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# Report On

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

FCC Part 15 Subpart B  
ICES-003 Issue 5



**Report No. SD72121022-1016C**

**January 2017**



America

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

<b>REPORT ON</b>	EMC Evaluation of the Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater
<b>TEST REPORT NUMBER</b>	SD72121022-1016C
<b>TEST REPORT DATE</b>	January 2017
<b>PREPARED FOR</b>	Nextivity Inc. 16550 West Bernardo Drive, Bldg 5, Suite 550, San Diego, CA 92127, USA
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<b>DATED</b>	January 03, 2017



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## Revision History

SD72121022-1016C Nextivity Inc. Cel-Fi Quatra Cellphone Signal Repeater					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
01/03/17	Initial Release				Juan M Gonzalez



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## **SECTION 1**

### **1REPORT 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)	NU: Q34-2/5/13/66NU CU: Q34-2/5/13/66CU
FCC ID Number	NU: YETQ34-251366NU CU: YETQ34-251366CU
IC Number	NU: 9298A-Q34251366NU CU: 9298A-Q34251366CU
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"> <li>FCC Part 15 Subpart B (October 1, 2016)</li> <li>Spectrum Management and Telecommunications Interference-Causing Equipment Standard ICES-003 Information Technology Equipment (ITE) — Limits and methods of measurement (Issue 6 January 2016).</li> </ul>
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

**Compliant\*** *A variant of the EUT was previously approved under FCC IDs YETQ34-251266NU and YETQ34-251266CU under Model Numbers Q34-2/5/12/66NU and Q34-2/5/12/66CU. The EUT is identical with this model with the exception of LTE Band 12 support. The testing were from this variant and covered under test report SD72113545-0216A Nextivity QuatraFCC Subpart B Class B and ICES 003 Test Report.*

### **1.3 PRODUCT INFORMATION**

#### **1.3.1 Technical Description**

The Equipment Under Test (EUT) was a Nextivity Inc. Cel-Fi Quatra. 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).



### **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

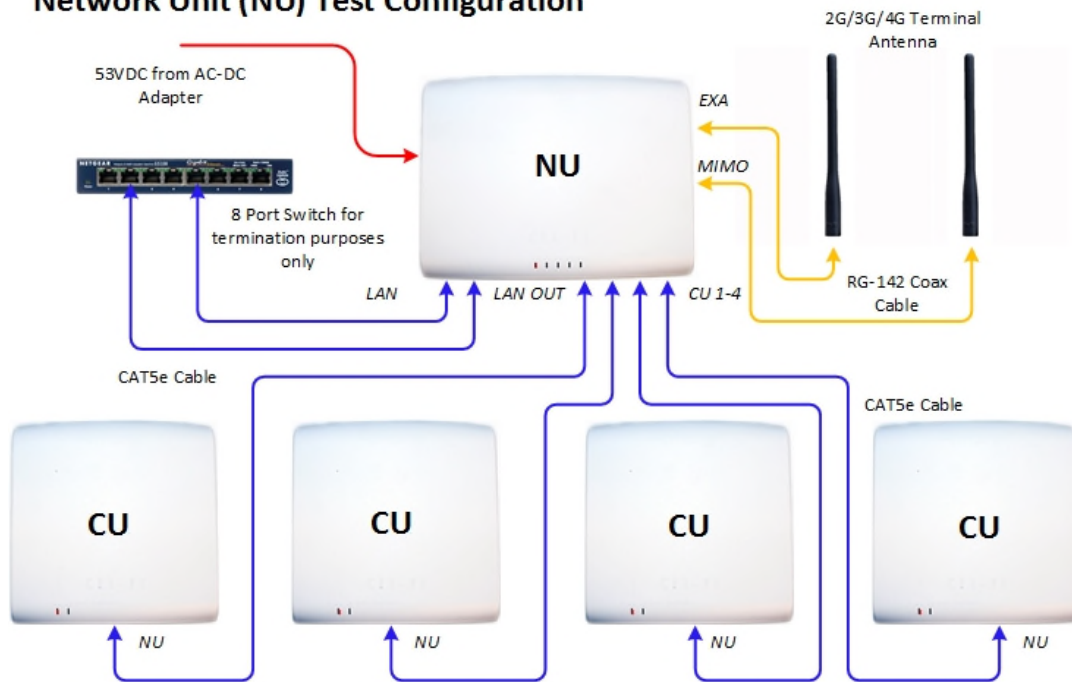
None. No special test software was used to exercise the EUT during verification.

### 1.4.3 Support Equipment and I/O cables

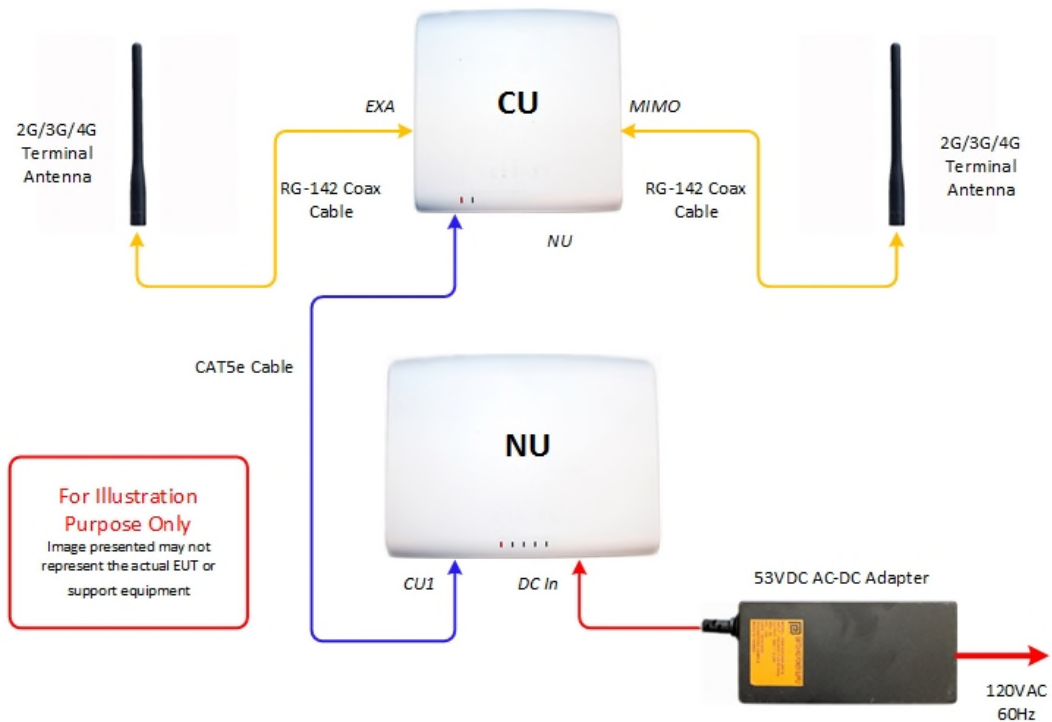
Manufacturer	Equipment/Cable	Description
Phihong	Switching Power Supply	Model PSA120U-540L6NT-R Rev 02 No. 026 (Engineering Sample)
Netgear	ProSAFE® 8-Port Gigabit Switch	M/N GS108v4 S/N 3TX25B7W86385
Netgear	AC-DC Adapter for support switch	Model AD2015F23 P/N 332-10744-01
-	Network patch Cable (2x 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)

16936 Via Del Campo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 678-1400 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 TUV SUD 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)**

TUV 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**

TUV SUD 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**

### **2TEST 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  $\mu$ 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 $\mu$ 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)

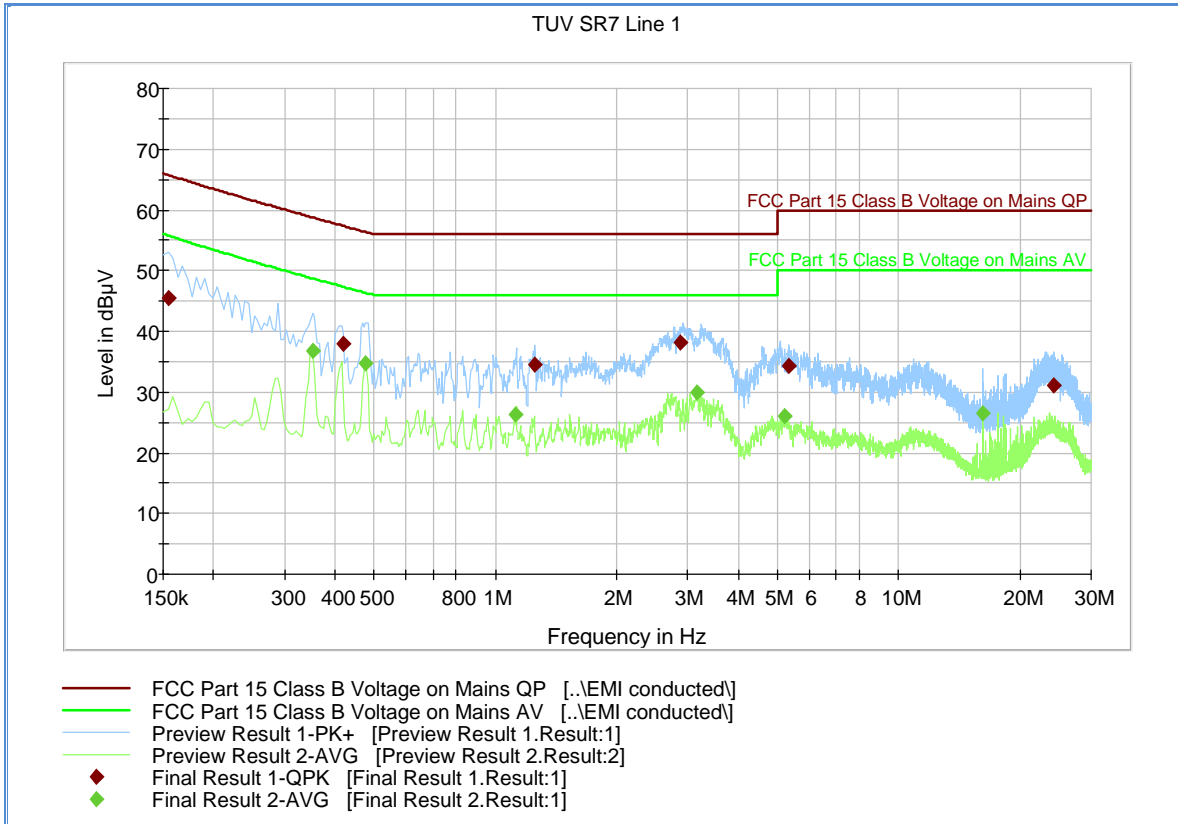
Measuring equipment raw measurement (db $\mu$ V) @ 150kHz			5.5
Correction Factor (dB)	Asset# 8822(20 dB attenuator)	19.9	20.7
	Asset# 1177 (cable)	0.15	
	Asset# 1176 (cable)	0.35	
	Asset# 7567(LISN)	0.30	
Reported QuasiPeak Final Measurement (db $\mu$ V) @ 150kHz			26.2

### 2.1.9 Test Results

Compliant. See attached plots and tables.



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



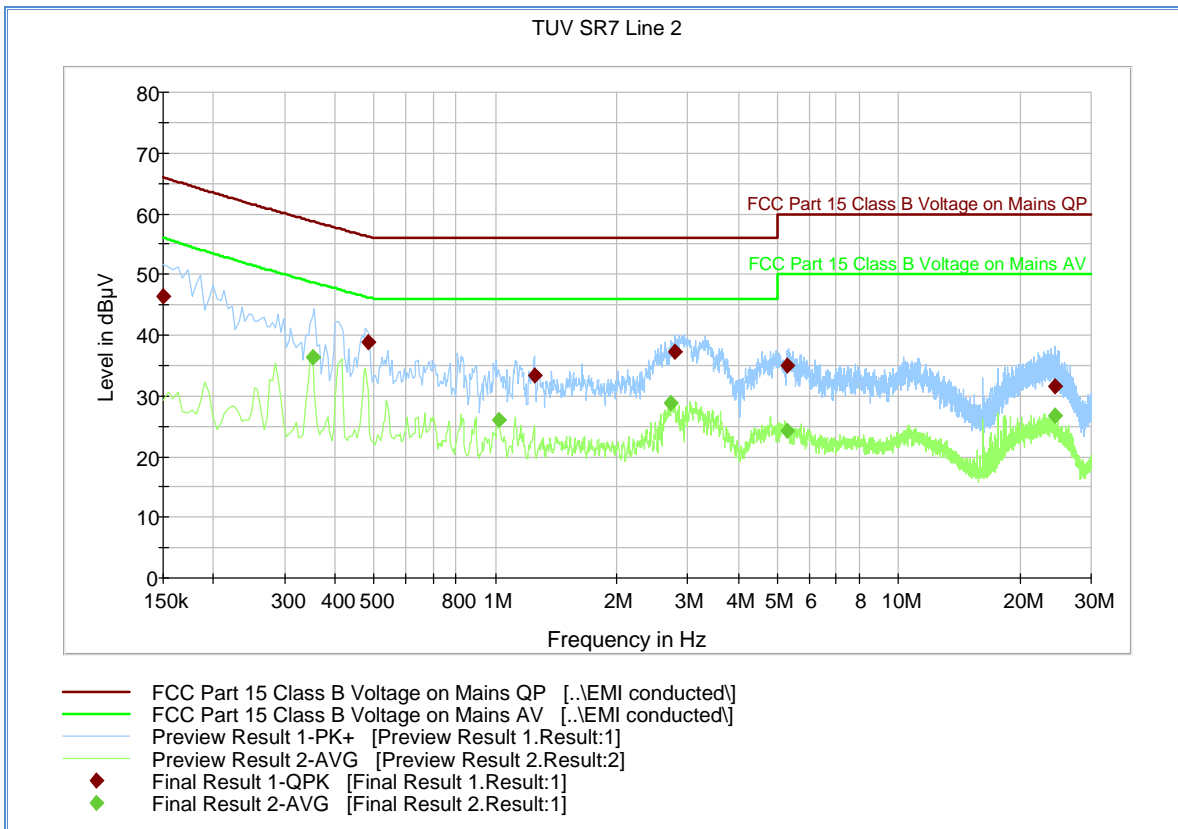
### Quasi Peak

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

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



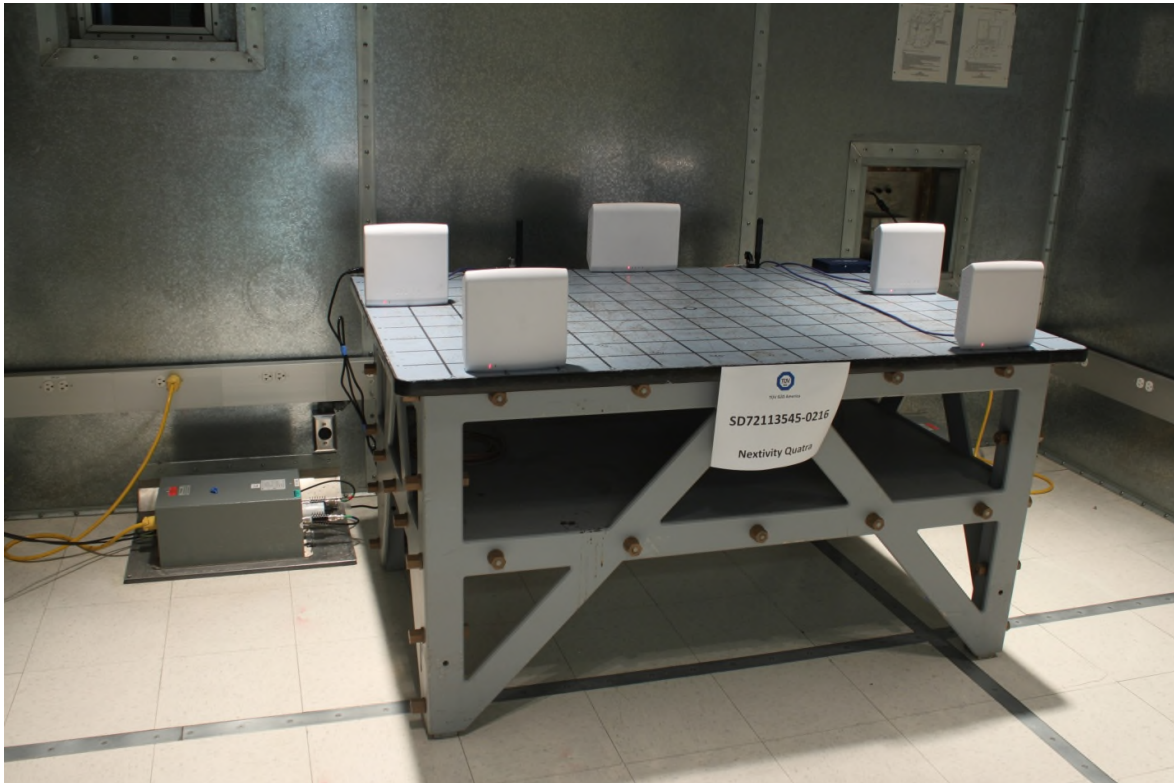
### Quasi Peak

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

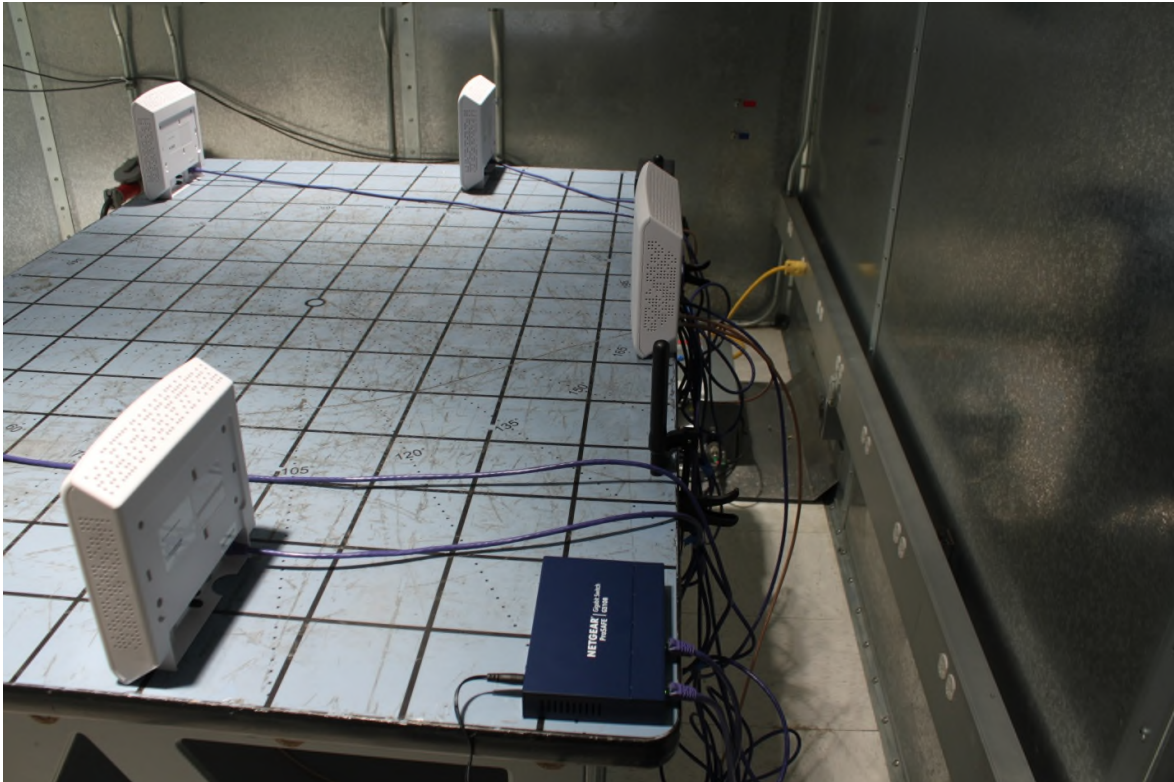
Frequency (MHz)	Average (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin - Ave (dB)	Limit - Ave (dBµV)
0.352500	36.3	1000.0	9.000	Off	N	20.0	12.4	48.7
0.352500	36.4	1000.0	9.000	Off	N	20.0	12.3	48.7
1.018500	26.0	1000.0	9.000	Off	N	20.0	20.0	46.0
2.733000	28.8	1000.0	9.000	Off	N	20.1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

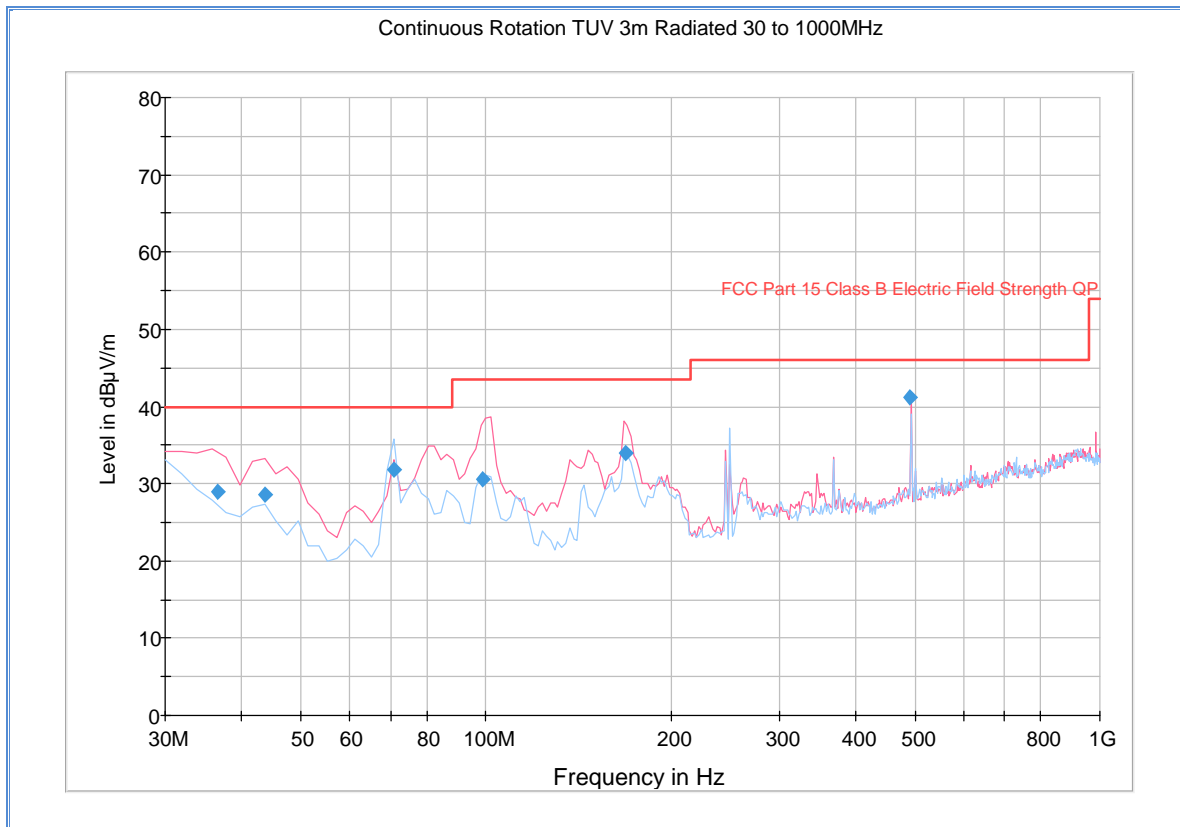
### 2.2.8 Sample Computation (Radiated Emission)

Measuring equipment raw measurement (db $\mu$ 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 $\mu$ V/m) @ 30MHz			11.8

### 2.2.9 Test Results

See attached plots.

### 2.2.9.1 Below 1GHz Radiated Emission Test (NU)

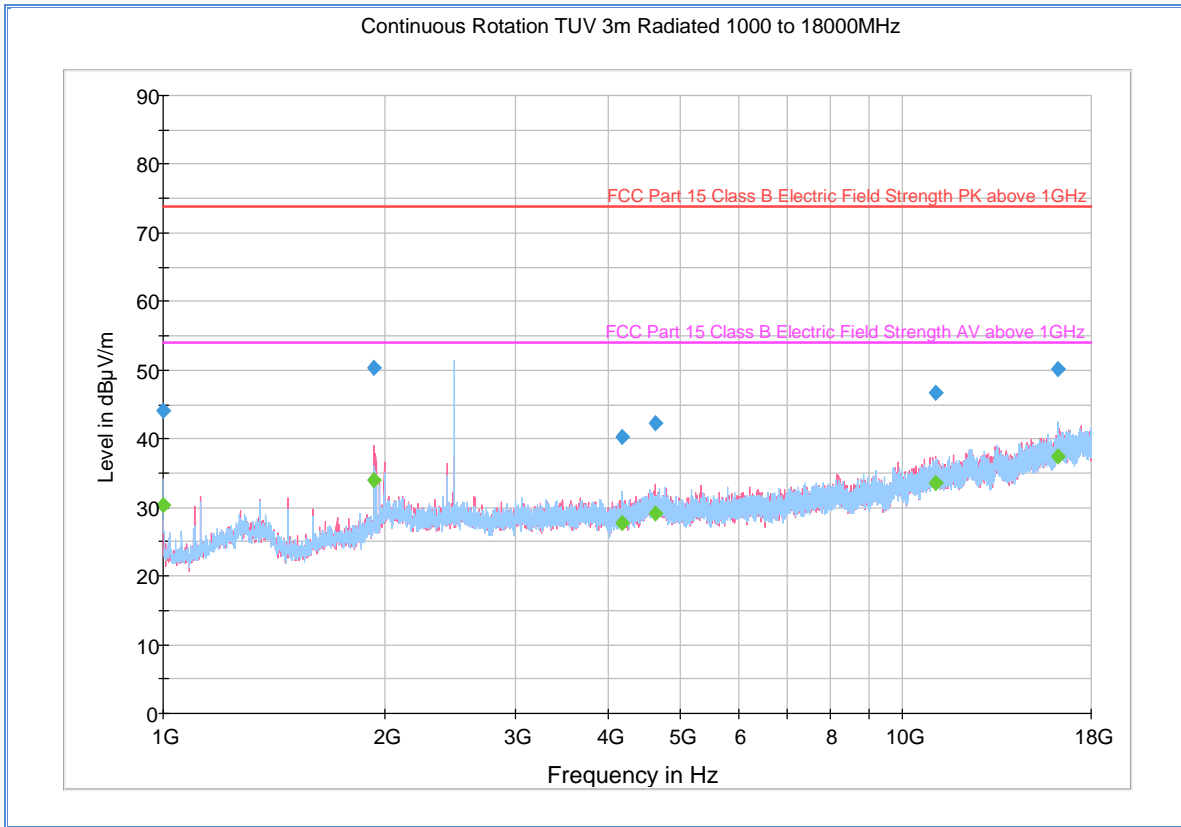


#### Quasi-Peak Data

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)



#### 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

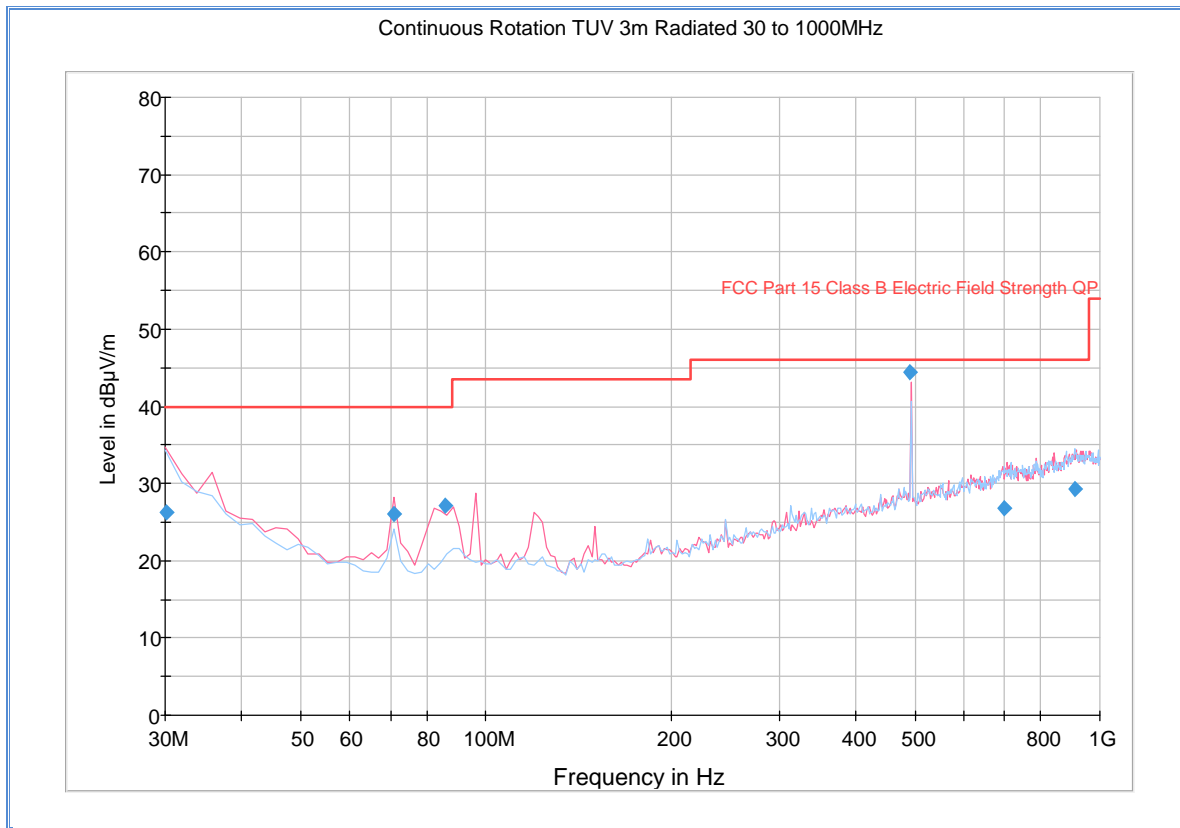
#### Average Data

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)

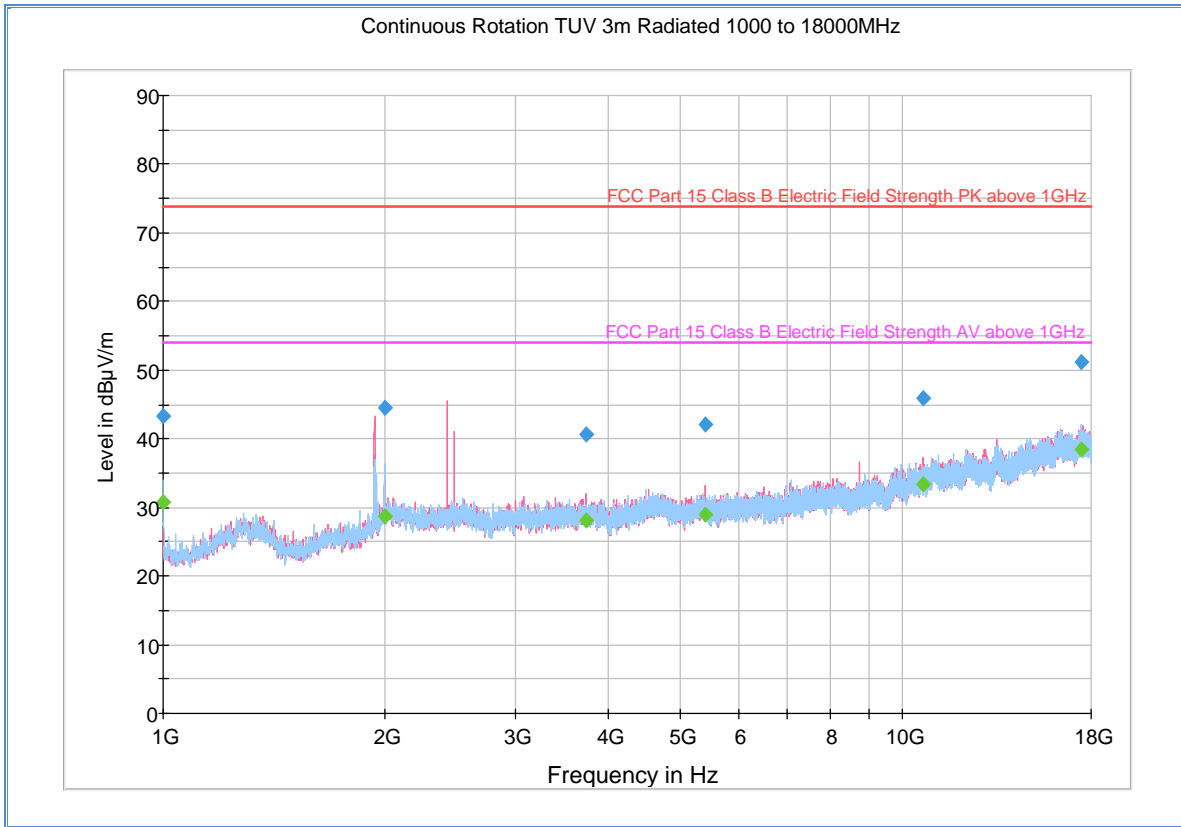


#### Quasi-Peak Data

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

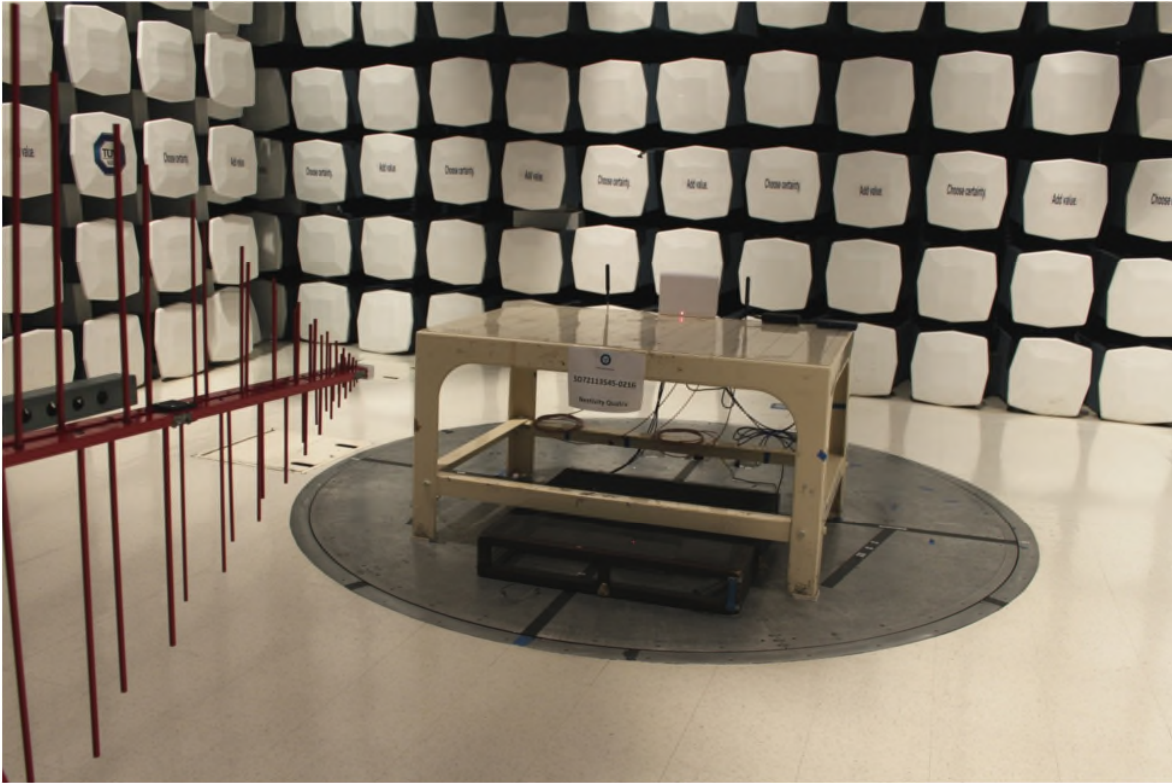
Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	43.2	1000.0	1000.000	202.3	H	287.0	-7.9	30.7	73.9
1993.200000	44.4	1000.0	1000.000	314.2	H	320.0	-0.7	29.5	73.9
3729.633333	40.7	1000.0	1000.000	167.6	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

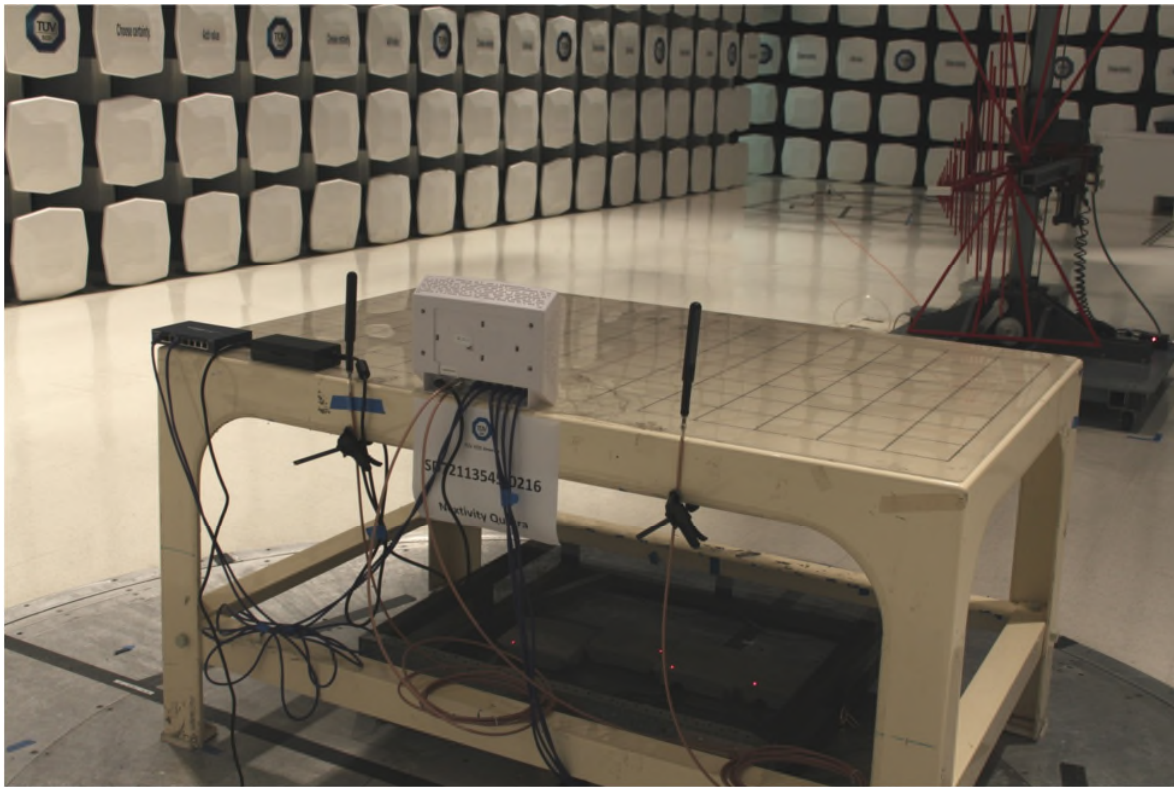
Frequency (MHz)	Average (dBμV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBμV/m)
1000.000000	30.7	1000.0	1000.000	202.3	H	287.0	-7.9	23.2	53.9
1993.200000	28.8	1000.0	1000.000	314.2	H	320.0	-0.7	25.1	53.9
3729.633333	28.1	1000.0	1000.000	167.6	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.

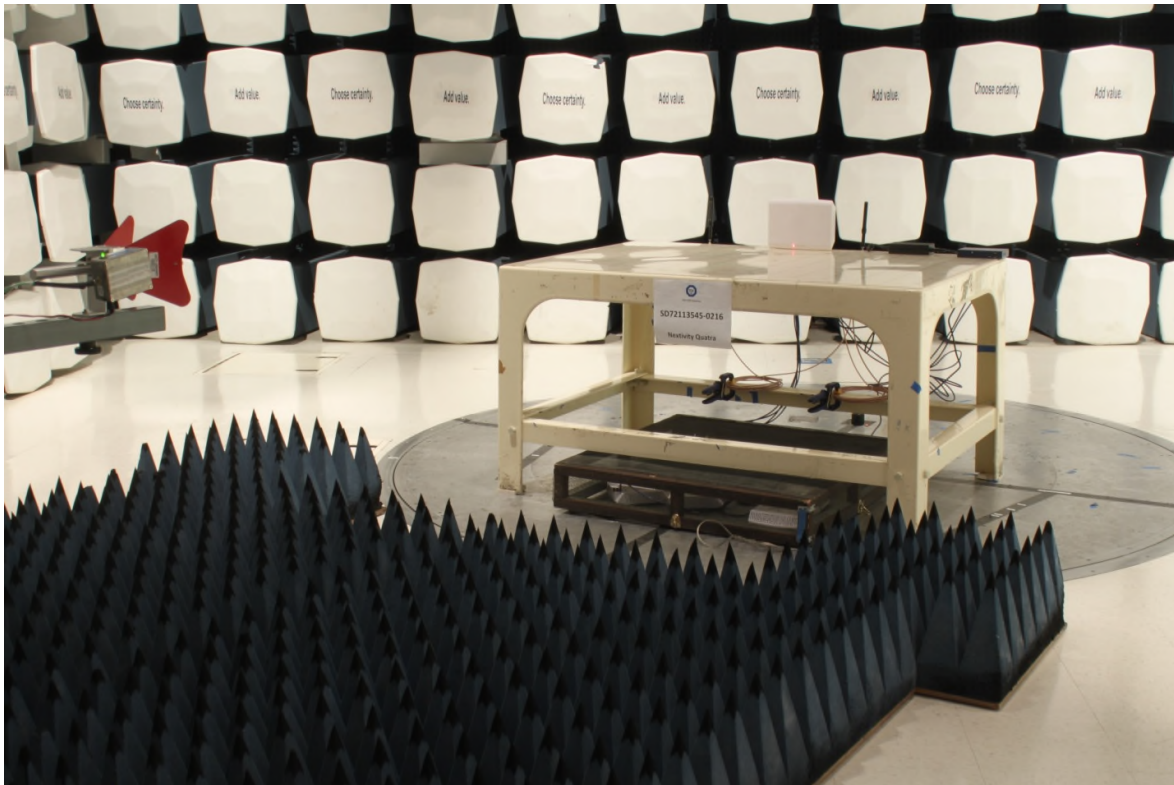
### 2.2.10 Test Setup Photo (Below 1GHz Front -NU)



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

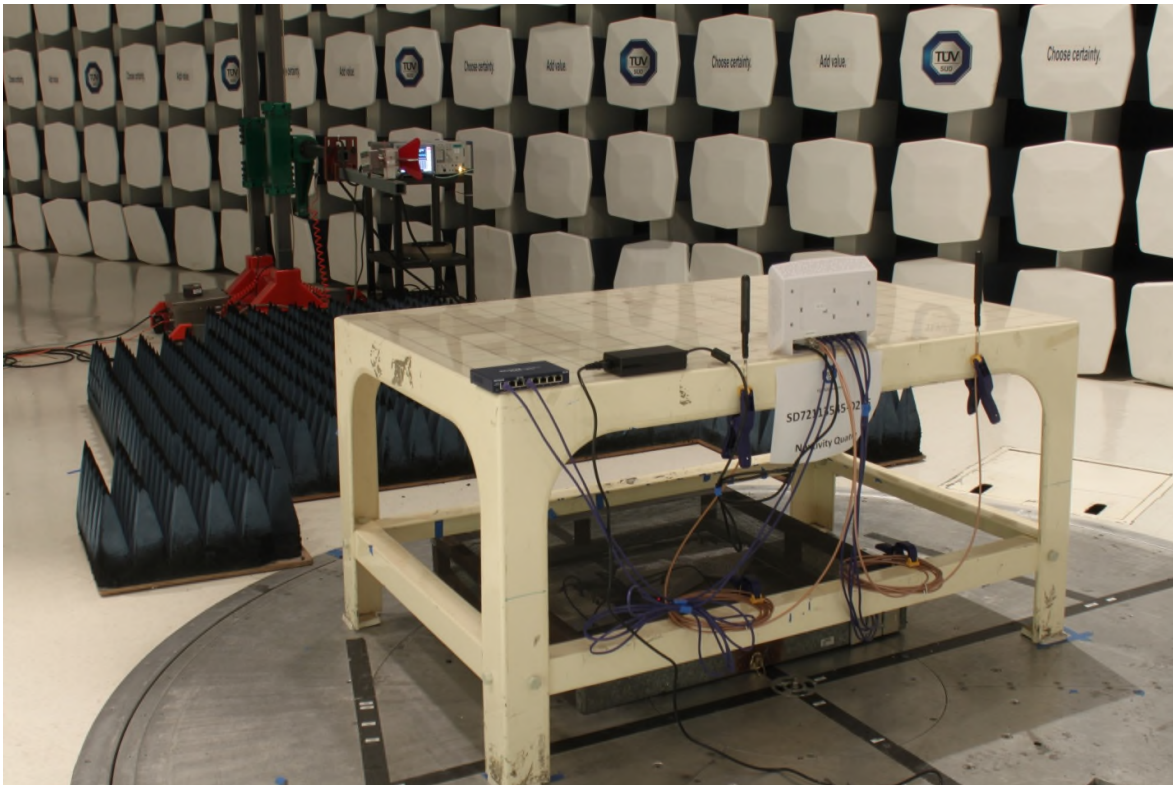


### 2.2.12 Test Setup Photo (Above 1GHz Front - NU)

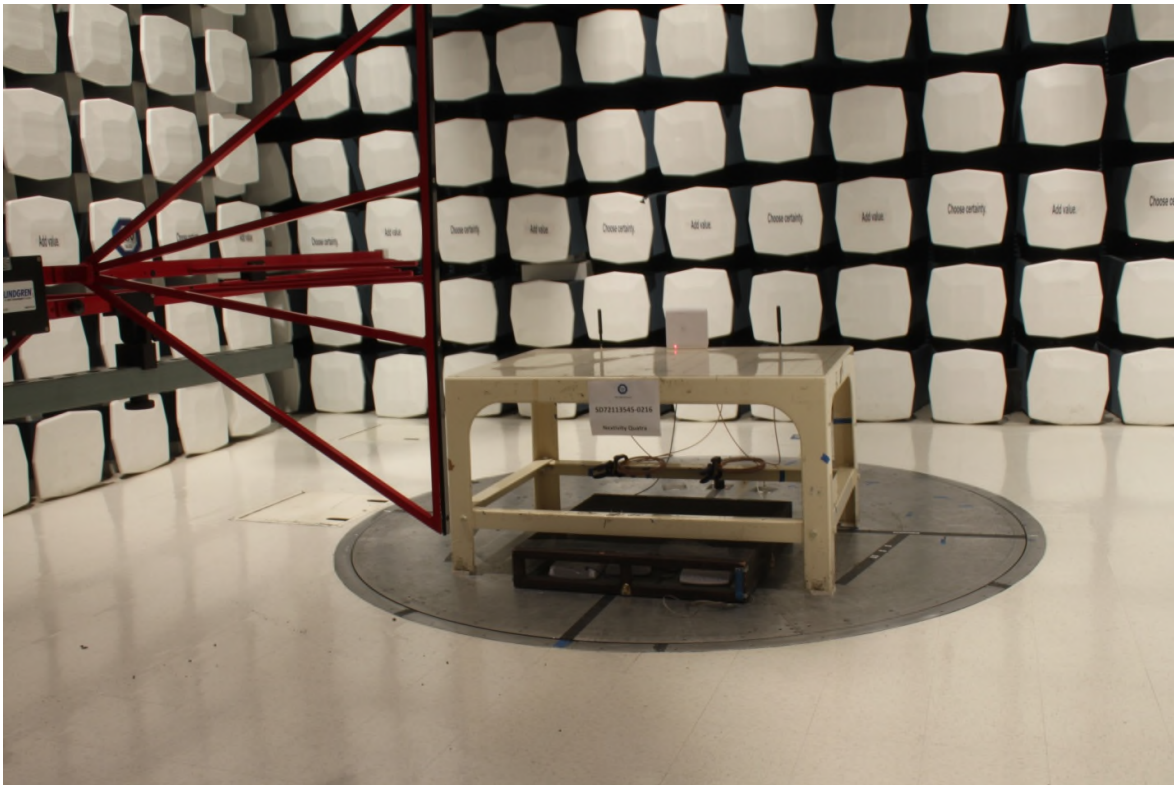




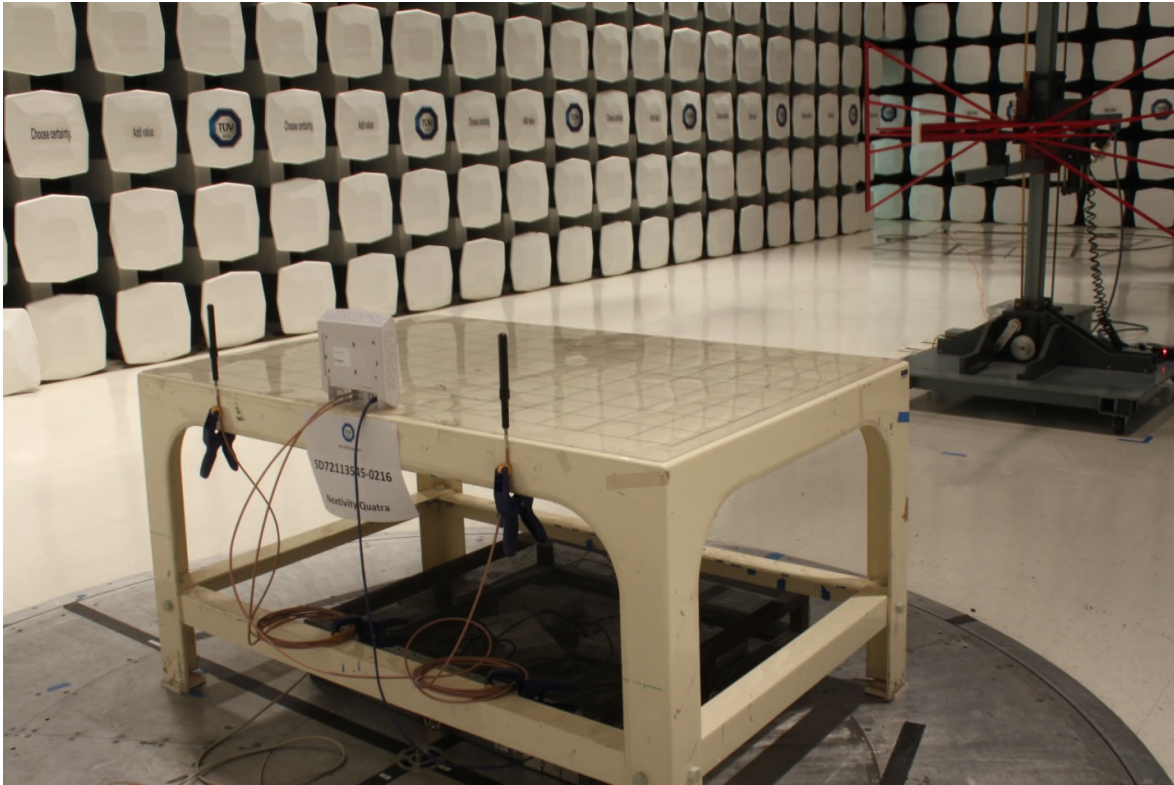
### 2.2.13 Test Setup Photo (Above 1GHz Back - NU)



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

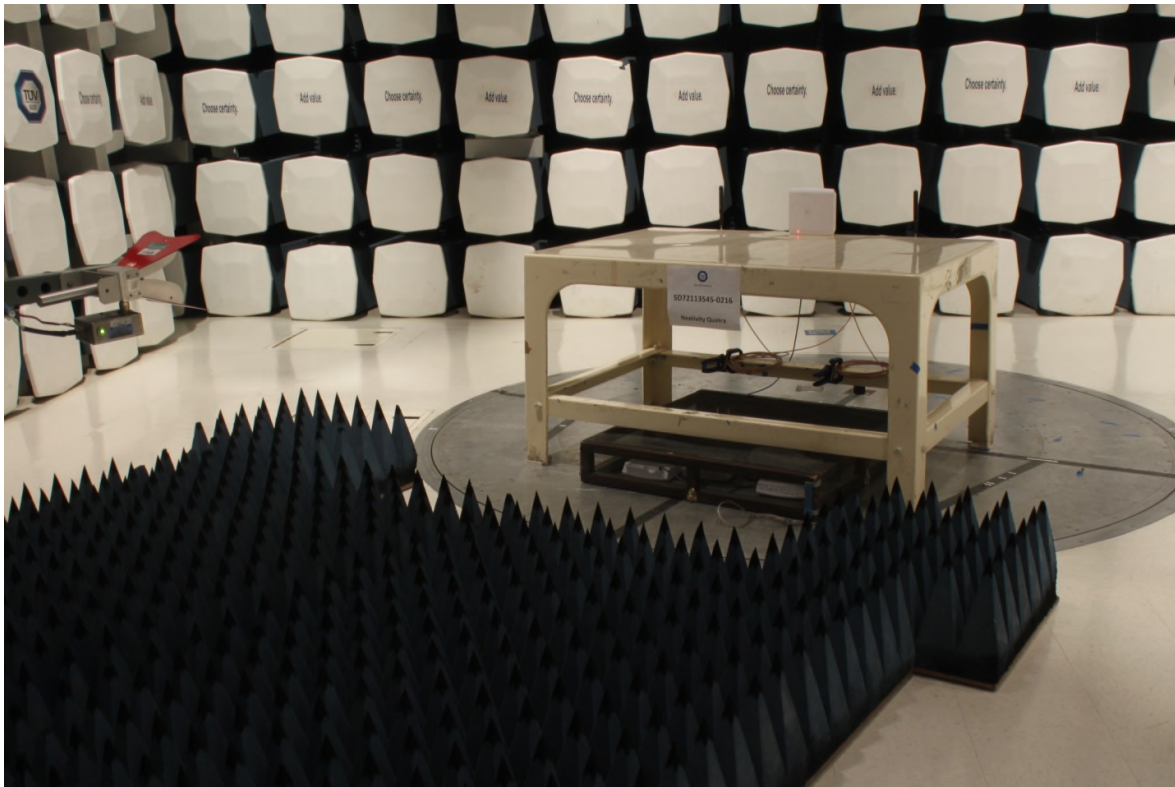


### 2.2.2 Test Setup Photo (Below 1GHz Back -CU)

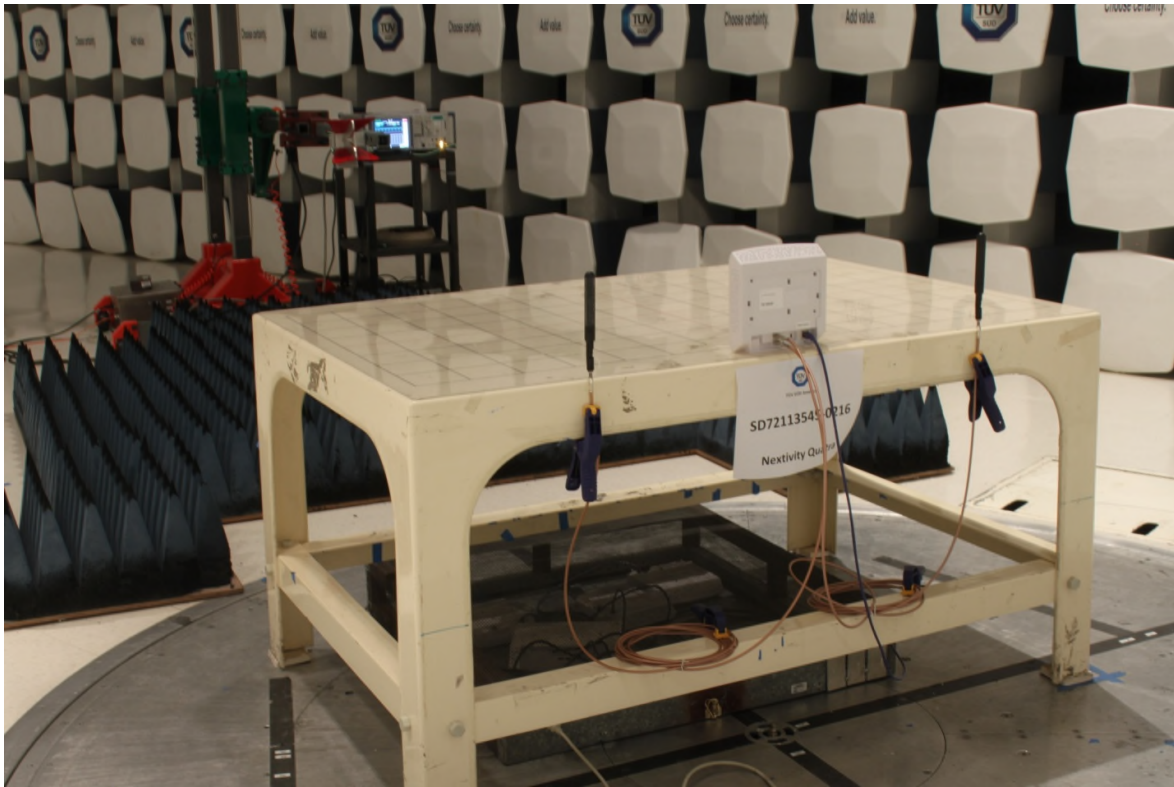




### 2.2.3 Test Setup Photo (Above 1GHz Front - CU)



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



### **SECTION 3**

#### **3TEST 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	Preamplifier	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

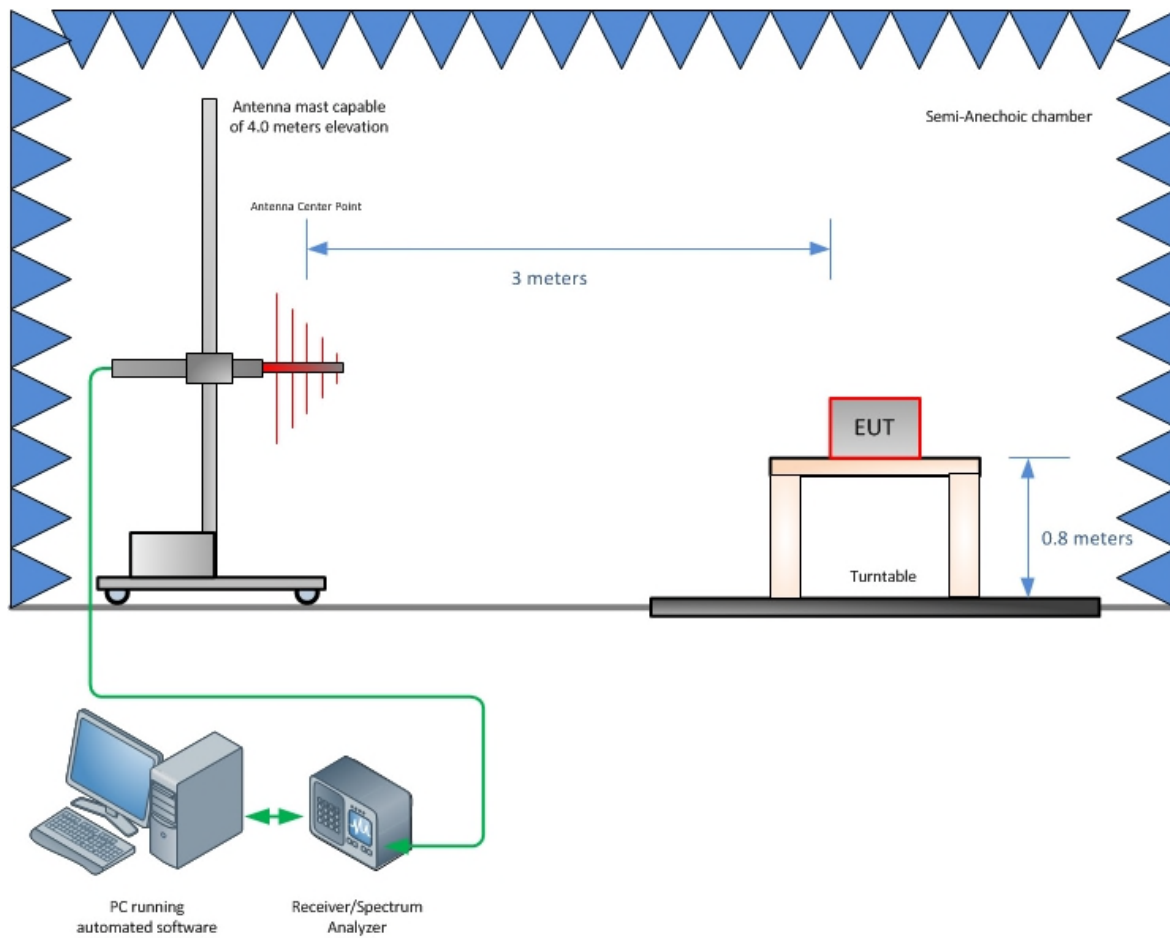
### 3.2.3 Radiated Emission Measurements (Above 1GHz)

	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	Preamplifier	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

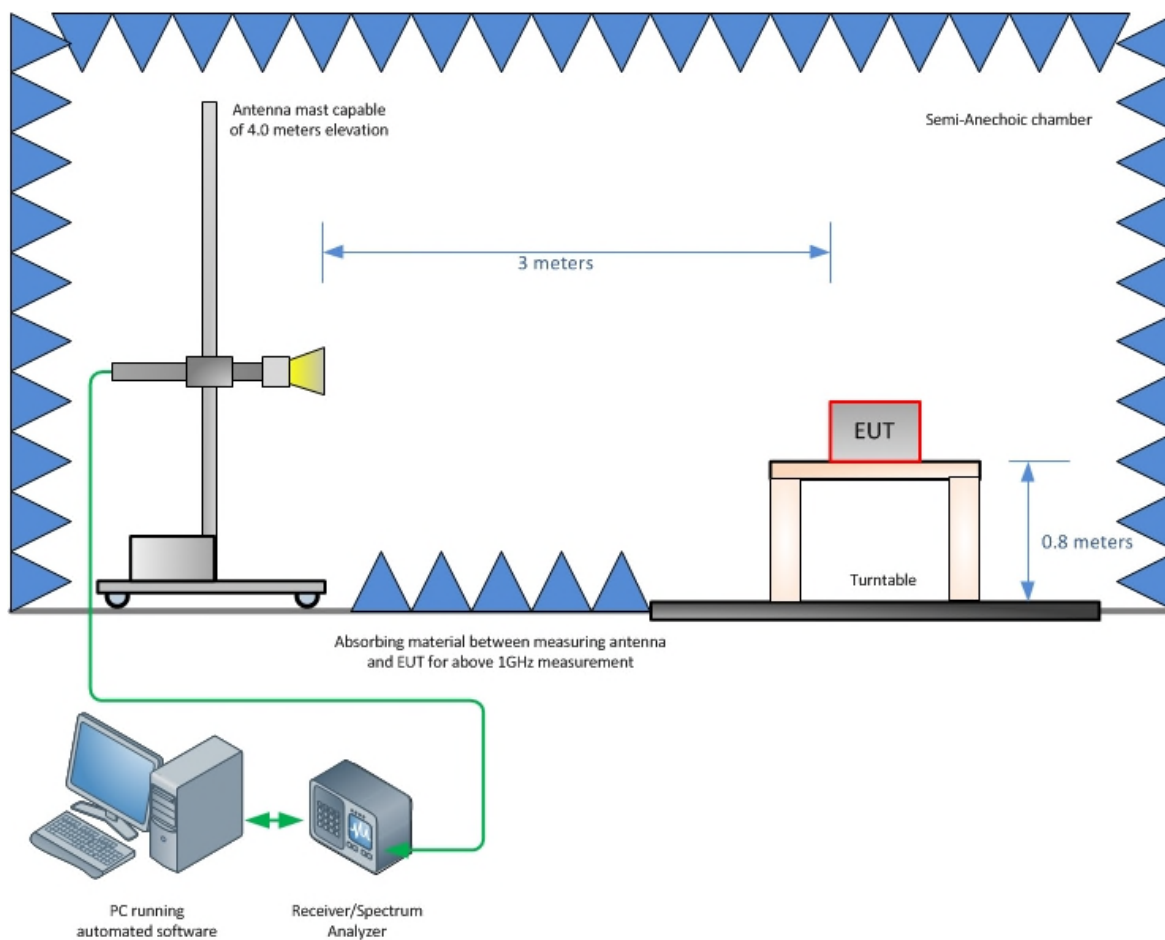
## **SECTION 4**

### **4DIAGRAM OF TEST SETUP**

#### 4.1 TEST SETUP DIAGRAM

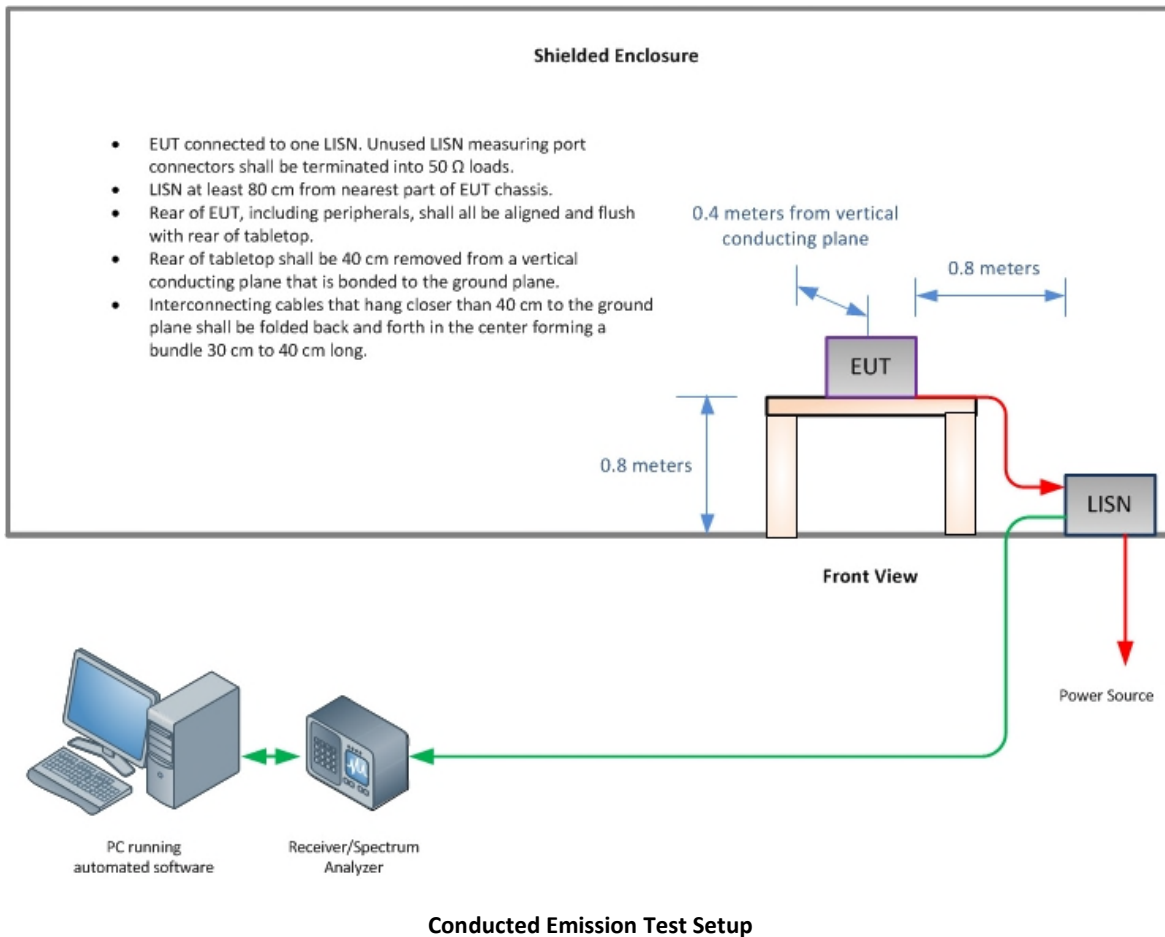


**Radiated Emission Test Setup (Below 1GHz)**



**Radiated Emission Test Setup (Above 1GHz)**





## **SECTION 5**

### **5ACCREDITATION, DISCLAIMERS AND COPYRIGHT**

## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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