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REPORT

FCC Certification

Applicant Name:
KMW U.S.A.,INC.

Address:
1818 E. Orangethorpe Ave. Fullerton,
CA 92831

Date of Issue:
September 07, 2016
Test Site/Location:
HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA
Report No.: HCT-R-1609-F005
HCT FRN: 0005866421
IC Recognition No.: 5944A-5

FCC ID:	**ZUQ-H-FEM-L-W**
APPLICANT:	**KMW U.S.A., INC.**

Model(s):	POD-H-FEM-L-W
EUT Type:	DAS 7-Band Remote Unit
Frequency Range :	UL : 2305 MHz ~2315 MHz (WCS)
Conducted Output Power:	UL : 0.316 mW (-5 dBm)
Date of Test:	December 07, 2015 ~ February 23, 2016
FCC Rule Part(s):	CFR 47 Part 2, Part 27

The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of the FCC Rules under normal use and maintenance.

Report prepared by
:Kyung Soo Kang
Test engineer of RF Team

Approved by
:Jong Seok Lee
Manager of RF Team

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-R-1609-F005	September 07, 2016	- First Approval Report

Table of Contents

1. CLIENT INFORMATION 4

2. FACILITIES AND ACCREDITATIONS 5

2.1. FACILITIES 5

2.2. EQUIPMENT 5

3. TEST SPECIFICATIONS 6

3.1. STANDARDS 6

3.2. MODE OF OPERATION DURING THE TEST 7

3.3. MAXIMUM MEASUREMENT UNCERTAINTY 7

4. STANDARDS ENVIRONMENTAL TEST CONDITIONS 7

5. TEST EQUIPMENT 8

6. RF OUTPUT POWER 9

7. OCCUPIED BANDWIDTH 14

8. OUT OF BAND REJECTION 19

9. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL 21

10. RADIATED SPURIOUS EMISSIONS 32

1. CLIENT INFORMATION

The EUT has been tested by request of

Company	KMW U.S.A.,INC. 1818 E. Orangethorpe Ave. Fullerton, CA 92831

FCC ID:	ZUQ-H-FEM-L-W
EUT Type:	DAS 7-Band Remote Unit
FCC Model(s):	POD-H-FEM-L-W
Frequency Ranges :	UL : 2305 MHz ~2315 MHz (WCS)
Conducted Output Power:	UL : 0.316 mW (-5 dBm)
Antenna Gain(s):	Manufacturer does not provide an antenna.
Measurement standard(s):	ANSI/TIA-603-C-2004, KDB 971168 D01 v02r02, KDB 935210 D02 v03r02, KDB 935210 D05 v01r01, KDB 662911 D01 v02r01
FCC Rule Part(s):	CFR 47 Part 2, Part 27
Place of Tests:	HCT CO., LTD., 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA (IC Recognition No. : 5944A-5)

2. FACILITIES AND ACCREDITATIONS

2.1. FACILITIES

The SAC(Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA. The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2003) and CISPR Publication 22. Detailed description of test facility was submitted to the Commission and accepted dated July 07, 2015 (Registration Number: 90661).

2.2. EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3. TEST SPECIFICATIONS

3.1. STANDARDS

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 2, Part 27.

Description	Reference (FCC)	Results
Conducted RF Output Power	§2.1046; §27.50	Compliant
Occupied Bandwidth	§2.1049	Compliant
Passband Gain and Bandwidth & Out of Band Rejection	KDB 935210 D02 v03r02	Compliant
Spurious Emissions at Antenna Terminals	§2.1051, §27.53	Compliant
Radiated Spurious Emissions	§2.1053, §27.53	Compliant
Frequency Stability	§2.1055, §27.54	N/A The EUT does not perform frequency translation

NOTE. DAS 7-Band Remote Unit supports SISO and MIMO system.
Support frequency Band
SISO system : 700M, SMR800, 850M, PCS, AWS, WCS, BRS
MIMO system : 700M, PCS, AWS, BRS

Calculation methods.
RF Output Power : KDB 662911 D01 v02r01, section E)2)c)
Out-of-Band and Spurious Emission : KDB 662911 D01 v02r01, section E)3)a)iii)

3.2. MODE OF OPERATION DURING THE TEST

The EUT was operated in a manner representative of the typical usage of the equipment.
During all testing, system components were manipulated within the confines of typical usage to maximize each emission.
The device does not supply antenna(s) with the system, so the dummy loads were connected to the RF output ports for radiated spurious emission testing.

Band Info	Modulation
WCS	LTE(10 MHz)

3.3. MAXIMUM MEASUREMENT UNCERTAINTY

The value of the measurement uncertainty for the measurement of each parameter.
Coverage factor *k* = 2, Confidence levels of 95 %

Description	Condition	Uncertainty
Conducted RF Output Power	-	± 0.72 dB
Occupied Bandwidth	OBW ≤ 20 MHz	± 52 kHz
Passband Gain and Bandwidth & Out of Band Rejection	Gain 20 dB bandwidth	± 0.89 dB ± 0.58 MHz
Spurious Emissions at Antenna Terminals	-	± 1.08 dB
Radiated Spurious Emissions	f ≤ 1 GHz f > 1 GHz	± 4.80 dB ± 6.07 dB

4. STANDARDS ENVIRONMENTAL TEST CONDITIONS

Temperature :	**+ 15 ℃ to + 35 ℃**
Relative humidity:	**30 % to 60 %**
Air pressure	**860 mbar to 1 060 mbar**

5. TEST EQUIPMENT

Manufacturer	Model / Equipment	Cal Interval	Calibration Date	Serial No.
Agilent	E4438C /Signal Generator	Annual	09/02/2015	MY42082646
Agilent	N5182A /Signal Generator	Annual	04/07/2015	MY50141649
Agilent	N5182A /Signal Generator	Annual	05/13/2015	MY47070230
Rohde & Schwarz	SMBV100A /Signal Generator	Annual	10/20/2015	255727
Rohde & Schwarz	SMB100A /Signal Generator	Annual	07/16/2015	177633
NANGYEUL CO., LTD.	NY-THR18750 / Temperature and Humidity Chamber	Annual	10/27/2015	NY-2009012201A
Agilent	N9020A /Signal Analyzer	Annual	02/27/2015	MY46471587
WEINSCHEL	67-30-33 / Fixed Attenuator	Annual	10/29/2015	BR5347
DEAYOUNG ENT	DFSS60 / AC Power Supply	Annual	04/01/2015	1003030-1
Rohde & Schwarz	FSP / Spectrum Analyzer	Annual	09/24/2015	100688
CERNEX, Inc	CBLU1183540/AMP	Annual	07/21/2015	22964
WEINSCHEL	1506A/Power Divider	Annual	10/21/2015	MD793
Schwarzbeck	BBHA 9120D / Horn Antenna	Biennial	07/30/2015	1151
Schwarzbeck	VULB 9160 / TRILOG Antenna	Biennial	10/10/2014	9160-3368
HD	MA240 / Antenna Position Tower	N/A	N/A	556
EMCO	1050 / Turn Table	N/A	N/A	114
HD GmbH	HD 100 / Controller	N/A	N/A	13
HD GmbH	KMS 560/ SlideBar	N/A	N/A	12

6. RF OUTPUT POWER

FCC Rules

Test Requirements:

§ 2.1046 Measurements required: RF power output:

§ 2.1046 (a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in § 2.1033(c)(8).The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

§ 2.1046 (b) For single sideband, independent sideband, and single channel, controlled carrier Radio telephone transmitters, the procedure specified in paragraph (a) of this section shall be employed and, in addition, the transmitter shall be modulated during the test as specified and as applicable in § 2.1046 (b) (1-5). In all tests, the input level of the modulating signal shall be such as to develop rated peak envelope power or carrier power, as appropriate, for the transmitter.

§ 2.1046 (c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all Calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.

§ 27.50 Power limits and duty cycle.

(a) The following power limits and related requirements apply to stations transmitting in the 2305-2320 MHz band or the 2345-2360 MHz band.(1) Base and fixed stations. (i) For base and fixed stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band:

(A) The average equivalent isotropically radiated power (EIRP) must not exceed 2,000 watts within any 5 megahertz of authorized bandwidth and must not exceed 400 watts within any 1 megahertz of authorized bandwidth.

(B) The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB. The PAPR measurements should be made using either an instrument with complementary cumulative distribution function (CCDF) capabilities to determine that PAPR will not exceed 13 dB for more than 0.1 percent of the time or other Commission approved procedure. The measurement must be performed using a signal corresponding to the highest PAPR expected during periods of continuous transmission.

Test Procedures:

Measurements were in accordance with the test methods section 3.5.2 of KDB 935210 D05 v01.

a) Connect a signal generator to the input of the EUT.

b) Configure to generate the AWGN (broadband) test signal.

c) The frequency of the signal generator shall be set to the frequency of (f0) as determined from 3.3.

d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.

e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.

f) Measure the output power of the EUT and record (Power measurement with a spectrum analyzer).

g) Remove the EUT from the measurement setup and using the same signal generator settings, repeat the power measurement on the input signal to the EUT and record as input power.

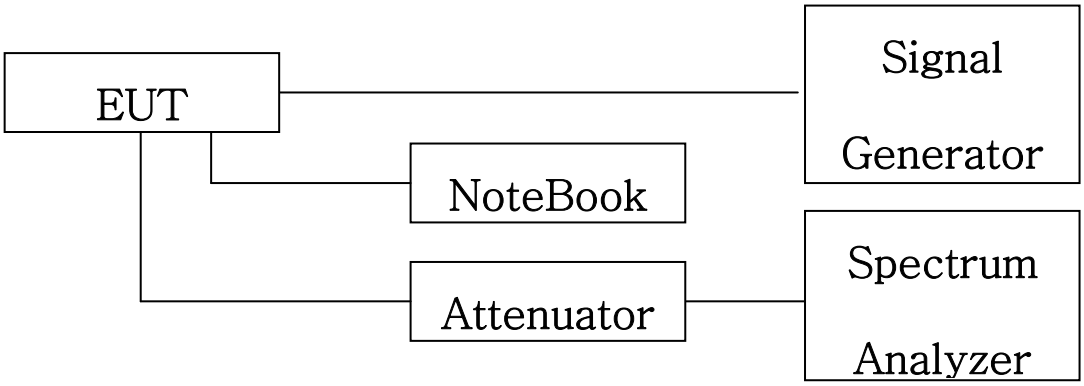
h) Repeat the procedure with the narrowband test signal.

i) Repeat the procedure for both test signals with input signal amplitude set to 3 dB above the AGC threshold level.

j) Repeat for all frequency bands authorized for use by the EUT.

Power measurement Method :

Guidance for performing input/output power measurements using a spectrum or signal analyzer is provided in 5.2 of KDB Publication 971168.



Block Diagram 1. RF Power Output Test Setup

Test Results:

Input Signal	Input Level (dBm)	Maximum Amp Gain
WCS	DL : -15 dBm UL : -45 dBm	DL : 45 dB UL : 40 dB

Single channel Enhancer

* Due to EUT's ALC function (Auto Level Control), even if input signal is increased,

The same output power is transmit.

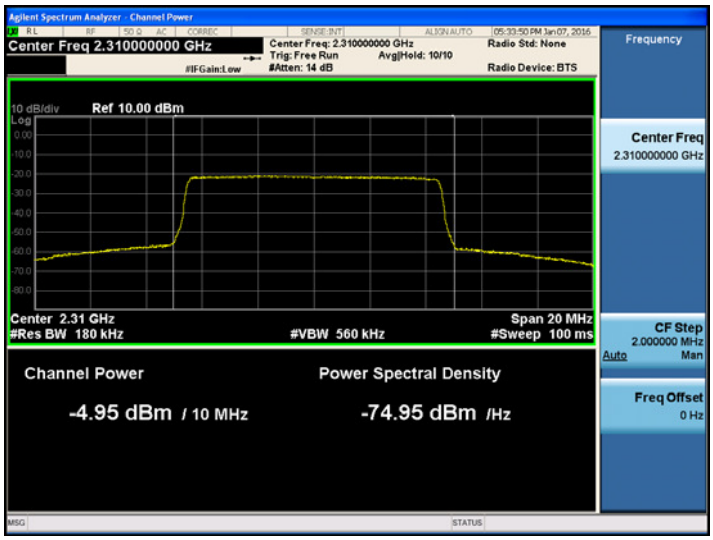
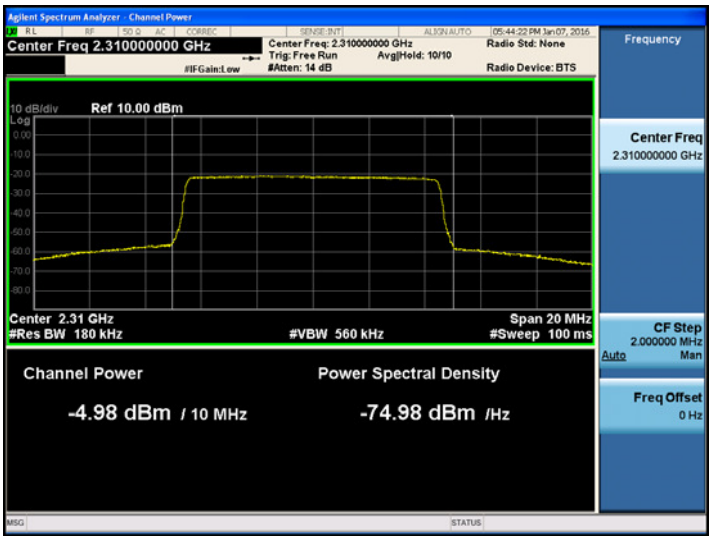
[Uplink]

	Channel	**Frequency (MHz)**	**Output Power**	
			(dBm)	**(W)**
WCS_ LTE 10MHz AGC threshold	Low	-	-	-
	Middle	2310.00	-4.95	0.320
	High	-	-	-
WCS_ LTE 10MHz +3dBm above the AGC threshold	Low	-	-	-
	Middle	2310.00	-4.98	0.318
	High	-	-	-

	Channel	Frequency (MHz)	PAR (dB)
WCS_ LTE 10MHz the peak-to-average ratio (PAR) AGC threshold	Low	-	-
	Middle	2310.00	9.82
	High	-	-
WCS_ LTE 10MHz the peak-to-average ratio (PAR) +3dBm above the AGC threshold	Low	-	-
	Middle	2310.00	8.25
	High	-	-

Single channel Enhancer Plots of RF Output Power

WCS LTE 10MHz Band UL

[WCS AGC threshold Uplink LTE 10MHz]	[WCS +3dB above the threshold Uplink LTE 10MHz]
	

7. OCCUPIED BANDWIDTH

FCC Rules

Test Requirement(s):

§ 2.1049 Measurements required: Occupied bandwidth:

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 radiated by a given emission shall be measured under the specified conditions of § 2.1049 (a) through (i) as applicable.

Test Procedures:

Measurements were in accordance with the test methods section 3.4 of KDB 935210 D05 v01 and section 4.2 of KDB 971168 D01 v02r02.

Test is 99% OBW measured and used.

a) Connect a signal generator to the input of the EUT.

b) Configure the signal generator to transmit the AWGN signal.

c) Configure the signal amplitude to be just below the AGC threshold level (see 3.2), but not more than 0.5 dB below.

d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.

e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test. The span range of the spectrum analyzer shall be between 2 times to 5 times the OBW.

f) The nominal resolution bandwidth (RBW) shall be in the range of 1% to 5 % of the anticipated OBW, and the VBW shall be ≥ 3 × RBW.

g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level.

NOTE—Steps f) and g) may require iteration to enable adjustments within the specified tolerances.

h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.

i) Set spectrum analyzer detection function to positive peak.

j) Set the trace mode to max hold.

k) Use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

l) Repeat steps e) to k) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).

m) Compare the spectral plot of the input signal (determined from step l) to the output signal

(determined from step k) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral locations), and include plot(s) and descriptions in test report.

n) Repeat for all frequency bands authorized for use by the EUT.

Test Results: The EUT complies with the requirements of this section.

Input Signal	Input Level (dBm)	Maximum Amp Gain
WCS	DL : -15 dBm UL : -45 dBm	DL : 45 dB UL : 40 dB

[Uplink Output]

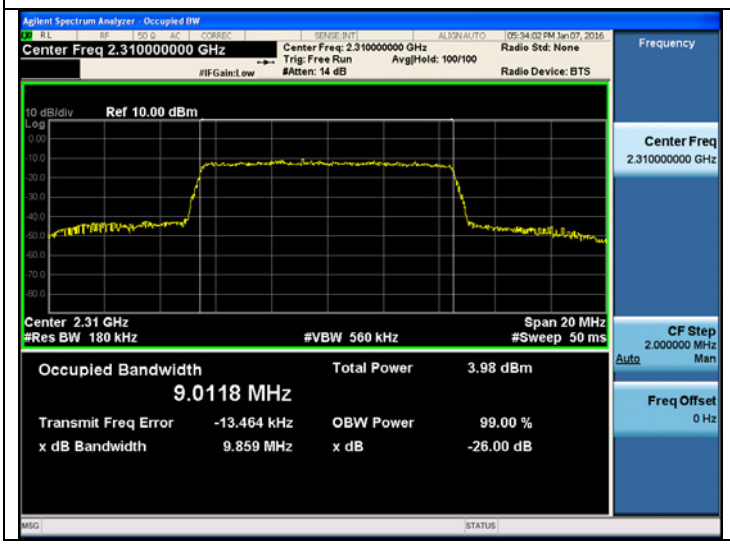
	Channel	**Frequency (MHz)**	**OBW (MHz)**
WCS_ LTE 10MHz AGC threshold	Low	-	-
	Middle	2310.00	9.012
	High	-	-
WCS_ LTE 10MHz +3dBm above the AGC threshold	Low	-	-
	Middle	2310.00	9.010
	High	-	-

[Uplink Input]

	Channel	**Frequency (MHz)**	**OBW (MHz)**
WCS_ LTE 10MHz AGC threshold	Low	-	-
	Middle	2310.00	9.021
	High	-	-

Plots of Occupied Bandwidth

WCS_LTE 10MHz UL_Output

[WCS AGC threshold Uplink Output LTE 10MHz Mid]	[WCS +3dBm above the AGC threshold Uplink Output LTE 10MHzMid]
	

WCS_LTE 10MHz UL_Input

[WCS AGC threshold Uplink Input LTE 10MHz Mid]

8. OUT OF BAND REJECTION

FCC Rules

Test Requirement(s): KDB 935210 D02 v03r02

Out of Band Rejection – Test for rejection of out of band signals. Filter freq. response plots are acceptable.

Test Procedures: A modulated carrier generated by the signal generator carrier was connected to either the Downlink or Downlink RF port at a maximum level as determined by the spectrum analyzer was connected to either the Downlink or Downlink port depending on the circuitry being measured. Signal generator sweep from the frequency more lower than the operating frequency to the frequency more higher than it, find the product band filter characteristic

Test Results: The EUT complies with the requirements of this section.

Input Signal	Input Level (dBm)	Maximum Amp Gain
WCS	DL : -15 dBm UL : -45 dBm	DL : 45 dB UL : 40 dB

WCS Band

[Upnlink]

20 dB point frequency (MHz)	Output power (dBm)	Gain (dB)
2298.62~2320.71	-4.92	40.08

Plots of Passband Gain and Bandwidth & Out of Band Rejection

[WCS Band Uplink]

9. SPURIOUS AND HARMONIC EMISSION AT ANTENNA TERMINAL

FCC Rules

Test Requirement(s):

§ 2.1051 Measurements required: Spurious emissions at antenna terminals:

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in § 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

§ 27.53 Emission limits

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(1) For base and fixed stations' operations in the 2305-2320 MHz band and the 2345-2360 MHz band:

(i) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, and not less than 75 + 10 log (P) dB on all frequencies between 2320 and 2345 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 70 + 10 log (P) dB on all frequencies between 2287.5 and 2300 MHz, 72 + 10 log (P) dB on all frequencies between 2285 and 2287.5 MHz, and 75 + 10 log (P) dB below 2285 MHz;

(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2362.5 MHz, 55 + 10 log (P) dB on all frequencies between 2362.5 and 2365 MHz, 70 + 10 log (P) dB on all frequencies between 2365 and 2367.5 MHz, 72 + 10 log (P) dB on all frequencies between 2367.5 and 2370 MHz, and 75 + 10 log (P) dB above 2370 MHz.

Test Procedures: Measurements were in accordance with the test methods section 3.5.2 of KDB 935210 D05 v01.

1. General

Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle and high channels or frequencies within each authorized frequency band of operation.

Out-of-band/block emissions (including intermodulation products) shall be measured under

each of the following two stimulus conditions:

a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;

b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the frequency band/block under examination.

NOTE—Single channel boosters that cannot accommodate two simultaneous signals within the passband, can be excluded from the test stipulated in step a).

2. EUT out-of-band/block emissions conducted measurement

a) Connect a signal generator to the input of the EUT.

NOTE—If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support the two-tone test.

b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz OBW).

c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block of interest.

d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168, but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band (typically 1 % of the emission bandwidth, 100 kHz, or 1 MHz)

g) Set the VBW = 3 × RBW.

h) Set the detector to power averaging (rms) detector.

i) Set the Sweep time = auto-couple.

j) Set the analyzer start frequency to the upper block edge frequency and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz for frequencies below and above 1 GHz, respectively.

k) Trace average at least 100 traces in power averaging (i.e., rms) mode.

l) Use the marker function to find the maximum power level.

m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.

n) Repeat the procedure with the composite input power level set to 3 dB above the AGC

threshold.

o) Reset the input signals frequencies to the lower edge of the frequency block or band under examination.

p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz, or 3 MHz (for frequencies below and above 1 GHz, respectively), and the stop frequency to the lower band or block edge frequency.

q) Repeat steps k) to n).

r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.

s) Repeat steps a) to r) with the narrowband test signal.

t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

3. EUT spurious emissions conducted measurement

a) Connect a signal generator to the input of the EUT.

b) Set the signal generator to produce the broadband test signal as previously described (e.g., 4.1 MHz OBW AWGN).

c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.

d) Set the EUT input power to a level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation (e.g., reference bandwidth is typically 100 kHz or 1 MHz).

g) Set the VBW ≥ 3 × RBW.

h) Set the Sweep time = auto-couple.

i) Set the analyzer start frequency to the lowest radio frequency signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part.

NOTE—The number of measurement points in each sweep must be ≥ (2 × span/RBW) which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.

j) Select the power averaging (rms) detector function.

k) Trace average at least 10 traces in power averaging (i.e., rms) mode.

l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.

m) Reset the analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the analyzer stop frequency to 10 times the highest frequency of the fundamental emission (see §2.1057). Note that the number of measurement points in each sweep must be ≥ (2 × span/RBW) which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.

n) Trace average at least 10 traces in power averaging (i.e., rms) mode.

o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report and provide tabular data, if required.

p) Repeat the procedure with the input test signals tuned to a middle band/block frequency/channel and then a high band/block frequency/channel.

q) Repeat entire procedure with the narrowband test signal.

r) Repeat for all authorized frequency bands/blocks used by the EUT.

WCS band

[Uplink]

Band Edge

	Channel	Frequency (MHz)	Emission Level (dBm)
LTE 10 MHz	Low	2310.00	-58.91
	High	2310.00	-61.17

Spurious emissions

	Channel	Frequency (MHz)	Emission Level (dBm)
LTE 10 MHz	Low	-	-
	Middle	2310.00	-23.51
	High	-	-

Note. Emission level is the worst measurement value

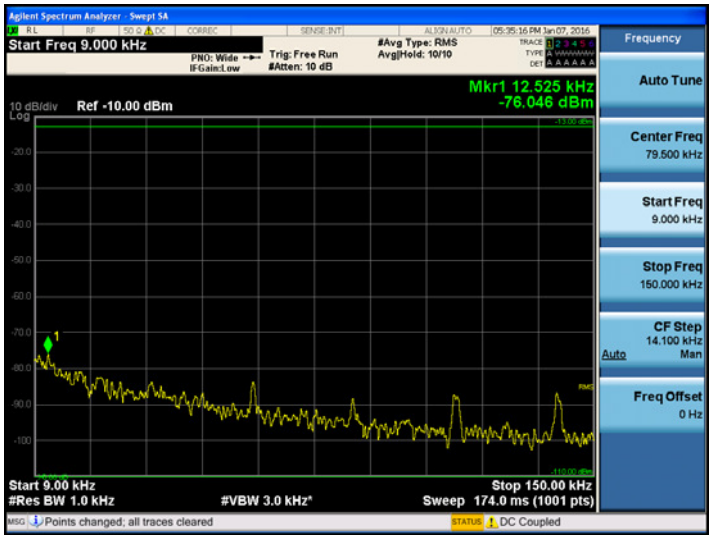
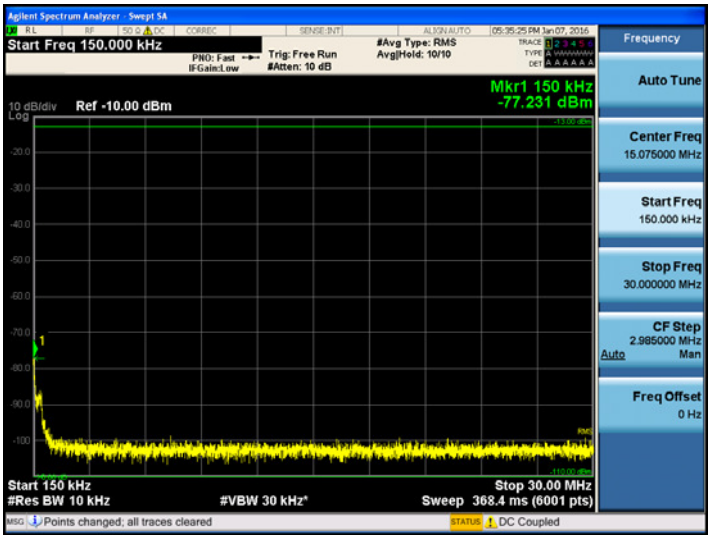
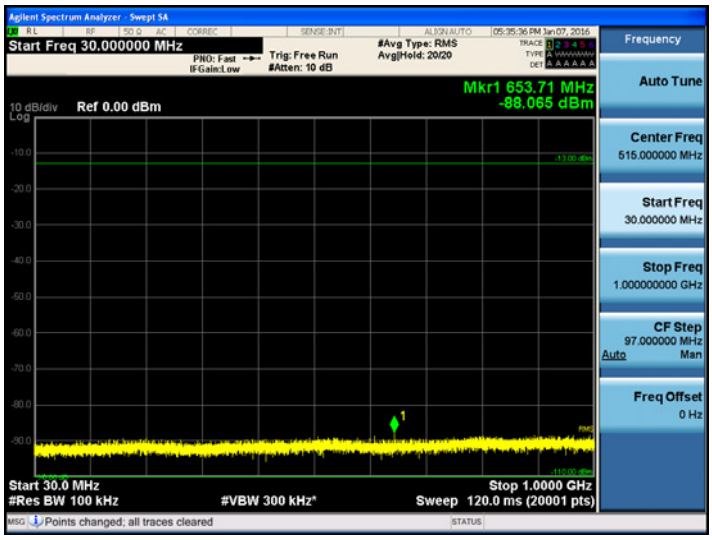
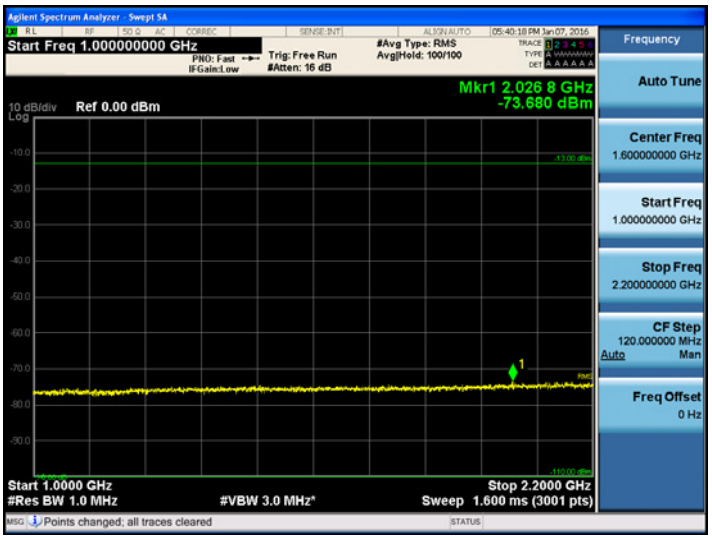
Additional spurious emission is shown on corresponding plots on the 582 ~ 586 page

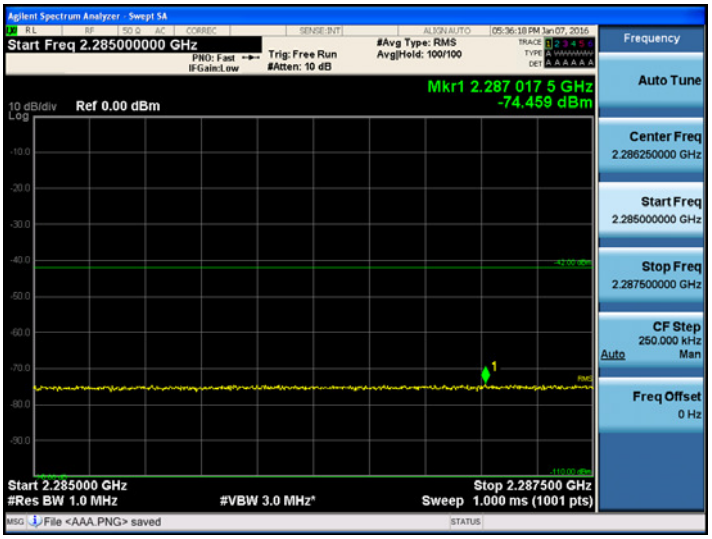
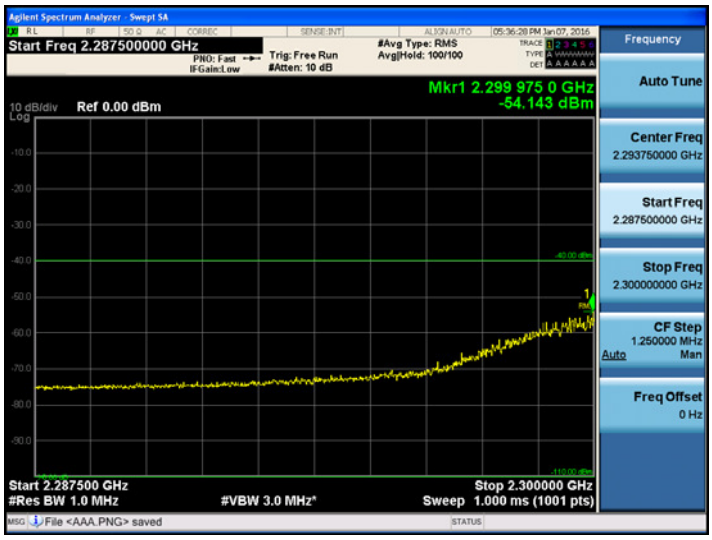
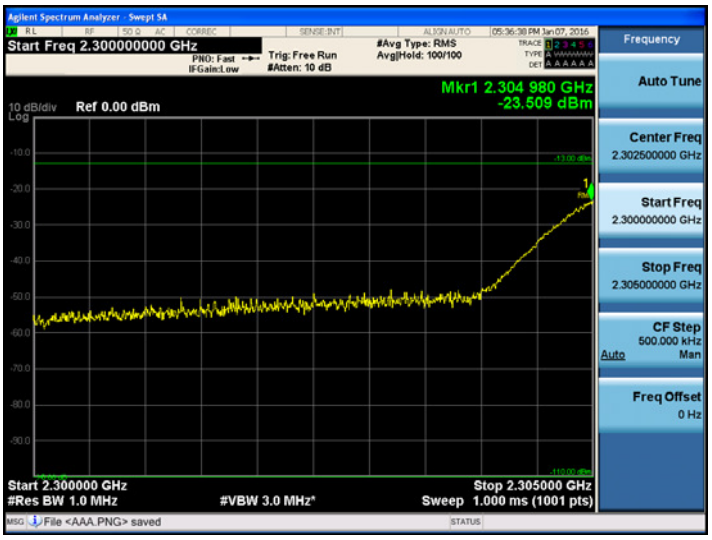
Single channel Enhancer Plots of Spurious Emission

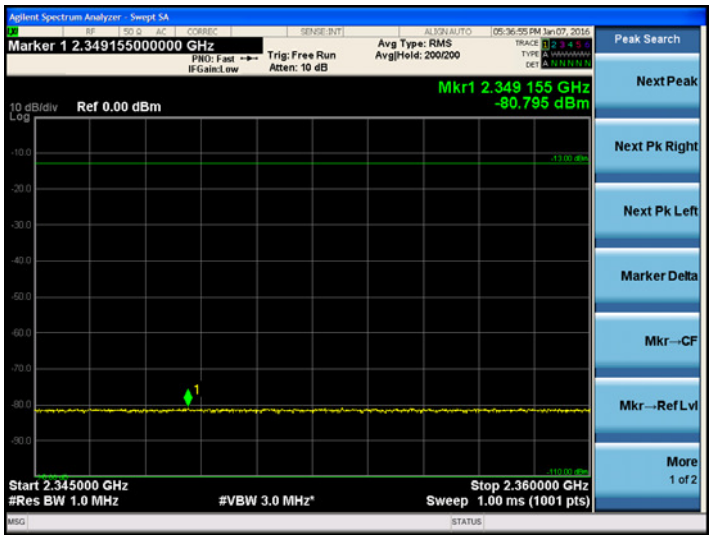
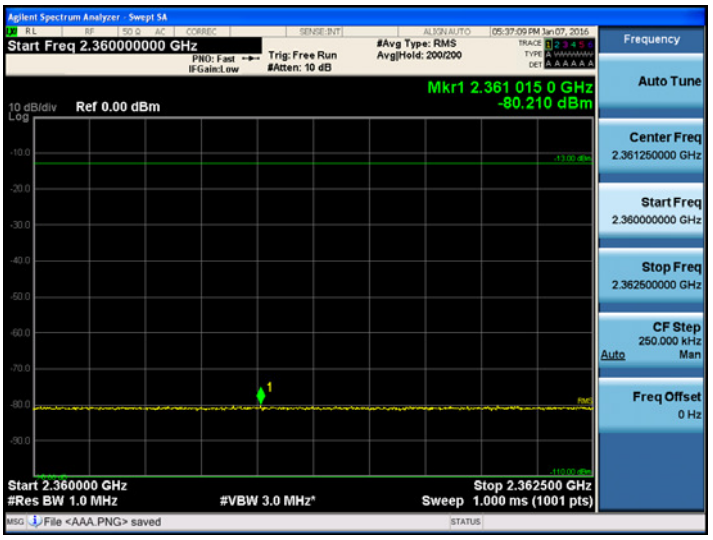
Uplink

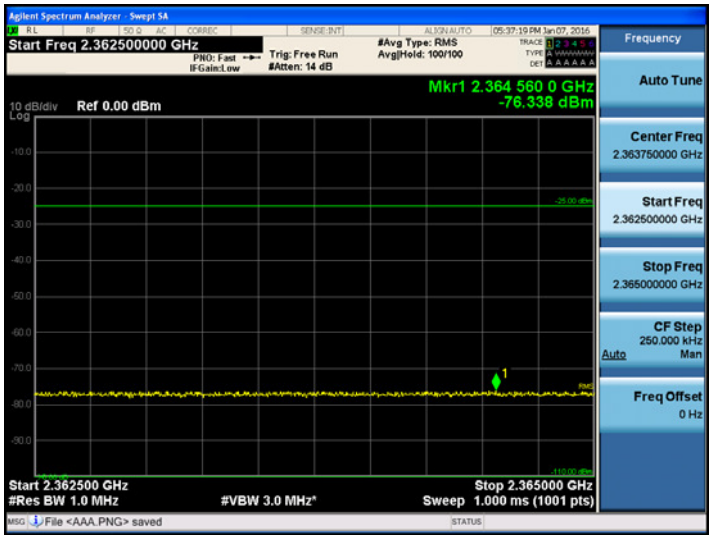
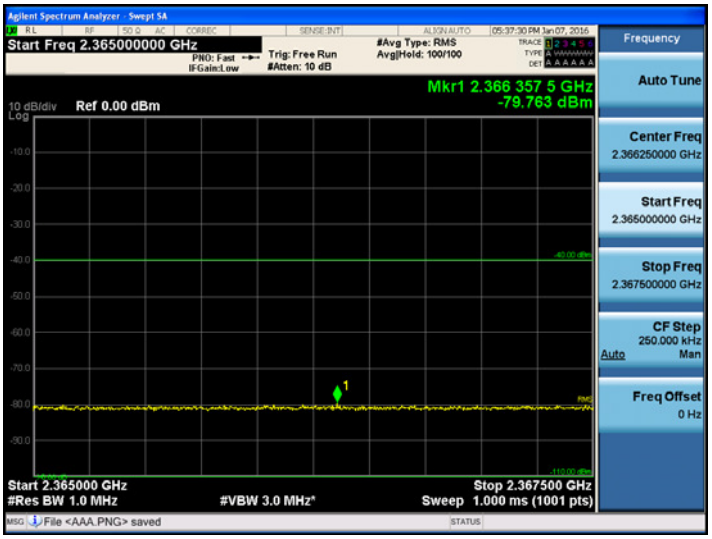
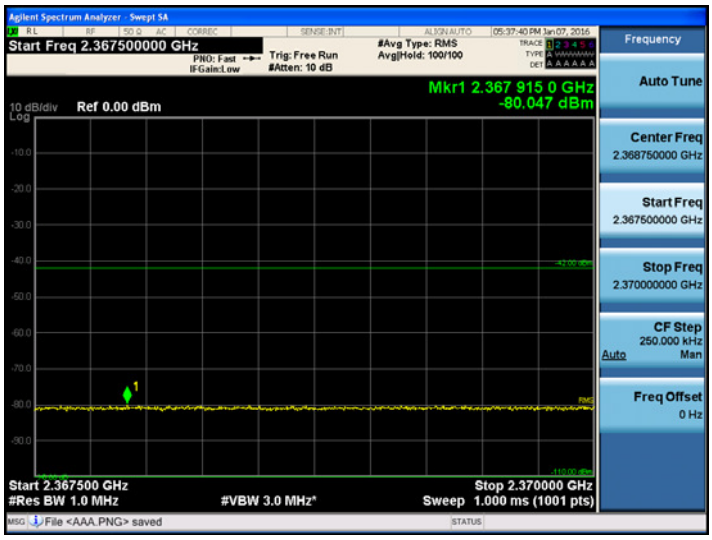
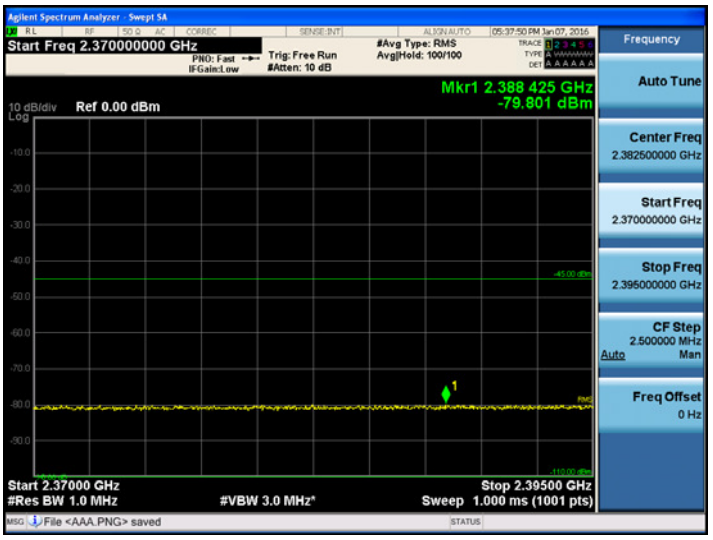
WCS Band LTE 10MHz

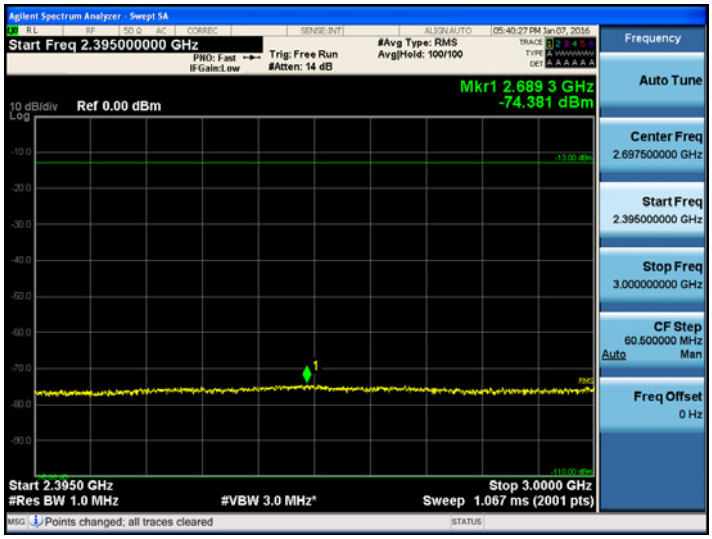
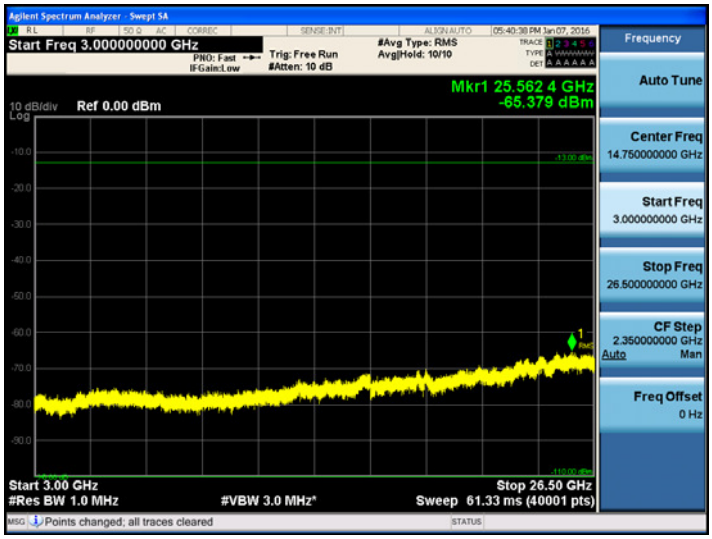
[WCS Band LTE10MHz Uplink Mid]

9㎑ ~ 150㎑	150㎑ ~ 30㎒
	
30㎒ ~ 1㎓	**1㎓ ~ 2200 ㎒**
	

2200 MHz ~ 2285 MHz	2285 MHz ~ 2287.5 MHz
	
2287.5 MHz ~ 2300 MHz	**2300 MHz ~ 2305 MHz**
	

2310 MHz ~ 2320 MHz	2320 MHz ~ 2345 MHz
2345 MHz ~ 2360 MHz	**2360 MHz ~ 2362.5 MHz**
	

2362.5 MHz ~ 2365 MHz	2365 MHz ~ 2367.5 MHz
	
2367.5 MHz ~ 2370 MHz	**2370 MHz ~ 2395 MHz**
	

2395 MHz ~ 3 GHz	3 GHz~ 26.5 GHz
	

Intermodulation Spurious Emissions for FCC

Uplink

WCS Band

[WCS LTE 10MHz Downlink Low]	[WCS LTE 10MHz Downlink High]
NO Test **Note. The minimum 30MHz bandwidth required to test** **But wcs band supports 10MHz bandwidth**	**NO Test** **Note. The minimum 30MHz bandwidth required to test** **But wcs band supports 10MHz bandwidth**

10. RADIATED SPURIOUS EMISSIONS

Test Requirement(s): § 2.1053 Measurements required: Field strength of spurious radiation.

§ 2.1053 (a) Measurements shall be made to detect spurious emissions that may be Radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of § 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from half-wave dipole antennas.

§ 2.1053 (b): The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.

(2) All equipment operating on frequencies higher than 25 MHz.

(3) All equipment where the antenna is an integral part of, and attached directly to The transmitter.

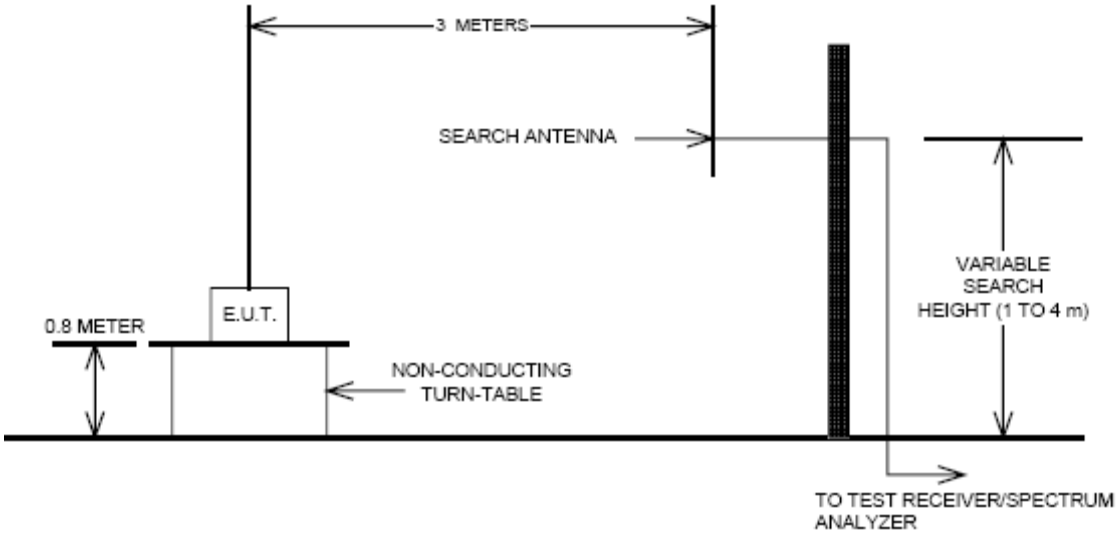
(4) Other types of equipment as required, when deemed necessary by the Commission.

Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of ANSI/TIA-603-C-2004 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about

360 and the receiving antenna scanned from 1-3m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried. out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10th or 40GHz, whichever was the lesser, were investigated.

Radiated Spurious Emissions Test Setup



Test Result:

Note.

Input signal is the CW signal.

WCS band

[Downlink]

Voltage supplied to EUT	Tx Freq.(MHz)	Freq.(MHz)	Substitute Level [dBm]	Ant. Gain (dBi)	C.L	Pol.	EIRP (dBm)	Margin (dB)
120 Vac	-	No Peak Found						
	2355.00							
	-							