LTE RF TEST REPORT

No. 2011TAR601

for

Sierra Wireless Inc.

USB Modem

Model Name: AirCard 330U

FCC ID: N7NAC330U

IC: 2417C-AC330U

Issued Date: Nov 17, 2011

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

Test Laboratory:

DAR accreditation (DIN EN ISO/IEC 17025): No. DAT-P-114/01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629A-1

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology
Shouxiang Science Building, No 51, Xueyuan Road, Haidian District, Beijing, P.R.China 100191
Tel:+86(0)10-62304633-2678, Fax:+86(0)10-62304793 Email:welcome@emcite.com. www.emcite.com

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1. Test Laboratory

1.1. Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	Shouxiang Science Building, No 51, Xueyuan Road, Haidian District, Beijing, P.R.China
Postal Code:	100191
Telephone:	00861062304633
Fax:	00861062304793

1.2. Testing Environment

Normal Temperature:	15-35℃
Relative Humidity:	20-75%

1.3. Project data

Testing Start Date:	Oct 20, 2011
Testing End Date:	Nov 17, 2011

1.4. Signature

Zi Xiaogang

(Prepared this test report)

Sun Xiangqian

(Reviewed this test report)

Lu Bingsong

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Sierra Wireless Inc.
Address /Post:	13811 Wireless Way, Richmond, BC, Canada, V6V 3A4
City:	Richmond
Country:	Canada
Telephone:	1 604 231 1100
Fax:	1 604 231 1109

2.2. Manufacturer Information

Company Name:	Sierra Wireless Inc.
Address /Post:	13811 Wireless Way, Richmond, BC, Canada, V6V 3A4
City:	Richmond
Country:	Canada
Telephone:	1604 231 1100
Fax:	1 604 231 1109

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	USB Modem
Model Name	AirCard 330U
FCC ID	N7NAC330U
IC	2417C-AC330U
Frequency	GSM 850MHz; PCS 1900MHz; WCDMA Band II; WCDMA Band V；LTE Band 4；LTE Band 7；

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
N07	/	DV1.1	SWI9200X_03.00.06.05AP

*EUT ID: is used to identify the test sample in the lab internally.

3.3. General Description

The Equipment Under Test (EUT) is a model of USB Modem with integrated antenna. Manual and specifications of the EUT were provided to fulfil the test. Samples undergoing test were selected by the Client.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 27	MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES	V 10.1.07
RSS-Gen	RSS-Gen — General Requirements and Information for the Certification of Radiocommunication Equipment	Issue 2, June 2007
RSS139	Advanced Wireless Services Equipment Operating in the Bands 1710-1755 MHz and 2110-2155 MHz	Issue 2, February 2009
RSS199	Broadband Radio Service (BRS) Equipment Operating in the Band 2500-2690 MHz	Issue 1, January 2010
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2004
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2003

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.2 dB, 10 m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

Control room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 30 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 10 kΩ
Ground system resistance	< 0.5 Ω
Uniformity of field strength	Between 0 and 6 dB, from 80 to 2000 MHz

6. SUMMARY OF TEST RESULTS

LTE BAND 4

Items	Test Name	Clause in FCC rules	Clause in IC rules RSS-139	Section in this report	Verdict
1	Output Power	§27.50(d)	6.4	A.1	P
2	Emission Limit	§27.53(h)	6.5	A.2	P

LTE BAND 7

Items	Test Name	Clause in FCC rules	Clause in IC rules RSS-199	Section in this report	Verdict
1	Output Power	§27.50(h)	4.4	A.1	P
2	Emission Limit	§27.53(m)	4.5	A.2	P

LTE BAND 4 Receiver Radiated Emission

Items	Test Name	Clause in IC rules RSS-139	Section in this report	Verdict
1	Receiver Radiated Emissions	6.6	A.3	P

LTE BAND 7 Receiver Radiated Emission

Items	Test Name	Clause in IC rules RSS-199	Section in this report	Verdict
1	Receiver Radiated Emissions	4.6	A.3	P

7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL DUE DATE
1	Test Receiver	ESCI	100766	R&S	2012-12-06
2	Test Receiver	ESI40	831564/002	R&S	2012-12-12
3	BiLog Antenna	VULB9163	9163-175	Schwarzbeck	2012-12-05
4	BiLog Antenna	VULB9163	9163-302	Schwarzbeck	2012-12-10
5	Signal Generator	SMB100A	102063	R&S	2012-12-05
7	LISN	ESH2-Z5	829991/012	R&S	2012-12-20
8	Spectrum Analyzer	FSU26	200030	R&S	2012-12-18
9	Spectrum Analyzer	FSU46	100054	R&S	2012-12-14
10	Universal Radio Communication Tester	CMM500	101675	R&S	2012-12-23
12	Dual-Ridge Waveguide Horn Antenna	3117	00119024	ETS	2012-12-21
13	Dual-Ridge Waveguide Horn Antenna	3117	00119021	ETS	2012-12-31
14	Dual-Ridge Waveguide Horn Antenna	3116	2663	EMCO	2013-12-09
15	Dual-Ridge Waveguide Horn Antenna	3116	2661	EMCO	2012-12-01
16	Climatic chamber	PL-2G	343074	ESPEC	2012-12-01

ANNEX A: MEASUREMENT RESULTS

A.1 OUTPUT POWER (§27.50(d)(h))

A.1.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.
This result contains peak output power and EIRP measurements for the EUT. In all cases, output power is within the specified limits.

A.1.2 Radiated

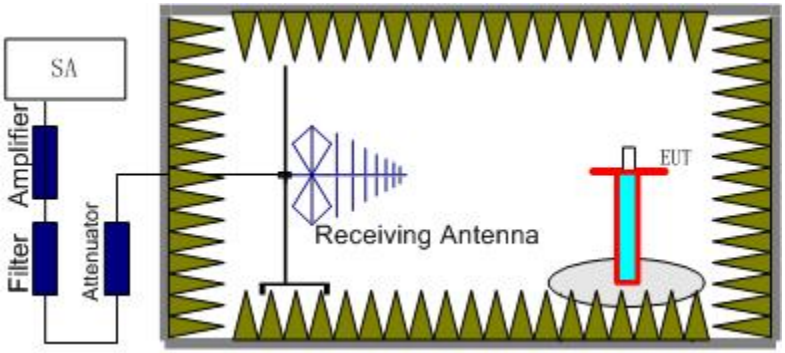
A.1.2.1 Description

This is the test for the maximum radiated power from the EUT.
Rule Part 27.50(d) specifies, "Fixed, mobile, and portable (handheld) stations operating in the 1710–1755 MHz band are limited to a peak EIRP of 1 watt."
Rule Part 27.50(h) specifies, "Mobile stations are limited to 2.0 watts EIRP."

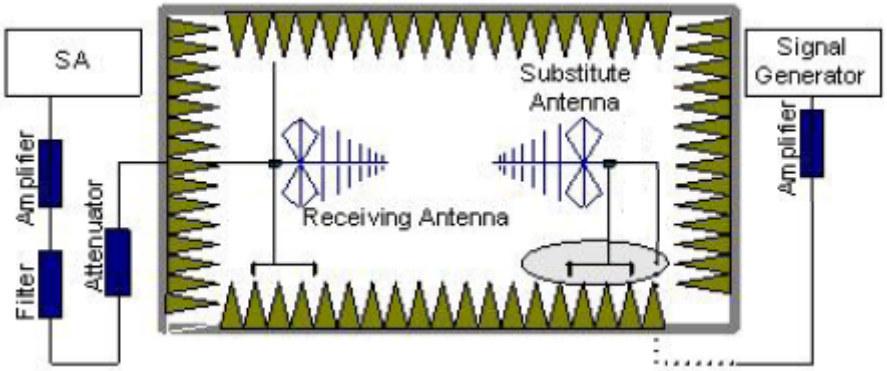
A.1.2.2 Method of Measurement

The measurements procedures in TIA-603C-2004 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna.
   The cable loss (P_{cl}) ,the Substitution Antenna Gain (G_a) and the Amplifier Gain (P_{Ag}) should be recorded after test.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{Ag} + P_{cl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

LTE Band 4-EIRP

Limits

	Burst Peak EIRP (dBm)
LTE BAND 4	≤30dBm (1W)

Measurement result

BW 10MHz, 1RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-28.27	3.50	-53.00	-5.15	**26.38**	H
1732.50	-31.32	3.57	-53.00	-5.08	23.19	H
1750.00	-29.40	3.63	-53.00	-5.00	24.97	H

BW 10MHz, 1RB, Offset 49, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-27.83	3.50	-53.00	-5.15	**26.82**	H
1732.50	-30.24	3.57	-53.00	-5.08	24.27	H
1750.00	-28.46	3.63	-53.00	-5.00	25.91	H

BW 10MHz, 25RB, Offset 12, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
824.20	-29.61	3.50	-53.00	-5.15	**25.04**	H
824.20	-32.84	3.57	-53.00	-5.08	21.67	H
824.20	-29.82	3.63	-53.00	-5.00	24.55	H

BW 10MHz, 50RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-29.66	3.50	-53.00	-5.15	**24.99**	H
1732.50	-32.96	3.57	-53.00	-5.08	21.55	H
1750.00	-30.52	3.63	-53.00	-5.00	23.85	H

BW 10MHz, 1RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-28.06	3.50	-53.00	-5.15	**26.59**	H
1732.50	-30.84	3.57	-53.00	-5.08	23.67	H
1750.00	-27.82	3.63	-53.00	-5.00	26.55	H

BW 10MHz, 1RB, Offset 49,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-27.68	3.50	-53.00	-5.15	**26.97**	H
1732.50	-30.67	3.57	-53.00	-5.08	23.84	H
1750.00	-28.21	3.63	-53.00	-5.00	26.16	H

BW 10MHz, 25RB, Offset 12,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-30.37	3.50	-53.00	-5.15	**24.28**	H
1732.50	-33.57	3.57	-53.00	-5.08	20.94	H
1750.00	-30.37	3.63	-53.00	-5.00	24.00	H

BW 10MHz, 50RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1715.00	-31.25	3.50	-53.00	-5.15	**23.40**	H
1732.50	-34.65	3.57	-53.00	-5.08	19.86	H
1750.00	-31.67	3.63	-53.00	-5.00	22.70	H

BW 20MHz, 1RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-29.47	3.50	-53.00	-5.13	**25.16**	H
1732.50	-29.88	3.57	-53.00	-5.08	24.63	H
1745.00	-30.01	3.61	-53.00	-5.02	24.40	H

BW 20MHz, 1RB, Offset 99, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-29.83	3.50	-53.00	-5.13	**24.80**	H
1732.50	-30.39	3.57	-53.00	-5.08	24.12	H
1745.00	-30.53	3.61	-53.00	-5.02	23.88	H

BW 20MHz, 50RB, Offset 25, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-33.45	3.50	-53.00	-5.13	21.18	H
1732.50	-34.30	3.50	-53.00	-5.08	20.21	H
1745.00	-33.03	3.57	-53.00	-5.02	**21.38**	H

BW 20MHz, 100RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-36.90	3.50	-53.00	-5.13	17.73	H
1732.50	-34.69	3.57	-53.00	-5.08	**19.82**	H
1745.00	-36.78	3.61	-53.00	-5.02	17.63	H

BW 20MHz, 1RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-29.70	3.50	-53.00	-5.13	**24.93**	H
1732.50	-34.51	3.57	-53.00	-5.08	20.00	H
1745.00	-29.56	3.61	-53.00	-5.02	24.85	H

BW 20MHz, 1RB, Offset 99,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-29.26	3.50	-53.00	-5.13	**25.37**	H
1732.50	-32.95	3.57	-53.00	-5.08	21.56	H
1745.00	-32.68	3.61	-53.00	-5.02	21.73	H

BW 20MHz, 50RB, Offset 25,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-35.46	3.50	-53.00	-5.13	**19.17**	H
1732.50	-39.72	3.57	-53.00	-5.08	14.79	H
1745.00	-35.75	3.61	-53.00	-5.02	18.66	H

BW 20MHz, 100RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
1720.00	-27.91	3.50	-53.00	-5.13	**26.72**	H
1732.50	-32.39	3.57	-53.00	-5.08	22.12	H
1745.00	-28.68	3.61	-53.00	-5.02	25.73	H

Configuartion:

Frequency: 1715MHz , BW 10MHz, 1RB, Offset 49,16QAM

Peak EIRP(dBm)= P_{Mea}(-27.68dBm)- P_{cl}(3.5dB)- P_{Ag}(-53dB)-G_a (-5.15dB) = 26.97dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

LTE Band 7-EIRP

Limits

	Burst Peak EIRP (dBm)
LTE BAND 7	≤33dBm(2W)

Measurement result

BW 10MHz, 1RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-29.06	4.36	-53.00	-5.41	24.99	H
2535.00	-25.01	4.32	-53.00	-5.49	29.16	H
2565.00	-24.00	4.42	-53.00	-5.57	**30.15**	H

BW 10MHz, 1RB, Offset 49, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-27.96	4.36	-53.00	-5.41	26.09	H
2535.00	-24.83	4.32	-53.00	-5.49	29.34	H
2565.00	-24.48	4.42	-53.00	-5.57	**29.67**	H

BW 10MHz, 25RB, Offset 12, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-30.51	4.36	-53.00	-5.41	23.54	H
2535.00	-25.81	4.32	-53.00	-5.49	**28.36**	H
2565.00	-25.83	4.42	-53.00	-5.57	28.32	H

BW 10MHz, 50RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-31.46	4.36	-53.00	-5.41	22.59	H
2535.00	-26.52	4.32	-53.00	-5.49	**27.65**	H
2565.00	-27.41	4.42	-53.00	-5.57	26.74	H

BW 10MHz, 1RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-27.71	4.36	-53.00	-5.41	26.34	H
2535.00	-24.47	4.32	-53.00	-5.49	29.70	H
2565.00	-23.28	4.42	-53.00	-5.57	**30.87**	H

BW 10MHz, 1RB, Offset 49,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-27.33	4.36	-53.00	-5.41	26.72	H
2535.00	-24.24	4.32	-53.00	-5.49	29.93	H
2565.00	-23.22	4.42	-53.00	-5.57	**30.93**	H

BW 10MHz, 25RB, Offset 12,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-30.61	4.36	-53.00	-5.41	23.44	H
2535.00	-27.28	4.32	-53.00	-5.49	26.89	H
2565.00	-26.28	4.42	-53.00	-5.57	**27.87**	H

BW 10MHz, 50RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2505.00	-30.93	4.36	-53.00	-5.41	23.12	H
2535.00	-28.42	4.32	-53.00	-5.49	25.75	H
2565.00	-27.47	4.42	-53.00	-5.57	**26.68**	H

BW 20MHz, 1RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-25.45	4.31	-53.00	-5.43	28.67	H
2535.00	-24.38	4.32	-53.00	-5.49	**29.79**	H
2560.00	-24.85	4.46	-53.00	-5.56	29.25	H

BW 20MHz, 1RB, Offset 99, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-24.78	4.31	-53.00	-5.43	29.34	H
2535.00	-24.57	4.32	-53.00	-5.49	**29.60**	H
2560.00	-24.75	4.46	-53.00	-5.56	29.35	H

BW 20MHz, 50RB, Offset 25, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-28.06	4.31	-53.00	-5.43	26.06	H
2535.00	-26.62	4.32	-53.00	-5.49	**27.55**	H
2560.00	-27.50	4.46	-53.00	-5.56	26.60	H

BW 20MHz, 100RB, Offset 0, QPSK

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-30.07	4.31	-53.00	-5.43	24.05	H
2535.00	-28.93	4.32	-53.00	-5.49	**25.24**	H
2560.00	-29.87	4.46	-53.00	-5.56	24.23	H

BW 20MHz, 1RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-24.76	4.31	-53.00	-5.43	29.36	H
2535.00	-23.95	4.32	-53.00	-5.49	**30.22**	H
2560.00	-24.07	4.46	-53.00	-5.56	30.03	H

BW 20MHz, 1RB, Offset 99,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-24.57	4.31	-53.00	-5.43	29.55	H
2535.00	-24.14	4.32	-53.00	-5.49	**30.03**	H
2560.00	-24.48	4.46	-53.00	-5.56	29.62	H

BW 20MHz, 50RB, Offset 25,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-29.09	4.31	-53.00	-5.43	25.03	H
2535.00	-27.69	4.32	-53.00	-5.49	**26.48**	H
2560.00	-28.6	4.46	-53.00	-5.56	25.50	H

BW 20MHz, 100RB, Offset 0,16QAM

Frequency(MHz)	P_{Mea}(dBm)	P_{cl}(dB)	P_{Ag}(dB)	G_a Antenna Gain(dB)	Peak EIRP(dBm)	Polarization
2510.00	-31.06	4.31	-53.00	-5.43	23.06	H
2535.00	-30.59	4.32	-53.00	-5.49	**23.58**	H
2560.00	-32.07	4.46	-53.00	-5.56	22.03	H

Configration:

Frequency: 2565MHz , BW 10MHz, 1RB, Offset 49,16QAM

Peak EIRP(dBm)= P_{Mea}(-23.22dBm)- P_{cl}(4.42dB)- P_{Ag}(-53dB)-G_a (-5.57dB) = 30.93dBm

ANALYZER SETTINGS: RBW = VBW = 3MHz

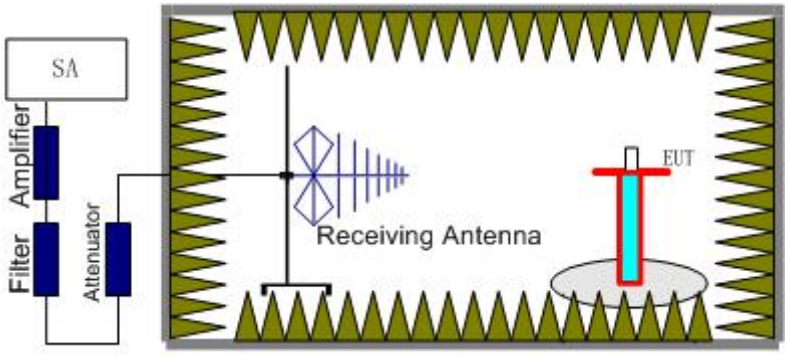
A.2 EMISSION LIMIT (§27.53(h)(m))

A.2.1 Measurement Method

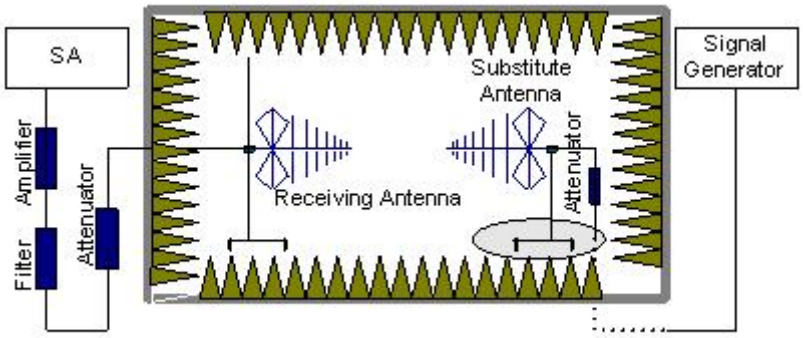
The measurements procedures in TIA-603C-2004 are used. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment. The resolution bandwidth is set as outlined in Part 27.53(h)(m). The spectrum is scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of LTE Band 4 and LTE Band 7

The procedure of radiated spurious emissions is as follows:

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (P_{Mea}) is applied to the input of the

substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (P_r). The power of signal source (P_{Mea}) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss (P_{pl}) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain (G_a) should be recorded after test.
   A amplifier should be connected in for the test.
   The Path loss (P_{pl}) is the summation of the cable loss and the gain of the amplifier.
   The measurement results are obtained as described below:
   Power(EIRP)=P_{Mea}+ P_{pl} + G_a
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP -2.15dBi.

A.2.2 Measurement Limit

Part 27.53(h) specify that, “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 log10 (P) dB.”

The specification that emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, translates in the relevant power range (1 to 0.001 W) to -13 dBm. At 1 W the specified minimum attenuation becomes 43 dB and relative to a 30 dBm (1 W) carrier becomes a limit of -13 dBm. At 0.001 W (0 dBm) the minimum attenuation is 13 dB, which again yields a limit of -13 dBm. In this way a translation of the specification from relative to absolute terms is carried out.

Part 27.53(m) specify that, “For mobile digital stations, the attenuation factor shall be not less than 43 + 10 log (P) dB at the channel edge and 55 + 10 log (P) dB at 5.5 megahertz from the channel edges.

A.2.3 Measurement Results

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of LTE Band 4 and LTE Band 7 . It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of LTE Band 4 and LTE Band 7 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

A.2.4 Measurement Results Table

Frequency	Channel	Frequency Range	Result
LTE BAND 4	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass
LTE BAND 7	Low	30MHz-20GHz	Pass
	Middle	30MHz-20GHz	Pass
	High	30MHz-20GHz	Pass

A.2.5 Sweep Table

Working Frequency	Subrange (GHz)	RBW	VBW	Sweep time (s)
LTE BAND 4	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2
LTE BAND 7	0.03~1	100KHz	300KHz	10
	1-2	1 MHz	3 MHz	2
	2~5	1 MHz	3 MHz	3
	5~8	1 MHz	3 MHz	3
	8~11	1 MHz	3 MHz	3
	11~14	1 MHz	3 MHz	3
	14~18	1 MHz	3 MHz	3
	18~20	1 MHz	3 MHz	2

LTE BAND 4

Channel 20000 / QPSK

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3786.84	-67.23	5.62	-8.24	-64.61	-13.00	51.61	H
5132.03	-63.18	6.95	-9.78	-60.35	-13.00	47.35	H
6843.86	-66.00	7.53	-10.94	-62.59	-13.00	49.59	V
8553.11	-62.13	7.72	-12.24	-57.61	-13.00	44.61	V
10675.44	-62.23	8.79	-12.46	-58.56	-13.00	45.56	H
13174.51	-61.01	10.27	-13.47	-57.81	-13.00	44.81	H

Channel 20175 / QPSK

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3456.16	-62.32	5.49	-7.79	-60.02	-13.00	47.02	H
5300.26	-67.76	7.53	-9.88	-65.41	-13.00	52.41	H
6624.15	-64.87	7.37	-10.72	-61.52	-13.00	48.52	V
8522.06	-66.32	7.73	-12.22	-61.83	-13.00	48.83	V
10068.82	-64.88	8.47	-12.41	-60.94	-13.00	47.94	V
14865.16	-60.56	11.55	-13.53	-58.58	-13.00	45.58	H

Channel 20350 / QPSK

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3743.46	-71.02	5.95	-8.19	-68.78	-13.00	55.78	H
4972.92	-57.55	7.19	-9.65	-55.09	-13.00	42.09	H
8727.87	-64.07	8.05	-12.38	-59.74	-13.00	46.74	V
13736.57	-62.13	11.35	-13.89	-59.59	-13.00	46.59	H
16214.31	-59.85	11.54	-12.74	-58.65	-13.00	45.65	V
17666.72	-57.89	11.90	-13.40	-56.39	-13.00	43.39	H

Channel 20000 / 16QAM

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3743.46	-71.02	5.95	-8.19	-68.78	-13.00	55.78	H
4972.92	-57.55	7.19	-9.65	-55.09	-13.00	42.09	H
8727.87	-64.07	8.05	-12.38	-59.74	-13.00	46.74	V
13736.57	-62.13	11.35	-13.89	-59.59	-13.00	46.59	H
16214.31	-59.85	11.54	-12.74	-58.65	-13.00	45.65	V
17666.72	-57.89	11.90	-13.40	-56.39	-13.00	43.39	H

Channel 20175 /16QAM

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3275.78	-67.24	5.01	-7.36	-64.89	-13.00	51.89	V
5498.86	-66.91	8.61	-10.00	-65.52	-13.00	52.52	H
8809.07	-65.12	8.03	-12.45	-60.70	-13.00	47.70	H
10099.10	-66.11	8.44	-12.42	-62.13	-13.00	49.13	V
13181.20	-61.69	10.27	-13.48	-58.48	-13.00	45.48	H
14993.22	-59.54	11.31	-13.50	-57.35	-13.00	44.35	V

Channel 20350 / 16QAM

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
3564.01	-68.20	5.31	-7.98	-65.53	-13.00	52.53	V
5545.83	-69.93	8.73	-10.02	-68.64	-13.00	55.64	V
9211.15	-66.28	8.27	-12.60	-61.95	-13.00	48.95	V
10750.31	-64.65	8.92	-12.45	-61.12	-13.00	48.12	V
13792.72	-61.63	11.41	-13.92	-59.12	-13.00	46.12	V
14538.45	-60.48	12.15	-13.59	-59.04	-13.00	46.04	V

LTE BAND 7

Limit:

Frequency Offset from Band Edge < 5.5MHz, -13dBm

Frequency Offset from Band Edge >= 5.5MHz, -25dBm

Channel 20800 / QPSK

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
5001.19	-57.13	6.78	-9.70	-54.21	-25.00	41.21	V
6606.53	-64.84	7.49	-10.71	-61.62	-25.00	48.62	V
9562.68	-66.21	8.33	-12.57	-61.97	-25.00	48.97	V
12508.34	-61.96	9.71	-12.71	-58.96	-25.00	45.96	H
14584.91	-59.29	12.20	-13.58	-57.91	-25.00	44.91	V
16225.38	-60.12	11.52	-12.73	-58.91	-25.00	45.91	V

Channel 21100 / QPSK

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
5061.14	-62.27	7.34	-9.74	-59.87	-25.00	46.87	H
7087.06	-64.87	8.54	-11.15	-62.26	-25.00	49.26	H
8227.02	-68.44	7.64	-12.04	-64.04	-25.00	51.04	V
9838.78	-65.47	8.25	-12.46	-61.26	-25.00	48.26	V
12646.96	-63.86	9.92	-12.88	-60.90	-25.00	47.90	V
13980.71	-61.66	11.89	-13.99	-59.56	-25.00	46.56	V

Channel 21400 / QPSK

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
5120.94	-59.77	7.11	-9.77	-57.11	-25.00	44.11	V
7140.72	-67.14	8.64	-11.18	-64.60	-25.00	51.60	H
8492.78	-64.74	7.86	-12.20	-60.40	-25.00	47.40	H
9548.57	-64.87	8.35	-12.58	-60.64	-25.00	47.64	H
14944.45	-62.59	11.42	-13.51	-60.50	-25.00	47.50	V
16817.63	-58.06	11.69	-12.40	-57.35	-25.00	44.35	V

Channel 20800 / 16QAM

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
5001.15	-60.26	6.78	-9.70	-57.34	-25.00	44.34	H
6520.59	-65.31	7.67	-10.62	-62.36	-25.00	49.36	V
8578.45	-64.08	7.71	-12.26	-59.53	-25.00	46.53	H
10372.04	-63.58	8.67	-12.47	-59.78	-25.00	46.78	H
13491.37	-62.48	10.81	-13.79	-59.50	-25.00	46.50	H
16112.32	-58.90	10.91	-12.87	-56.94	-25.00	43.94	H

Channel 21100 /16QAM

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
6289.80	-66.66	8.88	-10.43	-65.11	-25.00	52.11	H
7971.76	-68.23	7.58	-11.87	-63.94	-25.00	50.94	V
10242.87	-63.75	8.60	-12.45	-59.90	-25.00	46.90	H
13166.80	-65.97	10.27	-13.47	-62.77	-25.00	49.77	H
14993.79	-62.79	11.31	-13.50	-60.60	-25.00	47.60	H
17233.58	-60.65	11.74	-12.82	-59.57	-25.00	46.57	V

Channel 21400 / 16QAM

Frequency(MHz)	P_{Mea}(dBm)	Path Loss	Antenna Gain	Peak EIRP(dBm)	Limit （dBm）	Margin(dB)	Polarization
5055.30	-69.51	7.31	-9.73	-67.09	-25.00	54.09	H
7858.54	-67.31	7.63	-11.76	-63.18	-25.00	50.18	V
8836.71	-66.68	7.88	-12.47	-62.09	-25.00	49.09	V
10082.36	-64.03	8.46	-12.42	-60.07	-25.00	47.07	H
12694.87	-60.80	9.99	-12.93	-57.86	-25.00	44.86	H
14997.92	-62.63	11.30	-13.50	-60.43	-25.00	47.43	H

A.3 RECEIVER RADIATION EMISSION

Reference

IC: RSS 139, Issue 2, Section 6.6. RSS 199, Issue 1, Section 4.6

A.3.1 Method of Measurement

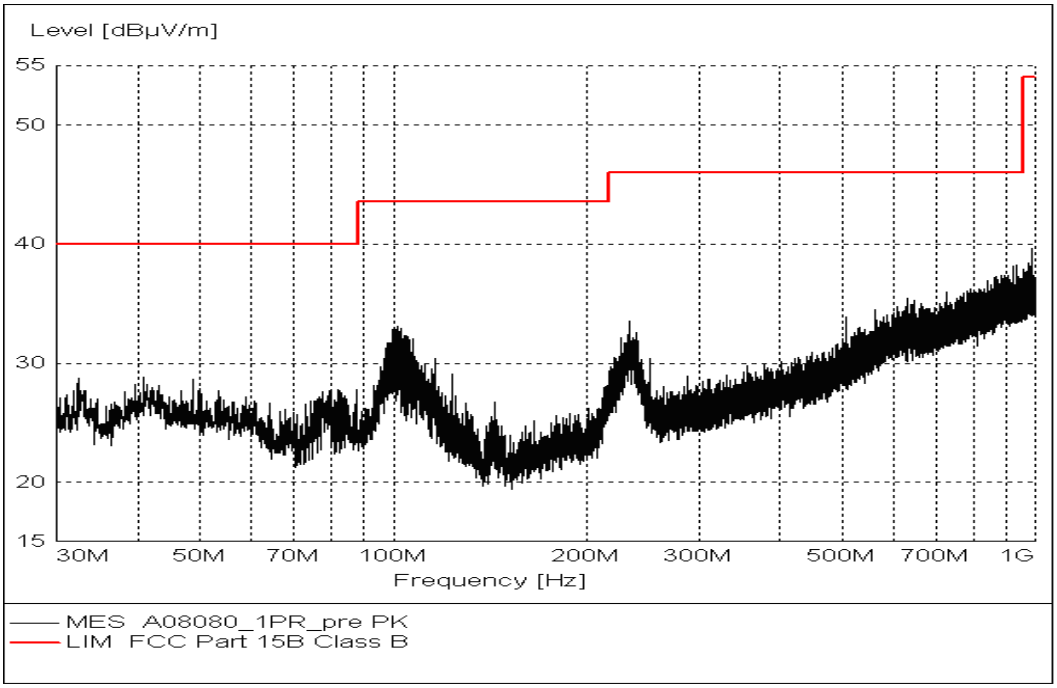
The measurement procedure in ANSI C64.4-2003 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMW500 signaling.

A.3.2 Method of Measurement

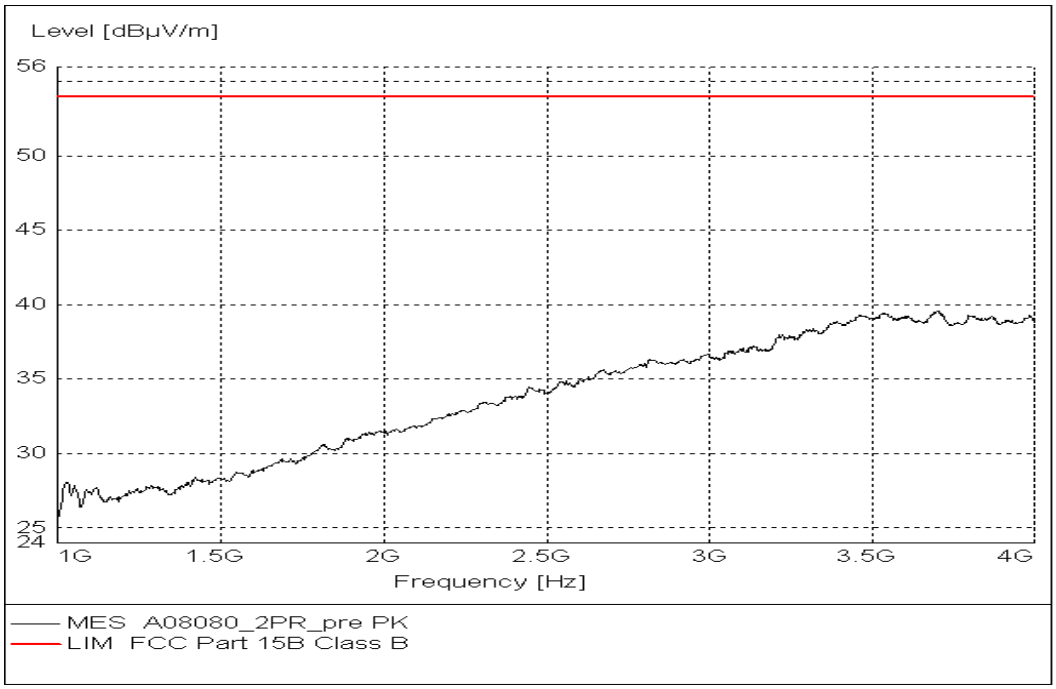
Frequency of Emission (MHz)	Limit (dBμV/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

A. 3.3 Measurement results



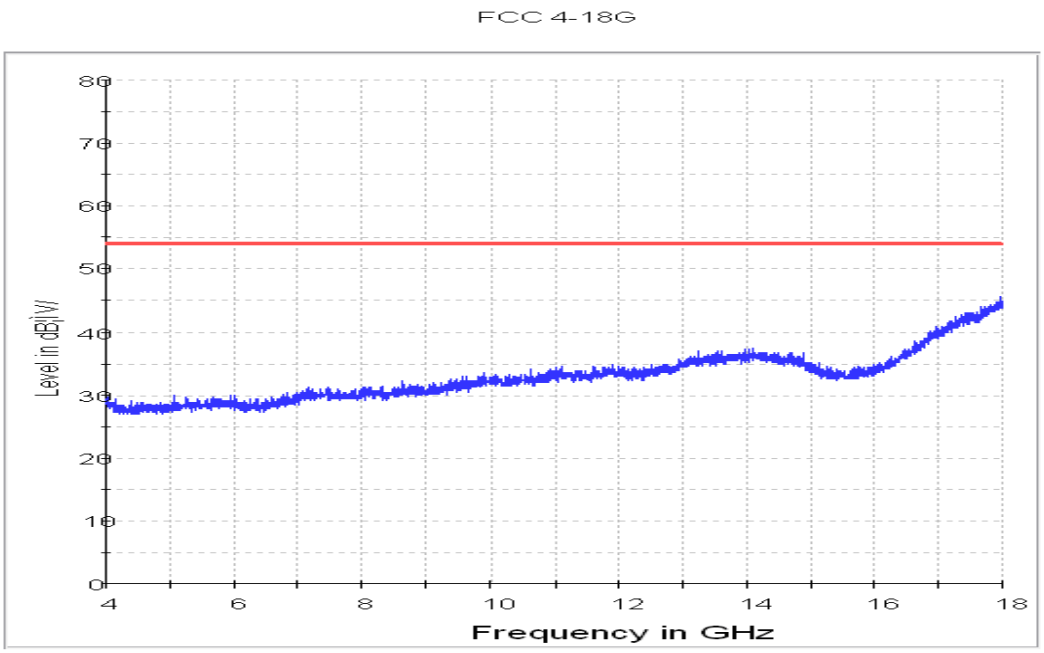
IF bandwidth: 120 kHz

Idle Mode: 30MHz-1GHz



RBW / VBW 1 MHz

Idle Mode: 1GHz-4GHz



RBW / VBW 1 MHz

Idle Mode: 4GHz-18GHz

*****END OF REPORT*****