RF TEST REPORT

Test item	:	GSM/WCDMA/LTE Phone with Bluetooth 4.0 LE, WIFI802.11b/g/n(2.4G)
Model No.	:	LG-H520g, LGH520g, H520g, LG-H520AR, LGH520AR, H520AR
Order No.	:	DTNC1502-00709
Date of receipt	:	2015-02-13
Test duration	:	2015-02-16 ~ 2015-03-19, 2015-03-30
Date of issue	:	2015-03-30
Use of report	:	FCC Original Grant

Applicant : LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

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

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

Tested by:

Engineer
Jaejin Lee

Reviewed by:

Technical Manager
Geunki Son

Test Report Version

Test Report No.	Date	Description
DRTFCC1503-0060	Mar. 25, 2015	Initial issue
DRTFCC1503-0060(1)	Mar. 30, 2015	Retested the band edge emissions.

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1. GENERAL INFORMATION

Applicant Name: LG Electronics MobileComm U.S.A., Inc.

Address: 1000 Sylvan Avenue, Englewood Cliffs NJ 07632

FCC ID : ZNFH520G

FCC Classification : PCS Licensed Transmitter (PCB)
EUT Type : GSM/WCDMA/LTE Phone with Bluetooth 4.0 LE, WIFI802.11b/g/n(2.4G)

Model Name : LG-H520g

Add Model Name : LGH520g, H520g, LG-H520AR, LGH520AR, H520AR

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 4	1710.7 ~ 1754.3	1M08G7D	QPSK	24.51	0.282
LTE Band 4	1710.7 ~ 1754.3	1M09W7D	16QAM	23.56	0.227
LTE Band 4	1711.5 ~ 1753.5	2M70G7D	QPSK	24.69	0.294
LTE Band 4	1711.5 ~ 1753.5	2M68W7D	16QAM	23.91	0.246
LTE Band 4	1712.5 ~ 1752.5	4M50G7D	QPSK	24.54	0.284
LTE Band 4	1712.5 ~ 1752.5	4M50W7D	16QAM	23.88	0.244
LTE Band 4	1715 ~ 1750	8M95G7D	QPSK	24.80	0.302
LTE Band 4	1715 ~ 1750	8M94W7D	16QAM	24.02	0.252
LTE Band 4	1717.5 ~ 1747.5	13M5G7D	QPSK	24.73	0.297
LTE Band 4	1717.5 ~ 1747.5	13M4W7D	16QAM	23.55	0.226
LTE Band 4	1720 ~ 1745	17M9G7D	QPSK	24.53	0.284
LTE Band 4	1720 ~ 1745	17M9W7D	16QAM	23.90	0.245
LTE Band 2	1850.7 ~ 1909.3	1M08G7D	QPSK	25.05	0.320
LTE Band 2	1850.7 ~ 1909.3	1M09W7D	16QAM	24.31	0.270
LTE Band 2	1851.5 ~ 1908.5	2M69G7D	QPSK	25.22	0.333
LTE Band 2	1851.5 ~ 1908.5	2M70W7D	16QAM	24.17	0.261
LTE Band 2	1852.5 ~ 1907.5	4M50G7D	QPSK	25.54	0.358
LTE Band 2	1852.5 ~ 1907.5	4M49W7D	16QAM	24.93	0.311
LTE Band 2	1855 ~ 1905	8M95G7D	QPSK	25.83	0.383
LTE Band 2	1855 ~ 1905	8M94W7D	16QAM	24.98	0.315
LTE Band 2	1857.5 ~ 1902.5	13M5G7D	QPSK	25.75	0.376
LTE Band 2	1857.5 ~ 1902.5	13M5W7D	16QAM	24.73	0.297
LTE Band 2	1860 ~ 1900	17M9G7D	QPSK	25.85	0.385
LTE Band 2	1860 ~ 1900	17M9W7D	16QAM	24.95	0.313
LTE Band 7	2502.5 ~ 2567.5	4M48G7D	QPSK	24.33	0.271
LTE Band 7	2502.5 ~ 2567.5	4M50W7D	16QAM	23.55	0.226
LTE Band 7	2505 ~ 2565	8M96G7D	QPSK	24.00	0.251
LTE Band 7	2505 ~ 2565	8M95W7D	16QAM	23.42	0.220
LTE Band 7	2507.5 ~ 2562.5	13M5G7D	QPSK	24.13	0.259
LTE Band 7	2507.5 ~ 2562.5	13M4W7D	16QAM	23.27	0.212
LTE Band 7	2510 ~ 2560	17M9G7D	QPSK	24.39	0.275
LTE Band 7	2510 ~ 2560	17M9W7D	16QAM	23.50	0.224

2. INTRODUCTION

2.1 EUT DESCRIPTION

The Equipment under Test (EUT) supports 850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 4 (1.4, 3, 5, 10, 15, 20 MHz BW), Band 2 (1.4, 3, 5, 10, 15, 20 MHz BW), Band 7 (5, 10, 15, 20 MHz BW) LTE, 802.11 b/g/n WLAN, Bluetooth (BDR, EDR, LE)

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

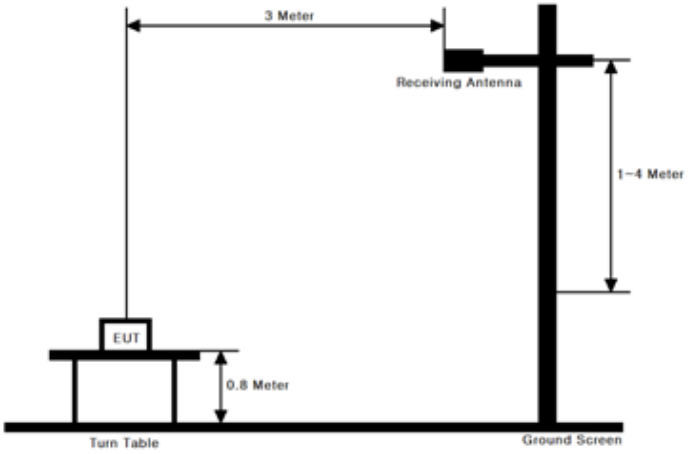
The 3M test site and conducted measurement facility used to collect the radiated data are located at the 42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935. The site is constructed in conformance with the requirements.

- 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 ≥ 3 x RBW.
4. Set number of points in sweep ≥ 2 × 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 ≥ 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.

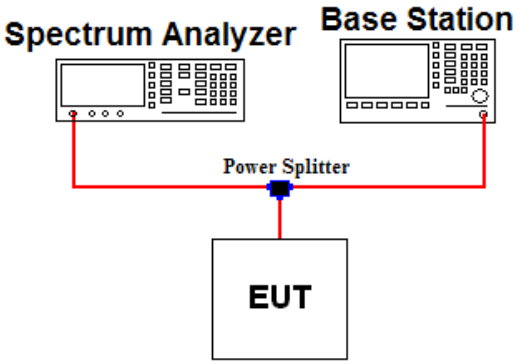
The ERP/EIRP is calculated using the following formula:

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 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.

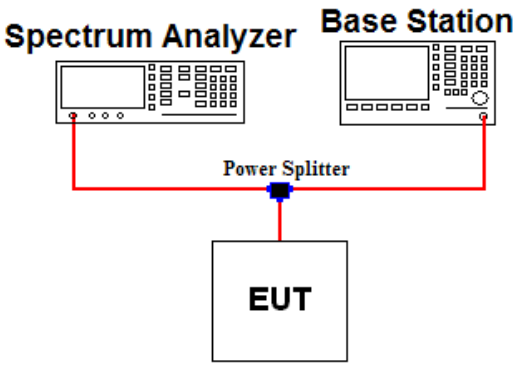
Test setting

The spectrum Analyzer`s CCDF measurement function is enabled.

1. Set resolution/measurement bandwidth ≥ 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**

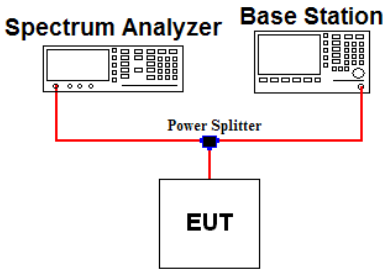
The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power of a given emission.

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 ~ 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 (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

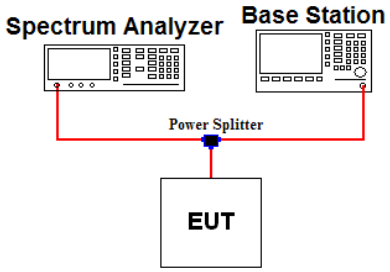
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW ≥ 1 % of the emission bandwidth or 2 % of the emission bandwidth (refer to note 2)
4. VBW ≥ 3 X RBW
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: 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 that 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.

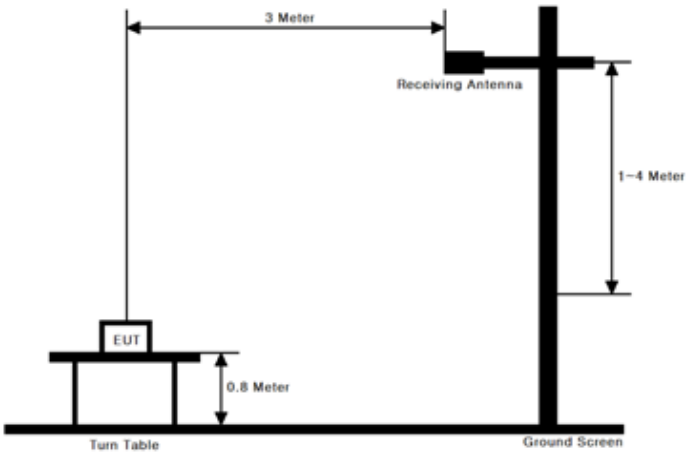
Test setting

1. RBW = 100 KHz or 1 MHz & VBW ≥ 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 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.

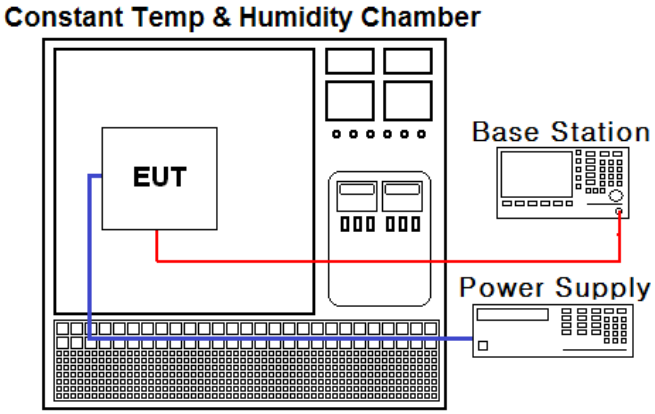
Test setting

1. RBW = 100 kHz for below 1 GHz and 1 MHz for above 1 GHz / VBW ≥ 3 X RBW
2. Detector = Peak & 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-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 ± 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.
   (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	14/09/11	15/09/11	MY43000211
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 Technologies	N9020A	14/09/15	15/09/15	MY50200867
MXA Signal Analyzer	Agilent	N9020A	14/08/21	15/08/21	MY49060056
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	WHKX12-2580-3000-18000-80SS	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 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 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 2,7)	< 2 Watts max. EIRP	Radiated	C
27.50(d.4)	Equivalent Isotropic Radiated Power (Band 4)	< 1 Watts max. ERP		C
2.1053 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 thechannel 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 4(QPSK)

Emission Designator = **17M9G7D**
LTE OBW = 17.920 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 4(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.945 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 2(QPSK)

Emission Designator = **17M9G7D**
LTE OBW = 17.918 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 2(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.881 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 7(QPSK)

Emission Designator = **17M9G7D**
LTE OBW = 17.904 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data Transmission

LTE Band 7(16QAM)

Emission Designator = **17M9W7D**
LTE OBW = 17.937 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data Transmission

B. EIRP Sample Calculation

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Spectrum Reading Value(dBm)	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1720	QPSK	1/0	-17.96	X	H	15.66	8.87	24.53	0.284

EIRP = @ 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 isotropic radiated power (EIRP).

7. TEST DATA

7.1 OCCUPIED BANDWIDTH

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

7.2 PEAKTOAVERAGERATIO

- 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 EQUIVALENT ISOTROPIC RADIATED POWER

7.5.1 LTE Band 4

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	1720	QPSK	1/0	X	H	15.66	8.87	24.53	0.284
		16QAM	1/50	X	H	15.03	8.87	23.90	0.245
	1732.5	QPSK	1/0	X	H	15.10	8.88	23.98	0.250
		16QAM	1/0	X	H	14.48	8.88	23.36	0.217
	1745	QPSK	1/0	X	H	15.38	8.89	24.27	0.267
		16QAM	1/0	X	H	14.79	8.89	23.68	0.233
15	1717.5	QPSK	1/74	X	H	15.42	8.86	24.28	0.268
		16QAM	1/0	X	H	14.49	8.86	23.35	0.216
	1732.5	QPSK	1/0	X	H	15.85	8.88	24.73	0.297
		16QAM	1/36	X	H	14.67	8.88	23.55	0.226
	1747.5	QPSK	1/0	X	H	15.20	8.90	24.10	0.257
		16QAM	1/0	X	H	14.37	8.90	23.27	0.212
10	1715	QPSK	1/0	X	H	15.75	8.86	24.61	0.289
		16QAM	1/0	X	H	15.03	8.86	23.89	0.245
	1732.5	QPSK	1/0	X	H	15.92	8.88	24.80	0.302
		16QAM	1/0	X	H	15.14	8.88	24.02	0.252
	1750	QPSK	1/0	X	H	15.57	8.90	24.47	0.280
		16QAM	1/0	X	H	14.94	8.90	23.84	0.242
5	1712.5	QPSK	1/12	X	H	15.47	8.86	24.33	0.271
		16QAM	1/0	X	H	14.93	8.86	23.79	0.239
	1732.5	QPSK	1/0	X	H	15.66	8.88	24.54	0.284
		16QAM	1/12	X	H	15.00	8.88	23.88	0.244
	1752.5	QPSK	1/0	X	H	15.52	8.90	24.42	0.277
		16QAM	1/12	X	H	14.88	8.90	23.78	0.239
3	1711.5	QPSK	1/7	X	H	15.58	8.86	24.44	0.278
		16QAM	1/7	X	H	15.05	8.86	23.91	0.246
	1732.5	QPSK	1/14	X	H	15.34	8.88	24.22	0.264
		16QAM	1/7	X	H	14.73	8.88	23.61	0.230
	1753.5	QPSK	1/0	X	H	15.79	8.90	24.69	0.294
		16QAM	1/7	X	H	14.89	8.90	23.79	0.239
1.4	1710.7	QPSK	3/0	X	H	15.60	8.86	24.46	0.279
		16QAM	3/0	X	H	14.46	8.86	23.32	0.215
	1732.5	QPSK	3/0	X	H	15.63	8.88	24.51	0.282
		16QAM	3/0	X	H	14.68	8.88	23.56	0.227
	1754.3	QPSK	3/0	X	H	15.03	8.90	23.93	0.247
		16QAM	3/0	X	H	14.27	8.90	23.17	0.207

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 2

Channel Bandwidth (MHz)	Test Frequency (MHz)	Test Mode	RB Size/ Offset	Battery cover	EUT Axis	Ant Pol (H/V)	Level(dBm) @ Ant Terminal	TX Ant Gain (dBi)	EIRP (dBm)	EIRP (W)
20	1860	QPSK	1/0	Standard	X	H	15.66	9.02	24.68	0.294
		16QAM	1/99	Standard	X	H	14.95	9.02	23.97	0.249
	1880	QPSK	1/0	Standard	X	H	16.07	9.05	25.12	0.325
		16QAM	1/0	Standard	X	H	15.39	9.05	24.44	0.278
	1900	QPSK	1/99	Standard	X	H	16.78	9.07	25.85	0.385
		16QAM	1/99	Standard	X	H	15.88	9.07	24.95	0.313
15	1857.5	QPSK	1/0	Standard	X	H	15.89	9.02	24.91	0.310
		16QAM	1/0	Standard	X	H	15.22	9.02	24.24	0.265
	1880	QPSK	1/0	Standard	X	H	15.91	9.05	24.96	0.313
		16QAM	1/74	Standard	X	H	15.12	9.05	24.17	0.261
	1902.5	QPSK	1/74	Standard	X	H	16.68	9.07	25.75	0.376
		16QAM	1/0	Standard	X	H	15.66	9.07	24.73	0.297
10	1855	QPSK	1/0	Standard	X	H	15.59	9.02	24.61	0.289
		16QAM	1/0	Standard	X	H	15.07	9.02	24.09	0.256
	1880	QPSK	1/0	Standard	X	H	15.40	9.05	24.45	0.279
		16QAM	1/25	Standard	X	H	14.57	9.05	23.62	0.230
	1905	QPSK	1/49	Standard	X	H	16.76	9.07	25.83	0.383
		16QAM	1/25	Standard	X	H	15.91	9.07	24.98	0.315
5	1852.5	QPSK	1/0	Standard	X	H	15.41	9.01	24.42	0.277
		16QAM	1/12	Standard	X	H	14.95	9.01	23.96	0.249
	1880	QPSK	1/12	Standard	X	H	15.46	9.05	24.51	0.282
		16QAM	1/12	Standard	X	H	14.48	9.05	23.53	0.225
	1907.5	QPSK	1/12	Standard	X	H	16.46	9.08	25.54	0.358
		16QAM	1/12	Standard	X	H	15.85	9.08	24.93	0.311
3	1851.5	QPSK	1/7	Standard	X	H	15.14	9.01	24.15	0.260
		16QAM	1/7	Standard	X	H	14.36	9.01	23.37	0.217
	1880	QPSK	1/7	Standard	X	H	15.70	9.05	24.75	0.299
		16QAM	1/7	Standard	X	H	14.92	9.05	23.97	0.249
	1908.5	QPSK	1/14	Standard	X	H	16.14	9.08	25.22	0.333
		16QAM	1/7	Standard	X	H	15.09	9.08	24.17	0.261
1.4	1850.7	QPSK	3/0	Standard	X	H	15.67	9.01	24.68	0.294
		16QAM	3/0	Standard	X	H	14.53	9.01	23.54	0.226
	1880	QPSK	3/0	Standard	X	H	15.10	9.05	24.15	0.260
		16QAM	3/0	Standard	X	H	14.34	9.05	23.39	0.218
	1909.3	QPSK	3/0	Standard	X	H	15.97	9.08	25.05	0.320
		16QAM	3/0	Standard	X	H	15.23	9.08	24.31	0.270

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 7

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	2510	QPSK	1/50	X	H	14.19	9.77	23.96	0.249
		16QAM	1/99	X	H	13.67	9.77	23.44	0.221
	2535	QPSK	1/50	X	H	14.30	9.80	24.10	0.257
		16QAM	1/99	X	H	13.61	9.80	23.41	0.219
	2560	QPSK	1/99	X	H	14.64	9.75	24.39	0.275
		16QAM	1/99	X	H	13.75	9.75	23.50	0.224
15	2507.5	QPSK	1/0	X	H	13.96	9.77	23.73	0.236
		16QAM	1/74	X	H	13.17	9.77	22.94	0.197
	2535	QPSK	1/74	X	H	14.23	9.80	24.03	0.253
		16QAM	1/74	X	H	13.35	9.80	23.15	0.207
	2562.5	QPSK	1/74	X	H	14.38	9.75	24.13	0.259
		16QAM	1/74	X	H	13.52	9.75	23.27	0.212
10	2505	QPSK	1/0	X	H	13.54	9.77	23.31	0.214
		16QAM	1/49	X	H	12.62	9.77	22.39	0.173
	2535	QPSK	1/25	X	H	14.20	9.80	24.00	0.251
		16QAM	1/49	X	H	13.62	9.80	23.42	0.220
	2565	QPSK	1/25	X	H	14.01	9.75	23.76	0.238
		16QAM	1/49	X	H	13.41	9.75	23.16	0.207
5	2502.5	QPSK	1/12	X	H	13.88	9.76	23.64	0.231
		16QAM	1/12	X	H	13.21	9.76	22.97	0.198
	2535	QPSK	1/12	X	H	14.53	9.80	24.33	0.271
		16QAM	1/0	X	H	13.75	9.80	23.55	0.226
	2567.5	QPSK	1/12	X	H	14.26	9.75	24.01	0.252
		16QAM	1/12	X	H	13.47	9.75	23.22	0.210

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 4

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	1720	1/0	QPSK	3422.12	Z	H	-53.24	10.04	-43.20	67.73	37.53
				5133.24	Z	V	-45.50	10.74	-34.76	59.29	
				6844.44	Z	V	-37.42	11.69	-25.73	50.26	
		1/50	16QAM	3440.18	Z	H	-54.48	10.06	-44.42	68.95	36.90
				5133.28	Z	V	-41.62	10.74	-30.88	55.41	
				6880.29	Z	V	-33.98	11.69	-22.29	46.82	
	1732.5	1/0	QPSK	3447.36	Z	H	-54.76	10.06	-44.70	68.68	36.98
				5170.70	Z	V	-38.99	10.76	-28.23	52.21	
				6894.50	Z	V	-36.04	11.69	-24.35	48.33	
		1/0	16QAM	3447.36	Z	H	-54.93	10.06	-44.87	68.85	36.36
				5170.78	Z	V	-37.89	10.76	-27.13	51.11	
				6894.28	Z	V	-34.47	11.69	-22.78	46.76	
	1745	1/0	QPSK	3472.17	Z	H	-55.13	10.09	-45.04	69.31	37.27
				5208.43	Z	V	-40.96	10.77	-30.19	54.46	
				6944.27	Z	V	-37.14	11.70	-25.44	49.71	
		1/0	16QAM	3472.00	Z	H	-55.07	10.09	-44.98	69.25	36.68
				5208.42	Z	V	-41.06	10.77	-30.29	54.56	
				6944.51	Z	V	-37.17	11.70	-25.47	49.74	
15	1717.5	1/74	QPSK	3448.41	Z	H	-55.58	10.07	-45.51	70.04	37.28
				5172.58	Z	V	-39.80	10.76	-29.04	53.57	
				6896.81	Z	V	-35.12	11.69	-23.43	47.96	
		1/0	16QAM	3421.63	Z	H	-54.73	10.04	-44.69	69.22	36.35
				5132.49	Z	V	-41.65	10.74	-30.91	55.44	
				6843.28	Z	V	-33.15	11.69	-21.46	45.99	
	1732.5	1/0	QPSK	3451.60	Z	H	-54.51	10.07	-44.44	68.42	37.73
				5177.50	Z	V	-40.64	10.76	-29.88	53.86	
				6903.48	Z	V	-34.57	11.70	-22.87	46.85	
		1/36	16QAM	3465.27	Z	H	-55.56	10.08	-45.48	69.46	36.55
				5198.00	Z	V	-42.26	10.77	-31.49	55.47	
				6930.63	Z	V	-36.63	11.70	-24.93	48.91	
	1747.5	1/0	QPSK	3481.74	Z	H	-53.86	10.09	-43.77	68.04	37.10
				5222.59	Z	V	-42.66	10.78	-31.88	56.15	
				6963.28	Z	V	-36.43	11.70	-24.73	49.00	
		1/0	16QAM	3481.56	Z	H	-55.17	10.09	-45.08	69.35	36.27
				5222.40	Z	V	-42.39	10.78	-31.61	55.88	
				6963.37	Z	V	-38.88	11.70	-27.18	51.45	

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	1715	1/0	QPSK	3421.15	Z	H	-54.36	10.04	-44.32	68.85	37.61
				5131.70	Z	V	-41.35	10.74	-30.61	55.14	
				6842.44	Z	V	-31.88	11.69	-20.19	44.72	
		1/0	16QAM	3421.23	Z	H	-54.61	10.04	-44.57	69.10	36.89
				5131.65	Z	V	-41.42	10.74	-30.68	55.21	
				6824.29	Z	V	-31.13	11.69	-19.44	43.97	
	1732.5	1/0	QPSK	3456.13	Z	H	-56.05	10.07	-45.98	69.96	37.80
				5184.29	Z	V	-39.71	10.76	-28.95	52.93	
				6912.43	Z	V	-34.54	11.70	-22.84	46.82	
		1/0	16QAM	3456.14	Z	H	-54.81	10.07	-44.74	68.72	37.02
				5184.24	Z	V	-40.51	10.76	-29.75	53.73	
				6912.35	Z	V	-33.77	11.70	-22.07	46.05	
	1750	1/0	QPSK	3491.17	Z	H	-53.75	10.10	-43.65	67.92	37.47
				5236.80	Z	V	-40.90	10.78	-30.12	54.39	
				6982.45	Z	V	-35.90	11.70	-24.20	48.47	
		1/0	16QAM	3491.17	Z	H	-54.21	10.10	-44.11	68.38	36.84
				5236.71	Z	V	-40.57	10.78	-29.79	54.06	
				6982.37	Z	V	-35.73	11.70	-24.03	48.30	
5	1712.5	1/12	QPSK	3425.34	Z	H	-54.81	10.05	-44.76	69.09	37.33
				5138.06	Z	V	-41.13	10.74	-30.39	54.72	
				6850.66	Z	V	-32.29	11.69	-20.60	44.93	
		1/0	16QAM	3420.62	Z	H	-54.53	10.04	-44.49	68.82	36.79
				5130.94	Z	V	-40.97	10.74	-30.23	54.56	
				6841.41	Z	V	-31.37	11.69	-19.68	44.01	
	1732.5	1/0	QPSK	3460.77	Z	H	-55.93	10.08	-45.85	70.39	37.54
				5191.11	Z	V	-41.28	10.76	-30.52	55.06	
				6921.38	Z	V	-35.35	11.70	-23.65	48.19	
		1/12	16QAM	3465.48	Z	H	-56.28	10.08	-46.20	70.74	36.88
				5198.19	Z	V	-43.31	10.77	-32.54	57.08	
				6930.65	Z	V	-36.00	11.70	-24.30	48.84	
	1752.5	1/0	QPSK	3500.76	Z	H	-54.39	10.11	-44.28	68.70	37.42
				5251.20	Z	V	-42.56	10.79	-31.77	56.19	
				7001.40	Z	V	-35.58	11.70	-23.88	48.30	
		1/12	16QAM	3505.39	Z	H	-55.24	10.10	-45.14	69.56	36.78
				5257.96	Z	V	-40.15	10.79	-29.36	53.78	
				7010.67	Z	V	-34.20	11.70	-22.50	46.92	

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)	
3	1711.5	1/7	QPSK	3423.18	Z	H	-54.64	10.04	-44.60	68.93	37.44
				5135.12	Z	V	-43.45	10.74	-32.71	57.04	
				6846.84	Z	V	-32.89	11.69	-21.20	45.53	
		1/7	16QAM	3423.23	Z	H	-54.65	10.04	-44.61	68.94	36.91
				5135.07	Z	V	-43.81	10.74	-33.07	57.40	
				6846.76	Z	V	-32.27	11.69	-20.58	44.91	
	1732.5	1/14	QPSK	3466.85	Z	H	-54.24	10.08	-44.16	68.70	37.22
				5200.77	Z	V	-42.12	10.77	-31.35	55.89	
				6935.17	Z	V	-35.91	11.70	-24.21	48.75	
		1/7	16QAM	3465.36	Z	H	-55.61	10.08	-45.53	70.07	36.61
				5197.95	Z	V	-41.97	10.77	-31.20	55.74	
				6930.60	Z	V	-35.69	11.70	-23.99	48.53	
	1753.5	1/0	QPSK	3504.33	Z	H	-54.19	10.11	-44.08	68.50	37.69
				5256.86	Z	V	-40.26	10.79	-29.47	53.89	
				7008.96	Z	V	-34.70	11.70	-23.00	47.42	
		1/7	16QAM	3504.48	Z	H	-54.52	10.11	-44.41	68.83	36.79
				5261.20	Z	V	-40.02	10.79	-29.23	53.65	
				7014.72	Z	V	-34.19	11.69	-22.50	46.92	
1.4	1710.7	3/0	QPSK	3420.50	Z	H	-54.17	10.04	-44.13	68.46	37.46
				5131.30	Z	V	-44.04	10.74	-33.30	57.63	
				6841.85	Z	V	-31.80	11.69	-20.11	44.44	
		3/0	16QAM	3420.47	Z	H	-54.46	10.04	-44.42	68.75	36.32
				5131.27	Z	V	-43.91	10.74	-33.17	57.50	
				6841.86	Z	V	-31.64	11.69	-19.95	44.28	
	1732.5	3/0	QPSK	3464.23	Z	H	-55.96	10.08	-45.88	70.42	37.51
				5196.70	Z	V	-46.05	10.77	-35.28	59.82	
				6928.97	Z	V	-36.00	11.70	-24.30	48.84	
		3/0	16QAM	3464.55	Z	H	-55.53	10.08	-45.45	69.99	36.56
				5196.78	Z	V	-45.83	10.77	-35.06	59.60	
				6928.86	Z	V	-35.84	11.70	-24.14	48.68	
	1754.3	3/0	QPSK	3508.35	Z	H	-54.67	10.10	-44.57	68.99	36.93
				5262.06	Z	V	-42.05	10.80	-31.25	55.67	
				7016.09	Z	V	-35.03	11.69	-23.34	47.76	
		3/0	16QAM	3508.07	Z	H	-55.24	10.10	-45.14	69.56	36.17
				5262.20	Z	V	-41.72	10.80	-30.92	55.34	
				7016.16	Z	V	-34.56	11.69	-22.87	47.29	

Note 1: Limit Calculation = 43 + $10\log_{10}$ (P[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 2

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	1/0	QPSK	3702.28	X	H	-44.55	9.91	-34.64	59.32	37.68
				5553.40	X	V	-32.01	10.98	-21.03	45.71	
				7404.43	Y	H	-44.00	11.55	-32.45	57.13	
		1/50	16QAM	3787.83	X	H	-46.51	9.83	-36.68	60.65	36.97
				5606.63	X	V	-35.45	11.06	-24.39	48.36	
				7475.75	Y	H	-46.20	11.52	-34.68	58.65	
	1880	1/0	QPSK	3472.18	X	H	-46.24	10.09	-36.15	61.27	38.12
				5613.33	X	V	-34.23	11.07	-23.16	48.28	
				7484.40	Y	H	-47.11	11.52	-35.59	60.71	
		1/0	16QAM	3742.16	X	H	-44.45	9.87	-34.58	59.02	37.44
				5613.23	X	V	-34.19	11.07	-23.12	47.56	
				7484.34	Y	H	-47.12	11.52	-35.60	60.04	
	1900	1/99	QPSK	3817.73	X	H	-44.90	9.80	-35.10	60.95	38.85
				5726.73	X	V	-33.45	11.24	-22.21	48.06	
				7635.70	Y	H	-47.82	11.46	-36.36	62.21	
		1/0	16QAM	3817.83	X	H	-44.79	9.80	-34.99	59.94	37.95
				5726.73	X	V	-34.61	11.24	-23.37	48.32	
				7635.84	Y	H	-48.15	11.46	-36.69	61.64	
15	1857.5	1/0	QPSK	3701.84	X	H	-46.01	9.91	-36.10	61.01	37.91
				5552.60	X	V	-34.08	10.98	-23.10	48.01	
				7403.30	Y	H	-44.75	11.55	-33.20	58.11	
		1/0	16QAM	3701.70	X	H	-46.67	9.91	-36.76	61.00	37.24
				5552.56	X	V	-33.90	10.98	-22.92	47.16	
				7403.17	Y	H	-45.19	11.55	-33.64	57.88	
	1880	1/0	QPSK	3746.51	X	H	-46.02	9.87	-36.15	61.11	37.96
				5619.99	X	V	-32.78	11.08	-21.70	46.66	
				7493.37	Y	H	-47.13	11.52	-35.61	60.57	
		1/74	16QAM	3733.44	X	H	-47.83	9.88	-37.95	62.12	37.17
				5660.03	X	V	-35.44	11.14	-24.30	48.47	
				7546.55	Y	H	-45.52	11.50	-34.02	58.19	
	1902.5	1/74	QPSK	3818.60	X	H	-46.05	9.80	-36.25	62.00	38.75
				5727.51	X	V	-34.15	11.24	-22.91	48.66	
				7636.63	Y	H	-48.13	11.46	-36.67	62.42	
		1/0	16QAM	3791.86	X	H	-48.05	9.82	-38.23	62.96	37.73
				5687.45	X	V	-33.27	11.18	-22.09	46.82	
				7583.35	Y	H	-48.74	11.48	-37.26	61.99	

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	1855	1/0	QPSK	3701.13	X	H	-47.67	9.91	-37.76	62.37	37.61
				5551.79	X	V	-34.36	10.98	-23.38	47.99	
				7402.57	Y	H	-44.38	11.55	-32.83	57.44	
		1/0	16QAM	3701.02	X	H	-48.32	9.91	-38.41	62.50	37.09
				5551.82	X	V	-34.06	10.98	-23.08	47.17	
				7402.46	Y	H	-45.69	11.55	-34.14	58.23	
	1880	1/0	QPSK	3751.22	X	H	-45.59	9.86	-35.73	60.18	37.45
				5626.81	X	V	-35.80	11.09	-24.71	49.16	
				7502.60	Y	H	-47.67	11.51	-36.16	60.61	
		1/25	16QAM	3760.20	X	H	-47.34	9.86	-37.48	61.10	36.62
				5626.69	X	V	-34.23	11.09	-23.14	46.76	
				7520.22	Y	H	-49.07	11.51	-37.56	61.18	
	1905	1/49	QPSK	3818.82	X	H	-45.11	9.80	-35.31	61.14	38.83
				5728.20	X	V	-33.64	11.24	-22.40	48.23	
				7637.74	Y	H	-48.63	11.46	-37.17	63.00	
		1/25	16QAM	3810.15	X	H	-46.49	9.81	-36.68	61.66	37.98
				5715.23	X	V	-34.59	11.22	-23.37	48.35	
				7620.33	Y	H	-47.71	11.47	-36.24	61.22	
5	1852.5	1/0	QPSK	3700.65	X	H	-46.54	9.91	-36.63	61.05	37.42
				5551.13	X	V	-33.11	10.98	-22.13	46.55	
				7401.26	Y	H	-48.18	11.55	-36.63	61.05	
		1/12	16QAM	3705.40	X	H	-48.17	9.91	-38.26	62.22	36.96
				5558.07	X	V	-31.87	10.99	-20.88	44.84	
				7410.75	Y	H	-46.08	11.55	-34.53	58.49	
	1880	1/12	QPSK	3755.82	X	H	-47.40	9.86	-37.54	62.05	37.51
				5640.48	X	V	-29.40	11.11	-18.29	42.80	
				7520.46	Y	H	-47.70	11.51	-36.19	60.70	
		1/12	16QAM	3760.23	X	H	-47.35	9.85	-37.50	61.03	36.53
				5640.49	X	V	-29.05	11.11	-17.94	41.47	
				7520.48	Y	H	-48.79	11.51	-37.28	60.81	
	1907.5	1/12	QPSK	3815.45	X	H	-45.03	9.80	-35.23	60.77	38.54
				5723.06	X	V	-31.84	11.23	-20.61	46.15	
				7630.50	Y	H	-47.28	11.47	-35.81	61.35	
		1/12	16QAM	3815.25	X	H	-44.28	9.80	-34.48	59.41	37.93
				5723.04	X	V	-31.09	11.23	-19.86	44.79	
				7630.33	Y	H	-47.45	11.47	-35.98	60.91	

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)	
3	1851.5	1/7	QPSK	3703.25	X	H	-46.64	9.91	-36.73	60.88	37.15
				5555.01	X	V	-32.22	10.98	-21.24	45.39	
				7406.74	Y	H	-47.61	11.55	-36.06	60.21	
		1/7	16QAM	3703.19	X	H	-47.00	9.91	-37.09	60.46	36.37
				5550.01	X	V	-32.44	10.98	-21.46	44.83	
				7406.57	Y	H	-47.14	11.55	-35.59	58.96	
	1880	1/7	QPSK	3760.47	X	H	-45.26	9.85	-35.41	60.16	37.75
				5640.55	X	V	-29.74	11.11	-18.63	43.38	
				7520.59	Y	H	-47.95	11.51	-36.44	61.19	
		1/7	16QAM	3760.27	X	H	-44.50	9.85	-34.65	58.62	36.97
				5640.55	X	V	-29.36	11.11	-18.25	42.22	
				7520.91	Y	H	-48.58	11.51	-37.07	61.04	
	1908.5	1/14	QPSK	3819.73	X	H	-46.39	9.80	-36.59	61.81	38.22
				5729.27	X	V	-30.11	11.24	-18.87	44.09	
				7639.22	Y	H	-49.32	11.46	-37.86	63.08	
		1/7	16QAM	3817.40	X	H	-46.26	9.80	-36.46	60.63	37.17
				5725.98	X	V	-29.78	11.24	-18.54	42.71	
				7634.75	Y	H	-47.76	11.47	-36.29	60.46	
1.4	1850.7	3/0	QPSK	3700.66	X	H	-50.86	9.91	-40.95	65.63	37.68
				5551.29	X	V	-32.49	10.98	-21.51	46.19	
				7401.86	Y	H	-46.55	11.55	-35.00	59.68	
		3/0	16QAM	3700.69	X	H	-49.90	9.91	-39.99	63.53	36.54
				5551.37	X	V	-32.67	10.98	-21.69	45.23	
				7401.57	Y	H	-46.21	11.55	-34.66	58.20	
	1880	3/0	QPSK	3759.54	X	H	-49.53	9.86	-39.67	63.82	37.15
				5639.19	X	V	-31.78	11.11	-20.67	44.82	
				7519.05	Y	H	-46.91	11.51	-35.40	59.55	
		3/0	16QAM	3759.60	X	H	-50.18	9.86	-40.32	63.71	36.39
				5639.36	X	V	-31.26	11.11	-20.15	43.54	
				7519.14	Y	H	-46.89	11.51	-35.38	58.77	
	1909.3	3/0	QPSK	3818.20	X	H	-49.69	9.80	-39.89	64.94	38.05
				5727.16	X	V	-29.26	11.24	-18.02	43.07	
				7326.28	Y	H	-47.80	11.58	-36.22	61.27	
		3/0	16QAM	3818.04	X	H	-49.64	9.80	-39.84	64.15	37.31
				5727.12	X	V	-30.11	11.24	-18.87	43.18	
				7636.16	Y	H	-47.88	11.46	-36.42	60.73	

Note 1: Limit Calculation = 43 + $10\log_{10}$ (P[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.

7.6.3 LTE Band 7

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	2510	1/50	QPSK	5020.19	Y	H	-47.00	10.69	-36.31	60.27	48.96
				7530.26	Z	V	-53.61	11.50	-42.11	66.07	
				10040.44	Y	H	-46.44	12.24	-34.20	58.16	
		1/99	16QAM	5037.85	Y	H	-49.45	10.70	-38.75	62.19	48.44
				7556.82	Z	V	-52.17	11.49	-40.68	64.12	
				10075.64	Y	H	-46.86	12.26	-34.60	58.04	
	2535	1/50	QPSK	5070.19	Y	H	-46.24	10.71	-35.53	59.63	49.10
				7605.29	Z	V	-51.47	11.48	-39.99	64.09	
				10140.56	Y	H	-43.82	12.29	-31.53	55.63	
		1/99	16QAM	5087.85	Y	H	-47.31	10.72	-36.59	60.00	48.41
				7631.55	Z	V	-52.70	11.47	-41.23	64.64	
				10175.78	Y	H	-44.19	12.30	-31.89	55.30	
	2560	1/99	QPSK	5137.79	Y	H	-47.75	10.74	-37.01	61.40	49.39
				7706.64	Z	V	-52.45	11.44	-41.01	65.40	
				10275.49	Y	H	-42.17	12.35	-29.82	54.21	
		1/99	16QAM	5137.93	Y	H	-49.06	10.74	-38.32	61.82	48.50
				7706.67	Z	V	-52.03	11.44	-40.59	64.09	
				10275.64	Y	H	-41.72	12.35	-29.37	52.87	
15	2507.5	1/0	QPSK	5001.75	Y	H	-48.95	10.68	-38.27	62.00	48.73
				7502.69	Z	V	-51.80	11.51	-40.29	64.02	
				10003.60	Y	H	-46.48	12.22	-34.26	57.99	
		1/74	16QAM	5028.16	Y	H	-47.82	10.69	-37.13	60.07	47.94
				7542.66	Z	V	-50.92	11.50	-39.42	62.36	
				10056.53	Y	H	-47.55	12.25	-35.30	58.24	
	2535	1/74	QPSK	5083.35	Y	H	-46.97	10.72	-36.25	60.28	49.03
				7624.98	Z	V	-52.11	11.47	-40.64	64.67	
				10166.57	Y	H	-44.00	12.30	-31.70	55.73	
		1/74	16QAM	5083.40	Y	H	-46.45	10.72	-35.73	58.88	48.15
				7624.05	Z	V	-51.82	11.47	-40.35	63.50	
				10166.79	Y	H	-44.10	12.30	-31.80	54.95	
	2562.5	1/74	QPSK	5137.43	Y	H	-45.70	10.74	-34.96	59.09	49.13
				7707.53	Z	V	-51.97	11.44	-40.53	64.66	
				10276.70	Y	H	-40.94	12.35	-28.59	52.72	
		1/74	16QAM	5138.35	Y	H	-47.16	10.74	-36.42	59.69	48.27
				7707.37	Z	V	-52.70	11.44	-41.26	64.53	
				10276.52	Y	H	-41.39	12.35	-29.04	52.31	

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	2505	1/0	QPSK	5001.26	Y	H	-48.37	10.68	-37.69	61.00	48.31
				7501.79	Z	V	-51.82	11.51	-40.31	63.62	
				10002.30	Y	H	-47.18	12.22	-34.96	58.27	
		1/49	16QAM	5018.75	Y	H	-49.34	10.69	-38.65	61.04	47.39
				7528.29	Z	V	-52.15	11.50	-40.65	63.04	
				10037.66	Y	H	-46.27	12.24	-34.03	56.42	
	2535	1/25	QPSK	5070.34	Y	H	-46.70	10.71	-35.99	59.99	49.00
				7605.29	Z	V	-52.50	11.48	-41.02	65.02	
				10140.35	Y	H	-42.88	12.29	-30.59	54.59	
		1/49	16QAM	5078.86	Y	H	-46.19	10.71	-35.48	58.90	48.42
				7618.21	Z	V	-52.37	11.47	-40.90	64.32	
				10157.51	Y	H	-43.41	12.29	-31.12	54.54	
	2565	1/25	QPSK	5130.16	Y	H	-45.15	10.74	-34.41	58.17	48.76
				7695.49	Z	V	-52.13	11.44	-40.69	64.45	
				10260.47	Y	H	-40.95	12.34	-28.61	52.37	
		1/49	16QAM	5138.75	Y	H	-46.73	10.74	-35.99	59.15	48.16
				7708.20	Z	V	-51.76	11.44	-40.32	63.48	
				10277.85	Y	H	-41.70	12.35	-29.35	52.51	
5	2502.5	1/12	QPSK	5005.41	Y	H	-46.84	10.68	-36.16	59.80	48.64
				7508.02	Z	V	-51.78	11.51	-40.27	63.91	
				10010.73	Y	H	-46.79	12.23	-34.56	58.20	
		1/12	16QAM	5005.35	Y	H	-46.34	10.68	-35.66	58.63	47.97
				7507.81	Z	V	-52.39	11.51	-40.88	63.85	
				10010.60	Y	H	-45.60	12.22	-33.38	56.35	
	2535	1/12	QPSK	5070.40	Y	H	-47.83	10.71	-37.12	61.45	49.33
				7605.53	Z	V	-52.38	11.48	-40.90	65.23	
				10140.75	Y	H	-45.45	12.29	-33.16	57.49	
		1/0	16QAM	5070.39	Y	H	-47.49	10.71	-36.78	60.33	48.55
				7598.38	Z	V	-52.88	11.48	-41.40	64.95	
				10131.15	Y	H	-45.60	12.28	-33.32	56.87	
	2567.5	1/12	QPSK	5135.33	Y	H	-46.41	10.74	-35.67	59.68	49.01
				7703.08	Z	V	-53.82	11.44	-42.38	66.39	
				10270.55	Y	H	-42.70	12.35	-30.35	54.36	
		1/12	16QAM	5135.40	Y	H	-47.34	10.74	-36.60	59.82	48.22
				7703.13	Z	V	-53.29	11.44	-41.85	65.07	
				10270.75	Y	H	-43.51	12.35	-31.16	54.38	

Note 1: Limit Calculation = 55 + 10log$_{10}$ (P[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.

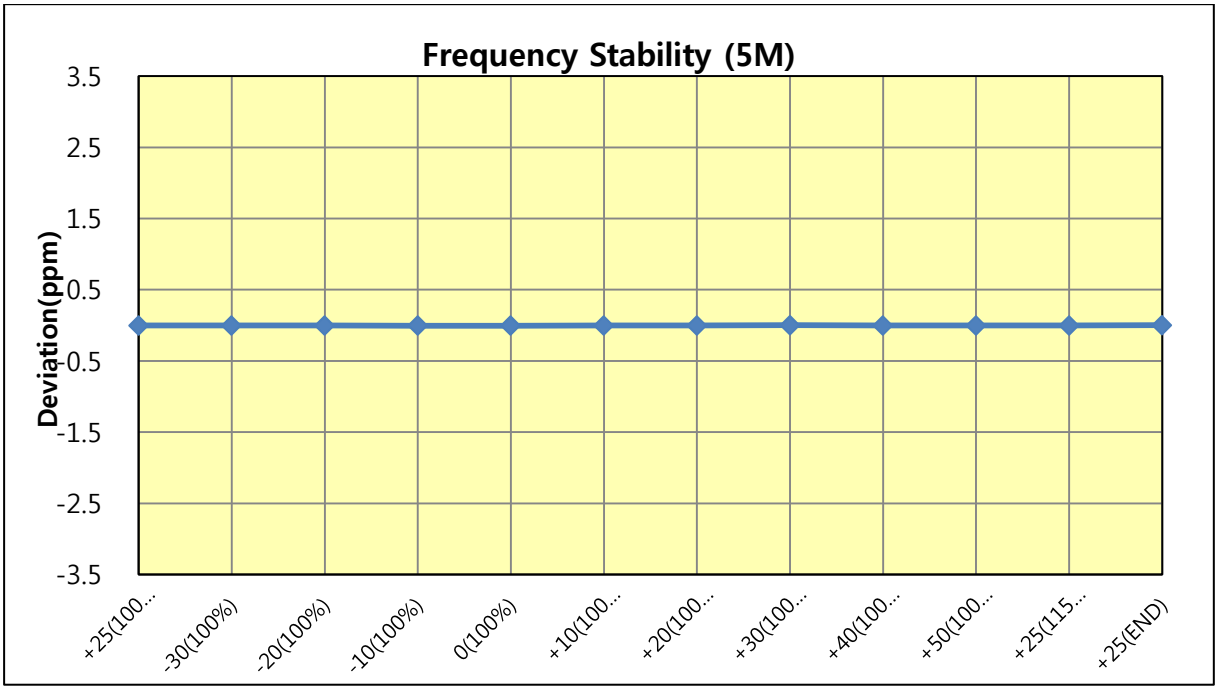
Note 3: The frequency spectrum is examined from 9 kHz to the 10th harmonic of the fundamental frequency of the transmitter. No other spurious and harmonic emissions were reported greater than listed emissions above table.

7.7 FREQUENCY STABILITY

7.7.1 LTE Band 4

OPERATING FREQUENCY : 1732.5 MHz
CHANNEL : 20175
REFERENCE VOLTAGE : 3.8 VDC
LIMIT : The frequency stability shall be sufficient to ensure that the fundamental emission stays wthin the authorized frequency block.

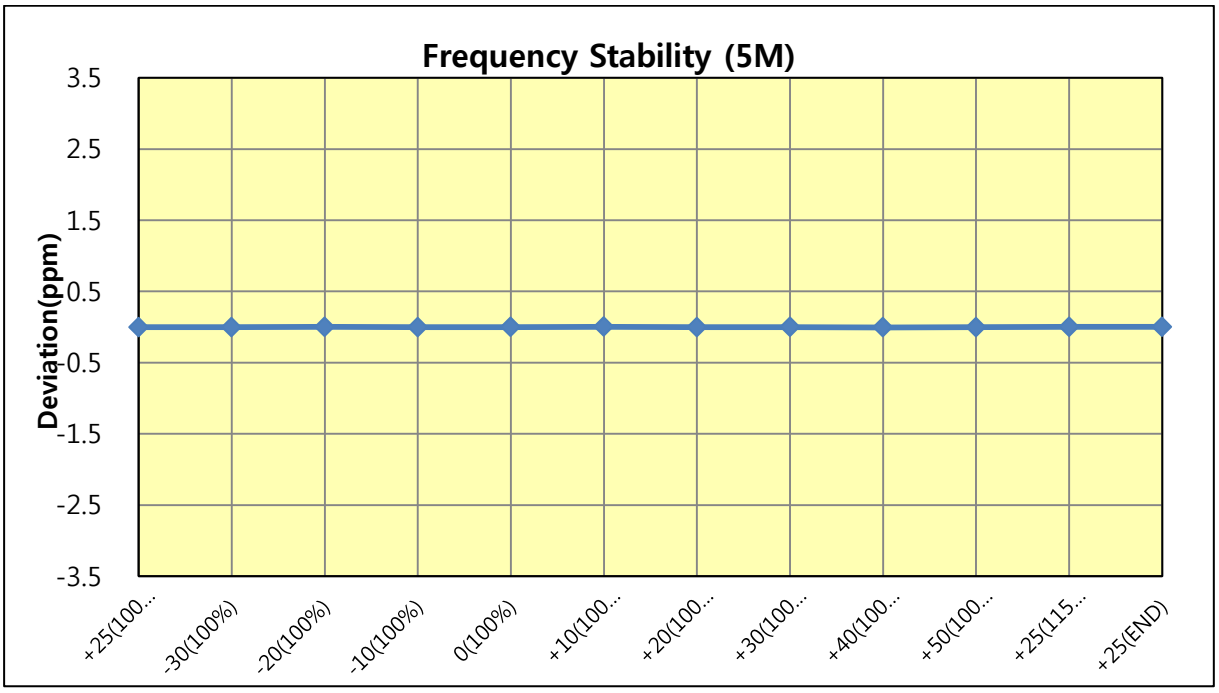
VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	3.80	+25(Ref)	1,732,499,997	-4	-0.0020	-0.000000202
100%		-30	1,732,499,995	-5	-0.0027	-0.000000271
100%		-20	1,732,499,997	-3	-0.0016	-0.000000162
100%		-10	1,732,499,993	-7	-0.0038	-0.000000381
100%		0	1,732,499,990	-10	-0.0055	-0.000000554
100%		10	1,732,499,997	-3	-0.0018	-0.000000179
100%		20	1,732,499,996	-4	-0.0022	-0.000000219
100%		30	1,732,500,005	5	0.0026	0.000000260
100%		40	1,732,499,996	-4	-0.0021	-0.000000214
100%		50	1,732,499,996	-4	-0.0023	-0.000000231
115%	4.37	25	1,732,499,996	0	-0.0023	-0.000000231
BATT.ENDPOINT	3.23	25	1,732,500,002	-4	0.0013	0.000000127



7.7.2 LTE Band 2

OPERATING FREQUENCY : 1800 MHz
CHANNEL : 18900
REFERENCE VOLTAGE : 3.8 VDC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

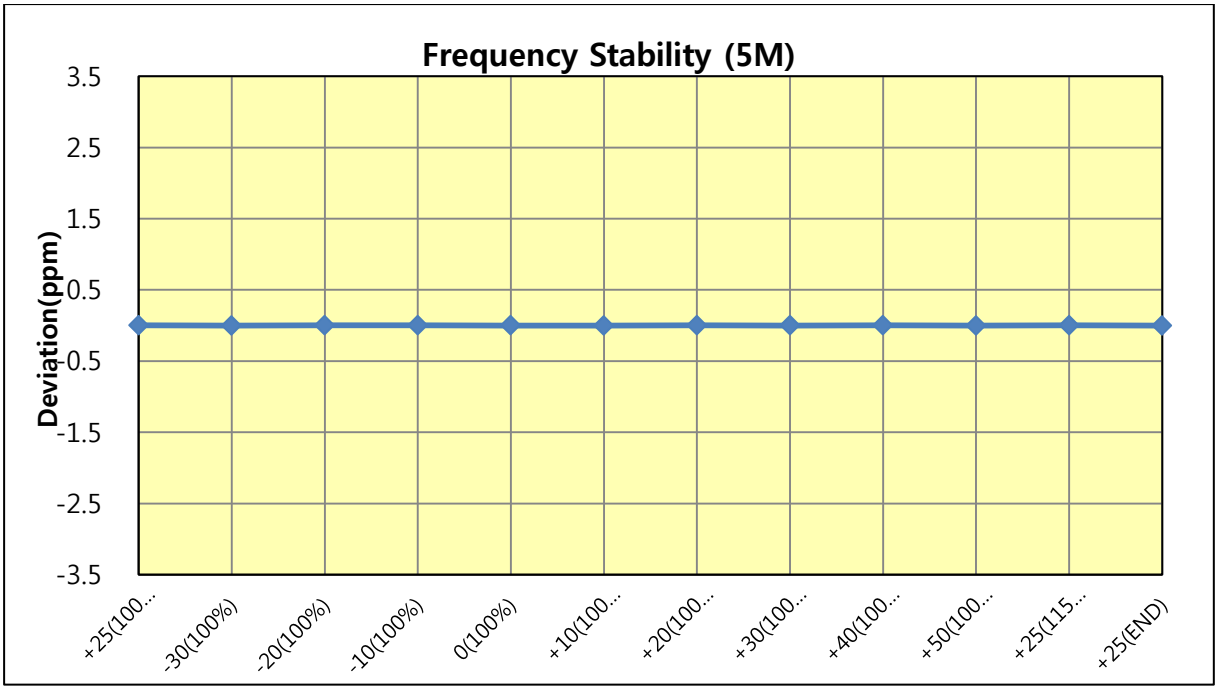
VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	3.80	+25(Ref)	1,879,999,996	-4	-0.0021	-0.000000207
100%		-30	1,879,999,994	-6	-0.0030	-0.000000303
100%		-20	1,880,000,002	2	0.0012	0.000000117
100%		-10	1,879,999,996	-4	-0.0019	-0.000000191
100%		0	1,879,999,998	-2	-0.0010	-0.000000096
100%		+10	1,880,000,009	9	0.0050	0.000000500
100%		+20	1,879,999,997	-3	-0.0016	-0.000000165
100%		+30	1,880,000,002	2	0.0008	0.000000080
100%		+40	1,879,999,992	-8	-0.0042	-0.000000420
100%		+50	1,879,999,997	-3	-0.0015	-0.000000154
115%	4.37	+25	1,880,000,003	0	0.0018	0.000000181
BATT.ENDPOINT	3.23	+25	1,880,000,003	3	0.0018	0.000000176



7.7.3 LTE Band 7

OPERATING FREQUENCY : 2535 MHz
CHANNEL : 21000
REFERENCE VOLTAGE : 3.8 VDC
DEVIATION LIMIT : ± 0.00025 % or 2.5 ppm

VOLTAGE (%)	POWER (V DC)	TEMP (℃)	FREQUENCY (Hz)	FREQ.Dev (Hz)	Deviation	
					(ppm)	(%)
100%	3.80	+25(Ref)	2,535,000,006	6	0.0024	0.000000241
100%		-30	2,534,999,997	-4	-0.0014	-0.000000138
100%		-20	2,535,000,003	3	0.0010	0.000000099
100%		-10	2,535,000,004	4	0.0017	0.000000166
100%		0	2,534,999,997	-3	-0.0013	-0.000000126
100%		+10	2,534,999,996	-4	-0.0017	-0.000000166
100%		+20	2,535,000,003	3	0.0010	0.000000103
100%		+30	2,534,999,998	-2	-0.0007	-0.000000067
100%		+40	2,535,000,005	5	0.0019	0.000000189
100%		+50	2,534,999,996	-4	-0.0017	-0.000000170
115%	4.37	+25	2,535,000,008	0	0.0030	0.000000300
BATT.ENDPOINT	3.23	+25	2,534,999,995	8	-0.0018	-0.000000181

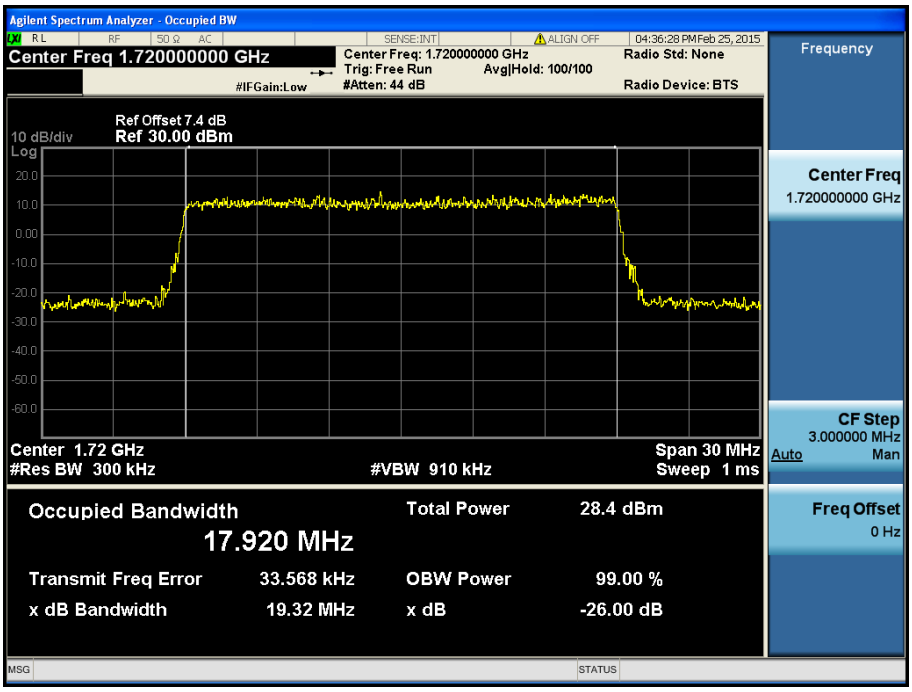


8. TEST PLOTS

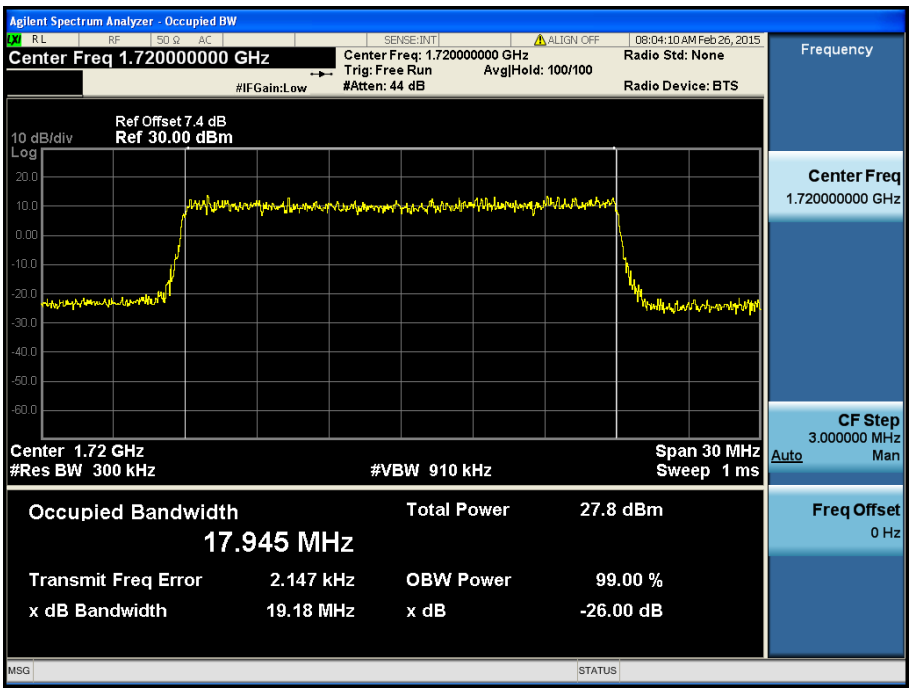
Note: All bandwidths, RB configurations, and modulations were investigated. The worst case test results are reported below.

8.1 OCCUPIED BANDWIDTH

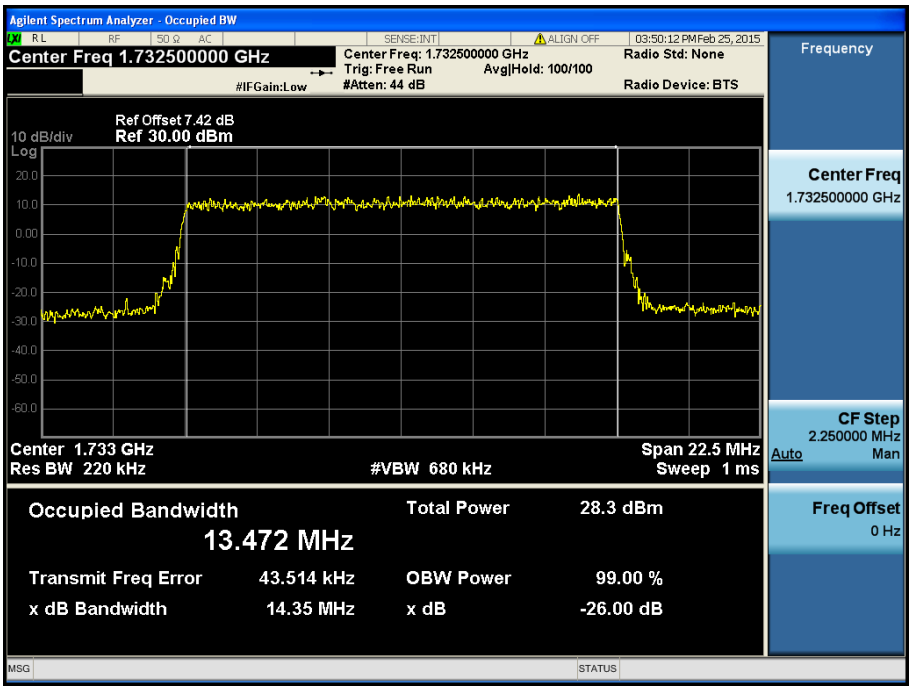
8.1.1 LTE Band 4



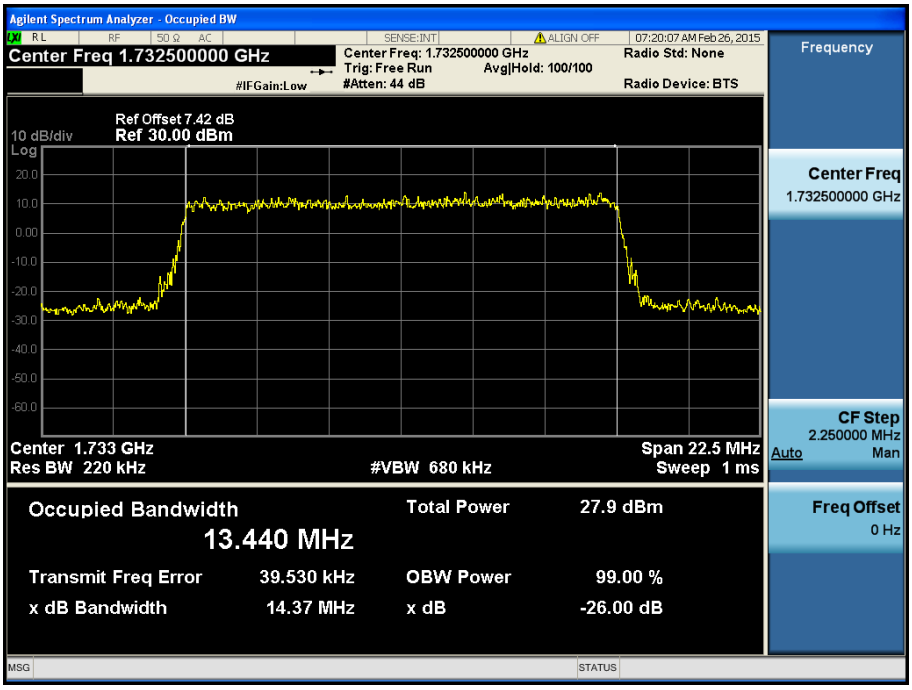
LTE Band 4 / 20 MHz / QPSK - RB Size 100



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