FCC CFR47 PART 90 SUBPART R

CERTIFICATION TEST REPORT

FOR

LTE MICROCELL ENODEB BAND 14

MODEL NUMBER: MB4310-n114

FCC ID: DI407403801

REPORT NUMBER: 16U22637-E1V5

ISSUE DATE: 3/29/2016

Prepared for

NEC CORPORATION
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Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2/16/2016	Initial Issue	D. CORONIA
V2	2/22/2016	Updated Sections 2, 5.3, 7, and 15. Added section 14.1.1.	D. CORONIA
V3	3/4/2016	Updated 5.2 and 5.3	D. CORONIA
V4	3/23/2016	Updated Section 11-11.1, 12-12.1 and 14-14.2.1	D. CORONIA
V5	3/29/2016	Updated Section 14.2 and 14.2.1	D. CORONIA

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: NEC CORPORATION
EUT DESCRIPTION: LTE MICROCELL ENODEB BAND 14
MODEL: MB4310-n114
SERIAL NUMBER: 900007
DATE TESTED: JANUARY 25 – FEBRUARY 22, 2016

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC CFR47 PART 90 SUBPART R	PASS

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revision section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For

UL Verification Services Inc. By:

DAN CORONIA
CONSUMER TECHNOLOGY DIVISION
WiSE PROJECT LEAD
UL VERIFICATION SERVICES INC

Tested By:

STEVEN TRAN
CONSUMER TECHNOLOGY DIVISION
WiSE ENGINEER
UL VERIFICATION SERVICES INC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-D and FCC CFR 47 Part 90 for a fixed and based station.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0.

Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

ERP = Conducted Output Power + Antenna Gain

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 9KHz to 30 MHz	2.14 dB
Radiated Disturbance, 30 to 1000 MHz	4.98 dB
Radiated Disturbance,1000 to 6000 MHz	3.86 dB
Radiated Disturbance,6000 to 18000 MHz	4.23 dB
Radiated Disturbance,18000 to 26000 MHz	5.30 dB
Radiated Disturbance,26000 to 40000 MHz	5.23 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

This EUT is a LTE MICROCELL ENODEB BAND 14

5.2. MAXIMUM OUTPUT POWER (LTE)

The transmitter has a maximum peak conducted and radiated ERP output powers as follows:

Combined Conducted Output Power

Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					760.5 MHz	763MHz	765.5 MHz
LTE Band 14	5	QPSK	25	0	40.40	40.40	40.15
		16QAM	25	0	40.33	40.28	40.15
		64QAM	25	0	40.39	40.33	40.06
Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					763 MHz		
LTE Band 14	10	QPSK	50	0		40.34	
		16QAM	50	0		40.27	
		64QAM	50	0		40.21	

ERP

Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					760.5 MHz	763MHz	765.5 MHz
LTE Band 14	5	QPSK	25	0	58.25	58.25	58.00
		16QAM	25	0	58.18	58.13	58.00
		64QAM	25	0	58.24	58.18	57.91
Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					763MHz		
LTE Band 14	10	QPSK	50	0		58.19	
		16QAM	50	0		58.12	
		64QAM	50	0		58.06	

NOTE:

The customer stated that the EUT is designed to operate with a maximum antenna gain of 20 dBi. As the limit is an ERP limit the gain in dBi has been converted to dBd. The dBd values was calculate as below:

20dBi – 2.15 dB = 17.85 dBd

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio should utilize an antenna with the maximum peak gain as follow:

Frequency (MHz)	Peak Gain (dBi)
Band 14, 758~768 MHz	20

Note: The customer stated that the EUT is designed to operate with a maximum antenna gain of 20 dBi.

5.4. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
Test Laptop	Lenovo	T440	N/A	N/A
GPS Antenna	Panasonic	AH32ST14	6740	N/A
Omni Directional Antenna x 2	Cisco	ANT-4G-OMNI-OUT-IN	N/A	N/A

I/O CABLES (CONDUCTED SETUP)

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	RF Out	1	Spectrum Analyzer	Shielded	None	NA
2	Antenna Port	1	EUT	Shielded	0.1m	NA

I/O CABLES (RADIATED SETUP)

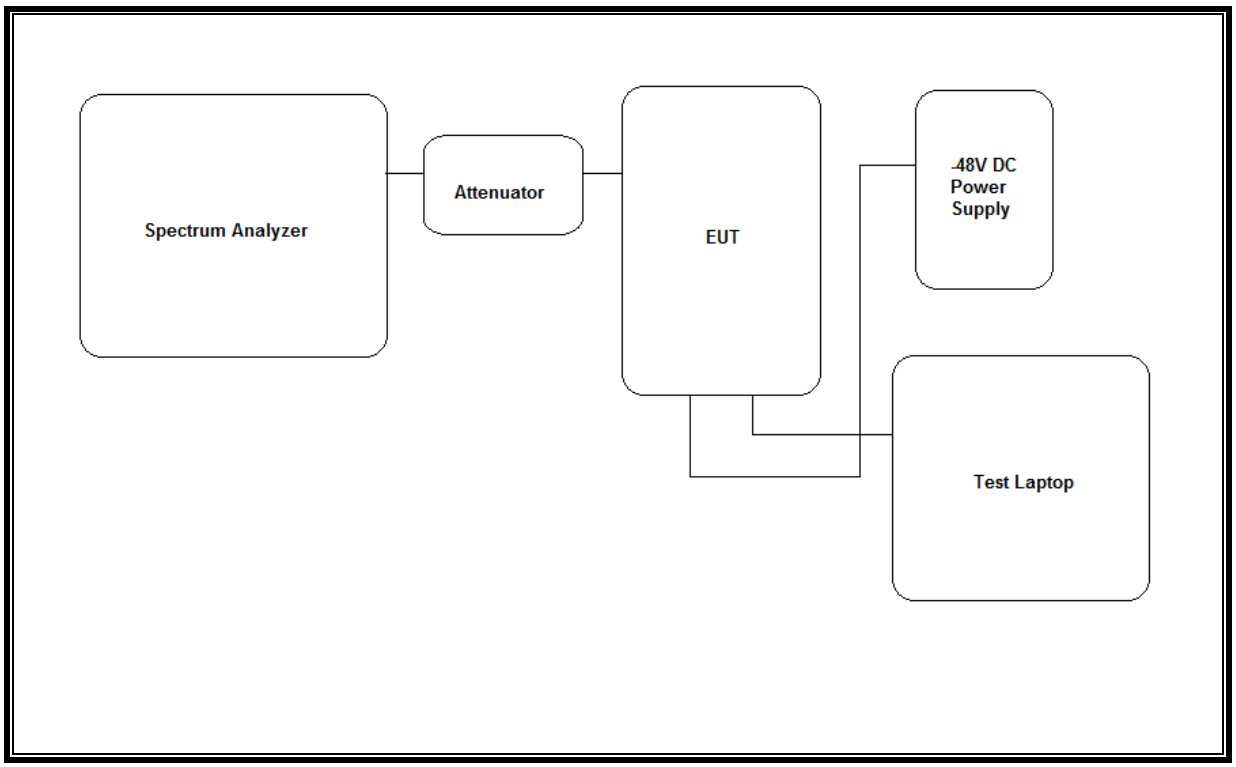
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Ethernet	1	RJ-45	Un-shielded	10m	NA

TEST SETUP

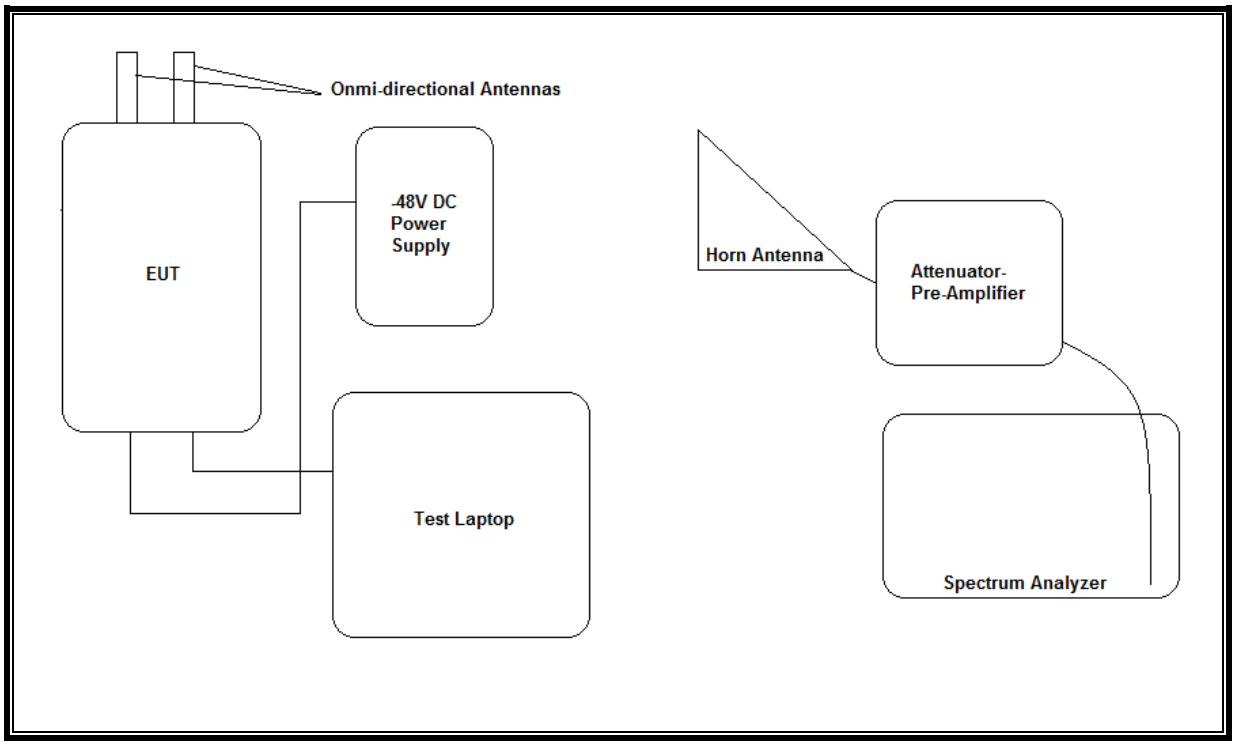
The EUT is continuously transmitting standalone, communicated to a test laptop during the tests.

The EUT is configured in its upright position, as intended for when the EUT is in use.

SETUP DIAGRAM FOR TESTS (CONDUCTED TEST SETUP)



SETUP DIAGRAM FOR TESTS (RADIATED TEST SETUP)



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**T Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	Keysight	N9030A	907	01/06/17
Antenna, Horn, 18 GHz	ETS Lindgren	3115	345	03/03/16
Highpass Filter, 1 GHz	Microwave-Circuits	H1G018G8	PRE0126666	12/22/16
Highpass Filter, 1 GHz	Microwave-Circuits	H1G018G8	PRE0126665	CNR
Ampllifier	Hewlett-Packard	8447D	10	02/01/17
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	80	05/15/16
50 W/30dB Attenuator	Bird	50-18A-MFN-30	1425	*
50 W/30dB Attenuator	Pasternack	PE7019-30	PRE0128207	*
50 Ohm Terminater x 2	Pasternack	PE6097	N/A	N/A
DC power supply 60V, 18A	Ametek	XHR 60-18	348	CNR
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	447	05/18/16

7. SUMMARY TABLE

FCC Part Section	Test Description	Test Limit	Test Condition	Test Result
2.1049	Occupied Band width (99%)	N/A	Conducted	Pass
90.543(e)(1)/(e)(3)	Band Edge / Conducted Spurious Emission	-13dBm - 46dBm		Pass
90.542(a)(3)/2.1046	Conducted output power	N/A		Pass
90.539(d)	Frequency Stability	1PPM		Pass
90.542(a)(3)	Effective Radiated Power	60 dBm	Radiated	Pass
90.543(e)(1)/(e)(3)	Radiated Emissions Limitation	-46 dBm		Pass
90.543(f)		-40 dBm		Pass
90.543(e)(3)	Radiated Spurious Emission	-13dBm		Pass

8. RF POWER OUTPUT VERIFICATION

8.1. LTE OUTPUT POWER RESULT

LTE Band 14

Chain 0

Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					760.5 MHz	763MHz	765.5 MHz
LTE Band 14	5	QPSK	25	0	37.48	37.45	37.10
		16QAM	25	0	37.33	37.23	37.23
		64QAM	25	0	37.40	37.28	37.00
Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					763 MHz		
LTE Band 14	10	QPSK	50	0		37.24	
		16QAM	50	0		37.26	
		64QAM	50	0		37.20	

Chain 1

Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					760.5 MHz	763MHz	765.5 MHz
LTE Band 14	5	QPSK	25	0	37.30	37.33	37.17
		16QAM	25	0	37.31	37.30	37.05
		64QAM	25	0	37.35	37.36	37.10
Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					763 MHz		
LTE Band 14	10	QPSK	50	0		37.41	
		16QAM	50	0		37.25	
		64QAM	50	0		37.20	

Combined Conducted Output Power

Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					760.5 MHz	763MHz	765.5 MHz
LTE Band 14	5	QPSK	25	0	40.40	40.40	40.15
		16QAM	25	0	40.33	40.28	40.15
		64QAM	25	0	40.39	40.33	40.06
Band	BW (MHz)	Mode	RB Allocation	RB offset	Avg Pwr (dBm)		
					763 MHz		
LTE Band 14	10	QPSK	50	0		40.34	
		16QAM	50	0		40.27	
		64QAM	50	0		40.21	

9. PEAK TO AVERAGE RATIO

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

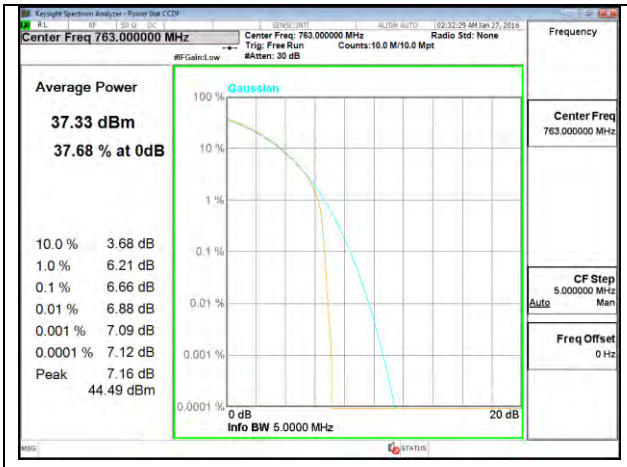
TEST SPEC

In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

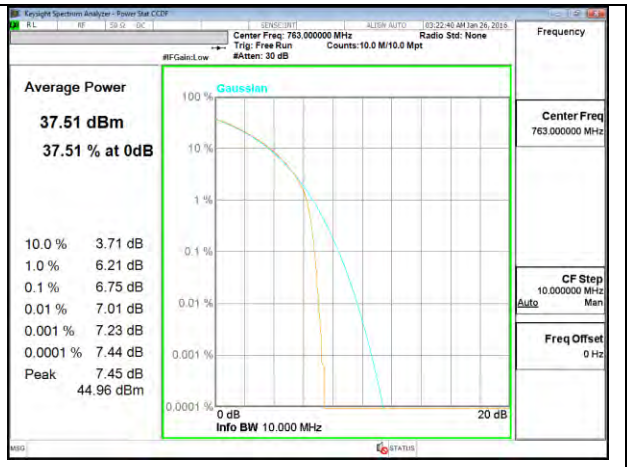
9.1. CONDUCTED PEAK TO AVERAGE RESULT

LTE Band 14

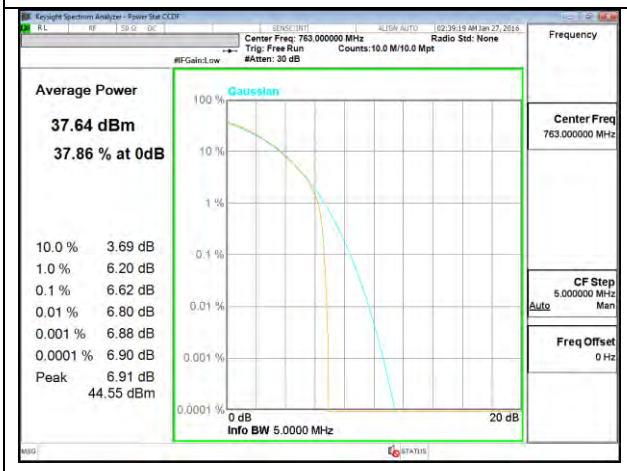
Chain 0



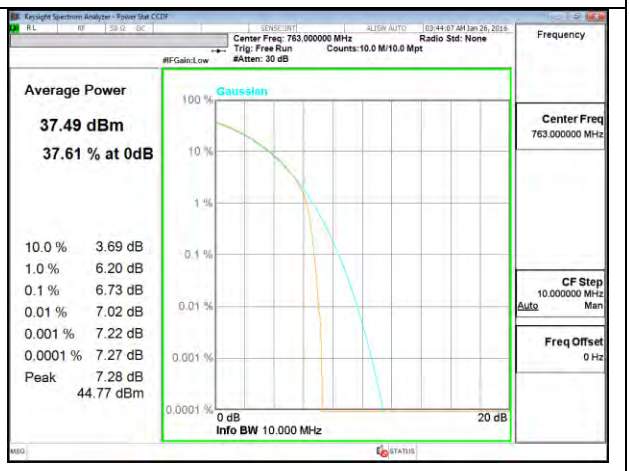
LTE B14 5MHz QPSK Middle Channel



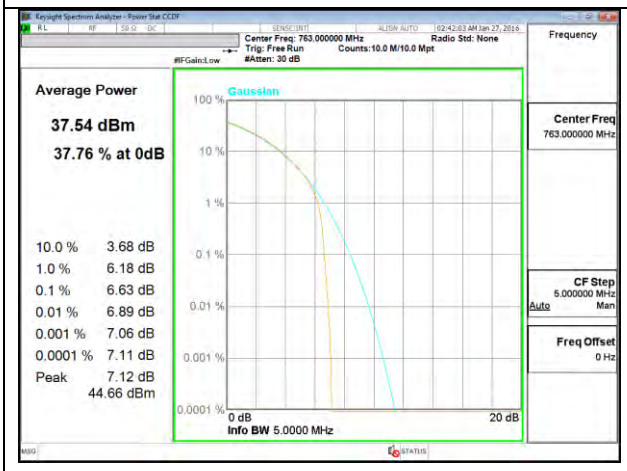
LTE B14 10MHz QPSK Middle Channel



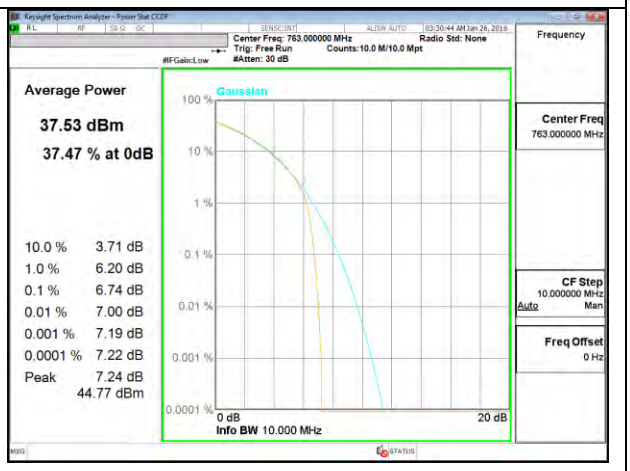
LTE B14 5MHz 16QAM Middle Channel



LTE B14 10MHz 16QAM Middle Channel

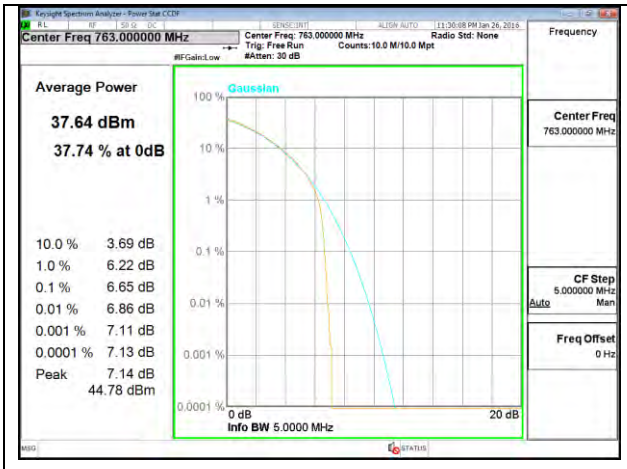


LTE B14 5MHz 64QAM Middle Channel

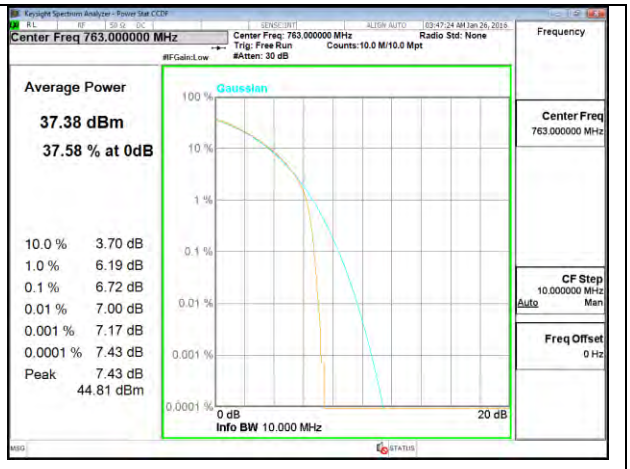


LTE B14 10MHz 64QAM Middle Channel

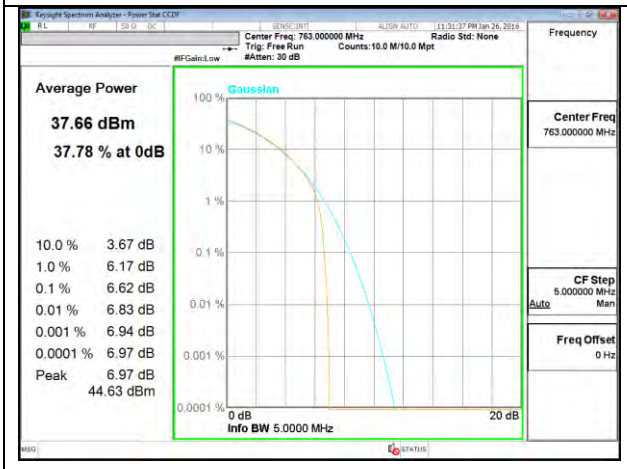
Chain 1



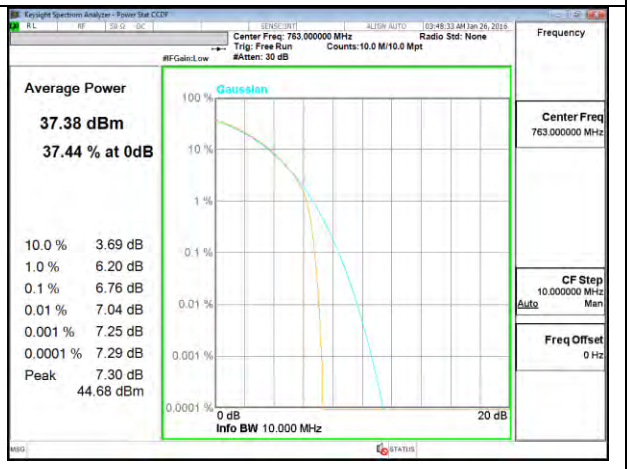
LTE B14 5MHz QPSK Middle Channel



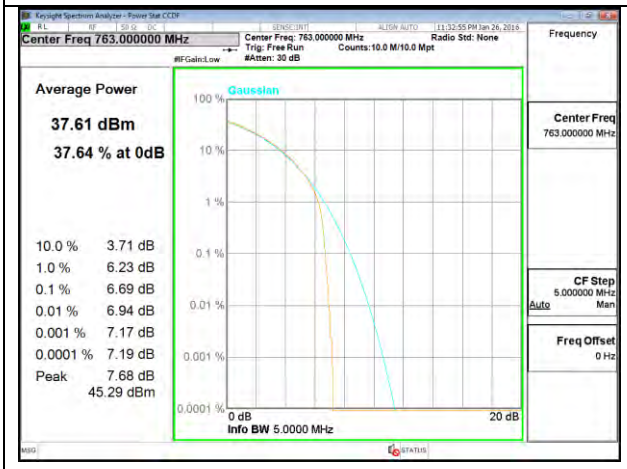
LTE B14 10MHz QPSK Middle Channel



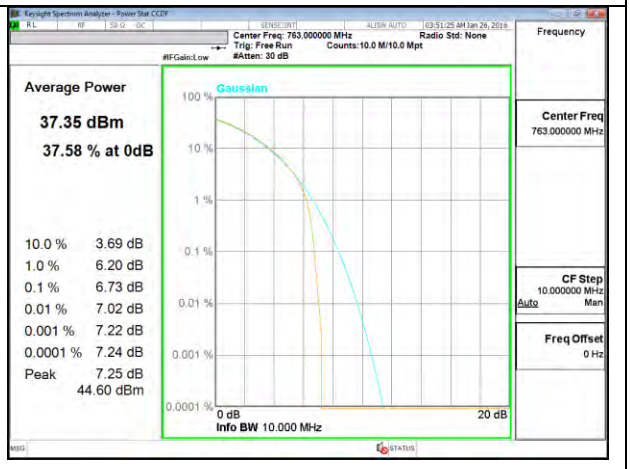
LTE B14 5MHz 16QAM Middle Channel



LTE B14 10MHz 16QAM Middle Channel



LTE B14 5MHz 64QAM Middle Channel



LTE B14 10MHz 64QAM Middle Channel

10. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

(KDB 971168 D01 Power Meas License Digital Systems v02r02)

10.1. OCCUPIED BANDWIDTH RESULTS AND PLOTS

LTE Band 14

Chain 0

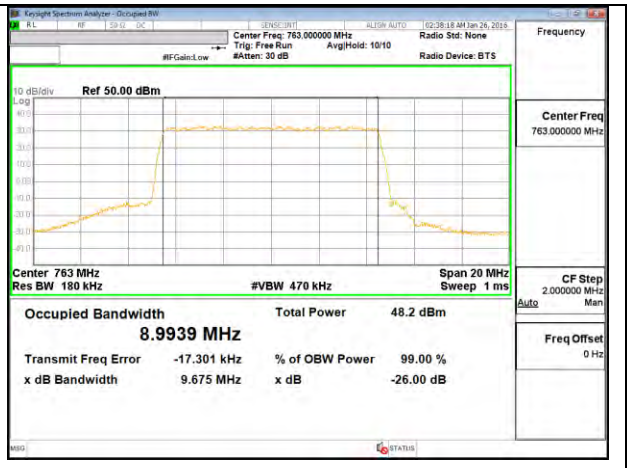
BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
5	QPSK	25/0	760.5	4.4661	4.7520
		25/0	763	4.4807	4.7700
		25/0	765.5	4.4774	4.7320
	16QAM	25/0	760.5	4.4680	4.7580
		25/0	763	4.4681	4.7710
		25/0	765.5	4.4668	4.7680
	64QAM	25/0	760.5	4.4830	4.7880
		25/0	763	4.4797	4.7640
		25/0	765.5	4.4802	4.7940
10	QPSK	50/0	763	8.9939	9.6750
	16QAM	50/0	763	8.9899	9.6240
	64QAM	50/0	763	8.9110	9.5170

Chain 1

BW(MHz)	Mode	RB/RB Size	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
5	QPSK	25/0	760.5	4.4661	4.7520
		25/0	763	4.4807	4.7700
		25/0	765.5	4.4774	4.7320
	16QAM	25/0	760.5	4.4680	4.7580
		25/0	763	4.4681	4.7710
		25/0	765.5	4.4668	4.7680
	64QAM	25/0	760.5	4.4830	4.7880
		25/0	763	4.4797	4.7640
		25/0	765.5	4.4802	4.7940
10	QPSK	50/0	763	8.9878	9.6300
	16QAM	50/0	763	9.0101	9.5830
	64QAM	50/0	763	8.9697	9.6200

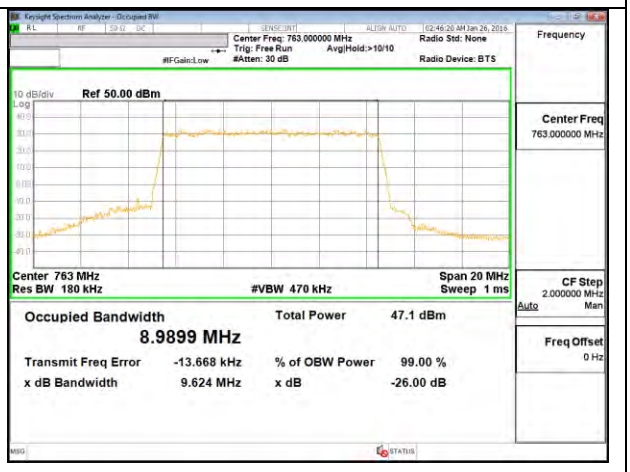
Chain 0

LTE B14 5MHz QPSK Middle Channel



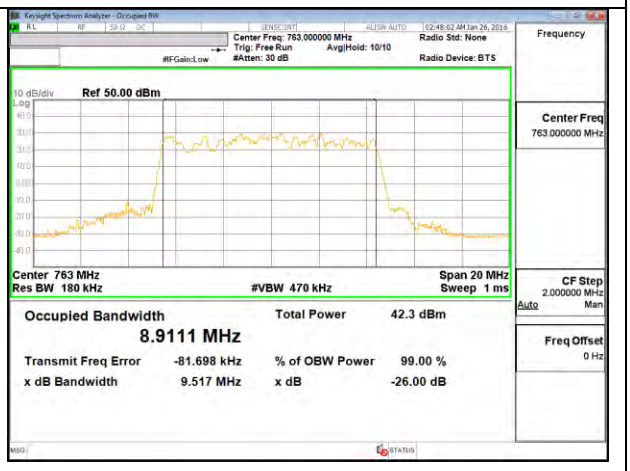
LTE B14 10MHz QPSK Middle Channel

LTE B14 5MHz 16QAM Middle Channel



LTE B14 10MHz 16QAM Middle Channel

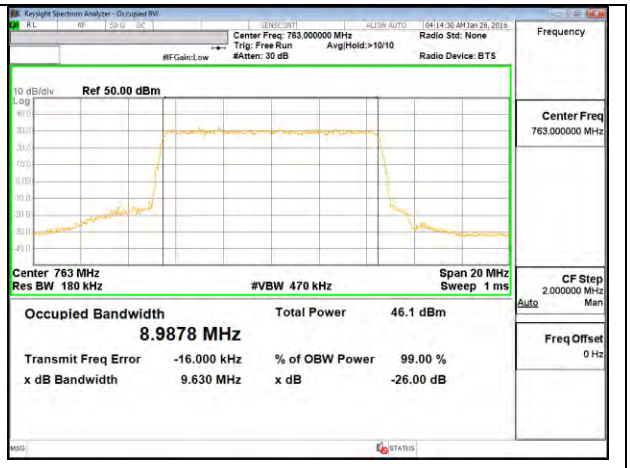
LTE B14 5MHz 64QAM Middle Channel



LTE B14 10MHz 64QAM Middle Channel

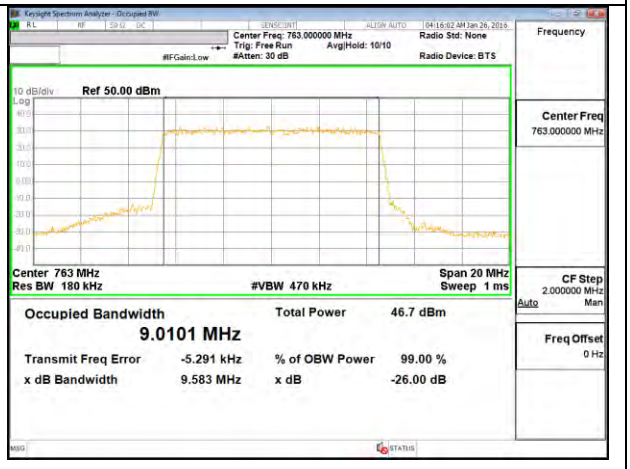
Chain 1

LTE B14 5MHz QPSK Middle Channel



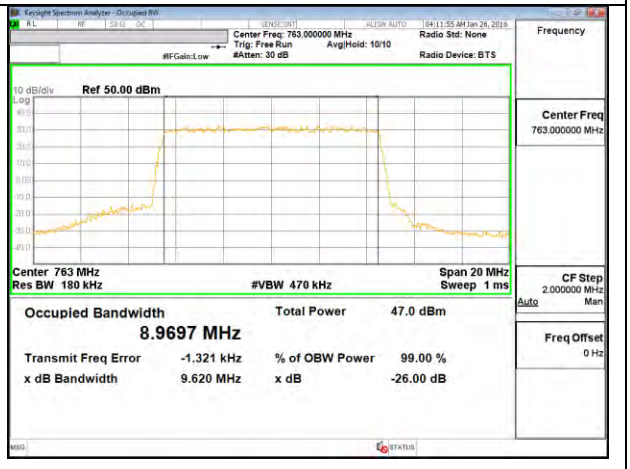
LTE B14 10MHz QPSK Middle Channel

LTE B14 5MHz 16QAM Middle Channel



LTE B14 10MHz 16QAM Middle Channel

LTE B14 5MHz 64QAM Middle Channel



LTE B14 10MHz 64QAM Middle Channel

11. BAND EDGE EMISSIONS

RULE PART(S)

FCC: § 90.543(e)(1), § 90.543(e)(3)

LIMITS

The power of any emission outside of the authorized operating frequency ranges shall be attenuated below the transmitting power (P) in accordance with the following:

(e)(1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

(e)(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

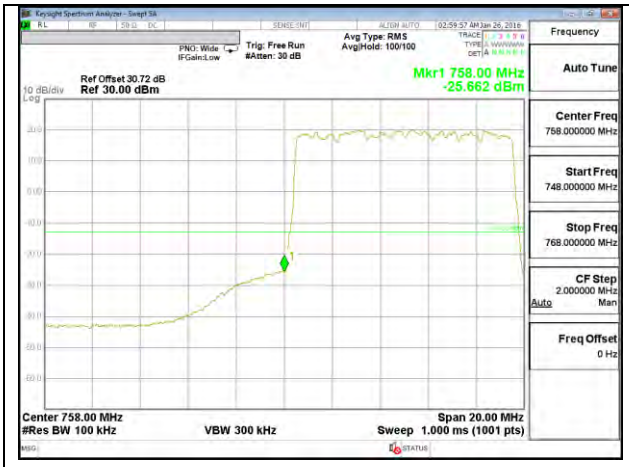
TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02

The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.

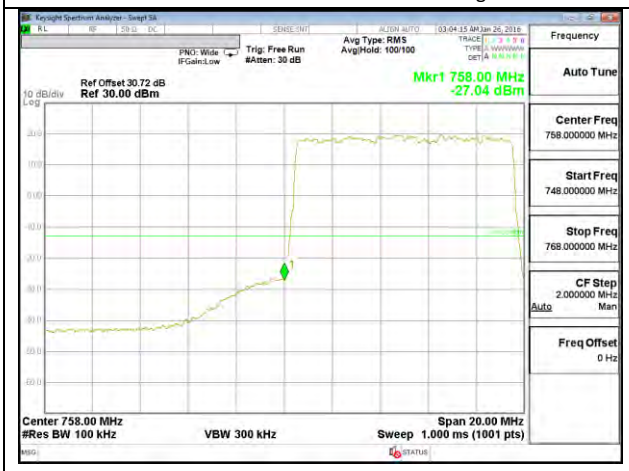
11.1. BAND EDGE PLOTS

Chain 0 (758MHz - Lower Band Edge and 769MHz - Upper Band Edge)



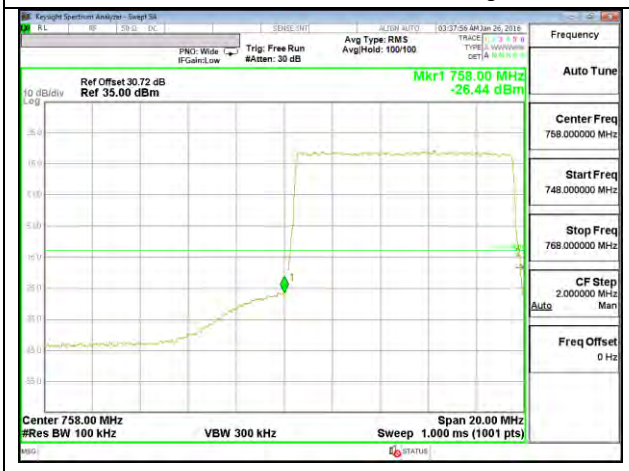
LTE B14 5MHz QPSK Low Channel FRB.gif

LTE B14 5MHz QPSK High Channel FRB.gif



LTE B14 5MHz 16QAM Low Channel FRB.gif

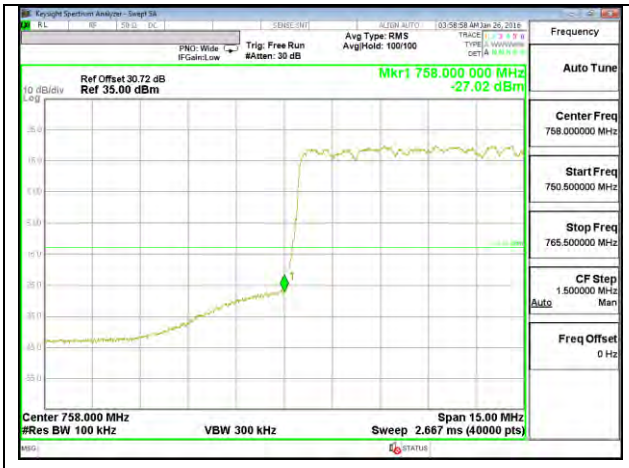
LTE B14 5MHz 16QAM High Channel FRB.gif



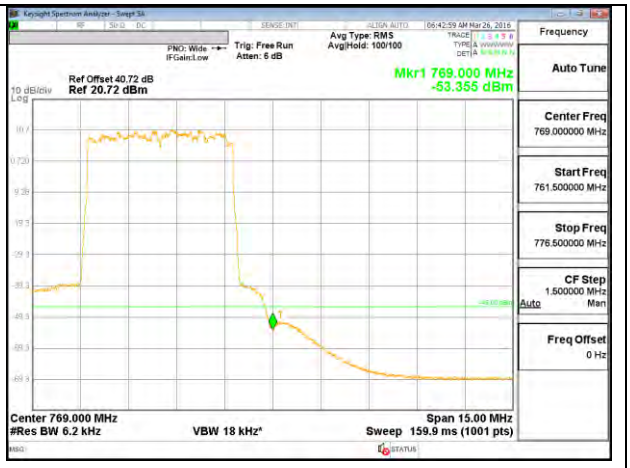
LTE B14 5MHz 64QAM Low Channel FRB.gif

LTE B14 5MHz 64QAM High Channel FRB.gif

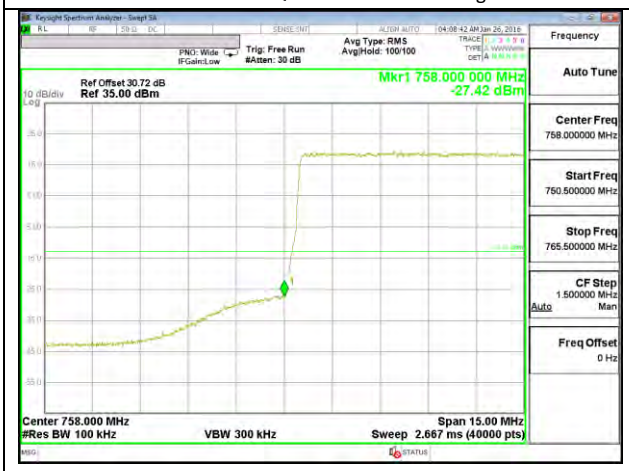
Chain 1 (758MHz - Lower Band Edge and 769MHz - Upper Band Edge)



LTE B14 5MHz QPSK Low Channel FRB.gif

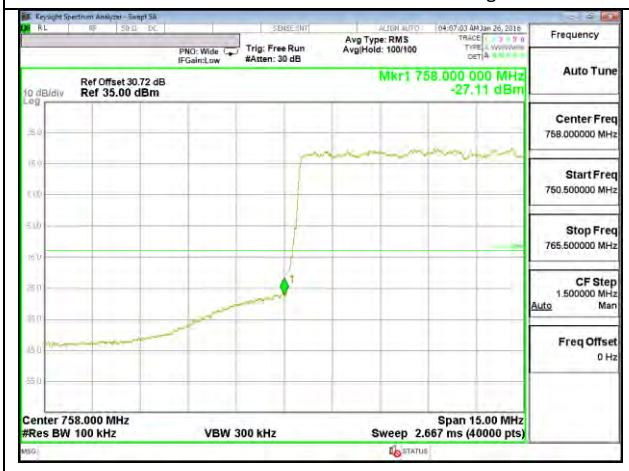


LTE B14 5MHz QPSK High Channel FRB.gif

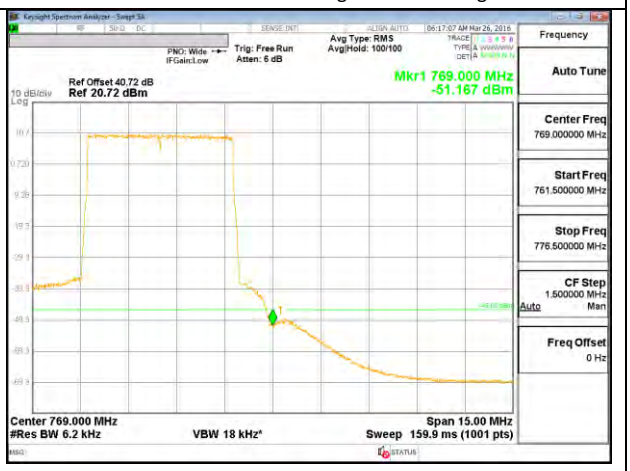


LTE B14 5MHz 16QAM Low Channel FRB.gif

LTE B14 5MHz 16QAM High Channel FRB.gif



LTE B14 5MHz 64QAM Low Channel FRB.gif



LTE B14 5MHz 64QAM High Channel FRB.gif

12. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051 and §90.543(e)(3)

LIMITS

The power of any emission outside of the authorized operating frequency ranges shall be attenuated below the transmitting power (P) in accordance with the following:

(e)(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02, referencing FCC Part 2.1051

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in 100 trace average using RMS detector.

12.1. OUT OF BAND EMISSIONS RESULT AND PLOTS

Chain 0

BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
5	QPSK	760.5	-25.656	-13	-12.656
		763	-25.952	-13	-12.952
		765.5	-26.055	-13	-13.055
	16QAM	760.5	-25.377	-13	-12.377
		763	-25.651	-13	-12.651
		765.5	-25.61	-13	-12.61
	64QAM	760.5	-25.904	-13	-12.904
		763	-25.032	-13	-12.032
		765.5	-25.732	-13	-12.732
10	QPSK	763	-25.935	-13	-12.935
	16QAM	763	-25.755	-13	-12.755
	62QAM	763	-25.417	-13	-12.417

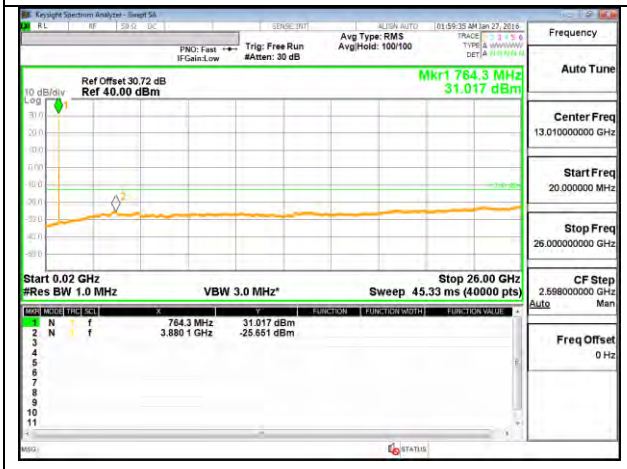
Chain 1

BW(MHz)	Mode	f (MHz)	Spur (dBm)	Spec (dBm)	Delta (dB)
5	QPSK	760.5	-25.545	-13	-12.545
		763	-25.785	-13	-12.785
		765.5	-25.611	-13	-12.611
	16QAM	760.5	-25.931	-13	-12.931
		763	-25.619	-13	-12.619
		765.5	-26.171	-13	-13.171
	64QAM	760.5	-25.368	-13	-12.368
		763	-25.32	-13	-12.32
		765.5	-25.251	-13	-12.251
10	QPSK	763	-25.542	-13	-12.542
	16QAM	763	-25.374	-13	-12.374
	62QAM	763	-25.687	-13	-12.687

Chain 0

LTE B14 5MHz QPSK Middle Channel

LTE B14 10MHz QPSK Middle Channel



LTE B14 5MHz 16QAM Middle Channel

LTE B14 10MHz 16QAM Middle Channel

LTE B14 5MHz 64QAM Middle Channel

LTE B14 10MHz 64QAM Middle Channel

Chain 1

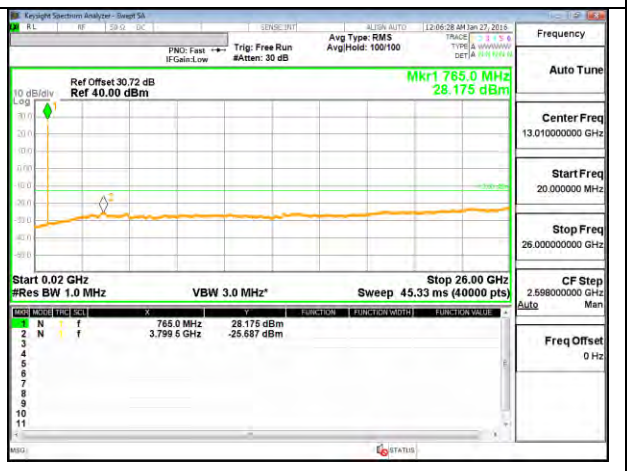
LTE B14 5MHz QPSK Middle Channel

LTE B14 10MHz QPSK Middle Channel

LTE B14 5MHz 16QAM Middle Channel

LTE B14 10MHz 16QAM Middle Channel

LTE B14 5MHz 64QAM Middle Channel



LTE B14 10MHz 64QAM Middle Channel

13. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055 and §90.539(d)

LIMITS

§90.539(d)- The carrier frequency shall not depart from the reference frequency in excess of ±1 ppm for base stations.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02, referencing FCC Part 2.1055

13.1. FREQUENCY STABILITY RESULTS

LTE Band 14

Reference Frequency: LTE Band 14 Mid Channel		763	MHz @ 20°C	
		Limit: to stay +- 1 ppm =	763.000	Hz
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
48.00	50	763.002800	-0.786	1
48.00	40	763.001650	0.721	1
48.00	30	763.002200	0.000	1
48.00	***20***	**763.002200**	**0**	***1***
48.00	10	763.002200	0.000	1
48.00	0	763.002750	-0.721	1
48.00	-10	763.001650	0.721	1
48.00	-20	763.002200	0.000	1
48.00	-30	763.002750	-0.721	1

Reference Frequency: LTE Band 14 Mid Channel		763	MHz @ 20°C	
		Limit: to stay +- 1 ppm =	763.000	Hz
Power Supply	Environment	Frequency Deviation Measured with Time Elapse		
(Vdc)	Temperature (°C)	(MHz)	Delta (ppm)	Limit (ppm)
48.00	***20***	***763.002200***	***0***	***1***
55.20	20	763.001650	*0.721*	1
40.80	20	763.002800	*-0.786*	1

14. RADIATED TEST RESULTS

14.1. TRANSMITTER RADIATED EMISSIONS LIMITATIONS

RULE PART(S)

FCC: §2.1053 and §90.543(e)(1), §90.543(e)(3) & §90.543(f)

LIMIT

e(1)On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.

e(3) On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

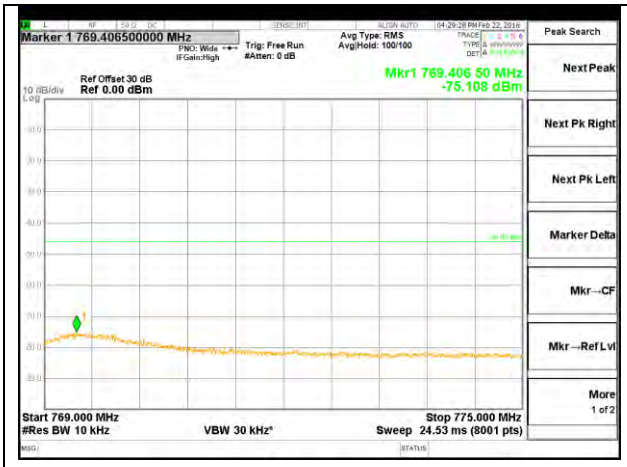
(f) For operations in the 758-775 MHz and 788-805 MHz bands, all emissions including harmonics in the band 1559-1610 MHz shall be limited to −70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and −80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

TEST PROCEDURE

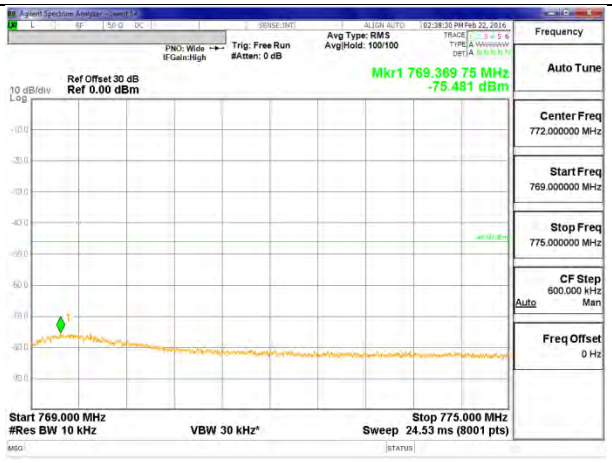
Per KDB 971168 D01 Power Meas License Digital Systems v02r02, referencing FCC Part 2.1053

14.1.1. RADIATED EMISSIONS PLOTS

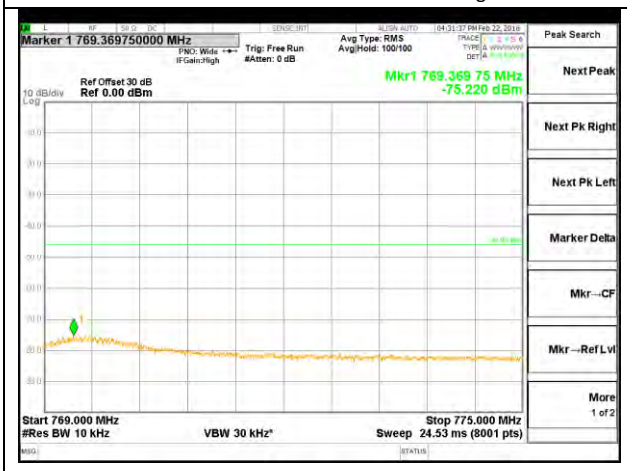
769-775 MHz



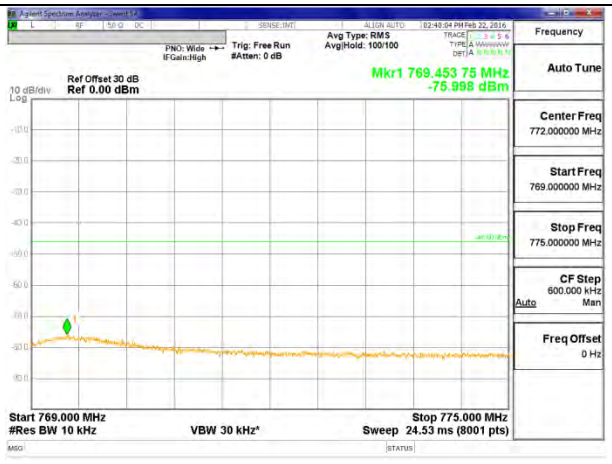
LTE B14 5MHz QPSK Low Channel FRB.gif



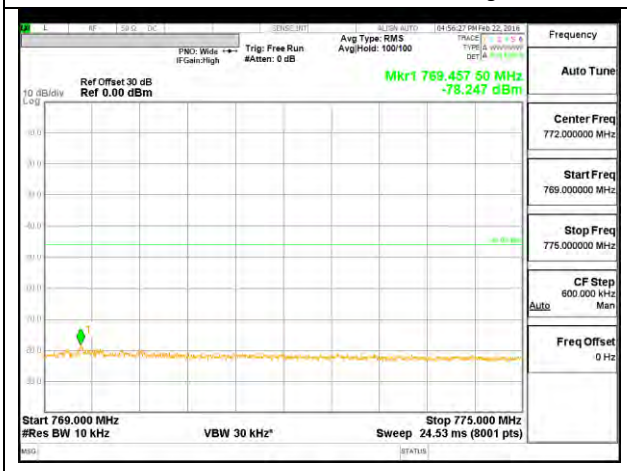
LTE B14 5MHz QPSK Mid Channel FRB.gif



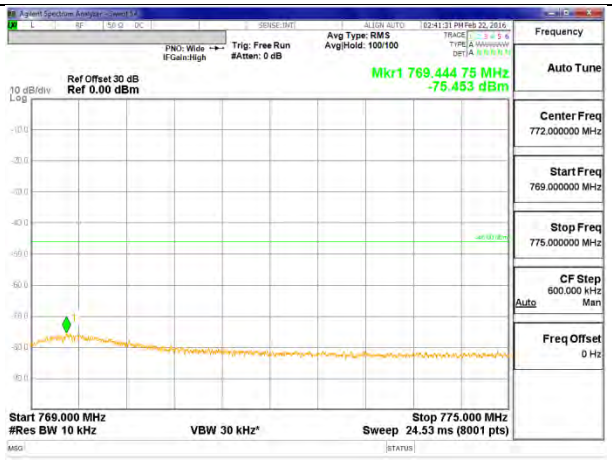
LTE B14 5MHz 16QAM Low Channel FRB.gif



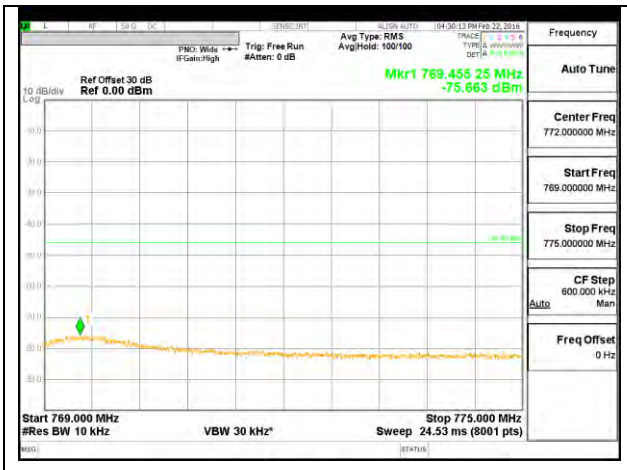
LTE B14 5MHz 16QAM Mid Channel FRB.gif



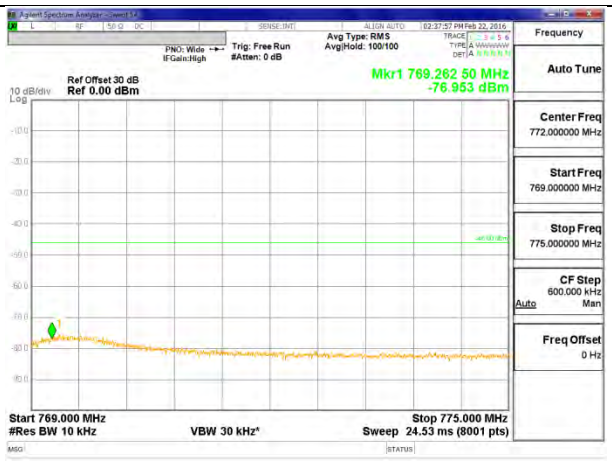
LTE B14 5MHz 64QAM Low Channel FRB.gif



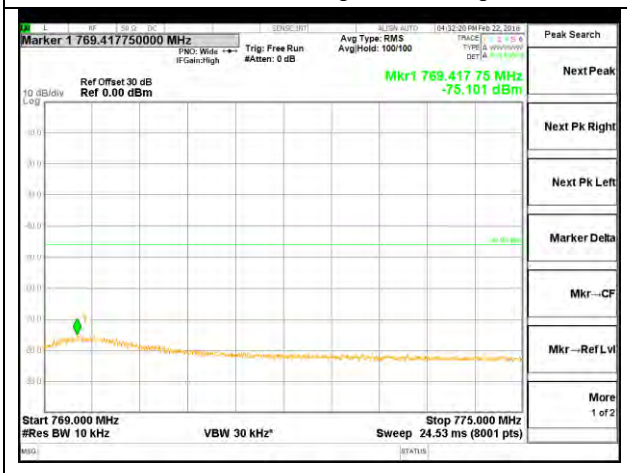
LTE B14 5MHz 64QAM Mid Channel FRB.gif



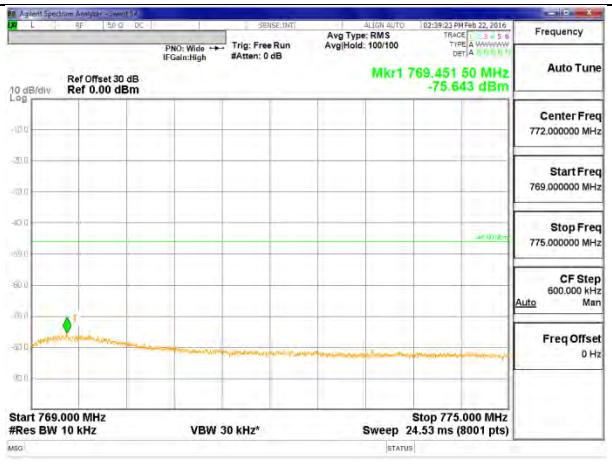
LTE B14 5MHz QPSK High Channel FRB.gif



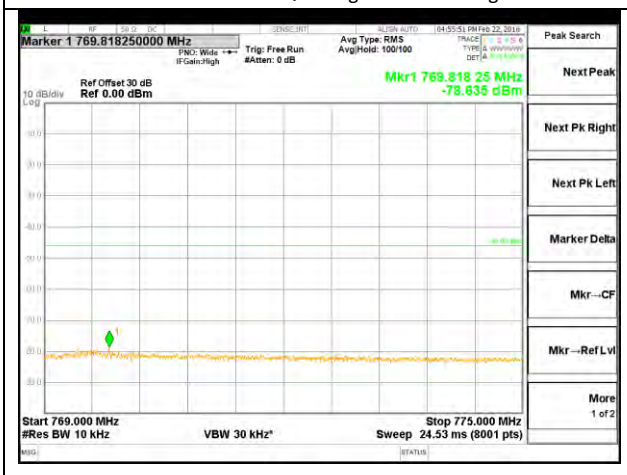
LTE B14 10MHz QPSK Mid Channel FRB.gif



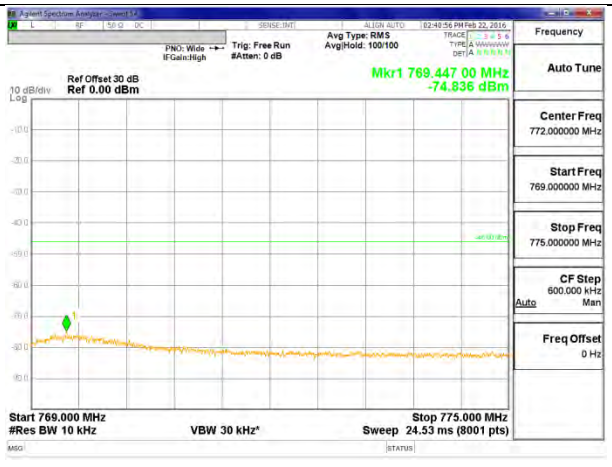
LTE B14 5MHz 16QAM High Channel FRB.gif



LTE B14 10MHz 16QAM Mid Channel FRB.gif



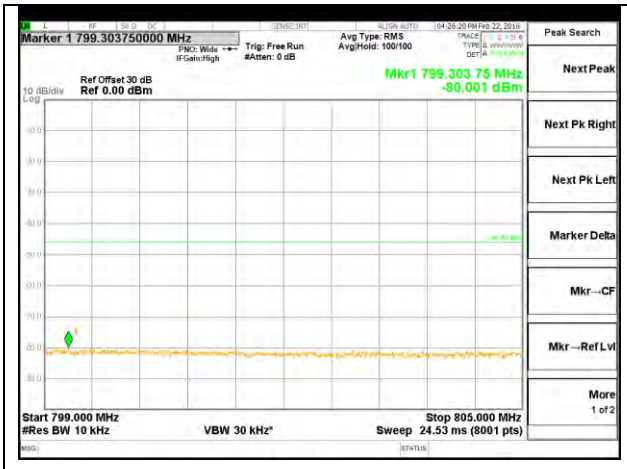
LTE B14 5MHz 64QAM High Channel FRB.gif



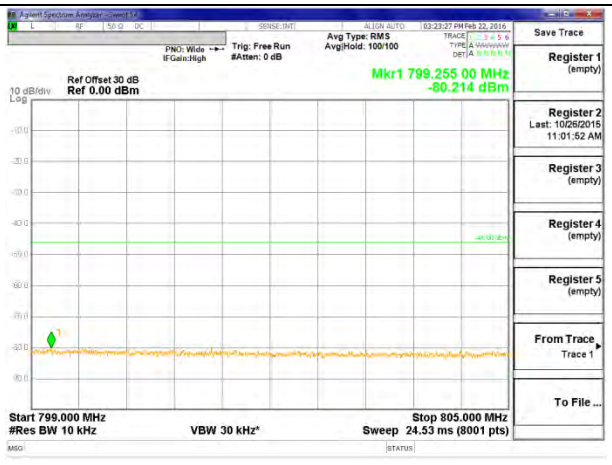
LTE B14 10MHz 64QAM Mid Channel FRB.gif

Note: For the radiated emissions; pre-amp, cable loss and receiving antenna gain are applied to the offset.

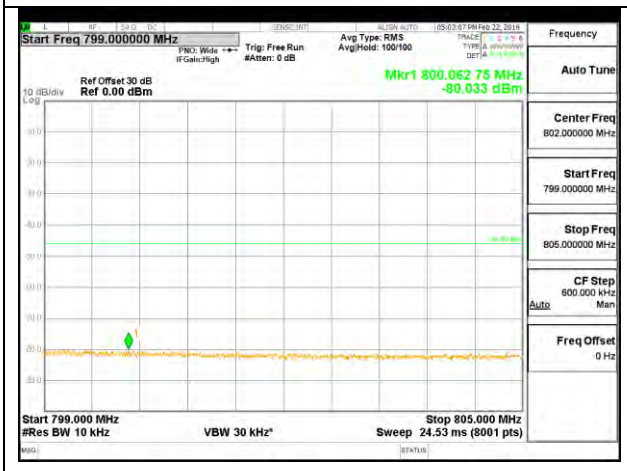
799-805 MHz



LTE B14 5MHz QPSK Low Channel FRB.gif

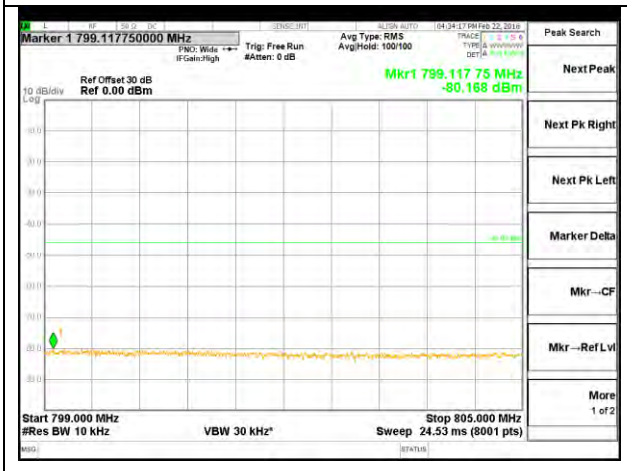


LTE B14 5MHz QPSK Mid Channel FRB.gif



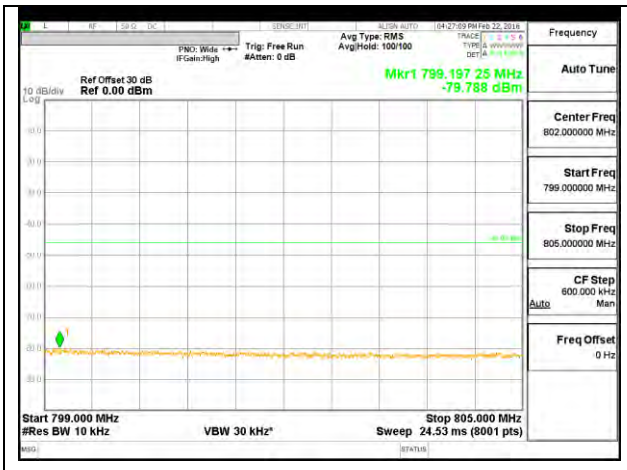
LTE B14 5MHz 16QAM Low Channel FRB.gif

LTE B14 5MHz 16QAM Mid Channel FRB.gif

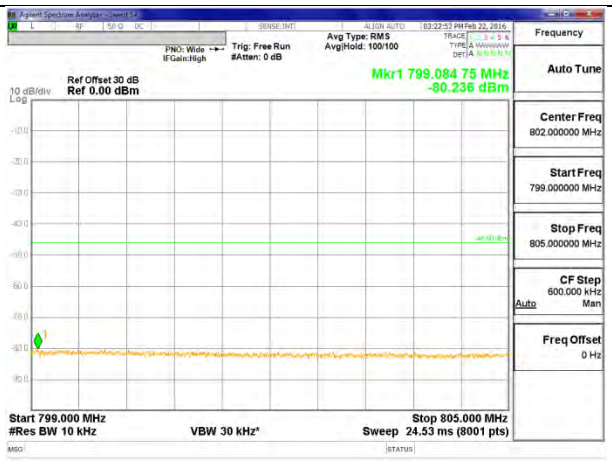


LTE B14 5MHz 64QAM Low Channel FRB.gif

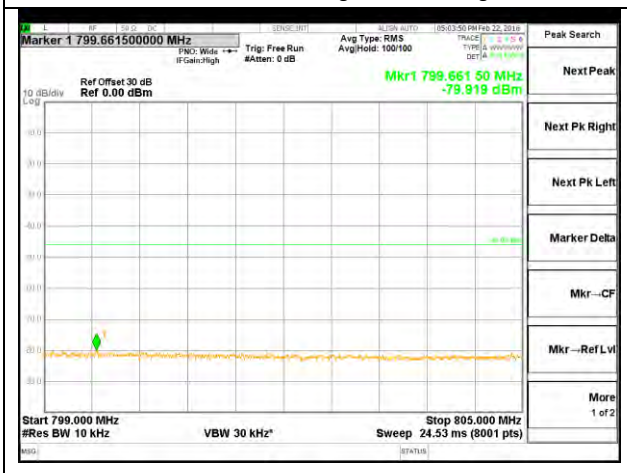
LTE B14 5MHz 64QAM Mid Channel FRB.gif



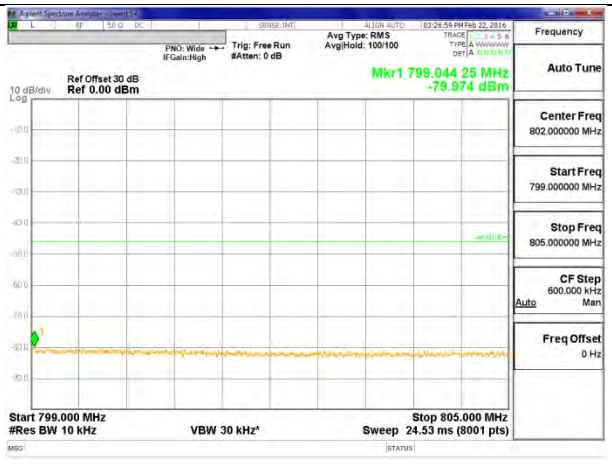
LTE B14 5MHz QPSK High Channel FRB.gif



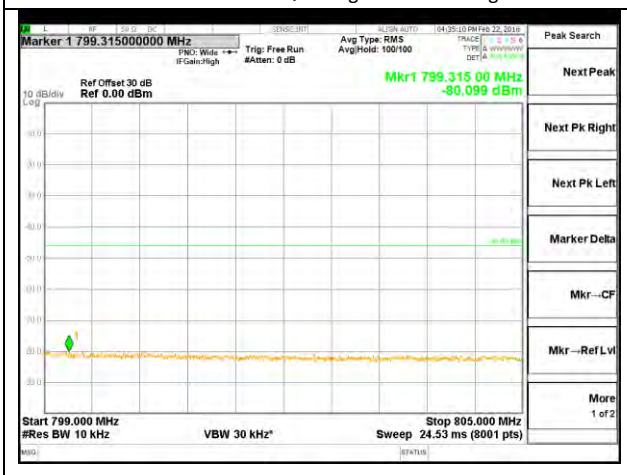
LTE B14 10MHz QPSK Mid Channel FRB.gif



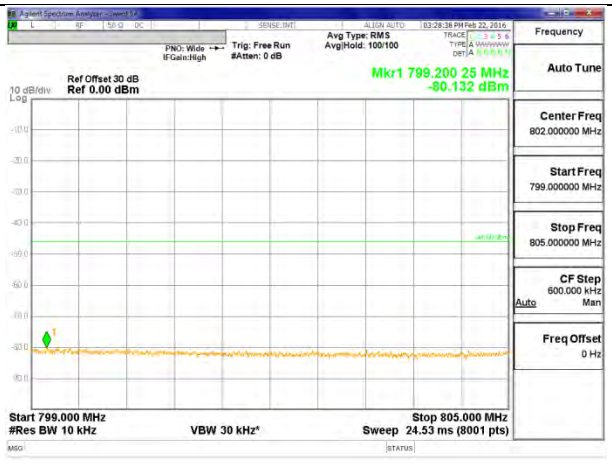
LTE B14 5MHz 16QAM High Channel FRB.gif



LTE B14 10MHz 16QAM Mid Channel FRB.gif



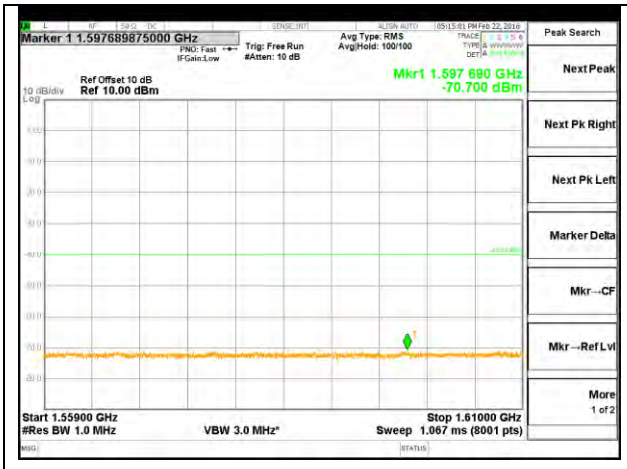
LTE B14 5MHz 64QAM High Channel FRB.gif



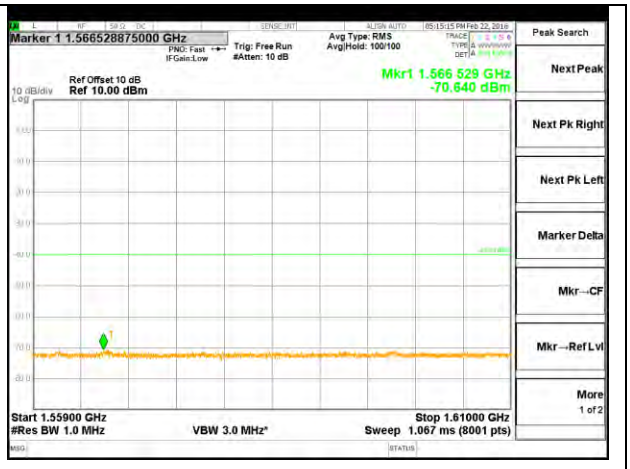
LTE B14 10MHz 64QAM Mid Channel FRB.gif

Note: For the radiated emissions; pre-amp, cable loss and receiving antenna gain are applied to the offset.

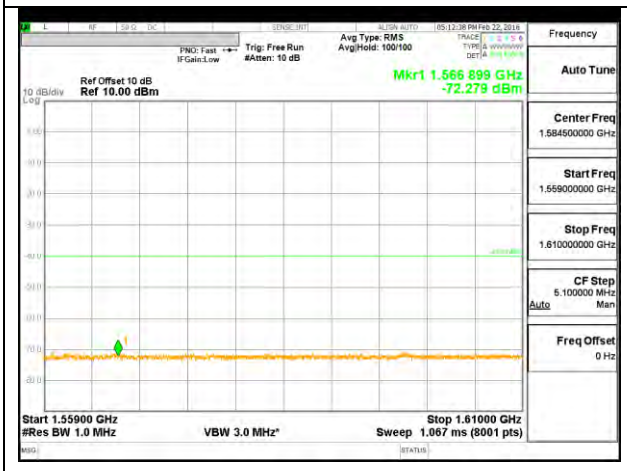
1559-1610 MHz



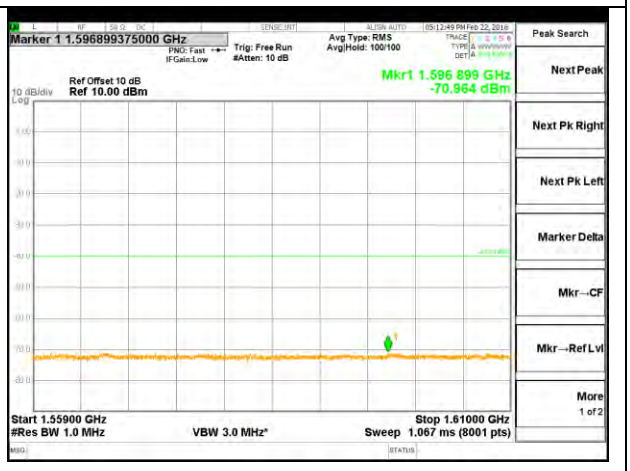
LTE B14 5MHz QPSK Low Channel FRB.gif



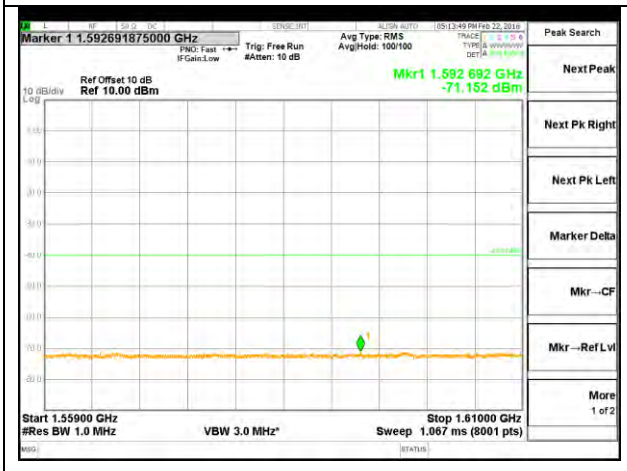
LTE B14 5MHz QPSK Mid Channel FRB.gif



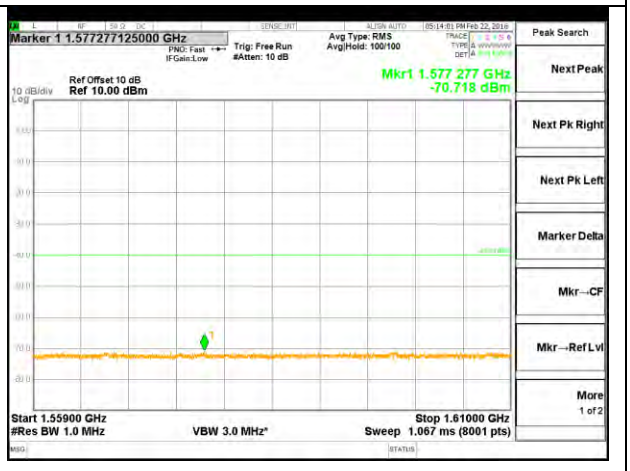
LTE B14 5MHz 16QAM Low Channel FRB.gif



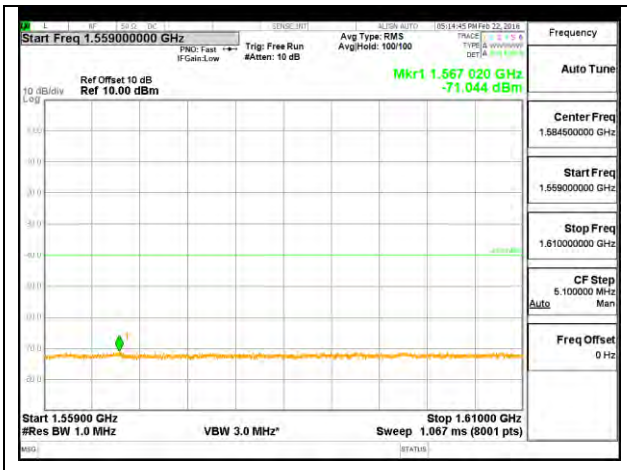
LTE B14 5MHz 16QAM Mid Channel FRB.gif



LTE B14 5MHz 64QAM Low Channel FRB.gif



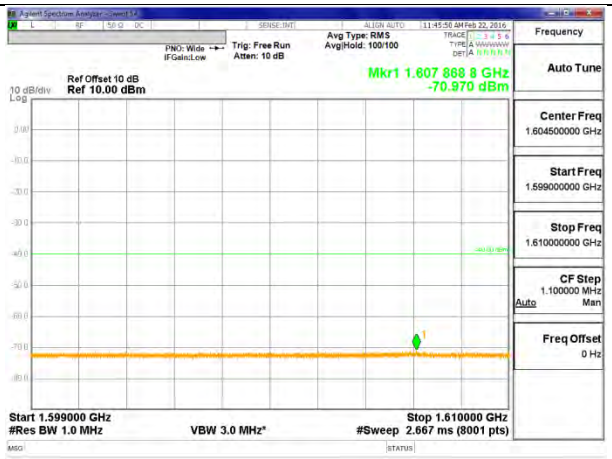
LTE B14 5MHz 64QAM Mid Channel FRB.gif



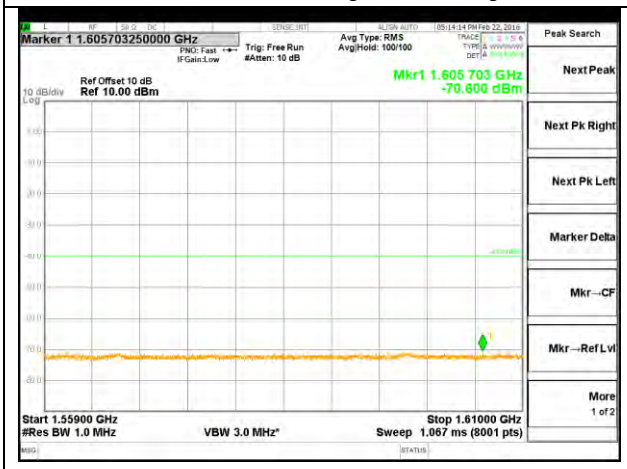
LTE B14 5MHz QPSK High Channel FRB.gif

LTE B14 10MHz QPSK Mid Channel FRB.gif

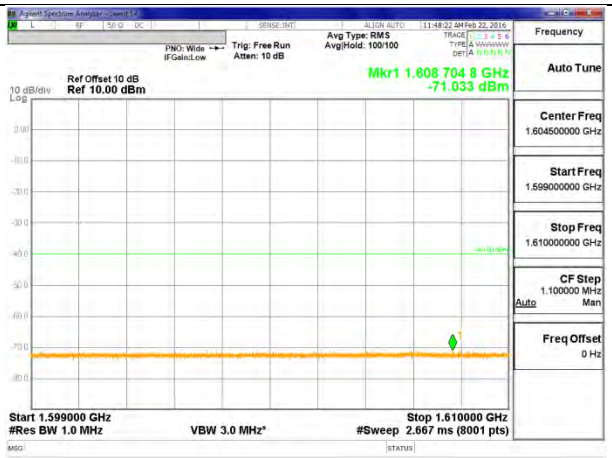
LTE B14 5MHz 16QAM High Channel FRB.gif



LTE B14 10MHz 16QAM Mid Channel FRB.gif



LTE B14 5MHz 64QAM High Channel FRB.gif



LTE B14 10MHz 64QAM Mid Channel FRB.gif

Note: For the radiated emissions; pre-amp, cable loss and receiving antenna gain are applied to the offset.

14.2. SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1053 and §90.543(e)(3)

LIMIT

(e)(3)On any frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least 43 + 10 log (P) dB.

TEST PROCEDURE

Per KDB 971168 D01 Power Meas License Digital Systems v02r02, referencing FCC Part 2.1053

14.2.1. SPURIOUS RADIATION PLOTS

LTE Band 14

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: NEC
Project #: 16U22637
Date: 1/28/2016
Test Engineer: S.Tran
Configuration: EUT
Location: Chamber B
Mode: LTE_QPSK Band 14 Harmonics, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Horn T59, 4ft SMA Cable

Band	f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
LTE14	Low Ch, 760.5								
	1521.00	-46.26	V	0.9	8.1	-39.04	-13.0	-26.0	
	2281.50	-41.30	V	0.9	9.6	-32.61	-13.0	-19.6	
5MHz	3042.00	-37.43	V	0.9	9.5	-28.83	-13.0	-15.8	
	1521.00	-45.66	H	0.9	8.1	-38.44	-13.0	-25.4	
QPSK	2281.50	-41.53	H	0.9	9.6	-32.84	-13.0	-19.8	
	3042.00	-37.65	H	0.9	9.5	-29.06	-13.0	-16.1	
	Mid Ch,763								
	1526.00	-46.01	V	0.9	8.1	-38.79	-13.0	-25.8	
	2289.00	-41.22	V	0.9	9.6	-32.53	-13.0	-19.5	
	3052.00	-36.94	V	0.9	9.5	-28.35	-13.0	-15.3	
	1526.00	-45.71	H	0.9	8.1	-38.49	-13.0	-25.5	
	2289.00	-41.58	H	0.9	9.6	-32.89	-13.0	-19.9	
	3052.00	-37.70	H	0.9	9.5	-29.11	-13.0	-16.1	
	High Ch, 765.5								
	1531.00	-44.93	V	0.9	8.1	-37.71	-13.0	-24.7	
	2296.50	-39.71	V	0.9	9.6	-31.02	-13.0	-18.0	
	3062.00	-35.78	V	0.9	9.5	-27.19	-13.0	-14.2	
	1531.00	-44.44	H	0.9	8.1	-37.22	-13.0	-24.2	
	2296.50	-39.85	H	0.9	9.6	-31.16	-13.0	-18.2	
	3062.00	-36.03	H	0.9	9.5	-27.44	-13.0	-14.4	

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: NEC
Project #: 16U22637
Date: 1/28/2016
Test Engineer: S.Tran
Configuration: EUT
Location: Chamber B
Mode: LTE_16QAM Band 14 Harmonics, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Horn T59, 4ft SMA Cable

Band: LTE14 5MHz 16QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 760.5								
1521.00	-46.23	V	0.9	8.1	-39.01	-13.0	-26.0	
2281.50	-41.27	V	0.9	9.6	-32.58	-13.0	-19.6	
3042.00	-37.26	V	0.9	9.5	-28.67	-13.0	-15.7	
1521.00	-45.82	H	0.9	8.1	-38.60	-13.0	-25.6	
2281.50	-41.45	H	0.9	9.6	-32.76	-13.0	-19.8	
3042.00	-37.81	H	0.9	9.5	-29.22	-13.0	-16.2	
Mid Ch,763								
1526.00	-46.15	V	0.9	8.1	-38.93	-13.0	-25.9	
2289.00	-41.22	V	0.9	9.6	-32.53	-13.0	-19.5	
3052.00	-37.35	V	0.9	9.5	-28.75	-13.0	-15.8	
1526.00	-47.38	H	0.9	8.1	-40.16	-13.0	-27.2	
2289.00	-41.22	H	0.9	9.6	-32.53	-13.0	-19.5	
3052.00	-37.73	H	0.9	9.5	-29.13	-13.0	-16.1	
High Ch, 765.5								
1531.00	-44.62	V	0.9	8.1	-37.40	-13.0	-24.4	
2296.50	-39.92	V	0.9	9.6	-31.23	-13.0	-18.2	
3062.00	-35.96	V	0.9	9.5	-27.37	-13.0	-14.4	
1531.00	-44.33	H	0.9	8.1	-37.12	-13.0	-24.1	
2296.50	-39.69	H	0.9	9.6	-31.00	-13.0	-18.0	
3062.00	-36.09	H	0.9	9.5	-27.49	-13.0	-14.5	

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: NEC
Project #: 16U22637
Date: 1/28/2016
Test Engineer: S.Tran
Configuration: EUT
Location: Chamber B
Mode: LTE_64QAM Band 14 Harmonics, 5MHz Bandwidth

Test Equpment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Horn T59, 4ft SMA Cable

Band
LTE14
5MHz
64QAM

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, 760.5								
1521.00	-46.07	V	0.9	8.1	-38.85	-13.0	-25.9	
2281.50	-41.28	V	0.9	9.6	-32.58	-13.0	-19.6	
3042.00	-37.48	V	0.9	9.5	-28.88	-13.0	-15.9	
1521.00	-45.48	H	0.9	8.1	-38.27	-13.0	-25.3	
2281.50	-41.25	H	0.9	9.6	-32.56	-13.0	-19.6	
3042.00	-37.77	H	0.9	9.5	-29.18	-13.0	-16.2	
Mid Ch,763								
1526.00	-46.06	V	0.9	8.1	-38.84	-13.0	-25.8	
2289.00	-41.14	V	0.9	9.6	-32.45	-13.0	-19.5	
3052.00	-37.26	V	0.9	9.5	-28.67	-13.0	-15.7	
1526.00	-45.71	H	0.9	8.1	-38.49	-13.0	-25.5	
2289.00	-41.43	H	0.9	9.6	-32.74	-13.0	-19.7	
3052.00	-37.54	H	0.9	9.5	-28.95	-13.0	-16.0	
High Ch, 765.5								
1531.00	-44.66	V	0.9	8.1	-37.44	-13.0	-24.4	
2296.50	-39.67	V	0.9	9.6	-30.97	-13.0	-18.0	
3062.00	-35.92	V	0.9	9.5	-27.33	-13.0	-14.3	
1531.00	-44.39	H	0.9	8.1	-37.17	-13.0	-24.2	
2296.50	-39.92	H	0.9	9.6	-31.23	-13.0	-18.2	
3062.00	-36.08	H	0.9	9.5	-27.49	-13.0	-14.5	

Band

LTE14

10MHz

QPSK

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: NEC
Project #: 16U22637
Date: 1/28/2016
Test Engineer: S.Tran
Configuration: EUT
Location: Chamber B
Mode: LTE_QPSK Band 14 Harmonics, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Horn T59, 4ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch,763								
1526.00	-44.64	V	0.9	8.1	-37.42	-13.0	-24.4	
2289.00	-39.62	V	0.9	9.6	-30.93	-13.0	-17.9	
3052.00	-36.01	V	0.9	9.5	-27.42	-13.0	-14.4	
1526.00	-44.81	H	0.9	8.1	-37.60	-13.0	-24.6	
2289.00	-40.15	H	0.9	9.6	-31.46	-13.0	-18.5	
3052.00	-36.03	H	0.9	9.5	-27.44	-13.0	-14.4	

Band

LTE14

10MHz

16QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: NEC
Project #: 16U22637
Date: 1/28/2016
Test Engineer: S.Tran
Configuration: EUT
Location: Chamber B
Mode: LTE_16QAM Band 14 Harmonics, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Horn T59, 4ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch,763								
1526.00	-44.63	V	0.9	8.1	-37.41	-13.0	-24.4	
2289.00	-39.73	V	0.9	9.6	-31.03	-13.0	-18.0	
3052.00	-35.99	V	0.9	9.5	-27.40	-13.0	-14.4	
1526.00	-44.32	H	0.9	8.1	-37.10	-13.0	-24.1	
2289.00	-39.95	H	0.9	9.6	-31.26	-13.0	-18.3	
3052.00	-36.35	H	0.9	9.5	-27.75	-13.0	-14.8	

Band

LTE14

10MHz

64QAM

High Frequency Substitution Measurement
UL Verification Services, Inc.

Company: NEC
Project #: 16U22637
Date: 1/28/2016
Test Engineer: S.Tran
Configuration: EUT
Location: Chamber B
Mode: LTE_64QAM Band 14 Harmonics, 10MHz Bandwidth

Test Equpment:
Receiving: Hybrid T243, and Chamber B SMA Cables
Substitution: Horn T59, 4ft SMA Cable

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Delta (dB)	Notes
Mid Ch,763								
1526.00	-44.70	V	0.9	8.1	-37.48	-13.0	-24.5	
2289.00	-39.58	V	0.9	9.6	-30.89	-13.0	-17.9	
3052.00	-36.01	V	0.9	9.5	-27.41	-13.0	-14.4	
1526.00	-44.37	H	0.9	8.1	-37.15	-13.0	-24.1	
2289.00	-40.00	H	0.9	9.6	-31.31	-13.0	-18.3	
3052.00	-36.20	H	0.9	9.5	-27.61	-13.0	-14.6	