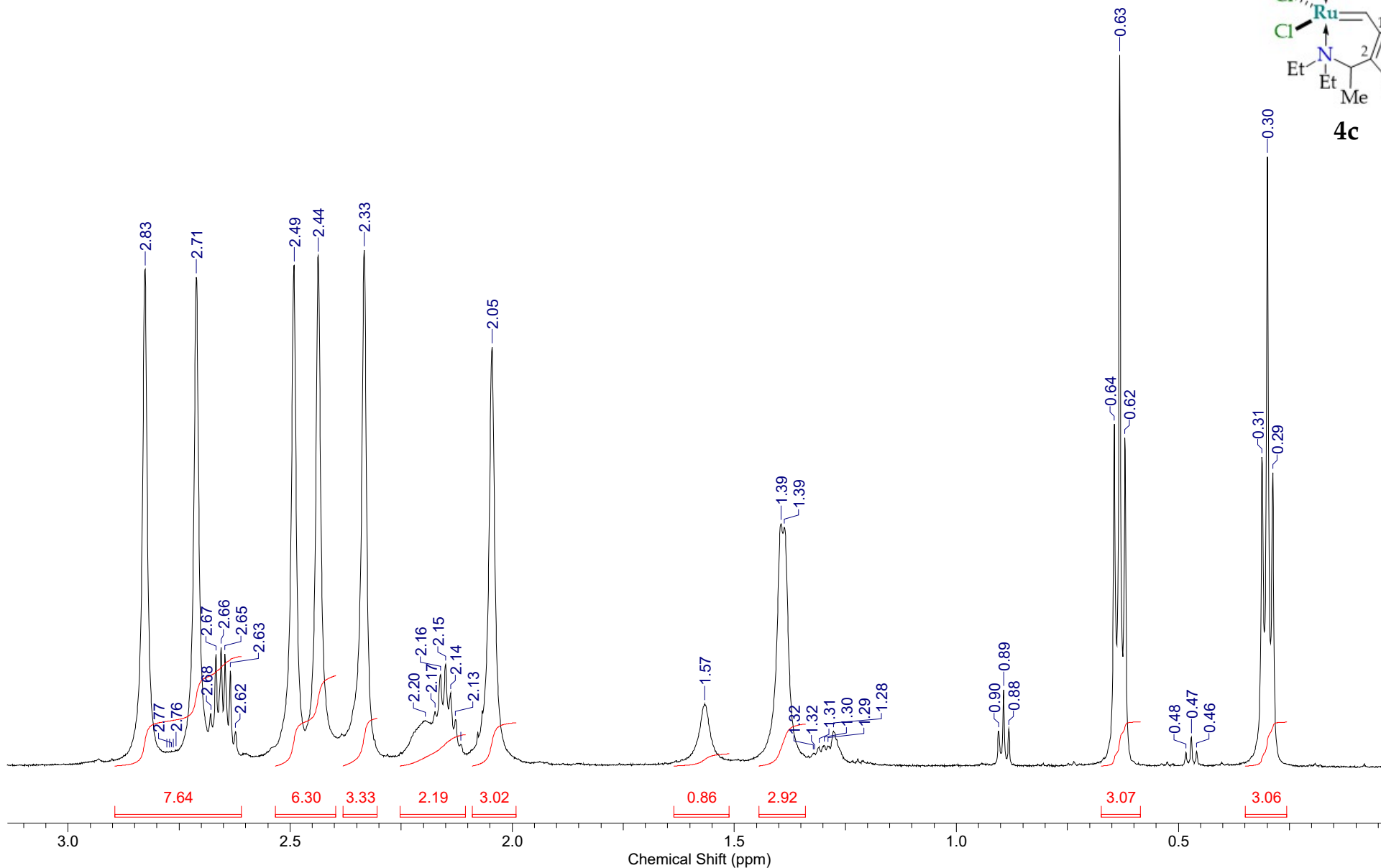
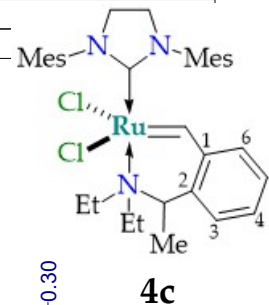


**4c**



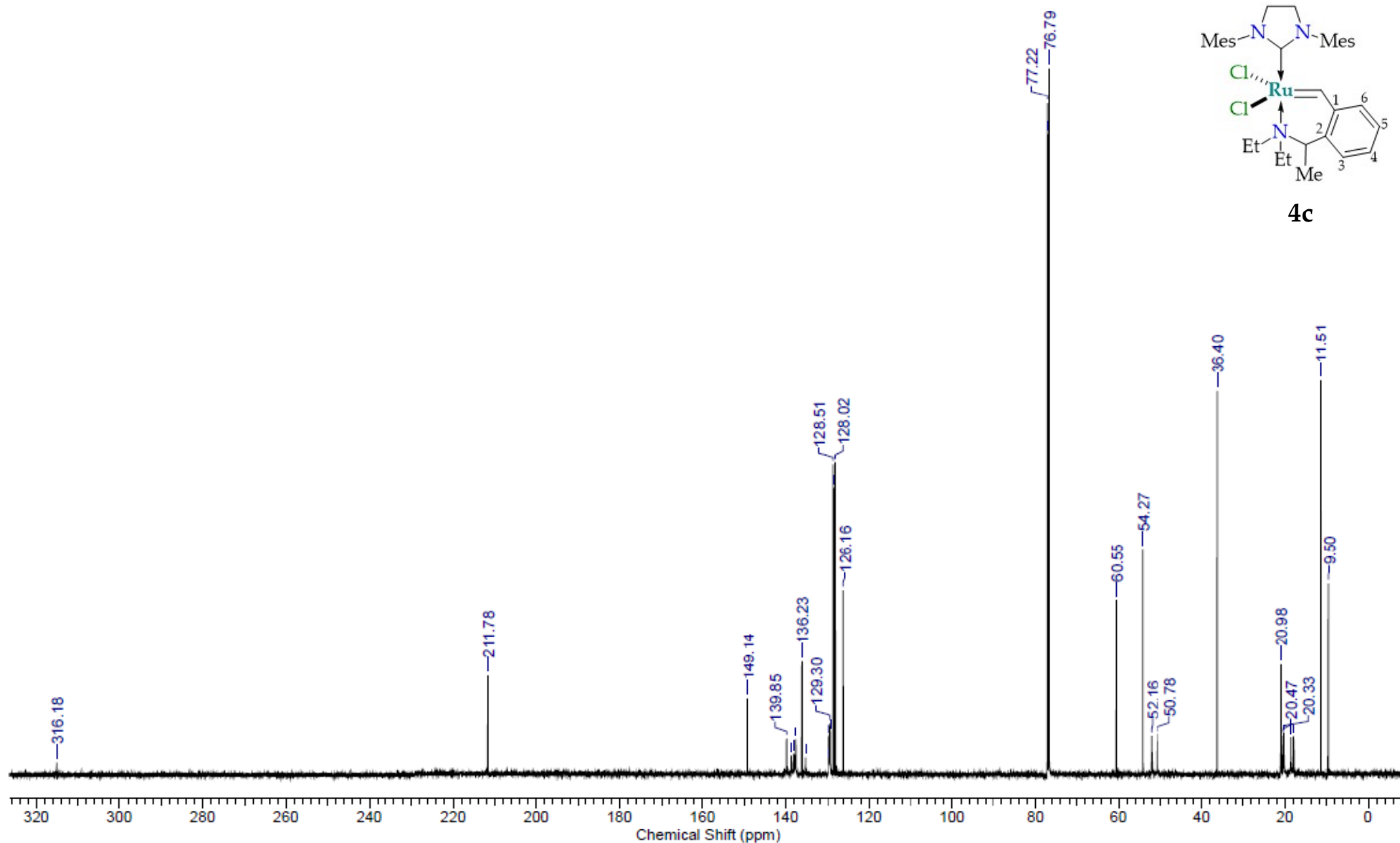
# <sup>1</sup>H spectrum of compound 4c

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	14 Sep 2022 15:40:30
Date Stamp	14 Sep 2022 15:25:37	File Name			
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	42.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5413.5879



# $^{13}\text{C}$ spectrum of compound **4c**

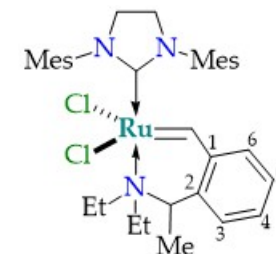
Acquisition Time (sec)	1.7197	Comment	single pulse decoupled gated NOE	Date	19 Jan 2023 06:46:31
Date Stamp		File Name			
Frequency (MHz)	150.91	Nucleus	$^{13}\text{C}$	Number of Transients	4000
Original Points Count	131072	Owner	CKP	Points Count	131072
Receiver Gain	56.00	Solvent	CHLOROFORM-d	Pulse Sequence	single pulse dec
Sweep Width (Hz)	76219.52			Spectrum Offset (Hz)	25629.8613



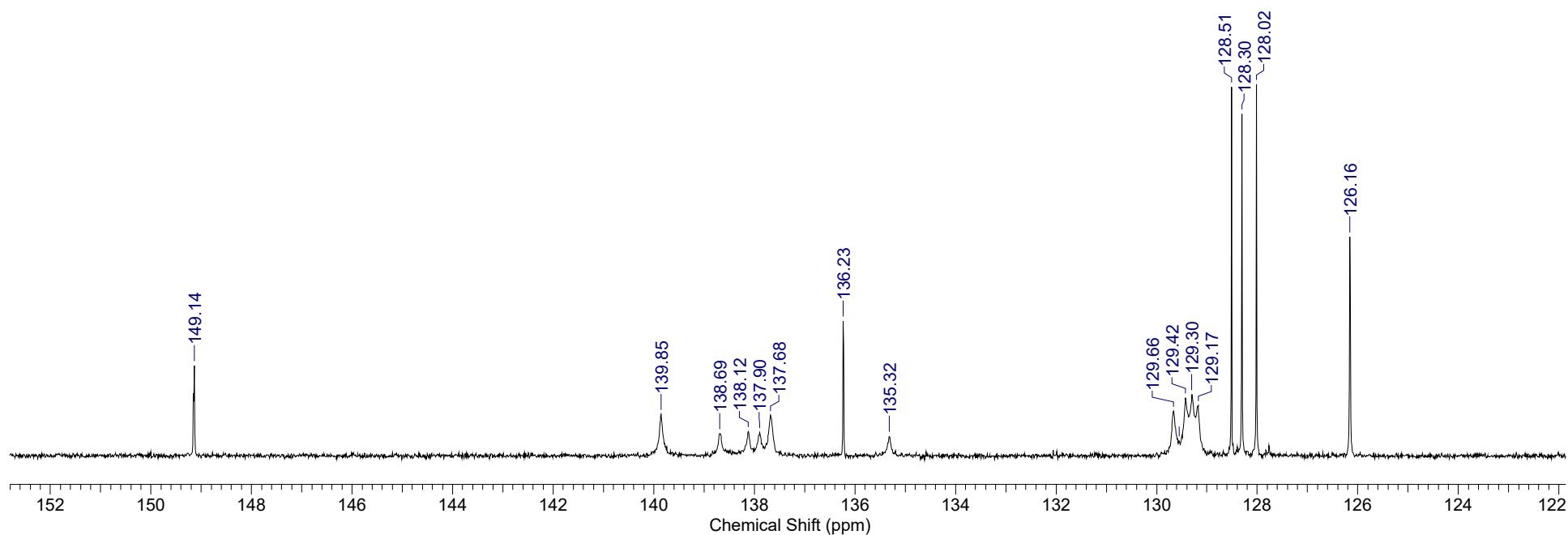
# $^{13}\text{C}$ spectrum of compound **4c**

<b>Formula</b> $\text{C}_{15}\text{H}_{22}\text{Cl}_2\text{N}_3\text{Ru}$	<b>FW</b> 416.3313+?
---	----------------------

<b>Acquisition Time (sec)</b> 0.6921	<b>Comment</b> single pulse decoupled gated NOE	<b>Date</b> 12 Jan 2023 09:51:21
<b>Date Stamp</b> 12 Jan 2023 08:48:40	<b>File Name</b>	
<b>Frequency (MHz)</b> 150.91	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 3401
<b>Original Points Count</b> 32768	<b>Owner</b> CKP	<b>Points Count</b> 32768
<b>Receiver Gain</b> 56.00	<b>Solvent</b> CHLOROFORM-d	<b>Pulse Sequence</b> single pulse dec
<b>Sweep Width (Hz)</b> 47348.49		<b>Spectrum Offset (Hz)</b> 15065.9502



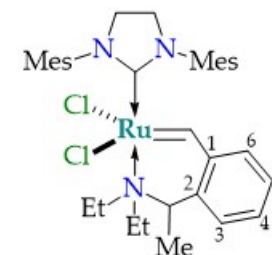
**4c**



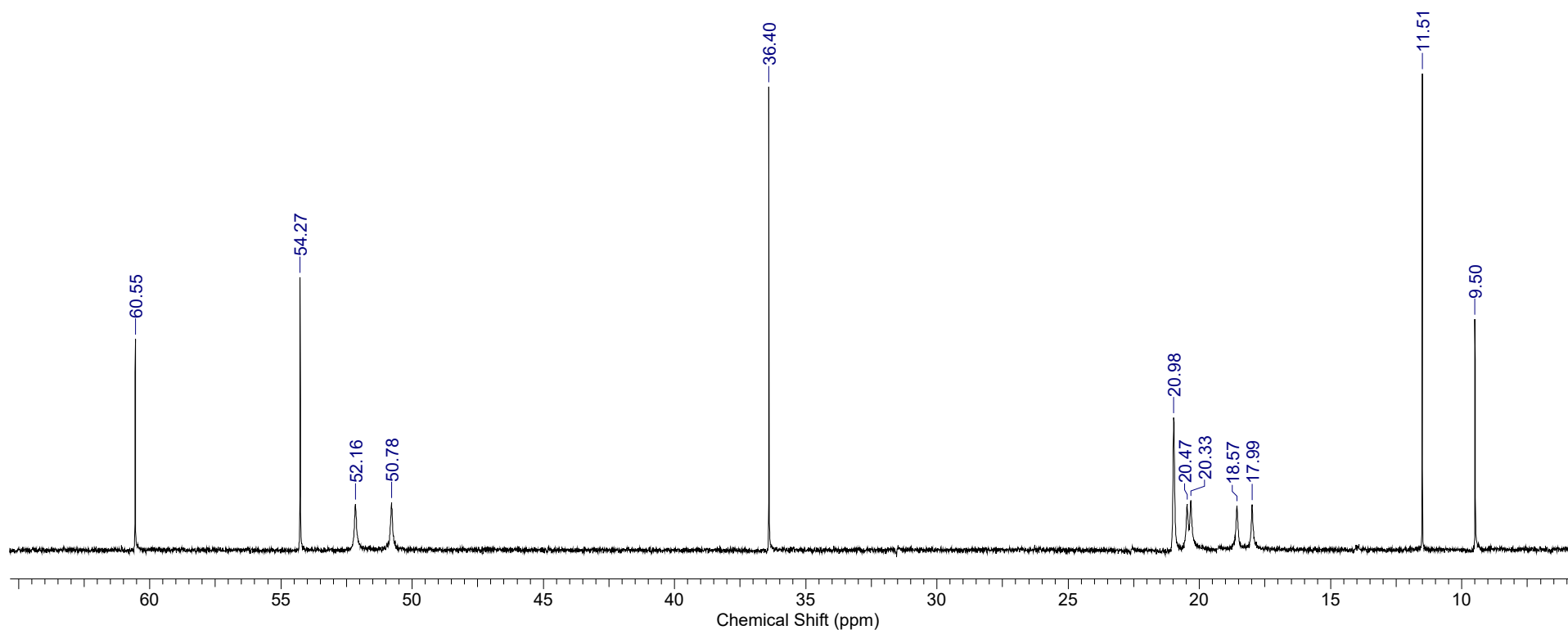
# $^{13}\text{C}$ spectrum of compound **4c**

<b>Formula</b> $\text{C}_{15}\text{H}_{22}\text{Cl}_2\text{N}_2\text{Ru}$	<b>FW</b> 416.3313+?
---	----------------------

<b>Acquisition Time (sec)</b> 0.6921	<b>Comment</b> single pulse decoupled gated NOE	<b>Date</b> 12 Jan 2023 09:51:21
<b>Date Stamp</b> 12 Jan 2023 08:48:40	<b>File Name</b>	
<b>Frequency (MHz)</b> 150.91	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 3401
<b>Original Points Count</b> 32768	<b>Owner</b> CKP	<b>Points Count</b> 32768
<b>Receiver Gain</b> 56.00	<b>Solvent</b> CHLOROFORM-d	<b>Pulse Sequence</b> single pulse dec
<b>Sweep Width (Hz)</b> 47348.49		<b>Spectrum Offset (Hz)</b> 15065.9502

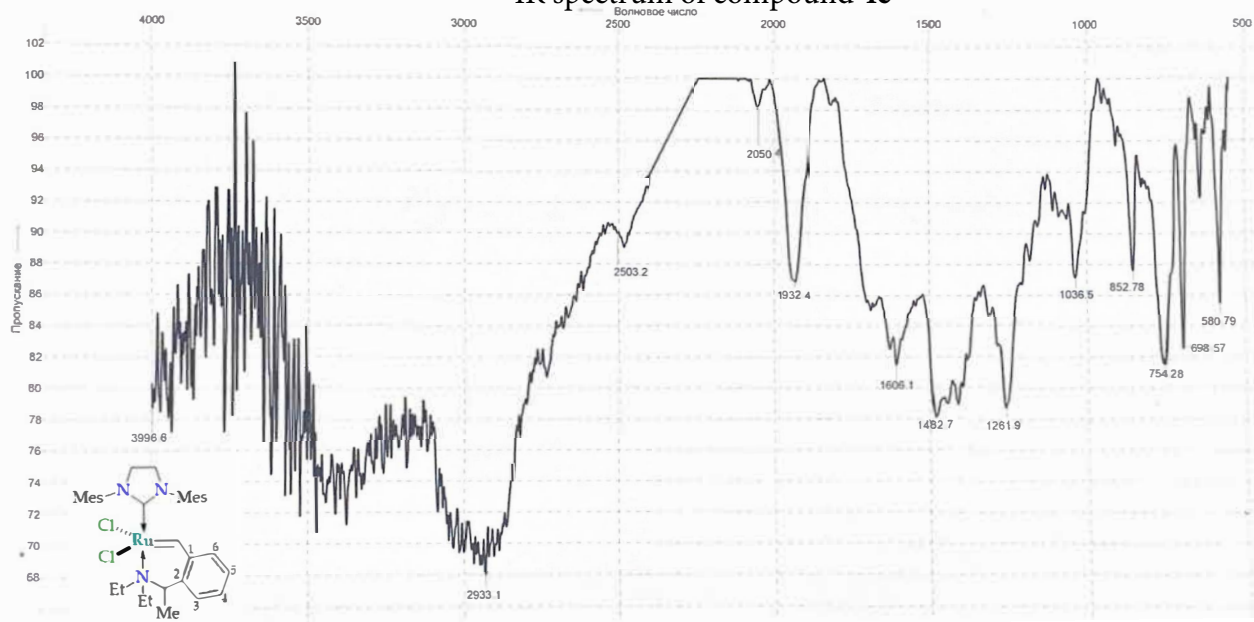


**4c**





# IR spectrum of compound 4c



# MALDI-ToF MS of compound 4c

## Display Report

### Analysis Info

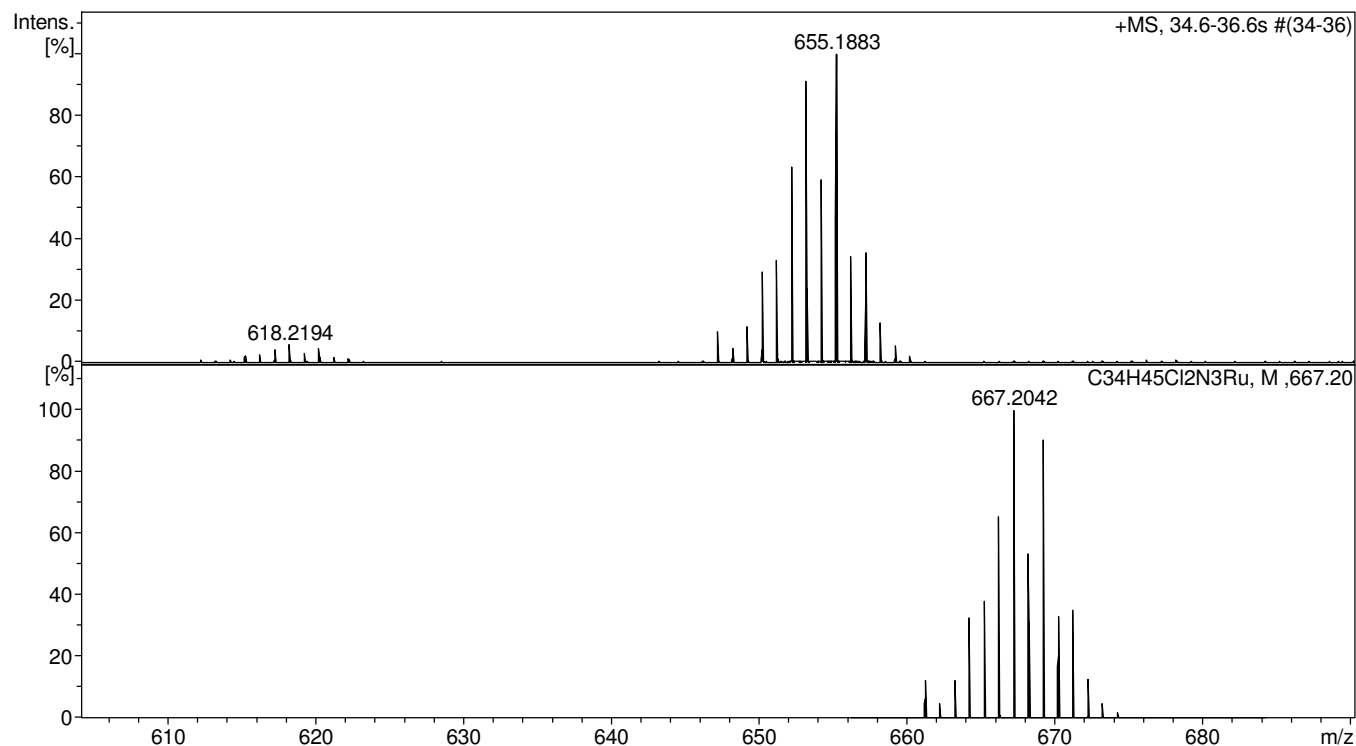
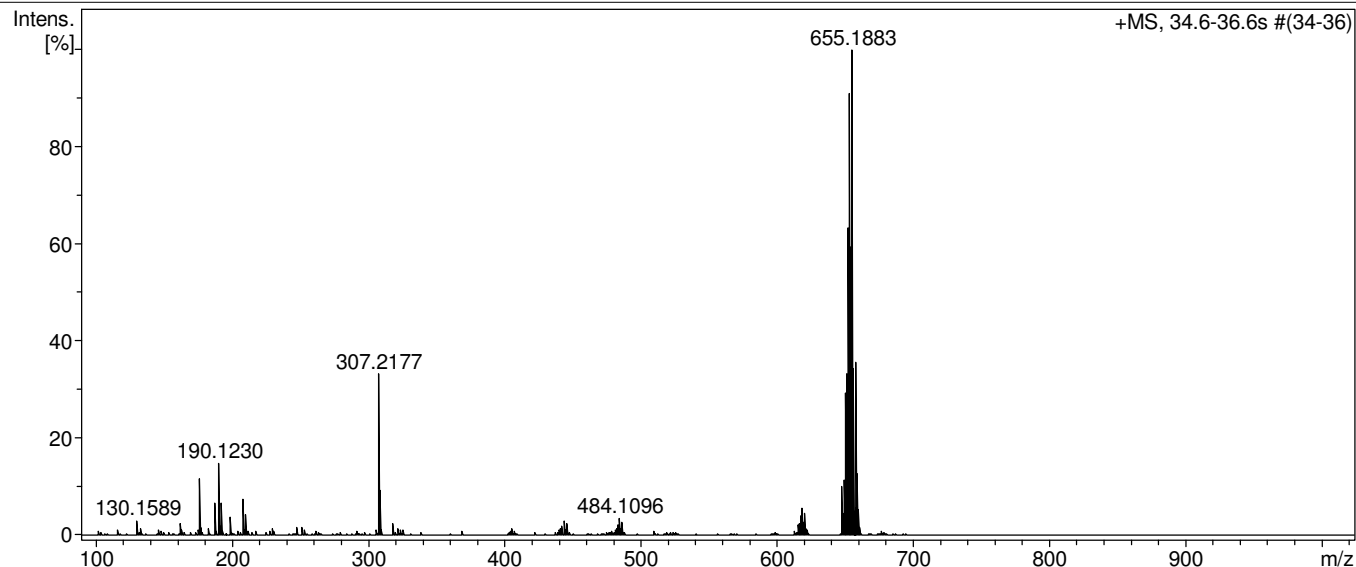
Analysis Name D:\Data\Surzhikova\MVGA-4c.d  
Method tune\_100-1200.m  
Sample Name  
Comment

Acquisition Date 12.01.2023 13:17:40

Operator BDAL@DE  
Instrument / Ser# maXis 43

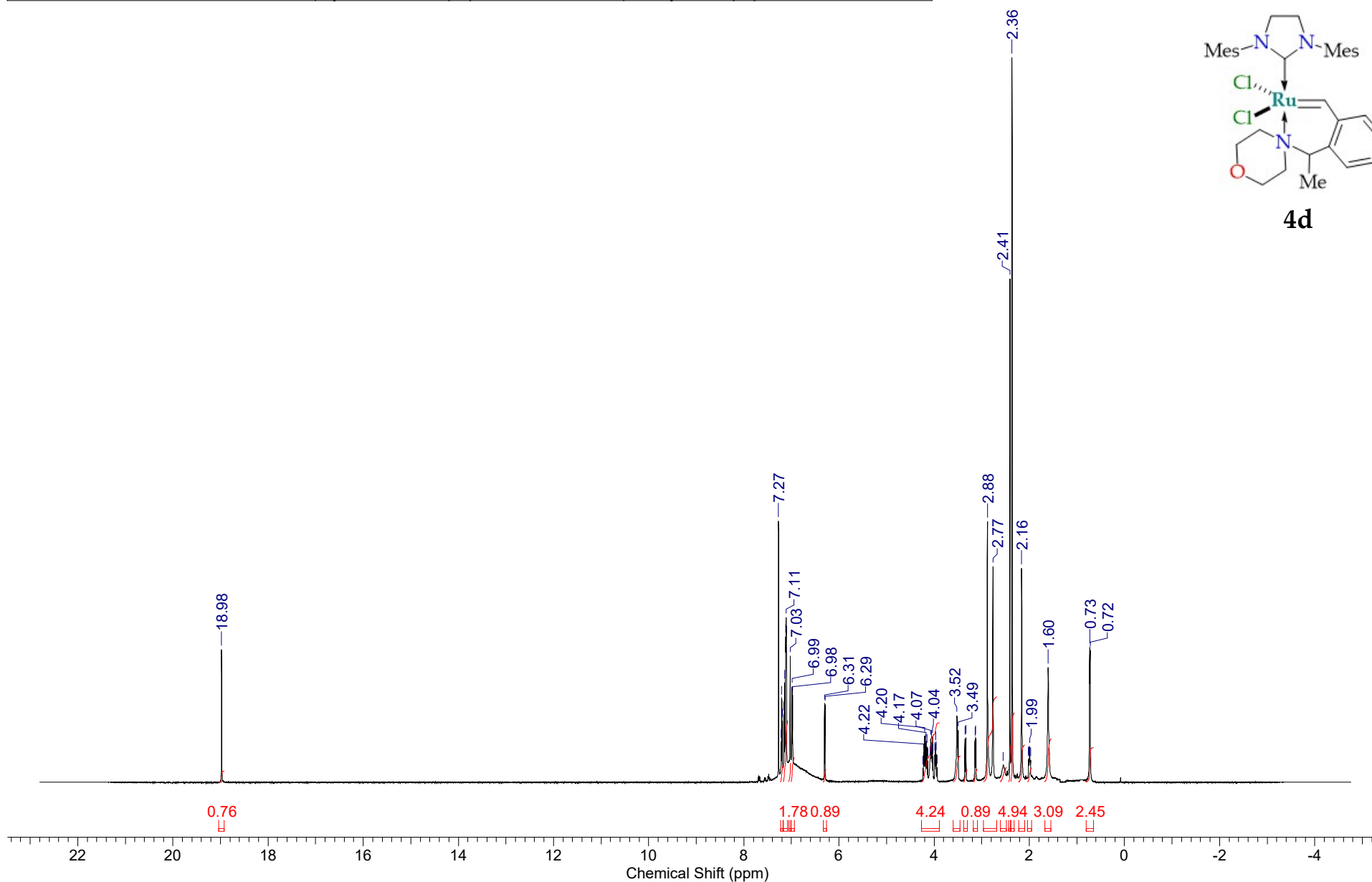
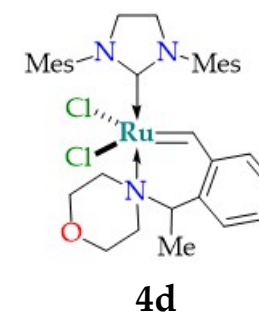
### Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	1.0 Bar
Focus	Active			Set Dry Heater	200 °C
Scan Begin	50 m/z	Set Capillary	4500 V	Set Dry Gas	4.0 l/min
Scan End	1800 m/z	Set End Plate Offset	-500 V	Set Divert Valve	Waste



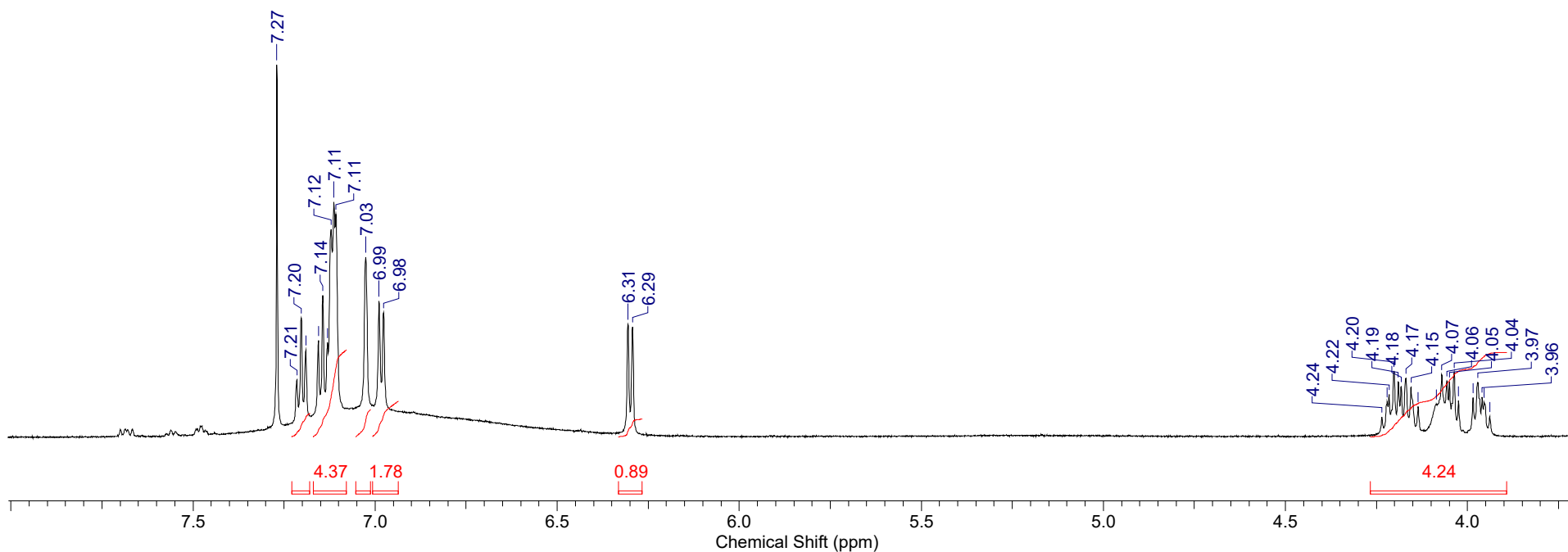
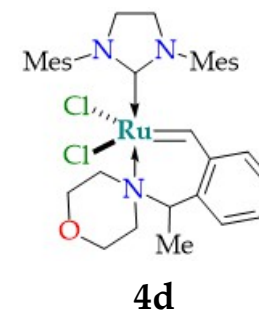
# <sup>1</sup>H spectrum of compound 4d

Acquisition Time (sec)	1.9818	Comment	single_pulse	Date	27 Oct 2022 08:24:45
Date Stamp	27 Oct 2022 08:10:30				
File Name					Frequency (MHz) 600.17
Nucleus	1H	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5413.5884	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	40.00



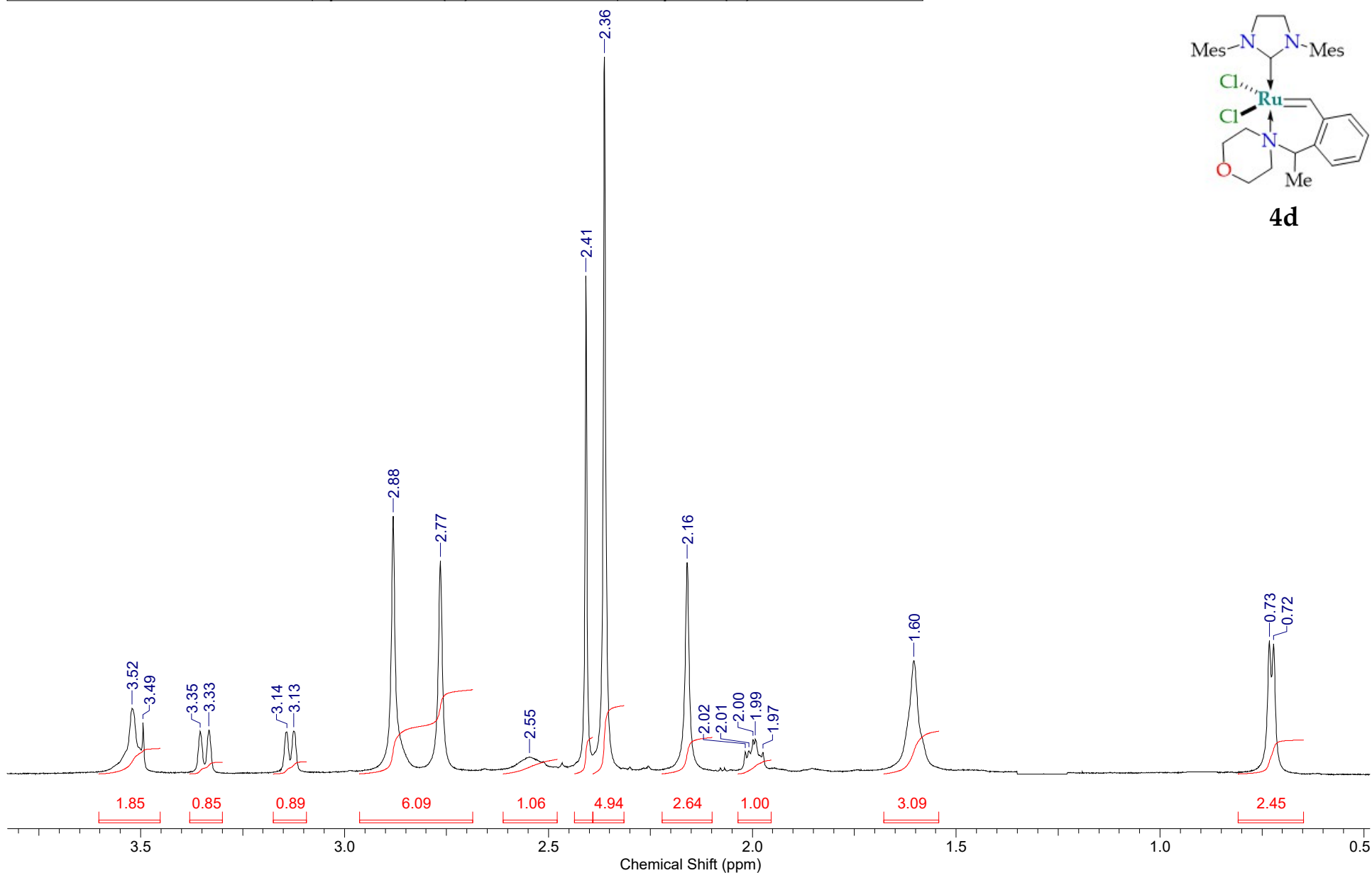
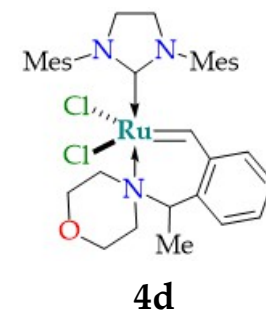
# $^1\text{H}$ spectrum of compound **4d**

Acquisition Time (sec)	1.9818	Comment	single_pulse	Date	27 Oct 2022 08:24:45
Date Stamp	27 Oct 2022 08:10:30				
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5413.5884	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	40.00



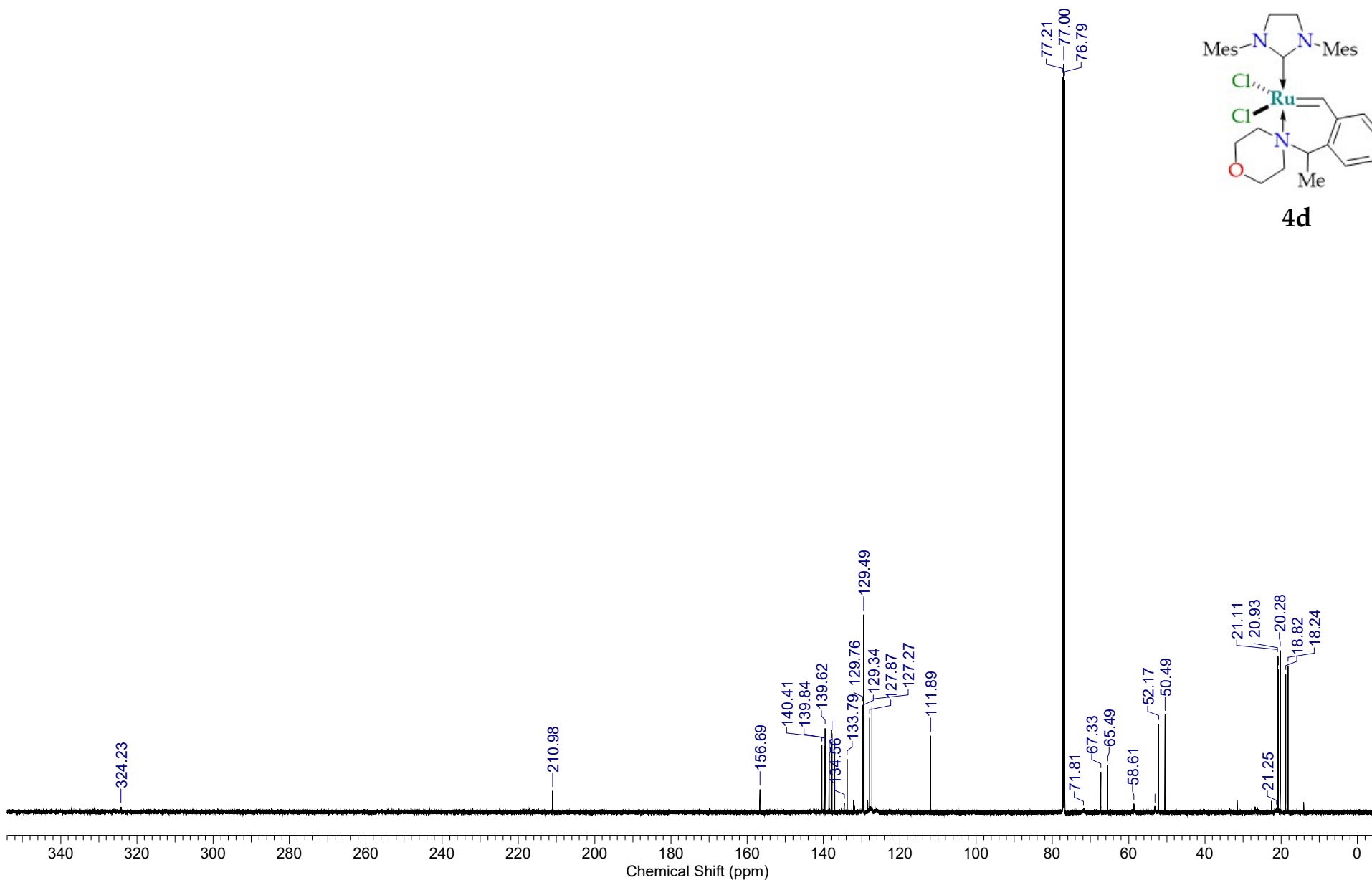
# $^1\text{H}$ spectrum of compound **4d**

Acquisition Time (sec)	1.9818	Comment	single_pulse	Date	27 Oct 2022 08:24:45
Date Stamp	27 Oct 2022 08:10:30				
File Name				Frequency (MHz)	600.17
Nucleus	$^1\text{H}$	Number of Transients	8	Origin	ECA 600
Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse.ex2
Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5413.5884	Sweep Width (Hz)	16534.39
				Original Points Count	32768
				Receiver Gain	40.00



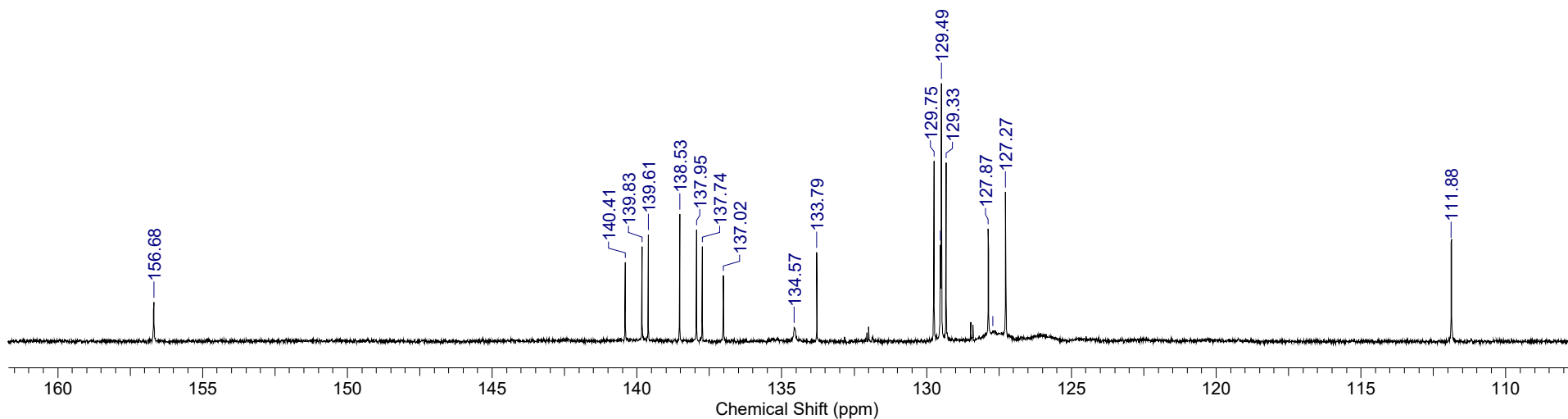
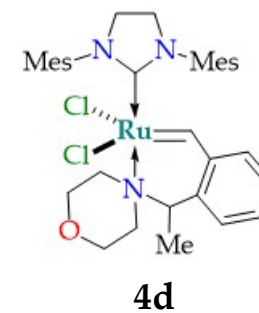
# $^{13}\text{C}$ spectrum of compound **4d**

<b>Acquisition Time (sec)</b>	1.7197	<b>Comment</b>	single pulse decoupled gated NOE	<b>Date</b>	18 Jan 2023 17:46:18
<b>Date Stamp</b>	18 Jan 2023 16:43:47	<b>File Name</b>			
<b>Frequency (MHz)</b>	150.91	<b>Nucleus</b>	$^{13}\text{C}$	<b>Number of Transients</b>	4000
<b>Original Points Count</b>	131072	<b>Owner</b>	CKP	<b>Points Count</b>	131072
<b>Receiver Gain</b>	54.00	<b>Solvent</b>	CHLOROFORM-d	<b>Pulse Sequence</b>	single pulse dec
<b>Sweep Width (Hz)</b>	76219.52			<b>Spectrum Offset (Hz)</b>	25631.6035



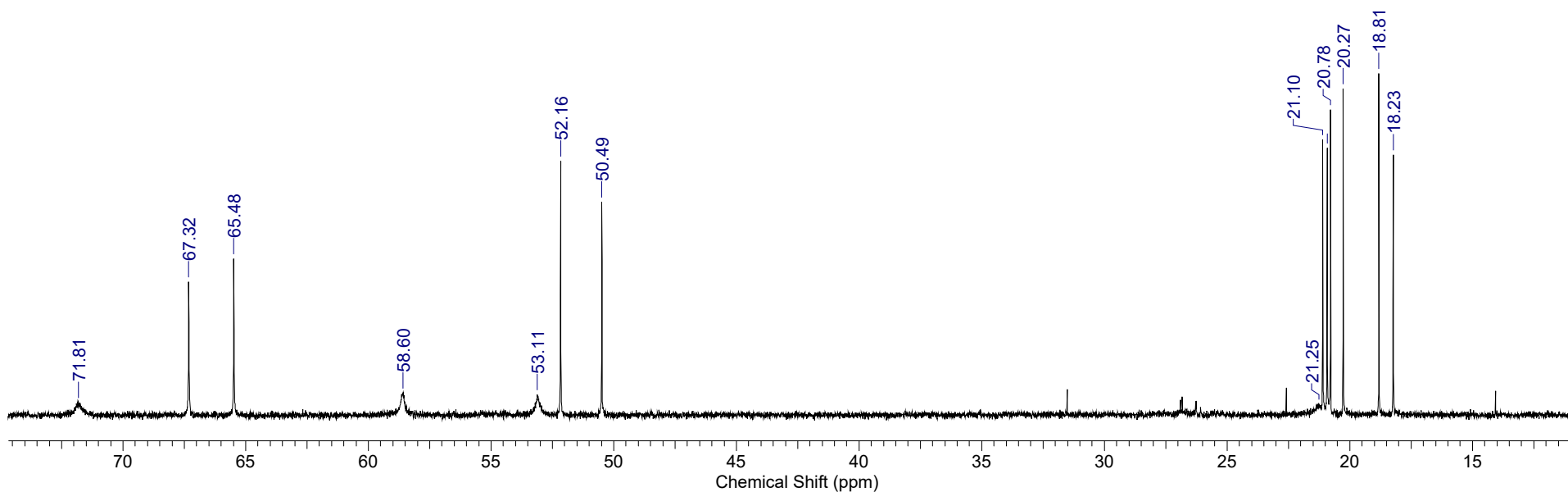
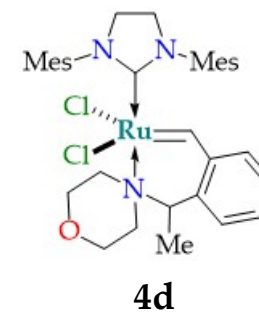
# $^{13}\text{C}$ spectrum of compound **4d**

<b>Acquisition Time (sec)</b>	0.6921	<b>Comment</b>	single pulse decoupled gated NOE	<b>Date</b>	13 Jan 2023 00:48:39
<b>Date Stamp</b>	12 Jan 2023 17:58:14	<b>File Name</b>			
<b>Frequency (MHz)</b>	150.91	<b>Nucleus</b>	$^{13}\text{C}$	<b>Number of Transients</b>	4000
<b>Original Points Count</b>	32768	<b>Owner</b>	CKP	<b>Points Count</b>	32768
<b>Receiver Gain</b>	58.00	<b>Solvent</b>	CHLOROFORM-d	<b>Pulse Sequence</b>	single pulse dec
<b>Sweep Width (Hz)</b>	47348.49			<b>Spectrum Offset (Hz)</b>	15065.9502



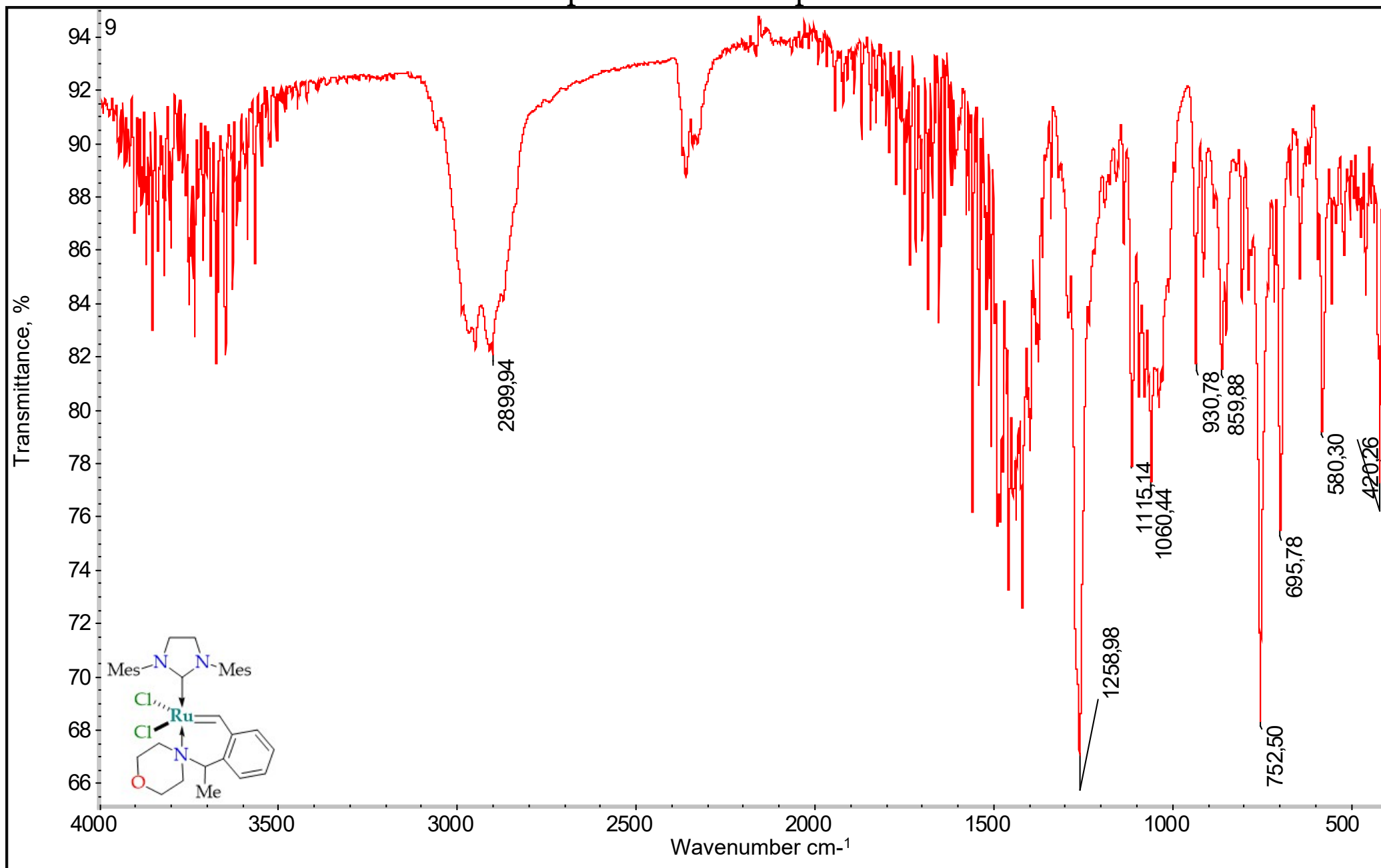
# $^{13}\text{C}$ spectrum of compound **4d**

Acquisition Time (sec) 0.6921		Comment single pulse decoupled gated NOE		Date 13 Jan 2023 00:48:39	
Date Stamp 12 Jan 2023 17:58:14		File Name			
Frequency (MHz) 150.91		Nucleus 13C		Number of Transients 4000	
Original Points Count 32768		Owner CKP		Points Count 32768	
Receiver Gain 58.00		Solvent CHLOROFORM-d		Pulse Sequence single_pulse_dec	
Sweep Width (Hz) 47348.49				Spectrum Offset (Hz) 15065.9502	



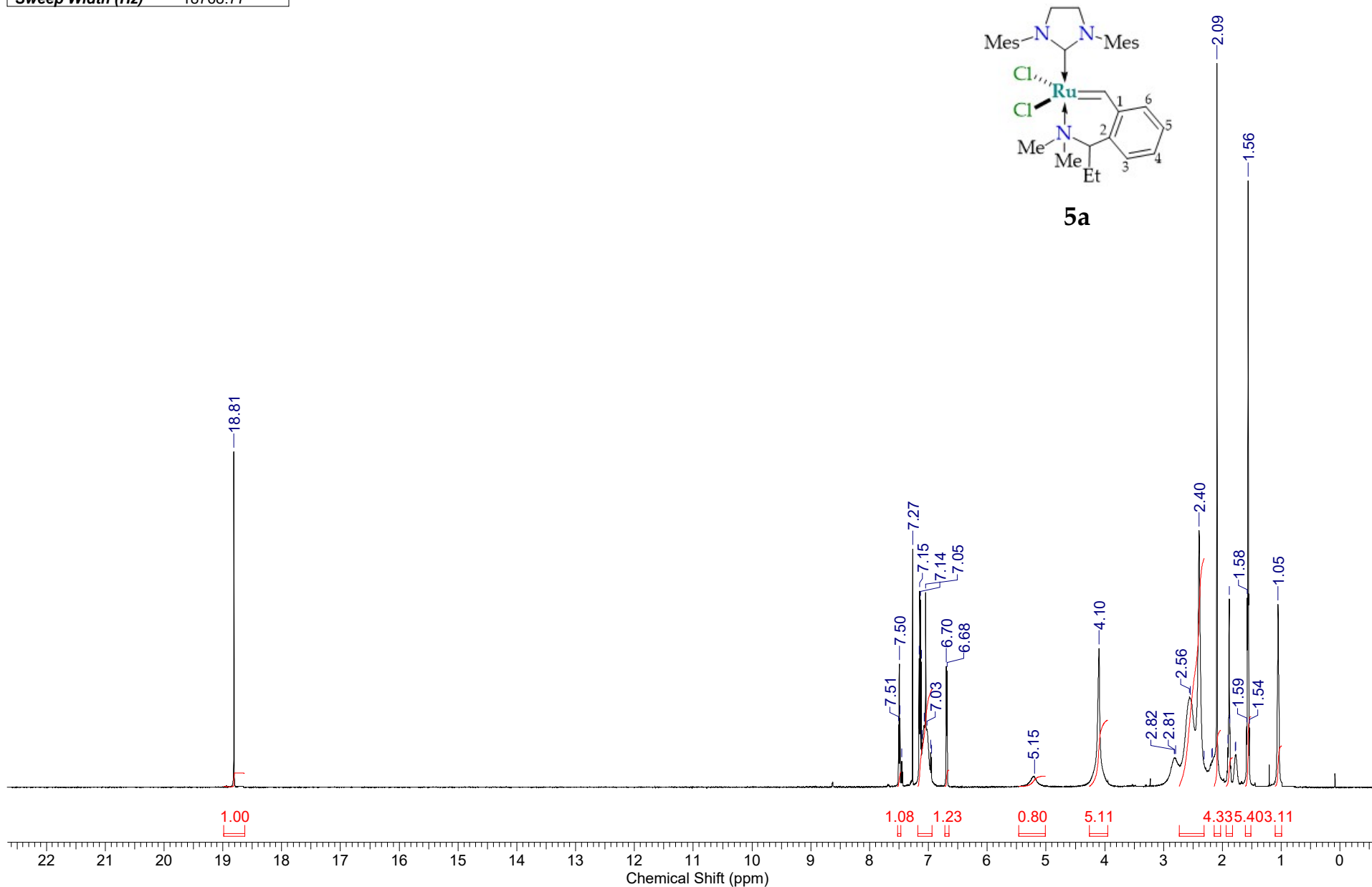
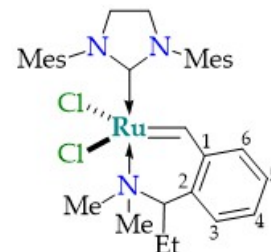


# IR spectrum of compound 4d



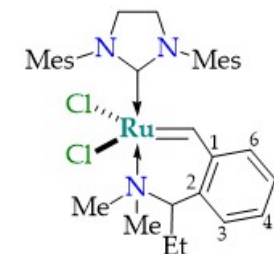
# $^1\text{H}$ spectrum of compound 5a

Acquisition Time (sec)	1.7459	Comment	single pulse	Date	23 Jan 2023 17:17:07
Date Stamp	23 Jan 2023 16:14:45	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	16
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	38.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	18768.77			Spectrum Offset (Hz)	6614.0498

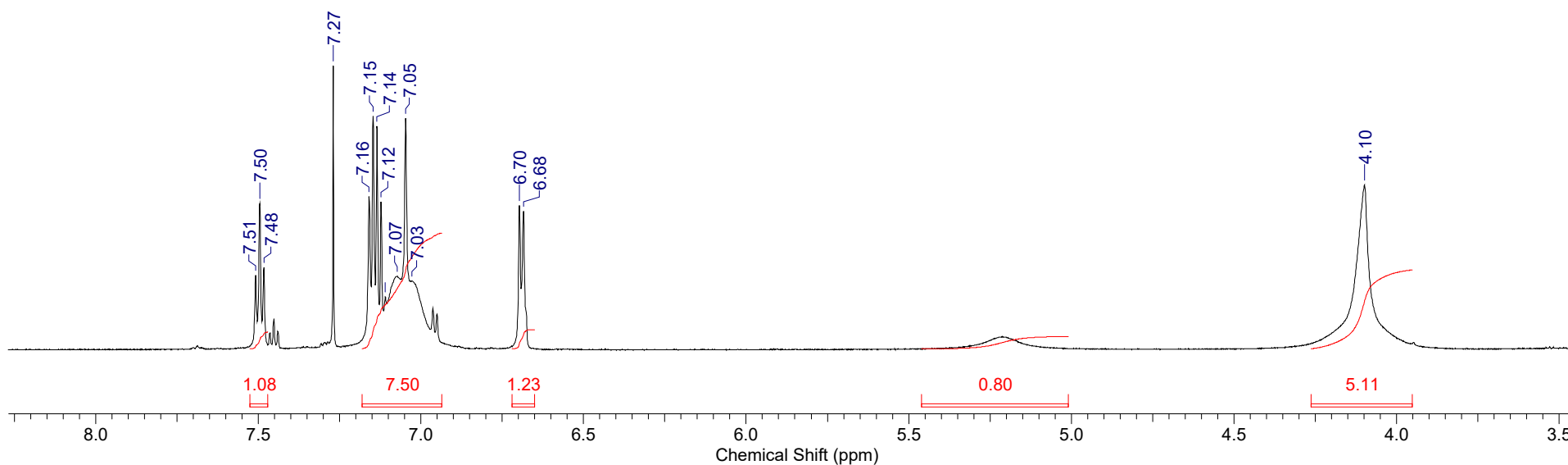


# $^1\text{H}$ spectrum of compound 5a

Acquisition Time (sec)	1.7459	Comment	single pulse	Date	23 Jan 2023 17:17:07
Date Stamp	23 Jan 2023 16:14:45	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	16
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	38.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	18768.77	Spectrum Offset (Hz)			

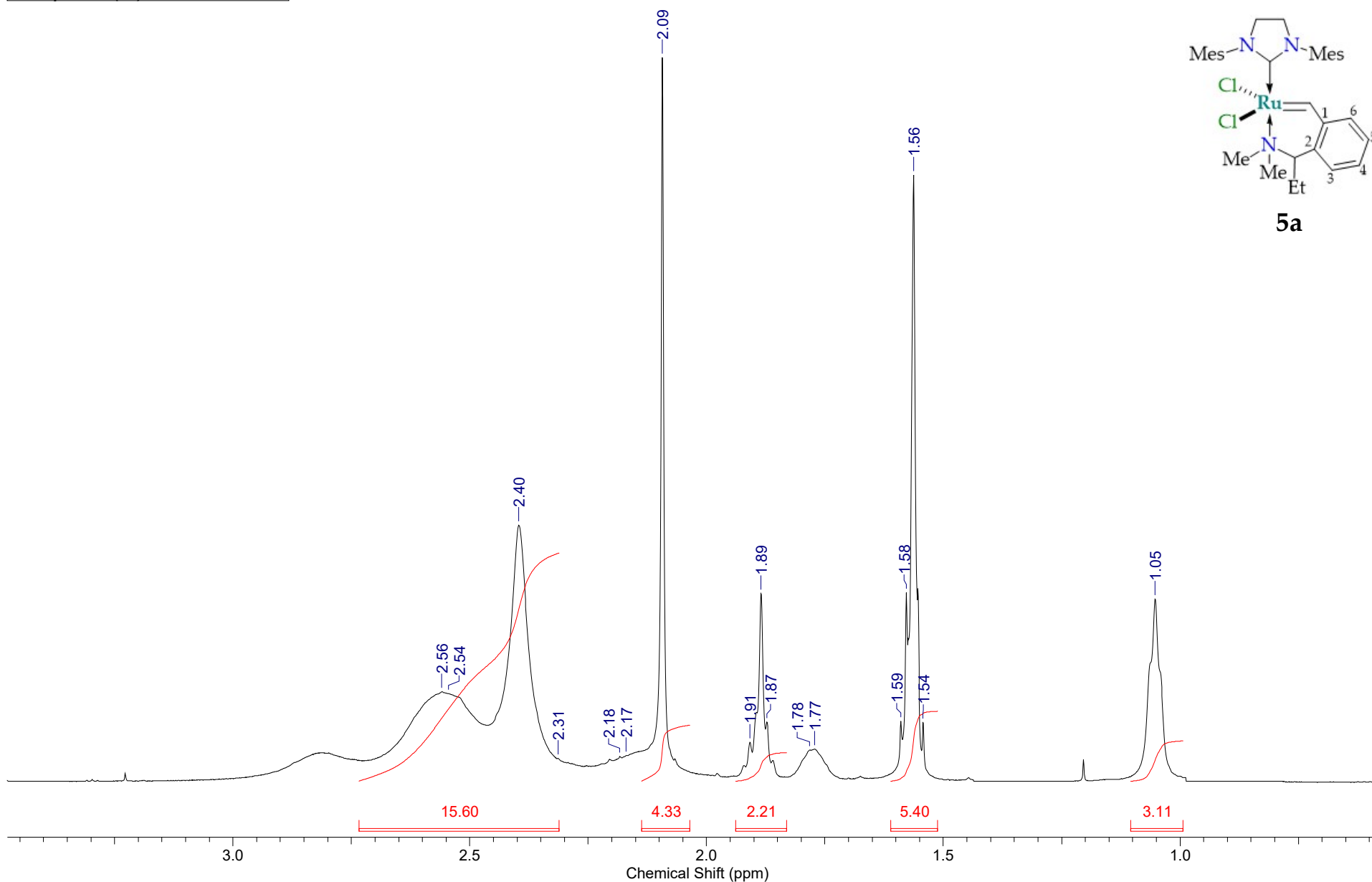


5a



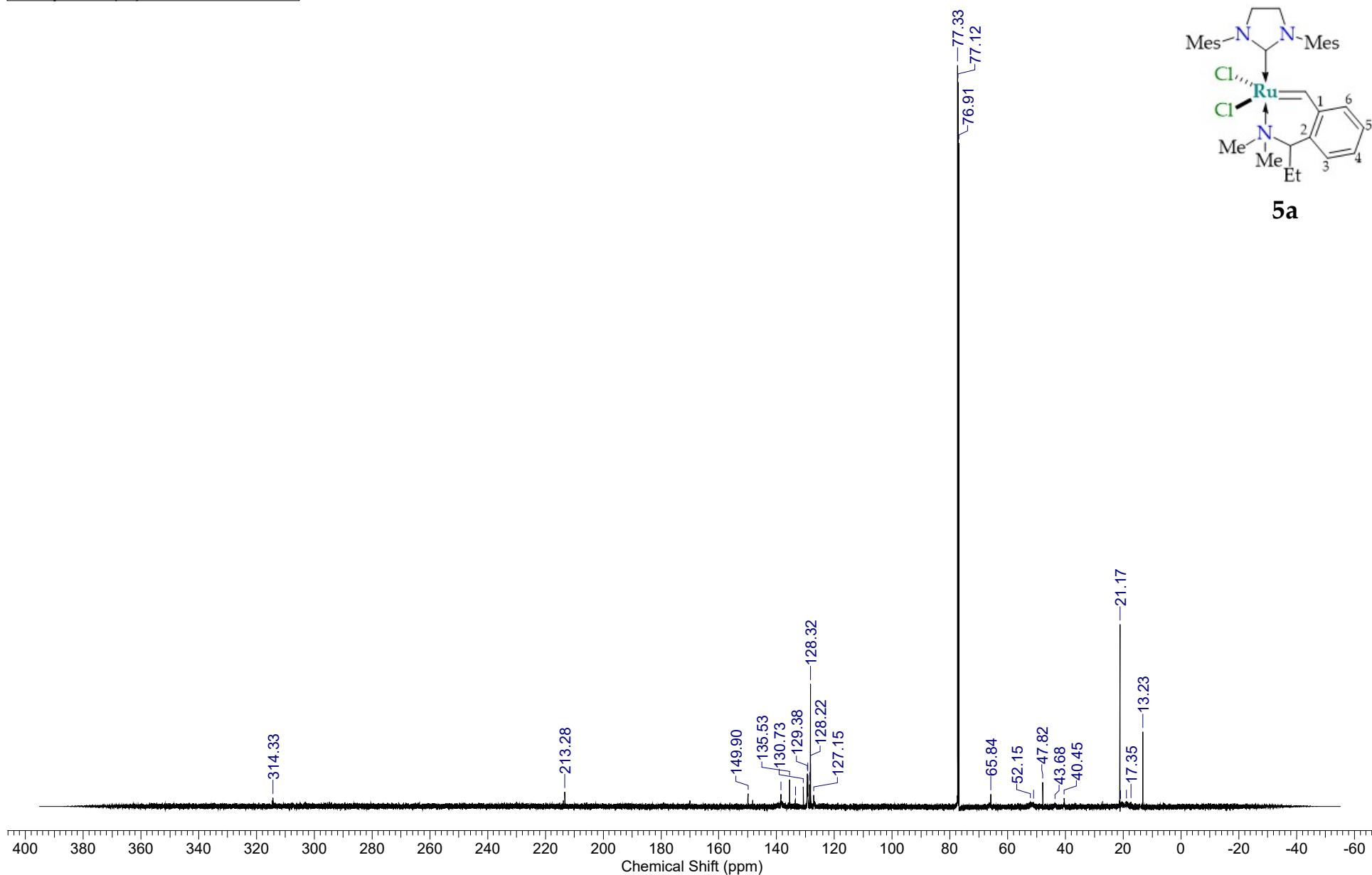
# <sup>1</sup>H spectrum of compound 5a

Acquisition Time (sec)	1.7459	Comment	single pulse	Date	23 Jan 2023 17:17:07
Date Stamp	23 Jan 2023 16:14:45	File Name			
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	16
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	38.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	18768.77			Spectrum Offset (Hz)	6614.0498



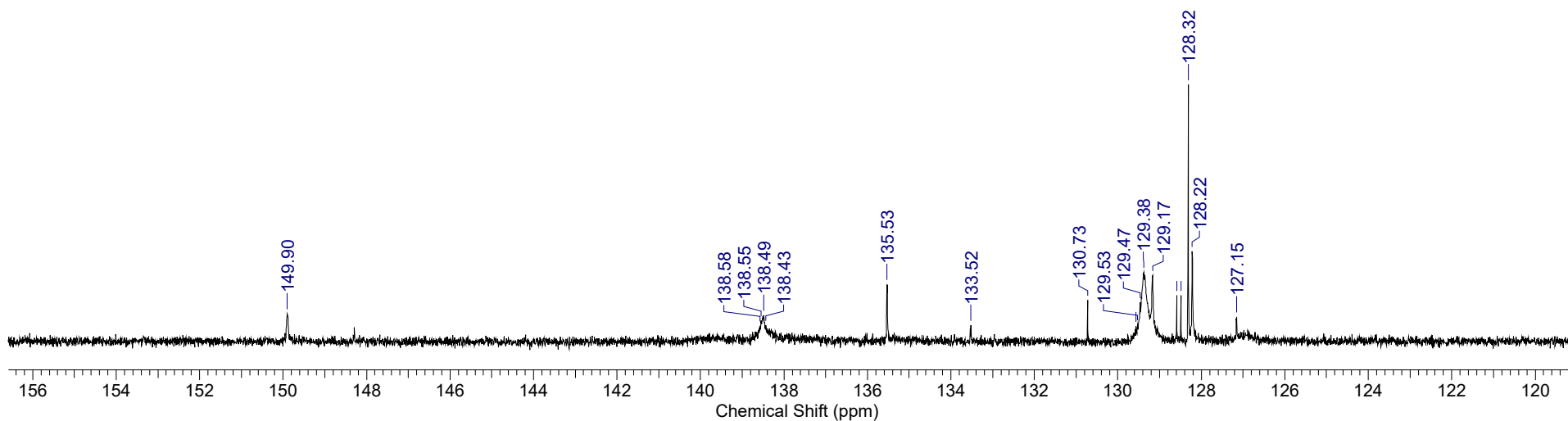
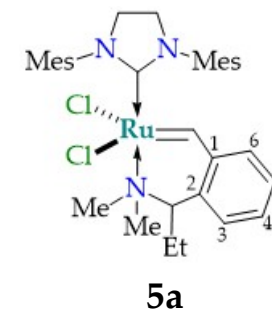
# $^{13}\text{C}$ spectrum of compound 5a

Acquisition Time (sec) 0.9647		Comment single pulse decoupled gated NOE		Date 24 Jan 2023 00:44:55	
Date Stamp 23 Jan 2023 17:54:48		File Name			
Frequency (MHz) 150.91		Nucleus 13C		Number of Transients 4000	
Original Points Count 65536		Owner CKP		Points Count 65536	
Receiver Gain 58.00		Solvent CHLOROFORM-d		Pulse Sequence single_pulse_dec	
Sweep Width (Hz) 67934.78		Spectrum Offset (Hz) 25655.2832			



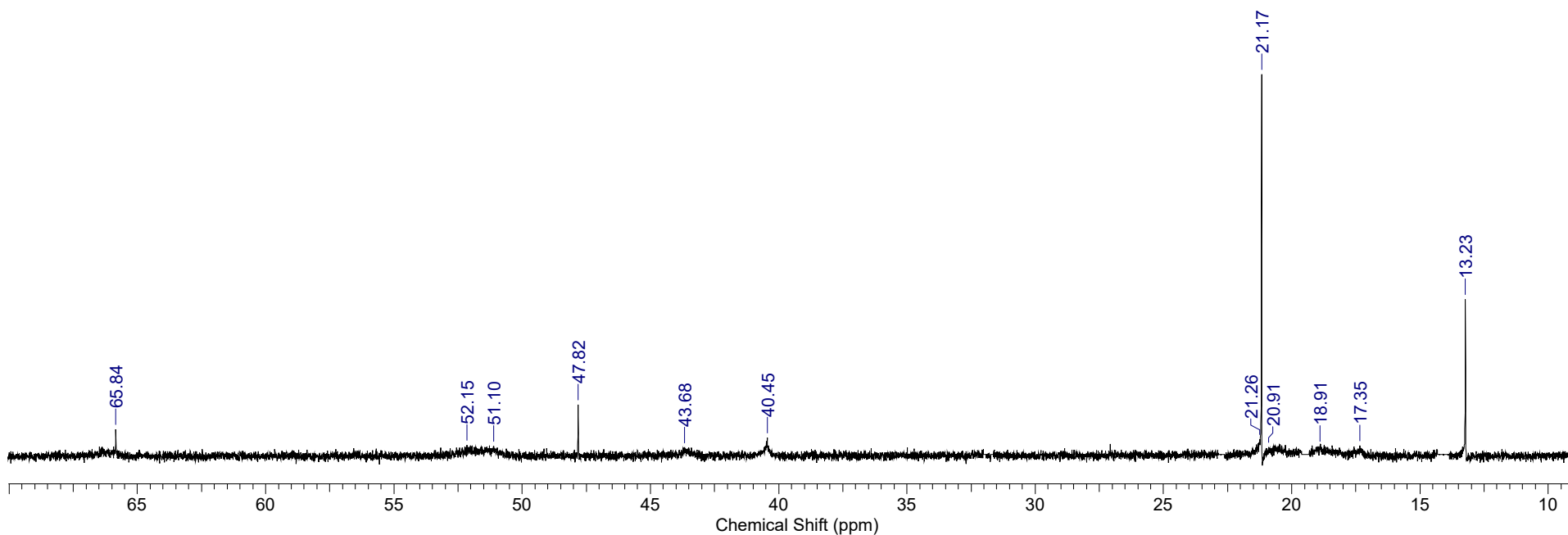
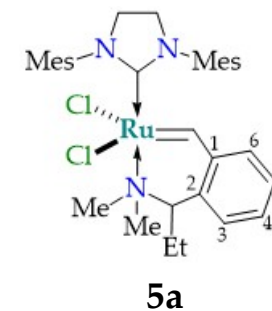
# $^{13}\text{C}$ spectrum of compound 5a

<b>Acquisition Time (sec)</b> 0.9647	<b>Comment</b> single pulse decoupled gated NOE	<b>Date</b> 24 Jan 2023 00:44:55
<b>Date Stamp</b> 23 Jan 2023 17:54:48	<b>File Name</b>	
<b>Frequency (MHz)</b> 150.91	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 4000
<b>Original Points Count</b> 65536	<b>Owner</b> CKP	<b>Points Count</b> 65536
<b>Receiver Gain</b> 58.00	<b>Solvent</b> CHLOROFORM-d	<b>Pulse Sequence</b> single pulse dec
<b>Sweep Width (Hz)</b> 67934.78		<b>Spectrum Offset (Hz)</b> 25655.2832

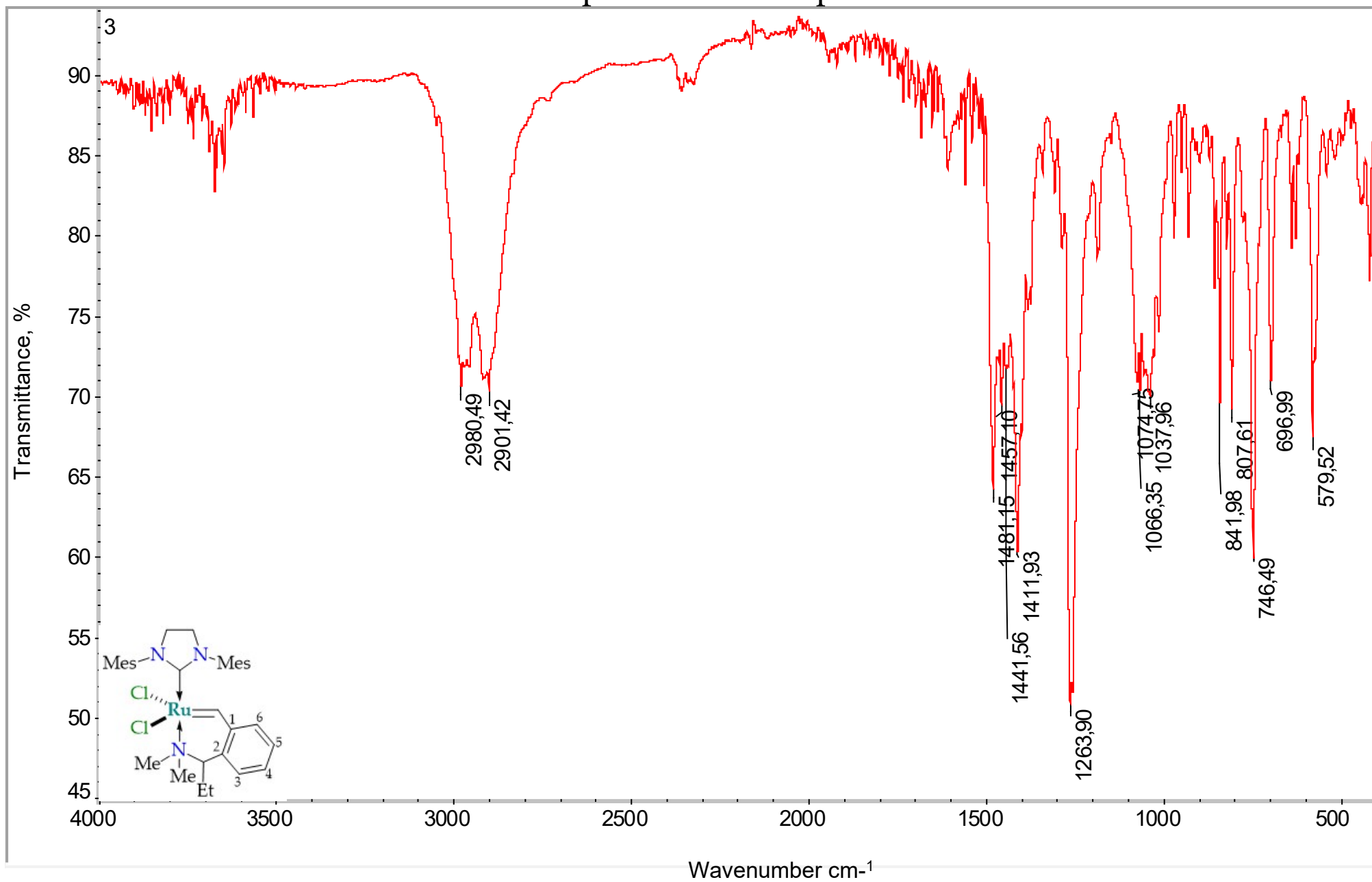


# $^{13}\text{C}$ spectrum of compound 5a

Acquisition Time (sec) 0.9647		Comment single pulse decoupled gated NOE		Date 24 Jan 2023 00:44:55	
Date Stamp 23 Jan 2023 17:54:48		File Name			
Frequency (MHz) 150.91		Nucleus 13C		Number of Transients 4000	
Original Points Count 65536		Owner CKP		Points Count 65536	
Receiver Gain 58.00		Solvent CHLOROFORM-d		Pulse Sequence single_pulse_dec	
Sweep Width (Hz) 67934.78		Spectrum Offset (Hz) 25655.2832			



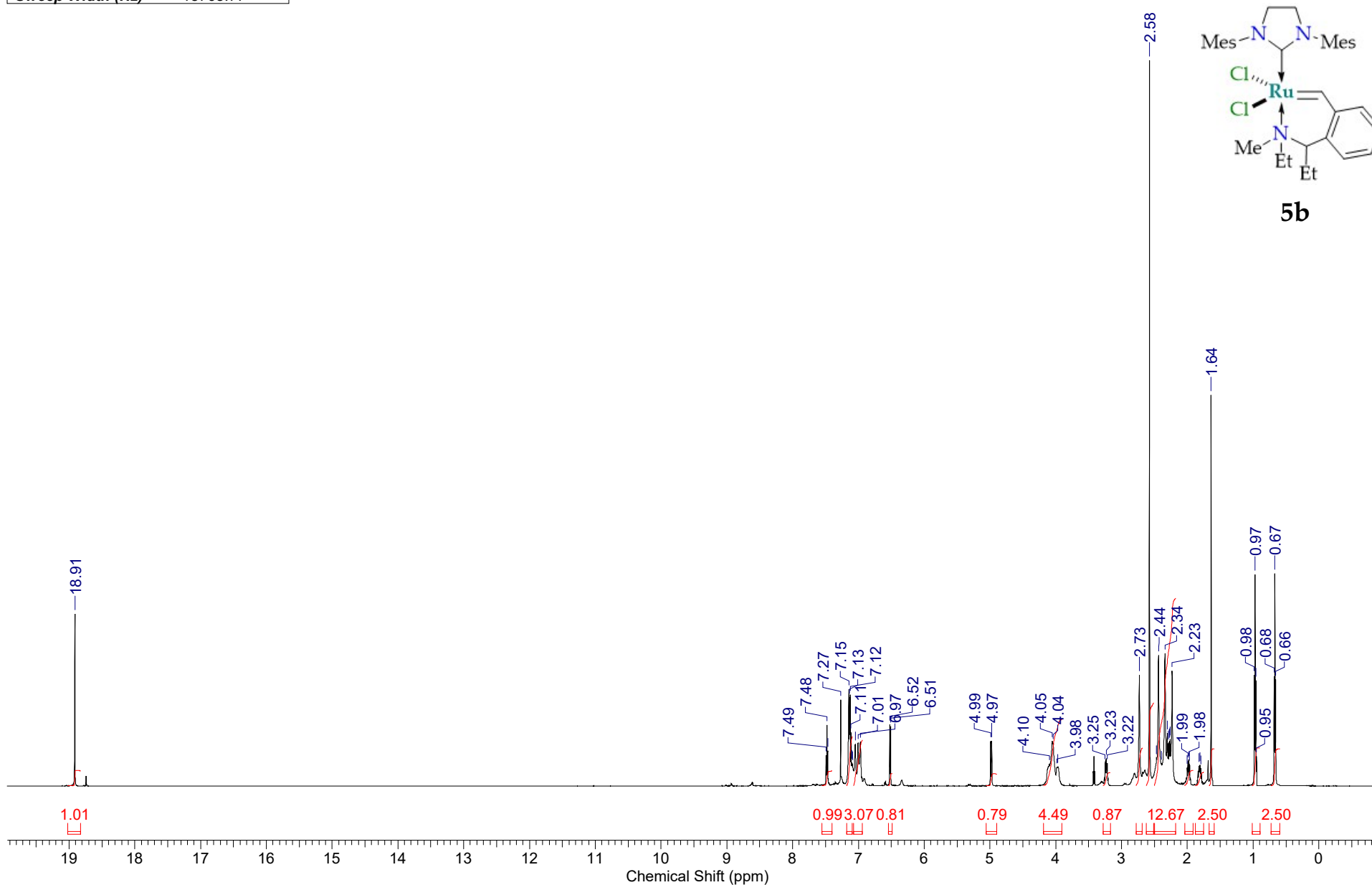
# IR spectrum of compound 5a





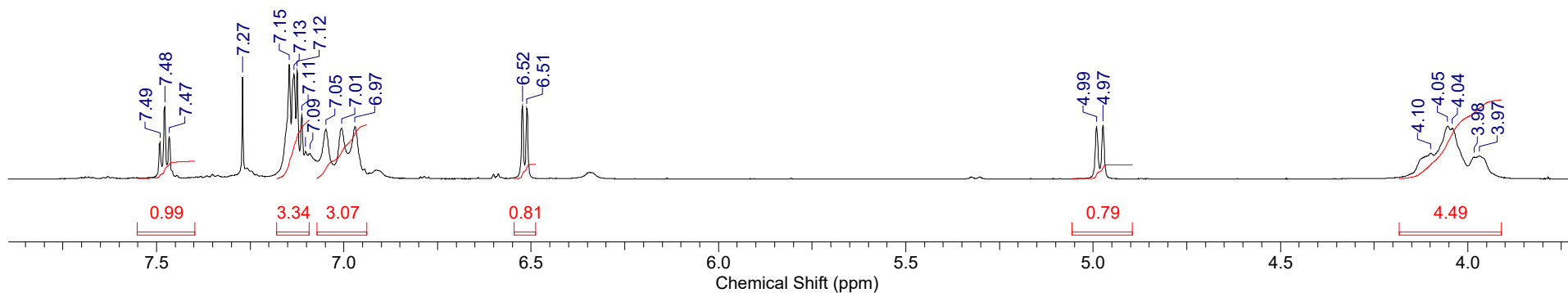
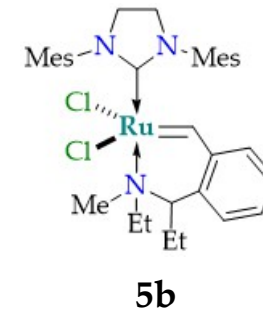
# $^1\text{H}$ spectrum of compound **5b**

Acquisition Time (sec)	1.7459	Comment	single pulse	Date	23 Jan 2023 11:57:29
Date Stamp	23 Jan 2023 10:55:06	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	16
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	34.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	18768.77			Spectrum Offset (Hz)	6614.6226



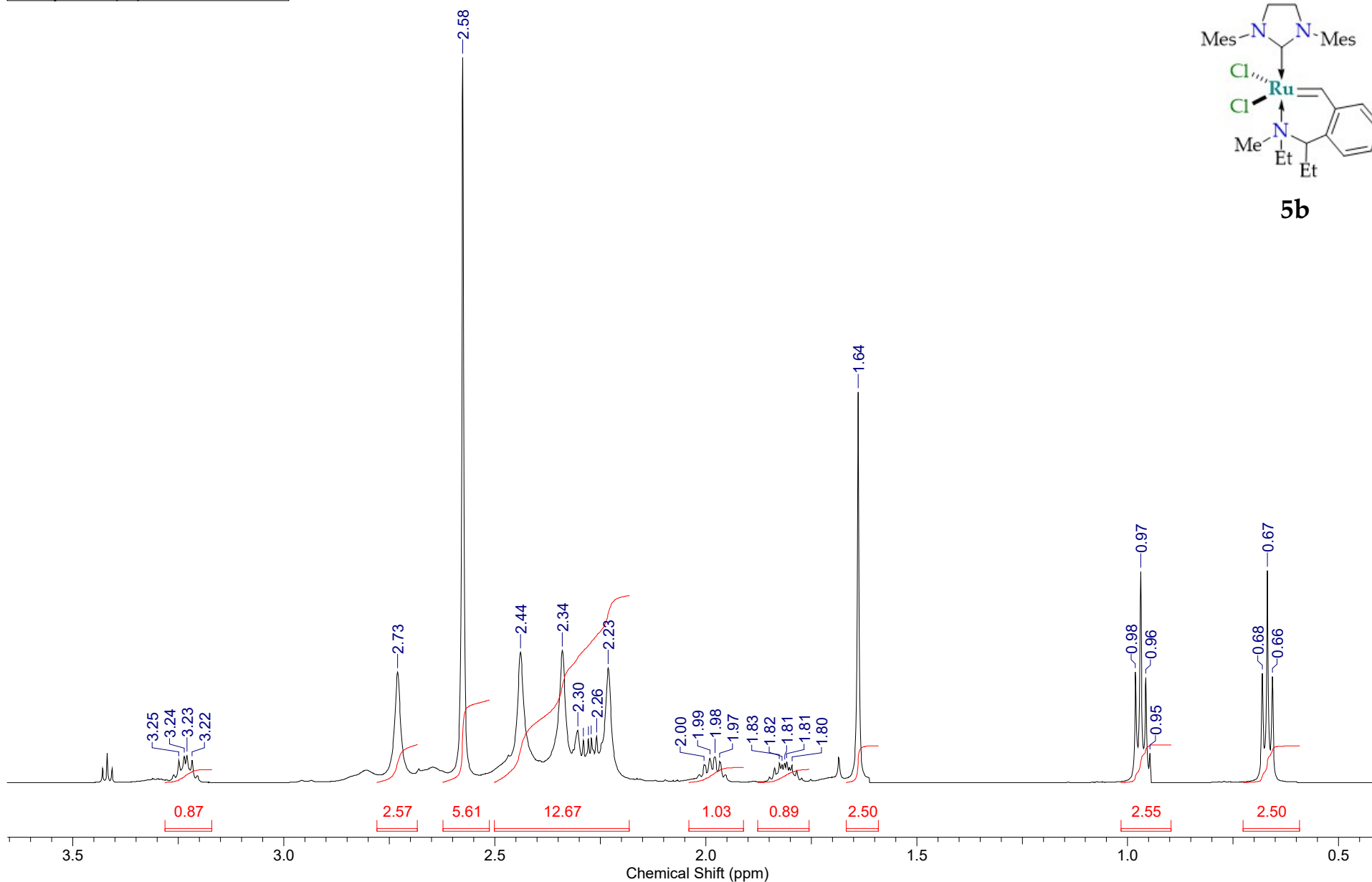
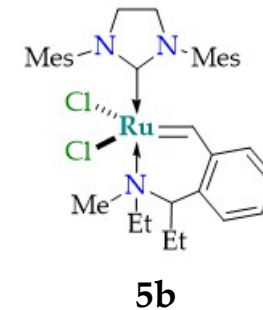
# $^1\text{H}$ spectrum of compound **5b**

Acquisition Time (sec)	1.7459	Comment	single pulse	Date	23 Jan 2023 11:57:29
Date Stamp	23 Jan 2023 10:55:06	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	16
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	34.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	18768.77			Spectrum Offset (Hz)	6614.6226



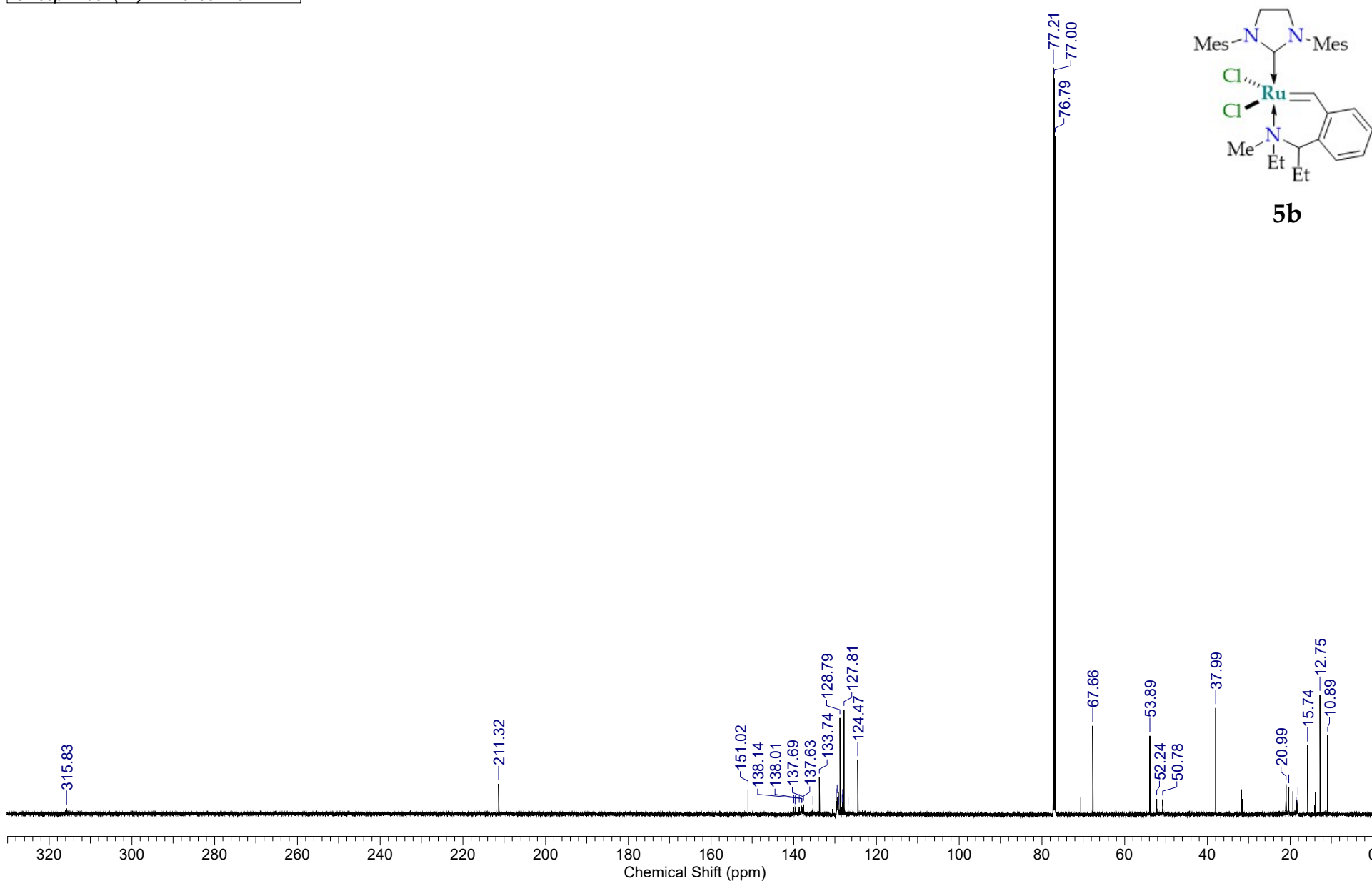
# $^1\text{H}$ spectrum of compound **5b**

Acquisition Time (sec)	1.7459	Comment	single pulse	Date	23 Jan 2023 11:57:29
Date Stamp	23 Jan 2023 10:55:06	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	16
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	34.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	18768.77			Spectrum Offset (Hz)	6614.6226



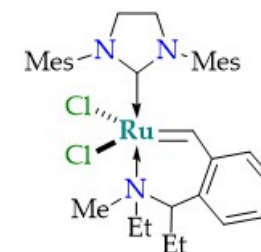
# $^{13}\text{C}$ spectrum of compound 5b

Acquisition Time (sec)	0.9647	Comment	single pulse decoupled gated NOE	Date	23 Jan 2023 13:37:35
Date Stamp	23 Jan 2023 12:35:13	File Name			
Frequency (MHz)	150.91	Nucleus	$^{13}\text{C}$	Number of Transients	4000
Original Points Count	65536	Owner	CKP	Points Count	65536
Receiver Gain	56.00	Solvent	CHLOROFORM-d	Pulse Sequence	single pulse dec
Sweep Width (Hz)	67934.78			Spectrum Offset (Hz)	25629.7129

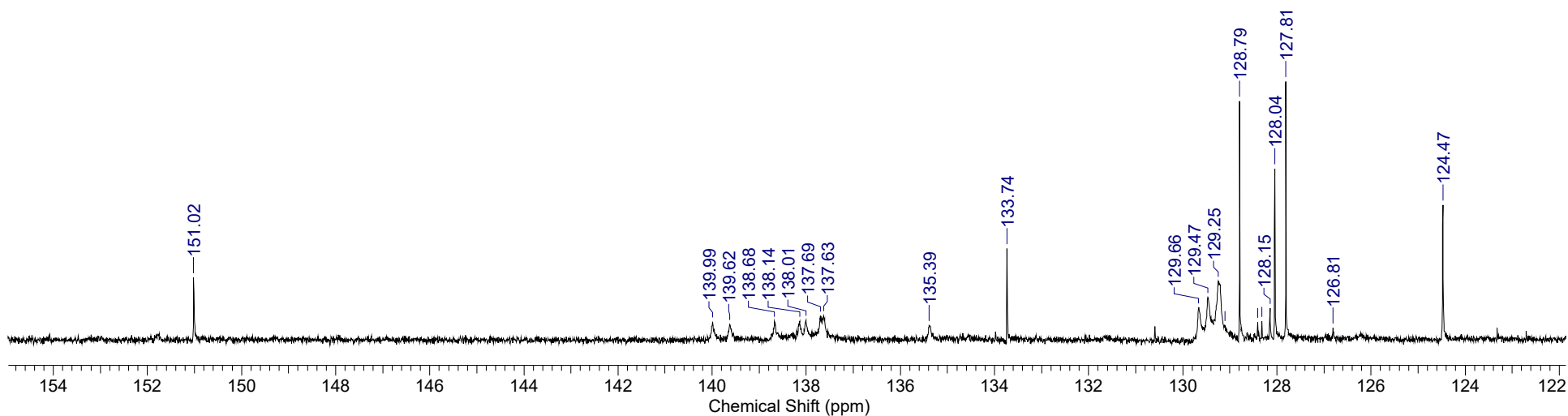


# $^{13}\text{C}$ spectrum of compound **5b**

<b>Acquisition Time (sec)</b> 0.9647	<b>Comment</b> single pulse decoupled gated NOE	<b>Date</b> 23 Jan 2023 13:37:35
<b>Date Stamp</b> 23 Jan 2023 12:35:13	<b>File Name</b>	
<b>Frequency (MHz)</b> 150.91	<b>Nucleus</b> $^{13}\text{C}$	<b>Number of Transients</b> 4000
<b>Original Points Count</b> 65536	<b>Owner</b> CKP	<b>Points Count</b> 65536
<b>Receiver Gain</b> 56.00	<b>Solvent</b> CHLOROFORM-d	<b>Pulse Sequence</b> single pulse dec
<b>Sweep Width (Hz)</b> 67934.78	<b>Spectrum Offset (Hz)</b> 25629.7129	



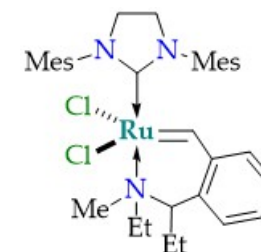
**5b**



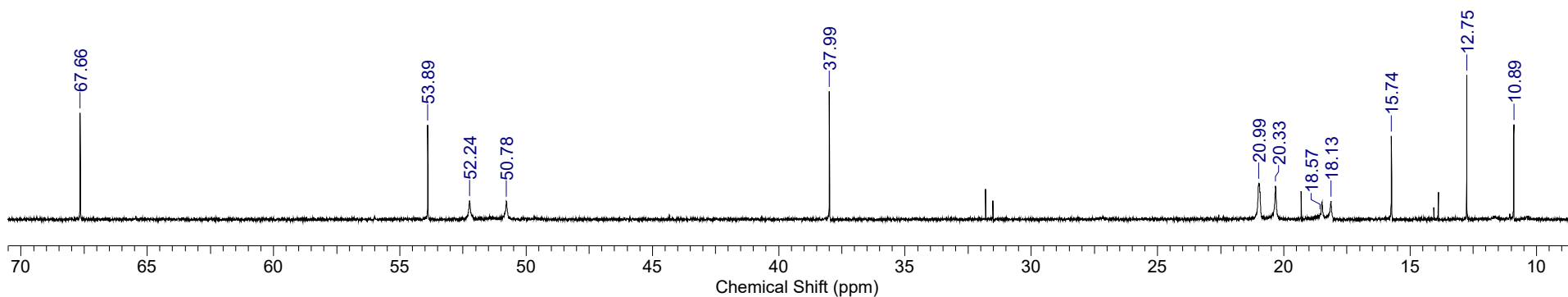
# $^{13}\text{C}$ spectrum of compound **5b**

<b>Acquisition Time (sec)</b> 0.9647		<b>Comment</b> single pulse decoupled gated NOE	<b>Date</b> 23 Jan 2023 13:37:35	
<b>Date Stamp</b> 23 Jan 2023 12:35:13		<b>File Name</b>		
<b>Frequency (MHz)</b> 150.91	<b>Nucleus</b> 13C	<b>Number of Transients</b> 4000	<b>Origin</b> ECA 600	
<b>Original Points Count</b> 65536	<b>Owner</b> CKP	<b>Points Count</b> 65536	<b>Pulse Sequence</b> single_pulse_dec	
<b>Receiver Gain</b> 56.00	<b>Solvent</b> CHLOROFORM-d	<b>Spectrum Offset (Hz)</b> 25629.7129		
<b>Sweep Width (Hz)</b> 67934.78				

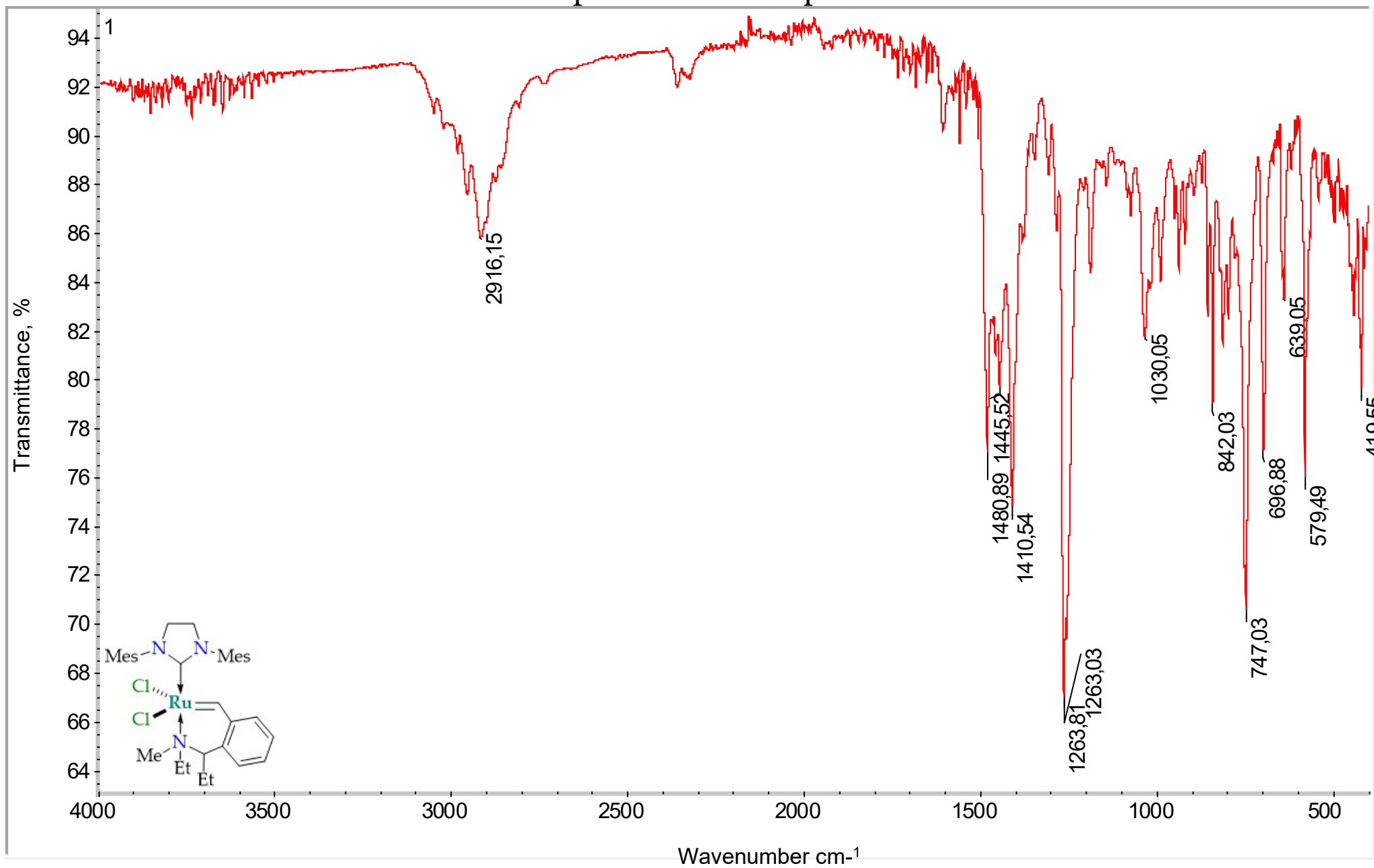
FZ1491-2.JDF



**5b**

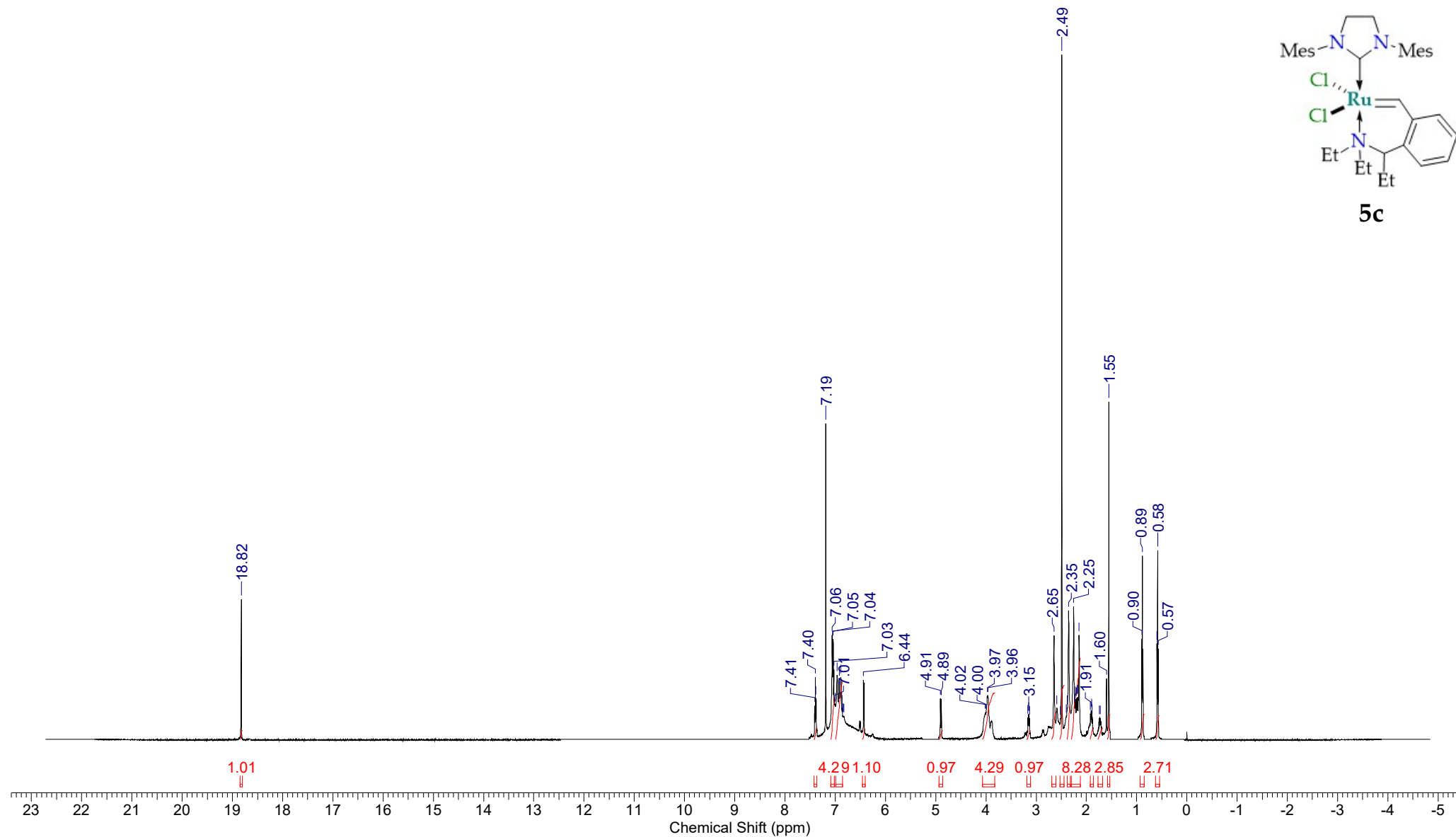


# IR spectrum of compound 5b



# $^1\text{H}$ spectrum of compound 5c

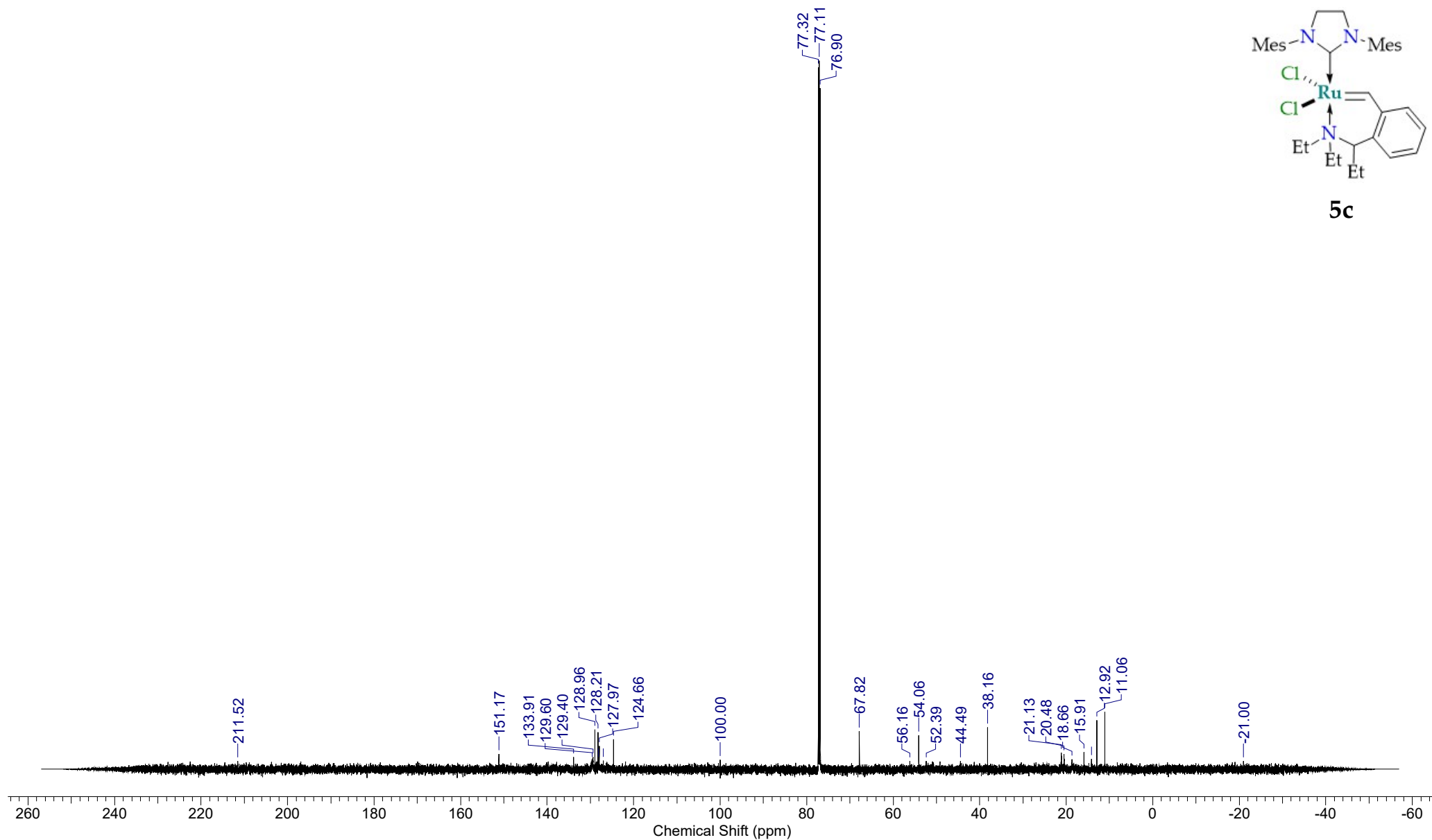
Acquisition Time (sec)	1.9818	Comment	single pulse	Date	
Date Stamp					
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	42.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	5364.2036
				Origin	ECA 600
				Pulse Sequence	single_pulse.ex2
				Sweep Width (Hz)	16534.39





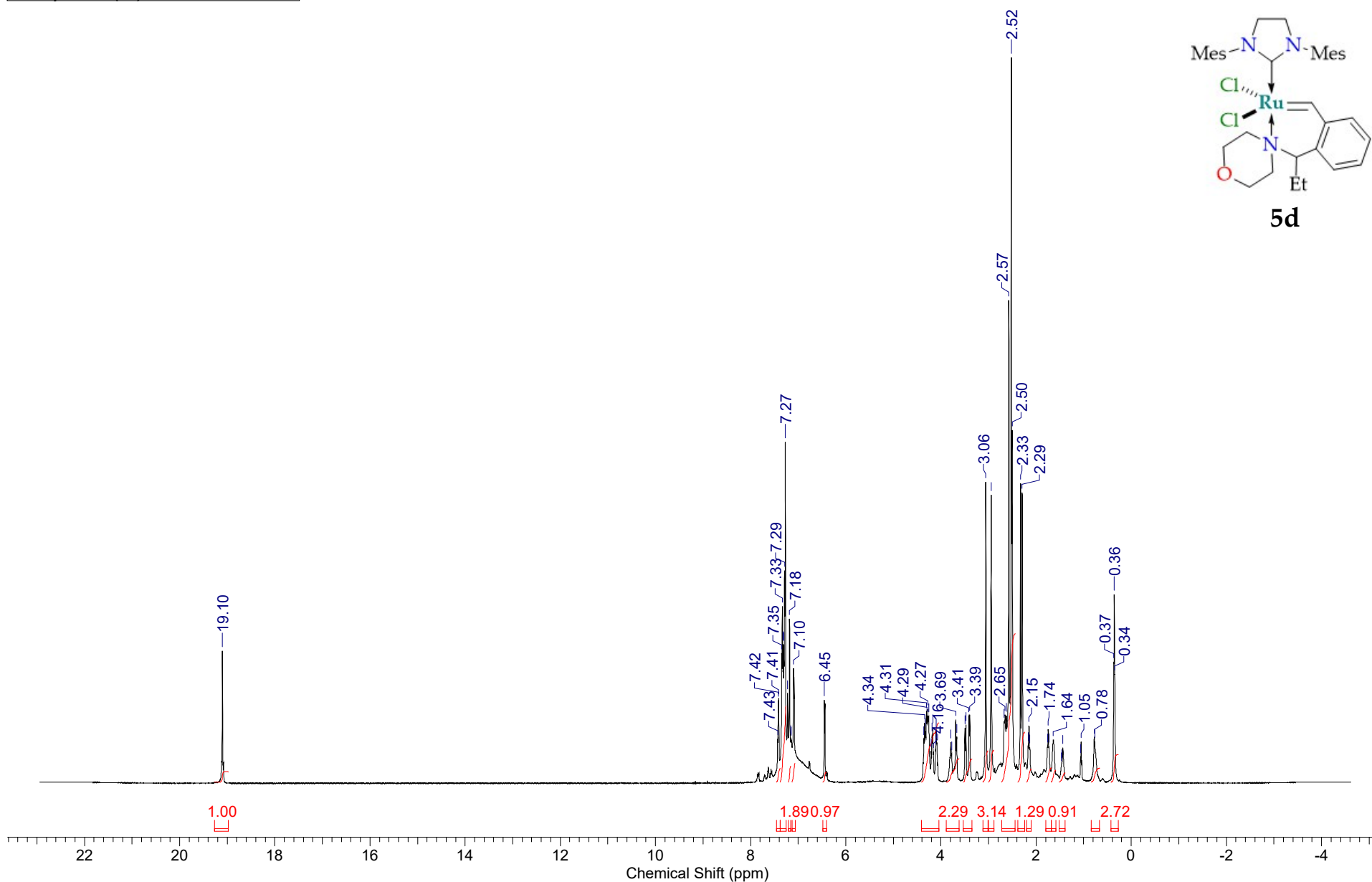
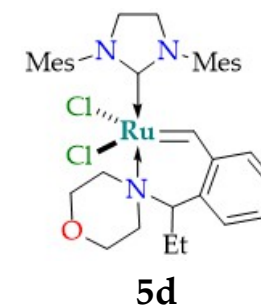
# $^{13}\text{C}$ spectrum of compound 5c

Acquisition Time (sec)	0.6921	Comment	single pulse decoupled gated NOE		Date		
Date Stamp							
Frequency (MHz)	150.91	Nucleus	13C	Number of Transients	1000	Origin	ECA 600
Original Points Count	32768	Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse_dec
Receiver Gain	54.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	15091.3428	Sweep Width (Hz)	47348.49



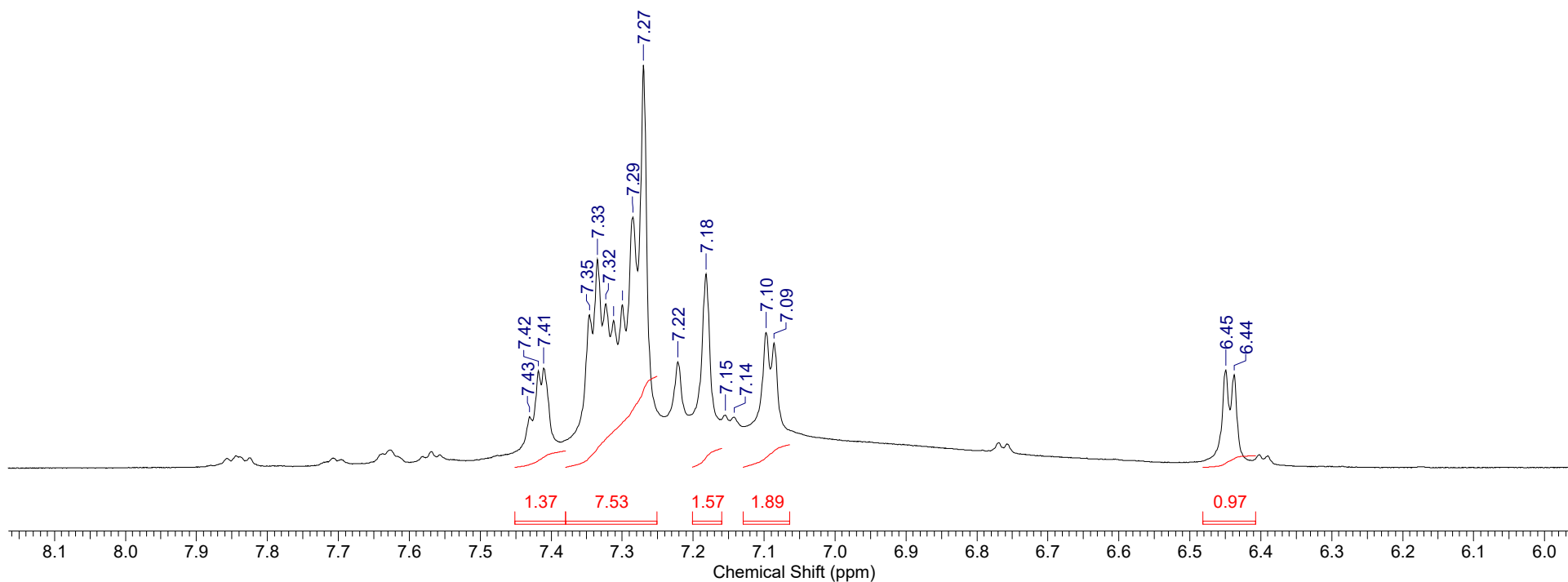
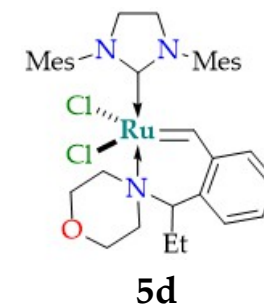
# <sup>1</sup>H spectrum of compound 5d

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	02 Nov 2022 13:18:46
Date Stamp	02 Nov 2022 12:18:25	File Name			
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	28.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5498.8667



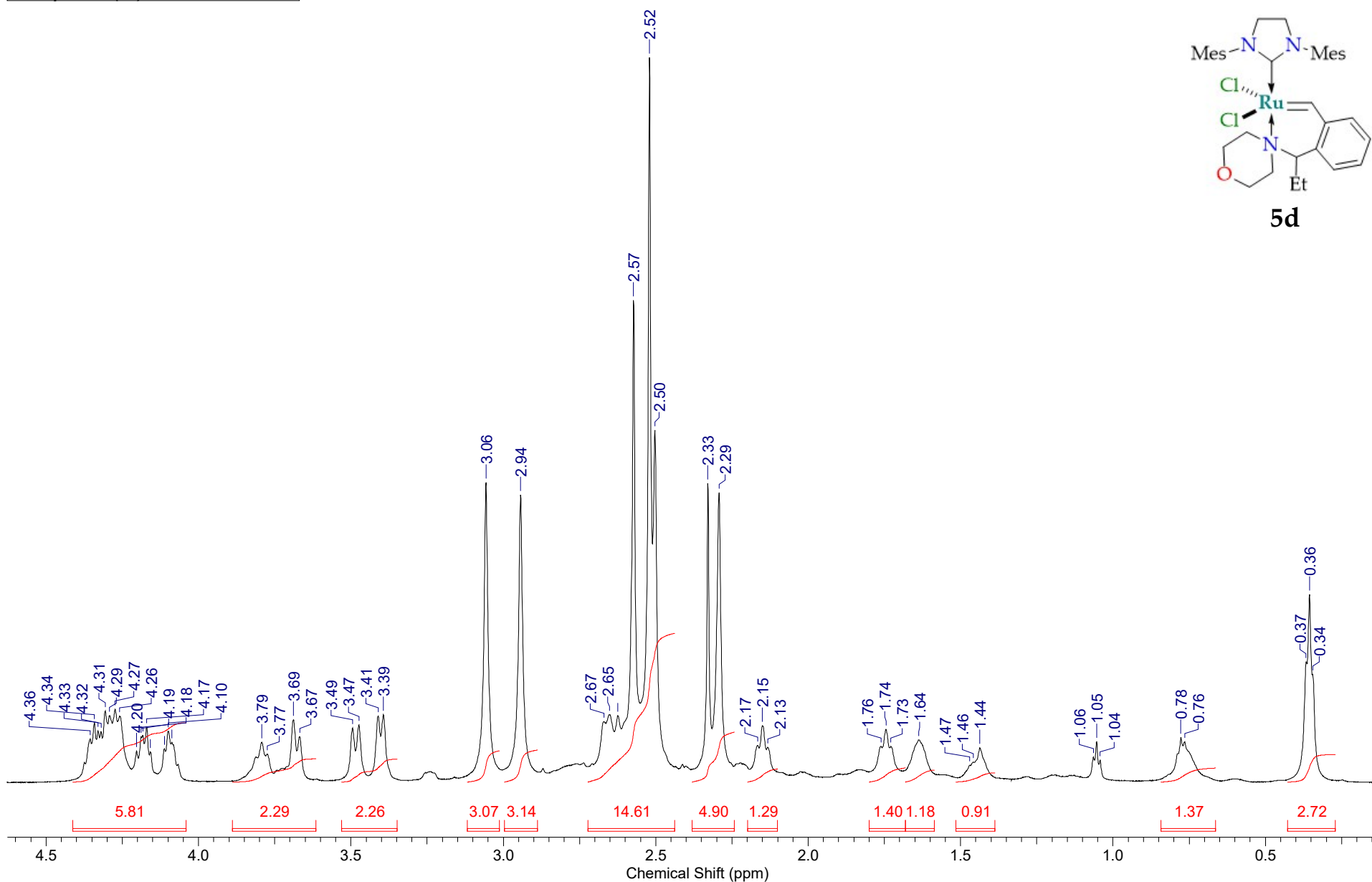
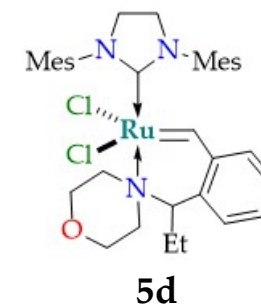
# <sup>1</sup>H spectrum of compound 5d

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	02 Nov 2022 13:18:46
Date Stamp	02 Nov 2022 12:18:25	File Name			
Frequency (MHz)	600.17	Nucleus	1H	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	28.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5498.8667



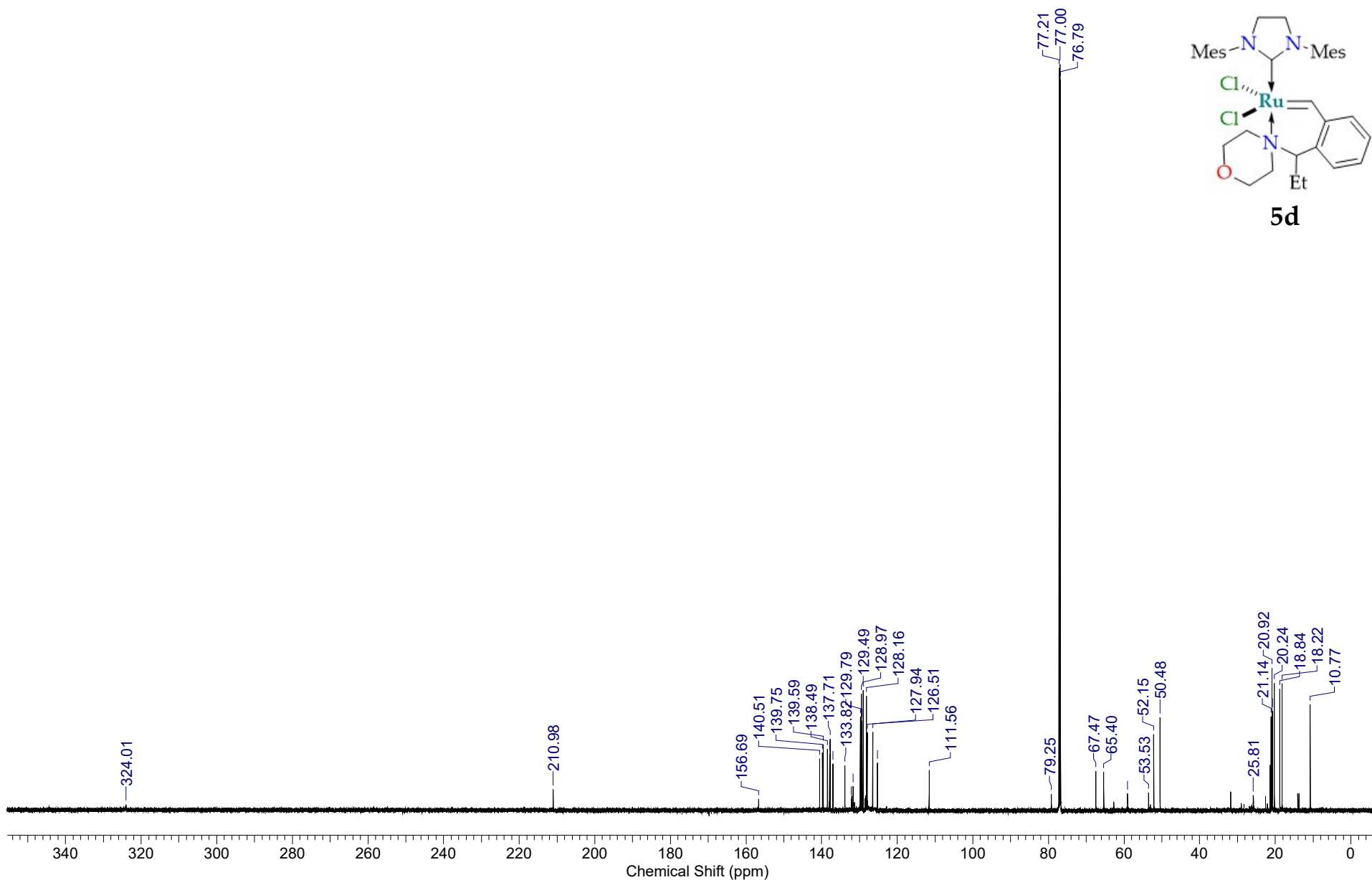
# $^1\text{H}$ spectrum of compound 5d

Acquisition Time (sec)	1.9818	Comment	single pulse	Date	02 Nov 2022 13:18:46
Date Stamp	02 Nov 2022 12:18:25	File Name			
Frequency (MHz)	600.17	Nucleus	$^1\text{H}$	Number of Transients	8
Original Points Count	32768	Owner	CKP	Points Count	32768
Receiver Gain	28.00	Solvent	CHLOROFORM-d	Pulse Sequence	single_pulse.ex2
Sweep Width (Hz)	16534.39			Spectrum Offset (Hz)	5498.8667



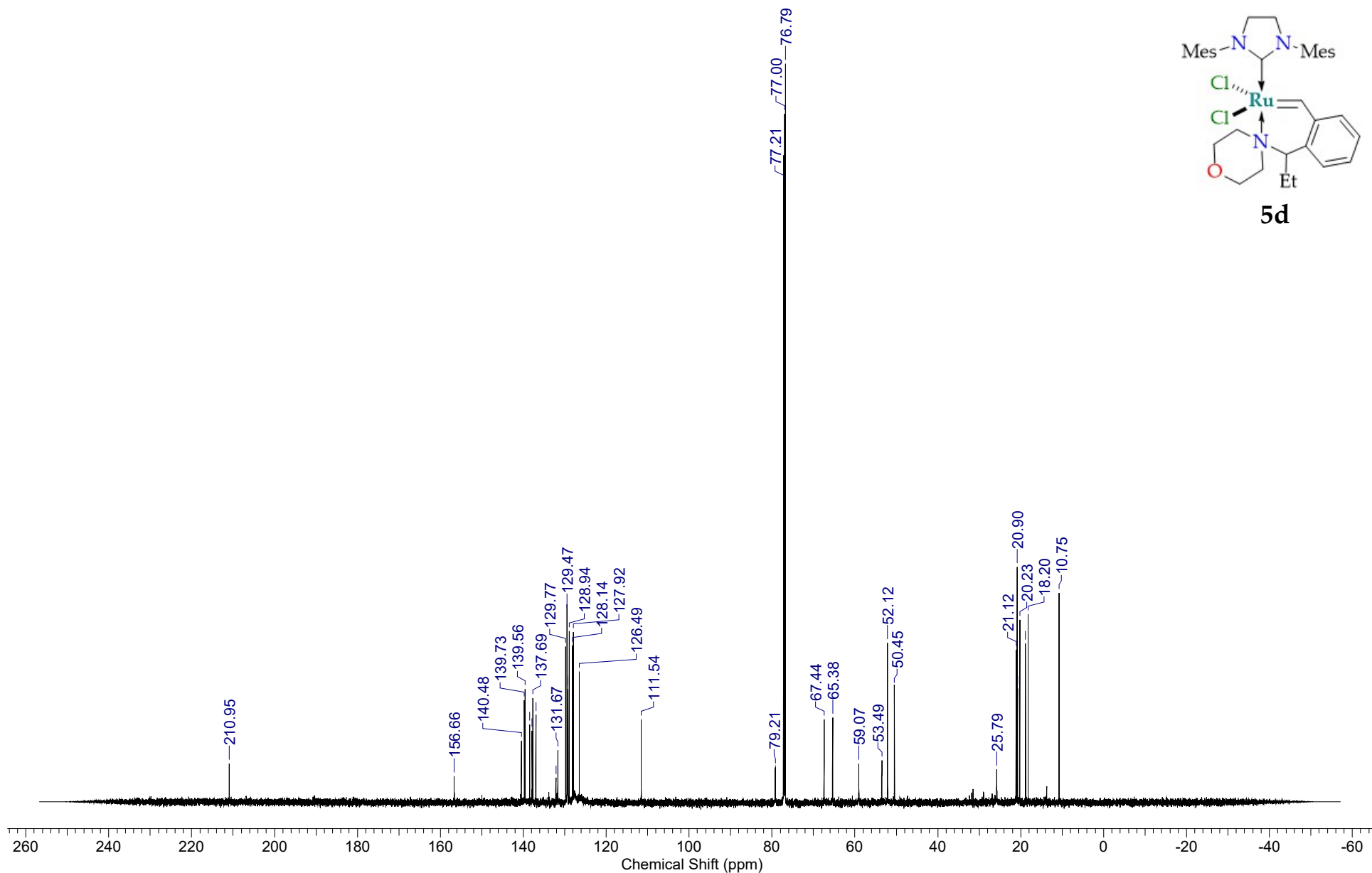
# $^{13}\text{C}$ spectrum of compound 5d

Acquisition Time (sec)	1.7197	Comment	single pulse decoupled gated NOE		Date	19 Jan 2023 04:22:34	
Date Stamp	19 Jan 2023 03:20:04			File Name			
Frequency (MHz)	150.91	Nucleus	13C	Number of Transients	4000	Origin	ECA 600
Original Points Count	131072	Owner	CKP	Points Count	131072	Pulse Sequence	single pulse dec
Receiver Gain	54.00	Solvent	CHLOROFORM-d		Spectrum Offset (Hz)	25630.4414	
Sweep Width (Hz)	76219.52						



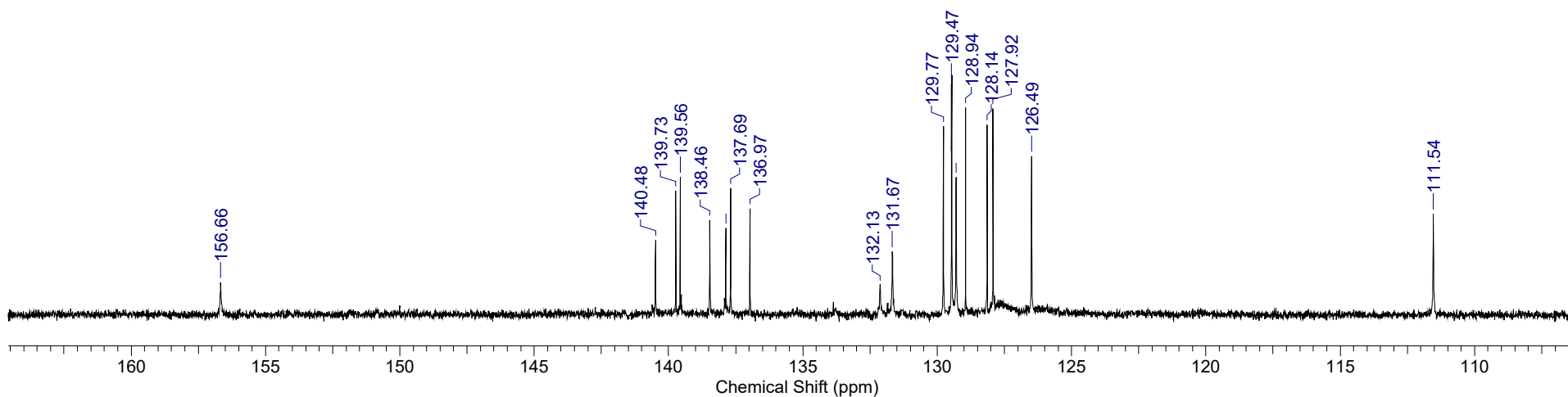
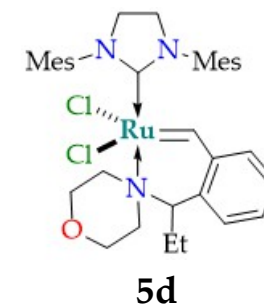
# $^{13}\text{C}$ spectrum of compound 5d

Acquisition Time (sec) 0.6921		Comment single pulse decoupled gated NOE		Date 02 Nov 2022 13:40:49	
Date Stamp 02 Nov 2022 12:40:28		File Name			
Frequency (MHz) 150.91		Nucleus 13C		Number of Transients 1000	
Original Points Count 32768		Owner CKP		Points Count 32768	
Receiver Gain 58.00		Solvent CHLOROFORM-d		Pulse Sequence single_pulse_dec	
Sweep Width (Hz) 47348.49		Spectrum Offset (Hz) 15061.6152			



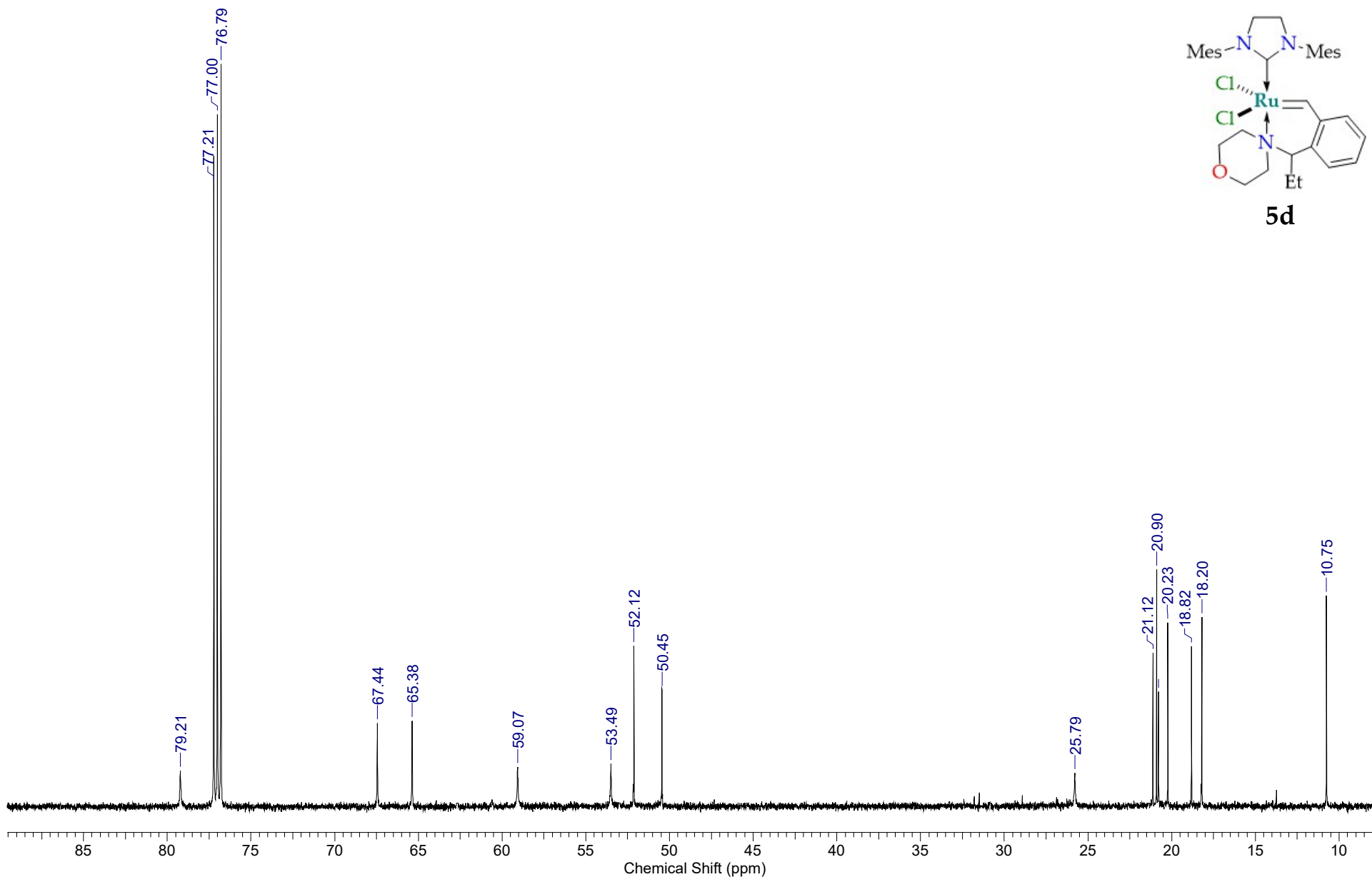
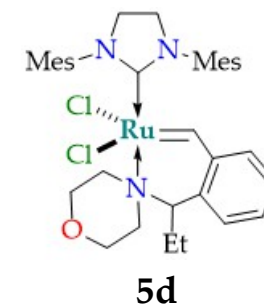
# $^{13}\text{C}$ spectrum of compound 5d

Acquisition Time (sec) 0.6921		Comment single pulse decoupled gated NOE		Date 02 Nov 2022 13:40:49	
Date Stamp 02 Nov 2022 12:40:28		File Name			
Frequency (MHz) 150.91		Nucleus 13C		Number of Transients 1000	
Original Points Count 32768		Owner CKP		Points Count 32768	
Receiver Gain 58.00		Solvent CHLOROFORM-d		Pulse Sequence single_pulse_dec	
Sweep Width (Hz) 47348.49		Spectrum Offset (Hz) 15061.6152			



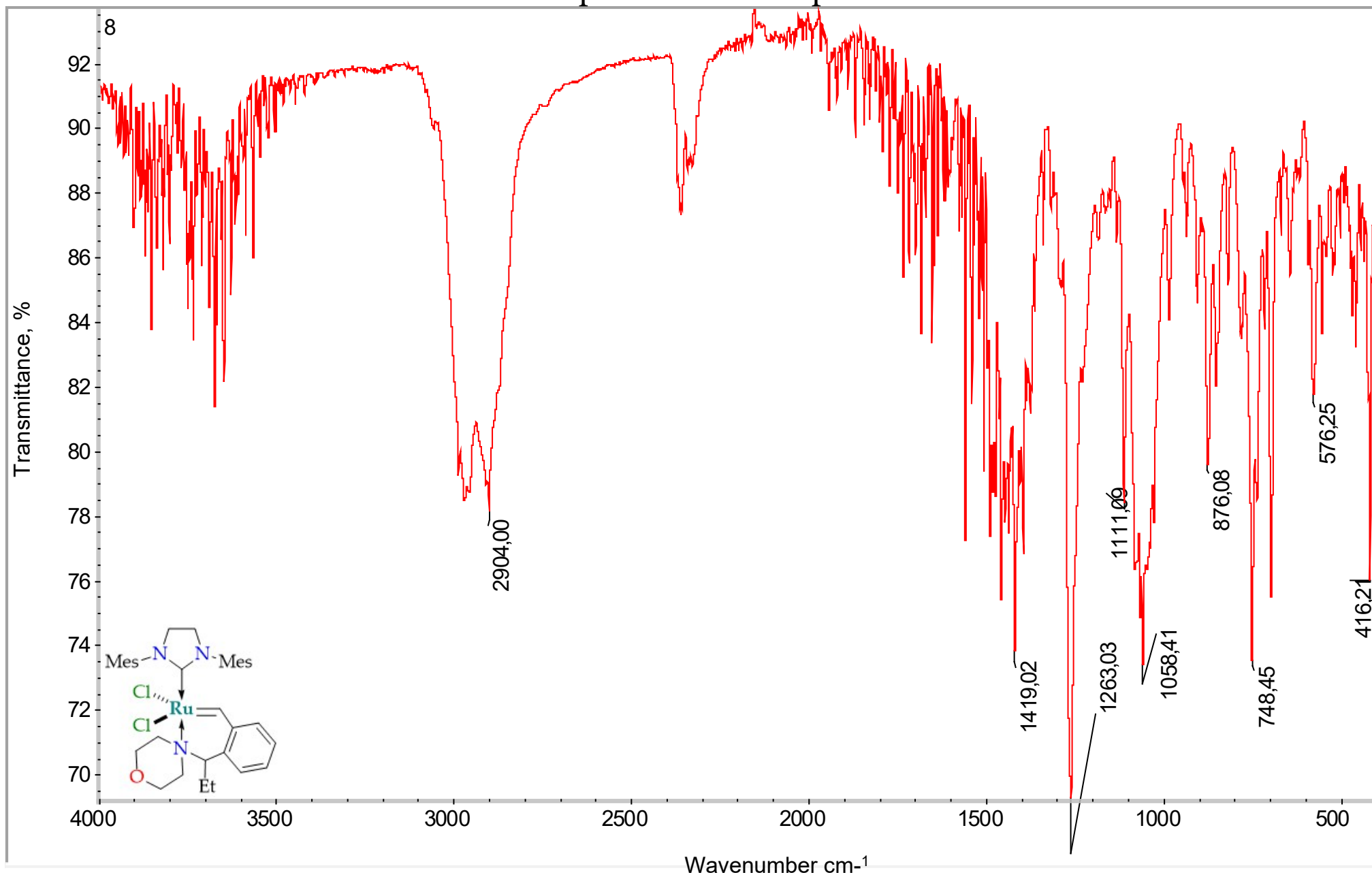
# $^{13}\text{C}$ spectrum of compound 5d

Acquisition Time (sec) 0.6921		Comment	single pulse decoupled gated NOE		Date	02 Nov 2022 13:40:49	
Date Stamp 02 Nov 2022 12:40:28				File Name			
Frequency (MHz)	150.91	Nucleus	13C	Number of Transients	1000	Origin	ECA 600
Original Points Count	32768	Owner	CKP	Points Count	32768	Pulse Sequence	single_pulse_dec
Receiver Gain	58.00	Solvent	CHLOROFORM-d		Spectrum Offset (Hz) 15061.6152		
Sweep Width (Hz)	47348.49						





# IR spectrum of compound 5d



# MALDI-ToF MS of compound 5d

## Display Report

### Analysis Info

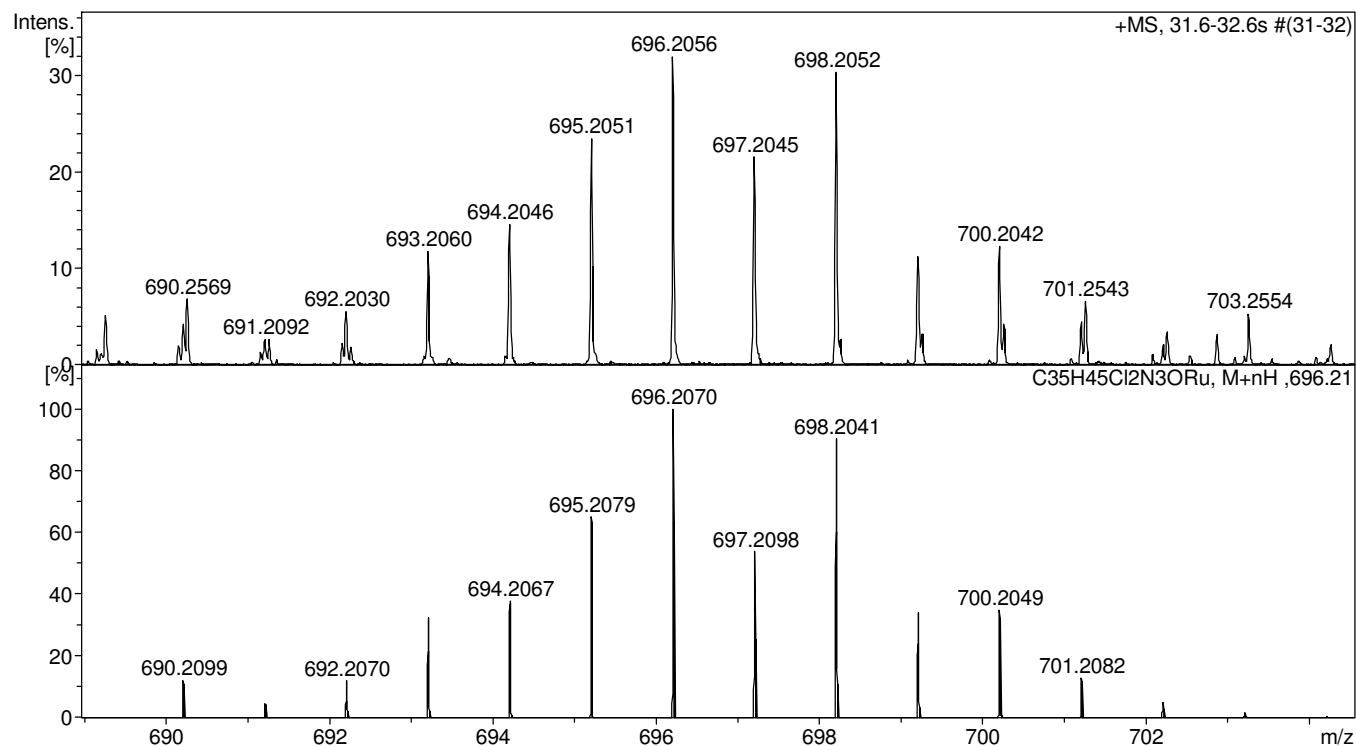
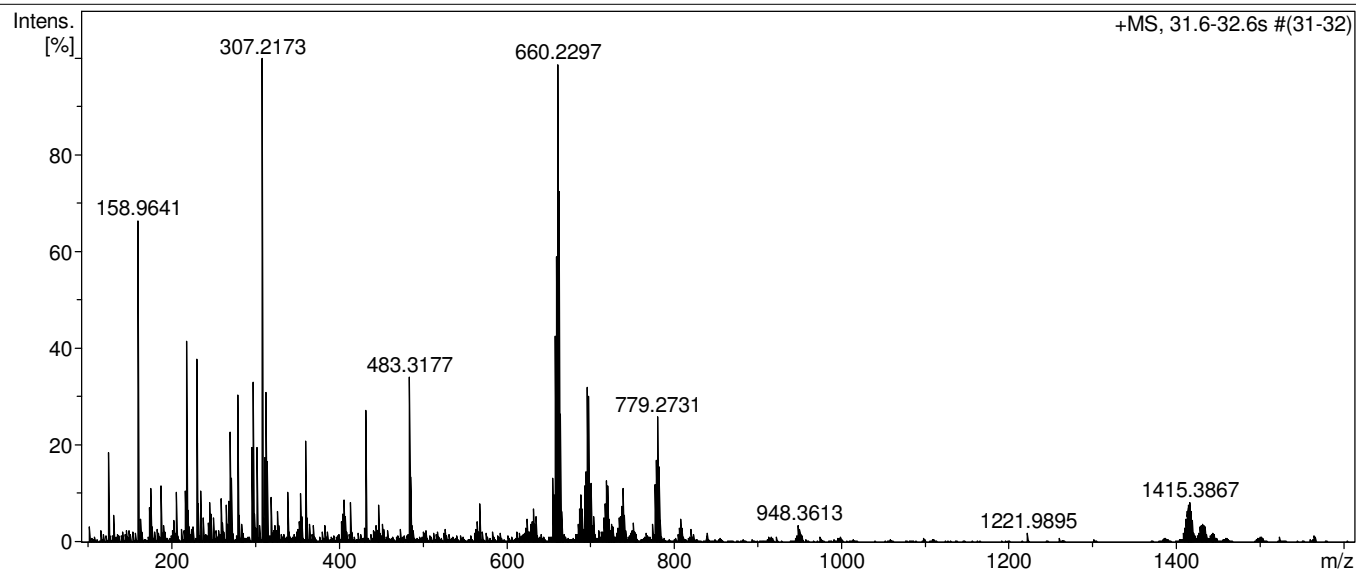
Analysis Name D:\Data\Surzhikova\MVGA-5d.d  
Method tune\_100-1200.m  
Sample Name  
Comment

Acquisition Date 12.01.2023 13:30:04

Operator BDAL@DE  
Instrument / Ser# maXis 43

### Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	1.0 Bar
Focus	Active			Set Dry Heater	200 °C
Scan Begin	50 m/z	Set Capillary	4500 V	Set Dry Gas	4.0 l/min
Scan End	1800 m/z	Set End Plate Offset	-500 V	Set Divert Valve	Waste



# MALDI-ToF MS of compound 5d

## Display Report

### Analysis Info

Analysis Name D:\Data\Surzhikova\MVGA-5d.d  
Method tune\_100-1200.m  
Sample Name  
Comment

Acquisition Date 12.01.2023 13:30:04

Operator BDAL@DE  
Instrument / Ser# maXis 43

### Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Nebulizer	1.0 Bar
Focus	Active			Set Dry Heater	200 °C
Scan Begin	50 m/z	Set Capillary	4500 V	Set Dry Gas	4.0 l/min
Scan End	1800 m/z	Set End Plate Offset	-500 V	Set Divert Valve	Waste

