

# Report on the Testing of the

John Deere  
CCD2BLE

In accordance with:  
FCC 47 CFR Part 15.247  
ISED RSS-247 Issue 2, February 2017

Prepared for: John Deere  
1750 NDSU Research Park Dr N  
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America

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## COMMERCIAL-IN-CONFIDENCE

Document Number: NC72158534.2 | Issue: 1

### SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
James Morris	Service Line Manager, EMC Central	Authorized Signatory	16 October 2020

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD America, Inc. document control rules.

FCC Accreditation Designation Number US1148 New Brighton, MN Test Laboratory	Innovation, Science, and Economic Development Canada Accreditation Site Number 4512A New Brighton, MN Test Laboratory
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### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with the standards listed above and the tests shown in Table 1.3.1 of this report.



A2LA Cert. No. 2955.11

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# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

**Table 1.1-1 – Modification Record**

Issue	Description of Change	Date of Issue
1	First Issue	16 October 2020

## 1.2 Introduction

Applicant	John Deere
Manufacturer	John Deere
Applicant’s Email Address	KottsickAndrewC@JohnDeere.com
Model Number(s)	PH85241179
Serial Number(s)	PHMA002500235
Number of Samples Tested	1
Test Specification/Issue/Date	FCC 47 CFR Part 15.247 ISED RSS-247 Issue 2, February 2017
Order Number	72158534
Date of Receipt of EUT	17 September 2020
Start of Test	17 September 2020
Finish of Test	28 September 2020
Related Document(s)	N/A



### 1.3 Summary of Results

A summary of the tests carried out in accordance with the specifications shown below.

**Table 1.3-1 – Summary of Results**

Section	Specification Clause		Test Description	Accreditation	Base Standard
2.1	15.247(d)	RSS-GEN	Radiated spurious emissions	A2LA	ANSI C63.10 2013
2.2	15.205	RSS-GEN	Radiated Restricted Bands of Emissions	A2LA	ANSI C63.10 2013

**Table 1.3-2 – Test Accreditation**

Test Name	Name of Tester(s)	Results / Comments
Radiated spurious emissions	Sean Sellergren	Pass
Radiated Restricted Bands of Emissions	Sean Sellergren	Pass

## 1.4 Product Information

### 1.4.1 Technical Description

T The Equipment Under Test (EUT): was a:  
CCD (Chrysler Collision Detection) with Bluetooth.

A full description and detailed product specification details are available from the manufacturer.



Photo 1.4-1 – Front View of the EUT



Photo 1.4-2 – Rear View of the EUT



**Table 1.4-1 – Cable Descriptions**

Cable/Port	Description
Cable Harness	Power and Communications Harness

**Table 1.4-2 – Support Equipment Descriptions**

Make/Model	Description
Laptop	Laptop supplied by TUV SUD America to program transmitter settings. Not connected during testing.

**1.4.2 Modes of Operation**

The tested mode of operation was with the EUT in Tx mode on channel 0 (low channel), channel 19 (middle channel) & channel 39 (high channel).

**1.5 Deviations from the Standard**

No deviations from the applicable test standard were made during testing.

**1.6 EUT Modification Record**

The table below details modifications made to the EUT during the test program. The modifications incorporated during each test are recorded on the appropriate test pages.

**Table 1.6-1 – Modification Record**

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	Initial State		

**1.7 Test Location**

TÜV SÜD conducted the following tests at our New Brighton, MN Test Laboratory.

Office address:

TÜV SÜD America  
 141 14th Street NW  
 New Brighton, MN 55112 USA



## 2 Test Details

### 2.1 Radiated spurious Emissions

#### 2.1.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, 15.247  
RSS-GEN Issue 5

#### 2.1.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

#### 2.1.3 Date of Test

17 - 28 September 2020

#### 2.1.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 0.8 m above a reference ground plane for 30-1000MHz and 1.5m above the ground plane for above 1GHz.

For 30 – 1000MHz a pre-scan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance.

For above 1GHz a pre-scan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using peak and average detectors; measurements were taken at a 3m distance.

For all frequency ranges the final readings were maximized by adjusting the antenna height, polarization and turntable azimuth, in accordance with the specification. For below 1GHz final measurements were taken with a quasi-peak detector and above 1GHz final measurements were re-measured with peak and average detectors.

The EUT was assessed against the limits specified in FCC 47 CFR Part 15C §15.209.

#### 2.1.5 Environmental Conditions

The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.



**2.1.6 Additional Observations**

The highest frequency to which the DUT was measured was determined in accordance with §15.33(a)(1).

Automated measurements used BAT-EMC (v3.18) software. Measurements from 30MHz – 1000MHz were done at a 3m distance. Measurements above 1GHz were done at a 3m distance. Reported level is the actual level with all the correction factors factored in. Correction Factor column is for informational purposes only.

**2.1.7 Sample Computation (Radiated Emissions)**

Measuring equipment raw measurement (dBµV) @ 30 MHz		20.0
Correction Factor (dB)	Cable 2	0.24
	TEMCO0011 (antenna)	18.70
Reported Quasi-peak Final Measurement (dBµV/m) @ 30MHz		38.94

**2.1.8 Test Results**

**Test Summary:** Measurements between 1 – 18GHz were taken with a 2.4GHz notch filter in front of the pre-amp to prevent overloading. Due to the duty cycle of the transmitter being less than 100% all measurements above 1GHz were done with a peak detector and compared to both the peak and average limit. Scans above 1GHz were also done at a 1m distance to ensure the peak detector noise floor was below the average limit.

**Test Result: Pass**

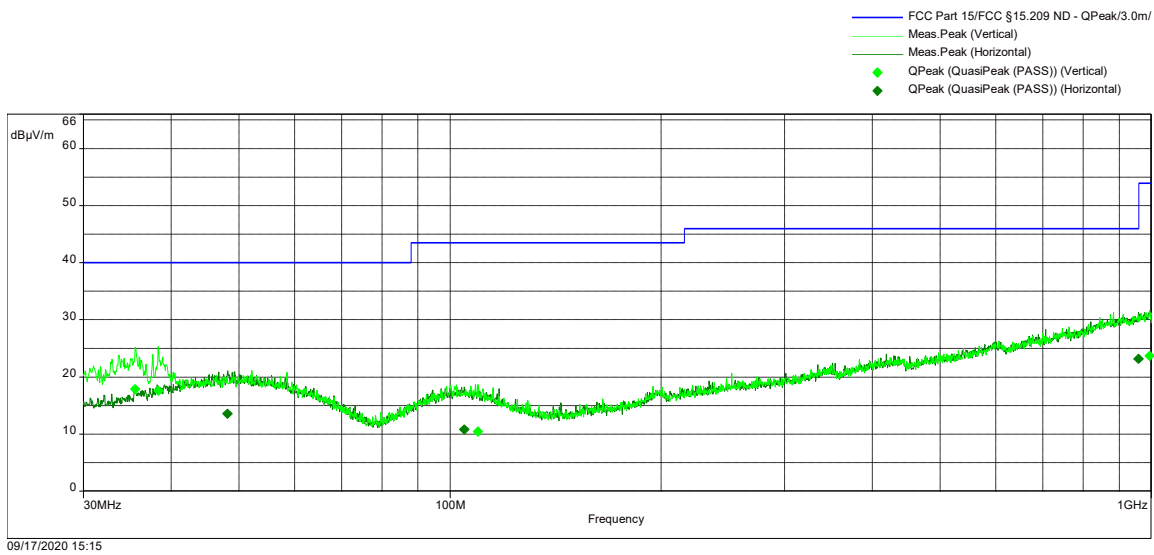
See data below for detailed results.





### Spurious Emissions 30M-1GHz Low Channel 2402MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
30MHz- 1GHz	Vertical	3m	100kHz	18000Pts	Auto
30MHz- 1GHz	Horizontal	3m	100kHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
Pass

Test Notes: Low Channel 2402MHz.

**Figure 2.1-1 – RE Spurious Emissions 30-1000MHz – Low Channel 2402MHz**



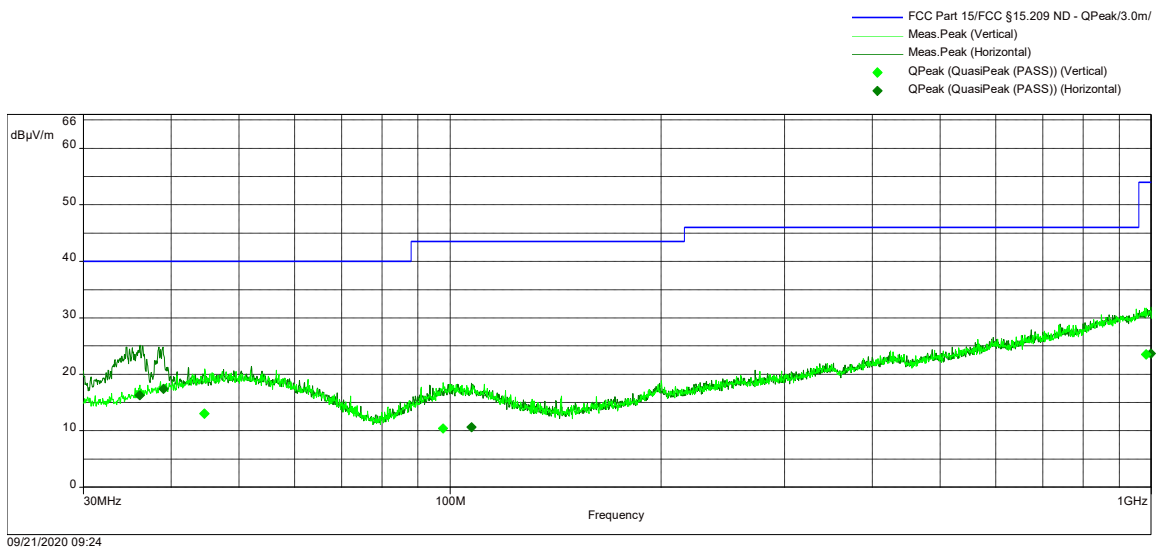
**Table 2.1-1 – RE Spurious Emissions 30-1000MHz – Low Channel 2402MHz**

Frequency	QP Level (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
35.566792MHz	17.85	40.00	-22.15	72.00	1.34	Vertical	Pass
38.351899MHz	17.56	40.00	-22.44	182.00	1.09	Vertical	Pass
48.179079MHz	13.56	40.00	-26.44	76.00	3.83	Horizontal	Pass
104.82195MHz	10.81	43.50	-32.69	86.00	1.78	Horizontal	Pass
109.50847MHz	10.47	43.50	-33.03	325.00	1.95	Vertical	Pass
959.5712MHz	23.15	46.00	-22.85	350.00	2.90	Horizontal	Pass
994.72268MHz	23.71	53.97	-30.26	266.00	1.81	Vertical	Pass



### Spurious Emissions 30M-1GHz Mid Channel 2440MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
30MHz- 1GHz	Vertical	3m	100kHz	18000Pts	Auto
30MHz- 1GHz	Horizontal	3m	100kHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
Pass

Test Notes: Mid Channel 2440MHz.

**Figure 2.1-2 – RE Spurious Emissions 30-100MHz – Middle Channel 2440MHz**



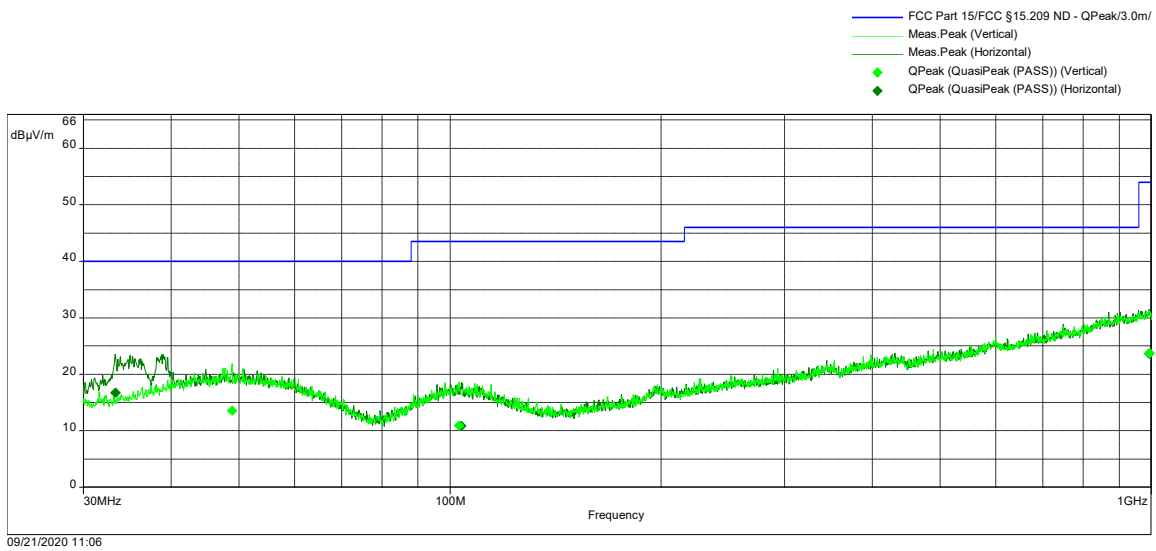
**Table 2.1-2 – RE Spurious Emissions 30-1000MHz – Middle Channel 2440MHz**

Frequency	QP Level (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
36.108275MHz	16.25	40.00	-23.75	360.00	2.00	Horizontal	Pass
38.989998MHz	17.40	40.00	-22.60	171.00	1.39	Horizontal	Pass
44.666097MHz	13.03	40.00	-26.97	35.00	3.07	Vertical	Pass
97.70511MHz	10.38	43.50	-33.12	21.00	1.65	Vertical	Pass
107.32582MHz	10.62	43.50	-32.88	50.00	3.98	Horizontal	Pass
983.28845MHz	23.49	53.97	-30.48	116.00	1.65	Vertical	Pass
998.37689MHz	23.69	53.97	-30.28	123.00	2.23	Horizontal	Pass



## Spurious Emissions 30M-1GHz High Channel 2480MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
30MHz- 1GHz	Vertical	3m	100kHz	18000Pts	Auto
30MHz- 1GHz	Horizontal	3m	100kHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
Pass

Test Notes: High Channel 2480MHz.

**Figure 2.1-3 – RE Spurious Emissions 30-1000MHz – High Channel 2480MHz**



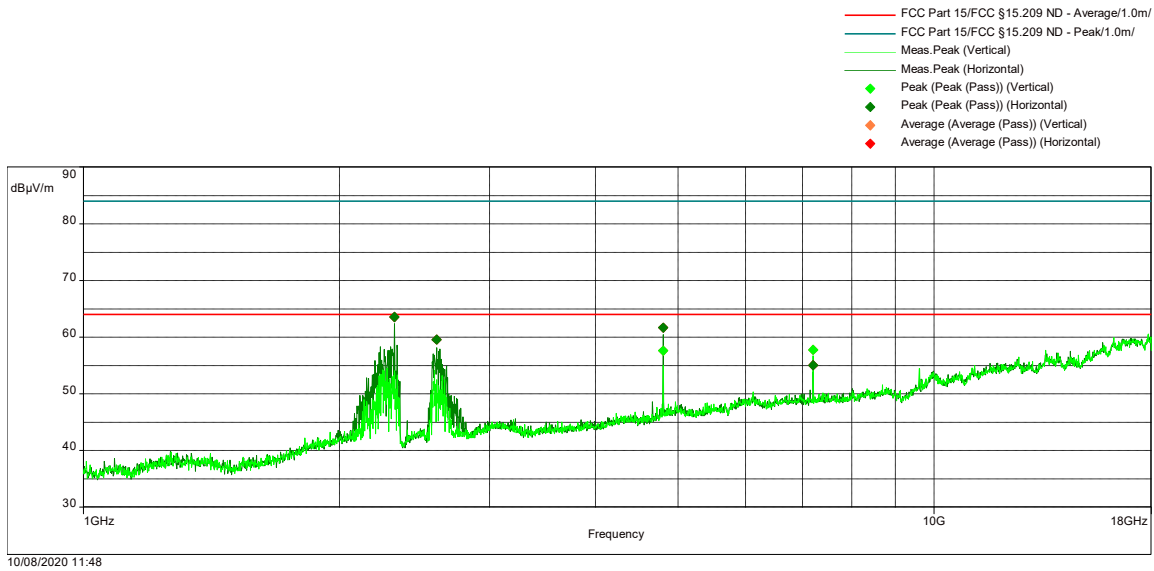
**Table 2.1-3 – RE Spurious Emissions 30-1000MHz – High Channel 2480MHz**

Frequency	QP Level (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (°)	Height (m)	Polarity	Result
33.33135MHz	16.72	40.00	-23.28	360.00	1.00	Horizontal	Pass
48.90293MHz	13.55	40.00	-26.45	272.00	3.07	Vertical	Pass
103.04712MHz	10.90	43.50	-32.60	353.00	1.19	Vertical	Pass
103.75028MHz	10.83	43.50	-32.67	243.00	1.78	Horizontal	Pass
993.22347MHz	23.66	53.97	-30.31	352.00	2.92	Horizontal	Pass
994.09582MHz	23.71	53.97	-30.26	331.00	1.04	Vertical	Pass



### Spurious Emissions 1 - 18GHz low channel 2402 MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
1GHz- 18GHz	Vertical	1m	1MHz	18000Pts	Auto
1GHz- 18GHz	Horizontal	1m	1MHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
Pass

Test Notes: Test Distance is 1m. Peak data used to meet both peak and average limits.

**Figure 2.1-4 – RE Spurious Emissions 1-18GHz – Low Channel 2402MHz**



**Table 2.1-4 – RE Spurious Emissions 1-18GHz – Low Channel 2402MHz**

Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Peak Result	Average Result
2.3204067GHz	63.52	84.00	-20.48	64.00	-0.48	143.00	1.85	Horizontal	Pass	Pass
2.6018668GHz	59.58	84.00	-24.42	64.00	-4.42	107.00	1.14	Horizontal	Pass	Pass
4.8034891GHz	57.57	84.00	-26.43	64.00	-6.43	73.00	2.84	Vertical	Pass	Pass
4.8044336GHz	61.69	84.00	-22.31	64.00	-2.31	95.00	1.19	Horizontal	Pass	Pass
7.2062892GHz	55.07	84.00	-28.93	64.00	-8.93	129.00	1.14	Horizontal	Pass	Pass

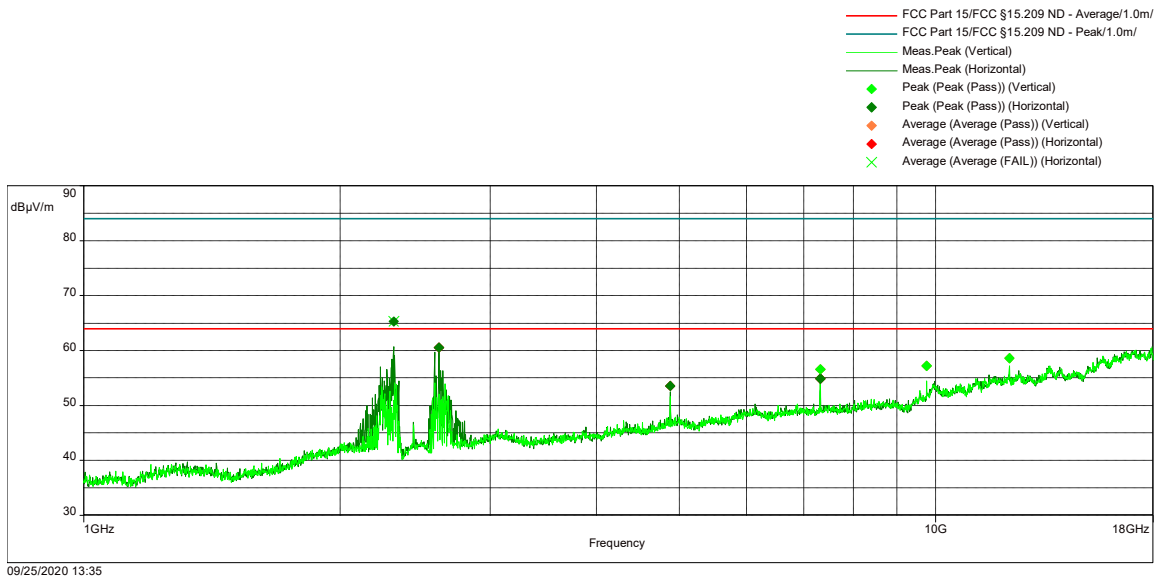
Note: Average margin is based on peak detector measurement compared to average limit.





### Spurious Emissions 1 - 18GHz Mid channel 2440 MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
1GHz- 18GHz	Vertical	1m	1MHz	18000Pts	Auto
1GHz- 18GHz	Horizontal	1m	1MHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
Pass

Test Notes: Test Distance is 1m. Peak data used to meet both peak and average limits.

**Figure 2.1-5 – RE Spurious Emissions 1-18GHz – Middle Channel 2440MHz**



**Table 2.1-5 – RE Spurious Emissions 1-18GHz – Middle Channel 2440MHz**

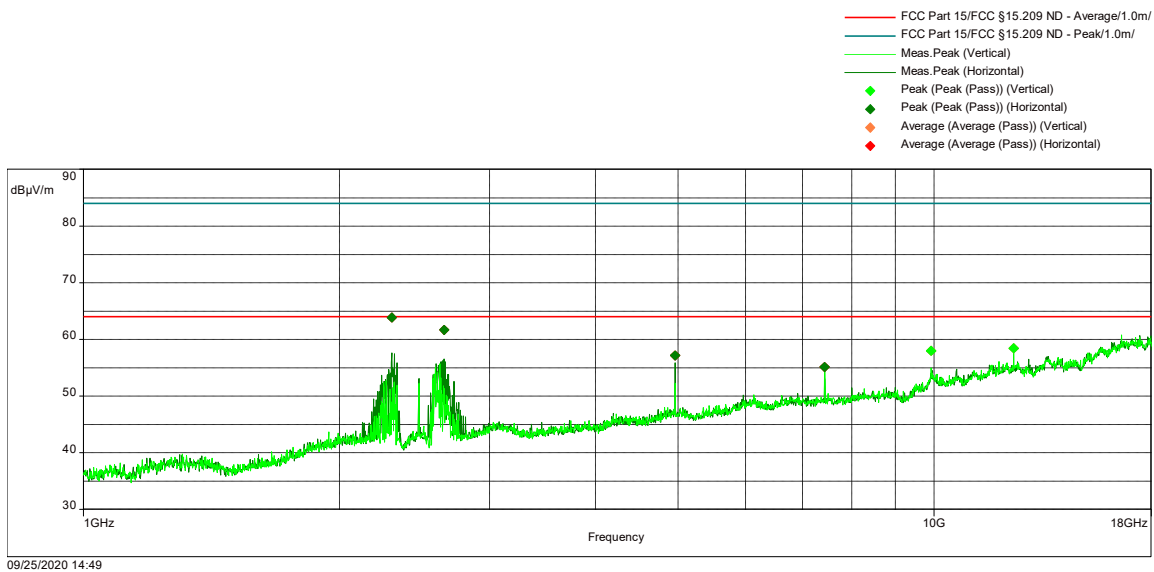
Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Peak Result	Average Result
2.3119062GHz	42.19*	84.00	-41.80	64.00	-21.80	150.00	1.88	Horizontal	Pass	Pass
2.6141452GHz	60.54	84.00	-23.46	64.00	-3.46	107.00	1.00	Horizontal	Pass	Pass
4.8809378GHz	53.55	84.00	-30.45	64.00	-10.45	139.00	1.34	Horizontal	Pass	Pass
7.3205734GHz	54.89	84.00	-29.11	64.00	-9.11	117.00	1.00	Horizontal	Pass	Pass
9.7611534GHz	57.22	84.00	-26.78	64.00	-6.78	184.00	2.72	Vertical	Pass	Pass
12.201733GHz	58.60	84.00	-25.40	64.00	-5.40	220.00	2.15	Vertical	Pass	Pass

Note: Average margin is based on peak detector measurement compared to average limit. For the frequency of 2.311GHz a duty cycle correction factor corresponding the manufacturer’s reported operational duty cycle of the transmitter equal to 14.33% was used.



### Spurious Emissions 1 - 18GHz High channel 2480 MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
1GHz- 18GHz	Vertical	1m	1MHz	18000Pts	Auto
1GHz- 18GHz	Horizontal	1m	1MHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
Pass

Test Notes: Test Distance is 1m. Peak data used to meet both peak and average limits.

**Figure 2.1-6 – RE Spurious Emissions 1-18GHz – High Channel 2480MHz**



**Table 2.1-6 – RE Spurious Emissions 1-18GHz – High Channel 2480MHz**

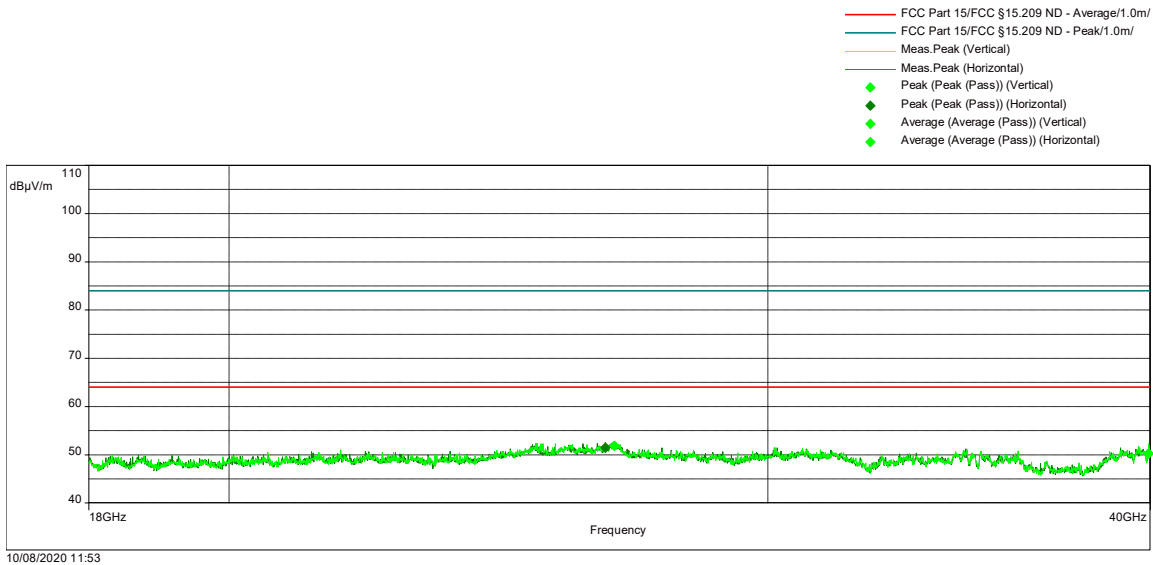
Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Peak Result	Average Result
2.3034057GHz	63.83	84.00	-20.17	64.00	-0.17	132.00	1.88	Horizontal	Pass	Pass
2.6547586GHz	61.64	84.00	-22.36	64.00	-2.36	128.00	1.83	Horizontal	Pass	Pass
4.9602756GHz	57.12	84.00	-26.88	64.00	-6.88	271.00	2.21	Horizontal	Pass	Pass
7.4386355GHz	55.14	84.00	-28.86	64.00	-8.86	253.00	1.80	Horizontal	Pass	Pass
9.9207734GHz	57.97	84.00	-26.03	64.00	-6.03	0.00	3.13	Vertical	Pass	Pass
12.398189GHz	58.40	84.00	-25.60	64.00	-5.60	271.00	1.59	Vertical	Pass	Pass

Note: Average margin is based on peak detector measurement compared to average limit.



### Spurious Emissions 18 - 40GHz Low Channel 2402 MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
18GHz- 40GHz	Vertical	1m	1MHz	18000Pts	Auto
18GHz- 40GHz	Horizontal	1m	1MHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
n/a

Test Notes: Test Distance is 1m. Peak data used to meet both peak and average limits.

**Figure 2.1-7 – RE Spurious Emissions 18-40GHz – Low Channel 2402MHz**



**Table 2.1-7 – RE Spurious Emissions 18-40GHz – Low Channel 2402MHz**

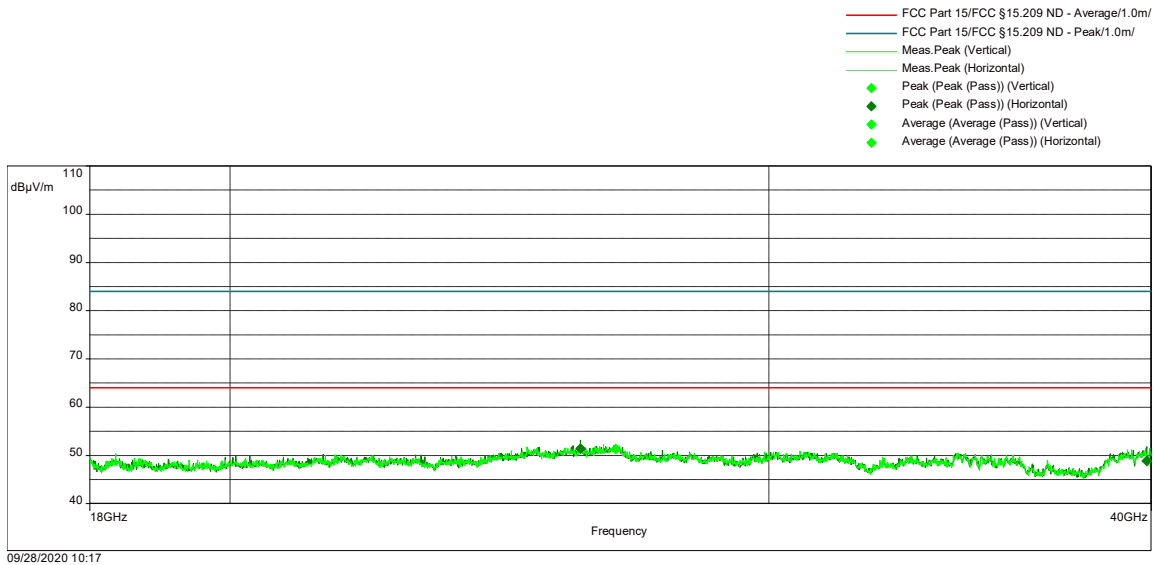
Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Peak Result	Average Result
26.54503GHz	51.47	84.00	-32.53	64.00	-12.53	292.00	3.79	Horizontal	Pass	Pass
26.729596GHz	51.82	84.00	-32.18	64.00	-12.18	0.00	2.11	Vertical	Pass	Pass
39.951108GHz	50.31	84.00	-33.69	64.00	-13.69	28.00	1.29	Vertical	Pass	Pass

Note: Average margin is based on peak detector measurement compared to average limit.



### Spurious Emissions 18 - 40GHz Mid Channel 2440 MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
18GHz- 40GHz	Vertical	1m	1MHz	18000Pts	Auto
18GHz- 40GHz	Horizontal	1m	1MHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
n/a

Test Notes: Test Distance is 1m. Peak data used to meet both peak and average limits.

**Figure 2.1-8 – RE Spurious Emissions 18-40GHz – Middle Channel 2440MHz**



**Table 2.1-8 – RE Spurious Emissions 18-40GHz – Middle Channel 2440MHz**

Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Peak Result	Average Result
26.54503GHz	51.47	84.00	-32.53	64.00	-12.53	292.00	3.79	Horizontal	Pass	Pass
26.729596GHz	51.82	84.00	-32.18	64.00	-12.18	0.00	2.11	Vertical	Pass	Pass
39.951108GHz	50.31	84.00	-33.69	64.00	-13.69	28.00	1.29	Vertical	Pass	Pass

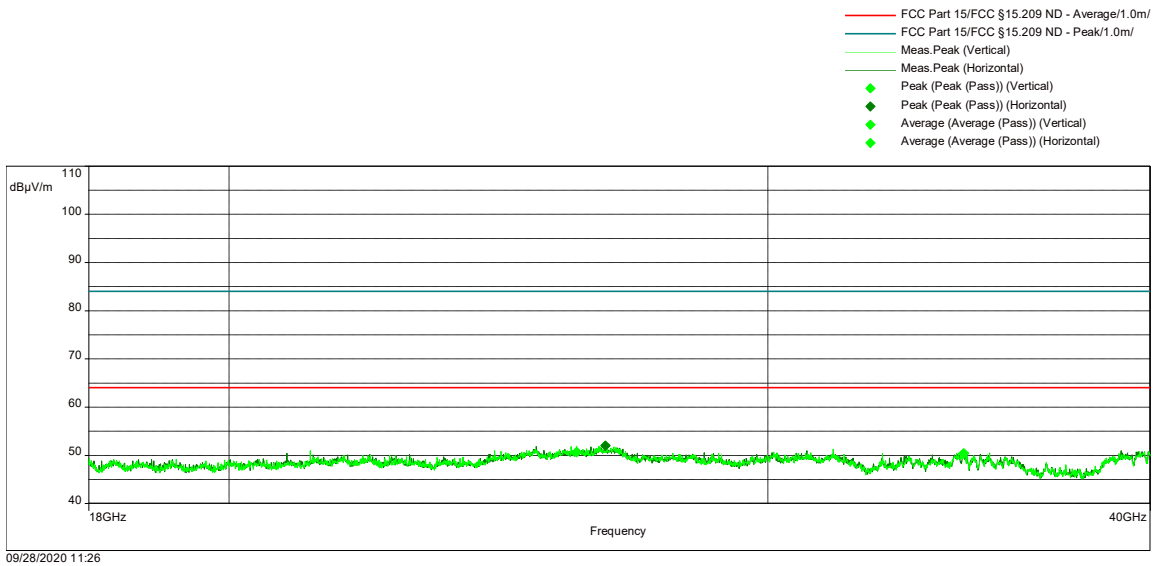
Note: Average margin is based on peak detector measurement compared to average limit.





## Spurious Emissions 18 - 40GHz High Channel 2480 MHz

Frequency Range	Polarity	Antenna Distance	RBW	Step Size	Sweep Time
18GHz- 40GHz	Vertical	1m	1MHz	18000Pts	Auto
18GHz- 40GHz	Horizontal	1m	1MHz	18000Pts	Auto



**Limit:**  
FCC §15.209

**Test Results:**  
n/a

Test Notes: Test Distance is 1m. Peak data used to meet both peak and average limits.

**Figure 2.1-9 – RE Spurious Emissions 18-40GHz – High Channel 2480MHz**



**Table 2.1-9 – RE Spurious Emissions 18-40GHz – High Channel 2480MHz**

Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Average Limit (dBuV/m)	Average Margin (dB)	Azimuth (°)	Height (m)	Polarity	Peak Result	Average Result
25.975443GHz	50.75	84.00	-33.25	64.00	-13.25	72.00	4.00	Vertical	Pass	Pass
26.549919GHz	52.02	84.00	-31.98	64.00	-11.98	189.00	3.12	Horizontal	Pass	Pass
34.763709GHz	50.43	84.00	-33.57	64.00	-13.57	72.00	2.36	Vertical	Pass	Pass

Note: Average margin is based on peak detector measurement compared to average limit.

## 2.1.9 Radiated Emissions photos

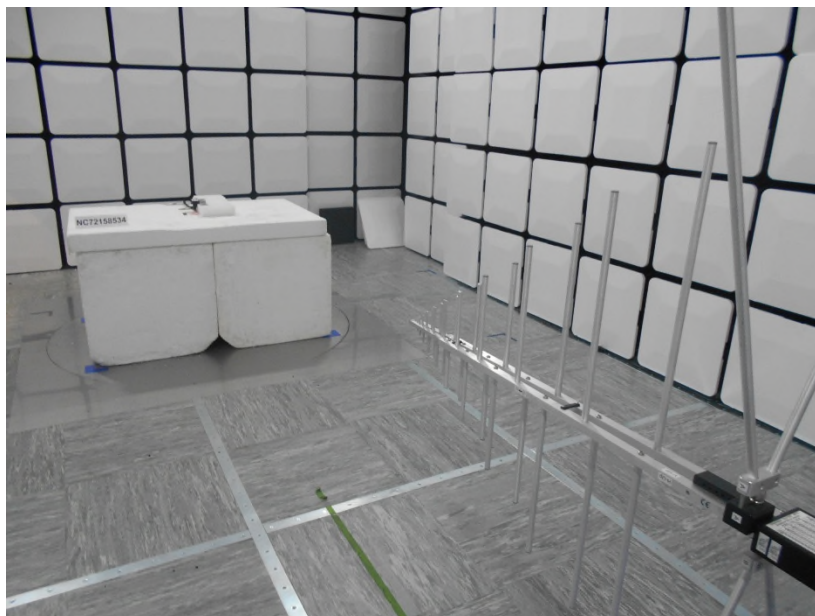


Photo 2.1-1 – RE Spurious Emissions 30-1000MHz – Front Side

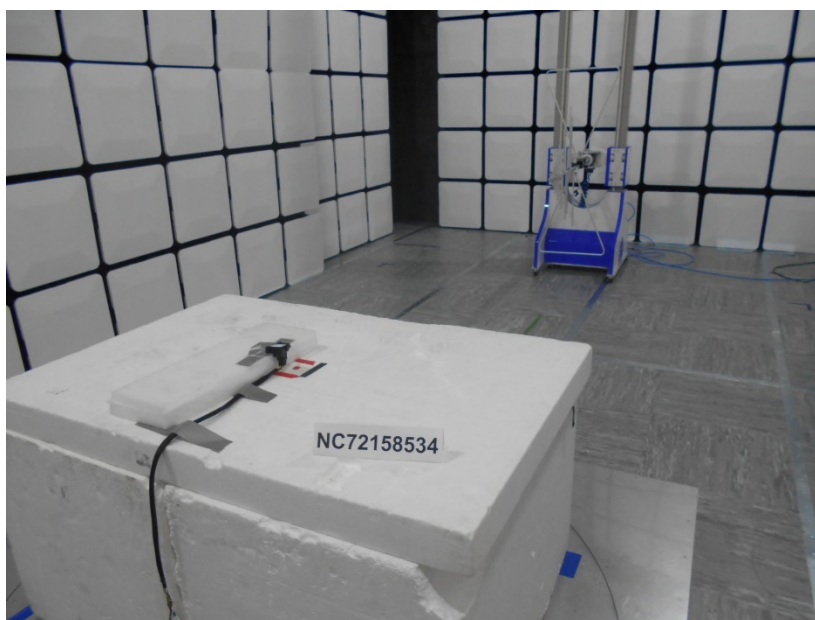
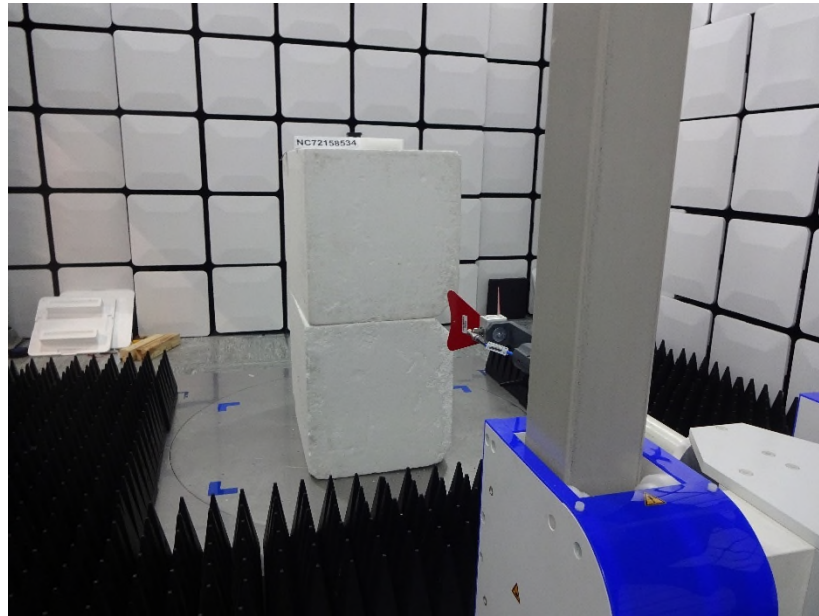
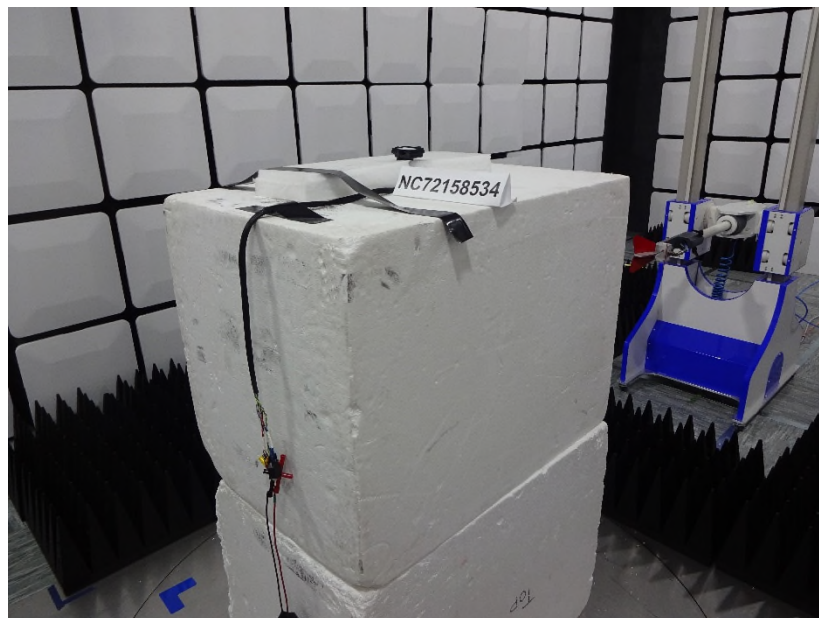


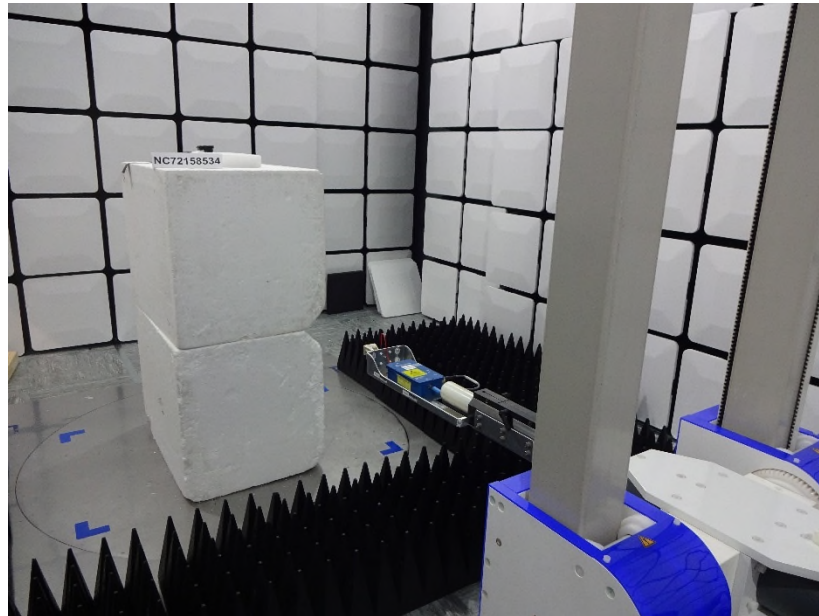
Photo 2.1-2 – RE Spurious Emissions 30-1000MHz – Back Side



**Photo 2.1-3 – RE Spurious Emissions 1-18GHz – Front Side**



**Photo 2.1-4 – RE Spurious Emissions 1-18GHz – Back Side**



**Photo 2.1-5 – RE Spurious Emissions 18-40GHz – Front Side**



**Photo 2.1-6 – RE Spurious Emissions 18-40GHz – Back Side**



**2.1.10 Test Location and Test Equipment Used**

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.1-10 – Radiated Emissions Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
NBLE11141	Hewlett-Packard	Preamplifier, 100 kHz-1300 MHz	8447D	2944A08773	B	01/09/2020	01/09/2021
WRLE11519	Com-Power Corp.	Preamp, 500 MHz-18 GHz	PAM-118A	18040002	B	01/09/2020	01/09/2021
NBLE11555	Rohde & Schwarz	Receiver, 2 Hz-44 GHz	ESW44	101537	G	04/26/2019	10/26/2020
NBLE11630	ETS-Lindgren	Antenna, 1-18 GHz	3117	00218816	G	09/04/2020	09/04/2022
NBLE11645	SCHWARZBECK MESS-ELEKTRONIK	Antenna, Trilog Broadband, 30-7000 MHz	VULB 9162	0254	G	03/18/2019	03/18/2021
NBLE11689	ATM	Antenna, DRG 18-40 GHz	180-442-KF	102040	G	05/13/2019	05/13/2021
NBLE11688	Rohde & Schwarz	Preamp, 18-40 GHz	TRS-PR1840	10006	G	05/02/2019	05/02/2021
NBLE11699	Microwave Circuits	Notch Filter, 2.4-2.4837 GHz	N0324415	502922 DC1947	B	11/22/2019	11/22/2020

Cal Code G = Calibration performed by an accredited outside source.  
 Cal Code B = Calibration verification performed internally.  
 Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



## 2.2 Restricted Band-edge

### 2.2.1 Specification Reference

FCC 47 CFR Part 15 Subpart C, 15.247  
RSS-GEN Issue 5

### 2.2.2 Equipment Under Test and Modification State

As shown in §1.4 with modification state “0”, as noted in §1.6.

### 2.2.3 Date of Test

17 - 28 September 2020

### 2.2.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a non-conductive table 1.5 m above a reference ground plane. Measurements were taken at a 3m distance. The fundamental signal was maximized while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector. Band-edge measurements were made with the device in its maximized position using a peak and average detector as described in ANSI C63.10.

The EUT was assessed against the limits specified in FCC 47 CFR Part 15C §15.209.

### 2.2.5 Environmental Conditions

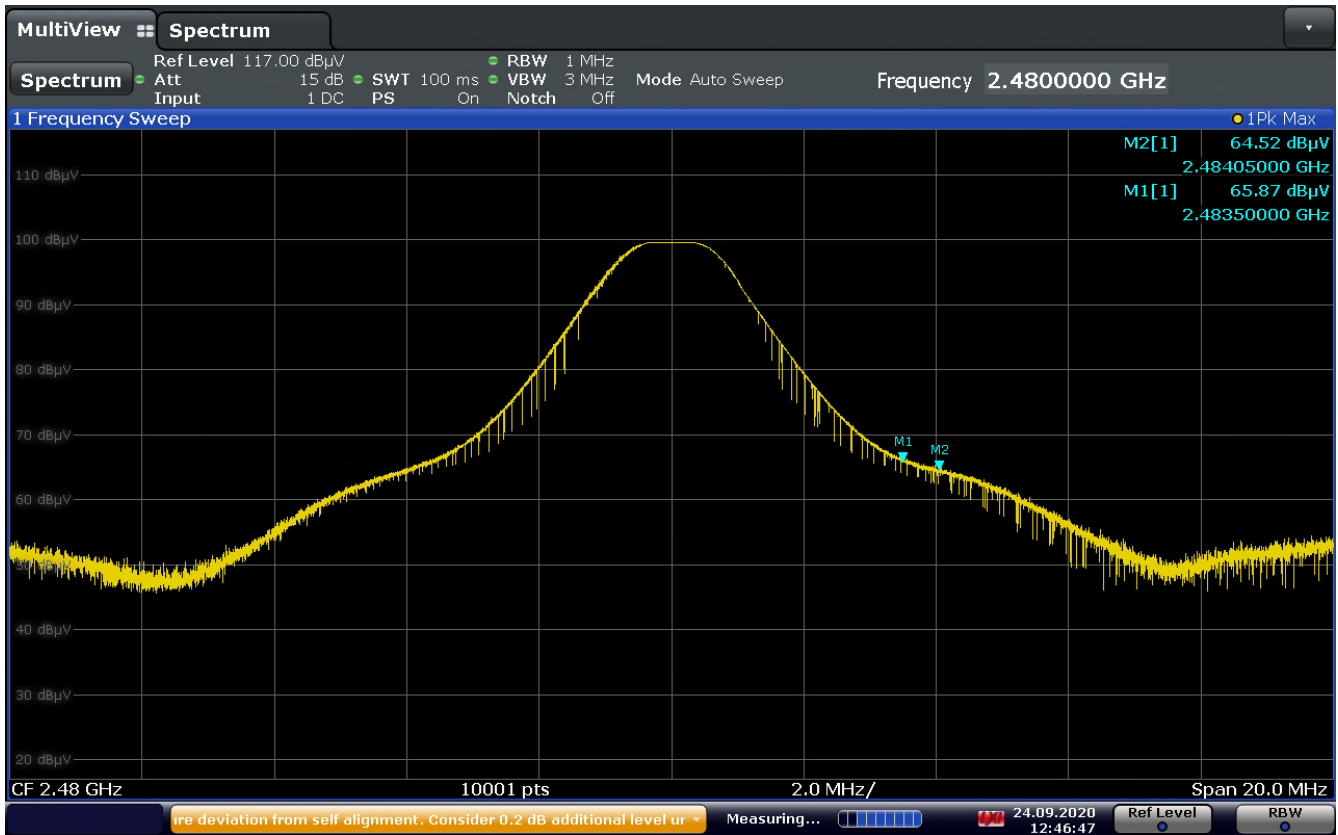
The EUT was evaluated within the climatic range of the EUT as specified by the manufacturer. When the manufacturer does not specify climatic parameters for the EUT, all tests are performed within the ambient climatic conditions of the laboratory.

### 2.2.6 Test Results

**Test Summary:** Calculated final data is shown in the tables below the screen capture.

**Test Result: Pass**

See data below for detailed results.



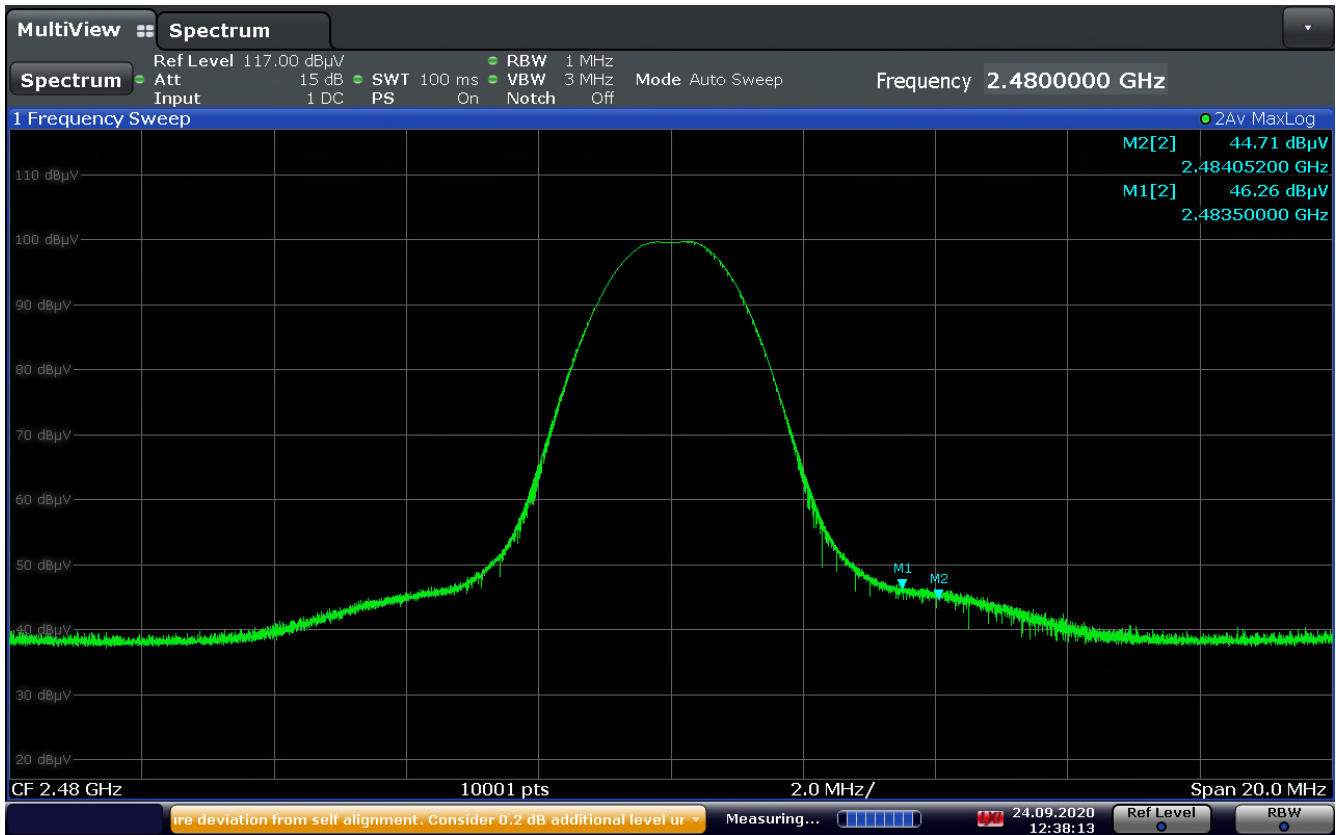
12:46:48 24.09.2020

Figure 2.2-1 – Band-edge, High Channel – Peak

TÜV SÜD America Inc  
141 14<sup>th</sup> Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)





12:38:14 24.09.2020

Figure 2.2-2 – Band-edge, High Channel - Average

TÜV SÜD America Inc  
141 14<sup>th</sup> Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



**Table 2.2-1 – Restricted Band Edge – High Channel – Peak**

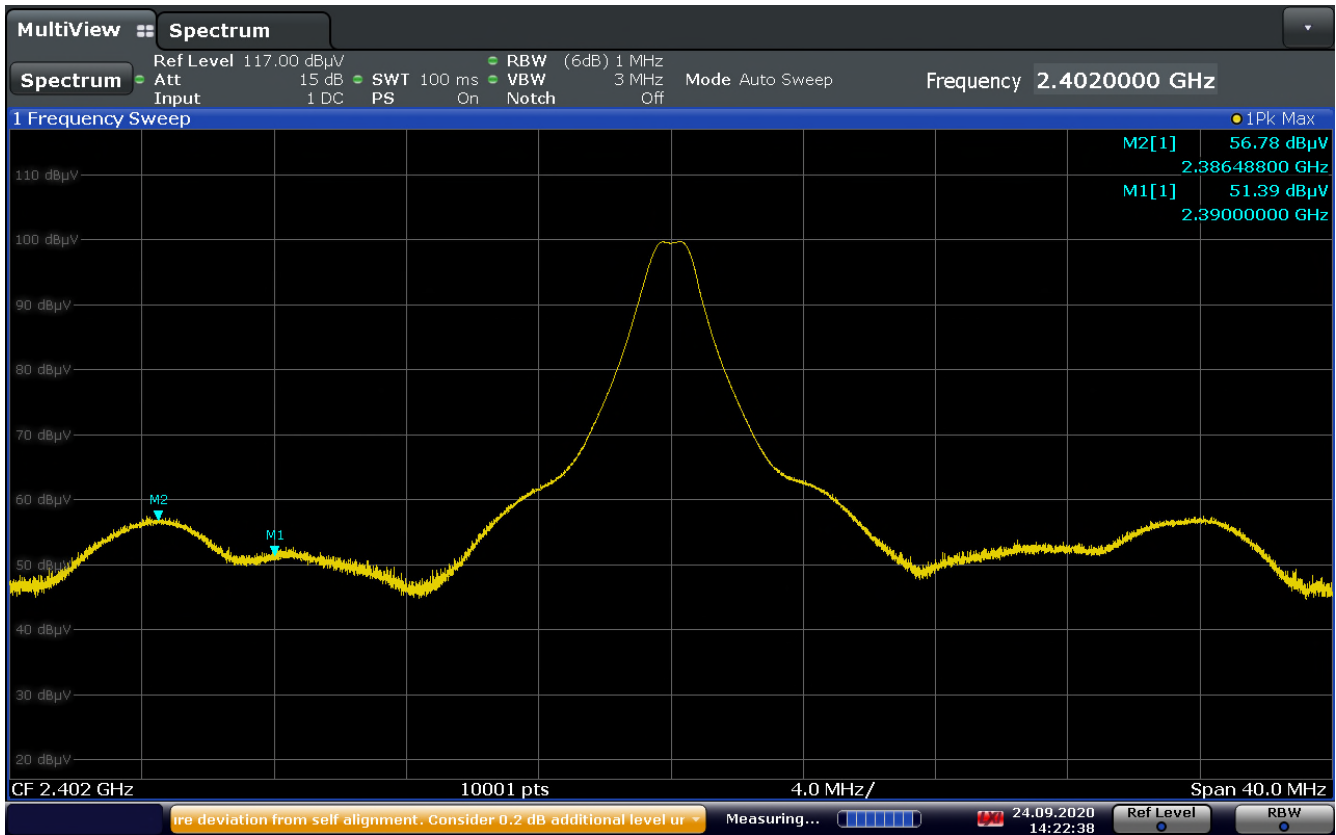
Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Correction Factor (dB)	Peak Result
2483.5MHz	59.2	74.00	-14.8	6.67	Pass
2484MHz	57.85	74.00	-16.15	6.67	Pass

Note: Peak level calculation: Final Peak level = analyzer level – correction factor. Margin Calculation: Peak Margin = Peak Level – Peak Limit.

**Table 2.2-2 – Restricted Band Edge – High Channel – Average**

Frequency	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Correction Factor (dB)	Average Result
2483.5MHz	39.59	54.00	-14.41	6.67	Pass
2484MHz	38.04	54.00	-15.96	6.67	Pass

Note: Peak level calculation: Final Average level = analyzer level – correction factor. Margin Calculation: Average Margin = Average Level – Average Limit.

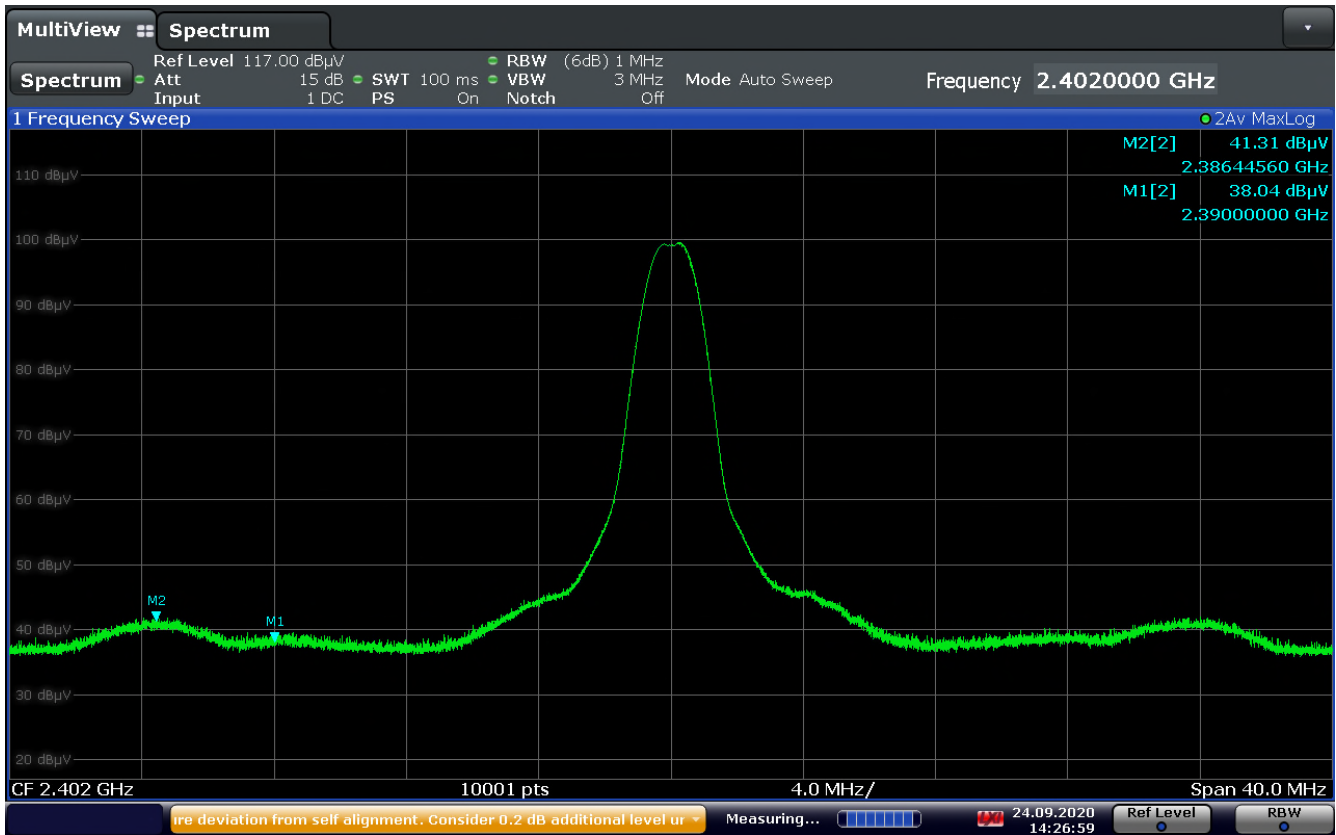


14:22:39 24.09.2020

Figure 2.2-3 – Band-edge, Low Channel – Peak

TÜV SÜD America Inc  
141 14<sup>th</sup> Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



14:27:00 24.09.2020

Figure 2.2-4 – Band-edge, Low Channel - Average

TÜV SÜD America Inc  
141 14<sup>th</sup> Street NW  
New Brighton, MN 55112

Phone: 651-631-2487  
[www.tuv-sud-america.com](http://www.tuv-sud-america.com)



**Table 2.2-3 – Restricted Band Edge – Low Channel – Peak**

Frequency	Peak Level (dBuV/m)	Peak Limit (dBuV/m)	Peak Margin (dB)	Correction Factor (dB)	Peak Result
2386.4MHz	50.13	74.00	-23.87	6.65	Pass
2390MHz	44.74	74.00	-29.26	6.65	Pass

Note: Peak level calculation: Final Peak level = analyzer level – correction factor. Margin Calculation: Peak Margin = Peak Level – Peak Limit.

**Table 2.2-4 – Restricted Band Edge – Low Channel – Average**

Frequency	Average Level (dBuV/m)	Average Limit (dBuV/m)	Average Margin (dB)	Correction Factor (dB)	Average Result
2386.4MHz	34.66	54.00	-29.34	6.65	Pass
2390MHz	31.39	54.00	-32.61	6.65	Pass

Note: Peak level calculation: Final Average level = analyzer level – correction factor. Margin Calculation: Average Margin = Average Level – Average Limit.

## 2.2.7 Restricted Band-edge photos

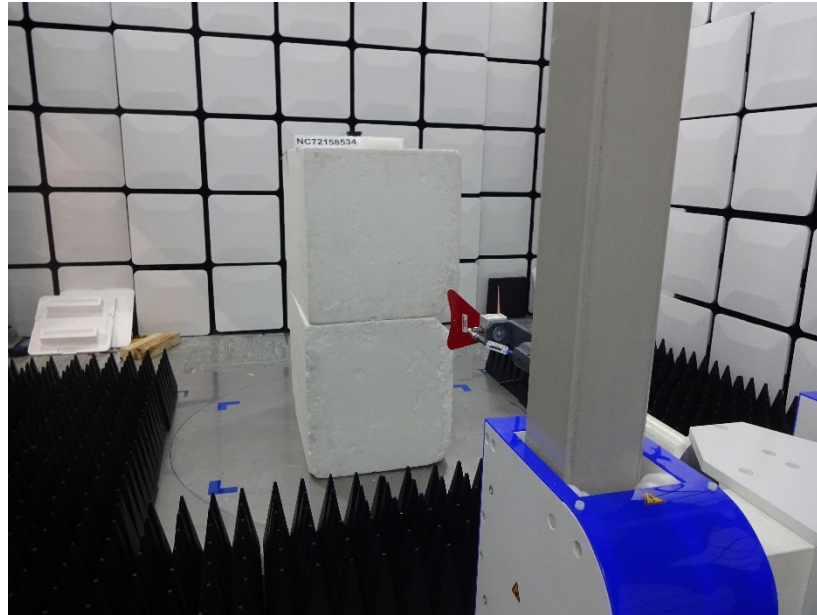


Photo 2.2-1 – Band-edge – Front Side

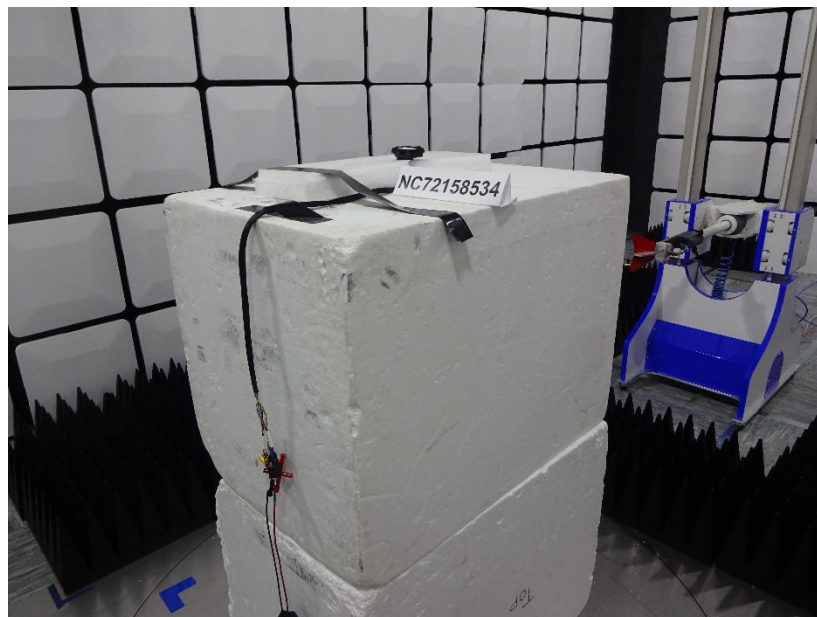


Photo 2.2-2 – Band-edge – Back Side



**2.2.8 Test Location and Test Equipment Used**

The tests were carried out in New Brighton, MN.  
 Test Area: 3mSAC

**Table 2.2-5 – Restricted Band Edge Equipment List**

Device #	Manufacturer	Description	Model	Serial #	Cal Code	Cal Date	Cal Due
WRLE11519	Com-Power Corp.	Preamp, 500 MHz-18 GHz	PAM-118A	18040002	B	01/09/2020	01/09/2021
NBLE11555	Rohde & Schwarz	Receiver, 2 Hz-44 GHz	ESW44	101537	G	04/26/2019	10/26/2020
NBLE11630	ETS-Lindgren	Antenna, 1-18 GHz	3117	00218816	G	09/04/2020	09/04/2022

Cal Code G = Calibration performed by an accredited outside source.

Cal Code B = Calibration verification performed internally.

Cal Code Y = Passive Device, or Calibration not required when used with other calibrated equipment.



### 3 Accreditation, Disclaimers and Copyright

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#### STATEMENT OF MEASUREMENT UNCERTAINTY – Emissions

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. This test system has a measurement uncertainty of  $\pm 3.30$  dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. This test system for 30 MHz-1000 MHz has a measurement uncertainty of  $\pm 5.88$  dB and above 1 GHz a measurement uncertainty of  $\pm 4.47$  dB. The measurement uncertainty values for conducted and radiated emissions meet the requirements as expressed in CISPR 16-4-2. The equipment comprising the test systems is calibrated on an annual basis.

#### TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated to meet test method standard requirements and/or manufacturer's specifications