TEST REPORT

Dt&C

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 : DRTFCC2105-0048(1)

2. Customer

- Name (FCC) : Point Mobile Co., LTD. / Name (IC) : POINTMOBILE CO.,LTD
- Address (FCC) : B-9F, Kabul Great Valley 32 Digital-ro 9-gil, Geumcheon-gu Seoul South Korea 153-70
  Address (IC) : B-9F Kabul Great Valley, 32, Digital-ro 9-gil, Geumcheon-gu Seoul Korea (Republic Of)

3. Use of Report : FCC & IC Certification

4. Product Name / Model Name : Mobile Computer / PM30
   FCC ID : V2X-PM30
   IC : 10664A-PM30

5. FCC Regulation(s): Part 22, 24, 27, 90
   IC Standard(s): RSS-130 Issue 2, 132 Issue 3, 133 Issue 6, 139 Issue 3, 140 Issue 1, 199 Issue 3
   Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015

6. Date of Test : 2021.03.24 ~ 2021.04.27

7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing

8. Testing Environment : See appended test report.

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

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

Affirmation	Tested by Name : JaeHyeok Bang (Signature)	Reviewed by Name : JaeJin Lee (Signature)

2021 . 05 . 20 .

DT&C Co., Ltd.

This test report is a general report that does not use the KOLAS accreditation mark and is not related to KS Q ISO/IEC 17025 and KOLAS accreditation.

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
DRTFCC2105-0048	May. 18, 2021	Initial issue	ChangWon Lee	JaeJin Lee
DRTFCC2105-0048(1)	May. 20, 2021	Correct the typo	JaeHyeok Bang	JaeJin Lee

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1. GENERAL INFORMATION

FCC Classification : PCS Licensed Transmitter held to ear(PCE)

FCC ID : V2X-PM30

IC : 10664A-PM30

Product Name : Mobile Computer

Model Name : PM30

Add Model Name : -

Hardware Version : MP

Software Version : 30.00xx

Serial Number : 2034310066(Conducted), 2034010538(Radiated)

Supplying power : DC 3.85 V

Antenna Type : LDS Antenna

Mode	TX Frequency (MHz)	Emission Designator	Modulation	ERP(FCC&IC)		EIRP	
				Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
LTE Band 12(17)	704 ~ 711	8M95G7D	QPSK	19.53	0.090	-	-
LTE Band 12(17)	704 ~ 711	8M93W7D	16QAM	18.81	0.076	-	-
LTE Band 12(17)	701.5 ~ 713.5	4M47G7D	QPSK	19.37	0.086	-	-
LTE Band 12(17)	701.5 ~ 713.5	4M48W7D	16QAM	18.65	0.073	-	-
LTE Band 12	700.5 ~ 714.5	2M68G7D	QPSK	19.14	0.082	-	-
LTE Band 12	700.5 ~ 714.5	2M68W7D	16QAM	18.44	0.070	-	-
LTE Band 12	699.7 ~ 715.3	1M08G7D	QPSK	19.03	0.080	-	-
LTE Band 12	699.7 ~ 715.3	1M08W7D	16QAM	18.19	0.066	-	-
LTE Band 13	782 ~ 782	8M95G7D	QPSK	21.87	0.154	-	-
LTE Band 13	782 ~ 782	8M94W7D	16QAM	21.23	0.133	-	-
LTE Band 13	779.5 ~ 784.5	4M48G7D	QPSK	22.05	0.160	-	-
LTE Band 13	779.5 ~ 784.5	4M48W7D	16QAM	21.17	0.131	-	-
LTE Band 14	793 ~ 793	8M94G7D	QPSK	21.68	0.147	-	-
LTE Band 14	793 ~ 793	8M90W7D	16QAM	20.74	0.119	-	-
LTE Band 14	790.5 ~ 795.5	4M48G7D	QPSK	21.68	0.147	-	-
LTE Band 14	790.5 ~ 795.5	4M47W7D	16QAM	20.61	0.115	-	-

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Mode	TX Frequency (MHz)	Emission Designator	Modulation	ERP(For FCC)		EIRP(For IC)	
				Max power (dBm)	Max power (W)	Max power (dBm)	Max power (W)
LTE Band 26	831.5 ~ 841.5	13M4G7D	QPSK	20.74	0.119	22.89	0.195
LTE Band 26	831.5 ~ 841.5	13M4W7D	16QAM	19.90	0.098	22.05	0.160
LTE Band 26(5)	829 ~ 844	8M93G7D	QPSK	20.55	0.114	22.70	0.186
LTE Band 26(5)	829 ~ 844	8M93W7D	16QAM	19.93	0.098	22.08	0.161
LTE Band 26(5)	826.5 ~ 846.5	4M48G7D	QPSK	20.20	0.105	22.35	0.172
LTE Band 26(5)	826.5 ~ 846.5	4M48W7D	16QAM	19.37	0.086	21.52	0.142
LTE Band 26(5)	825.5 ~ 847.5	2M68G7D	QPSK	20.18	0.104	22.33	0.171
LTE Band 26(5)	825.5 ~ 847.5	2M68W7D	16QAM	19.40	0.087	21.55	0.143
LTE Band 26(5)	824.7 ~ 848.3	1M08G7D	QPSK	20.11	0.103	22.26	0.168
LTE Band 26(5)	824.7 ~ 848.3	1M08W7D	16QAM	19.32	0.086	21.47	0.140

Mode	TX Frequency (MHz)	Emission Designator	Modulation	EIRP(FCC & IC)	
				Max power(dBm)	Max power(W)
LTE Band 66(4)	1 720 ~ 1 770	17M8G7D	QPSK	25.92	0.391
LTE Band 66(4)	1 720 ~ 1 770	17M8W7D	16QAM	25.43	0.349
LTE Band 66(4)	1 717.5 ~ 1 772.5	13M4G7D	QPSK	25.95	0.394
LTE Band 66(4)	1 717.5 ~ 1 772.5	13M4W7D	16QAM	25.28	0.337
LTE Band 66(4)	1 715 ~ 1 775	8M93G7D	QPSK	25.72	0.373
LTE Band 66(4)	1 715 ~ 1 775	8M93W7D	16QAM	25.02	0.318
LTE Band 66(4)	1 712.5 ~ 1 777.5	4M48G7D	QPSK	25.59	0.362
LTE Band 66(4)	1 712.5 ~ 1 777.5	4M47W7D	16QAM	24.88	0.308
LTE Band 66(4)	1 711.5 ~ 1 778.5	2M69G7D	QPSK	25.48	0.353
LTE Band 66(4)	1 711.5 ~ 1 778.5	2M69W7D	16QAM	24.81	0.303
LTE Band 66(4)	1 710.7 ~ 1 779.3	1M08G7D	QPSK	25.45	0.351
LTE Band 66(4)	1 710.7 ~ 1 779.3	1M08W7D	16QAM	24.53	0.284
LTE Band 25(2)	1 860 ~ 1 905	17M9G7D	QPSK	25.89	0.388
LTE Band 25(2)	1 860 ~ 1 905	17M8W7D	16QAM	25.31	0.340
LTE Band 25(2)	1 857.5 ~ 1 907.5	13M4G7D	QPSK	25.41	0.348
LTE Band 25(2)	1 857.5 ~ 1 907.5	13M4W7D	16QAM	24.61	0.289
LTE Band 25(2)	1 855 ~ 1 910	8M94G7D	QPSK	25.80	0.380
LTE Band 25(2)	1 855 ~ 1 910	8M94W7D	16QAM	24.92	0.310
LTE Band 25(2)	1 852.5 ~ 1 912.5	4M48G7D	QPSK	25.24	0.334
LTE Band 25(2)	1 852.5 ~ 1 912.5	4M48W7D	16QAM	24.36	0.273
LTE Band 25(2)	1 851.5 ~ 1 913.5	2M69G7D	QPSK	25.39	0.346
LTE Band 25(2)	1 851.5 ~ 1 913.5	2M68W7D	16QAM	24.64	0.291
LTE Band 25(2)	1 850.7 ~ 1 914.3	1M08G7D	QPSK	25.31	0.340
LTE Band 25(2)	1 850.7 ~ 1 914.3	1M08W7D	16QAM	25.19	0.330

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Mode	TX Frequency (MHz)	Emission Designator	Modulation	EIRP(FCC & IC)	
				Max power(dBm)	Max power(W)
LTE Band 7	2 510 ~ 2 560	17M8G7D	QPSK	24.64	0.291
LTE Band 7	2 510 ~ 2 560	17M9W7D	16QAM	24.45	0.279
LTE Band 7	2 507.5 ~ 2 562.5	13M4G7D	QPSK	24.66	0.292
LTE Band 7	2 507.5 ~ 2 562.5	13M4W7D	16QAM	23.91	0.246
LTE Band 7	2 505 ~ 2 565	8M96G7D	QPSK	24.41	0.276
LTE Band 7	2 505 ~ 2 565	8M93W7D	16QAM	23.80	0.240
LTE Band 7	2 502.5 ~ 2 567.5	4M48G7D	QPSK	24.30	0.269
LTE Band 7	2 502.5 ~ 2 567.5	4M47W7D	16QAM	23.70	0.234
LTE Band 41(38)	2 506 ~ 2 680	17M7G7D	QPSK	25.80	0.380
LTE Band 41(38)	2 506 ~ 2 680	17M9W7D	16QAM	24.77	0.300
LTE Band 41(38)	2 503.5 ~ 2 682.5	13M4G7D	QPSK	25.57	0.361
LTE Band 41(38)	2 503.5 ~ 2 682.5	13M2W7D	16QAM	24.60	0.288
LTE Band 41(38)	2 501 ~ 2 685	8M96G7D	QPSK	25.78	0.378
LTE Band 41(38)	2 501 ~ 2 685	8M89W7D	16QAM	24.54	0.284
LTE Band 41(38)	2 498.5 ~ 2 687.5	4M44G7D	QPSK	25.72	0.373
LTE Band 41(38)	2 498.5 ~ 2 687.5	4M48W7D	16QAM	24.59	0.288

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2. INTRODUCTION

2.1 EUT DESCRIPTION

The Equipment Under Test (EUT) supports 850/1900 GSM, 850/1700/1900 WCDMA, Multi-band LTE, 802.11b/g/n WLAN(2.4GHz), 802.11a/n/ac WLAN(5GHz), Bluetooth(BDR, EDR, LE) and NFC.

2.2 TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+22 ℃ ~ +25 ℃
▪ Relative Humidity	42 % ~ 45 %

2.3 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.

2.4 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)	4.9 dB (The confidence level is about 95 %, k = 2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.0 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)

2.5 TEST FACILITY

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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 complies with the requirements of Part 2.948 according to ANSI C63.4-2014.

- FCC & IC MRA Designation No. : KR0034

- ISED#: 5740A

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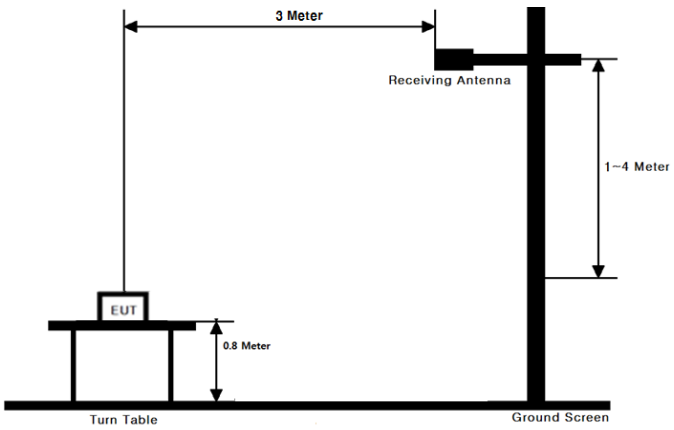
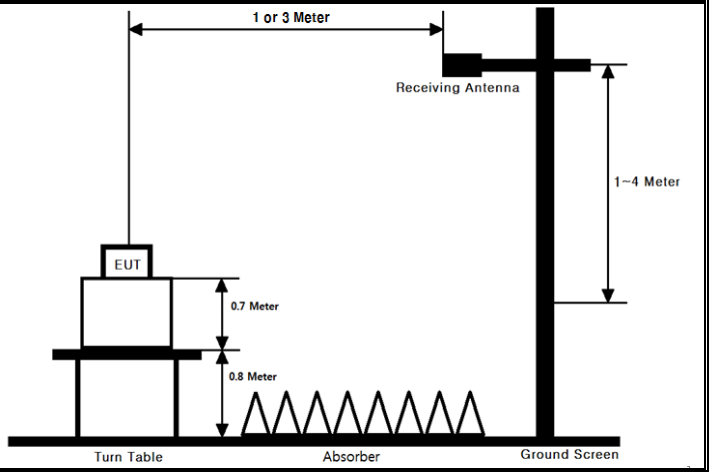
3. DESCRIPTION OF TESTS

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 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 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.

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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.

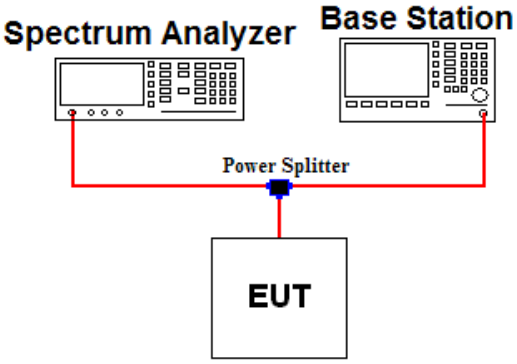
The ERP/EIRP is calculated using the following formula:

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.

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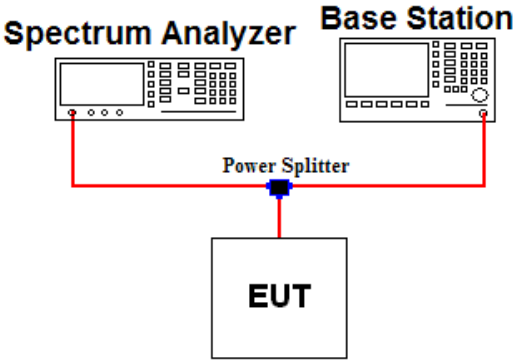
3.3 OCCUPIED BANDWIDTH.

Test set-up



Test Procedure

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

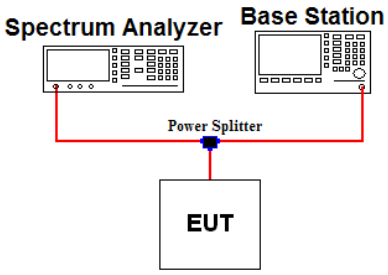
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

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

Note 4: For part 27.53(m)(4) the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2 490.5 MHz and 2 496 MHz and 55 + 10 log (P) dB at or below 2 490.5 MHz.

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 2 495 MHz - 2 496 MHz, in which case a resolution bandwidth of at least one percent may be employed.

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Note 6: 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.

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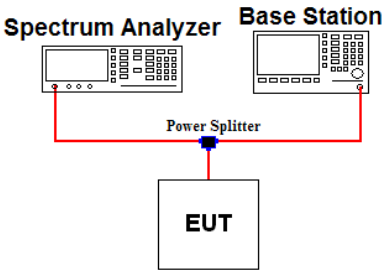
3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

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 1 GHz and 1MHz or greater for frequencies greater than 1GHz.

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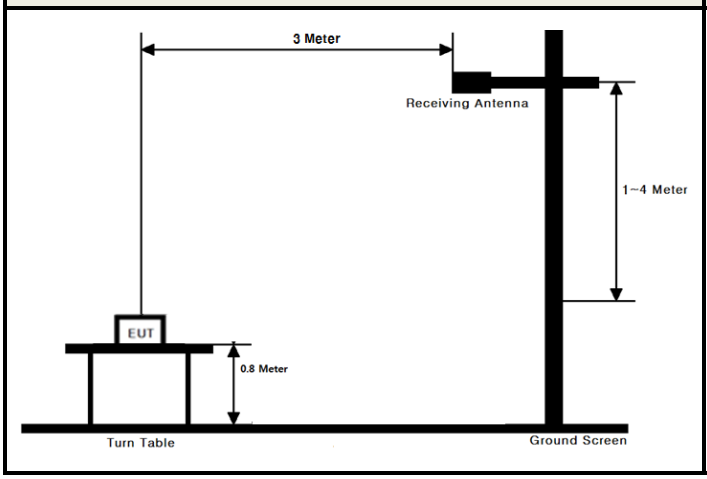
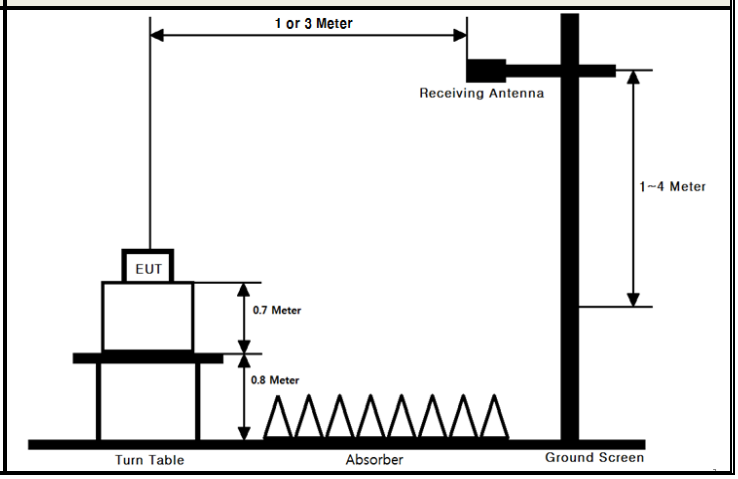
3.6 UNDESIRABLE EMISSIONS

Test Set-up

Below 1GHz	Above 1GHz
	

These measurements were performed at 3 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.

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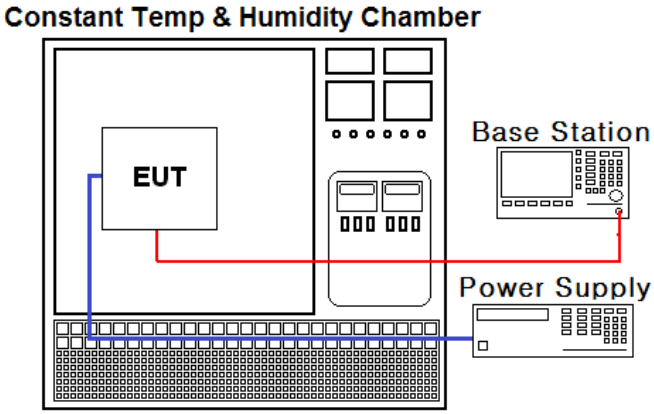
3.7 FREQUENCY STABILITY

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, 90. 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.

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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	20/10/22	21/10/22	MY50200867
Spectrum Analyzer	Agilent Technologies	N9020A	20/06/24	21/06/24	US47360812
Spectrum Analyzer	Agilent Technologies	N9030B	20/12/16	21/12/16	MY55480168
DC power supply	Agilent Technologies	66332A	20/06/24	21/06/24	US37473627
Multimeter	FLUKE	17B+	20/12/16	21/12/16	36390701WS
Power Splitter	Anritsu	K241B	20/12/16	21/12/16	016681
Temp & Humi	SJ Science	SJ-TH-S50	20/12/14	21/12/14	U5542113
Radio Communication Analyzer	Anritsu	MT8820C	20/12/16	21/12/16	6201274516
Thermohygrometer	BODYCOM	BJ5478	20/12/16	21/12/16	120612-2
Thermohygrometer	BODYCOM	BJ5478	20/12/16	21/12/16	120612-1
Signal Generator	Rohde Schwarz	SMBV100A	20/12/16	21/12/16	255571
Signal Generator	ANRITSU	MG3695C	20/12/16	21/12/16	173501
Loop Antenna	ETS-Lindgren	6502	21/01/28	23/01/28	00226186
Bilog Antenna	Schwarzbeck	VULB 9160	20/12/16	21/12/16	9160-3362
Dipole Antenna	A.H.Systems Inc.	FCC-4	20/12/16	22/12/16	710A
Dipole Antenna	Schwarzbeck	UHA9105	20/04/10	22/04/10	2262
HORN ANT	ETS	3117	20/12/16	21/12/16	00140394
HORN ANT	ETS	3117	20/10/23	21/10/23	00143278
HORN ANT	A.H.Systems	SAS-574	20/06/24	21/06/24	154
HORN ANT	A.H.Systems	SAS-574	20/06/24	21/06/24	155
Amplifier	EMPOWER	BBS3Q7ELU	20/06/24	21/06/24	1020
PreAmplifier	H.P	8447D	20/12/16	21/12/16	2944A07774
PreAmplifier	Agilent	8449B	20/06/24	21/06/24	3008A02108
PreAmplifier	A.H.Systems Inc.	PAM-1840VH	20/06/24	21/06/24	163
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	20/06/24	21/06/24	7
High-pass filter	Wainwright	WHKX10-2838-3300-18000-60SS	20/06/24	21/06/24	2
High-pass filter	Wainwright	WHKX6-6320-8000-26500-40CC	20/06/24	21/06/24	2
Cable	HUBER+SUHNER	SUCOFLEX100	21/01/08	22/01/08	M-1
Cable	HUBER+SUHNER	SUCOFLEX100	21/01/08	22/01/08	M-2
Cable	JUNFLON	MWX241/B	21/01/08	22/01/08	M-3
Cable	JUNFLON	MWX221	21/01/08	22/01/08	M-4
Cable	JUNFLON	MWX221	21/01/08	22/01/08	M-5
Cable	DTNC	Cable	21/01/08	22/01/08	M-6
Cable	JUNFLON	J12J101757-00	21/01/08	22/01/08	M-7
Cable	HUBER+SUHNER	SUCOFLEX104	21/01/08	22/01/08	M-8
Cable	HUBER+SUHNER	SUCOFLEX106	21/01/08	22/01/08	M-9
Cable	Junkosha	MWX221	21/01/13	22/01/13	M-06
Cable	Radiall	Cable	21/01/16	22/01/16	RF-48

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.

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5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
2.1046	-	Conducted Output Power	N/A	Conducted	C Note2
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-140 [4.3] RSS-199 [4.4]	Peak to Average Ratio	< 13 dB		C
2.1051 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h) 90.543(c)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [6.6] RSS-140 [4.4]	Band Edge / Conducted Spurious Emissions	> 43 + 10log$_{10}$ (P) dB at Band edge and for all out-of-band emissions		C
27.53(c.4)	RSS-130 [4.7.2]	Undesirable emissions in 763 ~ 775MHz & 793 ~ 806MHz	>65 + 10 log (P) dB in a 6.25 kHz band segment frequencies between 763-775 MHz and 793-805 MHz		C
90.543(e)	RSS-140 [4.4]	Undesirable emissions in 769 ~ 775MHz & 799 ~ 806MHz, 775 ~ 788 MHz	>65 + 10 log (P) dB in a 6.25 kHz band segment frequencies between 769-775 MHz and 799-806 MHz >43 + 10 log (P) dB at frequencies between 775-788 MHz		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 90.213	RSS-130 [4.5] RSS-132 [5.3] RSS-133 [6.3] RSS-139 [6.4] RSS-199 [4.3] RSS-140 [4.2]	Frequency Stability	< 2.5 ppm (Part 22) or Fundamental emissions must stay within Authorized frequency block (Part 24, 27, 90)		C
27.50(b.10) 27.50(c.10) 90.542(a)	RSS-130 [4.6] RSS-140 [4.3]	Radiated Output Power (B12, 13, 14, 17)	< 3 Watts max. ERP (FCC & IC)	Radiated	C Note3, 4
22.913(a.5)	RSS-132 [5.4]	Radiated Output Power (B26, 5)	< 7 Watts max. ERP (FCC) < 11.5 Watts max. EIRP (IC)		C Note3, 4
27.50(d.4)	RSS-139 [6.5]	Radiated Output Power (B66, 4)	< 1 Watts max. EIRP (FCC & IC)		C Note3, 4
24.232(c) 27.50(h.2)	RSS-133 [6.4] RSS-199 [4.4]	Radiated Output Power (B25, 2, 7, 41, 38)	< 2 Watts max. EIRP (FCC & IC)		C Note3, 4
2.1053 22.917(a) 24.238(a) 27.53(c) 27.53(g) 27.53(h) 90.543(c)	RSS-130 [4.7] RSS-132 [5.5] RSS-133 [6.5] RSS-139 [6.6] RSS-140 [4.4]	Undesirable Emissions	> 43 + 10log$_{10}$ (P) dB for all out-of-band emissions		C Note3, 4
27.53(m)	RSS-199 [4.5]	Undesirable Emissions (B7, 41, 38)	> 55 + 10log$_{10}$ (P) dB for all out-of-band emissions		C Note3, 4
27.53(f) 90.543(f)	RSS-130 [4.7.2] RSS-140 [4.4]	Undesirable Emissions in 1559 ~ 1610 MHz (B13, 14)	< -70 dBW/MHz (for wideband signals) < -80 dBW (for discrete emissions of less than 700 Hz bandwidth)		C Note3, 4

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable
Note 2: Refer to RF Exposure Report (Test Report SAR)
Note 3: This test item was performed in three orthogonal EUT positions and the worst case data was reported.
Note 4: This device supports wireless charging.
So per KDB648474 D03v01r0, the radiated test items were performed all not charging, charging, the handset is placed on the representative charging pad under normal conditions and in a simulated call configuration.

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6. SAMPLE CALCULATION

A. Emission Designator

LTE Band 12(17)(QPSK)

Emission Designator = **8M95G7D**
LTE OBW = 8.945 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 12(17)(16QAM)

Emission Designator = **8M93W7D**
LTE OBW = 8.931 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 13(QPSK)

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

LTE Band 13(16QAM)

Emission Designator **= 8M94W7D**
LTE OBW = 8.940 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 14(QPSK)

Emission Designator = **8M94G7D**
LTE OBW = 8.939 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 14(16QAM)

Emission Designator **= 8M90W7D**
LTE OBW = 8.904 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 26(5)(QPSK)

Emission Designator =**13M4G7D**
LTE OBW = 13.382 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 26(5)(16QAM)

Emission Designator = **13M4W7D**
LTE OBW = 13.384 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 25(2)(QPSK)

Emission Designator = **17M9G7D**
LTE OBW = 17.870 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 25(2)(16QAM)

Emission Designator = **17M8W7D**
LTE OBW = 17.816 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 41(38)(QPSK)

Emission Designator = **17M7G7D**
LTE OBW = 17.716 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 41(38)(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.879 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

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LTE Band 7(QPSK)

Emission Designator = **17M8G7D**
LTE OBW = 17.845 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 7(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.866 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 66(4)(QPSK)

Emission Designator = **17M8G7D**
LTE OBW = 17.845 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 66(4)(16QAM)

Emission Designator = **17M8W7D**
LTE OBW = 17.807 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

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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 OCCUPIED BANDWIDTH

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

7.2 PEAK TO AVERAGE RATIO

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

7.3 BAND EDEG EMISSIONS (Conducted)

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

7.4 SPURIOUS AND HARMONICS EMISSIONS (Conducted)

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

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7.5 ERP & EIRP

- Test Notes

1) This is device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the below table.

7.5.1 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	1/25	V	19.57	-0.63	18.94	0.078
		16QAM	1/25	V	18.83	-0.63	18.20	0.066
	711	QPSK	1/0	V	20.15	-0.62	19.53	0.090
		16QAM	1/0	V	19.43	-0.62	18.81	0.076
5	701.5	QPSK	1/0	V	19.54	-0.63	18.91	0.078
		16QAM	1/0	V	18.70	-0.63	18.07	0.064
	707.5	QPSK	1/0	V	19.99	-0.62	19.37	0.086
		16QAM	1/0	V	19.27	-0.62	18.65	0.073
	713.5	QPSK	1/0	V	19.52	-0.62	18.90	0.078
		16QAM	1/0	V	18.61	-0.62	17.99	0.063

With wireless charging pad

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	711	QPSK	1/0	V	20.10	-0.62	19.48	0.089
		16QAM	1/0	V	19.30	-0.62	18.68	0.074

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7.5.2 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	1/7	V	19.31	-0.63	18.68	0.074
		16QAM	1/7	V	18.51	-0.63	17.88	0.061
	707.5	QPSK	1/0	V	19.76	-0.62	19.14	0.082
		16QAM	1/0	V	19.06	-0.62	18.44	0.070
	714.5	QPSK	1/0	V	19.02	-0.62	18.40	0.069
		16QAM	1/0	V	18.50	-0.62	17.88	0.061
1.4	699.7	QPSK	1/0	V	19.00	-0.63	18.37	0.069
		16QAM	1/0	V	18.21	-0.63	17.58	0.057
	707.5	QPSK	1/0	V	19.65	-0.62	19.03	0.080
		16QAM	1/0	V	18.81	-0.62	18.19	0.066
	715.3	QPSK	1/0	V	18.93	-0.62	18.31	0.068
		16QAM	1/0	V	18.45	-0.62	17.83	0.061

With wireless charging pad

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	707.5	QPSK	1/0	V	19.45	-0.62	18.83	0.076
		16QAM	1/0	V	18.87	-0.62	18.25	0.067

7.5.3 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	1/49	H	22.45	-0.58	21.87	0.154
		16QAM	1/49	H	21.81	-0.58	21.23	0.133
5	779.5	QPSK	1/24	H	22.14	-0.58	21.56	0.143
		16QAM	1/24	H	21.41	-0.58	20.83	0.121
	784.5	QPSK	1/12	H	22.63	-0.58	22.05	0.160
		16QAM	1/12	H	21.75	-0.58	21.17	0.131

With wireless charging pad

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	1/49	H	22.23	-0.58	21.65	0.146
		16QAM	1/49	H	21.39	-0.58	20.81	0.121

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7.5.4 LTE Band 14

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	793	QPSK	1/0	H	22.25	-0.57	21.68	0.147
		16QAM	1/0	H	21.31	-0.57	20.74	0.119
5	790.5	QPSK	1/0	H	22.25	-0.57	21.68	0.147
		16QAM	1/0	H	21.18	-0.57	20.61	0.115
	795.5	QPSK	1/0	H	21.05	-0.57	20.48	0.112
		16QAM	1/0	H	20.44	-0.57	19.87	0.097

With wireless charging pad

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	793	QPSK	1/0	H	22.04	-0.57	21.47	0.140
		16QAM	1/0	H	20.92	-0.57	20.35	0.108

7.5.5 LTE Band 26

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)
15	831.5	QPSK	1/0	H	21.55	-0.81	20.74	0.119
		16QAM	1/0	H	20.71	-0.81	19.90	0.098
	841.5	QPSK	1/0	H	19.64	-0.89	18.75	0.075
		16QAM	1/0	H	19.06	-0.89	18.17	0.066

With wireless charging pad

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)
15	831.5	QPSK	1/0	H	21.47	-0.81	20.66	0.116
		16QAM	1/0	H	20.52	-0.81	19.71	0.094

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7.5.6 LTE Band 26(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	21.34	-0.79	20.55	0.114
		16QAM	1/0	H	20.72	-0.79	19.93	0.098
	836.5	QPSK	1/0	H	20.41	-0.85	19.56	0.090
		16QAM	1/0	H	19.66	-0.85	18.81	0.076
	844	QPSK	1/0	H	19.32	-0.91	18.41	0.069
		16QAM	1/0	H	18.73	-0.91	17.82	0.061
5	826.5	QPSK	1/0	H	20.98	-0.78	20.20	0.105
		16QAM	1/0	H	20.15	-0.78	19.37	0.086
	836.5	QPSK	1/0	H	19.91	-0.85	19.06	0.081
		16QAM	1/0	H	18.77	-0.85	17.92	0.062
	846.5	QPSK	1/0	H	19.07	-0.93	18.14	0.065
		16QAM	1/0	H	18.26	-0.93	17.33	0.054
3	825.5	QPSK	1/0	H	20.95	-0.77	20.18	0.104
		16QAM	1/0	H	20.17	-0.77	19.40	0.087
	836.5	QPSK	1/0	H	19.67	-0.85	18.82	0.076
		16QAM	1/0	H	19.04	-0.85	18.19	0.066
	847.5	QPSK	1/0	H	18.85	-0.94	17.91	0.062
		16QAM	1/0	H	18.25	-0.94	17.31	0.054
1.4	824.7	QPSK	1/0	H	20.87	-0.76	20.11	0.103
		16QAM	1/0	H	20.08	-0.76	19.32	0.086
	836.5	QPSK	1/0	H	19.62	-0.85	18.77	0.075
		16QAM	1/0	H	19.00	-0.85	18.15	0.065
	848.3	QPSK	1/0	H	18.81	-0.95	17.86	0.061
		16QAM	1/0	H	18.23	-0.95	17.28	0.053

With wireless charging pad

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	21.26	-0.79	20.47	0.111
		16QAM	1/0	H	20.56	-0.79	19.77	0.095

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7.5.7 LTE Band 66(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	1 720	QPSK	1/50	H	19.45	6.47	25.92	0.391
		16QAM	1/50	H	18.71	6.47	25.18	0.330
	1 732.5	QPSK	1/50	H	19.42	6.15	25.57	0.361
		16QAM	1/50	H	18.61	6.15	24.76	0.299
	1 745	QPSK	1/0	H	19.90	5.86	25.76	0.377
		16QAM	1/0	H	19.57	5.86	25.43	0.349
15	1 717.5	QPSK	1/36	H	19.45	6.50	25.95	0.394
		16QAM	1/36	H	18.78	6.50	25.28	0.337
	1 732.5	QPSK	1/36	H	19.61	6.15	25.76	0.377
		16QAM	1/36	H	18.50	6.15	24.65	0.292
	1 747.5	QPSK	1/36	H	19.86	5.83	25.69	0.371
		16QAM	1/36	H	19.15	5.83	24.98	0.315
10	1 715	QPSK	1/25	H	19.13	6.54	25.67	0.369
		16QAM	1/25	H	18.47	6.54	25.01	0.317
	1 732.5	QPSK	1/25	H	19.28	6.15	25.43	0.349
		16QAM	1/25	H	18.61	6.15	24.76	0.299
	1 750	QPSK	1/0	H	19.91	5.81	25.72	0.373
		16QAM	1/0	H	19.21	5.81	25.02	0.318
5	1 712.5	QPSK	1/12	H	19.02	6.57	25.59	0.362
		16QAM	1/12	H	18.31	6.57	24.88	0.308
	1 732.5	QPSK	1/12	H	19.33	6.15	25.48	0.353
		16QAM	1/12	H	18.39	6.15	24.54	0.284
	1 752.5	QPSK	1/12	H	18.79	5.78	24.57	0.286
		16QAM	1/12	H	18.20	5.78	23.98	0.250
3	1 711.5	QPSK	1/7	H	18.88	6.58	25.46	0.352
		16QAM	1/7	H	18.22	6.58	24.80	0.302
	1 732.5	QPSK	1/7	H	19.33	6.15	25.48	0.353
		16QAM	1/7	H	18.66	6.15	24.81	0.303
	1 753.5	QPSK	1/7	H	19.05	5.77	24.82	0.303
		16QAM	1/7	H	18.19	5.77	23.96	0.249
1.4	1 710.7	QPSK	1/0	H	18.73	6.59	25.32	0.340
		16QAM	1/0	H	17.94	6.59	24.53	0.284
	1 732.5	QPSK	1/0	H	19.30	6.15	25.45	0.351
		16QAM	1/0	H	18.36	6.15	24.51	0.282
	1 754.3	QPSK	1/0	H	19.10	5.76	24.86	0.306
		16QAM	1/0	H	18.19	5.76	23.95	0.248

With wireless charging pad

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	1 770	QPSK	1/0	H	19.77	5.86	25.63	0.366
		16QAM	1/0	H	19.43	5.86	25.29	0.338

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7.5.8 LTE Band 25(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	1 860	QPSK	1/50	V	20.58	5.31	25.89	0.388
		16QAM	1/50	V	20.00	5.31	25.31	0.340
	1 882.5	QPSK	1/0	V	19.40	5.19	24.59	0.288
		16QAM	1/0	V	19.03	5.19	24.22	0.264
	1 905	QPSK	1/0	V	19.36	5.09	24.45	0.279
		16QAM	1/0	V	18.61	5.09	23.70	0.234
15	1 857.5	QPSK	1/0	V	20.07	5.32	25.39	0.346
		16QAM	1/0	V	19.29	5.32	24.61	0.289
	1 882.5	QPSK	1/0	V	20.22	5.19	25.41	0.348
		16QAM	1/0	V	19.33	5.19	24.52	0.283
	1 907.5	QPSK	1/0	V	18.79	5.08	23.87	0.244
		16QAM	1/0	V	17.92	5.08	23.00	0.200
10	1 855	QPSK	1/49	V	20.47	5.33	25.80	0.380
		16QAM	1/49	V	19.59	5.33	24.92	0.310
	1 882.5	QPSK	1/0	V	19.68	5.19	24.87	0.307
		16QAM	1/0	V	19.13	5.19	24.32	0.270
	1 910	QPSK	1/0	V	18.35	5.08	23.43	0.220
		16QAM	1/0	V	17.44	5.08	22.52	0.179
5	1 852.5	QPSK	1/0	V	19.90	5.34	25.24	0.334
		16QAM	1/0	V	19.02	5.34	24.36	0.273
	1 882.5	QPSK	1/0	V	19.16	5.19	24.35	0.272
		16QAM	1/0	V	18.38	5.19	23.57	0.228
	1 912.5	QPSK	1/0	V	18.17	5.08	23.25	0.211
		16QAM	1/0	V	17.59	5.08	22.67	0.185
3	1 851.5	QPSK	1/7	V	20.05	5.34	25.39	0.346
		16QAM	1/7	V	19.30	5.34	24.64	0.291
	1 882.5	QPSK	1/0	V	19.81	5.19	25.00	0.316
		16QAM	1/0	V	18.91	5.19	24.10	0.257
	1 913.5	QPSK	1/7	V	18.22	5.07	23.29	0.213
		16QAM	1/7	V	17.68	5.07	22.75	0.188
1.4	1 850.7	QPSK	1/0	V	19.96	5.35	25.31	0.340
		16QAM	1/0	V	19.84	5.35	25.19	0.330
	1 882.5	QPSK	1/0	V	19.66	5.19	24.85	0.305
		16QAM	1/0	V	19.12	5.19	24.31	0.270
	1 914.3	QPSK	1/0	V	18.21	5.07	23.28	0.213
		16QAM	1/0	V	17.73	5.07	22.80	0.191

With wireless charging pad

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	1 905	QPSK	1/0	V	19.24	5.09	24.33	0.271
		16QAM	1/0	V	18.19	5.09	23.28	0.213

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7.5.9 LTE Band 41(38)

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	2 506	QPSK	1/99	H	16.94	6.32	23.26	0.212
		16QAM	1/99	H	16.23	6.32	22.55	0.180
	2 593	QPSK	1/50	H	17.85	6.59	24.44	0.278
		16QAM	1/50	H	15.93	6.59	22.52	0.179
	2 680	QPSK	1/50	H	19.15	6.65	25.80	0.380
		16QAM	1/50	H	18.12	6.65	24.77	0.300
15	2 503.5	QPSK	1/0	H	18.69	6.32	25.01	0.317
		16QAM	1/0	H	16.91	6.32	23.23	0.210
	2 593	QPSK	1/74	H	18.98	6.59	25.57	0.361
		16QAM	1/74	H	18.01	6.59	24.60	0.288
	2 682.5	QPSK	1/74	H	18.71	6.65	25.36	0.344
		16QAM	1/74	H	17.74	6.65	24.39	0.275
10	2 501	QPSK	1/25	H	18.93	6.31	25.24	0.334
		16QAM	1/25	H	17.65	6.31	23.96	0.249
	2 593	QPSK	1/25	H	19.15	6.59	25.74	0.375
		16QAM	1/25	H	17.95	6.59	24.54	0.284
	2 685	QPSK	1/25	H	19.13	6.65	25.78	0.378
		16QAM	1/25	H	17.62	6.65	24.27	0.267
5	2 498.5	QPSK	1/0	H	17.93	6.31	24.24	0.265
		16QAM	1/0	H	16.69	6.31	23.00	0.200
	2 593	QPSK	1/24	H	19.13	6.59	25.72	0.373
		16QAM	1/24	H	17.79	6.59	24.38	0.274
	2 687.5	QPSK	1/24	H	19.03	6.65	25.68	0.370
		16QAM	1/24	H	17.94	6.65	24.59	0.288

With wireless charging pad

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	2 680	QPSK	1/50	H	17.82	6.65	24.47	0.280
		16QAM	1/50	H	16.24	6.65	22.89	0.195

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7.5.10 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	2 510	QPSK	1/0	V	16.24	6.33	22.57	0.181
		16QAM	1/0	V	15.66	6.33	21.99	0.158
	2 535	QPSK	1/0	V	18.27	6.37	24.64	0.291
		16QAM	1/0	V	18.08	6.37	24.45	0.279
	2 560	QPSK	1/50	V	17.73	6.45	24.18	0.262
		16QAM	1/50	V	17.26	6.45	23.71	0.235
15	2 507.5	QPSK	1/0	V	16.29	6.33	22.62	0.183
		16QAM	1/0	V	15.49	6.33	21.82	0.152
	2 535	QPSK	1/0	V	18.29	6.37	24.66	0.292
		16QAM	1/0	V	17.42	6.37	23.79	0.239
	2 562.5	QPSK	1/0	V	18.05	6.46	24.51	0.282
		16QAM	1/0	V	17.45	6.46	23.91	0.246
10	2 505	QPSK	1/0	V	16.19	6.32	22.51	0.178
		16QAM	1/0	V	15.45	6.32	21.77	0.150
	2 535	QPSK	1/0	V	18.04	6.37	24.41	0.276
		16QAM	1/0	V	17.43	6.37	23.80	0.240
	2 565	QPSK	1/0	V	17.92	6.47	24.39	0.275
		16QAM	1/0	V	17.02	6.47	23.49	0.223
5	2 502.5	QPSK	1/0	V	16.18	6.32	22.50	0.178
		16QAM	1/0	V	15.62	6.32	21.94	0.156
	2 535	QPSK	1/12	V	17.93	6.37	24.30	0.269
		16QAM	1/12	V	17.15	6.37	23.52	0.225
	2 567.5	QPSK	1/0	V	17.74	6.48	24.22	0.264
		16QAM	1/0	V	17.22	6.48	23.70	0.234

With wireless charging pad

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	2 560	QPSK	1/50	H	17.57	6.45	24.02	0.252
		16QAM	1/50	H	17.12	6.45	23.57	0.228

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7.6 UNDESIRABLE EMISSIONS (Radiated)

- Test Notes

1) This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported.
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.
3) Limit Calculation for Band 25(2)/66(4)/12(17)/13/14/26(5) = 43 + 10 log10 (P[Watts])
4) Limit Calculation for Band 7/41(38) = 55 + 10 $\log_{10}$ (P[Watts])
5) Limit Calculation for 1 559 MHz ~ 1 610 MHz in Band 13, 14 = −70 dBW/MHz (equivalent isotropically radiated power for wideband signals)

7.6.1 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		Limit (dBc)
								(dBm)	(dBc)	
10	704	1/49	QPSK	1 408.13	H	-41.35	3.16	-38.19	57.13	31.94
				2 112.30	H	-60.84	3.31	-57.53	76.47	
			16QAM	1 408.13	H	-41.93	3.16	-38.77	56.97	31.20
				2 112.23	H	-61.36	3.31	-58.05	76.25	
	711	1/49	QPSK	1 413.14	H	-42.52	3.20	-39.32	58.85	32.53
				2 119.78	H	-56.85	3.31	-53.54	73.07	
			16QAM	1 413.07	H	-43.40	3.20	-40.20	59.01	31.81
				2 119.68	H	-57.50	3.31	-54.19	73.00	

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
10	704	1/49	QPSK	1 413.39	H	-42.86	3.20	-39.66	59.63	32.97
				2 119.24	H	-57.16	3.31	-53.85	73.82	

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7.6.2 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 (dBc)
								(dBm)	(dBc)	
10	782	1/49	QPSK	2 359.24	H	-61.91	4.19	-57.72	79.59	34.87
			16QAM	2 359.22	H	-62.34	4.19	-58.15	79.38	34.23
5	784.5	1/12	QPSK	2 353.38	H	-63.20	4.19	-59.01	81.06	35.05
			16QAM	2 353.36	H	-63.60	4.19	-59.41	80.58	34.17

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
10	782	1/49	QPSK	2 359.35	H	-62.35	4.19	-58.16	79.69	34.53

UNDESIRABLE EMISSIONS IN 1 559 MHz ~ 1 610 MHz (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	Margin	Limit (dBm/MHz)
								(dBm)	(dB)	
10	782	1/49	QPSK	1 572.80	V	-51.89	6.05	-45.84	5.84	-40.00
		1/49	16QAM	1 572.94	V	-52.54	6.05	-46.49	6.49	
5	779.5	1/12	QPSK	1 569.10	V	-50.92	6.03	-44.89	4.89	
		1/12	16QAM	1 568.93	V	-52.11	6.03	-46.08	6.08	

With wireless charging pad

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	Margin	Limit (dBm/MHz)
								(dBm)	(dB)	
10	782	1/49	QPSK	1 573.22	V	-52.70	6.06	-46.64	6.64	-40.00

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7.6.3 LTE Band 14

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 (dBc)
								(dBm)	(dBc)	
10	793	1/0	QPSK	2 365.77	H	-63.39	4.18	-59.21	80.89	34.68
			16QAM	2 365.72	H	-63.41	4.18	-59.23	79.97	33.74

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
10	793	1/0	QPSK	2 365.12	H	-64.05	4.18	-59.87	80.11	33.24

UNDESIRABLE EMISSIONS IN 1 559 MHz ~ 1 610 MHz (LTE Band 14)

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	Margin	Limit (dBm/MHz)
								(dBm)	(dB)	
10	793	1/0	QPSK	1 577.11	V	-53.25	6.08	-47.17	7.17	-40.00
		1/0	16QAM	1 577.13	V	-54.02	6.08	-47.94	7.94	

With wireless charging pad

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	Margin	Limit (dBm/MHz)
								(dBm)	(dB)	
10	793	1/0	QPSK	1 577.83	V	-53.67	6.08	-47.59	7.59	-40.00

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7.6.4 LTE Band 26

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 (dBc)
								(dBm)	(dBc)	
15	831.5	1/0	QPSK	1649.53	H	-59.74	4.52	-55.22	75.96	33.74
				2474.43	V	-57.61	4.14	-53.47	74.21	
			16QAM	1649.61	H	-59.94	4.52	-55.42	75.32	32.90
				2474.51	V	-56.75	4.14	-52.61	72.51	
	841.5	1/0	QPSK	1669.69	H	-60.49	4.54	-55.95	74.70	31.75
				2504.67	V	-58.75	4.14	-54.61	73.36	
			16QAM	1669.62	H	-61.15	4.54	-56.61	74.78	31.17
				2504.29	V	-58.09	4.14	-53.95	72.12	

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
15	831.5	1/0	QPSK	1649.75	H	-59.92	4.52	-55.40	75.52	33.12
				2474.12	V	-58.07	4.14	-53.93	74.05	

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7.6.5 LTE Band 66(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 (dBc)
								(dBm)	(dBc)	
20	1 720	1/50	QPSK	3 440.14	V	-54.59	8.73	-45.86	71.78	38.92
				5 160.37	H	-55.18	10.80	-44.38	70.30	
				6 880.34	H	-45.09	12.03	-33.06	58.98	
				8 600.50	V	-43.28	13.51	-29.77	55.69	
			16QAM	3 440.23	V	-53.82	8.74	-45.08	70.26	38.18
				5 160.28	H	-54.09	10.80	-43.29	68.47	
				6 880.30	H	-44.52	12.03	-32.49	57.67	
				8 600.40	V	-42.11	13.51	-28.60	53.78	
	1 732.5	1/50	QPSK	3 490.31	V	-53.91	8.80	-45.11	70.68	38.57
				5 235.22	H	-50.39	10.93	-39.46	65.03	
				6 980.42	H	-41.43	12.20	-29.23	54.80	
				8 725.58	V	-39.95	13.74	-26.21	51.78	
			16QAM	3 489.86	V	-54.91	8.80	-46.11	70.87	37.76
				5 235.33	H	-50.38	10.93	-39.45	64.21	
				6 980.26	H	-40.70	12.20	-28.50	53.26	
				8 725.47	V	-38.06	13.74	-24.32	49.08	
	1 745	1/0	QPSK	3 521.66	V	-55.71	8.81	-46.90	72.66	38.76
				5 283.03	H	-50.20	10.91	-39.29	65.05	
				7 044.09	H	-41.86	12.18	-29.68	55.44	
				8 804.79	V	-40.47	13.71	-26.76	52.52	
			16QAM	3 522.16	V	-55.90	8.81	-47.09	72.52	38.43
				5 282.83	H	-50.14	10.91	-39.23	64.66	
				7 044.16	H	-40.52	12.18	-28.34	53.77	
				8 804.83	V	-39.05	13.71	-25.34	50.77	

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
20	1 770	1/0	QPSK	3 521.17	V	-56.23	8.81	-47.42	69.92	35.50
				5 283.29	H	-50.36	10.91	-39.45	61.95	
				7 044.48	H	-42.10	12.18	-29.92	52.42	
				8 804.53	V	-40.78	13.71	-27.07	49.57	

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7.6.6 LTE Band 25(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		Limit (dBc)
								(dBm)	(dBc)	
20	1 860	1/50	QPSK	3 727.71	V	-55.84	8.89	-46.95	72.84	38.89
				5 580.47	H	-52.09	11.01	-41.08	66.97	
				7 440.20	V	-44.28	12.43	-31.85	57.74	
				9 300.53	H	-42.96	13.79	-29.17	55.06	
			16QAM	3 705.94	V	-56.10	8.88	-47.22	72.53	38.31
				5 579.73	H	-51.86	11.01	-40.85	66.16	
				7 440.24	V	-43.74	12.43	-31.31	56.62	
				9 300.56	H	-41.57	13.79	-27.78	53.09	
	1 882.5	1/50	QPSK	3 731.52	V	-56.15	8.89	-47.26	71.85	37.59
				5 620.65	H	-50.34	11.07	-39.27	63.86	
				7 494.50	V	-42.50	12.51	-29.99	54.58	
				9 367.75	H	-43.92	13.82	-30.10	54.69	
			16QAM	3 756.19	V	-56.07	8.91	-47.16	71.38	37.22
				5 620.87	H	-49.74	11.07	-38.67	62.89	
				7 494.60	V	-41.84	12.51	-29.33	53.55	
				9 368.24	H	-43.63	13.82	-29.81	54.03	
	1 905	1/0	QPSK	3 800.13	V	-55.72	9.02	-46.70	71.15	37.45
				5 688.11	H	-50.00	11.12	-38.88	63.33	
				7 584.31	V	-39.85	12.55	-27.30	51.75	
				9 480.54	H	-46.91	13.75	-33.16	57.61	
			16QAM	3 804.69	V	-55.81	9.04	-46.77	70.47	36.70
				5 688.21	H	-49.92	11.12	-38.80	62.50	
				7 584.43	V	-39.29	12.55	-26.74	50.44	
				9 480.45	H	-45.92	13.75	-32.17	55.87	

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
20	1 905	1/0	QPSK	3 800.39	V	-56.15	9.02	-47.13	70.12	35.99
				5 688.03	H	-50.55	11.12	-39.43	62.42	
				7 584.48	V	-41.00	12.55	-28.45	51.44	
				9 480.19	H	-47.34	13.75	-33.59	56.58	

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7.6.7 LTE Band 41(38)

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 (dBc)
								(dBm)	(dBc)	
20	2 506	1/99	QPSK	5 028.34	V	-57.65	10.61	-47.04	70.30	48.26
				7 544.63	V	-46.96	12.57	-34.39	57.65	
			16QAM	5 049.34	V	-57.26	10.69	-46.57	69.12	47.55
				7 547.23	V	-55.67	12.58	-43.09	65.64	
	2 593	1/99	QPSK	5 166.22	V	-57.49	10.82	-46.67	71.11	49.44
				7 779.44	V	-45.05	12.74	-32.31	56.75	
			16QAM	5 168.92	V	-56.89	10.83	-46.06	68.58	47.52
				7 779.42	V	-46.26	12.74	-33.52	56.04	
	2 680	1/99	QPSK	5 360.11	V	-55.98	10.97	-45.01	70.81	50.80
				8 040.43	V	-43.92	13.13	-30.79	56.59	
			16QAM	5 352.73	V	-57.54	10.98	-46.56	71.33	49.77
				8 040.87	V	-46.06	13.13	-32.93	57.70	

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
20	2 680	1/50	QPSK	5 360.49	V	-56.05	10.96	-45.09	68.97	48.88
				8 040.11	V	-44.57	13.13	-31.44	55.32	
10	2 685	1/25	QPSK	5 370.23	V	-55.84	10.94	-44.90	71.00	51.10
				8 055.38	V	-43.75	13.15	-30.60	56.70	

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7.6.8 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		Limit (dBc)
								(dBm)	(dBc)	
20	2 510	1/0	QPSK	5 009.57	V	-56.69	10.54	-46.15	68.72	47.57
				7 503.20	V	-49.46	12.52	-36.94	59.51	
			16QAM	5 007.79	V	-56.91	10.53	-46.38	68.37	46.99
				7 503.20	V	-48.84	12.52	-36.32	58.31	
	2 535	1/0	QPSK	5 052.76	V	-57.81	10.69	-47.12	71.76	49.64
				7 578.22	V	-50.25	12.56	-37.69	62.33	
			16QAM	5 041.43	V	-57.00	10.66	-46.34	70.79	49.45
				7 578.27	V	-50.43	12.56	-37.87	62.32	
	2 560	1/50	QPSK	5 113.29	V	-57.26	10.77	-46.49	70.67	49.18
				7 680.58	V	-50.15	12.67	-37.48	61.66	
			16QAM	5 096.03	V	-57.14	10.76	-46.38	70.09	48.71
				7 679.99	V	-50.30	12.67	-37.63	61.34	
15	2 562.5	1/0	QPSK	5 122.09	V	-57.73	10.77	-46.96	71.47	49.51
				7 667.77	V	-50.86	12.68	-38.18	62.69	
			16QAM	5 112.44	V	-57.49	10.77	-46.72	70.63	48.91
				7 667.57	V	-50.34	12.68	-37.66	61.57	

With wireless charging pad

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 (dBc)
								(dBm)	(dBc)	
20	2 560	1/0	QPSK	5 113.85	V	-57.69	10.77	-46.92	68.76	46.84
				7 680.24	V	-50.44	12.67	-37.77	59.61	
15	2 562.5	1/0	QPSK	5 122.48	V	-57.88	10.77	-47.11	69.14	47.03
				7 667.26	V	-51.52	12.68	-38.84	60.87	

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7.7 FREQUENCY STABILITY

- Test Notes

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 in-band 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.

7.7.1 LTE Band 12(17)

OPERATING FREQUENCY : 707.5 MHz
REFERENCE VOLTAGE : 3.85 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 %	3.85	+20(Ref)	707,500,007	+7	+0.0099	+0.000 000 989
100 %		-30	707,500,006	+6	+0.0085	+0.000 000 848
100 %		-20	707,499,995	-5	-0.0071	-0.000 000 707
100 %		-10	707,499,997	-3	-0.0042	-0.000 000 424
100 %		0	707,500,004	+4	+0.0057	+0.000 000 565
100 %		+10	707,500,007	+7	+0.0099	+0.000 000 989
100 %		+20	707,500,007	+7	+0.0099	+0.000 000 989
100 %		+30	707,500,006	+6	+0.0085	+0.000 000 848
100 %		+40	707,500,011	+11	+0.0155	+0.000 001 555
100 %		+50	707,500,009	+9	+0.0127	+0.000 001 272
115 %	4.43	+20	707,500,002	+2	+0.0028	+0.000 000 283
BATT.ENDPOINT	3.20	+20	707,500,001	+1	+0.0014	+0.000 000 141

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7.7.2 LTE Band 13

OPERATING FREQUENCY : 782 MHz
REFERENCE VOLTAGE : 3.85 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 %	3.85	+20(Ref)	782,000,002	+2	+0.0026	+0.000 000 256
100 %		-30	781,999,995	-5	-0.0064	-0.000 000 639
100 %		-20	781,999,996	-4	-0.0051	-0.000 000 512
100 %		-10	782,000,001	+1	+0.0013	+0.000 000 128
100 %		0	782,000,007	+7	+0.0090	+0.000 000 895
100 %		+10	782,000,009	+9	+0.0115	+0.000 001 151
100 %		+20	782,000,002	+2	+0.0026	+0.000 000 256
100 %		+30	782,000,011	+11	+0.0141	+0.000 001 407
100 %		+40	782,000,010	+10	+0.0128	+0.000 001 279
100 %		+50	781,999,994	-6	-0.0077	-0.000 000 767
115 %	4.43	+20	781,999,996	-4	-0.0051	-0.000 000 512
BATT.ENDPOINT	3.20	+20	781,999,997	-3	-0.0038	-0.000 000 384

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7.7.3 LTE Band 14

OPERATING FREQUENCY : 793 MHz
REFERENCE VOLTAGE : 3.85 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 %	3.85	+20(Ref)	793,000,002	+2	+0.0025	+0.000 000 252
100 %		-30	793,000,007	+7	+0.0088	+0.000 000 883
100 %		-20	792,999,995	-5	-0.0063	-0.000 000 631
100 %		-10	792,999,997	-3	-0.0038	-0.000 000 378
100 %		0	793,000,009	+9	+0.0113	+0.000 001 135
100 %		+10	793,000,010	+10	+0.0126	+0.000 001 261
100 %		+20	793,000,002	+2	+0.0025	+0.000 000 252
100 %		+30	793,000,012	+12	+0.0151	+0.000 001 513
100 %		+40	793,000,001	+1	+0.0013	+0.000 000 126
100 %		+50	792,999,997	-3	-0.0038	-0.000 000 378
115 %	4.43	+20	793,000,004	+4	+0.0050	+0.000 000 504
BATT.ENDPOINT	3.20	+20	793,000,002	+2	+0.0025	+0.000 000 252

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7.7.4 LTE Band 26(5)

OPERATING FREQUENCY : 836.5 MHz
REFERENCE VOLTAGE : 3.85 VDC
DEVIATION LIMIT(FCC&IC) : ± 0.000 25 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100 %	3.85	+20(Ref)	836,499,991	-9	-0.0108	-0.000 001 076
100 %		-30	836,500,011	+11	+0.0132	+0.000 001 315
100 %		-20	836,500,002	+2	+0.0024	+0.000 000 239
100 %		-10	836,500,004	+4	+0.0048	+0.000 000 478
100 %		0	836,500,007	+7	+0.0084	+0.000 000 837
100 %		+10	836,499,995	-5	-0.0060	-0.000 000 598
100 %		+20	836,499,991	-9	-0.0108	-0.000 001 076
100 %		+30	836,499,997	-3	-0.0036	-0.000 000 359
100 %		+40	836,500,001	+1	+0.0012	+0.000 000 120
100 %		+50	836,500,000	+0	+0.0000	+0.000 000 000
115 %	4.43	+20	836,499,997	-3	-0.0036	-0.000 000 359
BATT.ENDPOINT	3.20	+20	836,500,004	+4	+0.0048	+0.000 000 478

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7.7.5 LTE Band 66(4)

OPERATING FREQUENCY : 1 745 MHz
REFERENCE VOLTAGE 3.85 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 %	3.85	+20(Ref)	1,745,000,003	+3	+0.0017	+0.000 000 172
100 %		-30	1,745,000,007	+7	+0.0040	+0.000 000 401
100 %		-20	1,745,000,002	+2	+0.0011	+0.000 000 115
100 %		-10	1,744,999,996	-4	-0.0023	-0.000 000 229
100 %		0	1,744,999,991	-9	-0.0052	-0.000 000 516
100 %		+10	1,745,000,010	+10	+0.0057	+0.000 000 573
100 %		+20	1,745,000,003	+3	+0.0017	+0.000 000 172
100 %		+30	1,745,000,009	+9	+0.0052	+0.000 000 516
100 %		+40	1,744,999,990	-10	-0.0057	-0.000 000 573
100 %		+50	1,745,000,005	+5	+0.0029	+0.000 000 287
115 %	4.43	+20	1,745,000,004	+4	+0.0023	+0.000 000 229
BATT.ENDPOINT	3.20	+20	1,745,000,007	+7	+0.0040	+0.000 000 401

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7.7.6 LTE Band 25(2)

OPERATING FREQUENCY : 1 882.5 MHz
REFERENCE VOLTAGE 3.85 VDC
LIMIT(FCC) : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
LIMIT(IC) : ± 0.000 25 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100 %	3.85	+20(Ref)	1,882,499,995	-5	-0.0027	-0.000 000 266
100 %		-30	1,882,500,004	+4	+0.0021	+0.000 000 212
100 %		-20	1,882,499,999	-1	-0.0005	-0.000 000 053
100 %		-10	1,882,500,002	+2	+0.0011	+0.000 000 106
100 %		0	1,882,500,007	+7	+0.0037	+0.000 000 372
100 %		+10	1,882,499,997	-3	-0.0016	-0.000 000 159
100 %		+20	1,882,499,995	-5	-0.0027	-0.000 000 266
100 %		+30	1,882,500,004	+4	+0.0021	+0.000 000 212
100 %		+40	1,882,500,004	+4	+0.0021	+0.000 000 212
100 %		+50	1,882,500,002	+2	+0.0011	+0.000 000 106
115 %	4.43	+20	1,882,499,998	-2	-0.0011	-0.000 000 106
BATT.ENDPOINT	3.20	+20	1,882,499,993	-7	-0.0037	-0.000 000 372

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7.7.7 LTE Band 41(38)

OPERATING FREQUENCY : 2 593 MHz
REFERENCE VOLTAGE : 3.85 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 %	3.85	+20(Ref)	2,593,000,001	+1	+0.0004	+0.000 000 039
100 %		-30	2,593,000,007	+7	+0.0027	+0.000 000 270
100 %		-20	2,593,000,009	+9	+0.0035	+0.000 000 347
100 %		-10	2,592,999,996	-4	-0.0015	-0.000 000 154
100 %		0	2,592,999,991	-9	-0.0035	-0.000 000 347
100 %		+10	2,593,000,010	+10	+0.0039	+0.000 000 386
100 %		+20	2,593,000,001	+1	+0.0004	+0.000 000 039
100 %		+30	2,593,000,003	+3	+0.0012	+0.000 000 116
100 %		+40	2,593,000,004	+4	+0.0015	+0.000 000 154
100 %		+50	2,592,999,998	-2	-0.0008	-0.000 000 077
115 %	4.43	+20	2,592,999,994	-6	-0.0023	-0.000 000 231
BATT.ENDPOINT	3.20	+20	2,593,000,007	+7	+0.0027	+0.000 000 270

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7.7.8 LTE Band 7

OPERATING FREQUENCY : 2 535 MHz
REFERENCE VOLTAGE : 3.85 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 %	3.85	+20(Ref)	2,535,000,005	+5	+0.0020	+0.000 000 197
100 %		-30	2,535,000,003	+3	+0.0012	+0.000 000 118
100 %		-20	2,534,999,990	-10	-0.0039	-0.000 000 394
100 %		-10	2,535,000,003	+3	+0.0012	+0.000 000 118
100 %		0	2,535,000,005	+5	+0.0020	+0.000 000 197
100 %		+10	2,535,000,004	+4	+0.0016	+0.000 000 158
100 %		+20	2,535,000,005	+5	+0.0020	+0.000 000 197
100 %		+30	2,535,000,007	+7	+0.0028	+0.000 000 276
100 %		+40	2,534,999,998	-2	-0.0008	-0.000 000 079
100 %		+50	2,534,999,992	-8	-0.0032	-0.000 000 316
115 %	4.43	+20	2,534,999,991	-9	-0.0036	-0.000 000 355
BATT.ENDPOINT	3.20	+20	2,535,000,004	+4	+0.0016	+0.000 000 158

This test report is prohibited to copy or reissue in whole or in part without the approval of DT&C Co., Ltd.

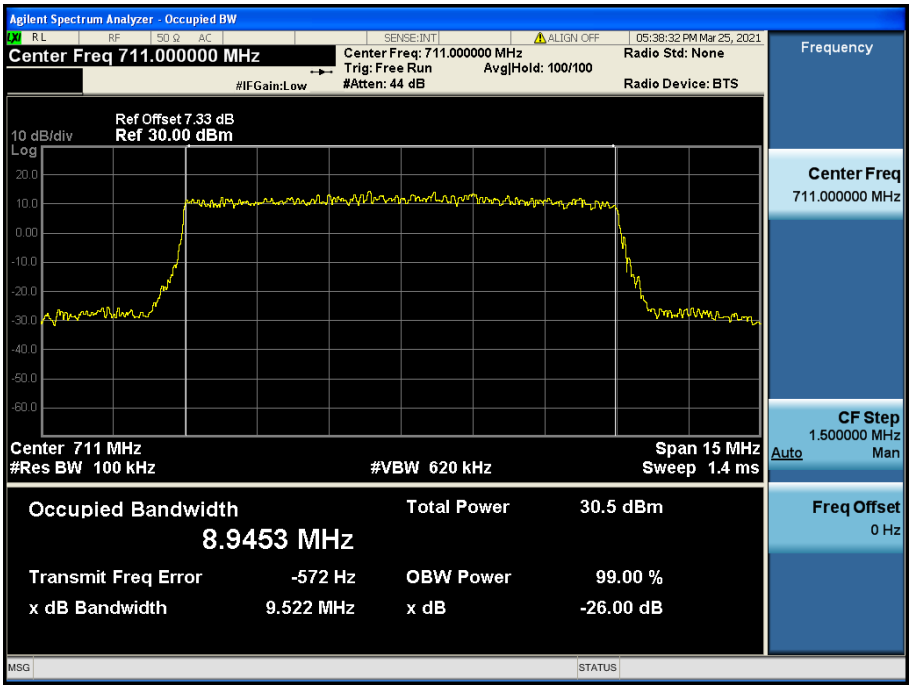
8. TEST PLOTS

- Test Notes:

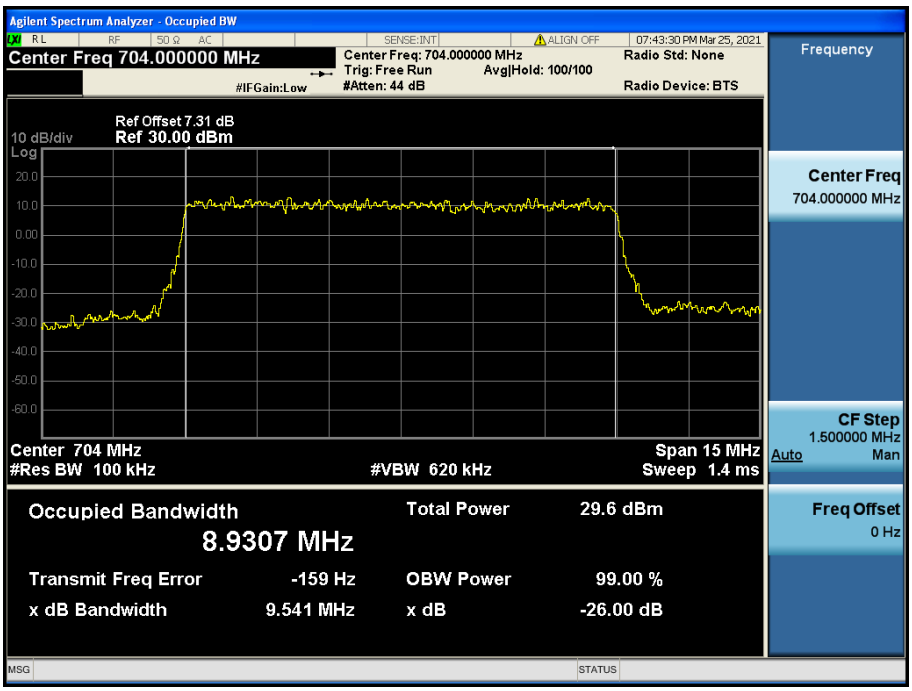
All bandwidths, RB configurations, and modulations were investigated.
The worst case test results are reported.

8.1 OCCUPIED BANDWIDTH

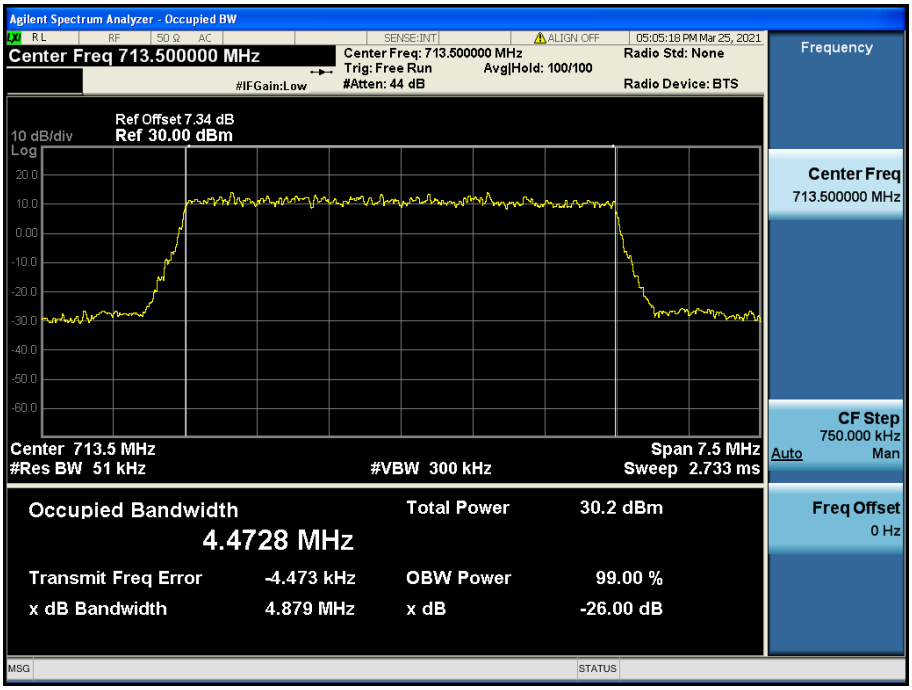
8.1.1 LTE Band 12(17)



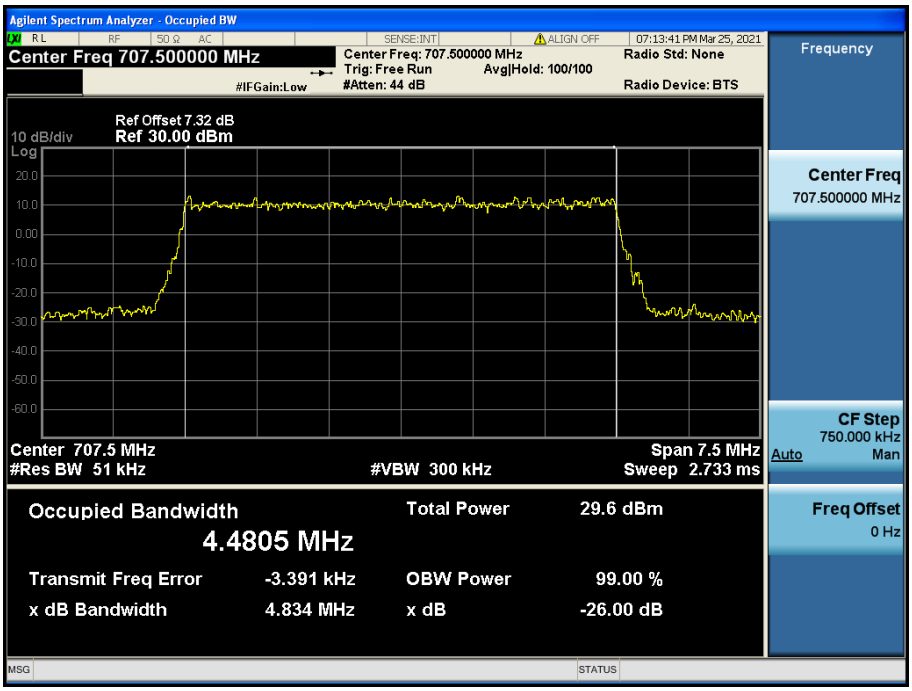
LTE Band 12(17) / 10 MHz / QPSK - RB Size 50



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

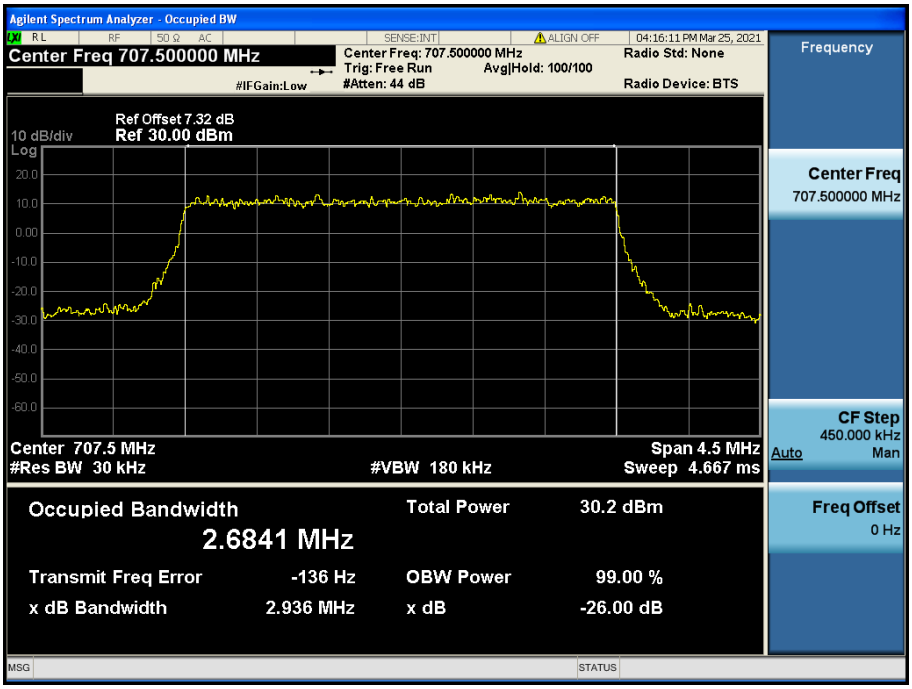


LTE Band 12(17) / 5 MHz / QPSK - RB Size 25

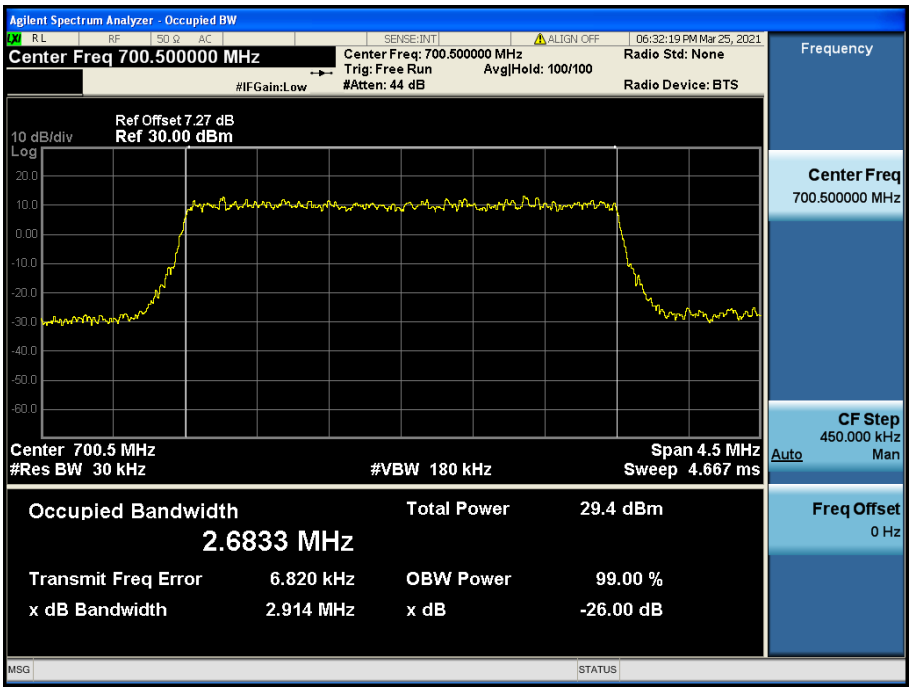


LTE Band 12(17) / 5 MHz / 16QAM - RB Size 25

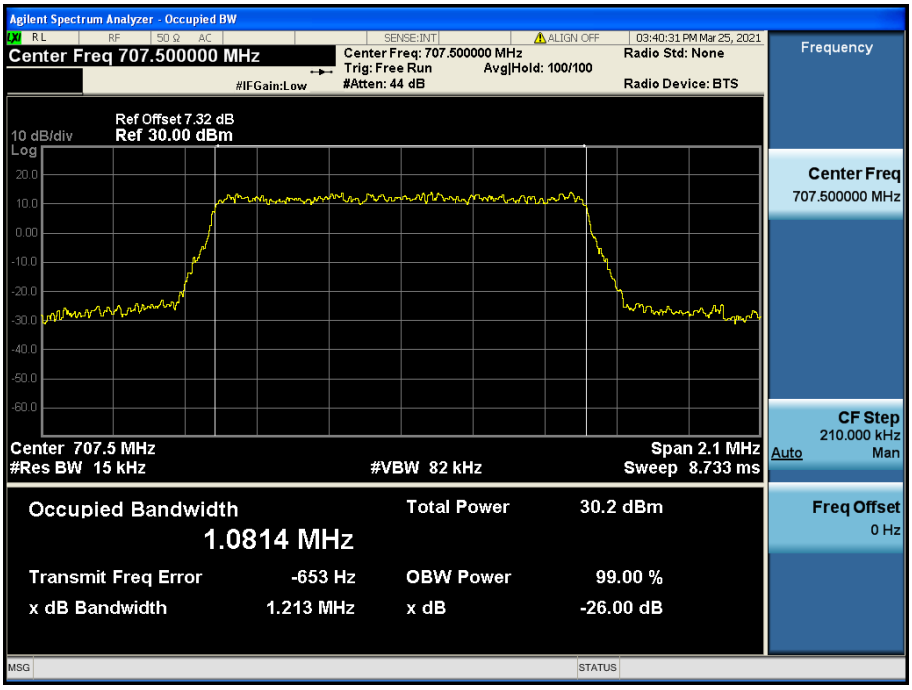
8.1.2 LTE Band 12



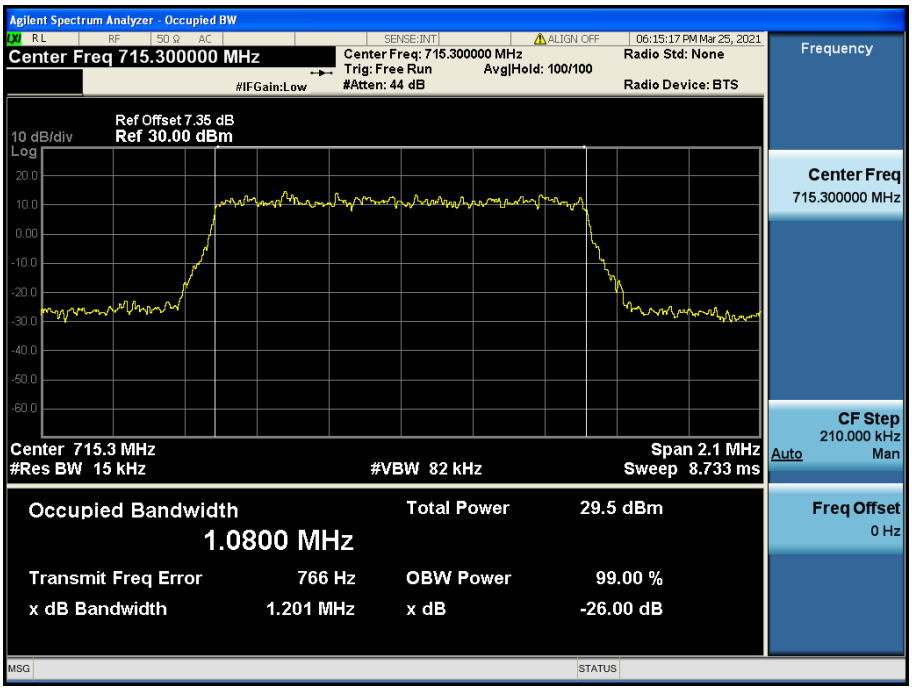
LTE Band 12 / 3 MHz / QPSK - RB Size 15



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

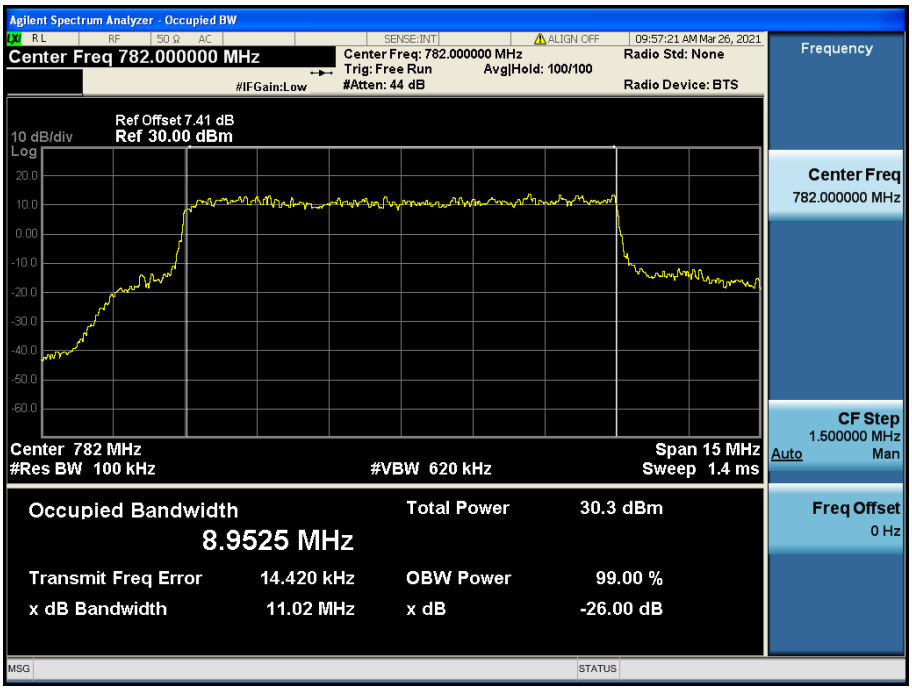


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

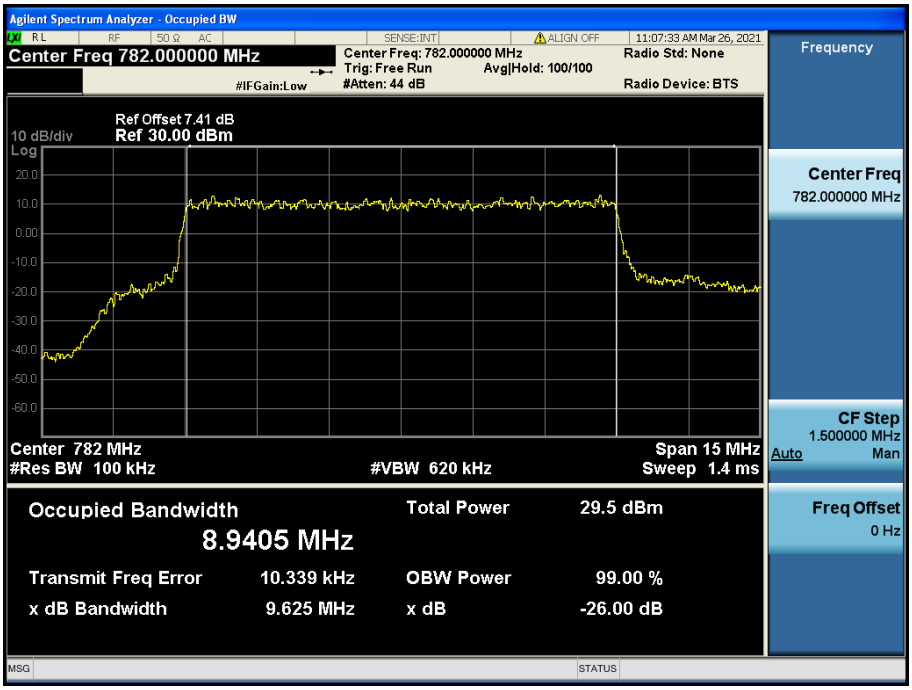


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

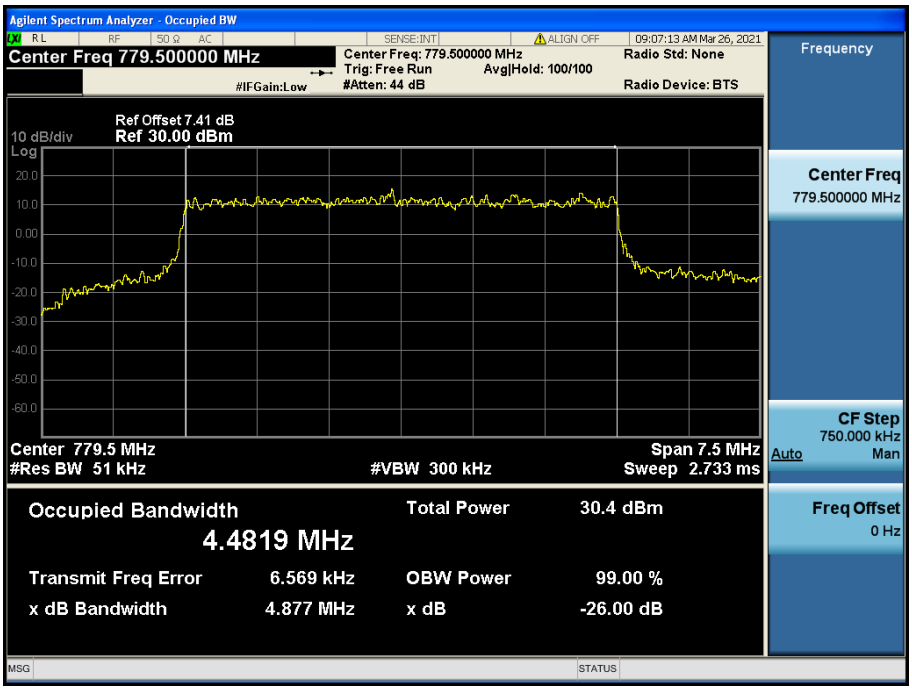
8.1.3 LTE Band 13



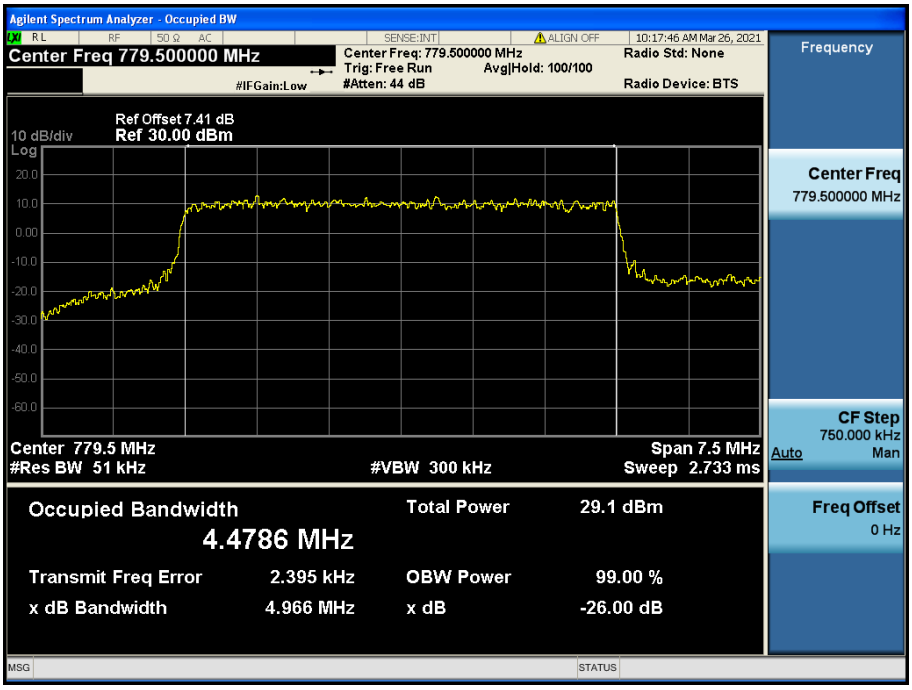
LTE Band 13 / 10 MHz / QPSK - RB Size 50



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

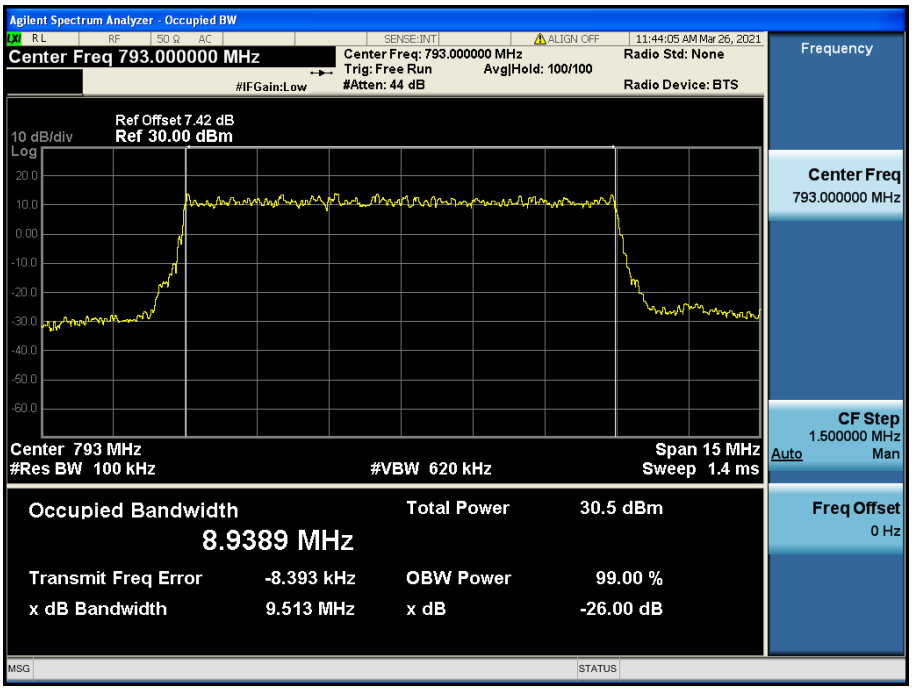


LTE Band 13 / 5 MHz / QPSK - RB Size 25

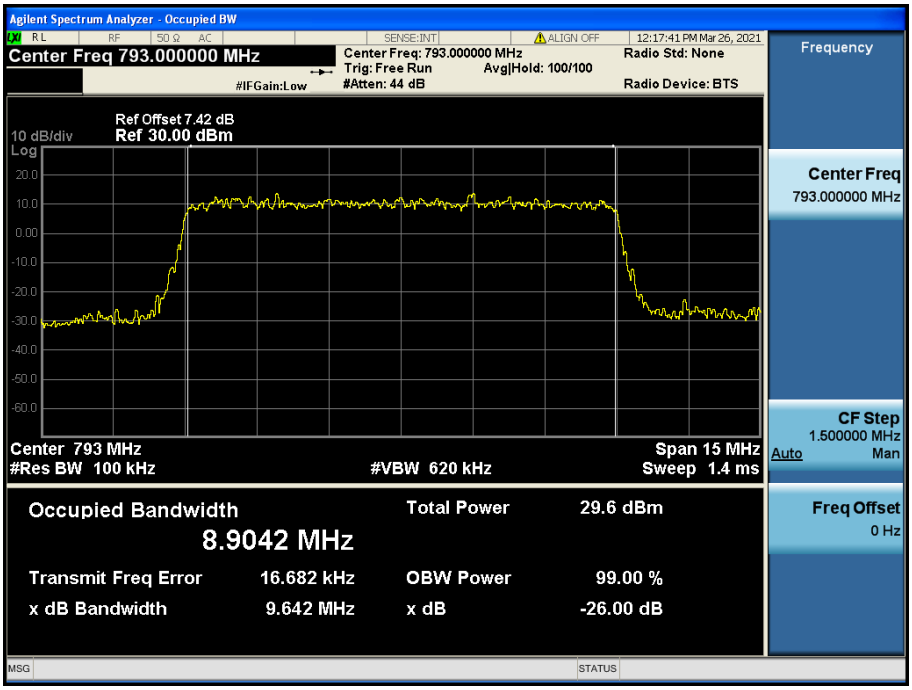


LTE Band 13 / 5 MHz / 16QAM - RB Size 25

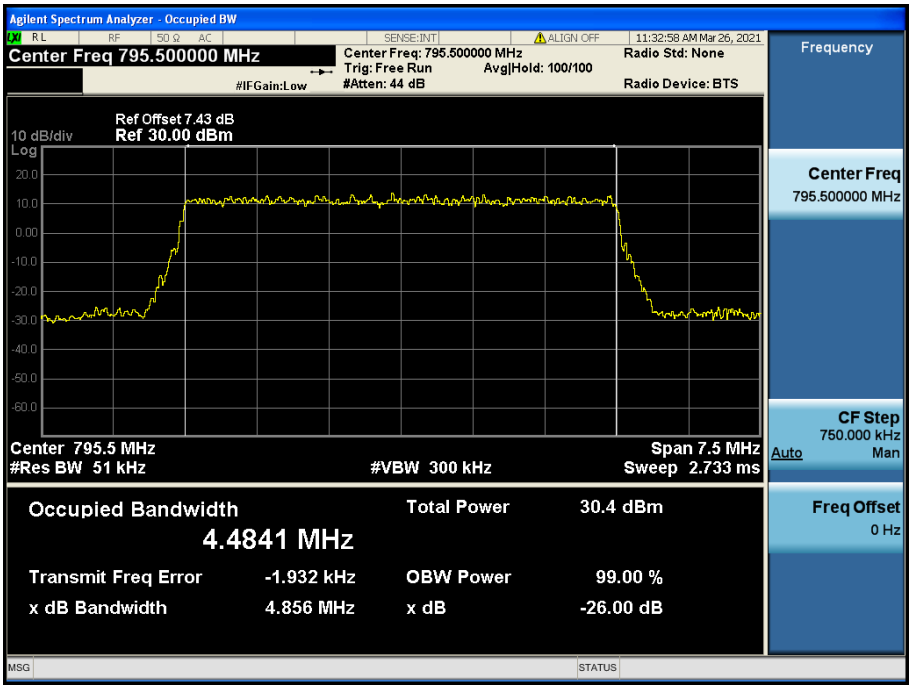
8.1.4 LTE Band 14



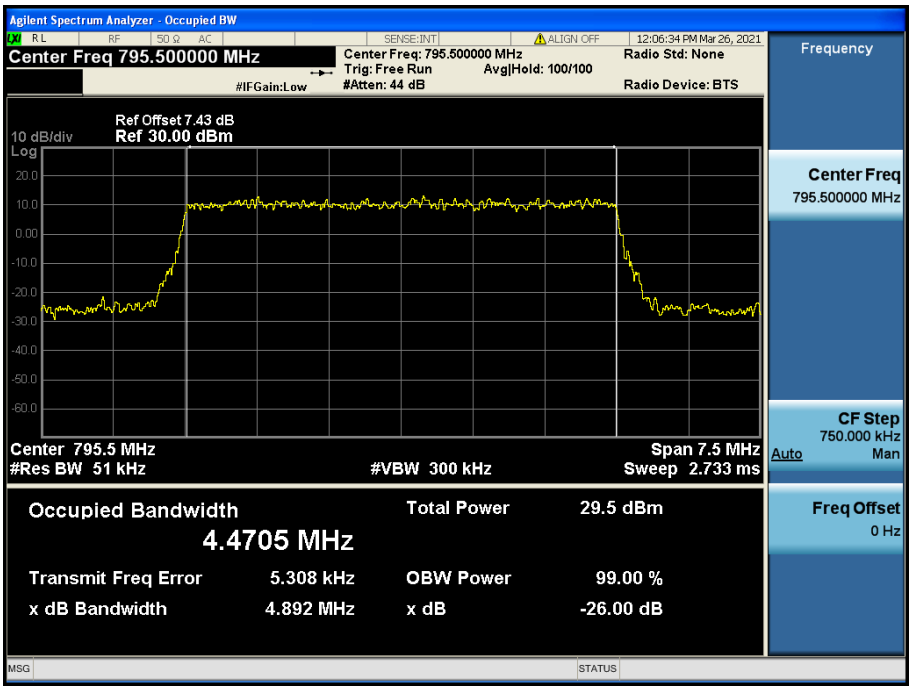
LTE Band 14 / 10 MHz / QPSK - RB Size 50



LTE Band 14 / 10 MHz / 16QAM - RB Size 50

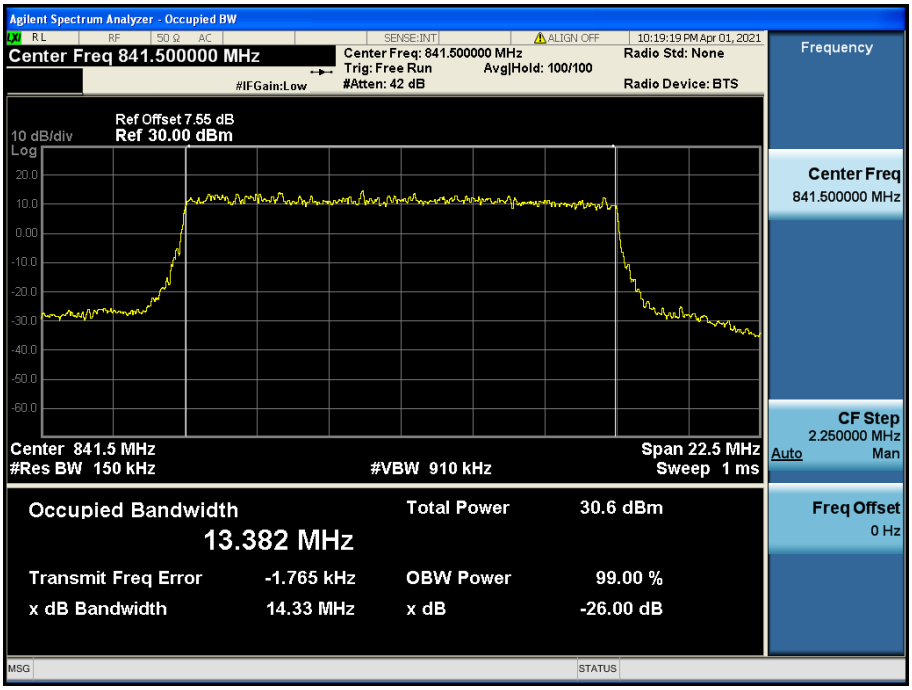


LTE Band 14 / 5 MHz / QPSK - RB Size 25

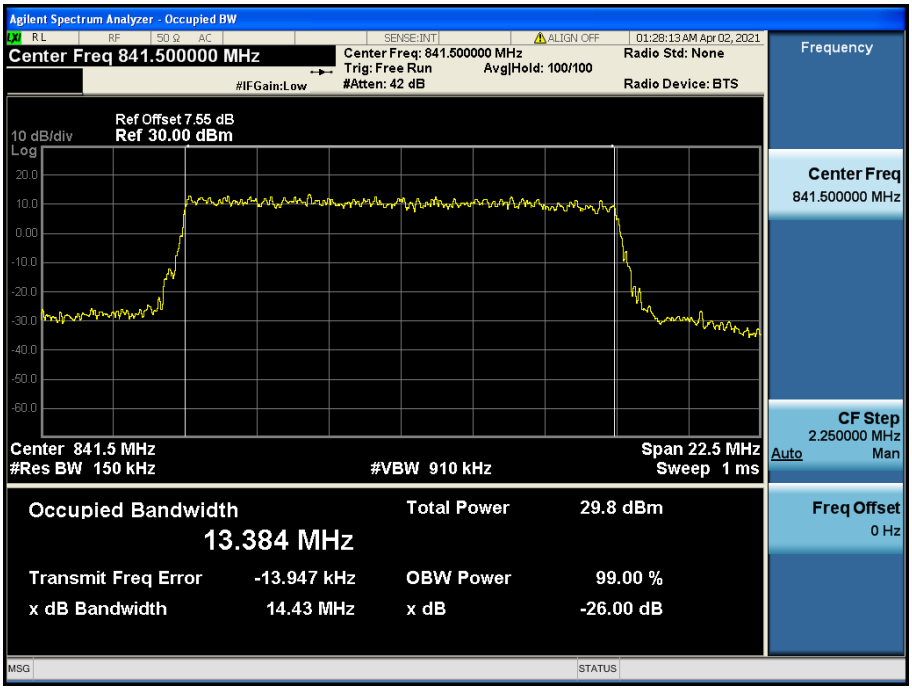


LTE Band 14 / 5 MHz / 16QAM - RB Size 25

8.1.5 LTE Band 26

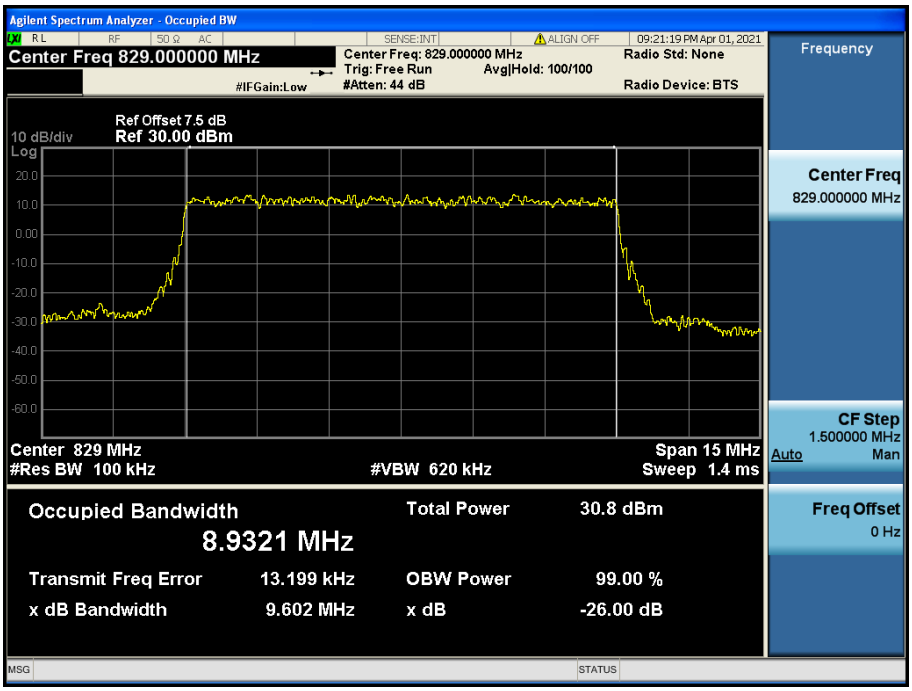


LTE Band 26 / 15 MHz / QPSK - RB Size 75

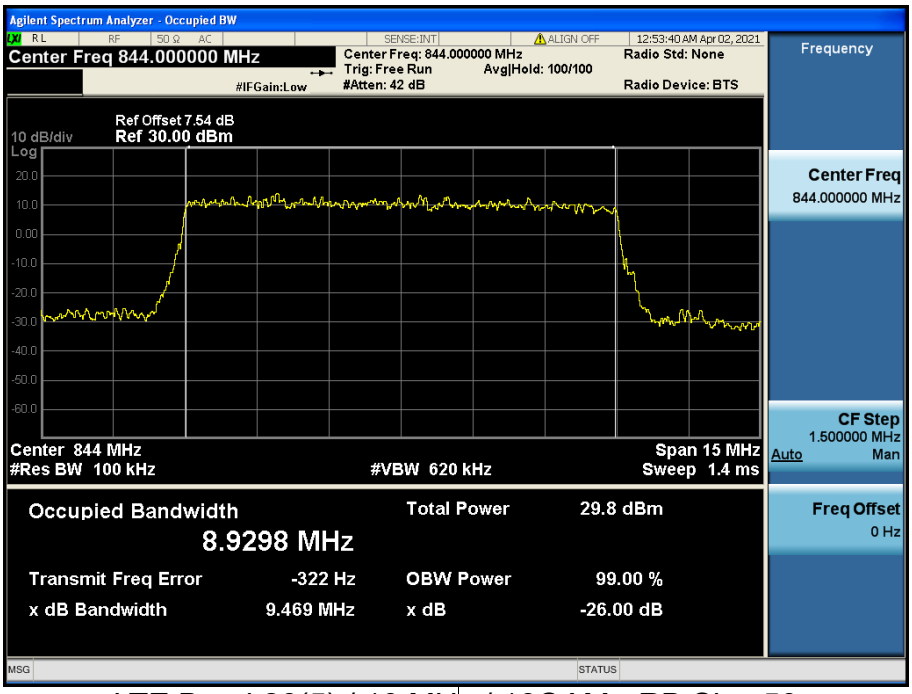


LTE Band 26 / 15 MHz / 16QAM - RB Size 75

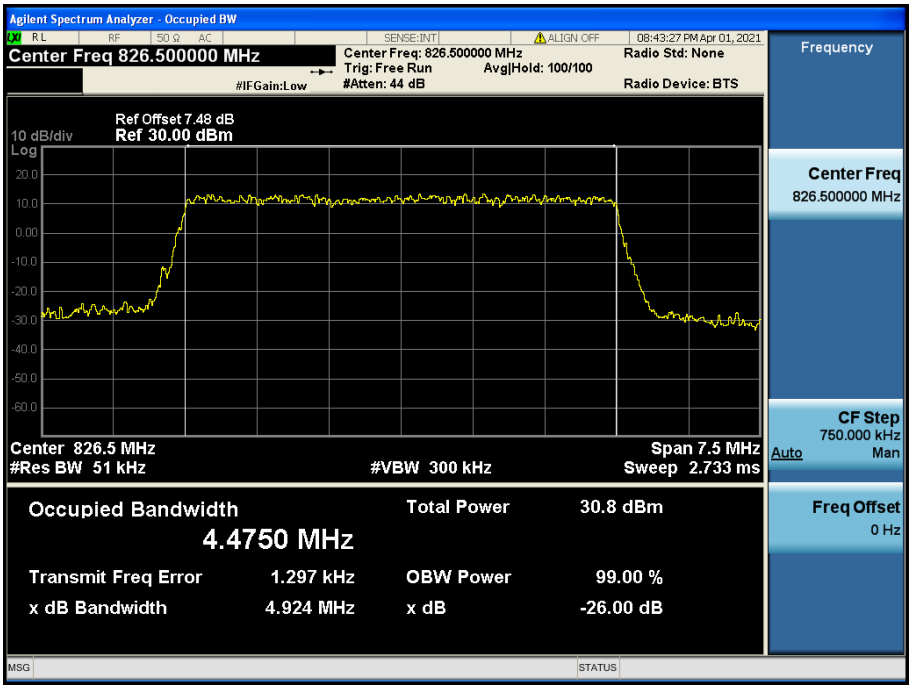
8.1.6 LTE Band 26(5)



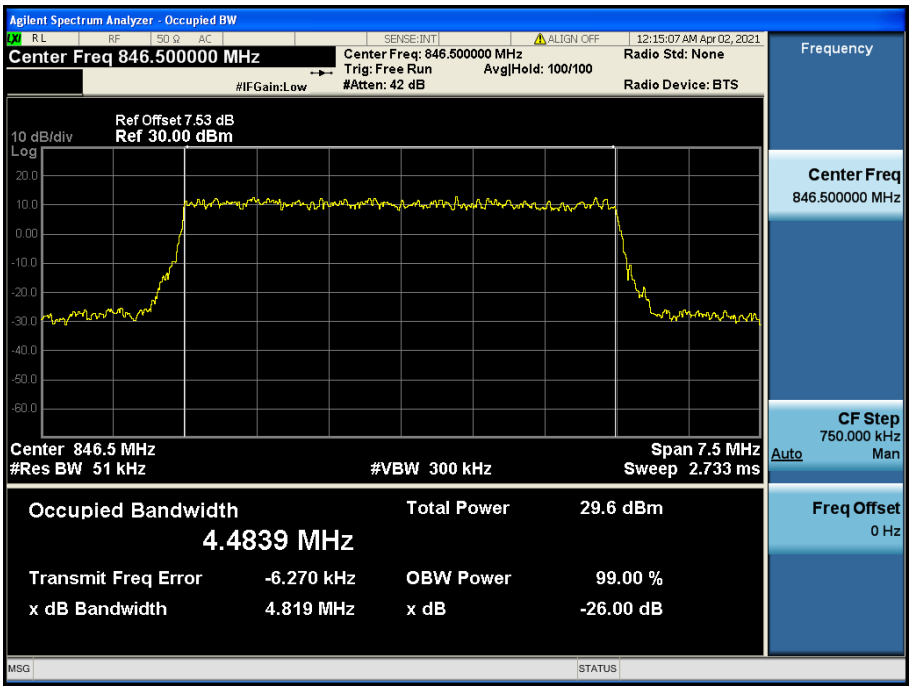
LTE Band 26(5) / 10 MHz / QPSK - RB Size 50



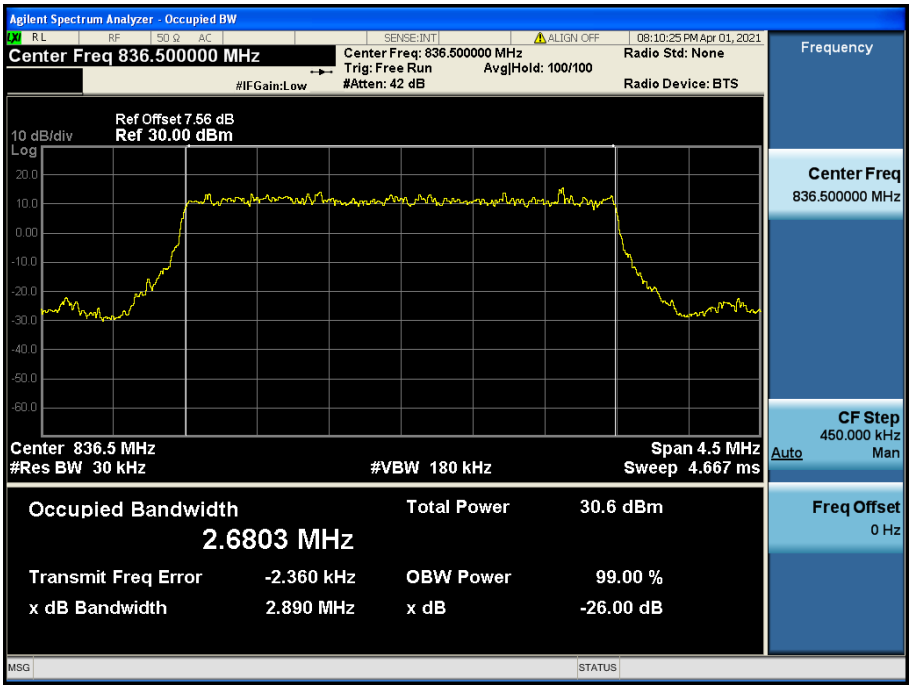
LTE Band 26(5) / 10 MHz / 16QAM - RB Size 50



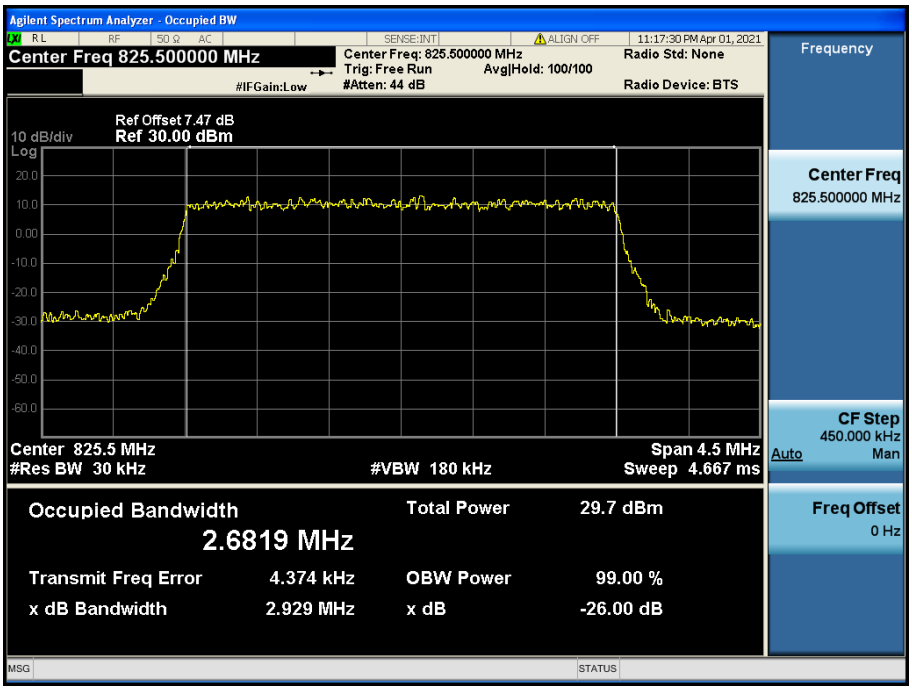
LTE Band 26(5) / 5 MHz / QPSK - RB Size 25



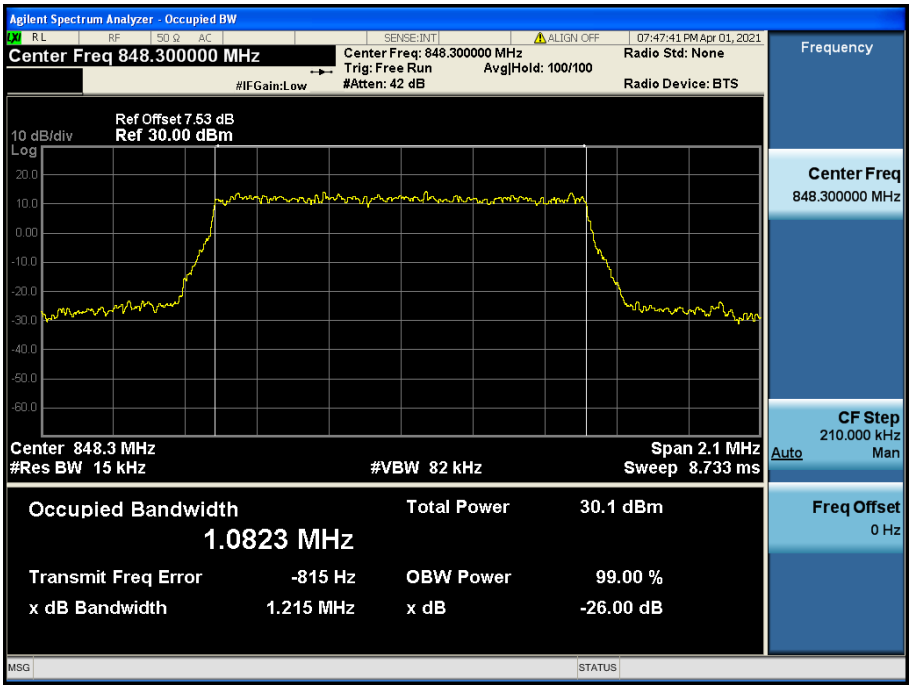
LTE Band 26(5) / 5 MHz / 16QAM - RB Size 25



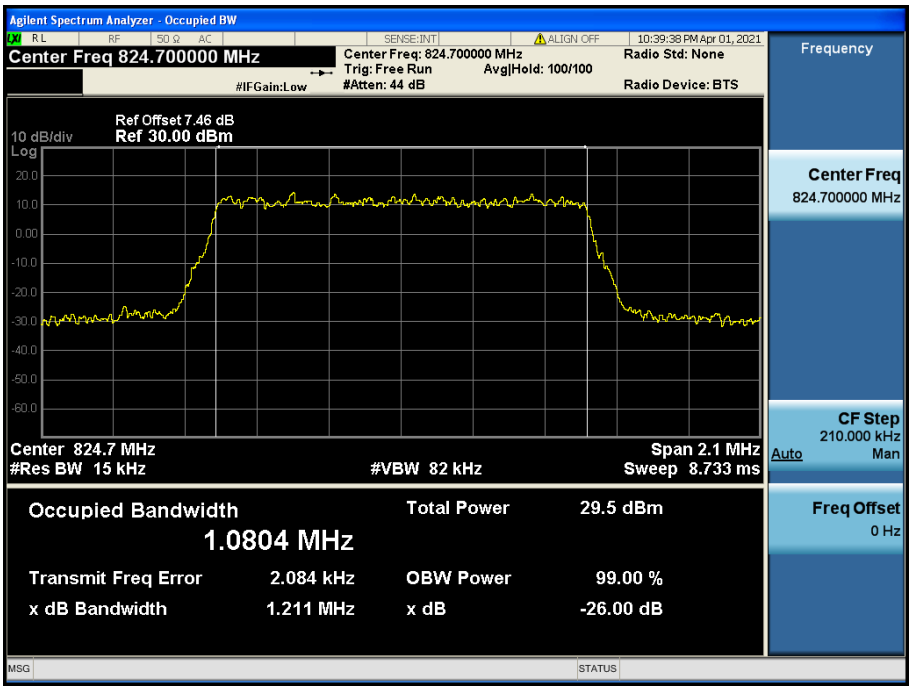
LTE Band 26(5) / 3 MHz / QPSK - RB Size 15



LTE Band 26(5) / 3 MHz / 16QAM - RB Size 15

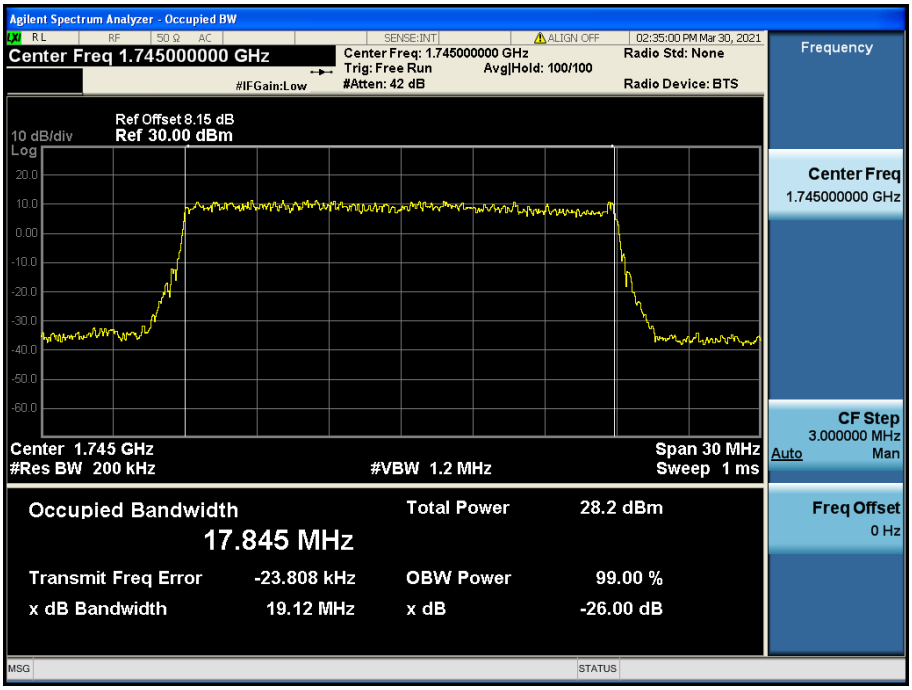


LTE Band 26(5) / 1.4 MHz / QPSK - RB Size 6

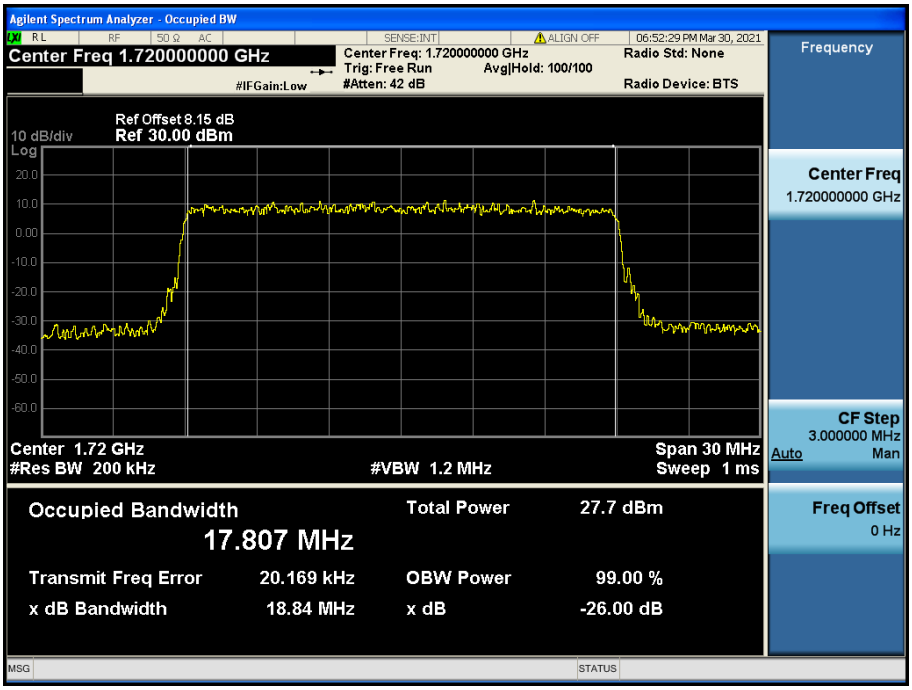


LTE Band 26(5) / 1.4 MHz / 16QAM - RB Size 6

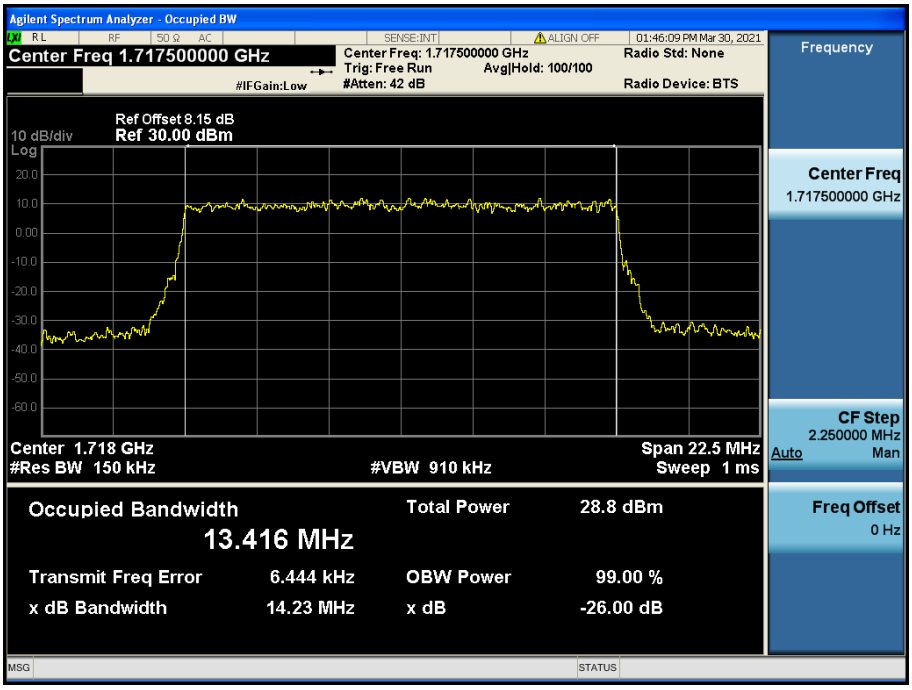
8.1.7 LTE Band 66(4)



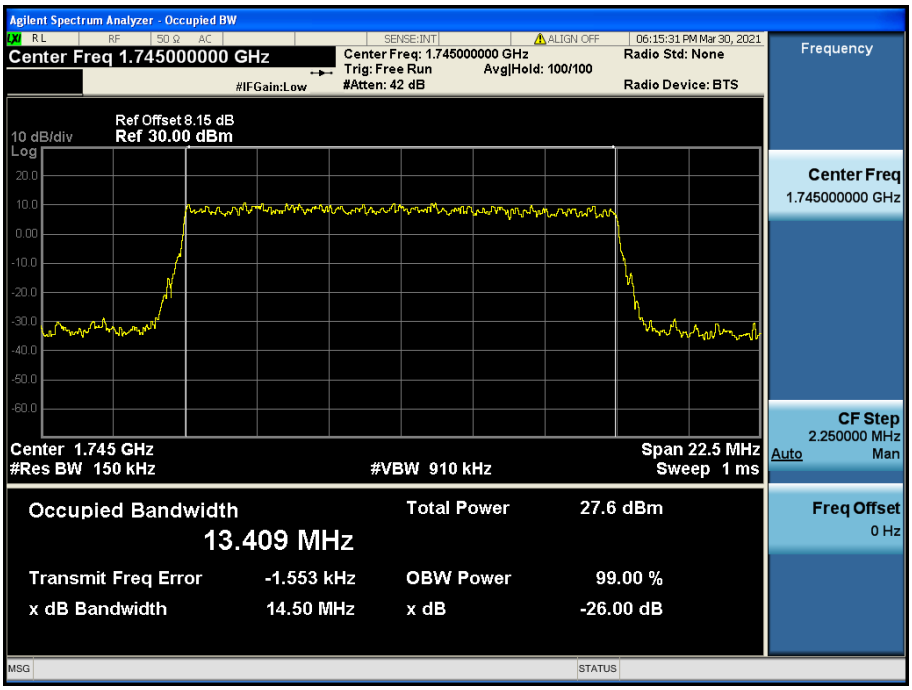
LTE Band 66(4) / 20 MHz / QPSK - RB Size 100



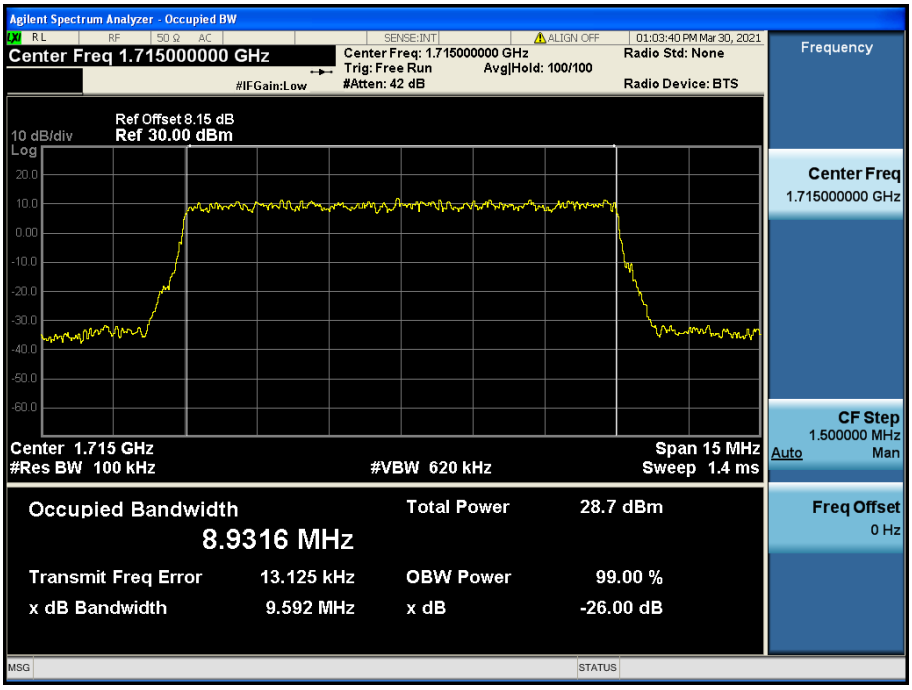
LTE Band 66(4) / 20 MHz / 16QAM - RB Size 100



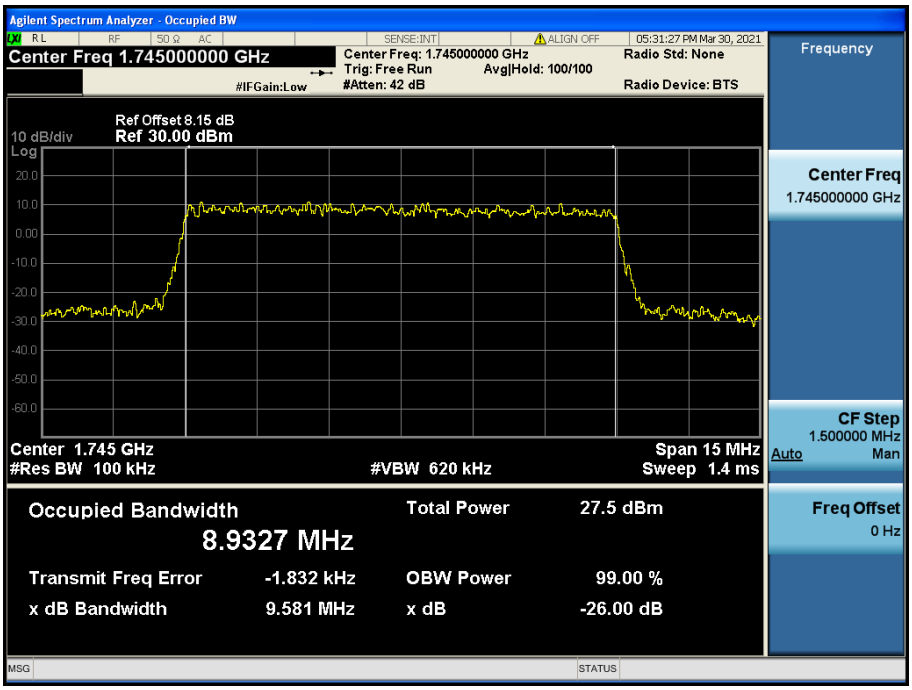
LTE Band 66(4) / 15 MHz / QPSK - RB Size 75



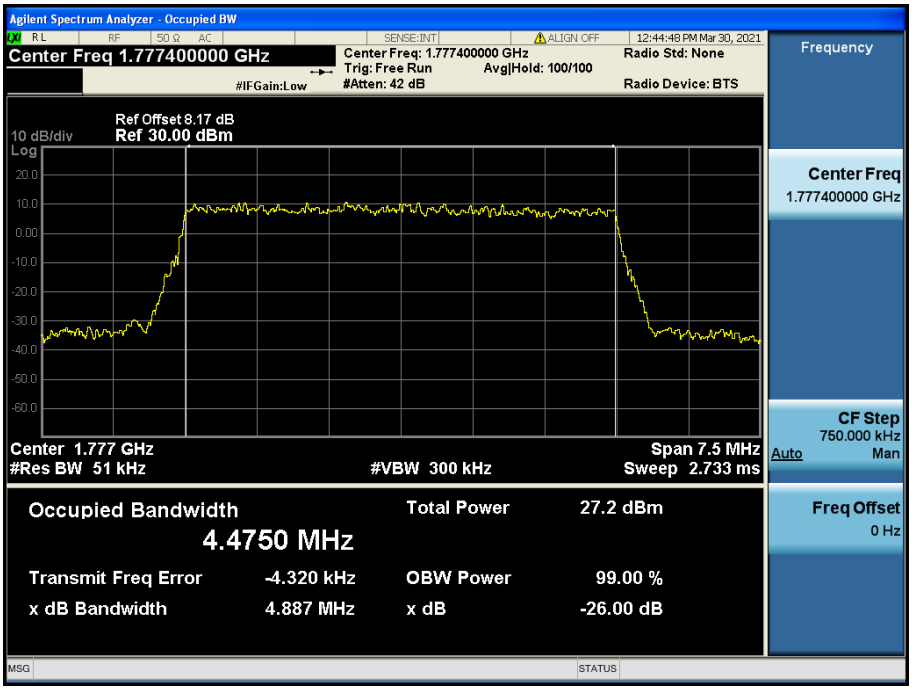
LTE Band 66(4) / 15 MHz / 16QAM - RB Size 75



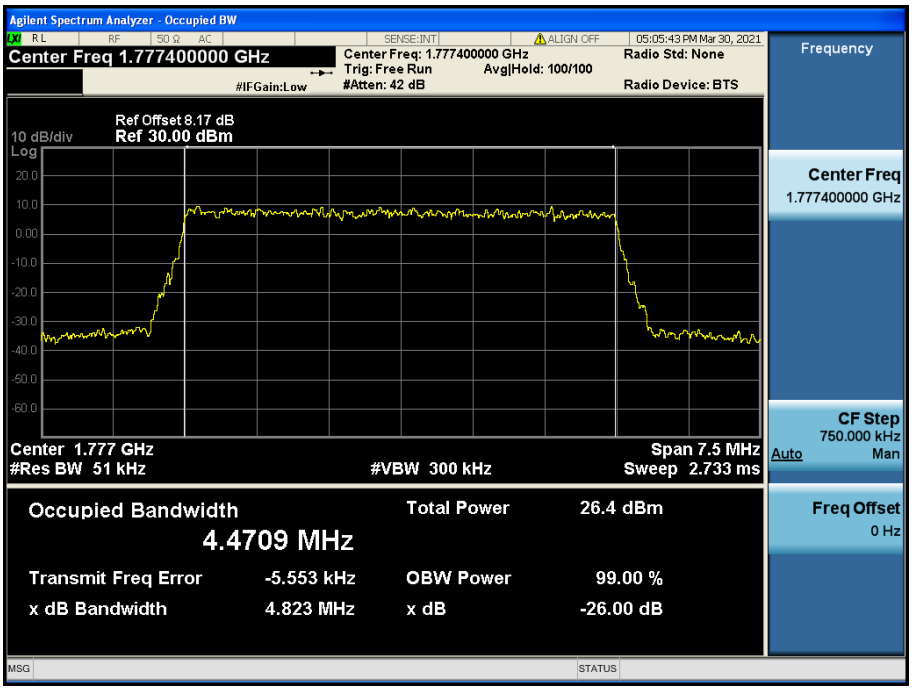
LTE Band 66(4) / 10 MHz / QPSK - RB Size 50



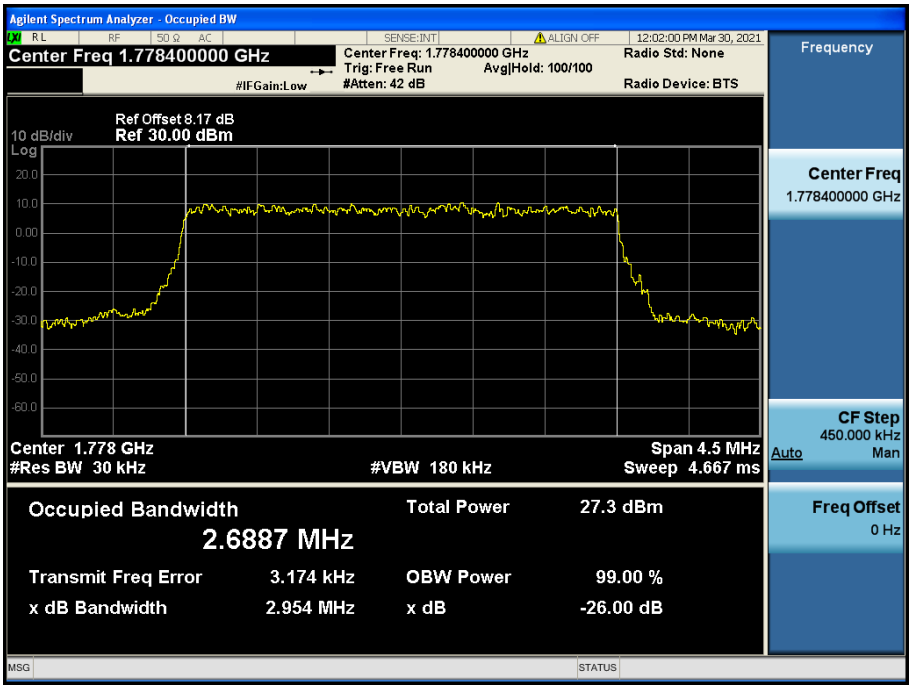
LTE Band 66(4) / 10 MHz / 16QAM - RB Size 50



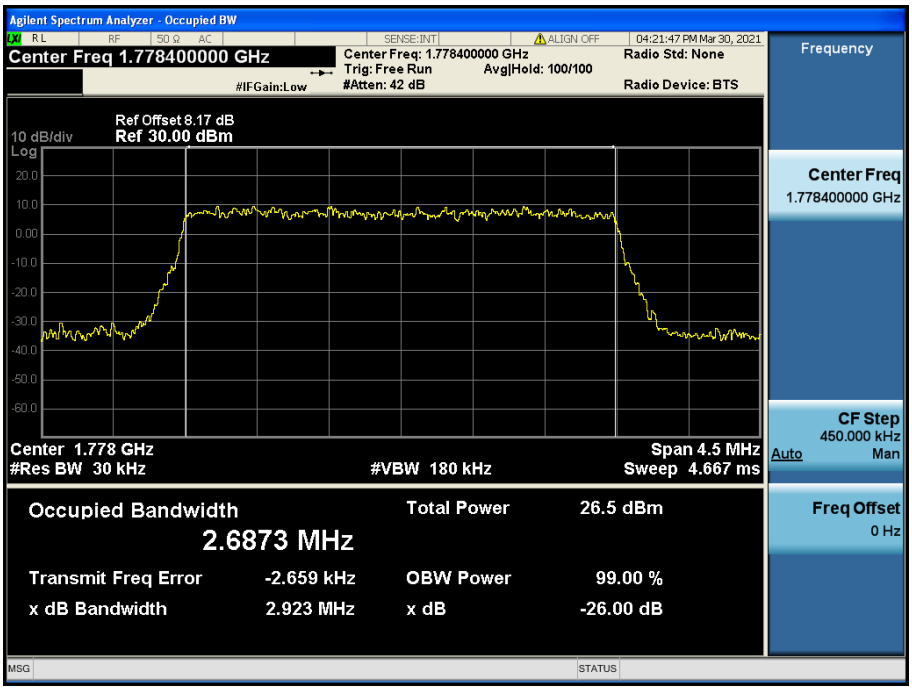
LTE Band 66(4) / 5 MHz / QPSK - RB Size 25



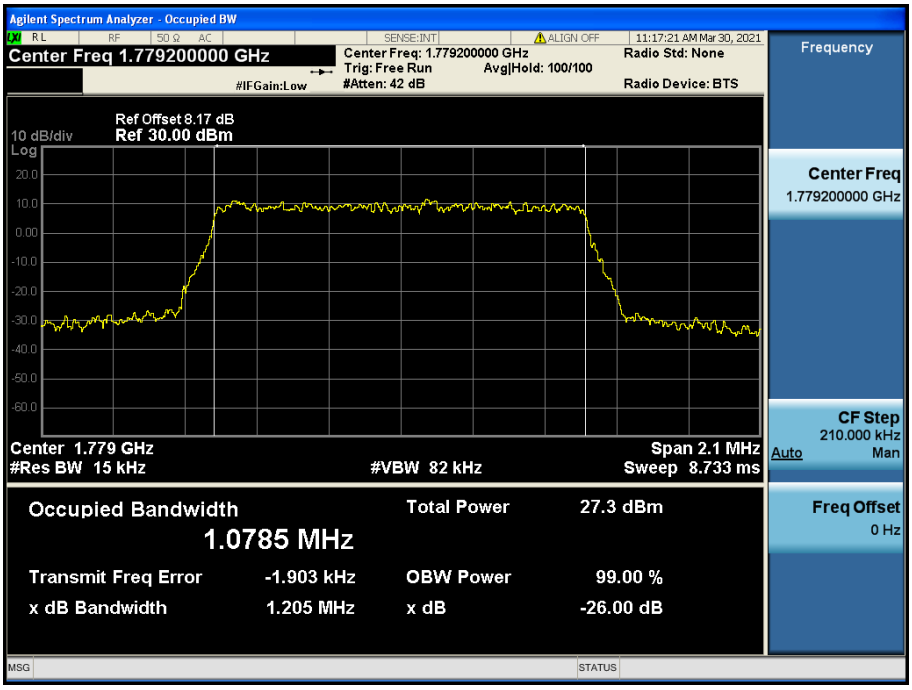
LTE Band 66(4) / 5 MHz / 16QAM - RB Size 25



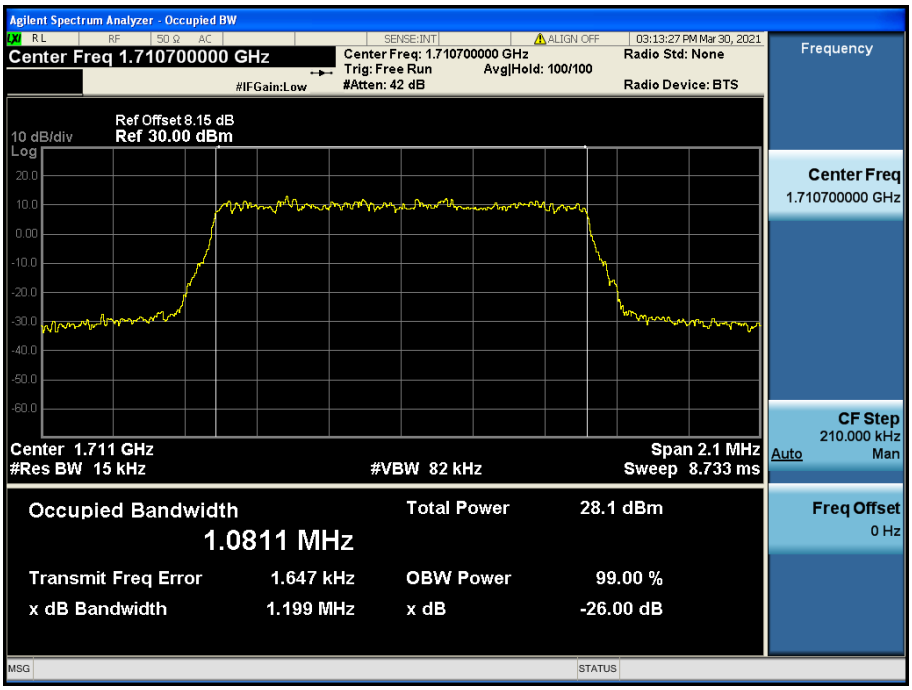
LTE Band 66(4) / 3 MHz / QPSK - RB Size 15



LTE Band 66(4) / 3 MHz / 16QAM - RB Size 15

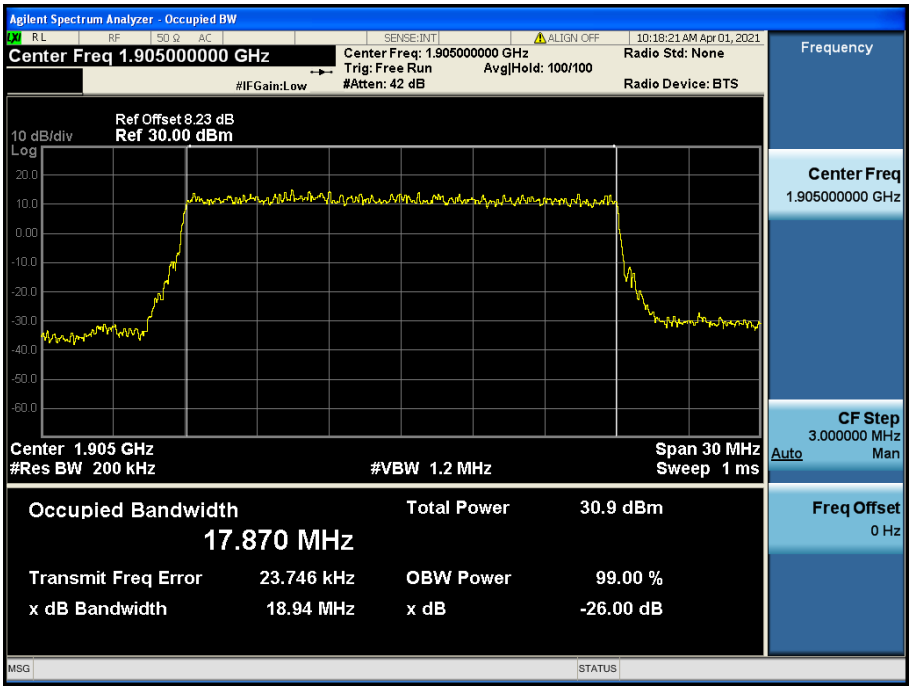


LTE Band 66(4) / 1.4 MHz / QPSK - RB Size 6

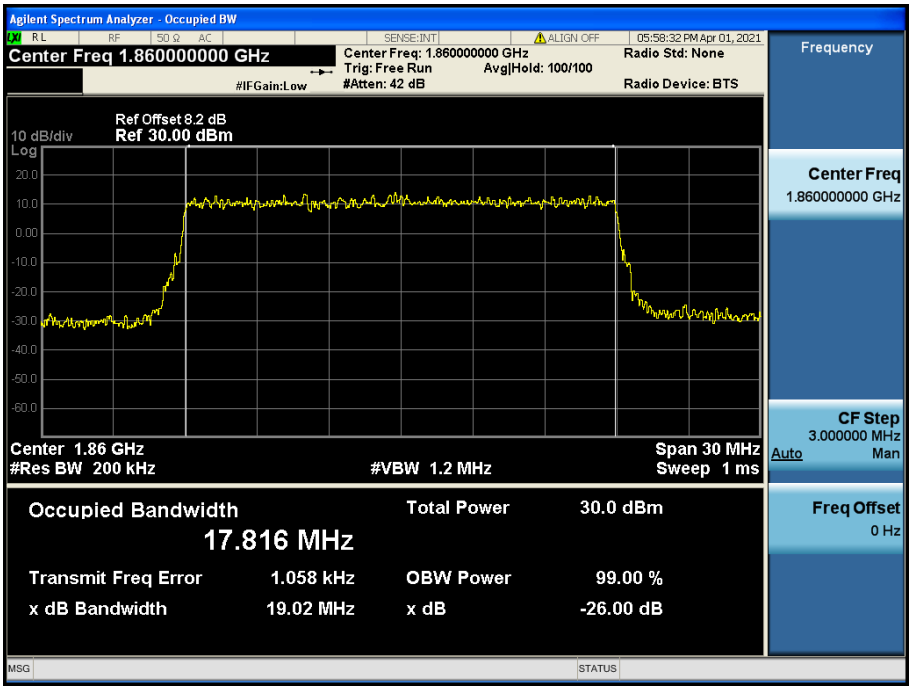


LTE Band 66(4) / 1.4 MHz / 16QAM - RB Size 6

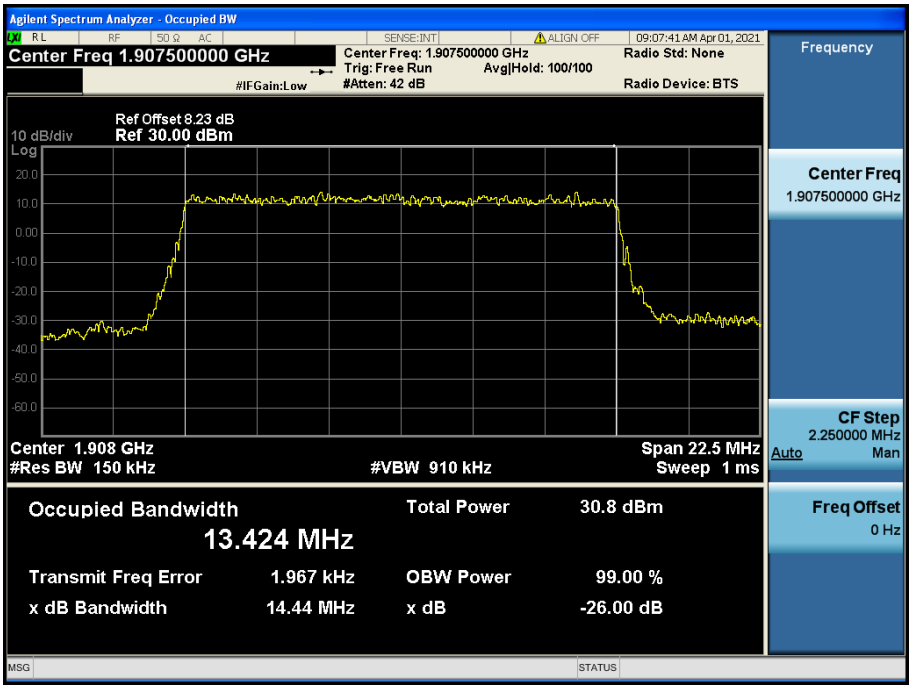
8.1.8 LTE Band 25(2)



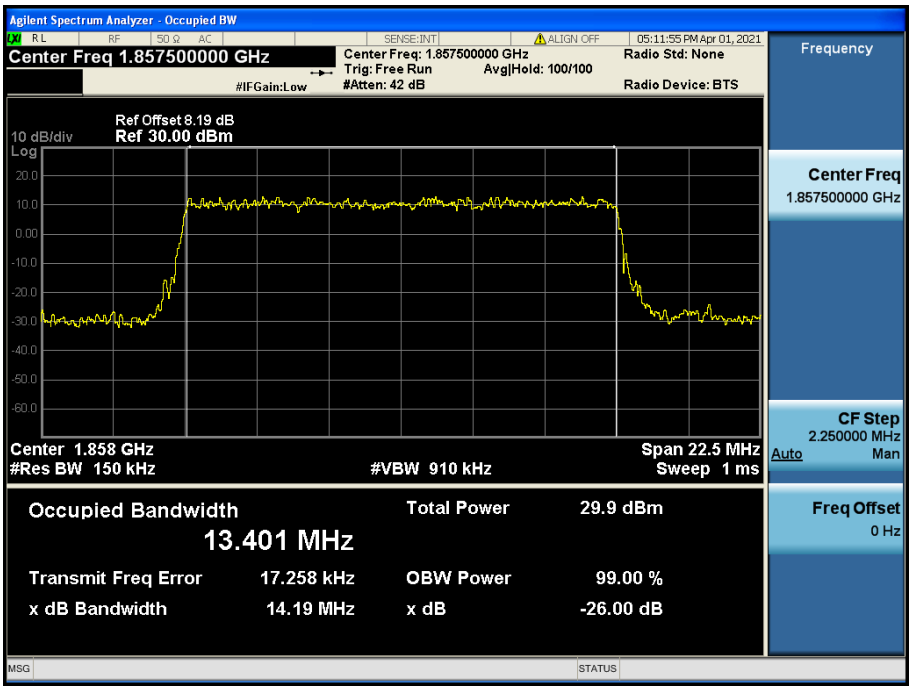
LTE Band 25(2) / 20 MHz / QPSK - RB Size 100



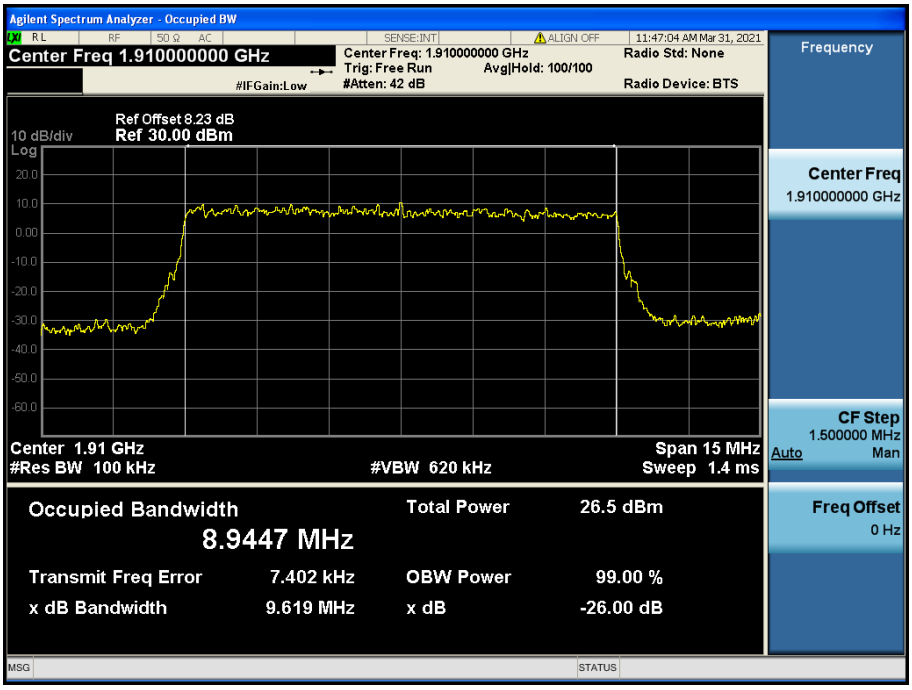
LTE Band 25(2) / 20 MHz / 16QAM - RB Size 100



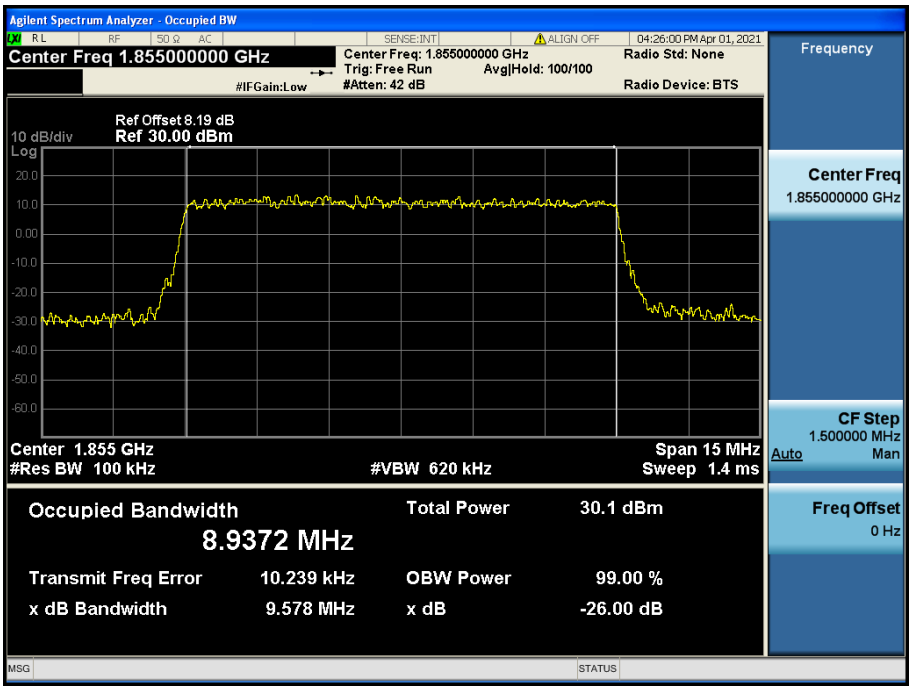
LTE Band 25(2) / 15 MHz / QPSK - RB Size 75



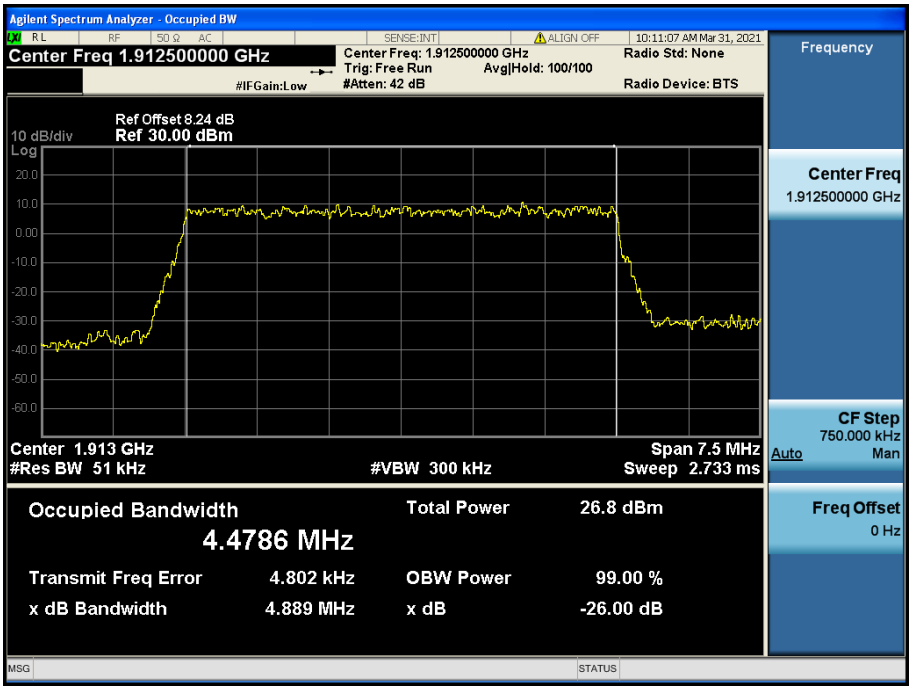
LTE Band 25(2) / 15 MHz / 16QAM - RB Size 75



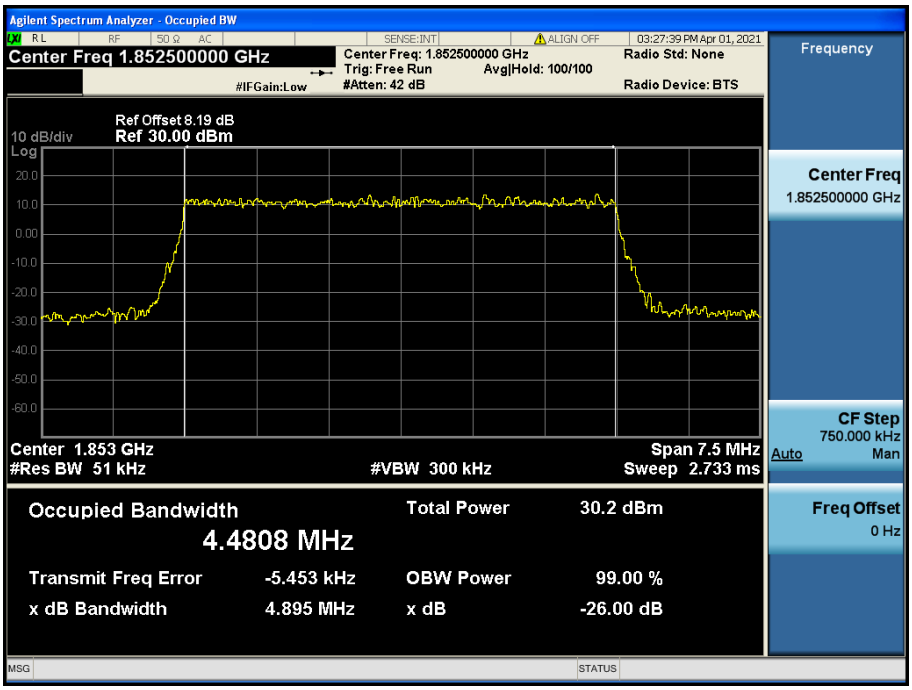
LTE Band 25(2) / 10 MHz / QPSK - RB Size 50



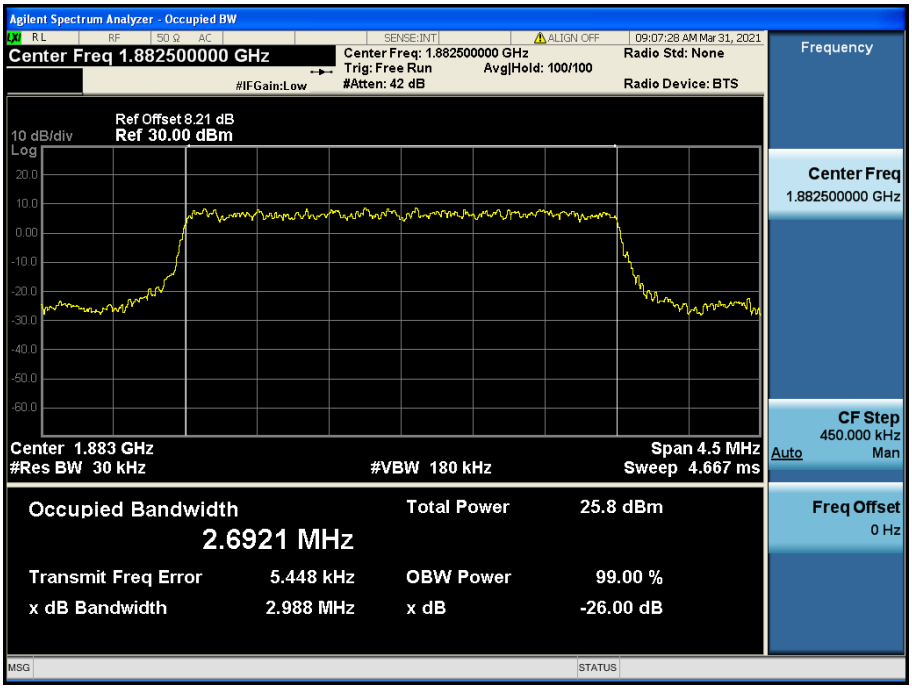
LTE Band 25(2) / 10 MHz / 16QAM - RB Size 50



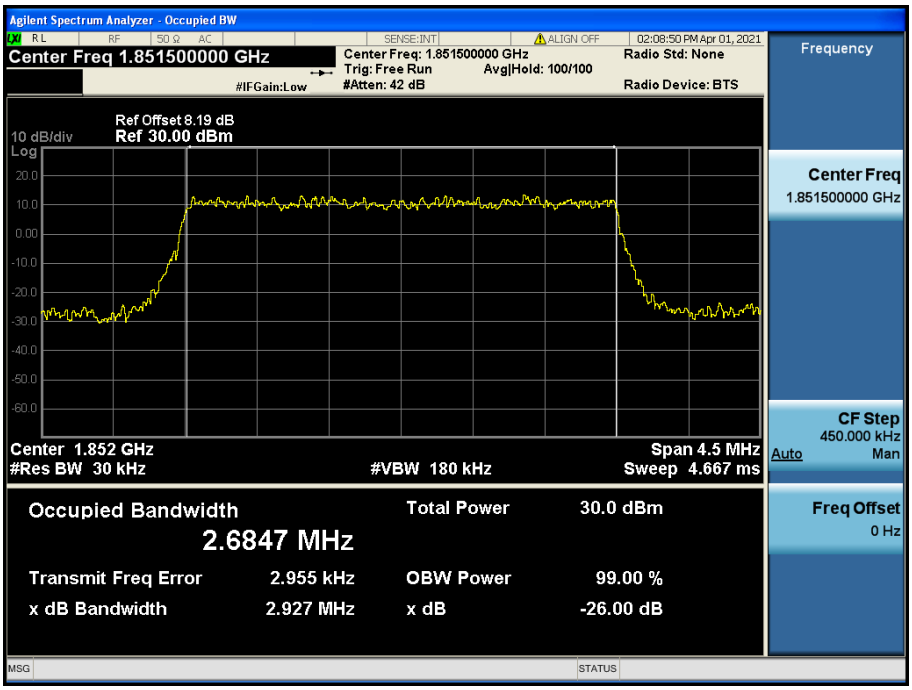
LTE Band 25(2) / 5 MHz / QPSK - RB Size 25



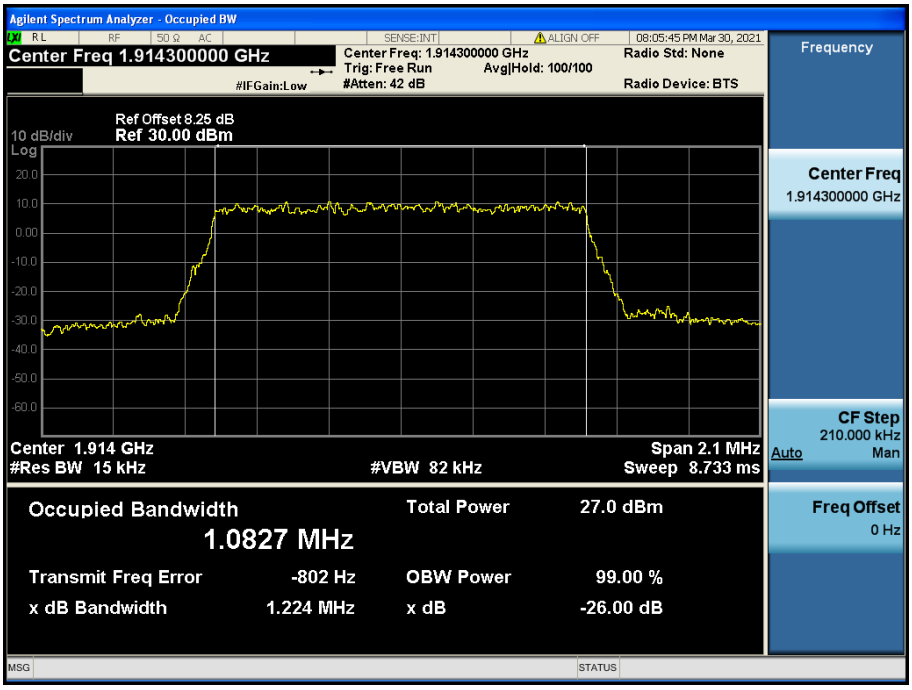
LTE Band 25(2) / 5 MHz / 16QAM - RB Size 25



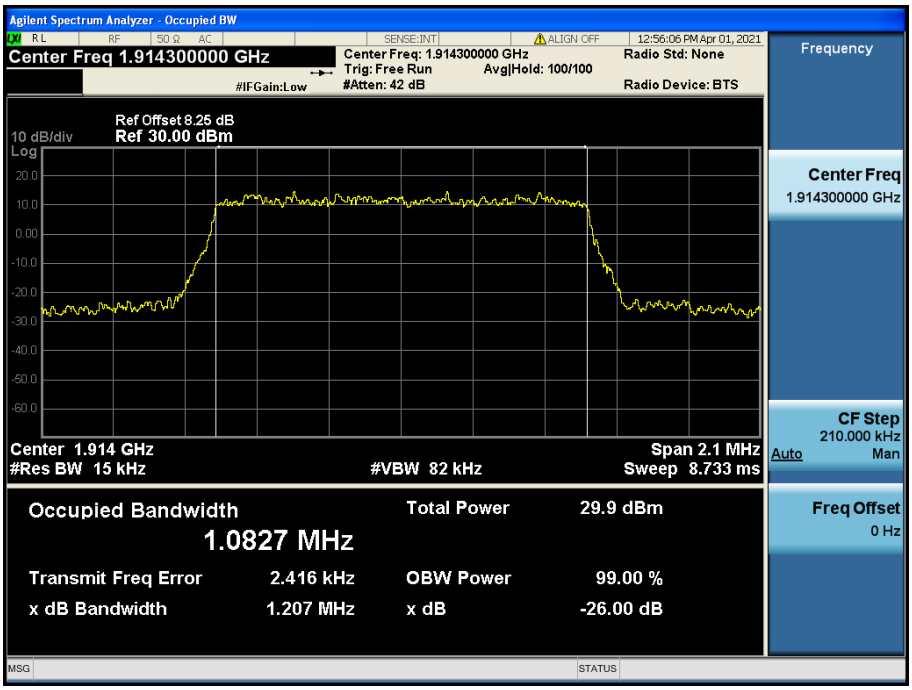
LTE Band 25(2) / 3 MHz / QPSK - RB Size 15



LTE Band 25(2) / 3 MHz / 16QAM - RB Size 15

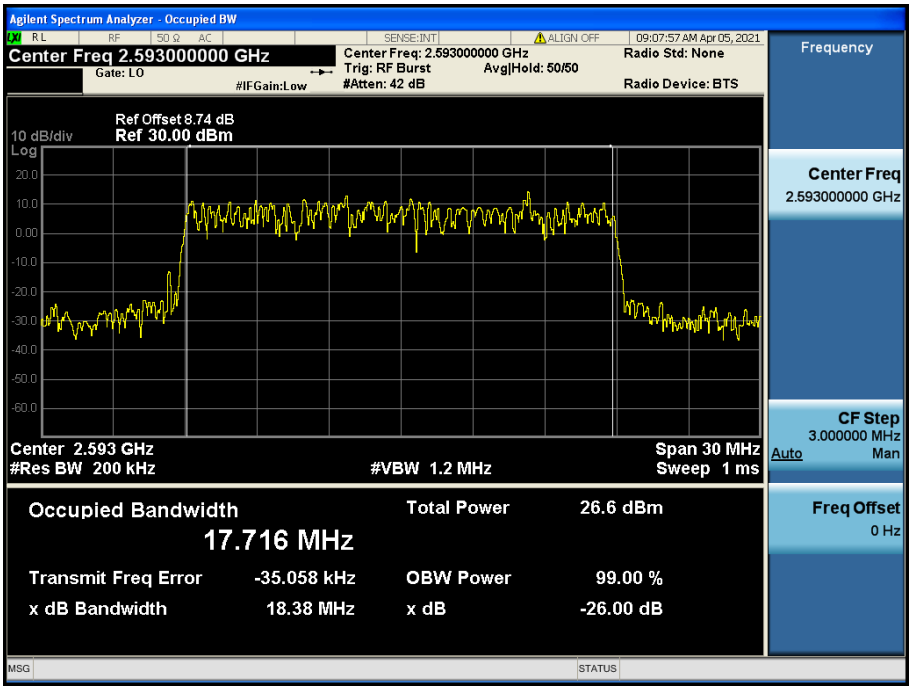


LTE Band 25(2) / 1.4 MHz / QPSK - RB Size 6

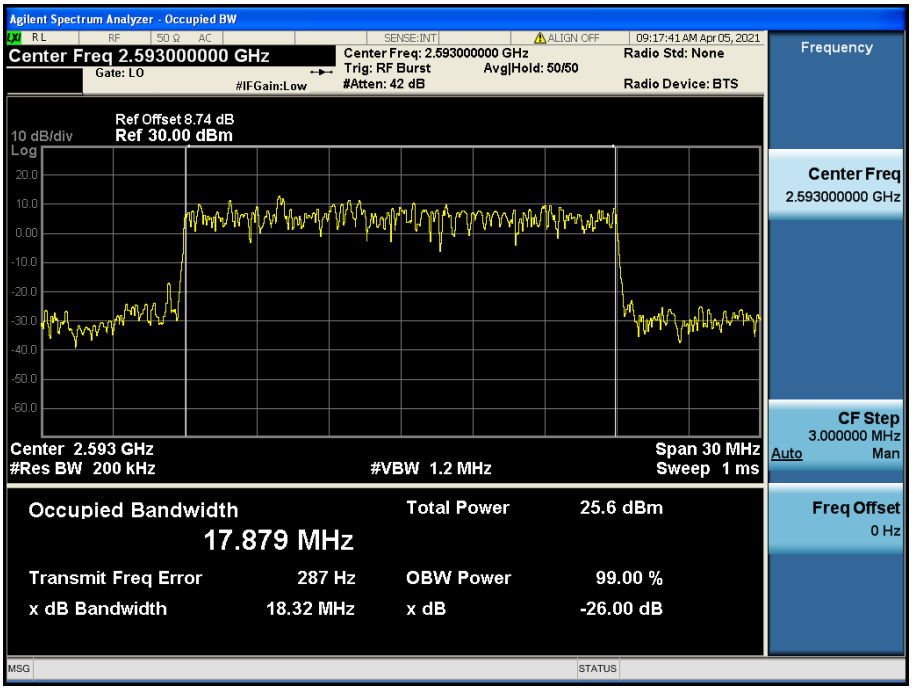


LTE Band 25(2) / 1.4 MHz / 16QAM - RB Size 6

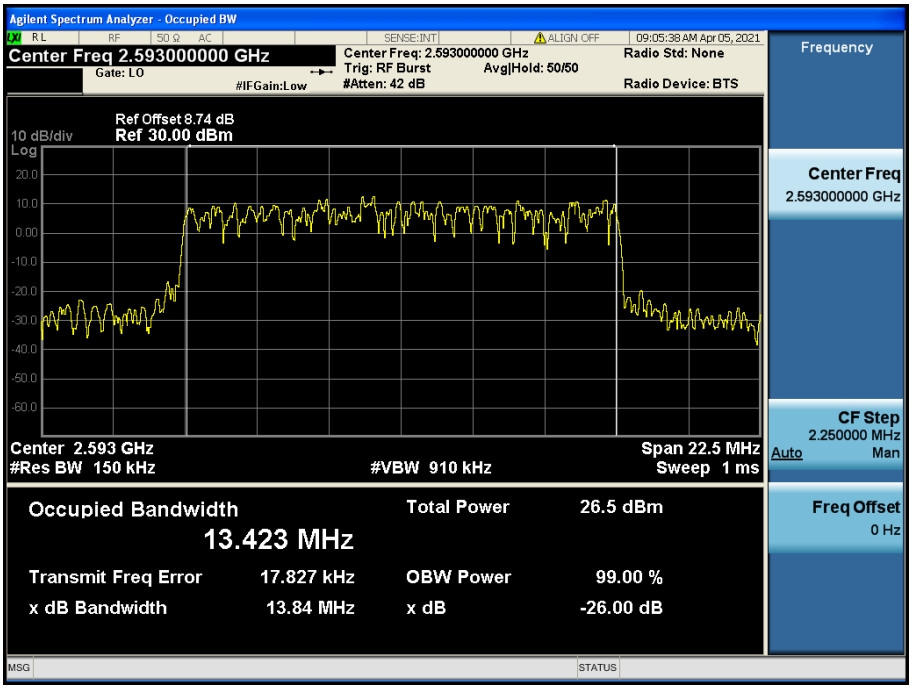
8.1.9 LTE Band 41(38)



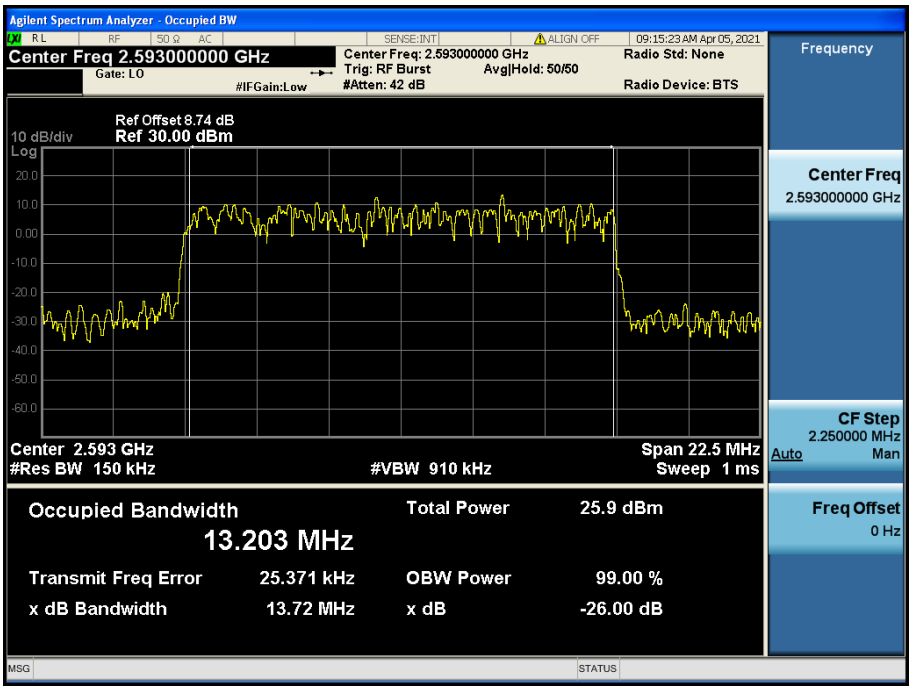
LTE Band 41(38) / 20 MHz / QPSK - RB Size 100



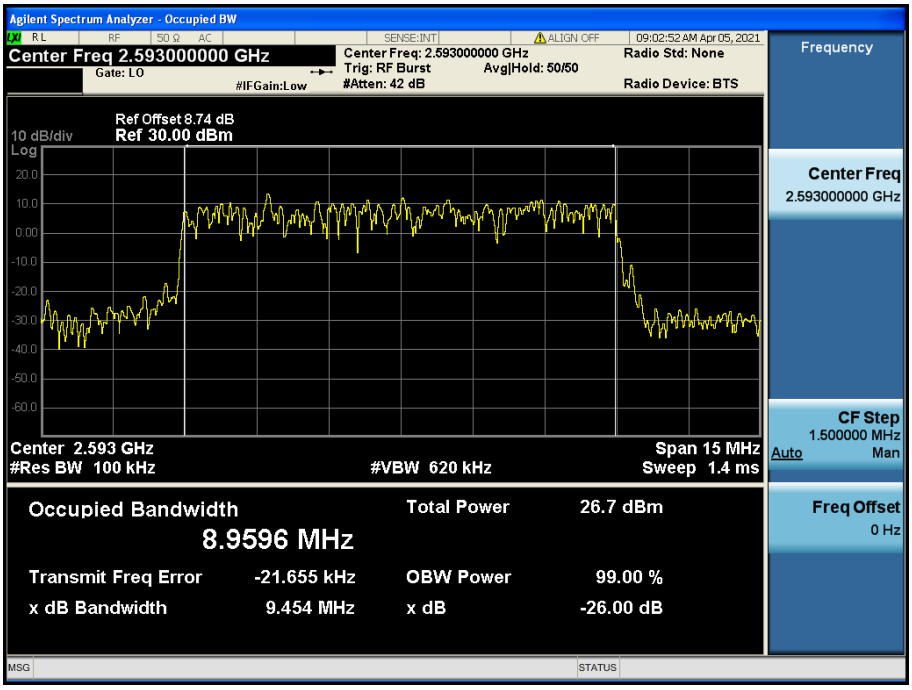
LTE Band 41(38) / 20 MHz / 16QAM - RB Size 100



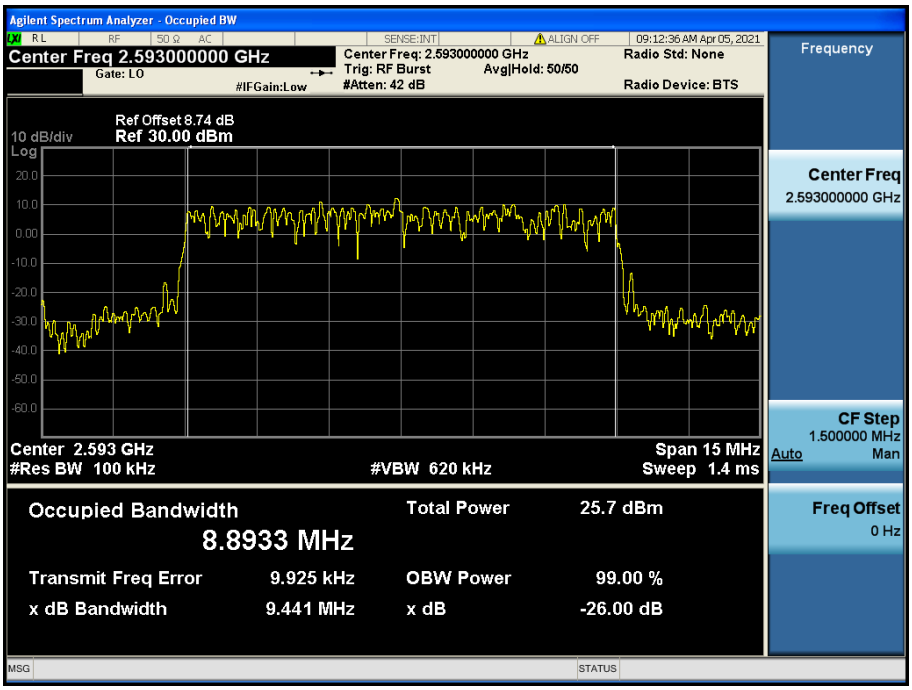
LTE Band 41(38) / 15 MHz / QPSK - RB Size 75



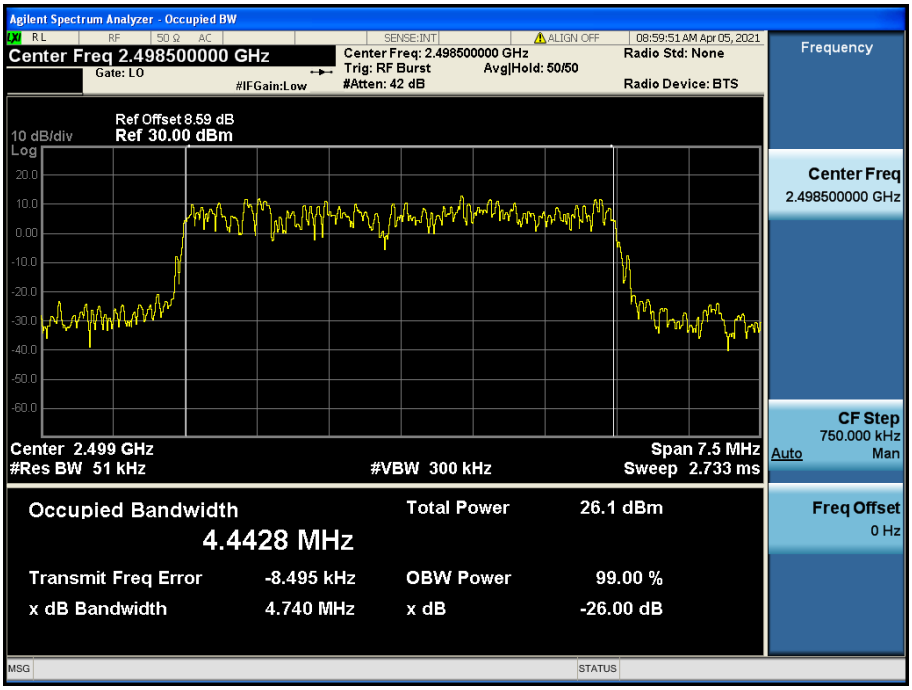
LTE Band 41(38) / 15 MHz / 16QAM - RB Size 75



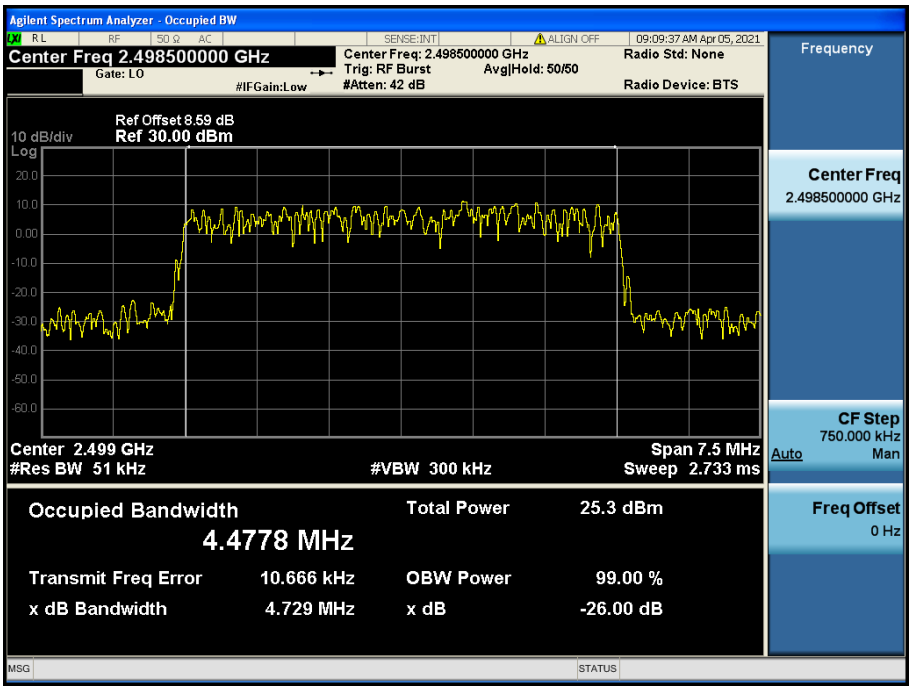
LTE Band 41(38) / 10 MHz / QPSK - RB Size 50



LTE Band 41(38) / 10 MHz / 16QAM - RB Size 50

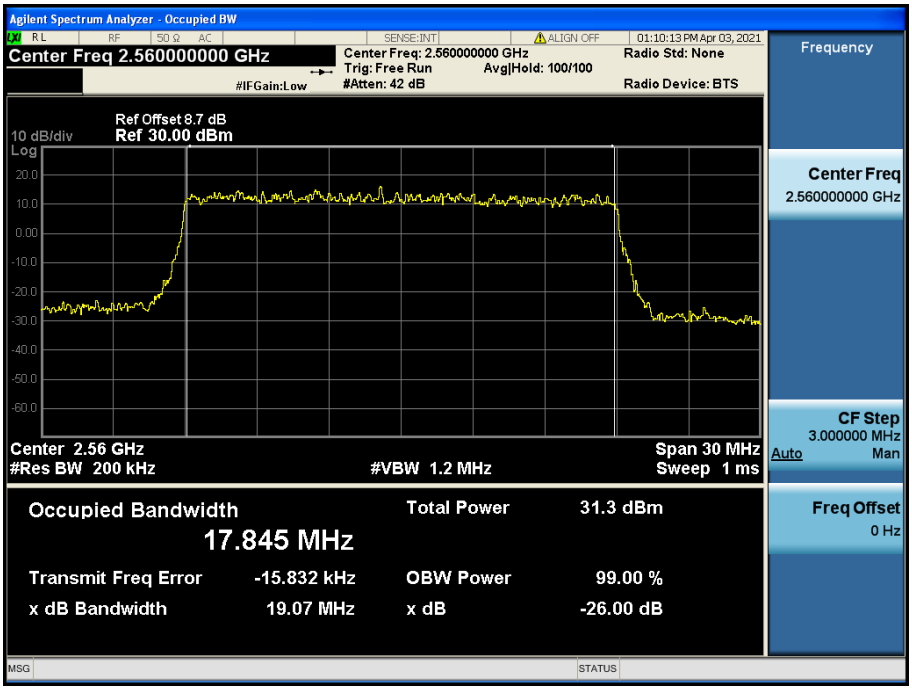


LTE Band 41(38) / 5 MHz / QPSK - RB Size 25

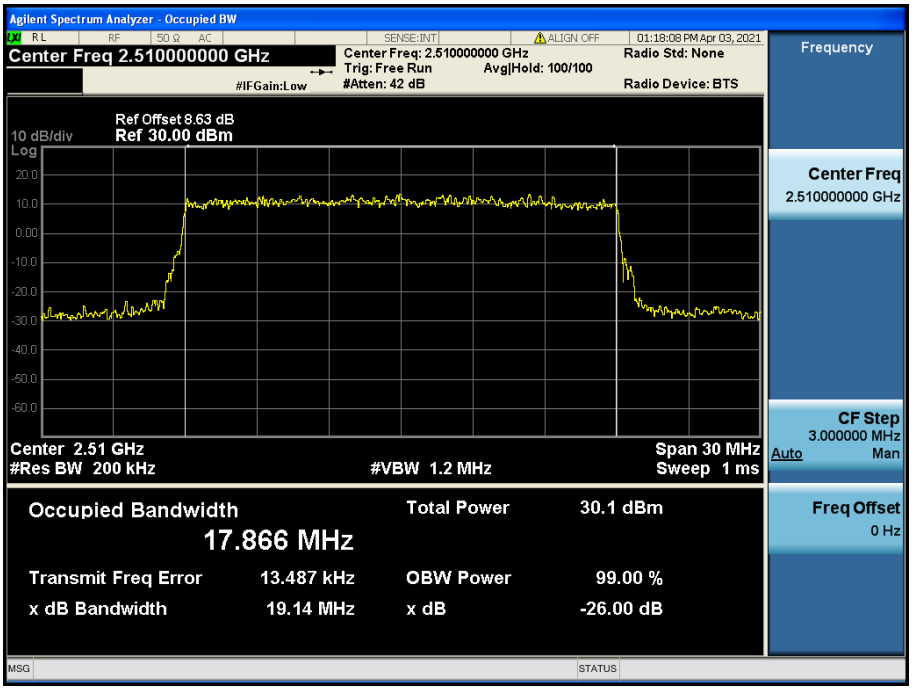


LTE Band 41(38) / 5 MHz / 16QAM - RB Size 25

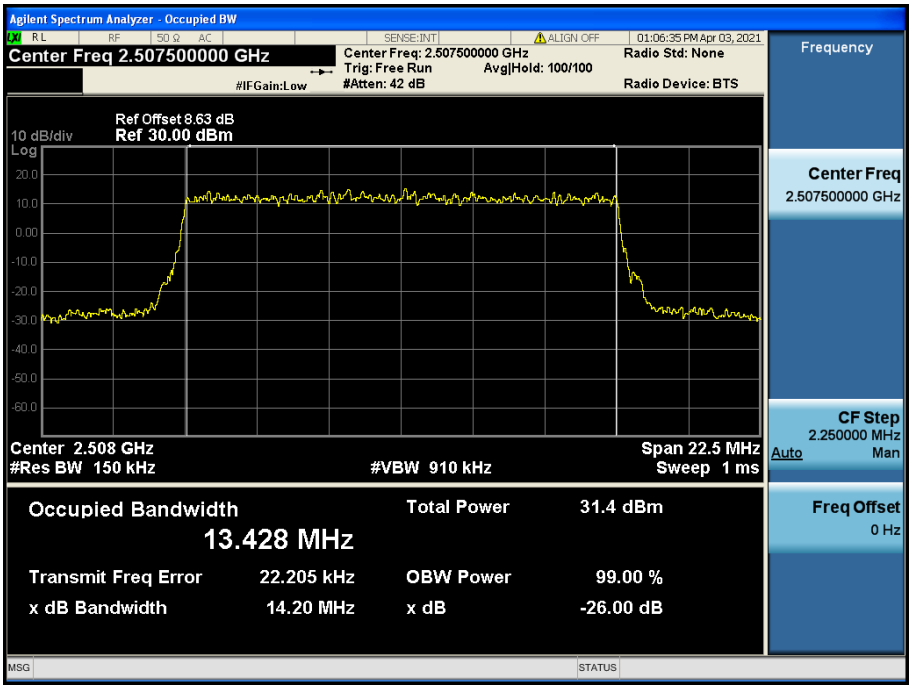
8.1.10 LTE Band 7



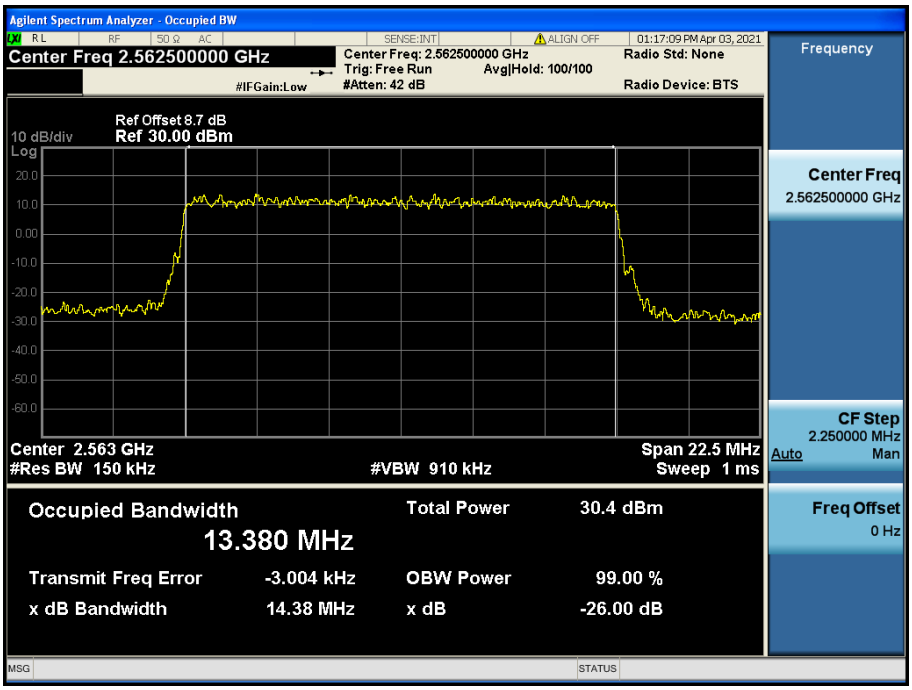
LTE Band 7 / 20 MHz / QPSK - RB Size 100



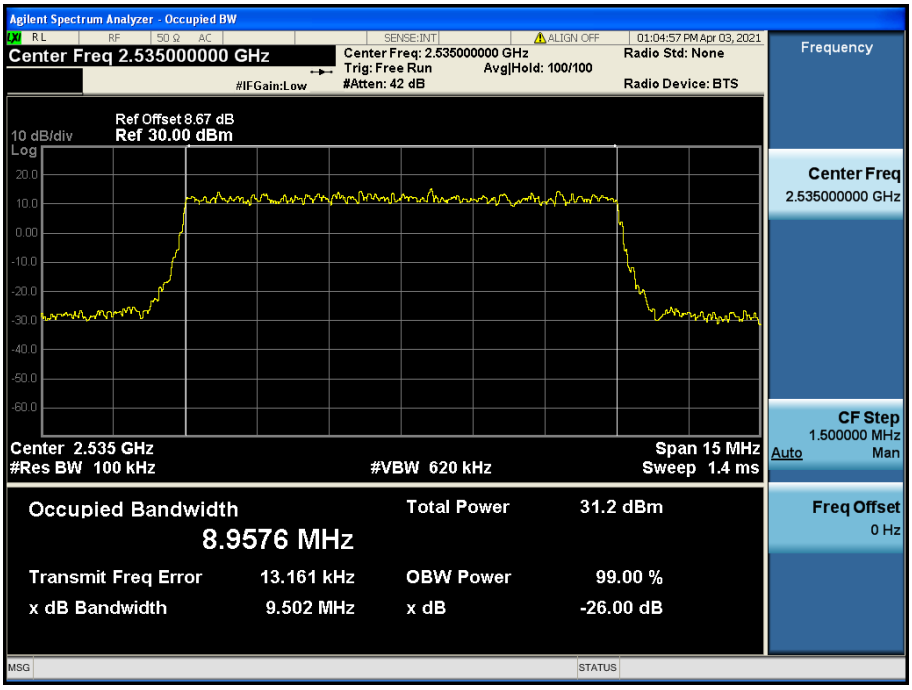
LTE Band 7 / 20 MHz / 16QAM - RB Size 100



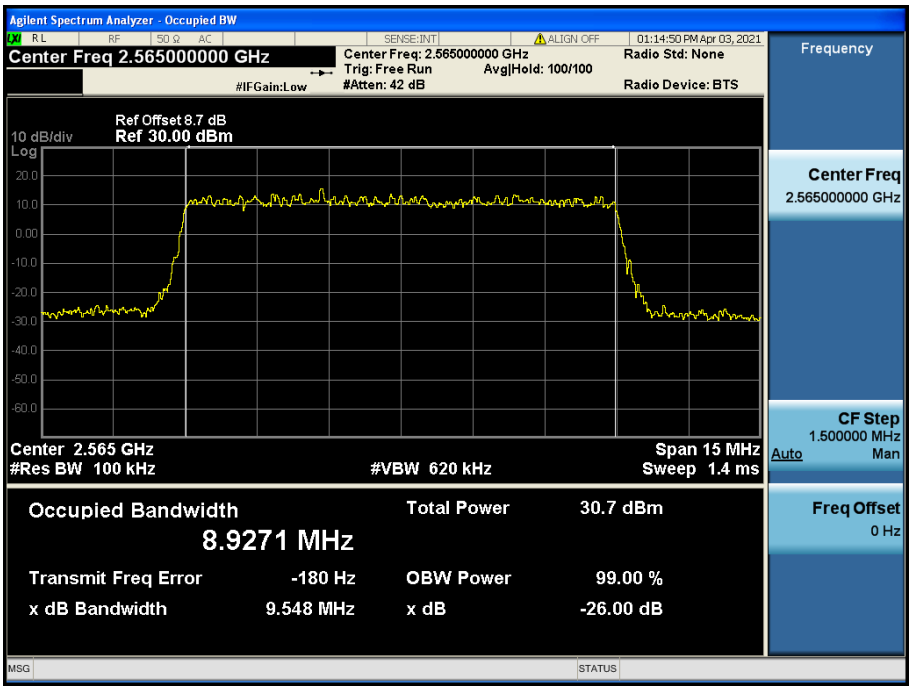
LTE Band 7 / 15 MHz / QPSK - RB Size 75



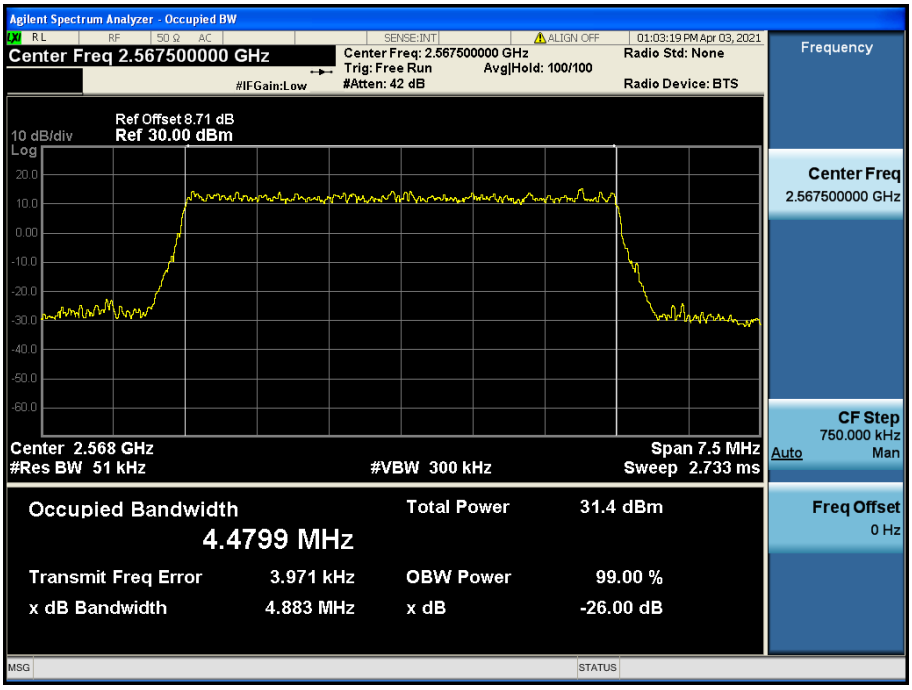
LTE Band 7 / 15 MHz / 16QAM - RB Size 75



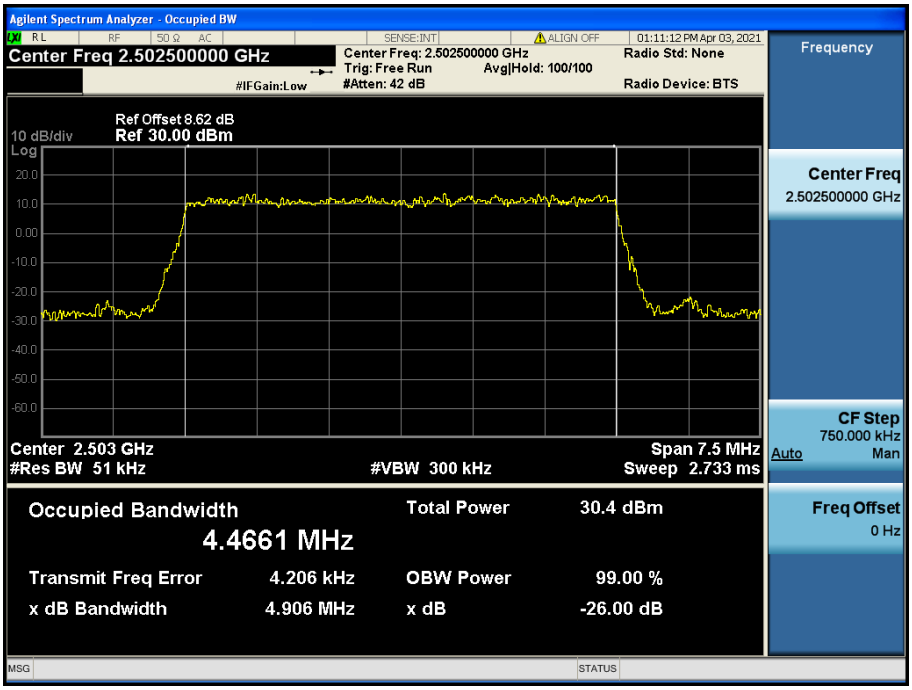
LTE Band 7 / 10 MHz / QPSK - RB Size 50



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



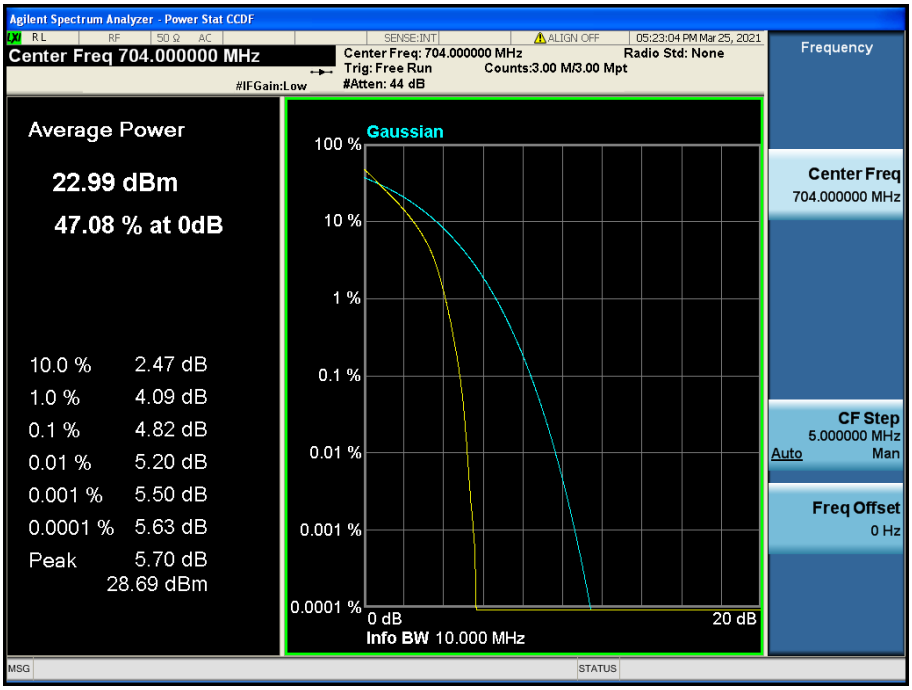
LTE Band 7 / 5 MHz / QPSK - RB Size 25



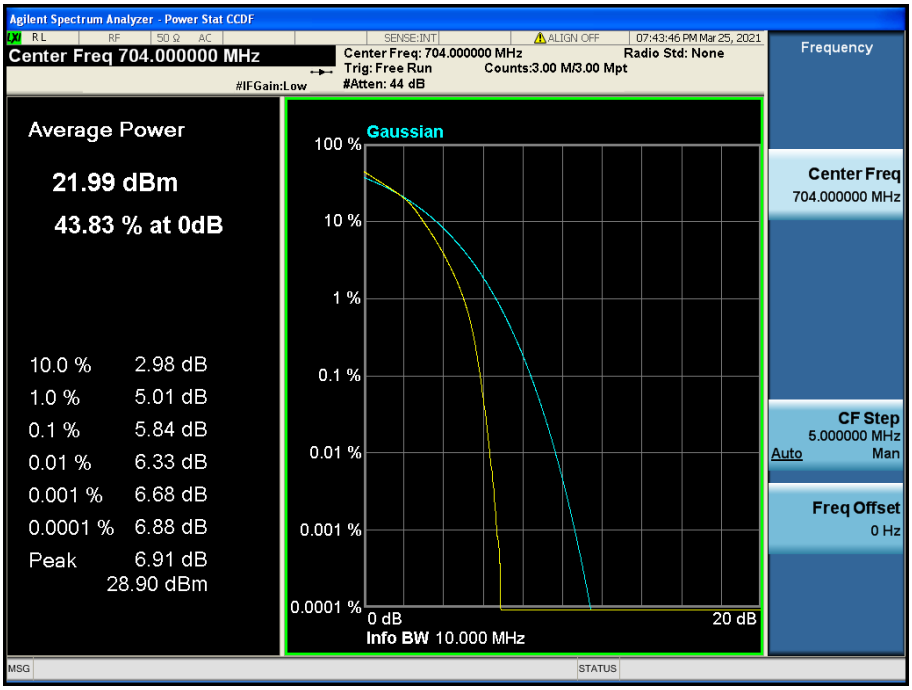
LTE Band 7 / 5 MHz / 16QAM - RB Size 25

8.2 PEAK TO AVERAGE RATIO

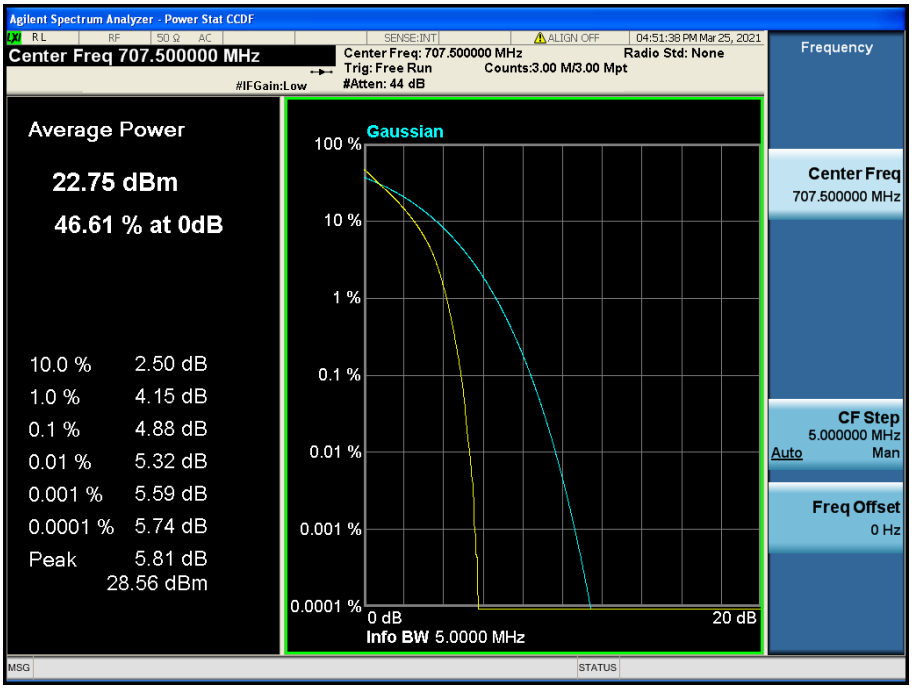
8.2.1 LTE Band 12(17)



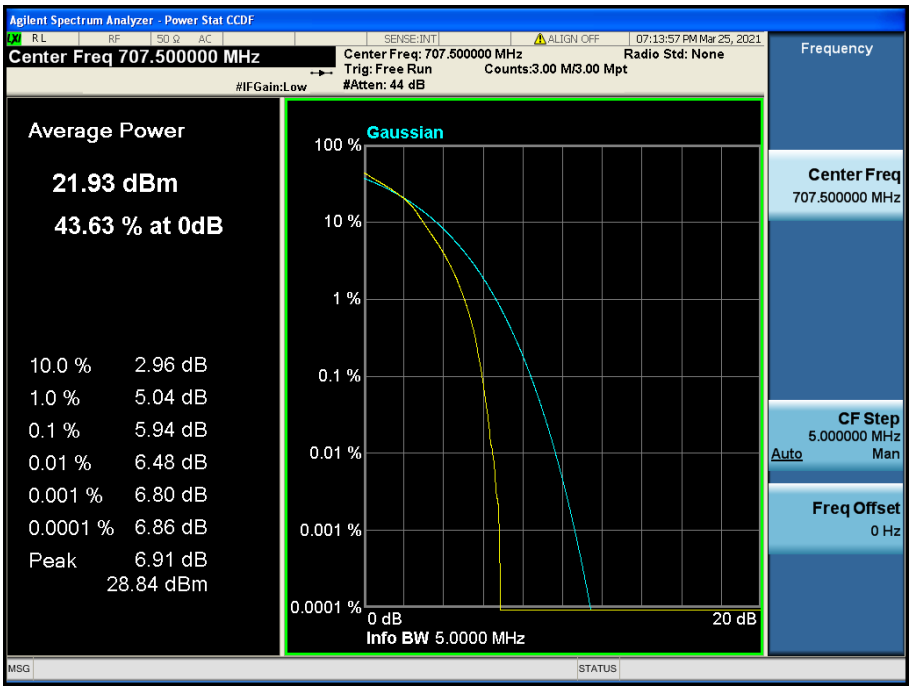
LTE Band 12(17) / 10 MHz / QPSK - RB Size 50



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

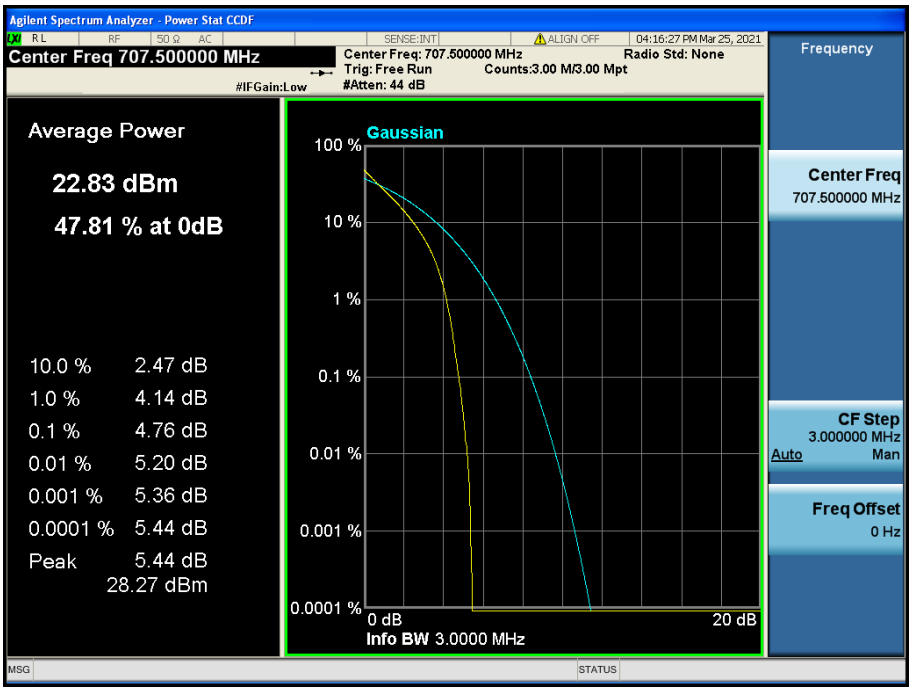


LTE Band 12(17) / 5 MHz / QPSK - RB Size 25

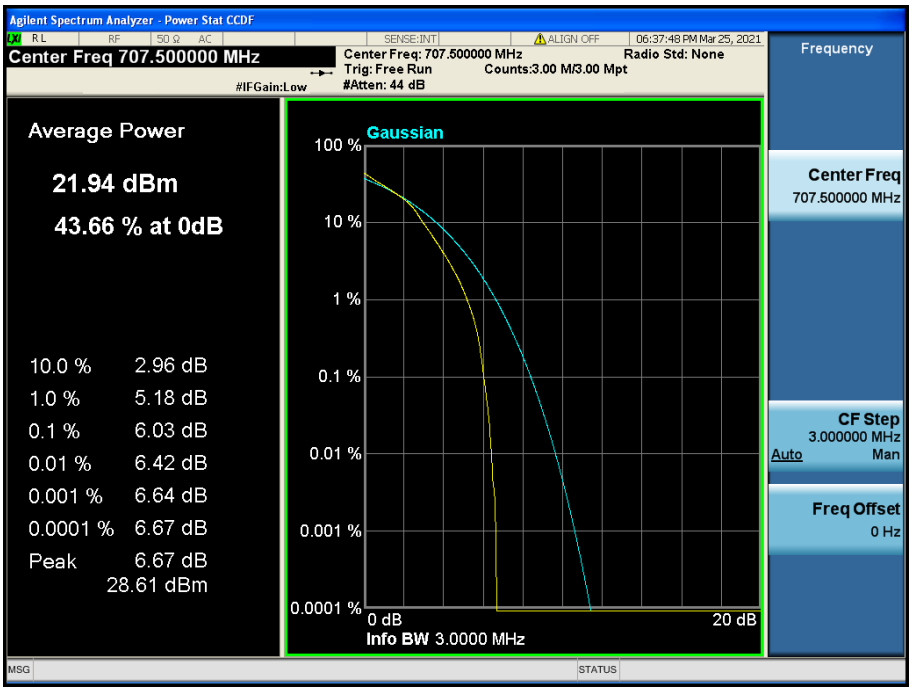


LTE Band 12(17) / 5 MHz / 16QAM - RB Size 25

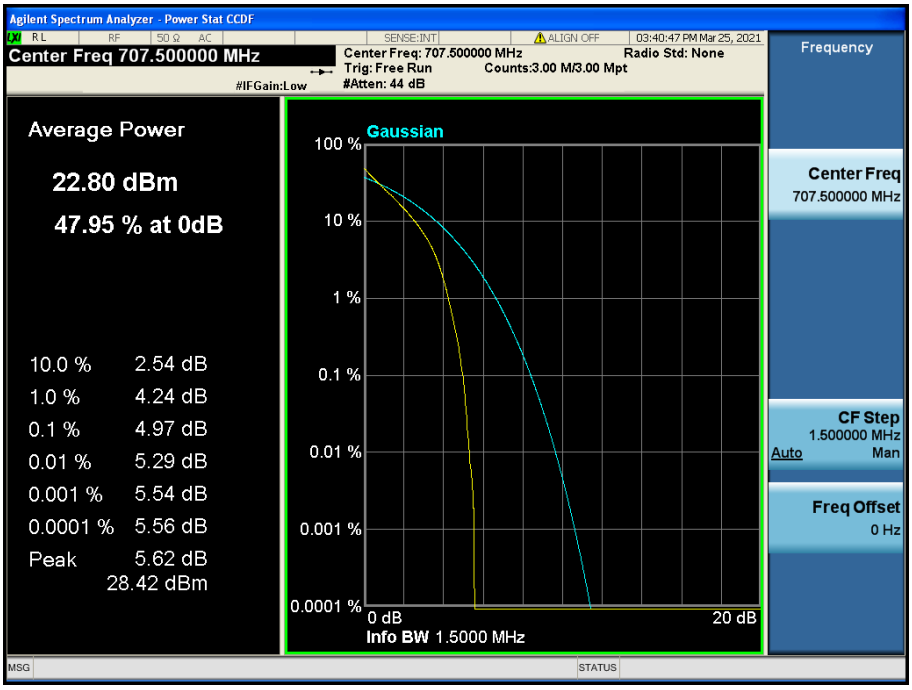
8.2.2 LTE Band 12



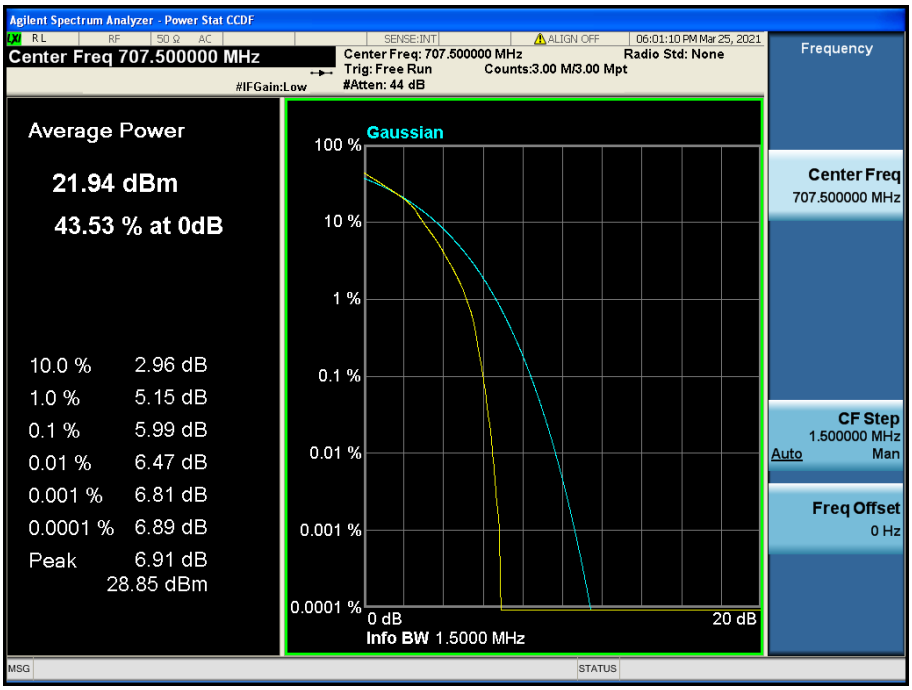
LTE Band 12 / 3 MHz / QPSK - RB Size 15



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

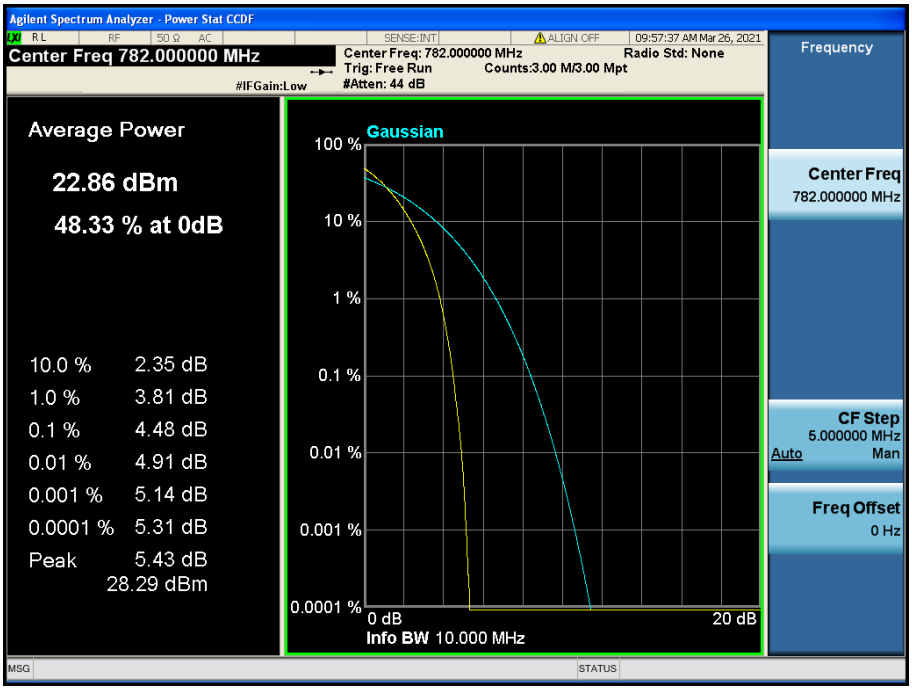


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

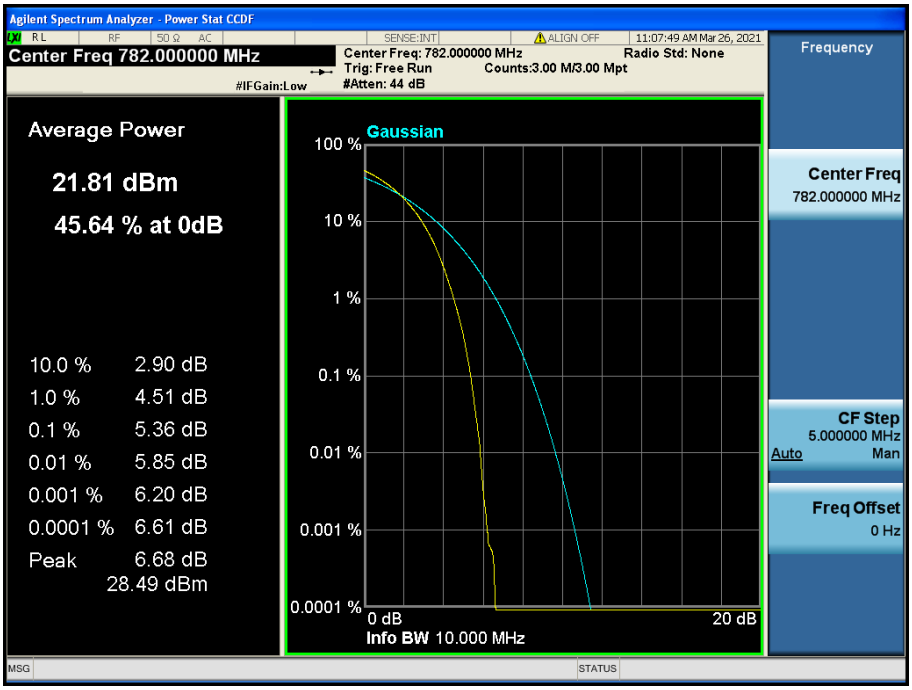


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

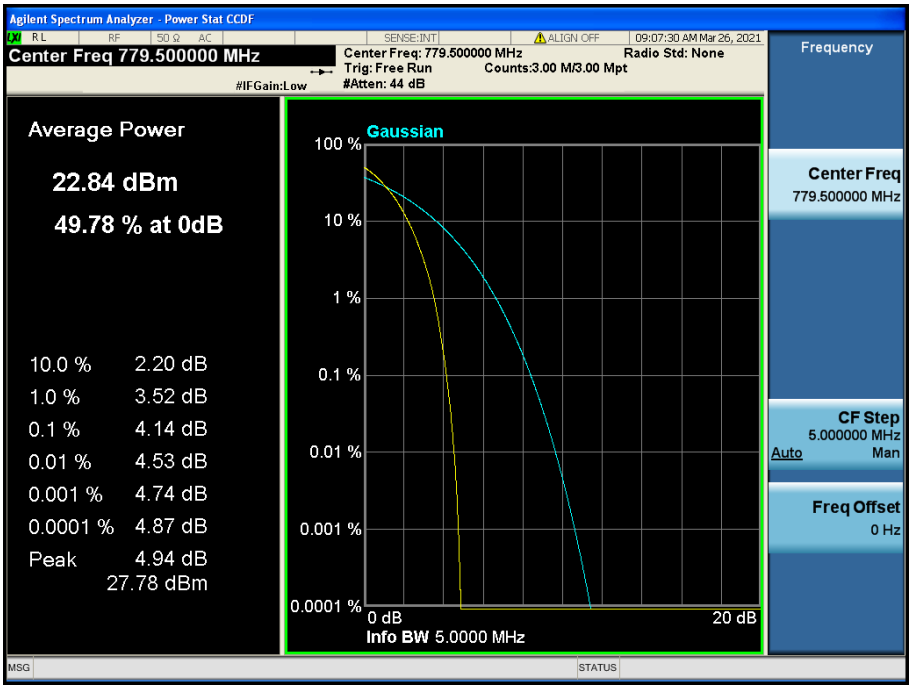
8.2.3 LTE Band 13



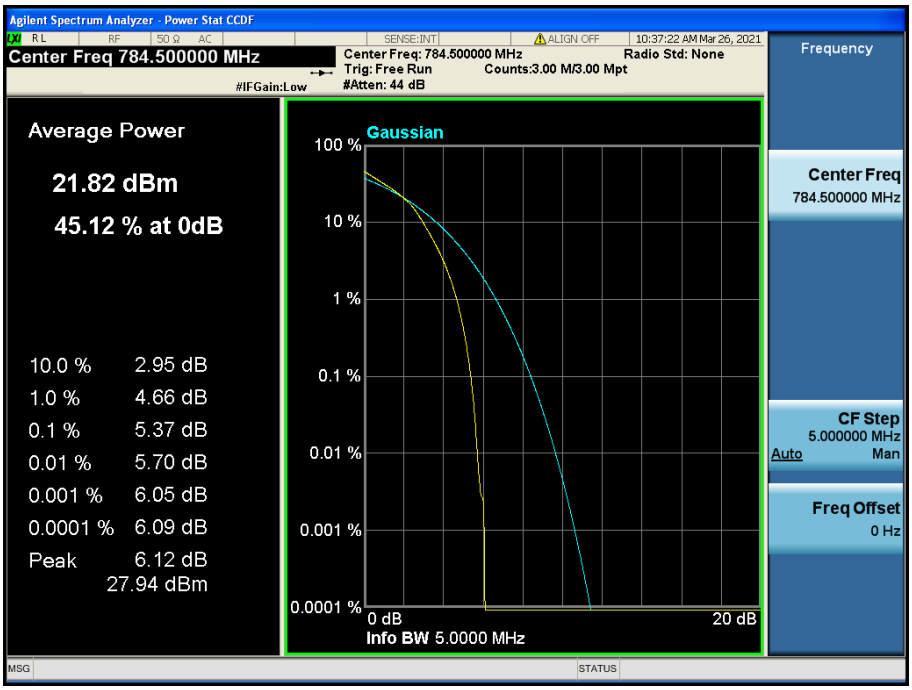
LTE Band 13 / 10 MHz / QPSK - RB Size 50



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

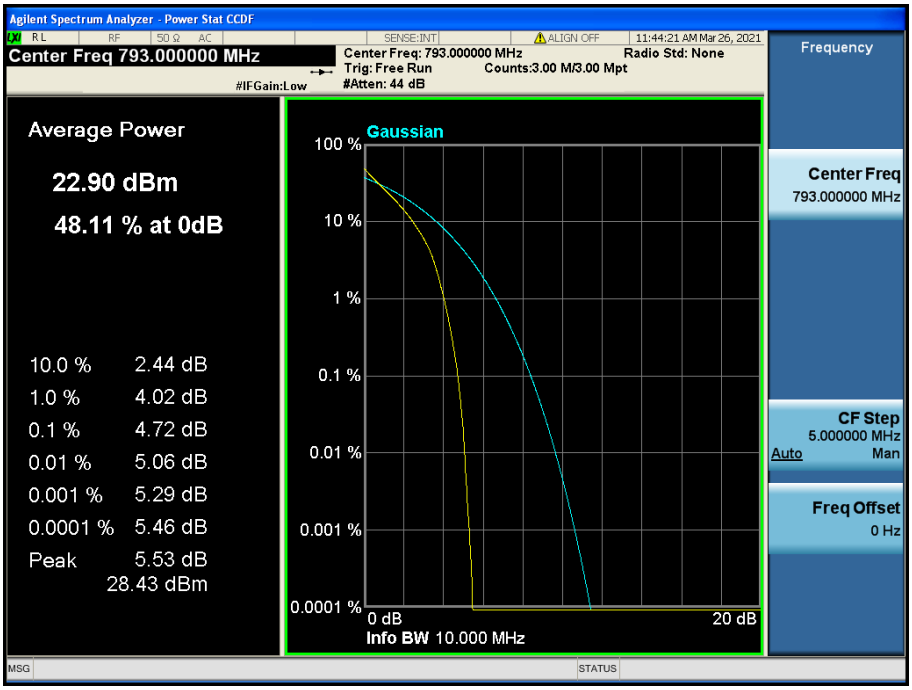


LTE Band 13 / 5 MHz / QPSK - RB Size 25

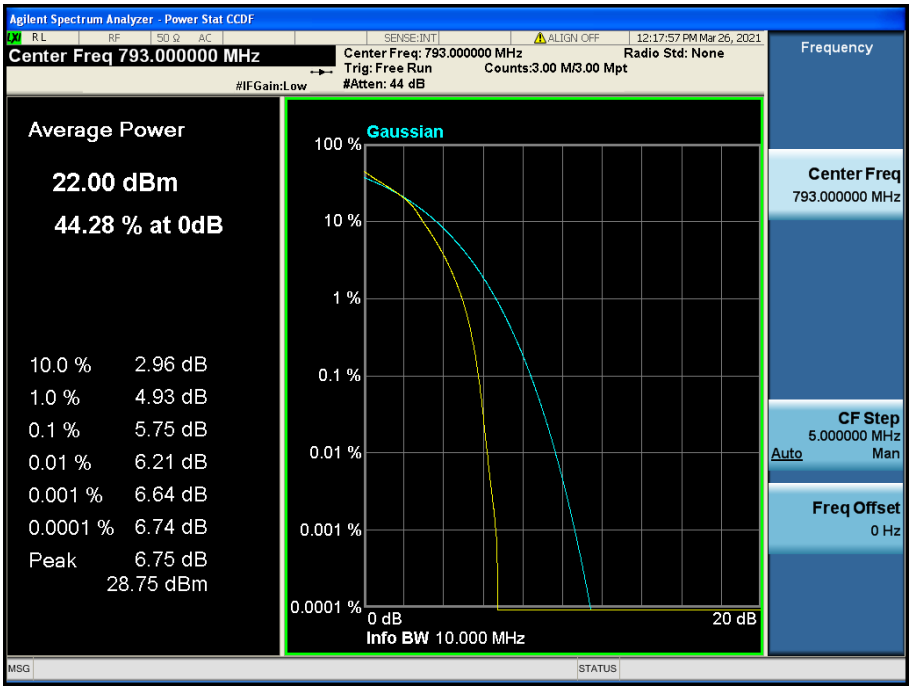


LTE Band 13 / 5 MHz / 16QAM - RB Size 25

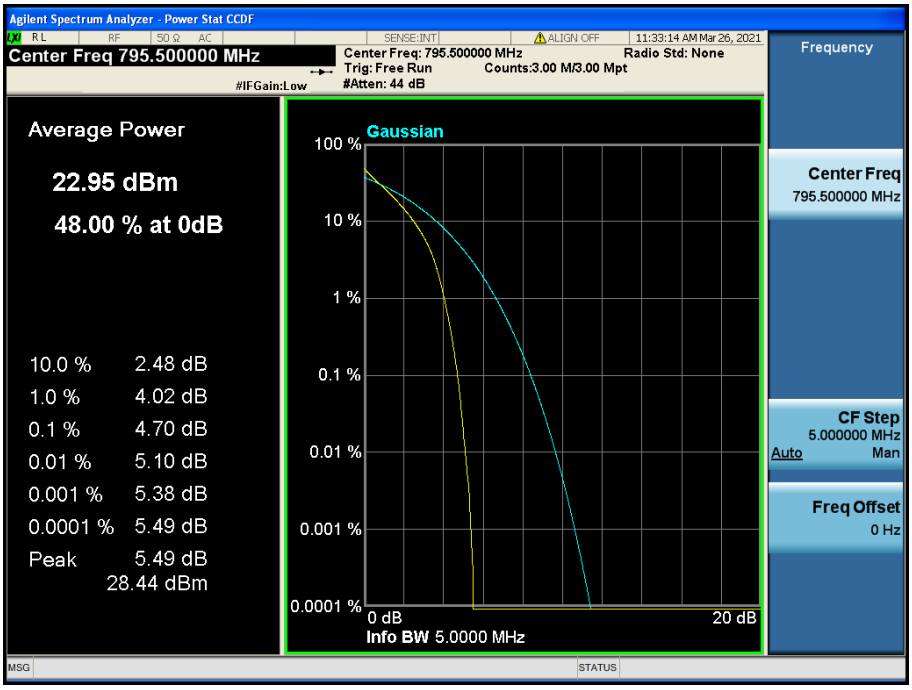
8.2.4 LTE Band 14



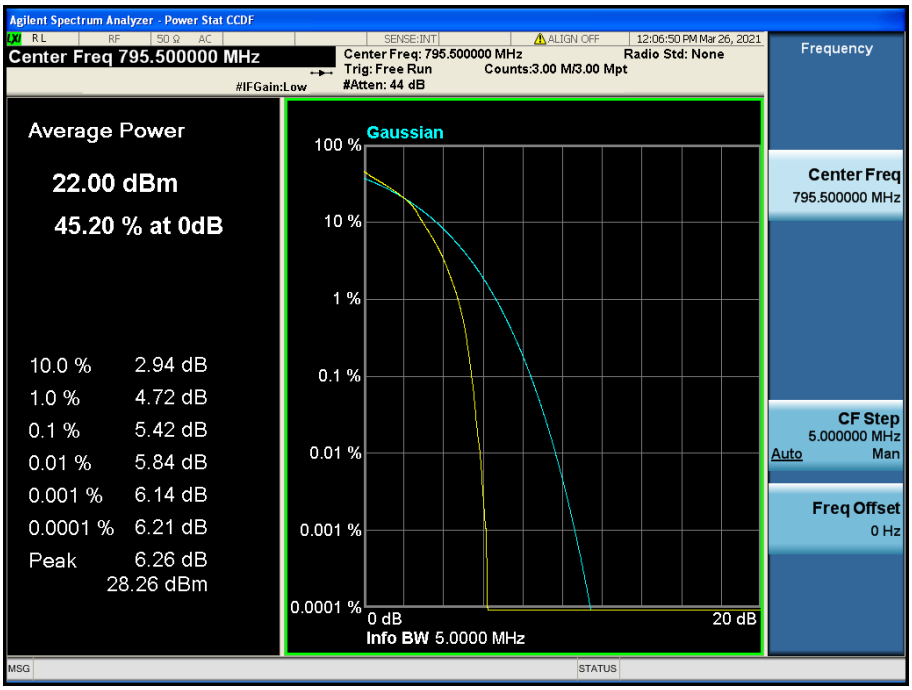
LTE Band 14 / 10 MHz / QPSK - RB Size 50



LTE Band 14 / 10 MHz / 16QAM - RB Size 50

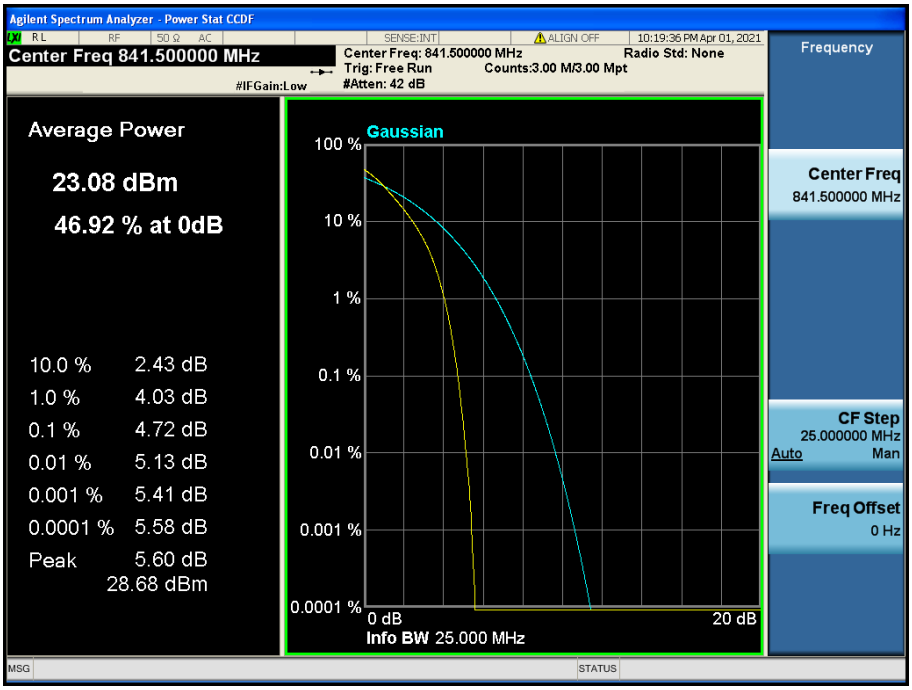


LTE Band 14 / 5 MHz / QPSK - RB Size 25

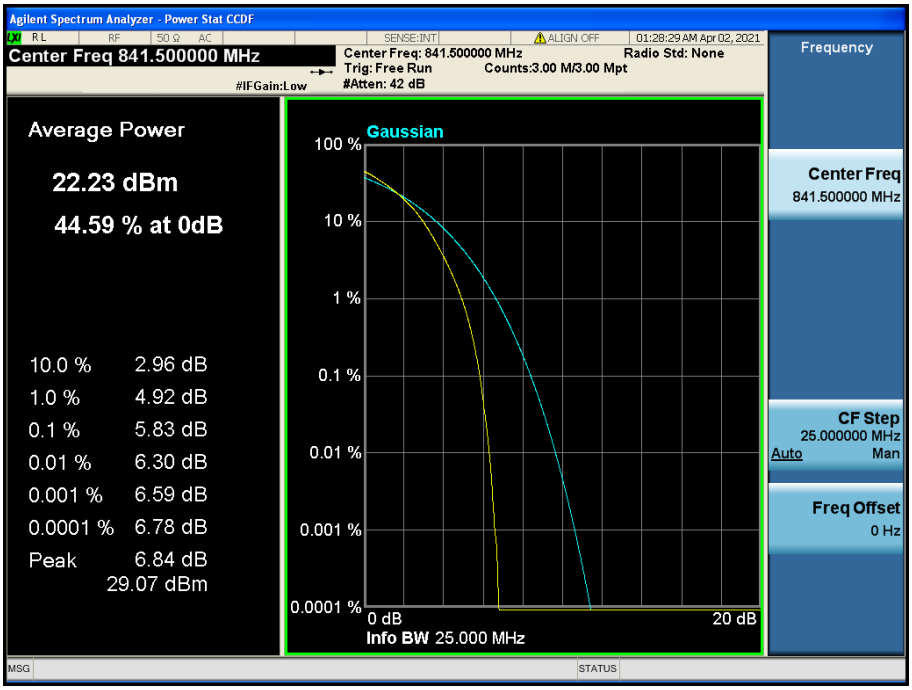


LTE Band 14 / 5 MHz / 16QAM - RB Size 25

8.2.5 LTE Band 26

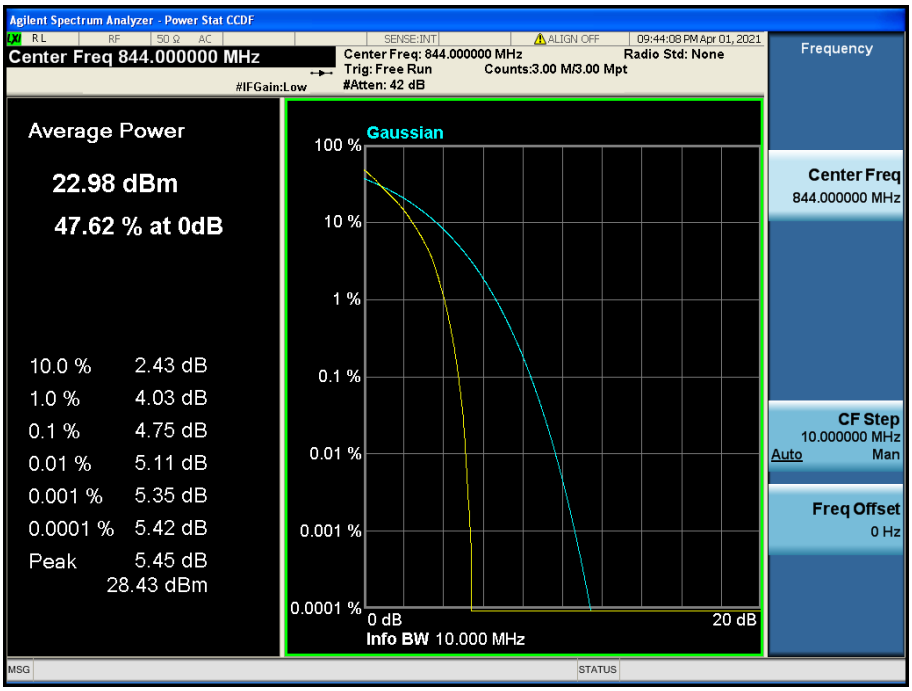


LTE Band 26 / 15 MHz / QPSK - RB Size 75

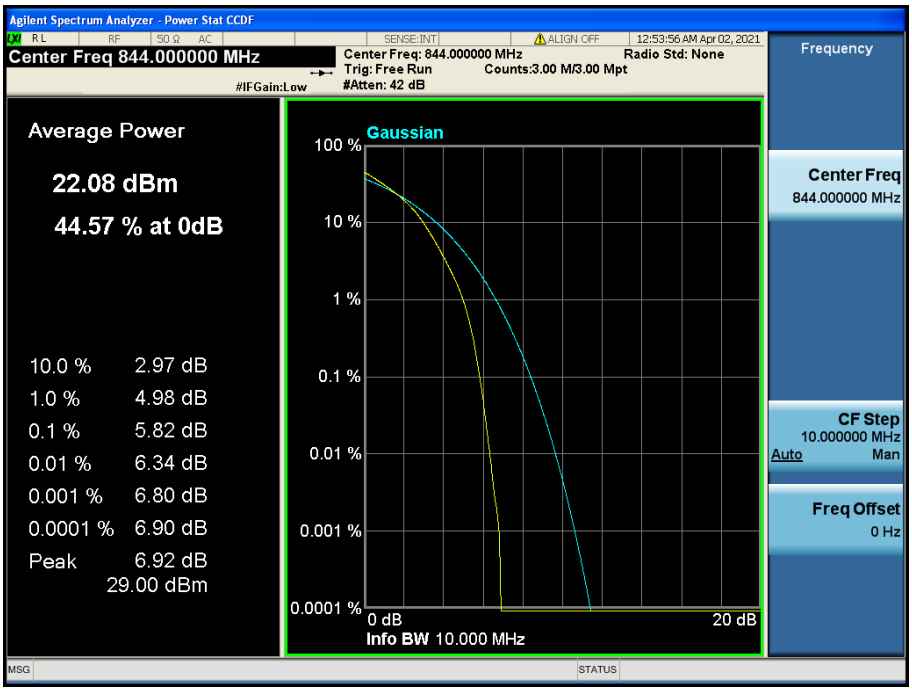


LTE Band 26 / 15 MHz / 16QAM - RB Size 75

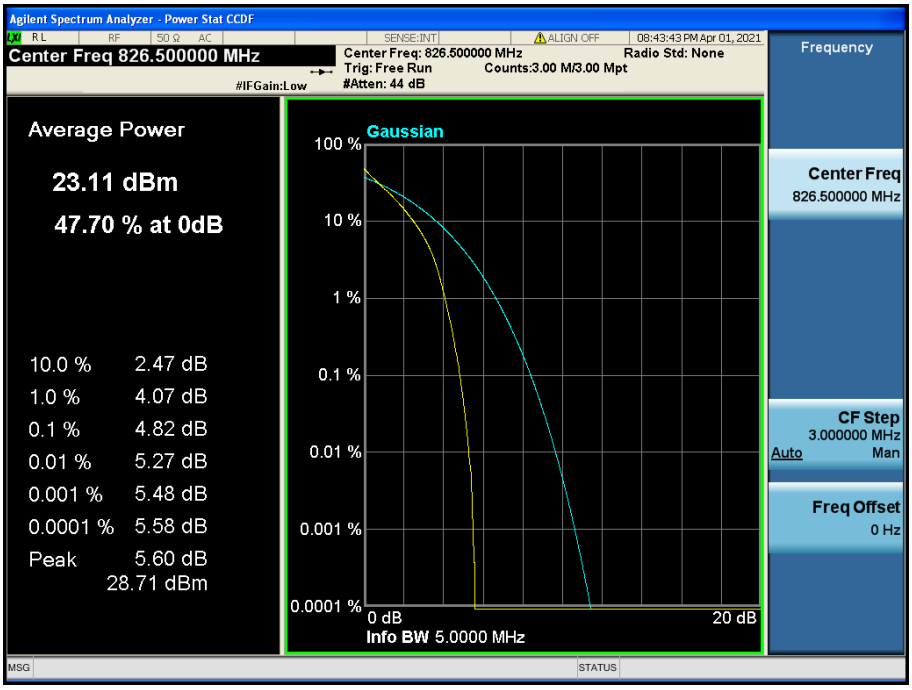
8.2.6 LTE Band 26(5)



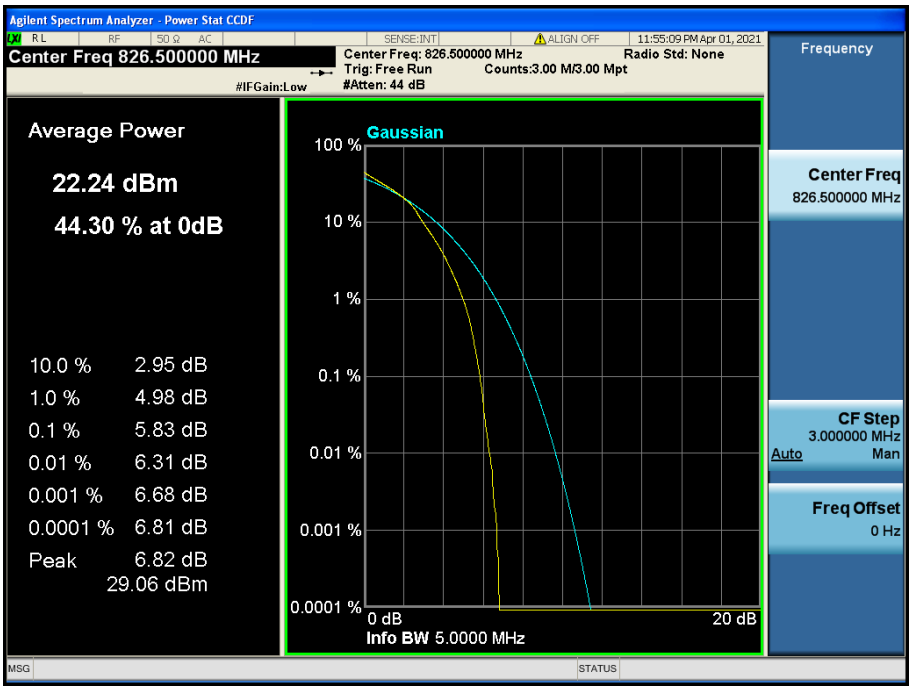
LTE Band 26(5) / 10 MHz / QPSK - RB Size 50



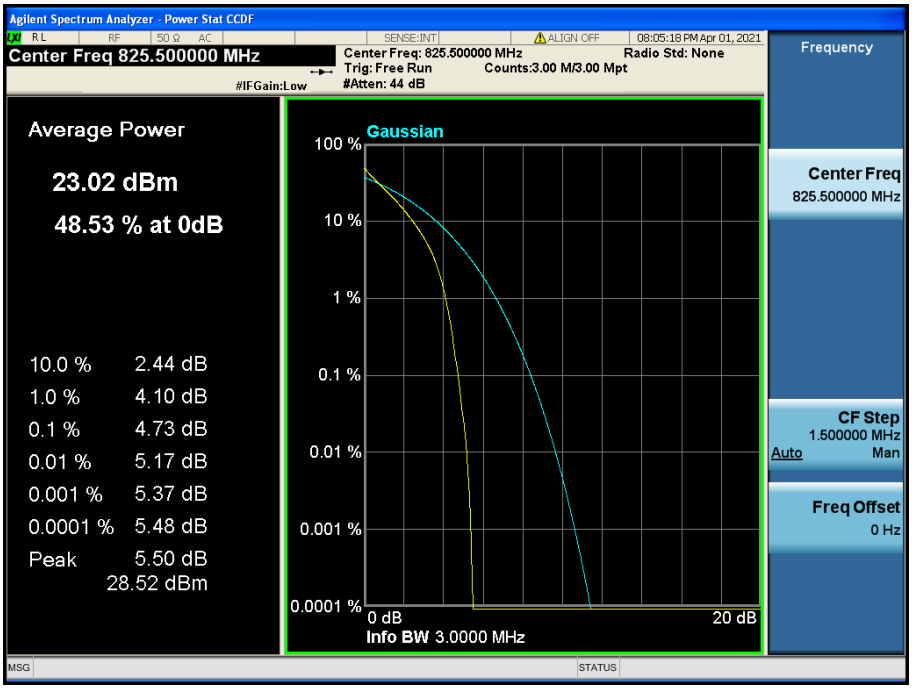
LTE Band 26(5) / 10 MHz / 16QAM - RB Size 50



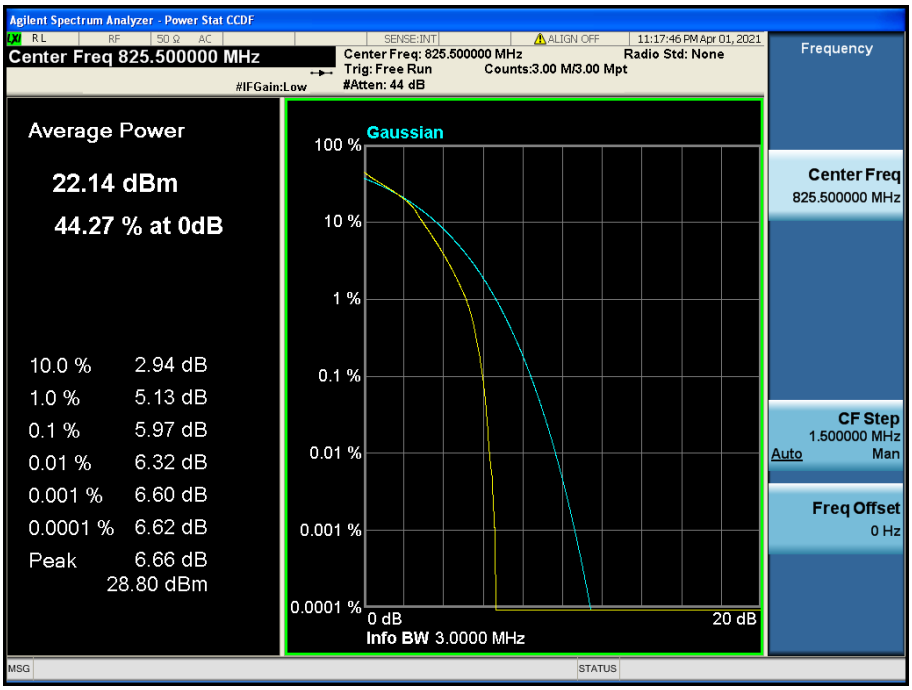
LTE Band 26(5) / 5 MHz / QPSK - RB Size 25



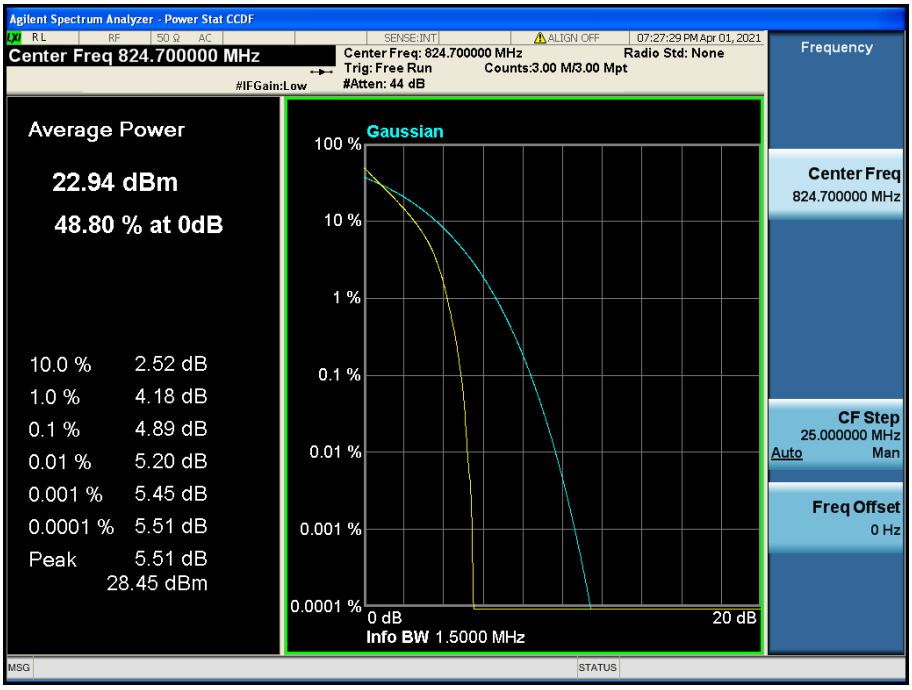
LTE Band 26(5) / 5 MHz / 16QAM - RB Size 25



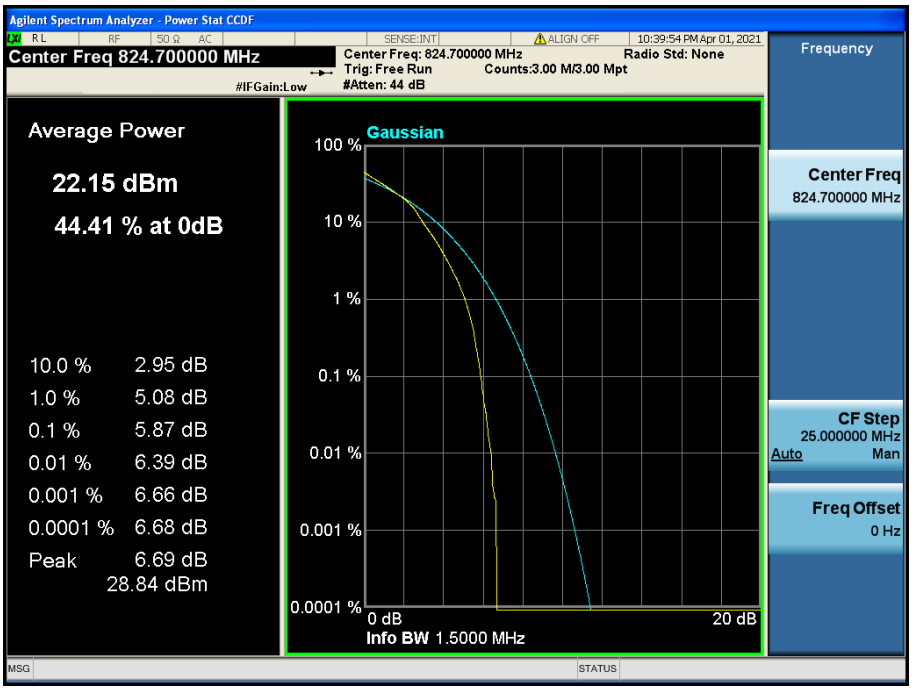
LTE Band 26(5) / 3 MHz / QPSK - RB Size 15



LTE Band 26(5) / 3 MHz / 16QAM - RB Size 15

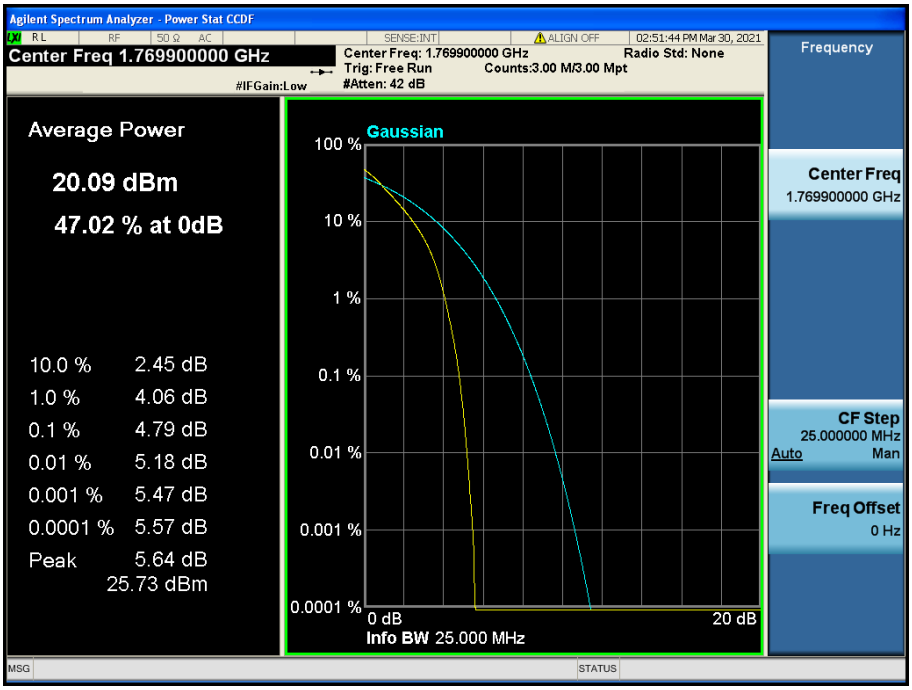


LTE Band 26(5) / 1.4 MHz / QPSK - RB Size 6

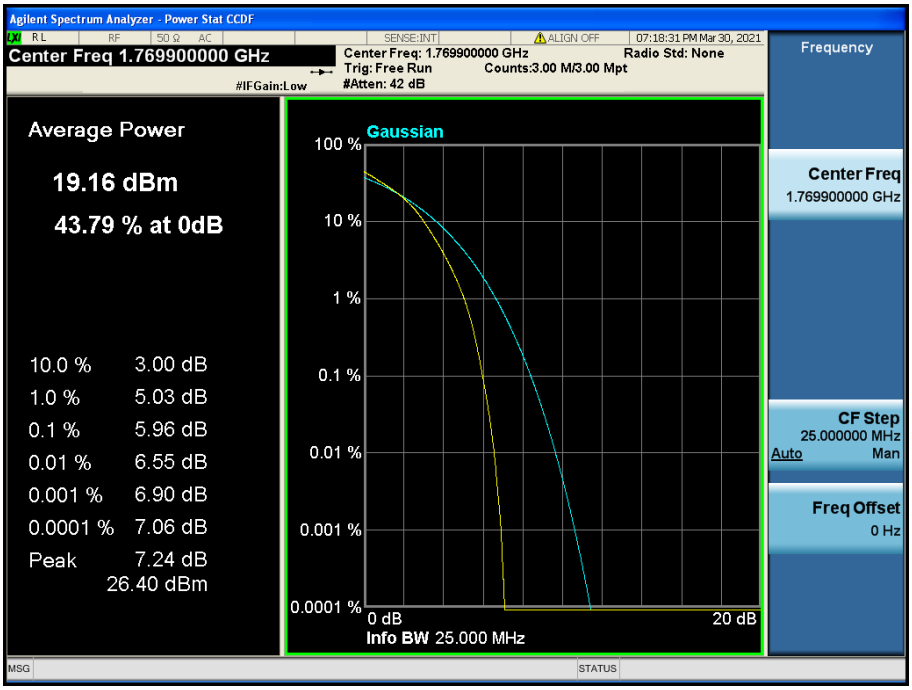


LTE Band 26(5) / 1.4 MHz / 16QAM - RB Size 6

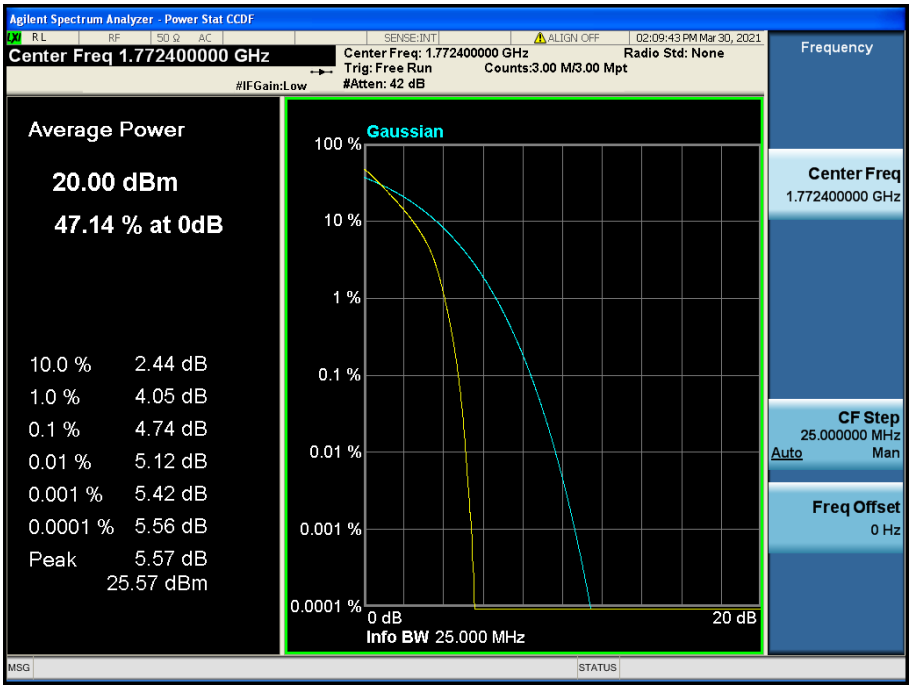
8.2.7 LTE Band 66(4)



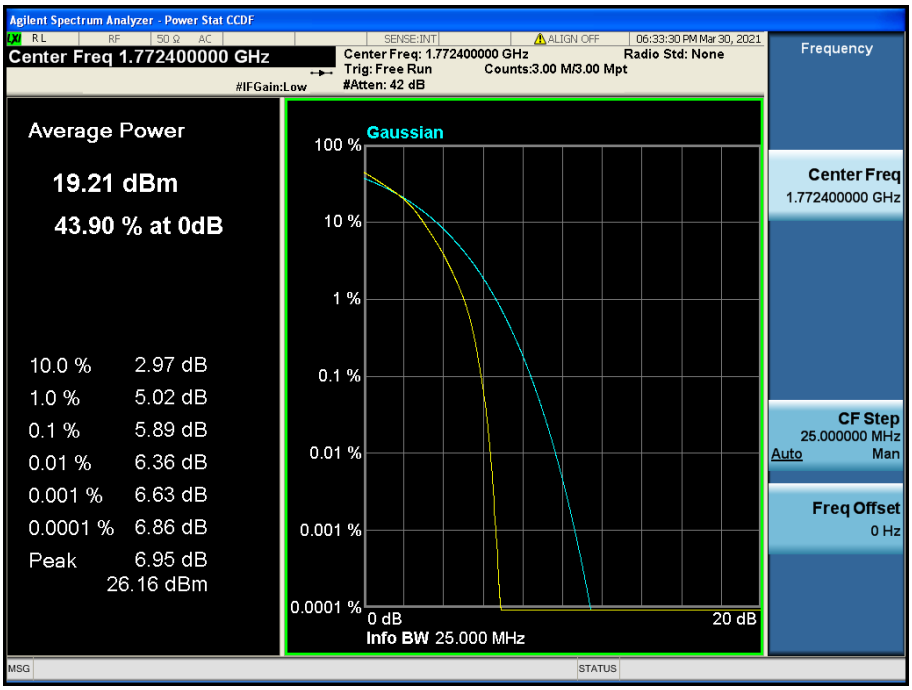
LTE Band 66(4) / 20 MHz / QPSK - RB Size 100



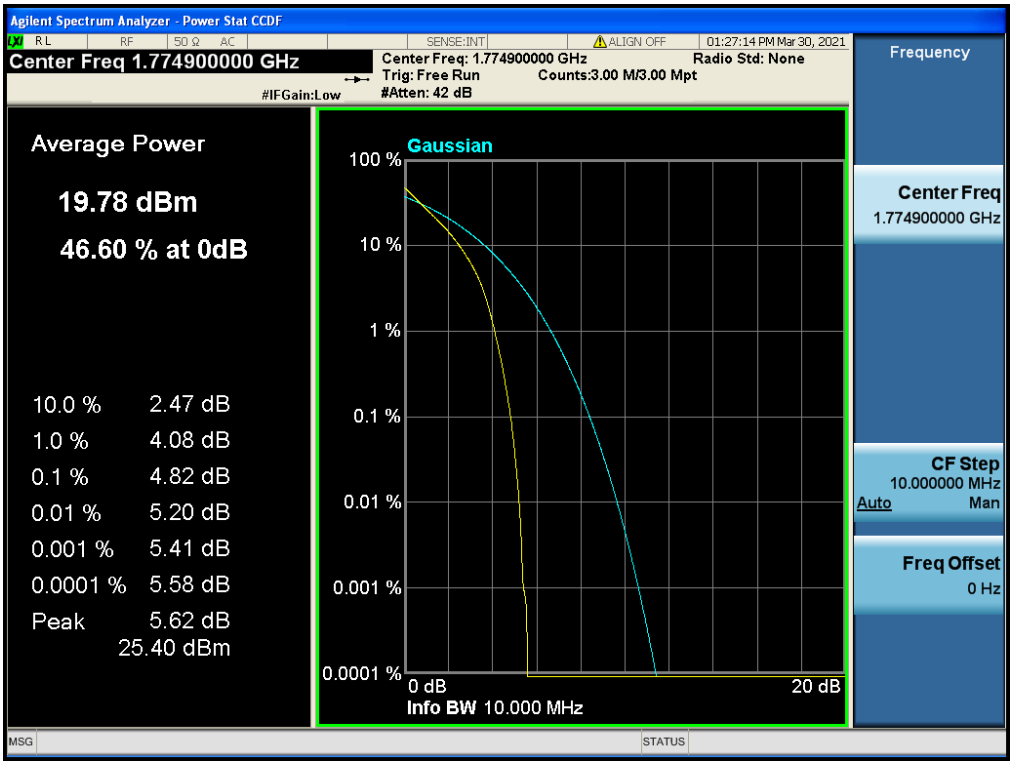
LTE Band 66(4) / 20 MHz / 16QAM - RB Size 100



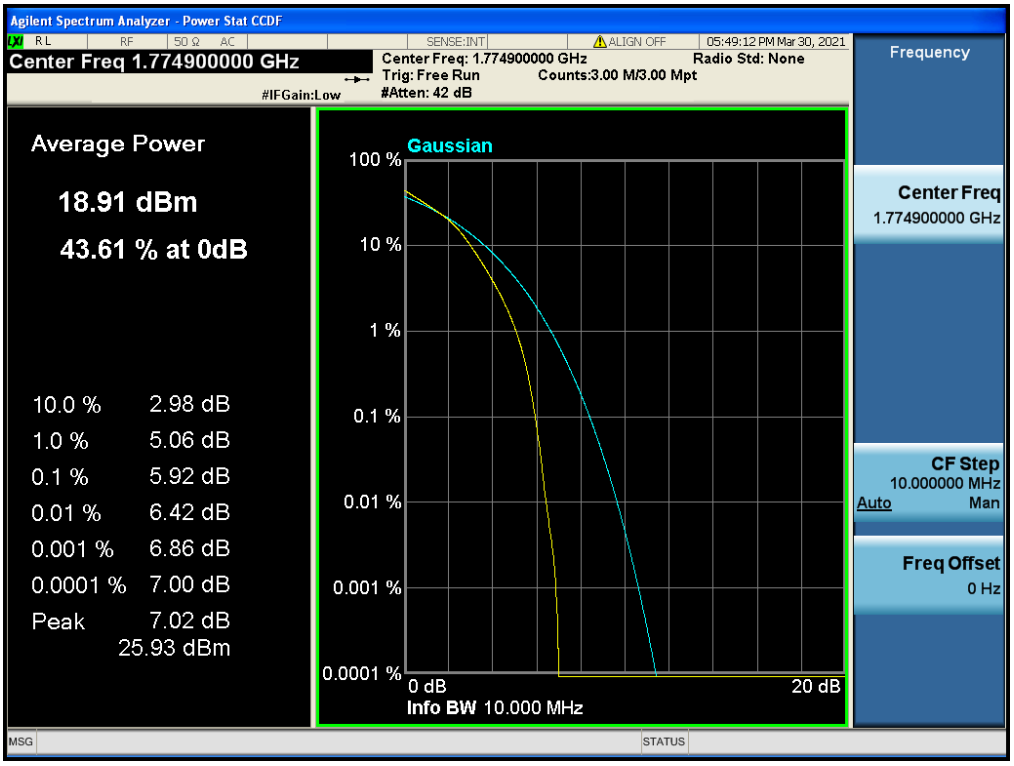
LTE Band 66(4) / 15 MHz / QPSK - RB Size 75



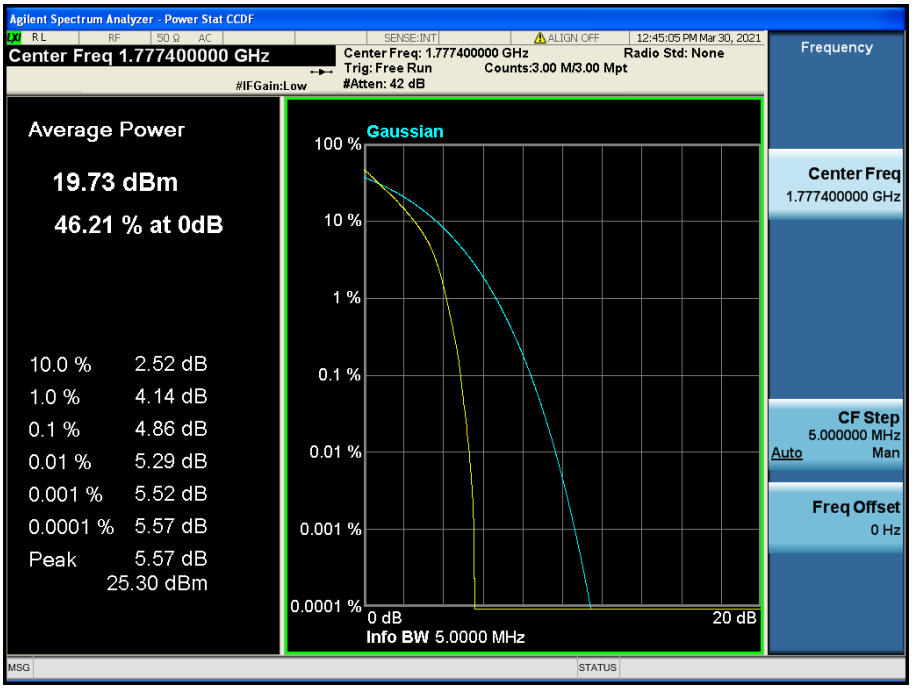
LTE Band 66(4) / 15 MHz / 16QAM - RB Size 75



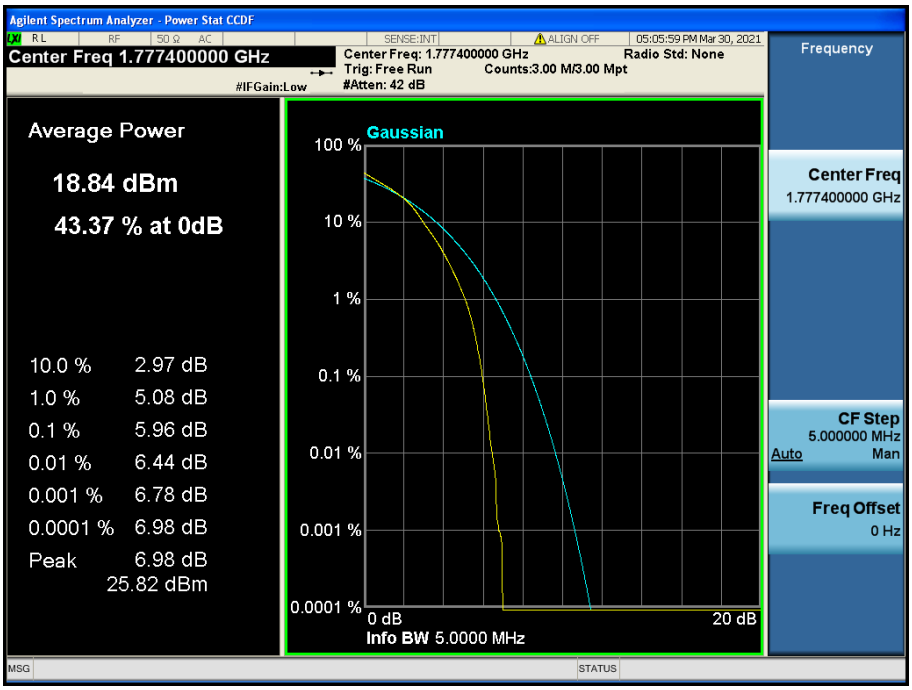
LTE Band 66(4) / 10 MHz / QPSK - RB Size 50



LTE Band 66(4) / 10 MHz / 16QAM - RB Size 50



LTE Band 66(4) / 5 MHz / QPSK - RB Size 25



LTE Band 66(4) / 5 MHz / 16QAM - RB Size 25