TEST REPORT

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

1. Report No : DRTFCC2008-0245
2. Customer
   - Name : BLUEBIRD INC.
   - Address : 3F, 115, Irwon-ro, Gangnam-gu, Seoul, South Korea
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : Smart POS Payment Terminal / SP500
   FCC ID : SS4SP500
5. Test Method Used : KDB971168 D01v03, ANSI/TIA-603-E-2016, ANSI C63.26-2015
   Test Specification : §2, §22, §24, §27
6. Date of Test : 2020.06.01 ~ 2020.07.20
7. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing
8. Testing Environment : Refer to 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 : Jungwoo Kim (Signature)	Reviewed by Name : JaeJin Lee (Signature)

2020 . 08 . 21 .

DT&C Co., Ltd.

Not abided by KS Q ISO / IEC 17025 and KOLAS accreditation.

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

Test Report Version

Test Report No.	Date	Description	Revised by	Reviewed by
DRTFCC2008-0245	Aug. 21, 2020	Initial issue	Jungwoo Kim	JaeJin Lee

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1. GENERAL INFORMATION

Applicant Name : BLUEBIRD INC.

Address : F, 115, Irwon-ro, Gangnam-gu, Seoul, South Korea

FCC ID : SS4SP500

FCC Classification : PCS Licensed Transmitter (PCB)

EUT Type : Smart POS Payment Terminal

Model Name : SP500

Add Model Name : NA

Serial Number : Radiated(SP500A4LAA1SSD22007),Conducted(SP500A4LAA1SSD22003)

Supplying power : DC 7.26 V

Antenna Information : FPCB Antenna

Mode	TX Frequency (MHz)	Emission Designator	Modulation	ERP	
				Max power (dBm)	Max power (W)
LTE Band 12	704 ~ 711	8M96G7D	QPSK	17.04	0.051
LTE Band 12	704 ~ 711	8M98W7D	16QAM	15.74	0.037
LTE Band 12	701.5 ~ 713.5	4M51G7D	QPSK	16.61	0.046
LTE Band 12	701.5 ~ 713.5	4M49W7D	16QAM	15.55	0.036
LTE Band 12	700.5 ~ 714.5	2M70G7D	QPSK	16.60	0.046
LTE Band 12	700.5 ~ 714.5	2M70W7D	16QAM	15.28	0.034
LTE Band 12	699.7 ~ 715.3	1M09G7D	QPSK	16.76	0.047
LTE Band 12	699.7 ~ 715.3	1M09W7D	16QAM	15.82	0.038
LTE Band 5	829 ~ 844	8M95G7D	QPSK	18.25	0.067
LTE Band 5	829 ~ 844	8M94W7D	16QAM	17.01	0.050
LTE Band 5	826.5 ~ 846.5	4M48G7D	QPSK	18.04	0.064
LTE Band 5	826.5 ~ 846.5	4M49W7D	16QAM	17.02	0.050
LTE Band 5	825.5 ~ 847.5	2M69G7D	QPSK	18.16	0.065
LTE Band 5	825.5 ~ 847.5	2M69W7D	16QAM	17.14	0.052
LTE Band 5	824.7 ~ 848.3	1M09G7D	QPSK	17.92	0.062
LTE Band 5	824.7 ~ 848.3	1M09W7D	16QAM	16.85	0.048

Mode	TX Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max power(dBm)	Max power(W)
LTE Band 4	1 720 ~ 1 745	17M9G7D	QPSK	24.21	0.264
LTE Band 4	1 720 ~ 1 745	17M9W7D	16QAM	24.00	0.251
LTE Band 4	1 717.5 ~ 1 747.5	13M5G7D	QPSK	23.38	0.218
LTE Band 4	1 717.5 ~ 1 747.5	13M4W7D	16QAM	23.34	0.216
LTE Band 4	1 715 ~ 1 750	8M95G7D	QPSK	23.51	0.224
LTE Band 4	1 715 ~ 1 750	8M96W7D	16QAM	23.50	0.224
LTE Band 4	1 712.5 ~ 1 752.5	4M51G7D	QPSK	24.01	0.252
LTE Band 4	1 712.5 ~ 1 752.5	4M49W7D	16QAM	23.16	0.207
LTE Band 4	1 711.5 ~ 1 753.5	2M70G7D	QPSK	24.13	0.259
LTE Band 4	1 711.5 ~ 1 753.5	2M70W7D	16QAM	23.28	0.213
LTE Band 4	1 710.7 ~ 1 754.3	1M09G7D	QPSK	23.71	0.235
LTE Band 4	1 710.7 ~ 1 754.3	1M09W7D	16QAM	22.68	0.185
LTE Band 2	1 860 ~ 1 900	18M0G7D	QPSK	26.49	0.446
LTE Band 2	1 860 ~ 1 900	17M9W7D	16QAM	25.10	0.324
LTE Band 2	1 857.5 ~ 1 902.5	13M4G7D	QPSK	26.28	0.425
LTE Band 2	1 857.5 ~ 1 902.5	13M4W7D	16QAM	26.12	0.409
LTE Band 2	1 855 ~ 1 905	8M98G7D	QPSK	26.44	0.441
LTE Band 2	1 855 ~ 1 905	8M93W7D	16QAM	25.50	0.355
LTE Band 2	1 852.5 ~ 1 907.5	4M50G7D	QPSK	26.55	0.452
LTE Band 2	1 852.5 ~ 1 907.5	4M49W7D	16QAM	25.54	0.358
LTE Band 2	1 851.5 ~ 1 908.5	2M70G7D	QPSK	26.60	0.457
LTE Band 2	1 851.5 ~ 1 908.5	2M69W7D	16QAM	25.48	0.353
LTE Band 2	1 850.7 ~ 1 909.3	1M09G7D	QPSK	25.95	0.394
LTE Band 2	1 850.7 ~ 1 909.3	1M09W7D	16QAM	24.74	0.298

2. INTRODUCTION

2.1 EUT DESCRIPTION

This EUT contains the following capabilities:
WCDMA/HSUPA 850/1900, Multi-band LTE, 802.11b/g/n WLAN(2.4GHz),
802.11a/n WLAN(5GHz), Bluetooth(BDR, EDR, LE), NFC.

2.2 TESTING ENVIRONMENT

Ambient Condition	
▪ Temperature	+21 ℃ ~ +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)	5.1 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)

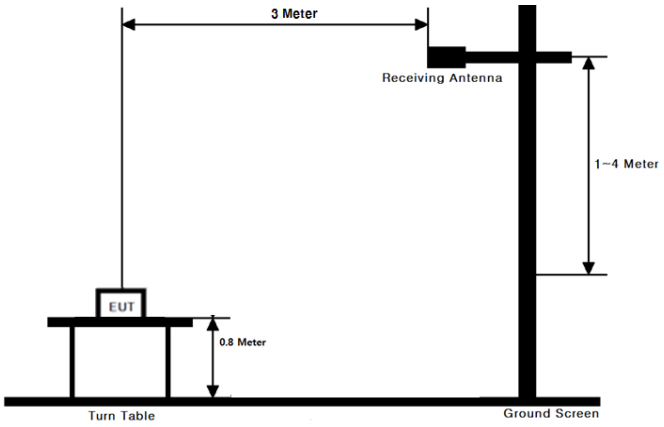
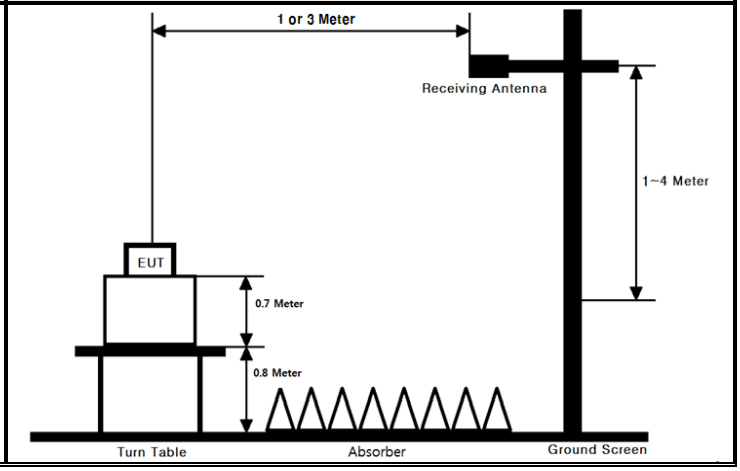
2.5 TEST FACILITY

DT&C Co., Ltd.		
The 3 m test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 17042. The test site comply with the requirements of § 2.948 according to ANSI 63.4-2014. **- FCC & IC MRA Designation No. : KR0034**		
www.dtnc.net		
Telephone	:	+ 82-31-321-2664
FAX	:	+ 82-31-321-1664

3. DESCRIPTION OF TESTS

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

Test Set-up

Below 1 GHz	Above 1 GHz
	

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

Test Procedure

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

Test setting

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

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

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

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

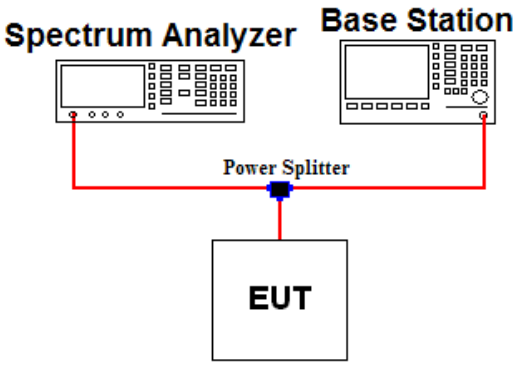
The ERP / EIRP is calculated using the following formula:

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

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

3.2 PEAK TO AVERAGE RATIO

Test set-up



Test Procedure

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

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

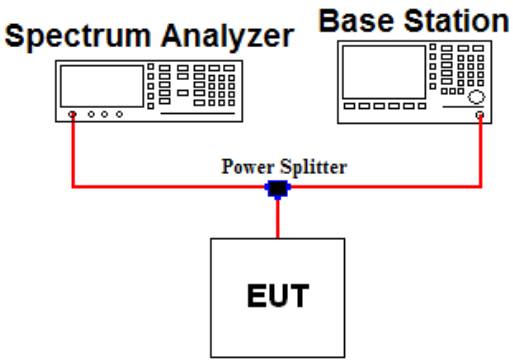
Test setting

The spectrum Analyzer`s CCDF measurement function is enabled.

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

3.3 OCCUPIED BANDWIDTH.

Test set-up



Test Procedure

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

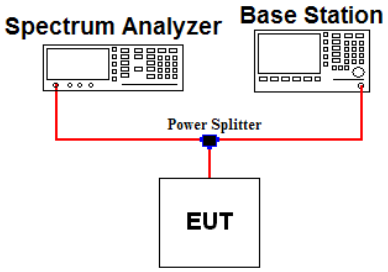
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

Test setting

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

3.4 BAND EDGE EMISSIONS AT ANTENNA TERMINAL

Test set-up



Test Procedure

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

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

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

Test setting

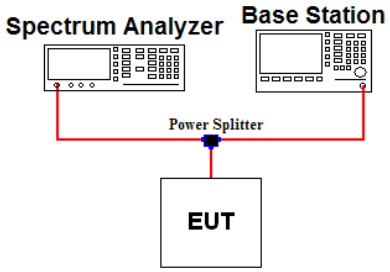
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1 % of the emission bandwidth
4. VBW ≥ 3 X RBW
5. Detector = RMS & Trace mode = Max hold
6. Sweep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

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

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

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.

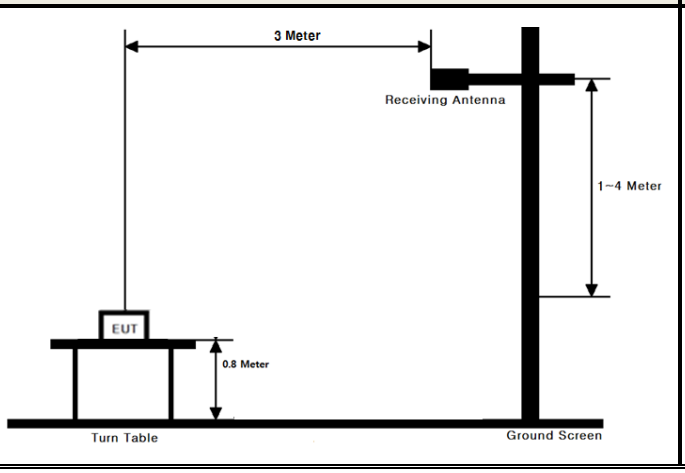
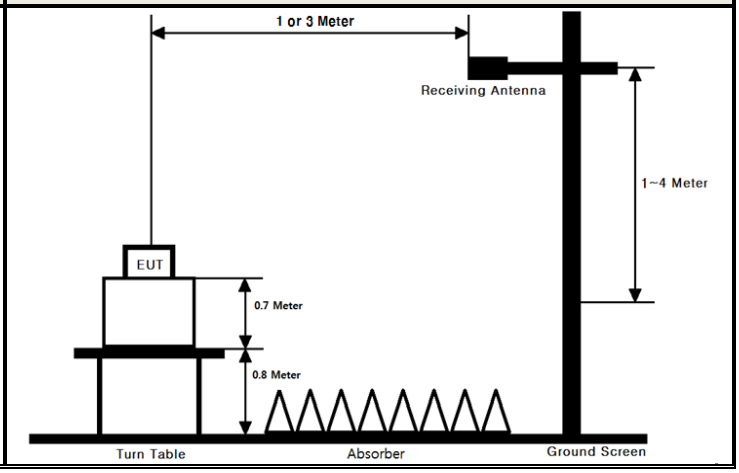
Test setting

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 1 MHz or greater for frequencies greater than 1 GHz.

3.6 UNDESIRABLE EMISSIONS

Test Set-up

Below 1 GHz	Above 1 GHz
	

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

Test Procedure

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

Test setting

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

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

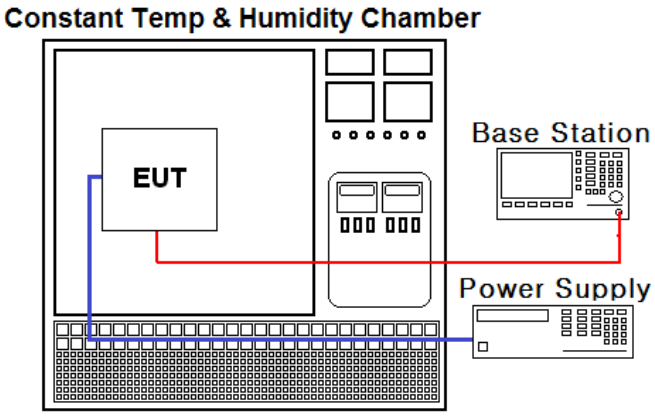
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

For radiated power measurements above 1 GHz, a Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading. The difference between the gain of the horn and an isotropic antenna are taken into consideration.

This measurement was performed with the EUT oriented in 3 orthogonal axis.

3.7 FREQUENCY STABILITY

Test Set-up



Test Procedure

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

The frequency stability of the transmitter is measured by:

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

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

Specification:

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

Time Period and Procedure:

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

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

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

4. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal. Date (yy/mm/dd)	S/N
Spectrum Analyzer	Agilent Technologies	N9020A	19/06/26 20/06/24	20/06/26 21/06/24	MY50200834
Spectrum Analyzer	Agilent Technologies	N9020A	19/12/16	20/12/26	MY48010133
DC power supply	Agilent Technologies	66332A	19/06/26 20/06/24	20/06/26 21/06/24	MY43001172
Multimeter	FLUKE	17B+	19/12/16	20/12/16	36390701WS
Power Splitter	Anritsu	K241B	19/12/16	20/12/16	016681
Temp & Humi	SJ Science	SJ-TH-S50	19/06/25 20/06/23	20/06/25 21/06/23	U5542113
Radio Communication Analyzer	Anritsu	MT8820C	19/06/28 20/06/24	20/06/28 21/06/24	6200978101
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-2
Thermohygrometer	BODYCOM	BJ5478	19/12/18	20/12/18	120612-1
Signal Generator	Rohde Schwarz	SMBV100A	19/12/16	20/12/16	255571
Signal Generator	ANRITSU	MG3695C	19/12/16	20/12/16	173501
Loop Antenna	ETS-Lindgren	6502	19/09/18	21/09/18	00226186
Bilog Antenna	Schwarzbeck	VULB 9160	19/04/23	21/04/23	9160-3362
Dipole Antenna	A.H.Systems Inc.	FCC-4	19/03/26	21/03/26	710A
Dipole Antenna	Schwarzbeck	UHA9105	20/04/10	22/04/10	2262
HORN ANT	ETS	3117	20/04/24	22/04/24	00140394
HORN ANT	ETS	3117	20/03/26	22/03/26	00152145
HORN ANT	A.H.Systems	SAS-574	19/04/23	21/04/23	154
HORN ANT	A.H.Systems	SAS-574	19/07/03	21/07/03	155
PreAmplifier	RFBAY.Inc	MPA-40-40	19/12/16	20/12/16	21151801
PreAmplifier	H.P	8447D	19/12/16	20/12/16	2944A07774
PreAmplifier	Agilent	8449B	19/06/27 20/06/24	20/06/27 21/06/24	3008A02108
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	19/06/24 20/06/24	20/06/24 21/06/24	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	19/06/24 20/06/24	20/06/24 21/06/24	3
High-pass filter	Wainwright	WHNX8.5/26.5G-6SS	19/06/24 20/06/24	20/06/24 21/06/24	1
Cable	DTNC	Cable	20/01/13	21/01/13	M-01
Cable	DTNC	Cable	20/01/13	21/01/13	M-04
Cable	Junkosha	MWX315	20/01/13	21/01/13	M-05
Cable	Junkosha	MWX221	20/01/13	21/01/13	M-06
Cable	Radiall	Cable	20/01/16	21/01/16	RF-84

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

5. SUMMARY OF TEST RESULTS

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Status Note 1
2.1046	Conducted Output Power	N/A	Conducted	C Note2
2.1049	Occupied Bandwidth	N/A		C
24.232(d) 27.50(d.5)	Peak to Average Ratio	< 13 dB		C
2.1051 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Band Edge / Conducted Spurious Emissions	> 43 + 10log$_{10}$(P) dB at Band edge and for all out-of-band emissions		C
2.1055 22.355 24.235 27.54	Frequency Stability	< 2.5 ppm (Part 22) Fundamental emissions must stay within Authorized frequency block (Part 24, 27)		C
27.50(c.10)	Radiated Output Power (B12)	< 3 Watts max. ERP	Radiated	C
22.913(a.5)	Radiated Output Power (B5)	< 7 Watts max. ERP		C
27.50(d.4)	Radiated Output Power (B4)	< 1 Watts max. EIRP		C
24.232(c)	Radiated Output Power(B2)	< 2 Watts max. EIRP		C
2.1053 22.917(a) 24.238(a) 27.53(g) 27.53(h)	Undesirable Emissions	> 43 + 10log$_{10}$(P) dB for all out-of-band emissions		C

Note 1: **C**=Comply **NC**=Not Comply **NT**=Not Tested **NA**=Not Applicable
Note 2: Refer to RF Exposure Report (Test Report SAR)

6. SAMPLE CALCULATION

A. Emission Designator

LTE Band 12(QPSK)

Emission Designator = **8M96G7D**
LTE OBW = 8.958 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 12(16QAM)

Emission Designator = **8M98W7D**
LTE OBW = 8.984 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 5(QPSK)

Emission Designator = **8M95G7D**
LTE OBW = 8.949 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 5(16QAM)

Emission Designator = **8M94W7D**
LTE OBW = 8.938 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 4(QPSK)

Emission Designator = **17M9G7D**
LTE OBW = 17.897 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 4(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.867 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 2(QPSK)

Emission Designator =**18M0G7D**
LTE OBW = 17.966 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 2(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.874 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

B. For substitution method

1) The EUT was placed on a turntable with 0.8 meter height for frequency below 1 GHz 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. 28.88 dBm)
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

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

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	H	17.69	-0.65	17.04	0.051
		16QAM	1/25	H	16.12	-0.65	15.47	0.035
	711	QPSK	1/0	H	17.32	-0.63	16.69	0.047
		16QAM	1/0	H	16.37	-0.63	15.74	0.037
5	701.5	QPSK	1/24	H	17.15	-0.66	16.49	0.045
		16QAM	1/24	H	15.78	-0.66	15.12	0.033
	707.5	QPSK	1/12	H	17.25	-0.64	16.61	0.046
		16QAM	1/12	H	16.19	-0.64	15.55	0.036
	713.5	QPSK	1/12	H	16.89	-0.62	16.27	0.042
		16QAM	1/12	H	15.89	-0.62	15.27	0.034
3	700.5	QPSK	1/14	H	17.10	-0.66	16.44	0.044
		16QAM	1/14	H	15.70	-0.66	15.04	0.032
	707.5	QPSK	1/0	H	17.24	-0.64	16.60	0.046
		16QAM	1/0	H	15.92	-0.64	15.28	0.034
	714.5	QPSK	1/7	H	17.00	-0.62	16.38	0.043
		16QAM	1/7	H	15.69	-0.62	15.07	0.032
1.4	699.7	QPSK	1/5	H	17.22	-0.66	16.56	0.045
		16QAM	1/5	H	15.81	-0.66	15.15	0.033
	707.5	QPSK	1/2	H	17.40	-0.64	16.76	0.047
		16QAM	1/2	H	16.46	-0.64	15.82	0.038
	715.3	QPSK	1/2	H	17.04	-0.62	16.42	0.044
		16QAM	1/2	H	15.46	-0.62	14.84	0.030

7.5.2 LTE Band 5

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	ERP (dBm)	ERP (W)
10	829	QPSK	1/0	H	18.92	-0.67	18.25	0.067
		16QAM	1/0	H	17.68	-0.67	17.01	0.050
	836.5	QPSK	1/0	H	18.72	-0.74	17.98	0.063
		16QAM	1/0	H	17.73	-0.74	16.99	0.050
	844	QPSK	1/0	H	18.59	-0.81	17.78	0.060
		16QAM	1/0	H	17.27	-0.81	16.46	0.044
5	826.5	QPSK	1/12	H	18.69	-0.65	18.04	0.064
		16QAM	1/12	H	17.67	-0.65	17.02	0.050
	836.5	QPSK	1/0	H	18.53	-0.74	17.79	0.060
		16QAM	1/0	H	17.28	-0.74	16.54	0.045
	846.5	QPSK	1/0	H	18.01	-0.83	17.18	0.052
		16QAM	1/0	H	16.58	-0.83	15.75	0.038
3	825.5	QPSK	1/7	H	18.80	-0.64	18.16	0.065
		16QAM	1/7	H	17.78	-0.64	17.14	0.052
	836.5	QPSK	1/14	H	18.34	-0.74	17.60	0.058
		16QAM	1/14	H	16.90	-0.74	16.16	0.041
	847.5	QPSK	1/0	H	17.93	-0.84	17.09	0.051
		16QAM	1/0	H	16.41	-0.84	15.57	0.036
1.4	824.7	QPSK	1/2	H	18.55	-0.63	17.92	0.062
		16QAM	1/2	H	17.48	-0.63	16.85	0.048
	836.5	QPSK	1/0	H	18.06	-0.74	17.32	0.054
		16QAM	1/0	H	16.88	-0.74	16.14	0.041
	848.3	QPSK	1/0	H	17.06	-0.85	16.21	0.042
		16QAM	1/0	H	15.90	-0.85	15.05	0.032

7.5.3 LTE Band 4

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1720	QPSK	1/99	V	16.96	5.28	22.24	0.167
		16QAM	1/99	V	16.00	5.28	21.28	0.134
	1732.5	QPSK	1/0	V	17.31	5.33	22.64	0.184
		16QAM	1/0	V	16.59	5.33	21.92	0.156
	1745	QPSK	1/0	V	18.83	5.38	24.21	0.264
		16QAM	1/0	V	18.62	5.38	24.00	0.251
15	1717.5	QPSK	1/0	V	16.69	5.27	21.96	0.157
		16QAM	1/0	V	15.74	5.27	21.01	0.126
	1732.5	QPSK	1/36	V	18.04	5.33	23.37	0.217
		16QAM	1/36	V	16.52	5.33	21.85	0.153
	1747.5	QPSK	1/0	V	17.99	5.39	23.38	0.218
		16QAM	1/0	V	17.95	5.39	23.34	0.216
10	1715	QPSK	1/25	V	16.81	5.26	22.07	0.161
		16QAM	1/25	V	15.51	5.26	20.77	0.119
	1732.5	QPSK	1/25	V	17.87	5.33	23.20	0.209
		16QAM	1/25	V	17.14	5.33	22.47	0.177
	1750	QPSK	1/25	V	18.11	5.40	23.51	0.224
		16QAM	1/25	V	18.10	5.40	23.50	0.224
5	1712.5	QPSK	1/0	V	16.45	5.25	21.70	0.148
		16QAM	1/0	V	15.75	5.25	21.00	0.126
	1732.5	QPSK	1/24	V	17.93	5.33	23.26	0.212
		16QAM	1/24	V	16.55	5.33	21.88	0.154
	1752.5	QPSK	1/0	V	18.63	5.38	24.01	0.252
		16QAM	1/0	V	17.78	5.38	23.16	0.207
3	1711.5	QPSK	1/14	V	16.41	5.25	21.66	0.147
		16QAM	1/14	V	15.64	5.25	20.89	0.123
	1732.5	QPSK	1/7	V	17.96	5.33	23.29	0.213
		16QAM	1/7	V	16.95	5.33	22.28	0.169
	1753.5	QPSK	1/0	V	18.76	5.37	24.13	0.259
		16QAM	1/0	V	17.91	5.37	23.28	0.213
1.4	1710.7	QPSK	1/0	V	16.18	5.24	21.42	0.139
		16QAM	1/0	V	15.11	5.24	20.35	0.108
	1732.5	QPSK	1/2	V	17.95	5.33	23.28	0.213
		16QAM	1/2	V	16.55	5.33	21.88	0.154
	1754.3	QPSK	1/5	V	18.35	5.36	23.71	0.235
		16QAM	1/5	V	17.32	5.36	22.68	0.185

7.5.4 LTE Band 2

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1 860	QPSK	1/0	V	19.15	4.80	23.95	0.248
		16QAM	1/0	V	17.49	4.80	22.29	0.169
	1 880	QPSK	1/0	V	20.40	4.60	25.00	0.316
		16QAM	1/0	V	18.70	4.60	23.30	0.214
	1 900	QPSK	1/0	V	22.09	4.40	26.49	0.446
		16QAM	1/0	V	20.70	4.40	25.10	0.324
15	1 857.5	QPSK	1/0	V	18.76	4.83	23.59	0.229
		16QAM	1/0	V	17.47	4.83	22.30	0.170
	1 880	QPSK	1/74	V	20.47	4.60	25.07	0.321
		16QAM	1/74	V	19.43	4.60	24.03	0.253
	1 902.5	QPSK	1/74	V	21.87	4.41	26.28	0.425
		16QAM	1/74	V	21.71	4.41	26.12	0.409
10	1 855	QPSK	1/0	V	18.81	4.85	23.66	0.232
		16QAM	1/0	V	18.12	4.85	22.97	0.198
	1 880	QPSK	1/25	V	20.41	4.60	25.01	0.317
		16QAM	1/25	V	18.83	4.60	23.43	0.220
	1 905	QPSK	1/25	V	22.02	4.42	26.44	0.441
		16QAM	1/25	V	21.08	4.42	25.50	0.355
5	1 852.5	QPSK	1/0	V	18.70	4.88	23.58	0.228
		16QAM	1/0	V	17.35	4.88	22.23	0.167
	1 880	QPSK	1/12	V	20.45	4.60	25.05	0.320
		16QAM	1/12	V	19.06	4.60	23.66	0.232
	1 907.5	QPSK	1/12	V	22.12	4.43	26.55	0.452
		16QAM	1/12	V	21.11	4.43	25.54	0.358
3	1 851.5	QPSK	1/0	V	18.75	4.89	23.64	0.231
		16QAM	1/0	V	17.68	4.89	22.57	0.181
	1 880	QPSK	1/14	V	20.40	4.60	25.00	0.316
		16QAM	1/14	V	18.72	4.60	23.32	0.215
	1 908.5	QPSK	1/0	V	22.17	4.43	26.60	0.457
		16QAM	1/0	V	21.05	4.43	25.48	0.353
1.4	1 850.7	QPSK	1/0	V	19.03	4.89	23.92	0.247
		16QAM	1/0	V	18.10	4.89	22.99	0.199
	1 880	QPSK	1/0	V	19.46	4.60	24.06	0.255
		16QAM	1/0	V	17.79	4.60	22.39	0.173
	1 909.3	QPSK	1/0	V	21.51	4.44	25.95	0.394
		16QAM	1/0	V	20.30	4.44	24.74	0.298

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 2/4/5/12 = 43 + 10log10 (P[Watts])

7.6.1 LTE Band 12

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result		Limit (dBc)
								(dBm)	(dBc)	
10	704	1/25	QPSK	1 408.24	V	-43.71	2.48	-41.23	58.27	30.04
				2 112.32	V	-49.40	3.10	-46.30	63.34	
				2 816.49	V	-50.87	4.58	-46.29	63.33	
				3 519.70	V	-55.57	5.83	-49.74	66.78	
				4 223.60	H	-52.91	7.00	-45.91	62.95	
			16QAM	1 408.05	V	-43.94	2.48	-41.46	56.93	28.47
				2 112.08	V	-49.75	3.10	-46.65	62.12	
				2 816.66	V	-51.40	4.58	-46.82	62.29	
				3 528.33	V	-55.33	5.86	-49.47	64.94	
				4 224.73	H	-53.23	7.00	-46.23	61.70	
	711	1/0	QPSK	1 413.21	V	-49.60	2.50	-47.10	63.79	29.69
				2 119.60	V	-49.27	3.13	-46.14	62.83	
				2 826.24	V	-51.40	4.60	-46.80	63.49	
				3 541.79	V	-55.79	5.92	-49.87	66.56	
				4 224.84	H	-54.45	7.00	-47.45	64.14	
			16QAM	1 413.32	V	-49.57	2.50	-47.07	62.81	28.74
				2 119.63	V	-49.97	3.13	-46.84	62.58	
				2 826.52	V	-51.78	4.60	-47.18	62.92	
				3 534.63	V	-56.30	5.89	-50.41	66.15	
				4 224.73	H	-53.51	7.00	-46.51	62.25	

7.6.2 LTE Band 5

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result		Limit (dBc)
								(dBm)	(dBc)	
10	829	1/0	QPSK	1 649.27	H	-55.75	4.16	-51.59	69.84	31.25
				2 467.68	V	-53.44	3.56	-49.88	68.13	
				3 289.12	V	-54.72	5.23	-49.49	67.74	
			16QAM	1 649.47	H	-56.20	4.15	-52.05	69.06	30.01
				2 481.47	V	-52.95	3.64	-49.31	66.32	
				3 287.03	V	-53.31	5.22	-48.09	65.10	
	836.5	1/0	QPSK	1 664.25	H	-55.91	3.84	-52.07	70.05	30.98
				2 491.03	V	-53.26	3.70	-49.56	67.54	
				3 316.57	V	-55.24	5.32	-49.92	67.90	
			16QAM	1 664.62	H	-57.17	3.83	-53.34	70.33	29.99
				2 500.51	V	-52.35	3.75	-48.60	65.59	
				3 323.52	V	-54.59	5.34	-49.25	66.24	
	844	1/0	QPSK	1 679.04	H	-55.02	3.51	-51.51	69.29	30.78
				2 520.63	V	-53.07	3.83	-49.24	67.02	
				3 344.12	V	-55.23	5.43	-49.80	67.58	
			16QAM	1 678.81	H	-57.14	3.52	-53.62	70.08	29.46
				2 509.53	V	-53.08	3.79	-49.29	65.75	
				3 353.61	V	-54.26	5.46	-48.80	65.26	

7.6.3 LTE Band 4

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
								(dBm)	(dBc)	
20	1 720	1/99	QPSK	3 457.89	V	-40.21	7.82	-32.39	54.63	35.24
				5 186.81	H	-34.64	10.37	-24.27	46.51	
				6 915.56	V	-46.18	11.33	-34.85	57.09	
			16QAM	3 457.82	V	-39.60	7.82	-31.78	53.06	34.28
				5 186.74	H	-34.86	10.37	-24.49	45.77	
				6 915.85	V	-50.36	11.33	-39.03	60.31	
	1 732.5	1/0	QPSK	3 447.12	V	-40.07	7.79	-32.28	54.92	35.64
				5 170.69	H	-34.34	10.34	-24.00	46.64	
				6 894.49	V	-47.14	11.30	-35.84	58.48	
			16QAM	3 447.26	V	-39.89	7.79	-32.10	54.02	34.92
				5 171.01	H	-35.44	10.34	-25.10	47.02	
				6 894.30	V	-49.60	11.30	-38.30	60.22	
	1 745	1/0	QPSK	3 472.22	V	-39.67	7.84	-31.83	56.04	37.21
				5 208.37	H	-34.31	10.38	-23.93	48.14	
				6 944.67	V	-46.53	11.39	-35.14	59.35	
			16QAM	3 472.24	V	-39.08	7.84	-31.24	55.24	37.00
				5 208.27	H	-34.62	10.38	-24.24	48.24	
				6 940.15	V	-51.02	11.38	-39.64	63.64	

7.6.4 LTE Band 2

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
								(dBm)	(dBc)	
20	1 860	1/0	QPSK	3 702.13	V	-37.87	8.30	-29.57	53.52	36.95
				5 553.31	H	-30.73	10.52	-20.21	44.16	
				7 404.61	H	-45.74	12.00	-33.74	57.69	
			16QAM	3 702.11	V	-37.22	8.30	-28.92	51.21	35.29
				5 553.28	H	-31.13	10.52	-20.61	42.90	
				7 404.39	H	-46.07	12.00	-34.07	56.36	
	1 880	1/0	QPSK	3 742.28	V	-38.24	8.38	-29.86	54.86	38.00
				5 613.40	H	-31.29	10.77	-20.52	45.52	
				7 484.44	H	-47.37	12.07	-35.30	60.30	
			16QAM	3 742.17	V	-37.95	8.38	-29.57	52.87	36.30
				5 613.30	H	-31.81	10.77	-21.04	44.34	
				7 484.28	H	-47.52	12.07	-35.45	58.75	
	1 900	1/0	QPSK	3 782.12	V	-39.12	8.46	-30.66	57.15	39.49
				5 673.35	H	-32.53	10.65	-21.88	48.37	
				7 564.43	H	-47.19	12.20	-34.99	61.48	
			16QAM	3 782.25	V	-38.98	8.46	-30.52	55.62	38.10
				5 673.42	H	-32.86	10.65	-22.21	47.31	
				7 564.32	H	-48.16	12.20	-35.96	61.06	
3	1908.5	1/0	QPSK	3 814.43	V	-39.04	8.50	-30.54	57.14	39.60
				5 721.72	H	-32.74	10.60	-22.14	48.74	
				7 629.04	H	-46.12	12.20	-33.92	60.52	
			16QAM	3 814.46	V	-38.45	8.50	-29.95	55.43	38.48
				5 721.66	H	-32.81	10.60	-22.21	47.69	
				7 628.85	H	-46.26	12.20	-34.06	59.54	

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

OPERATING FREQUENCY : 707.5 MHz
REFERENCE VOLTAGE : 7.26 VDC
LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100 %	7.26	+20(Ref)	707,500,005	+5	+0.007 1	+0.000 000 707
100 %		-30	707,499,989	-11	-0.015 5	-0.000 001 555
100 %		-20	707,499,998	-2	-0.002 8	-0.000 000 283
100 %		-10	707,500,007	+7	+0.009 9	+0.000 000 989
100 %		0	707,500,009	+9	+0.012 7	+0.000 001 272
100 %		+10	707,499,999	-1	-0.001 4	-0.000 000 141
100 %		+20	707,500,005	+5	+0.007 1	+0.000 000 707
100 %		+30	707,499,996	-4	-0.005 7	-0.000 000 565
100 %		+40	707,500,013	+13	+0.018 4	+0.000 001 837
100 %		+50	707,499,998	-2	-0.002 8	-0.000 000 283
115 %	8.35	+20	707,500,001	+1	+0.001 4	+0.000 000 141
BATT.ENDPOINT	6.60	+20	707,500,009	+9	+0.012 7	+0.000 001 272

7.7.2 LTE Band 5

OPERATING FREQUENCY : 836.5 MHz
REFERENCE VOLTAGE : 7.26 VDC
DEVIATION LIMIT : ± 0.000 25 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100 %	7.26	+20(Ref)	836,500,010	+10	+0.012 0	+0.000 001 195
100 %		-30	836,499,993	-7	-0.008 4	-0.000 000 837
100 %		-20	836,500,005	+5	+0.006 0	+0.000 000 598
100 %		-10	836,500,011	+11	+0.013 2	+0.000 001 315
100 %		0	836,499,996	-4	-0.004 8	-0.000 000 478
100 %		+10	836,499,999	-1	-0.001 2	-0.000 000 120
100 %		+20	836,500,010	+10	+0.012 0	+0.000 001 195
100 %		+30	836,500,006	+6	+0.007 2	+0.000 000 717
100 %		+40	836,499,997	-3	-0.003 6	-0.000 000 359
100 %		+50	836,500,008	+8	+0.009 6	+0.000 000 956
115 %	8.35	+20	836,499,989	-11	-0.013 2	-0.000 001 315
BATT.ENDPOINT	6.60	+20	836,500,002	+2	+0.002 4	+0.000 000 239

7.7.3 LTE Band 4

OPERATING FREQUENCY : 1 732.5 MHz
REFERENCE VOLTAGE 7.26 VDC
LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100 %	7.26	+20(Ref)	1,732,500,005	+5	+0.0029	+0.000 000 289
100 %		-30	1,732,499,989	-11	-0.0063	-0.000 000 635
100 %		-20	1,732,499,997	-3	-0.0017	-0.000 000 173
100 %		-10	1,732,500,008	+8	+0.0046	+0.000 000 462
100 %		0	1,732,500,002	+2	+0.0012	+0.000 000 115
100 %		+10	1,732,499,988	-12	-0.0069	-0.000 000 693
100 %		+20	1,732,500,005	+5	+0.0029	+0.000 000 289
100 %		+30	1,732,500,005	+5	+0.0029	+0.000 000 289
100 %		+40	1,732,500,009	+9	+0.0052	+0.000 000 519
100 %		+50	1,732,499,999	-1	-0.0006	-0.000 000 058
115 %	8.35	+20	1,732,499,988	-12	-0.0069	-0.000 000 693
BATT.ENDPOINT	6.60	+20	1,732,500,003	+3	+0.0017	+0.000 000 173

7.7.4 LTE Band 2

OPERATING FREQUENCY : 1 880.0 MHz
REFERENCE VOLTAGE 7.26 VDC
LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100 %	7.26	+20(Ref)	1,880,000,011	+11	+0.0059	+0.000 000 585
100 %		-30	1,879,999,998	-2	-0.0011	-0.000 000 106
100 %		-20	1,879,999,993	-7	-0.0037	-0.000 000 372
100 %		-10	1,880,000,006	+6	+0.0032	+0.000 000 319
100 %		0	1,880,000,010	+10	+0.0053	+0.000 000 532
100 %		+10	1,880,000,012	+12	+0.0064	+0.000 000 638
100 %		+20	1,880,000,011	+11	+0.0059	+0.000 000 585
100 %		+30	1,879,999,995	-5	-0.0027	-0.000 000 266
100 %		+40	1,879,999,999	-1	-0.0005	-0.000 000 053
100 %		+50	1,880,000,013	+13	+0.0069	+0.000 000 691
115 %	8.35	+20	1,880,000,002	+2	+0.0011	+0.000 000 106
BATT.ENDPOINT	6.60	+20	1,879,999,997	-3	-0.0016	-0.000 000 160

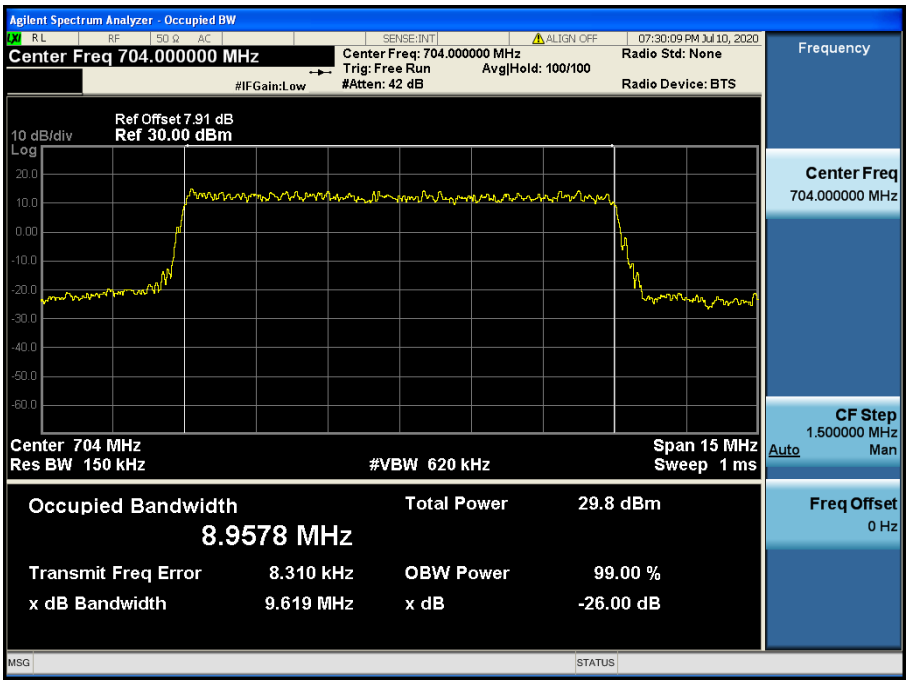
8. TEST PLOTS

- Test Notes:

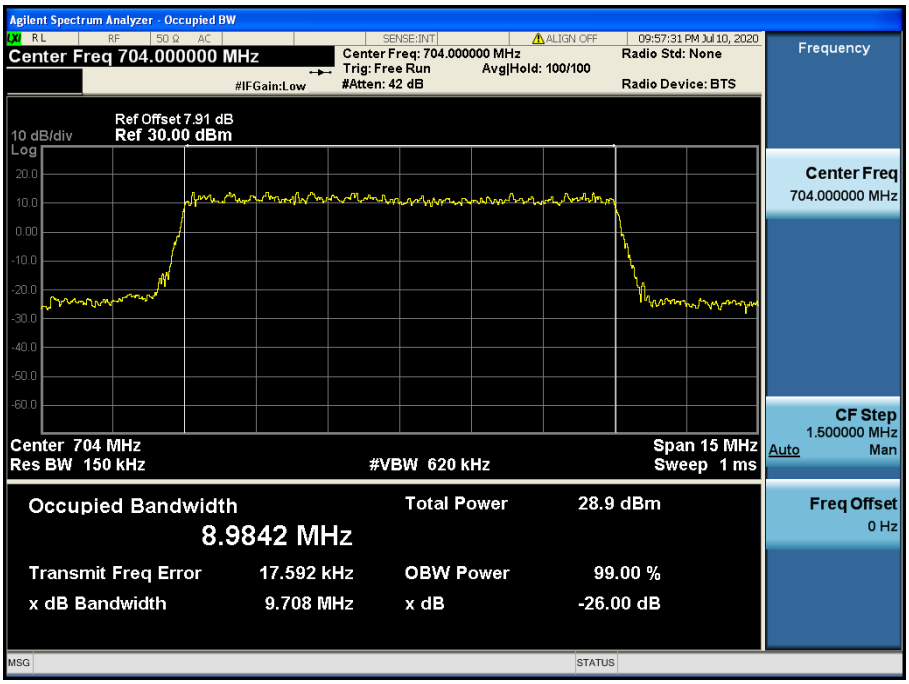
All bandwidths, RB configurations, and modulations were investigated.
The worst case test results are reported.

8.1 OCCUPIED BANDWIDTH

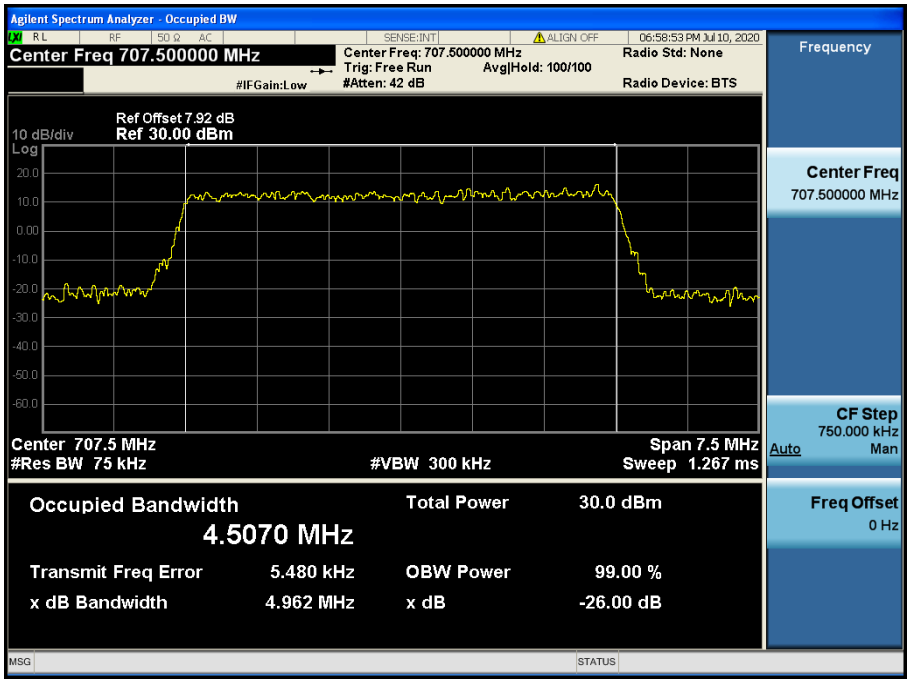
8.1.1 LTE Band 12



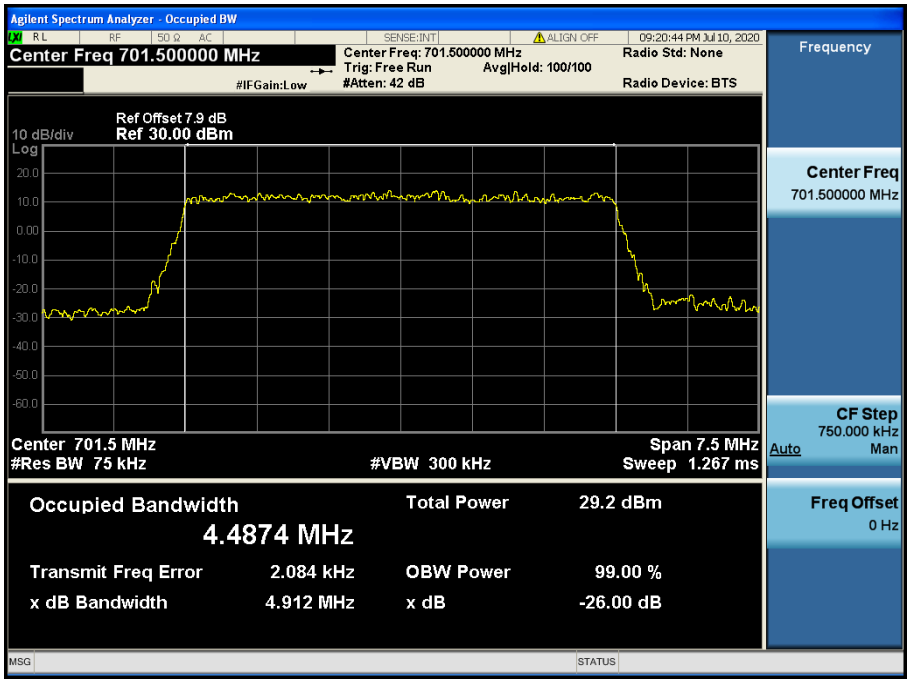
LTE Band 12 / 10 MHz / QPSK - RB Size 50



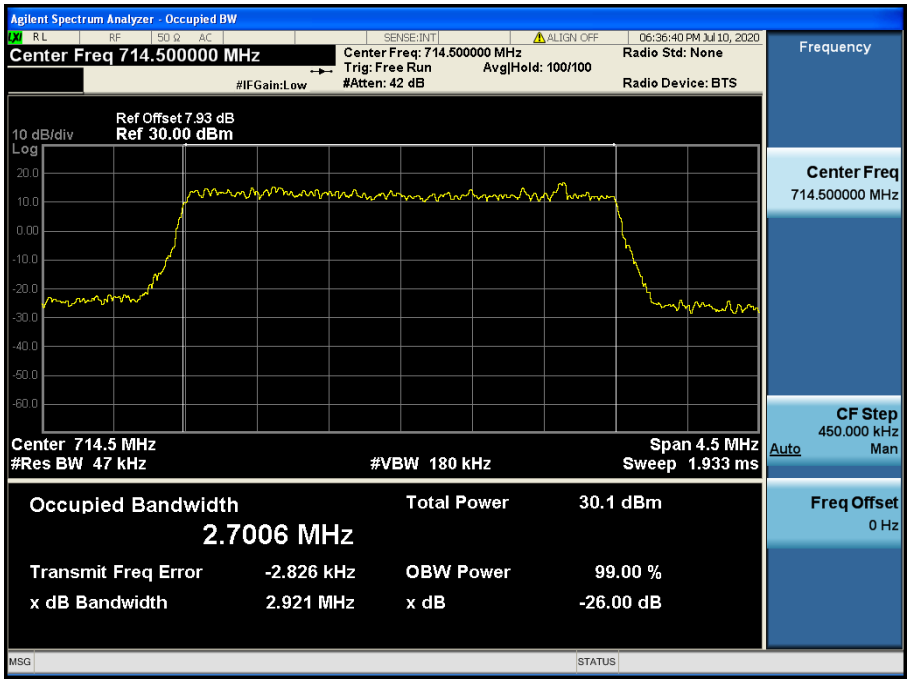
LTE Band 12 / 10 MHz / 16QAM - RB Size 50



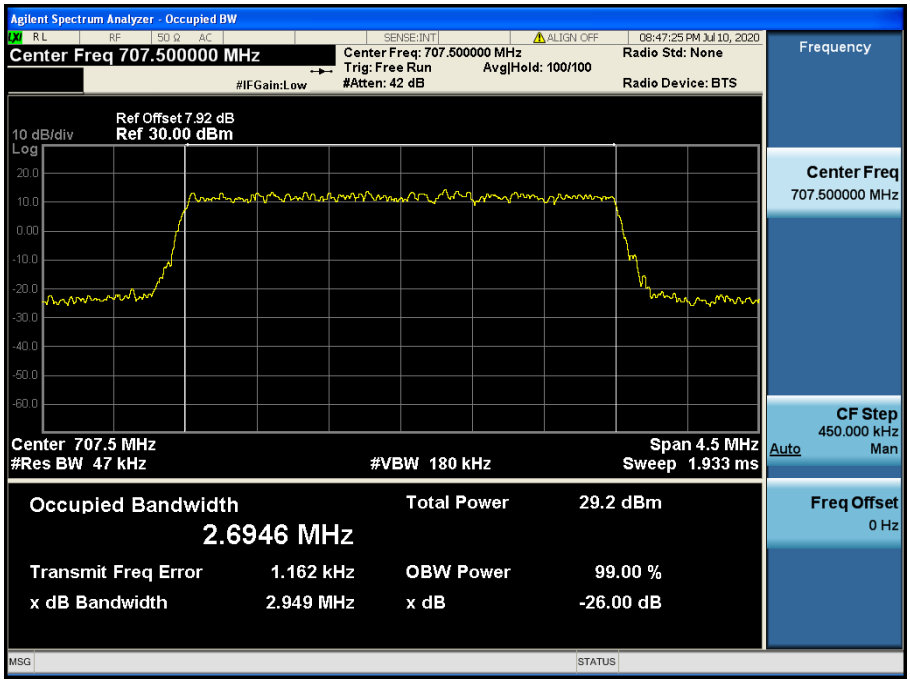
LTE Band 12 / 5 MHz / QPSK - RB Size 25



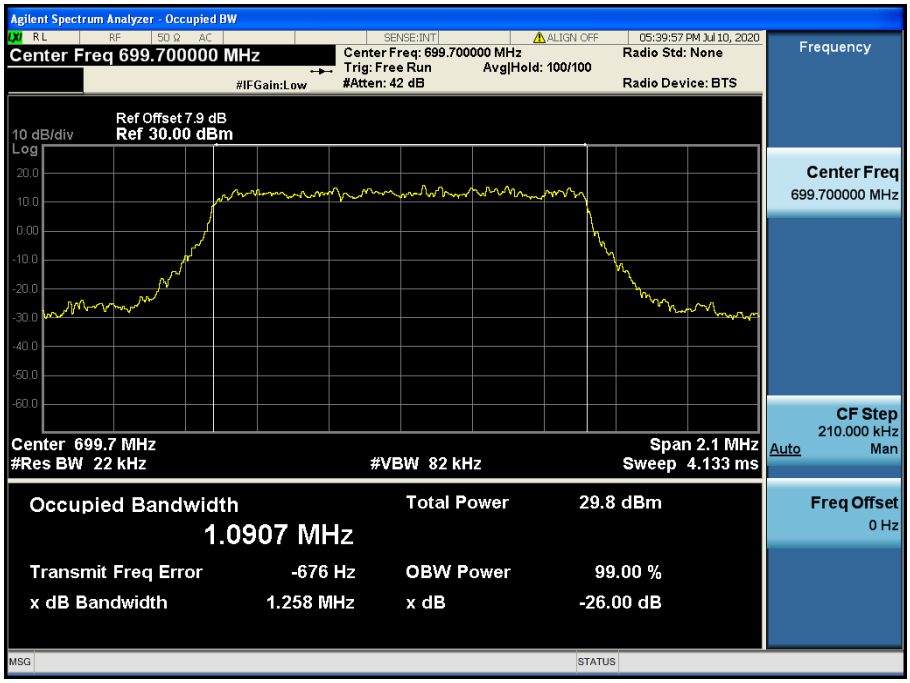
LTE Band 12 / 5 MHz / 16QAM - RB Size 25



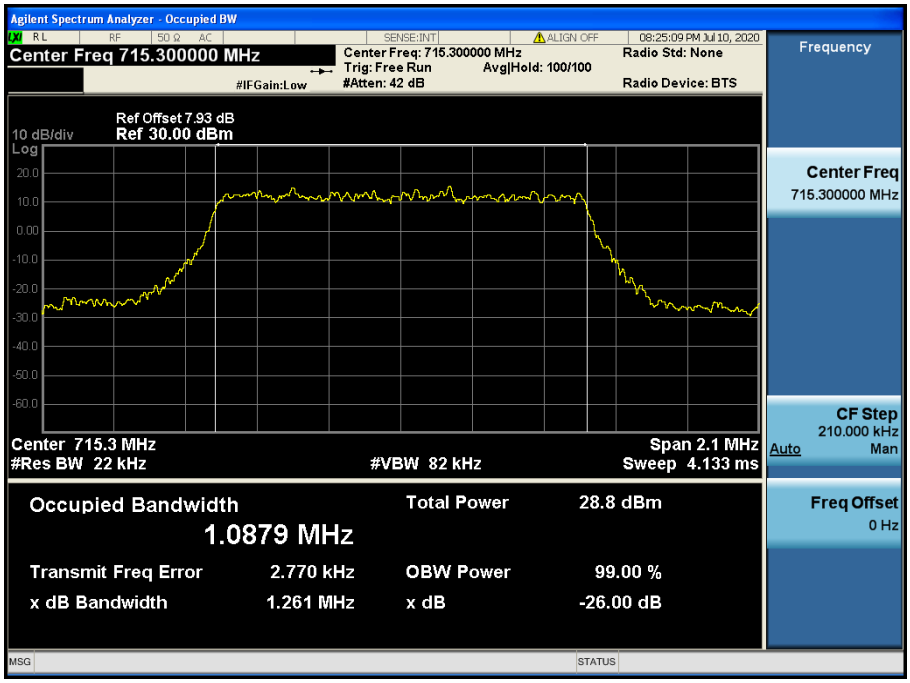
LTE Band 12 / 3 MHz / QPSK - RB Size 15



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

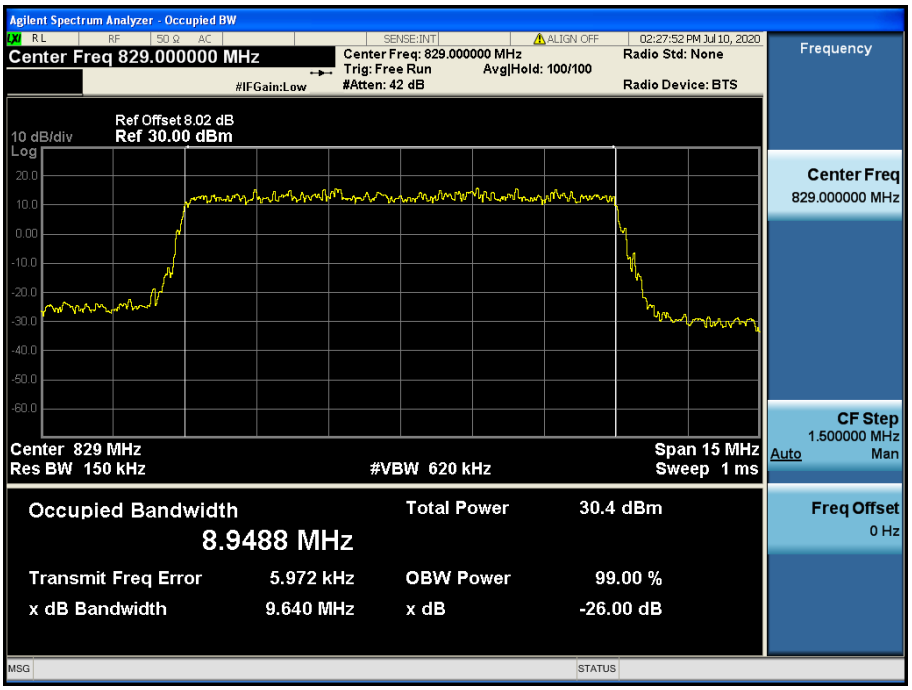


LTE Band 12 / 1.4 MHz / QPSK - RB Size 6

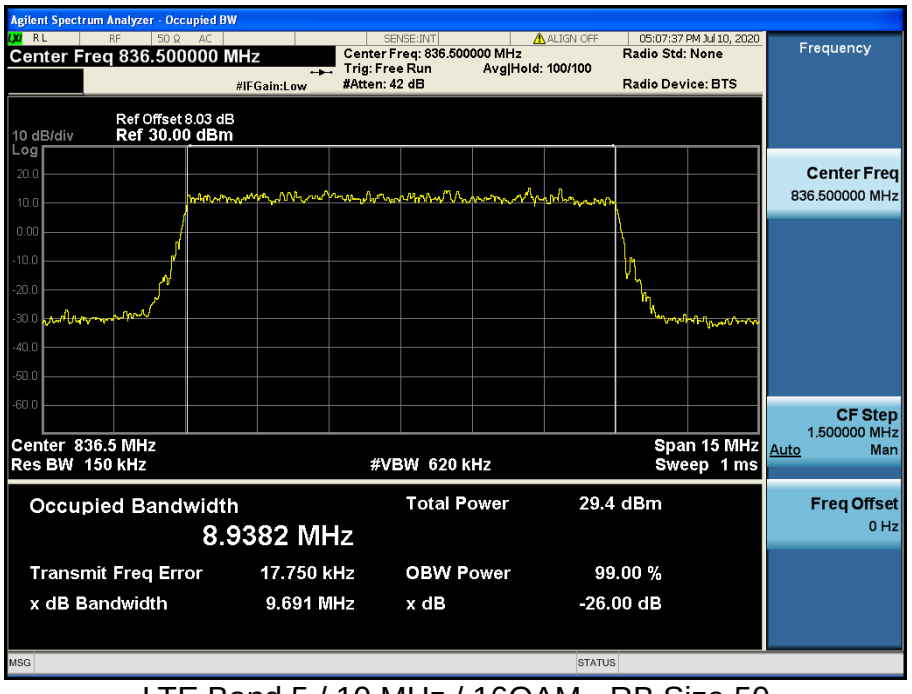


LTE Band 12 / 1.4 MHz / 16QAM - RB Size 6

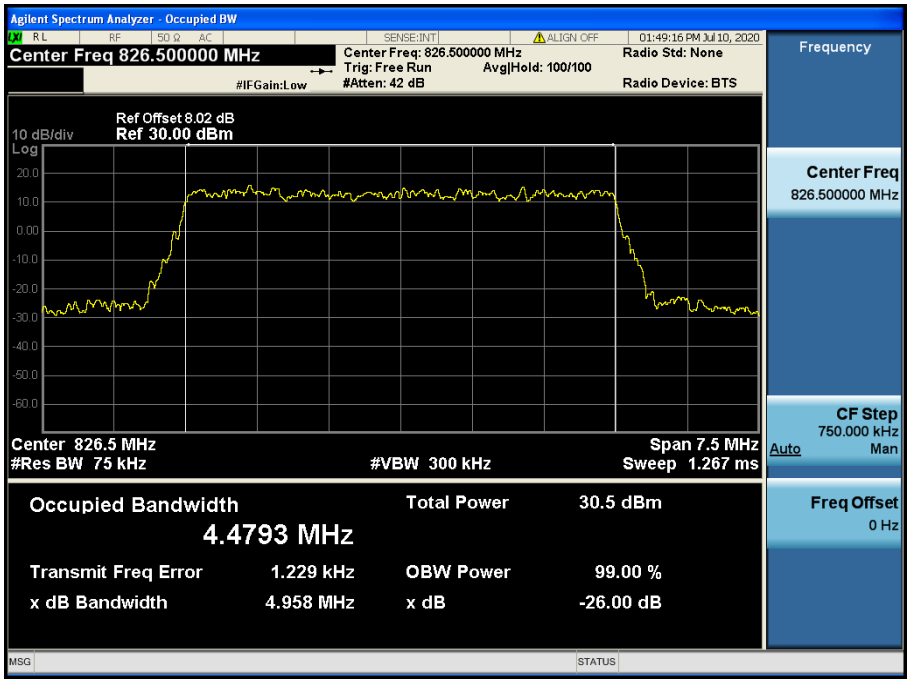
8.1.2 LTE Band 5



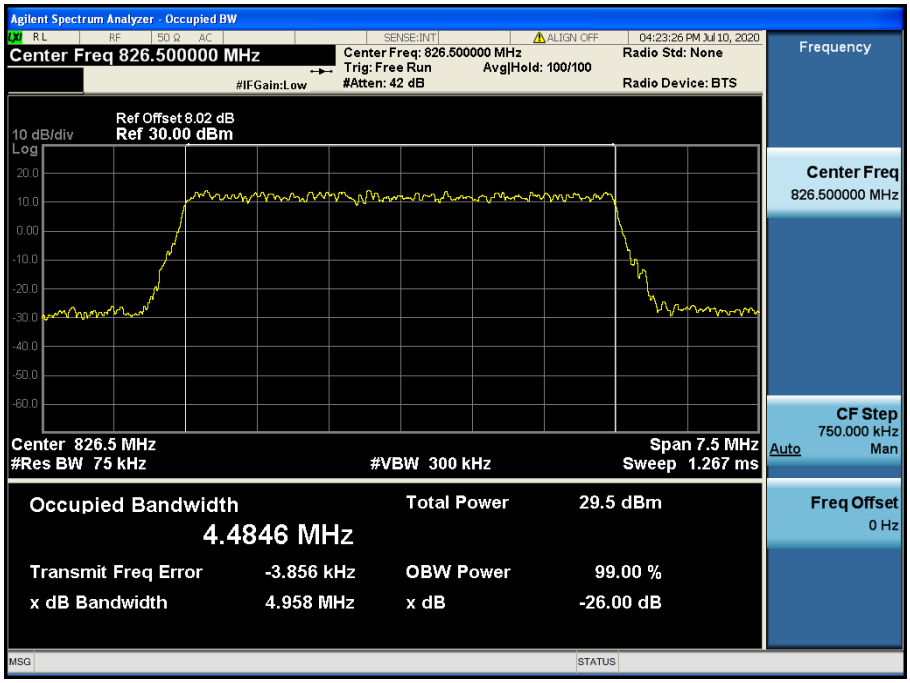
LTE Band 5 / 10 MHz / QPSK - RB Size 50



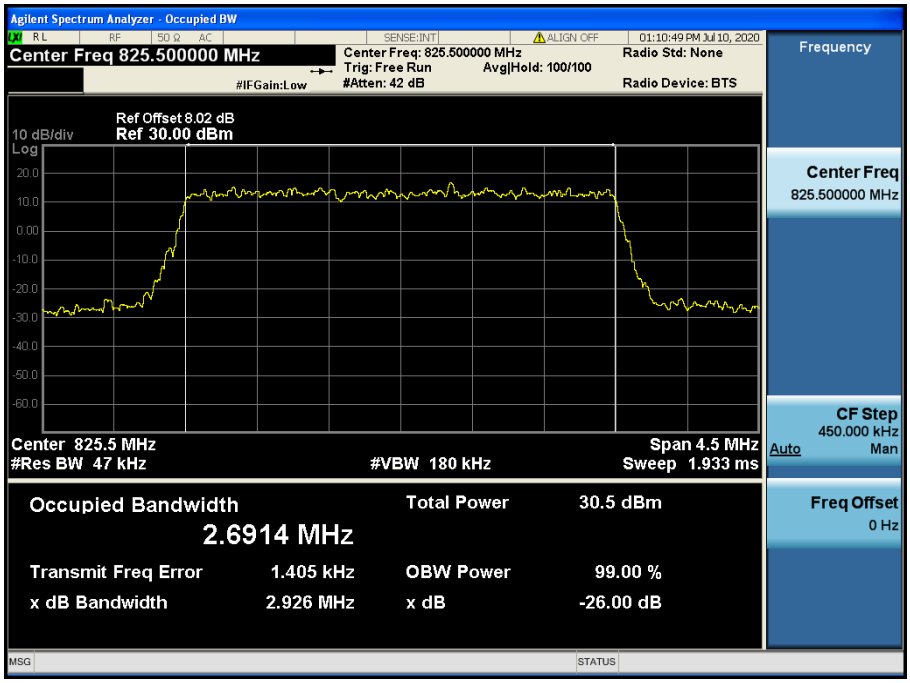
LTE Band 5 / 10 MHz / 16QAM - RB Size 50



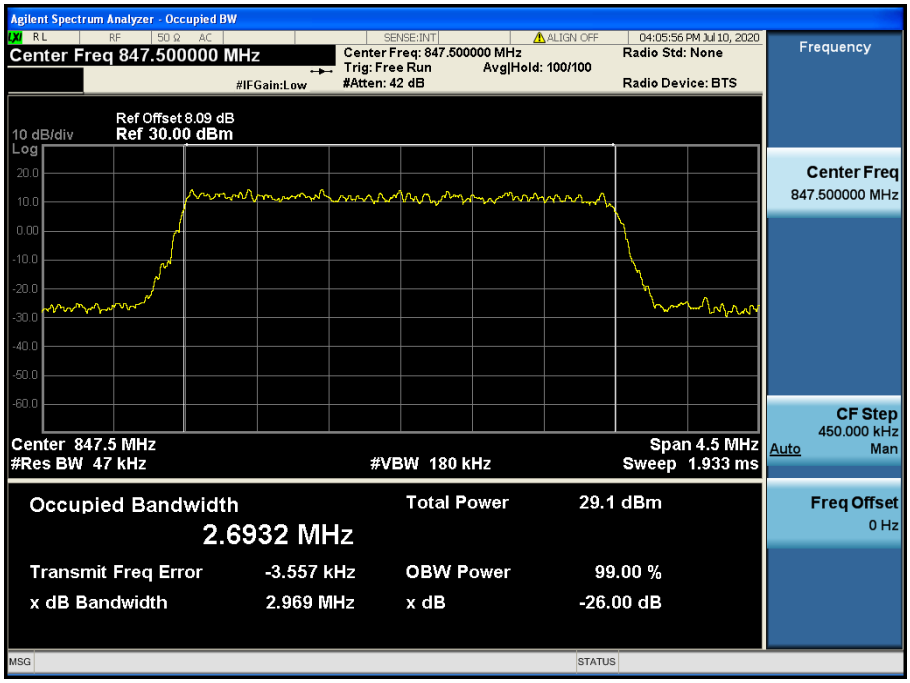
LTE Band 5 / 5 MHz / QPSK - RB Size 25



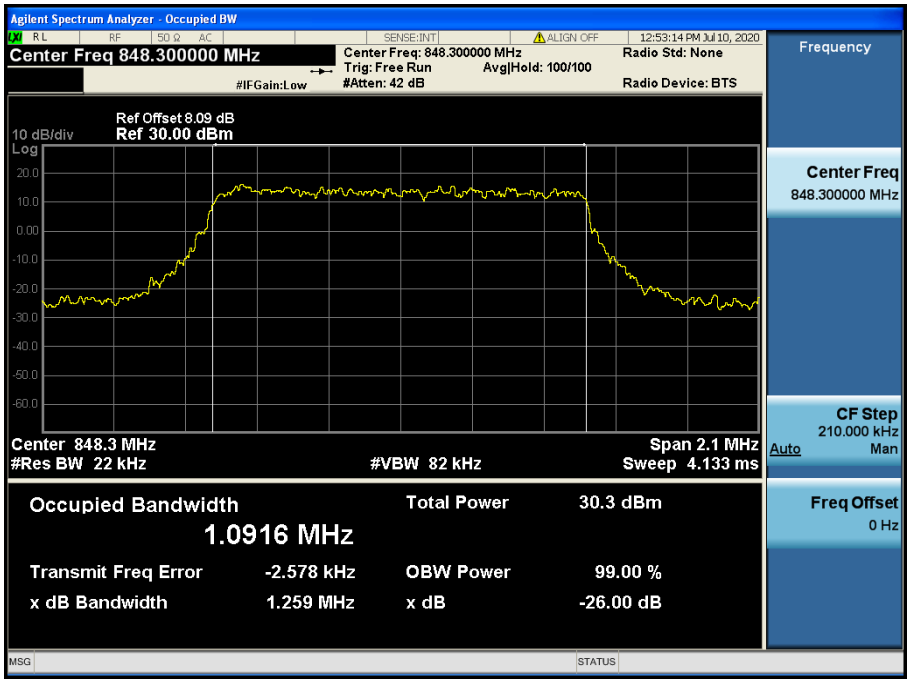
LTE Band 5 / 5 MHz / 16QAM - RB Size 25



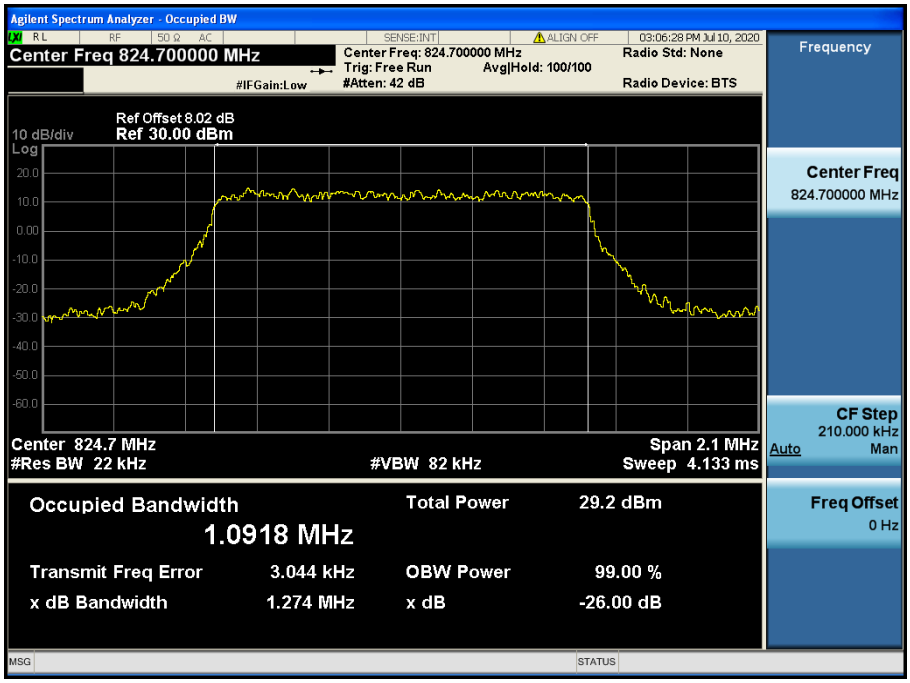
LTE Band 5 / 3 MHz / QPSK - RB Size 15



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

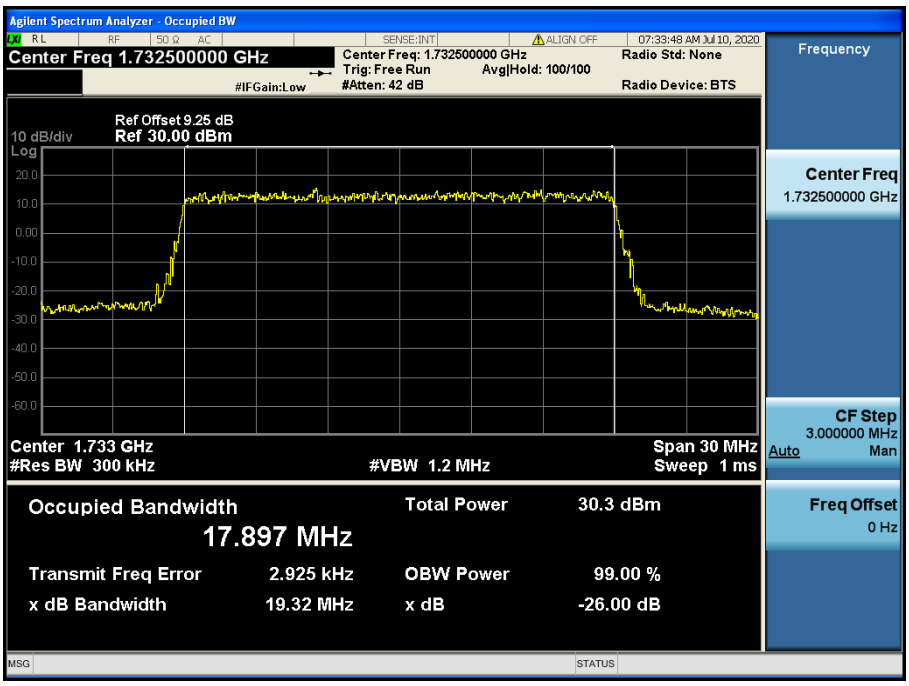


LTE Band 5 / 1.4 MHz / QPSK - RB Size 6

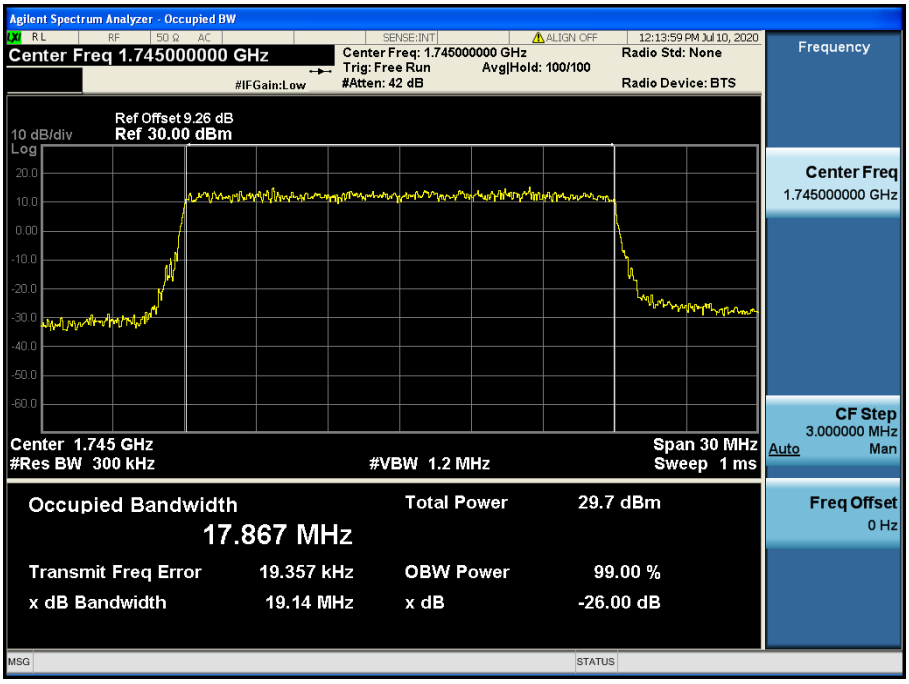


LTE Band 5 / 1.4 MHz / 16QAM - RB Size 6

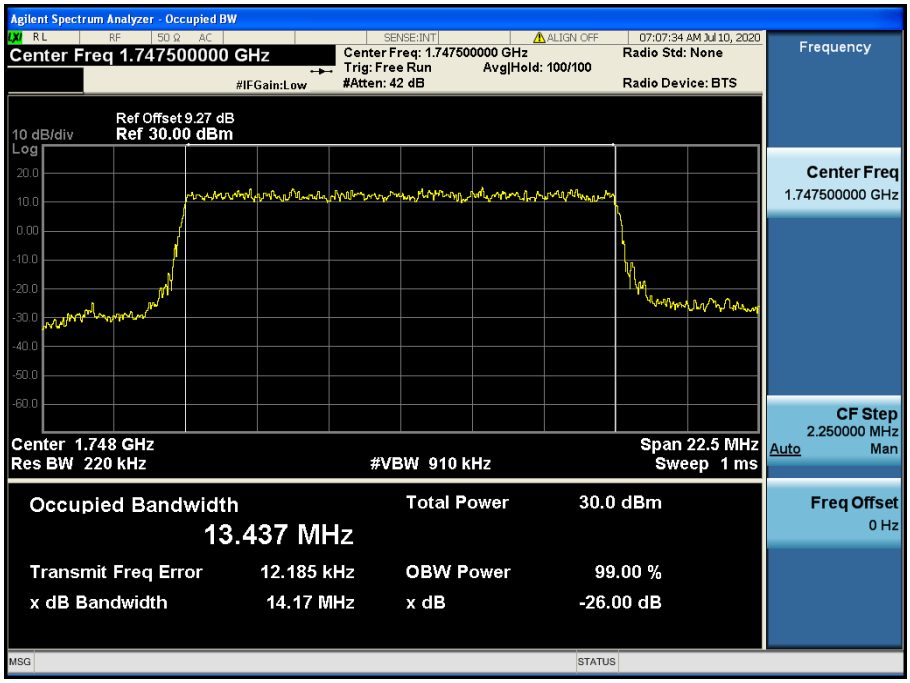
8.1.3 LTE Band 4



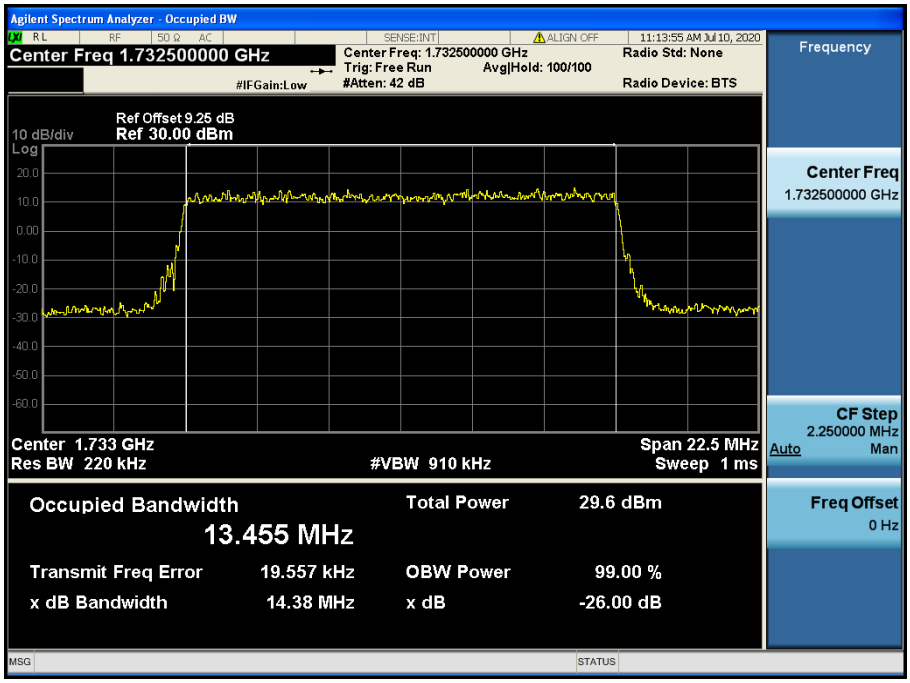
LTE Band 4 / 20 MHz / QPSK - RB Size 100



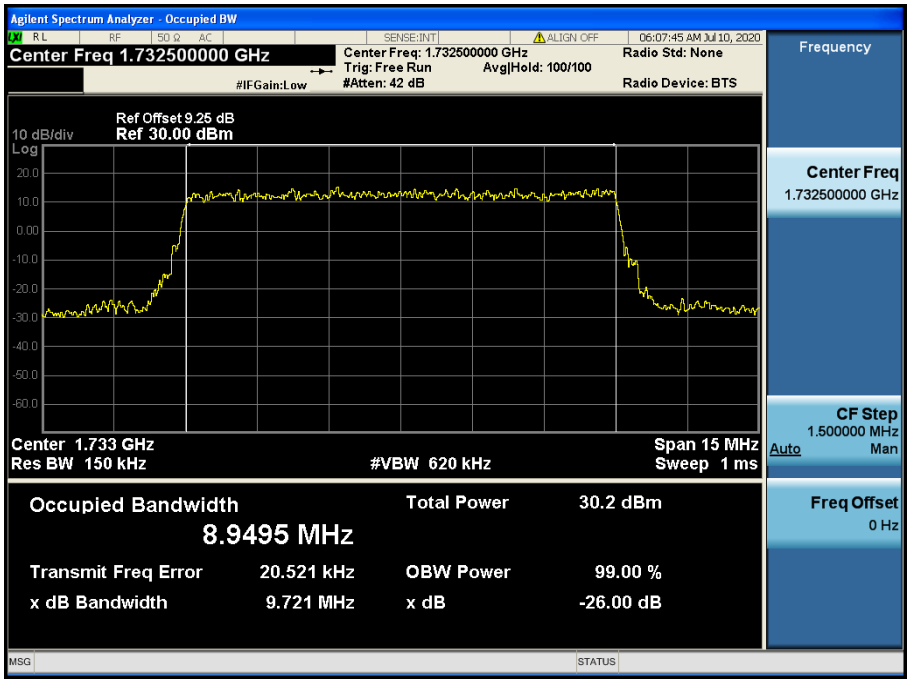
LTE Band 4 / 20 MHz / 16QAM - RB Size 100



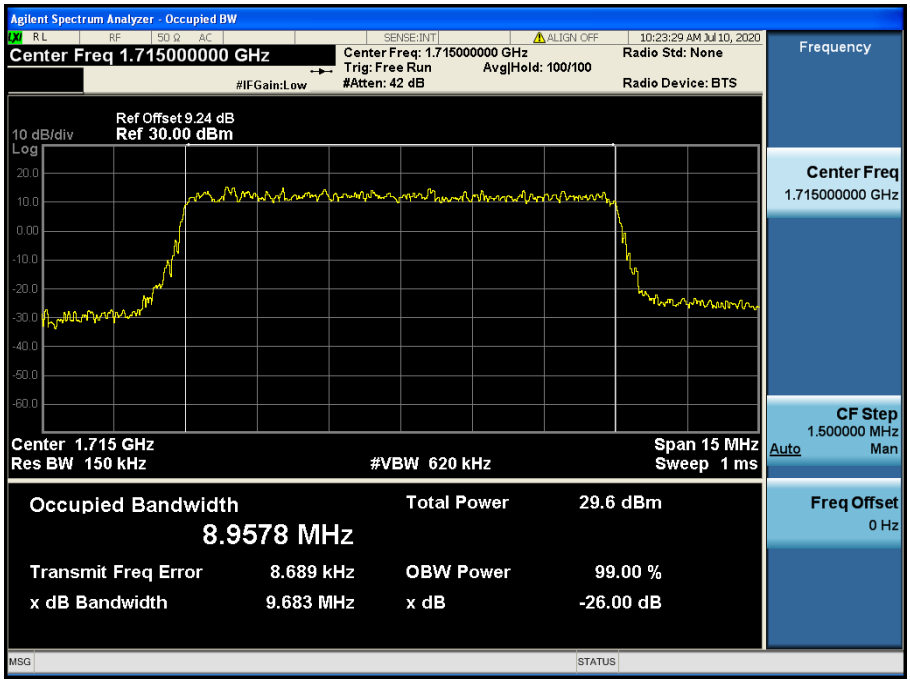
LTE Band 4 / 15 MHz / QPSK - RB Size 75



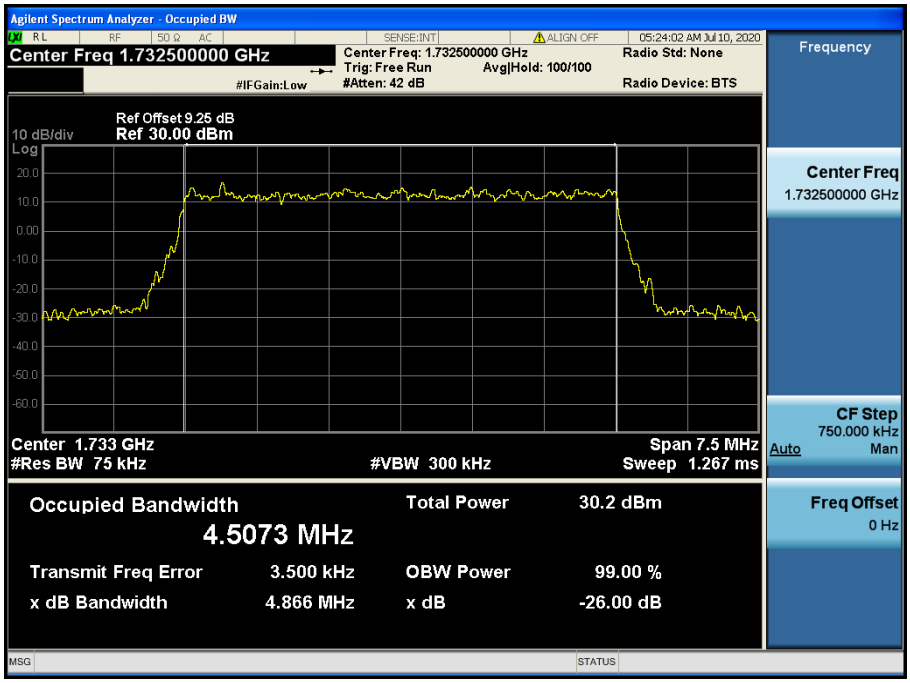
LTE Band 4 / 15 MHz / 16QAM - RB Size 75



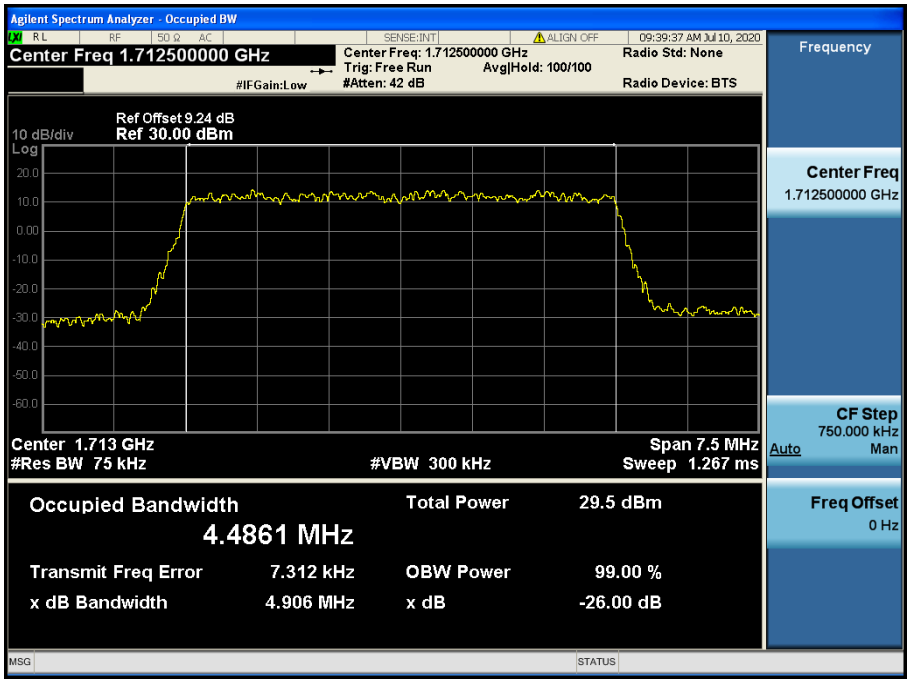
LTE Band 4 / 10 MHz / QPSK - RB Size 50



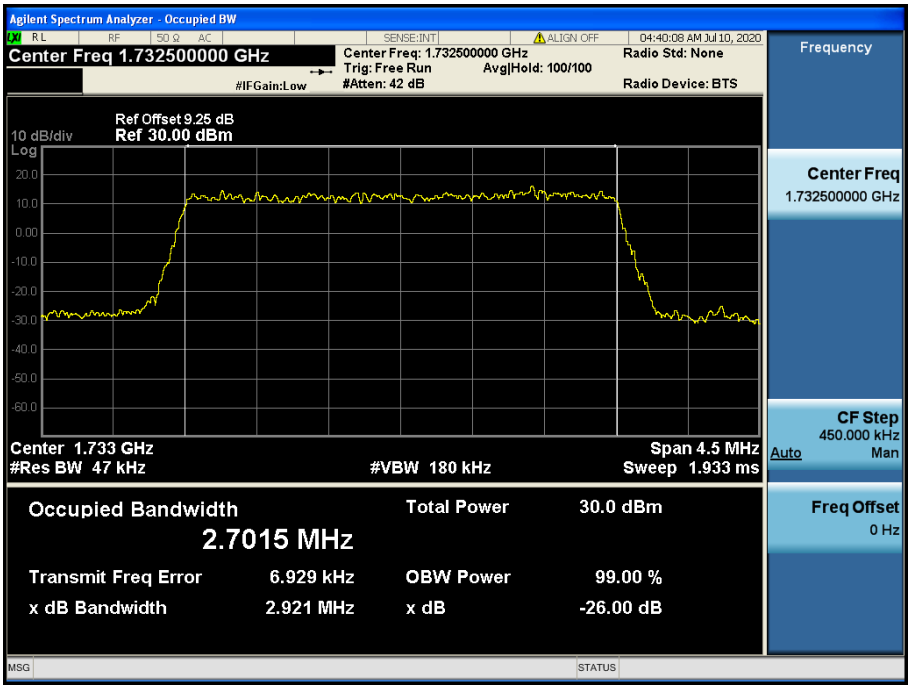
LTE Band 4 / 10 MHz / 16QAM - RB Size 50



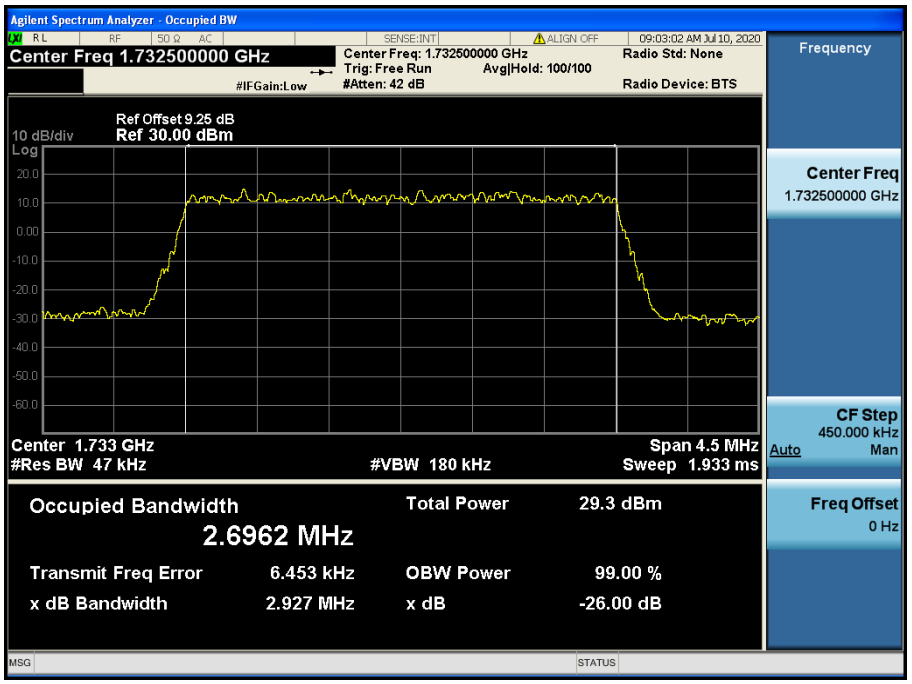
LTE Band 4 / 5 MHz / QPSK - RB Size 25



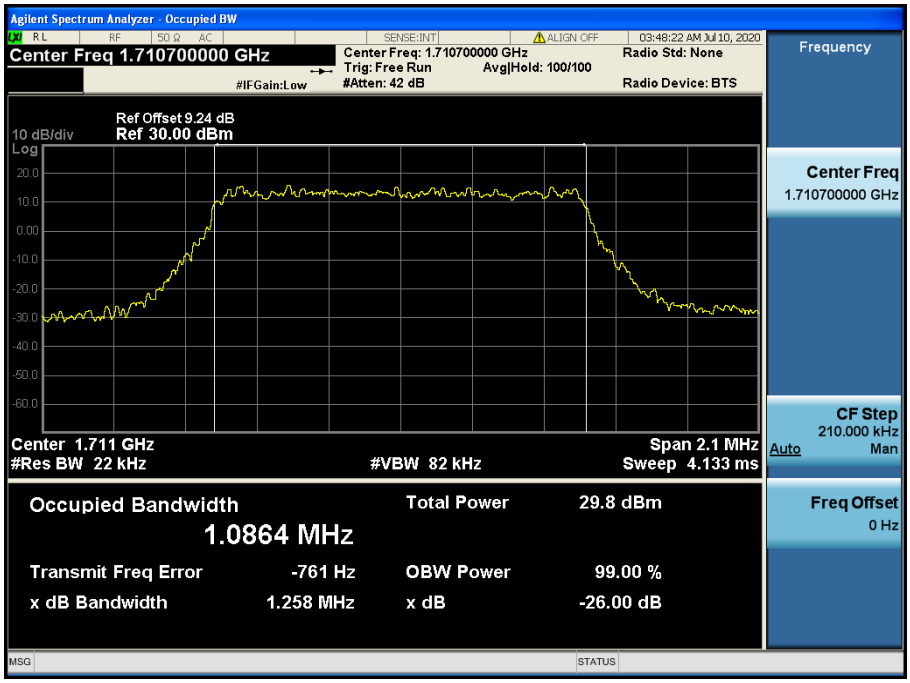
LTE Band 4 / 5 MHz / 16QAM - RB Size 25



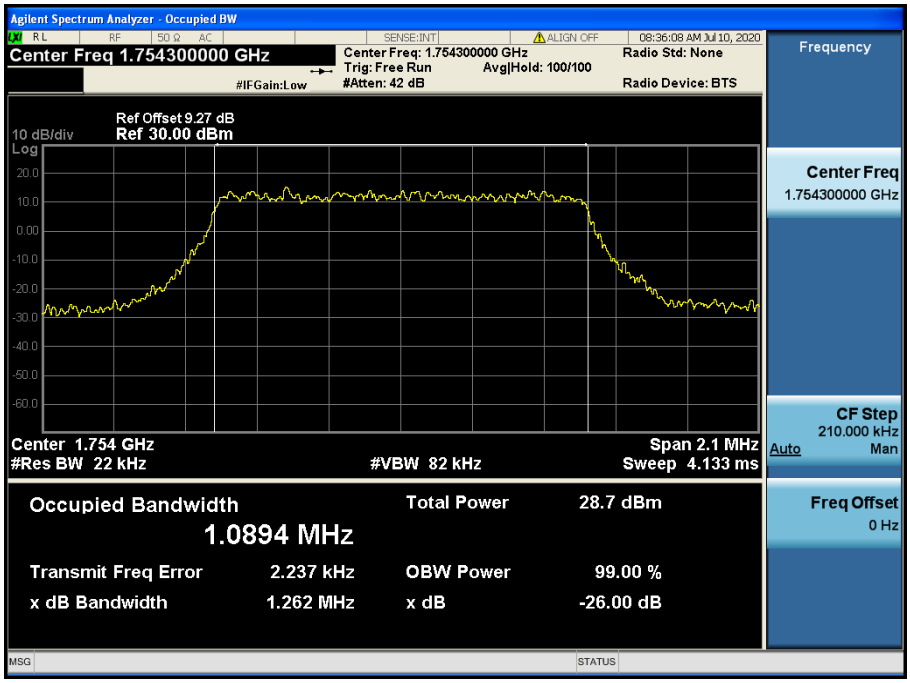
LTE Band 4 / 3 MHz / QPSK - RB Size 15



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

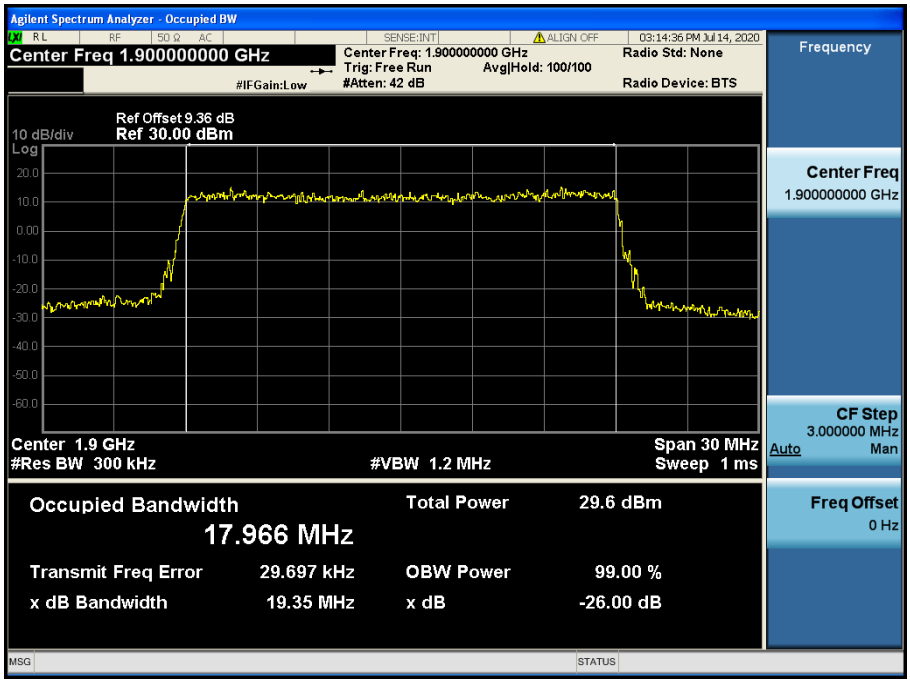


LTE Band 4 / 1.4 MHz / QPSK - RB Size 6

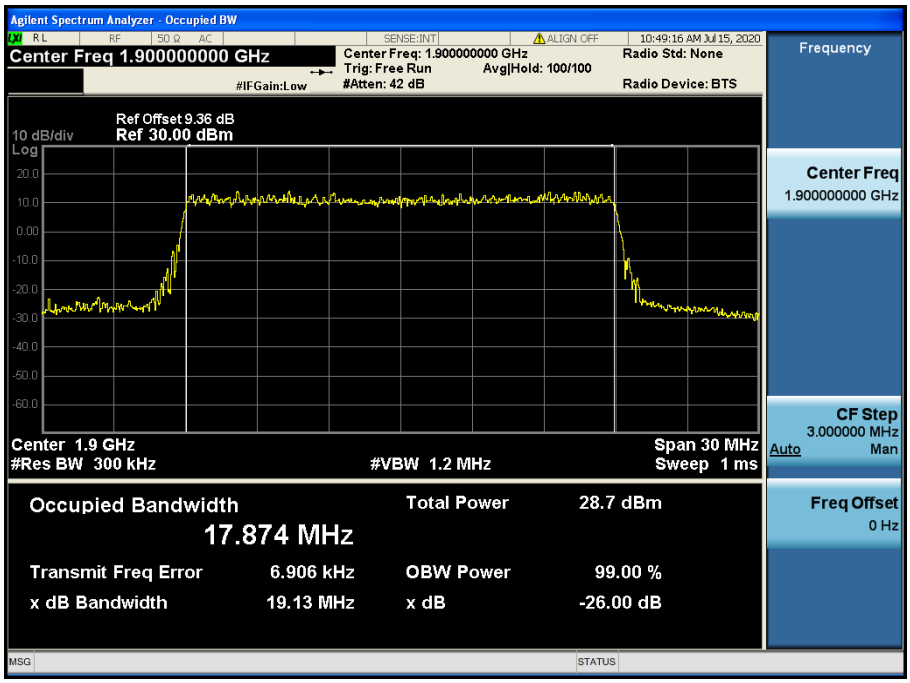


LTE Band 4 / 1.4 MHz / 16QAM - RB Size 6

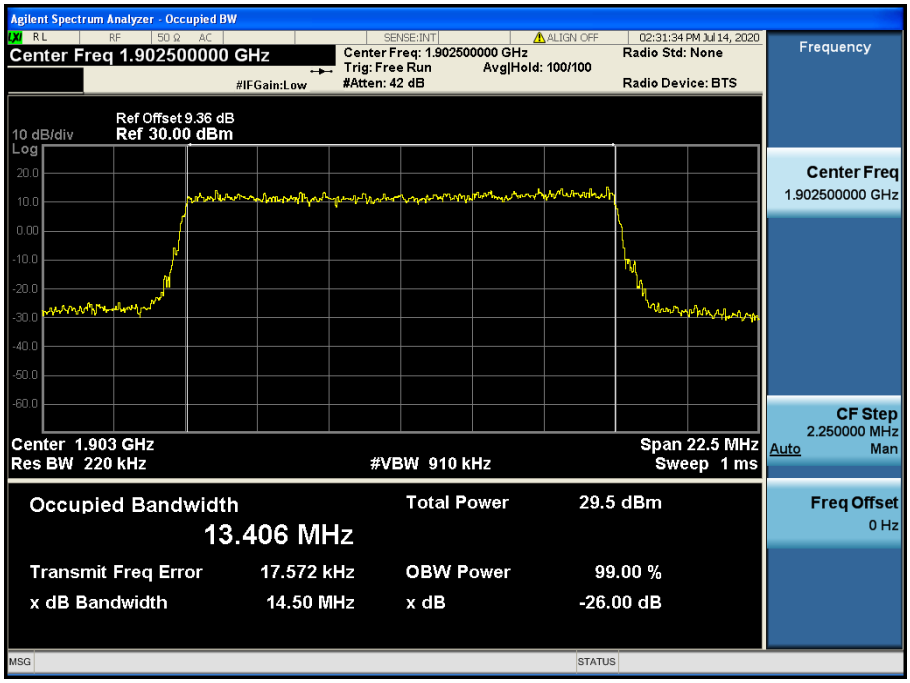
8.1.4 LTE Band 2



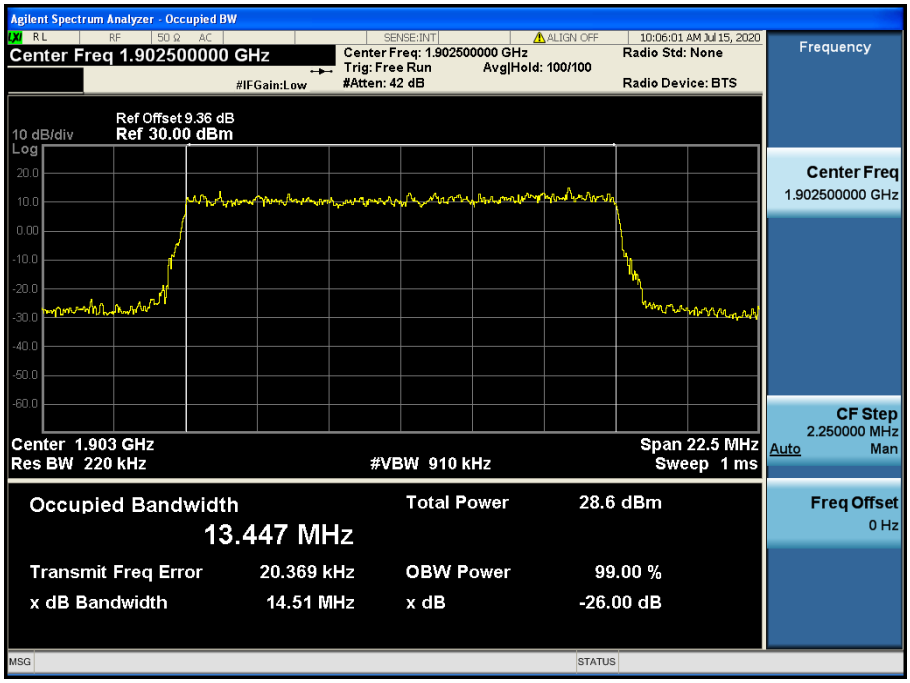
LTE Band 2 / 20 MHz / QPSK - RB Size 100



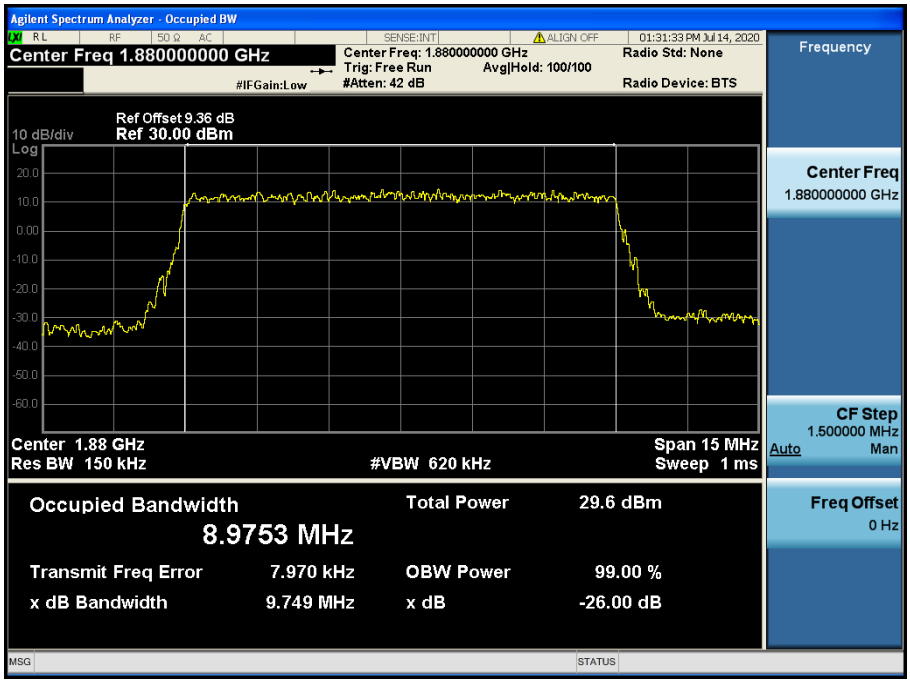
LTE Band 2 / 20 MHz / 16QAM - RB Size 100



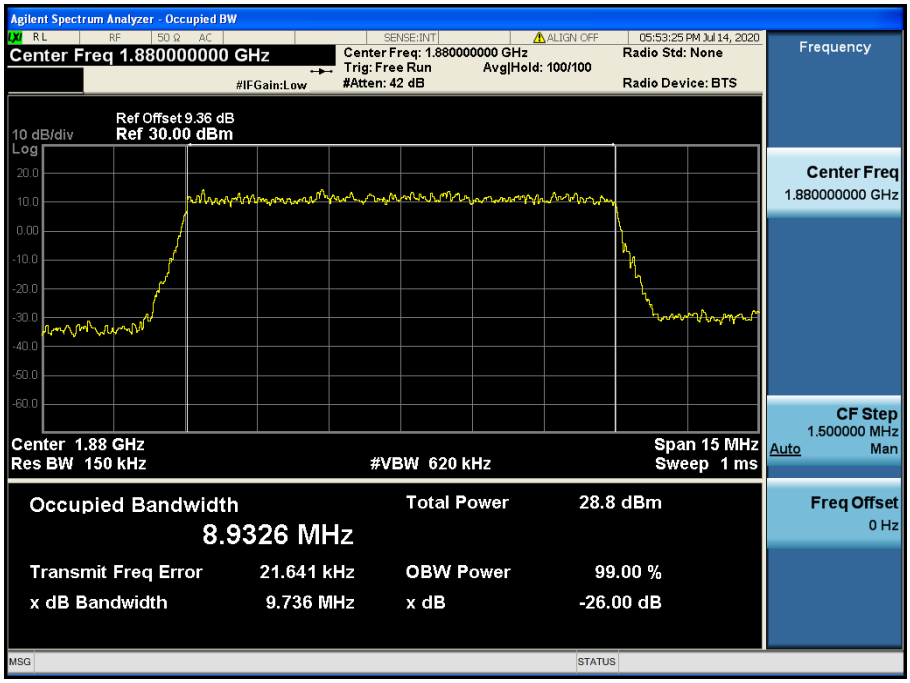
LTE Band 2 / 15 MHz / QPSK - RB Size 75



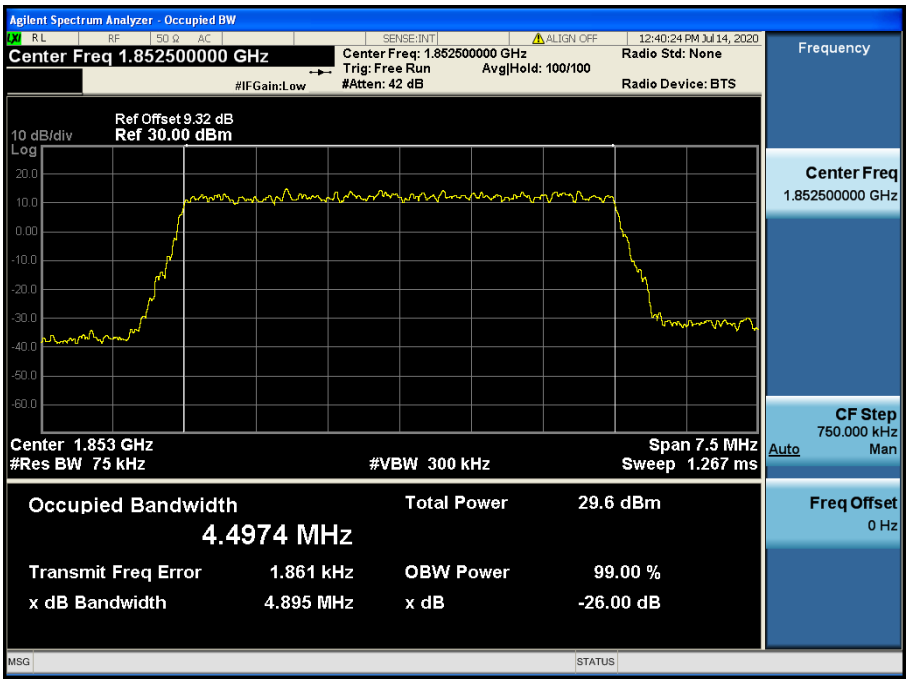
LTE Band 2 / 15 MHz / 16QAM - RB Size 75



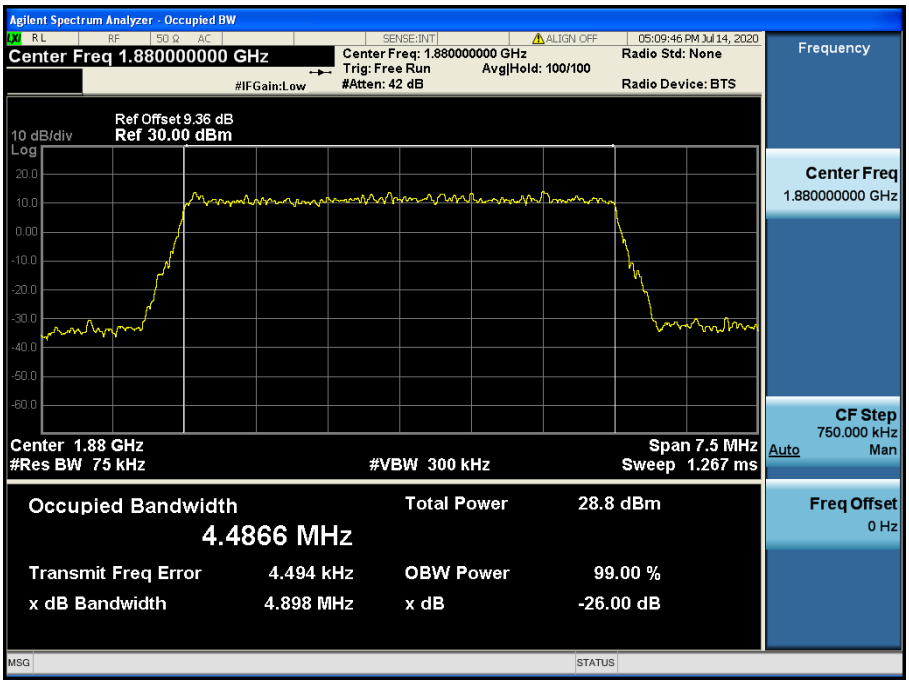
LTE Band 2 / 10 MHz / QPSK - RB Size 50



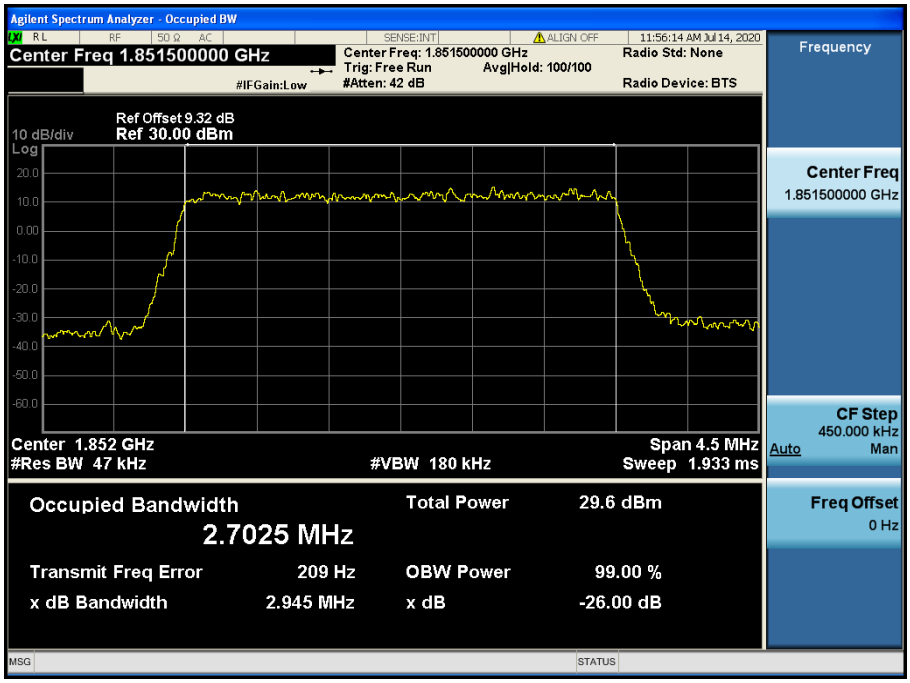
LTE Band 2 / 10 MHz / 16QAM - RB Size 50



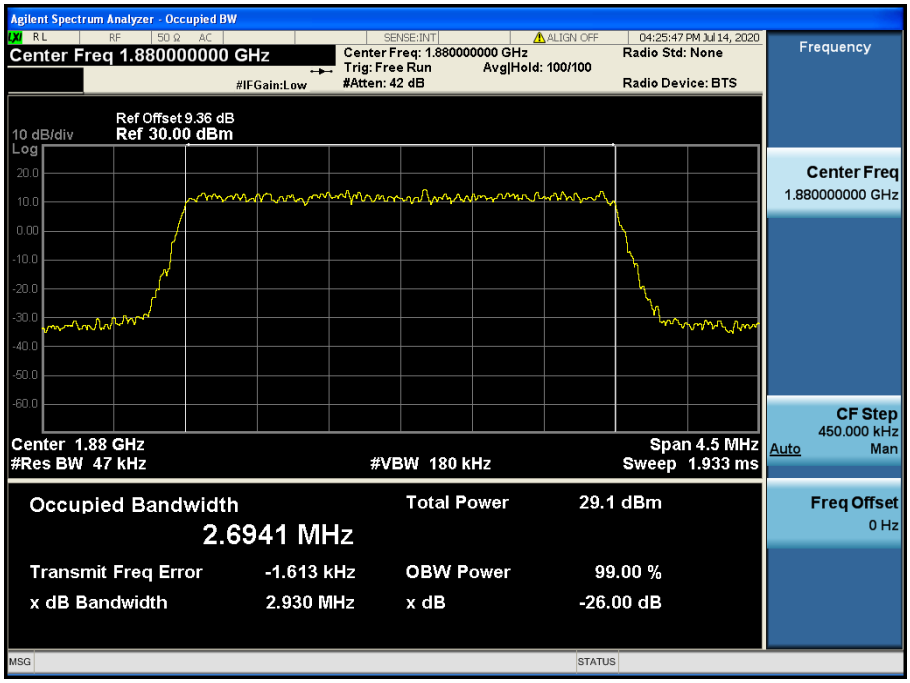
LTE Band 2 / 5 MHz / QPSK - RB Size 25



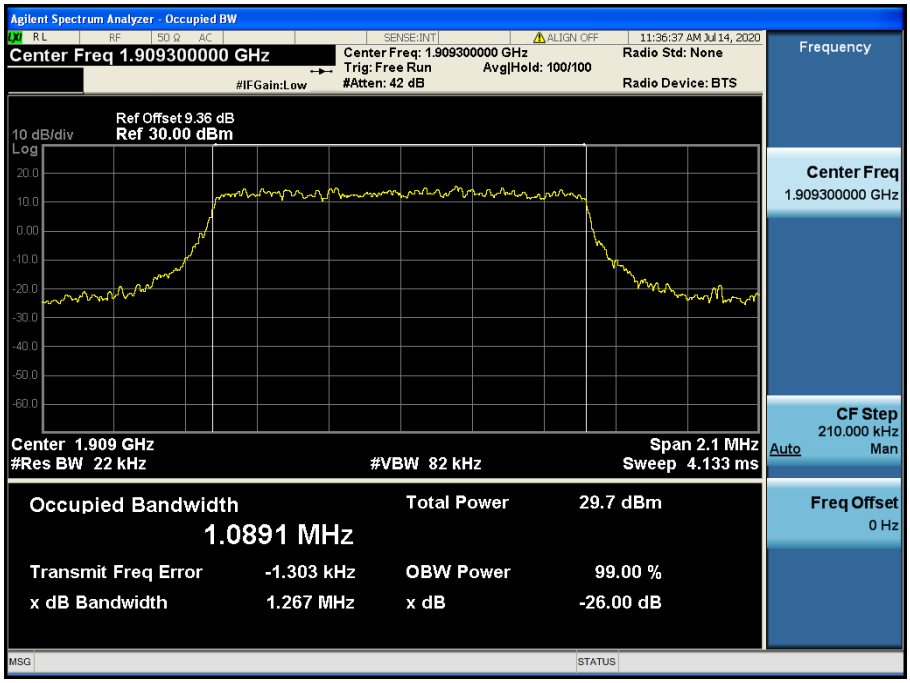
LTE Band 2 / 5 MHz / 16QAM - RB Size 25



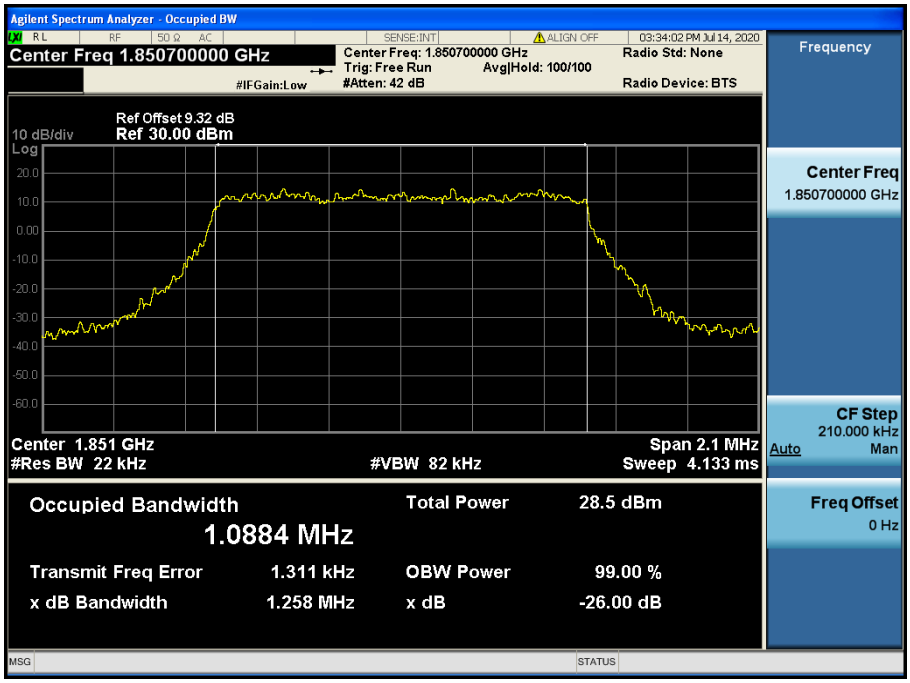
LTE Band 2 / 3 MHz / QPSK - RB Size 15



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



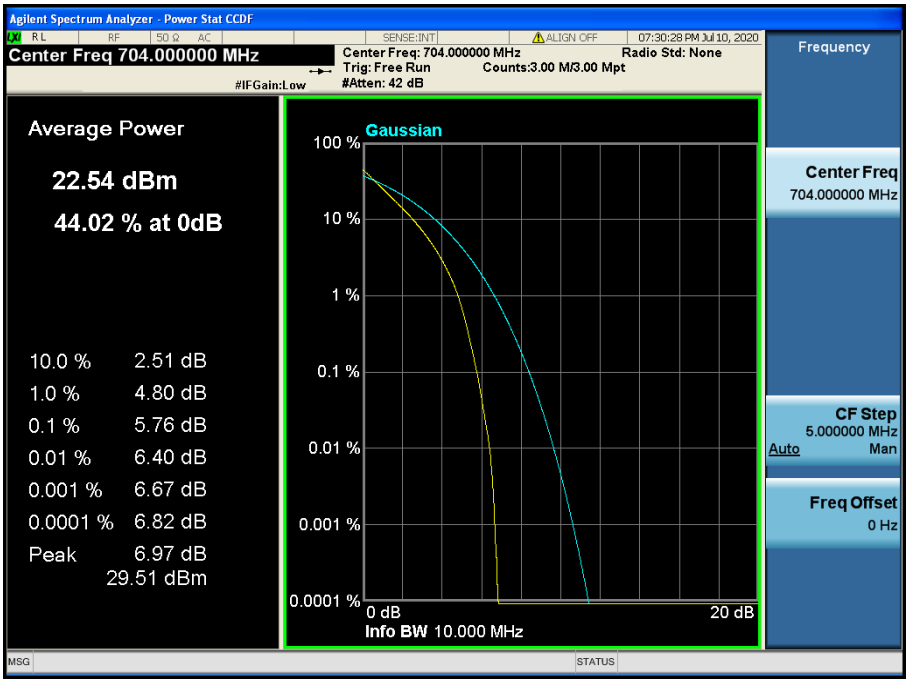
LTE Band 2 / 1.4 MHz / QPSK - RB Size 6



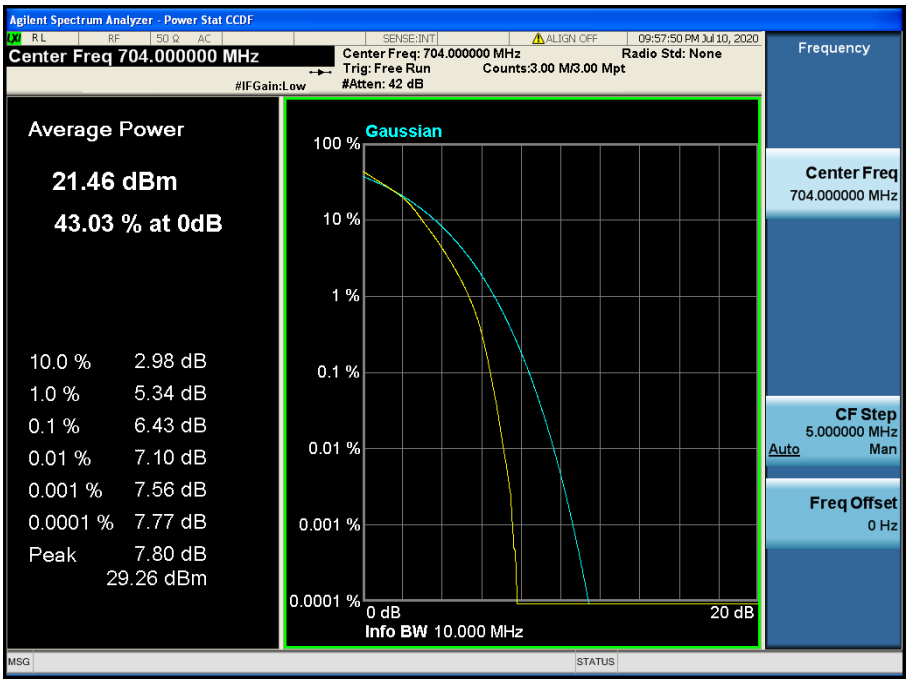
LTE Band 2 / 1.4 MHz / 16QAM - RB Size 6

8.2 PEAK TO AVERAGE RATIO

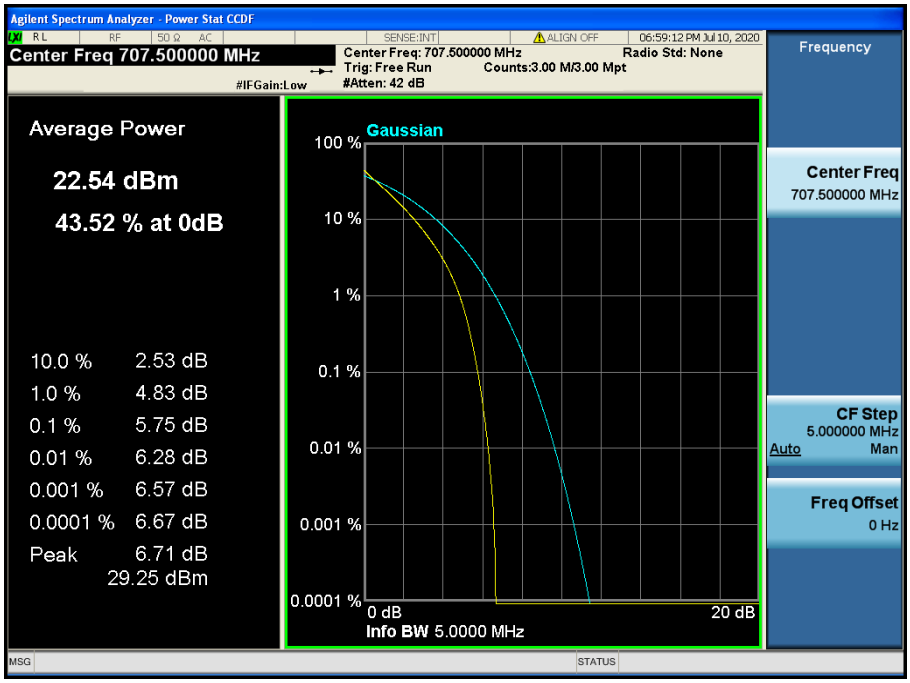
8.2.1 LTE Band 12



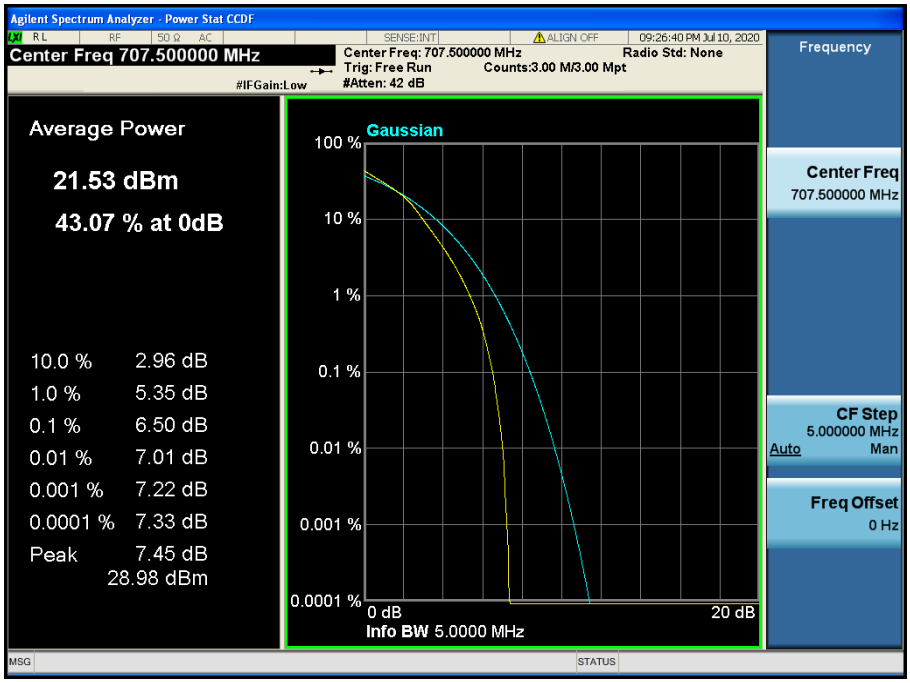
LTE Band 12 / 10 MHz / QPSK - RB Size 50



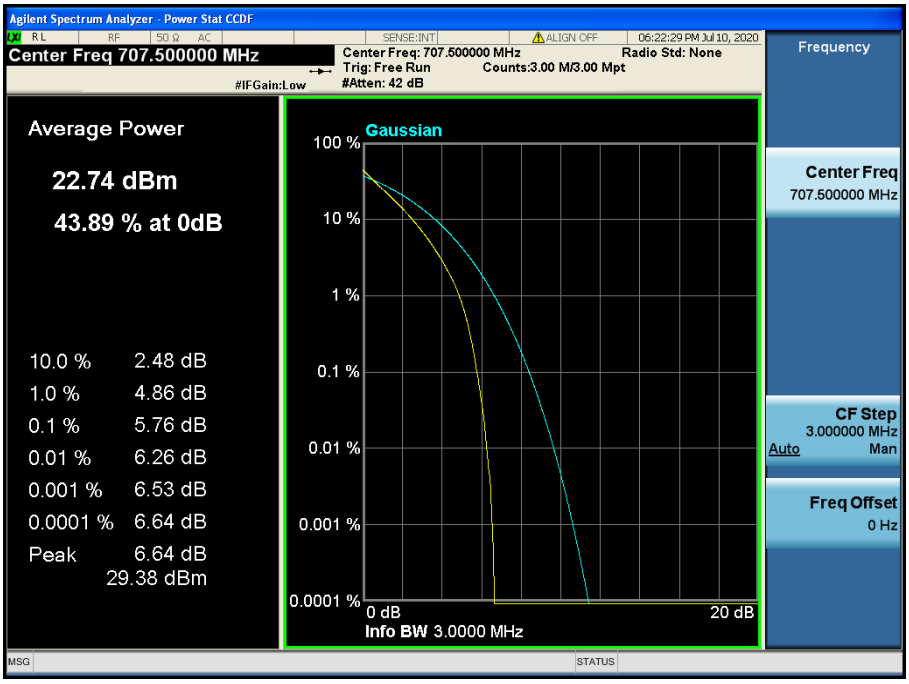
LTE Band 12 / 10 MHz / 16QAM - RB Size 50



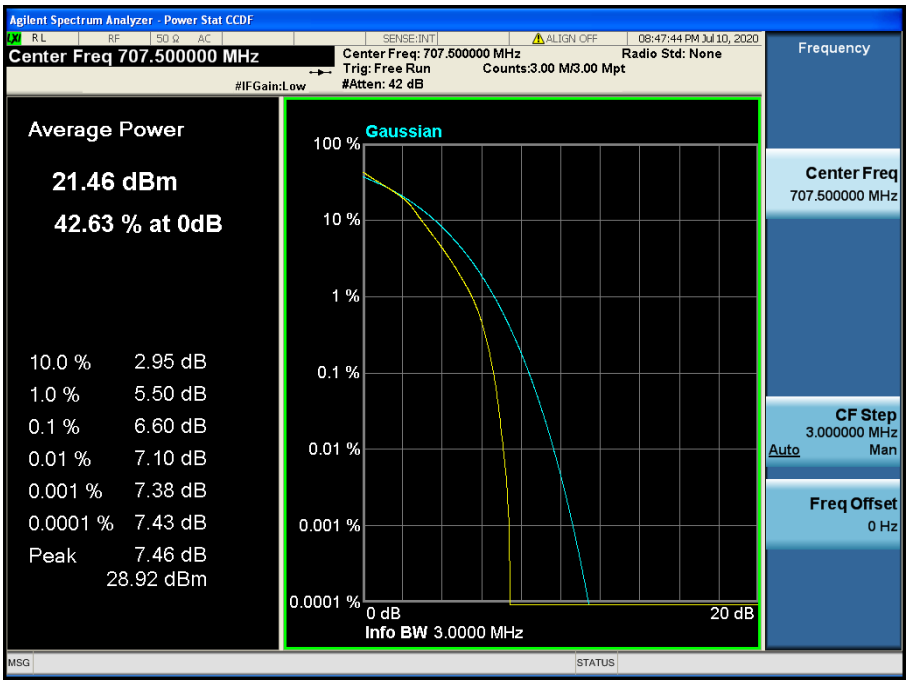
LTE Band 12 / 5 MHz / QPSK - RB Size 25



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



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



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