

TEST REPORT

Report Number: R14950775-E1

Applicant : Axon Enterprise Inc.
17800 North 85th Street
Scottsdale, AZ 85255, USA

Model : VR1002

FCC ID : X4GS01834B

IC : 8803A-S01834B

EUT Description : TASER 7 VR CONTROLLER

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C: 2023
ISED RSS-247 ISSUE 3: 2023
ISED RSS-GEN ISSUE 5 + A2: 2021

Date Of Issue:

2023-10-30

Prepared by:

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-10-30	Initial Issue	Charles Moody

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Axon Enterprise Inc.
17800 North 85th Street
Scottsdale, AZ 85255, USA

EUT DESCRIPTION: TASER 7 VR CONTROLLER

MODEL: VR1002

SERIAL NUMBER: CE_RF Conducted 129, CE_RF Radiated 065/091/133

SAMPLE RECEIPT DATE: 2023-09-29 TO 2023-10-18

DATE TESTED: 2023-09-29 TO 2023-10-19

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2023	Refer to Section 2
ISED RSS-247 Issue 3: 2023	Refer to Section 2
ISED RSS-GEN Issue 5 + A2: 2021	Refer to Section 2

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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:



Michael Ferrer
Staff Engineer
Consumer, Medical and IT Segment
UL LLC

Prepared By:



Charles Moody
Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

Below is a list of the data provided by the customer:

- 1) Antenna gain and type (see section 6.3)
- 2) Cable loss (see section 9.4 and 9.5)

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Compliant	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Compliant	None.
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Compliant	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Compliant	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	N/A	EUT is battery operated only.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC 47 CFR Part 2, FCC 47 CFR Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A2, and RSS-247 Issue 3.

4. FACILITIES AND ACCREDITATION

UL LLC is accredited by 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	

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. 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.

5.2. 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.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U _{Lab}
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

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

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a rechargeable battery-operated TASER 7 VR CONTROLLER with a BLE radio. Battery is only rechargeable once removed from EUT. This report covers the full emissions testing of the BLE radio.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	5.67	3.69

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:
The radio utilizes a PIFA antenna, with a maximum gain of 3.83 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 1107.
The test utility software used during testing was USB tool.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz and above 18GHz were performed with the EUT set to transmit at the channel with highest power spectral density as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low and high channels, with mid channel added for radiated emissions.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation.

Data rate supported as provided by the client was 1 Mbps.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Support Laptop	Lenovo	Yoga 7	PF49WDf49	N/A
Laptop AC Adapter	Lenovo	ADLX65YCC2A	8SSA10M13947C1SG96EGVNL	N/A
DC Power Supply	Circuitspecialists	CSI3003X5	653668	N/A

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB-C	1	USB-C to USB A	Shielded	<3m	Used to connect EUT to support laptop for testing purposes only
2	Battery	1	Quick Connect	Unshielded	<3m	Provides DC power to dummy battery for testing purposes only.

Note: Dummy battery is provided DC power by way of either a set of double leads or a USB cable. Neither of these are present on production samples and are for testing purposes only.

TEST SETUP

The EUT is connected to a test laptop during the tests. Test software exercised the radio card.

SETUP DIAGRAM

Please refer to R14950775-EP1 for setup diagrams

7. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10, Section 11.6 : Zero-Span Spectrum Analyzer Method.

6 dB BW: ANSI C63.10 Subclause -11.8.1

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.2.3.1 Method PKPM1 Peak-reading power meter
ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11 and 6.10.4

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1 and 6.10.5

General Radiated Spurious Emissions: ANSI C63.10-2013 Section 6.3 to 6.6

AC Power-line conducted emissions: ANSI C63.10-2013, Section 6.2.

8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was 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.
	Common Equipment				
	Conducted Room 1				
90411	Spectrum Analyzer	Keysight Technologies	N9030A	2023-08-02	2024-08-02
134477	RF Power Meter	Keysight Technologies	N1912A	2023-08-04	2024-08-04
135124	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-07-12	2024-07-31
179892	Environmental Meter	Fisher Scientific	15-077-963	2023-07-26	2024-06-31
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
	Conducted Room 2				
238710	Environmental Meter	Fisher Scientific	15-077-963	2023-06-27	2024-06-27
135121	RF Power Meter	Keysight Technologies	N1912A	2023-07-12	2024-07-31
90418	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2023-08-21	2024-08-21
	Additional Equipment used				
CBL099	Micro-Coax UTIFLEX Cable Assembly, Low Loss, 40GHz, 39.3", Connectors 2	Carlisle Interconnect Technologies	UFA147A-0-0180-200200	2023-02-17	2024-02-17
226559	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2023-02-16	2024-02-16

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	30-1000 MHz				
90629	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2023-01-06	2024-01-06
	1-18 GHz				
89509	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-05-23	2025-05-23
	Gain-Loss Chains				
207639	Gain-loss string: 25-1000MHz	Various	Various	2023-09-18	2024-09-18
207640	Gain-loss string: 1-18GHz	Various	Various	2023-05-17	2024-05-17
	Receiver & Software				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-04-10	2024-04-10
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
200540	Environmental Meter	Fisher Scientific	15-077-963	2022-10-05	2023-10-31

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 2)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
135144	Active Loop Antenna	ETS-Lindgren	6502	2023-01-17	2024-01-17
	1-18 GHz				
86408	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2023-06-19	2025-06-19
	18-40 GHz				
204704	Horn Antenna, 18-26.5GHz	Com-Power	AH-826	2023-07-20	2025-07-20
	Gain-Loss Chains				
91975	Gain-loss string: 0.009-30MHz	Various	Various	2023-06-06	2024-06-06
91977	Gain-loss string: 1-18GHz	Various	Various	2023-06-06	2024-06-06
136042	Gain-loss string: 18-40GHz	Various	Various	2023-06-06	2024-06-06
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-02-02	2024-02-02
90416	Spectrum Analyzer	Keysight	N9030A	2023-06-09	2024-06-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
239540	Environmental Meter	Fisher Scientific	15-077-963	2023-07-19	2025-07-19

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

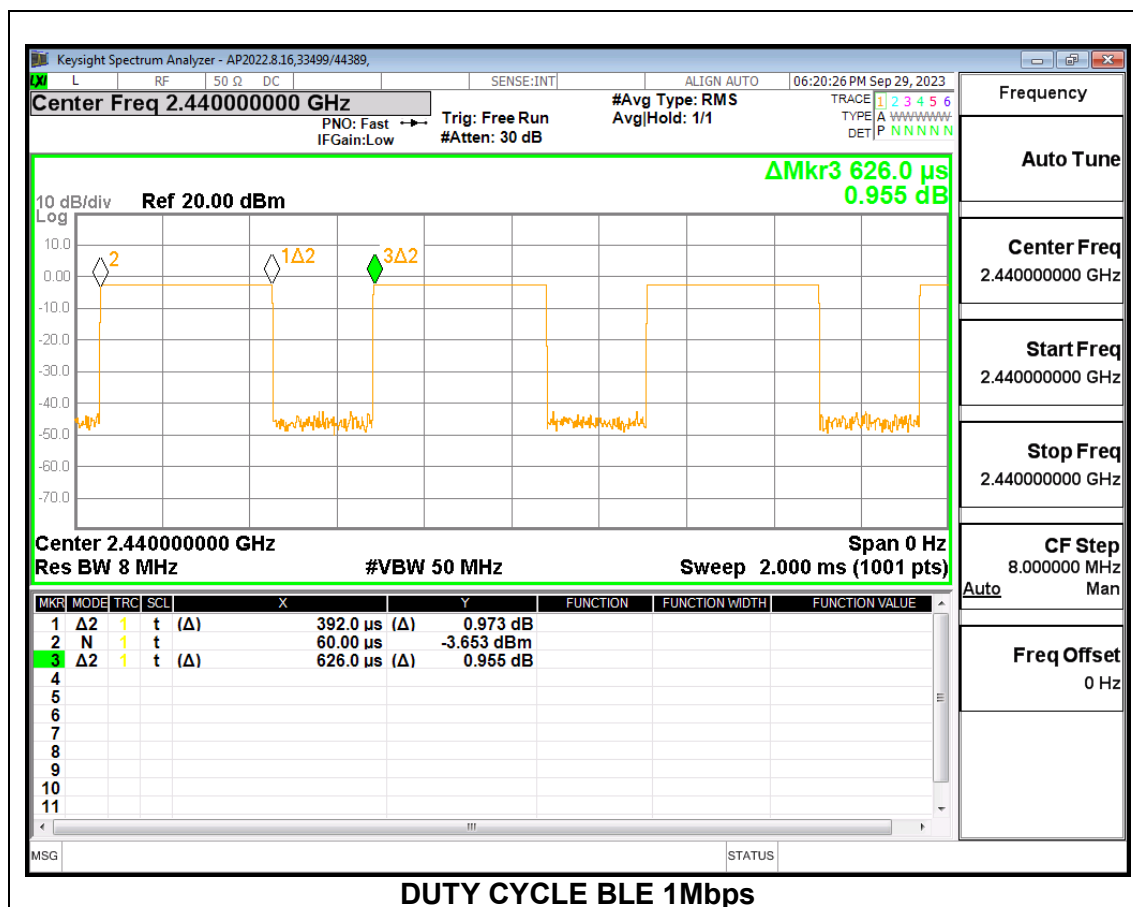
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
BLE	0.392	0.626	0.626	62.62	4.07	2.551

DUTY CYCLE PLOTS



9.2. 99% BANDWIDTH

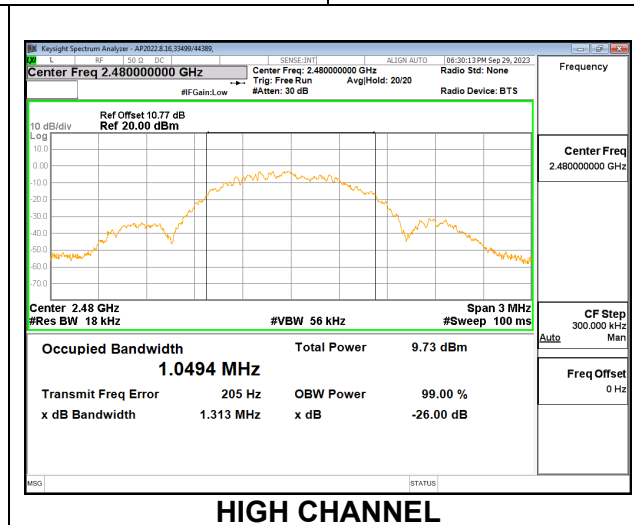
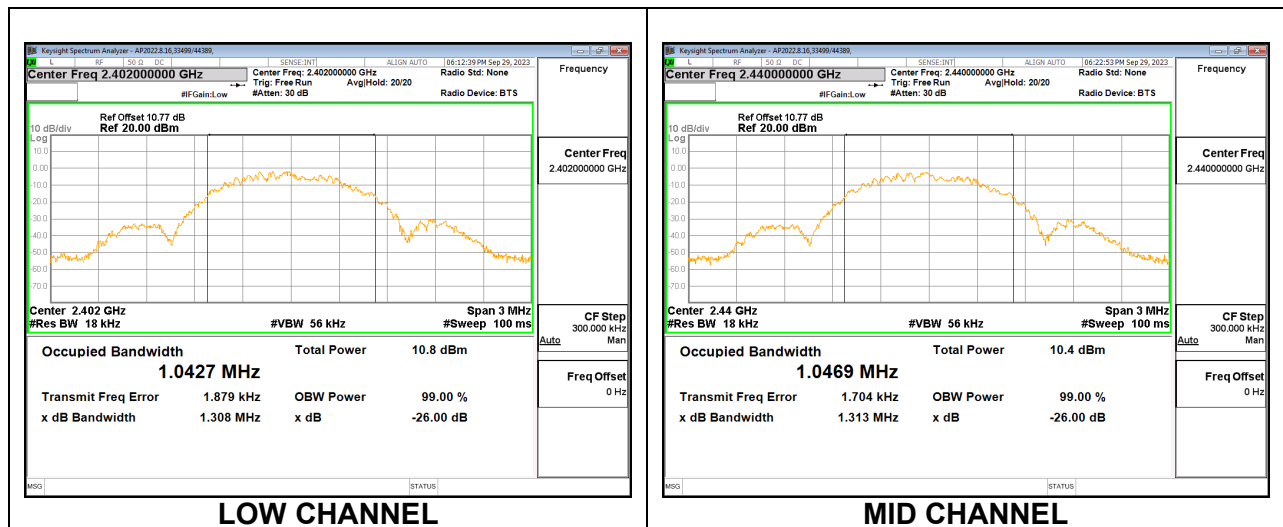
LIMITS

None; for reporting purposes only.

RESULTS

9.2.1. BLE (1Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0427
Middle	2440	1.0469
High	2480	1.0494



9.3. 6 dB BANDWIDTH

LIMITS

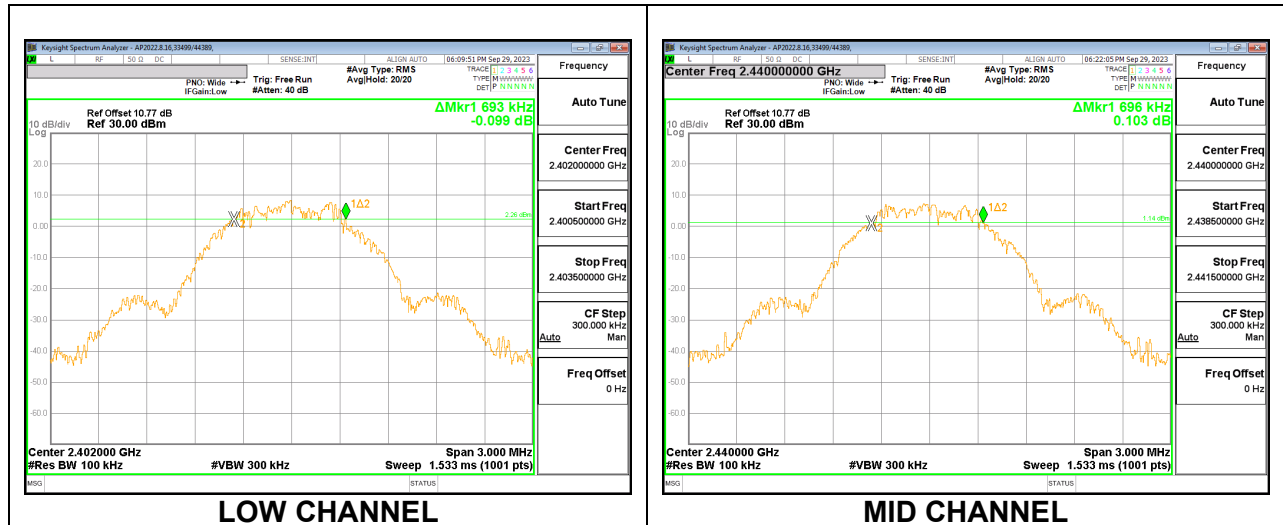
FCC §15.247 (a) (2)
 RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

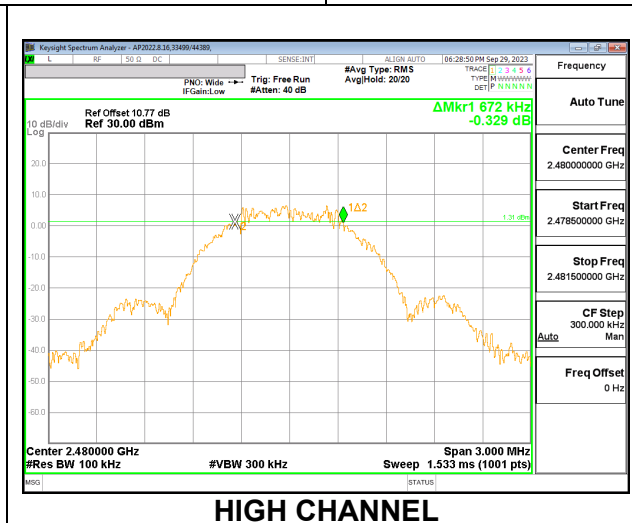
9.3.1. BLE (1Mbps)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.693	0.5
Middle	2440	0.696	0.5
High	2480	0.672	0.5



LOW CHANNEL

MID CHANNEL



HIGH CHANNEL

9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)
RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.77 dB (including 9.72 dB pad, 0.75 dB EUT cable and a 0.30 test cable) was entered as an offset in the power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Peak output power was read directly from the power meter.

RESULTS

9.4.1. BLE (1Mbps)

Tested By:	85502/44389
Date:	2023-10-09

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.67	30	-24.330
Middle	2440	4.95	30	-25.050
High	2480	4.36	30	-25.640

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a gated average power meter.

The cable assembly insertion loss of 10.77 dB (including 9.72 dB pad, 0.75 dB EUT cable and a 0.3 dB test cable) was entered as an offset in the power meter.

The power output was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor. Gated average output power was read directly from power meter.

RESULTS

9.5.1. BLE (1Mbps)

Tested By:	85502/44389
Date:	2023-10-09

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	5.56
Middle	2440	4.84
High	2480	4.23

9.6. POWER SPECTRAL DENSITY

LIMITS

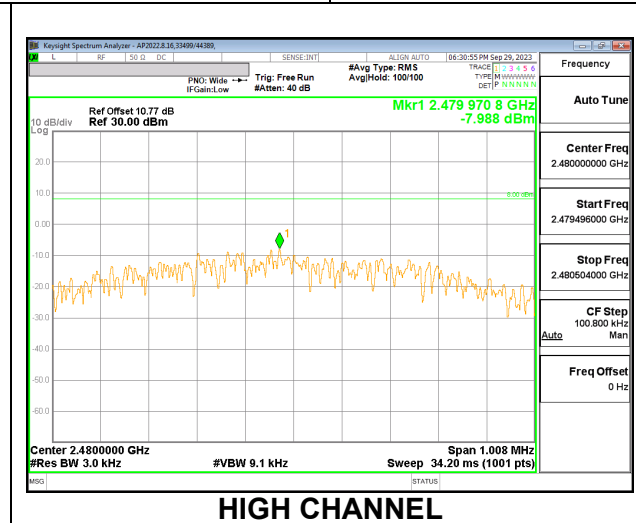
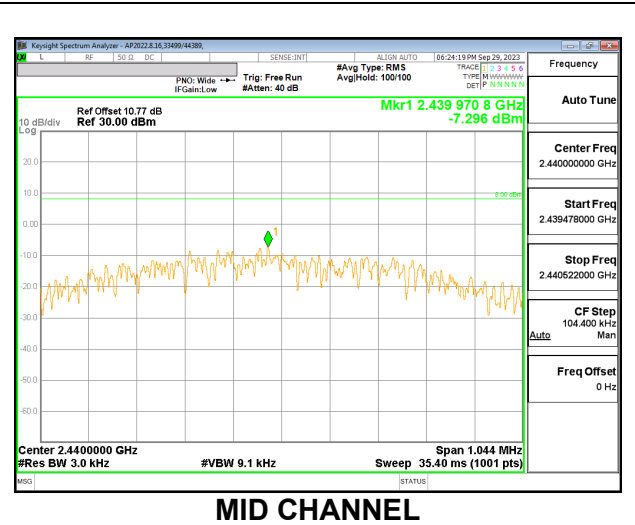
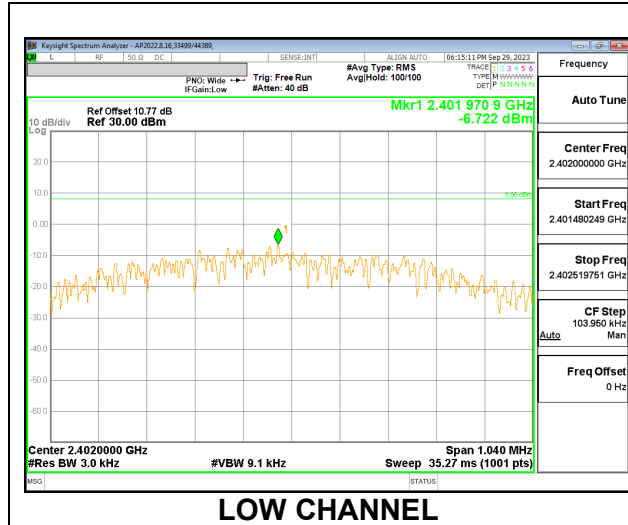
FCC §15.247 (e)
 RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

9.6.1. BLE (1Mbps)

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-6.722	8	-14.72
Middle	2440	-7.296	8	-15.30
High	2480	-7.988	8	-15.99



9.7. CONDUCTED SPURIOUS EMISSIONS

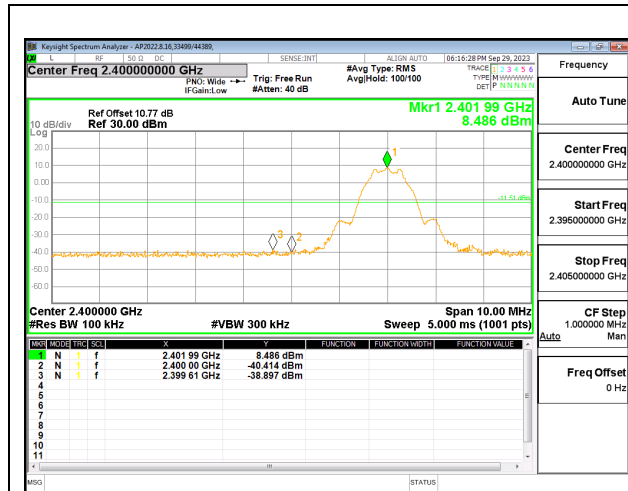
LIMITS

FCC §15.247 (d)
RSS-247 5.5

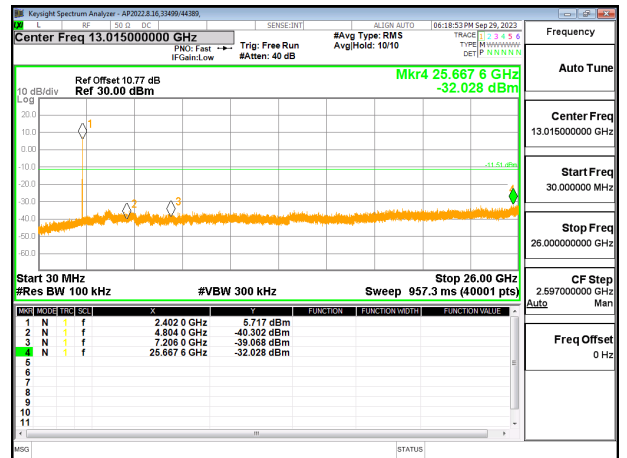
Output power was measured based on the use of a peak measurement; therefore the required attenuation is -20 dBc.

RESULTS

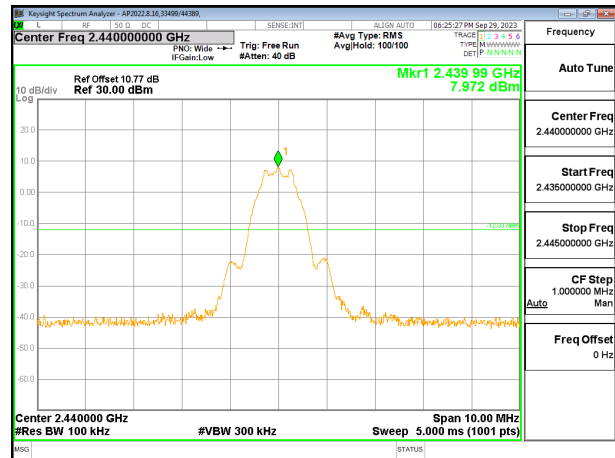
9.7.1. BLE (1Mbps)



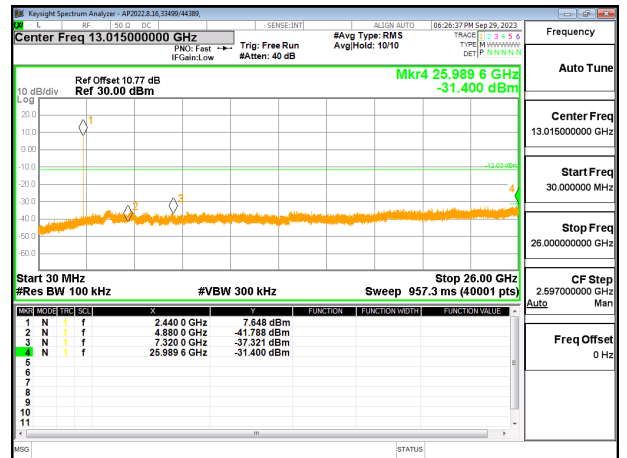
LOW CHANNEL BANDEDGE



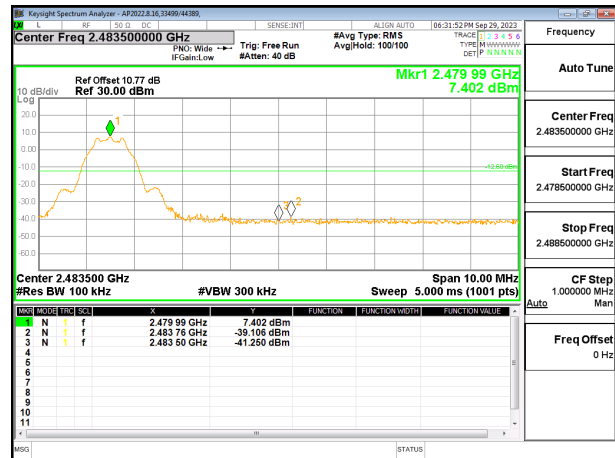
OUT-OF-BAND LOW CHANNEL



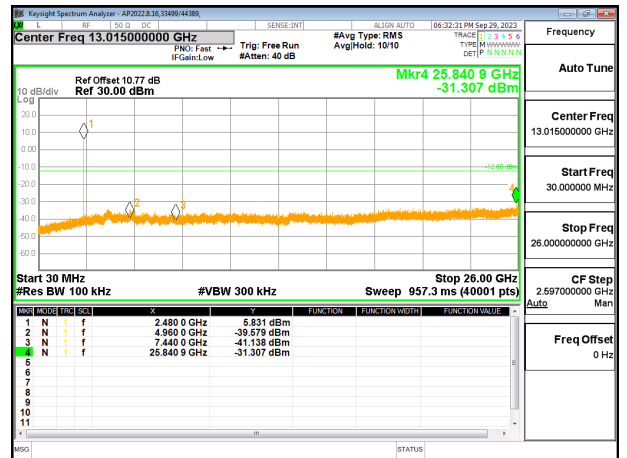
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uA/m) at 3 m	Field Strength Limit (dBuA/m) at 3 m
0.009-0.490	6.37/F(kHz) @ 300 m	-
0.490-1.705	63.7/F(kHz) @ 30 m	-
1.705 - 30	0.08 @ 30m	-
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements. Linear Voltage Averaging was used.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest power spectral density was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

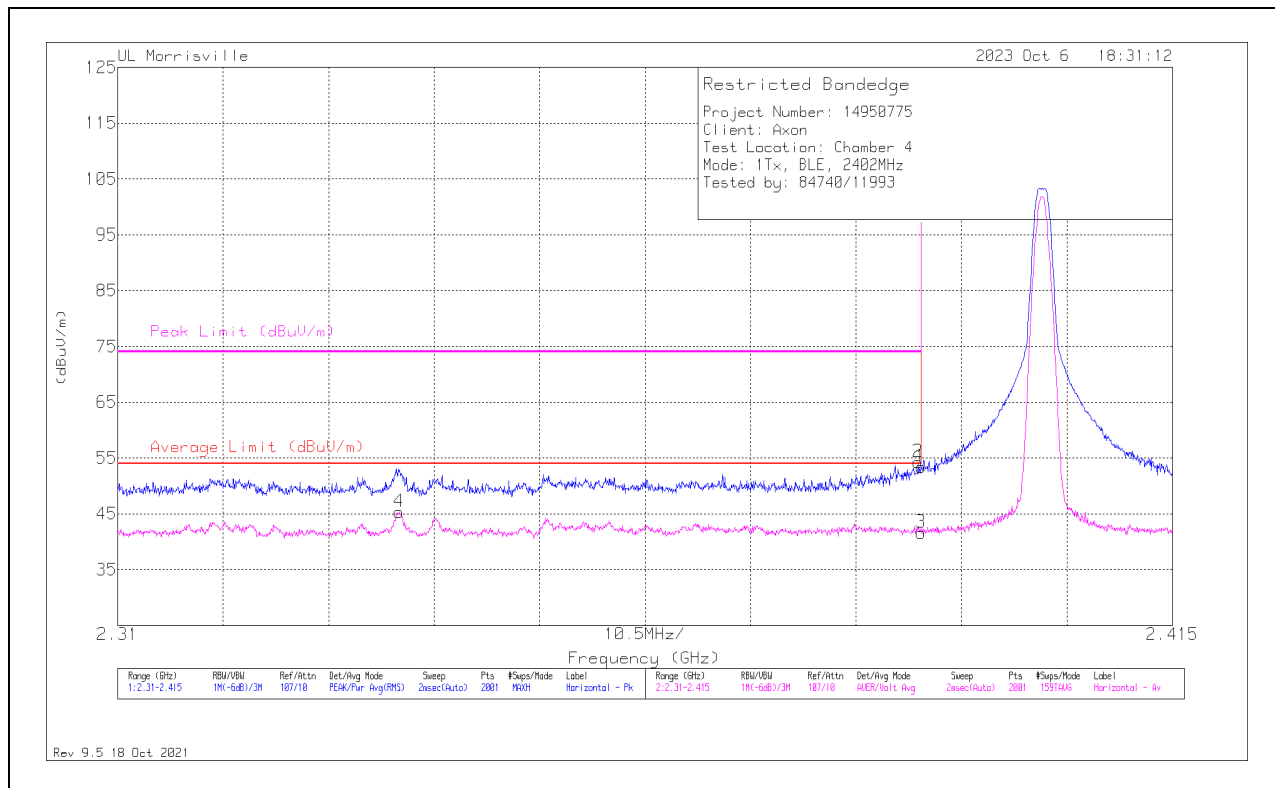
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.38996	34.63	Pk	32	-13.2	0	53.43	-	-	74	-20.57	68	117	H
2	*** 2.3897	35.46	Pk	32	-13.2	0	54.26	-	-	74	-19.74	68	117	H
3	*** 2.38996	18.73	ADV	32	-13.2	4.07	41.6	54	-12.4	-	-	68	117	H
4	*** 2.33804	22.51	ADV	31.9	-13.1	4.07	45.38	54	-8.62	-	-	68	117	H

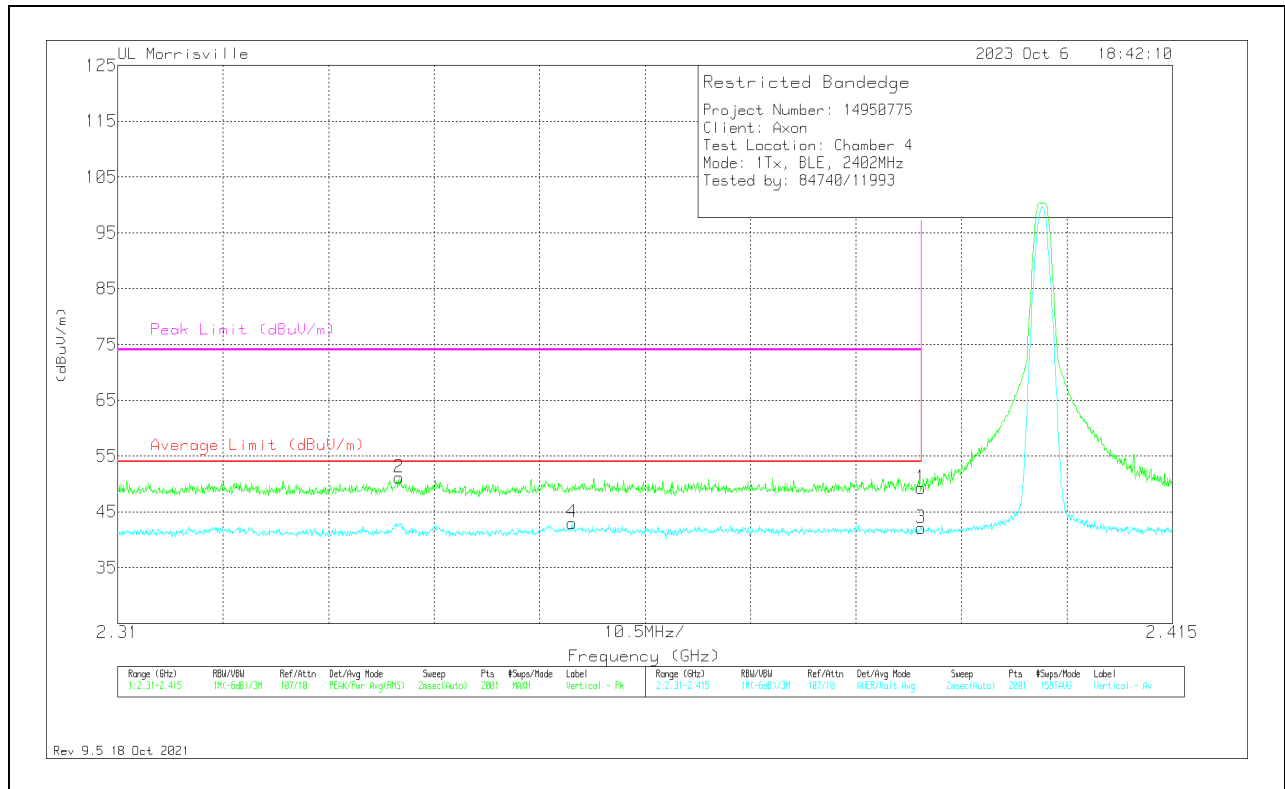
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT

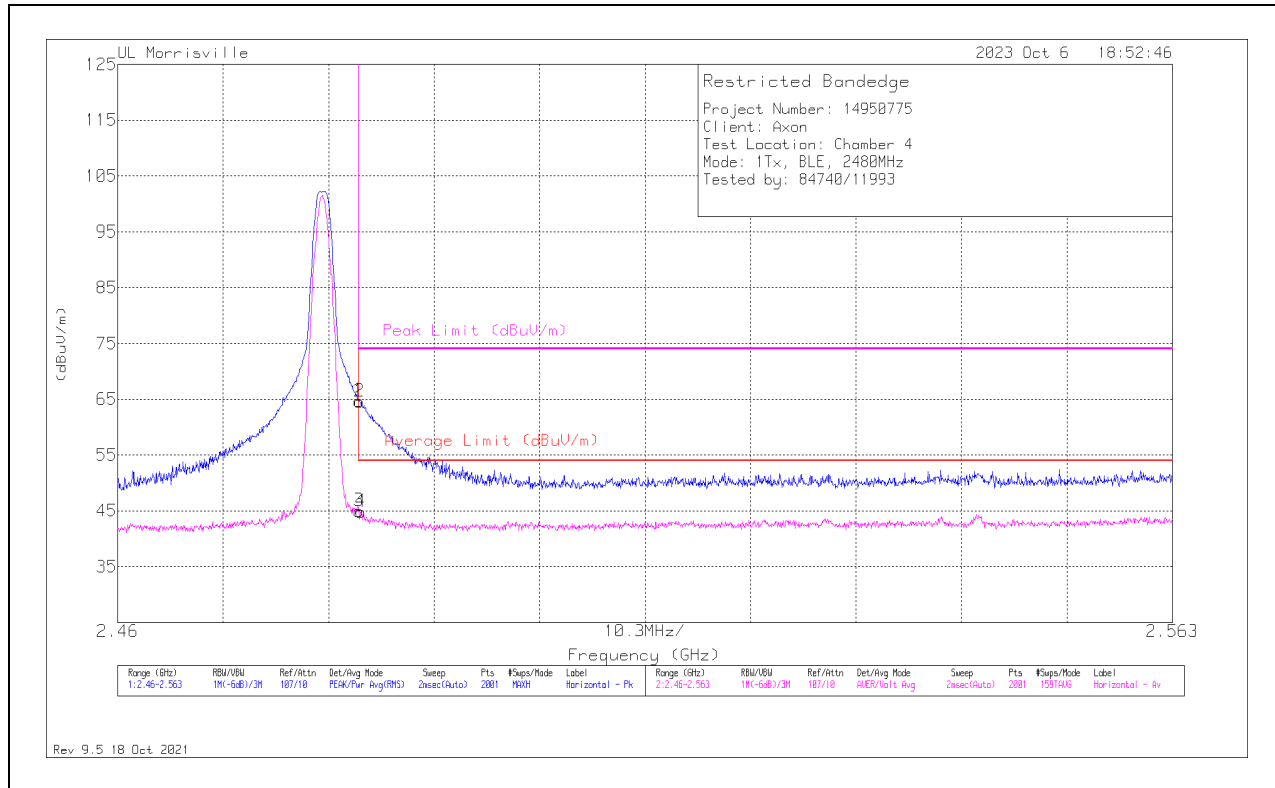


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	30.52	Pk	32	-13.2	0	49.32	-	-	74	-24.68	28	106	V
2	* ** 2.33798	32.31	Pk	31.9	-13.1	0	51.11	-	-	74	-22.89	28	106	V
3	* ** 2.38996	19.26	ADV	32	-13.2	4.07	42.13	54	-11.87	-	-	28	106	V
4	* ** 2.3552	20.16	ADV	31.9	-13.1	4.07	43.03	54	-10.97	-	-	28	106	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	45.26	Pk	32.3	-12.9	0	64.66	-	-	74	-9.34	70	103	H
2	* ** 2.48364	45.22	Pk	32.3	-12.9	0	64.62	-	-	74	-9.38	70	103	H
3	* ** 2.48354	21.44	ADV	32.3	-12.9	4.07	44.91	54	-9.09	-	-	70	103	H
4	* ** 2.48374	21.36	ADV	32.3	-12.9	4.07	44.83	54	-9.17	-	-	70	103	H

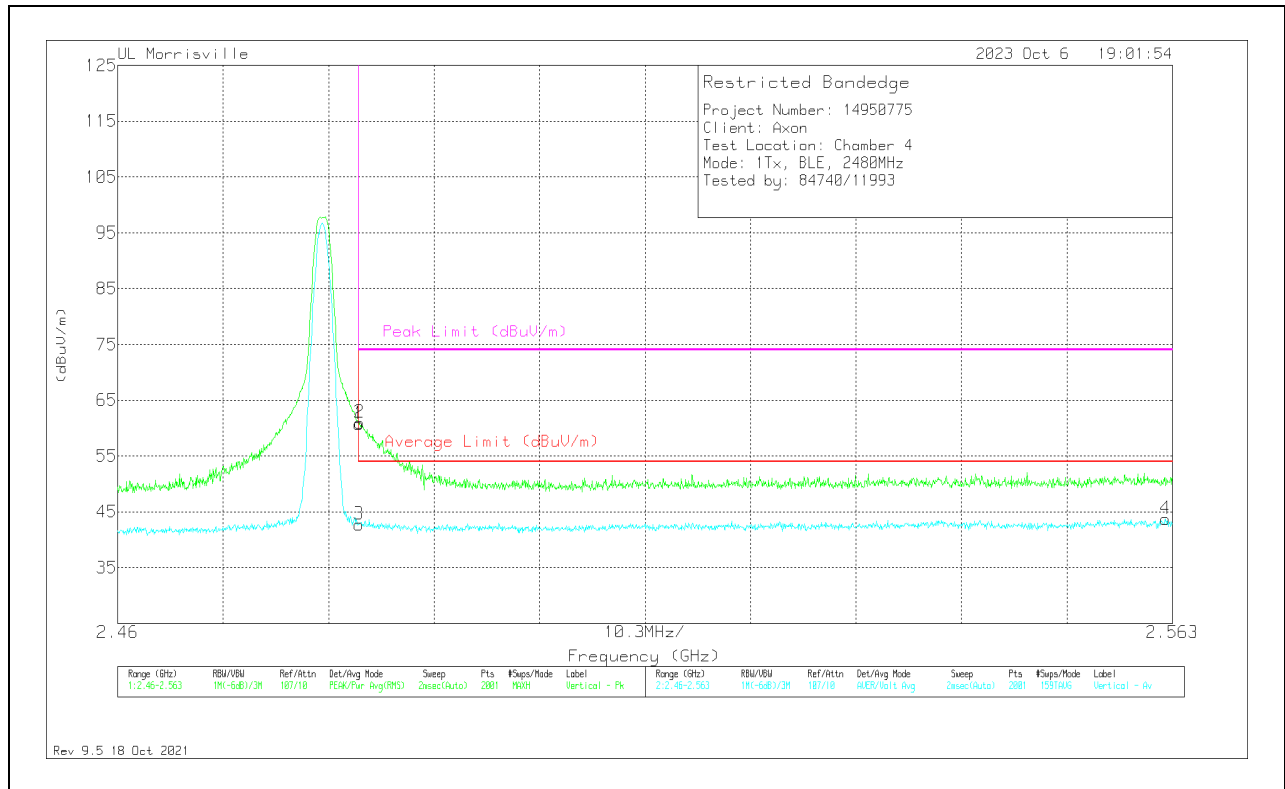
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT

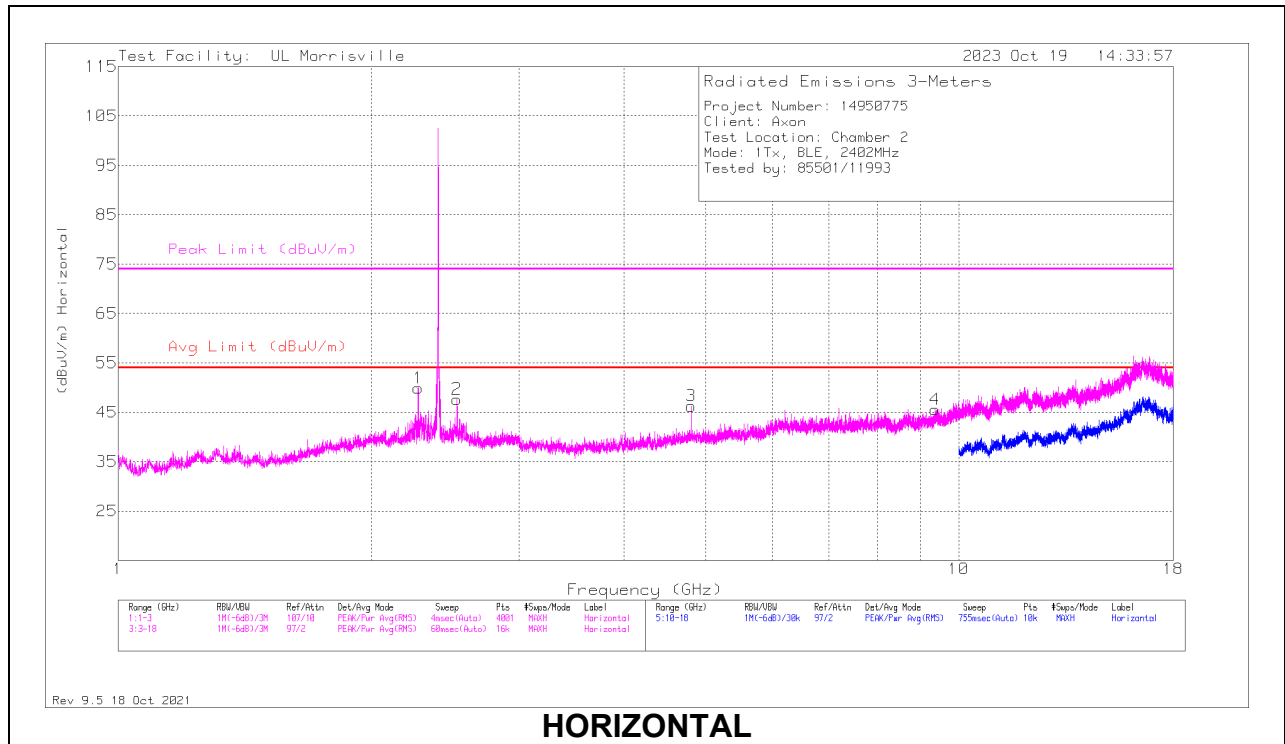


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	41.29	Pk	32.3	-12.9	0	60.69	-	-	74	-13.31	19	101	V
2	* ** 2.48364	41.53	Pk	32.3	-12.9	0	60.93	-	-	74	-13.07	19	101	V
3	* ** 2.48354	19.26	ADV	32.3	-12.9	4.07	42.73	54	-11.27	-	-	19	100	V
4	** 2.56233	19.95	ADV	32.5	-12.8	4.07	43.72	54	-10.28	-	-	19	100	V

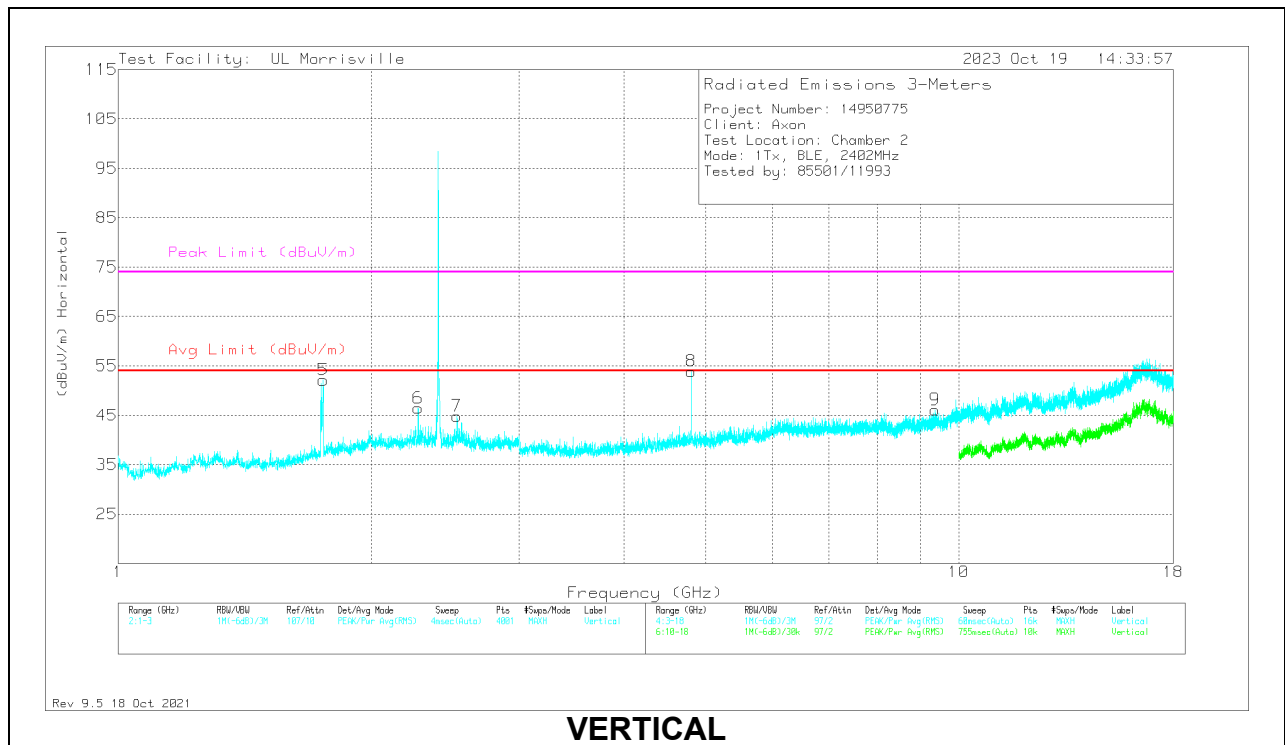
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 ** - indicates frequency in Taiwan NCC LP0002 Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	86408 (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.27368	45.59	PK2	32	-23.6	0	53.99	-	-	74	-20.01	308	104	H
	* ** 2.27407	36.98	ADV	32	-23.6	4.07	49.45	54	-4.55	-	-	308	104	H
2	** 2.53	39.92	Pk	32.5	-24.8	0	47.62	54	-6.38	74	-26.38	0-360	200	H
5	** 1.75151	51.18	PK2	30.1	-22.6	0	58.68	-	-	74	-15.32	139	148	V
	** 1.75394	21.18	ADV	30.1	-22.7	4.07	32.65	54	-21.35	-	-	139	148	V
6	* ** 2.274	38.03	Pk	32	-23.6	0	46.43	54	-7.57	74	-27.57	0-360	200	V
7	** 2.53	37.15	Pk	32.5	-24.8	0	44.85	54	-9.15	74	-29.15	0-360	200	V
3	* ** 4.80375	42.07	Pk	34.2	-30	0	46.27	54	-7.73	74	-27.73	0-360	101	H
4	* ** 9.3675	34.95	Pk	36.1	-25.5	0	45.55	54	-8.45	74	-28.45	0-360	101	H
8	* ** 4.80348	50.83	PK2	34.2	-30	0	55.03	-	-	74	-18.97	298	113	V
	* ** 4.80399	42.78	ADV	34.2	-30	4.07	51.05	54	-2.95	-	-	298	113	V
9	* ** 9.36938	35.4	Pk	36.1	-25.4	0	46.1	54	-7.9	74	-27.9	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

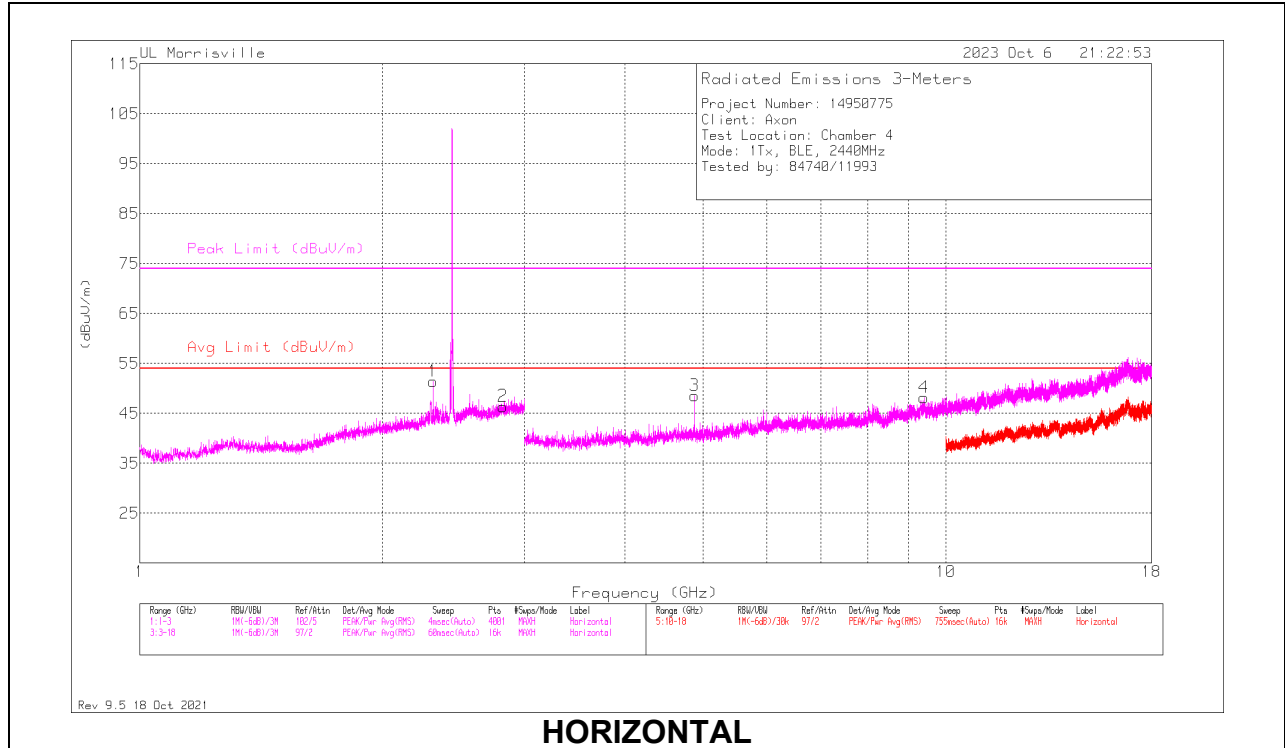
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

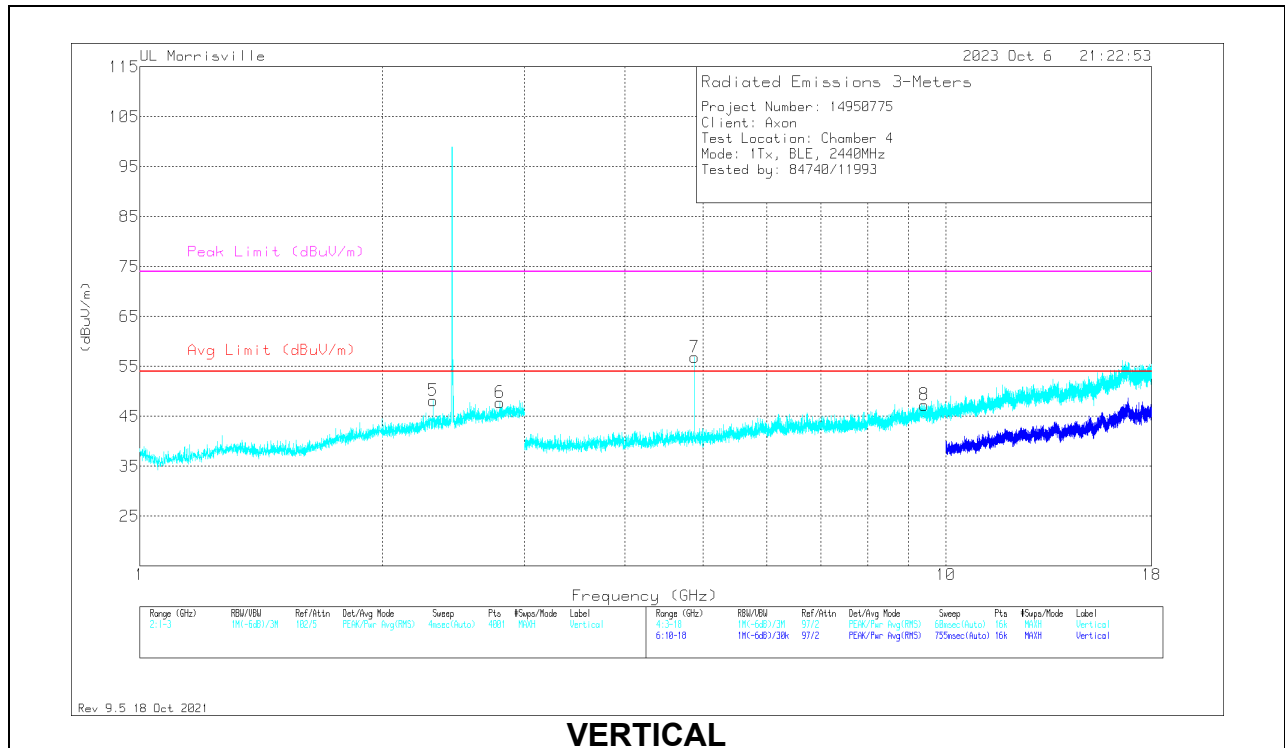
PK2 - Maximum Peak

ADV - Linear Voltage Average

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.31168	36.68	PK2	32	-13.2	0	55.48	-	-	74	-18.52	85	123	H
	* ** 2.31193	27.59	ADV	32	-13.2	4.07	50.46	54	-3.54	-	-	85	123	H
2	* ** 2.821	26.41	Pk	32.4	-12.4	0	46.41	54	-7.59	74	-27.59	0-360	100	H
5	* ** 2.31168	32.16	PK2	32	-13.2	0	50.96	-	-	74	-23.04	91	200	V
	* ** 2.31202	22.18	ADV	32	-13.2	4.07	45.05	54	-8.95	-	-	91	200	V
6	* ** 2.7975	27.46	Pk	32.6	-12.3	0	47.76	54	-6.24	74	-26.24	0-360	200	V
3	* ** 4.87944	48.44	PK2	34	-31.4	0	51.04	-	-	74	-22.96	360	143	H
	* ** 4.87968	37.47	ADV	34	-31.4	4.07	44.14	54	-9.86	-	-	360	143	H
4	* ** 9.39737	38.07	PK2	36.6	-25.6	0	49.07	-	-	74	-24.93	99	174	H
	* ** 9.39758	25.15	ADV	36.6	-25.6	4.07	40.22	54	-13.78	-	-	99	174	H
7	* ** 4.87996	50.81	PK2	34	-31.4	0	53.41	-	-	74	-20.59	135	170	V
	* ** 4.87992	41.68	ADV	34	-31.4	4.07	48.35	54	-5.65	-	-	135	170	V
8	* ** 9.40406	36.42	Pk	36.6	-25.7	0	47.32	54	-6.68	74	-26.68	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

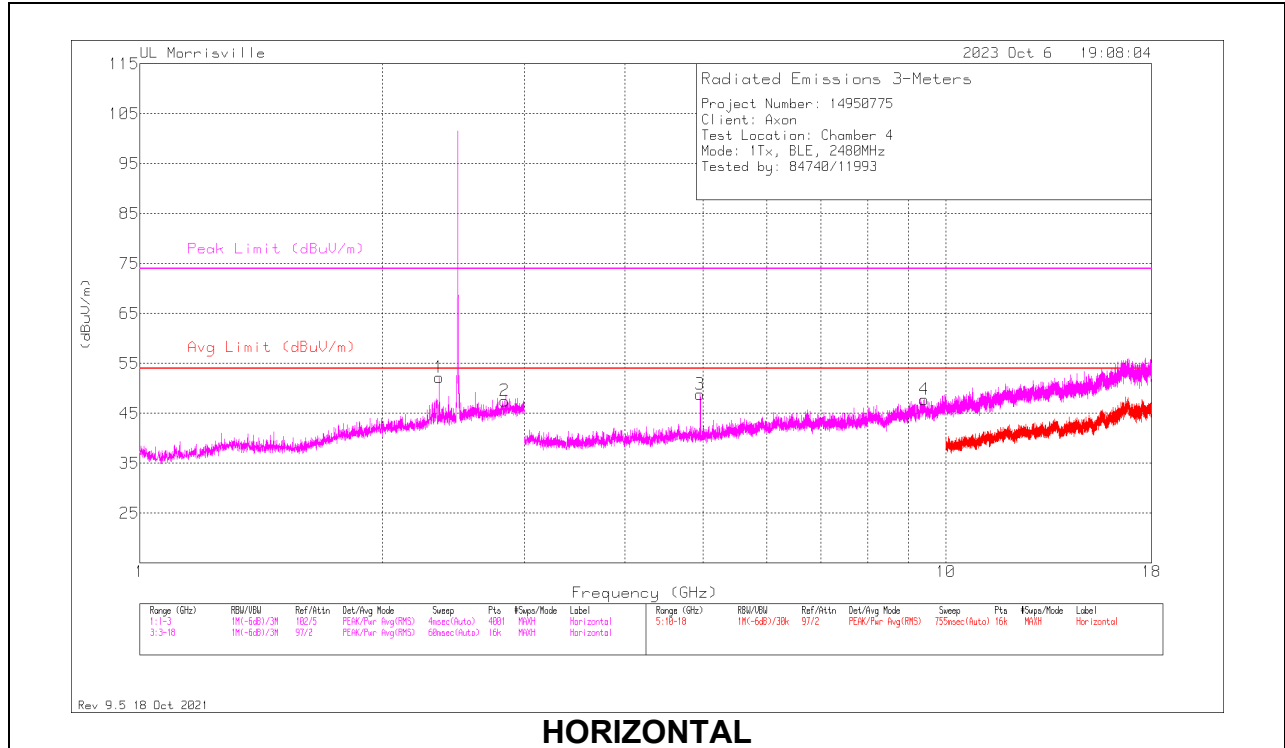
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

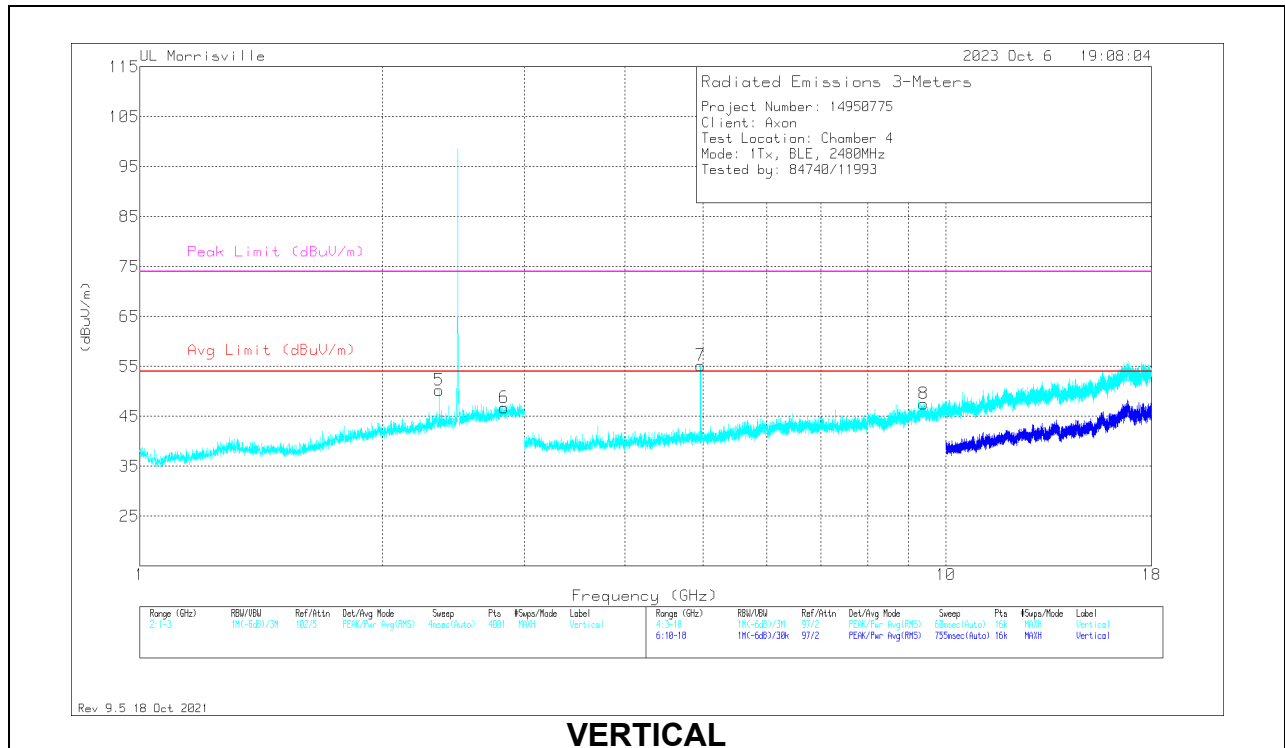
PK2 - Maximum Peak

ADV - Linear Voltage Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	89509 ACF (dB/m)	Gain/Loss (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.35179	37.76	PK2	31.8	-13	0	56.56	-	-	74	-17.44	85	102	H
	* ** 2.35201	28.26	ADV	31.8	-13	4.07	51.13	54	-2.87	-	-	85	102	H
2	* ** 2.835	27.37	Pk	32.4	-12.3	0	47.47	54	-6.53	74	-26.53	0-360	100	H
5	* ** 2.35187	32.79	PK2	31.8	-13	0	51.59	-	-	74	-22.41	113	190	V
	* ** 2.35193	22.73	ADV	31.8	-13	4.07	45.6	54	-8.4	-	-	113	190	V
6	* ** 2.829	26.6	Pk	32.4	-12.3	0	46.7	54	-7.3	74	-27.3	0-360	200	V
3	* ** 4.95979	48.16	PK2	33.9	-31.4	0	50.66	-	-	74	-23.34	69	107	H
	* ** 4.96013	39.49	ADV	33.9	-31.4	4.07	46.06	54	-7.94	-	-	69	107	H
4	* ** 9.39844	36.93	Pk	36.6	-25.7	0	47.83	54	-6.17	74	-26.17	0-360	100	H
7	* ** 4.95947	50.44	PK2	33.9	-31.4	0	52.94	-	-	74	-21.06	137	176	V
	* ** 4.95999	41.04	ADV	33.9	-31.4	4.07	47.61	54	-6.39	-	-	137	176	V
8	* ** 9.38438	35.92	Pk	36.6	-25	0	47.52	54	-6.48	74	-26.48	0-360	200	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

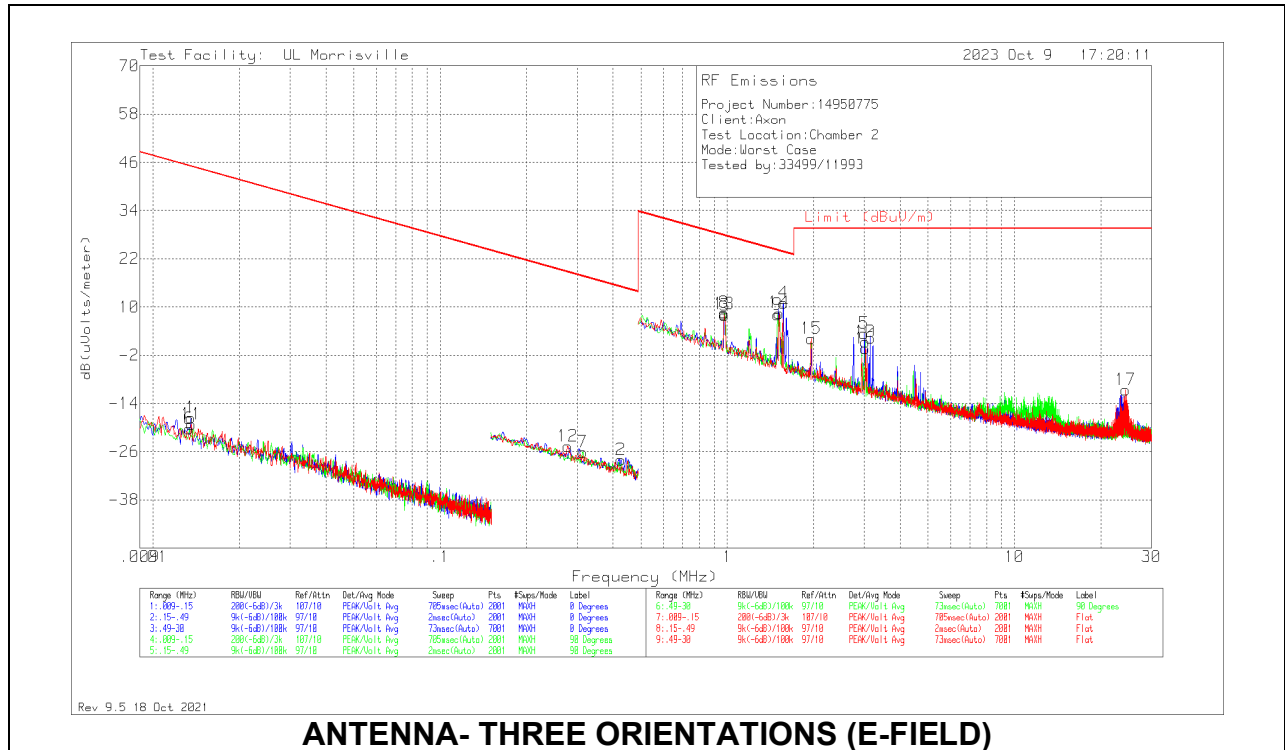
PK2 - Maximum Peak

ADV - Linear Voltage Average

10.3. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

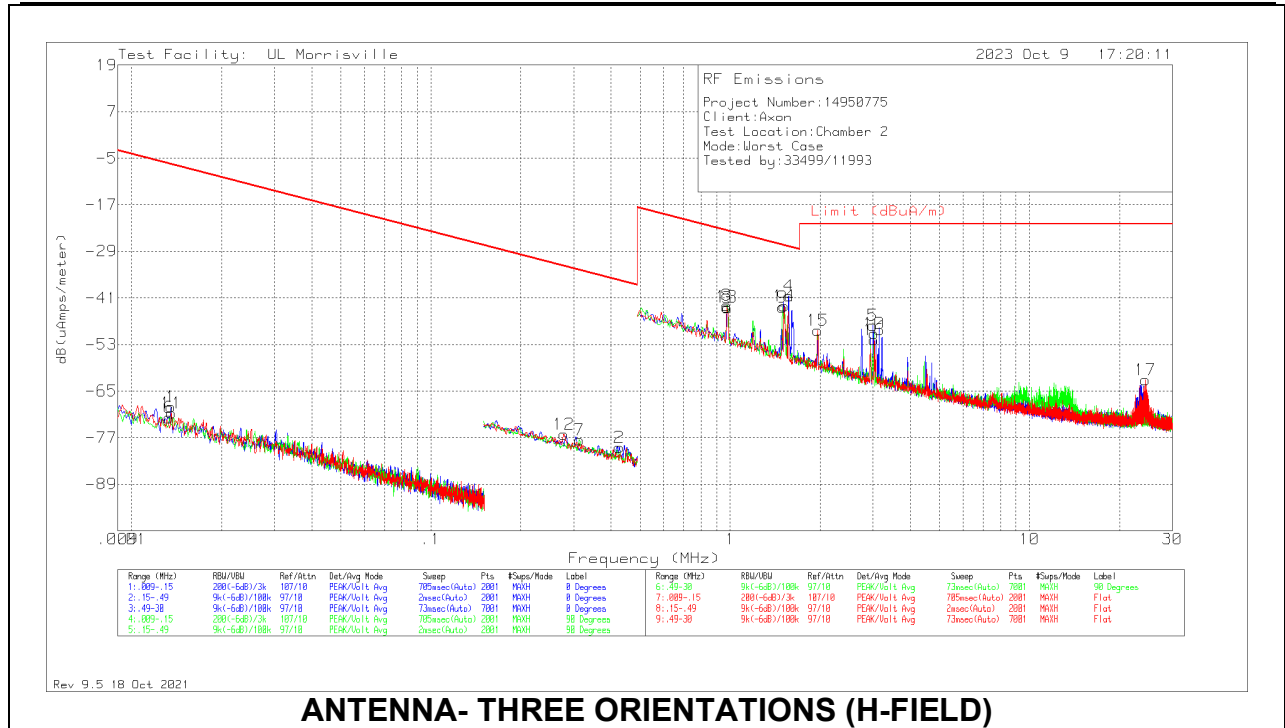
Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were $40 \cdot \log(\text{test distance} / \text{specification distance})$.



Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	QP/AV Limit (dBuV/m)	PK Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
6	.01333	41.73	Pk	17.8	.1	-80	-20.37	45.11	65.11	-65.48	0-360	90 degs
1	.01354	44.65	Pk	17.7	.1	-80	-17.55	44.97	64.97	-62.52	0-360	0 degs
11	.01362	42.97	Pk	17.7	.1	-80	-19.23	44.92	64.92	-64.15	0-360	Flat
12	.2781	43.05	Pk	12.2	.1	-80	-24.65	18.72	38.72	-43.37	0-360	Flat
7	.31363	41.63	Pk	12.2	.1	-80	-26.07	17.68	37.68	-43.75	0-360	90 degs
2	.42625	39.69	Pk	12.2	.1	-80	-28.01	15.01	35.01	-43.02	0-360	0 degs
8	.97484	36.15	Pk	12.2	.2	-40	8.55	27.83	-	-19.28	0-360	90 degs
13	.97484	35.78	Pk	12.2	.2	-40	8.18	27.83	-	-19.65	0-360	Flat
3	.97906	35.52	Pk	12.2	.2	-40	7.92	27.79	-	-19.87	0-360	0 degs
9	1.49341	35.7	Pk	12.2	.2	-40	8.1	24.12	-	-16.02	0-360	90 degs
14	1.51449	35.99	Pk	12.3	.2	-40	8.49	24	-	-15.51	0-360	Flat
4	1.5693	38.45	Pk	12.3	.2	-40	10.95	23.69	-	-12.74	0-360	0 degs
15	1.96138	29.57	Pk	12.3	.2	-40	2.07	29.54	-	-27.47	0-360	Flat
5	2.9943	30.92	Pk	12.2	.3	-40	3.42	29.54	-	-26.12	0-360	0 degs
10	3.02382	28.87	Pk	12.2	.3	-40	1.37	29.54	-	-28.17	0-360	90 degs
16	3.02803	27.19	Pk	12.2	.3	-40	-.31	29.54	-	-29.85	0-360	Flat
17	24.33148	19.44	Pk	9	.9	-40	-10.66	29.54	-	-40.2	0-360	Flat

Pk - Peak detector



ANTENNA- THREE ORIENTATIONS (H-FIELD)

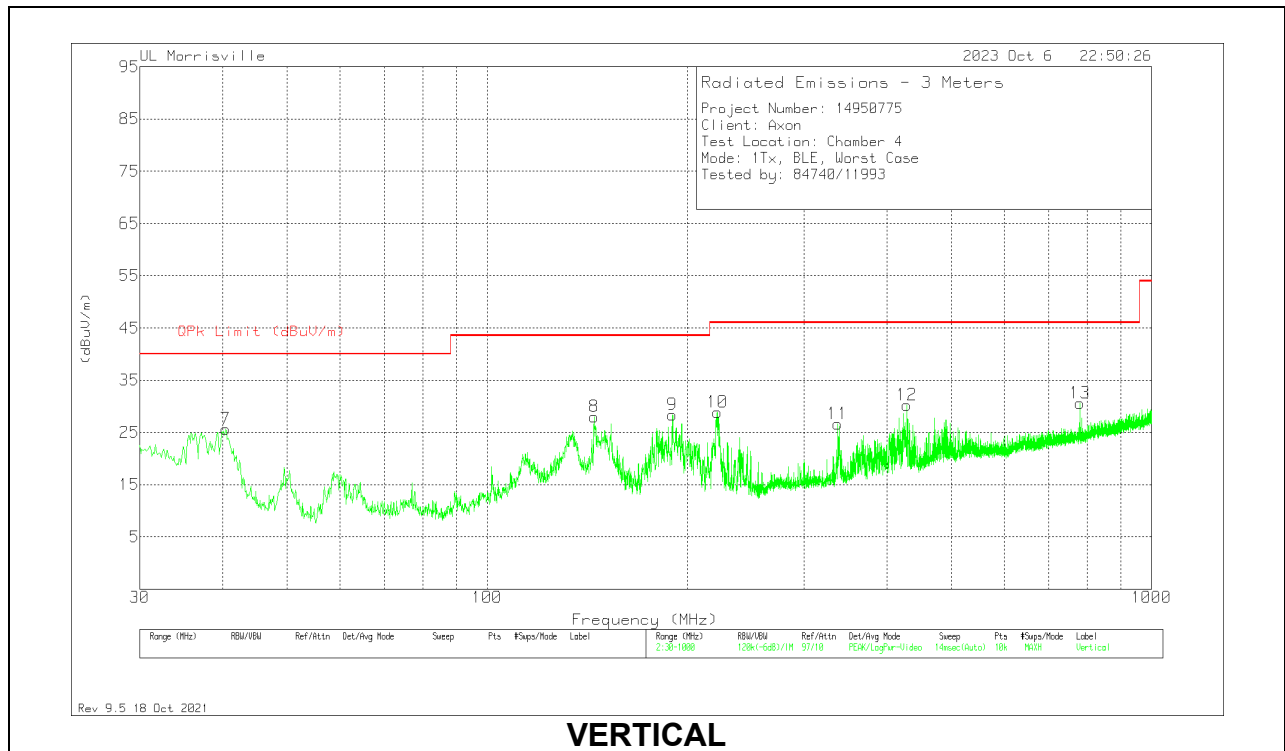
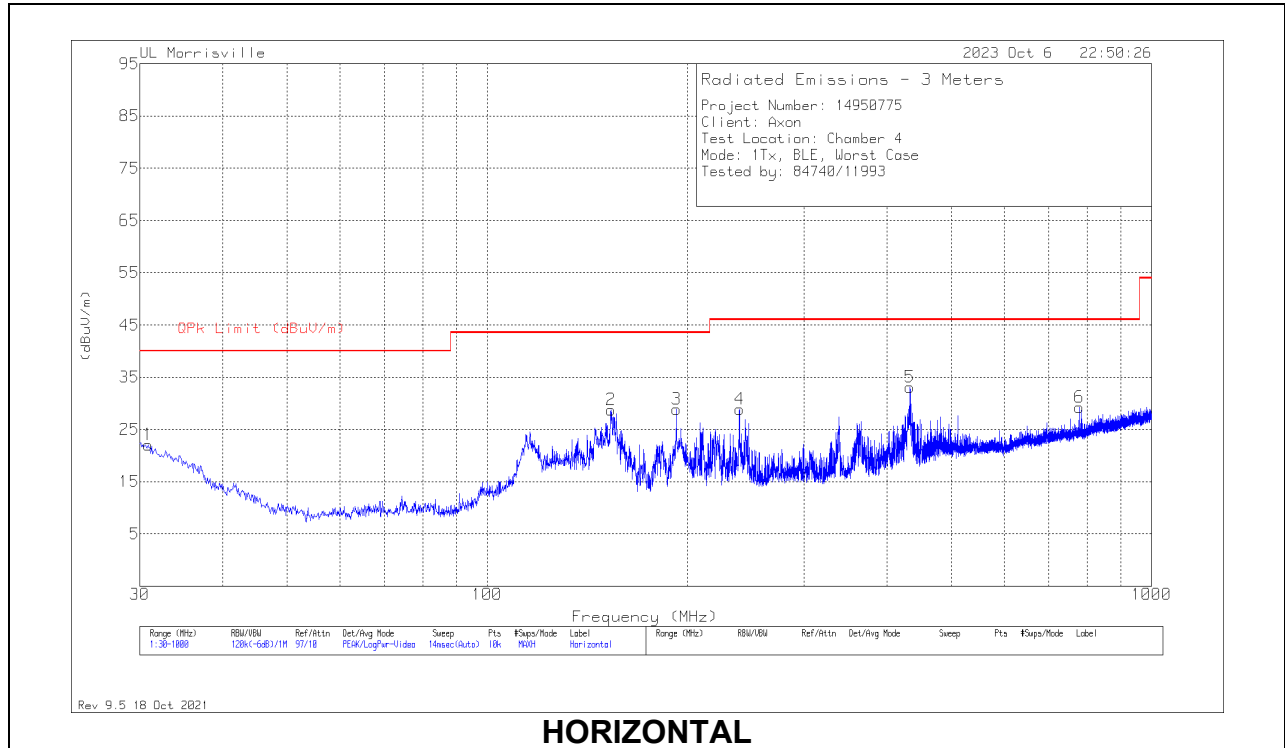
Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	QP/AV Limit (dBuA/m)	PK Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
6	.01333	41.73	Pk	-33.7	.1	-80	-71.87	-6.39	13.61	-65.48	0-360	90 degs
1	.01354	44.65	Pk	-33.8	.1	-80	-69.05	-6.53	13.47	-62.52	0-360	0 degs
11	.01362	42.97	Pk	-33.8	.1	-80	-70.73	-6.58	13.42	-64.15	0-360	Flat
12	.2781	43.05	Pk	-39.3	.1	-80	-76.15	-32.78	-12.78	-43.37	0-360	Flat
7	.31363	41.63	Pk	-39.3	.1	-80	-77.57	-33.82	-13.82	-43.75	0-360	90 degs
2	.42625	39.69	Pk	-39.3	.1	-80	-79.51	-36.49	-16.49	-43.02	0-360	0 degs
8	.97484	36.15	Pk	-39.3	.2	-40	-42.95	-23.67	-	-19.28	0-360	90 degs
13	.97484	35.78	Pk	-39.3	.2	-40	-43.32	-23.67	-	-19.65	0-360	Flat
3	.97906	35.52	Pk	-39.3	.2	-40	-43.58	-23.71	-	-19.87	0-360	0 degs
9	1.49341	35.7	Pk	-39.3	.2	-40	-43.4	-27.38	-	-16.02	0-360	90 degs
14	1.51449	35.99	Pk	-39.2	.2	-40	-43.01	-27.5	-	-15.51	0-360	Flat
4	1.5693	38.45	Pk	-39.2	.2	-40	-40.55	-27.81	-	-12.74	0-360	0 degs
15	1.96138	29.57	Pk	-39.2	.2	-40	-49.43	-21.96	-	-27.47	0-360	Flat
5	2.9943	30.92	Pk	-39.3	.3	-40	-48.08	-21.96	-	-26.12	0-360	0 degs
10	3.02382	28.87	Pk	-39.3	.3	-40	-50.13	-21.96	-	-28.17	0-360	90 degs
16	3.02803	27.19	Pk	-39.3	.3	-40	-51.81	-21.96	-	-29.85	0-360	Flat
17	24.33148	19.44	Pk	-42.5	.9	-40	-62.16	-21.96	-	-40.2	0-360	Flat

Pk - Peak detector

10.4. WORST CASE BELOW 1 GHZ

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



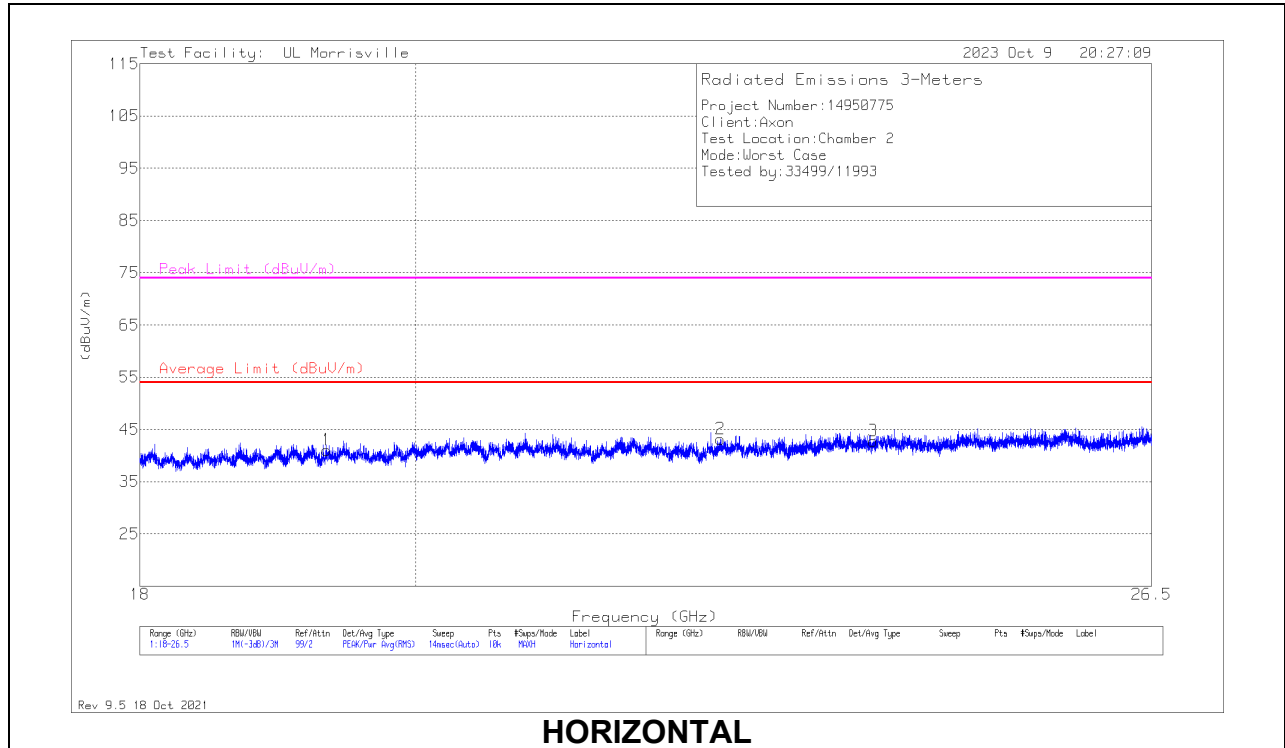
Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90629 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	30.873	27.65	Pk	26.5	-32.1	22.05	40	-17.95	0-360	100	H
2	153.772	41.08	Pk	18.7	-31.1	28.68	43.52	-14.84	0-360	200	H
3	192.766	42.08	Pk	17.7	-30.9	28.88	43.52	-14.64	0-360	100	H
4	239.908	41.81	Pk	17.7	-30.6	28.91	46.02	-17.11	0-360	100	H
5	433.132	40.26	Pk	22.6	-29.8	33.06	46.02	-12.96	0-360	100	H
6	778.355	30.46	Pk	27.2	-28.4	29.26	46.02	-16.76	0-360	100	H
7	40.379	38.19	Pk	19.4	-32	25.59	40	-14.41	0-360	100	V
8	144.848	40.32	Pk	18.8	-31.1	28.02	43.52	-15.5	0-360	100	V
9	190.147	41.81	Pk	17.5	-30.9	28.41	43.52	-15.11	0-360	100	V
10	221.963	42.78	Pk	16.8	-30.7	28.88	46.02	-17.14	0-360	100	V
11	337.199	36.62	Pk	20.1	-30.1	26.62	46.02	-19.4	0-360	100	V
12	428.379	37.47	Pk	22.5	-29.8	30.17	46.02	-15.85	0-360	100	V
13	780.004	31.81	Pk	27.2	-28.4	30.61	46.02	-15.41	0-360	100	V

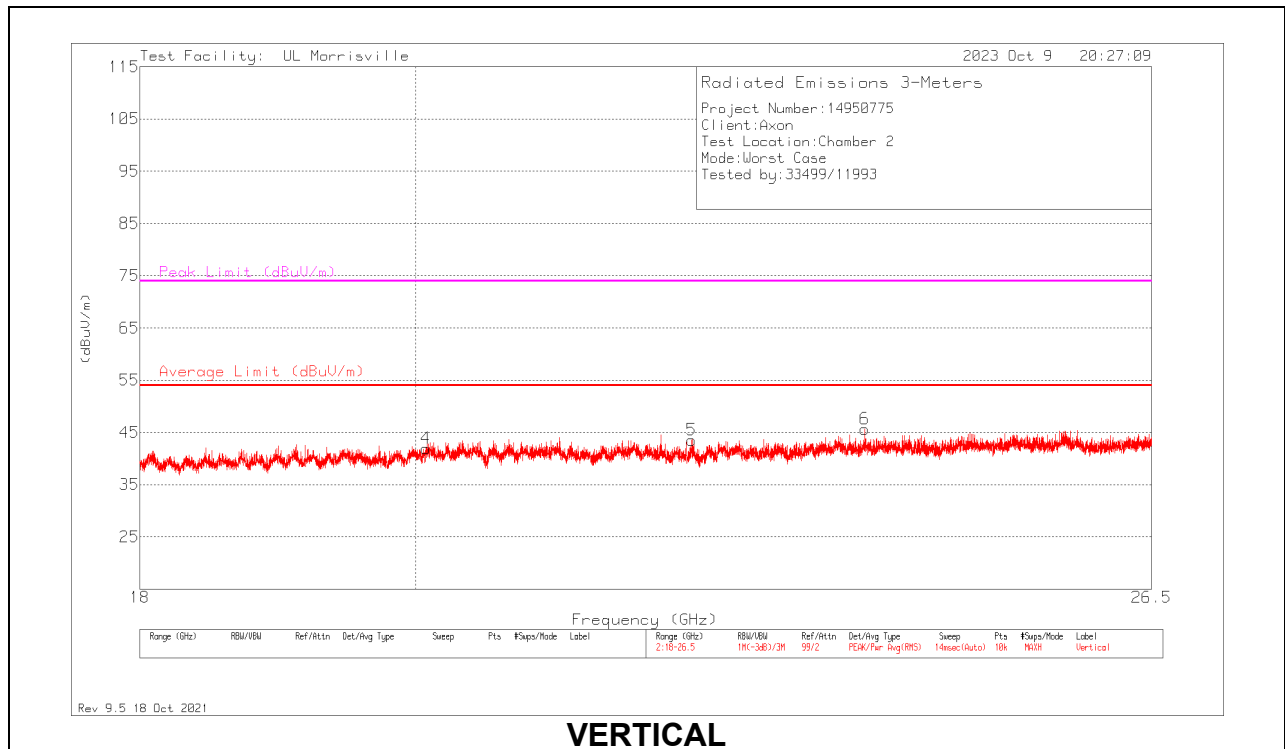
Pk - Peak detector

10.5. WORST CASE 18-26 GHZ

SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

18 – 26GHz Data

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	204704 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 19.33208	45.98	Pk	33.3	-38.2	41.08	54	-12.92	74	-32.92	0-360	150	H
2	* ** 22.47145	46.73	Pk	34.2	-37.8	43.13	54	-10.87	74	-30.87	0-360	250	H
3	* ** 23.82223	45.83	Pk	34.4	-37.5	42.73	54	-11.27	74	-31.27	0-360	250	H
4	* ** 20.08016	46.43	Pk	33.5	-38	41.93	54	-12.07	74	-32.07	0-360	250	V
5	* ** 22.22747	46.83	Pk	34.3	-37.6	43.53	54	-10.47	74	-30.47	0-360	101	V
6	* ** 23.75083	48.4	Pk	34.4	-37.2	45.6	54	-8.4	74	-28.4	0-360	250	V

Pk - Peak detector

11. SETUP PHOTOS

Please refer to R14950775-EP1 for setup photos

END OF TEST REPORT