

RF TEST REPORT

Test item : Mobile Router
Model No. : IML-C4300W
Order No. : DTNC1502-00483
Date of receipt : 2015-02-02
Test duration : 2015-02-09 ~ 2015-03-16
Date of issue : 2015-03-25
Use of report : FCC Original Grant

Applicant : Infomark Co., Ltd.
3rd Floor, Humaxvillage, 216, Hwangsaoul-ro Bundang-gu Seongnam-Si,
Gyeonggi-Do South Korea, 463-875

Test laboratory : DT&C Co., Ltd.
42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification : FCC Part 22, 24, 27
Test environment : See appended test report
Test result : ☒ Pass ☐ Fail

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

Tested by:



Engineer
Jaejin Lee

Reviewed by:



Technical Manager
Geunki Son

Test Report Version

Test Report No.	Date	Description
DRTFCC1503-0058	Mar. 25, 2015	Initial issue

Table of Contents

1. GENERAL INFORMATION	5
2. INTRODUCTION	6
2.1 EUT DESCRIPTION	6
2.2 MEASURING INSTRUMENT CALIBRATION.....	6
2.3 TEST FACILITY.....	6
3. DESCRIPTION OF TESTS.....	7
3.1 ERP&EIRP	7
3.2 PEAK TO AVERAGE RATIO	9
3.3 OCCUPIED BANDWIDTH.....	10
3.4 BAND EDGE EMISSIONS (Conducted).....	11
3.5 SPURIOUS AND HARMONIC EMISSIONS (Conducted).....	12
3.6 UNDESIRABLE EMISSIONS (Radiated)	13
3.6 FREQUENCY STABILITY	14
4. LIST OF TEST EQUIPMENT	15
5. SUMMARY OF TEST RESULTS.....	16
6. SAMPLE CALCULATION	17
7. TEST DATA.....	18
7.1 OCCUPIED BANDWIDTH.....	18
7.2 PEAKTOAVERAGERATIO.....	18
7.3 BAND EDEG EMISSIONS (Conducted).....	18
7.4SPURIOUS AND HARMONICS EMISSIONS (Conducted)	18
7.5 EQUIVALENT ISOTROPIC RADIATED POWER	19
7.5.1 LTE Band 25.....	19
7.5.2 LTE Band 26.....	20
7.5.3 LTE Band 41.....	21
7.6 UNDESIRABLE EMISSIONS (Radiated).....	22
7.6.1 LTE Band 25.....	22
7.6.2 LTE Band 26.....	24
7.6.3 LTE Band 41.....	25
7.7 FREQUENCY STABILITY	29
7.7.1 LTE Band 25.....	29
7.7.2 LTE Band 26.....	30
7.7.3 LTE Band 41.....	31
8. TEST PLOTS	32
8.1 OCCUPIED BANDWIDTH.....	32
8.1.1 LTE Band 25.....	32
8.1.2 LTE Band 26.....	38
8.1.3 LTE Band 41.....	43
8.2 PEAK TO AVERAGE RATIO	47
8.2.1 LTE Band 25.....	47

8.3 BAND EDEG EMISSIONS(Conducted)	53
8.3.1 LTE Band 25.....	53
8.3.2 LTE Band 26.....	65
8.3.3 LTE Band 41.....	75
8.4 SPURIOUS AND HARMONICS EMISSIONS(Conducted)	81
8.4.1 LTE Band 25.....	81
8.4.2 LTE Band 26.....	99
8.4.1 LTE Band 41.....	107

1. GENERAL INFORMATION

Applicant Name: Infomark Co., Ltd.

Address: 3rd Floor, Humaxvillage, 216, Hwangsaеul-ro Bundang-gu Seongnam-Si,
Gyeonggi-Do South Korea, 463-875

FCC ID : YCO-IML-C4300W

FCC Classification : PCS Licensed Transmitter (PCB)

EUT Type : Mobile Router

Model Name : IML-C4300W

Add Model Name : N/A

Supplying power : DC 3.8 V

Antenna Information : Internal Antenna

Mode	Tx Frequency (MHz)	Emission Designator	Modulation	ERP/EIRP	
				Max power(dBm)	Max power(W)
LTE Band 25	1850.7 ~ 1914.3	1M09G7D	QPSK	27.02	0.504
LTE Band 25	1850.7 ~ 1914.3	1M09W7D	16QAM	26.26	0.423
LTE Band 25	1851.5 ~ 1913.5	2M69G7D	QPSK	26.94	0.494
LTE Band 25	1851.5 ~ 1913.5	2M69W7D	16QAM	25.82	0.382
LTE Band 25	1852.5 ~ 1912.5	4M49G7D	QPSK	26.81	0.480
LTE Band 25	1852.5 ~ 1912.5	4M48W7D	16QAM	25.76	0.377
LTE Band 25	1855 ~ 1910	8M99G7D	QPSK	27.00	0.501
LTE Band 25	1855 ~ 1910	8M96W7D	16QAM	26.33	0.430
LTE Band 25	1857.5 ~ 1907.5	13M4G7D	QPSK	26.66	0.463
LTE Band 25	1857.5 ~ 1907.5	13M4W7D	16QAM	26.16	0.413
LTE Band 25	1860 ~ 1905	18M0G7D	QPSK	26.86	0.485
LTE Band 25	1860 ~ 1905	18M0W7D	16QAM	26.10	0.407
LTE Band 26	824.7 ~ 848.3	1M09G7D	QPSK	22.14	0.164
LTE Band 26	824.7 ~ 848.3	1M09W7D	16QAM	21.43	0.139
LTE Band 26	825.5 ~ 847.5	2M69G7D	QPSK	23.09	0.204
LTE Band 26	825.5 ~ 847.5	2M69W7D	16QAM	22.24	0.167
LTE Band 26	826.5 ~ 846.5	4M48G7D	QPSK	22.25	0.168
LTE Band 26	826.5 ~ 846.5	4M48W7D	16QAM	21.48	0.141
LTE Band 26	829 ~ 844	8M95G7D	QPSK	21.58	0.144
LTE Band 26	829 ~ 844	8M95W7D	16QAM	21.21	0.132
LTE Band 26	831.5 ~ 841.5	13M4G7D	QPSK	23.22	0.210
LTE Band 26	831.5 ~ 841.5	13M4W7D	16QAM	22.10	0.162
LTE Band 41	2498.5 ~ 2687.5	4M49G7D	QPSK	25.60	0.363
LTE Band 41	2498.5 ~ 2687.5	4M48W7D	16QAM	24.33	0.271
LTE Band 41	2501 ~ 2685	8M96G7D	QPSK	25.92	0.391
LTE Band 41	2501 ~ 2685	8M94W7D	16QAM	24.79	0.301
LTE Band 41	2503.5 ~ 2682.5	13M4G7D	QPSK	25.85	0.385
LTE Band 41	2503.5 ~ 2682.5	13M4W7D	16QAM	24.90	0.309
LTE Band 41	2506 ~ 2680	17M9G7D	QPSK	25.73	0.374
LTE Band 41	2506 ~ 2680	17M9W7D	16QAM	24.76	0.299

2. INTRODUCTION

2.1 EUT DESCRIPTION

The Equipment Under Test(EUT) supports Band 26 (1.4, 3, 5, 10, 15 MHz BW), Band 25 (1.4, 3, 5, 10, 15, 20 MHz BW), Band 41 (5, 10, 15, 20 MHz BW) LTE, 802.11a/b/g/n WLAN.

2.2 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.

2.3 TEST FACILITY

The 3M 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 449-935. The site is constructed in conformance with the requirements.

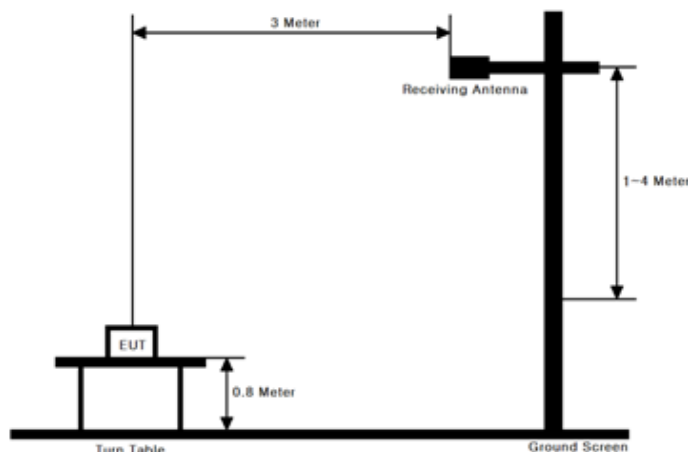
- 3M test site registration Number: 165783

3. DESCRIPTION OF TESTS

3.1 ERP&EIRP

(Effective Radiated Power & Equivalent Isotropic Radiated Power)

Test Set-up



Test Procedure

- ANSI/TIA-603-C-2004 - Section 2.2.17
- KDB971168 v02r02 - Section 5.2.1

These measurements were performed at 3 & 10 m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna.

Test setting

1. Set span to at least 1.5 times the OBW.
 2. Set RBW = 1-5 % of the OBW, not to exceed 1 MHz.
 3. Set VBW $\geq 3 \times$ RBW.
 4. Set number of points in sweep $\geq 2 \times$ span / RBW.
 5. Sweep time = auto couple.
 6. Detector = RMS (power averaging).
 7. If the EUT can be configured to transmit continuously (i.e., burst duty cycle $\geq 98\%$), then set the trigger to free run.
 8. If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle $< 98\%$), 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.
- Ensure that the sweep time is less than or equal to the transmission burst duration.
9. Trace average at least 100 traces in power averaging (i.e., RMS) mode.
 10. Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band 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 receive 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.

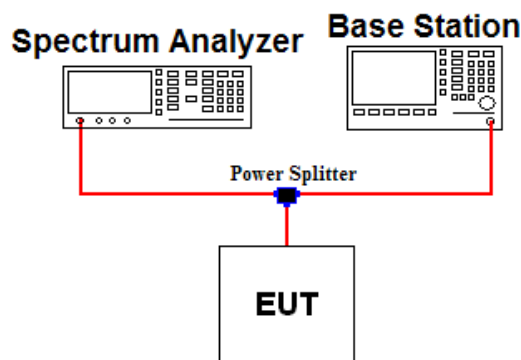
The ERP/EIRP is calculated using the following formula:

$$\text{ERP/EIRP} = \text{The conducted power at the substitute antenna's terminal [dBm]} + \text{Substitute Antenna gain [dBd for ERP, dBi for EIRP]}$$

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 v02r02 - Section 5.7.1

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

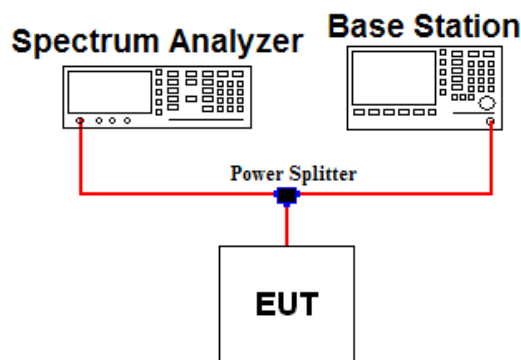
Test setting

The spectrum Analyzer's CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth $\geq$ signal's occupied 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 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 and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1 %

3.3 OCCUPIED BANDWIDTH.

Test set-up



Test Procedure

- KDB971168 v02r02 - Section 4.2

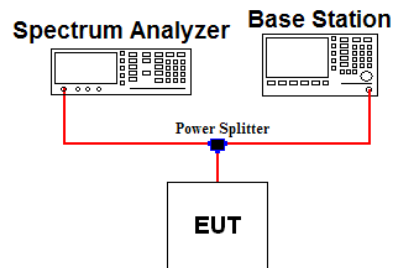
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

Test setting

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

3.4 BAND EDGE EMISSIONS (Conducted)

Test set-up



Test Procedure

- KDB971168 v02r02 - Section 6.0

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 or requirements on note 2 in case of band 7 and 41.

Test setting

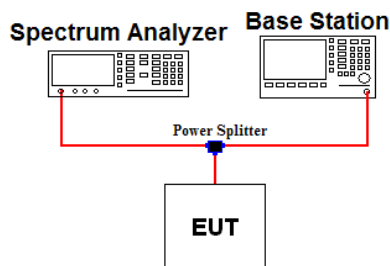
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW $\geq 1\%$ of the emission bandwidth or 2% of the emission bandwidth (refer to note 2)
4. VBW $\geq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

Note 1: 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: 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 MHz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 MHz and X MHz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. For mobile digital stations, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of **at least two percent** may be employed, except when the 1 MHz band is 2495-2496 MHz, in which case a resolution bandwidth of **at least one percent** may be employed.

3.5 SPURIOUS AND HARMONIC EMISSIONS (Conducted)

Test set-up



Test Procedure

- KDB971168 v02r02 - Section 6.0

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 30 MHz 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 or $55 + 10 \log(P)$ in case of band 7 and 41.

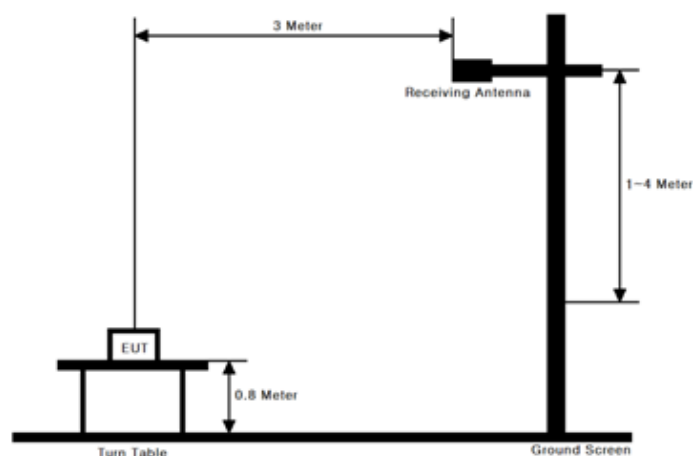
Test setting

1. RBW = 100 KHz or 1 MHz & VBW $\geq 3 \times$ RBW (Refer to Note 1)
2. Detector = RMS & Trace mode = Max hold
3. Sweep time = Auto couple
4. Number of sweep point $\geq 2 \times$ span / RBW
5. The trace was allowed to stabilize

Note 1: Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for Part 22 and 1 MHz or greater for Part 24, 27.

3.6 UNDESIRABLE EMISSIONS (Radiated)

Test Set-up



Test Procedure

- ANSI/TIA-603-C-2004 - Section 2.2.12
- KDB971168 v02r02 - Section 5.8

These measurements were performed at 3 & 10m test site. The equipment under test is placed on a non-conductive table 0.8-meters above a turntable which is flush with the ground plane and 3 meters from the receive antenna.

Test setting

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

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

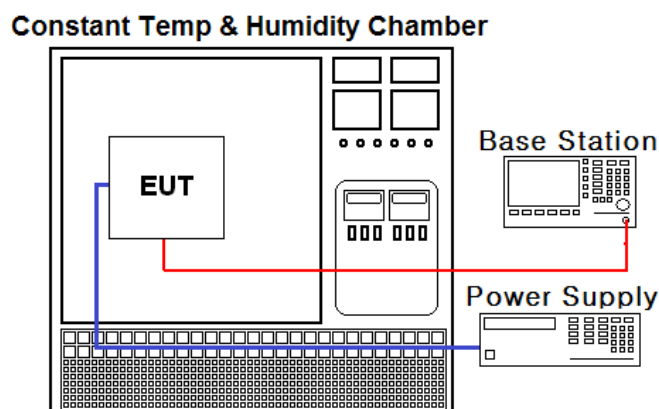
For radiated power measurements below 1 GHz, a half-wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same spectrum analyzer reading.

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

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

3.6 FREQUENCY STABILITY

Test Set-up



Test Procedure

- ANSI/TIA-603-C-2004
- KDB971168 v02r02 - Section 9.0

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. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ (± 2.5 ppm) of the center frequency for Part 22.

Time Period and Procedure:

1. The carrier frequency of the transmitter is measured at room temperature.
(25 °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
Multimeter	Fluke	17B	14/05/12	15/05/12	26030065WS
DC Power Supply	Agilent	66332A	15/01/22	16/01/22	GB37470200
Power Splitter	Anritsu	K241B	14/10/21	15/10/21	1701101
Thermohygrometer	BODYCOM	BJ5478	15/02/26	16/02/26	1209
Temp & Humi Test Chamber	SJ Science	SJ-TH-S50	14/10/21	15/10/21	SJ-TH-S50-130930
MXA Signal Analyzer	Agilent	N9020A	14/08/21	15/08/21	MY49060056
MXA Signal Analyzer	Agilent	N9020A	14/09/23	15/09/23	MY46471248
PXA Signal Analyzer	Agilent	N9030A	14/10/21	15/10/21	MY53310140
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Vector Signal Generator	Rohde Schwarz	SMBV100A	15/01/06	16/01/06	255571
Loop Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
Dipole Antenna	Schwarzbeck	VHA9103	13/10/24	15/10/24	2116
Dipole Antenna	Schwarzbeck	VHA9103	14/04/01	16/04/01	2117
Dipole Antenna	Schwarzbeck	UHA9105	13/10/24	15/10/24	2261
Dipole Antenna	Schwarzbeck	UHA9105	14/04/01	16/04/01	2262
Bilog Antenna	Schwarzbeck	VULB 9160	14/04/04	16/04/04	3357
HORN ANT	ETS	3115	15/02/09	17/02/09	00021097
HORN ANT	ETS	3117	14/05/12	16/05/12	140394
HORN ANT	A.H.Systems	SAS-574	13/03/20	15/03/20	154
HORN ANT	A.H.Systems	SAS-574	13/05/27	15/05/27	155
Low Noise Pre Amplifier	TSJ	MLA-010K01-B01-27	14/04/09	15/04/09	1844538
PreAmplifier	Agilent	8449B	14/11/06	15/11/06	3008A02108
PreAmplifier	A.H. SYSTEMS	PAM-1840VH	14/12/12	15/12/12	163
High-pass filter	Wainwright	WHKX12-935-1000-15000-40SS	14/09/11	15/09/11	7
High-pass filter	Wainwright	WHKX12-2580-3000-18000-80SS	14/09/11	15/09/11	3
High-pass filter	Wainwright	WHNX5.0	14/09/12	15/09/12	8
RadioCommunication Analyzer	Anritsu	MT8820C	15/01/09	16/01/09	6201274516

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)	Peak to Average Ratio	< 13 dB		C
2.1051 22.917(a) 24.238(a) 27.53(h)	Band Edge / conducted Spurious Emissions	> 43 + 10log ₁₀ (P) dB at Band edge and for all out-of-band emissions		C
27.53(m)	Band Edge / conducted Spurious Emissions	> 40 + 10log ₁₀ (P) dB at channel edge and 5 MHz from the channel edge > 43 + 10log ₁₀ (P) dB at 5 MHz and X MHz from the channel edge > 55 + 10log ₁₀ (P) dB at all frequencies more than X MHz from the channel edge		C Note3
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
24.232(c) 27.50(h.2)	Equivalent Isotropic Radiated Power (Band 25,41)	< 2 Watts max. EIRP	Radiated	C
21.913(a)	Equivalent Radiated Power (Band 26)	< 7 Watts max. ERP		C
2.1053 22.917(a) 24.238(a) 27.53(h)	Undesirable Emissions	> 43 + 10log ₁₀ (P) dB at Band edge and for all out-of-band emissions		C
27.53(m)	Undesirable Emissions	> 40 + 10log ₁₀ (P) dB at channel edge and 5 MHz from the channel edge > 43 + 10log ₁₀ (P) dB at 5 MHz and X MHz from the channel edge > 55 + 10log ₁₀ (P) dB at all frequencies more than X MHz from the channel edge		C

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: where X is the greater of 6 MHz or the actual emission bandwidth as defined in paragraph (m)(6) of this section.

The sample was tested according to the following specification:
ANSI/TIA/EIA-603-C-2004 and KDB 971168 D01 v02r02

6. SAMPLE CALCULATION

A. Emission Designator

LTE Band 25 (QPSK)

Emission Designator = **18M0G7D**

LTEOBW = 17.970 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 25 (16QAM)

Emission Designator = **18M0W7D**

LTEOBW = 17.952 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 26 (QPSK)

Emission Designator = **13M4G7D**

LTEOBW = 13.414 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 26 (16QAM)

Emission Designator = **13M4W7D**

LTEOBW = 13.444 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 41 (QPSK)

Emission Designator = **17M9G7D**

LTEOBW = 17.887 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data Transmission

LTE Band 41 (16QAM)

Emission Designator = **17M9W7D**

LTEOBW = 17.881 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data Transmission

B. ERP Sample Calculation

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Offset/ Size	Spectrum Reading Value(dBm)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
15	831.50	QPSK	1/74	-11.57	X	H	22.03	1.19	23.22	0.210

ERP = @ Ant Terminal LEVEL(dBm) + Ant. Gain

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

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 EDGE 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 EQUIVALENT ISOTROPIC RADIATED POWER

7.5.1 LTE Band 25

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1860	QPSK	1/99	X	H	14.93	9.02	23.95	0.248
		16QAM	1/50	X	H	14.49	9.02	23.51	0.224
	1882.5	QPSK	1/50	X	H	16.89	9.05	25.94	0.393
		16QAM	1/0	X	H	15.26	9.05	24.31	0.270
	1905	QPSK	1/99	X	H	17.79	9.07	26.86	0.485
		16QAM	1/99	X	H	17.03	9.07	26.10	0.407
15	1857.5	QPSK	1/36	X	H	17.33	9.02	26.35	0.432
		16QAM	1/36	X	H	16.54	9.02	25.56	0.360
	1882.5	QPSK	1/0	X	H	17.32	9.05	26.37	0.434
		16QAM	1/0	X	H	16.48	9.05	25.53	0.357
	1907.5	QPSK	1/74	X	H	17.58	9.08	26.66	0.463
		16QAM	1/74	X	H	17.08	9.08	26.16	0.413
10	1855	QPSK	1/49	X	H	16.68	9.02	25.70	0.372
		16QAM	1/49	X	H	15.83	9.02	24.85	0.305
	1882.5	QPSK	1/0	X	H	15.67	9.05	24.72	0.296
		16QAM	1/0	X	H	14.94	9.05	23.99	0.251
	1910	QPSK	1/25	X	H	17.92	9.08	27.00	0.501
		16QAM	1/25	X	H	17.25	9.08	26.33	0.430
5	1852.5	QPSK	1/12	X	H	17.04	9.01	26.05	0.403
		16QAM	1/24	X	H	15.84	9.01	24.85	0.305
	1882.5	QPSK	1/12	X	H	16.49	9.05	25.54	0.358
		16QAM	1/0	X	H	15.96	9.05	25.01	0.317
	1912.5	QPSK	1/0	X	H	17.73	9.08	26.81	0.480
		16QAM	1/0	X	H	16.68	9.08	25.76	0.377
3	1851.5	QPSK	1/14	X	H	16.72	9.01	25.73	0.374
		16QAM	1/14	X	H	15.67	9.01	24.68	0.294
	1882.5	QPSK	1/14	X	H	16.43	9.05	25.48	0.353
		16QAM	1/14	X	H	15.45	9.05	24.50	0.282
	1913.5	QPSK	1/0	X	H	17.86	9.08	26.94	0.494
		16QAM	1/0	X	H	16.74	9.08	25.82	0.382
1.4	1850.7	QPSK	1/5	X	H	16.64	9.01	25.65	0.367
		16QAM	1/5	X	H	15.52	9.01	24.53	0.284
	1882.5	QPSK	1/0	X	H	16.45	9.05	25.50	0.355
		16QAM	1/0	X	H	15.40	9.05	24.45	0.279
	1914.3	QPSK	1/0	X	H	17.94	9.08	27.02	0.504
		16QAM	1/0	X	H	17.18	9.08	26.26	0.423

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

7.5.2 LTE Band 26

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBd)	EIRP (dBm)	EIRP (W)
15	831.5	QPSK	1/74	X	H	22.03	1.19	23.22	0.210
		16QAM	1/74	X	H	20.91	1.19	22.10	0.162
	841.5	QPSK	1/74	X	H	20.65	1.14	21.79	0.151
		16QAM	1/36	X	H	19.74	1.14	20.88	0.122
10	829	QPSK	1/49	X	H	20.37	1.21	21.58	0.144
		16QAM	1/49	X	H	19.45	1.21	20.66	0.116
	836.5	QPSK	1/49	X	H	20.06	1.17	21.23	0.133
		16QAM	1/0	X	H	19.38	1.17	20.55	0.114
	844	QPSK	1/49	X	H	20.45	1.13	21.58	0.144
		16QAM	1/25	X	H	20.08	1.13	21.21	0.132
5	826.5	QPSK	1/24	X	H	21.03	1.22	22.25	0.168
		16QAM	1/24	X	H	20.26	1.22	21.48	0.141
	836.5	QPSK	1/12	X	H	19.64	1.17	20.81	0.121
		16QAM	1/12	X	H	19.16	1.17	20.33	0.108
	846.5	QPSK	1/12	X	H	20.08	1.12	21.20	0.132
		16QAM	1/12	X	H	19.51	1.12	20.63	0.116
3	825.5	QPSK	1/0	X	H	21.87	1.22	23.09	0.204
		16QAM	1/7	X	H	21.02	1.22	22.24	0.167
	836.5	QPSK	1/0	X	H	20.38	1.17	21.55	0.143
		16QAM	1/7	X	H	19.61	1.17	20.78	0.120
	847.5	QPSK	1/0	X	H	21.35	1.11	22.46	0.176
		16QAM	1/0	X	H	19.97	1.11	21.08	0.128
1.4	824.7	QPSK	1/0	X	H	20.91	1.23	22.14	0.164
		16QAM	1/0	X	H	20.20	1.23	21.43	0.139
	836.5	QPSK	1/5	X	H	19.95	1.17	21.12	0.129
		16QAM	1/2	X	H	19.48	1.17	20.65	0.116
	848.3	QPSK	1/0	X	H	20.21	1.11	21.32	0.136
		16QAM	1/0	X	H	19.54	1.11	20.65	0.116

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

7.5.3 LTE Band 41

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/Offset	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	2506	QPSK	1/99	X	H	14.60	9.76	24.36	0.273
		16QAM	1/99	X	H	13.95	9.76	23.71	0.235
	2593	QPSK	1/50	X	H	15.98	9.75	25.73	0.374
		16QAM	1/50	X	H	14.90	9.75	24.65	0.292
	2680	QPSK	1/50	X	H	15.54	9.73	25.27	0.337
		16QAM	1/50	X	H	15.03	9.73	24.76	0.299
15	2503.5	QPSK	1/74	X	H	16.09	9.76	25.85	0.385
		16QAM	1/74	X	H	15.14	9.76	24.90	0.309
	2593	QPSK	1/0	X	H	15.50	9.75	25.25	0.335
		16QAM	1/0	X	H	14.74	9.75	24.49	0.281
	2682.5	QPSK	1/36	X	H	14.75	9.73	24.48	0.281
		16QAM	1/0	X	H	13.43	9.73	23.16	0.207
10	2501	QPSK	1/49	X	H	16.16	9.76	25.92	0.391
		16QAM	1/25	X	H	15.03	9.76	24.79	0.301
	2593	QPSK	1/0	X	H	13.89	9.75	23.64	0.231
		16QAM	1/25	X	H	13.29	9.75	23.04	0.201
	2685	QPSK	1/25	X	H	14.01	9.73	23.74	0.237
		16QAM	1/0	X	H	13.48	9.73	23.21	0.209
5	2498.5	QPSK	1/24	X	H	15.10	9.76	24.86	0.306
		16QAM	1/24	X	H	13.86	9.76	23.62	0.230
	2593	QPSK	1/12	X	H	15.85	9.75	25.60	0.363
		16QAM	1/12	X	H	14.58	9.75	24.33	0.271
	2687.5	QPSK	1/12	X	H	13.88	9.73	23.61	0.230
		16QAM	1/0	X	H	12.46	9.73	22.19	0.166

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

7.6 UNDESIRABLE EMISSIONS (Radiated)

7.6.1 LTE Band 25

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
									(dBm)	(dBc)	
20	1860	1/99	QPSK	3737.87	Z	H	-49.89	9.88	-40.01	63.96	36.95
				7475.73	Y	H	-41.84	11.52	-30.32	54.27	
		1/50	16QAM	3720.14	Z	H	-51.36	9.89	-41.47	64.98	36.51
				7440.48	Y	H	-41.13	11.54	-29.59	53.10	
	1882.5	1/50	QPSK	3765.33	Z	H	-51.36	9.85	-41.51	67.45	38.94
				7530.35	Y	H	-46.52	11.50	-35.02	60.96	
		1/0	16QAM	3747.33	Z	H	-51.86	9.87	-41.99	66.30	37.31
				7494.39	Y	H	-43.67	11.52	-32.15	56.46	
	1905	1/99	QPSK	3827.81	Z	H	-53.06	9.79	-43.27	70.13	39.86
				7655.38	Y	H	-44.79	11.46	-33.33	60.19	
		1/99	16QAM	3827.85	Z	H	-54.02	9.79	-44.23	70.33	39.10
				7655.63	Y	H	-43.73	11.46	-32.27	58.37	
15	1857.5	1/36	QPSK	3715.44	Z	H	-51.53	9.90	-41.63	67.98	39.35
				7430.65	Y	H	-41.86	11.54	-30.32	56.67	
		1/36	16QAM	3715.42	Z	H	-52.59	9.90	-42.69	68.25	38.56
				7430.80	Y	H	-41.66	11.54	-30.12	55.68	
	1882.5	1/0	QPSK	3751.76	Z	H	-52.61	9.86	-42.75	69.12	39.37
				7503.48	Y	H	-45.68	11.51	-34.17	60.54	
		1/0	16QAM	3751.18	Z	H	-53.51	9.86	-43.65	69.18	38.53
				7503.44	Y	H	-44.52	11.51	-33.01	58.54	
	1907.5	1/74	QPSK	3828.37	Z	H	-52.16	9.79	-42.37	69.03	39.66
				7656.87	Y	H	-45.42	11.46	-33.96	60.62	
		1/74	16QAM	3828.28	Z	H	-52.84	9.79	-43.05	69.21	39.16
				7656.64	Y	H	-45.37	11.46	-33.91	60.07	
10	1855	1/49	QPSK	3718.80	Z	H	-53.11	9.90	-43.21	68.91	38.70
				7437.72	Y	H	-41.91	11.54	-30.37	56.07	
		1/49	16QAM	3718.91	Z	H	-53.29	9.90	-43.39	68.24	37.85
				7437.52	Y	H	-42.30	11.54	-30.76	55.61	
	1882.5	1/0	QPSK	3756.11	Z	H	-52.92	9.86	-43.06	67.78	37.72
				7512.21	Y	H	-46.74	11.51	-35.23	59.95	
		1/0	16QAM	3756.29	Z	H	-53.51	9.86	-43.65	67.64	36.99
				7512.34	Y	H	-47.63	11.51	-36.12	60.11	
	1910	1/25	QPSK	3820.09	Z	H	-49.64	9.80	-39.84	66.84	40.00
				7640.31	Y	H	-41.77	11.46	-30.31	57.31	
		1/25	16QAM	3820.21	Z	H	-49.61	9.80	-39.81	66.14	39.33
				7640.34	Y	H	-41.92	11.46	-30.46	56.79	

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
									(dBm)	(dBc)	
5	1852.5	1/12	QPSK	3705.23	Z	H	-54.40	9.91	-44.49	70.54	39.05
				7410.82	Y	H	-43.46	11.55	-31.91	57.96	
		1/24	16QAM	3705.18	Z	H	-55.34	9.91	-45.43	70.28	37.85
				7418.64	Y	H	-43.34	11.55	-31.79	56.64	
	1882.5	1/12	QPSK	3705.33	Z	H	-52.13	9.91	-42.22	67.76	38.54
				7530.85	Y	H	-46.43	11.50	-34.93	60.47	
		1/0	16QAM	3760.61	Z	H	-53.29	9.85	-43.44	68.45	38.01
				7521.43	Y	H	-47.73	11.51	-36.22	61.23	
	1912.5	1/0	QPSK	3820.70	Z	H	-50.18	9.80	-40.38	67.19	39.81
				7641.40	Y	H	-41.24	11.46	-29.78	56.59	
		1/0	16QAM	3820.80	Z	H	-50.12	9.80	-40.32	66.08	38.76
				7641.35	Y	H	-41.30	11.46	-29.84	55.60	
3	1851.5	1/14	QPSK	3705.42	Z	H	-52.07	9.91	-42.16	67.89	38.73
				7411.21	Y	H	-43.74	11.55	-32.19	57.92	
		1/14	16QAM	3705.58	Z	H	-52.01	9.91	-42.10	66.78	37.68
				7410.99	Y	H	-43.52	11.55	-31.97	56.65	
	1882.5	1/14	QPSK	3767.36	Z	H	-55.81	9.85	-45.96	71.44	38.48
				7535.13	Y	H	-45.25	11.50	-33.75	59.23	
		1/14	16QAM	3767.43	Z	H	-55.19	9.85	-45.34	69.84	37.50
				7535.24	Y	H	-45.21	11.50	-33.71	58.21	
	1913.5	1/0	QPSK	3824.62	Z	H	-50.19	9.79	-40.40	67.34	39.94
				7648.93	Y	H	-40.57	11.46	-29.11	56.05	
		1/0	16QAM	3824.46	Z	H	-50.87	9.79	-41.08	66.90	38.82
				7648.87	Y	H	-40.92	11.46	-29.46	55.28	
1.4	1850.7	1/5	QPSK	3702.14	Z	H	-53.82	9.91	-43.91	69.56	38.65
				7404.56	Y	H	-42.17	11.55	-30.62	56.27	
		1/5	16QAM	3702.21	Z	H	-58.72	9.91	-48.81	73.34	37.53
				7404.76	Y	H	-42.82	11.55	-31.27	55.80	
	1882.5	1/0	QPSK	3764.19	Z	H	-54.61	9.85	-44.76	70.26	38.50
				7528.27	Y	H	-45.14	11.50	-33.64	59.14	
		1/5	16QAM	3764.25	Z	H	-60.08	9.85	-50.23	74.68	37.45
				7528.07	Y	H	-45.45	11.50	-33.95	58.40	
	1914.3	1/0	QPSK	3827.51	Z	H	-56.75	9.79	-46.96	73.98	40.02
				7655.18	Y	H	-43.72	11.46	-32.26	59.28	
		1/5	16QAM	3827.60	Z	H	-61.20	9.79	-51.41	77.67	39.26
				7655.45	Y	H	-50.36	11.46	-38.90	65.16	

Note 1: Limit Calculation = $43 + 10\log_{10}(P[\text{Watts}])$

Note 2: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 3: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

7.6.2 LTE Band 26

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBd)	Result		Limit (dBc)
									(dBm)	(dBc)	
15	831.5	1/74	QPSK	1676.41	X	H	-45.63	6.67	-38.96	62.18	36.22
		1/74	16QAM	1676.32	X	H	-44.37	6.67	-37.70	59.80	35.10
	841.5	1/74	QPSK	1696.31	X	H	-44.42	6.69	-37.73	59.52	34.79
		1/36	16QAM	1683.36	X	H	-46.87	6.68	-40.19	61.07	33.88
10	829	1/49	QPSK	1666.84	X	H	-50.06	6.66	-43.40	64.98	34.58
		1/49	16QAM	1666.76	X	H	-48.81	6.66	-42.15	62.81	33.66
	836.5	1/49	QPSK	1681.82	X	H	-42.79	6.67	-36.12	57.35	34.23
		1/0	16QAM	1681.74	X	H	-43.81	6.67	-37.14	57.69	33.55
	844	1/49	QPSK	1696.77	X	H	-45.87	6.69	-39.18	60.76	34.58
		1/25	16QAM	1696.78	X	H	-45.69	6.69	-39.00	60.21	34.21
5	826.5	1/24	QPSK	1657.25	X	H	-50.56	6.65	-43.91	66.16	35.25
		1/24	16QAM	1657.29	X	H	-50.52	6.65	-43.87	65.35	34.48
	836.5	1/12	QPSK	1673.30	X	H	-44.16	6.66	-37.50	58.31	33.81
		1/12	16QAM	1673.25	X	H	-45.20	6.66	-38.54	58.87	33.33
	846.5	1/12	QPSK	1693.29	X	H	-50.54	6.69	-43.85	65.05	34.20
		1/12	16QAM	1693.29	X	H	-50.00	6.69	-43.31	63.94	33.63
3	825.5	1/0	QPSK	1648.44	X	H	-47.30	6.64	-40.66	63.75	36.09
		1/7	16QAM	1651.44	X	H	-49.14	6.64	-42.50	64.74	35.24
	836.5	1/0	QPSK	1670.51	X	H	-49.54	6.66	-42.88	64.43	34.55
		1/7	16QAM	1673.34	X	H	-44.64	6.66	-37.98	58.76	33.78
	847.5	1/0	QPSK	1692.50	X	H	-50.41	6.69	-43.72	66.18	35.46
		1/0	16QAM	1692.47	X	H	-48.66	6.69	-41.97	63.05	34.08
1.4	824.7	1/0	QPSK	1648.53	X	H	-48.21	6.64	-41.57	63.71	35.14
		1/0	16QAM	1648.55	X	H	-48.13	6.64	-41.49	62.92	34.43
	836.5	1/5	QPSK	1673.88	X	H	-42.86	6.66	-36.20	57.32	34.12
		1/2	16QAM	1673.24	X	H	-43.39	6.66	-36.73	57.38	33.65
	848.3	1/0	QPSK	1695.67	X	H	-45.50	6.69	-38.81	60.13	34.32
		1/0	16QAM	1695.71	X	H	-46.38	6.69	-39.69	60.34	33.65

Note 1: Limit Calculation = $43 + 10\log_{10}(P[\text{Watts}])$

Note 2: This device was tested with all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 3: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

7.6.3 LTE Band 41

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
									(dBm)	(dBc)	
20	2506	1/99	QPSK	5029.82	X	H	-51.72	10.69	-41.03	65.39	49.36
				7544.74	Y	H	-39.83	11.50	-28.33	52.69	
				10059.92	Y	H	-43.43	12.25	-31.18	55.54	
				12574.44	Y	H	-48.29	12.84	-35.45	59.81	
		1/99	16QAM	5029.82	X	H	-51.66	10.69	-40.97	64.68	48.71
				7544.74	Y	H	-41.35	11.50	-29.85	53.56	
				10059.86	Y	H	-44.09	12.25	-31.84	55.55	
				12574.59	Y	H	-48.60	12.84	-35.76	59.47	
	2593	1/50	QPSK	5185.82	X	H	-49.33	10.76	-38.57	64.30	50.73
				7779.30	Y	H	-43.63	11.41	-32.22	57.95	
				10372.52	Y	H	-45.24	12.40	-32.84	58.57	
				12965.79	Y	H	-48.16	12.95	-35.21	60.94	
		1/50	16QAM	5816.10	X	H	-48.89	11.37	-37.52	62.17	49.65
				7779.50	Y	H	-42.48	11.41	-31.07	55.72	
				10372.53	Y	H	-45.06	12.40	-32.66	57.31	
				12965.74	Y	H	-47.76	12.95	-34.81	59.46	
	2680	1/50	QPSK	5360.07	X	H	-48.36	10.84	-37.52	62.79	50.27
				8040.39	Y	H	-39.85	11.33	-28.52	53.79	
				10720.52	Y	H	-44.98	12.56	-32.42	57.69	
				13400.79	Y	H	-45.24	12.59	-32.65	57.92	
		1/50	16QAM	5359.94	X	H	-48.98	10.84	-38.14	62.90	49.76
				8040.39	Y	H	-40.38	11.33	-29.05	53.81	
				10720.35	Y	H	-45.87	12.56	-33.31	58.07	
				13400.52	Y	H	-44.44	12.59	-31.85	56.61	

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
									(dBm)	(dBc)	
15	2503.5	1/74	QPSK	5020.04	X	H	-53.32	10.69	-42.63	68.48	50.85
				7530.43	Y	H	-40.07	11.50	-28.57	54.42	
				10040.54	Y	H	-45.74	12.24	-33.50	59.35	
				12563.40	Y	H	-49.71	12.84	-36.87	62.72	
		1/74	16QAM	5020.27	X	H	-53.72	10.69	-43.03	67.93	49.90
				7530.62	Y	H	-39.70	11.50	-28.20	53.10	
				10040.47	Y	H	-45.04	12.24	-32.80	57.70	
				12563.56	Y	H	-49.43	12.84	-36.59	61.49	
	2593	1/0	QPSK	5172.62	X	H	-49.90	10.76	-39.14	64.39	50.25
				7759.16	Y	H	-42.71	11.42	-31.29	56.54	
				10345.57	Y	H	-45.02	12.38	-32.64	57.89	
				12931.94	Y	H	-49.04	12.94	-36.10	61.35	
		1/0	16QAM	5172.76	X	H	-50.56	10.76	-39.80	64.29	49.49
				7759.07	Y	H	-41.84	11.42	-30.42	54.91	
				10345.22	Y	H	-45.05	12.38	-32.67	57.16	
				12931.93	Y	H	-47.37	12.94	-34.43	58.92	
	2682.5	1/36	QPSK	5365.22	X	H	-50.23	10.84	-39.39	63.87	49.48
				8027.48	Y	H	-40.32	11.33	-28.99	53.47	
				10730.93	Y	H	-44.00	12.56	-31.44	55.92	
				13413.39	Y	H	-43.34	12.58	-30.76	55.24	
		1/0	16QAM	5351.72	X	H	-51.52	10.83	-40.69	63.85	48.16
				8027.58	Y	H	-40.14	11.33	-28.81	51.97	
				10703.48	Y	H	-45.92	12.55	-33.37	56.53	
				13379.18	Y	H	-43.27	12.61	-30.66	53.82	

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
									(dBm)	(dBc)	
10	2501	1/49	QPSK	5010.79	X	H	-53.23	10.68	-42.55	68.47	50.92
				7516.19	Y	H	-40.17	11.51	-28.66	54.58	
				10021.60	Y	H	-46.24	12.23	-34.01	59.93	
				12527.05	Y	H	-50.04	12.83	-37.21	63.13	
		1/25	16QAM	5001.91	X	H	-53.94	10.68	-43.26	68.05	49.79
				7503.10	Y	H	-40.44	11.51	-28.93	53.72	
				10004.54	Y	H	-45.54	12.22	-33.32	58.11	
				12505.47	Y	H	-49.28	12.82	-36.46	61.25	
	2593	1/0	QPSK	5177.05	X	H	-49.67	10.76	-38.91	62.55	48.64
				7765.79	Y	H	-42.86	11.42	-31.44	55.08	
				10354.36	Y	H	-44.63	12.39	-32.24	55.88	
				12943.03	Y	H	-47.85	12.94	-34.91	58.55	
		1/25	16QAM	5186.05	X	H	-51.09	10.76	-40.33	63.37	48.04
				7779.38	Y	H	-43.74	11.41	-32.33	55.37	
				10372.50	Y	H	-44.96	12.40	-32.56	55.60	
				12965.47	Y	H	-49.82	12.95	-36.87	59.91	
	2685	1/25	QPSK	5370.02	X	H	-48.42	10.84	-37.58	61.32	48.74
				8055.15	Y	H	-40.03	11.33	-28.70	52.44	
				10740.26	Y	H	-44.23	12.57	-31.66	55.40	
				13425.54	Y	H	-43.85	12.56	-31.29	55.03	
		1/0	16QAM	5361.18	X	H	-49.85	10.84	-39.01	62.22	48.21
				8041.75	Y	H	-40.50	11.33	-29.17	52.38	
				10722.34	Y	H	-44.02	12.56	-31.46	54.67	
				13402.94	Y	H	-43.00	12.59	-30.41	53.62	

B.W (MHz)	Test Freq. (MHz)	RB Size/ Offset	Test Mode	Freq.(MHz)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain(dBi)	Result		Limit (dBc)
									(dBm)	(dBc)	
5	2498.5	1/24	QPSK	5001.40	X	H	-52.78	10.68	-42.10	66.96	49.86
				7501.90	Y	H	-40.42	11.51	-28.91	53.77	
				10002.67	Y	H	-44.64	12.22	-32.42	57.28	
				12503.46	Y	H	-47.79	12.82	-34.97	59.83	
		1/24	16QAM	5001.33	X	H	-53.55	10.68	-42.87	66.49	48.62
				7502.14	Y	H	-39.70	11.51	-28.19	51.81	
				10002.65	Y	H	-43.17	12.22	-30.95	54.57	
				12503.21	Y	H	-48.11	12.82	-35.29	58.91	
	2593	1/12	QPSK	5186.29	X	H	-49.25	10.76	-38.49	64.09	50.60
				7779.56	Y	H	-43.79	11.41	-32.38	57.98	
				10372.58	Y	H	-44.34	12.40	-31.94	57.54	
				12966.20	Y	H	-48.81	12.95	-35.86	61.46	
		1/12	16QAM	5186.21	X	H	-49.70	10.76	-38.94	63.27	49.33
				7779.64	Y	H	-42.55	11.41	-31.14	55.47	
				10372.61	Y	H	-44.28	12.40	-31.88	56.21	
				12965.73	Y	H	-48.33	12.95	-35.38	59.71	
	2687.5	1/12	QPSK	5375.30	X	H	-48.88	10.85	-38.03	61.64	48.61
				8062.95	Y	H	-39.17	11.33	-27.84	51.45	
				10750.65	Y	H	-45.44	12.57	-32.87	56.48	
				13438.45	Y	H	-42.72	12.55	-30.17	53.78	
		1/0	16QAM	5370.55	X	H	-48.70	10.84	-37.86	60.05	47.19
				8055.94	Y	H	-40.60	11.33	-29.27	51.46	
				10741.25	Y	H	-45.01	12.57	-32.44	54.63	
				13426.87	Y	H	-43.69	12.56	-31.13	53.32	

Note 1: Limit Calculation = $55 + 10\log_{10}(P[\text{Watts}])$ at all frequencies more than X MHz from the channel edge.
(where X is the greater of 6 MHz or the actual emission bandwidth.)

Note 2: This device was tested under all bandwidths, modulations and RB configurations and the worst case data are reported in the table above.

Note 3: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

1/38

7.7 FREQUENCY STABILITY**7.7.1 LTE Band 25**

OPERATING FREQUENCY : 1,882,500,000 Hz
 CHANNEL : 26365
 REFERENCE VOLTAGE : 3.8 VDC
 LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	3.80	+25(Ref)	1,882,500,003	3	0.0015	0.000000154
100%		-30	1,882,499,994	-6	-0.0031	-0.000000313
100%		-20	1,882,500,005	5	0.0024	0.000000239
100%		-10	1,882,499,997	-3	-0.0014	-0.000000138
100%		0	1,882,500,005	5	0.0024	0.000000239
100%		10	1,882,500,005	5	0.0026	0.000000260
100%		20	1,882,500,011	11	0.0059	0.000000595
100%		30	1,882,499,997	-3	-0.0015	-0.000000149
100%		40	1,882,499,995	-5	-0.0027	-0.000000271
100%		50	1,882,499,993	-7	-0.0035	-0.000000351
115%	4.37	25	1,882,499,996	-4	-0.0022	-0.000000218
BATT.ENDPOINT	3.30	25	1,882,499,990	-10	-0.0055	-0.000000547

7.7.2 LTE Band 26

OPERATING FREQUENCY : 836,500,000 Hz
 CHANNEL : 26865
 REFERENCE VOLTAGE : 3.8 VDC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	3.80	+25(Ref)	836,500,004	4	0.0049	0.000000490
100%		-30	836,499,994	-6	-0.0074	-0.000000741
100%		-20	836,499,991	-9	-0.0109	-0.000001088
100%		-10	836,499,995	-5	-0.0061	-0.000000610
100%		0	836,499,994	-7	-0.0078	-0.000000777
100%		+10	836,499,989	-11	-0.0130	-0.000001303
100%		+20	836,499,993	-7	-0.0086	-0.000000861
100%		+30	836,499,997	-3	-0.0041	-0.000000406
100%		+40	836,499,989	-11	-0.0132	-0.000001315
100%		+50	836,499,995	-5	-0.0056	-0.000000562
115%	4.37	+25	836,500,003	3	0.0039	0.000000395
BATT.ENDPOINT	3.30	+25	836,499,990	-10	-0.0118	-0.000001184

7.7.3 LTE Band 41

OPERATING FREQUENCY : 2,592,000,000 Hz
 CHANNEL : 40620
 REFERENCE VOLTAGE : 3.8 VDC
 DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

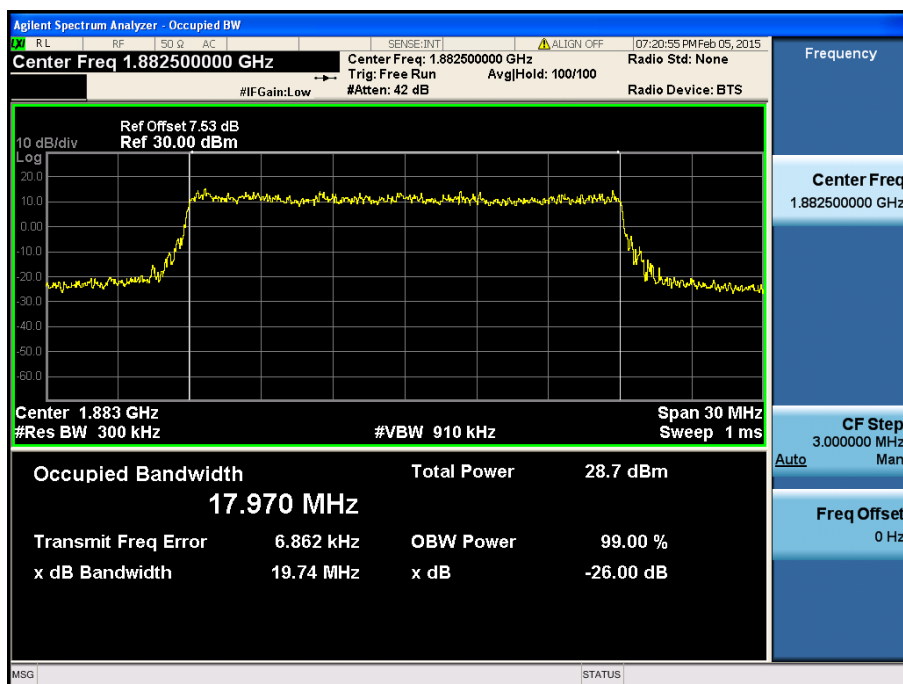
VOLTAGE (%)	POWER (V DC)	TEMP (°C)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	3.80	+25(Ref)	2,592,999,992	-8	-0.0032	-0.000000320
100%		-30	2,592,999,989	-11	-0.0042	-0.000000424
100%		-20	2,592,999,992	-8	-0.0032	-0.000000320
100%		-10	2,592,999,989	-11	-0.0044	-0.000000436
100%		0	2,592,999,997	-3	-0.0010	-0.000000100
100%		+10	2,592,999,985	-16	-0.0060	-0.000000598
100%		+20	2,592,999,990	-10	-0.0038	-0.000000382
100%		+30	2,592,999,988	-12	-0.0046	-0.000000455
100%		+40	2,593,000,017	17	0.0064	0.000000636
100%		+50	2,592,999,995	-5	-0.0019	-0.000000185
115%	4.37	+25	2,592,999,982	-18	-0.0070	-0.000000698
BATT.ENDPOINT	3.30	+25	2,592,999,991	-9	-0.0034	-0.000000336

8. TEST PLOTS

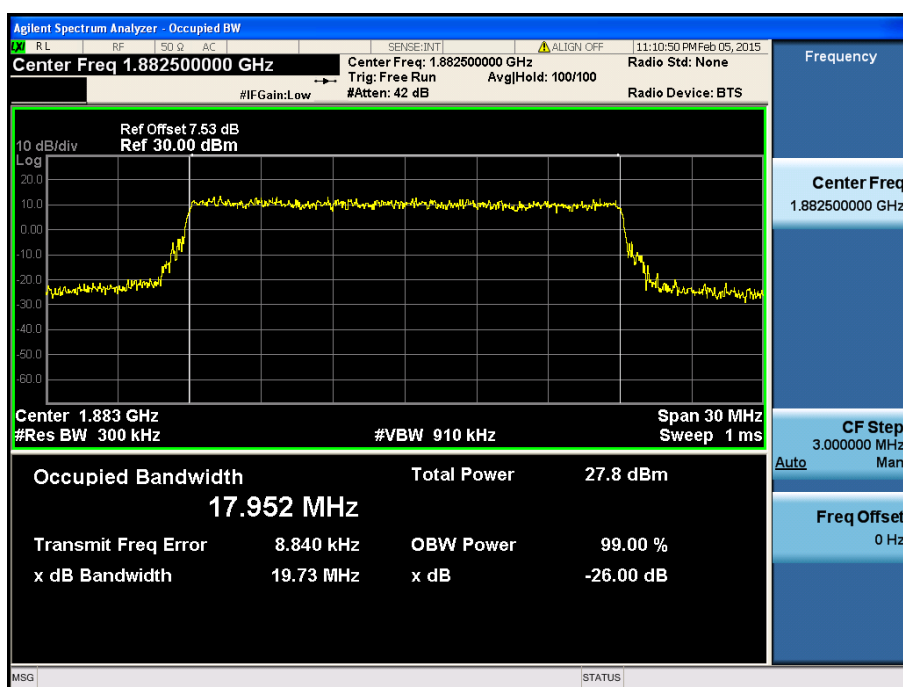
Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

8.1 OCCUPIED BANDWIDTH

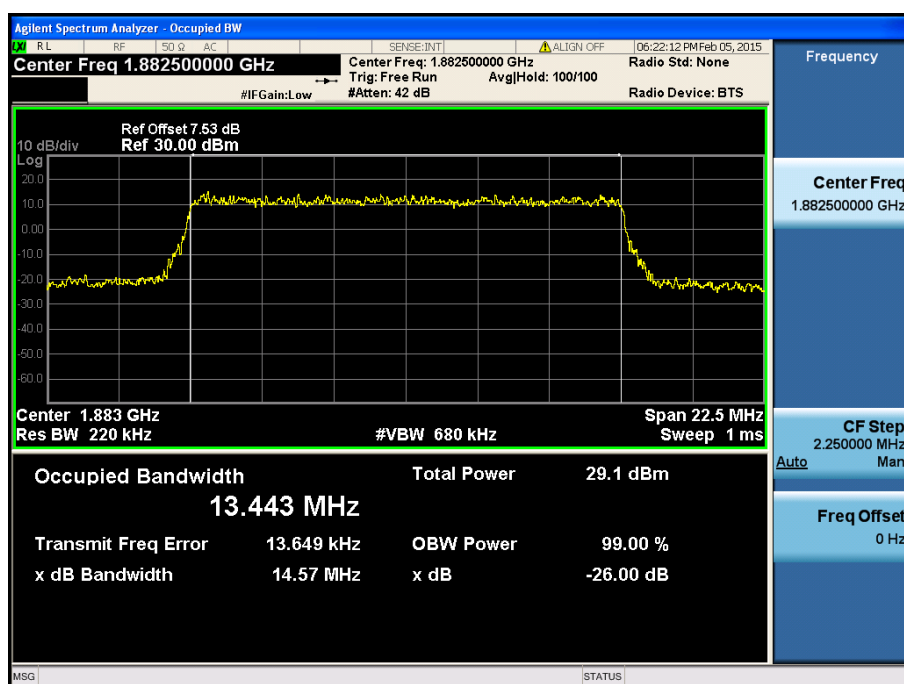
8.1.1 LTE Band 25



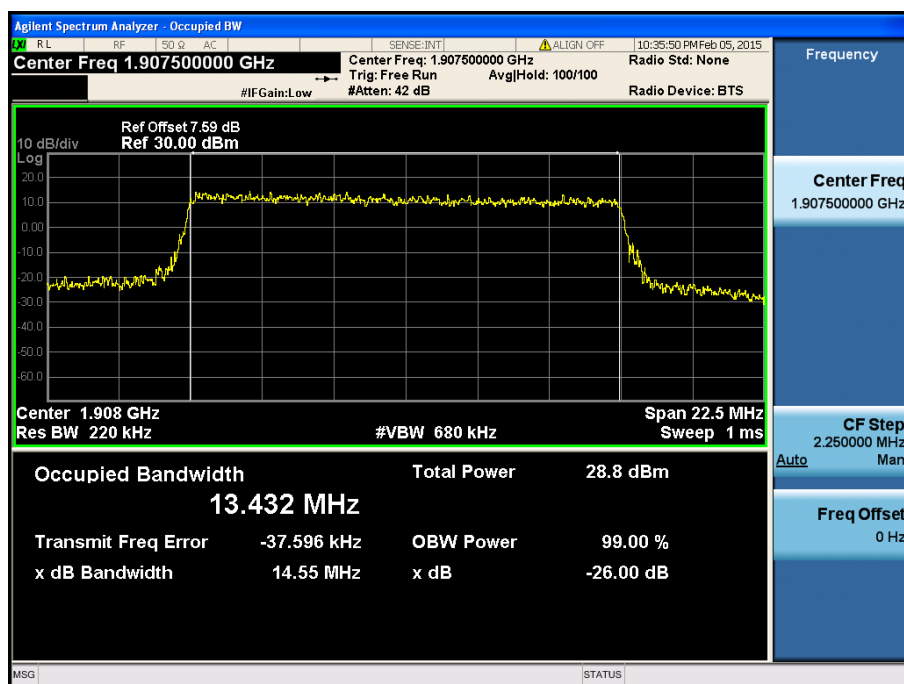
LTE Band 25 / 20MHz / QPSK - RB Size 100



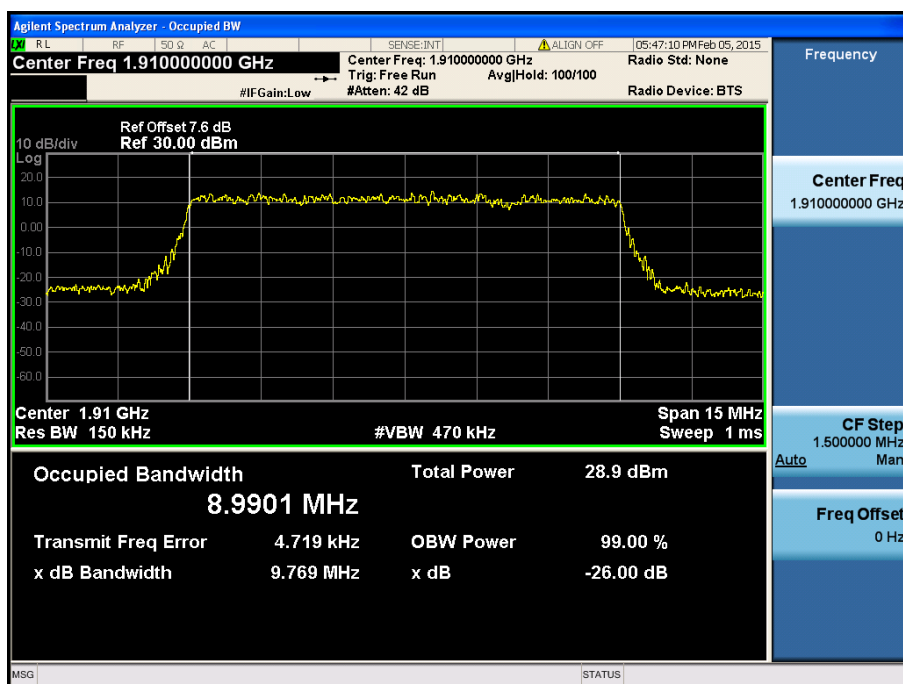
LTE Band 25 / 20MHz / 16QAM - RB Size 100



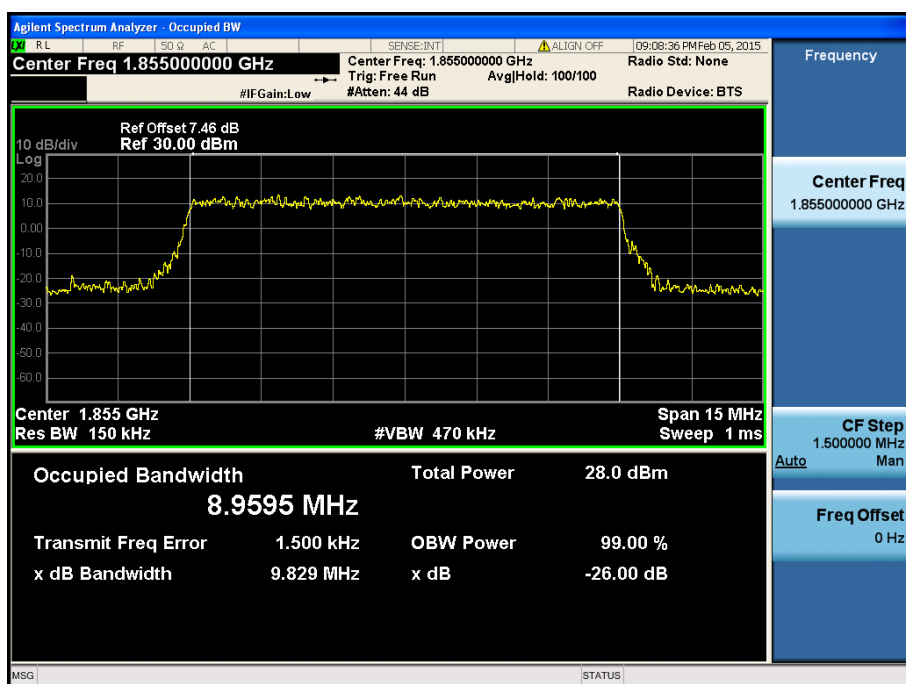
LTE Band 25 / 15MHz / QPSK - RB Size 75



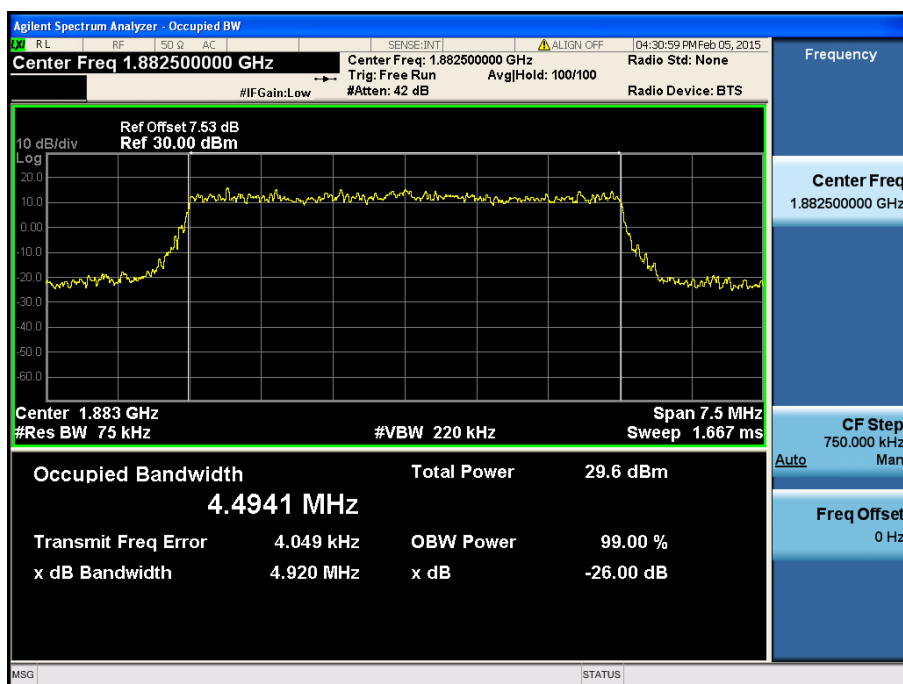
LTE Band 25 / 15MHz / 16QAM - RB Size 75



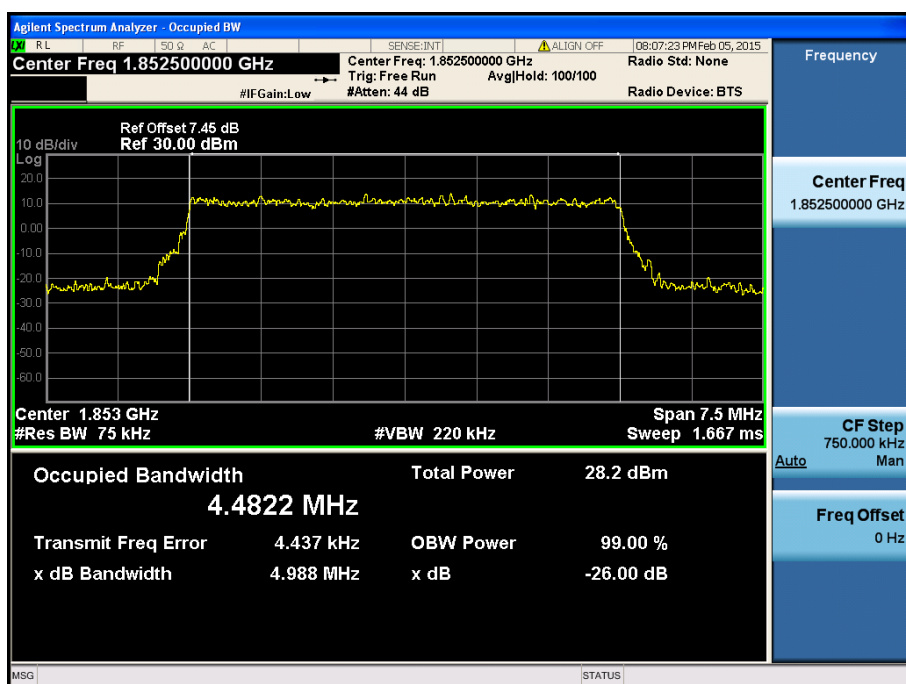
LTE Band 25 / 10MHz / QPSK - RB Size 50



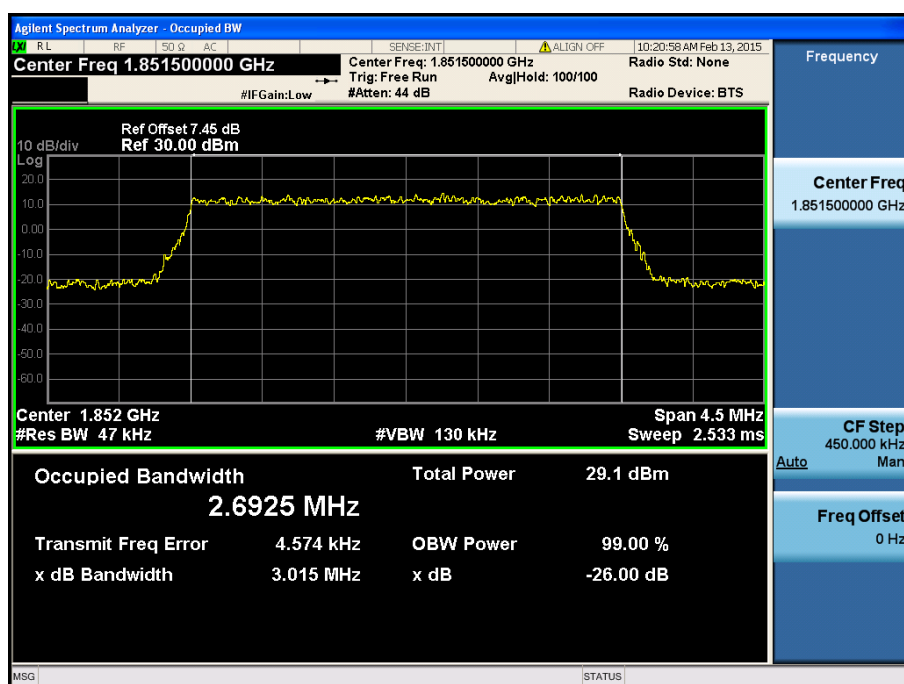
LTE Band 25 / 10MHz / 16QAM - RB Size 50



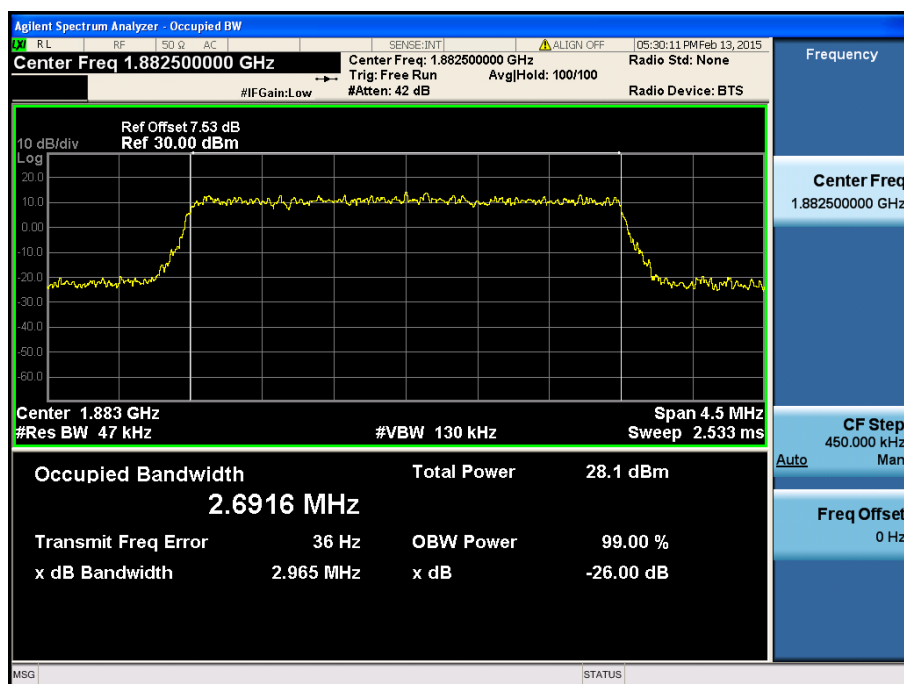
LTE Band 25 / 5MHz / QPSK - RB Size 25



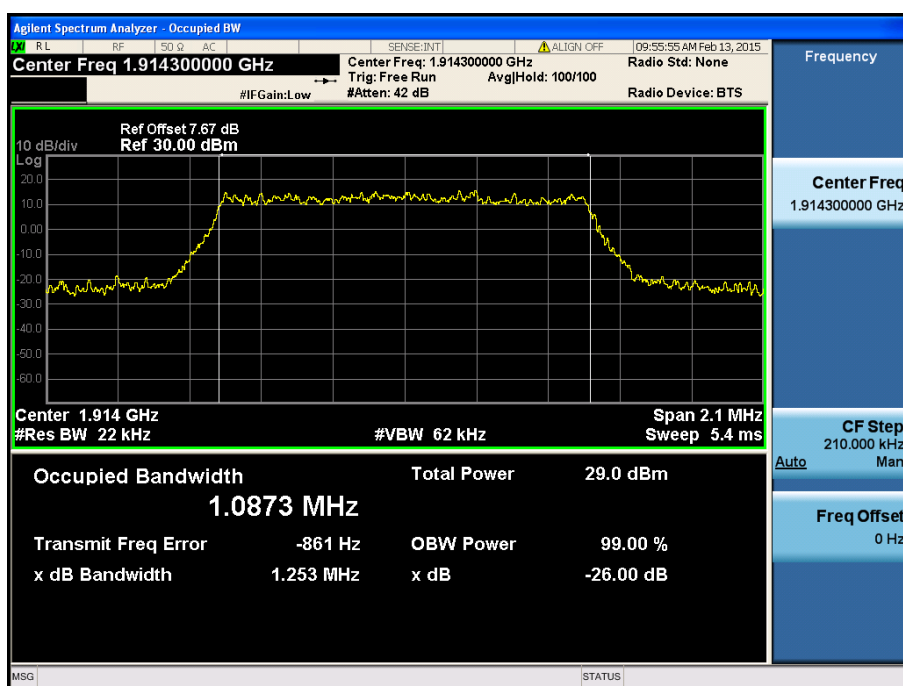
LTE Band 25 / 5MHz / 16QAM - RB Size 25



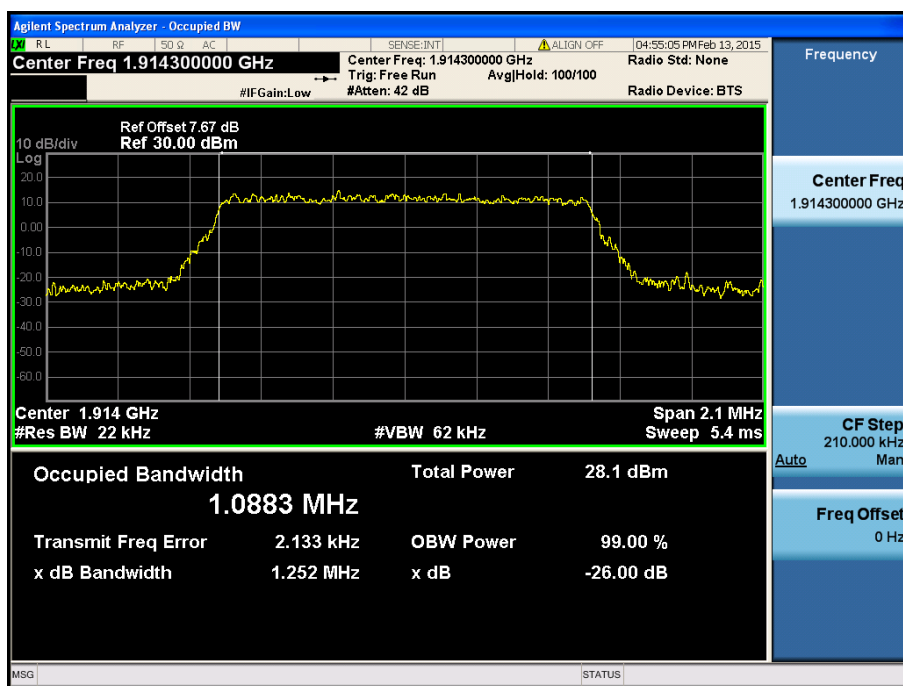
LTE Band 25 / 3MHz / QPSK - RB Size 15



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

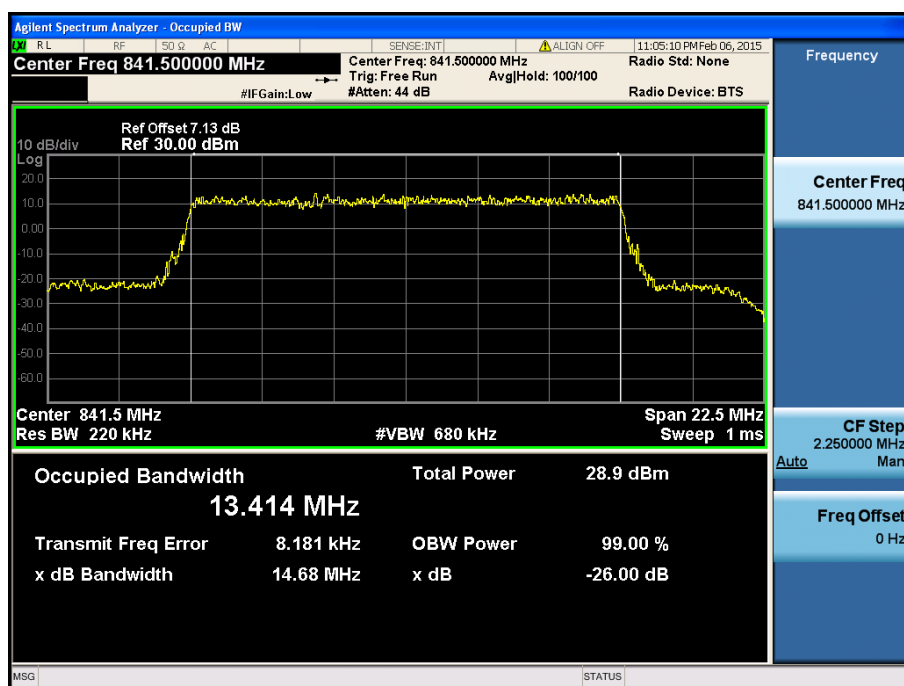


LTE Band 25 / 1.4MHz / QPSK - RB Size 6

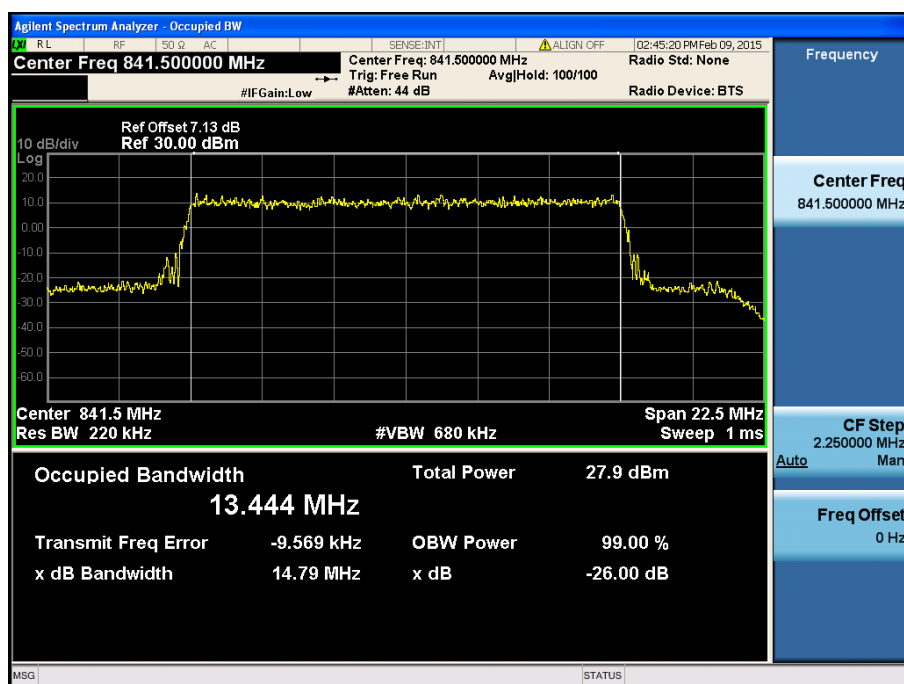


LTE Band 25 / 1.4MHz / 16QAM - RB Size 6

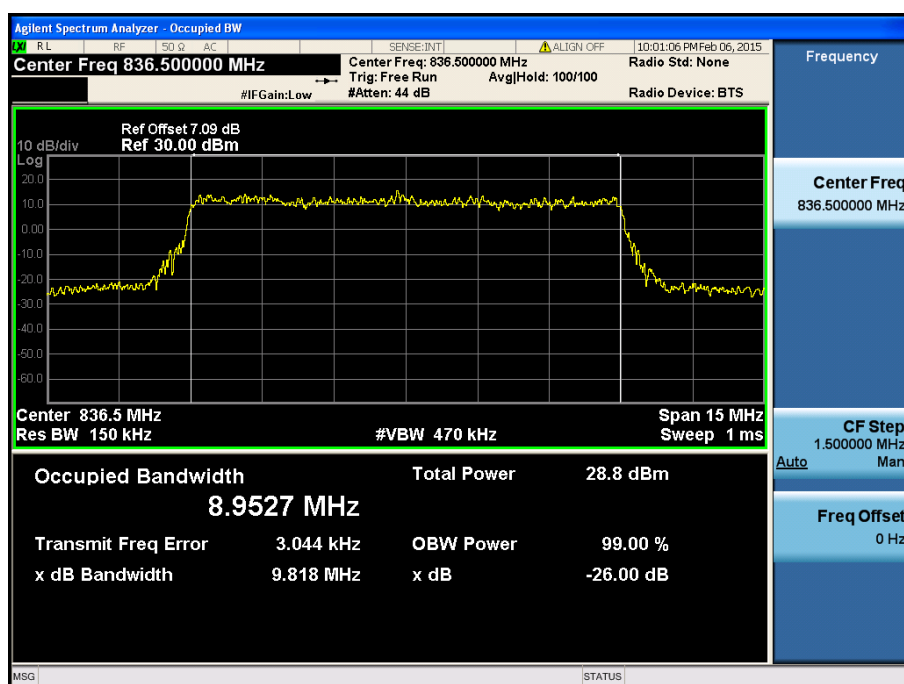
8.1.2 LTE Band 26



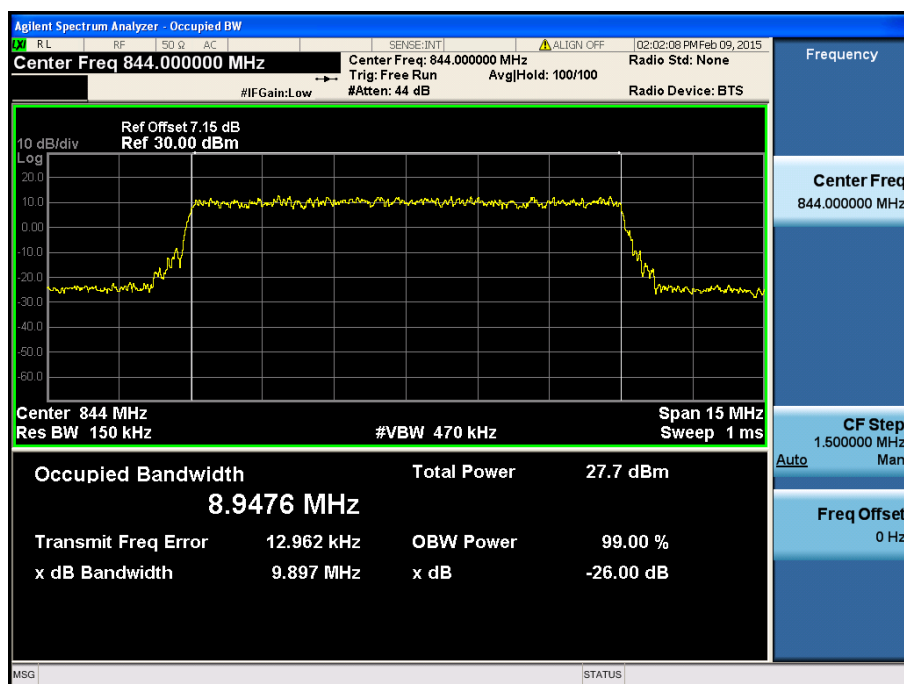
LTE Band 26 / 15MHz / QPSK - RB Size 75



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



LTE Band 26 / 10MHz / QPSK - RB Size 50



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