

Synthesis of 3-Acyltetramates by Side Chain Manipulation and their Antibacterial Activity

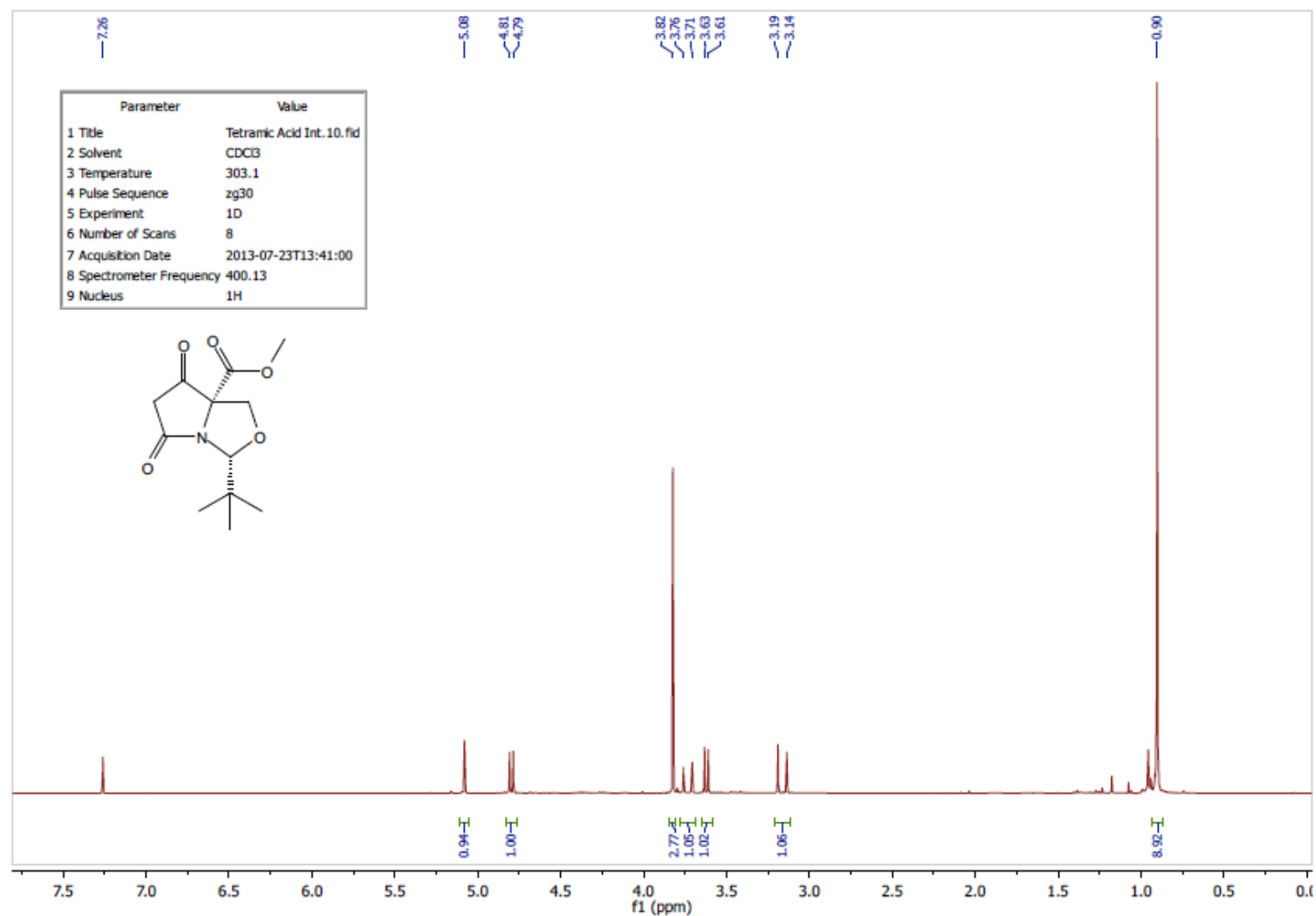
Song Wei Benjamin Tan^{a,b}, Christina L.L. Chai^{b,c*} and Mark G. Moloney^{a*}.

^aThe Department of Chemistry, Chemistry Research Laboratory, The University of Oxford, 12 Mansfield Road, Oxford. OX1 3TA.

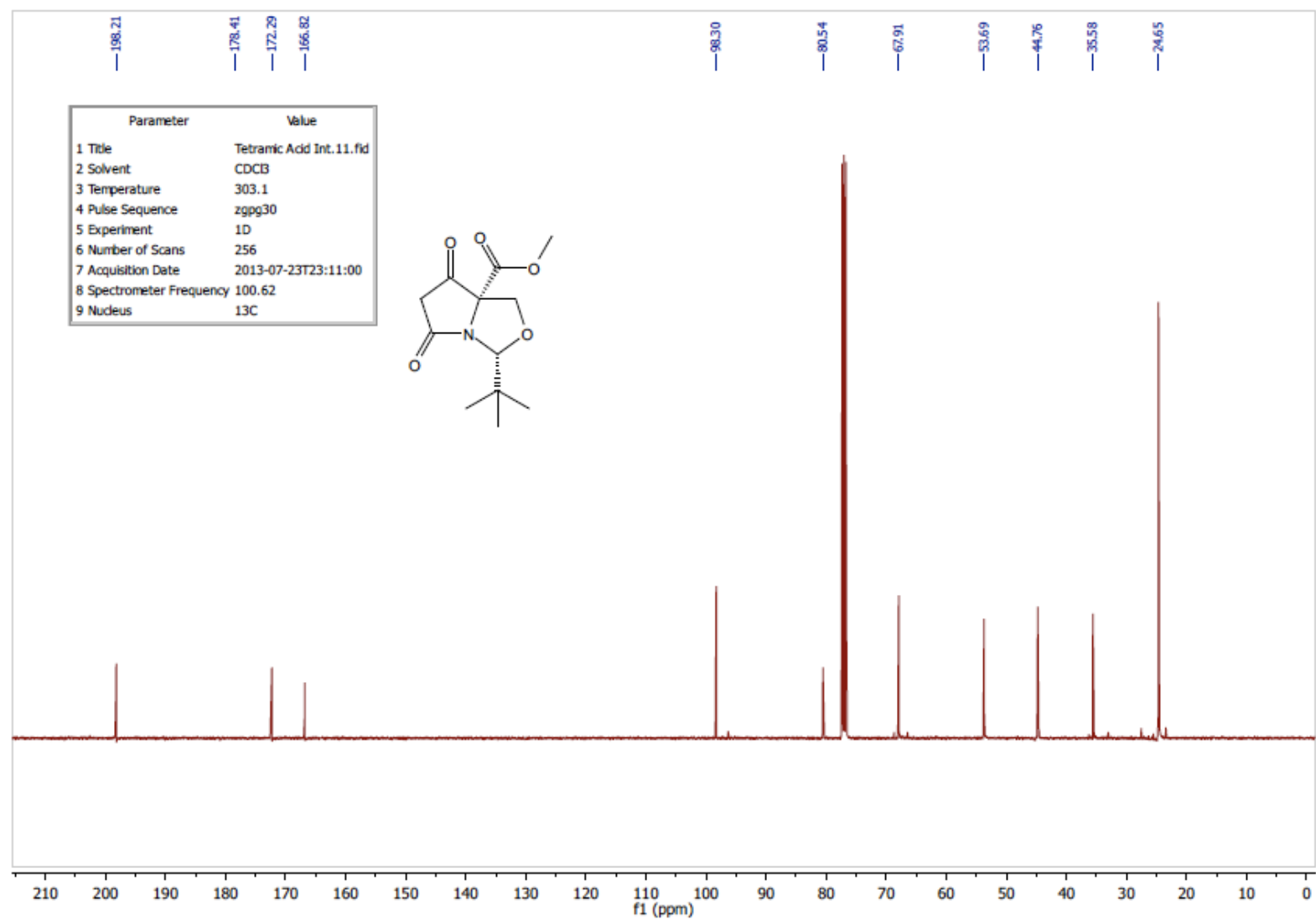
^bInstitute of Chemical and Engineering Sciences (ICES), 8 Biomedical Grove, Neuros Building, #07-01/02/03, Singapore 138665;

^cDepartment of Pharmacy, National University of Singapore, 18 Science Drive 4, Singapore, 117543

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3

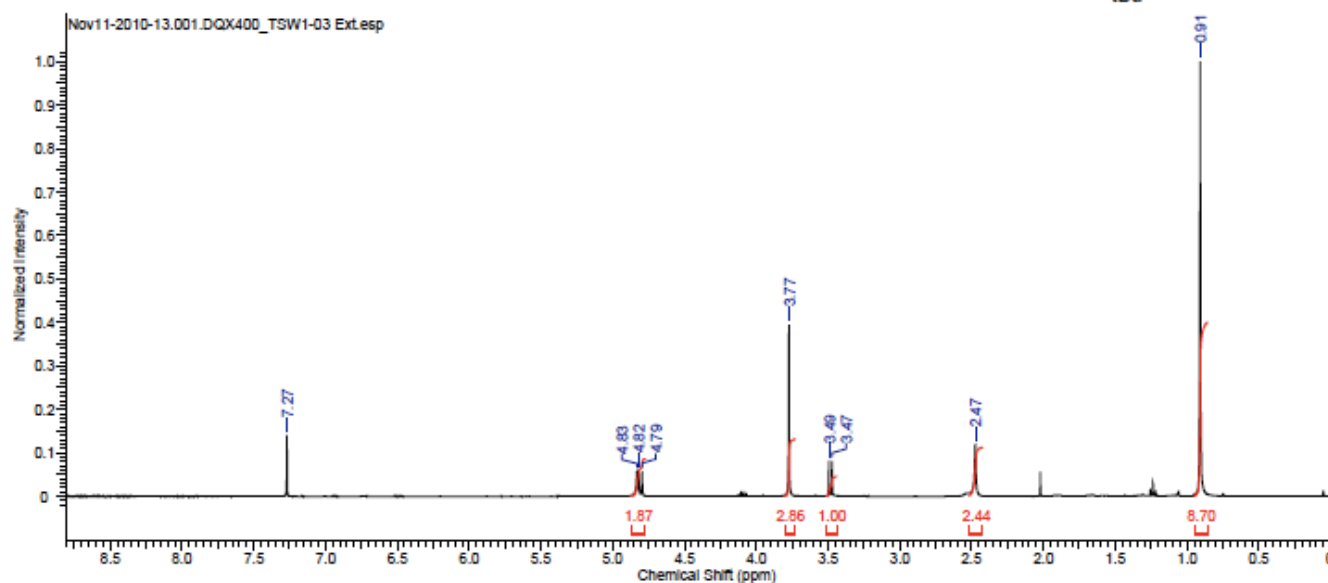
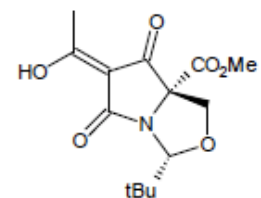


5a

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20/7/2013 12:12:24 PM

Formula	C ₁₈ H ₂₀ NO ₄	FW	240.1895
Acquisition Time (sec)	3.9584	Comment	Instrument DQX400 Chemist TSW Group MGM TSW1-013 Ext 1H h1acq.au CDCl ₃ (C:\NMR) mgmgrp 13
Date	12 Nov 2010 11:14:08	Date Stamp	12 Nov 2010 11:14:08
File Name	C:\Documents and Settings\mgmgrp\CHEM\Desktop\Nov11-2010-13\1\pdata\1\1r	Frequency (MHz)	400.20
Nucleus	¹ H	Number of Transients	16
Owner	dp-nmrgrp	Points Count	32768
SW (cyclical) (Hz)	8278.15	Pulse Sequence	zgpg30
Sweep Width (Hz)	8277.89	Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	2468.5974
		Spectrum Type	STANDARD
		Temperature (degree C)	27.000

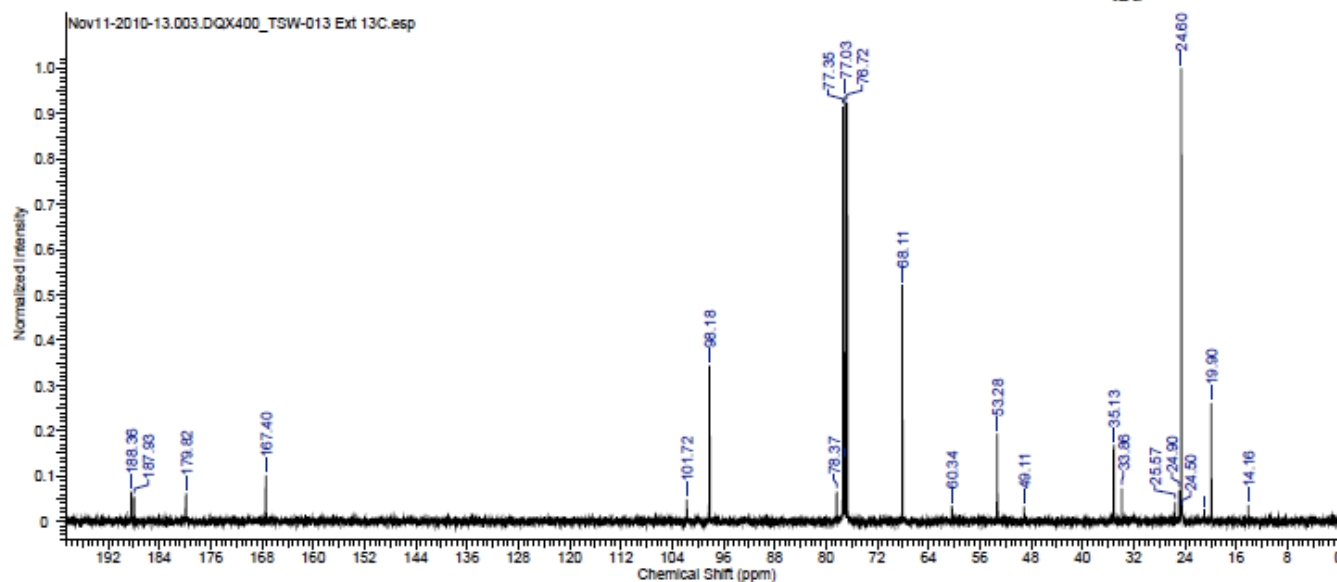
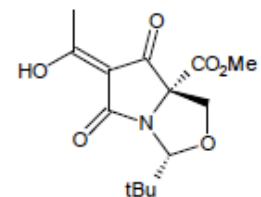


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20/7/2013 12:13:07 PM

Formula	C ₁₈ H ₂₀ NO ₄	FW	240.189547
Acquisition Time (sec)	0.6259	Comment	Instrument DQX400 Chemist TSW Group MGM TSW-013 Ext 13C c13acq.au CDCl3 (C13NMR) mgmgrp 13
Date	12 Nov 2010 11:24:48	Date Stamp	12 Nov 2010 11:24:48
File Name	C:\Documents and Settings\mgmgrp\CHEM\Desktop\Nov11-2010-13\3\data1\11r	Frequency (MHz)	100.63
Nucleus	13C	Number of Transients	256
Owner	dp-nmgrp	Points Count	32768
SW (cyclical) (Hz)	26178.01	Pulse Sequence	zgpg30
Sweep Width (Hz)	26177.21	Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	10021.2939
		Receiver Gain	32768.00
		Spectrum Type	STANDARD
		Temperature (degree C)	27.000

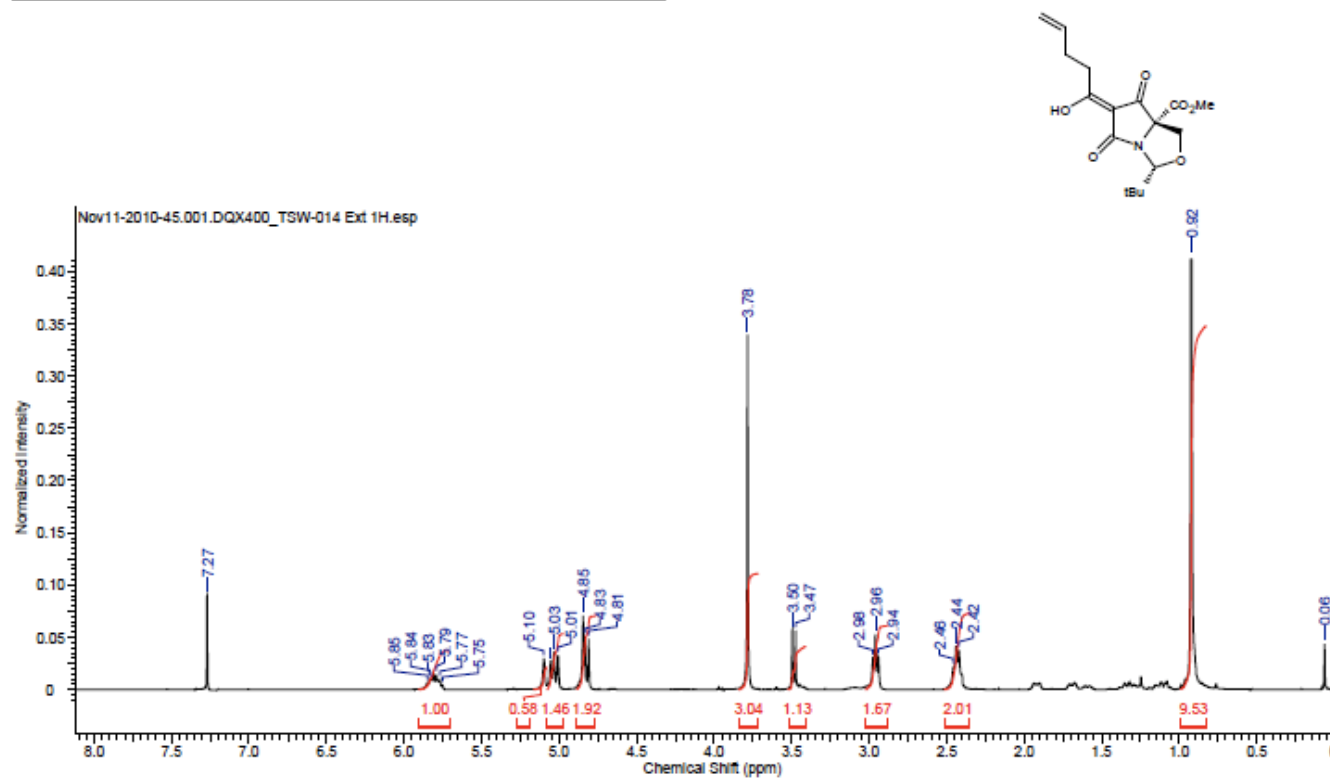


5b

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20/7/2013 12:06:18 PM

Formula	C ₁₉ H ₂₄ NO ₇	FW	280.2533+?
Acquisition Time (sec)	3.9584	Comment	Instrument DQX400 Chemist TSW Group MGM TSW1-014 Ext 1H h1acq.au CDC13 (C1NMR) mgmgrp 45
Date	12 Nov 2010 00:21:20	Date Stamp	12 Nov 2010 00:21:20
File Name	C:\Documents and Settings\mgmgrp\CHEM\Desktop\Nov11-2010-45\1\pdata\1\1r	Frequency (MHz)	400.20
Nucleus	1H	Number of Transients	16
Owner	dp-nmrgrp	Points Count	32768
SW(cyclical) (Hz)	8278.15	Pulse Sequence	zgpg30
Sweep Width (Hz)	8277.89	Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	2468.5974
		Spectrum Type	STANDARD
		Temperature (degree C)	27.000

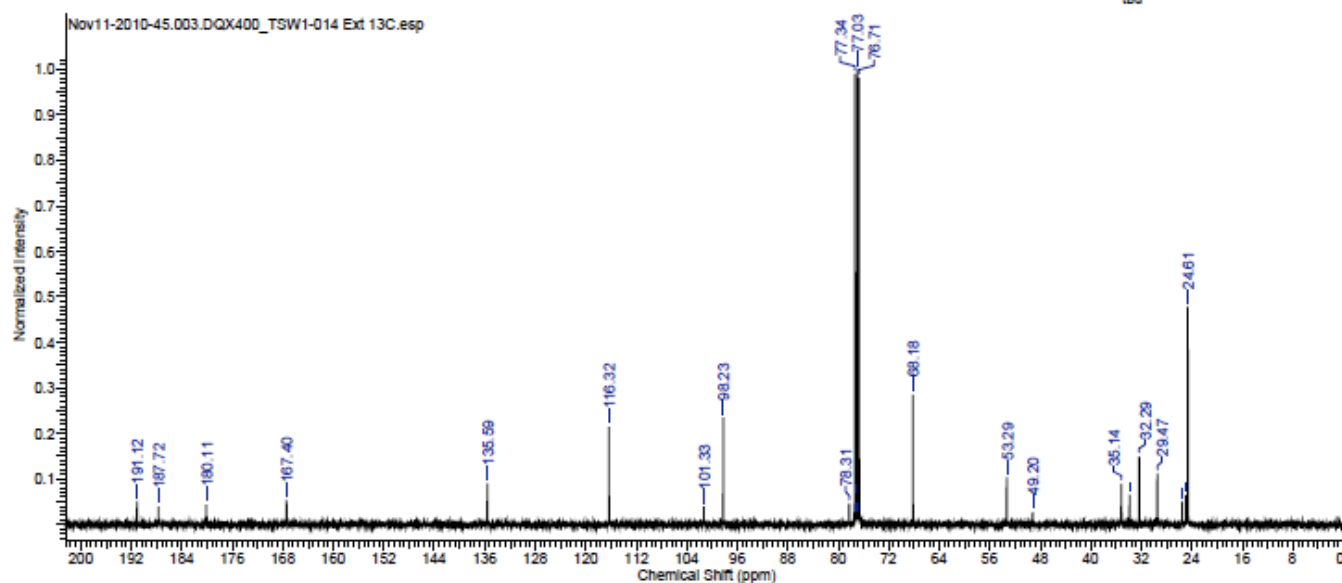
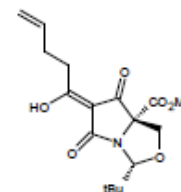


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20/7/2013 12:07:14 PM

Formula	C ₁₉ H ₂₄ NO ₇	FW	280.2533+?
Acquisition Time (sec)	0.6259	Comment	Instrument DQX400 Chemist TSW Group MGM TSW1-014 Ext 13C c13acq.au CDCl3 (C13NMR) mgmgrp 45
Date	12 Nov 2010 00:34:08	Date Stamp	12 Nov 2010 00:34:08
File Name	C:\Documents and Settings\mgmgrp\CHEM\Desktop\Nov11-2010-45\3\data1\11r	Frequency (MHz)	100.63
Nucleus	13C	Number of Transients	256
Owner	dp-nmgrp	Points Count	32768
SW(cyclical) (Hz)	26178.01	Solvent	CHLOROFORM-d
Sweep Width (Hz)	26177.21	Temperature (degree C)	27.000
		Origin	av400
		Pulse Sequence	zgpg30
		Spectrum Offset (Hz)	10021.2939
		Original Points Count	16384
		Receiver Gain	32768.00
		Spectrum Type	STANDARD

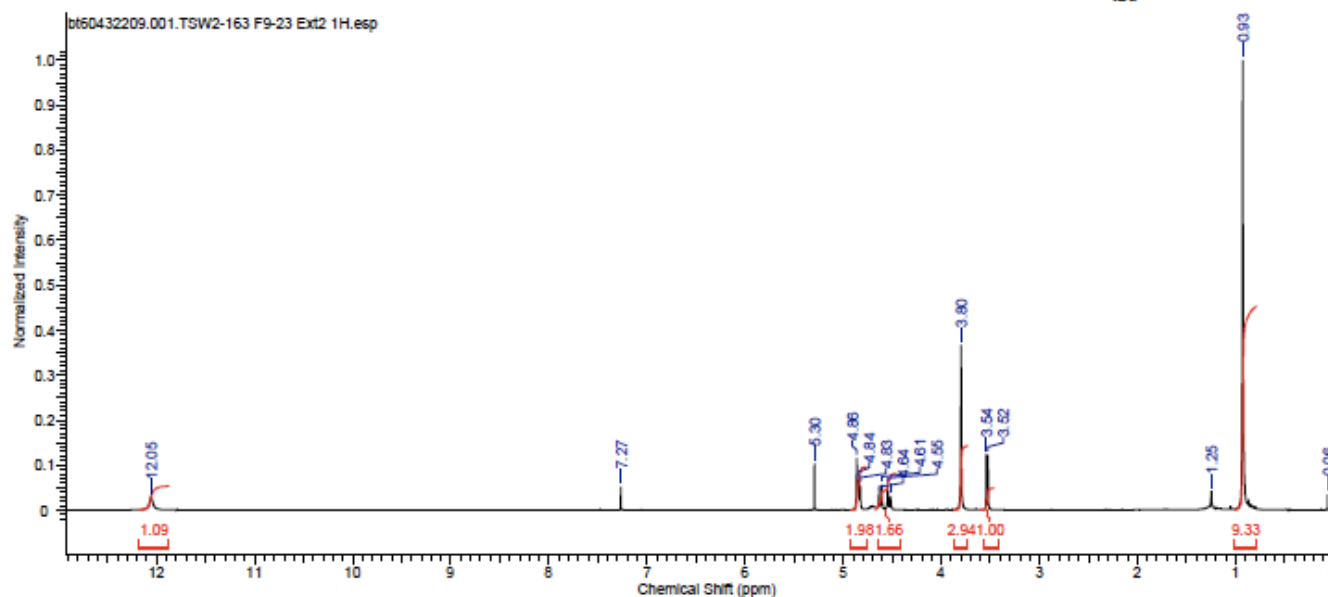
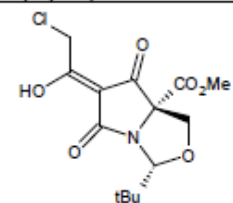


5c

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20/7/2013 12:34:01 PM

Formula C ₁₅ H ₁₄ ClNO ₄ ?		FW 274.6345+7			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM BEN TAM 6043 22/9/11	Date	23 Sep 2011 02:04:00
Date Stamp	23 Sep 2011 02:04:00	File Name	C:\Documents and Settings\mjmgroup\Desktop\bt60432209\1\data\1\1r		
Frequency (MHz)	500.30	Nucleus	1H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
				Temperature (degree C)	24.970

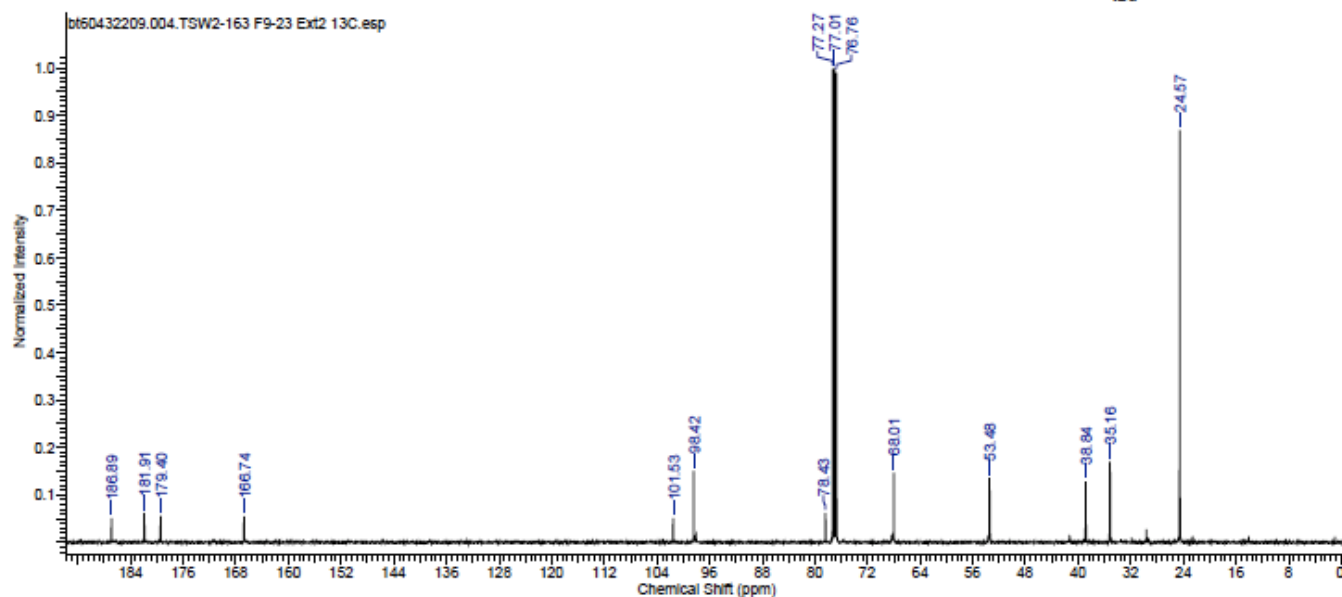
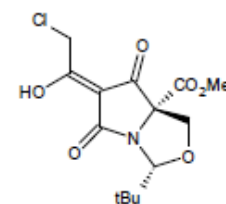


5c

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20/7/2013 12:33:10 PM

Formula C ₁₈ H ₁₅ ClNO ₇ ?		FW 274.6345+?			
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM BEN TAM 6043 22/9/11	Date	23 Sep 2011 02:33:52
Date Stamp	23 Sep 2011 02:33:52	File Name	C:\Documents and Settings\mgmgroup\Desktop\bt60432209\4\data\111r	Origin	avc500
Frequency (MHz)	125.80	Nucleus	13C	Number of Transients	256
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	12571.3047

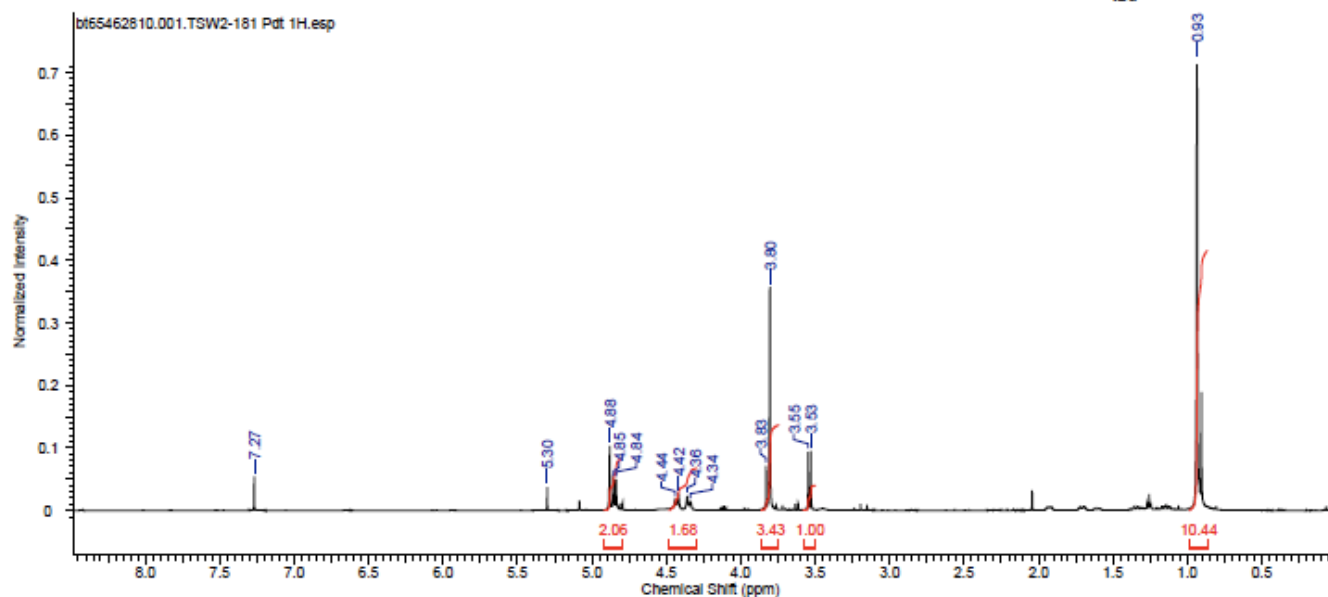
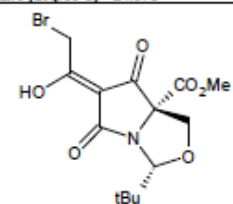


5d

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20/7/2013 12:38:02 PM

Formula C ₁₅ H ₁₁ BrNO ₃ ?		FW 319.0655+7			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 6546 Benjamin Tan 28/10/11	Date	28 Oct 2011 19:27:12
Date Stamp	28 Oct 2011 19:27:12	File Name	C:\Documents and Settings\imgroup\Desktop\bt6546281011\data\11r		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
				Temperature (degree C)	24.970

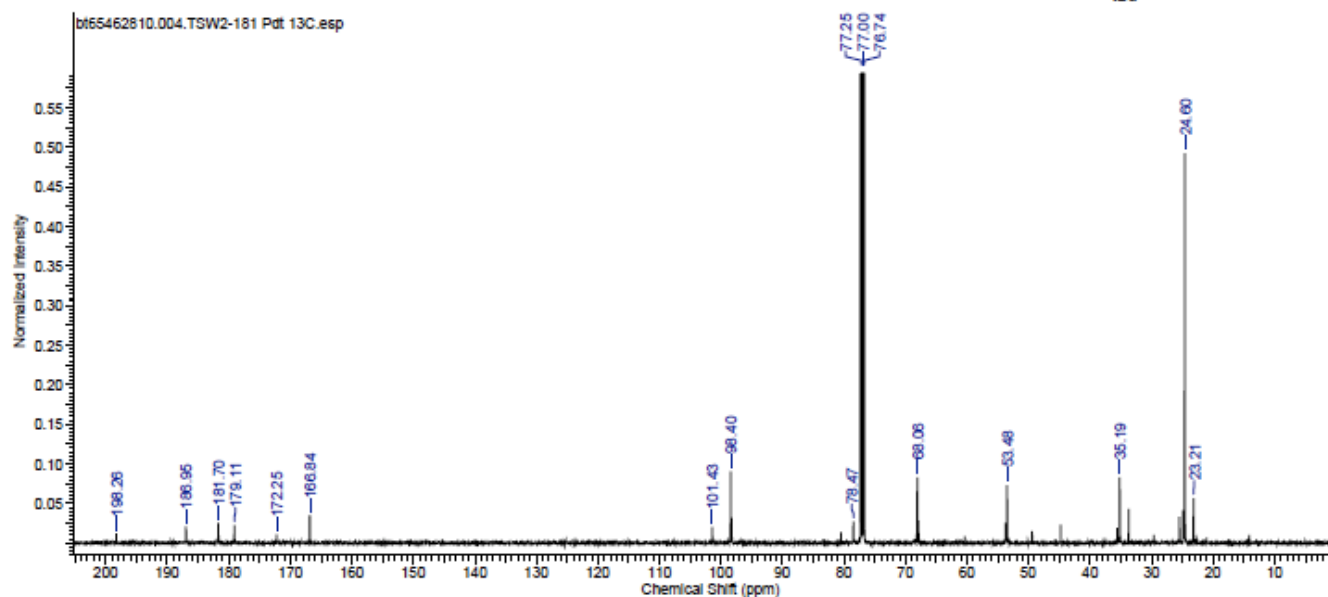
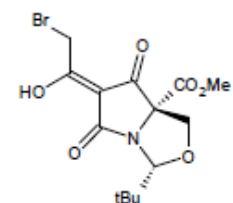


5d

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20/7/2013 12:37:15 PM

Formula C ₁₈ H ₁₅ BrNO ₄ ?		FW 319.0855+?			
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 6546 Benjamin Tan 28/10/11	Date	28 Oct 2011 20:16:16
Date Stamp	28 Oct 2011 20:16:16		File Name	C:\Documents and Settings\mymgroup\Desktop\bt6546281014\pdata\11\1r	
Frequency (MHz)	125.80	Nucleus	¹³ C	Number of Transients	512
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	912.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	12571.3047

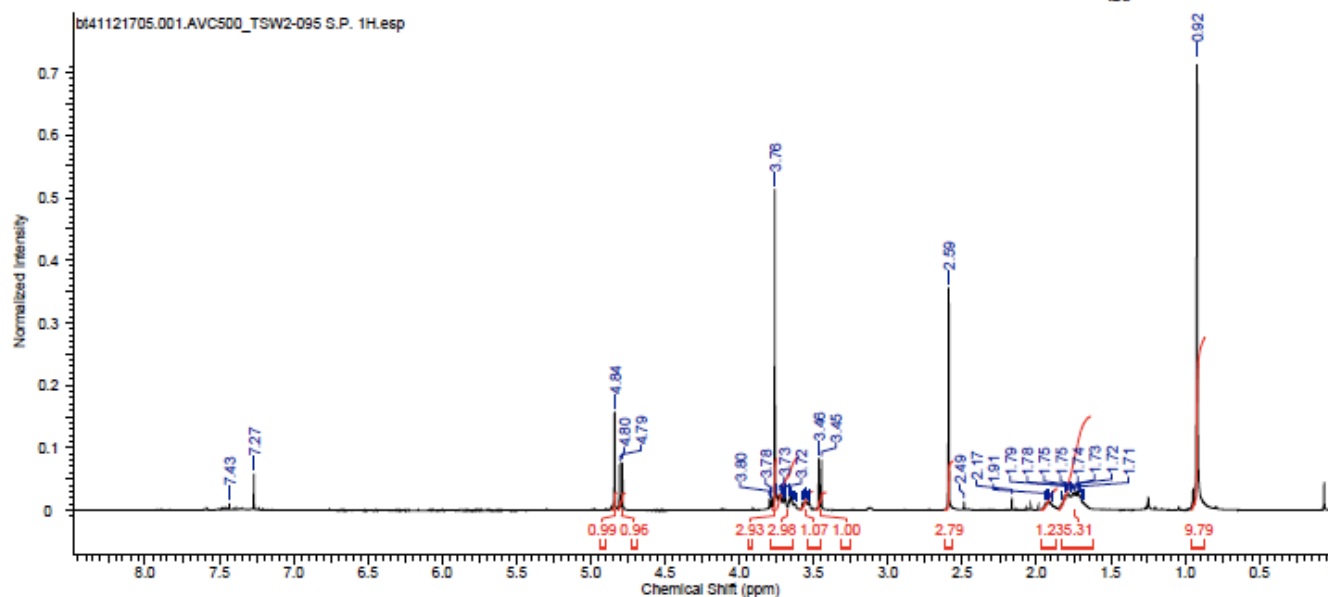
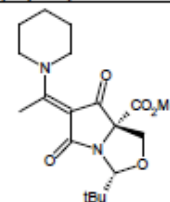


6c

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20/7/2013 2:05:17 PM

Formula C ₁₈ H ₂₃ N ₂ O ₄		FW 307.3217+?			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 4112 Benjamin Tan 17/5/11	Date	23 May 2011 12:44:00
Date Stamp	23 May 2011 12:44:00	File Name	C:\Documents and Settings\imgroup\Desktop\bt41121705\1\data\1\1r		
Frequency (MHz)	500.30	Nucleus	1H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
				Temperature (degree C)	24.970

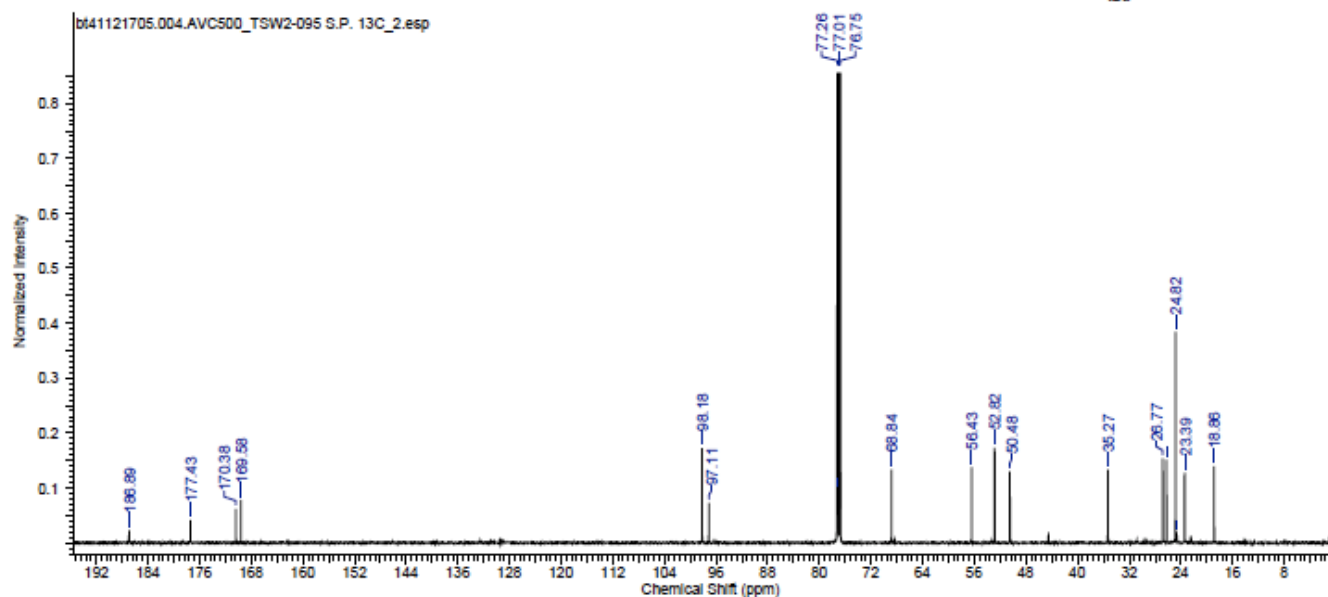
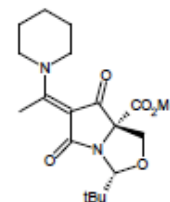


6c

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

20/7/2013 2:01:18 PM

Formula C ₁₈ H ₂₃ N ₂ O ₅		FW 307.3217+?			
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 4112 Benjamin Tan 17/5/11	Date	23 May 2011 13:26:40
Date Stamp	23 May 2011 13:26:40	File Name	C:\Documents and Settings\mngroup\Desktop\bt41121705\4\data\11\1r		
Frequency (MHz)	125.80	Nucleus	13C	Number of Transients	512
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	12571.3047

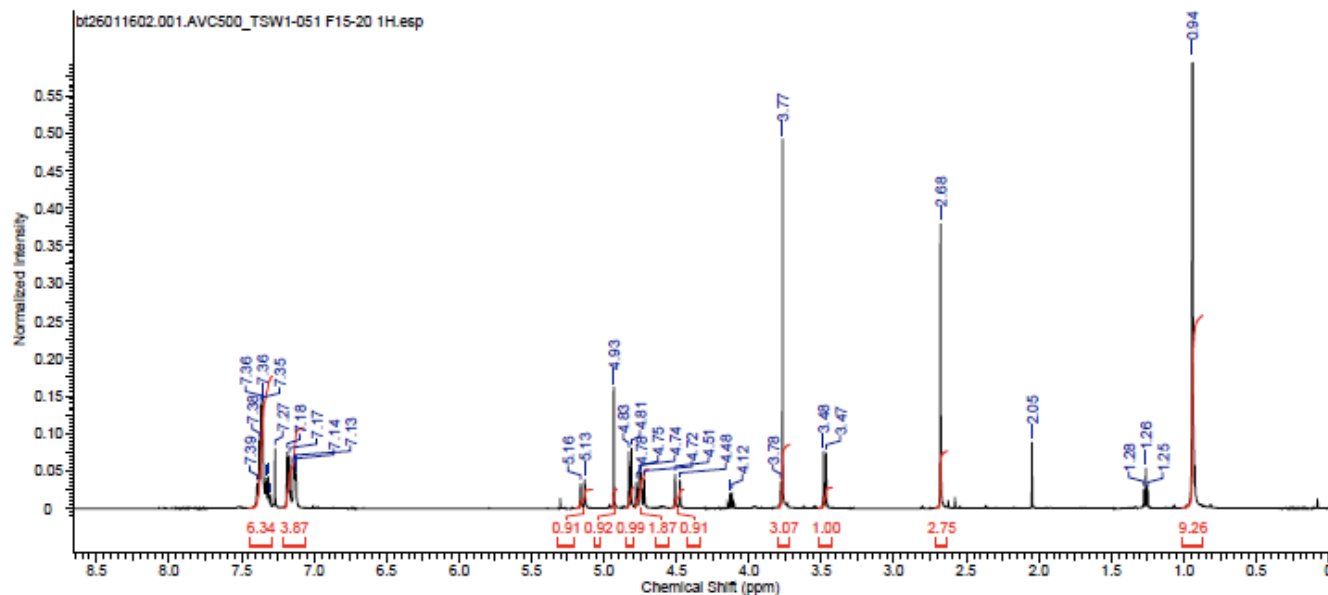
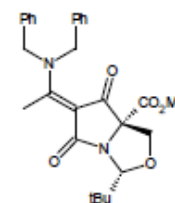


6d

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21/7/2013 10:45:15 AM

Formula	C ₂₆ H ₂₇ N ₂ O ₇	FW	419.4498+7
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 2601 Benjamin Tan 16/2/11
Date Stamp	18 Feb 2011 06:32:32	File Name	C:\Documents and Settings\vmqmgrou.CHEM\Desktop\bt2601160211\data\111r
Frequency (MHz)	500.30	Nucleus	1H
Original Points Count	32768	Owner	dp-nmrgroup
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58
Spectrum Type	STANDARD	Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	3065.5417
		Temperature (degree C)	25.076

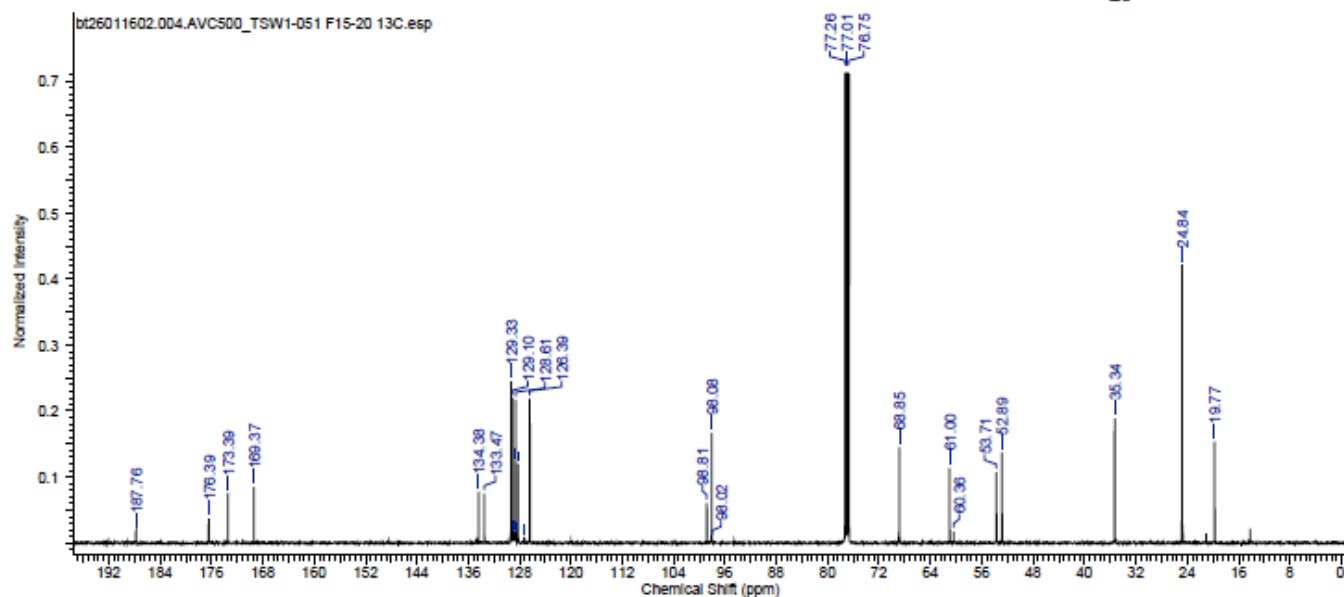
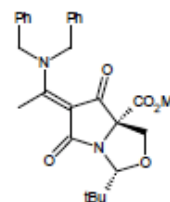


6d

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21/7/2013 10:46:54 AM

Formula C ₂₆ H ₂₇ N ₃ O ₄		FW 419.4498+7			
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Date Stamp	18 Feb 2011 07:15:12	File Name	C:\Documents and Settings\mymgroup\CHEM\Desktop\bt26011602\4\data\1\11r		
Frequency (MHz)	125.80	Nucleus	13C	Number of Transients	512
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970
					Spectrum Offset (Hz) 12571.3047

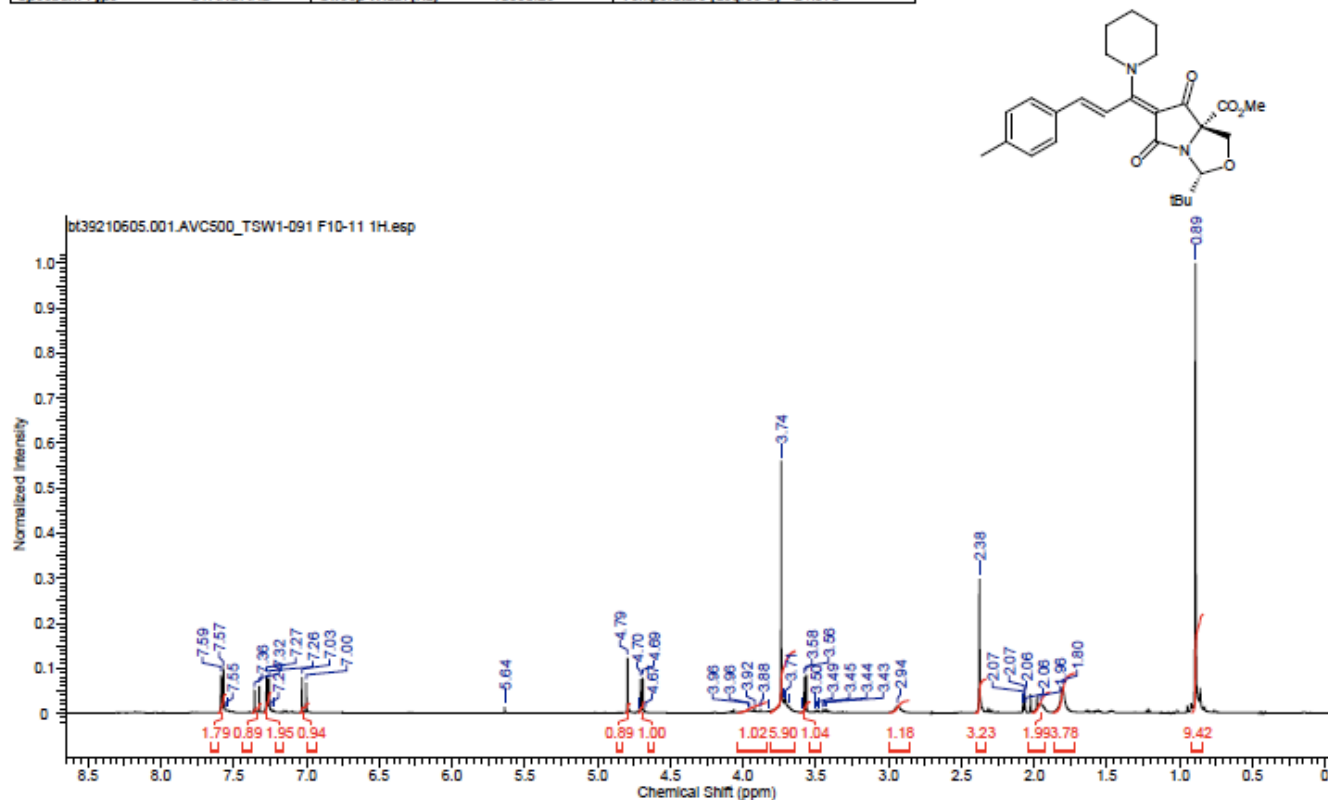


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20/7/2013 2:17:58 PM

Formula C ₂₉ H ₃₂ N ₂ O ₇		FW 409.4550+?			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 3921 Benjamin Tan 6/5/11	Date	07 May 2011 08:13:04
Date Stamp	07 May 2011 08:13:04	File Name	C:\Documents and Settings\mqmgrouper\Desktop\bt39210605\1\data\111r		
Frequency (MHz)	500.30	Nucleus	1H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	Acetone
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970

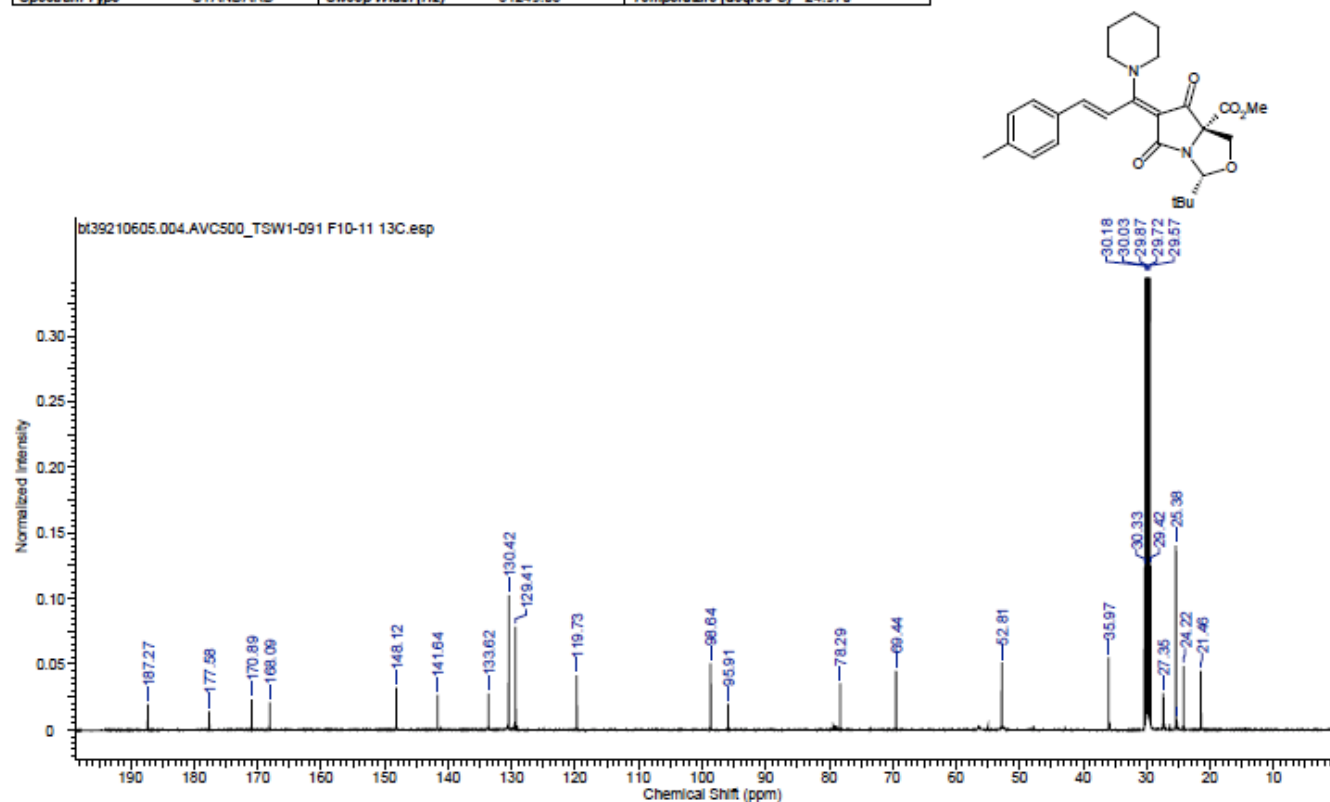


7a

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20/7/2013 2:17:26 PM

Formula C ₂₉ H ₃₂ N ₂ O ₄		FW 409.4550+?			
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 3921 Benjamin Tan 6/5/11	Date	07 May 2011 09:23:28
Date Stamp	07 May 2011 09:23:28	File Name	C:\Documents and Settings\imgmgroup\Desktop\bt39210605\4\data\1\1r		
Frequency (MHz)	125.80	Nucleus	¹³ C	Number of Transients	1024
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	Acetone
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970
					Spectrum Offset (Hz) 12693.3281

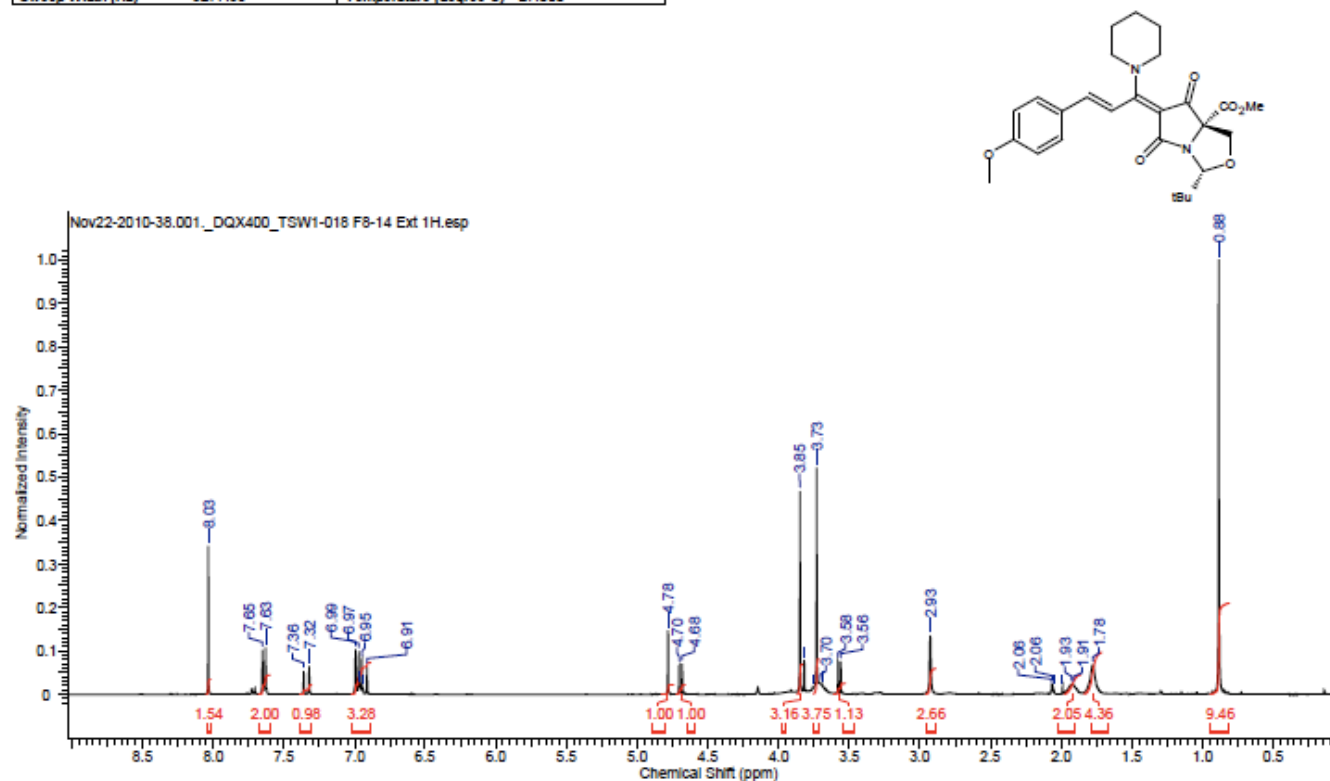


7b

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20/7/2013 2:13:19 PM

Formula	C ₂₂ H ₂₂ N ₂ O ₇	FW	425.4544+7
Acquisition Time (sec)	3.9584	Comment	Instrument DQX400 Chemist TSW Group MGM TSW1-018 F8-13 Ext 1H h1acq.au Acetone (C:1NMR) mgmgrp 38
Date	22 Nov 2010 15:15:12	Date Stamp	22 Nov 2010 15:15:12
File Name	C:\Documents and Settings\mgmgroup\CHEM\Desktop\Nov22-2010-38\1\data\1\1r	Frequency (MHz)	400.20
Nucleus	1H	Number of Transients	16
Owner	dp-nmrgrp	Points Count	32768
SW (cyclical) (Hz)	8278.15	Pulse Sequence	zgpg30
Sweep Width (Hz)	8277.89	Solvent	Acetone
		Spectrum Offset (Hz)	2471.3989
		Spectrum Type	STANDARD

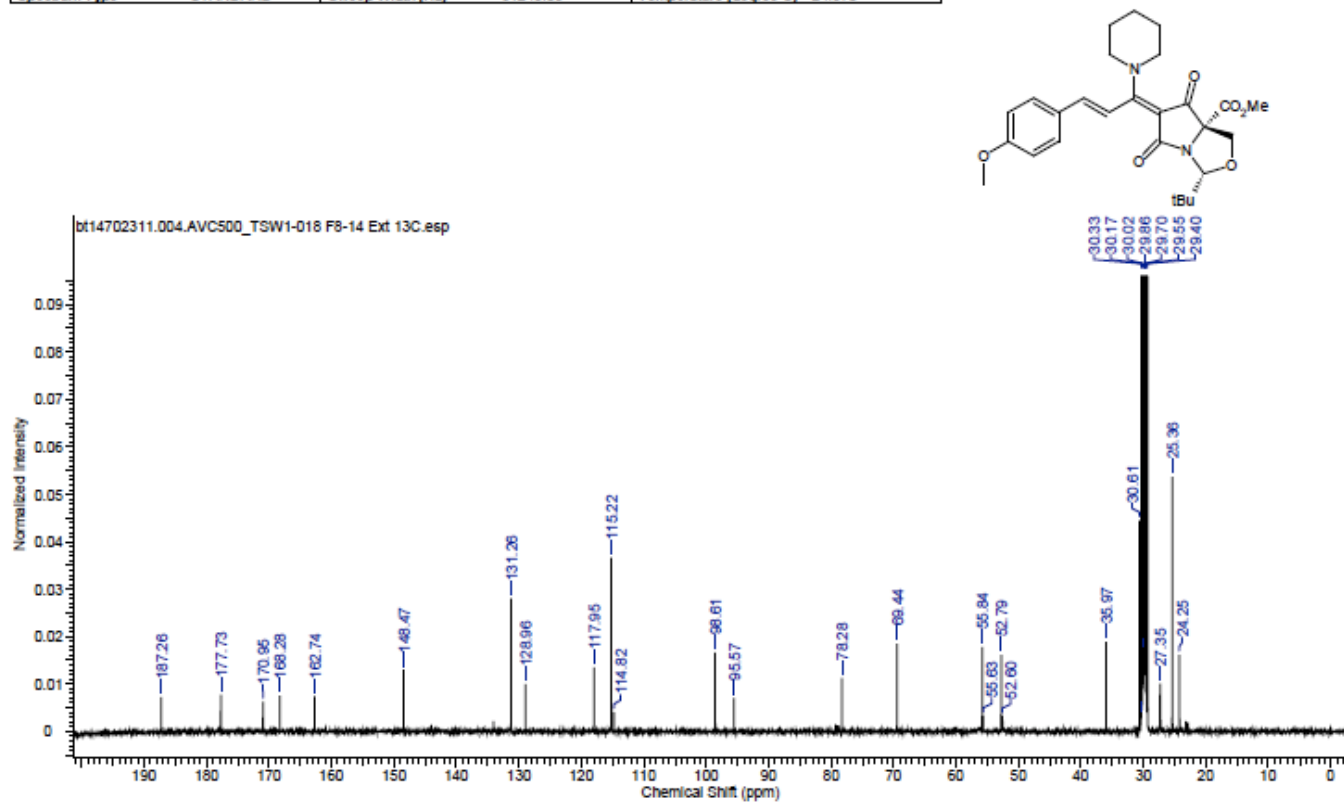


7b

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20/7/2013 2:14:10 PM

Formula C ₂₅ H ₃₂ N ₂ O ₇		FW 425.4544+?					
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM BENJAMIN TAN 1470 23/11/10	Date	24 Nov 2010 02:40:00		
Date Stamp	24 Nov 2010 02:40:00	File Name	C:\Documents and Settings\mngmgroup\CHEM\Desktop\bt1470231114\data\111r				
Frequency (MHz)	125.80	Nucleus	¹³ C	Number of Transients	512	Origin	avc500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	1820.00	SW(cycles)	31250.00	Solvent	Acetone	Spectrum Offset (Hz)	12693.3281
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970		

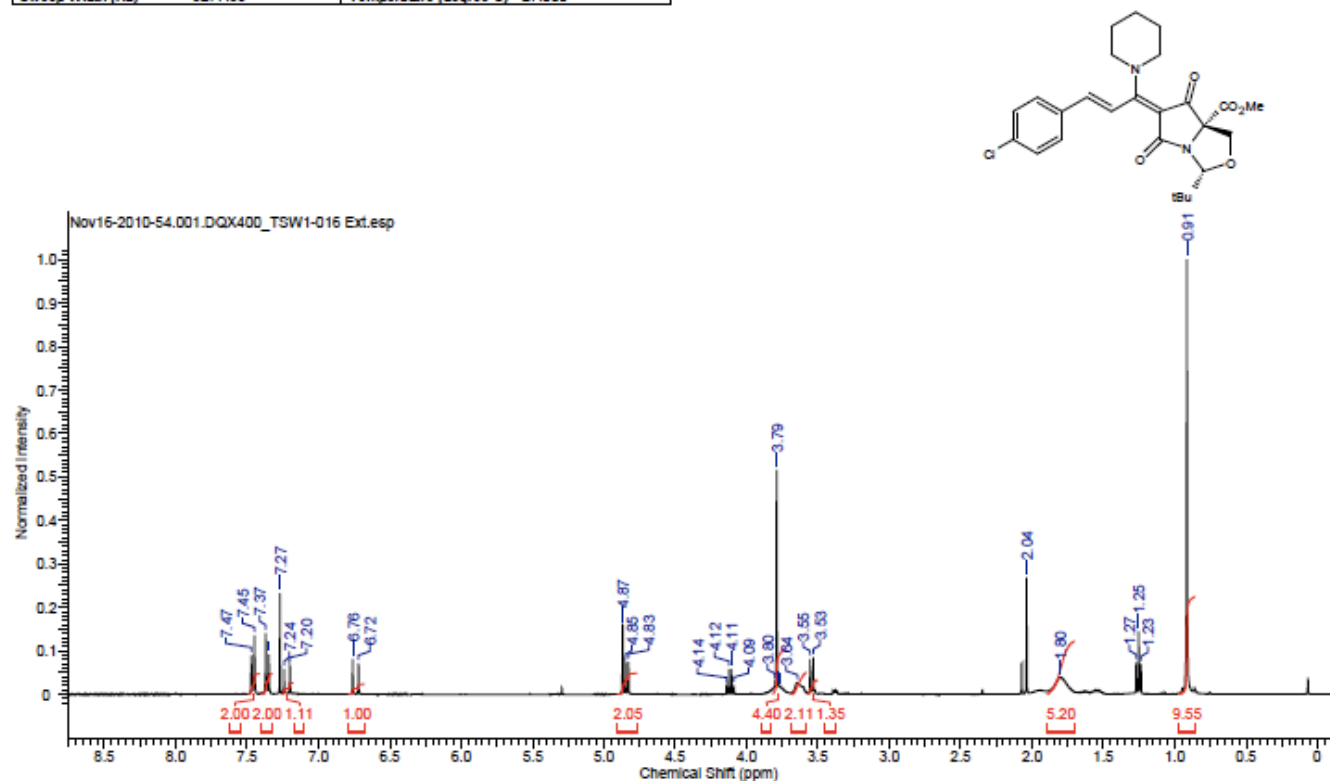


7c

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21/7/2013 10:39:54 AM

Formula	C ₂₈ H ₃₂ ClN ₂ O ₇	FW	429.673547
Acquisition Time (sec)	3.9584	Comment	Instrument DQX400 Chemist TSW Group MGM TSW1-016 F8-13 Ext 1H h1acq.au CDC13 (C13NMR) mgmgrp 54
Date	17 Nov 2010 13:37:04	Date Stamp	17 Nov 2010 13:37:04
File Name	C:\Documents and Settings\mgmgrp\CHEM\Desktop\Nov16-2010-54\1\pdata\1\1r	Frequency (MHz)	400.20
Nucleus	1H	Number of Transients	16
Owner	dp-nmgrp	Points Count	32768
SW (cyclical) (Hz)	8278.15	Pulse Sequence	zgpg30
Sweep Width (Hz)	8277.89	Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	2468.5974
		Spectrum Type	STANDARD

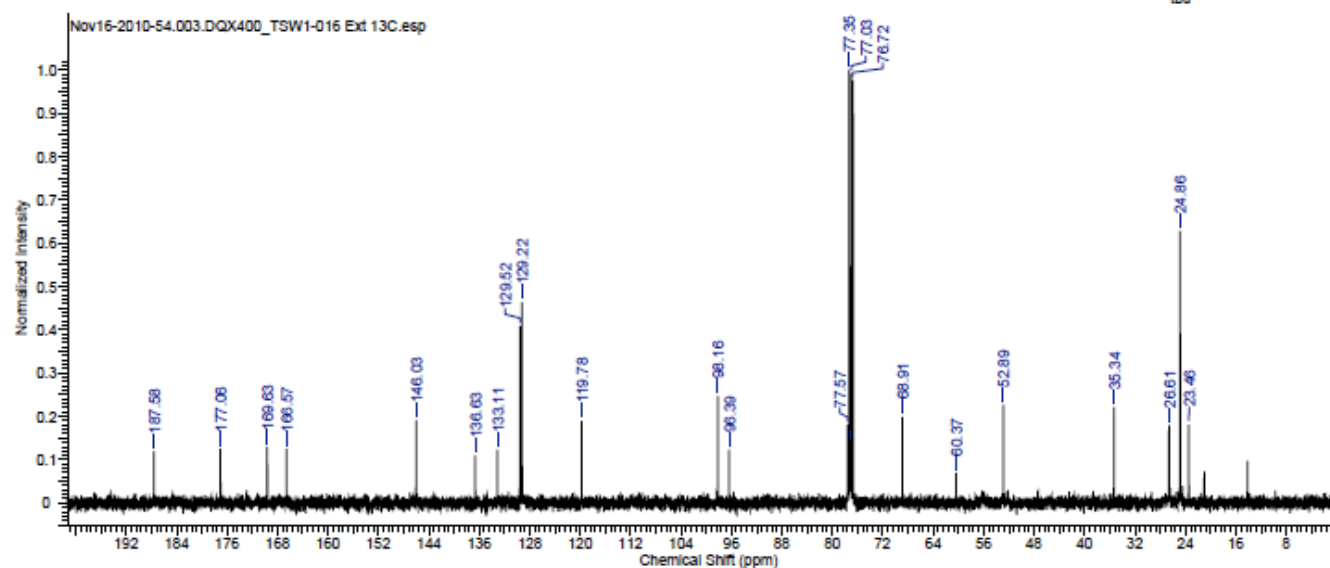
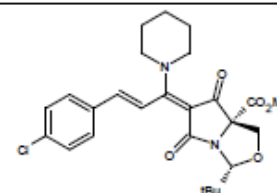


7c

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21/7/2013 10:41:31 AM

Formula	C ₂₈ H ₃₂ ClN ₂ O ₅ ?	FW	429.6735+?
Acquisition Time (sec)	0.6259	Comment	Instrument DQX400 Chemist TSW Group MGM TSW1-016 F8-13 Ext 13C c13acq.au CDCl3 (C:1NMR) mgmgrp 54
Date	17 Nov 2010 13:47:44	Date Stamp	17 Nov 2010 13:47:44
File Name	C:\Documents and Settings\mgmgrp\My Documents\Nov16-2010-54\3\data\1\1r		
Frequency (MHz)	100.63	Nucleus	13C
Origin	av400	Original Points Count	16384
Points Count	32768	Pulse Sequence	zgpg30
SW (cycles) (Hz)	26178.01	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	26177.21
		Temperature (degree C)	27.000
		Number of Transients	256
		Owner	dp-nmrgrp
		Receiver Gain	32768.00
		Spectrum Offset (Hz)	10021.2939

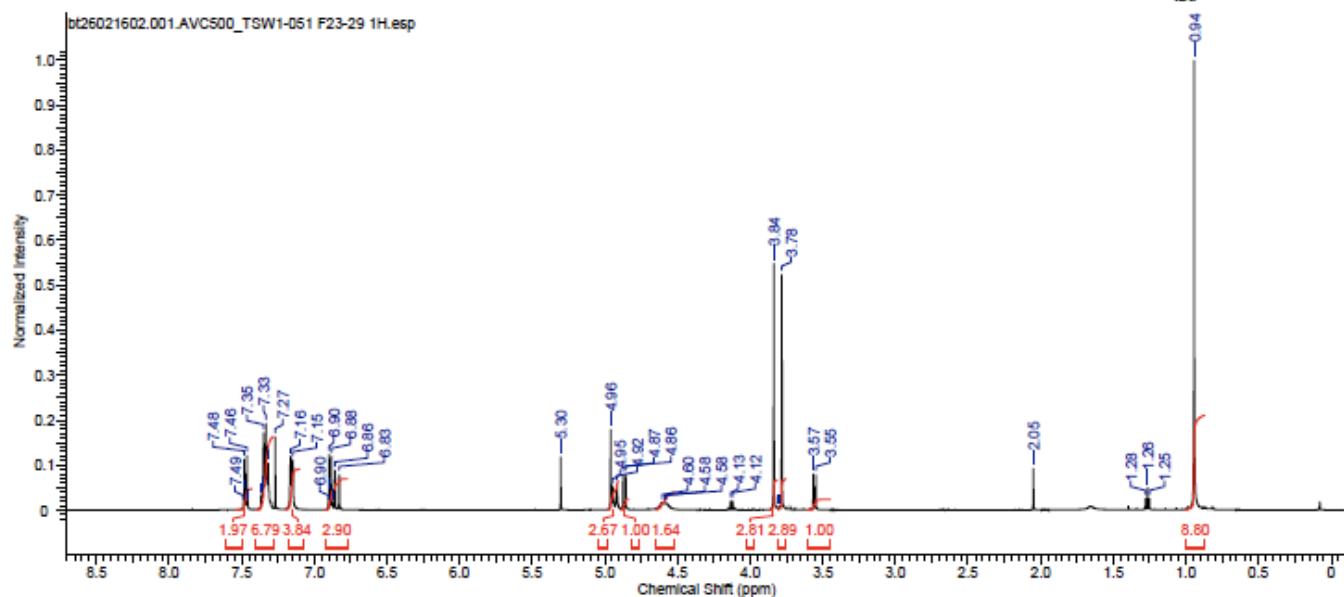
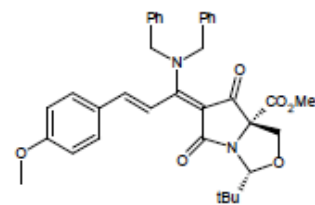


7d

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21/7/2013 10:51:01 AM

Formula C ₂₈ H ₂₈ N ₂ O ₇		FW 537.5824+?			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 2602 Benjamin Tan 16/2/11	Date	18 Feb 2011 07:51:28
Date Stamp	18 Feb 2011 07:51:28	File Name	C:\Documents and Settings\vmqmgrou.CHEM\Desktop\bt2602160211\data1\11r		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	3065.5417

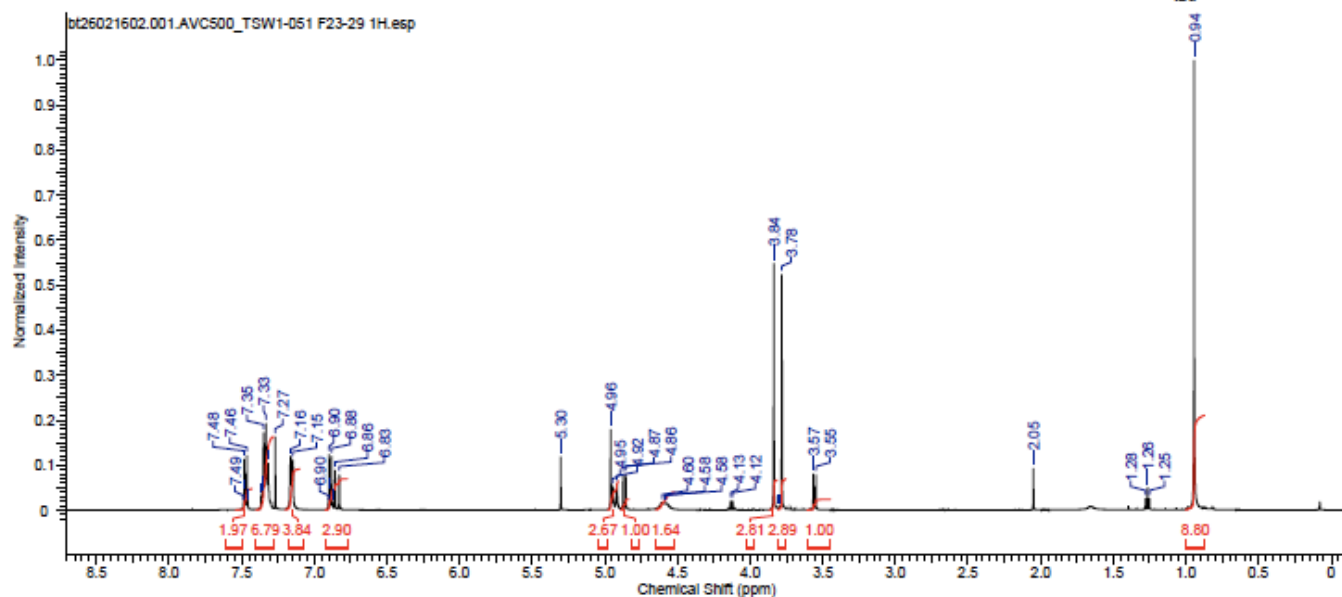
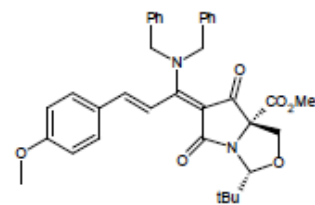


7d

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

21/7/2013 10:51:01 AM

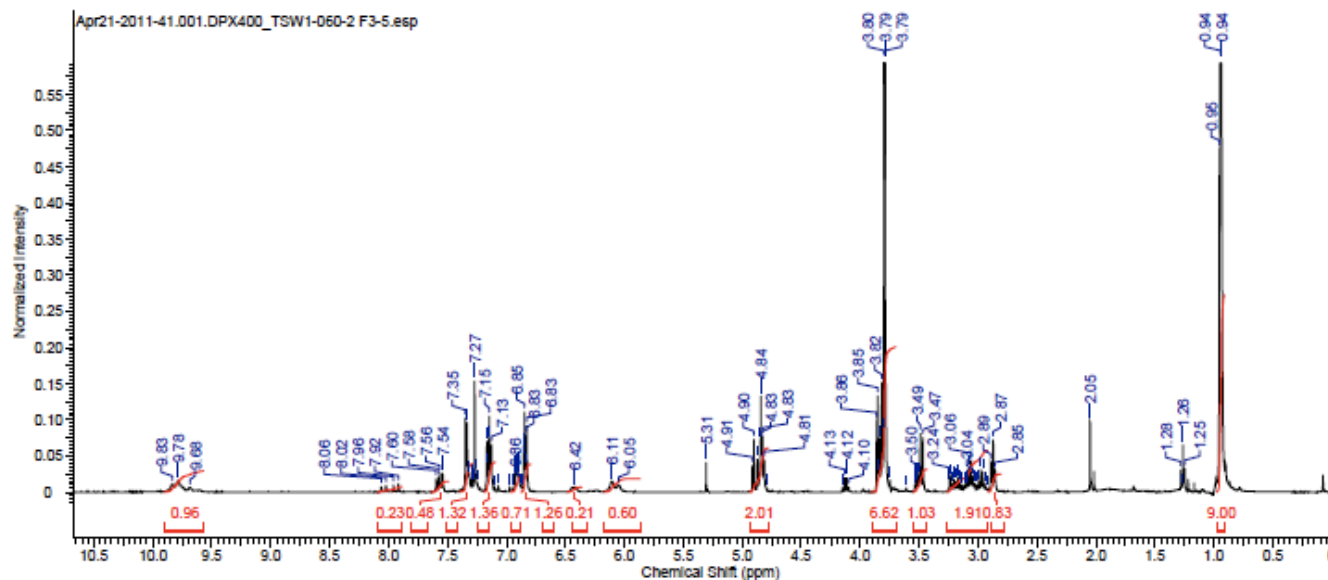
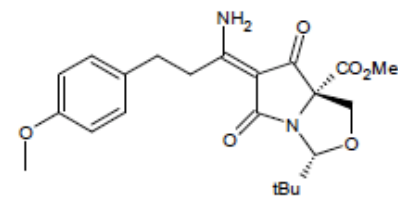
Formula C ₂₈ H ₂₈ N ₂ O ₇		FW 537.5824+?			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 2602 Benjamin Tan 16/2/11	Date	18 Feb 2011 07:51:28
Date Stamp	18 Feb 2011 07:51:28	File Name	C:\Documents and Settings\vmqmgrou.CHEM\Desktop\bt2602160211\data1\11r		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	3065.5417



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21/7/2013 11:03:28 AM

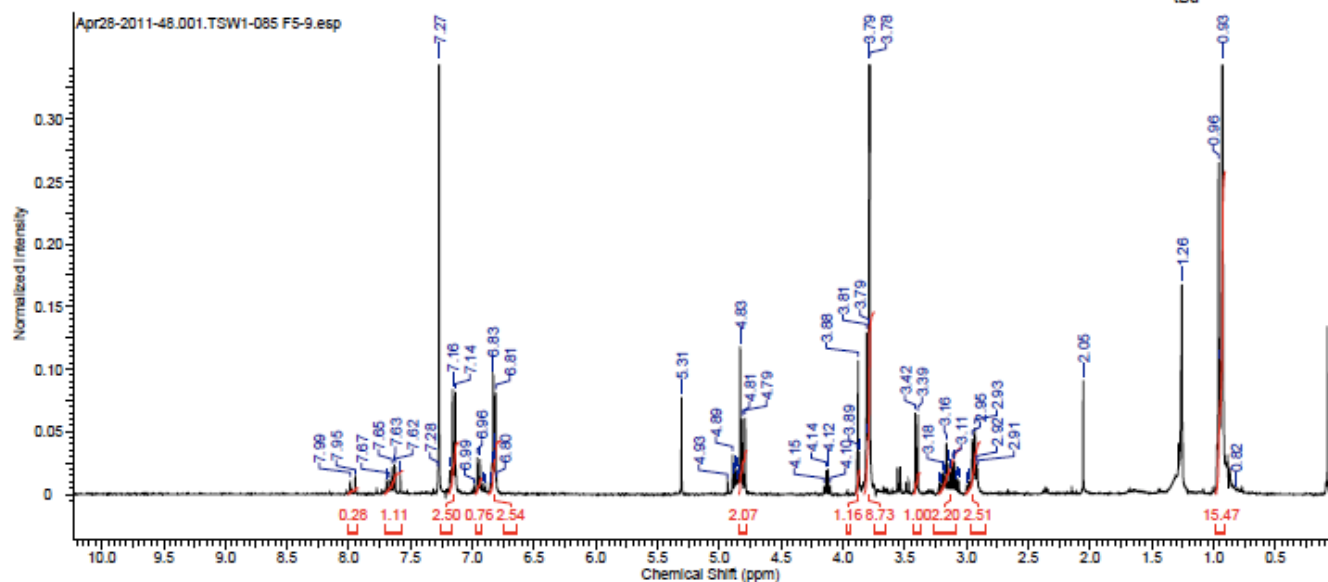
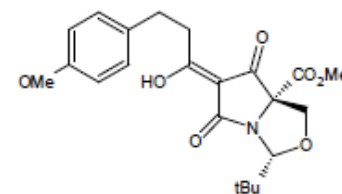
Formula C ₁₆ H ₁₉ N ₃ O ₇		FW 359.3532+?	
Acquisition Time (sec) 2.9295		Comment Instrument DPX400 Chemist TSW Group MGM TSW1-060-2 F3-5 Qh1acq.au CDCl3 (C1NMR) mqmgp 41	
Date 21 Apr 2011 13:16:00		Date Stamp 21 Apr 2011 13:16:00	
File Name C:\Documents and Settings\mqmgp\Desktop\Apr21-2011-41\1\data\1\1r		Frequency (MHz) 400.13	
Nucleus 1H	Number of Transients 16	Origin dpx400	Original Points Count 16384
Owner dp-nmrgroup	Points Count 32768	Pulse Sequence zgpg30	Receiver Gain 114.00
SW (cyclical) (Hz) 5592.84	Solvent CHLOROFORM-d	Spectrum Offset (Hz) 1982.4041	Spectrum Type STANDARD
Sweep Width (Hz) 5592.67	Temperature (degree C) 27.000		



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21/7/2013 11:05:04 AM

Formula	C ₂₁ H ₂₀ NO ₅	FW	329.3041		
Acquisition Time (sec)	2.9295	Comment	Instrument DPX400 Chemist TSW Group MGM TSW1-085 F5-9 Ext Qh1acq.au CDCl ₃ (C:\NMR) mcmgrp 48		
Date	28 Apr 2011 12:16:16	Date Stamp	28 Apr 2011 12:16:16		
File Name	C:\Documents and Settings\mcmgrp\Desktop\Apr28-2011-48\1\data\111r			Frequency (MHz)	400.13
Nucleus	¹ H	Number of Transients	16	Origin	dpx400
Owner	dp-nmrgrp	Points Count	32768	Pulse Sequence	zg60
SW(cyclical) (Hz)	5592.84	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	1982.4041
Sweep Width (Hz)	5592.67	Temperature (degree C)	27.000	Spectrum Type	STANDARD

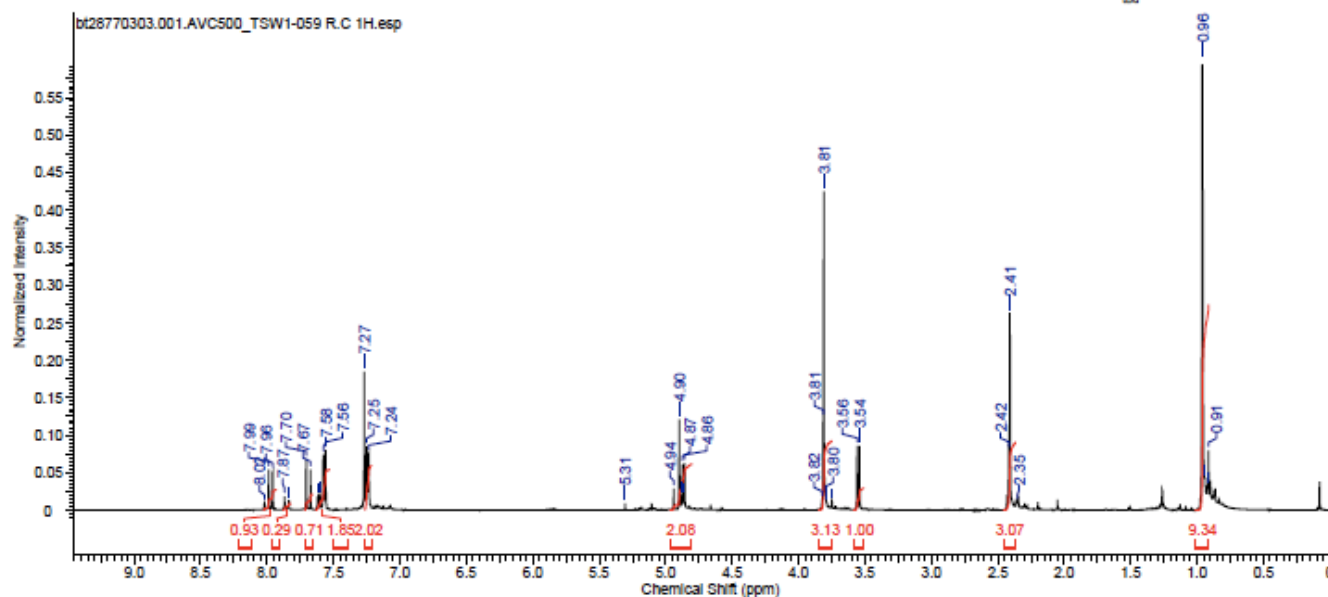
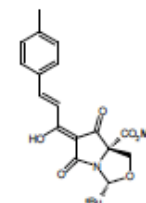


10a

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20/7/2013 1:27:52 PM

Formula	C ₁₈ H ₁₆ NO ₅	FW	342.3227
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 2877 Benjamin Tan 3/3/11
Date Stamp	05 Mar 2011 22:43:12	File Name	C:\Documents and Settings\mcmgroup\CHEM\Desktop\bt28770303\1\data\1\1r
Frequency (MHz)	500.30	Nucleus	¹ H
Original Points Count	32768	Owner	dp-nmrgroup
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
		Temperature (degree C)	24.970
		Number of Transients	16
		Points Count	32768
		Pulse Sequence	zg30
		Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	3065.5417

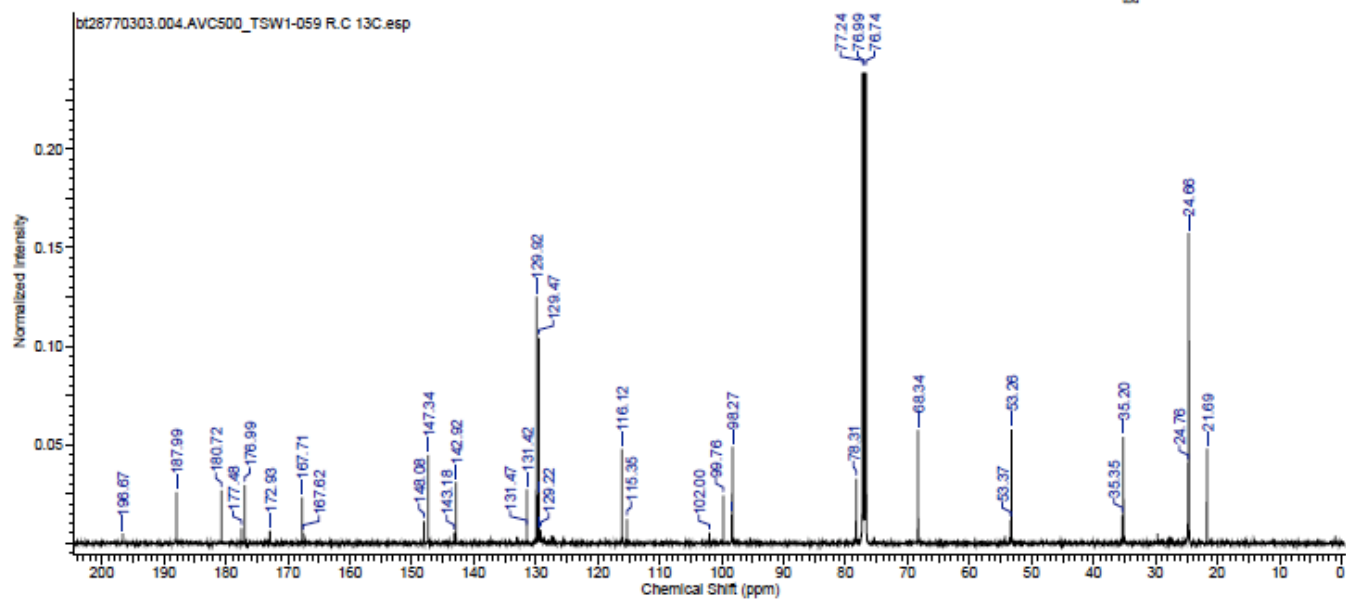
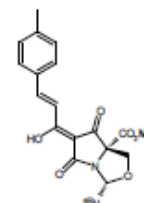


10a

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20/7/2013 1:28:12 PM

Formula	C ₁₈ H ₁₆ NO ₄	FW	342.3227
Acquisition Time (sec)	1.0486	Comment	Instrument AVCS00 Group MGM 2677 Benjamin Tan 3/3/11
Date Stamp	06 Mar 2011 00:19:12	File Name	C:\Documents and Settings\imgmgroup\CHEM\Desktop\bt26770303\4\data\1\11r
Frequency (MHz)	125.80	Nucleus	13C
Original Points Count	32768	Owner	dp-nmrgroup
Receiver Gain	1820.00	SW (cycles)	31250.00
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05
		Temperature (degree C)	24.970
		Number of Transients	1024
		Points Count	32768
		Pulse Sequence	zgpg30
		Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	12571.3047

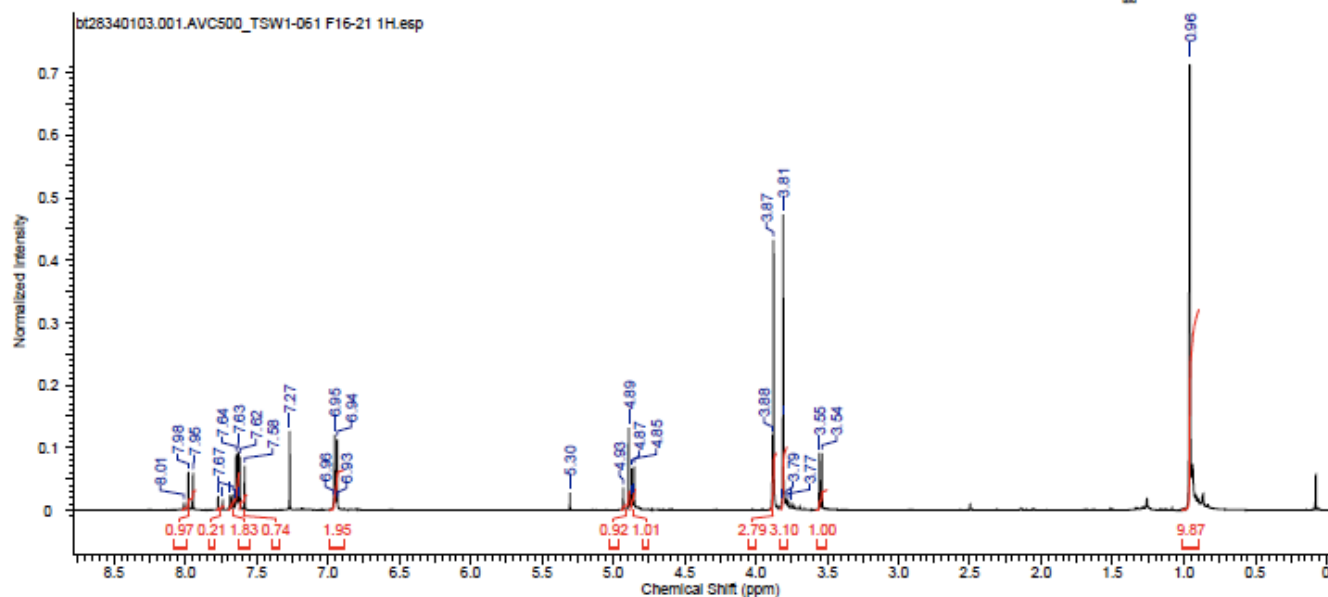
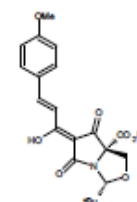


10b

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20/7/2013 1:24:22 PM

Formula	C ₁₈ H ₁₆ NO ₇	FW	358.322147				
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 2834 Benjamin Tan 1/3/11	Date	03 Mar 2011 05:49:52		
Date Stamp	03 Mar 2011 05:49:52	File Name	C:\Documents and Settings\mcmgroup\CHEM\Desktop\bt28340103\1\data\1\1r	Origin	avc500		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16		
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zg30
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	3065.5417
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970		

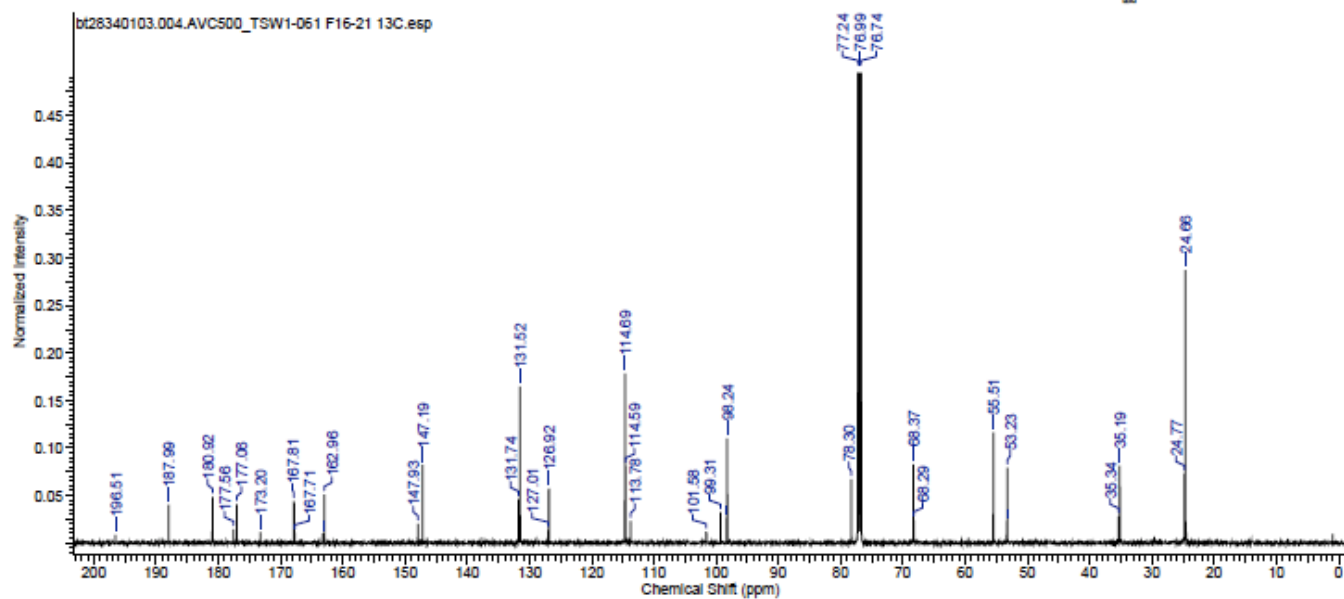
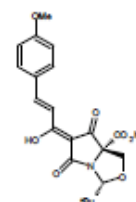


10b

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20/7/2013 1:23:54 PM

Formula	C ₁₈ H ₁₆ NO ₇	FW	358.322147				
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 2834 Benjamin Tan 1/3/11	Date	03 Mar 2011 06:32:32		
Date Stamp	03 Mar 2011 06:32:32	File Name	C:\Documents and Settings\mqmgroun\CH\EM\Desktop\bt28340103\4\data\1\1r	Origin	avc500		
Frequency (MHz)	125.80	Nucleus	13C	Number of Transients	512		
Original Points Count	32768	Owner	dp-nmr\group	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	1820.00	SW(cycles) (Hz)	31250.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	12571.3047
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970		

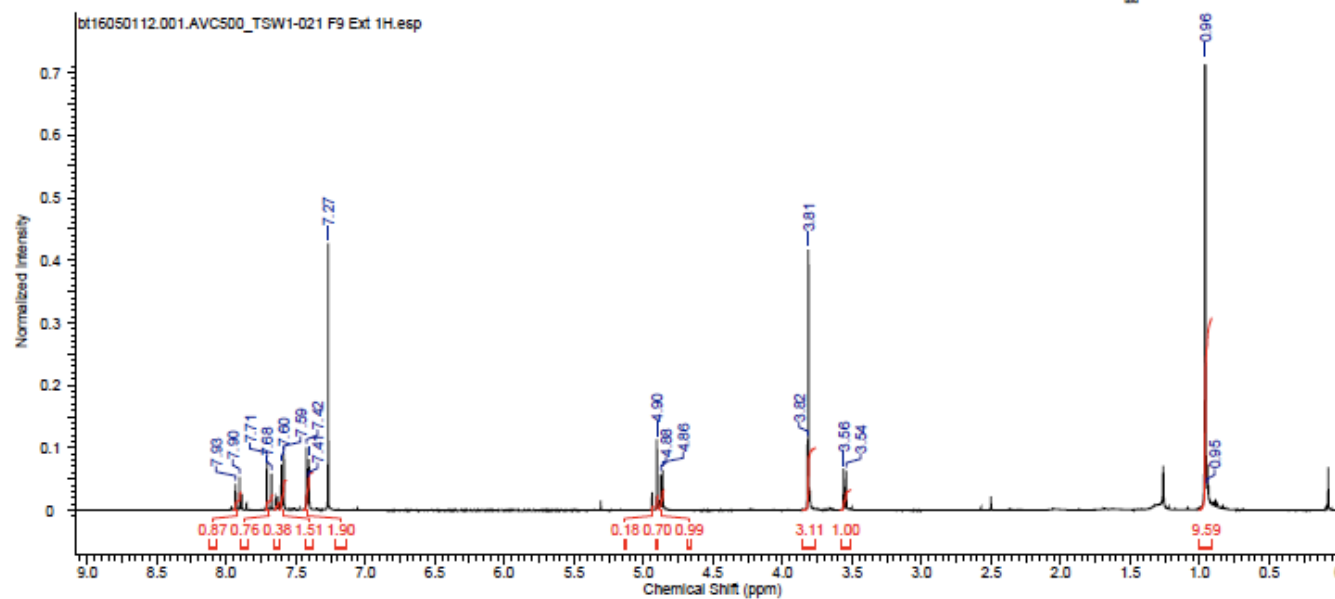
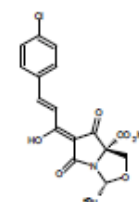


10c

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20/7/2013 1:15:11 PM

Formula C ₁₇ H ₁₂ ClNO ₇ ?		FW 362.7412+?			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 1605 Benjamin Tan 1/12/10	Date	02 Dec 2010 19:29:04
Date Stamp	02 Dec 2010 19:29:04	File Name	C:\Documents and Settings\mymgroup\CHEM\Desktop\bt16050112\1\pdata\1\1r		
Frequency (MHz)	500.30	Nucleus	1H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970
					Spectrum Offset (Hz) 3065.5417

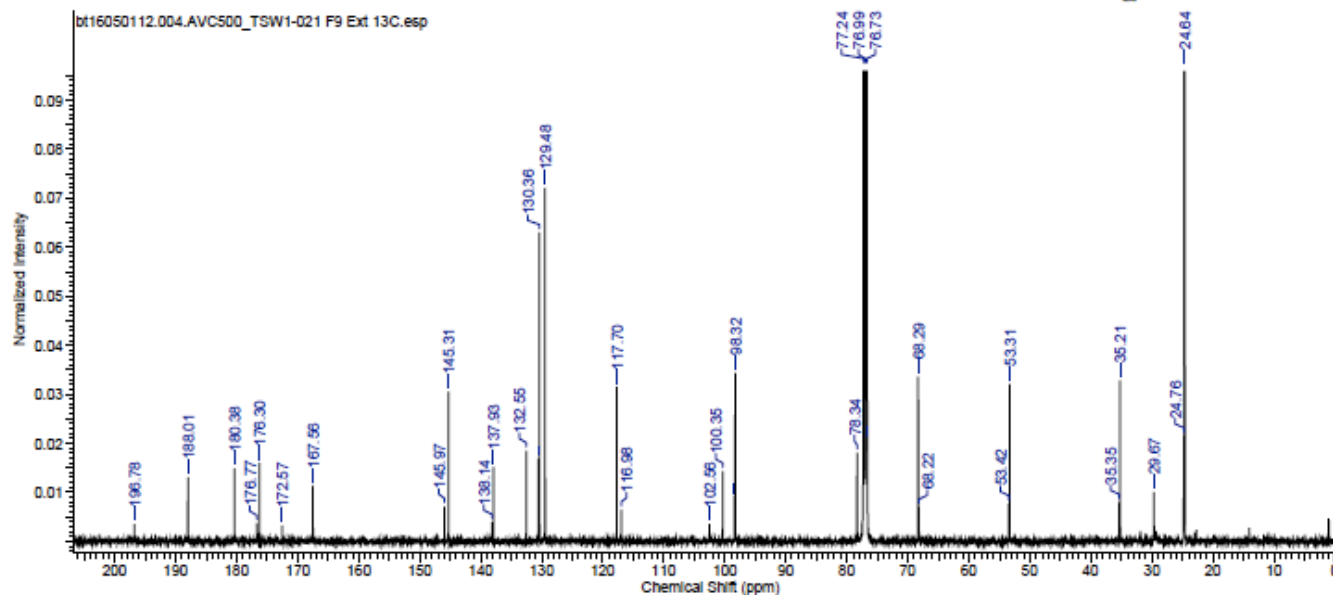
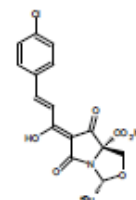


10c

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20/7/2013 1:14:06 PM

Formula C ₁₇ H ₁₂ ClNO ₇ ?		FW 362.7412+?			
Acquisition Time (sec) 1.0486		Comment Instrument AVC500 Group MGM 1605 Benjamin Tan 1/12/10		Date 02 Dec 2010 20:39:28	
Date Stamp 02 Dec 2010 20:39:28		File Name C:\Documents and Settings\mqmgrouper\CHEMIDesktop\bt16050112\4\data\1\11		Origin avc500	
Frequency (MHz) 125.80		Nucleus 13C		Number of Transients 1024	
Original Points Count 32768		Owner dp-nmrgroup		Points Count 32768	
Receiver Gain 1820.00		SW(cyclical) (Hz) 31250.00		Solvent CHLOROFORM-d	
Spectrum Type STANDARD		Sweep Width (Hz) 31249.05		Spectrum Offset (Hz) 12571.3047	
		Temperature (degree C) 24.970			

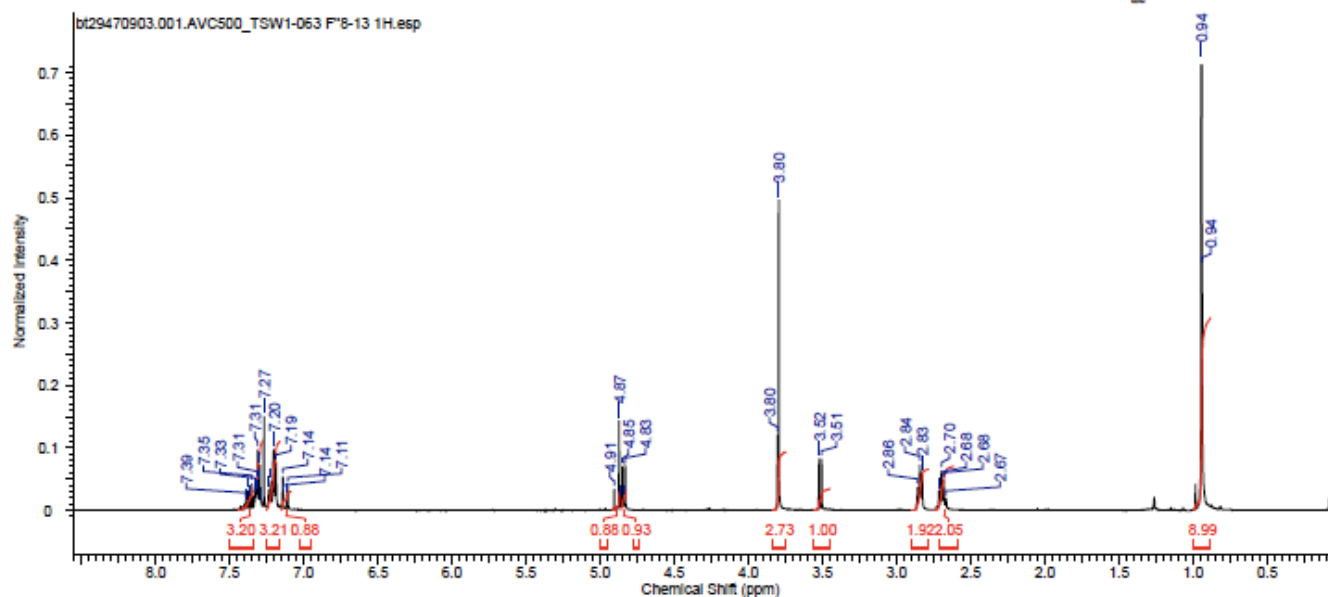
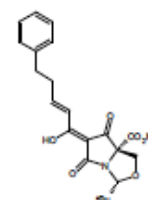


10d

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20/7/2013 1:30:55 PM

Formula	C ₁₈ H ₁₆ NO ₇	FW	356.3493+?		
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 2947 Benjamin Tan 9/3/11	Date	10 Mar 2011 16:55:28
Date Stamp	10 Mar 2011 16:55:28	File Name	C:\Documents and Settings\mcmgroup\CHEM\Desktop\bt29470903\1\data\1\1r	Origin	avc500
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Pulse Sequence	zg30
Spectrum Type	STANDARD	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	3065.5417
		Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970

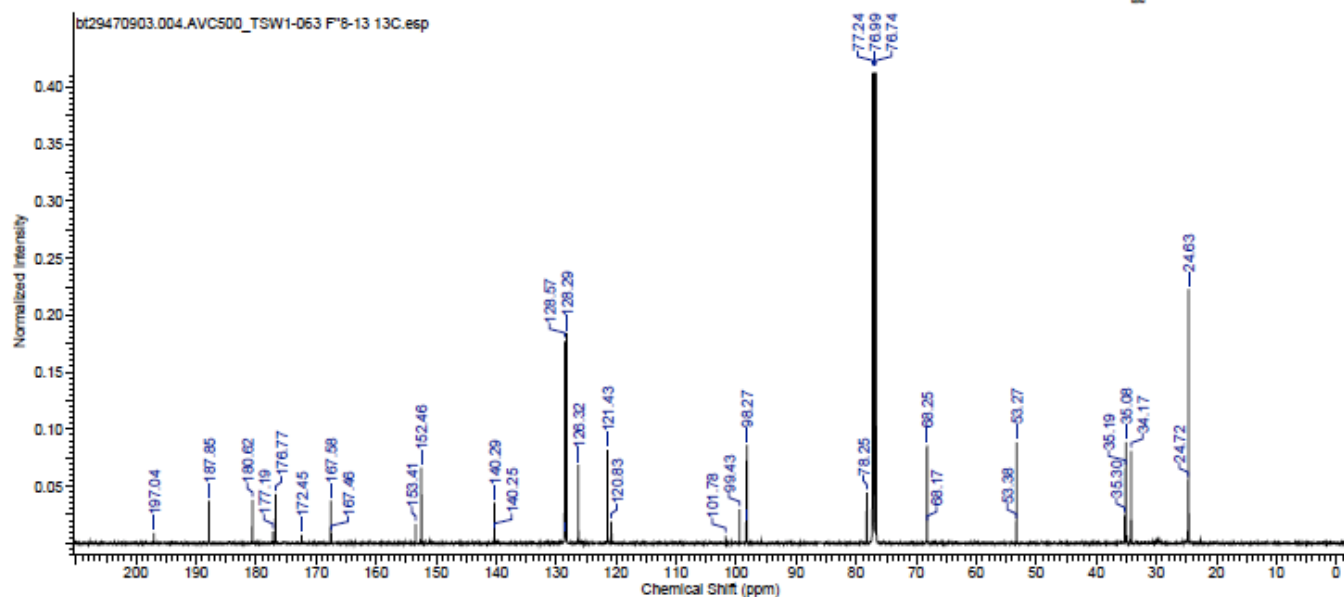
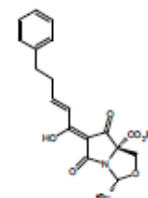


10d

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20/7/2013 1:30:18 PM

Formula	C ₁₈ H ₁₆ NO ₇ ?	FW	356.3493+?		
Acquisition Time (sec)	1.0486	Comment	Instrument AVCS500 Group MGM 2947 Benjamin Tan 9/3/11	Date	10 Mar 2011 18:05:52
Date Stamp	10 Mar 2011 18:05:52	File Name	C:\Documents and Settings\imgmgroup\CHEM\Desktop\bt29470903\4\data\1\11	Number of Transients	1024
Frequency (MHz)	125.80	Nucleus	13C	Origin	avc500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	12571.3047

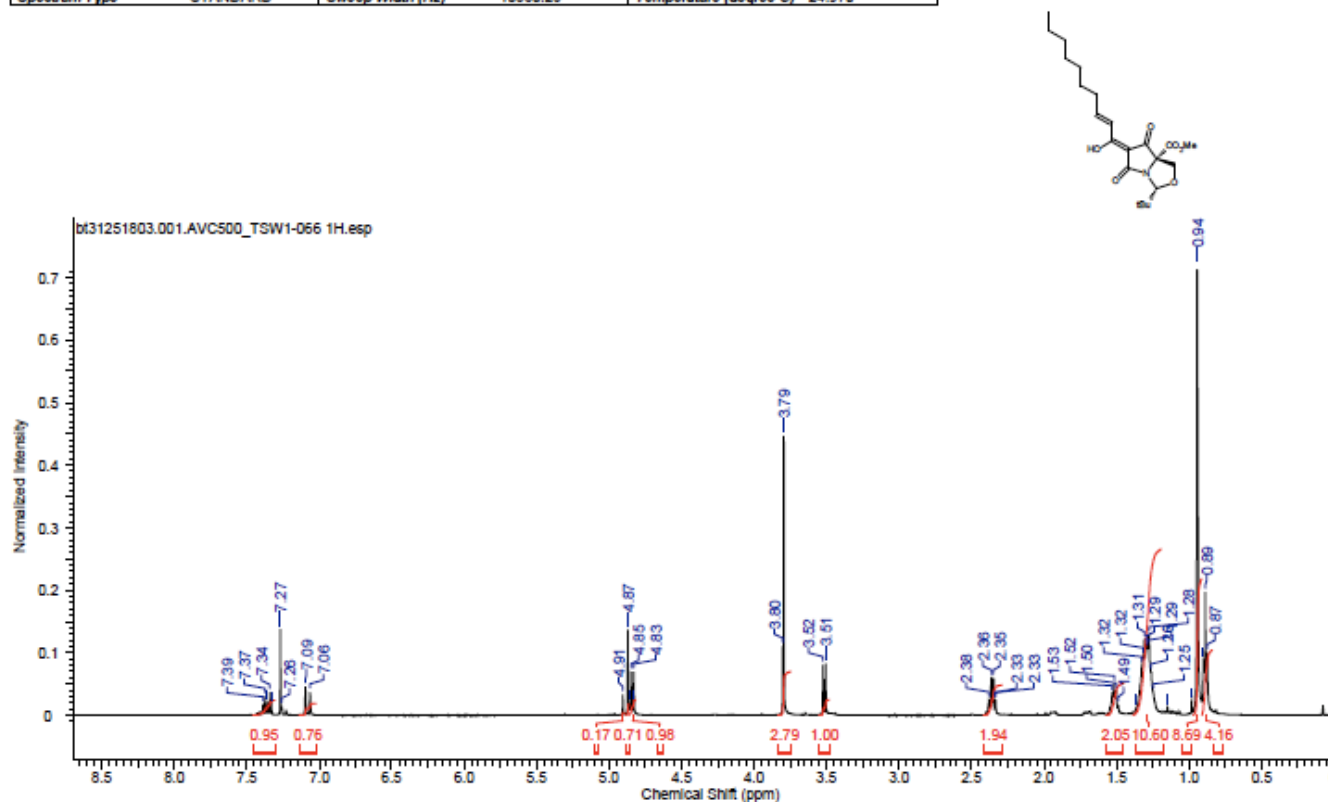


10e

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20/7/2013 1:34:20 PM

Formula	C ₁₈ H ₂₄ NO ₇	FW	350.3662+?		
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 3125 Benjamin Tan 18/3/11	Date	20 Mar 2011 10:03:44
Date Stamp	20 Mar 2011 10:03:44	File Name	C:\Documents and Settings\mymgroup\CHEM\Desktop\bt3125180311\data\111r	Origin	avc500
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970
				Spectrum Offset (Hz)	3065.5417

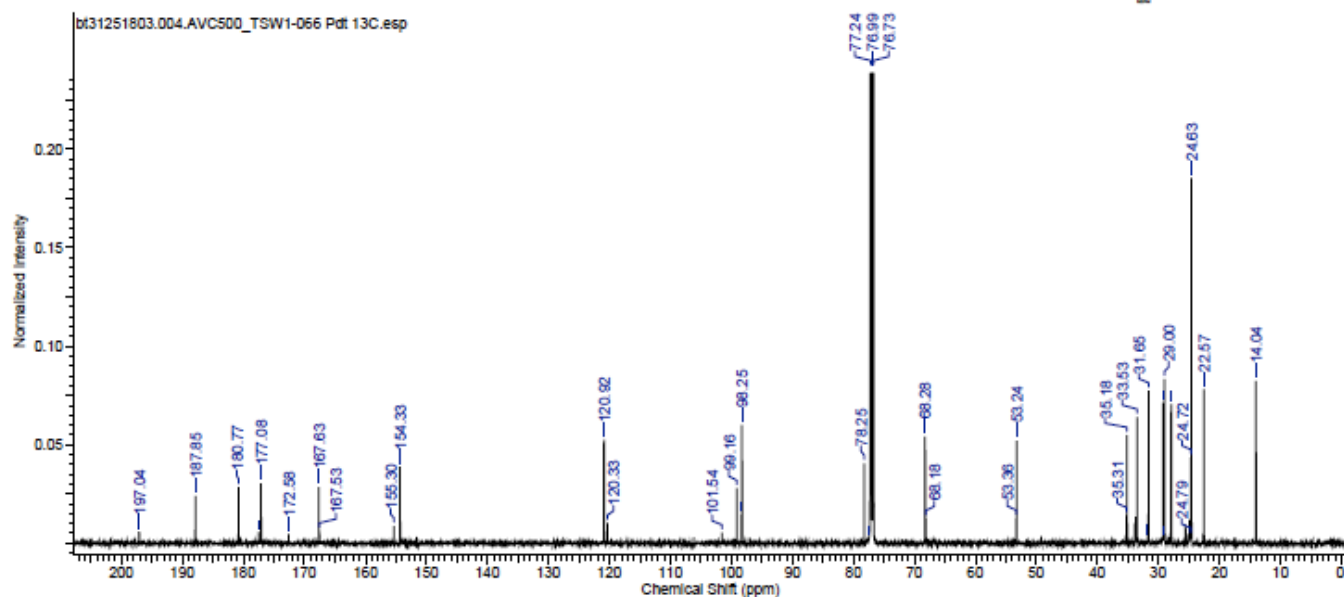
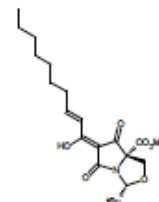


10e

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

20/7/2013 1:34:52 PM

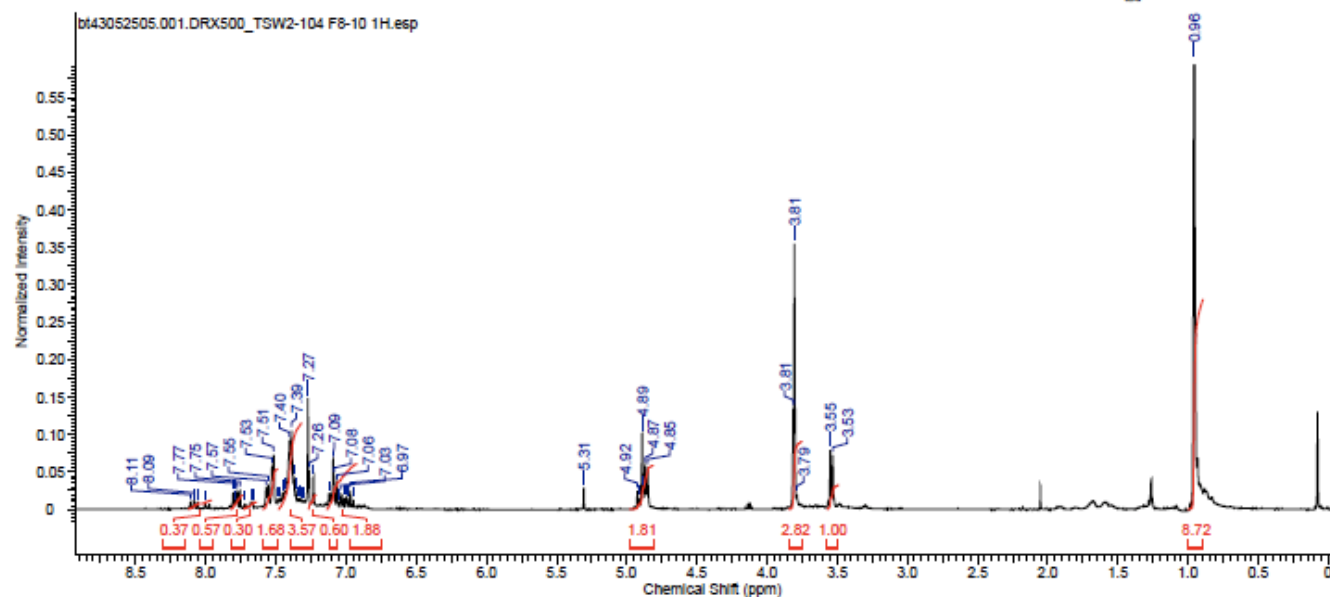
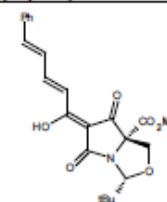
Formula	C ₁₈ H ₂₄ NO ₇	FW	350.366247				
Acquisition Time (sec)	1.0486	Comment	Instrument AVCS500 Group MGM 3125 Benjamin Tan 18/3/11	Date	20 Mar 2011 11:12:00		
Date Stamp	20 Mar 2011 11:12:00	File Name	C:\Documents and Settings\imgroup\CHEM\Desktop\bt31251803\4\data\1\11r	Origin	avc500		
Frequency (MHz)	125.80	Nucleus	13C	Number of Transients	512		
Original Points Count	32768	Owner	dp-nmr\group	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	12571.3047
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970		



This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

20/7/2013 1:43:04 PM

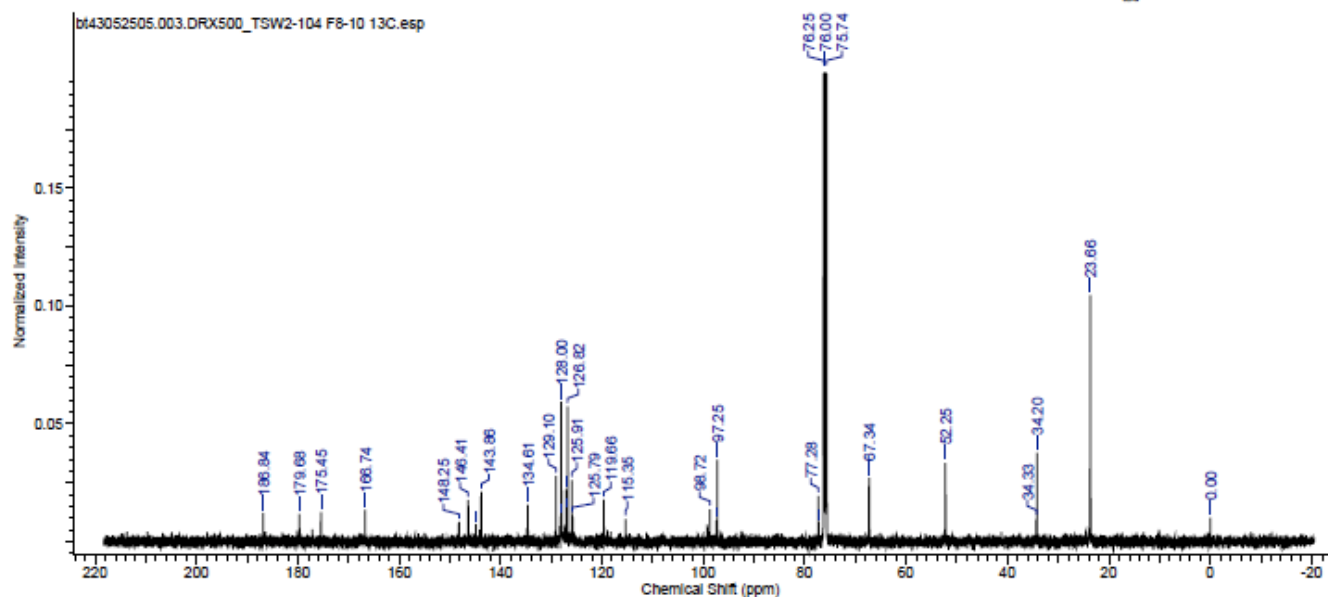
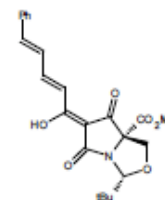
Formula	C ₁₈ H ₁₆ NO ₇	FW	354.3334		
Acquisition Time (sec)	3.1719	Comment	ben tam 4305 25/5/11 PROTON CDCl ₃ (C1/NMR) organic 7	Date	26 May 2011 09:23:28
Date Stamp	26 May 2011 09:23:28	File Name	C:\Documents and Settings\mqmgroup\Desktop\bt43052505\1\data\1\1r	Number of Transients	15
Frequency (MHz)	500.13	Nucleus	¹ H	Origin	drx500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	203.20	SW (cyclical) (Hz)	10330.58	Pulse Sequence	zq30
Spectrum Offset (Hz)	3064.8506	Solvent	CHLOROFORM-d	Spectrum Type	STANDARD
		Sweep Width (Hz)	10330.26	Temperature (degree C)	24.996



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20/7/2013 1:42:38 PM

Formula	C ₁₈ H ₁₆ NO ₇	FW	354.3334				
Acquisition Time (sec)	1.0912	Comment	ben lam 4305 25/5/11 C13CPD CDCl3 (C13NMR) organic 7		Date	26 May 2011 09:42:40	
Date Stamp	26 May 2011 09:42:40		File Name	C:\Documents and Settings\mqmgroup\Desktop\bl43052505\3\data\11\1r			
Frequency (MHz)	125.76	Nucleus	13C	Number of Transients	1024	Origin	dm500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	4597.60	SW (cyclical) (Hz)	30030.03	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	12441.5107
Spectrum Type	STANDARD	Sweep Width (Hz)	30029.11	Temperature (degree C)	24.996		

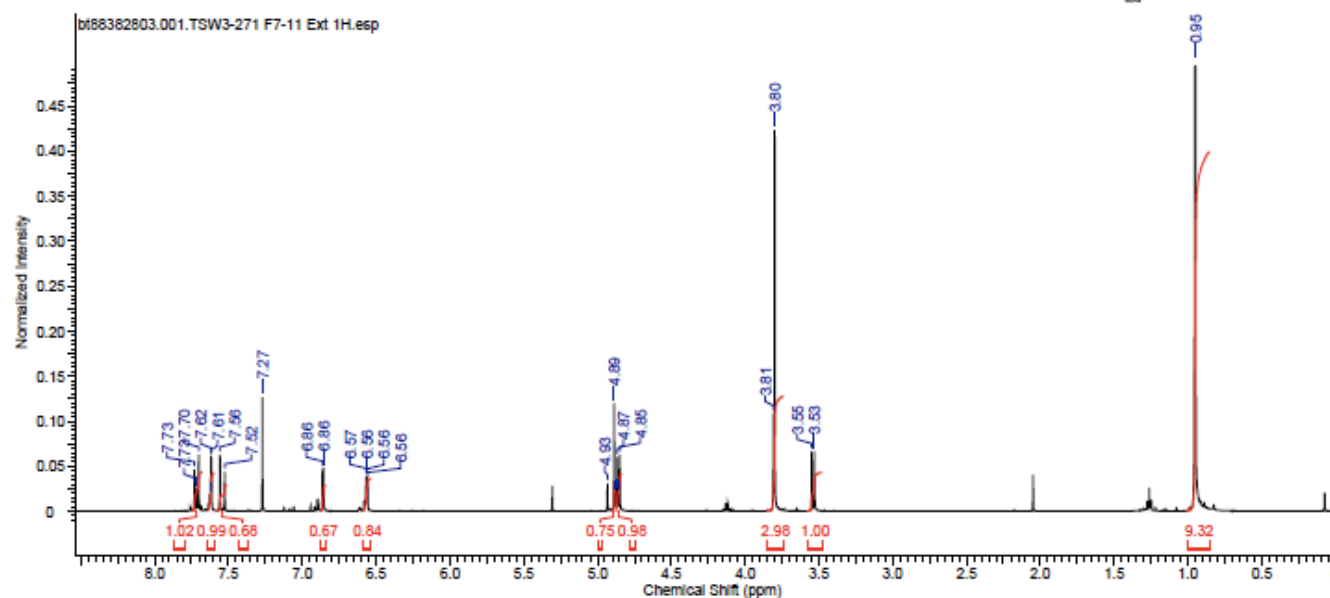
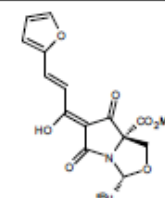


10g

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20/7/2013 1:45:48 PM

Formula	C ₁₈ H ₁₂ NO ₇	FW	318.2583+?		
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 8838 Benjamin Tan 28/3/12	Date	30 Mar 2012 12:07:44
Date Stamp	30 Mar 2012 12:07:44	File Name	C:\Documents and Settings\mqmgroup\Desktop\bt88382803\1\data\1\1r		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	15
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
				Temperature (degree C)	24.970

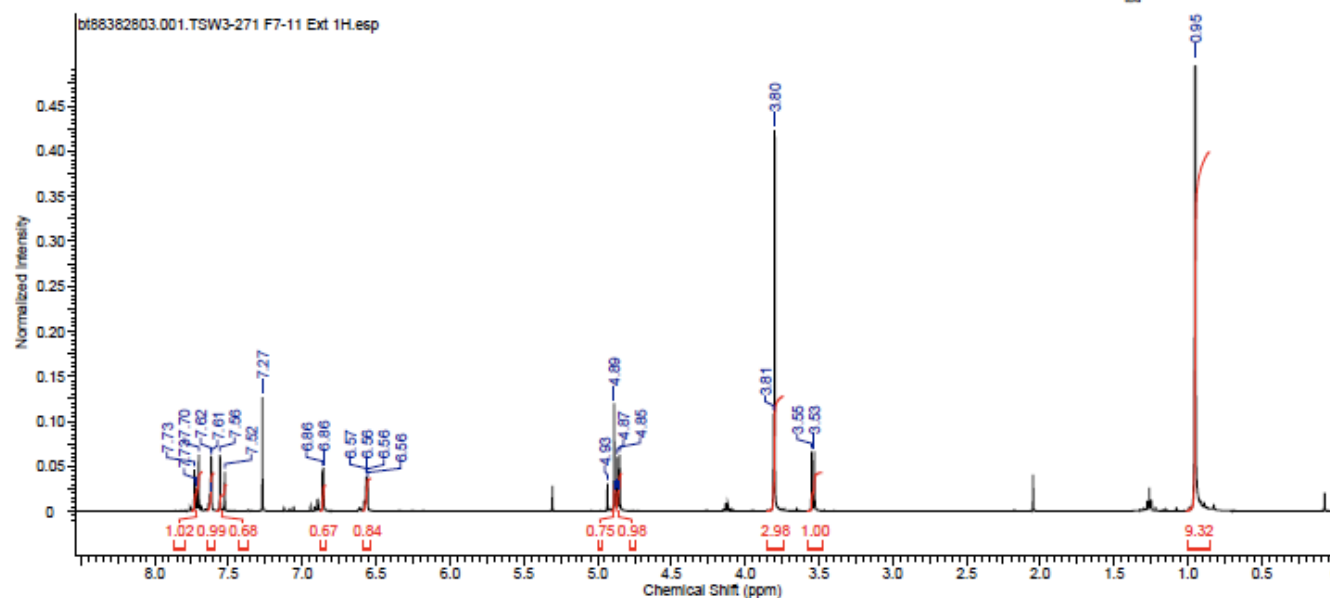
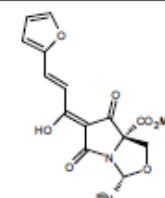


10g

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20/7/2013 1:45:48 PM

Formula	C ₁₈ H ₁₂ NO ₇	FW	318.2583+?		
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 8838 Benjamin Tan 28/3/12	Date	30 Mar 2012 12:07:44
Date Stamp	30 Mar 2012 12:07:44	File Name	C:\Documents and Settings\mqmgroup\Desktop\bt88382803\1\data\1\1r		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	15
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
				Temperature (degree C)	24.970

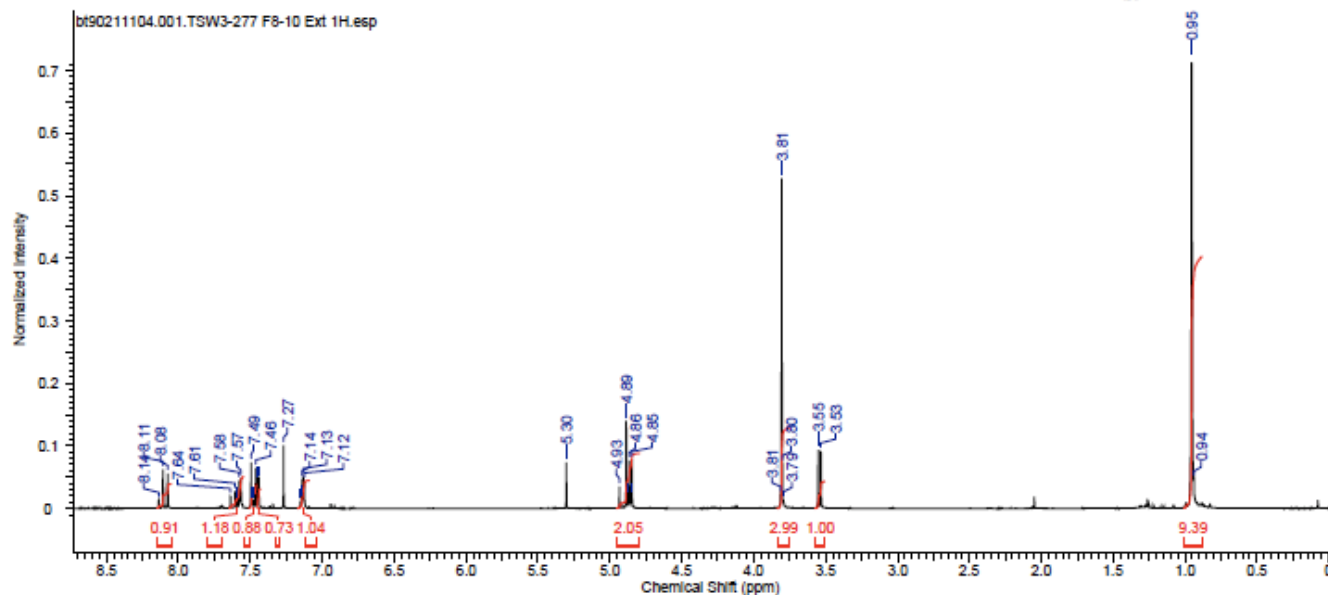
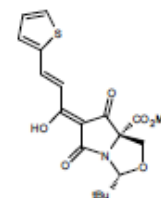


10h

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20/7/2013 1:56:57 PM

Formula C ₁₈ H ₁₂ NO ₅ S?		FW 334.3239+7			
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 9021 Benjamin Tan 11/4/12	Date	13 Apr 2012 02:31:44
Date Stamp	13 Apr 2012 02:31:44	File Name	C:\Documents and Settings\mqmgroup\Desktop\bt90211104\1\data\1\1r		
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	15
Original Points Count	32768	Owner	do-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Solvent	CHLOROFORM-d
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26
				Temperature (degree C)	25.076

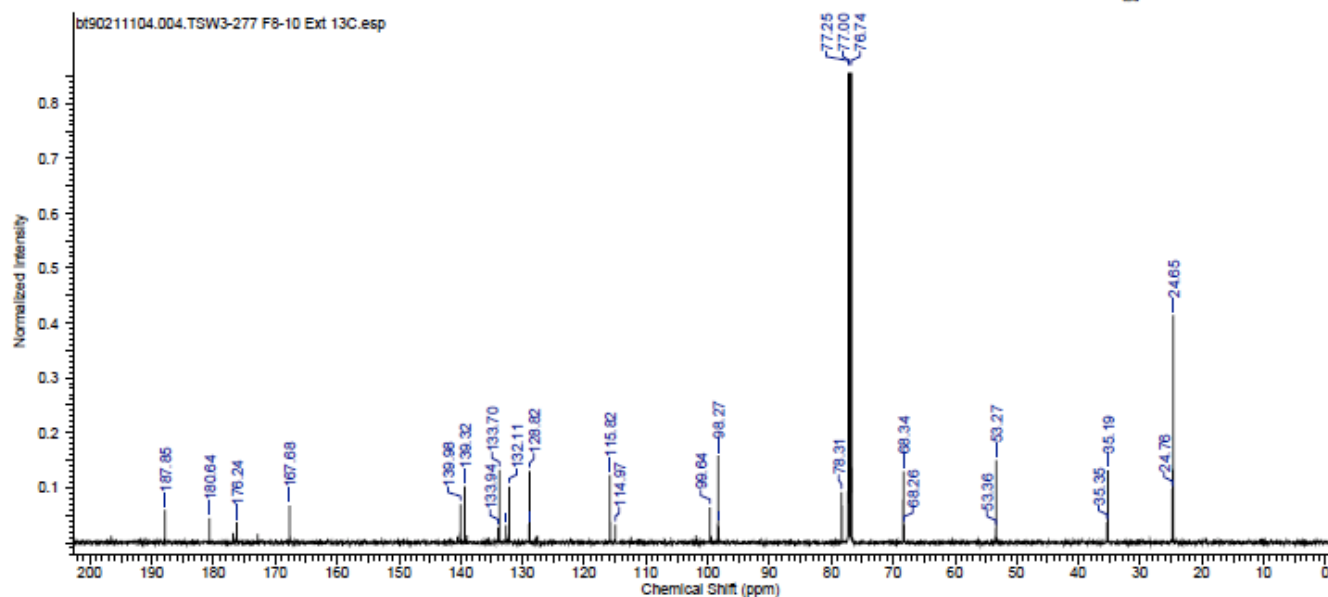
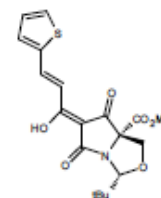


10h

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20/7/2013 1:56:24 PM

Formula	C ₁₈ H ₁₂ NO ₅ S	FW	334.3239+7
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 9021 Benjamin Tan 11/4/12
Date Stamp	13 Apr 2012 03:05:52	File Name	C:\Documents and Settings\m\mgroup\Desktop\bt90211104\4\pdata\1\1r
Frequency (MHz)	125.80	Nucleus	13C
Original Points Count	32768	Owner	dp-nmrgroup
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05
		Temperature (degree C)	24.970
		Number of Transients	256
		Points Count	32768
		Solvent	CHLOROFORM-d
		Pulse Sequence	zgpg30
		Spectrum Offset (Hz)	12571.3047

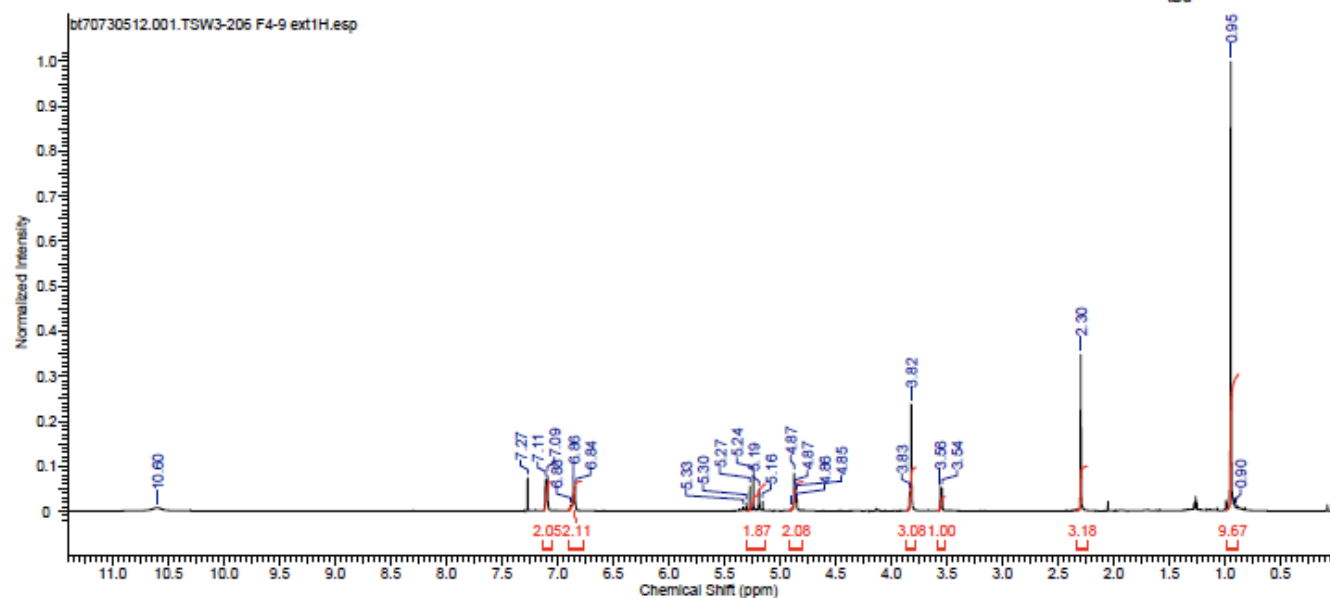
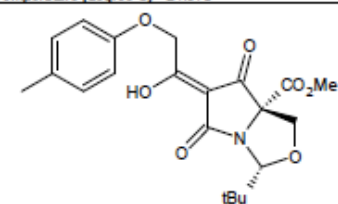


11a

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20/7/2013 12:44:49 PM

Formula	C ₁₇ H ₁₆ NO ₅	FW	346.3114				
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 7073 Benjamin Tan 5/12/11		Date	07 Dec 2011 05:56:16	
Date Stamp	07 Dec 2011 05:56:16		File Name	C:\Documents and Settings\imgroup\Desktop\bt7073051211\data\111r			
Frequency (MHz)	500.30	Nucleus	¹ H	Number of Transients	16	Origin	avc500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zg30
Receiver Gain	4.00	SW (cycles) (Hz)	10330.58	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26	Temperature (degree C)	24.970

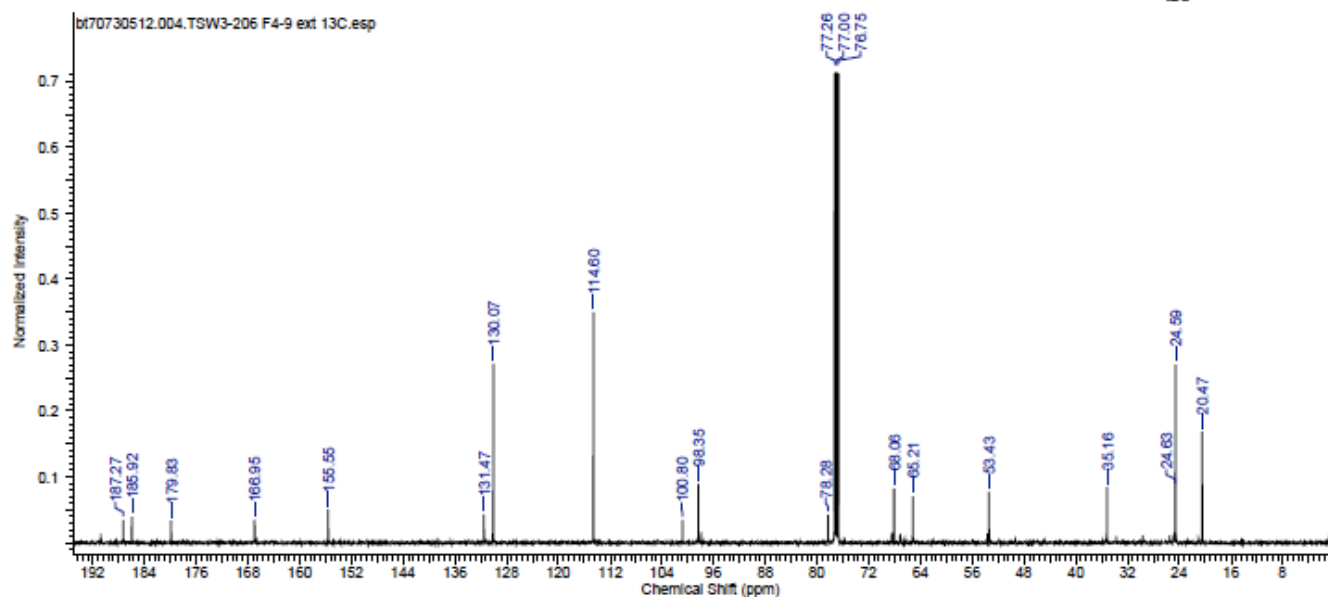
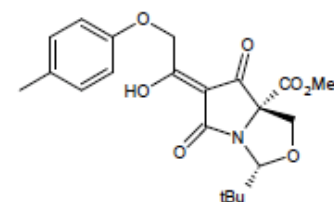


11a

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

20/7/2013 12:45:16 PM

Formula	C ₂₇ H ₂₈ NO ₇	FW	346.3114				
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 7073 Benjamin Tan 5/12/11		Date	07 Dec 2011 06:32:32	
Date Stamp	07 Dec 2011 06:32:32		File Name	C:\Documents and Settings\mymgroup\Desktop\bt70730512\4\data\111r			
Frequency (MHz)	125.80	Nucleus	¹³ C	Number of Transients	256	Origin	avc500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	912.00	SW (cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d	Spectrum Offset (Hz)	12571.3047
Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970		

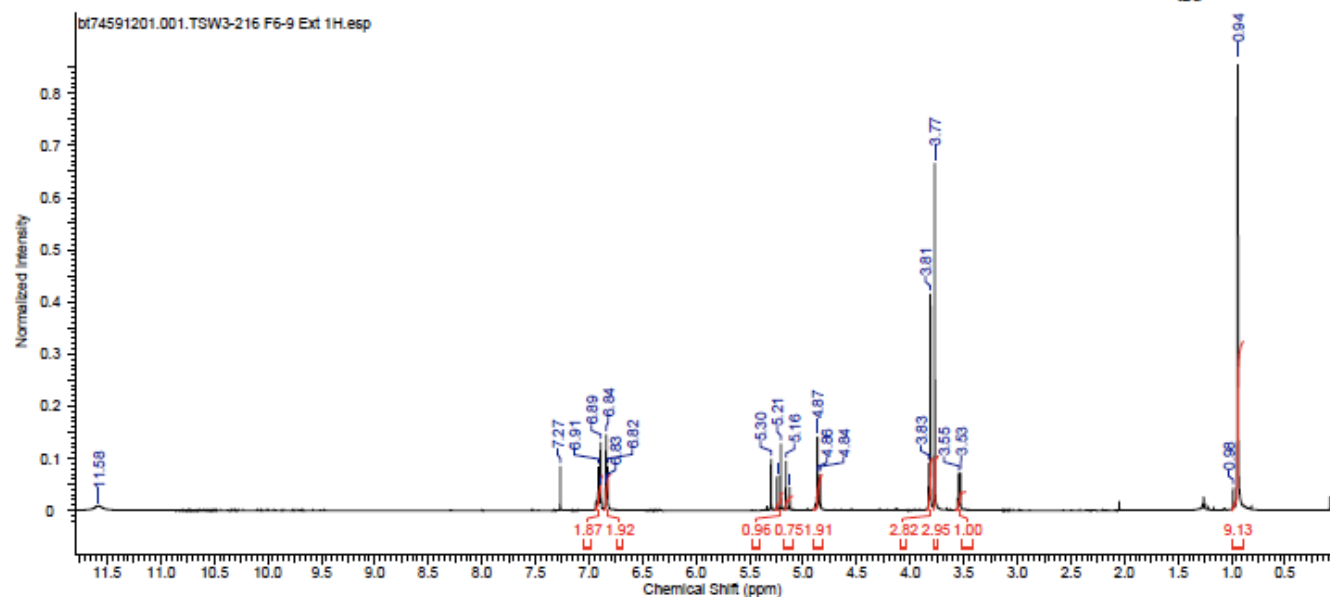
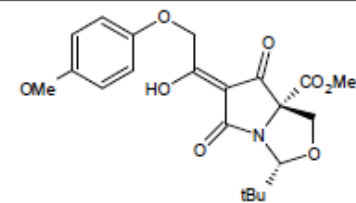


11b

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20/7/2013 12:55:31 PM

Formula	C ₁₈ H ₁₇ NO ₇	FW	331.2769
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM 7459 Benjamin Tan 12/1/12
Date Stamp	15 Jan 2012 11:54:40	File Name	C:\Users\admin\NUS\Desktop\bt745912011\1\data\111r
Frequency (MHz)	500.30	Nucleus	1H
Original Points Count	32768	Owner	dp-nmrgroup
Receiver Gain	4.00	SW (cycles) (Hz)	10330.58
Spectrum Offset (Hz)	3065.5417	Spectrum Type	STANDARD
		Sweep Width (Hz)	10330.26
		Temperature (degree C)	24.970

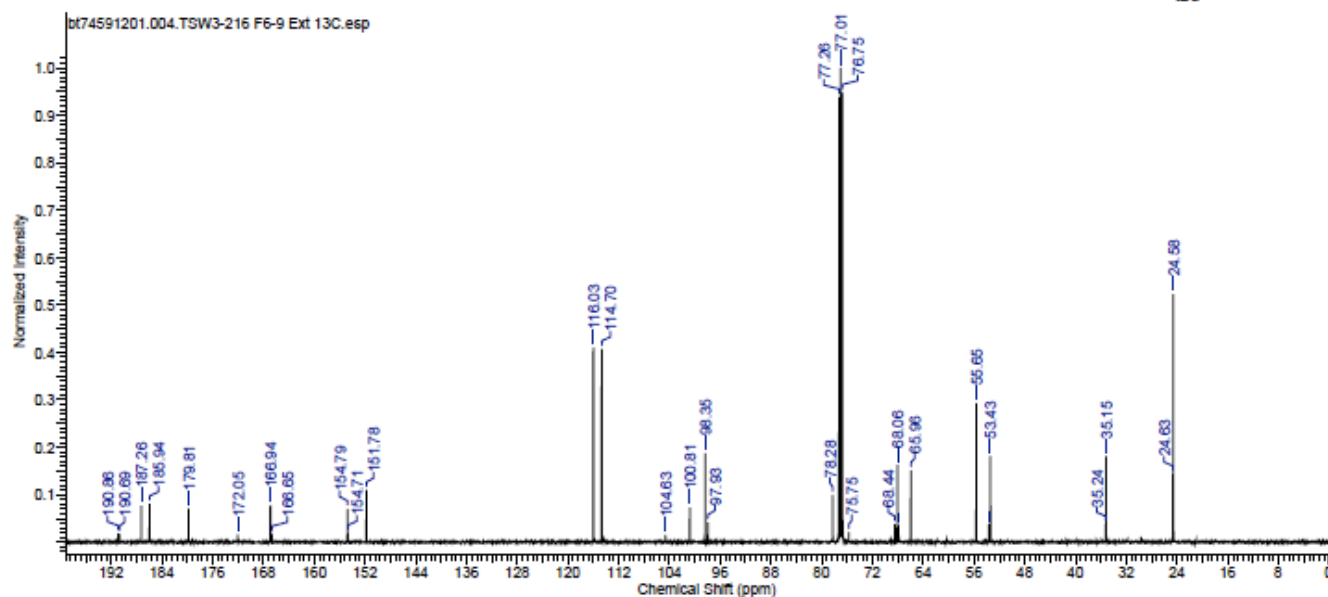
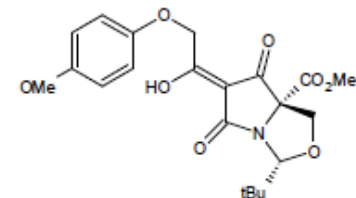


11b

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20/7/2013 12:56:15 PM

Formula	C ₁₈ H ₁₇ NO ₇	FW	331.2769				
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM 7459 Benjamin Tan 12/1/12			Date	15 Jan 2012 12:28:48
Date Stamp	15 Jan 2012 12:28:48		File Name	C:\Users\admin\NUS\Desktop\bt74591201\4\data\111r			
Frequency (MHz)	125.80	Nucleus	¹³ C	Number of Transients	256	Origin	avc500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	1290.00	SW (cycles) (Hz)	31250.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	12571.3047	Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970

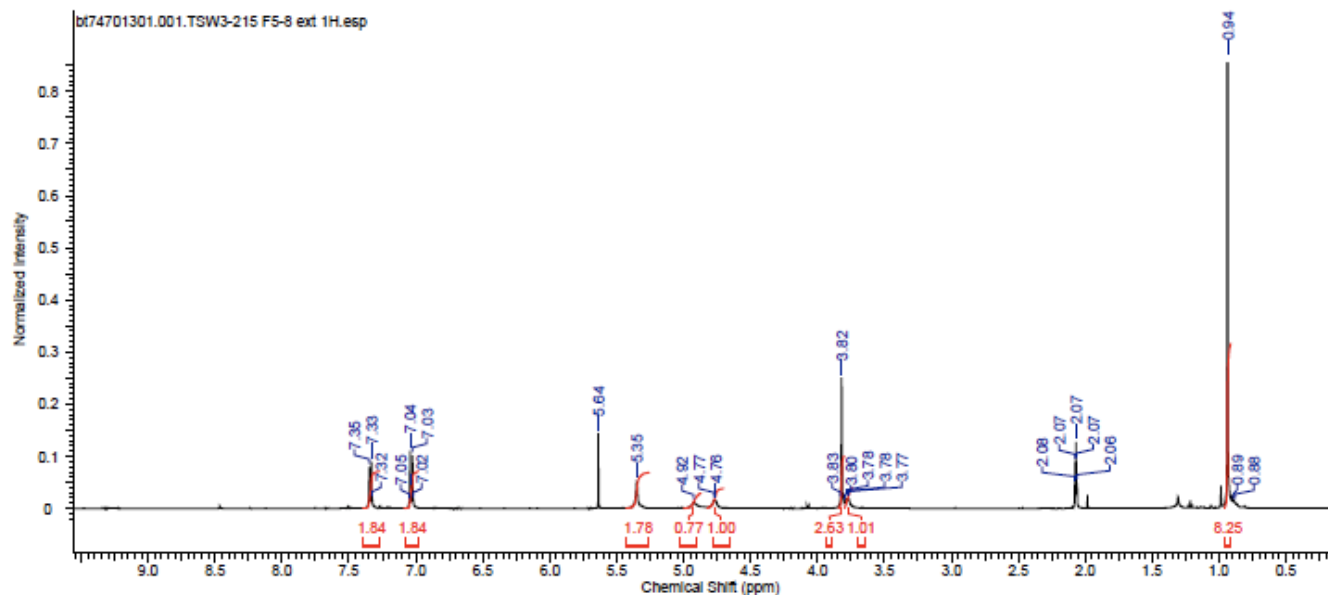
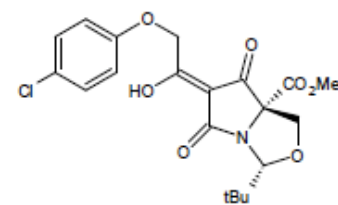


11c

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20/7/2013 12:48:22 PM

Formula C ₁₈ H ₁₇ ClNO ₄ ?		FW 366.7299+?			
Acquisition Time (sec) 3.1719		Comment Instrument AVC500 Group MGM 7470 Benjamin Tan 13/1/12		Date 15 Jan 2012 23:00:16	
Date Stamp 15 Jan 2012 23:00:16		File Name C:\Documents and Settings\mqmggroup\Desktop\bt74701301\1\data\1\1r		Origin avc500	
Frequency (MHz) 500.30		Nucleus ¹ H		Number of Transients 16	
Original Points Count 32768		Owner dp-nmrqgroup		Points Count 32768	
Receiver Gain 4.00		SW(cyclical) (Hz) 10330.58		Solvent Acetone	
Spectrum Type STANDARD		Sweep Width (Hz) 10330.26		Temperature (degree C) 24.970	
				Spectrum Offset (Hz) 3089.5557	

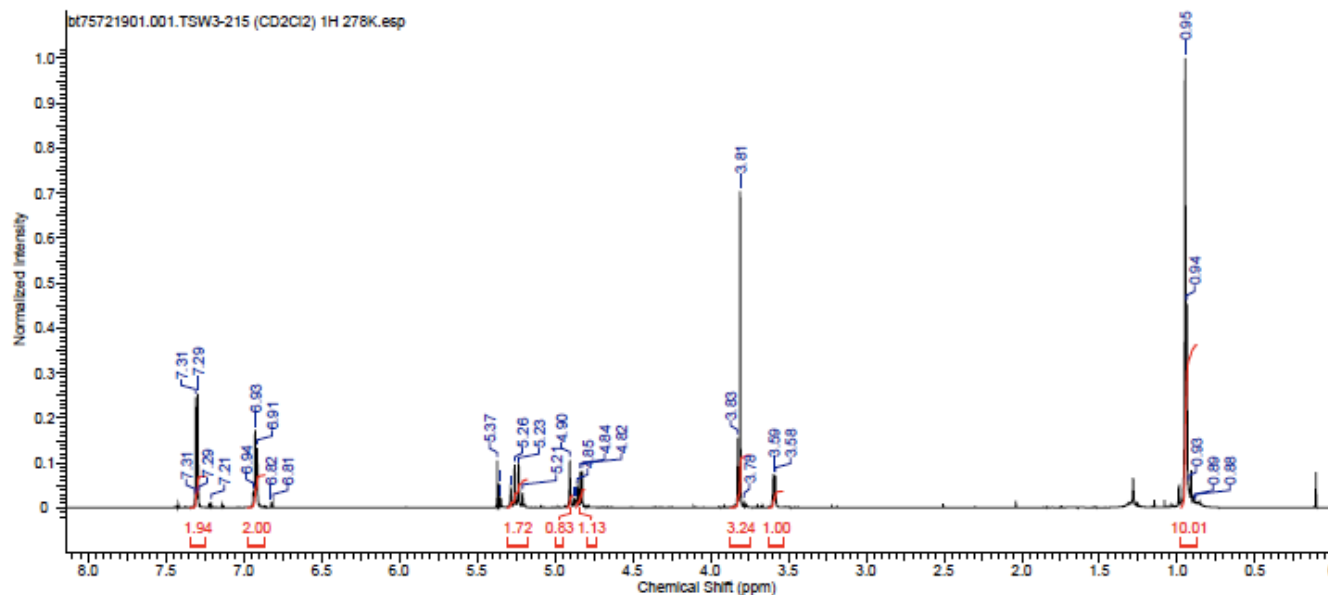
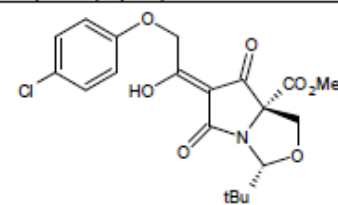


11c

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20/7/2013 12:52:09 PM

Formula C ₁₈ H ₁₇ ClNO ₄ ?		FW 366.7299+?			
Acquisition Time (sec) 2.9360		Comment AV700 1H BENJAMIN TAM 7572 19/1/12CD2Cl2 temp = 278K		Date 19 Jan 2012 11:14:08	
Date Stamp 19 Jan 2012 11:14:08		File Name C:\Documents and Settings\mnmgroup\Desktop\bt75721901\1\data\1\1r			
Frequency (MHz) 699.99		Nucleus 1H		Number of Transients 16	
Original Points Count 32768		Owner dp-nmrgroup		Points Count 131072	
Receiver Gain 3.56		SW(cyclical) (Hz) 11160.71		Solvent DICHLOROMETHANE-d2	
Spectrum Offset (Hz) 3499.9480		Spectrum Type STANDARD		Sweep Width (Hz) 11160.63	
				Temperature (degree C) 5.010	

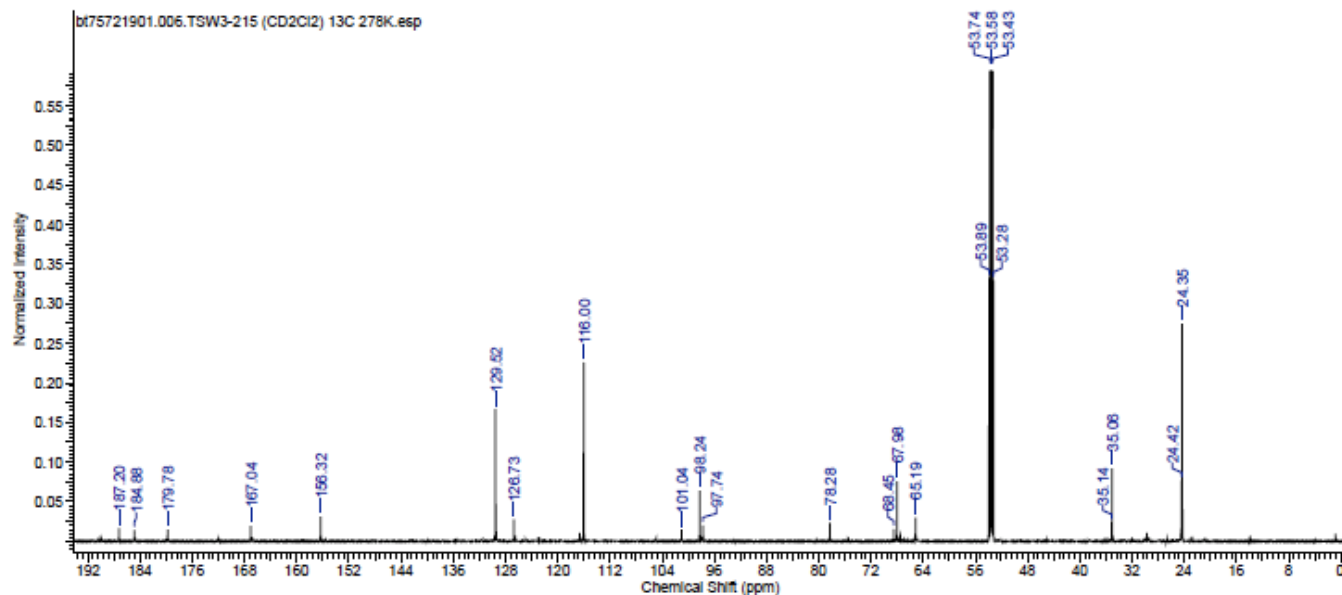
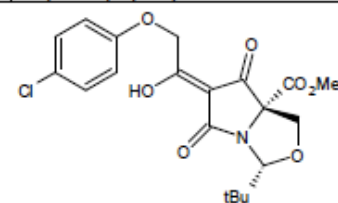


11c

This report was created by ACD/NMR Processor Academic Edition. For more information go to www.acdlabs.com/nmrproc/

20/7/2013 12:52:55 PM

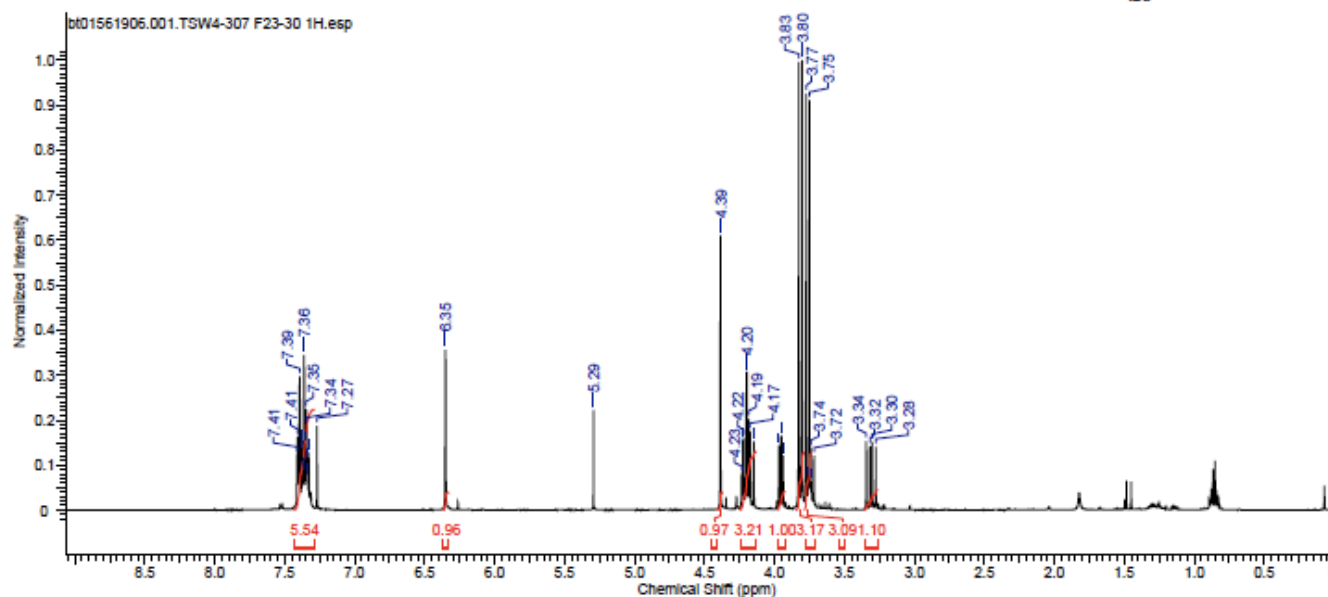
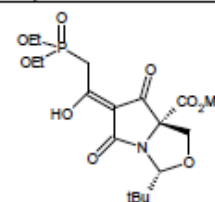
Formula C ₁₈ H ₁₅ ClNO ₄ ?		FW 366.7299+?			
Acquisition Time (sec) 0.7864		Comment AV700 13C BENJAMIN TAM 7572 19/1/12CD2Cl2 temp = 278K		Date 19 Jan 2012 15:47:12	
Date Stamp 19 Jan 2012 15:47:12		File Name C:\Documents and Settings\mqmgroupl\Desktop\bt75721901\6\data\111r		Origin av700	
Frequency (MHz) 176.01		Nucleus 13C		Number of Transients 1024	
Original Points Count 32768		Owner dp-nmrgroup		Points Count 65536	
Receiver Gain 2050.00		SW(cycloct) (Hz) 41666.67		Solvent DICHLOROMETHANE-d2	
Spectrum Offset (Hz) 17600.7637		Spectrum Type STANDARD		Sweep Width (Hz) 41666.03	
				Temperature (degree C) 5.010	



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20/7/2013 1:00:41 PM

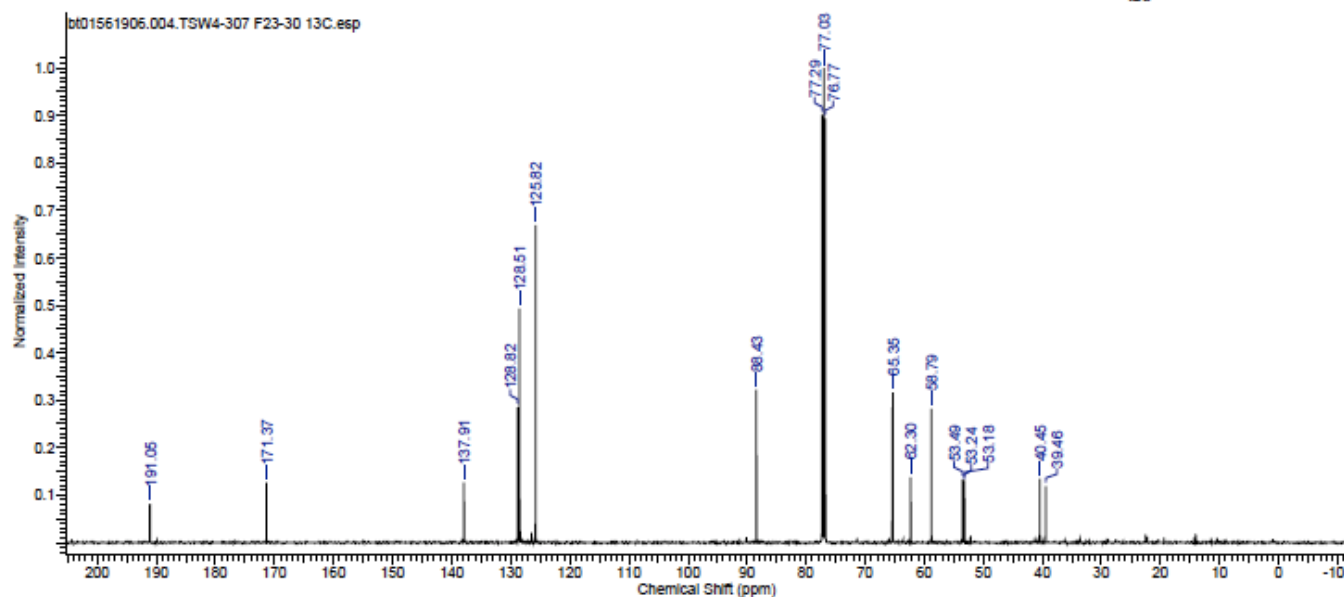
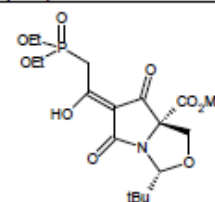
Formula	C ₁₈ H ₁₈ NO ₇ P ₂	FW	286.1547+?		
Acquisition Time (sec)	3.1719	Comment	Instrument AVC500 Group MGM BEN TAM 30156 19/6/12	Date	20 Jun 2012 02:36:00
Date Stamp	20 Jun 2012 02:36:00	File Name	D:\bt01561906\1\data\1\1r		
Frequency (MHz)	500.30	Nucleus	1H	Number of Transients	16
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768
Receiver Gain	4.00	SW(cyclical) (Hz)	10330.58	Pulse Sequence	zg30
Spectrum Offset (Hz)	3065.5417	Solvent	CHLOROFORM-d	Temperature (degree C)	24.970
Spectrum Type	STANDARD	Sweep Width (Hz)	10330.26		



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20/7/2013 1:00:13 PM

Formula	C ₁₈ H ₁₈ NO ₇ P ₂	FW	286.1547+?				
Acquisition Time (sec)	1.0486	Comment	Instrument AVC500 Group MGM BEN TAM 30156 19/6/12	Date	20 Jun 2012 03:50:40		
Date Stamp	20 Jun 2012 03:50:40	File Name	D:\bt01561906\4\pdata\1\1r				
Frequency (MHz)	125.80	Nucleus	13C	Number of Transients	1024	Origin	avc500
Original Points Count	32768	Owner	dp-nmrgroup	Points Count	32768	Pulse Sequence	zgpg30
Receiver Gain	1820.00	SW(cyclical) (Hz)	31250.00	Solvent	CHLOROFORM-d		
Spectrum Offset (Hz)	12571.3047	Spectrum Type	STANDARD	Sweep Width (Hz)	31249.05	Temperature (degree C)	24.970



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20/7/2013 1:01:03 PM

Formula	C ₁₈ H ₁₈ NO ₇ P	FW	286.1547+?
Acquisition Time (sec)	0.8061	Comment	Benjamin Tan MGM 20/6/12 p31acqbbo CDCl3 (C-13NMR) organic 4
Date	20 Jun 2012 11:31:28	Date Stamp	20 Jun 2012 11:31:28
File Name	C:\Documents and Settings\mgmgroup\Desktop\bt01562006\1\pdata\1\1r	Frequency (MHz)	202.46
Nucleus	31P	Number of Transients	64
Owner	dp-nmrgroup	Points Count	32768
SW (cyclical) (Hz)	20325.20	Pulse Sequence	zgpg30
Sweep Width (Hz)	20324.58	Solvent	CHLOROFORM-d
		Spectrum Offset (Hz)	-0.0002
		Spectrum Type	STANDARD
		Temperature (degree C)	24.996

