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Report On

Application for Grant of Equipment Authorization of the
NantWorks
HBox Access Point for Medical Devices

FCC Subpart C Part 15.249: 2014
IC RSS-210 Issue 8 December 2010

Report No. SD72102282-0215H

June 2015



America

TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121
Tel: (858) 678-1400. Website: www.TUVamerica.com

REPORT ON Radio Testing of the
NantWorks
HBox Access Point for Medical Devices

TEST REPORT NUMBER SD72102282-0215H

PREPARED FOR NantWorks
9920 Jefferson Blvd.
Culver City, CA 90232

CONTACT PERSON David Lu
Principal Engineer
(858) 735-6852
dlu@nantworks.com

PREPARED BY _____
Xiaoying Zhang
Name
Authorized Signatory
Title: EMC/Wireless Test Engineer

APPROVED BY _____
Juan M. Gonzalez
Name
Authorized Signatory
Title: Commercial Wireless EMC Lab Manager

DATED June 23, 2015



America

TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121
Tel: (858) 678-1400. Website: www.TUVamerica.com

Revision History

SD72102282-0215H NantWorks HBox Access Point for Medical Devices					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
06/23/2015	Initial Release				Juan M Gonzalez

CONTENTS

Section	Page No
1 REPORT SUMMARY	5
1.1 Introduction.....	6
1.2 Brief Summary of Results.....	7
1.3 Product Information	8
1.4 EUT Test configuration	10
1.5 Deviations from the Standard.....	12
1.6 Modification Record	12
1.7 test methodology	12
1.8 test facility.....	12
2 TEST DETAILS.....	13
2.1 Conducted Emissions.....	14
2.2 20 dB bandwidth	20
2.3 99% EMISSION bandwidth.....	22
2.4 Field Strength Limits for Fundamental and Harmonics	24
2.5 Radiated Spurious Emissions	28
3 TEST EQUIPMENT USED	29
3.1 Test Equipment Used.....	30
3.2 Measurement Uncertainty	31
4 Diagram of Test Setup	32
4.1 Radiated Emission Test Setup (Below 1GHz).....	33
4.2 Radiated Emission Test Setup (Above 1GHz).....	34
5 ACCREDITATION, DISCLAIMERS AND COPYRIGHT	35
5.1 Accreditation, Disclaimers and Copyright	36

FCC ID: IFU1001011
IC: N/A
Report No. SD72102282-0215H



SECTION 1

REPORT SUMMARY

Radio Testing of the
NantWorks
HBox Access Point for Medical Devices

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the NantWorks HBox Access Point for Medical Devices to the requirements of FCC Subpart C Part 15.249 and IC RSS-210 Issue 8 December 2010.

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	NantWorks
Model Number(s)	200-HBV-PDL
FCC ID Number	IFU1001011
IC Number	N/A
Serial Number(s)	N/A (Sample #2) Conducted antenna service port testing sample, serial number not available due to temporary addition of an antenna port for testing / (Sample #1) (Radiated testing)
Number of Samples Tested	2
Test Specification/Issue/Date	<ul style="list-style-type: none">• FCC Subpart C Part 15.249 (October 1, 2014).• RSS-210 - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment (Issue 8, December 2010).• RSS-Gen - General Requirements and Information for the Certification of Radio Apparatus (Issue 4, November 2014).
Start of Test	April 28, 2015
Finish of Test	June 17, 2015
Name of Engineer(s)	Xiaoying Zhang
Related Document(s)	None. Supporting documents for EUT certification are separate exhibits.

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with FCC Subpart C Part 15.249 with cross-reference to the corresponding IC RSS standard is shown below.

Section	Spec Clause	RSS	Test Description	Result	Comments/Base Standard
2.1	§15.207(a)	RSS-Gen 7.2.4	Conducted Emissions	Compliant	
2.2	§15.215(c)	RSS-Gen 4.6.3	20 dB Bandwidth	As Reported	
2.3		RSS-Gen 4.6.1	99% Emission Bandwidth	As Reported	
2.4	§15.249(a)	RSS-210 A2.9(a)	Field Strength Limits for Fundamental and Harmonics	Compliant	
2.5	§15.249(d)	RSS-210 A2.9(b)	Spurious Radiated Emissions	Compliant	
-		RSS-Gen 4.10	Receiver Spurious Emissions	N/A*	

* Not applicable. EUT does not have a separate receive mode.



1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a NantWorks HBox Access Point for Medical Devices. The EUT can connect to a network through Ethernet port or Wi-Fi. In normal operation, the EUT collects user data via USB, Bluetooth or Wi-Fi and upload the information back to a data server. The NFC function is for quick Bluetooth pairing by obtaining the device info when within NFC range of the EUT. Only the ISM900 functions verified in this test report.

1.3.2 EUT General Description

EUT Description	Access Point for Medical Devices
Model Name	HBox
Model Number(s)	200-HBV-PDL
Output Power	87.6 dB μ V/m @ 3 meters
Frequency Range	907.892 MHz in the 902 MHz to 928 MHz Band
Rated Voltage	Internal 3.7VDC Li-Ion Battery (GP Batteries 2501022), AC adapter/charger is Hon-Kwang Switching Power Supply Model: HK-AD-050A500-US, output is 5.0VDC 5.0A
Mode Verified	ISM900
Capability	CDMA2000 1xRTT, 1xEvDO Release A, 802.11 a/b/g/n WLAN (DTS/U-NII), Bluetooth 2.0 + EDR, Bluetooth 4.0, ISM900 and NFC
Primary Unit (EUT)	<input checked="" type="checkbox"/> Production <input type="checkbox"/> Pre-Production <input type="checkbox"/> Engineering
Number of Operating Frequencies	2
Modulation	2FSK
Antenna Type	Integral
Antenna Gain	1.0dBi

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
A	Antenna conducted port test configuration. All measurements were performed on the main antenna (Ant.#1). Programmed using PuTTY SSH2 (Secure Shell) client software.
B	Radiated emissions test configuration. The EUT is programmed using PuTTY SSH2 (Secure Shell) client software. The EUT is connected to a support broadband router where the support laptop used to program the EUT is also connected. Client provided radio commands to modify modes, channel number and data rates. TX power is set to max power as a default setting.

1.4.2 EUT Exercise Software

HBOX Function Tester. This is built-in within the firmware. Radio commands are executed via Ethernet using Putty from a support PC.

1.4.3 Support Equipment and I/O cables

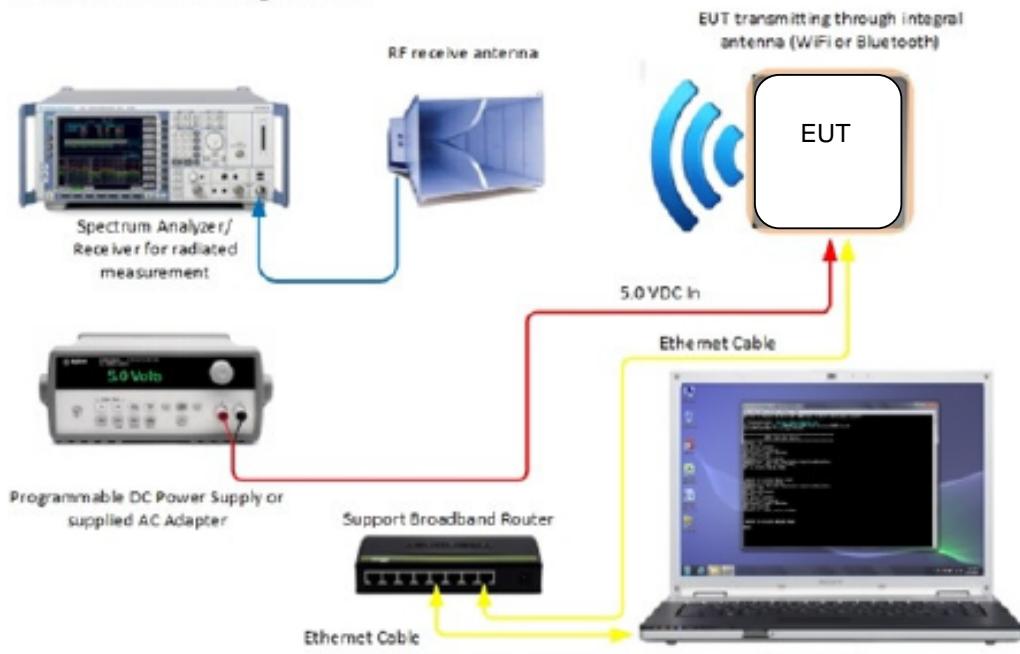
Manufacturer	Equipment/Cable	Model	Description
Sony	Personal Computer (Y Series Laptop)	PCG-31311L	-
Sony	AC Adapter	PCGA-AC19V9	S/N:147839091 0023259
HON-KWANG	Switching Power Supply (x2)	HK-AD-050A500-US	5VDC @ 5A
Trendnet	Broadband Router	TW100-S4W1CA,	S/N: RA1332S400789
Lorom	CAT5E Patch Cable (x2)	-	Unshielded, 1.5 meters Ethernet cables

1.4.4 Worst Case Configuration

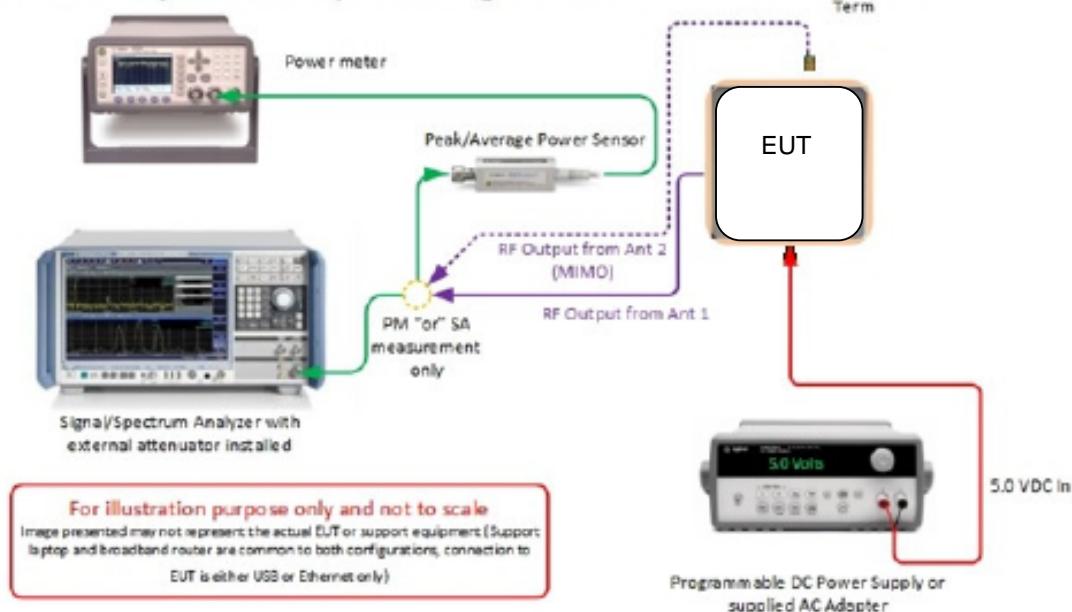
EUT is a mobile device. For radiated measurements X, Y and Z orientations were verified. Worst case position is "X".

1.4.5 Simplified Test Configuration Diagram

Radiated Test Configuration



Conducted (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 N/A (Sample #2) and (Sample #1)		
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 and 789033 D01 General U-NII Test Procedures v01r03 (Federal Communications Commission Office of Engineering and Technology Laboratory Division Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.

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.: US1146

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 §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Registration is US1146.

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.

FCC ID: IFU1001011
IC: N/A
Report No. SD72102282-0215H



SECTION 2

TEST DETAILS

Radio Testing of the
NantWorks
HBox Access Point for Medical Devices

2.1 CONDUCTED EMISSIONS

2.1.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.207(a)
RSS-GEN, Clause 8.8

2.1.2 Standard Applicable

An intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms 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.

2.1.3 Equipment Under Test and Modification State

Serial No: N/A (Sample #!) / Test Configuration B

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

April 28 and May 18, 2014/XYZ

2.1.5 Test Equipment Used

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

2.1.6 Environmental Conditions

Ambient Temperature	22.9 - 23.8 °C
Relative Humidity	45.2 - 47.1%
ATM Pressure	99.2 - 99.9 kPa

2.1.7 Additional Observations

- The EUT was verified using AC adapter supplied by the manufacturer..
- EUT verified using input voltage of 120VAC 60Hz.
- There are no significant variations in test results between each operating modes. Only the worst case observed configuration is presented.
- Receive mode is also presented for comparison.



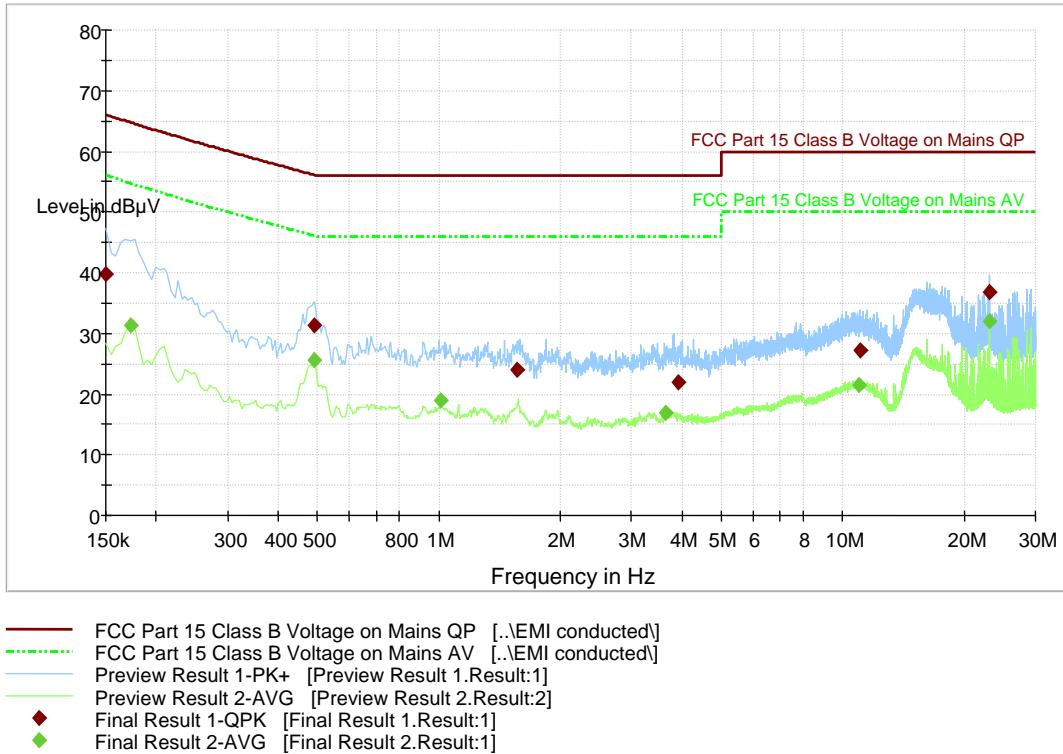
- Measurement was done using EMC32 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.2.8 for sample computation.

2.1.8 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	20.7
	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

2.1.9 Test Results - Conducted Emissions Line 1 – Hot (Test Results for 907.892MHz mode)

TUV SR7 Line 1 ESCS



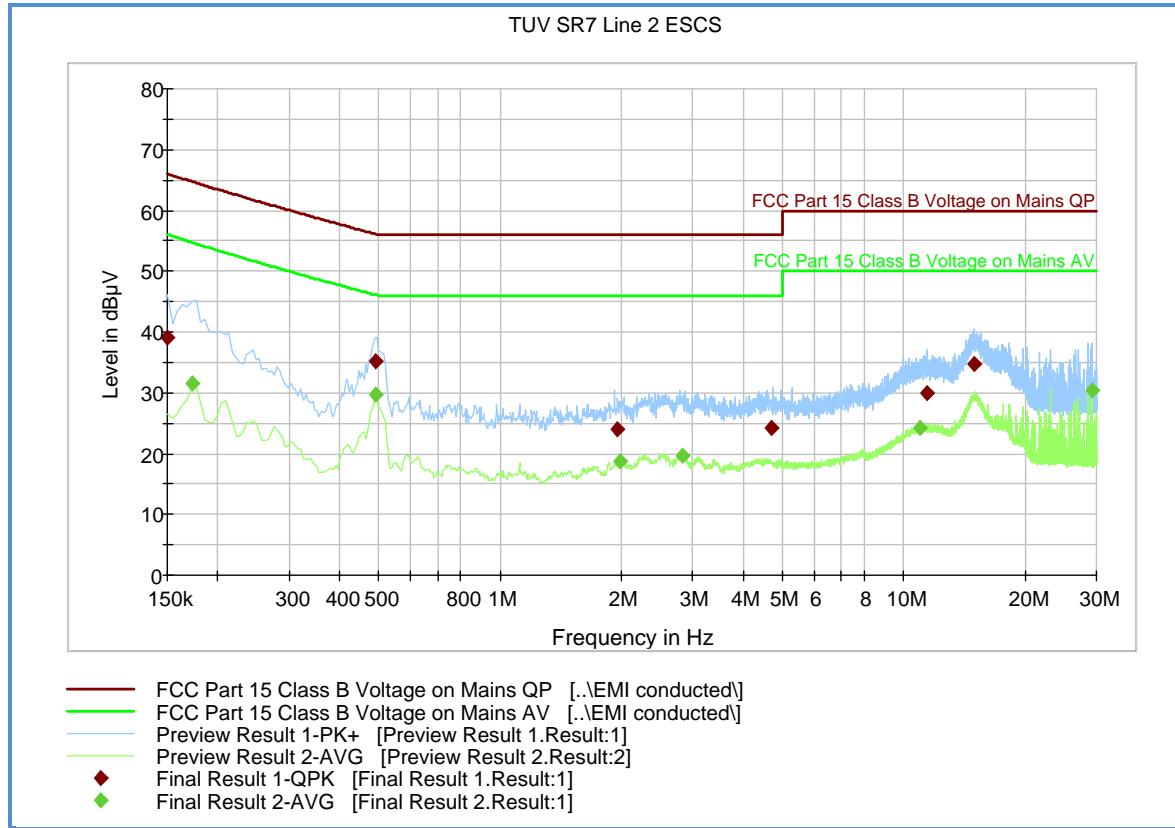
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	39.7	1000.0	9.000	Off	N	20.1	26.3	66.0
0.492000	31.3	1000.0	9.000	Off	N	20.1	24.9	56.1
1.563000	23.9	1000.0	9.000	Off	N	20.2	32.1	56.0
3.912000	22.0	1000.0	9.000	Off	N	20.5	34.0	56.0
11.022000	27.2	1000.0	9.000	Off	N	20.7	32.8	60.0
23.127000	36.7	1000.0	9.000	Off	N	20.9	23.3	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.172500	31.4	1000.0	9.000	Off	N	20.1	23.4	54.7
0.492000	25.6	1000.0	9.000	Off	N	20.1	20.5	46.1
1.014000	19.1	1000.0	9.000	Off	N	20.2	26.9	46.0
3.655500	16.9	1000.0	9.000	Off	N	20.4	29.1	46.0
10.941000	21.5	1000.0	9.000	Off	N	20.7	28.5	50.0
23.127000	31.9	1000.0	9.000	Off	N	20.9	18.1	50.0

2.1.10 FCC Conducted Emissions Line 2 – Neutral (Test Results for 907.892MHz mode)



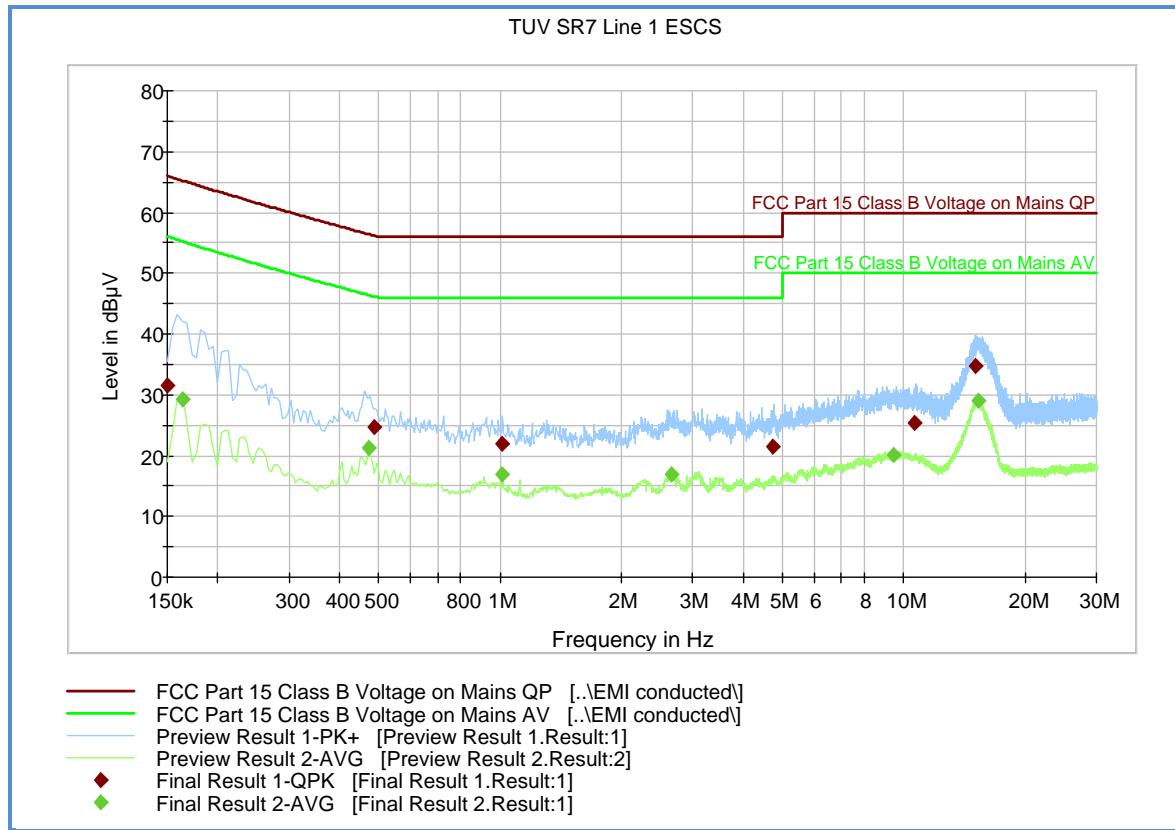
Quasi Peak

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V)
0.150000	39.1	1000.0	9.000	Off	N	20.1	26.9	66.0
0.492000	35.1	1000.0	9.000	Off	N	20.1	21.0	56.1
1.950000	24.1	1000.0	9.000	Off	N	20.1	31.9	56.0
4.717500	24.2	1000.0	9.000	Off	N	20.4	31.8	56.0
11.377500	29.9	1000.0	9.000	Off	N	20.7	30.1	60.0
14.928000	34.7	1000.0	9.000	Off	N	20.7	25.3	60.0

Average

Frequency (MHz)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dB μ V)
0.172500	31.5	1000.0	9.000	Off	N	20.1	23.2	54.7
0.492000	29.8	1000.0	9.000	Off	N	20.1	16.3	46.1
1.981500	18.7	1000.0	9.000	Off	N	20.2	27.3	46.0
2.827500	19.7	1000.0	9.000	Off	N	20.5	26.3	46.0
10.986000	24.2	1000.0	9.000	Off	N	20.7	25.8	50.0
29.233500	30.3	1000.0	9.000	Off	N	21.0	19.7	50.0

2.1.11 FCC Conducted Emissions Line 1 – Hot (Receive Mode)



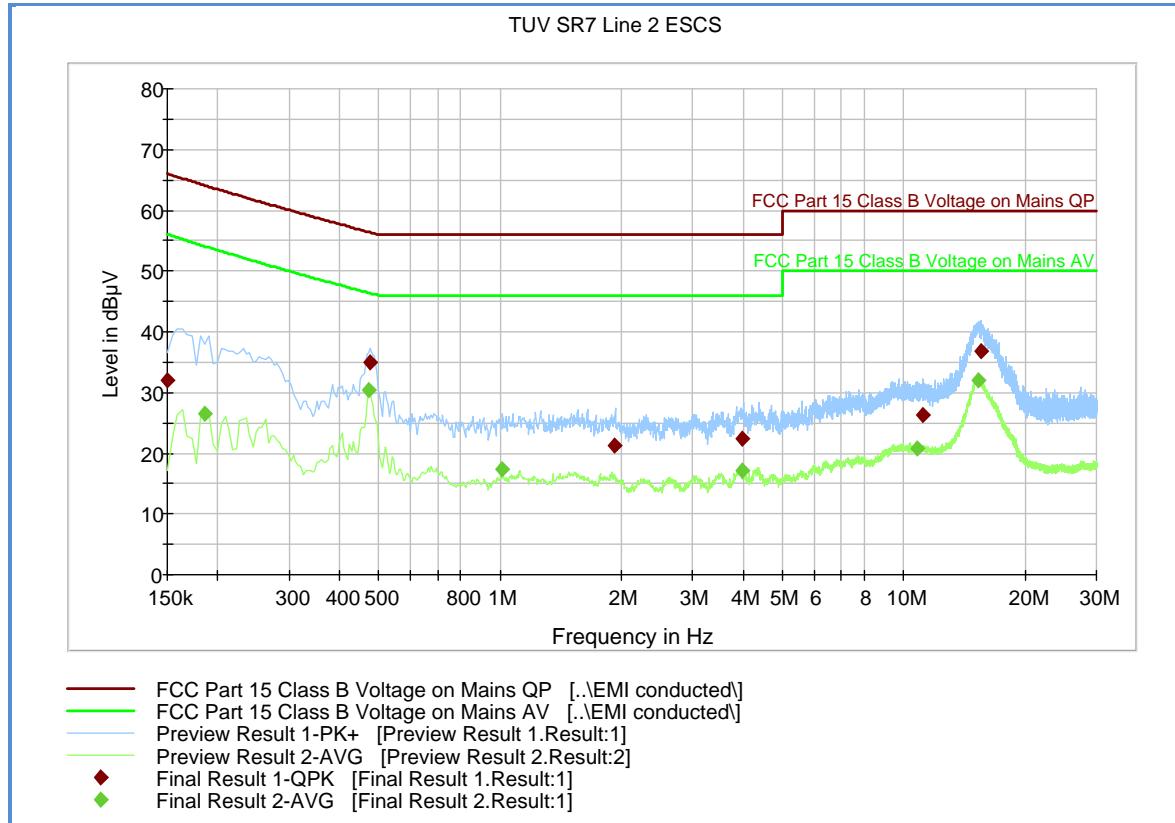
Quasi Peak

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBμV)
0.150000	31.6	1000.0	9.000	Off	L1	20.1	34.4	66.0
0.487500	24.7	1000.0	9.000	Off	L1	20.1	31.5	56.2
1.014000	21.9	1000.0	9.000	Off	L1	20.2	34.1	56.0
4.722000	21.6	1000.0	9.000	Off	L1	20.6	34.4	56.0
10.671000	25.4	1000.0	9.000	Off	L1	20.7	34.6	60.0
15.076500	34.8	1000.0	9.000	Off	L1	20.9	25.2	60.0

Average

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBμV)
0.163500	29.3	1000.0	9.000	Off	L1	20.1	25.9	55.2
0.474000	21.2	1000.0	9.000	Off	L1	20.1	25.2	46.4
1.014000	17.0	1000.0	9.000	Off	L1	20.2	29.0	46.0
2.661000	16.9	1000.0	9.000	Off	L1	20.5	29.1	46.0
9.433500	20.1	1000.0	9.000	Off	L1	20.7	29.9	50.0
15.310500	28.9	1000.0	9.000	Off	L1	20.9	21.1	50.0

2.1.12 FCC Conducted Emissions Line 2 – Neutral (Receive Mode)



Quasi Peak

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dB μ V)
0.150000	32.1	1000.0	9.000	Off	N	20.1	33.9	66.0
0.478500	35.0	1000.0	9.000	Off	N	20.1	21.4	56.3
1.927500	21.1	1000.0	9.000	Off	N	20.1	34.9	56.0
3.975000	22.3	1000.0	9.000	Off	N	20.5	33.7	56.0
11.134500	26.3	1000.0	9.000	Off	N	20.7	33.7	60.0
15.513000	36.9	1000.0	9.000	Off	N	20.7	23.1	60.0

Average

Frequency (MHz)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dB μ V)
0.186000	26.4	1000.0	9.000	Off	N	20.1	27.6	54.1
0.474000	30.4	1000.0	9.000	Off	N	20.1	16.0	46.4
1.014000	17.3	1000.0	9.000	Off	N	20.2	28.7	46.0
3.966000	17.1	1000.0	9.000	Off	N	20.5	28.9	46.0
10.770000	20.8	1000.0	9.000	Off	N	20.6	29.2	50.0
15.310500	32.0	1000.0	9.000	Off	N	20.7	18.0	50.0

2.2 20 dB BANDWIDTH

2.2.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.215(c)
Industry Canada RSS-GEN, Clause 6.6

2.2.2 Standard Applicable

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

2.2.3 Equipment Under Test and Modification State

Serial No: N/A (Sample #2) / Test Configuration A

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

June 17, 2015/XYZ

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.9°C
Relative Humidity	46.2%
ATM Pressure	99.4 kPa

2.2.7 Additional Observations

- This is a conducted test.
- “n dB down” marker function of the Spectrum Analyzer used.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the Span, VBW is 3XRBW.
- Sweep is auto.
- Detector is peak.
- Trace is max hold.

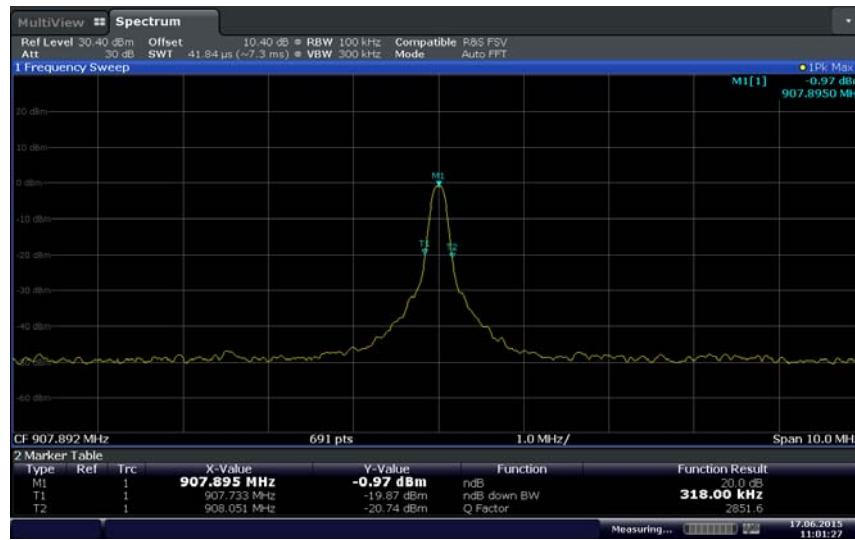
2.2.8 Test Results

Frequency (MHz)	20dB Bandwidth (kHz)
907.892	318.0

Frequency Band: 902 MHz to 928 MHz Band

907.892 MHz – (20dB BW/2) = 907.733 (Within the frequency Band –Compliant)

907.892 MHz + (20dB BW/2) = 908.051 (Within the frequency Band –Compliant)



2.3 99% EMISSION BANDWIDTH

2.3.1 Specification Reference

Industry Canada RSS-GEN, Clause 6.6

2.3.2 Standard Applicable

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
- The resolution bandwidth shall be set in the range of 1% to 5% of the occupied bandwidth (OBW) and the video bandwidth (VBW) shall be set to approximately 3 x RBW.

Video averaging is not permitted.

A peak, or peak hold, may be used in place of the sampling detector as this may produce a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold may be necessary to determine the occupied bandwidth if the device is not transmitting continuously.

The trace data points are recovered and are directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded.

The difference between the two recorded frequencies is the 99% occupied bandwidth.

2.3.3 Equipment Under Test and Modification State

Serial No: N/A (Sample #2) / Test Configuration B

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

June 17, 2015/XYZ

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.9°C
Relative Humidity	46.2%
ATM Pressure	99.4 kPa

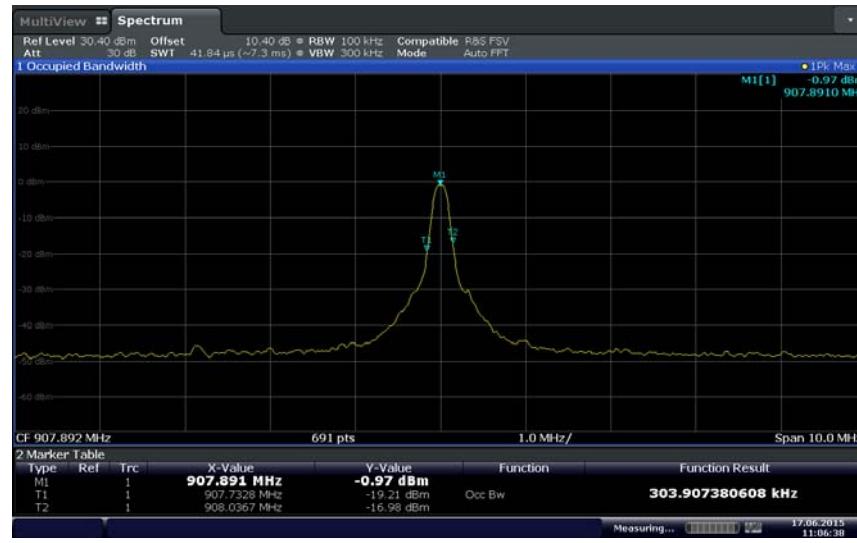
2.3.7 Additional Observations

- This is a conducted test.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the Span. VBW is 3XRBW.
- Sweep is auto.
- Detector is peak.
- The % Power Bandwidth setting in the spectrum analyzer was set to 99% (default).
- The Channel Bandwidth measurement function of the spectrum analyzer was used for this test.

2.3.8 Test Results

Frequency (MHz)	99% Bandwidth (kHz)
907.892	303.907

2.3.9 Test Plots



2.4 FIELD STRENGTH LIMITS FOR FUNDAMENTAL AND HARMONICS

2.4.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.249(a)
Industry Canada RSS-210, Clause A2.9(a)

2.4.2 Standard Applicable

(a) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of fundamental (dB μ V/m)	Field strength of harmonics (microvolts/meter)	Field strength of harmonics (dB μ V/m)
902–928 MHz	50	93.98	500	53.98
2400–2483.5 MHz	50	93.98	500	53.98
5725–5875 MHz	50	93.98	500	53.98
24.0–24.25 GHz	250	107.96	2500	67.96

The field strength limits in paragraphs (a) of this section are based on average limits.

2.4.3 Equipment Under Test and Modification State

Serial No: N/A (Sample #1) / Test Configuration B

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

June 17 and 18, 2015/XYZ

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.9°C
Relative Humidity	46.2%
ATM Pressure	99.4 - 99.6 kPa

2.4.7 Additional Observations

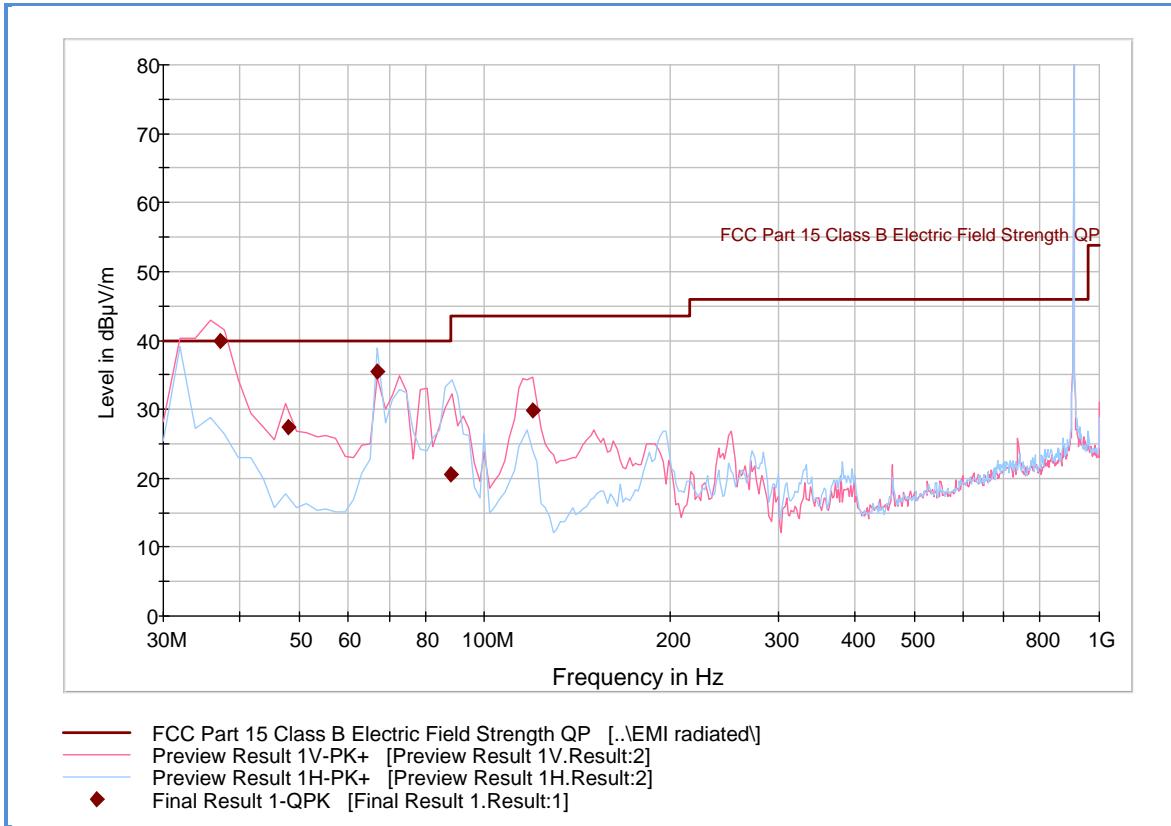
- This is a radiated test. The spectrum was searched from 1GHz to at least the 10th harmonic (10GHz).
- Measurement was done using EMC32 V8.53 automated software. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only. See Section 2.3.8 for sample computation.

2.4.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (db μ V) @ 30 MHz			24.4
Correction Factor (dB)	Asset# 1066 (cable)	0.3	-12.6
	Asset# 1172 (cable)	0.3	
	Asset# 1016 (preamplifier)	-30.7	
	Asset# 1175(cable)	0.3	
	Asset# 1033 (antenna)	17.2	
Reported QuasiPeak Final Measurement (db μ V/m) @ 30MHz			11.8



2.4.9 Test Results for 907.892MHz below 1GHz (Fundamental, Band Edges and Immediate Restricted Bands)

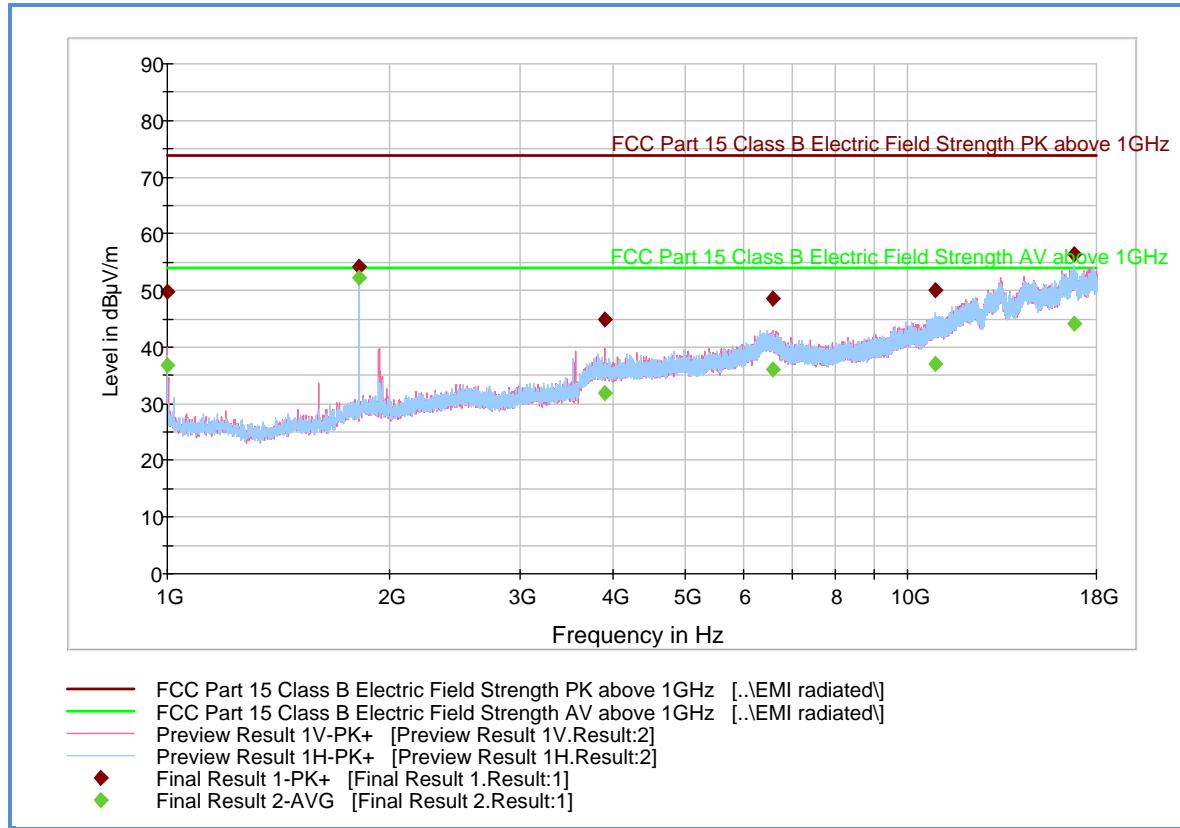


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
37.111663	40.0	1000.0	120.000	100.0	V	-1.0	-15.2	0.0	40.0
48.014990	27.5	1000.0	120.000	122.0	V	166.0	-19.5	12.5	40.0
66.773868	35.4	1000.0	120.000	109.0	H	227.0	-22.3	4.6	43.5
87.972745	20.6	1000.0	120.000	200.0	H	-2.0	-21.2	19.4	46.0
119.946613	29.9	1000.0	120.000	100.0	V	-8.0	-20.3	13.6	46.0
907.877275	89.0	1000.0	120.000	256.0	H	227.0	1.0	5.0	94.0

Test Notes: All spurious emissions complies with the general requirement of 15.209 and 15.249. The fundamental complies with 15.249.

2.4.10 Test Results for 907.892MHz above 1GHz (Harmonics)



Peak Data

Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1000.00000	49.7	1000.0	1000.000	202.5	V	206.0	-7.2	24.2	73.9
1815.63333	54.2	1000.0	1000.000	115.8	H	78.0	-3.5	19.7	73.9
3905.13333	44.8	1000.0	1000.000	131.7	V	106.0	5.1	29.1	73.9
6565.20000	48.6	1000.0	1000.000	406.7	V	2.0	11.3	25.3	73.9
10891.1666	49.9	1000.0	1000.000	265.3	H	199.0	14.5	24.0	73.9
16819.3000	56.3	1000.0	1000.000	236.4	H	2.0	23.6	17.6	73.9

Average Data

Frequency (MHz)	Average (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
1000.00000	36.7	1000.0	1000.000	202.5	V	206.0	-7.2	17.2	53.9
1815.63333	52.3	1000.0	1000.000	115.8	H	78.0	-3.5	1.6	53.9
3905.13333	32.0	1000.0	1000.000	131.7	V	106.0	5.1	21.9	53.9
6565.20000	36.0	1000.0	1000.000	406.7	V	2.0	11.3	17.9	53.9
10891.1666	37.0	1000.0	1000.000	265.3	H	199.0	14.5	16.9	53.9
16819.3000	44.1	1000.0	1000.000	236.4	H	2.0	23.6	9.8	53.9

Test Notes: All harmonics complies with the general requirement of 15.209. (The Average limit for 15.249 is 89.0 dB μ V/m – 50 = 39.0 dB μ V/m, and the Peak limit for 15.249 is 66.8 dB μ V/m. The limits of 15.209 are applicable.)

2.5 RADIATED SPURIOUS EMISSIONS

2.5.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.249(d)
Industry Canada RSS-210, Clause A2.9(b)

2.5.2 Standard Applicable

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

2.5.3 Equipment Under Test and Modification State

Serial No: N/A (Sample #1) / Test Configuration B

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

June 17 and 18, 2015/XYZ

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/ Test Location

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility

Ambient Temperature	23.9°C
Relative Humidity	46.2%
ATM Pressure	99.4 - 99.6 kPa

2.5.7 Additional Observations

- This is a radiated test. The spectrum was searched from 30MHz to at least the 10th harmonic (10GHz).
- The measurement results are identical to test results presented under Section 2.3.9 up to Section 2.4.10 of this test report. No other significant spurious emissions observed other than harmonics of the fundamental frequency.

FCC ID: IFU1001011
IC: N/A
Report No. SD72102282-0215H



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						
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/22/14	12/22/15
1003	Signal Generator	SMR 40	1104.0002.40	Rhode & Schwarz	04/29/15	04/29/16
7604	Series Power Meter	N1912A	SG45100273	Agilent	05/27/15	05/27/16
-	10dB Attenuator	PE7010-10	3	PASTERNACK	Verified by 7604 and 1003	
Radiated Test Setup						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	01/30/14	01/30/16
1051	Double-ridged waveguide horn antenna	3115	9408-4329	EMCO	02/28/14	02/28/16
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	03/20/15	03/20/16
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	09/29/14	09/29/15
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/11/15	03/11/16
1016	Pre-amplifier	PAM-0202	187	PAM	12/10/14	12/10/15
Miscellaneous						
6792	Multimeter	3478A	2911A70964	Hewlett Packard	08/12/14	08/12/15
	Test Software	EMC32	V8.53	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

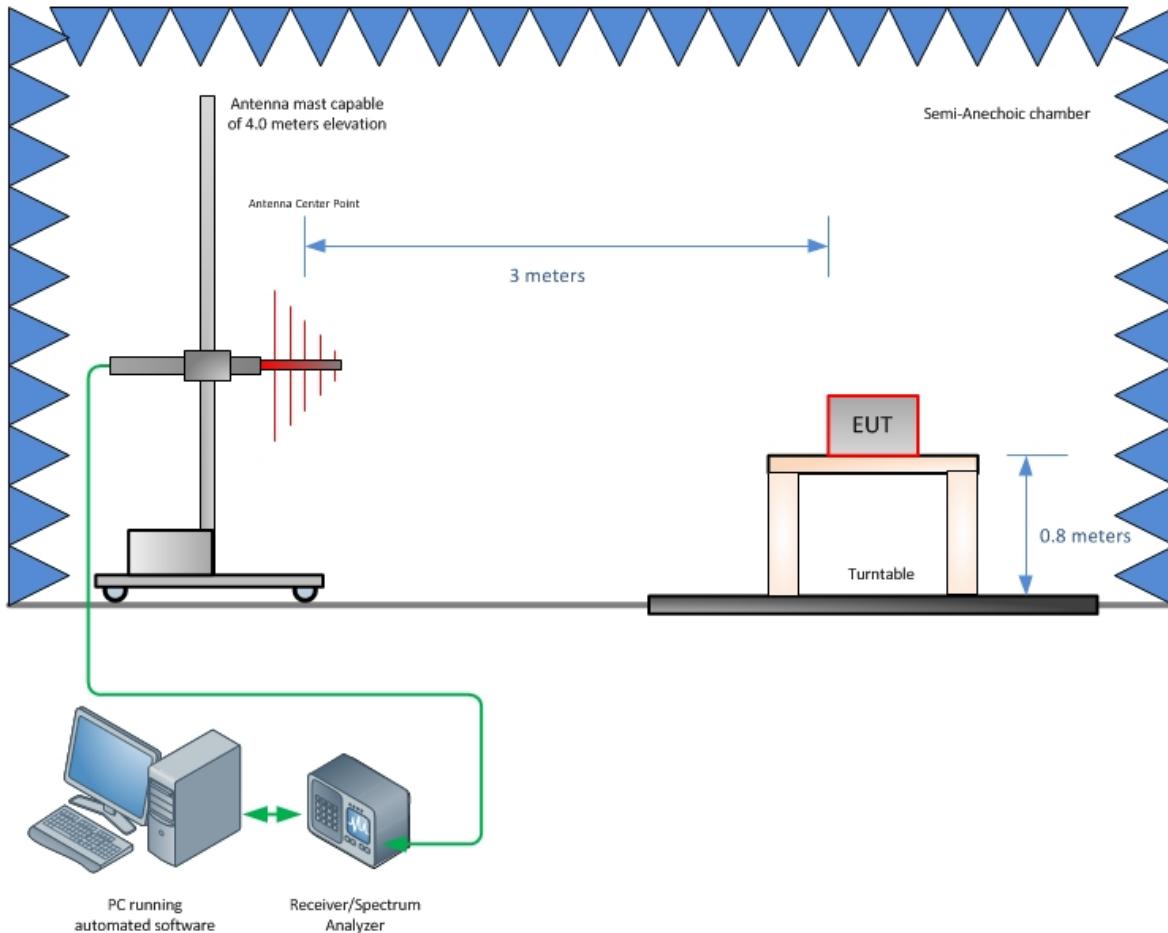
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Report No. SD72102282-0215H



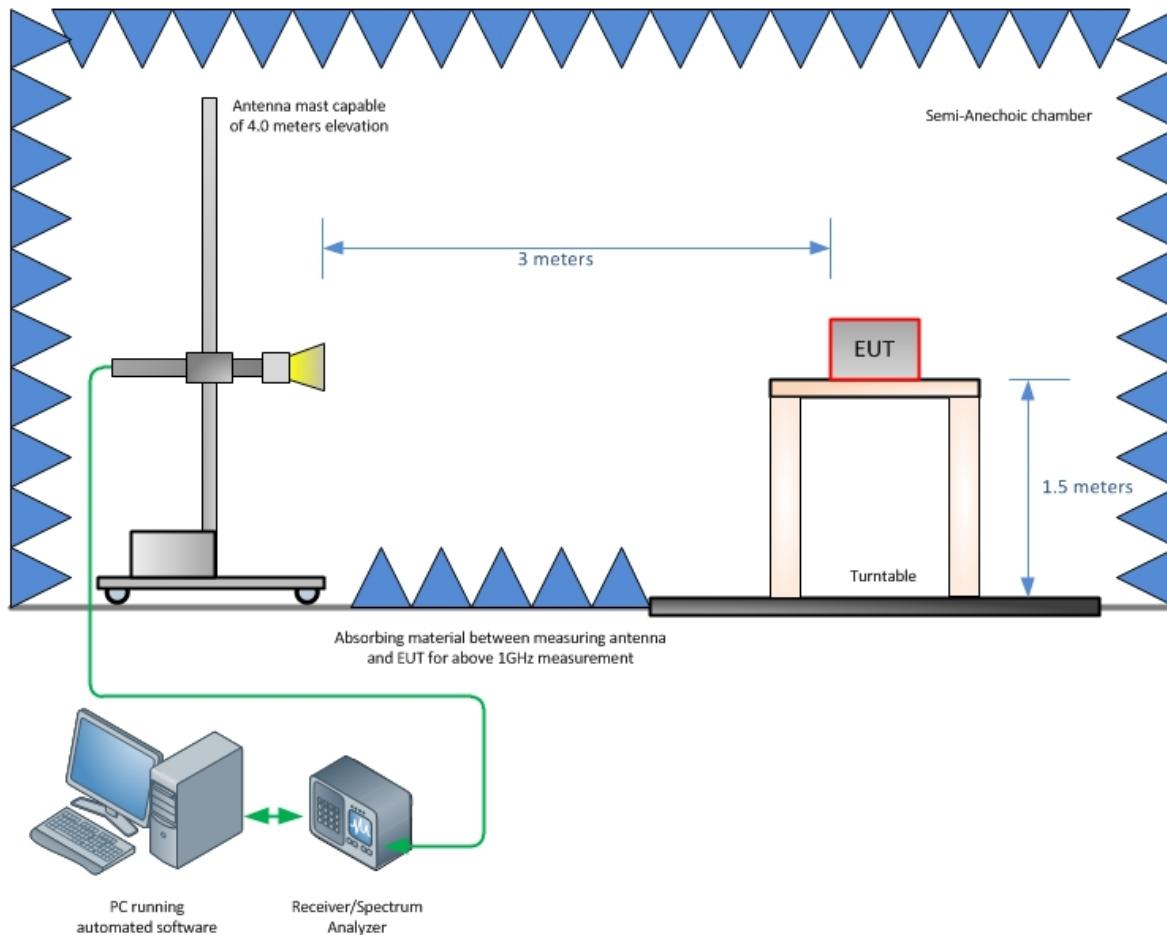
SECTION 4

DIAGRAM OF TEST SETUP

4.1 RADIATED EMISSION TEST SETUP (BELOW 1GHZ)



4.2 RADIATED EMISSION TEST SETUP (ABOVE 1GHZ)



FCC ID: IFU1001011
IC: N/A
Report No. SD72102282-0215H



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

Page 35 of 36



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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