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Report On

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

MiFi 5510 Personal Wireless Router

FCC CFR 47 Part 2, Part 22 and Part 24
IC RSS-Gen, RSS-132 and RSS-133

Report No. SC1209591D

October 2012




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

TEST REPORT NUMBER SC1209591D

PREPARED FOR Novatel Wireless Inc.
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DATED

October 24, 2012



Revision History

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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, Part 22 and Part 24
- IC RSS-Gen, RSS-132 and RSS-133.

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 5510
FCC ID Number	PKRNVWMIFI5510
IC Number	N/A
Serial Number(s)	UB010912700038
Number of Samples Tested	1
Test Specification/Issue/Date	<ul style="list-style-type: none">• FCC CFR 47 Part 2, Part 22 and Part 24 (October 1, 2011).• RSS-132 - Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz (Issue 2, September 2005).• RSS-133 – 2 GHz Personal Communications Services (Issue 5, February 2009).• RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 3, December 2010).
Start of Test	October 13, 2012
Finish of Test	October 21, 2012
Name of Engineer(s)	Ferdie Custodio
Related Document(s)	<ul style="list-style-type: none">• RF Exposure Lab Certificate Of Compliance SAR Evaluation Test Report Number: SAR.20121001• 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, Part 22 and Part 24 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	RSS-132(4.4),RSS-133(4.1)	Transmitter Conducted Output Power	Compliant (RF Exposure Test Report)
2.2	22.913(a)(2), 2.1046	RSS-132(4.4),SRSP-503(5.1.3)	Effective Radiated Power	Compliant
2.3	24.232(c),2.1046	RSS-133(6.4),SRSP-510(5.1.2)	Equivalent Isotropic Radiated Power	Compliant
2.4	2.1049,22.917(b), 24.238(b)	RSS-Gen(4.6.1)	Occupied Bandwidth	Compliant
2.5	24.232(d)	RRSS-133(6.4)	Peak-Average Ratio	Compliant
2.6	2.1051,22.917(a), 24.238(a)	RSS-132(4.5.1),RSS-133(6.5.1)	Band Edge/Conducted Spurious Emissions	Compliant
2.7	2.1053,22.917(a), 24.238(a)	RSS-132(4.5.1),RSS-133(6.5.1)	Field Strength Of Spurious Radiation	Compliant
2.8	2.1055,22.355,24.235	RSS-132(4.3),RSS-133(6.3)	Frequency Stability	Compliant
2.9		RSS-132(4.6),RSS-133(6.6)	Receiver Spurious Emissions	Compliant
2.10		RSS-Gen 7.2.4	Power Line Conducted Emission	Compliant

1.3 PRODUCT INFORMATION

1.3.1 EUT General Description

The Equipment Under Test (EUT) was a Novatel Wireless Inc. MiFi 5510 Personal Wireless Router. 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. The EUT comes with an AC adapter Novatel Wireless model: SSW-2001PI-U.

1.3.2 EUT General Description

EUT Description	MiFi 5510 Personal Wireless Router
Model Number(s)	MiFi 5510
FCC Classification	PCB - PCS Licensed Transmitter
Rated Voltage	3.7VDC Nominal Voltage.
Mode	CDMA 1xRTT/1xEV-DO/4G-LTE
Capability	800/1900 CDMA2000 1xRTT and 1xEV-DO Release 0 Revision A, Band 4 and 13 LTE, 802.11 b/g/n WLAN
Frequency Tolerance	0.01146 ppm
Primary Unit (EUT)	<input type="checkbox"/> Production <input checked="" type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
Antenna Type	Integral. Planar Inverted F Antenna (Flex)
Antenna Gain	CELL (824-849 MHz) = 0.19dBi PCS (1851-1909 MHz) = 1.23dBi

1.3.3 Transmit Frequency Table

Mode	Tx Frequency (MHz)	Emission Designator	ERP(Part 22)/EIRP(Part 24)	
			Max. Power (dBm)	Max. Power (W)
CDMA2000-1xRTT Cell Band	824.7-848.31	1M35F9W	25.68	0.370
CDMA2000-1xEvDO Cell Band	824.7-848.31	1M32F9W	26.48	0.445
CDMA2000-1xRTT PCS Band	1851.25-1908.75	1M36F9W	25.62	0.365
CDMA2000-1xEvDO PCS Band	1851.25-1908.75	1M33F9W	28.06	0.640

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 unless in Receive mode. .
C	Conducted antenna port test setup. EUT powered via battery and USB connected to supplied AC adapter.

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

1.4.2 EUT Exercise Software

None. The firmware installed in the EUT allows direct connection with the call box. All test configuration parameters are configured using the call box (CMW500).

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Dell	Support Laptop	Novatel Wireless Test Configuration Support Laptop
LUXSHARE-ICT	USB cable	Shielded Type A to Micro USB (0.912 meter) USB Revision 2.

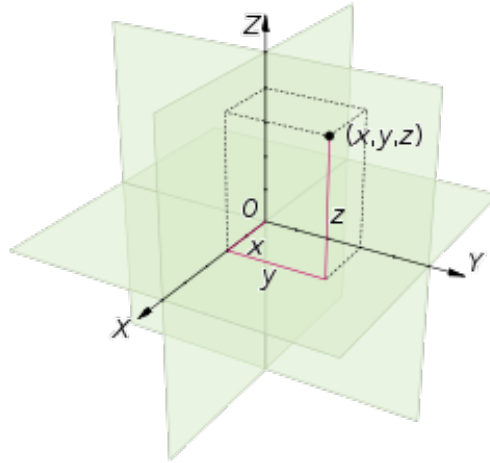
1.4.4 Worst Case Configuration

Worst-case configuration used in this test report provided by the manufacturer and based from SAR Test Report #: SAR.20121001 (RF Exposure Labs)

Mode	Cellular	PCS
CDMA 1xRTT	Channel 384	Channel 1175
1xEV-DO Release 0/A	Channel 1013	Channel 1175

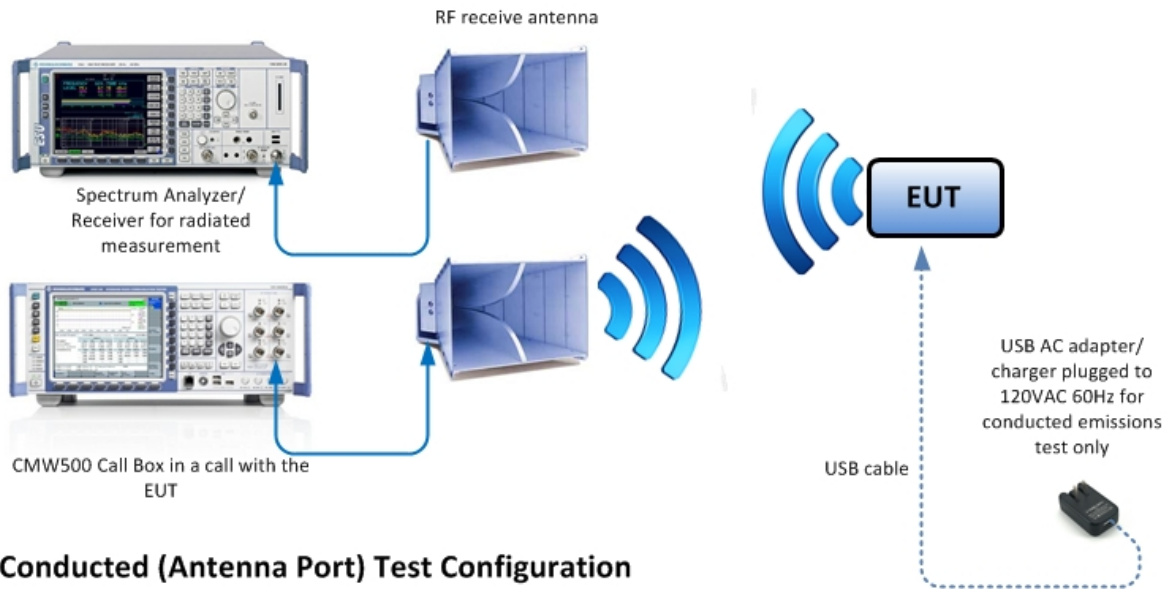
- CDMA2000 1xRTT signalling configuration is SO2 (Loopback), Radio Configuration (Forward/Reverse) of 3/3 H-PSK. Expected Power Mode at Max. Power.
- CDMA2000 1xEvDO signalling configuration is NR (Network Release) Release 0 Physical Layer Subtype 0/1, Application is Reverse Test (RTAP), Min and Max Data Channel Rate is 9.6 kbit/s. Expected Power Mode at Max. Power.

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

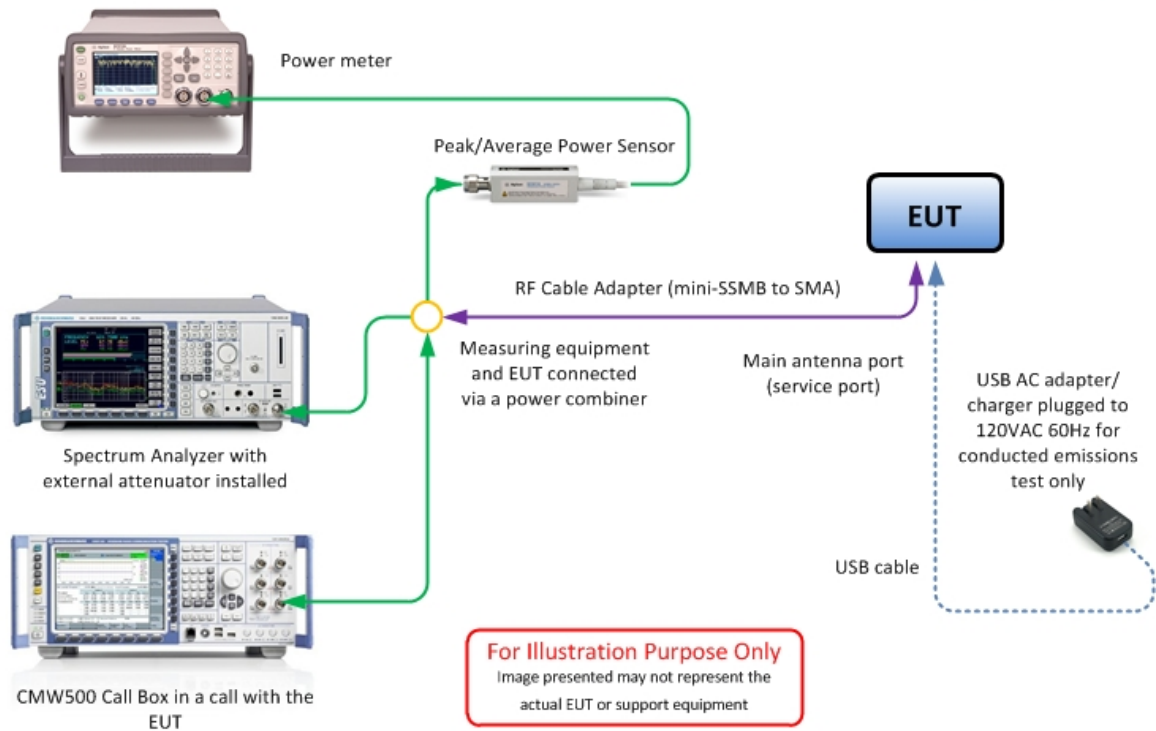


1.4.5 Simplified Test Configuration Diagram

Radiated Test Configuration/Conducted Emissions Test Configuration



Conducted (Antenna Port) Test Configuration



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 UB010912700038		
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.: US5296

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.498 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US5296.

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 CDMA Emission Designator

Emission Designator = 1M30F9W
 F = Frequency Modulation
 9= Composite Digital Info
 W = Combination (Audio/Data)

1.9.2 Spurious Radiated Emission (below 1GHz)

Measuring equipment raw measurement (dBµV/m) @ 30 MHz		24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3
	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

1.9.3 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 verified as a requirement for compliance with ANSI/IEEE Std. C95.1-1992.

2.1.3 Equipment Under Test and Modification State

Verification performed by RF Exposure Labs

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

See SAR report #: 20121001 (RF Exposure Labs)

2.1.5 Test Equipment Used

See SAR report #: 20121001 (RF Exposure Labs)

2.1.6 Additional Observations

The following data were taken directly from the SAR report.

2.1.7 Test Results

See attached table. These are the Conducted port measurements as 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.

		IS-2000	1Xev-Do Rev. 0	1Xev-Do Rev. A Subtype 0/1
	Channel	TDSO SO32 RC3	RTAP (dBm)	RTAP (dBm)
Cellular	1013	24.47	24.46	24.46
	384	24.49	24.46	24.44
	777	24.48	24.46	24.42
PCS	25	24.44	24.42	24.46
	600	24.44	24.33	24.45
	1175	24.49	24.35	24.48

2.2 EFFECTIVE RADIATED POWER

2.2.1 Specification Reference

Part 22 Subpart H §22.913(a)(2)

2.2.2 Standard Applicable

The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

2.2.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration B

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

October 21, 2012/FSC

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	22.6°C
Relative Humidity	55.6%
ATM Pressure	99.0 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).
- Worst case configuration presented. See Section 1.4.4 of this test report for details.

2.2.8 Test Results

See attached table.

CDMA2000							
Frequency (MHz)	Measured Level (dBμV/m)	Substitute Level (dBm)	Pol (H/V)	ERP (dBm)	ERP (Watts)	ERP Limit (dBm)	Margin (dB)
824.70	123.9	27.77	H	25.62	0.365	38.45	12.83
836.52	123.8	27.83	H	25.68	0.370	38.45	12.77
848.31	122.3	26.34	H	24.19	0.262	38.45	14.26

1xEV-DO							
Frequency (MHz)	Measured Level (dBμV/m)	Substitute Level (dBm)	Pol (H/V)	ERP (dBm)	ERP (Watts)	ERP Limit (dBm)	Margin (dB)
824.70	123.6	27.47	H	25.32	0.340	38.45	13.13
836.52	123.9	27.77	H	25.62	0.365	38.45	12.83
848.31	123.9	27.77	H	25.62	0.365	38.45	12.83

2.3 EQUIVALENT ISOTROPIC RADIATED POWER

2.3.1 Specification Reference

Part 24 Subpart E §24.232(c)

2.3.2 Standard Applicable

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

2.3.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration B

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

October 21, 2012/FSC

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	22.6°C
Relative Humidity	55.6%
ATM Pressure	99.0 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.
- Worst case configuration presented. See Section 1.4.4 of this test report for details..

2.3.8 Test Results

See attached table.

CDMA2000							
Frequency (MHz)	Measured Level (dB μ V/m)	Substitute Level (dBm)	Pol (H/V)	EIRP (dBm)	EIRP (Watts)	EIRP Limit (Watts)	Margin (Watts)
1851.25	124.636	26.48	H	26.48	0.445	2	1.550
1880.00	124.430	26.24	H	26.24	0.421	2	1.579
1908.75	123.509	25.31	H	25.31	0.340	2	1.660

1xEV-DO							
Frequency (MHz)	Measured Level (dB μ V/m)	Substitute Level (dBm)	Pol (H/V)	EIRP (dBm)	EIRP (Watts)	EIRP Limit (Watts)	Margin (Watts)
1851.25	126.222	28.06	H	28.06	0.640	2	1.360
1880.00	125.845	27.66	H	27.66	0.583	2	1.417
1908.75	123.499	25.30	H	25.30	0.339	2	1.661

2.4 OCCUPIED BANDWIDTH

2.4.1 Specification Reference

Part 22 Subpart H §22.917(b) and Part 24 Subpart E §24.238(b)

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: UB010912700038 / Test Configuration C

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

October 16, 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	22.7°C
Relative Humidity	45.5%
ATM Pressure	99.9 kPa

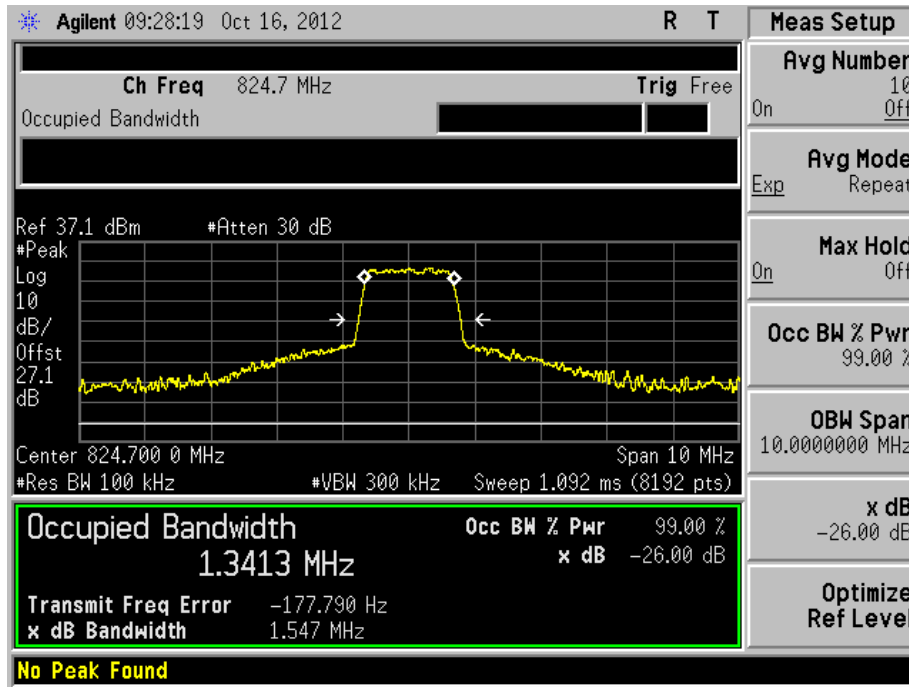
2.4.7 Additional Observations

- This is a conducted test. Both 26dB bandwidth and 99% bandwidth presented.
- All channels for emission bandwidth verification verified.
- The RBW is set to 1% of the span while the VBW is 3X RBW.
- Only worst case configuration presented (see Section 1.4.4 of this test report for details).
- The SA built-in emission bandwidth measurement feature is utilized. The power level setting is set to 99% while "x dB" is set to -26.

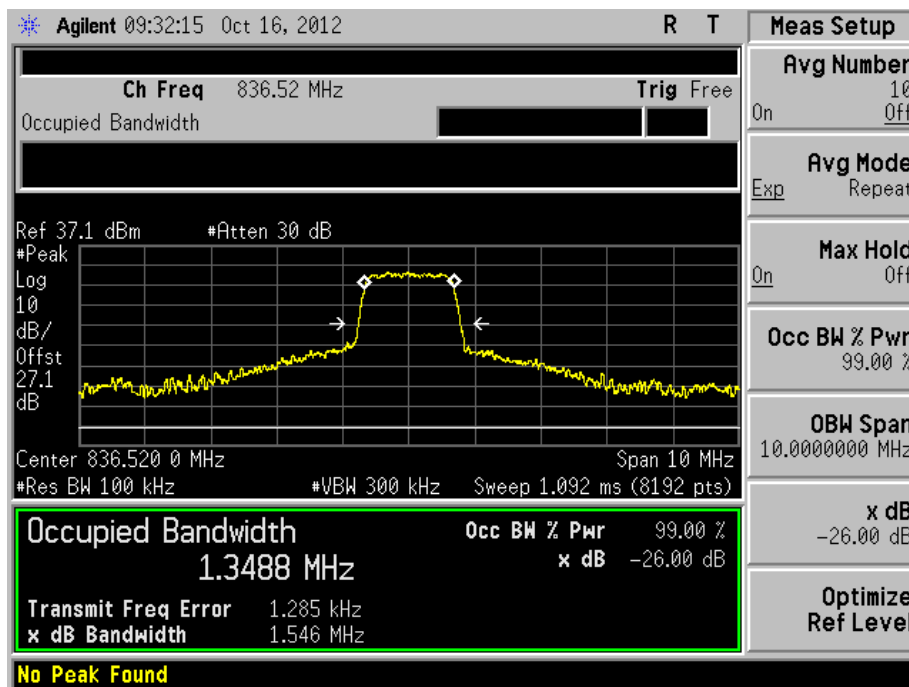
2.4.8 Test Results

See attached plots.

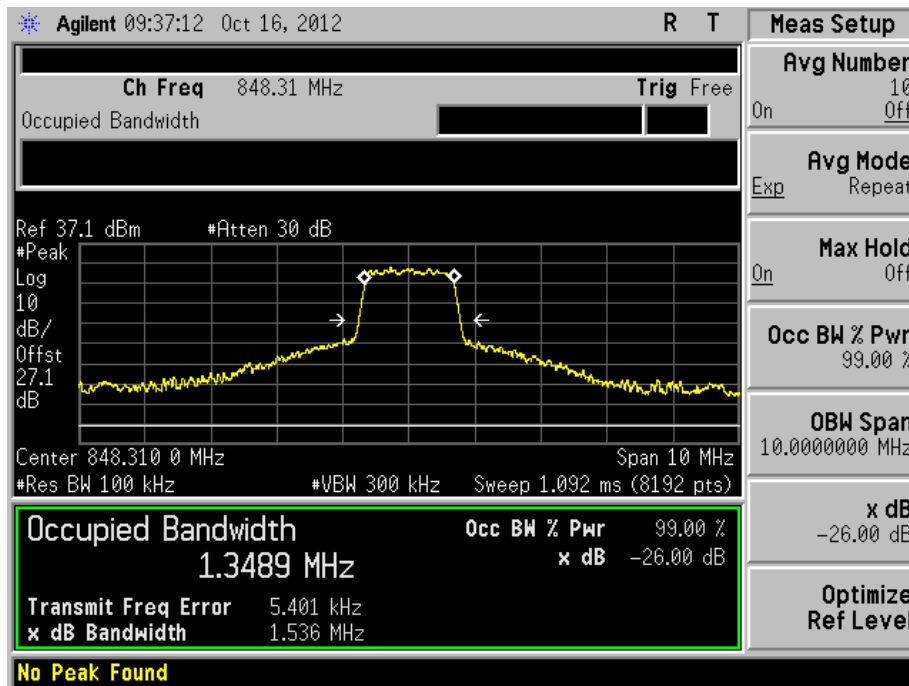
CDMA2000-1xRTT Cell Band Low Channel -26dB BW/99% OBW



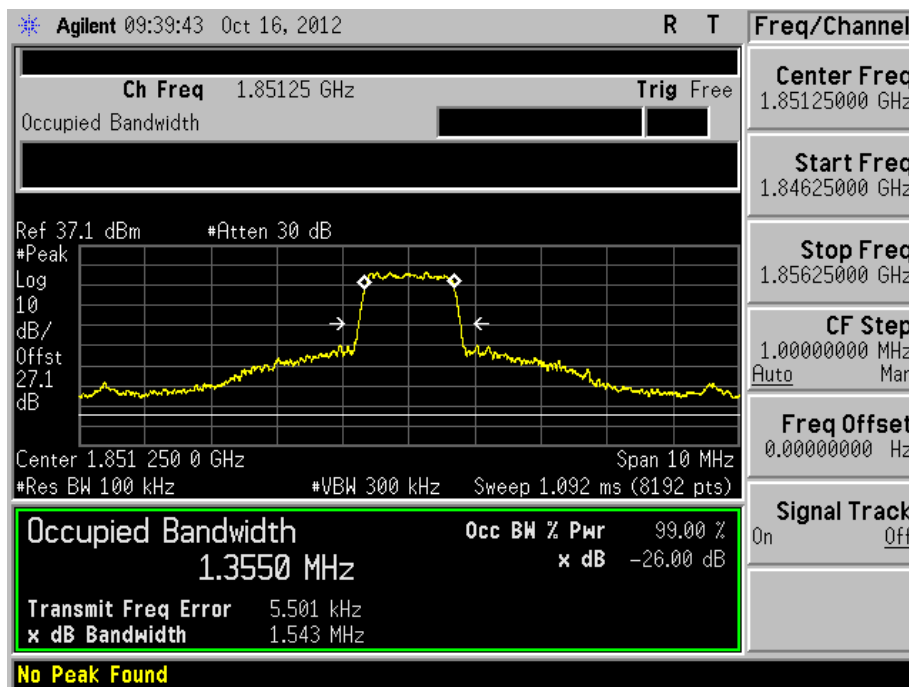
CDMA2000-1xRTT Cell Band Low Channel -26dB BW/99% OBW



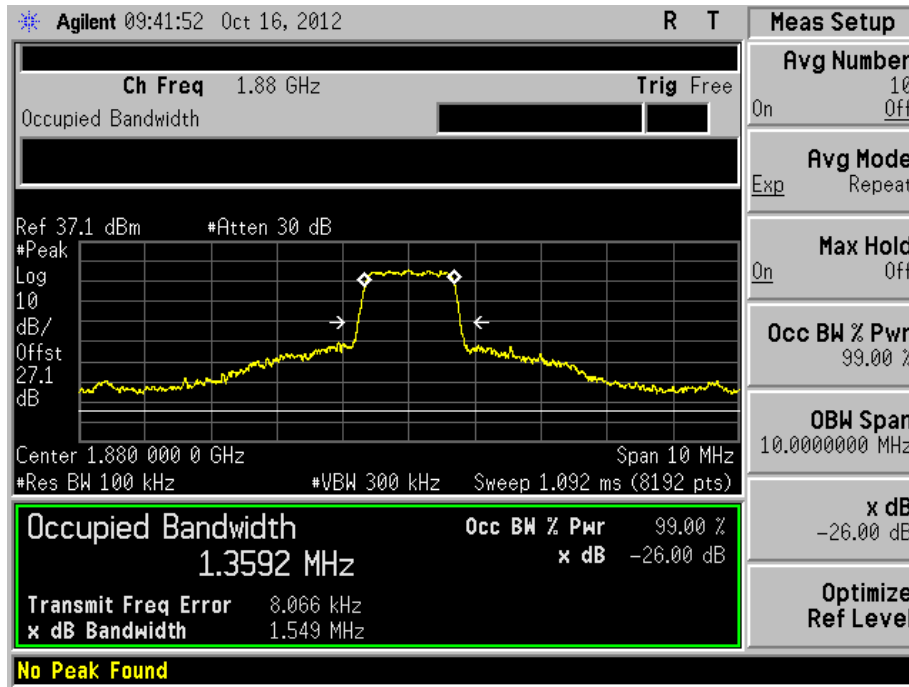
CDMA2000-1xRTT Cell Band High Channel -26dB BW/99% OBW



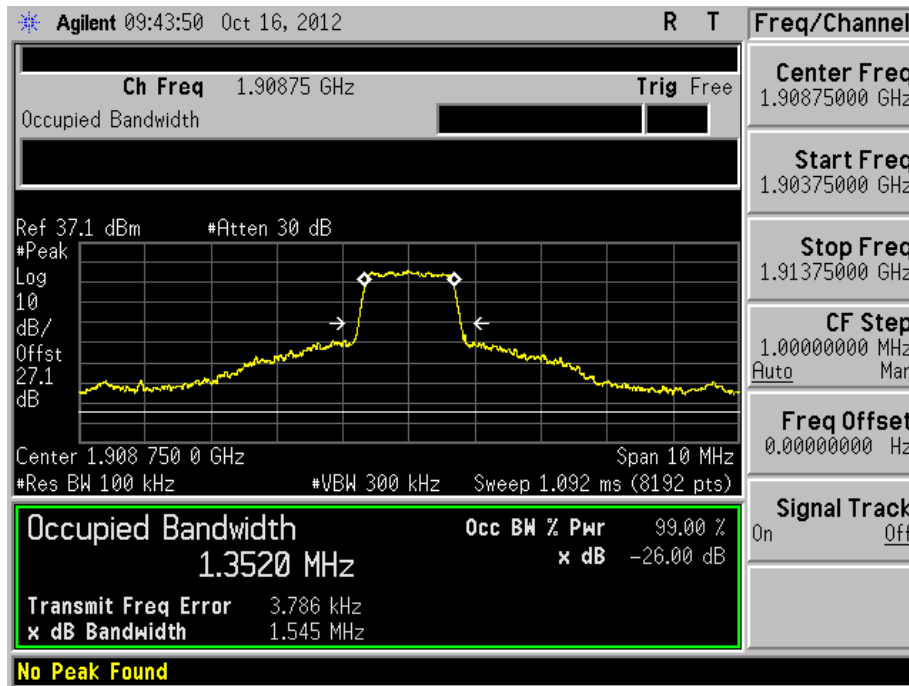
CDMA2000-1xRTT PCS Band Low Channel -26dB BW/99% OBW



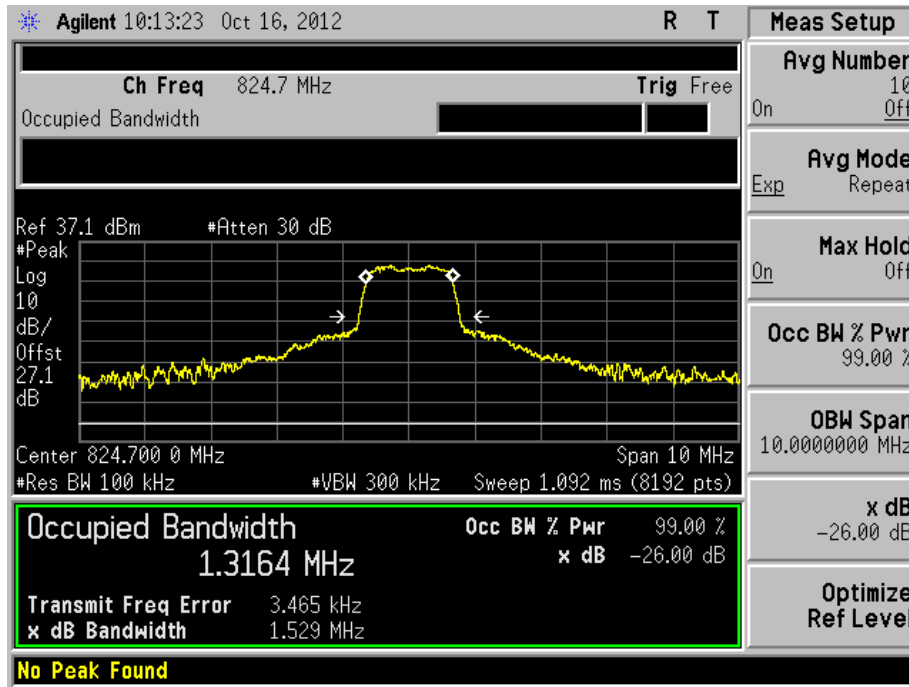
CDMA2000-1xRTT PCS Band Mid Channel -26dB BW/99% OBW



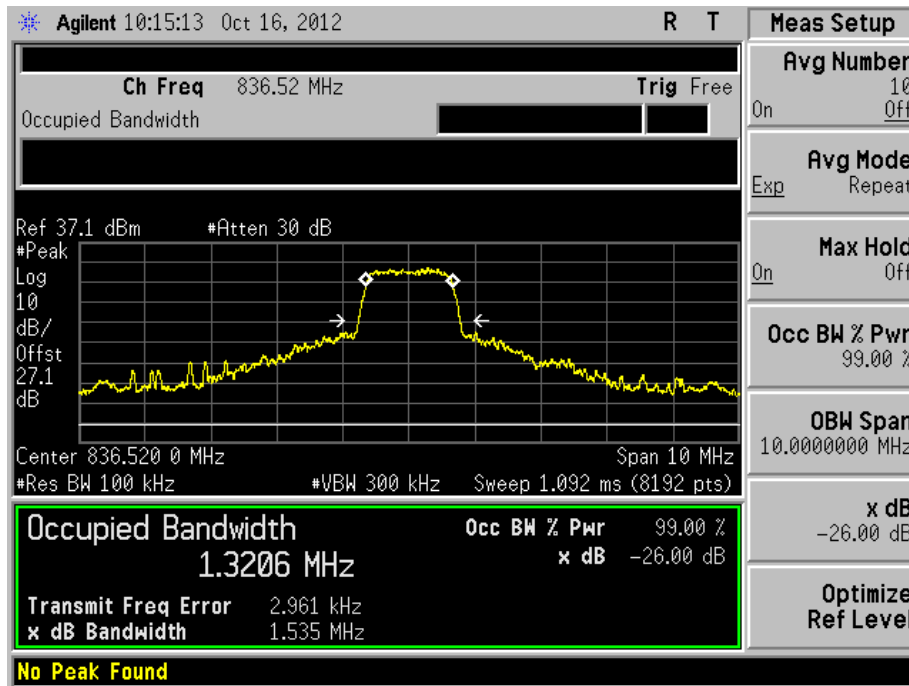
CDMA2000-1xRTT PCS Band High Channel -26dB BW/99% OBW



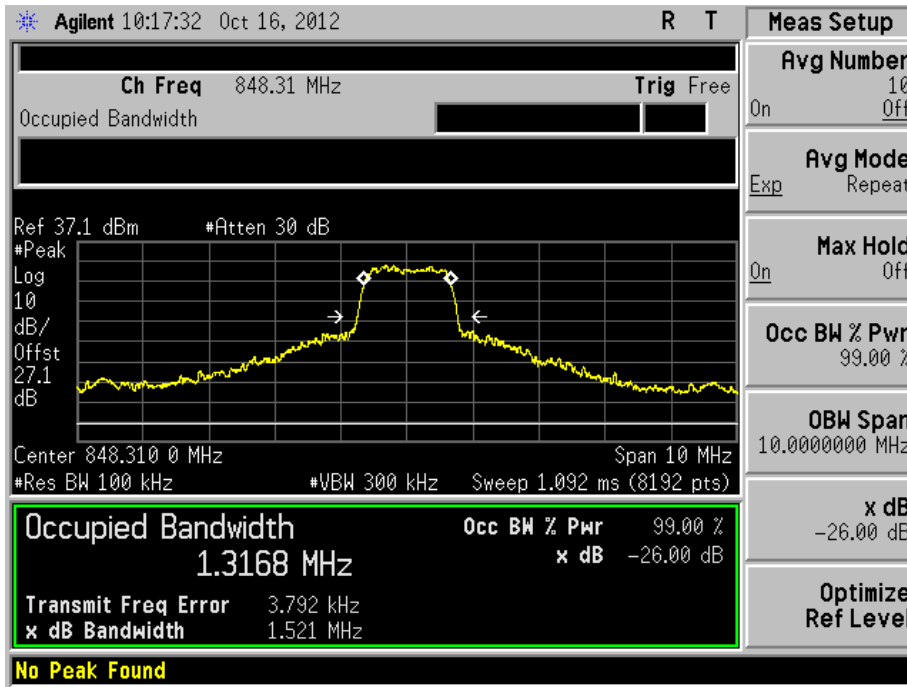
CDMA2000-1xEvDO Cell Band Low Channel -26dB BW/99% OBW



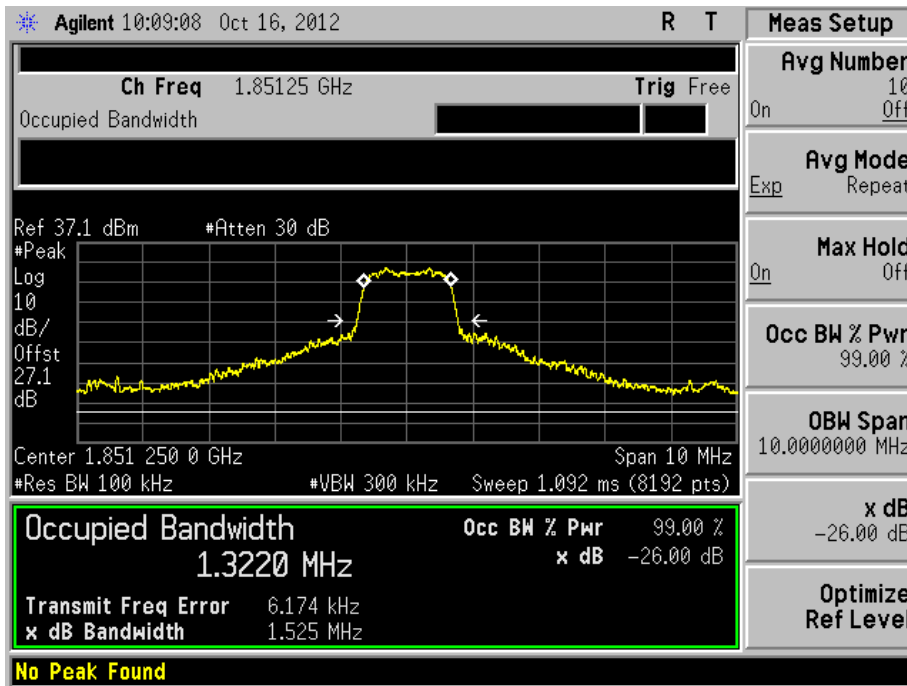
CDMA2000-1xEvDO Cell Band Mid Channel -26dB BW/99% OBW



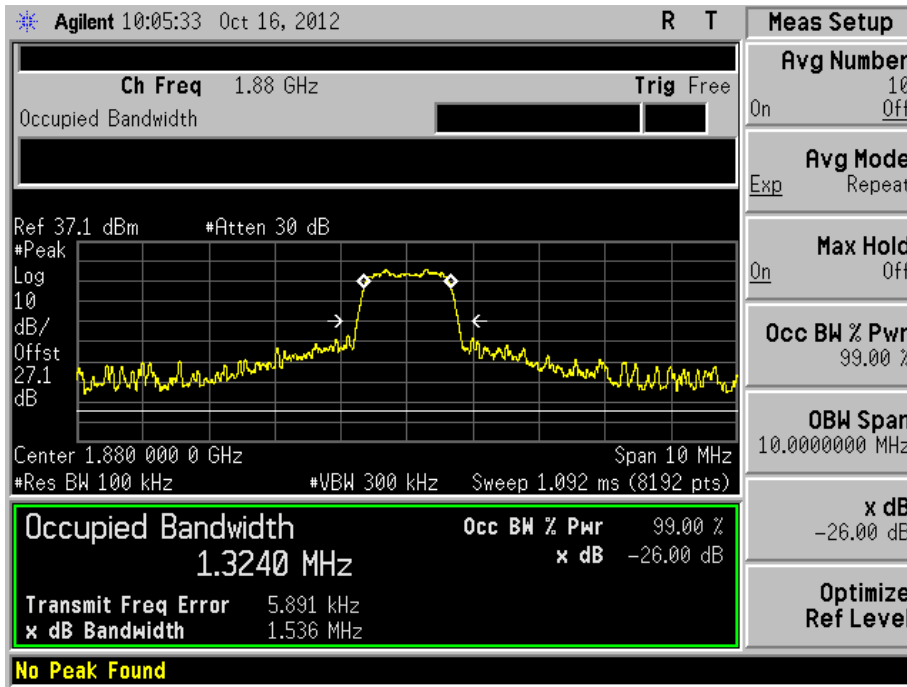
CDMA2000-1xEvDO Cell Band High Channel -26dB BW/99% OBW



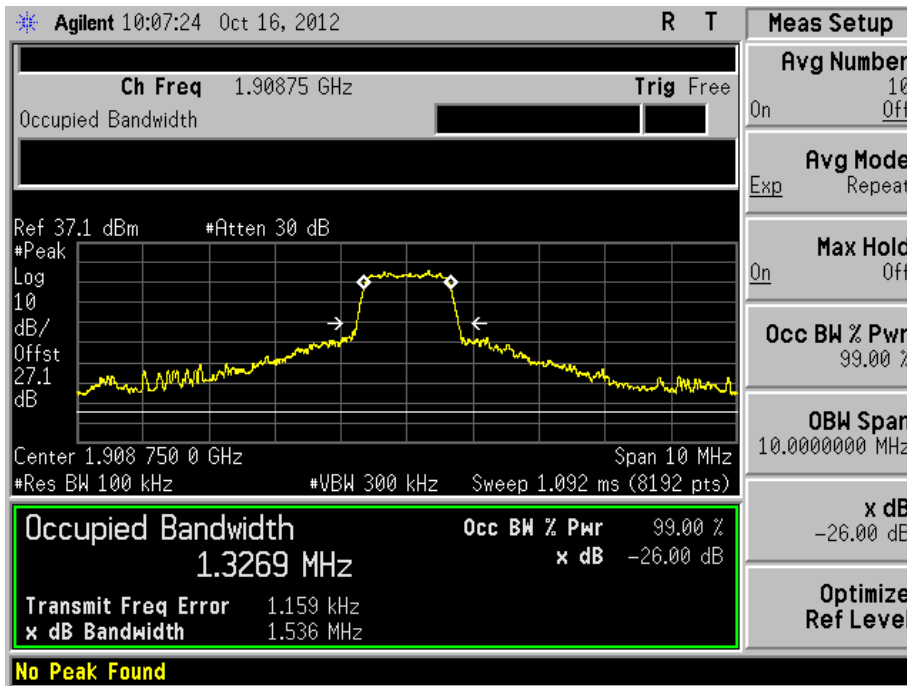
CDMA2000-1xEvDO PCS Band Low Channel -26dB BW/99% OBW



CDMA2000-1xEvDO PCS Band Mid Channel -26dB BW/99% OBW



CDMA2000-1xEvDO PCS Band High Channel -26dB BW/99% OBW



2.5 PEAK-AVERAGE RATIO

2.5.1 Specification Reference

Part 24 Subpart E §24.232(d)

2.5.2 Standard Applicable

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 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. 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: UB010912700038 / Test Configuration C

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

October 16, 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	22.7°C
Relative Humidity	45.5%
ATM Pressure	99.9 kPa

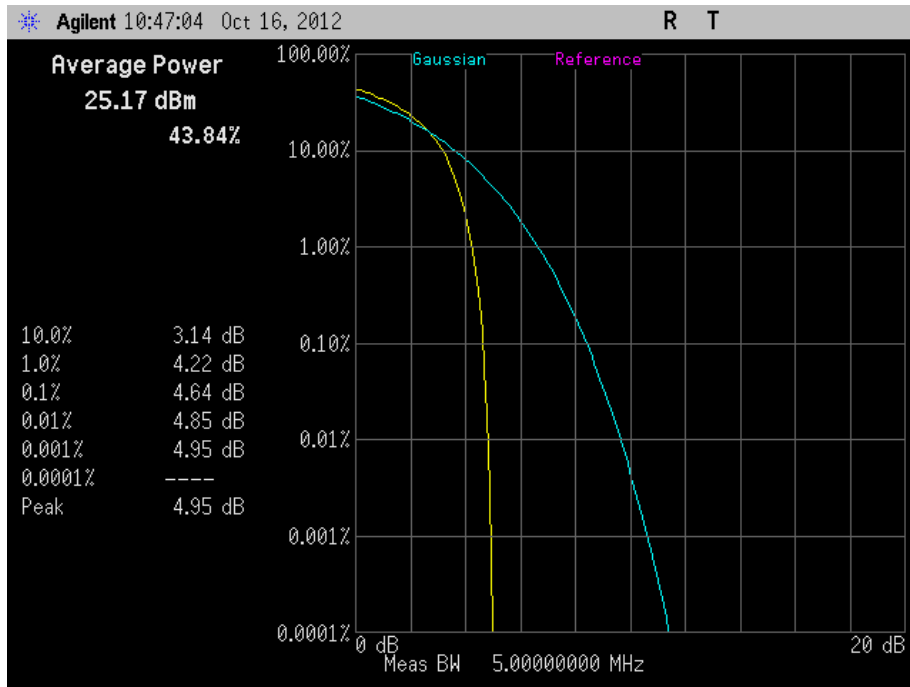
2.5.7 Additional Observations

- This is a conducted test. Test procedure is per Section 6.0 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) The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signals spends at or above the level defines the probability for that particular power level.
- All channels based from worst case configuration were verified.
- There are no measured PAR levels greater than 13dB. EUT complies.

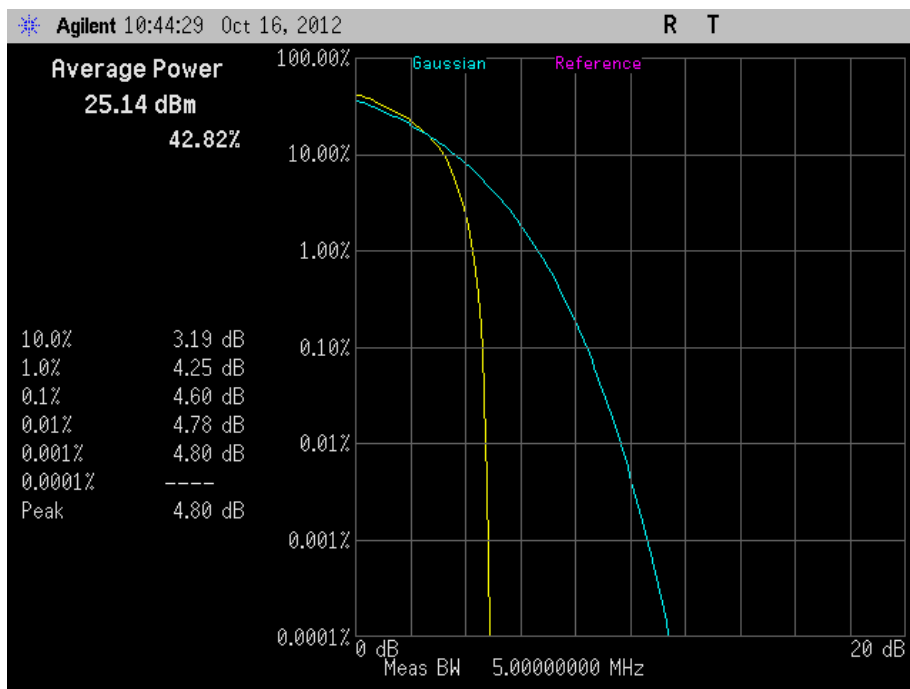
2.5.8 Test Results

See attached plots.

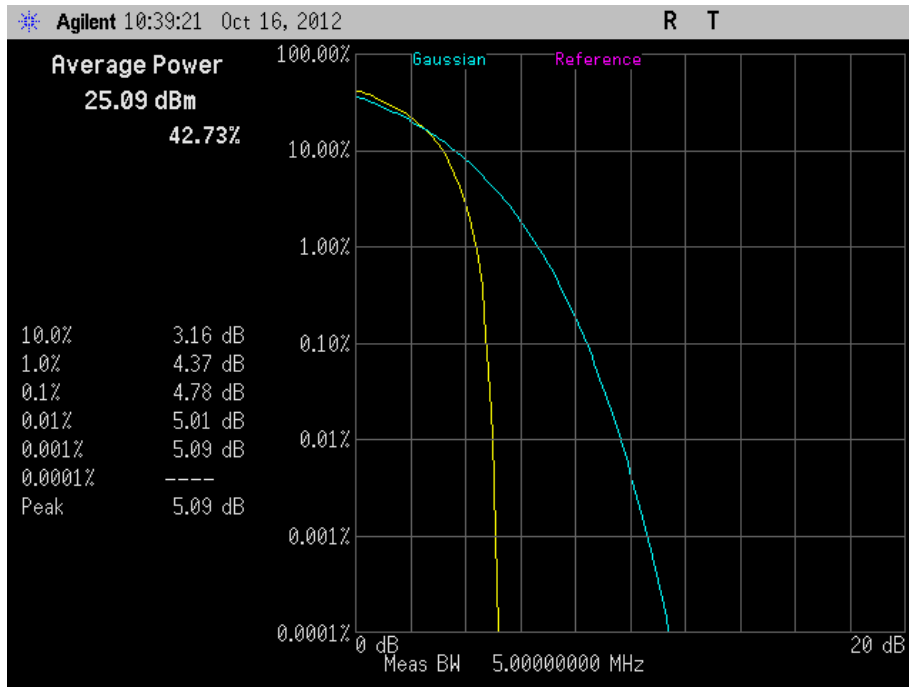
CDMA2000-1xEvDO Cell Band Low Channel -PAR



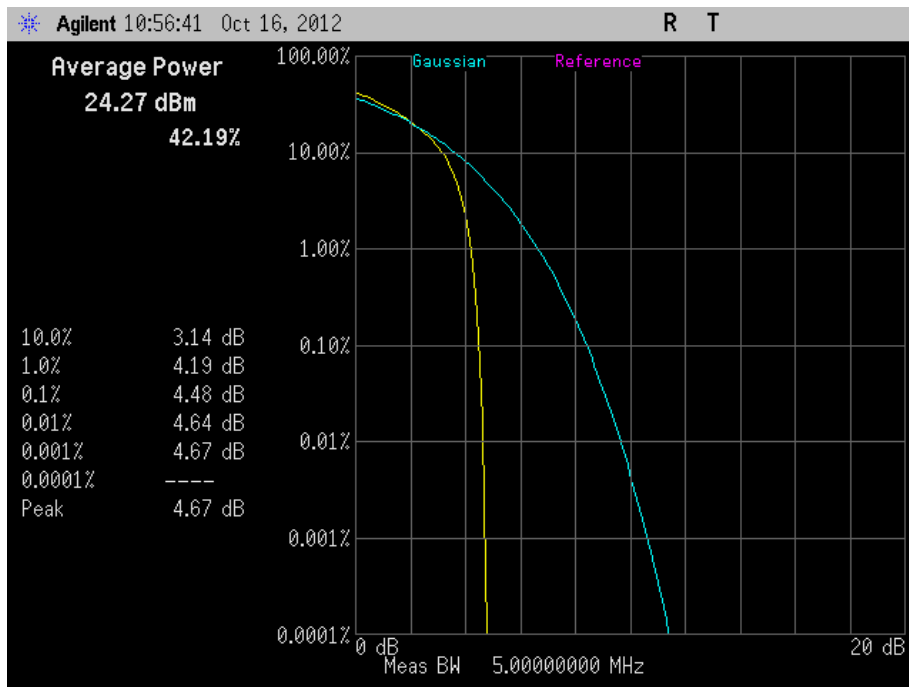
CDMA2000-1xEvDO Cell Band Mid Channel -PAR



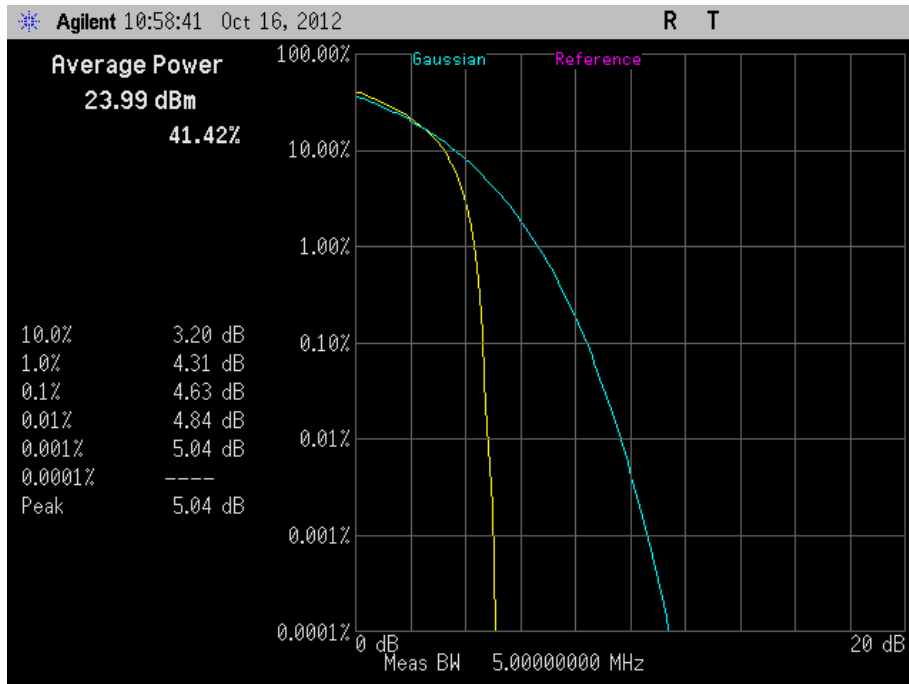
CDMA2000-1xEvDO Cell Band High Channel -PAR



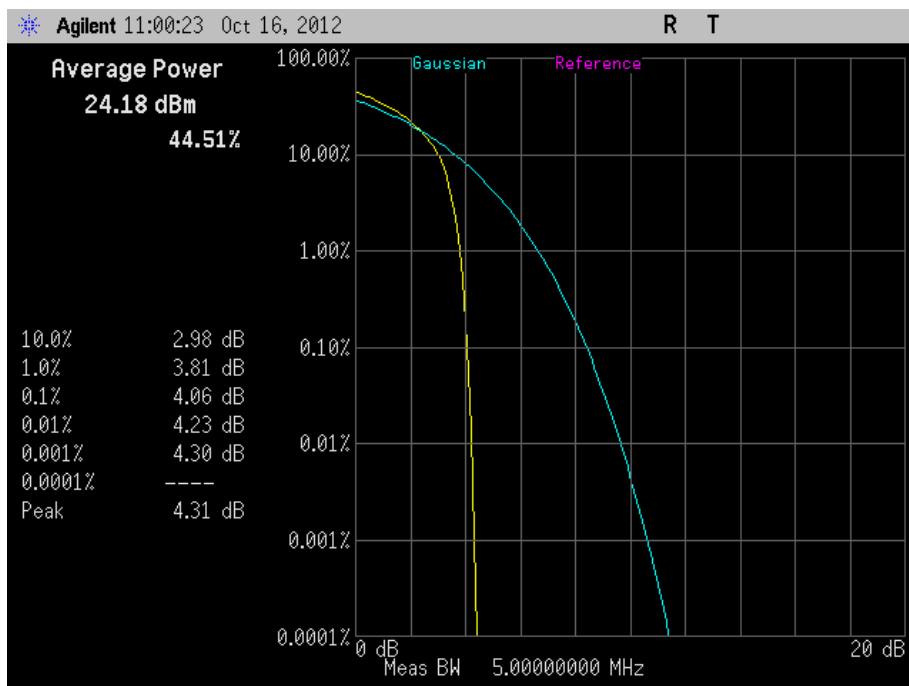
CDMA2000-1xEvDO PCS Band Low Channel -PAR



CDMA2000-1xEvDO PCS Band Mid Channel -PAR



CDMA2000-1xEvDO PCS Band High Channel -PAR



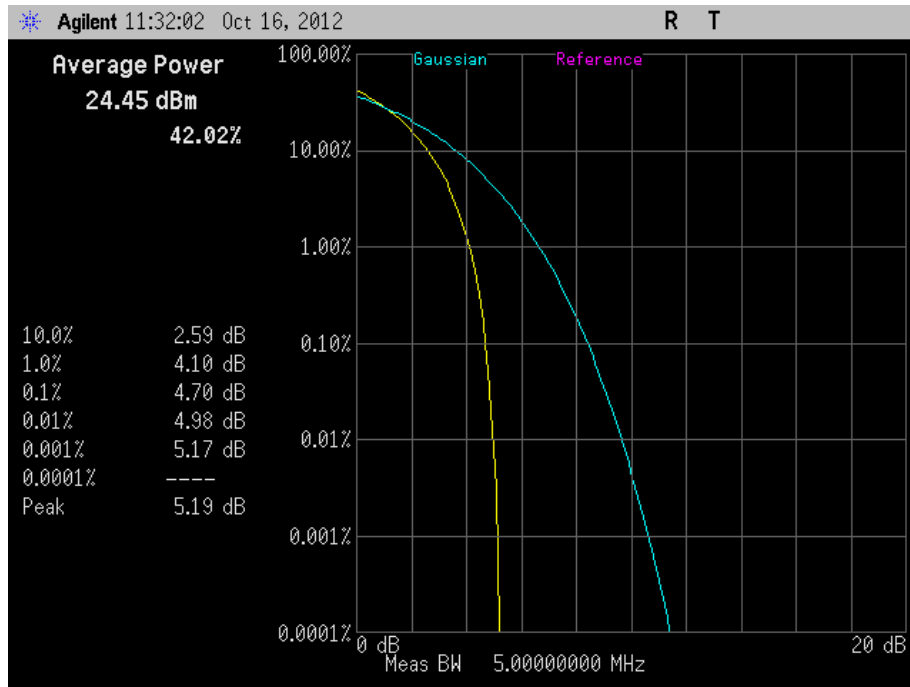
CDMA2000-1xRTT Cell Band Low Channel -PAR



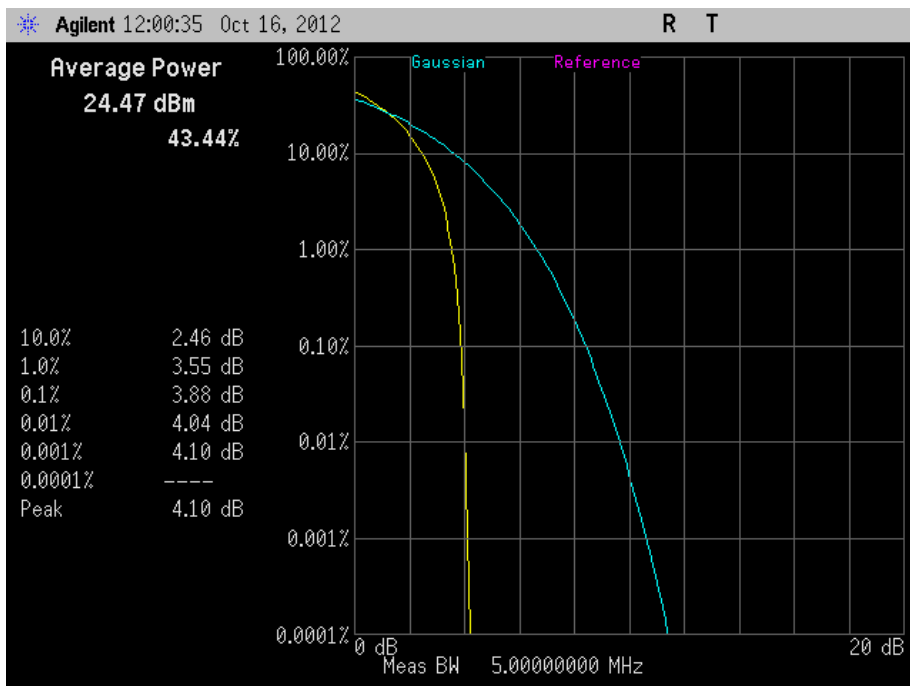
CDMA2000-1xRTT Cell Band Mid Channel -PAR



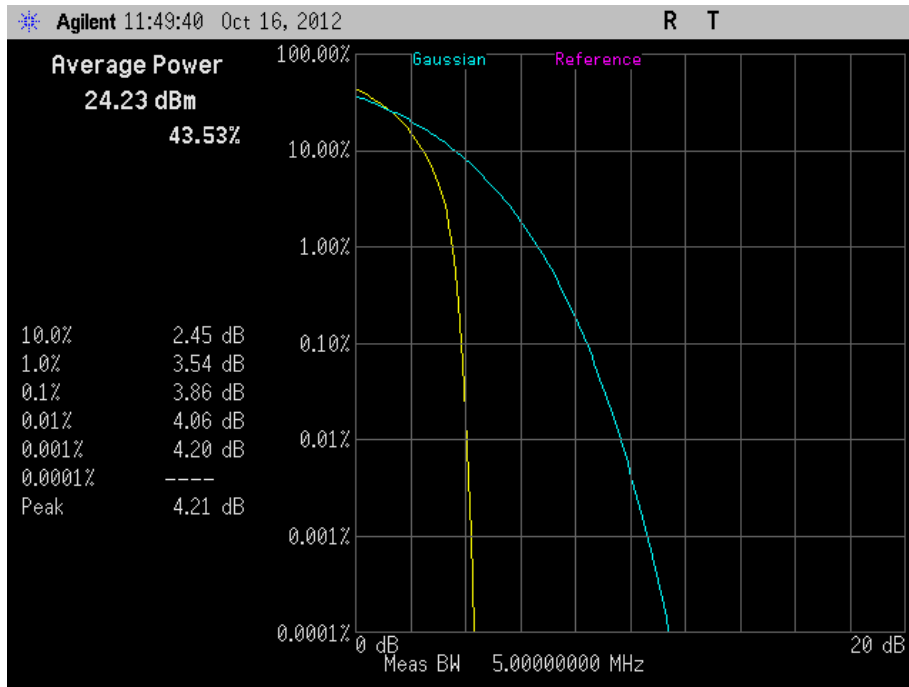
CDMA2000-1xRTT Cell Band High Channel -PAR



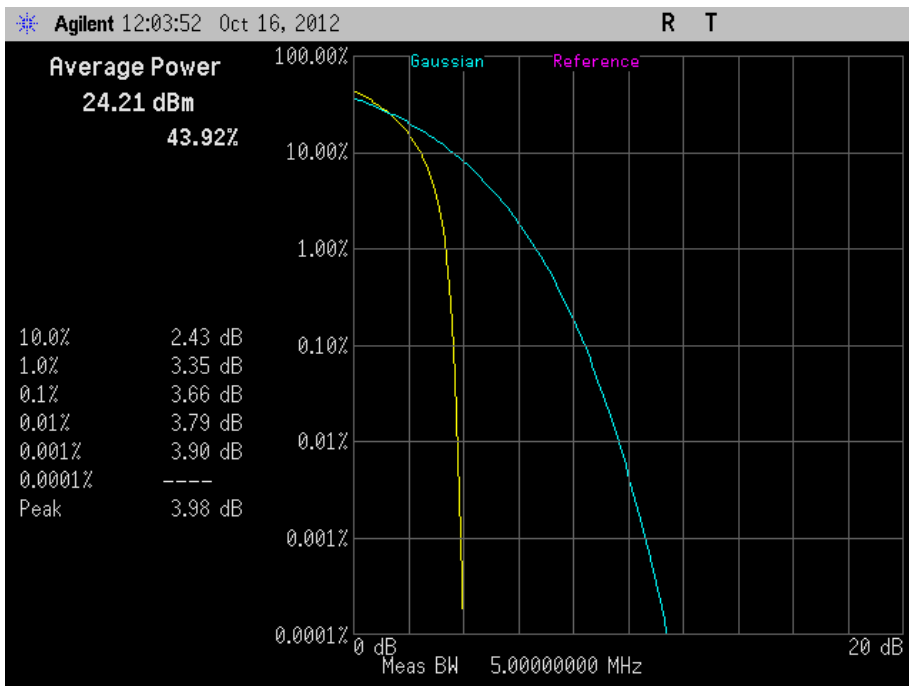
CDMA2000-1xRTT PCS Band Low Channel -PAR



CDMA2000-1xRTT PCS Band Mid Channel -PAR



CDMA2000-1xRTT PCS Band High Channel -PAR



2.6 BAND EDGE/CONDUCTED SPURIOUS EMISSIONS

2.6.1 Specification Reference

Part 22 Subpart H §22.917(a) and Part 24 Subpart E §24.238(a)

2.6.2 Standard Applicable

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

2.6.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration C

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

October 16, 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	22.7°C
Relative Humidity	45.5%
ATM Pressure	99.9 kPa

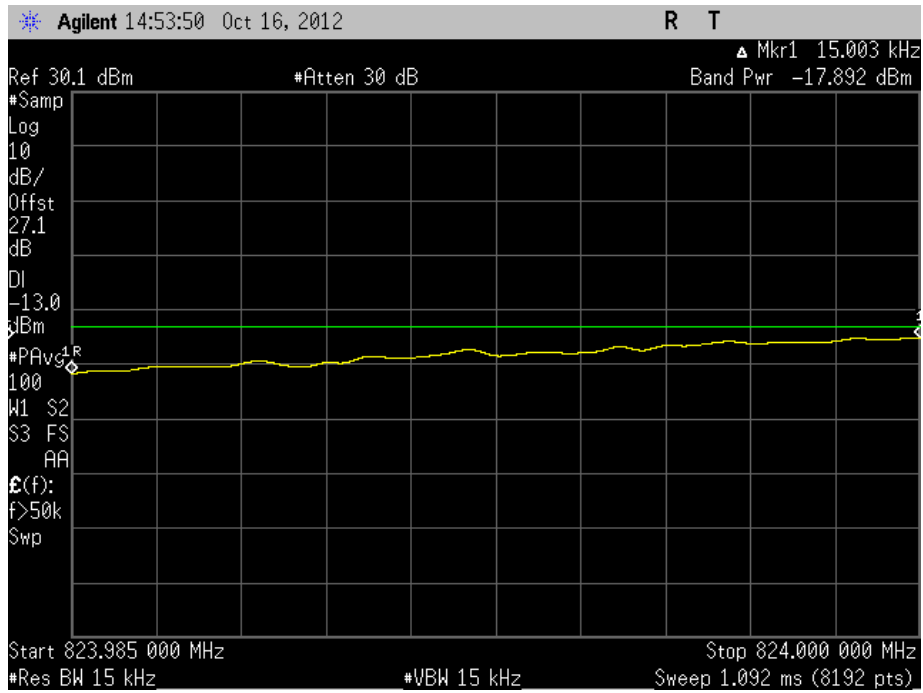
2.6.7 Additional Observations

- This is a conducted test.
- The 27.1dB offset is from the power splitter, external attenuator and cable used.
- For band edge measurements, set RBW to 1% of the span.
- For both band edge and out of band emissions, set the limit to -13dBm.
- Only worst case configuration for all technologies presented in this test report.
- Band power was integrated over 1% of OBW for cellular band edge measurements.

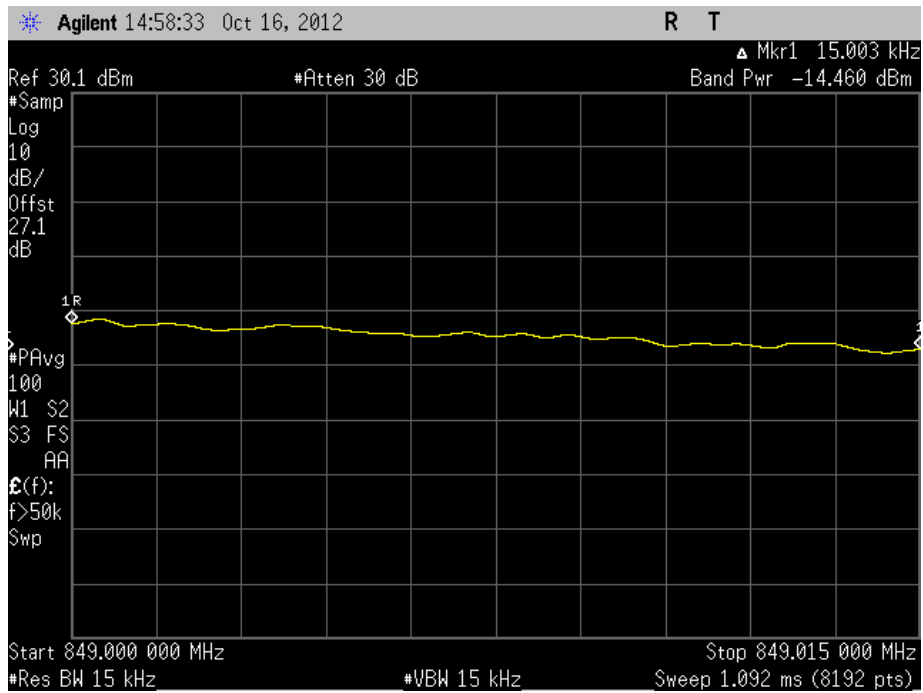
2.6.8 Test Results

See attached plots.

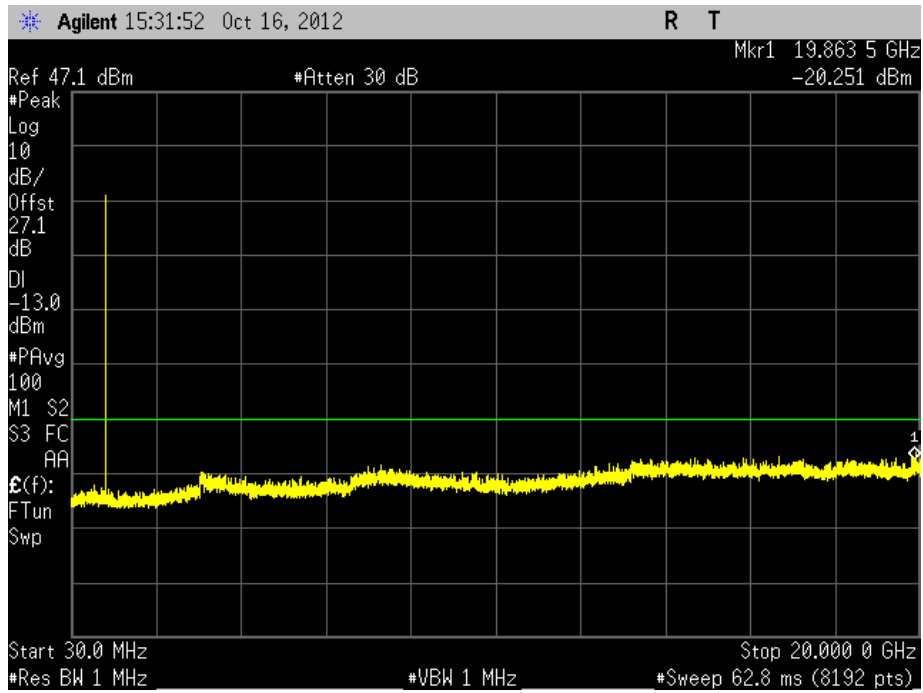
CDMA2000-1xRTT Cell Band Edge @ 824MHz



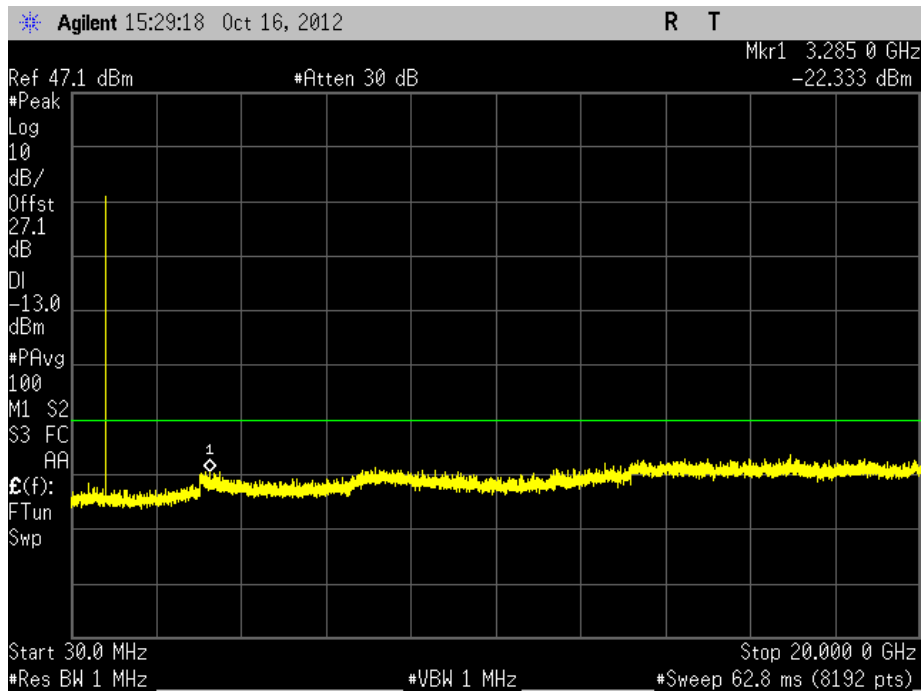
CDMA2000-1xRTT Cell Band Edge @ 849MHz



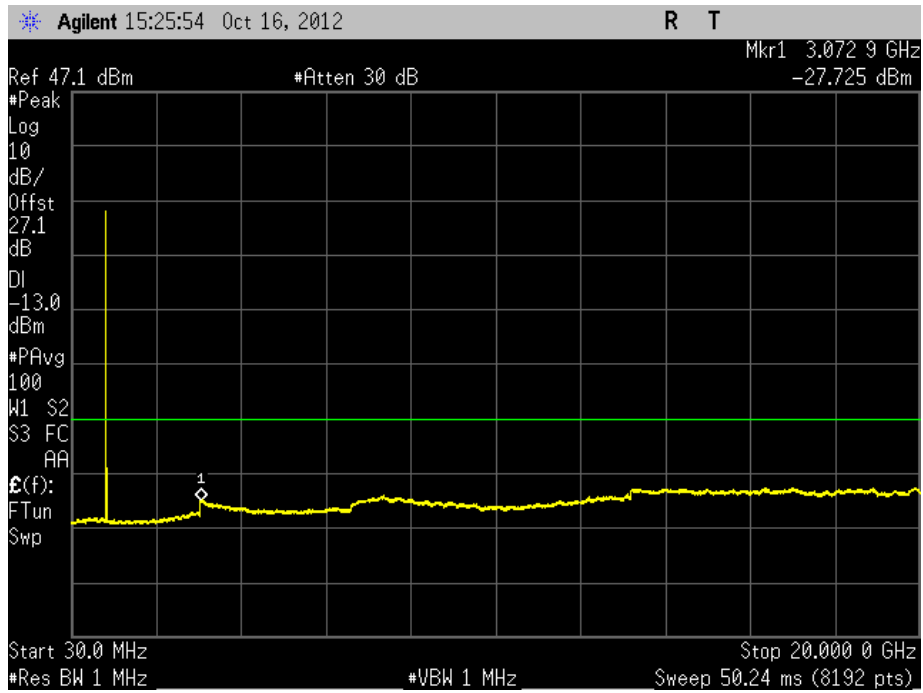
CDMA2000-1xRTT Cell Low Channel 30MHz to 20GHz Conducted Spurious Plot



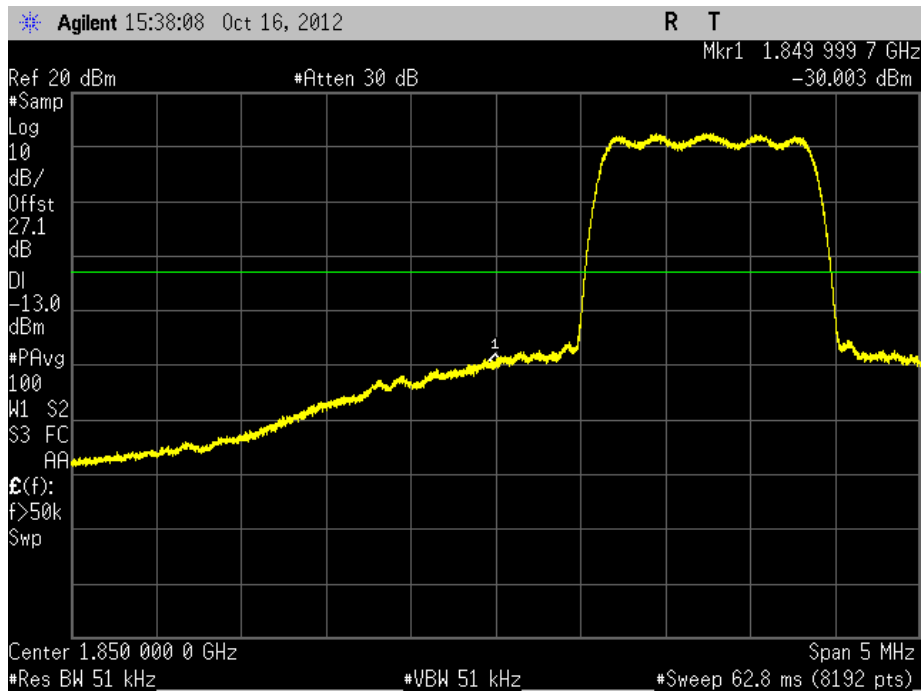
CDMA2000-1xRTT Cell Mid Channel 30MHz to 20GHz Conducted Spurious Plot



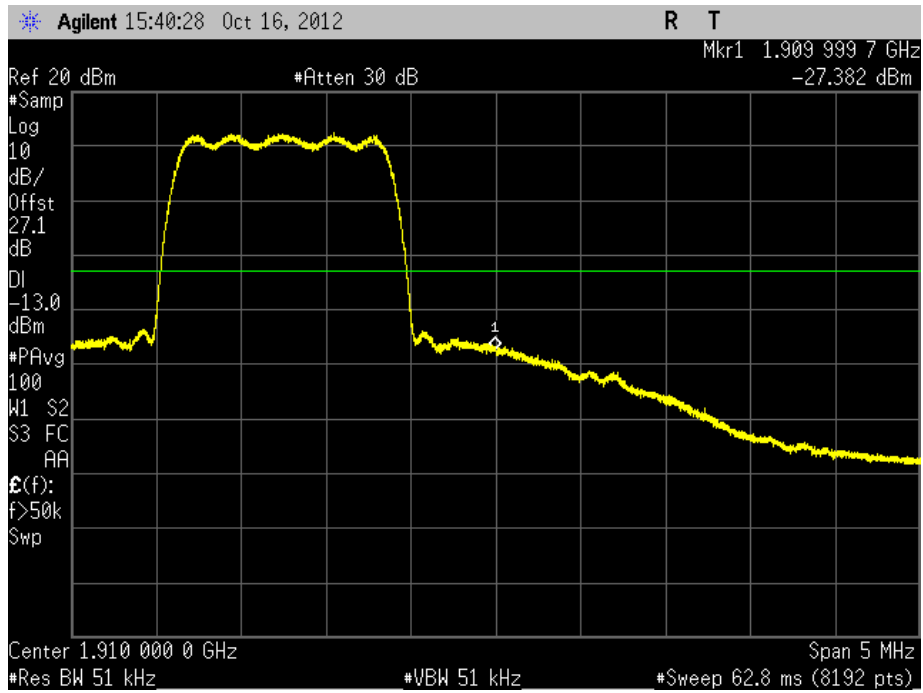
CDMA2000-1xRTT Cell High Channel 30MHz to 20GHz Conducted Spurious Plot



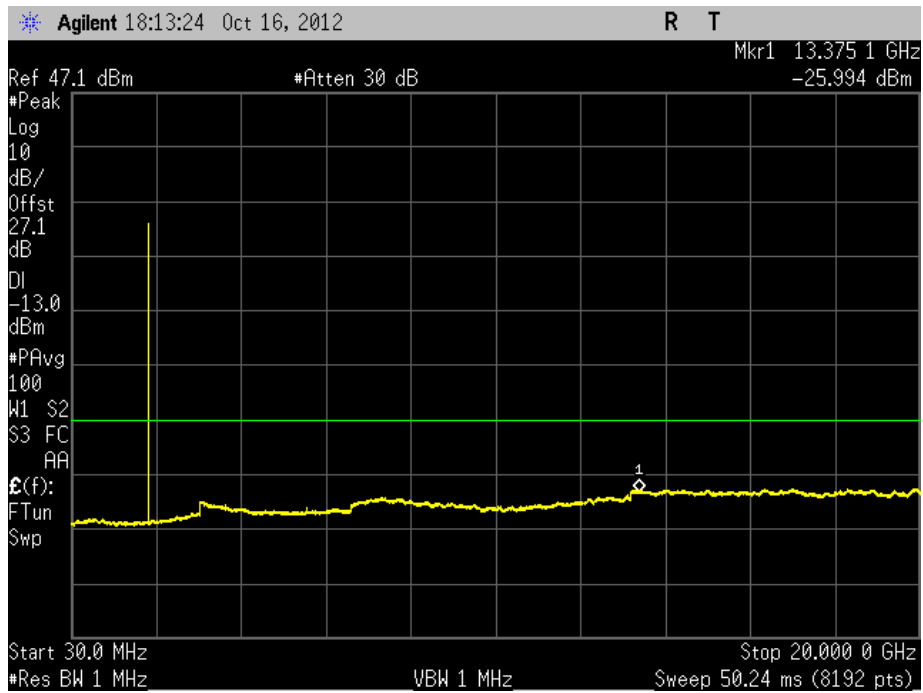
CDMA2000-1xRTT PCS Band Edge @ 1850MHz



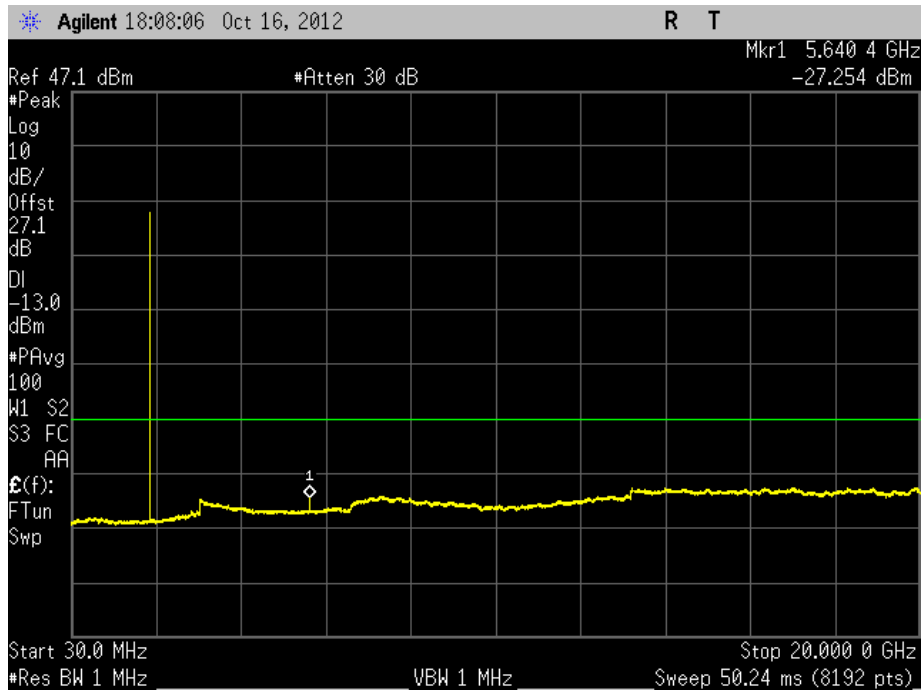
CDMA2000-1xRTT PCS Band Edge @ 1910MHz



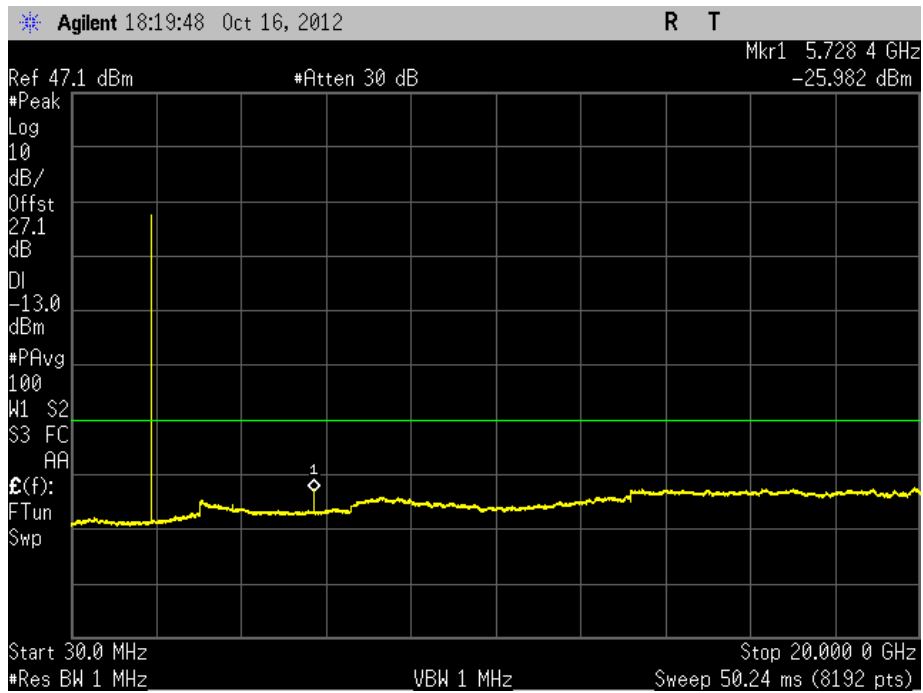
CDMA2000-1xRTT PCS Low Channel 30MHz to 20GHz Conducted Spurious Plot



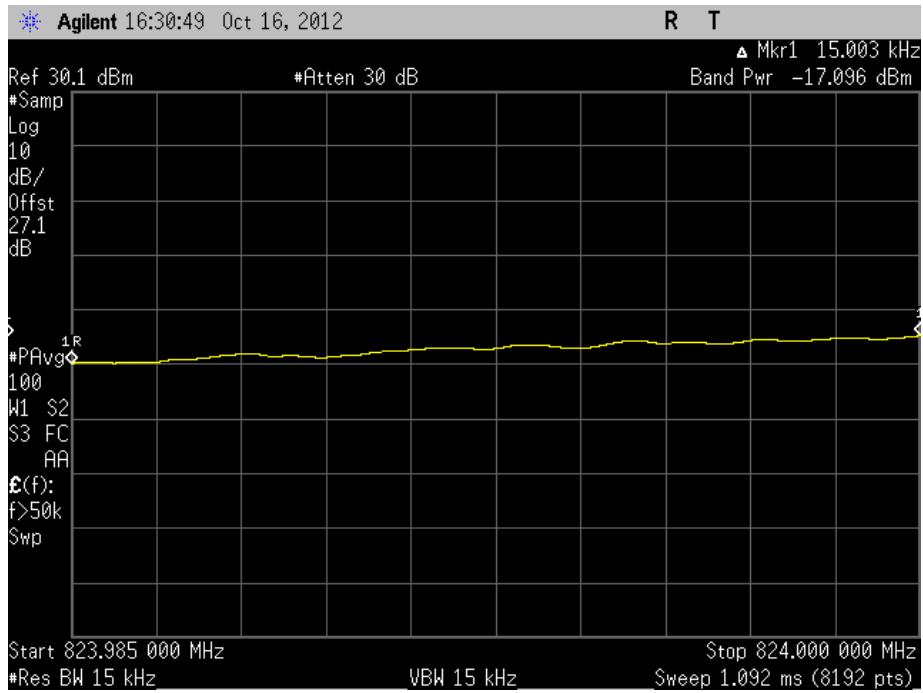
CDMA2000-1xRTT PCS Mid Channel 30MHz to 20GHz Conducted Spurious Plot



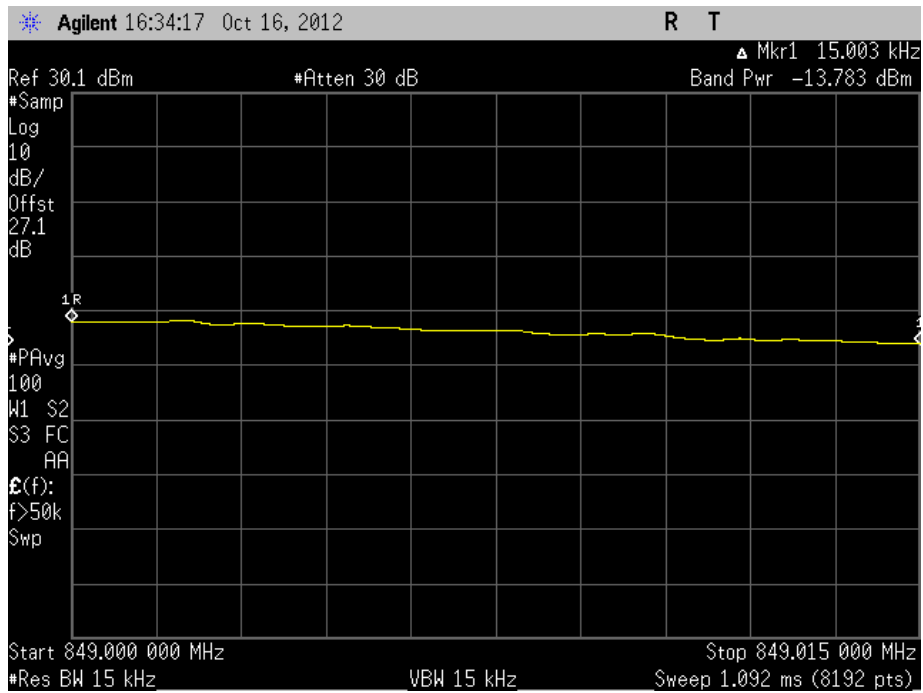
CDMA2000-1xRTT PCS High Channel 30MHz to 20GHz Conducted Spurious Plot



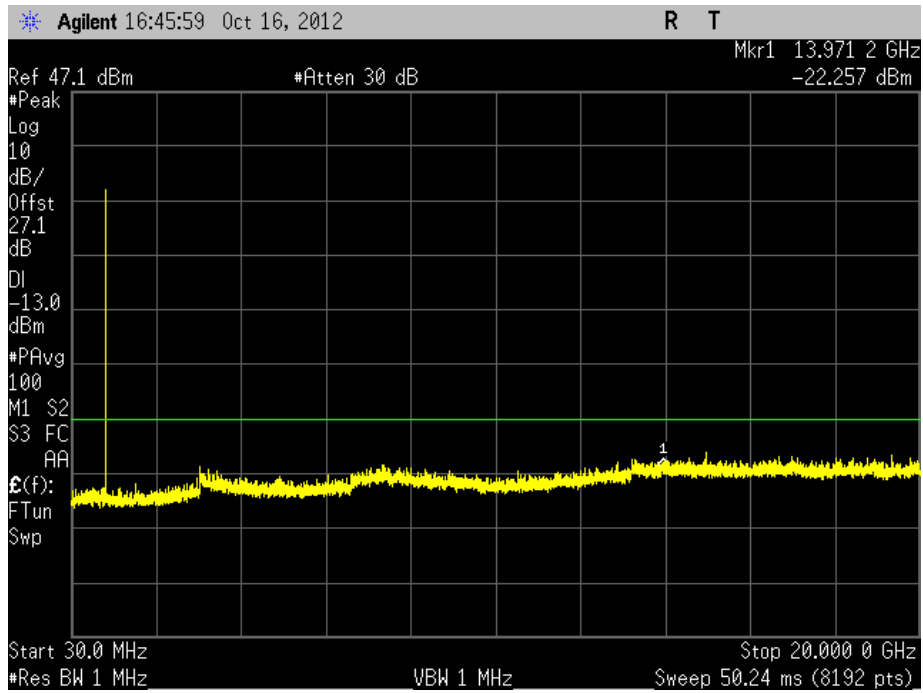
CDMA2000-1xEvDO Cell Band Edge @ 824MHz



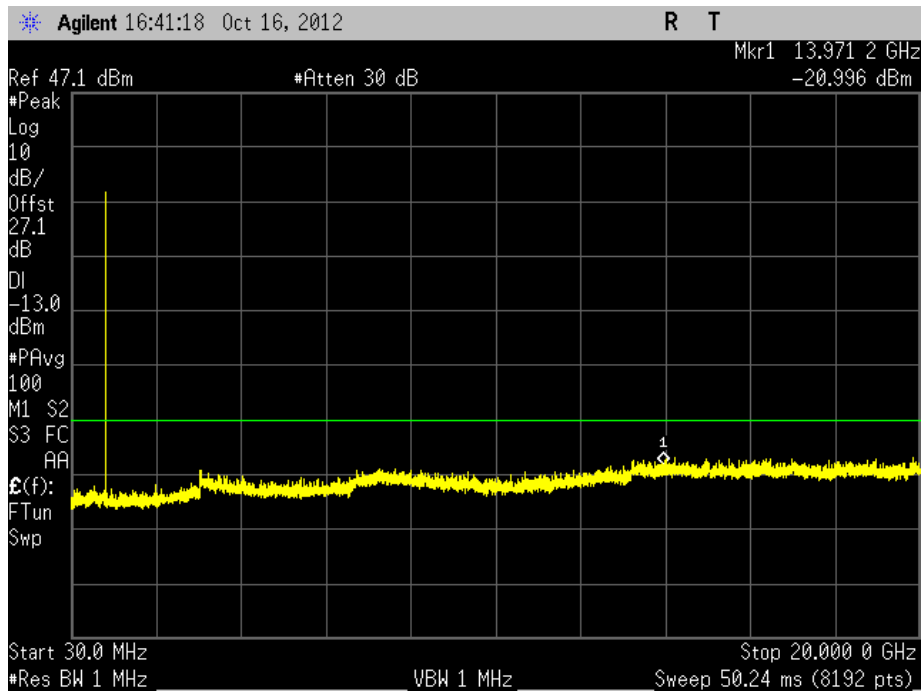
CDMA2000-1xEvDO Cell Band Edge @ 849MHz



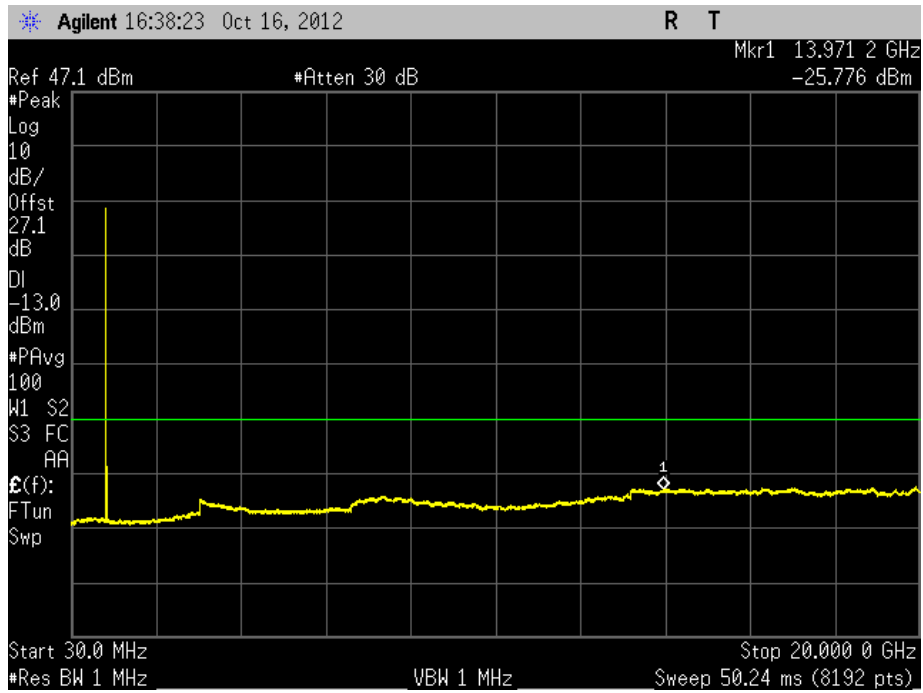
CDMA2000-1xEVDO Cell Low Channel 30MHz to 20GHz Conducted Spurious Plot



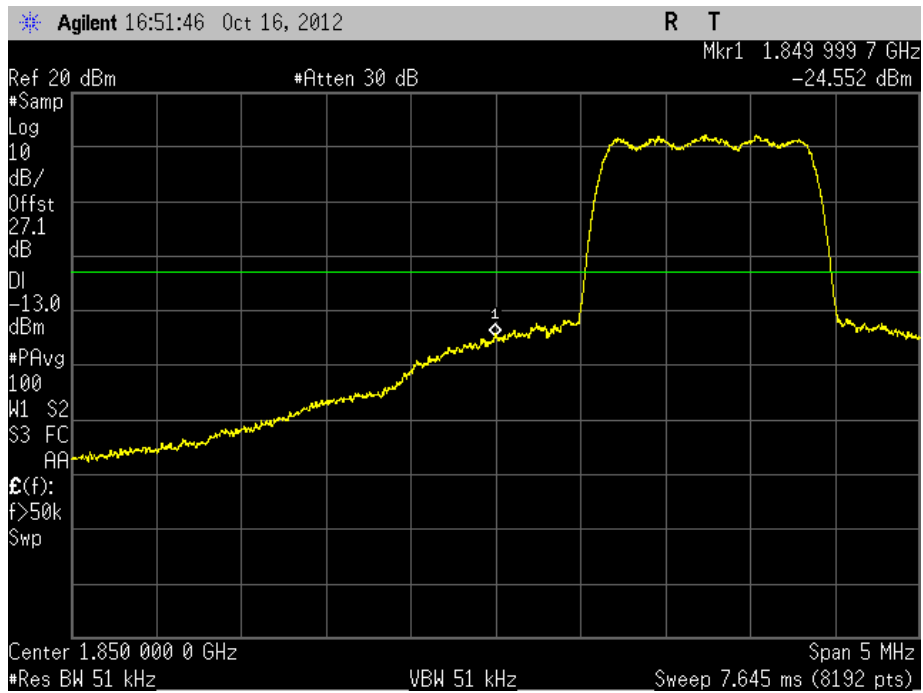
CDMA2000-1xEVDO Cell Mid Channel 30MHz to 20GHz Conducted Spurious Plot



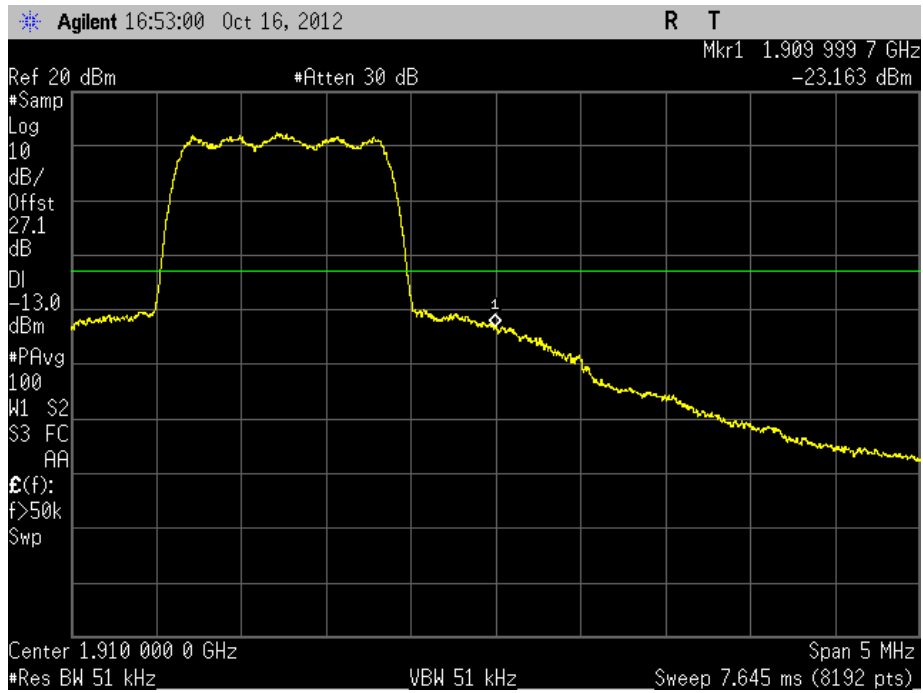
CDMA2000-1xEvDO Cell High Channel 30MHz to 20GHz Conducted Spurious Plot



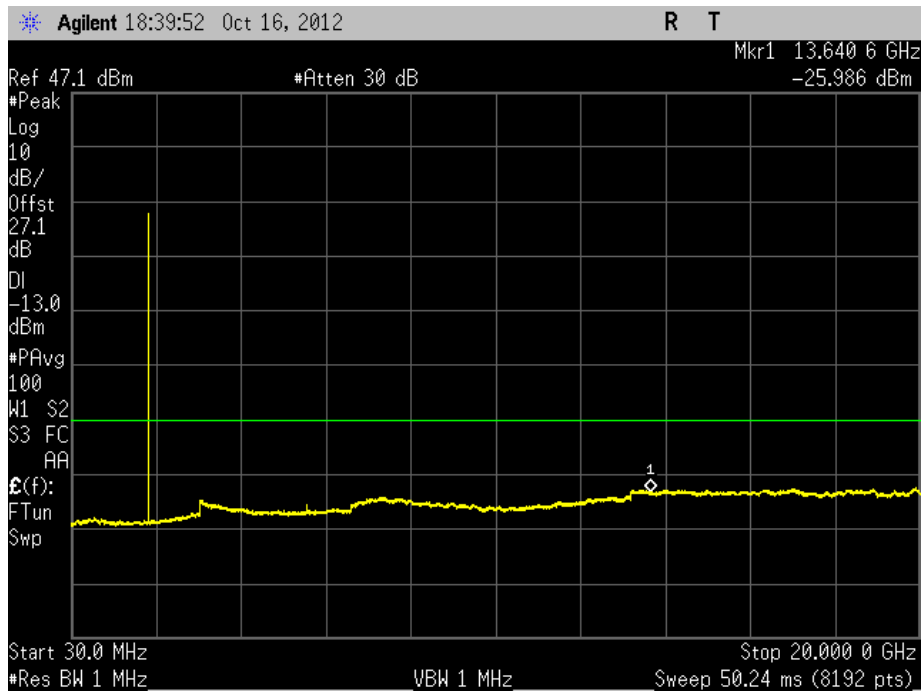
CDMA2000-1xEvDO PCS Band Edge @ 1850MHz



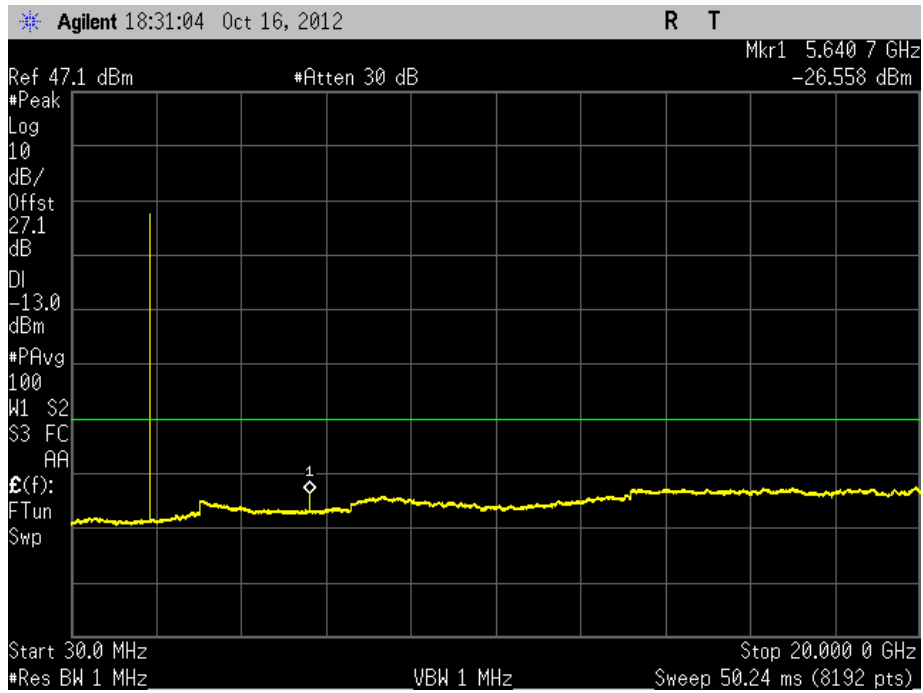
CDMA2000-1xEvDO PCS Band Edge @ 1910MHz



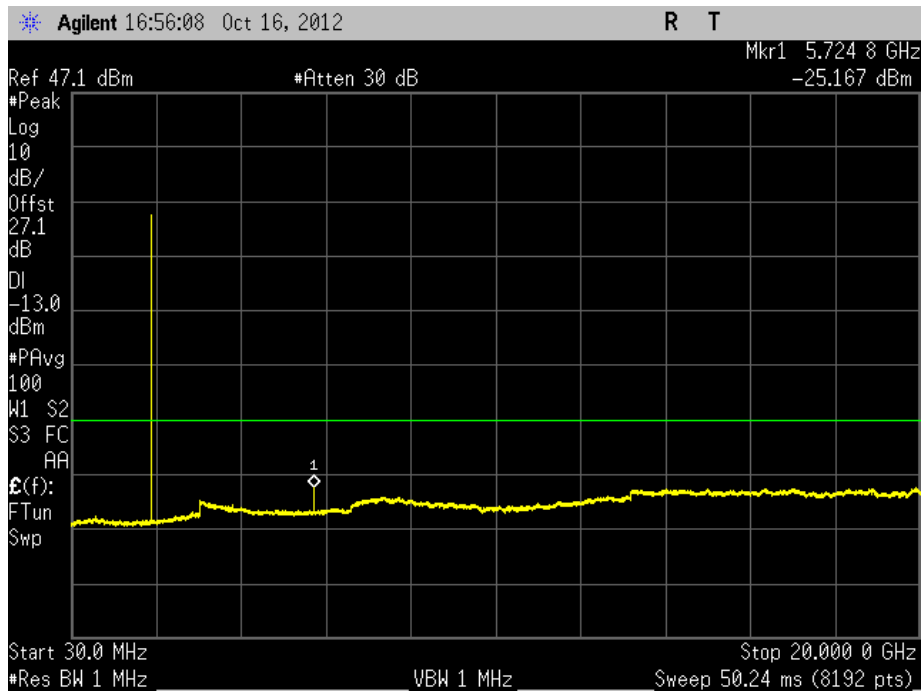
CDMA2000-1xEvDO PCS Low Channel 30MHz to 20GHz Conducted Spurious Plot



CDMA2000-1xEvDO PCS Mid Channel 30MHz to 20GHz Conducted Spurious Plot



CDMA2000-1xEvDO PCS High Channel 30MHz to 20GHz Conducted Spurious Plot



2.7 FIELD STRENGTH OF SPURIOUS RADIATION

2.7.1 Specification Reference

Part 22 Subpart H §22.917(a) and Part 24 Subpart E §24.238(a)

2.7.2 Standard Applicable

Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

2.7.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration B

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

October 21, 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	22.7 °C
Relative Humidity	53.7 %
ATM Pressure	99.7 kPa

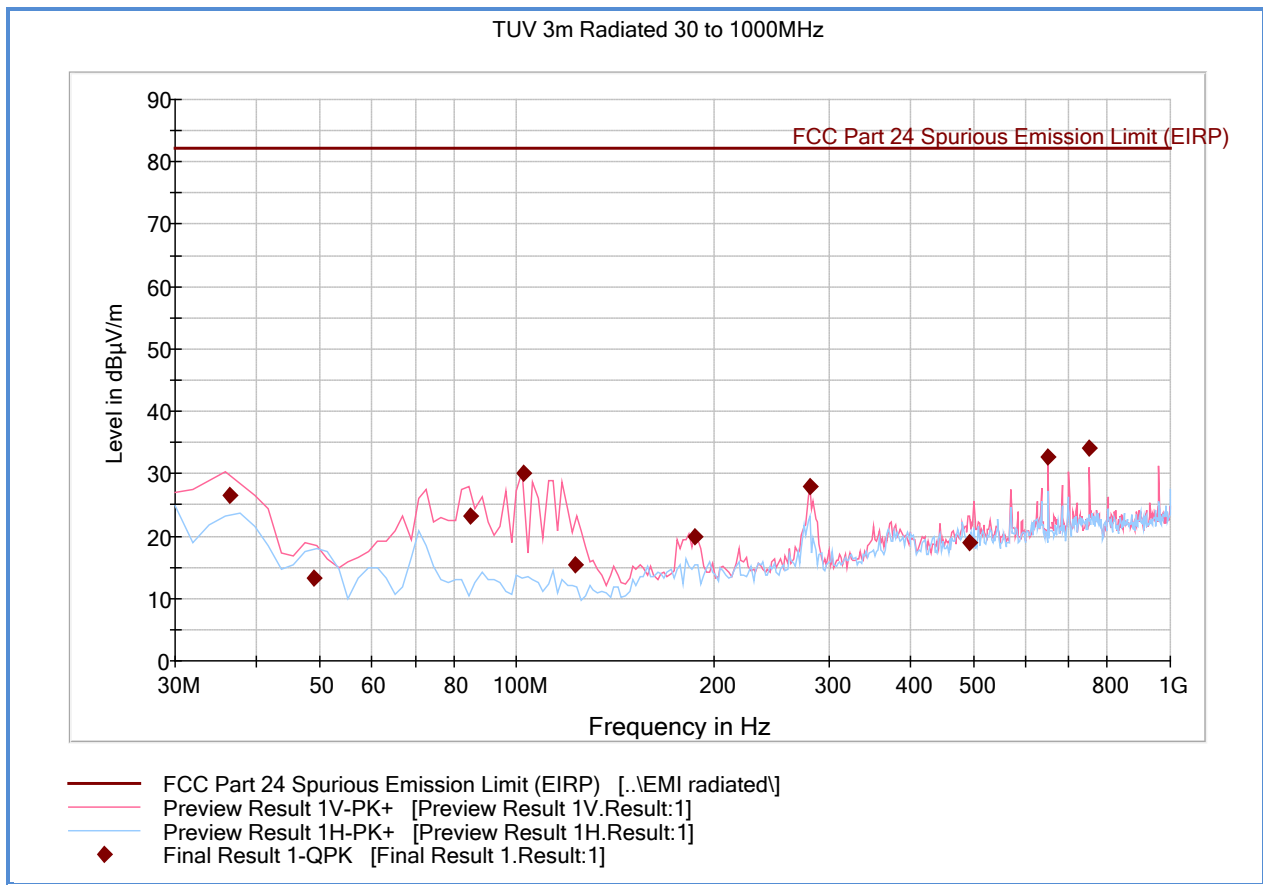
2.7.7 Additional Observations

- 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.
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

2.7.8 Test Results

See attached plots.

2.7.9 Test Results Below 1GHz (Worst Case Configuration)

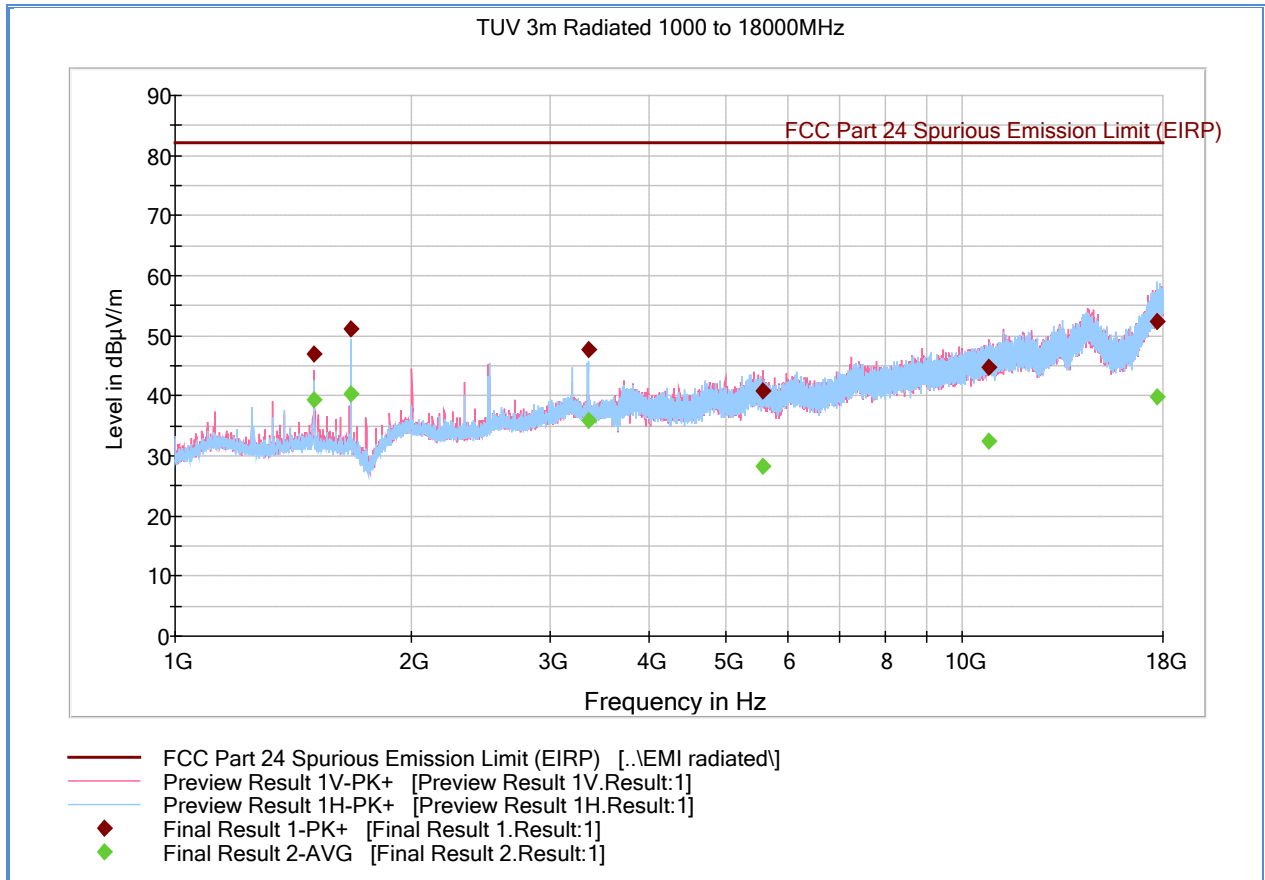


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
36.311663	26.6	1000.0	120.000	115.0	V	49.0	-15.3	55.7	82.2
48.894990	13.3	1000.0	120.000	400.0	V	223.0	-19.9	68.9	82.2
84.828858	23.2	1000.0	120.000	100.0	V	228.0	-21.2	59.0	82.2
102.243848	30.1	1000.0	120.000	100.0	V	169.0	-19.9	52.1	82.2
122.626613	15.4	1000.0	120.000	100.0	V	230.0	-20.7	66.9	82.2
186.894910	20.0	1000.0	120.000	100.0	V	142.0	-16.4	62.3	82.2
280.321523	27.9	1000.0	120.000	178.0	V	125.0	-12.4	54.3	82.2
491.805291	18.8	1000.0	120.000	108.0	V	254.0	-6.6	63.4	82.2
650.020200	32.6	1000.0	120.000	110.0	V	102.0	-4.7	49.6	82.2
750.022365	34.0	1000.0	120.000	100.0	V	287.0	-1.9	48.2	82.2

Test Notes: Only worst case channel presented for spurious emissions below 1GHz.

2.7.10 Test Results Above 1GHz (CDMA2000 Cellular Mid Channel)



Peak Data

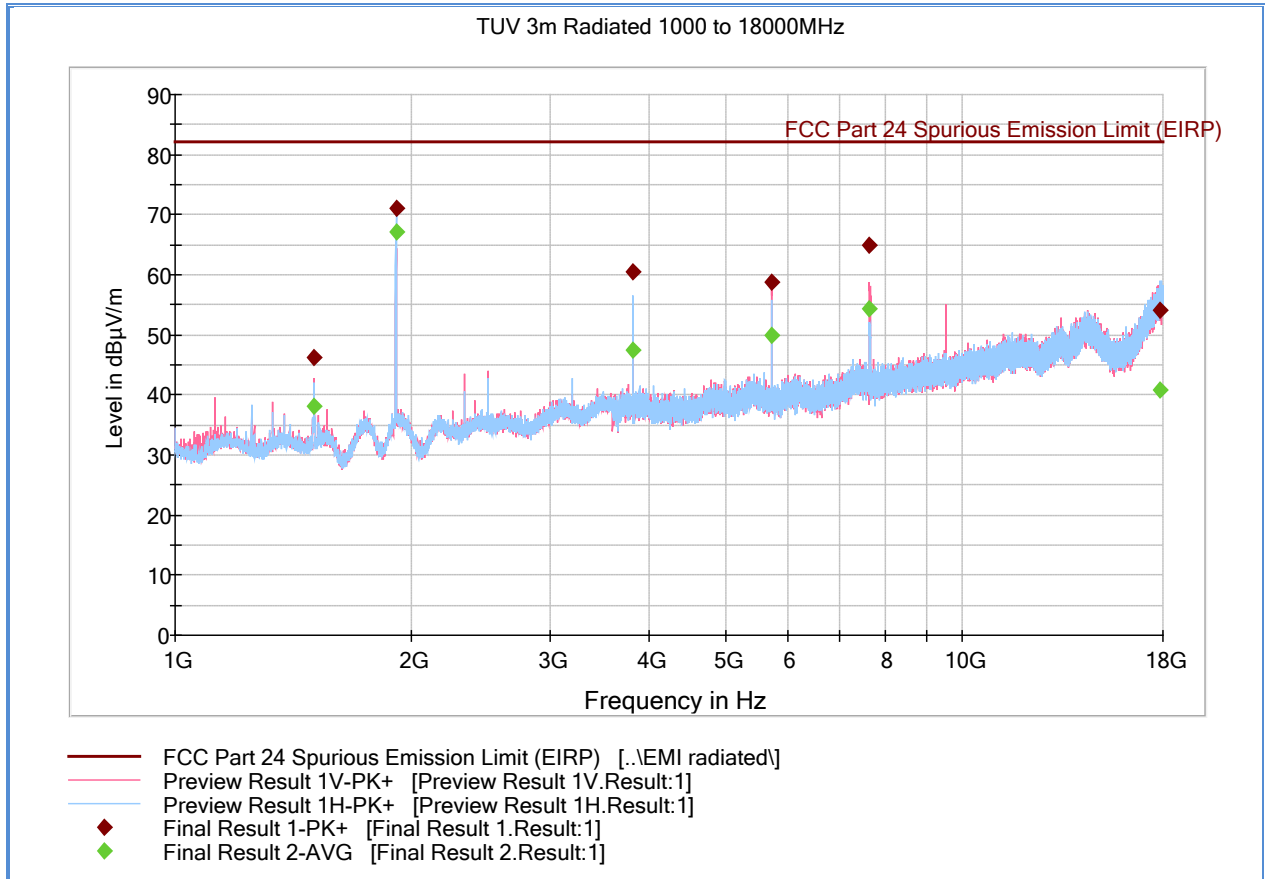
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.140000	47.0	1000.0	1000.000	100.0	V	321.0	-9.0	35.2	82.2
1673.666667	51.1	1000.0	1000.000	100.0	H	268.0	-8.3	31.2	82.2
3346.833333	47.7	1000.0	1000.000	100.0	H	70.0	-1.0	34.5	82.2
5573.753333	40.8	1000.0	1000.000	146.0	V	132.0	4.2	41.4	82.2
10825.453333	44.7	1000.0	1000.000	223.0	V	356.0	11.2	37.5	82.2
17689.720000	52.4	1000.0	1000.000	181.0	H	67.0	20.6	29.8	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)	Compliance

Test Notes: Only worst case channel presented for spurious emissions above 1GHz. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).

2.7.11 Test Results Above 1GHz (CDMA2000 PCS High Channel)



Peak Data

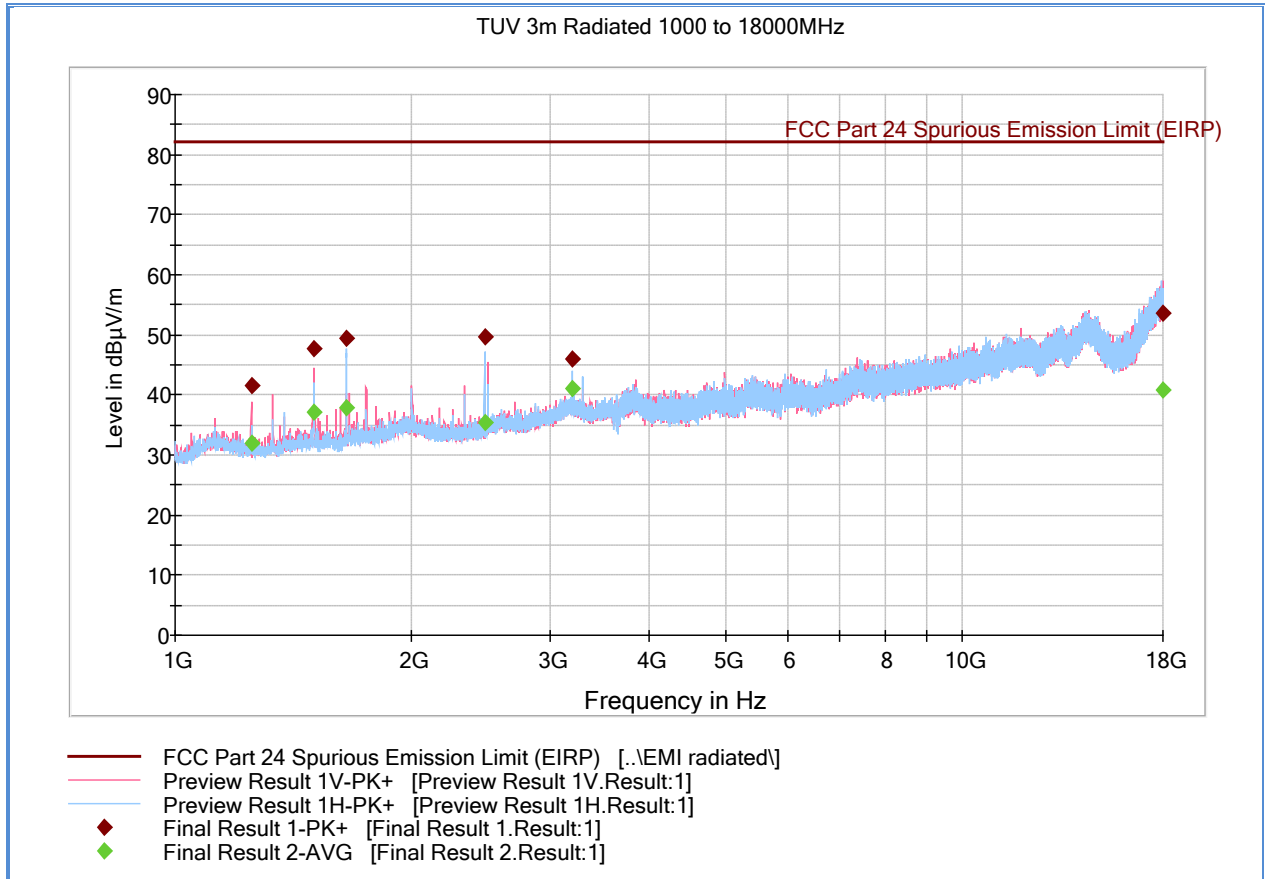
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.100000	46.3	1000.0	1000.000	100.0	V	313.0	-9.0	35.9	82.2
1908.746667	71.1	1000.0	1000.000	128.0	H	282.0	-6.5	11.2	82.2
3816.313333	60.5	1000.0	1000.000	100.0	H	101.0	0.8	21.7	82.2
5726.253333	58.8	1000.0	1000.000	100.0	V	44.0	4.1	23.4	82.2
7634.386667	64.9	1000.0	1000.000	100.0	V	19.0	7.2	17.3	82.2
17813.386667	54.2	1000.0	1000.000	105.0	H	160.0	21.1	28.1	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)	Compliance
7634.387	64.9	2.8	11.30	-40.01	-31.51	-13	Complies

Test Notes: Only worst case channel presented for spurious emissions above 1GHz. 1908 MHz is fundamental attenuated by the notch filter.

2.7.12 Test Results Above 1GHz (CDMA2000-1xEVDO Cellular Low Channel)



Peak Data

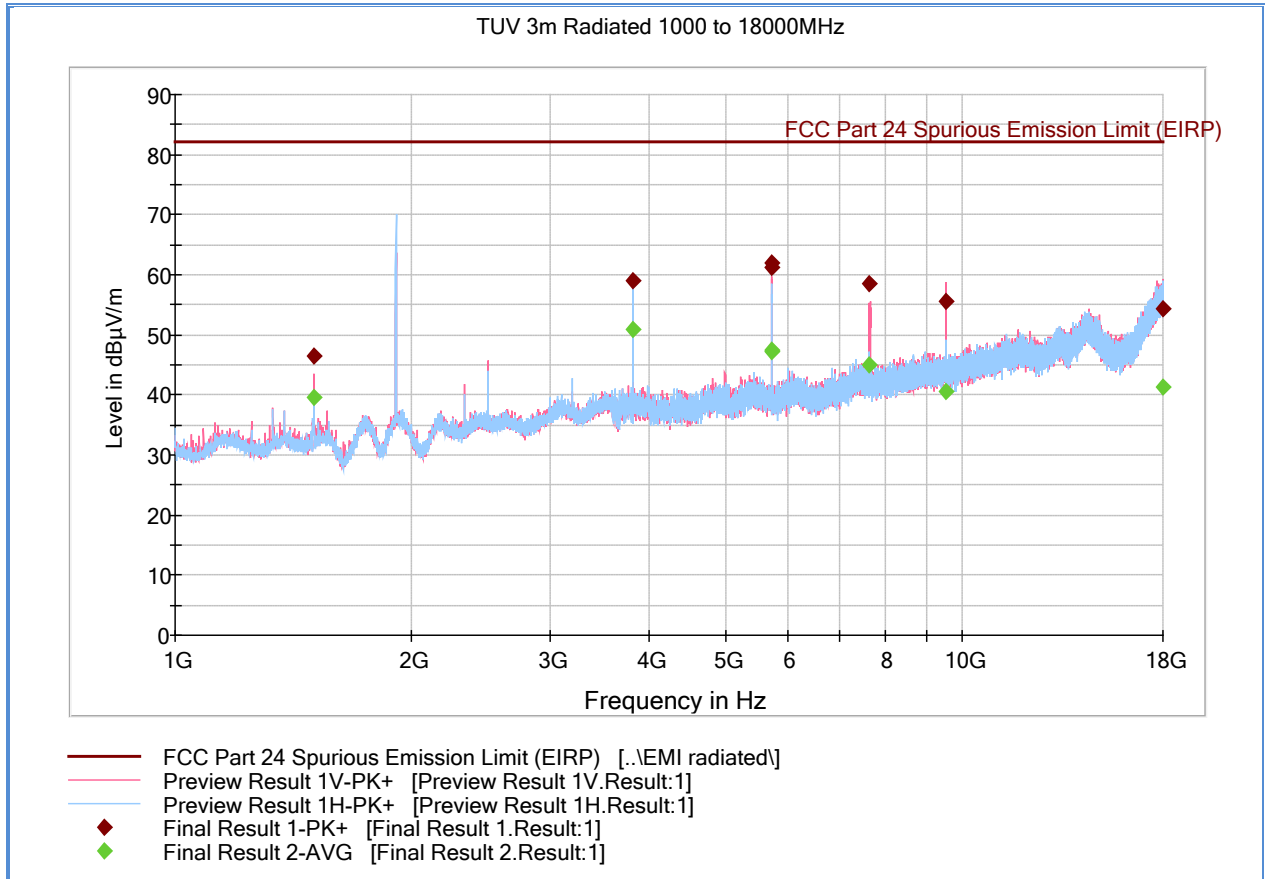
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1249.993333	41.6	1000.0	1000.000	100.0	V	243.0	-9.5	40.6	82.2
1499.986667	47.8	1000.0	1000.000	100.0	V	220.0	-9.0	34.5	82.2
1648.846667	49.4	1000.0	1000.000	100.0	H	110.0	-8.5	32.9	82.2
2473.193333	49.7	1000.0	1000.000	100.0	H	327.0	-4.7	32.5	82.2
3200.020000	46.0	1000.0	1000.000	100.0	H	88.0	-1.5	36.3	82.2
17971.440000	53.7	1000.0	1000.000	208.0	V	67.0	21.7	28.6	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)	Compliance
							Complies

Test Notes: Only worst case channel presented for spurious emissions above 1GHz. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).

2.7.13 Test Results Above 1GHz (CDMA2000-1xEVDO PCS High Channel)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1500.140000	46.6	1000.0	1000.000	100.0	V	198.0	-9.0	35.6	82.2
3816.880000	59.1	1000.0	1000.000	104.0	H	255.0	0.8	23.1	82.2
5725.286667	61.9	1000.0	1000.000	115.0	V	133.0	4.1	20.3	82.2
5725.460000	61.2	1000.0	1000.000	210.0	V	37.0	4.1	21.1	82.2
7633.786667	58.5	1000.0	1000.000	100.0	V	19.0	7.2	23.7	82.2
9542.193333	55.6	1000.0	1000.000	100.0	V	309.0	9.2	26.7	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)	Compliance
							Complies

Test Notes: Only worst case channel presented for spurious emissions above 1GHz. Substitution data not required since margin is >20dB compared to the -13dBm limit (converted to field strength @ 3 meters).

2.8 FREQUENCY STABILITY

2.8.1 Specification Reference

Part 22 Subpart H §22.355 and Part 24 Subpart E §24.235

2.8.2 Standard Applicable

(§22.355) Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C–1 of this section.

Table C–1—Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Mobile ≤3 watts (ppm)
821 to 896	2.5

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

2.8.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration C (USB not connected, battery eliminator utilized)

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

October 23, 2012/FSC

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 26.1°C
Relative Humidity 47.6%
ATM Pressure 100.1 kPa

2.8.7 Additional Observations

- This is a conducted test. The EUT was operated at 3.7VDC using the battery eliminator unit 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 on both cellular and PCS channels were then performed. The temperature was then increased by 10°C steps and allowed to settle before taking the next set of measurements.
- Only worst case configuration presented. See Section 1.4.4 of this test report for details.

2.8.8 Test Results Summary

Mode	Frequency (MHz)	Deviation (Hz)	Deviation (ppm)
CDMA2000 Cellular (Mid Channel 384)	836.52	-9.59	0.01146
CDMA2000 PCS (High Channel 1175)	1908.75	-4.32	0.00226
CDMA2000-1xEvDO Cellular (Low Channel 1013)	824.7	8.64	0.01048
CDMA2000-1xEvDO PCS (High Channel 1175)	1908.75	10.55	0.00553

See attached tables for detailed test results.

CDMA2000 Cellular Worst Case Configuration (Mid Channel 384)					
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (MHz)	Frequency Deviation (Hz)	Deviation Limit (Hz)
100	3.700	-30	836.52	--6.37	2091.3
100		-20		-5.20	2091.3
100		-10		-6.30	2091.3
100		0		-7.40	2091.3
100		+10		-8.60	2091.3
100		+20		-8.57	2091.3
100		+30		-9.59	2091.3
100		+40		-7.1	2091.3
100		+50		-6.67	2091.3
115		4.255		+20	
85	3.145	+20		-7.20	2091.3

CDMA2000 PCS Worst Case Configuration (High Channel 1175)					
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (MHz)	Frequency Deviation (Hz)	Deviation (%)
100	3.700	-30	1908.75	-3.00	
100		-20		-1.68	
100		-10		3.22	
100		0		-3.15	
100		+10		-3.44	
100		+20		-3.66	
100		+30		-4.17	
100		+40		-4.32	
100		+50		-3.50	
115		4.255		+20	
85	3.145	+20		-4.03	

CDMA2000-1xEvDO Cellular Worst Case Configuration (Low Channel 1013)					
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (MHz)	Frequency Deviation (Hz)	Deviation Limit (Hz)
100	3.700	-30	824.7	8.64	2061.75
100		-20		2.05	2061.75
100		-10		2.27	2061.75
100		0		1.90	2061.75
100		+10		2.05	2061.75
100		+20		0.29	2061.75
100		+30		3.08	2061.75
100		+40		1.25	2061.75
100		+50		0.51	2061.75
115		4.255		+20	
85	3.145	+20		1.90	2061.75

CDMA2000-1xEvDO PCS Worst Case Configuration (High Channel 1175)					
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (MHz)	Frequency Deviation (Hz)	Deviation (%)
100	3.700	-30	1908.75	8.42	
100		-20		10.55	
100		-10		9.45	
100		0		8.06	
100		+10		5.13	
100		+20		1.68	
100		+30		1.39	
100		+40		-5.71	
100		+50		-6.30	
115		4.255		+20	
85	3.145	+20		1.32	

2.9 RECEIVER SPURIOUS EMISSIONS

2.9.1 Specification Reference

RSS-132(4.6) and RSS-133(6.6)

2.9.2 Standard Applicable

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

2.9.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration B

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

October 13, 2012/FSC

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	22.4 °C
Relative Humidity	48.7 %
ATM Pressure	99.4 kPa

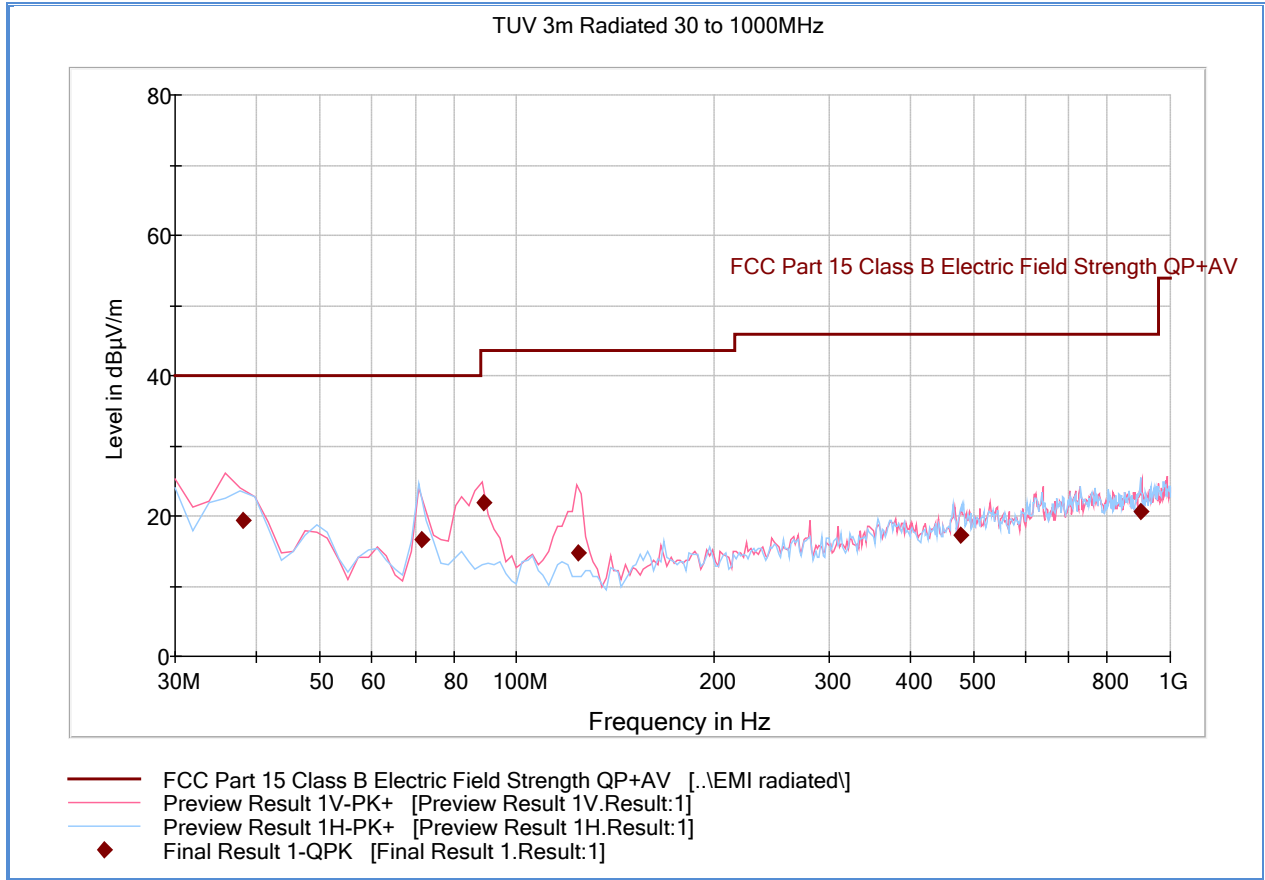
2.9.7 Additional Observations

- 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.

2.9.8 Test Results

See attached plots.

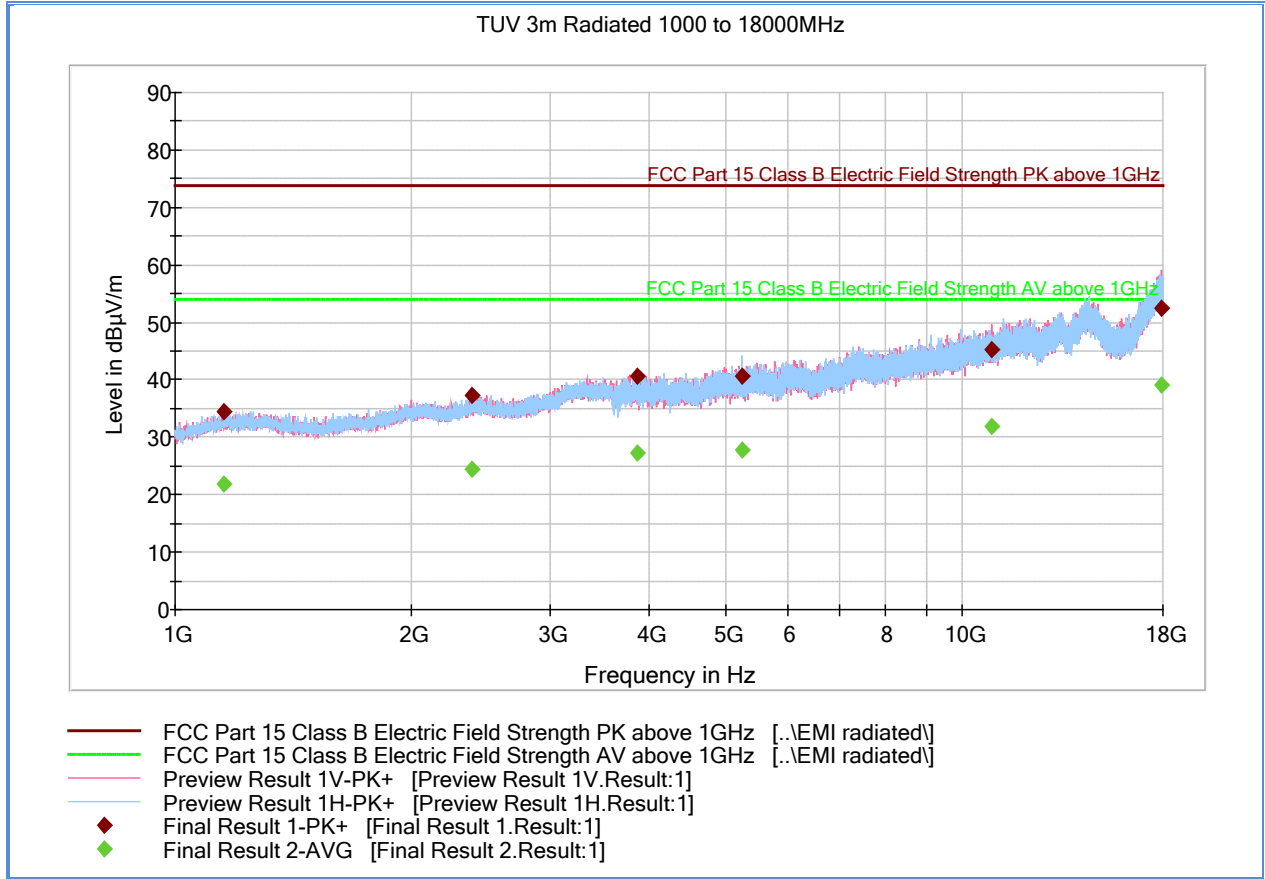
2.9.9 Test Results Below 1GHz (Receive Mode)



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)
38.111663	19.4	1000.0	120.000	117.0	V	18.0	-16.2	20.6	40.0
71.421643	16.7	1000.0	120.000	150.0	H	67.0	-21.9	23.3	40.0
88.772745	21.8	1000.0	120.000	100.0	V	127.0	-21.1	21.7	43.5
124.130501	14.8	1000.0	120.000	150.0	V	296.0	-20.7	28.7	43.5
477.998076	17.3	1000.0	120.000	190.0	H	286.0	-6.4	28.7	46.0
899.197836	20.6	1000.0	120.000	104.0	H	159.0	0.3	25.4	46.0

2.9.10 Test Results Above 1GHz (Receive Mode)



Peak Data

Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1154.520000	34.4	1000.0	1000.000	154.0	V	94.0	-10.0	39.5	73.9
2379.173333	37.2	1000.0	1000.000	298.0	H	4.0	-5.0	36.7	73.9
3871.646667	40.7	1000.0	1000.000	215.0	H	31.0	1.1	33.2	73.9
5252.573333	40.5	1000.0	1000.000	360.0	H	13.0	3.6	33.4	73.9
10916.20666	45.3	1000.0	1000.000	201.0	V	15.0	11.4	28.6	73.9
17929.46666	52.5	1000.0	1000.000	107.0	V	158.0	21.5	21.4	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)
1154.520000	21.8	1000.0	1000.000	154.0	V	94.0	-10.0	32.1	53.9
2379.173333	24.4	1000.0	1000.000	298.0	H	4.0	-5.0	29.5	53.9
3871.646667	27.3	1000.0	1000.000	215.0	H	31.0	1.1	26.6	53.9
5252.573333	27.8	1000.0	1000.000	360.0	H	13.0	3.6	26.1	53.9
10916.20666	31.8	1000.0	1000.000	201.0	V	15.0	11.4	22.1	53.9
17929.46666	39.0	1000.0	1000.000	107.0	V	158.0	21.5	14.9	53.9

Test Notes: No significant emissions observed. All emissions presented are noise-floor measurements.

2.10 POWER LINE CONDUCTED EMISSIONS

2.10.1 Specification Reference

RSS-Gen 7.2.4

2.10.2 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 (dB μ V)	
	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.*

2.10.3 Equipment Under Test and Modification State

Serial No: UB010912700038 / Test Configuration A

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

October 17, 2012/FSC

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	24.8°C
Relative Humidity	49.8%
ATM Pressure	99.9 kPa

2.10.7 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.

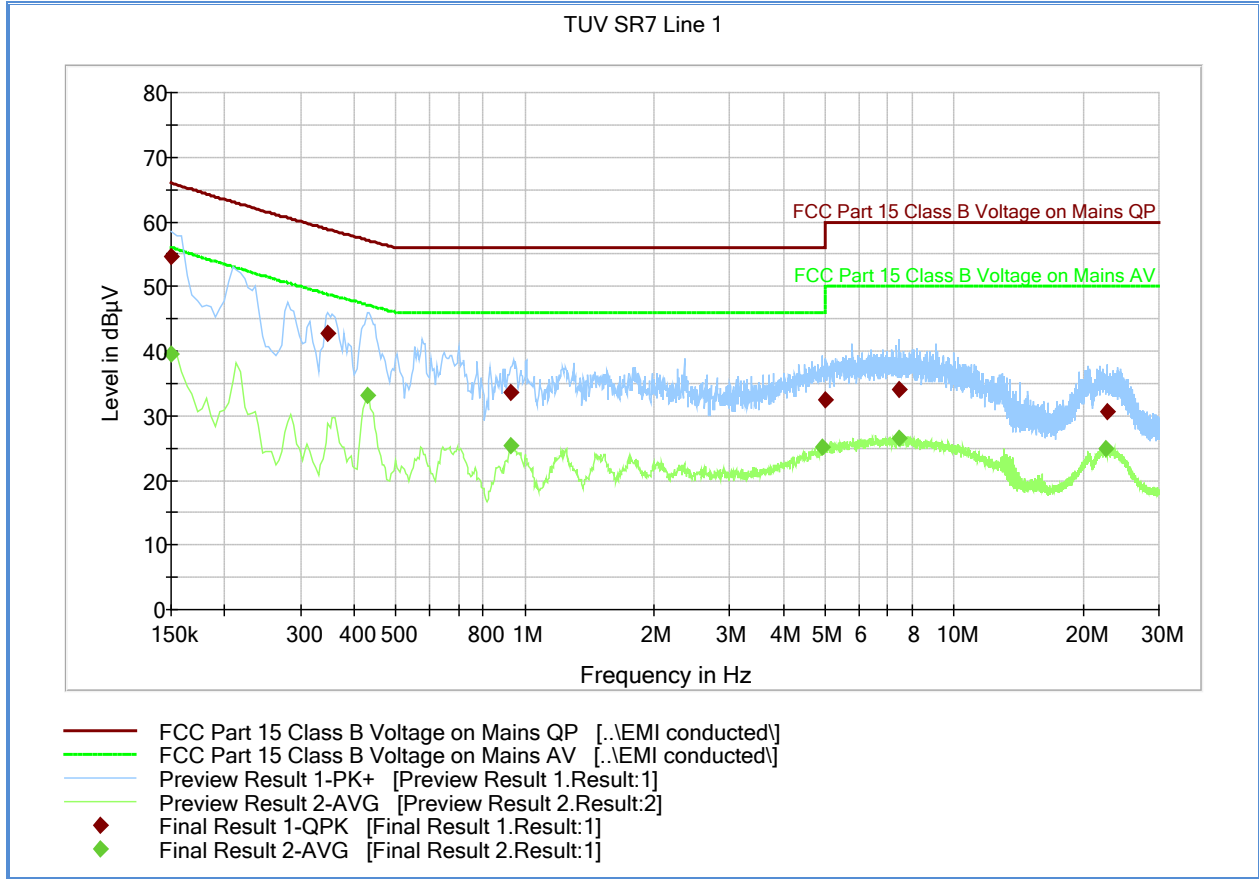
2.10.8 Sample Computation (Conducted Emission – Quasi Peak)

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 (db μ V) @ 150kHz		26.2

2.10.9 Test Results

Compliant. See attached plots and tables.

2.10.10 Line 1 (Hot) CDMA2000 Cell



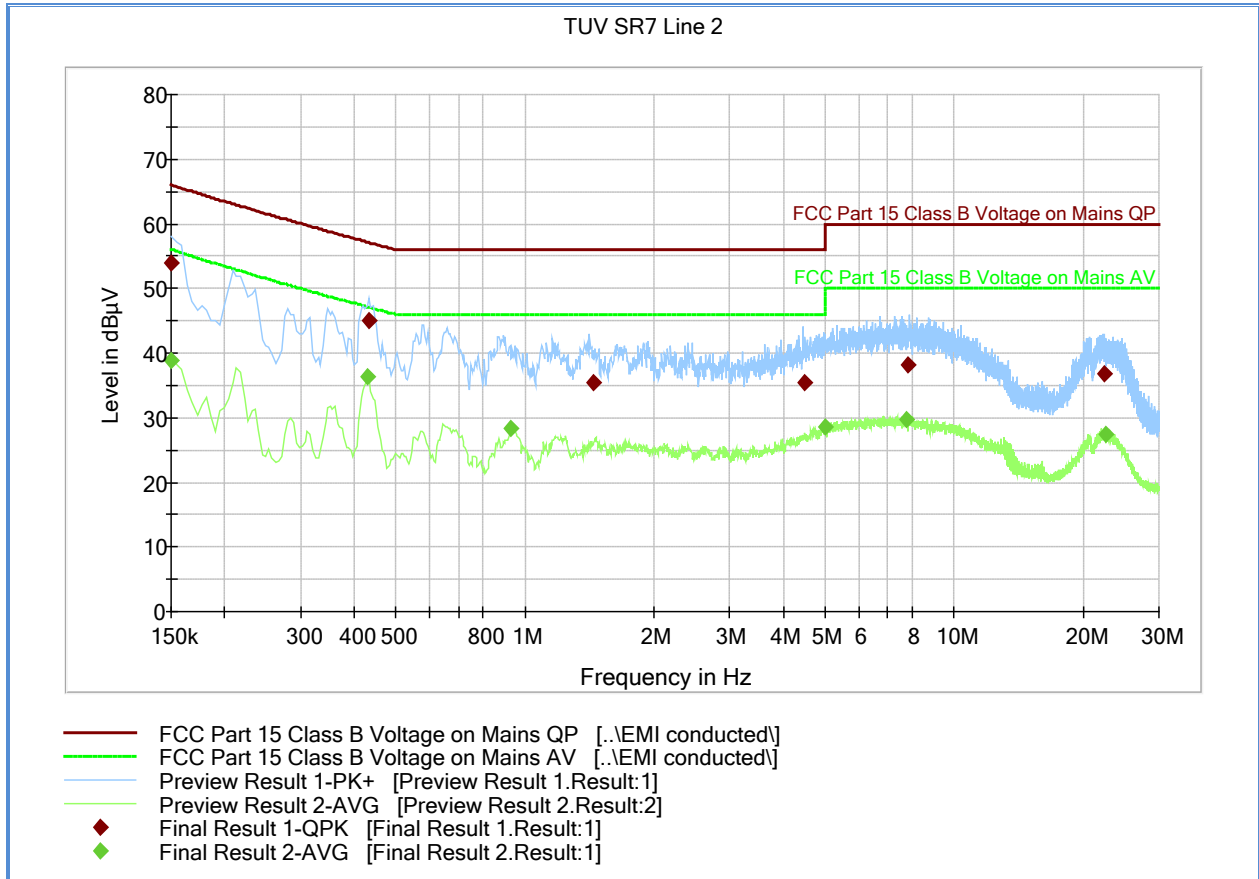
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	54.6	1000.0	9.000	Off	L1	19.6	11.4	66.0
0.348000	42.8	1000.0	9.000	Off	L1	19.4	16.0	58.8
0.928500	33.5	1000.0	9.000	Off	L1	19.6	22.5	56.0
5.001000	32.5	1000.0	9.000	Off	L1	20.4	27.5	60.0
7.440000	34.1	1000.0	9.000	Off	L1	20.5	25.9	60.0
22.753500	30.6	1000.0	9.000	Off	L1	20.9	29.4	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	39.5	1000.0	9.000	Off	L1	19.6	16.5	56.0
0.429000	33.1	1000.0	9.000	Off	L1	19.4	14.1	47.2
0.928500	25.3	1000.0	9.000	Off	L1	19.6	20.7	46.0
4.929000	25.1	1000.0	9.000	Off	L1	20.4	20.9	46.0
7.440000	26.4	1000.0	9.000	Off	L1	20.5	23.6	50.0
22.600500	24.9	1000.0	9.000	Off	L1	20.9	25.1	50.0

2.10.11 Line 2 (Neutral) CDMA2000 Cell



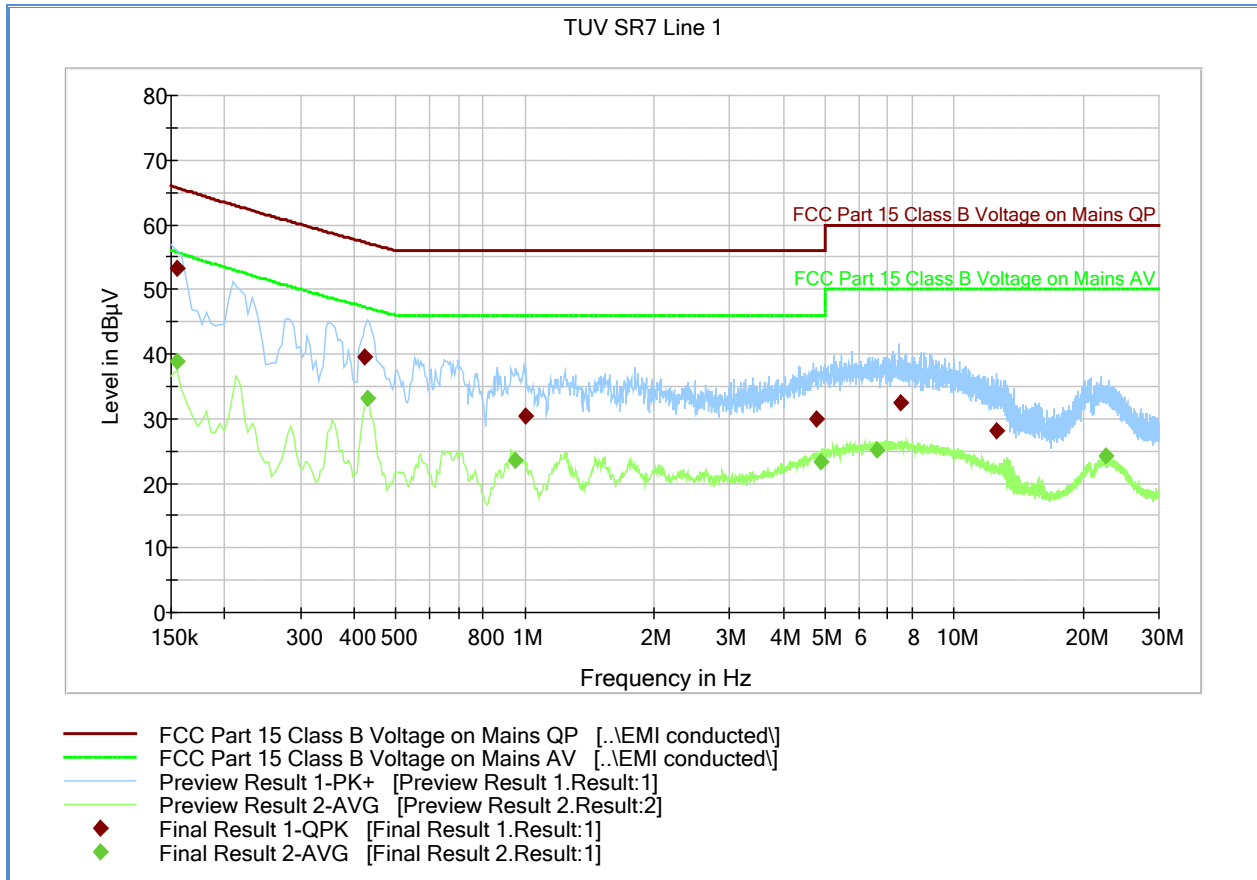
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	53.9	1000.0	9.000	Off	N	19.7	12.1	66.0
0.433500	45.0	1000.0	9.000	Off	N	19.6	12.1	57.1
1.446000	35.5	1000.0	9.000	Off	N	20.4	20.5	56.0
4.479000	35.4	1000.0	9.000	Off	N	21.1	20.6	56.0
7.822500	38.2	1000.0	9.000	Off	N	21.2	21.8	60.0
22.303500	36.8	1000.0	9.000	Off	N	21.6	23.2	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	38.9	1000.0	9.000	Off	N	19.7	17.1	56.0
0.429000	36.3	1000.0	9.000	Off	N	19.6	10.9	47.2
0.928500	28.4	1000.0	9.000	Off	N	20.0	17.6	46.0
5.010000	28.5	1000.0	9.000	Off	N	21.2	21.5	50.0
7.723500	29.7	1000.0	9.000	Off	N	21.2	20.3	50.0
22.533000	27.3	1000.0	9.000	Off	N	21.6	22.7	50.0

2.10.12 Line 1 (Hot) CDMA2000 PCS



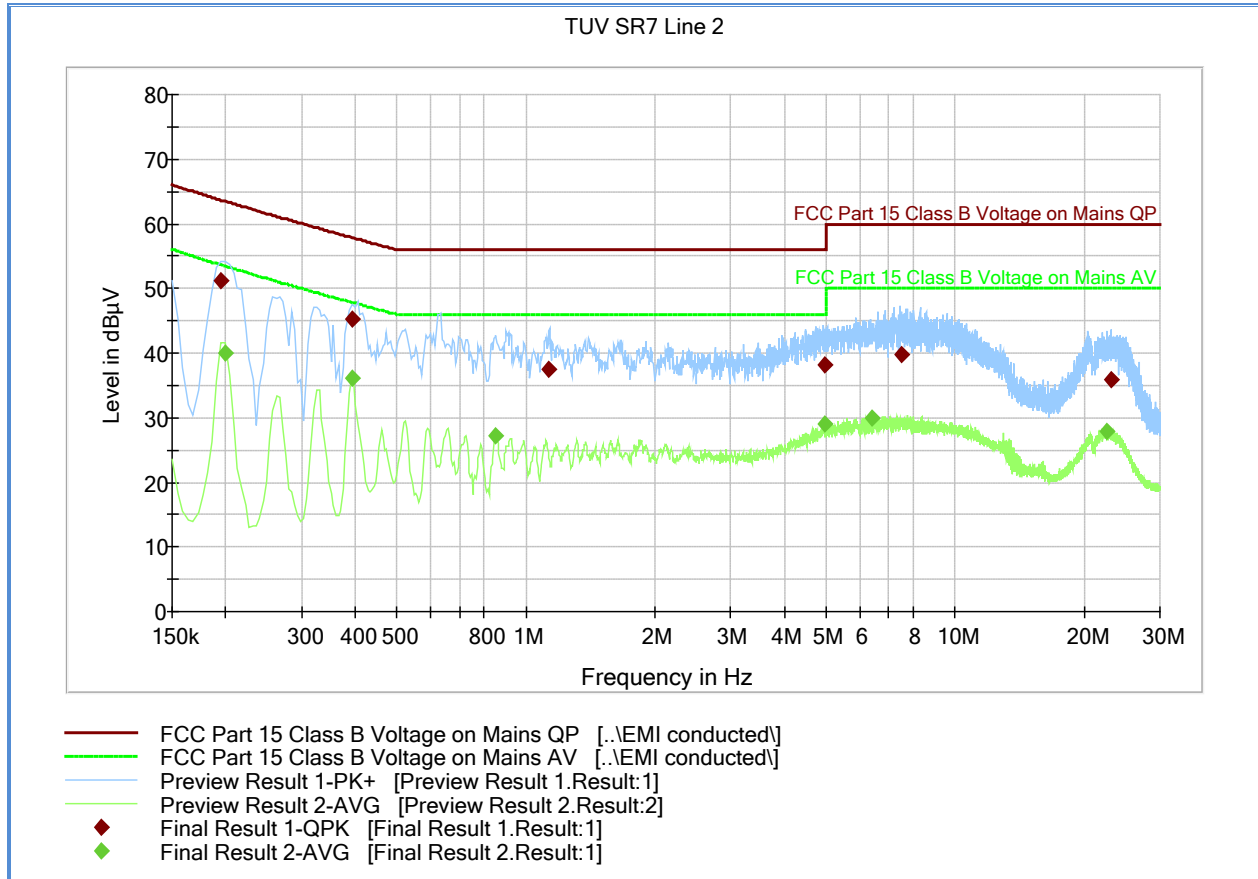
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	53.3	1000.0	9.000	Off	L1	19.6	12.5	65.7
0.424500	39.4	1000.0	9.000	Off	L1	19.4	17.8	57.3
1.005000	30.5	1000.0	9.000	Off	L1	19.6	25.5	56.0
4.789500	30.0	1000.0	9.000	Off	L1	20.4	26.0	56.0
7.530000	32.4	1000.0	9.000	Off	L1	20.5	27.6	60.0
12.547500	28.1	1000.0	9.000	Off	L1	20.5	31.9	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.154500	38.9	1000.0	9.000	Off	L1	19.6	16.9	55.7
0.429000	33.2	1000.0	9.000	Off	L1	19.4	14.0	47.2
0.946500	23.5	1000.0	9.000	Off	L1	19.6	22.5	46.0
4.875000	23.4	1000.0	9.000	Off	L1	20.4	22.6	46.0
6.607500	25.2	1000.0	9.000	Off	L1	20.5	24.8	50.0
22.501500	24.1	1000.0	9.000	Off	L1	20.9	25.9	50.0

2.10.13 Line 2 (Neutral) CDMA2000 PCS



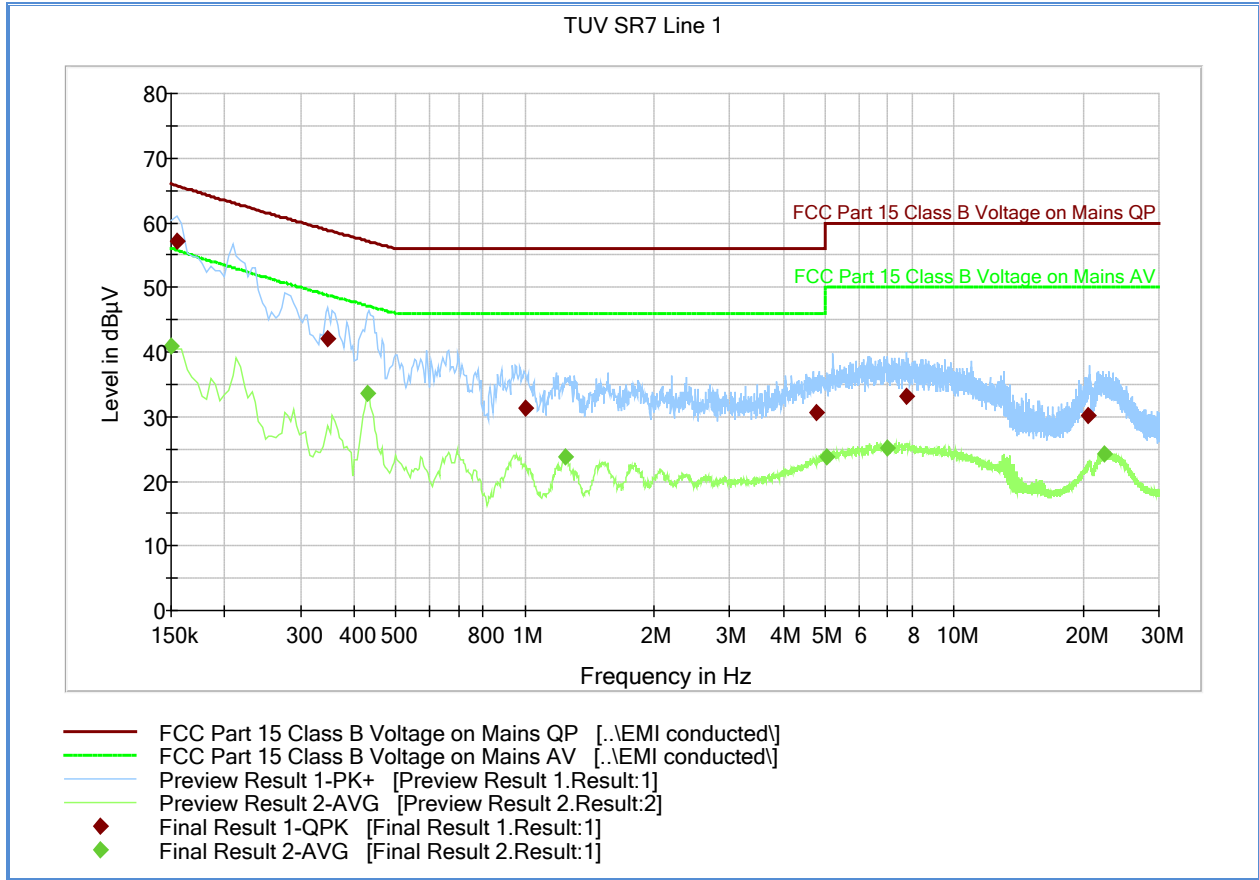
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.195000	51.2	1000.0	9.000	Off	N	19.6	12.5	63.7
0.393000	45.3	1000.0	9.000	Off	N	19.5	12.6	57.9
1.131000	37.4	1000.0	9.000	Off	N	20.1	18.6	56.0
4.960500	38.2	1000.0	9.000	Off	N	21.2	17.8	56.0
7.507500	39.7	1000.0	9.000	Off	N	21.2	20.3	60.0
23.095500	36.0	1000.0	9.000	Off	N	21.6	24.0	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.199500	40.1	1000.0	9.000	Off	N	19.6	13.3	53.5
0.393000	36.2	1000.0	9.000	Off	N	19.5	11.7	47.8
0.852000	27.3	1000.0	9.000	Off	N	19.9	18.7	46.0
4.978500	29.1	1000.0	9.000	Off	N	21.2	16.9	46.0
6.396000	30.0	1000.0	9.000	Off	N	21.2	20.0	50.0
22.600500	27.9	1000.0	9.000	Off	N	21.6	22.1	50.0

2.10.14 Line 1 (Hot) 1xE-VD0 Cell



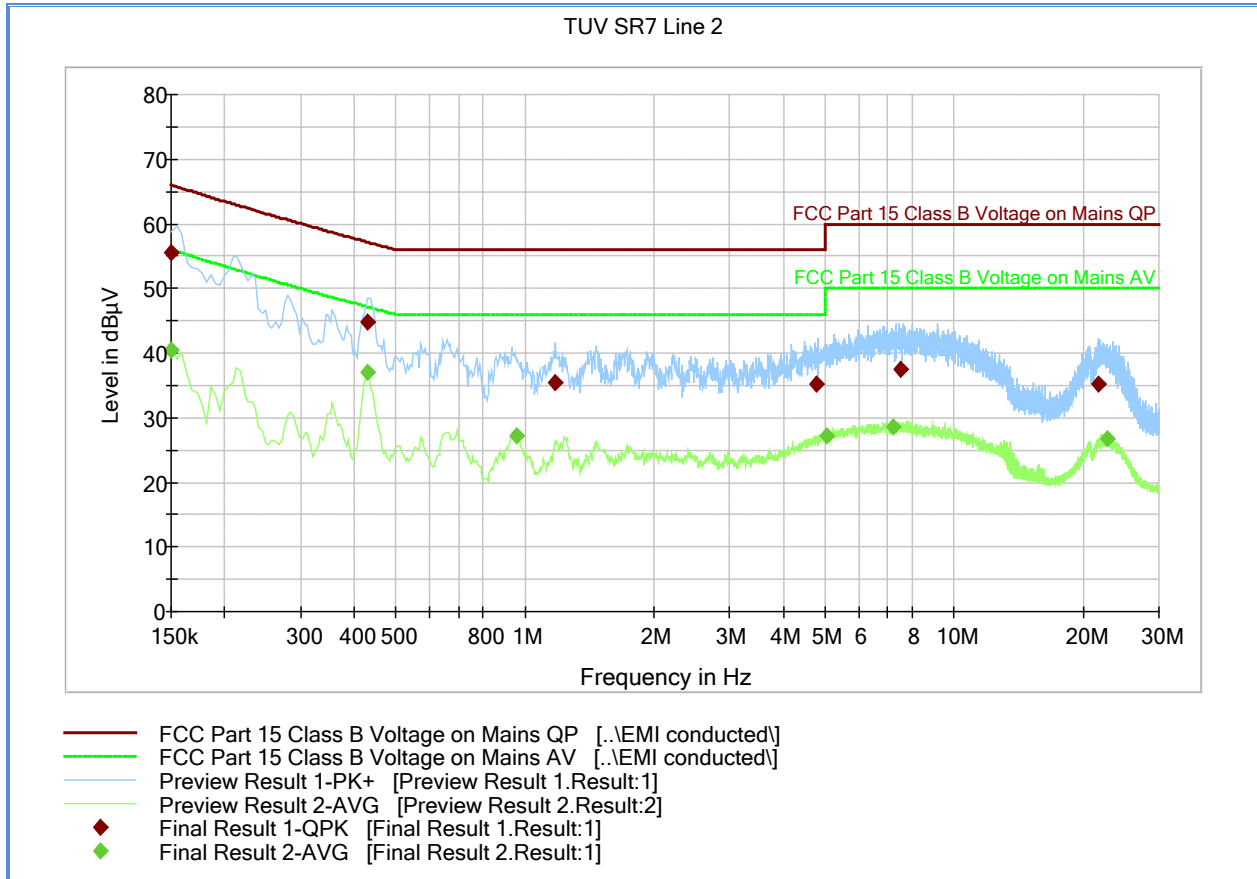
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	57.1	1000.0	9.000	Off	L1	19.6	8.6	65.7
0.348000	42.1	1000.0	9.000	Off	L1	19.4	16.7	58.8
1.000500	31.3	1000.0	9.000	Off	L1	19.6	24.7	56.0
4.776000	30.5	1000.0	9.000	Off	L1	20.4	25.5	56.0
7.773000	33.1	1000.0	9.000	Off	L1	20.5	26.9	60.0
20.557500	30.2	1000.0	9.000	Off	L1	20.7	29.8	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	40.9	1000.0	9.000	Off	L1	19.6	15.1	56.0
0.429000	33.6	1000.0	9.000	Off	L1	19.4	13.6	47.2
1.243500	23.8	1000.0	9.000	Off	L1	19.7	22.2	46.0
5.064000	23.8	1000.0	9.000	Off	L1	20.4	26.2	50.0
6.976500	25.2	1000.0	9.000	Off	L1	20.5	24.8	50.0
22.303500	24.3	1000.0	9.000	Off	L1	20.9	25.7	50.0

2.10.15 Line 2 (Neutral) 1xE-VD0 Cell



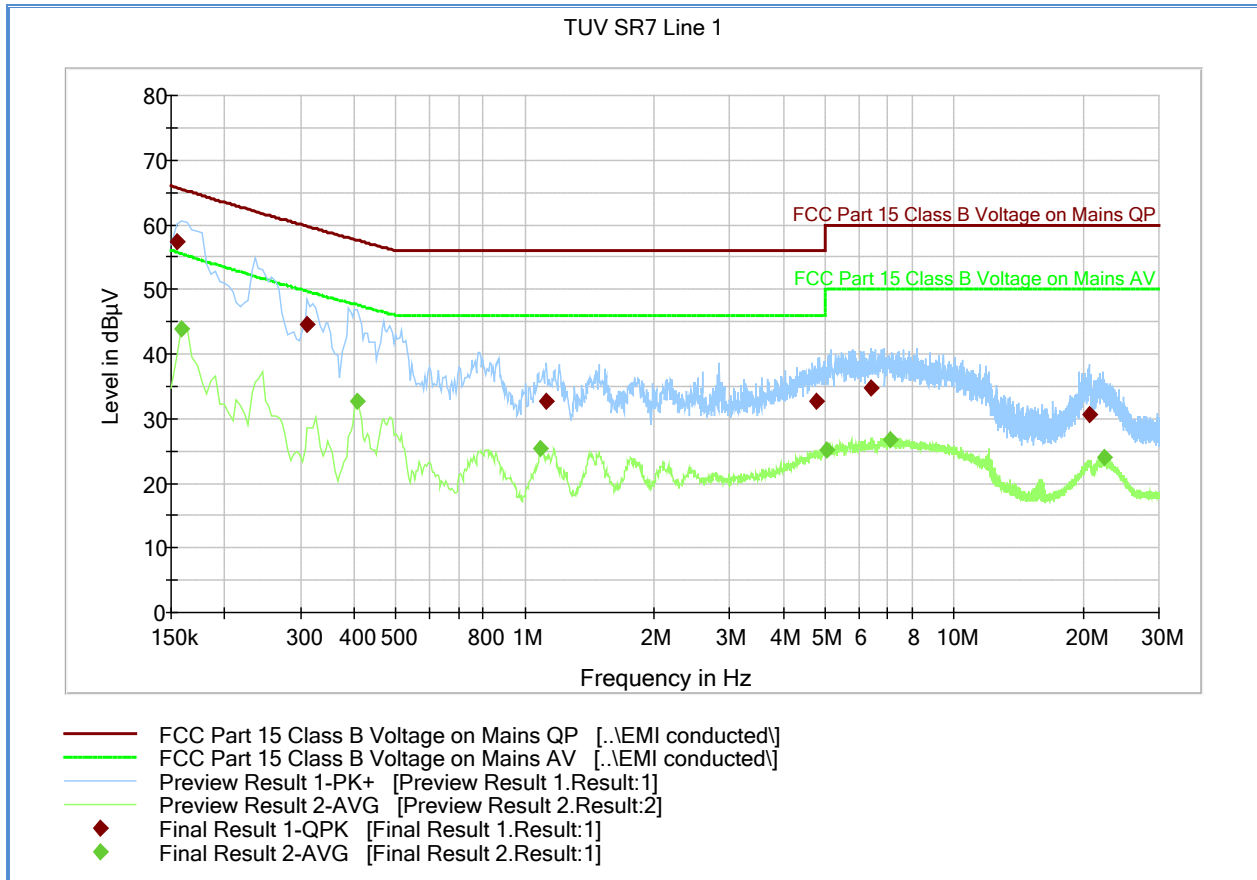
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	55.4	1000.0	9.000	Off	N	19.7	10.6	66.0
0.429000	44.8	1000.0	9.000	Off	N	19.6	12.4	57.2
1.180500	35.5	1000.0	9.000	Off	N	20.2	20.5	56.0
4.789500	35.1	1000.0	9.000	Off	N	21.1	20.9	56.0
7.512000	37.5	1000.0	9.000	Off	N	21.2	22.5	60.0
21.651000	35.2	1000.0	9.000	Off	N	21.5	24.8	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.150000	40.5	1000.0	9.000	Off	N	19.7	15.5	56.0
0.429000	37.1	1000.0	9.000	Off	N	19.6	10.1	47.2
0.955500	27.3	1000.0	9.000	Off	N	20.0	18.7	46.0
5.055000	27.3	1000.0	9.000	Off	N	21.2	22.7	50.0
7.201500	28.7	1000.0	9.000	Off	N	21.2	21.3	50.0
22.794000	26.7	1000.0	9.000	Off	N	21.6	23.3	50.0

2.10.16 Line 1 (Hot) 1xE-VD0 PCS



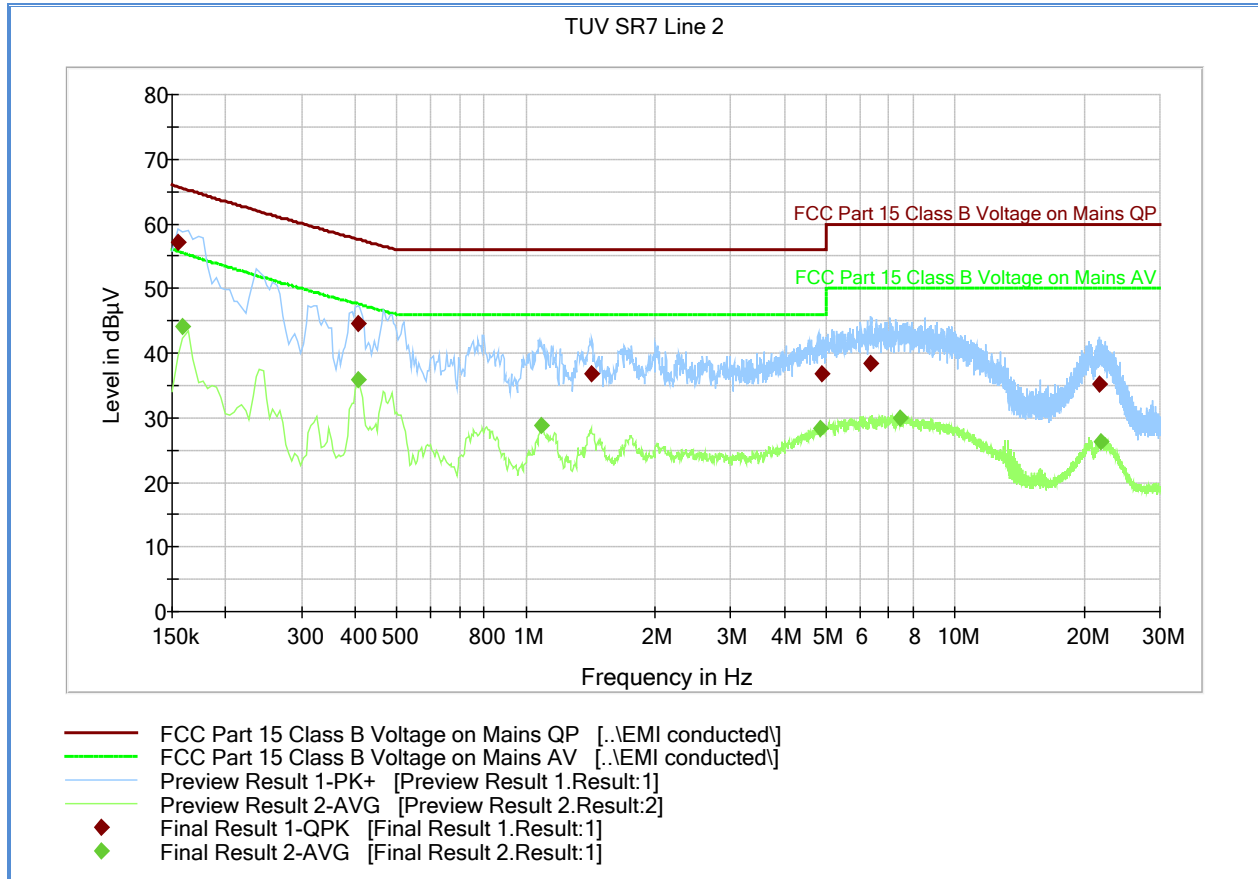
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	57.4	1000.0	9.000	Off	L1	19.6	8.3	65.7
0.312000	44.5	1000.0	9.000	Off	L1	19.4	15.2	59.7
1.122000	32.7	1000.0	9.000	Off	L1	19.7	23.3	56.0
4.785000	32.8	1000.0	9.000	Off	L1	20.4	23.2	56.0
6.405000	34.8	1000.0	9.000	Off	L1	20.5	25.2	60.0
20.607000	30.6	1000.0	9.000	Off	L1	20.7	29.4	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.159000	44.0	1000.0	9.000	Off	L1	19.5	11.5	55.5
0.406500	32.7	1000.0	9.000	Off	L1	19.4	14.8	47.6
1.090500	25.4	1000.0	9.000	Off	L1	19.7	20.6	46.0
5.037000	25.3	1000.0	9.000	Off	L1	20.4	24.7	50.0
7.102500	26.7	1000.0	9.000	Off	L1	20.5	23.3	50.0
22.303500	24.0	1000.0	9.000	Off	L1	20.9	26.0	50.0

2.10.17 Line 2 (Neutral) 1xE-VD0 PCS



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	57.1	1000.0	9.000	Off	N	19.7	8.6	65.7
0.406500	44.7	1000.0	9.000	Off	N	19.5	12.9	57.6
1.419000	36.8	1000.0	9.000	Off	N	20.3	19.2	56.0
4.888500	36.8	1000.0	9.000	Off	N	21.2	19.2	56.0
6.351000	38.5	1000.0	9.000	Off	N	21.2	21.5	60.0
21.754500	35.2	1000.0	9.000	Off	N	21.5	24.8	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.159000	44.1	1000.0	9.000	Off	N	19.7	11.3	55.5
0.406500	35.9	1000.0	9.000	Off	N	19.5	11.7	47.6
1.090500	28.9	1000.0	9.000	Off	N	20.1	17.1	46.0
4.834500	28.3	1000.0	9.000	Off	N	21.1	17.7	46.0
7.458000	30.0	1000.0	9.000	Off	N	21.2	20.0	50.0
21.813000	26.4	1000.0	9.000	Off	N	21.5	23.6	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						
6814	PSA Series Spectrum Analyzer	E4440A	MY42510441	Agilent	11/03/11	11/03/12
6610	Temperature Chamber	SH-27C	EV03	Envirotronics	06/29/12	06/29/13
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
Conducted Emissions Test Setup						
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
1024	EMI Test Receiver	ESCS 30	847793/001	Rhode & Schwarz	02/29/12	02/28/13
8607	20dB Attenuator	CAT-20	N/A	MCL HAT-20	08/21/12	08/21/13
8609	20dB Attenuator	CAT-20	N/A	MCL HAT-20	08/21/12	08/21/13
Radiated Test Setup						
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
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.	09/21/12	09/21/13
8543	High-frequency cable	Micropore 19057793	N/A	United Microwave Products	09/21/12	09/21/13
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	08/10/12	08/10/13
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	06/13/12	06/13/13
1016	Pre-amplifier	PAM-0202	187	PAM	09/24/12	09/24/13
7546	Signal Generator	SMP-02	1035.5005.02	Rhode & Schwarz	06/15/12	06/15/13
1151	Pre-amplifier	TS-PR26	100026	Rhode & Schwarz	Verified by 7546 and 1049	
1150	Horn antenna	RA42-K-F-4B-C	012054-004	CMT	Verified by 7546 and 1049	
	2.0GHz Band Notch Filter	BRM50707	005	Micro-Tronics	Verified by 7546 and 1049	
6815	2.4GHz Band Notch Filter	BRM50702	008	Micro-Tronics	Verified by 7546 and 1049	
Miscellaneous						
6452	Multimeter	3478A	2911A52177	Hewlett Packard	07/16/12	07/16/13
	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

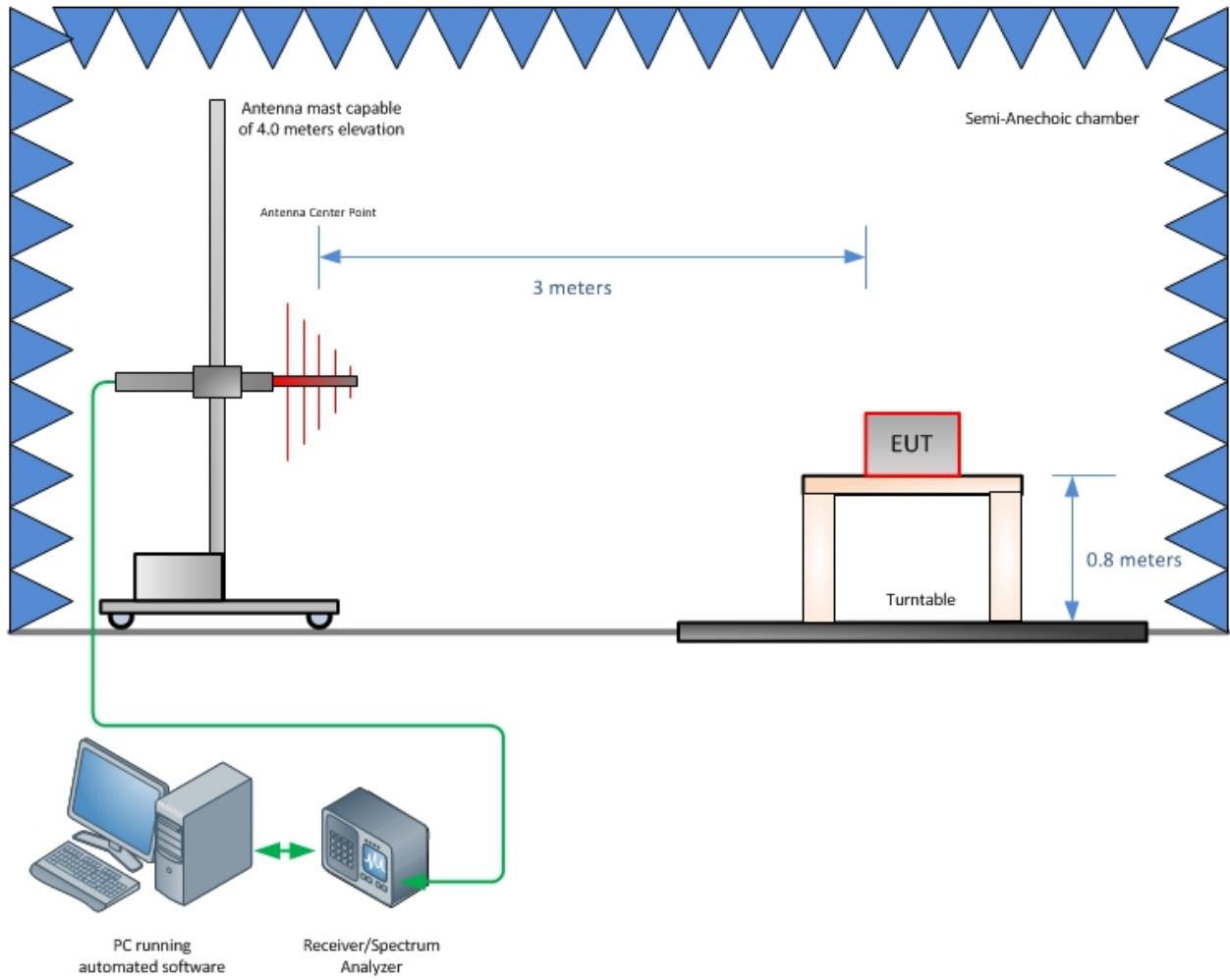
3.2.4 AC Mains Conducted Emissions Measurement

Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.36	0.21	0.04
2	Cables	Rectangular	0.50	0.29	0.08
3	LISN	Rectangular	0.66	0.38	0.15
4	Attenuator	Rectangular	0.30	0.17	0.03
5	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					0.80
Coverage Factor (k):					2
Expanded Uncertainty:					1.59

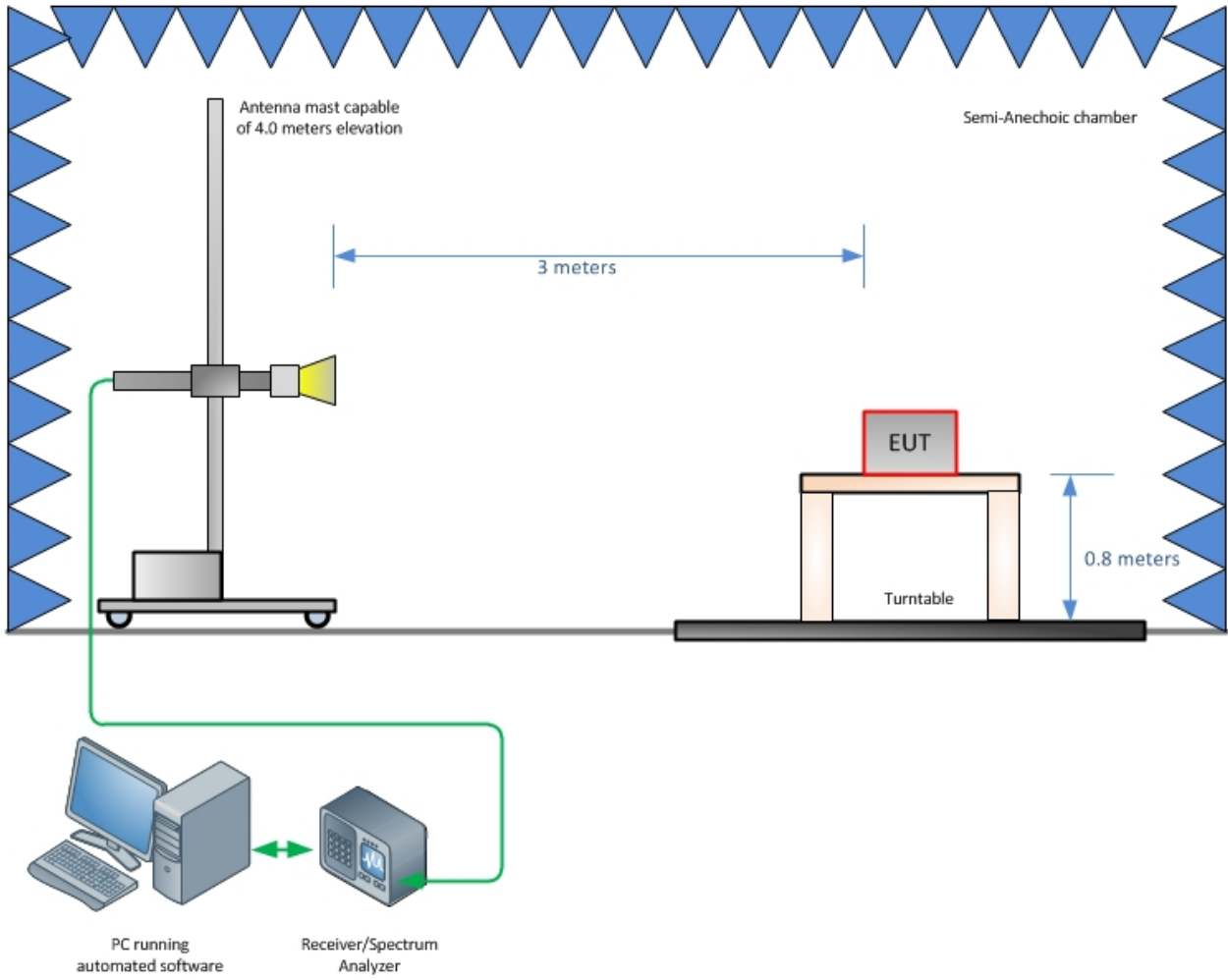
SECTION 4

DIAGRAM OF TEST SETUP

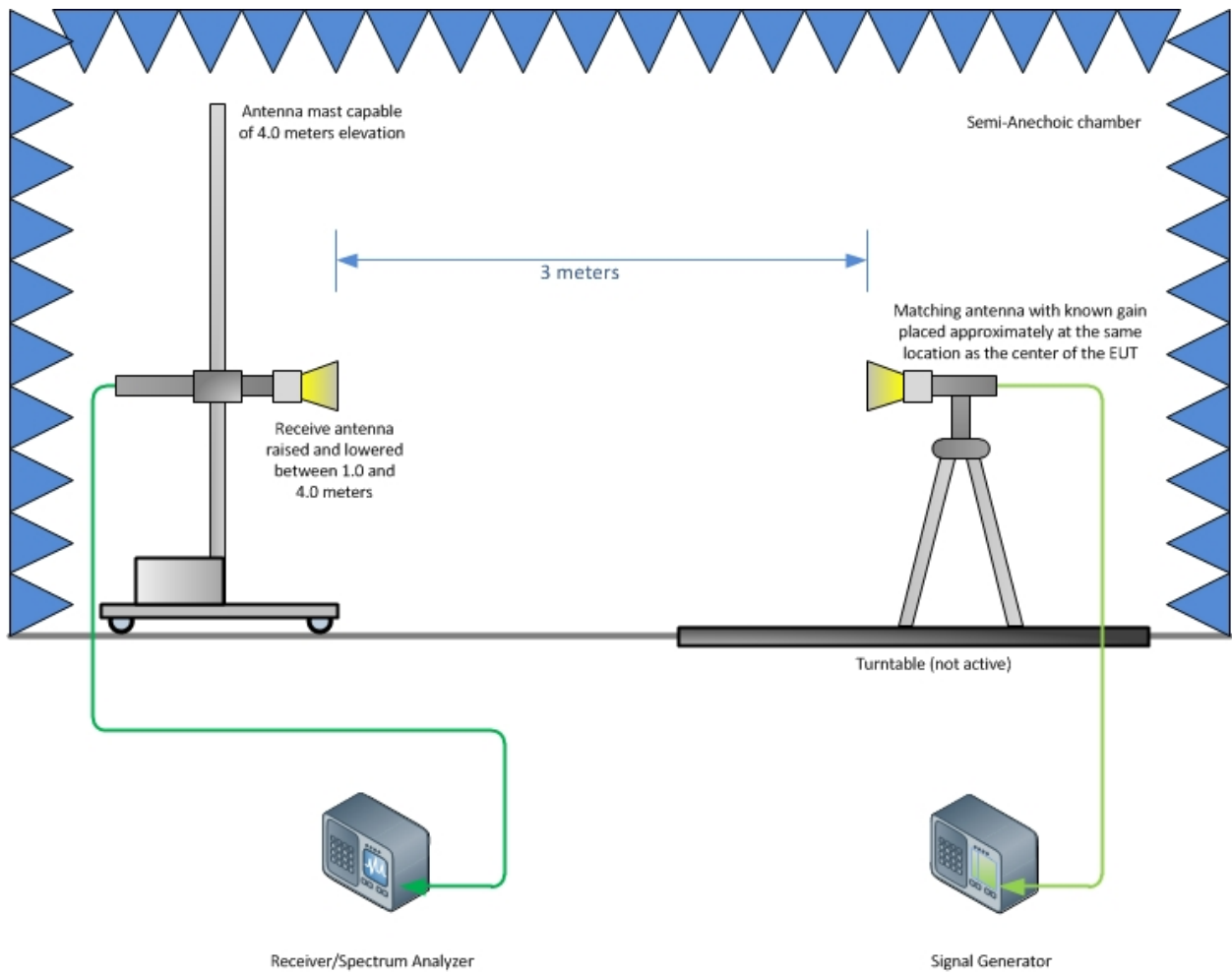
4.1 TEST SETUP DIAGRAM



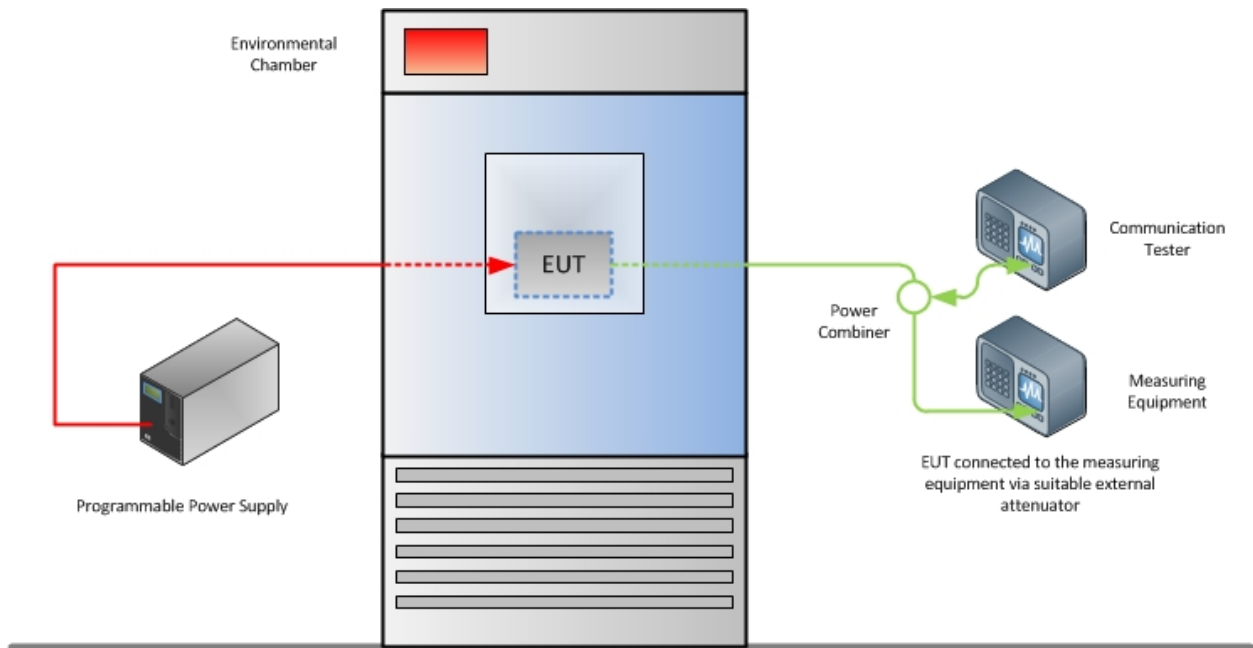
Radiated Emission Test Setup (Below 1GHz)



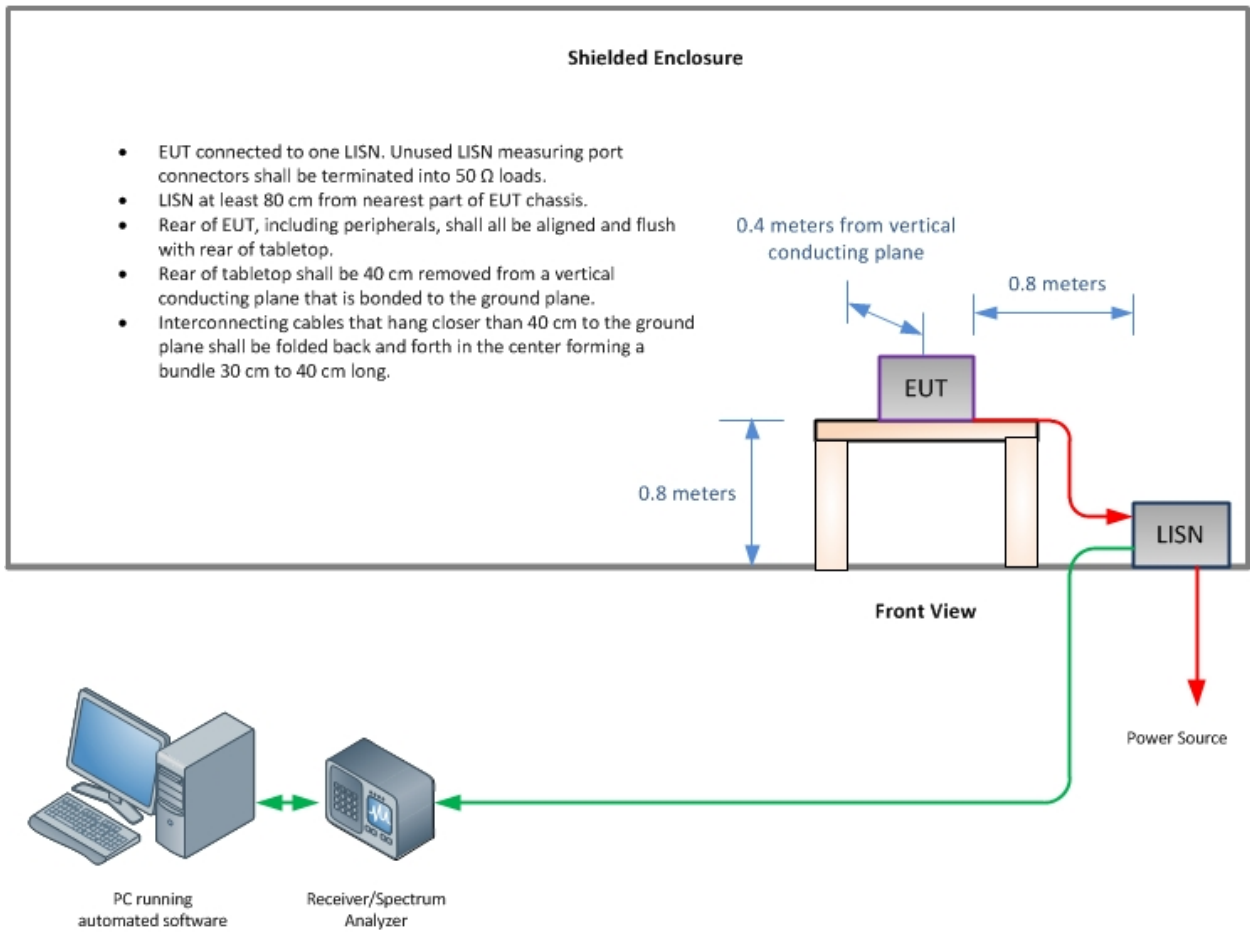
Radiated Emission Test Setup (Above 1GHz)



Substitution Test Method (Above 1GHz)



Frequency Stability Test Configuration



Conducted Emissions Test Configuration

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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