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Report On

Application for Grant of Equipment Authorization of the
Novatel Wireless Inc.

MiFi 5792 Personal Wireless Router

FCC CFR 47 Part 2 and Part 27

IC RSS-Gen and RSS-139

Report No. SC1206183-1

July 2012

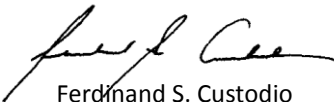



REPORT ON Radio Testing of the
Novatel Wireless Inc.
Personal Wireless Router

TEST REPORT NUMBER SC1206183-1

PREPARED FOR Novatel Wireless Inc.
9645 Scranton Road, Suite 205
San Diego, CA 92121-3030 USA

CONTACT PERSON Todd Gallagher
Regulatory Engineering Manager
(403) 295-4891
tgallagher@nvt.com

PREPARED BY 
Ferdinand S. Custodio
Name
Authorized Signatory
Title: EMC/Wireless Test Engineer

APPROVED BY 
Chip R. Fleury
Name
Authorized Signatory

DATED July 12, 2012



Revision History

SC1206183-1 Novatel Wireless Inc. MiFi 5792 Personal Wireless Router					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
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SECTION 1

REPORT SUMMARY

Radio Testing of the
Novatel Wireless Inc.
Personal Wireless Router



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Novatel Wireless Inc. Personal Wireless Router to the requirements of the following:

- FCC CFR 47 Part 2 and Part 27
- IC RSS-Gen and RSS-139.

Objective	To perform Radio Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Novatel Wireless Inc.
Model Number(s)	MiFi 5792
FCC ID Number	PKRNVWMIFI5792
IC Number	3229A-MIFI5792
Serial Number(s)	SA310512700012
Number of Samples Tested	1
Test Specification/Issue/Date	<ul style="list-style-type: none">• FCC CFR 47 Part 2 and Part 27 (October 1, 2011).• RSS-139 - Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz (Issue 2, February 2009).• RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 3, December 2010).
Start of Test	July 04, 2012
Finish of Test	July 11, 2012
Name of Engineer(s)	Juan Manuel Gonzalez Ferdinand Custodio
Related Document(s)	None. Supporting documents for EUT certification are separate exhibits.



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC CFR 47 Part 2 and Part 27 with cross-reference to the corresponding IC RSS standard is shown below.

Section	FCC Part Sections(s)	RSS Section(s)	Test Description	Result
2.1	2.1046		Transmitter Conducted Output Power	Compliant (RF Exposure Test Report)
2.2	2.1046 and 27.50 (d)(4)	RSS-139(6.4)	Equivalent Isotropic Radiated Power	Compliant
2.3	2.1046, 27.50 (c) (10) and (11)		Effective Radiated Power	Compliant
2.4	2.1049 and 27.53(h)(1)	RSS-Gen (4.6.1)	Occupied Bandwidth	Compliant
2.5	27.50(d)(5)	RSS-133(6.4)	Peak-Average Ratio	Compliant
2.6	27.53(g) and (h)	RSS-139(6.5)	Band Edge	Compliant
2.7	27.53(g) and (h)	RSS-139(6.5)	Conducted Spurious Emissions	Compliant
2.8	2.1053, 27.53(g) and (h)	RSS-139(6.5)	Field Strength Of Spurious Radiation	Compliant
2.9	2.1055(a)(1) 2.1055(d)(1) and 27.54	RSS-139(6.3)	Frequency Stability	Compliant
2.10		RSS-139(6.6)	Receiver Spurious Emissions	Compliant
2.11		RSS-Gen 7.2.4	Powerline Conducted Emissions	Compliant



1.3 **PRODUCT INFORMATION**

1.3.1 **EUT General Description**

The Equipment Under Test (EUT) was a Novatel Wireless Inc. MiFi 5792 Personal Wireless Router as shown in the photograph below. The EUT creates a personal Wi-Fi cloud, capable of sharing high-speed 4G LTE and 3G Mobile Broadband Internet connectivity with up to 10 Wi-Fi-enabled devices simultaneously.



1.3.2 **EUT General Description**

EUT Description	MiFi 5792 Personal Wireless Router
Model Number(s)	MiFi 5792
FCC Classification	PCB - PCS Licensed Transmitter
Rated Voltage	4.35VDC Nominal voltage.
Mode	GSM/EGPRS/UMTS/4G-LTE
Capability	850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Band 2,4,5 and 17 LTE, 802.11 b/g/n WLAN
Frequency Tolerance	From -30°C to +55°C the transmission must remain in the band
Primary Unit (EUT)	<input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
Antenna Type	Integral. Planar Inverted F type
Antenna Gain	[17]700MHz = -3.4dBi [B5]800MHz = -1.8dBi [B4]1700MHz = 0.6dBi [B2]1900MHz = 0.4dBi [B1]2100MHz = -1.2dBi



1.3.3 Transmit Frequency Table

LTE Band 4				
Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
1.4	1710-1755	1M10G7D	0.244	23.87
1.4	1710-1755	1M10W7D	0.244	23.87
3.0	1710-1755	2M71G7D	0.330	25.19
3.0	1710-1755	2M70W7D	0.319	25.04
5.0	1710-1755	4M52G7D	0.348	25.42
5.0	1710-1755	4M50W7D	0.364	25.61
10.0	1710-1755	9M04G7D	0.332	25.21
10.0	1710-1755	9M00W7D	0.344	25.36
15.0	1710-1755	13M6G7D	0.377	25.76
15.0	1710-1755	13M5W7D	0.377	25.76
20.0	1710-1755	18M1G7D	0.370	25.68
20.0	1710-1755	18M2W7D	0.364	25.61
LTE Band 17				
Bandwidth (MHz)	Tx Frequency (MHz)	Emission Designator	ERP/EIRP	
			Max. Power (W)	Max. Power (dBm)
5.0	704-716	4M52G7D	0.277	24.42
5.0	704-716	4M50W7D	0.251	24.00
10.0	704-716	9M00G7D	0.179	22.53
10.0	704-716	9M00W7D	0.186	22.70

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Conducted Emission test setup. EUT powered by USB AC adapter/charger. EUT transmitting max. power.
B	Radiated Emission test setup. Fresh batteries installed before each test. EUT transmitting max. power.
C	Conducted antenna port test setup. EUT powered via battery and USB connected to support laptop.

Note: Antenna port is for service function only and is not accessible to the end user.

1.4.2 EUT Exercise Software

Test mode of the EUT is updated using QUALCOMM eXtensible Diagnostic Monitor Version 03.14.184 (Production Build) using the support laptop via USB cable.

1.4.3 Support Equipment and I/O cables

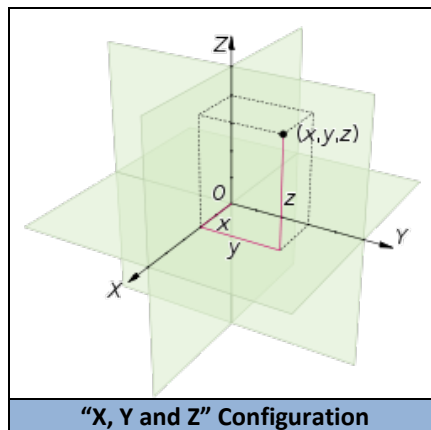
Manufacturer	Equipment/Cable	Description
Dell	Support Laptop	Novatel Wireless Test configuration Laptop #2 PAL50-PC/E396_E362_E371
ASAP	USB cable	0.9m, shielded, Type A to Mini-A connector, style 2725, USB Revision 2.0

1.4.4 Worst Case Configuration

Worst-case configuration used in this test report as per radiated power measurement performed:

Band	Channel BW	Modulation	RB Size/Offset
LTE Band 4	15MHz	QPSK	1/0
LTE Band 17	5MHz	QPSK	1/24

EUT is a portable device. For radiated measurements X,Y and Z orientations were verified. Worst case position is "Z".





1.4.5 **Simplified Test Configuration Diagram**



Radiated Emissions Setup (Test Configuration A)



Conducted Emissions Setup (Test Configuration B)





1.5 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.6 MODIFICATION RECORD

Description of Modification	Modification Fitted By	Date Modification Fitted
Serial Number SA310512700012		
N/A		

The table above details modifications made to the EUT during the test programme. The modifications incorporated during each test (if relevant) are recorded on the appropriate test pages.

1.7 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.4-2009, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

Effective Radiated Power (ERP) and Equivalent Isotropic Radiated Power (EIRP) measurements by Substitution method were conducted according to ANSI/TIA/EIA-603-C-2004, August 17,2004. Land Mobile FM or PM -Communications Equipment -Measurement and Performance Standards.

For conducted and radiated emissions the equipment under test (EUT) was configured to measure its highest possible emission level. This level was based on the maximized cable configuration from exploratory testing per ANSI C63.4-2009. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY

1.8.1 FCC – Registration No.: US5281

TUV SUD America Inc. (San Diego), a §2.498 listed test firm operates the EMC Laboratory registered under Sony Electronics Inc. Product Quality Division EMC. This laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files and the Registration is US5281.

1.8.2 Industry Canada (IC) Registration No.: 3067A

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego), has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No. 3067A.



1.9 **SAMPLE CALCULATIONS**

1.9.1 **LTE Emission Designator (QPSK)**

Emission Designator = 4M51G7D
 G = Phase Modulation
 7= Quantized/Digital Info
 D = Combination (Audio/Data)

1.9.2 **LTE Emission Designator (16QAM)**

Emission Designator = 4M50W7D
 W = Frequency Modulation
 7= Quantized/Digital Info
 D = Combination (Audio/Data)

1.9.3 **Spurious Radiated Emission (below 1GHz)**

Measuring equipment raw measurement (dBµV/m) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1002 (antenna)	17.2	
Reported QuasiPeak Final Measurement (dBµV/m) @ 30MHz			11.8

1.9.4 **Spurious Radiated Emission – Substitution Method**

Example = 84dBµV/m @ 1413 MHz (numerical sample only)

The field strength reading of 84dBµV/m @ 1413 MHz (2nd Harmonic of 706.5 MHz) is the maximized measurement when the EUT is on the turntable measured at 3 meters. The gain of the substituted antenna is 7.8dBi while the transmit cable loss is 1.0 dB (cable between signal generator and the substituted antenna). The signal generator level is adjusted until the 84dBµV/m level at the receiving end is replicated (identical test setup, i.e. same antenna, cable/s and preamp). If the adjusted signal generator level is -18dBm, then we have the following for both EIRP and ERP as required:

$$\begin{aligned}
 P_{EIRP} &= -18 \text{ dBm} + 7.8 \text{ dBi} - 1\text{dB} \\
 &= 11.2 \text{ dBm} \\
 P_{ERP} &= P_{EIRP} - 2.15 \text{ dB} \\
 &= 11.2 \text{ dBm} - 2.15 \text{ dB} \\
 &= 9.05 \text{ dBm}
 \end{aligned}$$



SECTION 2

TEST DETAILS

Radio Testing of the
Novatel Wireless Inc.
Personal Wireless Router



2.1 **TRANSMITTER CONDUCTED POWER MEASUREMENTS**

2.1.1 **Specification Reference**

Part 2.1046

2.1.2 **Standard Applicable**

The conducted power measurements were made in accordance to FCC Part 2.1046, RSS-132 and RSS-133

2.1.3 **Equipment Under Test and Modification State**

Serial No: SA310512700012 / Test Configuration B

2.1.4 **Date of Test/Initial of test personnel who performed the test**

See SAR report#: 20120702 REV C (RF Exposure Labs)

2.1.5 **Test Equipment Used**

See SAR report # 20120702 REV C (RF Exposure Labs)

2.1.6 **Additional Observations**

- The following data was taken directly from the SAR report. Report #

2.1.7 **Test Results**

See attached table. These are the Conducted port measurements at provided by the RF exposure SAR laboratory and inserted into this report for completion. The data was used to help in determining worst case testing conditions for the remainder of the report.



Band	Modulation	Bandwidth	RB Size	RB Offset	Channel	Frequency	Power	Power
							QPSK	16QAM
4	QPSK	1.4 MHz	6	0	19957	1710.7	23.2	22.0
					20175	1732.5	23.1	22.0
					20393	1754.3	23.2	22.2
			3	1	19957	1710.7	24.0	23.1
					20175	1732.5	24.0	23.1
					20393	1754.3	24.0	23.2
			1	0	19957	1710.7	24.0	23.0
					20175	1732.5	23.9	23.0
					20393	1754.3	23.9	23.1
		1	5	19957	1710.7	24.0	23.1	
				20175	1732.5	24.0	23.0	
				20393	1754.3	23.9	23.1	
		3 MHz	15	0	19965	1711.5	23.3	22.2
					20175	1732.5	23.4	22.3
					20385	1753.5	23.2	22.4
			8	3	19965	1711.5	23.1	22.1
					20175	1732.5	23.1	22.3
					20385	1753.5	23.2	22.2
			1	0	19965	1711.5	24.0	23.1
					20175	1732.5	24.0	23.0
					20385	1753.5	23.9	23.1
		1	14	19965	1711.5	24.0	23.3	
				20175	1732.5	24.0	23.2	
				20385	1753.5	24.0	23.4	
		5 MHz	25	0	19975	1712.5	23.3	22.3
					20175	1732.5	23.3	22.2
					20375	1752.5	23.2	22.1
			12	6	19975	1712.5	23.1	22.3
					20175	1732.5	23.3	22.2
					20375	1752.5	23.2	22.4
1	0		19975	1712.5	24.0	23.0		
			20175	1732.5	24.0	23.0		
			20375	1752.5	24.0	23.1		
1	24		19975	1712.5	24.0	23.0		
			20175	1732.5	24.0	23.0		
			20375	1752.5	23.9	23.1		



Band	Modulation	Bandwidth	RB Size	RB Offset	Channel	Frequency	Power	Power
							QPSK	16QAM
4	QPSK	10 MHz	50	0	20000	1715	23.1	22.2
					20175	1732.5	23.2	22.1
					20350	1750	23.3	22.3
			25	12	20000	1715	23.2	22.3
					20175	1732.5	23.3	22.2
					20350	1750	23.4	22.4
			1	0	20000	1715	24.0	23.3
					20175	1732.5	24.0	23.2
					20350	1750	24.0	23.2
			1	24	20000	1715	24.0	23.3
					20175	1732.5	24.0	23.1
					20350	1750	24.0	23.2
		15 MHz	75	0	20025	1717.5	23.1	22.1
					20175	1732.5	23.2	22.0
					20325	1747.5	23.2	22.1
			36	19	20025	1717.5	23.2	22.3
					20175	1732.5	23.2	22.3
					20325	1747.5	23.2	22.2
			1	0	20025	1717.5	24.0	23.2
					20175	1732.5	24.0	23.3
					20325	1747.5	24.0	23.3
			1	74	20025	1717.5	24.0	23.1
					20175	1732.5	24.0	23.0
					20325	1747.5	24.0	23.2
		20 MHz	100	0	20050	1720	23.2	22.2
					20175	1732.5	23.2	22.1
					20300	1745	23.3	22.3
			50	25	20050	1720	23.1	22.1
					20175	1732.5	23.1	22.0
					20300	1745	23.3	22.2
1	0		20050	1720	24.0	23.3		
			20175	1732.5	24.0	23.4		
			20300	1745	24.0	23.2		
1	99		20050	1720	24.0	23.1		
			20175	1732.5	24.0	23.2		
			20300	1745	24.0	23.2		



Band	Modulation	Bandwidth	RB Size	RB Offset	Channel	Frequency	Power	Power
							QPSK	16QAM
17	QPSK	5 MHz	25	0	23755	706.5	23.1	22.0
					23790	710	23.2	22.1
					23825	713.5	23.0	22.0
			12	6	23755	706.5	23.0	22.1
					23790	710	23.2	22.3
					23825	713.5	23.1	22.3
			1	0	23755	706.5	23.9	23.1
					23790	710	23.9	23.3
					23825	713.5	24.0	23.2
			1	24	23755	706.5	24.0	23.0
					23790	710	24.0	23.1
					23825	713.5	23.8	22.9
		10 MHz	50	0	23780	709	22.9	21.9
					23790	710	22.9	21.9
					23800	711	23.1	22.0
			25	12	23780	709	23.0	22.1
					23790	710	23.0	22.0
					23800	711	23.0	22.0
			1	0	23780	709	23.9	23.1
					23790	710	23.9	23.1
					23800	711	24.0	22.9
1	24	23780	709	24.0	22.9			
		23790	710	23.8	23.0			
		23800	711	24.0	22.8			



2.2 EQUIVALENT ISOTROPIC RADIATED POWER

2.2.1 Specification Reference

Part 27 Subpart C §27.50 (d)(4), Part 2.1046, RSS-139 Issue 2 (6.4)

2.2.2 Standard Applicable

(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands:

(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP. Fixed stations operating in this band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in this band must employ a means for limiting power to the minimum necessary for successful communications

2.2.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Test Configuration B

2.2.4 Date of Test/Initial of test personnel who performed the test

July 07-08, 2012/JMG

2.2.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions

Ambient Temperature	24.1-24.2°C
Relative Humidity	54.5-55.2%
ATM Pressure	99.0-99.1 kPa

2.2.7 Additional Observations

- This is a radiated test as per Radiated Power Output method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- The Substitute level reported is the signal generator level with all correction factors (+ transmit antenna gain – transmit cable loss).
- The EUT was verified under all configurations (RB size and offset) and the worst case radiated power reported for each modulation/channel bandwidth.

2.2.8 Test Results

See attached table.



LTE Band 4								
Freq. (MHz)	Channel BW (MHz)	Mod.	RB Size/Offset	Substitute Level (dBm)	Pol (H/V)	EIRP (dBm)	EIRP (Watt)	Limit (Watt)
1710.7	1.4	QPSK	3/1	23.55	V	23.55	0.226	1
1732.5	1.4	QPSK	3/1	23.87	V	23.87	0.244	1
1754.3	1.4	QPSK	3/1	23.30	V	23.30	0.214	1
1710.7	1.4	16-QAM	3/1	23.87	V	23.87	0.244	1
1732.5	1.4	16-QAM	3/1	23.52	V	23.52	0.225	1
1754.3	1.4	16-QAM	3/1	22.98	V	22.98	0.199	1
1711.5	3	QPSK	1/0	24.89	V	24.89	0.308	1
1732.5	3	QPSK	1/0	25.19	V	25.19	0.330	1
1753.5	3	QPSK	1/0	24.67	V	24.67	0.293	1
1711.5	3	16-QAM	1/0	25.04	V	25.04	0.319	1
1732.5	3	16-QAM	1/0	24.78	V	24.78	0.301	1
1753.5	3	16-QAM	1/0	23.77	V	23.77	0.238	1
1712.5	5	QPSK	1/0	24.93	V	24.93	0.311	1
1732.5	5	QPSK	1/0	25.42	V	25.42	0.348	1
1752.5	5	QPSK	1/0	23.75	V	23.75	0.237	1
1712.5	5	16-QAM	1/0	24.93	V	24.93	0.311	1
1732.5	5	16-QAM	1/0	25.61	V	25.61	0.364	1
1752.5	5	16-QAM	1/0	23.04	V	23.04	0.201	1
1715	10	QPSK	1/0	24.83	V	24.83	0.304	1
1732.5	10	QPSK	1/0	25.21	V	25.21	0.332	1
1750	10	QPSK	1/0	25.00	V	25.00	0.316	1
1715	10	16-QAM	1/0	24.99	V	24.99	0.316	1
1732.5	10	16-QAM	1/0	25.36	V	25.36	0.344	1
1750	10	16-QAM	1/0	25.32	V	25.32	0.340	1
1717.5	15	QPSK	1/0	24.88	V	24.88	0.308	1
1732.5	15	QPSK	1/0	25.09	V	25.09	0.323	1
1747.5	15	QPSK	1/0	25.76	V	25.76	0.377	1
1717.5	15	16-QAM	1/0	25.20	V	25.20	0.331	1
1732.5	15	16-QAM	1/0	25.10	V	25.10	0.324	1
1747.5	15	16-QAM	1/0	25.76	V	25.76	0.377	1
1720	20	QPSK	1/0	25.68	V	25.68	0.370	1
1732.5	20	QPSK	1/0	25.20	V	25.20	0.331	1
1745	20	QPSK	1/0	25.12	V	25.12	0.325	1
1720	20	16-QAM	1/0	25.61	V	25.61	0.364	1
1732.5	20	16-QAM	1/0	25.08	V	25.08	0.322	1
1745	20	16-QAM	1/0	25.22	V	25.22	0.333	1



2.3 EFFECTIVE RADIATED POWER OUTPUT DATA

2.3.1 Specification Reference

Part 27 Subpart C §27.50 (c) (10)(11), Part 2.1046, RSS-139 Issue 2 (6.4)

2.3.2 Standard Applicable

(c) The following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band:

(10) Portable stations (hand-held devices) are limited to 3 watts ERP; and

(11) Licensees may employ equipment operating in compliance with either the measurement techniques described in paragraph (b)(11) of this section or a Commission-approved average power technique. In both instances, equipment employed must be authorized in accordance with the provisions of §27.51

2.3.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Test Configuration B

2.3.4 Date of Test/Initial of test personnel who performed the test

July 07-08, 2012/JMG

2.3.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.3.6 Environmental Conditions

Ambient Temperature	24.1-24.2°C
Relative Humidity	54.5-55.2%
ATM Pressure	99.0-99.1 kPa

2.3.7 Additional Observations

- This is a radiated test as per Radiated Power Output method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- The Substitute level reported is the signal generator level with all correction factors (+ transmit antenna gain – transmit cable loss). This level is then converted to ERP using a factor of 2.15.
- The EUT was verified under all configurations (RB size and offset) and the worst case radiated power reported for each modulation/channel bandwidth.

2.3.8 Test Results

See attached table.



LTE Band 17								
Freq. (MHz)	Channel BW (MHz)	Mod.	RB Size/Offset	Substitute Level (dBm)	Pol (H/V)	ERP (dBm)	ERP (Watts)	Limit (Watts)
706.5	5	QPSK	1/24	26.15	H	24	0.251	3
710	5	QPSK	1/24	26.57	H	24.42	0.277	3
713.5	5	QPSK	1/24	25.76	H	23.61	0.230	3
706.5	5	16-QAM	1/24	25.91	H	23.76	0.238	3
710	5	16-QAM	1/24	26.15	H	24	0.251	3
713.5	5	16-QAM	1/24	25.55	H	23.4	0.219	3
709	10	QPSK	1/24	24.55	H	22.4	0.174	3
710	10	QPSK	1/24	24.68	H	22.53	0.179	3
711	10	QPSK	1/24	24.58	H	22.43	0.175	3
709	10	16-QAM	1/24	24.69	H	22.54	0.179	3
710	10	16-QAM	1/24	24.85	H	22.7	0.186	3
711	10	16-QAM	1/24	24.33	H	22.18	0.165	3



2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

Part 27 Subpart C §27.53(h)(1), 2.1049, RSS-GEN Issue 3 (4.6.1)

2.4.2 Standard Applicable

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 emissions are attenuated at least 26 dB below the transmitter power.

2.4.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Default Test Configuration C

2.4.4 Date of Test/Initial of test personnel who performed the test

July 06 and 08, 2012/FSC

2.4.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.4.6 Environmental Conditions

Ambient Temperature	23.0°C
Relative Humidity	49.8%
ATM Pressure	99.0 kPa

2.4.7 Additional Observations

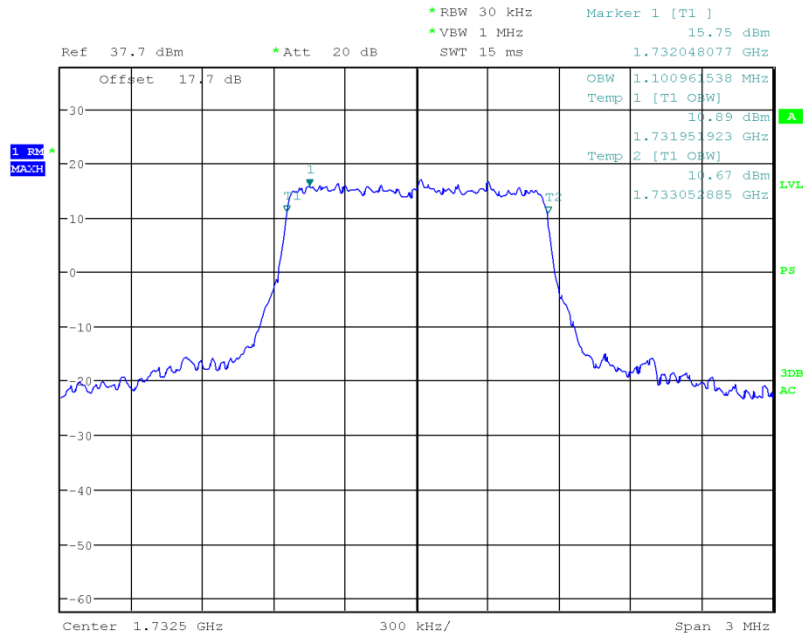
- This is a conducted test. Test procedure is per Section 3.0 of KDB971168 (D01 Power Meas License Digital Systems v01).
- All channels per each channel bandwidth/band were verified. Only the worst channel presented.

2.4.8 Test Results

See attached plots.

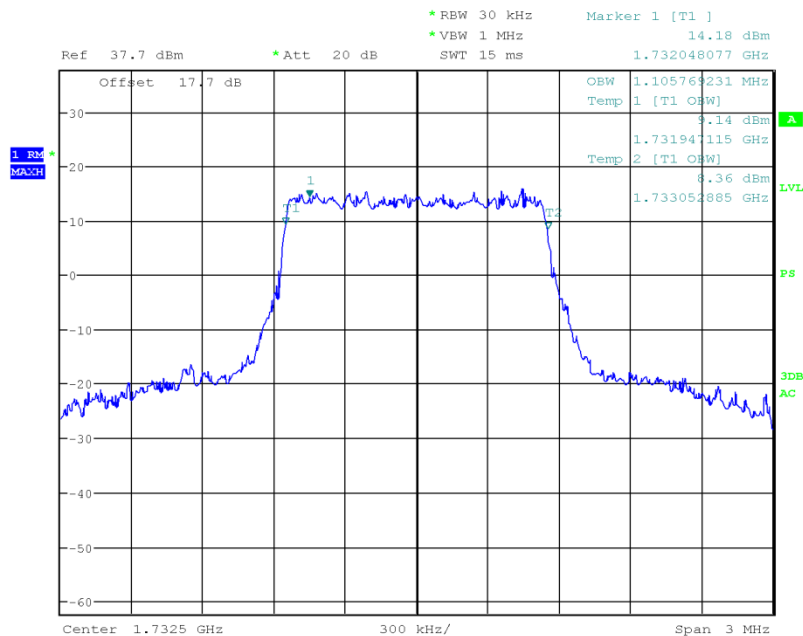


LTE Band 4 1732.5MHz (1.4 MHz BW) QPSK



Date: 6.JUL.2012 11:44:08

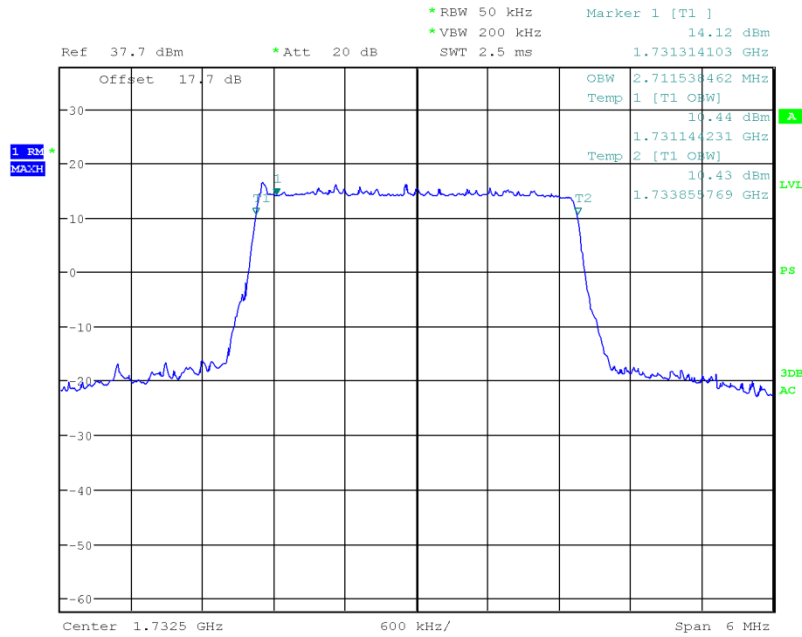
LTE Band 4 1732.5MHz (1.4 MHz BW) 16QAM



Date: 6.JUL.2012 11:44:36

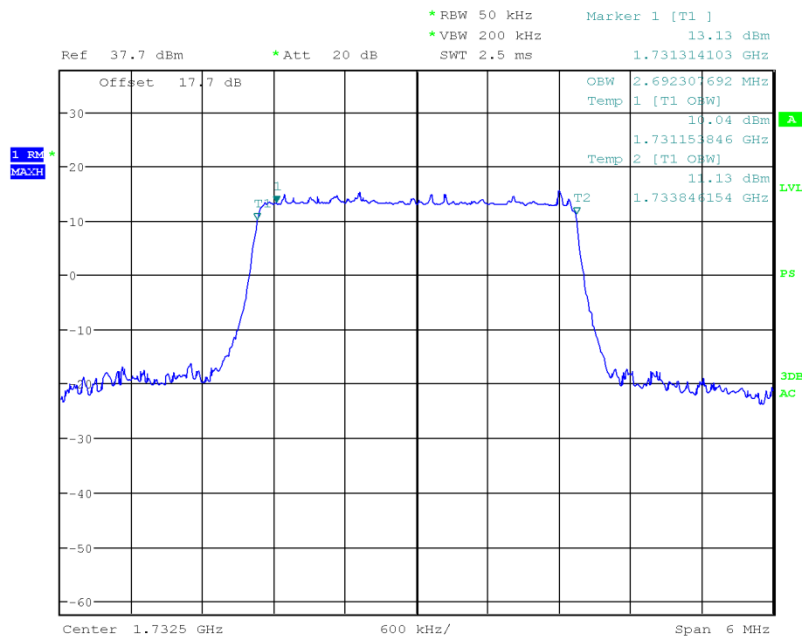


LTE Band 4 1732.5MHz (3.0 MHz BW) QPSK



Date: 6.JUL.2012 11:22:53

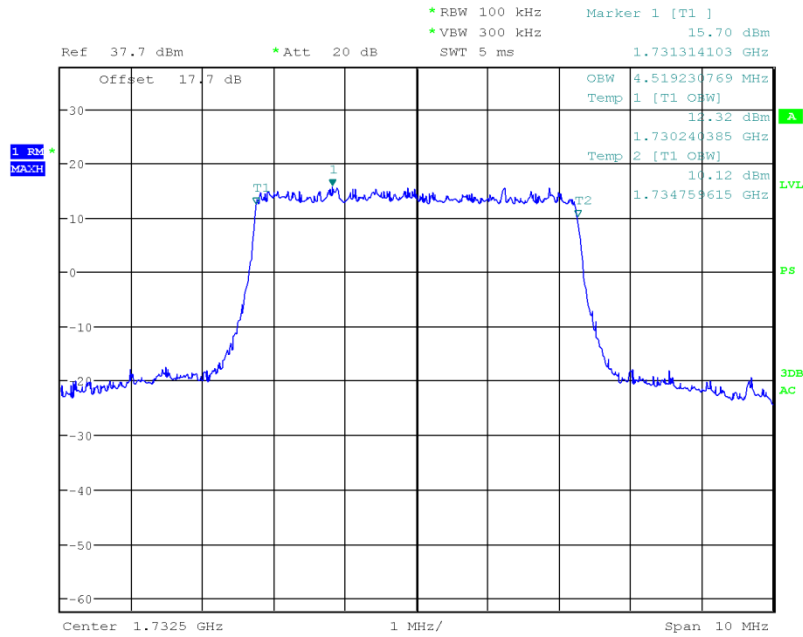
LTE Band 4 1732.5MHz (3.0 MHz BW) 16QAM



Date: 6.JUL.2012 11:23:33

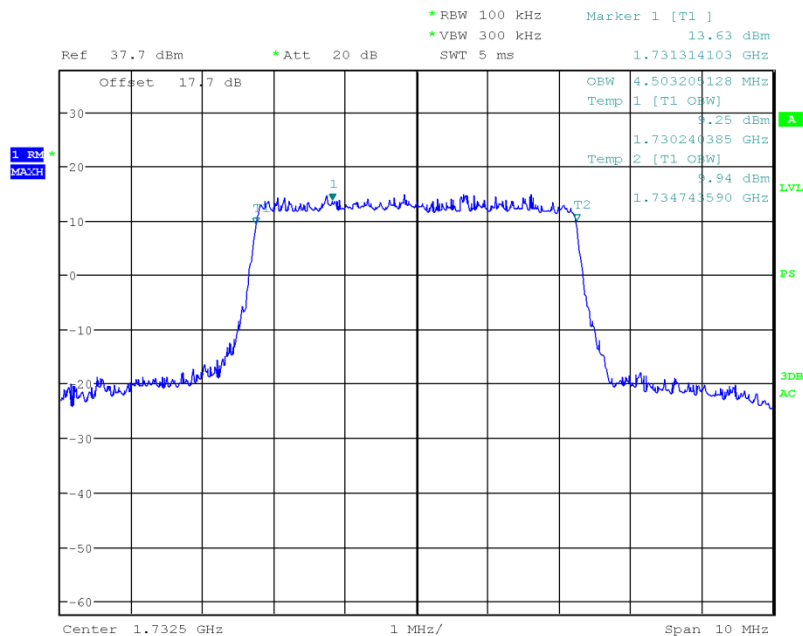


LTE Band 4 1732.5MHz (5.0 MHz BW) QPSK

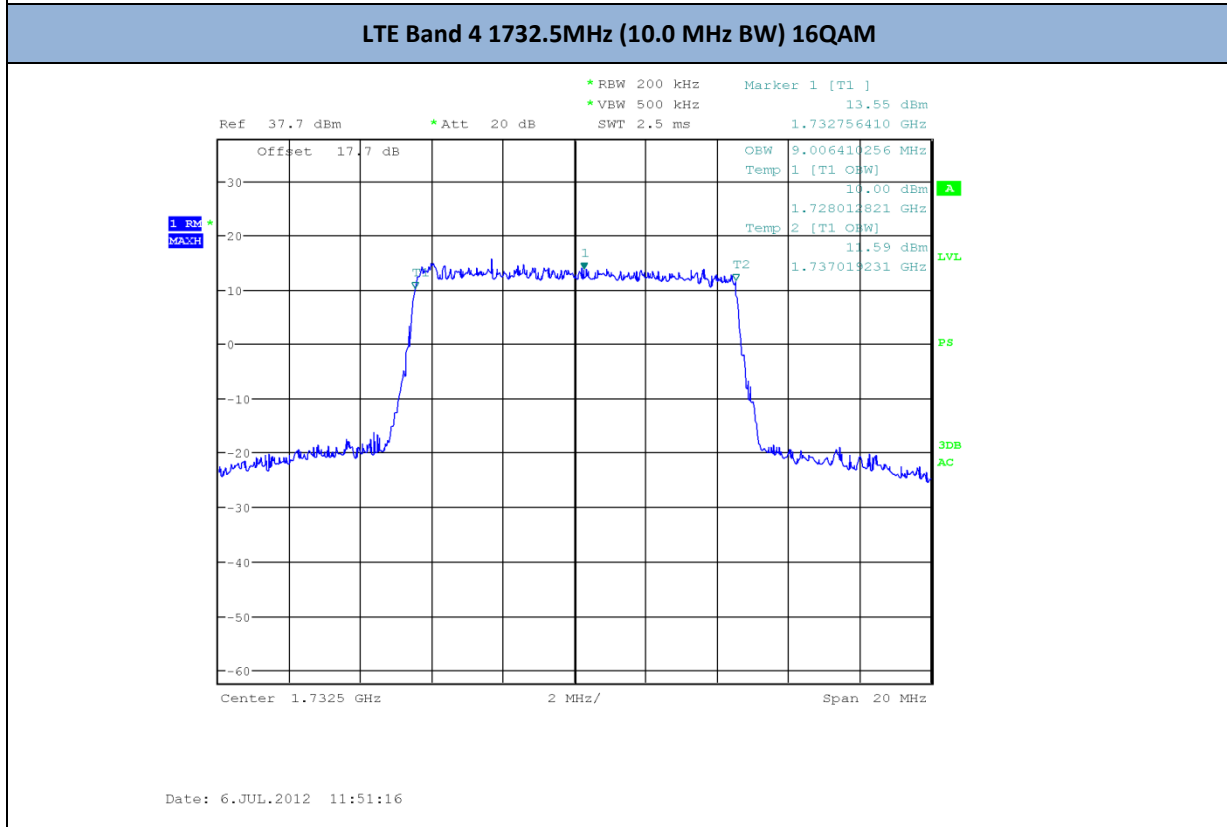
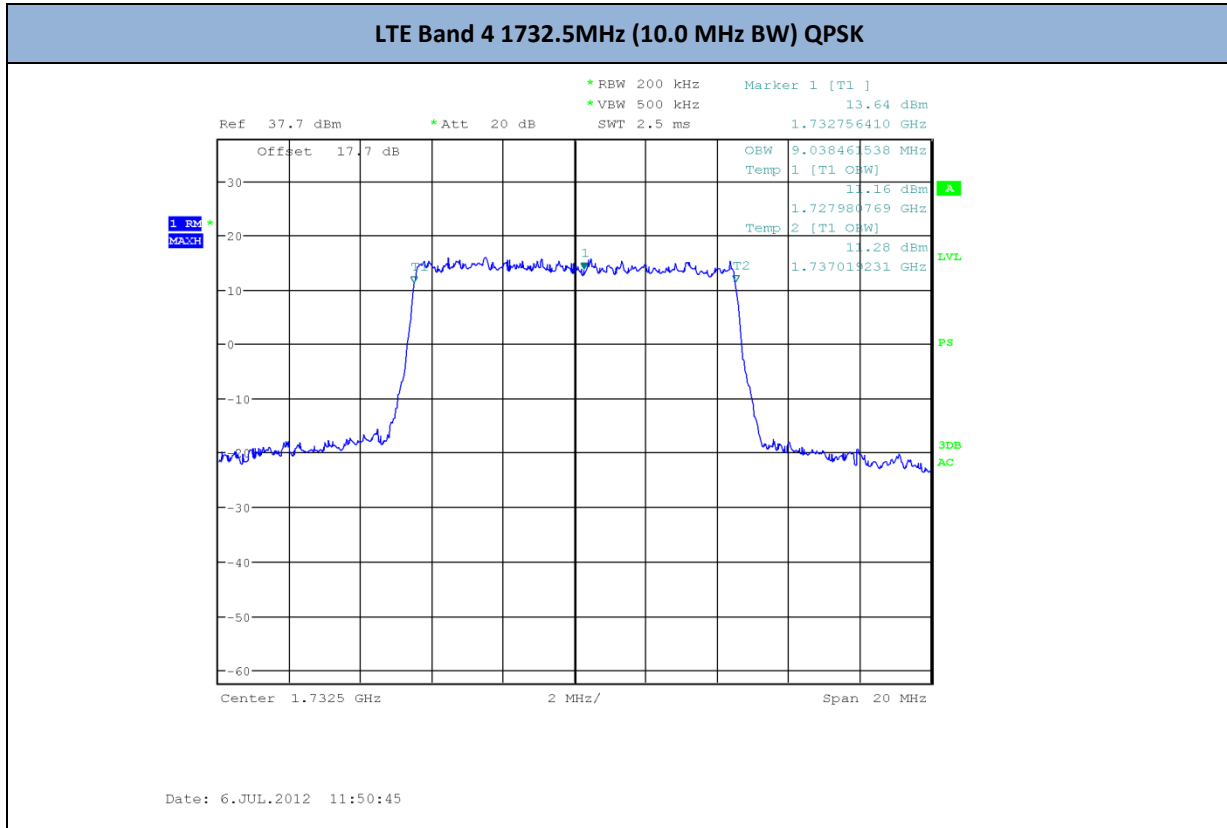


Date: 6.JUL.2012 11:18:43

LTE Band 4 1732.5MHz (5.0 MHz BW) 16QAM

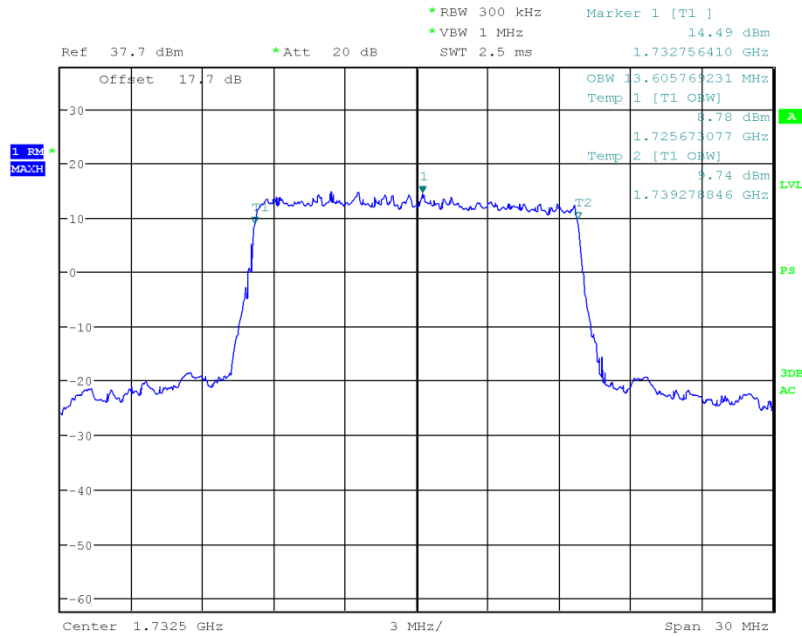


Date: 6.JUL.2012 11:18:07



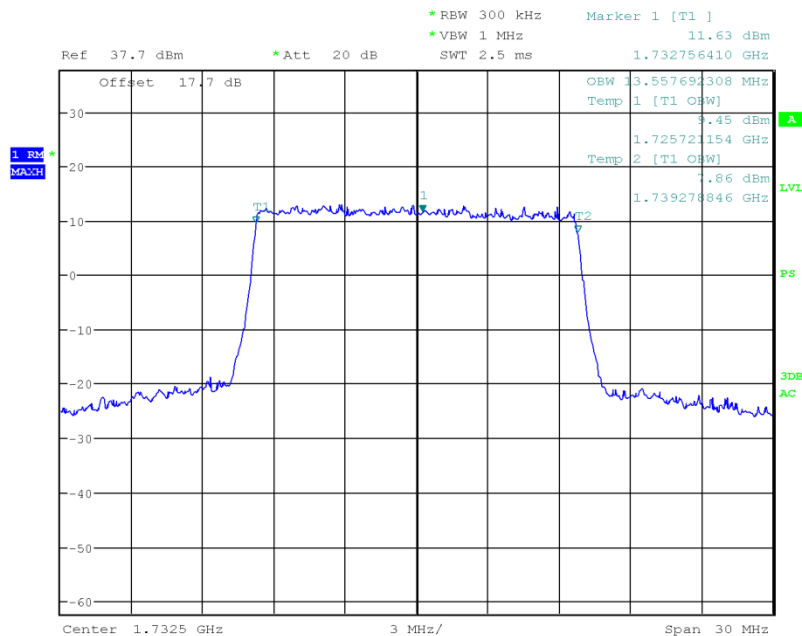


LTE Band 4 1732.5MHz (15.0 MHz BW) QPSK



Date: 6.JUL.2012 11:55:19

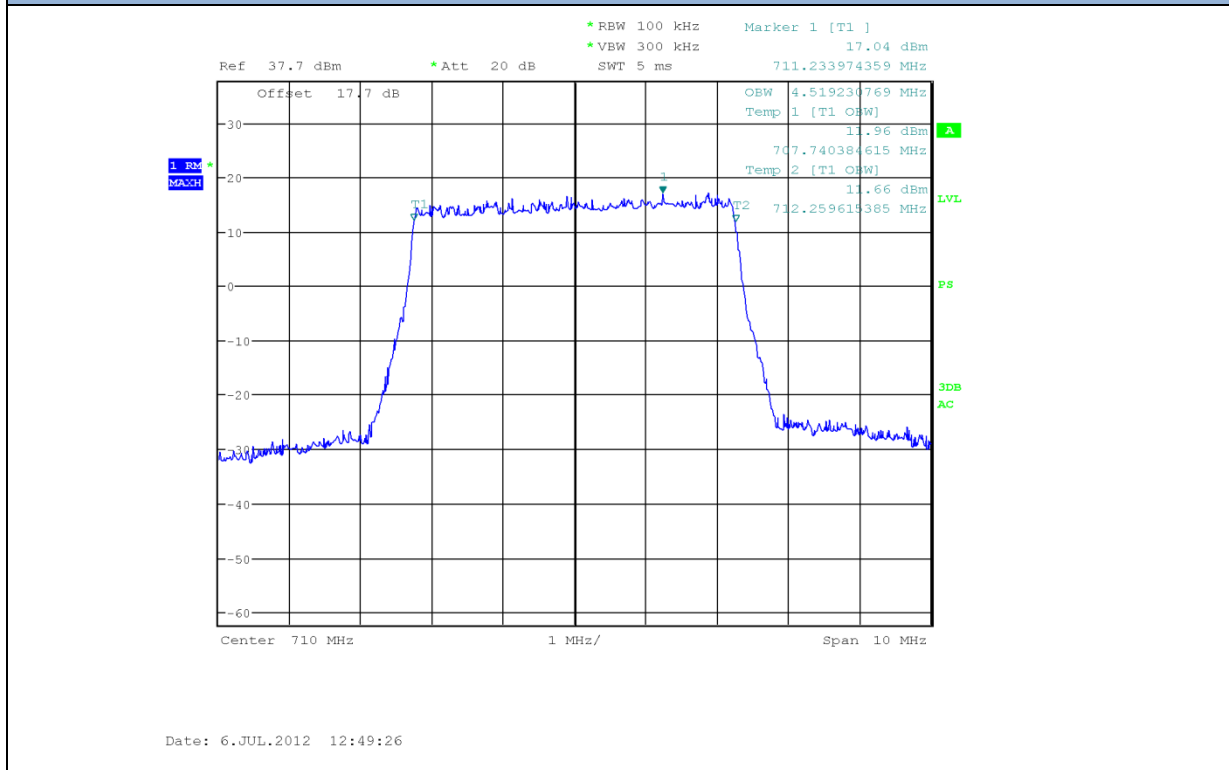
LTE Band 4 1732.5MHz (15.0 MHz BW) 16QAM



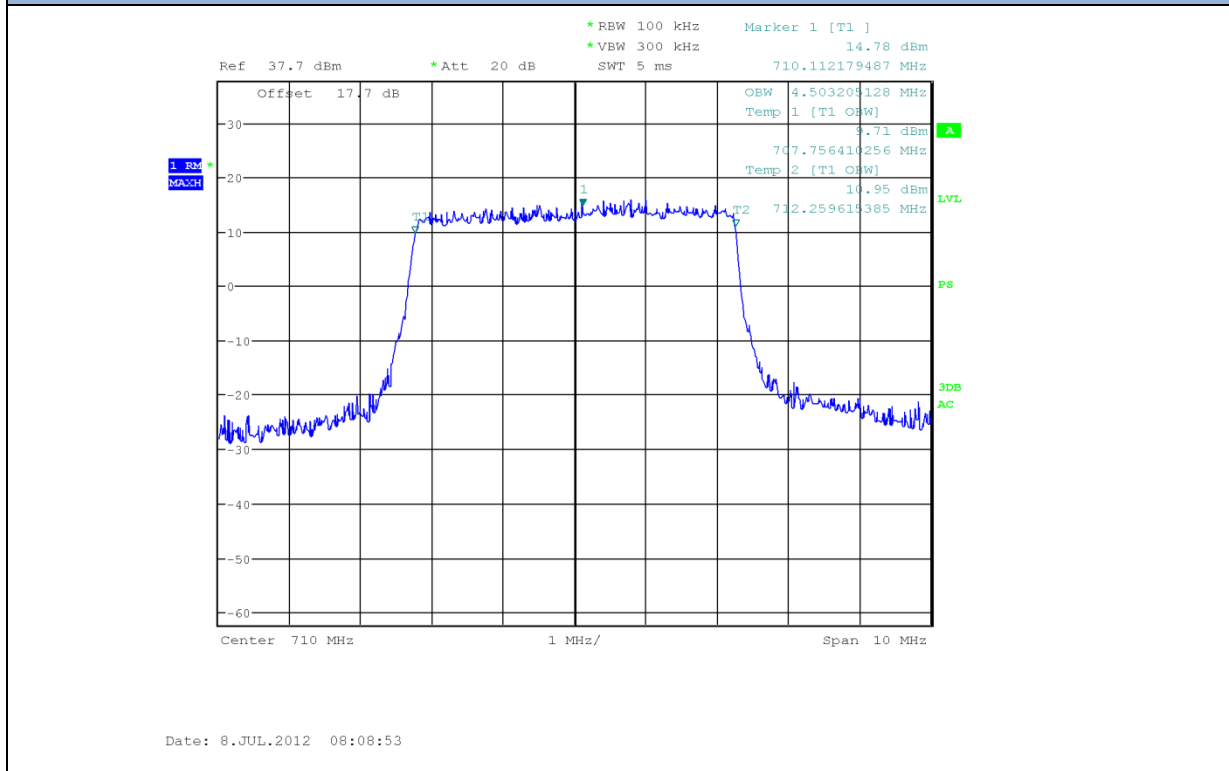
Date: 6.JUL.2012 11:56:13



LTE Band 17 710.0MHz (5.0 MHz BW) QPSK

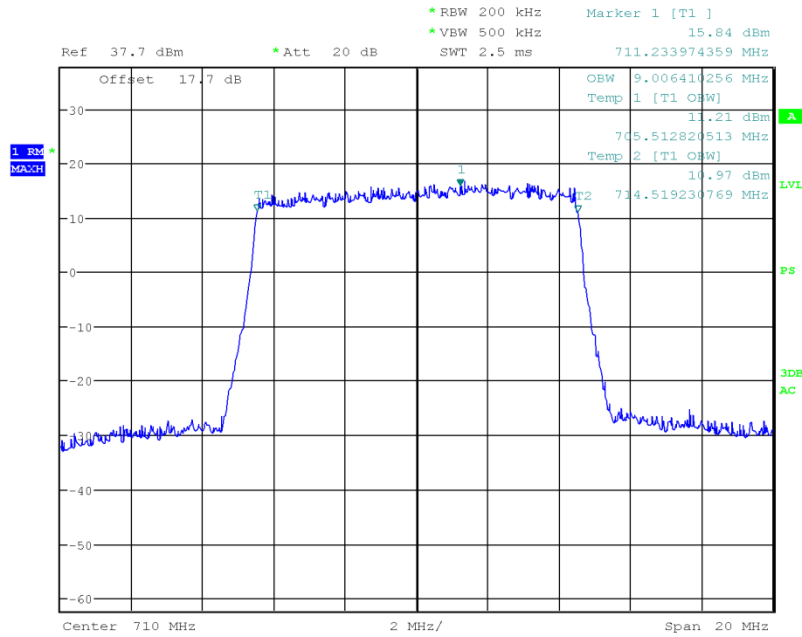


LTE Band 17 710.0MHz (5.0 MHz BW) 16QAM



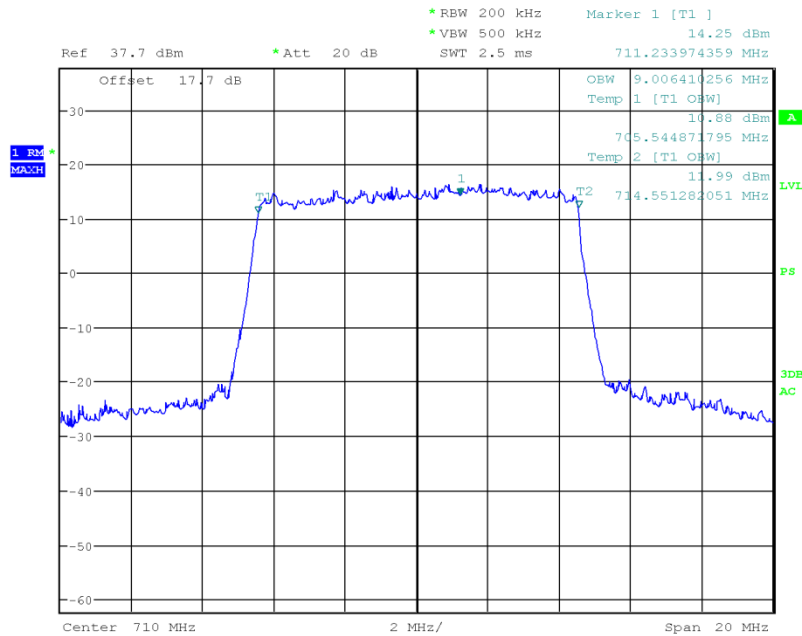


LTE Band 17 710.0MHz (10.0 MHz BW) QPSK



Date: 6.JUL.2012 12:54:42

LTE Band 17 710.0MHz (10.0 MHz BW) 16QAM



Date: 6.JUL.2012 12:54:04



2.5 PEAK-AVERAGE POWER RATIO

2.5.1 Specification Reference

Part 27 Subpart C §27.50(d)(5), RSS-139 Issue 2 (6.4)

2.5.2 Standard Applicable

(d) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands:

(5) Equipment employed must be authorized in accordance with the provisions of §24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

2.5.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Test Configuration C

2.5.4 Date of Test/Initial of test personnel who performed the test

July 06, 2012/FSC

2.5.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.5.6 Environmental Conditions

Ambient Temperature	23.0°C
Relative Humidity	49.8%
ATM Pressure	99.0 kPa

2.5.7 Additional Observations

- This is a conducted test. Test procedure is per Section 3.0 of KDB971168 (D01 Power Meas License Digital Systems v01).
- Measurement was done using the Spectrum Analyzer's Complementary Cumulative Distribution Function (CCDF) measurement profile. The built-in function is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth (crest factor or peak-to-average ratio) A CCDF curve depicts the probability of the peak signal amplitude exceeding the average power level. Most contemporary measurement instrumentation include the capability to produce CCDF curves for an input signal provided that the instrument's resolution bandwidth can be set wide enough to accommodate the entire input signal bandwidth.



- All channels based from worst case configuration channel bandwidth were verified. Only the worst channel presented.
- There are no measured PAPR levels greater than 13dB. EUT complies.

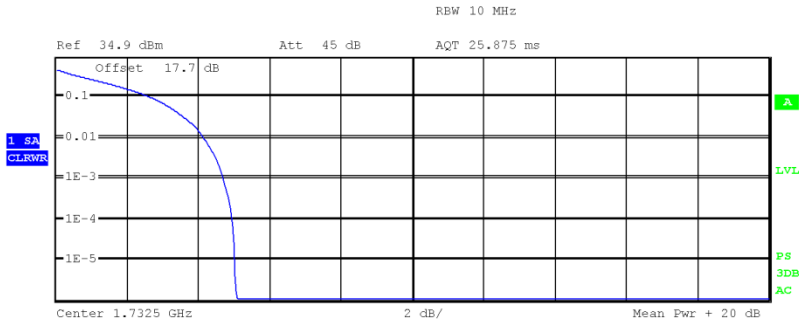
2.5.8 **Test Results**

The Worst case measured PARP level was 7.64dB at 1732.5 MHz using 16QAM with a 20MHz BW

See attached plots.



LTE Band 4 1732.5MHz (1.4 MHz BW) QPSK

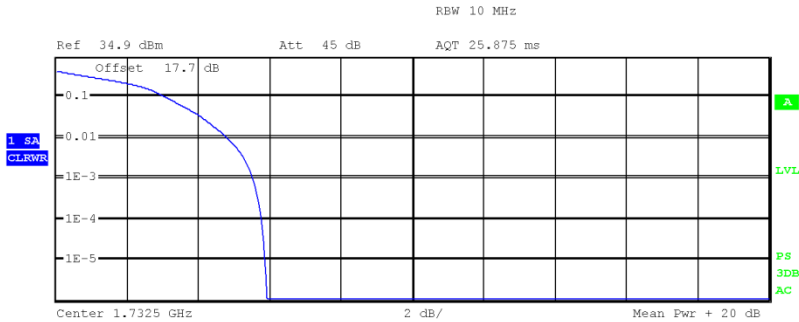


Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	22.79 dBm
Peak	27.87 dBm
Crest	5.08 dB
10 %	2.66 dB
1 %	4.13 dB
.1 %	4.71 dB
.01 %	4.94 dB

Date: 6.JUL.2012 13:30:53

LTE Band 4 1732.5MHz (1.4 MHz BW) 16QAM



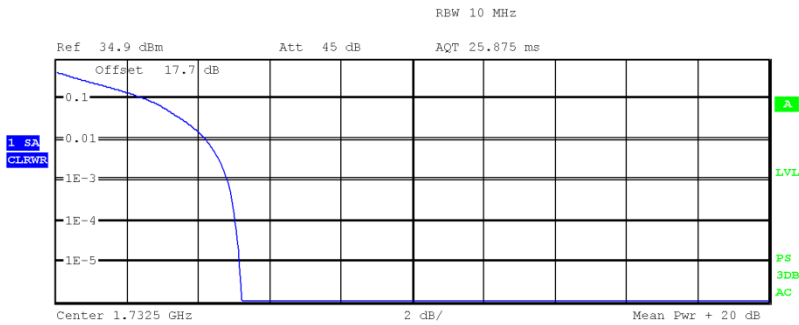
Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	21.82 dBm
Peak	27.73 dBm
Crest	5.91 dB
10 %	3.08 dB
1 %	4.81 dB
.1 %	5.51 dB
.01 %	5.77 dB

Date: 6.JUL.2012 13:31:13



LTE Band 4 1732.5MHz (3.0 MHz BW) QPSK

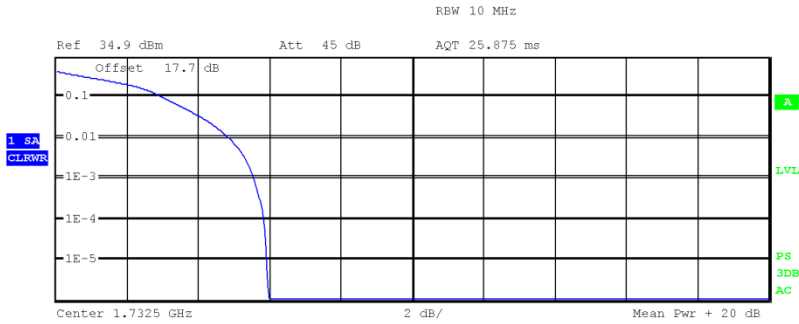


Center 1.7325 GHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	22.72 dBm
Peak	27.94 dBm
Crest	5.23 dB
10 %	2.53 dB
1 %	4.20 dB
.1 %	4.81 dB
.01 %	5.03 dB

Date: 6.JUL.2012 13:31:36

LTE Band 4 1732.5MHz (3.0 MHz BW) 16QAM



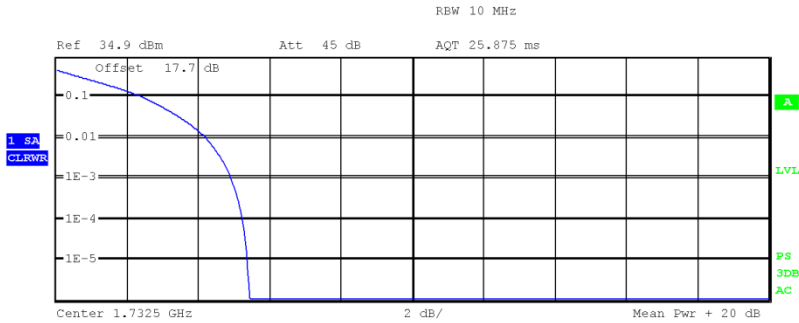
Center 1.7325 GHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	21.76 dBm
Peak	27.73 dBm
Crest	5.97 dB
10 %	2.98 dB
1 %	4.84 dB
.1 %	5.54 dB
.01 %	5.83 dB

Date: 6.JUL.2012 13:31:54



LTE Band 4 1732.5MHz (5.0 MHz BW) QPSK

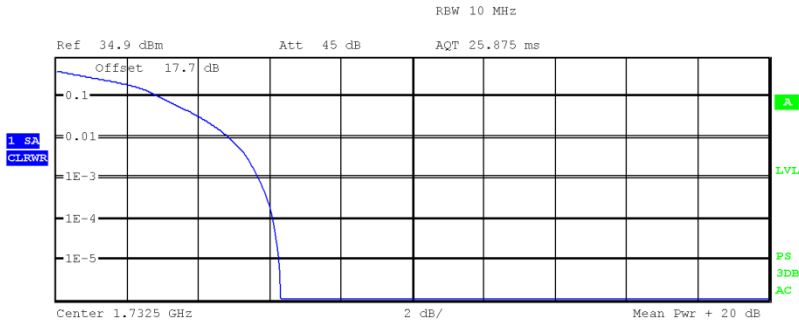


Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	22.71 dBm
Peak	28.16 dBm
Crest	5.45 dB
10 %	2.47 dB
1 %	4.20 dB
.1 %	4.90 dB
.01 %	5.22 dB

Date: 6.JUL.2012 13:32:16

LTE Band 4 1732.5MHz (5.0 MHz BW) 16QAM



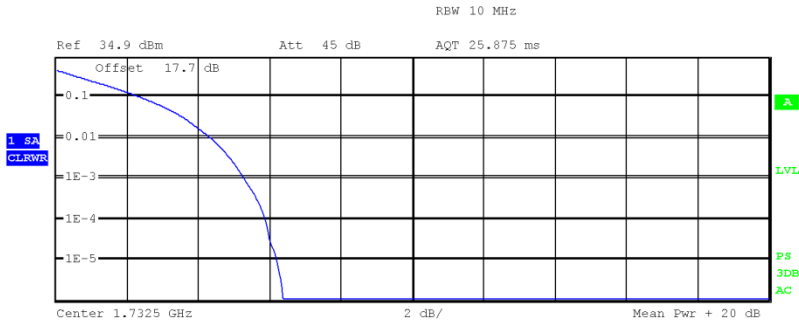
Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	21.72 dBm
Peak	28.01 dBm
Crest	6.30 dB
10 %	2.92 dB
1 %	4.87 dB
.1 %	5.71 dB
.01 %	6.09 dB

Date: 6.JUL.2012 13:32:30



LTE Band 4 1732.5MHz (10.0 MHz BW) QPSK

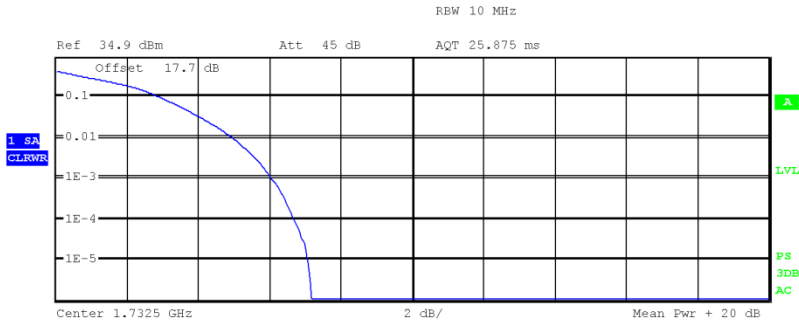


Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

	Trace 1
Mean	22.53 dBm
Peak	28.93 dBm
Crest	6.40 dB
10 %	2.40 dB
1 %	4.33 dB
.1 %	5.29 dB
.01 %	5.87 dB

Date: 6.JUL.2012 13:32:52

LTE Band 4 1732.5MHz (10.0 MHz BW) 16QAM



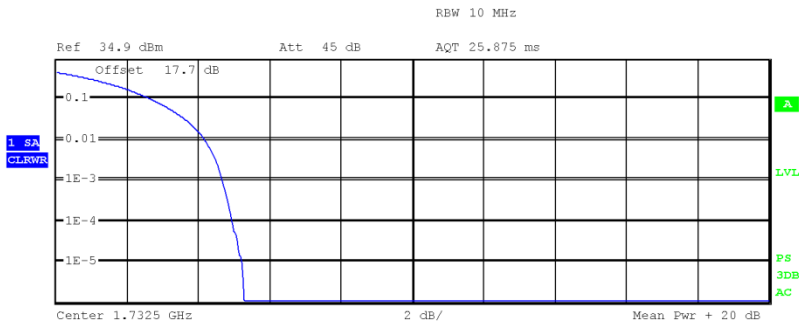
Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

	Trace 1
Mean	21.40 dBm
Peak	28.58 dBm
Crest	7.18 dB
10 %	2.92 dB
1 %	4.94 dB
.1 %	6.06 dB
.01 %	6.67 dB

Date: 6.JUL.2012 13:33:05



LTE Band 4 1732.5MHz (15.0 MHz BW) QPSK

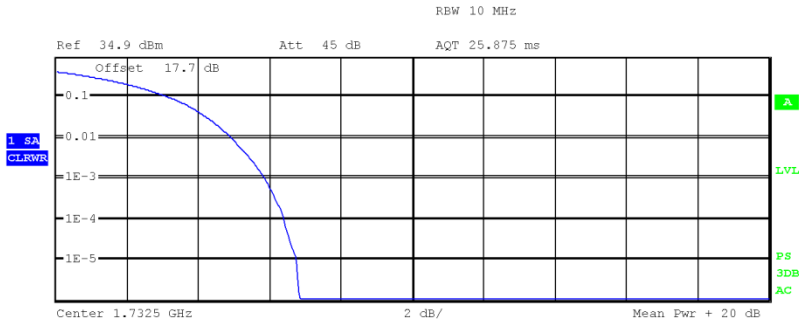


Center 1.7325 GHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	21.83 dBm
Peak	27.10 dBm
Crest	5.27 dB
10 %	2.66 dB
1 %	4.17 dB
.1 %	4.68 dB
.01 %	4.94 dB

Date: 6.JUL.2012 13:33:21

LTE Band 4 1732.5MHz (15.0 MHz BW) 16QAM



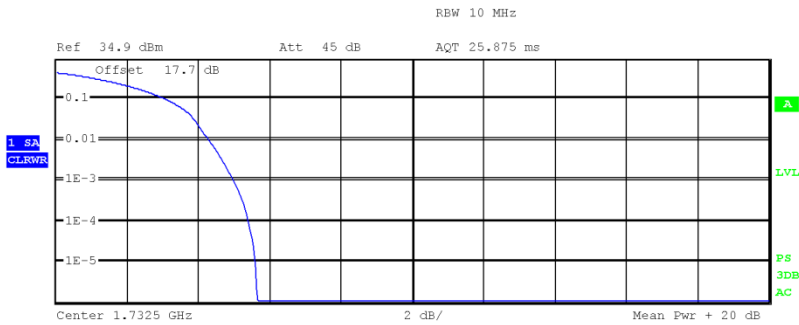
Center 1.7325 GHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	20.73 dBm
Peak	27.59 dBm
Crest	6.86 dB
10 %	3.17 dB
1 %	4.90 dB
.1 %	5.87 dB
.01 %	6.41 dB

Date: 6.JUL.2012 13:33:32



LTE Band 4 1732.5MHz (20.0 MHz BW) QPSK

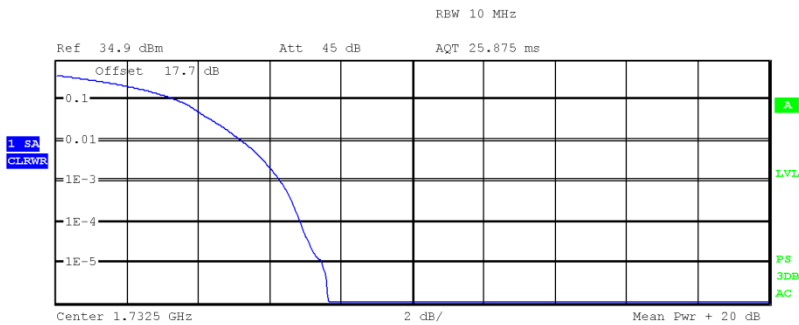


Center 1.7325 GHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	20.61 dBm
Peak	26.25 dBm
Crest	5.64 dB
10 %	3.08 dB
1 %	4.29 dB
.1 %	5.00 dB
.01 %	5.38 dB

Date: 6.JUL.2012 13:33:51

LTE Band 4 1732.5MHz (20.0 MHz BW) 16QAM



Center 1.7325 GHz 2 dB/ Mean Pwr + 20 dB
 Complementary Cumulative Distribution Function
 NOF samples: 414000, Usable BW: 11.2MHz

Trace 1	
Mean	19.67 dBm
Peak	27.31 dBm
Crest	7.64 dB
10 %	3.40 dB
1 %	5.19 dB
.1 %	6.31 dB
.01 %	6.86 dB

Date: 6.JUL.2012 13:34:00



2.6 **BAND EDGE**

2.6.1 **Specification Reference**

Part 27 Subpart C §27.53(g) and (h), RSS-139 Issue 2 (6.5)

2.6.2 **Standard Applicable**

(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

2.6.3 **Equipment Under Test and Modification State**

Serial No: SA310512700012 / Test Configuration C

2.6.4 **Date of Test/Initial of test personnel who performed the test**

July 06 17, 2012/FSC

2.6.5 **Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

2.6.6 **Environmental Conditions**

Ambient Temperature	23.0°C
Relative Humidity	49.8%
ATM Pressure	99.0 kPa

2.6.7 **Additional Observations**

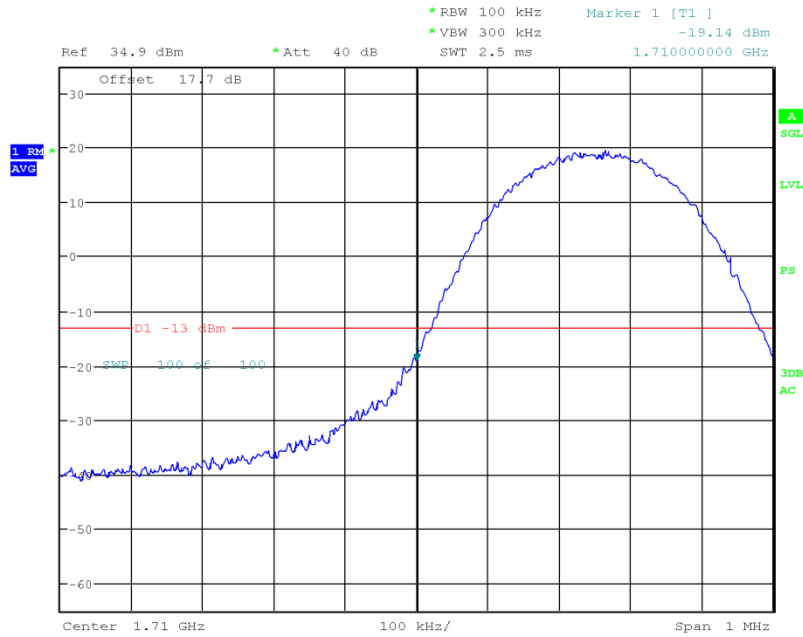
- This is a conducted test.
- The 17.7dB offset is from the power splitter, external attenuator and cable used.
- The center frequency of the spectrum is the band edge frequency using a span of 1MHz. RBW is set to 100 kHz and VBW is set to 3X RBW.
- For lower band edge, 0 offset is utilized while the maximum allowable offset per channel bandwidth for upper band edge is used.
- All RB size available verified and the worst case size for band edge verification presented in this test report.

2.6.8 **Test Results**

See attached plots.

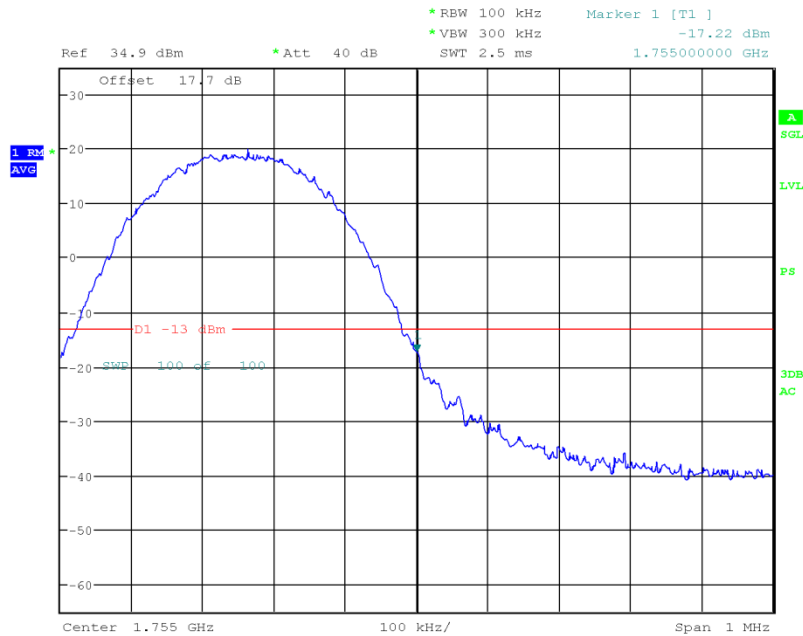


LTE Band 4 1.4MHz BW Low Channel Band Edge @ 1710MHz (1RB)



Date: 6.JUL.2012 15:02:38

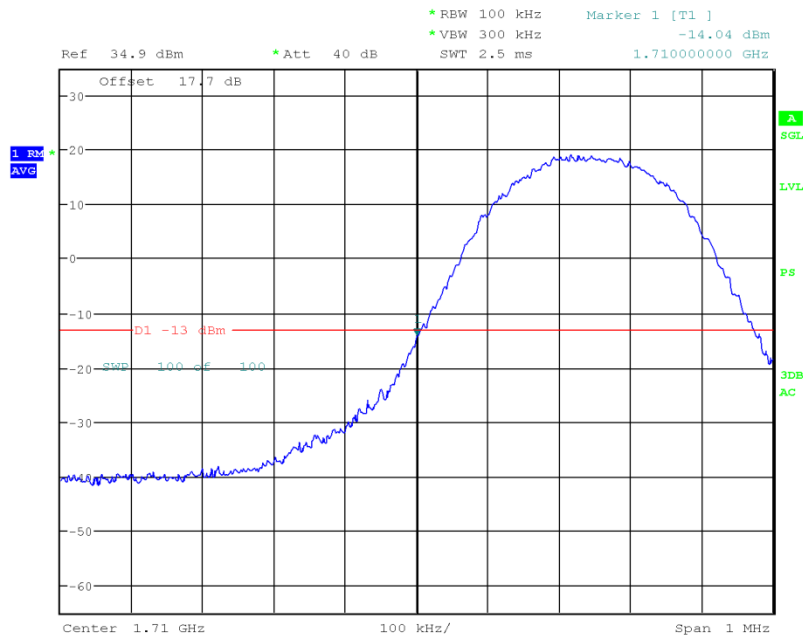
LTE Band 4 1.4MHz BW High Channel Band Edge @ 1755MHz (1RB)



Date: 6.JUL.2012 15:45:58

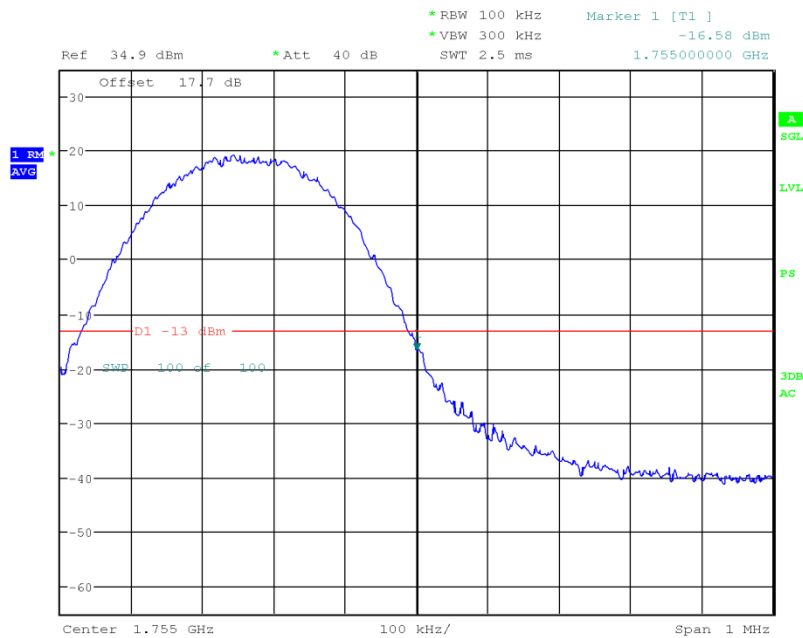


LTE Band 4 3.0MHz BW Low Channel Band Edge @ 1710MHz (1RB)



Date: 6.JUL.2012 15:00:02

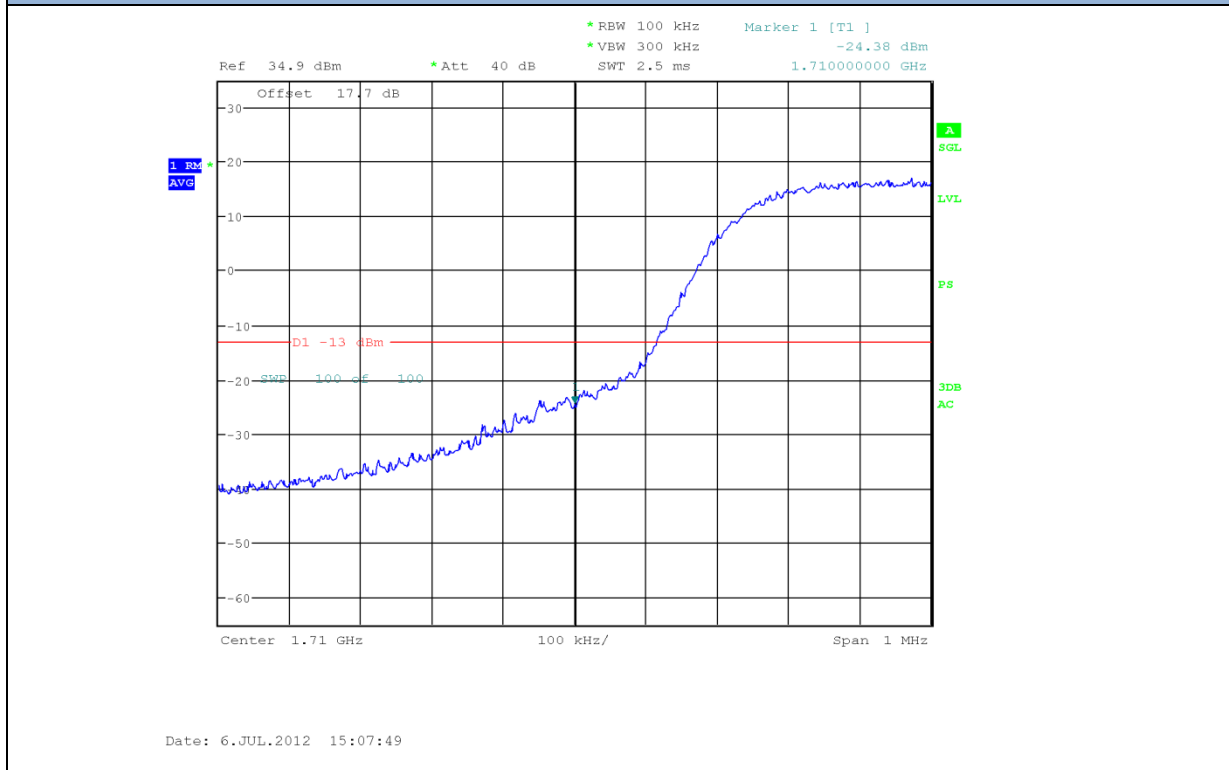
LTE Band 4 3.0MHz BW High Channel Band Edge @ 1755MHz (1RB)



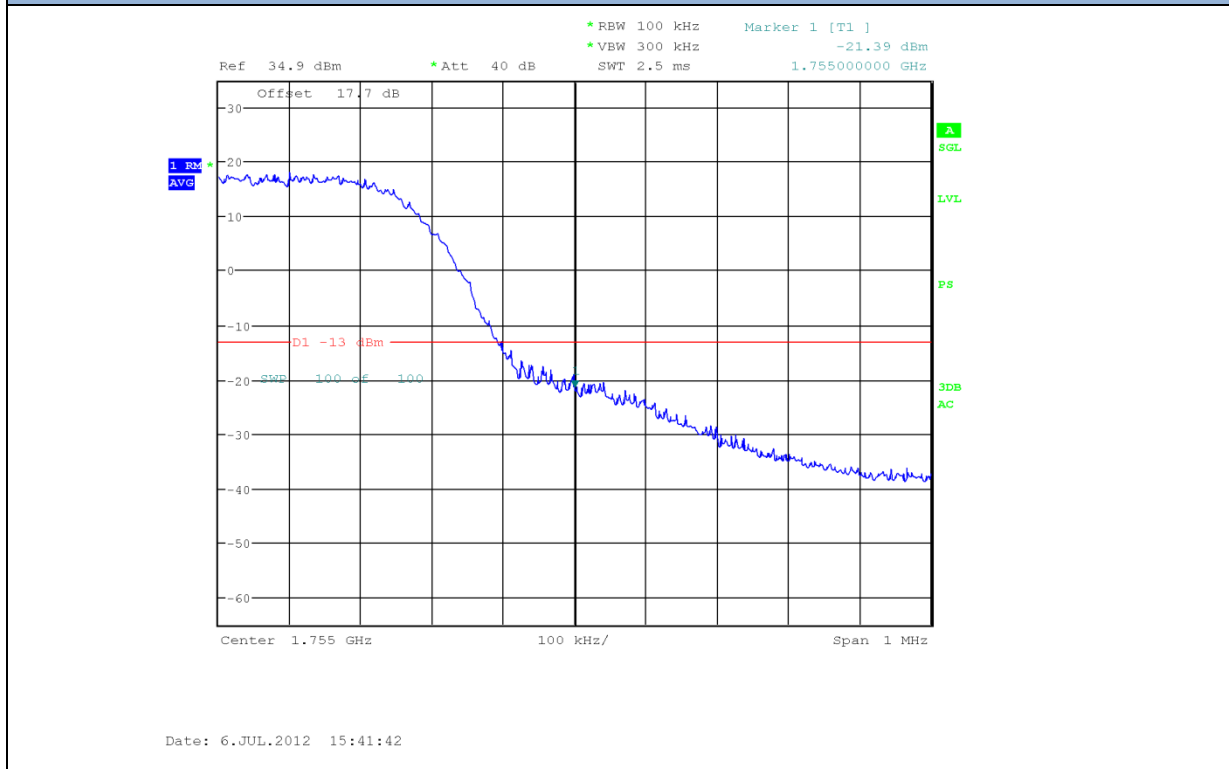
Date: 6.JUL.2012 15:44:48



LTE Band 4 5.0MHz BW Low Channel Band Edge @ 1710MHz (2RB)

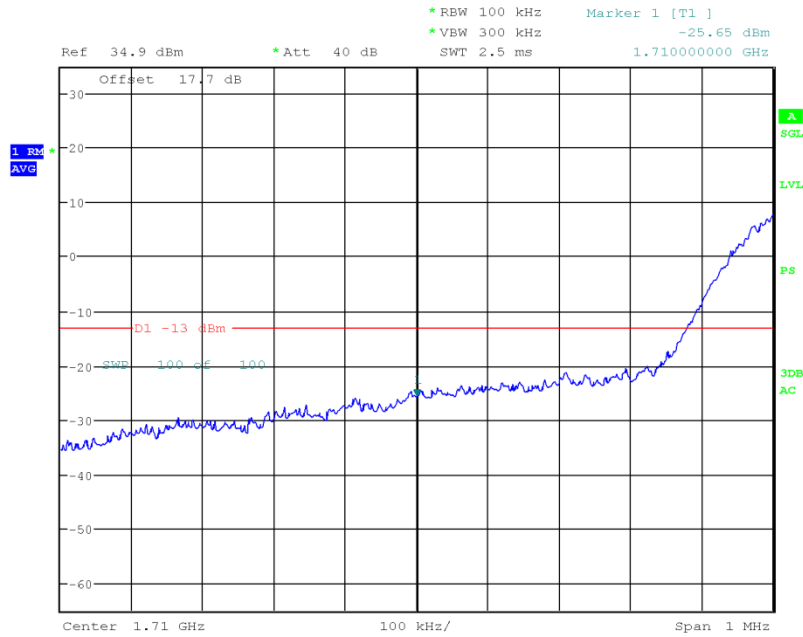


LTE Band 4 5.0MHz BW High Channel Band Edge @ 1755MHz (2RB)



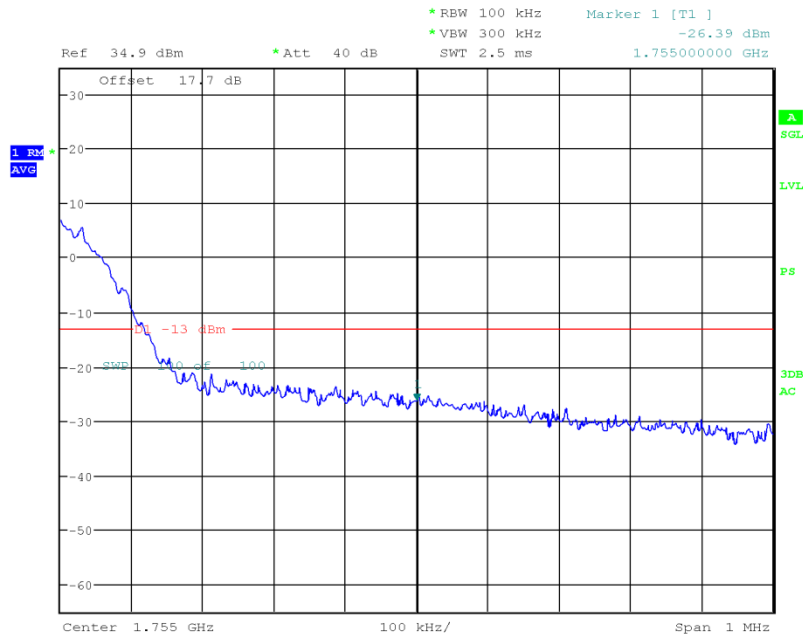


LTE Band 4 10.0MHz BW Low Channel Band Edge @ 1710MHz (5RB)



Date: 6.JUL.2012 15:15:12

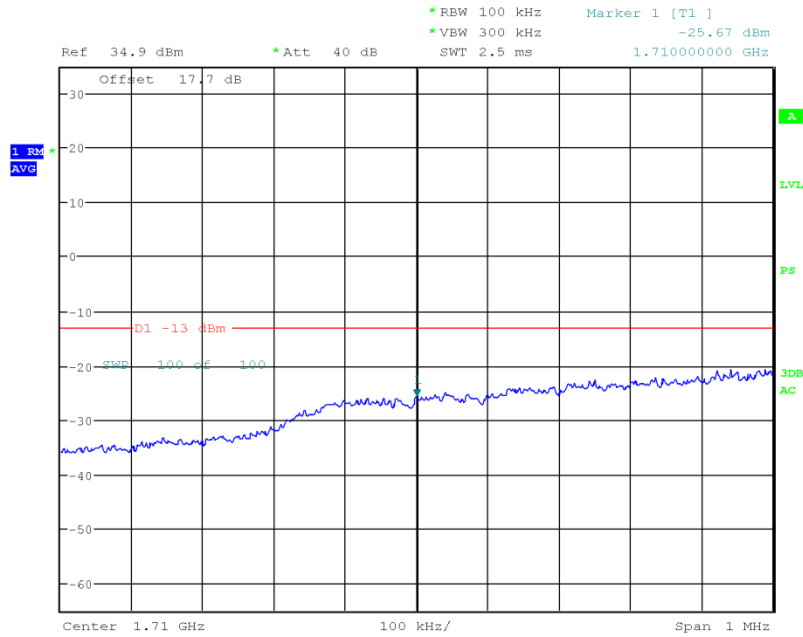
LTE Band 4 10.0MHz BW High Channel Band Edge @ 1755MHz (6RB)



Date: 6.JUL.2012 15:39:01

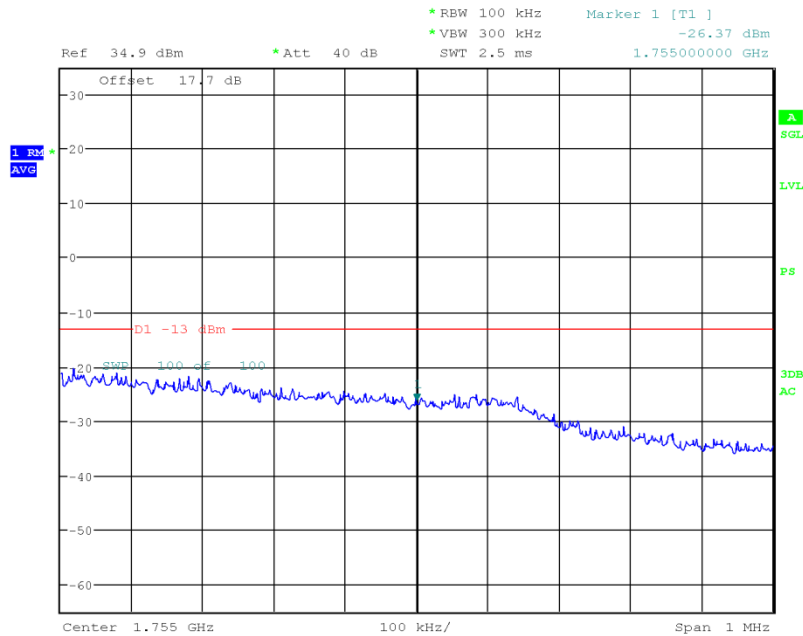


LTE Band 4 15.0MHz BW Low Channel Band Edge @ 1710MHz (5RB)



Date: 6.JUL.2012 15:18:14

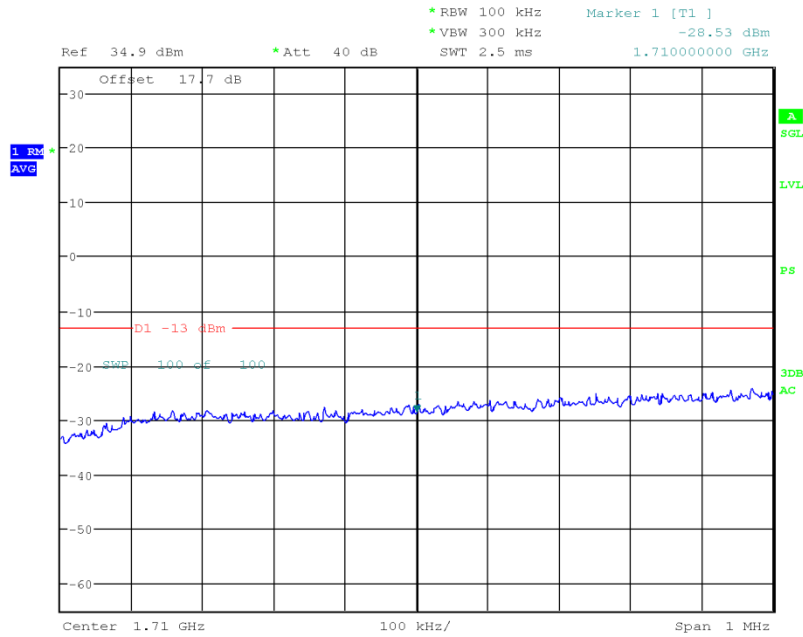
LTE Band 4 15.0MHz BW High Channel Band Edge @ 1755MHz (5RB)



Date: 6.JUL.2012 15:35:32

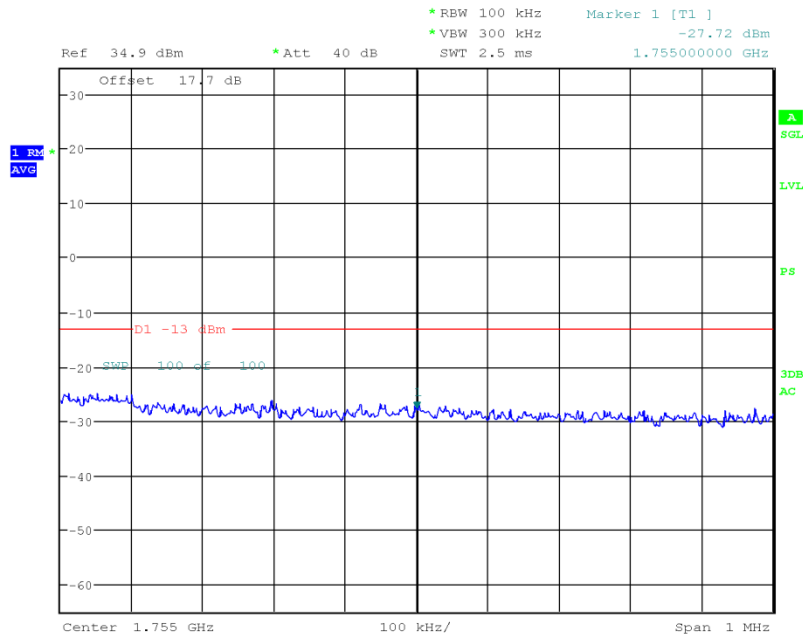


LTE Band 4 20.0MHz BW Low Channel Band Edge @ 1710MHz (8RB)



Date: 6.JUL.2012 15:22:08

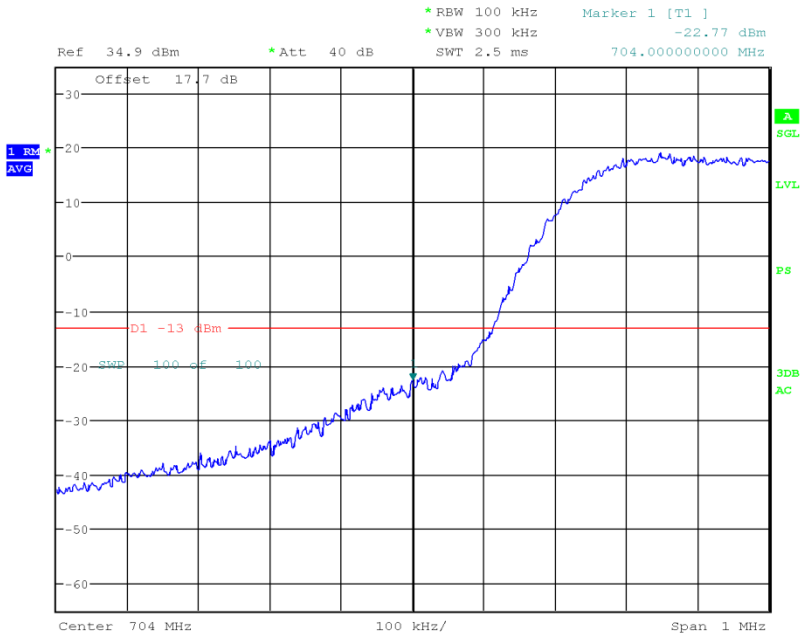
LTE Band 4 20.0MHz BW High Channel Band Edge @ 1755MHz (9RB)



Date: 6.JUL.2012 15:32:20

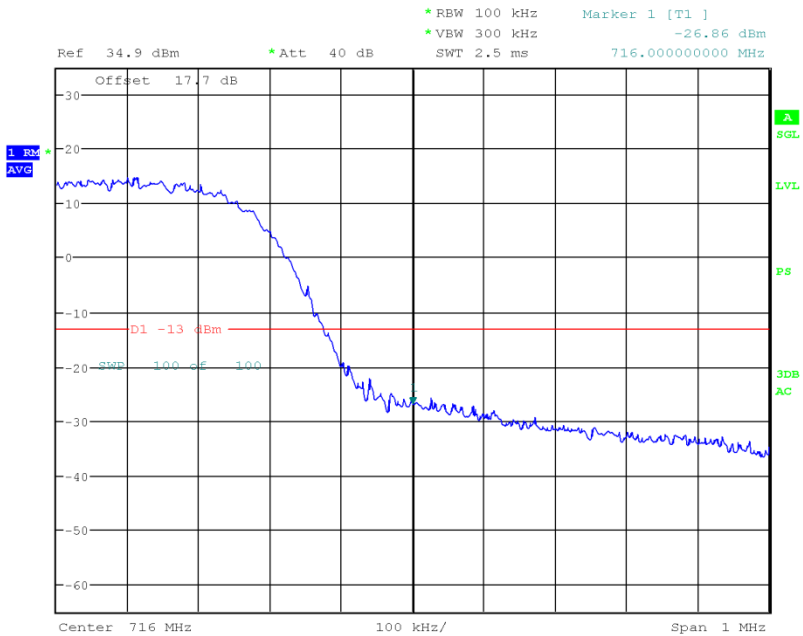


LTE Band 17 5.0MHz BW Low Channel Band Edge @ 704MHz (2RB)



Date: 6.JUL.2012 16:15:38

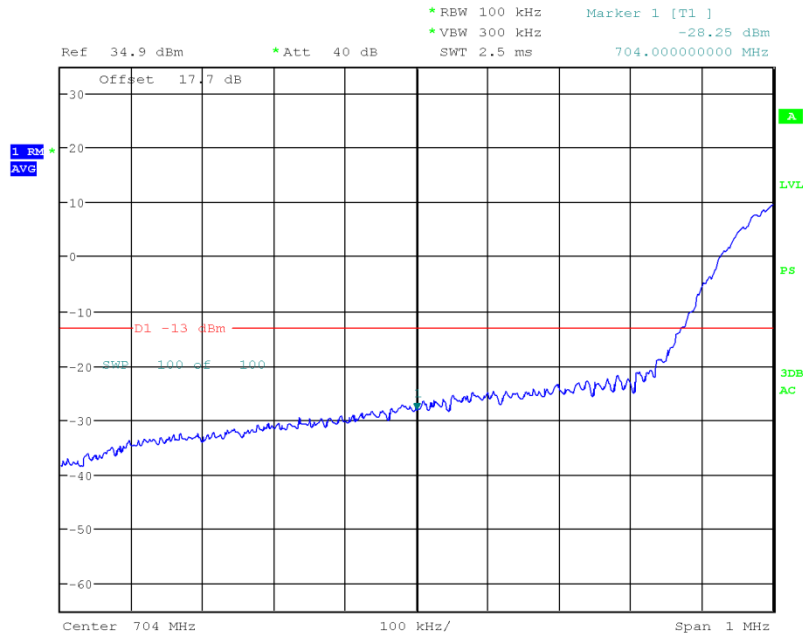
LTE Band 17 5.0MHz BW High Channel Band Edge @ 716MHz (4RB)



Date: 6.JUL.2012 16:33:36

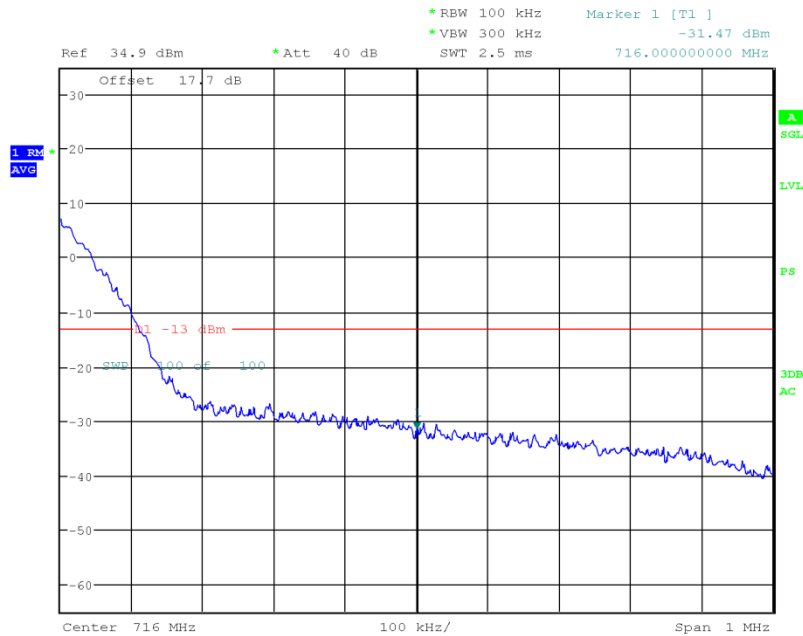


LTE Band 17 10.0MHz BW Low Channel Band Edge @ 704MHz (5RB)



Date: 6.JUL.2012 16:18:54

LTE Band 17 10.0MHz BW High Channel Band Edge @ 716MHz (5RB)



Date: 6.JUL.2012 16:21:45



2.7 CONDUCTED SPURIOUS EMISSIONS

2.7.1 Specification Reference

Part 27 Subpart C §27.53(g) and (h) and Part 2.1051, RSS-139 Issue 2(6.5)

2.7.2 Standard Applicable

(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

2.7.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Default Test Configuration C

2.7.4 Date of Test/Initial of test personnel who performed the test

July 07, 2012/FSC

2.7.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.7.6 Environmental Conditions

Ambient Temperature	23.4°C
Relative Humidity	55.6%
ATM Pressure	99.2 kPa

2.7.7 Additional Observations

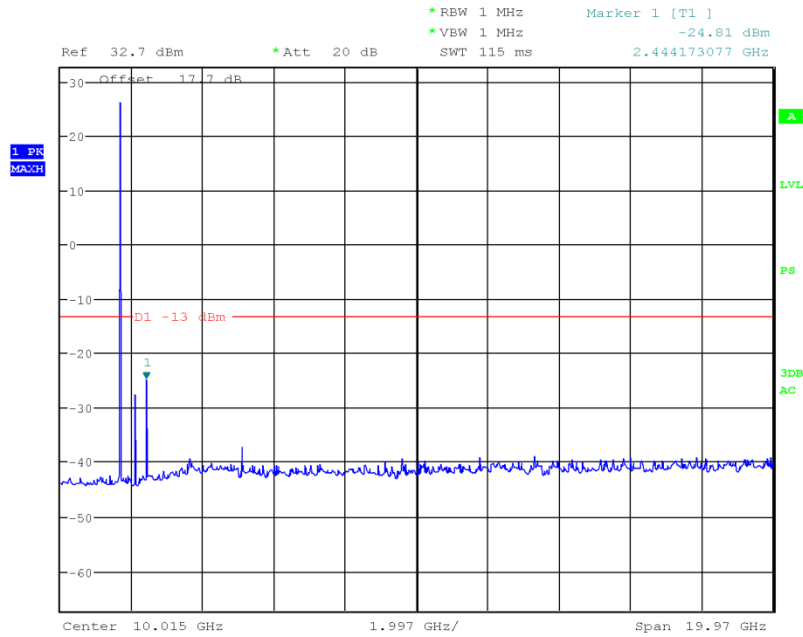
- This is a conducted test. The 17.7dB offset is from the power splitter, external attenuator and cable used.
- The spectrum was searched from 30MHz to the 10th harmonic (20GHz) for Band 4. Band 17 verified to up to 10GHz.
- Low, Mid and High channels on all channel bandwidth verified. Only the worst RB size/offset presented (See Section 1.4.4).

2.7.8 Test Results

Compliant. See attached plots.

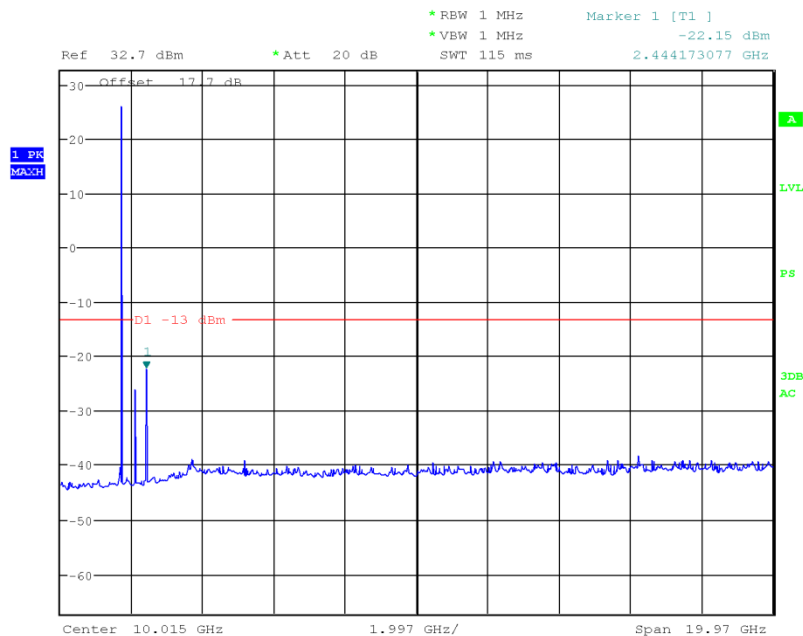


LTE Band 4 1.4MHz BW Low Channel

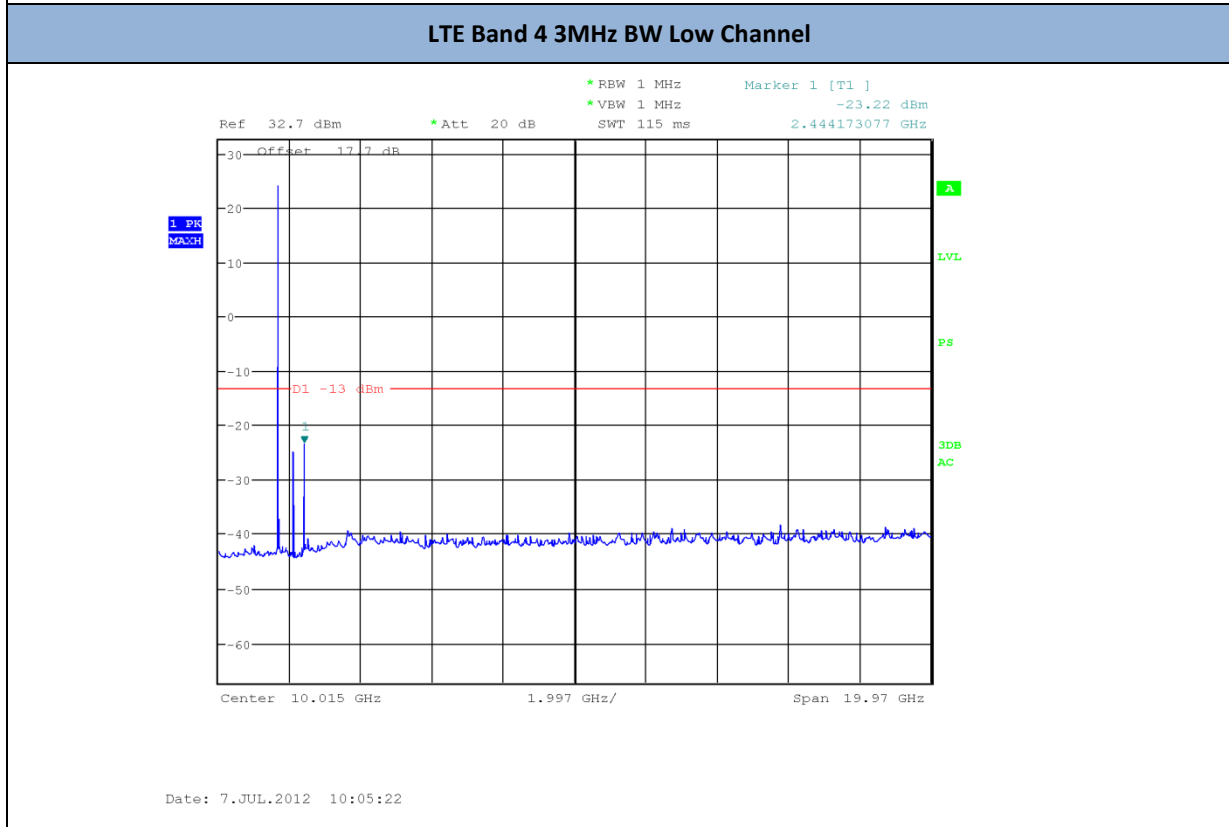
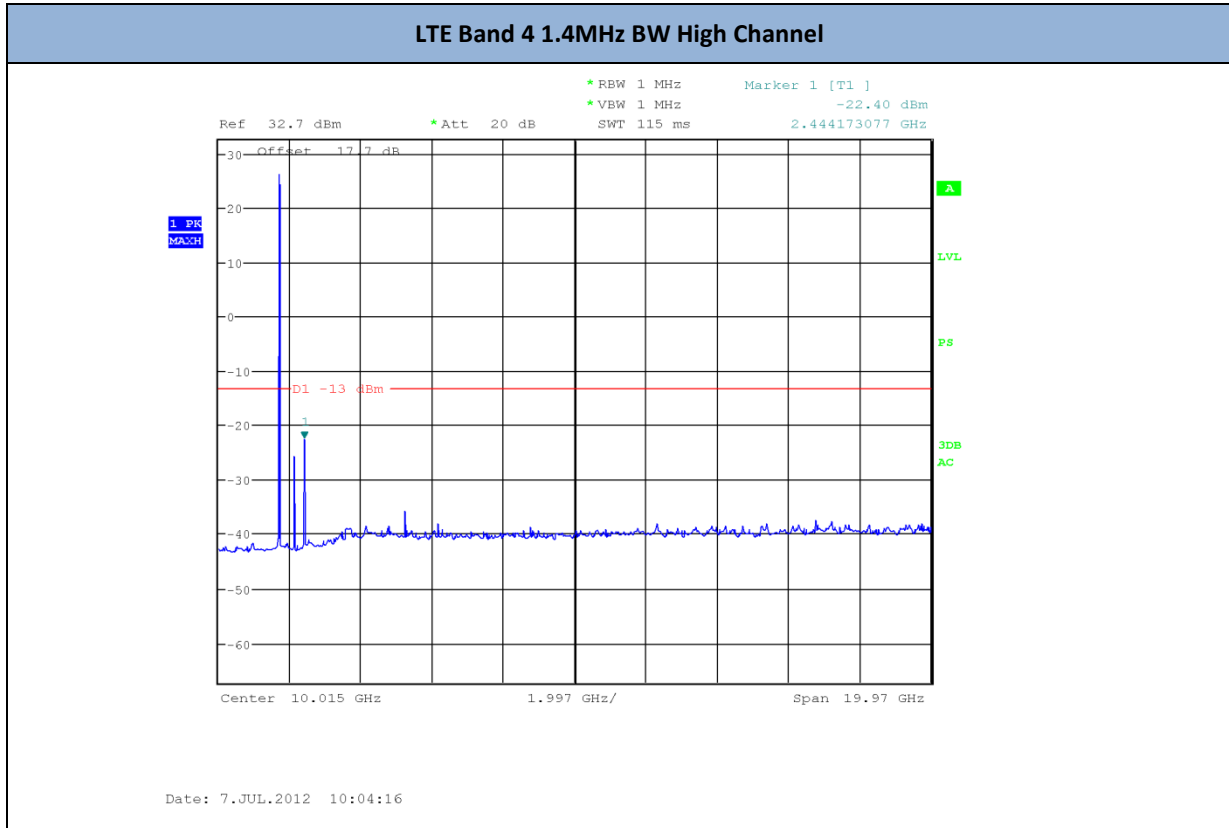


Date: 7.JUL.2012 09:57:50

LTE Band 4 1.4MHz BW Mid Channel

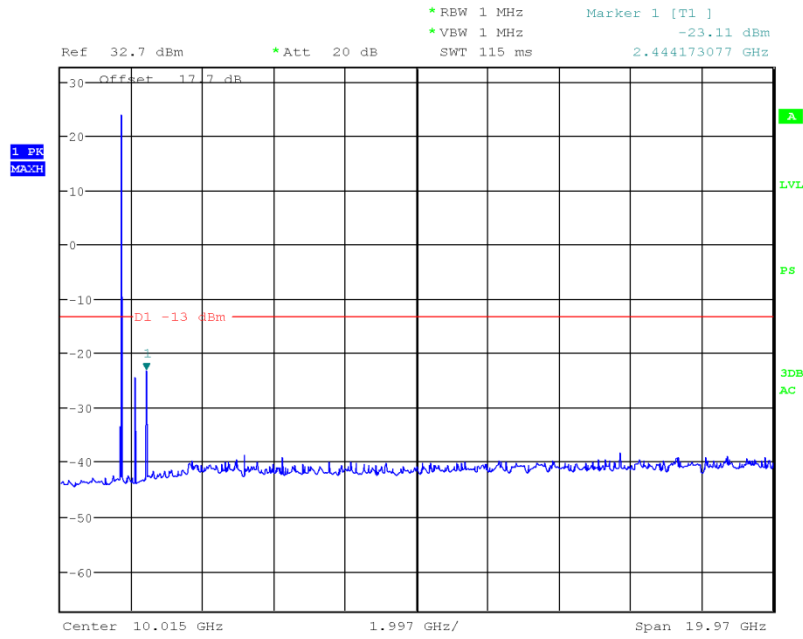


Date: 7.JUL.2012 09:58:25



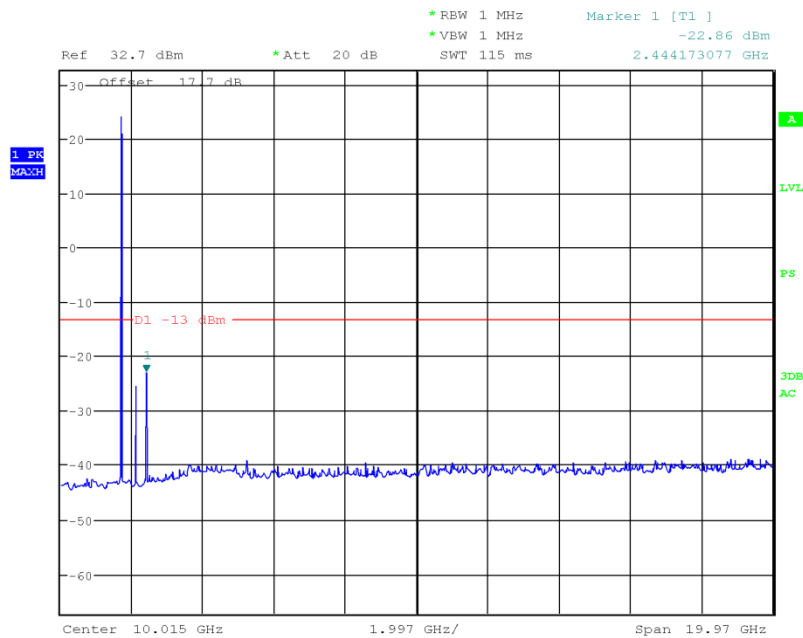


LTE Band 4 3MHz BW Mid Channel



Date: 7.JUL.2012 10:05:58

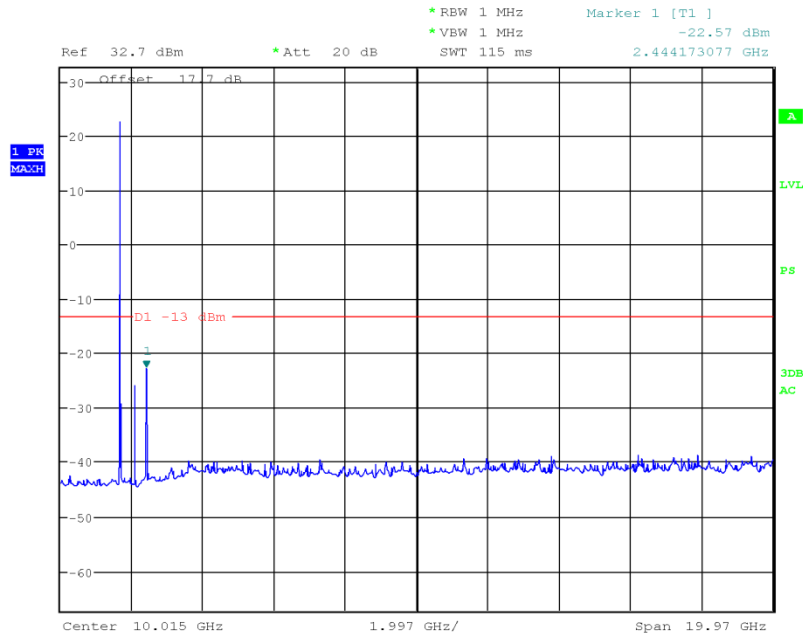
LTE Band 4 3MHz BW High Channel



Date: 7.JUL.2012 10:06:33

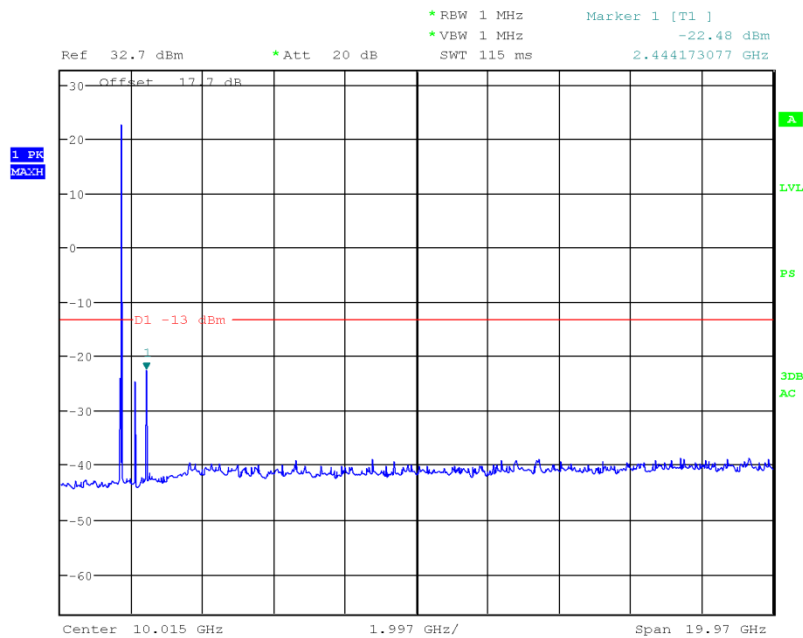


LTE Band 4 5MHz BW Low Channel



Date: 7.JUL.2012 10:09:07

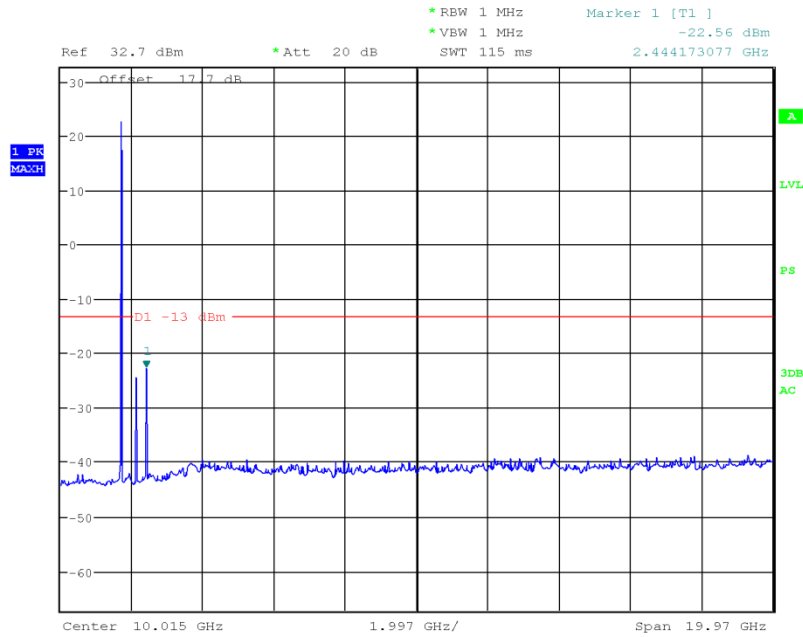
LTE Band 4 5MHz BW Mid Channel



Date: 7.JUL.2012 10:09:38

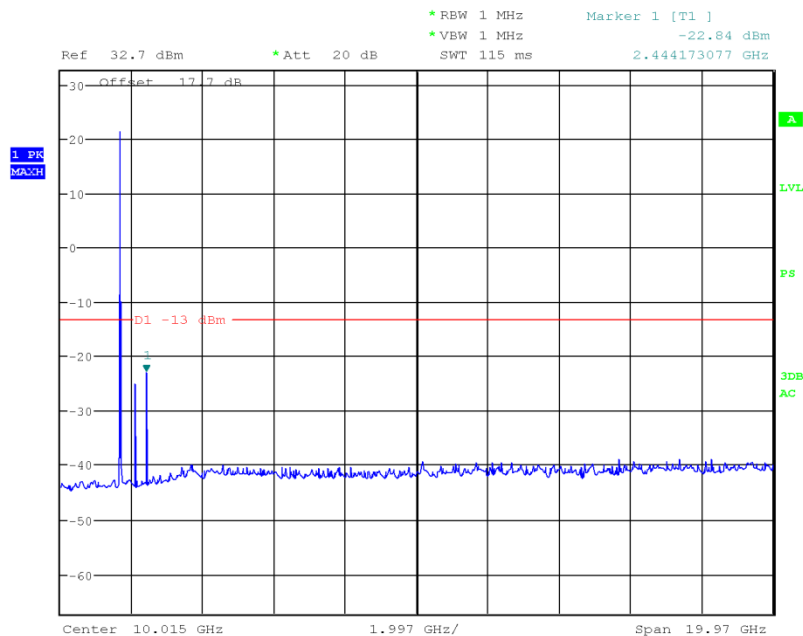


LTE Band 4 5MHz BW High Channel



Date: 7.JUL.2012 10:10:15

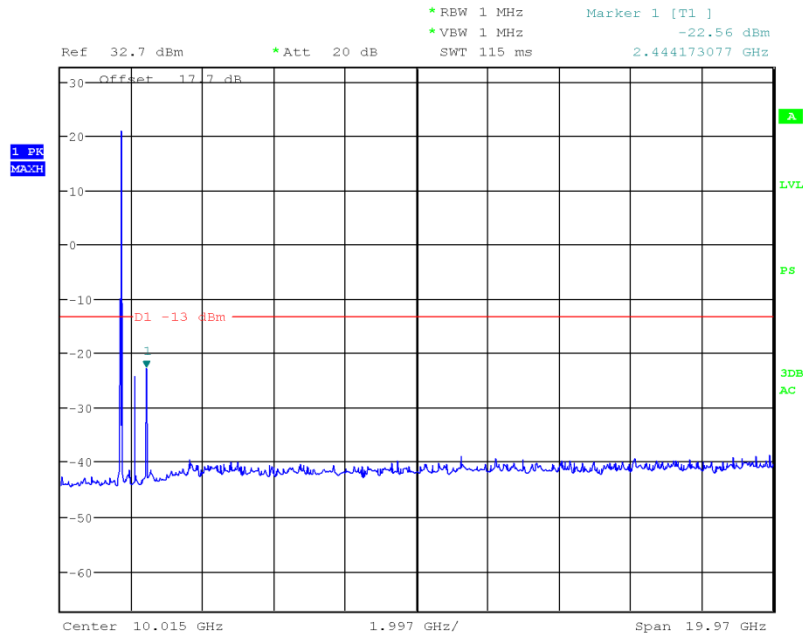
LTE Band 4 10MHz BW Low Channel



Date: 7.JUL.2012 10:15:31

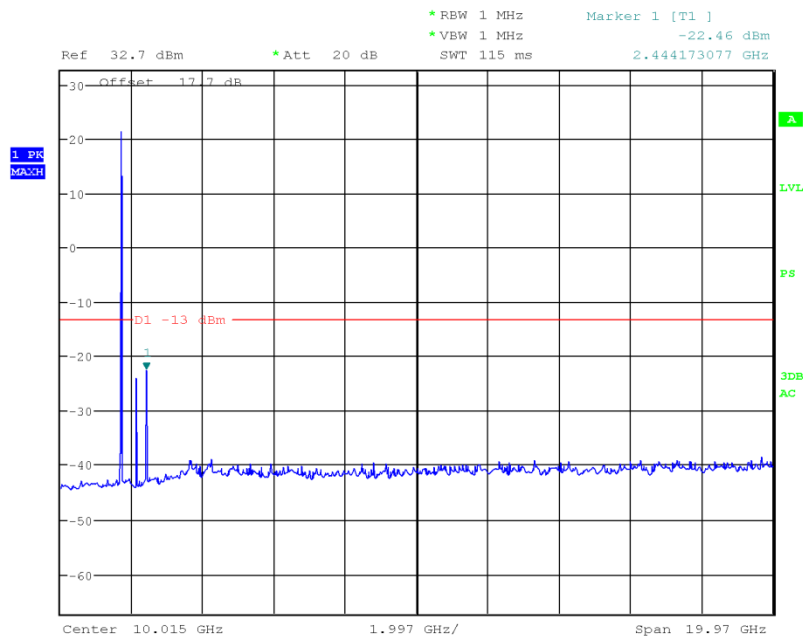


LTE Band 4 10MHz BW Mid Channel



Date: 7.JUL.2012 10:16:09

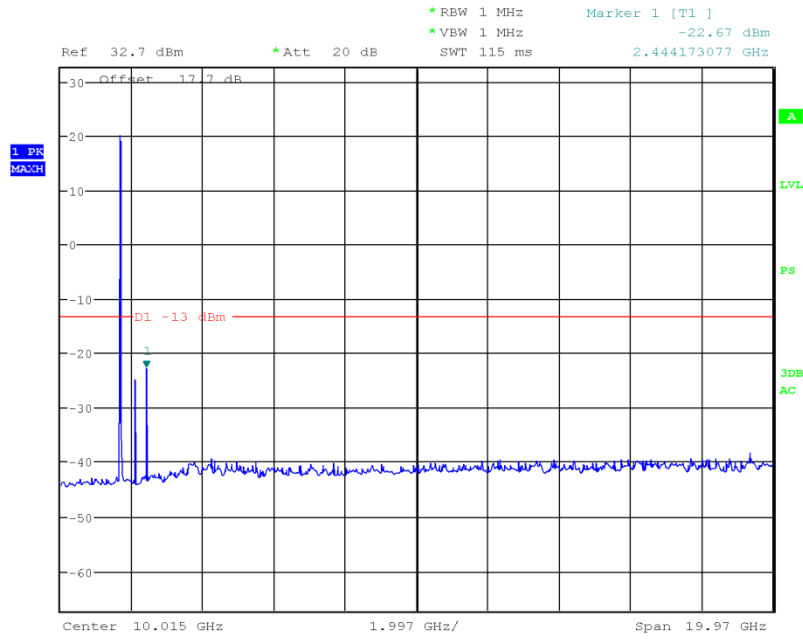
LTE Band 4 10MHz BW High Channel



Date: 7.JUL.2012 10:16:45

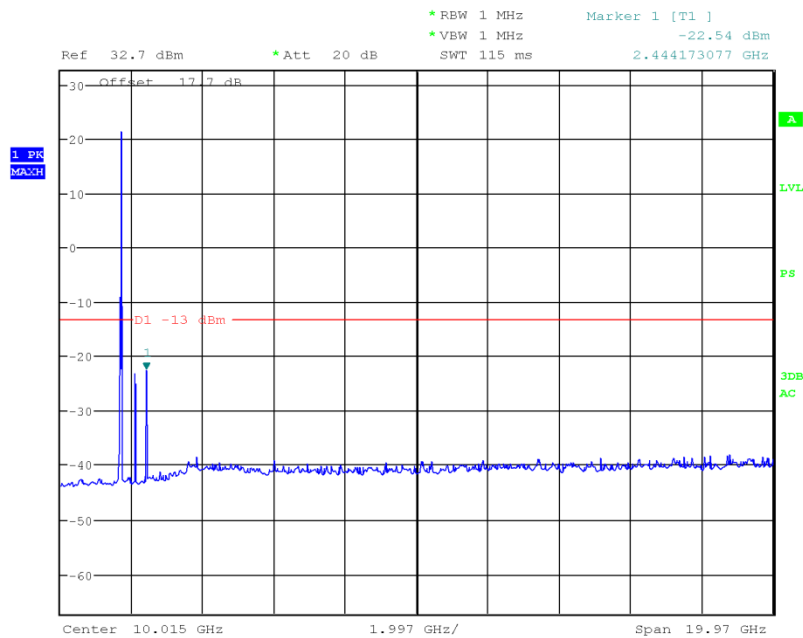


LTE Band 4 15MHz BW Low Channel



Date: 7.JUL.2012 10:17:38

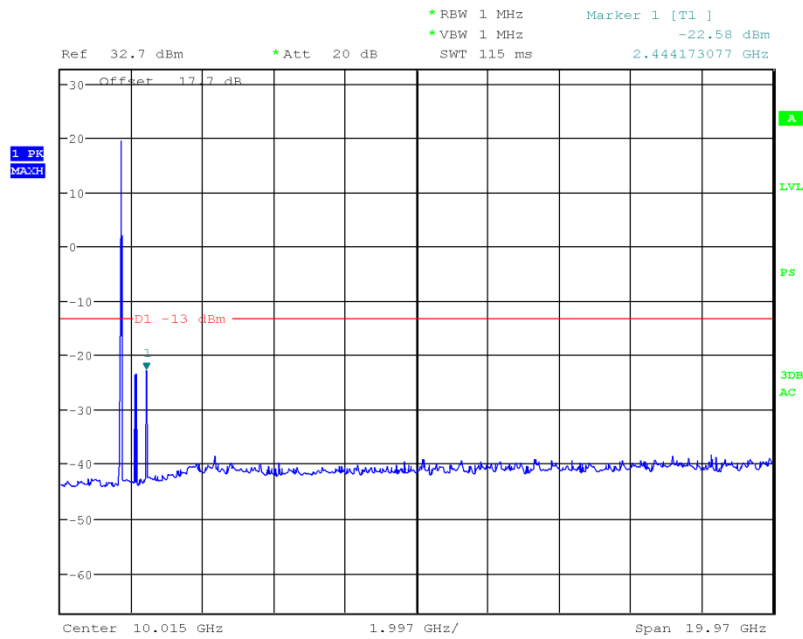
LTE Band 4 15MHz BW Mid Channel



Date: 7.JUL.2012 10:18:41

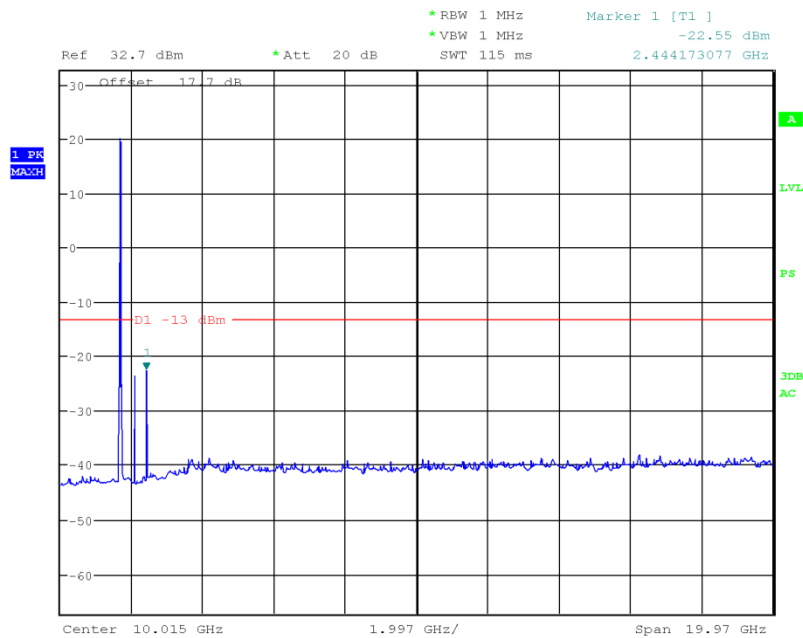


LTE Band 4 15MHz BW High Channel



Date: 7.JUL.2012 10:24:55

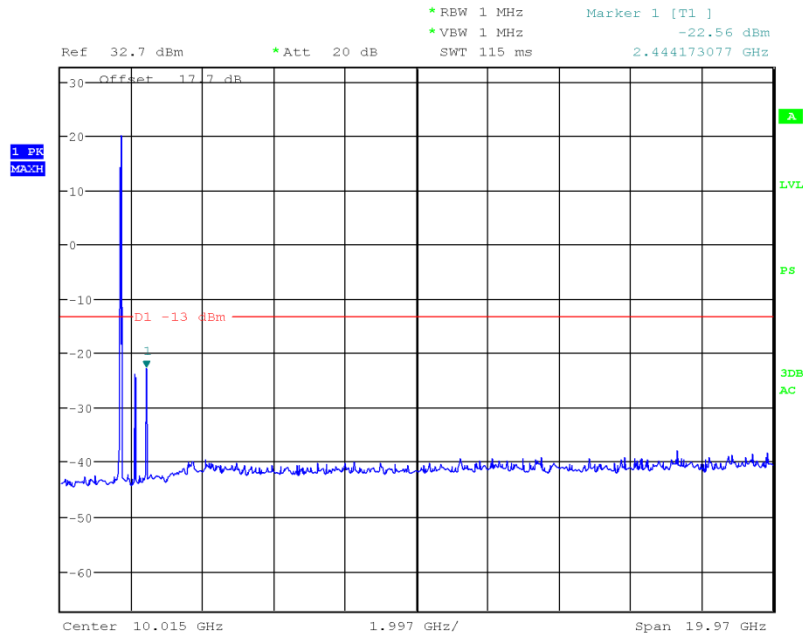
LTE Band 4 20MHz BW Low Channel



Date: 7.JUL.2012 10:23:15

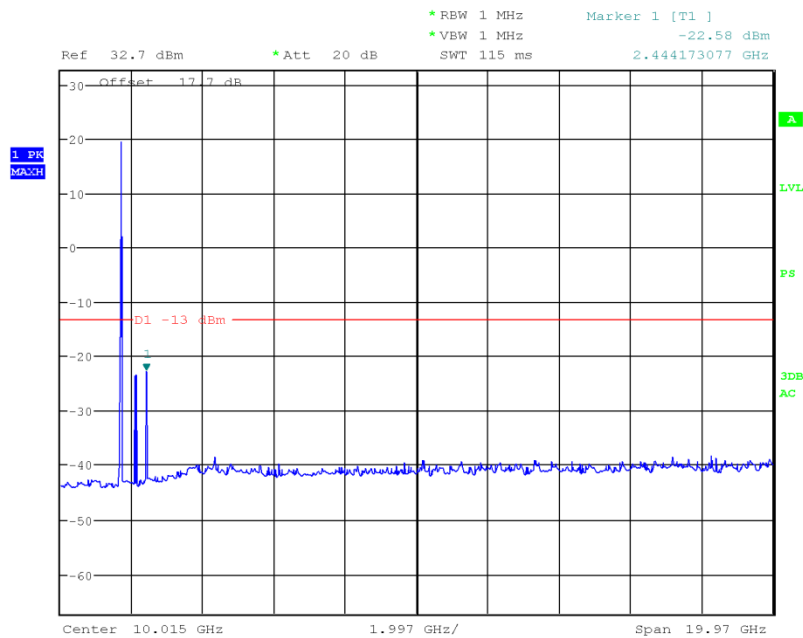


LTE Band 4 20MHz BW Mid Channel



Date: 7.JUL.2012 10:23:44

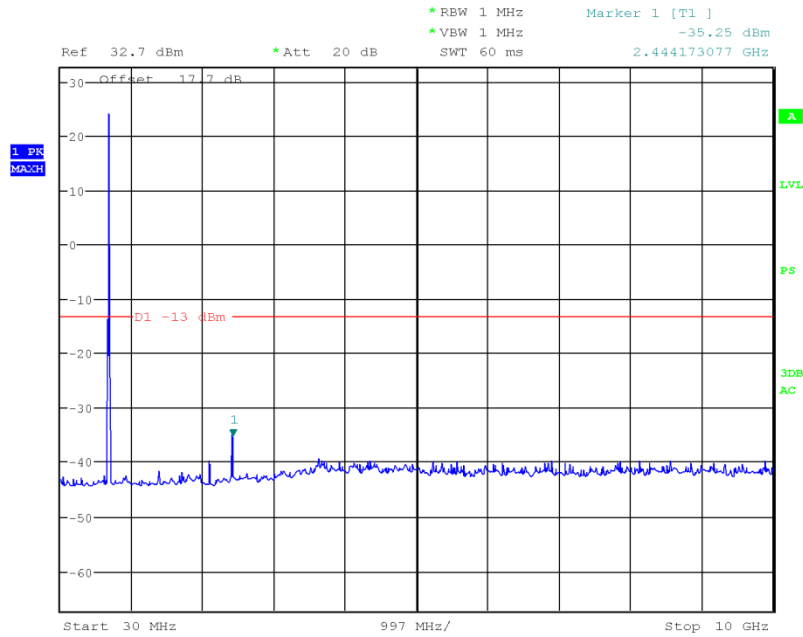
LTE Band 4 20MHz BW High Channel



Date: 7.JUL.2012 10:24:55

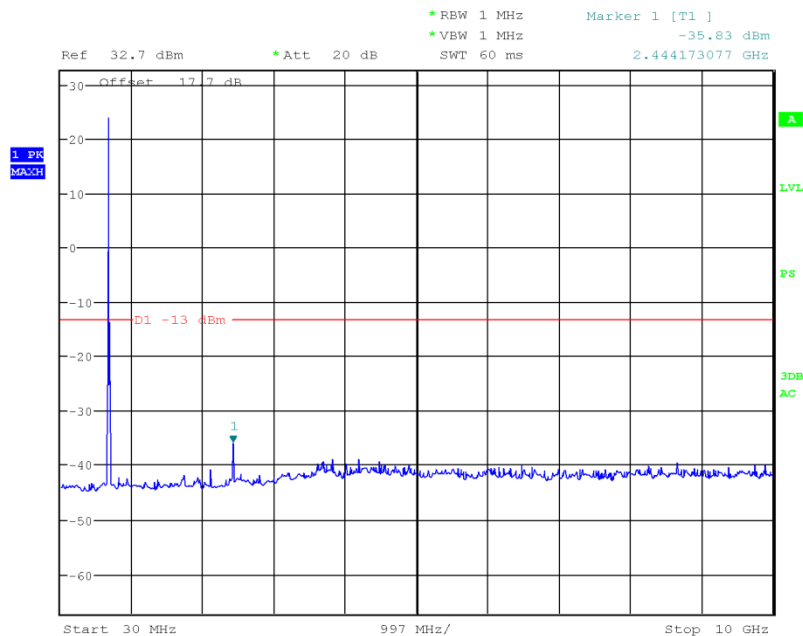


LTE Band 17 5MHz BW Low Channel



Date: 7.JUL.2012 10:40:35

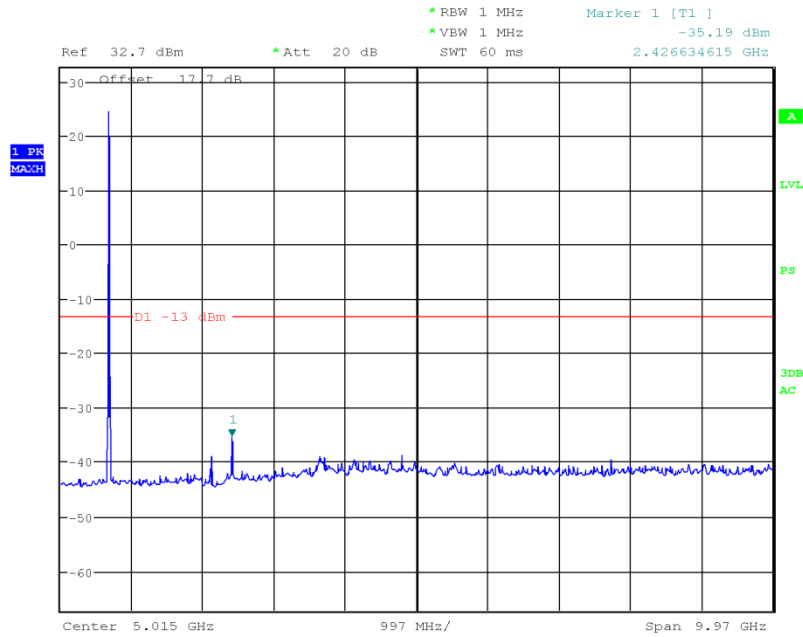
LTE Band 17 5MHz BW Mid Channel



Date: 7.JUL.2012 10:41:12

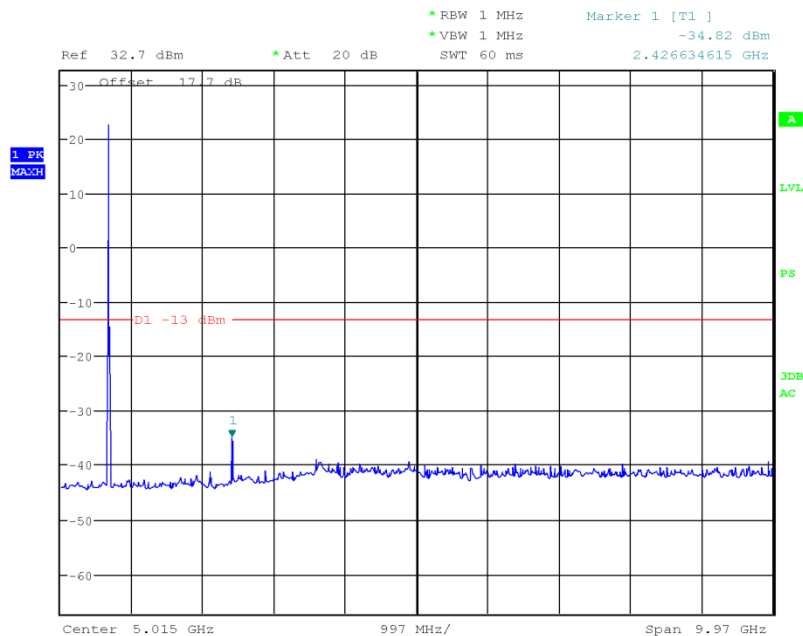


LTE Band 17 5MHz BW High Channel



Date: 7.JUL.2012 11:00:20

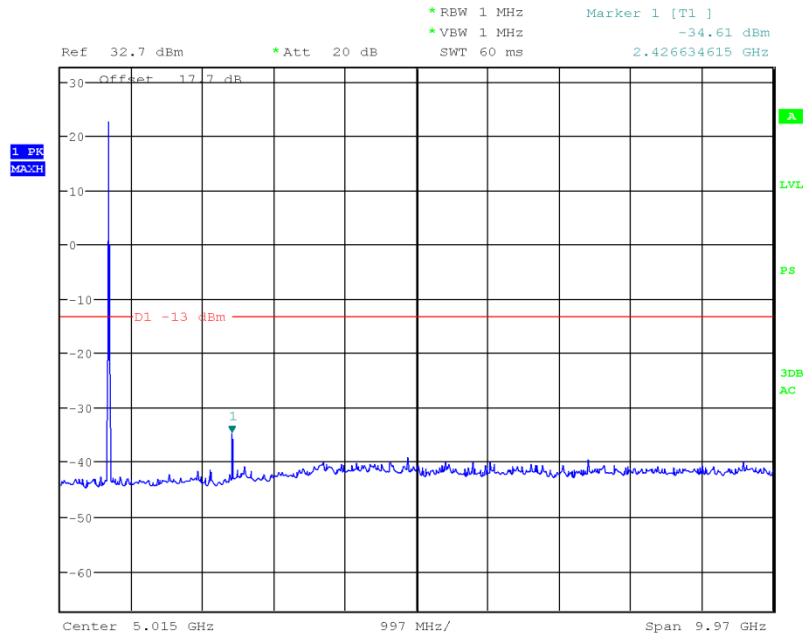
LTE Band 17 10MHz BW Low Channel



Date: 7.JUL.2012 10:54:14

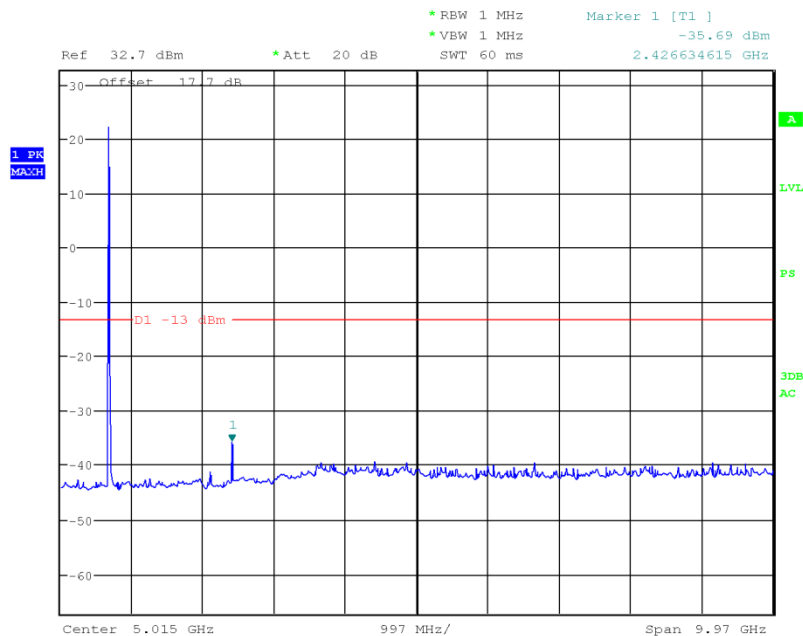


LTE Band 17 10MHz BW Mid Channel



Date: 7.JUL.2012 10:54:47

LTE Band 17 10MHz BW High Channel



Date: 7.JUL.2012 10:55:25



2.8 FIELD STRENGTH OF SPURIOUS RADIATION

2.8.1 Specification Reference

Part 27 Subpart C §27.53(g) and (h) and Part 2.1053, RSS-139 Issue 2(6.5)

2.8.2 Standard Applicable

(g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) by at least $43 + 10 \log_{10}(P)$ dB.

2.8.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Test Configuration B

2.8.4 Date of Test/Initial of test personnel who performed the test

July 08, 2012/JMG

2.8.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.8.6 Environmental Conditions

Ambient Temperature	27.8°C
Relative Humidity	48.8%
ATM Pressure	98.9 kPa

2.8.7 Additional Observations

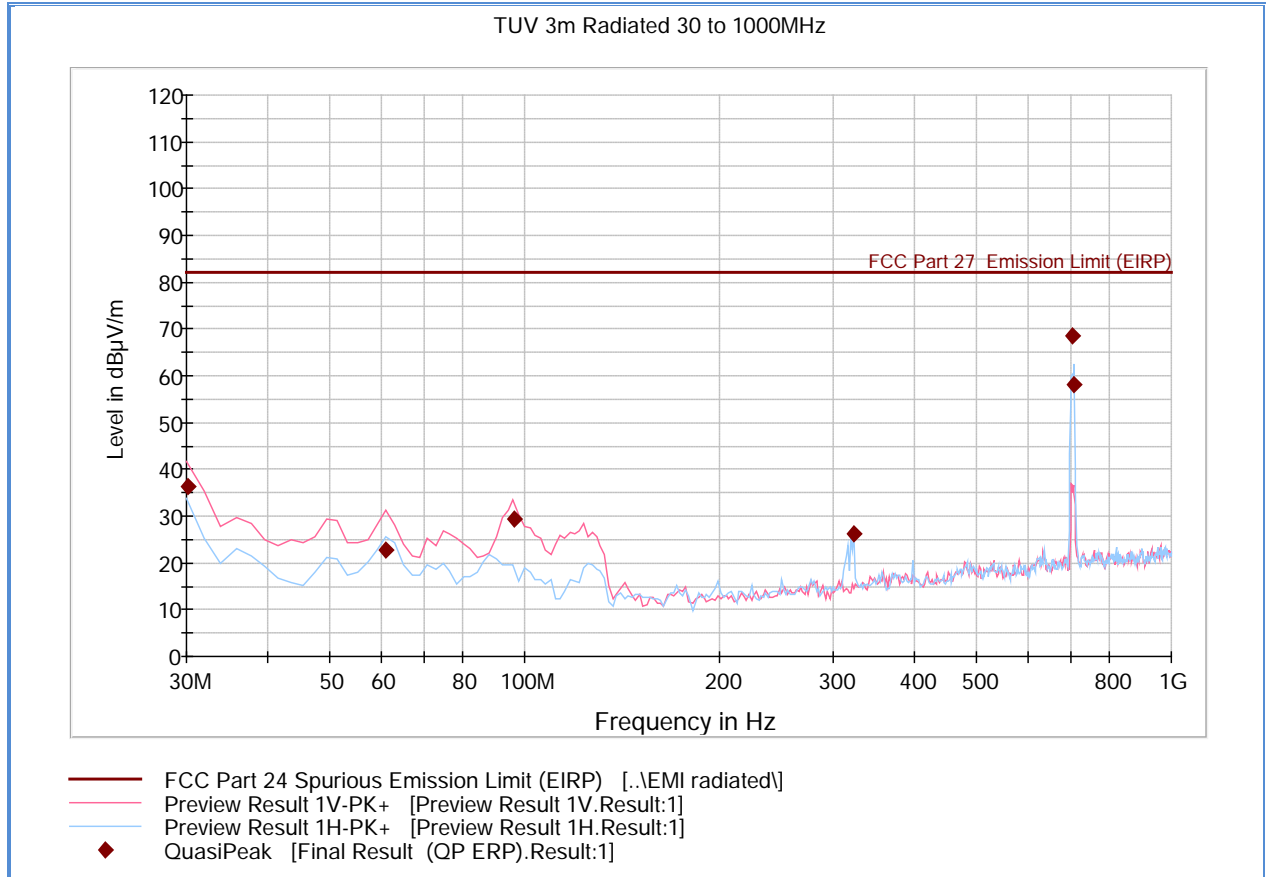
- This is a radiated test using substitution method as per Unwanted Emissions: Radiated Spurious method of measurement of ANSI/TIA/EIA-603-C 2004, August 17, 2004.
- Only the worst case configuration presented in this test report.

2.8.8 Test Results

See attached plots.



2.8.9 Test Results Below 1GHz



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.120000	36.3	1000.0	120.000	100.0	V	330.0	-12.3	45.9	82.2
61.062204	22.7	1000.0	120.000	103.0	V	110.0	-21.9	59.5	82.2
96.572184	29.5	1000.0	120.000	109.0	V	110.0	-20.5	52.8	82.2
323.247054	26.1	1000.0	120.000	103.0	H	126.0	-12.2	56.1	82.2
702.705170	68.7	1000.0	120.000	107.0	H	15.0	-3.3	13.6	82.2
705.536834	58.0	1000.0	120.000	100.0	H	99.0	-2.9	24.2	82.2

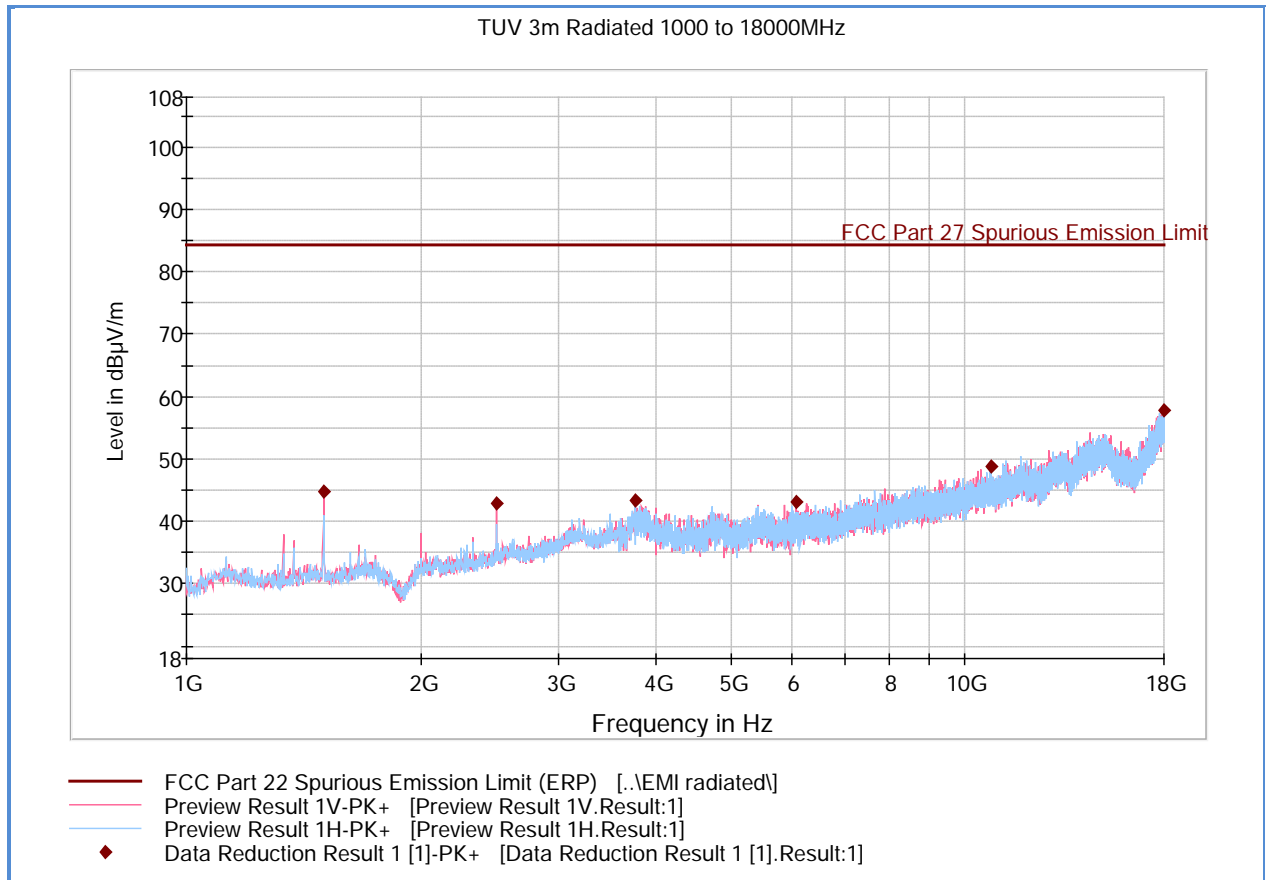
Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin
702.705170	68.7	5.1	6.13	-27.72	-26.69	-13	13.69

Test Notes: Only worst case channel presented for spurious emissions below 1GHz. Emissions profile between Band 4 and 17 are identical below 1GHz. Plot presented is Band 14, mid channel, 15MHz channel bandwidth with RB size/offset of 1/0.



2.8.10 Test Results Above 1GHz (Low Channel - Worst Case Configuration Band 17)



Peak Data

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1499.800000	44.7	100.0	V	0.0	-9.0	39.7	84.4
2499.400000	42.8	100.0	V	22.0	-4.6	41.6	84.4
3767.600000	43.3	100.0	H	0.0	2.8	41.1	84.4
6079.600000	43.1	200.0	V	0.0	4.7	41.3	84.4
10809.000000	48.7	200.0	H	22.0	11.2	35.7	84.4
17989.800000	57.8	100.0	V	0.0	21.3	26.5	84.4

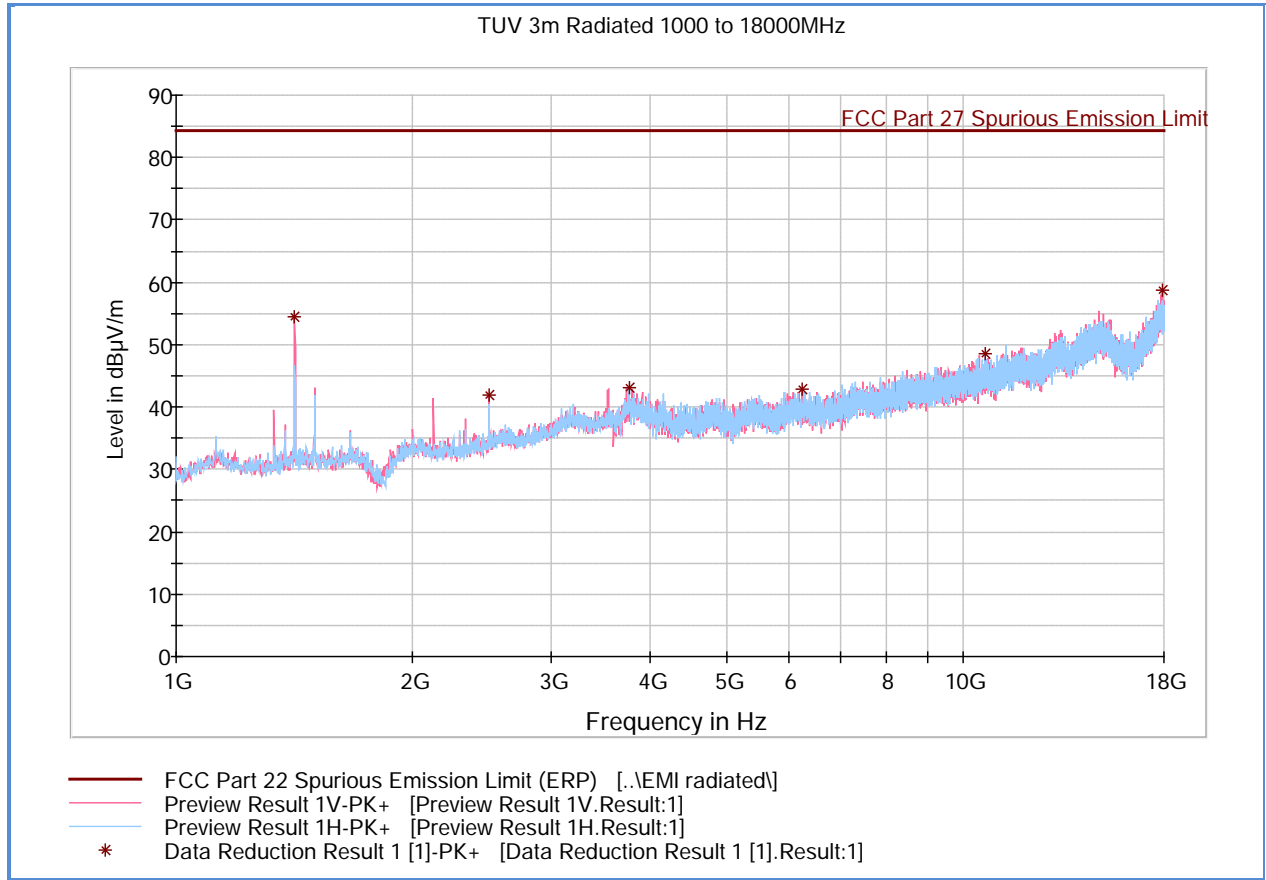
Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin

Test Notes: Measurement was performed with a 900MHz High Pass filter. Emissions within 20dB of the limit are proven by substitution method. However no such emission observed.



2.8.11 Test Results Above 1GHz (Mid Channel - Worst Case Configuration Band 17)



Peak Data

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1414.800000	54.6	100.0	V	1.0	-9.2	29.8	84.4
2499.400000	41.8	100.0	V	22.0	-4.6	42.6	84.4
3760.800000	43.2	100.0	H	0.0	2.8	41.2	84.4
6251.300000	42.8	100.0	V	1.0	5.0	41.6	84.4
10667.900000	48.5	100.0	H	22.0	11.1	35.8	84.4
17932.000000	58.8	200.0	V	1.0	21.0	25.6	84.4

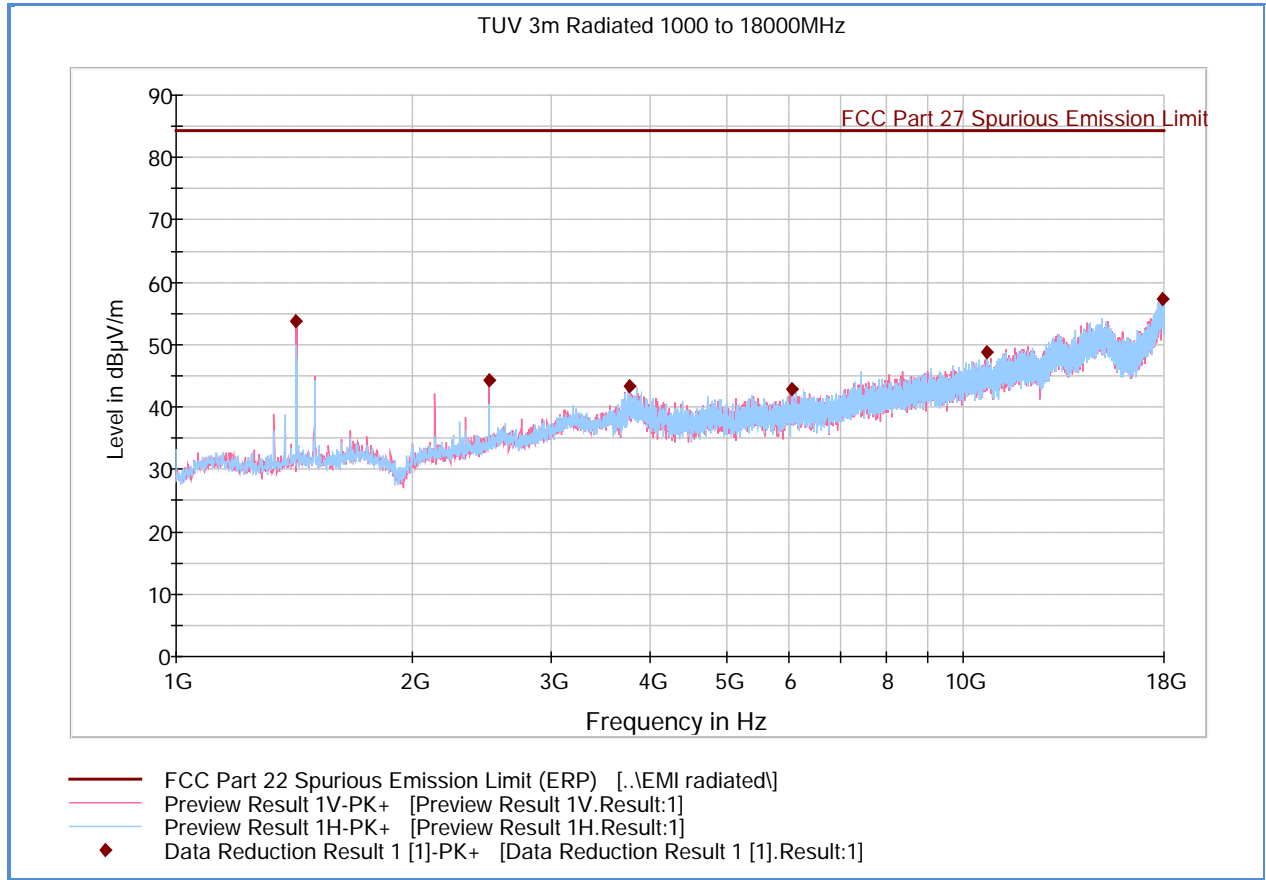
Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin

Test Notes: Measurement was performed with a 900MHz High Pass filter. Emissions within 20dB of the limit are proven by substitution method. However no such emission observed.



2.8.12 Test Results Above 1GHz (High Channel - Worst Case Configuration Band 17)



Peak Data

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
1421.600000	53.9	100.0	V	0.0	-9.2	30.5	84.4
2499.400000	44.4	100.0	V	22.0	-4.6	40.0	84.4
3765.900000	43.3	200.0	V	0.0	2.8	41.1	84.4
6049.000000	42.9	200.0	V	22.0	4.6	41.5	84.4
10729.10000	48.8	200.0	H	0.0	11.2	35.5	84.4
17915.00000	57.4	100.0	V	0.0	21.0	27.0	84.4

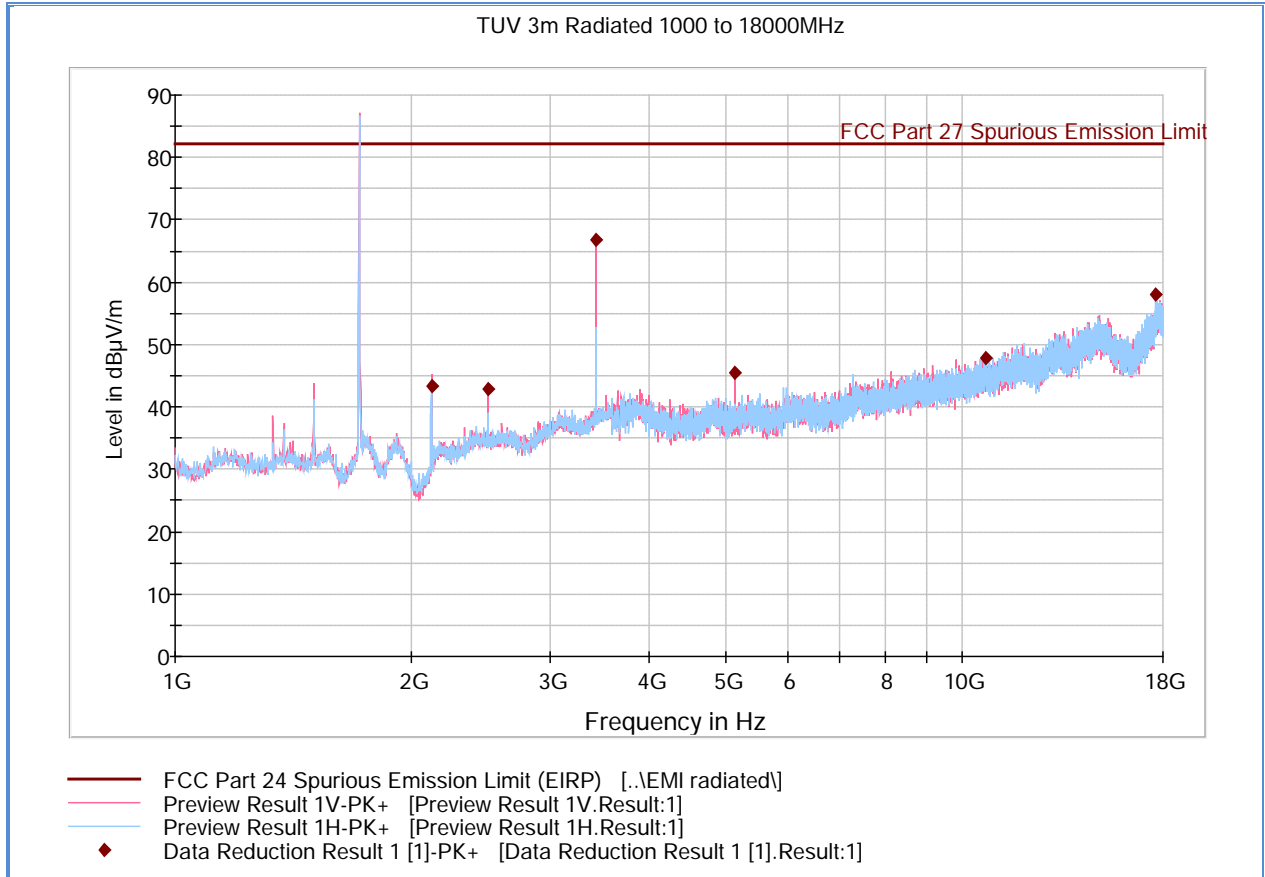
Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin

Test Notes: Measurement was performed with a 900MHz High Pass filter. Emissions within 20dB of the limit are proven by substitution method. However no such emission observed.



2.8.13 Test Results Above 1GHz (Low Channel - Worst Case Configuration Band 4)



Peak Data

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2118.600000	43.3	200.0	H	22.0	-6.1	38.9	82.2
2499.400000	42.8	100.0	V	22.0	-4.6	39.5	82.2
3431.000000	66.8	100.0	V	0.0	0.0	15.4	82.2
5144.600000	45.4	100.0	V	22.0	3.1	36.9	82.2
10730.800000	47.9	200.0	H	22.0	11.2	34.4	82.2
17643.000000	58.1	100.0	H	0.0	19.9	24.2	82.2

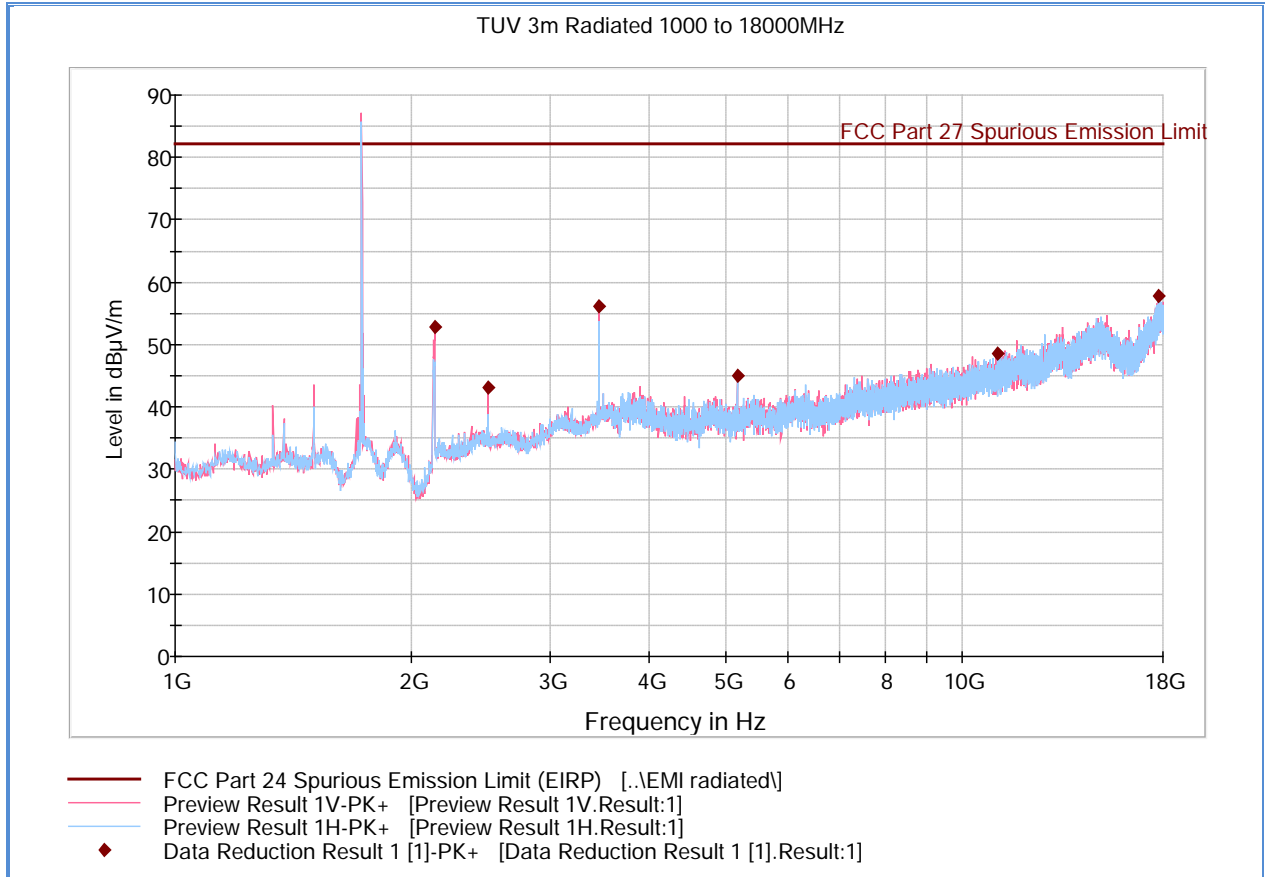
Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin
3431.000000	66.8	1.60	9.50	-38.12	-30.22	-13	17.22

Test Notes: Measurement was performed with a 2.0GHz notch filter. Emissions within 20dB of the limit are proven by substitution method.



2.8.14 Test Results Above 1GHz (Mid Channel - Worst Case Configuration Band 4)



Peak Data

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2137.300000	52.9	100.0	V	22.0	-6.1	29.4	82.2
2499.400000	43.1	100.0	V	22.0	-4.6	39.2	82.2
3451.400000	56.2	100.0	V	22.0	0.1	26.0	82.2
5176.900000	45.0	100.0	V	22.0	3.3	37.2	82.2
11101.40000	48.6	200.0	H	22.0	11.7	33.6	82.2
17755.20000	57.8	200.0	V	22.0	20.8	24.5	82.2

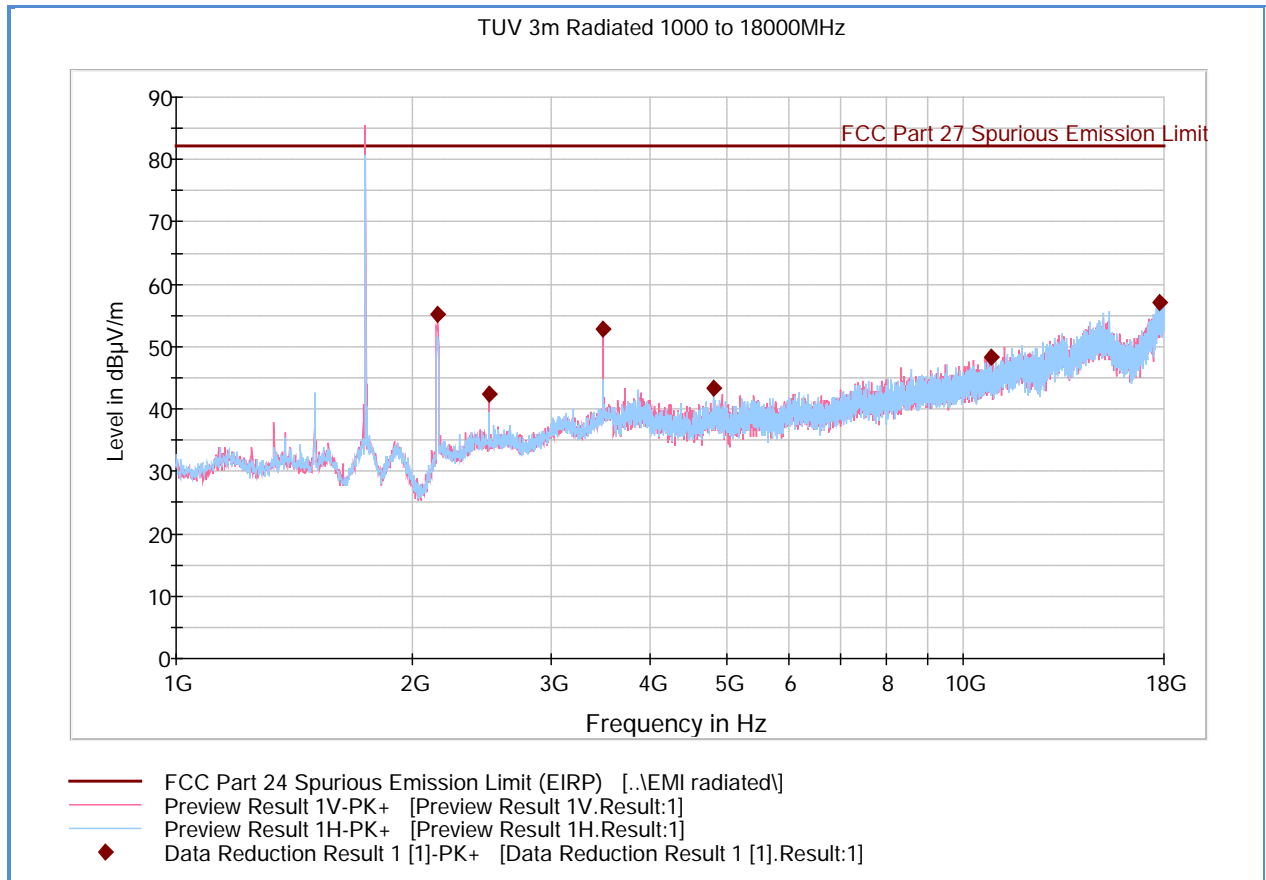
Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin

Test Notes: Measurement was performed with a 2.0GHz notch filter. Emissions within 20dB of the limit are proven by substitution method. However no such emission observed.



2.8.15 Test Results Above 1GHz (High Channel - Worst Case Configuration Band 4)



Peak Data

Frequency (MHz)	MaxPeak-MaxHold (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin - PK+ (dB)	Limit - PK+ (dBµV/m)
2149.200000	55.3	100.0	V	22.0	-6.1	27.0	82.2
2499.400000	42.4	100.0	V	22.0	-4.6	39.8	82.2
3482.000000	52.9	100.0	V	0.0	0.2	29.3	82.2
4813.100000	43.2	100.0	H	0.0	2.1	39.0	82.2
10860.000000	48.3	100.0	H	0.0	11.3	33.9	82.2
17736.500000	57.2	100.0	V	0.0	20.7	25.0	82.2

Substitution Data

Frequency (MHz)	Field Strength @ 3 meters (dBµV/m)	Cable Loss (dB)	Substitution Antenna Gain (dBi)	Signal Generator Level (dBm)	Substitution Data SGL+AG-CL (dBm)	Limit (dBm)	Margin

Test Notes: Measurement was performed with a 2.0GHz notch filter. Emissions within 20dB of the limit are proven by substitution method. However no such emission observed.



2.9 **FREQUENCY STABILITY**

2.9.1 **Specification Reference**

Part 27 Subpart C §27.54 and Part 2.1055(a)(1) AND (d)(1), RSS-139(6.3)

2.9.2 **Standard Applicable**

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

2.9.3 **Equipment Under Test and Modification State**

Serial No: SA310512700012 / Default Test Configuration

2.9.4 **Date of Test/Initial of test personnel who performed the test**

July 10, 2012/JMG

2.9.5 **Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

2.9.6 **Environmental Conditions**

Ambient Temperature	24.1°C
Relative Humidity	42.6%
ATM Pressure	100.3 kPa

2.9.7 **Additional Observations**

- This is a conducted test. The EUT was operated at 4.2VDC using the USB power for testing and was placed in the temperature chamber for this evaluation. The EUT was controlled by a CMW500 outside of the chamber, the CMW500 was also used as the device to measure the frequency error.
- The Temperature was reduced to -30°C and allowed to sit for 1 hour to allow the equipment and chamber temperature to stabilize. The measurements for LTE bands 4 and 17 were then performed. The temperature was then increased by 10°C steps and allowed to settle before taking the next set of measurements.
- The testing was performed using one RB and Bandwidth setting for each band.

2.9.8 **Test Results**

See data below



America

LTE Band 17 – QPSK - Channel 23790 – Frequency 710MHz – RB 25/0				
Voltage (%)	Power (VDC)	Temp (°C)	Frequency Deviation (Hz)	Complies (Y or N)
100	4.35	-30	5.32	Y (SEE NOTE)
100		-20	-5.64	Y (SEE NOTE)
100		-10	-5.79	Y (SEE NOTE)
100		0	-4.58	Y (SEE NOTE)
100		+10	-4.21	Y (SEE NOTE)
100		+20	-5.35	Y (SEE NOTE)
100		+30	-5.31	Y (SEE NOTE)
100		+40	-5.6	Y (SEE NOTE)
100		+50	-6.08	Y (SEE NOTE)
115		5.0025	+20	-6.37
85	3.6975	+20	-5.49	Y (SEE NOTE)

LTE Band 4 – QPSK - Channel 20175 – Frequency 1732.5MHz RB 6/0				
Voltage (%)	Power (VDC)	Temp (°C)	Frequency Deviation (Hz)	Complies (Y or N)
100	4.35	-30	12.66	Y (SEE NOTE)
100		-20	11.76	Y (SEE NOTE)
100		-10	10.7	Y (SEE NOTE)
100		0	11.64	Y (SEE NOTE)
100		+10	11.46	Y (SEE NOTE)
100		+20	9.38	Y (SEE NOTE)
100		+30	-10.99	Y (SEE NOTE)
100		+40	10.80	Y (SEE NOTE)
100		+50	12.72	Y (SEE NOTE)
115		5.0025	+20	11.10
85	3.6975	+20	12,62	Y (SEE NOTE)

NOTE: For both Band 4 and 17 the Frequency deviation was a maximum of 12.66Hz. During bandedge measurements the worst case emission was removed from the bandedge was at least 1kHz. Therefore this limited amount of deviation confirms the signal remains in the band during the Frequency stability evaluation.



2.10 **RECEIVER SPURIOUS EMISSIONS**

2.10.1 **Specification Reference**

RSS-139(6.6) and RSS-GEN Issue 3

2.10.2 **Standard Applicable**

Receiver spurious emissions shall comply with the limits specified in RSS-Gen.

2.10.3 **Equipment Under Test and Modification State**

Serial No: SA310512700012 / Test Configuration B

2.10.4 **Date of Test/Initial of test personnel who performed the test**

July 08, 2012/JMG

2.10.5 **Test Equipment Used**

The major items of test equipment used for the above tests are identified in Section 3.1.

2.10.6 **Environmental Conditions**

Ambient Temperature	27.8°C
Relative Humidity	48.8%
ATM Pressure	98.9 kPa

2.10.7 **Additional Observations**

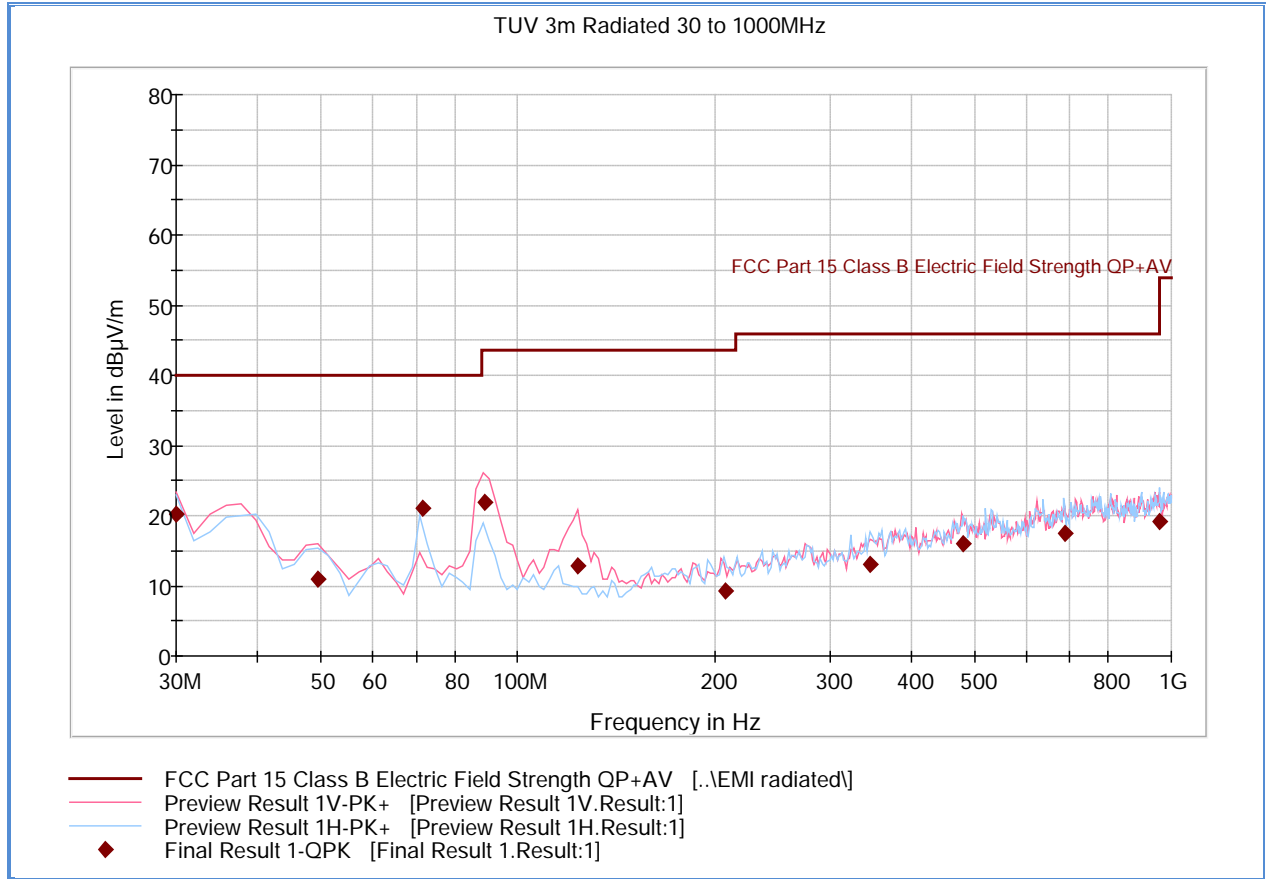
- This is a radiated test. The spectrum was searched from 30MHz to the 18GHz (6GHz as per requirement).
- Limit used is from FCC §15.209 which is identical to RSS-Gen limits.
- All emissions observed above 1GHz are noise floor measurements.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.10.8 **Test Results**

See attached plots.



2.10.9 Test Results Below 1GHz



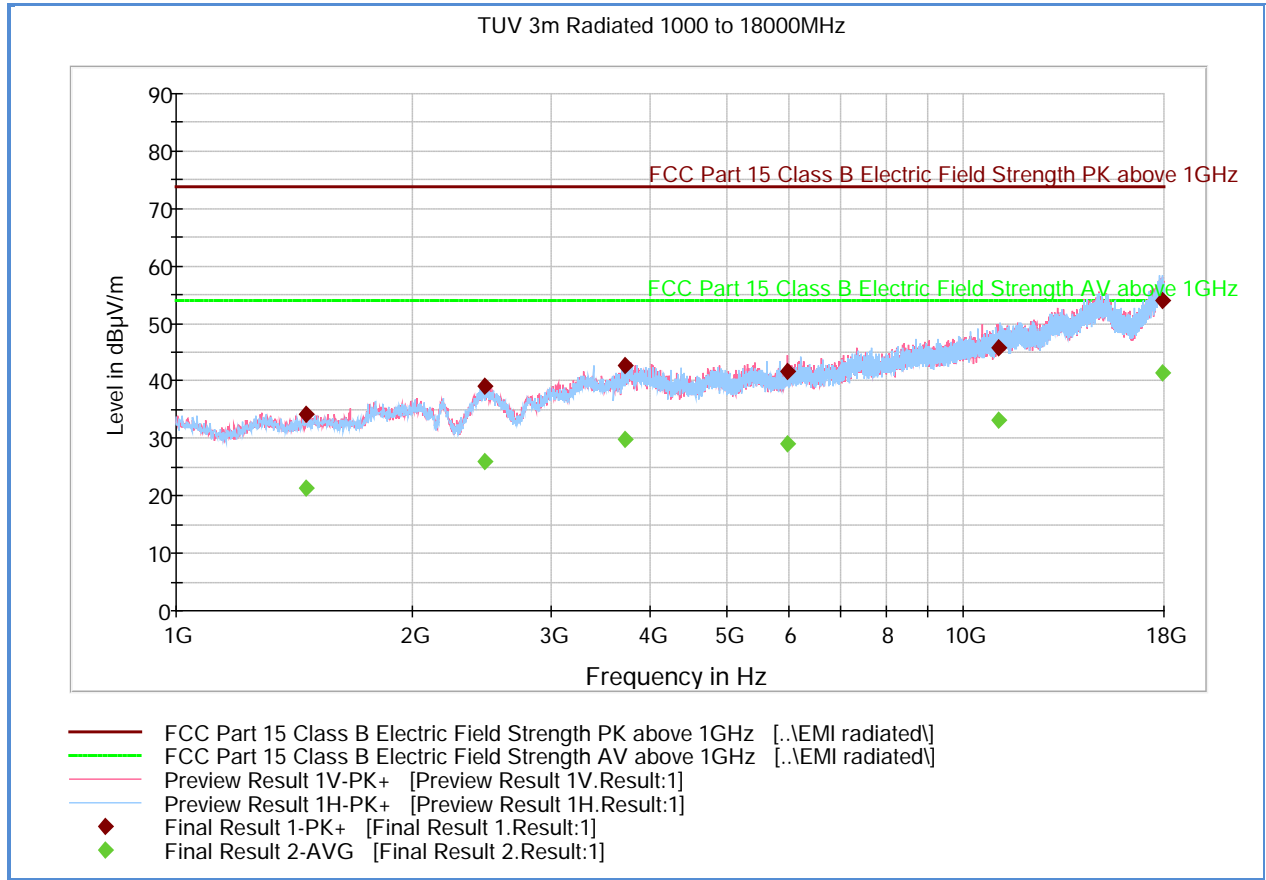
Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.000000	20.3	1000.0	120.000	204.0	V	35.0	-12.2	19.7	40.0
49.558878	11.0	1000.0	120.000	338.0	V	163.0	-20.4	29.0	40.0
71.381643	21.0	1000.0	120.000	238.0	H	252.0	-22.2	19.0	40.0
88.772745	21.8	1000.0	120.000	100.0	V	127.0	-21.1	21.7	43.5
123.706613	12.8	1000.0	120.000	103.0	V	14.0	-20.9	30.7	43.5
207.293788	9.3	1000.0	120.000	244.0	H	6.0	-15.8	34.2	43.5
346.813707	13.1	1000.0	120.000	192.0	H	132.0	-10.6	32.9	46.0
479.094188	16.0	1000.0	120.000	257.0	V	267.0	-6.7	30.0	46.0
687.010180	17.5	1000.0	120.000	301.0	H	52.0	-3.5	28.5	46.0
959.138357	19.1	1000.0	120.000	400.0	H	172.0	0.1	26.9	46.0

Test Notes: Only worst case channel/configuration presented for spurious emissions below 1GHz. There are no significant emissions variations between modes and configuration when the EUT is on receive mode.



2.10.10 Test Results Above 1GHz



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1463.600000	34.3	1000.0	1000.000	294.0	V	159.0	-9.1	39.6	73.9
2465.460000	39.0	1000.0	1000.000	176.0	V	199.0	-4.6	34.9	73.9
3720.300000	42.8	1000.0	1000.000	185.0	V	24.0	2.6	31.1	73.9
5987.180000	41.8	1000.0	1000.000	400.0	V	342.0	4.5	32.1	73.9
11113.080000	45.7	1000.0	1000.000	283.0	V	96.0	11.7	28.2	73.9
17956.620000	54.0	1000.0	1000.000	391.0	H	40.0	21.2	19.9	73.9

Average Data

Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1463.600000	21.3	1000.0	1000.000	294.0	V	159.0	-9.1	32.6	53.9
2465.460000	26.0	1000.0	1000.000	176.0	V	199.0	-4.6	27.9	53.9
3720.300000	29.9	1000.0	1000.000	185.0	V	24.0	2.6	24.0	53.9
5987.180000	29.0	1000.0	1000.000	400.0	V	342.0	4.5	24.9	53.9
11113.080000	33.1	1000.0	1000.000	283.0	V	96.0	11.7	20.8	53.9
17956.620000	41.5	1000.0	1000.000	391.0	H	40.0	21.2	12.4	53.9

Test Notes: Only worst case channel/configuration presented for spurious emissions above 1GHz. There are no significant emissions variations between modes and configuration when the EUT is on receive mode.



2.11 POWER LINE CONDUCTED EMISSIONS

2.11.1 Specification Reference

RSS-Gen 7.2.4

2.11.2 Standard Applicable

Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The more stringent limit applies at the frequency range boundaries.

The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network (LISN).

Frequency of emission (MHz)	Conducted limit (dBµV)	
	Quasi-peak	Average
0.15–0.5	66 to 56*	56 to 46*
0.5–5	56	46
5–30	60	50

**Decreases with the logarithm of the frequency.*

2.11.3 Equipment Under Test and Modification State

Serial No: SA310512700012 / Test Configuration A

2.11.4 Date of Test/Initial of test personnel who performed the test

July 07, 2012/FSC

2.11.5 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.11.6 Environmental Conditions

Ambient Temperature 26.6°C
 Relative Humidity 52.1%
 ATM Pressure 99.9 kPa

2.11.7 Additional Observations

- The EUT is a battery powered device however with provision to connect to public AC mains via supplied AC adapter/charger.



- The EUT was verified using worst case configuration (worst case channel/mode). The EUT was set to transmit max. power while plugged into the AC adapter.
- EUT verified using input voltage of 120VAC 60Hz.
- Limit used is from FCC §15.207 which is identical to RSS-Gen limits.
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.10.8 for sample computation.

2.11.8 **Sample Computation (Conducted Emission – Quasi Peak)**

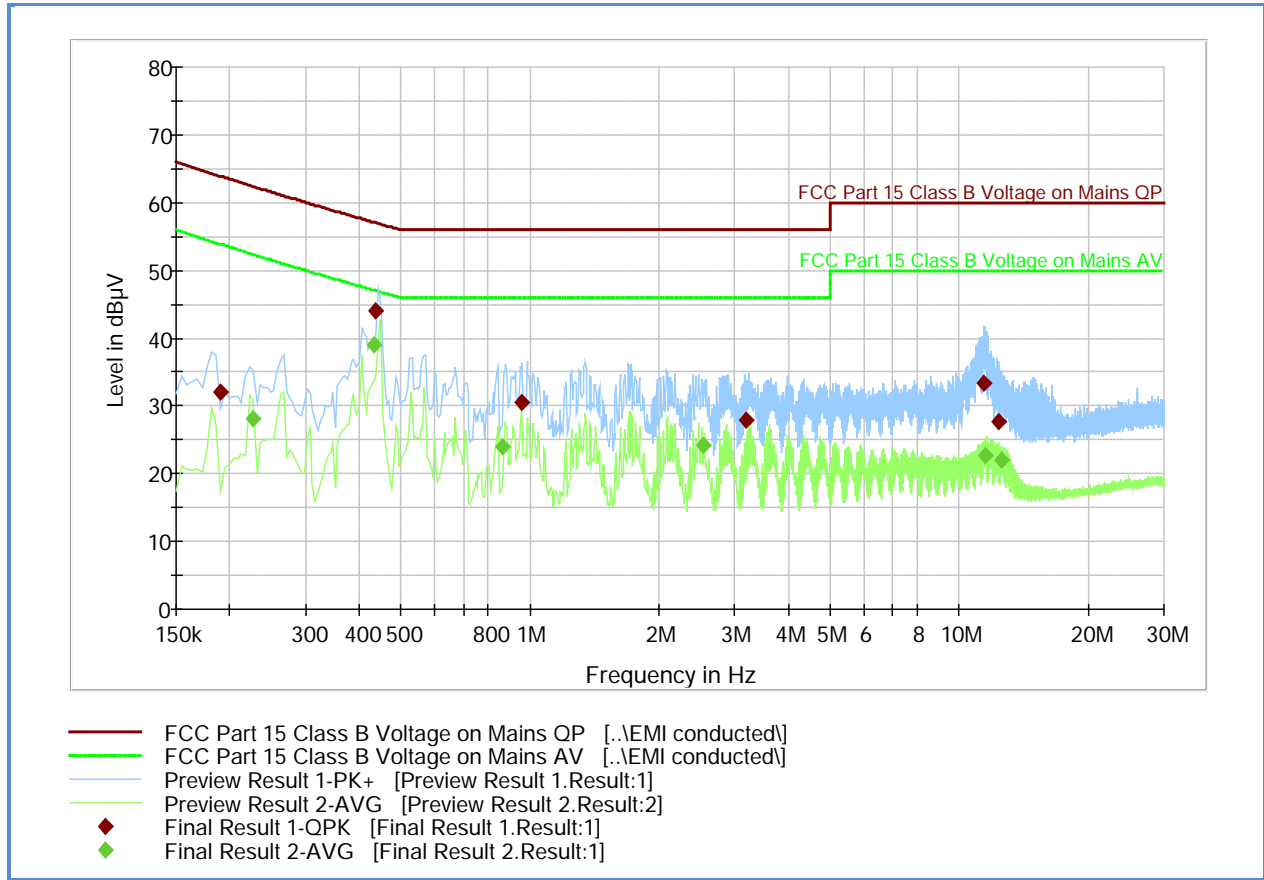
Measuring equipment raw measurement (db μ V) @ 150kHz		5.5
Correction Factor (dB)	Asset# 8607 (20 dB attenuator)	19.9
	Asset# 1177 (cable)	0.15
	Asset# 1176 (cable)	0.35
	Asset# 7567 (LISN)	0.30
Reported QuasiPeak Final Measurement (dbμV) @ 150kHz		26.2

2.11.9 **Test Results**

Compliant. See attached plots and tables.



2.11.10 Line 1 (Hot) LTE Band 4



Quasi Peak

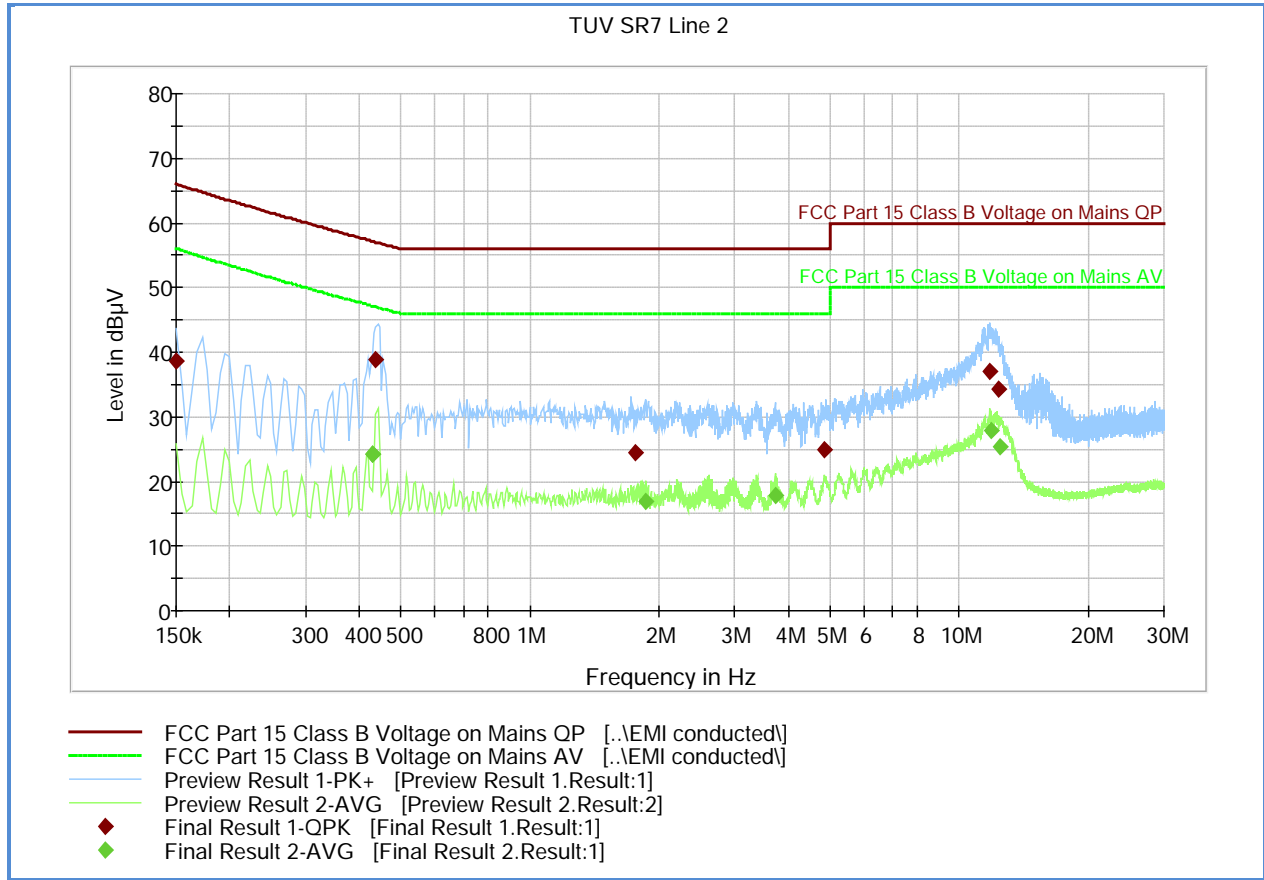
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.190500	32.0	1000.0	9.000	Off	L1	20.5	31.9	63.9
0.438000	43.9	1000.0	9.000	Off	L1	20.2	13.1	57.0
0.955500	30.5	1000.0	9.000	Off	L1	20.1	25.5	56.0
3.187500	28.0	1000.0	9.000	Off	L1	20.2	28.0	56.0
11.440500	33.4	1000.0	9.000	Off	L1	20.4	26.6	60.0
12.363000	27.6	1000.0	9.000	Off	L1	20.5	32.4	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.226500	28.1	1000.0	9.000	Off	L1	20.4	24.3	52.4
0.433500	38.9	1000.0	9.000	Off	L1	20.2	8.2	47.1
0.865500	23.9	1000.0	9.000	Off	L1	20.2	22.1	46.0
2.530500	24.1	1000.0	9.000	Off	L1	20.1	21.9	46.0
11.503500	22.7	1000.0	9.000	Off	L1	20.5	27.3	50.0
12.520500	22.0	1000.0	9.000	Off	L1	20.5	28.0	50.0



2.11.11 Line 2 (Neutral) LTE Band 4



Quasi Peak

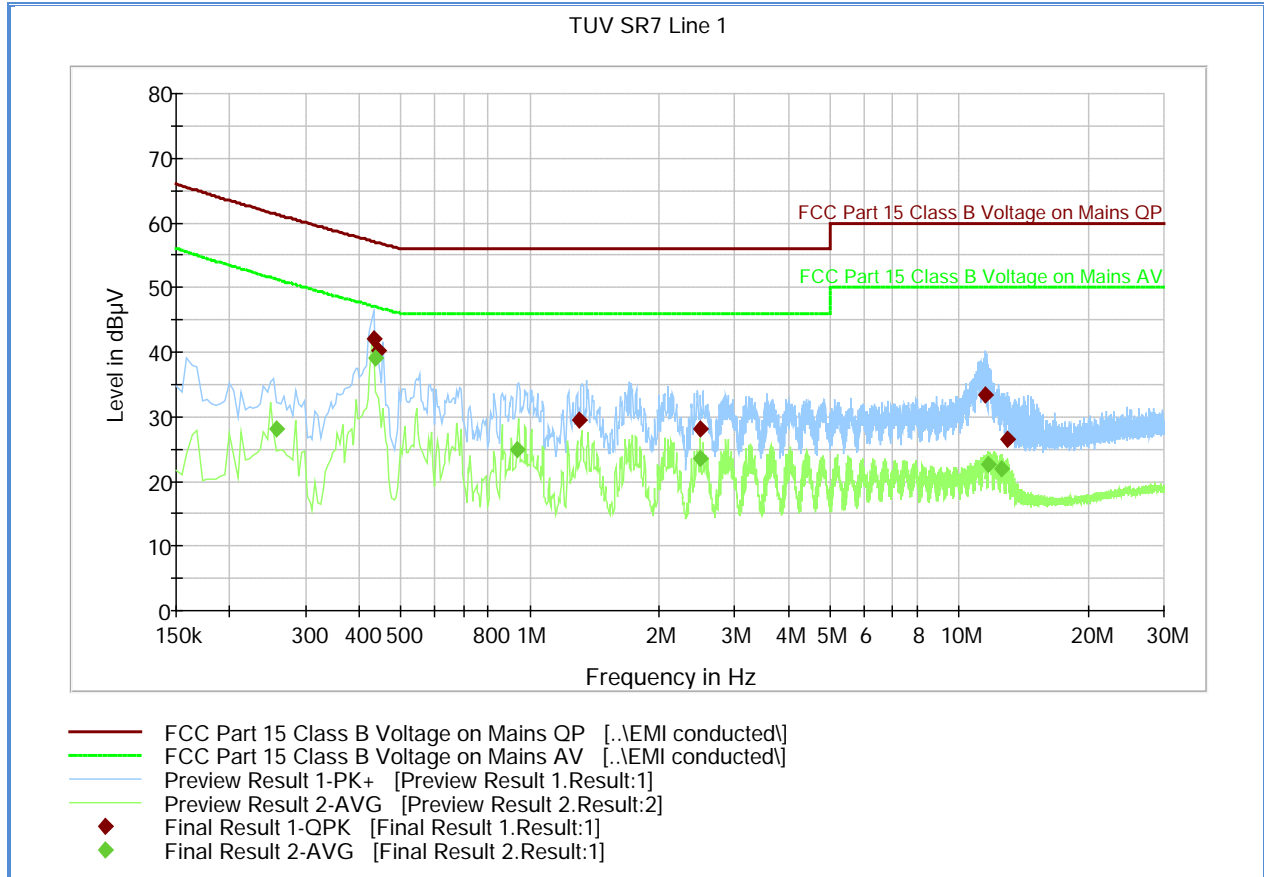
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	38.6	1000.0	9.000	Off	N	21.0	27.4	66.0
0.438000	38.8	1000.0	9.000	Off	N	20.7	18.2	57.0
1.756500	24.5	1000.0	9.000	Off	N	20.5	31.5	56.0
4.834500	24.8	1000.0	9.000	Off	N	20.7	31.2	56.0
11.805000	37.0	1000.0	9.000	Off	N	20.9	23.0	60.0
12.354000	34.2	1000.0	9.000	Off	N	20.9	25.8	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.429000	24.2	1000.0	9.000	Off	N	20.6	22.9	47.2
0.429000	24.2	1000.0	9.000	Off	N	20.6	23.0	47.2
1.855500	16.9	1000.0	9.000	Off	N	20.5	29.1	46.0
3.727500	17.9	1000.0	9.000	Off	N	20.6	28.1	46.0
11.863500	27.8	1000.0	9.000	Off	N	20.9	22.2	50.0
12.426000	25.4	1000.0	9.000	Off	N	20.9	24.6	50.0



2.11.12 Line 1 (Hot) LTE Band 17



Quasi Peak

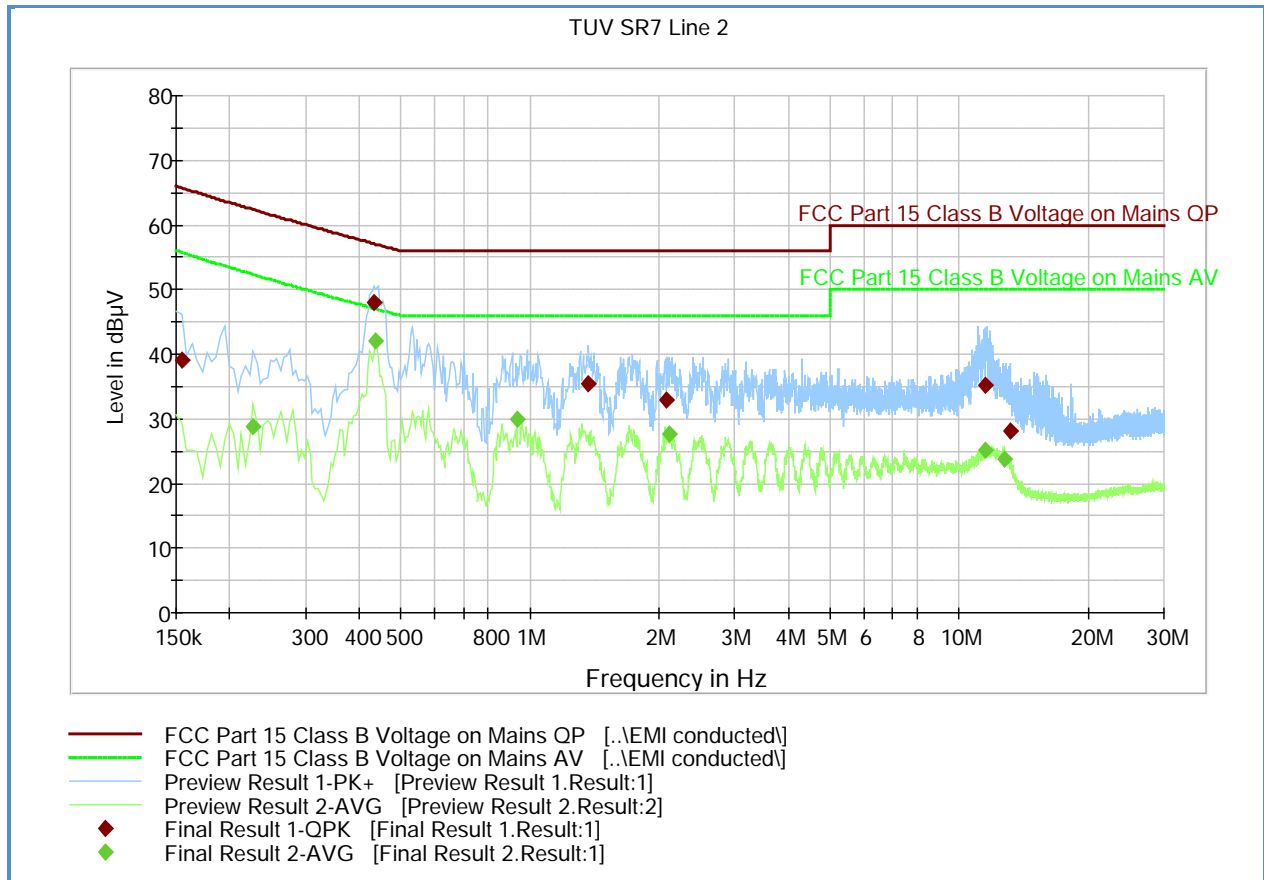
Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.433500	42.0	1000.0	9.000	Off	L1	20.2	15.1	57.1
0.442500	40.3	1000.0	9.000	Off	L1	20.2	16.6	56.9
1.306500	29.5	1000.0	9.000	Off	L1	20.1	26.5	56.0
2.485500	28.2	1000.0	9.000	Off	L1	20.1	27.8	56.0
11.485500	33.4	1000.0	9.000	Off	L1	20.4	26.6	60.0
12.988500	26.5	1000.0	9.000	Off	L1	20.5	33.5	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.258000	28.2	1000.0	9.000	Off	L1	20.4	23.0	51.3
0.438000	39.0	1000.0	9.000	Off	L1	20.2	8.0	47.0
0.933000	25.0	1000.0	9.000	Off	L1	20.2	21.0	46.0
2.490000	23.6	1000.0	9.000	Off	L1	20.1	22.4	46.0
11.706000	22.7	1000.0	9.000	Off	L1	20.5	27.3	50.0
12.561000	22.0	1000.0	9.000	Off	L1	20.5	28.0	50.0



2.11.13 Line 2 (Neutral) LTE Band 17



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	39.1	1000.0	9.000	Off	N	21.0	26.6	65.7
0.433500	47.9	1000.0	9.000	Off	N	20.6	9.2	57.1
1.369500	35.4	1000.0	9.000	Off	N	20.5	20.6	56.0
2.085000	33.0	1000.0	9.000	Off	N	20.5	23.0	56.0
11.548500	35.2	1000.0	9.000	Off	N	20.9	24.8	60.0
13.132500	28.2	1000.0	9.000	Off	N	20.9	31.8	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.226500	28.7	1000.0	9.000	Off	N	20.8	23.6	52.4
0.438000	42.2	1000.0	9.000	Off	N	20.7	4.8	47.0
0.937500	30.0	1000.0	9.000	Off	N	20.6	16.0	46.0
2.107500	27.7	1000.0	9.000	Off	N	20.5	18.3	46.0
11.526000	25.1	1000.0	9.000	Off	N	20.9	24.9	50.0
12.732000	23.7	1000.0	9.000	Off	N	20.9	26.3	50.0



SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

ID Number (SDGE/SDRB)	Test Equipment	Type	Serial Number	Manufacturer	Cal Date	Cal Due Date
Conducted Port Setup						
1024	EMI Test Receiver	ESCS 30	847793/001	Rhode & Schwarz	02/29/12	02/28/13
7571	Wideband Radio Communication Tester	CMW 500	1201.0002k50/103829	Rhode & Schwarz	04/04/12	04/04/13
7569	Series Power Meter	N1911A P-	MY45100625	Agilent	02/24/12	02/24/14
7570	50MHz-18GHz Wideband Power Sensor	N1921A	MY45240588	Agilent	02/14/12	02/24/13
7567	LISN	FCC-LISN-50-25-2-10	120304	Fischer Custom Comm.	05/24/12	05/24/13
7568	LISN	FCC-LISN-50-25-2-10	120305	Fischer Custom Comm.	05/24/12	05/24/13
1027, 1028	EMI Test Receiver	ESMI	846517/0001	Rhode & Schwarz	03/20/12	03/20/13
8607	20dB Attenuator	CAT-20	N/A	MCL HAT-20	07/29/11	07/29/12
8609	20dB Attenuator	CAT-20	N/A	MCL HAT-20	07/29/11	07/29/12
6559	Absorbing Clamp	MDS-21	194.0100.50	Rhode & Schwarz	02/28/11	02/28/12
7550	TLISN	FCC-TLISN-T8-02-09	091602	Fischer Custom Comm.	05/10/12	05/10/13
6836	LISN	FCC-LISN-50-25-2	5024	Fischer Custom Comm.	02/08/12	02/08/13
6610	Temperature Chamber	SH-27C	EV03	Envirotronics	06/29/12	06/29/13
Radiated Test Setup						
1033	Bilog Antenna	3142C	00044556	EMCO	04/01/11	04/01/12
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	12/06/11	12/06/12
6669	Double-ridged waveguide horn antenna	3115	94124364	EMCO	11/07/11	11/07/12
6628	Loop Antenna	HFH 2 -Z2	880 458/25	Rhode & Schwarz	05/09/11	05/09/12
1051	Double-ridged waveguide horn antenna	3115	9408-4329	EMCO	01/04/12	01/04/13
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	08/17/11	08/17/12
8543	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	08/17/11	08/17/12
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	08/10/11	08/10/12
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/13/12	06/13/13
1016	Pre-amplifier	PAM-0202	187	PAM	08/17/11	08/17/12
1003	Signal Generator	SMR-40	1104.0002.40	Rhode & Schwarz	10/13/11	10/13/12
1151	Pre-amplifier	TS-PR26	100026	Rhode & Schwarz	Verified by 1003 and 1049	
	2.0GHz Band Notch Filter	BRM50707	005	Micro-Tronics	Verified by 1003 and 1049	
Miscellaneous						
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	07/12/11	07/12/12
	Test Software	EMC32	V8.52	Rhode & Schwarz	N/A	



3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:

3.2.1 Radiated Emission Measurements (Below 1GHz)

Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1 Receiver/Spectrum Analyzer	Rectangular	0.45	0.26	0.07
2 Cables	Rectangular	0.50	0.29	0.08
3 Preamp	Rectangular	0.50	0.29	0.08
4 Antenna	Rectangular	0.75	0.43	0.19
5 Site	Rectangular	3.55	2.05	4.20
6 EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):				2.23
Coverage Factor (k):				2
Expanded Uncertainty:				4.45

3.2.2 Radiated Emission Measurements (Above 1GHz)

Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1 Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2 Cables	Rectangular	0.70	0.40	0.16
3 Preamp	Rectangular	0.50	0.29	0.08
4 Antenna	Rectangular	0.37	0.21	0.05
5 Site	Rectangular	3.55	2.05	4.20
6 EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):				2.22
Coverage Factor (k):				2
Expanded Uncertainty:				4.44

3.2.3 Conducted Antenna Port Measurement

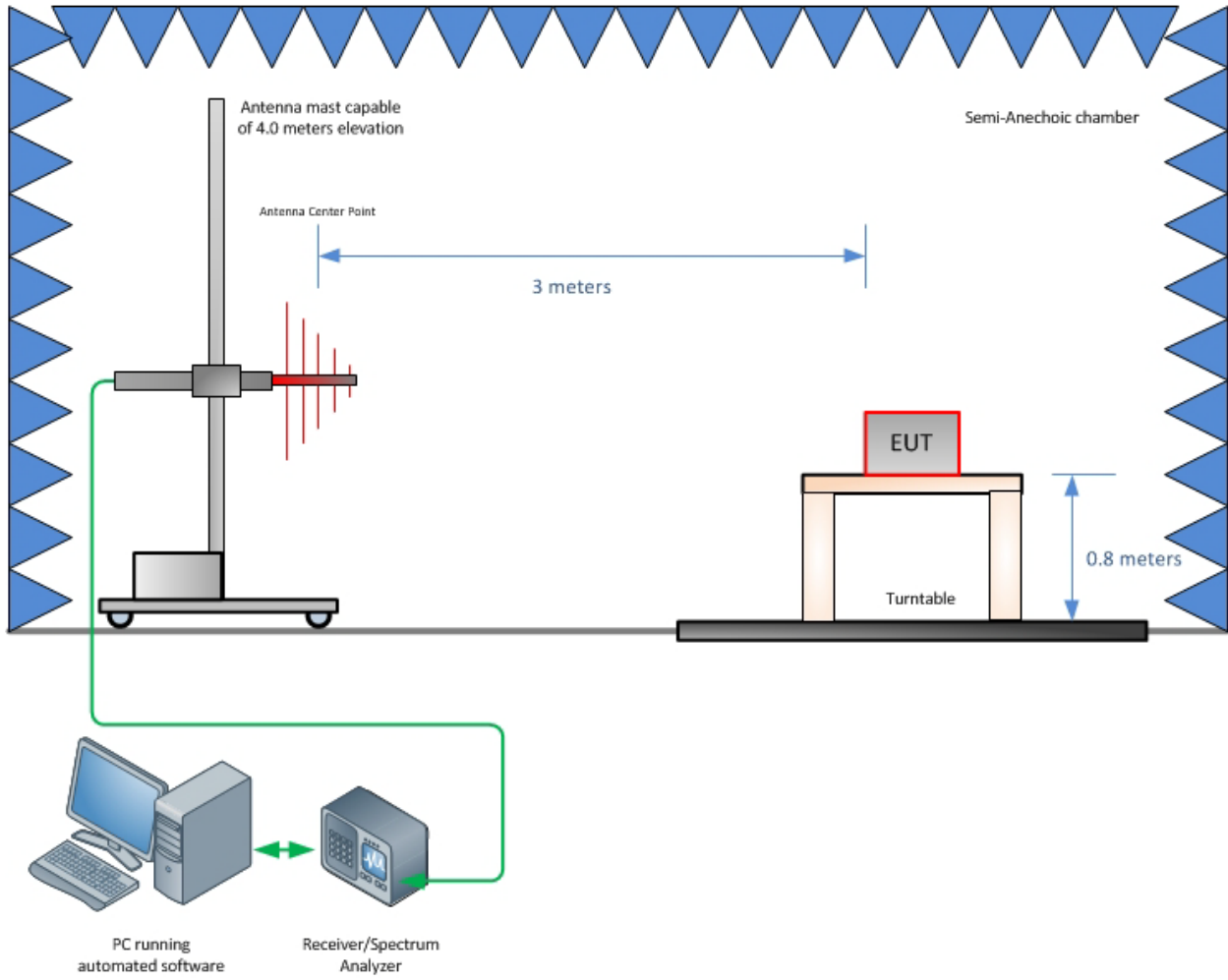
Contribution	Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1 Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2 Cables	Rectangular	0.50	0.29	0.08
3 EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):				0.72
Coverage Factor (k):				2
Expanded Uncertainty:				1.45



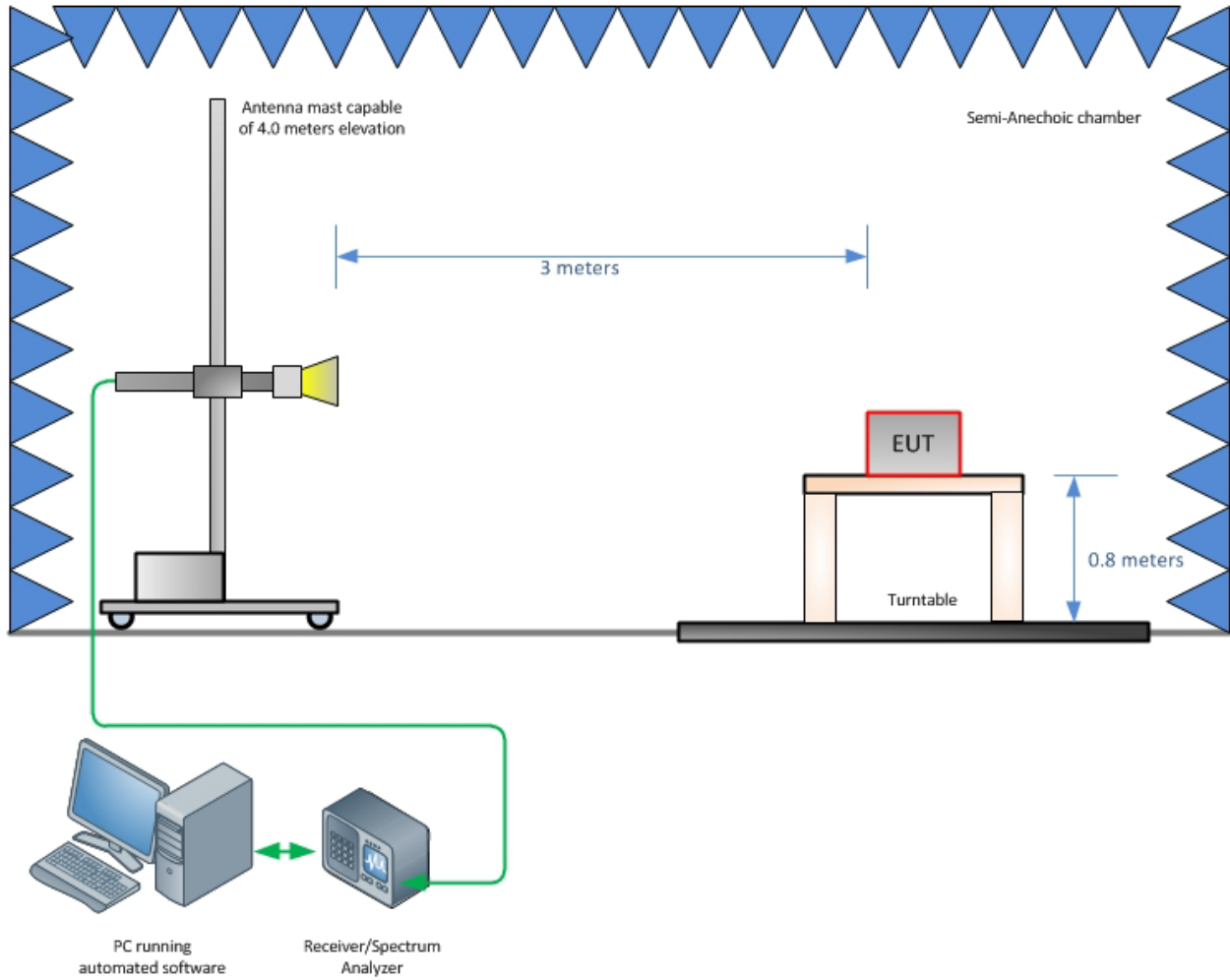
SECTION 4

DIAGRAM OF TEST SETUP

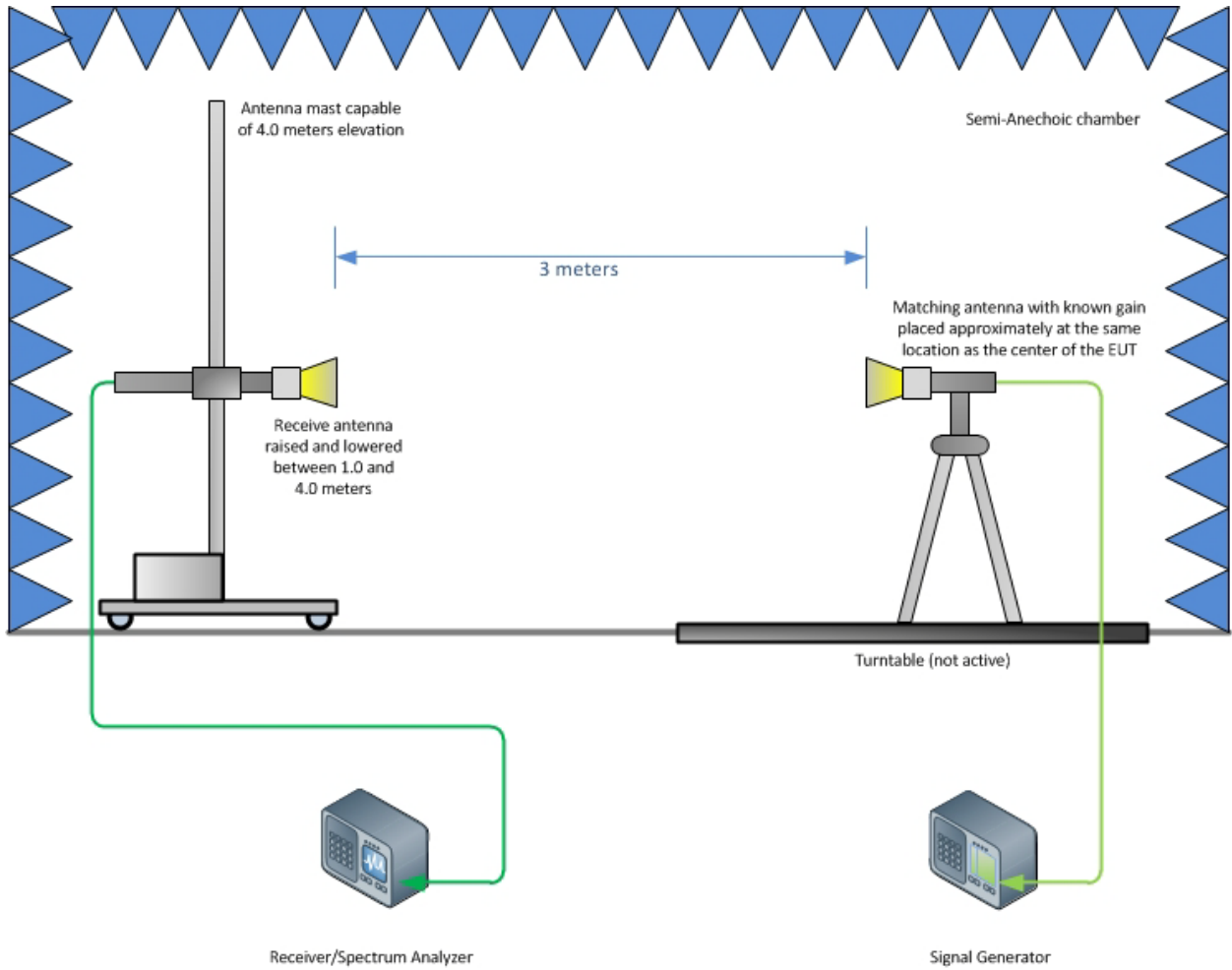
4.1 TEST SETUP DIAGRAM



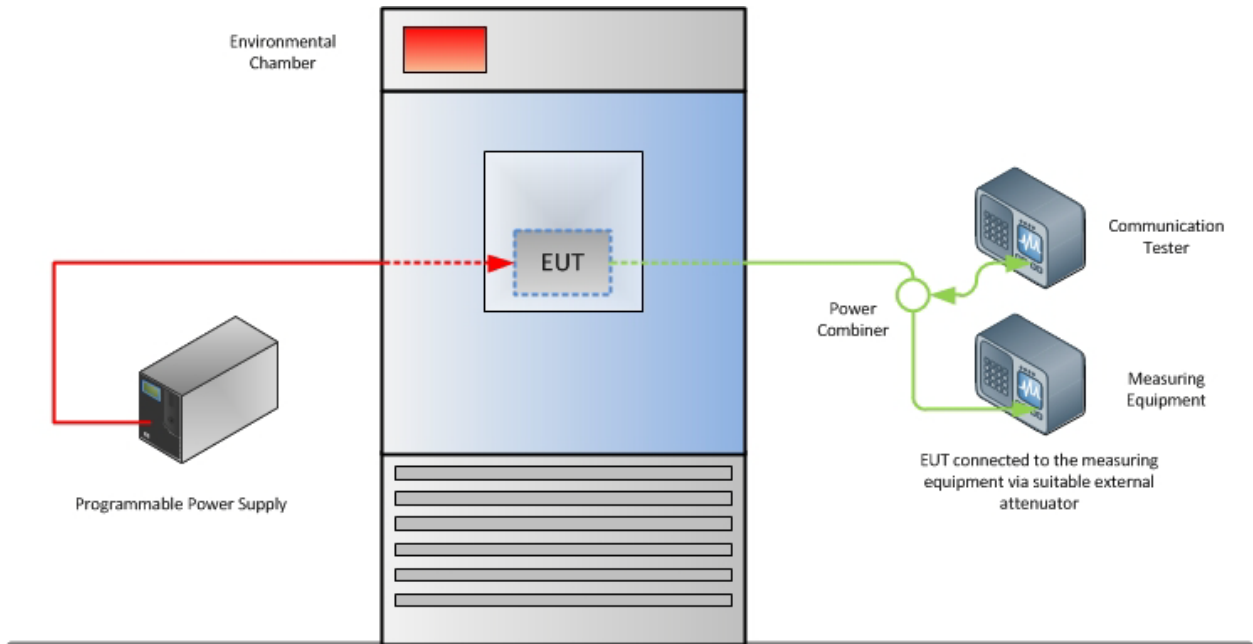
Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz)



Frequency Stability Test Configuration



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**

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