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Report On

Radio Testing of the
NantWorks
HBox Access Point for Medical Devices

FCC Part 15 Subpart C §15.225: 2014
IC RSS-210 Issue 8: 2010

Report No.SD72106517-0515C Rev.1 **July 2015**

REPORT ON	Radio Testing of the NantWorks HBox Access Point for Medical Devices
TEST REPORT NUMBER	SD72106517-0515C Rev.1
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	July 15, 2015

Revision History

SD72106517-0515C Rev.1 NantWorks 200-HBX-PDL rev 1 HBox Access Point for Medical Devices					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
06/24/2015	Initial Release				Juan M Gonzalez
07/15/2015		Rev.1	Model name correction	6 and 9	Alex Chang

CONTENTS

Section **Page No**

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

SECTION 1

REPORT SUMMARY

Radio Testing of the
NantWorks
HBox Access Point for Medical Devices

TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the NantWorks Access Point for Medical Devices to the requirements of the following:
FCC Part 15 Subpart C §15.225: 2014
IC RSS-210 Issue 8: 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-HBX-PDL rev 1
FCC ID Number	IFU1001012
IC Number	N/A (Manufacturer not seeking IC Certification at the time of verification)
Serial Number(s)	N/A (Sample #1) Radiated testing Sample
Number of Samples Tested	1
Test Specification/Issue/Date	• FCC Part 15 Subpart C §15.225: 2014 • IC RSS-210 Issue 8: 2010 - Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment. • RSS-Gen Issue 3: 2010 - General Requirements and Information for the Certification of Radio Apparatus.
Start of Test	April 30, 2015
Finish of Test	May 22, 2015
Test Facility location	All test performed on this test report were performed at: TÜV SÜD America Inc. (Rancho Bernardo) Sony Electronics Inc., Building #8 16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 FAX: 858-546 0364
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 Part 15 Subpart C §15.225: 2014 and IC RSS-210 Issue 8: 2010 with cross-reference to the corresponding IC RSS standard is shown below.

Section	Spec Clause	RSS	Test Description	Result	Comments/Base Standard
2.1	§2.1049	RSS-Gen 6.6	Occupied Bandwidth	As Reported	
2.2	§15.225(a)(b)(c)	RSS-210 A2.6	In-Band Emissions	Compliant	
2.3	§15.225(d)	RSS-210 A2.6	Out-of-Band Emissions	Compliant	§15.209
2.4	§15.207	RSS-Gen 7.1.3	AC Conducted Emissions	Compliant	
-		RSS-Gen 7.1.2	Receiver Spurious Emissions	N/A*	

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

Note: All verifications performed on model 200-HBV-PDL.The two models 200-HBV-PDL and HBox are identical except that 200-HBV-PDL has CDMA2000 and ISM900 RF modules and HBox unit does not have.

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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 NFC function verified in this test report.

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1.3.2 EUT General Description

EUT Description	Access Point for Medical Devices
Model Name	HBox
Model Number(s)	200-HBX-PDL rev 1
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	NFC (Near Field Communication)
Device Capabilities	802.11 a/b/g/n WLAN (DTS/U-NII), Bluetooth 2.0 + EDR, Bluetooth 4.0 and NFC
Frequency Range	13.56 MHz in the 13.110 to14.010 MHz band
Primary Unit (EUT)	☒ Production
	☐ Pre-Production
	☐ Engineering
Output Power	39.9 dBµV/m @ 3 meters
Number of Operating Frequencies	1
Channel/s Verified	13.56 MHz
Antenna Type (used during evaluation)	Integral near field antenna (Complies with Part 15.203 requirements)
Modulation Used	ASK

*: All verifications performed on model 200-HBV-PDL.The two models 200-HBV-PDL and HBox are identical except that 200-HBV-PDL has CDMA2000 and ISM900 RF modules and HBox unit does not have.

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	Using PuTTY SSH2 (Secure Shell) client software to program the EUT, NFC (Near Field Communication) module is set to WFE (Wait for Event) and then active mode. These mode programs the EUT for continuous and maximum power operation of the radio. This mode is considered worst case as declared by the manufacturer for verification purposes.

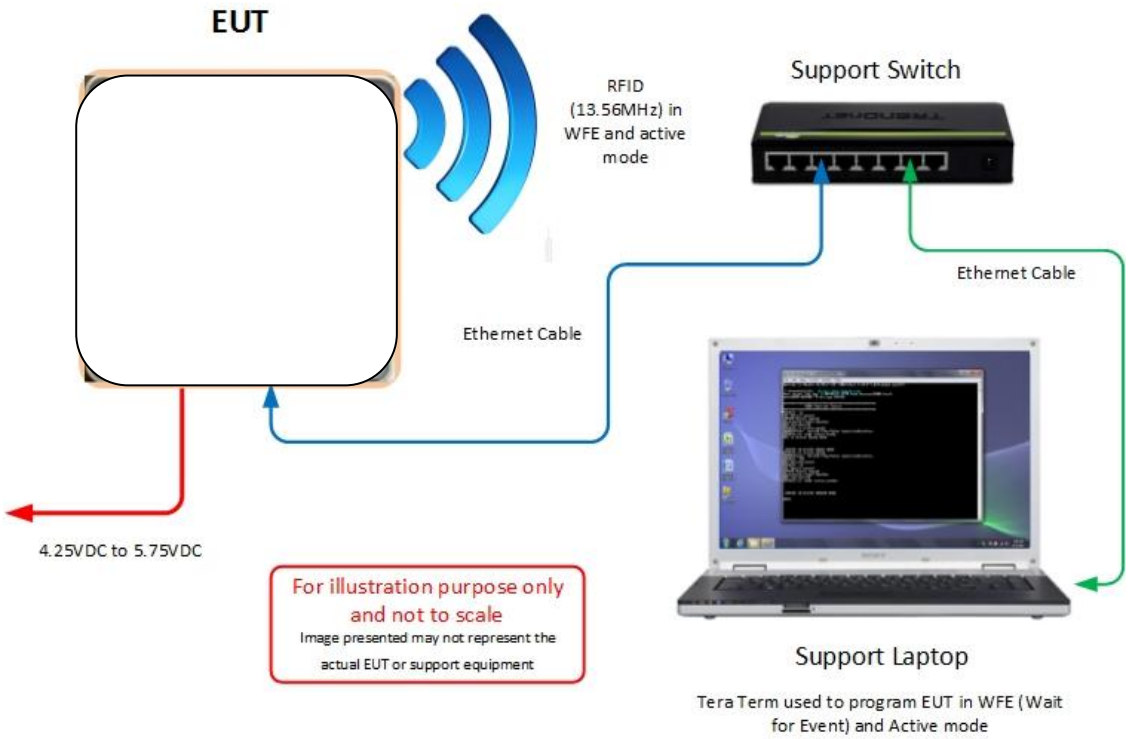
1.4.2 EUT Exercise Software

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	HK-AD-050A500-US	5VDC @ 5A
Trendnet	Broadband Router	TW100-S4W1CA,	S/N: RA1332S400789
Lorom	CAT5E Patch Cable (2X)	-	Unshielded, 1.5 meters Ethernet cables

1.4.4 Simplified Test Configuration Diagram



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 #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.
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.

SECTION 2

TEST DETAILS

Radio Testing of the
NantWorks
HBox Access Point for Medical Devices

2.1 OCCUPIED BANDWIDTH

2.1.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.1049,
RSS-Gen, Clause 6.6

2.1.2 Standard Applicable

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

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.

2.1.3 Equipment Under Test and Modification State

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

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

May 21, 2015/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

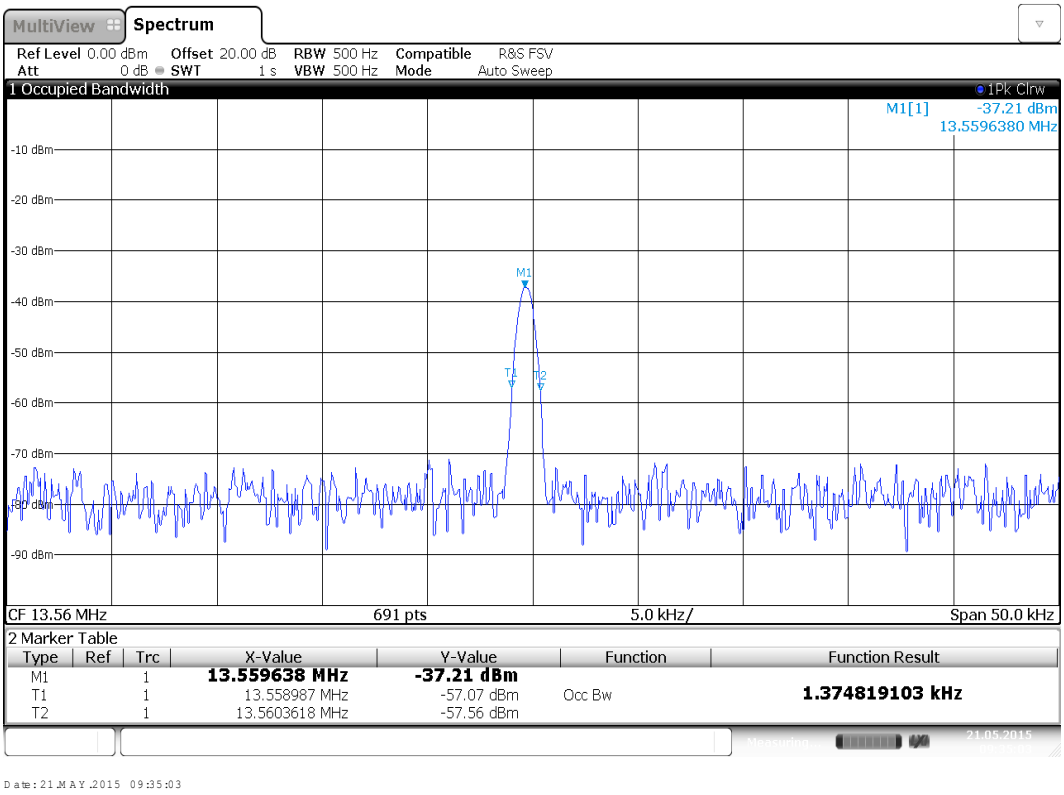
Ambient Temperature	23.5°C
Relative Humidity	43.3%
ATM Pressure	98.9kPa

2.1.7 Additional Observations

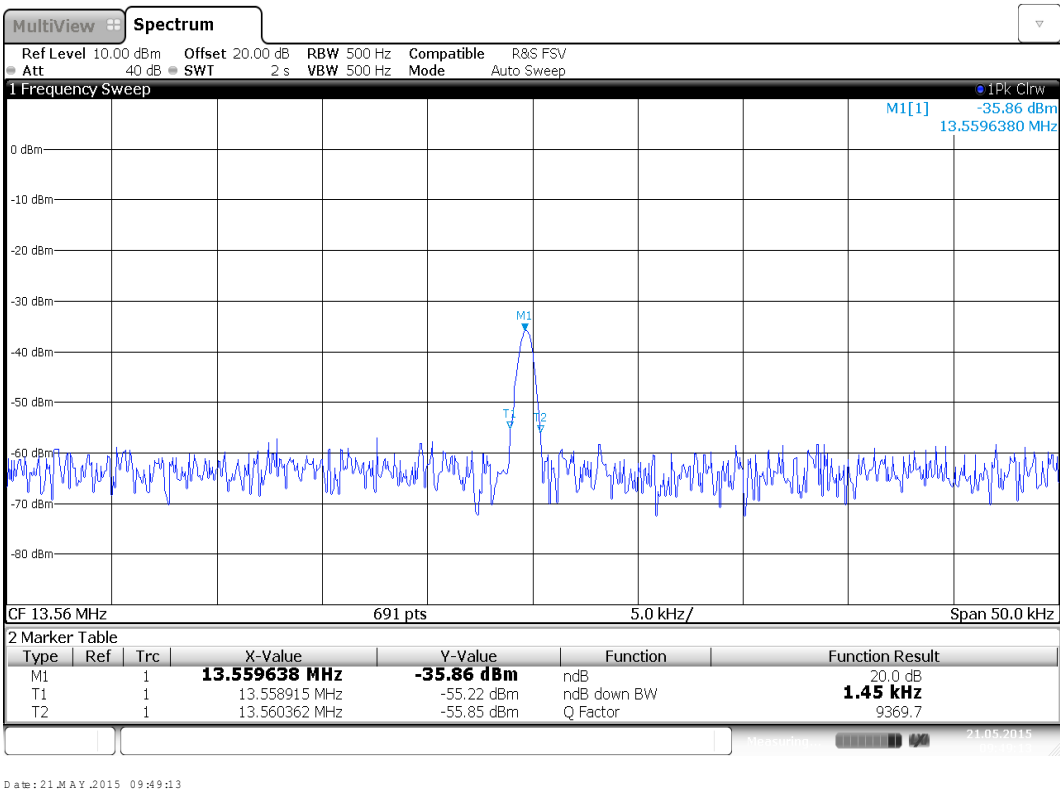
- This is a radiated test using a loop antenna connected to the spectrum analyzer.
- A peak output reading was taken.
- For 99% bandwidth, the OBW measurement function of the spectrum analyzer was used.
- 20dB bandwidth verified using the “n” dB down marker function of the spectrum analyzer.
- Span is wide enough to capture the channel transmission.
- RBW is 1% of the span.
- VBW is 3X RBW.
- Sweep is auto.
- Detector is peak.
- Trace is clear write.

2.1.8 Test Results

Frequency	20 dB Bandwidth	99% Bandwidth
13.56 MHz	145 kHz	137 kHz



99% OBW


MultiView
Spectrum
Ref Level 10.00 dBm Offset 20.00 dB RBW 500 Hz Compatible R&S FSV
Att 40 dB SWT 2 s VBW 500 Hz Mode Auto Sweep
1 Frequency Sweep
1Pk Clrw
M1[1] -35.86 dBm
13.5596380 MHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
T1
T2
CF 13.56 MHz
691 pts
5.0 kHz/
Span 50.0 kHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 13.559638 MHz -35.86 dBm ndB 20.0 dB
T1 1 13.558915 MHz -55.22 dBm ndB down BW 1.45 kHz
T2 1 13.560362 MHz -55.85 dBm Q Factor 9369.7
Measuring
21.05.2015
Date: 21.MAY.2015 09:49:13

20 dB BW

2.2 IN BAND EMISSIONS

2.2.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.225(a)(b)(c)
RSS-210, Clause A2.6

2.2.2 Standard Applicable

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

2.2.3 Equipment Under Test and Modification State

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

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

May 22, 2015/XYZ

2.2.5 Test Equipment Used

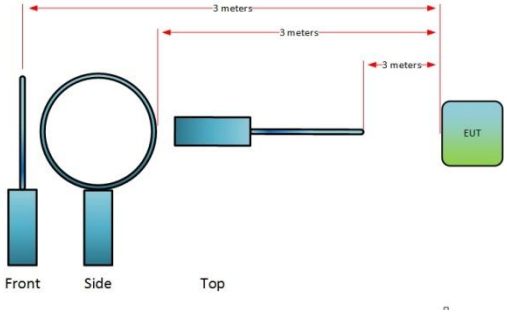
The major items of test equipment used for the above tests are identified in Section 3.1.

2.2.6 Environmental Conditions

Ambient Temperature	22.9°C
Relative Humidity	47.1 %
ATM Pressure	99.2 kPa

2.2.7 Additional Observations

- This is a radiated test. The spectrum was searched from 9 kHz to 1GHz.
- Below 30MHz, prescans were performed to determine best antenna position with the highest recorded emissions. No significant results difference noted. Verification performed using “Front” position.



- The EUT was verified in three (3) orthogonal axes. Only the worst case configuration presented ("Y" Axis).

		
"X" Configuration	***"Y" Configuration***	***"Z" Configuration***

- Measurement was done at 3 meter. Limits below 30MHz were corrected using extrapolation factor of 40 dB/decade. See sample computation below:

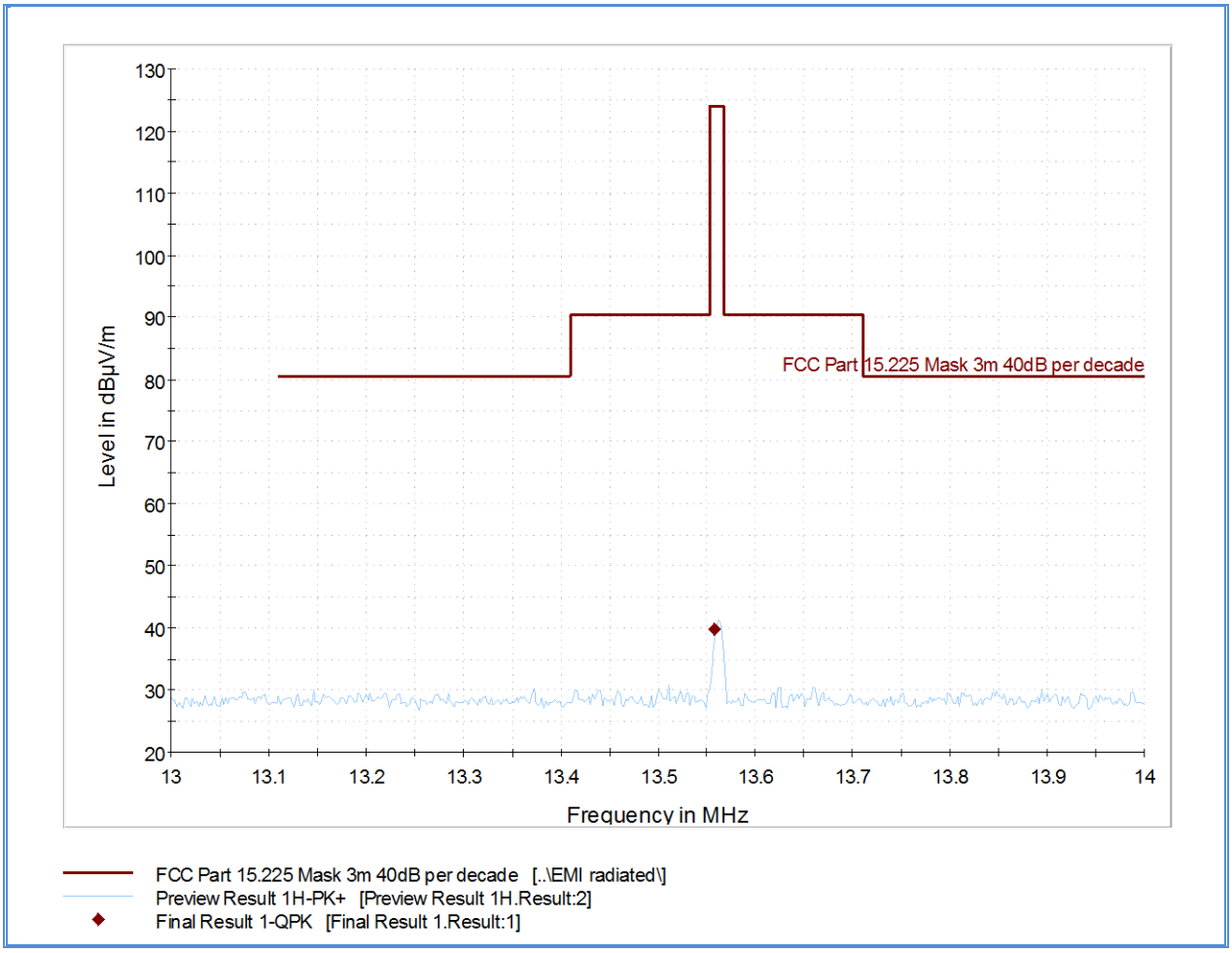
  Limit @ 9kHz = 2400/F(kHz) µV/m
  = 20 log (2400/9) dBµV/m
  = 48.52 dBµV/m @ 300 meters
  = 48.52 dBµV/m + (40 log 300/3) @ 3 meters
  = 128.52 dBµV/m @ 3 meters

- There are no other emissions observed "in-band" other than the fundamental (13.56 MHz).
- 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 computations.

2.2.8 Test Results Summary Table

Frequency	Axis (Orientation)	QuasiPeak (dBµV/m)
13.56 MHz	Y	39.9

2.2.9 Test Results ("Y" Axis)



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)
13.557622	39.9	1500.0	9.000	100.0	H	335.0	20.7	84.1	124.0

Test Notes:

2.3 OUT OF BAND EMISSIONS

2.3.1 Specification Reference

FCC 47 CFR Part 15, Clasue 15.225(d)
RSS-210, Clause A2.6

2.3.2 Standard Applicable

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

2.3.3 Equipment Under Test and Modification State

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

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

April 30 and May 22, 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

Ambient Temperature	22.9 - 24.3 C
Relative Humidity	31.2 – 47.1 %
ATM Pressure	99.2 - 99.5 kPa

2.3.7 Additional Observations

- This is a radiated test. The spectrum was searched from 9 kHz to 1GHz.
- Below 30MHz, prescans were performed to determine best antenna position with the highest recorded emissions. No significant difference noted on the results. Verification performed using “Front” position.
- The EUT was verified in three (3) orthogonal axes. Only the worst case configuration presented (“Y” Axis).
- Measurement was done at 3 meter. Limits below 30MHz were corrected using extrapolation factor of 40 dB/decade. See sample computation below:

  Limit @ 9kHz = 2400/F(kHz) µV/m
  = 20 log (2400/9) dBµV/m
  = 48.52 dBµV/m @ 300 meters
  = 48.52 dBµV/m + (40 log 300/3) @ 3 meters
  = 128.52 dBµV/m @ 3 meters

- 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 and 2.3.9 for sample computations.

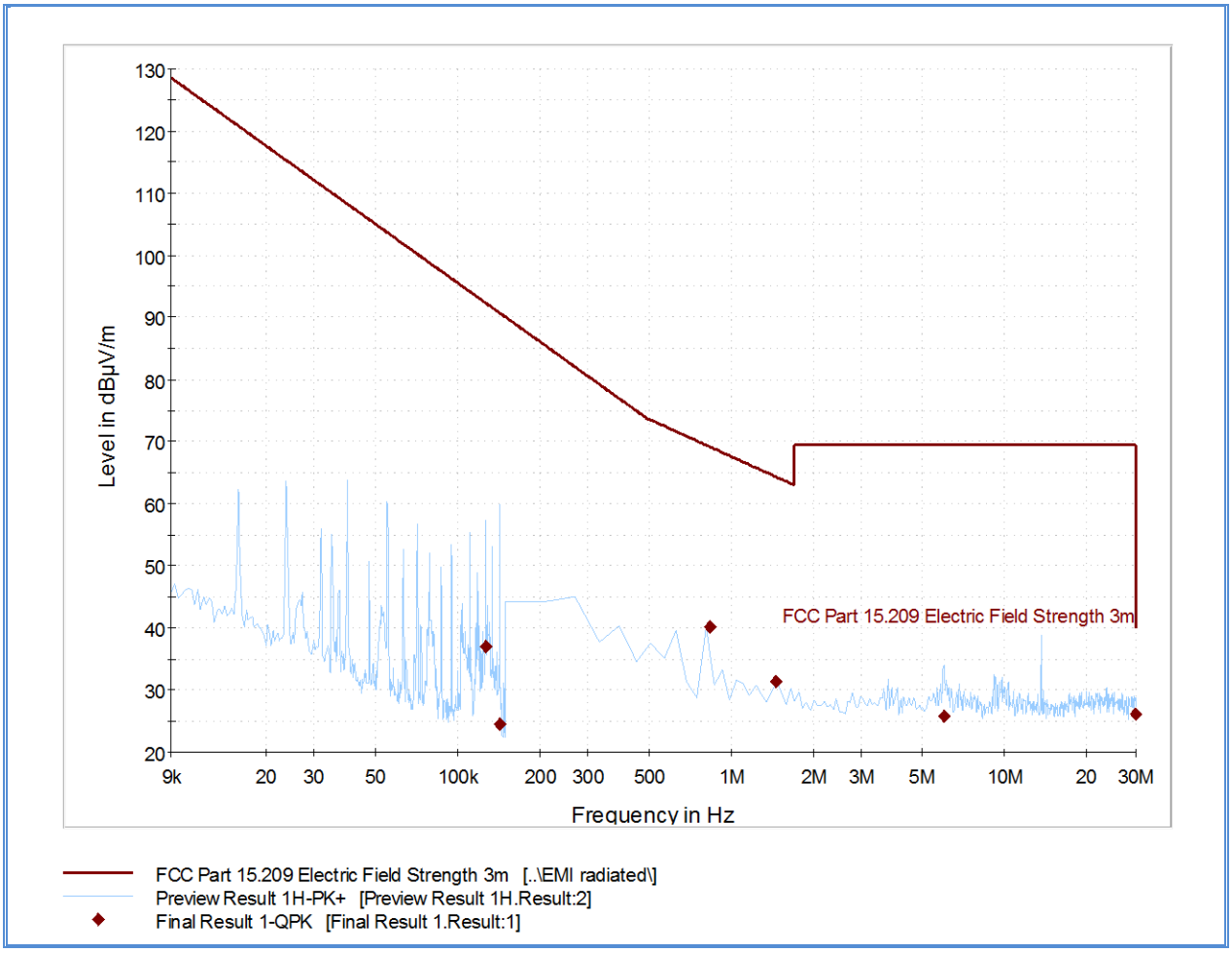
2.3.8 Sample Computation (Radiated Emission 9kHz to 30MHz)

Measuring equipment raw measurement (dbµV) @ 9 kHz			25.0
Correction Factor (dB)	Asset# 1057 (cable)	0.1	24.8
	Asset# 1172 (cable)	0.3	
	Asset# 6628 (antenna)	24.4	
Reported QuasiPeak Final Measurement (dbµV/m) @ 9kHz			**49.8**

2.3.9 Sample Computation (Radiated Emission 30MHz to 1GHz)

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

2.3.10 Test Results (Worst Case Orientation 9kHz to 30MHz)

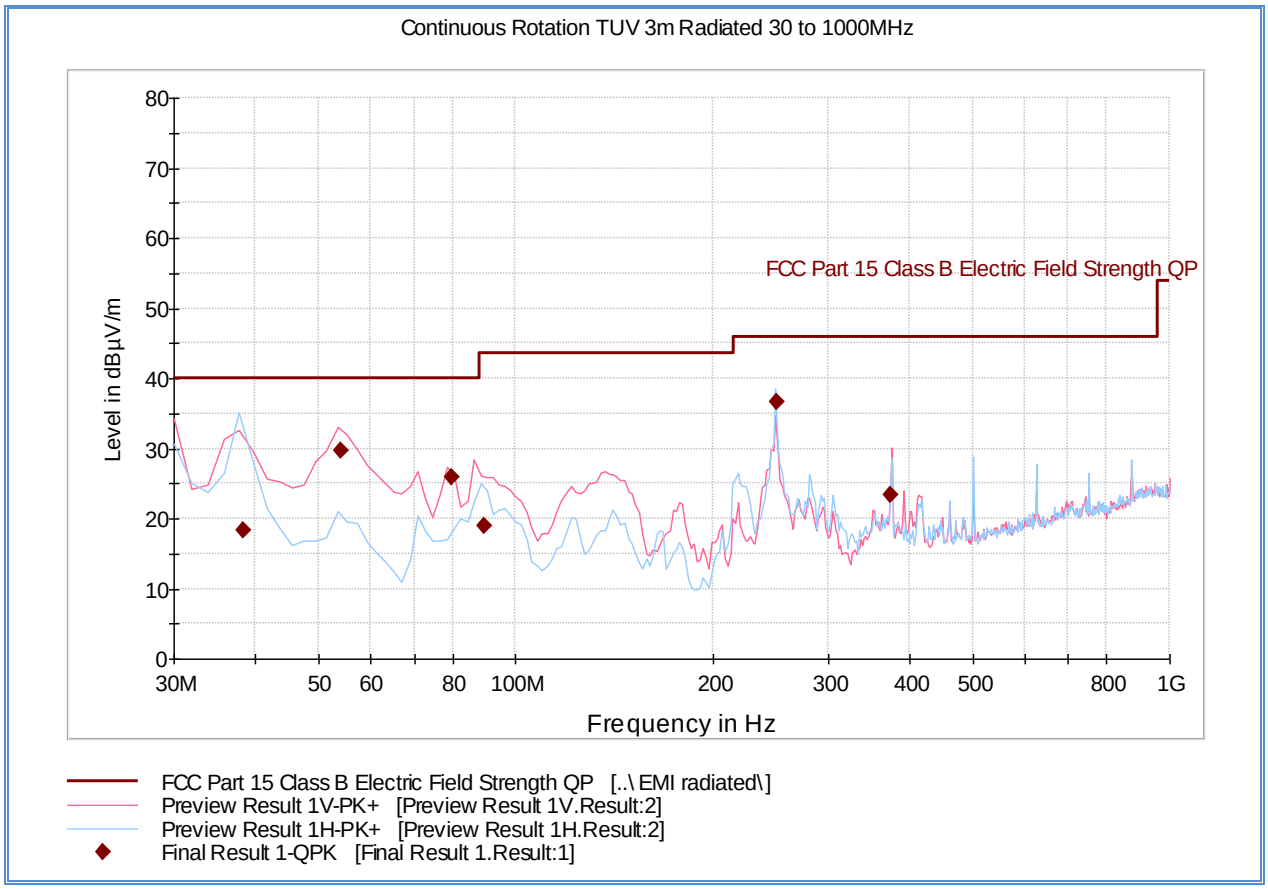


Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
0.126530	37.1	1000.0	0.200	105.0	H	208.0	19.6	55.3	92.3
0.141953	24.5	1000.0	0.200	122.0	H	203.0	19.6	66.3	90.8
0.833516	40.2	1500.0	9.000	100.0	H	10.0	19.7	29.0	69.2
1.458532	31.4	1500.0	9.000	100.0	H	11.0	20.2	33.0	64.3
6.004825	25.8	1500.0	9.000	100.0	H	-7.0	20.5	43.8	69.5
29.999000	26.1	1500.0	9.000	100.0	H	15.0	24.0	43.4	69.5

Test Notes: In-band emissions ignored for this test.

2.3.11 Test Results (Worst Case Orientation 30MHz to 1GHz)



Quasi Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
38.295551	18.2	1000.0	120.000	400.0	H	15.0	-15.9	21.8	40.0
54.046653	29.7	1000.0	120.000	100.0	V	111.0	-20.8	10.3	40.0
79.757194	25.8	1000.0	120.000	100.0	V	125.0	-22.0	14.2	40.0
89.532745	18.9	1000.0	120.000	106.0	V	-6.0	-20.9	24.6	43.5
249.979319	36.7	1000.0	120.000	106.0	H	62.0	-14.5	9.3	46.0
374.932024	23.4	1000.0	120.000	182.0	V	300.0	-9.6	22.6	46.0

2.4 AC CONDUCTED EMISSIONS

2.4.1 Specification Reference

FCC 47 CFR Part 15, Clause 15.207
RSS-Gen, Clause 7.1.3

2.4.2 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 μH/50 ohms line impedance stabilization network (LISN).

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

**Decreases with the logarithm of the frequency.*

2.4.3 Equipment Under Test and Modification State

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

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

May 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

Ambient Temperature	22.9°C
Relative Humidity	47.1%
ATM Pressure	99.2 kPa

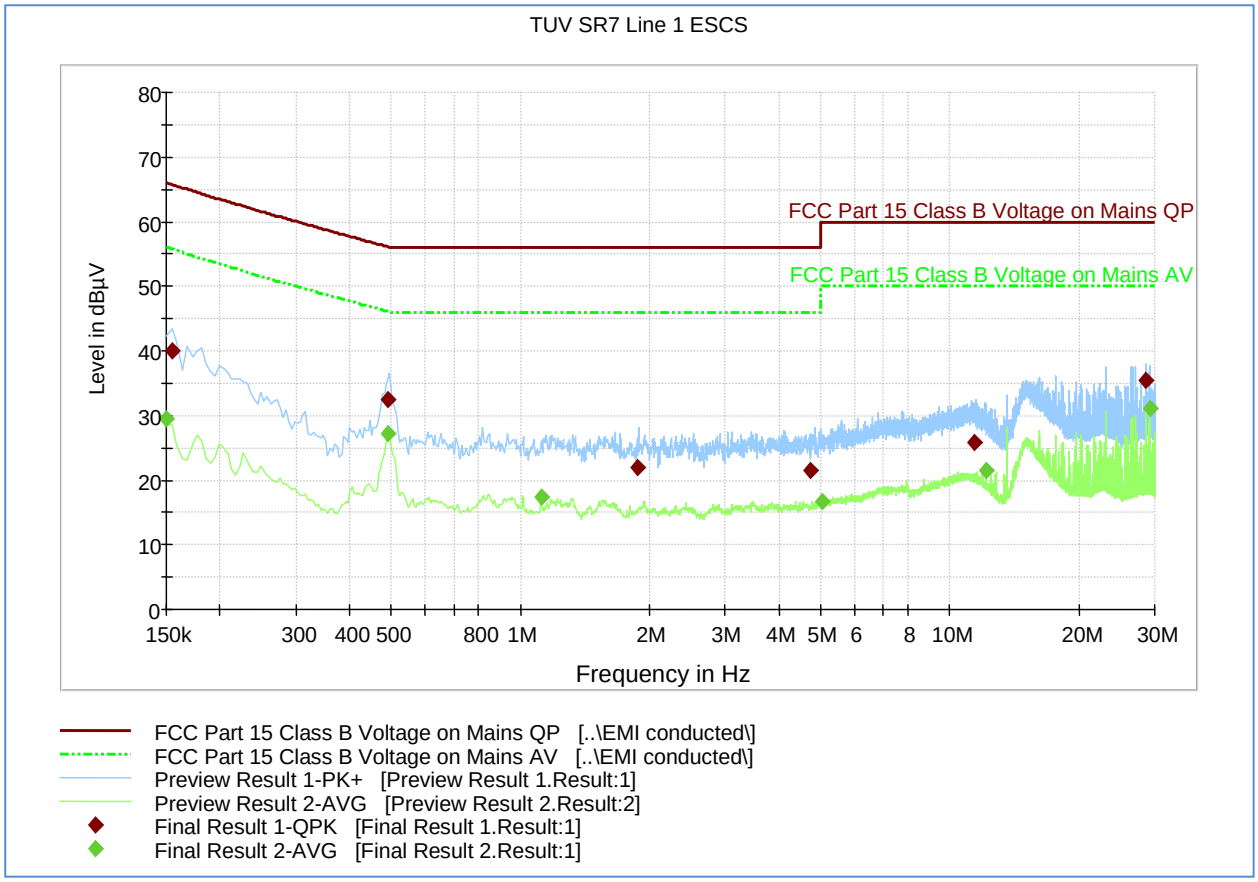
2.4.7 Additional Observations

- The EUT was verified using AC adapter supplied by the manufacturer..
- EUT verified using input voltage of 120VAC 60Hz.
- 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 2.4.8 for sample computation.

2.4.8 Sample Computation (Conducted Emission – Quasi Peak)

Measuring equipment raw measurement (dbµV) @ 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 (dbµV) @ 150kHz			**26.2**

2.4.9 Test Results - Line 1 (Hot) NFC Mode



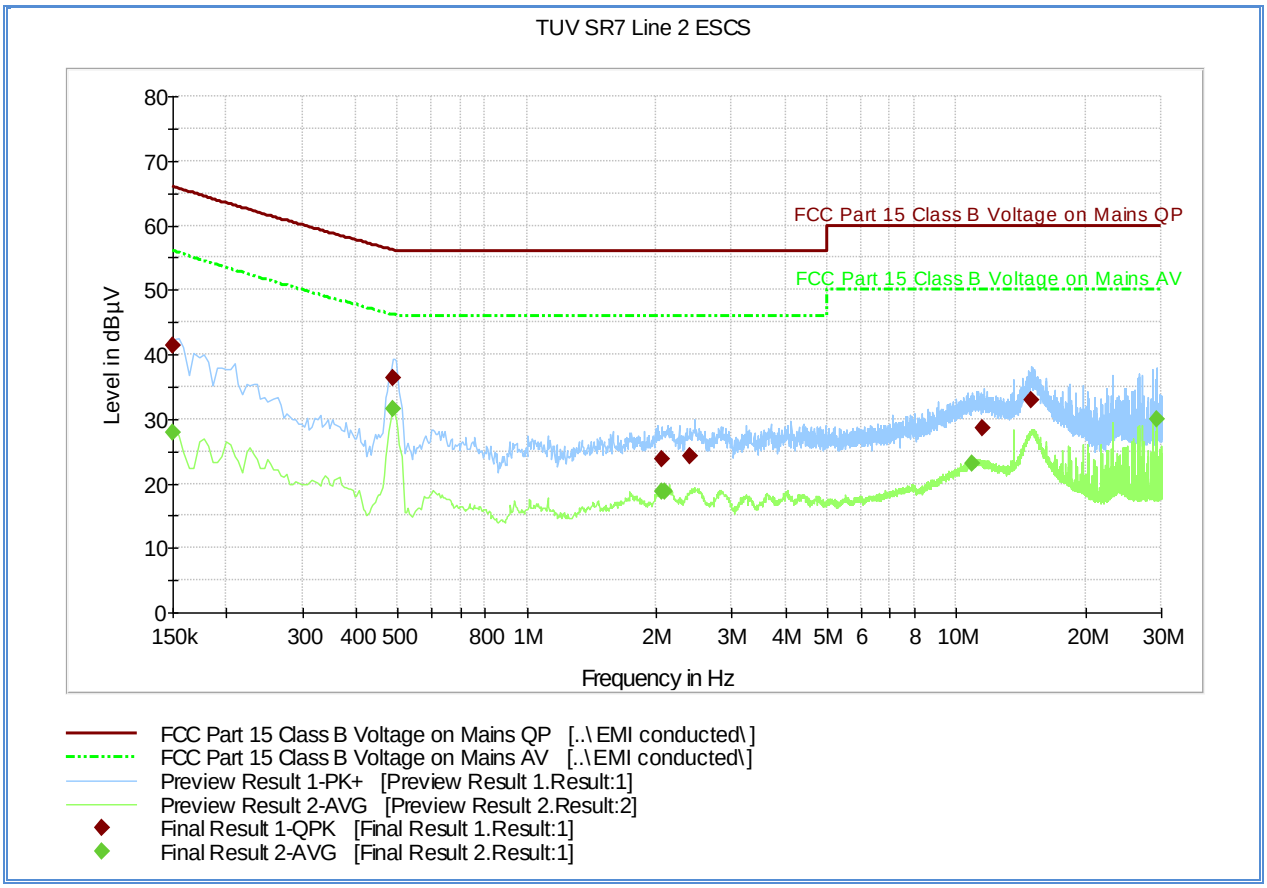
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	39.9	1000.0	9.000	Off	L	20.0	25.8	65.7
0.492000	32.5	1000.0	9.000	Off	L	20.1	23.6	56.1
1.882500	22.0	1000.0	9.000	Off	L	20.2	34.0	56.0
4.753500	21.5	1000.0	9.000	Off	L	20.5	34.5	56.0
11.454000	25.8	1000.0	9.000	Off	L	20.7	34.2	60.0
28.684500	35.3	1000.0	9.000	Off	L	21.0	24.7	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.150000	29.4	1000.0	9.000	Off	L	20.1	26.6	56.0
0.492000	27.2	1000.0	9.000	Off	L	20.1	18.9	46.1
1.117500	17.5	1000.0	9.000	Off	L	20.2	28.5	46.0
5.068500	16.7	1000.0	9.000	Off	L	20.5	33.3	50.0
12.196500	21.5	1000.0	9.000	Off	L	20.7	28.5	50.0
29.233500	31.1	1000.0	9.000	Off	L	21.0	18.9	50.0

2.4.10 Line 2 (Neutral) NFC Mode



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	41.3	1000.0	9.000	Off	N	20.1	24.7	66.0
0.487500	36.4	1000.0	9.000	Off	N	20.1	19.8	56.2
2.058000	23.7	1000.0	9.000	Off	N	20.2	32.3	56.0
2.404500	24.3	1000.0	9.000	Off	N	20.4	31.7	56.0
11.472000	28.6	1000.0	9.000	Off	N	20.7	31.4	60.0
14.946000	32.9	1000.0	9.000	Off	N	20.7	27.1	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit – Ave (dBµV)
0.150000	27.9	1000.0	9.000	Off	N	20.1	28.1	56.0
0.487500	31.5	1000.0	9.000	Off	N	20.1	14.7	46.2
2.071500	18.7	1000.0	9.000	Off	N	20.2	27.3	46.0
2.103000	18.8	1000.0	9.000	Off	N	20.3	27.2	46.0
10.914000	23.0	1000.0	9.000	Off	N	20.7	27.0	50.0
29.233500	29.9	1000.0	9.000	Off	N	21.0	20.1	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
Antenna Conducted Port Measurement						
7582	Signal/Spectrum Analyzer	FSW26	101614	Rhode & Schwarz	12/22/14	12/22/15
Conducted Emissions						
1024	EMI Test Receiver	ESCS 30	847793/001	Rhode & Schwarz	04/10/15	04/10/16
7567	LISN	FCC-LISN-50-25-2-10	120304	Fischer Custom Comm.	07/01/14	07/01/15
7568	LISN	FCC-LISN-50-25-2-10	120305	Fischer Custom Comm.	09/02/14	09/02/15
8822	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/20/15	02/20/16
8824	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/20/15	02/20/16
Radiated Emissions						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	09/25/14	09/25/16
6628	Loop Antenna	HFH 2 –Z2	880 458/25	Rhode & Schwarz	10/31/13	10/31/15
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						
	Test Software	EMC32	V8.53	Rhode & Schwarz	N/A	
1072	DC Power Supply	E3610A	KR51311519	Hewlett Packard	Verified by 6792	
6792	Multimeter	3478A	2911A70964	Hewlett Packard	08/12/14	08/12/15
7554	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	01/30/14	01/30/16

3.2 MEASUREMENT UNCERTAINTY

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

3.2.1 Conducted Measurements

	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

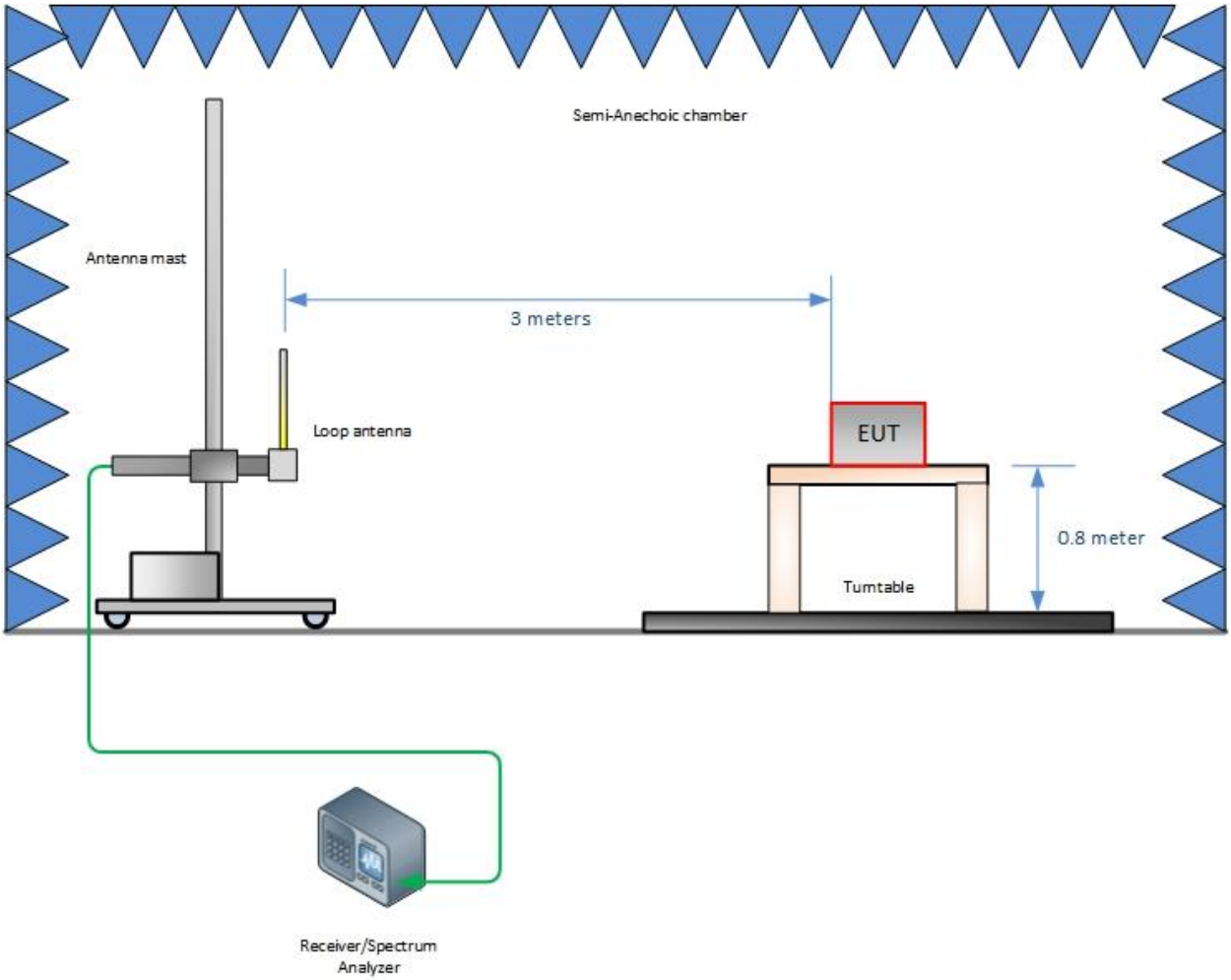
3.2.2 Radiated Measurements (Below 1GHz)

	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

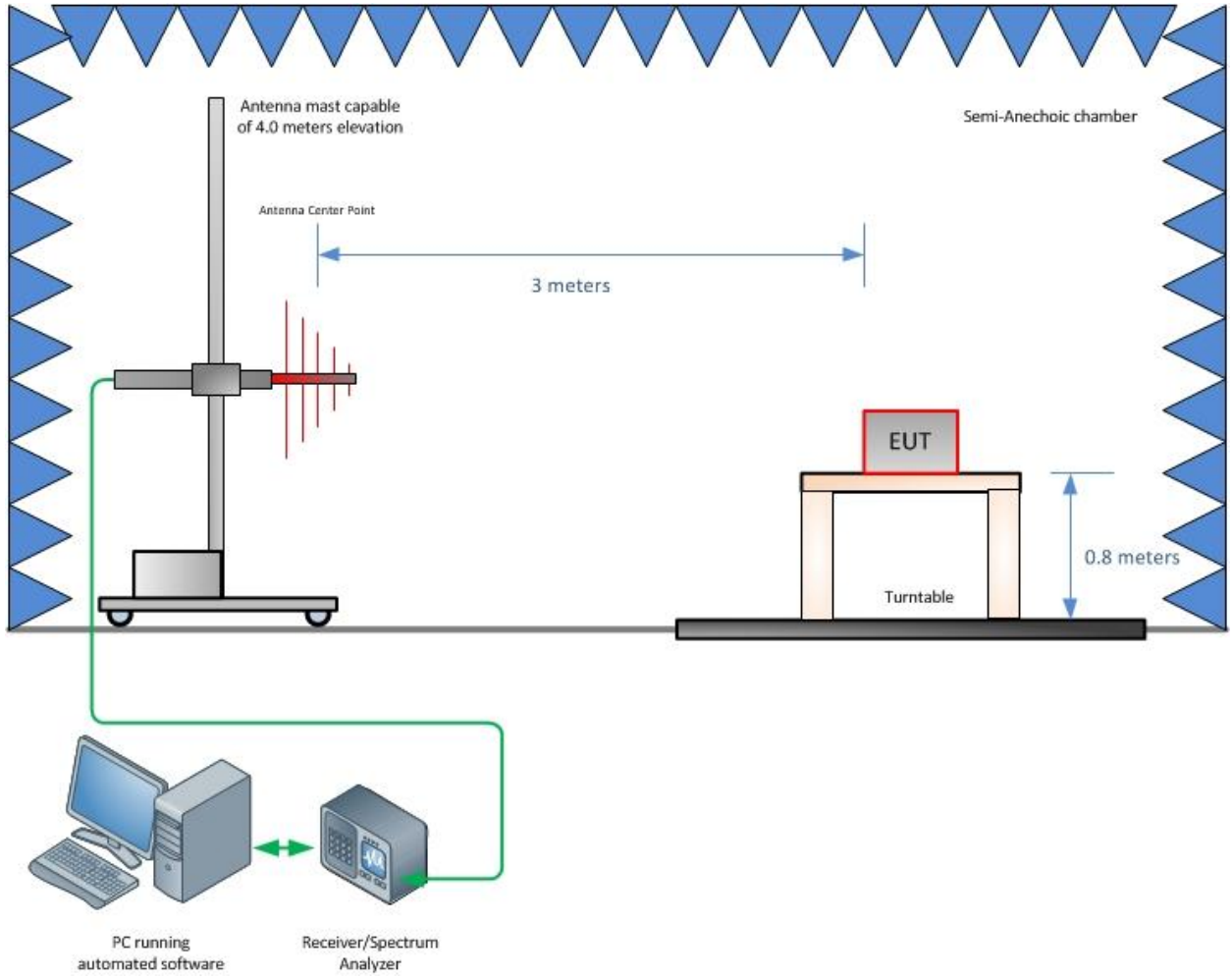
SECTION 4

DIAGRAM OF TEST SETUP

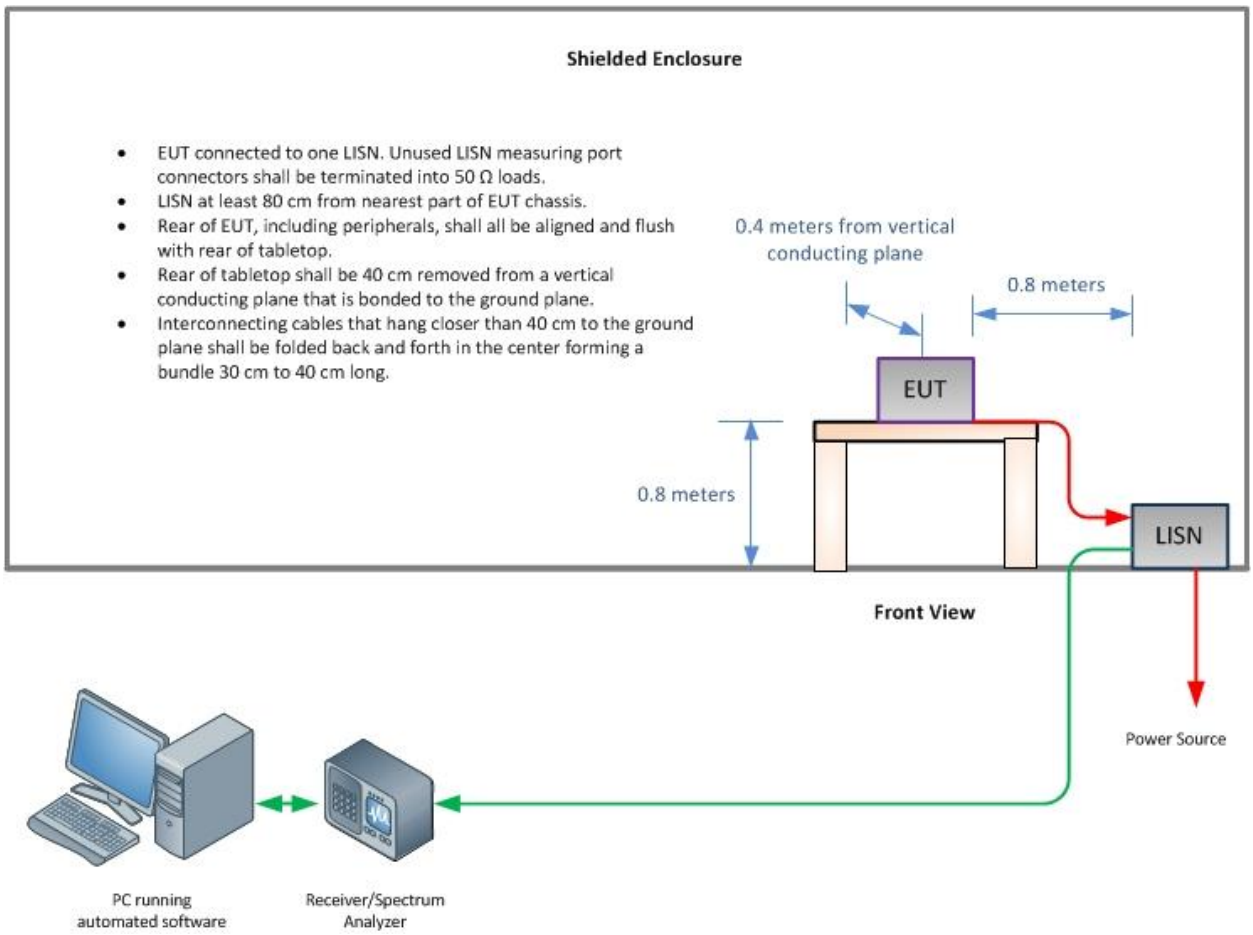
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 30 MHz)



Radiated Emission Test Setup (30MHz to 1GHz)



Conducted Emission Test Setup

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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TÜV SÜD AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone: 858 678 1400 FAX: 858 546 0364