FCC REPORT

Report Reference No. ..... :	TRE1612017506 R/C…….: 23449
FCC ID ..... :	SRQ-ZTEBLADEA602
Applicant's name ..... :	ZTE Corporation
Address ..... :	ZTE Plaza, Keji Road South, Shenzhen, China
Manufacturer.....:	ZTE Corporation
Address.....:	ZTE Plaza, Keji Road South, Shenzhen, China
Test item description..... :	LTE/WCDMA/GSM（GPRS） Multi-Mode Digital Mobile Phone
Trade Mark ..... :	ZTE
Model/Type reference..... :	ZTE BLADE A602
Listed Model(s) ..... :	ZTE Blade A602, BLADE A602, Blade A602
Standard..... :	47 CFR Part 24(E): Personal Communications Services 47 CFR Part 27: Miscellaneous wireless communications services
Date of receipt of test sample……..:	Oct. 25, 2016
Date of testing……:	Nov. 17, 2016 - Dec. 14, 2016
Date of issue……...:	Dec.15, 2016
Result.....……...:	Pass

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Testing Laboratory Name ..... :	Shenzhen Huatongwei International Inspection Co., Ltd.
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Change History		
Issue	Date	Reason for change
1.0	2016.12.15	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type	LTE/WCDMA/GSM（GPRS） Multi-Mode Digital Mobile Phone
Hardware Version	MB V1.0
Software Version	TEL_MX_BLADE_A602V1.0.0
EUT supports Radios application	GSM/GPRS/EDGE/WCDMA/HSPA/LTE WLAN2.4GHz 802.11b/g/n (HT40) Bluetooth V3.0+EDR / Bluetooth V4.0LE
Frequency Range	LTE Band 2 Tx: 1850.7MHz~1909.3MHz Rx: 1930.7MHz~1989.3MHz LTE Band 4 Tx: 1710.7MHz~1754.3MHz Rx: 2110.7MHz~2154.3MHz LTE Band 7 Tx: 2502.5MHz~2567.5MHz Rx: 2622.5MHz~2687.5MHz LTE Band 12 Tx: 699.7MHz~715.3MHz Rx: 729.7MHz~745.3MHz LTE Band 13 Tx: 779.5MHz~784.5MHz Rx: 748.5MHz~753.5MHz LTE Band 17 Tx: 706.5MHz~713.5MHz Rx: 736.5MHz~743.5MHz
Maximum Output Power to Antenna	LTE Band 2: 23.06dBm LTE Band 4: 22.54dBm LTE Band 7: 22.16dBm LTE Band 12: 22.92dBm LTE Band 13: 22.90dBm LTE Band 17: 23.13dBm
Bandwidth	LTE Band 2: 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz LTE Band 4: 1.4MHz/3MHz/5MHz/10MHz/15MHz/20MHz

	LTE Band 7: 5MHz/10MHz/15MHz/20MHz LTE Band 12: 1.4MHz/3MHz/5MHz/10MHz LTE Band 13: 5MHz/10MHz LTE Band 17: 5MHz/10MHz
Modulation Type	QPSK/16QAM
Antenna Type	Internal Antenna
Antenna Gain	LTE Band 2: -1.9dBi LTE Band 4: -1.8dBi LTE Band 7: -2.4dBi LTE Band 12/17: -1.5dBi LTE Band 13: -1.3dBi

Note: The EUT is a Mobile Phone, it contains 4 models, they are ZTE BLADE A602, ZTE Blade A602, BLADE A602, Blade A602. They have the same size, appearance and internal structure, and the only difference is the model number.

1.2 Maximum ERP/EIRP Power, Frequency Tolerance, and Emission Designator

FCC Rule	System	Type of Modulation	BW (MHz)	Emission Designator	Frequency Tolerance (ppm)	Maximum ERP/EIRP(W)
Part 24	LTE Band 2	QPSK	1.4	1M10G7D	—	0.121
Part 24	LTE Band 2	16QAM	1.4	1M10W7D	—	0.102
Part 24	LTE Band 2	QPSK	3	2M74G7D	—	0.122
Part 24	LTE Band 2	16QAM	3	2M74W7D	—	0.103
Part 24	LTE Band 2	QPSK	5	4M53G7D	0.03	0.123
Part 24	LTE Band 2	16QAM	5	4M53W7D	0.03	0.104
Part 24	LTE Band 2	QPSK	10	9M07G7D	—	0.124
Part 24	LTE Band 2	16QAM	10	9M07W7D	—	0.105
Part 24	LTE Band 2	QPSK	15	13M5G7D	—	0.126
Part 24	LTE Band 2	16QAM	15	13M5W7D	—	0.106
Part 24	LTE Band 2	QPSK	20	18M5G7D	—	0.127
Part 24	LTE Band 2	16QAM	20	18M4W7D	—	0.108
Part 27	LTE Band 4	QPSK	1.4	1M10G7D	—	0.107
Part 27	LTE Band 4	16QAM	1.4	1M10W7D	—	0.091
Part 27	LTE Band 4	QPSK	3	2M74G7D	—	0.108
Part 27	LTE Band 4	16QAM	3	2M74W7D	—	0.093
Part 27	LTE Band 4	QPSK	5	4M53G7D	0.03	0.109
Part 27	LTE Band 4	16QAM	5	4M52W7D	0.03	0.094
Part 27	LTE Band 4	QPSK	10	8M96G7D	—	0.110
Part 27	LTE Band 4	16QAM	10	8M95W7D	—	0.095
Part 27	LTE Band 4	QPSK	15	13M5G7D	—	0.111
Part 27	LTE Band 4	16QAM	15	13M5W7D	—	0.097
Part 27	LTE Band 4	QPSK	20	18M5G7D	—	0.113
Part 27	LTE Band 4	16QAM	20	18M5W7D	—	0.098

Part 27	LTE Band 7	QPSK	5	4M53G7D	0.02	0.089
Part 27	LTE Band 7	16QAM	5	4M52W7D	0.02	0.074
Part 27	LTE Band 7	QPSK	10	8M96G7D	—	0.090
Part 27	LTE Band 7	16QAM	10	8M94W7D	—	0.075
Part 27	LTE Band 7	QPSK	15	13M5G7D	—	0.091
Part 27	LTE Band 7	16QAM	15	13M5W7D	—	0.076
Part 27	LTE Band 7	QPSK	20	18M5G7D	—	0.092
Part 27	LTE Band 7	16QAM	20	18M6W7D	—	0.077
Part 27	LTE Band 12	QPSK	1.4	1M10G7D	—	0.131
Part 27	LTE Band 12	16QAM	1.4	1M10W7D	—	0.107
Part 27	LTE Band 12	QPSK	3	2M74G7D	—	0.132
Part 27	LTE Band 12	16QAM	3	2M75W7D	—	0.108
Part 27	LTE Band 12	QPSK	5	4M54G7D	0.05	0.135
Part 27	LTE Band 12	16QAM	5	4M53W7D	0.05	0.110
Part 27	LTE Band 12	QPSK	10	9M01G7D	—	0.136
Part 27	LTE Band 12	16QAM	10	8M98W7D	—	0.112
Part 27	LTE Band 13	QPSK	5	4M53G7D	0.05	0.141
Part 27	LTE Band 13	16QAM	5	4M52W7D	0.05	0.117
Part 27	LTE Band 13	QPSK	10	8M95G7D	—	0.142
Part 27	LTE Band 13	16QAM	10	8M94W7D	—	0.119
Part 27	LTE Band 17	QPSK	5	4M54G7D	0.05	0.140
Part 27	LTE Band 17	16QAM	5	4M52W7D	0.05	0.116
Part 27	LTE Band 17	QPSK	10	8M97G7D	—	0.142
Part 27	LTE Band 17	16QAM	10	8M95W7D	—	0.119

1.3 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 2, Part24, Part27 for the EUT FCC ID Certification:

1.47 CFR Part 2, 24(E), 27(F), 27(L), 27(H), 27(M)

2. ANSI/TIA/EIA-603-D-2010

3. FCC KDB 971168 D01 Power Meas. License Digital Systems v02r02

Test detailed items/section required by FCC rules and results are as below:

No.	Section	Description	Limit	Result
1	2.1046	Conducted RF Output Power	Reporting Only	PASS
2	27.50(d)(5)	Peak to Average Radio	＜13dB	PASS
3	27.50(h)(2) 24.232(c)	Effective Radiated Power(Band 2/7)	EIRP＜2Watt	PASS
	27.50(d)(4)	Effective Radiated Power(Band 4)	EIRP＜1Watt	PASS
	27.50(b)(10) 27.50(c)(10)	Effective Radiated Power(Band 12/13/17)	EIRP＜3Watt	PASS
4	2.1049 27.53(h)(3) 27.53(m)(6)	Occupied Bandwidth	Reporting Only	PASS
5	2.1051 24.238(b) 27.53(c) 27.53(g) 27.53(h)	Conducted Band Edge(Band 2/4/12/13/17)	＜ 43+10log10(P[watt])	PASS

	2.1051 27.53(m)(4)	Conducted Band Edge(Band 7)	＜5.5MHz: -13dBm ⩾5.5MHz: -25dBm	PASS
6	2.1051 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Conducted Spurious Emission (Band 2/4/12/13/17)	＜ 43+10log10(P[watt])	PASS
	2.1051 27.53(m)(4)	Conducted Spurious Emission (Band 7)	＜ 55+10log10(P[watt])	PASS
7	2.1053 24.238(a) 27.53(c) 27.53(g) 27.53(h)	Radiated Spurious Emission (Band 2/4/12/13/17)	＜ 43+10log10(P[watt])	PASS
	2.1053 27.53(m)(4)	Radiated Spurious Emission (Band 7)	＜ 55+10log10(P[watt])	PASS
8	2.1055 27.54	Frequency Stability	＜2.5ppm	PASS

Remark：

1. All test items were verified and recorded according to the standards and without any deviation during the test.

2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.4 Test Configuration of Equipment Under Test

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas. License Digital Systems v02r02 with maximum output power.

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

Test Items	Band	Bandwidth(MHz)						Modulation		RB#			Test Channel		
		1.4	3	5	10	15	20	QPSK	16QAM	1	Half	Full	L	M	H
Max. Output Power	2	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	4	√	√	√	√	√	√	√	√	√	√	√	√	√	√
	7			√	√	√	√	√	√	√	√	√	√	√	√
	12	√	√	√	√			√	√	√	√	√	√	√	√
	13			√	√			√	√	√	√	√	√	√	√
	17			√	√			√	√	√	√	√	√	√	√
Peak-to-Average Ratio	2						√		√	√		√	√	√	√
	4						√		√	√		√	√	√	√
	7						√		√	√		√	√	√	√
	12				√				√	√		√	√	√	√
	13				√				√	√		√	√	√	√
	17				√				√	√		√	√	√	√
26dB and 99% Bandwidth	2	√	√	√	√	√	√	√	√			√		√	
	4	√	√	√	√	√	√	√	√			√		√	
	7			√	√	√	√	√	√			√		√	
	12	√	√	√	√			√	√			√		√	
	13			√	√			√	√			√		√	
	17			√	√			√	√			√		√	
Conducted Band Edge	2	√	√	√	√	√	√	√	√	√		√	√		√
	4	√	√	√	√	√	√	√	√	√		√	√		√
	7			√	√	√	√	√	√	√		√	√		√
	12	√	√	√	√			√	√	√		√	√		√
	13			√	√			√	√	√		√	√		√
	17			√	√			√	√	√		√	√		√
Conducted Spurious Emission	2	√	√	√	√	√	√	√	√	√			√	√	√
	4	√	√	√	√	√	√	√	√	√			√	√	√
	7			√	√	√	√	√	√	√			√	√	√
	12	√	√	√	√			√	√	√			√	√	√
	13			√	√			√	√	√			√	√	√

	17			√	√			√	√	√			√	√	√
Frequency Stability	2	√	√	√	√	√	√	√				√		√	
	4	√	√	√	√	√	√	√				√		√	
	7			√	√	√	√	√				√		√	
	12	√	√	√	√			√				√		√	
	13			√	√			√				√		√	
	17			√	√			√				√		√	
ERP/EIRP	2	√	√	√	√	√	√	√	√	√			√	√	√
	4	√	√	√	√	√	√	√	√	√			√	√	√
	7			√	√	√	√	√	√	√			√	√	√
	12	√	√	√	√			√	√	√			√	√	√
	13			√	√			√	√	√			√	√	√
	17			√	√			√	√	√			√	√	√
Radiated Spurious Emission	2	√	√	√	√	√	√	√		√			√	√	√
	4	√	√	√	√	√	√	√		√			√	√	√
	7			√	√	√	√	√		√			√	√	√
	12	√	√	√	√			√		√			√	√	√
	13			√	√			√		√			√	√	√
	17			√	√			√		√			√	√	√
Note	**1. The mark " √ " means that this configuration is chosen for testing.** **2. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported.** **3. For E.R.P/E.I.R.P. measurement, the widest bandwidth and the bandwidth with the highest conducted power of each band is chosen for testing. Besides, the lowest bandwidth of each band is also measured for reporting only.**														

1.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.
Following shows an offset computation example with cable loss 7.5dB and 10dB attenuator.

Example:

Offset (dB) = RF cable loss(dB) + attenuator factor(dB).
= 7 + 10 = 17 (dB)

1.6 Facilities and Accreditations

1.6.1 Test Facilities

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories

(identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection Co., Ltd. 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 our files. Registration 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

1.6.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15℃- 35℃
Relative Humidity (%):	30% -60%
Atmospheric Pressure (kPa):	86KPa-106KPa

2. 47 CFR PART 2, PART 27H REQUIREMENTS

2.1 Conducted RF Output Power

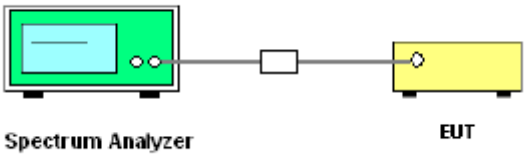
2.1.1 Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.1.3 Test Setup



2.1.4 Test Procedures

1. The transmitter output port was connected to the system simulator.
2. Set EUT at maximum power through system simulator.
3. Select lowest, middle, and highest channels for each band and different modulation.
4. Measure and record the power level from the system simulator.

2.1.5 Test Results

1. LTE Band 2 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				18700	18900	19100
Frequency(MHz)				1860	1880	1900
20	QPSK	1	0	**23.06**	23.04	23.05
20		1	49	23.01	23.00	23.02
20		1	99	22.96	22.98	22.95
20		50	0	22.21	22.20	22.22
20		50	24	22.16	22.12	22.15
20		50	49	22.11	22.13	22.12
20		100	0	22.07	22.10	22.08
20	16QAM	1	0	22.43	22.42	22.44
20		1	49	22.40	22.41	22.42
20		1	99	22.36	22.34	22.37
20		50	0	21.69	21.67	21.68
20		50	24	21.61	21.60	21.63
20		50	49	21.55	21.52	21.54
20		100	0	21.51	21.54	21.56
Channel				18675	18900	19125
Frequency(MHz)				1857.5	1880	1902.5
15	QPSK	1	0	23.00	**23.01**	22.98
15		1	37	22.96	22.98	22.95
15		1	74	22.90	22.93	22.91
15		36	0	22.12	22.15	22.16
15		36	18	22.10	22.09	22.11
15		36	37	22.03	22.07	22.08
15		75	0	22.02	22.06	22.05
15	16QAM	1	0	22.39	22.35	22.37
15		1	37	22.35	22.32	22.34
15		1	74	22.29	22.27	22.31
15		36	0	21.63	21.61	21.62
15		36	18	21.58	21.59	21.59
15		36	37	21.51	21.54	21.52
15		75	0	21.47	21.52	21.50

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				18650	18900	19150
Frequency(MHz)				1855	1880	1905
10	QPSK	1	0	22.94	**22.97**	22.95
10		1	24	22.88	22.89	22.91
10		1	49	22.80	22.87	22.88
10		25	0	22.05	22.08	22.10
10		25	12	22.02	22.05	22.07
10		25	24	21.99	22.01	22.03
10		50	0	21.98	21.95	21.96
10	16QAM	1	0	22.30	22.31	22.32
10		1	24	22.26	22.29	22.27
10		1	49	22.20	22.22	22.24
10		25	0	21.60	21.57	21.58
10		25	12	21.52	21.50	21.51
10		25	24	21.49	21.46	21.42
10		50	0	21.41	21.42	21.42
Channel				18625	18900	19175
Frequency(MHz)				1852.5	1880	1907.5
5	QPSK	1	0	**22.94**	22.91	22.92
5		1	12	22.85	22.86	22.84
5		1	24	22.78	22.77	22.76
5		12	0	22.01	21.99	22.03
5		12	6	21.98	21.94	21.99
5		12	11	21.91	21.98	21.97
5		25	0	21.90	21.91	21.92
5	16QAM	1	0	22.25	22.22	22.24
5		1	12	22.20	22.18	22.18
5		1	24	22.15	22.10	22.12
5		12	0	21.52	21.54	21.51
5		12	6	21.47	21.45	21.43
5		12	11	21.44	21.39	21.40
5		25	0	21.40	21.35	21.37

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				18615	18900	19185
Frequency(MHz)				1851.5	1880	1908.5
3	QPSK	1	0	22.86	**22.89**	22.87
3		1	7	22.78	22.81	22.80
3		1	14	22.72	22.75	22.74
3		8	0	21.96	21.98	21.97
3		8	4	21.88	21.81	21.83
3		8	7	21.83	21.78	21.81
3		15	0	21.85	21.79	21.82
3	16QAM	1	0	22.20	22.18	22.21
3		1	7	22.12	22.10	22.15
3		1	14	22.04	22.08	22.11
3		8	0	21.43	24.42	21.45
3		8	4	21.35	21.37	21.32
3		8	7	21.34	21.33	21.34
3		15	0	21.27	21.32	21.30
Channel				18607	18900	19193
Frequency(MHz)				1850.7	1732.5	1909.3
1.4	QPSK	1	0	**22.85**	22.81	21.83
1.4		1	2	22.73	22.72	22.76
1.4		1	5	22.68	22.66	22.70
1.4		3	0	21.90	21.89	21.85
1.4		3	1	21.82	21.84	21.81
1.4		3	2	21.78	21.75	21.76
1.4		6	0	21.75	21.72	21.74
1.4	16QAM	1	0	22.13	22.10	22.15
1.4		1	2	22.05	22.06	22.04
1.4		1	5	21.97	21.92	21.91
1.4		3	0	21.35	21.31	21.37
1.4		3	1	21.24	21.28	21.25
1.4		3	2	21.20	21.22	21.23
1.4		6	0	21.22	21.21	21.24

2. LTE Band 4 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20050	20175	20300
Frequency(MHz)				1720	1732.5	1745
20	QPSK	1	0	22.51	**22.54**	22.50
20		1	49	22.47	22.45	22.49
20		1	99	22.42	22.40	22.45
20		50	0	21.76	21.74	21.77
20		50	24	21.81	21.75	21.76
20		50	49	21.75	21.72	21.73
20		100	0	21.70	21.68	21.67
20	16QAM	1	0	22.02	22.05	22.04
20		1	49	21.95	21.92	21.96
20		1	99	21.84	21.85	21.87
20		50	0	21.27	21.22	21.24
20		50	24	21.19	21.17	21.10
20		50	49	21.11	21.15	21.06
20		100	0	21.14	21.10	21.11
Channel				20025	20175	20325
Frequency(MHz)				1717.5	1732.5	1747.5
15	QPSK	1	0	**22.46**	22.42	22.44
15		1	37	22.40	22.38	22.42
15		1	74	22.35	22.32	22.33
15		36	0	21.68	21.67	21.69
15		36	18	21.62	21.61	21.63
15		36	37	21.54	21.56	21.54
15		75	0	21.51	21.50	21.52
15	16QAM	1	0	21.96	21.99	21.93
15		1	37	21.90	21.95	21.89
15		1	74	21.82	21.82	21.83
15		36	0	21.16	21.13	21.18
15		36	18	21.09	21.05	21.10
15		36	37	21.01	20.96	21.03
15		75	0	21.06	21.04	21.01

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20000	20175	20350
Frequency(MHz)				1715	1732.5	1750
10	QPSK	1	0	**22.44**	22.41	22.42
10		1	24	22.38	22.39	22.36
10		1	49	22.29	22.32	22.28
10		25	0	21.72	21.76	21.73
10		25	12	21.68	21.65	21.69
10		25	24	21.60	21.61	21.65
10		50	0	21.50	21.52	21.52
10	16QAM	1	0	21.83	21.85	21.84
10		1	24	21.78	21.72	21.75
10		1	49	21.70	21.69	21.66
10		25	0	21.05	21.03	21.02
10		25	12	20.98	21.00	20.96
10		25	24	20.92	20.98	20.94
10		50	0	20.99	20.94	20.93
Channel				19975	20175	20375
Frequency(MHz)				1712.5	1732.5	1752.5
5	QPSK	1	0	22.39	**22.41**	22.38
5		1	12	22.36	22.33	22.34
5		1	24	22.31	22.23	22.25
5		12	0	21.61	21.59	21.61
5		12	6	21.54	21.55	21.58
5		12	11	21.50	21.51	21.57
5		25	0	21.48	21.52	21.50
5	16QAM	1	0	21.77	21.76	21.72
5		1	12	21.71	21.74	21.68
5		1	24	21.65	21.71	21.65
5		12	0	20.98	20.91	20.98
5		12	6	20.96	20.92	20.95
5		12	11	20.90	20.94	20.92
5		25	0	20.83	20.88	20.90

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				19965	20175	20385
Frequency(MHz)				1711.5	1732.5	1753.5
3	QPSK	1	0	22.35	22.36	**22.38**
3		1	7	22.31	22.30	22.32
3		1	14	22.26	22.22	22.25
3		8	0	21.60	21.61	21.54
3		8	4	21.52	21.55	21.50
3		8	7	21.48	21.42	21.46
3		15	0	21.42	21.40	21.41
3	16QAM	1	0	21.61	21.62	21.65
3		1	7	21.57	21.55	21.53
3		1	14	21.52	21.50	21.49
3		8	0	20.90	20.85	20.88
3		8	4	20.84	20.88	20.85
3		8	7	20.79	20.78	20.75
3		15	0	20.72	20.76	20.78
Channel				19957	20175	20393
Frequency(MHz)				1710.7	1732.5	1754.3
1.4	QPSK	1	0	**22.34**	22.32	22.31
1.4		1	2	22.28	22.29	22.30
1.4		1	5	22.22	22.24	22.23
1.4		3	0	21.56	21.58	21.55
1.4		3	1	21.52	21.53	21.58
1.4		3	2	21.46	21.47	21.51
1.4		6	0	21.35	21.39	21.39
1.4	16QAM	1	0	21.52	21.57	21.59
1.4		1	2	21.43	21.54	21.51
1.4		1	5	21.41	21.42	21.44
1.4		3	0	20.85	20.81	20.77
1.4		3	1	20.79	20.73	20.72
1.4		3	2	20.70	20.68	20.67
1.4		6	0	20.69	20.62	20.62

3. LTE Band 7 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				20850	21100	21350
Frequency(MHz)				2510	2535	2560
20	QPSK	1	0	22.12	**22.16**	22.14
20		1	49	22.08	22.07	22.03
20		1	99	22.01	22.02	22.05
20		50	0	21.42	21.44	21.46
20		50	24	21.38	21.40	21.41
20		50	49	21.30	21.32	21.35
20		100	0	21.31	21.30	21.33
20	16QAM	1	0	21.45	21.41	21.43
20		1	49	21.40	21.37	21.39
20		1	99	21.38	21.35	21.35
20		50	0	20.81	20.75	20.78
20		50	24	20.79	20.77	20.72
20		50	49	20.75	20.71	20.76
20		100	0	20.72	20.68	20.70
Channel				20825	21100	21375
Frequency(MHz)				2507.5	2535	2562.5
15	QPSK	1	0	**22.10**	22.08	22.09
15		1	37	22.08	22.05	22.08
15		1	74	22.02	22.98	22.04
15		36	0	21.35	21.33	21.36
15		36	18	21.32	21.31	21.32
15		36	37	21.25	21.27	21.28
15		75	0	21.24	21.23	21.25
15	16QAM	1	0	21.42	21.38	21.39
15		1	37	21.34	21.32	21.35
15		1	74	21.31	21.28	21.29
15		36	0	20.76	20.74	20.78
15		36	18	20.70	20.69	20.73
15		36	37	20.66	20.64	20.67
15		75	0	20.71	20.68	20.69

BW(MHz)	Modulation	RB	RB	Power(dBm)	Power(dBm)	Power(dBm)

		Size	Offset	Low Ch./Freq.	Middle Ch./Freq.	High Ch./Freq.
Channel				20800	21100	21400
Frequency(MHz)				2505	2535	2565
10	QPSK	1	0	**22.06**	22.02	22.05
10		1	24	22.01	22.00	22.03
10		1	49	22.96	22.93	22.98
10		25	0	21.30	21.30	21.28
10		25	12	21.22	21.24	21.25
10		25	24	21.25	21.27	21.28
10		50	0	21.20	21.22	21.25
10	16QAM	1	0	21.35	21.32	21.34
10		1	24	21.20	21.12	21.21
10		1	49	21.15	21.10	21.16
10		25	0	20.71	20.65	20.67
10		25	12	20.65	20.62	20.64
10		25	24	20.58	20.52	20.55
10		50	0	20.56	20.55	20.54
Channel				20775	21100	21425
Frequency(MHz)				2502.5	2535	2567.5
5	QPSK	1	0	22.00	**22.01**	22.02
5		1	12	21.96	21.98	21.94
5		1	24	21.90	22.91	22.88
5		12	0	21.25	21.25	21.22
5		12	6	21.21	21.20	21.20
5		12	11	21.18	21.15	21.16
5		25	0	21.15	21.16	21.12
5	16QAM	1	0	21.22	21.24	21.20
5		1	12	21.20	21.22	21.18
5		1	24	21.15	21.14	21.14
5		12	0	20.65	20.60	20.62
5		12	6	20.60	20.58	20.60
5		12	11	20.52	20.56	20.50
5		25	0	20.54	20.50	20.52

4. LTE Band 12 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				23060	23095	23130
Frequency(MHz)				704	707.5	711
10	QPSK	1	0	22.90	**22.92**	22.88
10		1	24	22.84	22.87	22.83
10		1	49	22.82	22.85	22.80
10		25	0	22.41	22.38	22.35
10		25	12	22.32	22.38	22.30
10		25	24	22.27	22.30	22.25
10		50	0	22.25	22.22	22.28
10	16QAM	1	0	22.03	22.05	22.04
10		1	24	21.96	21.02	21.98
10		1	49	21.92	21.99	21.96
10		25	0	21.55	21.53	21.50
10		25	12	21.48	21.50	21.47
10		25	24	21.42	21.48	21.44
10		50	0	21.40	21.44	21.40
Channel				23035	23095	23155
Frequency(MHz)				701.5	707.5	713.5
5	QPSK	1	0	**22.86**	22.85	22.82
5		1	12	22.81	22.79	22.78
5		1	24	22.78	22.71	22.72
5		12	0	22.36	22.35	22.32
5		12	6	22.25	22.23	22.22
5		12	11	22.18	22.18	22.19
5		25	0	22.20	22.21	22.20
5	16QAM	1	0	21.98	21.96	21.95
5		1	12	21.94	21.92	21.91
5		1	24	21.89	21.85	21.89
5		12	0	21.42	21.45	21.40
5		12	6	21.38	21.39	21.36
5		12	11	21.35	21.31	21.37
5		25	0	21.30	21.35	21.32

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				23025	23095	23165
Frequency(MHz)				700.5	707.5	714.5
3	QPSK	1	0	**22.80**	22.78	22.77
3		1	7	22.76	22.70	22.75
3		1	14	22.71	22.68	22.69
3		8	0	22.30	22.32	22.28
3		8	4	22.18	22.19	22.16
3		8	7	22.15	22.14	22.13
3		15	0	22.09	22.10	22.18
3	16QAM	1	0	21.90	21.93	21.91
3		1	7	21.87	21.88	21.89
3		1	14	21.82	21.82	21.85
3		8	0	21.36	21.39	21.35
3		8	4	21.31	21.36	21.30
3		8	7	21.28	21.30	21.26
3		15	0	21.25	21.28	21.27
Channel				23017	23095	23173
Frequency(MHz)				699.7	707.5	715.3
1.4	QPSK	1	0	**22.76**	22.74	22.75
1.4		1	2	22.70	22.68	22.71
1.4		1	5	22.66	22.66	22.64
1.4		3	0	22.25	22.23	22.24
1.4		3	1	22.12	22.11	22.10
1.4		3	2	22.10	22.09	22.09
1.4		6	0	22.02	22.04	22.10
1.4	16QAM	1	0	21.84	21.82	21.86
1.4		1	2	21.80	21.77	21.78
1.4		1	5	21.74	21.72	21.75
1.4		3	0	21.32	21.31	21.30
1.4		3	1	21.28	21.25	21.26
1.4		3	2	21.21	21.22	21.24
1.4		6	0	21.20	21.23	21.24

5. LTE Band 13 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				23230		
Frequency(MHz)				782		
10	QPSK	1	0	**22.90**		
10		1	24	22.86		
10		1	49	22.82		
10		25	0	22.22		
10		25	12	22.17		
10		25	24	22.21		
10		50	0	22.19		
10	16QAM	1	0	22.25		
10		1	24	22.18		
10		1	49	22.21		
10		25	0	21.81		
10		25	12	21.77		
10		25	24	21.69		
10		50	0	21.65		
Channel				23205	23230	23255
Frequency(MHz)				779.5	782	784.5
5	QPSK	1	0	**22.87**	22.84	22.85
5		1	12	22.79	22.80	22.82
5		1	24	22.74	22.75	22.75
5		12	0	22.16	22.13	22.17
5		12	6	22.12	22.11	22.13
5		12	11	22.10	22.14	22.09
5		25	0	22.14	22.10	22.12
5	16QAM	1	0	22.20	22.19	22.18
5		1	12	22.14	22.15	22.17
5		1	24	22.09	22.12	22.13
5		12	0	21.72	21.66	21.64
5		12	6	21.68	21.59	21.60
5		12	11	21.62	21.55	21.54
5		25	0	21.55	21.56	21.57

6. LTE Band 17 Conducted Power Test Verdict:

BW(MHz)	Modulation	RB Size	RB Offset	Power(dBm) Low Ch./Freq.	Power(dBm) Middle Ch./Freq.	Power(dBm) High Ch./Freq.
Channel				23780	23790	23800
Frequency(MHz)				709	710	711
10	QPSK	1	0	23.10	23.11	**23.13**
10		1	24	23.08	23.07	23.11
10		1	49	23.05	23.06	23.08
10		25	0	22.65	22.71	22.72
10		25	12	22.62	22.66	22.64
10		25	24	22.61	22.64	22.66
10		50	0	22.64	22.63	22.62
10	16QAM	1	0	22.30	22.29	22.27
10		1	24	22.26	22.25	22.23
10		1	49	22.21	22.24	22.21
10		25	0	21.78	21.76	21.75
10		25	12	21.72	21.70	21.71
10		25	24	21.66	21.65	21.67
10		50	0	21.62	21.58	21.60
Channel				23755	23790	23825
Frequency(MHz)				706.5	710	713.5
5	QPSK	1	0	**23.05**	23.04	23.02
5		1	12	23.01	23.03	23.00
5		1	24	22.94	22.98	22.95
5		12	0	22.51	22.53	22.57
5		12	6	22.46	22.50	22.49
5		12	11	22.42	22.44	22.45
5		25	0	22.51	22.50	22.52
5	16QAM	1	0	22.22	22.23	22.20
5		1	12	22.20	22.18	22.16
5		1	24	22.12	22.15	22.13
5		12	0	21.62	21.65	21.64
5		12	6	21.60	21.61	21.62
5		12	11	21.57	21.58	21.55
5		25	0	21.54	21.53	21.51

2.2 Peak to Average Radio

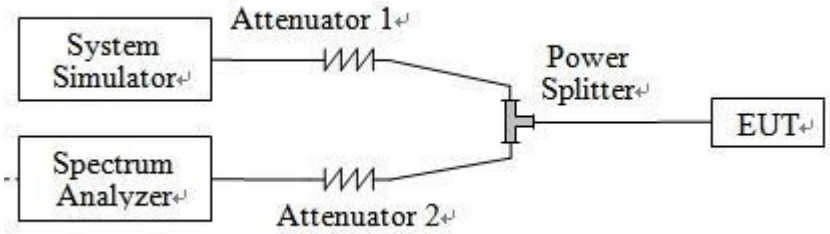
2.2.1 Definition

Power Complementary Cumulative Distribution Function (CCDF) curves provide a means for characterizing the power peaks of a digitally modulated signal on a statistical basis. A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

2.2.3 Test Description



2.2.4 Test Procedures

1. The EUT was connected to spectrum and system simulator via a power divider.
2. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
3. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

2.2.5 Test Results of Peak-to-Average Ratio

1. Test Result of LTE Band 2 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
20	16QAM	18700	1860	1	0	4.93	Plot A1 to A6	13	PASS
				100	0	6.18			
	16QAM	18900	1880	1	0	5.32			PASS
				100	0	6.06			
	16QAM	19100	1900	1	0	5.24			PASS
				100	0	6.18			

2. Test Result of LTE Band 4 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
20	16QAM	20050	1720	1	0	5.19	Plot B1 to B6	13	PASS
				100	0	6.36			
	16QAM	20175	1732.5	1	0	5.91			PASS
				100	0	6.40			
	16QAM	20300	1745	1	0	5.33			PASS
				100	0	6.17			

3. Test Result of LTE Band 7 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
20	16QAM	20850	2510	1	0	4.47	Plot C1 to C6	13	PASS
				100	0	5.99			
	16QAM	21100	2535	1	0	4.41			PASS
				100	0	6.19			
	16QAM	21350	2560	1	0	4.30			PASS
				100	0	5.83			

4. Test Result of LTE Band 12 Peak-to-Average Ratio:

BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
10	16QAM	23060	704	1	0	6.31	Plot D1 to D6	13	PASS
				50	0	6.33			
	16QAM	23095	707.5	1	0	4.99			PASS
				50	0	6.61			
	16QAM	23130	711	1	0	4.88			PASS
				50	0	6.40			

5. Test Result of LTE Band 13 Peak-to-Average Ratio:

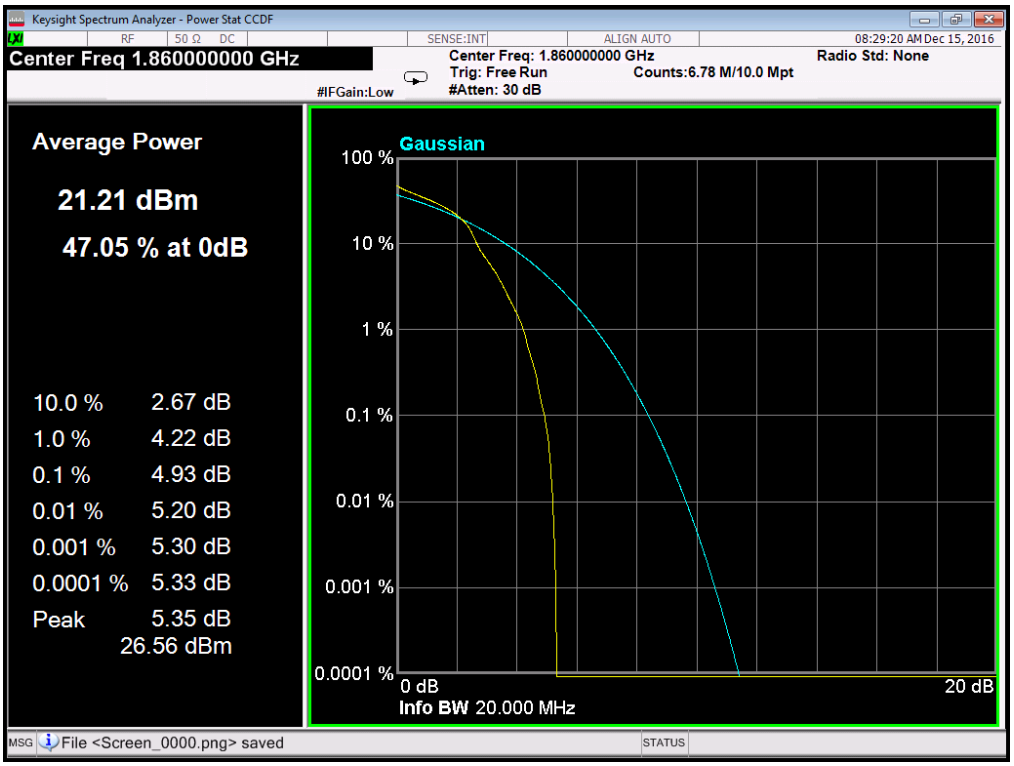
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
10	16QAM	23230	782	1	0	5.31	Plot E1 to E2	13	PASS
				50	0	6.48			

6. Test Result of LTE Band 17 Peak-to-Average Ratio:

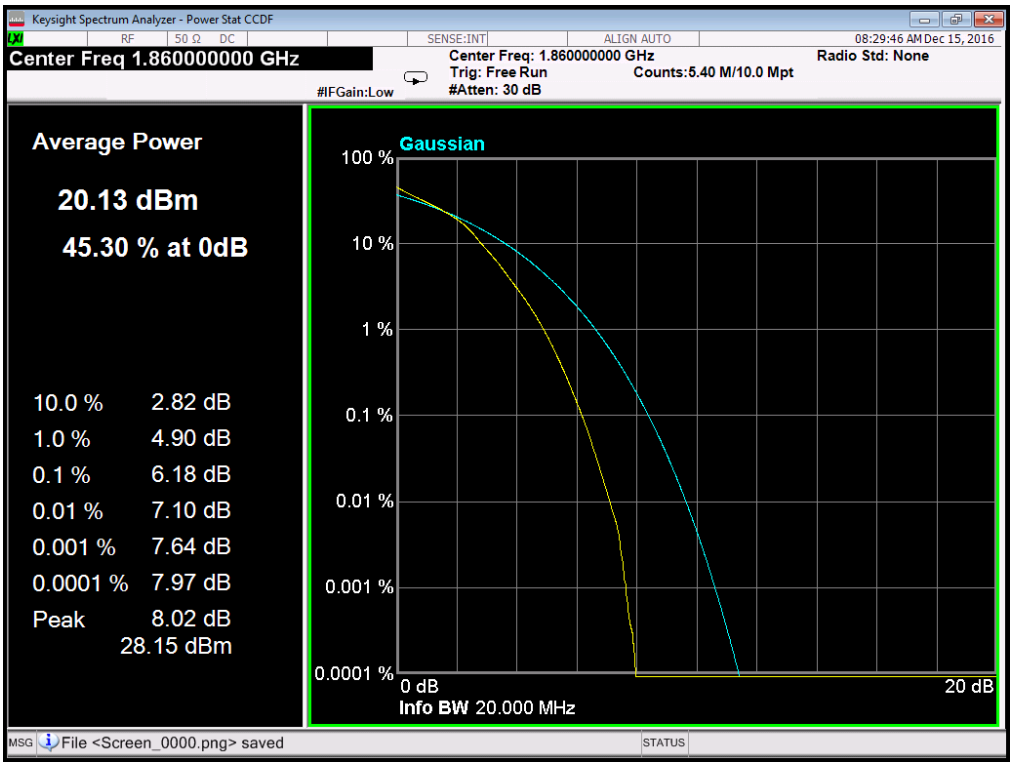
BW (MHz)	Modulation	Channel	Frequency (MHz)	RB Size	RB Offset	Peak to Average radio		Limit	Verdict
						dB	Refer to Plot	dB	
10	16QAM	23780	709	1	0	4.41	Plot F1 to F6	13	PASS
				50	0	6.32			
	16QAM	23790	710	1	0	4.43			PASS
				50	0	6.46			
	16QAM	23800	711	1	0	4.86			PASS
				50	0	6.33			

Note: both QPSK/16QAM modulation modes were tested, only provide worst-case mode (16QAM) test plots here.

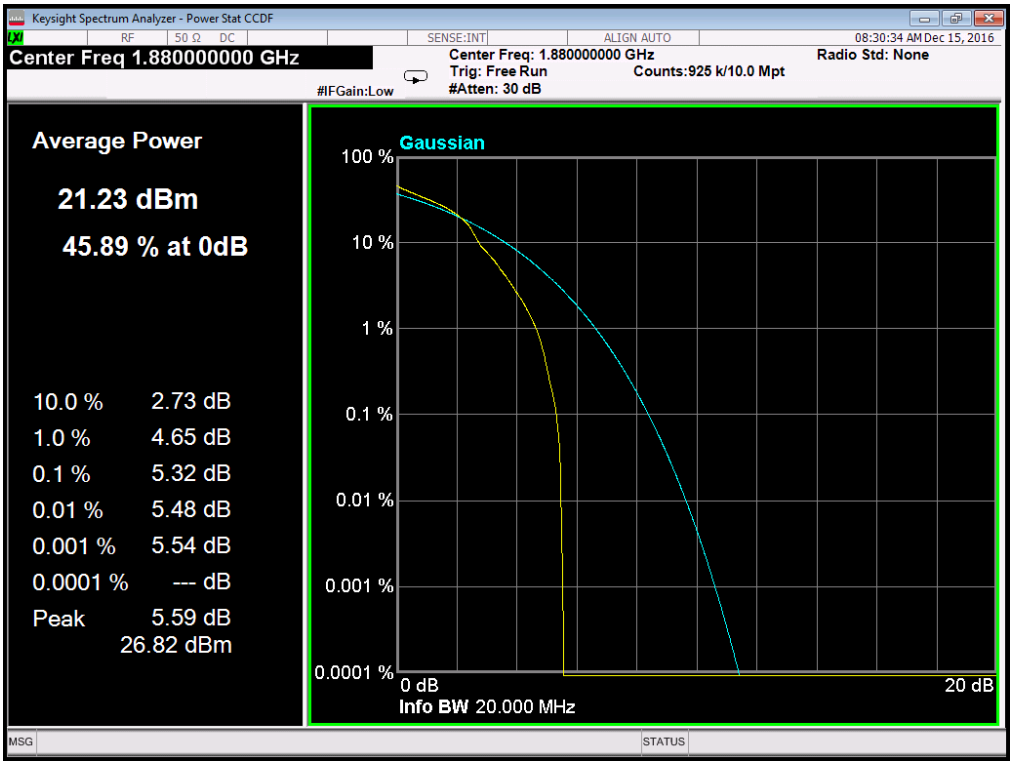
2.2.6 Test Results (Plots) of Peak-to-Average Ratio



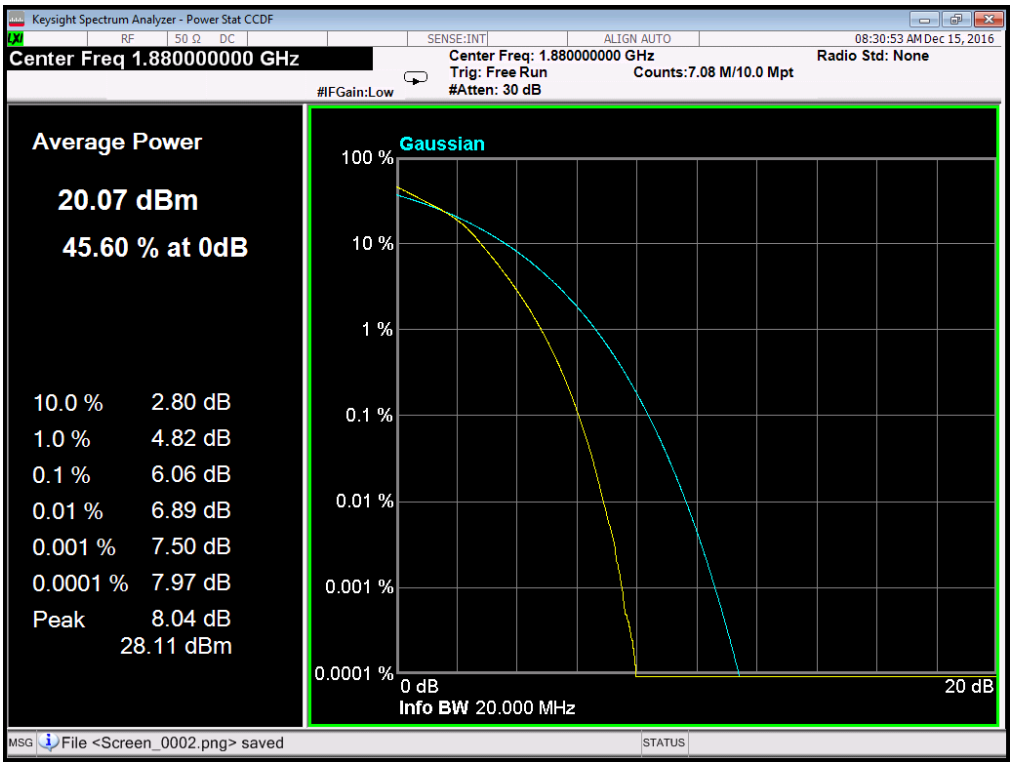
(Plot A1: Band 2/20MHz/16QAM in L Ch 1RB Size)



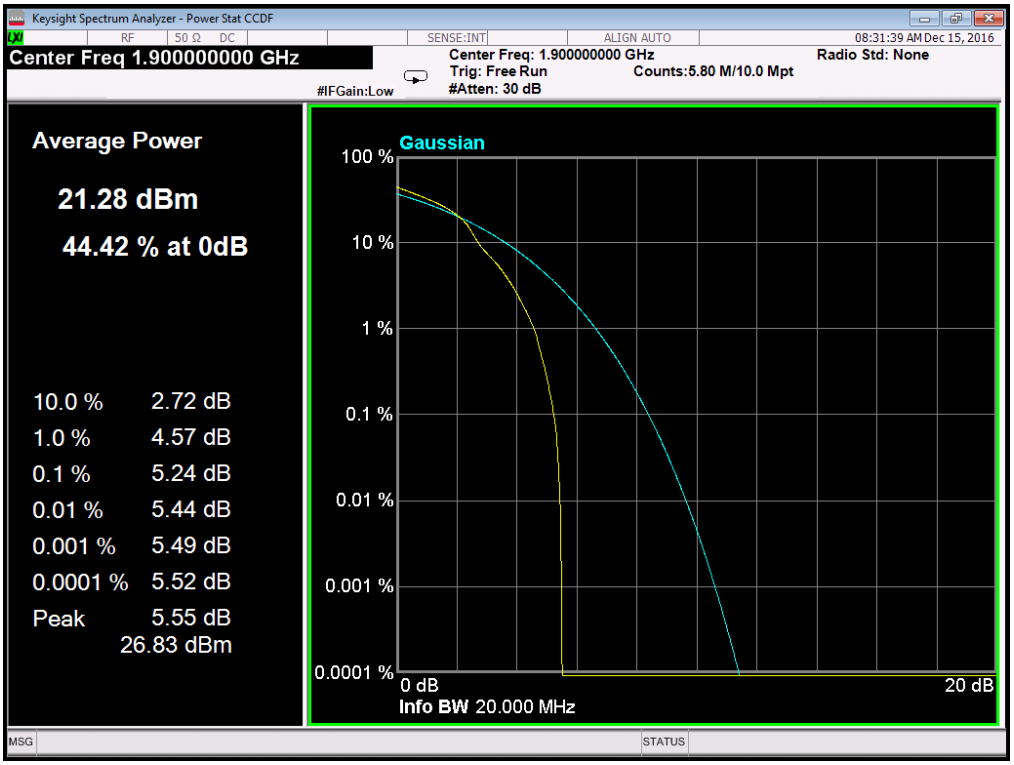
(Plot A1: Band 2/20MHz/16QAM in L Ch 100RB Size)



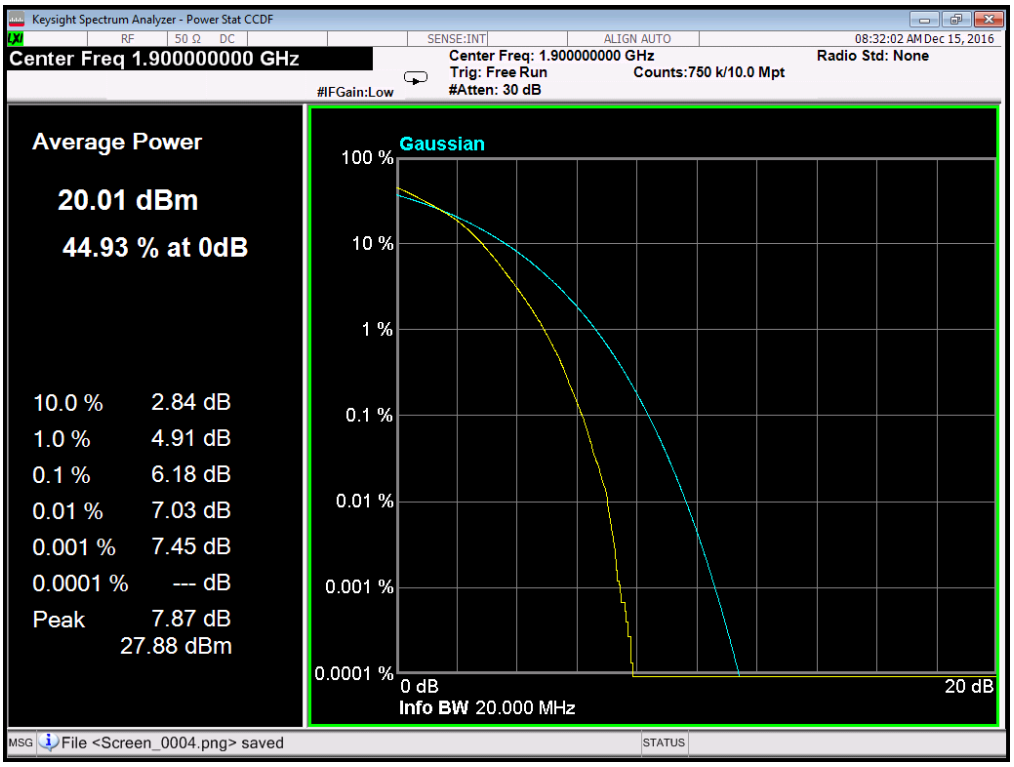
(Plot A1: Band 2/20MHz/16QAM in M Ch 1RB Size)



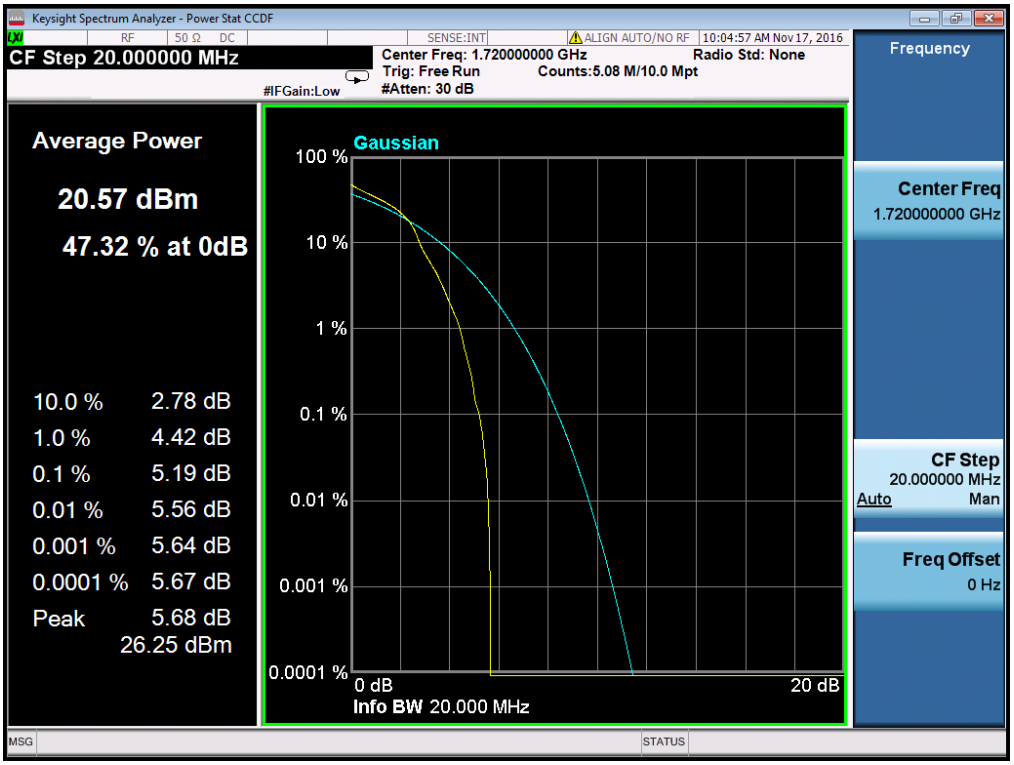
(Plot A1: Band 2/20MHz/16QAM in M Ch 100RB Size)



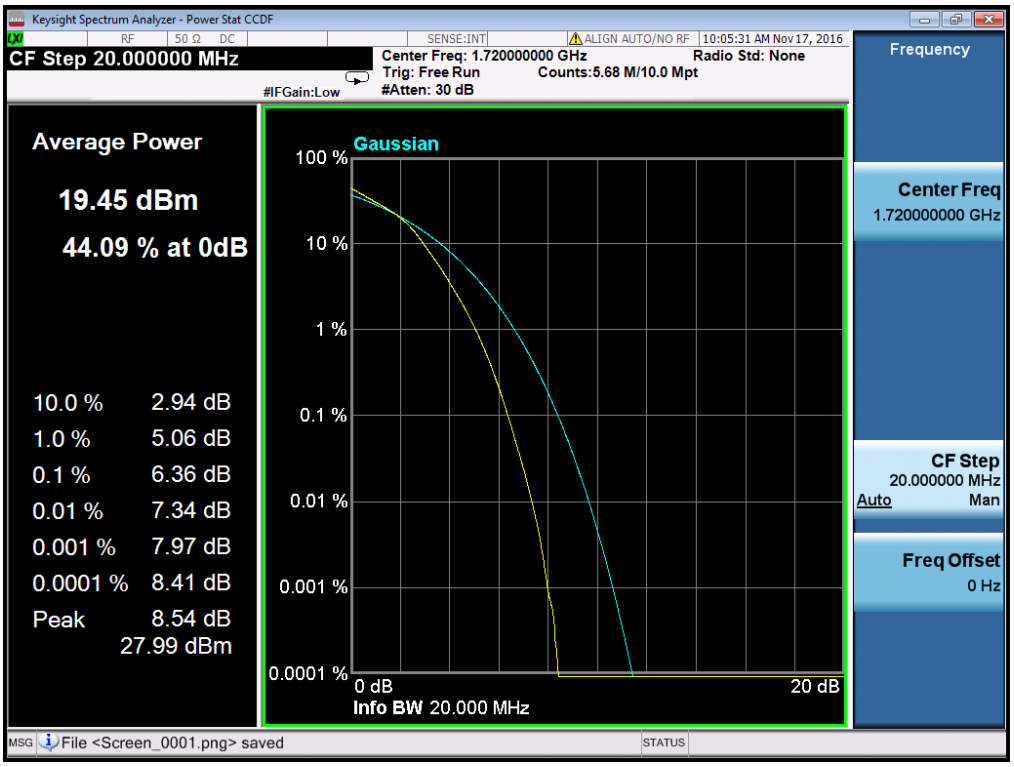
(Plot A1: Band 2/20MHz/16QAM in H Ch 1RB Size)



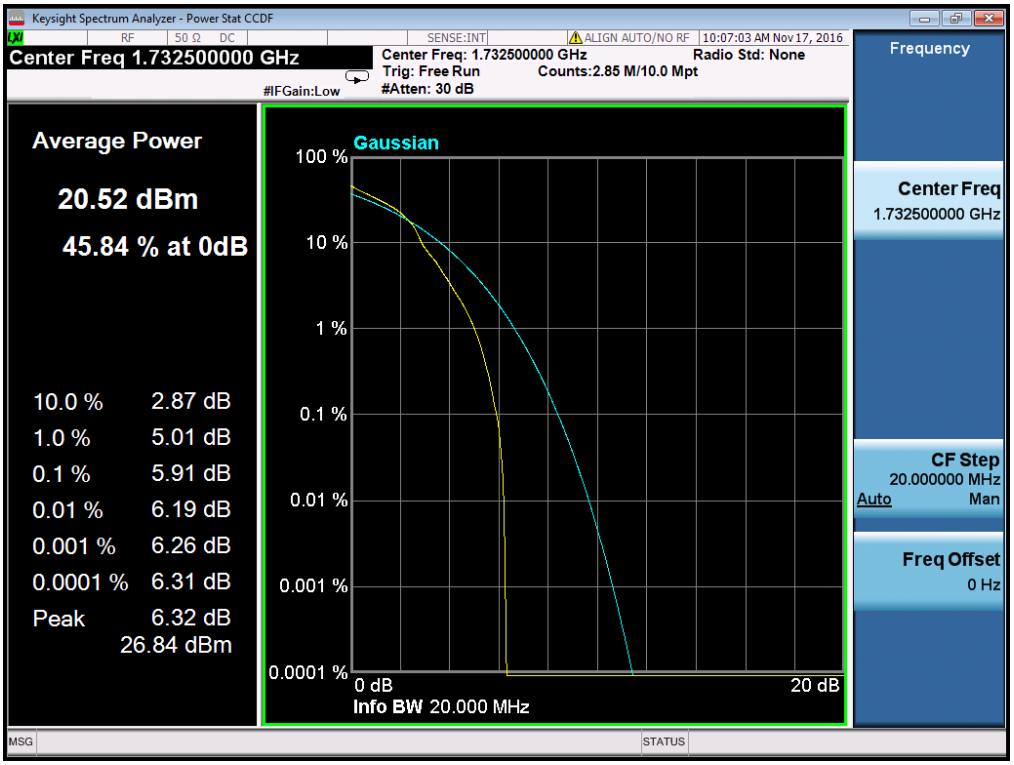
(Plot A1: Band 2/20MHz/16QAM in H Ch 100RB Size)



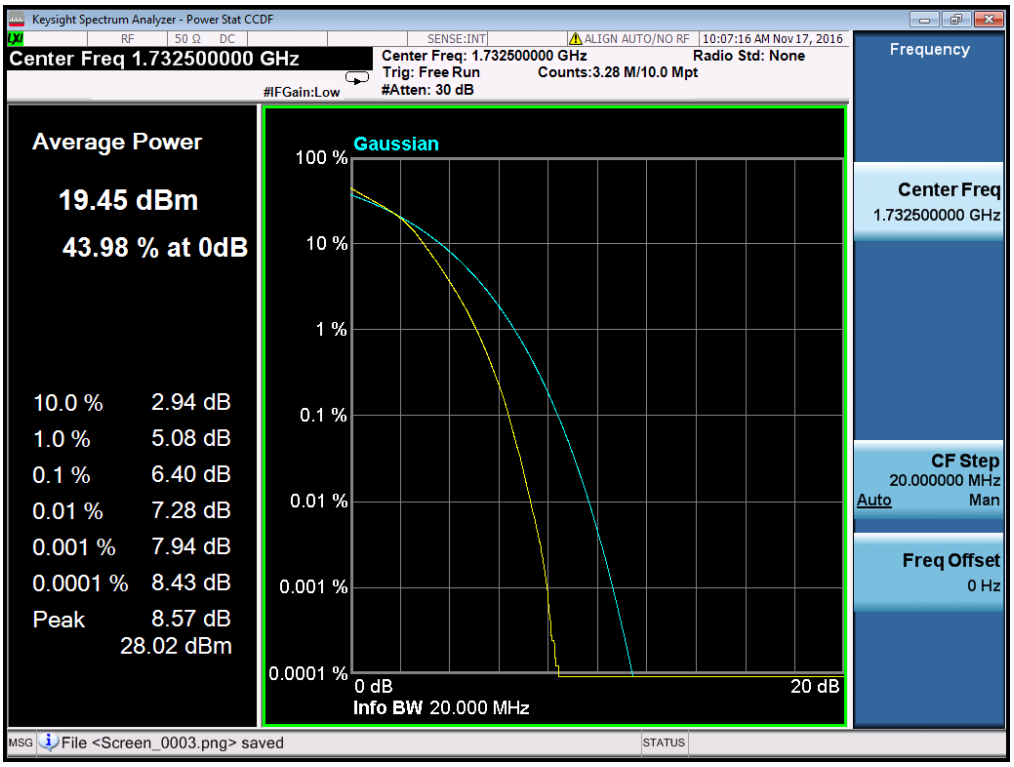
(Plot B1: Band 4/20MHz/16QAM in L Ch 1RB Size)



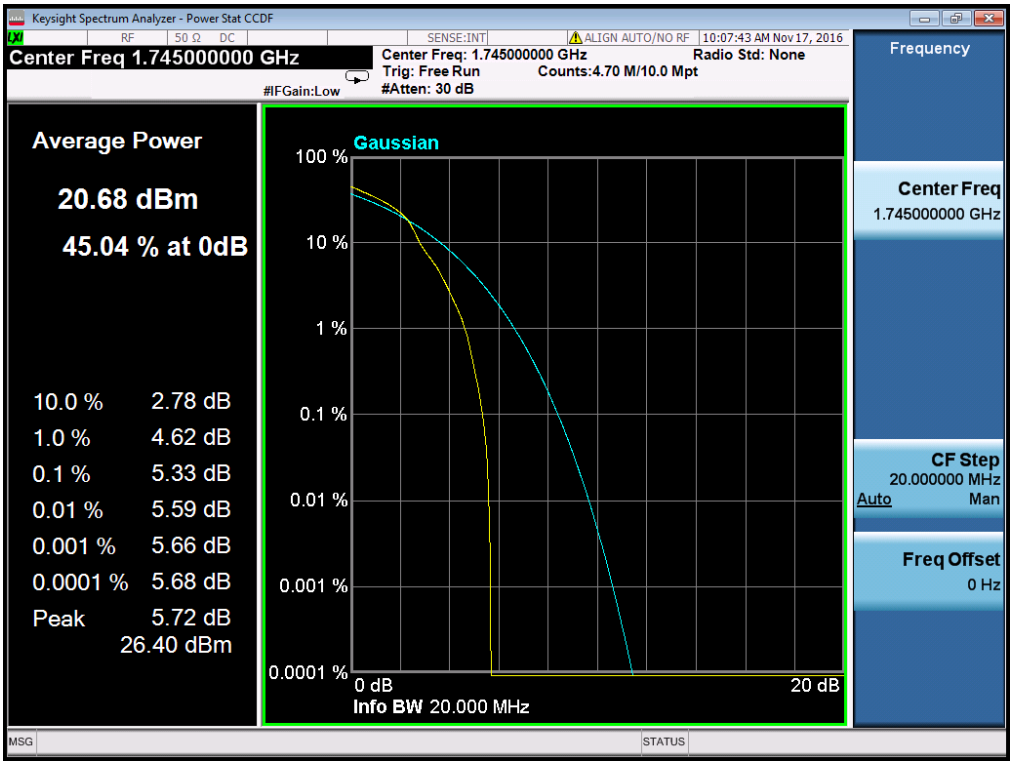
(Plot B2: Band 4/20MHz/16QAM in L Ch 100RB Size)



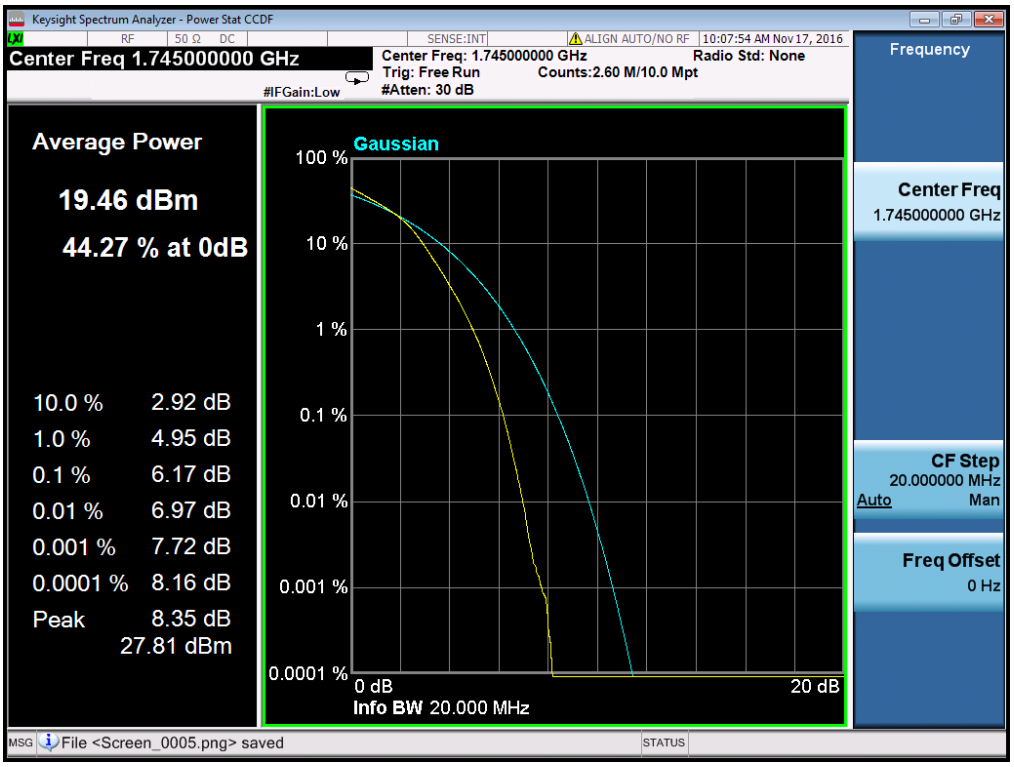
(Plot B3: Band 4/20MHz/16QAM in M Ch 1RB Size)



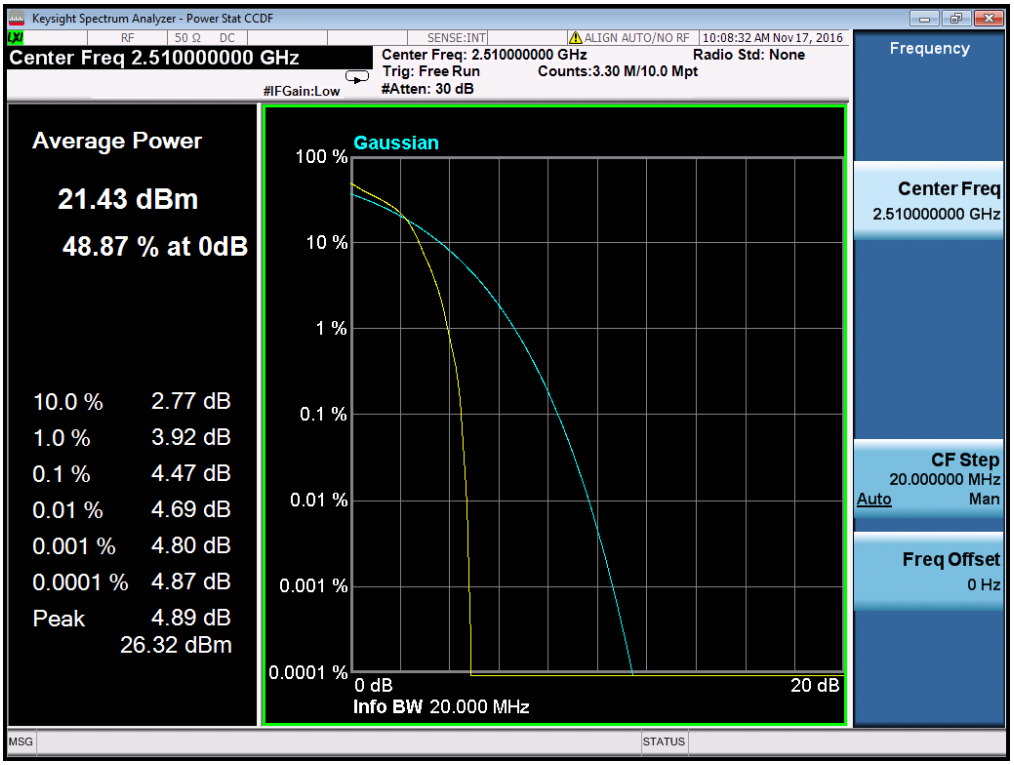
(Plot B4: Band 4/20MHz/16QAM in M Ch 100RB Size)



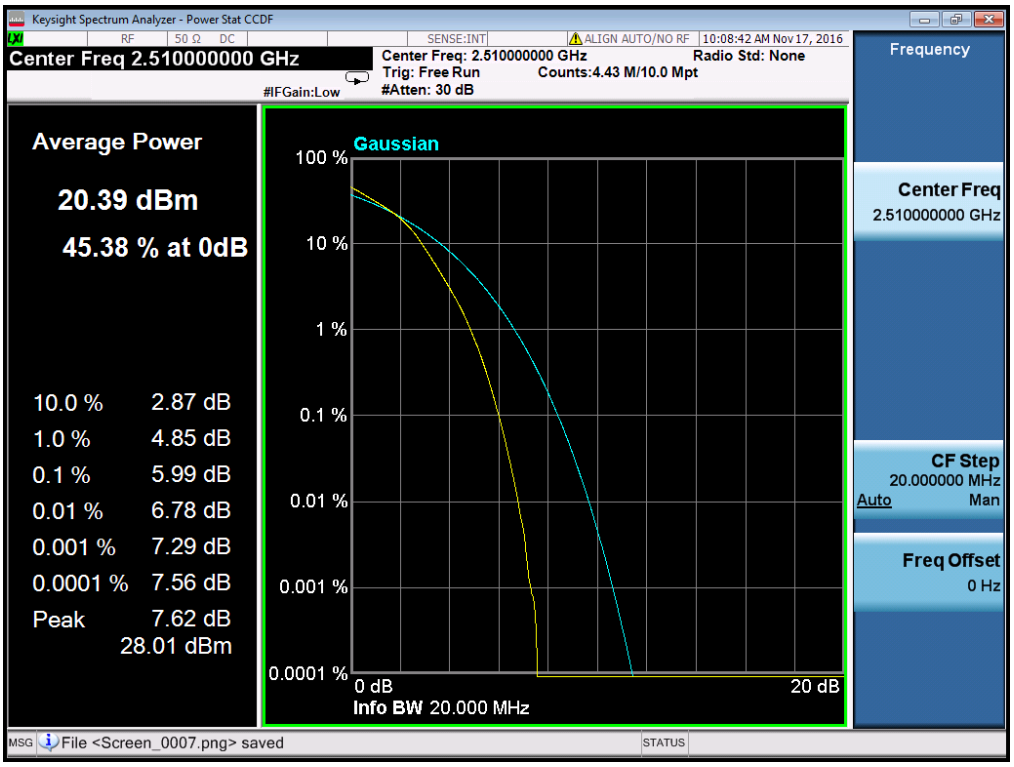
(Plot B5: Band 4/20MHz/16QAM in H Ch 1RB Size)



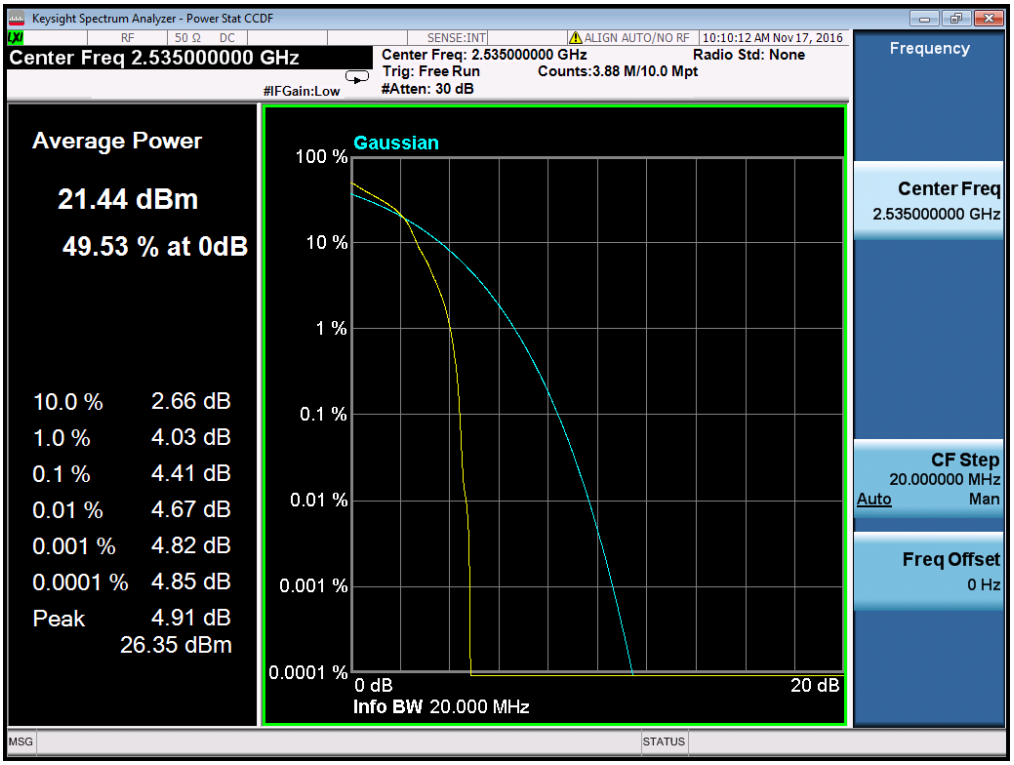
(Plot B6: Band 4/20MHz/16QAM in H Ch 100RB Size)



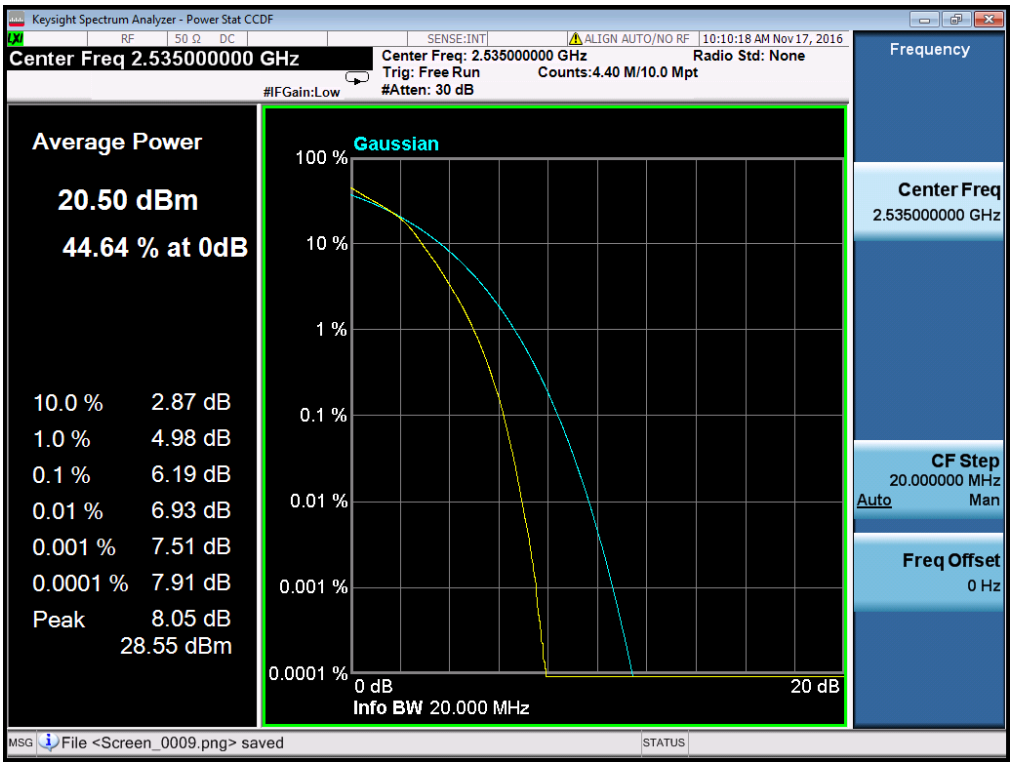
(Plot C1: Band 7/20MHz/16QAM in L Ch 1RB Size)



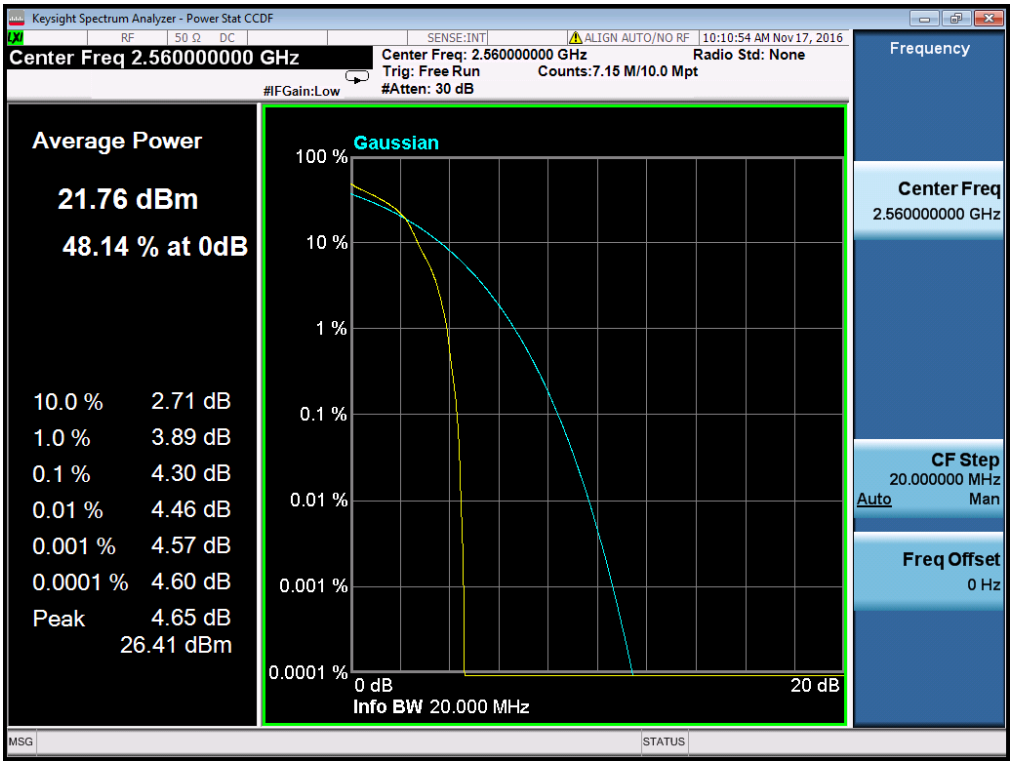
(Plot C2: Band 7/20MHz/16QAM in L Ch 100RB Size)



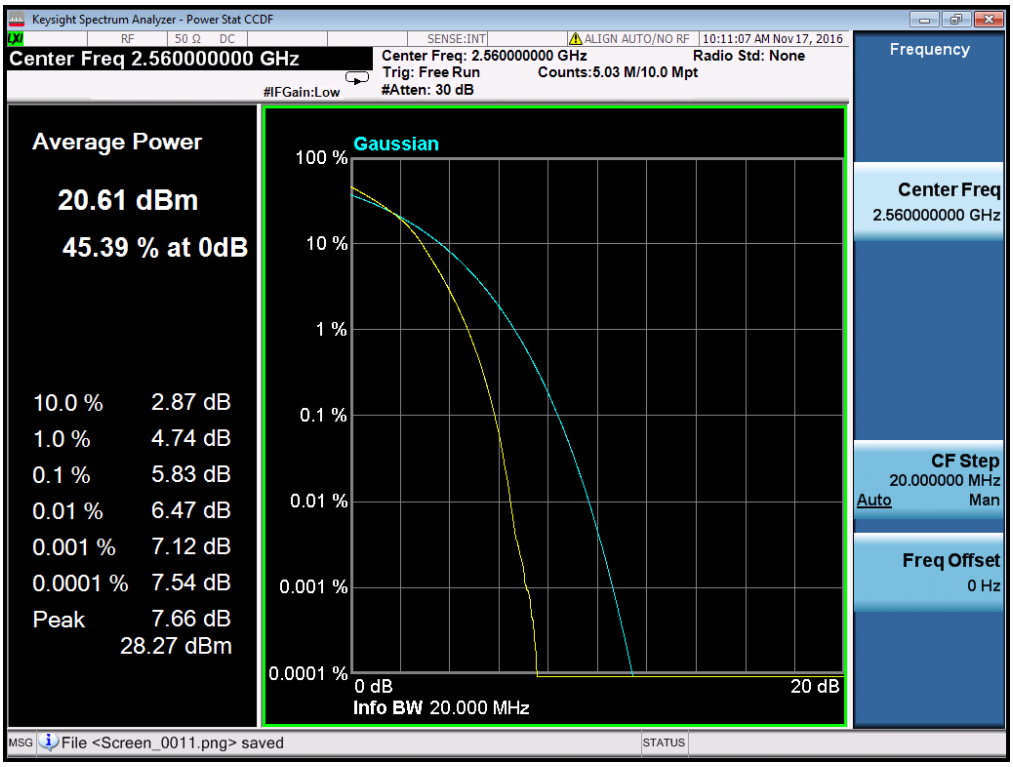
(Plot C3: Band 7/20MHz/16QAM in M Ch 1RB Size)



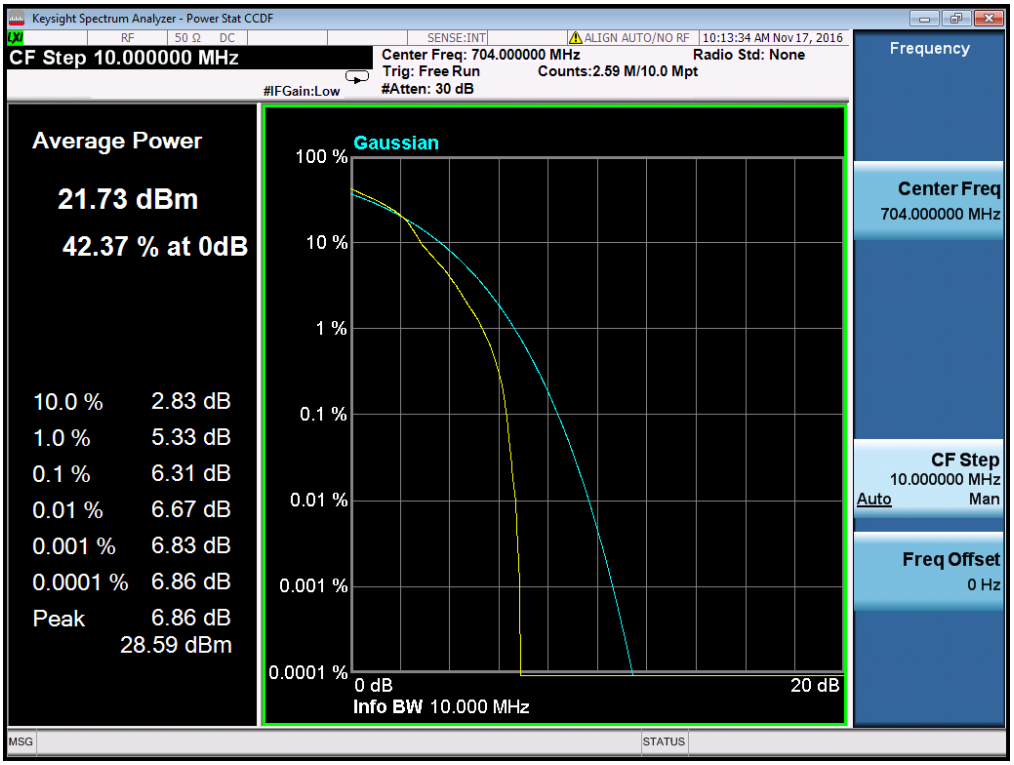
(Plot C4: Band 7/20MHz/16QAM in M Ch 100RB Size)



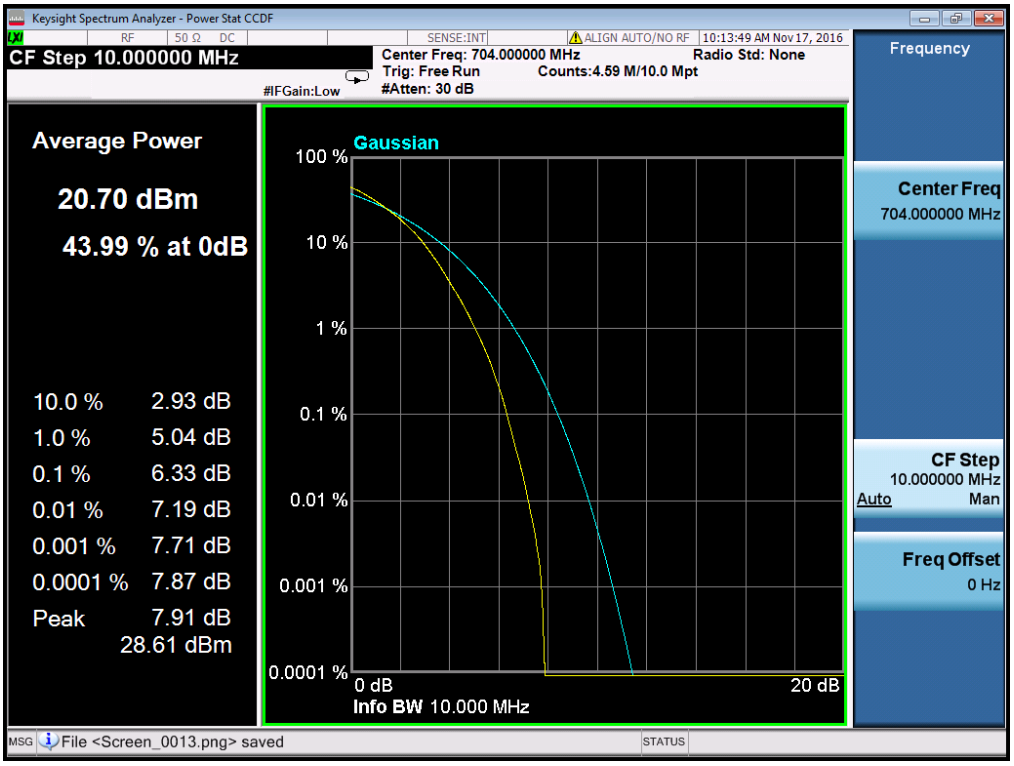
(Plot C5: Band 7/20MHz/16QAM in H Ch 1RB Size)



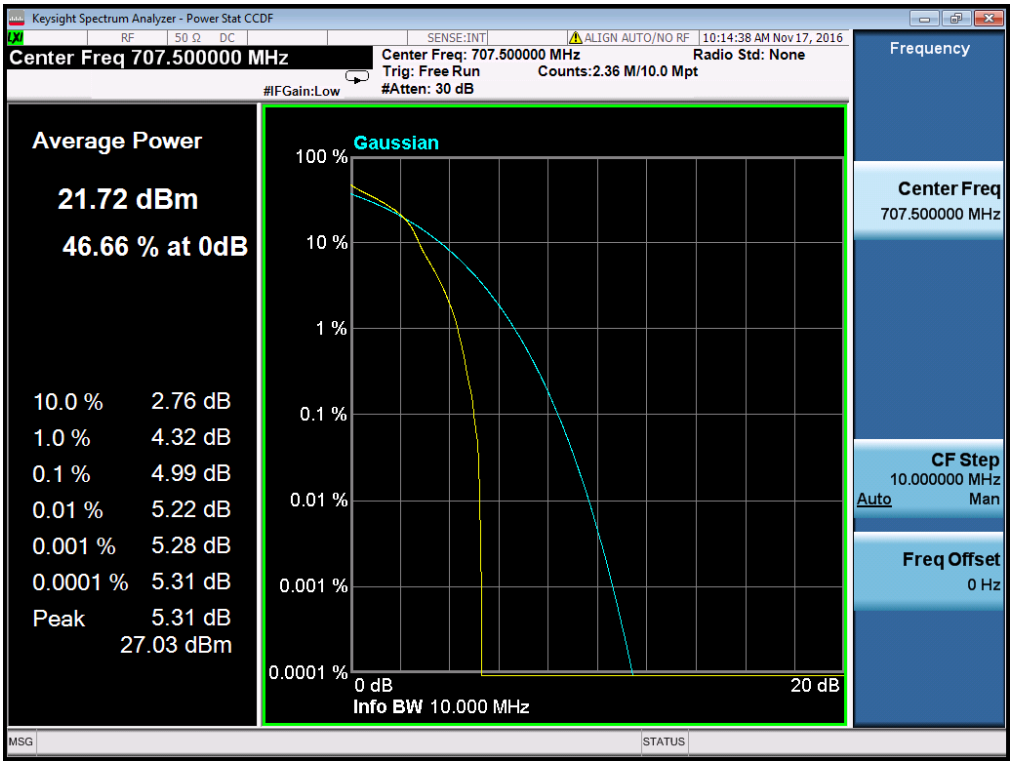
(Plot C6: Band 7/20MHz/16QAM in H Ch 100RB Size)



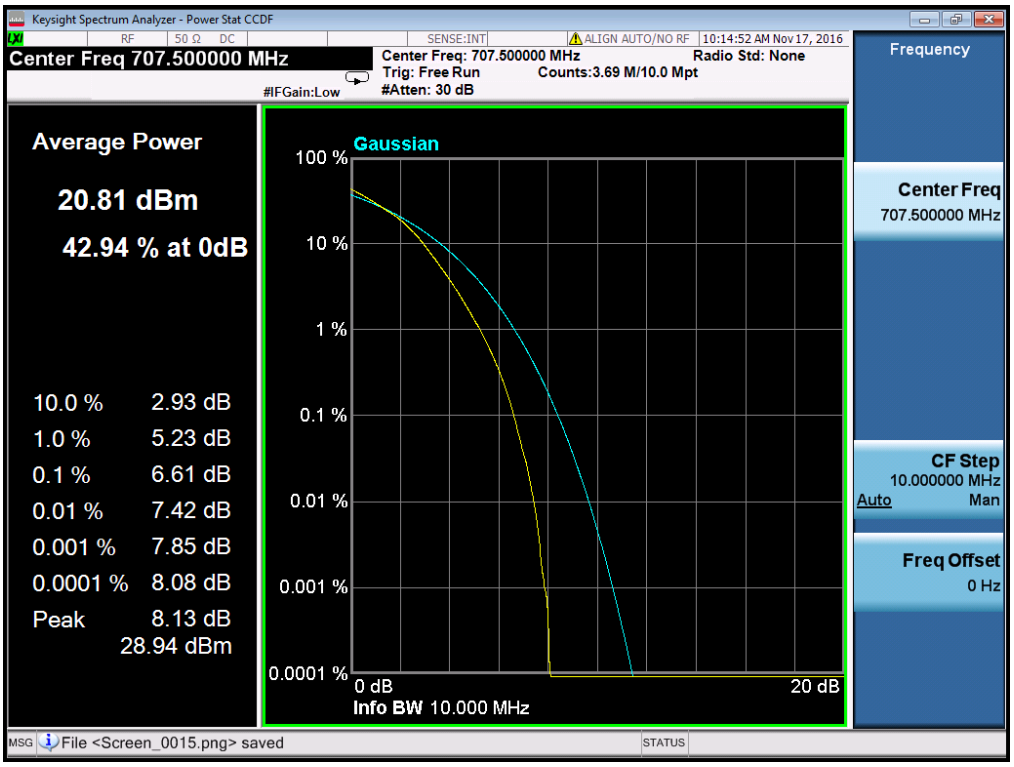
(Plot D1: Band 12/10MHz/16QAM in L Ch 1RB Size)



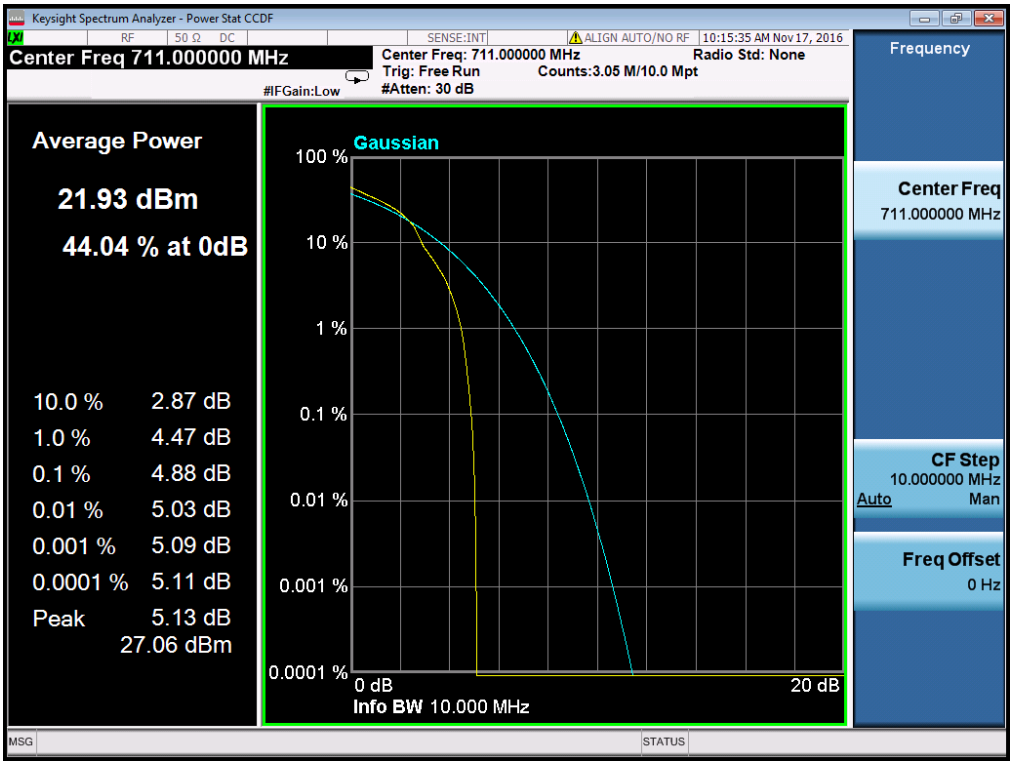
(Plot D2: Band 12/10MHz/16QAM in L Ch 50RB Size)



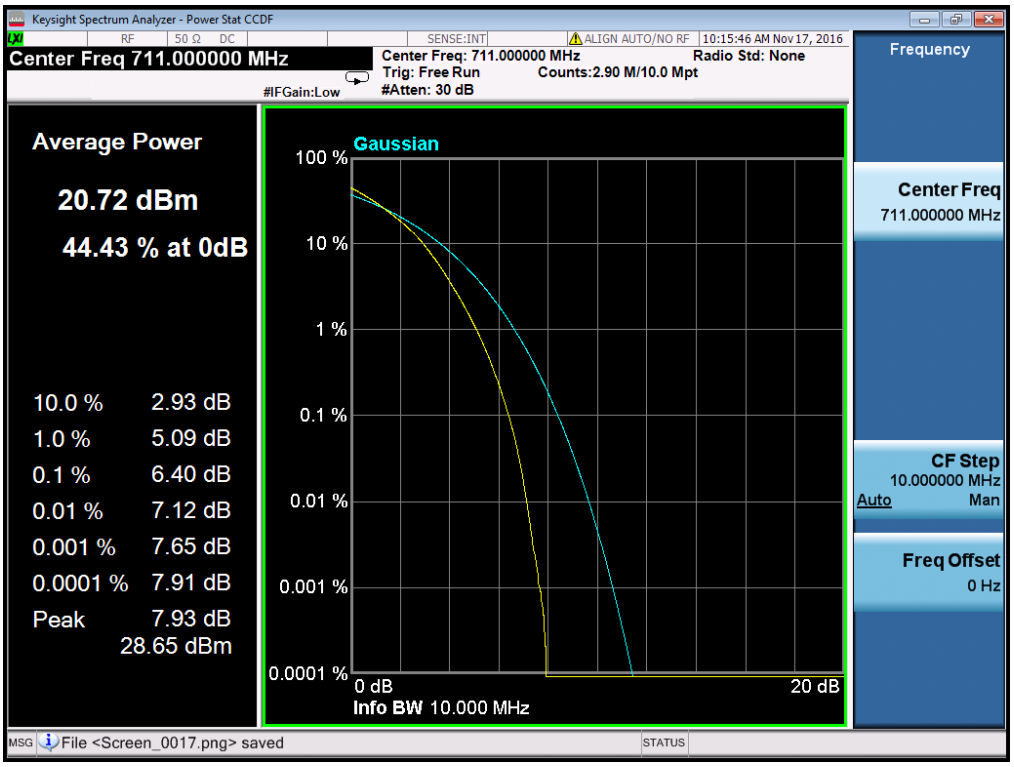
(Plot D3: Band 12/10MHz/16QAM in M Ch 1RB Size)



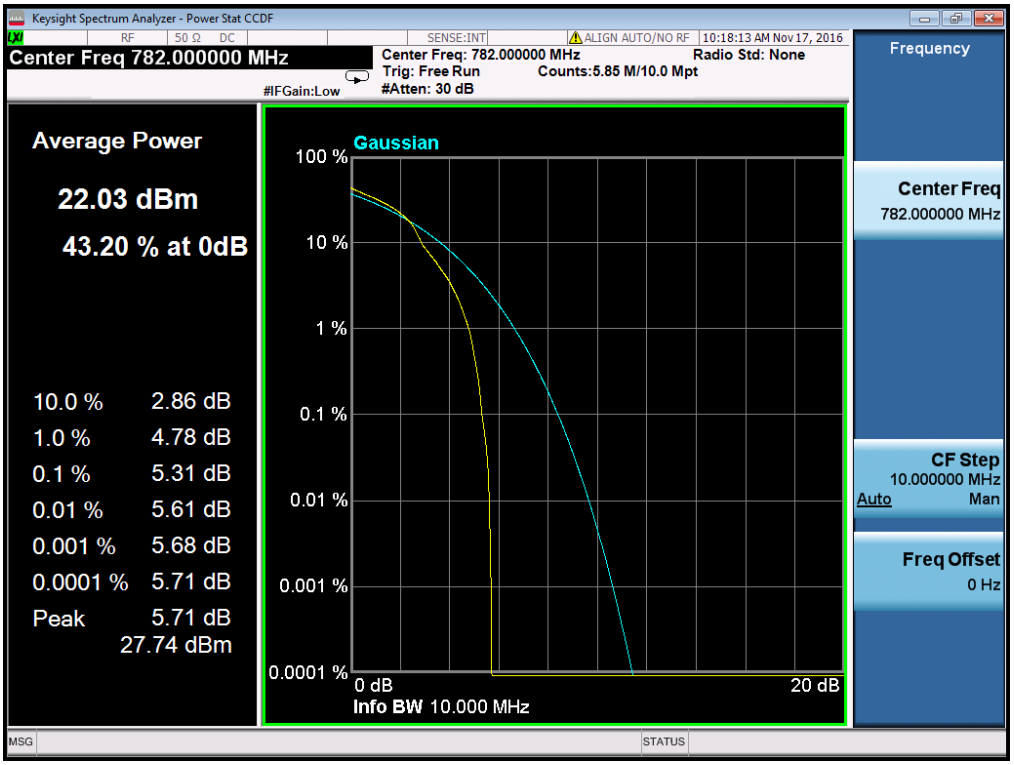
(Plot D4: Band 12/10MHz/16QAM in M Ch 50RB Size)



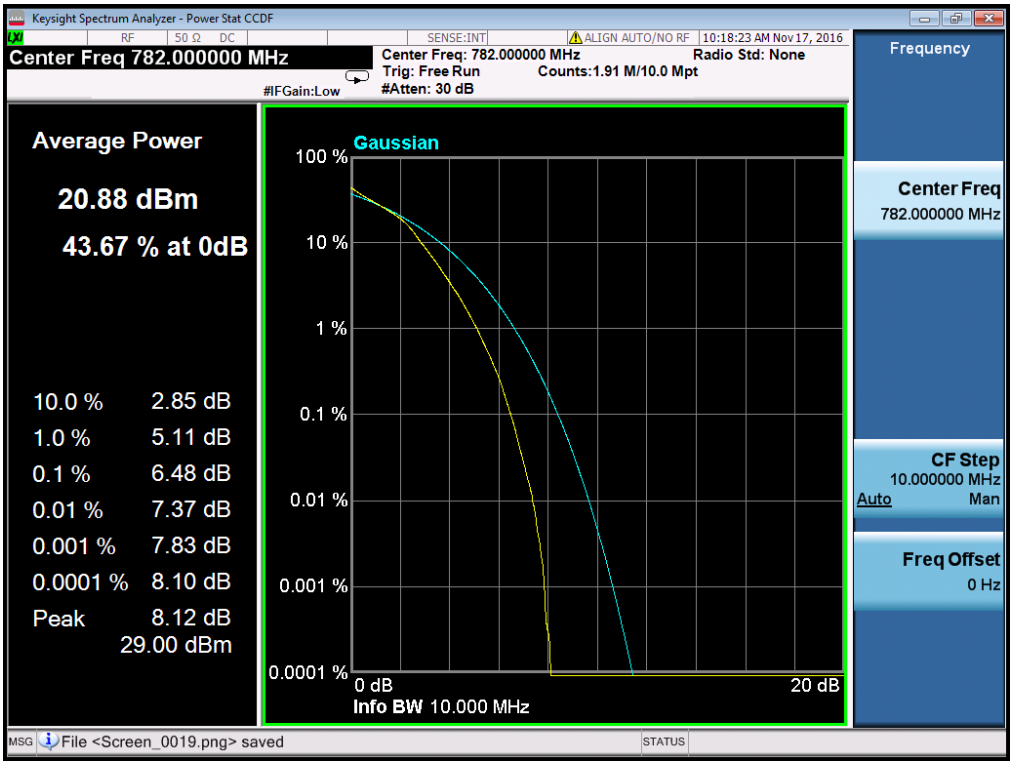
(Plot D5: Band 12/10MHz/16QAM in H Ch 1RB Size)



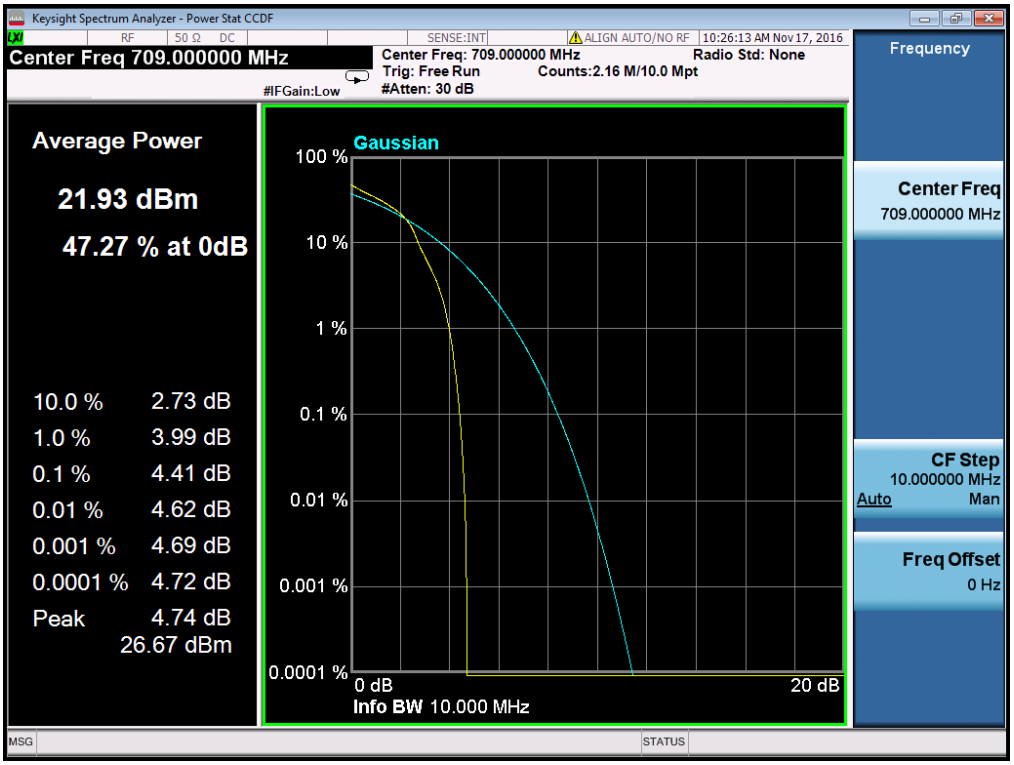
(Plot D6: Band 12/10MHz/16QAM in H Ch 50RB Size)



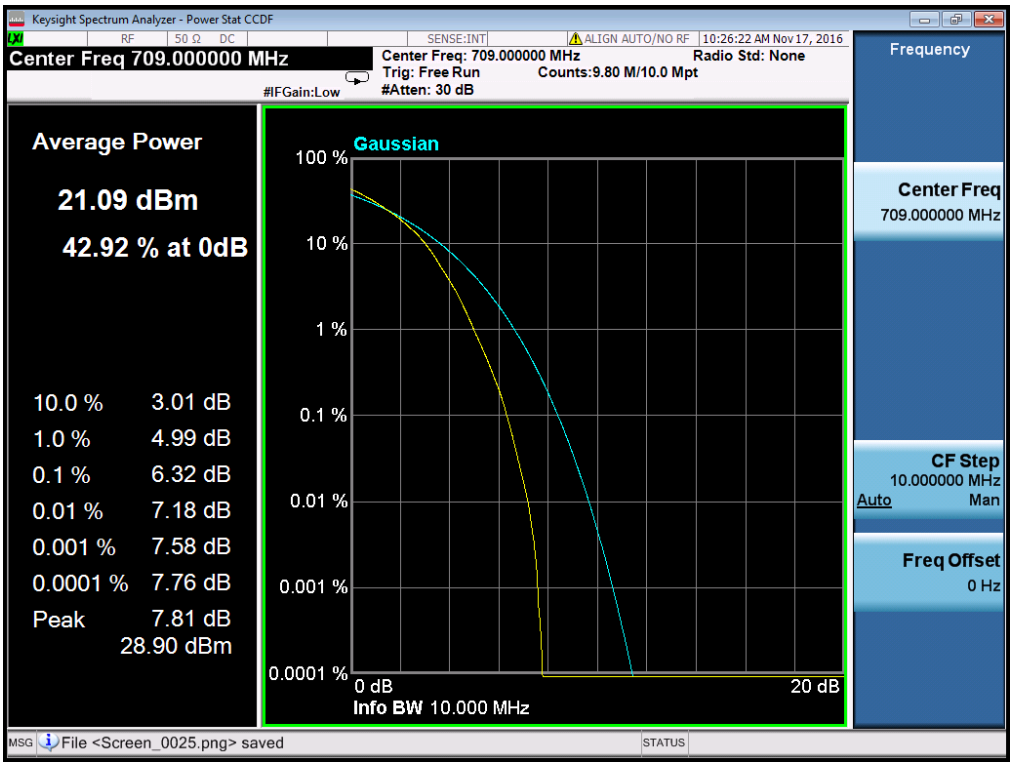
(Plot E1: Band 13/10MHz/16QAM in L/M/H Ch 1RB Size)



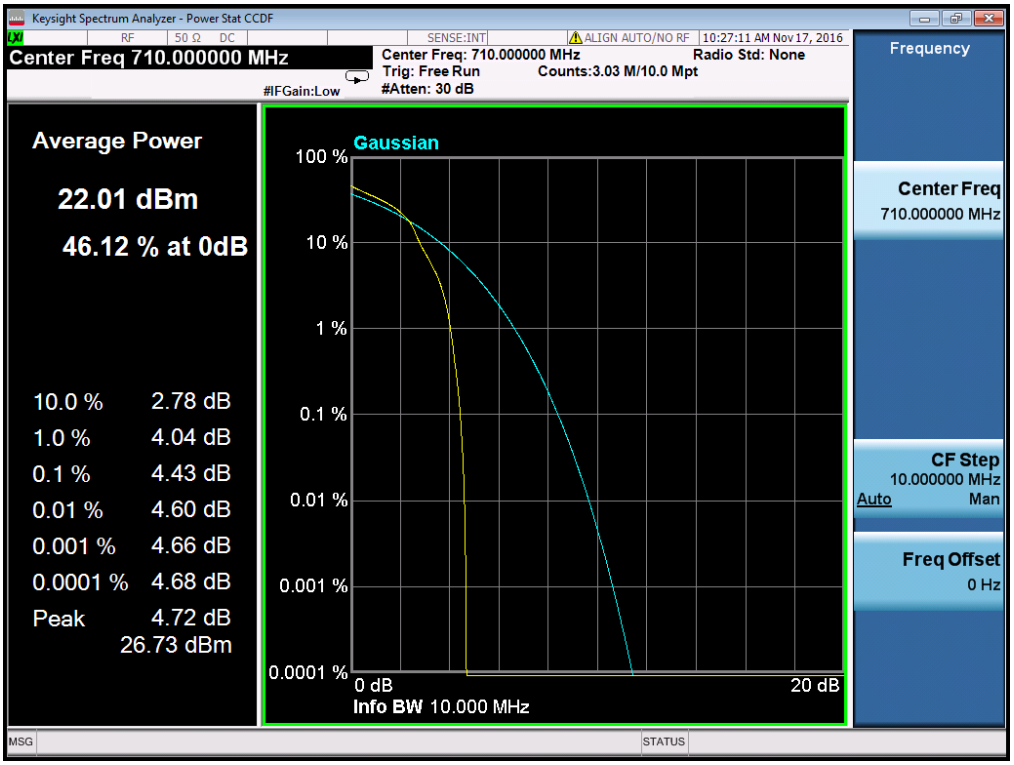
(Plot E2: Band 13/20MHz/16QAM in L/M/H Ch 50RB Size)



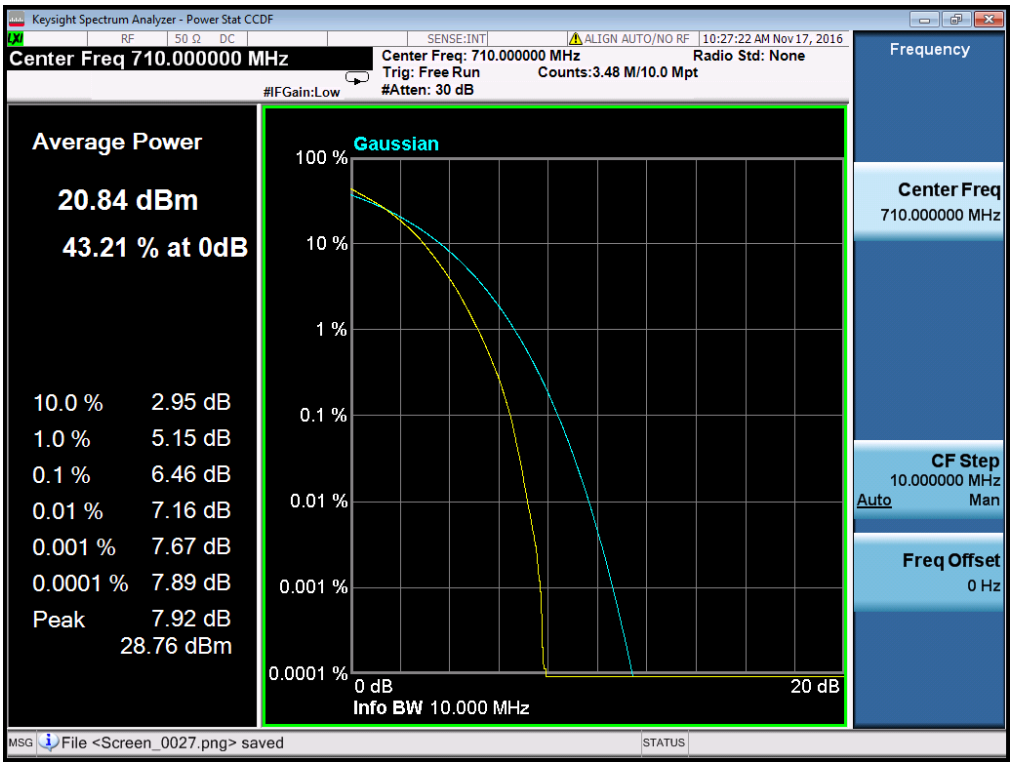
(Plot F1: Band 17/10MHz/16QAM in L Ch 1RB Size)



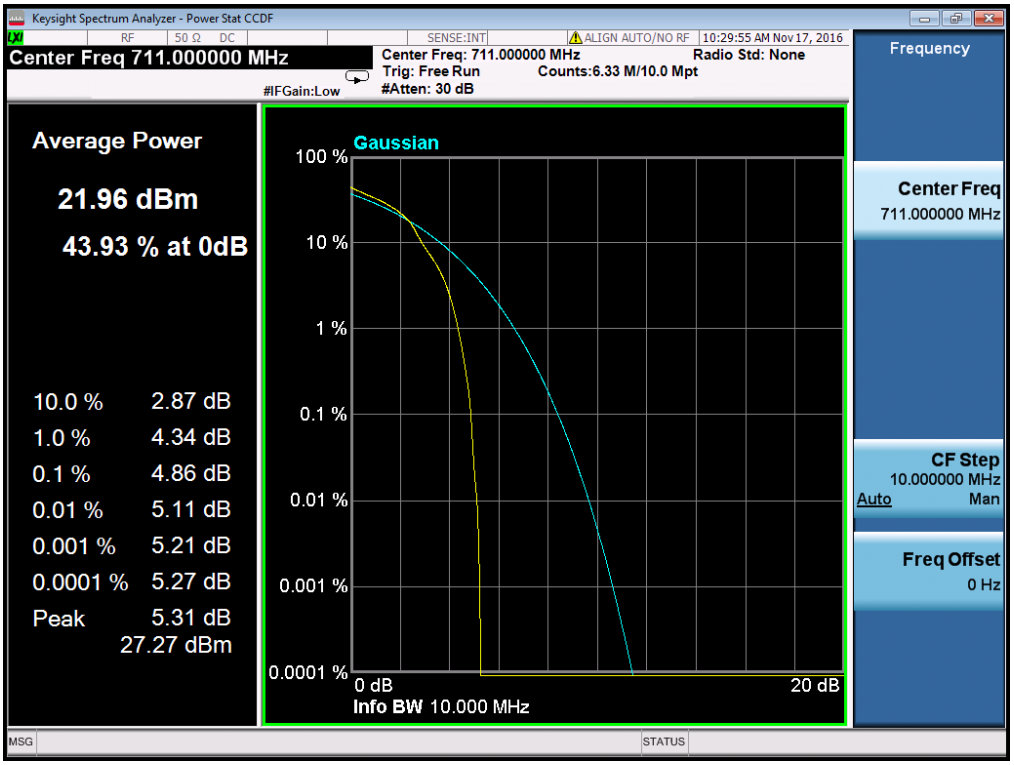
(Plot F2: Band 17/10MHz/16QAM in L Ch 50RB Size)



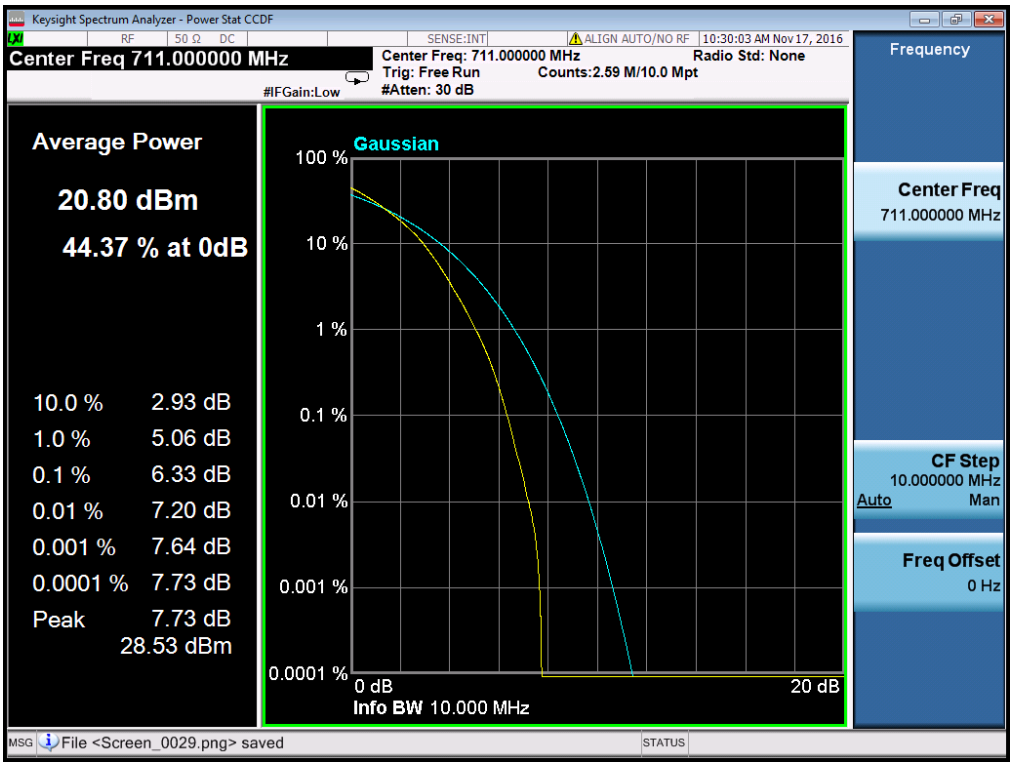
(Plot F3: Band 17/10MHz/16QAM in M Ch 1RB Size)



(Plot F4: Band 17/10MHz/16QAM in M Ch 50RB Size)



(Plot F5: Band 17/10MHz/16QAM in H Ch 1RB Size)



(Plot F6: Band 17/10MHz/16QAM in H Ch 50RB Size)

2.3 99% Occupied Bandwidth and 26dB Bandwidth

2.3.1 Definition

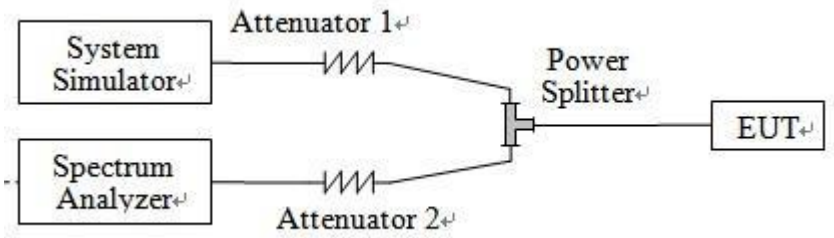
According to FCC section 2.1049, the occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The 26 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 26 dB below the maximum in-band spectral density of the modulated signal. Spectral density (power per unit bandwidth) is to be measured with a detector of resolution bandwidth equal to approximately 1.0% of the emission bandwidth.

2.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

2.3.3 Test Setup



2.3.4 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The 26dB and 99% occupied bandwidth (BW) of the middle channel for the highest RF power with full RB sizes were measured.

2.3.5 Test Result of 99% Occupied Bandwidth and 26dB Bandwidth

LTE Band 2					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
1.4	18900	1880	QPSK	1.10	1.27
			16QAM	1.10	1.27
3	18900	1880	QPSK	2.74	3.05
			16QAM	2.74	3.03
5	18900	1880	QPSK	4.53	5.07
			16QAM	4.53	5.08
10	18900	1880	QPSK	9.07	10.22
			16QAM	9.07	10.23
15	18900	1880	QPSK	13.46	14.88
			16QAM	13.47	14.90
20	18900	1880	QPSK	18.48	20.49
			16QAM	18.42	20.49

LTE Band 4					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
1.4	20175	1732.5	QPSK	1.10	1.28
			16QAM	1.09	1.26
3	20175	1732.5	QPSK	2.74	3.03
			16QAM	2.74	3.04
5	20175	1732.5	QPSK	4.53	5.02
			16QAM	4.52	5.04
10	20175	1732.5	QPSK	8.96	9.75
			16QAM	8.95	9.65
15	20175	1732.5	QPSK	13.52	14.75
			16QAM	13.51	14.91
20	20175	1732.5	QPSK	18.46	20.53
			16QAM	18.47	20.61

LTE Band 7					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
5	21100	2535	QPSK	4.53	5.10
			16QAM	4.52	5.05
10	21100	2535	QPSK	8.96	9.75
			16QAM	8.94	9.68
15	21100	2535	QPSK	13.53	14.91
			16QAM	13.51	14.83
20	21100	2535	QPSK	18.51	20.63
			16QAM	18.57	20.78

LTE Band 12					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
1.4	23095	707.5	QPSK	1.10	1.27
			16QAM	1.10	1.28
3	23095	707.5	QPSK	2.74	3.05
			16QAM	2.75	3.05
5	23095	707.5	QPSK	4.54	5.04
			16QAM	4.53	5.10
10	23095	707.5	QPSK	9.01	9.85
			16QAM	8.98	9.70

LTE Band 13					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
5	23230	782	QPSK	4.53	5.06
			16QAM	4.52	5.08
10	23230	782	QPSK	8.95	9.84
			16QAM	8.94	9.67

LTE Band 17					
BW (MHz)	Channel	Frequency (MHz)	Mode	99% Occupied Bandwidth(MHz)	26dBBandwidth (MHz)
5	23790	710	QPSK	4.54	5.00
			16QAM	4.52	5.05
10	23790	710	QPSK	8.97	9.75
			16QAM	8.95	9.69

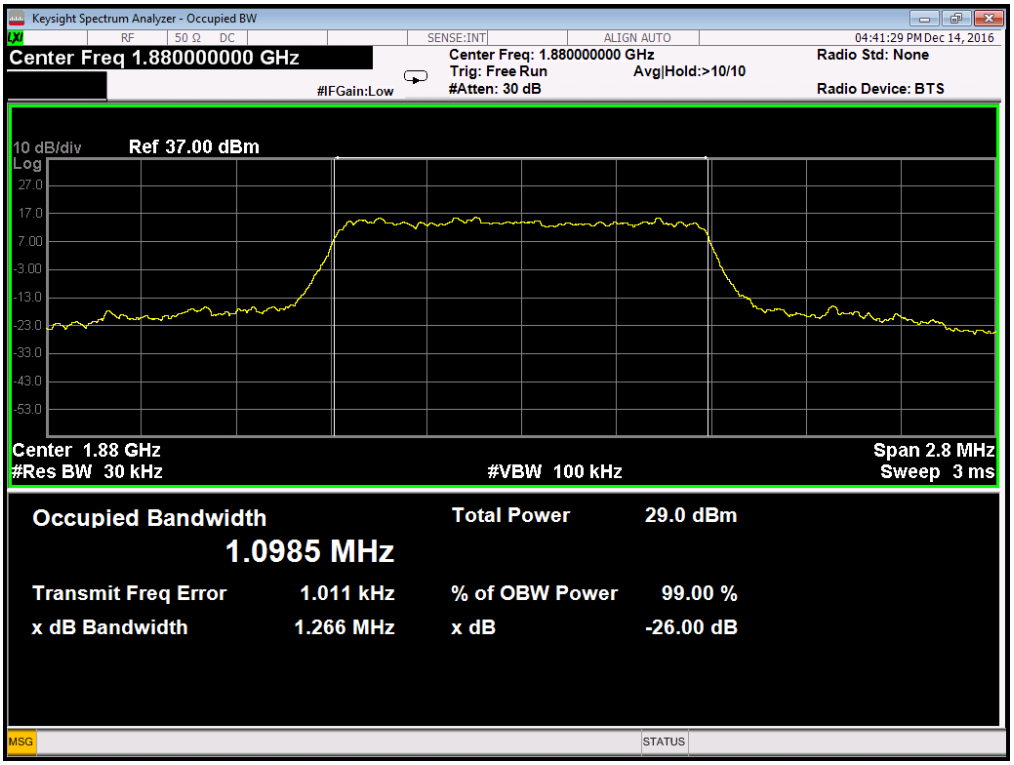
Note: The maximum RB configurations of the 99% Occupied Bandwidth and 26dB Bandwidth summary as below:

BW1.4MHz RB setting: RB Size 6,RB Offset 0 BW3MHz RB setting: RB Size 15,RB Offset 0

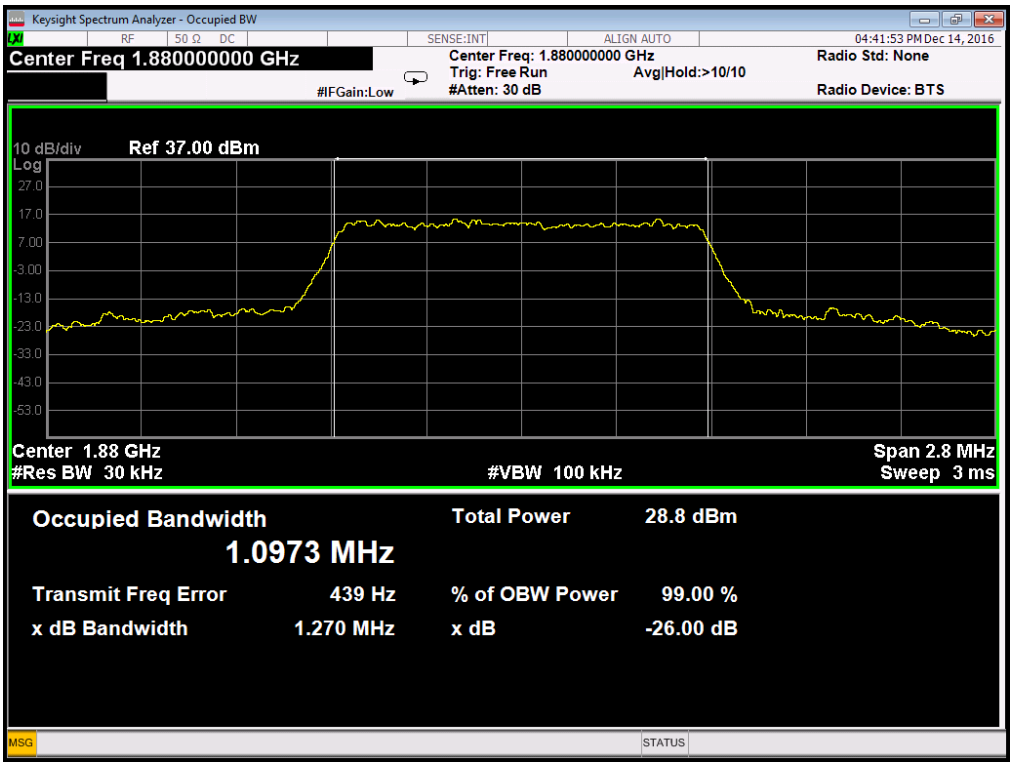
BW5MHz RB setting: RB Size 25,RB Offset 0 BW10MHz RB setting: RB Size 50,RB Offset 0

BW15MHz RB setting: RB Size 75,RB Offset 0 BW20MHz RB setting: RB Size 100,RB Offset 0

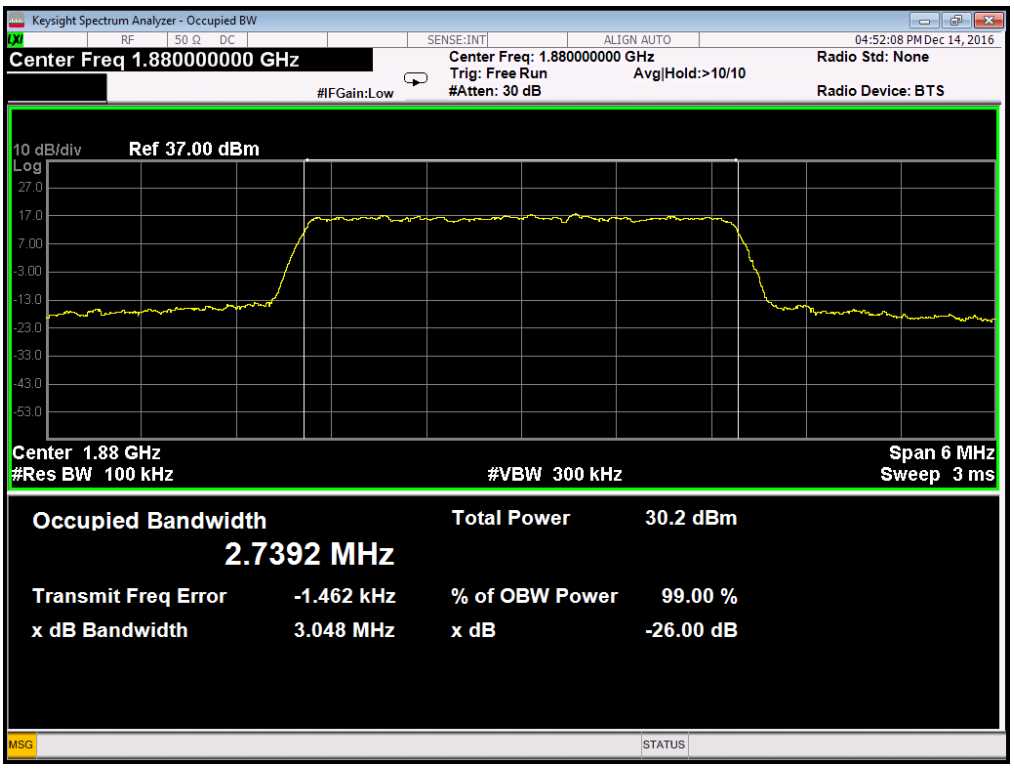
2.3.6 Test Result (Plots) of 99% Occupied Bandwidth and 26dB Bandwidth



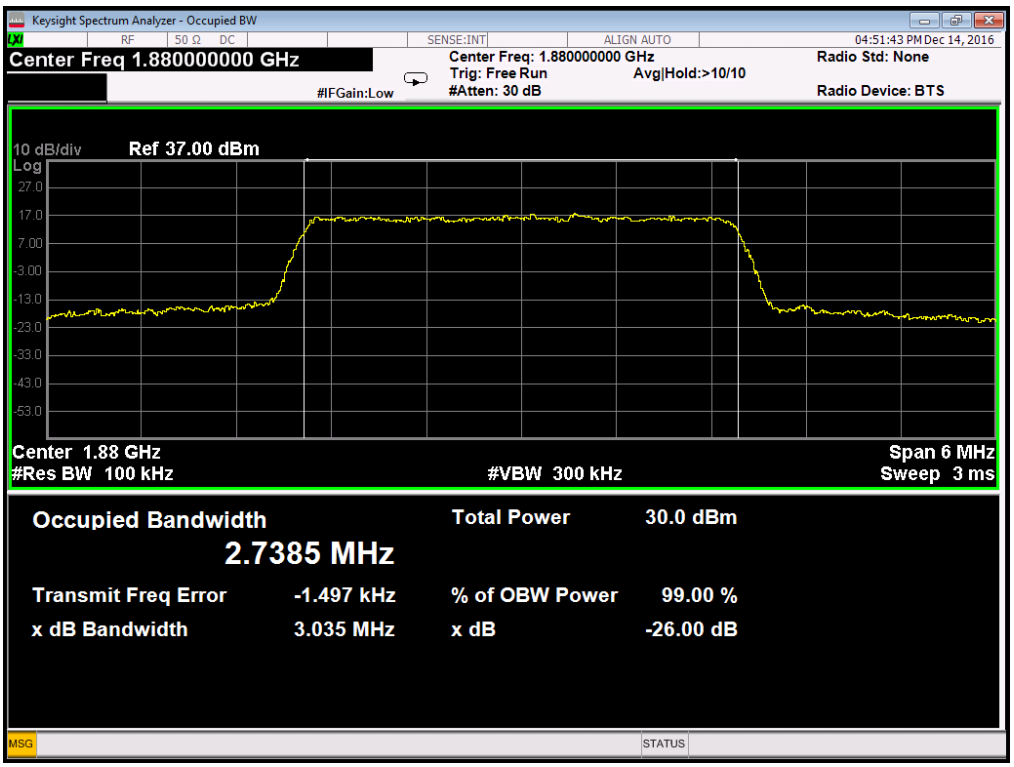
Occupied Bandwidth LTE Band 2/1.4MHz/QPSK



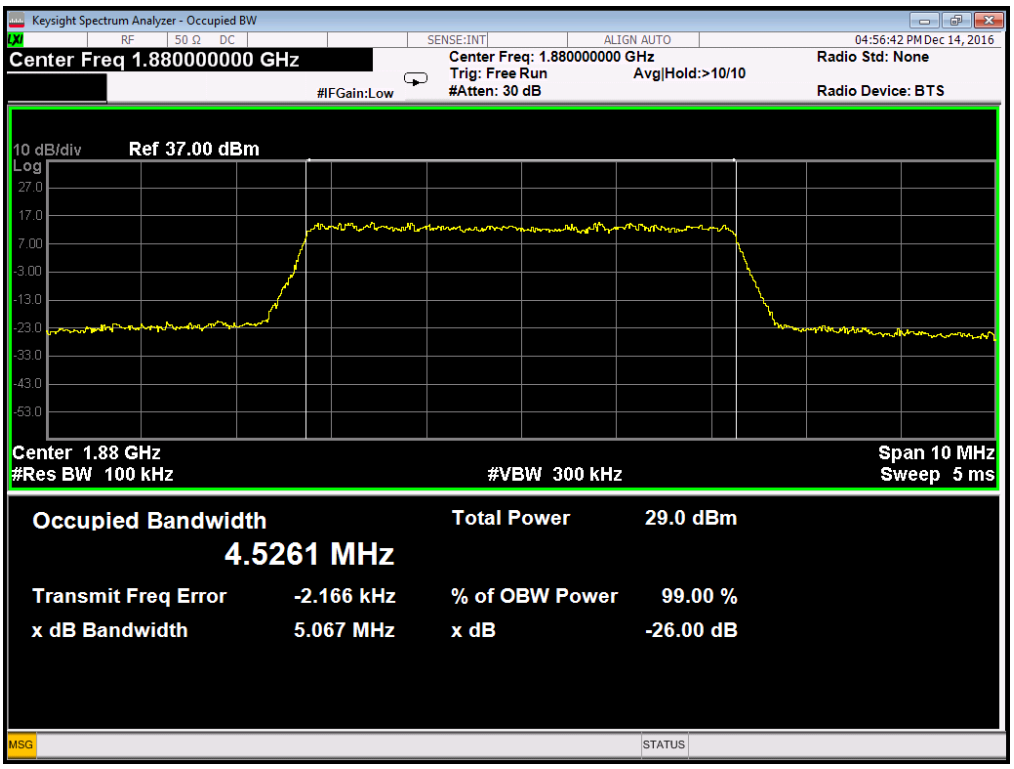
Occupied Bandwidth LTE Band 2/1.4MHz/16QAM



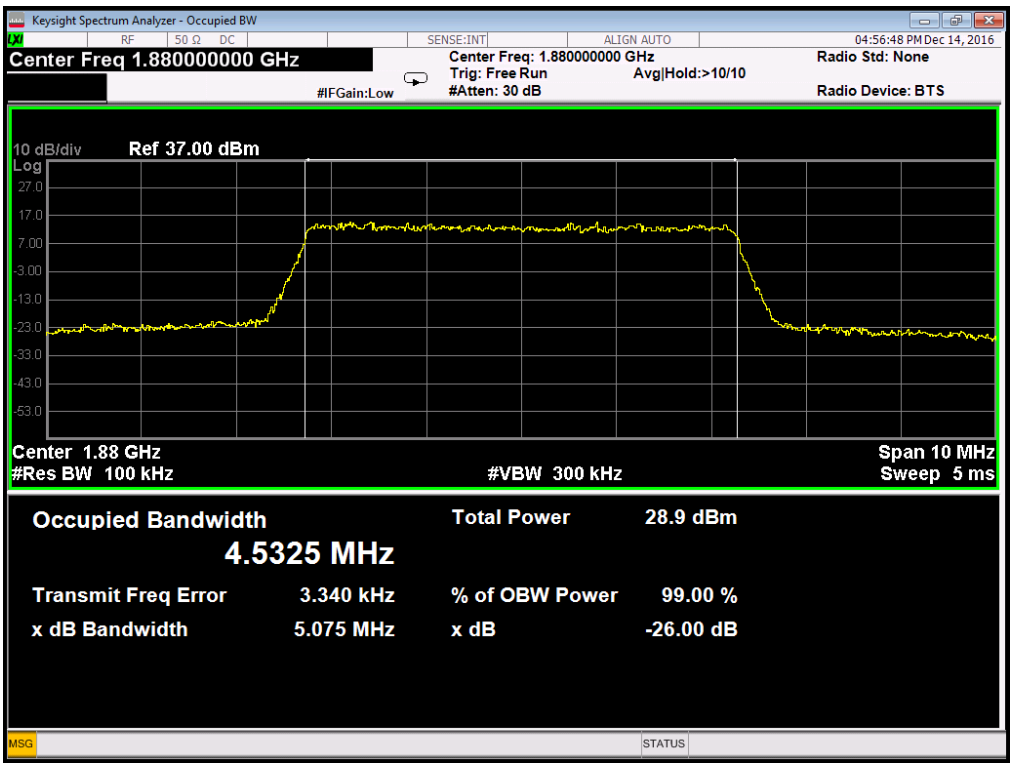
Occupied Bandwidth LTE Band 2/3MHz/QPSK



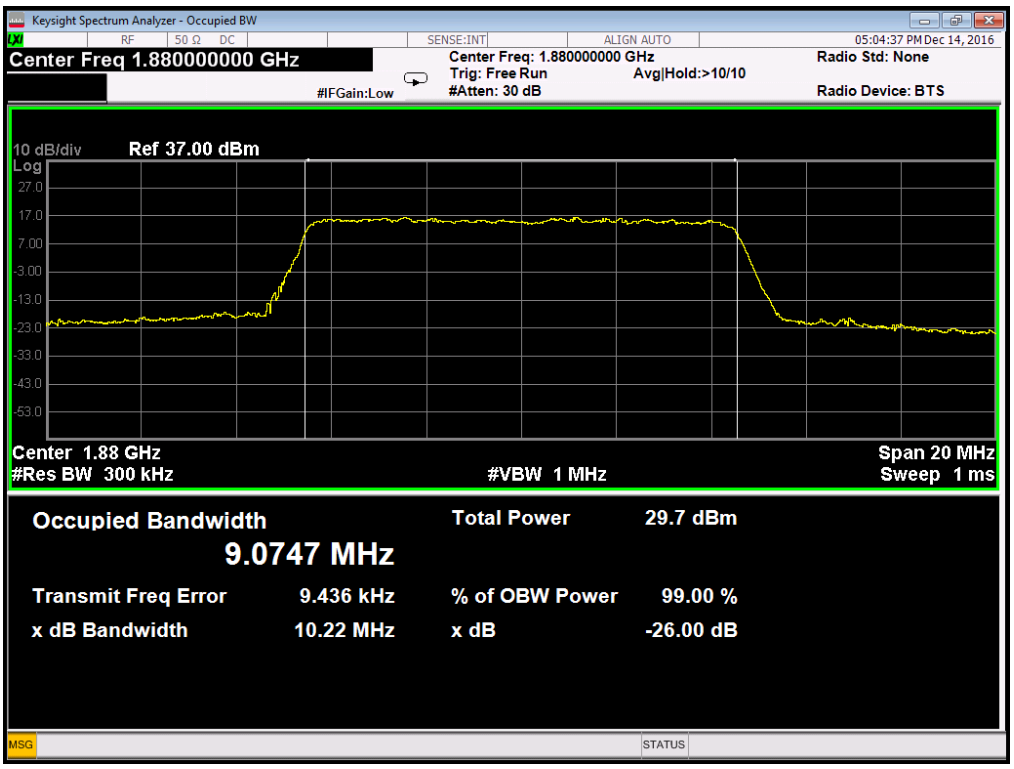
Occupied Bandwidth LTE Band 2/3MHz/16QAM



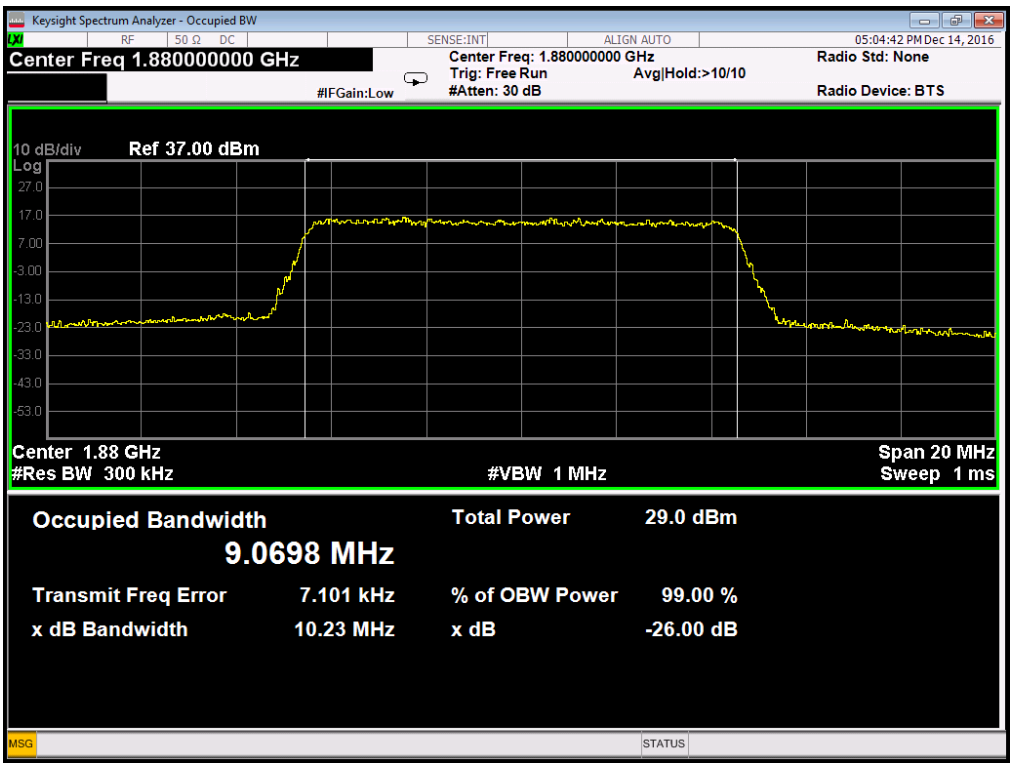
Occupied Bandwidth LTE Band 2/5MHz/QPSK



Occupied Bandwidth LTE Band 2/5MHz/16QAM



Occupied Bandwidth LTE Band 2/10MHz/QPSK



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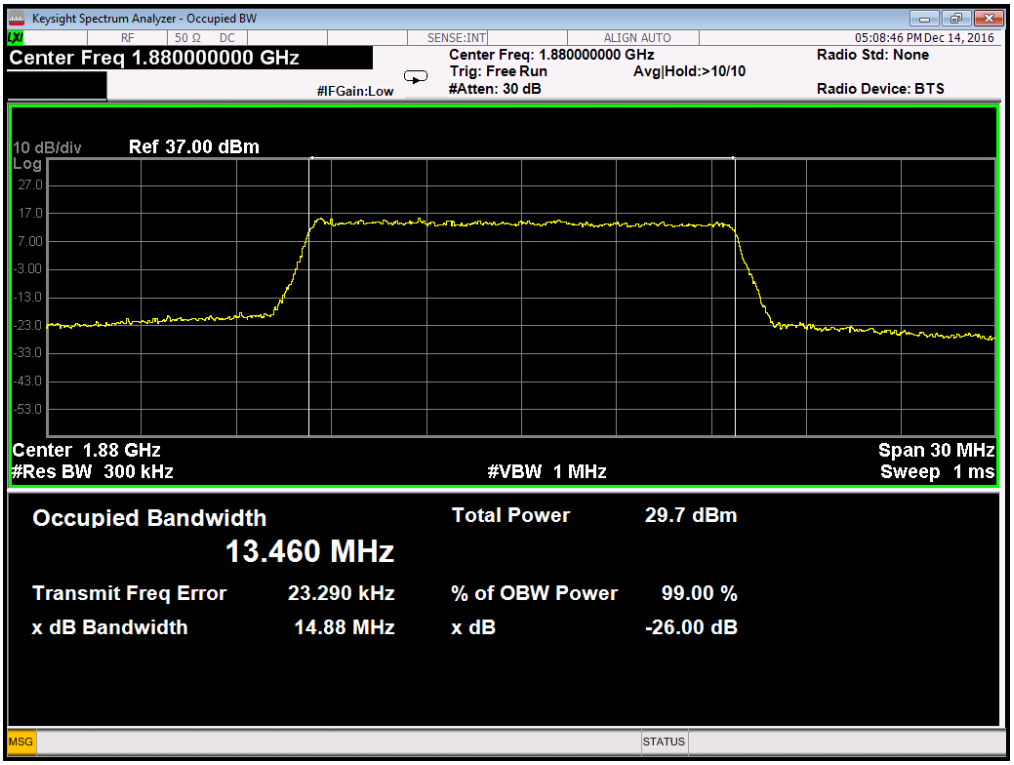

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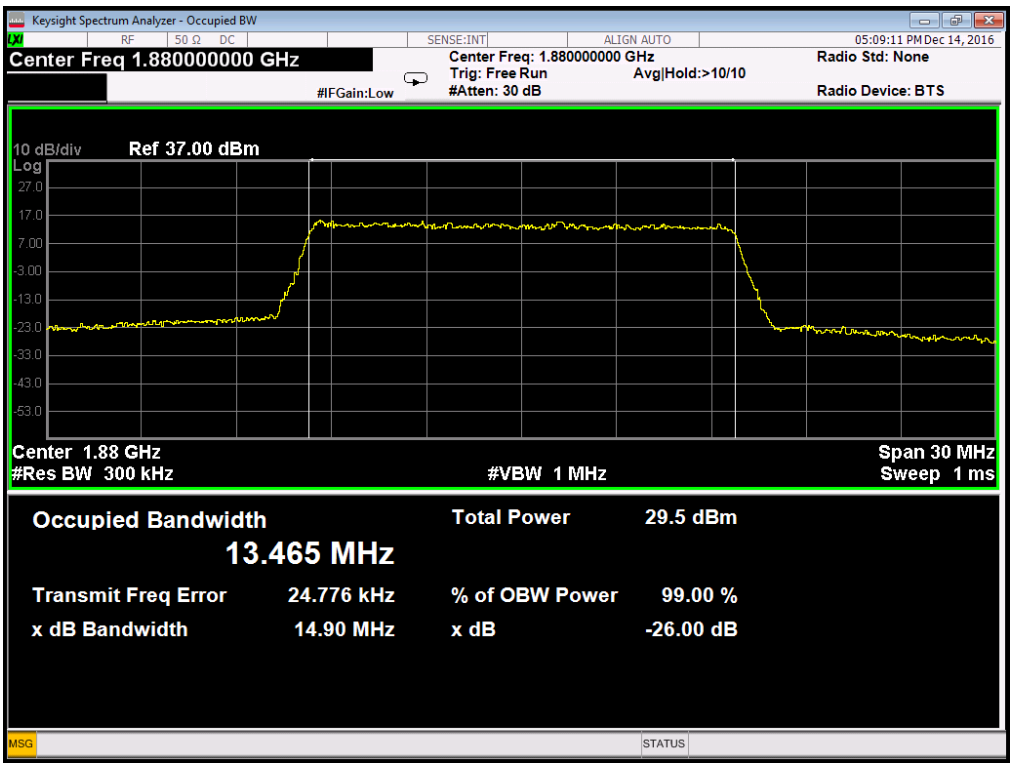

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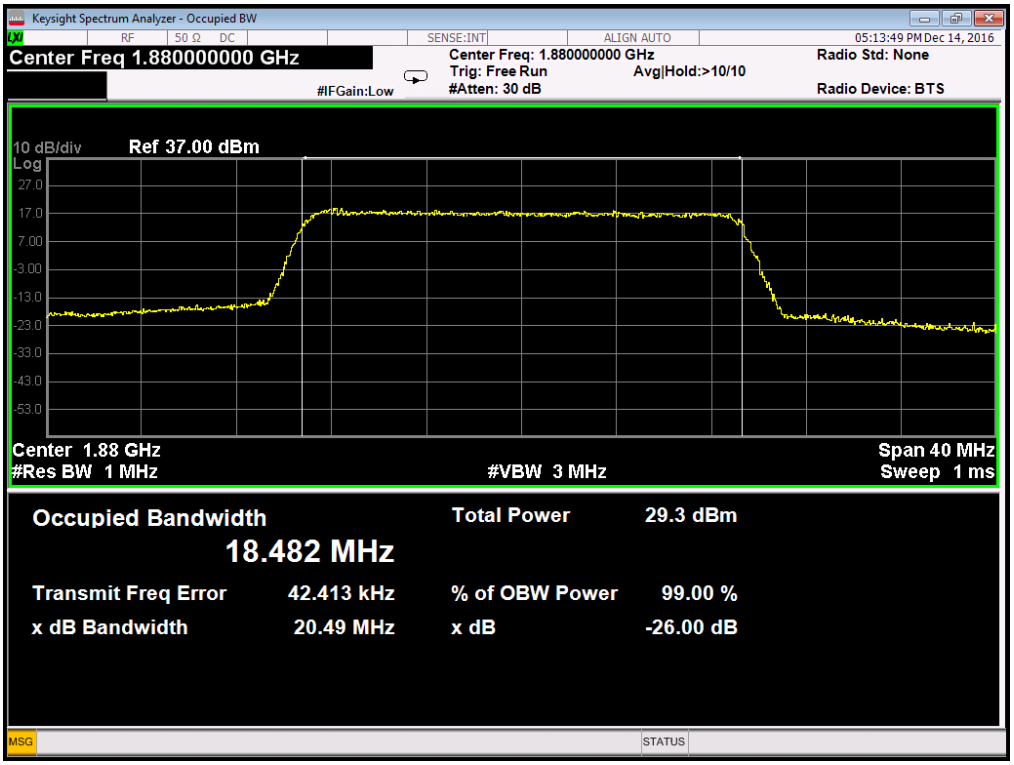

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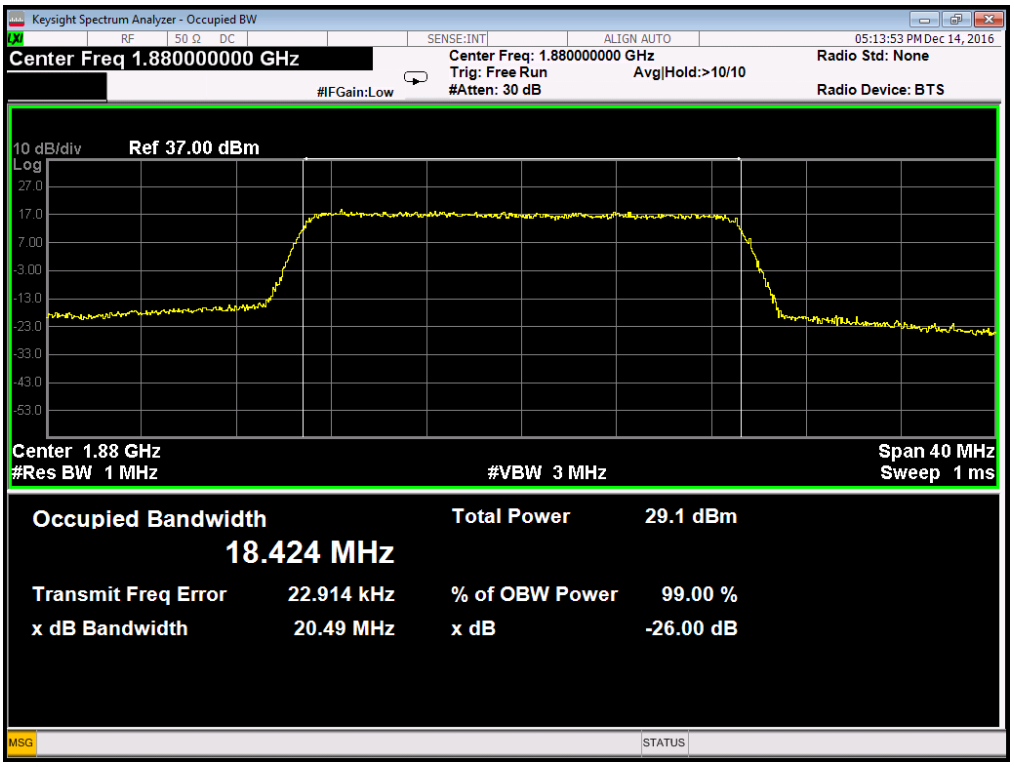

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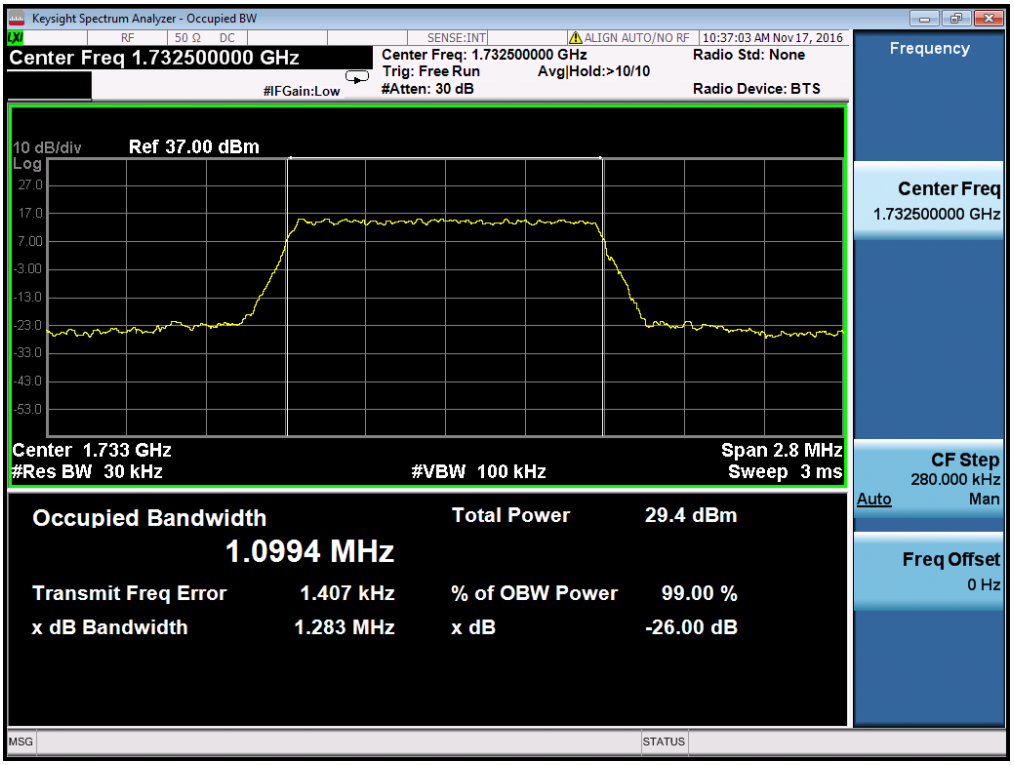

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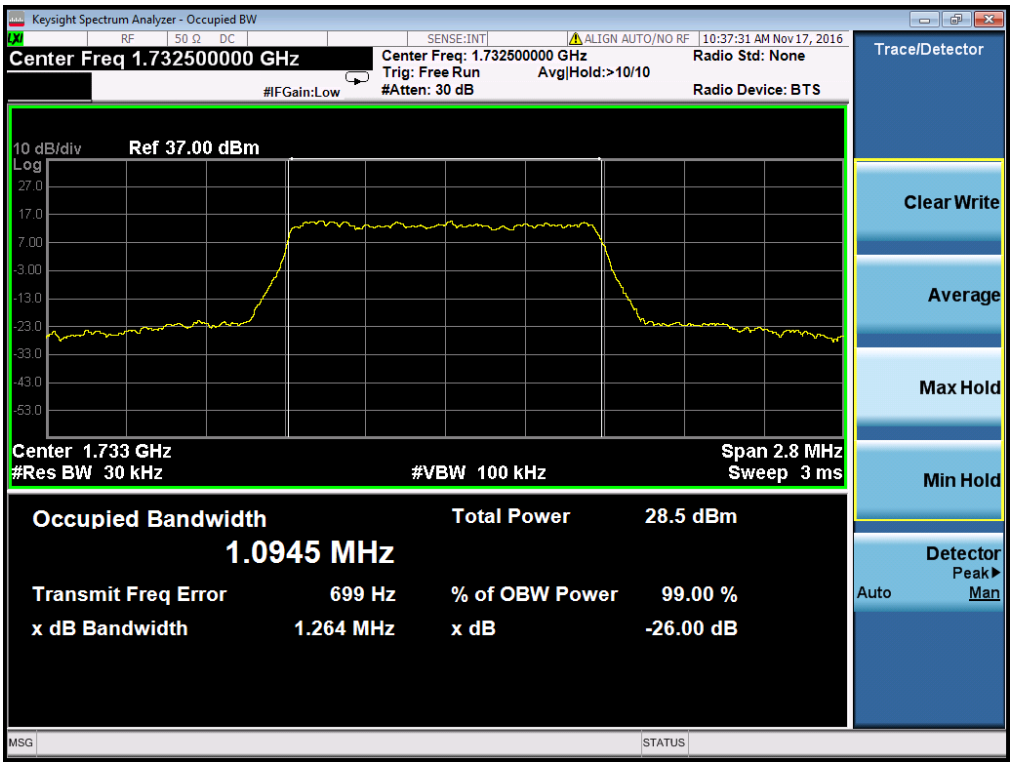

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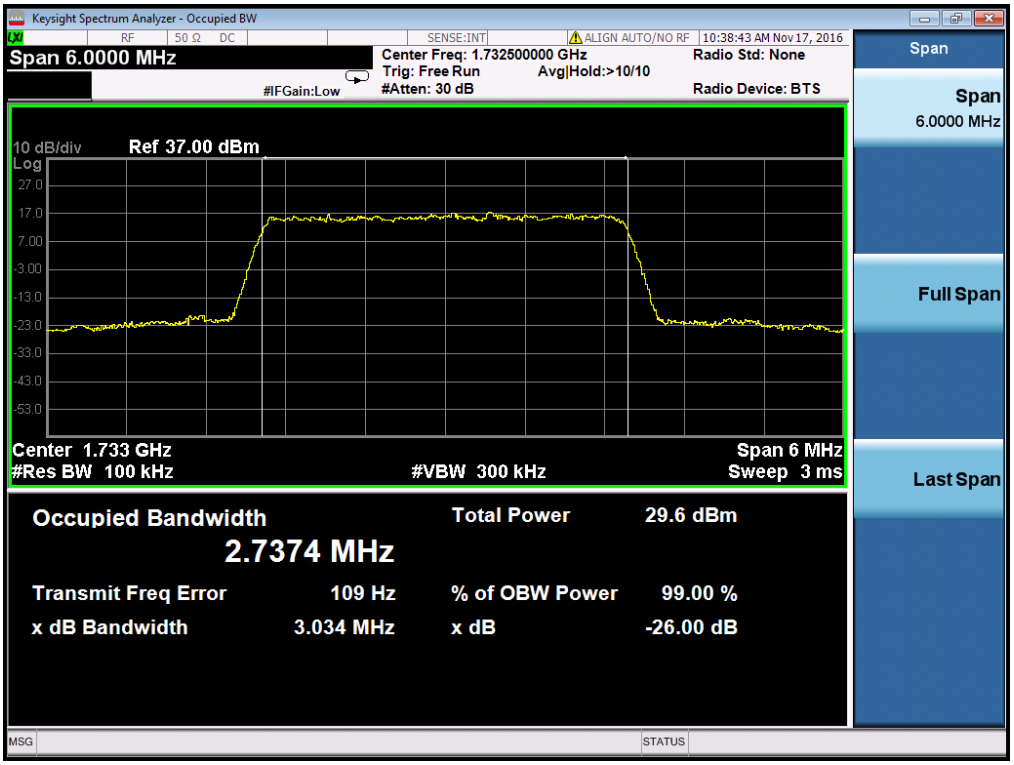

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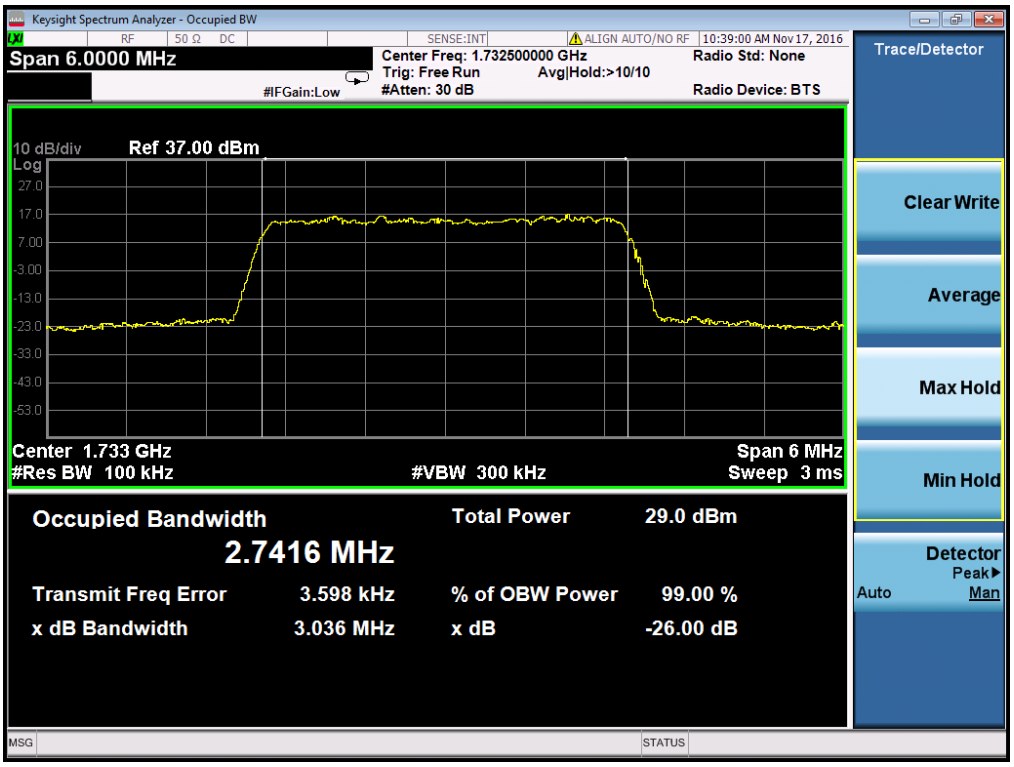
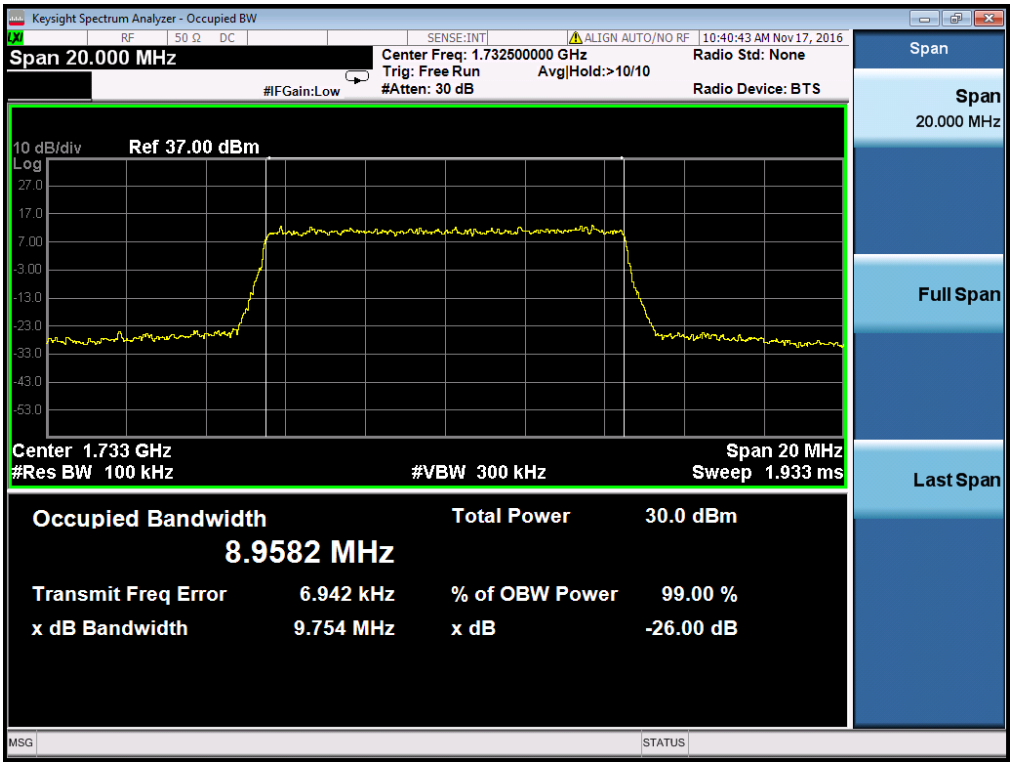


Occupied Bandwidth LTE Band 4/3MHz/16QAM

Occupied Bandwidth LTE Band 4/5MHz/QPSK

Occupied Bandwidth LTE Band 4/5MHz/16QAM



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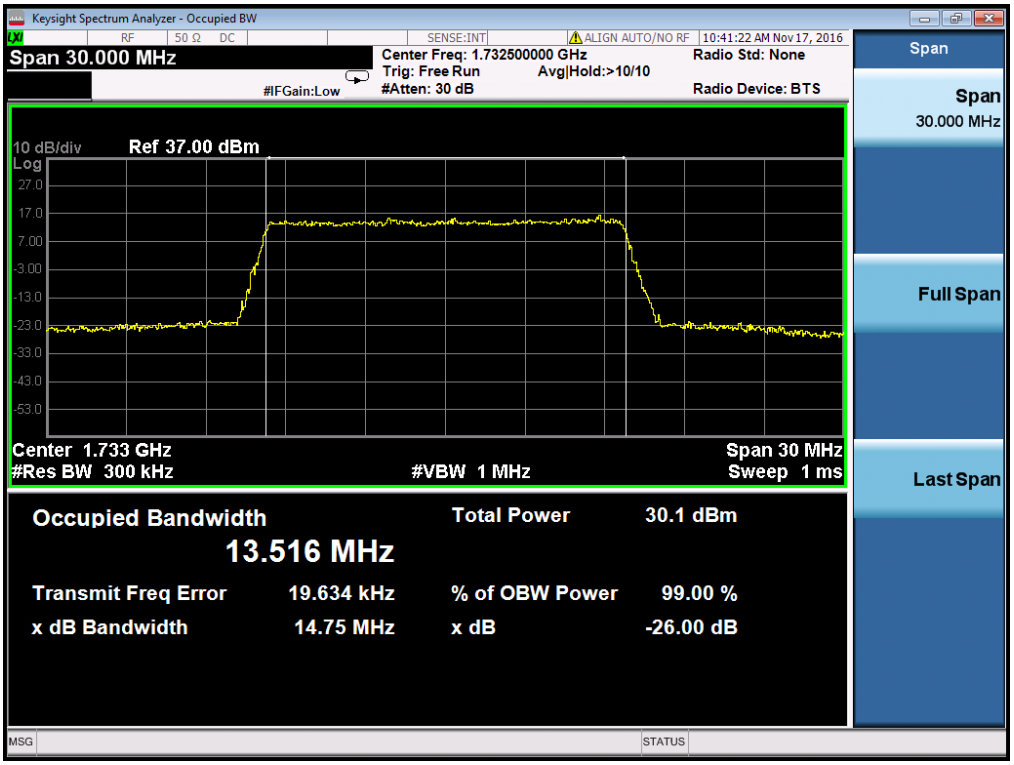

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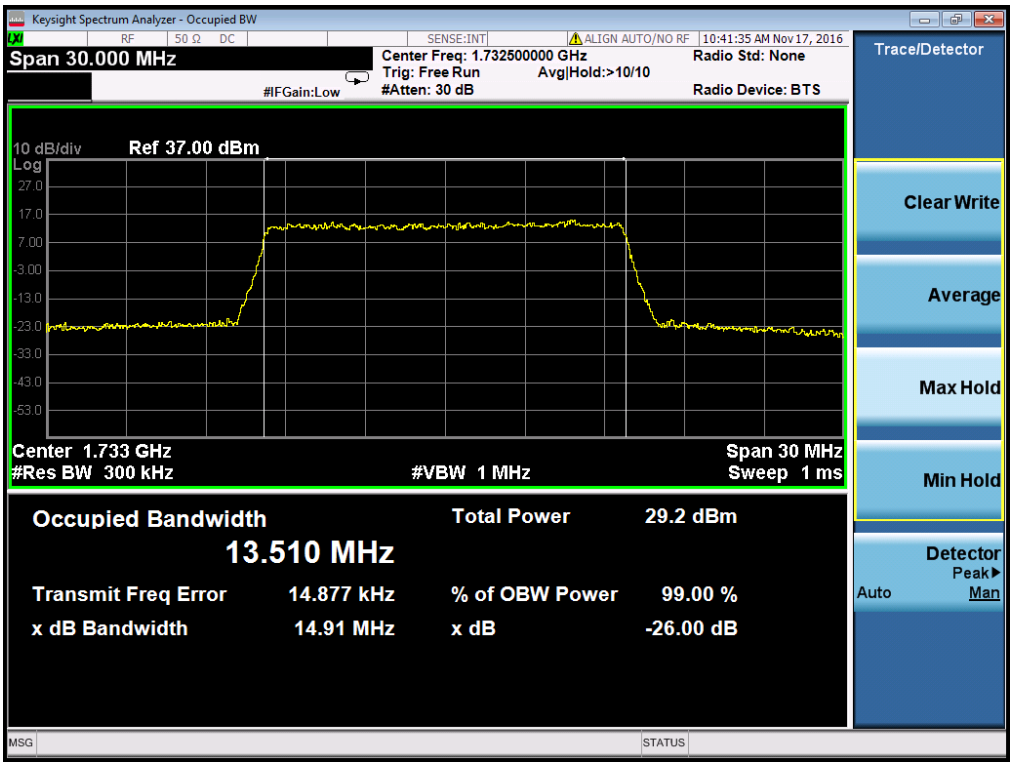

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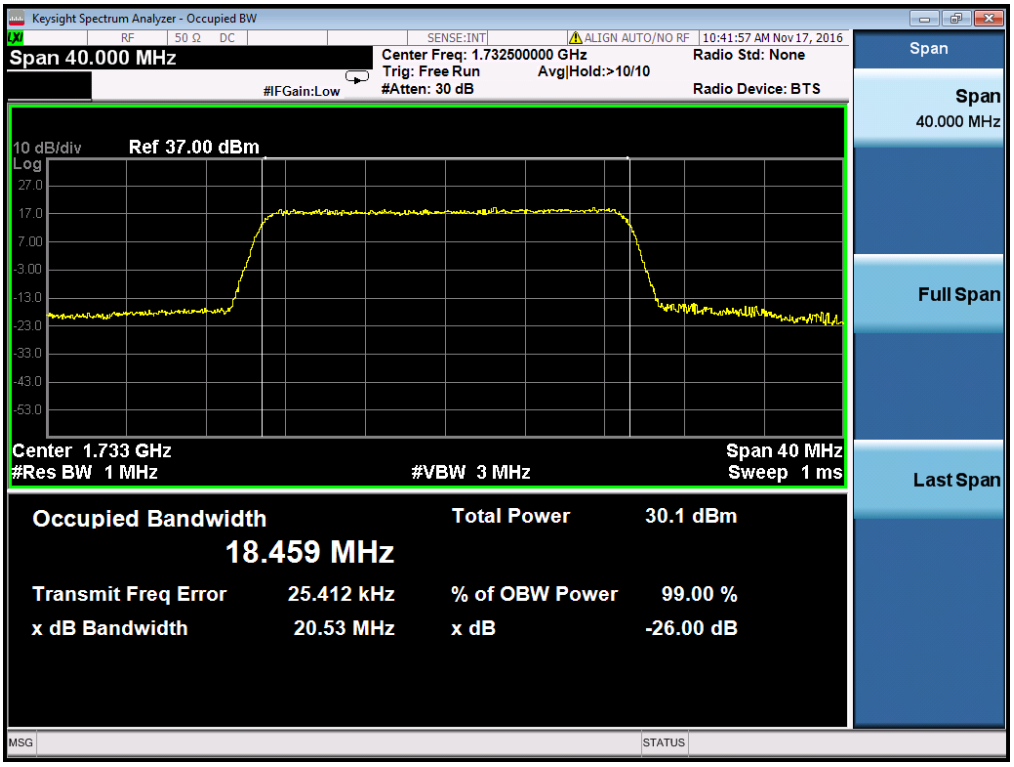

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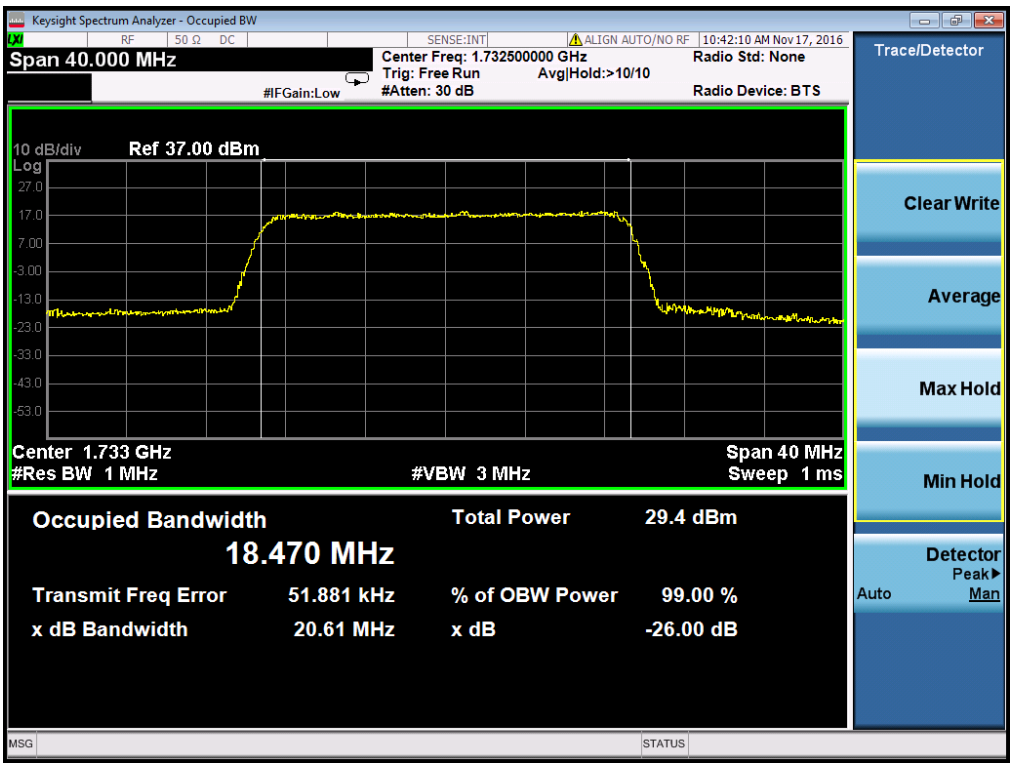

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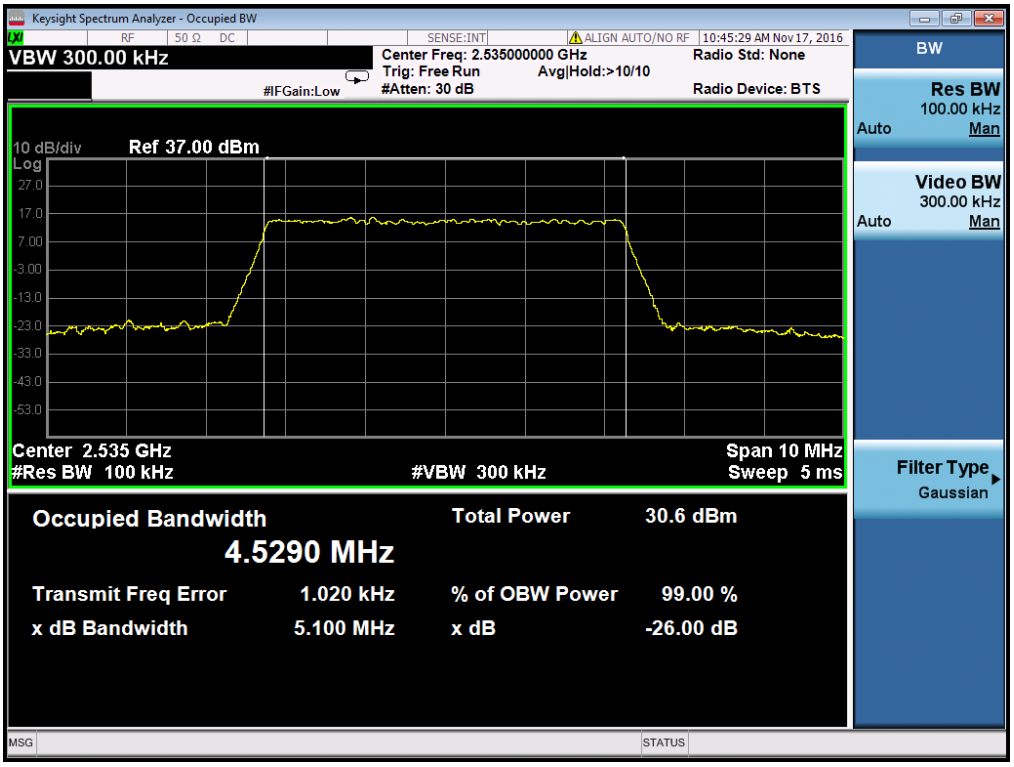

Occupied Bandwidth LTE Band 7/5MHz/QPSK

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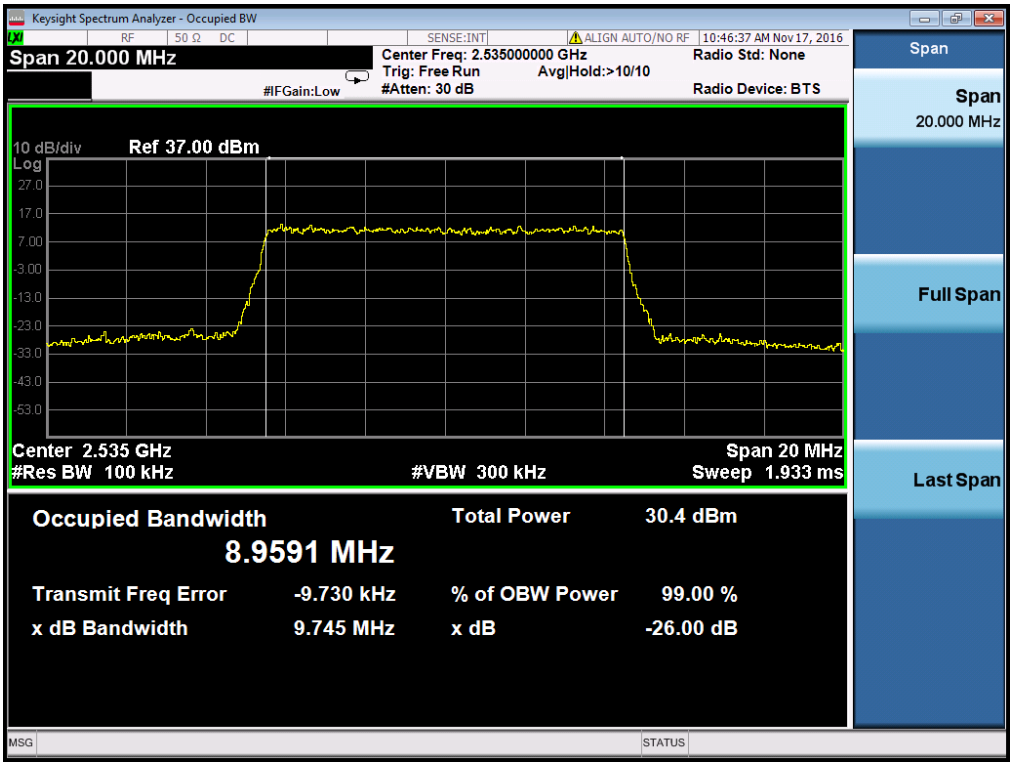

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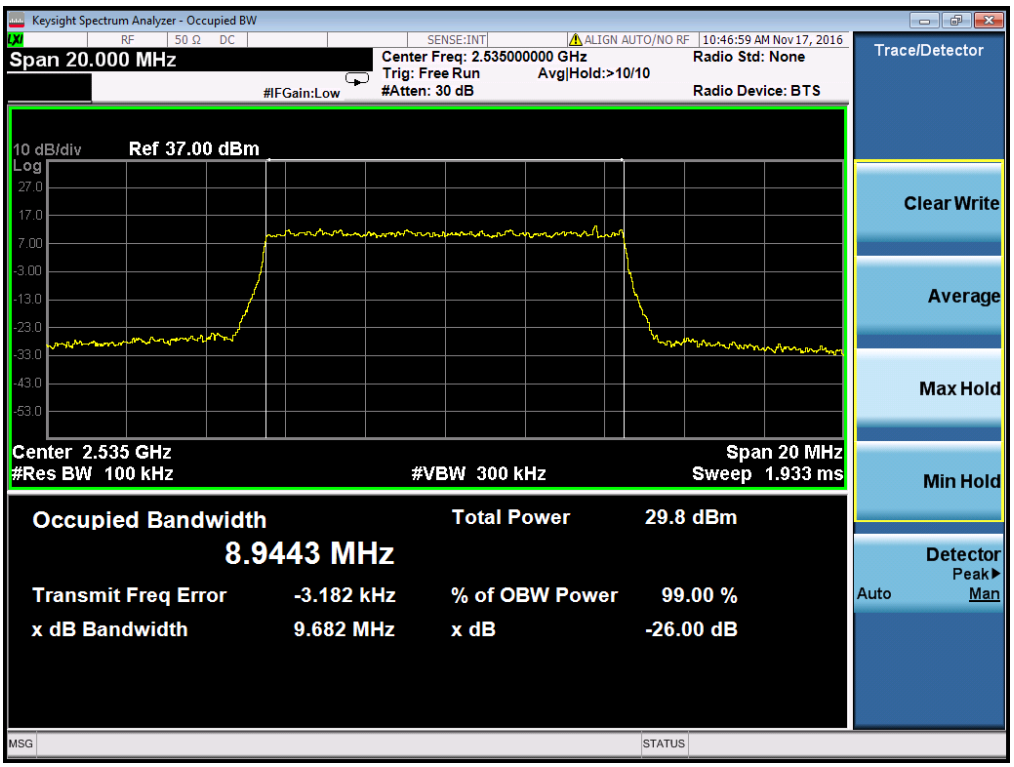

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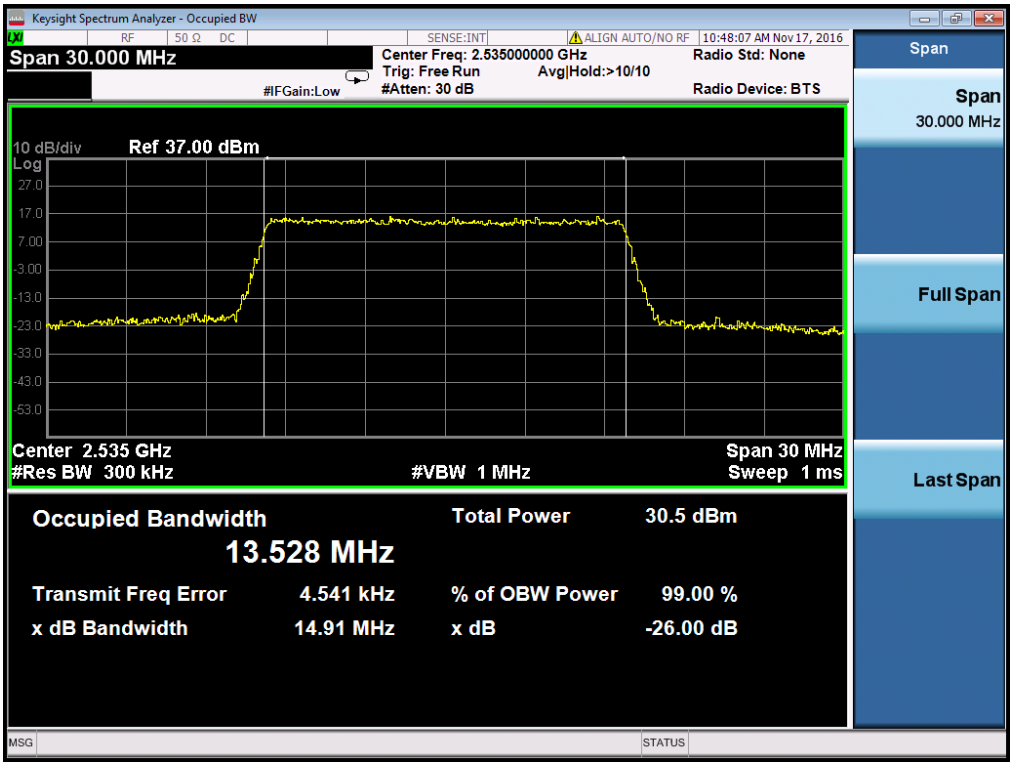

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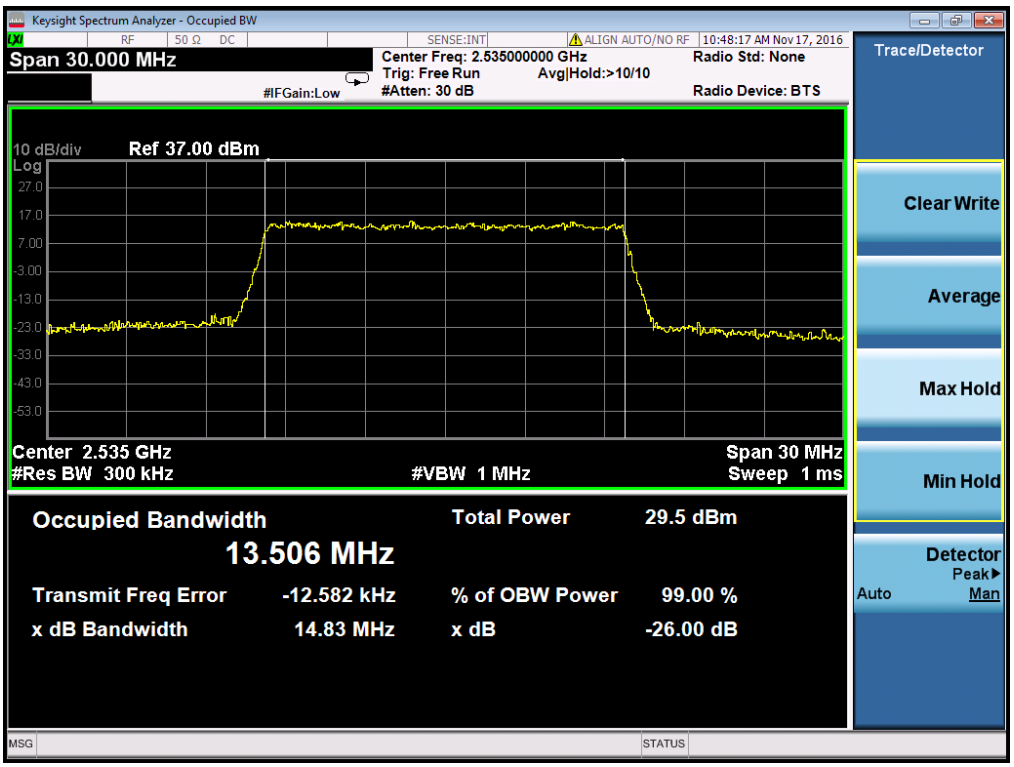

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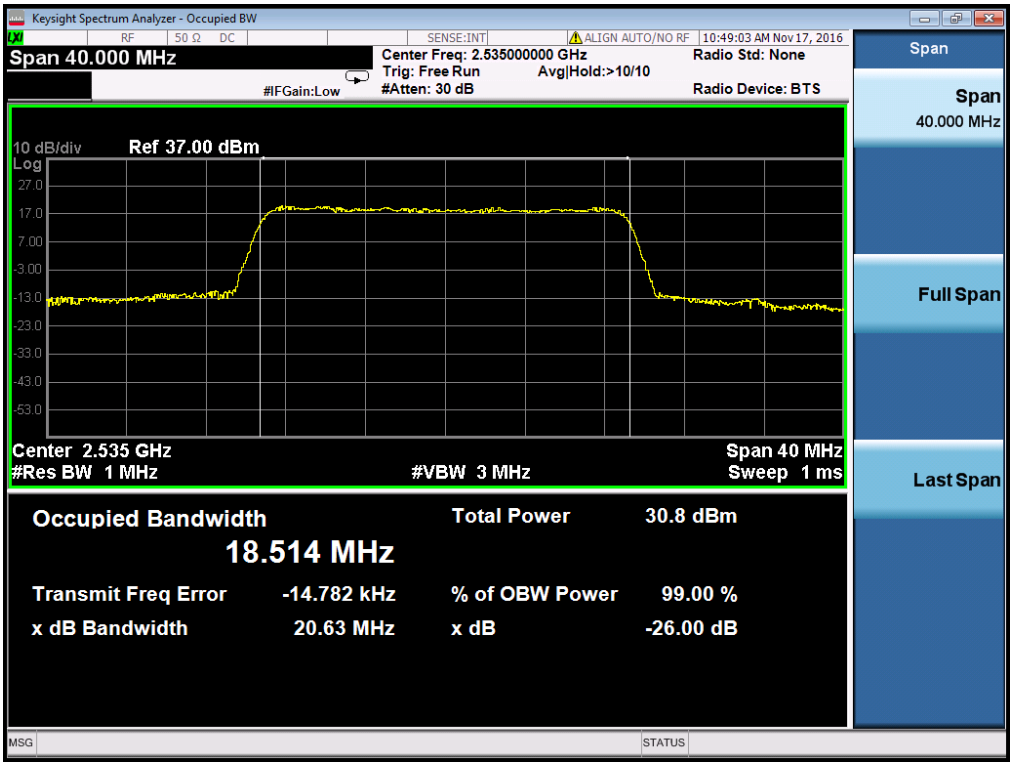

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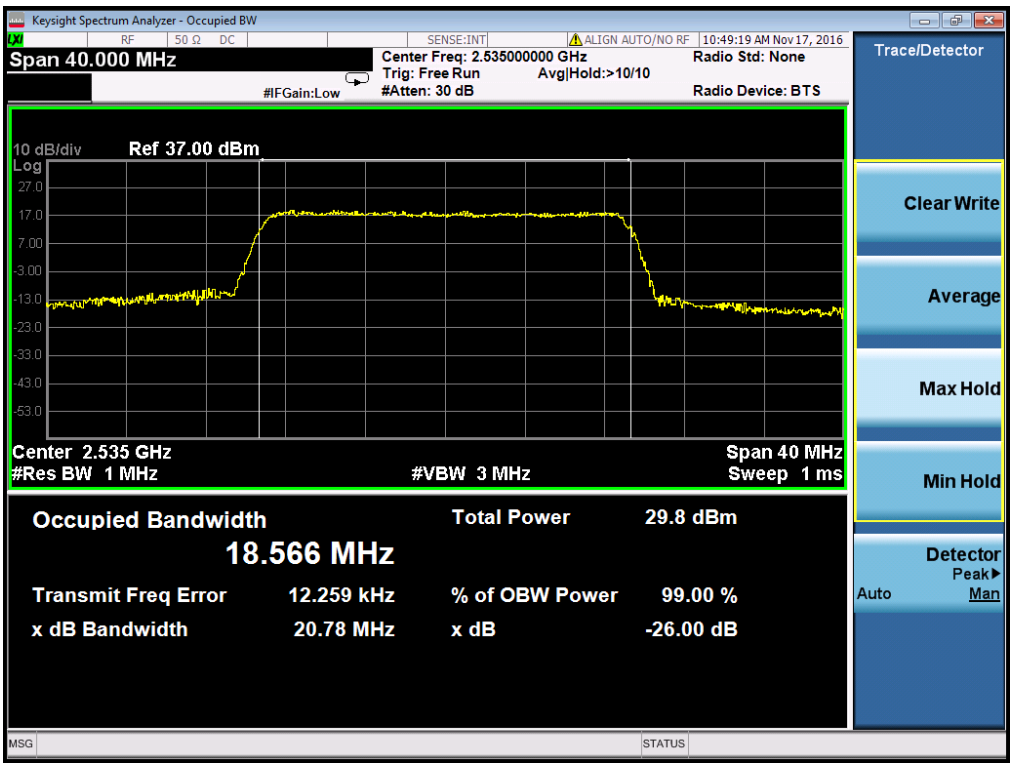

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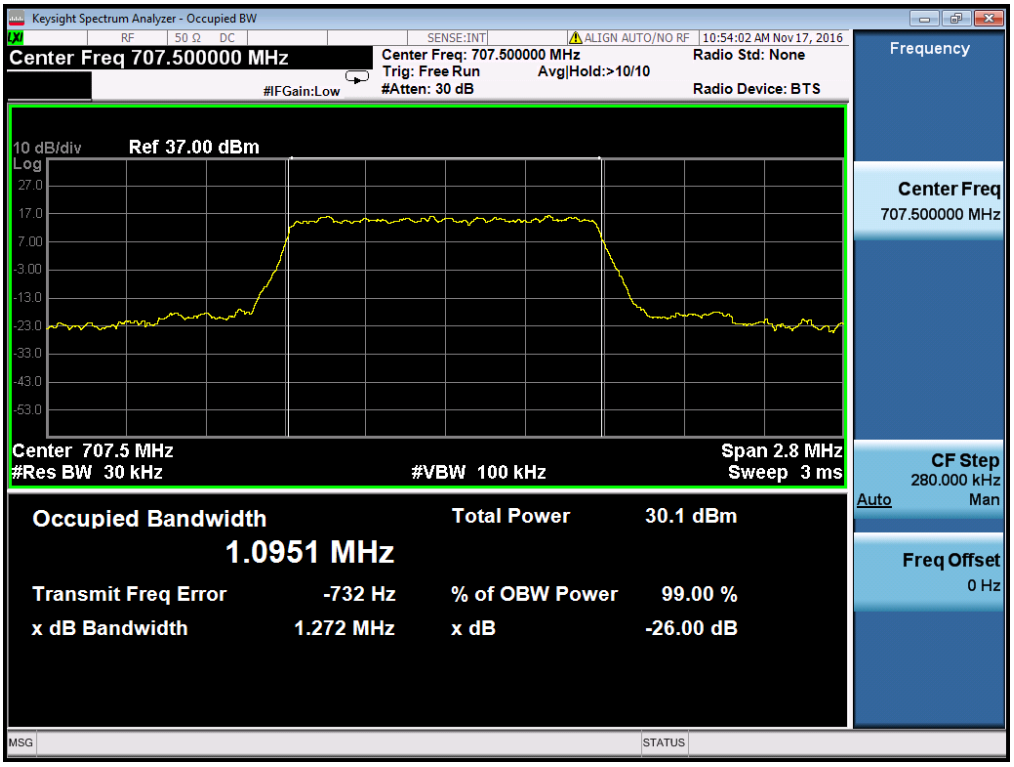

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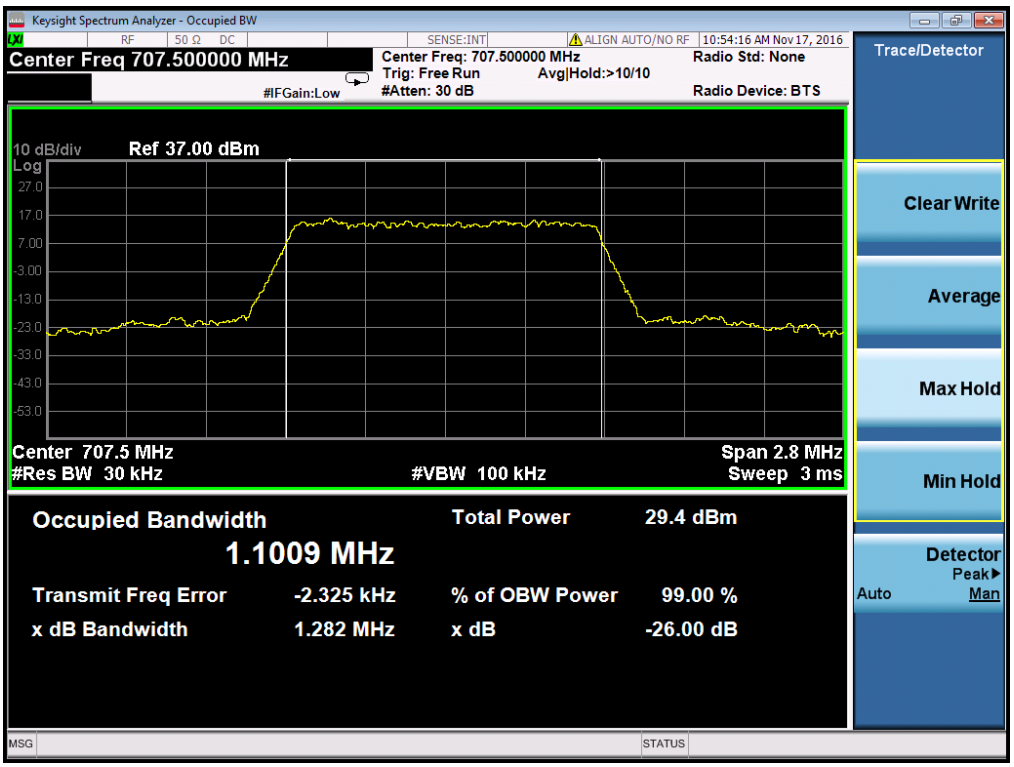

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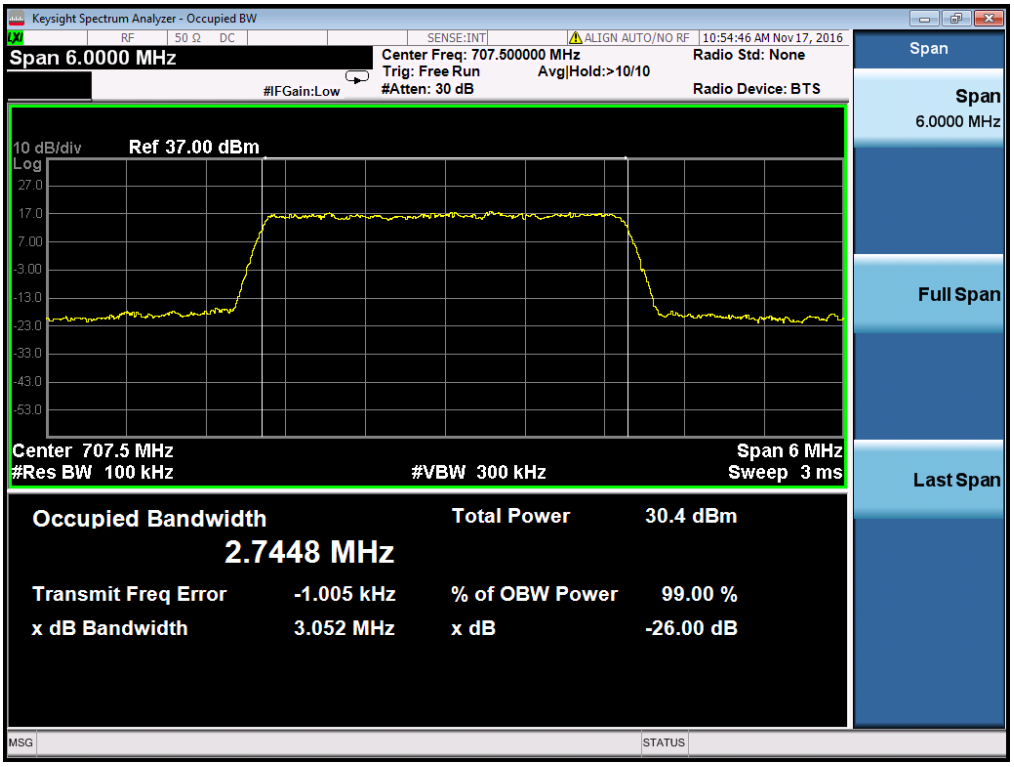

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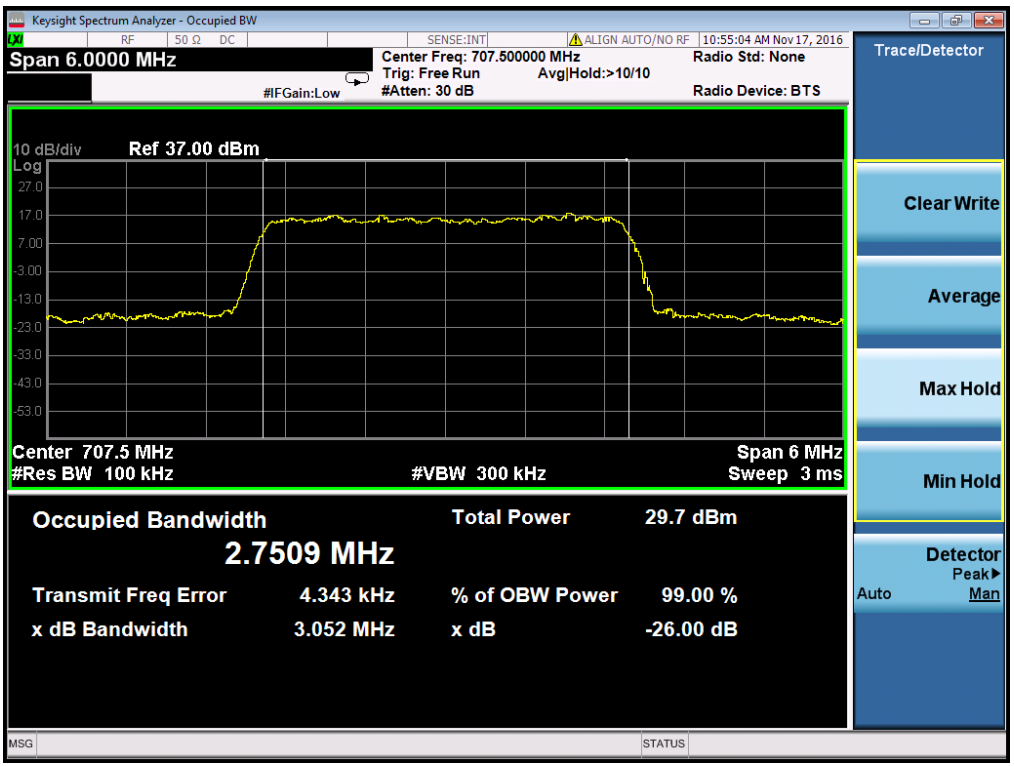

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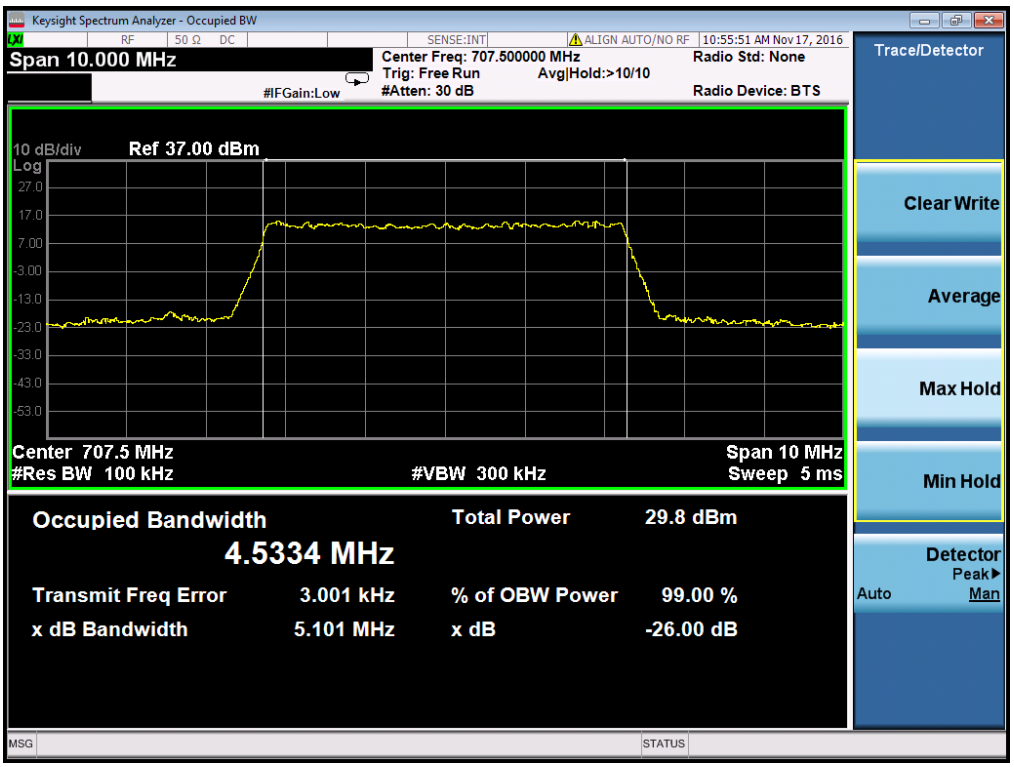

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Occupied Bandwidth LTE Band 12/10MHz/QPSK

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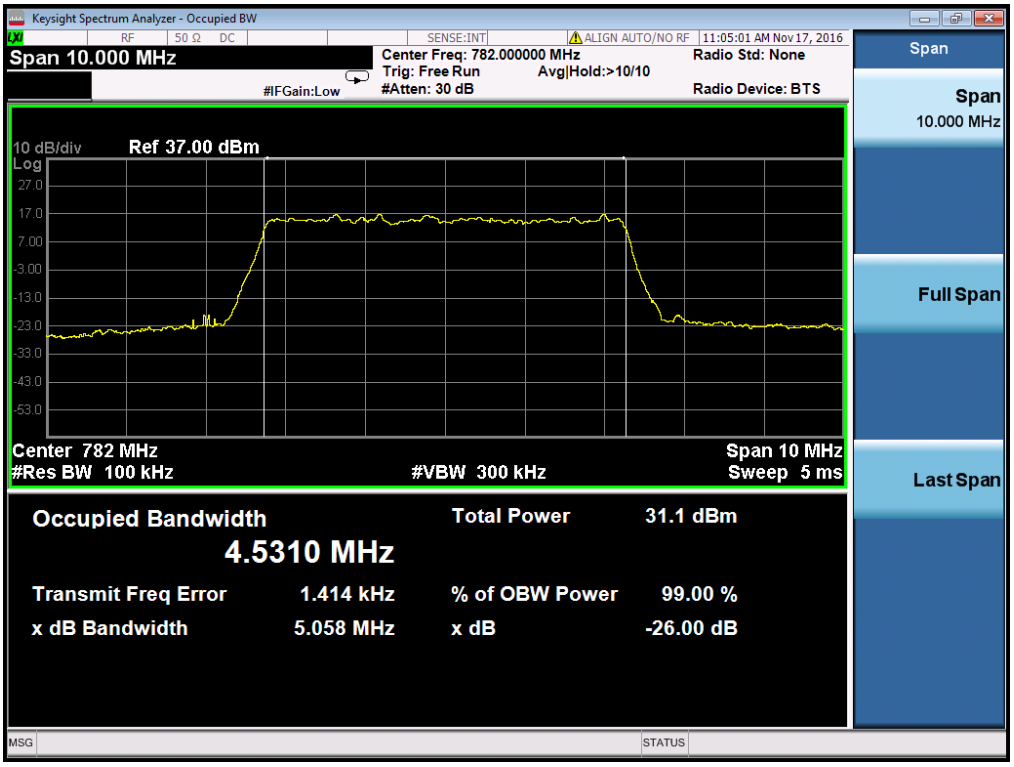

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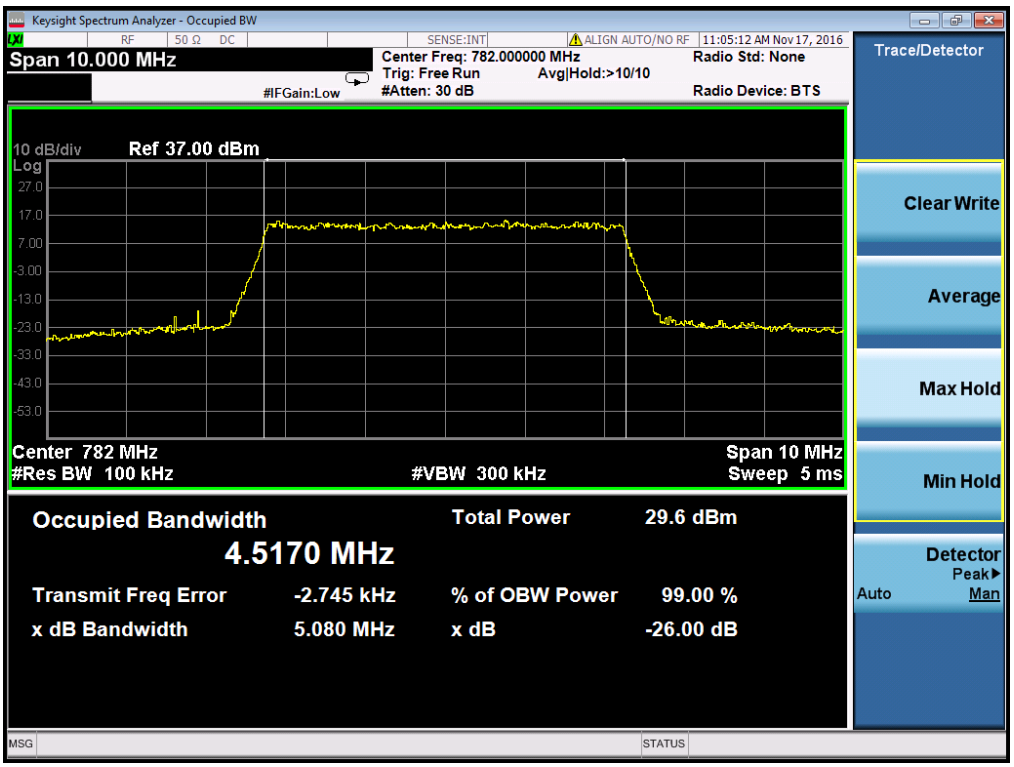

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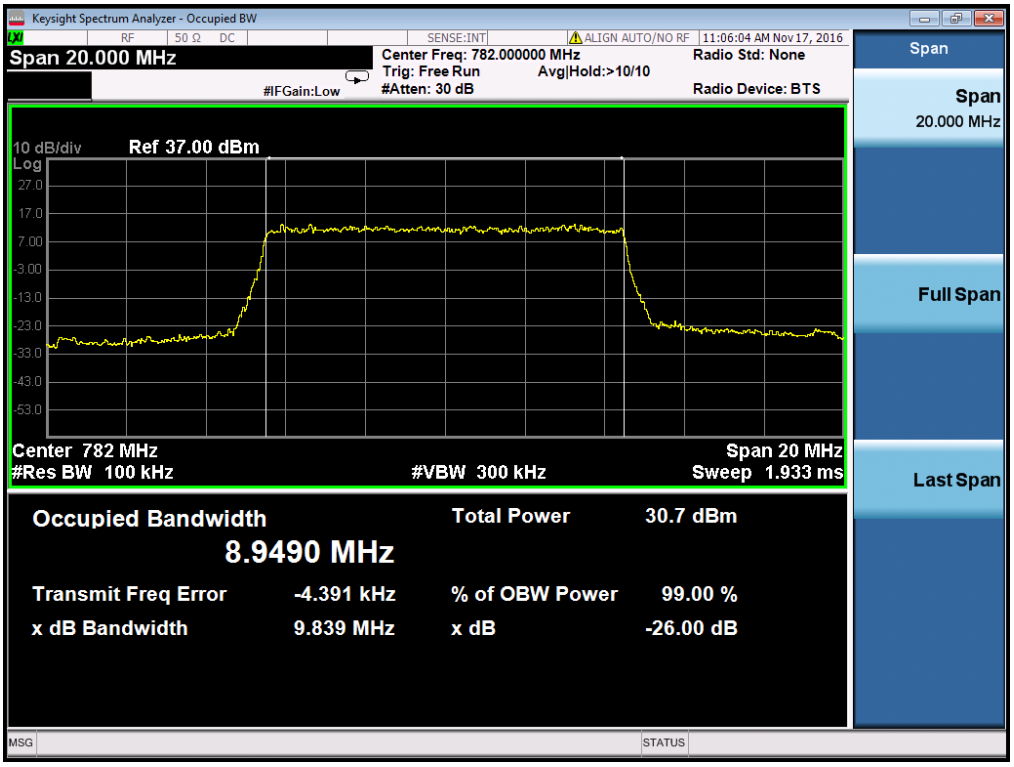

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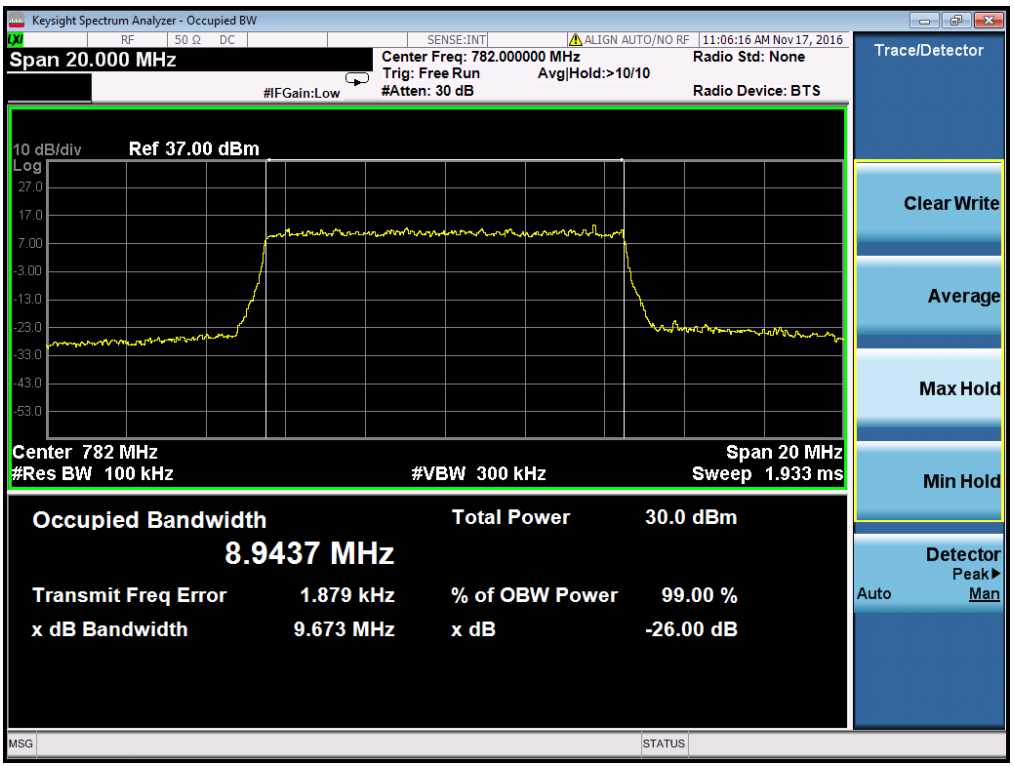

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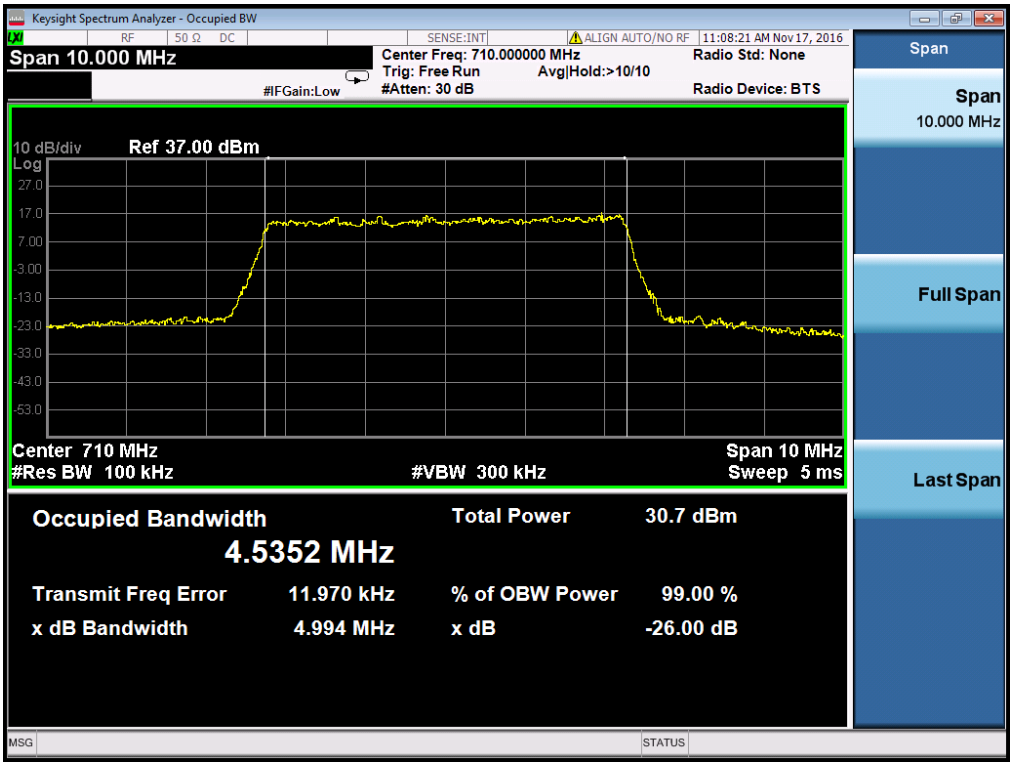
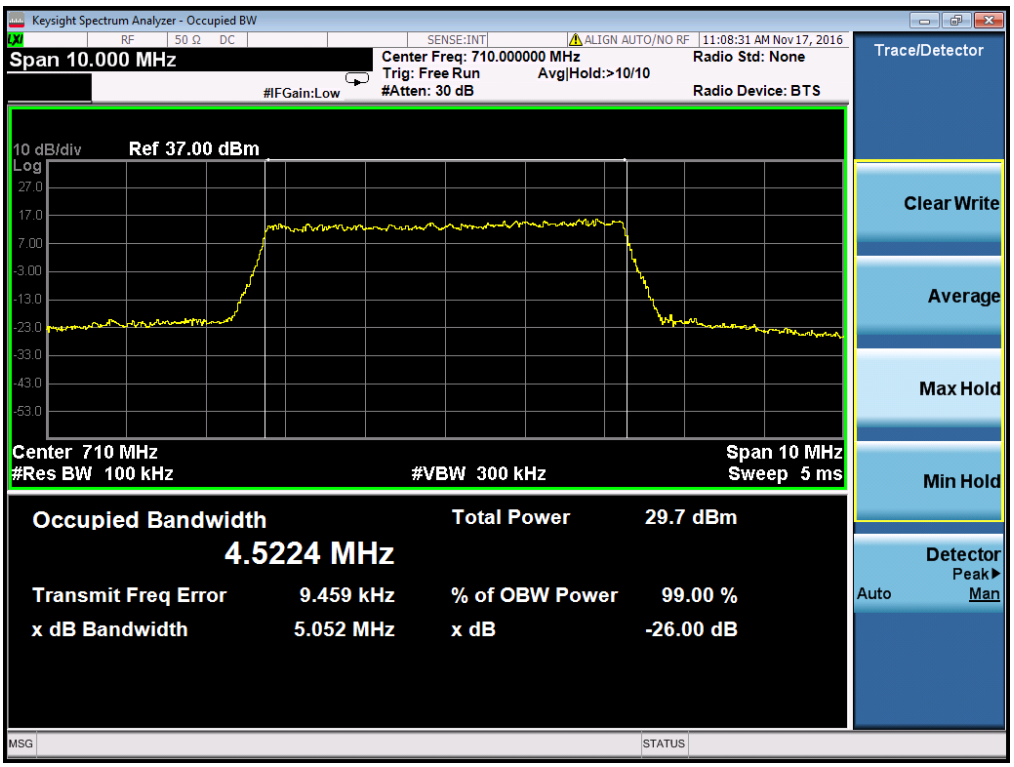


Occupied Bandwidth LTE Band 17/5MHz/QPSK



Occupied Bandwidth LTE Band 17/5MHz/16QAM

Occupied Bandwidth LTE Band 17/10MHz/QPSK

Occupied Bandwidth LTE Band 17/10MHz/16QAM

2.4 Frequency Stability

2.4.1 Requirement

According to FCC section 27.54, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency. According to FCC section 2.1055, the test conditions are:

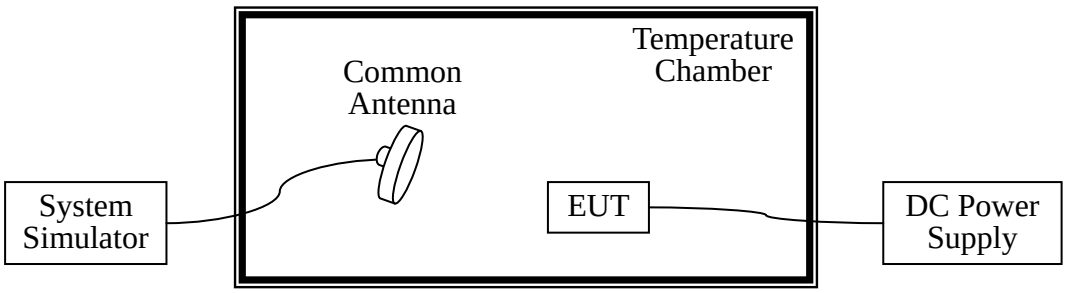
(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.4.2 Measuring Instruments

The measuring equipment is listed in the section 3 of this test report.

2.4.3 Test Setup



2.4.4 Test Procedures

1. The EUT was set up in the thermal chamber and connected with the system simulator.

2. With power OFF, the temperature was decreased to -30°C and the EUT was stabilized

before testing. Power was applied and the maximum change in frequency was recorded within one minute.

3. With power OFF, the temperature was raised in 10°C step up to 50°C. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. The nominal, highest and lowest extreme voltages were tested, which are specified by the applicant; the normal temperature here used is 25°C.
5. The variation in frequency was measured for the worst case.

2.4.5 Test Result of Frequency Stability

1. LTE Band 2, QPSK, BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 1880MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	50	0.03	2.5
	-20	22	0.01	
	-10	17	0.01	
	0	40	0.02	
	+10	18	0.01	
	+20	59	0.03	
	+30	20	0.01	
	+40	22	0.01	
	+55	52	0.03	
4.2	+25	33	0.02	
3.5	+25	20	0.01	

2. LTE Band 4, QPSK ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 1732.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	30	0.02	2.5
	-20	42	0.02	
	-10	25	0.01	
	0	40	0.02	
	+10	15	0.01	
	+20	20	0.01	
	+30	25	0.01	
	+40	52	0.03	
	+55	26	0.02	
4.2	+25	30	0.02	
3.5	+25	24	0.01	

3. LTE Band 4, 16QAM ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 1732.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	58	0.03	2.5
	-20	22	0.01	
	-10	35	0.02	
	0	24	0.02	
	+10	31	0.02	
	+20	18	0.01	
	+30	32	0.02	
	+40	25	0.01	
	+55	15	0.01	
4.2	+25	55	0.03	
3.5	+25	36	0.02	

4. LTE Band 7, QPSK ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 2535MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	21	0.01	2.5
	-20	55	0.02	
	-10	40	0.02	
	0	24	0.01	
	+10	22	0.01	
	+20	28	0.01	
	+30	32	0.01	
	+40	24	0.01	
	+55	20	0.01	
4.2	+25	58	0.02	
3.5	+25	51	0.02	

5. LTE Band 7,16QAM ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 2535MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	25	0.01	2.5
	-20	49	0.02	
	-10	24	0.01	
	0	20	0.01	
	+10	25	0.01	
	+20	51	0.02	
	+30	25	0.01	
	+40	23	0.01	
	+55	20	0.01	
4.2	+25	56	0.02	
3.5	+25	21	0.01	

6. LTE Band 12, QPSK ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 707.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	12	0.02	2.5
	-20	18	0.02	
	-10	25	0.04	
	0	14	0.02	
	+10	22	0.03	
	+20	36	0.05	
	+30	20	0.03	
	+40	30	0.04	
	+55	24	0.03	
4.2	+25	21	0.03	
3.5	+25	40	0.05	

7. LTE Band 12, 16QAM ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 707.5MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	26	0.04	2.5
	-20	16	0.02	
	-10	12	0.02	
	0	9	0.01	
	+10	25	0.04	
	+20	21	0.03	
	+30	36	0.05	
	+40	22	0.03	
	+55	20	0.03	
4.2	+25	35	0.05	
3.5	+25	20	0.03	

8. LTE Band 13, QPSK ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 782MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	22	0.03	2.5
	-20	13	0.02	
	-10	35	0.04	
	0	22	0.03	
	+10	27	0.03	
	+20	41	0.05	
	+30	12	0.02	
	+40	21	0.03	
	+55	22	0.03	
4.2	+25	36	0.04	
3.5	+25	18	0.02	

9. LTE Band 13,16QAM ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 782MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	24	0.03	2.5
	-20	14	0.02	
	-10	32	0.04	
	0	30	0.04	
	+10	25	0.03	
	+20	42	0.05	
	+30	14	0.02	
	+40	20	0.03	
	+55	25	0.03	
4.2	+25	34	0.04	
3.5	+25	20	0.02	

10. LTE Band 17, QPSK ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 710MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	35	0.05	2.5
	-20	21	0.03	
	-10	15	0.02	
	0	21	0.03	
	+10	22	0.03	
	+20	37	0.05	
	+30	12	0.02	
	+40	15	0.02	
	+55	30	0.04	
4.2	+25	22	0.03	
3.5	+25	30	0.04	

11. LTE Band 17,16QAM ,BW 5MHz

Test Conditions		Frequency Deviation BW 5MHz Middle Channel 710MHz		
Power (VDC)	Temperature (°C)	Frequency Error	Frequency Error	Limit
		Hz	ppm	ppm
3.7	-30	36	0.05	2.5
	-20	20	0.03	
	-10	18	0.03	
	0	16	0.02	
	+10	21	0.03	
	+20	15	0.02	
	+30	25	0.04	
	+40	20	0.03	
	+55	14	0.02	
4.2	+25	24	0.04	
3.5	+25	32	0.05	

2.5 Conducted Out of Band Emissions

2.5.1 Requirement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43+10*log(P)dB. This calculated to be -13dBm.

For Band 7:

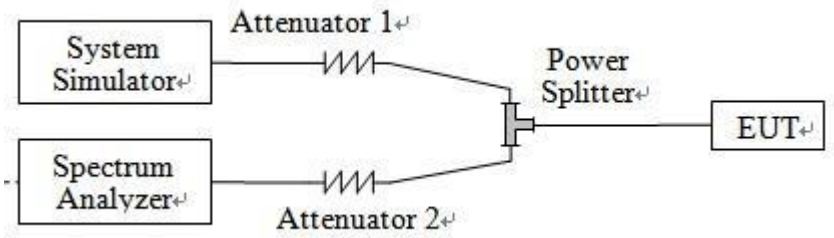
The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power(P) by a factor of at least 55+10 log(P) dB. This calculated to be -25dBm.

It is measured by means of a calibrated spectrum analyzer and scanned from 30MHz up to a frequency including its 10th harmonic.

2.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

2.5.3 Test Setup



2.5.4 Test Procedures

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was

measured.

4. The conducted spurious emission for the whole frequency range was taken.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
7. The limit line is derived from 43 + 10log(P)dB below the transmitter power P(Watts)

   = P(W)- [43 + 10log(P)] (dB)

   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

   = -13dBm.
8. For Band 7

   The limit line is derived from 55 + 10log(P)dB below the transmitter power P(Watts)

   = P(W)- [55 + 10log(P)] (dB)

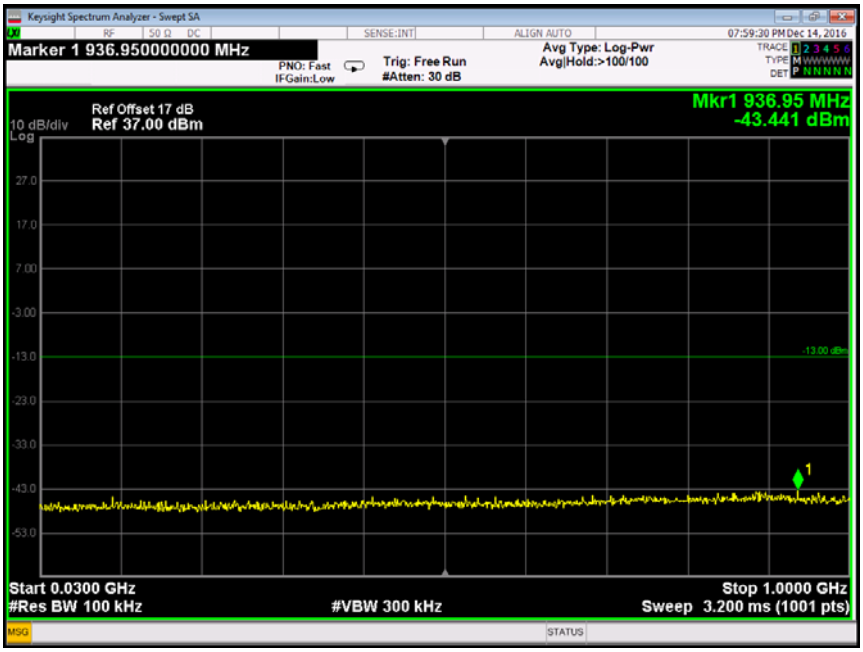
   = [30 + 10log(P)] (dBm) - [55 + 10log(P)] (dB)

   = -25dBm.
9. For 9KHz to 30MHz: the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

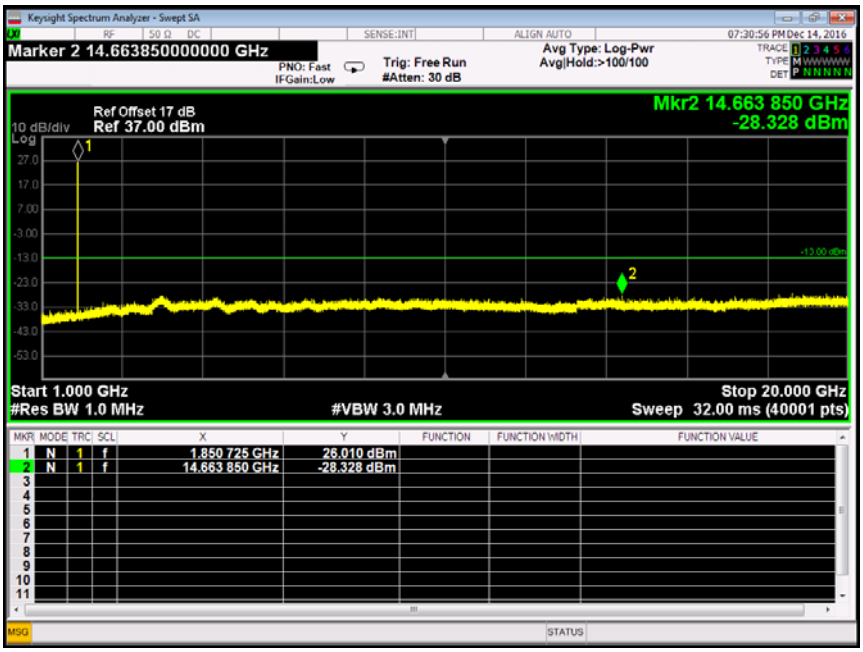
2.5.5 Test Result of Conducted Spurious Emission

Note: For 9 KHz to 30MHz: the amplitude of spurious emissions is attenuated by more than 20dB below the permissible value, so we not provide the test result here

Band	LTE Band 2	Channel	Low
Bandwidth	1.4MHz	Modulation	QPSK

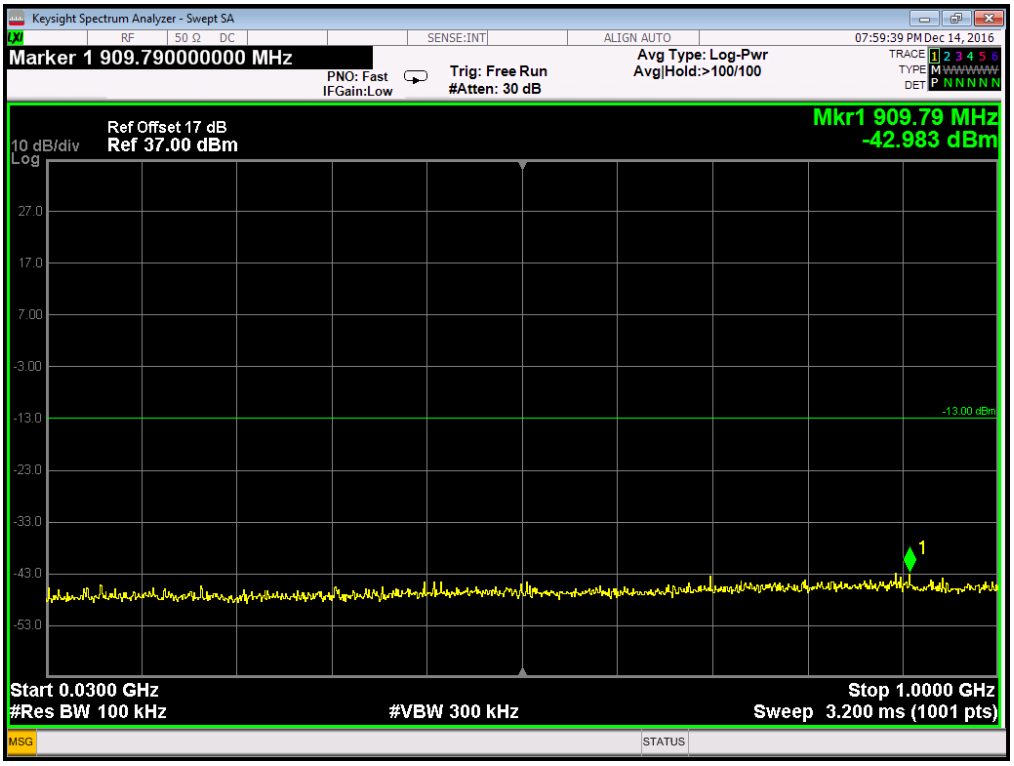


RB Size 1, RB Offset 0 30MHz to 1GHz

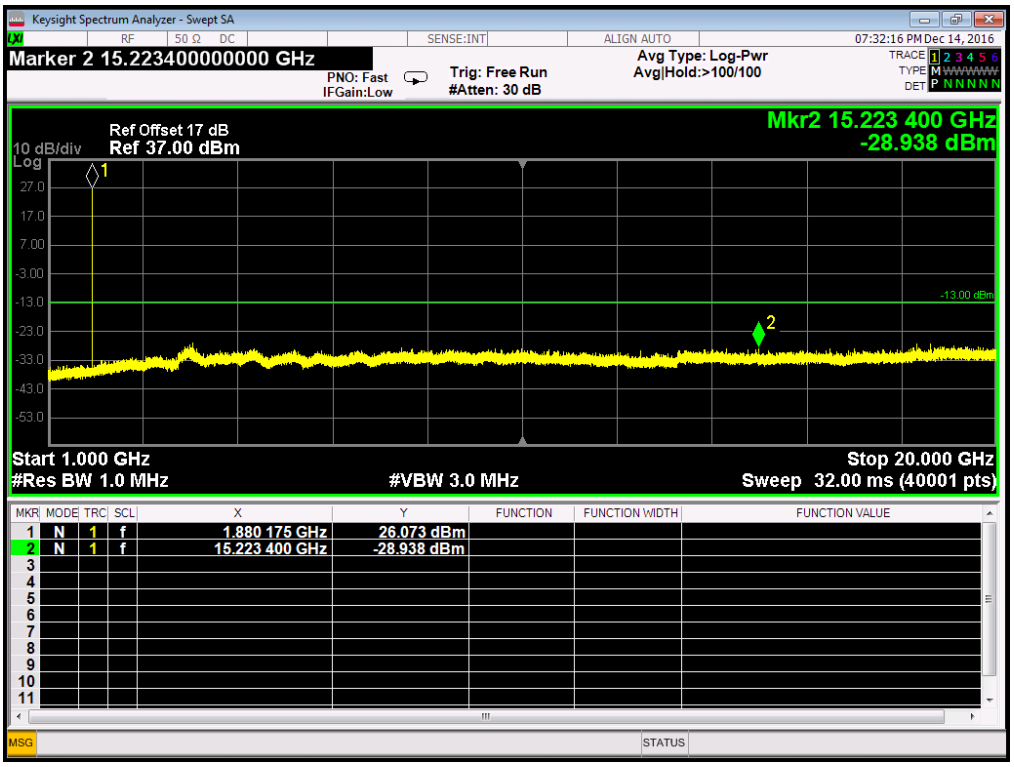


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	1.4MHz	Modulation	QPSK

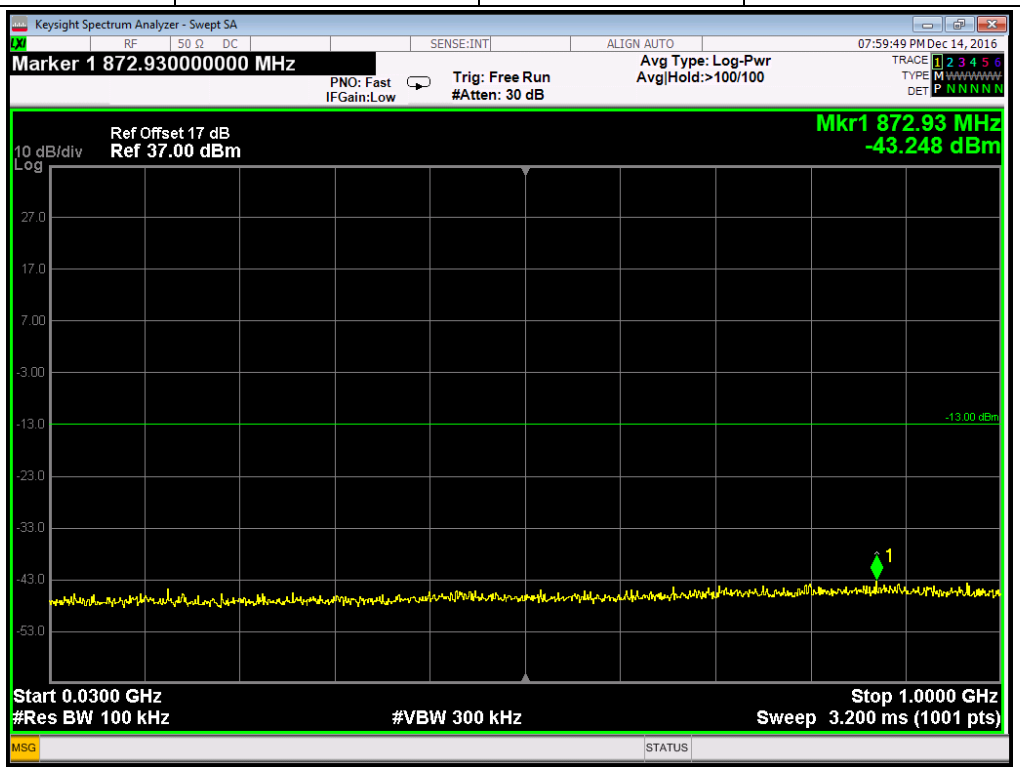


RB Size 1, RB Offset 0 30MHz to 1GHz

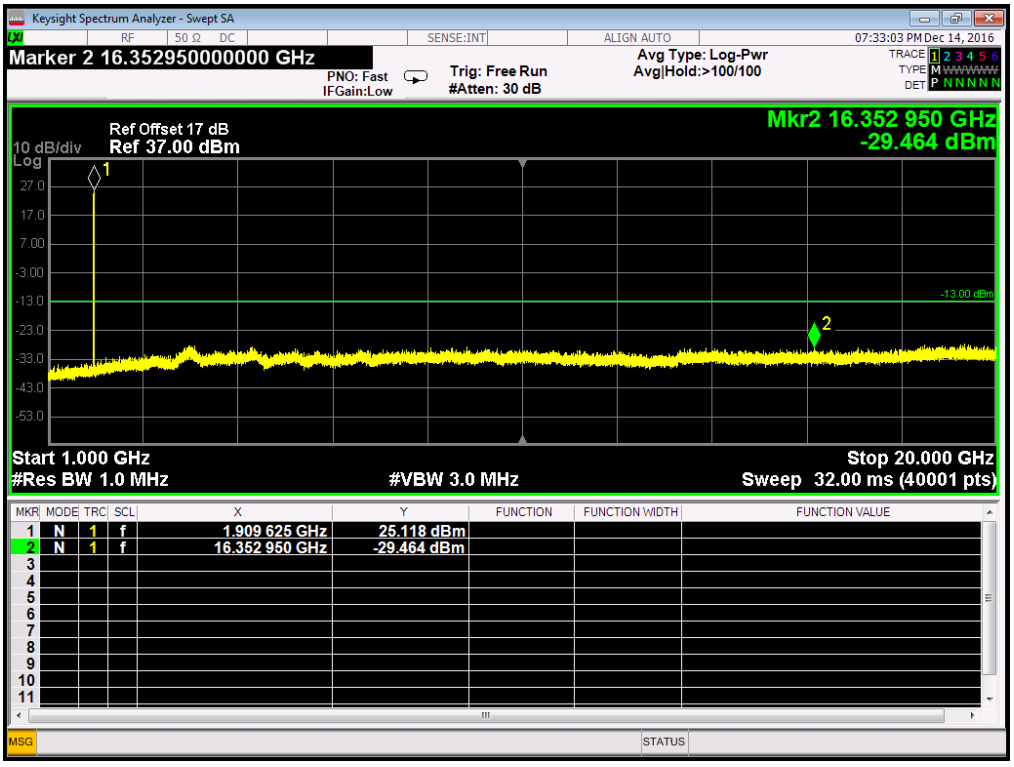


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	1.4MHz	Modulation	QPSK

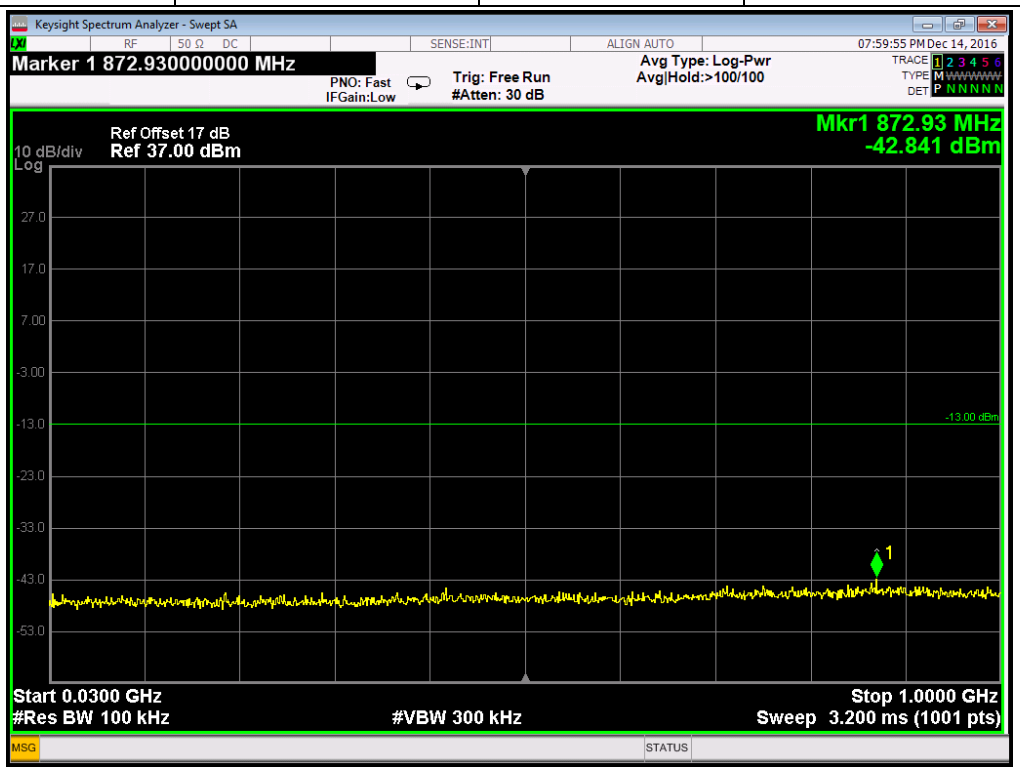


RB Size 1, RB Offset 0 30MHz to 1GHz

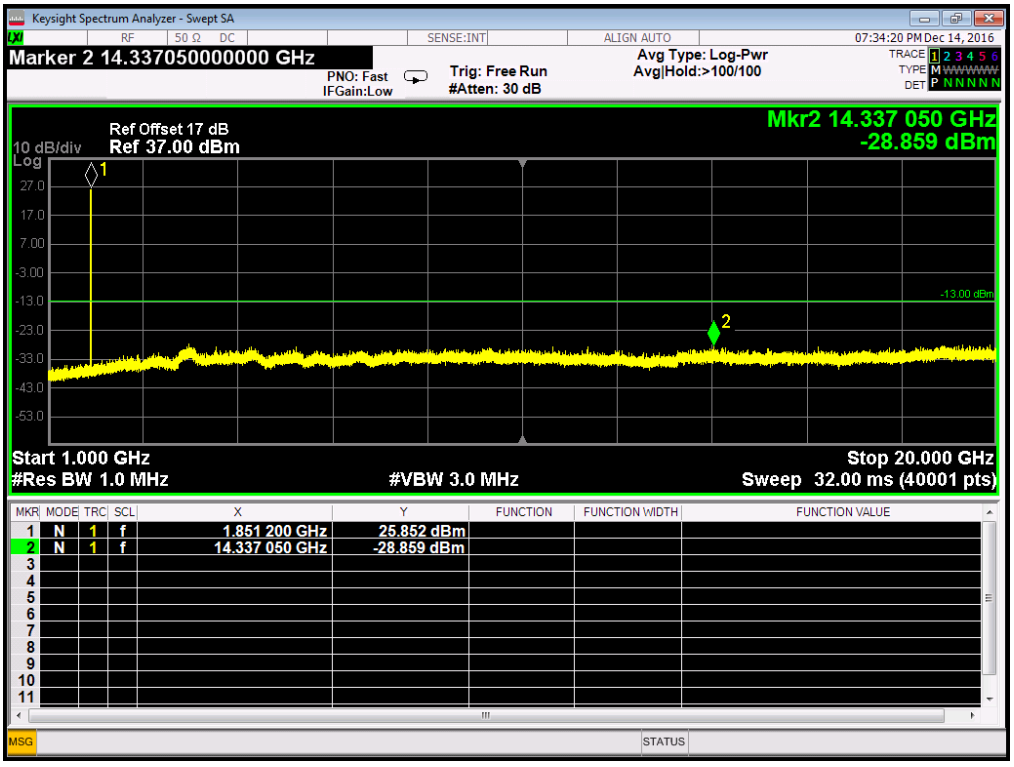


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	3MHz	Modulation	QPSK

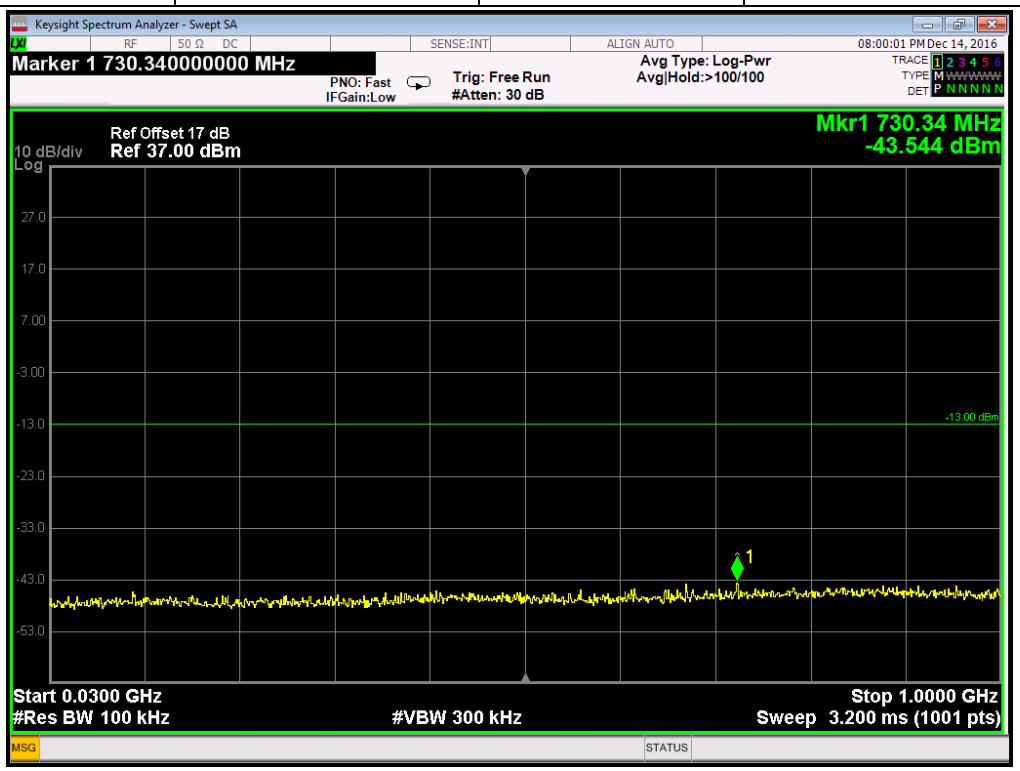


RB Size 1, RB Offset 0 30MHz to 1GHz

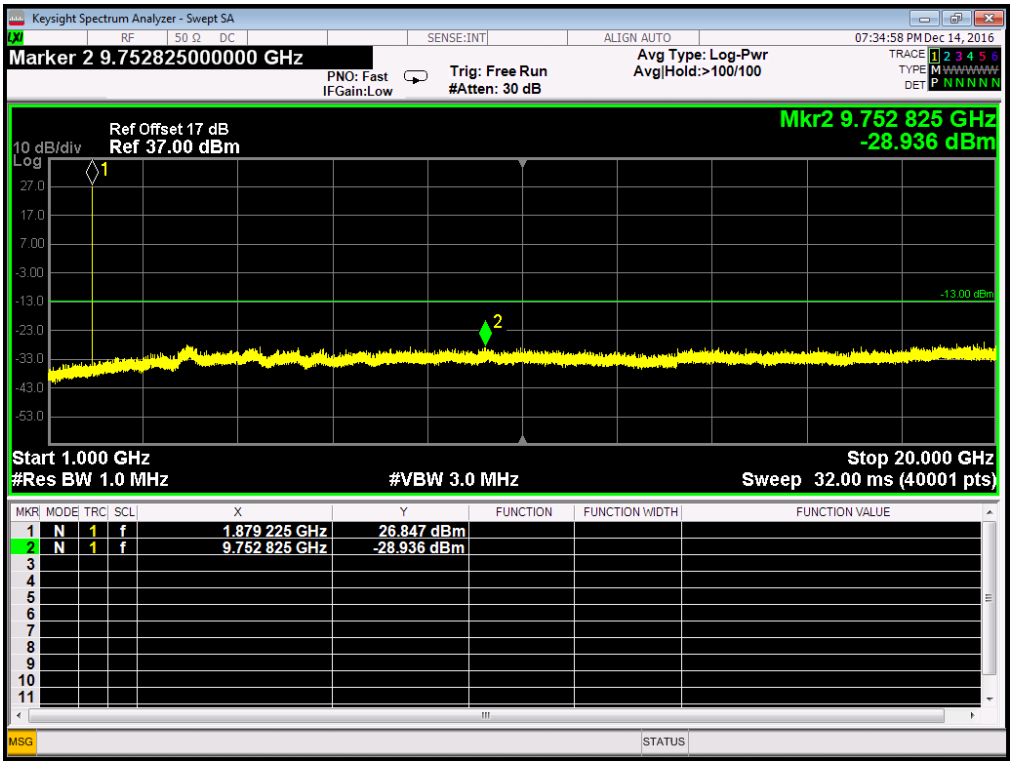


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	3MHz	Modulation	QPSK

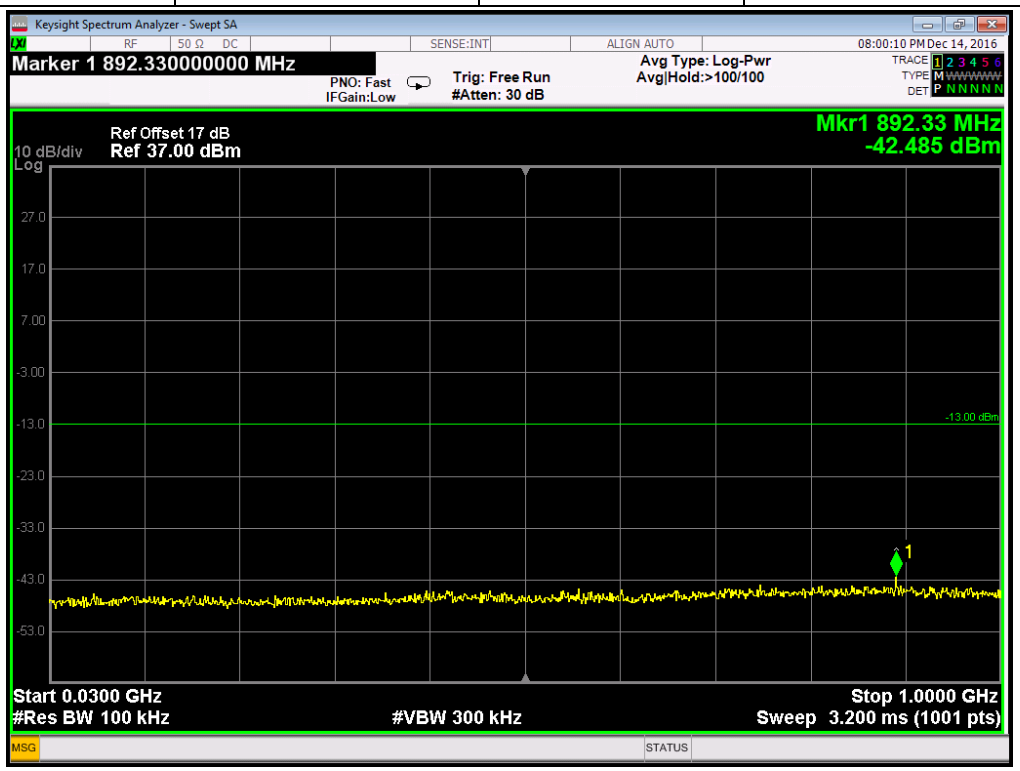


RB Size 1, RB Offset 0 30MHz to 1GHz

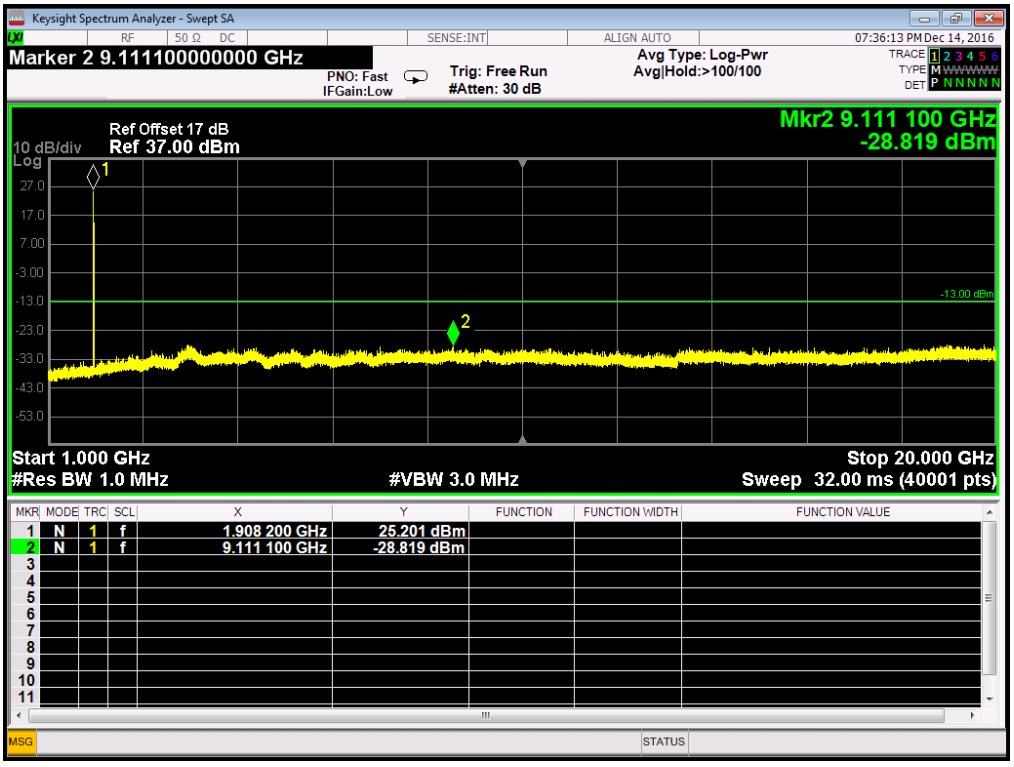


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	3MHz	Modulation	QPSK

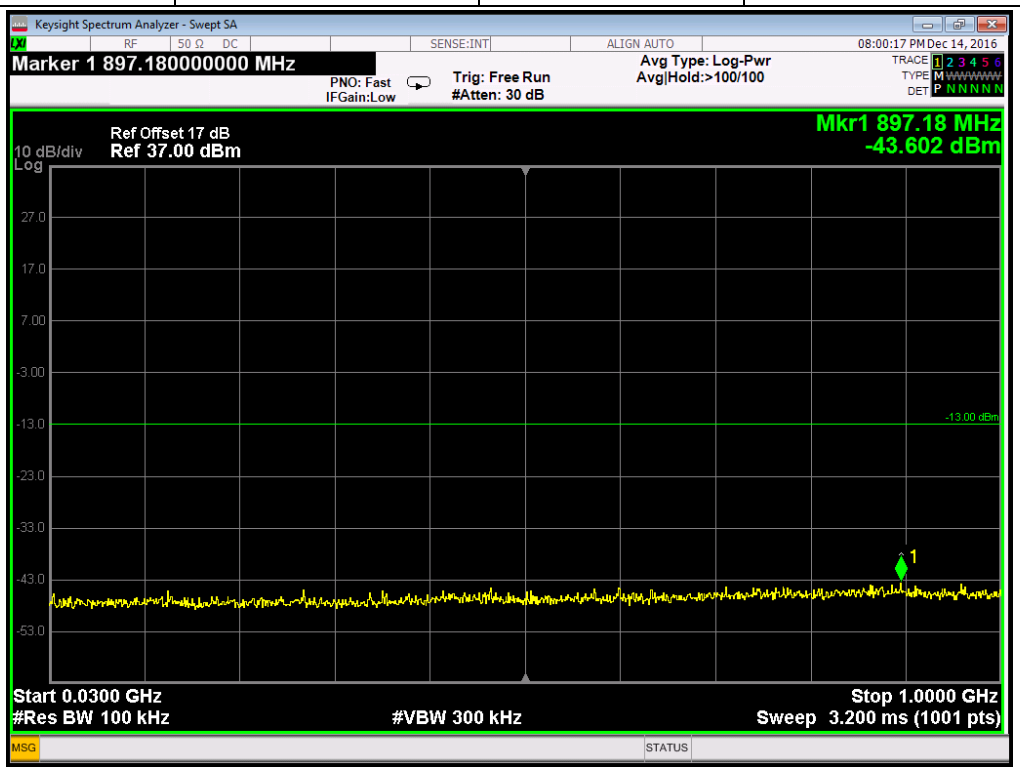


RB Size 1, RB Offset 0 30MHz to 1GHz

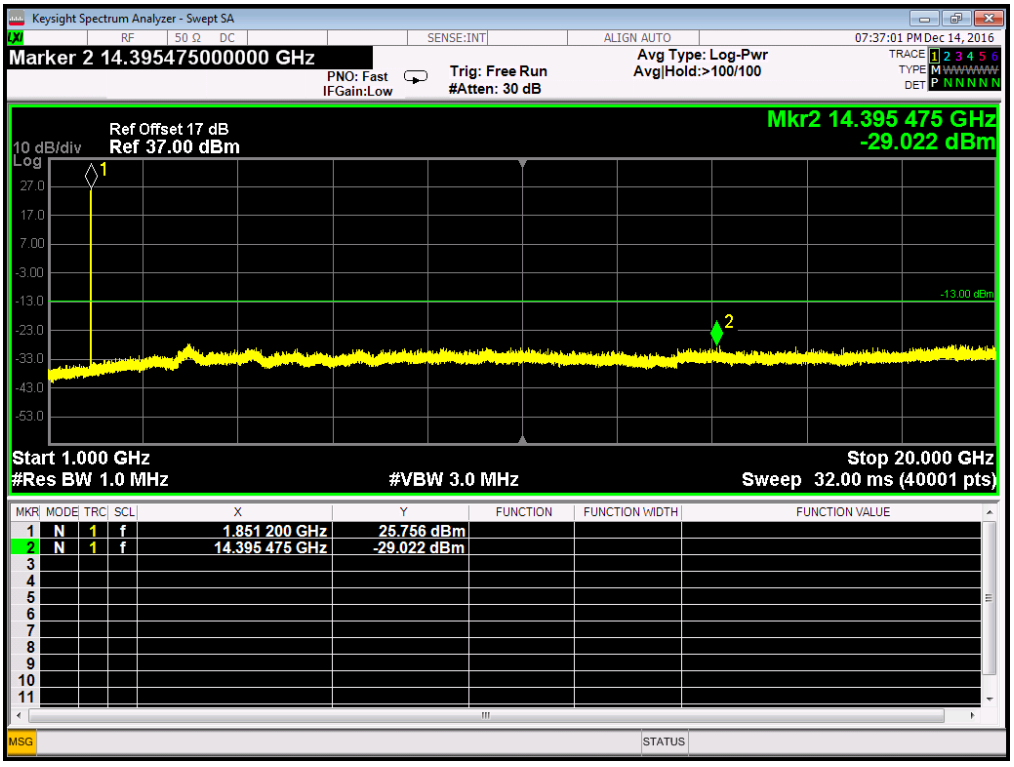


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	5MHz	Modulation	QPSK

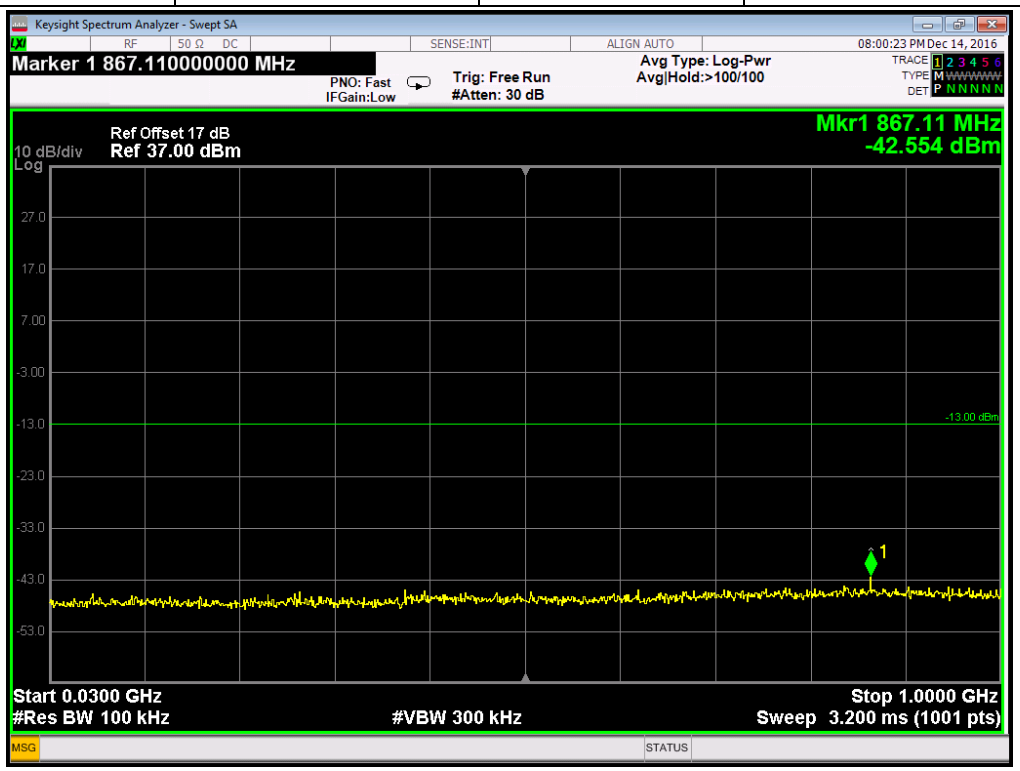


RB Size 1, RB Offset 0 30MHz to 1GHz

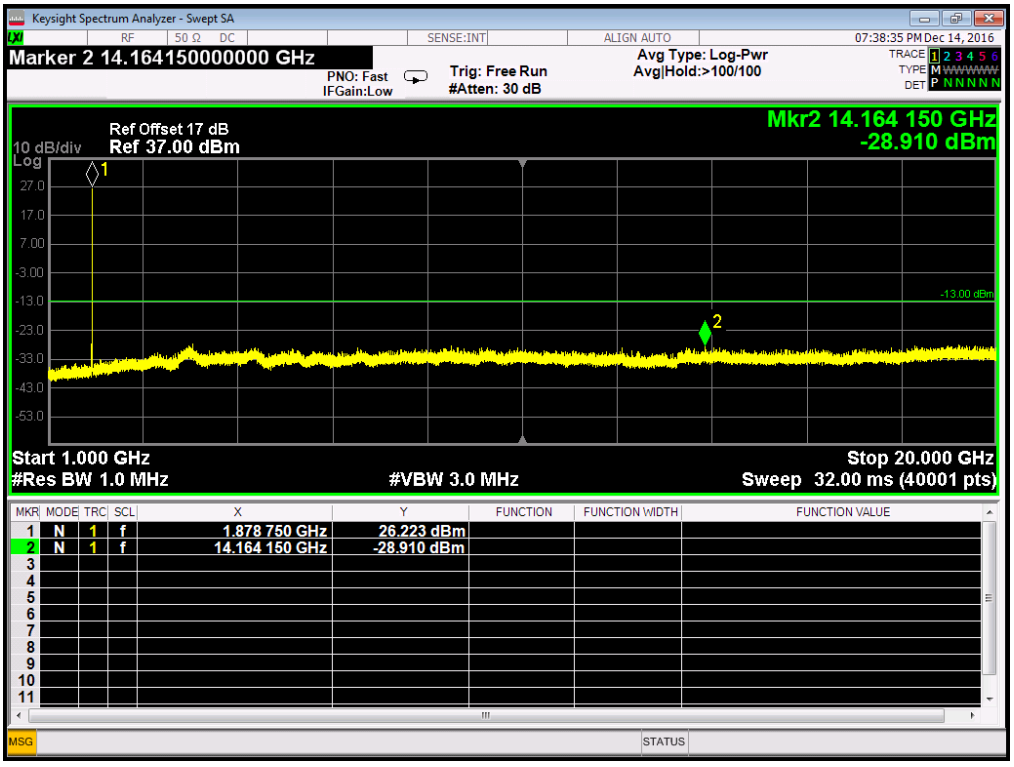


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	5MHz	Modulation	QPSK

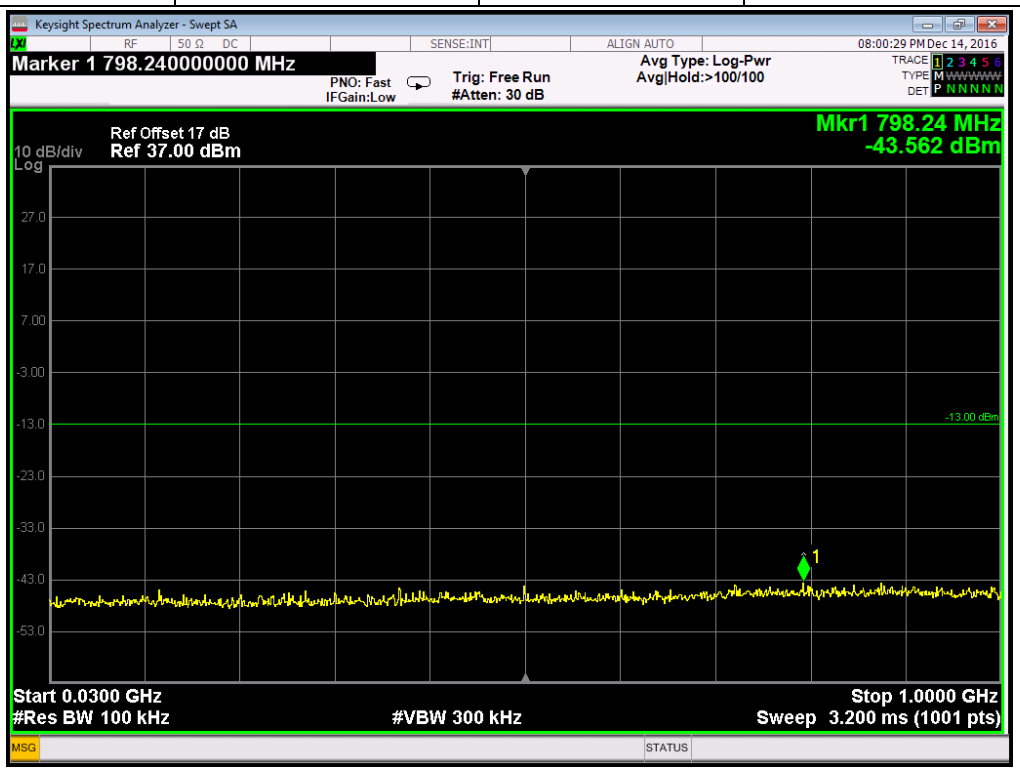


RB Size 1, RB Offset 0 30MHz to 1GHz

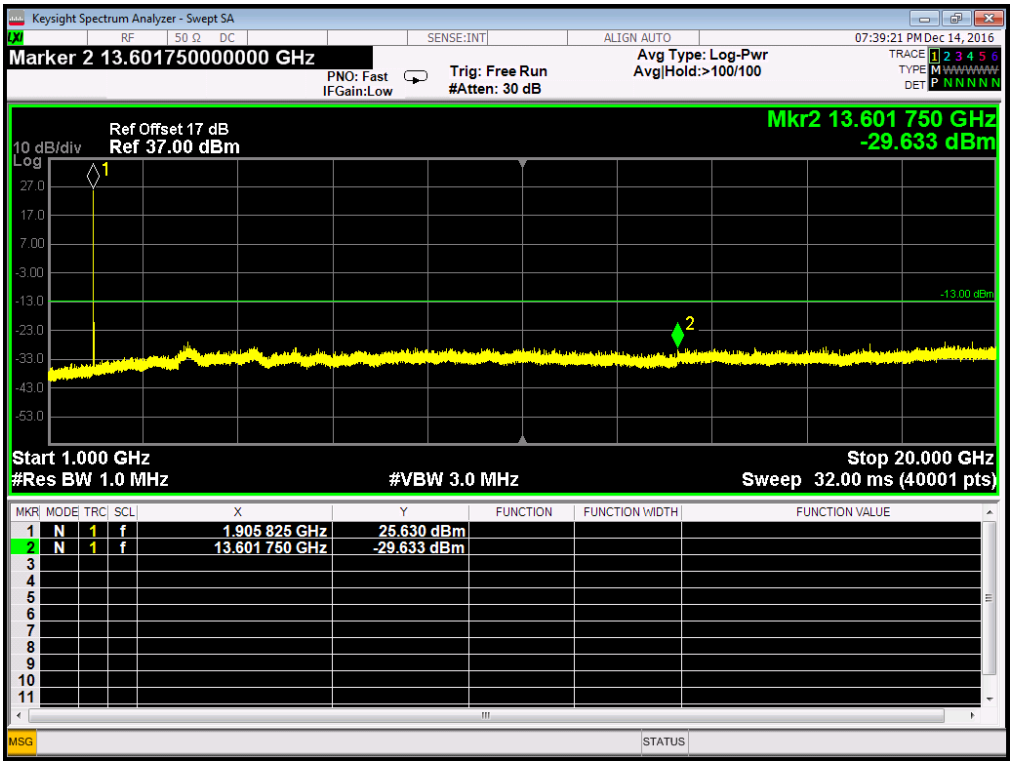


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	5MHz	Modulation	QPSK

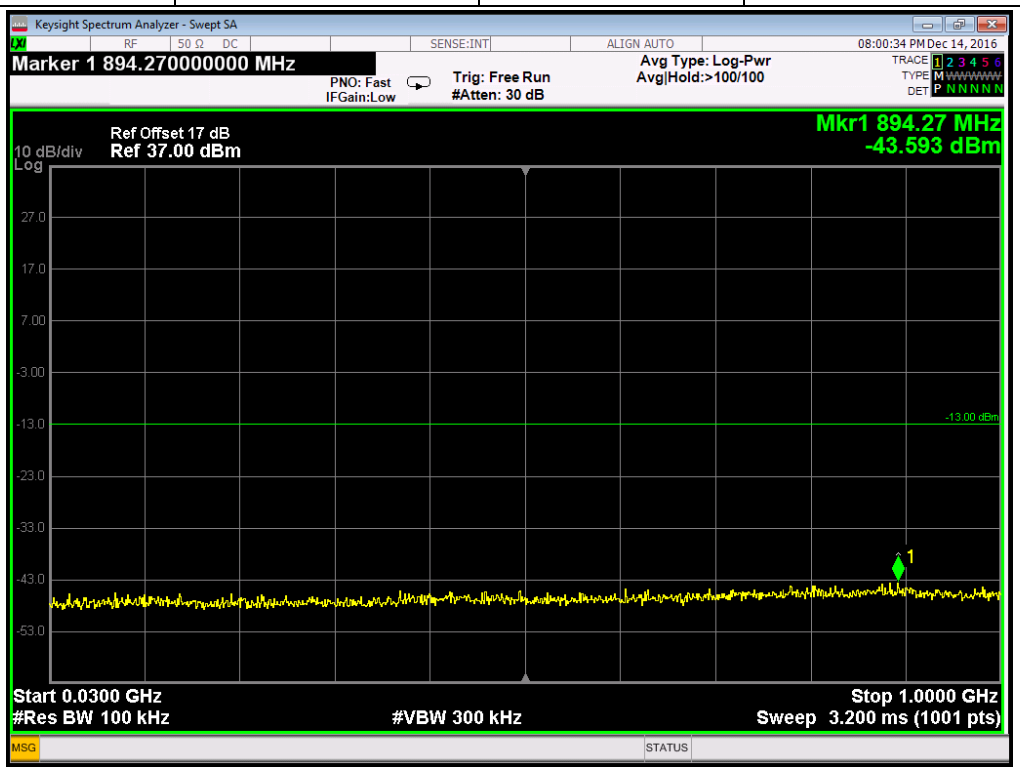


RB Size 1, RB Offset 0 30MHz to 1GHz

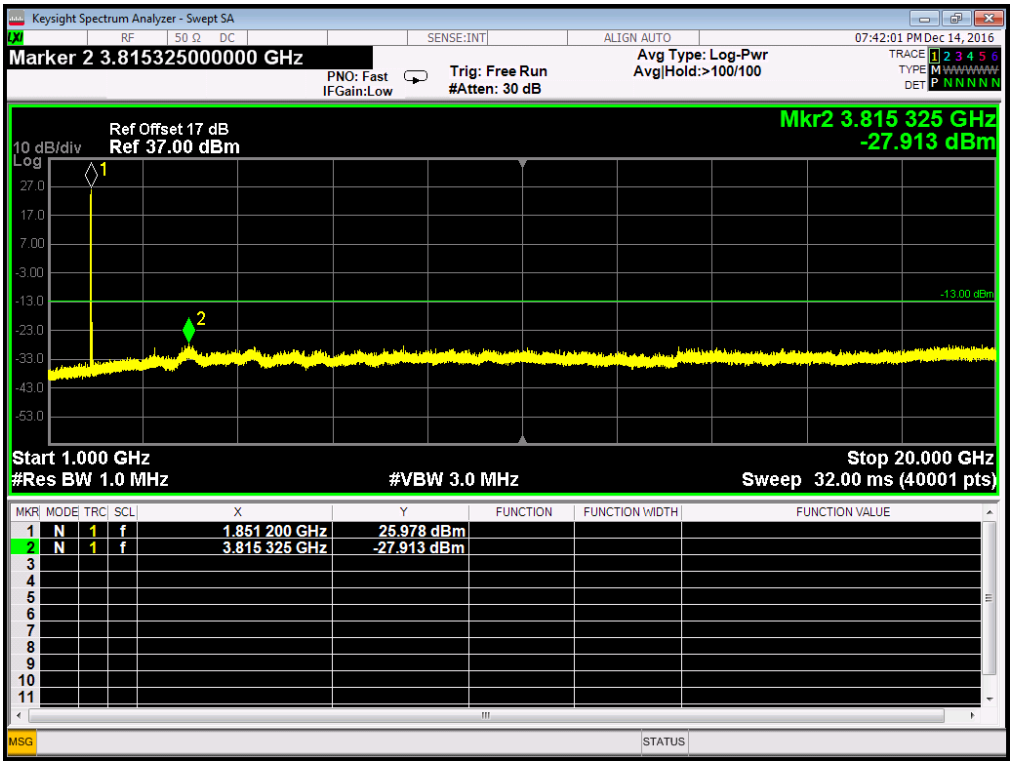


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	10MHz	Modulation	QPSK

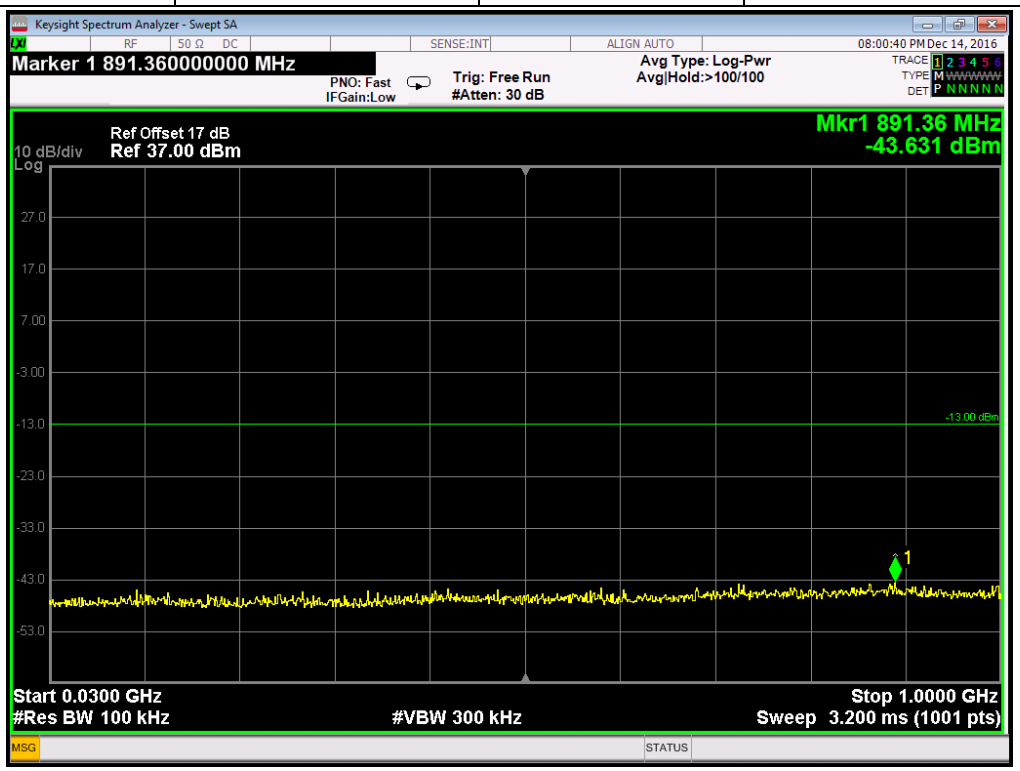


RB Size 1, RB Offset 0 30MHz to 1GHz

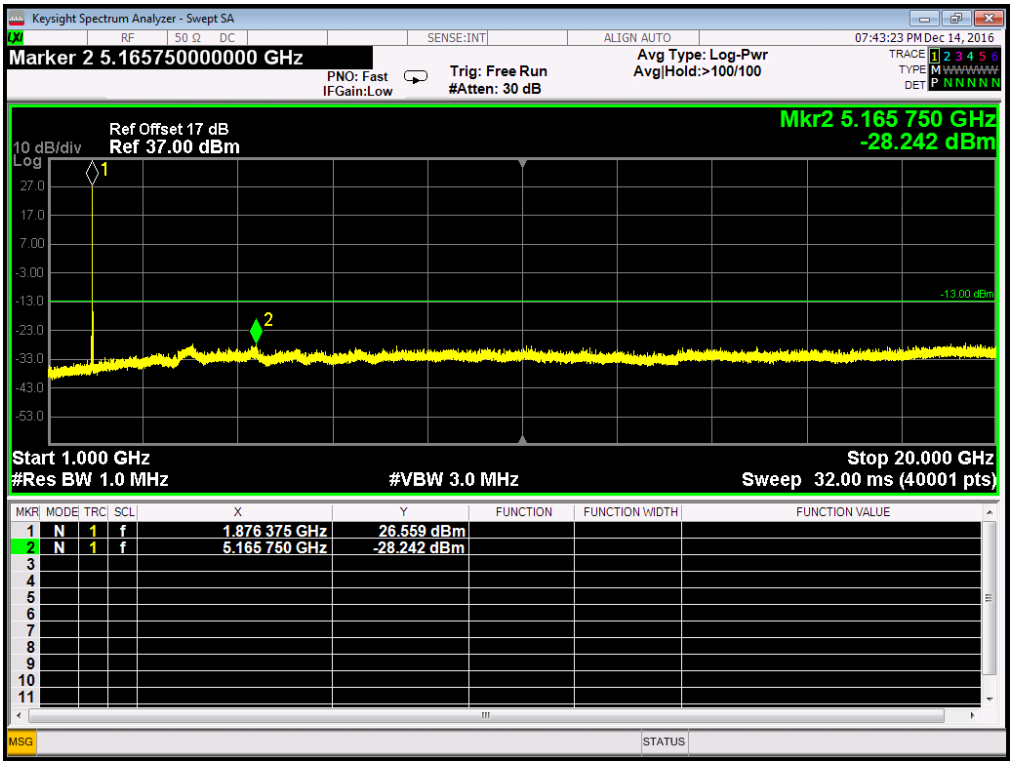


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	10MHz	Modulation	QPSK

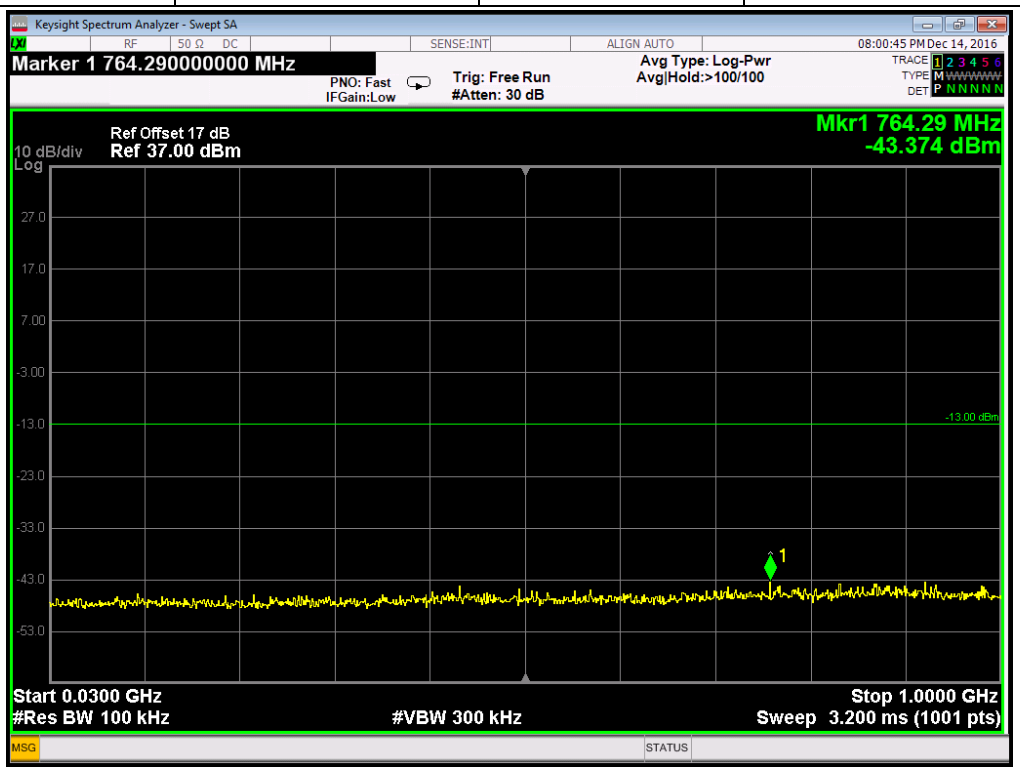


RB Size 1, RB Offset 0 30MHz to 1GHz

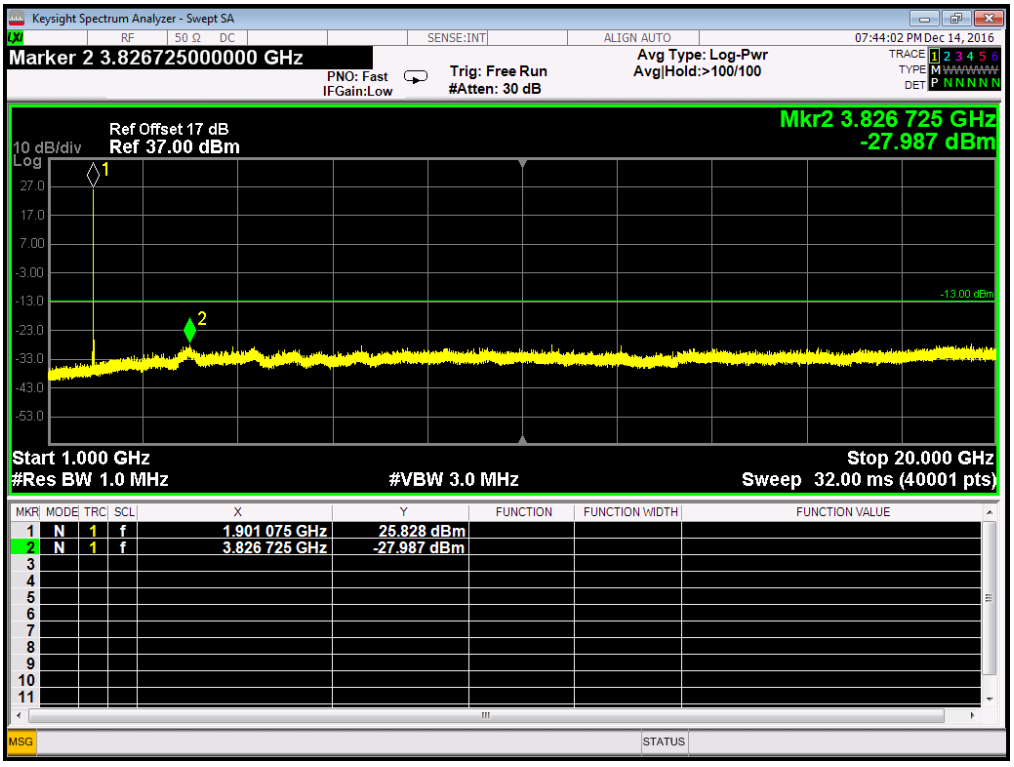


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	10MHz	Modulation	QPSK

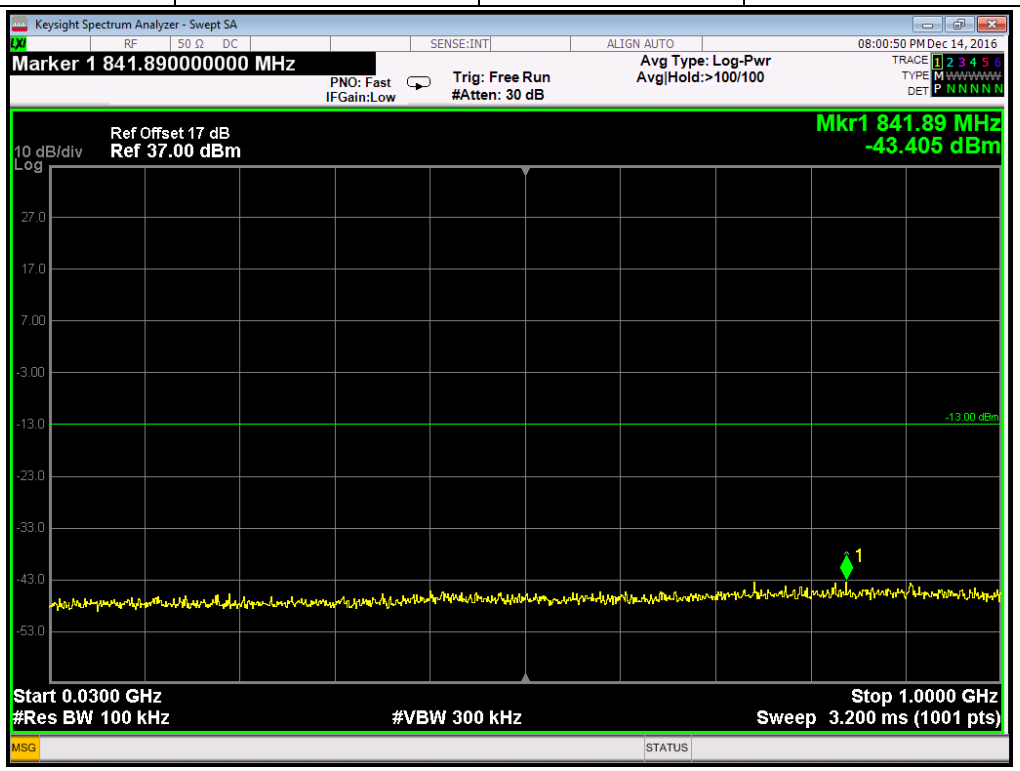


RB Size 1, RB Offset 0 30MHz to 1GHz

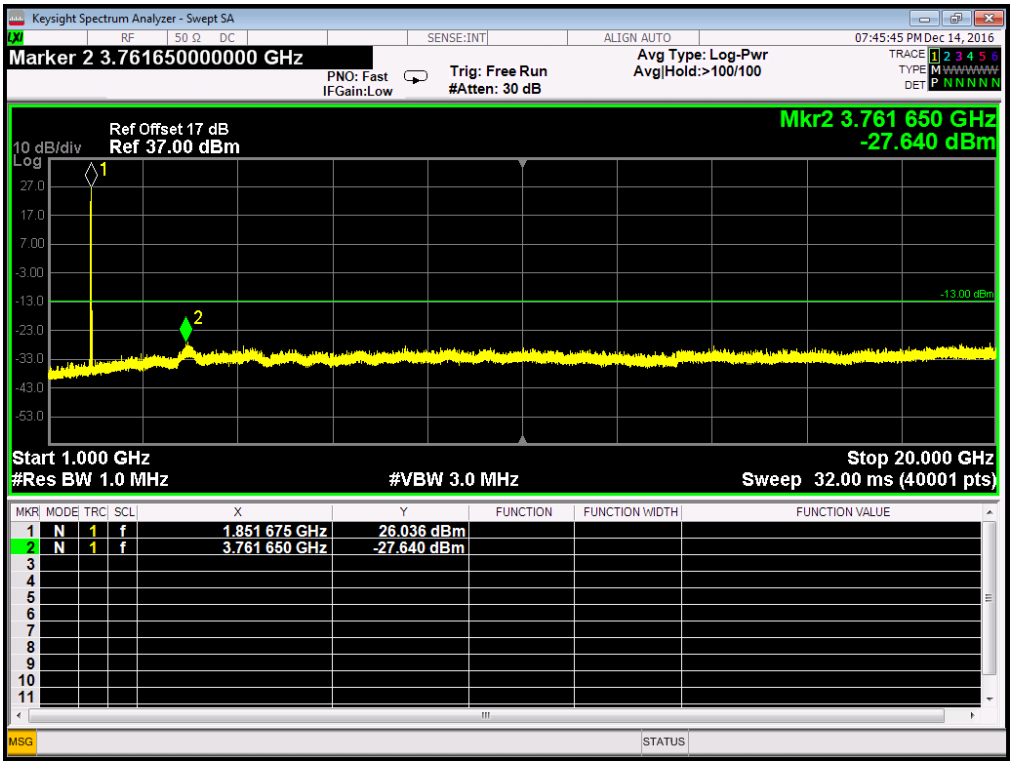


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	15MHz	Modulation	QPSK

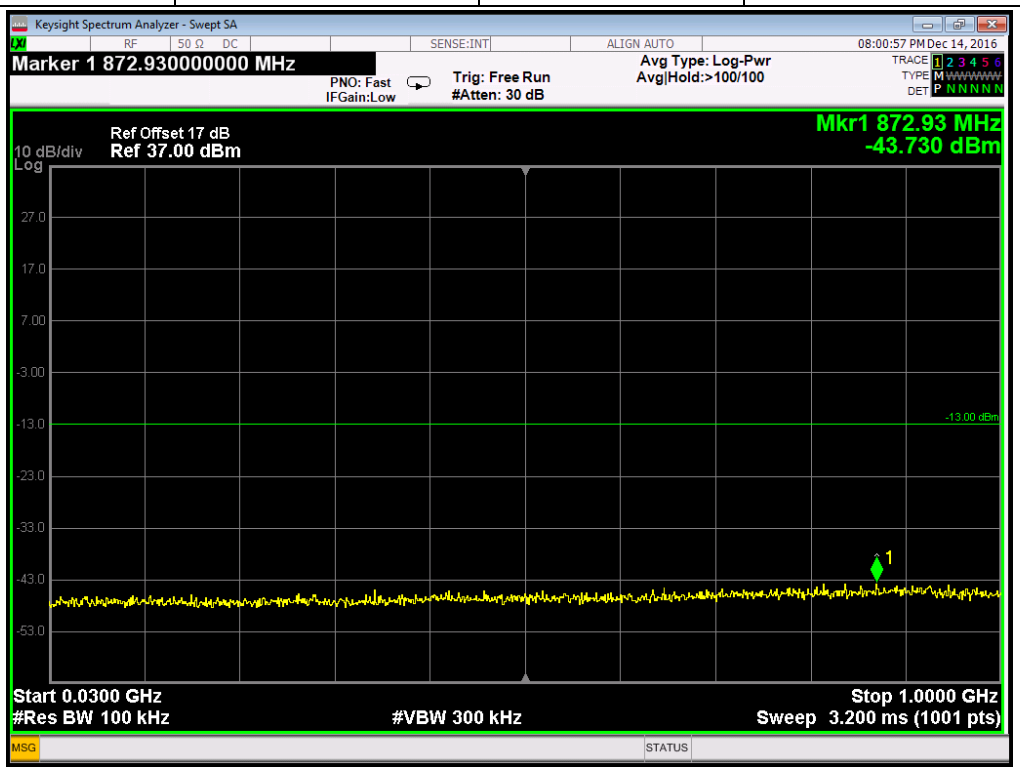


RB Size 1, RB Offset 0 30MHz to 1GHz

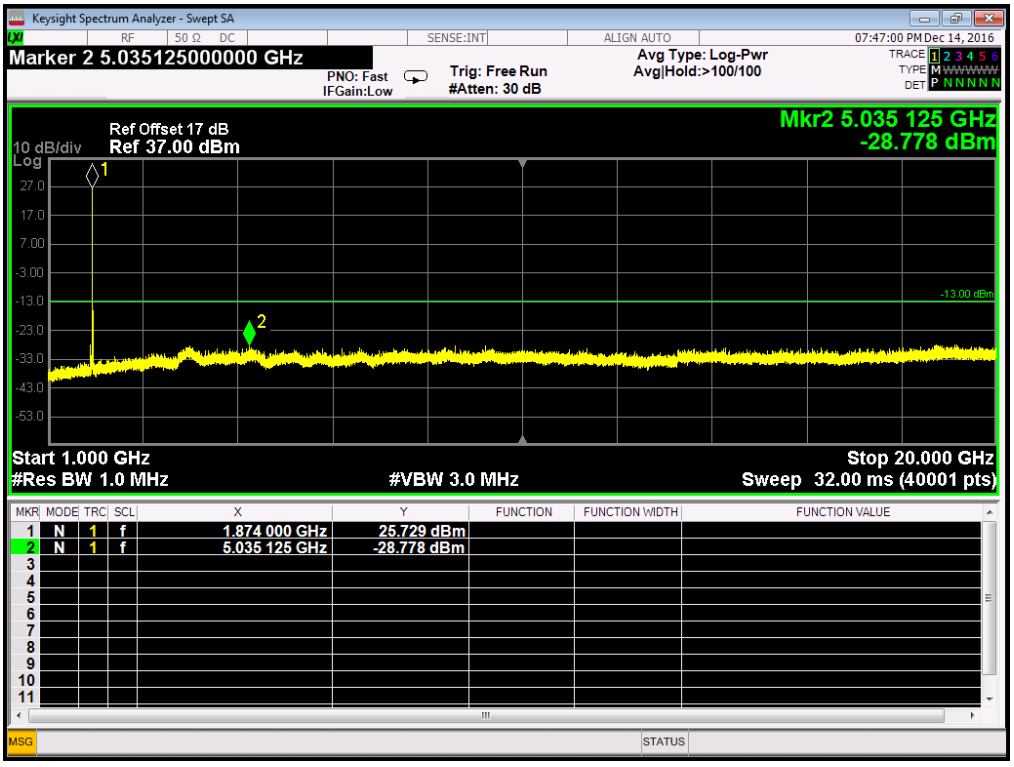


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	15MHz	Modulation	QPSK

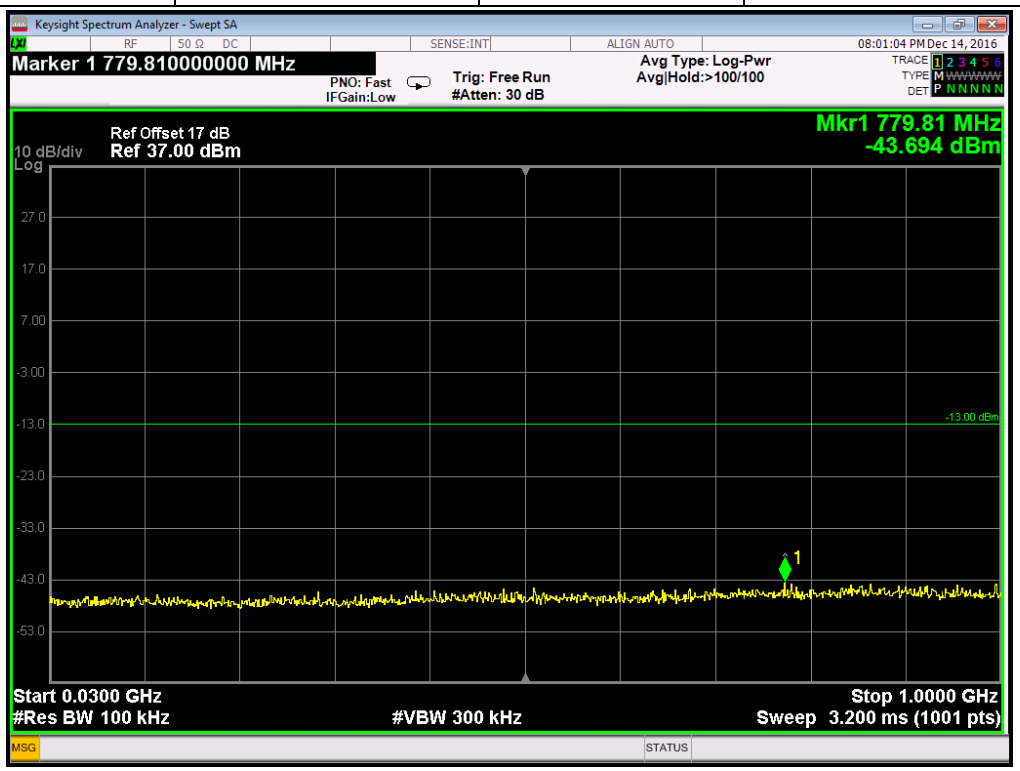


RB Size 1, RB Offset 0 30MHz to 1GHz

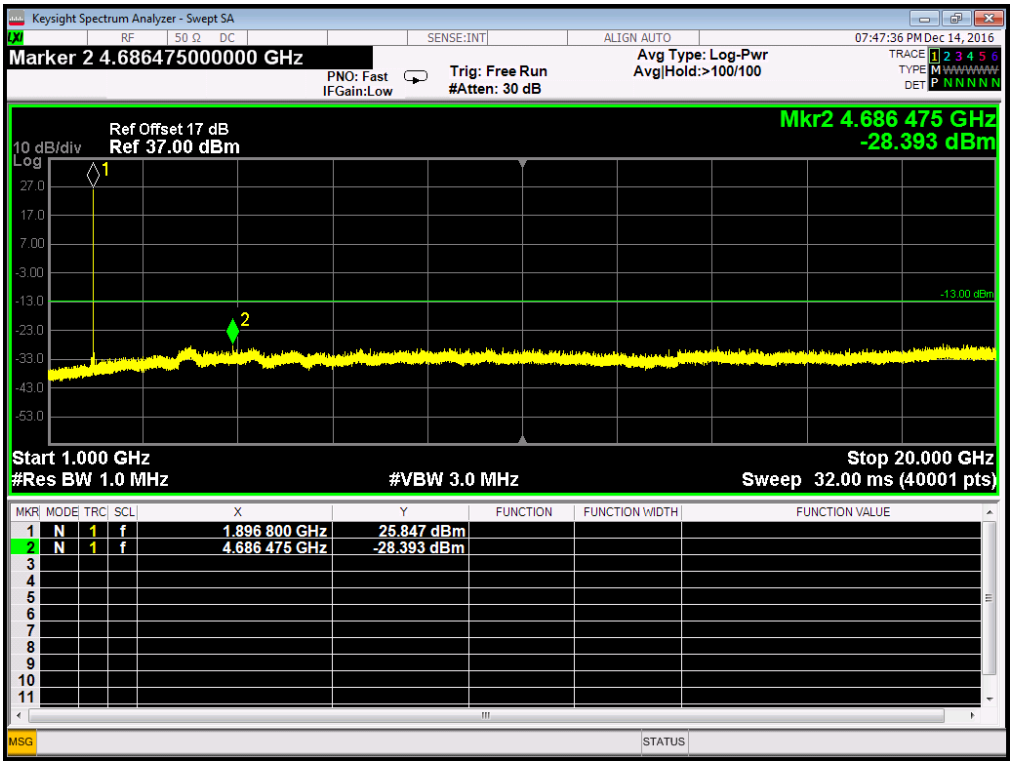


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	15MHz	Modulation	QPSK

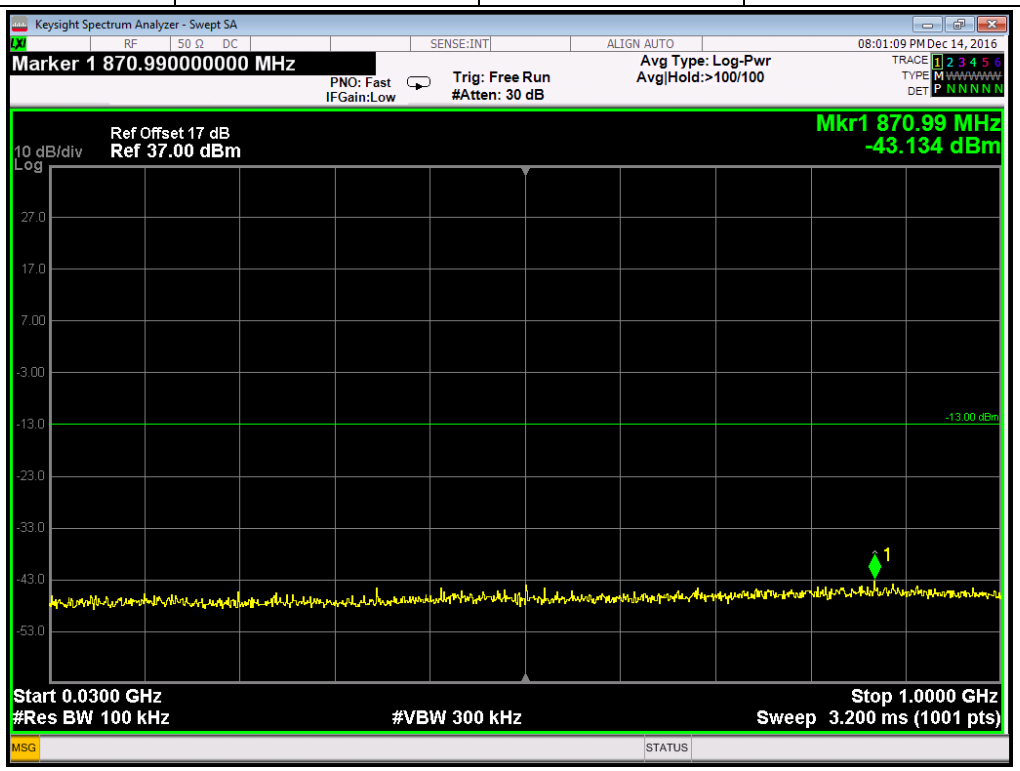


RB Size 1, RB Offset 0 30MHz to 1GHz

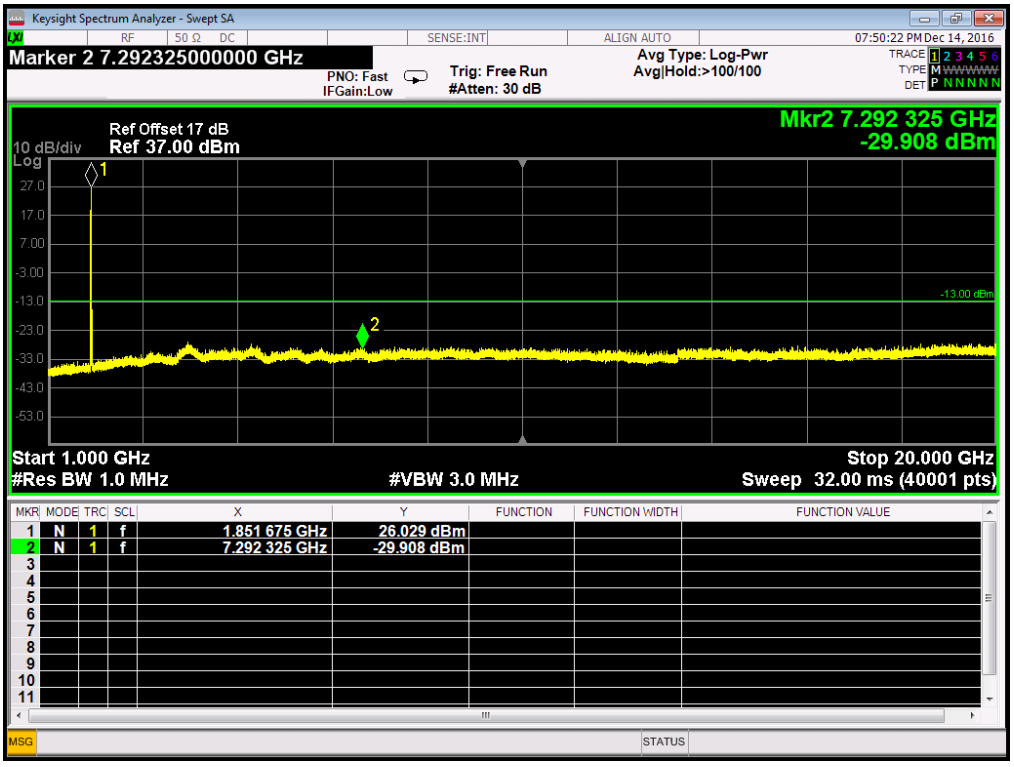


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Low
Bandwidth	20MHz	Modulation	QPSK

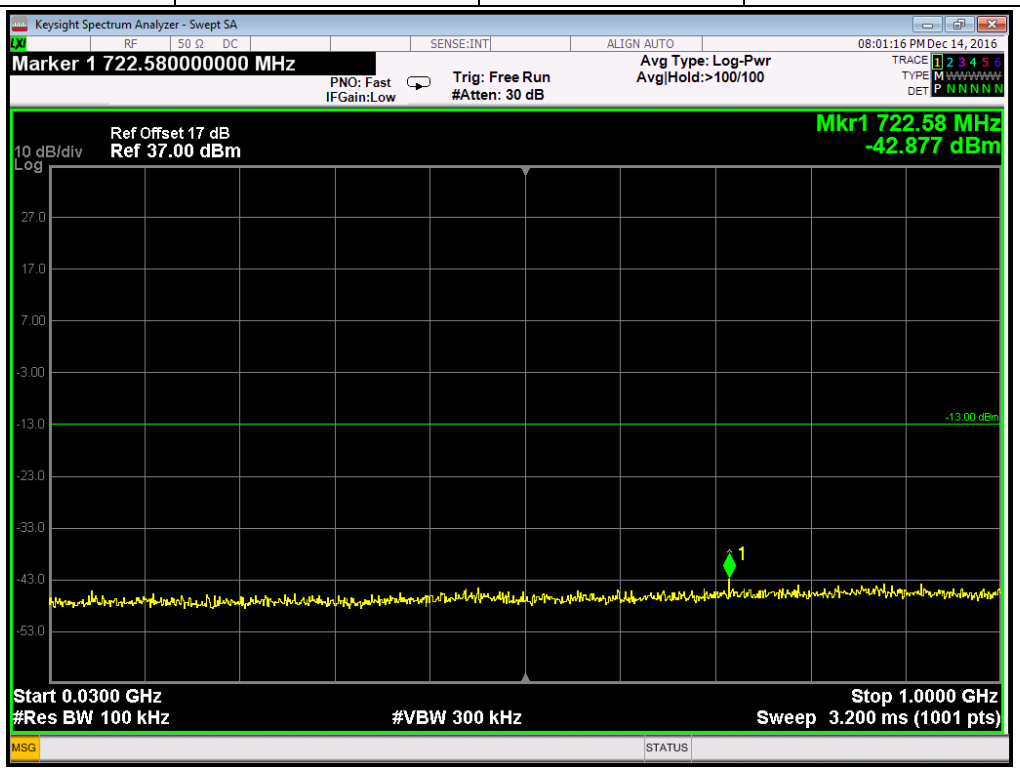


RB Size 1, RB Offset 0 30MHz to 1GHz

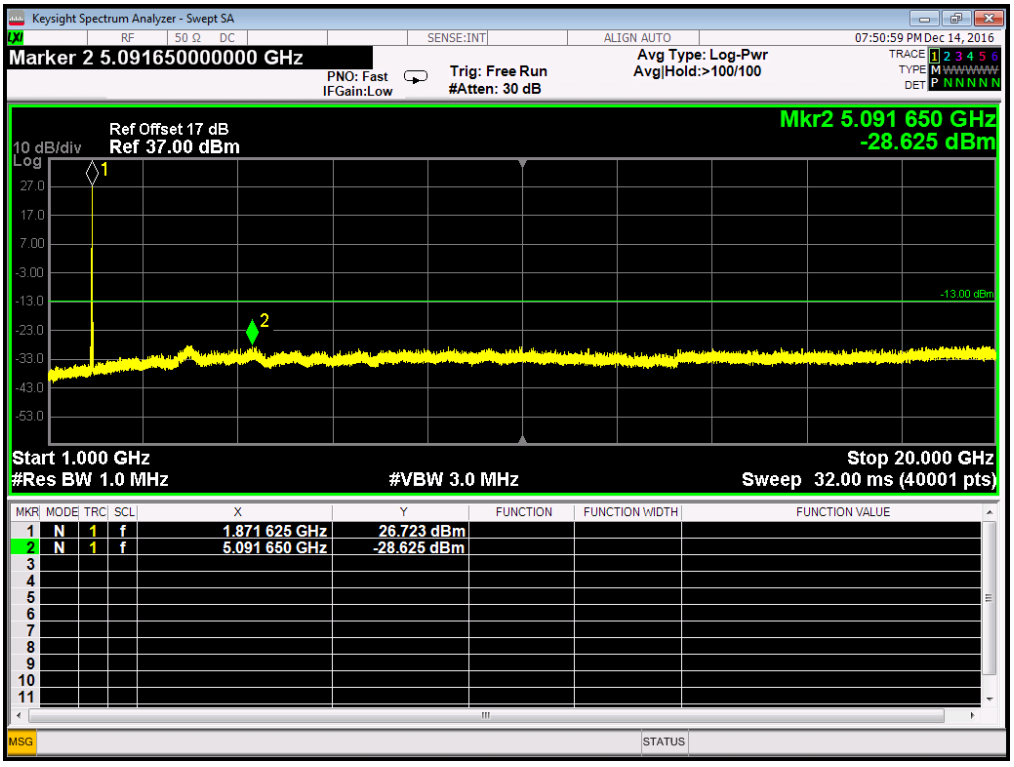


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	Middle
Bandwidth	20MHz	Modulation	QPSK

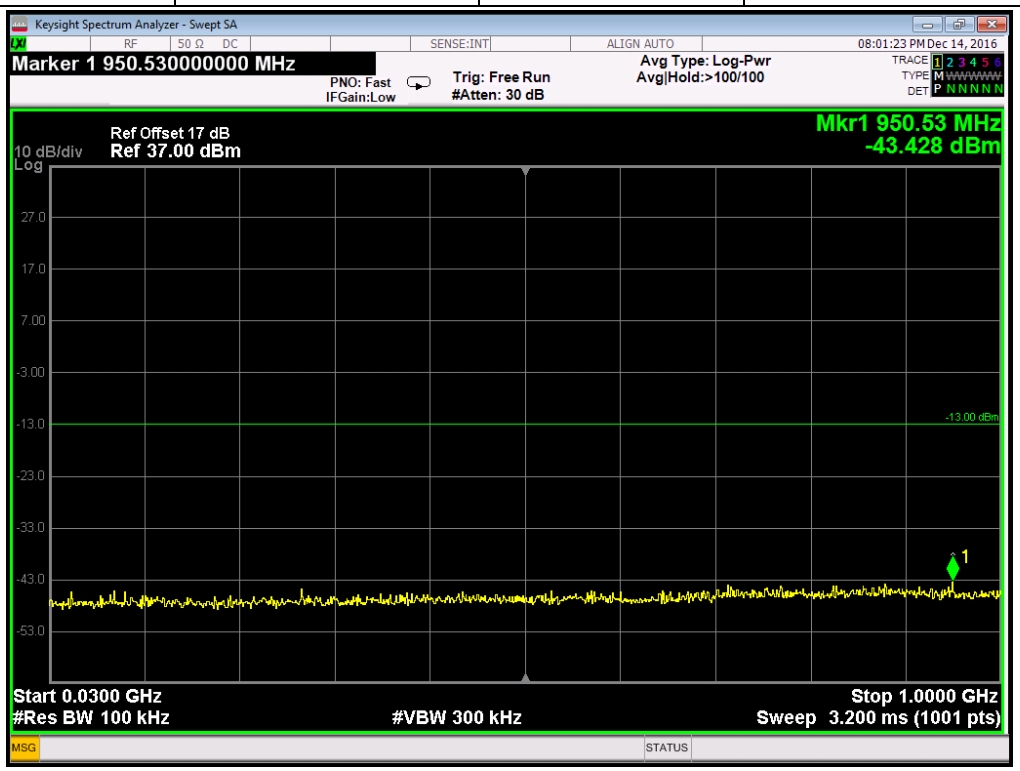


RB Size 1, RB Offset 0 30MHz to 1GHz

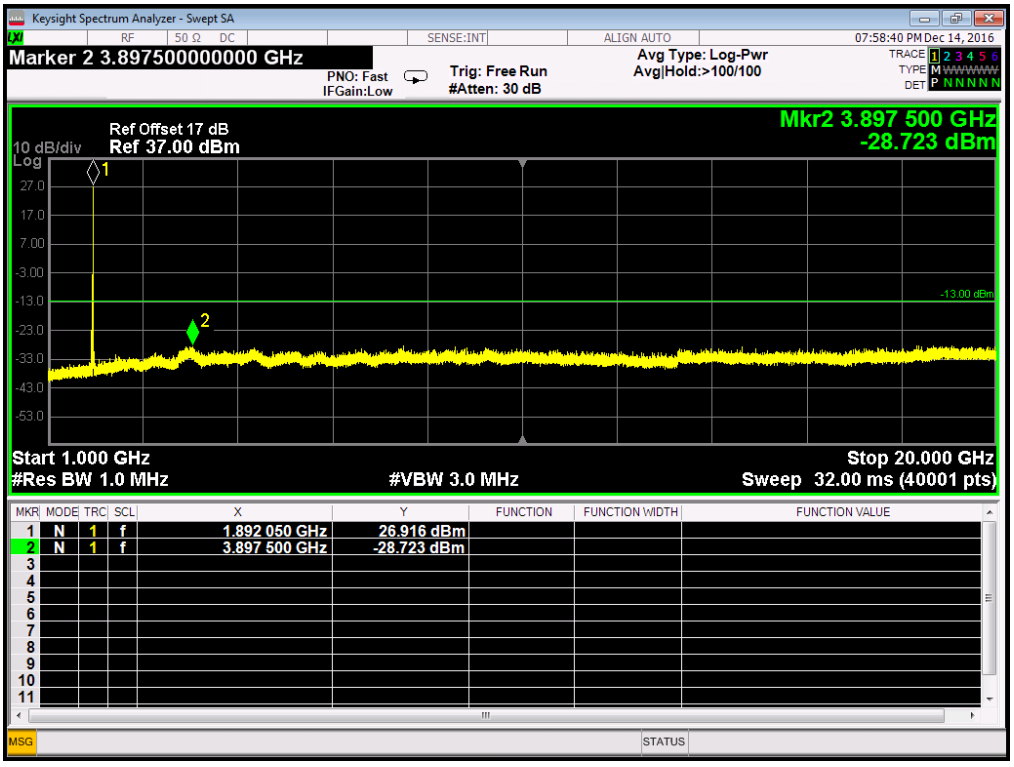


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 2	Channel	High
Bandwidth	20MHz	Modulation	QPSK

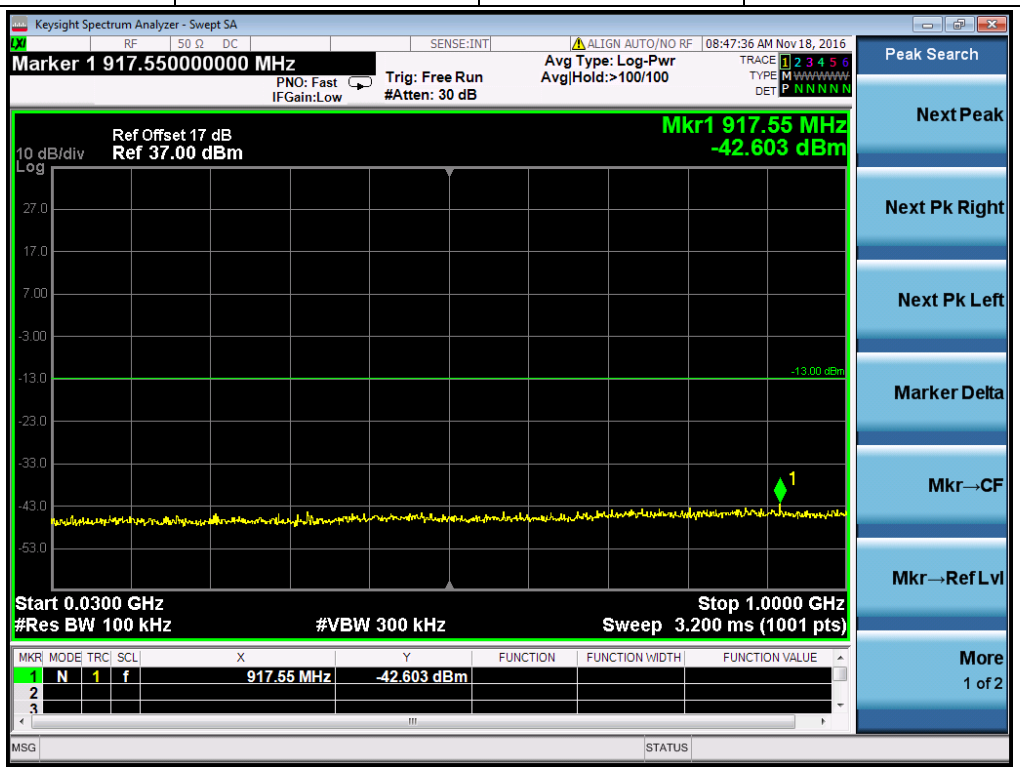


RB Size 1, RB Offset 0 30MHz to 1GHz

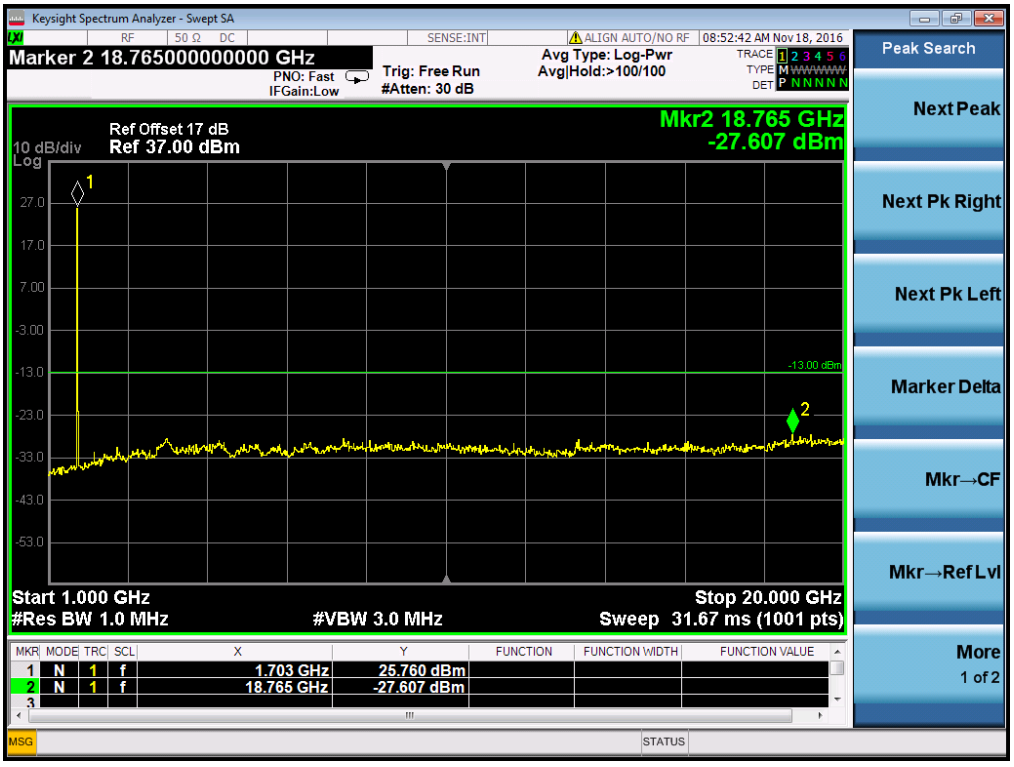


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	1.4MHz	Modulation	QPSK

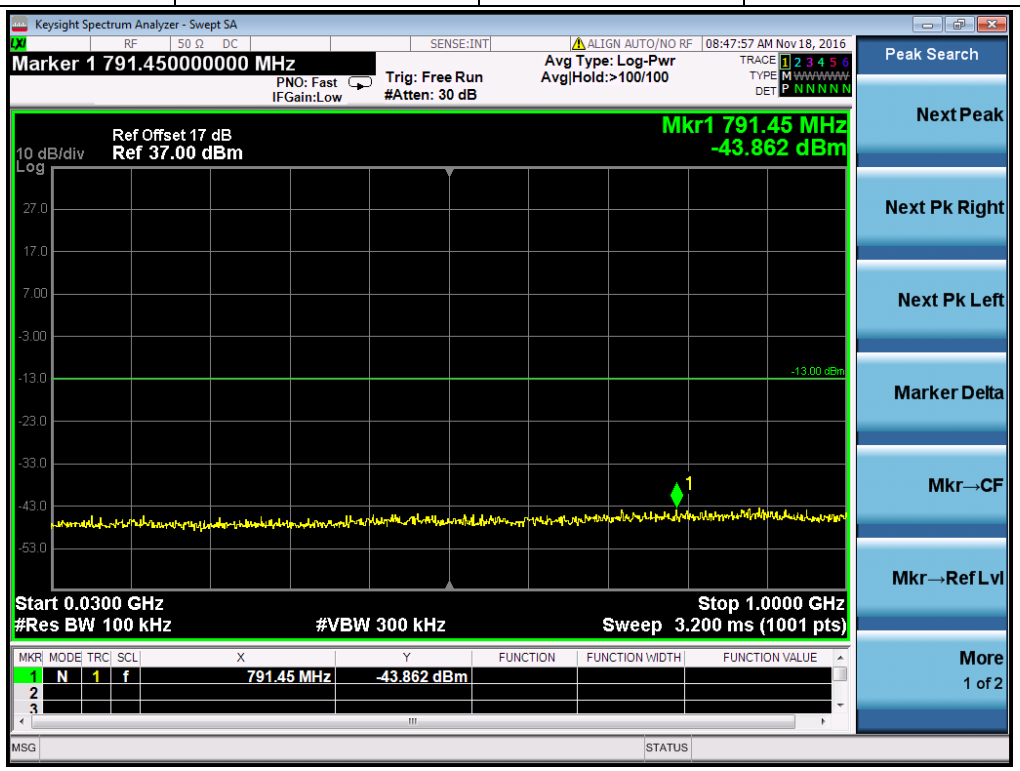


RB Size 1, RB Offset 0 30MHz to 1GHz

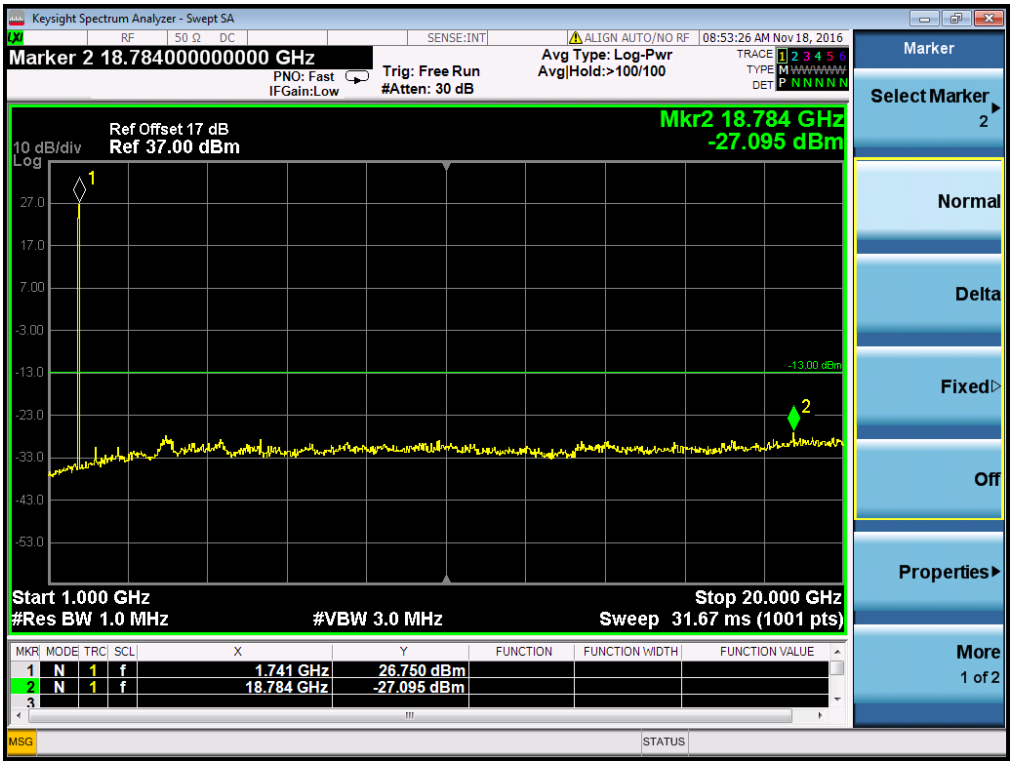


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Middle
Bandwidth	1.4MHz	Modulation	QPSK

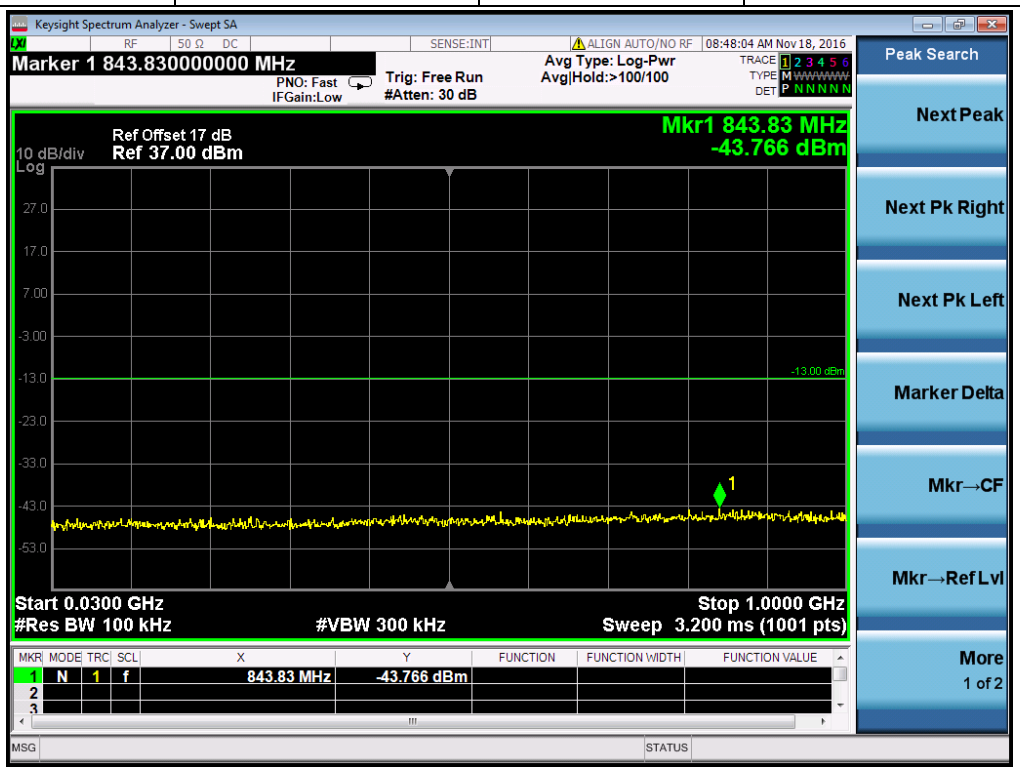


RB Size 1, RB Offset 0 30MHz to 1GHz

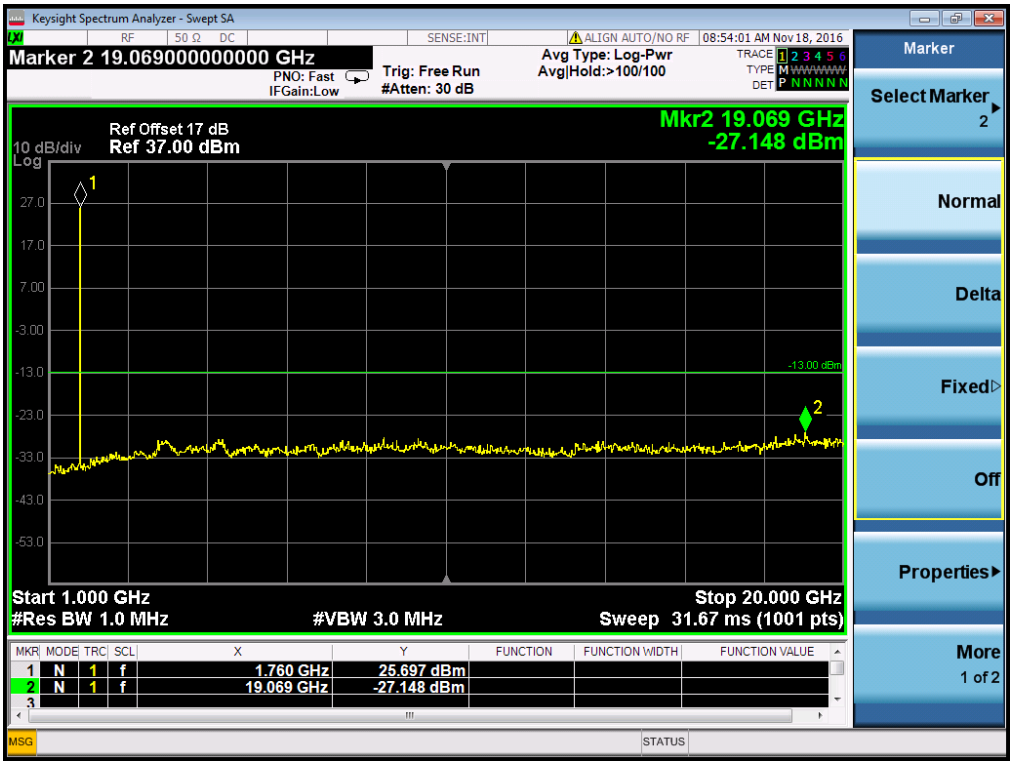


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	High
Bandwidth	1.4MHz	Modulation	QPSK

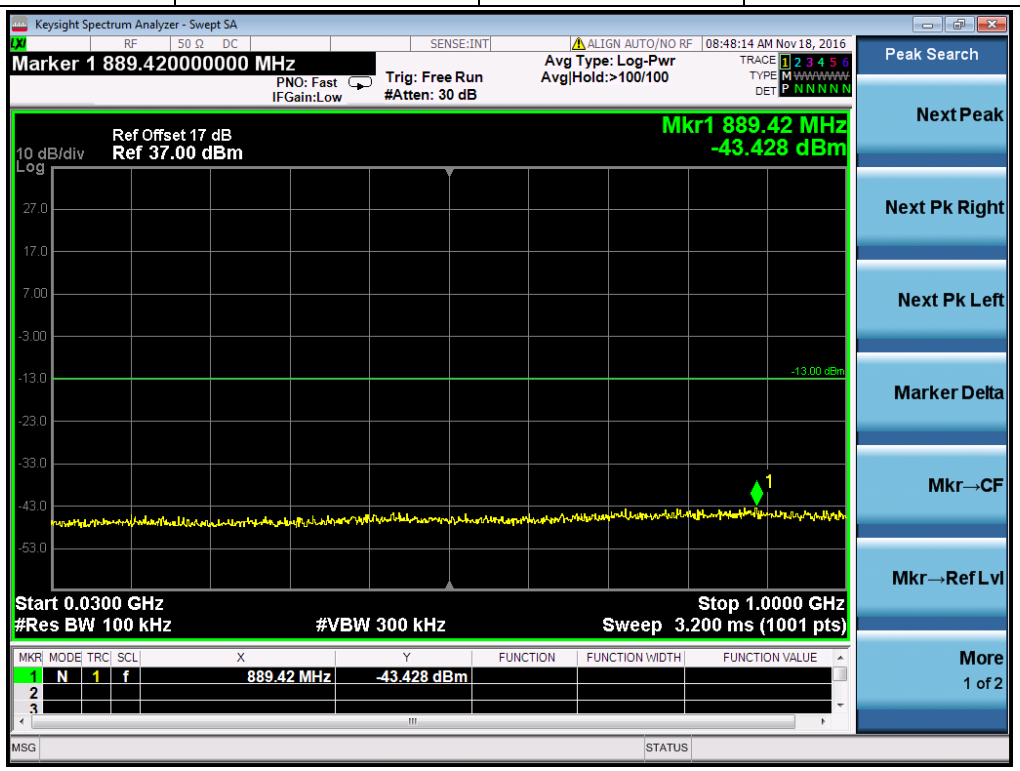


RB Size 1, RB Offset 0 30MHz to 1GHz

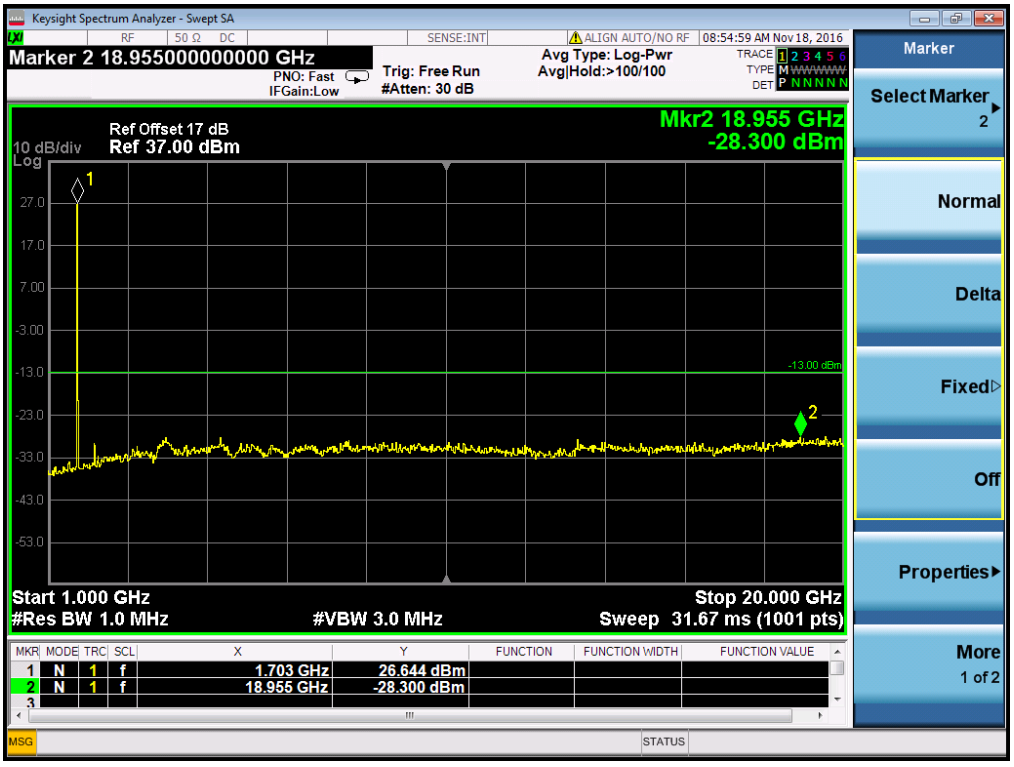


RB Size 1, RB Offset 0 1GHz to 20GHz

Band	LTE Band 4	Channel	Low
Bandwidth	3MHz	Modulation	QPSK



RB Size 1, RB Offset 0 30MHz to 1GHz



RB Size 1, RB Offset 0 1GHz to 20GHz