

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 : DRTFCC1902-0059(1)

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 : Telematics / TLVLM3IU-N

FCC ID : BEJTLVLM3IU-N / IC : 2703H-TLVLM3IUN

5. Test Method Used : KDB971168 D01v03r01, ANSI/TIA-603-E-2016, ANSI C63.26-2015

Test Specification : §2, §22, §24(E), §27

RSS-130 Issue 2, RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 3,

6. Date of Test : 2018.11.23 ~ 2019.02.22

7. Testing Environment : Refer to appended test report.

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

Affirmation	Tested by	Reviewed by
	Name : JaeHyeok Bang 	Name : Geunki Son  (Signature)

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2019 . 03 . 04 .

DT&C Co., Ltd.

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

Test Report Version

Test Report No.	Date	Description
DRTFCC1902-0059	Feb. 27, 2019	Initial issue
DRTFCC1902-0059(1)	Mar. 04, 2019	Update KDB971168 specification

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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 : BEJTLVLM3IU-N
IC : 2703H-TLVLM3IUN
FCC Classification : PCS Licensed Transmitter (PCB)
EUT Type : Telematics
Model Name : TLVLM3IU-N
Add Model Name : TLVLP3IU-N
Supplying power : DC 12 V
Antenna Information : External antenna

Mode	TX Frequency (MHz)	Emission Designator	Modulation	ERP		EIRP	
				Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
LTE Band 12,17	704 ~ 711	8M96G7D	QPSK	18.18	0.066	-	-
LTE Band 12,17	704 ~ 711	8M96W7D	16QAM	17.29	0.054	-	-
LTE Band 12,17	701.5 ~ 713.5	4M48G7D	QPSK	18.05	0.064	-	-
LTE Band 12,17	701.5 ~ 713.5	4M48W7D	16QAM	17.13	0.052	-	-
LTE Band 12	700.5 ~ 714.5	2M69G7D	QPSK	17.93	0.062	-	-
LTE Band 12	700.5 ~ 714.5	2M69W7D	16QAM	16.94	0.049	-	-
LTE Band 12	699.7 ~ 715.3	1M09G7D	QPSK	17.79	0.060	-	-
LTE Band 12	699.7 ~ 715.3	1M09W7D	16QAM	16.71	0.047	-	-
LTE Band 13	782 ~ 782	8M92G7D	QPSK	17.24	0.053	-	-
LTE Band 13	782 ~ 782	8M89W7D	16QAM	16.06	0.040	-	-
LTE Band 13	779.5 ~ 784.5	4M49G7D	QPSK	16.79	0.048	-	-
LTE Band 13	779.5 ~ 784.5	4M48W7D	16QAM	15.71	0.037	-	-
LTE Band 5	829 ~ 844	8M96G7D	QPSK	19.78	0.095	21.93	0.156
LTE Band 5	829 ~ 844	8M96W7D	16QAM	18.32	0.068	20.47	0.111
LTE Band 5	826.5 ~ 846.5	4M49G7D	QPSK	19.45	0.088	21.60	0.145
LTE Band 5	826.5 ~ 846.5	4M49W7D	16QAM	18.55	0.072	20.70	0.117
LTE Band 5	825.5 ~ 847.5	2M70G7D	QPSK	20.06	0.101	22.21	0.166
LTE Band 5	825.5 ~ 847.5	2M70W7D	16QAM	18.66	0.073	20.81	0.121
LTE Band 5	824.7 ~ 848.3	1M09G7D	QPSK	19.91	0.098	22.06	0.161
LTE Band 5	824.7 ~ 848.3	1M09W7D	16QAM	18.69	0.074	20.84	0.121

Mode	TX Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max power(dBm)	Max power(W)
LTE Band 4	1720 ~ 1745	17M9G7D	QPSK	20.58	0.114
LTE Band 4	1720 ~ 1745	17M9W7D	16QAM	19.49	0.089
LTE Band 4	1717.5 ~ 1747.5	13M4G7D	QPSK	19.74	0.094
LTE Band 4	1717.5 ~ 1747.5	13M4W7D	16QAM	18.66	0.073
LTE Band 4	1715 ~ 1750	8M95G7D	QPSK	20.49	0.112
LTE Band 4	1715 ~ 1750	8M95W7D	16QAM	19.44	0.088
LTE Band 4	1712.5 ~ 1752.5	4M49G7D	QPSK	20.80	0.120
LTE Band 4	1712.5 ~ 1752.5	4M48W7D	16QAM	19.76	0.095
LTE Band 4	1711.5 ~ 1753.5	2M70G7D	QPSK	20.89	0.123
LTE Band 4	1711.5 ~ 1753.5	2M69W7D	16QAM	19.75	0.094
LTE Band 4	1710.7 ~ 1754.3	1M09G7D	QPSK	21.00	0.126
LTE Band 4	1710.7 ~ 1754.3	1M09W7D	16QAM	19.71	0.094
LTE Band 2	1860 ~ 1900	17M9G7D	QPSK	19.91	0.098
LTE Band 2	1860 ~ 1900	17M8W7D	16QAM	18.60	0.072
LTE Band 2	1857.5 ~ 1902.5	13M4G7D	QPSK	19.62	0.092
LTE Band 2	1857.5 ~ 1902.5	13M4W7D	16QAM	18.69	0.074
LTE Band 2	1855 ~ 1905	8M96G7D	QPSK	19.81	0.096
LTE Band 2	1855 ~ 1905	8M95W7D	16QAM	18.72	0.074
LTE Band 2	1852.5 ~ 1907.5	4M48G7D	QPSK	19.73	0.094
LTE Band 2	1852.5 ~ 1907.5	4M48W7D	16QAM	18.59	0.072
LTE Band 2	1851.5 ~ 1908.5	2M70G7D	QPSK	20.02	0.100
LTE Band 2	1851.5 ~ 1908.5	2M69W7D	16QAM	18.42	0.070
LTE Band 2	1850.7 ~ 1909.3	1M08G7D	QPSK	19.71	0.094
LTE Band 2	1850.7 ~ 1909.3	1M09W7D	16QAM	17.33	0.054

Note: This device supports both LTE Band 12(699 ~ 716MHz) and LTE Band 17(704 ~ 716MHz). 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 GSM/WCDMA/LTE with WLAN.

2.2. EUT CAPABILITIES

This EUT contains the following capabilities:

850/1900 GPRS/EDGE, 850/1700/1900 WCDMA/HSUPA, Multi-band LTE, 802.11b/g/n WLAN(2.4GHz).

2.3. TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 °C ~ +24 °C
▪ Relative Humidity	42 % ~ 46 %

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 %, $k = 2$)

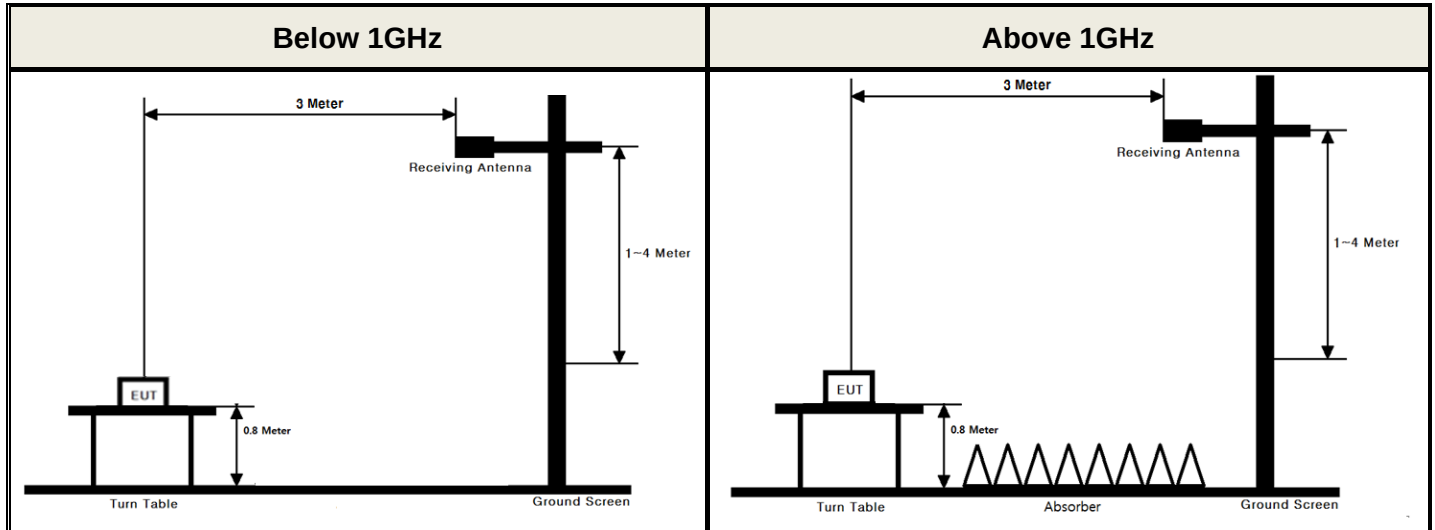
2.6. TEST FACILITY

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 MRA Accredited Test Firm No. : KR0034		
- IC Test site No. : 5740A-4		
www.dtnc.net		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

3. DESCRIPTION OF TESTS

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

Test Set-up



These measurements were performed at 3 m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna. For measurements above 1GHz 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 D01v03r01 - 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 $\geq$ 3 x RBW.
4. Set number of points in sweep $\geq$ 2 x span / RBW.
5. Sweep time:
 - 1) Set = auto-couple, or
 - 2) Set $\geq$ [10 x (number of points in sweep) x (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.

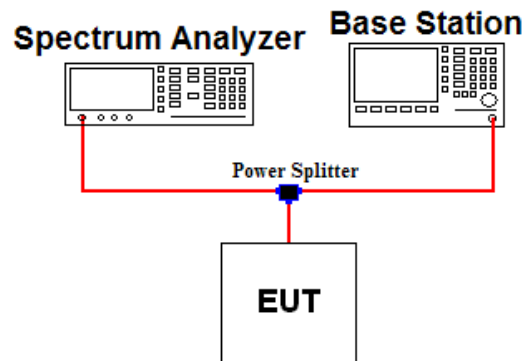
The ERP/EIRP is calculated using the following formula:

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 D01v03r01 - 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.

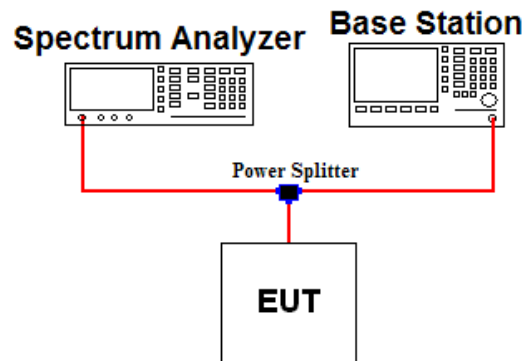
Test setting

The spectrum Analyzer`s CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth $\geq$ 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 $[10 \times (\text{number of points in sweep}) \times (\text{transmission symbol period})]$ 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 D01v03r01 - Section 4.3**
- **ANSI C63.26-2015 – Section 5.4.4**

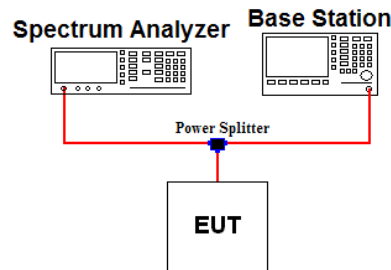
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

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. $RBW = 1 \sim 5 \%$ of the expected OBW & $VBW \geq 3 \times RBW$
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 D01v03r01 - 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 $\geq 3 \times$ RBW
5. Detector = RMS & Trace mode = Max hold
6. Sweep time = Auto couple or 1 s for band edge
7. Number of sweep point $\geq 2 \times$ 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.

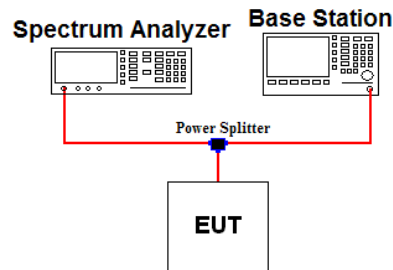
Note 4: Per Part 27.53(c.4) for all frequencies between 763-775 MHz and 793-805 MHz, the FCC limit is $65 + 10\log_{10}(P[\text{Watts}]) = -35\text{dBm}$ in a 6.25kHz bandwidth.

Note 3: Per Part 90.543(e) for operations in the 758-768 MHz and the 788-798 MHz bands, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

- (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations.
- (2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations.
- (3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log (P)$ dB.
- (4) Compliance with the provisions of paragraphs (e)(1) and (2) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.
- (5) Compliance with the provisions of paragraph (e)(3) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of 30 kHz may be employed.

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

- KDB971168 D01v03r01 - 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.

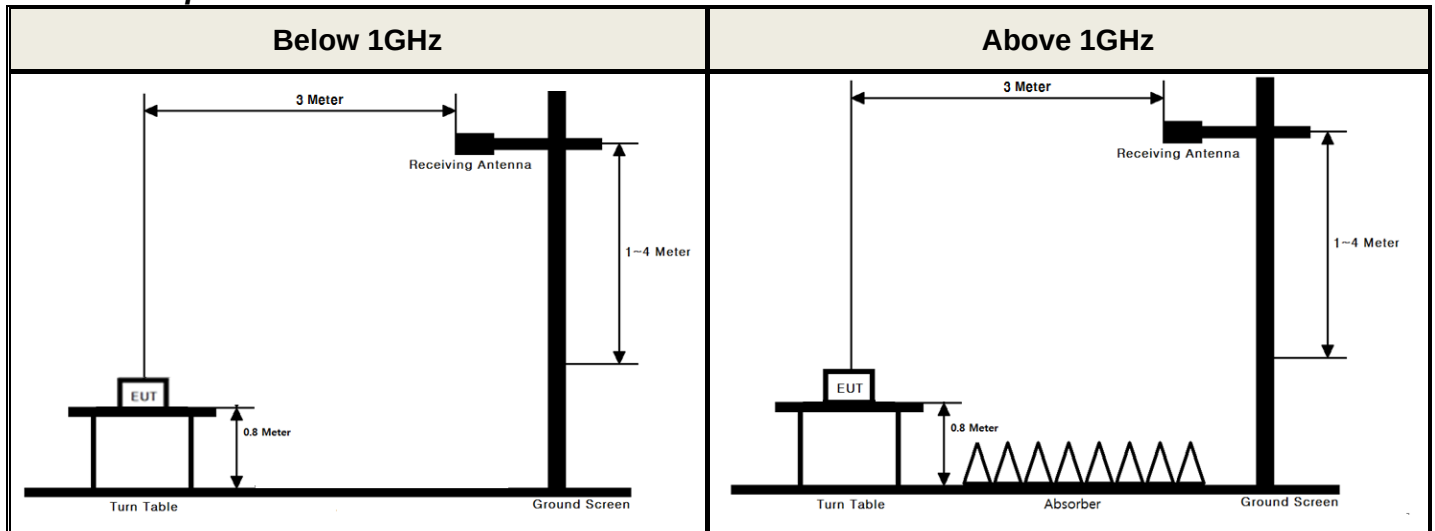
Test setting

1. RBW = 100 kHz(Below 1 GHz) or 1 MHz(Above 1 GHz) & VBW $\geq 3 \times$ RBW (Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ 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



These measurements were performed at 3 test site. The equipment under test is placed on a non-conductive table 0.8-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 D01v03r01 - 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 $\geq 3 \times$ RBW
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ 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.

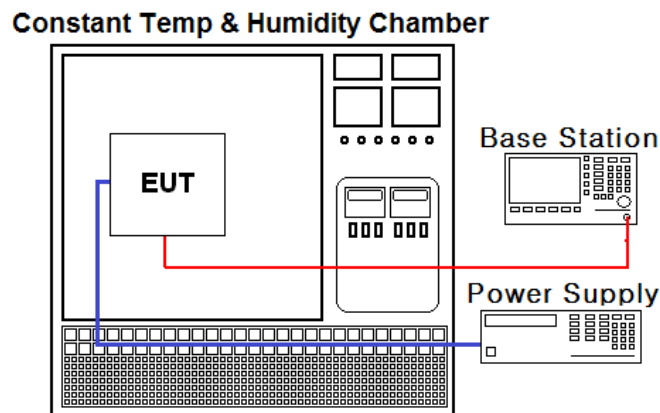
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

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 D01v03r01 - 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 $\pm 0.00025\%$ (± 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	18/07/09	19/07/09	MY46471251
Spectrum Analyzer	Agilent Technologies	N9020A	17/12/26 18/12/20	18/12/26 19/12/20	MY50200828
Spectrum Analyzer	Agilent Technologies	N9020A	18/07/09	19/07/09	MY50200834
DC power supply	Agilent Technologies	66332A	18/07/02	19/07/02	MY43001172
Multimeter	FLUKE	17B+	17/12/26 18/12/18	18/12/26 19/12/18	36390701WS
Power Splitter	Anritsu	K241B	18/12/19	19/12/19	016681
Temp & Humi	SJ Science	SJ-TH-S50	18/07/06	19/07/06	U5542113
Radio Communication Analyzer	Anritsu	MT8820C	18/07/03	19/07/03	6200978101
Thermohygrometer	BODYCOM	BJ5478	18/01/03 18/12/27	19/01/03 19/12/27	120612-1
Thermohygrometer	BODYCOM	BJ5478	18/01/03 18/12/27	19/01/03 19/12/27	120612-2
Signal Generator	Rohde Schwarz	SMBV100A	18/12/19	19/12/19	255571
Signal Generator	Rohde Schwarz	SMF100A	18/06/07	19/06/07	102341
Loop Antenna	Schwarzbeck	FMZB1513	18/01/30	20/01/30	1513-128
Bilog Antenna	Schwarzbeck	VULB 9160	18/07/13	20/07/13	3359
Dipole Antenna	Schwarzbeck	VHA9103	17/03/14	19/03/14	2116
Dipole Antenna	Schwarzbeck	VHA9103	18/04/13	20/04/13	2117
Dipole Antenna	Schwarzbeck	UHA9105	17/03/14	19/03/14	2261
Dipole Antenna	Schwarzbeck	UHA9105	18/04/13	20/04/13	2262
HORN ANT	ETS	3117	18/05/10	20/05/10	00140394
HORN ANT	ETS	3117	18/03/26	20/03/26	00152145
HORN ANT	A.H.Systems	SAS-574	17/04/25	19/04/25	154
HORN ANT	A.H.Systems	SAS-574	17/07/31	19/07/31	155
Amplifier	RF Bay Inc	MPA-40-40	17/12/28 18/12/20	18/12/28 19/12/20	21151801
Amplifier	EMPOWER	BBS3Q7ELU	18/07/10	19/07/10	1020
PreAmplifier	H.P	8447D	17/12/26 18/12/18	18/12/26 19/12/18	2944A07774
PreAmplifier	Agilent	8449B	18/07/05	19/07/05	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	18/07/05	19/07/05	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	18/07/05	19/07/05	3
High-pass filter	Wainwright	WHNX8.5/26.5G-6SS	18/07/03	19/07/03	1
Cable	DTNC	Cable	18/07/06	19/07/06	M-01
Cable	DTNC	Cable	18/07/06	19/07/06	M-02
Cable	Junkosha	MWX315	18/11/19	19/11/19	M-05
Cable	Junkosha	MWX221	18/11/19	19/11/19	M-06
Cable	Radiall	TESTPRO3	18/07/05	19/07/05	RF-84

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]	Peak to Average Ratio	< 13 dB		C
2.1051 22.917(a) 24.238(a) 27.53(c) 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
2.1055 22.355 24.235 27.54	RSS-130 [4.5] RSS-132 [5.3] RSS-133 [6.3] RSS-139 [6.4]	Frequency Stability	< 2.5 ppm (Part 22) Fundamental emissions must stay within Authorized frequency block (Part 27)		C
27.50(b.10) 27.50(c.10)	RSS-130 [4.6]	Radiated Output Power (B12,13, 17)	< 3 Watts max. ERP	Radiated	C
22.913(a.5)	RSS-132 [5.4]	Radiated Output Power (B5)	< 7 Watts max. ERP		C
27.50(d.4)	RSS-139 [6.5]	Radiated Output Power (B4)	< 1 Watts max. EIRP		C
24.232(c) 27.50(h.2)	RSS-133 [6.4]	Radiated Output Power(B2)	< 2 Watts max. EIRP		C
2.1053 22.917(a) 24.238(a) 27.53(c.2) 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(f)	RSS-130 [4.7.2]	Undesirable Emissions in 1559 ~ 1610MHz	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions of less than 700 Hz bandwidth)		C
Note 1: C=Comply NC=Not Comply NT=Not Tested NA=Not Applicable					

6. SAMPLE CALCULATION

A. Emission Designator

LTE Band 12,17(QPSK)

Emission Designator = **8M96G7D**

LTE OBW = 8.960 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 13(QPSK)

Emission Designator = **8M92G7D**

LTE OBW = 8.923 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 5(QPSK)

Emission Designator = **8M96G7D**

LTE OBW = 8.960 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 4(QPSK)

Emission Designator = **17M9G7D**

LTE OBW = 17.871 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 2(QPSK)

Emission Designator = **17M9G7D**

LTE OBW = 17.873 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 12,17(16QAM)

Emission Designator = **8M96W7D**

LTE OBW = 8.957 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 13(16QAM)

Emission Designator = **8M89W7D**

LTE OBW = 8.886 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 5(16QAM)

Emission Designator = **8M96W7D**

LTE OBW = 8.963 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 4(16QAM)

Emission Designator = **17M9W7D**

LTE OBW = 17.865 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 2(16QAM)

Emission Designator = **17M8W7D**

LTE OBW = 17.836 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

B. For substitution method

EIRP for Band 4

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Spectrum Reading Value(dBm)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
1.4	1754.3	QPSK	1/2	-26.64	Z	V	15.38	5.62	21.00	0.126

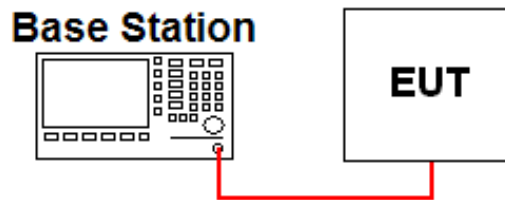
ERP or EIRP = Level @ Ant Terminal LEVEL(dBm) + Tx Ant. Gain

- 1) The EUT mounted on a non-conductive turntable is 0.8 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with substituted antenna gain is the rating of ERP, EIRP or Radiated spurious emission.

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	21.92	21.74	21.69	20.53	20.55	20.62	20.66
		16QAM	20.30	20.55	20.37	19.41	19.73	19.62	19.56
	711	QPSK	21.54	21.86	21.47	20.59	20.63	20.50	20.60
		16QAM	20.25	20.87	20.20	19.71	19.69	19.58	19.65
5	701.5	QPSK	21.55	21.54	21.66	20.58	20.47	20.61	20.51
		16QAM	20.60	20.42	20.55	19.56	19.67	19.79	19.63
	707.5	QPSK	21.53	21.60	21.61	20.47	20.62	20.63	20.54
		16QAM	20.30	20.39	20.49	19.38	19.63	19.54	19.76
	713.5	QPSK	21.60	21.48	21.47	20.45	20.43	20.49	20.42
		16QAM	20.34	20.40	19.97	19.36	19.54	19.49	19.47
3	700.5	QPSK	21.72	21.58	21.66	20.57	20.51	20.57	20.60
		16QAM	20.65	20.47	20.45	19.76	19.81	19.65	19.66
	707.5	QPSK	21.47	21.58	21.53	20.65	20.63	20.68	20.54
		16QAM	20.60	20.37	20.60	19.70	19.78	19.83	19.43
	714.5	QPSK	21.59	21.46	21.49	20.54	20.54	20.42	20.58
		16QAM	20.36	20.27	20.33	19.54	19.78	19.76	19.42
1.4	699.7	QPSK	21.82	21.72	21.45	21.63	21.64	21.60	20.66
		16QAM	20.79	20.77	20.60	20.64	20.63	20.53	19.56
	707.5	QPSK	21.45	21.63	21.72	21.50	21.59	21.54	20.63
		16QAM	20.37	20.59	20.54	20.56	20.66	20.88	19.60
	715.3	QPSK	21.55	21.59	21.53	21.46	21.55	21.49	20.51
		16QAM	20.38	20.53	20.51	20.46	20.57	20.65	19.53

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

▪ Band 13

Conducted Power [dBm]									
RB Alloc			1 RB			MID RB			FULL RB
B.W(MHz)	Freq.(MHz)	Modulation	LOW	MID	HIGH	LOW	MID	HIGH	
10	782	QPSK	21.91	21.86	21.66	20.97	20.90	20.87	20.96
		16QAM	20.82	20.99	20.64	20.05	20.31	19.85	19.87
5	779.5	QPSK	21.19	21.25	21.16	20.18	20.26	20.27	20.27
		16QAM	20.14	20.11	19.95	19.40	19.45	19.26	19.15
	784.5	QPSK	21.26	21.07	21.00	20.15	20.11	20.05	20.04
		16QAM	19.98	19.82	19.97	19.18	19.26	19.12	19.27

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	21.56	21.89	21.81	20.62	20.81	20.86	20.80
		16QAM	20.33	20.75	20.61	19.71	19.83	19.77	19.85
	836.5	QPSK	21.83	22.14	21.76	20.88	20.79	20.90	20.87
		16QAM	20.44	20.78	20.46	19.88	19.87	19.86	19.85
	844	QPSK	21.82	21.94	21.86	20.76	20.80	20.76	20.78
		16QAM	20.49	20.79	20.60	19.75	19.87	19.76	19.69
5	826.5	QPSK	21.59	21.64	21.76	20.62	20.63	20.76	20.70
		16QAM	20.38	20.42	20.43	19.42	19.63	19.76	19.59
	836.5	QPSK	21.77	21.82	21.79	20.83	20.86	20.74	20.90
		16QAM	20.66	20.60	20.28	19.74	19.58	19.72	19.67
	846.5	QPSK	21.67	21.85	21.67	20.76	20.91	20.73	20.82
		16QAM	20.41	20.50	20.50	19.78	19.93	19.77	19.73
3	825.5	QPSK	21.64	21.59	21.73	20.67	20.61	20.61	20.69
		16QAM	20.42	20.40	20.48	19.33	19.77	19.80	19.40
	836.5	QPSK	21.84	21.69	21.89	20.89	20.86	20.86	20.84
		16QAM	20.61	20.60	20.37	19.78	19.73	19.99	19.90
	847.5	QPSK	21.82	21.94	21.78	20.91	20.80	20.82	20.76
		16QAM	20.28	20.53	20.56	19.88	19.92	19.95	19.70
1.4	824.7	QPSK	21.72	21.72	21.57	21.58	21.61	21.61	20.69
		16QAM	20.53	20.71	20.46	20.64	20.63	20.58	19.56
	836.5	QPSK	21.93	21.93	21.99	21.76	21.78	21.73	20.92
		16QAM	20.65	20.77	20.69	20.74	20.88	20.82	19.26
	848.3	QPSK	21.78	21.96	21.79	21.74	21.83	21.78	20.72
		16QAM	20.60	20.78	20.65	20.67	20.81	20.74	19.48

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	21.96	22.25	21.86	20.90	20.85	20.85	20.75
		16QAM	20.81	20.91	20.54	19.96	19.89	19.97	19.78
	1732.5	QPSK	22.04	21.94	21.91	20.87	20.79	20.73	20.73
		16QAM	20.64	20.89	20.78	19.78	19.84	19.91	19.87
	1745	QPSK	22.20	22.45	21.94	21.04	21.01	20.92	20.96
		16QAM	21.01	20.97	20.49	20.06	20.02	20.02	19.95
15	1717.5	QPSK	22.08	21.99	21.86	20.88	20.92	20.85	20.83
		16QAM	20.86	20.82	20.72	19.96	19.99	19.89	19.97
	1732.5	QPSK	21.89	21.92	21.85	20.78	20.79	20.76	20.84
		16QAM	20.69	20.62	20.65	19.97	19.94	19.81	19.96
	1747.5	QPSK	22.11	22.06	21.97	21.02	20.94	20.94	20.83
		16QAM	20.95	20.85	20.64	20.04	19.94	19.87	19.92
10	1715	QPSK	22.08	22.10	22.03	20.92	20.99	20.88	20.91
		16QAM	20.77	20.96	20.76	20.09	20.14	19.99	20.03
	1732.5	QPSK	21.83	21.99	21.83	20.78	20.82	20.79	20.88
		16QAM	20.99	20.88	20.60	20.07	19.90	19.99	19.93
	1750	QPSK	22.13	22.17	22.12	20.93	20.98	20.88	20.90
		16QAM	20.82	21.07	20.80	20.23	20.11	20.17	20.01
5	1712.5	QPSK	21.86	21.92	21.88	20.90	20.86	20.86	20.83
		16QAM	20.75	20.57	20.83	19.94	20.10	20.07	19.94
	1732.5	QPSK	21.86	21.88	21.84	20.90	20.87	20.83	20.83
		16QAM	20.73	20.67	20.60	19.82	19.97	19.91	19.90
	1752.5	QPSK	22.11	21.94	21.95	20.88	20.96	20.95	20.90
		16QAM	20.78	20.82	20.79	20.12	20.19	20.07	20.01
3	1711.5	QPSK	21.92	21.89	21.87	21.01	21.00	20.93	20.90
		16QAM	20.73	20.85	20.83	19.98	20.02	20.27	19.76
	1732.5	QPSK	21.84	21.71	21.78	20.81	20.92	20.84	20.92
		16QAM	20.65	20.64	20.67	19.60	20.12	19.63	19.75
	1753.5	QPSK	21.90	21.86	21.92	20.81	20.88	20.87	20.74
		16QAM	20.78	20.62	20.86	20.02	20.08	20.26	20.00
1.4	1710.7	QPSK	21.98	22.07	21.88	21.85	21.95	21.92	20.92
		16QAM	20.84	20.93	20.89	21.03	21.19	21.05	19.97
	1732.5	QPSK	21.89	21.89	21.87	21.93	21.86	21.81	20.73
		16QAM	20.77	20.91	20.70	20.84	20.87	20.80	19.73
	1754.3	QPSK	21.96	22.02	21.89	21.72	21.87	21.84	20.78
		16QAM	20.82	21.00	20.78	20.87	21.03	20.90	19.83

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	21.85	22.02	21.90	20.61	20.70	20.78	20.58
		16QAM	20.79	20.74	20.71	19.70	19.73	19.80	19.71
	1880	QPSK	21.99	22.15	21.95	20.97	20.79	20.84	20.88
		16QAM	20.59	20.90	20.58	19.78	19.72	19.78	19.79
	1900	QPSK	22.01	22.02	21.86	20.88	20.79	20.60	20.72
		16QAM	20.74	20.80	20.51	19.93	19.85	19.76	19.74
15	1857.5	QPSK	21.86	21.83	21.67	20.66	20.72	20.63	20.55
		16QAM	20.68	20.47	20.48	19.63	19.67	19.58	19.78
	1880	QPSK	22.04	22.04	21.95	20.93	20.95	20.90	20.99
		16QAM	20.66	20.71	20.50	19.91	19.94	19.80	19.96
	1902.5	QPSK	21.97	22.05	21.85	20.80	20.96	20.67	20.84
		16QAM	20.64	20.68	20.51	19.86	19.94	19.77	19.90
10	1855	QPSK	21.90	22.19	21.68	20.73	20.87	20.74	20.82
		16QAM	20.39	20.64	20.44	19.95	19.92	19.79	19.71
	1880	QPSK	22.02	22.15	22.12	20.94	20.99	21.02	20.97
		16QAM	20.81	20.98	20.79	20.01	19.94	20.11	19.88
	1905	QPSK	22.16	22.19	21.91	20.89	20.87	20.76	20.88
		16QAM	20.61	21.05	20.59	19.98	19.88	19.86	19.99
5	1852.5	QPSK	21.75	21.78	21.74	20.74	20.70	20.59	20.75
		16QAM	20.50	20.78	20.43	19.68	19.82	19.61	19.77
	1880	QPSK	21.93	21.98	21.93	20.98	20.86	20.88	20.93
		16QAM	21.08	20.72	20.68	19.92	19.91	19.92	19.97
	1907.5	QPSK	21.83	21.83	21.91	20.75	20.68	20.62	20.74
		16QAM	21.06	20.90	20.44	19.82	19.95	19.89	20.00
3	1851.5	QPSK	21.91	21.86	21.71	20.64	20.72	20.73	20.70
		16QAM	20.70	20.41	20.44	19.53	19.70	19.94	19.65
	1880	QPSK	22.06	22.05	21.93	20.97	20.92	21.01	20.92
		16QAM	21.12	20.85	20.80	20.00	19.94	20.02	19.98
	1908.5	QPSK	21.93	21.82	21.96	20.85	20.76	20.79	20.84
		16QAM	20.69	20.52	20.40	19.58	19.98	20.05	19.92
1.4	1850.7	QPSK	21.83	21.70	21.62	21.72	21.76	21.64	20.59
		16QAM	20.81	20.86	20.58	20.65	20.70	20.63	19.59
	1880	QPSK	21.96	21.99	21.81	21.91	21.98	21.95	20.96
		16QAM	20.81	20.89	20.69	20.86	20.86	20.70	19.80
	1909.3	QPSK	21.79	22.09	21.92	21.70	21.67	21.88	20.78
		16QAM	20.53	20.66	20.51	20.64	20.67	20.53	19.53

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 EDGE 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	16.26	1.28	17.54	0.057
		16QAM	1/0	H	14.82	1.28	16.10	0.041
	711	QPSK	1/0	H	16.90	1.28	18.18	0.066
		16QAM	1/0	H	16.01	1.28	17.29	0.054
5	701.5	QPSK	1/24	H	16.65	1.28	17.93	0.062
		16QAM	1/24	H	15.71	1.28	16.99	0.050
	707.5	QPSK	1/24	H	16.77	1.28	18.05	0.064
		16QAM	1/24	H	15.85	1.28	17.13	0.052
	713.5	QPSK	1/0	H	16.07	1.28	17.35	0.054
		16QAM	1/0	H	15.02	1.28	16.30	0.043

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	16.56	1.28	17.84	0.061
		16QAM	1/0	H	15.29	1.28	16.57	0.045
	707.5	QPSK	1/7	H	16.65	1.28	17.93	0.062
		16QAM	1/7	H	15.66	1.28	16.94	0.049
	714.5	QPSK	1/0	H	15.74	1.28	17.02	0.050
		16QAM	1/0	H	14.66	1.28	15.94	0.039
1.4	699.7	QPSK	1/0	H	16.42	1.28	17.70	0.059
		16QAM	1/0	H	15.36	1.28	16.64	0.046
	707.5	QPSK	1/5	H	16.51	1.28	17.79	0.060
		16QAM	1/5	H	15.43	1.28	16.71	0.047
	715.3	QPSK	1/2	H	15.40	1.28	16.68	0.047
		16QAM	1/2	H	15.19	1.28	16.47	0.044

7.6.3 LTE Band 13

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	782	QPSK	1/0	H	15.98	1.26	17.24	0.053
		16QAM	1/0	H	14.80	1.26	16.06	0.040
5	779.5	QPSK	1/12	H	15.41	1.26	16.67	0.046
		16QAM	1/12	H	14.45	1.26	15.71	0.037
	784.5	QPSK	1/0	H	15.54	1.25	16.79	0.048
		16QAM	1/0	H	13.97	1.25	15.22	0.033

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 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	1/25	H	18.55	1.23	19.78	0.095
		16QAM	1/25	H	17.09	1.23	18.32	0.068
	836.5	QPSK	1/25	H	17.03	1.22	18.25	0.067
		16QAM	1/25	H	15.81	1.22	17.03	0.050
	844	QPSK	1/25	H	16.92	1.21	18.13	0.065
		16QAM	1/25	H	15.81	1.21	17.02	0.050
5	826.5	QPSK	1/24	H	18.22	1.23	19.45	0.088
		16QAM	1/24	H	17.32	1.23	18.55	0.072
	836.5	QPSK	1/12	H	17.21	1.22	18.43	0.070
		16QAM	1/12	H	16.05	1.22	17.27	0.053
	846.5	QPSK	1/12	H	16.50	1.21	17.71	0.059
		16QAM	1/12	H	15.61	1.21	16.82	0.048
3	825.5	QPSK	1/14	H	18.83	1.23	20.06	0.101
		16QAM	1/14	H	17.43	1.23	18.66	0.073
	836.5	QPSK	1/14	H	17.06	1.22	18.28	0.067
		16QAM	1/14	H	15.65	1.22	16.87	0.049
	847.5	QPSK	1/7	H	16.32	1.21	17.53	0.057
		16QAM	1/7	H	15.25	1.21	16.46	0.044
1.4	824.7	QPSK	1/2	H	18.68	1.23	19.91	0.098
		16QAM	1/2	H	17.46	1.23	18.69	0.074
	836.5	QPSK	1/5	H	17.07	1.22	18.29	0.067
		16QAM	1/5	H	15.97	1.22	17.19	0.052
	848.3	QPSK	1/2	H	16.64	1.21	17.85	0.061
		16QAM	1/2	H	15.29	1.21	16.50	0.045

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 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	1/50	V	13.21	5.95	19.16	0.082
		16QAM	1/50	V	12.20	5.95	18.15	0.065
	1732.5	QPSK	1/0	V	12.87	5.84	18.71	0.074
		16QAM	1/0	V	11.87	5.84	17.71	0.059
	1745	QPSK	1/50	V	14.85	5.73	20.58	0.114
		16QAM	1/50	V	13.76	5.73	19.49	0.089
15	1717.5	QPSK	1/0	V	13.16	5.97	19.13	0.082
		16QAM	1/0	V	12.55	5.97	18.52	0.071
	1732.5	QPSK	1/36	V	13.13	5.84	18.97	0.079
		16QAM	1/36	V	11.85	5.84	17.69	0.059
	1747.5	QPSK	1/0	V	14.04	5.70	19.74	0.094
		16QAM	1/0	V	12.96	5.70	18.66	0.073
10	1715	QPSK	1/25	V	13.02	6.00	19.02	0.080
		16QAM	1/25	V	12.12	6.00	18.12	0.065
	1732.5	QPSK	1/25	V	12.85	5.84	18.69	0.074
		16QAM	1/25	V	11.57	5.84	17.41	0.055
	1750	QPSK	1/25	V	14.81	5.68	20.49	0.112
		16QAM	1/25	V	13.76	5.68	19.44	0.088
5	1712.5	QPSK	1/12	V	13.46	6.02	19.48	0.089
		16QAM	1/12	V	12.34	6.02	18.36	0.069
	1732.5	QPSK	1/12	V	13.77	5.84	19.61	0.091
		16QAM	1/12	V	11.90	5.84	17.74	0.059
	1752.5	QPSK	1/0	V	15.15	5.65	20.80	0.120
		16QAM	1/0	V	14.11	5.65	19.76	0.095
3	1711.5	QPSK	1/0	V	13.02	6.03	19.05	0.080
		16QAM	1/0	V	10.72	6.03	16.75	0.047
	1732.5	QPSK	1/0	V	13.41	5.84	19.25	0.084
		16QAM	1/0	V	11.90	5.84	17.74	0.059
	1753.5	QPSK	1/14	V	15.26	5.63	20.89	0.123
		16QAM	1/14	V	14.12	5.63	19.75	0.094
1.4	1710.7	QPSK	1/2	V	13.28	6.03	19.31	0.085
		16QAM	1/2	V	10.83	6.03	16.86	0.049
	1732.5	QPSK	1/2	V	13.39	5.84	19.23	0.084
		16QAM	1/2	V	11.96	5.84	17.80	0.060
	1754.3	QPSK	1/2	V	15.38	5.62	21.00	0.126
		16QAM	1/2	V	14.09	5.62	19.71	0.094

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 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	1/50	V	15.00	4.91	19.91	0.098
		16QAM	1/50	V	13.59	4.91	18.50	0.071
	1880	QPSK	1/50	V	14.60	4.80	19.40	0.087
		16QAM	1/50	V	13.30	4.80	18.10	0.065
	1900	QPSK	1/50	V	14.74	4.69	19.43	0.088
		16QAM	1/50	V	13.91	4.69	18.60	0.072
15	1857.5	QPSK	1/0	V	14.44	4.92	19.36	0.086
		16QAM	1/0	V	13.77	4.92	18.69	0.074
	1880	QPSK	1/36	V	14.32	4.80	19.12	0.082
		16QAM	1/36	V	13.60	4.80	18.40	0.069
	1902.5	QPSK	1/36	V	14.94	4.68	19.62	0.092
		16QAM	1/36	V	13.86	4.68	18.54	0.071
10	1855	QPSK	1/25	V	14.18	4.94	19.12	0.082
		16QAM	1/25	V	13.76	4.94	18.70	0.074
	1880	QPSK	1/25	V	14.54	4.80	19.34	0.086
		16QAM	1/25	V	13.55	4.80	18.35	0.068
	1905	QPSK	1/25	V	15.14	4.67	19.81	0.096
		16QAM	1/25	V	14.05	4.67	18.72	0.074
5	1852.5	QPSK	1/12	V	14.78	4.95	19.73	0.094
		16QAM	1/12	V	13.64	4.95	18.59	0.072
	1880	QPSK	1/12	V	14.73	4.80	19.53	0.090
		16QAM	1/12	V	13.66	4.80	18.46	0.070
	1907.5	QPSK	1/24	V	14.37	4.65	19.02	0.080
		16QAM	1/24	V	13.00	4.65	17.65	0.058
3	1851.5	QPSK	1/0	V	14.41	4.95	19.36	0.086
		16QAM	1/0	V	13.44	4.95	18.39	0.069
	1880	QPSK	1/0	V	14.46	4.80	19.26	0.084
		16QAM	1/0	V	12.31	4.80	17.11	0.051
	1908.5	QPSK	1/0	V	15.37	4.65	20.02	0.100
		16QAM	1/0	V	13.77	4.65	18.42	0.070
1.4	1850.7	QPSK	1/0	V	14.27	4.96	19.23	0.084
		16QAM	1/0	V	12.18	4.96	17.14	0.052
	1880	QPSK	1/2	V	14.39	4.80	19.19	0.083
		16QAM	1/2	V	12.29	4.80	17.09	0.051
	1909.3	QPSK	1/2	V	15.07	4.64	19.71	0.094
		16QAM	1/2	V	12.69	4.64	17.33	0.054

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 (dBm)
10	704	1/0	QPSK	1399.18	V	-56.05	2.69	-53.36	-13.00	40.36
				2098.78	V	-39.53	3.00	-36.53	-13.00	23.53
			16QAM	1399.39	V	-55.61	2.69	-52.92	-13.00	39.92
				2098.55	V	-41.74	3.00	-38.74	-13.00	25.74
	711	1/0	QPSK	1422.02	V	-51.73	2.91	-48.82	-13.00	35.82
				2133.33	V	-42.15	3.15	-39.00	-13.00	26.00
			16QAM	1422.11	V	-52.97	2.92	-50.05	-13.00	37.05
				2133.27	V	-43.55	3.15	-40.40	-13.00	27.40
5	701.5	1/24	QPSK	1407.39	V	-48.16	2.77	-45.39	-13.00	32.39
				2111.10	V	-40.77	3.06	-37.71	-13.00	24.71
			16QAM	1407.42	V	-49.11	2.77	-46.34	-13.00	33.34
				2110.82	V	-41.05	3.06	-37.99	-13.00	24.99
	707.5	1/24	QPSK	1419.37	V	-54.34	2.89	-51.45	-13.00	38.45
				2128.99	V	-42.28	3.13	-39.15	-13.00	26.15
			16QAM	1419.44	V	-54.29	2.89	-51.40	-13.00	38.40
				2128.95	V	-44.16	3.13	-41.03	-13.00	28.03
	713.5	1/0	QPSK	1422.54	V	-50.93	2.92	-48.01	-13.00	35.01
				2134.16	V	-42.73	3.15	-39.58	-13.00	26.58
			16QAM	1422.44	V	-50.23	2.92	-47.31	-13.00	34.31
				2133.98	V	-41.79	3.15	-38.64	-13.00	25.64

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 12

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 (dBm)
3	700.5	1/0	QPSK	1398.29	V	-55.50	2.68	-52.82	-13.00	39.82
				2097.74	V	-38.43	3.00	-35.43	-13.00	22.43
			16QAM	1398.38	V	-54.54	2.68	-51.86	-13.00	38.86
				2097.50	V	-39.40	3.00	-36.40	-13.00	23.40
	707.5	1/7	QPSK	1414.97	V	-48.92	2.84	-46.08	-13.00	33.08
				2122.51	V	-40.16	3.10	-37.06	-13.00	24.06
			16QAM	1415.23	V	-48.28	2.85	-45.43	-13.00	32.43
				2122.57	V	-42.39	3.10	-39.29	-13.00	26.29
	714.5	1/0	QPSK	1426.57	V	-49.72	2.96	-46.76	-13.00	33.76
				2139.69	V	-44.77	3.18	-41.59	-13.00	28.59
			16QAM	1426.55	V	-50.19	2.96	-47.23	-13.00	34.23
				2139.61	V	-42.91	3.18	-39.73	-13.00	26.73
1.4	699.7	1/0	QPSK	1398.29	V	-55.35	2.68	-52.67	-13.00	39.67
				2123.80	V	-40.82	3.11	-37.71	-13.00	24.71
			16QAM	1398.94	V	-55.96	2.69	-53.27	-13.00	40.27
				2123.76	V	-40.38	3.11	-37.27	-13.00	24.27
	707.5	1/5	QPSK	1416.00	V	-49.96	2.85	-47.11	-13.00	34.11
				2124.05	V	-41.75	3.11	-38.64	-13.00	25.64
			16QAM	1416.00	V	-51.85	2.85	-49.00	-13.00	36.00
				2123.80	V	-40.82	3.11	-37.71	-13.00	24.71
	715.3	1/2	QPSK	1430.20	V	-52.58	3.00	-49.58	-13.00	36.58
				2145.79	V	-41.17	3.20	-37.97	-13.00	24.97
			16QAM	1430.61	V	-52.56	3.00	-49.56	-13.00	36.56
				2145.72	V	-43.30	3.20	-40.10	-13.00	27.10

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 13

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	Limit	Margin
								(dBm)	(dBm)	(dBm)
10	782	1/0	QPSK	1555.25	V	-54.56	3.79	-50.77	-13.00	37.77
				2330.98	V	-53.60	3.76	-49.84	-13.00	36.84
		1/0	16QAM	1555.32	V	-54.49	3.79	-50.70	-13.00	37.70
				2330.99	V	-54.53	3.76	-50.77	-13.00	37.77
5	779.5	1/12	QPSK	1558.84	V	-53.27	3.79	-49.48	-13.00	36.48
				2330.90	V	-53.60	3.76	-49.84	-13.00	36.84
		1/12	16QAM	1558.87	V	-54.39	3.79	-50.60	-13.00	37.60
				2330.99	V	-54.53	3.76	-50.77	-13.00	37.77
	784.5	1/0	QPSK	2344.37	V	-53.61	3.78	-49.83	-13.00	36.83
				-	-	-	-	-	-	-
		1/0	16QAM	2344.37	X	-53.64	3.78	-49.86	-13.00	36.86
				-	-	-	-	-	-	-

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.

UNDESIRABLE EMISSIONS IN 1559~1610MHz (LTE Band 13)

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	Limit	Margin
								(dBm)	(dBm)	(dBm)
5	784.5	1/0	QPSK	1564.61	V	-54.17	5.95	-48.22	-40.00	8.22
		1/0	16QAM	1564.60	V	-54.14	5.95	-48.19	-40.00	8.19

7.7.4 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 (dBm)
10	829	1/25	QPSK	1658.09	V	-52.65	3.85	-48.80	-13.00	35.80
				2487.32	V	-45.29	3.81	-41.48	-13.00	28.48
			16QAM	1658.28	V	-53.27	3.85	-49.42	-13.00	36.42
				2487.37	V	-46.57	3.81	-42.76	-13.00	29.76
	836.5	1/25	QPSK	1673.34	V	-54.12	3.89	-50.23	-13.00	37.23
				2509.80	V	-38.38	3.80	-34.58	-13.00	21.58
			16QAM	1673.53	V	-54.96	3.90	-51.06	-13.00	38.06
				2509.74	V	-39.37	3.80	-35.57	-13.00	22.57
	844	1/25	QPSK	1687.99	V	-52.82	3.94	-48.88	-13.00	35.88
				2532.26	V	-35.07	3.75	-31.32	-13.00	18.32
			16QAM	1688.52	V	-51.36	3.94	-47.42	-13.00	34.42
				2532.32	V	-36.56	3.75	-32.81	-13.00	19.81
5	826.5	1/24	QPSK	1657.63	V	-51.88	3.84	-48.04	-13.00	35.04
				2486.17	V	-44.87	3.81	-41.06	-13.00	28.06
			16QAM	1657.32	V	-51.64	3.84	-47.80	-13.00	34.80
				2486.10	V	-45.52	3.81	-41.71	-13.00	28.71
	836.5	1/12	QPSK	1673.17	V	-53.51	3.89	-49.62	-13.00	36.62
				2509.56	V	-38.67	3.81	-34.86	-13.00	21.86
			16QAM	1672.81	V	-52.46	3.89	-48.57	-13.00	35.57
				2509.46	V	-37.97	3.81	-34.16	-13.00	21.16
	846.5	1/12	QPSK	1692.96	V	-51.53	3.96	-47.57	-13.00	34.57
				2539.44	V	-34.51	3.73	-30.78	-13.00	17.78
			16QAM	1693.11	V	-51.92	3.96	-47.96	-13.00	34.96
				2539.60	V	-35.59	3.73	-31.86	-13.00	18.86
3	825.5	1/14	QPSK	1653.63	V	-50.57	3.83	-46.74	-13.00	33.74
				2481.07	V	-51.47	3.80	-47.67	-13.00	34.67
			16QAM	1653.49	V	-50.50	3.83	-46.67	-13.00	33.67
				2480.73	V	-51.72	3.80	-47.92	-13.00	34.92
	836.5	1/14	QPSK	1675.71	V	-54.61	3.90	-50.71	-13.00	37.71
				2513.38	V	-37.30	3.80	-33.50	-13.00	20.50
			16QAM	1675.56	V	-53.91	3.90	-50.01	-13.00	37.01
				2513.19	V	-38.91	3.80	-35.11	-13.00	22.11
	847.5	1/7	QPSK	1695.11	V	-52.79	3.96	-48.83	-13.00	35.83
				2542.57	V	-35.52	3.72	-31.80	-13.00	18.80
			16QAM	1695.11	V	-52.79	3.96	-48.83	-13.00	35.83
				2542.57	V	-35.52	3.72	-31.80	-13.00	18.80

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.

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 (dBm)
1.4	824.7	1/2	QPSK	1649.16	V	-51.46	3.82	-47.64	-13.00	34.64
				2473.91	V	-49.85	3.79	-46.06	-13.00	33.06
			16QAM	1649.39	V	-52.69	3.82	-48.87	-13.00	35.87
				2474.00	V	-50.95	3.79	-47.16	-13.00	34.16
	836.5	1/5	QPSK	1673.95	V	-54.37	3.90	-50.47	-13.00	37.47
				2510.88	V	-36.65	3.80	-32.85	-13.00	19.85
			16QAM	1674.26	V	-55.28	3.90	-51.38	-13.00	38.38
				2510.78	V	-37.73	3.80	-33.93	-13.00	20.93
	848.3	1/2	QPSK	1696.33	V	-51.37	3.97	-47.40	-13.00	34.40
				2544.75	V	-35.24	3.71	-31.53	-13.00	18.53
			16QAM	1696.33	V	-51.51	3.97	-47.54	-13.00	34.54
				2544.61	V	-36.37	3.71	-32.66	-13.00	19.66

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.

7.7.5 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	Limit	Margin
								(dBm)	(dBm)	
20	1720	1/50	QPSK	3439.28	H	-56.16	8.05	-48.11	-13.00	35.11
			16QAM	3438.98	H	-56.02	8.05	-47.97	-13.00	34.97
	1732.5	1/0	QPSK	3446.05	H	-55.26	8.07	-47.19	-13.00	34.19
			16QAM	3445.08	H	-55.62	8.07	-47.55	-13.00	34.55
	1745	1/50	QPSK	3488.11	H	-55.39	8.17	-47.22	-13.00	34.22
			16QAM	3488.06	H	-56.56	8.17	-48.39	-13.00	35.39
15	1717.5	1/0	QPSK	3421.60	H	-55.63	8.01	-47.62	-13.00	34.62
			16QAM	3421.64	H	-55.91	8.01	-47.90	-13.00	34.90
	1732.5	1/36	QPSK	3464.53	H	-55.77	8.11	-47.66	-13.00	34.66
			16QAM	3464.62	H	-55.64	8.12	-47.52	-13.00	34.52
	1747.5	1/0	QPSK	3481.64	H	-54.83	8.16	-46.67	-13.00	33.67
			16QAM	3481.57	H	-55.07	8.16	-46.91	-13.00	33.91
10	1715	1/25	QPSK	3430.16	H	-54.57	8.03	-46.54	-13.00	33.54
			16QAM	3430.25	H	-54.80	8.03	-46.77	-13.00	33.77
	1732.5	1/25	QPSK	3465.13	H	-54.09	8.12	-45.97	-13.00	32.97
			16QAM	3465.19	H	-54.57	8.12	-46.45	-13.00	33.45
	1750	1/25	QPSK	3500.12	H	-54.44	8.20	-46.24	-13.00	33.24
			16QAM	3500.12	H	-54.44	8.20	-46.24	-13.00	33.24
5	1712.5	1/12	QPSK	3425.05	H	-54.75	8.02	-46.73	-13.00	33.73
			16QAM	3425.02	H	-54.96	8.02	-46.94	-13.00	33.94
	1732.5	1/12	QPSK	3464.95	H	-54.58	8.12	-46.46	-13.00	33.46
			16QAM	3465.08	H	-54.72	8.12	-46.60	-13.00	33.60
	1752.5	1/0	QPSK	3500.64	H	-54.34	8.20	-46.14	-13.00	33.14
			16QAM	3500.65	H	-55.58	8.20	-47.38	-13.00	34.38
3	1711.5	1/0	QPSK	3420.50	H	-54.10	8.00	-46.10	-13.00	33.10
			16QAM	3420.41	H	-55.07	8.00	-47.07	-13.00	34.07
	1732.5	1/0	QPSK	3462.51	H	-54.15	8.11	-46.04	-13.00	33.04
			16QAM	3462.42	H	-54.32	8.11	-46.21	-13.00	33.21
	1753.5	1/14	QPSK	3509.47	H	-54.79	8.22	-46.57	-13.00	33.57
			16QAM	3509.66	H	-54.41	8.22	-46.19	-13.00	33.19
1.4	1710.7	1/2	QPSK	3421.20	H	-53.99	8.01	-45.98	-13.00	32.98
			16QAM	3421.32	H	-55.25	8.01	-47.24	-13.00	34.24
	1732.5	1/2	QPSK	3464.88	H	-54.12	8.12	-46.00	-13.00	33.00
			16QAM	3464.72	H	-54.21	8.12	-46.09	-13.00	33.09
	1754.3	1/2	QPSK	3508.58	H	-54.01	8.22	-45.79	-13.00	32.79
			16QAM	3508.40	H	-55.34	8.22	-47.12	-13.00	34.12

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

7.7.6 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 (dBm)
20	1860	1/50	QPSK	3718.93	H	-55.02	8.39	-46.63	-13.00	33.63
				5580.30	H	-43.75	10.51	-33.24	-13.00	20.24
			16QAM	3718.76	H	-55.05	8.39	-46.66	-13.00	33.66
				5580.30	H	-43.75	10.51	-33.24	-13.00	20.24
	1880	1/50	QPSK	3760.19	H	-54.68	8.36	-46.32	-13.00	33.32
				5640.11	H	-41.24	10.64	-30.60	-13.00	17.60
			16QAM	3760.29	H	-54.78	8.36	-46.42	-13.00	33.42
				5640.26	H	-41.79	10.64	-31.15	-13.00	18.15
	1900	1/50	QPSK	3800.79	H	-54.48	8.22	-46.26	-13.00	33.26
				5700.21	H	-41.94	10.74	-31.20	-13.00	18.20
			16QAM	3799.94	H	-55.78	8.22	-47.56	-13.00	34.56
				5700.15	H	-42.51	10.74	-31.77	-13.00	18.77
15	1857.5	1/0	QPSK	3701.90	H	-53.44	8.38	-45.06	-13.00	32.06
				5552.46	H	-45.63	10.42	-35.21	-13.00	22.21
			16QAM	3701.57	H	-53.51	8.38	-45.13	-13.00	32.13
				5552.75	H	-46.26	10.42	-35.84	-13.00	22.84
	1880	1/36	QPSK	3759.81	H	-54.72	8.36	-46.36	-13.00	33.36
				5639.60	H	-41.28	10.64	-30.64	-13.00	17.64
			16QAM	3759.54	H	-55.69	8.37	-47.32	-13.00	34.32
				5639.58	H	-42.89	10.64	-32.25	-13.00	19.25
	1902.5	1/36	QPSK	3804.50	H	-54.67	8.22	-46.45	-13.00	33.45
				5707.01	H	-41.90	10.74	-31.16	-13.00	18.16
			16QAM	3804.84	H	-55.28	8.22	-47.06	-13.00	34.06
				5707.09	H	-42.36	10.74	-31.62	-13.00	18.62
10	1855	1/25	QPSK	3710.30	H	-53.48	8.38	-45.10	-13.00	32.10
				5565.32	H	-42.86	10.46	-32.40	-13.00	19.40
			16QAM	3710.18	H	-55.16	8.38	-46.78	-13.00	33.78
				5565.53	H	-43.08	10.46	-32.62	-13.00	19.62
	1880	1/25	QPSK	3760.35	H	-54.68	8.36	-46.32	-13.00	33.32
				5640.31	H	-43.78	10.64	-33.14	-13.00	20.14
			16QAM	3760.35	H	-54.68	8.36	-46.32	-13.00	33.32
				5640.31	H	-43.78	10.64	-33.14	-13.00	20.14
	1905	1/25	QPSK	3810.40	H	-54.08	8.22	-45.86	-13.00	32.86
				5715.33	H	-40.67	10.73	-29.94	-13.00	16.94
			16QAM	3810.38	H	-55.82	8.22	-47.60	-13.00	34.60
				5715.22	H	-40.76	10.73	-30.03	-13.00	17.03

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

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	Limit	Margin
								(dBm)	(dBm)	(dBm)
5	1852.5	1/12	QPSK	3704.96	H	-53.60	8.38	-45.22	-13.00	32.22
				5557.47	H	-42.77	10.44	-32.33	-13.00	19.33
			16QAM	3704.99	H	-53.72	8.38	-45.34	-13.00	32.34
				5557.38	H	-43.23	10.44	-32.79	-13.00	19.79
	1880	1/12	QPSK	3760.12	H	-53.21	8.36	-44.85	-13.00	31.85
				5639.96	H	-42.30	10.64	-31.66	-13.00	18.66
			16QAM	3760.17	H	-54.58	8.36	-46.22	-13.00	33.22
				5640.11	H	-42.86	10.64	-32.22	-13.00	19.22
	1907.5	1/24	QPSK	3818.94	H	-53.26	8.22	-45.04	-13.00	32.04
				5728.91	H	-41.92	10.72	-31.20	-13.00	18.20
			16QAM	3819.26	H	-54.31	8.22	-46.09	-13.00	33.09
				5729.03	H	-42.78	10.72	-32.06	-13.00	19.06
3	1851.5	1/0	QPSK	3700.45	H	-53.76	8.38	-45.38	-13.00	32.38
				5550.67	H	-43.96	10.41	-33.55	-13.00	20.55
			16QAM	3700.41	H	-54.33	8.38	-45.95	-13.00	32.95
				5550.83	H	-44.59	10.41	-34.18	-13.00	21.18
	1880	1/0	QPSK	3757.49	H	-53.87	8.37	-45.50	-13.00	32.50
				5636.08	H	-41.53	10.64	-30.89	-13.00	17.89
			16QAM	3757.55	H	-54.44	8.37	-46.07	-13.00	33.07
				5636.33	H	-42.14	10.64	-31.50	-13.00	18.50
	1908.5	1/0	QPSK	3814.56	H	-53.19	8.22	-44.97	-13.00	31.97
				5721.71	H	-43.42	10.73	-32.69	-13.00	19.69
			16QAM	3814.16	H	-54.73	8.22	-46.51	-13.00	33.51
				5721.60	H	-44.28	10.73	-33.55	-13.00	20.55
1.4	1850.7	1/0	QPSK	3700.56	H	-53.84	8.38	-45.46	-13.00	32.46
				5550.78	H	-43.74	10.41	-33.33	-13.00	20.33
			16QAM	3700.56	H	-55.27	8.38	-46.89	-13.00	33.89
				5550.88	H	-43.86	10.41	-33.45	-13.00	20.45
	1880	1/2	QPSK	3759.71	H	-53.67	8.37	-45.30	-13.00	32.30
				5639.77	H	-41.61	10.64	-30.97	-13.00	17.97
			16QAM	3759.71	H	-55.25	8.37	-46.88	-13.00	33.88
				5639.78	H	-42.21	10.64	-31.57	-13.00	18.57
	1909.3	1/2	QPSK	3818.48	H	-53.46	8.22	-45.24	-13.00	32.24
				5726.79	H	-41.60	10.72	-30.88	-13.00	17.88
			16QAM	3818.48	H	-54.64	8.22	-46.42	-13.00	33.42
				5728.58	H	-42.43	10.72	-31.71	-13.00	18.71

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.

7.8 FREQUENCY STABILITY

7.8.1 LTE Band 12,17

OPERATING FREQUENCY : 707.5 MHz

REFERENCE VOLTAGE : 12 VDC

LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	707,500,003	3	0.0042	0.000000424
100%		-30	707,499,997	-3	-0.0042	-0.000000424
100%		-20	707,500,005	5	0.0071	0.000000707
100%		-10	707,500,002	2	0.0028	0.000000283
100%		0	707,499,998	-1	-0.0014	-0.000000141
100%		+10	707,499,996	-4	-0.0057	-0.000000565
100%		+20	707,500,003	3	0.0042	0.000000424
100%		+30	707,500,006	6	0.0085	0.000000848
100%		+40	707,500,004	4	0.0057	0.000000565
100%		+50	707,499,999	-1	-0.0014	-0.000000141
115%	13.80	+20	707,500,002	2	0.0028	0.000000283
BATT.ENDPOINT	6.00	+20	707,500,003	3	0.0042	0.000000424

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 13

OPERATING FREQUENCY : 782 MHz
 REFERENCE VOLTAGE : 12 VDC
 LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	782,000,003	3	0.0038	0.000000384
100%		-30	781,999,997	-1	-0.0013	-0.000000128
100%		-20	782,000,004	4	0.0051	0.000000512
100%		-10	781,999,998	-2	-0.0026	-0.000000256
100%		0	782,000,002	-1	-0.0013	-0.000000128
100%		+10	781,999,996	-4	-0.0051	-0.000000512
100%		+20	782,000,003	3	0.0038	0.000000384
100%		+30	782,000,006	6	0.0077	0.000000767
100%		+40	781,999,998	-2	-0.0026	-0.000000256
100%		+50	781,999,997	-3	-0.0038	-0.000000384
115%	10.20	+20	782,000,001	1	0.0013	0.000000128
BATT.ENDPOINT	6.00	+20	782,000,005	5	0.0064	0.000000639

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.

7.8.3 LTE Band 5

OPERATING FREQUENCY : 836.5 MHz
 REFERENCE VOLTAGE : 12 VDC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	836,500,005	5	0.0060	0.000000598
100%		-30	836,499,997	-3	-0.0036	-0.000000359
100%		-20	836,500,004	4	0.0048	0.000000478
100%		-10	836,499,999	-1	-0.0012	-0.000000120
100%		0	836,500,003	3	0.0036	0.000000359
100%		+10	836,499,996	-4	-0.0048	-0.000000478
100%		+20	836,500,005	5	0.0060	0.000000598
100%		+30	836,500,002	2	0.0024	0.000000239
100%		+40	836,500,005	5	0.0060	0.000000598
100%		+50	836,499,999	-1	-0.0012	-0.000000120
115%	10.20	+20	836,500,001	1	0.0012	0.000000120
BATT.ENDPOINT	6.00	+20	836,500,002	2	0.0024	0.000000239

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 4

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

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	1,880,000,003	3	0.0017	0.000000173
100%		-30	1,879,999,995	-5	-0.0029	-0.000000289
100%		-20	1,879,999,994	-6	-0.0035	-0.000000346
100%		-10	1,880,000,002	2	0.0012	0.000000115
100%		0	1,880,000,005	5	0.0029	0.000000289
100%		+10	1,880,000,002	2	0.0012	0.000000115
100%		+20	1,880,000,003	3	0.0017	0.000000173
100%		+30	1,879,999,997	-3	-0.0017	-0.000000173
100%		+40	1,880,000,004	4	0.0023	0.000000231
100%		+50	1,880,000,002	2	0.0012	0.000000115
115%	10.20	+20	1,880,000,006	6	0.0035	0.000000346
BATT.ENDPOINT	6.00	+20	1,879,999,998	-2	-0.0012	-0.000000115

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 2

OPERATING FREQUENCY : 1880 MHz
 REFERENCE VOLTAGE : 12 VDC
 LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	12	+20(Ref)	1,880,000,004	4	0.0021	0.000000213
100%		-30	1,880,000,002	2	0.0011	0.000000106
100%		-20	1,879,999,995	-5	-0.0027	-0.000000266
100%		-10	1,880,000,001	1	0.0005	0.000000053
100%		0	1,880,000,006	6	0.0032	0.000000319
100%		+10	1,879,999,998	-2	-0.0011	-0.000000106
100%		+20	1,880,000,004	4	0.0021	0.000000213
100%		+30	1,880,000,005	5	0.0027	0.000000266
100%		+40	1,880,000,002	2	0.0011	0.000000106
100%		+50	1,879,999,997	-3	-0.0016	-0.000000160
115%	10.20	+20	1,880,000,001	1	0.0005	0.000000053
BATT.ENDPOINT	6.00	+20	1,880,000,003	3	0.0016	0.000000160

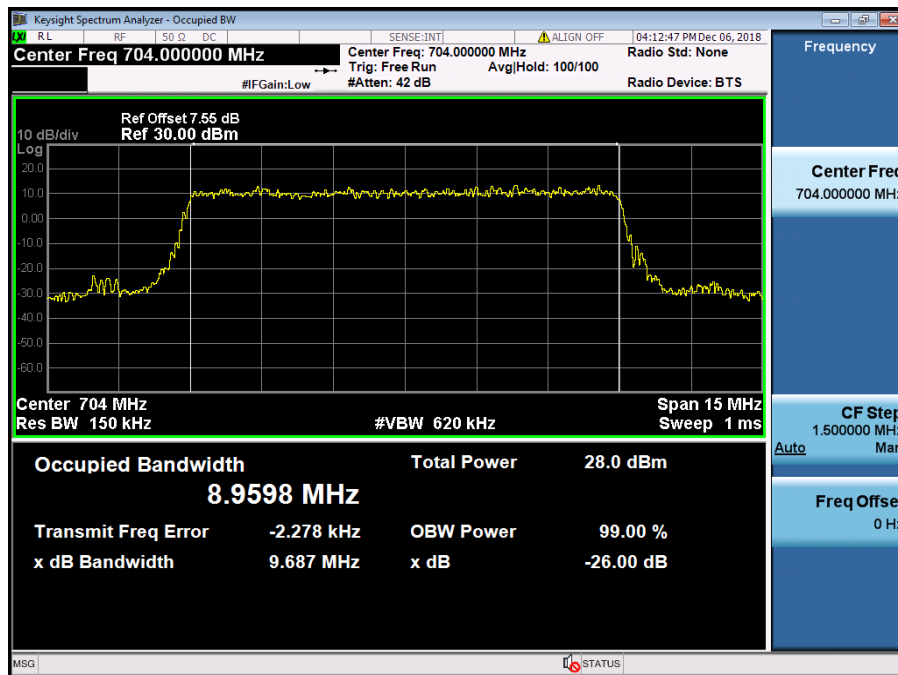
Note. Based on the results of the frequency stability test at the center channel the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain inband when the maximum measured frequency deviation noted during the frequency stability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

8. TEST PLOTS

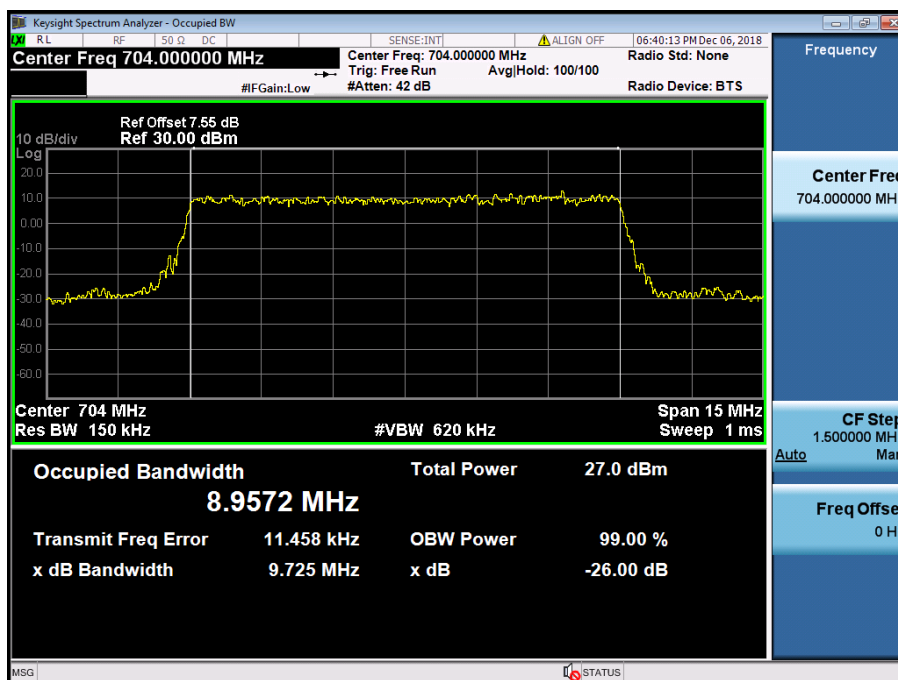
Note: All bandwidths, RB configurations, and modulations were investigated.
The worst case test results are reported.

8.1 OCCUPIED BANDWIDTH

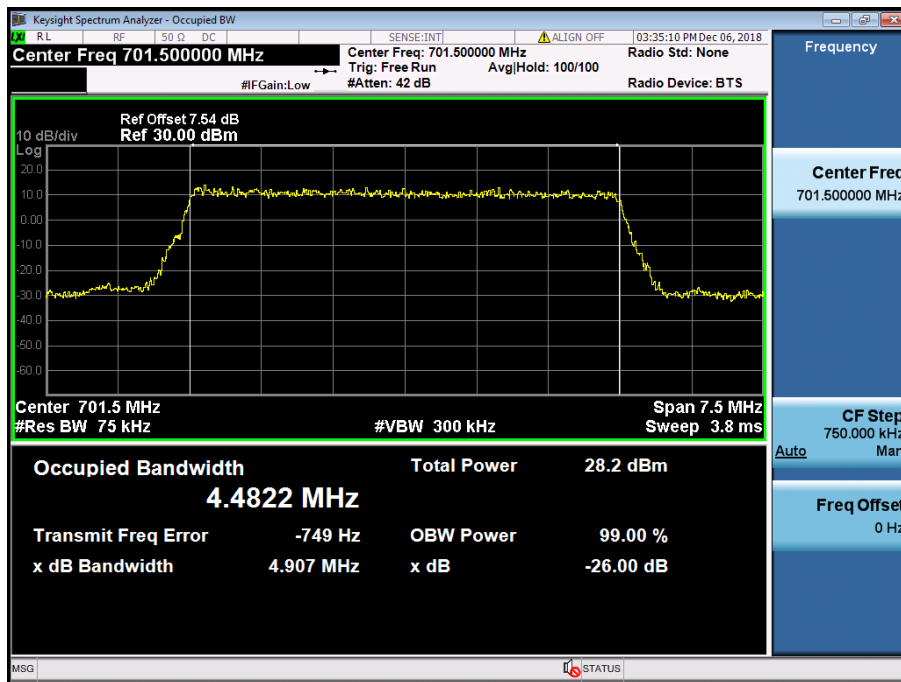
8.1.1 LTE Band 12,17



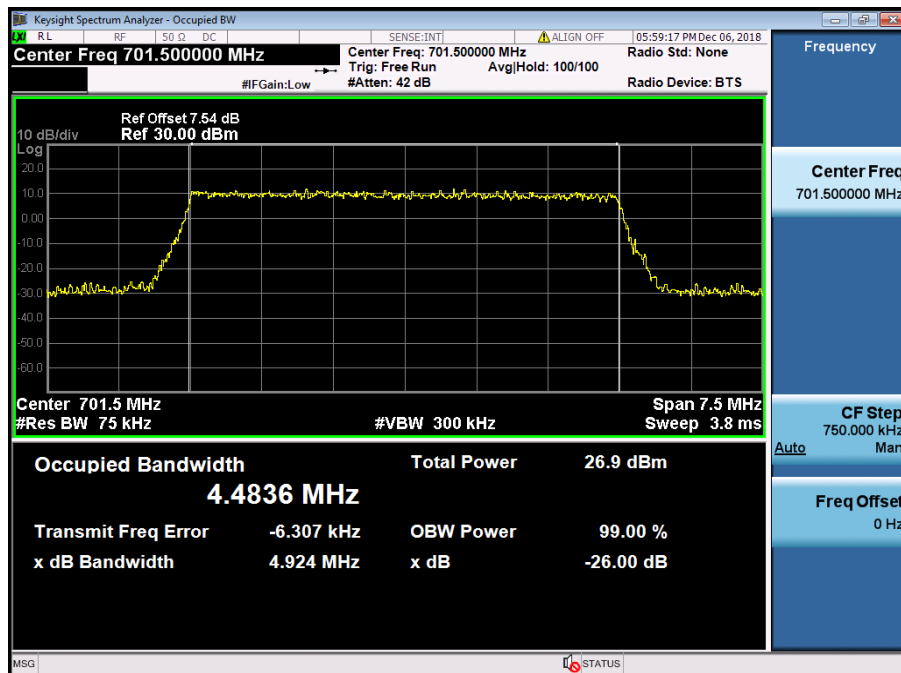
LTE Band 12,17 / 10 MHz / QPSK - RB Size 50



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

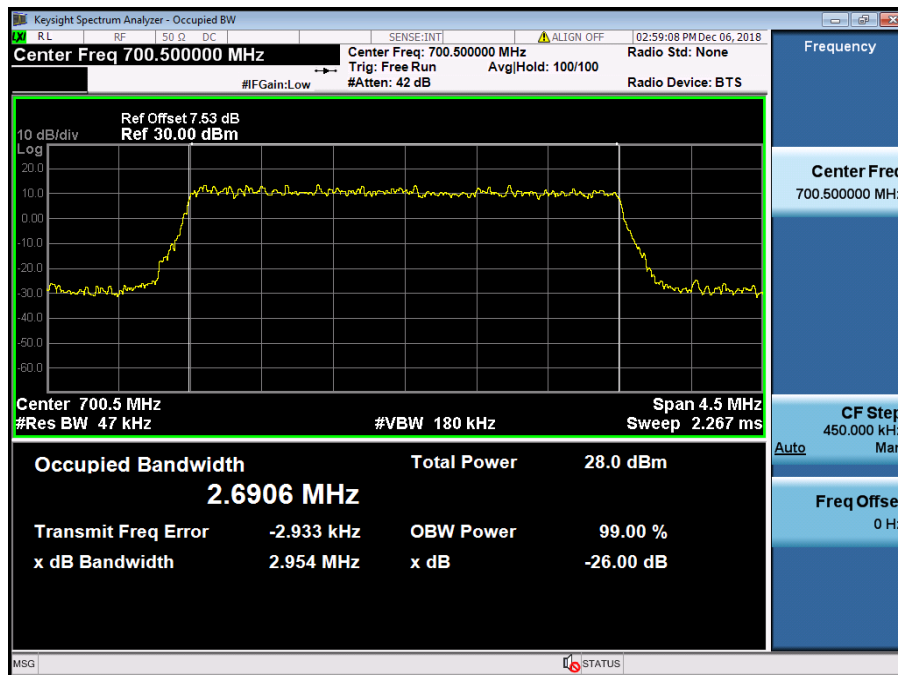


LTE Band 12,17 / 5 MHz / QPSK - RB Size 25

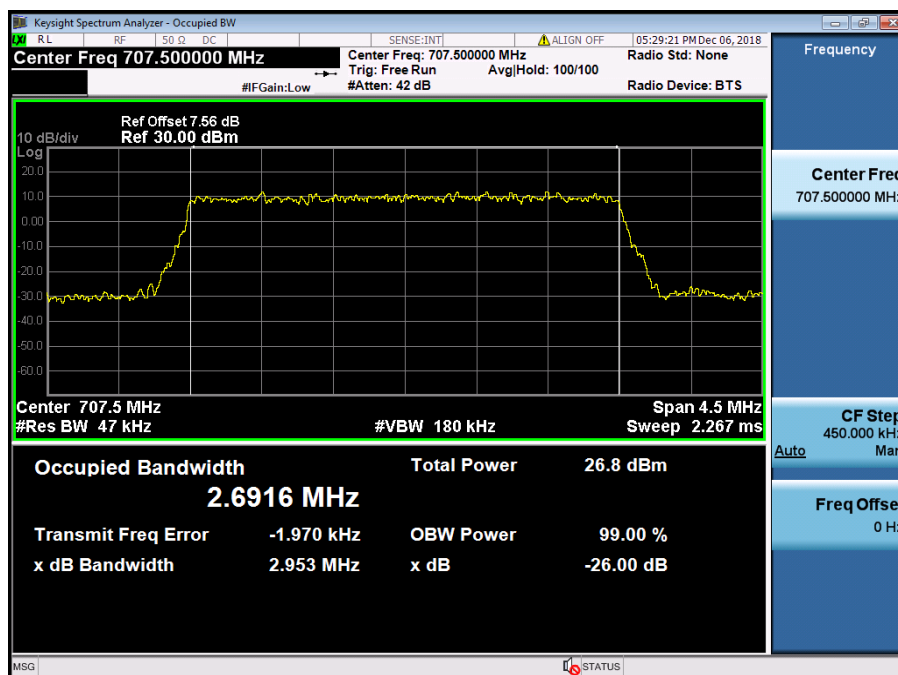


LTE Band 12,17 / 5 MHz / 16QAM - RB Size 25

8.1.2 LTE Band 12



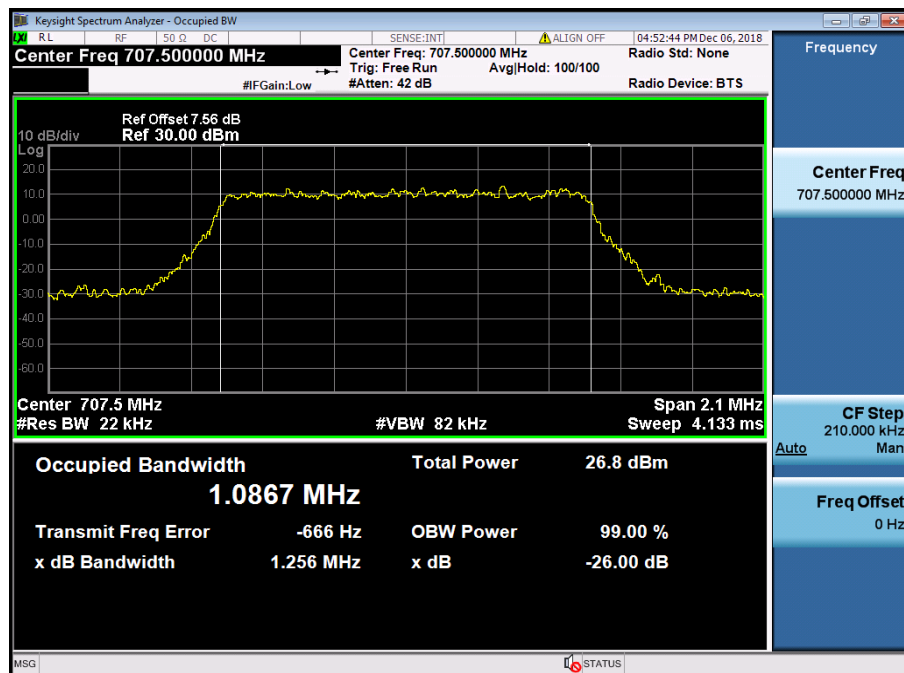
LTE Band 12 / 3 MHz / QPSK - RB Size 15



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

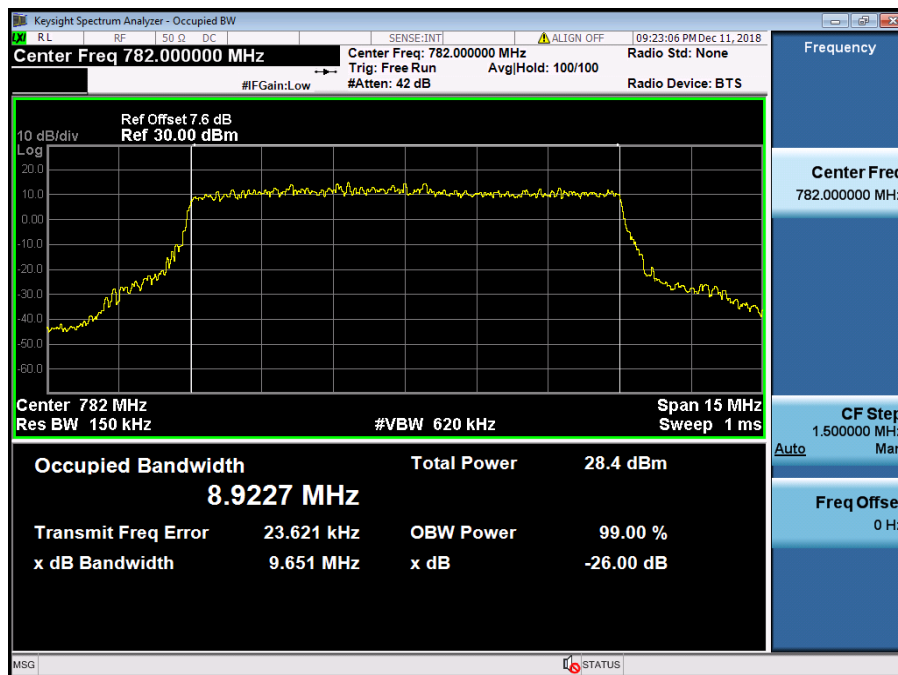


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

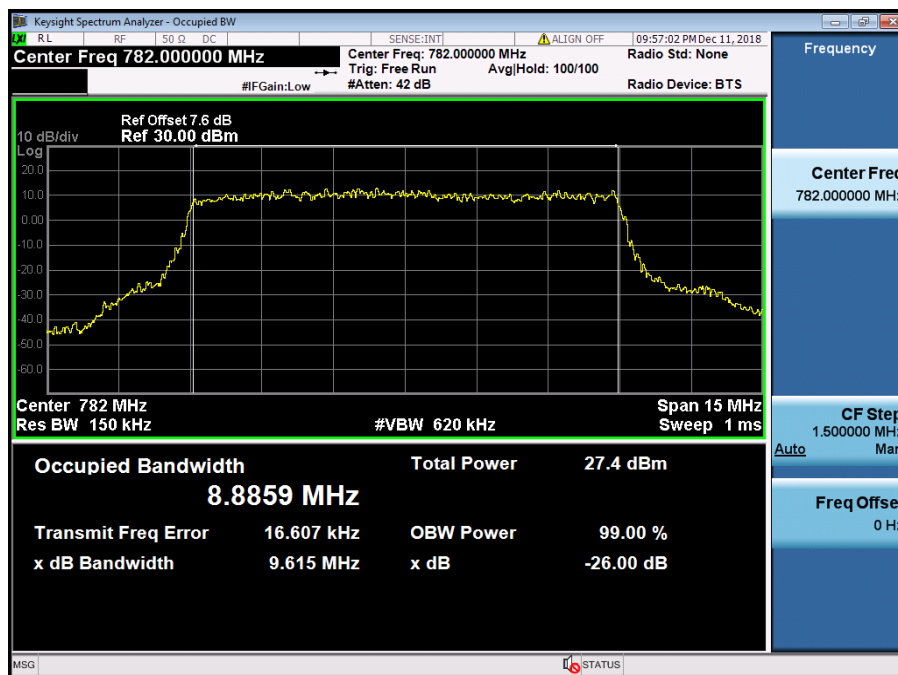


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

8.1.3 LTE Band 13



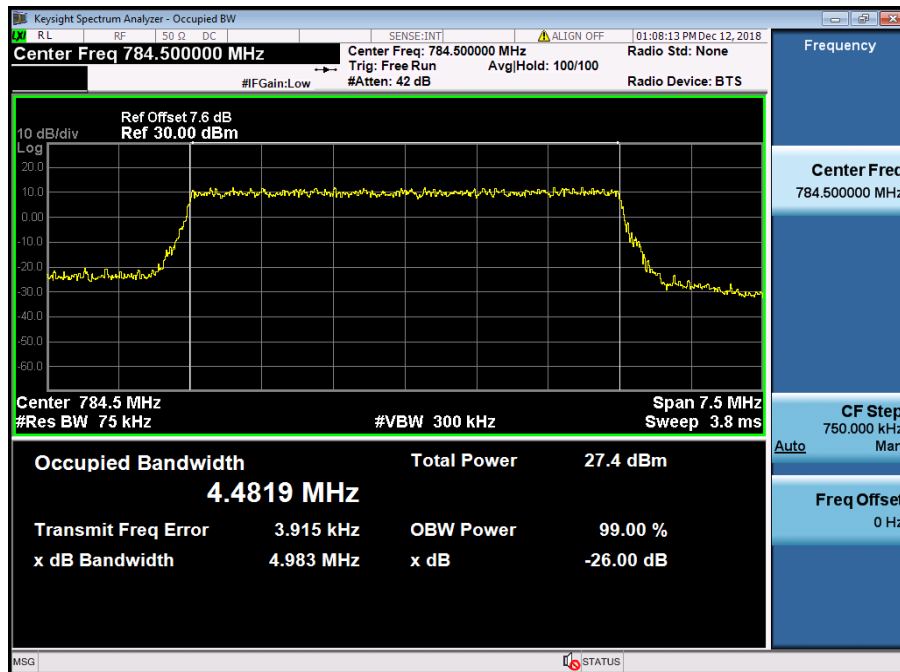
LTE Band 13 / 10 MHz / QPSK - RB Size 50



LTE Band 13 / 10 MHz / 16QAM - RB Size 50

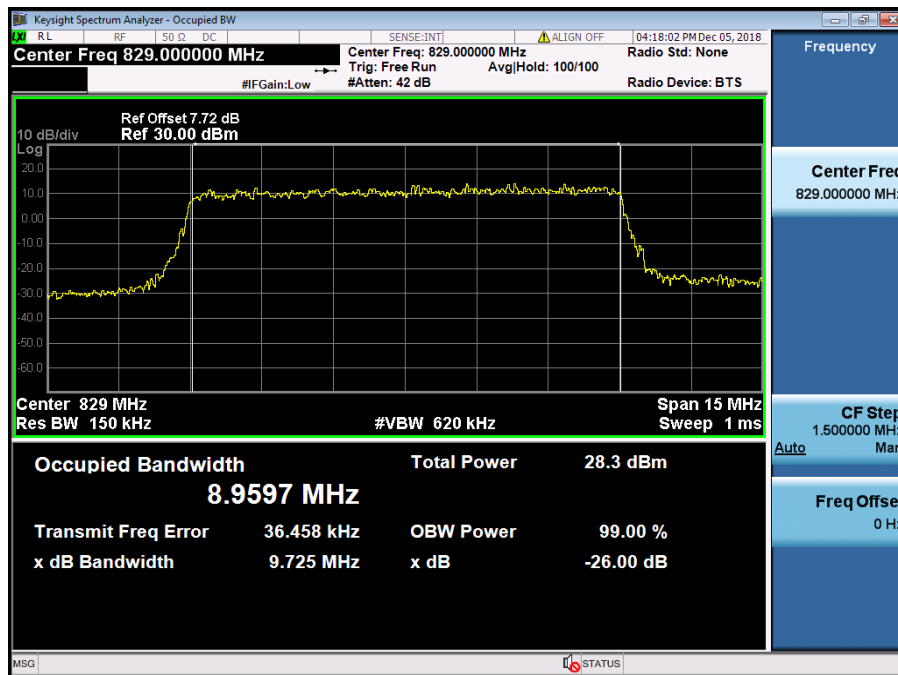


LTE Band 13 / 5 MHz / QPSK - RB Size 25

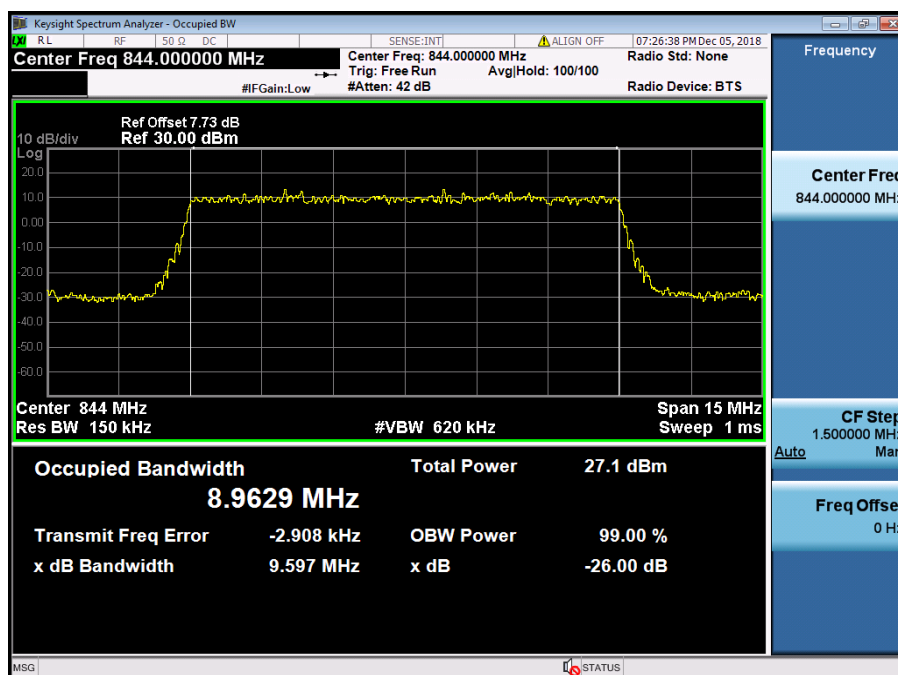


LTE Band 13 / 5 MHz / 16QAM - RB Size 25

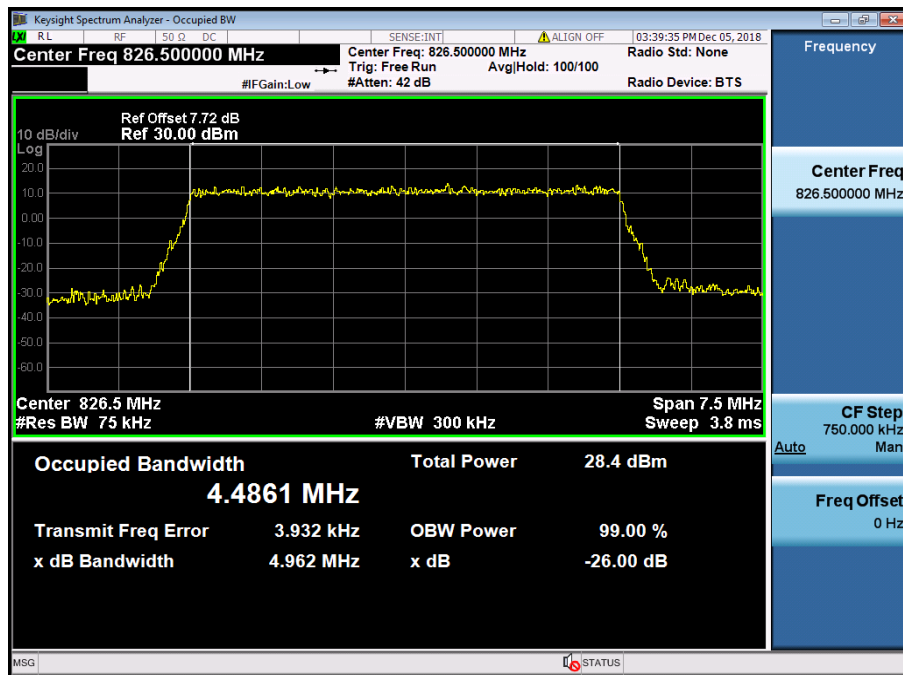
8.1.4 LTE Band 5



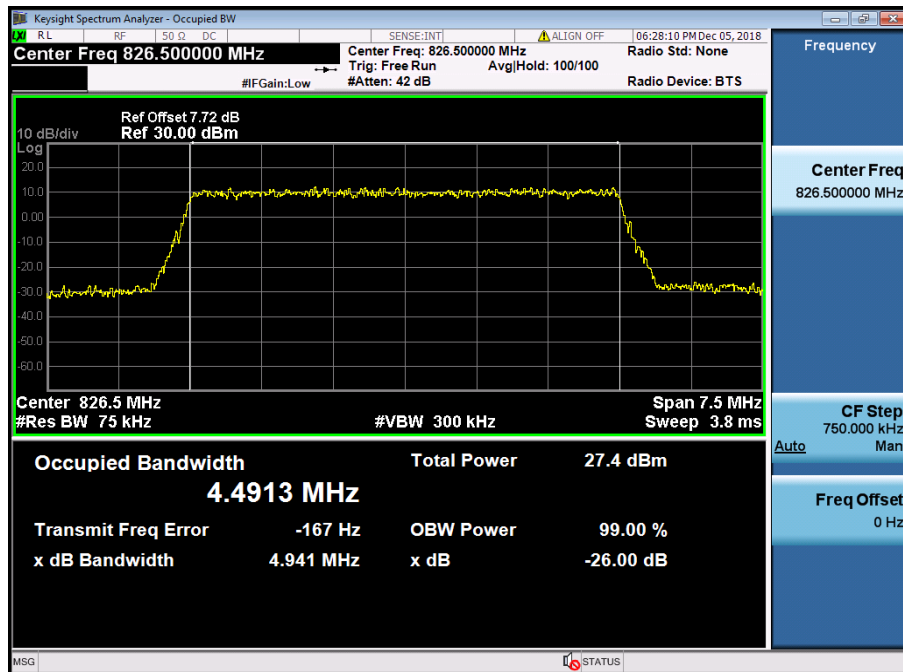
LTE Band 5 / 10 MHz / QPSK - RB Size 50



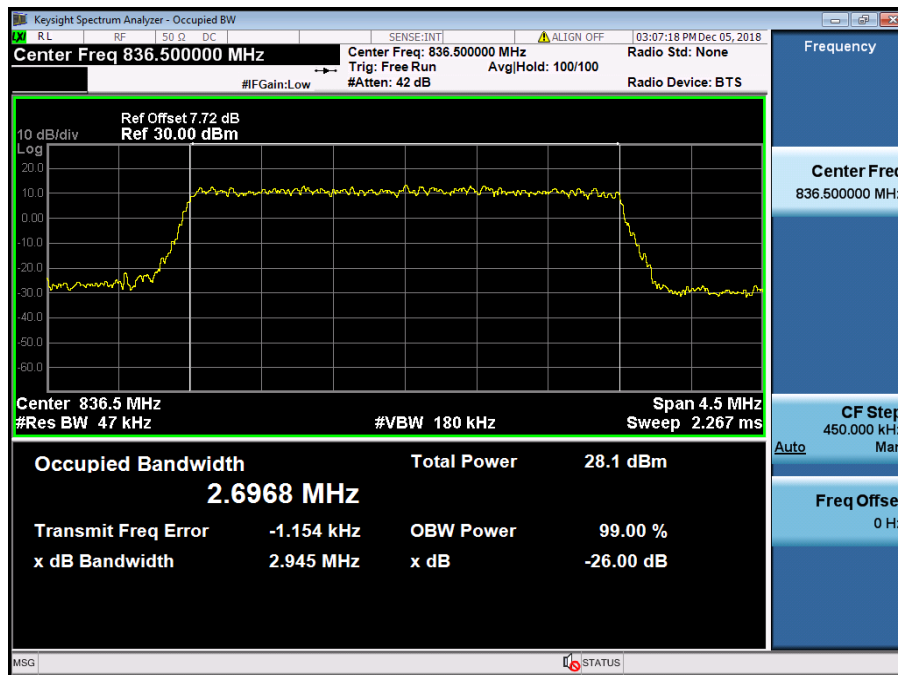
LTE Band 5 / 10 MHz / 16QAM - RB Size 50



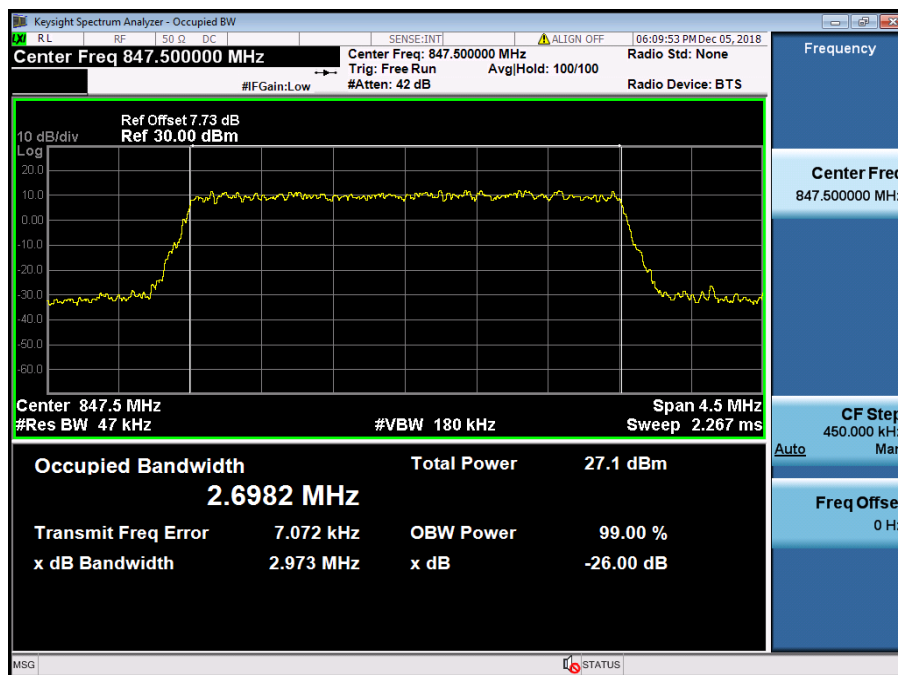
LTE Band 5 / 5 MHz / QPSK - RB Size 25



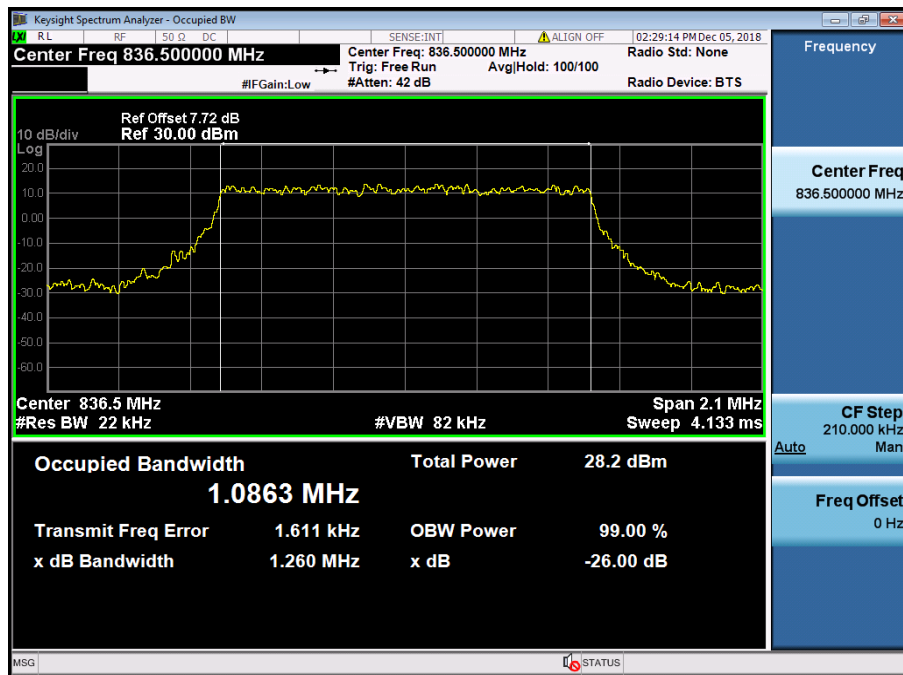
LTE Band 5 / 5 MHz / 16QAM - RB Size 25



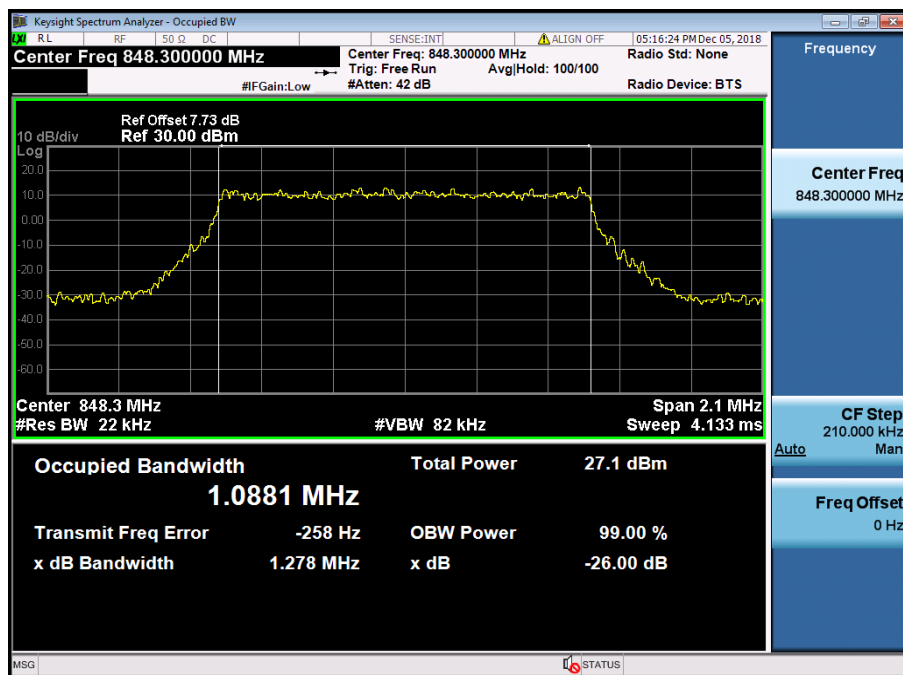
LTE Band 5 / 3 MHz / QPSK - RB Size 15



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

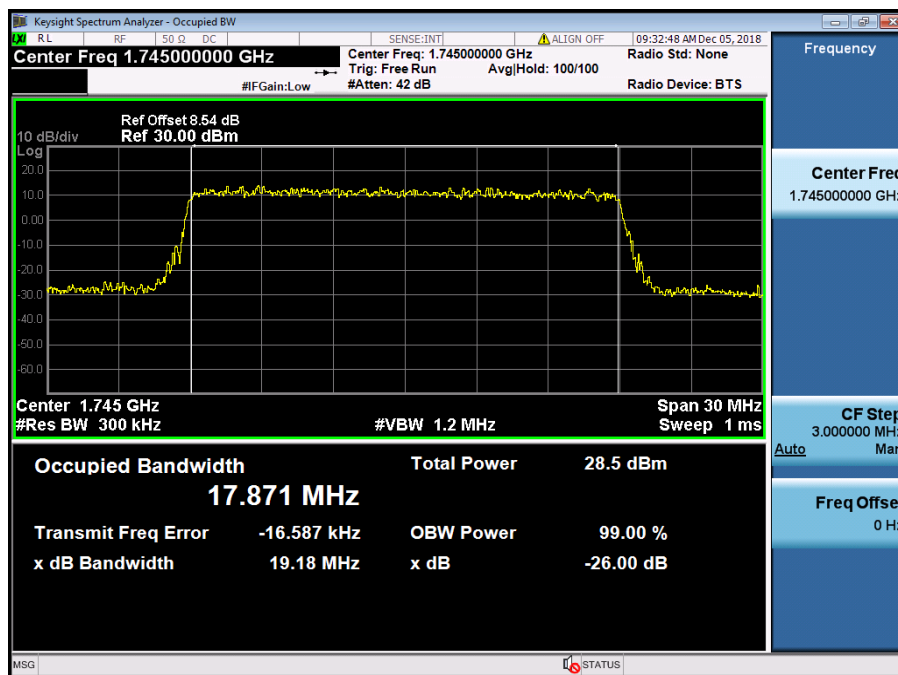


LTE Band 5 / 1.4 MHz / QPSK - RB Size 6

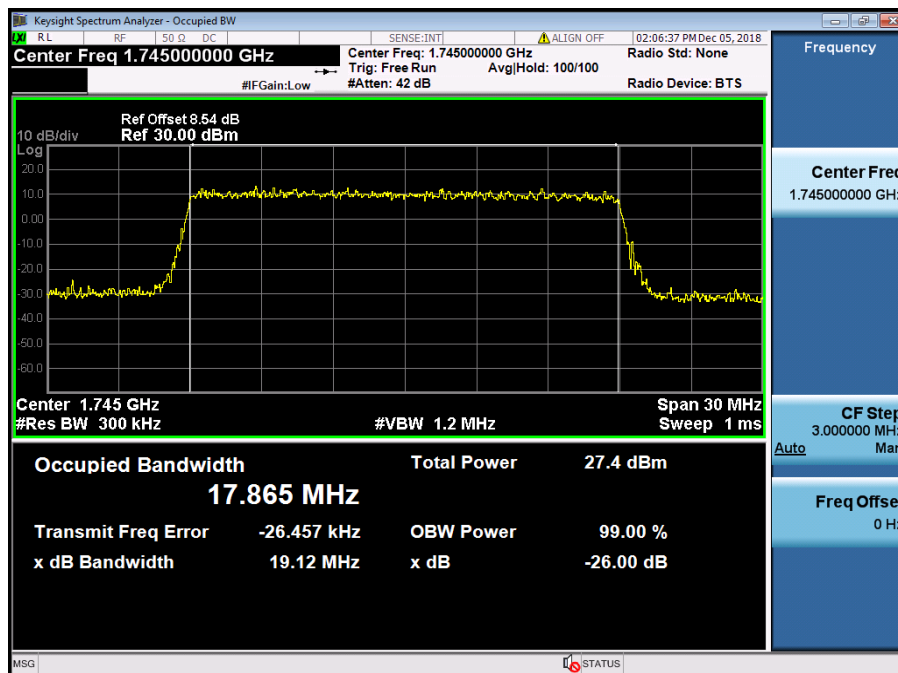


LTE Band 5 / 1.4 MHz / 16QAM - RB Size 6

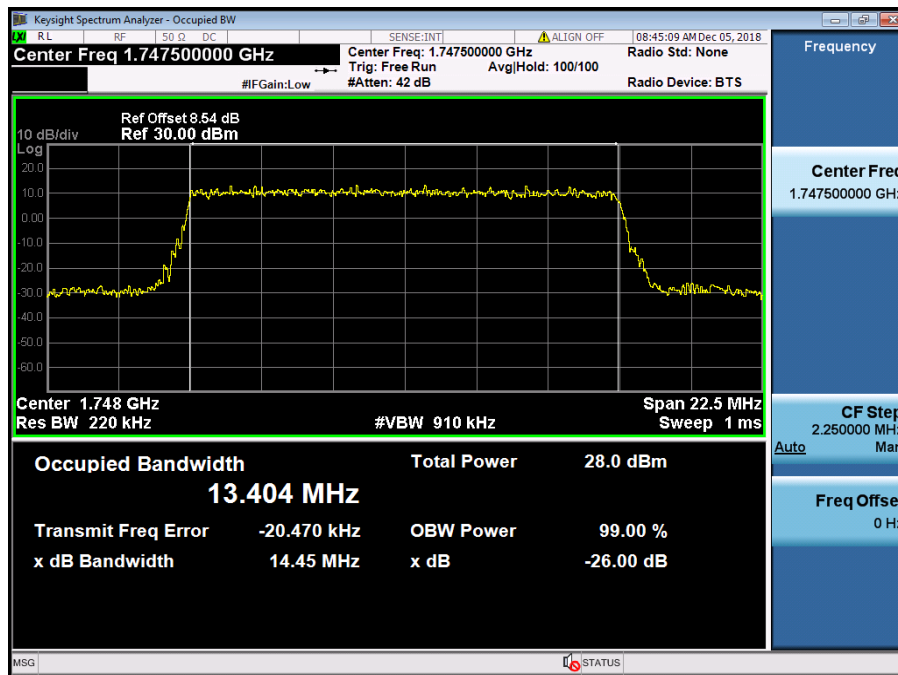
8.1.5 LTE Band 4



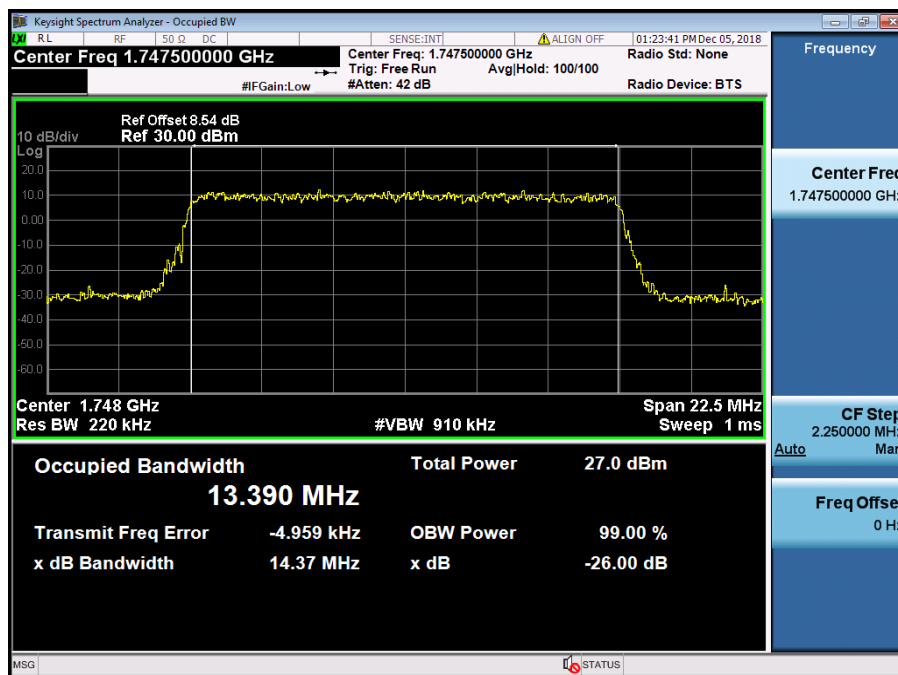
LTE Band 4 / 20 MHz / QPSK - RB Size 100



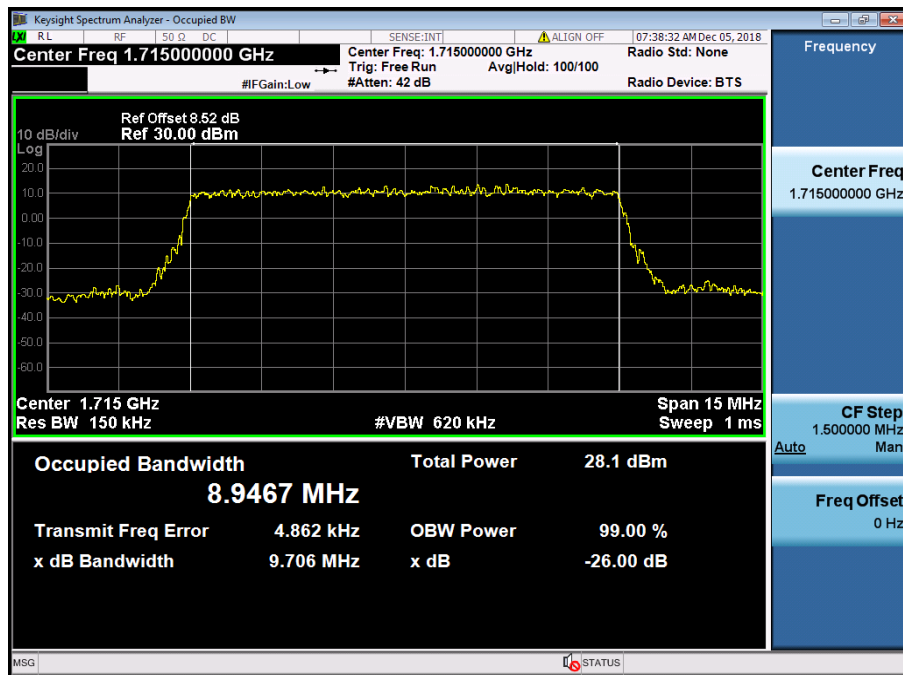
LTE Band 4 / 20 MHz / 16QAM - RB Size 100



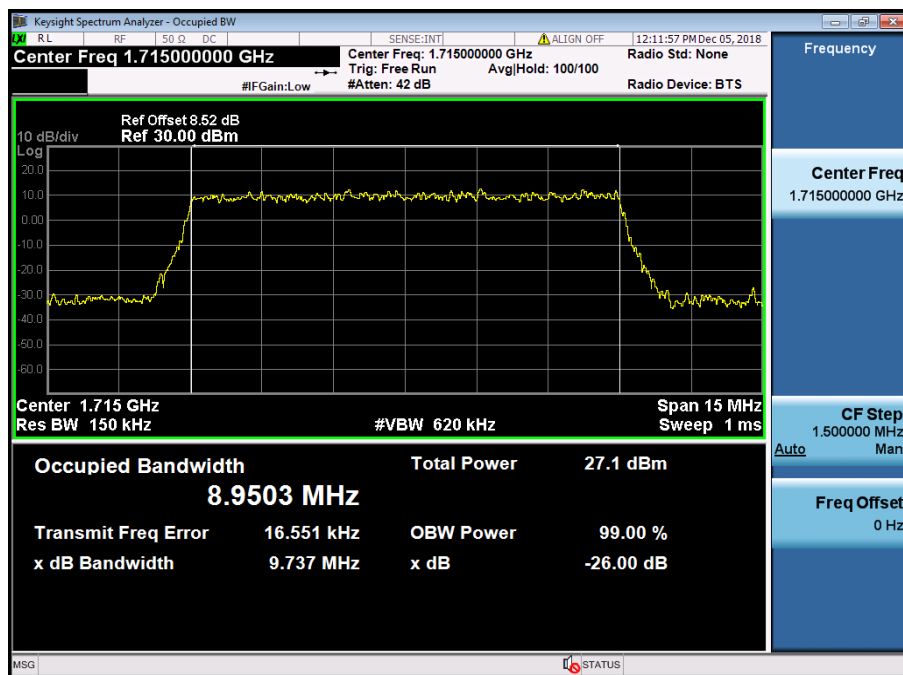
LTE Band 4 / 15 MHz / QPSK - RB Size 75



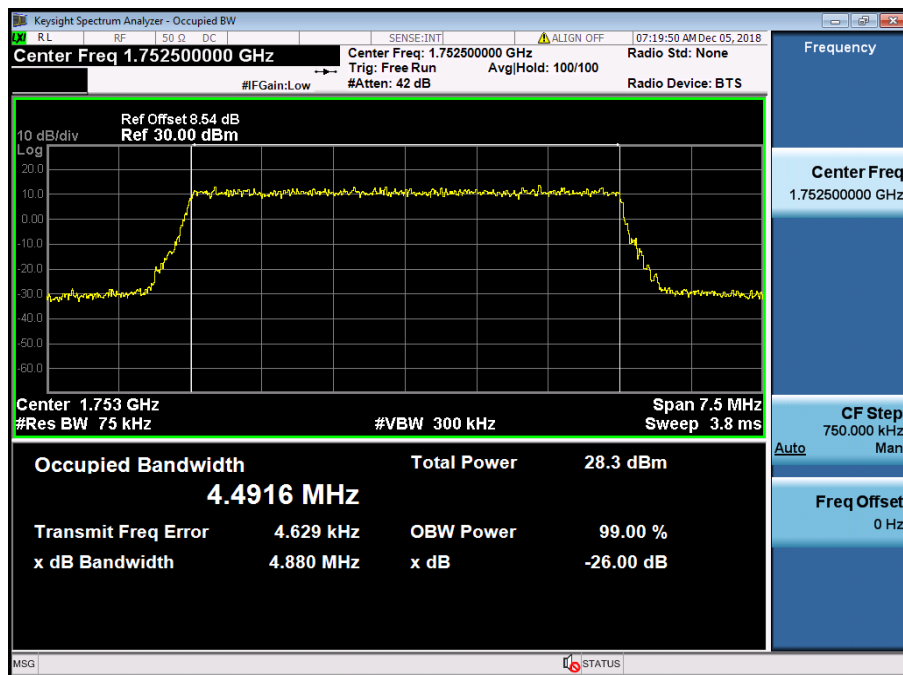
LTE Band 4 / 15 MHz / 16QAM - RB Size 75



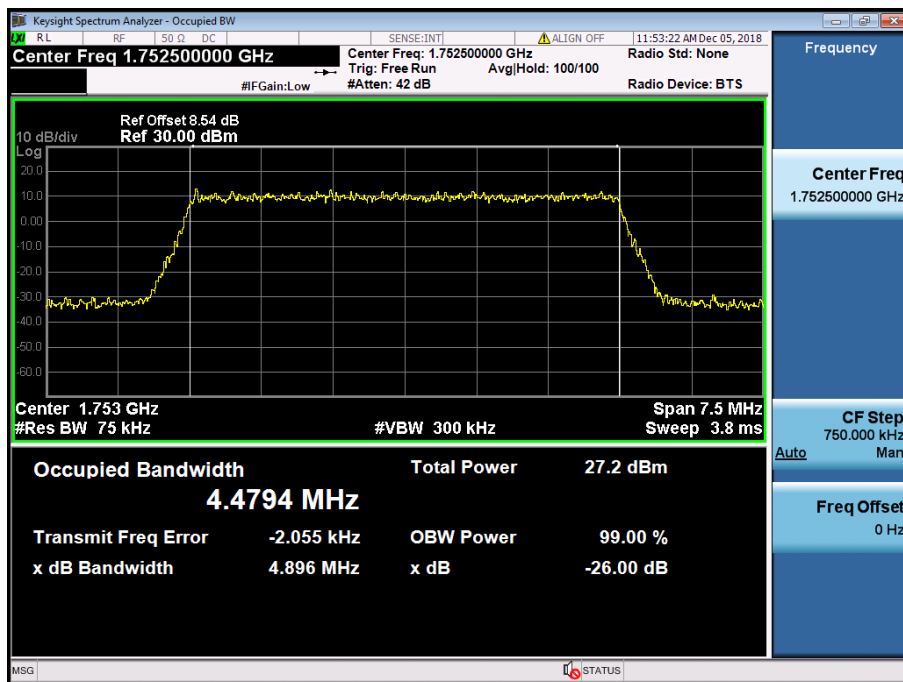
LTE Band 4 / 10 MHz / QPSK - RB Size 50



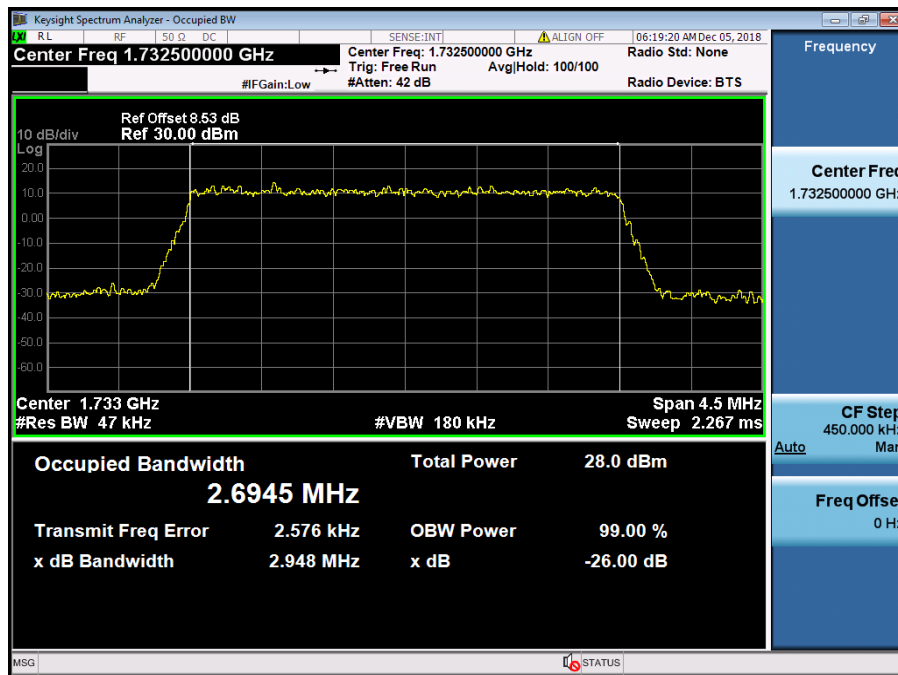
LTE Band 4 / 10 MHz / 16QAM - RB Size 50



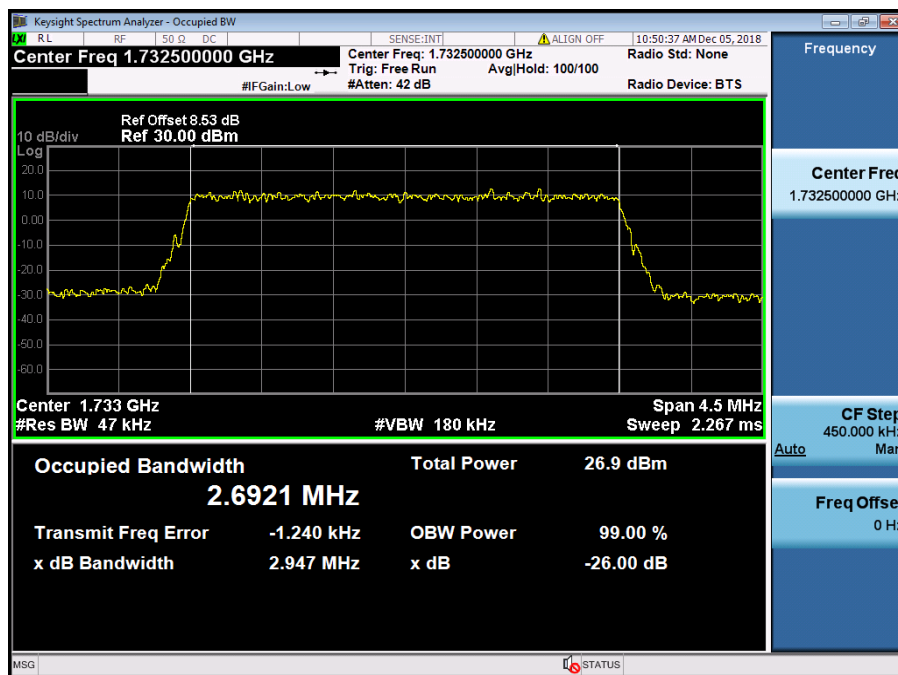
LTE Band 4 / 5 MHz / QPSK - RB Size 25



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



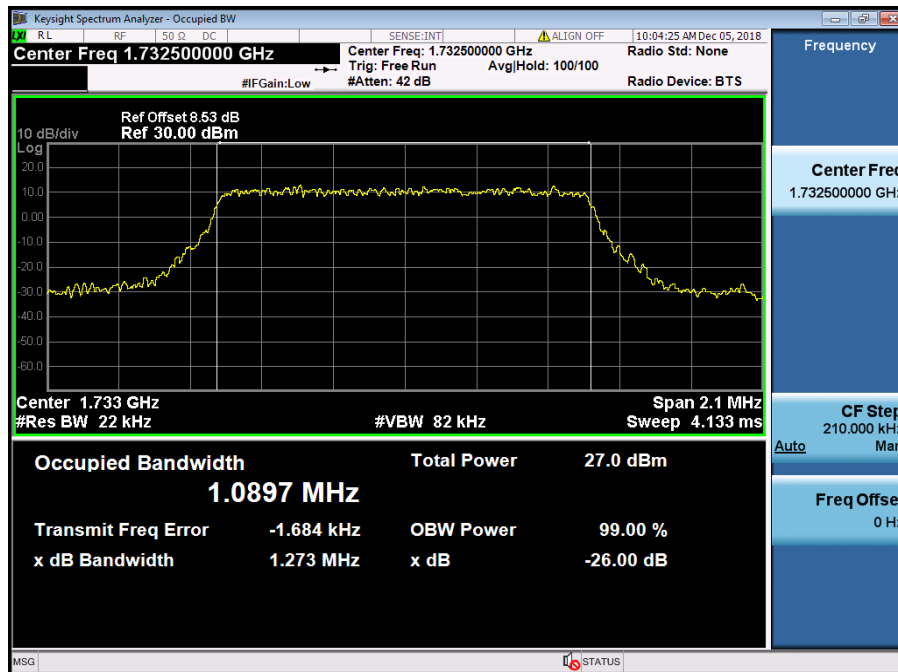
LTE Band 4 / 3 MHz / QPSK - RB Size 15



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

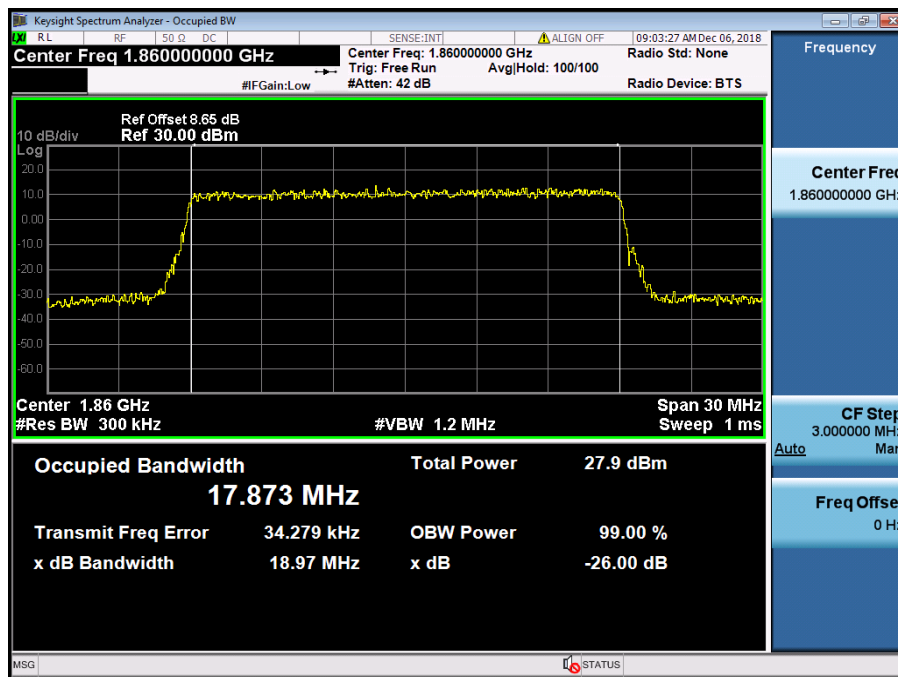


LTE Band 4 / 1.4 MHz / QPSK - RB Size 6

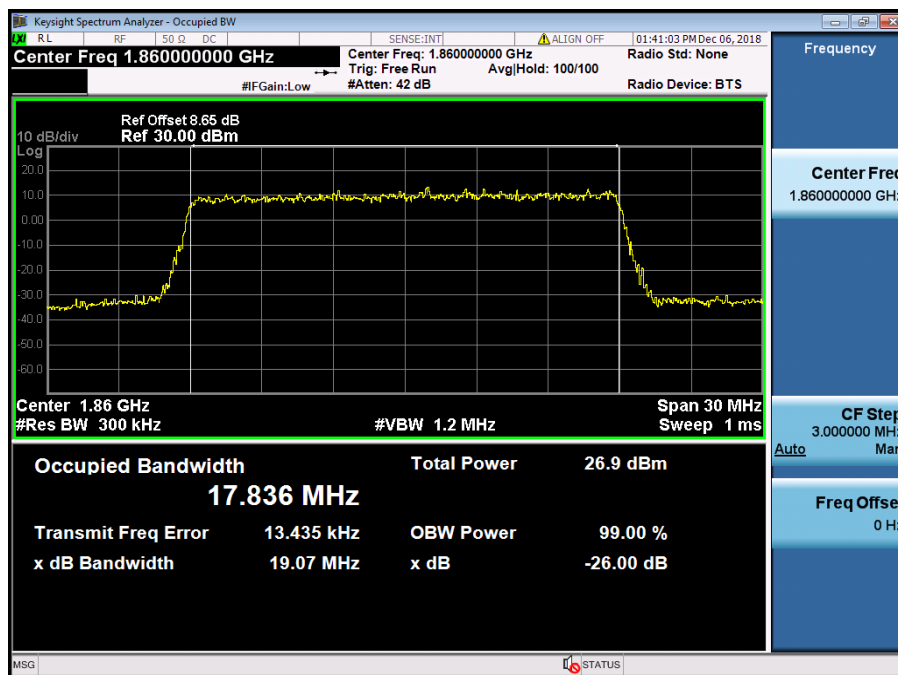


LTE Band 4 / 1.4 MHz / 16QAM - RB Size 6

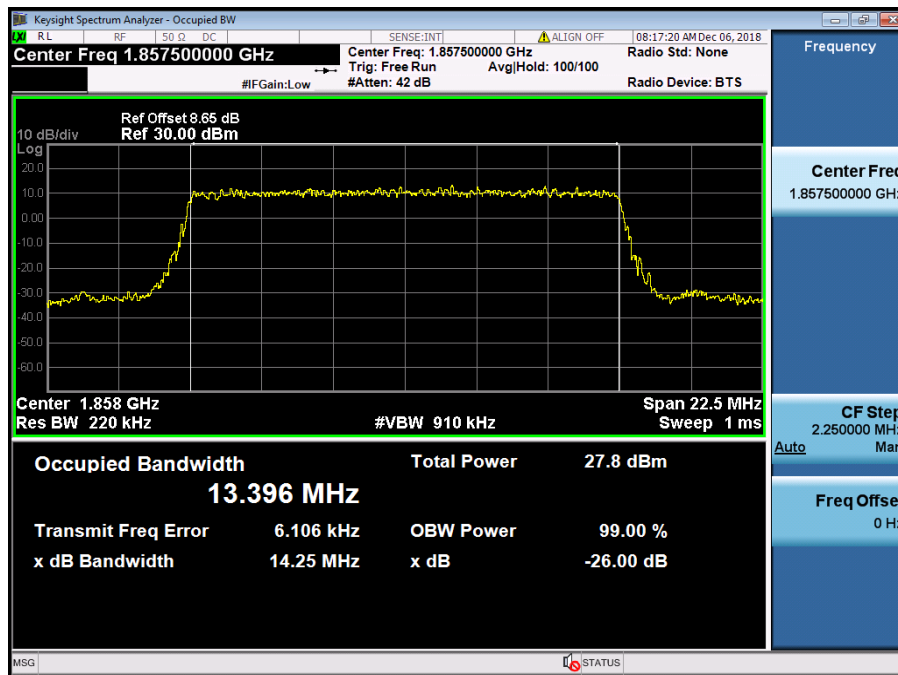
8.1.6 LTE Band 2



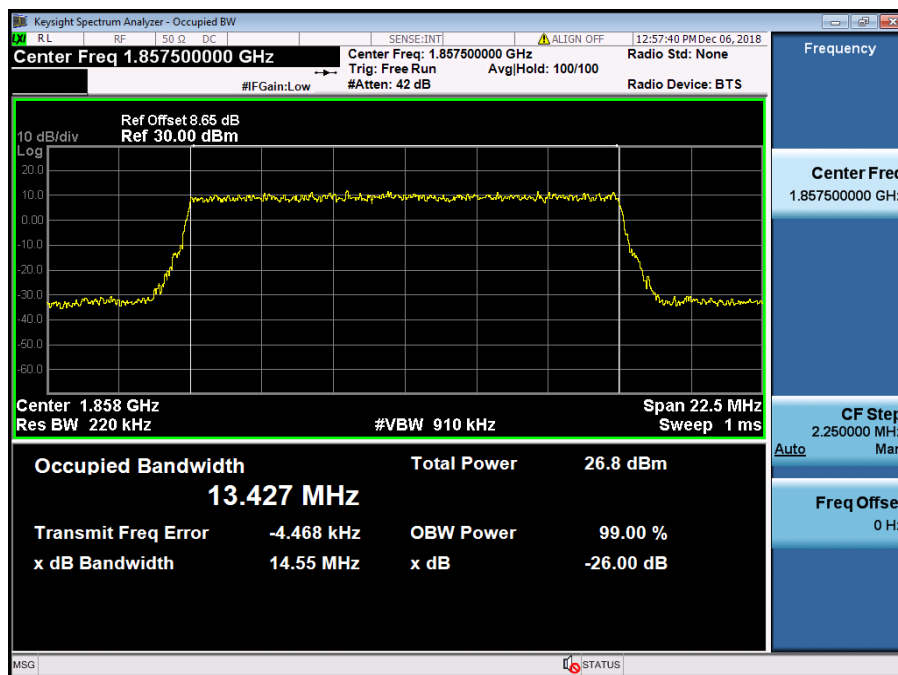
LTE Band 2 / 20 MHz / QPSK - RB Size 100



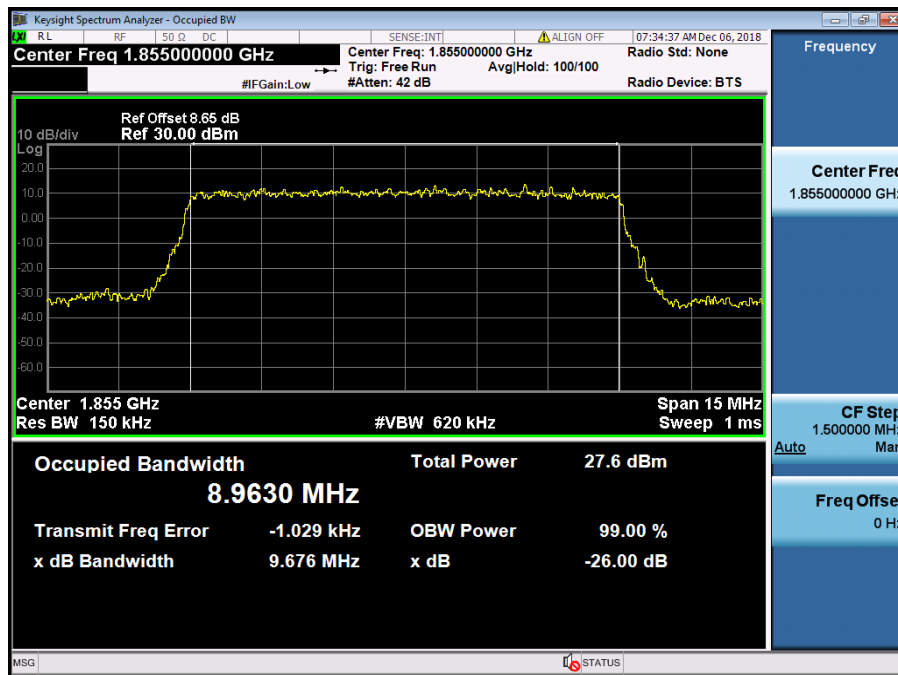
LTE Band 2 / 20 MHz / 16QAM - RB Size 100



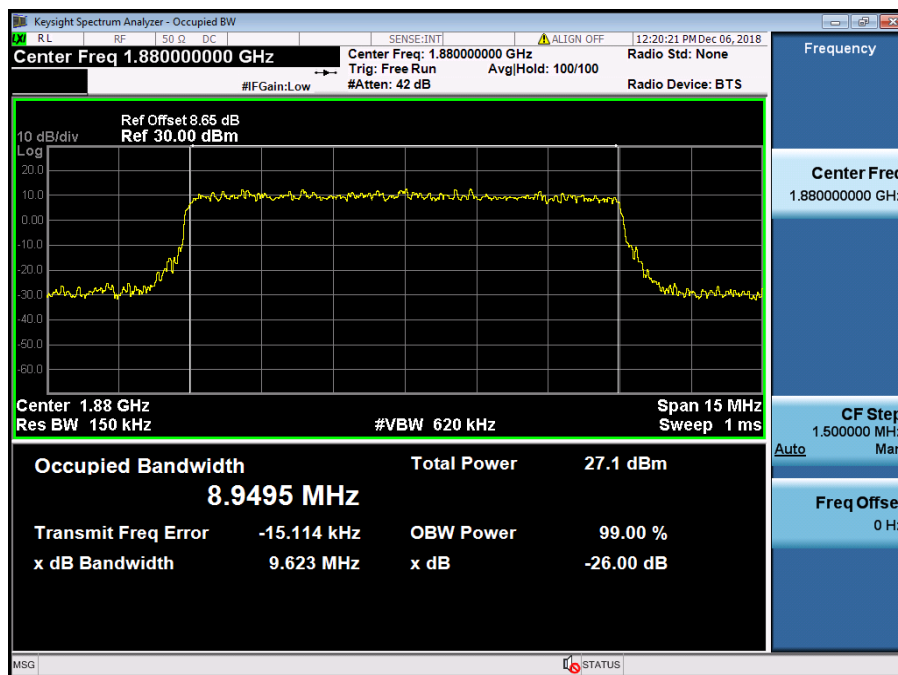
LTE Band 2 / 15 MHz / QPSK - RB Size 75



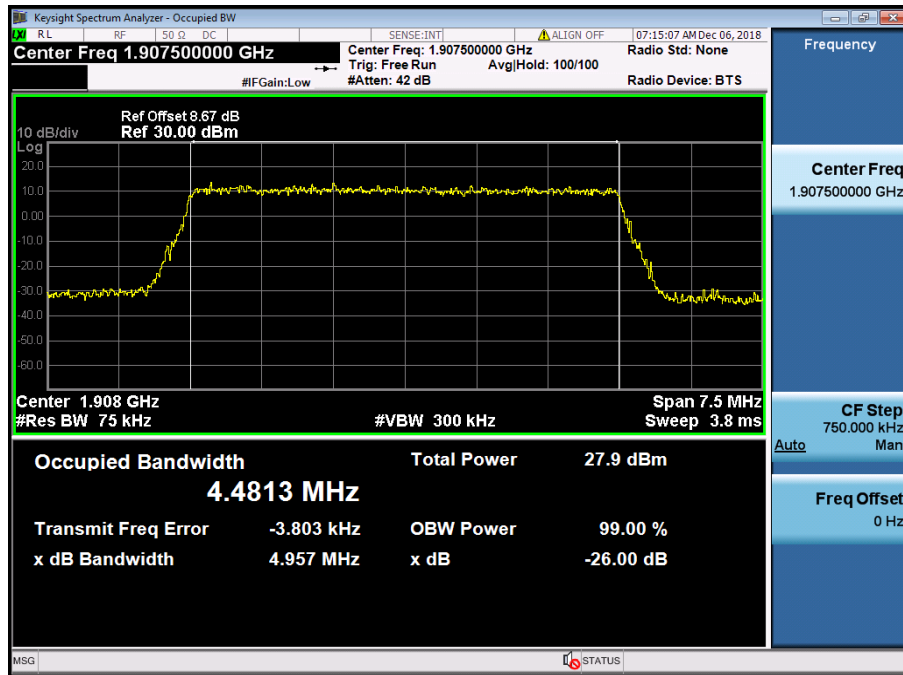
LTE Band 2 / 15 MHz / 16QAM - RB Size 75



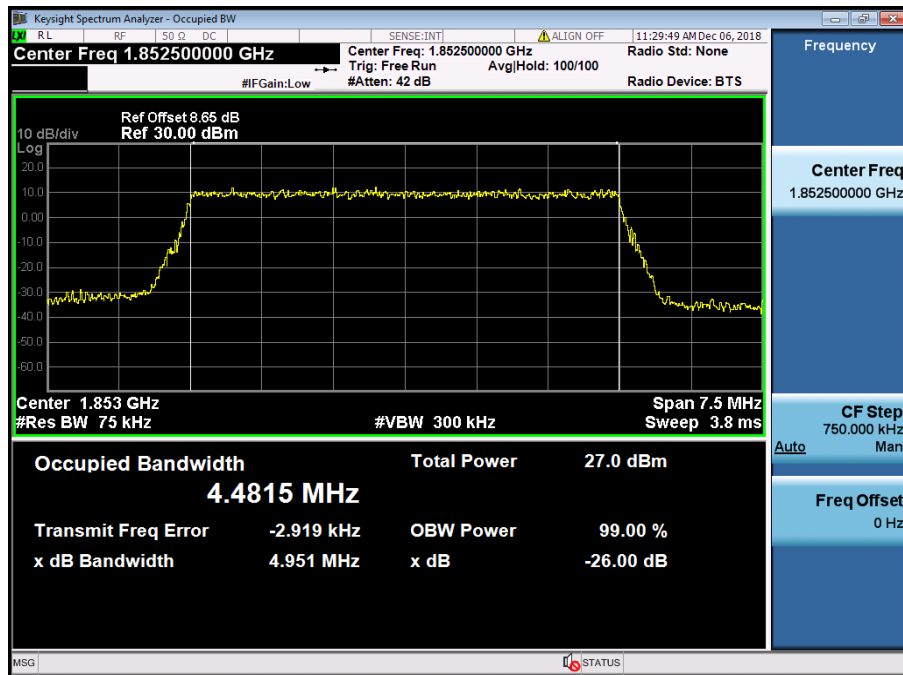
LTE Band 2 / 10 MHz / QPSK - RB Size 50



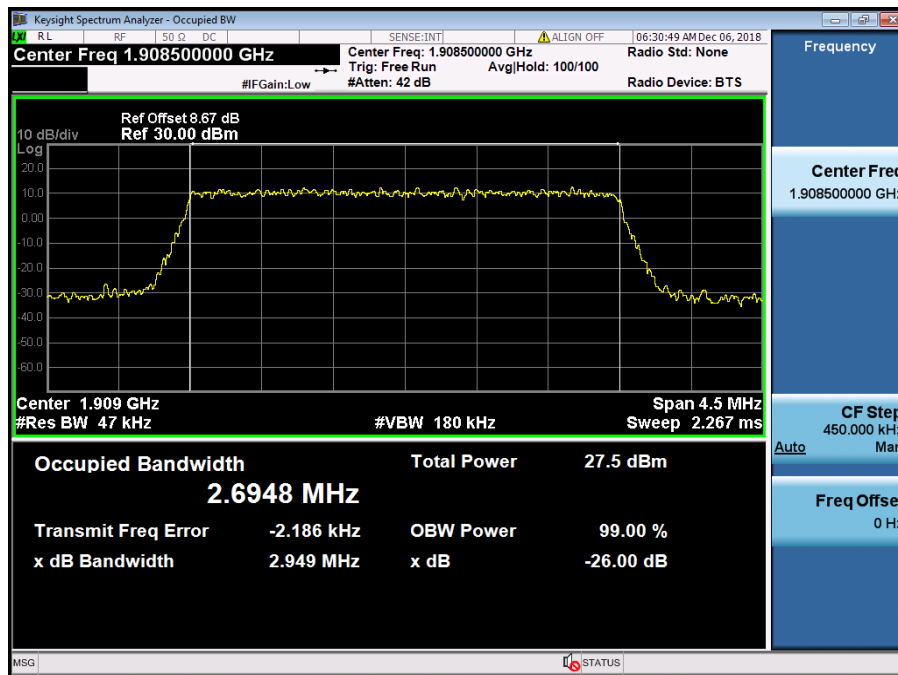
LTE Band 2 / 10 MHz / 16QAM - RB Size 50



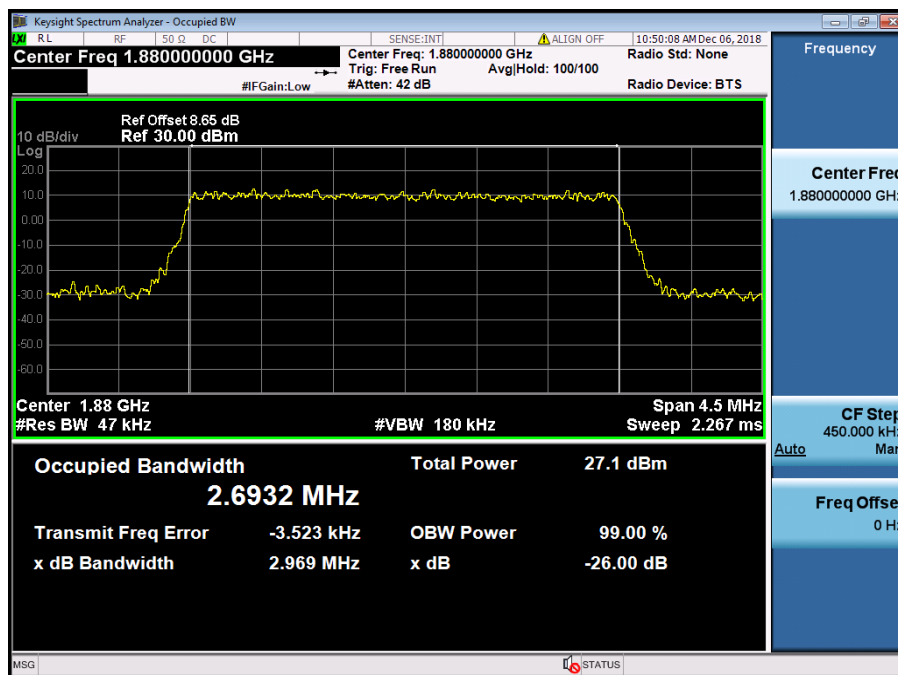
LTE Band 2 / 5 MHz / QPSK - RB Size 25



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



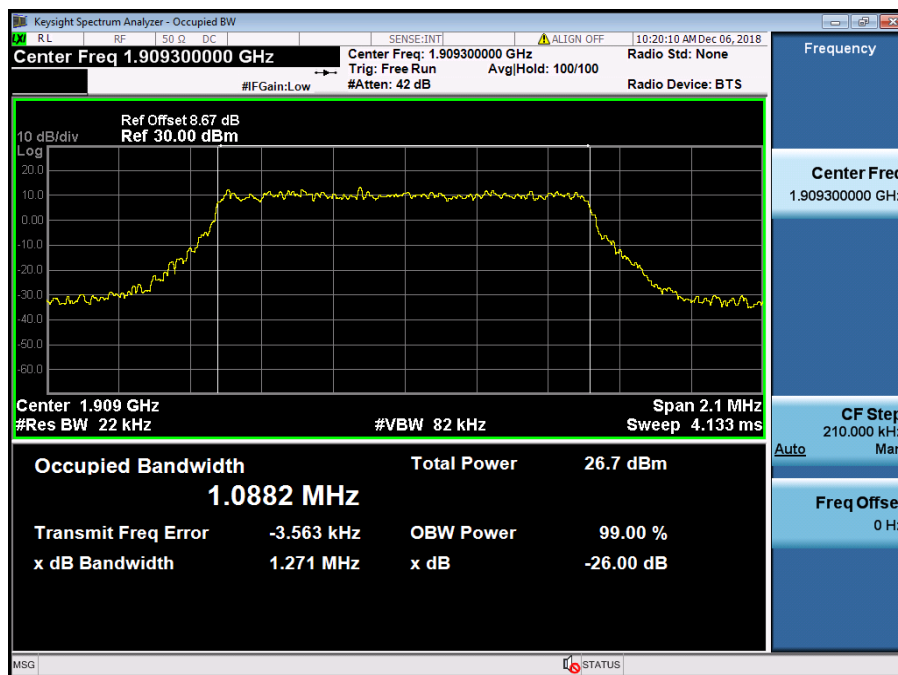
LTE Band 2 / 3 MHz / QPSK - RB Size 15



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



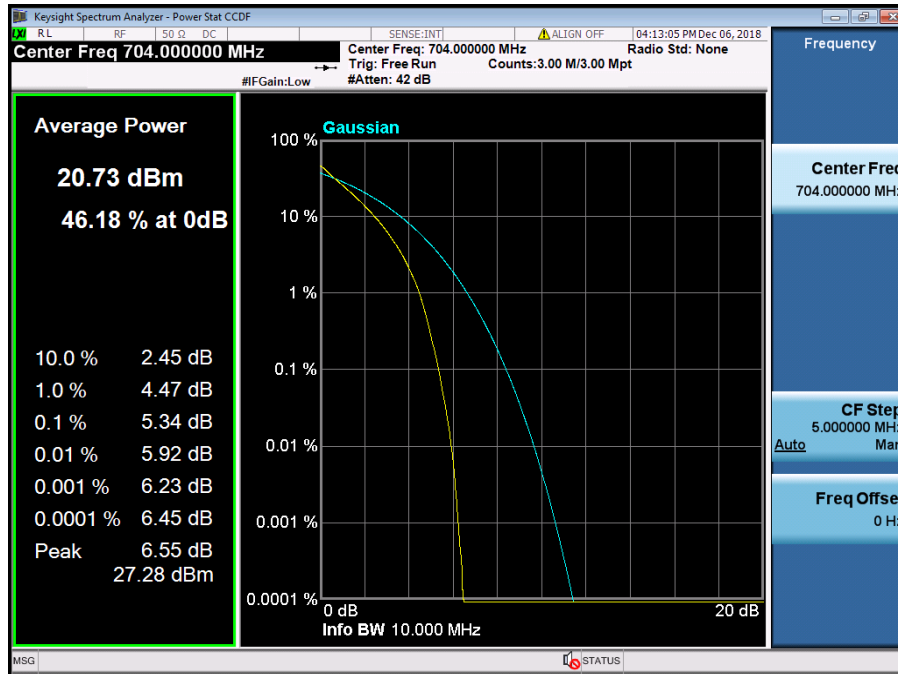
LTE Band 2 / 1.4 MHz / QPSK - RB Size 6



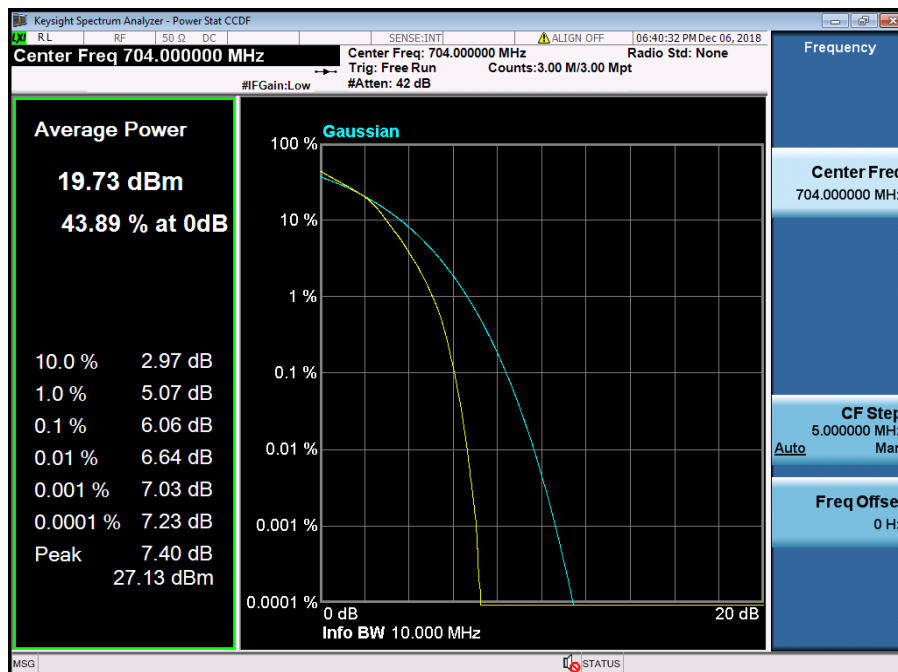
LTE Band 2 / 1.4 MHz / 16QAM - RB Size 6

8.2 PEAK TO AVERAGE RATIO

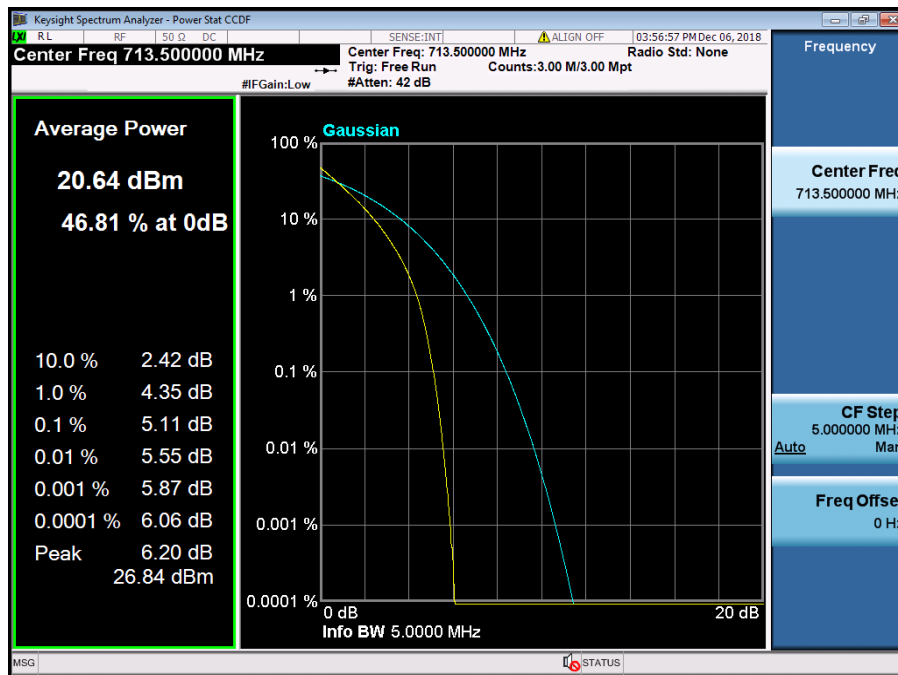
8.2.1 LTE Band 12,17



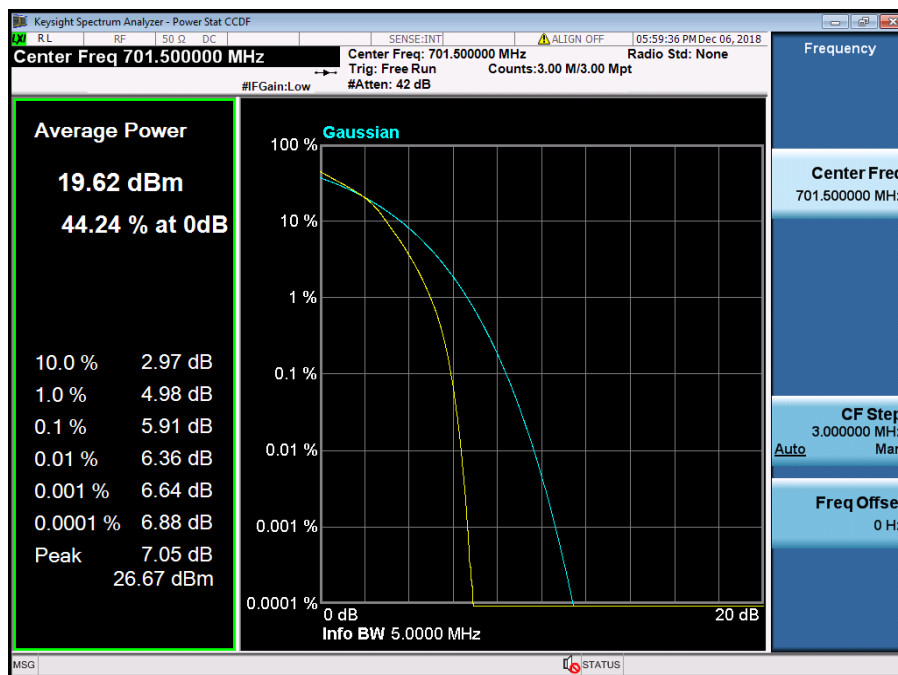
LTE Band 12,17 / 10 MHz / QPSK - RB Size 50



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

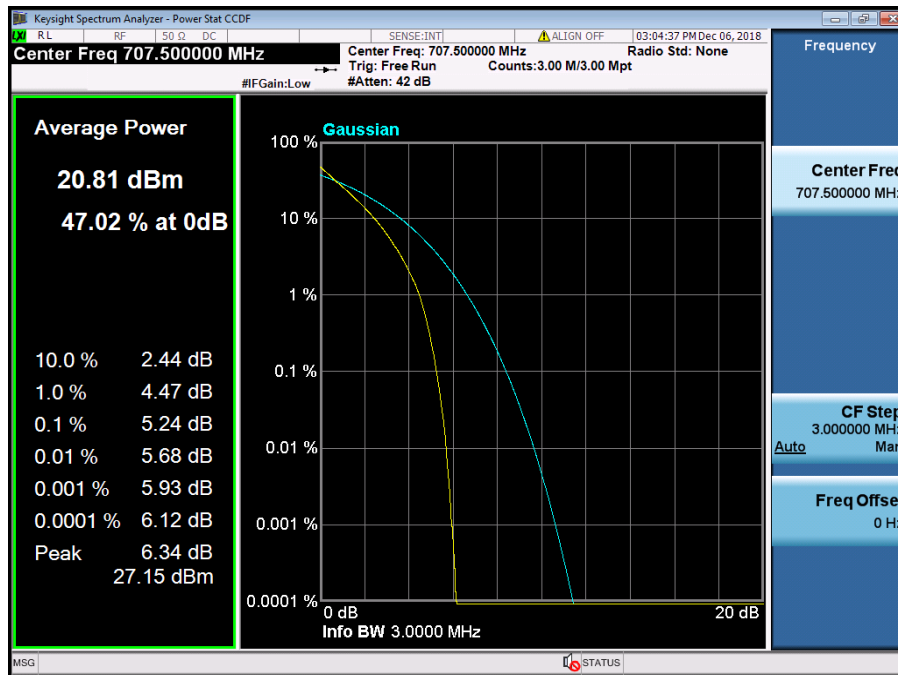


LTE Band 12,17 / 5 MHz / QPSK - RB Size 25

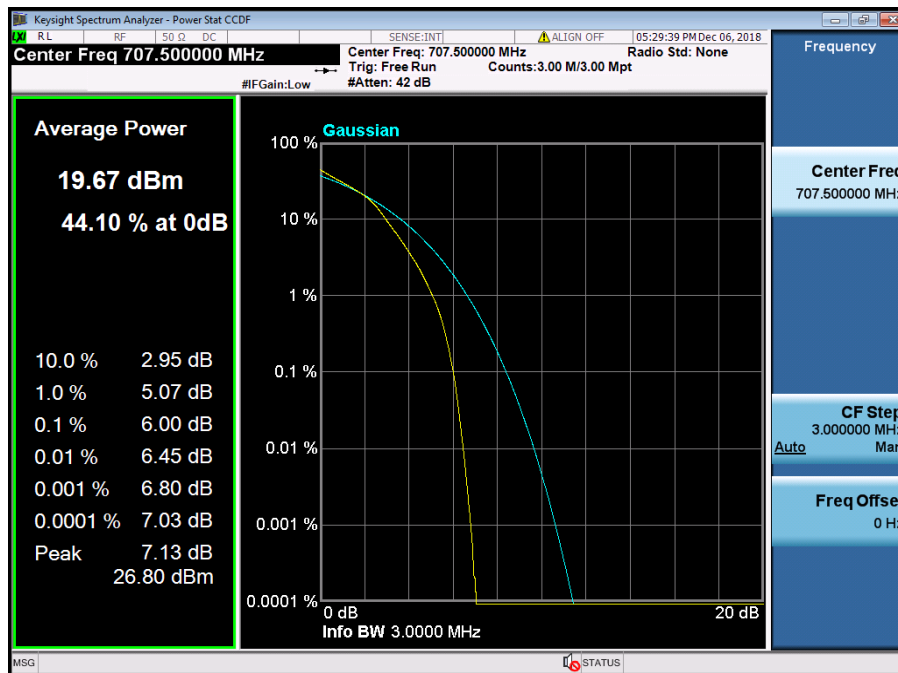


LTE Band 12,17 / 5 MHz / 16QAM - RB Size 25

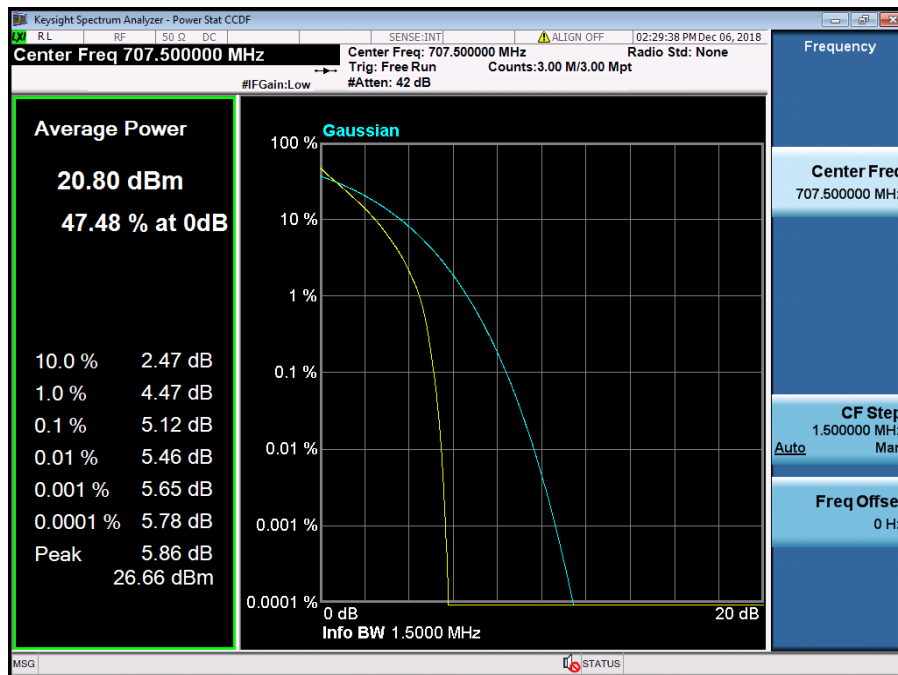
8.2.2 LTE Band 12



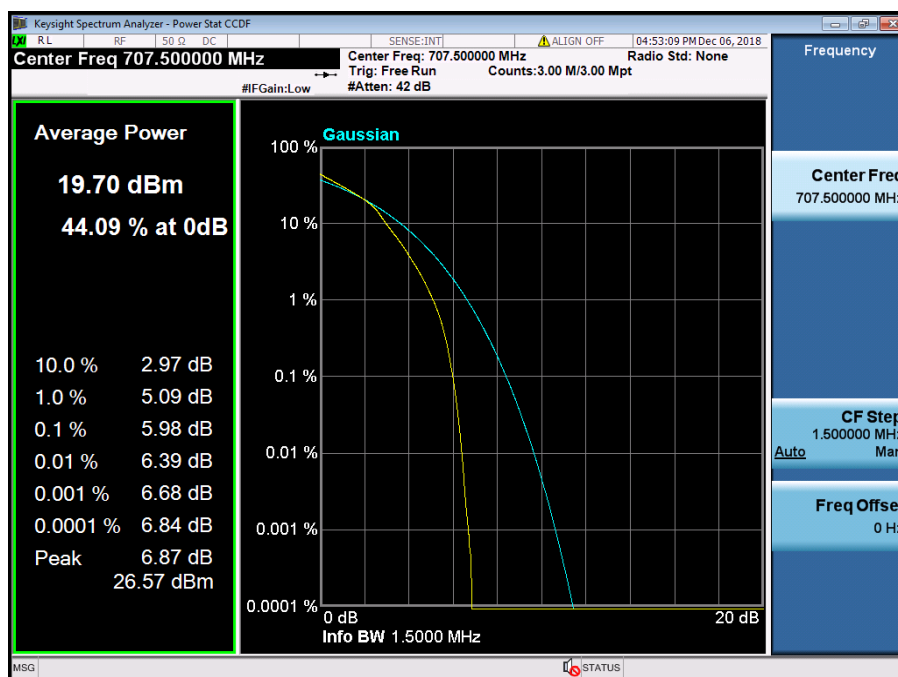
LTE Band 12 / 3 MHz / QPSK - RB Size 15



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

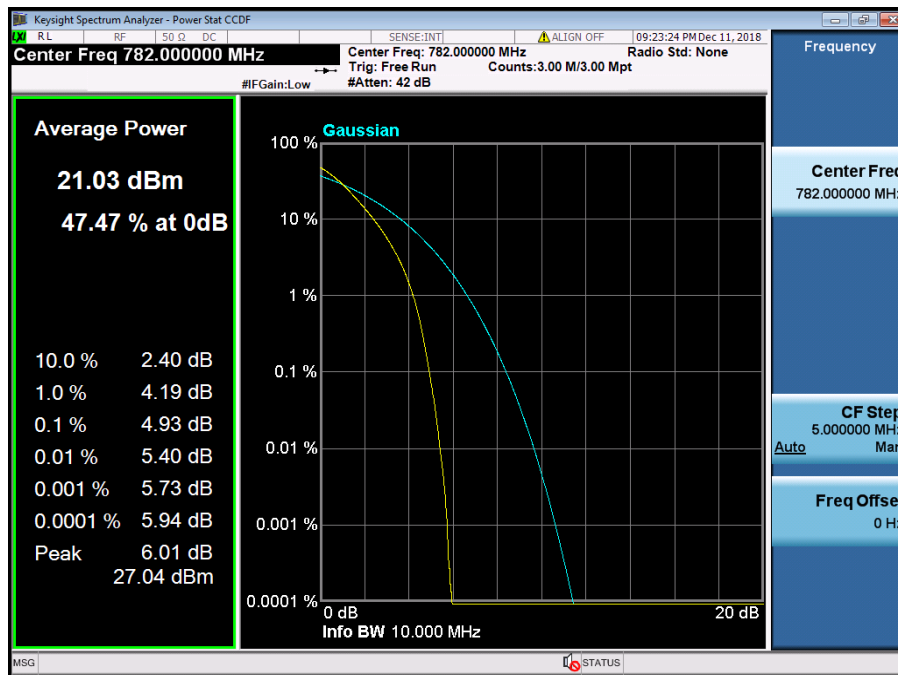


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

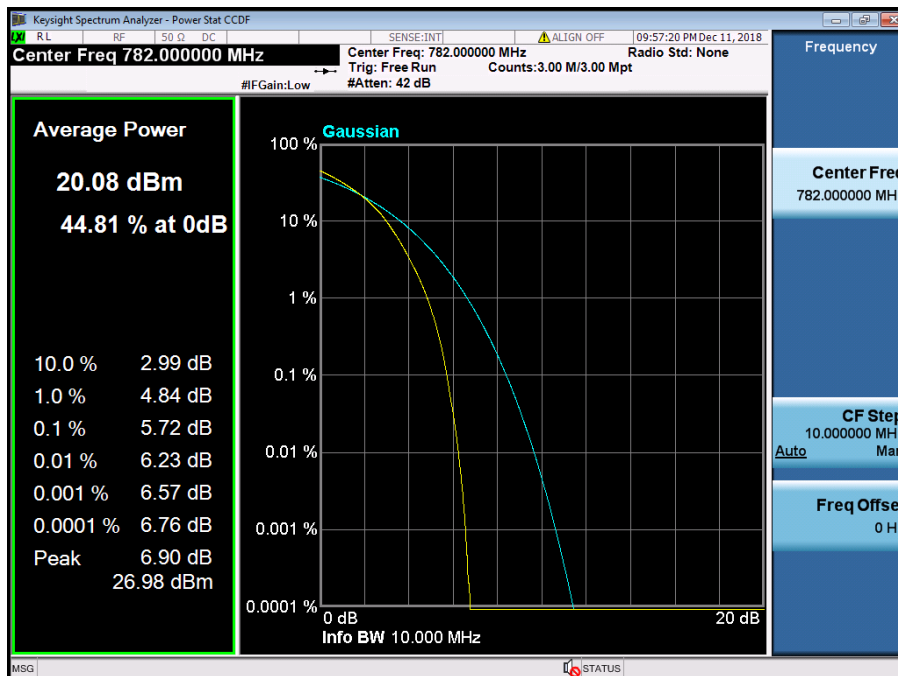


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

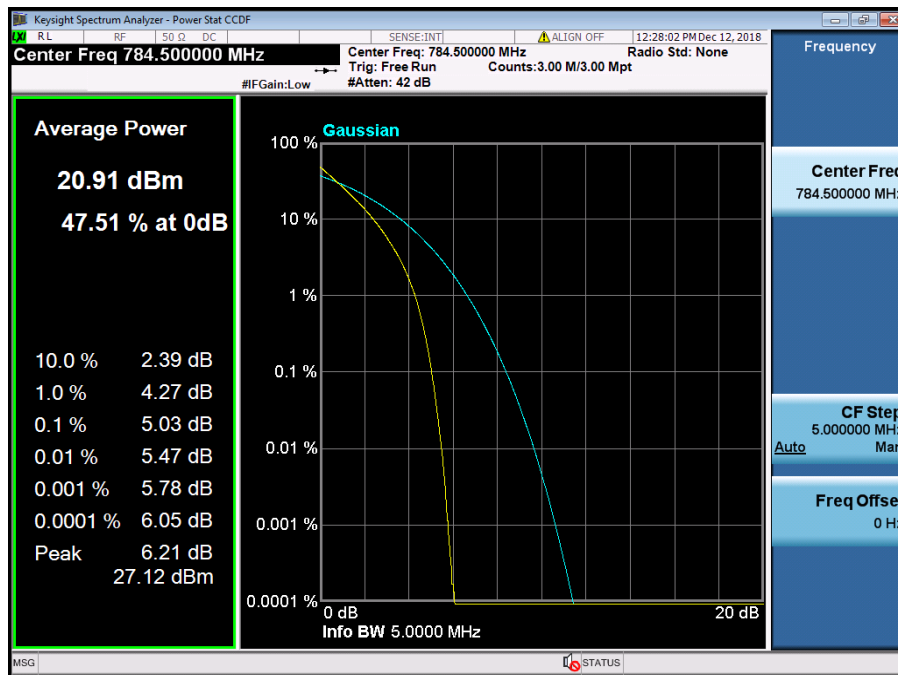
8.2.3 LTE Band 13



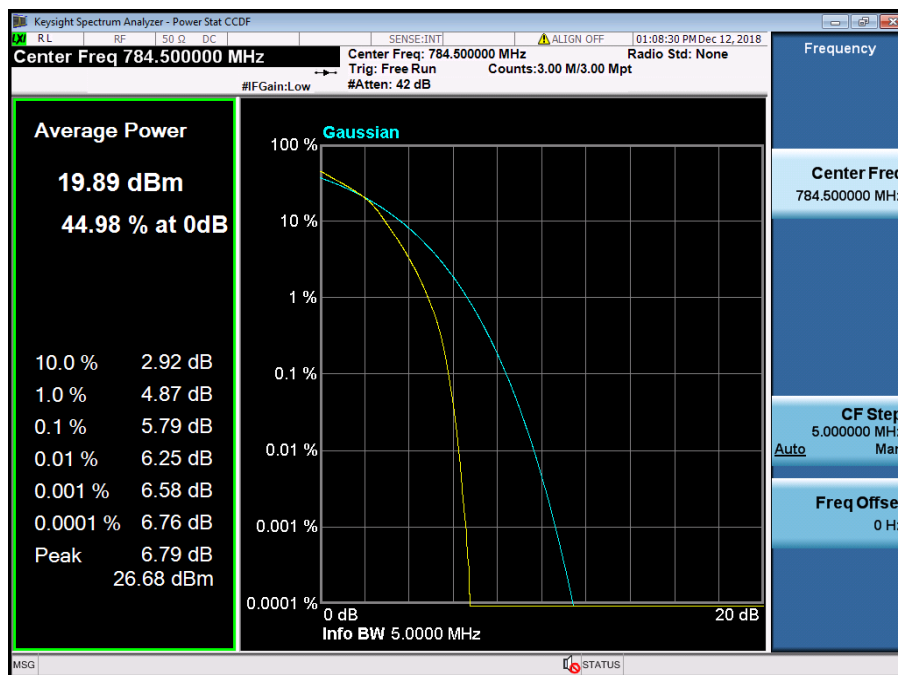
LTE Band 13 / 10 MHz / QPSK - RB Size 50



LTE Band 13 / 10 MHz / 16QAM - RB Size 50

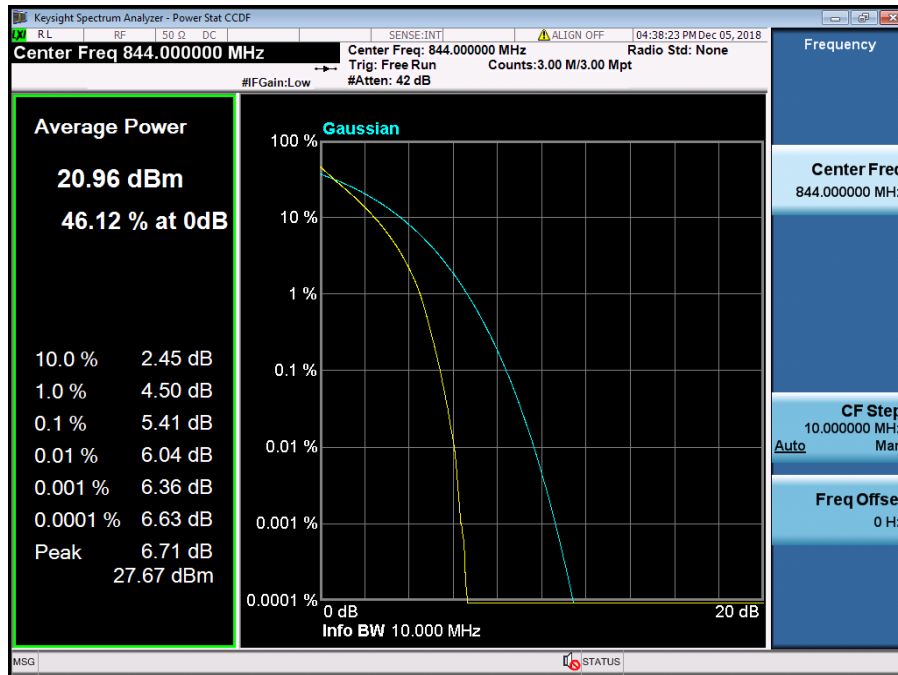


LTE Band 13 / 5 MHz / QPSK - RB Size 25

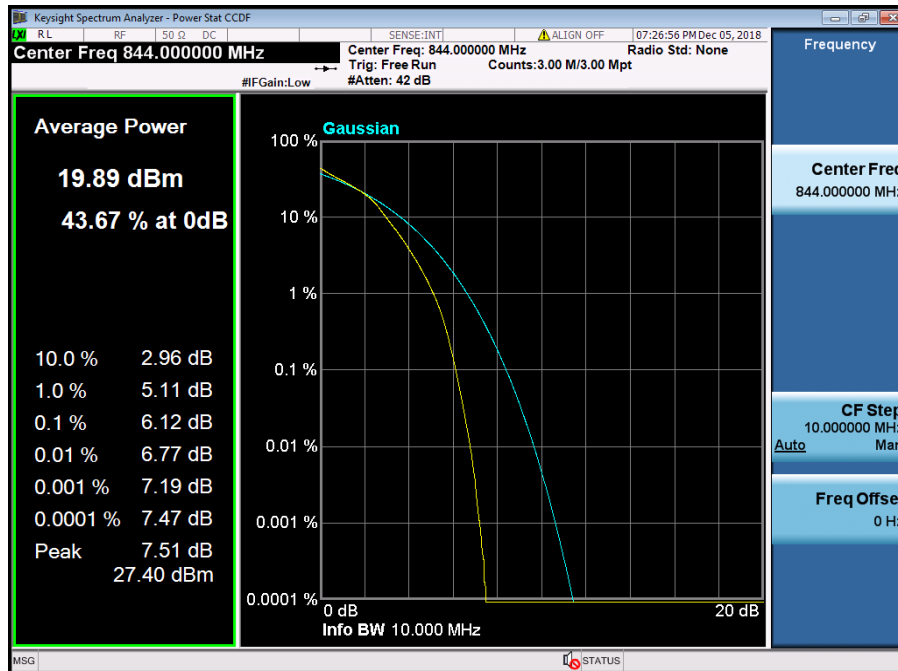


LTE Band 13 / 5 MHz / 16QAM - RB Size 25

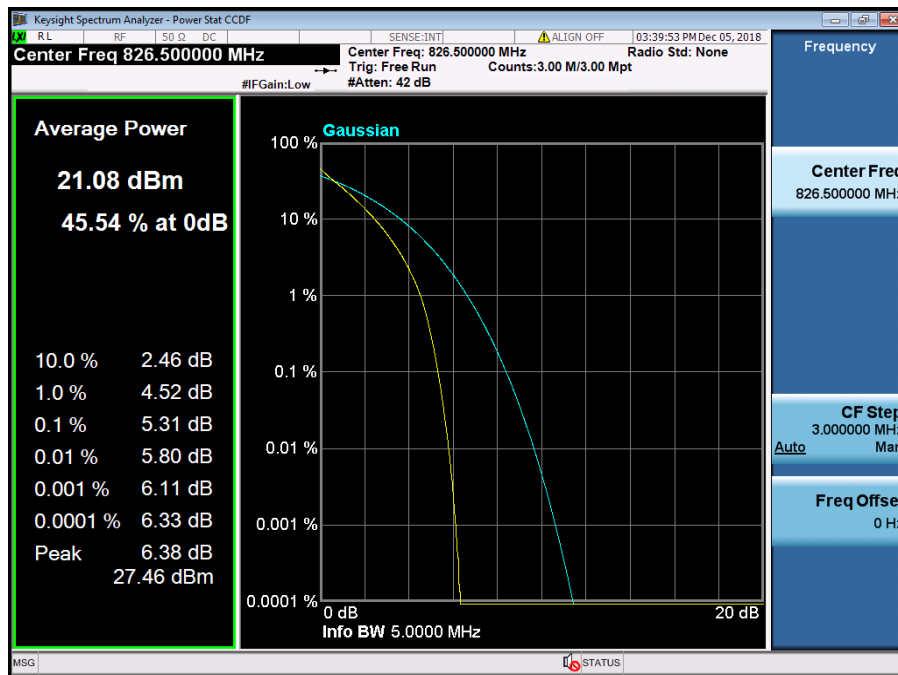
8.2.4 LTE Band 5



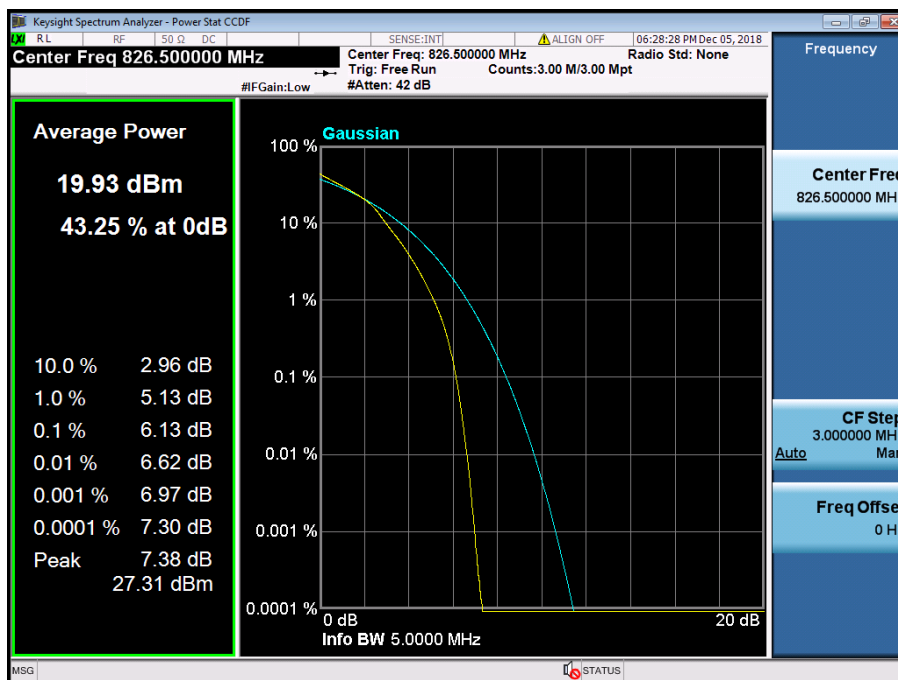
LTE Band 5 / 10 MHz / QPSK - RB Size 50



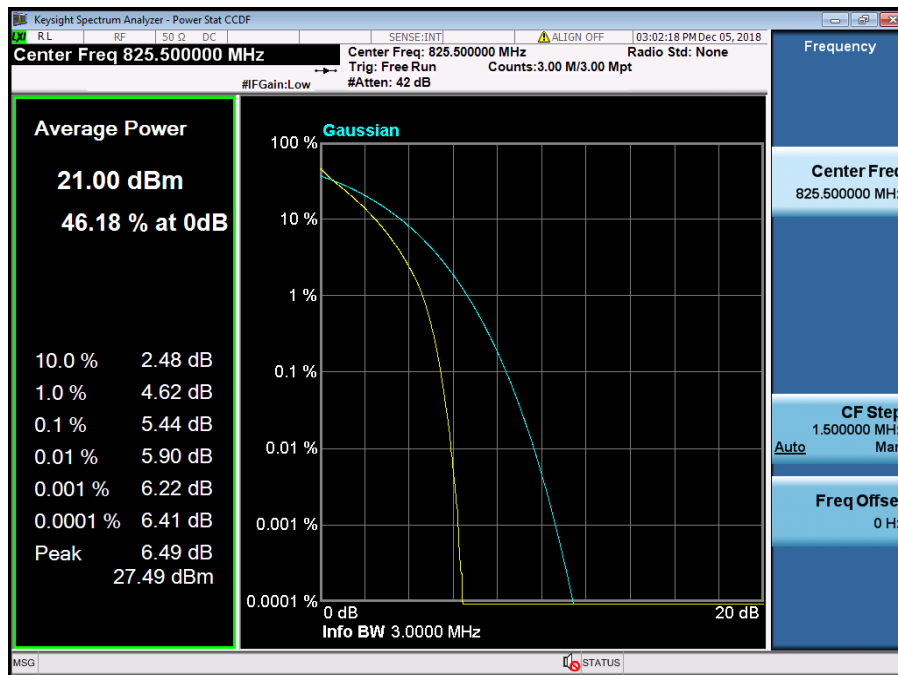
LTE Band 5 / 10 MHz / 16QAM - RB Size 50



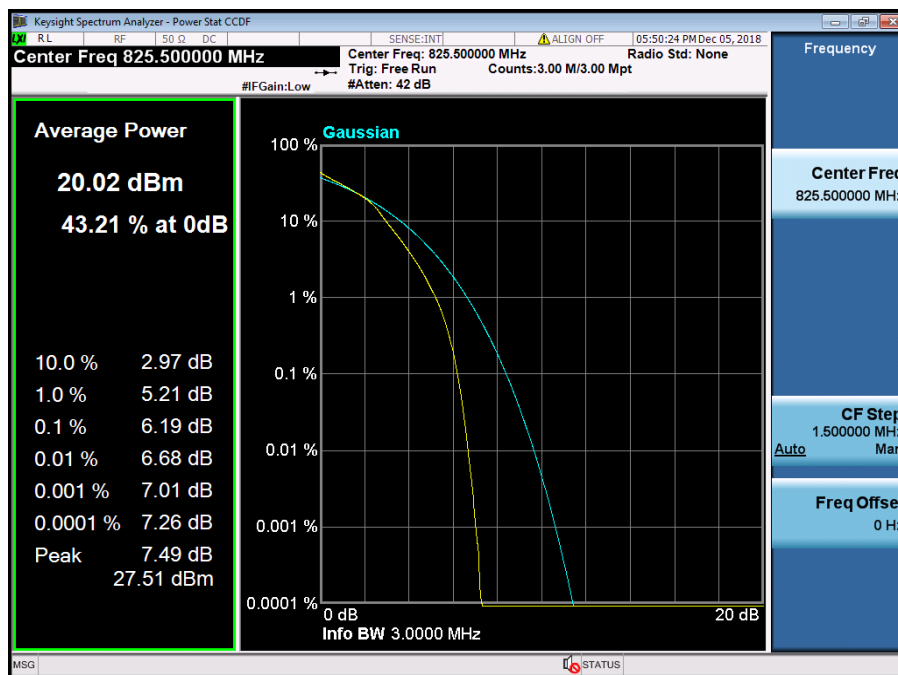
LTE Band 5 / 5 MHz / QPSK - RB Size 25



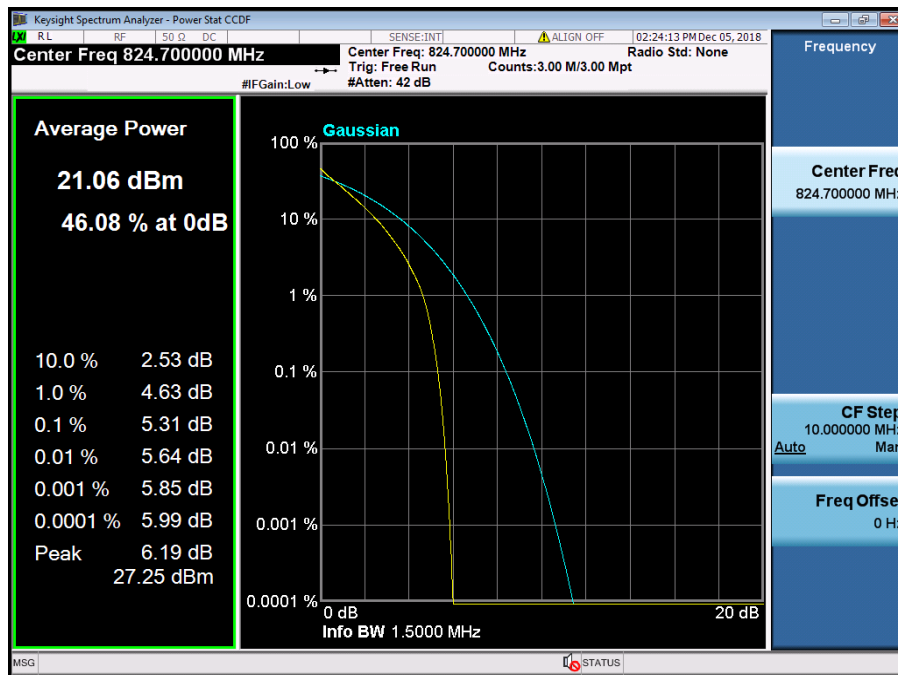
LTE Band 5 / 5 MHz / 16QAM - RB Size 25



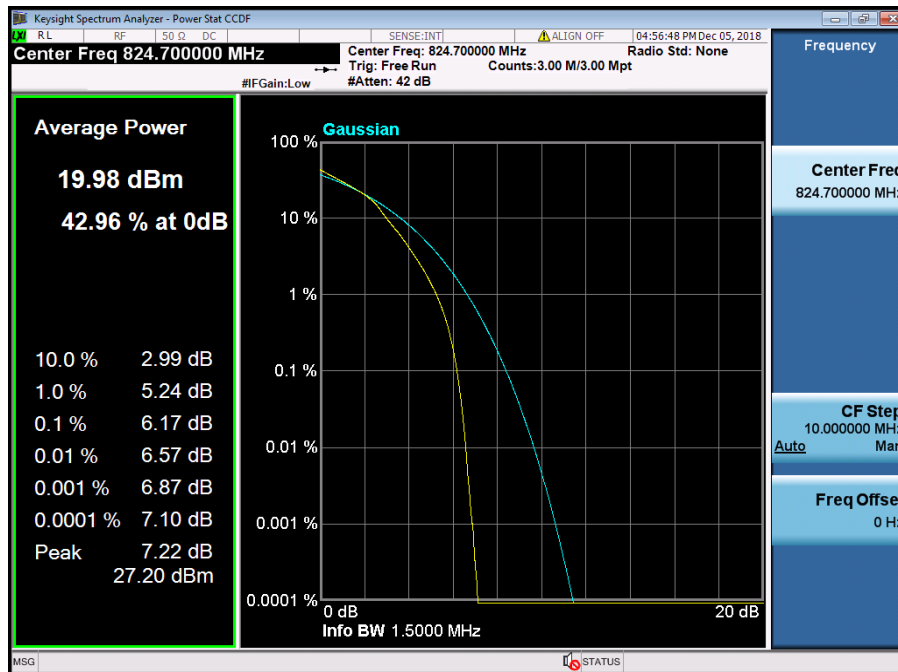
LTE Band 5 / 3 MHz / QPSK - RB Size 15



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

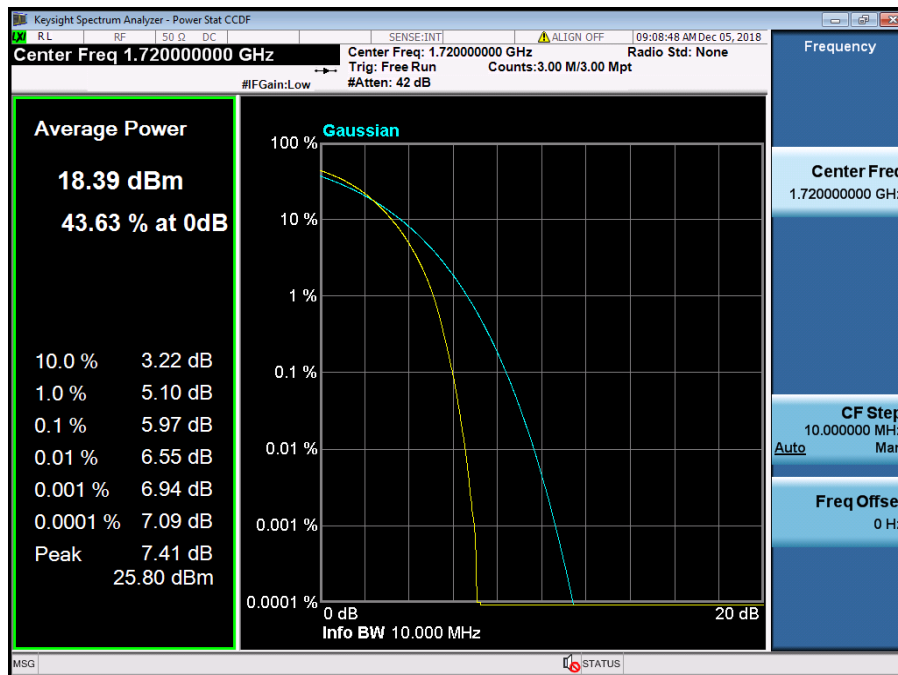


LTE Band 5 / 1.4 MHz / QPSK - RB Size 6



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

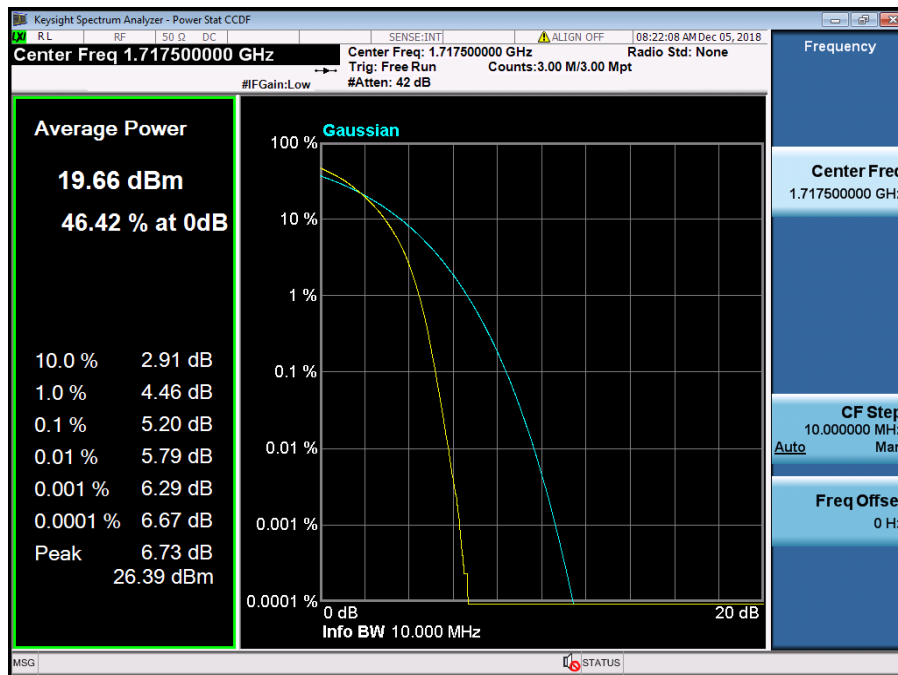
8.2.5 LTE Band 4



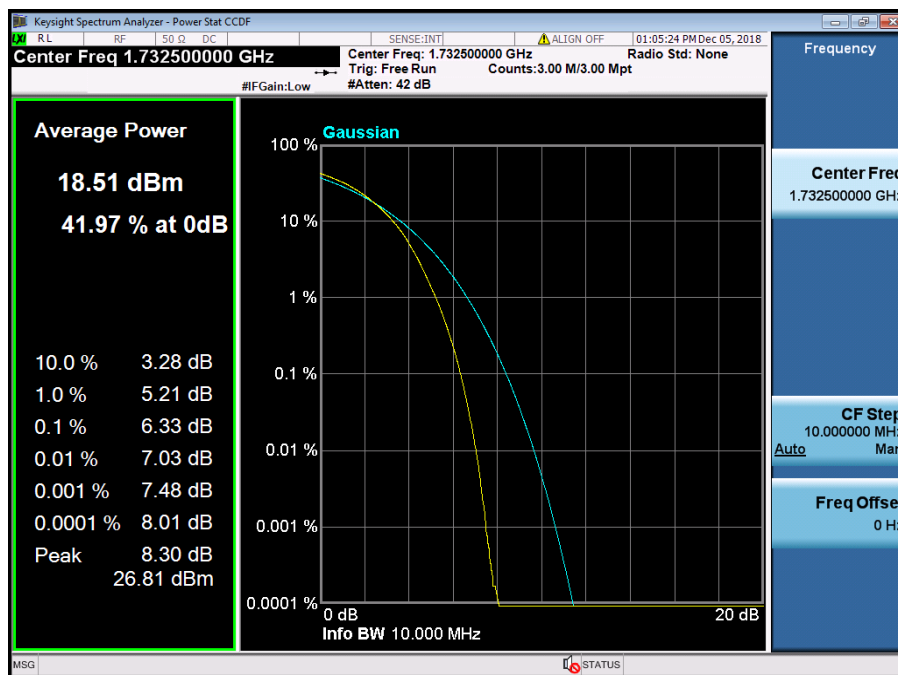
LTE Band 4 / 20 MHz / QPSK - RB Size 100



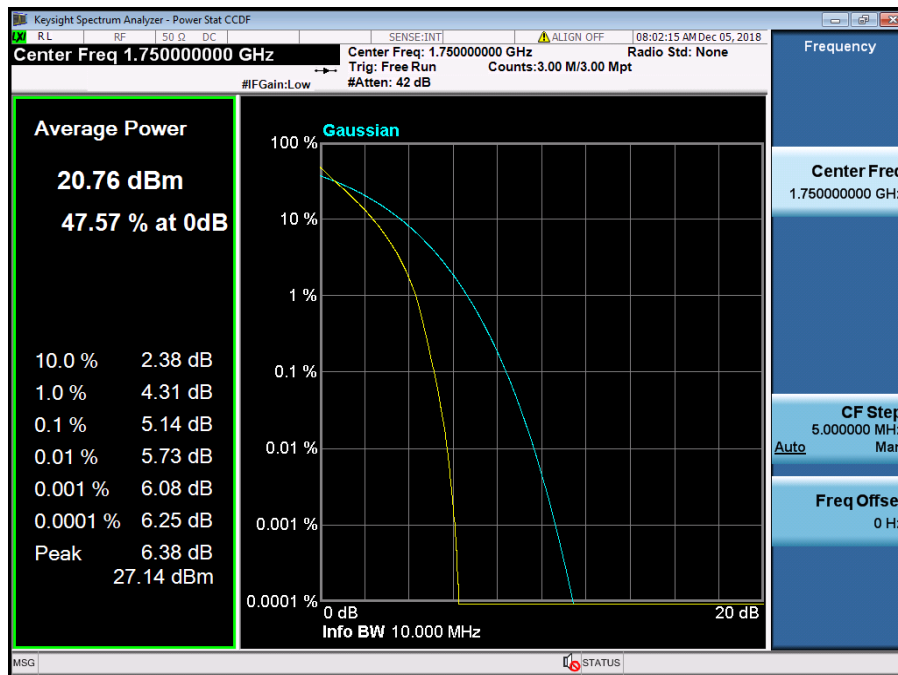
LTE Band 4 / 20 MHz / 16QAM - RB Size 100



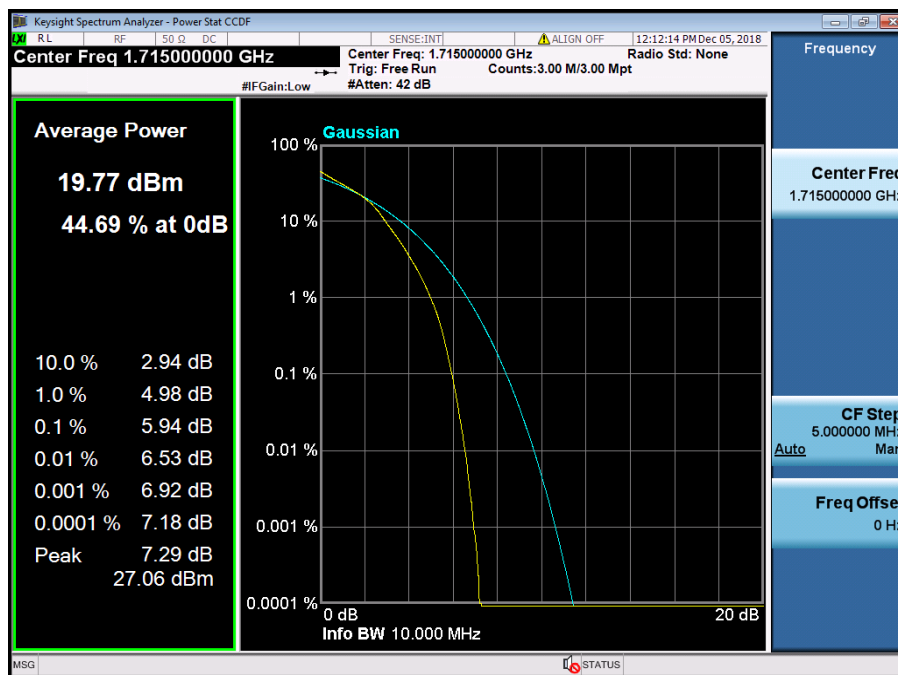
LTE Band 4 / 15 MHz / QPSK - RB Size 75



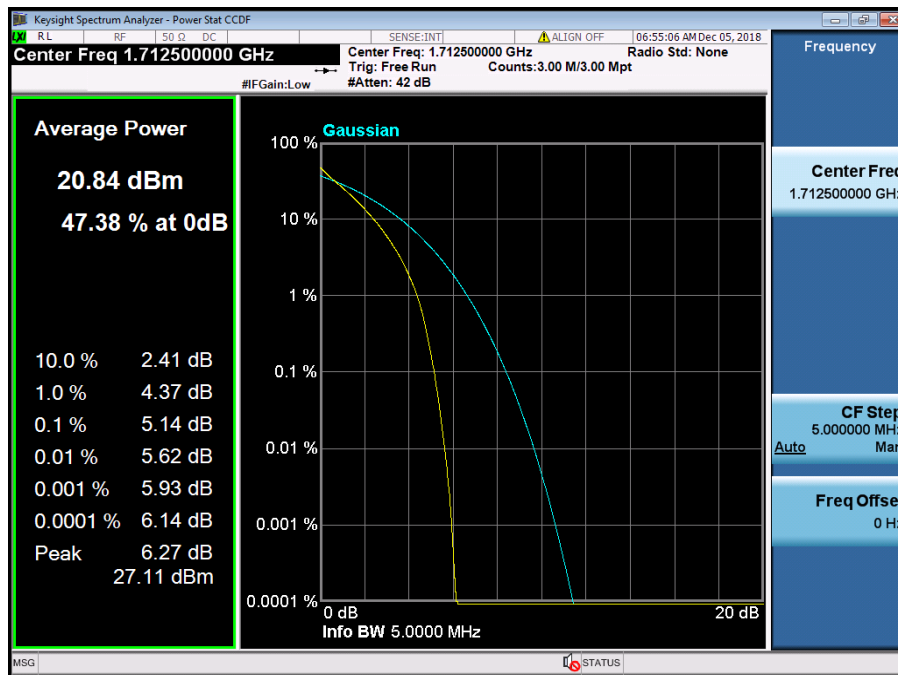
LTE Band 4 / 15 MHz / 16QAM - RB Size 75



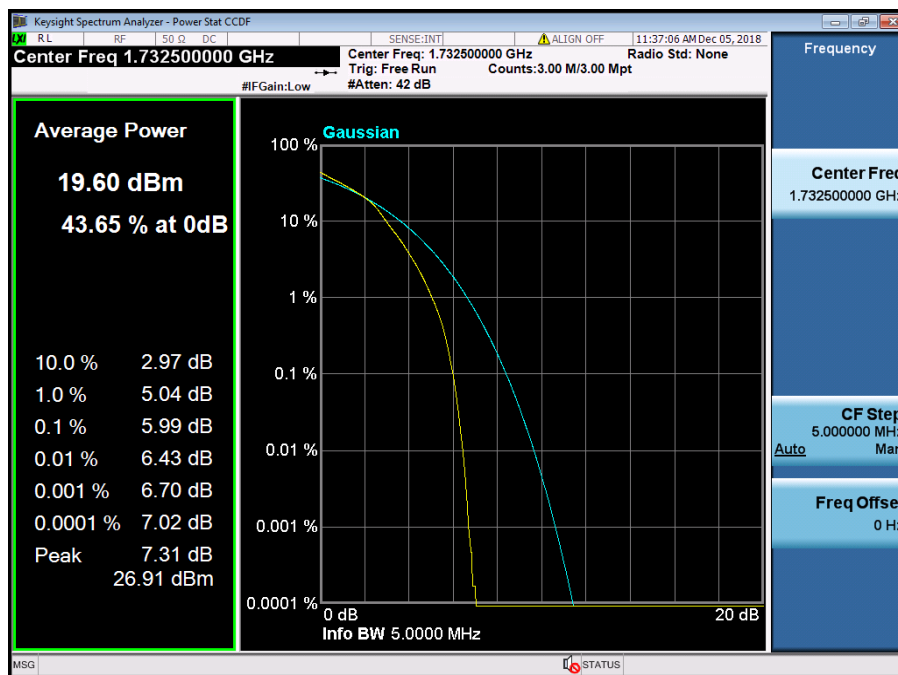
LTE Band 4 / 10 MHz / QPSK - RB Size 50



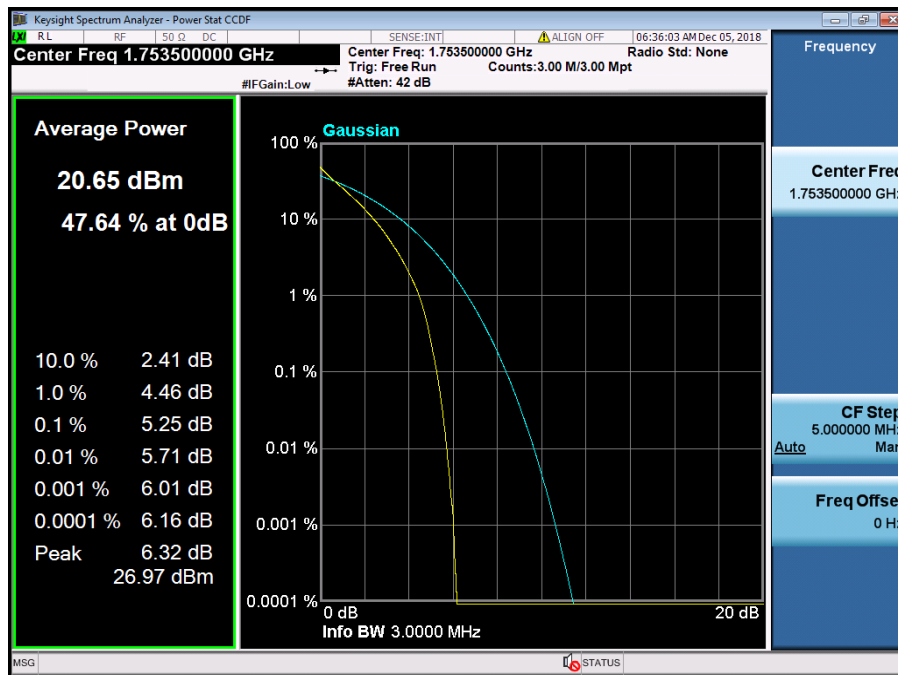
LTE Band 4 / 10 MHz / 16QAM - RB Size 50



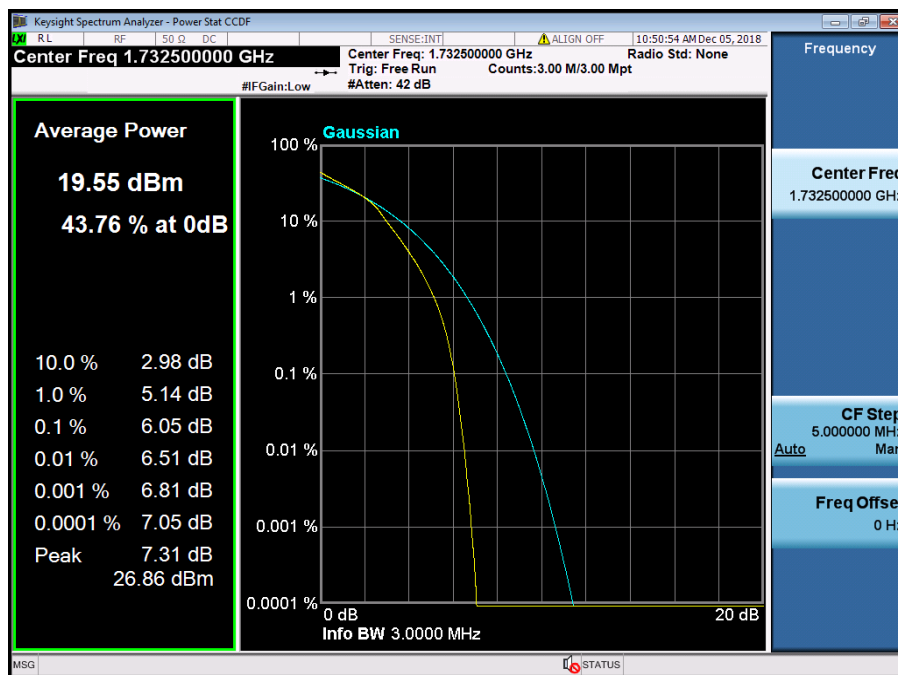
LTE Band 4 / 5 MHz / QPSK - RB Size 25



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