Spectrum Report (LTE)

Applicant:	Spireon Inc
Address of Applicant:	9724 Kingston Pike,Suite 800 Knoxville,TN37922, 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.:	JG-LS, JG-L
Marketing Name:	JG-L 001
FCC ID:	O9YJL01
IC:	22952-JL01
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:	September 10, 2018
Date of Test:	September 11-27, 2018
Date of report issued:	September 28, 2018
Test Result :	PASS *

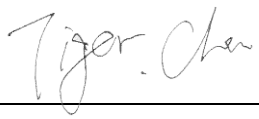
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

1 Version

Version No.	Date	Description
00	*September 28, 2018*	*Original*

Prepared By:  ***Date:*** *September 28, 2018*

Project Engineer

Check By:  ***Date:*** *September 28, 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.:	JG-LS, JG-L
Test model:	JG-LS
Remark: difference details of this two model,please refer to the difference description	
S/N:	XK2009000415
Tested Sample(s) ID:	GTS201809000106-01
Hardware Version:	P1.1.0
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:	Band 2: 1.9dBi Band 4: 2.2dBi Band 12: 2.2dBi
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 27 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 fully 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

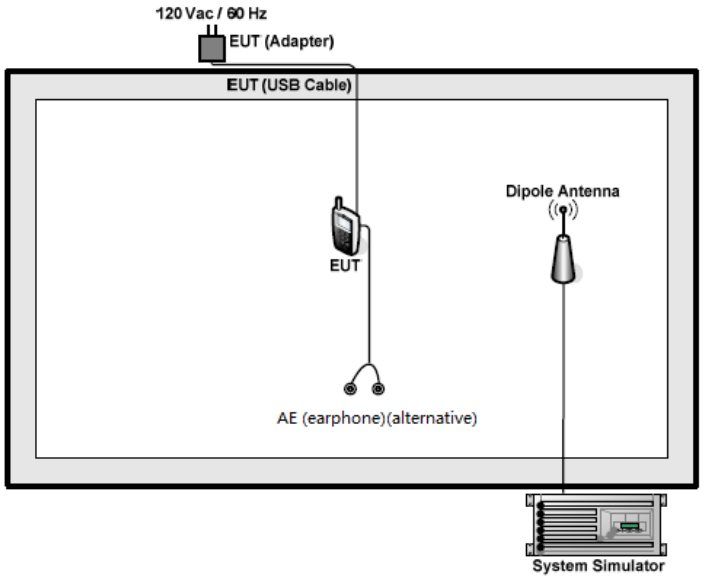
6 System test configuration

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



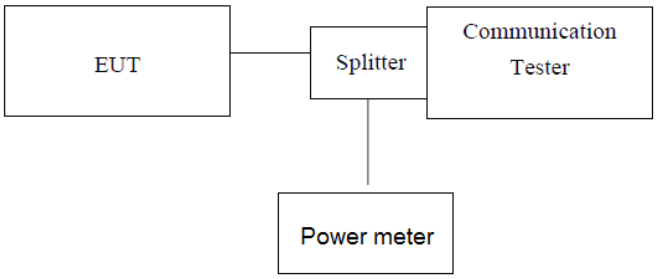
6.3 Frequency Plan

Frequency Plan for band 698MHz ~ 756MHz	
Frequency Plan (MHz)	**699-716**
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	22.60	21.26	21.61
		1	2	21.17	21.13	21.86
		1	5	21.24	22.35	22.70
		3	0	22.64	21.65	22.57
		3	1	21.31	21.76	21.67
		3	2	22.50	22.50	21.75
		6	0	21.86	21.18	22.02
	16QAM	1	0	21.74	21.30	22.66
		1	2	22.26	22.74	22.51
		1	5	22.55	21.43	21.57
		3	0	22.42	22.09	21.80
		3	1	22.43	21.95	22.19
		3	2	22.19	**22.92**	21.36
		6	0	22.73	22.57	22.32
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	22.72	21.48	21.50
		1	8	22.35	21.89	21.57
		1	14	22.42	21.84	22.18
		8	0	22.39	21.80	21.76
		8	4	22.07	22.62	21.98
		8	7	**22.91**	22.42	22.20
		15	0	22.84	21.90	22.45
	16QAM	1	0	21.36	22.31	21.62
		1	8	22.33	21.62	21.82
		1	14	22.05	21.29	21.79
		8	0	21.49	21.57	22.91
		8	4	22.24	21.03	22.30
		8	7	21.44	22.08	22.09
		15	0	22.01	22.65	22.27

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	21.30	22.13	22.17
		1	13	21.65	22.26	22.22
		1	24	21.76	21.88	22.78
		12	0	22.82	21.84	22.41
		12	6	21.63	21.23	21.30
		12	13	22.01	**23.00**	22.30
		25	0	22.62	22.21	22.01
	16QAM	1	0	22.02	22.61	21.37
		1	13	22.52	21.32	22.62
		1	24	22.55	22.18	22.31
		12	0	22.28	21.50	21.84
		12	6	22.91	22.10	21.89
		12	13	21.75	22.79	22.86
		25	0	21.22	21.67	22.52
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	21.72	22.44	21.39
		1	25	22.22	21.45	21.16
		1	49	21.01	22.12	21.61
		25	0	22.63	22.04	22.05
		25	13	21.80	21.28	22.63
		25	25	22.05	22.50	22.95
		50	0	21.23	22.07	21.49
	16QAM	1	0	21.45	21.25	21.75
		1	25	21.87	22.95	21.94
		1	49	22.52	21.92	22.01
		25	0	21.84	21.84	22.23
		25	13	22.77	21.84	21.14
		25	25	22.24	21.30	**22.98**
		50	0	21.91	22.80	21.10

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	22.20	21.14	22.18
		1	38	21.97	21.09	22.74
		1	74	21.01	21.00	22.25
		36	0	22.22	21.21	21.55
		36	18	22.04	21.72	22.89
		36	39	21.70	21.79	21.97
		75	0	22.57	21.11	22.63
	16QAM	1	0	22.71	21.70	22.11
		1	38	22.08	22.29	22.47
		1	74	21.86	**22.99**	22.15
		36	0	21.74	22.31	21.74
		36	18	22.58	22.80	22.97
		36	39	21.77	21.04	22.27
		75	0	22.00	21.10	21.19
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	22.23	22.60	21.46
		1	50	22.62	22.07	21.43
		1	99	22.28	21.29	21.31
		50	0	22.43	21.65	22.53
		50	25	22.45	22.15	21.60
		50	50	21.66	21.30	22.63
		100	0	21.93	22.35	21.02
	16QAM	1	0	21.15	21.28	21.49
		1	50	**22.99**	22.09	22.70
		1	99	22.55	21.46	22.61
		50	0	21.46	22.79	22.62
		50	25	22.89	22.94	22.80
		50	50	21.23	22.65	21.74
		100	0	22.32	22.87	21.03

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	22.76	21.54	22.90
		1	2	21.95	22.15	21.67
		1	5	22.55	21.07	22.34
		3	0	22.87	22.85	21.07
		3	1	21.30	21.69	22.05
		3	2	22.35	21.01	22.89
		6	0	22.30	22.59	**22.97**
	16QAM	1	0	22.95	22.09	21.84
		1	2	21.93	21.36	22.73
		1	5	22.25	22.00	21.98
		3	0	22.01	22.15	22.07
		3	1	22.18	22.77	22.65
		3	2	21.41	22.35	22.56
		6	0	22.60	21.80	21.56
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	22.83	21.76	21.97
		1	8	21.71	21.27	22.15
		1	14	22.62	22.47	22.25
		8	0	21.37	22.29	21.27
		8	4	22.21	21.78	21.19
		8	7	21.94	22.75	22.66
		15	0	21.36	22.36	21.11
	16QAM	1	0	21.67	22.54	21.27
		1	8	22.51	21.00	21.69
		1	14	21.26	22.33	21.24
		8	0	21.40	**22.97**	22.40
		8	4	22.10	22.11	22.41
		8	7	21.99	21.68	21.60
		15	0	22.76	22.11	22.25

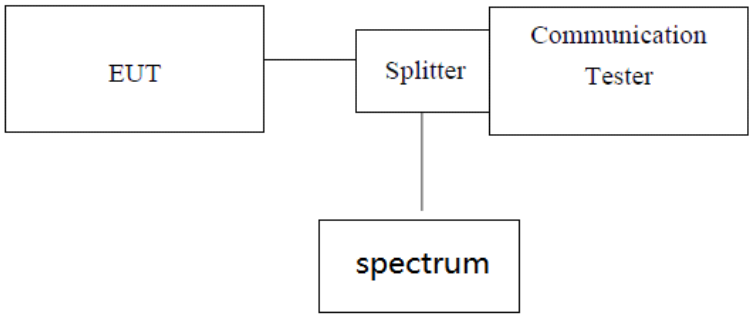
Bandwidth	Mode	RB Size	RB Offset	Actual output power(dBm)		
				Channel 19975 1712.5MHz	Channel 20175 1732.5MHz	Channel 20375 1752.5MHz
5MHz	QPSK	1	0	22.07	22.21	22.47
		1	13	21.83	22.43	22.12
		1	24	21.64	22.37	21.21
		12	0	22.80	22.97	21.21
		12	6	21.43	22.23	22.02
		12	13	22.23	21.03	21.96
		25	0	22.58	21.89	22.22
	16QAM	1	0	21.01	21.24	21.63
		1	13	22.68	22.66	21.21
		1	24	21.04	22.27	21.43
		12	0	22.78	22.19	21.97
		12	6	22.63	21.16	22.92
		12	13	**22.99**	21.11	22.90
		25	0	22.11	22.20	22.36
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	21.69	21.63	22.27
		1	25	22.40	22.44	21.65
		1	49	22.36	22.03	21.26
		25	0	21.75	21.43	21.58
		25	13	21.52	21.19	22.05
		25	25	22.46	22.41	21.96
		50	0	21.87	21.81	22.42
	16QAM	1	0	22.19	21.29	21.59
		1	25	21.94	21.92	**22.91**
		1	49	21.43	21.29	22.60
		25	0	21.32	21.66	22.09
		25	13	21.77	22.34	22.01
		25	25	21.15	21.48	22.67
		50	0	21.28	22.27	21.24

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	22.24	21.70	21.47
		1	38	21.15	21.56	22.53
		1	74	21.38	21.61	22.42
		36	0	21.79	21.18	21.22
		36	18	21.04	22.45	22.83
		36	39	21.66	22.10	22.79
		75	0	21.63	22.52	21.24
	16QAM	1	0	21.41	21.08	22.20
		1	38	21.97	22.31	21.58
		1	74	21.13	22.14	22.47
		36	0	22.10	**22.90**	21.43
		36	18	22.76	21.13	22.13
		36	39	22.33	21.21	21.60
		75	0	21.50	21.92	22.59
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	21.09	21.86	22.32
		1	50	22.03	22.56	21.42
		1	99	21.13	22.21	21.22
		50	0	21.72	21.20	22.92
		50	25	21.69	21.97	22.17
		50	50	21.17	22.00	21.39
		100	0	21.66	21.60	21.10
	16QAM	1	0	22.40	22.15	22.42
		1	50	21.74	21.31	22.36
		1	99	22.07	22.45	21.58
		50	0	22.65	22.64	22.76
		50	25	22.22	21.31	22.73
		50	50	22.79	**22.99**	22.23
		100	0	22.77	21.88	22.68

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	21.21	21.37	22.75
		1	2	22.85	21.46	21.55
		1	5	21.36	22.52	22.85
		3	0	22.25	22.37	22.93
		3	1	22.60	22.72	22.91
		3	2	22.81	22.55	21.66
		6	0	22.90	22.95	21.90
	16QAM	1	0	21.59	21.19	21.91
		1	2	22.61	21.12	22.67
		1	5	21.87	21.13	21.90
		3	0	21.95	22.70	21.54
		3	1	21.39	22.51	22.07
		3	2	**22.99**	22.98	21.61
		6	0	22.11	21.49	21.80
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	**22.92**	21.59	21.76
		1	8	21.21	22.74	22.08
		1	14	21.71	22.32	21.86
		8	0	22.56	22.75	22.27
		8	4	21.28	22.68	21.29
		8	7	21.36	22.26	21.32
		15	0	22.62	22.53	21.91
	16QAM	1	0	21.82	21.47	21.48
		1	8	22.11	22.70	22.76
		1	15	22.50	21.46	22.59
		8	0	22.49	21.85	21.40
		8	4	21.90	21.05	21.45
		8	7	22.69	21.88	22.64
		15	0	22.42	22.73	22.16

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	21.73	21.66	21.07
		1	13	21.27	21.24	21.05
		1	24	21.19	22.50	22.61
		12	0	21.16	21.47	21.73
		12	6	22.15	21.54	21.02
		12	13	22.21	**22.96**	22.52
		25	0	22.09	21.71	21.11
	16QAM	1	0	21.69	22.78	22.16
		1	13	21.27	21.95	22.50
		1	24	21.04	21.01	22.20
		12	0	22.25	22.66	22.20
		12	6	21.75	21.02	21.45
		12	13	22.20	22.17	21.44
		25	0	22.35	21.12	21.92
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	**22.87**	22.20	21.83
		1	25	21.40	21.18	22.20
		1	49	22.61	21.03	22.27
		25	0	21.66	21.49	21.09
		25	13	22.21	22.12	22.13
		25	25	21.56	22.48	22.13
		50	0	22.73	21.25	22.49
	16QAM	1	0	22.42	21.30	22.77
		1	25	22.84	21.01	21.67
		1	49	22.10	22.73	22.56
		25	0	22.06	22.02	22.23
		25	13	21.10	21.80	22.71
		25	25	21.50	21.35	22.08
		50	0	21.53	21.21	22.85

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

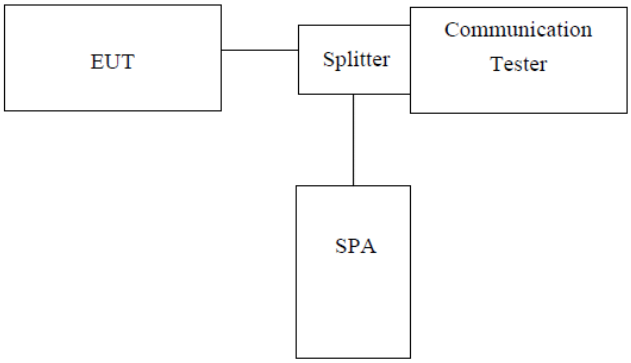
Measurement data:
QPSK mode:

Test Band	Bandwidth	Peak to Average Ratio（dB）			Limit（dB）	Result
		Low Ch.	Middle Ch.	High Ch.		
LTE Band 2	1.4MHz	2.25	2.59	2.55	13	PASS
	3MHz	2.77	2.75	2.98	13	PASS
	5MHz	4.32	4.80	4.17	13	PASS
	10MHz	5.73	5.96	5.43	13	PASS
	15MHz	6.19	6.94	6.01	13	PASS
	20MHz	6.50	6.93	6.14	13	PASS
LTE Band 4	1.4MHz	2.65	2.26	2.64	13	PASS
	3MHz	2.85	2.37	2.79	13	PASS
	5MHz	4.01	4.55	4.77	13	PASS
	10MHz	5.65	5.80	5.38	13	PASS
	15MHz	6.46	6.21	6.01	13	PASS
	20MHz	6.14	6.21	6.57	13	PASS
LTE Band 12	1.4MHz	3.08	3.47	3.40	13	PASS
	3MHz	4.72	4.68	4.95	13	PASS
	5MHz	4.72	4.40	4.39	13	PASS
	10MHz	5.70	5.59	5.68	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	2.17	2.59	2.09	13	PASS
	3MHz	3.04	3.16	3.03	13	PASS
	5MHz	4.64	4.78	4.81	13	PASS
	10MHz	5.70	5.60	5.17	13	PASS
	15MHz	6.37	6.63	6.48	13	PASS
	20MHz	6.67	6.84	6.63	13	PASS
LTE Band 4	1.4MHz	3.56	3.96	3.42	13	PASS
	3MHz	3.52	3.14	3.42	13	PASS
	5MHz	4.51	4.47	4.48	13	PASS
	10MHz	5.43	5.61	5.34	13	PASS
	15MHz	6.08	6.73	6.40	13	PASS
	20MHz	6.47	6.14	6.02	13	PASS
LTE Band 12	1.4MHz	3.80	3.38	3.48	13	PASS
	3MHz	4.71	4.90	4.35	13	PASS
	5MHz	4.99	4.36	4.56	13	PASS
	10MHz	5.88	5.85	5.86	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	1102.6	1323
		Mid range	6	0	1094.8	1267
		High range	6	0	1097.8	1302
	3MHz	Low range	15	0	2685.9	2964
		Mid range	15	0	2683.4	2952
		High range	15	0	2685.0	2952
	5MHz	Low range	25	0	4487.3	4889
		Mid range	25	0	4511.5	4967
		High range	25	0	4498.3	4974
	10MHz	Low range	50	0	8970.4	9736
		Mid range	50	0	8934.0	9732
		High range	50	0	8919.3	9391
	15MHz	Low range	75	0	13430.7	14540
		Mid range	75	0	13395.1	14375
		High range	75	0	13361.7	14348
	20MHz	Low range	100	0	17867.2	19328
		Mid range	100	0	17810.9	18936
		High range	100	0	17793.6	19115

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	1095.8	1289
		Mid range	6	0	1099.3	1335
		High range	6	0	1106.8	1309
	3MHz	Low range	15	0	2683.5	2940
		Mid range	15	0	2686.6	2956
		High range	15	0	2691.8	2962
	5MHz	Low range	25	0	4517.3	4959
		Mid range	25	0	4510.1	4996
		High range	25	0	4514.7	4979
	10MHz	Low range	50	0	8935.0	9744
		Mid range	50	0	8899.9	9627
		High range	50	0	8921.6	9473
	15MHz	Low range	75	0	13415.5	14506
		Mid range	75	0	13312.9	14280
		High range	75	0	13429.0	14356
	20MHz	Low range	100	0	17810.1	18781
		Mid range	100	0	17710.4	18797
		High range	100	0	17879.8	19040

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	1097.3	1276
		Mid range	6	0	1096.5	1283
		High range	6	0	1096.8	1287
	3MHz	Low range	15	0	2688.3	2933
		Mid range	15	0	2683.8	2926
		High range	15	0	2681.7	2915
	5MHz	Low range	25	0	4532.7	4991
		Mid range	25	0	4519.8	4991
		High range	25	0	4511.4	4971
	10MHz	Low range	50	0	8976.7	9727
		Mid range	50	0	8951.1	9547
		High range	50	0	8876.6	9513

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	1101.6	1315
		Mid range	6	0	1097.8	1308
		High range	6	0	1103.4	1333
	3MHz	Low range	15	0	2682.4	2967
		Mid range	15	0	2686.7	2947
		High range	15	0	2684.9	2933
	5MHz	Low range	25	0	4515.8	5005
		Mid range	25	0	4497.6	4961
		High range	25	0	4499.0	5007
	10MHz	Low range	50	0	8944.0	9585
		Mid range	50	0	8929.3	9768
		High range	50	0	8908.8	9619
	15MHz	Low range	75	0	13380.1	14474
		Mid range	75	0	13380.8	14584
		High range	75	0	13342.2	14522
	20MHz	Low range	100	0	17839.2	19136
		Mid range	100	0	17804.2	18910
		High range	100	0	17850.6	19250

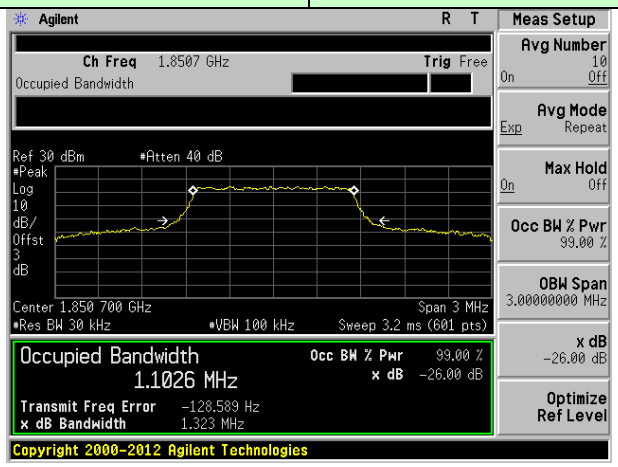
EUT Mode	Channel Bandwidth	Channel	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 4	1.4MHz	Low range	6	0	1102.3	1281
		Mid range	6	0	1098.5	1301
		High range	6	0	1096.7	1296
	3MHz	Low range	15	0	2684.8	2927
		Mid range	15	0	2687.3	2958
		High range	15	0	2684.9	2949
	5MHz	Low range	25	0	4521.2	4975
		Mid range	25	0	4517.0	5020
		High range	25	0	4472.6	4816
	10MHz	Low range	50	0	8942.2	9552
		Mid range	50	0	8907.3	9547
		High range	50	0	8946.2	9634
	15MHz	Low range	75	0	13382.2	14327
		Mid range	75	0	13343.0	14293
		High range	75	0	13415.7	14530
	20MHz	Low range	100	0	17804.8	18786
		Mid range	100	0	17695.5	18734
		High range	100	0	17878.2	19144

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	1098.2	1291
		Mid range	6	0	1095.0	1295
		High range	6	0	1090.5	1274
	3MHz	Low range	15	0	2686.6	2922
		Mid range	15	0	2678.6	2916
		High range	15	0	2684.2	2938
	5MHz	Low range	25	0	4531.2	4964
		Mid range	25	0	4515.3	4955
		High range	25	0	4505.4	5002
	10MHz	Low range	50	0	8970.9	9688
		Mid range	50	0	8940.7	9703
		High range	50	0	8881.7	9517

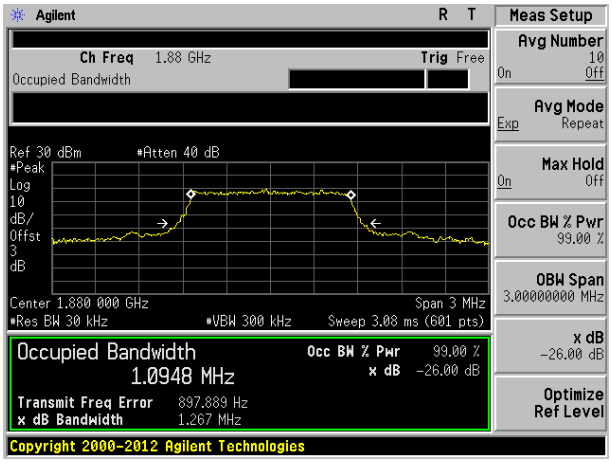
Test plot as follows:

QPSK mode:

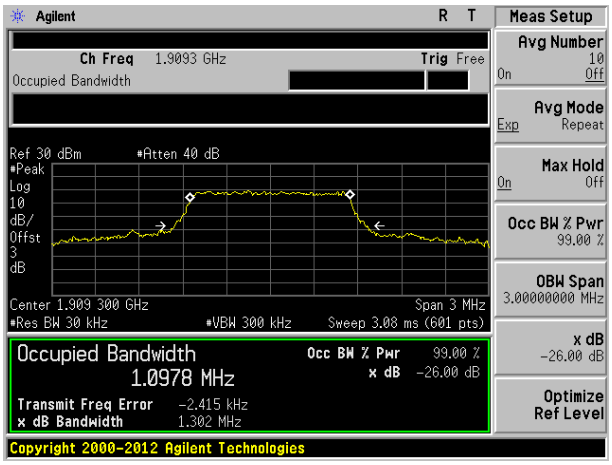
Test band: LTE Band 2	Channel Bandwidth: 1.4MHz



Lowest channel

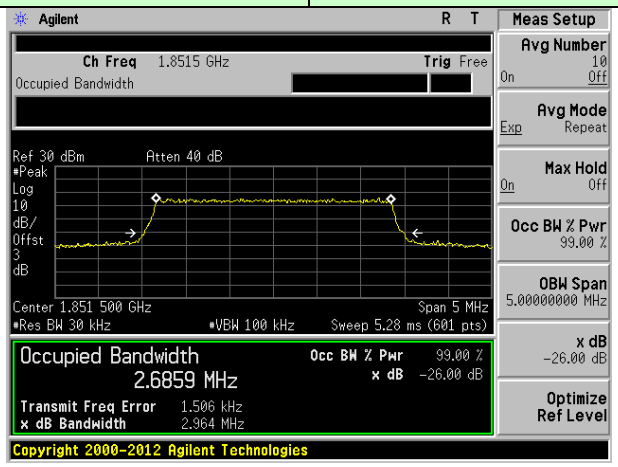


Middle channel

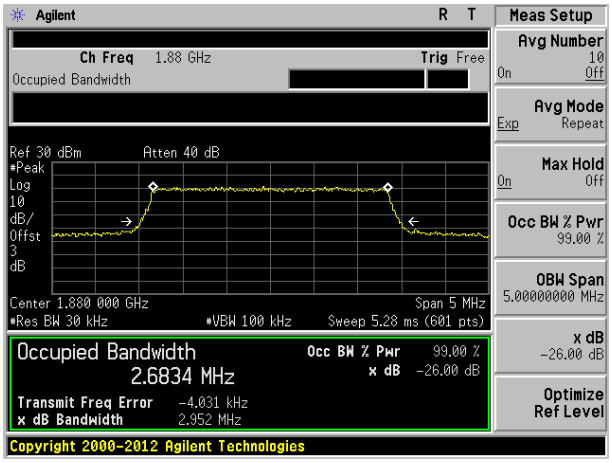


Highest channel

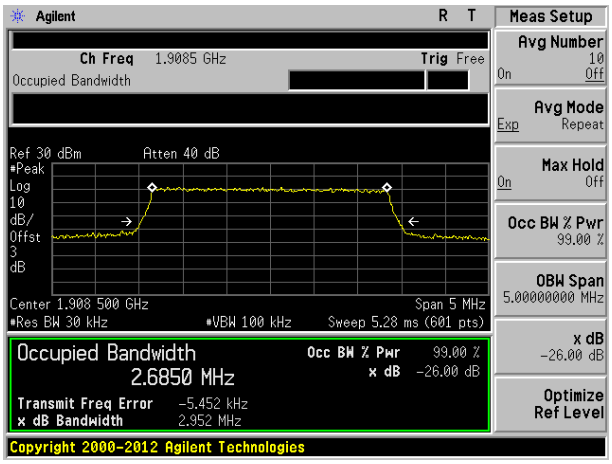
Test band: LTE Band 2	Channel Bandwidth:3MHz



Lowest channel

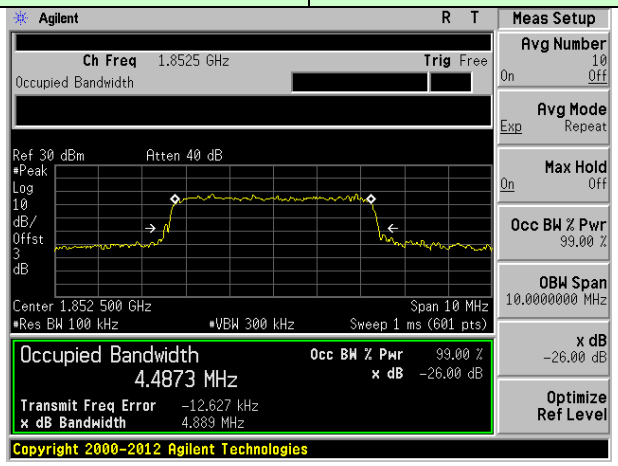


Middle channel

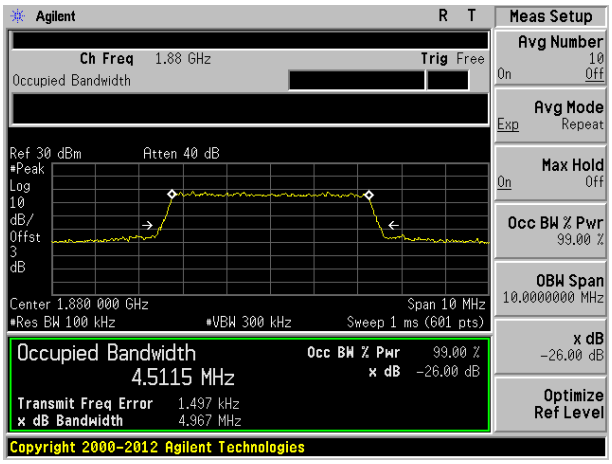


Highest channel

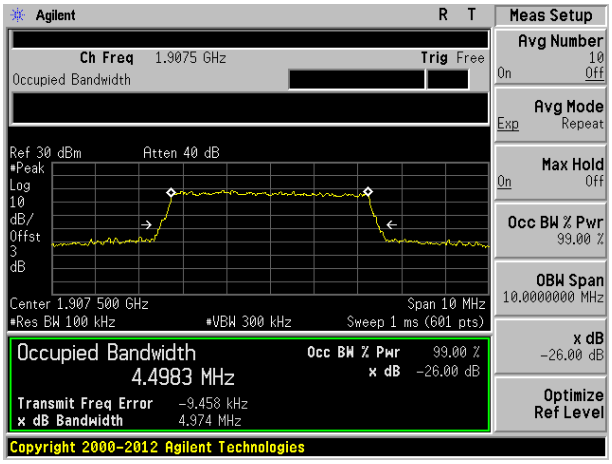
Test band: LTE Band 2	Channel Bandwidth: 5MHz



Lowest channel

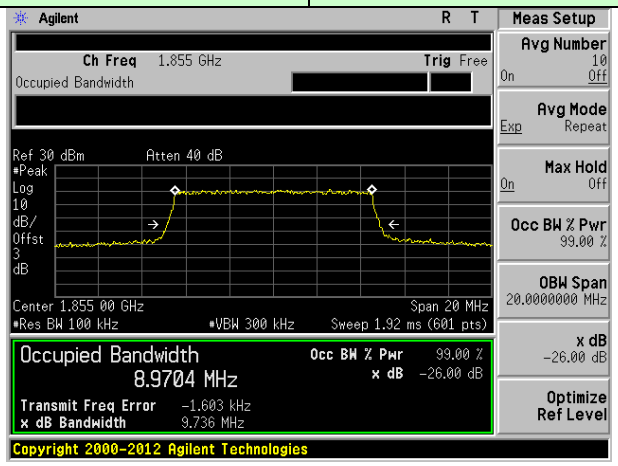


Middle channel

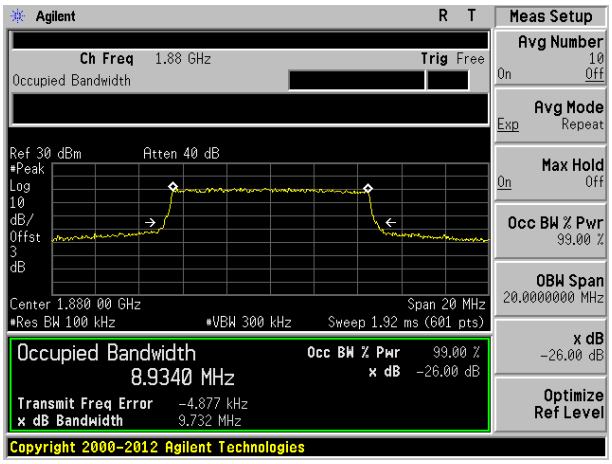


Highest channel

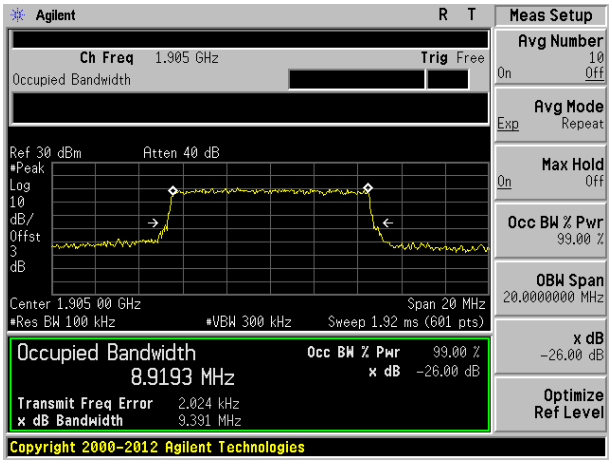
Test band: LTE Band 2	Channel Bandwidth:10MHz



Lowest channel

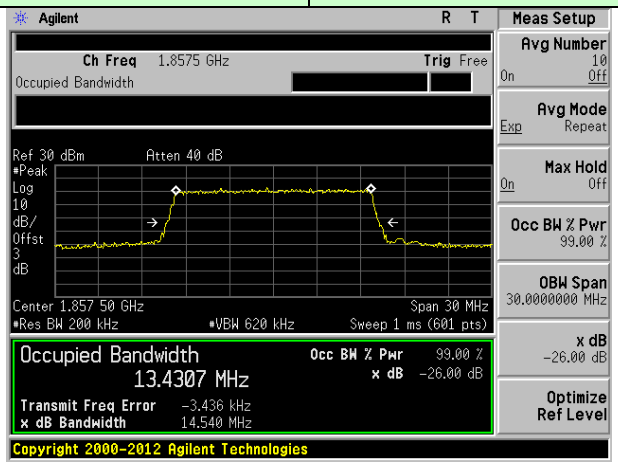


Middle channel

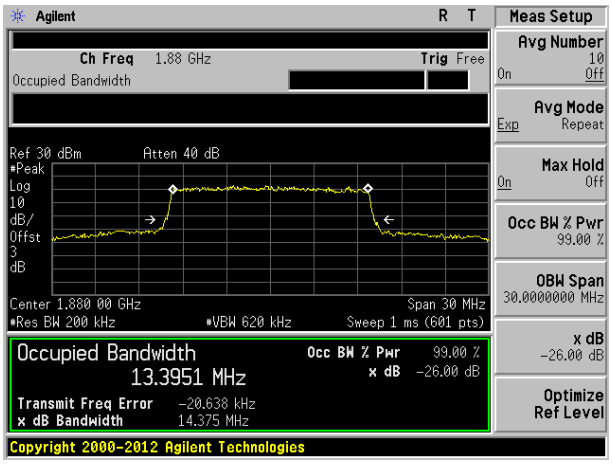


Highest channel

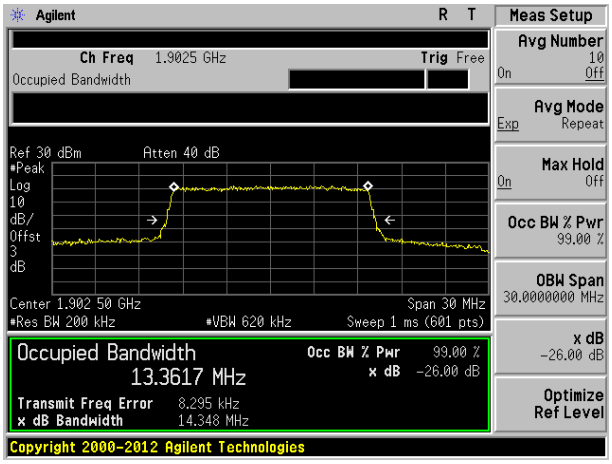
Test band: LTE Band 2	Channel Bandwidth:15MHz



Lowest channel

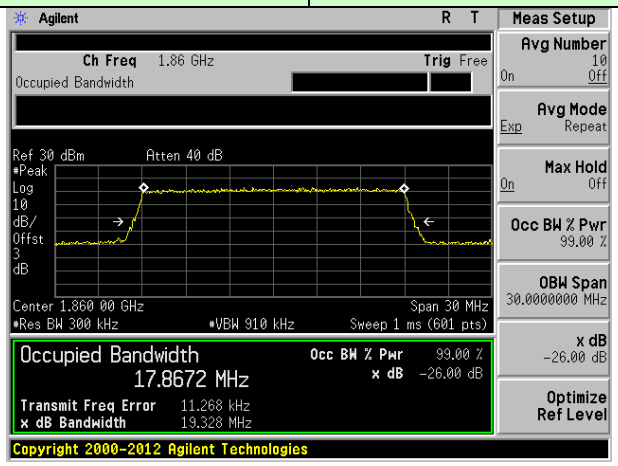


Middle channel

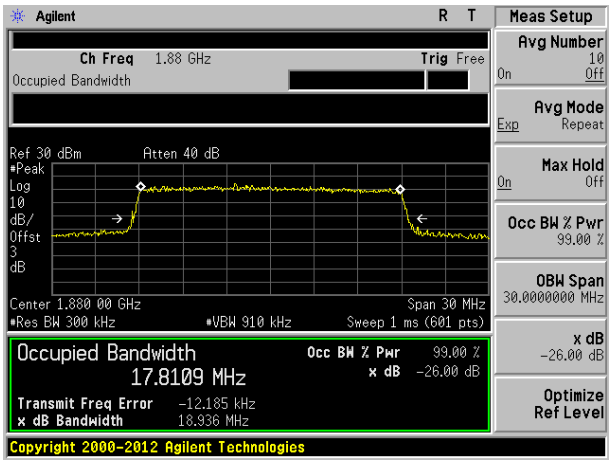


Highest channel

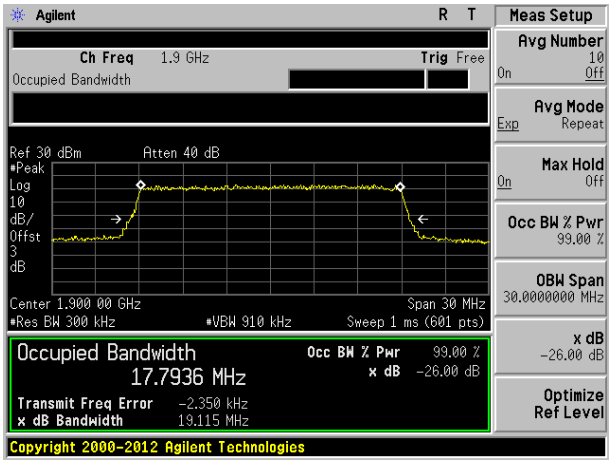
Test band: LTE Band 2	Channel Bandwidth:20MHz



Lowest channel

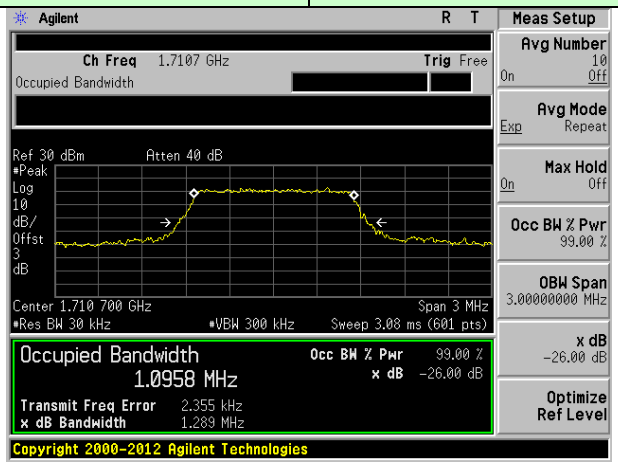


Middle channel

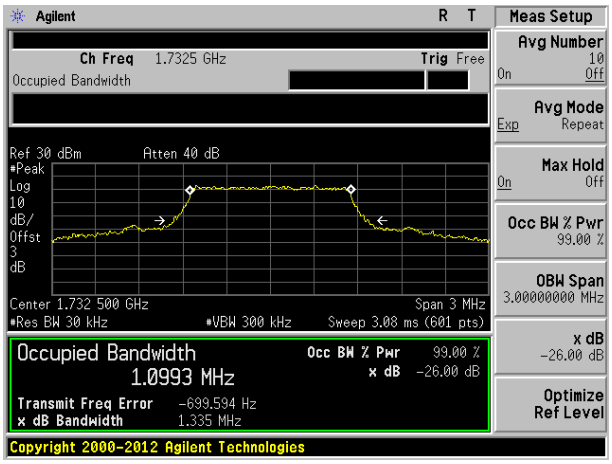


Highest channel

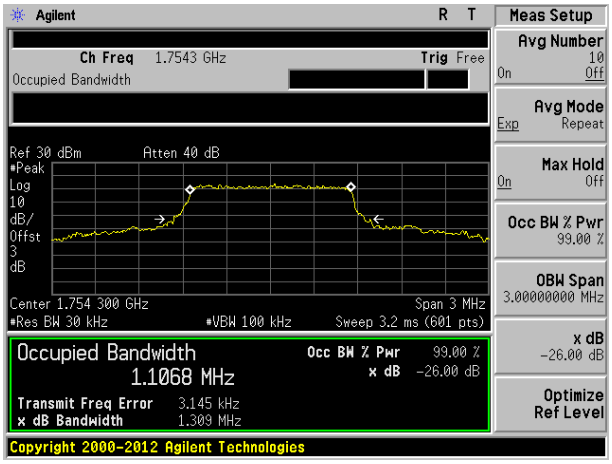
Test band: LTE Band 4	Channel Bandwidth: 1.4MHz



Lowest channel

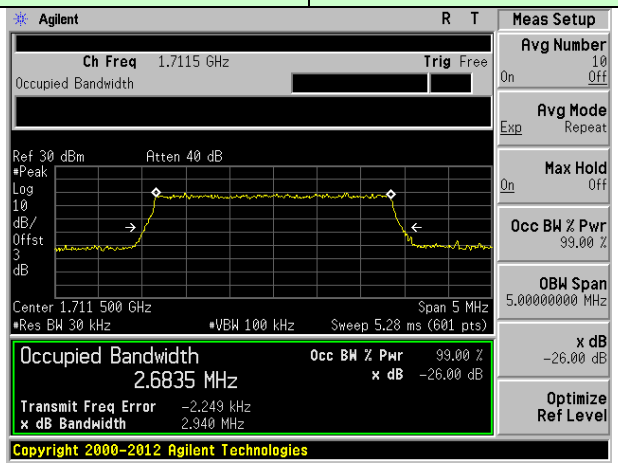


Middle channel

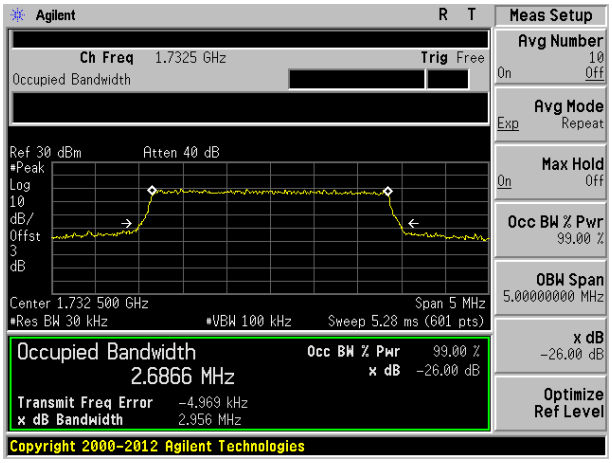


Highest channel

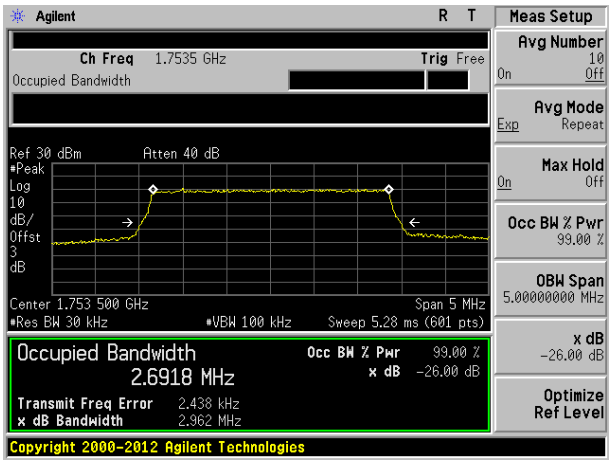
Test band: LTE Band 4	Channel Bandwidth: 3MHz



Lowest channel

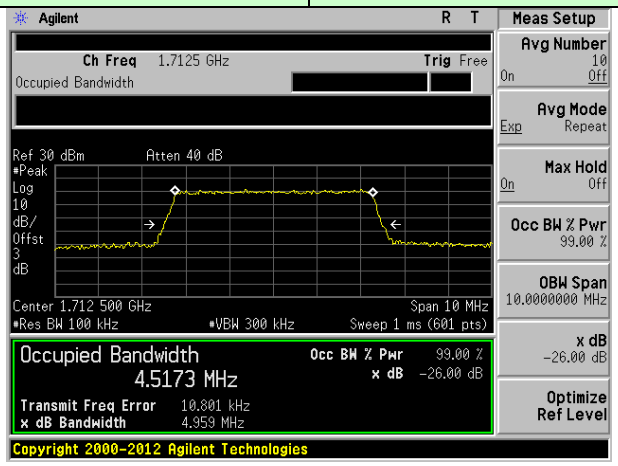


Middle channel

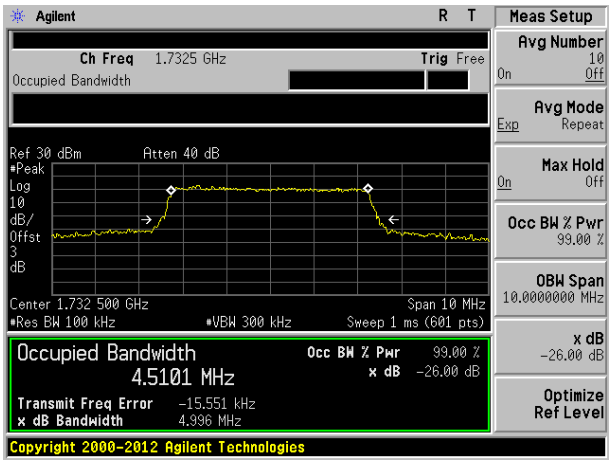


Highest channel

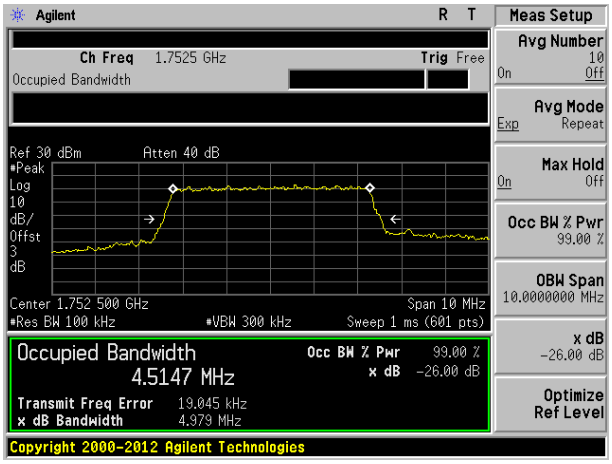
Test band: LTE Band 4	Channel Bandwidth: 5MHz



Lowest channel

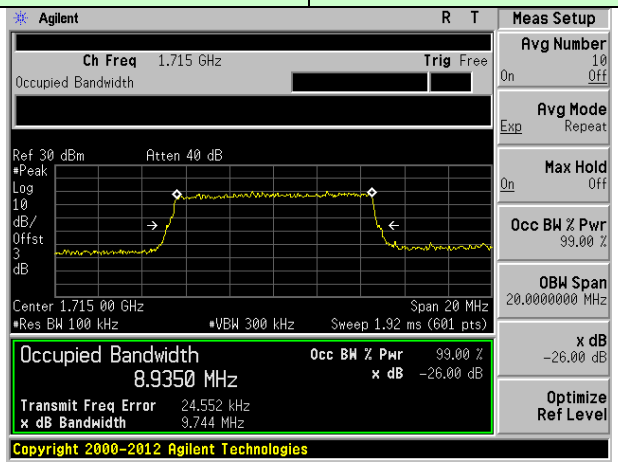


Middle channel

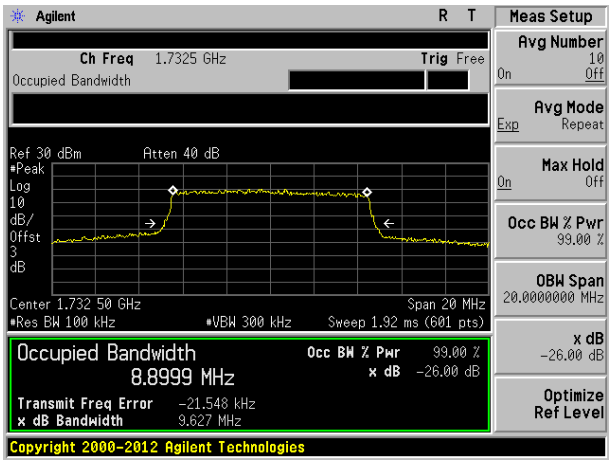


Highest channel

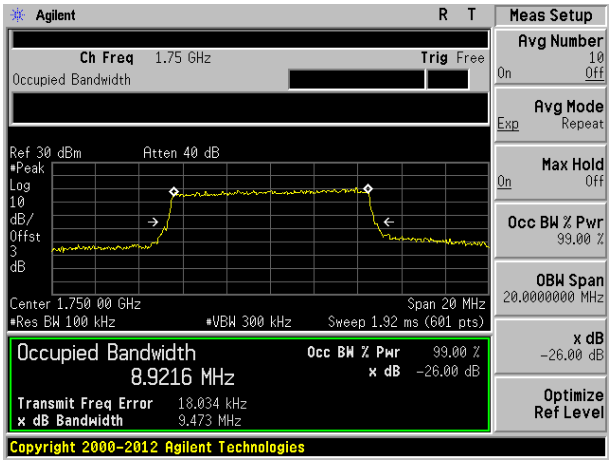
Test band: LTE Band 4	Channel Bandwidth: 10MHz



Lowest channel

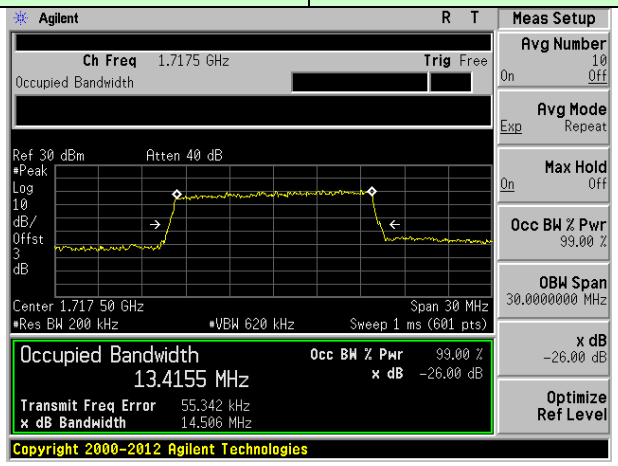


Middle channel

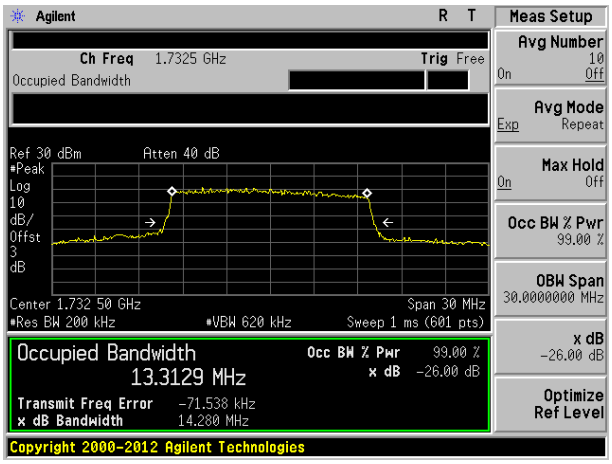


Highest channel

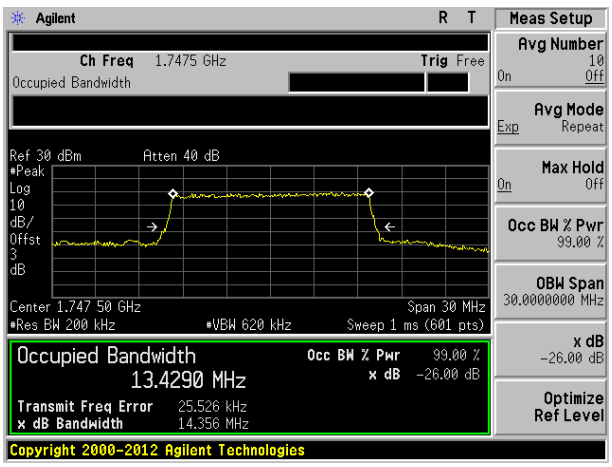
Test band: LTE Band 4	Channel Bandwidth: 15MHz



Lowest channel

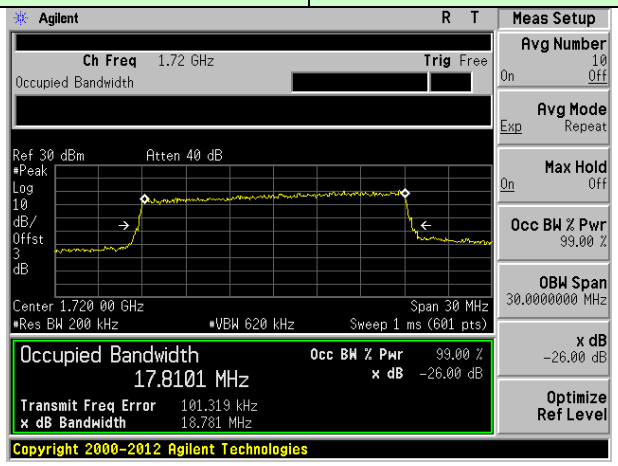


Middle channel

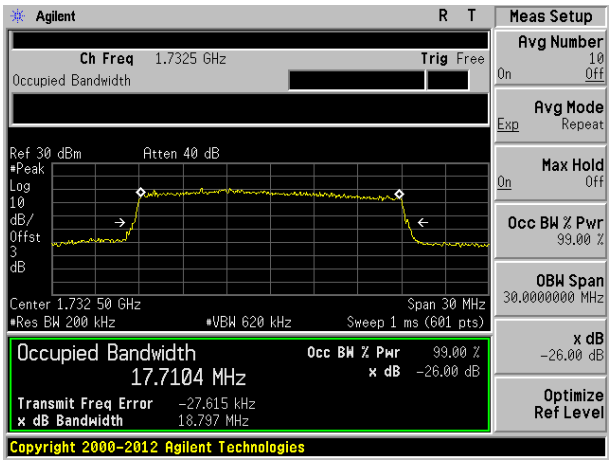


Highest channel

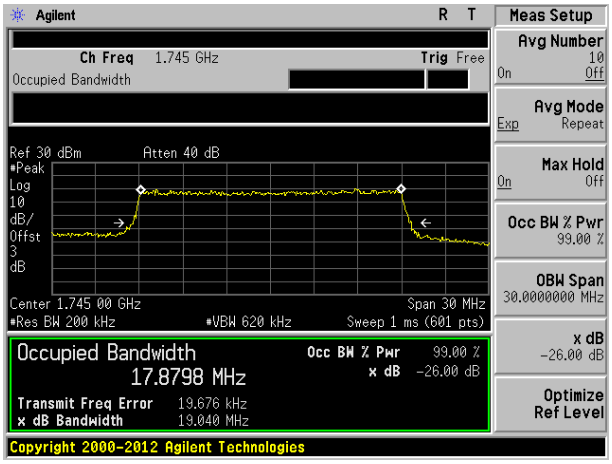
Test band: LTE Band 4	Channel Bandwidth: 20MHz



Lowest channel

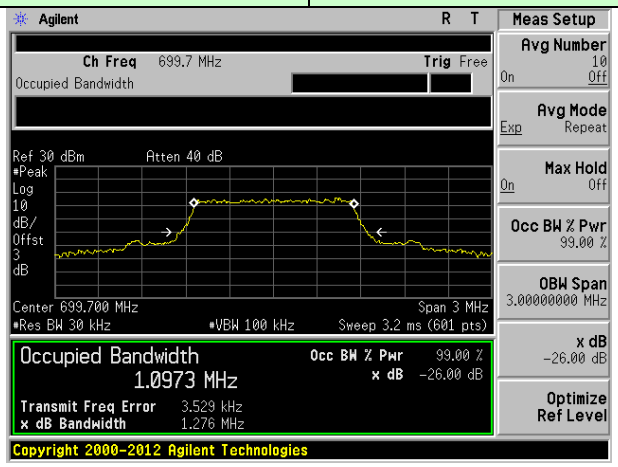


Middle channel

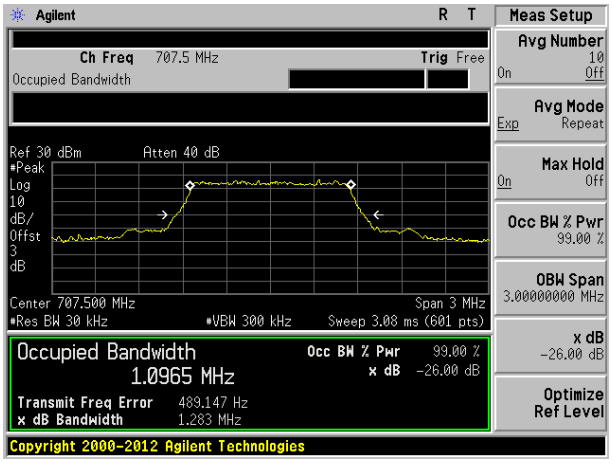


Highest channel

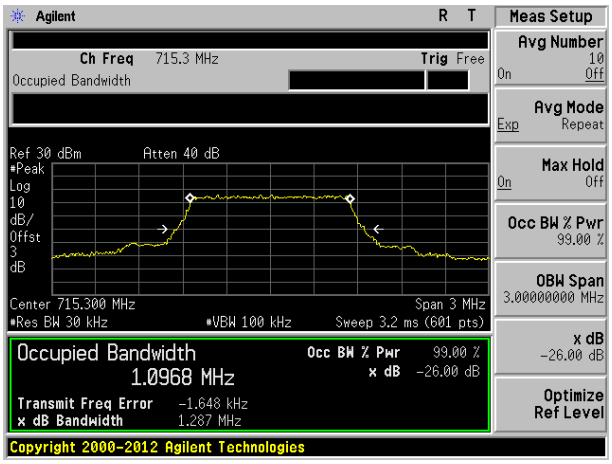
Test band: LTE Band 12	Channel Bandwidth: 1.4MHz



Lowest channel



Middle channel



Highest channel