



America

**Choose certainty.
Add value.**

Report On

EMC Evaluation of
Nextivity Inc.
Cel-Fi Quatra Cellphone Signal Repeater

FCC Part 15 Subpart B
ICES-003 Issue 5



Report No. SD72113545-0216A

March 2016



America

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

REPORT ON	EMC Evaluation of the Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater
TEST REPORT NUMBER	SD72113545-0216A
TEST REPORT DATE	March 2016
PREPARED FOR	Nextivity Inc. 12230 World trade Drive, Suite 250 San Diego, CA 92128
CONTACT PERSON	CK Li Sr. Principal Engineer, Regulatory CLi@NextivityInc.com (858) 829-1692
PREPARED BY	 Ferdie S. Custodio Name Authorized Signatory Title: EMC/Senior Wireless Test Engineer
APPROVED BY	 Chip R. Fleury Name Authorized Signatory Title: West Coast EMC Manager
DATED	<u>March 03, 2016</u>



America

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

Revision History

SD72113545-0216A Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
03/03/2016	Initial Release				Ferdinand Custodio

CONTENTS

Section	Page No
1	REPORT SUMMARY 4
1.1	Introduction 5
1.2	Brief Summary Of Results 6
1.3	Product Information 7
1.4	EUT Test Configuration 9
1.5	Deviations From The Standard 11
1.6	Modification Record 11
1.7	Test Methodology 11
1.8	Test Facility Location..... 11
1.9	Test Facility Registration 11
2	TEST DETAILS 13
2.1	Conducted Limits 14
2.2	Radiated Emission Limits 20
3	TEST EQUIPMENT USED 34
3.1	Test Equipment Used 35
3.2	Measurement Uncertainty 36
4	DIAGRAM OF TEST SETUP 37
4.1	Test Setup Diagram..... 38
5	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 41
5.1	Accreditation, Disclaimers and Copyright..... 42



SECTION 1

REPORT SUMMARY

EMC Evaluation of the
Nextivity Inc.
Cellphone Signal Repeater



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater to the requirements of FCC Part 15 Subpart B and Innovation, Science and Economic Development Canada ICES-003.

Objective	To perform EMC Evaluation to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Nextivity Inc.
Model Name	Cel-Fi Quatra
Model Number(s)	Q34-2/5/12/66NU and Q34-2/66/5/12CU
Serial Number(s)	258602000045 (NU), 259551000476 (CU #1), 259551000285 (CU #2), 259551000049 (CU #3), 259551000131 (CU #4)
Number of Samples Tested	5
Highest Frequency Generated or Used	2480 MHz (BT LE)
Test Specification/Issue/Date	<ul style="list-style-type: none"> FCC Part 15 Subpart B (October 1, 2015) Spectrum Management and Telecommunications Interference-Causing Equipment Standard ICES-003 Information Technology Equipment (ITE) — Limits and methods of measurement (Issue 6 January 2016).
Start of Test	March 01, 2016
Finish of Test	March 02, 2016
Name of Engineer(s)	Ferdie Custodio
Related Document(s)	None



1.2 BRIEF SUMMARY OF RESULTS

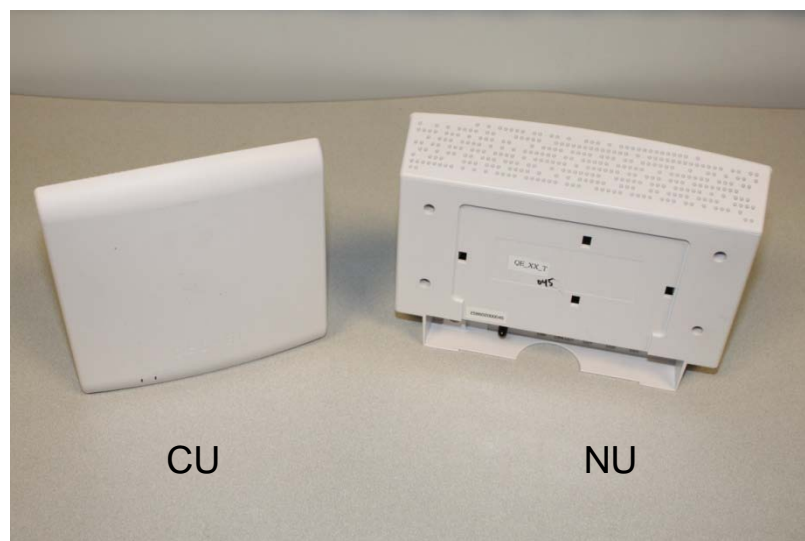
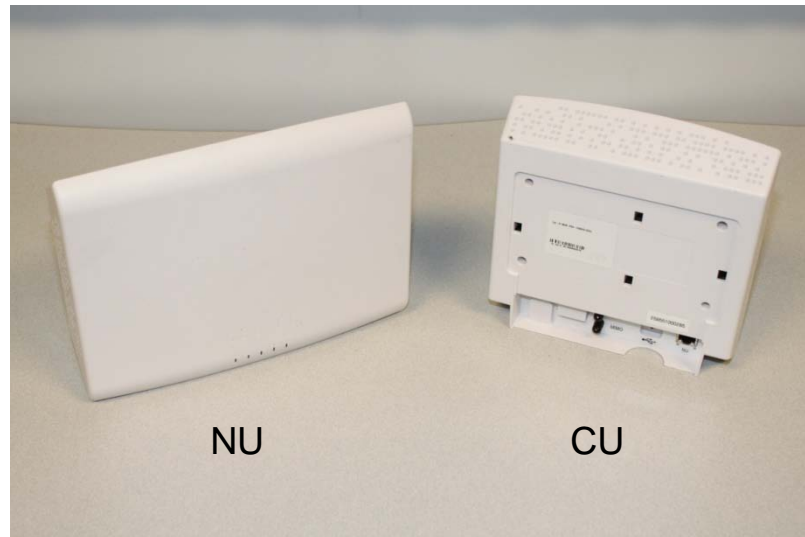
A brief summary of the tests carried out in accordance with FCC Part 15 Subpart B with cross-reference to Innovation, Science and Economic Development Canada Interference-Causing Equipment Standard ICES-003 is shown below.

Part 15	ICES-003	Test Description	Result	Comments/Base Standard
§15.107	Clause 6.1	Conducted Limits	Compliant	Class B requirement
§15.109	Clause 6.2	Radiated Emission Limits	Compliant	Class B requirement

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater as shown in the photograph below. The EUT is a WCDMA/LTE Signal Booster to improve voice and data cellular performance in large enterprise environments. The EUT consists of two separate units: the Network Unit (NU) and the Coverage Unit (CU). The NU comprises a transmitter and receiver which communicate with the cell tower and the CU. Users place the NU in an area with the strongest signal from the carrier network. The CU is then placed in the center of the home or office, or in the area where the best signal quality is best needed. The NU and CU are placed at varying distances apart and are communicated via Ethernet cables. This report covers “unintentional radiator” aspect of the EUT, all radios were placed on standby mode during testing (except for BT LE running in very low duty cycle).



Equipment Under Test



1.3.2 Labelling Requirement for Innovation, Science and Economic Development Canada

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section and in Notice 2014-DRS1003 for electronic labelling for every unit:

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

Each unit of an ITE model shall bear a label (see below) that represents the manufacturer's or the importer's SDoC with Innovation, Science and Economic Development Canada's ICES-003. This label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. If the dimensions of the device are too small or if it is not practical to place the label on the ITE and electronic labelling has not been implemented, the label shall be, upon agreement with Innovation, Science and Economic Development Canada, placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

Innovation, Science and Economic Development Canada ICES-003 Compliance Label:

CAN ICES-3 (B)/NMB-3(B)

1.3.3 Labelling Requirement for Part 15 (Verification) Device

See FCC Publication Number: 784748 for details:

<https://apps.fcc.gov/oetcf/kdb/forms/FTSSearchResultPage.cfm?id=27980&switch=P>

1.4 EUT TEST CONFIGURATION

1.4.1 Test Configuration Description

Test Configuration	Description
Default	NU powered supplying power via PoE to CU. Both NU and the CUs were fully booted up before each test. For Radiated Emissions, the NU and CU were verified independently while maintaining connections with each other. For AC Conducted Emissions, the EUT were tested as a set where four (4) CUs were connected to the NU.

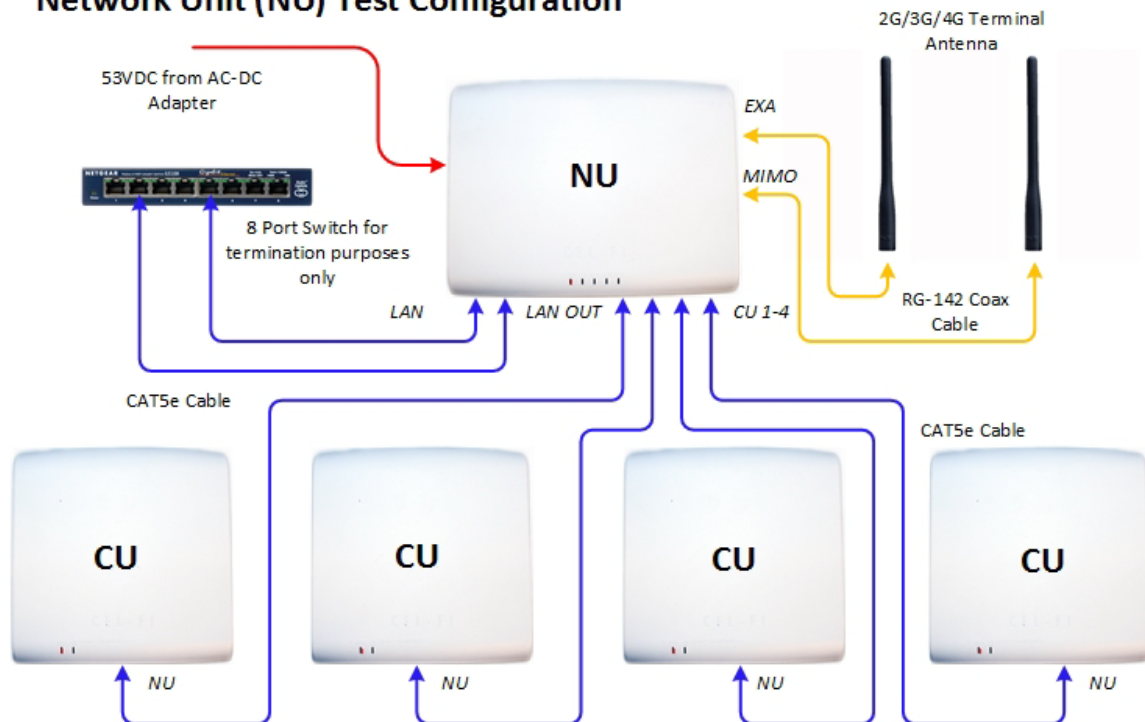
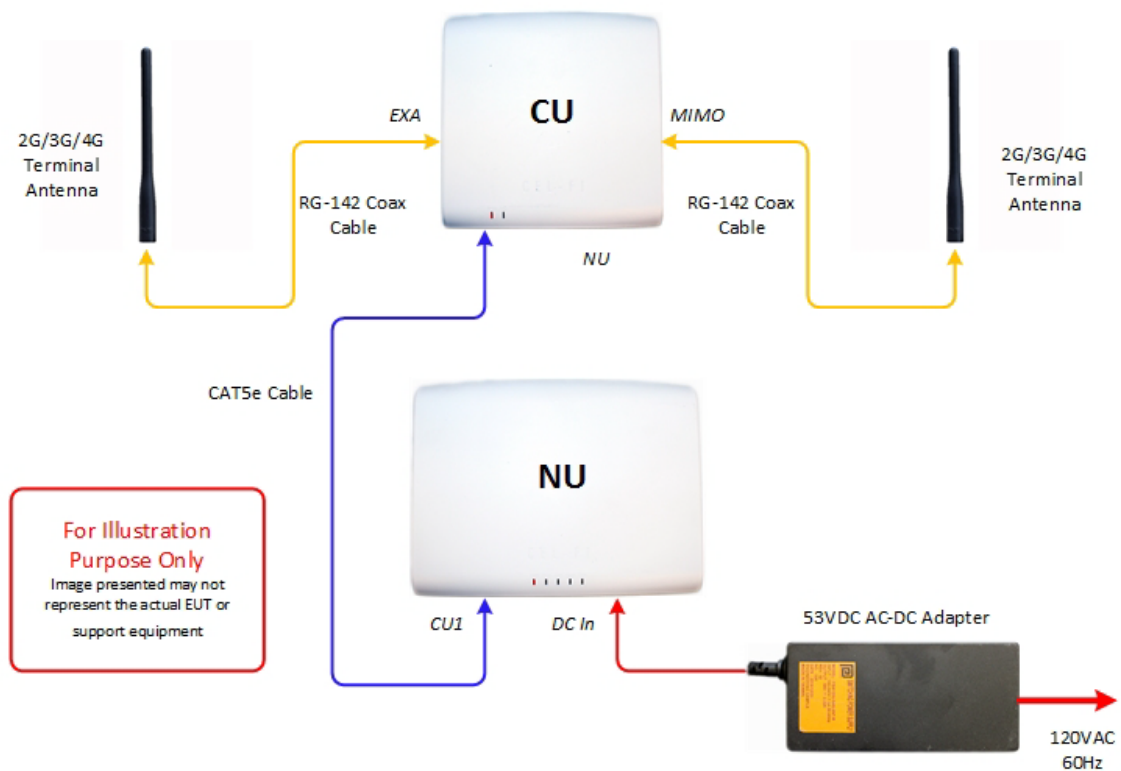
1.4.2 EUT Exercise Software

None. No special test software was used to exercise the EUT during verification.

1.4.3 Support Equipment and I/O cables

Manufacturer	Equipment/Cable	Description
Phihong	Switching Power Supply	Model PSA120U-540L6NT-R Rev 02 No. 026 (Engineering Sample)
Netgear	ProSAFE® 8-Port Gigabit Switch	M/N GS108v4 S/N 3TX25B7W86385
Netgear	AC-DC Adapter for support switch	Model AD2015F23 P/N 332-10744-01
-	Network patch Cable (2x NU to support Switch)	4.0m, unshielded, Cat5e 24AWG UTP
-	Network patch Cable (4x NU to CU)	4.0m, unshielded, Cat5e 24AWG UTP
-	Coaxial Cable (2x NU/CU to support antenna)	7.0m, RG-142 B/U
Taoglass	2G/3G/4G Terminal Antenna (2x)	Model TG.10.0113

1.4.4 Simplified Test Configuration Diagram

Network Unit (NU) Test Configuration**Coverage Unit (CU) Radiated Emissions 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: 258602000045 (NU), 259551000476 (CU #1), 259551000285 (CU #2), 259551000049 (CU #3), 259551000131 (CU #4)		
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 C63.4-2014, 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 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 C63.4-2014. The test modes were adapted according to the Operating Instructions provided by the manufacturer/client.

1.8 TEST FACILITY LOCATION

1.8.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 Fax: 858 546 0364.

1.8.2 TÜV SÜD America Inc. (Rancho Bernardo)

Building #8, 16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 Fax: 858 546 0364.

1.9 TEST FACILITY REGISTRATION

1.9.1 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.



1.9.2 Innovation, Science and Economic Development Canada (IC) Registration No.: 3067A

The 10m Semi-anechoic chamber of TÜV SÜD America Inc. (San Diego) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada for radio equipment testing with Registration No. 3067A.

1.9.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TÜV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.

1.9.4 VCCI – Registration No. A-0230

TÜV SÜD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.



SECTION 2

TEST DETAILS

EMC Evaluation of the
Nextivity Inc.
Cellphone Signal Repeater

2.1 CONDUCTED LIMITS

2.1.1 Specification Reference

Part 15 Subpart B §15.107(a)

2.1.2 Standard Applicable

Except for Class A digital devices, for equipment 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). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges

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: 258602000045 (NU), 259551000476 (CU #1), 259551000285 (CU #2), 259551000049 (CU #3), 259551000131 (CU #4) /Default Test Configuration

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

March 01, 2016/FSC

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

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	24.9 °C
Relative Humidity	42.3 %
ATM Pressure	99.3 kPa

2.1.7 Additional Observations

- EUT verified as a system through the NU with four (4) CU connected.



- 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 2.1.8 for sample computation.

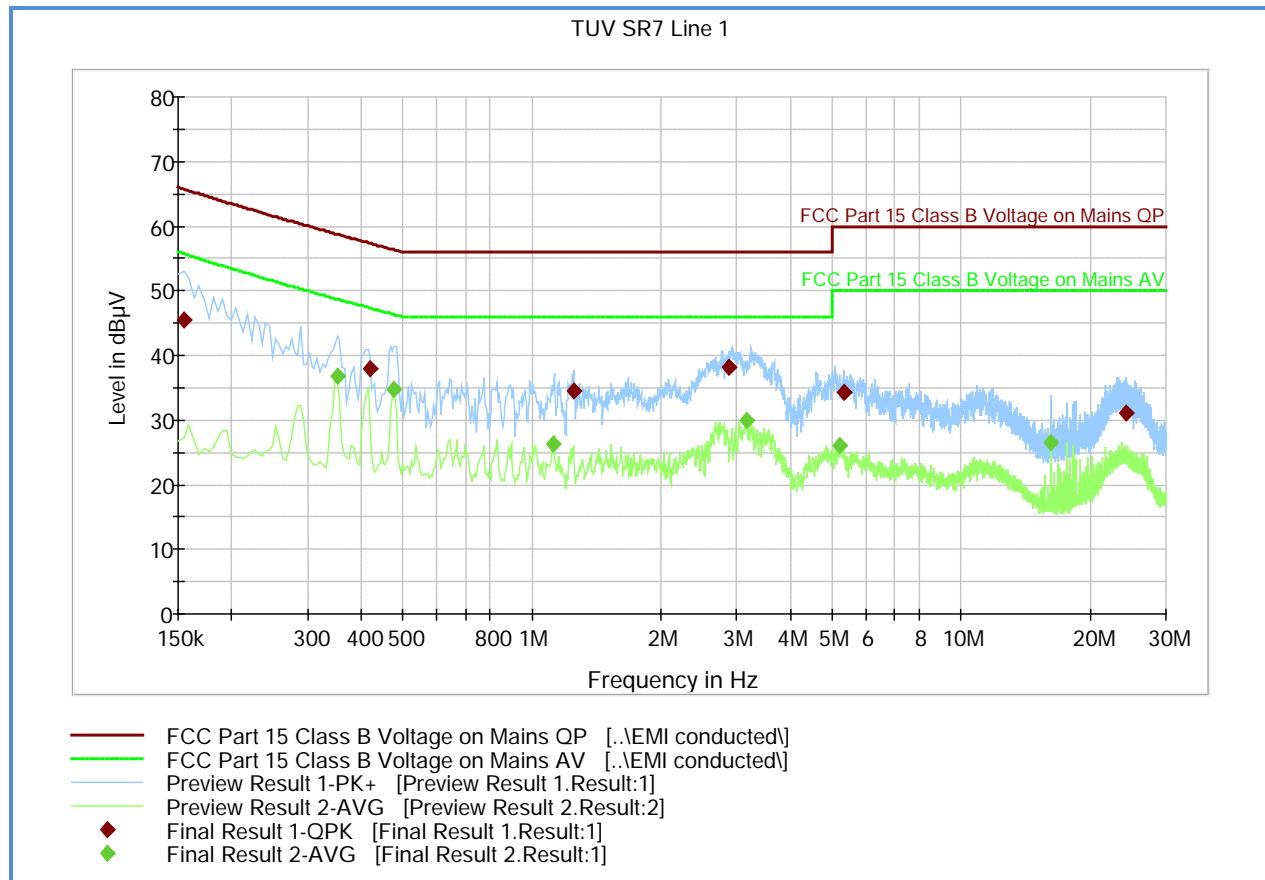
2.1.8 Sample Computation (Conducted Emission – Quasi Peak)

Measuring equipment raw measurement (db μ V) @ 150kHz			5.5
Correction Factor (dB)	Asset# 8822(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

Compliant. See attached plots and tables.

2.1.10 FCC Class B 120V 60Hz (Line 1 – Hot)



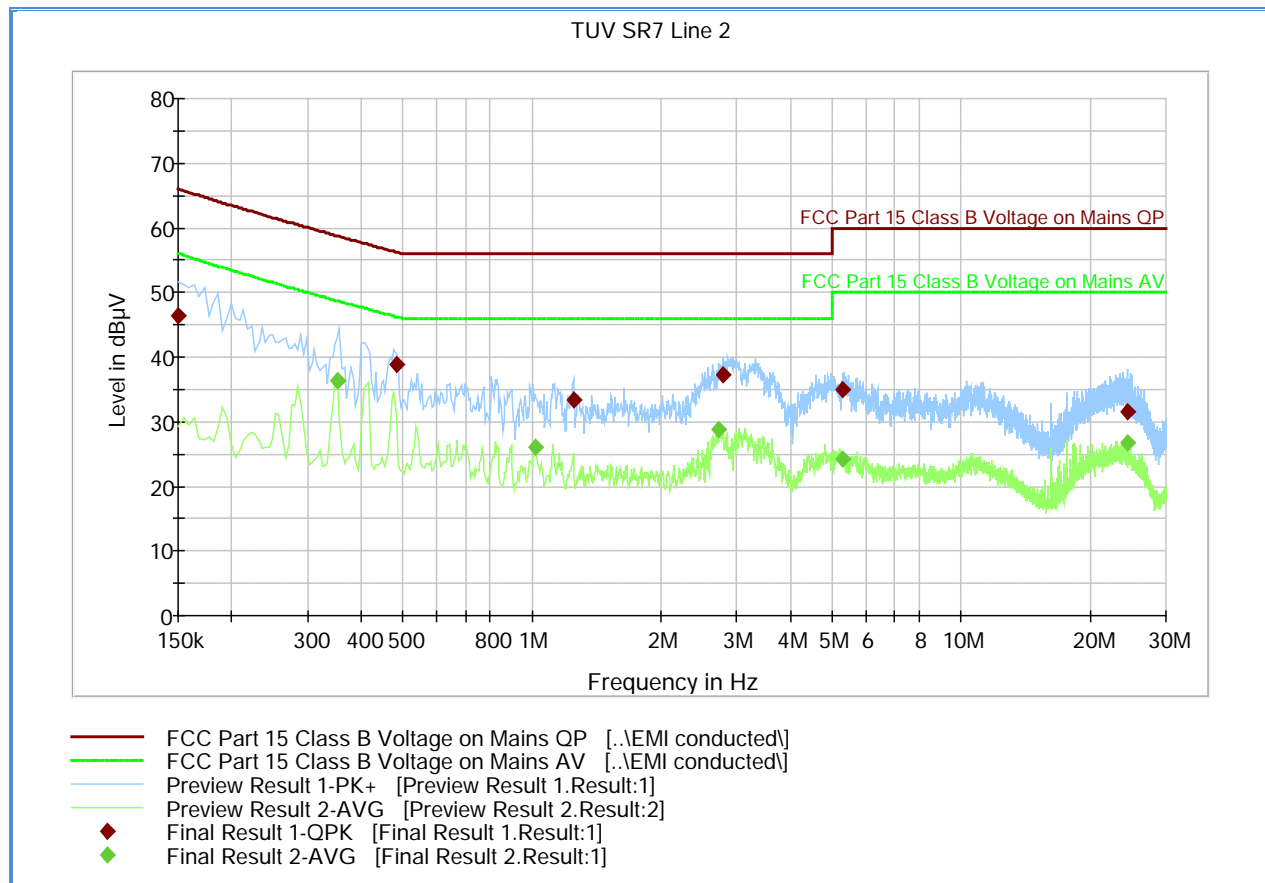
Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.154500	45.4	1000.0	9.000	Off	L1	20.2	20.3	65.7
0.420000	38.0	1000.0	9.000	Off	L1	20.0	19.4	57.3
1.248000	34.4	1000.0	9.000	Off	L1	20.0	21.6	56.0
2.868000	38.2	1000.0	9.000	Off	L1	20.1	17.8	56.0
5.338500	34.2	1000.0	9.000	Off	L1	20.1	25.8	60.0
24.216000	31.1	1000.0	9.000	Off	L1	20.5	28.9	60.0

Average

Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.352500	36.7	1000.0	9.000	Off	L1	20.0	12.0	48.7
0.478500	34.7	1000.0	9.000	Off	L1	20.0	11.6	46.3
1.122000	26.2	1000.0	9.000	Off	L1	20.0	19.8	46.0
3.156000	29.9	1000.0	9.000	Off	L1	20.1	16.1	46.0
5.208000	25.9	1000.0	9.000	Off	L1	20.1	24.1	50.0
16.228500	26.6	1000.0	9.000	Off	L1	20.3	23.4	50.0

2.1.1.1 FCC Class B 120V 60Hz (Line 2 – Neutral)



Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV)
0.150000	46.5	1000.0	9.000	Off	N	20.2	19.5	66.0
0.483000	38.9	1000.0	9.000	Off	N	20.0	17.4	56.3
1.252500	33.3	1000.0	9.000	Off	N	20.0	22.7	56.0
2.791500	37.3	1000.0	9.000	Off	N	20.1	18.7	56.0
5.307000	34.9	1000.0	9.000	Off	N	20.1	25.1	60.0
24.450000	31.5	1000.0	9.000	Off	N	20.4	28.5	60.0

Average

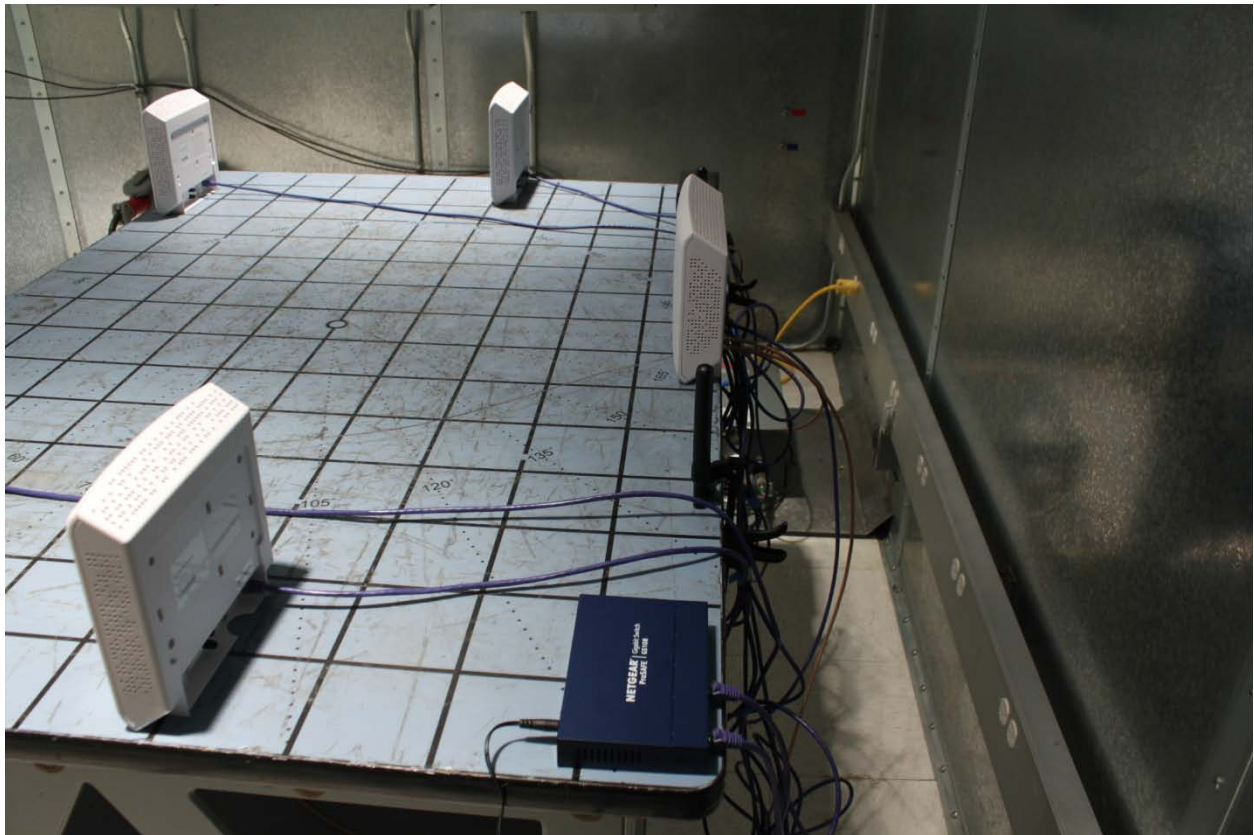
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.352500	36.3	1000.0	9.000	Off	N	20.0	12.4	48.7
0.352500	36.4	1000.0	9.000	Off	N	20.0	12.3	48.7
1.018500	26.0	1000.0	9.000	Off	N	20.0	20.0	46.0
2.733000	28.8	1000.0	9.000	Off	N	20.1	17.2	46.0
5.316000	24.3	1000.0	9.000	Off	N	20.1	25.7	50.0
24.445500	26.9	1000.0	9.000	Off	N	20.4	23.1	50.0

2.1.12 Test Setup Photo (Front)



Arrangement of EUT is for maximum separation possible as recommended by the manufacturer

2.1.13 Test Setup Photo (Back)



Arrangement of EUT is for maximum separation possible as recommended by the manufacturer

2.2 RADIATED EMISSION LIMITS

2.2.1 Specification Reference

Part 15 Subpart B §15.109(a)

2.2.2 Standard Applicable

(a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of emission (MHz)	Field Strength (microvolts/meter)
30-88	100
88-216	150
216-960	200
Above 960	500

2.2.3 Equipment Under Test and Modification State

Serial No: 258602000045 (NU), 259551000476 (CU #1), 259551000285 (CU #2), 259551000049 (CU #3), 259551000131 (CU #4) /Default Test Configuration

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

March 02, 2016/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

Test performed at TÜV SÜD America Inc. Rancho Bernardo facility.

Ambient Temperature	25.7 °C
Relative Humidity	41.3 %
ATM Pressure	99.5 kPa

2.2.7 Additional Observations

- The spectrum was searched from 30MHz to 18GHz.
- Verification was performed at 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 2.2.8 for sample computation.

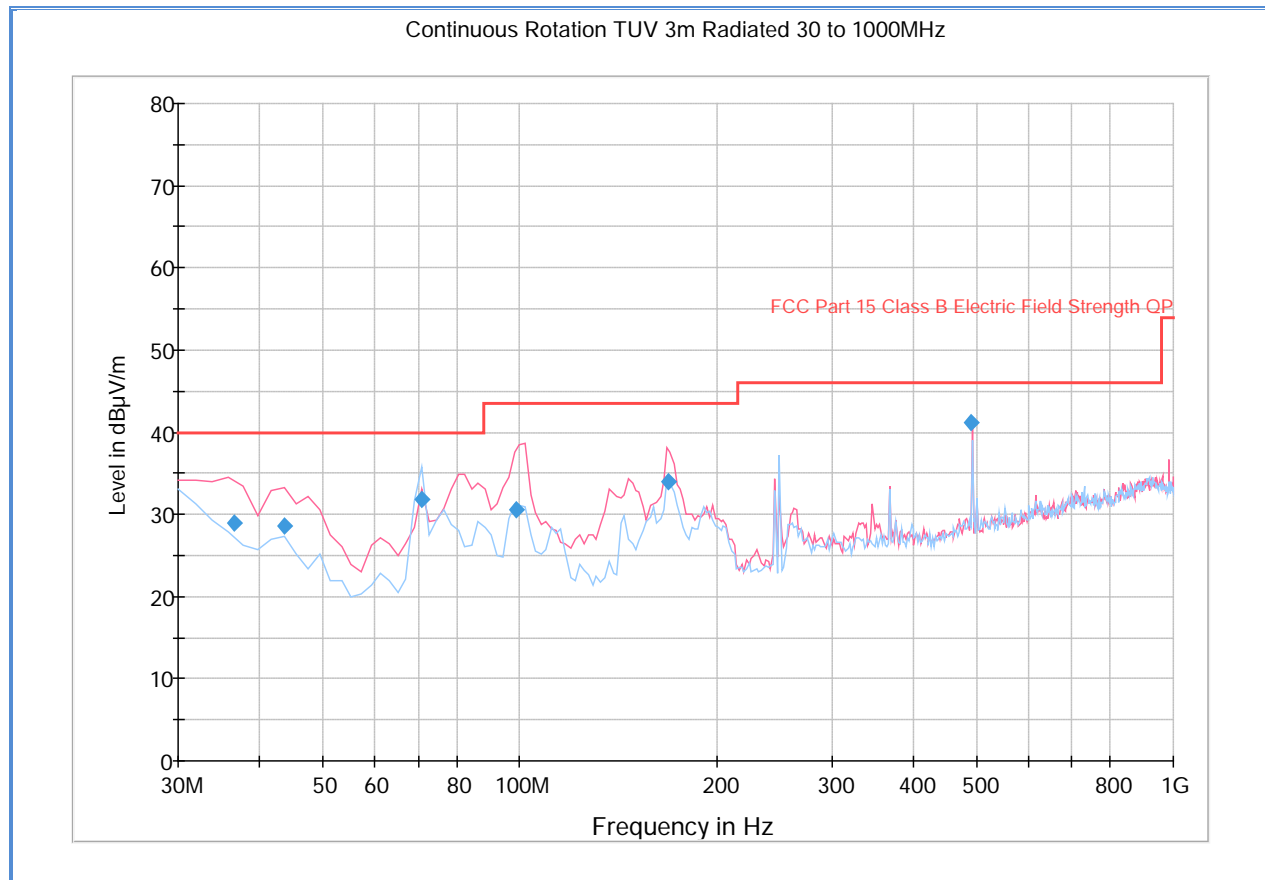
2.2.8 Sample Computation (Radiated Emission)

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

2.2.9 Test Results

See attached plots.

2.2.9.1 Below 1GHz Radiated Emission Test (NU)



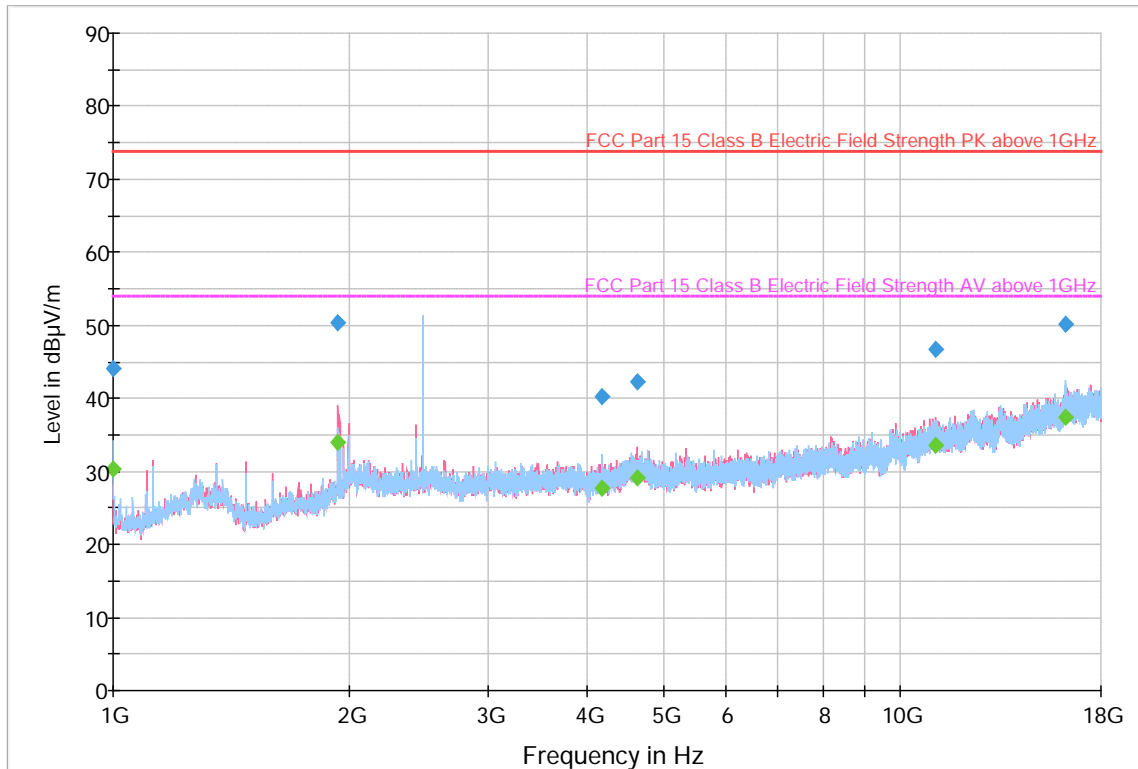
Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
36.471663	28.9	1000.0	120.000	100.0	V	279.0	-9.2	11.1	40.0
43.687214	28.6	1000.0	120.000	100.0	V	285.0	-12.3	11.4	40.0
70.621643	31.8	1000.0	120.000	377.0	H	311.0	-16.8	8.2	40.0
99.003848	30.6	1000.0	120.000	127.0	V	41.0	-14.1	12.9	43.5
169.016032	34.0	1000.0	120.000	100.0	V	184.0	-12.8	9.5	43.5
491.525291	41.2	1000.0	120.000	100.0	V	223.0	-1.6	4.8	46.0

Test Notes: All four (4) CU were placed inside a Faraday cage.

2.2.9.2 Above 1GHz Radiated Emission Test (NU)

Continuous Rotation TUV 3m Radiated 1000 to 18000MHz



Peak Data

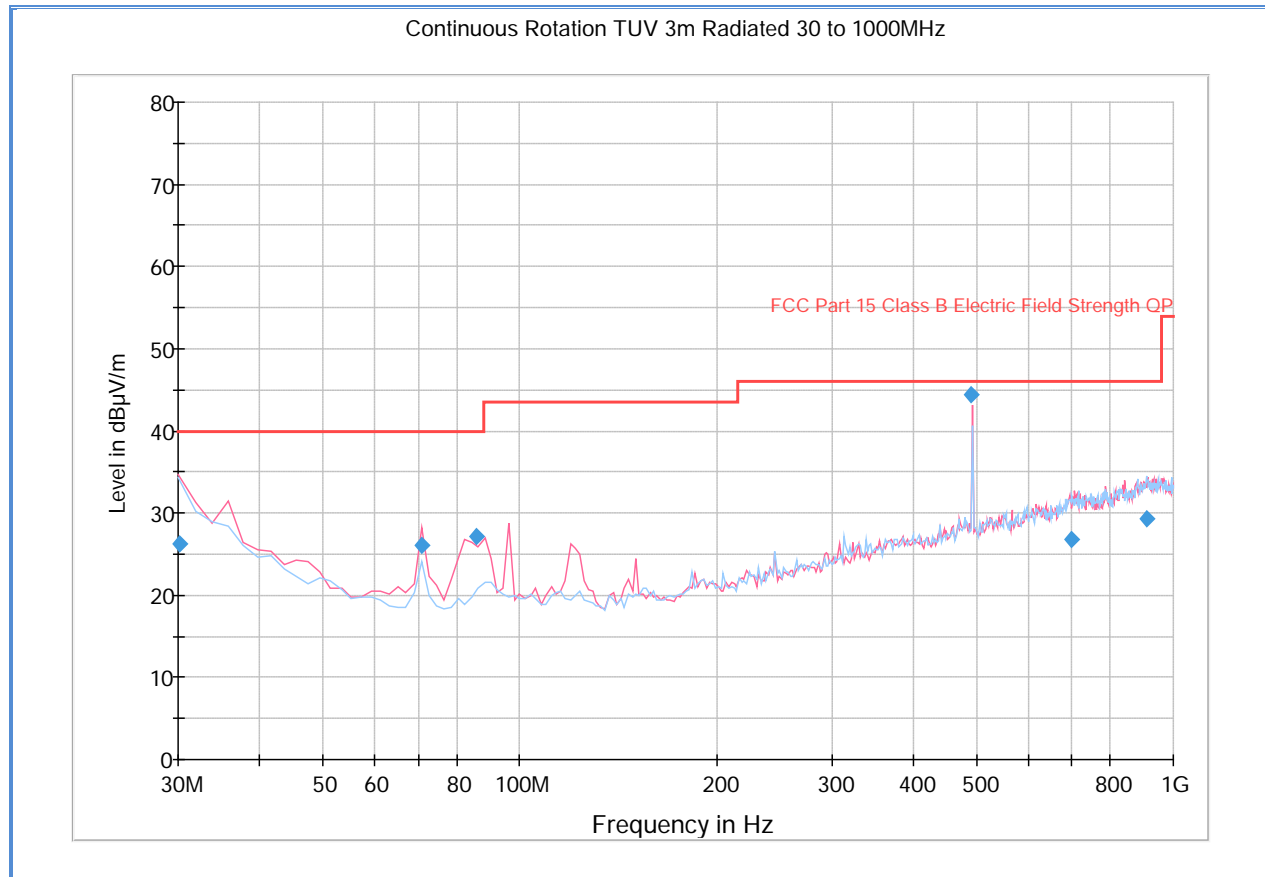
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.400000	44.0	1000.0	1000.000	239.4	H	11.0	-7.9	29.9	73.9
1932.366667	50.4	1000.0	1000.000	270.3	V	245.0	-1.6	23.5	73.9
4181.066667	40.1	1000.0	1000.000	404.5	H	175.0	1.9	33.8	73.9
4634.966667	42.2	1000.0	1000.000	372.1	V	-20.0	2.8	31.7	73.9
11088.733333	46.7	1000.0	1000.000	404.5	V	87.0	11.6	27.2	73.9
16249.600000	50.2	1000.0	1000.000	238.4	H	20.0	17.1	23.7	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)
1000.400000	30.3	1000.0	1000.000	239.4	H	11.0	-7.9	23.6	53.9
1932.366667	34.0	1000.0	1000.000	270.3	V	245.0	-1.6	19.9	53.9
4181.066667	27.8	1000.0	1000.000	404.5	H	175.0	1.9	26.1	53.9
4634.966667	29.1	1000.0	1000.000	372.1	V	-20.0	2.8	24.8	53.9
11088.733333	33.5	1000.0	1000.000	404.5	V	87.0	11.6	20.4	53.9
16249.600000	37.4	1000.0	1000.000	238.4	H	20.0	17.1	16.5	53.9

Test Notes: BT LE ignored during final measurement phase.

2.2.9.3 Below 1GHz Radiated Emission Test (CU)

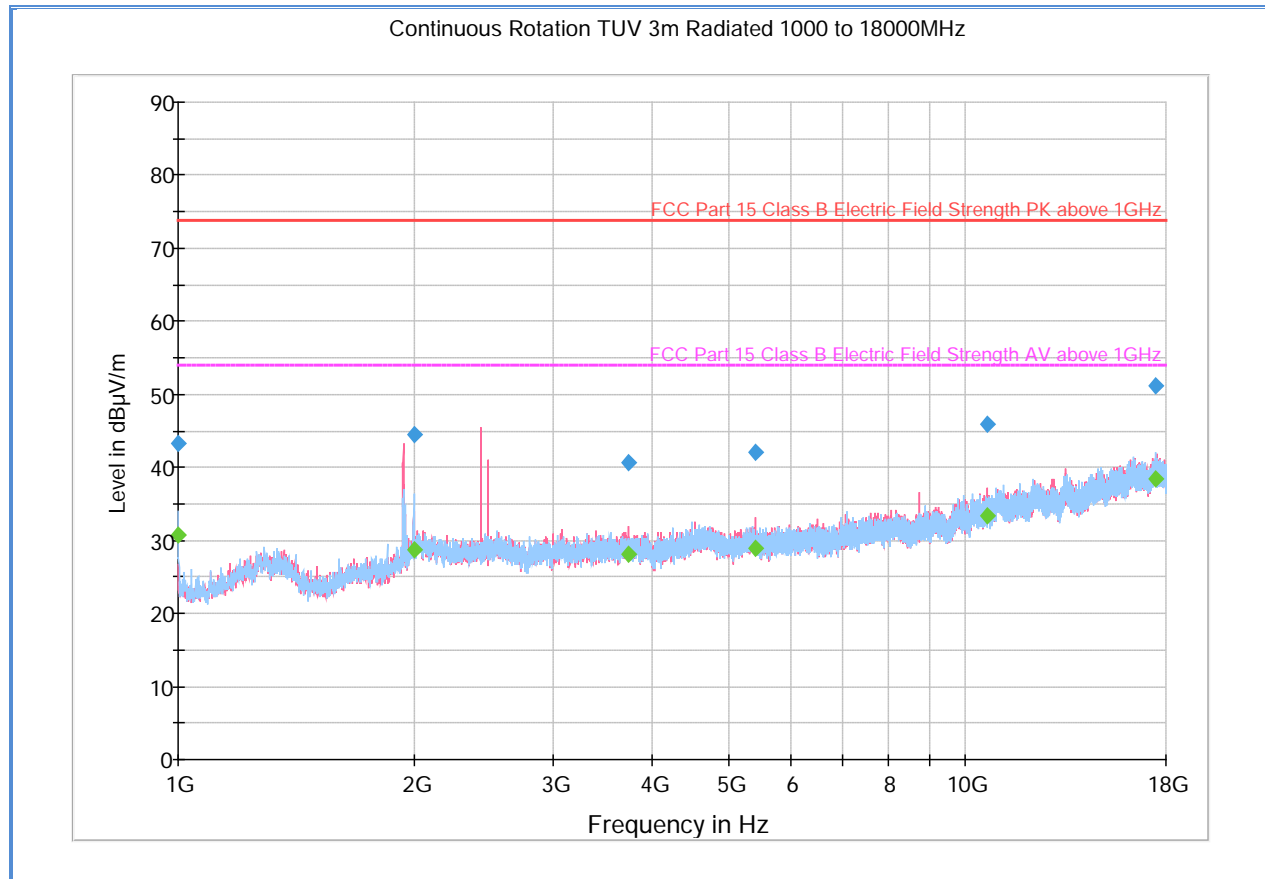


Quasi-Peak Data

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
30.120000	26.3	1000.0	120.000	150.0	V	18.0	-5.6	13.7	40.0
70.781643	26.0	1000.0	120.000	100.0	V	-5.0	-16.8	14.0	40.0
85.692745	27.2	1000.0	120.000	100.0	V	326.0	-15.9	12.8	40.0
491.525291	44.5	1000.0	120.000	100.0	V	250.0	-1.6	1.5	46.0
698.977395	26.8	1000.0	120.000	211.0	H	208.0	3.1	19.2	46.0
908.877275	29.3	1000.0	120.000	150.0	H	154.0	6.4	16.7	46.0

Test Notes: NU was placed inside a Faraday cage for this test.

2.2.9.4 Above 1GHz Radiated Emission Test (CU)



Peak Data

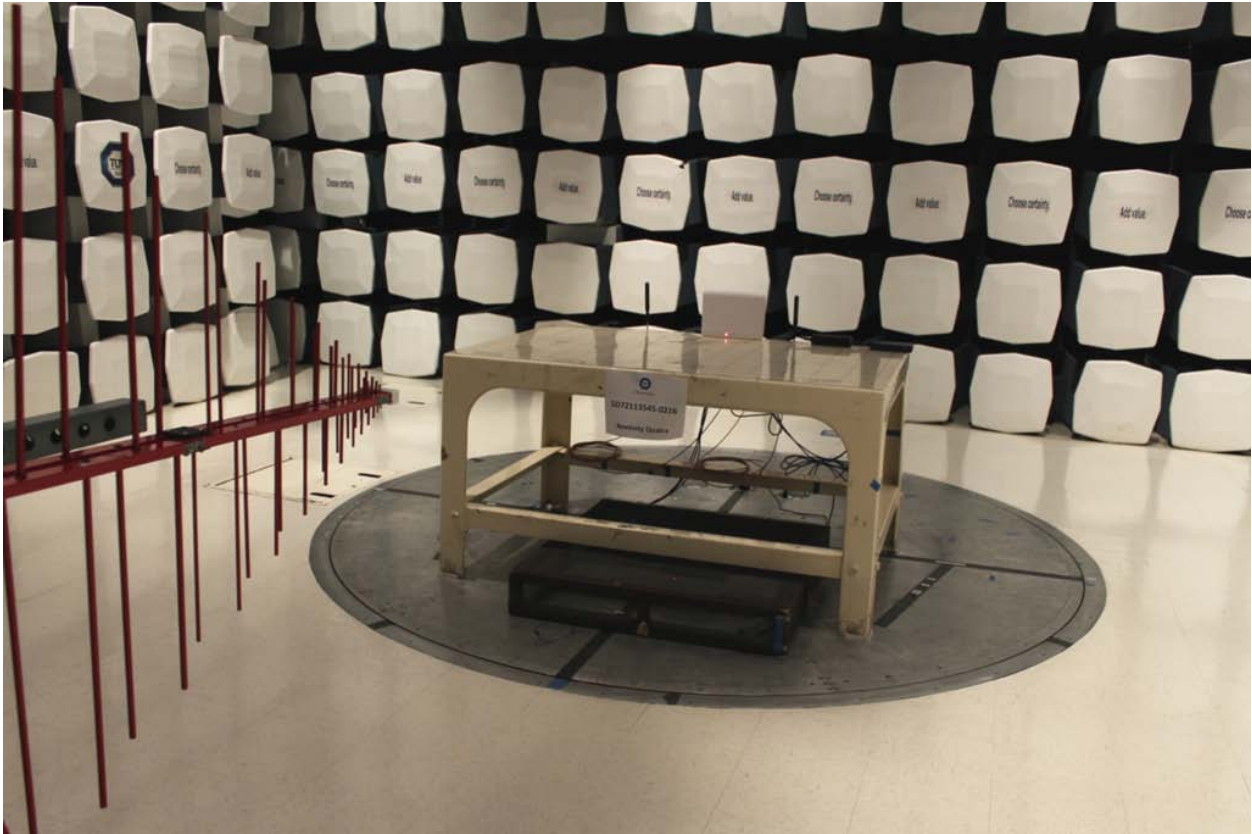
Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	43.2	1000.0	1000.000	202.3	H	287.0	-7.9	30.7	73.9
1993.200000	44.4	1000.0	1000.000	314.2	H	320.0	-0.7	29.5	73.9
3729.633333	40.7	1000.0	1000.000	167.6	V	13.0	1.2	33.2	73.9
5407.533333	42.0	1000.0	1000.000	164.6	V	245.0	3.9	31.9	73.9
10654.666667	45.9	1000.0	1000.000	300.6	V	20.0	11.1	28.0	73.9
17475.866667	51.2	1000.0	1000.000	302.2	H	20.0	18.0	22.7	73.9

Average Data

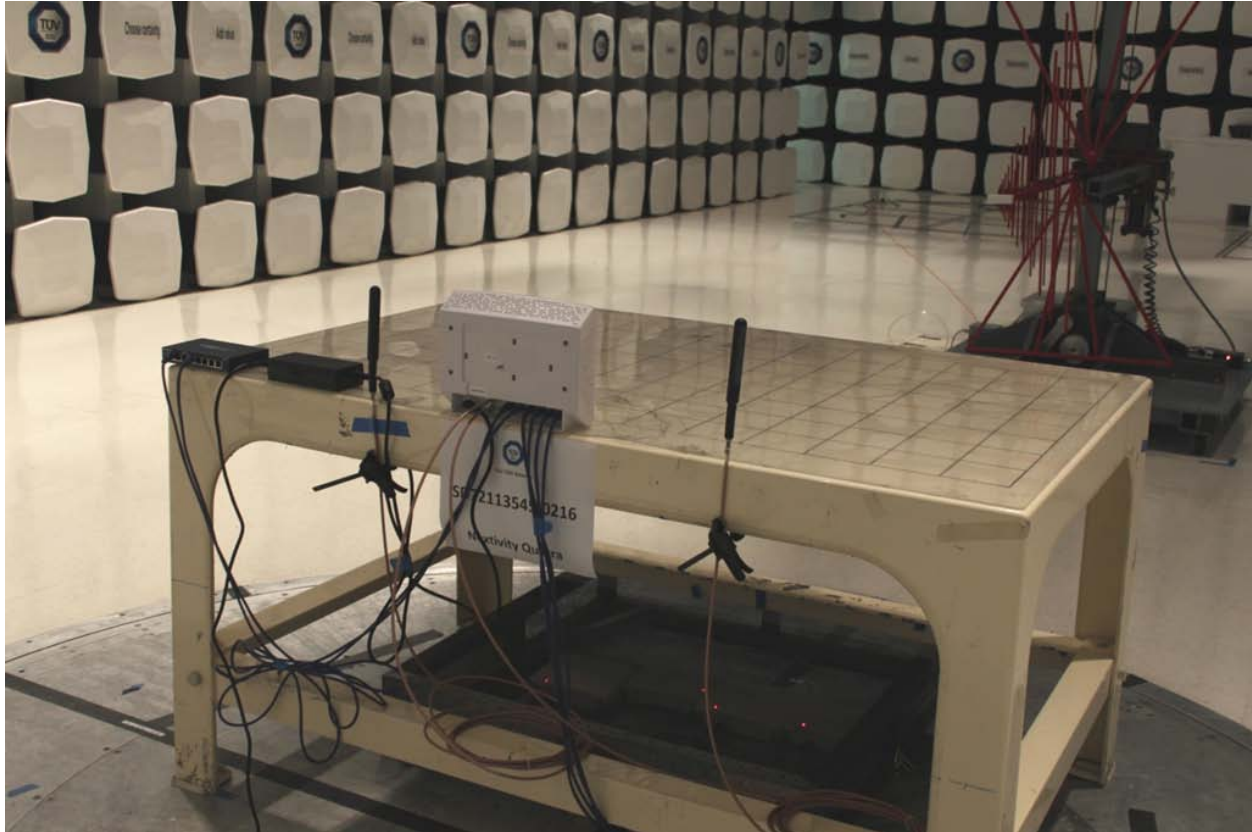
Frequency (MHz)	Average (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
1000.000000	30.7	1000.0	1000.000	202.3	H	287.0	-7.9	23.2	53.9
1993.200000	28.8	1000.0	1000.000	314.2	H	320.0	-0.7	25.1	53.9
3729.633333	28.1	1000.0	1000.000	167.6	V	13.0	1.2	25.8	53.9
5407.533333	29.0	1000.0	1000.000	164.6	V	245.0	3.9	24.9	53.9
10654.666667	33.3	1000.0	1000.000	300.6	V	20.0	11.1	20.6	53.9
17475.866667	38.5	1000.0	1000.000	302.2	H	20.0	18.0	15.4	53.9

Test Notes: BT LE and known ambient noise were ignored during final measurement phase.

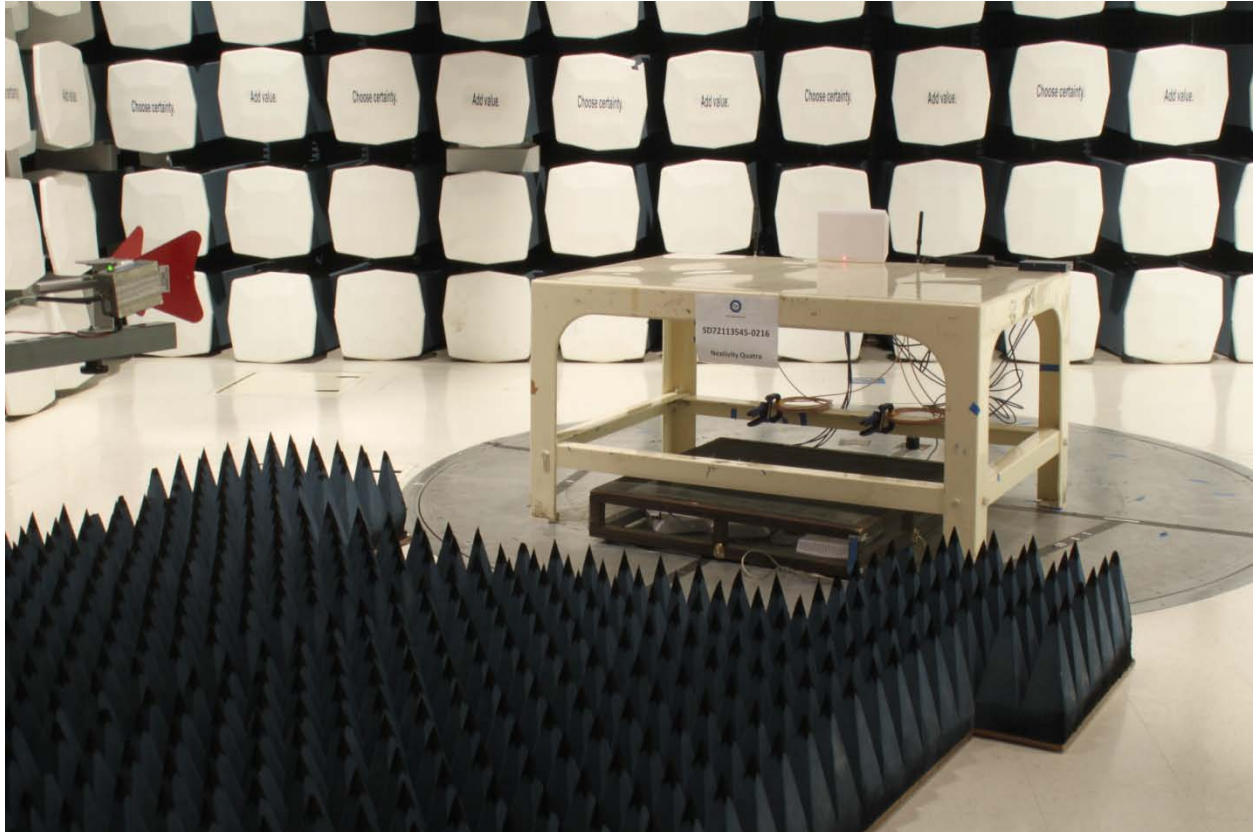
2.2.10 Test Setup Photo (Below 1GHz Front -NU)



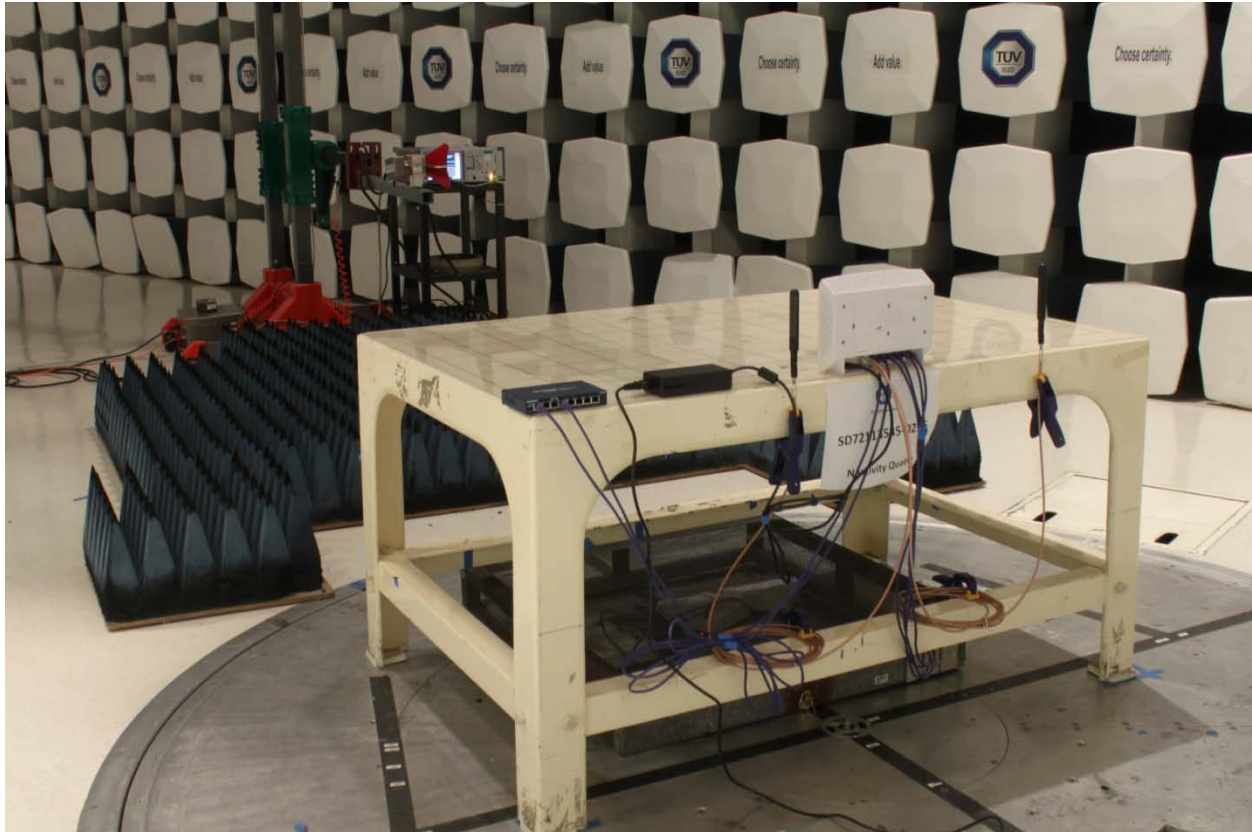
2.2.11 Test Setup Photo (Below 1GHz Back -NU)



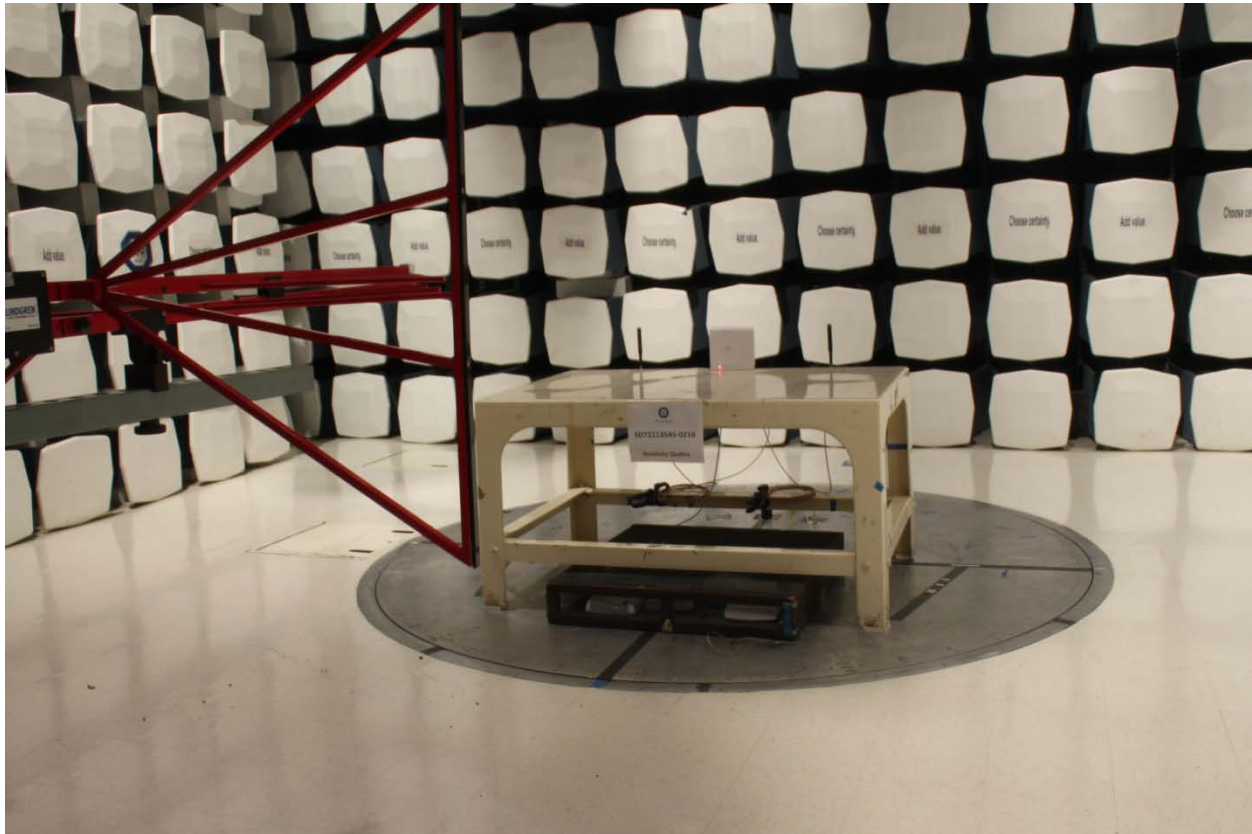
2.2.12 Test Setup Photo (Above 1GHz Front - NU)



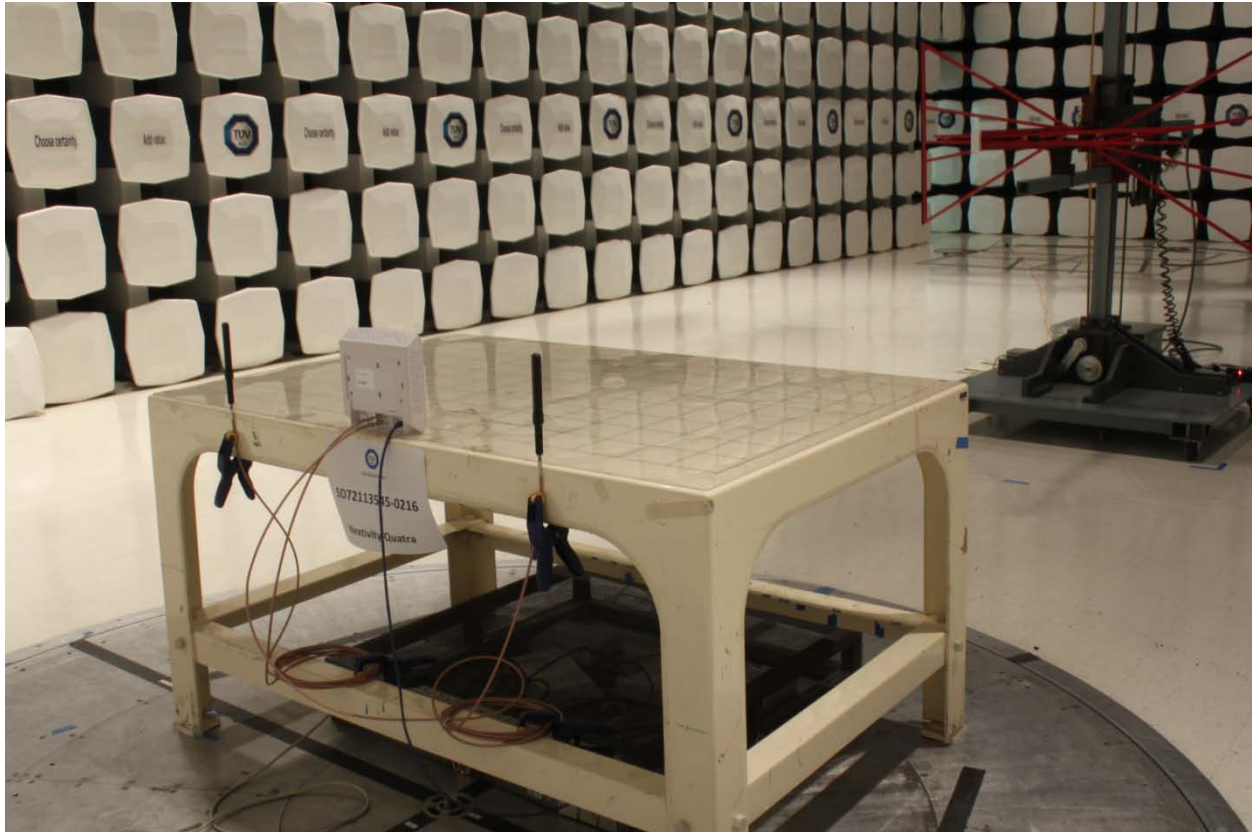
2.2.13 Test Setup Photo (Above 1GHz Back - NU)



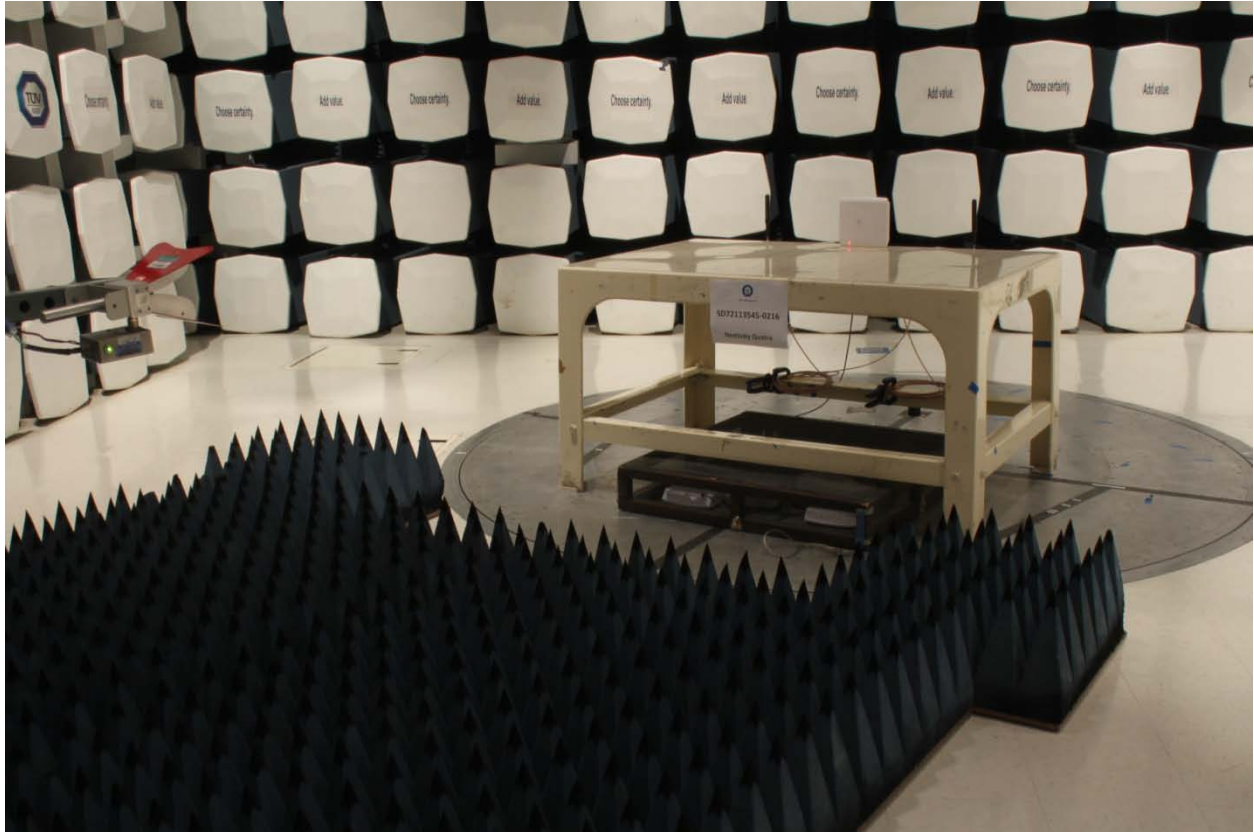
2.2.1 Test Setup Photo (Below 1GHz Front -CU)



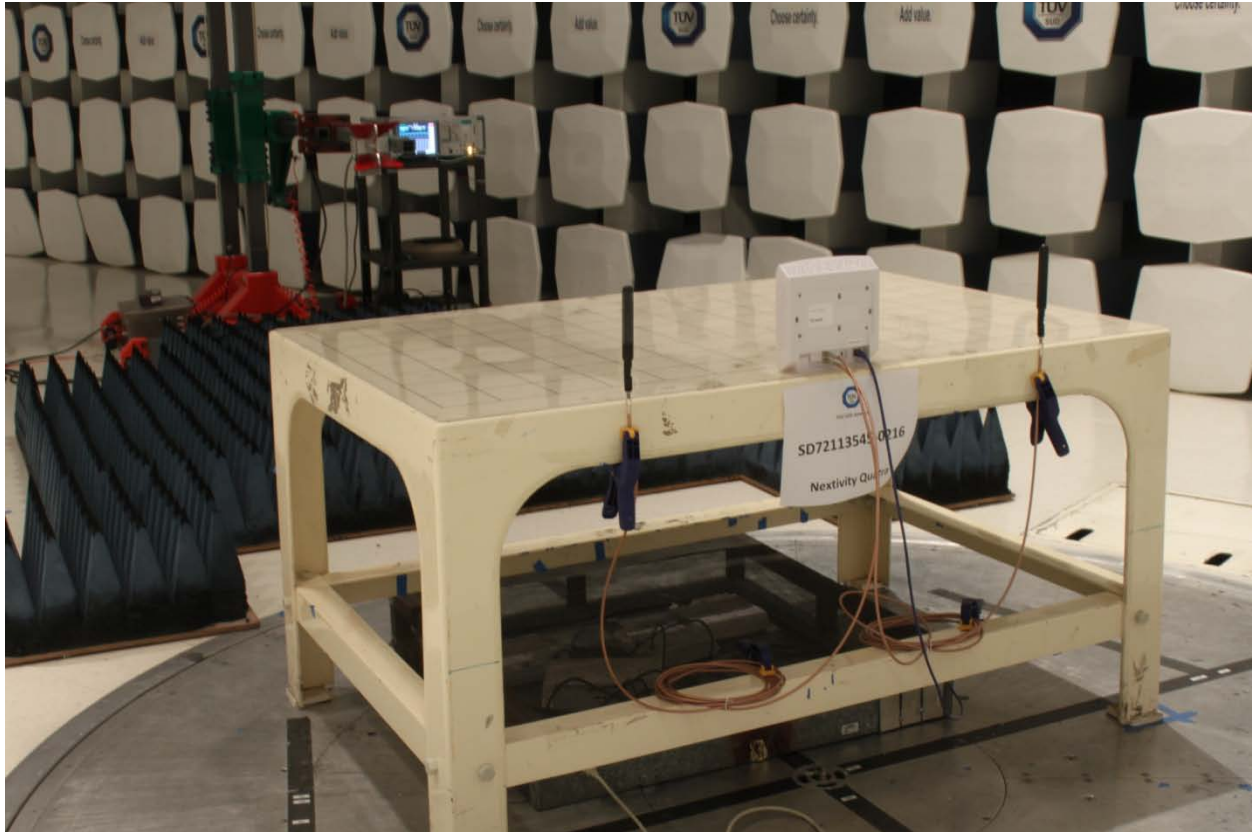
2.2.2 Test Setup Photo (Below 1GHz Back -CU)



2.2.3 Test Setup Photo (Above 1GHz Front - CU)



2.2.4 Test Setup Photo (Above 1GHz Back - CU)





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 Emissions						
7620	EMI Test Receiver	ESU40	100399	Rhode & Schwarz	09/03/15	09/03/16
7567	LISN	FCC-LISN-50-25-2-10	120304	Fischer Custom Comm.	07/14/15	07/14/16
7568	LISN	FCC-LISN-50-25-2-10	120305	Fischer Custom Comm.	10/28/15	10/28/16
8822	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/29/16	02/28/17
8824	20dB Attenuator	34-20-34	N/A	MCE / Weinschel	02/29/16	02/28/17
Radiated Emissions						
1002	Bilog Antenna	3142C	00058717	ETS-Lindgren	11/06/15	11/06/17
1040	EMI Test Receiver	ESIB40	100292	Rhode & Schwarz	09/29/15	09/29/16
1016	Pre-amplifier	PAM-0202	187	PAM	12/15/15	12/15/16
7575	Double-ridged waveguide horn antenna	3117	00155511	EMCO	04/27/15	04/27/16
1049	EMI Test Receiver	ESU	100133	Rhode & Schwarz	03/11/15	03/11/16
8628	Pre-amplifier	QLJ 01182835-JO	8986002	QuinStar Technologies Inc.	03/20/15	03/20/16
Miscellaneous						
6792	Multimeter	3478A	2911A70964	Hewlett Packard	08/14/15	08/14/16
7560	Barometer/Temperature /Humidity Transmitter	iBTHX-W	1240476	Omega	10/19/15	10/19/16
	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 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	2.70	1.56	2.43
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					1.78
Coverage Factor (k):					2
Expanded Uncertainty:					3.57

3.2.3 Radiated Emission Measurements (Above 1GHz)

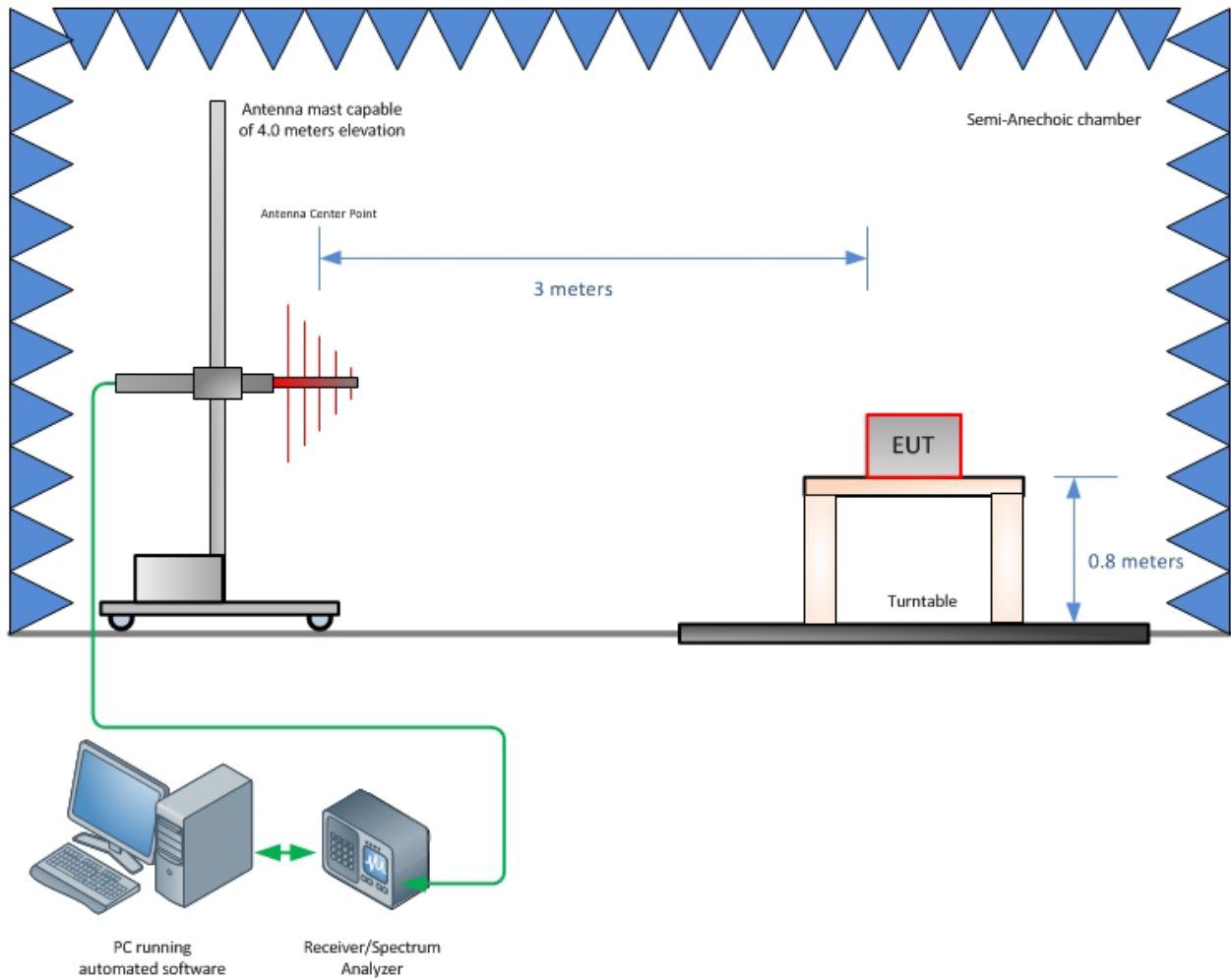
Contribution		Probability Distribution Type	Probability Distribution x_i	Standard Uncertainty $u(x_i)$	$[u(x_i)]^2$
1	Receiver/Spectrum Analyzer	Rectangular	0.57	0.33	0.11
2	Cables	Rectangular	0.70	0.40	0.16
3	Preamp	Rectangular	0.50	0.29	0.08
4	Antenna	Rectangular	0.37	0.21	0.05
5	Site	Rectangular	2.70	1.56	2.43
6	EUT Setup	Rectangular	1.00	0.58	0.33
Combined Uncertainty (u_c):					1.78
Coverage Factor (k):					2
Expanded Uncertainty:					3.56



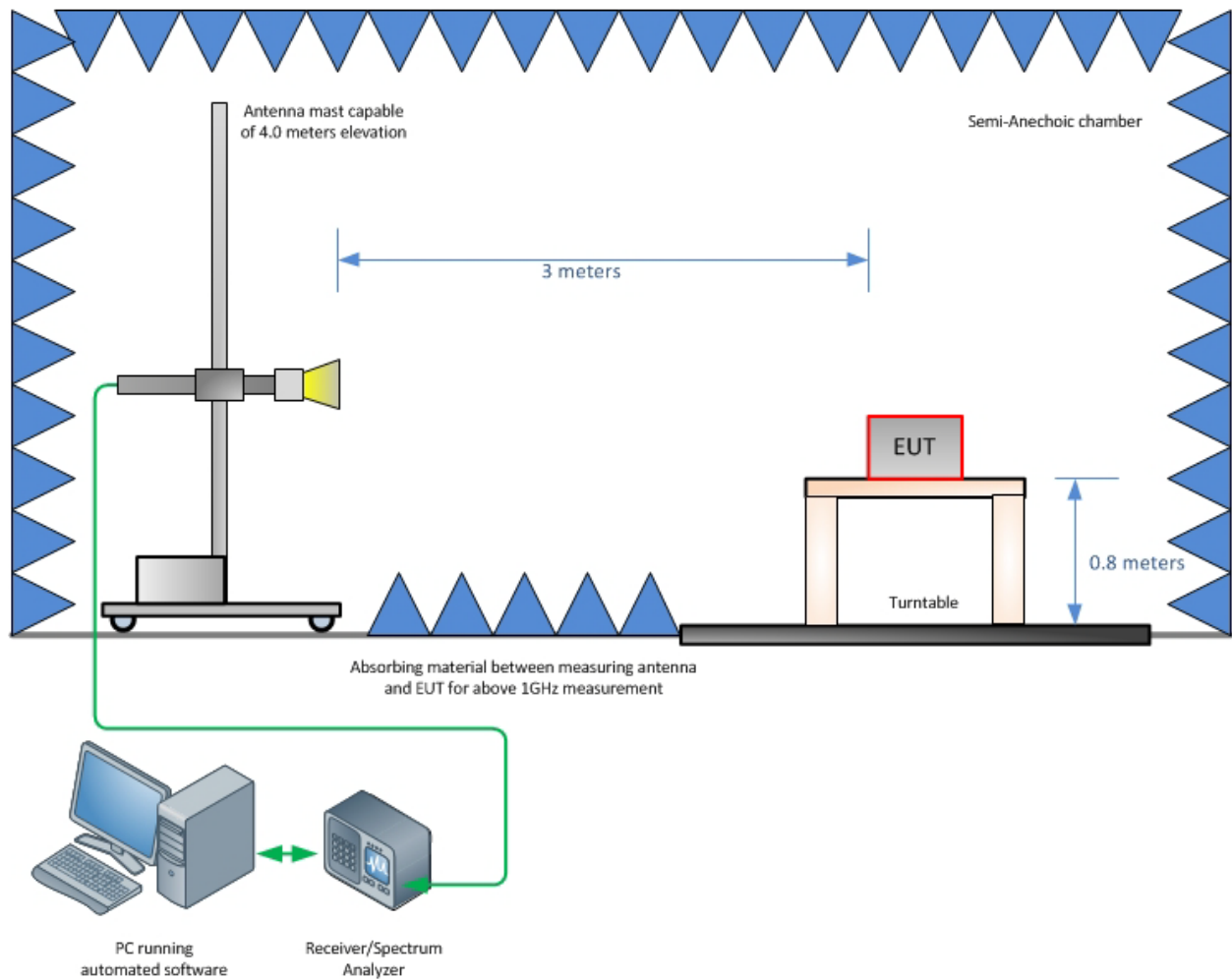
SECTION 4

DIAGRAM OF TEST SETUP

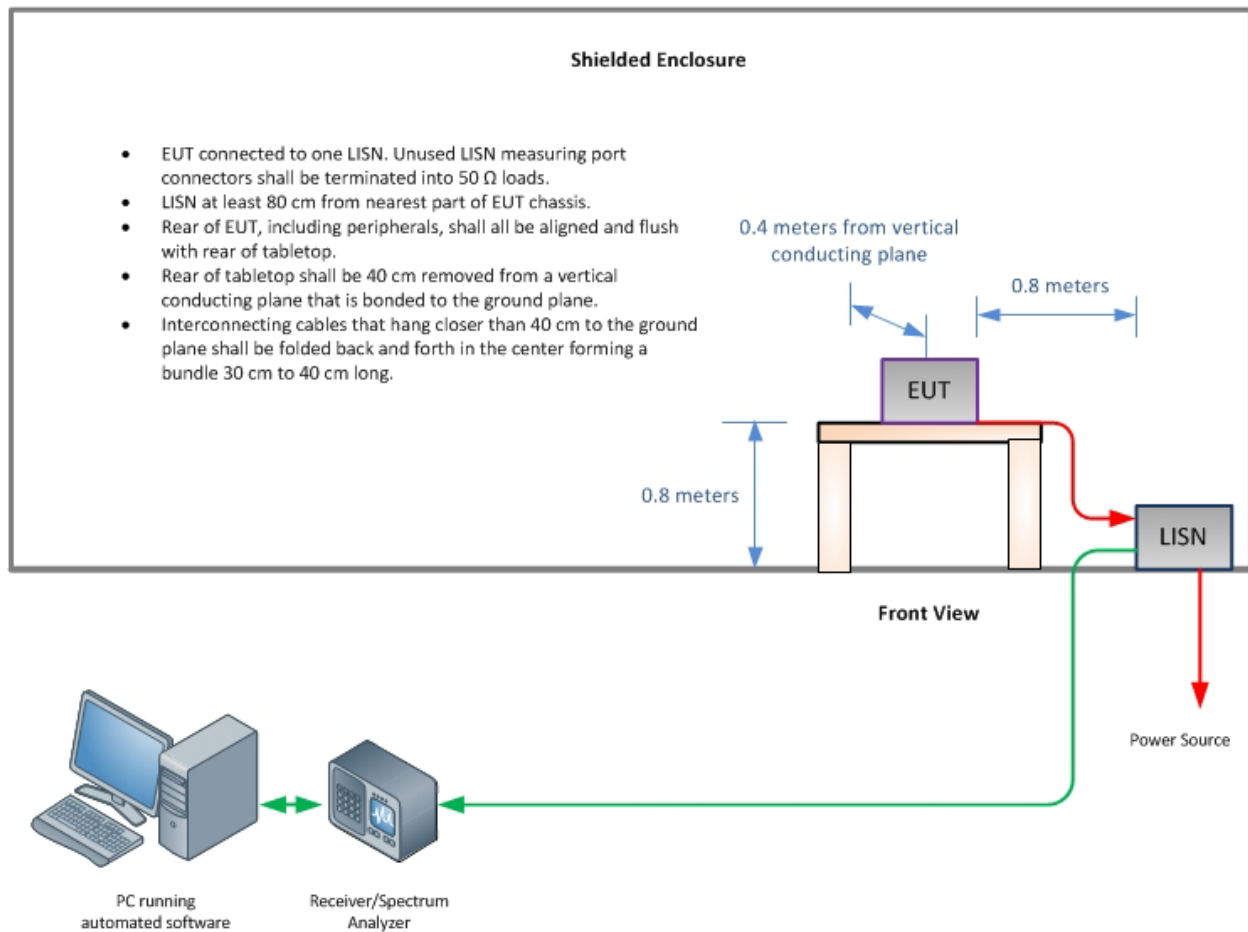
4.1 TEST SETUP DIAGRAM



Radiated Emission Test Setup (Below 1GHz)



Radiated Emission Test Setup (Above 1GHz)





SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV SÜD America, Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America, Inc.'s issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and TÜV SÜD America, Inc., extracts from the test report shall not be reproduced, except in full without TÜV SÜD America, Inc.'s written approval.

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the federal government.

TÜV SÜD America, Inc. and its professional staff hold government and professional organization certifications for AAMI, ACIL, AEA, ANSI, IEEE, A2LA, NIST and VCCI.

