TEST REPORT

DT&C Co., Ltd.
42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRTFCC2003-0083

2. Customer

- Name (FCC) : LG Electronics USA / Name (IC) : LG ELECTRONICS INC.
- Address (FCC) : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632
- Address (IC) : 222, LG-ro, Jinwi-myeon Pyeongtaek-si, Gyeonggi-do 451-713 Korea (Republic Of)

3. Use of Report : FCC & IC Original Grant

4. Product Name / Model Name : LTE Modem / TM13LNCAHK2
FCC ID : BEJTM13LNCAHK2 / IC : 2703H-TM13LNCAHK2

5. Test Method Used : KDB971168 D01v03r01, ANSI/TIA-603-E-2016, ANSI C63.26-2015
Test Specification : §2, §22, §24, §27
RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue6, RSS-139 Issue 3
RSS-199 Issue 3

6. Date of Test : 2020.02.03 ~ 2020.02.28

7. Testing Environment : Refer to appended test report.

8. Test Result : Refer to the attached test result.

Affirmation	Tested by Name : Inhee Bae	(Signature)	Reviewed by Name : GeunKi Son	(Signature)

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

2020 . 03 . 25 .

DT&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

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Test Report Version

Test Report No.	Date	Description	Revised By	Reviewed by
DRTFCC2003-0083	Mar. 25, 2020	Initial issue	Inhee Bae	GeunKi Son

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1. GENERAL INFORMATION

Applicant Name (FCC) : LG Electronics USA

Applicant Name (IC) : LG ELECTRONICS INC.

Address (FCC) : 1000 Sylvan Avenue, Englewood Cliffs, New Jersey, United States, 07632

Address (IC) : 222, LG-ro, Jinwi-myeon Pyeongtaek-si, Gyeonggi-do 451-713 Korea (Republic Of)

FCC ID : BEJTM13LNCAHK2

IC : 2703H-TM13LNCAHK2

FCC Classification : PCS Licensed Transmitter (PCB)

EUT Type : LTE Moedm

Model Name : TM13LNCAHK2

Add Model Name : NA

Supplying power : DC 12 V

Antenna Information : External antenna

Mode	TX Frequency (MHz)	Emission Designator	Modulation	Conducted Power		ERP		EIRP	
				Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
LTE Band 12(17)	704 ~ 711	8M92G7D	QPSK	23.52	0.225	24.09	0.256	-	-
LTE Band 12(17)	704 ~ 711	8M93W7D	16QAM	22.02	0.159	22.99	0.199	-	-
LTE Band 12(17)	701.5 ~ 713.5	4M50G7D	QPSK	23.11	0.205	24.07	0.255	-	-
LTE Band 12(17)	701.5 ~ 713.5	4M48W7D	16QAM	21.91	0.155	22.57	0.181	-	-
LTE Band 12	700.5 ~ 714.5	2M70G7D	QPSK	23.17	0.207	24.03	0.253	-	-
LTE Band 12	700.5 ~ 714.5	2M70W7D	16QAM	22.14	0.164	23.15	0.207	-	-
LTE Band 12	699.7 ~ 715.3	1M09G7D	QPSK	23.26	0.212	24.02	0.252	-	-
LTE Band 12	699.7 ~ 715.3	1M09W7D	16QAM	22.25	0.168	22.85	0.193	-	-
LTE Band 5	829 ~ 844	8M95G7D	QPSK	23.23	0.210	25.17	0.329	27.32	0.540
LTE Band 5	829 ~ 844	8M94W7D	16QAM	22.13	0.163	24.03	0.253	26.18	0.415
LTE Band 5	826.5 ~ 846.5	4M48G7D	QPSK	23.21	0.209	24.68	0.294	26.83	0.482
LTE Band 5	826.5 ~ 846.5	4M48W7D	16QAM	22.02	0.159	24.23	0.265	26.38	0.435
LTE Band 5	825.5 ~ 847.5	2M69G7D	QPSK	23.16	0.207	25.16	0.328	27.31	0.539
LTE Band 5	825.5 ~ 847.5	2M70W7D	16QAM	22.02	0.159	24.36	0.273	26.51	0.448
LTE Band 5	824.7 ~ 848.3	1M09G7D	QPSK	23.30	0.214	24.59	0.288	26.74	0.473
LTE Band 5	824.7 ~ 848.3	1M09W7D	16QAM	22.32	0.171	24.28	0.268	26.43	0.440

Mode	TX Frequency (MHz)	Emission Designator	Modulation	Conducted Power		EIRP	
				Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
LTE Band 4	1720 ~ 1745	17M8G7D	QPSK	23.75	0.237	22.99	0.199
LTE Band 4	1720 ~ 1745	17M8W7D	16QAM	22.41	0.174	21.78	0.151
LTE Band 4	1717.5 ~ 1747.5	13M4G7D	QPSK	23.70	0.234	22.93	0.196
LTE Band 4	1717.5 ~ 1747.5	13M4W7D	16QAM	22.39	0.173	21.48	0.141
LTE Band 4	1715 ~ 1750	8M96G7D	QPSK	23.59	0.229	21.96	0.157
LTE Band 4	1715 ~ 1750	8M95W7D	16QAM	22.38	0.173	21.07	0.128
LTE Band 4	1712.5 ~ 1752.5	4M50G7D	QPSK	23.43	0.220	21.95	0.157
LTE Band 4	1712.5 ~ 1752.5	4M49W7D	16QAM	22.33	0.171	21.17	0.131
LTE Band 4	1711.5 ~ 1753.5	2M69G7D	QPSK	23.44	0.221	22.11	0.163
LTE Band 4	1711.5 ~ 1753.5	2M69W7D	16QAM	22.26	0.168	21.40	0.138
LTE Band 4	1710.7 ~ 1754.3	1M09G7D	QPSK	23.57	0.228	21.86	0.153
LTE Band 4	1710.7 ~ 1754.3	1M09W7D	16QAM	22.71	0.187	20.94	0.124
LTE Band 2	1860 ~ 1900	17M9G7D	QPSK	23.92	0.247	24.20	0.263
LTE Band 2	1860 ~ 1900	17M8W7D	16QAM	22.82	0.191	23.66	0.232
LTE Band 2	1857.5 ~ 1902.5	13M4G7D	QPSK	23.85	0.243	23.31	0.214
LTE Band 2	1857.5 ~ 1902.5	13M4W7D	16QAM	22.88	0.194	22.23	0.167
LTE Band 2	1855 ~ 1905	8M95G7D	QPSK	23.87	0.244	23.28	0.213
LTE Band 2	1855 ~ 1905	8M94W7D	16QAM	23.02	0.200	22.43	0.175
LTE Band 2	1852.5 ~ 1907.5	4M50G7D	QPSK	23.66	0.232	23.76	0.238
LTE Band 2	1852.5 ~ 1907.5	4M49W7D	16QAM	22.61	0.182	22.25	0.168
LTE Band 2	1851.5 ~ 1908.5	2M70G7D	QPSK	23.84	0.242	24.01	0.252
LTE Band 2	1851.5 ~ 1908.5	2M70W7D	16QAM	22.70	0.186	22.63	0.183
LTE Band 2	1850.7 ~ 1909.3	1M09G7D	QPSK	23.83	0.242	24.18	0.262
LTE Band 2	1850.7 ~ 1909.3	1M09W7D	16QAM	23.04	0.201	23.03	0.201
LTE Band 7	2510 ~ 2560	17M8G7D	QPSK	23.95	0.248	20.98	0.125
LTE Band 7	2510 ~ 2560	17M9W7D	16QAM	22.84	0.192	20.33	0.108
LTE Band 7	2507.5 ~ 2562.5	13M4G7D	QPSK	23.96	0.249	19.95	0.099
LTE Band 7	2507.5 ~ 2562.5	13M4W7D	16QAM	22.83	0.192	19.00	0.079
LTE Band 7	2505 ~ 2565	8M95G7D	QPSK	24.02	0.252	20.11	0.103
LTE Band 7	2505 ~ 2565	8M93W7D	16QAM	23.11	0.205	19.55	0.090
LTE Band 7	2502.5 ~ 2567.5	4M49G7D	QPSK	23.76	0.238	20.07	0.102
LTE Band 7	2502.5 ~ 2567.5	4M49W7D	16QAM	22.72	0.187	19.29	0.085

Note: This device supports both LTE Band 12(699 ~ 716 MHz) and LTE Band 17(704 ~ 716 MHz). LTE Band 12 overlaps the entire frequency range of LTE Band 17 and tune-up power of is the same.
Therefore, test data provided in this report covers Band 17 as well as Band 12.

2. INTRODUCTION

2.1 EUT DESCRIPTION

The Equipment Under Test (EUT) supports WCDMA/LTE

2.2. EUT CAPABILITIES

This EUT contains the following capabilities:
850/1900 WCDMA/HSUPA, Multi-band LTE.

2.3. TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 ℃ ~ +23 ℃
▪ Relative Humidity	42 % ~ 44 %

2.4 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with requirements of ANSI C 63.4-2014. All measurement uncertainty values are shown with a coverage factor of *k* = 2 to indicate a 95 % level of confidence.

Parameter	Measurement uncertainty
Radiated Disturbance (Below 1 GHz)	5.1 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.4 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (Above 18 GHz)	5.3 dB (The confidence level is about 95 %, k = 2)

2.6. TEST FACILITY

DT&C Co., Ltd.

The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042.
The test site comply with the requirements of § 2.948 according to ANSI 63.4-2014.

- FCC & IC MRA Accredited Test Firm No. : KR0034

- ISED #: 5740A

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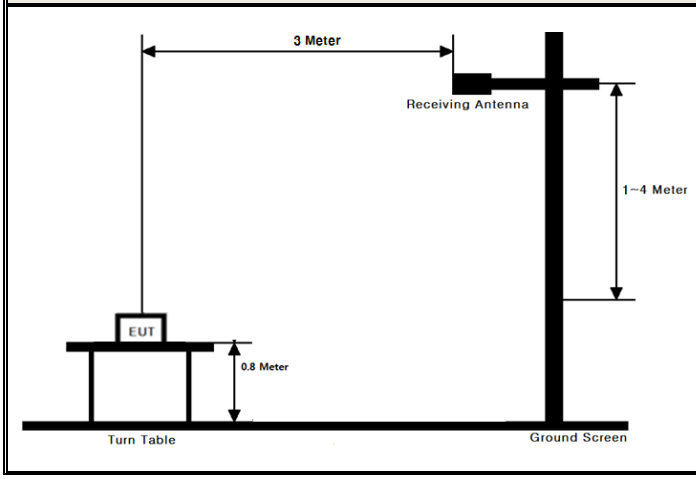
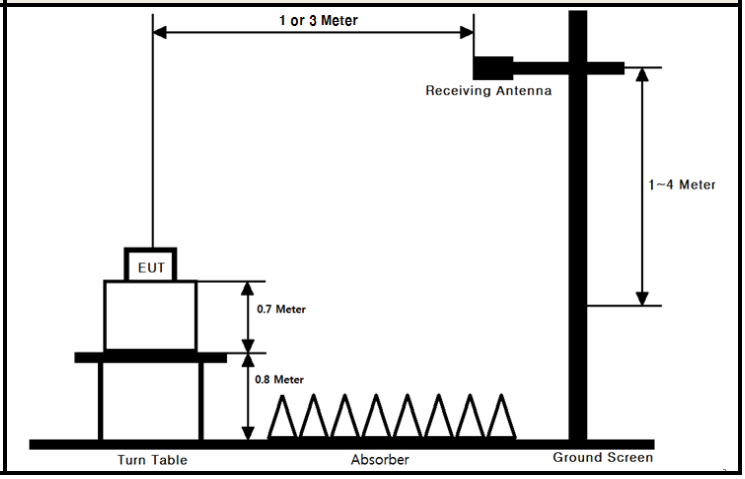
3. DESCRIPTION OF TESTS

3.1 ERP & EIRP (Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.17**
- **KDB971168 D01v03 - Section 5.2.2**
- **ANSI C63.26-2015 – Section 5.2.4.4.1**

Test setting

1. Set span to 2 x to 3 x the OBW.
2. Set RBW = 1% to 5% of the OBW.
3. Set VBW ≥ 3 x RBW.
4. Set number of points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   1) Set = auto-couple, or
   2) Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. Transmission period is the on and off time of the transmitter.
6. Detector = power averaging (rms).
7. If the EUT can be configured to transmit continuously, then set the trigger to free run.
8. If the EUT cannot be configured to transmit continuously, then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Verify that the sweep time is less than or equal to the transmission burst duration. Time gating can also be used under similar constraints (i.e., configured such that measurement data is collected only during active full-power transmissions).
9. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over multiple symbols, it can be necessary to increase the number of traces to be

averaged above 100 or, if using a manually configured sweep time, increase the sweep time.

10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band or channel power measurement function, with the band/channel limits set equal to the OBW band edges. If the instrument does not have a band or channel power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

The receiver antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.

A half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. The conducted power at the terminal of the substitute antenna is measured.

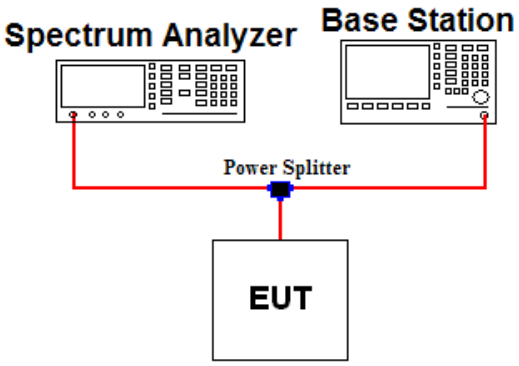
The ERP/EIRP is calculated using the following formula:

ERP/EIRP = The conducted power at the substitute antenna`s terminal [dBm] + Substitute Antenna gain [dBd for ERP , dBi for EIRP]

For readings above 1 GHz, the above procedure is repeated using horn antennas and the difference
Between the gain of the horn antenna and an isotropic antenna are taken into consideration.

3.2 PEAK TO AVERAGE RATIO

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 5.7.2**
- **ANSI C63.26-2015 – Section 5.2.3.4**

A peak to average ratio measurement is performed at the conducted port of the EUT.
The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The present of time the signal spends at or above the level defines the probability for that particular power level.

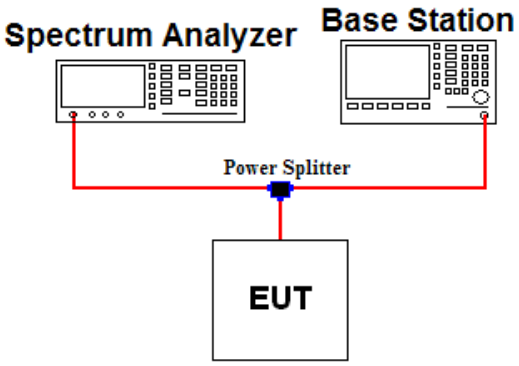
Test setting

The spectrum Analyzer`s CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth ≥ OBW or specified reference bandwidth.
2. Set the number of counts to a value that stabilizes the measured CCDF curve.
3. Set the measurement interval as follows:
   1) For continuous transmissions, set to the greater of [10 × (number of points in sweep) × (transmission symbol period)] or 1 ms.
   2) For burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize. Set the measurement interval to a time that is less than or equal to the burst duration.
   3) If there are several carriers in a single antenna port, the peak power shall be determined for each individual carrier (by disabling the other carriers while measuring the required carrier) and the total peak power calculated from the sum of the individual carrier peak powers.
4. Record the maximum PAPR level associated with a probability of 0.1%.
5. The peak power level is calculated form the sum of the PAPR value from step d) to the measured average power.

3.3 OCCUPIED BANDWIDTH.

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 4.3**
- **ANSI C63.26-2015 – Section 5.4.4**

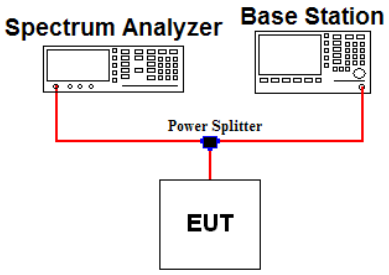
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

Test setting

1. The signal analyzer`s automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 ~ 5 % of the expected OBW & VBW ≥ 3 X RBW
3. Detector = Peak
4. Trance mode = Max hold
5. Sweep = Auto couple
6. The trace was allowed to stabilize
7. If necessary, step 2 ~ 6 were repeated after changing the RBW such that it would be within 1 ~ 5 % of the 99 % occupied bandwidth observed in step 6.

3.4 BAND EDGE EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 6**
- **ANSI C63.26-2015 – Section 5.7**

All out of band emissions are measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its lowest and highest channel with all bandwidths, modulations and RB configurations.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

Test setting

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1 % of the emission bandwidth
4. VBW ≥ 3 X RBW
5. Detector = RMS & Trace mode = Max hold
6. Sweep time = Auto couple or 1 s for band edge
7. Number of sweep point ≥ 2 X span / RBW
8. The trace was allowed to stabilize

Note 1: Per Part 22.917(b)(1) / 24.238(b) / 27.53(h) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit.
The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

Note 2: Per Part 27(g) for operations in the 600 MHz band and the 698-746 MHz band, compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Note 3: Per Part 27.53(c.5) for operations in the 776-788 MHz band, compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

Note 4: Per Part 27.53(c.4) for all frequencies between 763-775 MHz and 793-805 MHz, the FCC limit is 65 + 10log10(P[Watts])= -35dBm in a 6.25kHz bandwidth

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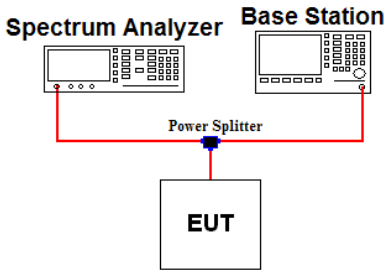
Note 5: Per part 27.53(m)(6) in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 MHz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- **KDB971168 D01v03 - Section 6**
- **ANSI C63.26-2015 – Section 5.7**

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The EUT was setup to maximum output power at its low, middle, high channel with all bandwidths, modulations and RB configurations. The spectrum is scanned from 9 kHz up to a frequency including its 10th harmonic.

The power of any spurious emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P) dB.

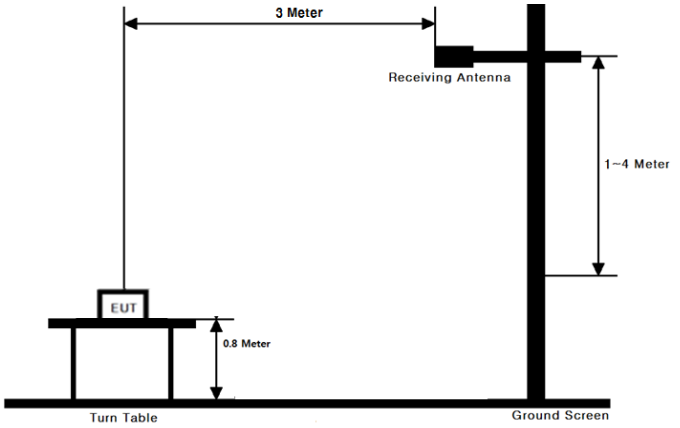
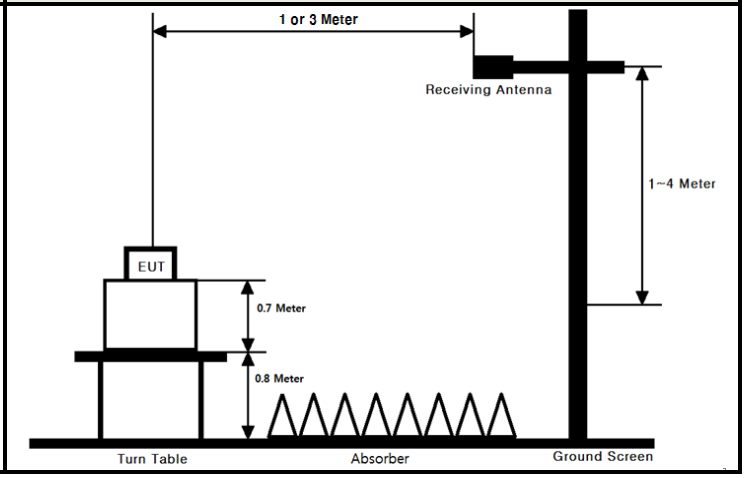
Test setting

1. RBW = 100 kHz(Below 1 GHz) or 1 MHz(Above 1 GHz) & VBW ≥ 3 X RBW (Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point ≥ 2 X span / RBW
5. The trace was allowed to stabilize

Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1GHz and 1MHz or greater for frequencies greater than 1GHz.

3.6 UNDESIRABLE EMISSIONS

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8 or 1.5 meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1 GHz absorbers are placed on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1 GHz, the absorbers are removed.

Test Procedure

- **ANSI/TIA-603-E-2016 - Section 2.2.12**
- **KDB971168 D01v03 - Section 5.8**
- **ANSI C63.26-2015 – Section 5.5**

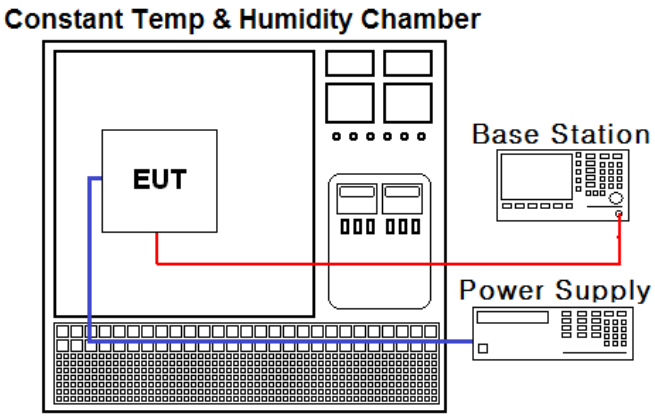
Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW ≥ 3 X RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point ≥ 2 X span / RBW
5. The trace was allowed to stabilize

The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer.
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.
For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.
This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.7 FREQUENCY STABILITY

Test Set-up



Test Procedure

- **ANSI/TIA-603-E-2016**
- **KDB971168 D01v03 - Section 9**

The frequency stability of the transmitter is measured by:

a.) **Temperature:**
The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.

b.) **Primary Supply Voltage:**
The primary supply voltage is varied from 85 % to 115 % of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification:

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block for Part 24, 27. The frequency stability of the transmitter shall be maintained within ± 0.000 25 % (± 2.5 ppm) of the center frequency for Part 22.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.
(20 °C to provide a reference)

2. The equipment is turned on in a “standby” condition for one minute before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C.
A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY48010133
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/16	MY49060056
DC power supply	Agilent Technologies	66332A	19/06/25	20/06/25	MY43001173
Multimeter	FLUKE	17B+	19/12/16	20/12/16	36390701WS
Power Splitter	Anritsu	K241B	19/12/16	20/12/16	1301182
Temp & Humi	SJ Science	SJ-TH-S50	19/06/25	20/06/25	U5542113
Radio Communication Analyzer	Anritus	MT8820C	19/06/26	20/06/26	6201127429
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-2
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-1
Signal Generator	Rohde Schwarz	SMBV100A	19/12/16	20/12/16	255571
Signal Generator	ANRITSU	MG3695C	19/12/16	20/12/16	173501
Loop Antenna	ETS-Lindgren	6502	19/09/18	21/09/18	00226186
Bilog Antenna	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Dipole Antenna	Schwarzbeck	VHA9103	18/04/13	20/04/13	2117
Dipole Antenna	Schwarzbeck	UHA9105	18/04/13	20/04/13	2262
HORN ANT	ETS	3117	18/05/10	20/05/10	00140394
HORN ANT	A.H.Systems	SAS-574	19/07/03	21/07/03	155
PreAmplifier	H.P	8447D	19/12/16	20/12/16	2944A07774
PreAmplifier	Agilent	8449B	19/06/27	20/06/27	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	19/06/24	20/06/24	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	19/06/24	20/06/24	4
Cable	DTNC	Cable	20/01/16	21/01/16	M-01
Cable	DTNC	Cable	20/01/16	21/01/16	M-02
Cable	Junkosha	MWX315	20/01/16	21/01/16	M-05
Cable	Junkosha	MWX221	20/01/16	21/01/16	M-06
Cable	DTNC	Cable	20/01/16	21/01/16	RF-10

Note1: The measurement antennas were calibrated in accordance to the requirements of ANSI C63.5-2017.
Note2: The cable is not a regular calibration item, so it has been calibrated by DT & C itself.

5. SUMMARY OF TEST RESULTS

FCC Part	Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
2.1046	-	Conducted Output Power	N/A	Conducted	C
2.1049	RSS-GEN[6.7]	Occupied Bandwidth	N/A		C
24.232(d) 27.50(d.5)	RSS-130 [4.6] RSS-132 [5.4] RSS-133 [6.4] RSS-139 [6.5] RSS-199 [4.4]	Peak to Average Ratio	< 13 dB		C
2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [6.6]	Band Edge / Conducted Spurious Emissions	> 43 + 10log$_{10}$ (P) dB at Band edge and for all out-of-band emissions		C
27.53(m)	RSS-199 [4.5]	Band Edge / Conducted Spurious Emissions	> 40 + 10log10 (P) dB at channel edge and 5 MHz from the channel edge > 43 + 10log10 (P) dB at 5 MHz and X MHz from the channel edge > 55 + 10log10 (P) dB at all frequencies more than X MHz from the channel edge		C
2.1055 22.355 24.235 27.54	RSS-130 [4.5] RSS-132 [5.3] RSS-133 [6.3] RSS-139 [6.4] RSS-199 [4.3]	Frequency Stability	< 2.5 ppm (Part 22) Fundamental emissions must stay within Authorized frequency block (Part 24, 27)		C
27.50(c.10)	RSS-130 [4.6]	Radiated Output Power (B12, 17)	< 3 Watts max. ERP (FCC &IC)	Radiated	C
22.913(a.5)	RSS-132 [5.4]	Radiated Output Power (B5)	< 7 Watts max. ERP (FCC) < 11.5 Watts max. EIRP (IC)		C
27.50(d.4)	RSS-139 [6.5]	Radiated Output Power (B4)	< 1 Watts max. EIRP (FCC &IC)		C
24.232(c) 27.50(h.2)	RSS-133 [6.4] RSS-199 [4.4]	Radiated Output Power(B2)	< 2 Watts max. EIRP (FCC &IC)		C
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [6.6]	Undesirable Emissions	> 43 + 10log$_{10}$ (P) dB for all out-of-band emissions		C
27.53(m)	RSS-199 [4.5]	Undesirable Emissions (B7, 41)	> 55 + 10log$_{10}$ (P) dB for all out-of-band emissions		C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable

6. SAMPLE CALCULATION

A. Emission Designator

LTE Band 12(QPSK)

Emission Designator = **8M92G7D**
LTE OBW = 8.923 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 12(16QAM)

Emission Designator = **8M93W7D**
LTE OBW = 8.929 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 5(QPSK)

Emission Designator = **8M95G7D**
LTE OBW = 8.953 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 5(16QAM)

Emission Designator = **8M94W7D**
LTE OBW = 8.943 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 4(QPSK)

Emission Designator = **17M8G7D**
LTE OBW = 17.839 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 4(16QAM)

Emission Designator = **17M8W7D**
LTE OBW = 17.845 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 2(QPSK)

Emission Designator = **17M9G7D**
LTE OBW = 17.855 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 2(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.887 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 7(QPSK)

Emission Designator = **17M8G7D**
LTE OBW = 17.837 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 7(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.851 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

B. For substitution method

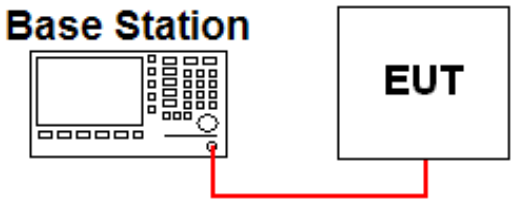
1) The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1 GHz respectively above ground.
2) The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
3) During the test, the turn table is rotated until the maximum signal is found.
4) Record the field strength meter's level. (ex. Spectrum reading level is -8.5 dBm)
5) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
6) Increase the signal generator output till the field strength meter's level is equal to the item (4). (ex. Signal generator level is -18.04 dBm)
7) The gain of the cable and amplifier between the signal generator and terminals of substituted antenna is 46.92 dB at test frequency.
8) Record the level at substituted antenna terminal. (ex. 28.88dBm)
9) The result is calculated as below;

EIRP(dBm) = LEVLE@ANTENNA TERMINAL + TX Antenna Gain (dBi)
ERP(dBm) = LEVLE@ANTENNA TERMINAL + TX Antenna Gain (dBd)
Where, TX Antenna Gain (dBd) = TX Antenna Gain (dBi) - 2.15 dB

7. TEST DATA

7.1 CONDUCTED OUTPUT POWER

A base station simulator was used to establish communication with the EUT. The base station simulator parameters were set to produce the maximum power from the EUT. This device was tested under all configurations and the highest power is reported. Conducted Output Powers of EUT are reported below.



▪ Band 12(17)

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
10	704	QPSK	23.12	23.52	23.23	22.00	21.98	22.09	21.92
		16QAM	21.73	22.02	21.71	21.00	21.06	20.97	20.92
	711	QPSK	23.01	23.21	23.05	21.99	22.08	21.96	21.97
		16QAM	21.64	21.98	21.67	20.99	21.11	20.97	21.04
5	701.5	QPSK	23.04	23.00	23.10	22.00	21.95	21.80	21.87
		16QAM	21.82	21.65	21.75	21.07	20.90	20.96	20.90
	707.5	QPSK	23.05	23.11	22.95	22.06	22.16	21.92	21.94
		16QAM	21.83	21.91	21.79	21.11	20.82	20.99	21.10
	713.5	QPSK	23.02	23.03	22.98	21.97	21.98	21.82	21.80
		16QAM	21.72	21.76	21.56	20.88	21.00	20.74	20.92

Note 1: The conducted output power was measured using the Anritsu MT8820C

▪ Band 12

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
3	700.5	QPSK	23.10	23.17	23.04	22.06	22.08	22.06	22.01
		16QAM	21.91	22.14	21.90	21.20	21.32	21.25	20.98
	707.5	QPSK	23.03	23.16	23.13	22.02	22.18	22.12	21.93
		16QAM	21.96	21.94	21.78	21.02	21.28	21.22	20.98
	714.5	QPSK	23.01	23.02	23.11	22.03	21.95	21.88	21.92
		16QAM	21.70	21.59	21.76	21.05	21.08	21.01	20.81
1.4	699.7	QPSK	23.07	23.14	23.10	23.06	23.18	23.11	22.13
		16QAM	22.25	21.97	21.76	21.94	22.07	21.91	20.89
	707.5	QPSK	23.01	23.26	23.19	23.02	23.06	23.12	22.16
		16QAM	21.88	22.09	21.99	21.87	22.00	21.94	20.81
	715.3	QPSK	23.08	23.14	23.08	22.98	22.99	23.00	21.90
		16QAM	21.63	21.93	21.82	21.80	21.82	22.01	20.91

Note 1: The conducted output power was measured using the Anritsu MT8820C

▪ Band 5

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
10	829	QPSK	23.15	23.23	23.15	22.08	22.16	22.03	22.04
		16QAM	21.71	22.13	21.88	21.10	21.15	20.97	20.98
	836.5	QPSK	23.08	23.21	23.04	22.05	22.08	21.96	22.06
		16QAM	21.74	22.06	21.67	21.04	21.16	21.02	21.06
	844	QPSK	23.13	23.15	23.08	22.05	22.18	22.05	22.09
		16QAM	21.68	22.09	21.75	20.96	21.16	21.12	21.08
5	826.5	QPSK	22.87	23.13	23.18	22.07	22.15	22.11	22.06
		16QAM	21.80	21.96	21.91	21.03	21.10	21.05	21.01
	836.5	QPSK	23.00	23.15	22.90	22.08	22.16	22.09	22.08
		16QAM	21.84	21.93	21.76	21.02	21.13	20.95	20.96
	846.5	QPSK	23.03	23.21	23.01	22.14	22.25	22.10	22.08
		16QAM	21.84	22.02	21.78	20.84	21.15	21.07	21.06
3	825.5	QPSK	22.93	23.09	23.12	22.07	22.10	22.10	22.05
		16QAM	22.02	21.80	21.99	21.26	21.25	21.24	21.07
	836.5	QPSK	23.08	22.89	23.08	22.11	22.18	22.20	22.05
		16QAM	21.92	21.89	21.86	20.84	21.03	21.29	20.83
	847.5	QPSK	23.12	23.09	23.16	22.25	22.30	22.17	22.08
		16QAM	22.02	21.78	21.91	20.94	21.10	21.26	20.94
1.4	824.7	QPSK	22.92	23.04	23.00	23.30	23.19	23.28	22.06
		16QAM	21.97	22.06	21.98	22.01	22.03	22.32	21.04
	836.5	QPSK	23.04	23.15	23.16	23.24	23.25	23.29	22.14
		16QAM	21.95	22.10	21.95	22.08	22.12	22.15	20.86
	848.3	QPSK	22.91	22.84	22.97	23.20	23.11	23.26	22.09
		16QAM	21.93	22.08	21.93	22.06	22.11	22.01	20.85

Note 1: The conducted output power was measured using the Anritsu MT8820C

▪ Band 4

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
20	1720	QPSK	23.38	23.57	23.54	22.41	22.33	22.34	22.49
		16QAM	22.12	22.41	22.25	21.51	21.34	21.33	21.49
	1732.5	QPSK	23.59	23.53	23.41	22.54	22.41	22.17	22.36
		16QAM	22.34	22.31	21.99	21.57	21.47	21.22	21.41
	1745	QPSK	23.68	23.75	23.59	22.61	22.44	22.16	22.28
		16QAM	22.27	22.26	22.09	21.53	21.39	21.28	21.39
15	1717.5	QPSK	23.46	23.43	23.42	22.38	22.37	22.20	22.35
		16QAM	22.10	22.23	22.20	21.57	21.46	21.30	21.45
	1732.5	QPSK	23.58	23.44	23.41	22.53	22.35	22.17	22.33
		16QAM	22.39	22.08	22.09	21.47	21.30	21.32	21.27
	1747.5	QPSK	23.70	23.44	23.49	22.40	22.46	22.30	22.27
		16QAM	22.30	22.15	22.20	21.42	21.38	21.30	21.38
10	1715	QPSK	23.38	23.51	23.40	22.32	22.26	22.44	22.32
		16QAM	22.17	22.38	22.21	21.51	21.52	21.39	21.29
	1732.5	QPSK	23.49	23.59	23.27	22.38	22.45	22.21	22.25
		16QAM	22.26	22.36	21.96	21.51	21.49	21.35	21.50
	1750	QPSK	23.56	23.58	23.54	22.38	22.28	22.15	22.32
		16QAM	22.23	22.33	22.33	21.39	21.53	21.38	21.53
5	1712.5	QPSK	23.29	23.30	23.27	22.25	22.31	22.28	22.26
		16QAM	22.15	22.07	22.07	21.33	21.34	21.27	21.26
	1732.5	QPSK	23.27	23.33	23.30	22.36	22.42	22.33	22.31
		16QAM	22.16	22.17	22.10	21.40	21.36	21.37	21.53
	1752.5	QPSK	23.43	23.39	23.30	22.25	22.23	22.22	22.20
		16QAM	22.15	22.28	22.33	21.36	21.34	21.42	21.31
3	1711.5	QPSK	23.25	23.29	23.29	22.30	22.31	22.34	22.27
		16QAM	22.02	22.12	22.03	21.56	21.58	21.46	21.35
	1732.5	QPSK	23.44	23.44	23.37	22.40	22.39	22.35	22.38
		16QAM	22.18	22.13	22.26	21.50	21.57	21.62	21.32
	1753.5	QPSK	23.24	23.32	23.44	22.21	22.24	22.28	22.21
		16QAM	22.14	22.15	22.15	21.47	21.49	21.63	21.31
1.4	1710.7	QPSK	23.29	23.38	23.23	23.26	23.23	23.21	22.14
		16QAM	22.12	22.16	22.04	22.13	22.23	22.08	21.22
	1732.5	QPSK	23.40	23.57	23.42	23.28	23.41	23.36	22.36
		16QAM	22.18	22.24	22.05	22.29	22.71	22.62	21.32
	1754.3	QPSK	23.29	23.41	23.39	23.21	23.29	23.37	22.29
		16QAM	22.22	22.39	22.34	22.68	22.57	22.48	21.16

Note 1: The conducted output power was measured using the Anritsu MT8820C

▪ Band 2

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
20	1860	QPSK	23.92	23.68	23.59	22.79	22.74	22.59	22.59
		16QAM	22.76	22.82	22.48	22.03	21.91	21.87	21.74
	1880	QPSK	23.57	23.55	23.60	22.78	22.77	22.63	22.71
		16QAM	22.62	22.77	22.54	21.80	21.85	21.82	21.69
	1900	QPSK	23.75	23.53	23.52	22.71	22.65	22.70	22.63
		16QAM	22.69	22.65	22.54	21.77	21.80	21.77	21.77
15	1857.5	QPSK	23.85	23.51	23.55	22.71	22.60	22.62	22.70
		16QAM	22.88	22.54	22.51	22.08	21.77	21.70	21.75
	1880	QPSK	23.61	23.61	23.41	22.80	22.68	22.51	22.63
		16QAM	22.75	22.61	22.44	21.84	21.89	21.71	21.83
	1902.5	QPSK	23.74	23.74	23.55	22.62	22.74	22.68	22.73
		16QAM	22.71	22.61	22.63	21.67	21.92	21.77	21.89
10	1855	QPSK	23.87	23.54	23.53	22.88	22.75	22.67	22.82
		16QAM	22.75	22.78	22.56	21.94	21.86	21.87	21.84
	1880	QPSK	23.72	23.59	23.40	22.74	22.72	22.61	22.71
		16QAM	22.69	22.77	22.44	21.83	21.91	21.79	21.90
	1905	QPSK	23.66	23.49	23.78	22.72	22.80	22.70	22.67
		16QAM	22.63	23.02	22.62	22.08	21.87	21.99	21.85
5	1852.5	QPSK	23.66	23.64	23.55	22.81	22.87	22.76	22.82
		16QAM	22.57	22.61	22.53	21.93	21.95	21.75	21.91
	1880	QPSK	23.55	23.56	23.39	22.66	22.70	22.67	22.67
		16QAM	22.44	22.54	22.38	21.76	21.79	21.75	21.76
	1907.5	QPSK	23.55	23.62	23.57	22.69	22.85	22.78	22.75
		16QAM	22.50	22.57	22.58	21.92	21.80	21.83	21.99
3	1851.5	QPSK	23.70	23.74	23.84	22.89	22.88	22.98	22.96
		16QAM	22.70	22.64	22.67	21.91	22.09	21.99	21.92
	1880	QPSK	23.69	23.62	23.47	22.74	22.69	22.67	22.76
		16QAM	22.54	22.50	22.44	21.81	21.94	22.03	21.79
	1908.5	QPSK	23.70	23.62	23.63	22.85	22.90	22.89	22.82
		16QAM	22.66	22.51	22.57	21.93	22.10	22.02	21.76
1.4	1850.7	QPSK	23.49	23.57	23.57	23.42	23.56	23.56	22.85
		16QAM	22.57	22.72	22.55	22.71	23.04	23.01	21.71
	1880	QPSK	23.57	23.63	23.50	23.82	23.62	23.59	22.73
		16QAM	22.44	22.63	22.47	22.64	22.73	22.65	21.57
	1909.3	QPSK	23.65	23.52	23.66	23.83	23.62	23.68	22.74
		16QAM	22.49	22.76	22.59	22.67	22.95	23.04	21.69

Note 1: The conducted output power was measured using the Anritsu MT8820C

▪ Band 7

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
20	2510	QPSK	23.87	23.95	23.44	22.90	22.88	22.81	22.80
		16QAM	22.73	22.73	22.44	21.91	21.87	21.81	21.77
	2535	QPSK	23.72	23.75	23.58	22.89	22.87	22.82	22.78
		16QAM	22.62	22.77	22.51	21.85	21.84	21.79	21.83
	2560	QPSK	23.86	23.84	23.63	22.78	22.78	22.77	22.81
		16QAM	22.60	22.84	22.55	21.75	21.61	21.91	21.85
15	2507.5	QPSK	23.96	23.83	23.87	22.96	22.91	22.82	22.92
		16QAM	22.83	22.63	22.75	21.88	21.94	21.85	21.87
	2535	QPSK	23.73	23.62	23.65	22.88	22.87	22.80	22.81
		16QAM	22.60	22.49	22.56	21.87	21.77	21.70	21.86
	2562.5	QPSK	23.60	23.71	23.67	22.80	22.94	22.82	22.74
		16QAM	22.52	22.59	22.66	21.74	21.80	21.72	21.80
10	2505	QPSK	24.02	23.95	23.70	22.90	23.00	22.79	22.88
		16QAM	22.79	23.11	22.51	22.01	22.10	21.88	21.90
	2535	QPSK	23.68	23.75	23.75	22.85	22.86	22.82	22.84
		16QAM	22.48	22.75	22.54	21.83	21.91	21.77	21.80
	2565	QPSK	23.87	23.78	23.85	22.90	22.84	22.82	22.86
		16QAM	22.64	22.81	22.59	21.92	21.86	21.76	21.80
5	2502.5	QPSK	23.76	23.75	23.74	22.98	22.95	22.84	22.81
		16QAM	22.72	22.65	22.54	21.91	22.01	21.95	21.94
	2535	QPSK	23.42	23.67	23.61	22.86	22.86	22.75	22.82
		16QAM	22.34	22.54	22.46	21.74	21.94	21.84	21.80
	2567.5	QPSK	23.57	23.65	23.61	22.76	22.74	22.69	22.70
		16QAM	22.41	22.49	22.50	21.56	21.56	21.80	21.76

Note 1: The conducted output power was measured using the Anritsu MT8820C

7.2 OCCUPIED BANDWIDTH

- Plots of the EUT's Occupied Bandwidth are shown in Clause 8.1

7.3 PEAK TO AVERAGE RATIO

- Plots of the EUT's Peak- to- Average Ratio are shown in Clause 8.2

7.4 BAND EDEG EMISSIONS (Conducted)

- Plots of the EUT's Band Edge Emissions are shown in Clause 8.3

7.5 SPURIOUS AND HARMONICS EMISSIONS (Conducted)

- Plots of the EUT's Spurious Emissions are shown in Clause 8.4

7.6 ERP & EIRP

7.6.1 LTE Band 12(17)

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	704	QPSK	1/0	H	24.74	-0.65	24.09	0.256
		16QAM	1/0	H	23.64	-0.65	22.99	0.199
	711	QPSK	1/0	H	24.19	-0.63	23.56	0.227
		16QAM	1/0	H	22.95	-0.63	22.32	0.171
5	701.5	QPSK	1/0	H	24.73	-0.66	24.07	0.255
		16QAM	1/0	H	23.16	-0.66	22.50	0.178
	707.5	QPSK	1/0	H	24.17	-0.64	23.53	0.225
		16QAM	1/0	H	23.21	-0.64	22.57	0.181
	713.5	QPSK	1/0	H	24.28	-0.62	23.66	0.232
		16QAM	1/0	H	23.13	-0.62	22.51	0.178

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.6.2 LTE Band 12

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
3	700.5	QPSK	1/0	H	24.67	-0.66	24.01	0.252
		16QAM	1/0	H	23.37	-0.66	22.71	0.187
	707.5	QPSK	1/0	H	24.11	-0.64	23.47	0.222
		16QAM	1/0	H	23.14	-0.64	22.50	0.178
	714.5	QPSK	1/0	H	24.65	-0.62	24.03	0.253
		16QAM	1/0	H	23.77	-0.62	23.15	0.207
1.4	699.7	QPSK	1/0	H	24.68	-0.66	24.02	0.252
		16QAM	1/0	H	23.35	-0.66	22.69	0.186
	707.5	QPSK	1/0	H	23.89	-0.64	23.25	0.211
		16QAM	1/0	H	22.59	-0.64	21.95	0.157
	715.3	QPSK	1/0	H	24.48	-0.62	23.86	0.243
		16QAM	1/0	H	23.47	-0.62	22.85	0.193

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.6.3 LTE Band 5

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/0	H	25.84	-0.67	25.17	0.329
		16QAM	1/0	H	24.70	-0.67	24.03	0.253
	836.5	QPSK	1/0	H	24.58	-0.74	23.84	0.242
		16QAM	1/0	H	23.61	-0.74	22.87	0.194
	844	QPSK	1/0	H	22.73	-0.81	21.92	0.156
		16QAM	1/0	H	21.39	-0.81	20.58	0.114
5	826.5	QPSK	1/0	H	25.33	-0.65	24.68	0.294
		16QAM	1/0	H	24.88	-0.65	24.23	0.265
	836.5	QPSK	1/0	H	25.07	-0.74	24.33	0.271
		16QAM	1/0	H	24.04	-0.74	23.30	0.214
	846.5	QPSK	1/0	H	23.91	-0.83	23.08	0.203
		16QAM	1/0	H	22.71	-0.83	21.88	0.154
3	825.5	QPSK	1/0	H	25.80	-0.64	25.16	0.328
		16QAM	1/0	H	25.00	-0.64	24.36	0.273
	836.5	QPSK	1/0	H	25.32	-0.74	24.58	0.287
		16QAM	1/0	H	23.84	-0.74	23.10	0.204
	847.5	QPSK	1/0	H	23.94	-0.84	23.10	0.204
		16QAM	1/0	H	22.51	-0.84	21.67	0.147
1.4	824.7	QPSK	1/0	H	25.22	-0.63	24.59	0.288
		16QAM	1/0	H	24.91	-0.63	24.28	0.268
	836.5	QPSK	1/0	H	25.10	-0.74	24.36	0.273
		16QAM	1/0	H	23.90	-0.74	23.16	0.207
	848.3	QPSK	1/0	H	24.45	-0.85	23.60	0.229
		16QAM	1/0	H	24.04	-0.85	23.19	0.208

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.6.4 LTE Band 4

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1720	QPSK	1/0	V	14.97	5.95	20.92	0.124
		16QAM	1/0	V	14.14	5.95	20.09	0.102
	1732.5	QPSK	1/0	V	15.76	5.84	21.60	0.145
		16QAM	1/0	V	14.39	5.84	20.23	0.105
	1745	QPSK	1/0	V	17.26	5.73	22.99	0.199
		16QAM	1/0	V	16.05	5.73	21.78	0.151
15	1717.5	QPSK	1/0	V	14.32	5.97	20.29	0.107
		16QAM	1/0	V	13.20	5.97	19.17	0.083
	1732.5	QPSK	1/0	V	17.09	5.84	22.93	0.196
		16QAM	1/0	V	15.64	5.84	21.48	0.141
	1747.5	QPSK	1/0	V	16.62	5.70	22.32	0.171
		16QAM	1/0	V	15.59	5.70	21.29	0.135
10	1715	QPSK	1/0	V	13.42	6.00	19.42	0.087
		16QAM	1/0	V	12.63	6.00	18.63	0.073
	1732.5	QPSK	1/0	V	15.35	5.84	21.19	0.132
		16QAM	1/0	V	14.60	5.84	20.44	0.111
	1750	QPSK	1/0	V	16.28	5.68	21.96	0.157
		16QAM	1/0	V	15.39	5.68	21.07	0.128
5	1712.5	QPSK	1/0	V	13.25	6.02	19.27	0.085
		16QAM	1/0	V	12.46	6.02	18.48	0.070
	1732.5	QPSK	1/0	V	15.32	5.84	21.16	0.131
		16QAM	1/0	V	13.87	5.84	19.71	0.094
	1752.5	QPSK	1/0	V	16.30	5.65	21.95	0.157
		16QAM	1/0	V	15.52	5.65	21.17	0.131
3	1711.5	QPSK	1/0	V	13.25	6.03	19.28	0.085
		16QAM	1/0	V	12.77	6.03	18.80	0.076
	1732.5	QPSK	1/0	V	15.32	5.84	21.16	0.131
		16QAM	1/0	V	14.31	5.84	20.15	0.104
	1753.5	QPSK	1/0	V	16.48	5.63	22.11	0.163
		16QAM	1/0	V	15.77	5.63	21.40	0.138
1.4	1710.7	QPSK	1/0	V	13.50	6.03	19.53	0.090
		16QAM	1/0	V	12.98	6.03	19.01	0.080
	1732.5	QPSK	1/0	V	14.56	5.84	20.40	0.110
		16QAM	1/0	V	13.91	5.84	19.75	0.094
	1754.3	QPSK	1/0	V	16.24	5.62	21.86	0.153
		16QAM	1/0	V	15.32	5.62	20.94	0.124

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.6.5 LTE Band 2

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1860	QPSK	1/0	V	18.04	4.91	22.95	0.197
		16QAM	1/0	V	17.47	4.91	22.38	0.173
	1880	QPSK	1/0	V	18.35	4.80	23.15	0.207
		16QAM	1/0	V	17.57	4.80	22.37	0.173
	1900	QPSK	1/0	V	19.51	4.69	24.20	0.263
		16QAM	1/0	V	18.97	4.69	23.66	0.232
15	1857.5	QPSK	1/0	V	17.86	4.92	22.78	0.190
		16QAM	1/0	V	17.00	4.92	21.92	0.156
	1880	QPSK	1/0	V	17.80	4.80	22.60	0.182
		16QAM	1/0	V	17.23	4.80	22.03	0.160
	1902.5	QPSK	1/0	V	18.63	4.68	23.31	0.214
		16QAM	1/0	V	17.55	4.68	22.23	0.167
10	1855	QPSK	1/0	V	17.92	4.94	22.86	0.193
		16QAM	1/0	V	17.06	4.94	22.00	0.158
	1880	QPSK	1/0	V	17.55	4.80	22.35	0.172
		16QAM	1/0	V	16.69	4.80	21.49	0.141
	1905	QPSK	1/0	V	18.61	4.67	23.28	0.213
		16QAM	1/0	V	17.76	4.67	22.43	0.175
5	1852.5	QPSK	1/0	V	17.70	4.95	22.65	0.184
		16QAM	1/0	V	16.99	4.95	21.94	0.156
	1880	QPSK	1/0	V	18.09	4.80	22.89	0.195
		16QAM	1/0	V	16.58	4.80	21.38	0.137
	1907.5	QPSK	1/0	V	19.11	4.65	23.76	0.238
		16QAM	1/0	V	17.60	4.65	22.25	0.168
3	1851.5	QPSK	1/0	V	17.72	4.95	22.67	0.185
		16QAM	1/0	V	16.67	4.95	21.62	0.145
	1880	QPSK	1/0	V	17.90	4.80	22.70	0.186
		16QAM	1/0	V	17.29	4.80	22.09	0.162
	1908.5	QPSK	1/0	V	19.36	4.65	24.01	0.252
		16QAM	1/0	V	17.98	4.65	22.63	0.183
1.4	1850.7	QPSK	1/0	V	17.86	4.96	22.82	0.191
		16QAM	1/0	V	17.10	4.96	22.06	0.161
	1880	QPSK	1/0	V	18.41	4.80	23.21	0.209
		16QAM	1/0	V	17.07	4.80	21.87	0.154
	1909.3	QPSK	1/0	V	19.54	4.64	24.18	0.262
		16QAM	1/0	V	18.39	4.64	23.03	0.201

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.6.6 LTE Band 7

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	2510	QPSK	1/0	V	15.03	5.95	20.98	0.125
		16QAM	1/0	V	14.38	5.95	20.33	0.108
	2535	QPSK	1/0	V	14.33	5.89	20.22	0.105
		16QAM	1/0	V	13.71	5.89	19.60	0.091
	2560	QPSK	1/0	V	13.54	5.86	19.40	0.087
		16QAM	1/0	V	12.80	5.86	18.66	0.073
15	2507.5	QPSK	1/0	V	13.63	5.96	19.59	0.091
		16QAM	1/0	V	12.80	5.96	18.76	0.075
	2535	QPSK	1/0	V	14.06	5.89	19.95	0.099
		16QAM	1/0	V	12.40	5.89	18.29	0.067
	2562.5	QPSK	1/0	V	13.96	5.87	19.83	0.096
		16QAM	1/0	V	13.13	5.87	19.00	0.079
10	2505	QPSK	1/0	V	14.14	5.97	20.11	0.103
		16QAM	1/0	V	13.45	5.97	19.42	0.087
	2535	QPSK	1/0	V	14.20	5.89	20.09	0.102
		16QAM	1/0	V	13.66	5.89	19.55	0.090
	2565	QPSK	1/0	V	14.12	5.87	19.99	0.100
		16QAM	1/0	V	13.26	5.87	19.13	0.082
5	2502.5	QPSK	1/0	V	14.05	5.97	20.02	0.100
		16QAM	1/0	V	13.22	5.97	19.19	0.083
	2535	QPSK	1/0	V	13.72	5.89	19.61	0.091
		16QAM	1/0	V	12.92	5.89	18.81	0.076
	2537.5	QPSK	1/0	V	14.19	5.88	20.07	0.102
		16QAM	1/0	V	13.41	5.88	19.29	0.085

Note: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

7.7 UNDESIRABLE EMISSIONS (Radiated)

7.7.1 LTE Band 12(17)

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	704	1/0	QPSK	1398.98	H	-29.06	2.69	-26.37	-13.00	13.37
				2098.89	V	-30.48	3.01	-27.47	-13.00	14.47
				2798.44	V	-27.65	4.80	-22.85	-13.00	9.85
				3497.90	V	-29.20	6.04	-23.16	-13.00	10.16
			16QAM	1398.56	H	-28.91	2.68	-26.23	-13.00	13.23
				2098.75	V	-30.53	3.00	-27.53	-13.00	14.53
				2798.17	V	-28.52	4.80	-23.72	-13.00	10.72
				3497.84	V	-28.97	6.04	-22.93	-13.00	9.93
	711	1/0	QPSK	1413.21	H	-24.25	2.82	-21.43	-13.00	8.43
				2119.80	V	-27.82	3.09	-24.73	-13.00	11.73
				2826.46	V	-31.34	4.89	-26.45	-13.00	13.45
				3533.00	V	-37.50	6.13	-31.37	-13.00	18.37
			16QAM	1413.23	H	-23.82	2.82	-21.00	-13.00	8.00
				2119.89	V	-27.94	3.09	-24.85	-13.00	11.85
				2826.53	V	-31.22	4.89	-26.33	-13.00	13.33
				3532.82	V	-37.62	6.13	-31.49	-13.00	18.49

Note 1: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 2: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

7.7.2 LTE Band 5

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result (dBm)	Limit (dBm)	Margin (dB)
10	829	1/0	QPSK	1649.00	H	-36.34	3.82	-32.52	-13.00	19.52
				2473.71	V	-30.47	3.79	-26.68	-13.00	13.68
				3298.11	V	-44.02	5.53	-38.49	-13.00	25.49
			16QAM	1649.15	H	-39.40	3.82	-35.58	-13.00	22.58
				2473.90	V	-32.55	3.79	-28.76	-13.00	15.76
				3298.35	V	-48.31	5.53	-42.78	-13.00	29.78
	836.5	1/0	QPSK	1664.04	H	-39.71	3.86	-35.85	-13.00	22.85
				2496.34	V	-36.43	3.82	-32.61	-13.00	19.61
				3328.27	V	-54.39	5.61	-48.78	-13.00	35.78
			16QAM	1664.09	H	-39.76	3.87	-35.89	-13.00	22.89
				2496.33	V	-36.54	3.82	-32.72	-13.00	19.72
				3328.17	V	-55.20	5.61	-49.59	-13.00	36.59
	844	1/0	QPSK	1679.23	H	-39.67	3.91	-35.76	-13.00	22.76
				2518.65	V	-29.36	3.78	-25.58	-13.00	12.58
				3358.40	V	-46.65	5.69	-40.96	-13.00	27.96
			16QAM	1679.27	H	-39.58	3.91	-35.67	-13.00	22.67
				2518.81	V	-31.38	3.78	-27.60	-13.00	14.60
				3358.05	V	-48.15	5.69	-42.46	-13.00	29.46

Note 1: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 2: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

7.7.3 LTE Band 4

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1720	1/0	QPSK	3422.17	V	-29.27	8.01	-21.26	-13.00	8.26
				5133.30	V	-36.42	10.26	-26.16	-13.00	13.16
				6844.22	V	-45.36	11.22	-34.14	-13.00	21.14
			16QAM	3422.13	V	-29.83	8.01	-21.82	-13.00	8.82
				5133.19	V	-37.27	10.26	-27.01	-13.00	14.01
				6844.22	V	-45.63	11.22	-34.41	-13.00	21.41
	1732.5	1/0	QPSK	3447.22	V	-28.58	8.07	-20.51	-13.00	7.51
				5170.78	V	-35.58	10.29	-25.29	-13.00	12.29
				6894.11	V	-45.28	11.29	-33.99	-13.00	20.99
			16QAM	3447.17	V	-27.65	8.07	-19.58	-13.00	6.58
				5170.82	V	-35.67	10.29	-25.38	-13.00	12.38
				6894.23	V	-44.52	11.29	-33.23	-13.00	20.23
	1745	1/0	QPSK	3472.25	V	-31.49	8.13	-23.36	-13.00	10.36
				5208.36	V	-32.02	10.34	-21.68	-13.00	8.68
				6944.51	V	-41.57	11.44	-30.13	-13.00	17.13
			16QAM	3472.16	V	-31.96	8.13	-23.83	-13.00	10.83
				5208.38	V	-33.18	10.34	-22.84	-13.00	9.84
				6944.35	V	-41.77	11.44	-30.33	-13.00	17.33

Note 1: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 2: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed

7.7.4 LTE Band 2

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	1860	1/0	QPSK	3702.31	V	-32.70	8.38	-24.32	-13.00	11.32
				5553.22	H	-31.03	10.42	-20.61	-13.00	7.61
				7404.22	V	-36.85	11.71	-25.14	-13.00	12.14
			16QAM	3702.16	V	-34.22	8.38	-25.84	-13.00	12.84
				5553.37	H	-37.19	10.42	-26.77	-13.00	13.77
				7404.34	V	-37.05	11.71	-25.34	-13.00	12.34
	1880	1/0	QPSK	3742.22	V	-27.57	8.40	-19.17	-13.00	6.17
				5613.24	H	-33.96	10.60	-23.36	-13.00	10.36
				7484.33	V	-39.35	11.87	-27.48	-13.00	14.48
			16QAM	3742.23	V	-28.69	8.40	-20.29	-13.00	7.29
				5613.25	H	-34.44	10.60	-23.84	-13.00	10.84
				7484.31	V	-39.16	11.87	-27.29	-13.00	14.29
	1900	1/0	QPSK	3782.21	V	-34.94	8.28	-26.66	-13.00	13.66
				5673.28	H	-33.95	10.70	-23.25	-13.00	10.25
				7564.32	V	-41.85	12.03	-29.82	-13.00	16.82
			16QAM	3782.22	V	-35.42	8.28	-27.14	-13.00	14.14
				5673.36	H	-34.50	10.70	-23.80	-13.00	10.80
				7564.30	V	-41.60	12.03	-29.57	-13.00	16.57

Note 1: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 2: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed

7.7.5 LTE Band 7

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result (dBm)	Limit (dBm)	Margin (dB)
20	2510	1/0	QPSK	5002.17	H	-45.01	10.00	-35.01	-25.00	10.01
				7503.41	V	-42.39	11.92	-30.47	-25.00	5.47
				10004.25	H	-42.73	13.12	-29.61	-25.00	4.61
			16QAM	5002.24	H	-47.74	10.00	-37.74	-25.00	12.74
				7503.30	V	-43.82	11.92	-31.90	-25.00	6.90
				10004.35	H	-45.11	13.12	-31.99	-25.00	6.99
	2535	1/0	QPSK	5052.14	H	-48.37	10.10	-38.27	-25.00	13.27
				7578.46	V	-43.15	12.07	-31.08	-25.00	6.08
				10104.12	H	-42.87	13.11	-29.76	-25.00	4.76
			16QAM	5052.09	H	-49.55	10.10	-39.45	-25.00	14.45
				7578.32	V	-44.00	12.07	-31.93	-25.00	6.93
				10104.45	H	-43.10	13.10	-30.00	-25.00	5.00
	2560	1/0	QPSK	5102.20	H	-50.29	10.27	-40.02	-25.00	15.02
				7653.23	V	-40.97	12.19	-28.78	-25.00	3.78
				10204.45	H	-43.37	13.09	-30.28	-25.00	5.28
			16QAM	5102.19	H	-51.05	10.27	-40.78	-25.00	15.78
				7653.17	V	-41.66	12.19	-29.47	-25.00	4.47
				10204.16	H	-44.88	13.09	-31.79	-25.00	6.79

Note 1: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 2: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed

7.8 FREQUENCY STABILITY

7.8.1 LTE Band 12(17)

OPERATING FREQUENCY : 707.5 MHz
REFERENCE VOLTAGE : 12 VDC
DEVIATION LIMIT(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	707,500,004	4	0.0057	0.000000565
100%		-30	707,500,010	10	0.0141	0.000001413
100%		-20	707,500,003	3	0.0042	0.000000424
100%		-10	707,499,993	-7	-0.0099	-0.000000989
100%		0	707,500,006	6	0.0085	0.000000848
100%		+10	707,500,002	2	0.0028	0.000000283
100%		+20	707,500,004	4	0.0057	0.000000565
100%		+30	707,500,001	1	0.0014	0.000000141
100%		+40	707,499,994	-6	-0.0085	-0.000000848
100%		+50	707,500,003	3	0.0042	0.000000424
115%	13.80	+20	707,500,004	4	0.0057	0.000000565
85%	10.20	+20	707,500,011	11	0.0155	0.000001555

Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

7.8.2 LTE Band 5

OPERATING FREQUENCY : 836.5 MHz
REFERENCE VOLTAGE : 12 VDC
DEVIATION LIMIT(FCC&IC) : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	836,500,005	5	0.0060	0.000000598
100%		-30	836,500,007	7	0.0084	0.000000837
100%		-20	836,499,995	-5	-0.0060	-0.000000598
100%		-10	836,499,997	-3	-0.0036	-0.000000359
100%		0	836,499,999	-1	-0.0012	-0.000000120
100%		+10	836,500,004	4	0.0048	0.000000478
100%		+20	836,500,005	5	0.0060	0.000000598
100%		+30	836,499,997	-3	-0.0036	-0.000000359
100%		+40	836,500,007	7	0.0084	0.000000837
100%		+50	836,500,009	9	0.0108	0.000001076
115%	13.80	+20	836,499,995	-5	-0.0060	-0.000000598
85%	10.20	+20	836,499,999	-1	-0.0012	-0.000000120

7.8.3 LTE Band 4

OPERATING FREQUENCY : 1732.5 MHz
REFERENCE VOLTAGE 12 VDC
LIMIT(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	1,732,500,008	8	0.0046	0.000000462
100%		-30	1,732,500,003	3	0.0017	0.000000173
100%		-20	1,732,499,995	-5	-0.0029	-0.000000289
100%		-10	1,732,499,999	-1	-0.0006	-0.000000058
100%		0	1,732,500,004	4	0.0023	0.000000231
100%		+10	1,732,500,006	6	0.0035	0.000000346
100%		+20	1,732,500,008	8	0.0046	0.000000462
100%		+30	1,732,500,012	12	0.0069	0.000000693
100%		+40	1,732,500,003	3	0.0017	0.000000173
100%		+50	1,732,499,995	-5	-0.0029	-0.000000289
115%	13.80	+20	1,732,499,993	-7	-0.0040	-0.000000404
85%	10.20	+20	1,732,500,006	6	0.0035	0.000000346

Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

7.8.4 LTE Band 2

OPERATING FREQUENCY : 1880 MHz
REFERENCE VOLTAGE 12 VDC
LIMIT(FCC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
LIMIT(IC) : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	1,880,000,010	10	0.0053	0.000000532
100%		-30	1,880,000,003	3	0.0016	0.000000160
100%		-20	1,879,999,994	-6	-0.0032	-0.000000319
100%		-10	1,880,000,007	7	0.0037	0.000000372
100%		0	1,880,000,003	3	0.0016	0.000000160
100%		+10	1,879,999,995	-5	-0.0027	-0.000000266
100%		+20	1,880,000,010	10	0.0053	0.000000532
100%		+30	1,880,000,004	4	0.0021	0.000000213
100%		+40	1,880,000,003	3	0.0016	0.000000160
100%		+50	1,880,000,004	4	0.0021	0.000000213
115%	13.80	+20	1,880,000,009	9	0.0048	0.000000479
85%	10.20	+20	1,879,999,998	-2	-0.0011	-0.000000106

Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

7.8.5 LTE Band 7

OPERATING FREQUENCY : 2353 MHz
REFERENCE VOLTAGE 12 VDC
LIMIT(FCC&IC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	2,535,000,004	4	0.0016	0.000000158
100%		-30	2,534,999,995	-5	-0.0020	-0.000000197
100%		-20	2,534,999,999	-1	-0.0004	-0.000000039
100%		-10	2,535,000,007	7	0.0028	0.000000276
100%		0	2,535,000,002	2	0.0008	0.000000079
100%		+10	2,535,000,009	9	0.0036	0.000000355
100%		+20	2,535,000,004	4	0.0016	0.000000158
100%		+30	2,535,000,013	13	0.0051	0.000000513
100%		+40	2,535,000,004	4	0.0016	0.000000158
100%		+50	2,534,999,999	-1	-0.0004	-0.000000039
115%	13.80	+20	2,534,999,992	-8	-0.0032	-0.000000316
85%	10.20	+20	2,535,000,009	9	0.0036	0.000000355

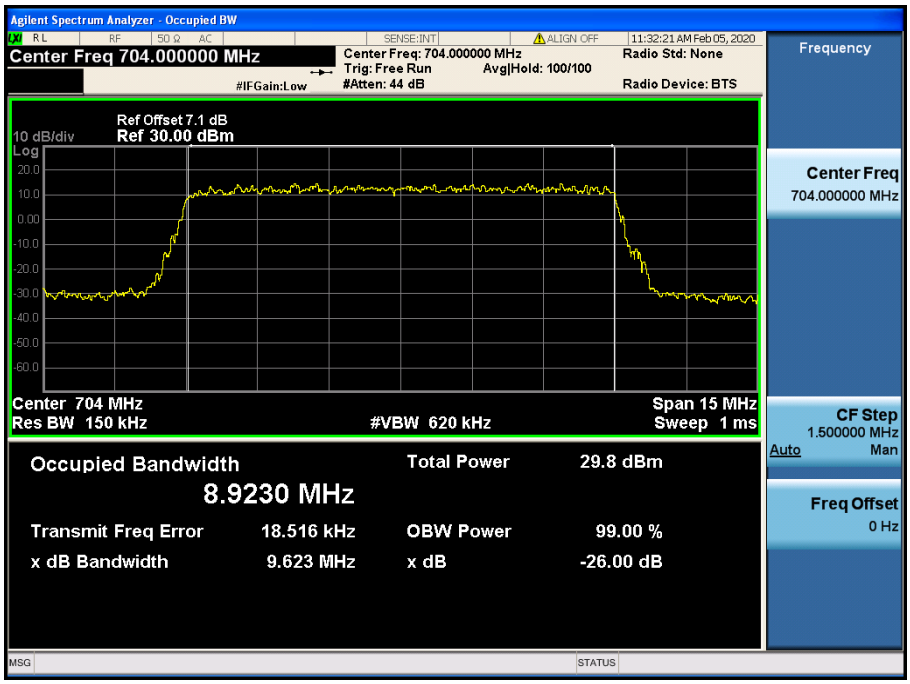
Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

8. TEST PLOTS

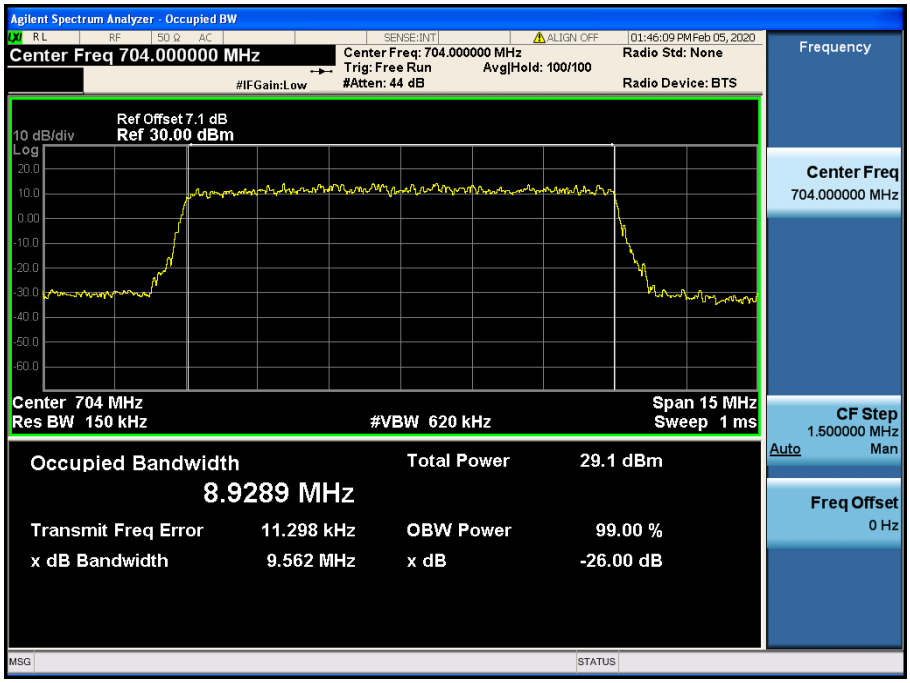
**Note: All bandwidths, RB configurations, and modulations were investigated.
The worst case test results are reported.**

8.1 OCCUPIED BANDWIDTH

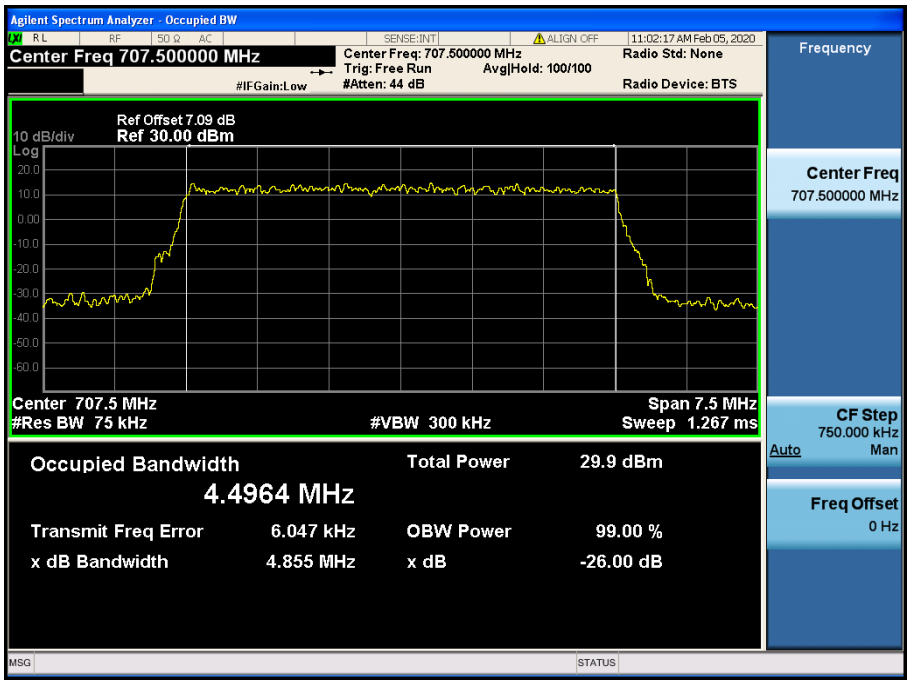
8.1.1 LTE Band 12(17)



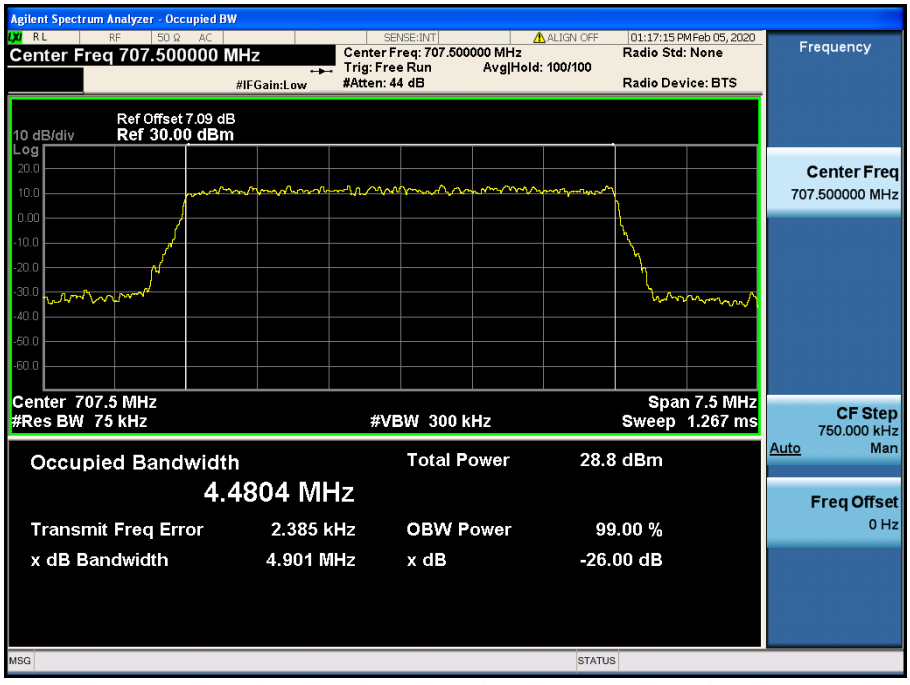
LTE Band 12,17 / 10 MHz / QPSK - RB Size 50



LTE Band 12,17 / 10 MHz / 16QAM - RB Size 50



LTE Band 12,17 / 5 MHz / QPSK - RB Size 25



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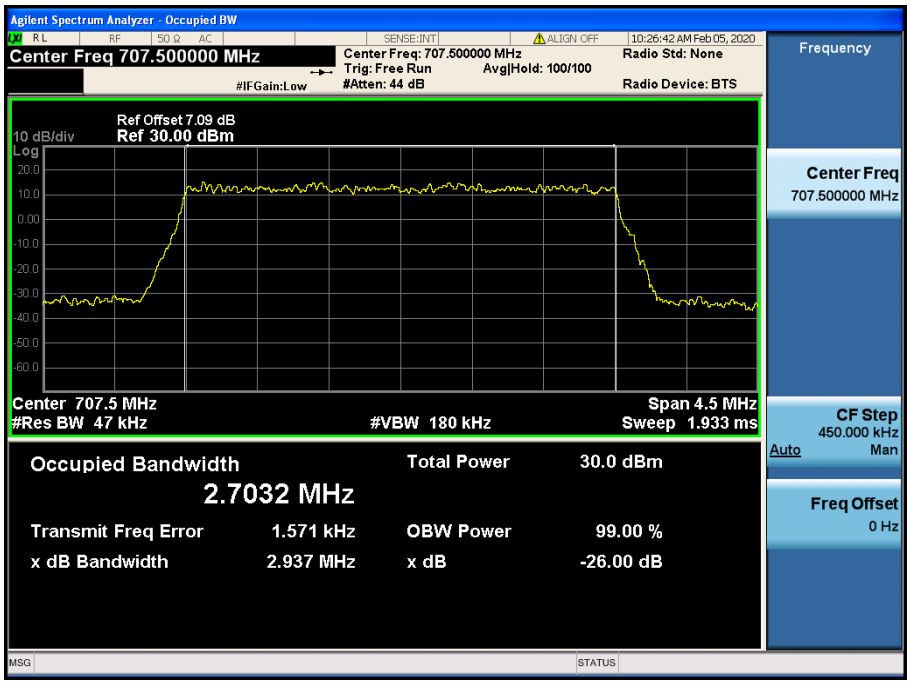
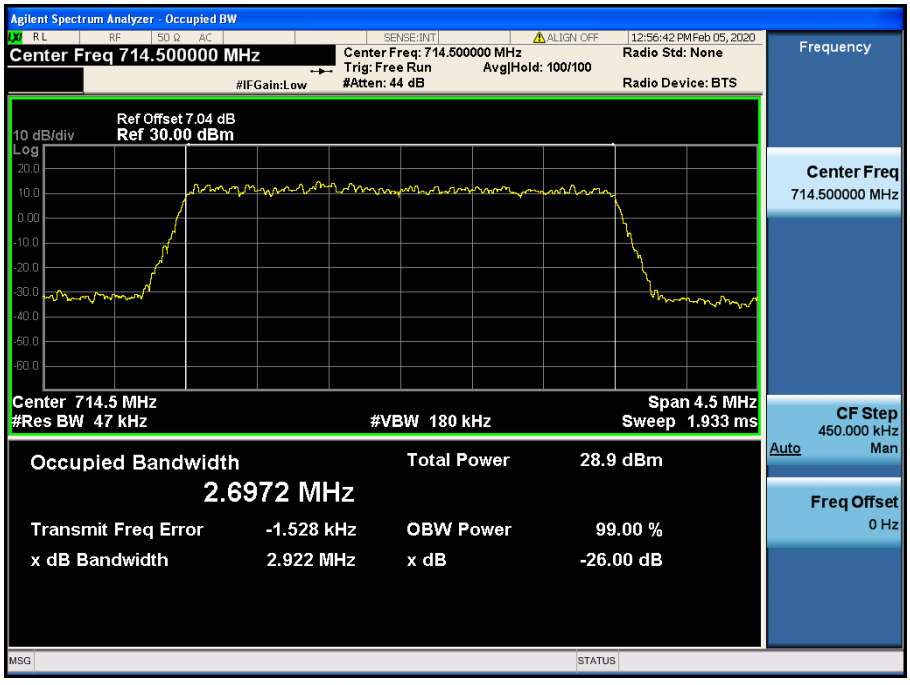
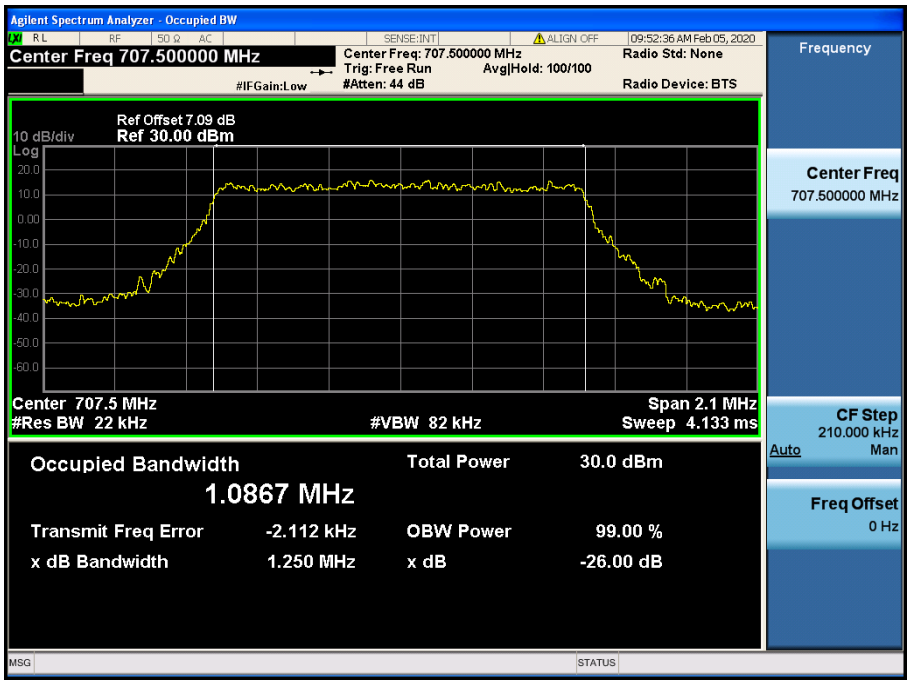


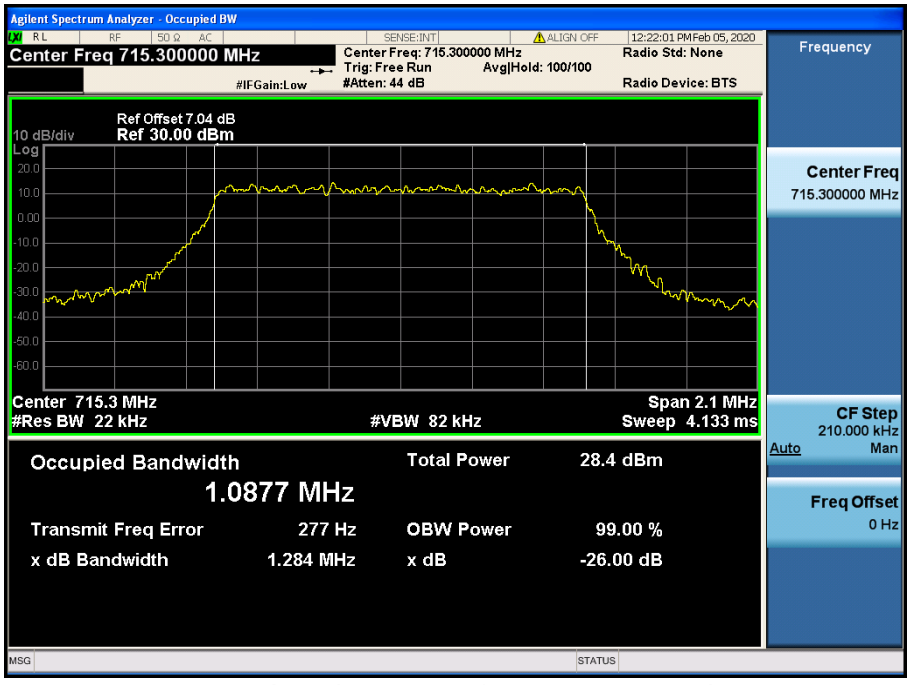
LTE Band 12 / 3 MHz / QPSK - RB Size 15



LTE Band 12 / 3 MHz / 16QAM - RB Size 15

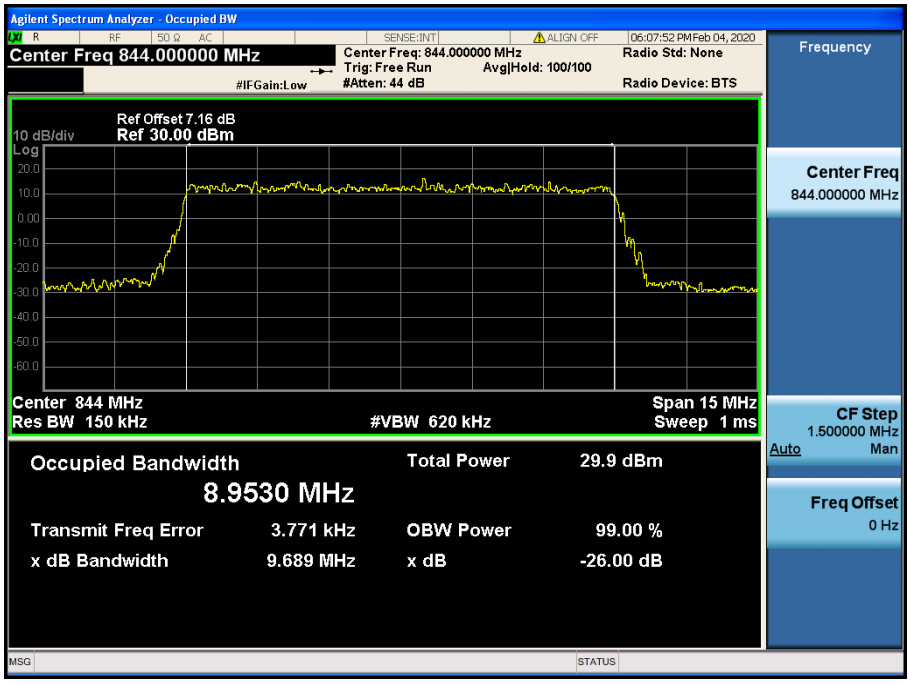


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

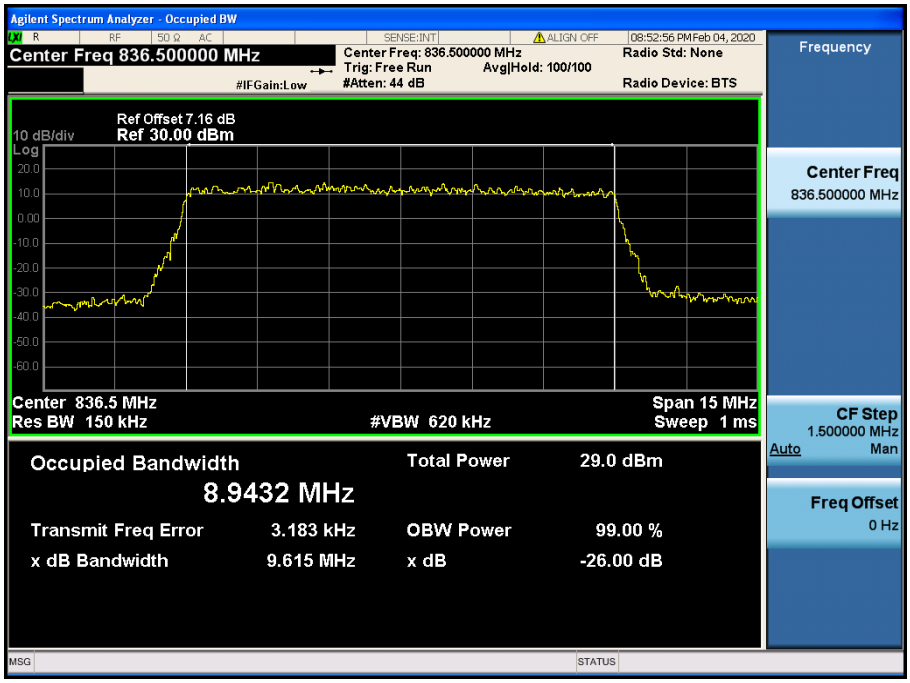


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

8.1.2 LTE Band 5

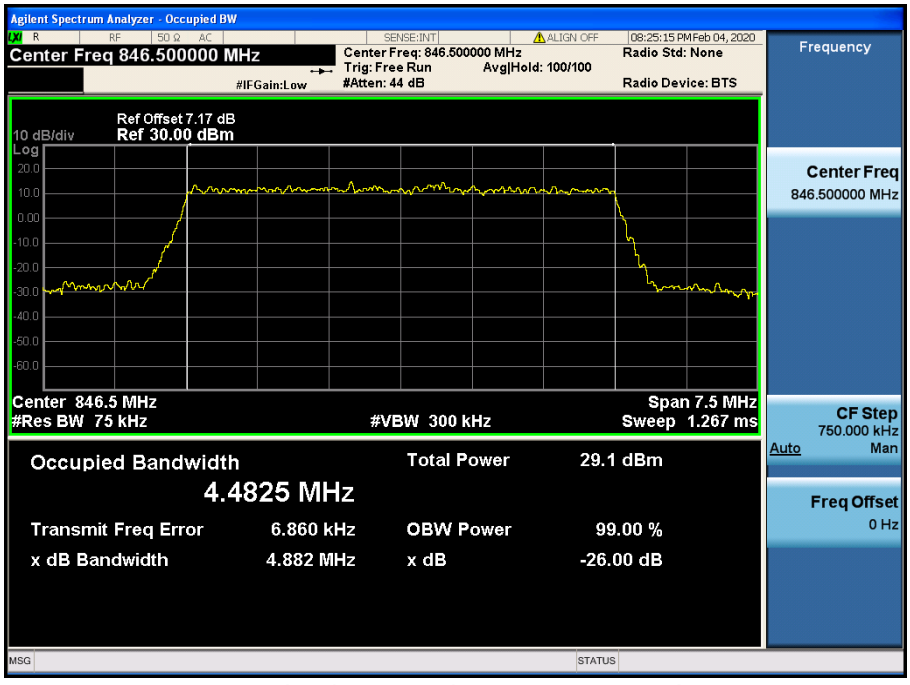


LTE Band 5 / 10 MHz / QPSK - RB Size 50

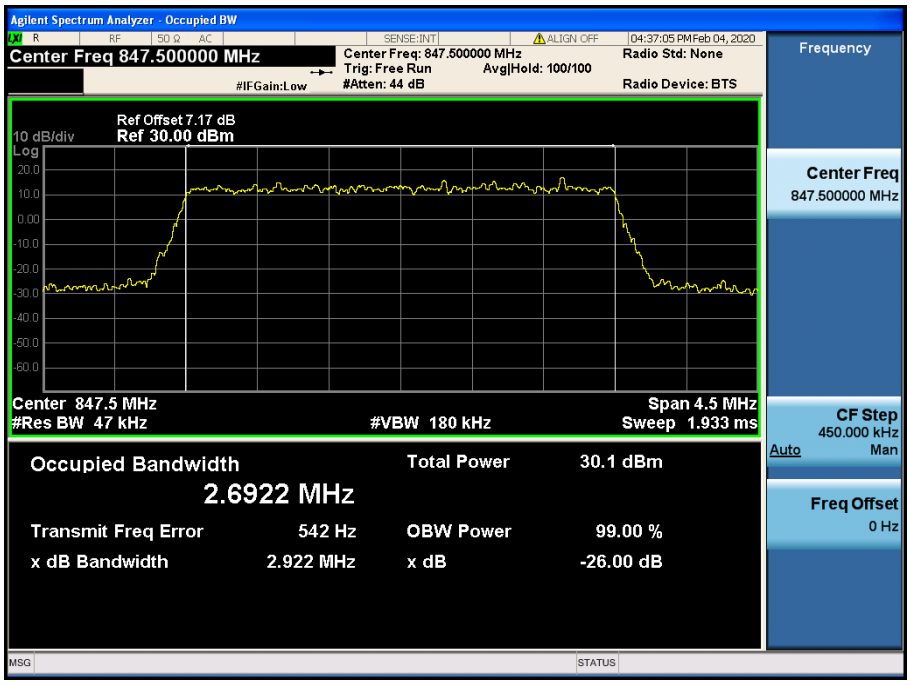


LTE Band 5 / 10 MHz / 16QAM - RB Size 50

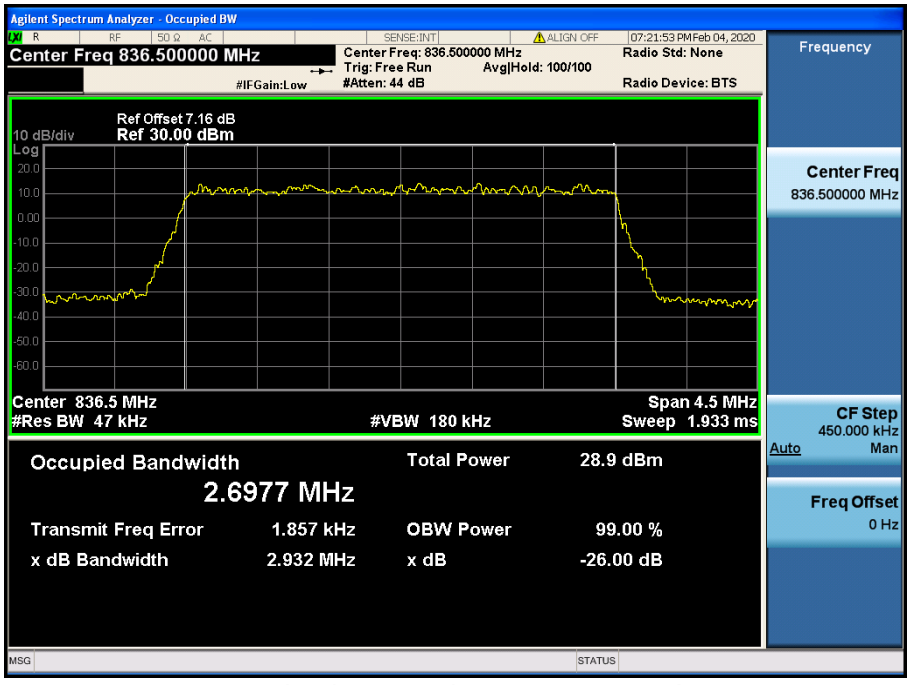
LTE Band 5 / 5 MHz / QPSK - RB Size 25



LTE Band 5 / 5 MHz / 16QAM - RB Size 25

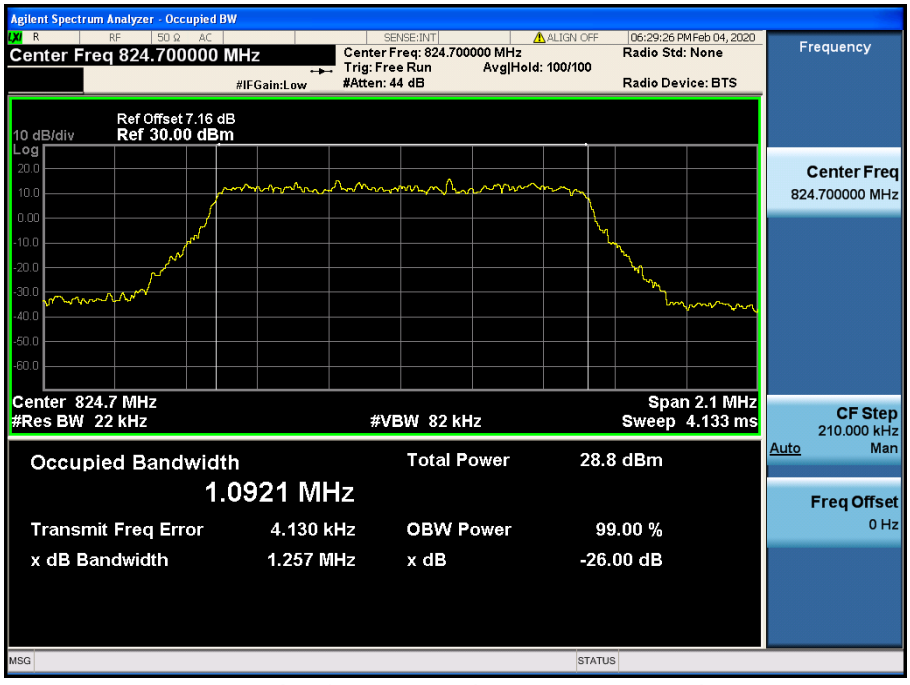


LTE Band 5 / 3 MHz / QPSK - RB Size 15



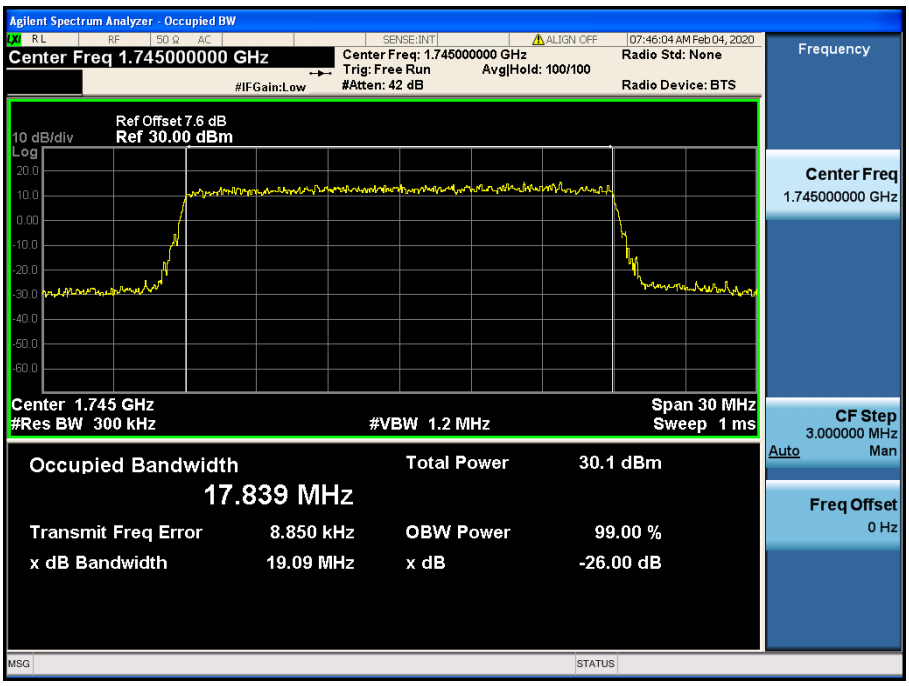
LTE Band 5 / 3 MHz / 16QAM - RB Size 15

LTE Band 5 / 1.4 MHz / QPSK - RB Size 6

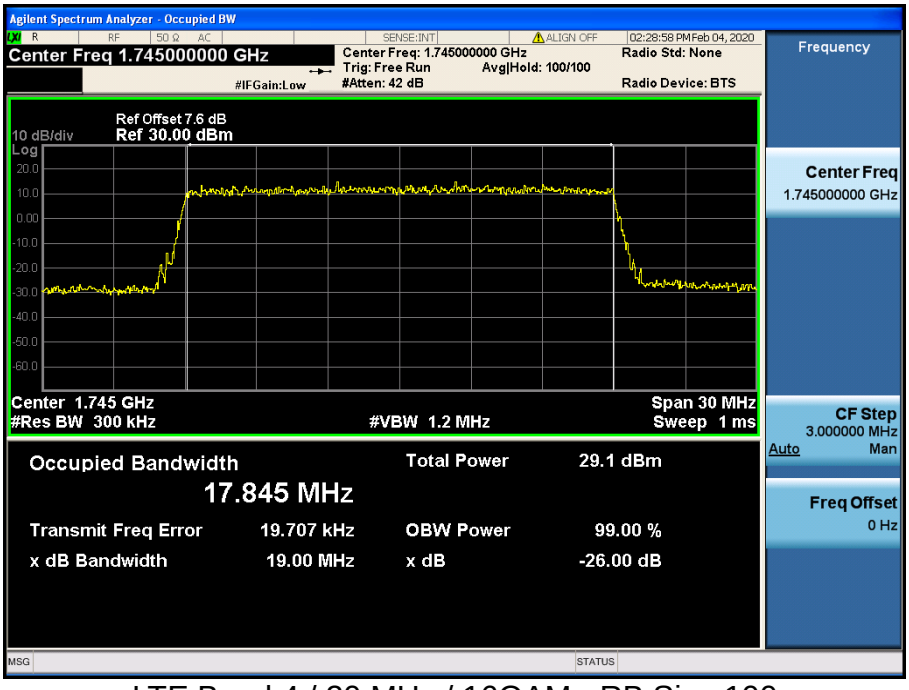


LTE Band 5 / 1.4 MHz / 16QAM - RB Size 6

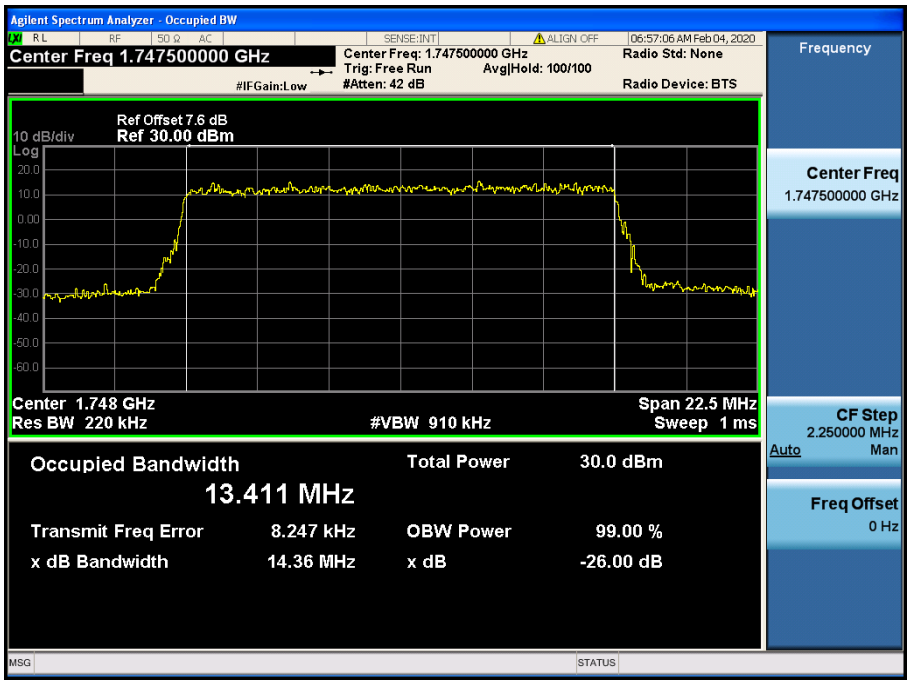
8.1.3 LTE Band 4



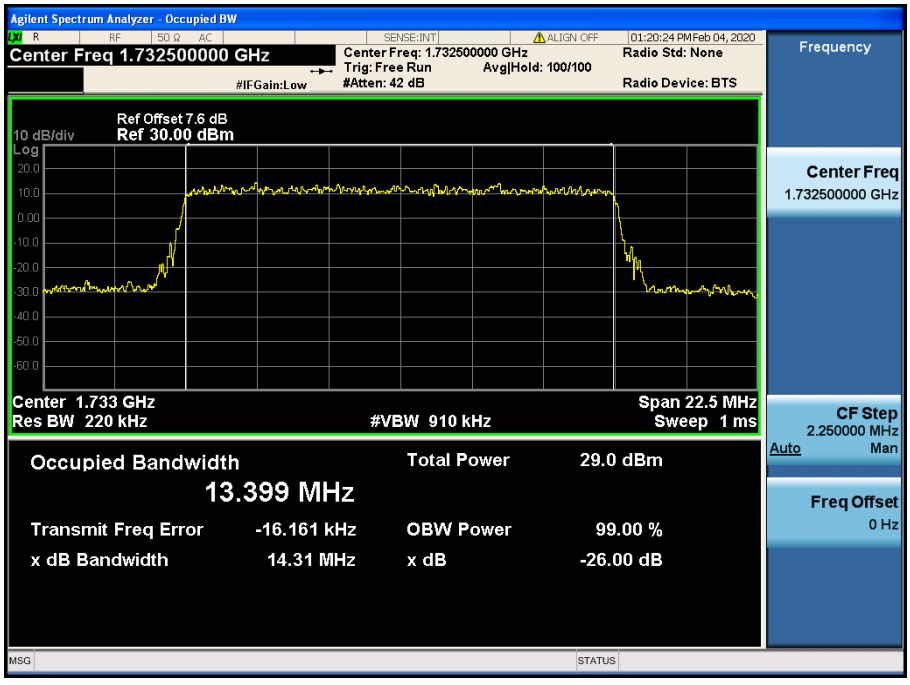
LTE Band 4 / 20 MHz / QPSK - RB Size 100



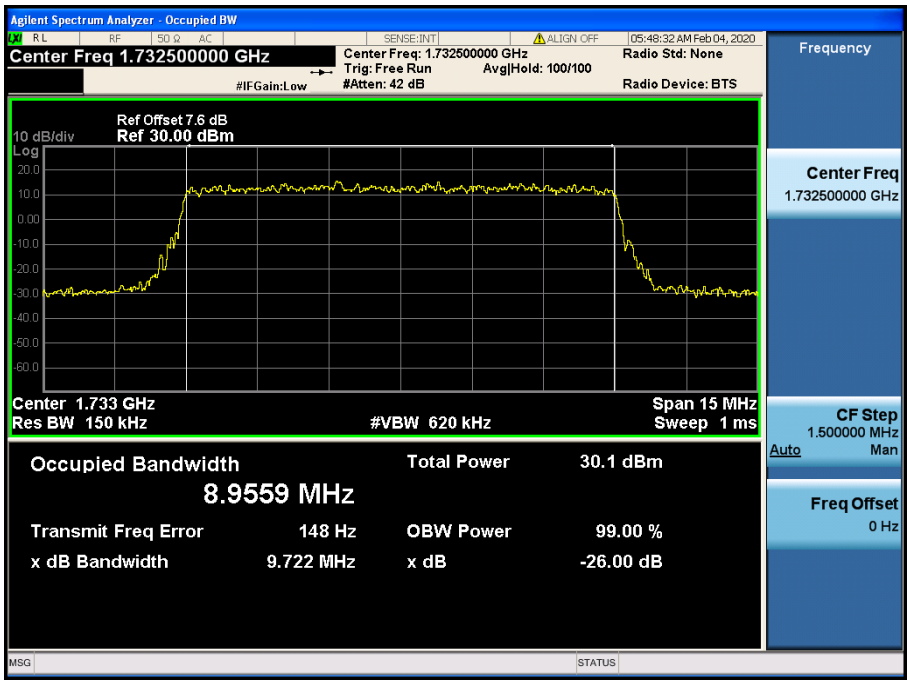
LTE Band 4 / 20 MHz / 16QAM - RB Size 100



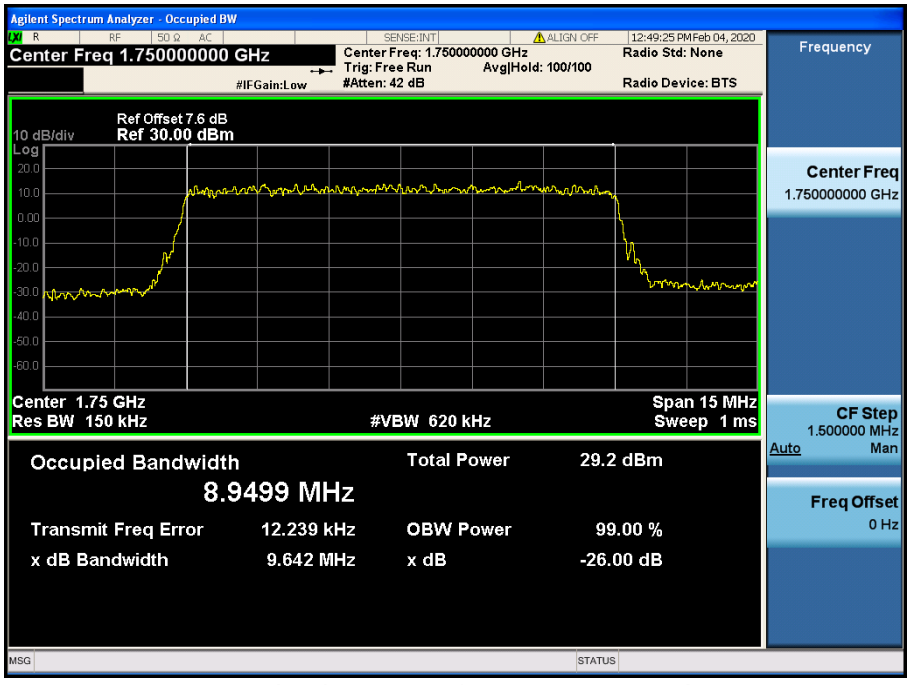
LTE Band 4 / 15 MHz / QPSK - RB Size 75



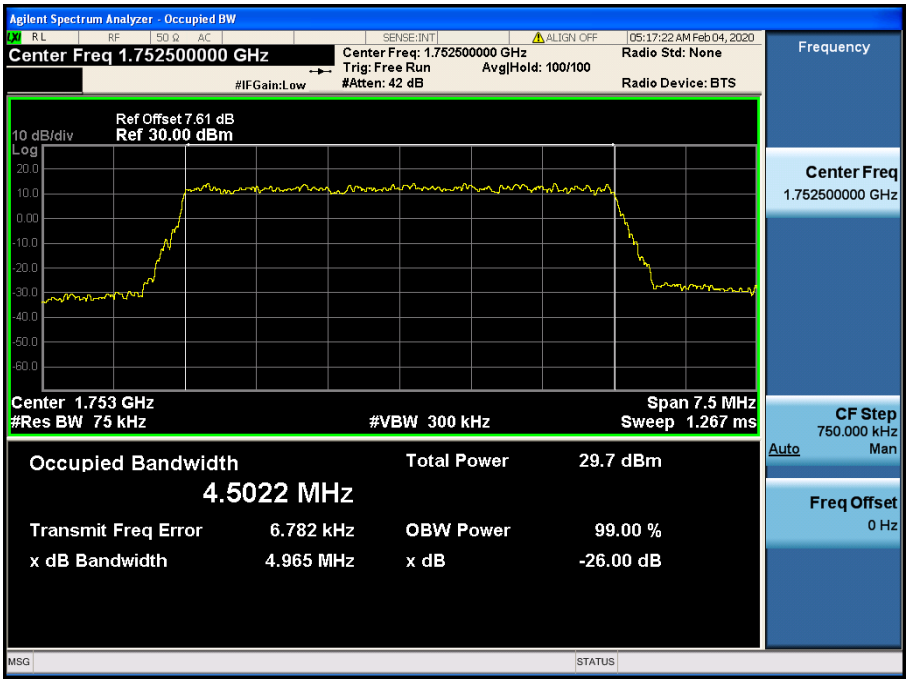
LTE Band 4 / 15 MHz / 16QAM - RB Size 75



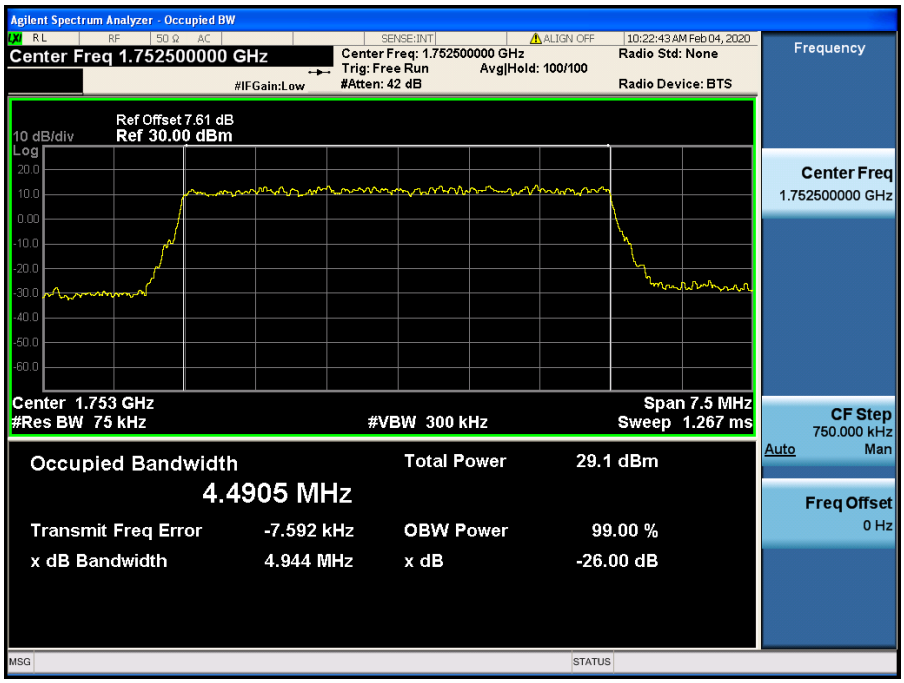
LTE Band 4 / 10 MHz / QPSK - RB Size 50



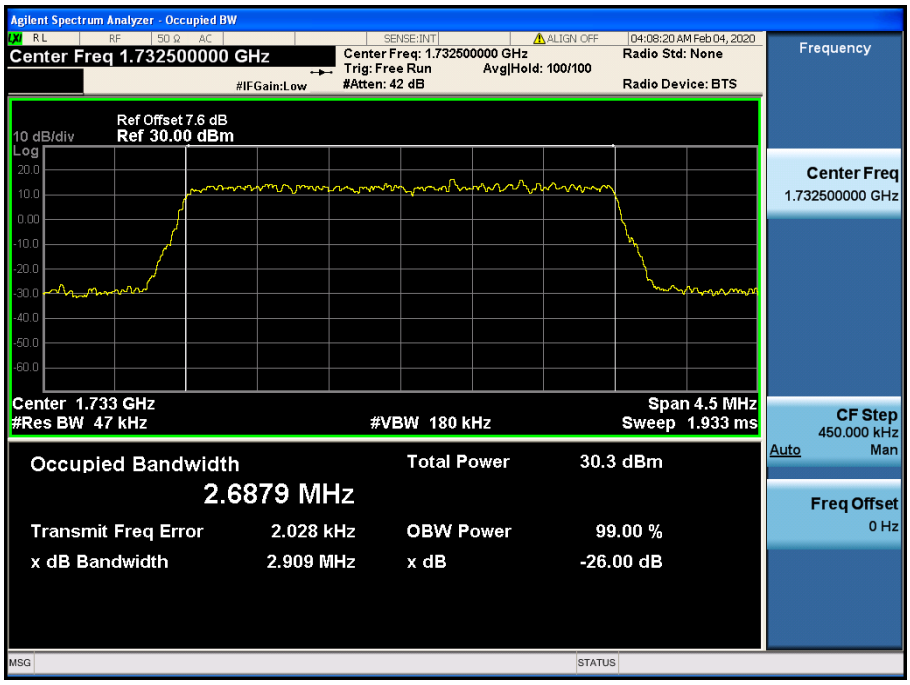
LTE Band 4 / 10 MHz / 16QAM - RB Size 50



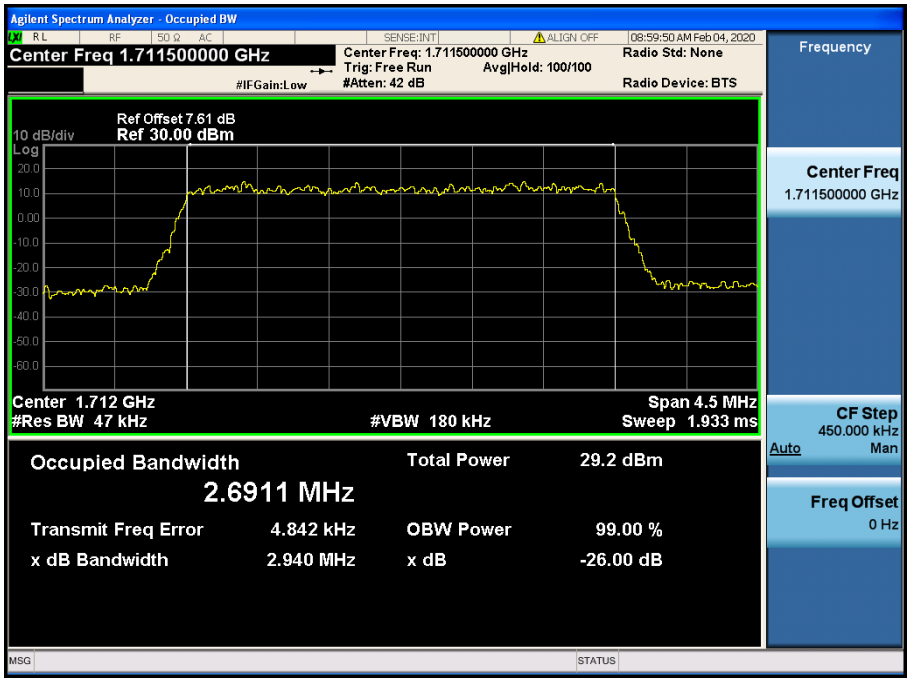
LTE Band 4 / 5 MHz / QPSK - RB Size 25



LTE Band 4 / 5 MHz / 16QAM - RB Size 25

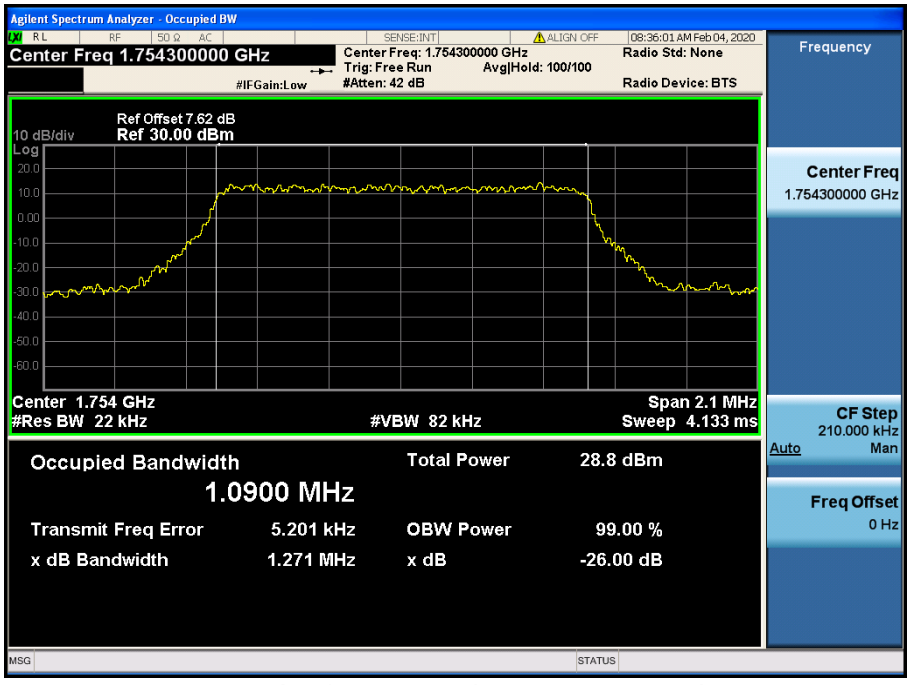


LTE Band 4 / 3 MHz / QPSK - RB Size 15



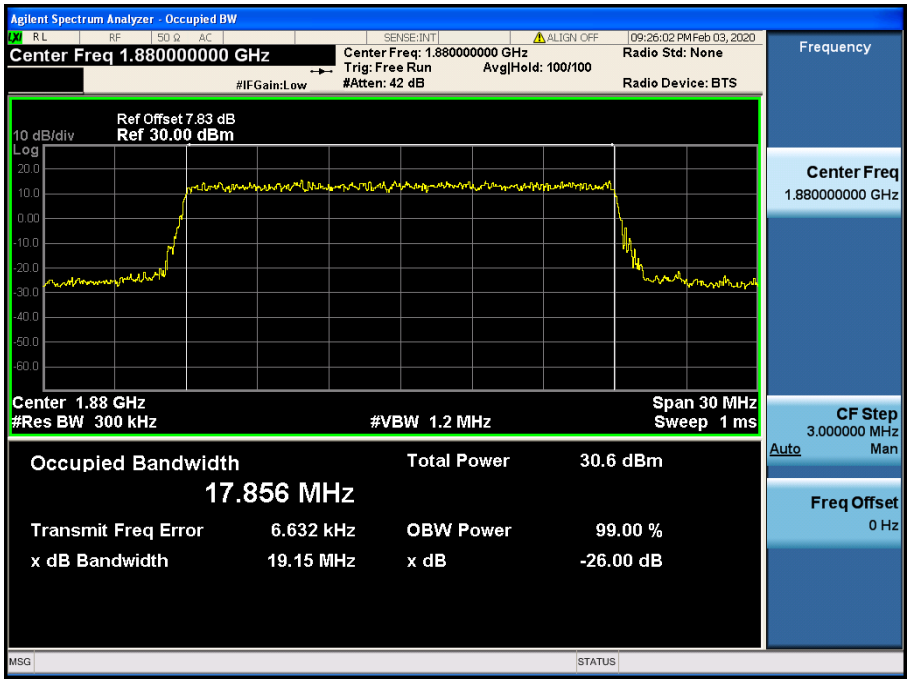
LTE Band 4 / 3 MHz / 16QAM - RB Size 15

LTE Band 4 / 1.4 MHz / QPSK - RB Size 6

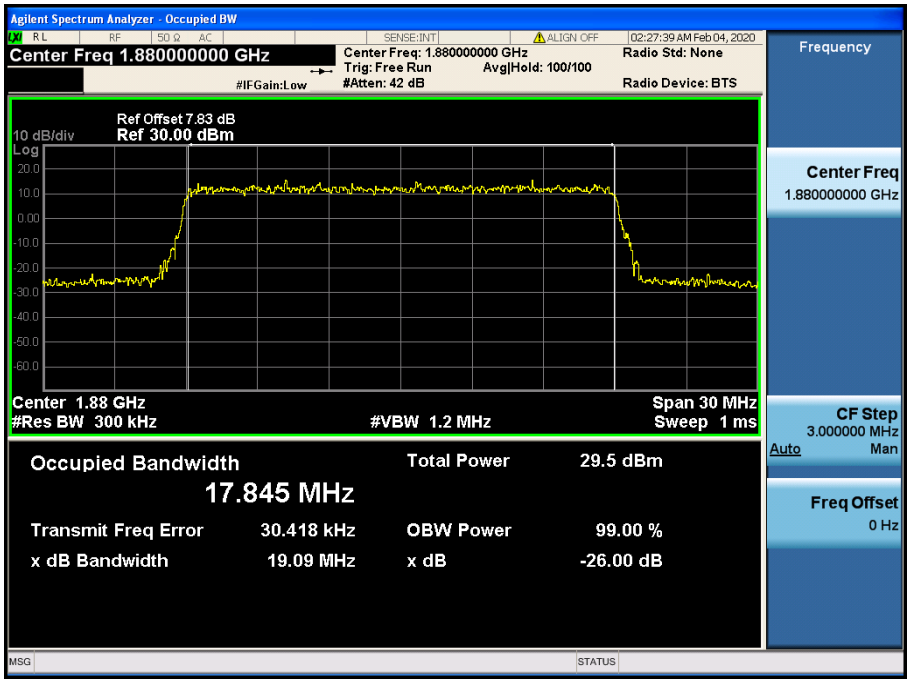


LTE Band 4 / 1.4 MHz / 16QAM - RB Size 6

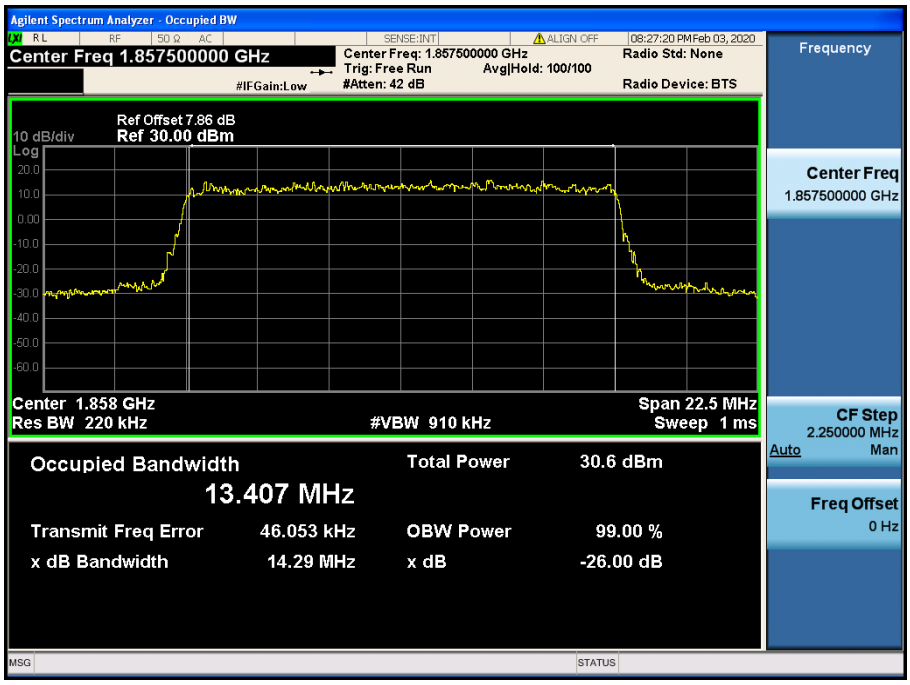
8.1.4 LTE Band 2



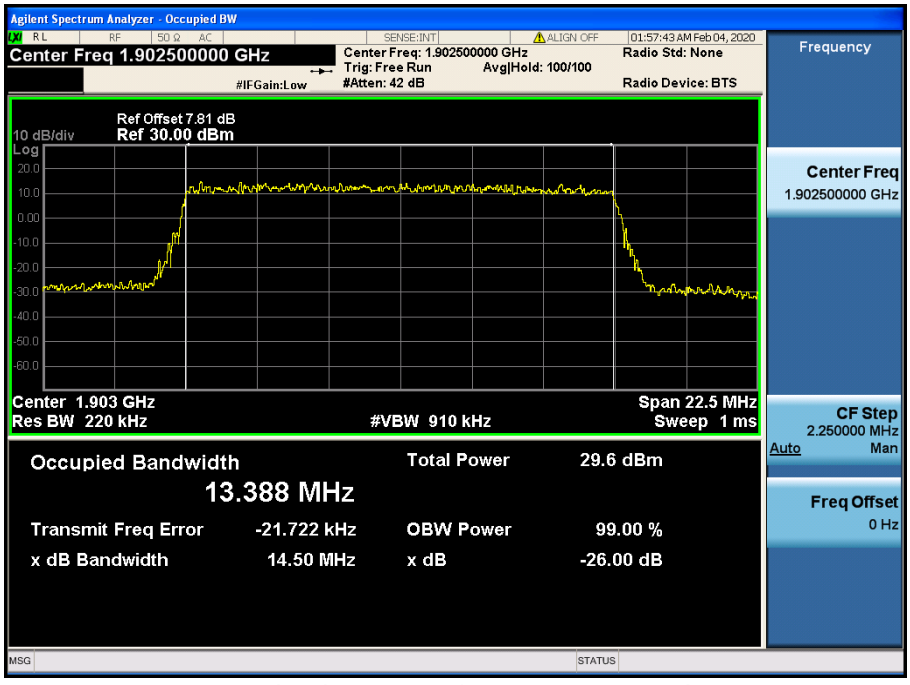
LTE Band 2 / 20 MHz / QPSK - RB Size 100



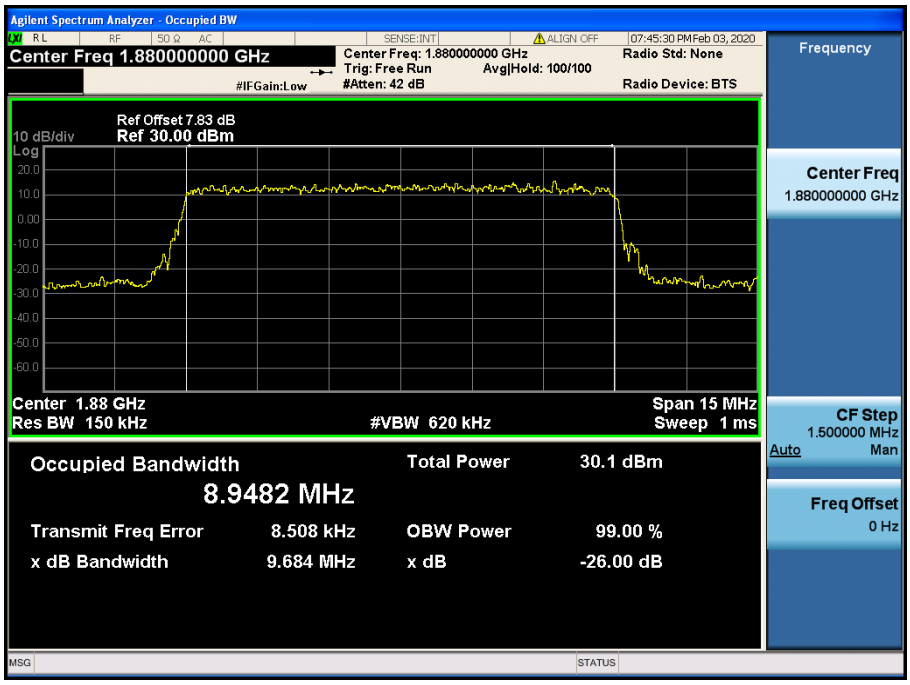
LTE Band 2 / 20 MHz / 16QAM - RB Size 100



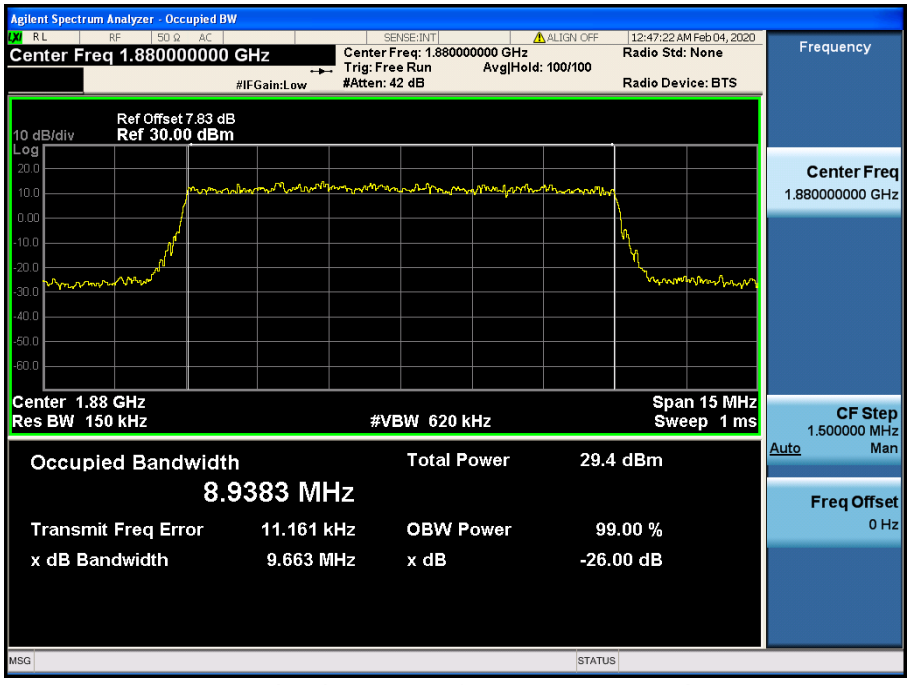
LTE Band 2 / 15 MHz / QPSK - RB Size 75



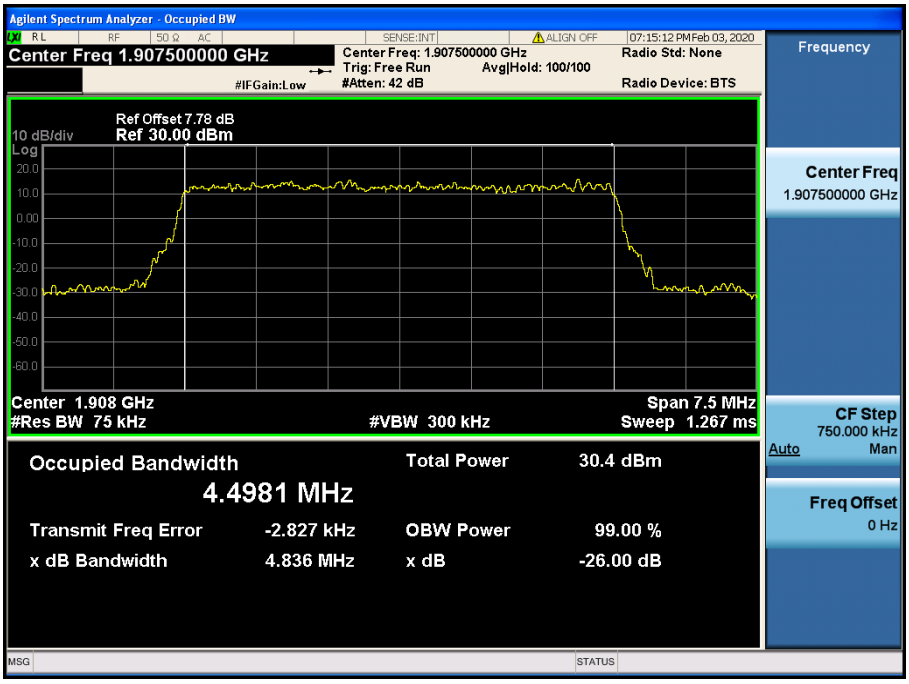
LTE Band 2 / 15 MHz / 16QAM - RB Size 75



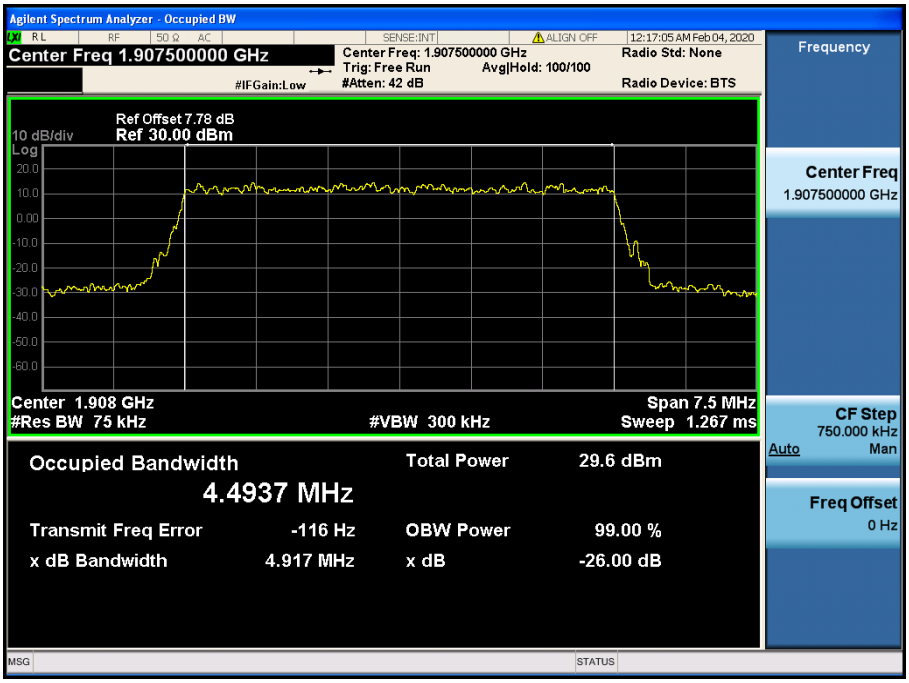
LTE Band 2 / 10 MHz / QPSK - RB Size 50



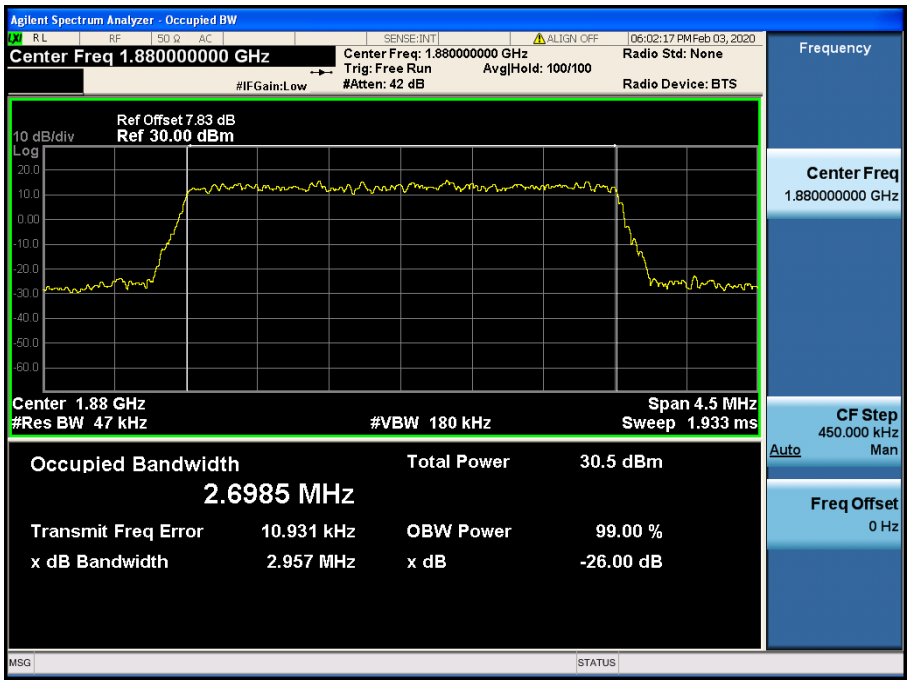
LTE Band 2 / 10 MHz / 16QAM - RB Size 50



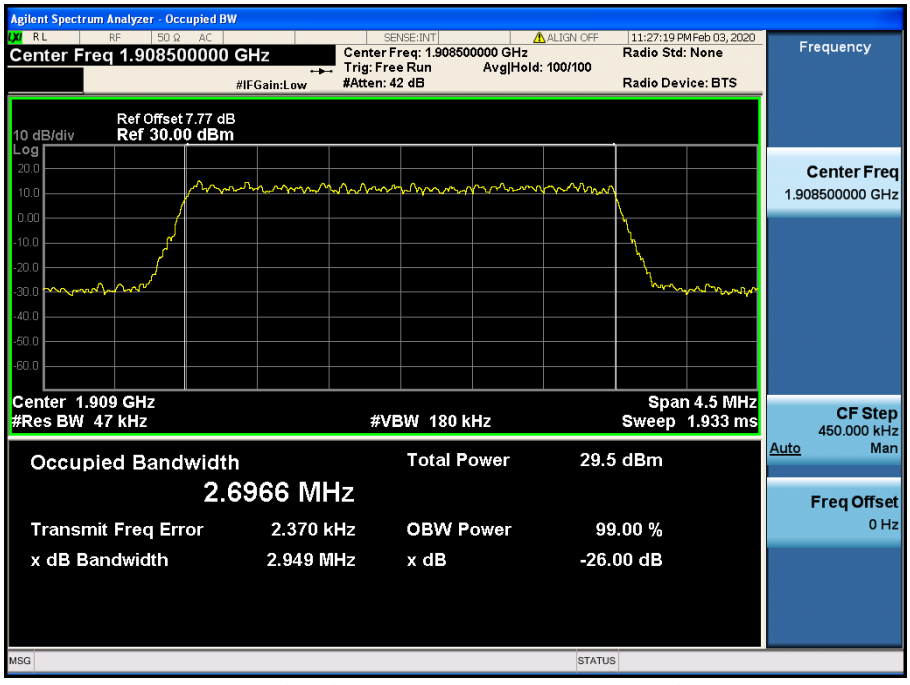
LTE Band 2 / 5 MHz / QPSK - RB Size 25



LTE Band 2 / 5 MHz / 16QAM - RB Size 25

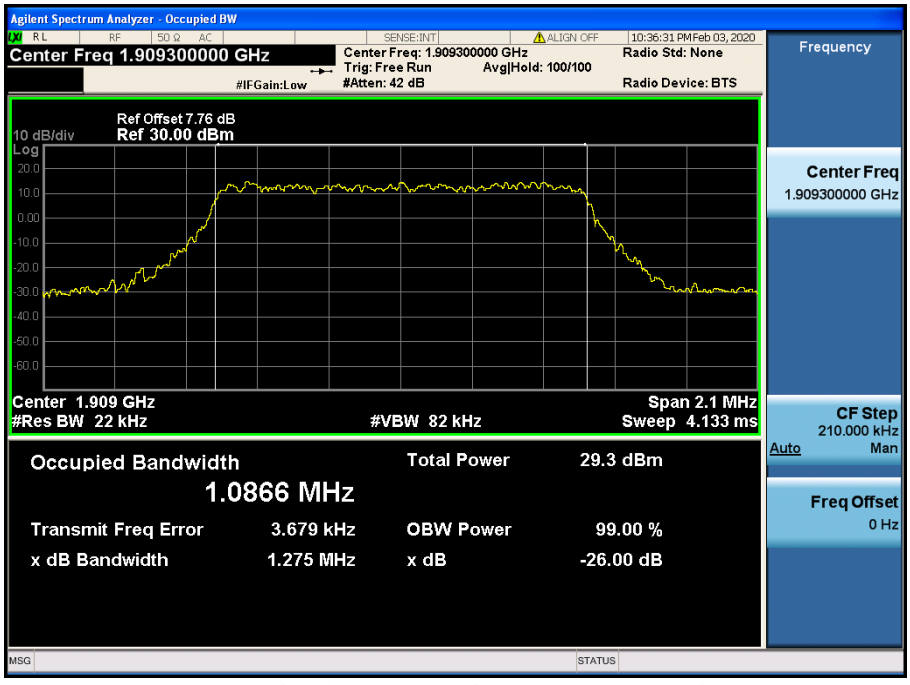


LTE Band 2 / 3 MHz / QPSK - RB Size 15



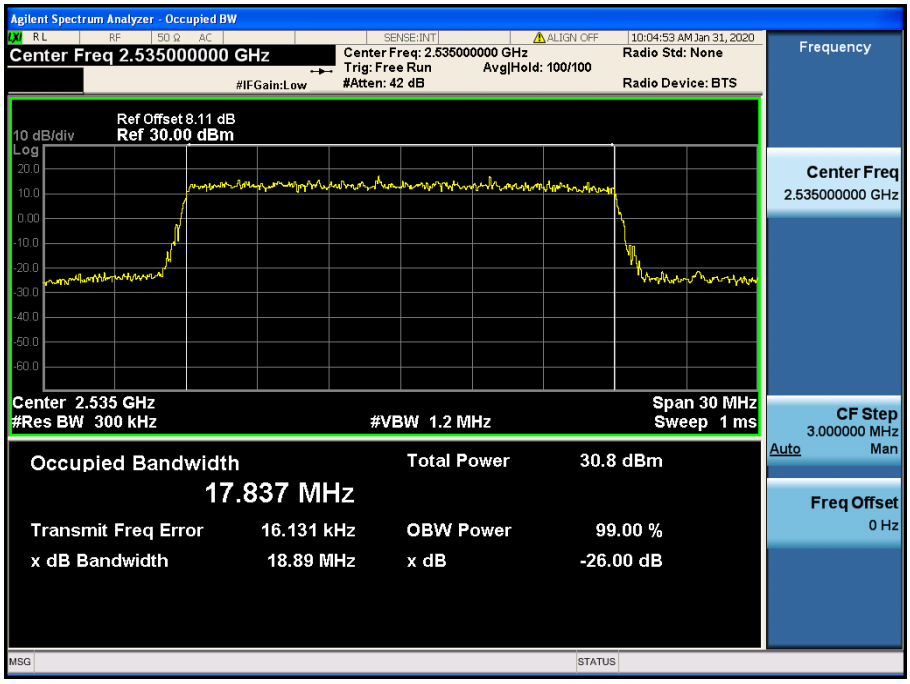
LTE Band 2 / 3 MHz / 16QAM - RB Size 15

LTE Band 2 / 1.4 MHz / QPSK - RB Size 6

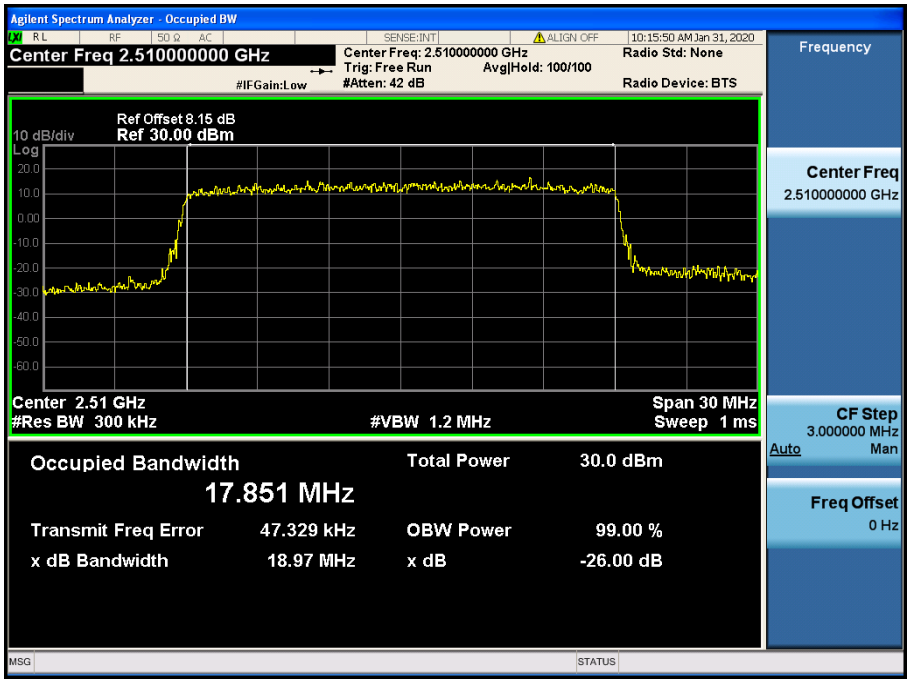


LTE Band 2 / 1.4 MHz / 16QAM - RB Size 6

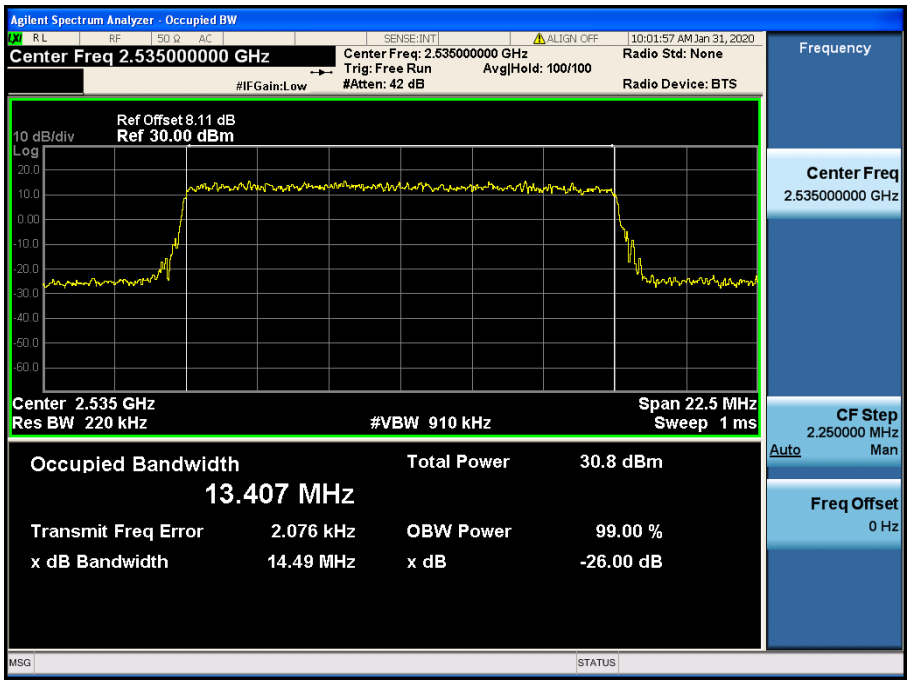
8.1.5 LTE Band 7



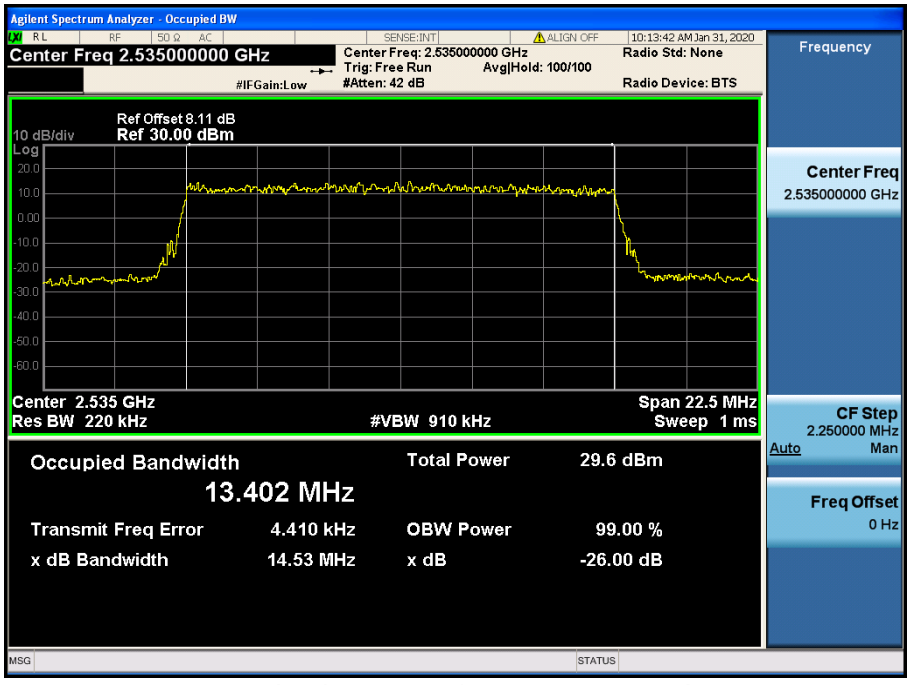
LTE Band 7 / 20 MHz / QPSK - RB Size 100



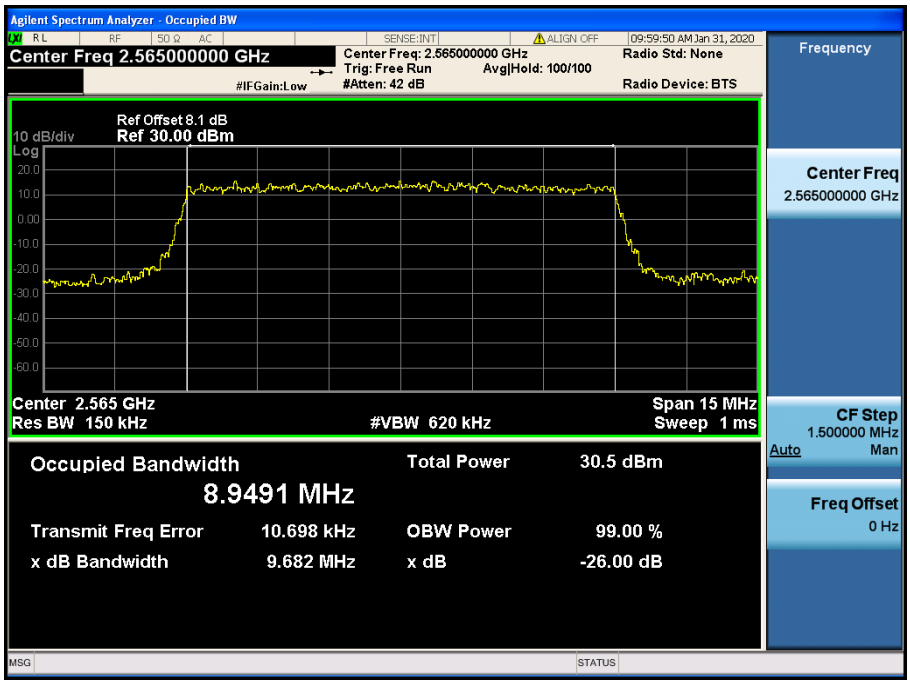
LTE Band 7 / 20 MHz / 16QAM - RB Size 100



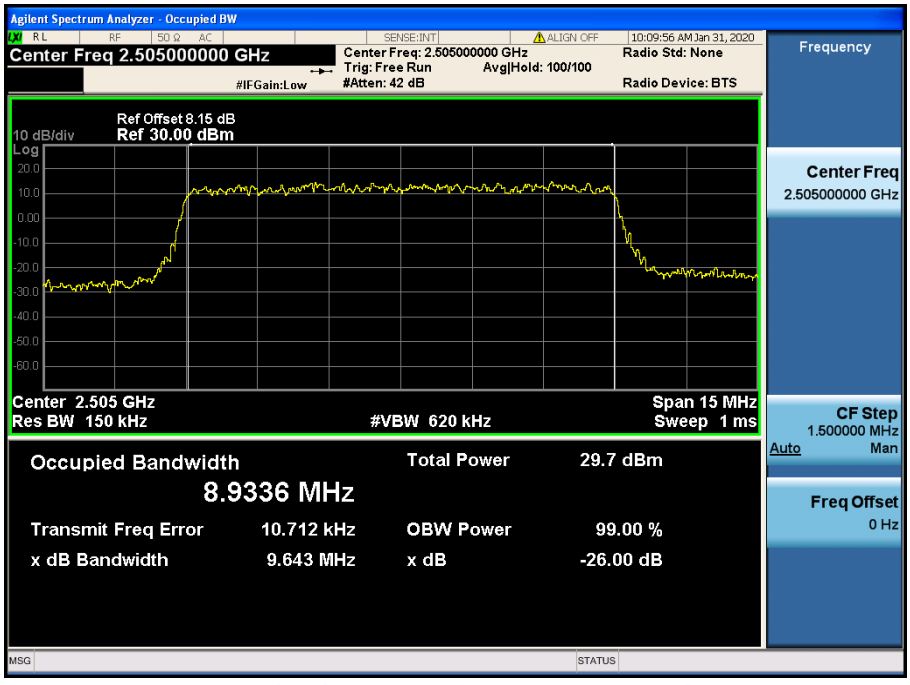
LTE Band 7 / 15 MHz / QPSK - RB Size 75



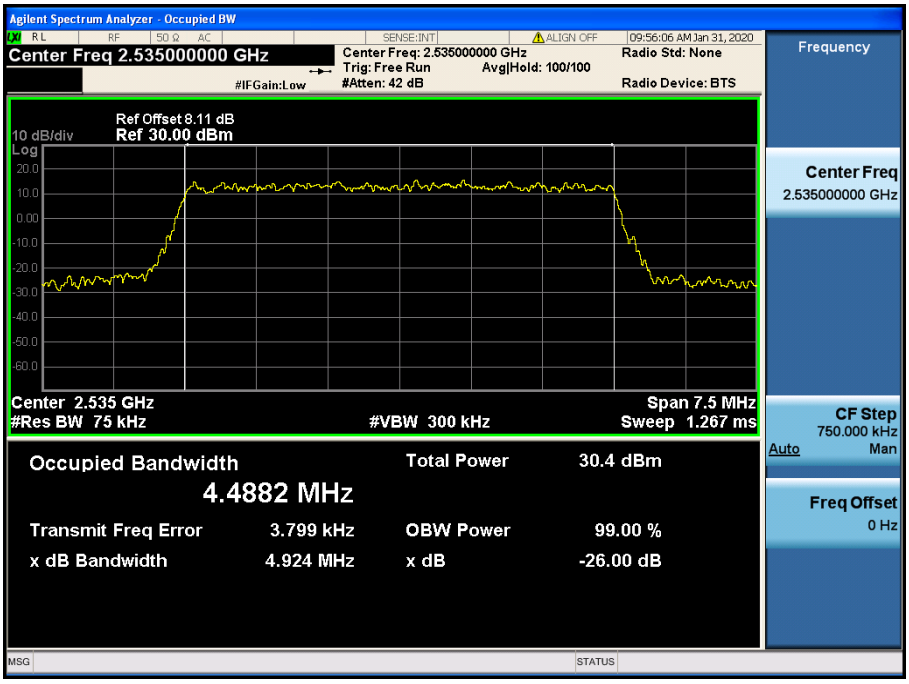
LTE Band 7 / 15 MHz / 16QAM - RB Size 75



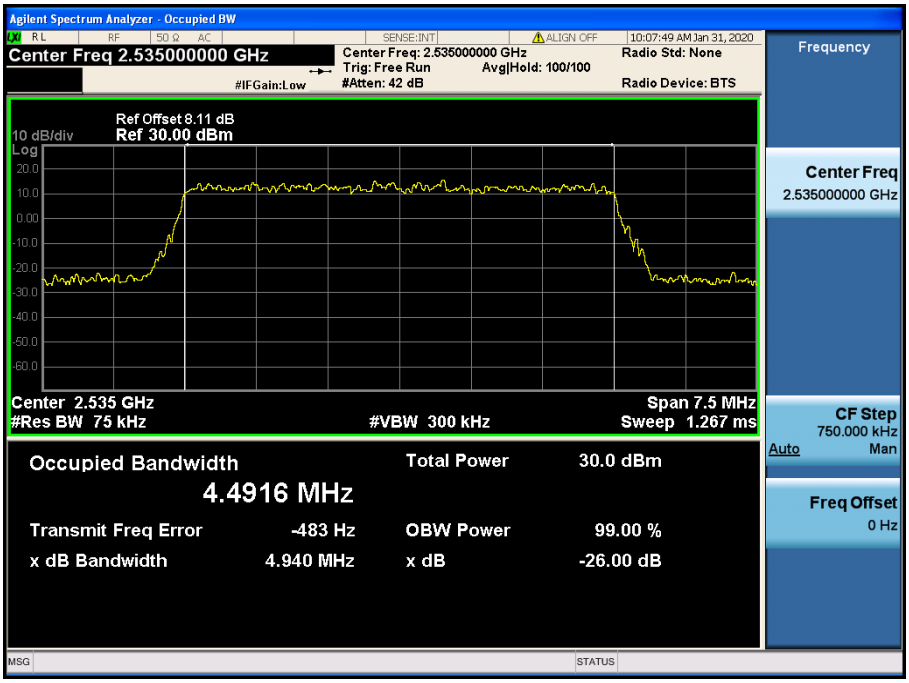
LTE Band 7 / 10 MHz / QPSK - RB Size 50



LTE Band 7 / 10 MHz / 16QAM - RB Size 50



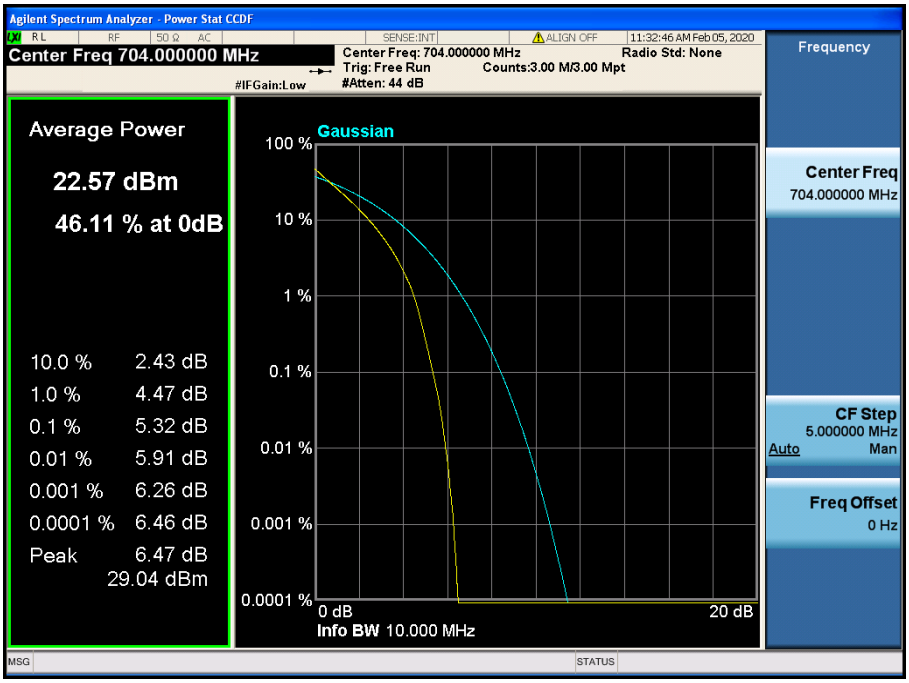
LTE Band 7 / 5 MHz / QPSK - RB Size 25



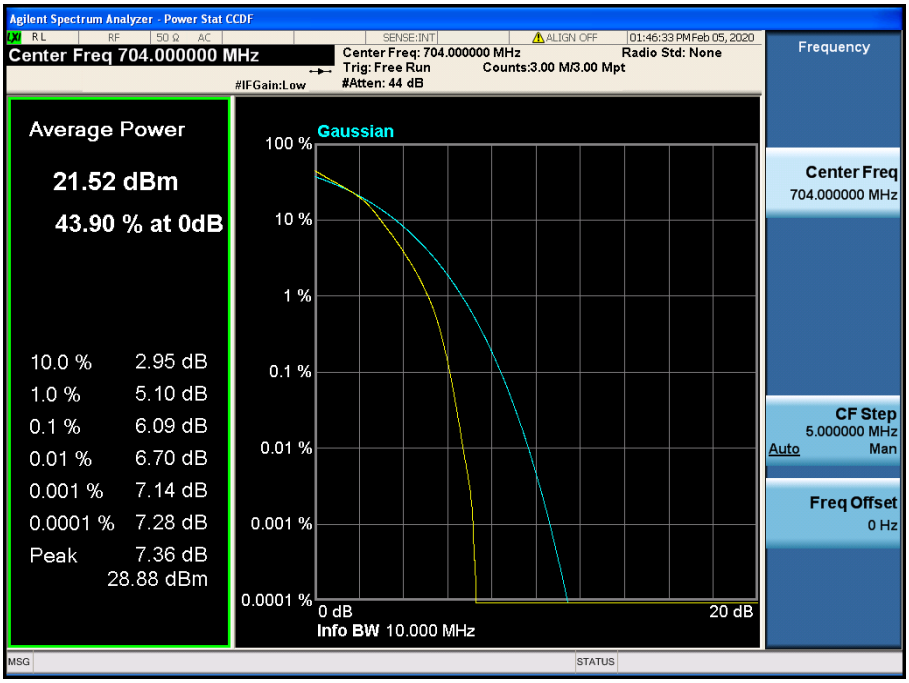
LTE Band 7 / 5 MHz / 16QAM - RB Size 25

8.2 PEAK TO AVERAGE RATIO

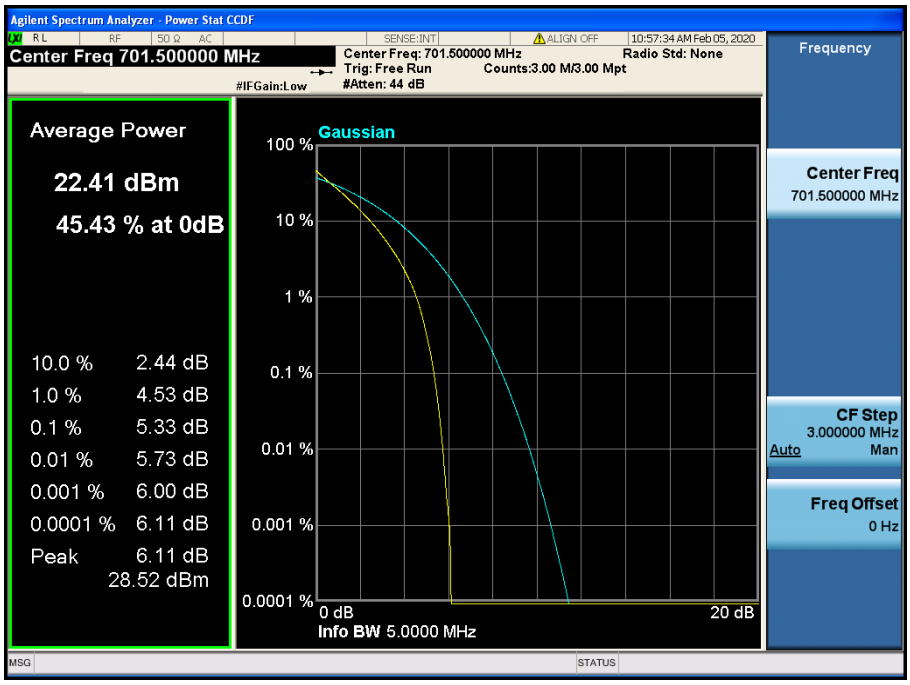
8.2.1 LTE Band 12(17)



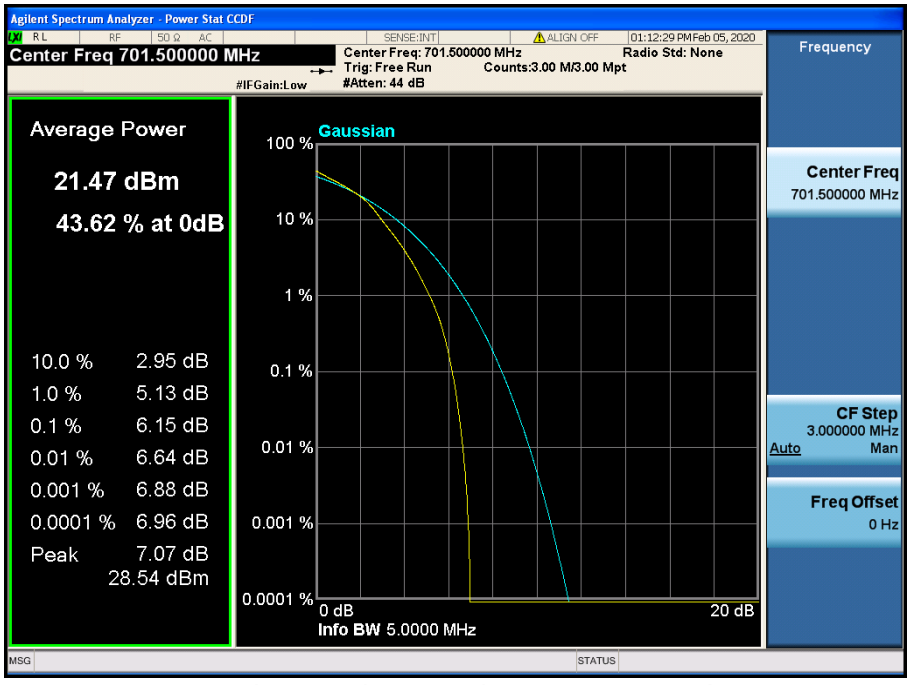
LTE Band 12,17 / 10 MHz / QPSK - RB Size 50



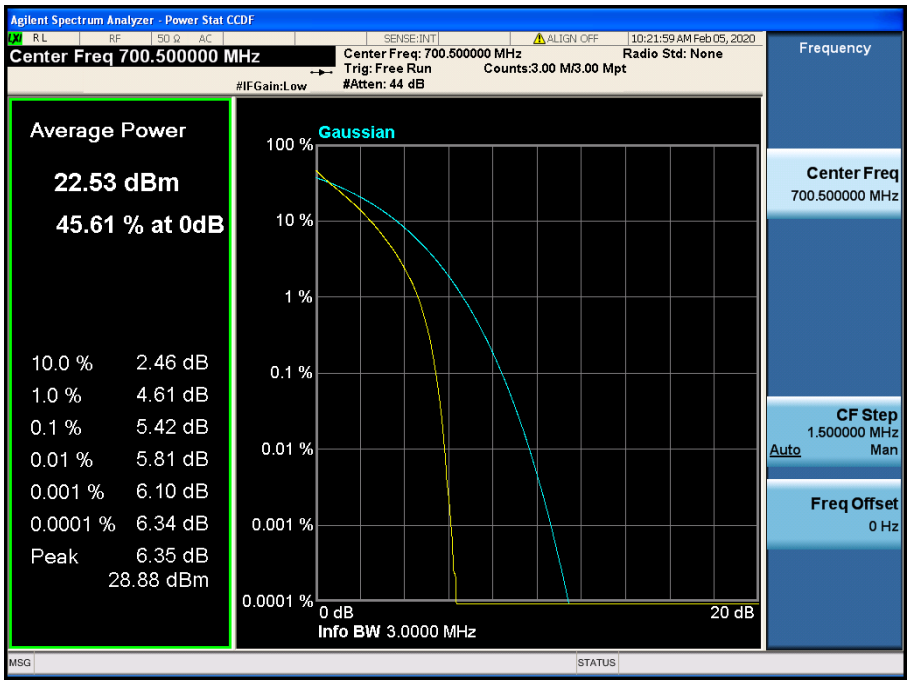
LTE Band 12,17 / 10 MHz / 16QAM - RB Size 50



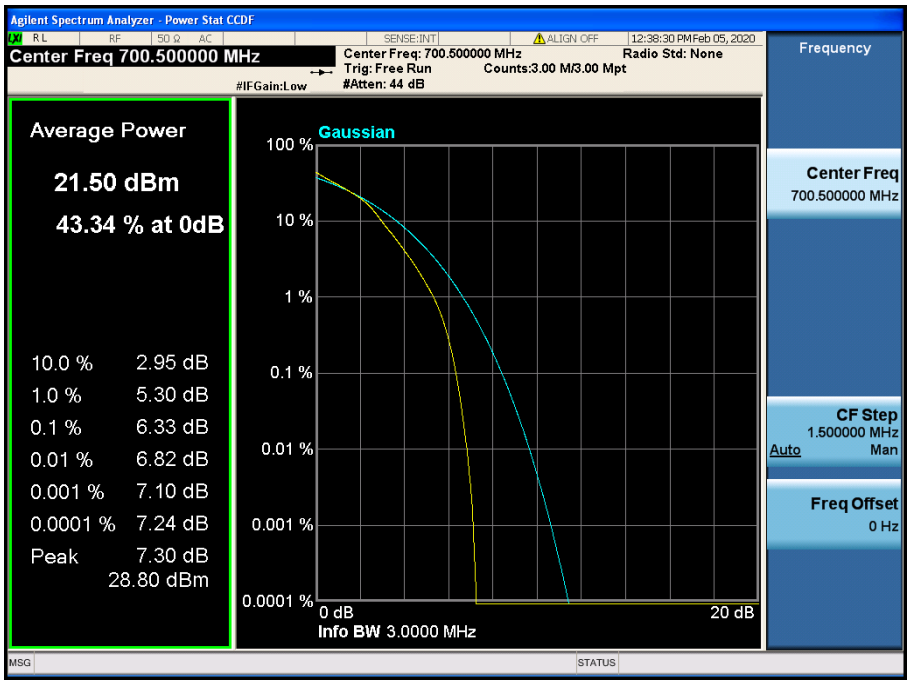
LTE Band 12,17 / 5 MHz / QPSK - RB Size 25



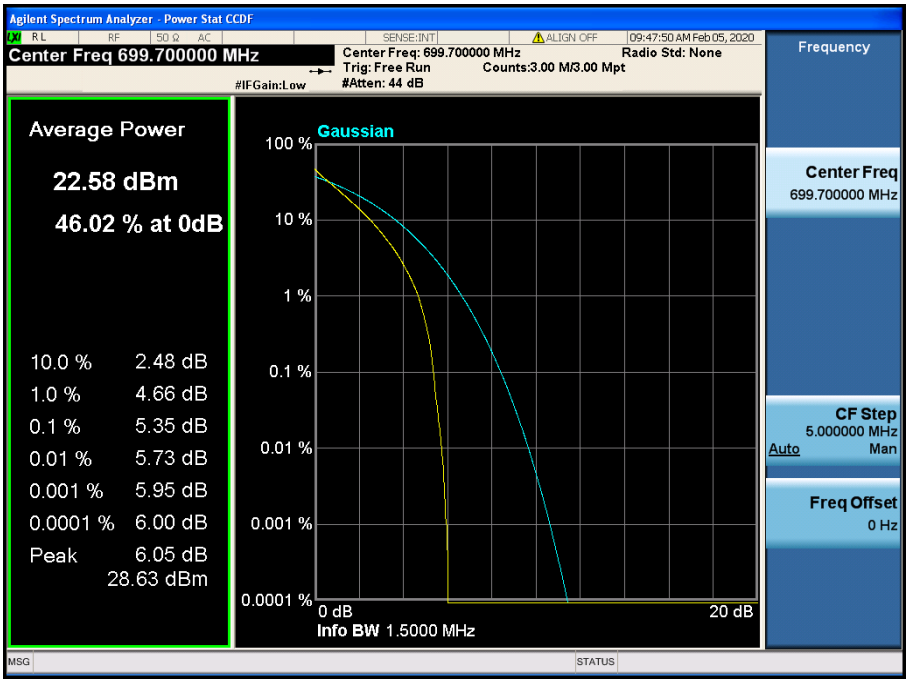
LTE Band 12,17 / 5 MHz / 16QAM - RB Size 25



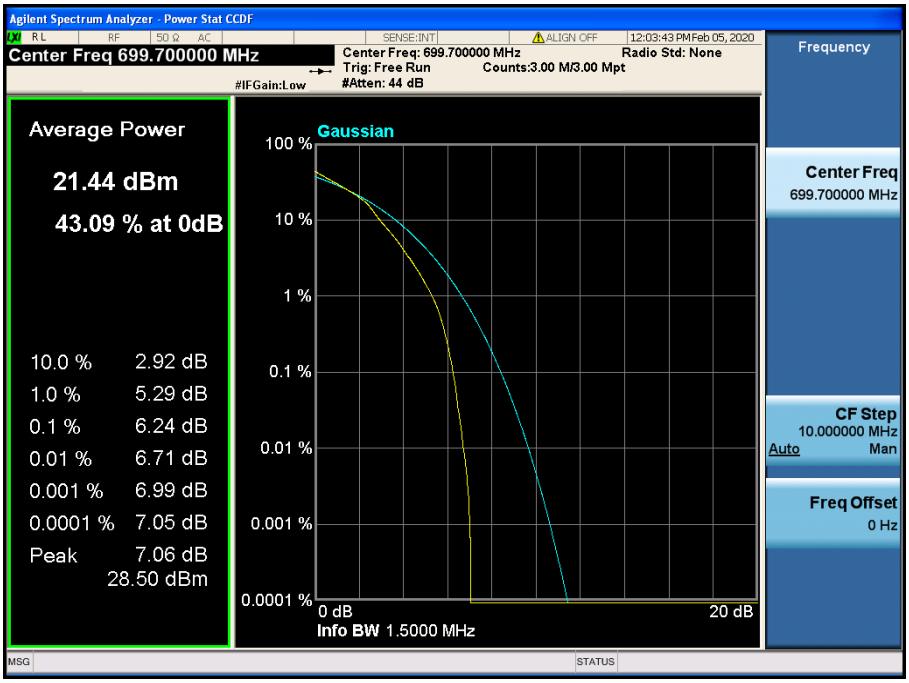
LTE Band 12 / 3 MHz / QPSK - RB Size 15



LTE Band 12 / 3 MHz / 16QAM - RB Size 15

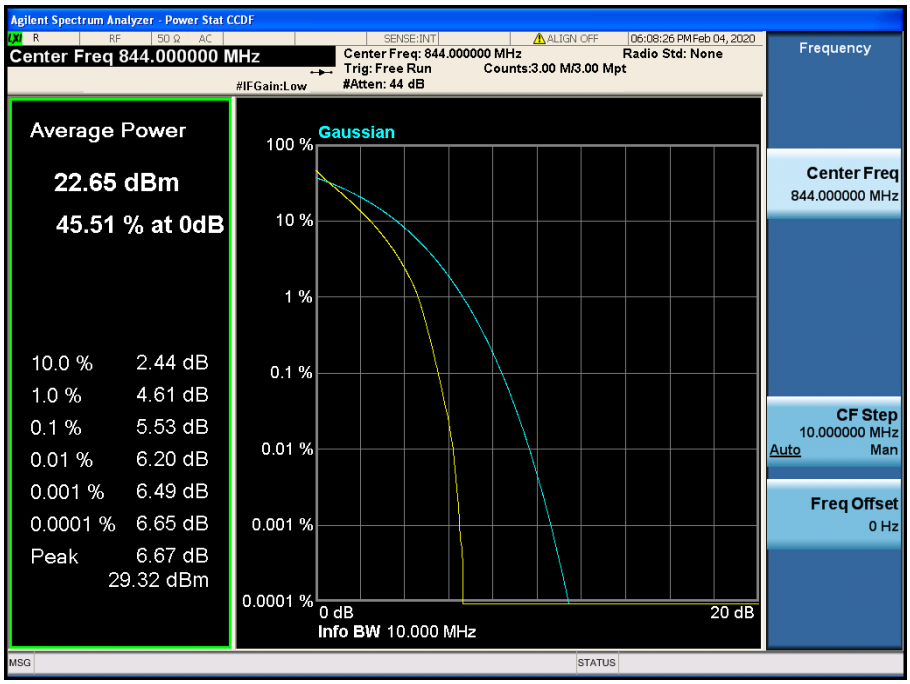


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

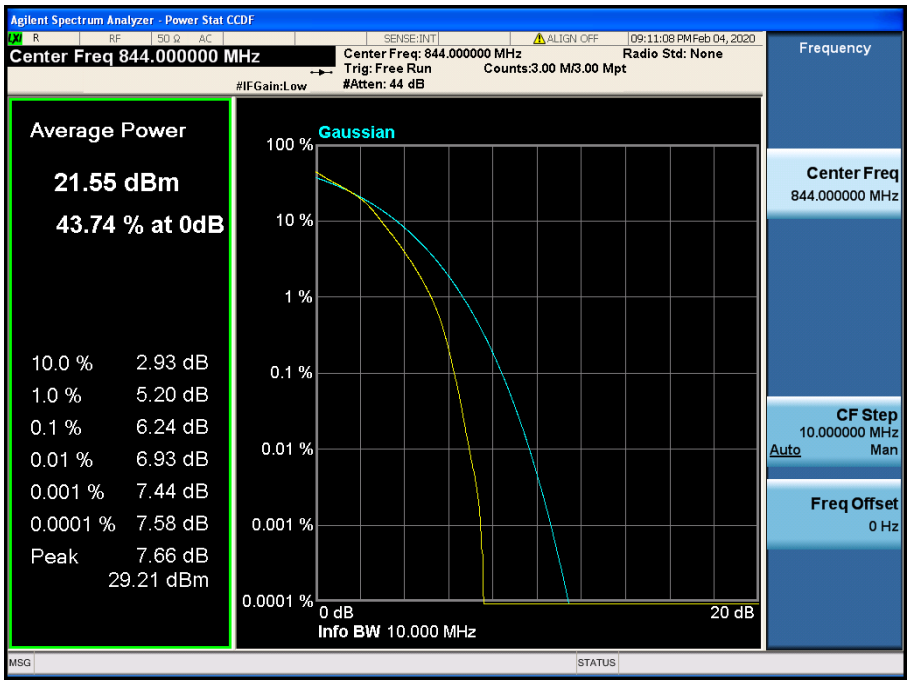


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

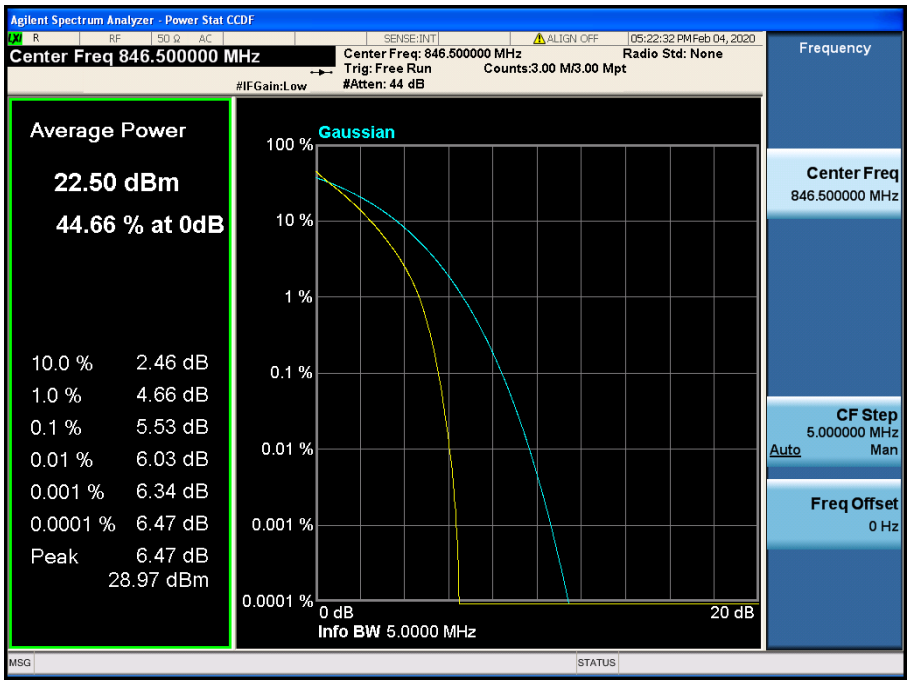
8.2.4 LTE Band 5



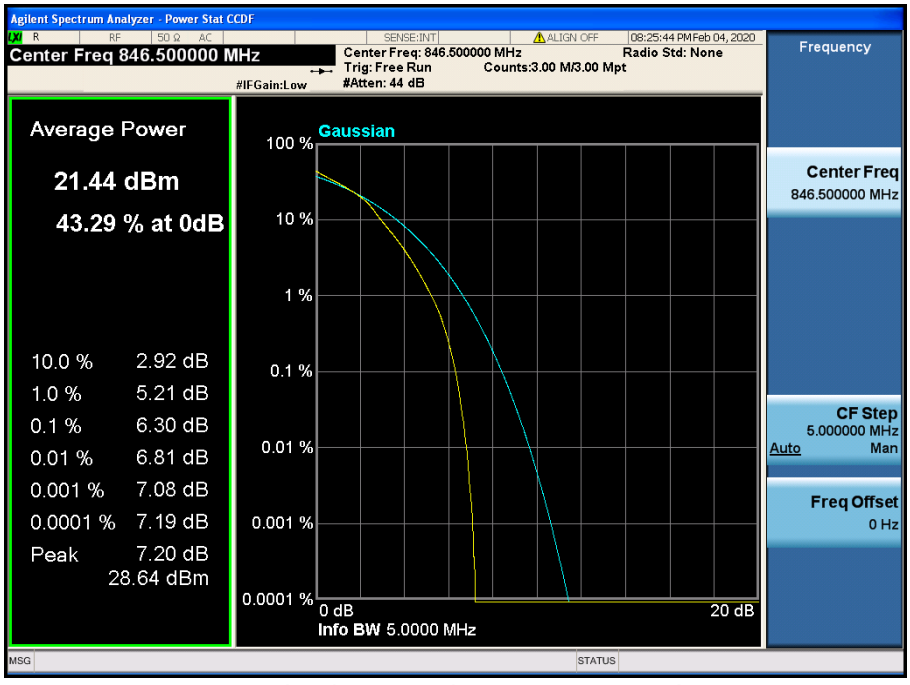
LTE Band 5 / 10 MHz / QPSK - RB Size 50



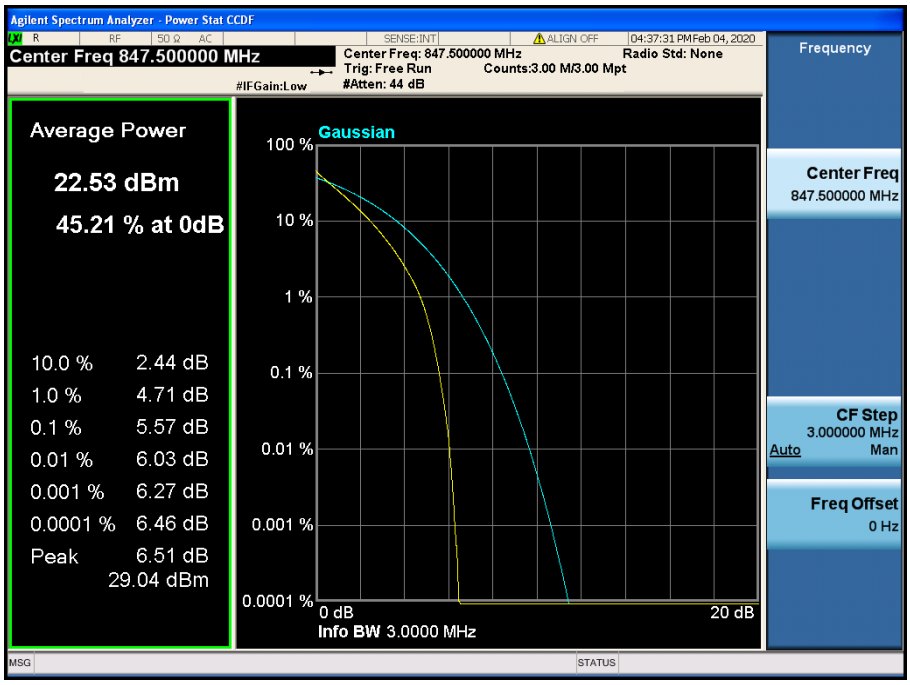
LTE Band 5 / 10 MHz / 16QAM - RB Size 50



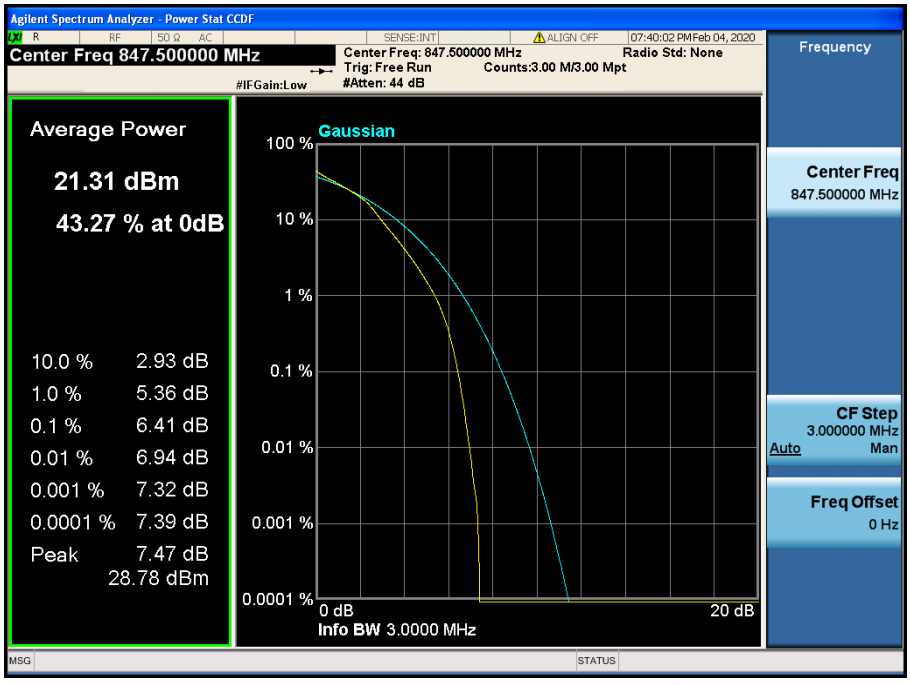
LTE Band 5 / 5 MHz / QPSK - RB Size 25



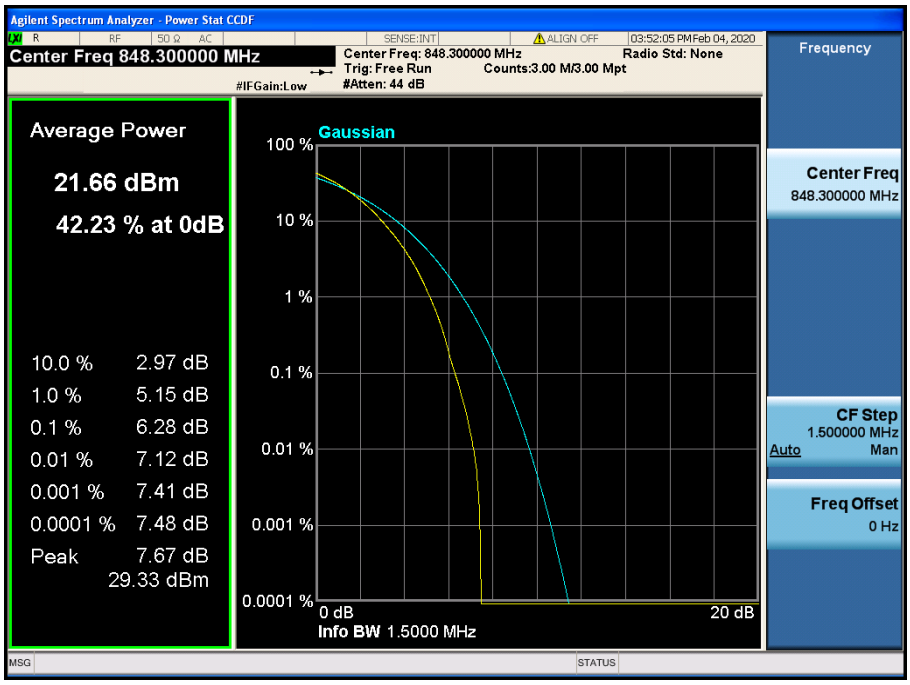
LTE Band 5 / 5 MHz / 16QAM - RB Size 25



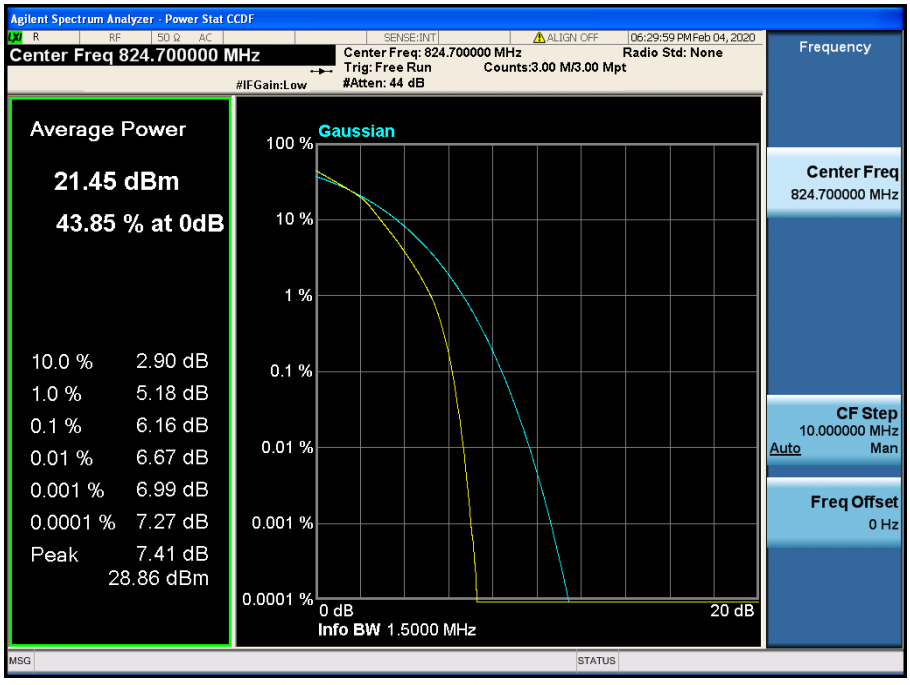
LTE Band 5 / 3 MHz / QPSK - RB Size 15



LTE Band 5 / 3 MHz / 16QAM - RB Size 15

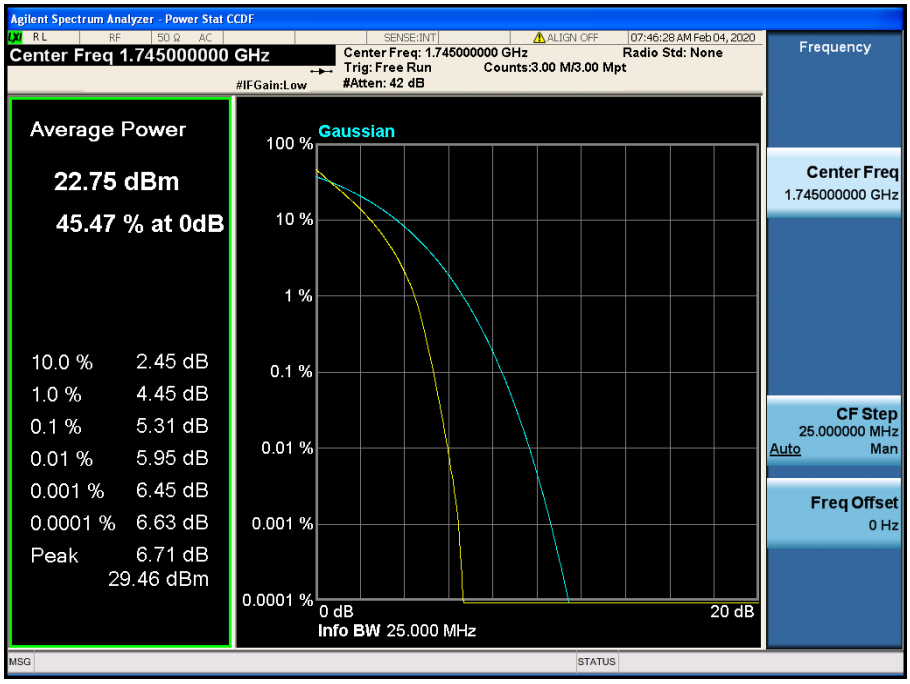


LTE Band 5 / 1.4 MHz / QPSK - RB Size 6

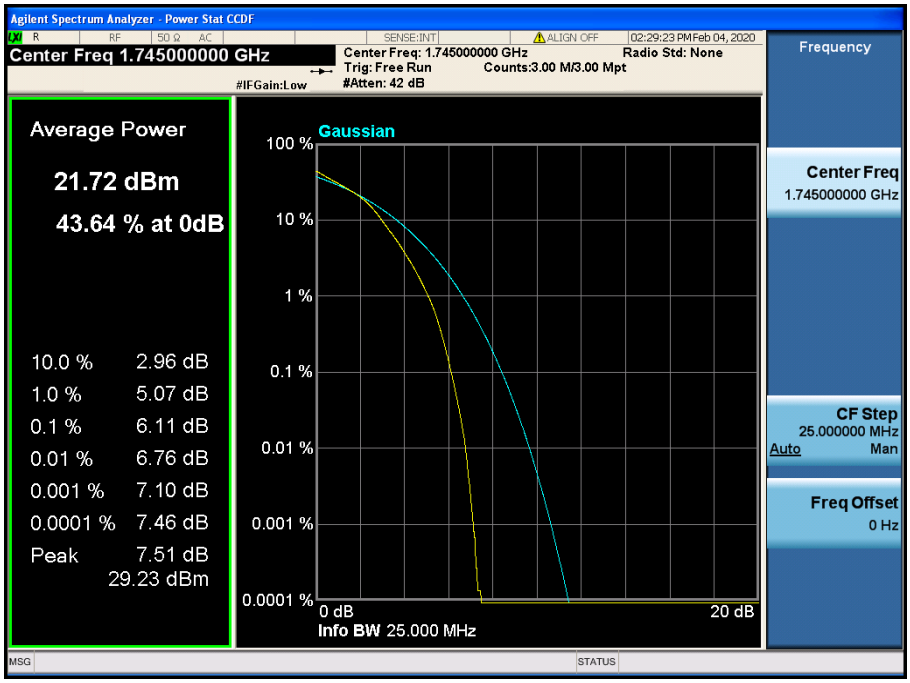


LTE Band 5 / 1.4 MHz / 16QAM - RB Size 6

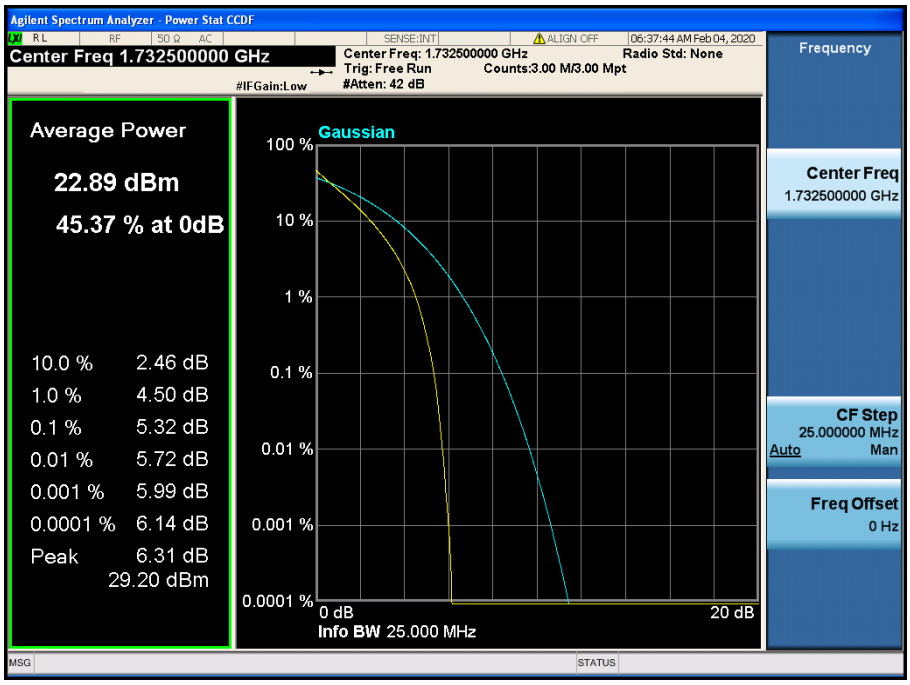
8.2.3 LTE Band 4



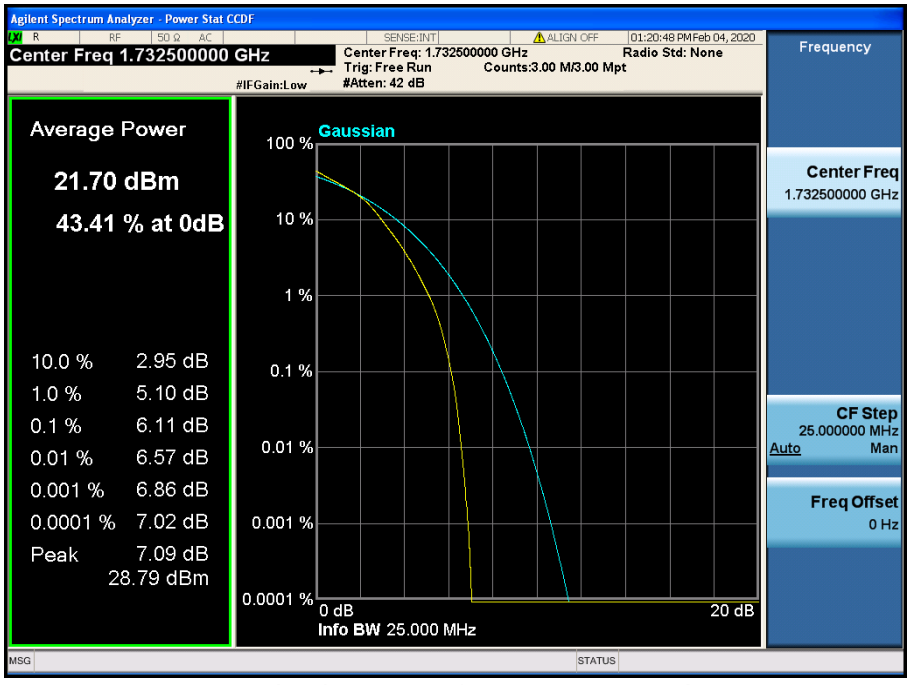
LTE Band 4 / 20 MHz / QPSK - RB Size 100



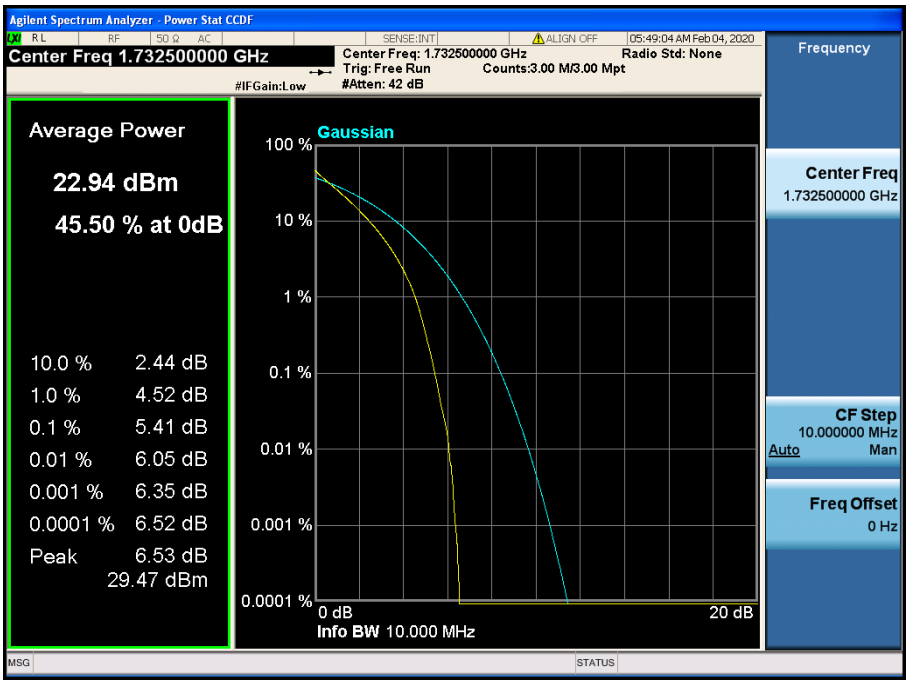
LTE Band 4 / 20 MHz / 16QAM - RB Size 100



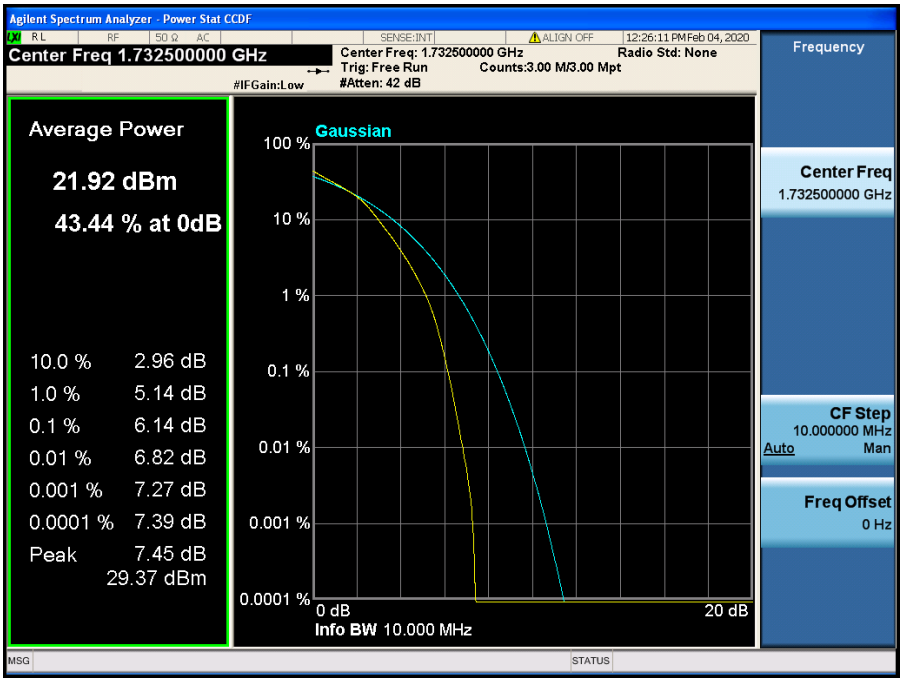
LTE Band 4 / 15 MHz / QPSK - RB Size 75



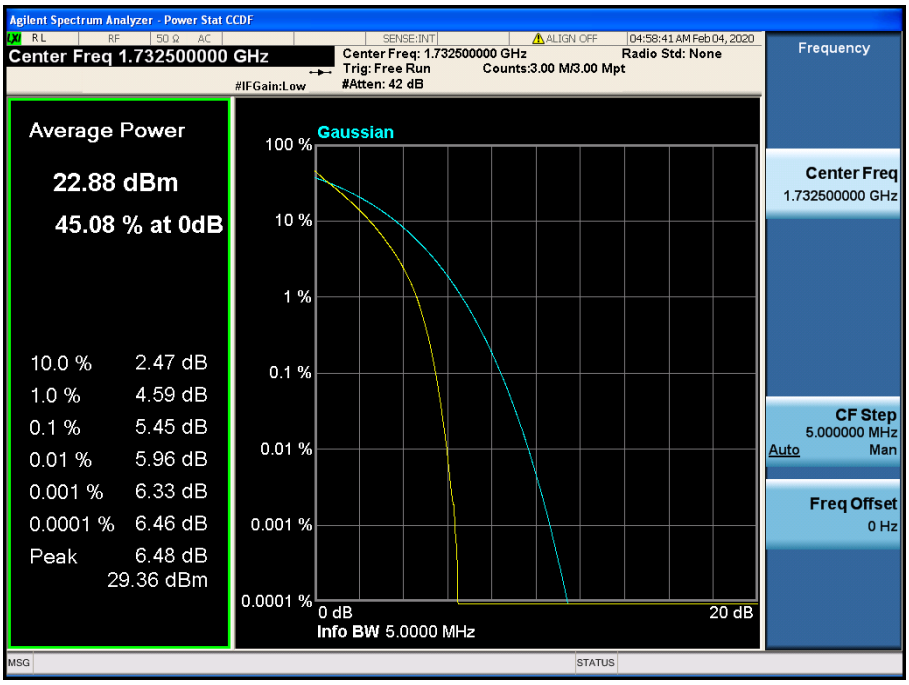
LTE Band 4 / 15 MHz / 16QAM - RB Size 75



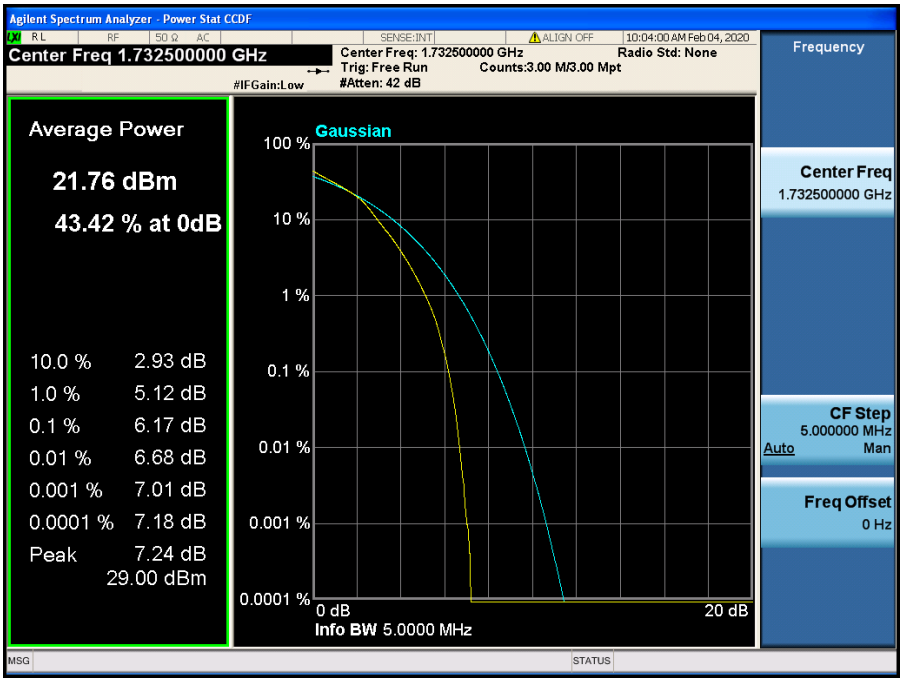
LTE Band 4 / 10 MHz / QPSK - RB Size 50



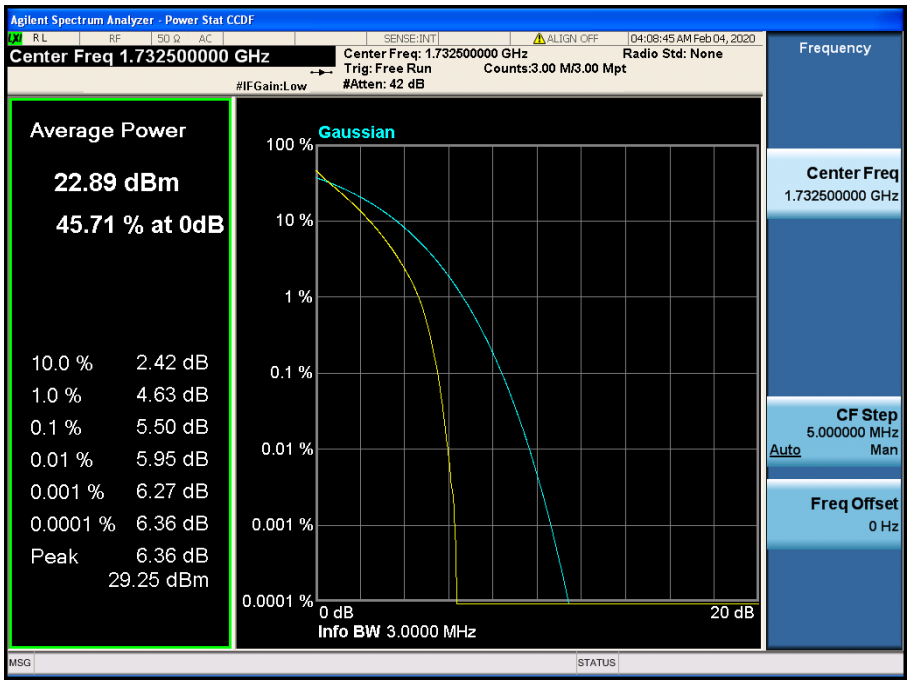
LTE Band 4 / 10 MHz / 16QAM - RB Size 50



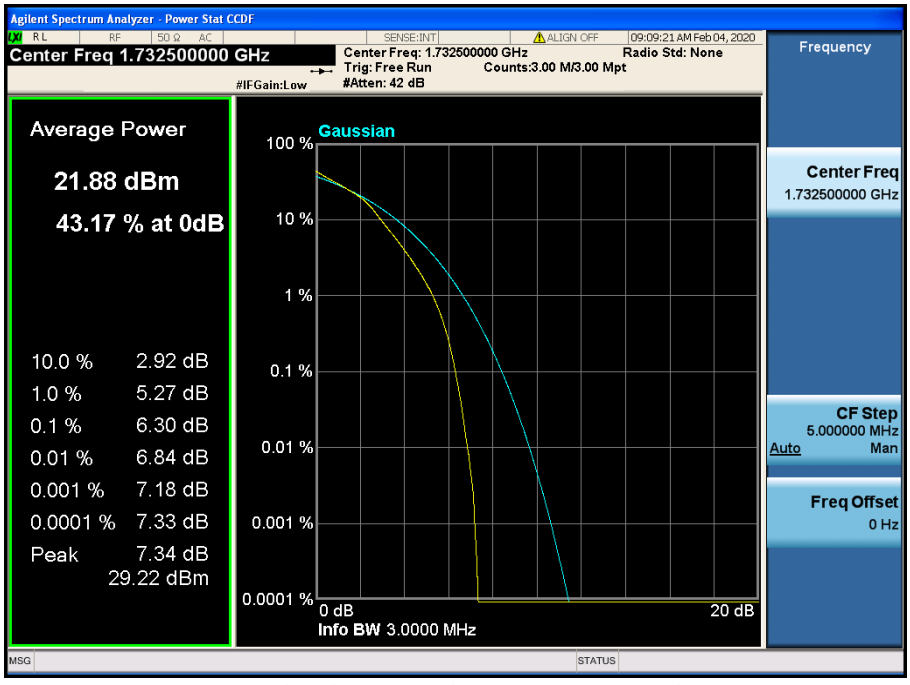
LTE Band 4 / 5 MHz / QPSK - RB Size 25



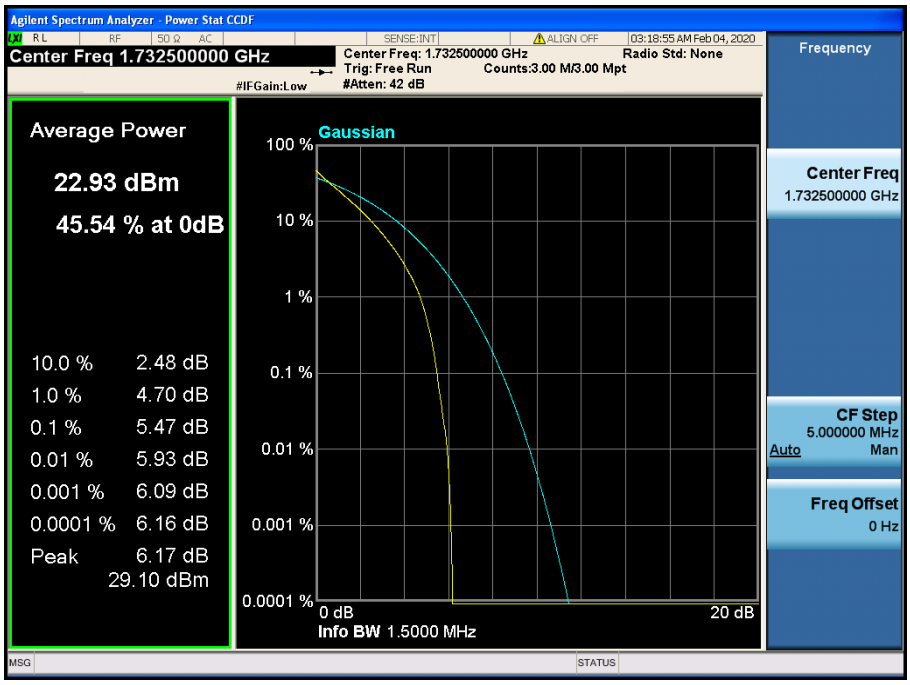
LTE Band 4 / 5 MHz / 16QAM - RB Size 25



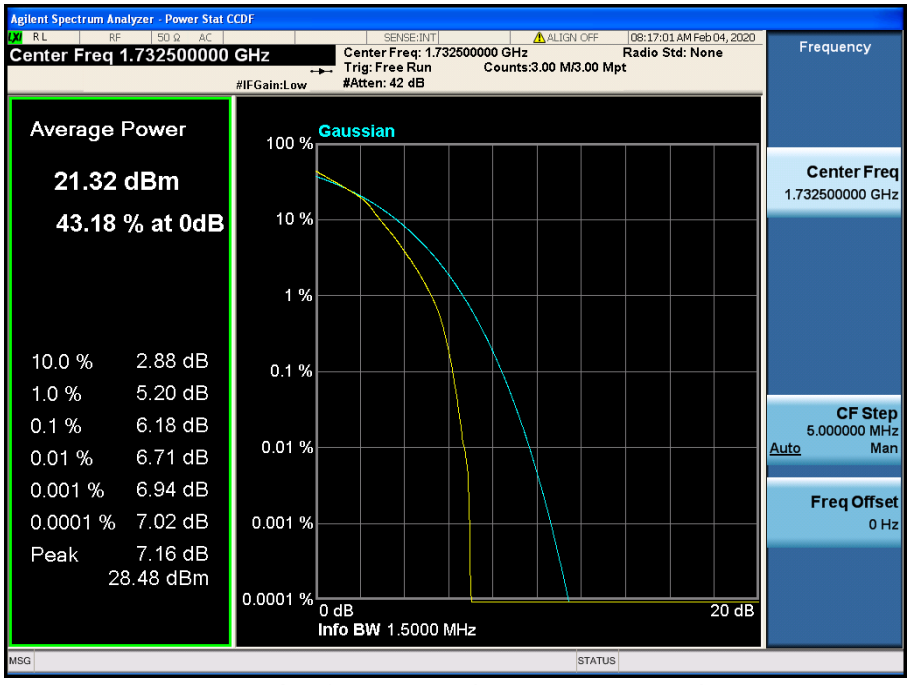
LTE Band 4 / 3 MHz / QPSK - RB Size 15



LTE Band 4 / 3 MHz / 16QAM - RB Size 15

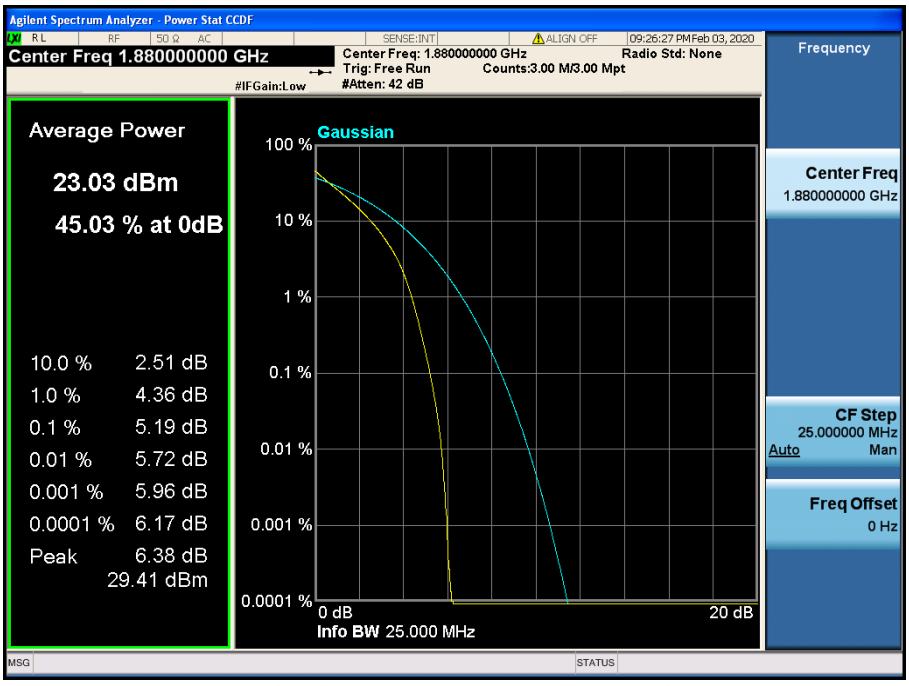


LTE Band 4 / 1.4 MHz / QPSK - RB Size 6

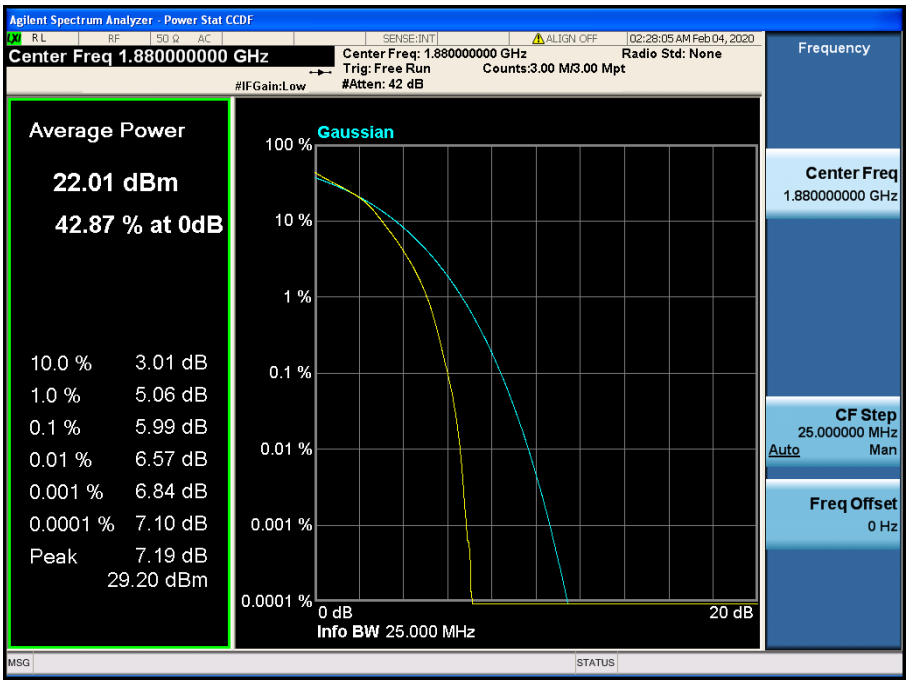


LTE Band 4 / 1.4 MHz / 16QAM - RB Size 6

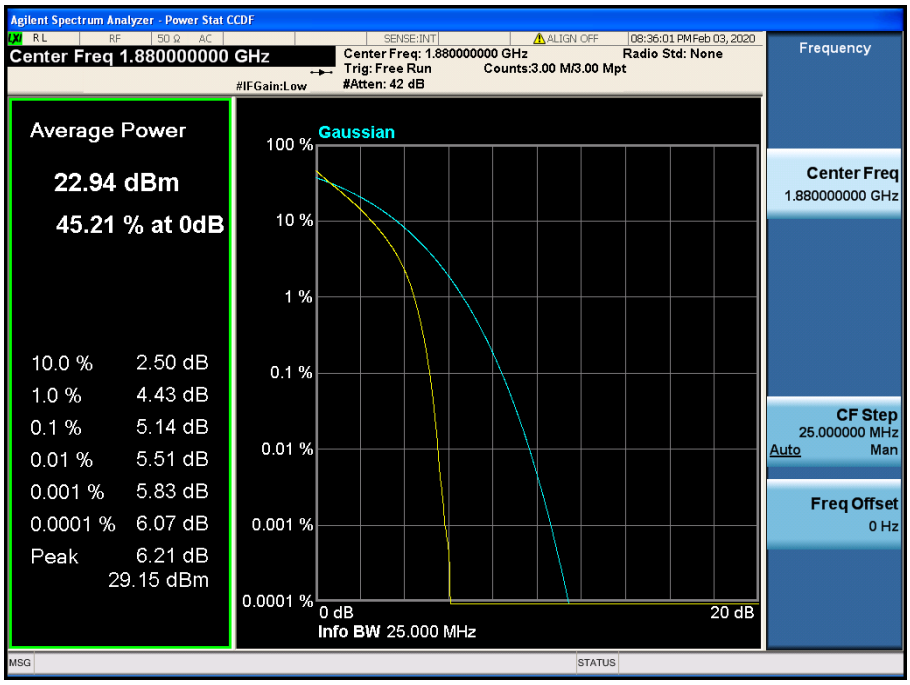
8.2.4 LTE Band 2



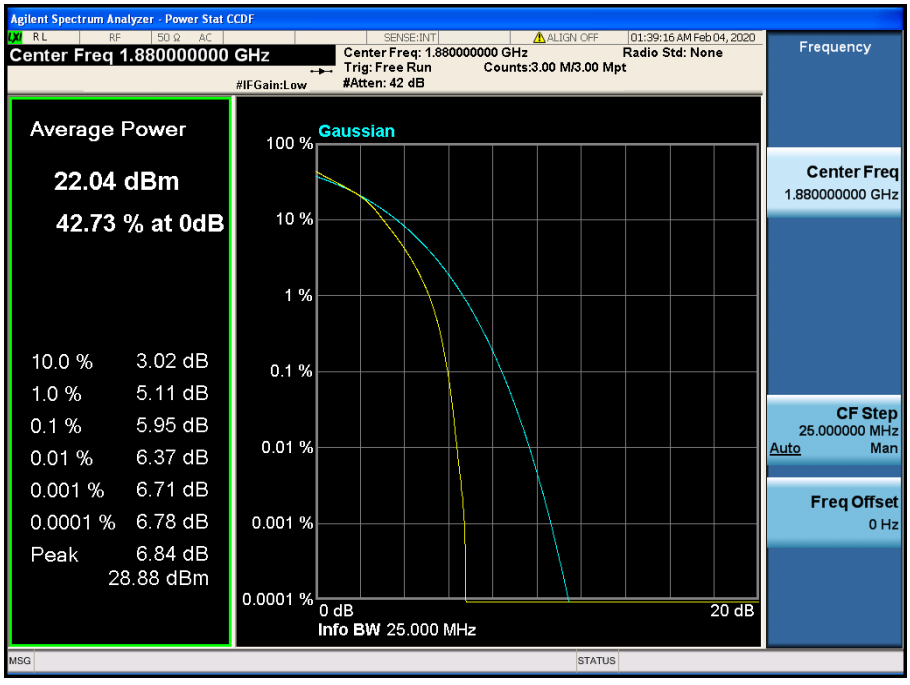
LTE Band 2 / 20 MHz / QPSK - RB Size 100



LTE Band 2 / 20 MHz / 16QAM - RB Size 100



LTE Band 2 / 15 MHz / QPSK - RB Size 75



LTE Band 2 / 15 MHz / 16QAM - RB Size 75