FCC & IC TEST REPORT

FCC ID: SY4-A02029

On Behalf of

Shanghai Huace Navigation Technology LTD.

Geodetic GNSS Receiver

Model No.: P5

Prepared for	:	Shanghai Huace Navigation Technology LTD.
Address	:	599 Gaojing Road, Building D, Shanghai 201702, China

Prepared By	:	Shenzhen Alpha Product Testing Co., Ltd.
Address	:	Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

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TEST REPORT DECLARATION

Applicant	:	Shanghai Huace Navigation Technology LTD.
Address	:	599 Gaojing Road, Building D, Shanghai 201702, China
Manufacturer	:	Shanghai Huace Navigation Technology LTD.
Address	:	599 Gaojing Road, Building D, Shanghai 201702, China
EUT Description	:	Geodetic GNSS Receiver
		(A) Model No. : P5
		(B) Trademark : CHCNAV

Measurement Standard Used:

FCC CFR Title 47 Part 2
FCC CFR Title 47 Part22 Subpart H
FCC CFR Title 47 Part24 Subpart E
FCC CFR Title 47 Part27
ANSI C63.26:2015

RSS-132 issue 3 January 2013
RSS-133 issue 6 January 2018
RSS-139 Issue 3, July 2015
RSS-199 issue 3 December 2016
RSS-Gen Issue5, April 2018
TIA/EIA-603-E:2016

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....:	Reak Yang Project Engineer	
Approved by (name + signature)…....:	Simple Guan Project Manager	
Date of issue…… ……..:	March 15, 2021	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	March 15, 2021	Initial released Issue	Reak Yang

1 Test Summary

Test Item	Section in CFR 47	Result
RF Exposure (SAR)	Part 2.1310 Part 2.1091 RSS-102 Issue 5	Pass* (Please refer to SAR Report)
RF Output Power	Part 2.1046 part22.913(a) Part 24.232 (c) Part 27.50 (d)(4) Part 27.50 (h)(2) RSS-132 (5.4) RSS-133 (6.4) RSS-139(6.5) RSS-199(4.4)	Pass
Peak-To-Average Ratio	Part 2.1046 Part 27.50 (a) ANSI/TIA-603-E	Pass
Modulation Characteristics	Part 2.1047 ANSI/TIA-603-E RSS-132 (5.2) RSS-133 (6.2) RSS-139(6.2) RSS-199(4.1)	Pass
99% & -26 dB Occupied Bandwidth	Part 2.1049 part22.913(a) Part 24.238 Part 27.53(a)(m) RSS-132 (3.1) RSS-133 (3.1) RSS-139(3.1) RSS-199(4.2)	Pass
Spurious Emissions at Antenna Terminal	Part 2.1051 part22.913(a) Part 24.238 (a) Part 27.53 (h)(m) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(6.6) RSS-199(4.5)	Pass

Field Strength of Spurious Radiation	Part 2.1053 part22.913(a) Part 24.238 (a) Part 27.53 (h)(m) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(6.6) RSS-199(4.5)	Pass
Out of band emission, Band Edge	part22.913(a) Part 24.238 (a) Part 27.53(h)(m) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(6.6) RSS-1994.5()	Pass
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) RSS-132 (5.3) RSS-133 (6.3) RSS-139(6.4) RSS-199(4.3)	Pass
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) RSS-132 (5.3) RSS-133 (6.3) RSS-139(6.4) RSS-199(4.3)	Pass

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

2 General Information

2.1 General Description of EUT

Description/PMN:	:	Geodetic GNSS Receiver
Model Number /HVIN(s)	:	P5
DIFF.	:	N/A
Trademark	:	CHCNAV
Support Networks	:	LTE
Support Bands	:	LTE Band 2, LTE Band 4, LTE Band 5, LTE Band 7
Channel Bandwidth	:	LTE Band 2: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz
TX Frequency:	:	LTE Band 2: 1852.5 MHz ~ 1907.5 MHz LTE Band 4: 1712.5 MHz ~ 1752.5 MHz LTE Band 5: 826.5 MHz ~ 846.5 MHz LTE Band 7: 2502.5MHz-2567.5MHz
Modulation type:	:	QPSK, 16QAM
Antenna type	:	External antenna
Antenna gain	:	0.5dBi(max.) For LTE
Power supply	:	DC 7.4V from battery or 12-36VDC, DC 12V From adapter
Software version	:	V1.2.21
Hardware version/FVIN	:	V2.0

Remark 1: The worst-case simultaneous transmission configuration was evaluated with no non-compliance found. Results in this report are only for 4G function, and there is no other transmitter involved.

2.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is filing to comply with Section Part 22 subpart H, Part 24 subpart E, Part 27 of the FCC CFR 47 Rules and RSS-132, RSS-133, RSS-139 and RSS-199 Rules.

2.3 Test Facility

Shenzhen Alpha Product Testing Co., Ltd
Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission
Registration Number: 293961
Designation Number: CN1236

July 15, 2019 Certificated by IC
Registration Number: 12135A

2.4 Measurement Uncertainty

Item	Uncertainty
Uncertainty for Power point Conducted Emissions Test	2.74dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	2.13 dB(Polarize: V)
	2.57dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.77dB(Polarize: V)
	3.80dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	4.16dB(Polarize: H)
	4.13dB(Polarize: V)
Uncertainty for radio frequency	5.4×10-8
Uncertainty for conducted RF Power	0.37dB
Uncertainty for temperature	0.2℃
Uncertainty for humidity	1%
Uncertainty for DC and low frequency voltages	0.06%

3 Test Instruments list

Equipment	Manufacture	Model No.	Serial No.	Last cal.	Cal Interval
9*6*6 anechoic chamber	CHENYU	9*6*6	N/A	2020.09.02	3Year
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	102137	2020.09.02	1Year
Spectrum analyzer	Agilent	N9020A	MY499100060	2020.09.02	1Year
Receiver	ROHDE&SCHWARZ	ESR	1316.3003K03-102082-Wa	2020.09.02	1Year
Receiver	R&S	ESCI	101165	2020.09.02	1Year
Bilog Antenna	Schwarzbeck	VULB 9168	VULB9168-438	2020.04.12	2Year
Horn Antenna	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D(1201)	2020.04.12	2Year
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00059	2019.09.07	2Year
Cable	Resenberger	N/A	No.1	2020.09.02	1Year
Cable	Resenberger	N/A	No.2	2020.09.02	1Year
Cable	Resenberger	N/A	No.3	2020.09.02	1Year
Pre-amplifier	HP	HP8347A	2834A00455	2020.09.02	1Year
Pre-amplifier	Agilent	8449B	3008A02664	2020.09.02	1Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2020.09.02	1Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2020.09.02	1 Year
20db Attenuator	ICPROBING	IATS1	82347	2020.09.02	1 Year
Horn Antenna	SCHWARZBECK	BBHA9170	00946	2019.09.07	2 Year
Preamplifier	SKET	LNPA_1840-50	SK2018101801	2020.09.02	1 Year
Power Meter	Agilent	E9300A	MY41496625	2020.09.02	1 Year
Power Sensor	DARE	RPR3006W	15100041SNO91	2020.09.02	1 Year
Temp. & Humid. Chamber	Weihuang	WHTH-1000-40-880	100631	2020.09.02	1 Year
Switching Mode Power Supply	JUNKE	JK12010S	20140927-6	2020.09.02	1 Year
Antenna	SCHWARZBECK	STLP9128E-special	STLP9128E s#139	N/A	NCR

4 System test configuration

4.1 Test mode

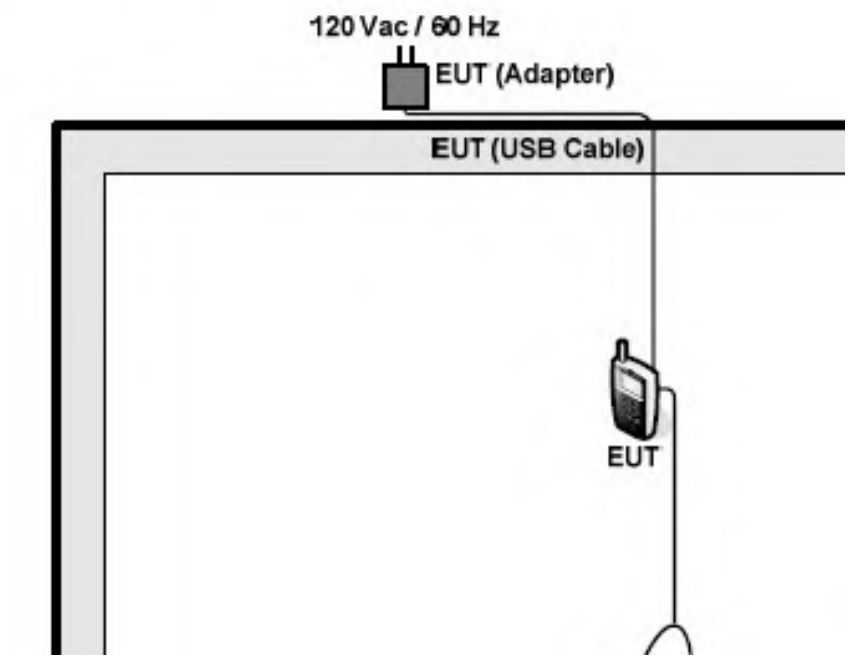
During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range, and EUT is rotated on three test planes to find out the worst emission.

Test modes		
Band	Radiated	Conducted
LTE Band 2	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 4	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 5	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link
LTE Band 7	■ QPSK link, 16QAM link	■ QPSK link, 16QAM link

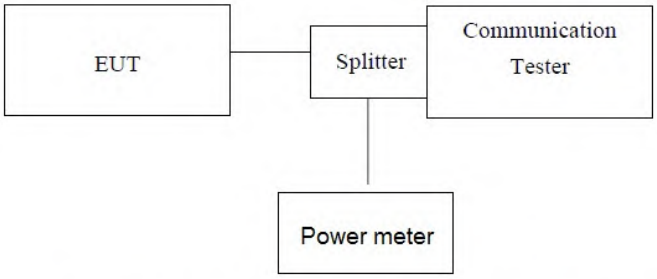
Note: Antenna port conducted and radiated test items were performed according to KDB 971168 D01 Power Meas License Digital Systems v03r1 with maximum output power.

Radiated measurements were performed with rotating EUT in different three orthogonal test planes to find the maximum emission.

4.2 Configuration of Tested System



4.3 Conducted Output Power

Test Requirement:	FCC part22.913(a), FCC part24.232(b), FCC part 27.50 and RSS-132 (5.4), RSS-133 (6.4), RSS-139(6.5) and RSS-199(4.4)
Test Method:	KDB 971168 D01 v03r1 clause 5.1, FCC part2.1046, ANSI/TIA-603-E, ANSI C63.26 clause 5.2.3
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 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

LTE Band2

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
5	1852.5	1	0	**24.13**	**23.79**
		1	12	22.78	22.30
		1	24	22.33	22.74
		12	0	22.51	22.06
		12	6	22.70	21.71
		12	13	22.34	21.46
		25	0	22.07	21.11
	1880.0	1	0	23.13	22.06
		1	12	22.72	21.96
		1	24	22.04	21.33
		12	0	21.18	20.34
		12	6	20.50	21.59
		12	13	20.97	20.24
		25	0	21.01	21.33
	1907.5	1	0	22.17	22.11
		1	12	21.96	21.49
		1	24	22.05	20.79
		12	0	21.74	21.96
		12	6	21.18	21.93
		12	13	21.30	21.48
		25	0	22.69	20.56
10	1855.0	1	0	23.25	22.24
		1	24	22.65	22.32
		1	49	23.60	22.48
		25	0	21.38	22.22
		25	12	21.49	20.71
		25	25	21.35	21.97
		50	0	21.60	21.86
	1880.0	1	0	22.32	23.05
		1	24	22.56	21.95
		1	49	20.70	21.33
		25	0	21.88	20.84
		25	12	19.87	20.49
		25	25	20.60	20.98
		50	0	20.25	20.32
	1905.0	1	0	22.31	21.62
		1	24	20.67	21.20
		1	49	22.70	22.00
		25	0	22.13	20.86
		25	12	22.33	20.74
		25	25	22.33	22.04
		50	0	20.98	21.91
15	1857.5	1	0	22.21	22.79
		1	37	22.53	22.26
		1	74	22.51	22.39

		37	0	21.83	20.88
		37	18	21.16	22.16
		37	38	22.18	21.76
		75	0	21.69	21.57
	1880.0	1	0	22.75	22.48
		1	37	23.28	23.49
		1	74	22.55	21.83
		37	0	21.05	20.80
		37	18	21.70	20.80
		37	38	22.58	22.10
		75	0	21.87	21.38
	1902.5	1	0	21.37	22.09
		1	37	22.71	21.09
		1	74	22.36	22.25
		37	0	21.23	20.77
		37	18	20.58	21.41
		37	38	21.49	20.35
		75	0	20.96	21.28
20	1860.0	1	0	23.89	22.85
		1	49	22.84	22.07
		1	99	22.16	23.09
		50	0	23.04	21.22
		50	25	22.63	21.93
		50	50	21.69	20.05
		100	0	22.50	21.21
	1880.0	1	0	22.52	23.43
		1	49	23.59	22.01
		1	99	21.73	21.86
		50	0	21.07	20.57
		50	25	22.23	21.72
		50	50	20.95	21.14
		100	0	21.38	21.92
	1900.0	1	0	21.18	21.21
		1	49	22.86	21.56
		1	99	20.92	21.10
		50	0	21.47	20.69
		50	25	20.98	20.98
		50	50	20.50	19.36
		100	0	21.78	19.57

LTE Band4

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
5	1712.5	1	0	**24.33**	22.84
		1	12	23.54	22.75
		1	24	23.48	22.85
		12	0	23.81	23.73
		12	6	22.75	22.88
		12	13	23.56	**24.13**
		25	0	23.43	22.41
	1732.5	1	0	23.35	22.59
		1	12	23.01	22.32
		1	24	20.92	20.81
		12	0	20.69	20.92
		12	6	20.57	20.85
		12	13	21.44	21.49
		25	0	20.68	20.73
	1752.5	1	0	21.78	21.45
		1	12	22.39	21.67
		1	24	22.24	21.89
		12	0	21.10	20.28
		12	6	20.86	20.76
		12	13	21.41	22.06
		25	0	21.70	21.13
10	1715.0	1	0	23.34	23.35
		1	24	23.71	23.18
		1	49	23.76	23.40
		25	0	22.30	21.81
		25	12	21.77	21.83
		25	25	22.12	22.59
		50	0	22.58	22.08
	1732.5	1	0	23.82	24.01
		1	24	23.11	22.72
		1	49	20.78	21.73
		25	0	21.41	21.15
		25	12	21.77	21.78
		25	25	21.70	20.43
		50	0	22.39	20.66
	1750.0	1	0	21.52	20.68
		1	24	22.00	21.42
		1	49	22.54	21.79
		25	0	20.90	21.48
		25	12	21.43	20.66
		25	25	21.36	19.69
		50	0	21.16	20.94
15	1717.5	1	0	24.10	23.80
		1	37	23.35	23.42
		1	74	24.32	23.45

		37	0	22.30	23.09
		37	18	23.22	22.08
		37	38	22.90	21.79
		75	0	22.07	21.68
	1732.5	1	0	23.90	22.74
		1	37	23.79	22.81
		1	74	22.09	20.68
		37	0	21.02	20.75
		37	18	21.79	20.36
		37	38	21.29	21.51
		75	0	21.11	20.76
	1747.5	1	0	22.23	21.43
		1	37	22.05	20.98
		1	74	22.38	22.25
		37	0	21.00	21.26
		37	18	21.46	21.31
		37	38	21.23	20.77
		75	0	20.68	20.72
20	1720.0	1	0	24.18	22.82
		1	49	23.74	23.33
		1	99	23.51	22.54
		50	0	23.49	22.84
		50	25	22.56	22.65
		50	50	22.33	21.76
		100	0	22.66	22.33
	1732.5	1	0	23.42	23.79
		1	49	23.30	22.76
		1	99	21.65	20.45
		50	0	21.44	21.23
		50	25	20.82	20.30
		50	50	20.51	20.38
		100	0	21.06	21.00
	1745.0	1	0	20.97	21.44
		1	49	22.40	21.86
		1	99	22.03	22.53
		50	0	21.54	21.42
		50	25	20.60	20.07
		50	50	20.30	21.22
		100	0	21.99	21.26

LTE Band5

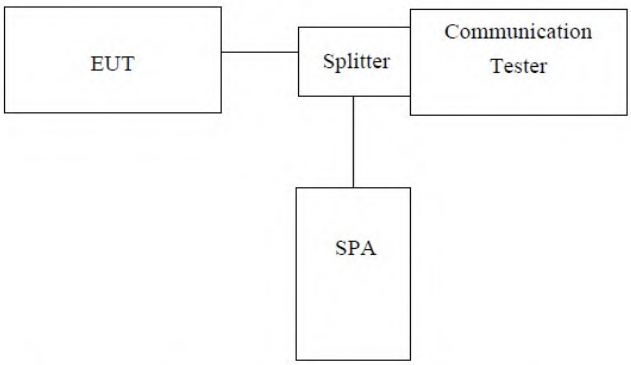
BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
5	826.5	1	0	21.52	**23.04**
		1	12	22.99	21.96
		1	24	22.62	21.50
		12	0	21.64	22.12
		12	6	22.61	21.79
		12	13	22.68	21.41
		25	0	23.77	22.19
	836.5	1	0	**23.82**	22.52
		1	12	22.48	22.64
		1	24	22.27	21.75
		12	0	21.33	21.70
		12	6	21.23	21.94
		12	13	21.99	21.38
		25	0	21.47	20.98
	846.5	1	0	20.56	20.83
		1	12	20.58	21.37
		1	24	21.73	21.59
		12	0	20.68	21.59
		12	6	22.33	21.12
		12	13	20.91	20.80
		25	0	21.85	20.78
10	829.0	1	0	21.91	22.55
		1	24	22.41	22.48
		1	49	23.70	22.26
		25	0	23.31	22.01
		25	12	23.05	22.07
		25	25	22.84	22.71
		50	0	23.00	23.02
	836.5	1	0	23.12	22.57
		1	24	22.42	21.63
		1	49	21.44	21.09
		25	0	21.79	21.79
		25	12	21.63	22.05
		25	25	22.97	21.05
		50	0	21.38	21.22
	844.0	1	0	22.82	22.72
		1	24	23.14	21.89
		1	49	21.77	21.85
		25	0	20.58	21.48
		25	12	21.66	21.67
		25	25	21.51	21.55
		50	0	22.02	21.60

LTE Band7

BW (MHz)	Frequency (MHz)	RB Configuration		Average Power [dBm]	
		Size	Offset	QPSK	16QAM
5	2502.5	1	0	22.43	22.32
		1	12	22.48	22.37
		1	24	22.02	21.06
		12	0	22.52	**23.62**
		12	6	**23.89**	22.48
		12	13	22.27	20.85
		25	0	23.27	21.77
	2535.0	1	0	22.57	21.98
		1	12	22.92	21.79
		1	24	21.05	19.68
		12	0	21.82	21.24
		12	6	21.55	22.09
		12	13	21.08	20.35
		25	0	21.22	19.96
	2567.5	1	0	21.04	20.17
		1	12	21.66	22.11
		1	24	20.97	19.36
		12	0	22.11	20.71
		12	6	22.01	21.21
		12	13	21.47	19.62
		25	0	22.05	19.32
10	2505.0	1	0	22.99	23.31
		1	24	22.12	21.69
		1	49	22.29	22.62
		25	0	22.79	22.14
		25	12	23.62	22.34
		25	25	22.84	21.54
		50	0	23.27	21.67
	2535.0	1	0	22.80	23.40
		1	24	23.59	21.99
		1	49	21.62	22.74
		25	0	22.28	21.67
		25	12	21.65	21.66
		25	25	22.17	20.55
		50	0	22.03	22.08
	2565.0	1	0	22.02	21.26
		1	24	22.59	22.66
		1	49	21.88	22.45
		25	0	21.17	21.80
		25	12	21.88	21.64
		25	25	22.81	22.09
		50	0	21.58	21.21
15	2507.5	1	0	22.14	21.94
		1	37	23.37	22.71
		1	74	21.84	22.51

		37	0	22.45	21.52
		37	18	22.59	22.27
		37	38	22.20	22.03
		75	0	23.17	22.03
	2535.0	1	0	22.01	22.01
		1	37	22.89	22.47
		1	74	19.97	21.25
		37	0	21.10	21.46
		37	18	22.05	21.21
		37	38	21.49	21.47
		75	0	21.23	21.83
	2562.5	1	0	21.65	21.12
		1	37	21.05	19.93
		1	74	21.30	20.35
		37	0	20.49	19.70
		37	18	21.80	19.64
		37	38	20.97	22.21
		75	0	21.66	20.17
20	2510.0	1	0	22.64	22.76
		1	49	21.73	21.93
		1	99	22.78	21.47
		50	0	23.16	21.30
		50	25	23.12	21.09
		50	50	21.30	21.72
		100	0	22.08	21.06
	2535.0	1	0	22.08	21.89
		1	49	22.60	21.93
		1	99	21.50	19.90
		50	0	20.87	20.03
		50	25	21.46	20.36
		50	50	22.52	20.96
		100	0	21.75	21.21
	2560	1	0	21.73	20.30
		1	49	21.30	21.54
		1	99	21.40	20.32
		50	0	21.48	20.59
		50	25	21.20	20.14
		50	50	20.61	20.43
		100	0	21.74	19.84

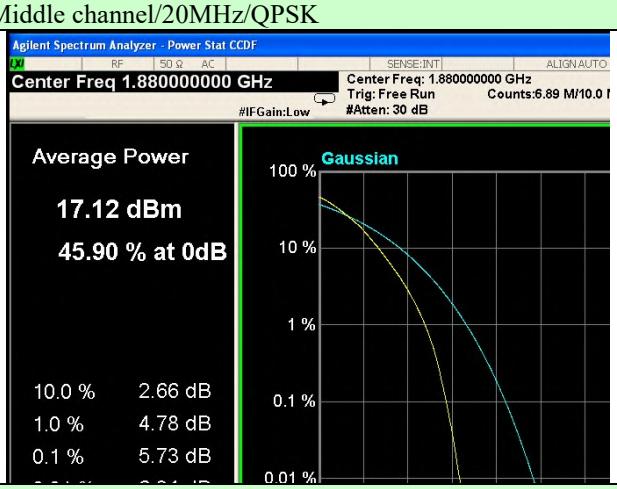
4.4 Peak-to-Average Ratio

Test Requirement:	Part 22.913(d), FCC part24.232(d), FCC part27.50(d)(5), RSS-132 (5.4), RSS-133 (6.4), RSS-139(6.5), RSS-199(4.4)
Test Method:	FCC part2.1046, ANSI/TIA-603-E, ANSI C63.26 Clause 5.2.3.4 FCC KDB971168 D01 v03r01 Section 5.7
Test Limit:	Used complementary cumulative distribution function (CCDF) of analyzer to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time
Test setup:	 ***Note:*** *Measurement setup for testing on Antenna connector*
Test Procedure:	1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.7.. 2. The EUT was connected to spectrum and system simulator via a power divider 3. Using the CCDF measurement of spectrum analyzer; 4. Set RBW≥OBW or specified reference bandwidth; 5. Set the number of counts to a value that stabilizes the measured CCDF curve; 6. Set the measurement interval as 1ms 7. Record the maximum PAPR level associated with a probability of 0.1%.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

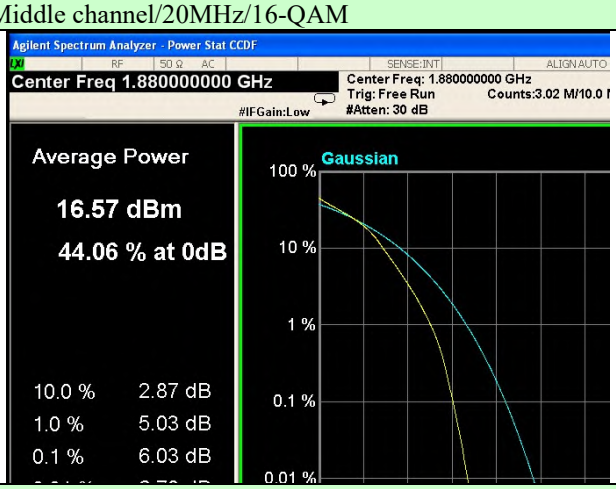
Test plots are listed as below:

Test mode	Peak to Average Ratio （dB）	Limit （dB）	Result
LTE Band 2 Middle channel/20MHz/QPSK	5.73	13	PASS
LTE Band 2 Middle channel/20MHz/16-QAM	6.03	13	PASS
LTE Band 4 Middle channel/20MHz/QPSK	4.81	13	PASS
LTE Band 4 Middle channel/20MHz/16-QAM	5.02	13	PASS
LTE Band 5 Middle channel/10MHz/QPSK	5.10	13	PASS
LTE Band 5 Middle channel/10MHz/16-QAM	5.09	13	PASS
LTE Band 7 Middle channel/20MHz/QPSK	4.56	13	PASS
LTE Band 7 Middle channel/20MHz/16-QAM	4.56	13	PASS

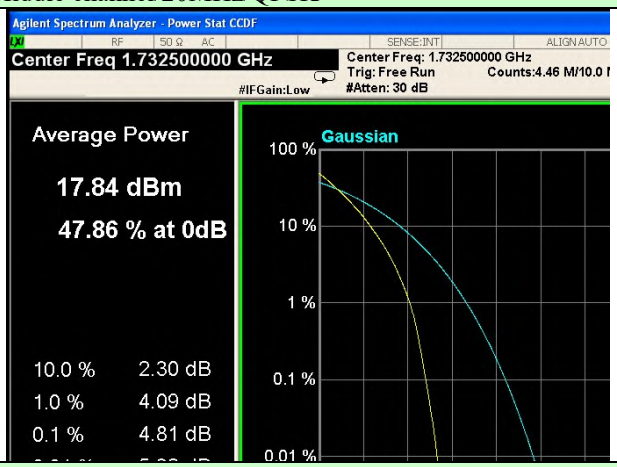
Test Mode: LTE Band 2
Middle channel/20MHz/QPSK



Test Mode: LTE Band 2
Middle channel/20MHz/16-QAM



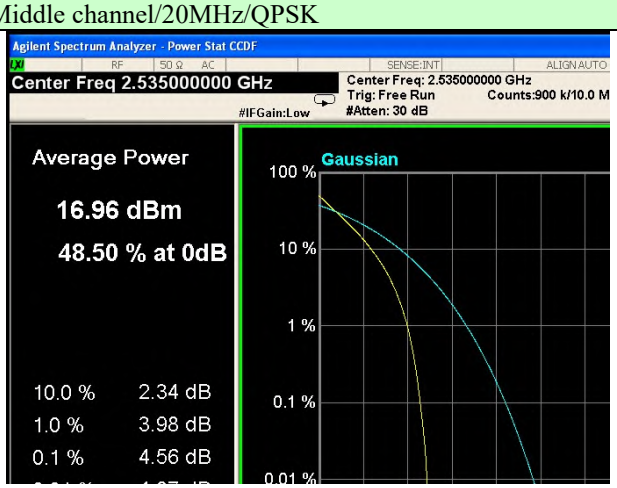
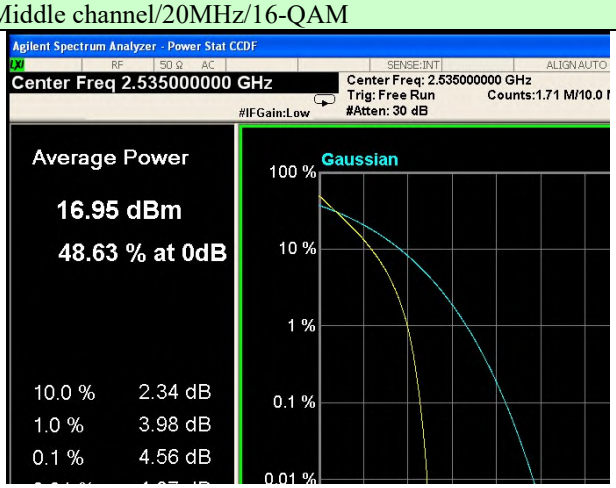
Test Mode: LTE Band 4
Middle channel/20MHz/QPSK



Test Mode: LTE Band 4
Middle channel/20MHz/16-QAM

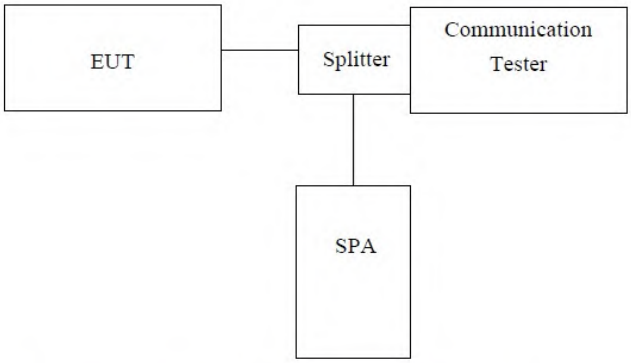
Test Mode: LTE Band 5
Middle channel/10MHz/QPSK

Test Mode: LTE Band 5
Middle channel/10MHz/16-QAM

Test Mode: LTE Band 7 Middle channel/20MHz/QPSK	Test Mode: LTE Band 7 Middle channel/20MHz/16-QAM
	

Note: All bandwidth and modulation are tested, only the worst results are reported.

4.5 Occupy Bandwidth

Test Requirement:	FCC Part 2.1049, FCC part22.913(a), FCC part24.232(b) and FCC part27.53(a), RSS-132 (3.1), RSS-133 (3.1), RSS-139(3.1) and RSS-199(4.2)
Test Method:	KDB 971168 D01 v03r1 clause 4, FCC part2.1049, ANSI/TIA-603-E, ANSI C63.26 clause 5.4, RSS-Gen Section 6.7.
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, set center frequency to channel center frequency. 2.RBW was set to about 1%-5% of emission OBW, VBW≥ 3 X RBW. 3.Set spectrum analyzer detection mode to peak, and the trace mode to max hold. 4. Use the 99% OBW function, The 99% power OBW can be found on the plot, determine the "-26dB amplitude" as equal to reference value -26dB.
Test Instruments:	Refer to section 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Measurement Data

EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 2	5MHz	QPSK	25	0	4490.8	4991
		16-QAM	25	0	4503.5	4986
	10MHz	QPSK	50	0	9046.4	10080
		16-QAM	50	0	9042.3	10070
	15MHz	QPSK	75	0	13437.0	14630
		16-QAM	75	0	13452.0	14590
	20MHz	QPSK	100	0	17892.0	19250
		16-QAM	100	0	17864.0	19260

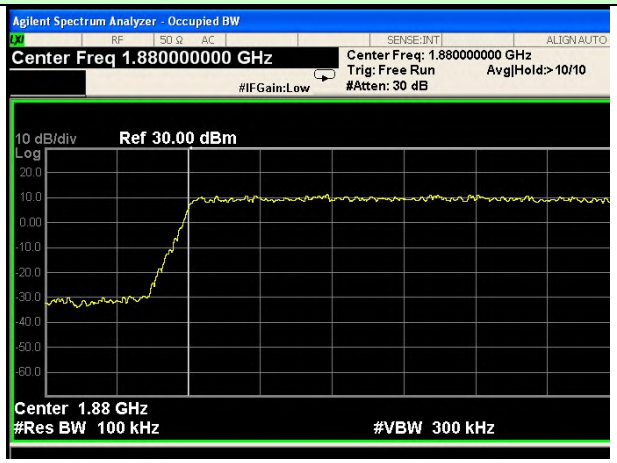
EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 4	5MHz	QPSK	25	0	4510.1	4992
		16-QAM	25	0	4505.7	4978
	10MHz	QPSK	50	0	8934.6	9562
		16-QAM	50	0	8935.6	9589
	15MHz	QPSK	75	0	13416.0	14600
		16-QAM	75	0	13390.0	14600
	20MHz	QPSK	100	0	17799.0	19270
		16-QAM	100	0	17824.0	19130

EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 5	5MHz	QPSK	25	0	4510.1	4980
		16-QAM	25	0	4506.1	5006
	10MHz	QPSK	50	0	8942.1	9852
		16-QAM	50	0	8941.4	9729

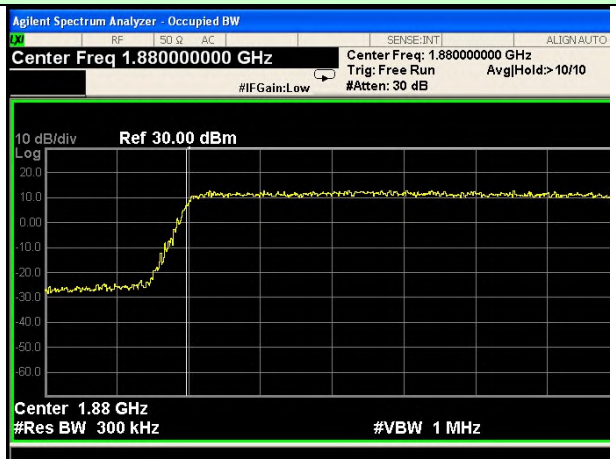
EUT Mode	Channel Bandwidth	Mode	RB Configure		99% Occupy bandwidth (KHz)	-26dB bandwidth (KHz)
			RB Size	RB Offset		
LTE Band 7	5MHz	QPSK	25	0	4499.7	4981
		16-QAM	25	0	4497.2	4950
	10MHz	QPSK	50	0	8937.6	9699
		16-QAM	50	0	8933.6	9705
	15MHz	QPSK	75	0	13433.0	14670
		16-QAM	75	0	13419.0	14640
	20MHz	QPSK	100	0	17837.0	19140
		16-QAM	100	0	17820.0	18970

Test plot as follows:

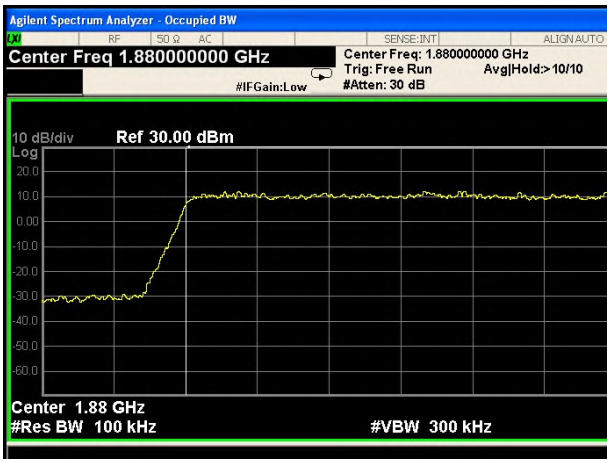
Test Mode: LTE Band 2 Channel Bandwidth: 5MHz	Test Mode: LTE Band 2 Channel Bandwidth: 10MHz



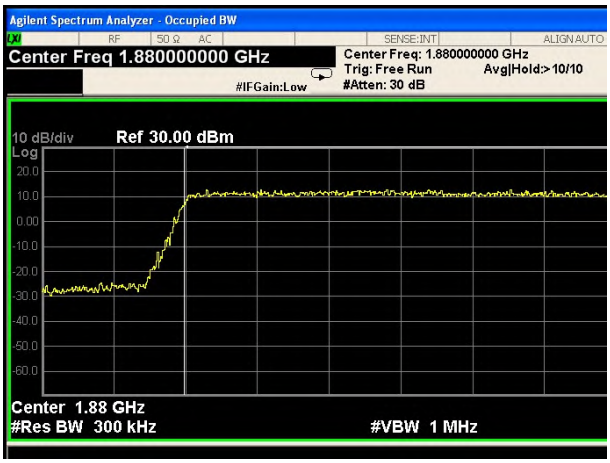
QPSK



QPSK

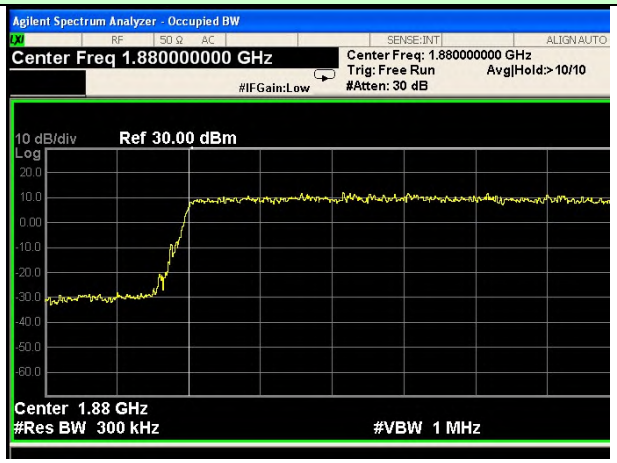


16-QAM

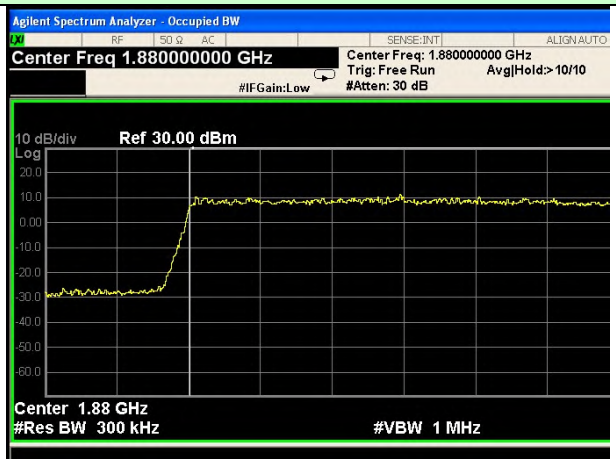


16-QAM

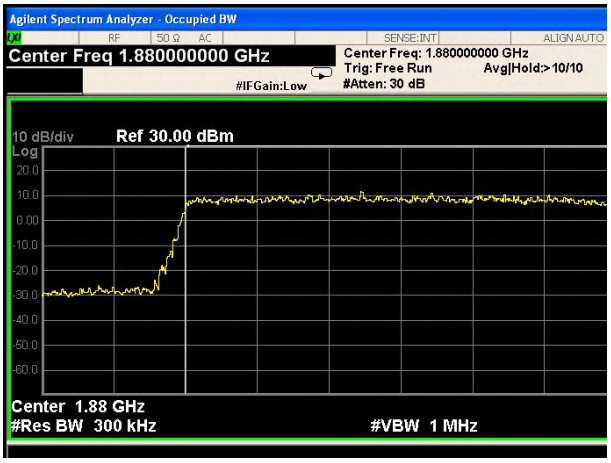
Test Mode: LTE Band 2 Channel Bandwidth: 15MHz	Test Mode: LTE Band 2 Channel Bandwidth: 20MHz



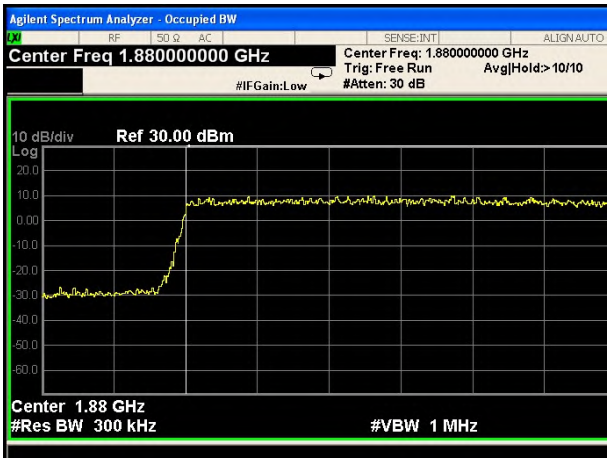
QPSK



QPSK

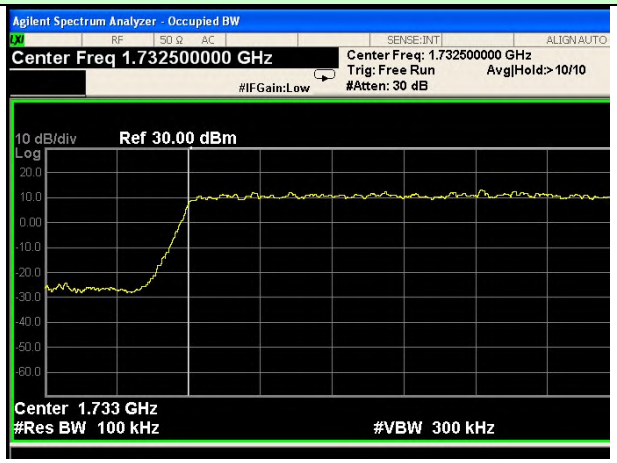


16-QAM

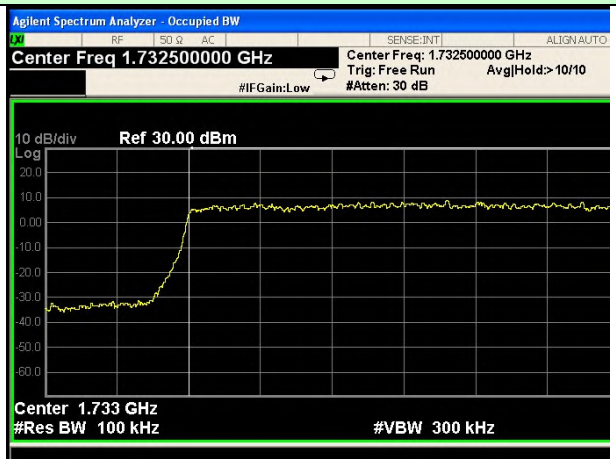


16-QAM

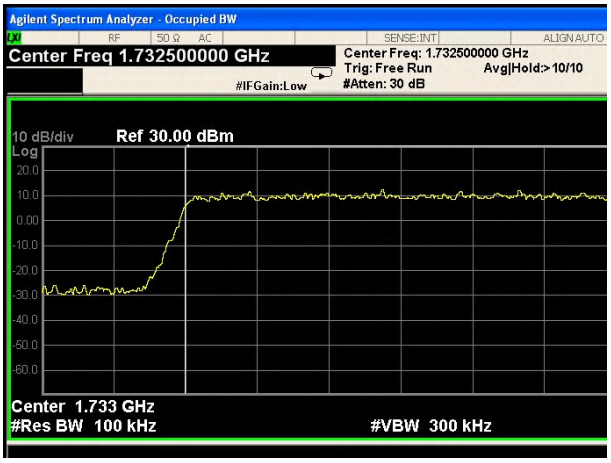
Test Mode: LTE Band 4 Channel Bandwidth: 5MHz	Test Mode: LTE Band 4 Channel Bandwidth: 10MHz



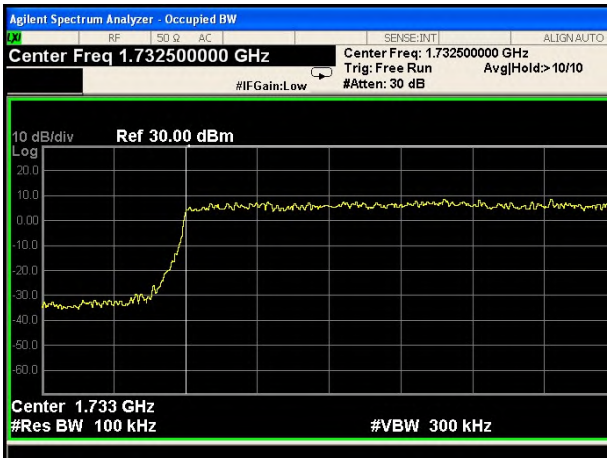
QPSK



QPSK

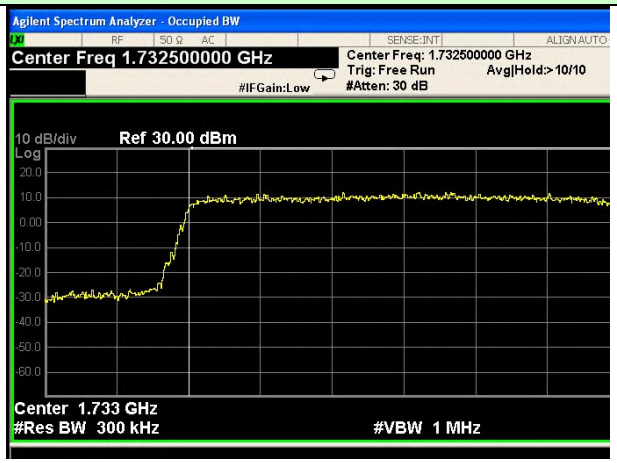


16-QAM

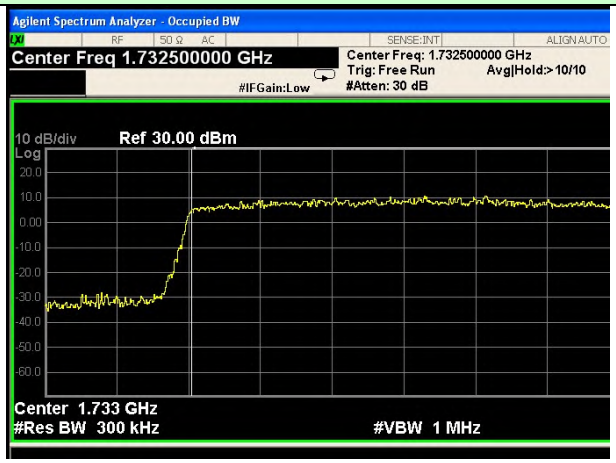


16-QAM

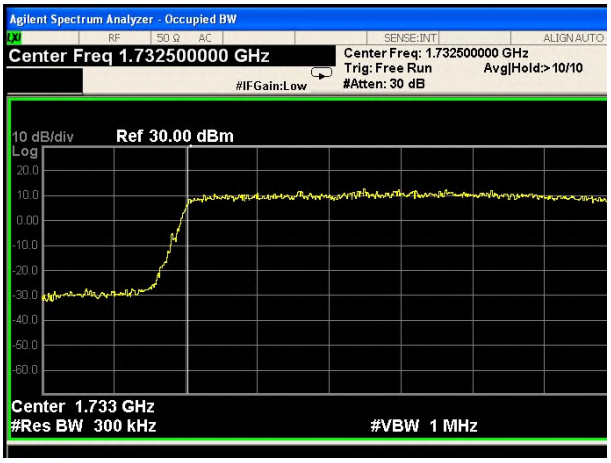
Test Mode: LTE Band 4 Channel Bandwidth: 15MHz	Test Mode: LTE Band 4 Channel Bandwidth: 20MHz



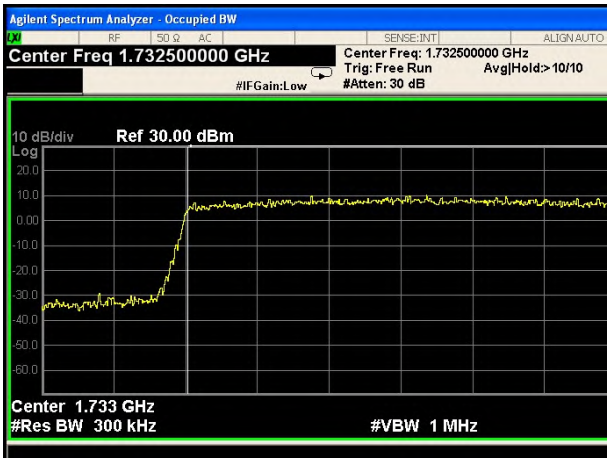
QPSK



QPSK

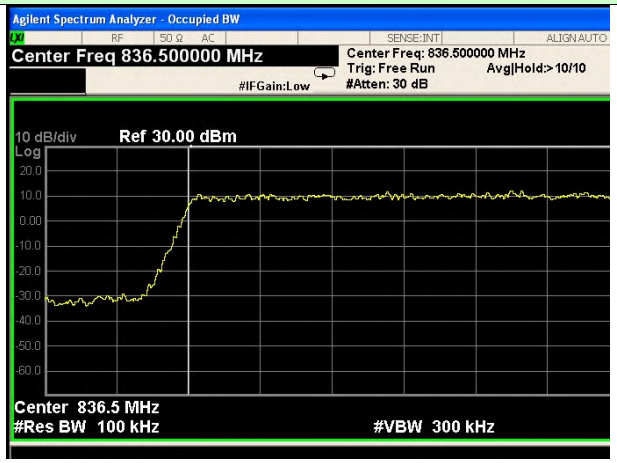


16-QAM

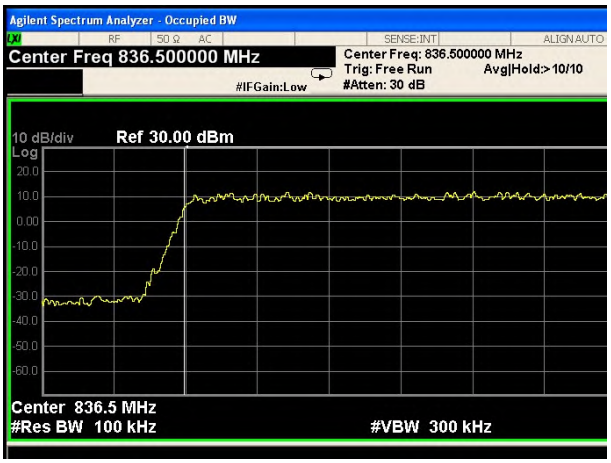


16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 5MHz

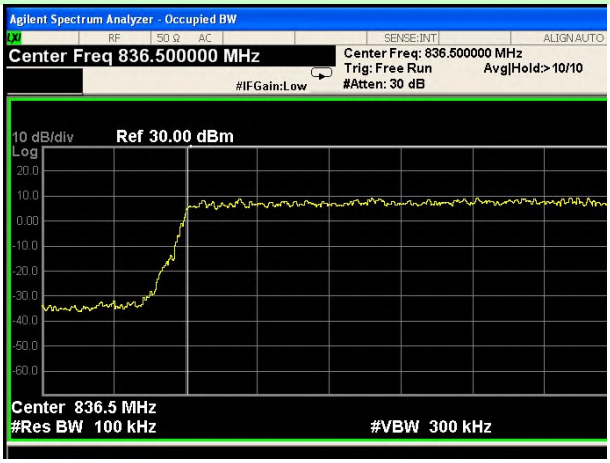


QPSK

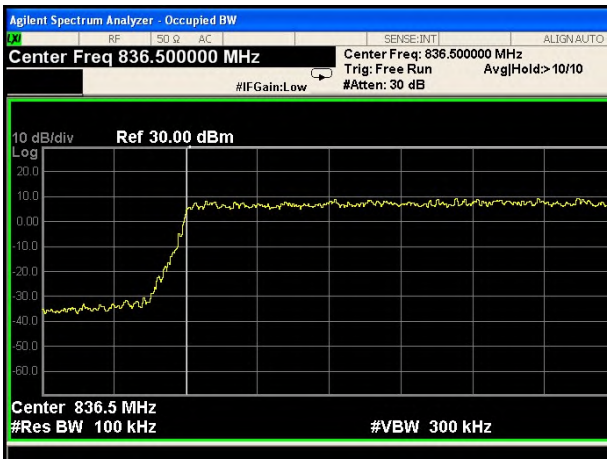


16-QAM

Test Mode: LTE Band 5
Channel Bandwidth: 10MHz

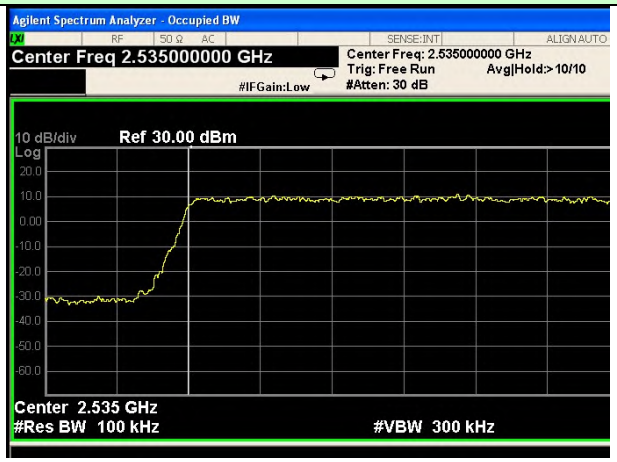


QPSK

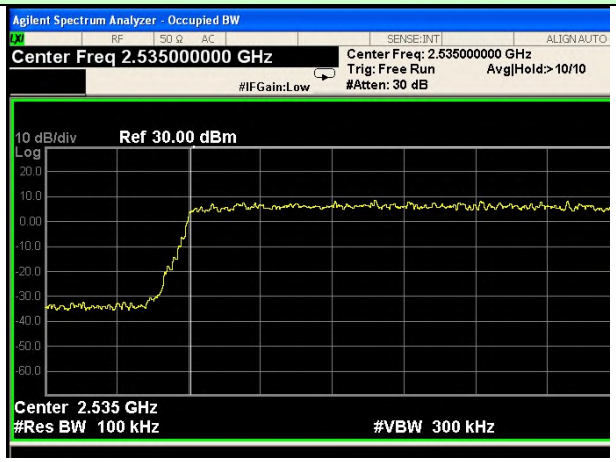


16-QAM

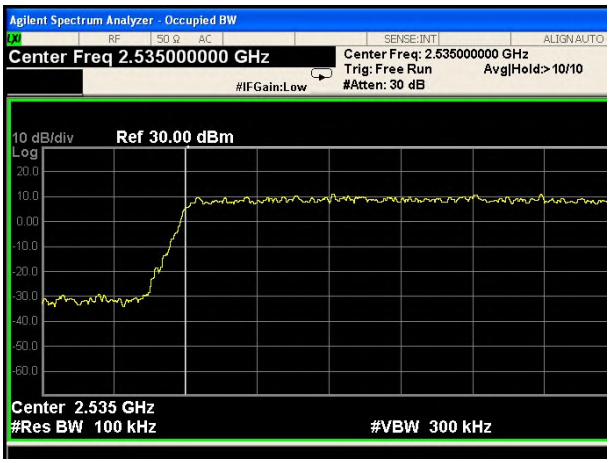
Test Mode: LTE Band 7 Channel Bandwidth: 5MHz	Test Mode: LTE Band 7 Channel Bandwidth: 10MHz



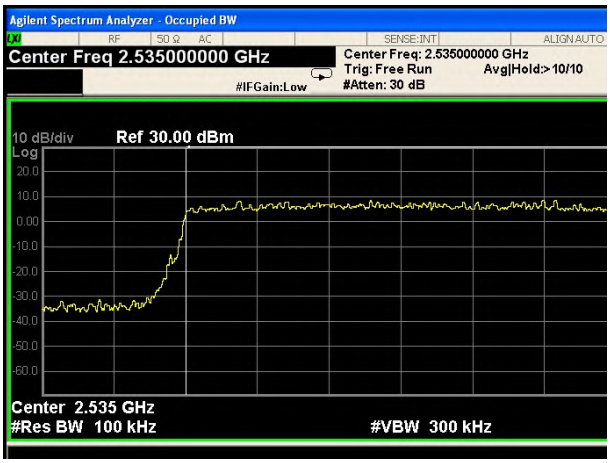
QPSK



QPSK

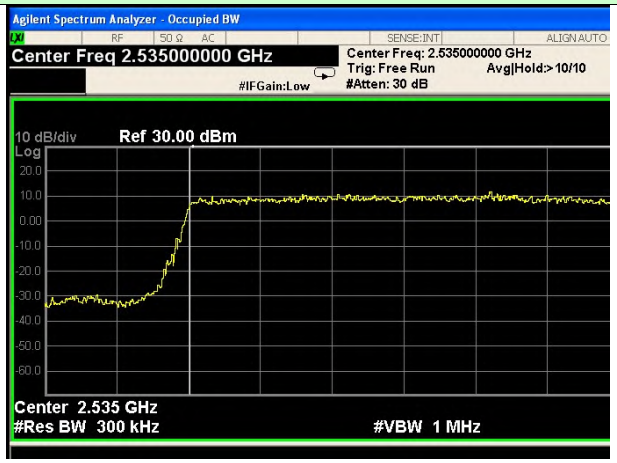


16-QAM

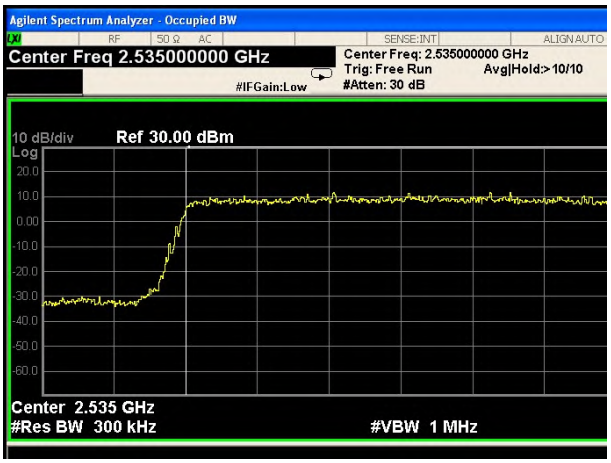


16-QAM

Test Mode: LTE Band 7
Channel Bandwidth: 15MHz

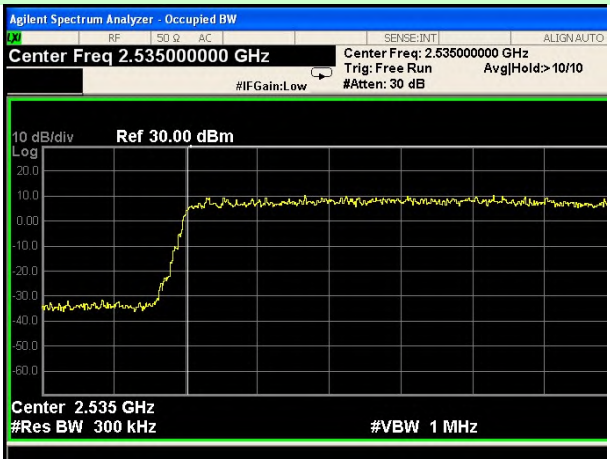


QPSK

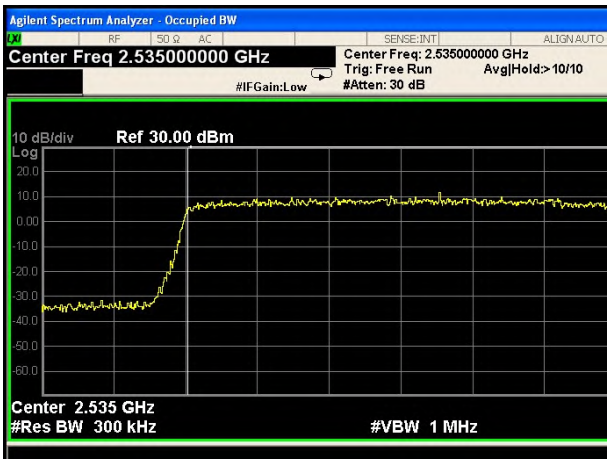


16-QAM

Test Mode: LTE Band 7
Channel Bandwidth: 20MHz



QPSK



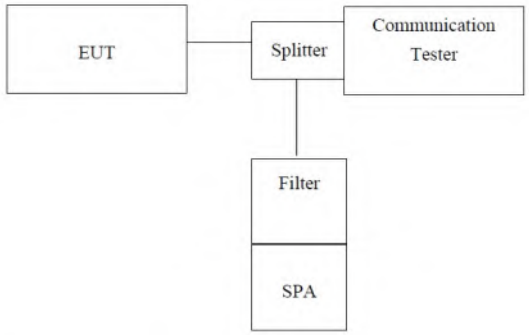
16-QAM

Note: All bandwidth and modulation are tested, only the worst results are reported.

4.6 MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H, Part 24E, Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.
According to RSS-132, RSS-133, RSS-139, RSS-199 the equipment certified under these standards shall employ digital modulation, but there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

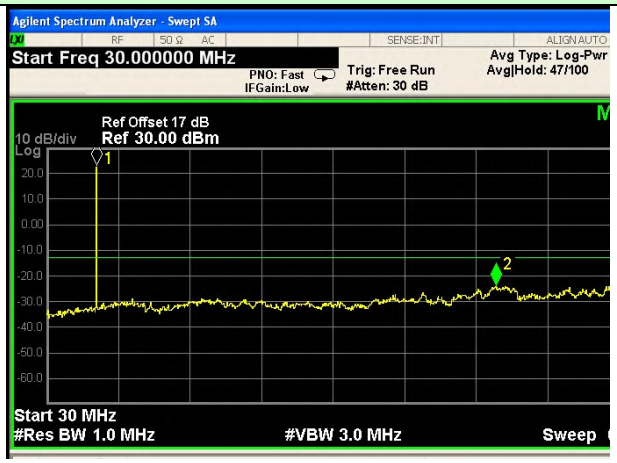
4.7 Out of band emission at antenna terminals

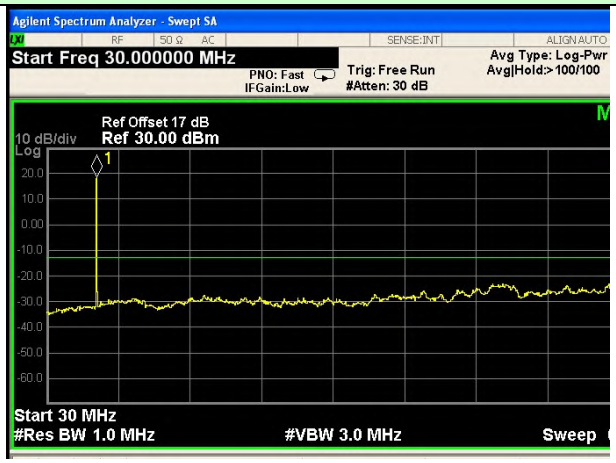
Test Requirement:	FCC part22.913(a), FCC part24.238(a), FCC part27.53(h) and RSS-132 (5.5), RSS-133 (6.5.1), RSS-139(6.6) and RSS-199(4.5)
Test Method:	KDB 971168 D01 v03r1 clause 6, FCC part2.1051, ANSI/TIA-603-E, ANSI C63.26 clause 5.7
Limit:	-13dBm(Band 7/13/26 request additional limit) Band 7 Additional Limit refer to RSS-199(4.5) and FCC part 27.53 Band 13 Additional Limit refer to FCC part 27.53
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=1MHz, VBW = 3MHz, 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 3 for details
Test mode:	Refer to section 4.1 for details
Test results:	Pass

Test plot as follows:

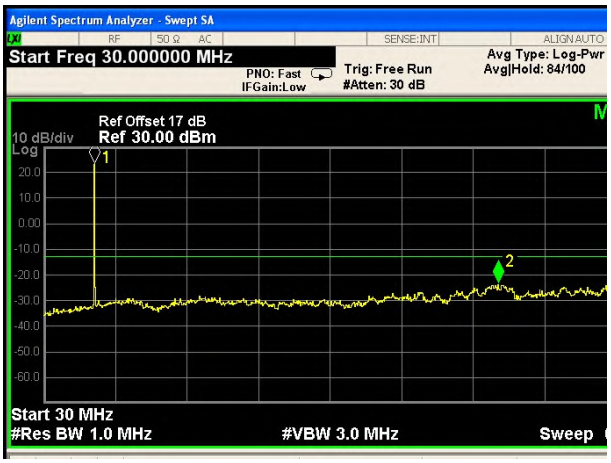
Conducted Spurious Emission:

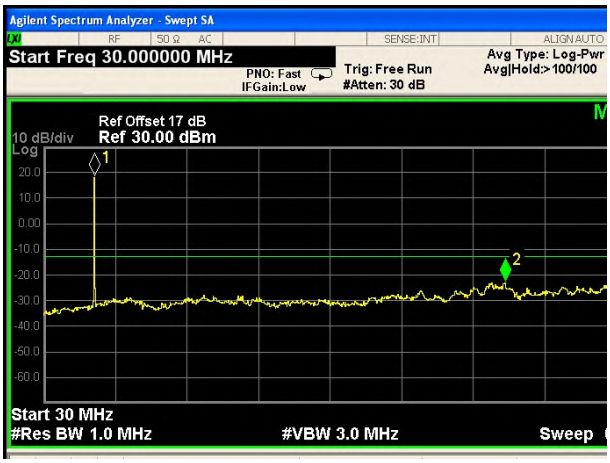
Test Mode: LTE Band 2 / 5MHz /1RB	Test Mode: LTE Band 2 / 5MHz /25RB



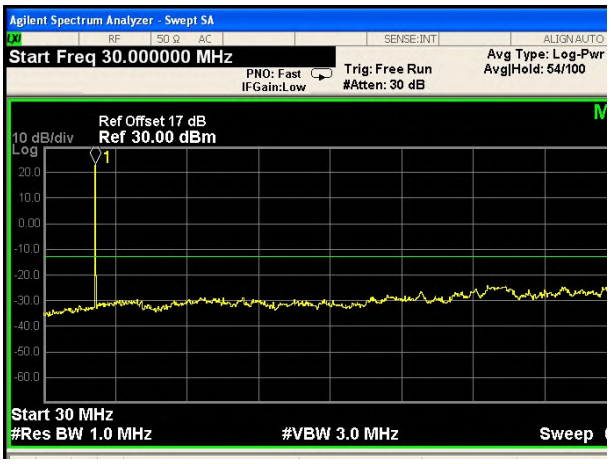


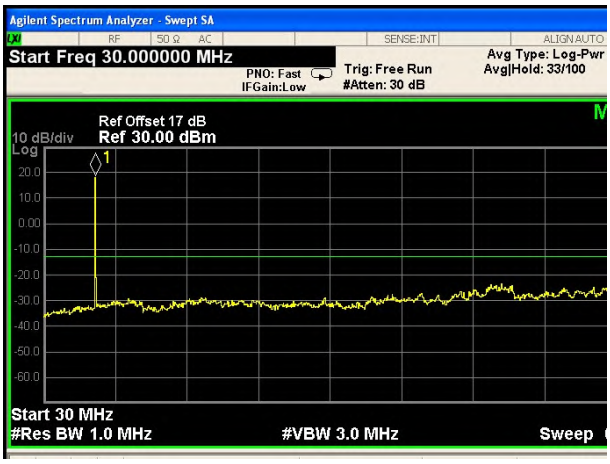
Lowest channel





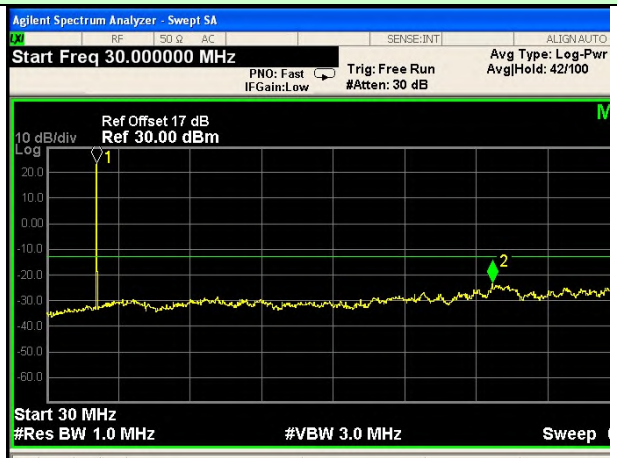
Middle channel

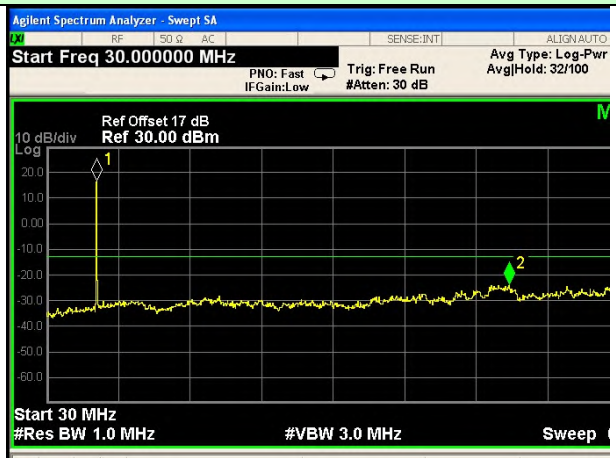




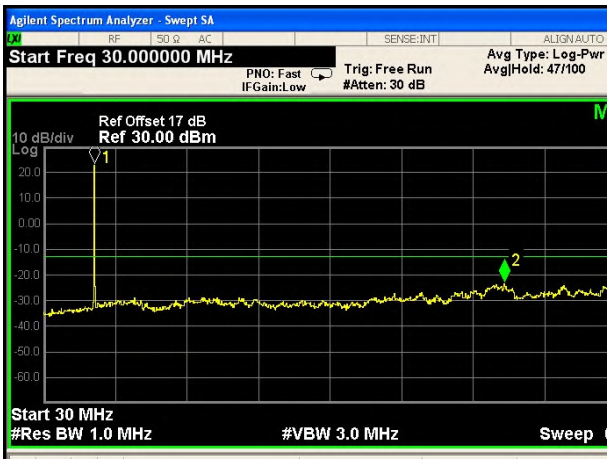
Highest channel

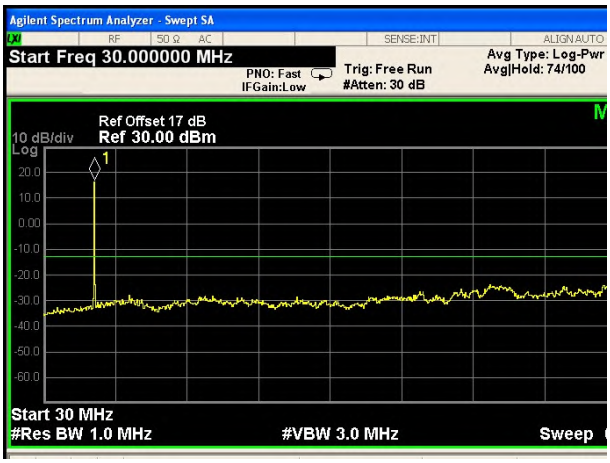
Test Mode: LTE Band 2 / 10MHz /1RB	Test Mode: LTE Band 2 / 10MHz /50RB



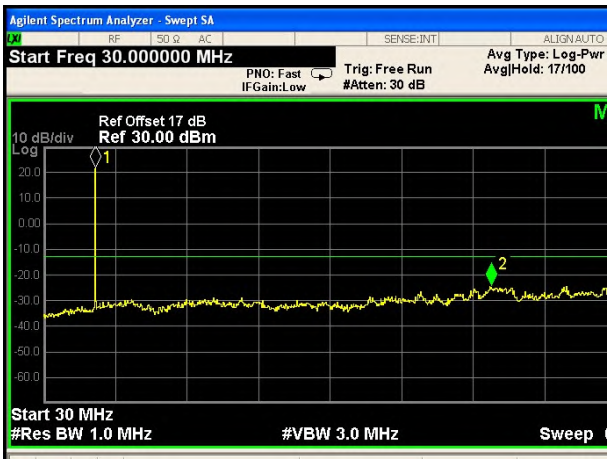


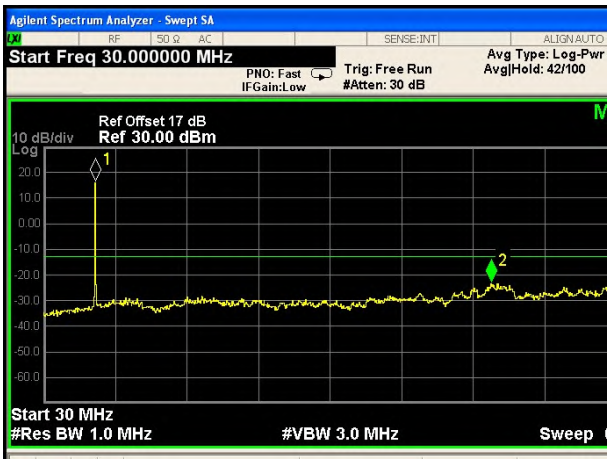
Lowest channel





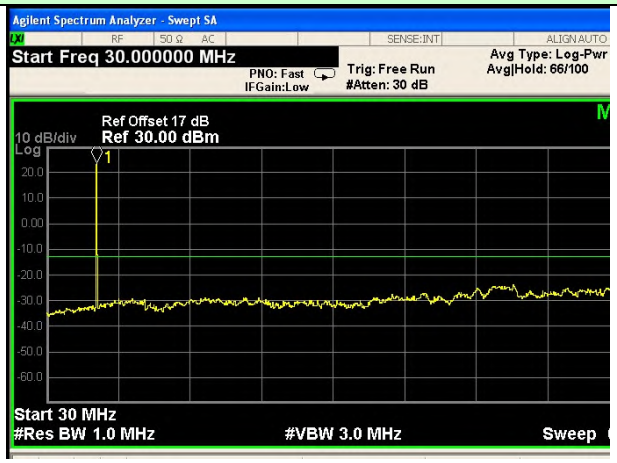
Middle channel

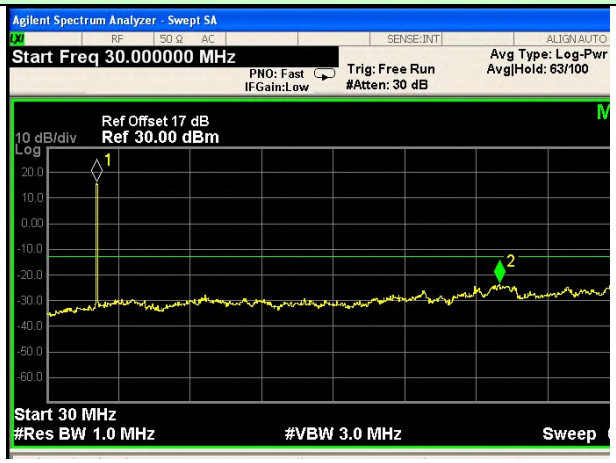




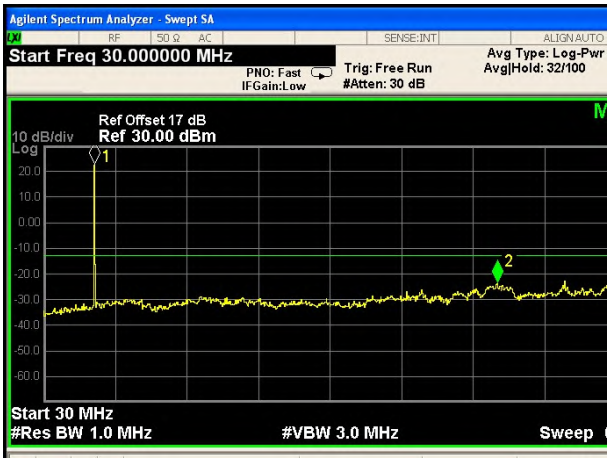
Highest channel

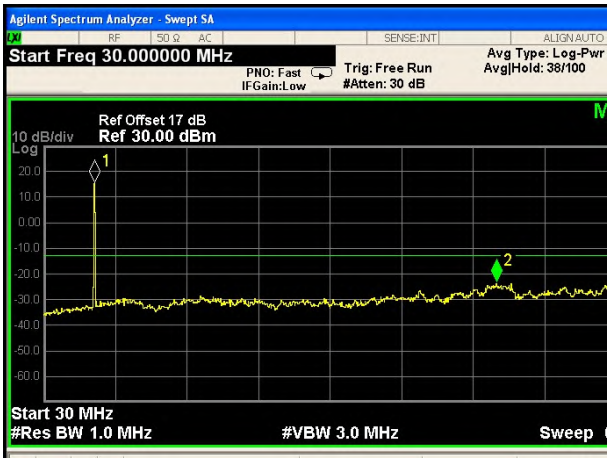
Test Mode: LTE Band 2 / 15MHz /1RB	Test Mode: LTE Band 2 / 15MHz /75RB



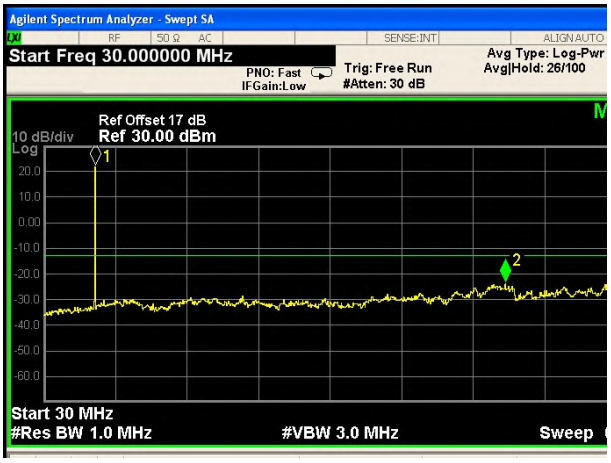


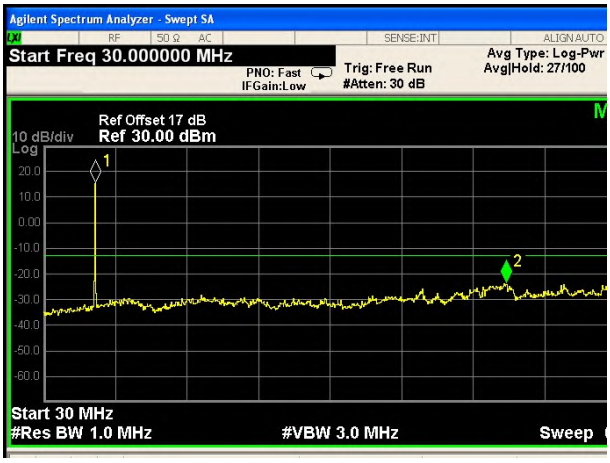
Lowest channel





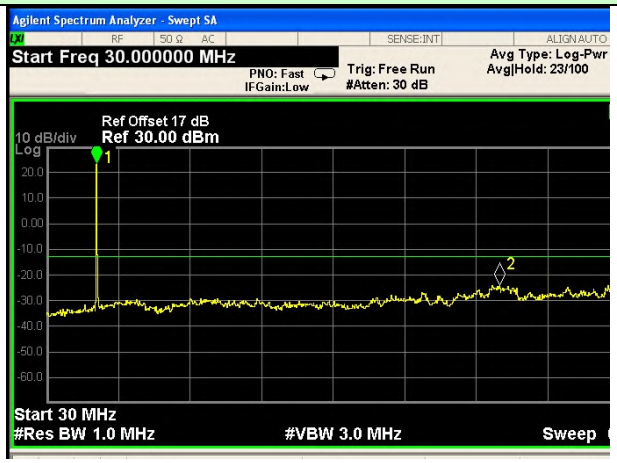
Middle channel

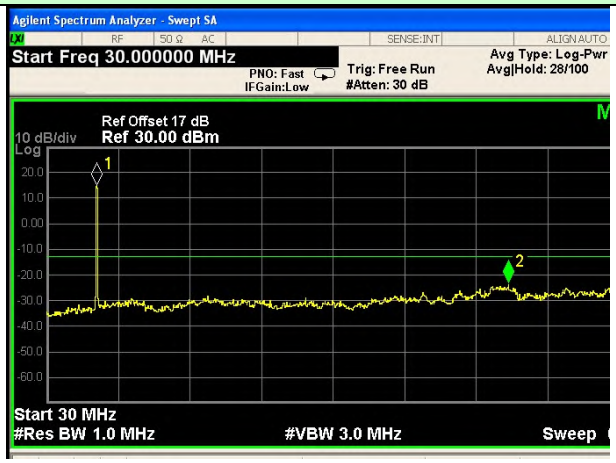




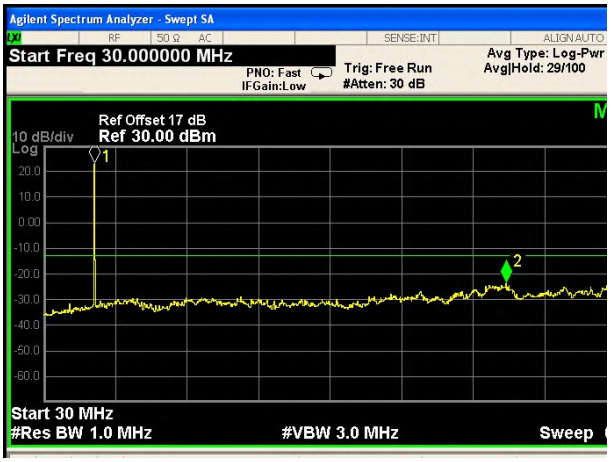
Highest channel

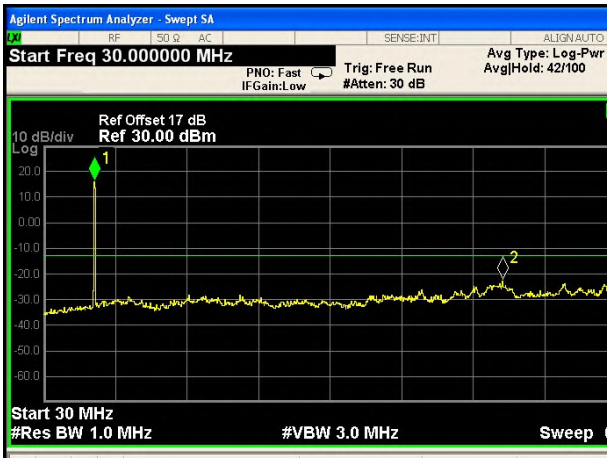
Test Mode: LTE Band 2 / 20MHz /1RB	Test Mode: LTE Band 2 / 20MHz /100RB



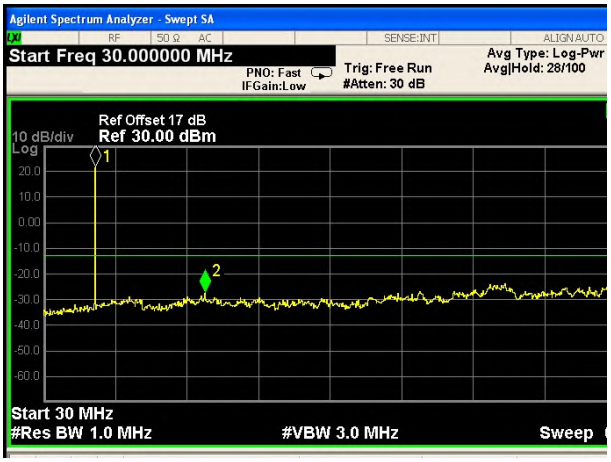


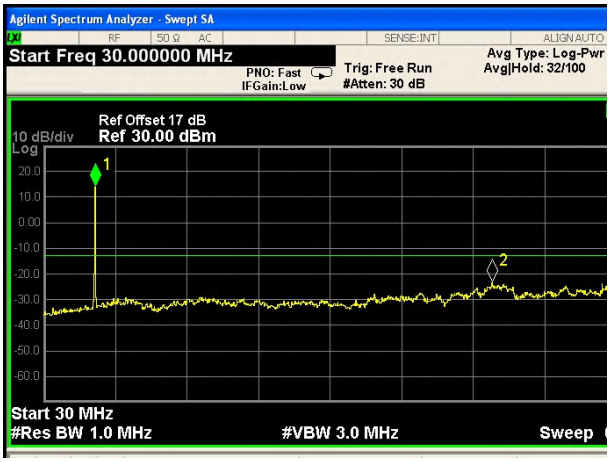
Lowest channel





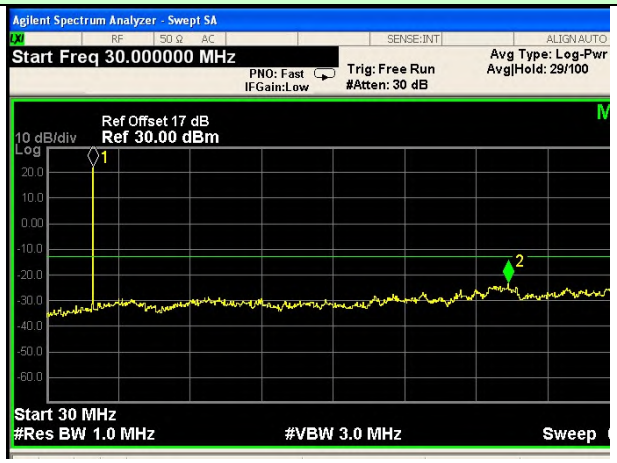
Middle channel

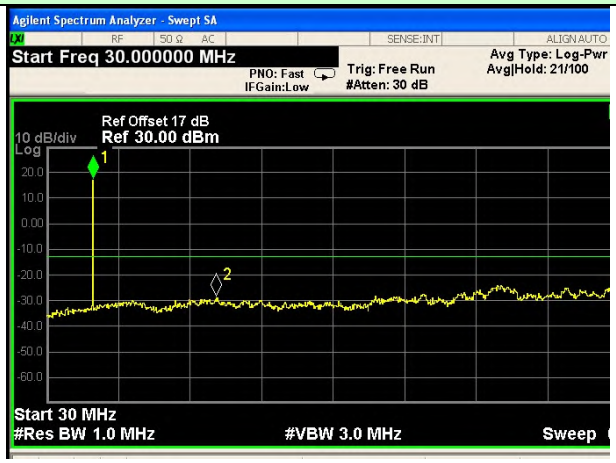




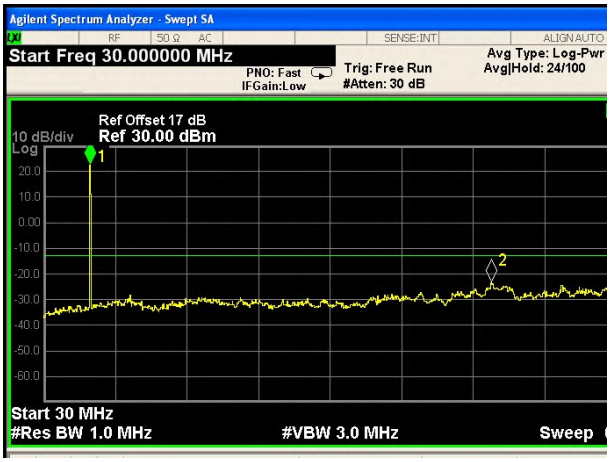
Highest channel

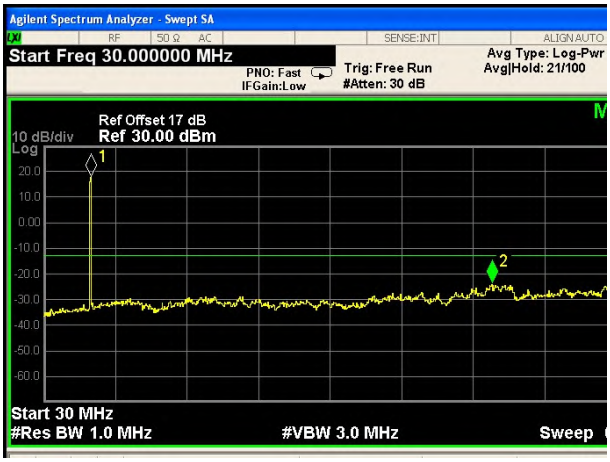
Test Mode: LTE Band 4 / 5MHz /1RB	Test Mode: LTE Band 4 / 5MHz /25RB



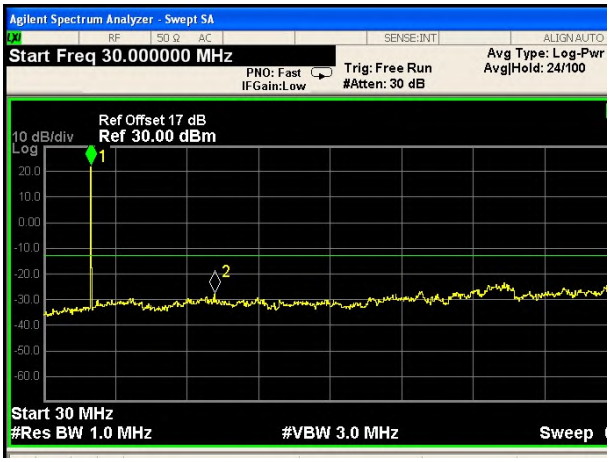


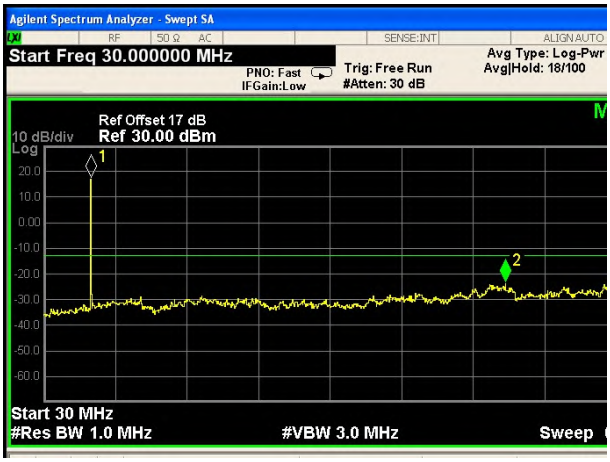
Lowest channel





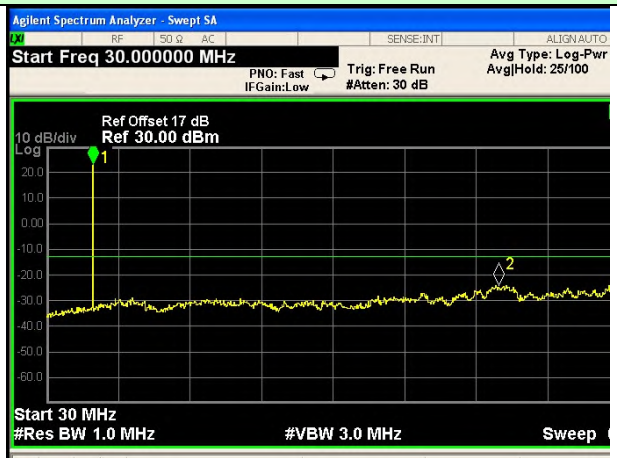
Middle channel

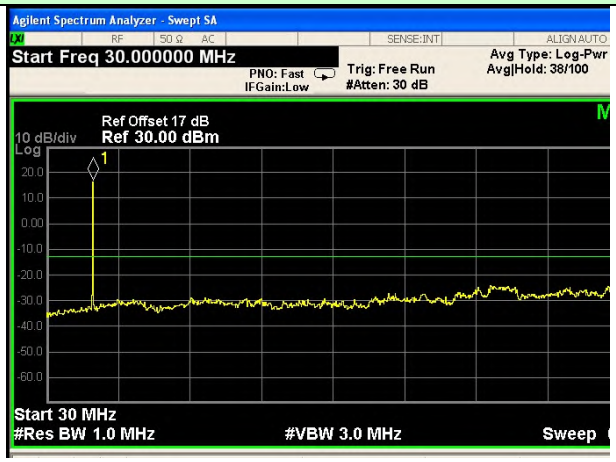




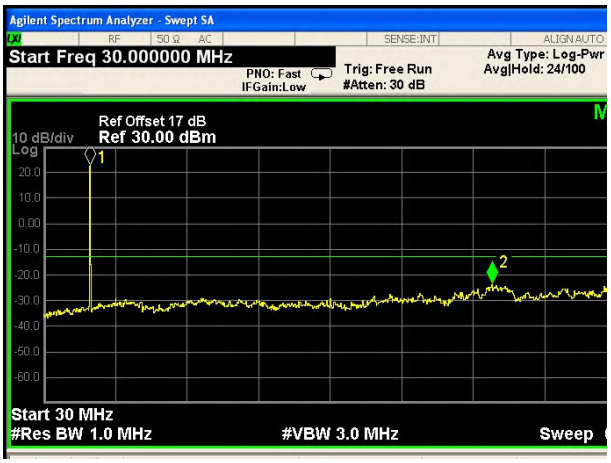
Highest channel

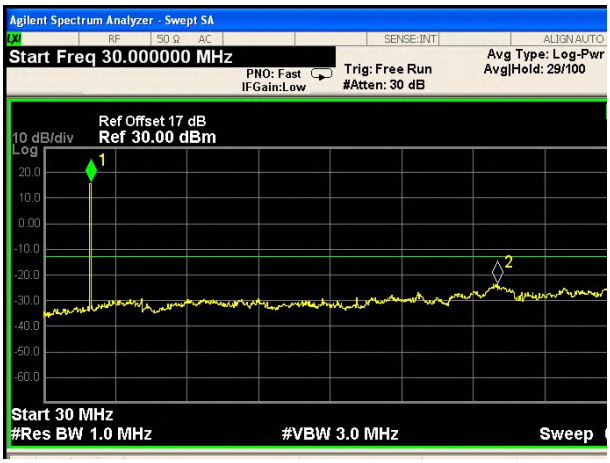
Test Mode: LTE Band 4 / 10MHz /1RB	Test Mode: LTE Band 4 / 10MHz /50RB



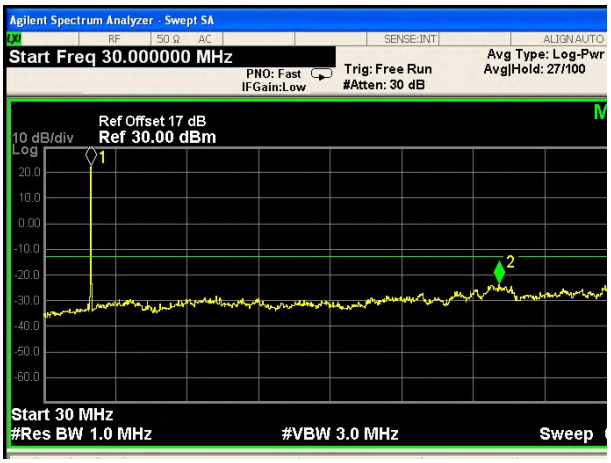


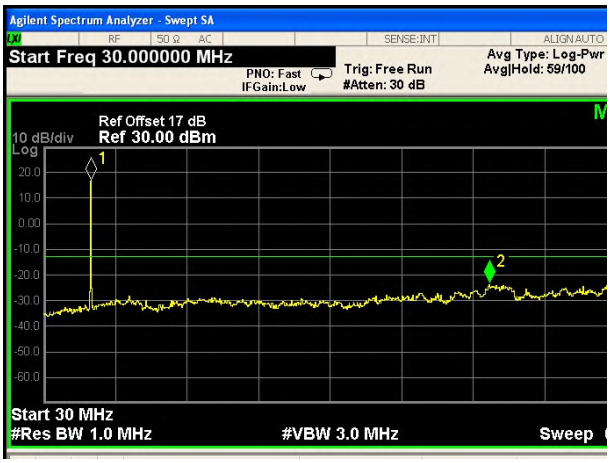
Lowest channel





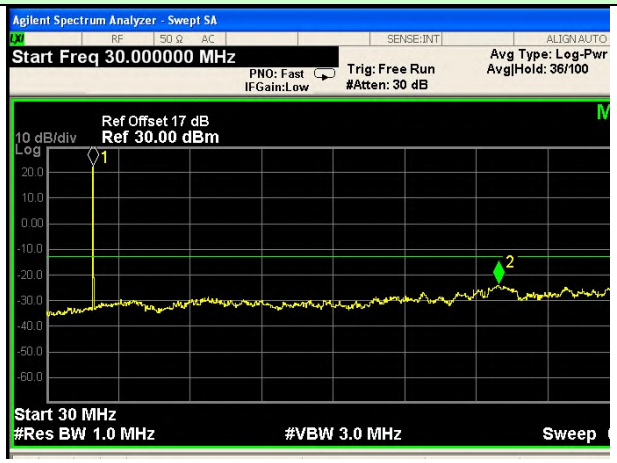
Middle channel

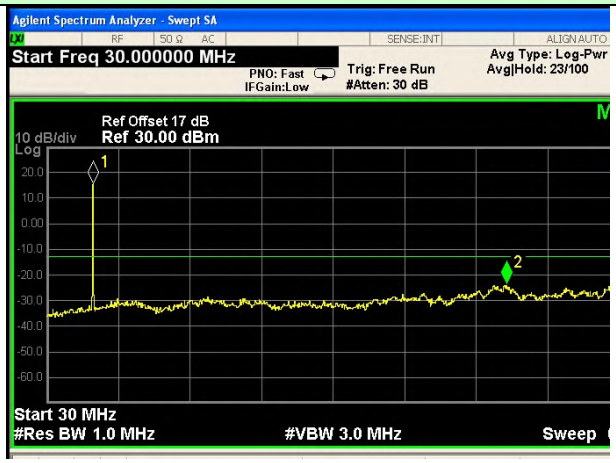




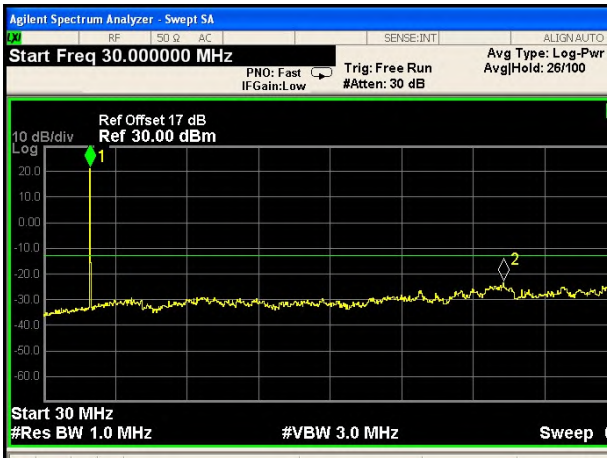
Highest channel

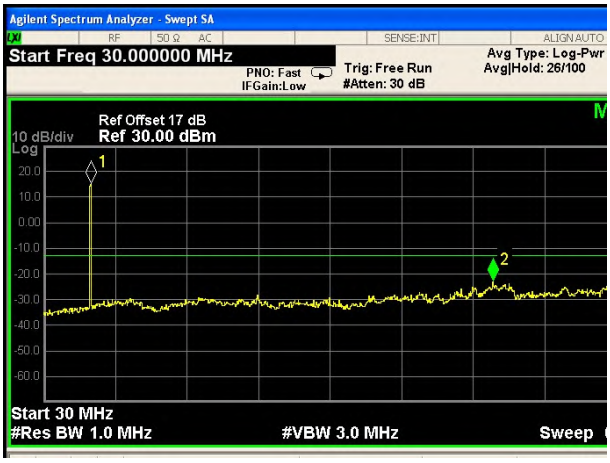
Test Mode: LTE Band 4 / 15MHz /1RB	Test Mode: LTE Band 4 / 15MHz /75RB



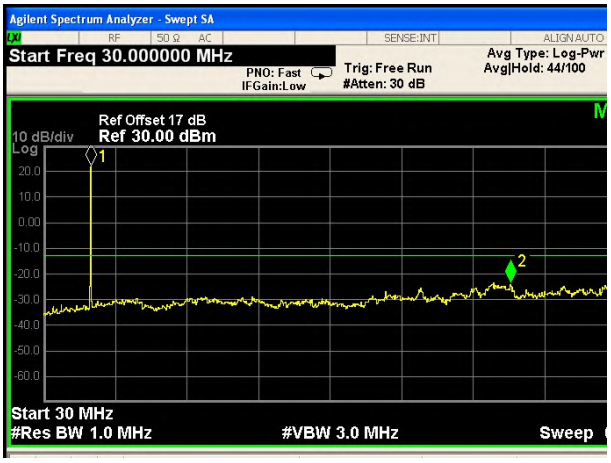


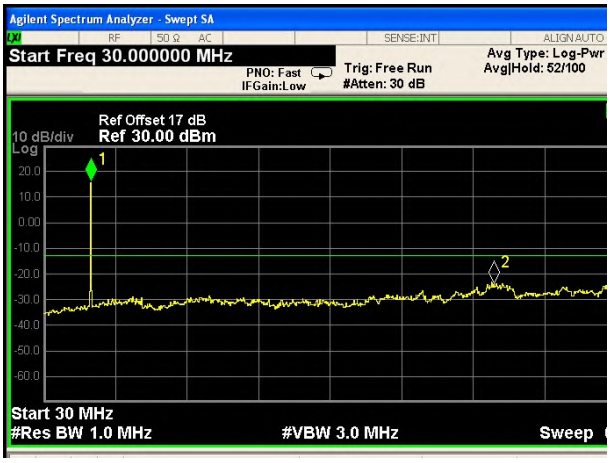
Lowest channel





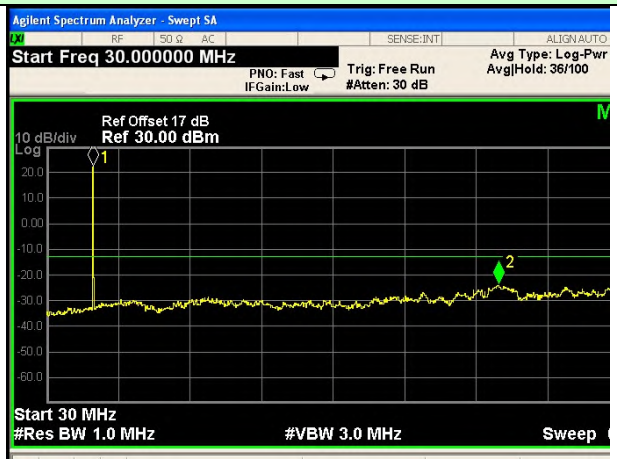
Middle channel

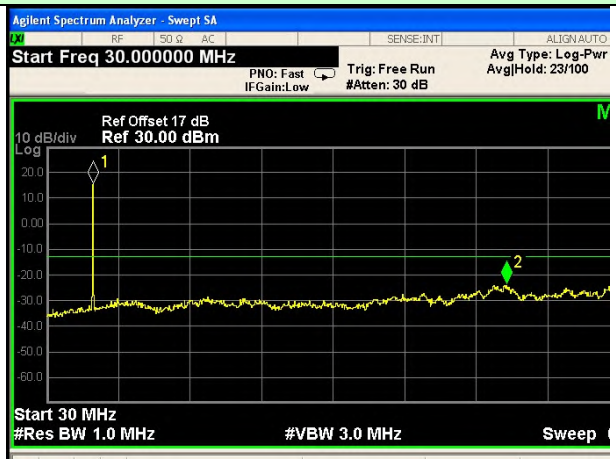




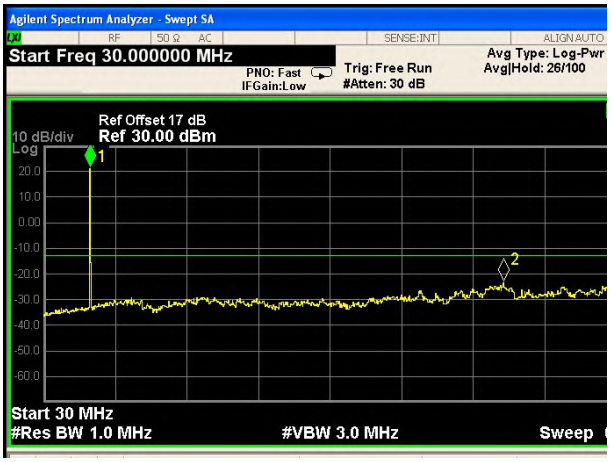
Highest channel

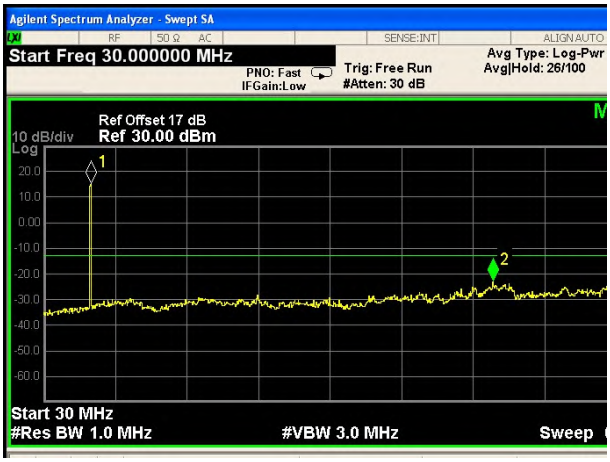
Test Mode: LTE Band 4 / 20MHz /1RB	Test Mode: LTE Band 4 / 20MHz /100RB



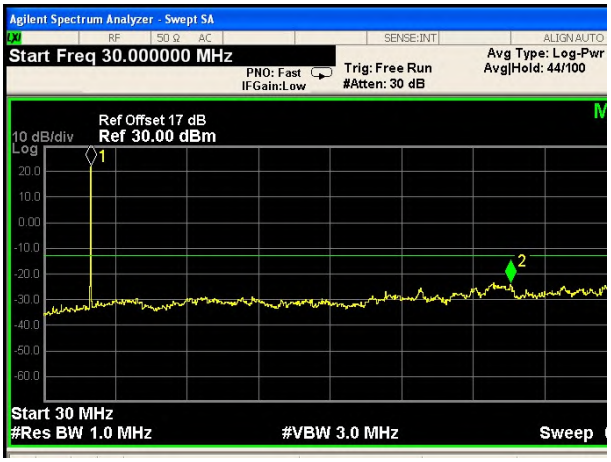


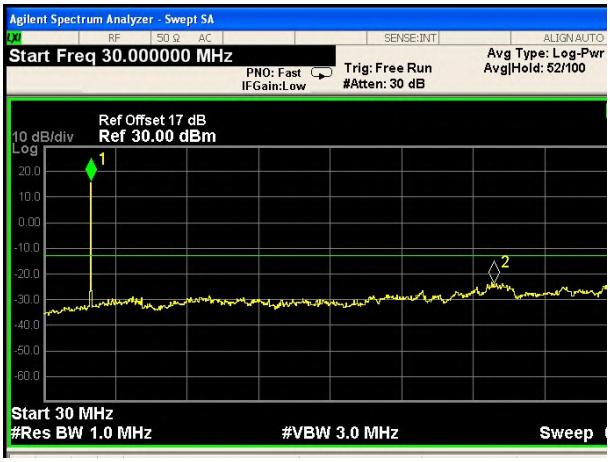
Lowest channel





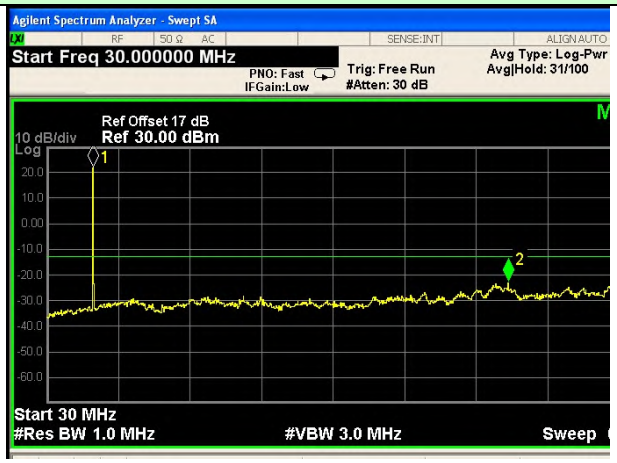
Middle channel

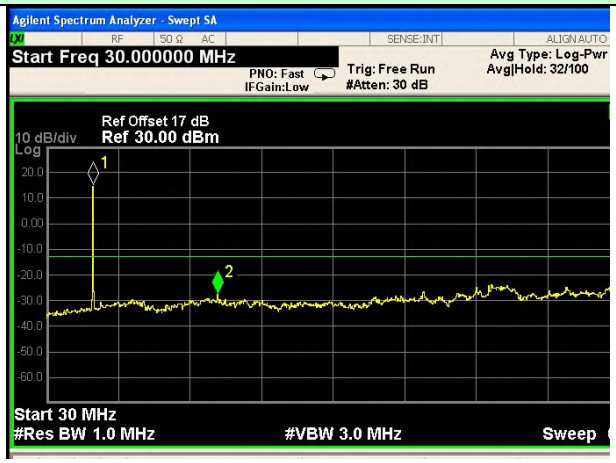




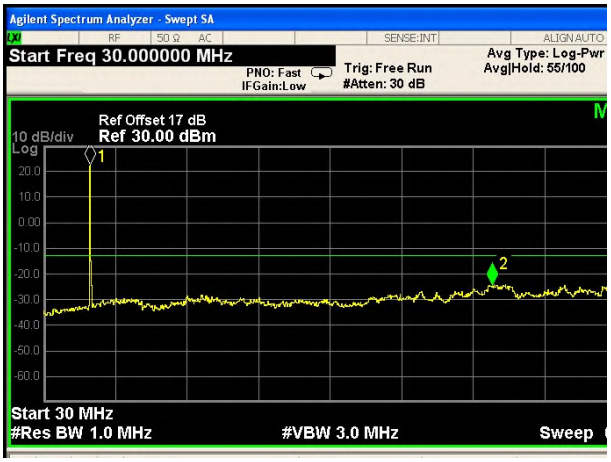
Highest channel

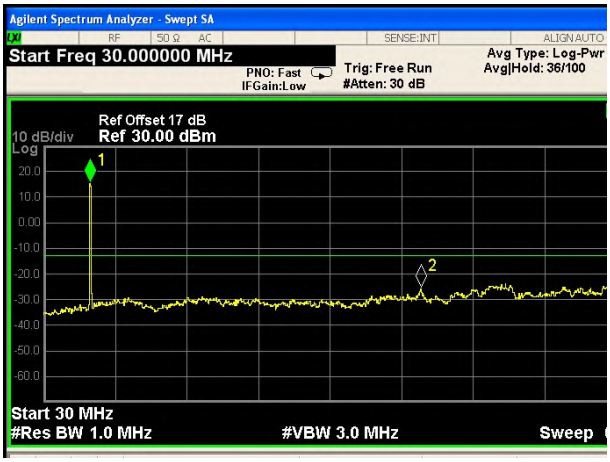
Test Mode: LTE Band 5/ 5MHz /1RB	Test Mode: LTE Band 5 / 5MHz /25RB



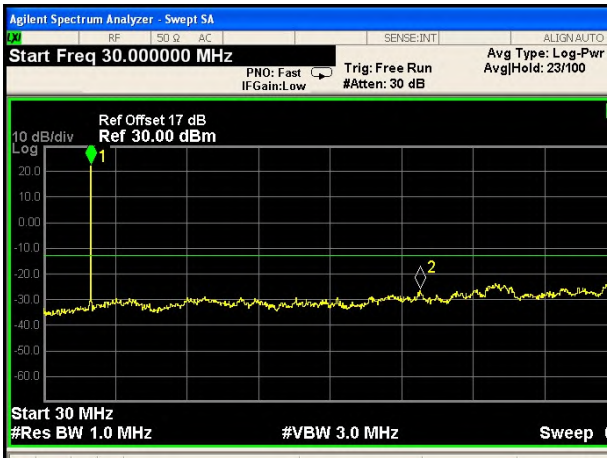


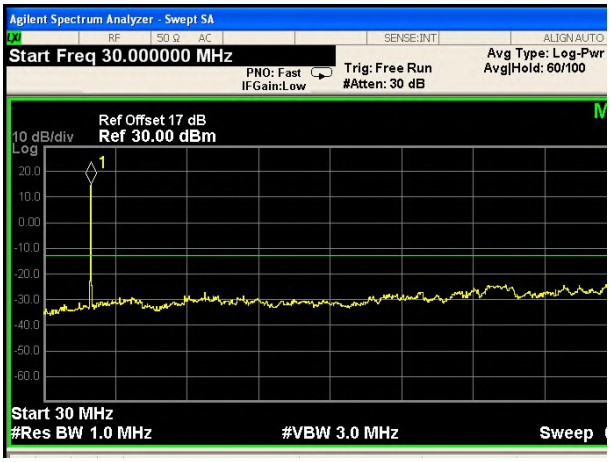
Lowest channel





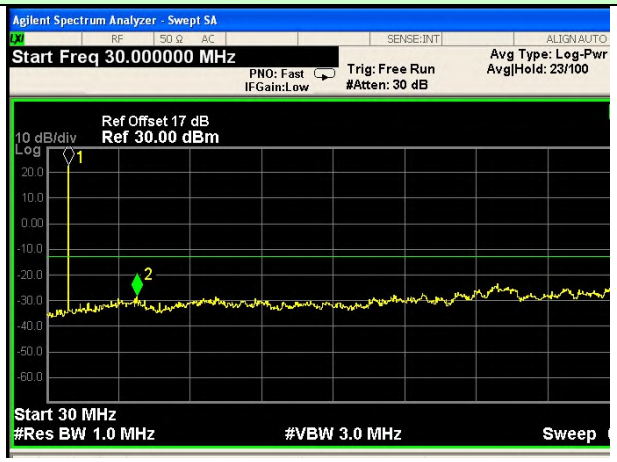
Middle channel

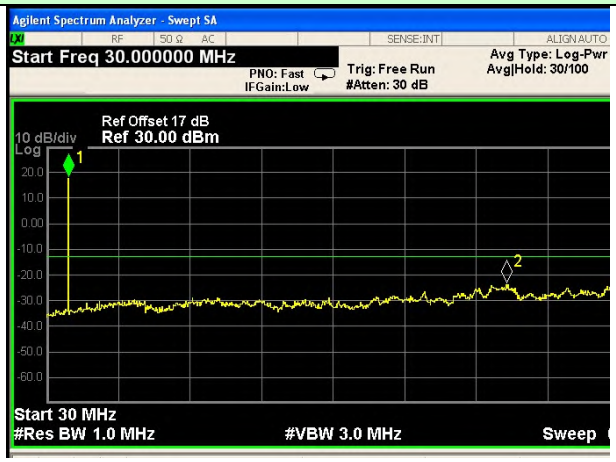




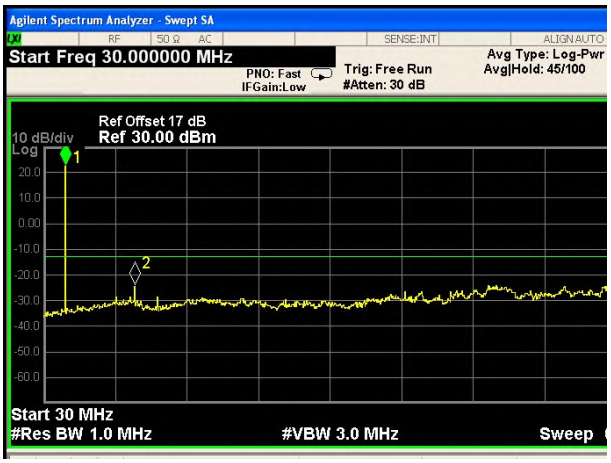
Highest channel

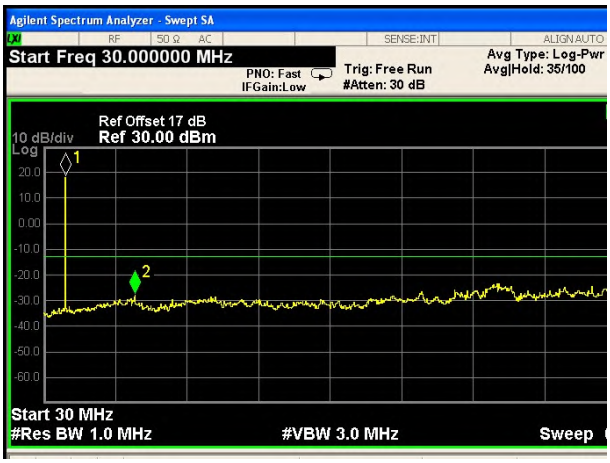
Test Mode: LTE Band 5/ 10MHz /1RB	Test Mode: LTE Band 5/ 10MHz /50RB



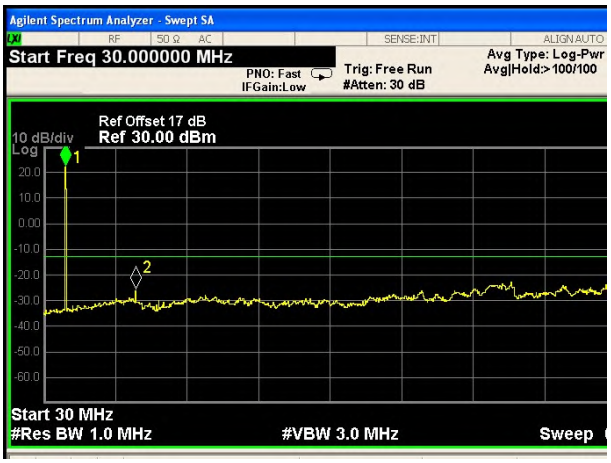


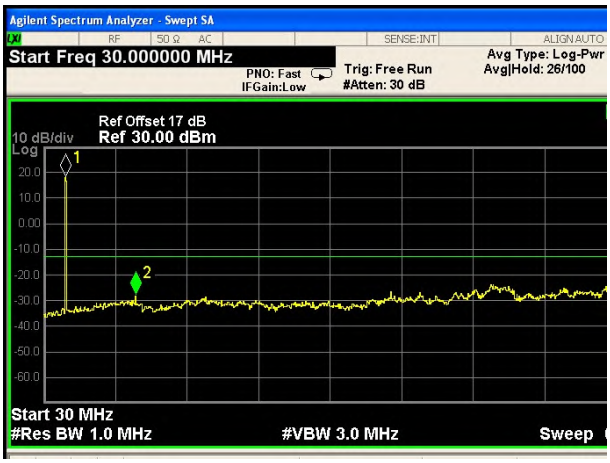
Lowest channel





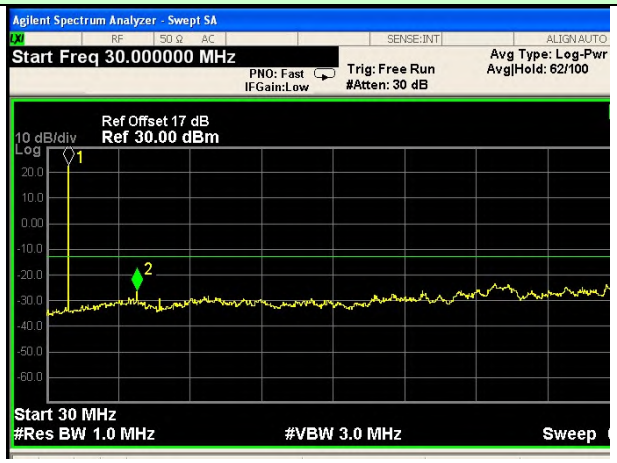
Middle channel

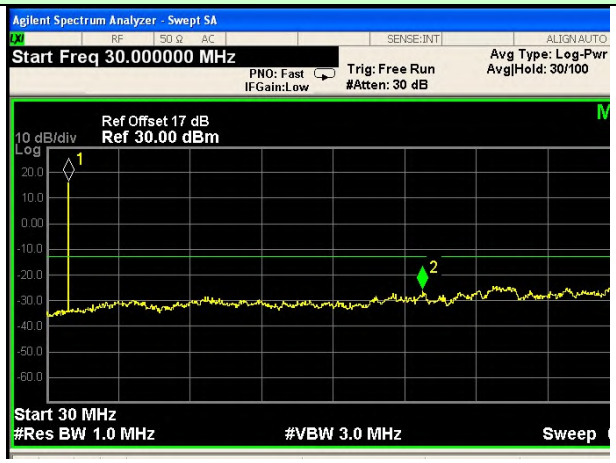




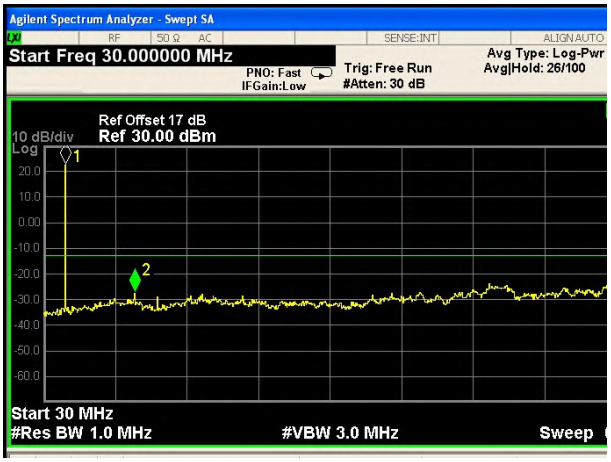
Highest channel

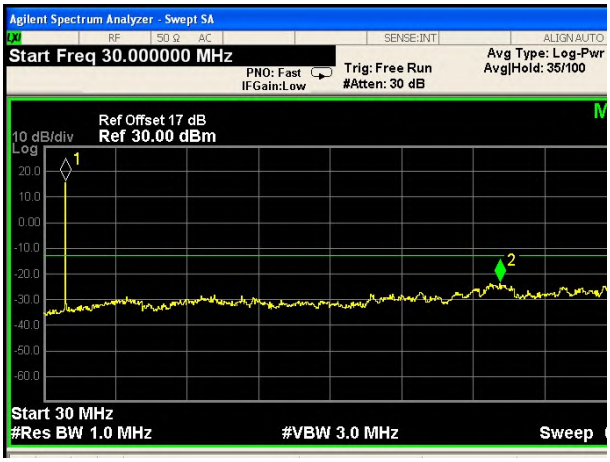
Test Mode: LTE Band 7 / 5MHz /1RB	Test Mode: LTE Band 7 / 5MHz /25RB



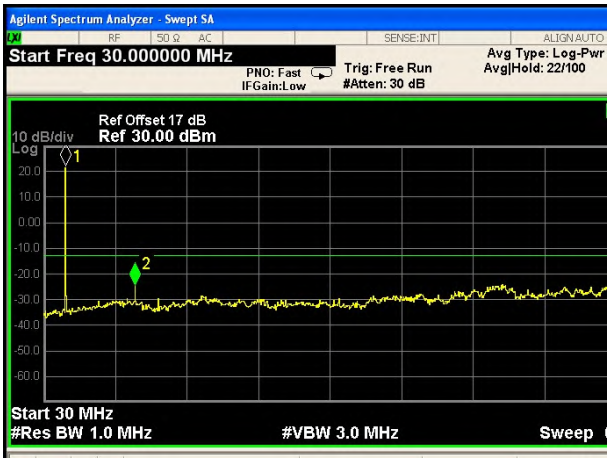


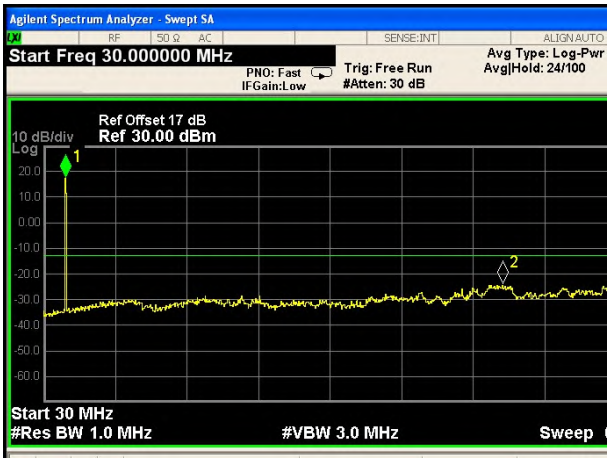
Lowest channel





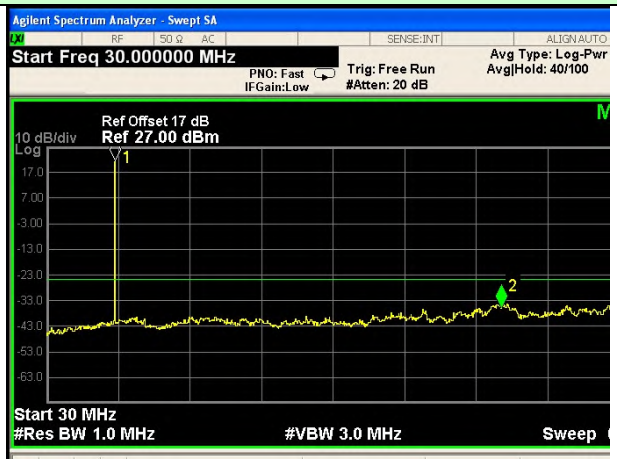
Middle channel

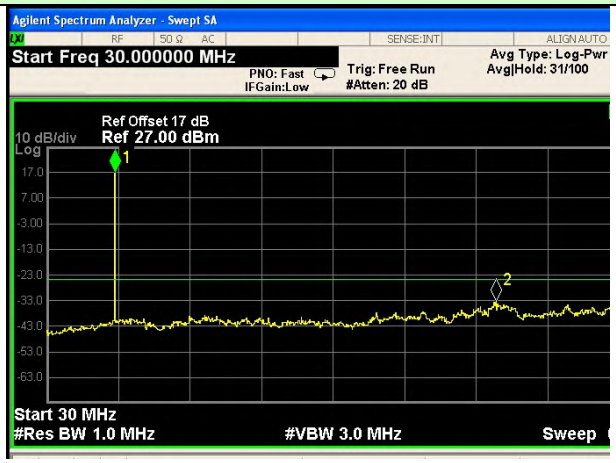




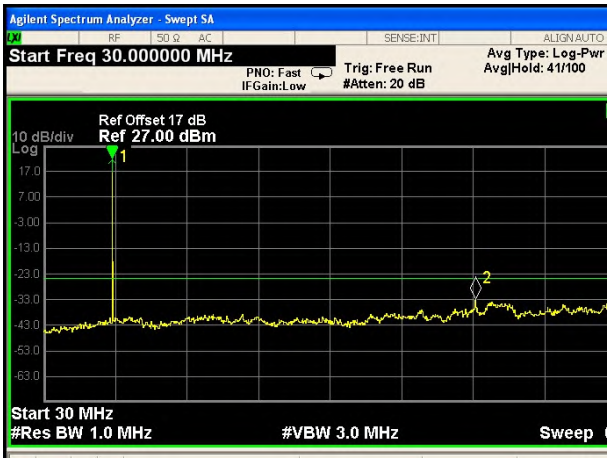
Highest channel

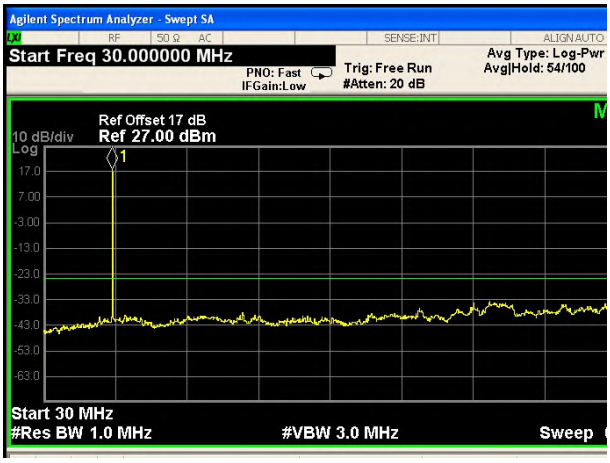
Test Mode: LTE Band 7 / 10MHz /1RB	Test Mode: LTE Band 7 / 10MHz /50RB



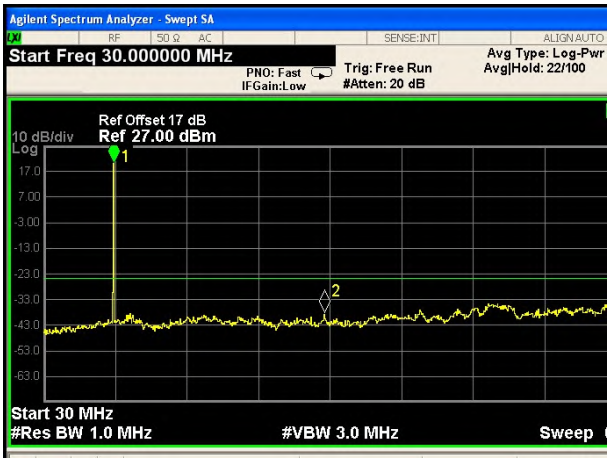


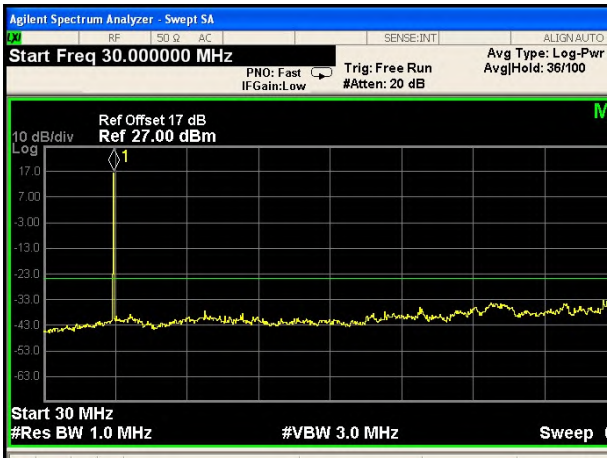
Lowest channel





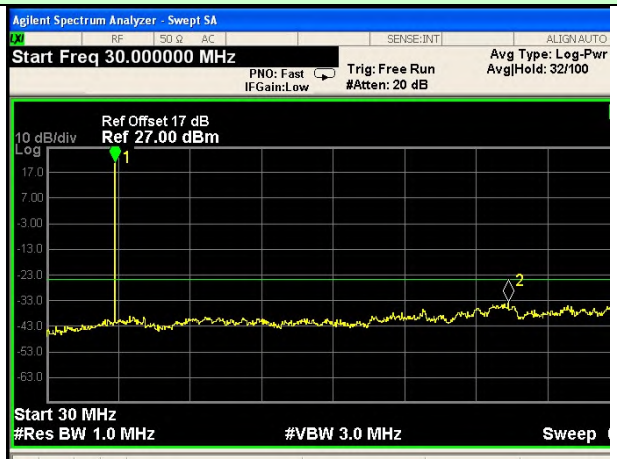
Middle channel

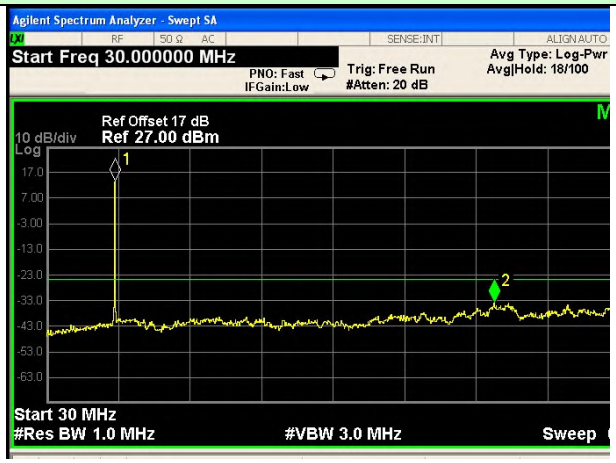




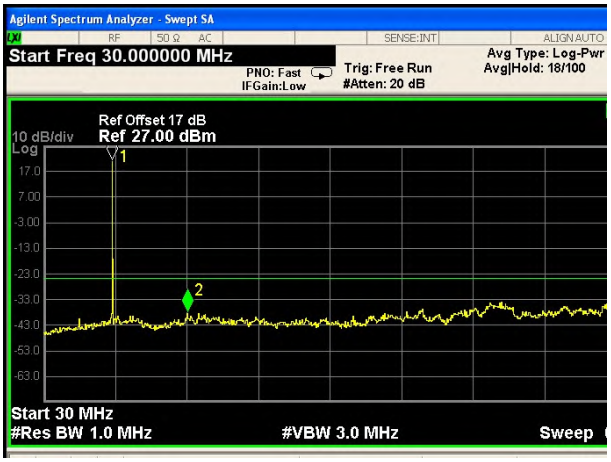
Highest channel

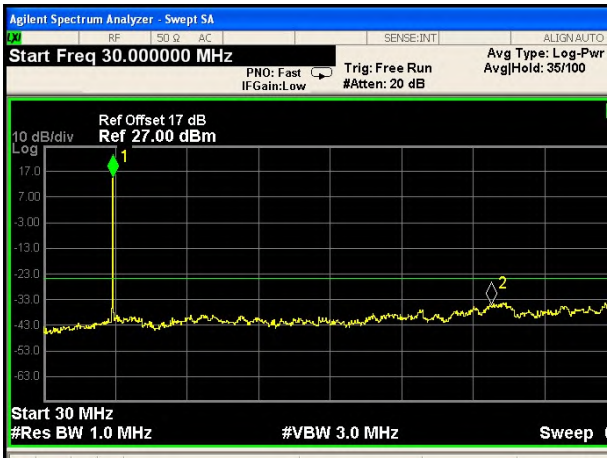
Test Mode: LTE Band 7 / 15MHz /1RB	Test Mode: LTE Band 7 / 15MHz /75RB



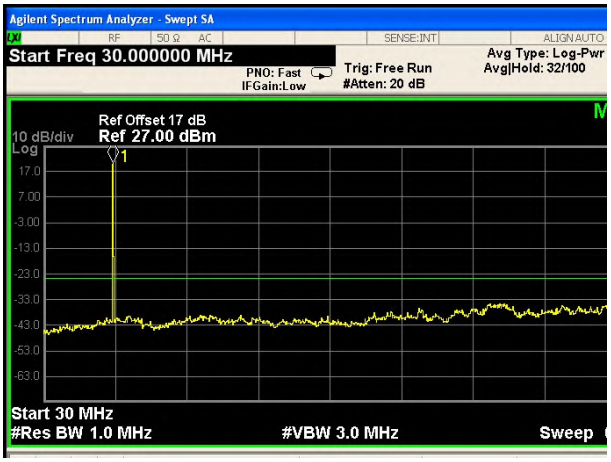


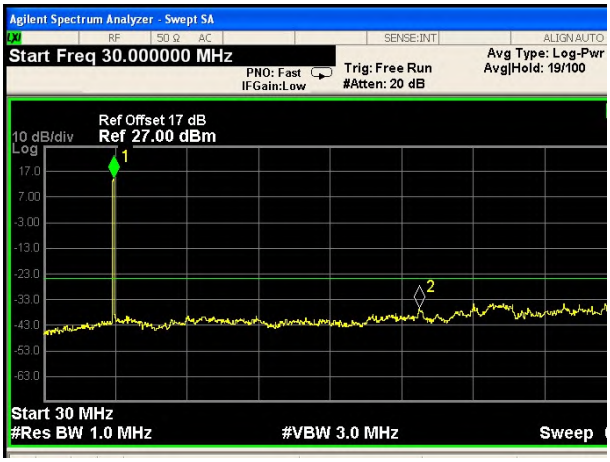
Lowest channel





Middle channel





Highest channel