Spectrum Report (LTE)

Applicant:	M-Labs Technologies, LLC
Address of Applicant:	4740 Von Karman,Suite150, Newport Beach, California 92660, United States
Manufacturer:	Kayamatics Limited
Address of Manufacturer:	Room 1206, Trend Center, 29 Cheung Lee Street, Chai Wan, Hong Kong

Equipment Under Test (EUT)

Product Name:	Wireless Communication Device
Model No.:	PM-L
Marketing Name:	PM-L 001
FCC ID:	2AAQ6PL01
IC:	20230-PL01
Applicable standards:	FCC CFR Title 47 Part 2 FCC CFR Title 47 Part 24 FCC CFR Title 47 Part 27 RSS-130 Issue 1, October 2013 RSS-133 Issue 6, January 2018 RSS-139 Issue 3, July 2015
Date of sample receipt:	August 01, 2018
Date of Test:	August 02-27, 2018
Date of report issued:	August 27, 2018
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

1 Version

Version No.	Date	Description
00	*August 27, 2018*	*Original*

Prepared By: *Tiger Chen* ***Date:*** *August 27, 2018*

Project Engineer

Check By: *Andy Wu* ***Date:*** *August 27, 2018*

Reviewer

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3 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 1.1307 Part 2.1093	Pass* (Please refer to MPE Report)
RF Output Power	Part 2.1046 Part 24.232 (c) Part 27.50(c)(10)/(d)(4)	Pass
Peak-to-Average Ratio	FCC part24.232(d) FCC Part 27.50	Pass
Modulation Characteristics	Part 2.1047	N/A
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 24.238 Part 27.53(h)/(g)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 24.238 (a) Part 27.53(h)/(g)	Pass
Field Strength of Spurious Radiation	Part 2.1053 Part 24.238 (a) Part 27.53(h)/(g)	Pass
Out of band emission, Band Edge	Part 24.238 (a) Part 27.53(h)/(g)	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2)	Pass

Pass: The EUT complies with the essential requirements in the standard.

N/A: Not applicable.

Test Item	Section in RSS	Result
RF Exposure (SAR)	RSS-102	Pass* (Please refer to MPE Report)
Frequency Plan	RSS-130 Clause 4.2 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Pass
Types of Modulation	RSS-130 Clause 4.2 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Pass
Occupied Bandwidth	RSS-Gen Clause 6.6	Pass
Frequency Stability	RSS-130 Clause 4.2 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Pass
Transmitter Output Power and Equivalent Isotropically Radiated Power	RSS-130 Clause 4.2 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Pass
Peak-to-Average Power Ratio	RSS-130 Clause 4.2 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Pass
Transmitter Unwanted Emissions	RSS-130 Clause 4.2 RSS-133 Clause 6.1 RSS-139 Clause 6.1	Pass
Field strength of spurious radiation measurement	RSS-Gen Clause 6.13	Pass

Pass: The EUT complies with the essential requirements in the standard.

3.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 26.5GHz	± 4.68dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

4 General Information

4.1 General Description of EUT

Product Name:	Wireless Communication Device
Model No.:	PM-L
S/N:	XK2069100358
Tested Sample(s) ID:	GTS201808000156-01
Hardware Version:	P1.0.0
Software Version:	1.0.1
Support Networks:	LTE
Support Bands:	LTE Band 2, LTE Band 4, LTE Band 12
Channel Bandwidth:	LTE Band 2: 1.4MHz; 3MHz; 5MHz; 10MHz; 15MHz; 20MHz LTE Band 4: 1.4MHz; 3MHz; 5MHz; 10MHz; 15MHz; 20MHz LTE Band 12: 1.4MHz; 3MHz; 5MHz; 10MHz
TX Frequency:	LTE Band 2: 1850.70MHz-1909.30MHz LTE Band 4: 1710.70MHz-1754.30MHz LTE Band 12: 699.70MHz-715.30MHz
Modulation type:	LTE Band 2/4/12: QPSK, 16QAM
Antenna type:	Integral antenna
Antenna gain:	1.0dBi (declare by manufacturer)
Power supply:	DC 12V or DC 7.4V 4400mAh/32.56Wh Li-ion Rechargeable Battery

4.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H and Part 24 subpart E of the FCC CFR 47 Rules.
This submittal(s) (test report) is filing to comply with RSS-132, RSS-133, RSS-139, RSS-Gen of the IC Rules.

4.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures document on TIA/EIA 603 and ANSI C63.4, FCC CFR 47.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

4.4 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
● **FCC —Registration No.: 381383**
Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fuly described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383, January 08, 2018.
● **Industry Canada (IC) —Registration No.: 9079A-2**
The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2, August 15, 2016.

4.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

Address: No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

5 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019

General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

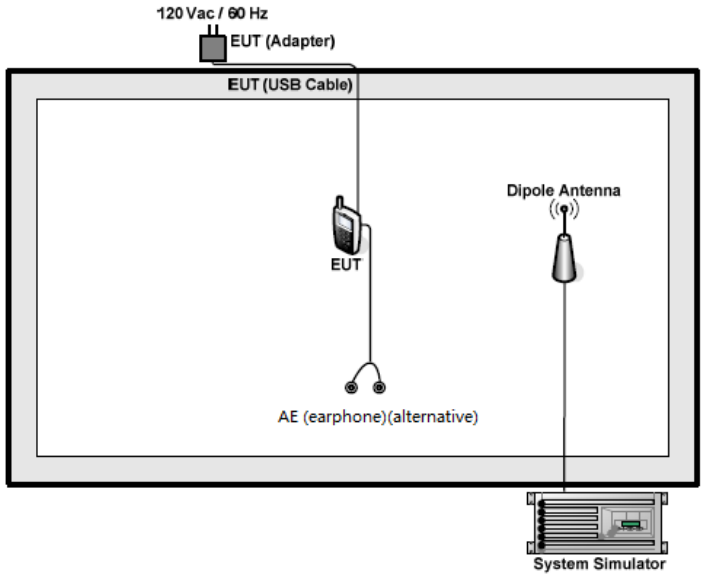
6 System test configuration

6.1 Test mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
LTE Band 2	■ QPSK and 16QAM link	■ QPSK and 16QAM link
LTE Band 4	■ QPSK and 16QAM link	■ QPSK and 16QAM link
LTE Band 12	■ QPSK and 16QAM link	■ QPSK and 16QAM link

6.2 Configuration of Tested System



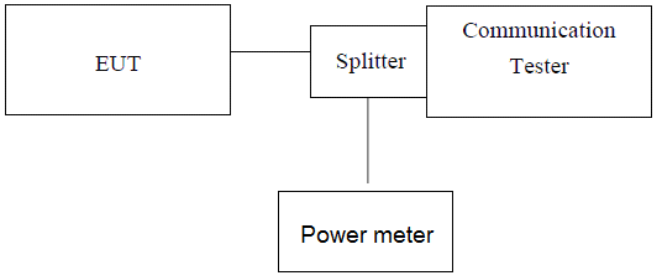
6.3 Frequency Plan

Frequency Plan for band 698MHz ~ 756MHz	
Frequency Plan (MHz)	**698-716**
Product Supported plan (Yes or No)	Y

Frequency Plan for band 1710MHz ~ 1755MHz			
Block	**Total Spectrum**	**Lower Sub-band**	**Product Supported plan (Yes or No)**
Block A	20 MHz	1710-1720 MHz	Y
Block B	20 MHz	1720-1730 MHz	Y
Block C	10 MHz	1730-1735 MHz	Y
Block D	10 MHz	1735-1740 MHz	Y
Block E	10 MHz	1740-1745 MHz	Y
Block F	20 MHz	1745-1755 MHz	Y
Block G	10 MHz	1755-1760 MHz	N
Block H	10 MHz	1760-1765 MHz	N
Block I	10 MHz	1765-1775 MHz	N
Block J1	10 MHz	1770-1775 MHz	N
Block J2	10 MHz	1775-1780 MHz	N

Frequency Plan for band 1850MHz ~ 1915MHz			
Block	**Total Spectrum**	**Lower Sub-band**	**Product Supported plan (Yes or No)**
Block A	30 MHz	1850-1865 MHz	Y
Block D*	10 MHz	1865-1870 MHz	Y
Block B1	10 MHz	1870-1875 MHz	Y
Block B2*	10 MHz	1875-1880 MHz	Y
Block B3*	10 MHz	1880-1885 MHz	Y
Block E*	10 MHz	1885-1890 MHz	Y
Block F	10 MHz	1890-1895 MHz	Y
Block C1*	10 MHz	1895-1900 MHz	Y
Block C2*	10 MHz	1900-1905 MHz	Y
Block C3*	10 MHz	1905-1910 MHz	Y
Block G	10 MHz	1910-1915 MHz	N
Note: * The usage of these blocks in certain geographic areas is under policies listed in SRSP-510 sections 3.1.3, 3.1.4, 3.1.5 and 3.1.15.			

6.4 Conducted Average Output Power

Test Requirement for FCC:	Part 24.232 (c); Part 27.50(c)(10)/(d)(4)
Test Requirement for IC:	RSS-130 Clause 4.4, RSS-133 Clause 6.4, RSS-139 Clause 6.5
Limit for FCC:	LTE Band 2: 2W LTE Band 4: 1W LTE Band 12: 3W
Limit for IC:	LTE Band 2: 2W LTE Band 4: 1W LTE Band 12: 5W
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data

Band 2						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18607 1850.7MHz	Channel 18900 1880.0MHz	Channel 19193 1909.3MHz
1.4MHz	QPSK	1	0	22.04	21.32	**22.95**
		1	2	22.86	22.70	21.83
		1	5	21.64	22.27	22.34
		3	0	21.69	21.38	21.56
		3	1	21.65	22.06	22.65
		3	2	22.35	21.13	22.47
		6	0	21.38	22.30	21.36
	16QAM	1	0	22.22	22.88	21.27
		1	2	21.35	22.18	21.36
		1	5	22.09	21.88	22.07
		3	0	22.12	22.87	21.56
		3	1	21.62	21.70	21.18
		3	2	21.77	21.23	22.35
		6	0	22.38	21.38	21.91
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18615 1851.5MHz	Channel 18900 1880.0MHz	Channel 19185 1908.5MHz
3MHz	QPSK	1	0	22.60	21.48	**23.00**
		1	8	22.87	22.01	21.43
		1	14	21.64	21.02	22.04
		8	0	21.37	22.46	22.37
		8	4	21.87	21.75	22.27
		8	7	21.61	22.74	21.97
		15	0	21.75	22.27	22.51
	16QAM	1	0	22.12	22.63	22.06
		1	8	22.34	22.67	22.13
		1	14	21.81	22.68	21.35
		8	0	21.76	22.53	22.91
		8	4	21.55	22.50	21.73
		8	7	21.31	21.44	22.28
		15	0	22.95	21.56	21.10

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18625 1852.5MHz	Channel 18900 1880.0MHz	Channel 19175 1907.5MHz
5MHz	QPSK	1	0	22.03	21.59	21.95
		1	13	21.13	21.87	21.67
		1	24	22.36	21.46	22.74
		12	0	22.48	21.31	21.28
		12	6	21.48	22.45	**22.97**
		12	13	22.27	22.36	21.75
		25	0	21.97	21.30	22.91
	16QAM	1	0	21.82	22.31	22.44
		1	13	21.40	22.33	22.08
		1	24	22.84	21.46	22.86
		12	0	21.23	21.31	22.72
		12	6	22.85	22.31	22.27
		12	13	21.77	21.59	22.77
		25	0	21.58	22.33	22.90
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18650 1855.0MHz	Channel 18900 1880.0MHz	Channel 19150 1905.0MHz
10MHz	QPSK	1	0	21.19	22.76	22.91
		1	25	21.41	22.95	21.83
		1	49	22.08	22.36	21.06
		25	0	22.15	21.81	22.56
		25	13	21.44	22.75	21.69
		25	25	22.03	22.21	22.14
		50	0	21.47	21.66	22.52
	16QAM	1	0	21.15	21.76	22.80
		1	25	22.63	22.75	22.07
		1	49	21.48	21.33	21.64
		25	0	21.76	21.14	22.17
		25	13	21.21	22.88	21.81
		25	25	**22.99**	21.87	22.66
		50	0	21.88	21.24	22.67

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18675 1857.5MHz	Channel 18900 1880.0MHz	Channel 19125 1902.5MHz
15MHz	QPSK	1	0	21.43	22.60	**22.96**
		1	38	22.69	22.36	22.63
		1	74	21.20	21.18	21.41
		36	0	21.77	21.75	21.01
		36	18	22.84	22.05	21.18
		36	39	21.66	21.69	22.72
		75	0	21.65	21.77	21.14
	16QAM	1	0	22.02	22.12	22.01
		1	38	22.19	22.03	21.95
		1	74	21.70	21.22	22.66
		36	0	22.54	22.36	22.79
		36	18	22.66	21.55	21.82
		36	39	21.05	22.74	21.22
		75	0	21.92	21.65	21.21
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 18700 1860.0MHz	Channel 18900 1880.0MHz	Channel 19100 1900.0MHz
20MHz	QPSK	1	0	22.29	22.85	22.80
		1	50	21.29	22.44	21.39
		1	99	**22.93**	21.58	22.89
		50	0	21.67	22.14	22.34
		50	25	21.40	22.69	22.11
		50	50	21.34	21.81	21.12
		100	0	21.60	22.87	21.43
	16QAM	1	0	22.09	22.26	21.99
		1	50	21.82	21.58	21.83
		1	99	21.86	21.05	21.68
		50	0	22.59	21.86	21.95
		50	25	21.80	21.12	21.16
		50	50	21.40	21.67	22.79
		100	0	22.73	22.65	22.54

Band 4						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19957 1710.7MHz	Channel 20175 1732.5MHz	Channel 20393 1754.3MHz
1.4MHz	QPSK	1	0	22.27	22.69	22.62
		1	2	22.74	22.28	22.60
		1	5	21.63	21.87	22.34
		3	0	22.35	22.79	**22.99**
		3	1	22.79	22.97	22.77
		3	2	22.80	21.74	22.31
		6	0	22.23	22.98	21.15
	16QAM	1	0	22.94	21.73	22.75
		1	2	21.39	22.22	21.71
		1	5	22.93	22.55	21.79
		3	0	21.53	22.20	21.60
		3	1	21.03	21.29	21.42
		3	2	22.73	22.36	22.80
		6	0	22.72	22.36	22.95
Bandwidth	Mode	RB Size	RB Offset	Actual output po2wer(dBm)		
				Channel 19965 1711.5MHz	Channel 20175 1732.5MHz	Channel 20385 753.5MHz
3MHz	QPSK	1	0	22.36	21.42	21.61
		1	8	21.44	21.91	22.31
		1	14	21.36	22.18	22.43
		8	0	**22.94**	22.16	22.90
		8	4	21.28	22.74	21.11
		8	7	22.88	22.75	22.15
		15	0	21.42	22.22	21.91
	16QAM	1	0	22.40	21.42	21.35
		1	8	21.92	22.53	21.29
		1	14	22.06	22.68	21.72
		8	0	22.09	21.89	22.66
		8	4	21.86	22.59	21.12
		8	7	21.18	21.26	21.73
		15	0	21.12	23.00	21.70

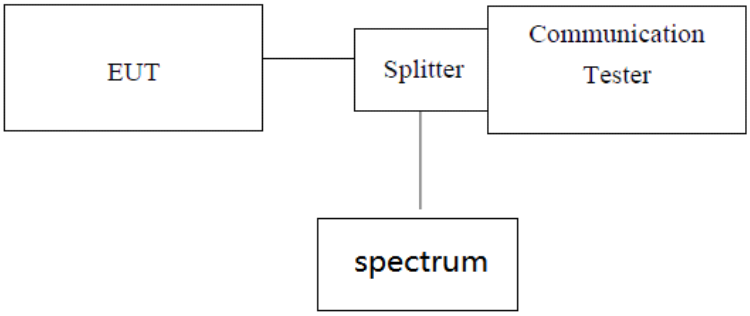
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19975 1712.5MHz	Channel 20175 1732.5MHz	Channel 20375 1752.5MHz
5MHz	QPSK	1	0	22.40	21.68	21.36
		1	13	21.59	22.16	22.05
		1	24	21.41	22.26	21.65
		12	0	21.01	21.78	21.16
		12	6	21.44	21.84	22.17
		12	13	22.56	21.12	**22.99**
		25	0	21.47	21.00	21.13
	16QAM	1	0	21.58	21.05	21.24
		1	13	21.39	21.62	22.51
		1	24	21.87	21.21	22.88
		12	0	21.04	22.74	22.07
		12	6	21.66	22.60	21.77
		12	13	22.90	21.99	21.46
		25	0	22.71	21.77	21.26
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20000 1715.0MHz	Channel 20175 1732.5MHz	Channel 20350 1750.0MHz
10MHz	QPSK	1	0	22.93	22.68	22.89
		1	25	22.67	21.65	22.56
		1	49	21.71	22.26	22.01
		25	0	21.22	21.53	21.13
		25	13	22.83	22.78	22.19
		25	25	22.60	21.79	22.11
		50	0	22.74	**22.98**	21.12
	16QAM	1	0	22.90	22.69	22.52
		1	25	22.77	21.81	21.27
		1	49	21.99	22.52	22.56
		25	0	21.20	22.54	21.57
		25	13	21.43	22.79	21.91
		25	25	22.49	21.77	22.35
		50	0	22.47	22.20	21.47

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20025 1717.5MHz	Channel 20175 1732.5MHz	Channel 20325 1747.5MHz
15MHz	QPSK	1	0	21.60	22.06	22.20
		1	38	21.30	21.91	21.81
		1	74	21.08	21.65	21.66
		36	0	21.74	22.60	22.75
		36	18	22.30	21.20	22.81
		36	39	22.63	21.34	21.77
		75	0	21.15	21.80	**22.89**
	16QAM	1	0	21.64	22.11	21.52
		1	38	21.80	21.37	22.65
		1	74	21.99	22.67	21.61
		36	0	22.47	22.32	21.48
		36	18	22.33	21.41	21.60
		36	39	22.78	21.61	22.63
		75	0	21.49	21.05	22.27
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 20050 1720.0MHz	Channel 20175 1732.5MHz	Channel 20300 1745.0MHz
20MHz	QPSK	1	0	21.68	22.23	**22.95**
		1	50	22.89	21.73	22.04
		1	99	21.67	22.11	22.81
		50	0	22.54	21.27	21.53
		50	25	22.90	21.50	21.08
		50	50	22.15	21.95	21.69
		100	0	22.71	21.84	22.34
	16QAM	1	0	22.93	21.53	22.79
		1	50	22.03	22.08	22.76
		1	99	22.83	22.46	21.95
		50	0	21.62	22.93	22.24
		50	25	22.55	21.96	21.79
		50	50	22.19	21.93	21.62
		100	0	22.66	21.13	22.03

Band 12						
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23017 699.7MHz	Channel 23095 707.5MHz	Channel 23173 715.3MHz
1.4MHz	QPSK	1	0	**22.99**	22.82	22.01
		1	2	22.65	22.05	22.98
		1	5	21.82	21.12	21.85
		3	0	21.29	21.04	22.46
		3	1	21.69	22.84	21.78
		3	2	22.94	22.01	22.68
		6	0	21.34	21.61	22.71
	16QAM	1	0	21.38	22.99	22.07
		1	2	21.34	22.78	21.20
		1	5	22.10	22.00	21.38
		3	0	22.92	21.89	21.37
		3	1	21.25	22.56	22.39
		3	2	22.56	21.44	21.79
		6	0	22.85	22.05	21.36
Bandwidth	Mode	RB Size	RB Offset	Actual output po2wer(dBm)		
				Channel 23025 700.5MHz	Channel 23095 707.5MHz	Channel 23165 714.5MHz
3MHz	QPSK	1	0	22.49	22.11	21.23
		1	8	21.88	22.68	22.30
		1	14	22.31	21.60	21.44
		8	0	22.07	**22.99**	21.13
		8	4	21.49	22.84	22.94
		8	7	21.09	21.03	22.76
		15	0	22.02	22.88	21.55
	16QAM	1	0	21.44	22.04	22.72
		1	8	22.80	22.32	21.24
		1	15	22.80	22.85	21.82
		8	0	22.98	22.92	22.54
		8	4	22.57	22.18	22.72
		8	7	21.11	21.11	22.84
		15	0	22.92	21.04	21.63

Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23035 701.5MHz	Channel 23095 707.5MHz	Channel 23155 713.5MHz
5MHz	QPSK	1	0	22.03	22.98	21.38
		1	13	22.10	21.53	21.47
		1	24	**22.99**	21.42	21.44
		12	0	21.72	22.49	21.46
		12	6	21.21	22.50	21.90
		12	13	22.94	21.74	22.86
		25	0	22.86	21.99	21.79
	16QAM	1	0	22.73	22.98	21.88
		1	13	22.14	22.65	21.78
		1	24	22.18	22.62	22.28
		12	0	22.90	21.94	22.69
		12	6	21.61	22.80	22.03
		12	13	21.37	21.88	22.45
		25	0	21.51	22.66	21.70
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 23060 704.0MHz	Channel 23095 707.5MHz	Channel 23130 711.0MHz
10MHz	QPSK	1	0	21.25	21.99	22.14
		1	25	22.06	22.48	21.36
		1	49	21.82	22.62	22.04
		25	0	21.14	22.48	22.25
		25	13	22.80	21.84	22.81
		25	25	22.19	22.43	22.21
		50	0	21.61	21.85	22.84
	16QAM	1	0	21.90	22.79	22.20
		1	25	22.61	21.93	21.88
		1	49	22.34	22.92	22.69
		25	0	22.80	21.08	**22.94**
		25	13	21.45	22.46	21.62
		25	25	21.33	22.21	22.40
		50	0	21.61	22.32	22.03

6.5 Peak-to-Average Ratio

Test Requirement for FCC:	FCC part24.232(d) & FCC Part 27.50
Test Requirement for IC:	RSS-130 Clause 4.4, RSS-133 Clause 6.4, RSS-139 Clause 6.5
Limit:	13db
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The transmitter output port was connected to base station. 2. The RF output of EUT was connected to the power meter by RF cable and attenuator, the path loss was compensated to the results for each measurement. 3. Set EUT at maximum power through base station. 4. Select lowest, middle, and highest channels for each band and different modulation. 5. Measure the maximum burst average power. 6. Record the maximum peak-to-average ratio value.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement data:

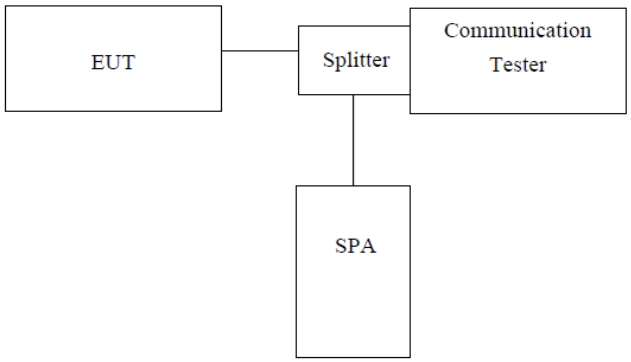
QPSK mode:

Test Band	Bandwidth	Peak to Average Ratio (dB)			Limit (dB)	Result
		Low Ch.	Middle Ch.	High Ch.		
LTE Band 2	1.4MHz	2.97	2.47	2.42	13	PASS
	3MHz	2.06	2.59	3.00	13	PASS
	5MHz	4.88	4.24	4.11	13	PASS
	10MHz	4.36	4.92	4.65	13	PASS
	15MHz	5.92	5.20	5.30	13	PASS
	20MHz	6.73	6.65	6.81	13	PASS
LTE Band 4	1.4MHz	2.17	2.93	2.02	13	PASS
	3MHz	2.58	2.12	2.61	13	PASS
	5MHz	4.88	4.12	4.99	13	PASS
	10MHz	4.52	4.76	4.36	13	PASS
	15MHz	5.06	5.41	5.24	13	PASS
	20MHz	6.56	6.02	6.24	13	PASS
LTE Band 12	1.4MHz	2.41	2.73	2.84	13	PASS
	3MHz	2.44	2.97	2.58	13	PASS
	5MHz	4.85	4.29	4.65	13	PASS
	10MHz	4.97	4.39	4.48	13	PASS

16QAM mode:

Test Band	Bandwidth	Peak to Average Ratio (dB)			Limit (dB)	Result
		Low Ch.	Middle Ch.	High Ch.		
LTE Band 2	1.4MHz	2.30	2.15	2.67	13	PASS
	3MHz	2.78	2.98	2.20	13	PASS
	5MHz	4.52	4.59	4.20	13	PASS
	10MHz	4.10	4.18	4.97	13	PASS
	15MHz	5.79	5.23	5.99	13	PASS
	20MHz	6.97	6.10	6.52	13	PASS
LTE Band 4	1.4MHz	2.56	2.89	2.34	13	PASS
	3MHz	2.51	2.70	2.35	13	PASS
	5MHz	4.10	4.38	4.26	13	PASS
	10MHz	4.48	4.46	4.93	13	PASS
	15MHz	5.93	5.08	5.49	13	PASS
	20MHz	6.60	6.94	6.92	13	PASS
LTE Band 12	1.4MHz	2.29	2.12	2.88	13	PASS
	3MHz	2.95	2.24	2.97	13	PASS
	5MHz	4.10	4.32	4.57	13	PASS
	10MHz	4.27	4.49	4.94	13	PASS

6.6 Occupy Bandwidth

Test Requirement for FCC:	Part 24.238; FCC Part 27.53(h)/(g)
Test Requirement for IC:	RSS-Gen Clause 6.6
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer 2. RBW was set to about 1% of emission BW, VBW= 3 times RBW. 3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data

QPSK mode：

EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 2	1.4MHz	Low range	6	0	1100.90	1311.00
		Mid range	6	0	1099.80	1280.00
		High range	6	0	1094.70	1290.00
	3MHz	Low range	15	0	2685.00	2936.00
		Mid range	15	0	2679.60	2939.00
		High range	15	0	2673.10	2918.00
	5MHz	Low range	25	0	4514.20	4863.00
		Mid range	25	0	4519.00	5052.00
		High range	25	0	4525.00	5297.00
	10MHz	Low range	50	0	8931.70	9693.00
		Mid range	50	0	8942.50	9642.00
		High range	50	0	8930.60	9677.00
	15MHz	Low range	75	0	13458.80	14803.00
		Mid range	75	0	13368.10	14595.00
		High range	75	0	13436.80	14681.00
	20MHz	Low range	100	0	17879.60	19282.00
		Mid range	100	0	17807.70	19019.00
		High range	100	0	17924.50	19480.00

EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 4	1.4MHz	Low range	6	0	1099.10	1310.00
		Mid range	6	0	1095.80	1296.00
		High range	6	0	1093.90	1287.00
	3MHz	Low range	15	0	2685.80	2935.00
		Mid range	15	0	2683.20	2931.00
		High range	15	0	2682.80	2941.00
	5MHz	Low range	25	0	4503.50	5012.00
		Mid range	25	0	4517.70	4959.00
		High range	25	0	4512.60	4905.00
	10MHz	Low range	50	0	8907.80	9599.00
		Mid range	50	0	8951.50	9793.00
		High range	50	0	8925.60	9677.00
	15MHz	Low range	75	0	13393.60	14670.00
		Mid range	75	0	13441.30	14757.00
		High range	75	0	13417.50	14569.00
	20MHz	Low range	100	0	17823.30	19119.00
		Mid range	100	0	17856.80	19329.00
		High range	100	0	17850.80	19243.00

EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 12	1.4MHz	Low range	6	0	1098.40	1300.00
		Mid range	6	0	1089.30	1292.00
		High range	6	0	1098.70	1276.00
	3MHz	Low range	15	0	2683.50	2944.00
		Mid range	15	0	2678.00	2935.00
		High range	15	0	2684.20	2948.00
	5MHz	Low range	25	0	4502.70	4956.00
		Mid range	25	0	4534.90	5080.00
		High range	25	0	4487.60	4955.00
	10MHz	Low range	50	0	8851.70	9538.00
		Mid range	50	0	8969.80	9751.00
		High range	50	0	8957.80	9582.00

16QAM mode：

EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 2	1.4MHz	Low range	6	0	1100.10	1345.00
		Mid range	6	0	1095.80	1300.00
		High range	6	0	1097.00	1297.00
	3MHz	Low range	15	0	2683.00	2948.00
		Mid range	15	0	2686.60	2932.00
		High range	15	0	2681.20	2926.00
	5MHz	Low range	25	0	4509.80	5050.00
		Mid range	25	0	4515.50	5042.00
		High range	25	0	4521.00	5761.00
	10MHz	Low range	50	0	8938.30	9622.00
		Mid range	50	0	8930.10	9663.00
		High range	50	0	8954.70	9616.00
	15MHz	Low range	75	0	13392.20	14472.00
		Mid range	75	0	13415.20	14655.00
		High range	75	0	13424.50	14525.00
	20MHz	Low range	100	0	17855.20	18874.00
		Mid range	100	0	17834.20	19088.00
		High range	100	0	17830.60	19016.00

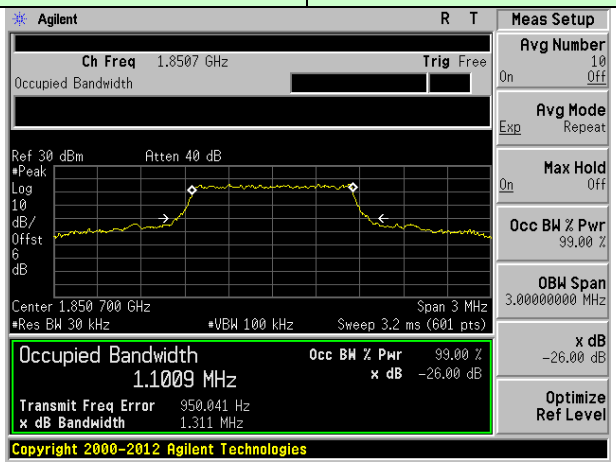
EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 4	1.4MHz	Low range	6	0	1095.00	1301.00
		Mid range	6	0	1097.70	1284.00
		High range	6	0	1101.60	1300.00
	3MHz	Low range	15	0	2682.50	2959.00
		Mid range	15	0	2677.00	2955.00
		High range	15	0	2681.30	2950.00
	5MHz	Low range	25	0	4507.10	5017.00
		Mid range	25	0	4520.90	4874.00
		High range	25	0	4501.60	4999.00
	10MHz	Low range	50	0	8927.30	9647.00
		Mid range	50	0	8921.80	9619.00
		High range	50	0	8940.50	9756.00
	15MHz	Low range	75	0	13382.60	14537.00
		Mid range	75	0	13384.70	14596.00
		High range	75	0	13411.10	14385.00
	20MHz	Low range	100	0	17852.90	19152.00
		Mid range	100	0	17777.90	18951.00
		High range	100	0	17824.40	19013.00

EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 12	1.4MHz	Low range	6	0	1096.30	1309.00
		Mid range	6	0	1095.60	1318.00
		High range	6	0	1098.40	1308.00
	3MHz	Low range	15	0	2688.90	2922.00
		Mid range	15	0	2684.50	2920.00
		High range	15	0	2686.40	2950.00
	5MHz	Low range	25	0	4506.90	4994.00
		Mid range	25	0	4532.20	5015.00
		High range	25	0	4481.10	4956.00
	10MHz	Low range	50	0	8945.00	9967.00
		Mid range	50	0	8954.40	10024.00
		High range	50	0	8971.40	9950.00

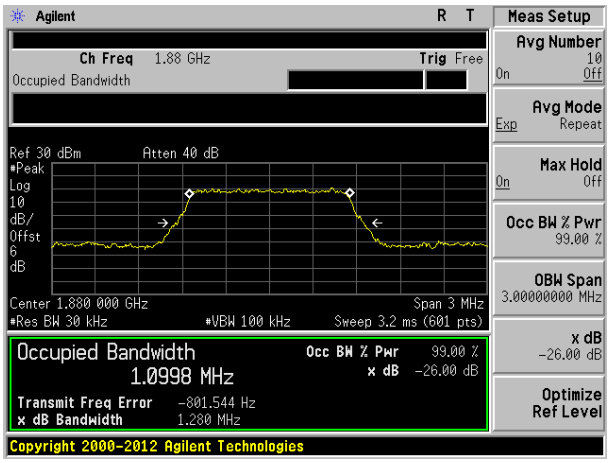
Test plot as follows:

QPSK mode:

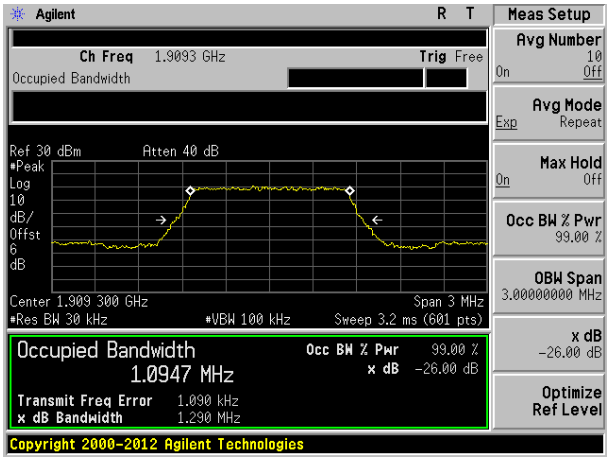
Test band: LTE Band 2	Channel Bandwidth: 1.4MHz



Lowest channel

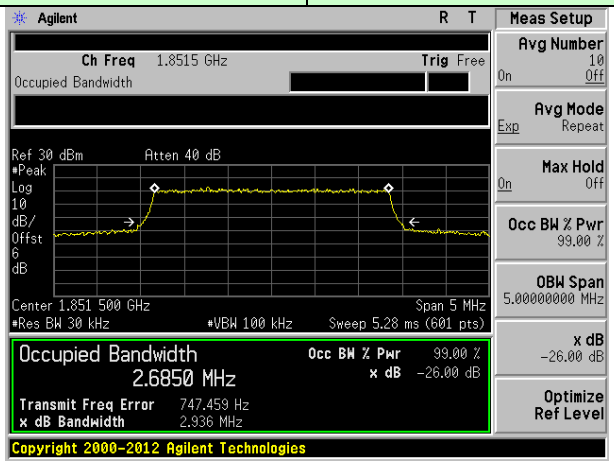


Middle channel

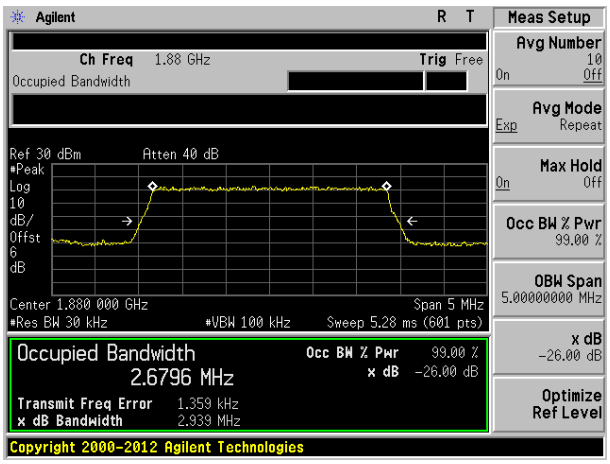


Highest channel

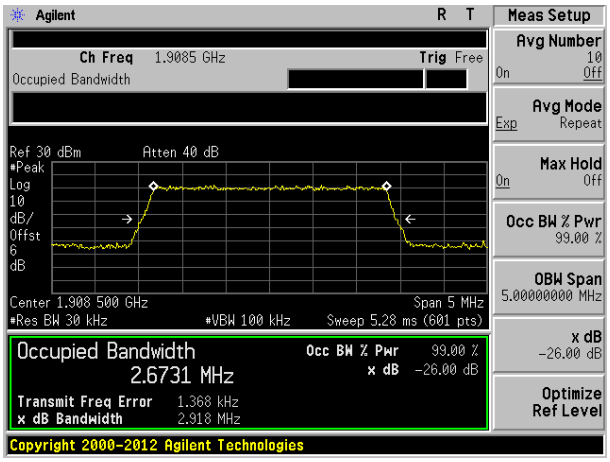
Test band: LTE Band 2	Channel Bandwidth:3MHz



Lowest channel

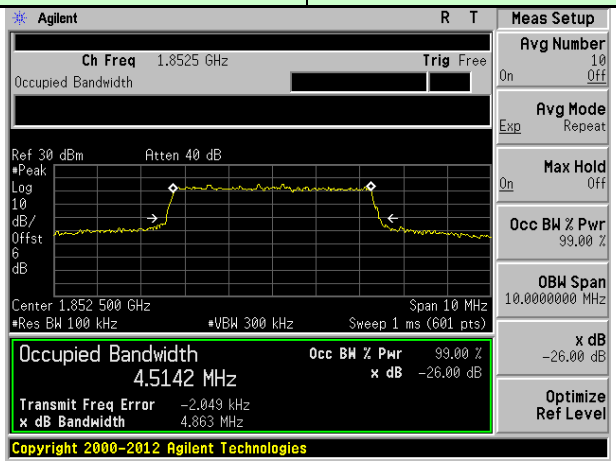


Middle channel

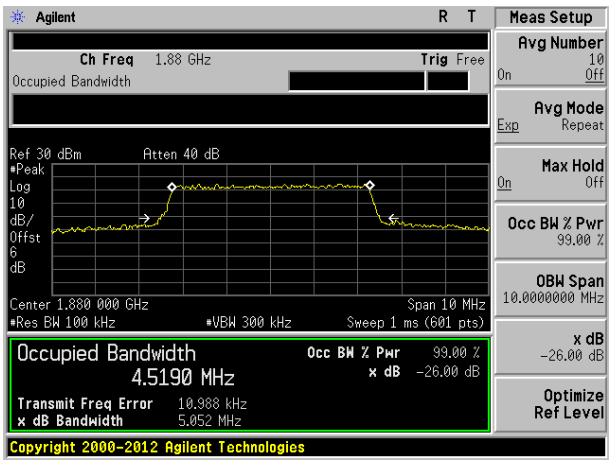


Highest channel

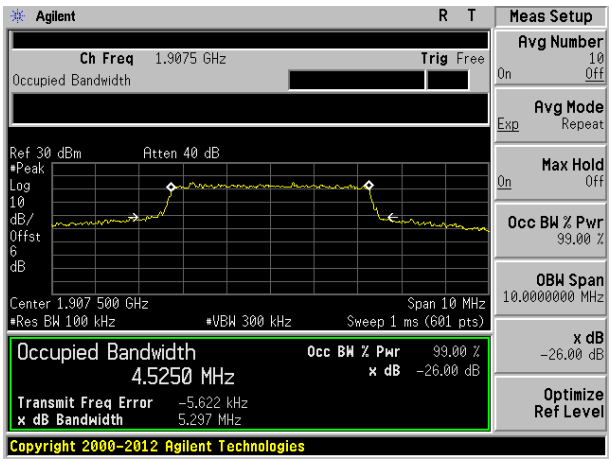
Test band: LTE Band 2	Channel Bandwidth: 5MHz



Lowest channel

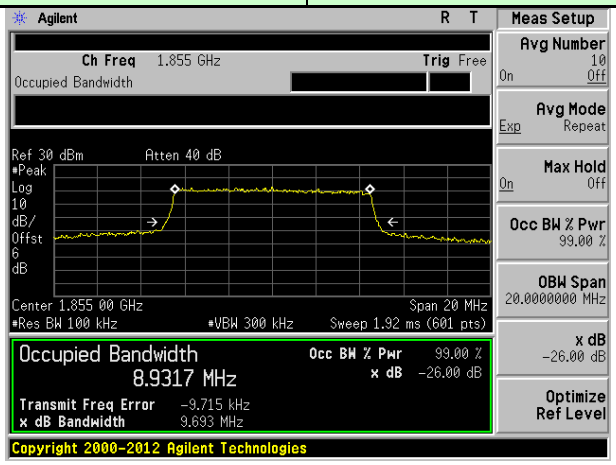


Middle channel

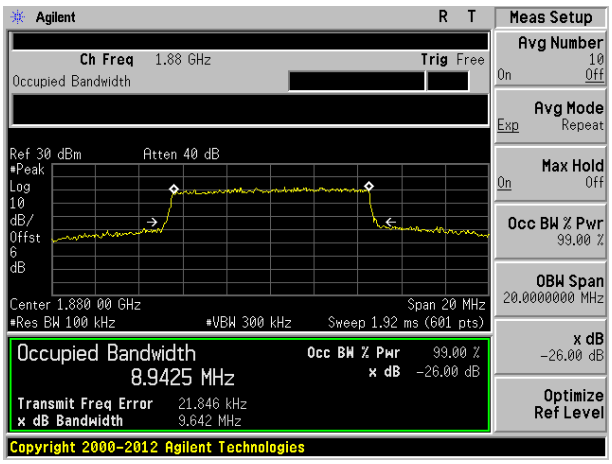


Highest channel

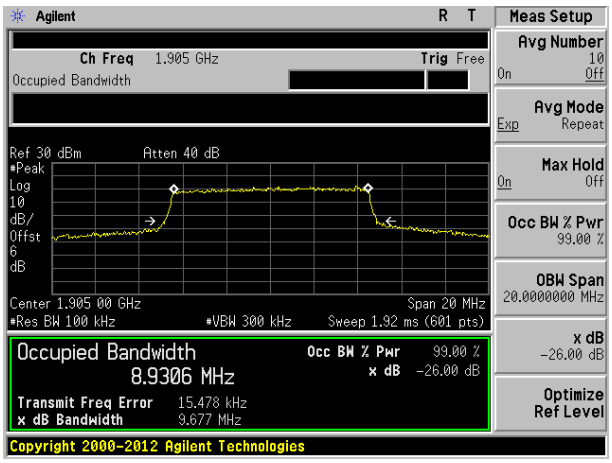
Test band: LTE Band 2	Channel Bandwidth:10MHz



Lowest channel

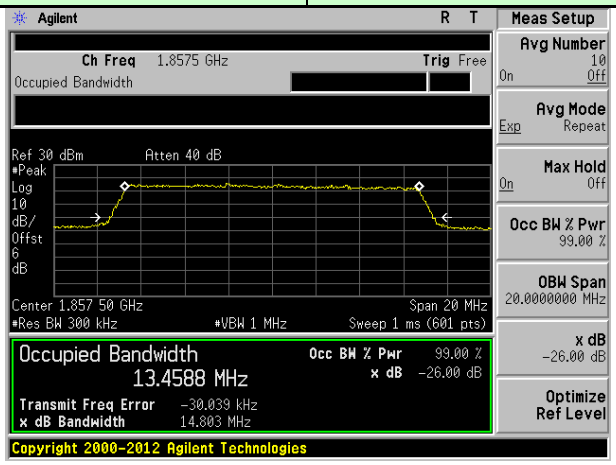


Middle channel

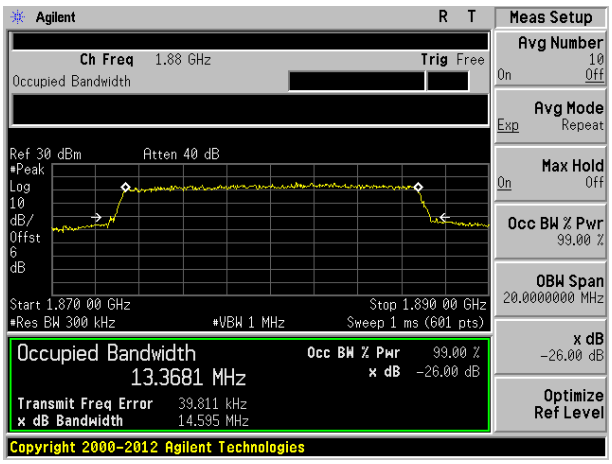


Highest channel

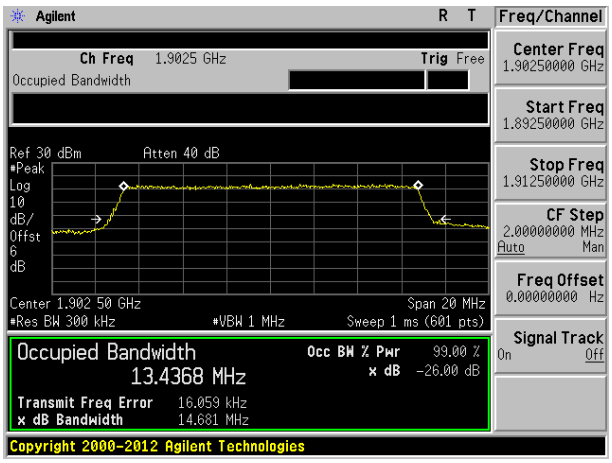
Test band: LTE Band 2	Channel Bandwidth:15MHz



Lowest channel

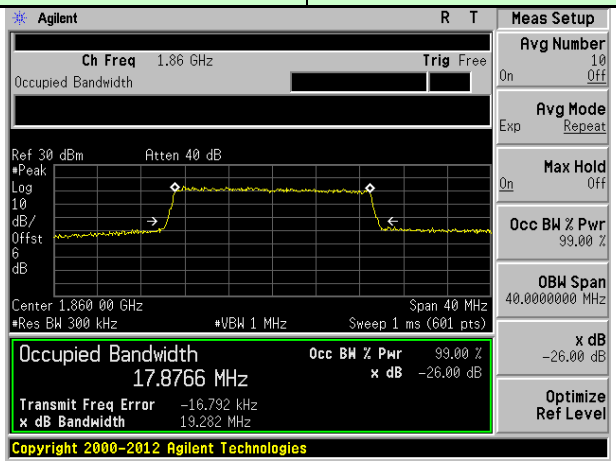


Middle channel

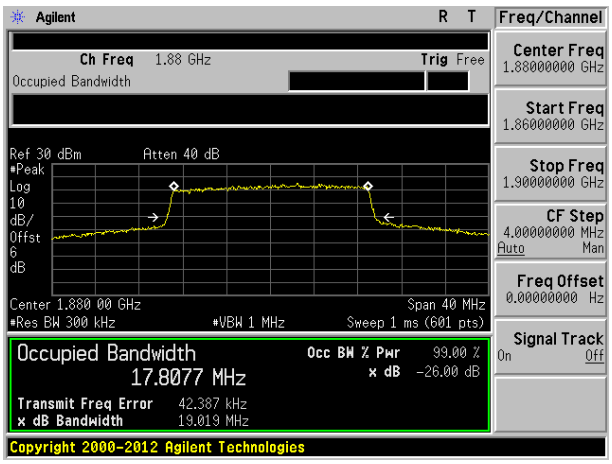


Highest channel

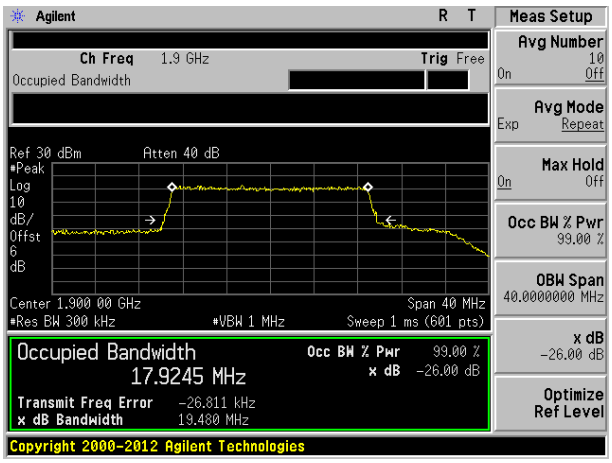
Test band: LTE Band 2	Channel Bandwidth:20MHz



Lowest channel

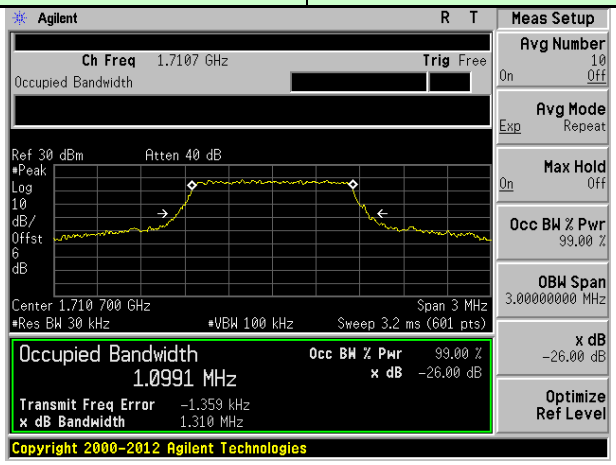


Middle channel

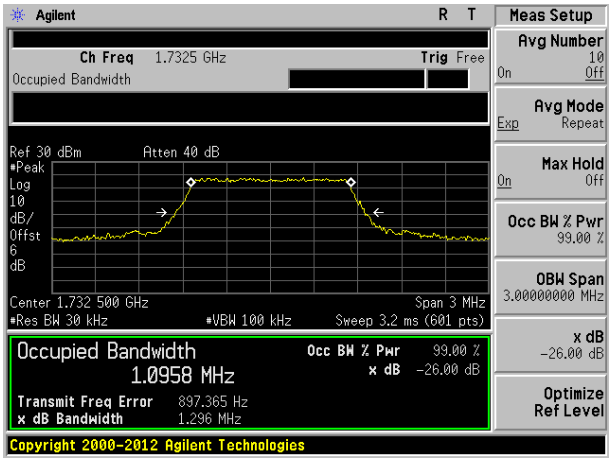


Highest channel

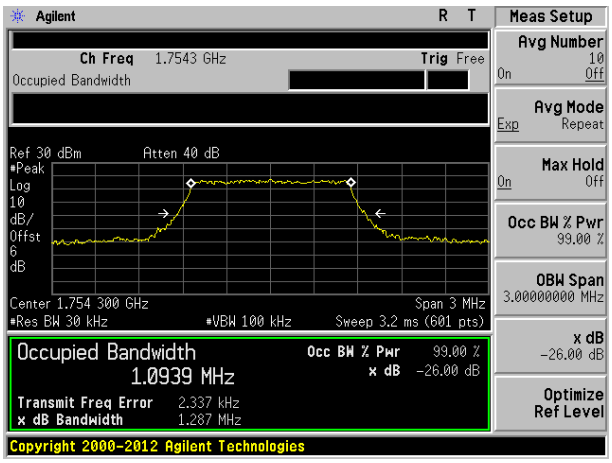
Test band: LTE Band 4	Channel Bandwidth: 1.4MHz



Lowest channel

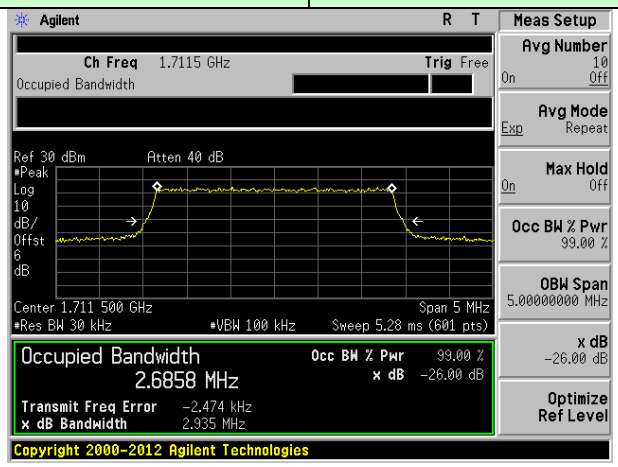


Middle channel

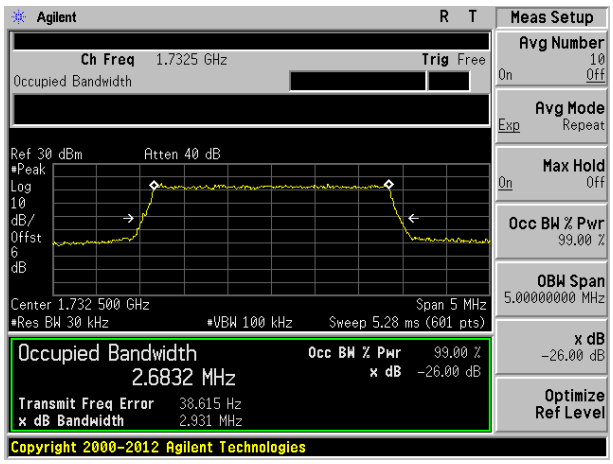


Highest channel

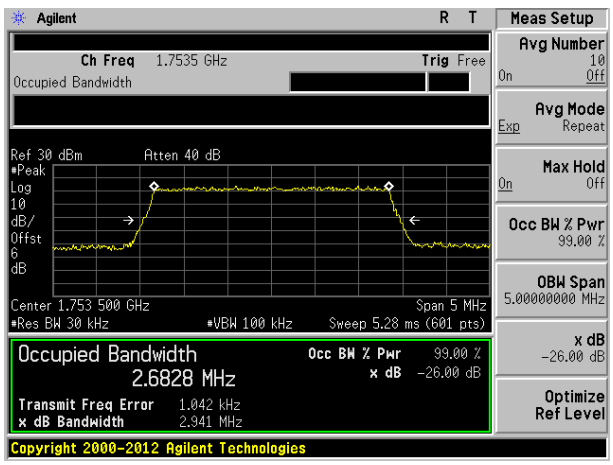
Test band: LTE Band 4	Channel Bandwidth: 3MHz



Lowest channel

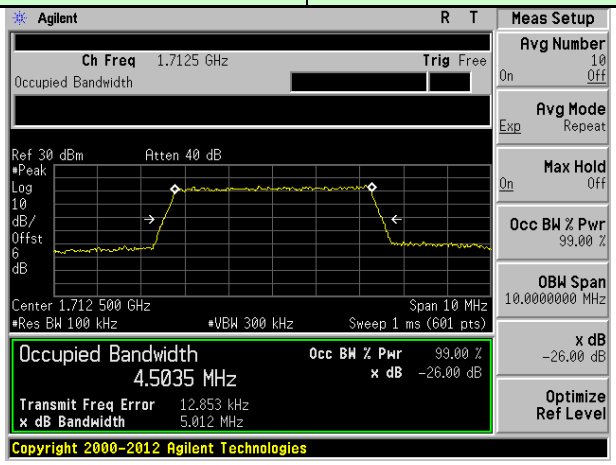


Middle channel

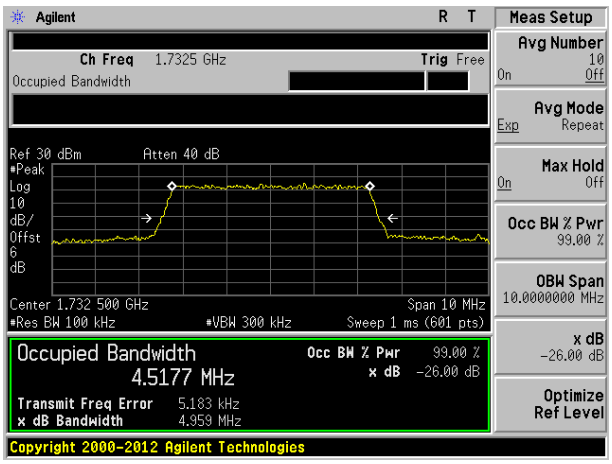


Highest channel

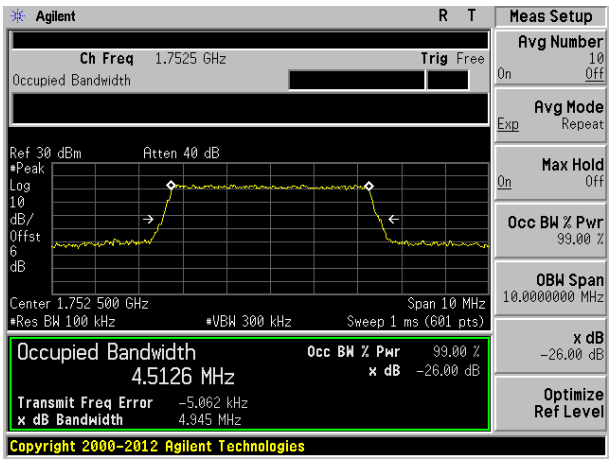
Test band: LTE Band 4	Channel Bandwidth: 5MHz



Lowest channel

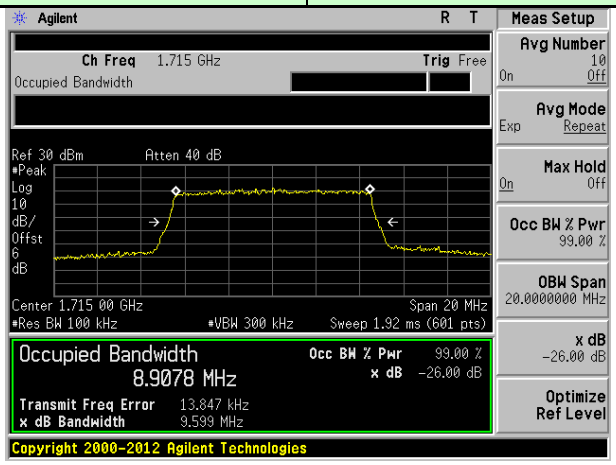


Middle channel

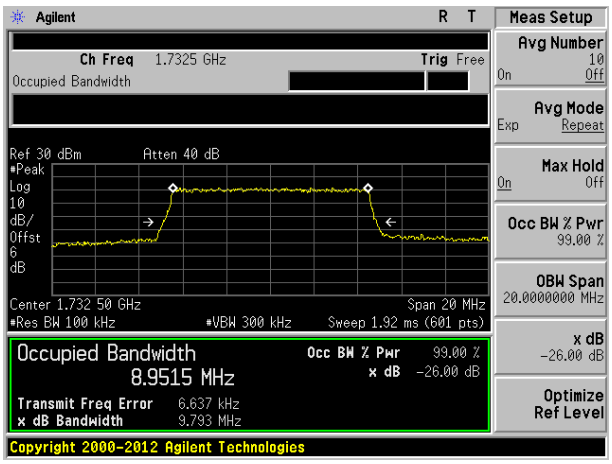


Highest channel

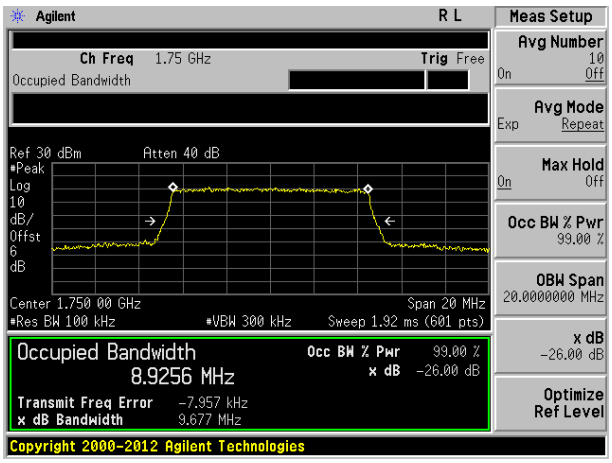
Test band: LTE Band 4	Channel Bandwidth: 10MHz



Lowest channel

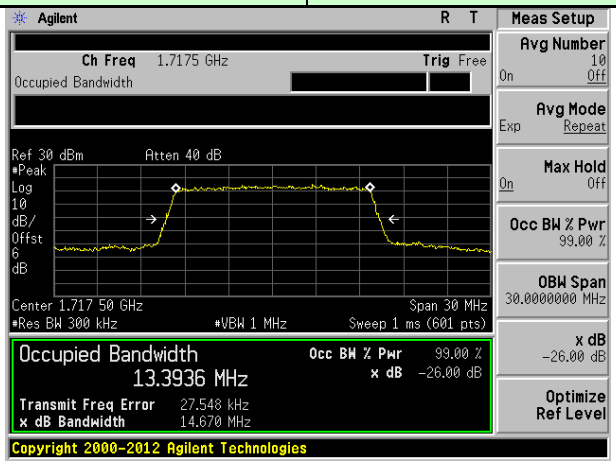


Middle channel

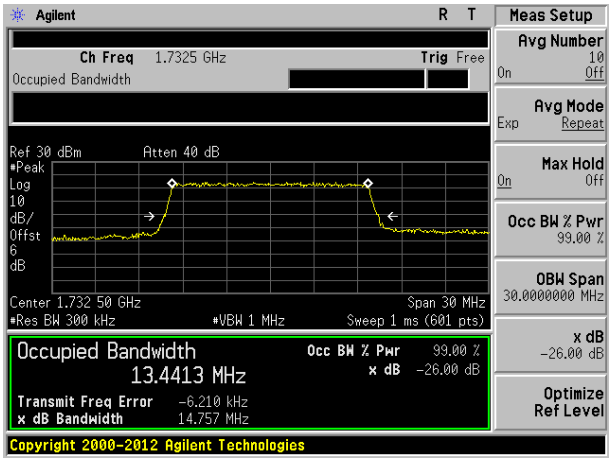


Highest channel

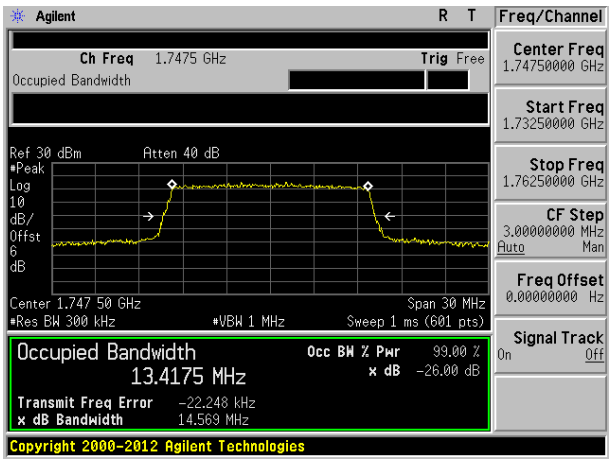
Test band: LTE Band 4	Channel Bandwidth: 15MHz



Lowest channel

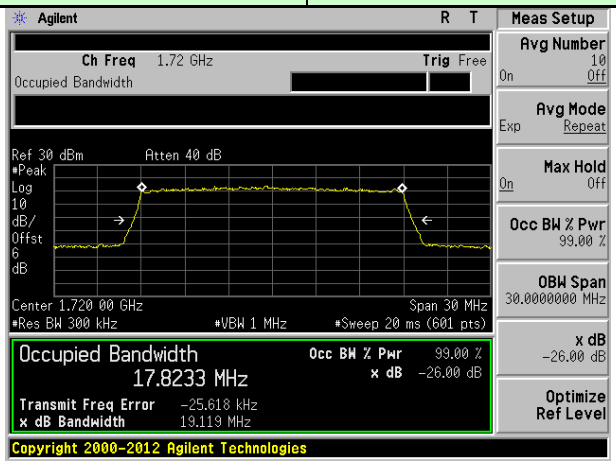


Middle channel

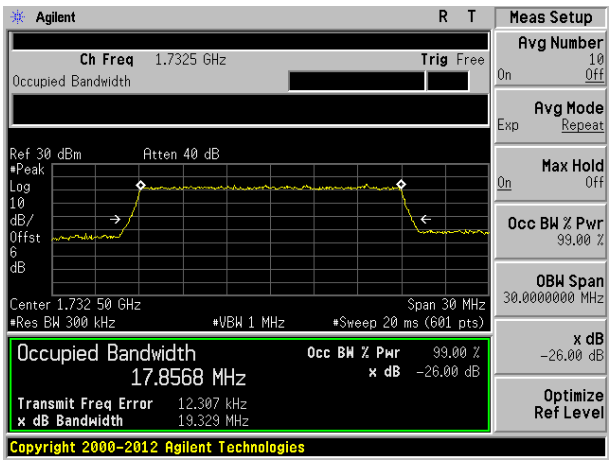


Highest channel

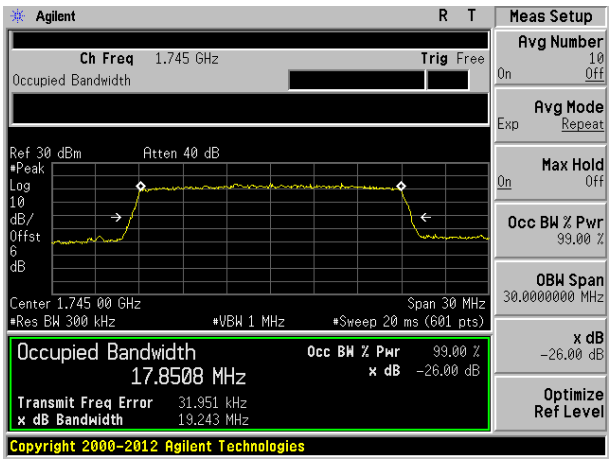
Test band: LTE Band 4	Channel Bandwidth: 20MHz



Lowest channel

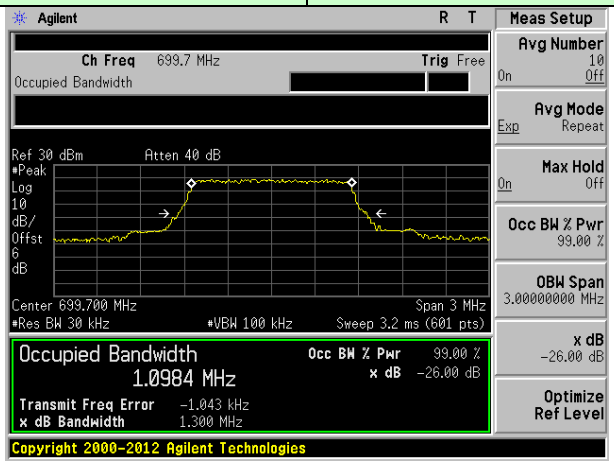


Middle channel

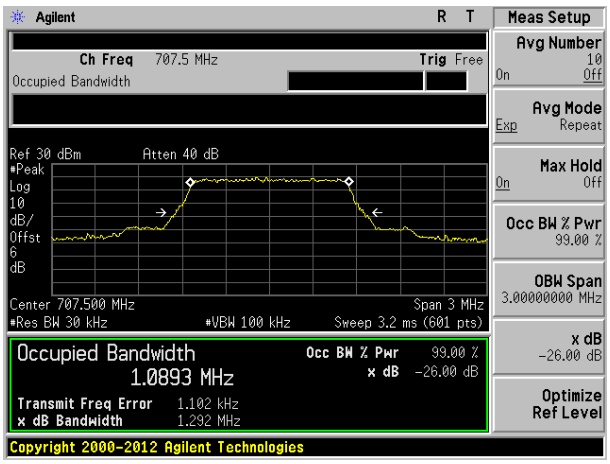


Highest channel

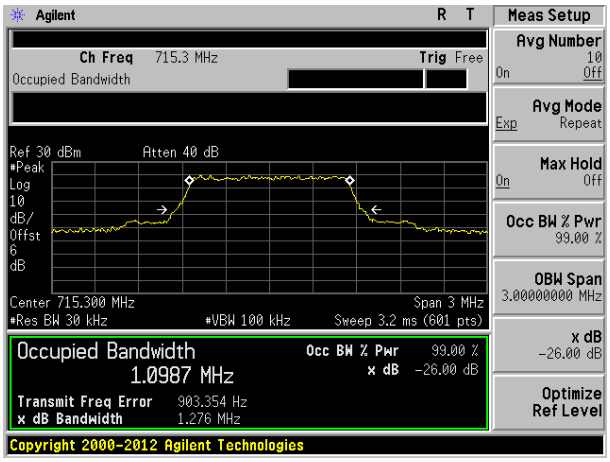
Test band: LTE Band 12	Channel Bandwidth: 1.4MHz



Lowest channel

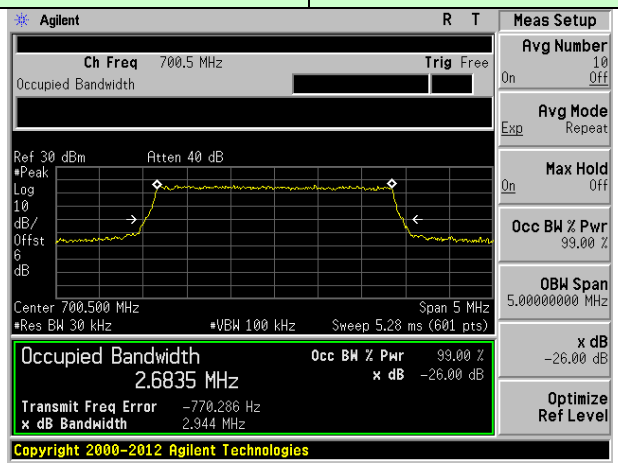


Middle channel

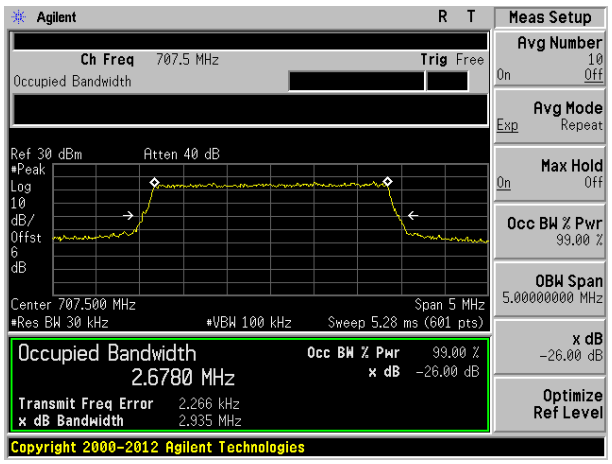


Highest channel

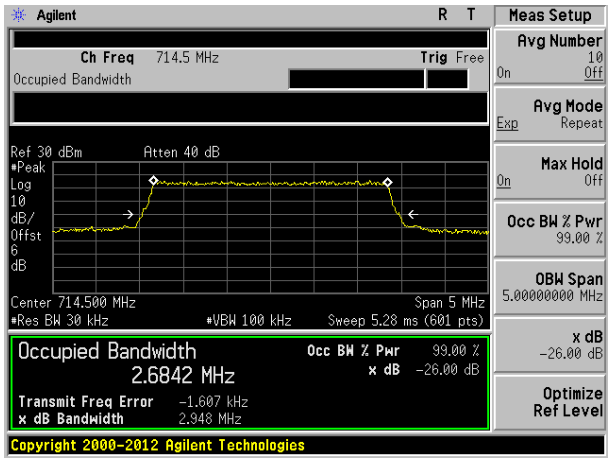
Test band: LTE Band 12	Channel Bandwidth: 3MHz



Lowest channel

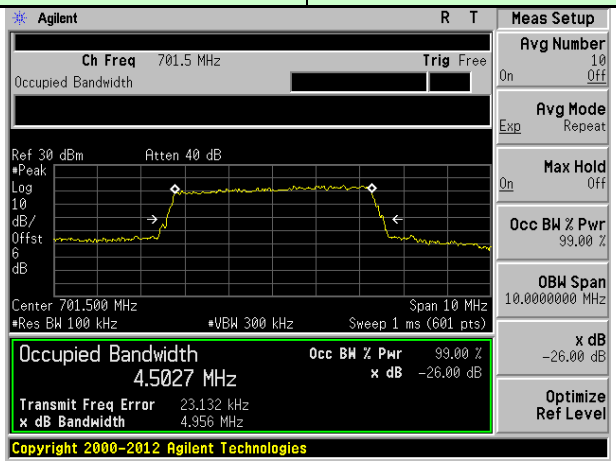


Middle channel

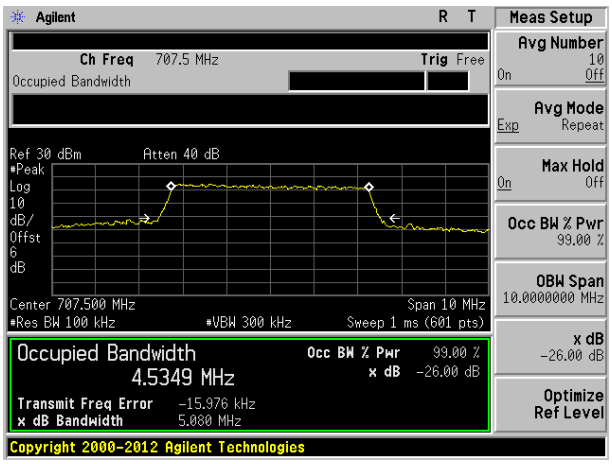


Highest channel

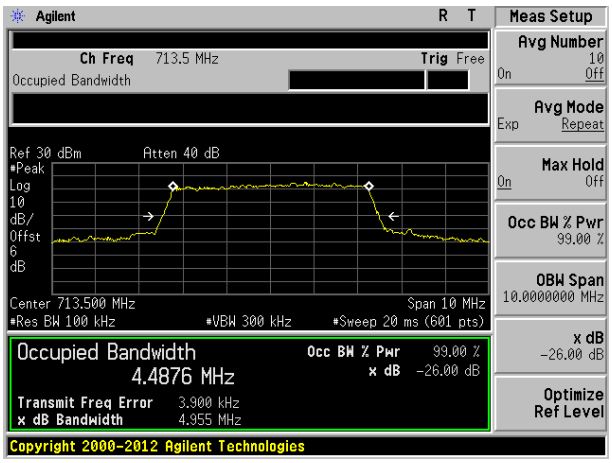
Test band: LTE Band 12	Channel Bandwidth: 5MHz



Lowest channel

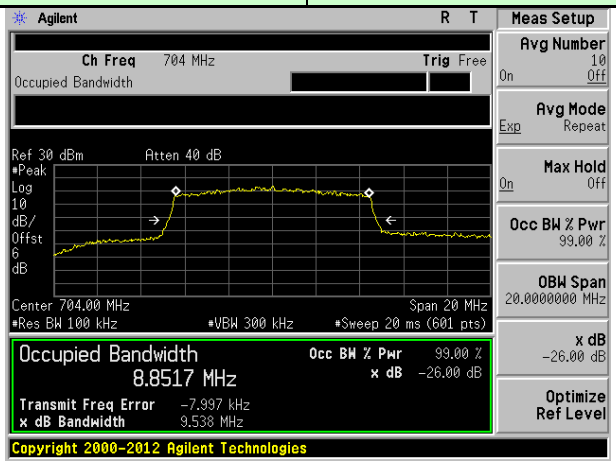


Middle channel

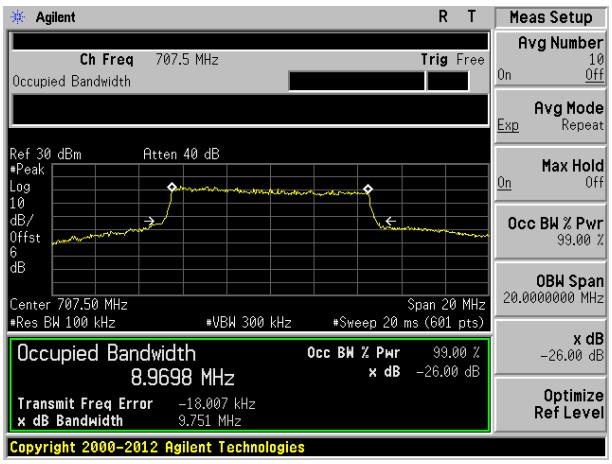


Highest channel

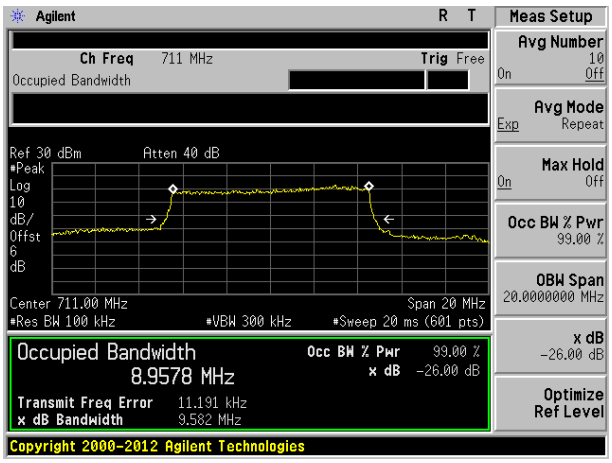
Test band: LTE Band 12	Channel Bandwidth: 10MHz



Lowest channel



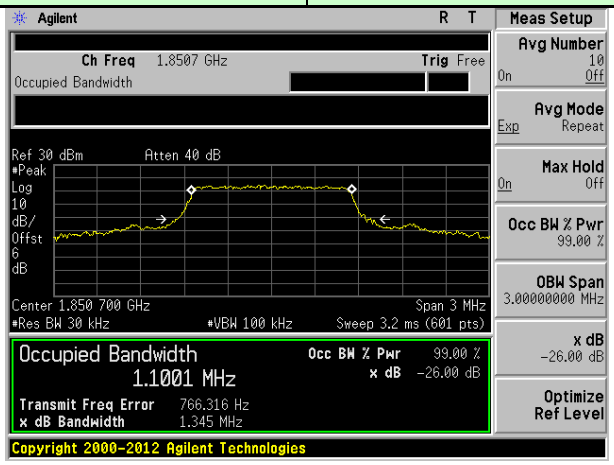
Middle channel



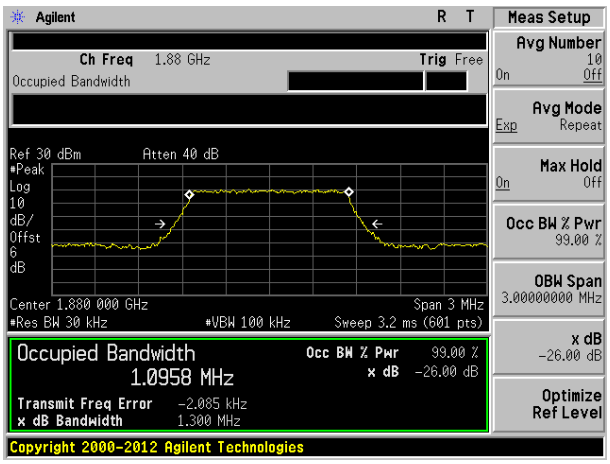
Highest channel

16QAM mode:

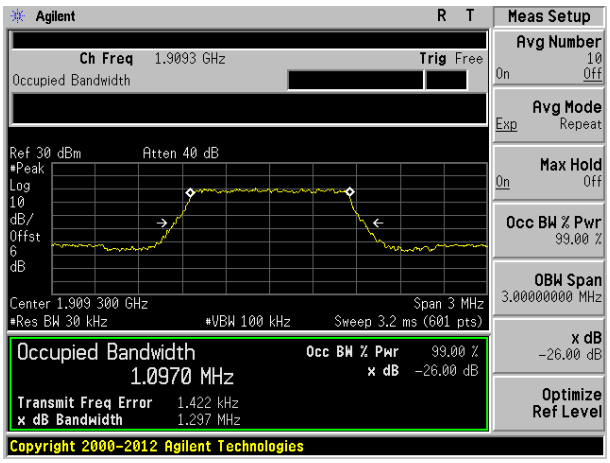
Test band: LTE Band 2	Channel Bandwidth: 1.4MHz



Lowest channel

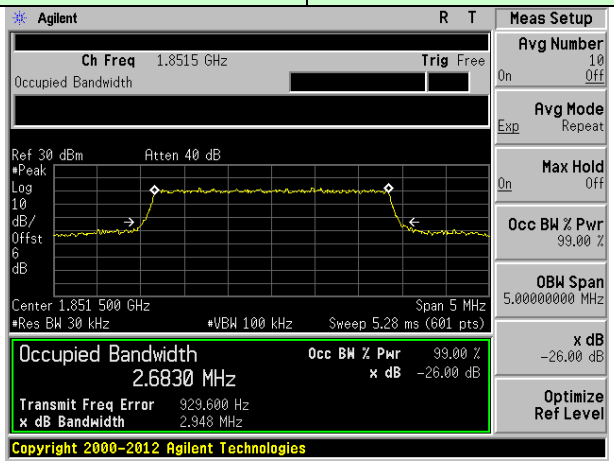


Middle channel

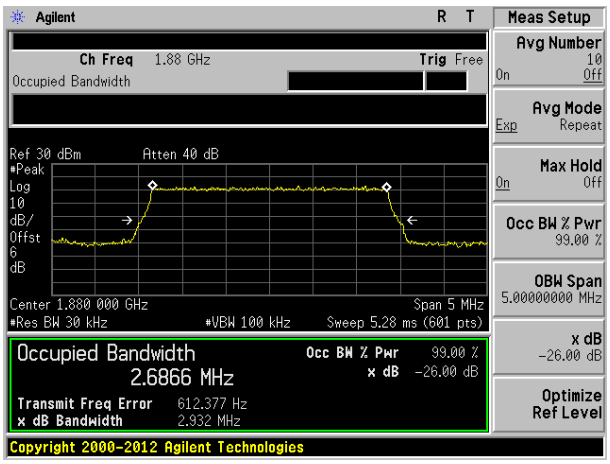


Highest channel

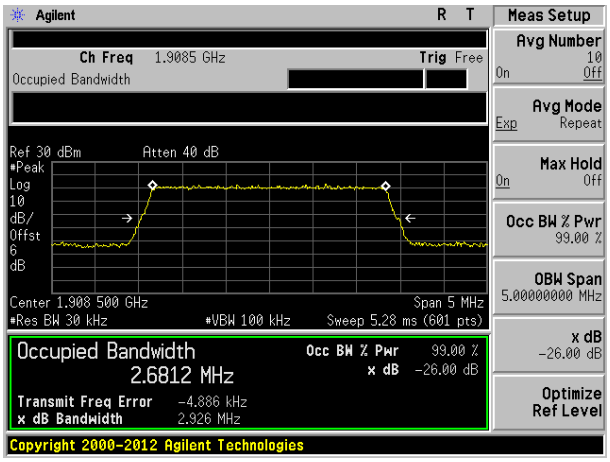
Test band: LTE Band 2	Channel Bandwidth:3MHz



Lowest channel

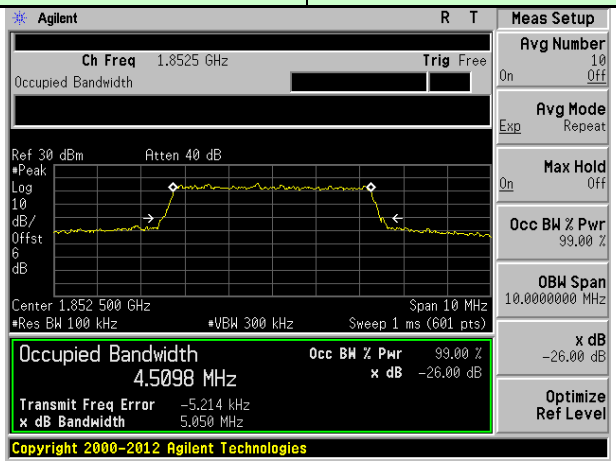


Middle channel

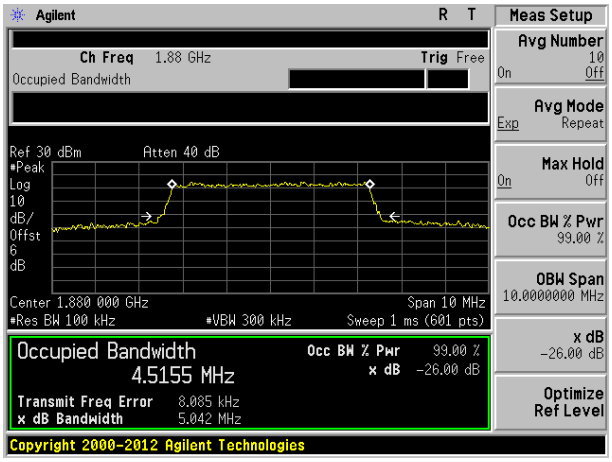


Highest channel

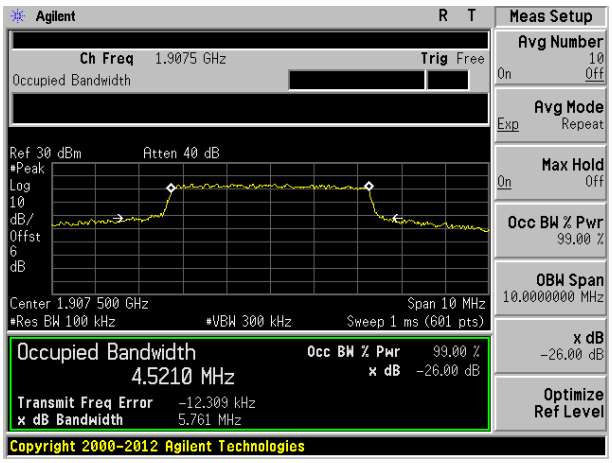
Test band: LTE Band 2	Channel Bandwidth: 5MHz



Lowest channel

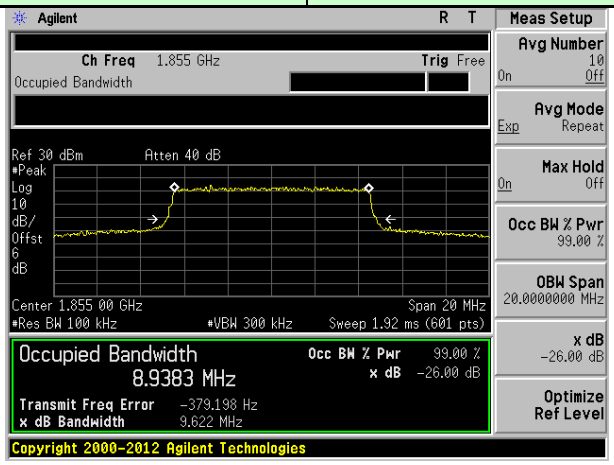


Middle channel

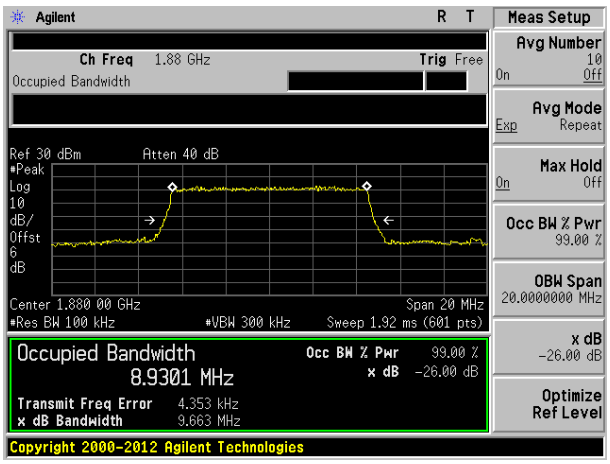


Highest channel

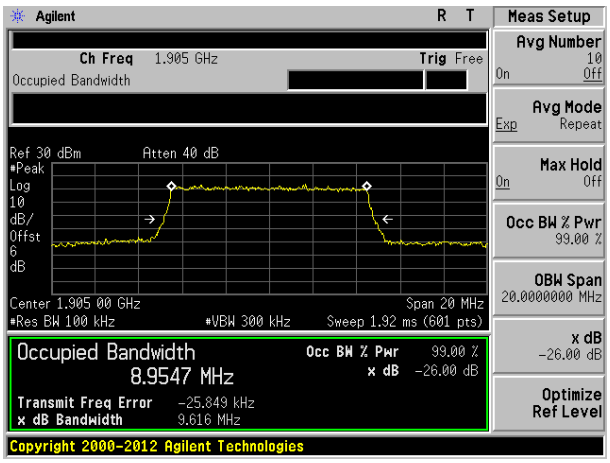
Test band: LTE Band 2	Channel Bandwidth:10MHz



Lowest channel

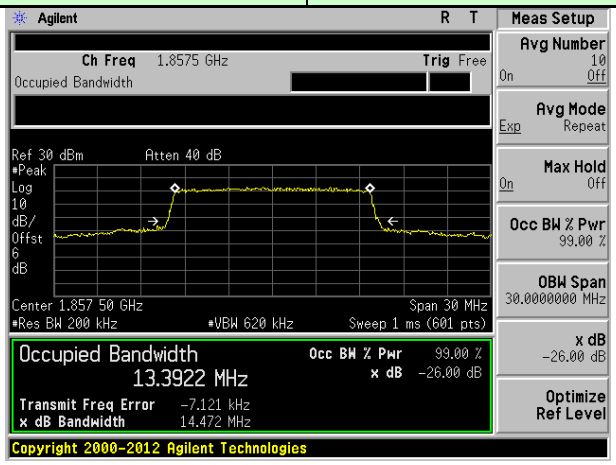


Middle channel

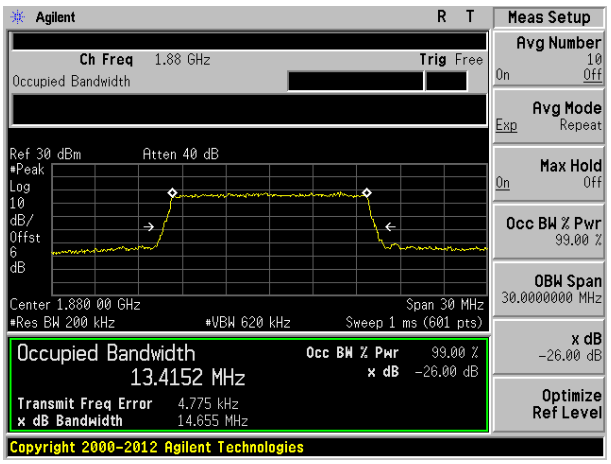


Highest channel

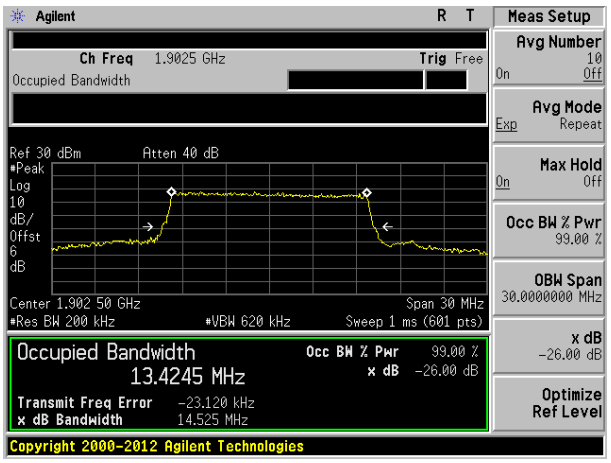
Test band: LTE Band 2	Channel Bandwidth:15MHz



Lowest channel

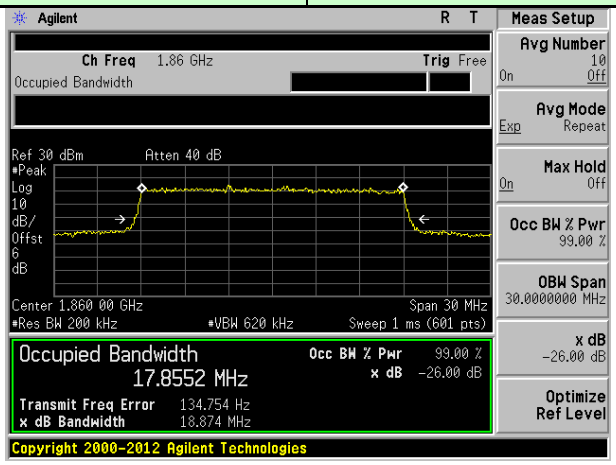


Middle channel

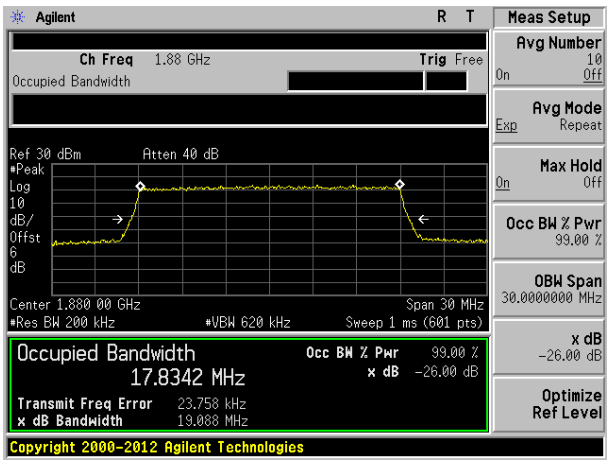


Highest channel

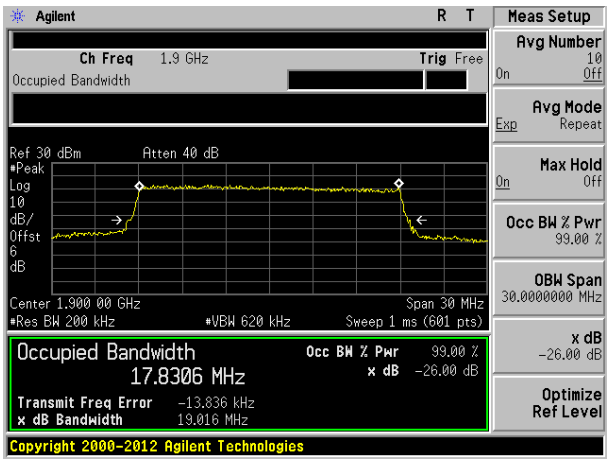
Test band: LTE Band 2	Channel Bandwidth:20MHz



Lowest channel

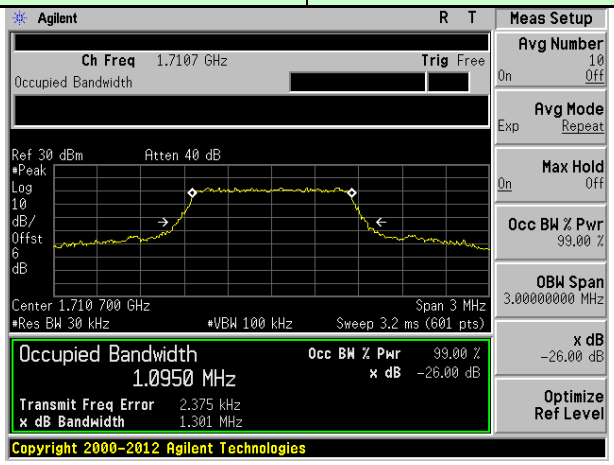


Middle channel

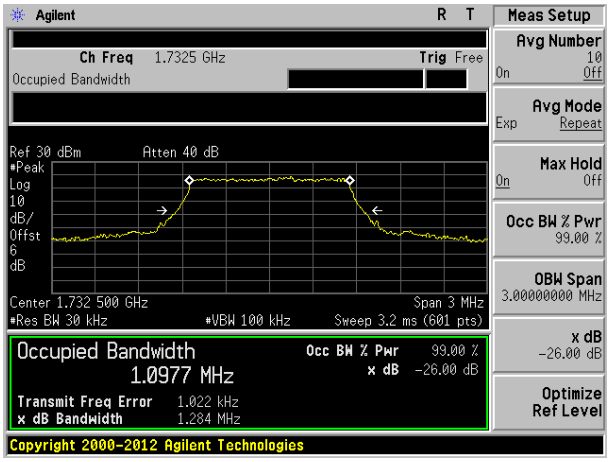


Highest channel

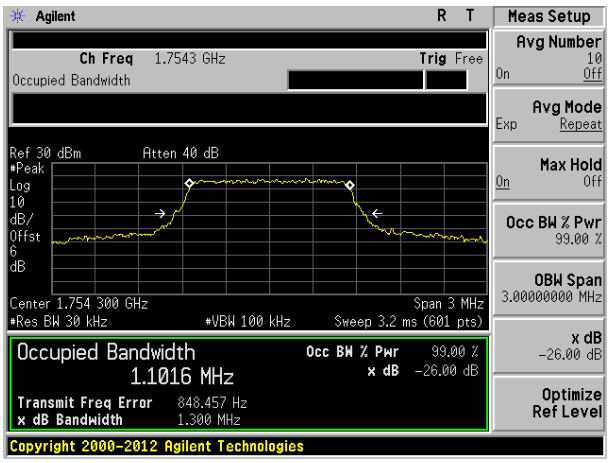
Test band: LTE Band 4	Channel Bandwidth: 1.4MHz



Lowest channel

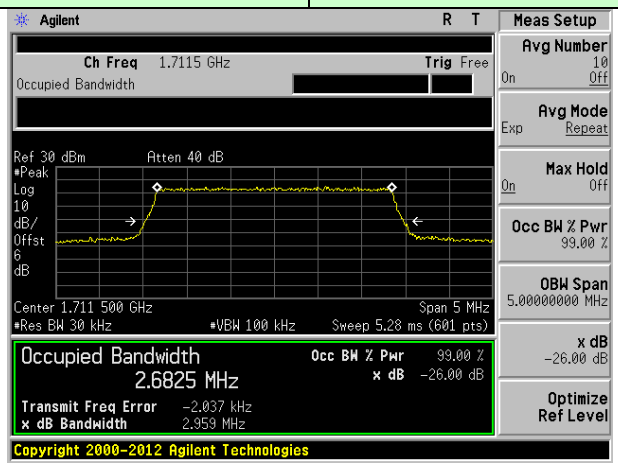


Middle channel

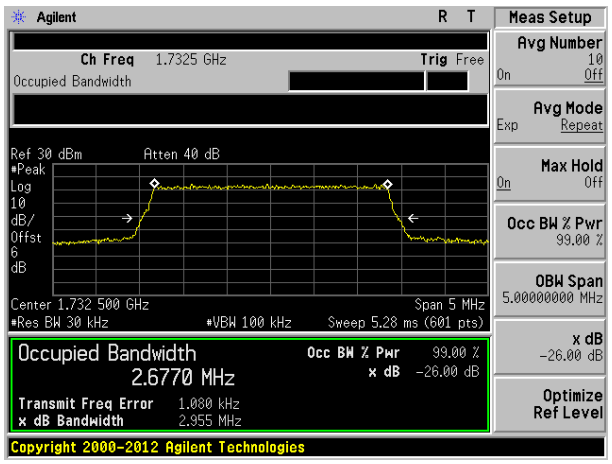


Highest channel

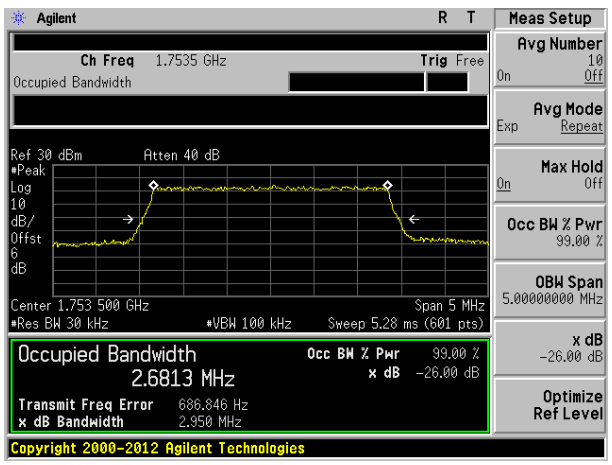
Test band: LTE Band 4	Channel Bandwidth: 3MHz



Lowest channel

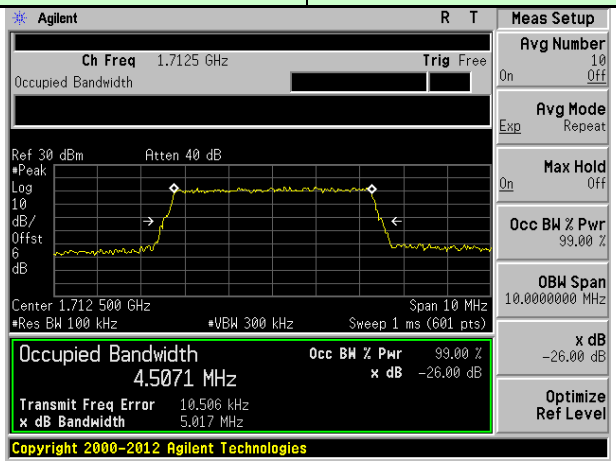


Middle channel

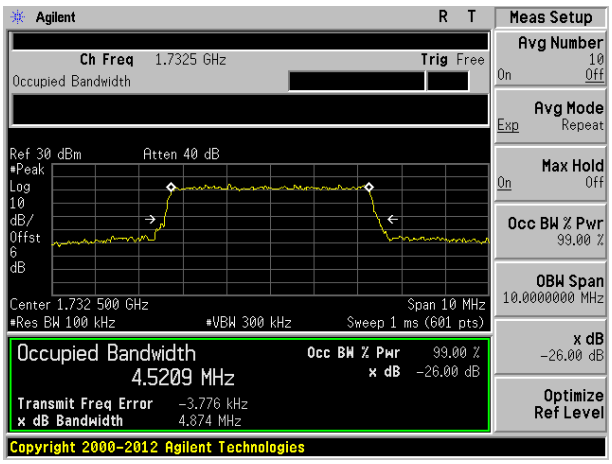


Highest channel

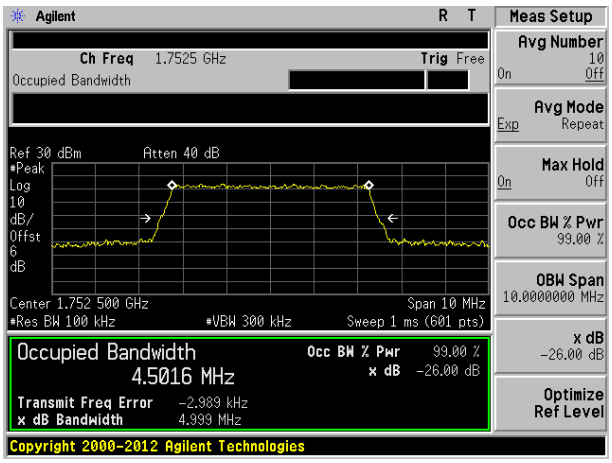
Test band: LTE Band 4	Channel Bandwidth: 5MHz



Lowest channel

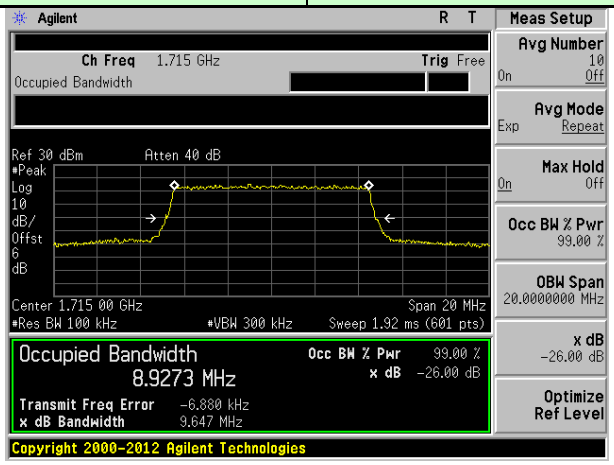


Middle channel

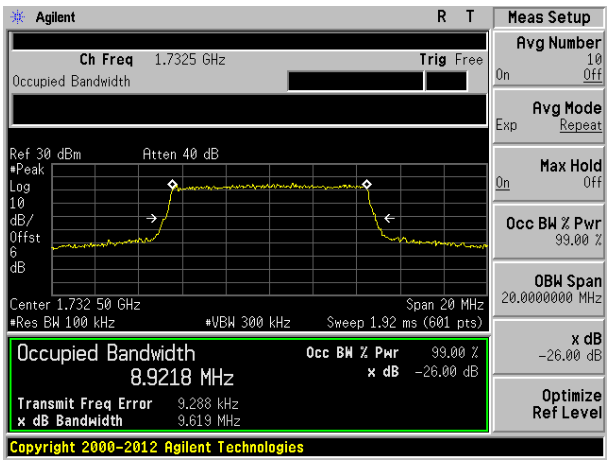


Highest channel

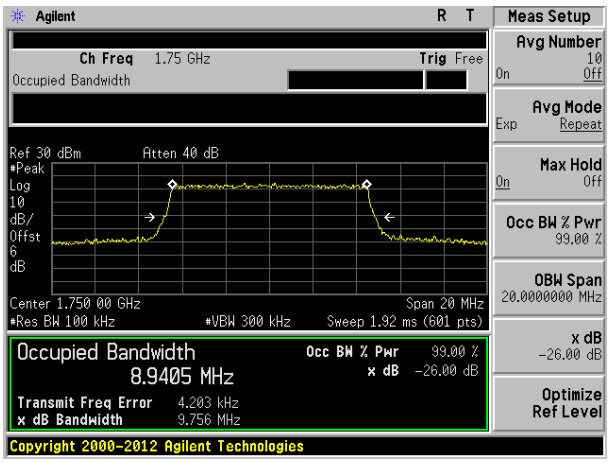
Test band: LTE Band 4	Channel Bandwidth: 10MHz



Lowest channel

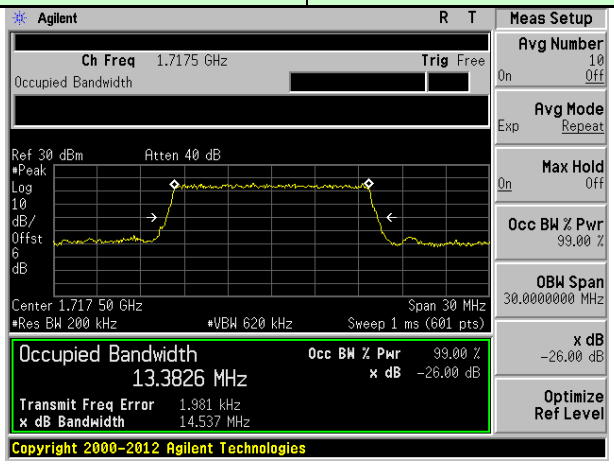


Middle channel

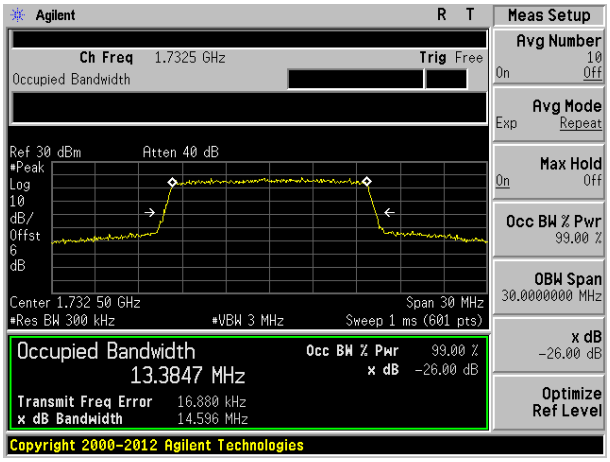


Highest channel

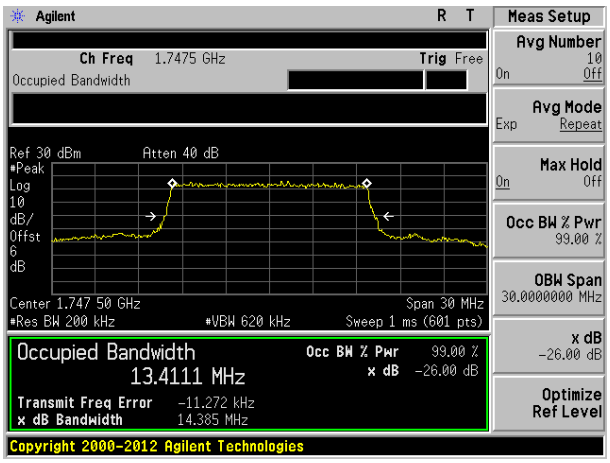
Test band: LTE Band 4	Channel Bandwidth: 15MHz



Lowest channel

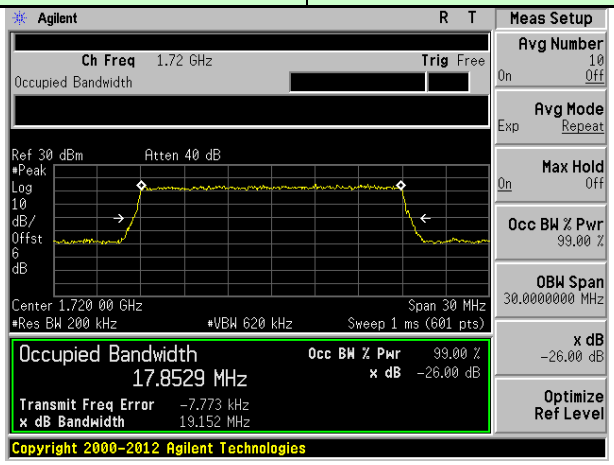


Middle channel

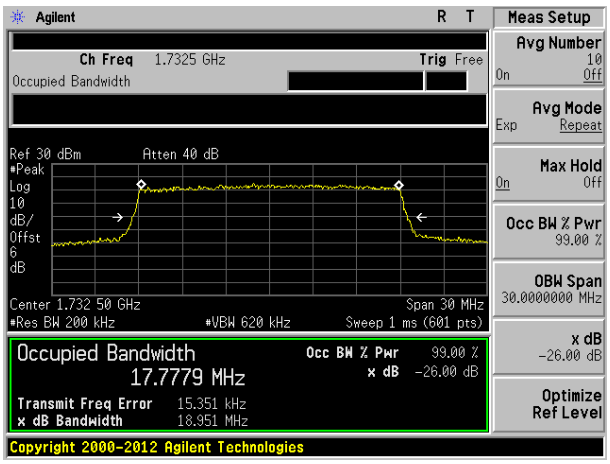


Highest channel

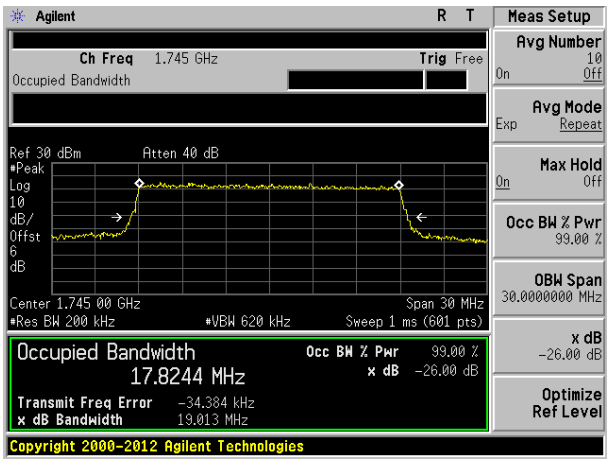
Test band: LTE Band 4	Channel Bandwidth: 20MHz



Lowest channel

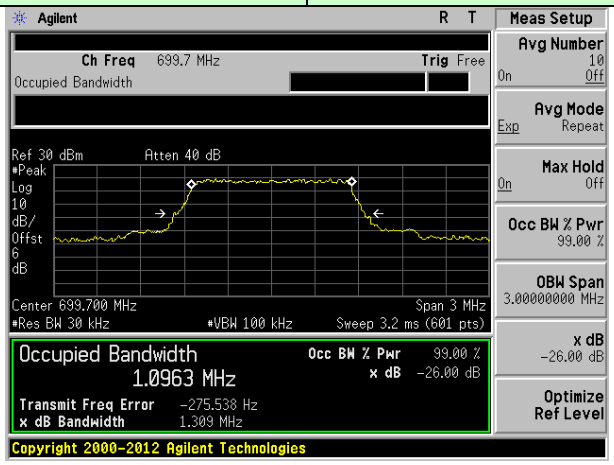


Middle channel

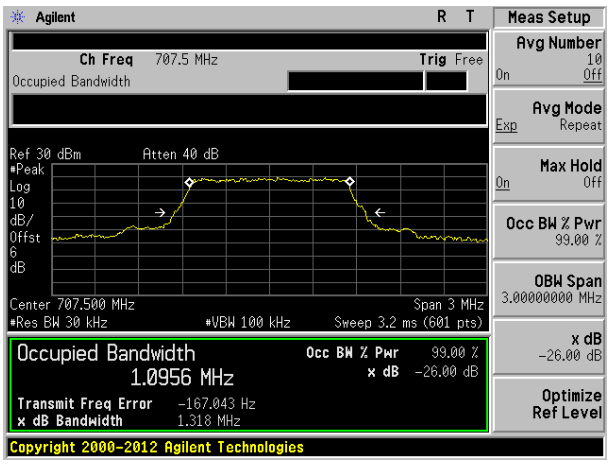


Highest channel

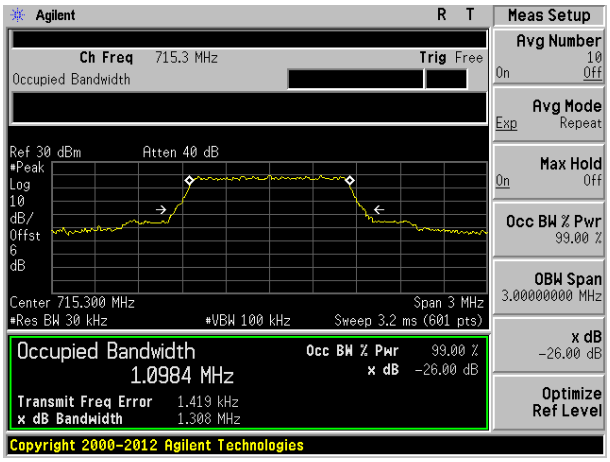
Test band: LTE Band 12	Channel Bandwidth: 1.4MHz



Lowest channel

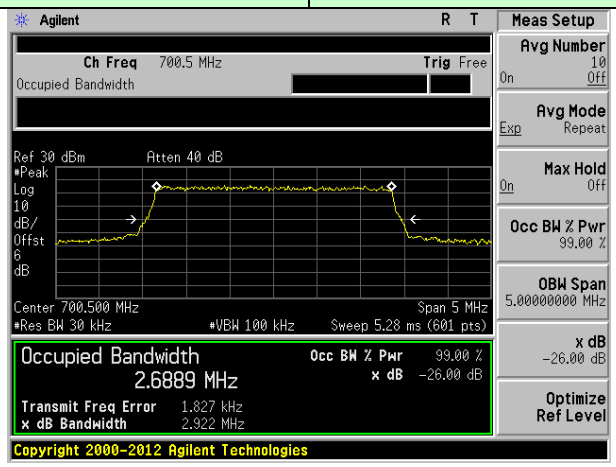


Middle channel

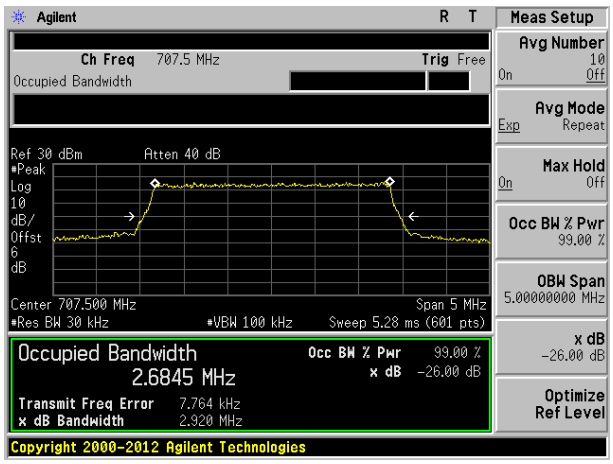


Highest channel

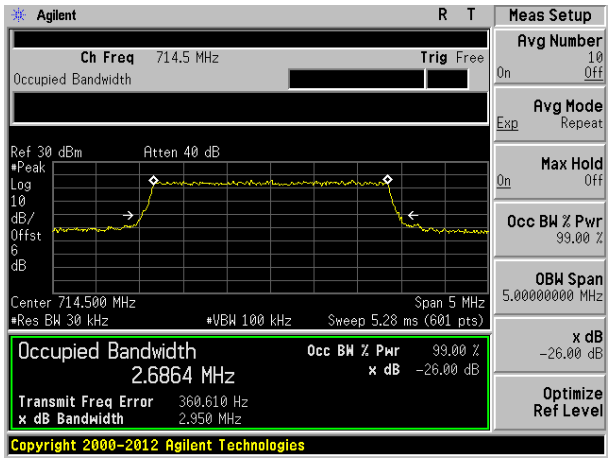
Test band: LTE Band 12	Channel Bandwidth: 3MHz



Lowest channel

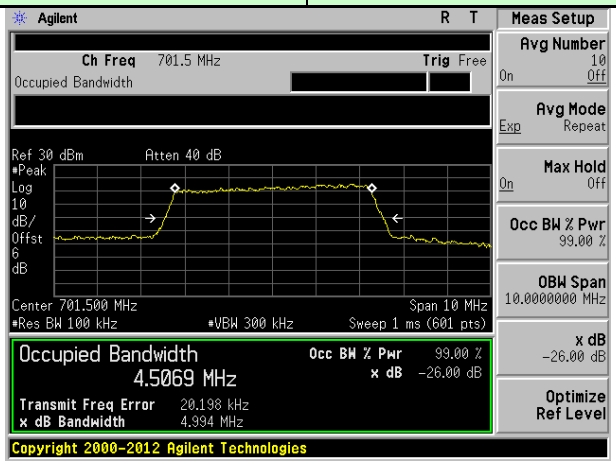


Middle channel

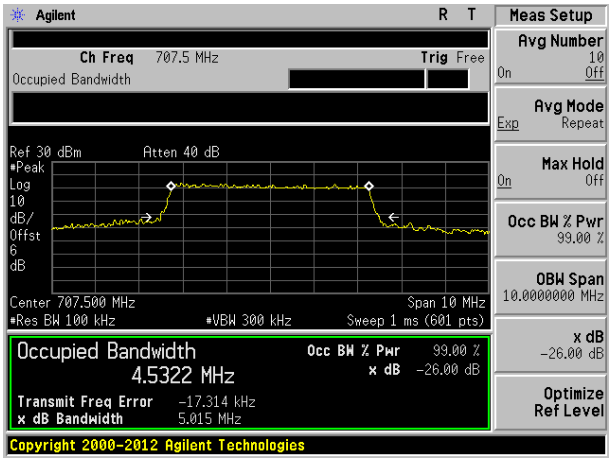


Highest channel

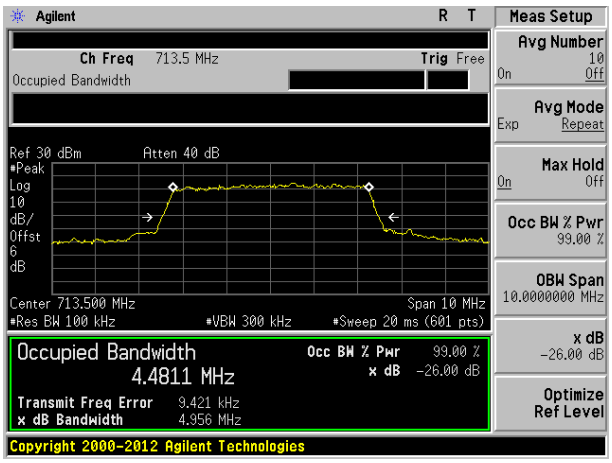
Test band: LTE Band 12	Channel Bandwidth: 5MHz



Lowest channel

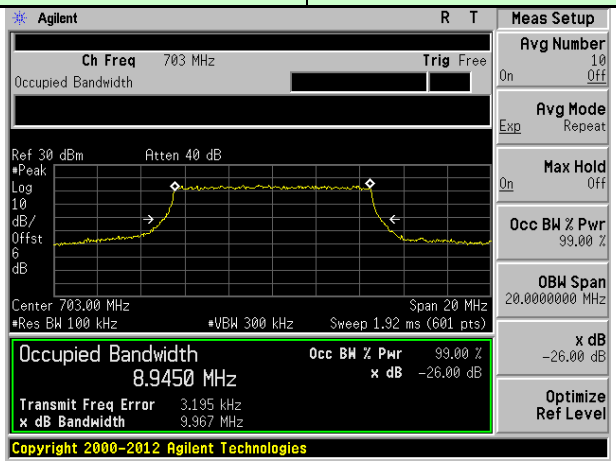


Middle channel

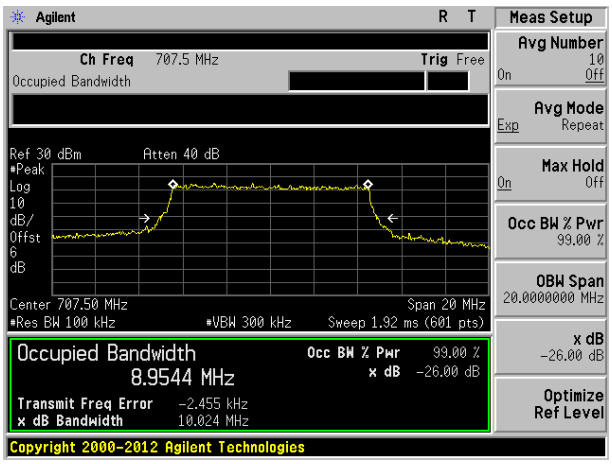


Highest channel

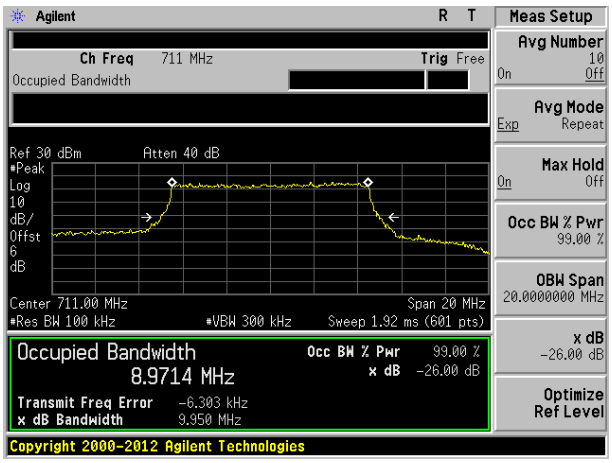
Test band: LTE Band 12	Channel Bandwidth: 10MHz



Lowest channel



Middle channel

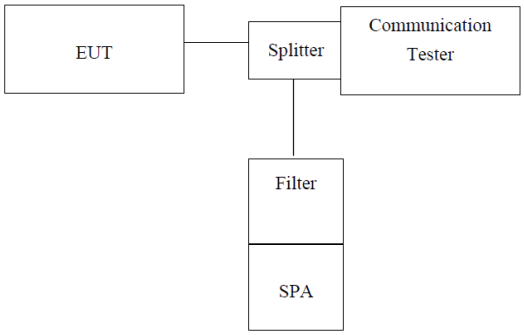


Highest channel

6.7 MODULATION CHARACTERISTIC

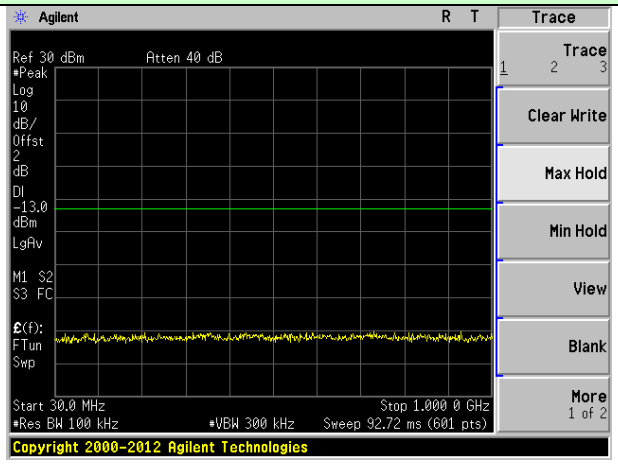
According to FCC § 2.1047(d), Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

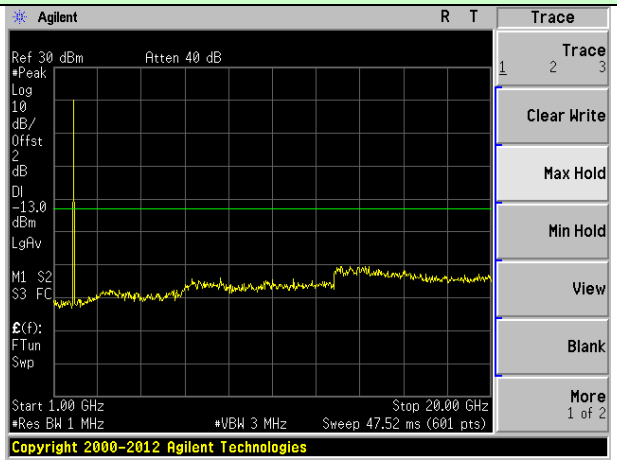
6.8 Out of band emission at antenna terminals

Test Requirement for FCC:	Part 24.238 (a); FCC Part 27.53(h)/(g)
Test Requirement for IC:	RSS-130 Clause 4.6, RSS-139 Clause 6.6, RSS-133 Clause 6.5
Limit:	-13dBm
Test setup:	 *Note: Measurement setup for testing on Antenna connector*
Test Procedure:	1 The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. 2 The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic. 3 For the out of band: Set the RBW, VBW = 1MHz, Start=30MHz, Stop= 10th harmonic. 4 Band Edge Requirements: In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 1 percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

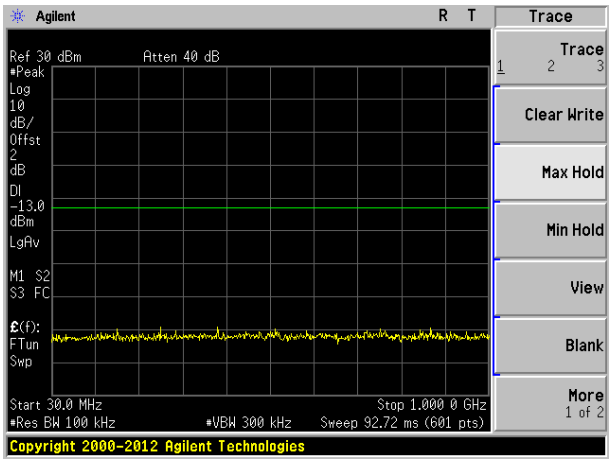
Test plot as follows:

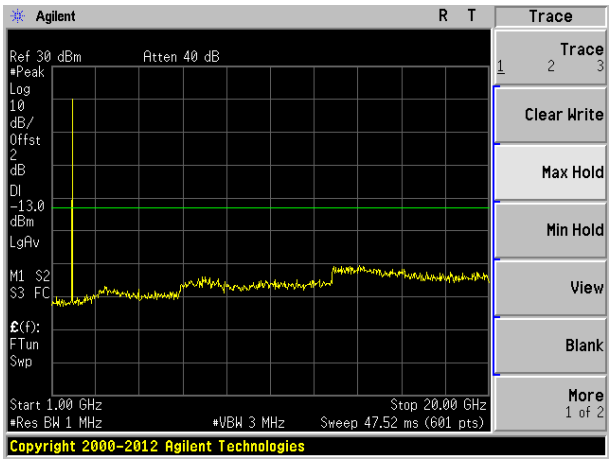
Test Mode: LTE Band 2	Channel Bandwidth: 1.4MHz



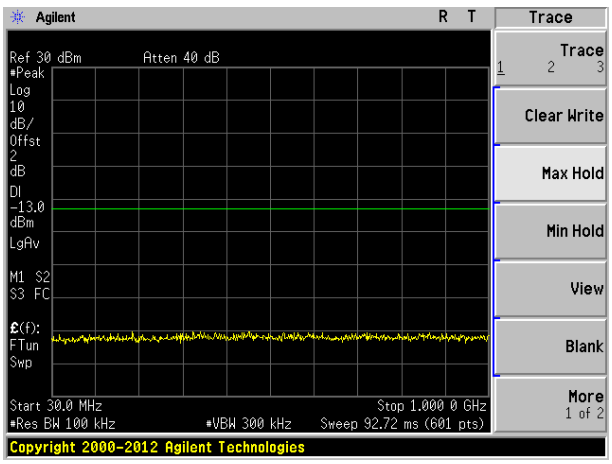


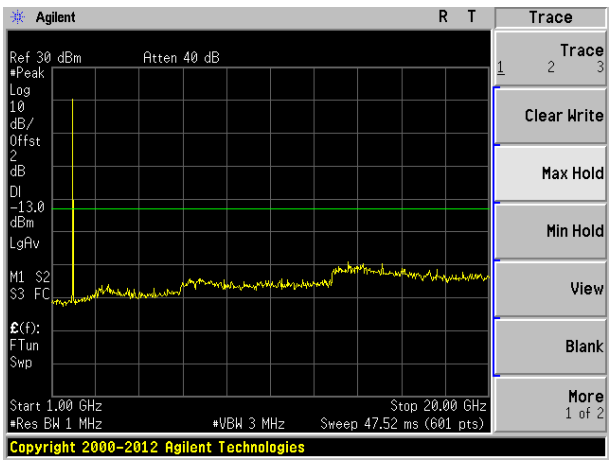
Lowest channel





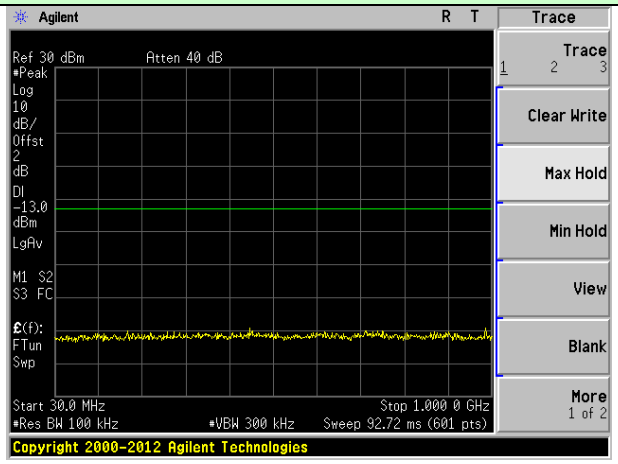
Middle channel

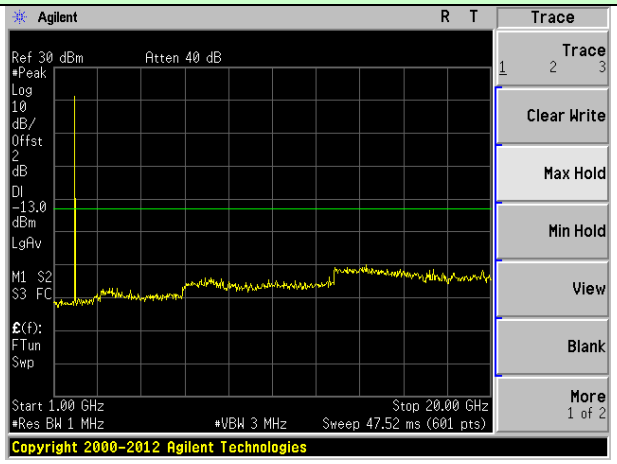




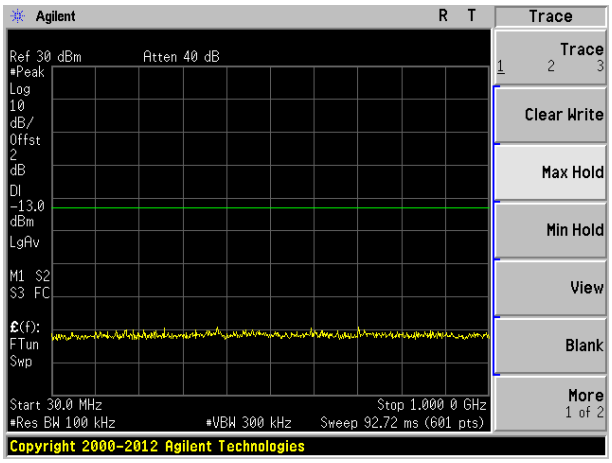
Highest channel

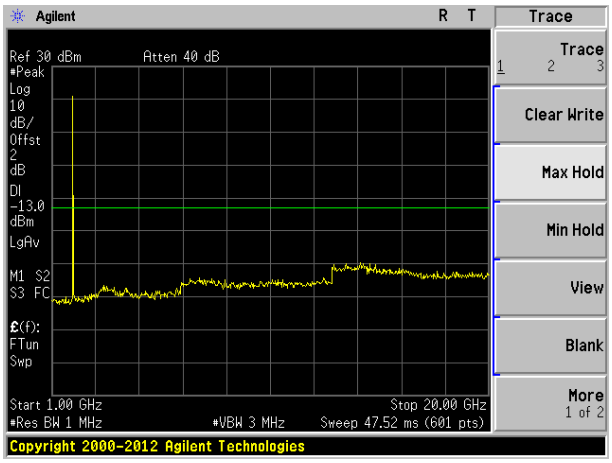
Test Mode: LTE Band 2	Channel Bandwidth: 3MHz



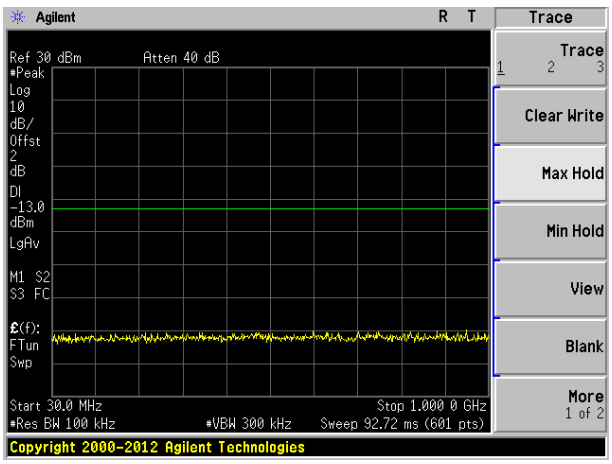


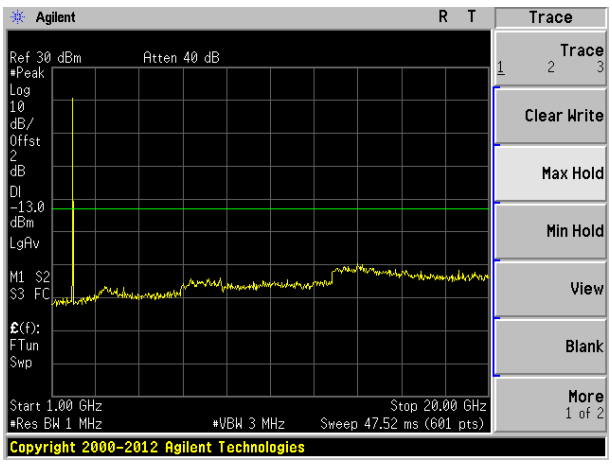
Lowest channel





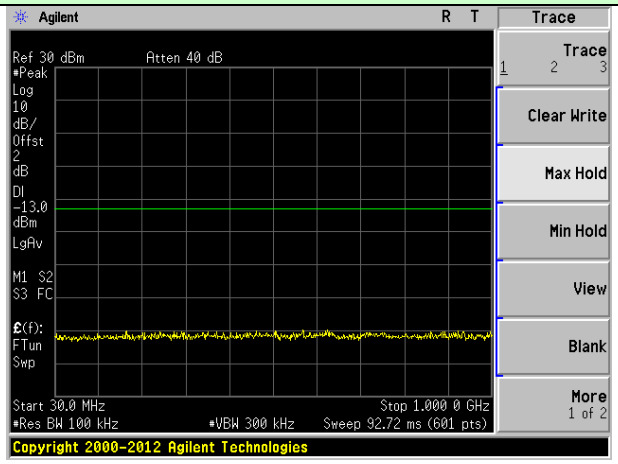
Middle channel

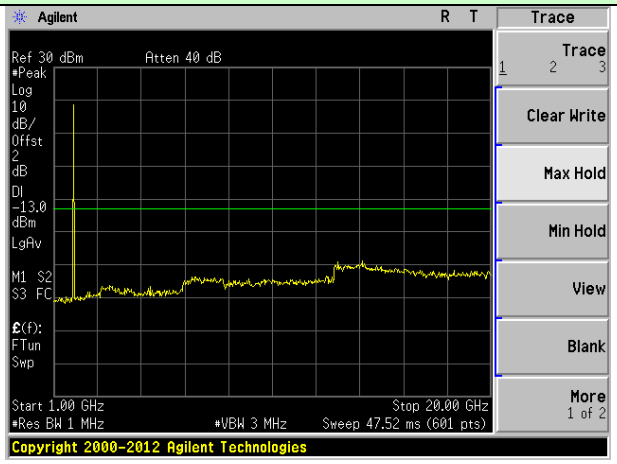




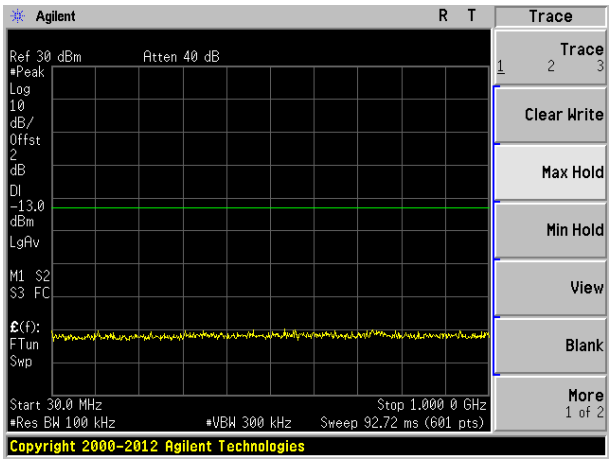
Highest channel

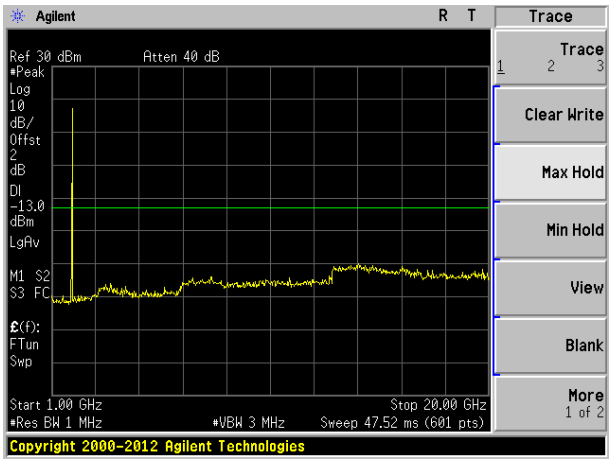
Test Mode: LTE Band 2	Channel Bandwidth: 5MHz



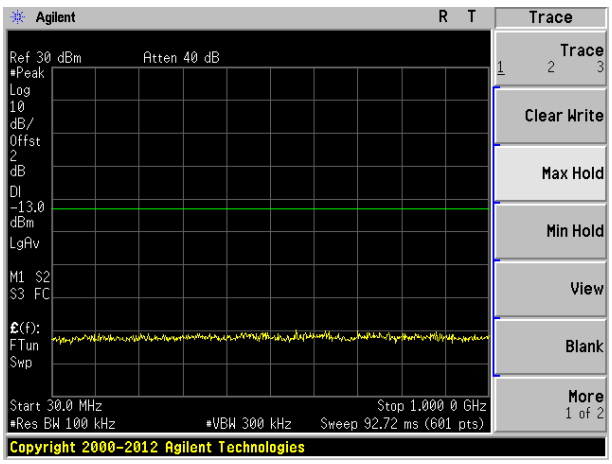


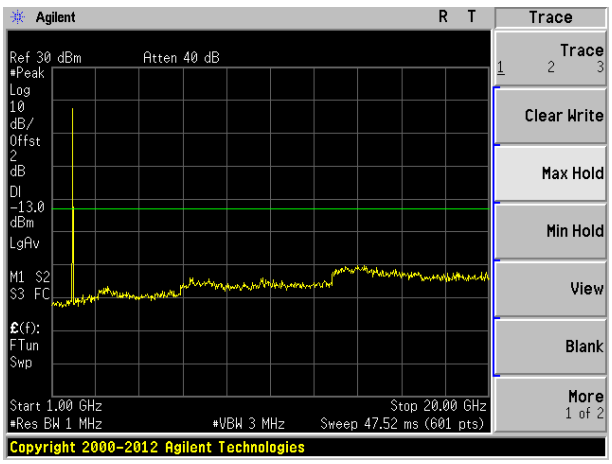
Lowest channel





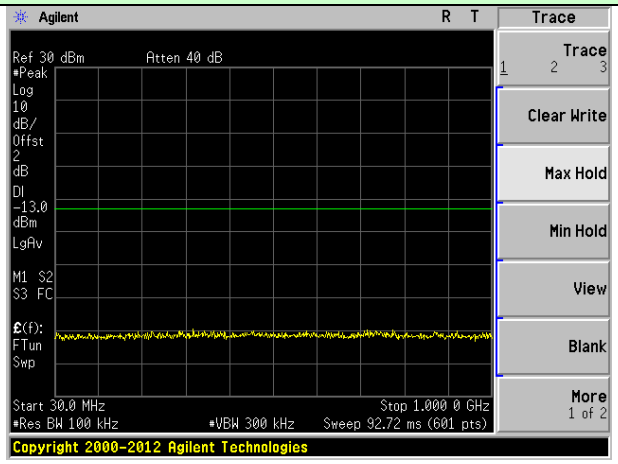
Middle channel

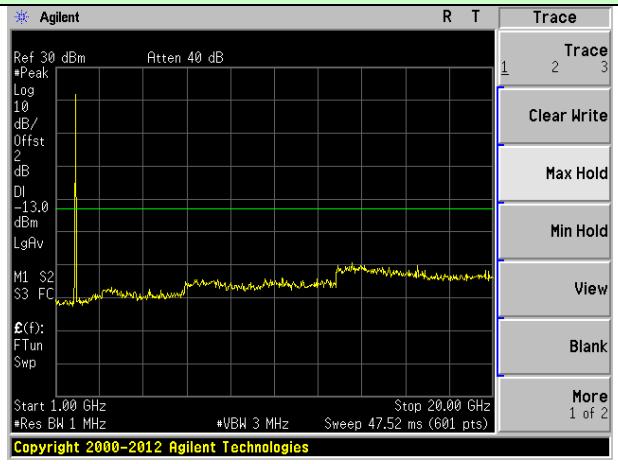




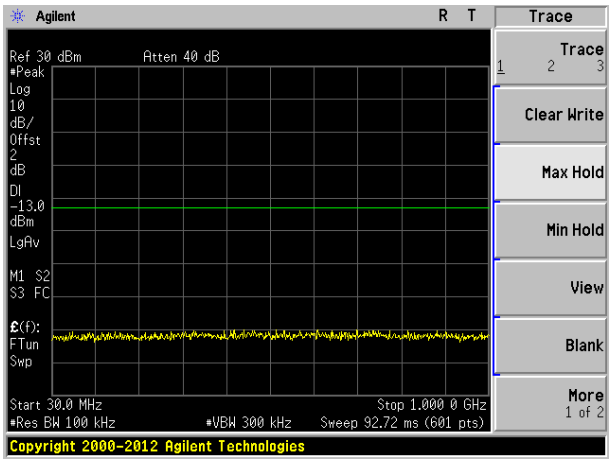
Highest channel

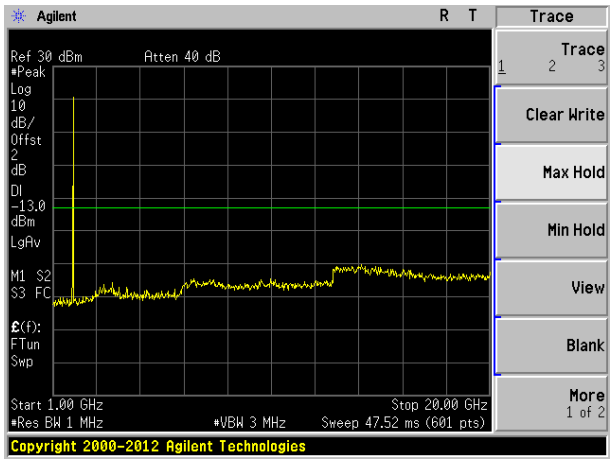
Test Mode: LTE Band 2	Channel Bandwidth: 10MHz



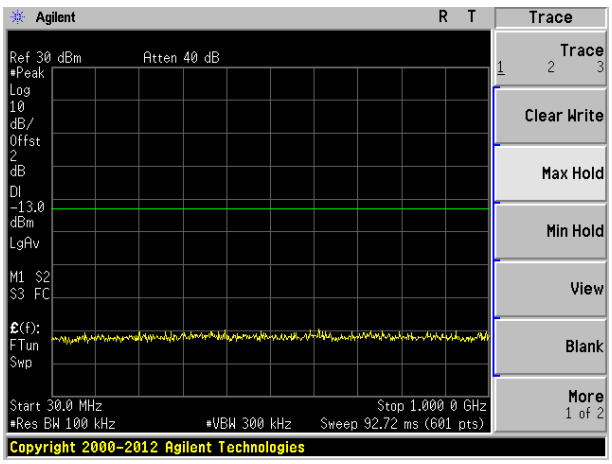


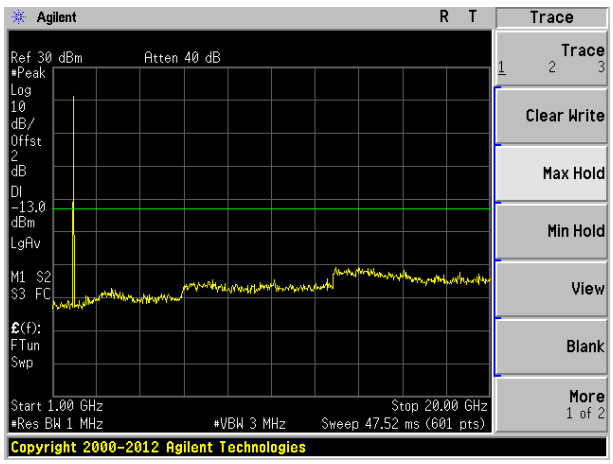
Lowest channel





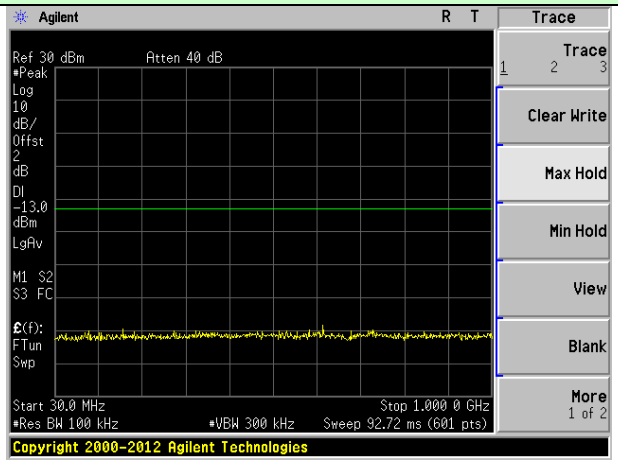
Middle channel

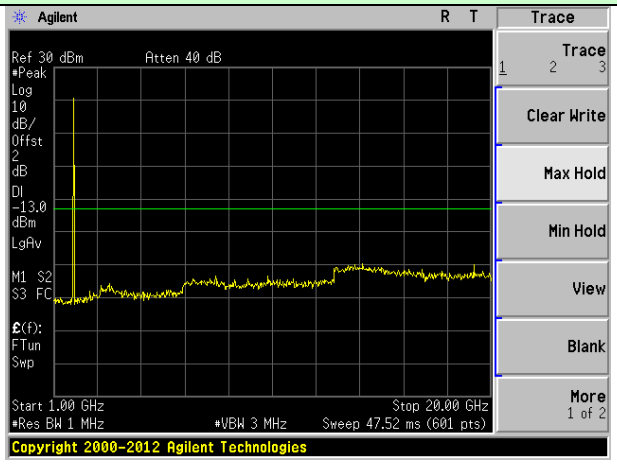




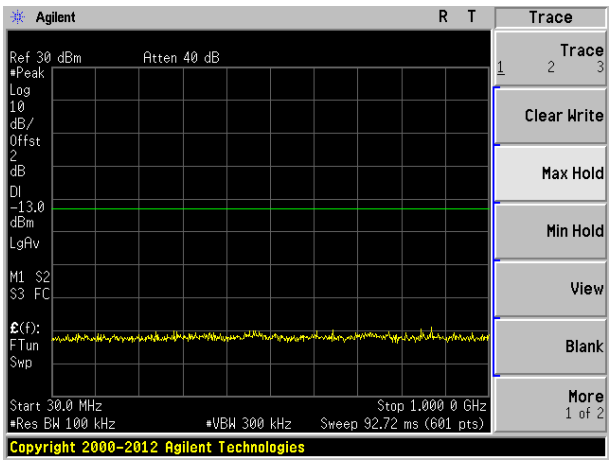
Highest channel

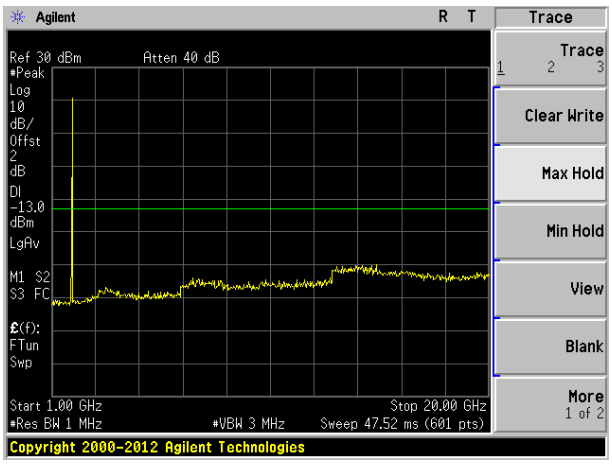
Test Mode: LTE Band 2	Channel Bandwidth: 15MHz



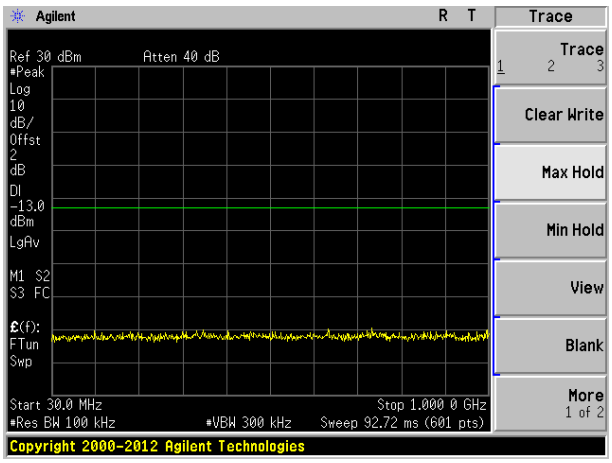


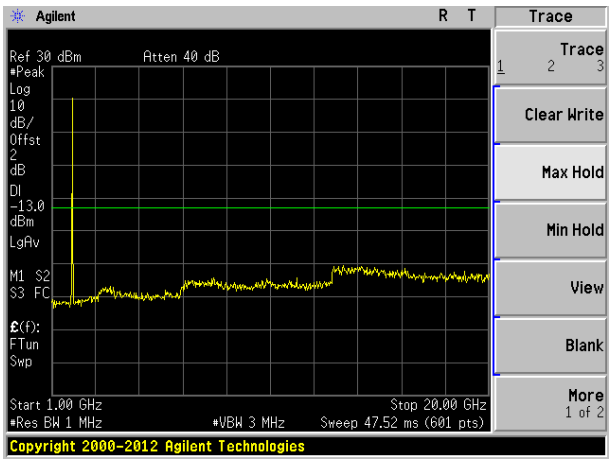
Lowest channel





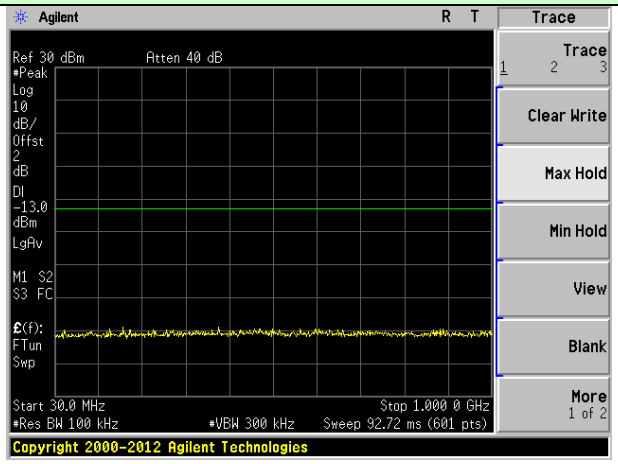
Middle channel

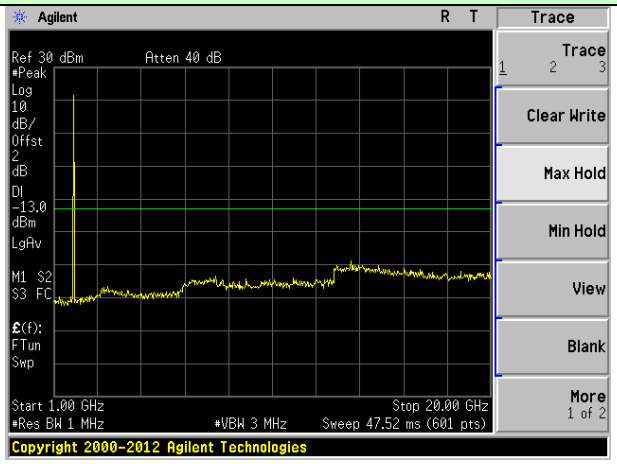




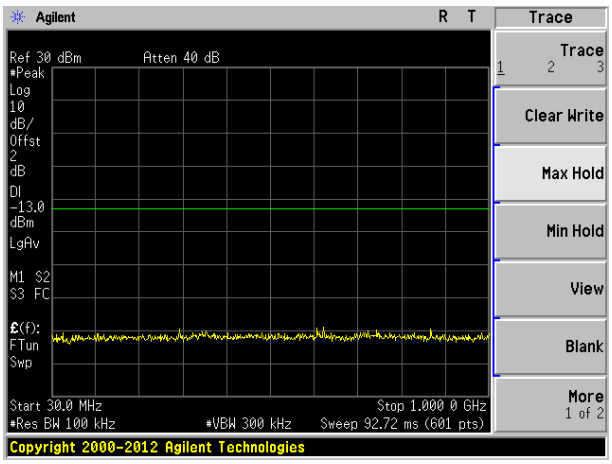
Highest channel

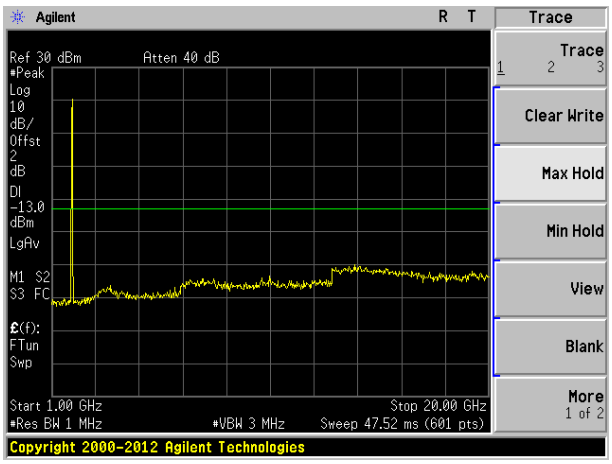
Test Mode: LTE Band 2	Channel Bandwidth: 20MHz



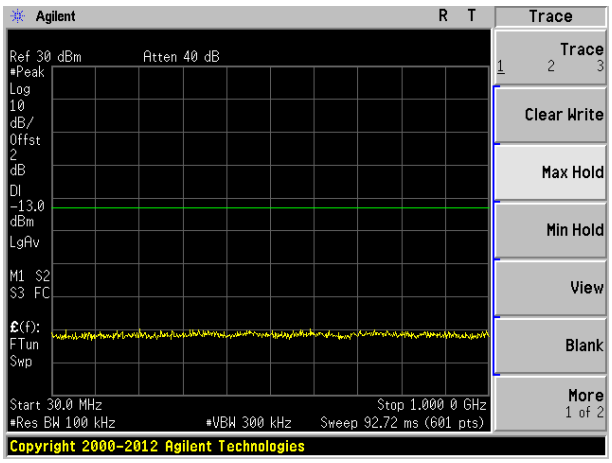


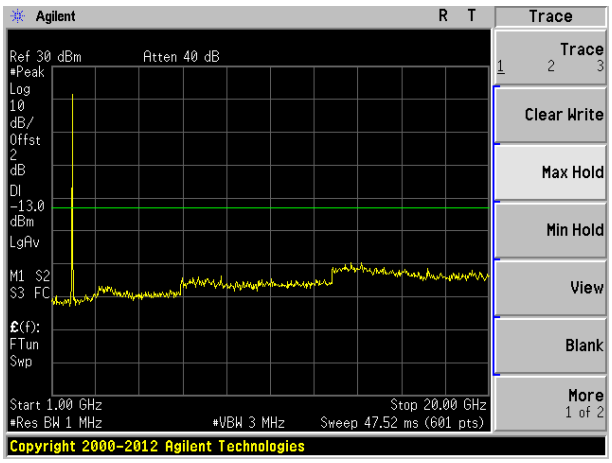
Lowest channel





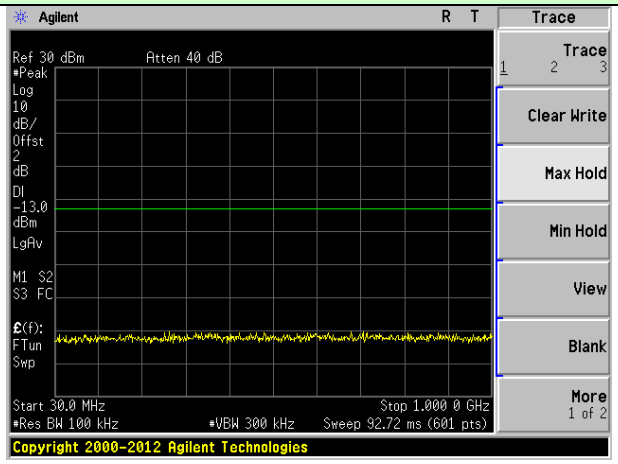
Middle channel

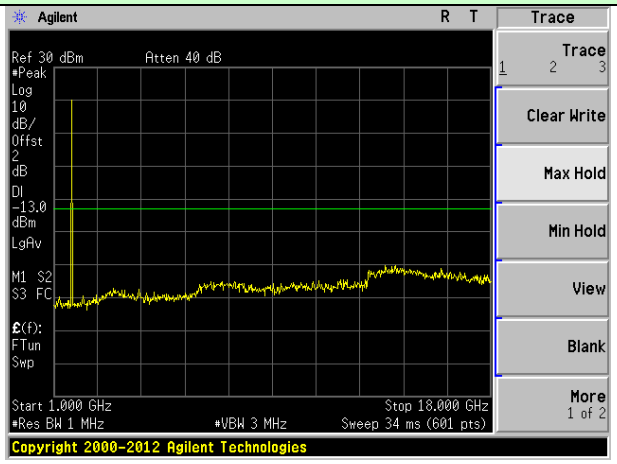




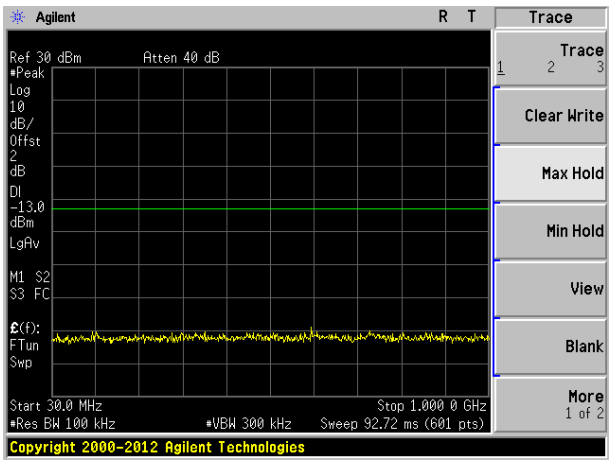
Highest channel

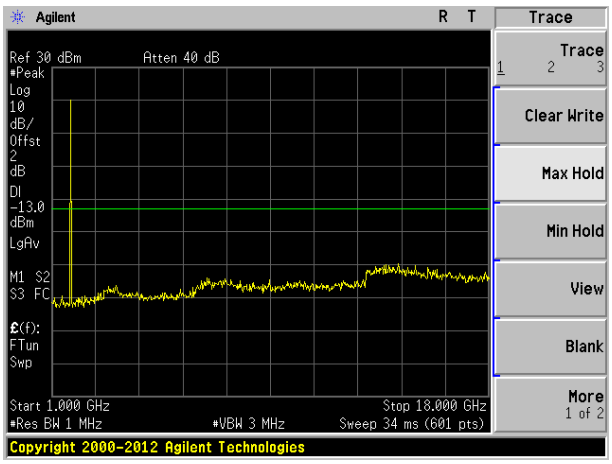
Test Mode: LTE Band 4	Channel Bandwidth: 1.4MHz



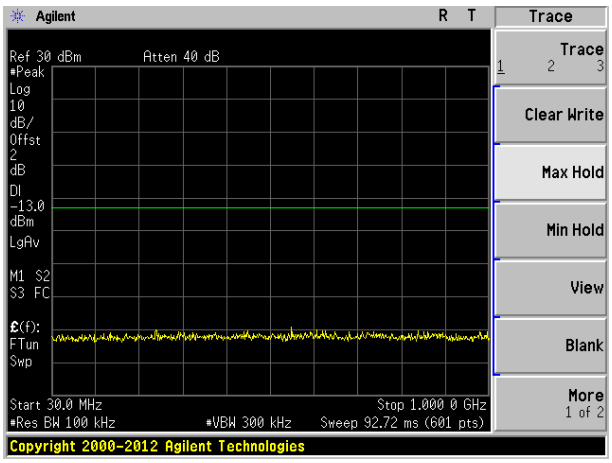


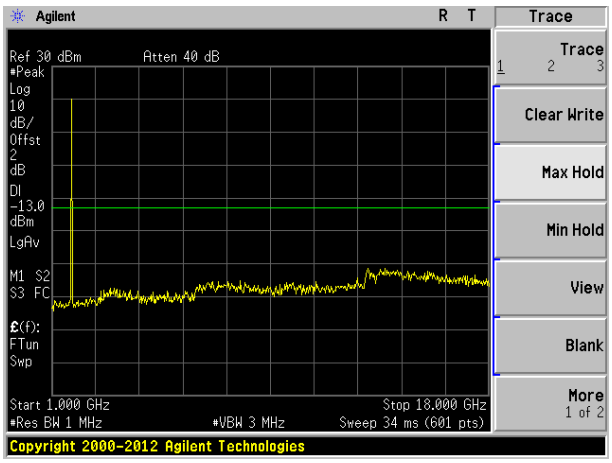
Lowest channel





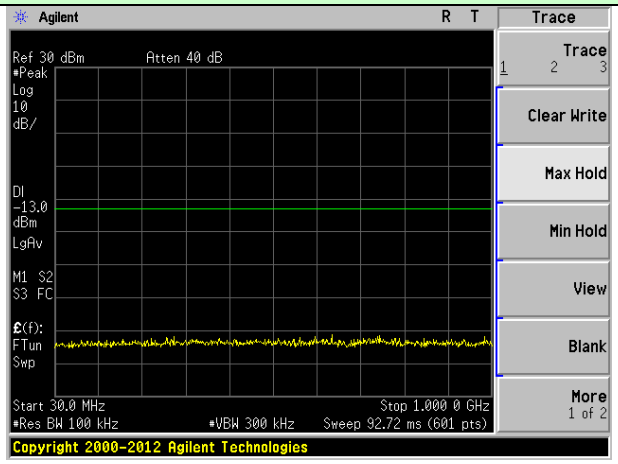
Middle channel

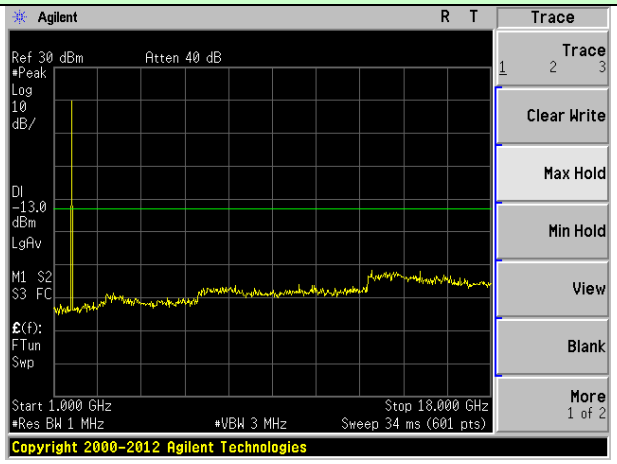




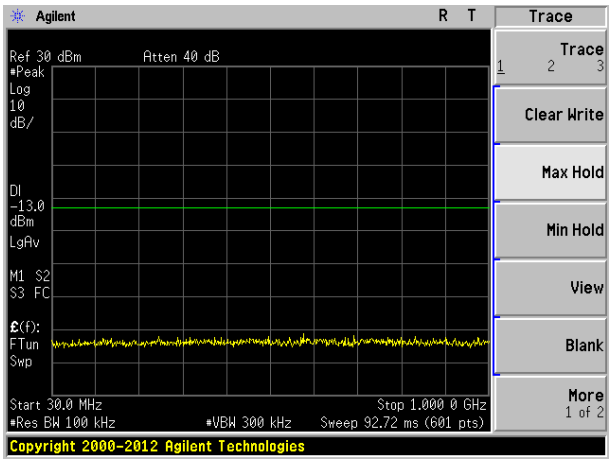
Highest channel

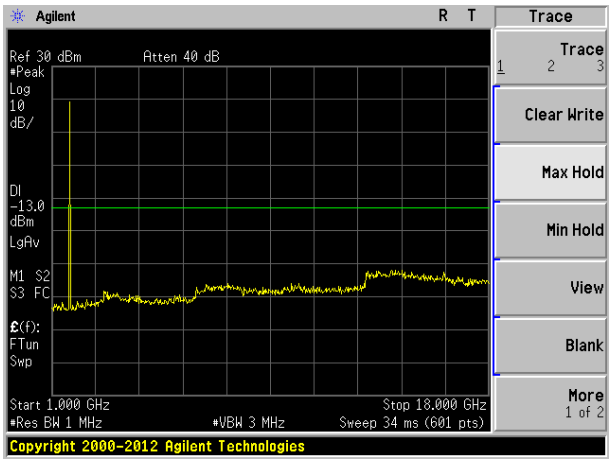
Test Mode: LTE Band 4	Channel Bandwidth: 3MHz



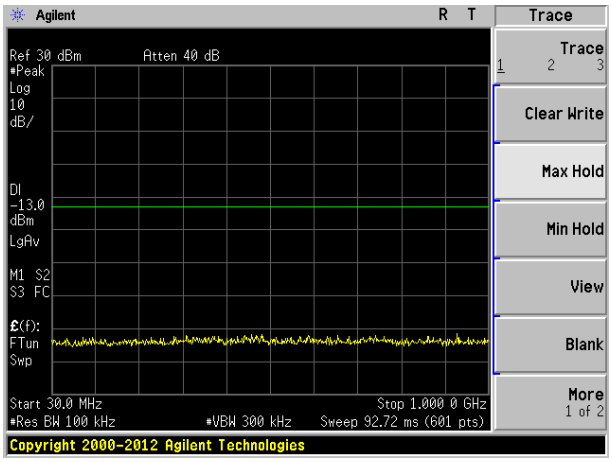


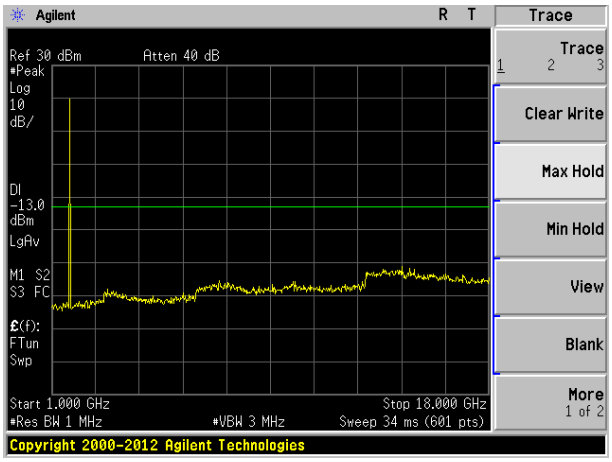
Lowest channel





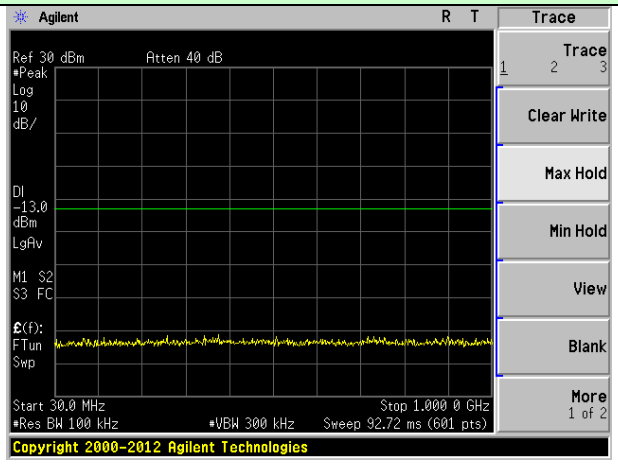
Middle channel

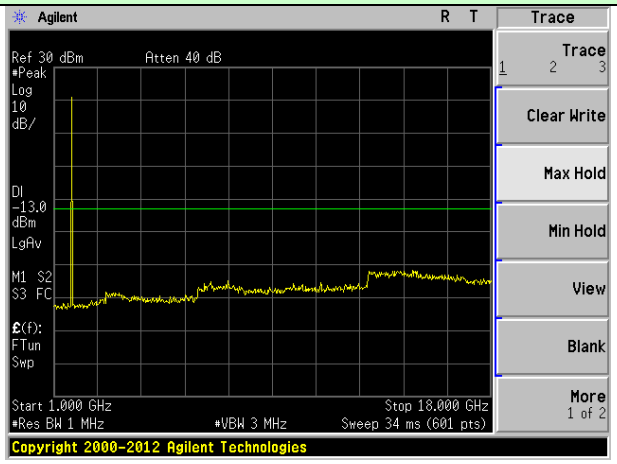




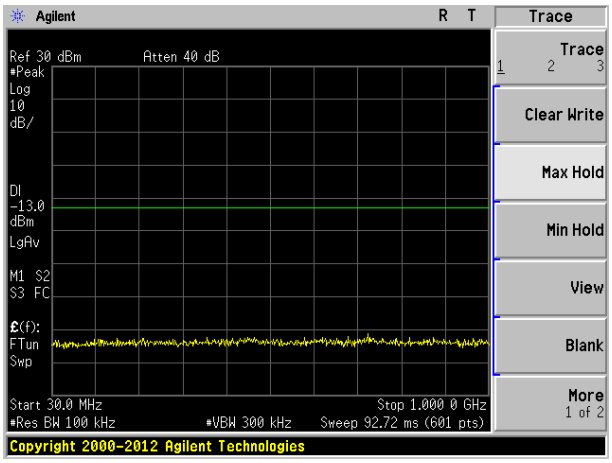
Highest channel

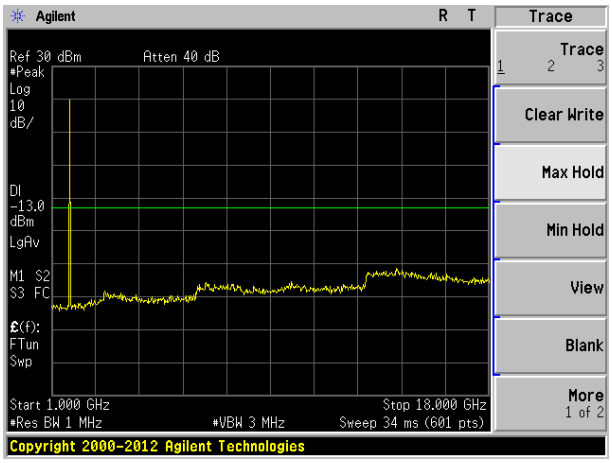
Test Mode: LTE Band 4	Channel Bandwidth: 5MHz



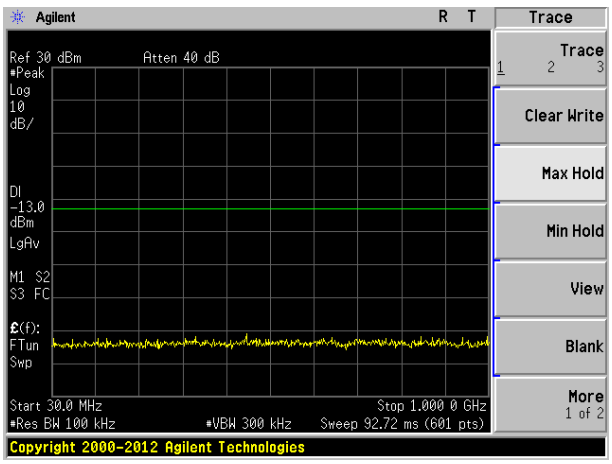


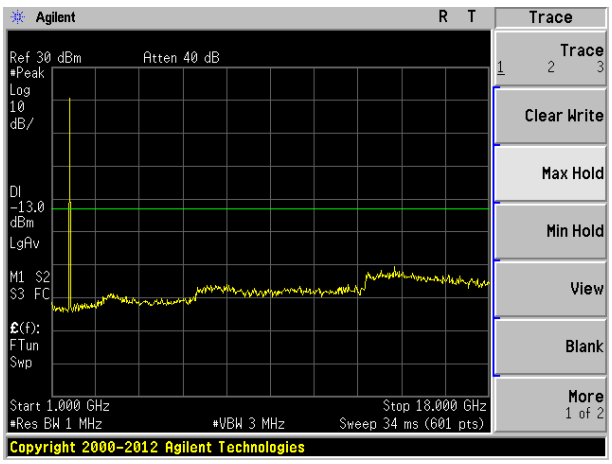
Lowest channel





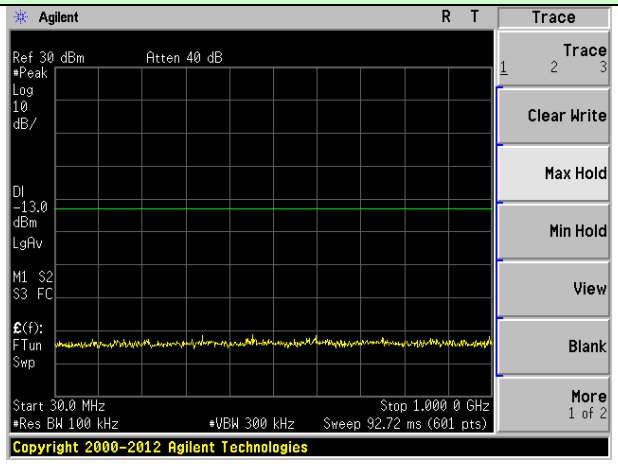
Middle channel

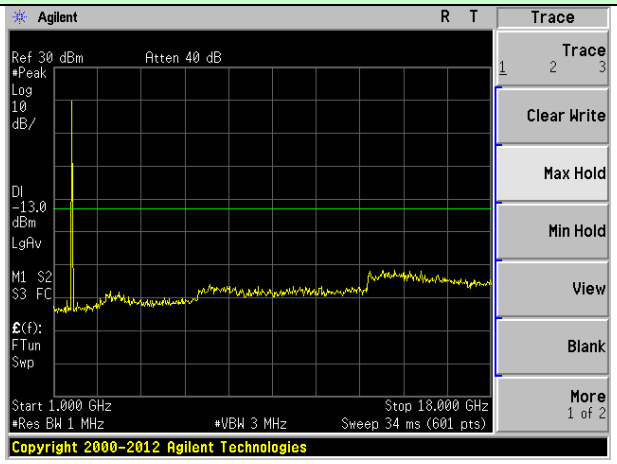




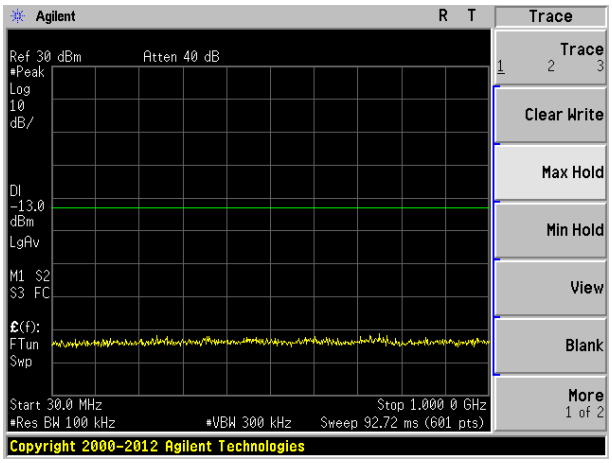
Highest channel

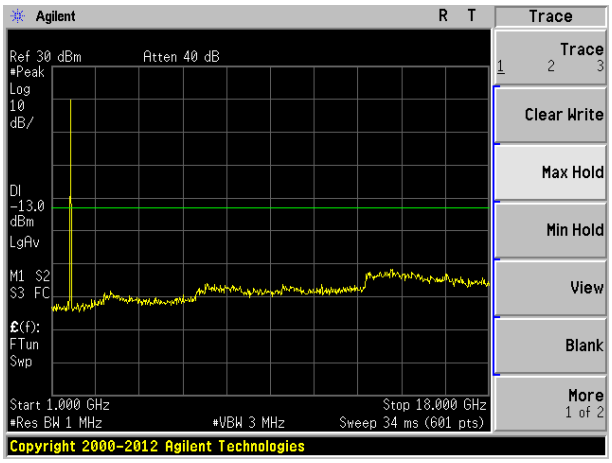
Test Mode: LTE Band 4	Channel Bandwidth: 10MHz



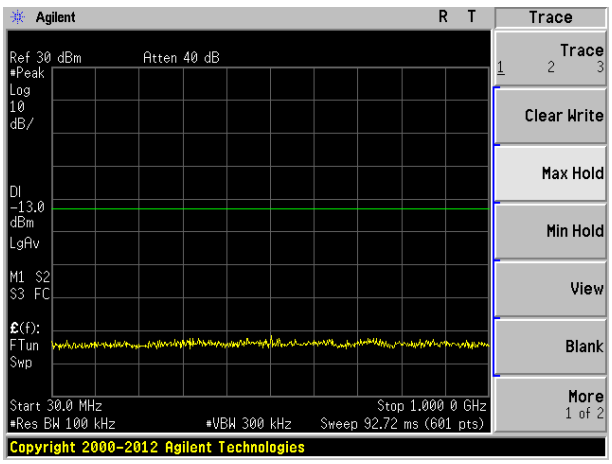


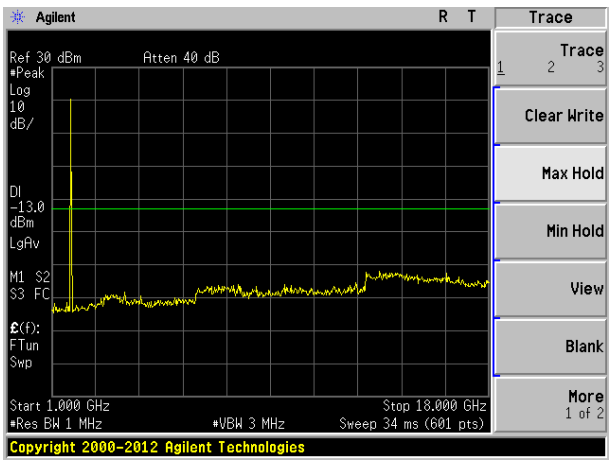
Lowest channel





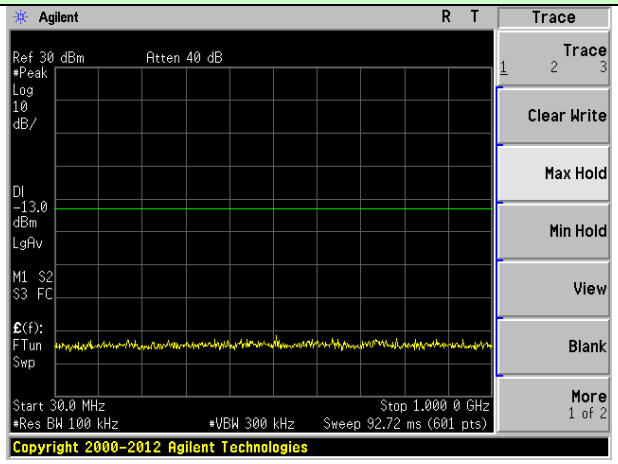
Middle channel

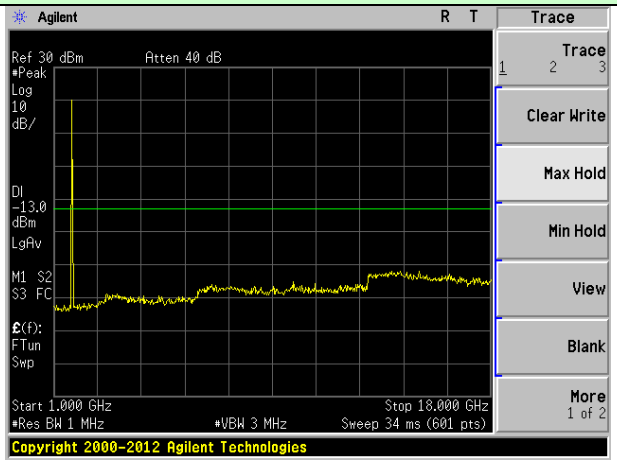




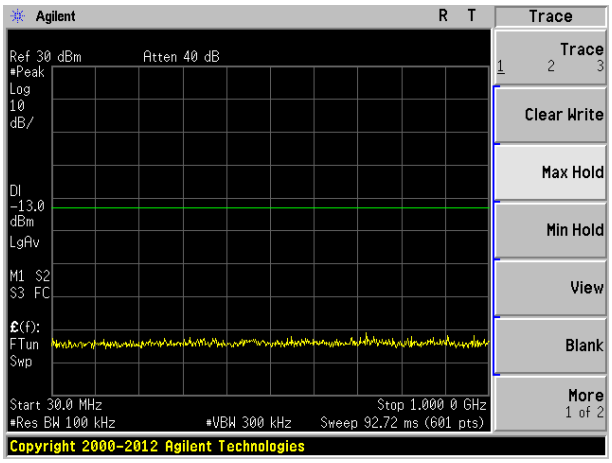
Highest channel

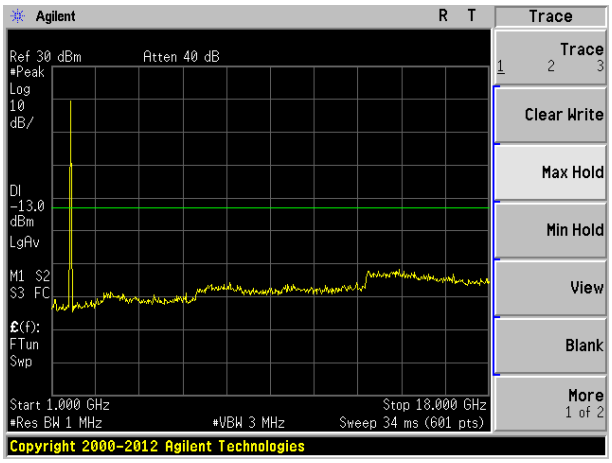
Test Mode: LTE Band 4	Channel Bandwidth: 15MHz



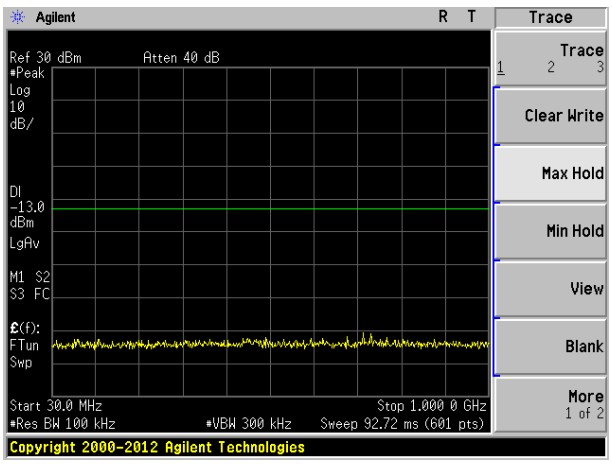


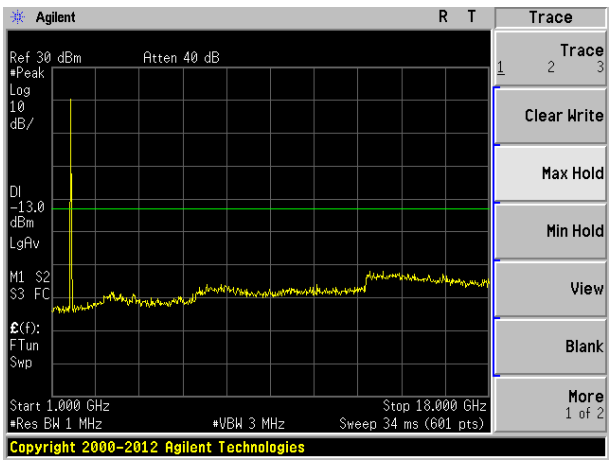
Lowest channel





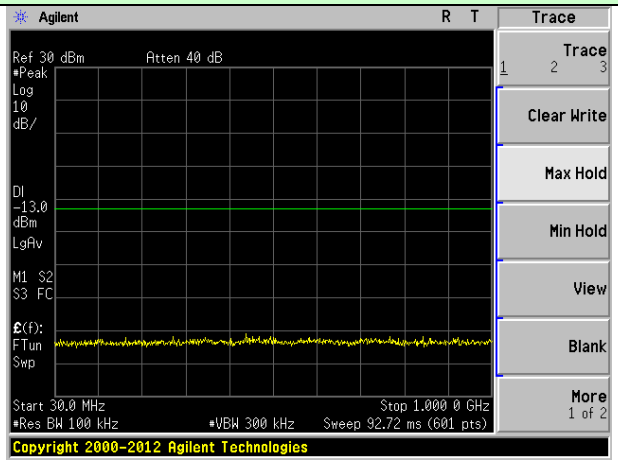
Middle channel

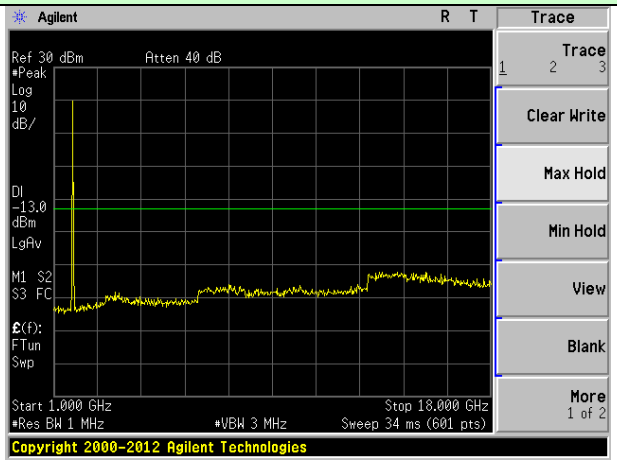




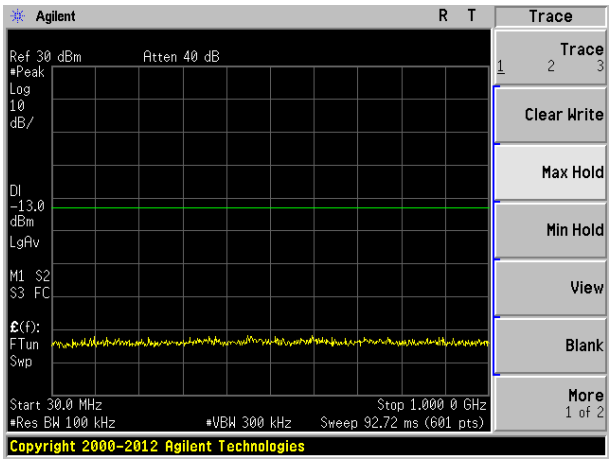
Highest channel

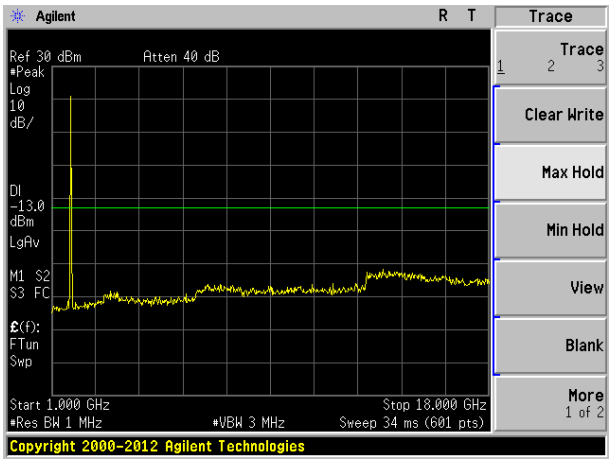
Test Mode: LTE Band 4	Channel Bandwidth: 20MHz



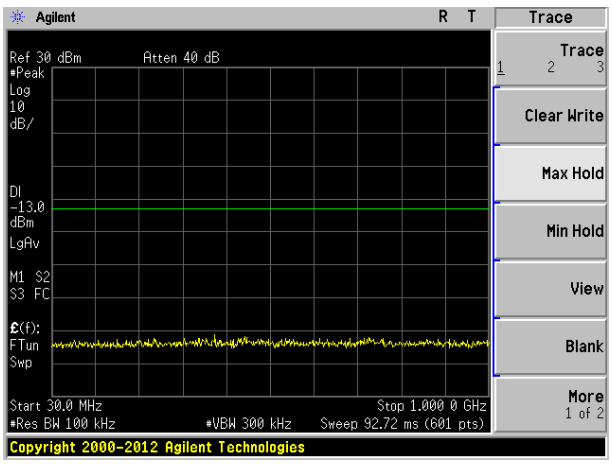


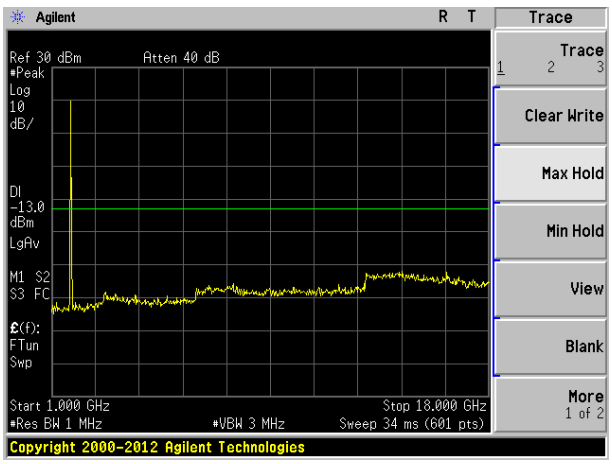
Lowest channel





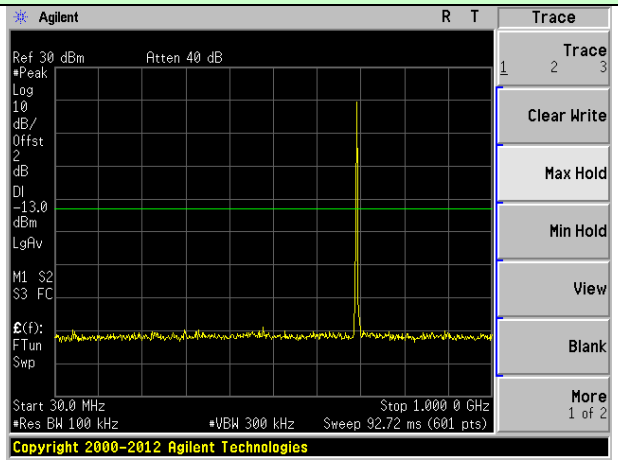
Middle channel

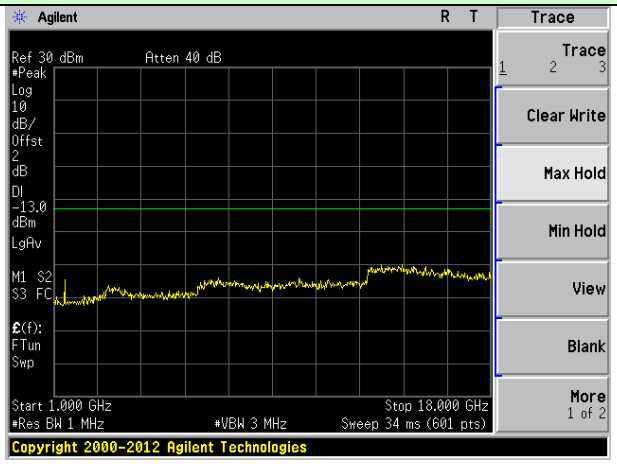




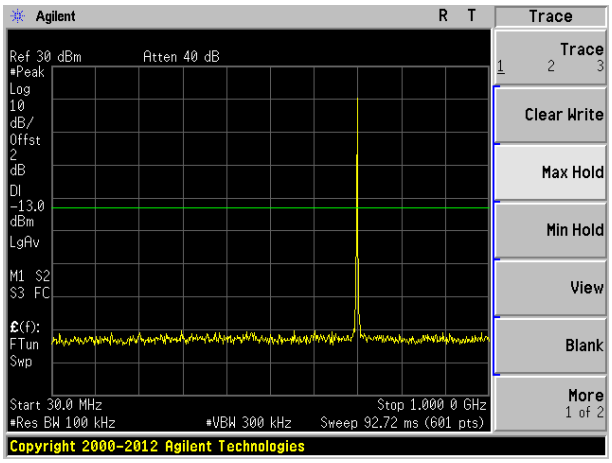
Highest channel

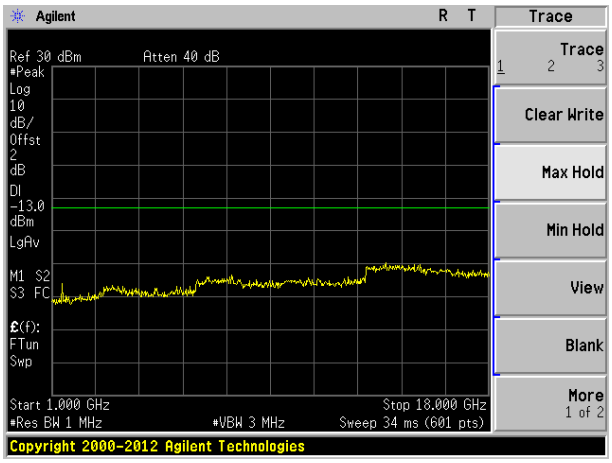
Test Mode: LTE Band 12	Channel Bandwidth: 1.4MHz



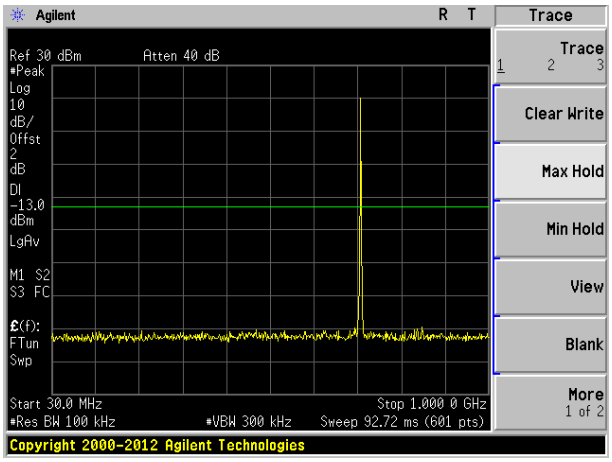


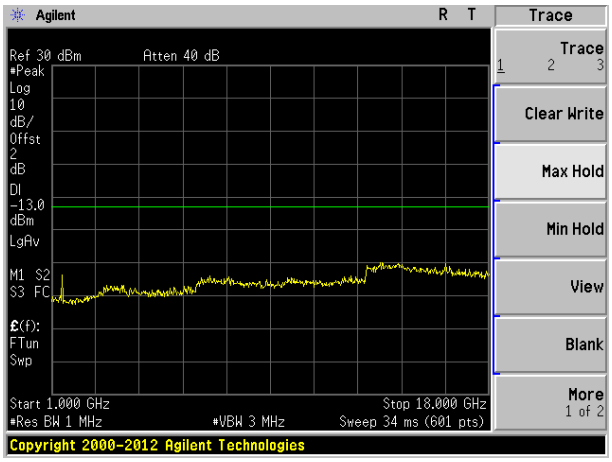
Lowest channel





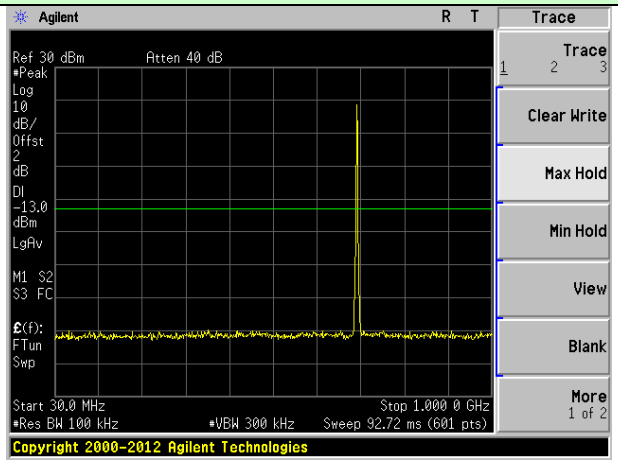
Middle channel

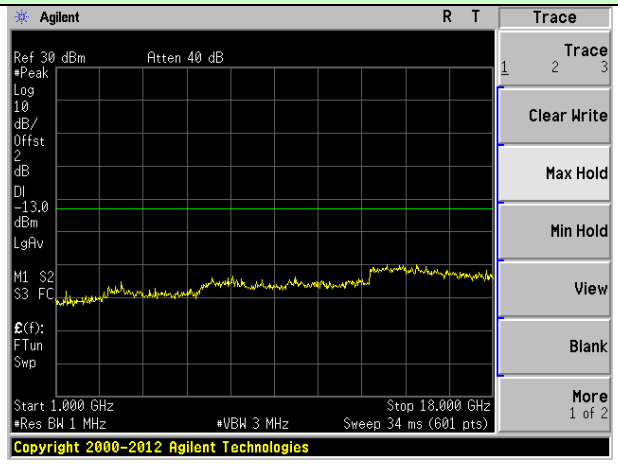




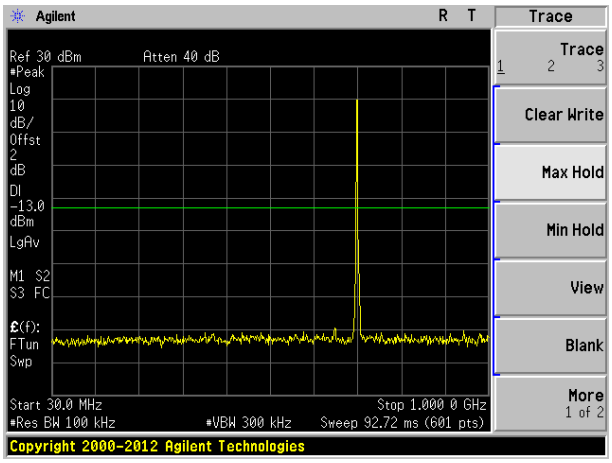
Highest channel

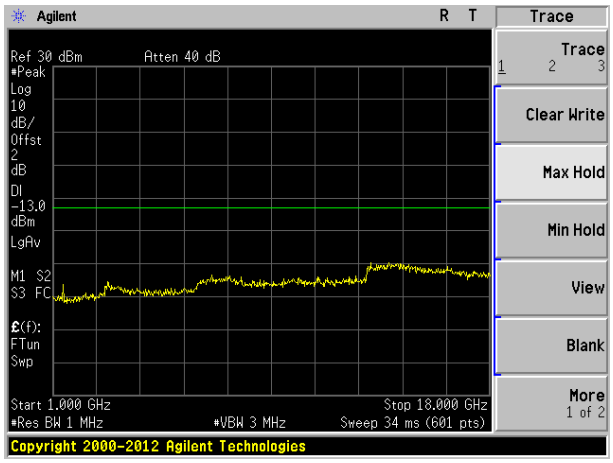
Test Mode: LTE Band 12	Channel Bandwidth: 3MHz



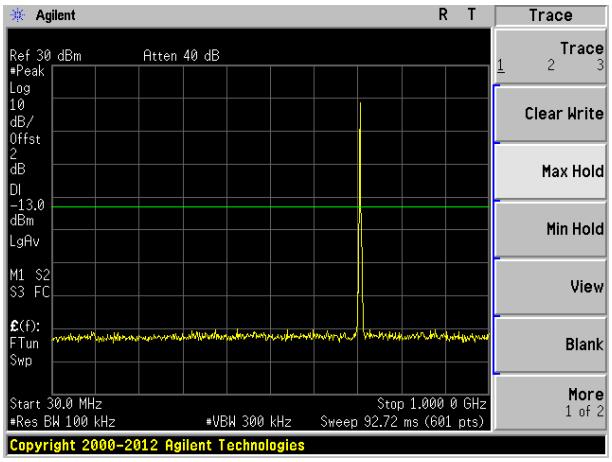


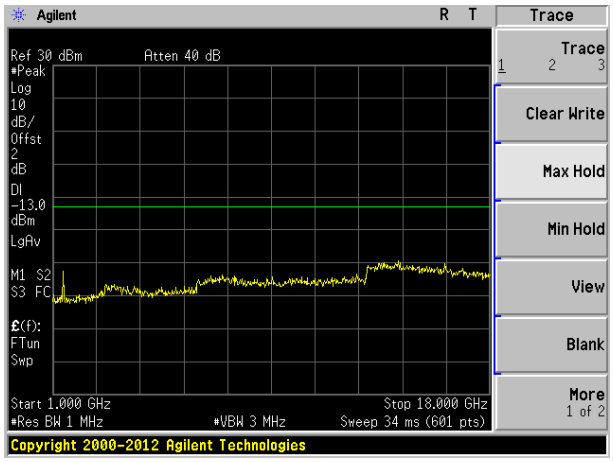
Lowest channel





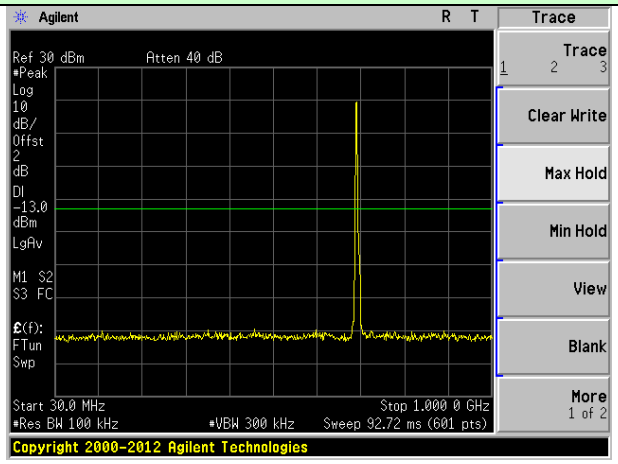
Middle channel

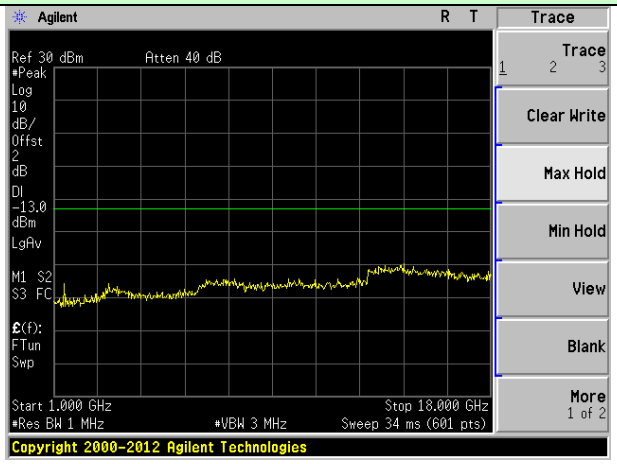




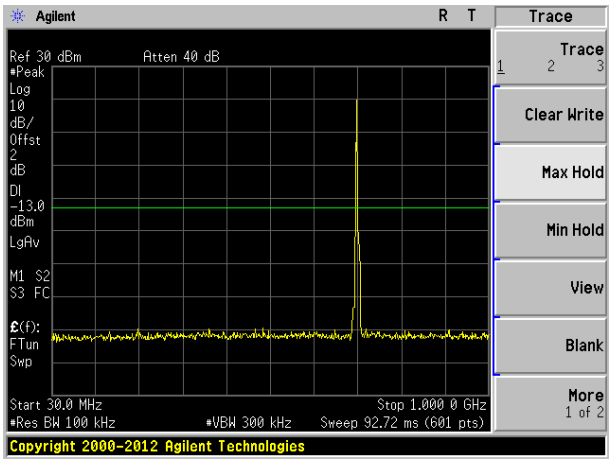
Highest channel

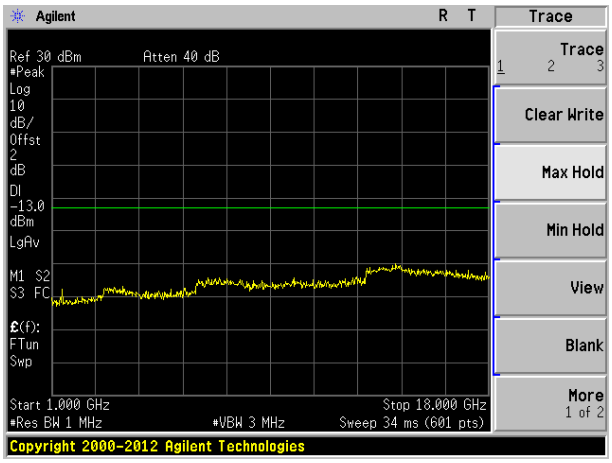
Test Mode: LTE Band 12	Channel Bandwidth: 5MHz



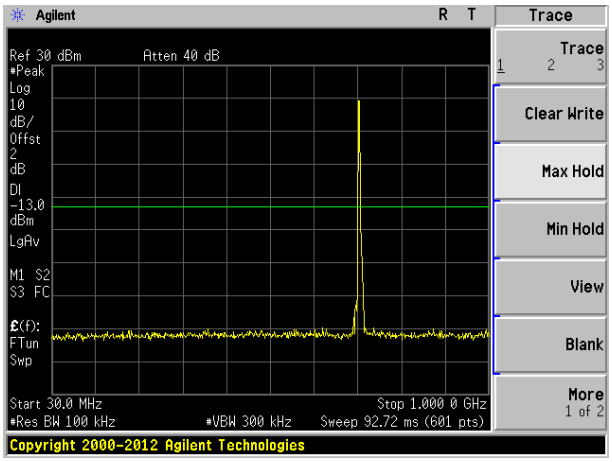


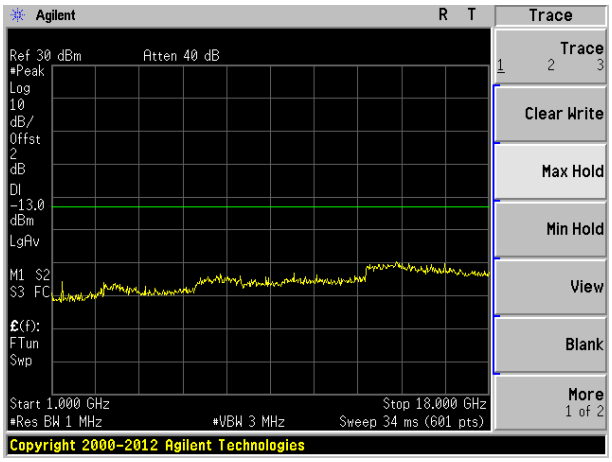
Lowest channel





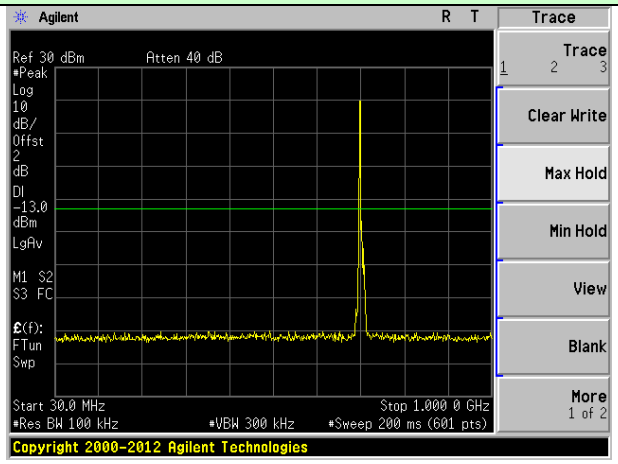
Middle channel

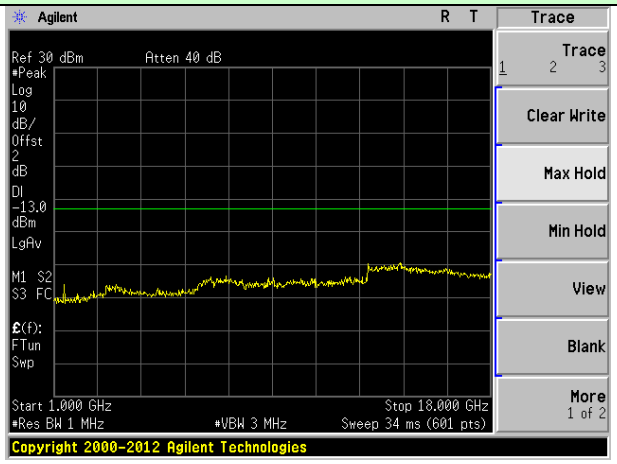




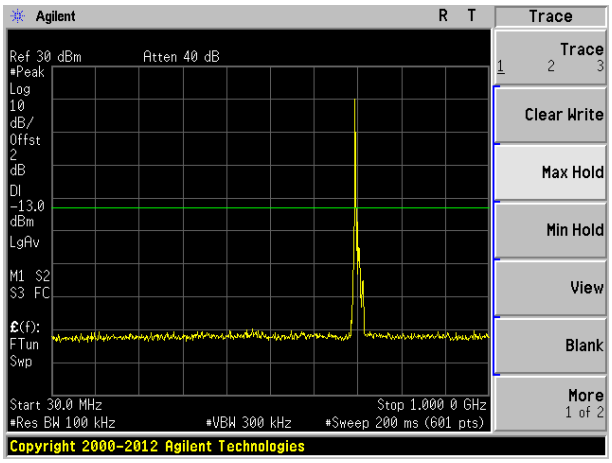
Highest channel

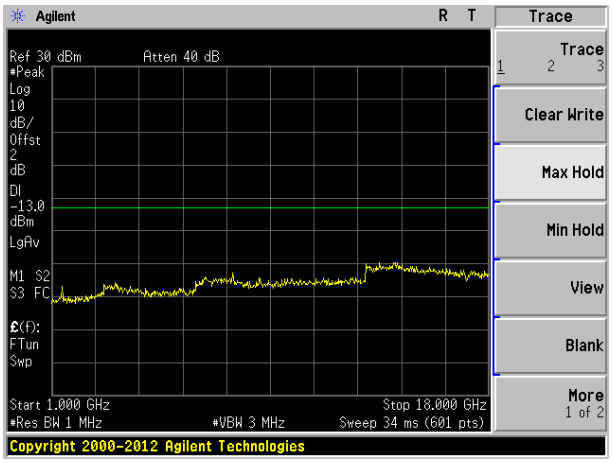
Test Mode: LTE Band 12	Channel Bandwidth: 10MHz



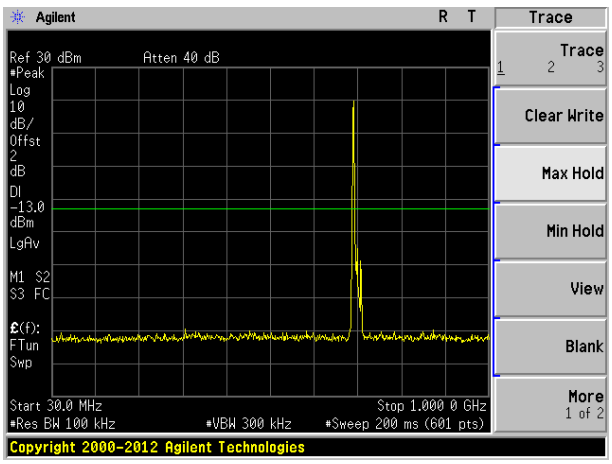


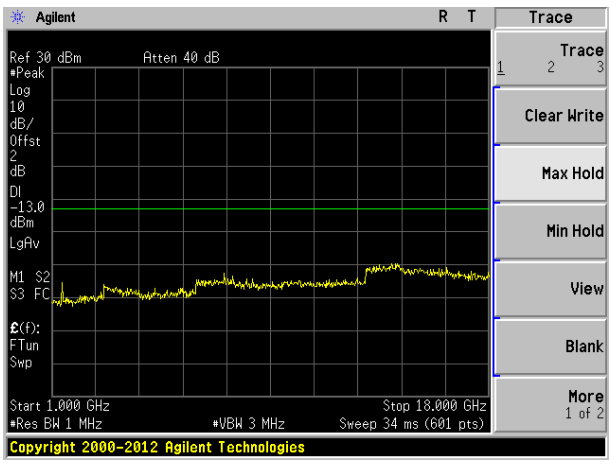
Lowest channel





Middle channel

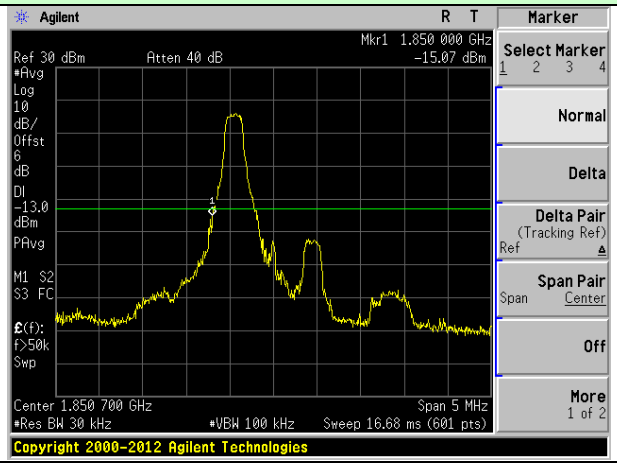
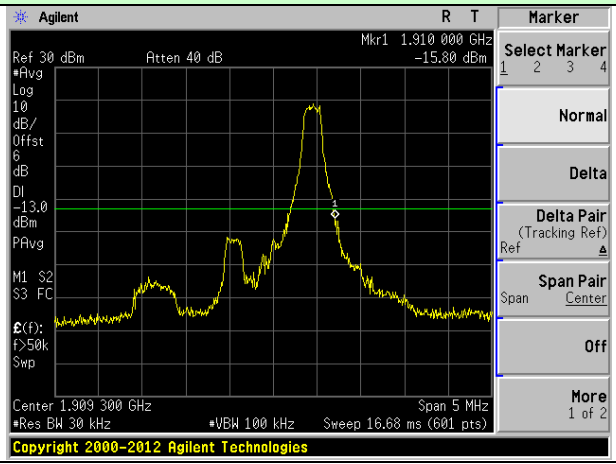


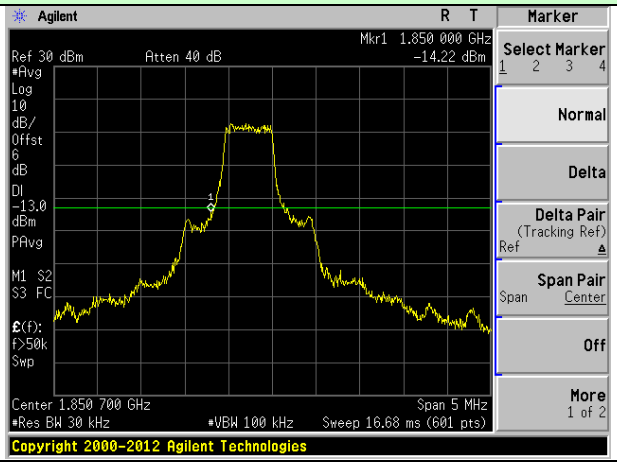
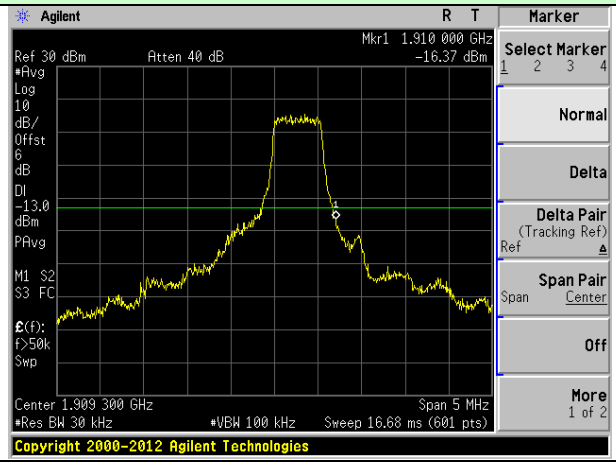


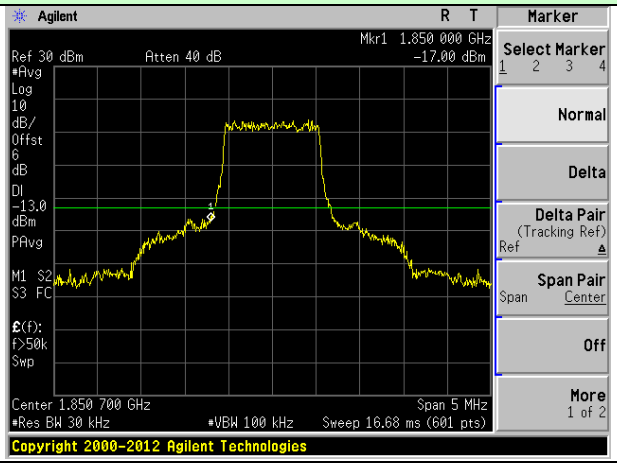
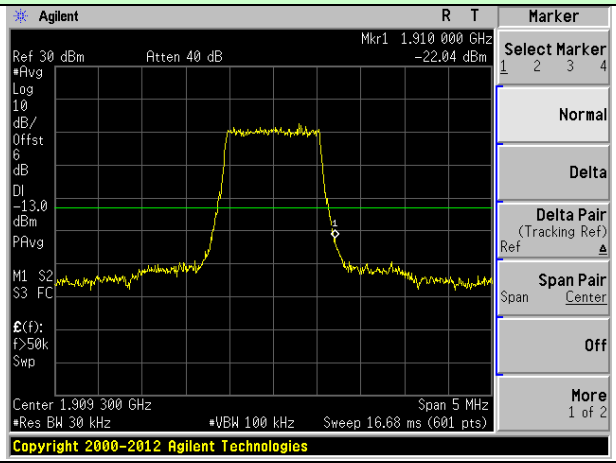
Highest channel

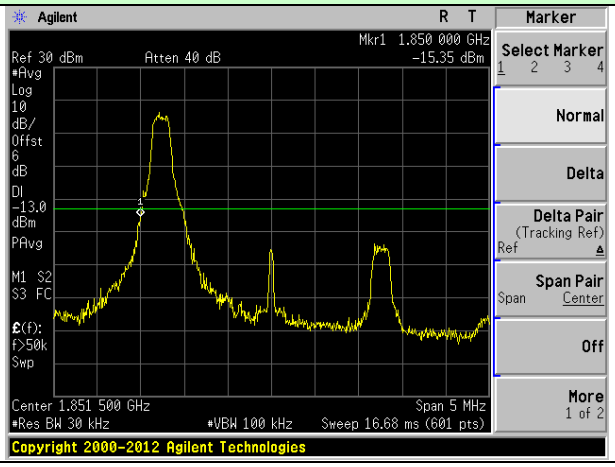
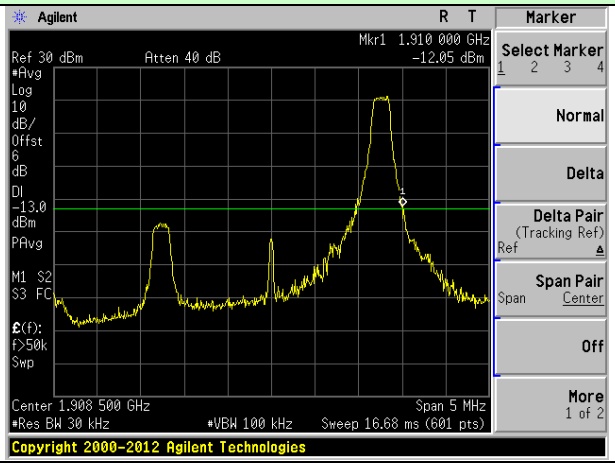
Band Edge:

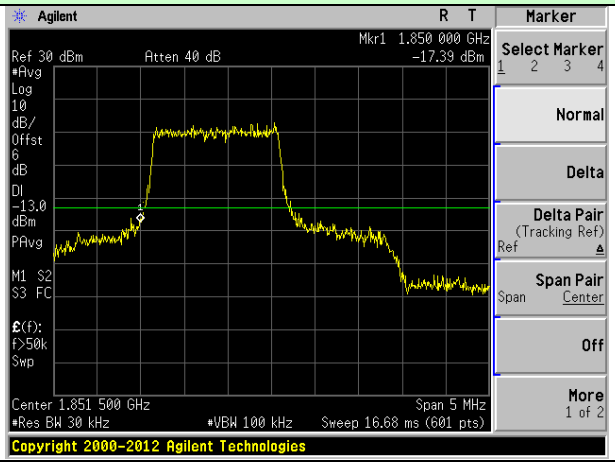
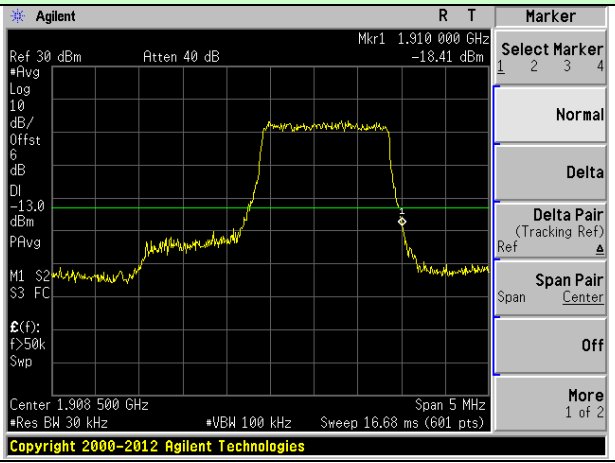
QPSK mode:

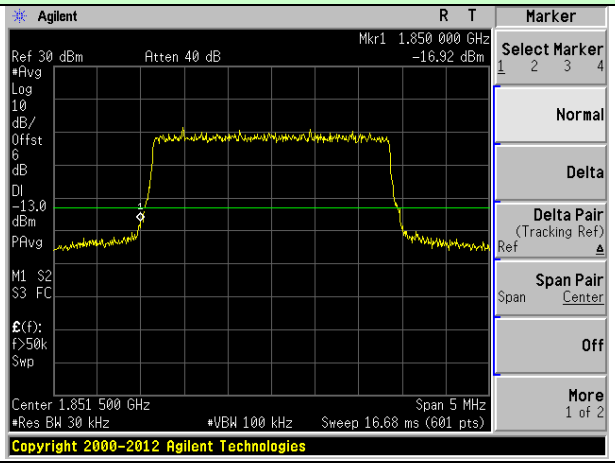
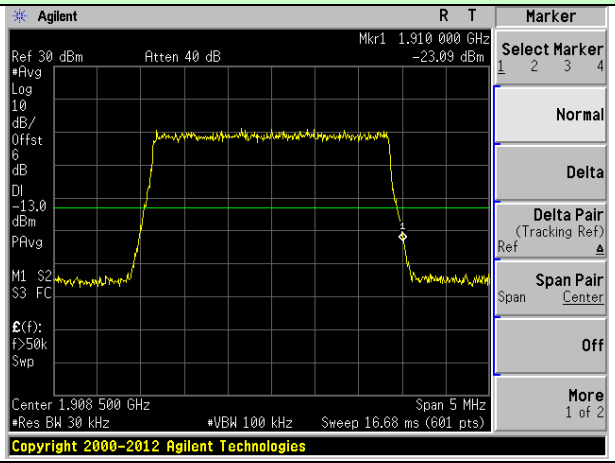
1.4MHz Bandwidth (RB size:1# RB offset:0#)	1.4MHz Bandwidth (RB size:1# RB offset:5#)
	
Lowest channel	Highest channel

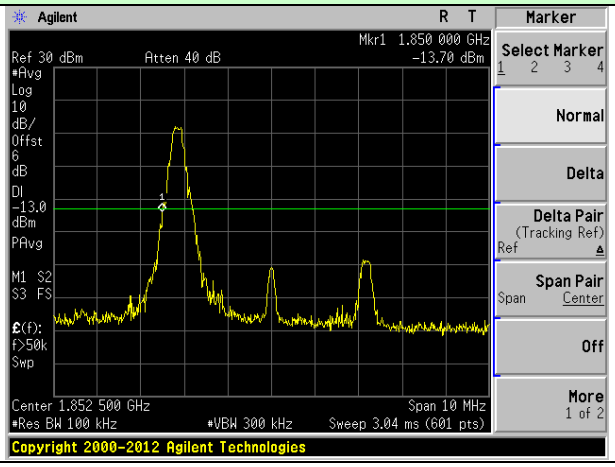
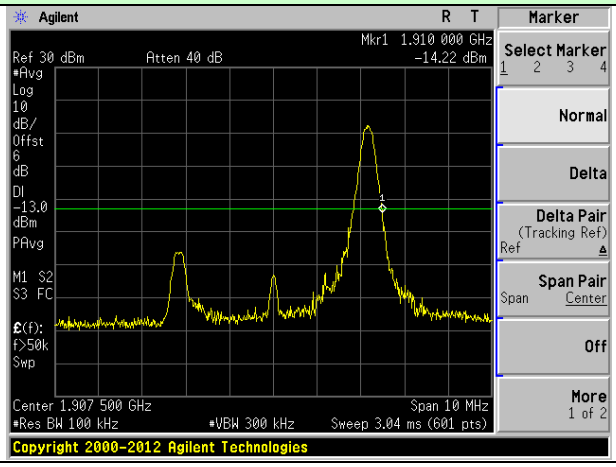
1.4MHz Bandwidth (RB size:3# RB offset:0#)	1.4MHz Bandwidth (RB size:3# RB offset:2#)
	
Lowest channel	Highest channel

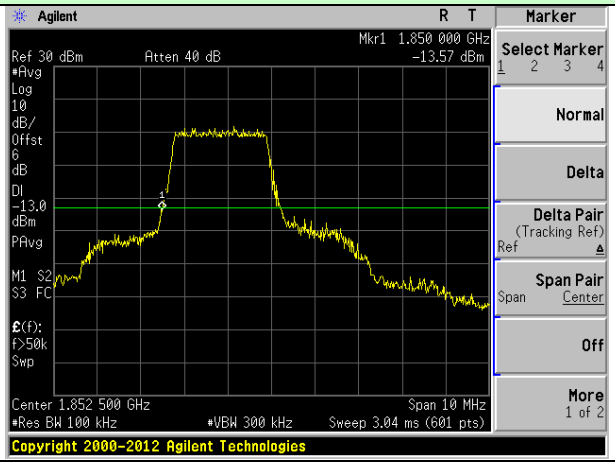
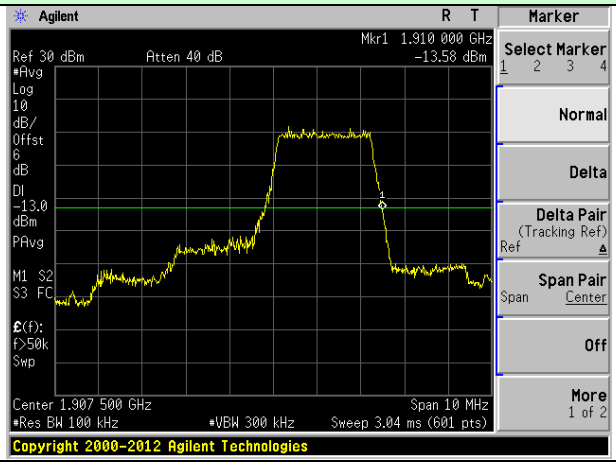
1.4MHz Bandwidth (RB size:6# RB offset:0#)	1.4MHz Bandwidth (RB size:6# RB offset:0#)
	
Lowest channel	Highest channel

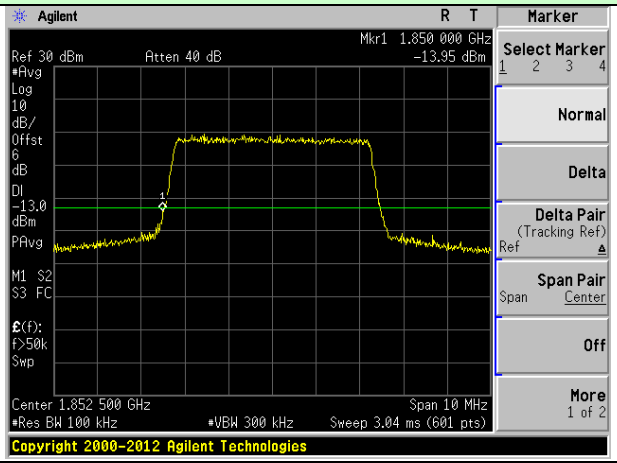
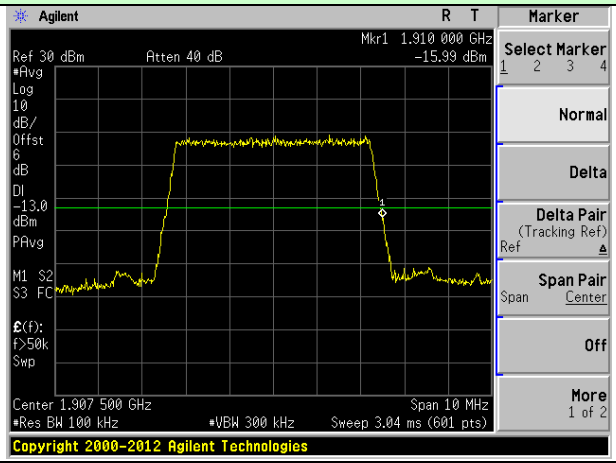
3MHz Bandwidth (RB size:1# RB offset:0#)	3MHz Bandwidth (RB size:1# RB offset:14#)
	
Lowest channel	Highest channel

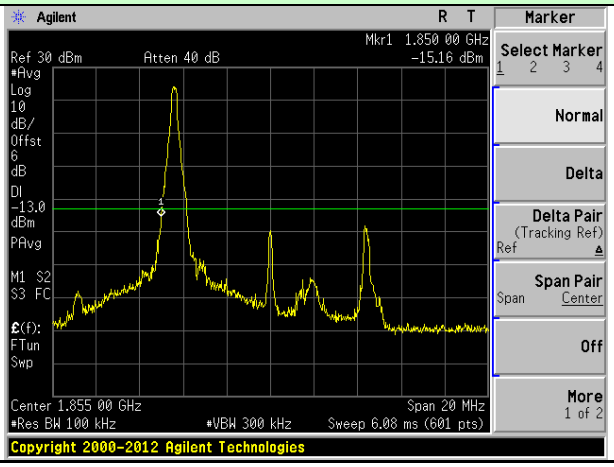
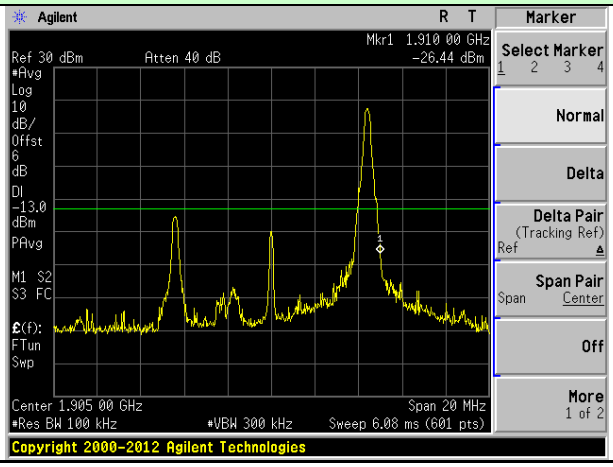
3MHz Bandwidth (RB size:8# RB offset:0#)	3MHz Bandwidth (RB size:8# RB offset:7#)
	
Lowest channel	Highest channel

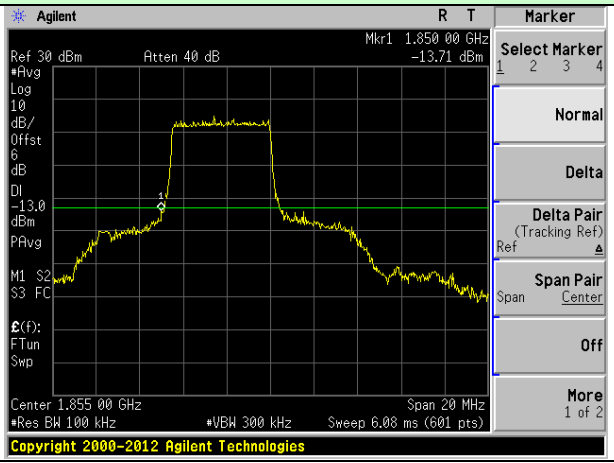
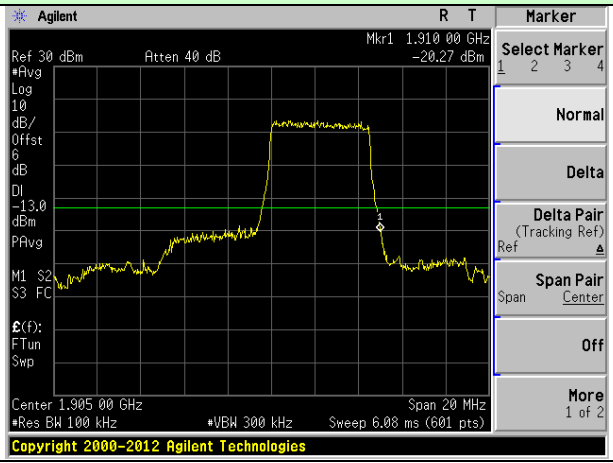
3MHz Bandwidth (RB size:15# RB offset:0#)	3MHz Bandwidth (RB size:15# RB offset:0#)
	
Lowest channel	Highest channel

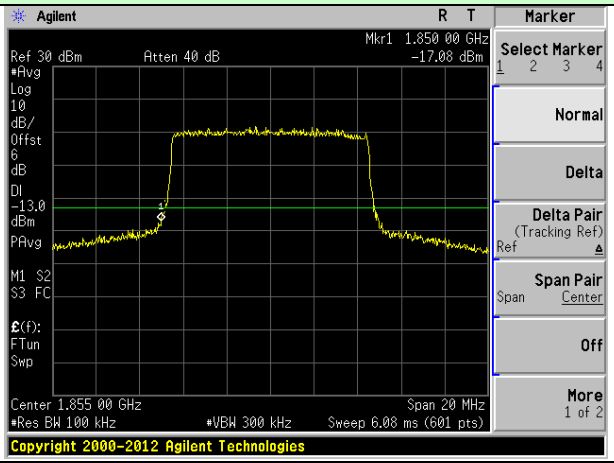
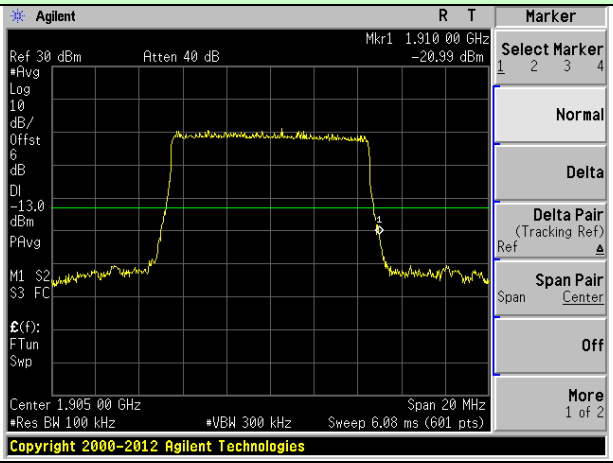
5MHz Bandwidth (RB size:1# RB offset:0#)	5MHz Bandwidth (RB size:1# RB offset:24#)
	
Lowest channel	Highest channel

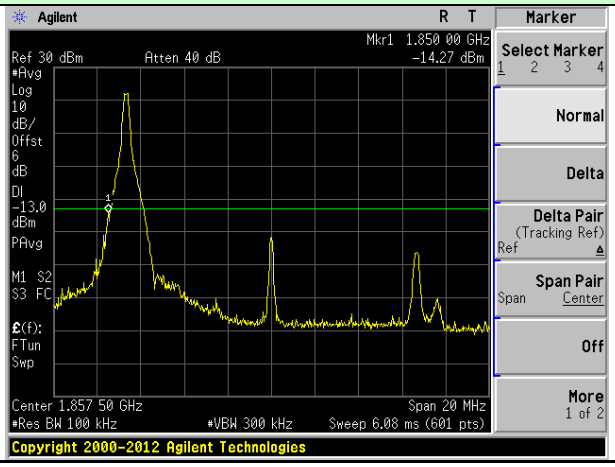
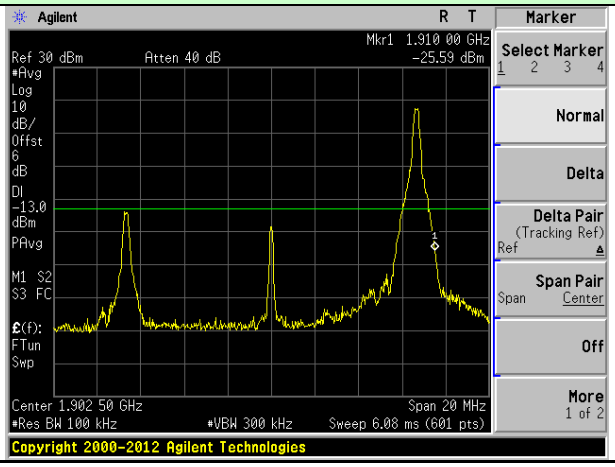
5MHz Bandwidth (RB size:12# RB offset:0#)	5MHz Bandwidth (RB size:12# RB offset:13#)
	
Lowest channel	Highest channel

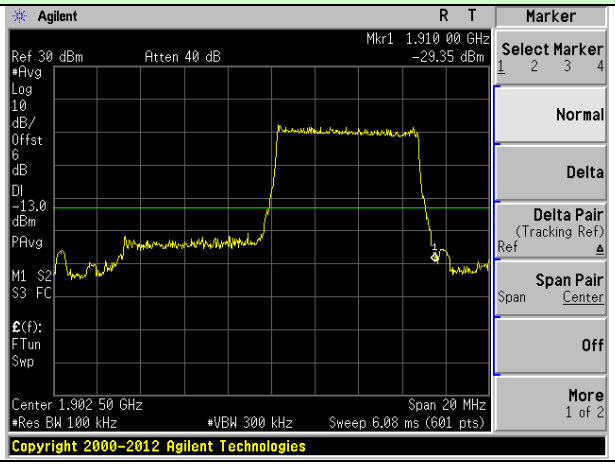
5MHz Bandwidth (RB size:25# RB offset:0#)	5MHz Bandwidth (RB size:25# RB offset:0#)
	
Lowest channel	Highest channel

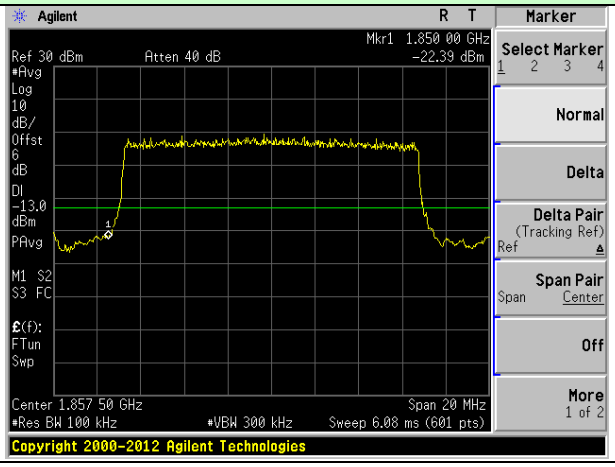
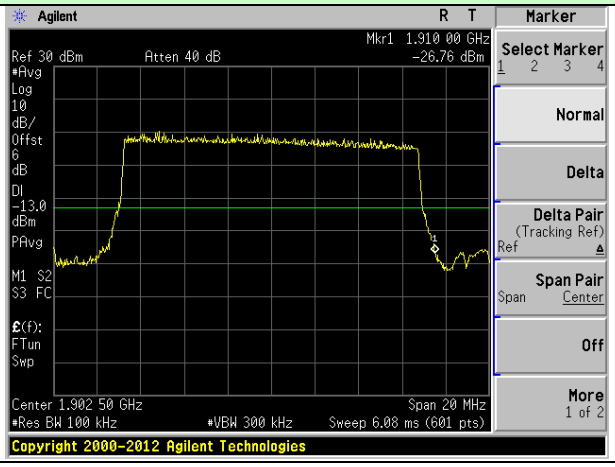
10MHz Bandwidth (RB size:1# RB offset:0#)	10MHz Bandwidth (RB size:1# RB offset:49#)
	
Lowest channel	Highest channel

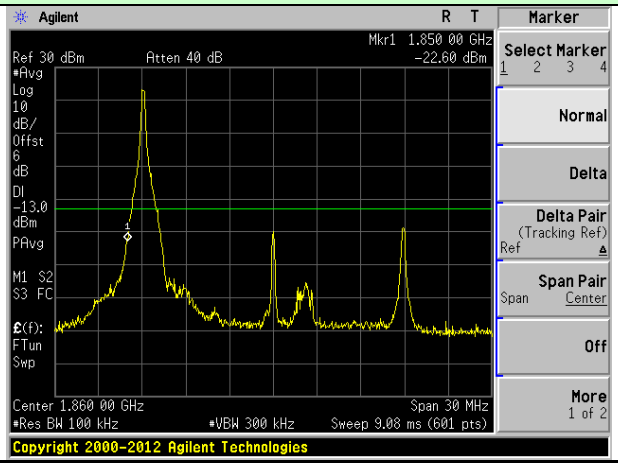
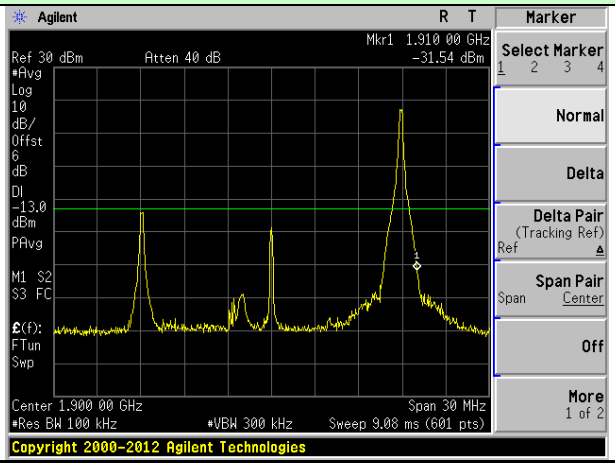
10MHz Bandwidth (RB size:25# RB offset:0#)	10MHz Bandwidth (RB size:25# RB offset:25#)
	
Lowest channel	Highest channel

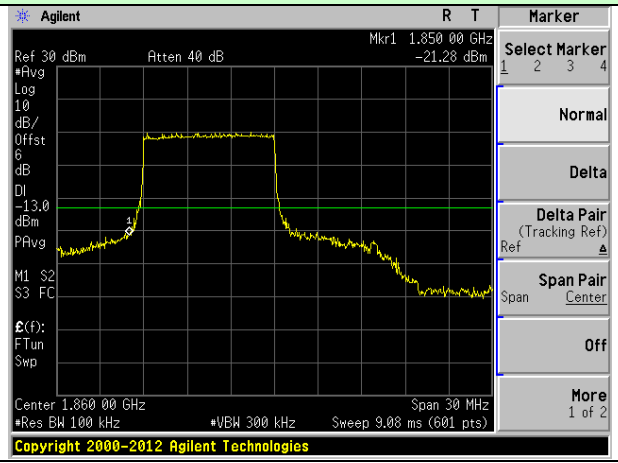
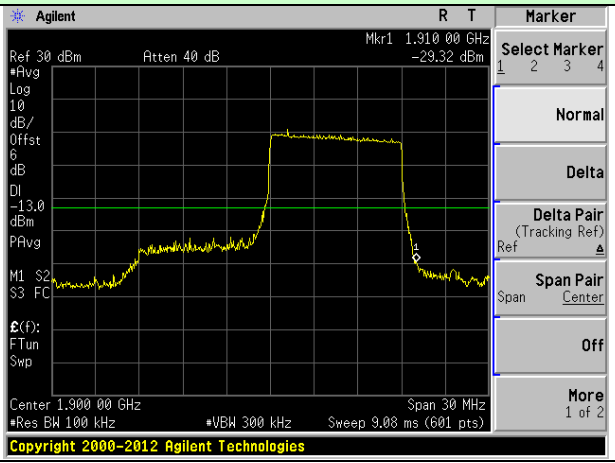
10MHz Bandwidth (RB size:50# RB offset:0#)	10MHz Bandwidth (RB size:50# RB offset:0#)
	
Lowest channel	Highest channel

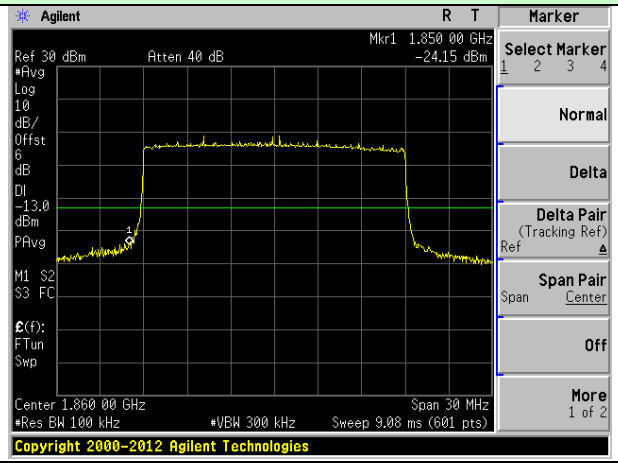
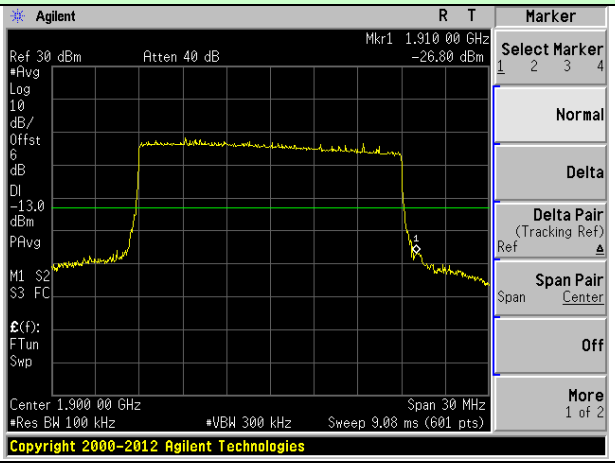
15MHz Bandwidth (RB size:1# RB offset:0#)	15MHz Bandwidth (RB size:1# RB offset:74#)
	
Lowest channel	Highest channel

15MHz Bandwidth (RB size:36# RB offset:0#)	15MHz Bandwidth (RB size:36# RB offset:39#)
	
Lowest channel	Highest channel

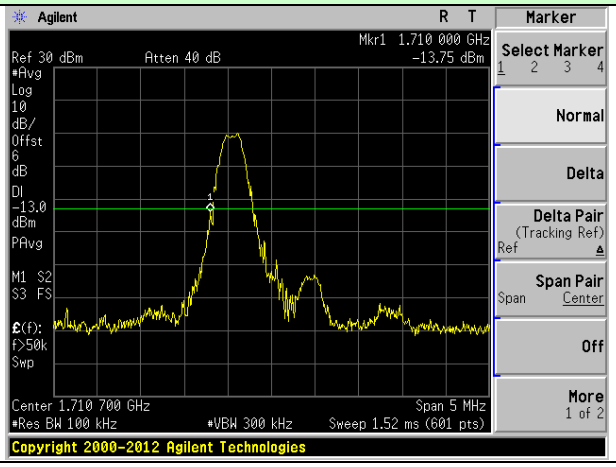
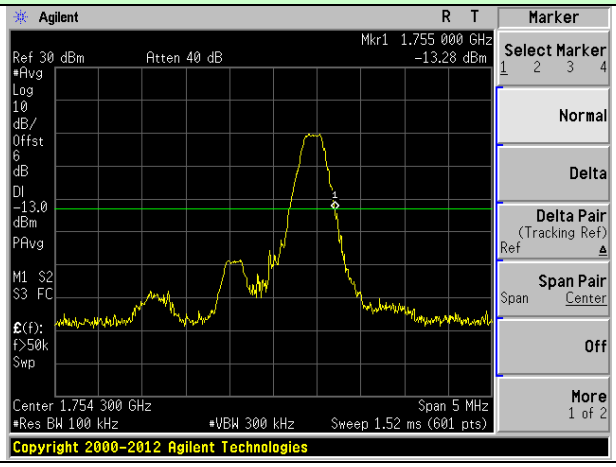
15MHz Bandwidth (RB size:75# RB offset:0#)	15MHz Bandwidth (RB size:75# RB offset:0#)
	
Lowest channel	Highest channel

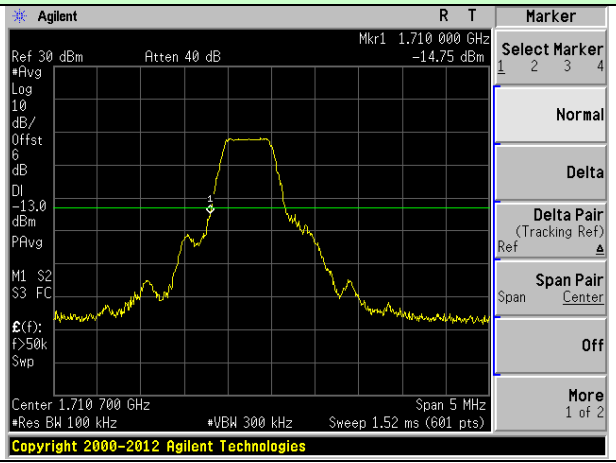
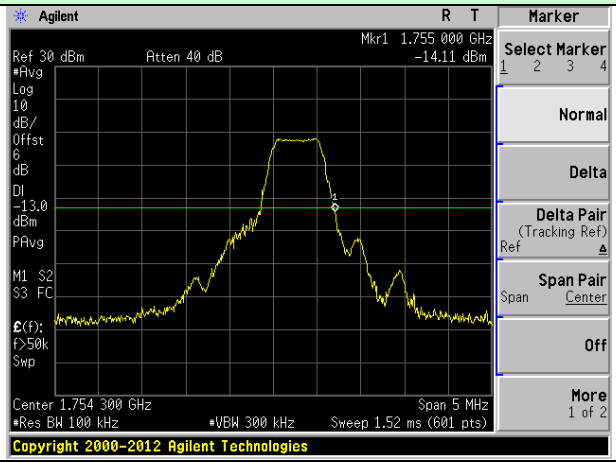
20MHz Bandwidth (RB size:1# RB offset:0#)	20MHz Bandwidth (RB size:1# RB offset:99#)
	
Lowest channel	Highest channel

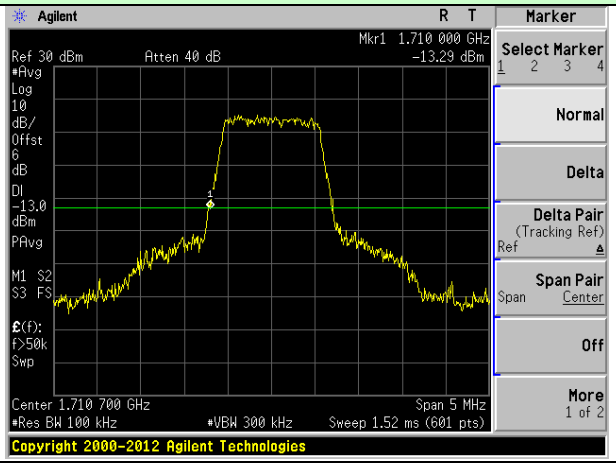
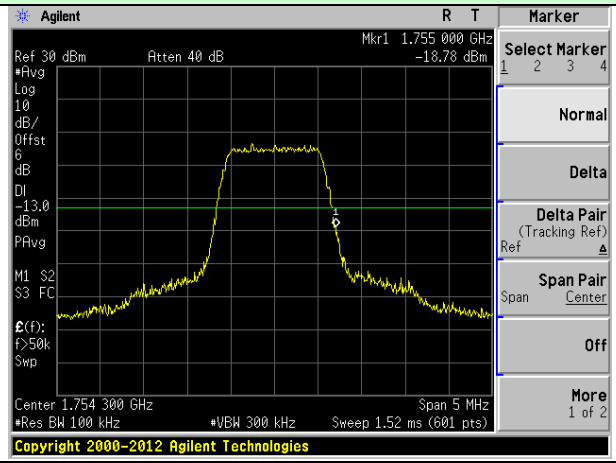
20MHz Bandwidth (RB size:50# RB offset:0#)	20MHz Bandwidth (RB size:50# RB offset:50#)
	
Lowest channel	Highest channel

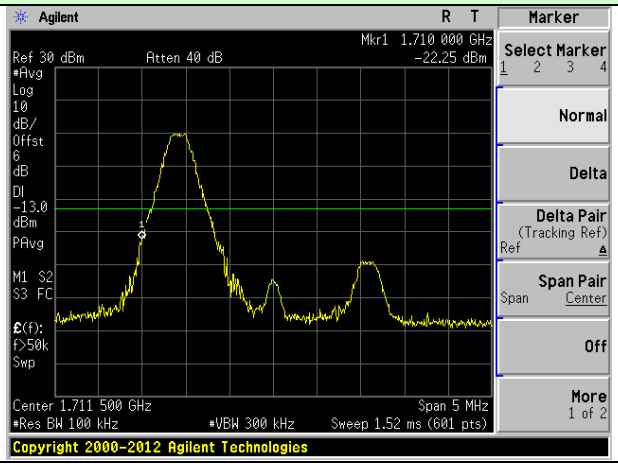
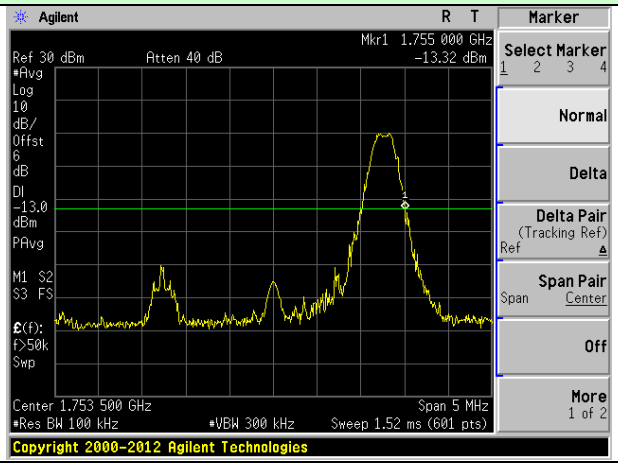
20MHz Bandwidth (RB size:100# RB offset:0#)	20MHz Bandwidth (RB size:100# RB offset:0#)
	
Lowest channel	Highest channel

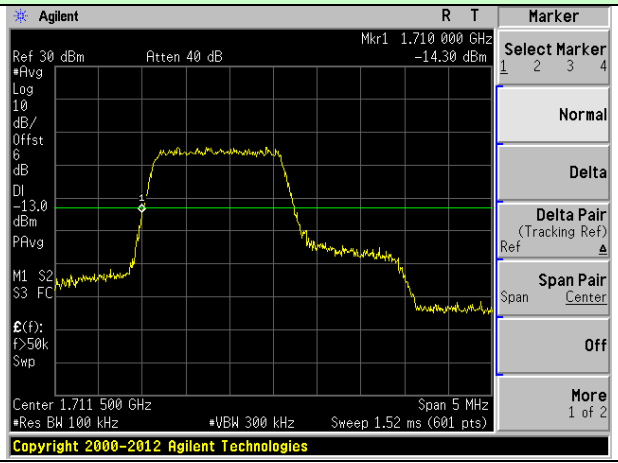
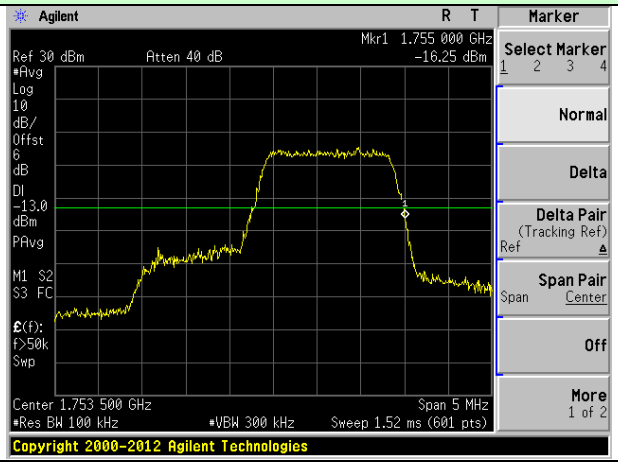
LTE Band 4

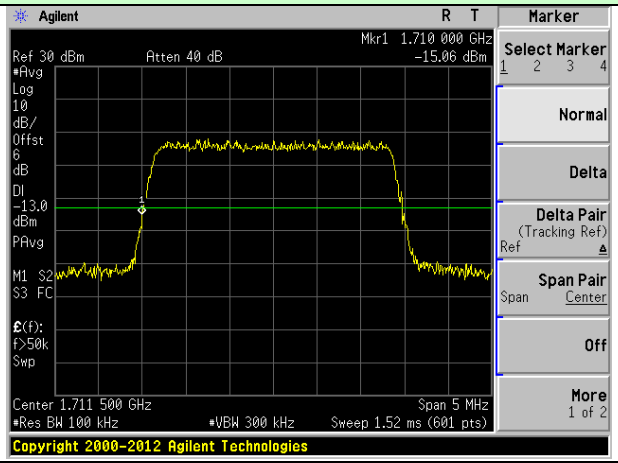
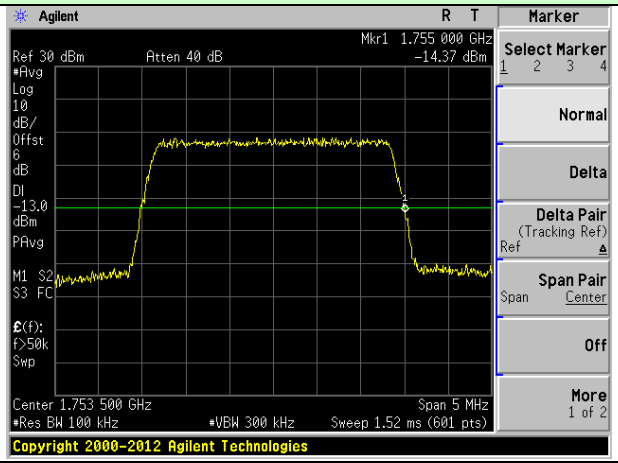
1.4MHz Bandwidth (RB size:1# RB offset:0#)	1.4MHz Bandwidth (RB size:1# RB offset:5#)
	
Lowest channel	Highest channel

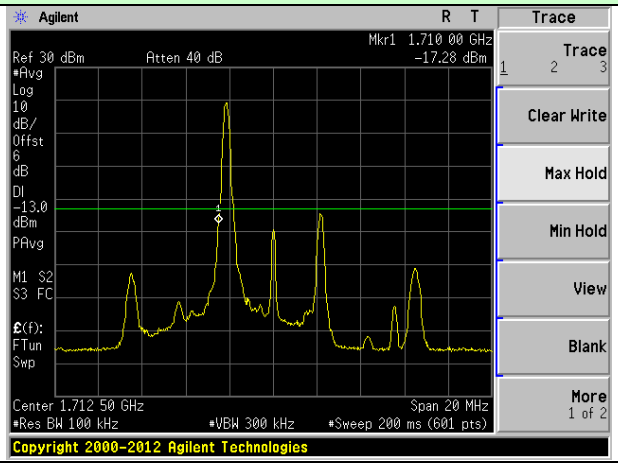
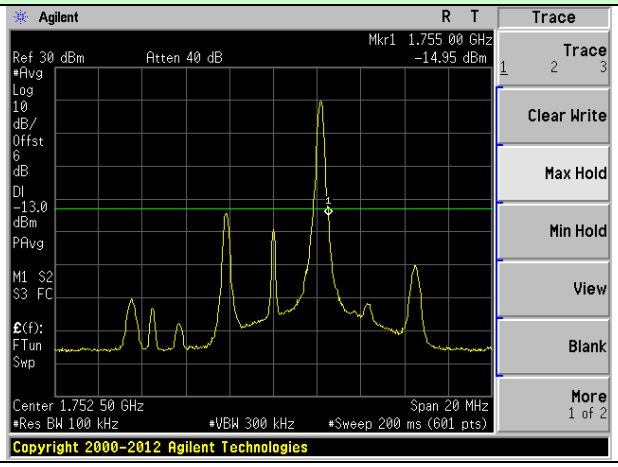
1.4MHz Bandwidth (RB size:3# RB offset:0#)	1.4MHz Bandwidth (RB size:3# RB offset:2#)
	
Lowest channel	Highest channel

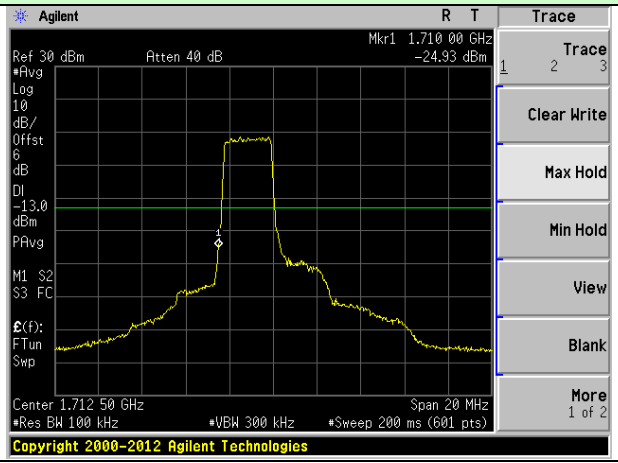
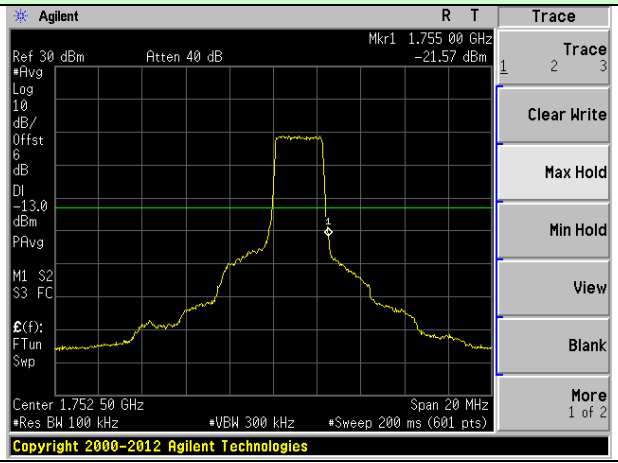
1.4MHz Bandwidth (RB size:6# RB offset:0#)	1.4MHz Bandwidth (RB size:6# RB offset:0#)
	
Lowest channel	Highest channel

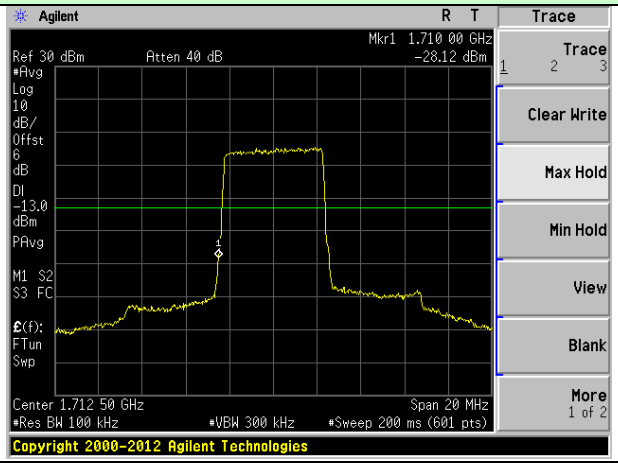
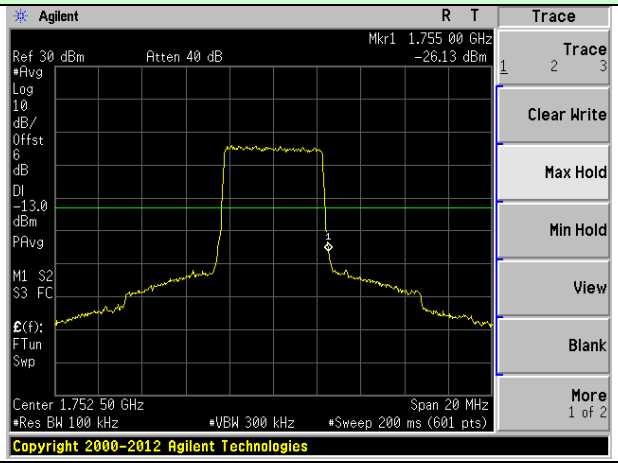
3MHz Bandwidth (RB size:1# RB offset:0#)	3MHz Bandwidth (RB size:1# RB offset:14#)
	
Lowest channel	Highest channel

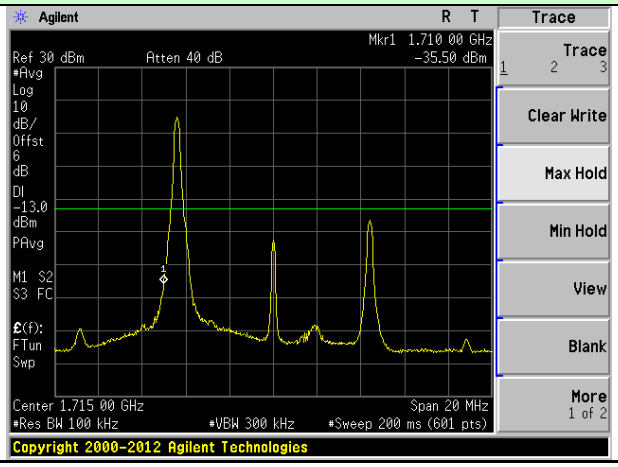
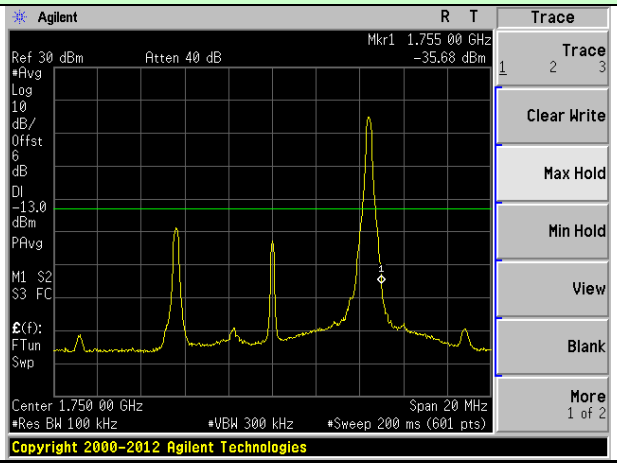
3MHz Bandwidth (RB size:8# RB offset:0#)	3MHz Bandwidth (RB size:8# RB offset:7#)
	
Lowest channel	Highest channel

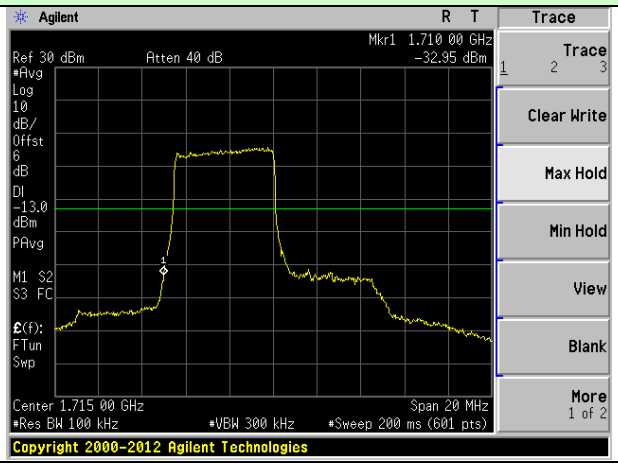
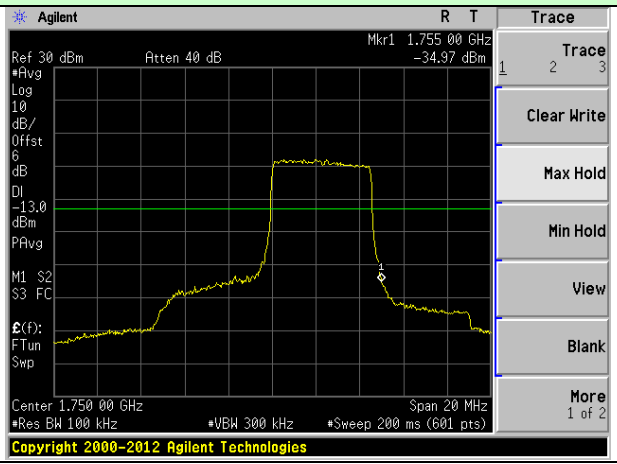
3MHz Bandwidth (RB size:15# RB offset:0#)	3MHz Bandwidth (RB size:15# RB offset:0#)
	
Lowest channel	Highest channel

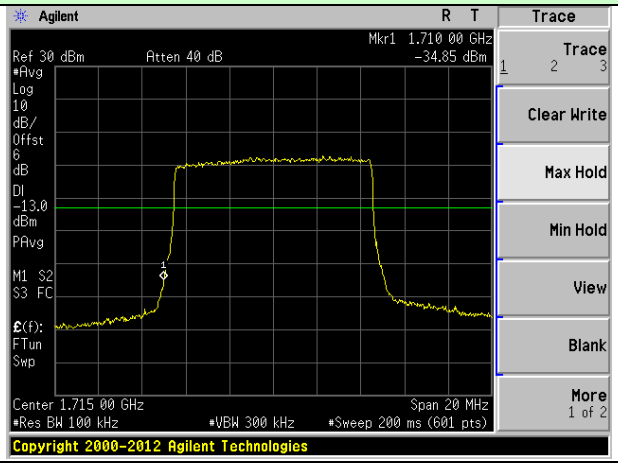
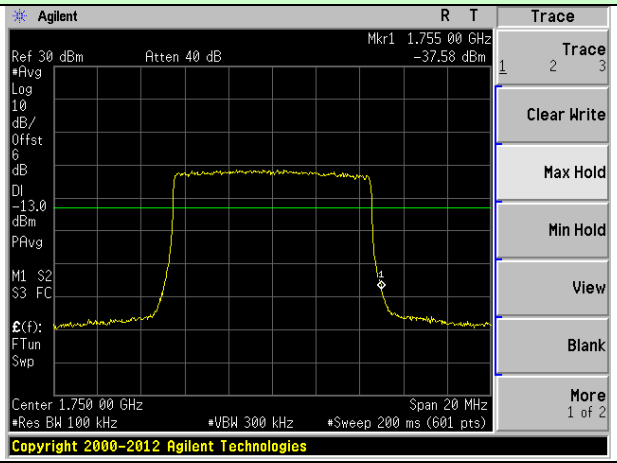
5MHz Bandwidth (RB size:1# RB offset:0#)	5MHz Bandwidth (RB size:1# RB offset:24#)
	
Lowest channel	Highest channel

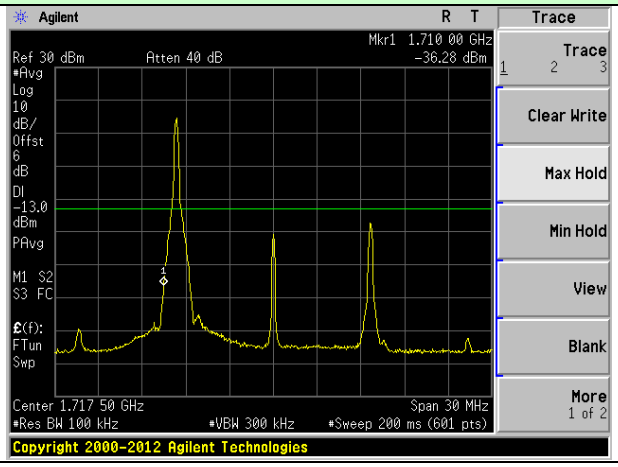
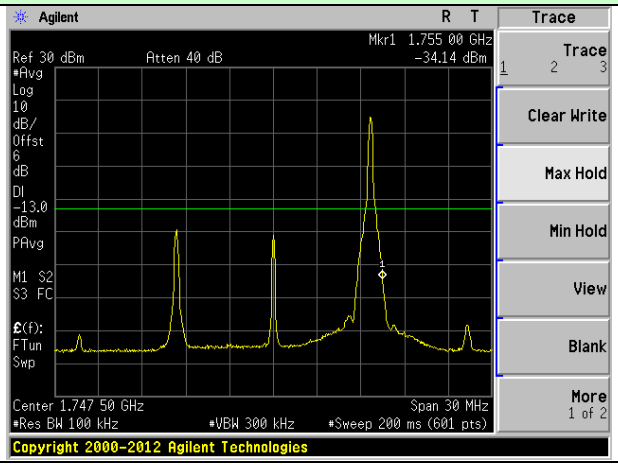
5MHz Bandwidth (RB size:12# RB offset:0#)	5MHz Bandwidth (RB size:12# RB offset:13#)
	
Lowest channel	Highest channel

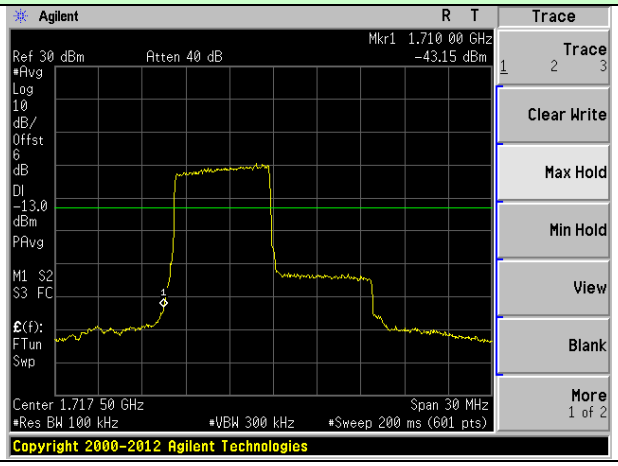
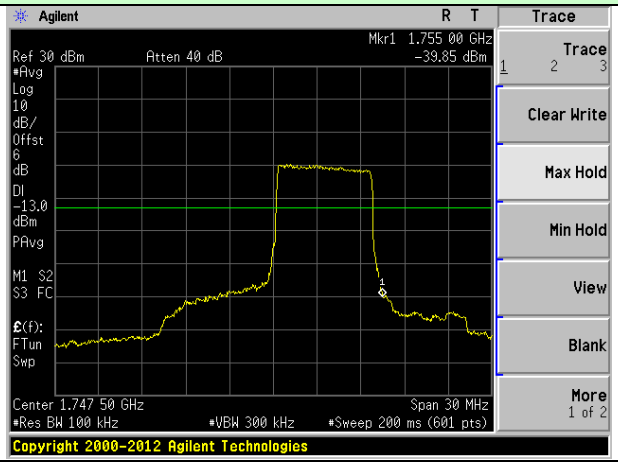
5MHz Bandwidth (RB size:25# RB offset:0#)	5MHz Bandwidth (RB size:25# RB offset:0#)
	
Lowest channel	Highest channel

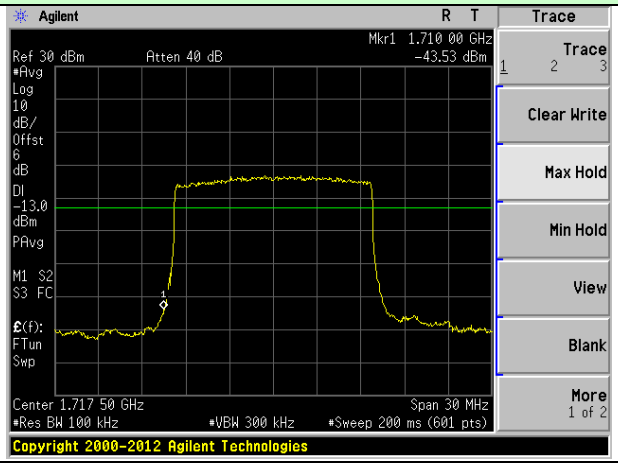
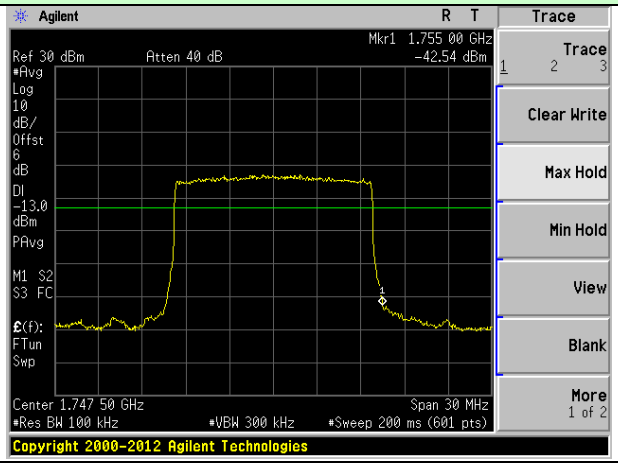
10MHz Bandwidth (RB size:1# RB offset:0#)	10MHz Bandwidth (RB size:1# RB offset:49#)
	
Lowest channel	Highest channel

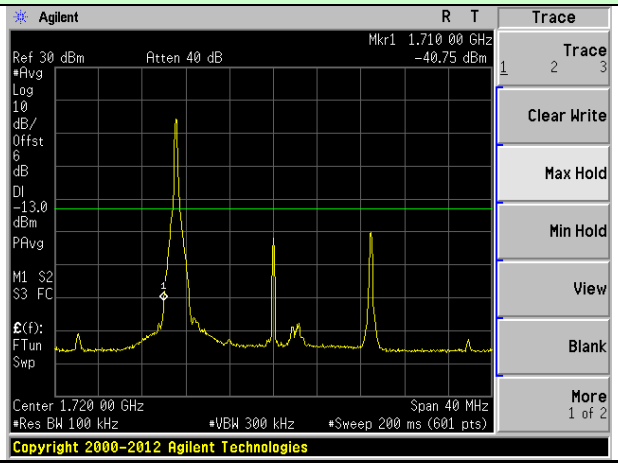
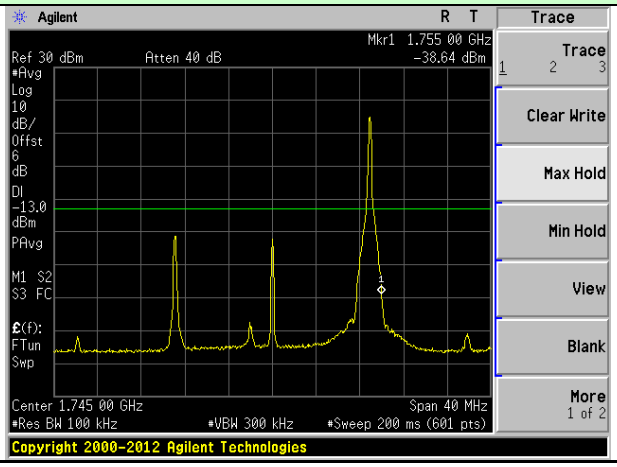
10MHz Bandwidth (RB size:25# RB offset:0#)	10MHz Bandwidth (RB size:25# RB offset:25#)
	
Lowest channel	Highest channel

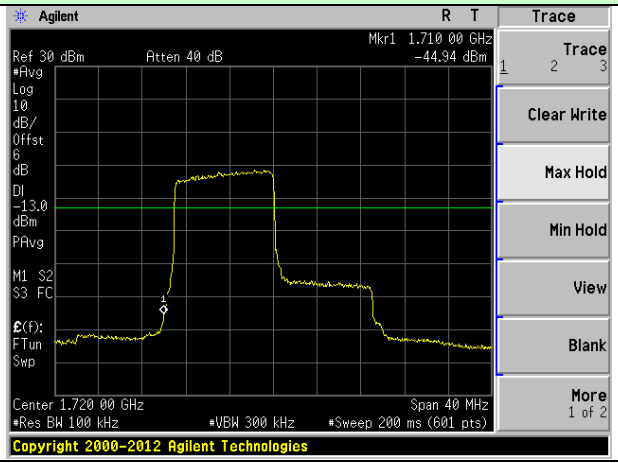
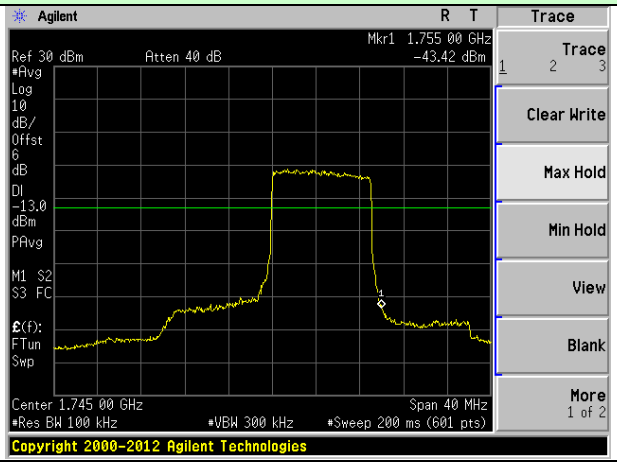
10MHz Bandwidth (RB size:50# RB offset:0#)	10MHz Bandwidth (RB size:50# RB offset:0#)
	
Lowest channel	Highest channel

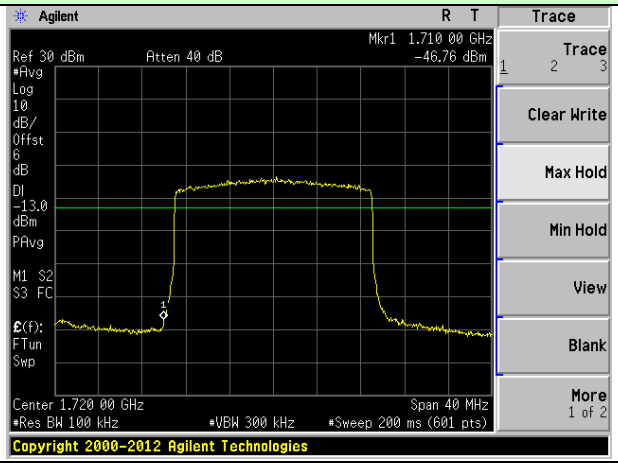
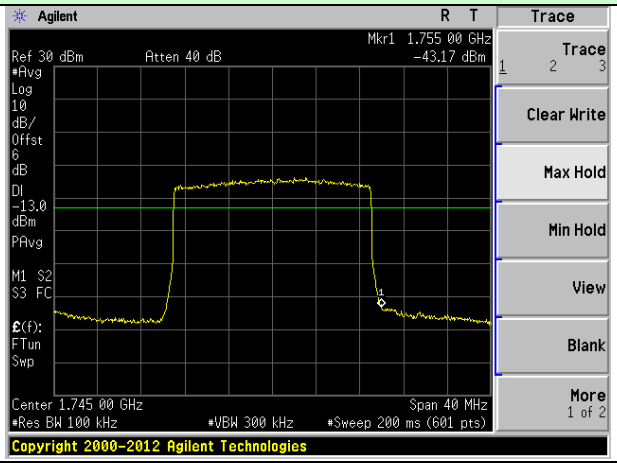
15MHz Bandwidth (RB size:1# RB offset:0#)	15MHz Bandwidth (RB size:1# RB offset:74#)
	
Lowest channel	Highest channel

15MHz Bandwidth (RB size:36# RB offset:0#)	15MHz Bandwidth (RB size:36# RB offset:39#)
	
Lowest channel	Highest channel

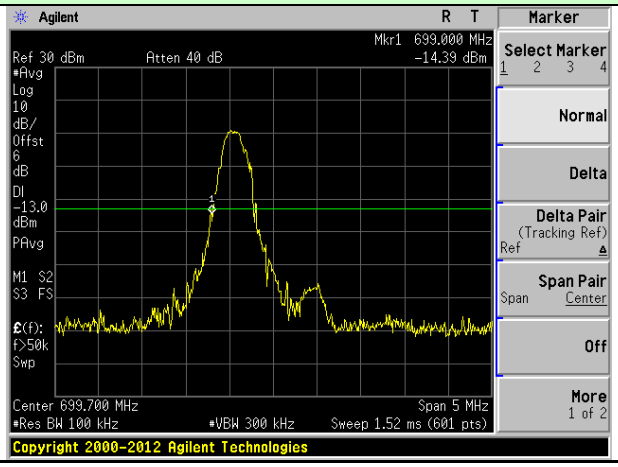
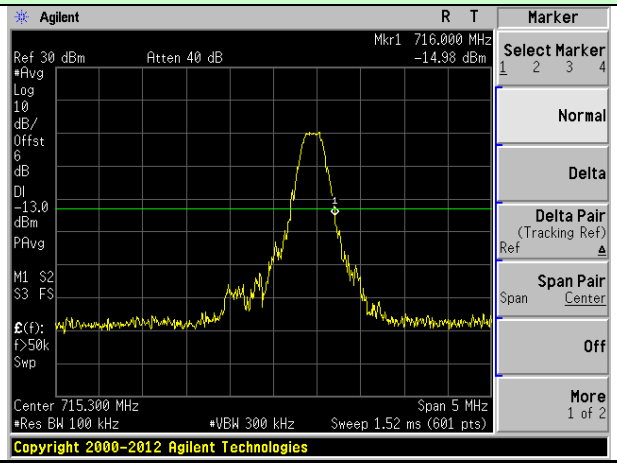
15MHz Bandwidth (RB size:75# RB offset:0#)	15MHz Bandwidth (RB size:75# RB offset:0#)
	
Lowest channel	Highest channel

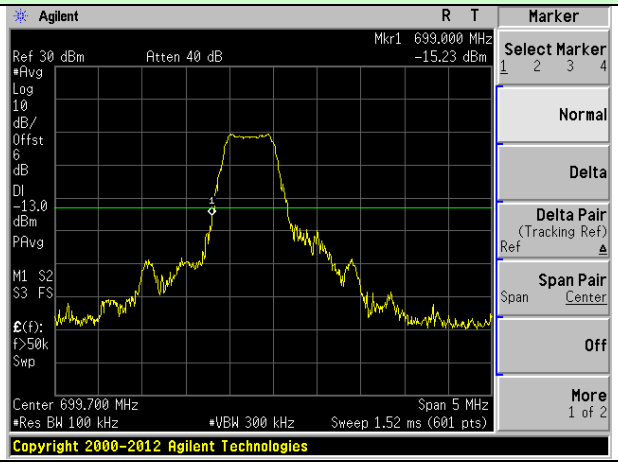
20MHz Bandwidth (RB size:1# RB offset:0#)	20MHz Bandwidth (RB size:1# RB offset:99#)
	
Lowest channel	Highest channel

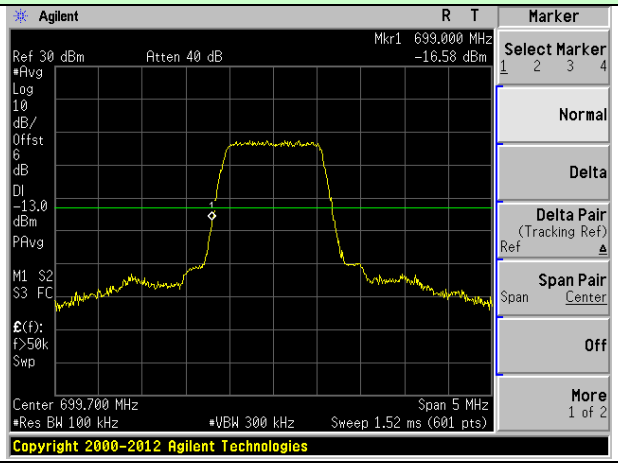
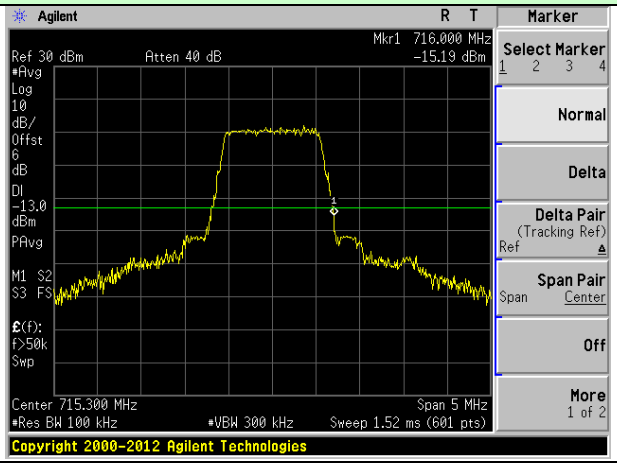
20MHz Bandwidth (RB size:50# RB offset:0#)	20MHz Bandwidth (RB size:50# RB offset:50#)
	
Lowest channel	Highest channel

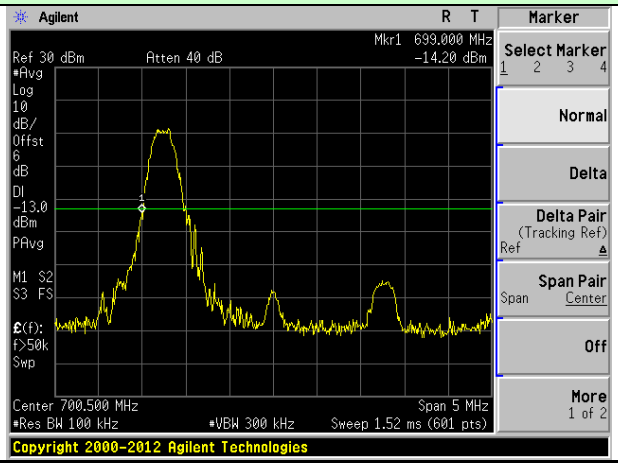
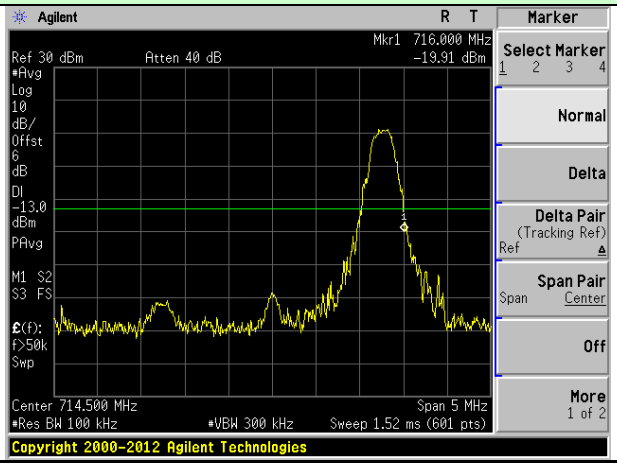
20MHz Bandwidth (RB size:100# RB offset:0#)	20MHz Bandwidth (RB size:100# RB offset:0#)
	
Lowest channel	Highest channel

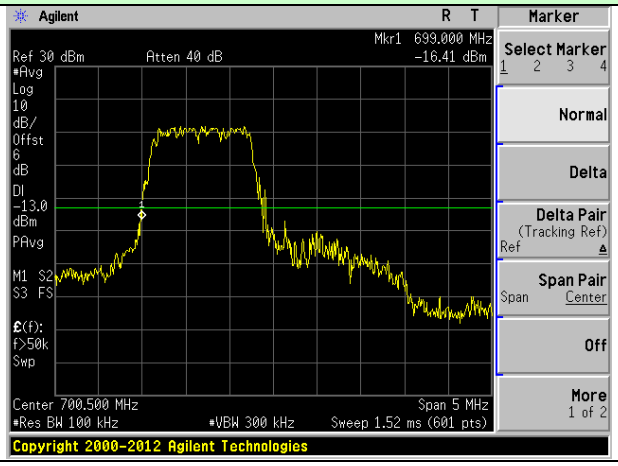
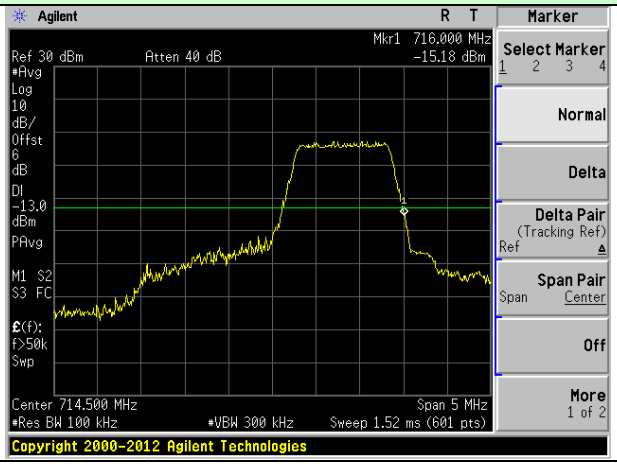
LTE Band 12:

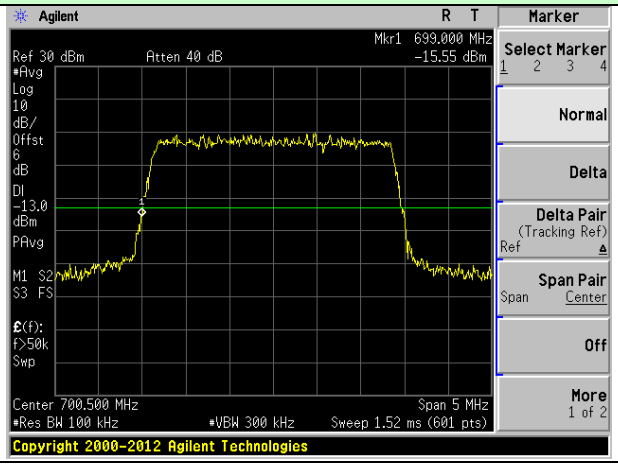
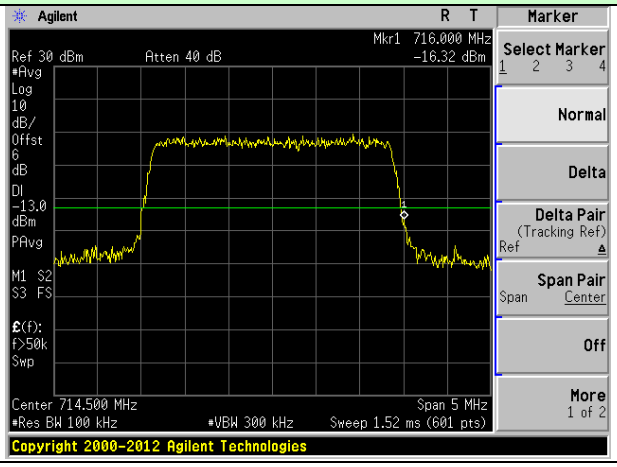
1.4MHz Bandwidth (RB size:1# RB offset:0#)	1.4MHz Bandwidth (RB size:1# RB offset:5#)
	
Lowest channel	Highest channel

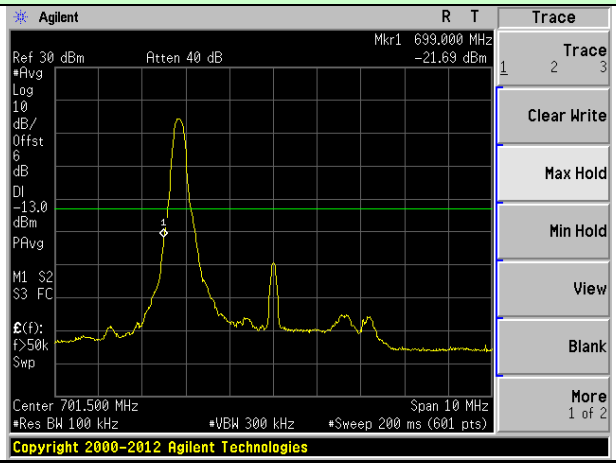
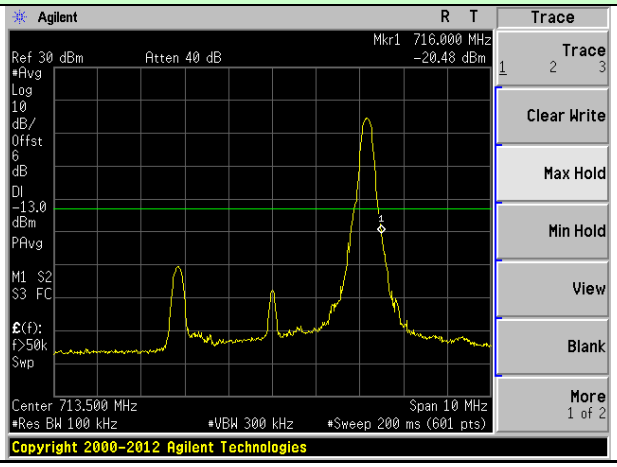
1.4MHz Bandwidth (RB size:3# RB offset:0#)	1.4MHz Bandwidth (RB size:3# RB offset:2#)
	
Lowest channel	Highest channel

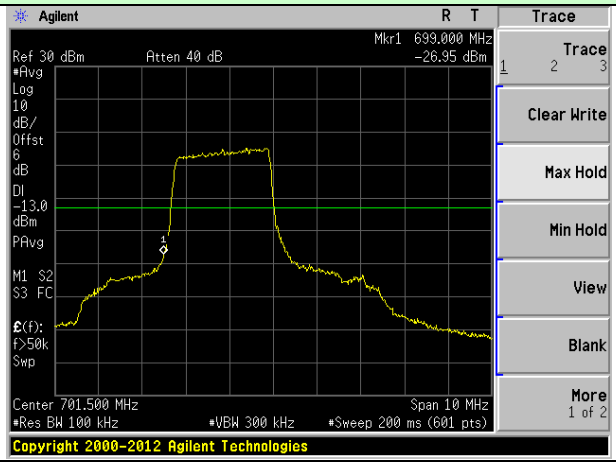
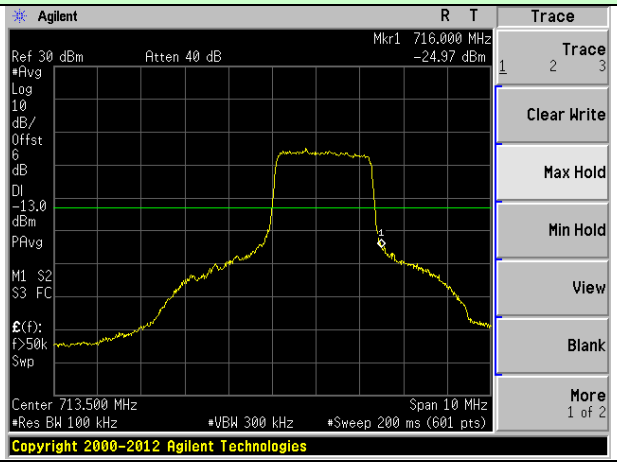
1.4MHz Bandwidth (RB size 6# RB offset:0#)	1.4MHz Bandwidth (RB size:6# RB offset:0#)
	
Lowest channel	Highest channel

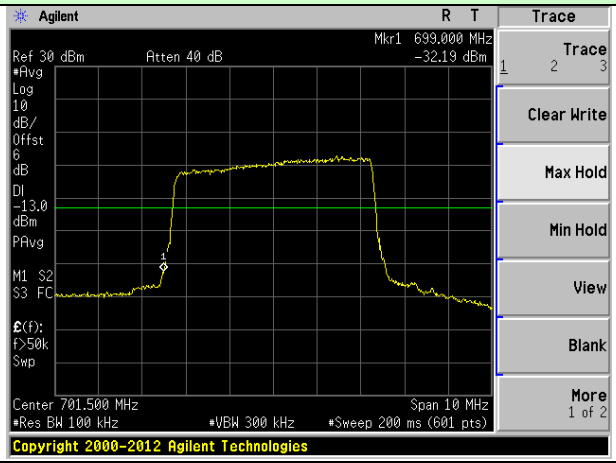
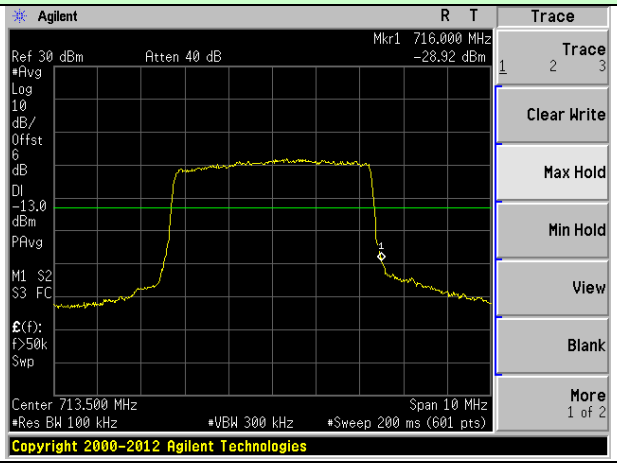
3MHz Bandwidth (RB size:1# RB offset:0#)	3MHz Bandwidth (RB size:1# RB offset:14#)
	
Lowest channel	Highest channel

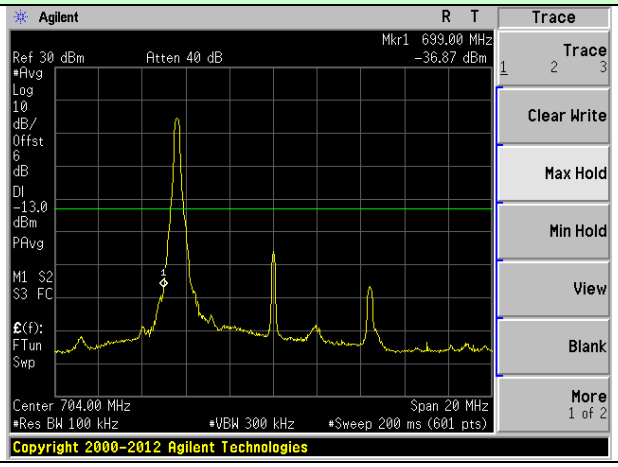
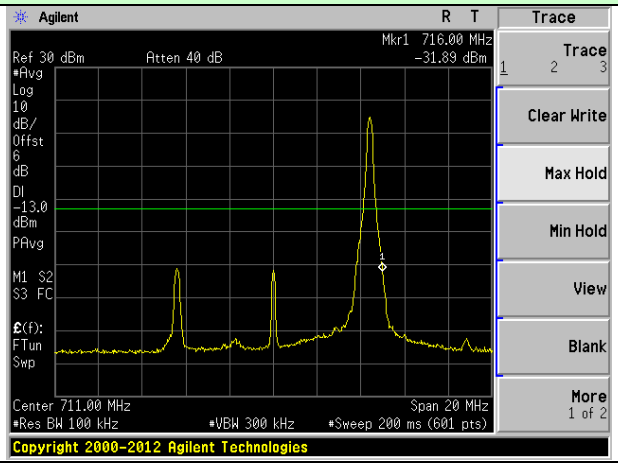
3MHz Bandwidth (RB size:8# RB offset:0#)	3MHz Bandwidth (RB size:8# RB offset:7#)
	
Lowest channel	Highest channel

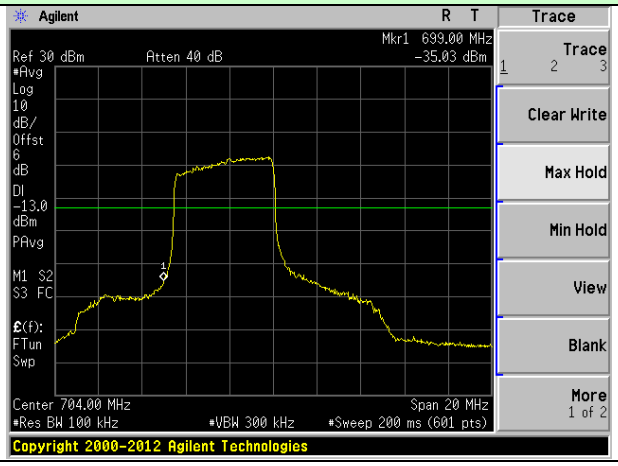
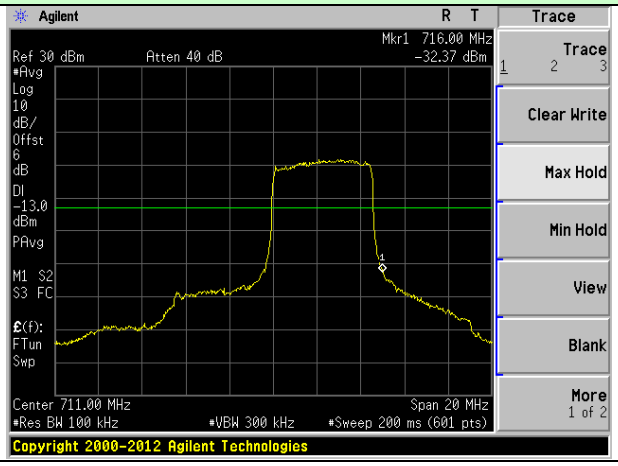
3MHz Bandwidth (RB size:15# RB offset:0#)	3MHz Bandwidth (RB size:15# RB offset:0#)
	
Lowest channel	Highest channel

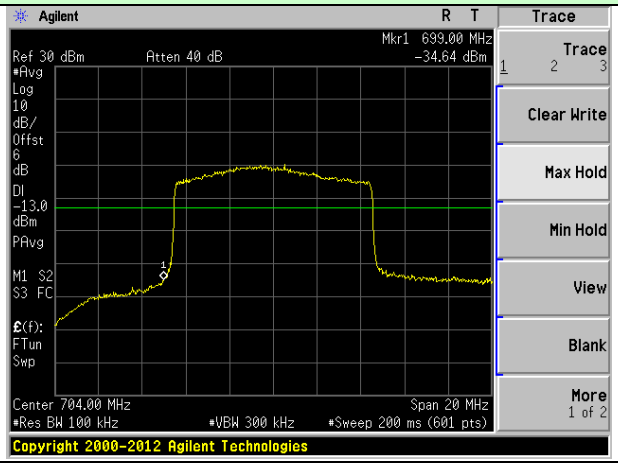
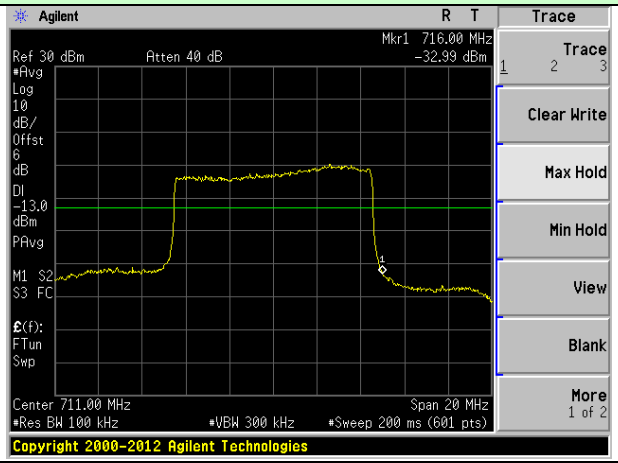
5MHz Bandwidth (RB size:1# RB offset:0#)	5MHz Bandwidth (RB size:1# RB offset:24#)
	
Lowest channel	Highest channel

5MHz Bandwidth (RB size:12# RB offset:0#)	5MHz Bandwidth (RB size:12# RB offset:13#)
	
Lowest channel	Highest channel

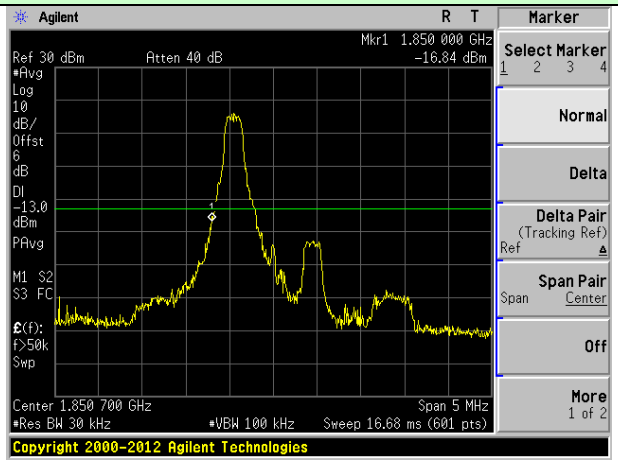
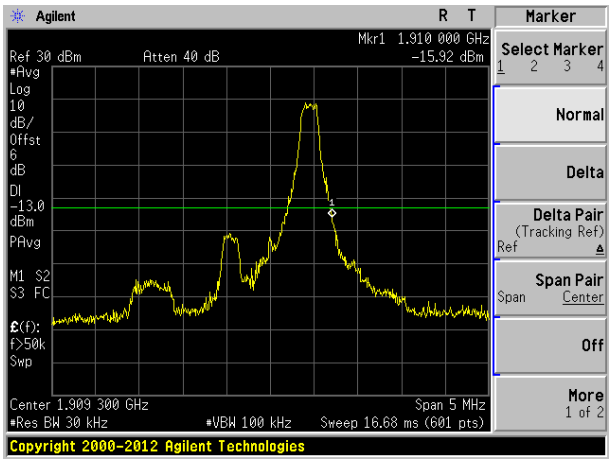
5MHz Bandwidth (RB size:25# RB offset:0#)	5MHz Bandwidth (RB size:25# RB offset:0#)
	
Lowest channel	Highest channel

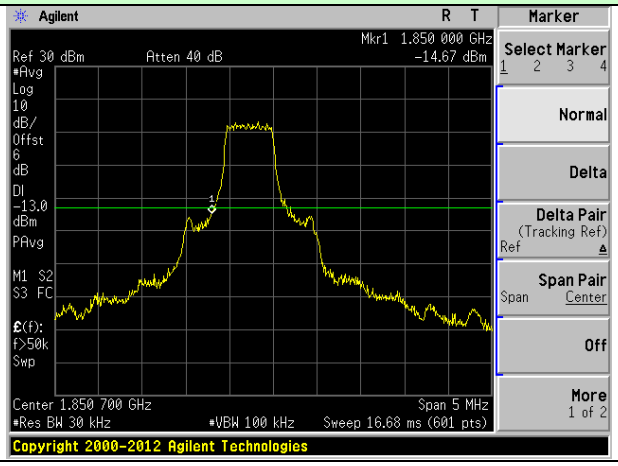
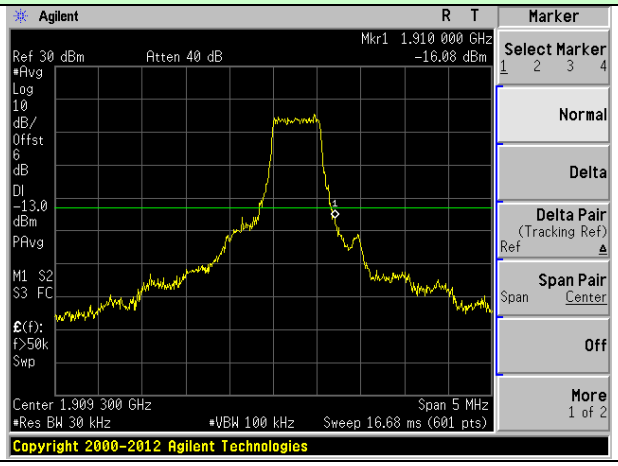
10MHz Bandwidth (RB size:1# RB offset:0#)	10MHz Bandwidth (RB size:1# RB offset:49#)
	
Lowest channel	Highest channel

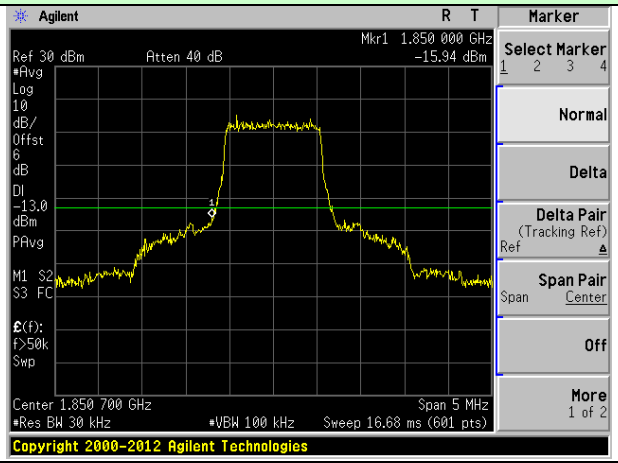
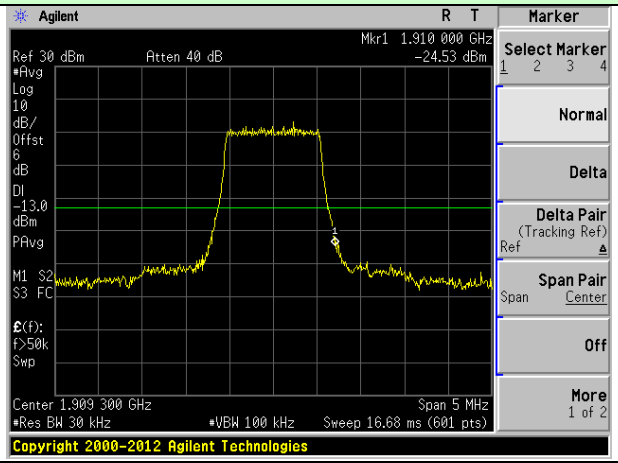
10MHz Bandwidth (RB size:25# RB offset:0#)	10MHz Bandwidth (RB size:25# RB offset:25#)
	
Lowest channel	Highest channel

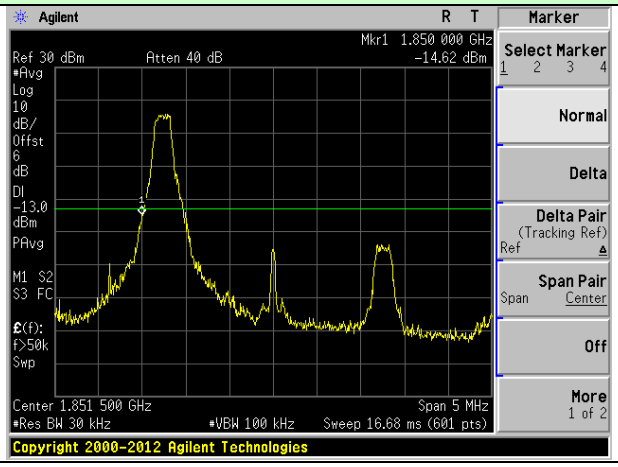
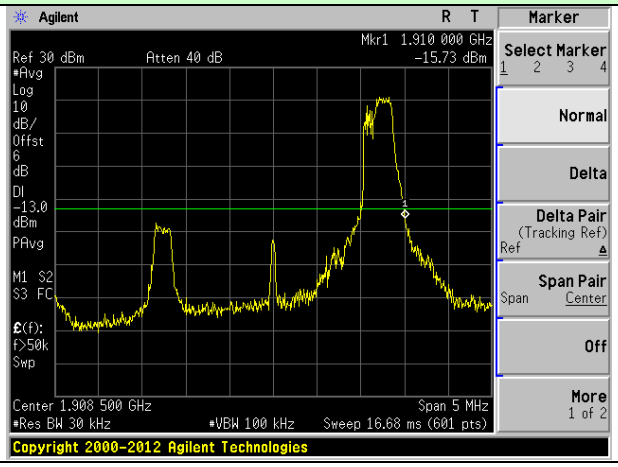
10MHz Bandwidth (RB size:50# RB offset:0#)	10MHz Bandwidth (RB size:50# RB offset:0#)
	
Lowest channel	Highest channel

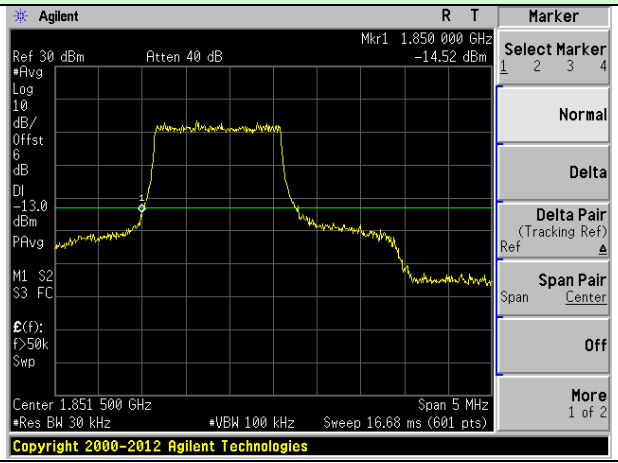
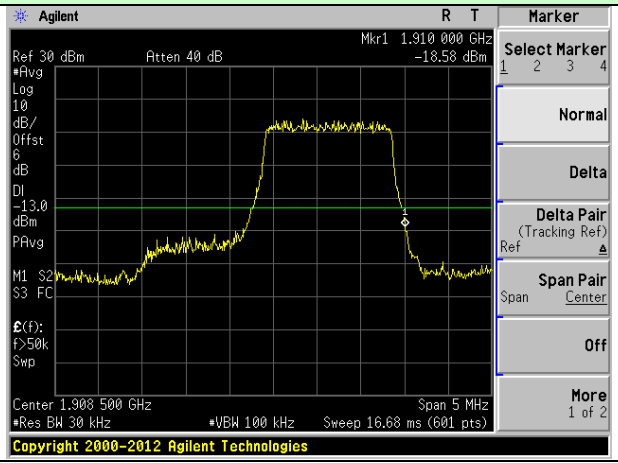
LTE Band 2 (16QAM mode):

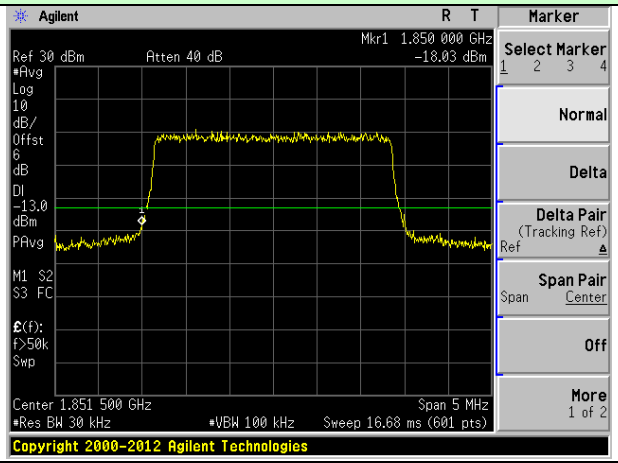
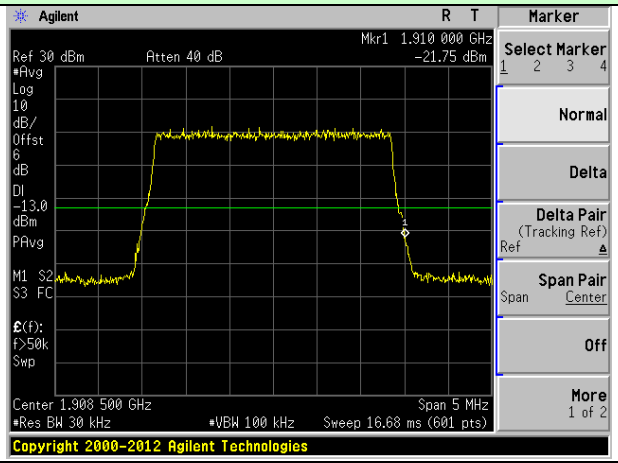
1.4MHz Bandwidth (RB size:1# RB offset:0#)	1.4MHz Bandwidth (RB size:1# RB offset:5#)
	
Lowest channel	Highest channel

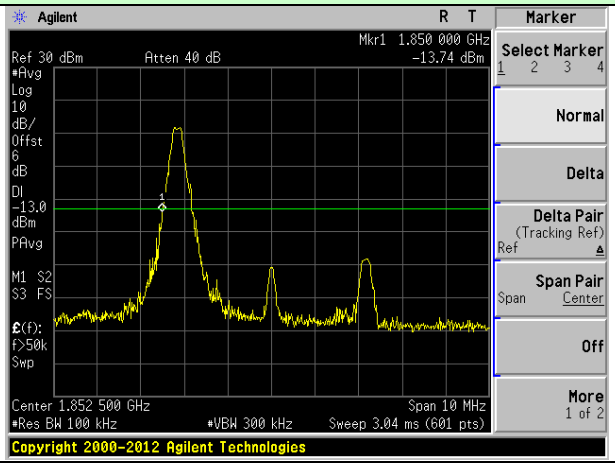
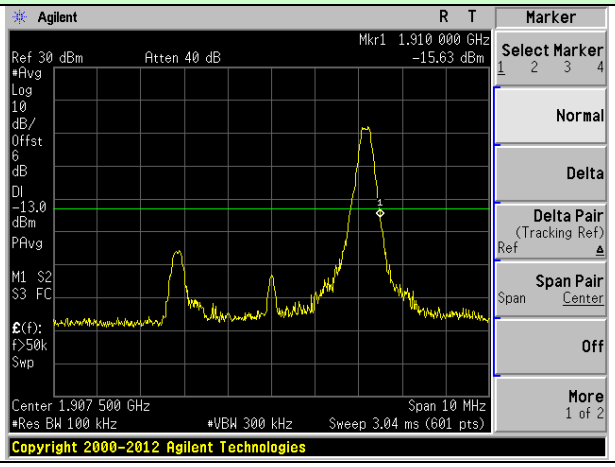
1.4MHz Bandwidth (RB size:3# RB offset:0#)	1.4MHz Bandwidth (RB size:3# RB offset:2#)
	
Lowest channel	Highest channel

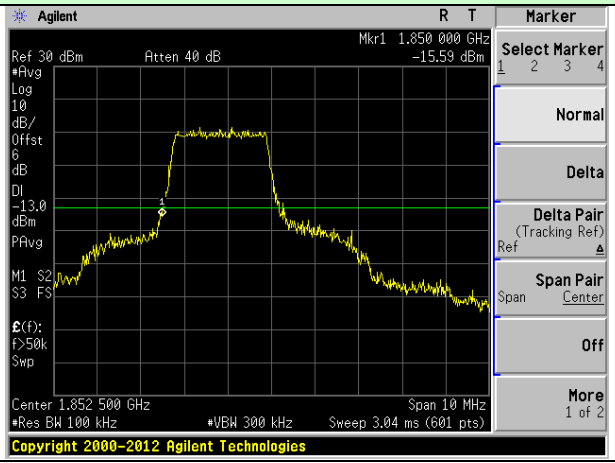
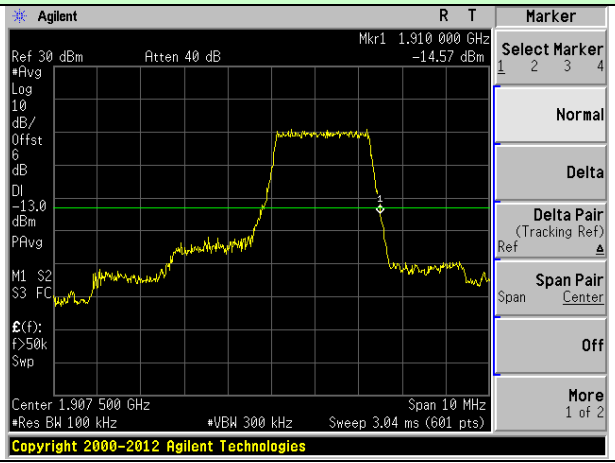
1.4MHz Bandwidth (RB size:6# RB offset:0#)	1.4MHz Bandwidth (RB size:6# RB offset:0#)
	
Lowest channel	Highest channel

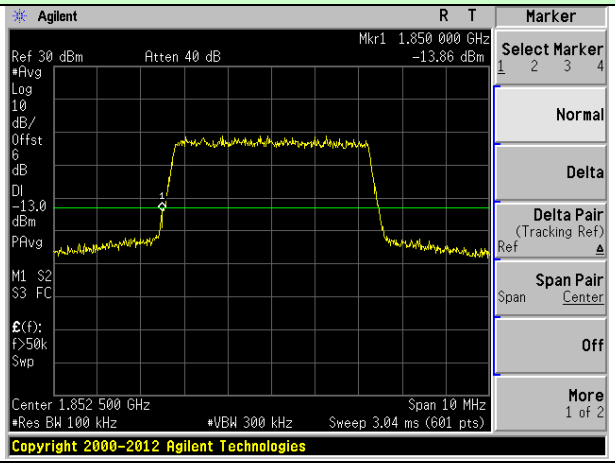
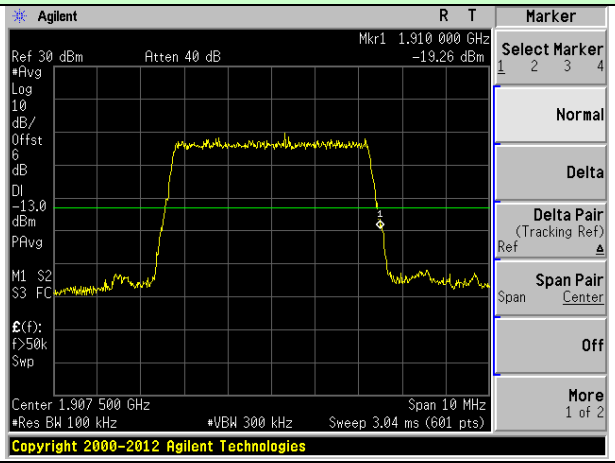
3MHz Bandwidth (RB size:1# RB offset:0#)	3MHz Bandwidth (RB size:1# RB offset:14#)
	
Lowest channel	Highest channel

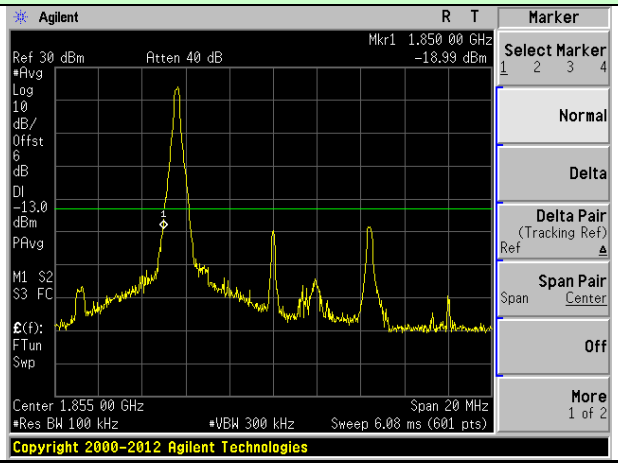
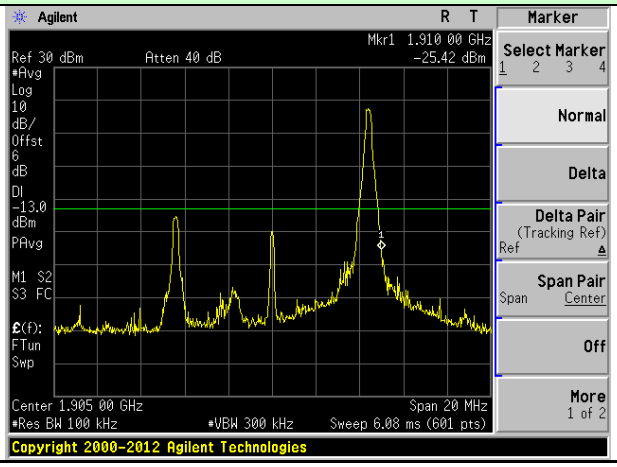
3MHz Bandwidth (RB size:8# RB offset:0#)	3MHz Bandwidth (RB size:8# RB offset:7#)
	
Lowest channel	Highest channel

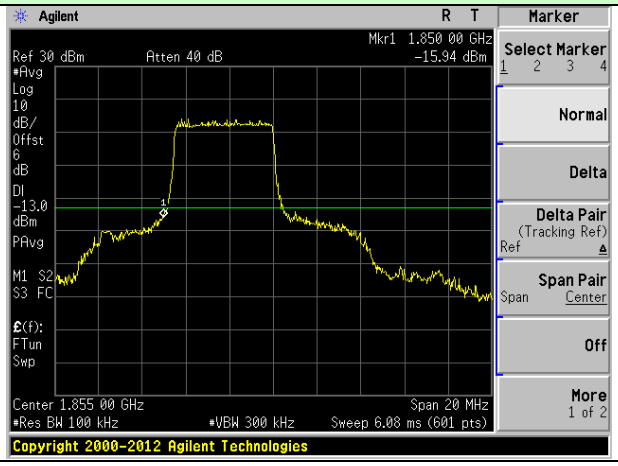
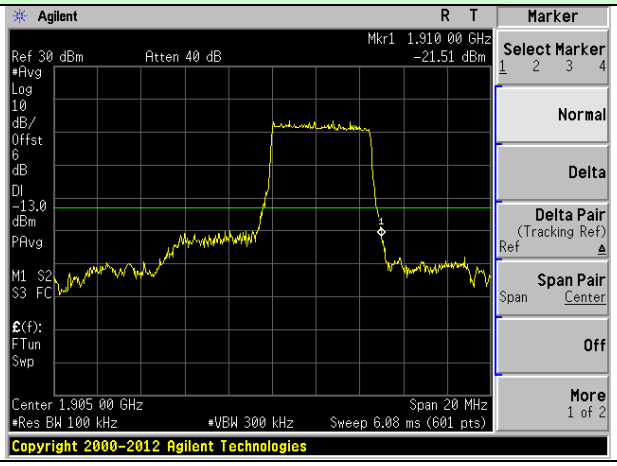
3MHz Bandwidth (RB size:15# RB offset:0#)	3MHz Bandwidth (RB size:15# RB offset:0#)
	
Lowest channel	Highest channel

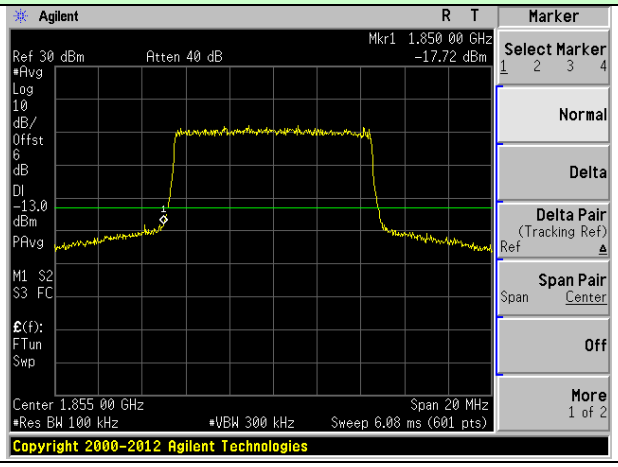
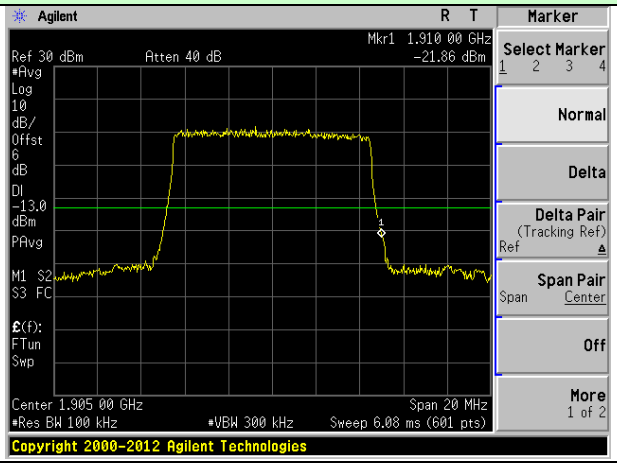
5MHz Bandwidth (RB size:1# RB offset:0#)	5MHz Bandwidth (RB size:1# RB offset:24#)
	
Lowest channel	Highest channel

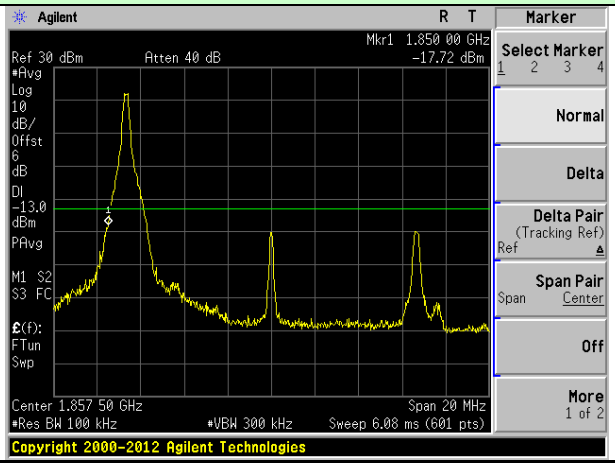
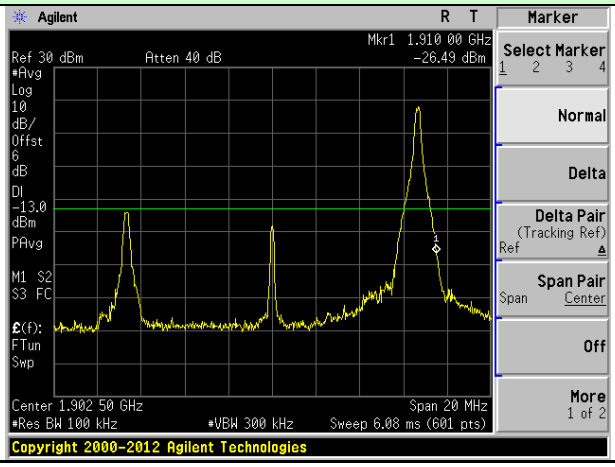
5MHz Bandwidth (RB size:12# RB offset:0#)	5MHz Bandwidth (RB size:12# RB offset:13#)
	
Lowest channel	Highest channel

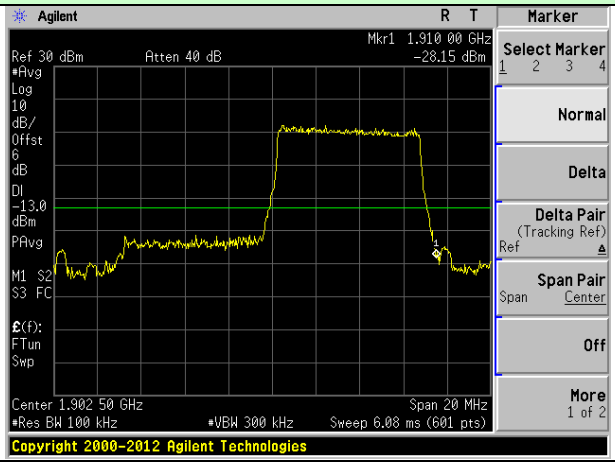
5MHz Bandwidth (RB size:25# RB offset:0#)	5MHz Bandwidth (RB size:25# RB offset:0#)
	
Lowest channel	Highest channel

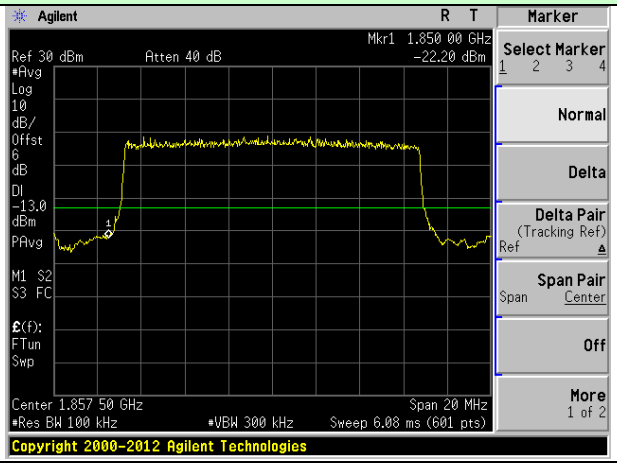
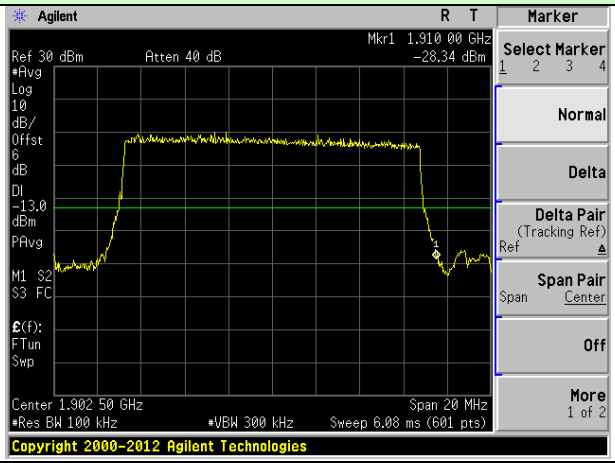
10MHz Bandwidth (RB size:1# RB offset:0#)	10MHz Bandwidth (RB size:1# RB offset:49#)
	
Lowest channel	Highest channel

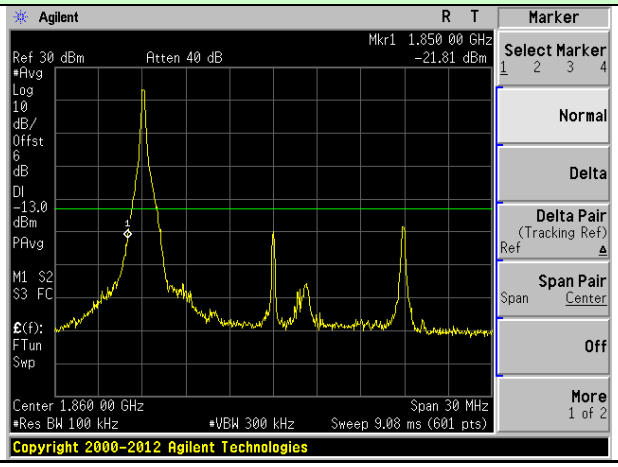
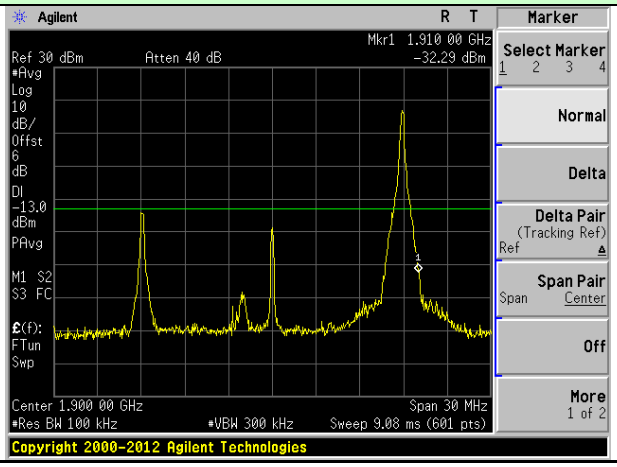
10MHz Bandwidth (RB size:25# RB offset:0#)	10MHz Bandwidth (RB size:25# RB offset:25#)
	
Lowest channel	Highest channel

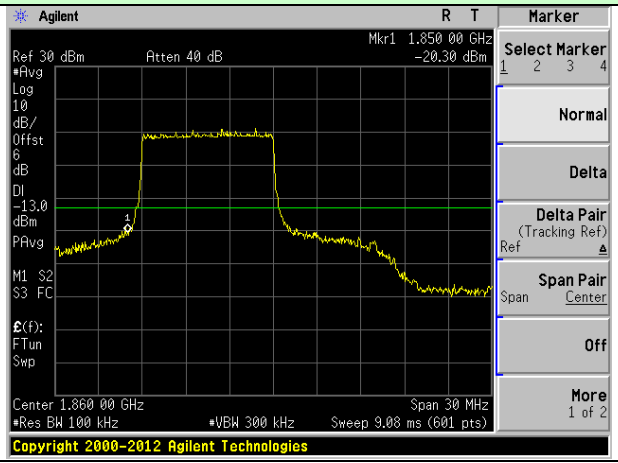
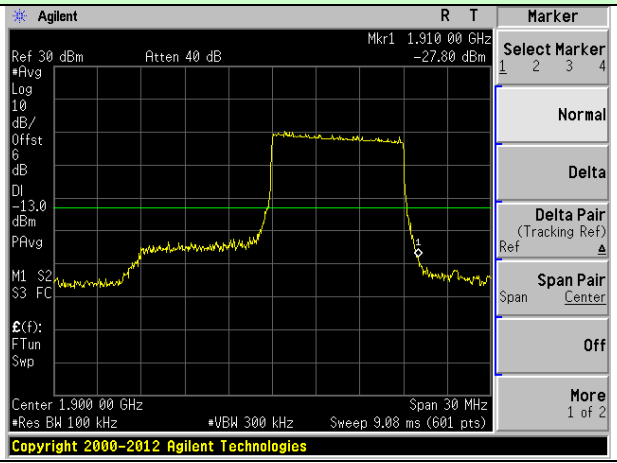
10MHz Bandwidth (RB size:50# RB offset:0#)	10MHz Bandwidth (RB size:50# RB offset:0#)
	
Lowest channel	Highest channel

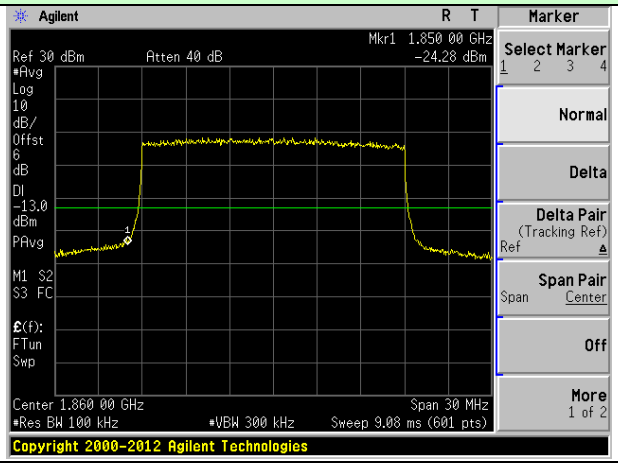
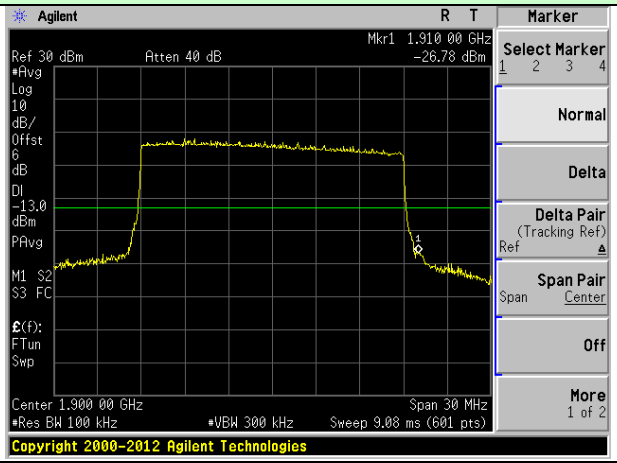
15MHz Bandwidth (RB size:1# RB offset:0#)	15MHz Bandwidth (RB size:1# RB offset:74#)
	
Lowest channel	Highest channel

15MHz Bandwidth (RB size:36# RB offset:0#)	15MHz Bandwidth (RB size:36# RB offset:39#)
	
Lowest channel	Highest channel

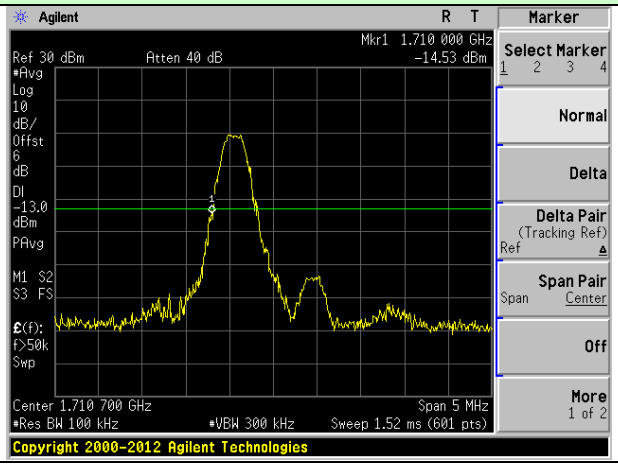
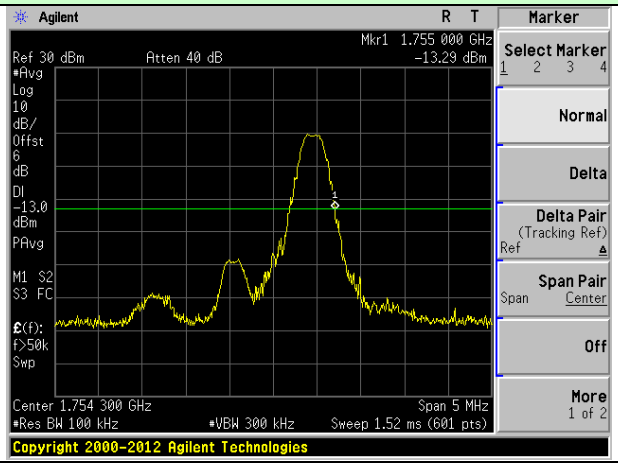
15MHz Bandwidth (RB size:75# RB offset:0#)	15MHz Bandwidth (RB size:75# RB offset:0#)
	
Lowest channel	Highest channel

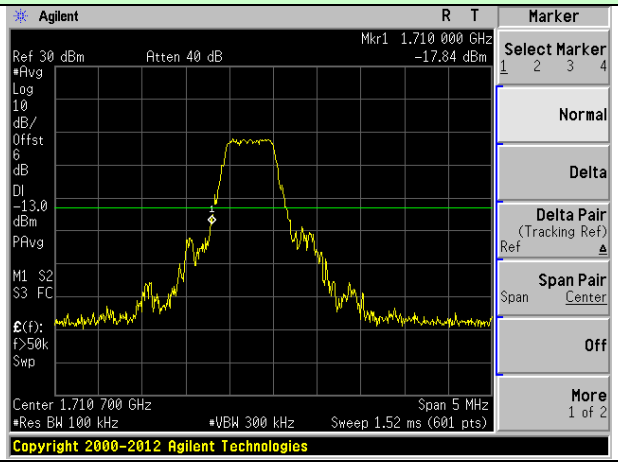
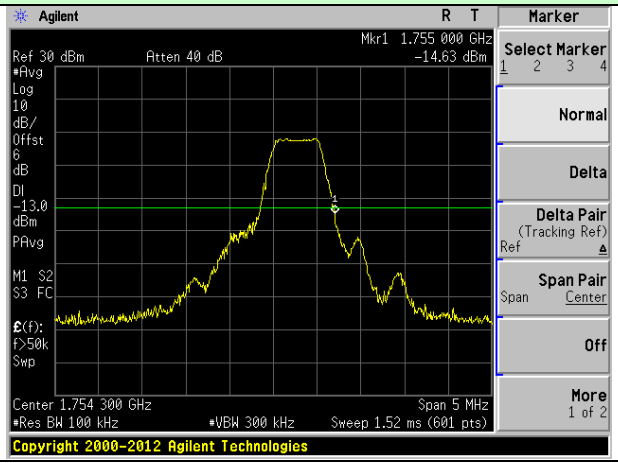
20MHz Bandwidth (RB size:1# RB offset:0#)	20MHz Bandwidth (RB size:1# RB offset:99#)
	
Lowest channel	Highest channel

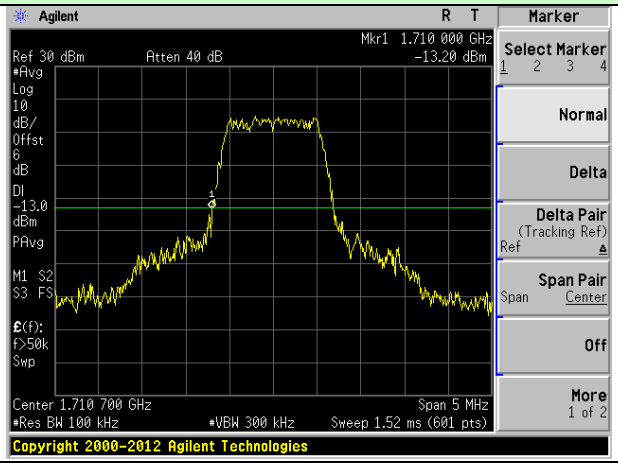
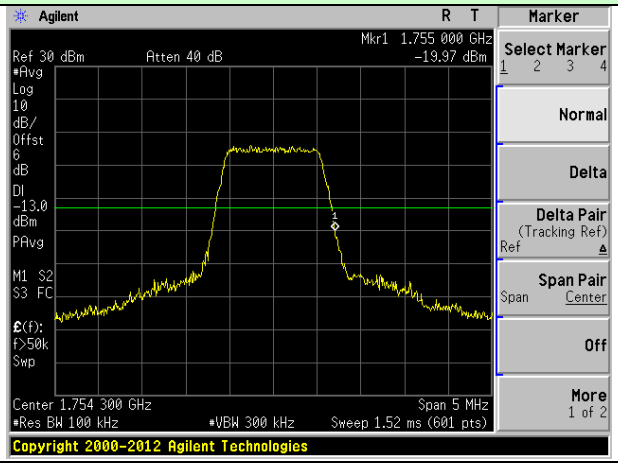
20MHz Bandwidth (RB size:50# RB offset:0#)	20MHz Bandwidth (RB size:50# RB offset:50#)
	
Lowest channel	Highest channel

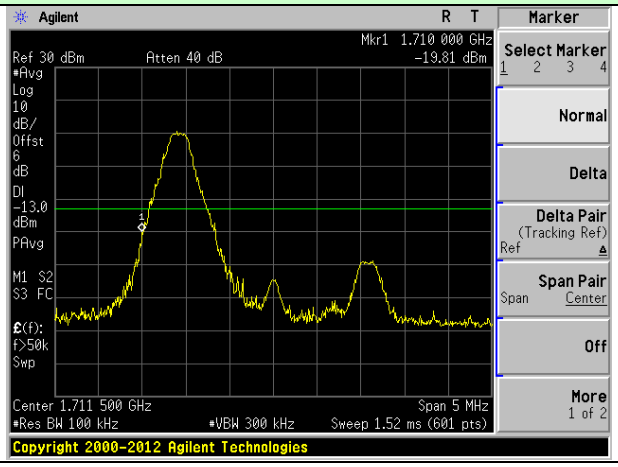
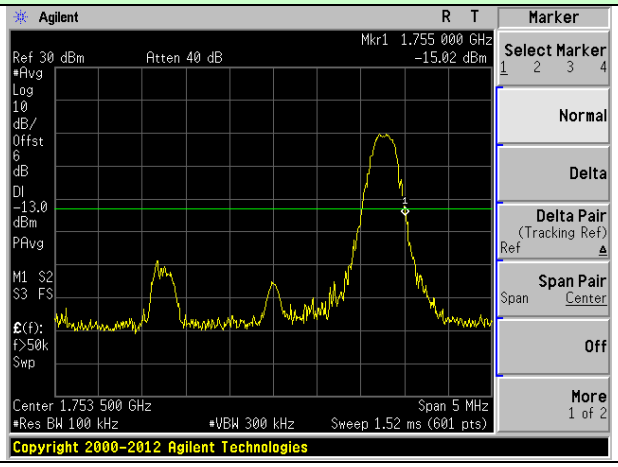
20MHz Bandwidth (RB size:100# RB offset:0#)	20MHz Bandwidth (RB size:100# RB offset:0#)
	
Lowest channel	Highest channel

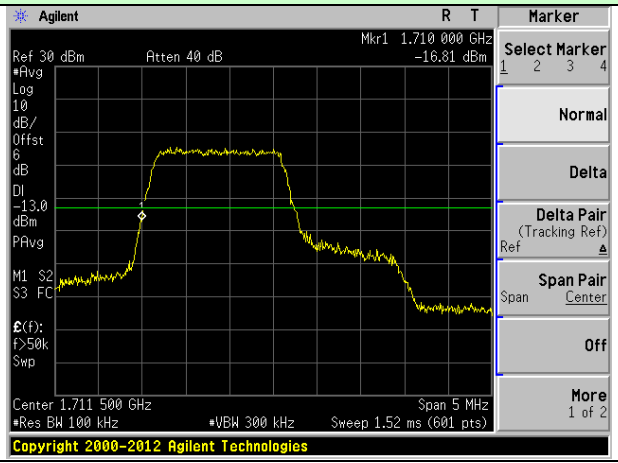
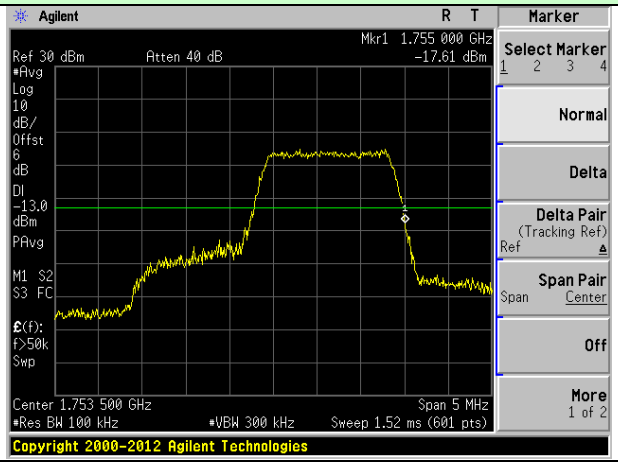
LTE Band 4 (16QAM mode):

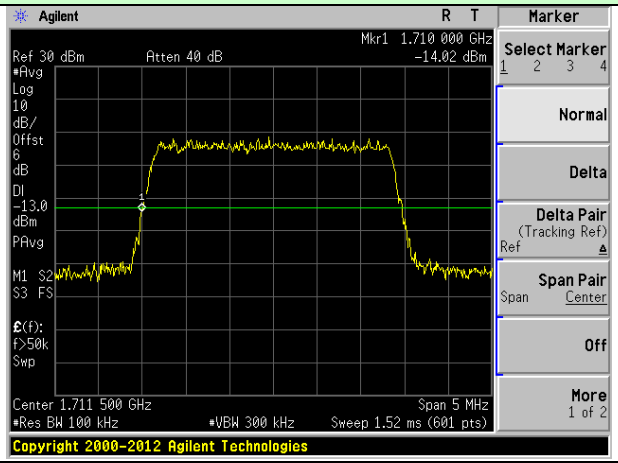
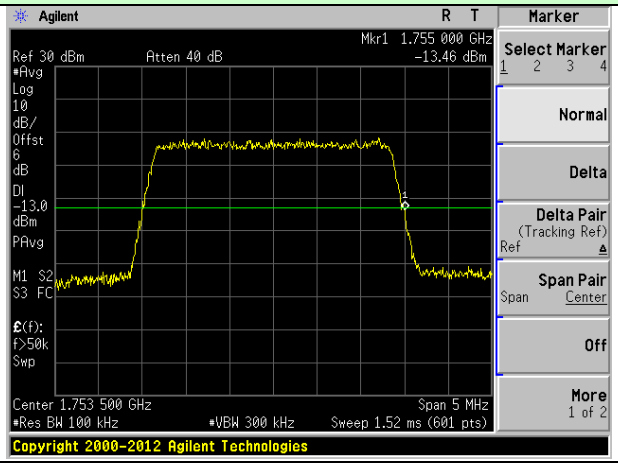
1.4MHz Bandwidth (RB size:1# RB offset:0#)	1.4MHz Bandwidth (RB size:1# RB offset:5#)
	
Lowest channel	Highest channel

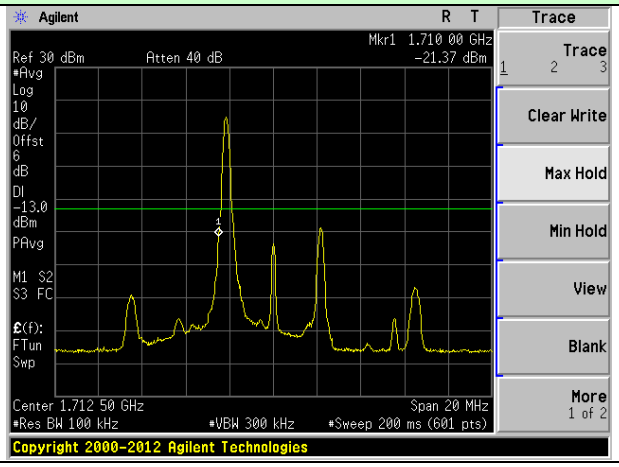
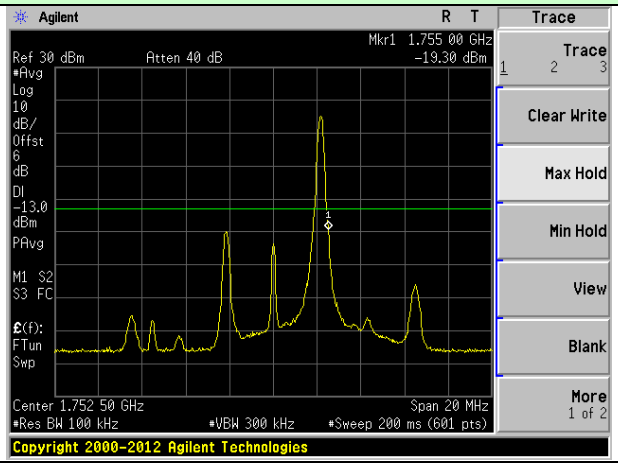
1.4MHz Bandwidth (RB size:3# RB offset:0#)	1.4MHz Bandwidth (RB size:3# RB offset:2#)
	
Lowest channel	Highest channel

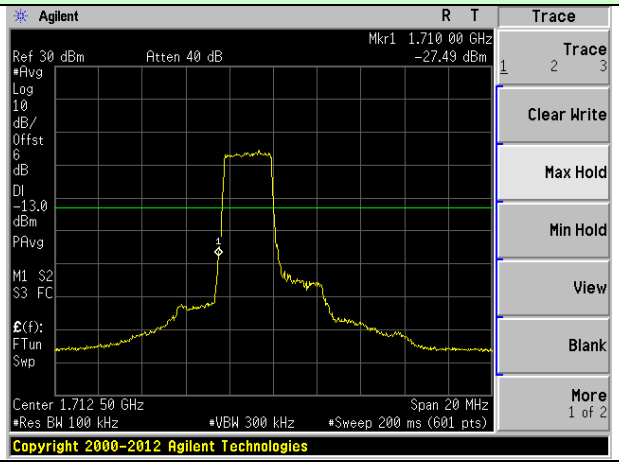
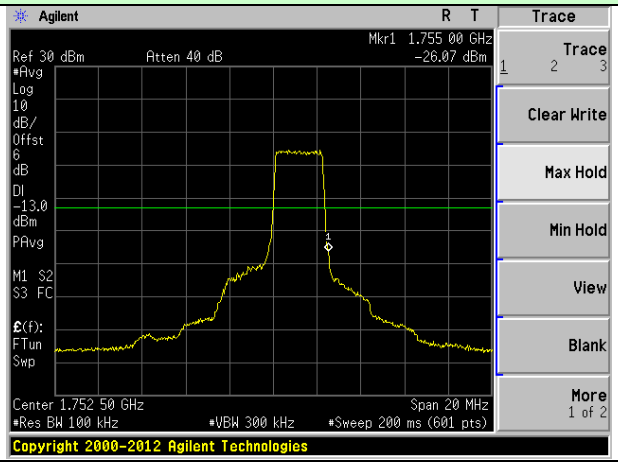
1.4MHz Bandwidth (RB size:6# RB offset:0#)	1.4MHz Bandwidth (RB size:6# RB offset:0#)
	
Lowest channel	Highest channel

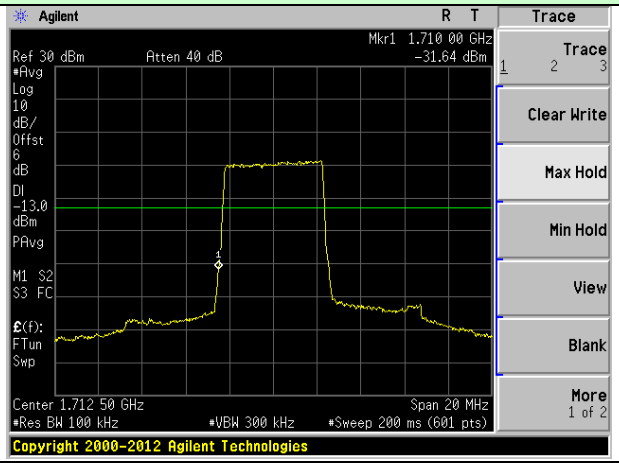
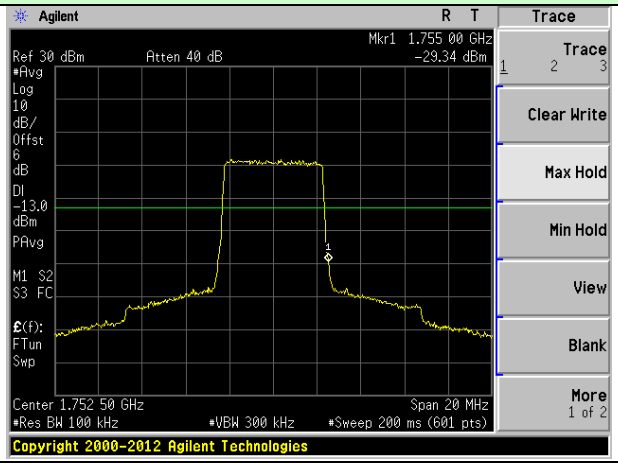
3MHz Bandwidth (RB size:1# RB offset:0#)	3MHz Bandwidth (RB size:1# RB offset:14#)
	
Lowest channel	Highest channel

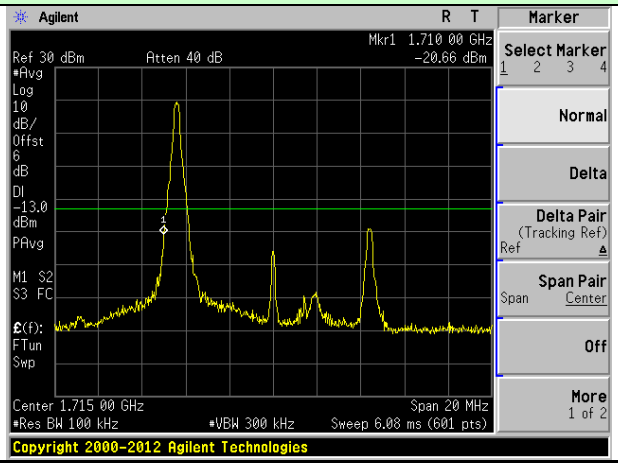
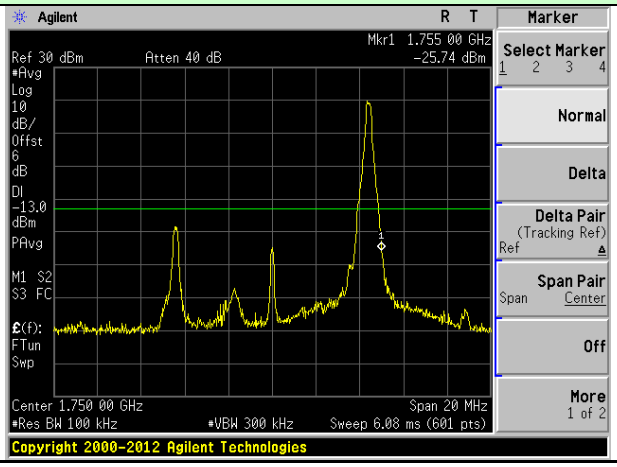
3MHz Bandwidth (RB size:8# RB offset:0#)	3MHz Bandwidth (RB size:8# RB offset:7#)
	
Lowest channel	Highest channel

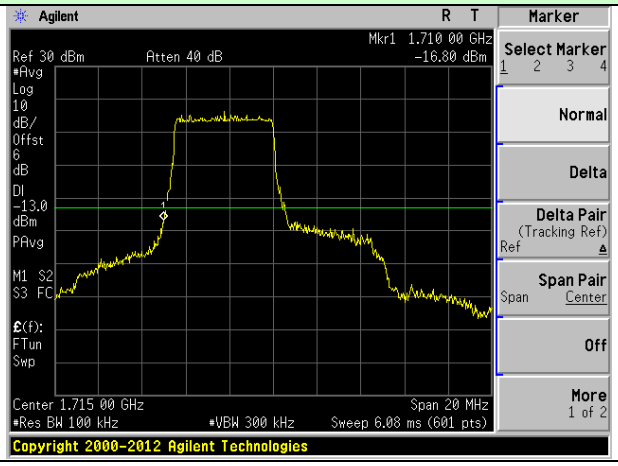
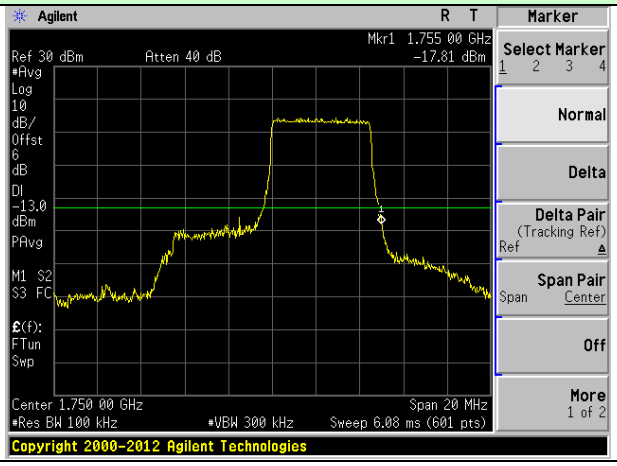
3MHz Bandwidth (RB size:15# RB offset:0#)	3MHz Bandwidth (RB size:15# RB offset:0#)
	
Lowest channel	Highest channel

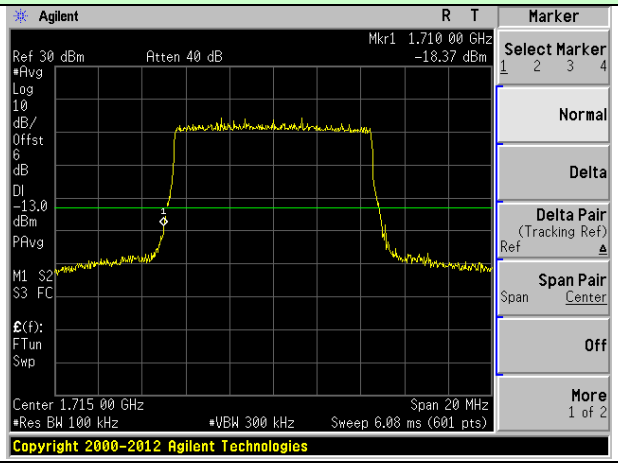
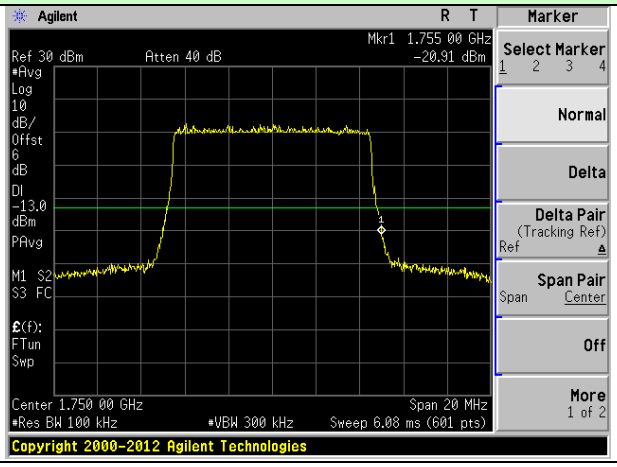
5MHz Bandwidth (RB size:1# RB offset:0#)	5MHz Bandwidth (RB size:1# RB offset:24#)
	
Lowest channel	Highest channel

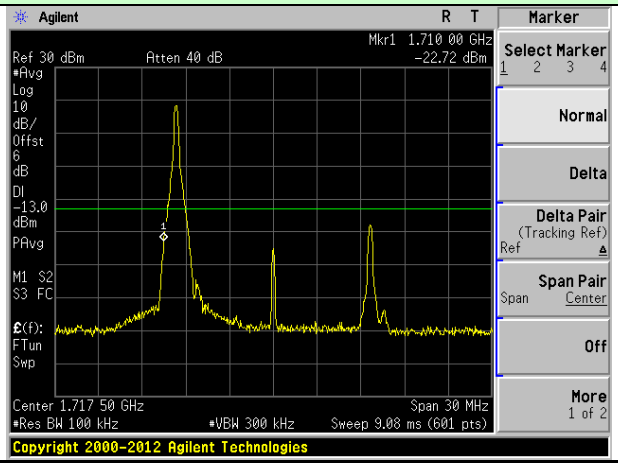
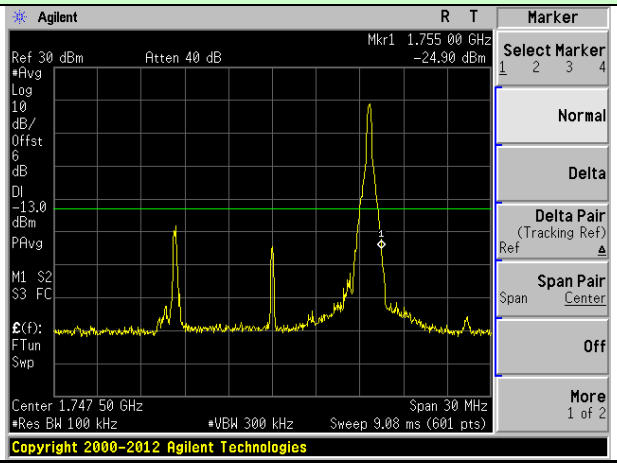
5MHz Bandwidth (RB size:12# RB offset:0#)	5MHz Bandwidth (RB size:12# RB offset:13#)
	
Lowest channel	Highest channel

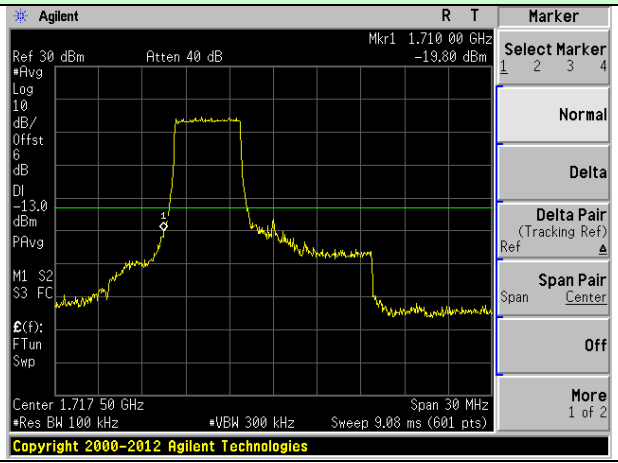
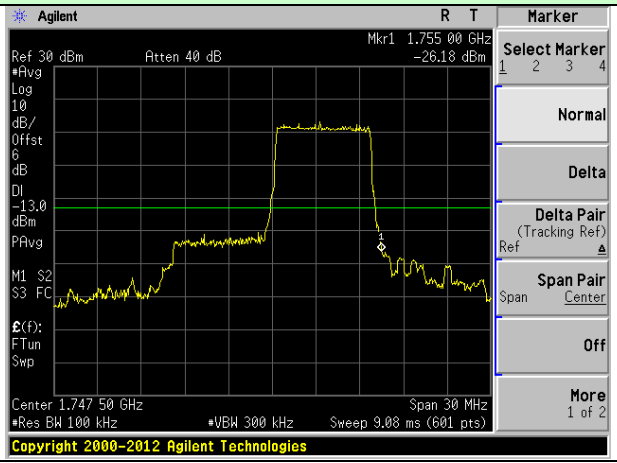
5MHz Bandwidth (RB size:25# RB offset:0#)	5MHz Bandwidth (RB size:25# RB offset:0#)
	
Lowest channel	Highest channel

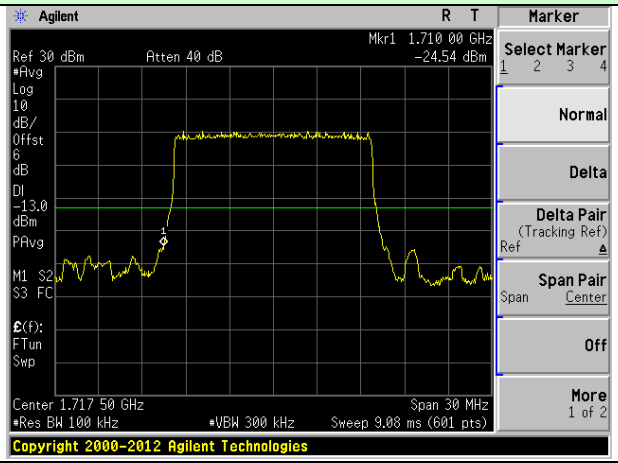
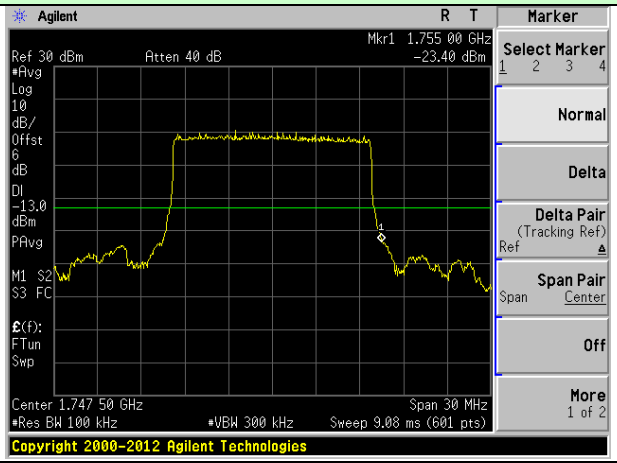
10MHz Bandwidth (RB size:1# RB offset:0#)	10MHz Bandwidth (RB size:1# RB offset:49#)
	
Lowest channel	Highest channel

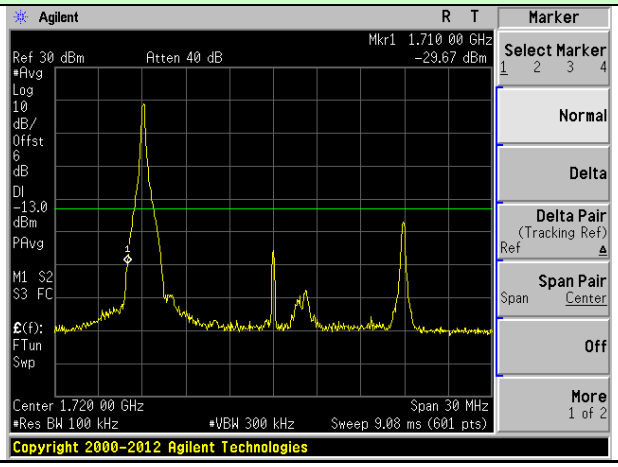
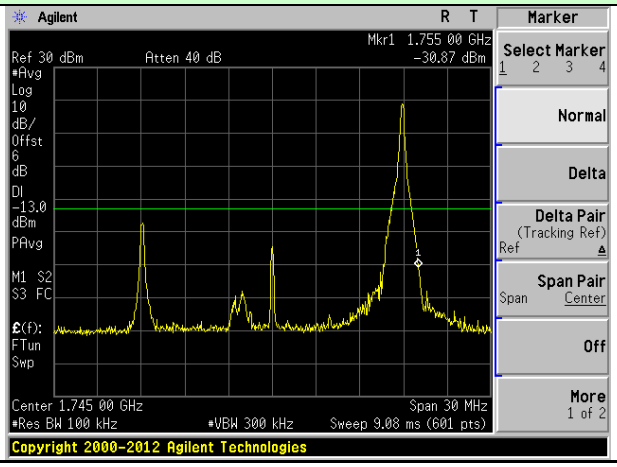
10MHz Bandwidth (RB size:25# RB offset:0#)	10MHz Bandwidth (RB size:25# RB offset:25#)
	
Lowest channel	Highest channel

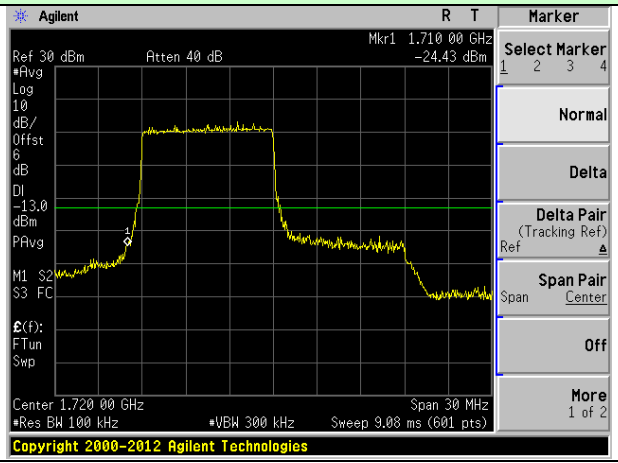
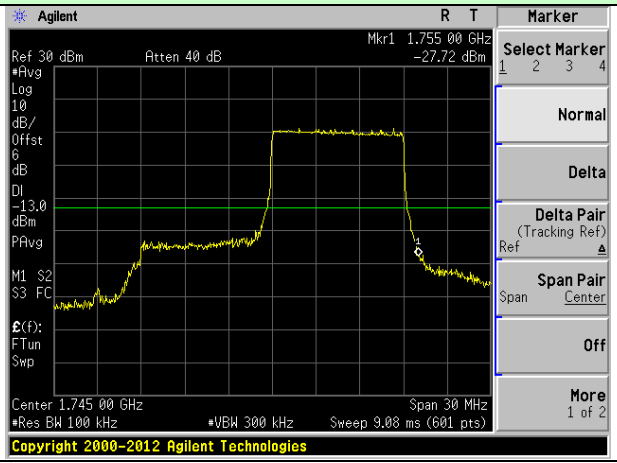
10MHz Bandwidth (RB size:50# RB offset:0#)	10MHz Bandwidth (RB size:50# RB offset:0#)
	
Lowest channel	Highest channel

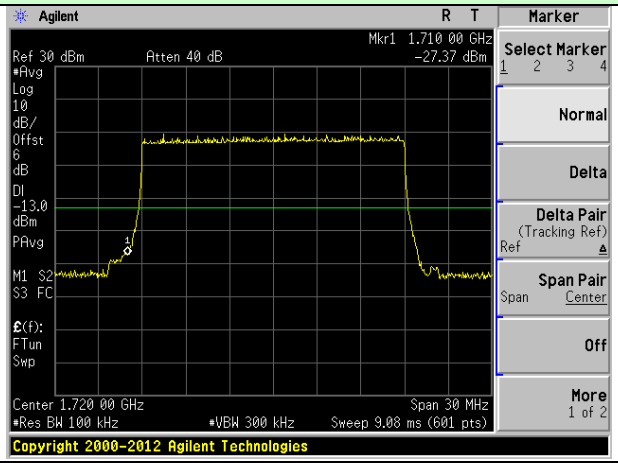
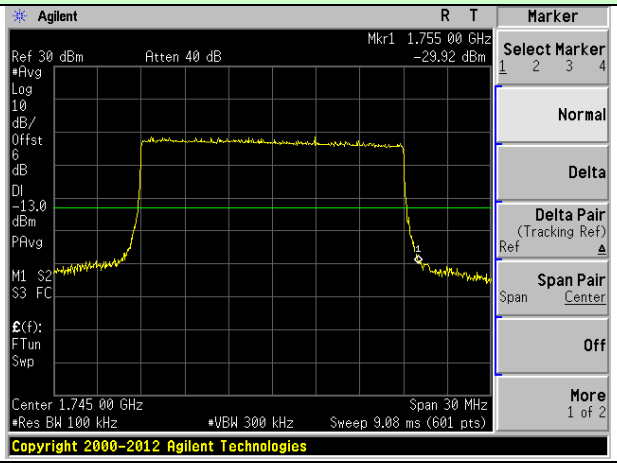
15MHz Bandwidth (RB size:1# RB offset:0#)	15MHz Bandwidth (RB size:1# RB offset:74#)
	
Lowest channel	Highest channel

15MHz Bandwidth (RB size:36# RB offset:0#)	15MHz Bandwidth (RB size:36# RB offset:39#)
	
Lowest channel	Highest channel

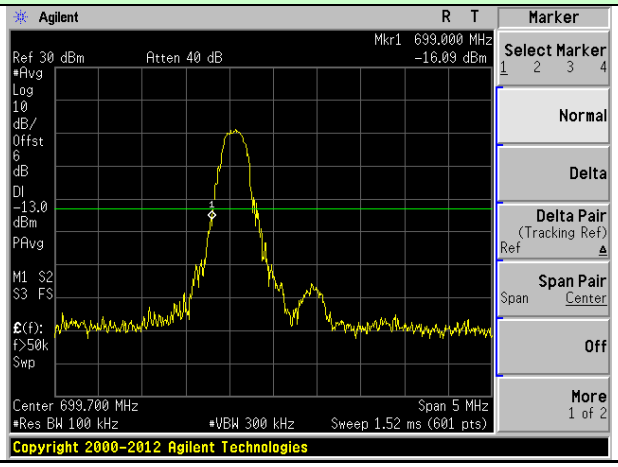
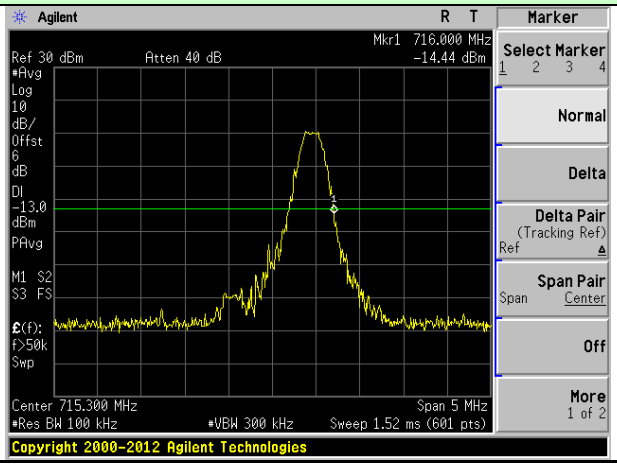
15MHz Bandwidth (RB size:75# RB offset:0#)	15MHz Bandwidth (RB size:75# RB offset:0#)
	
Lowest channel	Highest channel

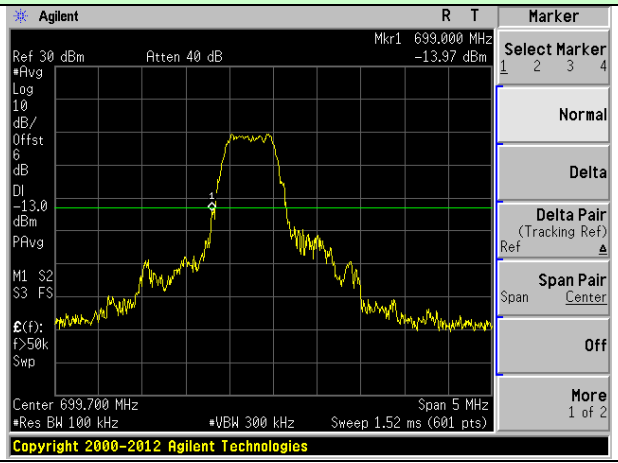
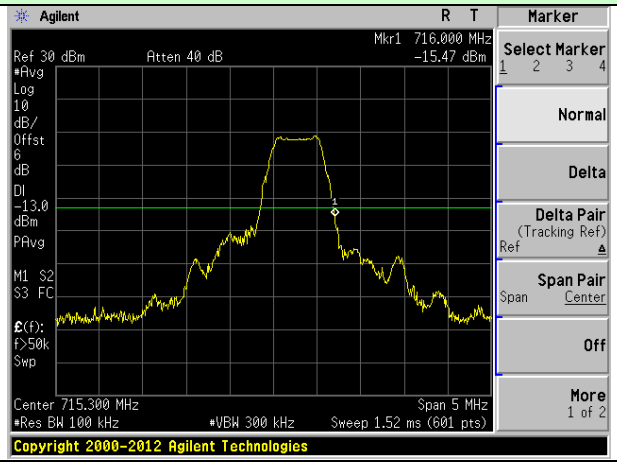
20MHz Bandwidth (RB size:1# RB offset:0#)	20MHz Bandwidth (RB size:1# RB offset:99#)
	
Lowest channel	Highest channel

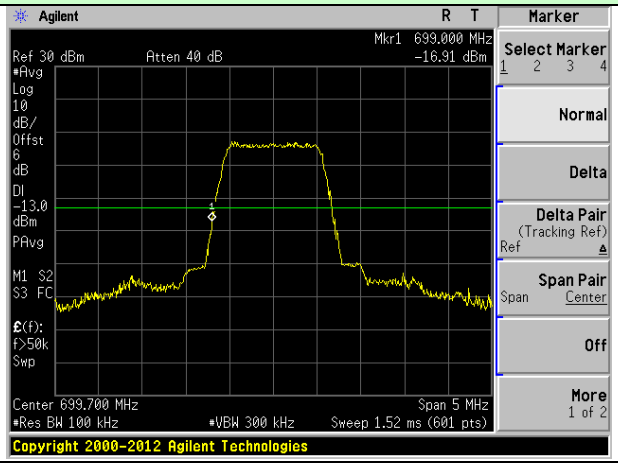
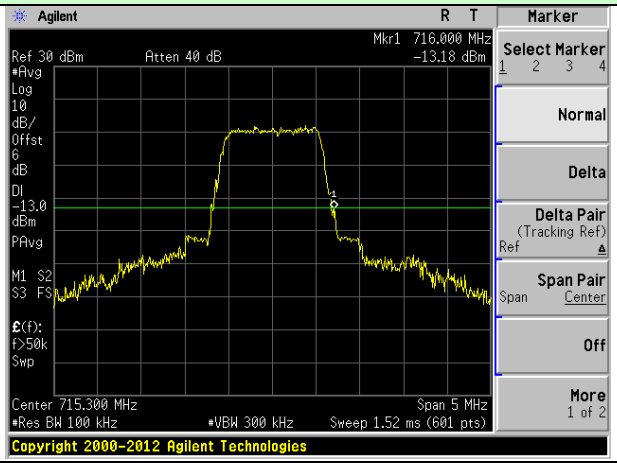
20MHz Bandwidth (RB size:50# RB offset:0#)	20MHz Bandwidth (RB size:50# RB offset:50#)
	
Lowest channel	Highest channel

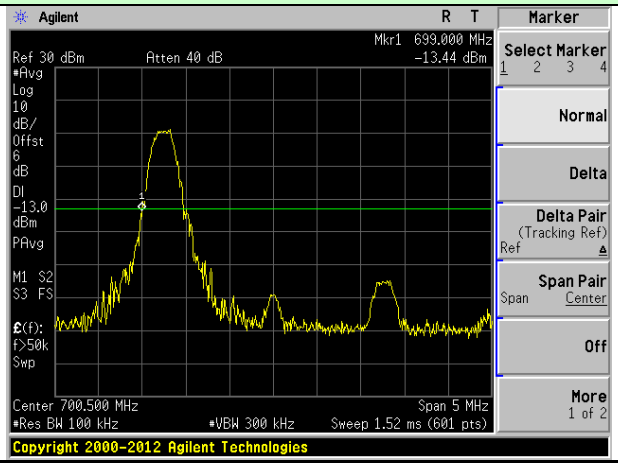
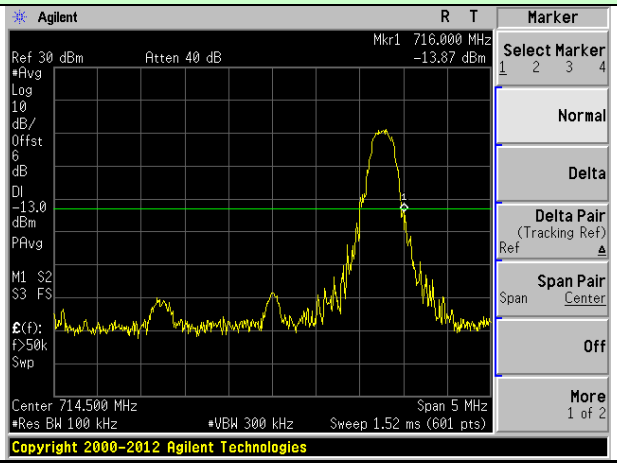
20MHz Bandwidth (RB size:100# RB offset:0#)	20MHz Bandwidth (RB size:100# RB offset:0#)
	
Lowest channel	Highest channel

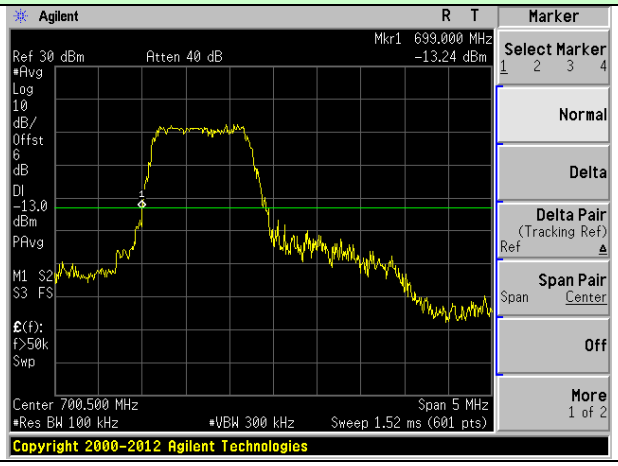
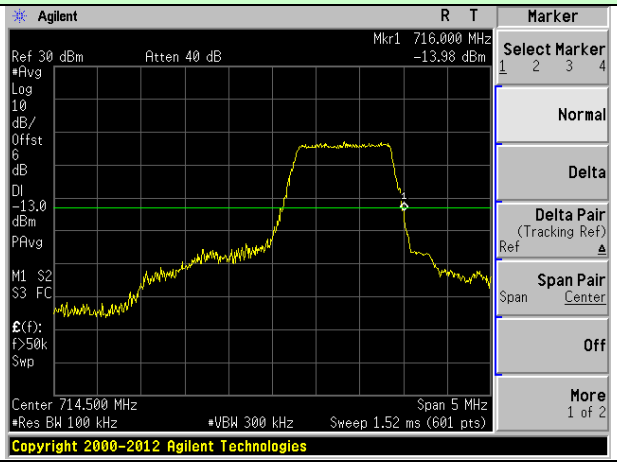
LTE Band 12 (16QAM mode):

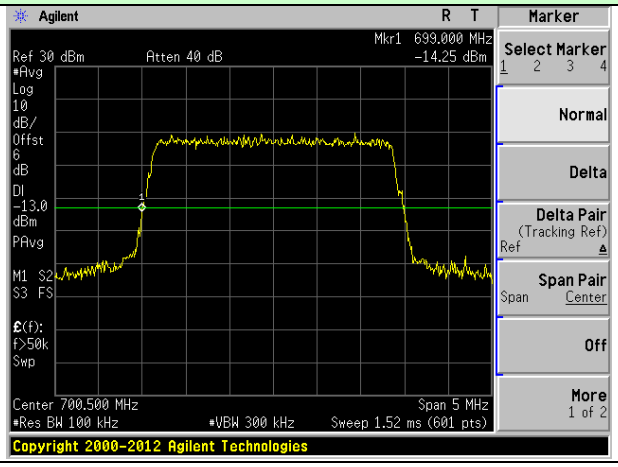
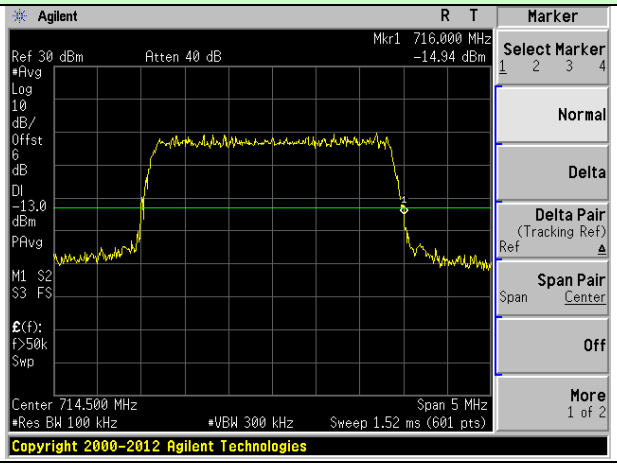
1.4MHz Bandwidth (RB size:1# RB offset:0#)	1.4MHz Bandwidth (RB size:1# RB offset:5#)
	
Lowest channel	Highest channel

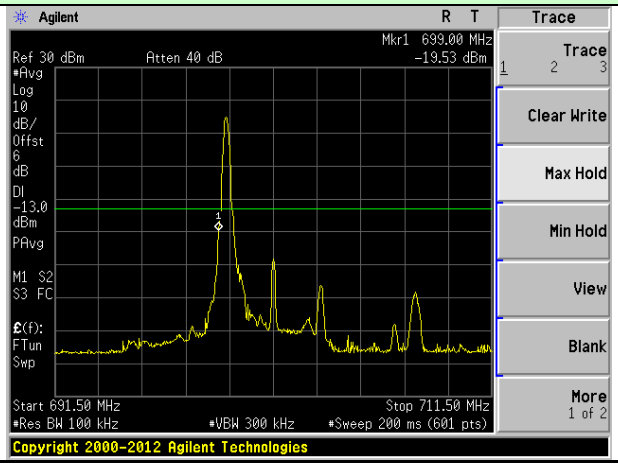
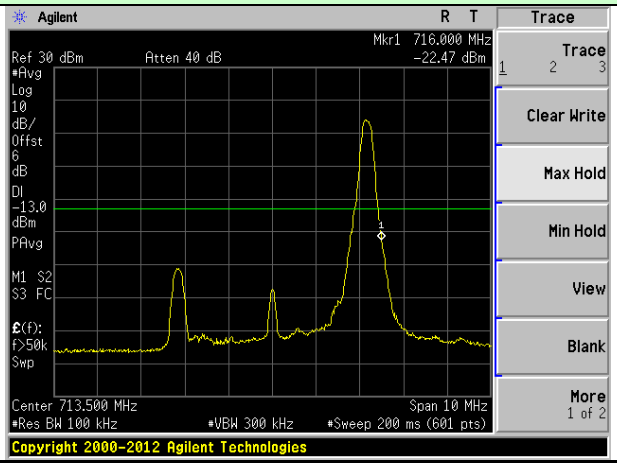
1.4MHz Bandwidth (RB size:3# RB offset:0#)	1.4MHz Bandwidth (RB size:3# RB offset:2#)
	
Lowest channel	Highest channel

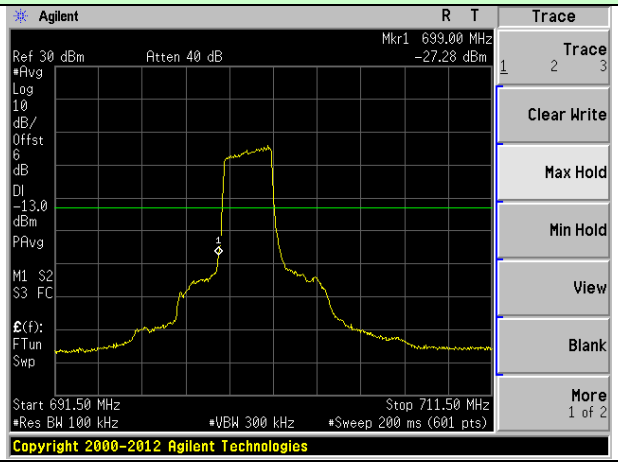
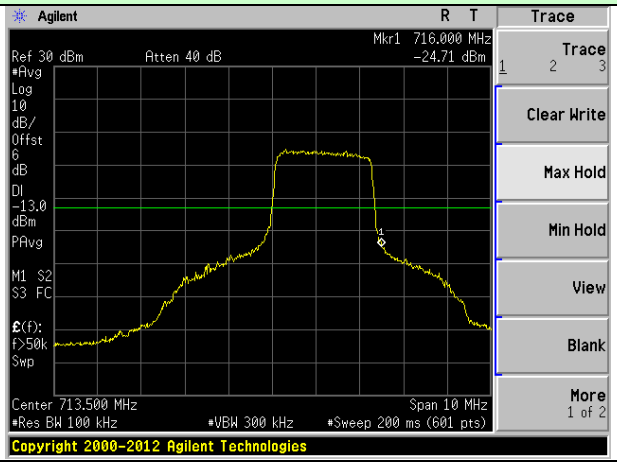
1.4MHz Bandwidth (RB size 6# RB offset:0#)	1.4MHz Bandwidth (RB size:6# RB offset:0#)
	
Lowest channel	Highest channel

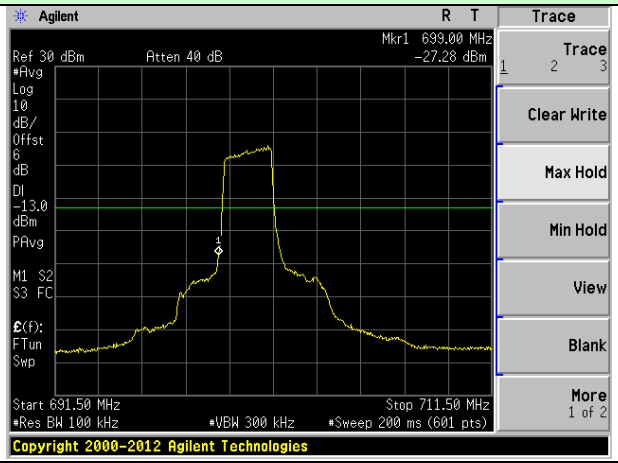
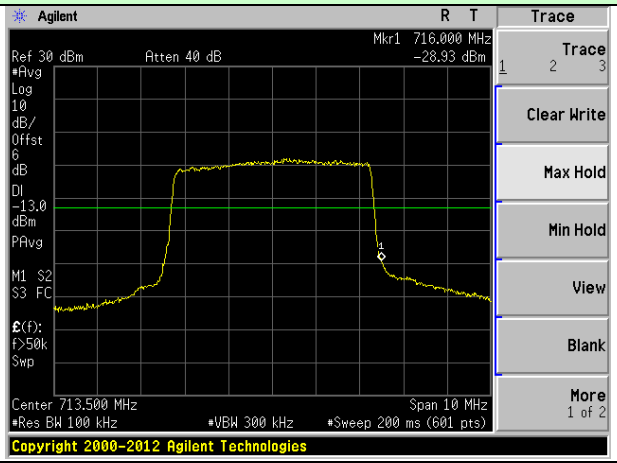
3MHz Bandwidth (RB size:1# RB offset:0#)	3MHz Bandwidth (RB size:1# RB offset:14#)
	
Lowest channel	Highest channel

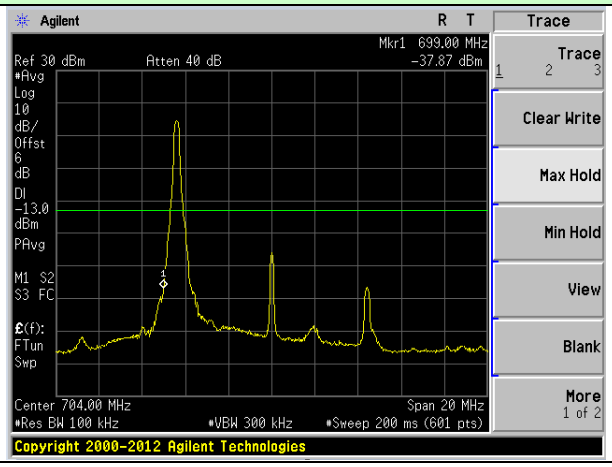
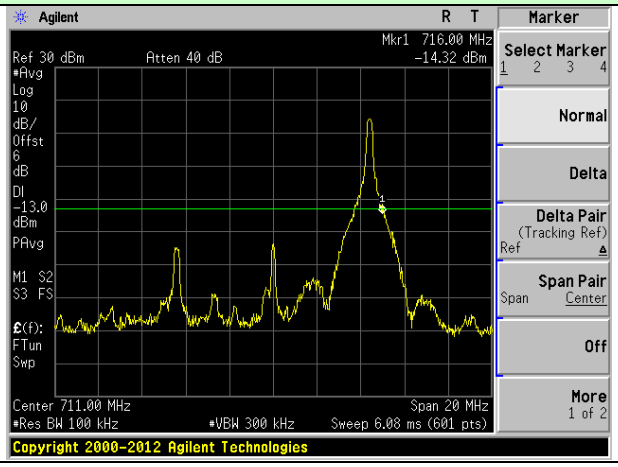
3MHz Bandwidth (RB size:8# RB offset:0#)	3MHz Bandwidth (RB size:8# RB offset:7#)
	
Lowest channel	Highest channel

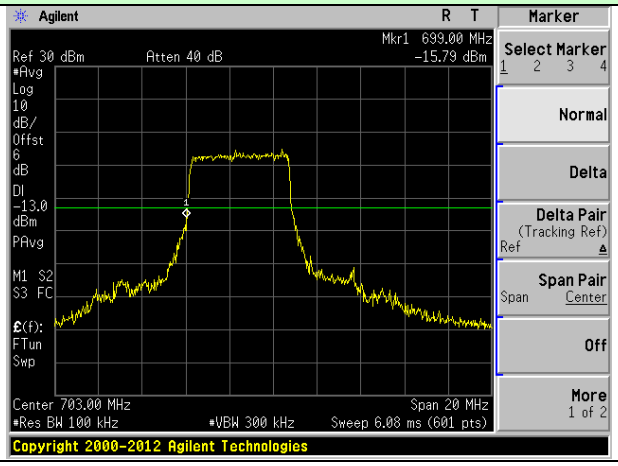
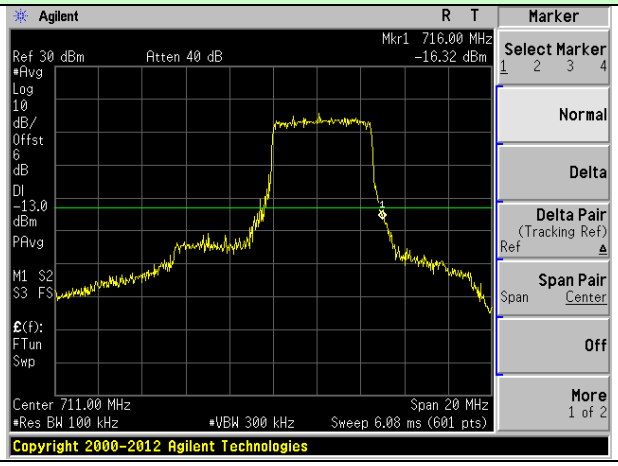
3MHz Bandwidth (RB size:15# RB offset:0#)	3MHz Bandwidth (RB size:15# RB offset:0#)
	
Lowest channel	Highest channel

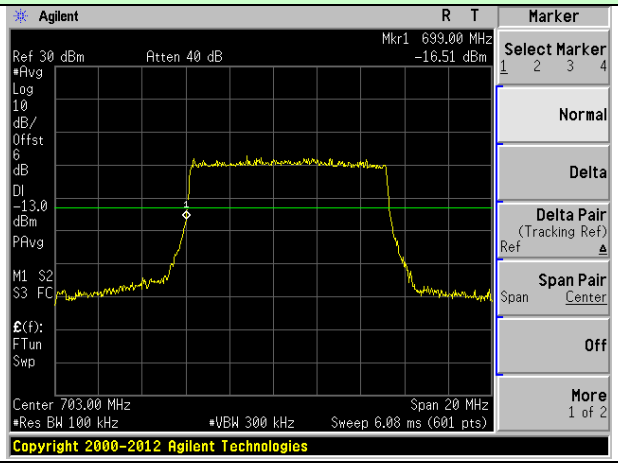
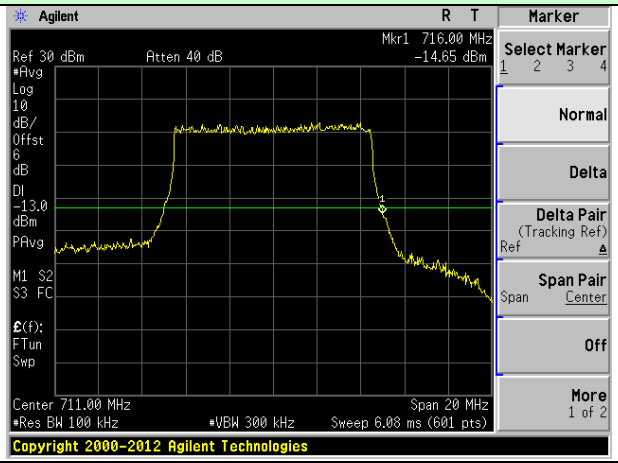
5MHz Bandwidth (RB size:1# RB offset:0#)	5MHz Bandwidth (RB size:1# RB offset:24#)
	
Lowest channel	Highest channel

5MHz Bandwidth (RB size:12# RB offset:0#)	5MHz Bandwidth (RB size:12# RB offset:13#)
	
Lowest channel	Highest channel

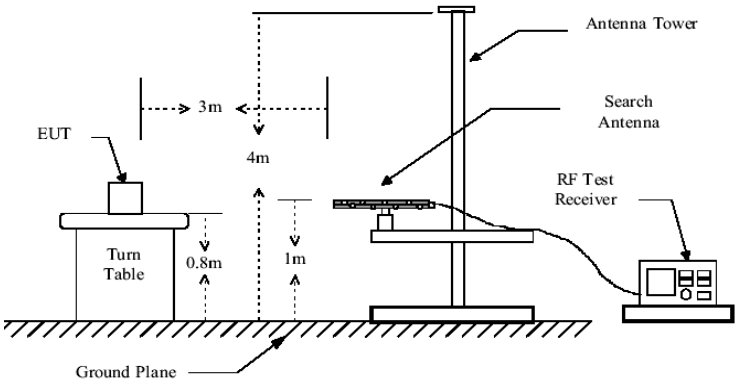
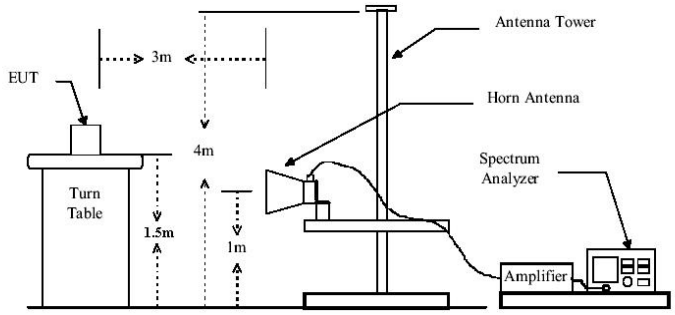
5MHz Bandwidth (RB size:25# RB offset:0#)	5MHz Bandwidth (RB size:25# RB offset:0#)
	
Lowest channel	Highest channel

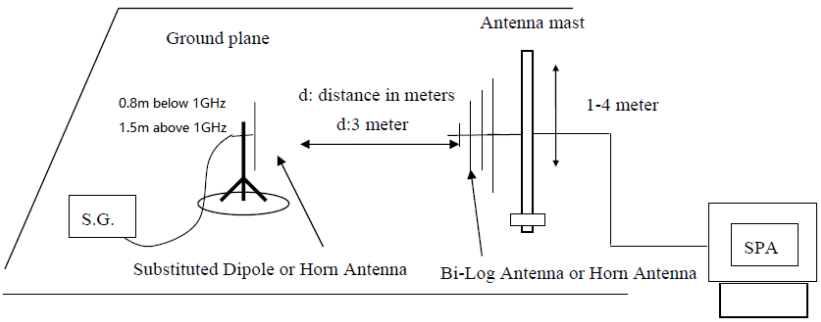
10MHz Bandwidth (RB size:1# RB offset:0#)	10MHz Bandwidth (RB size:1# RB offset:49#)
	
Lowest channel	Highest channel

10MHz Bandwidth (RB size:25# RB offset:0#)	10MHz Bandwidth (RB size:25# RB offset:25#)
	
Lowest channel	Highest channel

10MHz Bandwidth (RB size:50# RB offset:0#)	10MHz Bandwidth (RB size:50# RB offset:0#)
	
Lowest channel	Highest channel

6.9 ERP, EIRP Measurement

Test Requirement for FCC:	Part 24.238 (a); Part 27.50(c)(10)/(d)(4)
Test Requirement for IC:	RSS-130 Clause 4.4, RSS-133 Clause 6.4, RSS-139 Clause 6.5
Limit for FCC:	LTE Band 2: 2W (EIRP) LTE Band 4: 1W (EIRP) LTE Band 12: 3W (ERP)
Limit for IC:	LTE Band 2: 2W (EIRP) LTE Band 4: 1W (EIRP) LTE Band 12: 5W (EIRP)
Test setup:	Below 1GHz  Above 1GHz  Substituted method:

<table>
<tr><td></td><td colspan="6"> 
</td></tr>
<tr><td>Test Procedure:</td><td colspan="6">1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer.
2. During the measurement, the EUT was communication with the station. The highest emission was recorded with the rotation of the turntable and the lowering of the test antenna from 4m to 1m. The reading was recorded and the field strength (E in dBuV/m) was calculated.
3. ERP in frequency band 777–787MHz were measured using a substitution method. The EUT was replaced by dipole antenna connected, the S.G. output was recorded and ERP was calculated asfollows:
ERP = S.G. output (dBm) + Antenna Gain (dBd) – Cable Loss (dB)
4. EIRP in frequency band 1710–1755MHz were measured using a substitution method. The EUT was replaced by or horn antenna connected, the S.G. output was recorded and EIRP was calculated as follows:
EIRP = S.G. output (dBm) + Antenna Gain (dBi) – Cable Loss (dB)</td></tr>
<tr><td>Test environment:</td><td>Temp.:</td><td>25 °C</td><td>Humid.:</td><td>52%</td><td>Press.:</td><td>1 012mbar</td></tr>
<tr><td>Test Instruments:</td><td colspan="6">Refer to section 5.0 for details</td></tr>
<tr><td>Test mode:</td><td colspan="6">Refer to section 6.1 for details</td></tr>
<tr><td>Test results:</td><td colspan="6">Pass</td></tr>
</table>

Measurement Data

The maximum value has been record and the tighter limits apply:

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 2 (1.4M)	Lowest	QPSK	H	22.05	-1.93	1.13	21.25	33.00	Pass
	Middle	QPSK	H	22.98	-1.93	1.22	22.27	33.00	Pass
	Highest	QPSK	H	22.68	-1.93	1.34	22.09	33.00	Pass
	Lowest	16-QAM	H	22.55	-1.93	1.13	21.75	33.00	Pass
	Middle	16-QAM	H	22.76	-1.93	1.22	22.05	33.00	Pass
	Highest	16-QAM	H	22.47	-1.93	1.34	21.88	33.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 2 (3M)	Lowest	QPSK	H	22.3	-1.93	1.13	21.5	33.00	Pass
	Middle	QPSK	H	22.5	-1.93	1.22	21.79	33.00	Pass
	Highest	QPSK	H	22.65	-1.93	1.34	22.06	33.00	Pass
	Lowest	16-QAM	H	22.75	-1.93	1.13	21.95	33.00	Pass
	Middle	16-QAM	H	22.22	-1.93	1.22	21.51	33.00	Pass
	Highest	16-QAM	H	22.77	-1.93	1.34	22.18	33.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 2 (5M)	Lowest	QPSK	H	22.52	-1.93	1.13	21.72	33.00	Pass
	Middle	QPSK	H	22.63	-1.93	1.22	21.92	33.00	Pass
	Highest	QPSK	H	22.02	-1.93	1.34	21.43	33.00	Pass
	Lowest	16-QAM	H	22.35	-1.93	1.13	21.55	33.00	Pass
	Middle	16-QAM	H	22.66	-1.93	1.22	21.95	33.00	Pass
	Highest	16-QAM	H	22.72	-1.93	1.34	22.13	33.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 2 (10M)	Lowest	QPSK	H	22.32	-1.93	1.13	21.52	33.00	Pass
	Middle	QPSK	H	22.7	-1.93	1.22	21.99	33.00	Pass
	Highest	QPSK	H	22.63	-1.93	1.34	22.04	33.00	Pass
	Lowest	16-QAM	H	22.18	-1.93	1.13	21.38	33.00	Pass
	Middle	16-QAM	H	22.04	-1.93	1.22	21.33	33.00	Pass
	Highest	16-QAM	H	22.17	-1.93	1.34	21.58	33.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 2(15M)	Lowest	QPSK	H	22.32	-1.93	1.13	21.52	33.00	Pass
	Middle	QPSK	H	22.5	-1.93	1.22	21.79	33.00	Pass
	Highest	QPSK	H	22.48	-1.93	1.34	21.89	33.00	Pass
	Lowest	16-QAM	H	22.61	-1.93	1.13	21.81	33.00	Pass
	Middle	16-QAM	H	22.58	-1.93	1.22	21.87	33.00	Pass
	Highest	16-QAM	H	22.64	-1.93	1.34	22.05	33.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 2 (20M)	Lowest	QPSK	H	22.36	-1.93	1.13	21.56	33.00	Pass
	Middle	QPSK	H	22.26	-1.93	1.22	21.55	33.00	Pass
	Highest	QPSK	H	22.43	-1.93	1.34	21.84	33.00	Pass
	Lowest	16-QAM	H	22.46	-1.93	1.13	21.66	33.00	Pass
	Middle	16-QAM	H	22.64	-1.93	1.22	21.93	33.00	Pass
	Highest	16-QAM	H	22.18	-1.93	1.34	21.59	33.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 4 (1.4M)	Lowest	QPSK	H	22.85	-2.74	1.71	21.82	30.00	Pass
	Middle	QPSK	H	22.25	-2.74	1.73	21.24	30.00	Pass
	Highest	QPSK	H	22.26	-2.74	1.81	21.33	30.00	Pass
	Lowest	16-QAM	H	22.12	-2.74	1.71	21.09	30.00	Pass
	Middle	16-QAM	H	22.27	-2.74	1.73	21.26	30.00	Pass
	Highest	16-QAM	H	22.13	-2.74	1.81	21.2	30.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 4 (3M)	Lowest	QPSK	H	22.88	-2.74	1.71	21.85	30.00	Pass
	Middle	QPSK	H	22.35	-2.74	1.73	21.34	30.00	Pass
	Highest	QPSK	H	22.38	-2.74	1.81	21.45	30.00	Pass
	Lowest	16-QAM	H	22.62	-2.74	1.71	21.59	30.00	Pass
	Middle	16-QAM	H	22.63	-2.74	1.73	21.62	30.00	Pass
	Highest	16-QAM	H	22.14	-2.74	1.81	21.21	30.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 4 (5M)	Lowest	QPSK	H	22.95	-2.74	1.71	21.92	30.00	Pass
	Middle	QPSK	H	22.61	-2.74	1.73	21.6	30.00	Pass
	Highest	QPSK	H	22.06	-2.74	1.81	21.13	30.00	Pass
	Lowest	16-QAM	H	22.73	-2.74	1.71	21.7	30.00	Pass
	Middle	16-QAM	H	22.52	-2.74	1.73	21.51	30.00	Pass
	Highest	16-QAM	H	22.65	-2.74	1.81	21.72	30.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 4 (10M)	Lowest	QPSK	H	22.9	-2.74	1.71	21.87	30.00	Pass
	Middle	QPSK	H	22.12	-2.74	1.73	21.11	30.00	Pass
	Highest	QPSK	H	22.86	-2.74	1.81	21.93	30.00	Pass
	Lowest	16-QAM	H	22.3	-2.74	1.71	21.27	30.00	Pass
	Middle	16-QAM	H	22.48	-2.74	1.73	21.47	30.00	Pass
	Highest	16-QAM	H	22.5	-2.74	1.81	21.57	30.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 4 (15M)	Lowest	QPSK	H	22.58	-2.74	1.71	21.55	30.00	Pass
	Middle	QPSK	H	22.96	-2.74	1.73	21.95	30.00	Pass
	Highest	QPSK	H	22.12	-2.74	1.81	21.19	30.00	Pass
	Lowest	16-QAM	H	22.4	-2.74	1.71	21.37	30.00	Pass
	Middle	16-QAM	H	22.4	-2.74	1.73	21.39	30.00	Pass
	Highest	16-QAM	H	22.4	-2.74	1.81	21.47	30.00	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
LTE Band 4 (20M)	Lowest	QPSK	H	22.09	-2.74	1.71	21.06	30.00	Pass
	Middle	QPSK	H	22.01	-2.74	1.73	21	30.00	Pass
	Highest	QPSK	H	22.49	-2.74	1.81	21.56	30.00	Pass
	Lowest	16-QAM	H	22.23	-2.74	1.71	21.2	30.00	Pass
	Middle	16-QAM	H	22.83	-2.74	1.73	21.82	30.00	Pass
	Highest	16-QAM	H	22.18	-2.74	1.81	21.25	30.00	Pass

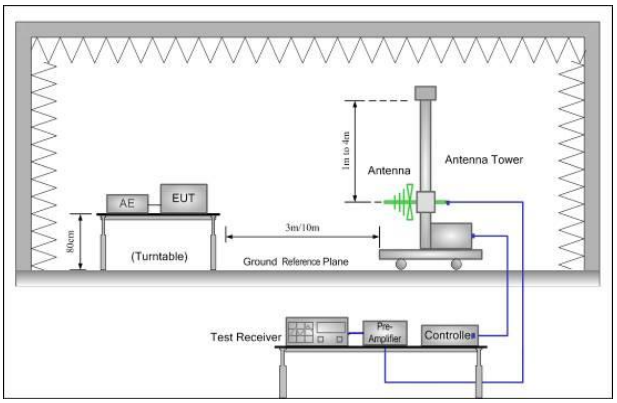
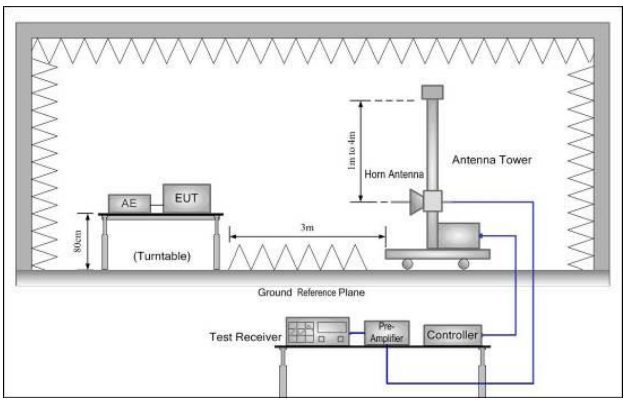
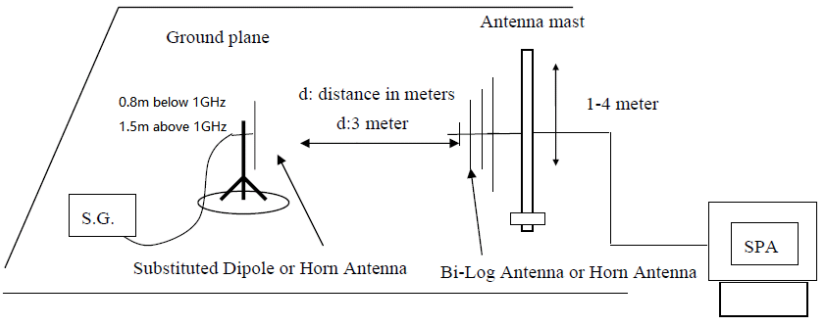
EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Result
LTE Band 12 (1.4M)	Lowest	QPSK	H	22.18	-2.46	1.55	21.27	34.77	Pass
	Middle	QPSK	H	22.85	-2.46	1.6	21.99	34.77	Pass
	Highest	QPSK	H	22.4	-2.46	1.65	21.59	34.77	Pass
	Lowest	16-QAM	H	22.56	-2.46	1.55	21.65	34.77	Pass
	Middle	16-QAM	H	22.04	-2.46	1.6	21.18	34.77	Pass
	Highest	16-QAM	H	22.83	-2.46	1.65	22.02	34.77	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Result
LTE Band 12 (5M)	Lowest	QPSK	H	22.45	-2.46	1.55	21.54	34.77	Pass
	Middle	QPSK	H	22.51	-2.46	1.6	21.65	34.77	Pass
	Highest	QPSK	H	22.41	-2.46	1.65	21.6	34.77	Pass
	Lowest	16-QAM	H	22.92	-2.46	1.55	22.01	34.77	Pass
	Middle	16-QAM	H	22.82	-2.46	1.6	21.96	34.77	Pass
	Highest	16-QAM	H	22.13	-2.46	1.65	21.32	34.77	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Result
LTE Band 12 (5M)	Lowest	QPSK	H	22.23	-2.46	1.55	21.32	34.77	Pass
	Middle	QPSK	H	22.23	-2.46	1.6	21.37	34.77	Pass
	Highest	QPSK	H	22.22	-2.46	1.65	21.41	34.77	Pass
	Lowest	16-QAM	H	22.16	-2.46	1.55	21.25	34.77	Pass
	Middle	16-QAM	H	22.1	-2.46	1.6	21.24	34.77	Pass
	Highest	16-QAM	H	22.14	-2.46	1.65	21.33	34.77	Pass

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Result
LTE Band 12 (10M)	Lowest	QPSK	H	22.37	-2.46	1.55	21.46	34.77	Pass
	Middle	QPSK	H	22.9	-2.46	1.6	22.04	34.77	Pass
	Highest	QPSK	H	22.06	-2.46	1.65	21.25	34.77	Pass
	Lowest	16-QAM	H	22.54	-2.46	1.55	21.63	34.77	Pass
	Middle	16-QAM	H	22.16	-2.46	1.6	21.3	34.77	Pass
	Highest	16-QAM	H	22.29	-2.46	1.65	21.48	34.77	Pass

6.10 Field strength of spurious radiation measurement

Test Requirement for FCC:	Part 24.238 (a); FCC Part 27.53(h)/(g)
Test Requirement for IC:	RSS-GEN Clause 6.13
Limit:	Band 2/4/12:-13dBm
Test setup:	Below 1GHz  Above 1GHz  Substituted method: 

Test Procedure:	1. The EUT was placed on an non-conductive turntable using a non-conductive support. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and EMI spectrum analyzer. 2. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations. 3. The frequency range up to tenth harmonic was investigated for each of three fundamental frequency (low, middle and high channels). Once spurious emission was identified, the power of the emission was determined using the substitution method. 4. The spurious emissions attenuation was calculated as the difference between radiated power at the fundamental frequency and the spurious emissions frequency. ERP / EIRP = S.G. output (dBm) + Antenna Gain(dB/dBi) – Cable Loss (dB)					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Test Instruments:	Refer to section 5.0 for details					
Test mode:	Refer to section 6.1 for details					
Test results:	Pass					

Measurement Data
Remark：
1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

QPSK mode:

Test mode:	LTE Band 2(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3705.00	Vertical	-42.17	-13.00	Pass
5557.50	V	-45.97		
7410.00	V	-44.93		
9262.50	V	-43.30		
11115.00	V	-45.83		
3705.00	Horizontal	-42.02	-13.00	Pass
5557.50	H	-42.48		
7410.00	H	-45.83		
9262.50	H	-44.21		
11115.00	H	-44.58		
Test mode:	**LTE Band 2(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-44.30	-13.00	Pass
5640.00	V	-43.74		
7520.00	V	-42.92		
9400.00	V	-43.65		
11280.00	V	-44.33		
3760.00	Horizontal	-41.74	-13.00	Pass
5640.00	H	-42.11		
7520.00	H	-42.67		
9400.00	H	-45.67		
11280.00	H	-42.45		
Test mode:	**LTE Band 2(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3815.00	Vertical	-44.19	-13.00	Pass
5722.50	V	-41.81		
7630.00	V	-42.55		
9537.50	V	-44.44		
11445.00	V	-45.97		
3815.00	Horizontal	-42.42	-13.00	Pass
5722.50	H	-44.49		
7630.00	H	-43.68		
9537.50	H	-43.09		
11445.00	H	-41.91		

Test mode:	LTE Band 2(10MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3810.00	Vertical	-44.46	-13.00	Pass
5715.00	V	-41.86		
7620.00	V	-41.96		
9525.00	V	-43.09		
11430.00	V	-42.17		
3810.00	Horizontal	-41.58	-13.00	Pass
5715.00	H	-45.00		
7620.00	H	-41.24		
9525.00	H	-42.32		
11430.00	H	-43.79		
Test mode:	**LTE Band 2(10MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-45.60	-13.00	Pass
5640.00	V	-42.58		
7520.00	V	-41.40		
9400.00	V	-45.96		
11280.00	V	-45.79		
3760.00	Horizontal	-45.91	-13.00	Pass
5640.00	H	-44.69		
7520.00	H	-45.84		
9400.00	H	-42.49		
11280.00	H	-44.31		
Test mode:	**LTE Band 2(10MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3710.00	Vertical	-44.32	-13.00	Pass
5565.00	V	-41.74		
7420.00	V	-42.19		
9275.00	V	-41.46		
11130.00	V	-42.56		
3710.00	Horizontal	-45.86	-13.00	Pass
5565.00	H	-41.41		
7420.00	H	-45.65		
9275.00	H	-41.46		
11130.00	H	-43.52		

Test mode:	LTE Band 2(15MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3805.00	Vertical	-44.28	-13.00	Pass
5707.50	V	-43.33		
7610.00	V	-42.77		
9512.50	V	-45.65		
11415.00	V	-43.39		
3805.00	Horizontal	-42.32	-13.00	Pass
5707.50	H	-44.66		
7610.00	H	-43.63		
9512.50	H	-41.02		
11415.00	H	-45.64		
Test mode:	**LTE Band 2(15MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-42.92	-13.00	Pass
5640.00	V	-44.57		
7520.00	V	-42.36		
9400.00	V	-44.88		
11280.00	V	-41.36		
3760.00	Horizontal	-42.45	-13.00	Pass
5640.00	H	-43.48		
7520.00	H	-45.80		
9400.00	H	-44.55		
11280.00	H	-41.40		
Test mode:	**LTE Band 2(15MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3715.00	Vertical	-41.46	-13.00	Pass
5572.50	V	-44.72		
7430.00	V	-44.16		
9287.50	V	-45.93		
11145.00	V	-42.28		
3715.00	Horizontal	-43.39	-13.00	Pass
5572.50	H	-44.96		
7430.00	H	-43.11		
9287.50	H	-44.84		
11145.00	H	-41.76		

Test mode:	LTE Band 2(20MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3800.00	Vertical	-41.55	-13.00	Pass
5700.00	V	-44.72		
7600.00	V	-41.63		
9500.00	V	-45.58		
11400.00	V	-42.25		
3800.00	Horizontal	-42.63	-13.00	Pass
5700.00	H	-41.45		
7600.00	H	-42.25		
9500.00	H	-44.59		
11400.00	H	-41.35		
Test mode:	**LTE Band 2(20MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-45.15	-13.00	Pass
5640.00	V	-43.24		
7520.00	V	-45.93		
9400.00	V	-43.88		
11280.00	V	-44.09		
3760.00	Horizontal	-43.56	-13.00	Pass
5640.00	H	-42.67		
7520.00	H	-42.17		
9400.00	H	-44.33		
11280.00	H	-44.38		
Test mode:	**LTE Band 2(20MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3720.00	Vertical	-41.94	-13.00	Pass
5580.00	V	-45.76		
7440.00	V	-41.60		
9300.00	V	-41.37		
11160.00	V	-45.94		
3720.00	Horizontal	-43.44	-13.00	Pass
5580.00	H	-44.24		
7440.00	H	-44.53		
9300.00	H	-44.37		
11160.00	H	-43.00		

Test mode:	LTE Band 4(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3425.00	Vertical	-42.00	-13.00	Pass
5137.50	V	-41.01		
6850.00	V	-41.81		
8562.50	V	-42.06		
10275.00	V	-41.53		
3425.00	Horizontal	-41.07	-13.00	Pass
5137.50	H	-41.44		
6850.00	H	-44.52		
8562.50	H	-41.70		
10275.00	H	-42.12		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-44.19	-13.00	Pass
5197.50	V	-43.46		
6930.00	V	-44.57		
8662.50	V	-42.58		
10395.00	V	-42.59		
3465.00	Horizontal	-41.64	-13.00	Pass
5197.50	H	-44.84		
6930.00	H	-43.85		
8662.50	H	-42.82		
10395.00	H	-44.48		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3505.00	Vertical	-41.00	-13.00	Pass
5257.50	V	-43.64		
7010.00	V	-44.56		
8762.50	V	-41.46		
10515.00	V	-42.94		
3505.00	Horizontal	-43.53	-13.00	Pass
5257.50	H	-43.89		
7010.00	H	-44.05		
8762.50	H	-42.44		
10515.00	H	-43.39		

Test mode:	LTE Band 4(10MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3430.00	Vertical	-44.90	-13.00	Pass
5145.00	V	-43.02		
6860.00	V	-42.75		
8575.00	V	-44.80		
10290.00	V	-45.97		
3430.00	Horizontal	-43.34	-13.00	Pass
5145.00	H	-44.64		
6860.00	H	-44.11		
8575.00	H	-45.79		
10290.00	H	-42.27		
Test mode:	**LTE Band 4(10MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-41.18	-13.00	Pass
5197.50	V	-44.56		
6930.00	V	-41.01		
8662.50	V	-44.72		
10395.00	V	-41.89		
3465.00	Horizontal	-44.45	-13.00	Pass
5197.50	H	-41.96		
6930.00	H	-43.89		
8662.50	H	-43.37		
10395.00	H	-43.07		
Test mode:	**LTE Band 4(10MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3500.00	Vertical	-42.49	-13.00	Pass
5250.00	V	-45.84		
7000.00	V	-42.20		
8750.00	V	-43.99		
10500.00	V	-42.91		
3500.00	Horizontal	-41.32	-13.00	Pass
5250.00	H	-43.75		
7000.00	H	-45.09		
8750.00	H	-45.53		
10500.00	H	-44.72		

Test mode:	LTE Band 4(15MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3435.00	Vertical	-47.01	-13.00	Pass
5152.50	V	-41.26		
6870.00	V	-46.05		
8587.50	V	-42.13		
10305.00	V	-42.10		
3435.00	Horizontal	-47.76	-13.00	Pass
5152.50	H	-43.01		
6870.00	H	-47.62		
8587.50	H	-47.27		
10305.00	H	-43.37		
Test mode:	**LTE Band 4(15MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-48.52	-13.00	Pass
5197.50	V	-47.61		
6930.00	V	-47.88		
8662.50	V	-45.60		
10395.00	V	-44.92		
3465.00	Horizontal	-48.71	-13.00	Pass
5197.50	H	-48.53		
6930.00	H	-42.20		
8662.50	H	-41.69		
10395.00	H	-42.44		
Test mode:	**LTE Band 4(15MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3495.00	Vertical	-48.76	-13.00	Pass
5242.50	V	-44.85		
6990.00	V	-42.28		
8737.50	V	-41.53		
10485.00	V	-47.93		
3495.00	Horizontal	-43.22	-13.00	Pass
5242.50	H	-45.71		
6990.00	H	-43.37		
8737.50	H	-42.14		
10485.00	H	-47.42		

Test mode:	LTE Band 4(20MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3440.00	Vertical	-43.02	-13.00	Pass
5160.00	V	-47.39		
6880.00	V	-43.55		
8600.00	V	-41.14		
10320.00	V	-47.32		
3440.00	Horizontal	-42.49	-13.00	Pass
5160.00	H	-46.85		
6880.00	H	-46.25		
8600.00	H	-42.47		
10320.00	H	-46.09		
Test mode:	**LTE Band 4(20MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-48.56	-13.00	Pass
5197.50	V	-41.39		
6930.00	V	-48.92		
8662.50	V	-48.00		
10395.00	V	-42.69		
3465.00	Horizontal	-45.83	-13.00	Pass
5197.50	H	-43.22		
6930.00	H	-42.51		
8662.50	H	-42.17		
10395.00	H	-43.42		
Test mode:	**LTE Band 4(20MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3490.00	Vertical	-44.48	-13.00	Pass
5235.00	V	-41.63		
6980.00	V	-44.71		
8725.00	V	-44.49		
10470.00	V	-46.66		
3490.00	Horizontal	-42.04	-13.00	Pass
5235.00	H	-43.06		
6980.00	H	-44.42		
8725.00	H	-43.26		
10470.00	H	-43.80		

Test mode:	LTE Band 12(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1559.00	Vertical	-44.26	-13.00	Pass
2338.50	V	-46.89		
3118.00	V	-41.90		
3897.50	V	-43.60		
4677.00	V	-47.60		
1559.00	Horizontal	-47.10	-13.00	Pass
2338.50	H	-41.35		
3118.00	H	-43.76		
3897.50	H	-43.89		
4677.00	H	-45.64		
Test mode:	**LTE Band 12(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1764.00	Vertical	-46.95	-13.00	Pass
2646.00	V	-42.61		
3528.00	V	-46.23		
4410.00	V	-48.03		
5292.00	V	-45.81		
1764.00	Horizontal	-46.33	-13.00	Pass
2646.00	H	-48.25		
3528.00	H	-44.84		
4410.00	H	-47.45		
5292.00	H	-41.26		
Test mode:	**LTE Band 12(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1569.00	Vertical	-44.02	-13.00	Pass
2353.50	V	-42.27		
3138.00	V	-45.08		
3922.50	V	-45.62		
4707.00	V	-41.40		
1569.00	Horizontal	-48.96	-13.00	Pass
2353.50	H	-46.81		
3138.00	H	-47.31		
3922.50	H	-48.14		
4707.00	H	-44.05		

Test mode:	LTE Band 12(10MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1408.00	Vertical	-44.71	-13.00	Pass
2112.00	V	-44.77		
2816.00	V	-46.22		
3520.00	V	-45.00		
4224.00	V	-48.41		
1408.00	Horizontal	-44.88	-13.00	Pass
2112.00	H	-47.25		
2816.00	H	-46.94		
3520.00	H	-42.70		
4224.00	H	-42.16		
Test mode:	**LTE Band 12(10MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1415.00	Vertical	-43.99	-13.00	Pass
2122.50	V	-43.44		
2830.00	V	-43.99		
3537.50	V	-47.43		
4245.00	V	-48.11		
1415.00	Horizontal	-43.64	-13.00	Pass
2122.50	H	-48.19		
2830.00	H	-42.74		
3537.50	H	-42.10		
4245.00	H	-41.40		
Test mode:	**LTE Band 12(10MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1422.00	Vertical	-45.74	-13.00	Pass
2133.00	V	-48.67		
2844.00	V	-44.34		
3555.00	V	-43.87		
4266.00	V	-47.07		
1422.00	Horizontal	-42.17	-13.00	Pass
2133.00	H	-43.93		
2844.00	H	-46.43		
3555.00	H	-42.60		
4266.00	H	-44.38		

16QAM mode:

Test mode:	LTE Band 2(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3705.00	Vertical	-44.27	-13.00	Pass
5557.50	V	-43.14		
7410.00	V	-45.92		
9262.50	V	-42.88		
11115.00	V	-47.17		
3705.00	Horizontal	-46.93	-13.00	Pass
5557.50	H	-43.05		
7410.00	H	-48.22		
9262.50	H	-46.00		
11115.00	H	-46.75		
Test mode:	**LTE Band 2(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-42.63	-13.00	Pass
5640.00	V	-41.80		
7520.00	V	-47.80		
9400.00	V	-44.91		
11280.00	V	-46.78		
3760.00	Horizontal	-43.78	-13.00	Pass
5640.00	H	-48.26		
7520.00	H	-47.10		
9400.00	H	-41.25		
11280.00	H	-46.29		
Test mode:	**LTE Band 2(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3815.00	Vertical	-47.92	-13.00	Pass
5722.50	V	-47.40		
7630.00	V	-44.93		
9537.50	V	-48.99		
11445.00	V	-45.64		
3815.00	Horizontal	-46.35	-13.00	Pass
5722.50	H	-45.71		
7630.00	H	-44.83		
9537.50	H	-41.16		
11445.00	H	-43.66		

Test mode:	LTE Band 2(10MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3810.00	Vertical	-42.61	-13.00	Pass
5715.00	V	-41.97		
7620.00	V	-44.98		
9525.00	V	-44.49		
11430.00	V	-43.23		
3810.00	Horizontal	-44.24	-13.00	Pass
5715.00	H	-46.08		
7620.00	H	-46.07		
9525.00	H	-48.24		
11430.00	H	-48.30		
Test mode:	**LTE Band 2(10MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-44.19	-13.00	Pass
5640.00	V	-44.05		
7520.00	V	-41.83		
9400.00	V	-43.66		
11280.00	V	-43.42		
3760.00	Horizontal	-44.73	-13.00	Pass
5640.00	H	-43.32		
7520.00	H	-45.34		
9400.00	H	-42.44		
11280.00	H	-43.76		
Test mode:	**LTE Band 2(10MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3710.00	Vertical	-45.95	-13.00	Pass
5565.00	V	-41.81		
7420.00	V	-44.48		
9275.00	V	-41.74		
11130.00	V	-42.27		
3710.00	Horizontal	-43.87	-13.00	Pass
5565.00	H	-43.73		
7420.00	H	-41.57		
9275.00	H	-42.48		
11130.00	H	-42.01		

Test mode:	LTE Band 2(15MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3805.00	Vertical	-45.61	-13.00	Pass
5707.50	V	-44.78		
7610.00	V	-45.80		
9512.50	V	-41.78		
11415.00	V	-44.82		
3805.00	Horizontal	-43.97	-13.00	Pass
5707.50	H	-45.01		
7610.00	H	-41.98		
9512.50	H	-42.63		
11415.00	H	-43.66		
Test mode:	**LTE Band 2(15MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-45.56	-13.00	Pass
5640.00	V	-43.57		
7520.00	V	-45.97		
9400.00	V	-45.67		
11280.00	V	-44.91		
3760.00	Horizontal	-42.10	-13.00	Pass
5640.00	H	-42.03		
7520.00	H	-41.11		
9400.00	H	-42.88		
11280.00	H	-42.96		
Test mode:	**LTE Band 2(15MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3715.00	Vertical	-43.42	-13.00	Pass
5572.50	V	-45.18		
7430.00	V	-45.95		
9287.50	V	-43.42		
11145.00	V	-42.09		
3715.00	Horizontal	-45.64	-13.00	Pass
5572.50	H	-43.25		
7430.00	H	-44.89		
9287.50	H	-42.73		
11145.00	H	-44.56		

Test mode:	LTE Band 2(20MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3800.00	Vertical	-44.47	-13.00	Pass
5700.00	V	-41.41		
7600.00	V	-42.62		
9500.00	V	-43.43		
11400.00	V	-41.03		
3800.00	Horizontal	-44.75	-13.00	Pass
5700.00	H	-45.84		
7600.00	H	-42.79		
9500.00	H	-42.39		
11400.00	H	-44.97		
Test mode:	**LTE Band 2(20MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-45.82	-13.00	Pass
5640.00	V	-42.35		
7520.00	V	-43.84		
9400.00	V	-43.87		
11280.00	V	-41.01		
3760.00	Horizontal	-42.50	-13.00	Pass
5640.00	H	-42.73		
7520.00	H	-45.61		
9400.00	H	-41.35		
11280.00	H	-45.11		
Test mode:	**LTE Band 2(20MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3720.00	Vertical	-41.42	-13.00	Pass
5580.00	V	-43.87		
7440.00	V	-45.87		
9300.00	V	-41.92		
11160.00	V	-41.72		
3720.00	Horizontal	-41.94	-13.00	Pass
5580.00	H	-42.94		
7440.00	H	-42.59		
9300.00	H	-41.28		
11160.00	H	-41.54		

Test mode:	LTE Band 4(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3425.00	Vertical	-44.19	-13.00	Pass
5137.50	V	-41.98		
6850.00	V	-43.56		
8562.50	V	-43.74		
10275.00	V	-41.07		
3425.00	Horizontal	-41.17	-13.00	Pass
5137.50	H	-41.27		
6850.00	H	-45.60		
8562.50	H	-42.16		
10275.00	H	-43.28		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-41.99	-13.00	Pass
5197.50	V	-45.34		
6930.00	V	-42.67		
8662.50	V	-41.07		
10395.00	V	-42.24		
3465.00	Horizontal	-43.49	-13.00	Pass
5197.50	H	-41.01		
6930.00	H	-42.12		
8662.50	H	-44.35		
10395.00	H	-45.69		
Test mode:	**LTE Band 4(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3505.00	Vertical	-42.36	-13.00	Pass
5257.50	V	-43.25		
7010.00	V	-43.03		
8762.50	V	-42.31		
10515.00	V	-43.42		
3505.00	Horizontal	-43.01	-13.00	Pass
5257.50	H	-41.32		
7010.00	H	-41.10		
8762.50	H	-43.44		
10515.00	H	-45.36		

Test mode:	LTE Band 4(10MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3430.00	Vertical	-44.50	-13.00	Pass
5145.00	V	-42.54		
6860.00	V	-42.75		
8575.00	V	-41.97		
10290.00	V	-45.58		
3430.00	Horizontal	-42.75	-13.00	Pass
5145.00	H	-41.14		
6860.00	H	-42.19		
8575.00	H	-42.19		
10290.00	H	-42.99		
Test mode:	**LTE Band 4(10MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-42.43	-13.00	Pass
5197.50	V	-44.45		
6930.00	V	-44.31		
8662.50	V	-44.87		
10395.00	V	-44.18		
3465.00	Horizontal	-44.00	-13.00	Pass
5197.50	H	-44.62		
6930.00	H	-45.49		
8662.50	H	-43.86		
10395.00	H	-43.48		
Test mode:	**LTE Band 4(10MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3500.00	Vertical	-45.27	-13.00	Pass
5250.00	V	-41.40		
7000.00	V	-45.90		
8750.00	V	-42.95		
10500.00	V	-42.56		
3500.00	Horizontal	-43.56	-13.00	Pass
5250.00	H	-45.51		
7000.00	H	-41.94		
8750.00	H	-41.60		
10500.00	H	-41.70		

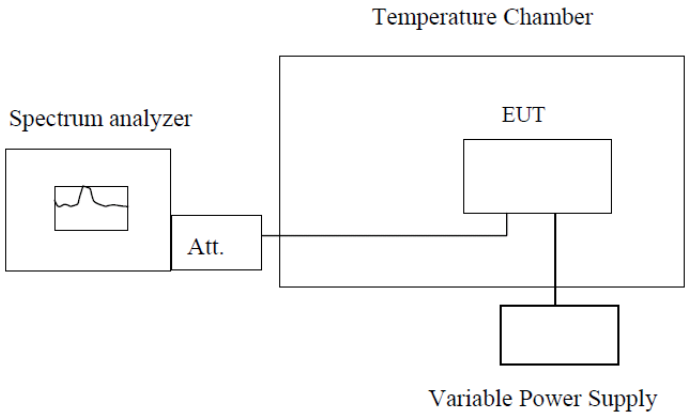
Test mode:	LTE Band 4(15MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3435.00	Vertical	-44.60	-13.00	Pass
5152.50	V	-44.40		
6870.00	V	-43.36		
8587.50	V	-43.87		
10305.00	V	-44.83		
3435.00	Horizontal	-45.55	-13.00	Pass
5152.50	H	-42.64		
6870.00	H	-44.38		
8587.50	H	-42.36		
10305.00	H	-44.61		
Test mode:	**LTE Band 4(15MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-42.30	-13.00	Pass
5197.50	V	-42.21		
6930.00	V	-43.87		
8662.50	V	-45.18		
10395.00	V	-41.46		
3465.00	Horizontal	-41.43	-13.00	Pass
5197.50	H	-41.01		
6930.00	H	-42.95		
8662.50	H	-41.58		
10395.00	H	-43.39		
Test mode:	**LTE Band 4(15MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3495.00	Vertical	-41.31	-13.00	Pass
5242.50	V	-45.58		
6990.00	V	-42.79		
8737.50	V	-45.14		
10485.00	V	-43.88		
3495.00	Horizontal	-41.72	-13.00	Pass
5242.50	H	-43.91		
6990.00	H	-45.86		
8737.50	H	-41.90		
10485.00	H	-41.61		

Test mode:	LTE Band 4(20MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3440.00	Vertical	-44.72	-13.00	Pass
5160.00	V	-45.93		
6880.00	V	-42.95		
8600.00	V	-45.61		
10320.00	V	-45.93		
3440.00	Horizontal	-45.23	-13.00	Pass
5160.00	H	-44.07		
6880.00	H	-44.68		
8600.00	H	-43.41		
10320.00	H	-42.30		
Test mode:	**LTE Band 4(20MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3465.00	Vertical	-41.30	-13.00	Pass
5197.50	V	-45.81		
6930.00	V	-44.93		
8662.50	V	-41.80		
10395.00	V	-42.34		
3465.00	Horizontal	-43.04	-13.00	Pass
5197.50	H	-45.63		
6930.00	H	-44.94		
8662.50	H	-42.75		
10395.00	H	-42.97		
Test mode:	**LTE Band 4(20MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3490.00	Vertical	-44.85	-13.00	Pass
5235.00	V	-43.27		
6980.00	V	-45.39		
8725.00	V	-43.61		
10470.00	V	-44.59		
3490.00	Horizontal	-43.79	-13.00	Pass
5235.00	H	-41.89		
6980.00	H	-42.63		
8725.00	H	-41.37		
10470.00	H	-41.79		

Test mode:	LTE Band 12(5MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1559.00	Vertical	-45.27	-13.00	Pass
2338.50	V	-41.96		
3118.00	V	-45.93		
3897.50	V	-43.02		
4677.00	V	-43.81		
1559.00	Horizontal	-45.15	-13.00	Pass
2338.50	H	-43.54		
3118.00	H	-45.82		
3897.50	H	-45.73		
4677.00	H	-42.29		
Test mode:	**LTE Band 12(5MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1764.00	Vertical	-41.61	-13.00	Pass
2646.00	V	-41.09		
3528.00	V	-42.79		
4410.00	V	-45.87		
5292.00	V	-41.43		
1764.00	Horizontal	-41.74	-13.00	Pass
2646.00	H	-42.33		
3528.00	H	-44.24		
4410.00	H	-45.05		
5292.00	H	-44.40		
Test mode:	**LTE Band 12(5MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1569.00	Vertical	-45.98	-13.00	Pass
2353.50	V	-43.26		
3138.00	V	-41.30		
3922.50	V	-44.47		
4707.00	V	-41.57		
1569.00	Horizontal	-41.57	-13.00	Pass
2353.50	H	-43.57		
3138.00	H	-45.66		
3922.50	H	-43.28		
4707.00	H	-41.17		

Test mode:	LTE Band 12(10MHz)		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1408.00	Vertical	-45.50	-13.00	Pass
2112.00	V	-41.53		
2816.00	V	-41.91		
3520.00	V	-44.78		
4224.00	V	-41.12		
1408.00	Horizontal	-43.39	-13.00	Pass
2112.00	H	-45.57		
2816.00	H	-45.82		
3520.00	H	-45.76		
4224.00	H	-44.38		
Test mode:	**LTE Band 12(10MHz)**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1415.00	Vertical	-42.05	-13.00	Pass
2122.50	V	-45.73		
2830.00	V	-41.18		
3537.50	V	-43.15		
4245.00	V	-45.11		
1415.00	Horizontal	-45.90	-13.00	Pass
2122.50	H	-42.20		
2830.00	H	-45.91		
3537.50	H	-45.88		
4245.00	H	-44.07		
Test mode:	**LTE Band 12(10MHz)**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1422.00	Vertical	-45.83	-13.00	Pass
2133.00	V	-41.85		
2844.00	V	-42.47		
3555.00	V	-45.17		
4266.00	V	-41.72		
1422.00	Horizontal	-45.18	-13.00	Pass
2133.00	H	-42.53		
2844.00	H	-43.24		
3555.00	H	-42.05		
4266.00	H	-42.49		

6.11 Frequency stability V.S. Temperature measurement

Test Requirement for FCC:	FCC Part2.1055(a)(1)(b)
Test Requirement for IC:	RSS-130 Clause 4.3, RSS-133 Clause 6.3, RSS-139 Clause 6.4
Limit:	2.5ppm
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. The equipment under test was connected to an external DC power supply and input rated voltage. 2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. 3. The EUT was placed inside the temperature chamber. 4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 25°C operating frequency as reference frequency. 5. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. 6. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data

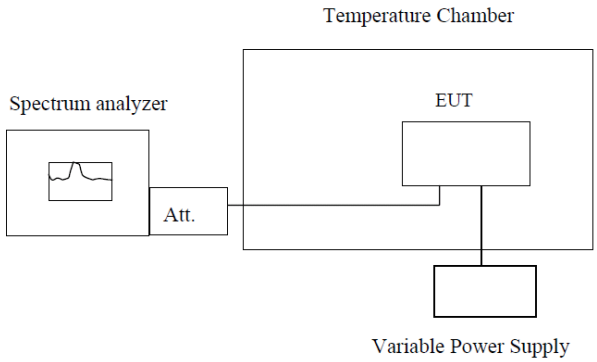
QPSK mode:

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	35	0.0186	2.5	Pass
	-20	36	0.0191		
	-10	33	0.0176		
	0	29	0.0154		
	10	32	0.0170		
	20	30	0.0160		
	30	40	0.0213		
	40	37	0.0197		
	50	38	0.0202		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	33	0.0190	2.5	Pass
	-20	32	0.0185		
	-10	31	0.0179		
	0	28	0.0162		
	10	29	0.0167		
	20	28	0.0162		
	30	39	0.0225		
	40	34	0.0196		
	50	34	0.0196		
Reference Frequency: LTE Band 12 Middle channel=23095 channel=707.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
12.0	-30	56	0.0792	2.5	Pass
	-20	62	0.0876		
	-10	53	0.0749		
	0	46	0.0650		
	10	51	0.0721		
	20	45	0.0636		
	30	75	0.1060		
	40	65	0.0919		
	50	63	0.0890		

16QAM mode:

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	33	0.0176	2.5	Pass
	-20	34	0.0181		
	-10	31	0.0165		
	0	27	0.0144		
	10	30	0.0160		
	20	28	0.0149		
	30	38	0.0202		
	40	35	0.0186		
	50	36	0.0191		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	26	0.0150	2.5	Pass
	-20	25	0.0144		
	-10	24	0.0139		
	0	22	0.0127		
	10	23	0.0133		
	20	22	0.0127		
	30	29	0.0167		
	40	25	0.0144		
	50	27	0.0156		
Reference Frequency: LTE Band 12 Middle channel=23095 channel=707.5MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
12.0	-30	54	0.0763	2.5	Pass
	-20	59	0.0834		
	-10	51	0.0721		
	0	44	0.0622		
	10	49	0.0693		
	20	44	0.0622		
	30	72	0.1018		
	40	62	0.0876		
	50	61	0.0862		

6.12 Frequency stability V.S. Voltage measurement

Test Requirement for FCC:	FCC Part2.1055(d)(1)(2)
Test Requirement for IC:	RSS-130 Clause 4.3, RSS-133 Clause 6.3, RSS-139 Clause 6.4
Limit:	2.5ppm
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test procedure:	1. Set chamber temperature to 25°C. Use a variable DC power source to power the EUT and set the voltage to rated voltage. 2. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency. 3. Reduce the input voltage to specified extreme voltage variation (+/- 15%) and endpoint, record the maximum frequency change.
Test Instruments:	Refer to section 5.0 for details
Test mode:	Refer to section 6.1 for details
Test results:	Pass

Measurement Data

QPSK mode:

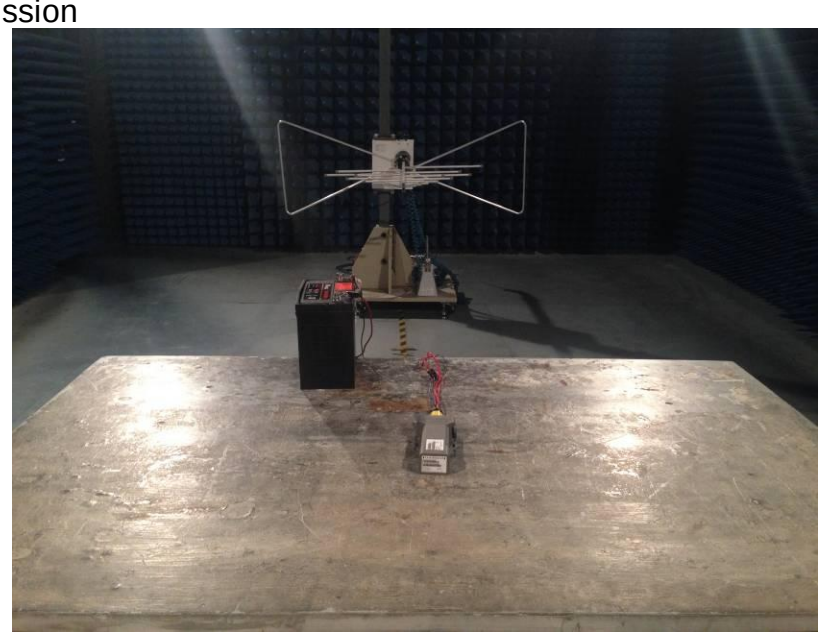
Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	14.0	19	0.0101	2.5	Pass
	12.0	19	0.0101		
	10.0	23	0.0122		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	14.0	21	0.0121	2.5	Pass
	12.0	14	0.0081		
	10.0	19	0.0110		
Reference Frequency: LTE Band 12 Middle channel=23095 channel=707.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	14.0	21	0.0297	2.5	Pass
	12.0	27	0.0382		
	10.0	29	0.0410		

16QAM mode:

Reference Frequency: LTE Band 2 Middle channel=18900 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	14.0	18	0.0096	2.5	Pass
	12.0	22	0.0117		
	10.0	24	0.0128		
Reference Frequency: LTE Band 4 Middle channel=20175 channel=1732.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	14.0	22	0.0127	2.5	Pass
	12.0	16	0.0092		
	10.0	18	0.0104		
Reference Frequency: LTE Band 12 Middle channel=23095 channel=707.5MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	14.0	18	0.0254	2.5	Pass
	12.0	26	0.0367		
	10.0	27	0.0382		

7 Test Setup Photo

Radiated Emission



8 EUT Constructional Details

Reference to the test report No. : GTS201808000156-01

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