

# TEST REPORT

**Report Number:** R14208543-E2

**Applicant :** Dynetics  
1002 Explorer Boulevard  
Huntsville, AL 35806

**Model :** 9120L

**FCC ID :** QFS001-10119614

**EUT Description :** Ground Radar

**Test Standard(s) :** FCC CFR47 PART 90.103

**Date of Issue:**  
2023-05-25

**Prepared by:**  
UL LLC  
12 Laboratory Dr.  
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## REVISION HISTORY

Ver.	Issue Date	Revisions	Revised By
1	2022-09-23	Initial Release	Noah Bennett
2	2023-05-25	Updated Section 8.3.1 to remove duplicated scans Updated UL Solutions Logo	Noah Bennett

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Dynetics  
1002 Explorer Boulevard  
Huntsville, AL 35806-2806

**EUT DESCRIPTION:** Ground Radar

**MODEL:** 9120L

**SERIAL NUMBER:** 9129

**SAMPLE RECEIVE DATE:** 2022-08-10

**DATE TESTED:** 2022-08-17 to 2022-09-06

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
47 CFR Part 90.103	Compliant

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released  
For UL LLC by:



Dan Coronia  
Operations Leader  
UL – Consumer Technology Division

Prepared By:



Noah Bennett  
Electrical Engineer  
UL – Consumer Technology Division

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, 47 CFR Part 90 and ANSI C63.26-2015.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Drive, Suite B, Morrisville, NC 27560.

UL LLC is accredited A2LA, certification # 0751.06, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Antenna Port Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	0.57%

Uncertainty figures are valid to a confidence level of 95%.

### 4.4. SAMPLE CALCULATION

#### **RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$
$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

#### **MAINS CONDUCTED EMISSIONS**

Where relevant, the following sample calculation is provided:

$$\text{Final Voltage (dBuV)} = \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \text{LISN Insertion Loss}$$
$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a wide-band ground radar used to monitor a specific area.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output powers as follows:

Channel	Mode 1 (8km) Peak power (dBm)	Mode 2 (10km) Peak Power (dBm)	Mode 3 (16km) Peak Power (dBm)
Low Channel	55.43	55.51	55.48
Middle Channel	56.49	56.55	56.54
High Channel	56.03	56.06	56.11

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna type is a patch array antenna. The maximum antenna gain is 15 dBi. The antenna connector type is SMA.

### 5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was revision 93601025.

The EUT software installed during testing was revision 8a0d07e719d39e9fc34ad2cc2bec12089cb501e6.

### 5.5. WORST-CASE CONFIGURATION AND MODE

The EUT operates in three specific modes as follows: Mode 1 (8km), Mode 2 (10km), and Mode 3(16km). All modes and three channels (low, middle, high) were tested during antenna-port measurements.

All modes were tested during radiated spurious emissions testing. The low, middle, and high channels were evaluated in the 1-18GHz range, while the highest-power channel was evaluated in the other ranges of interest. Radiated >18GHz is intended to cover both radiated and conducted emissions.

The device is intended to operate in only one orientation and was thus testing in the device’s intended orientation.

The operating frequencies of the EUT are as follows:

Center Frequencies (MHz)	Mode	Channel
3023.4375	1,2,3	Low
3039.0625	1,2,3	Mid
3070.3125	1,2,3	High

Due to the high power of the device and measurement equipment limitations the antenna port was terminated for emissions in ranges 9kHz – 18GHz. Testing above 18GHz was performed with the antenna.



**5.6. DESCRIPTION OF TEST SETUP**

**SUPPORT EQUIPMENT**

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude E6430	4JF28W1	N/A
Attenuator	Weinschel Associates	WA81-40-30	A157	N/A
Load	Weinchel Corp	1431-4	Bf8239	N/A

**I/O CABLES**

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	SMA	1	SMA	RF	>3m	Attached to attenuator for BL18G
2	Mil Spec Weatherproof	1	Circular Milspec	I/O	>3m	Power and Communication

**SETUP DIAGRAM**

Please see R14208543-EP1 For Setup Photos and Setup Diagrams

## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment were utilized for the tests documented in this report:

### Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
<b>Conducted 1</b>					
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SA0025	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-02	2023-05-02
SOFTEMI	Antenna Port Software	UL	Version 2022.5.4		
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16		
PS214	AC Power Source	ELGAR	CW2501	N/A	N/A
<b>Conducted 2</b>					
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-24	2023-05-24
SOFTEMI	UL EMC Software	UL	Version 2021.9.15		

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	<b>0.009-30MHz</b>				
AT0059	Active Loop Antenna	ETS-Lindgren	6502	2021-09-24	2022-09-24
	<b>30-1000 MHz</b>				
AT0081	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2021-12-08	2022-12-08
	<b>1-18 GHz</b>				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-05-24	2023-05-24
	<b>Gain-Loss Chains</b>				
C4-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2022-05-20	2023-05-20
C4-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2022-05-20	2023-05-20
C4-SAC03	Gain-loss string: 1-18GHz	Various	Various	2022-05-20	2023-05-20
	<b>Receiver &amp; Software</b>				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2022-02-15	2023-02-15
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	<b>Additional Equipment used</b>				
21642	Environmental Meter	Fisher Scientific	15-077-963 (s/n 210701692)	2021-08-16	2023-08-16
LPF008	DC-1000MHz low-pass filter	Pasternack	PE8720	2022-05-27	2023-05-27

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 1)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	<b>18-40 GHz</b>				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2021-11-04	2022-11-04
AT0061	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2021-11-04	2022-11-04
	<b>Gain-Loss Chains</b>				
C1-SAC04	Gain-loss string: 18-40GHz	Various	Various	2022-05-05	2023-05-05
	<b>Receiver &amp; Software</b>				
SA0026	Spectrum Analyzer	Agilent	N9030A	2022-08-02	2023-08-02
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	<b>Additional Equipment used</b>				
200539	Environmental Meter	Fisher Scientific	15-077-963 (s/n 181474341)	2021-09-27	2022-09-27

## 7. RF POWER OUTPUT

### REQUIREMENT

§2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

§90.205 Output Power.

(r) All other frequency bands. Requested transmitter power will be considered and authorized on a case by case basis.

### TEST PROCEDURE

The transmitter output was connected to the input of Spectrum Analyzer via calibrated coaxial cable and attenuator.

The output power was measured with the spectrum analyzer at the low, middle and high channel for each mode.

- Set the spectrum analyzer span wide enough or greater than the modulated signal BW.
- Set a spectrum analyzer at peak detection mode with VBW  $\geq$  RBW. The RBW was set to largest available (8MHz). It is less then overall bandwidth of individual channel but is larger than bandwidth of individual pulse within a channel.
- Set a marker to point the corresponding peak value.

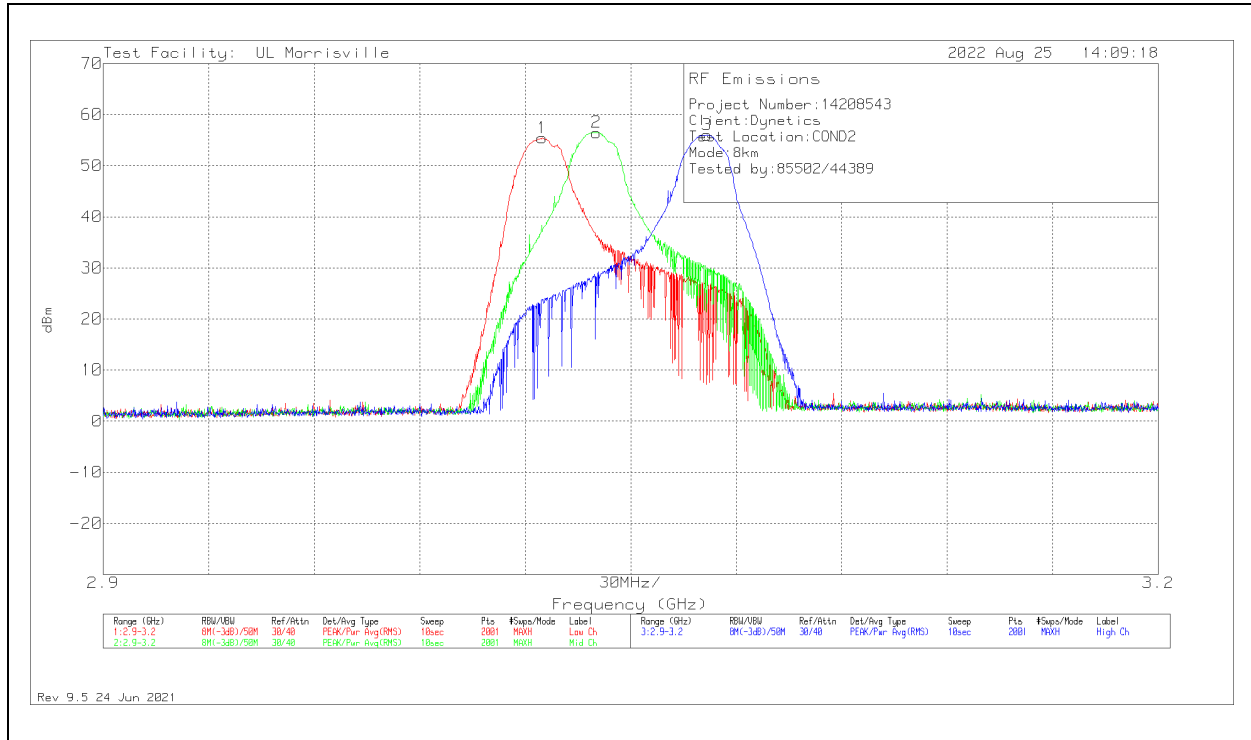
Note: 8MHz RBW is adequate for a pulse width of 2048ns ( $1/T=488.3\text{kHz}$ )

### TABULAR RESULTS

Channel	Mode 1 Peak power (dBm)	Mode 2 Peak Power (dBm)	Mode 3 Peak Power (dBm)
Low Channel	55.43	55.51	55.48
Middle Channel	56.49	56.55	56.54
High Channel	56.03	56.06	56.11

**RESULTS**

Mode1 – Low/Mid/High Channel Plot

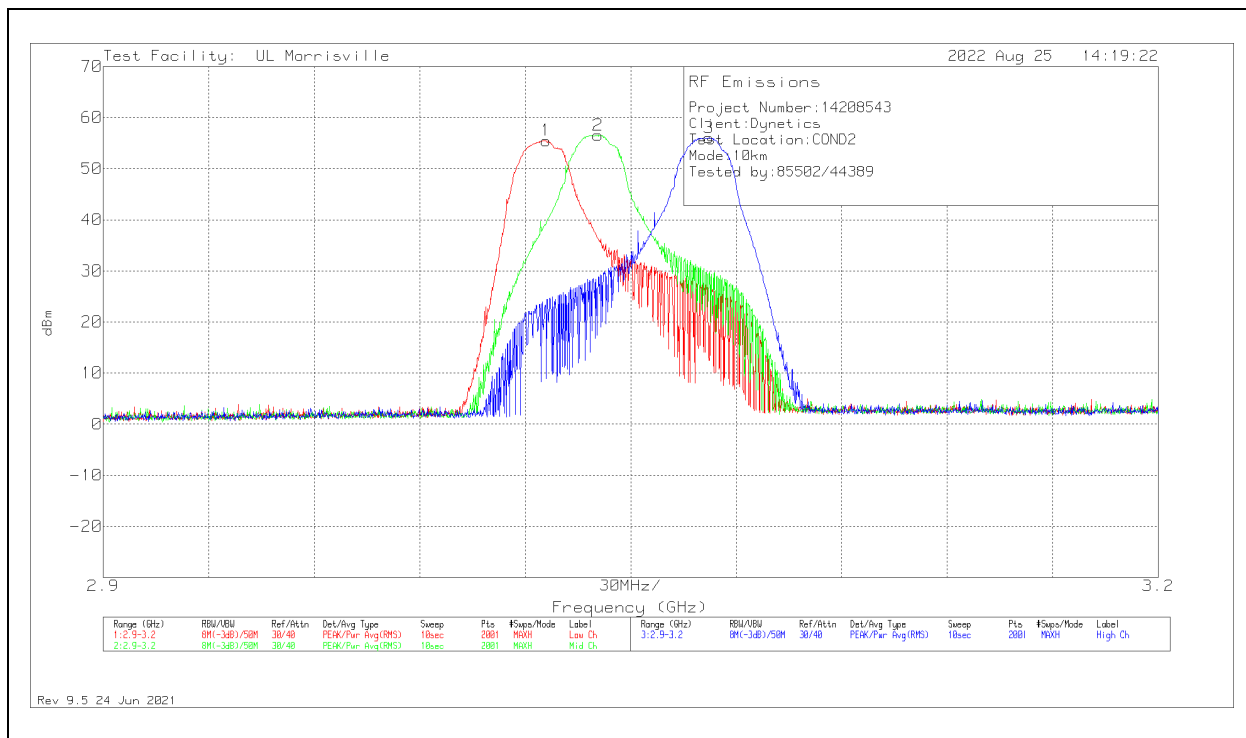


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm
1	3.0248	23.43	Pk	.6	.6	30.8	55.43
2	3.04025	24.29	Pk	.6	.6	31	56.49
3	3.07175	23.93	Pk	.6	.6	30.9	56.03

Pk - Peak detector

Mode 2 – Low/Mid/High Channel Plot

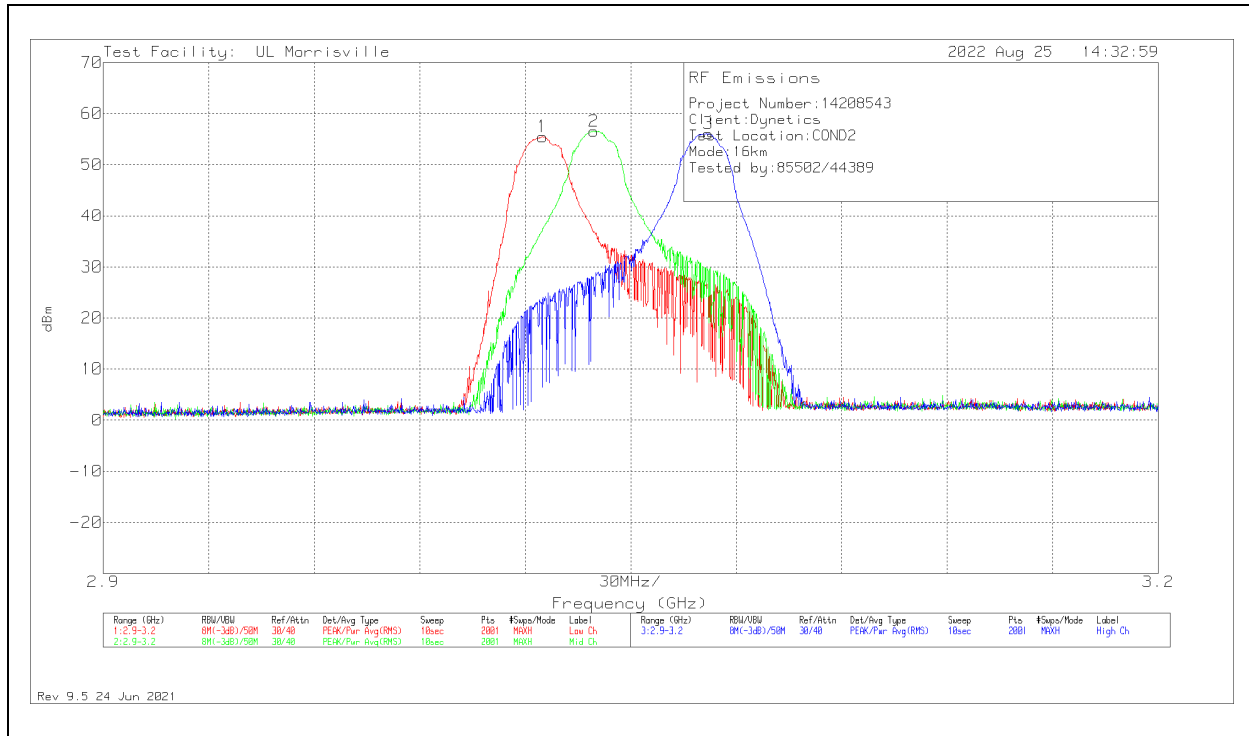


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm
1	3.026	23.51	Pk	.6	.6	30.8	55.51
2	3.0407	24.35	Pk	.6	.6	31	56.55
3	3.0722	23.96	Pk	.6	.6	30.9	56.06

Pk - Peak detector

Mode 3 – Low/Mid/High Channel Plot



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm
1	3.02495	23.48	Pk	.6	.6	30.8	55.48
2	3.0395	24.44	Pk	.6	.6	30.9	56.54
3	3.07205	24.01	Pk	.6	.6	30.9	56.11

Pk - Peak detector



## 8. EMISSIONS TEST RESULTS

### 8.1. OCCUPIED BANDWIDTH

#### RULE PART(S)

§2.105 Measurements required: Occupied bandwidth.

§90.207 Types of emissions.

(k) For radiolocation operations as may be authorized in accordance with subpart F, unless otherwise provided for any type of emission may be authorized upon a satisfactory showing of need.

§90.209 Bandwidth Limitation.

Above 2500 MHz:

<sup>2</sup>Bandwidths for radiolocation stations in the 420-450 MHz band and for stations operating in bands subject to this footnote will be reviewed and authorized on a case-by-case basis.

#### LIMITS

For reporting purposes only.

#### TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band.

#### MODES TESTED

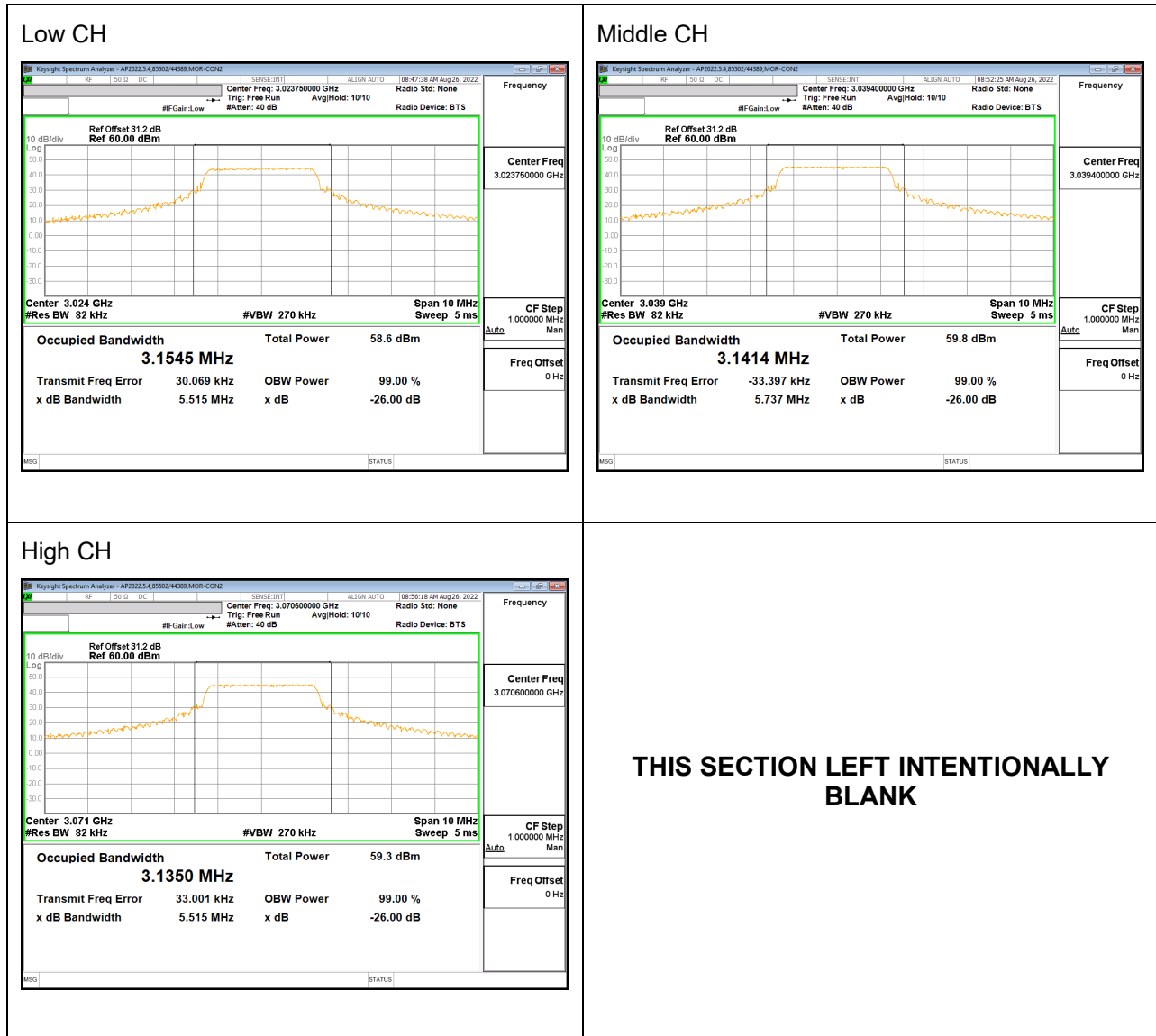
Mode 1, Mode 2, and Mode 3. Mid channel chosen was Ch21, (3.039GHz)

#### TABULAR RESULTS

Channel	Mode 1 99% Bandwidth MHz	Mode 2 99% Bandwidth MHz	Mode 3 99% Bandwidth MHz
Low Channel	3.1545	5.0442	3.1390
Middle Channel	3.1414	5.1060	3.1465
High Channel	3.1350	5.1057	3.1427

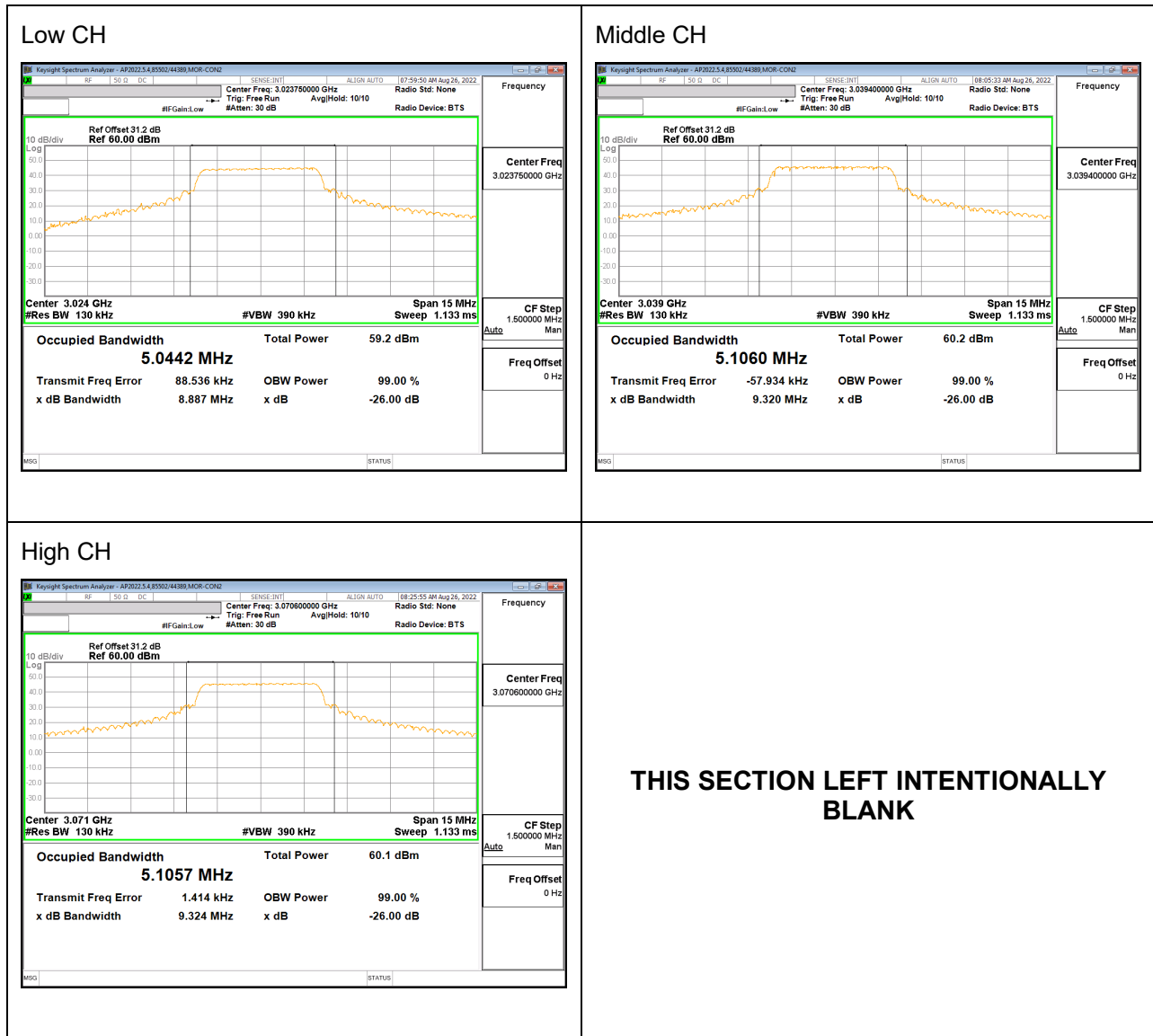
**GRAPHICAL RESULTS**

**MODE 1**

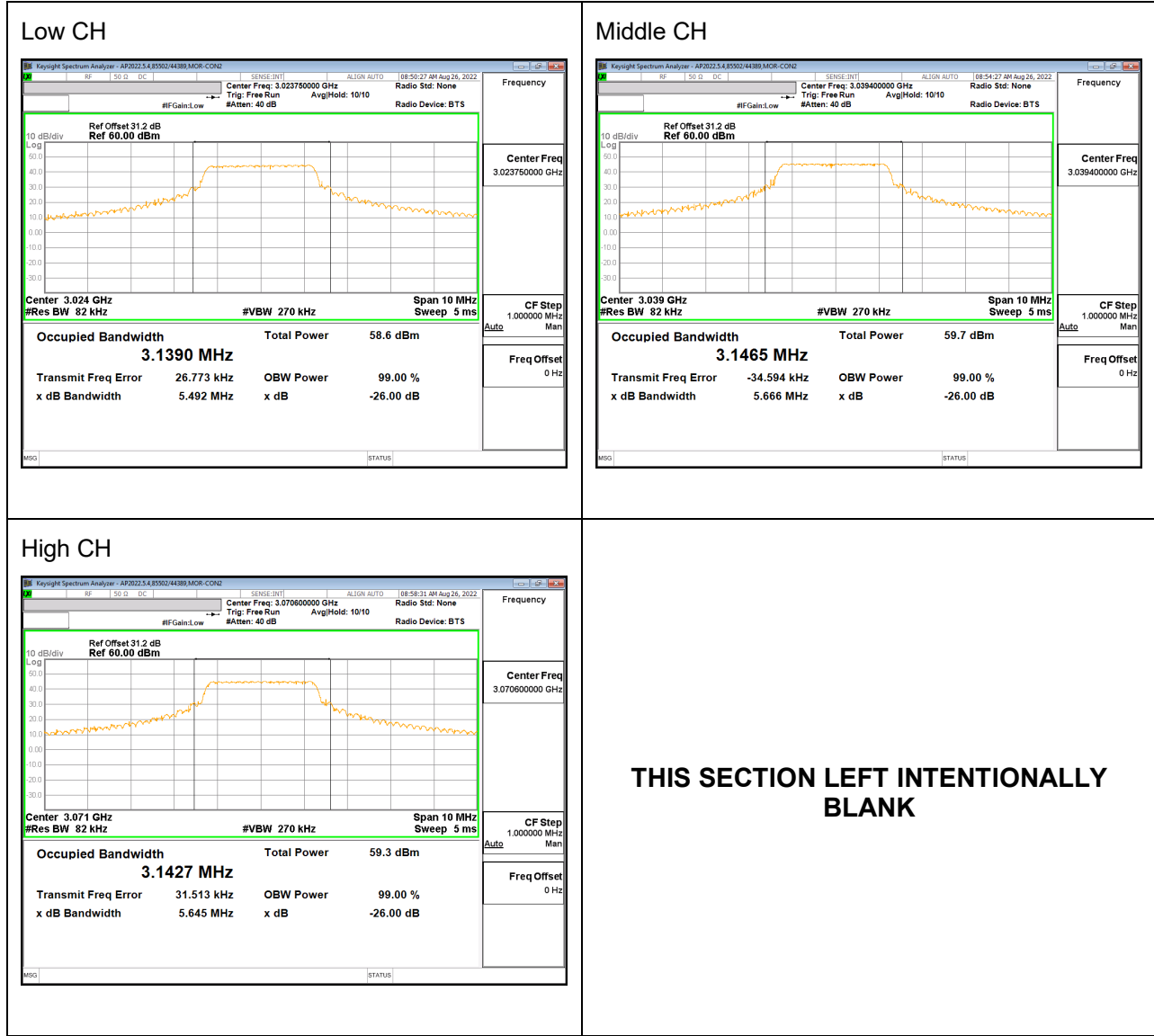


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**MODE 2**



**MODE 3**



## 8.2. BAND EDGE

### RULE PART(S)

§2.1051 Measurements required: Spurious emissions at antenna terminals. (At the band edges [3000 to 3100 MHz])

§90.210 Emission Mask

Mask of 90.210(b) is met as all emissions are below -13dBc as worst case limit.

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

### LIMITS

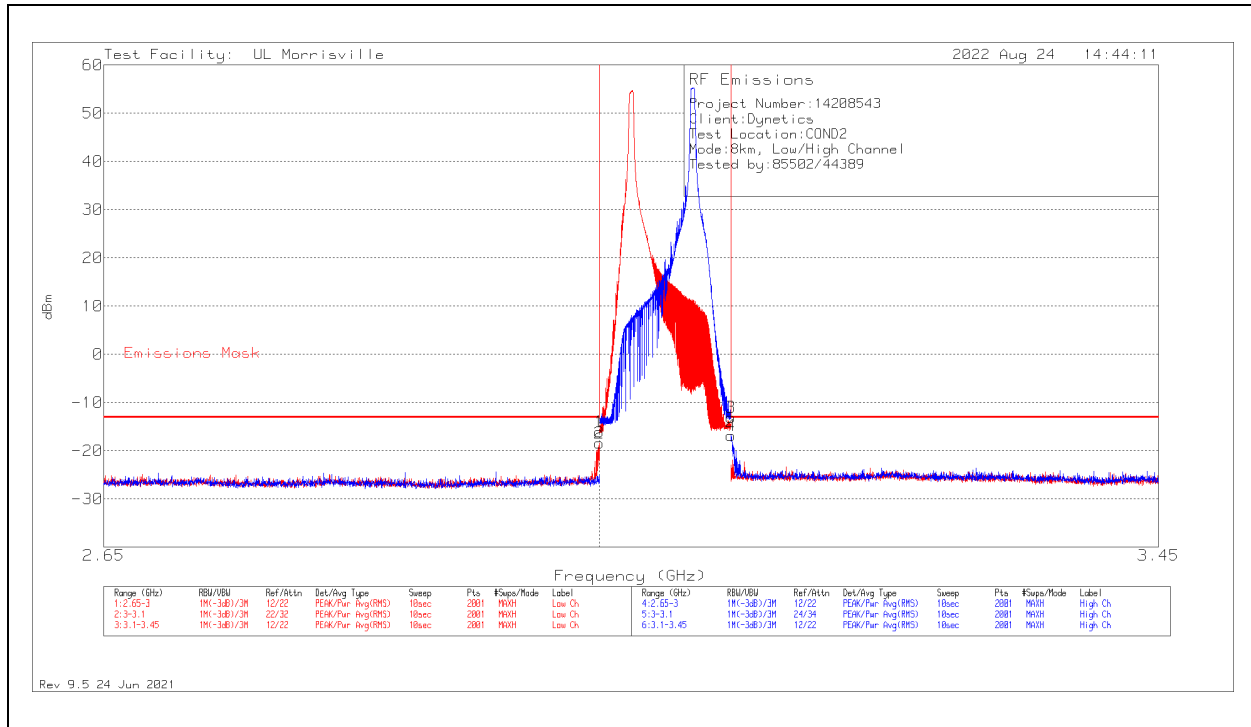
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB. (-13dBm)

### TEST PROCEDURE

The transmitter output was connected to the input of Spectrum Analyzer via calibrated coaxial cable and attenuator.

The output power was measured with the spectrum analyzer at the low and high channel for each mode.

**MODE 1**



**Trace Markers**

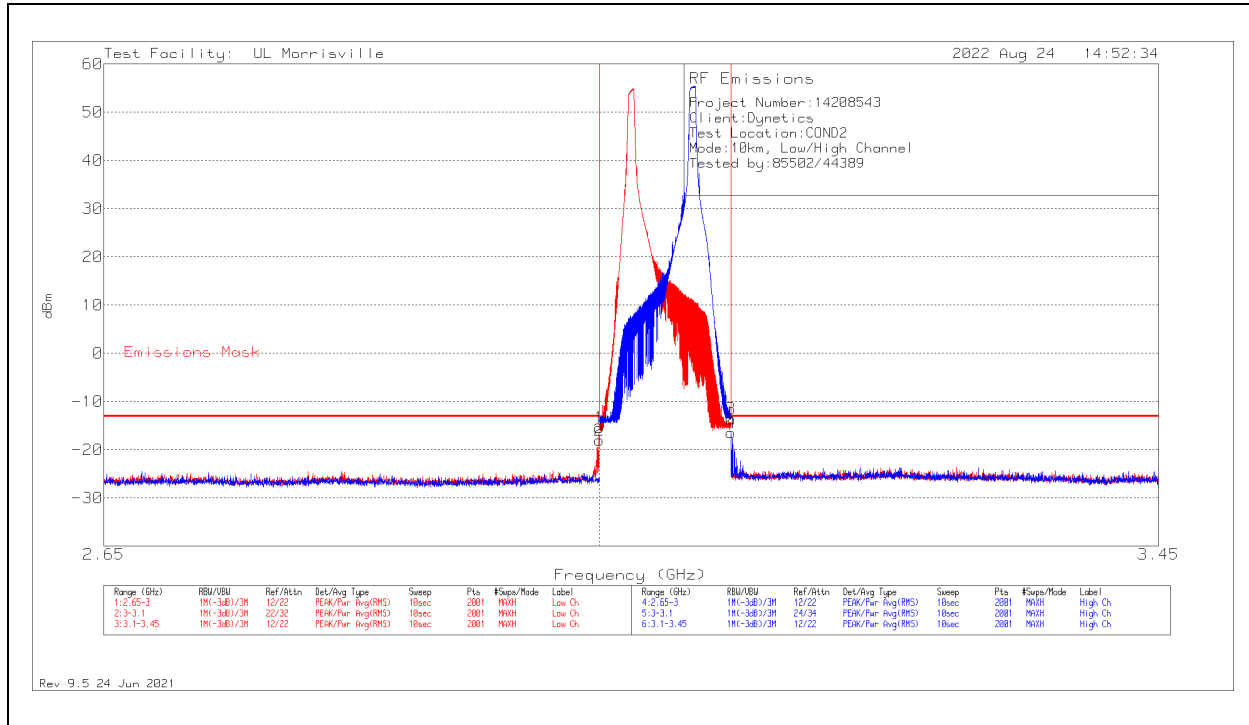
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	Emissions Mask	PK Margin (dB)
1	3	-48.23	Pk	.6	.6	31	-16.03	-13	-3.03
2	3	-50.58	Pk	.6	.6	31	-18.38	-13	-5.38
3	3.1	-45.37	Pk	.6	.6	31.1	-13.07	-13	-.07
4	3.1	-49.13	Pk	.6	.6	31.1	-16.83	-13	-3.83

Pk - Peak detector

**Note:**

Marker 1 and 2 are for low Bandedge.  
 Marker 3 and 4 are for high Bandedge.

**MODE 2**



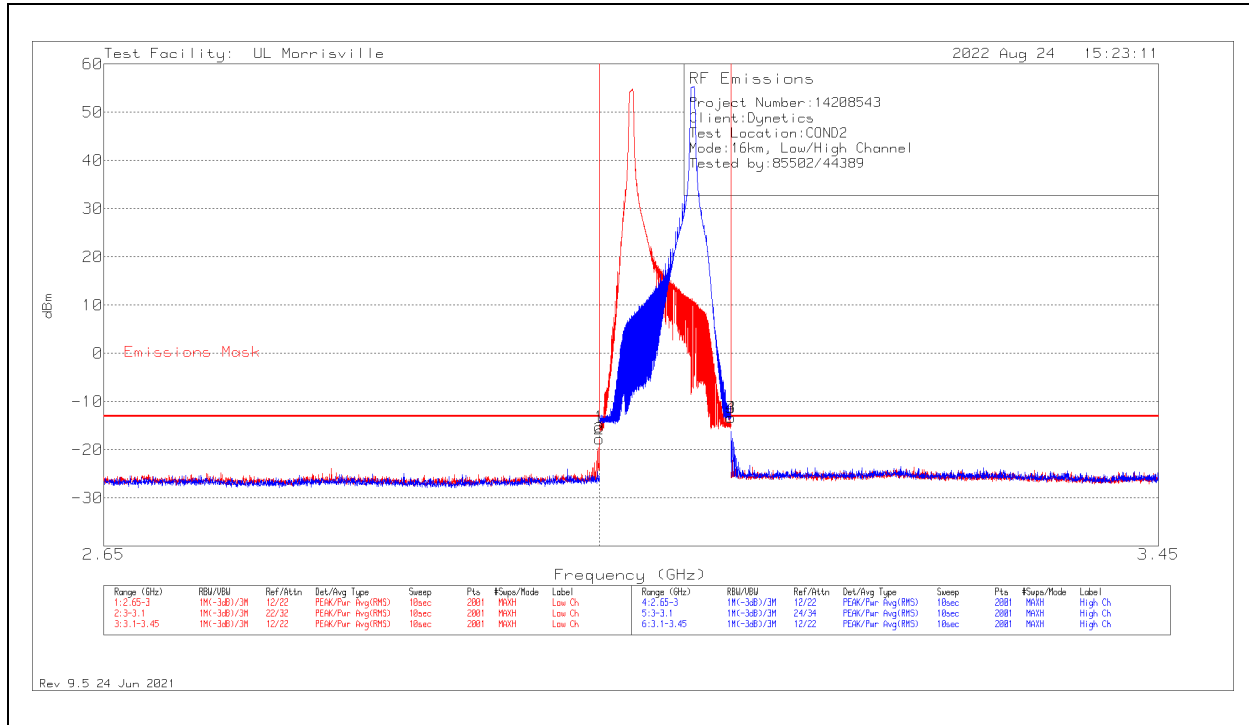
**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	Emissions Mask	PK Margin (dB)
1	3	-47.6	Pk	.6	.6	31	-15.4	-13	-2.4
2	3	-50.24	Pk	.6	.6	31	-18.04	-13	-5.04
3	3.1	-45.94	Pk	.6	.6	31.1	-13.64	-13	-.64
4	3.1	-48.69	Pk	.6	.6	31.1	-16.39	-13	-3.39

Pk - Peak detector

Note:  
 Marker 1 and 2 are for low Bandedge.  
 Marker 3 and 4 are for high Bandedge.

**MODE 3**



**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	Emissions Mask	PK Margin (dB)
1	3	-47.44	Pk	.6	.6	31	-15.24	-13	-2.24
2	3	-49.9	Pk	.6	.6	31	-17.7	-13	-4.7
3	3.1	-45.63	Pk	.6	.6	31.1	-13.33	-13	-33
4	3.1	-45.63	Pk	.6	.6	31.1	-13.33	-13	-33

Pk - Peak detector

Note:  
 Marker 1 and 2 are for low Bandedge.  
 Marker 3 and 4 are for high Bandedge.



### 8.3. OUT OF BAND EMISSIONS

#### RULE PART(S)

§2.1051 Measurements required: Spurious emissions at antenna terminals.

§2.1053 Measurements required: Field strength of spurious radiation.

§90.210 Emission Masks

Mask of 90.210(b) is met as all emissions are below -13dBc as worst-case limit.

#### LIMITS

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log (P)$  dB.

#### TEST PROCEDURE

For antenna port the RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For radiated emissions the radio output was terminated with artificial antenna (50Ohm Load). The measured electric field was converted to an EIRP value using the theoretical relationships given in section 5.2.7 of ANSI C63.26-2015 and is outlined below.

Know

$$(1) \text{ EIRP} = E - 95.2 \text{ (At a measurement distance of 3m.)}$$

Where

EIRP = equivalent isotropically radiated power in dBm

E = electric field in dBuV/m

$$(2) E = AF + V + G/L$$

Where

AF = antenna factor of receive antenna in dB/m.

V = receiver measured voltage in dBuV

G/L = gain-loss string between receive antenna and receiver

$$(3) V \text{ (dBuV)} = W \text{ (dBm)} + 107\text{dB}$$

Combine all the above and get the following:

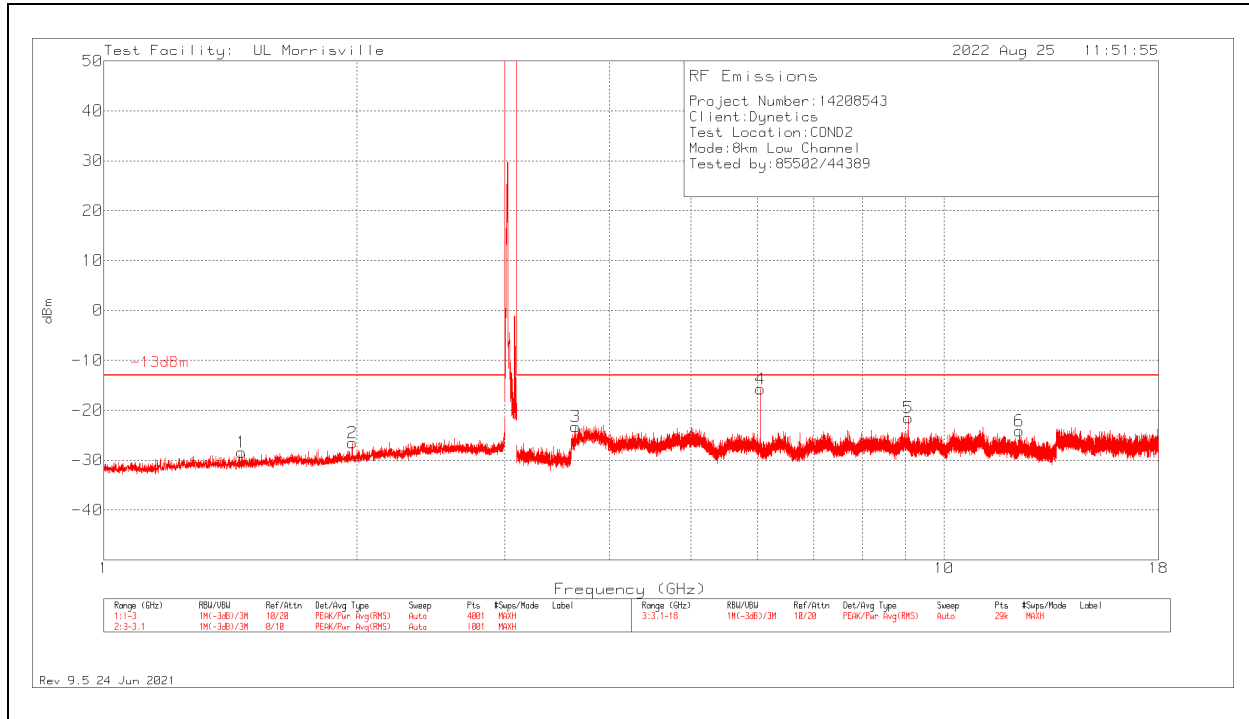
$$\text{EIRP} = (AF + V + G/L) - 95.2 = (AF + (W + 107) + G/L) - 95.2$$

$$\text{EIRP} = AF + V + G/L + 11.8$$

This EIRP value was then compared to the emissions limit of -13dBm.

### 8.3.1. ANTENNA PORT OUT OF BAND EMISSIONS

#### MODE 1 LOW CHANNEL 1GHz - 18GHz

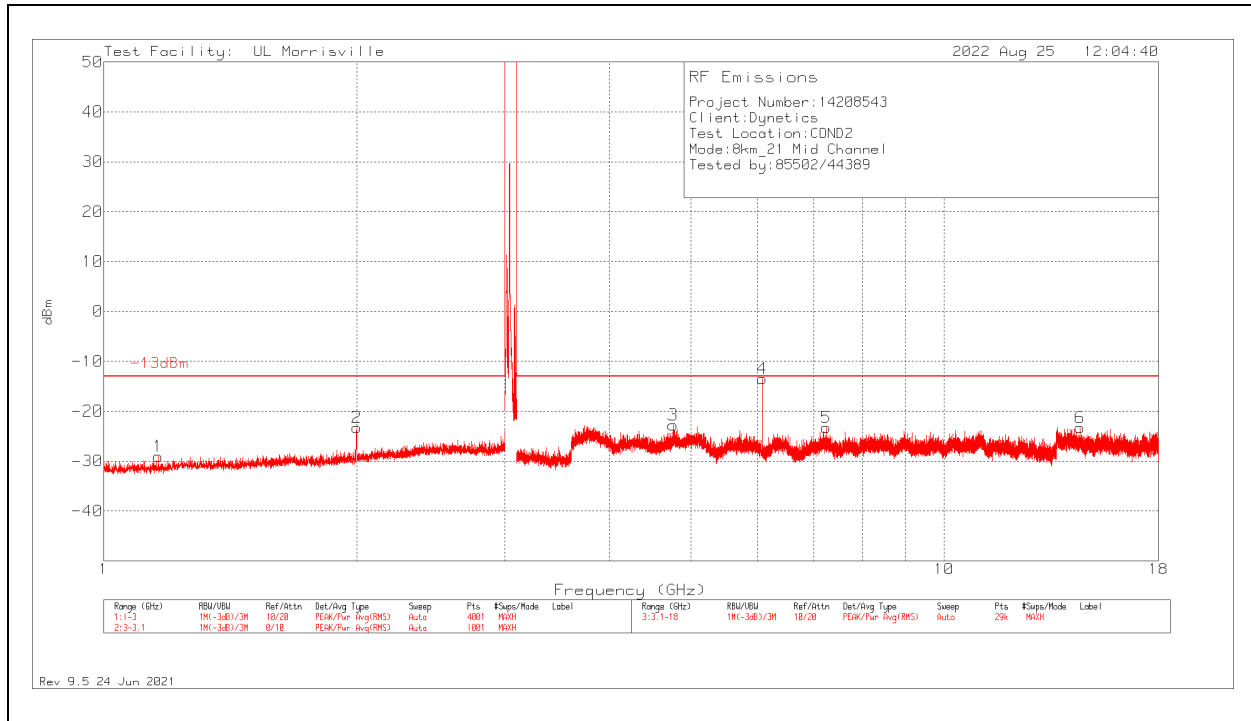


#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.46	-60.32	Pk	.6	.4	30.9	-28.42	-13	-15.42
2	1.9755	-58.44	Pk	.6	.4	30.9	-26.54	-13	-13.54
3	3.64308	-55.68	Pk	.6	.6	31.2	-23.28	-13	-10.28
4	6.04814	-48.67	Pk	.6	.9	31.4	-15.77	-13	-2.77
5	9.07439	-53.93	Pk	.6	1.2	30.6	-21.53	-13	-8.53
6	12.29792	-56.87	Pk	.6	1.2	30.9	-24.17	-13	-11.17

Pk - Peak detector

**MODE 1 MIDDLE CHANNEL 1GHz - 18GHz**

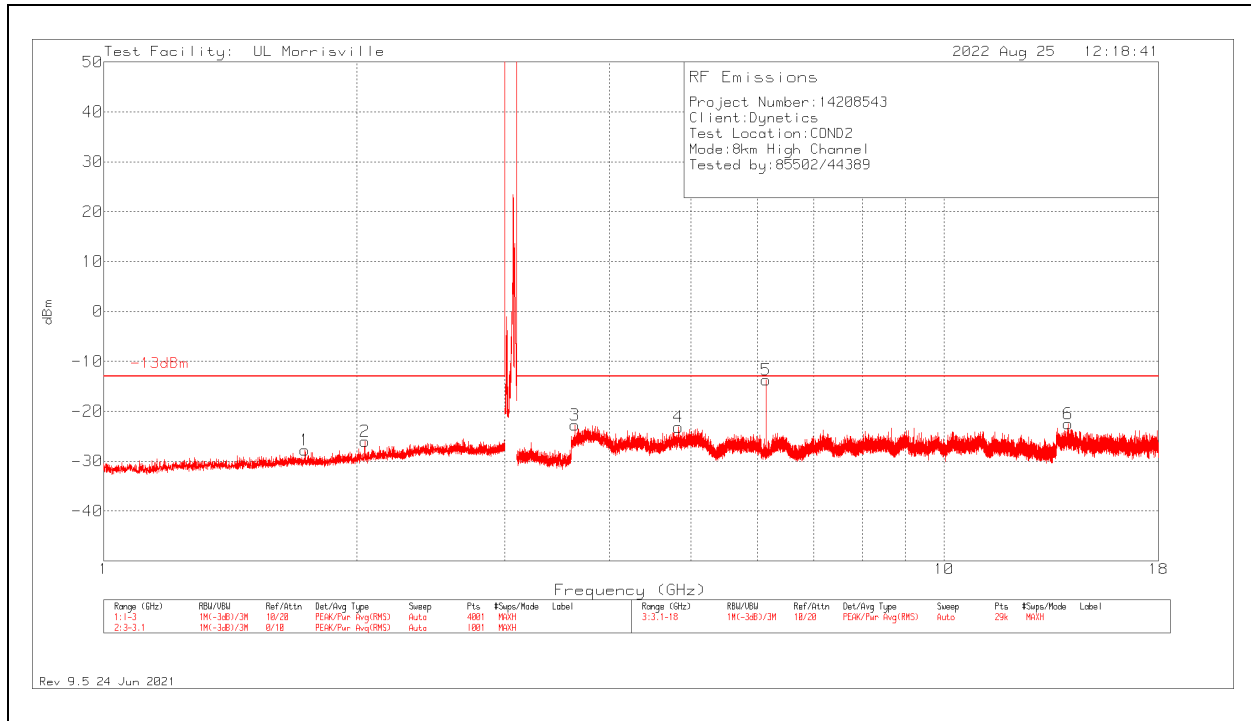


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.1605	-60.98	Pk	.6	.4	30.9	-29.08	-13	-16.08
2	1.9995	-55.41	Pk	.6	.4	31.1	-23.31	-13	-10.31
3	4.75955	-54.86	Pk	.6	.8	30.7	-22.76	-13	-9.76
4	6.08051	-45.76	Pk	.6	.9	30.8	-13.46	-13	-.46
5	7.24425	-55.92	Pk	.6	1.1	31	-23.22	-13	-10.22
6	14.51186	-55.69	Pk	.6	1.2	30.6	-23.29	-13	-10.29

Pk - Peak detector

**MODE 1 HIGH CHANNEL 1GHz - 18GHz**

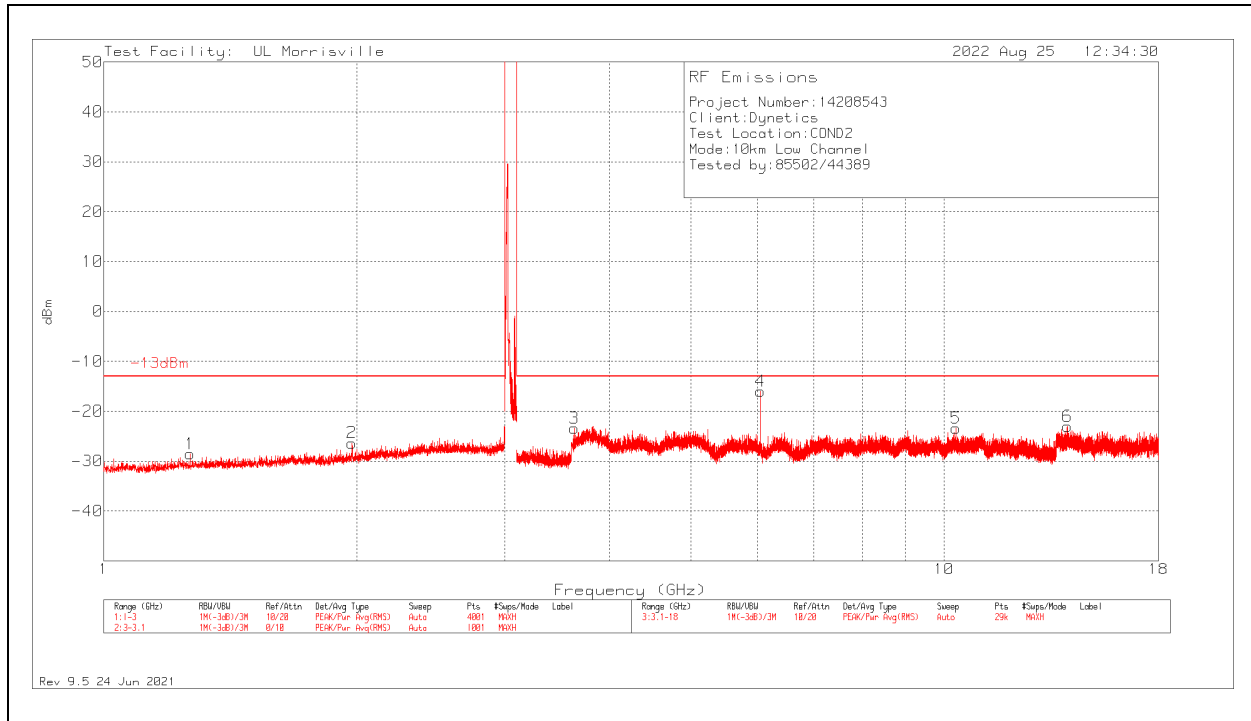


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.7345	-59.86	Pk	.6	.4	31.1	-27.76	-13	-14.76
2	2.045	-58.03	Pk	.6	.5	30.9	-26.03	-13	-13.03
3	3.63589	-55.22	Pk	.6	.6	31.3	-22.72	-13	-9.72
4	4.82583	-55.71	Pk	.6	.8	31.1	-23.21	-13	-10.21
5	6.14371	-45.98	Pk	.6	.9	30.8	-13.68	-13	-.68
6	14.0628	-54.92	Pk	.6	1.2	30.6	-22.52	-13	-9.52

Pk - Peak detector

**MODE 2 LOW CHANNEL 1GHz - 18GHz**

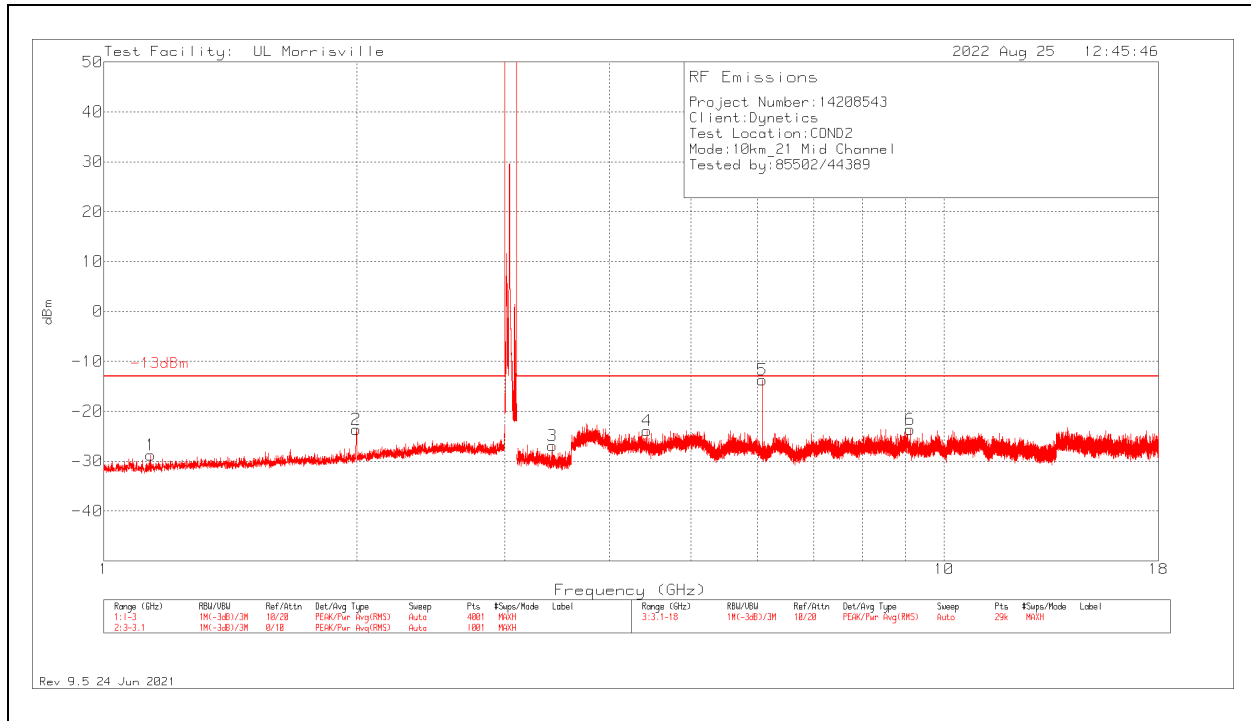


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.2675	-60.46	Pk	.6	.4	30.9	-28.56	-13	-15.56
2	1.975	-58.25	Pk	.6	.4	30.9	-26.35	-13	-13.35
3	3.63126	-55.81	Pk	.6	.6	31.2	-23.41	-13	-10.41
4	6.04917	-48.91	Pk	.6	.9	31.4	-16.01	-13	-3.01
5	10.32907	-55.75	Pk	.6	1.2	30.6	-23.35	-13	-10.35
6	14.02581	-56.25	Pk	.6	1.2	31.4	-23.05	-13	-10.05

Pk - Peak detector

**MODE 2 MIDDLE CHANNEL 1GHz - 18GHz**

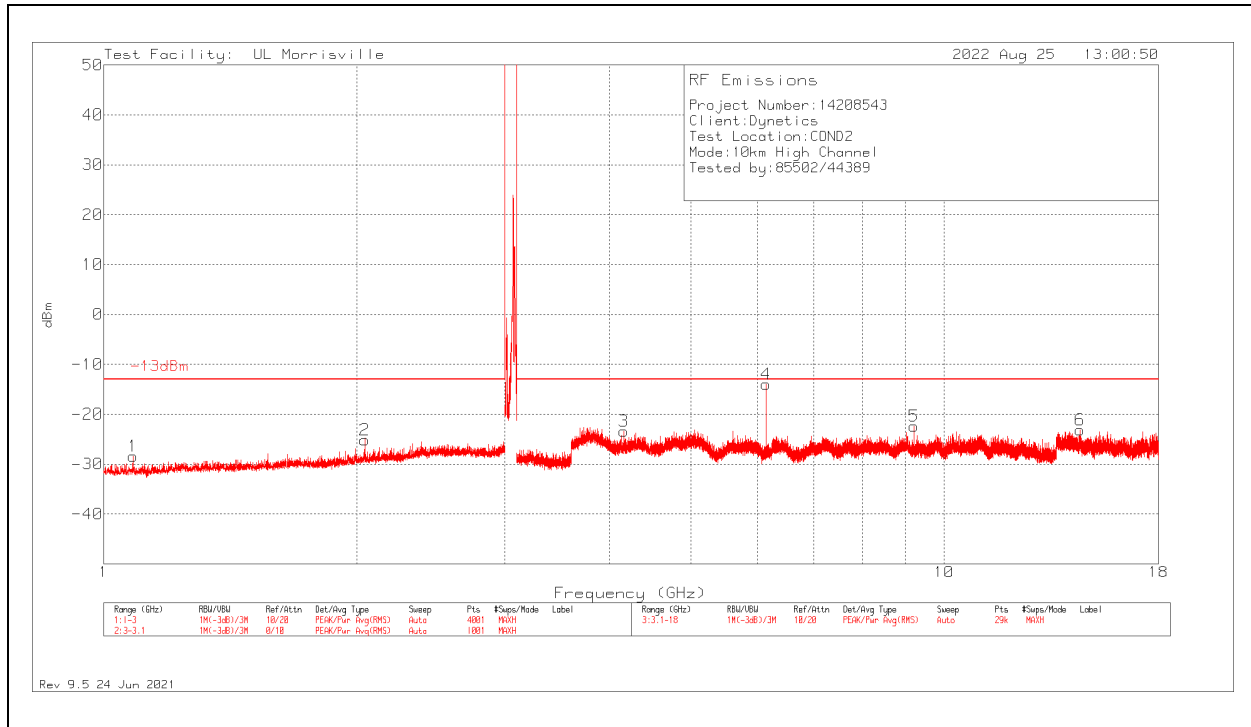


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.1365	-60.57	Pk	.6	.4	30.8	-28.77	-13	-15.77
2	1.9985	-55.7	Pk	.6	.4	31.1	-23.6	-13	-10.6
3	3.42009	-59.39	Pk	.6	.6	31.3	-26.89	-13	-13.89
4	4.4297	-56.06	Pk	.6	.7	30.8	-23.96	-13	-10.96
5	6.08	-46.06	Pk	.6	.9	30.8	-13.76	-13	-.76
6	9.11754	-56.18	Pk	.6	1.2	30.7	-23.68	-13	-10.68

Pk - Peak detector

**MODE 2 HIGH CHANNEL 1GHz - 18GHz**

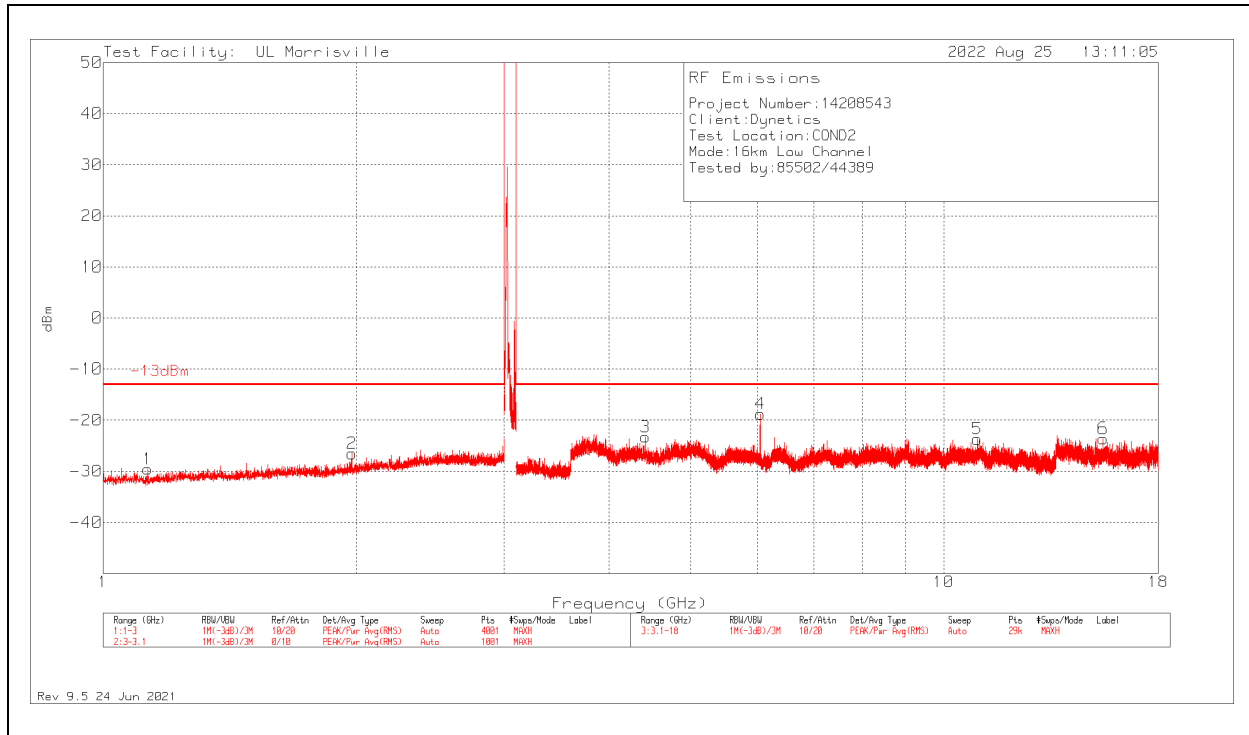


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.083	-60.4	Pk	.6	.3	31.1	-28.4	-13	-15.4
2	2.0445	-57.11	Pk	.6	.5	30.9	-25.11	-13	-12.11
3	4.16047	-56.04	Pk	.6	.7	31.3	-23.44	-13	-10.44
4	6.14371	-46.3	Pk	.6	.9	30.8	-14	-13	-1
5	9.20951	-55.21	Pk	.6	1.2	31	-22.41	-13	-9.41
6	14.5211	-55.93	Pk	.6	1.2	31	-23.13	-13	-10.13

Pk - Peak detector

**MODE 3 LOW CHANNEL 1GHz - 18GHz**



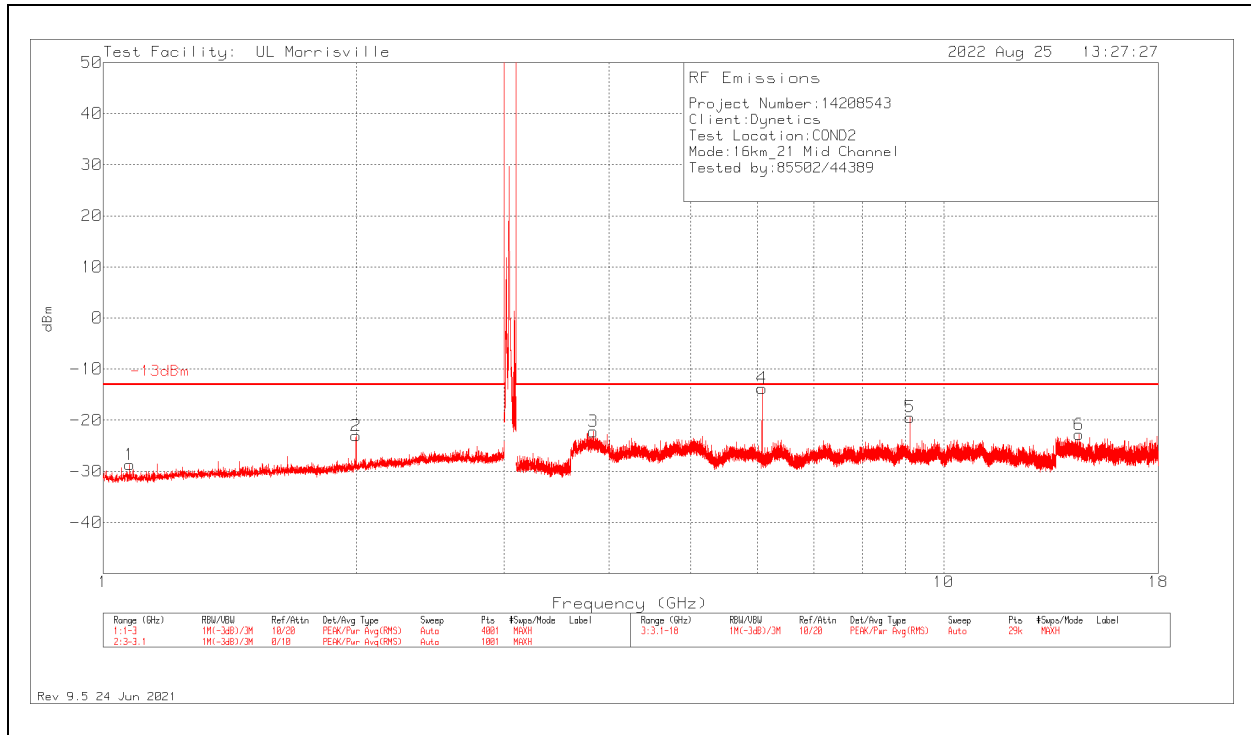
**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.1295	-61.29	Pk	.6	.3	30.8	-29.59	-13	-16.59
2	1.9755	-58.44	Pk	.6	.4	30.9	-26.54	-13	-13.54
3	4.41788	-55.72	Pk	.6	.7	31.1	-23.32	-13	-10.32
4	6.04866	-51.69	Pk	.6	.9	31.4	-18.79	-13	-5.79
5	10.96668	-56.41	Pk	.6	1.2	30.9	-23.71	-13	-10.71
6	15.4783	-56.23	Pk	.6	1.3	30.7	-23.63	-13	-10.63

Pk - Peak detector



**MODE 3 MIDDLE CHANNEL 1GHz - 18GHz**

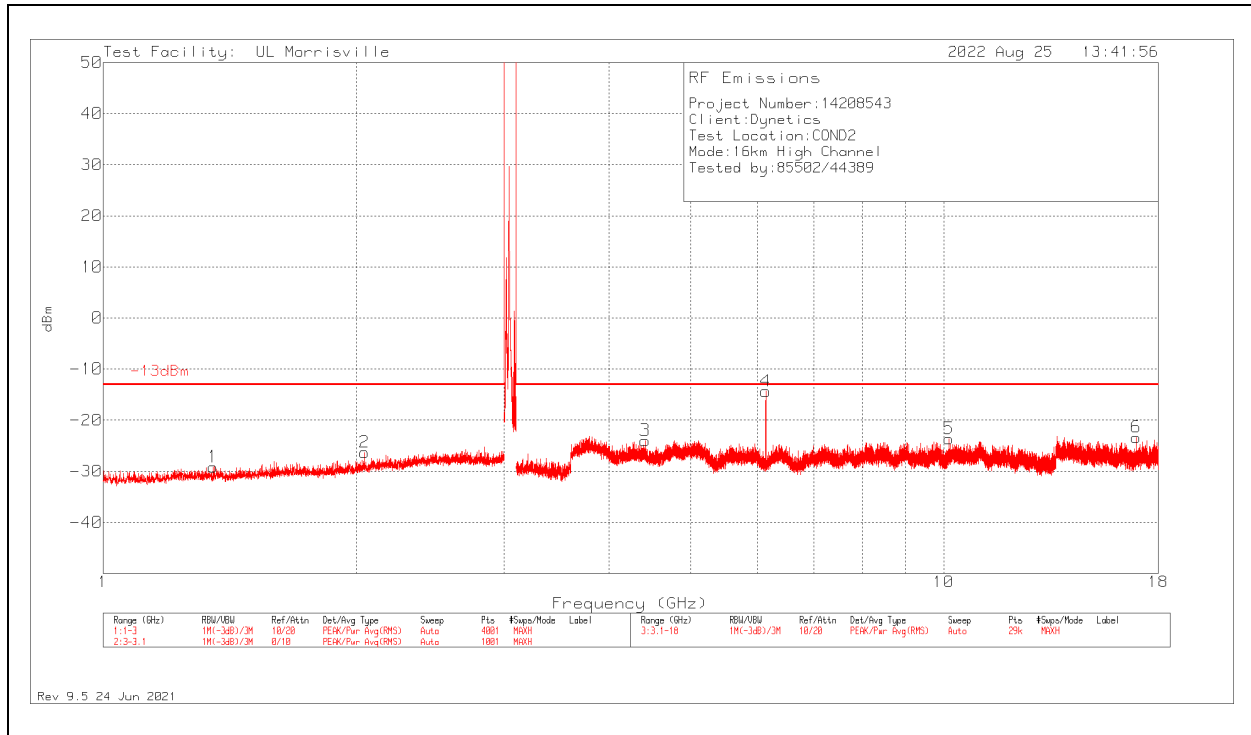


**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.0755	-60.73	Pk	.6	.3	31.1	-28.73	-13	-15.73
2	1.999	-55.16	Pk	.6	.4	31.1	-23.06	-13	-10.06
3	3.82907	-54.72	Pk	.6	.7	31.2	-22.22	-13	-9.22
4	6.07897	-46.06	Pk	.6	.9	30.8	-13.76	-13	-.76
5	9.12165	-51.92	Pk	.6	1.2	30.7	-19.42	-13	-6.42
6	14.48719	-55.1	Pk	.6	1.2	30.5	-22.8	-13	-9.8

Pk - Peak detector

**MODE 3 HIGH CHANNEL 1GHz - 18GHz**



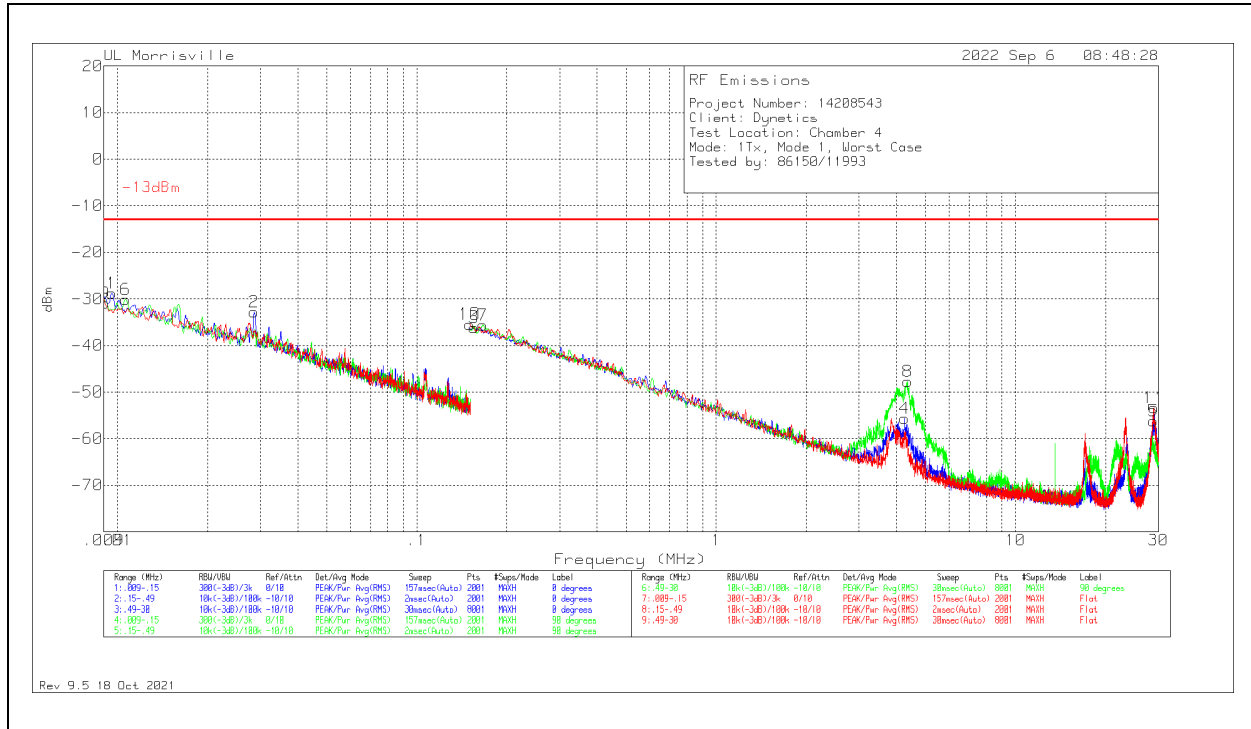
**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	Test Cable (dB)	Cable (dB)	Atten (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)
1	1.3515	-60.87	Pk	.6	.4	30.7	-29.17	-13	-16.17
2	2.046	-58.3	Pk	.6	.5	30.9	-26.3	-13	-13.3
3	4.41325	-56.49	Pk	.6	.7	31.2	-23.99	-13	-10.99
4	6.14165	-46.64	Pk	.6	.9	30.8	-14.34	-13	-1.34
5	10.14102	-55.82	Pk	.6	1.2	30.4	-23.62	-13	-10.62
6	16.94672	-55.35	Pk	.6	1.4	30	-23.35	-13	-10.35

Pk - Peak detector

### 8.3.2. RADIATED ENCLOSURE PORT OUT OF BAND EMISSIONS

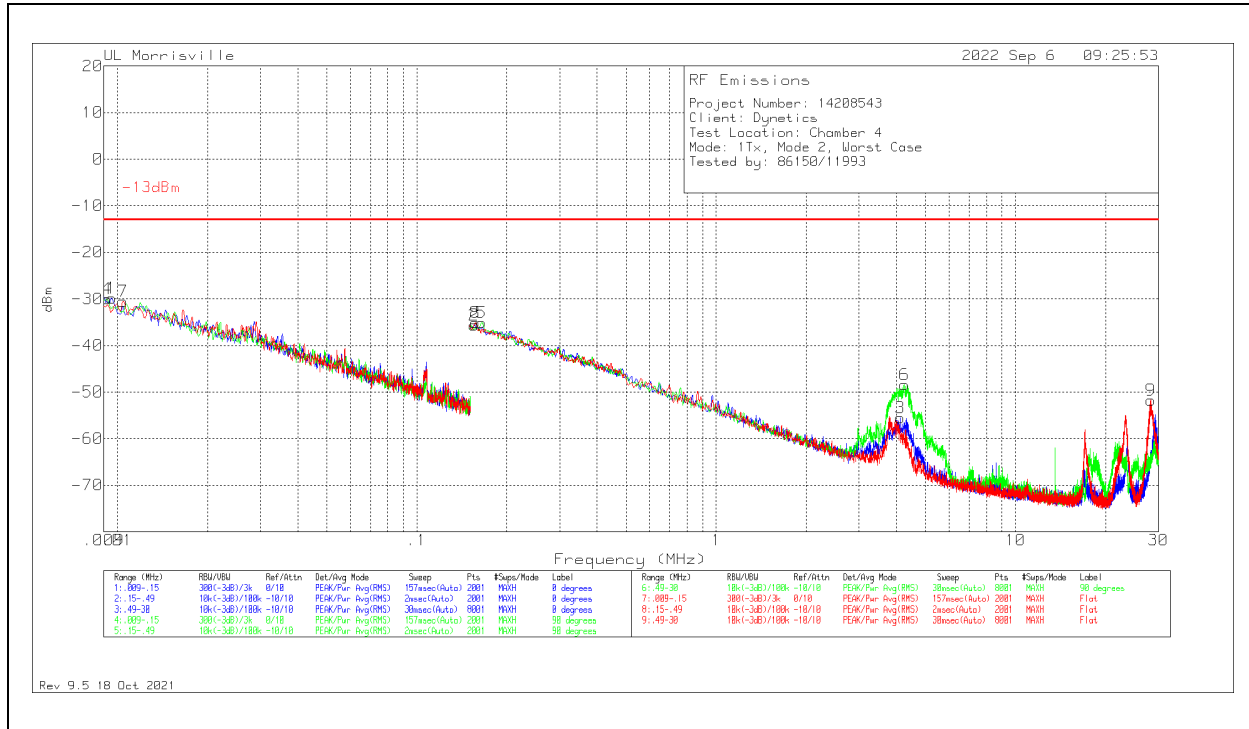
#### MODE 1 WORST-CASE <30MHz



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0059 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
9	.00907	-62.65	Pk	19.9	0	11.8	-30.95	-13	-17.95	0-360	400	Flat
1	.00957	-59.97	Pk	19.4	0	11.8	-28.77	-13	-15.77	0-360	400	0 degs
6	.01063	-60.51	Pk	18.6	0	11.8	-30.11	-13	-17.11	0-360	400	90 degs
2	.02867	-57.95	Pk	13.4	0	11.8	-32.75	-13	-19.75	0-360	400	0 degs
10	.15	-57.63	Pk	10.3	.1	11.8	-35.43	-13	-22.43	0-360	400	Flat
3	.15544	-58.2	Pk	10.2	.1	11.8	-36.1	-13	-23.1	0-360	400	0 degs
7	.16641	-57.69	Pk	10.2	.1	11.8	-35.59	-13	-22.59	0-360	400	90 degs
4	4.26385	-78.4	Pk	10.5	.4	11.8	-55.7	-13	-42.7	0-360	400	0 degs
8	4.35976	-70.44	Pk	10.5	.4	11.8	-47.74	-13	-34.74	0-360	400	90 degs
5	28.85103	-77.26	Pk	8.2	1.1	11.8	-56.16	-13	-43.16	0-360	400	0 degs
11	28.94326	-74.45	Pk	8.2	1.1	11.8	-53.35	-13	-40.35	0-360	400	Flat

PK - Peak detector

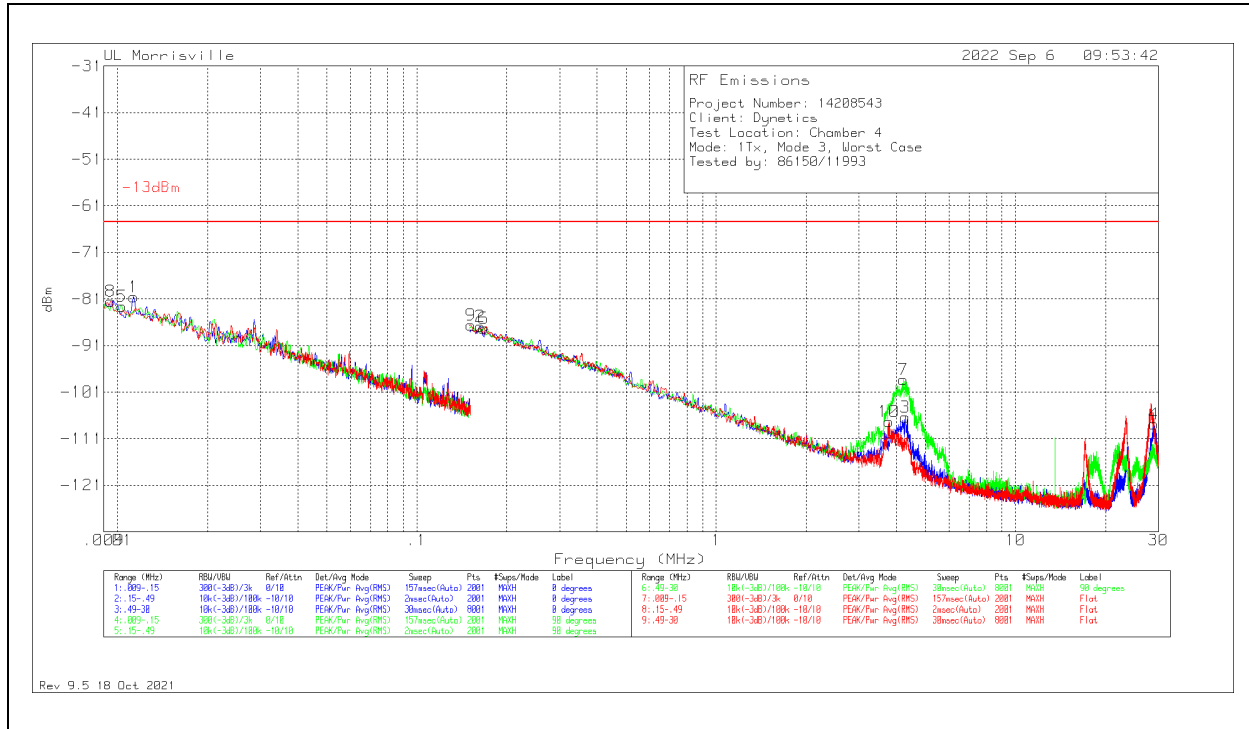
**MODE 2 WORST-CASE <30MHz**



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0059 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
4	.00921	-61.6	Pk	19.8	0	11.8	-30	-13	-17	0-360	400	90 degs
1	.00957	-61.06	Pk	19.4	0	11.8	-29.86	-13	-16.86	0-360	400	0 degs
7	.01042	-60.96	Pk	18.7	0	11.8	-30.46	-13	-17.46	0-360	400	Flat
2	.15561	-57.68	Pk	10.2	.1	11.8	-35.58	-13	-22.58	0-360	400	0 degs
8	.15672	-57.23	Pk	10.2	.1	11.8	-35.13	-13	-22.13	0-360	400	Flat
5	.16471	-57.18	Pk	10.2	.1	11.8	-35.08	-13	-22.08	0-360	400	90 degs
3	4.11629	-78.28	Pk	10.5	.4	11.8	-55.58	-13	-42.58	0-360	400	0 degs
6	4.25647	-71.14	Pk	10.5	.4	11.8	-48.44	-13	-35.44	0-360	400	90 degs
9	28.2571	-72.94	Pk	8.4	1	11.8	-51.74	-13	-38.74	0-360	400	Flat

Pk - Peak detector

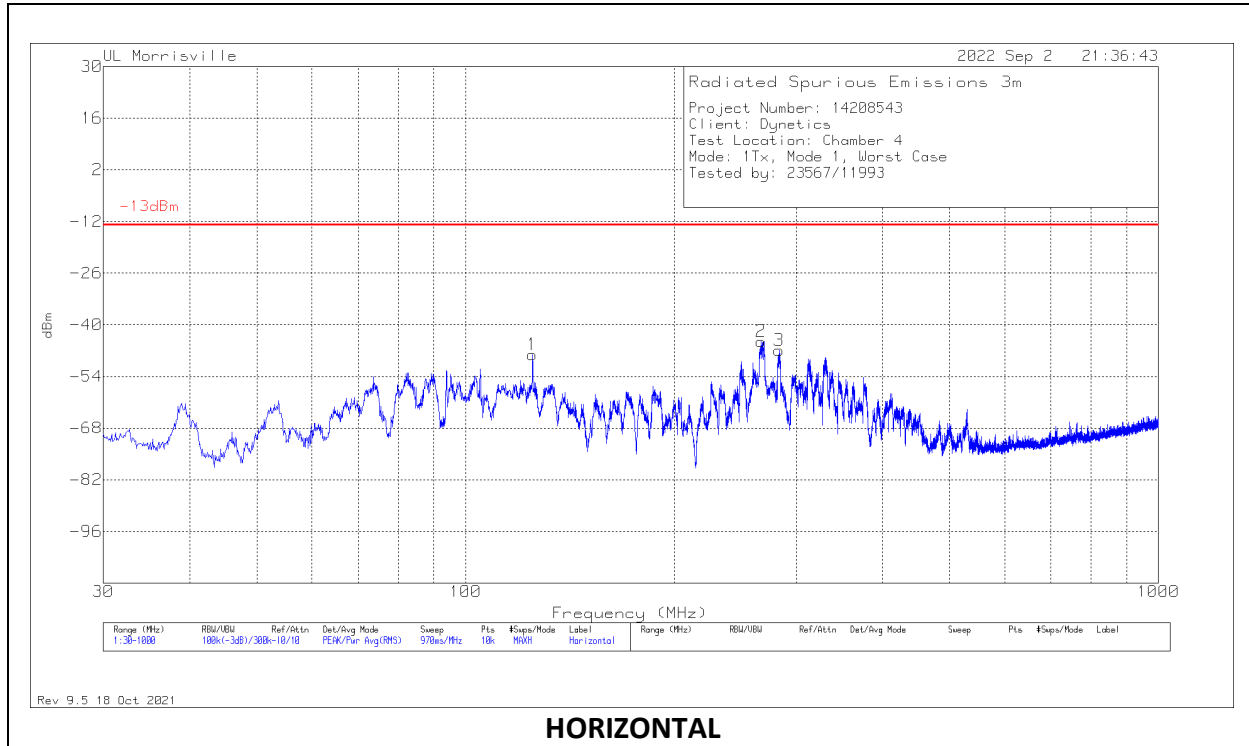
**MODE 3 WORST-CASE <30MHz**



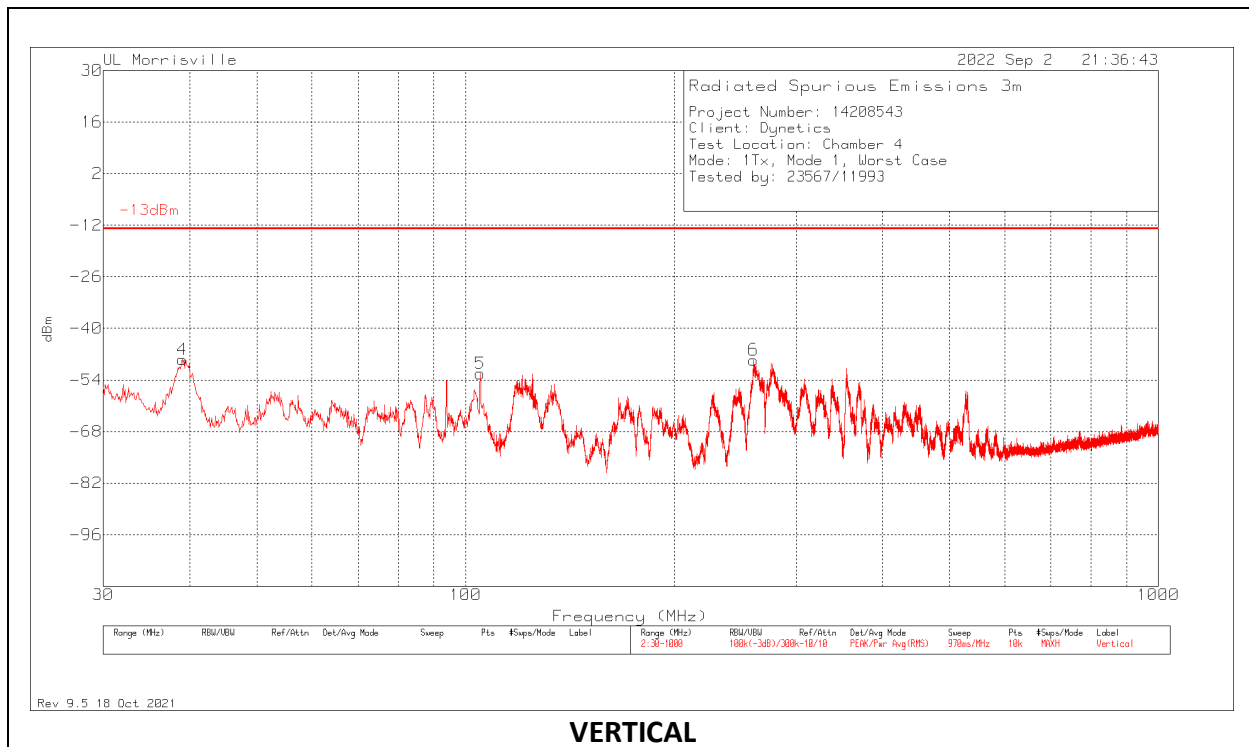
Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0059 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
8	.0095	-61.32	Pk	-32	0	11.8	-81.52	-64.5	-17.02	0-360	400	Flat
5	.01035	-61.56	Pk	-32.8	0	11.8	-82.56	-64.5	-18.06	0-360	400	90 degs
1	.01134	-59.16	Pk	-33.2	0	11.8	-80.56	-64.5	-16.06	0-360	400	0 degs
9	.15136	-57.18	Pk	-41.3	.1	11.8	-86.58	-64.5	-22.08	0-360	400	Flat
2	.16267	-57.54	Pk	-41.3	.1	11.8	-86.94	-64.5	-22.44	0-360	400	0 degs
6	.16734	-57.84	Pk	-41.3	.1	11.8	-87.24	-64.5	-22.74	0-360	400	90 degs
10	3.78059	-78.59	Pk	-41	.4	11.8	-107.39	-64.5	-42.89	0-360	400	Flat
7	4.21958	-69.49	Pk	-41	.4	11.8	-98.29	-64.5	-33.79	0-360	400	90 degs
3	4.2786	-77.54	Pk	-41	.4	11.8	-106.34	-64.5	-41.84	0-360	400	0 degs
4	28.95432	-77.52	Pk	-43.3	1.1	11.8	-107.92	-64.5	-43.42	0-360	400	0 degs

Pk - Peak detector

**MODE 1 WORST-CASE 30-1000 MHz**



**HORIZONTAL**

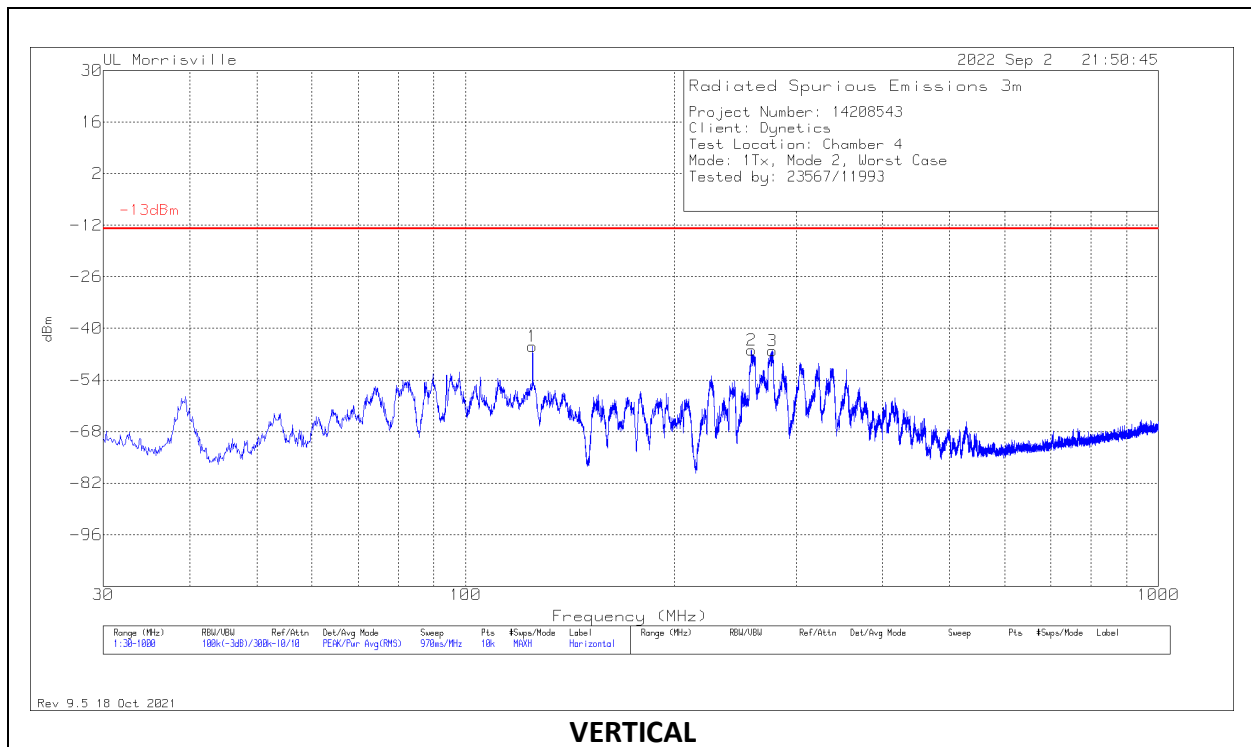
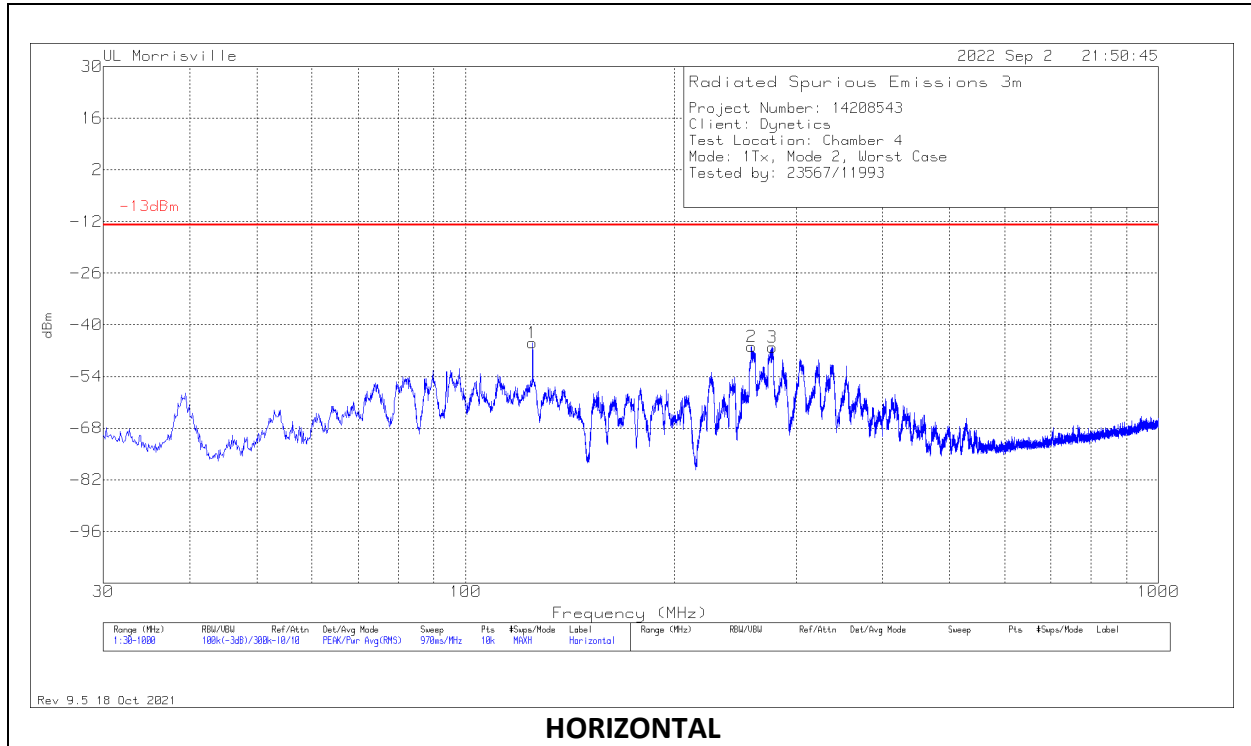


**VERTICAL**

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0081 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	39.021	-47.29	Pk	20.7	-31.7	.1	9.7	-48.49	-13	-35.49	0-360	100	V
5	105.078	-49.26	Pk	17.8	-30.7	.2	9.7	-52.26	-13	-39.26	0-360	100	V
1	124.963	-47.79	Pk	20.2	-30.4	.2	9.7	-48.09	-13	-35.09	0-360	300	H
6	260.375	-47.78	Pk	18.5	-29.3	.3	9.7	-48.58	-13	-35.58	0-360	100	V
2	266.971	-44.49	Pk	19.3	-29.3	.3	9.7	-44.49	-13	-31.49	0-360	100	H
3	283.461	-47.5	Pk	19.8	-29.2	.3	9.7	-46.9	-13	-33.9	0-360	100	H

Pk - Peak detector

**MODE 2 WORST-CASE 30-1000 MHz**

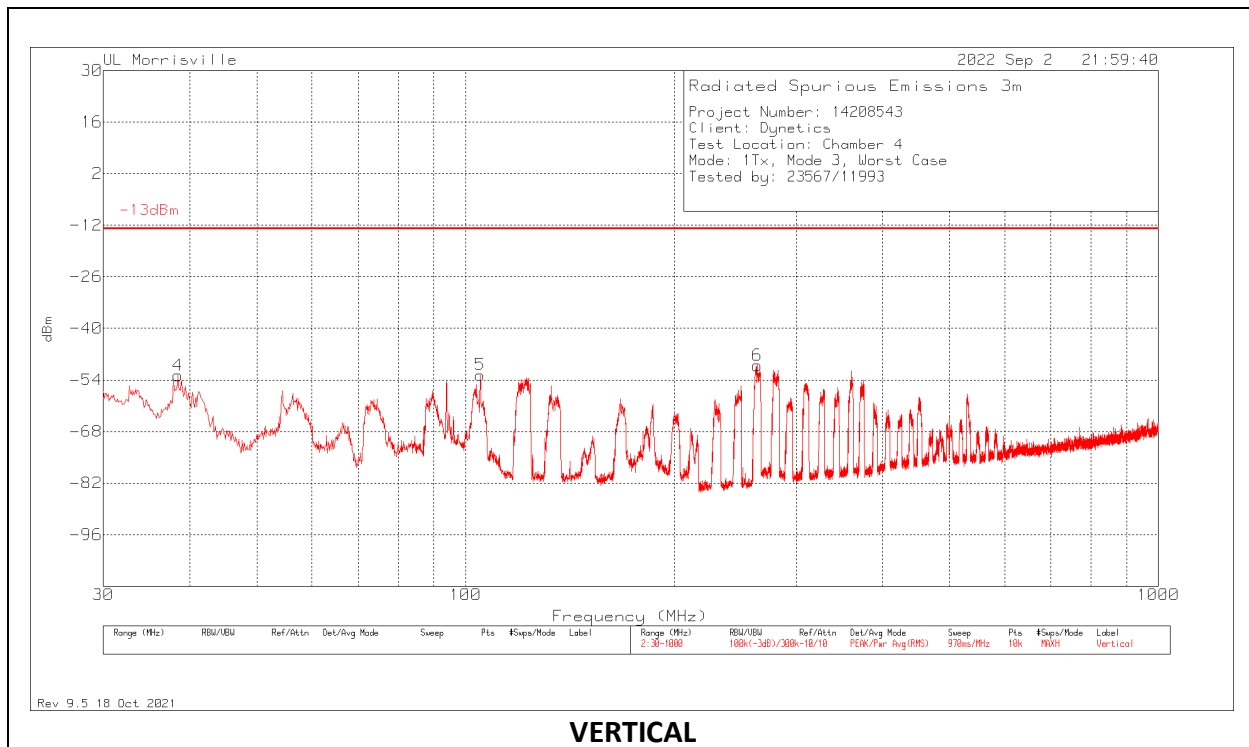
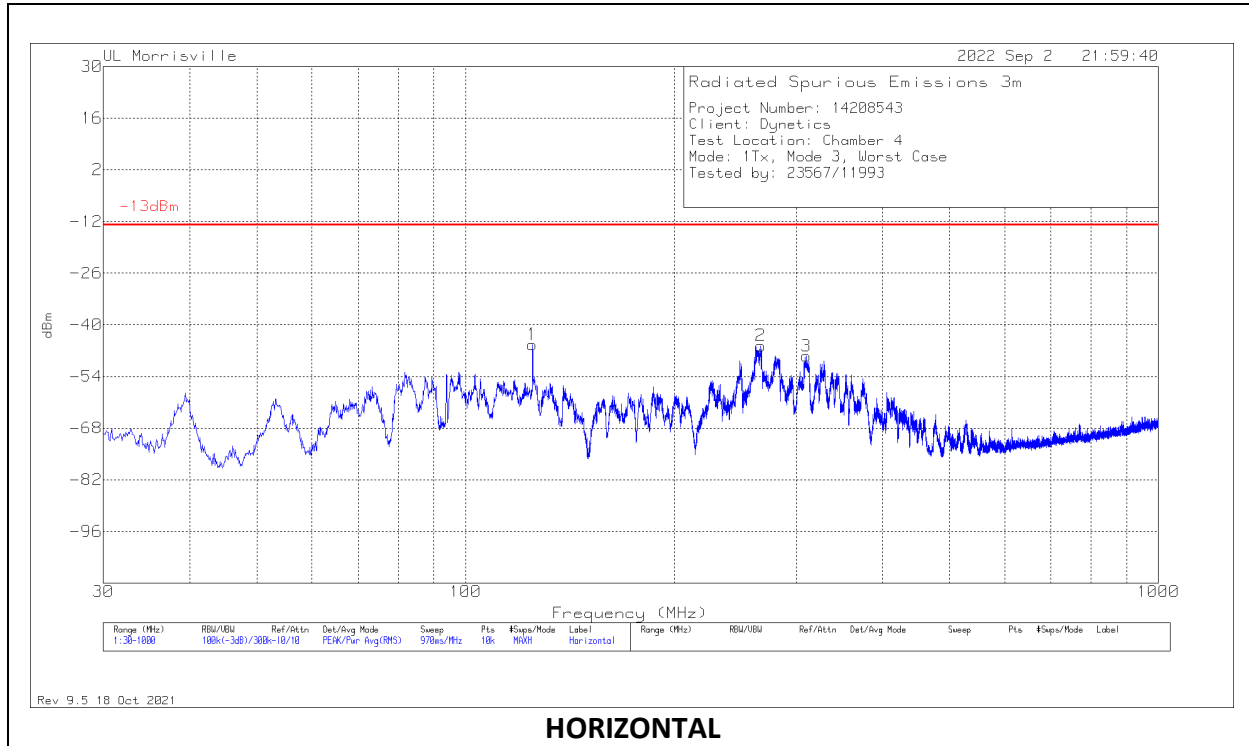




Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0081 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	39.312	-47.33	Pk	20.5	-31.7	.1	9.7	-48.73	-13	-35.73	0-360	100	V
1	124.963	-44.61	Pk	20.2	-30.4	.2	9.7	-44.91	-13	-31.91	0-360	200	H
5	124.963	-48.38	Pk	20.2	-30.4	.2	9.7	-48.68	-13	-35.68	0-360	100	V
2	258.92	-45	Pk	18.3	-29.2	.3	9.7	-45.9	-13	-32.9	0-360	100	H
6	260.666	-49.39	Pk	18.6	-29.3	.3	9.7	-50.09	-13	-37.09	0-360	100	V
3	277.253	-46.71	Pk	19.8	-29.2	.3	9.7	-46.11	-13	-33.11	0-360	100	H

Pk - Peak detector

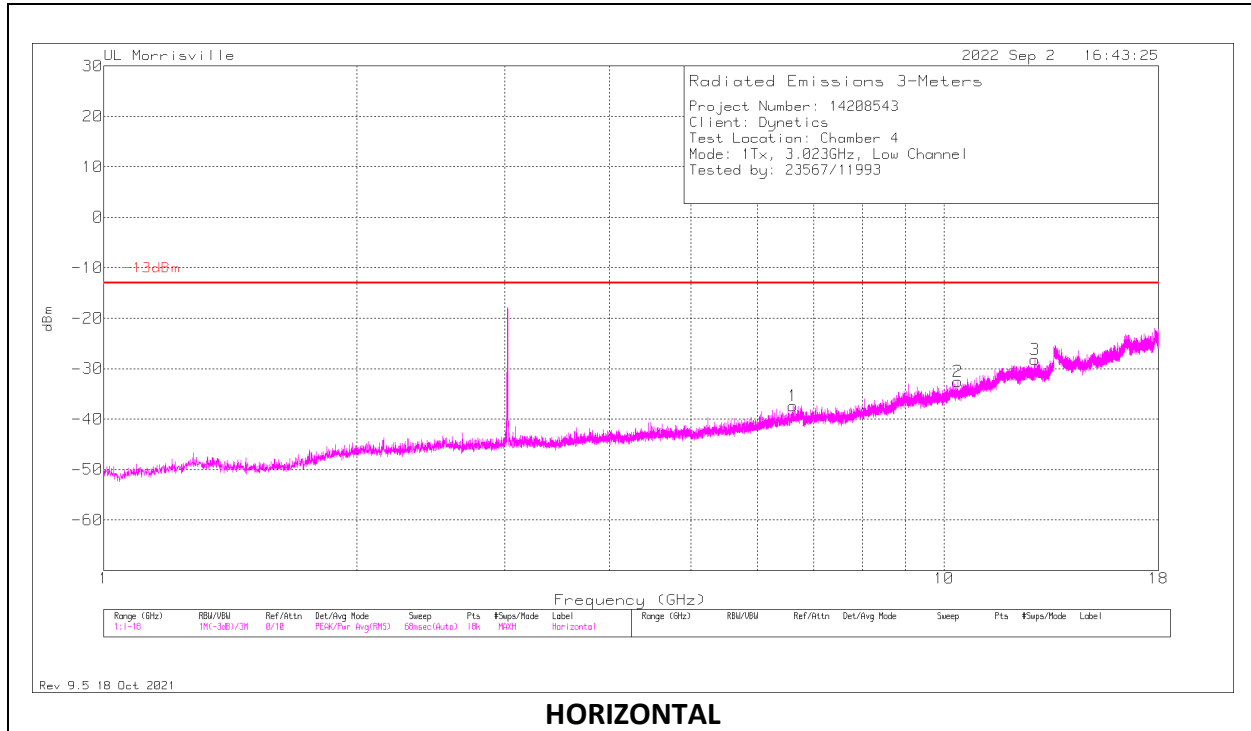
**MODE 3 WORST-CASE 30-1000 MHz**



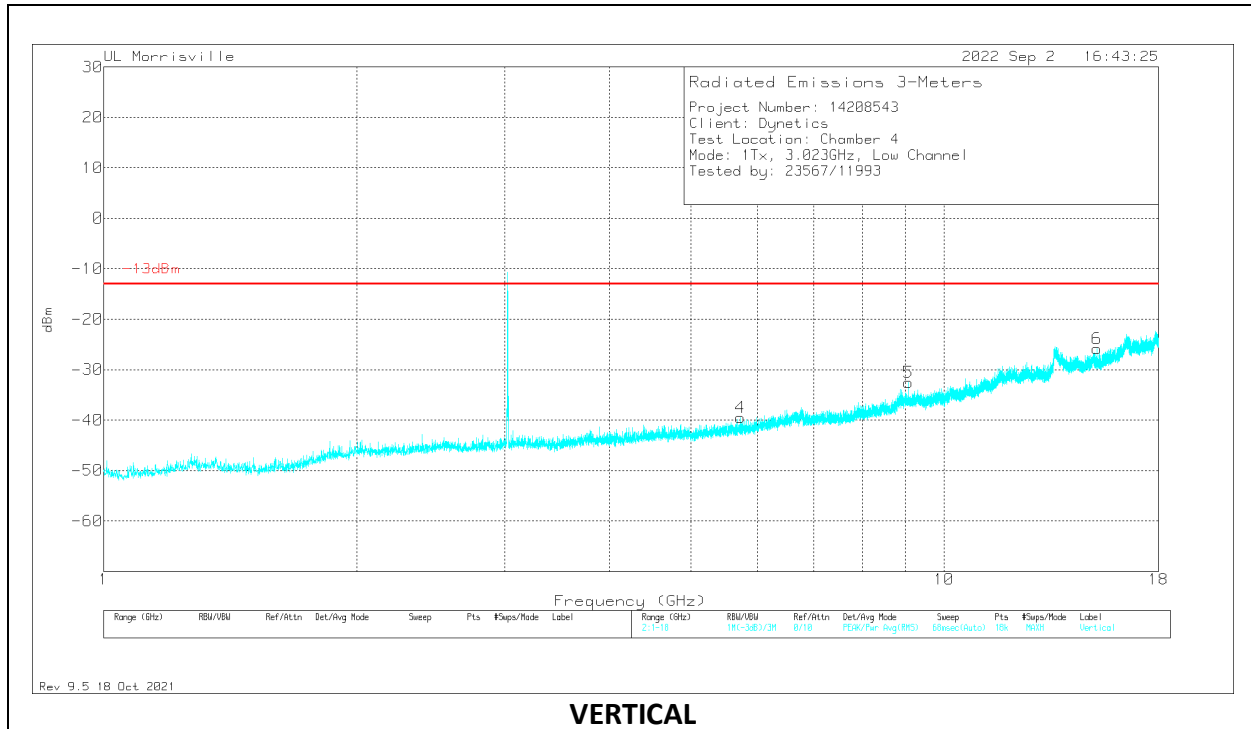
Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0081 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	38.439	-51.98	Pk	21.1	-31.7	.1	9.7	-52.78	-13	-39.78	0-360	100	V
5	105.0295	-49.65	Pk	17.8	-30.7	.2	9.7	-52.65	-13	-39.65	0-360	100	V
1	124.963	-45.06	Pk	20.2	-30.4	.2	9.7	-45.36	-13	-32.36	0-360	100	H
6	263.673	-49.67	Pk	19	-29.4	.3	9.7	-50.07	-13	-37.07	0-360	100	V
2	266.777	-45.56	Pk	19.3	-29.4	.3	9.7	-45.66	-13	-32.66	0-360	100	H
3	310.524	-49.48	Pk	20.2	-29.2	.3	9.7	-48.48	-13	-35.48	0-360	100	H

Pk - Peak detector

**MODE 1 LOW CHANNEL 1-18GHz**



**HORIZONTAL**

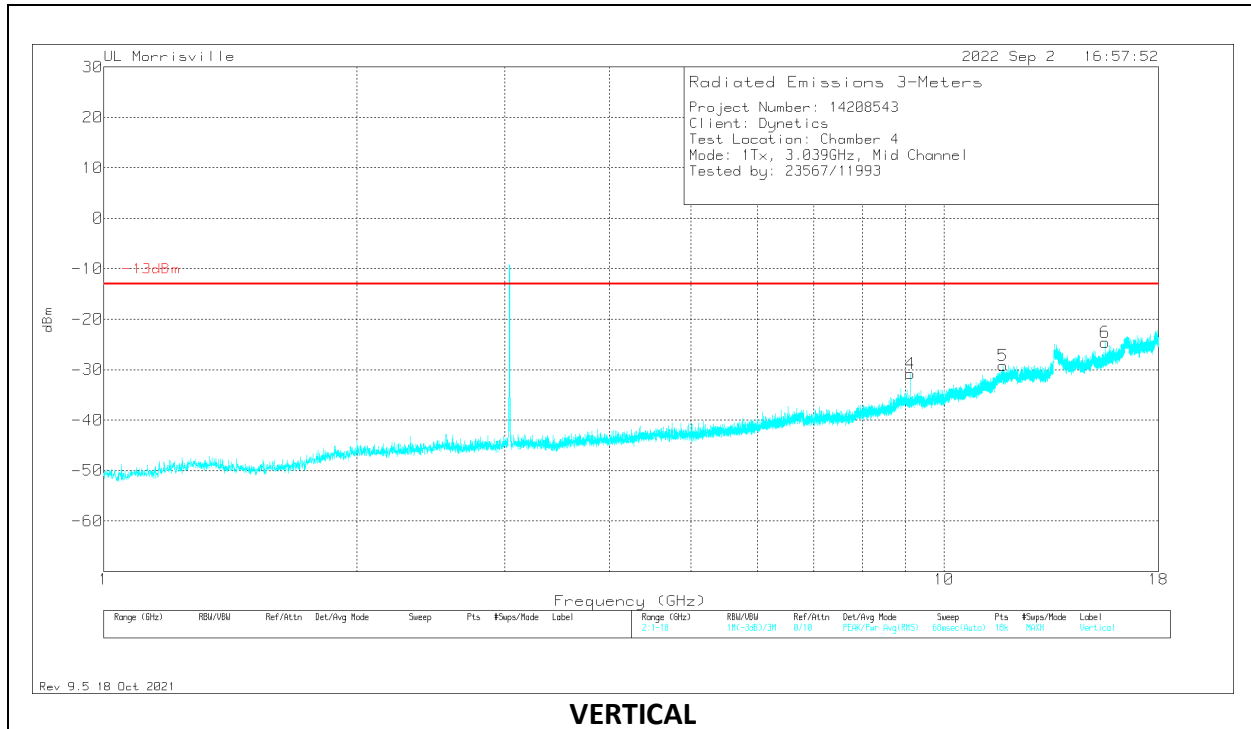
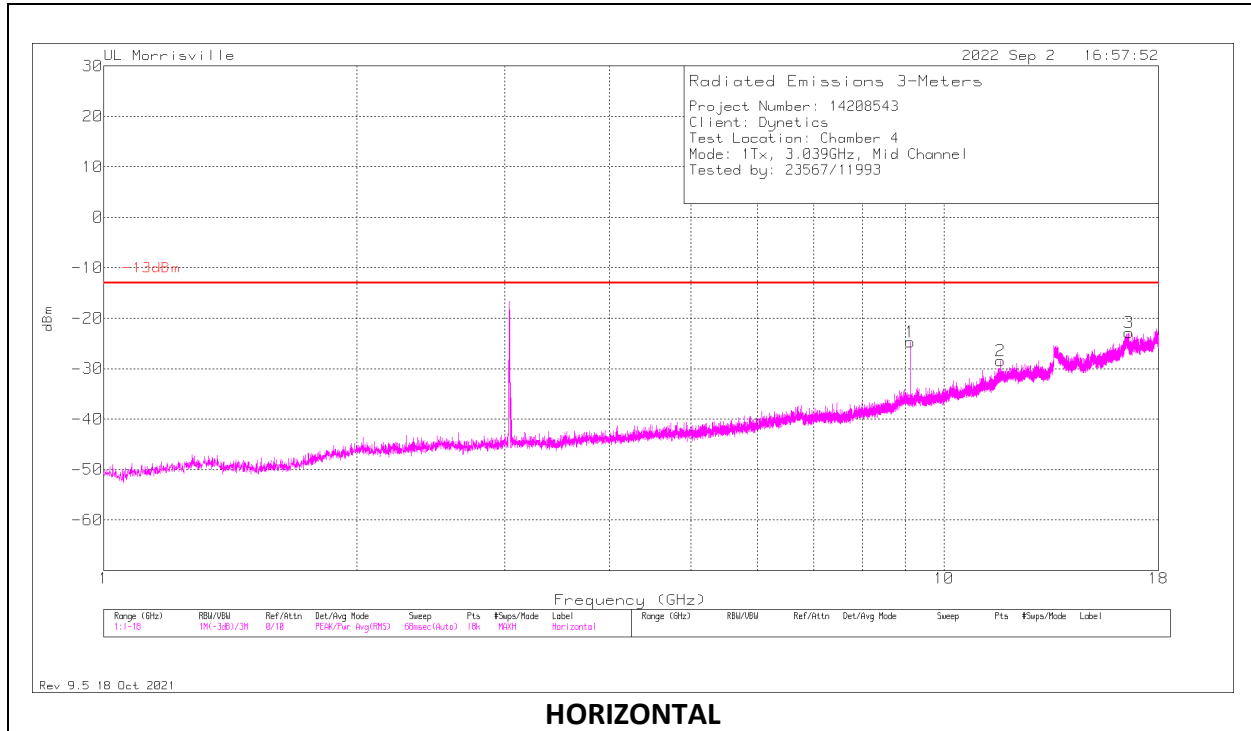


**VERTICAL**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	5.72883	-64.97	Pk	34.8	-21.1	11.8	-39.47	-13	-26.47	0-360	200	V
1	6.60811	-65.35	Pk	35.5	-19.3	11.8	-37.35	-13	-24.35	0-360	200	H
5	9.07216	-64.08	Pk	36.1	-16.4	11.8	-32.58	-13	-19.58	0-360	100	V
2	10.38872	-65.37	Pk	37.5	-16.5	11.8	-32.57	-13	-19.57	0-360	200	H
3	12.82916	-65.71	Pk	39.1	-13.4	11.8	-28.21	-13	-15.21	0-360	300	H
6	15.22238	-65.77	Pk	40.1	-12	11.8	-25.87	-13	-12.87	0-360	200	V

Pk - Peak detector

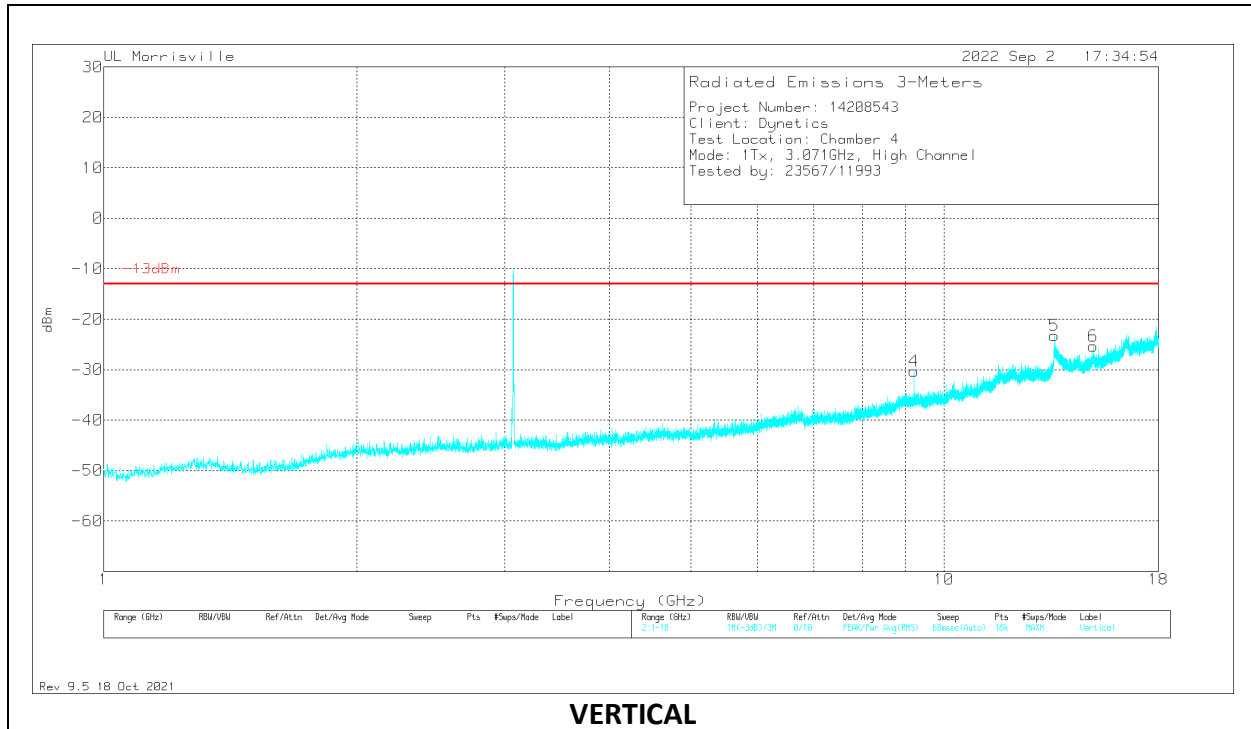
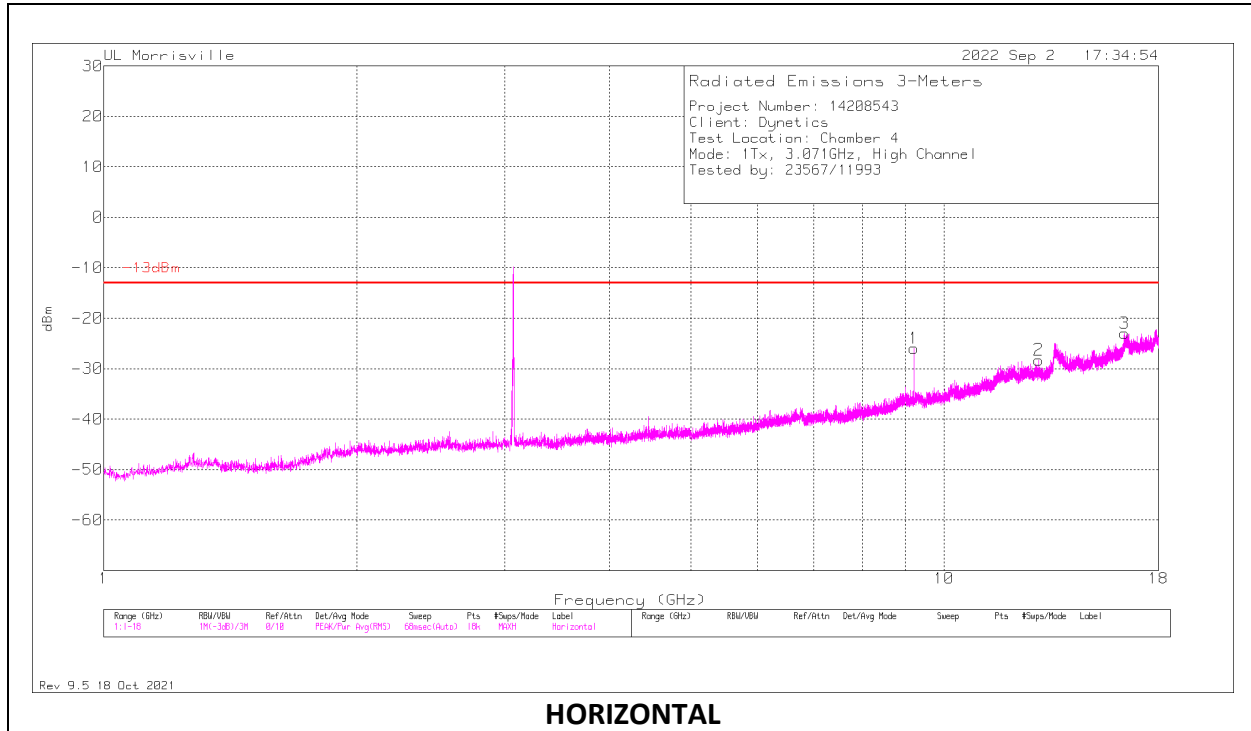
**MODE 1 MID CHANNEL 1-18GHZ**



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	9.11844	-56.34	Pk	36.2	-16.4	11.8	-24.74	-13	-11.74	0-360	100	H
4	9.12033	-62.38	Pk	36.2	-16.4	11.8	-30.78	-13	-17.78	0-360	200	V
2	11.67694	-64.49	Pk	38.5	-14.3	11.8	-28.49	-13	-15.49	0-360	200	H
5	11.76572	-65.37	Pk	38.6	-14.2	11.8	-29.17	-13	-16.17	0-360	200	V
6	15.56333	-65.15	Pk	40.3	-11.6	11.8	-24.65	-13	-11.65	0-360	200	V
3	16.5956	-65.81	Pk	41.1	-10	11.8	-22.91	-13	-9.91	0-360	100	H

Pk - Peak detector

**MODE 1 HIGH CHANNEL 1-18GHz**

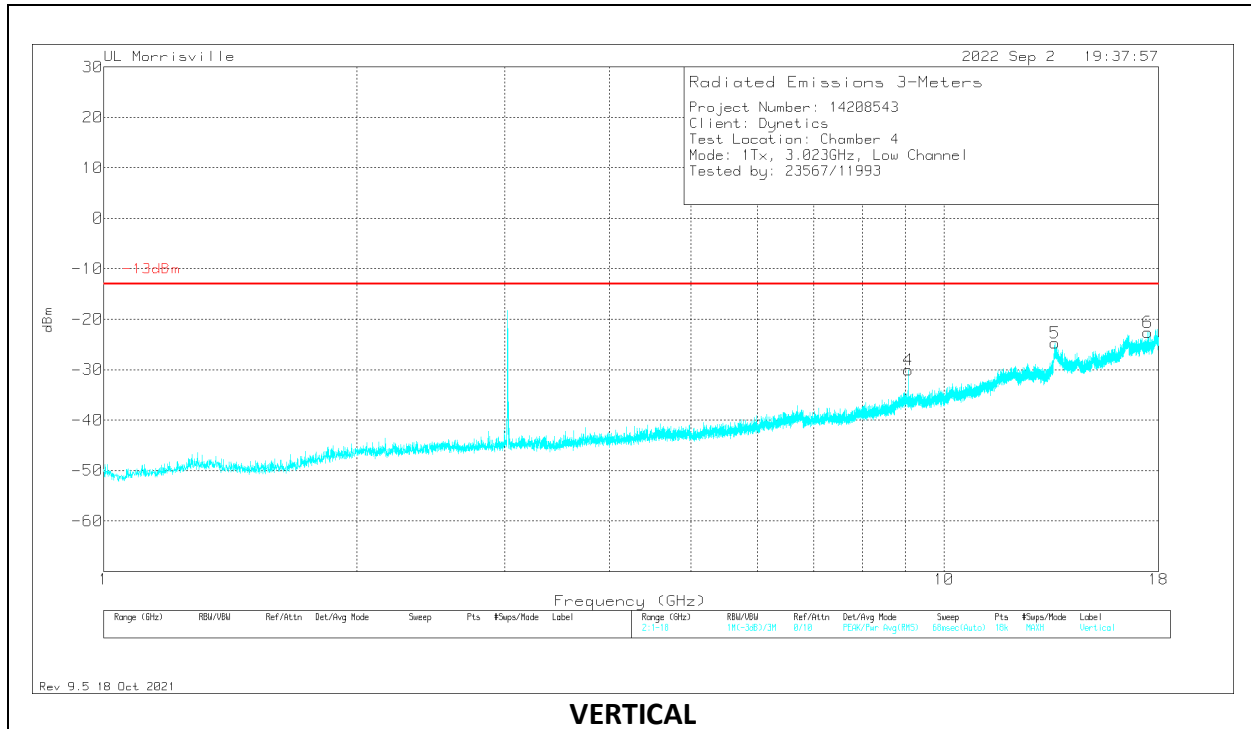
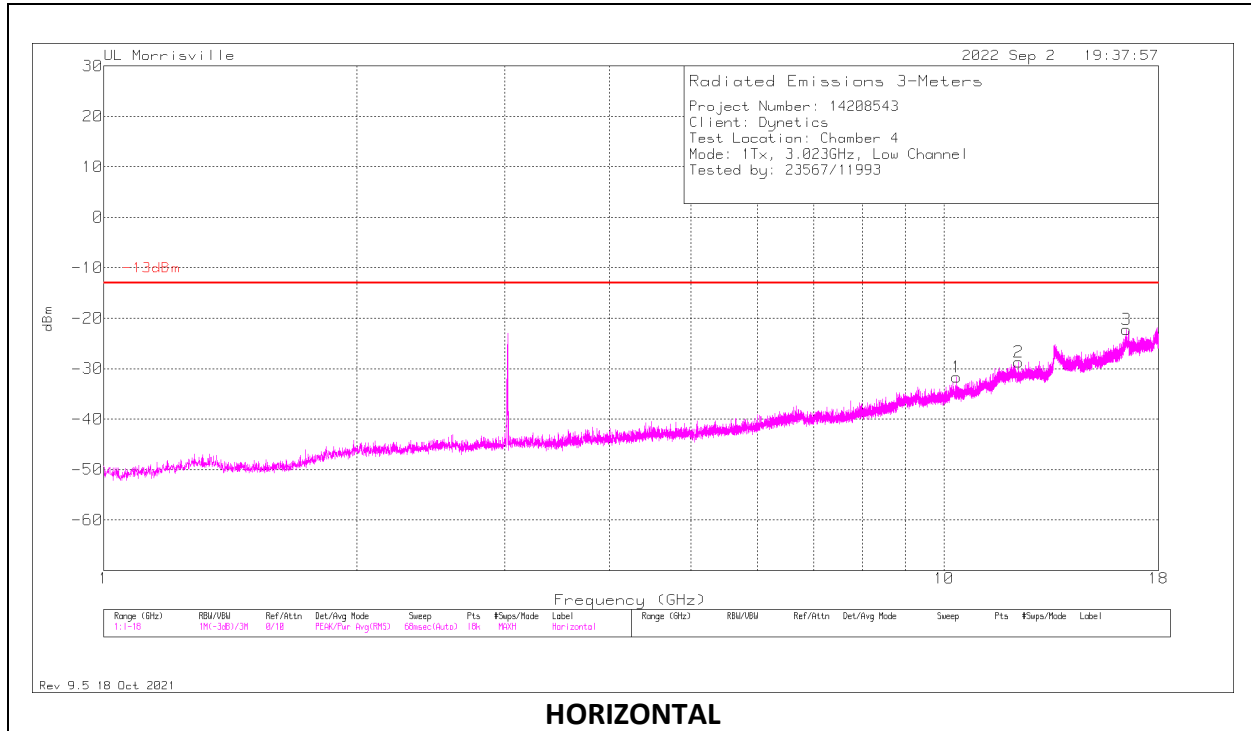




Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	9.21289	-61.76	Pk	36.2	-16.5	11.8	-30.26	-13	-17.26	0-360	300	V
1	9.21383	-57.46	Pk	36.2	-16.5	11.8	-25.96	-13	-12.96	0-360	100	H
2	12.96327	-65.76	Pk	39.1	-13.4	11.8	-28.26	-13	-15.26	0-360	100	H
5	13.53749	-61.37	Pk	38.7	-12.4	11.8	-23.27	-13	-10.27	0-360	300	V
6	15.04955	-65.72	Pk	39.9	-11.3	11.8	-25.32	-13	-12.32	0-360	200	V
3	16.41333	-64.87	Pk	40.8	-10.7	11.8	-22.97	-13	-9.97	0-360	100	H

Pk - Peak detector

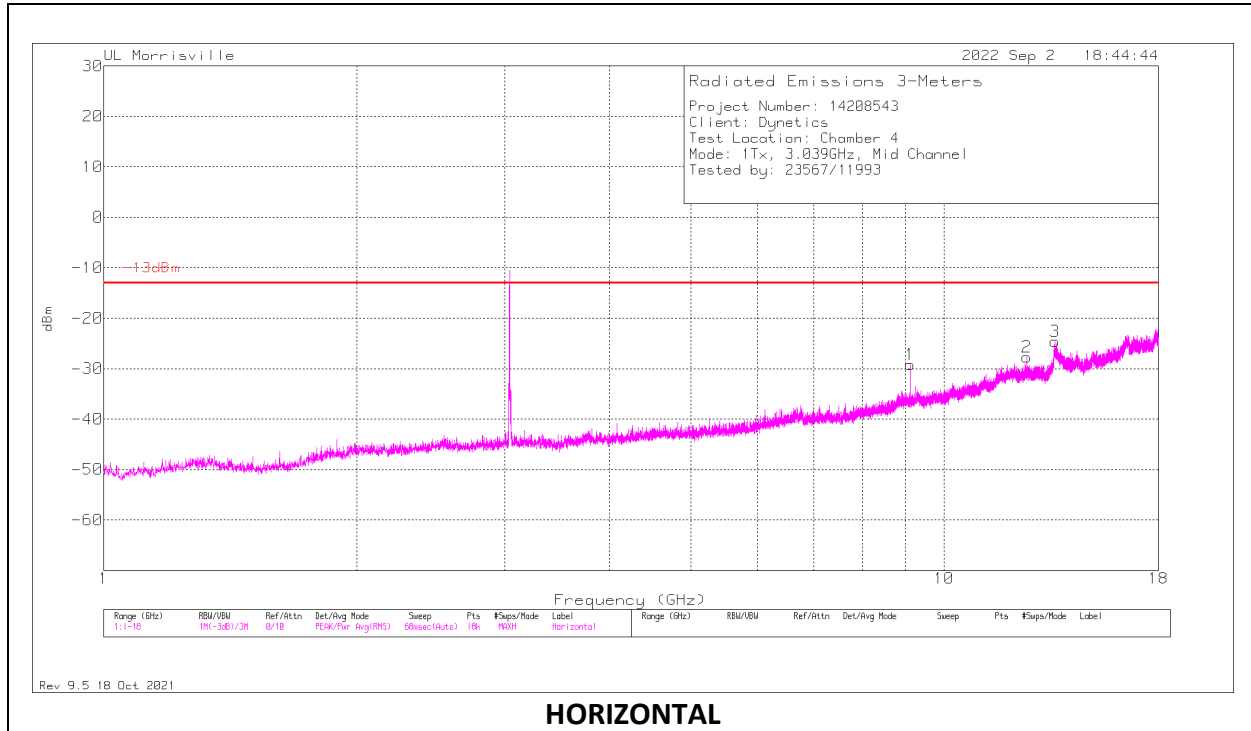
**MODE 2 LOW CHANNEL 1-18GHz**



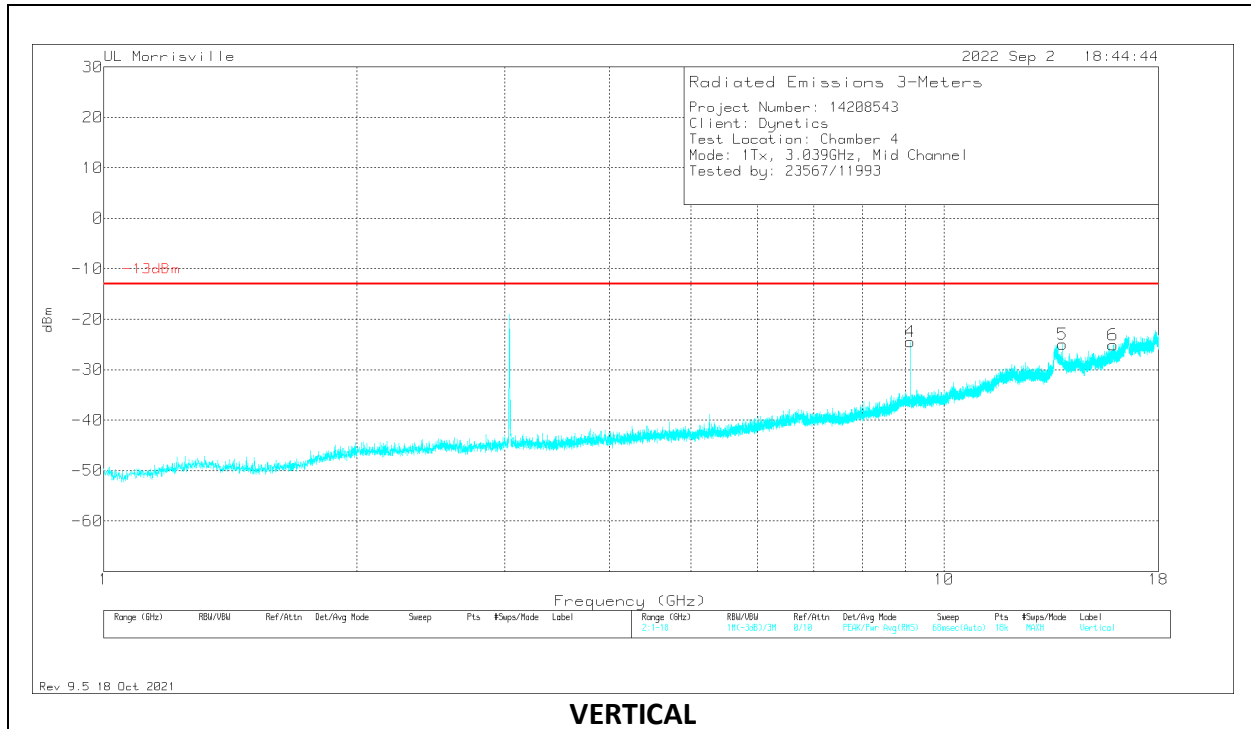
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	9.0665	-61.52	Pk	36.1	-16.4	11.8	-30.02	-13	-17.02	0-360	300	V
1	10.34716	-64.3	Pk	37.4	-16.6	11.8	-31.7	-13	-18.7	0-360	100	H
2	12.28044	-65.31	Pk	38.9	-14.1	11.8	-28.71	-13	-15.71	0-360	100	H
5	13.55261	-62.74	Pk	38.7	-12.5	11.8	-24.74	-13	-11.74	0-360	300	V
3	16.48888	-64.48	Pk	40.9	-10.4	11.8	-22.18	-13	-9.18	0-360	100	H
6	17.48999	-65.64	Pk	40.7	-9.5	11.8	-22.64	-13	-9.64	0-360	300	V

Pk - Peak detector

**MODE 2 MID CHANNEL 1-18GHZ**



**HORIZONTAL**

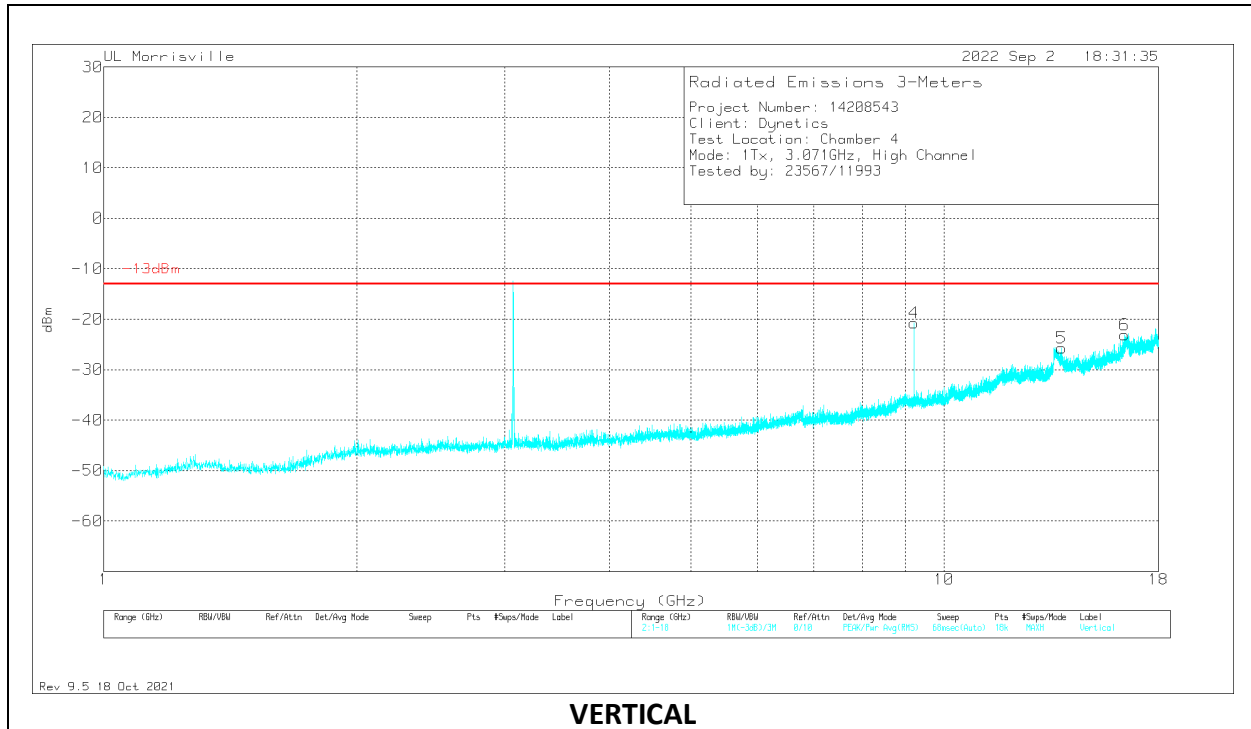
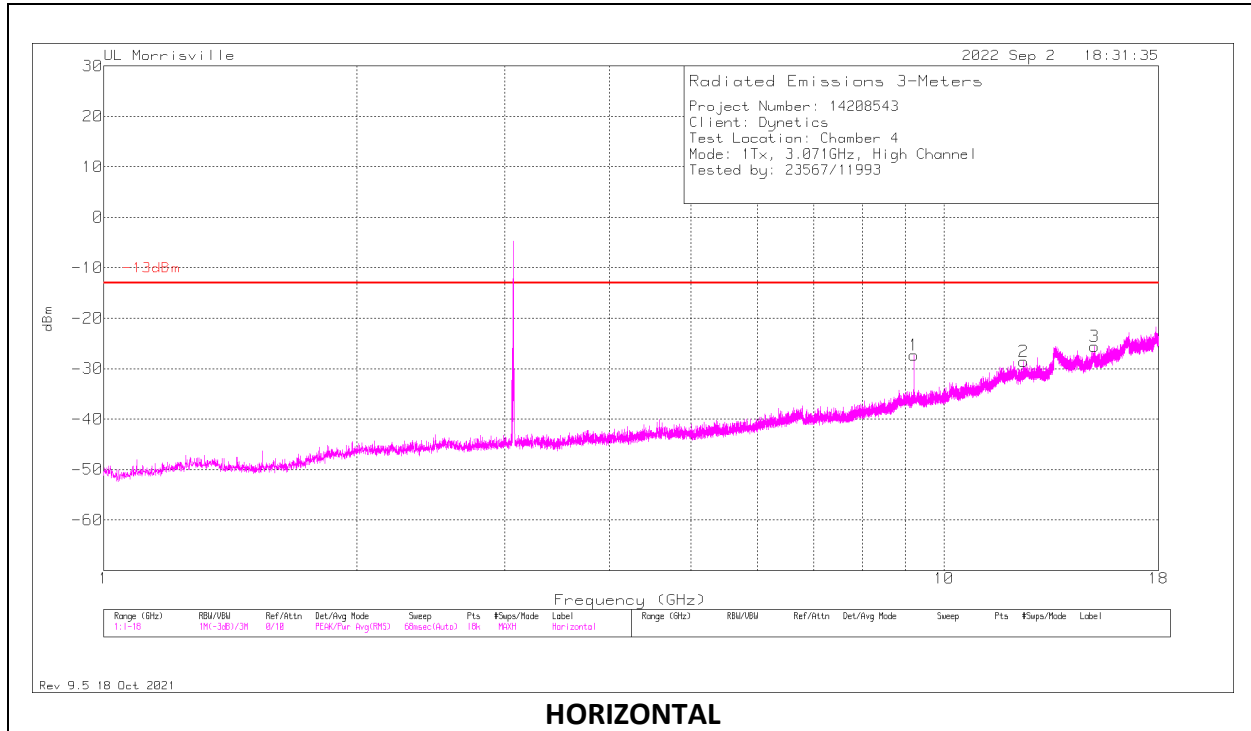


**VERTICAL**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	9.11655	-60.81	Pk	36.2	-16.4	11.8	-29.21	-13	-16.21	0-360	200	H
4	9.12127	-56.01	Pk	36.2	-16.5	11.8	-24.51	-13	-11.51	0-360	300	V
2	12.55055	-64.62	Pk	39	-13.9	11.8	-27.72	-13	-14.72	0-360	100	H
3	13.55261	-62.55	Pk	38.7	-12.5	11.8	-24.55	-13	-11.55	0-360	100	H
5	13.84349	-63.37	Pk	38.8	-12.2	11.8	-24.97	-13	-11.97	0-360	200	V
6	15.89199	-66.45	Pk	40.6	-11	11.8	-25.05	-13	-12.05	0-360	300	V

Pk - Peak detector

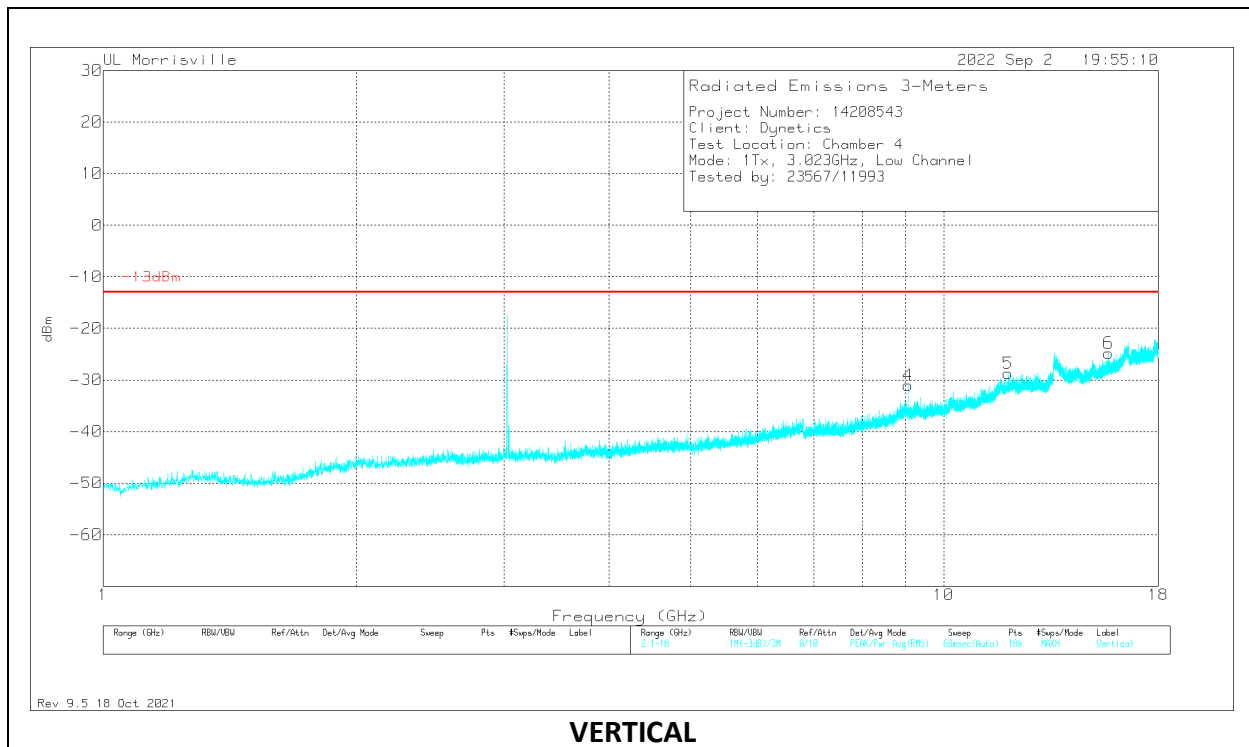
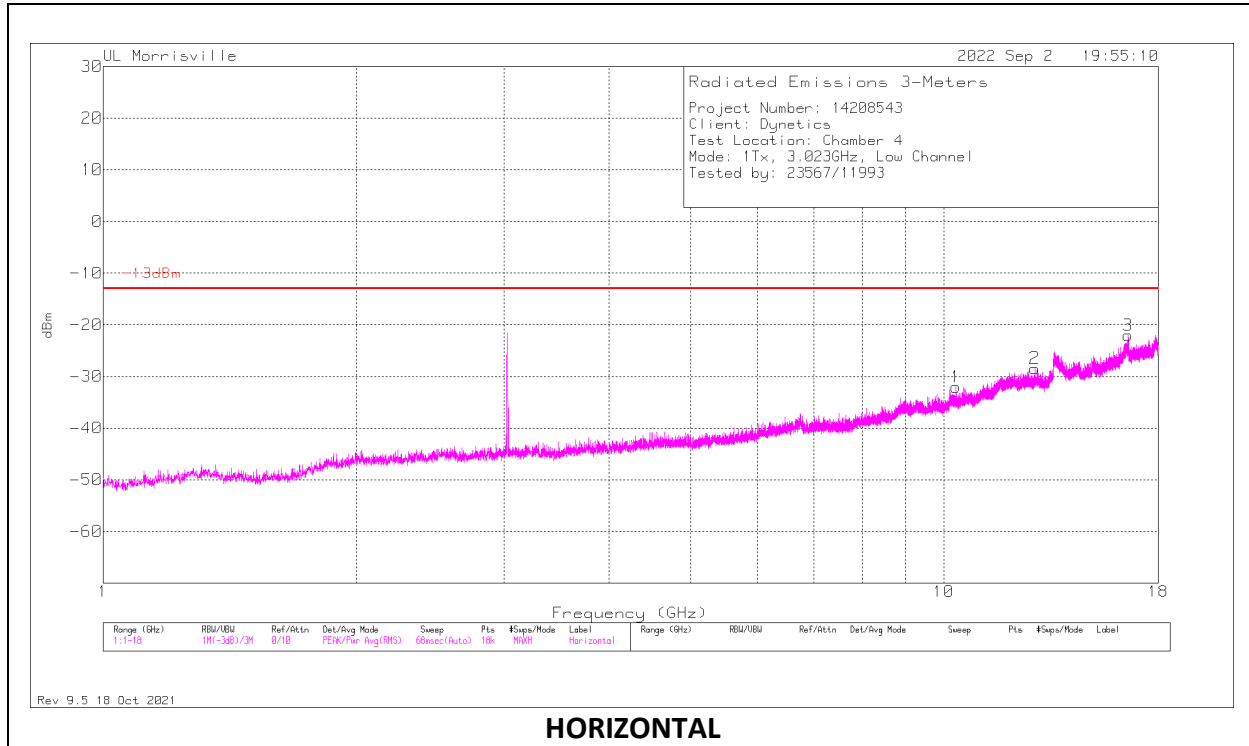
**MODE 2 HIGH CHANNEL 1-18GHz**



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	9.20722	-58.85	Pk	36.2	-16.5	11.8	-27.35	-13	-14.35	0-360	100	H
4	9.21383	-52.23	Pk	36.2	-16.5	11.8	-20.73	-13	-7.73	0-360	300	V
2	12.45044	-65.18	Pk	38.9	-14.1	11.8	-28.58	-13	-15.58	0-360	200	H
5	13.80383	-64.08	Pk	38.7	-12.1	11.8	-25.68	-13	-12.68	0-360	300	V
3	15.11755	-65.86	Pk	40	-11.5	11.8	-25.56	-13	-12.56	0-360	200	H
6	16.40199	-65.12	Pk	40.8	-10.6	11.8	-23.12	-13	-10.12	0-360	300	V

Pk - Peak detector

**MODE 3 LOW CHANNEL 1-18GHz**

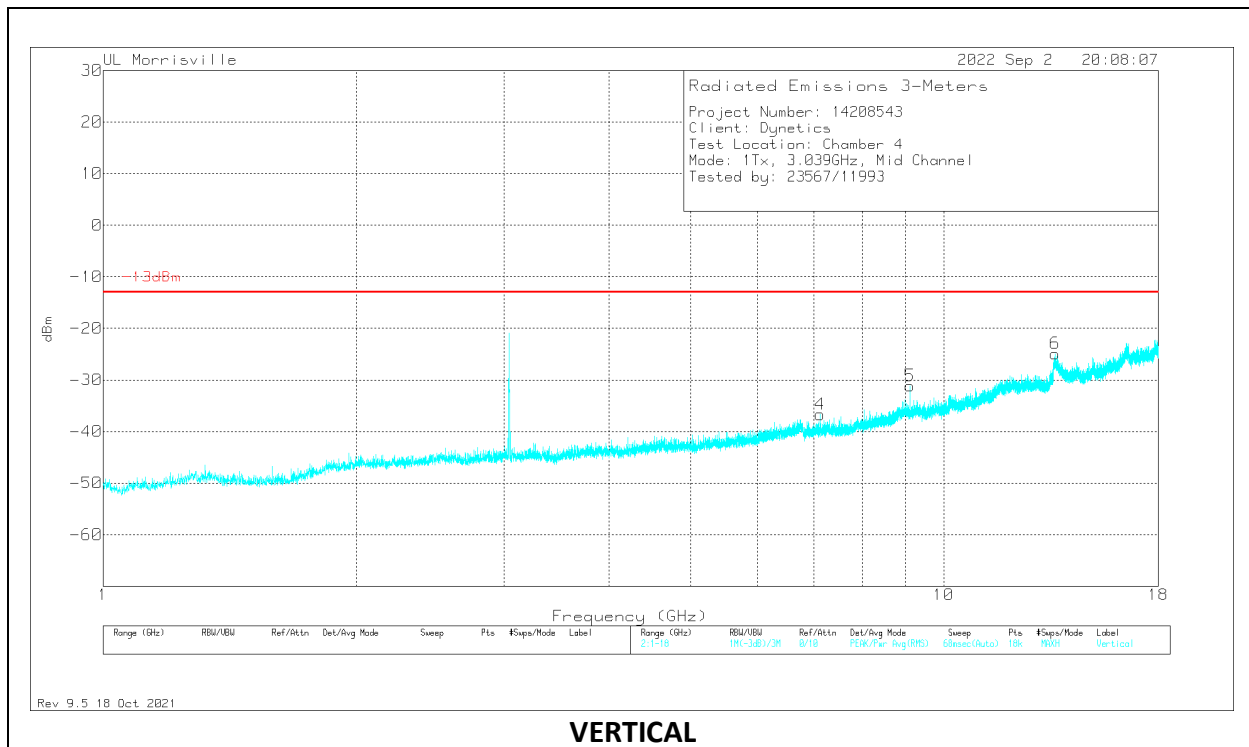
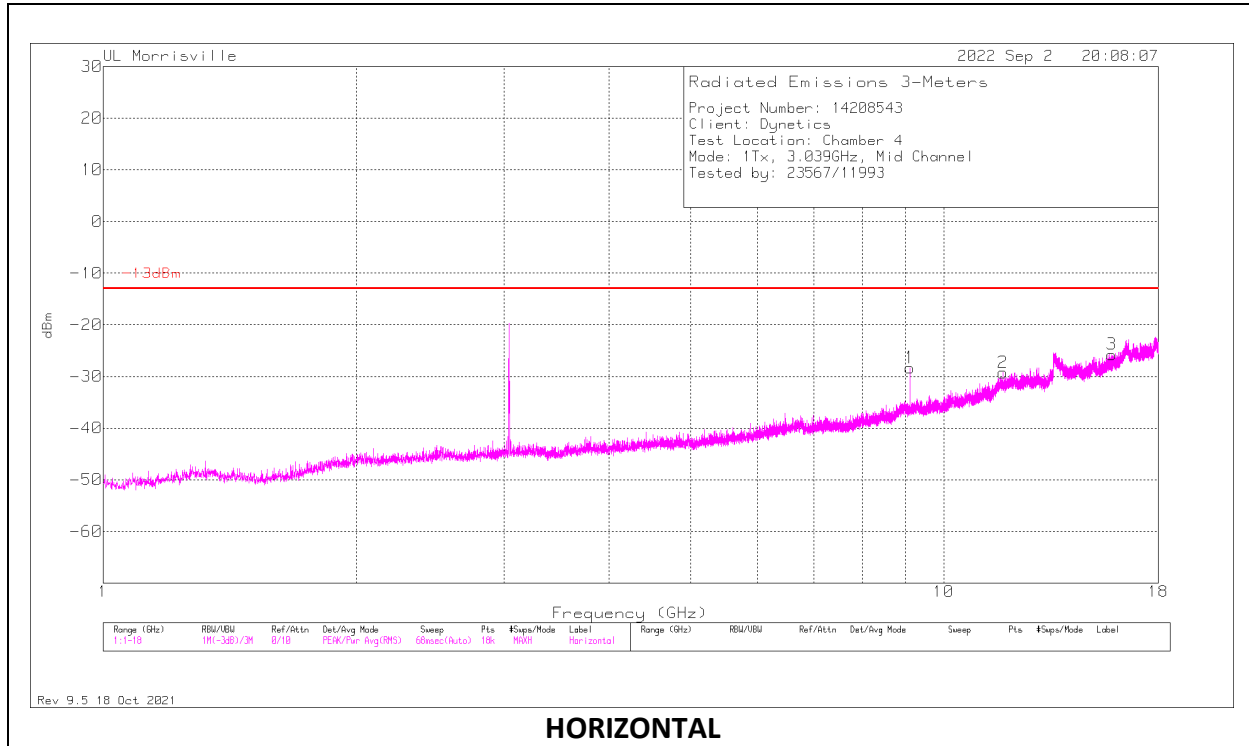




Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	9.07311	-62.55	Pk	36.1	-16.4	11.8	-31.05	-13	-18.05	0-360	300	V
1	10.34055	-64.55	Pk	37.4	-16.7	11.8	-32.05	-13	-19.05	0-360	100	H
5	11.92249	-65.14	Pk	38.7	-14.1	11.8	-28.74	-13	-15.74	0-360	300	V
2	12.83105	-65.94	Pk	39.1	-13.4	11.8	-28.44	-13	-15.44	0-360	100	H
6	15.70972	-65.69	Pk	40.4	-11.3	11.8	-24.79	-13	-11.79	0-360	300	V
3	16.57766	-64.73	Pk	41.1	-10.2	11.8	-22.03	-13	-9.03	0-360	200	H

Pk - Peak detector

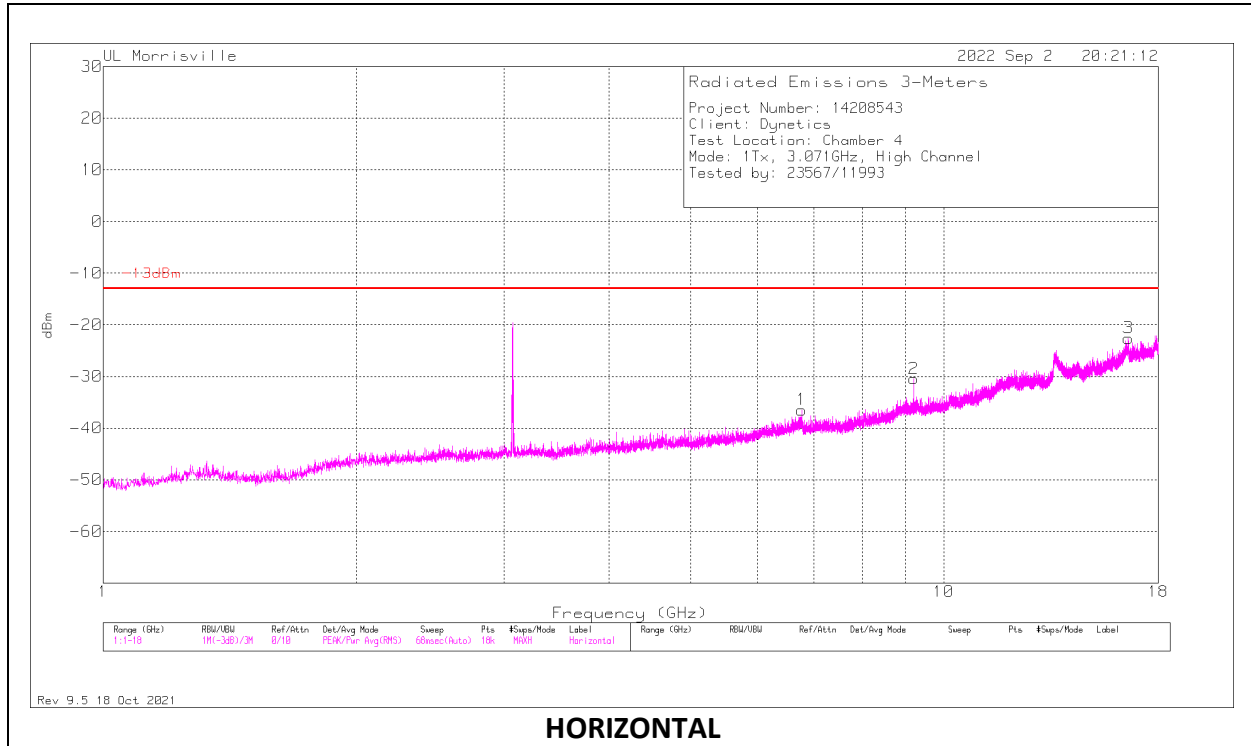
**MODE 3 MID CHANNEL 1-18GHZ**



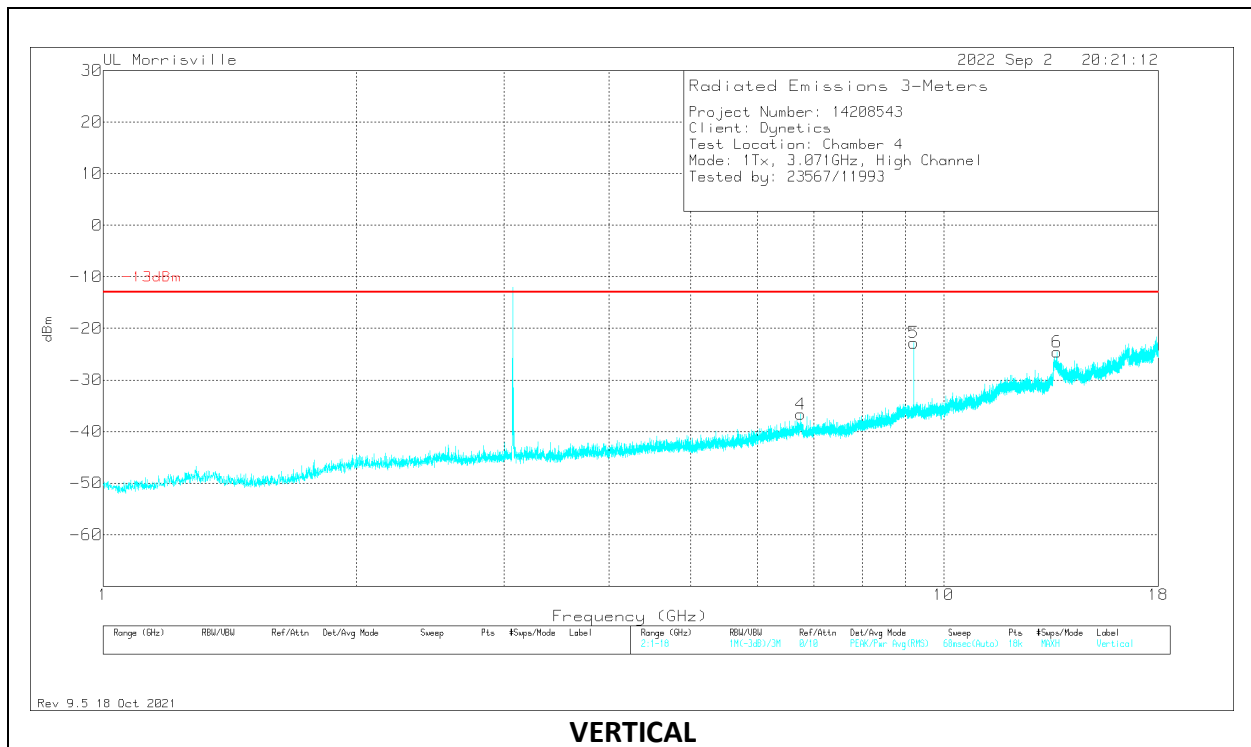
Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	7.12944	-65.28	Pk	35.7	-18.9	11.8	-36.68	-13	-23.68	0-360	300	V
1	9.11655	-59.94	Pk	36.2	-16.4	11.8	-28.34	-13	-15.34	0-360	100	H
5	9.11939	-62.75	Pk	36.2	-16.4	11.8	-31.15	-13	-18.15	0-360	200	V
2	11.76383	-65.46	Pk	38.6	-14.2	11.8	-29.26	-13	-16.26	0-360	100	H
6	13.56299	-62.79	Pk	38.7	-12.6	11.8	-24.89	-13	-11.89	0-360	200	V
3	15.85044	-66.75	Pk	40.6	-11.4	11.8	-25.75	-13	-12.75	0-360	100	H

Pk - Peak detector

**MODE 3 HIGH CHANNEL 1-18GHz**



**HORIZONTAL**



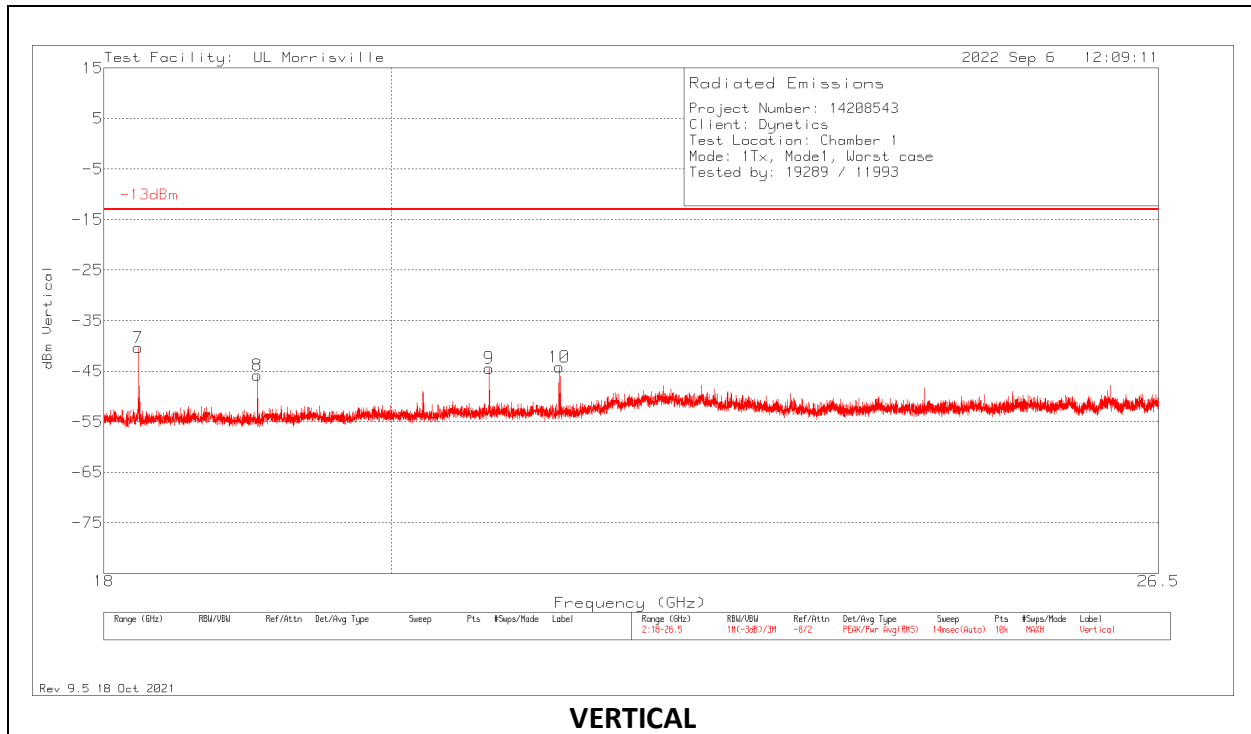
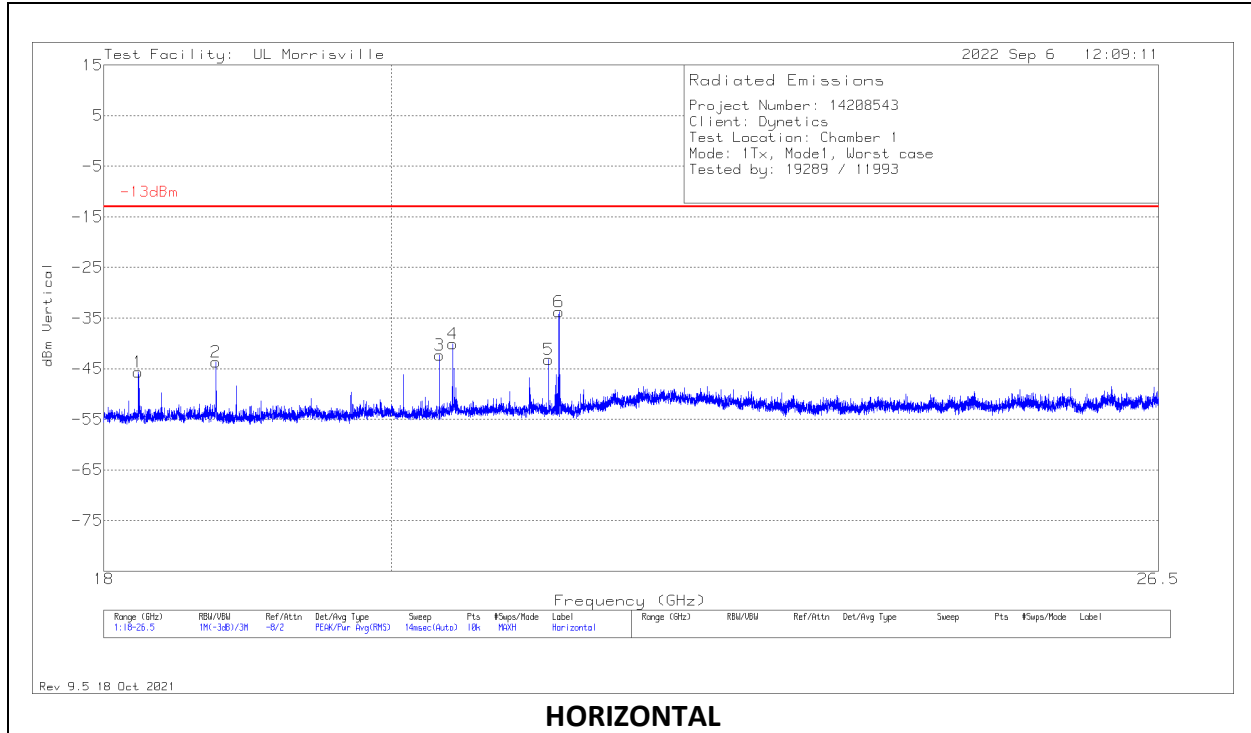
**VERTICAL**

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AT0067 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	6.75733	-64.97	Pk	35.6	-19.1	11.8	-36.67	-13	-23.67	0-360	200	V
1	6.77528	-64.56	Pk	35.6	-19.3	11.8	-36.46	-13	-23.46	0-360	100	H
5	9.20911	-54.29	Pk	36.2	-16.5	11.8	-22.79	-13	-9.79	0-360	300	V
2	9.211	-61.94	Pk	36.2	-16.5	11.8	-30.44	-13	-17.44	0-360	100	H
6	13.64233	-62.18	Pk	38.7	-12.9	11.8	-24.58	-13	-11.58	0-360	300	V
3	16.58238	-65.38	Pk	41.1	-10.1	11.8	-22.58	-13	-9.58	0-360	100	H

Pk - Peak detector

**MODE 1 WORST-CASE >18GHz**

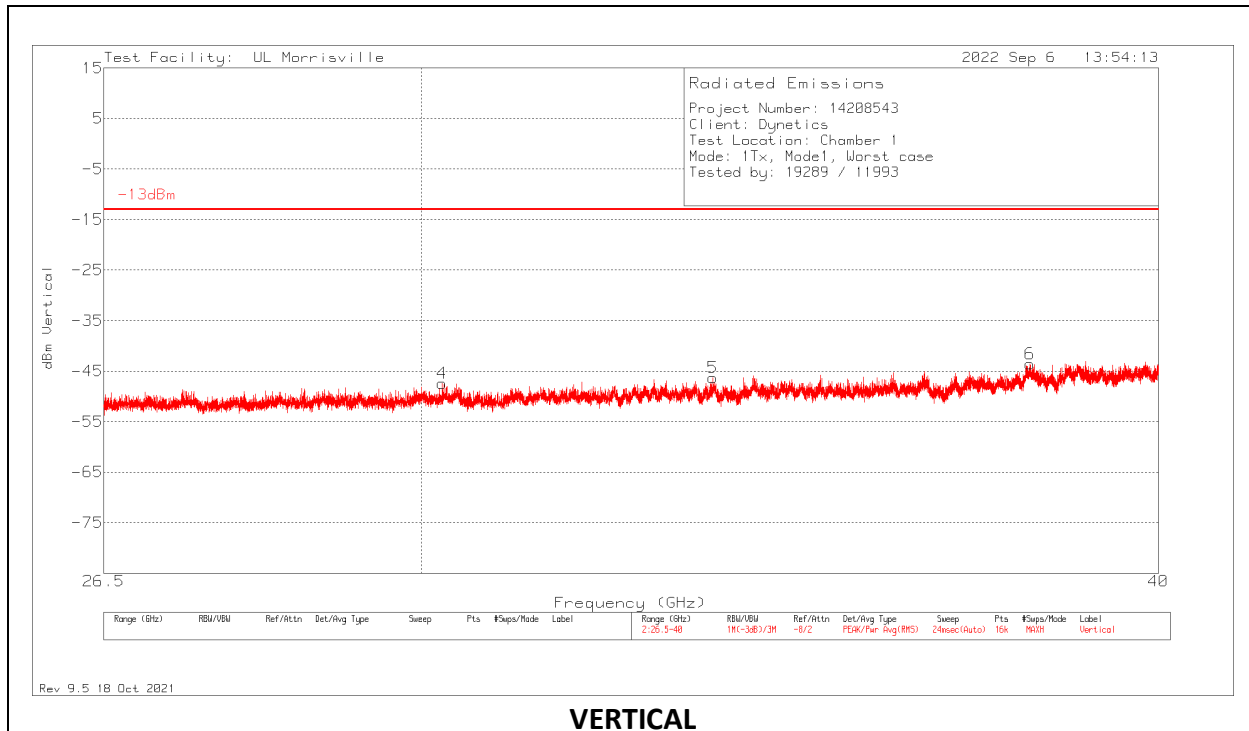
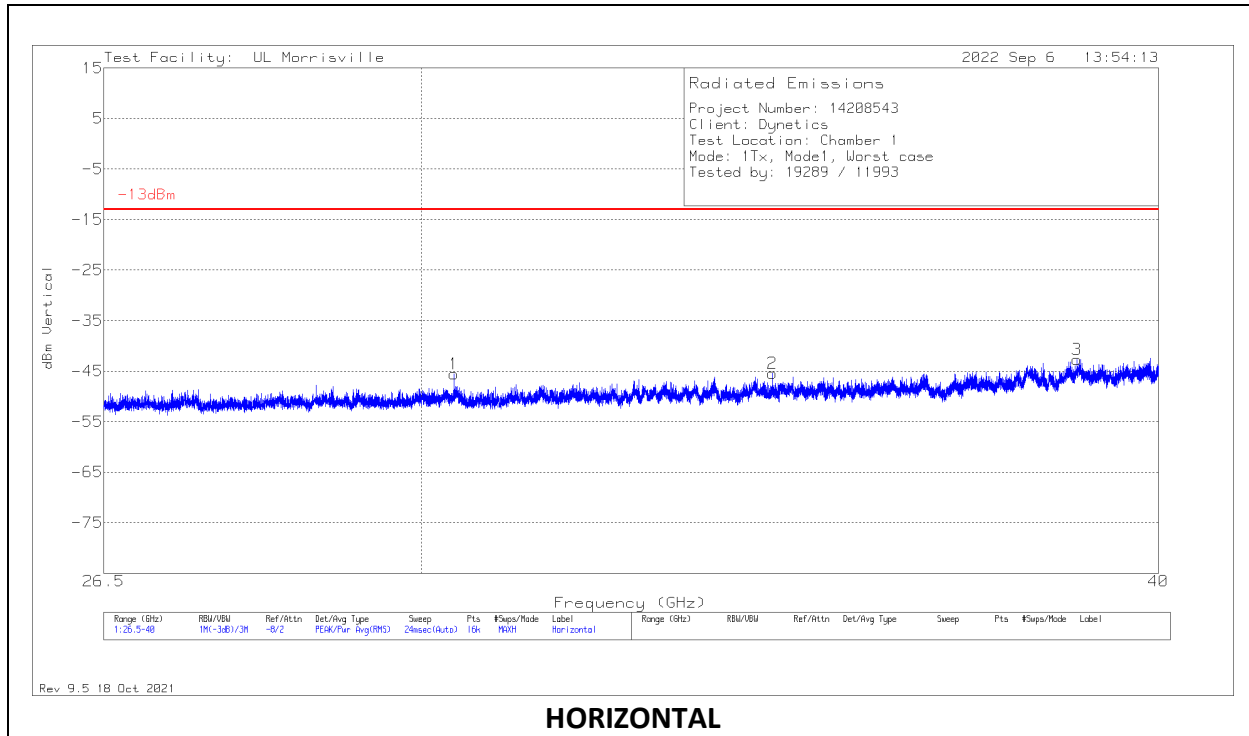
**18 to 26 GHz**



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	ANT (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7	18.22952	-46.19	Pk	33	-38.9	11.8	-40.29	-13	-27.29	0-360	299	V
1	18.23037	-51.6	Pk	33	-38.9	11.8	-45.7	-13	-32.7	0-360	250	H
2	18.75743	-49.78	Pk	33.2	-38.9	11.8	-43.68	-13	-30.68	0-360	250	H
8	19.04305	-51.38	Pk	33.4	-39.6	11.8	-45.78	-13	-32.78	0-360	299	V
3	20.35814	-48.87	Pk	33.8	-39.1	11.8	-42.37	-13	-29.37	0-360	299	H
4	20.45675	-46.64	Pk	33.9	-39.1	11.8	-40.04	-13	-27.04	0-360	150	H
9	20.73387	-50.98	Pk	33.9	-39.1	11.8	-44.38	-13	-31.38	0-360	199	V
5	21.19037	-49.92	Pk	34.2	-39.3	11.8	-43.22	-13	-30.22	0-360	200	H
6	21.27028	-40.46	Pk	34.3	-39.4	11.8	-33.76	-13	-20.76	0-360	101	H
10	21.27113	-50.89	Pk	34.3	-39.4	11.8	-44.19	-13	-31.19	0-360	199	V

Pk - Peak detector

26 to 40 GHz



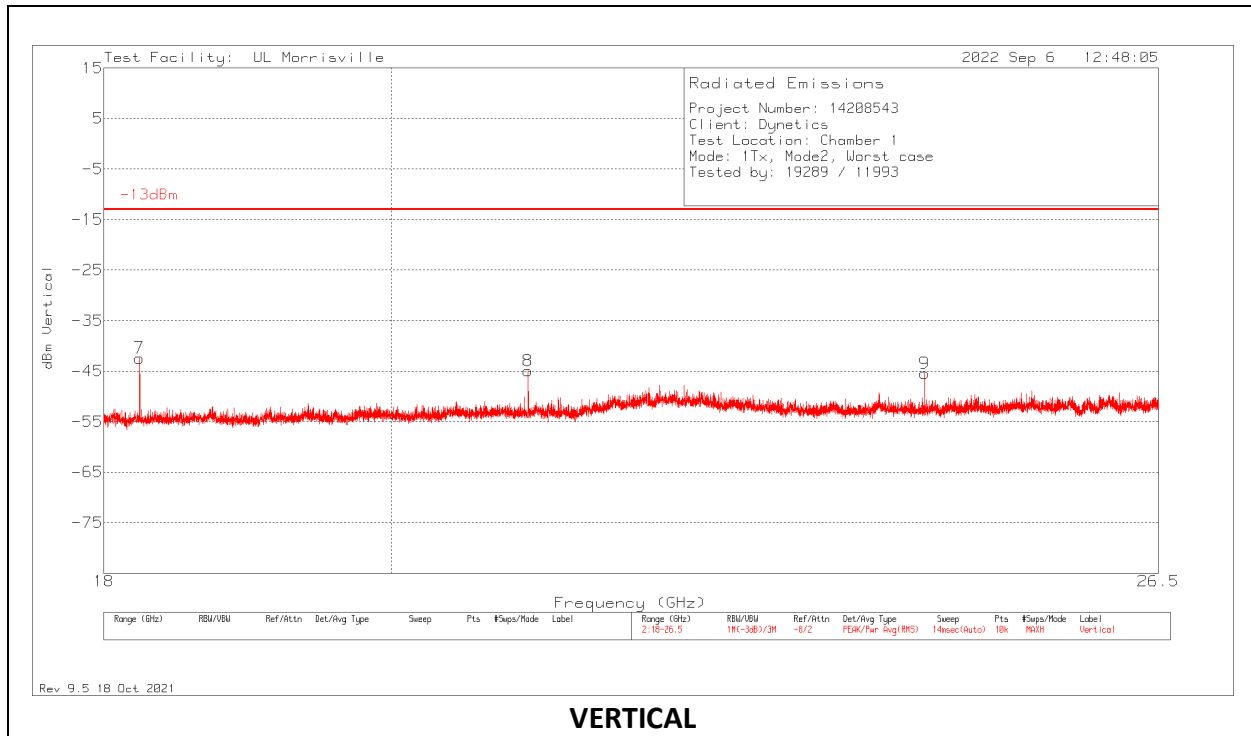
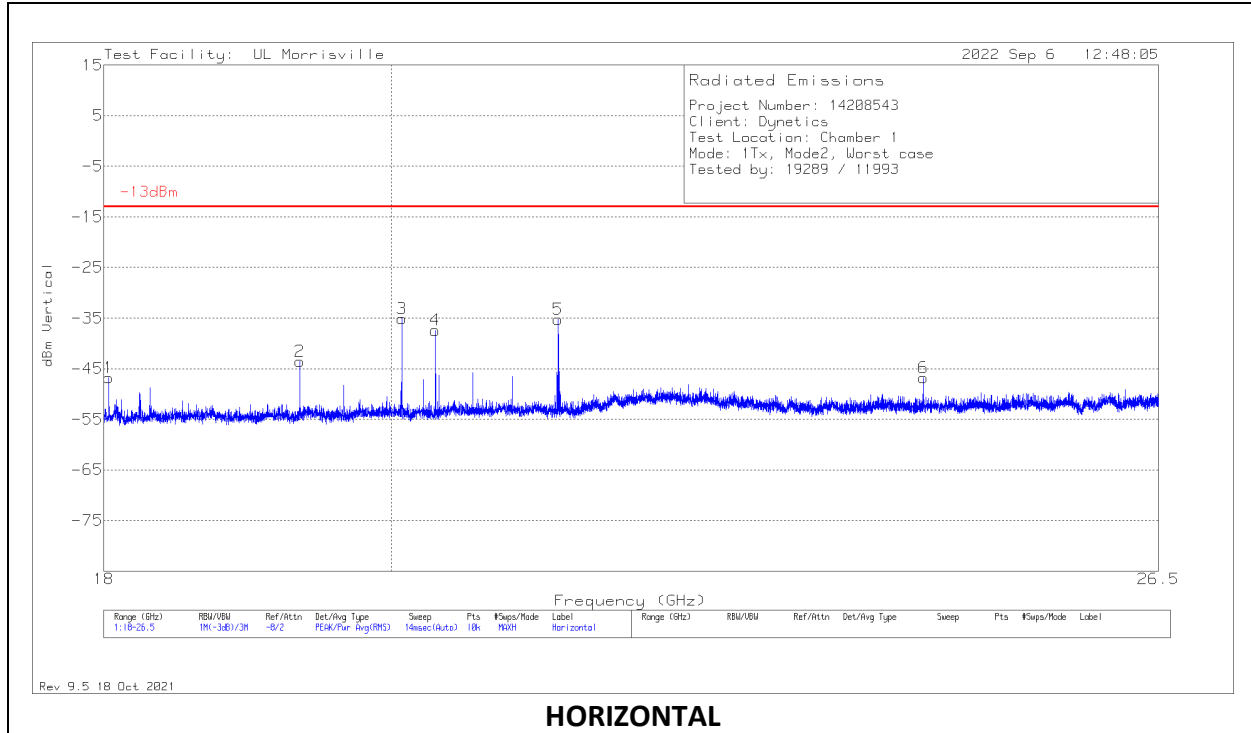


Marker	Frequency (GHz)	Meter Reading (dBm)	Det	ANT (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	30.24142	-59.95	Pk	36.7	-36	11.8	-47.45	-13	-34.45	0-360	151	V
1	30.38487	-58.5	Pk	36.6	-35.5	11.8	-45.6	-13	-32.6	0-360	101	H
5	33.61326	-59.94	Pk	37.2	-35.4	11.8	-46.34	-13	-33.34	0-360	200	V
2	34.40306	-58.36	Pk	37.8	-36.7	11.8	-45.46	-13	-32.46	0-360	199	H
6	38.04238	-60.02	Pk	38.7	-34	11.8	-43.52	-13	-30.52	0-360	200	V
3	38.75033	-59.9	Pk	39	-33.6	11.8	-42.7	-13	-29.7	0-360	101	H

Pk - Peak detector

**MODE 2 WORST-CASE >18GHZ**

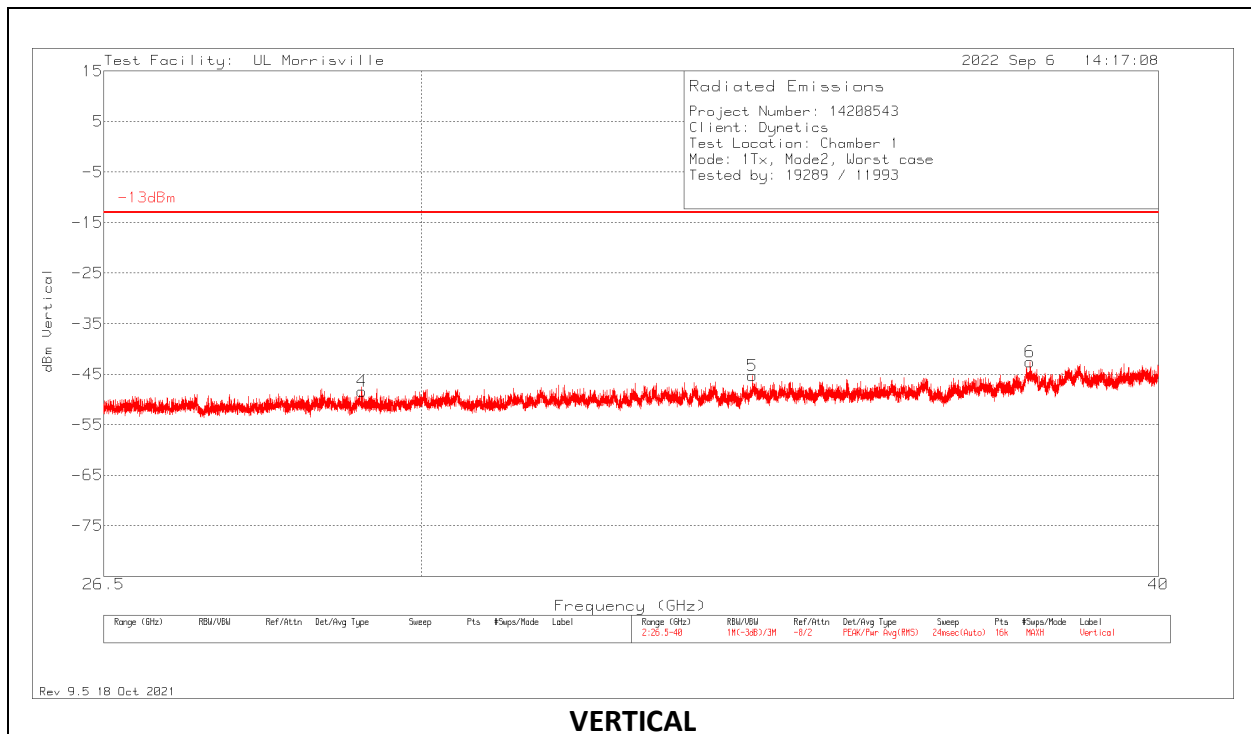
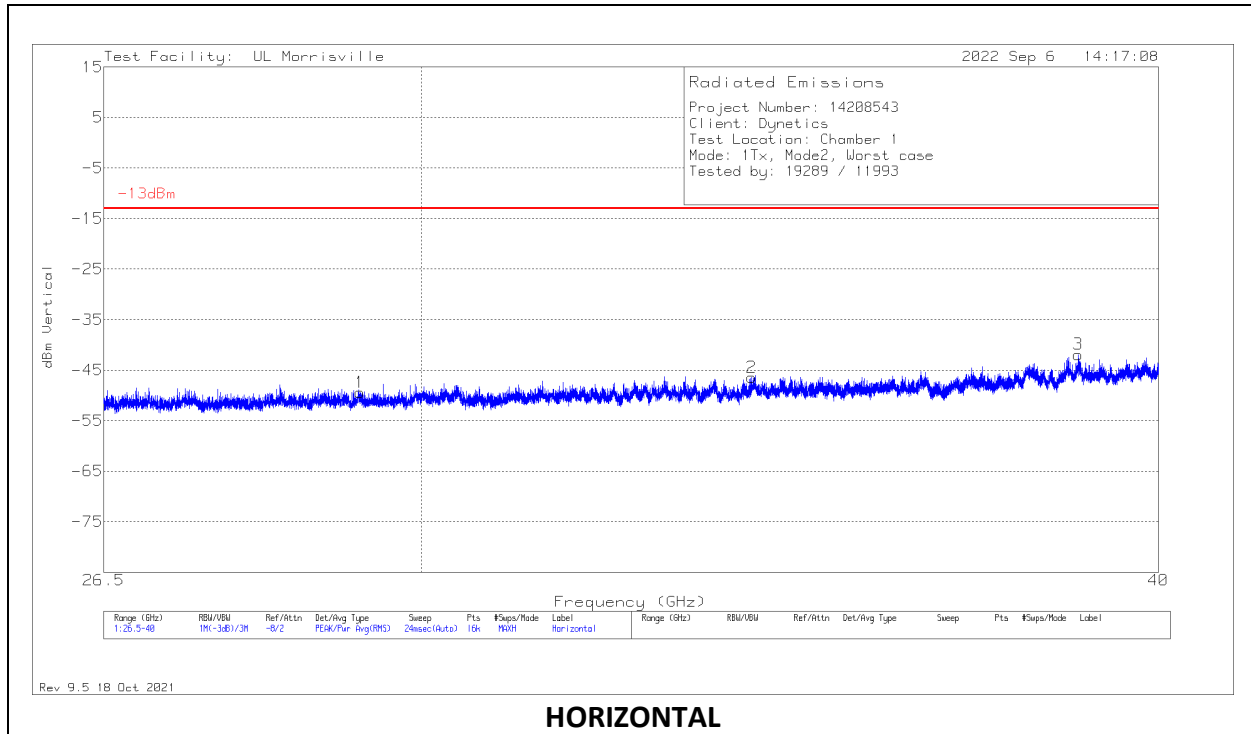
18 to 26 GHz



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	ANT (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	18.03315	-52.8	Pk	33.2	-39	11.8	-46.8	-13	-33.8	0-360	199	H
7	18.23717	-48.39	Pk	33	-38.8	11.8	-42.39	-13	-29.39	0-360	200	V
2	19.34228	-49.66	Pk	33.4	-39.1	11.8	-43.56	-13	-30.56	0-360	199	H
3	20.07931	-41.2	Pk	33.6	-39.3	11.8	-35.1	-13	-22.1	0-360	300	H
4	20.32753	-43.82	Pk	33.8	-39.2	11.8	-37.42	-13	-24.42	0-360	300	H
8	21.0314	-51.73	Pk	34.2	-39.2	11.8	-44.93	-13	-31.93	0-360	251	V
5	21.26433	-41.96	Pk	34.3	-39.4	11.8	-35.26	-13	-22.26	0-360	300	H
6	24.30933	-54.73	Pk	34.9	-38.8	11.8	-46.83	-13	-33.83	0-360	100	H
9	24.32123	-53.38	Pk	34.9	-38.8	11.8	-45.48	-13	-32.48	0-360	200	V

Pk - Peak detector

26 to 40 GHz

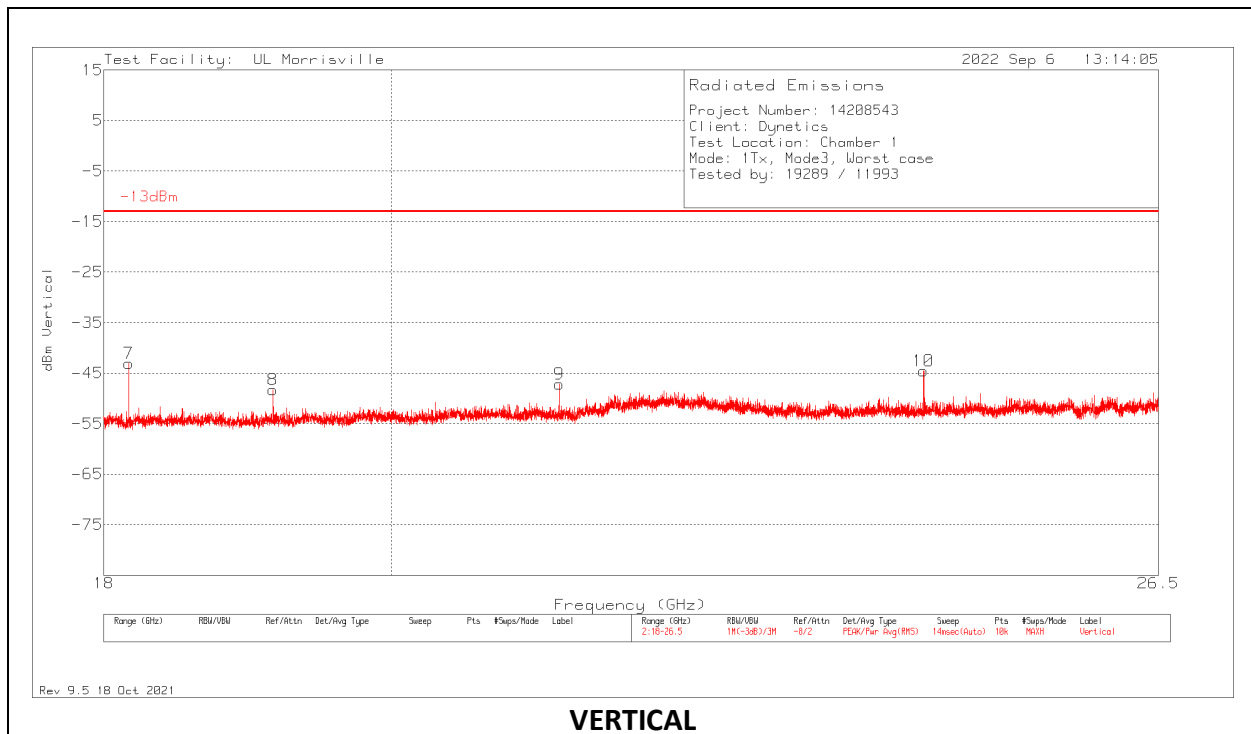
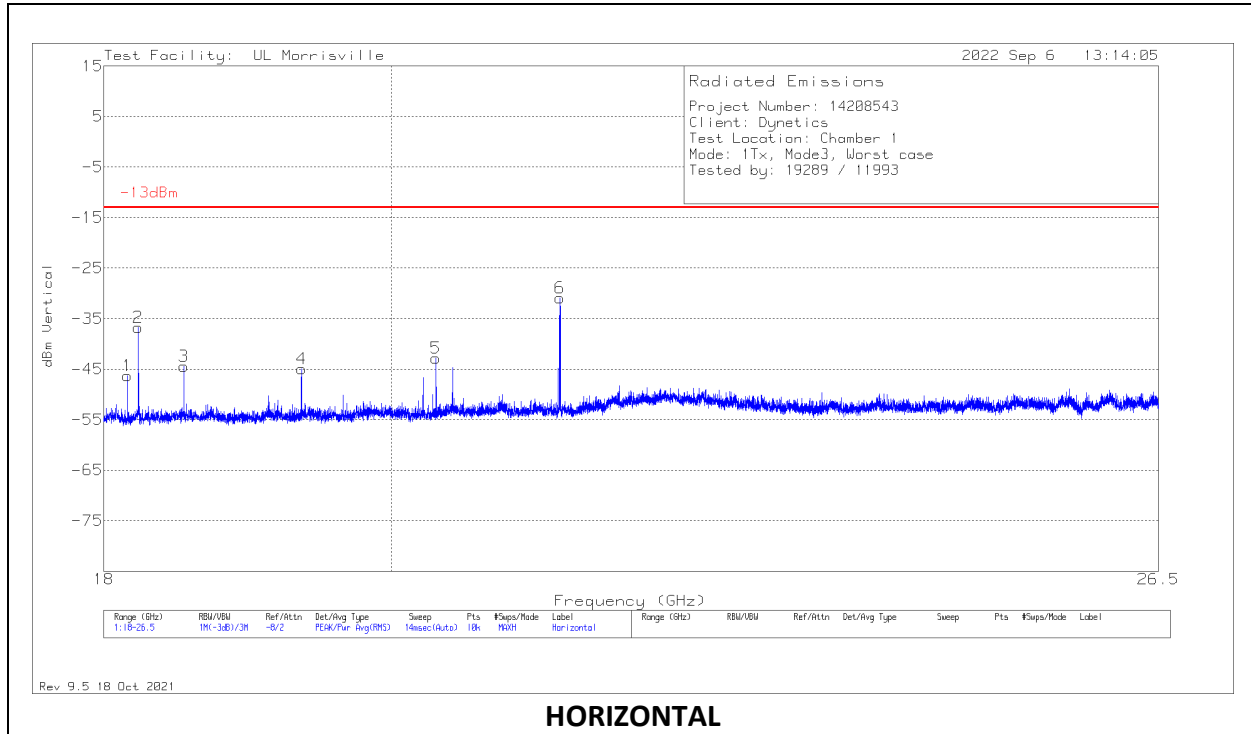


Marker	Frequency (GHz)	Meter Reading (dBm)	Det	ANT (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	29.28624	-61.18	Pk	36.3	-36.3	11.8	-49.38	-13	-36.38	0-360	199	H
4	29.31071	-59.97	Pk	36.3	-36.5	11.8	-48.37	-13	-35.37	0-360	101	V
2	34.12882	-59.96	Pk	37.7	-36	11.8	-46.46	-13	-33.46	0-360	250	H
5	34.13473	-58.83	Pk	37.7	-36	11.8	-45.33	-13	-32.33	0-360	150	V
6	38.04491	-59.08	Pk	38.7	-34	11.8	-42.58	-13	-29.58	0-360	150	V
3	38.76721	-59.19	Pk	39	-33.5	11.8	-41.89	-13	-28.89	0-360	150	H

Pk - Peak detector

**MODE 3 WORST-CASE >18GHZ**

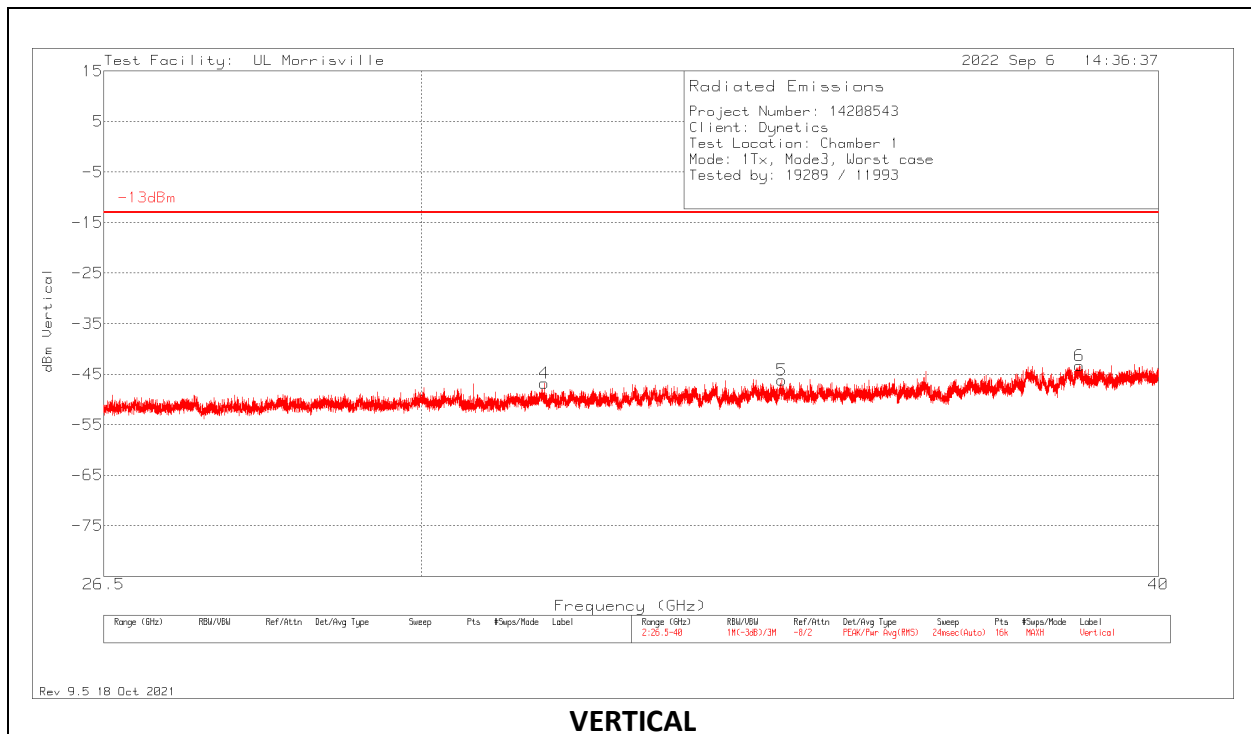
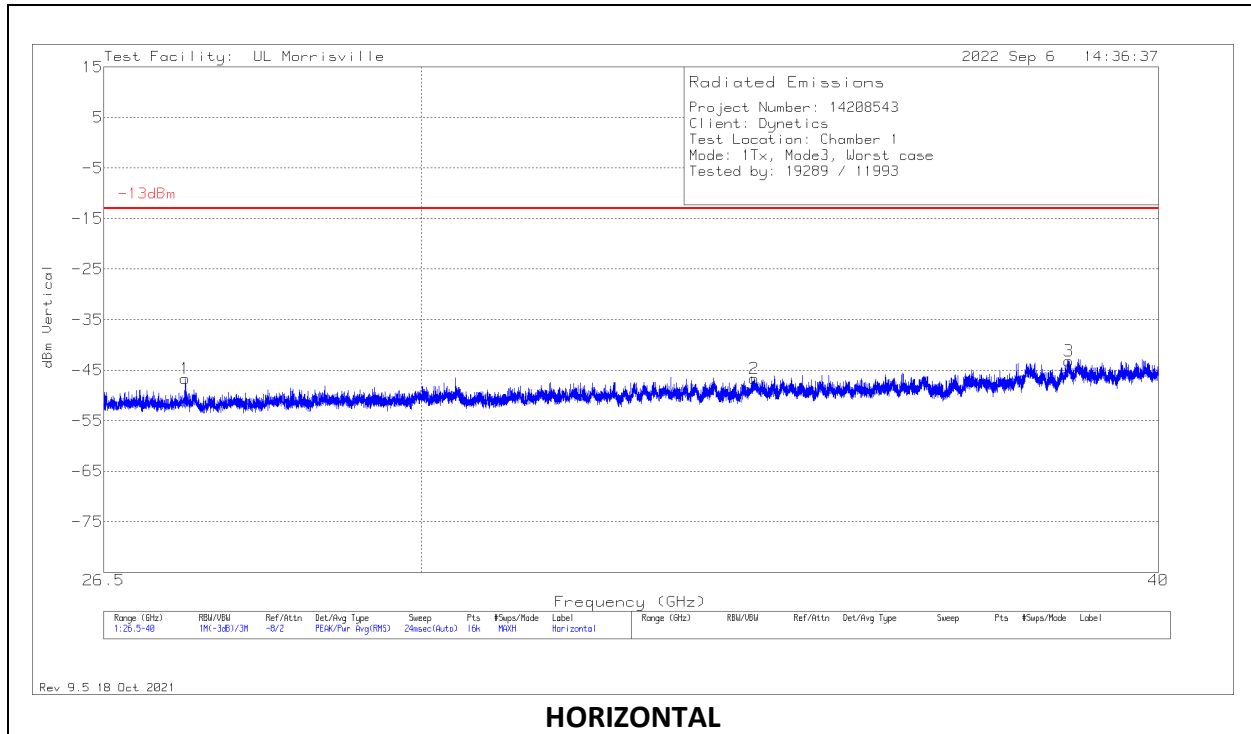
**18 to 26 GHz**



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	ANT (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	18.15812	-52.14	Pk	33.1	-39.1	11.8	-46.34	-13	-33.34	0-360	101	H
7	18.16492	-48.96	Pk	33.1	-39	11.8	-43.06	-13	-30.06	0-360	300	V
2	18.22952	-42.6	Pk	33	-38.9	11.8	-36.7	-13	-23.7	0-360	149	H
3	18.5364	-50.68	Pk	33.3	-38.9	11.8	-44.48	-13	-31.48	0-360	199	H
8	19.15357	-54.33	Pk	33.4	-39.2	11.8	-48.33	-13	-35.33	0-360	300	V
4	19.35334	-51.15	Pk	33.4	-39	11.8	-44.95	-13	-31.95	0-360	101	H
5	20.33263	-49.26	Pk	33.8	-39.2	11.8	-42.86	-13	-29.86	0-360	300	H
9	21.27113	-53.82	Pk	34.3	-39.4	11.8	-47.12	-13	-34.12	0-360	150	V
6	21.27963	-37.76	Pk	34.3	-39.3	11.8	-30.96	-13	-17.96	0-360	101	H
10	24.31358	-52.48	Pk	34.9	-38.8	11.8	-44.58	-13	-31.58	0-360	300	V

Pk - Peak detector

26 to 40 GHz





Marker	Frequency (GHz)	Meter Reading (dBm)	Det	ANT (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	27.35815	-57.61	Pk	36.1	-37	11.8	-46.71	-13	-33.71	0-360	300	H
4	31.47591	-59.63	Pk	36.9	-35.9	11.8	-46.83	-13	-33.83	0-360	150	V
2	34.15836	-60.22	Pk	37.7	-35.9	11.8	-46.62	-13	-33.62	0-360	101	H
5	34.52879	-59.29	Pk	37.9	-36.6	11.8	-46.19	-13	-33.19	0-360	251	V
3	38.62798	-60.66	Pk	39	-33.3	11.8	-43.16	-13	-30.16	0-360	199	H
6	38.78408	-60.84	Pk	39	-33.3	11.8	-43.34	-13	-30.34	0-360	101	V

Pk - Peak detector

## 9. FREQUENCY STABILITY

### RULE PART(S)

§2.1055 Measurements required: Frequency stability.

### §90.213 Frequency stability

Above 2450 MHz <sup>10</sup>

<sup>10</sup>Except for DSRC equipment in the 5850-5925 MHz band, frequency stability is to be specified in the station authorization. Frequency stability for DSRC equipment in the 5850-5925 MHz band is specified in subpart M of this part.

### LIMITS

Device must remain operating in between 3000MHz to 3100MHz.

### TEST PROCEDURE

Use spectrum analyzer to measure -6dBc points

- Temp. = -30° to +50°C
- Voltage = Nominal & Nominal +/-15%

### **Frequency Stability vs Temperature:**

Frequency stability is tested at 10 °C intervals of temperatures between -30 °C and +50 °C at the manufacturer's rated supply voltage per **section 5.6.4 of ANSI C63.26-2015**.

### **Frequency Stability vs Voltage:**

Frequency stability is tested at +20 °C temperature and ±15% supply voltage variations per **section 5.6.5 of ANSI C63.26-2015**.

The peak frequency error is recorded (worst-case).

### RESULTS

Based on the band edge measurements and the frequency error data the device will operate in between the frequency range of 3000MHz - 3100MHz under the temperature and voltage variations described in the preceding test-procedure section.

Tabular Data - Mode 1

Limit		3000	3100	3045.8656	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm	Freq Center		
Temperature	Voltage	(MHz)	(MHz)	(MHz)		
Normal (20C)	Normal	3022.4298	3069.3015	3045.8656		
Extreme (50C)		3022.3353	3069.2038	3045.7695	0.0961	0.0001
Extreme (40C)		3022.3545	3069.2163	3045.7854	0.0802	0.0001
Extreme (30C)		3022.3963	3069.2703	3045.8333	0.0324	0.0000
Extreme (10C)		3022.4548	3069.3030	3045.8789	-0.0132	0.0000
Extreme (0C)		3022.4260	3069.2978	3045.8619	0.0037	0.0000
Extreme (-10C)		3022.4023	3069.2963	3045.8493	0.0164	0.0000
Extreme (-20C)		3022.3628	3069.2025	3045.7826	0.0830	0.0001
Extreme (-30C)		3022.2700	3069.1423	3045.7061	0.1595	0.0001
20C	-15%	3022.4230	3069.2935	3045.8583	0.0074	0.0000
	End Point	3022.4298	3069.3015	3045.8656	0.0000	
	15%	3022.4255	3069.2898	3045.8576	0.0080	0.0000

Date: 2022-08-26, 2022-08-29  
 Location: COND1  
 Tested by: 85502/44389, 84740/44389

Tabular Data - Mode 2

Limit		3000	3100	3045.0072	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm	Freq Center		
Temperature	Voltage	(MHz)	(MHz)	(MHz)		
Normal (20C)	Normal	3021.5849	3068.4295	3045.0072		
Extreme (50C)		3023.7048	3070.5308	3047.1178	-2.1	-0.0014
Extreme (40C)		3023.7151	3070.5958	3047.1554	-2.1	-0.0014
Extreme (30C)		3023.7297	3070.5970	3047.1633	-2.2	-0.0014
Extreme (10C)		3023.6995	3070.5815	3047.1405	-2.1	-0.0014
Extreme (0C)		3023.6683	3070.5443	3047.1063	-2.1	-0.0014
Extreme (-10C)		3023.6168	3070.4783	3047.0476	-2.0	-0.0013
Extreme (-20C)		3023.5849	3070.4388	3047.0118	-2.0	-0.0013
Extreme (-30C)		3023.6725	3070.4616	3047.0671	-2.1	-0.0014
20C	-15%	3021.5995	3068.4306	3045.0151	0.0	0.0000
	End Point	3021.5849	3068.4295	3045.0072	0.0	
	15%	3021.5718	3068.4321	3045.0019	0.0	0.0000

Date: 2022-08-26, 2022-08-29, 2022-08-29  
 Location: COND1  
 Tested by: 85502/44389

Tabular Data - Mode 3

Limit		3000	3100	3045.8719	Delta (Hz)	Frequency Stability (ppm)
Condition		F low @ -13dBm	F high @ -13dBm	Freq Center		
Temperature	Voltage	(MHz)	(MHz)	(MHz)		
Normal (20C)	Normal	3022.4420	3069.3018	3045.8719		
Extreme (50C)		3023.7081	3070.5624	3047.1353	-1.3	-0.0008
Extreme (40C)		3023.7349	3070.6146	3047.1748	-1.3	-0.0009
Extreme (30C)		3023.7504	3070.6216	3047.1860	-1.3	-0.0009
Extreme (10C)		3023.7211	3070.6039	3047.1625	-1.3	-0.0008
Extreme (0C)		3023.6904	3070.5643	3047.1273	-1.3	-0.0008
Extreme (-10C)		3023.6164	3070.5205	3047.0685	-1.2	-0.0008
Extreme (-20C)		3023.5828	3070.6003	3047.0915	-1.2	-0.0008
Extreme (-30C)		3023.6500	3070.4596	3047.0548	-1.2	-0.0008
					0.0000	
20C	-15%	3022.4253	3069.2925	3045.8589	0.0	0.0000
	End Point	3022.4420	3069.3018	3045.8719	0.0	
	15%	3022.4238	3069.2880	3045.8559	0.0	0.0000

Date: 2022-08-26, 2022-08-29, 2022-08-29  
 Location: COND1  
 Tested by: 85502/44389

## 10. TEST SETUP PHOTOS

See R14208543-EP1 for Setup Photos and Setup Diagrams

**END OF REPORT**