TEST REPORT

Report Number: R14872513-E1

Applicant	:	Axon Enterprise Inc. 17800 North 85th Street Scottsdale, AZ 85255, USA
Model	:	VR1000
Brand	:	Axon
FCC ID	:	X4GS01834
IC	:	8803A-S01834
EUT Description	:	TASER 10 VR CONTROLLER
Test Standard(s)	:	FCC 47 CFR Part 15 Subpart C ISED RSS-247 Issue 2 ISED RSS-GEN Issue 5 + A1 + A2

Date Of Issue:
2023-08-03

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

ACCREDITED
CERT #0751.06

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-08-01	Initial Issue	B. Kiewra
V2	2023-08-03	Revised model and EUT descriptor	B. Kiewra

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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 10 VR CONTROLLER
MODEL:	VR1000
BRAND:	Axon
SERIAL NUMBER:	RF-RAD, RF-CON
SAMPLE RECEIPT DATE:	2023-07-11
DATE TESTED:	2023-07-19 to 2023-08-01

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Refer to Section 2
ISED RSS-247 Issue 2	Refer to Section 2
ISED RSS-GEN Issue 5 + A1 + A2	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:

Brian Kiewra
Project Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

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 + A1 + A2, and RSS-247 Issue 2.

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
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	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:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a rechargeable battery operated TASER 10 VR CONTROLLER with a BLE radio. Battery is only rechargeable once removed from EUT.

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	6.01	3.99

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:
The radio utilizes an 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, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power 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.

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Support Laptop	Dell	Inspiron 15 3000	P112F003	N/A
Laptop AC Adapter	Dell	DA65NM191	CN-0KPVMF-DES00-22N-A4N0A00	N/A
Dc Power Supply	Circuit Specialists	CSI30003X5	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 R14872513-EP1 for setup diagrams

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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.

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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/Brand	Model Number	Last Cal.	Next Cal.
210642	Environmental Meter	Fisher Scientific	15-077-963	2021-08-16	2023-08-16
135123	RF Power Meter	Keysight Technologies	N1911A	2022-09-10	2023-09-10
90417	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	N1912A	2023-06-26	2024-06-30
SA0026	Spectrum Analyzer	Keysight Technologies	N9030A	2022-08-02	2023-08-02
SOFTEMI	Antenna Port Software	UL	Version 2021.8.16		

Test Equipment Used - Wireless Conducted Attenuators, Cables, and Couplers

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
226561	SMA Coaxial 20dB Attenuator 25MHz-18GHz	CentricRF	C18S2-20	2023-02-16	2024-02-16

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

Equipment 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
30-1000 MHz					
90627	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2022-09-07	2023-09-07
1-18 GHz					
88761	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-09-13	2023-09-13
18-40 GHz					
78835	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2022-12-15	2023-12-15
Gain-Loss Chains					
91975	Gain-loss string: 0.009-30MHz	Various	Various	2023-06-06	2024-06-06
91978	Gain-loss string: 25-1000MHz	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					
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2023-03-24	2024-03-24
90416	Spectrum Analyzer	Keysight	N9030A	2023-06-09	2024-06-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
Additional Equipment used					
200540	Environmental Meter	Fisher Scientific	15-077-963	2022-10-05	2023-10-05

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

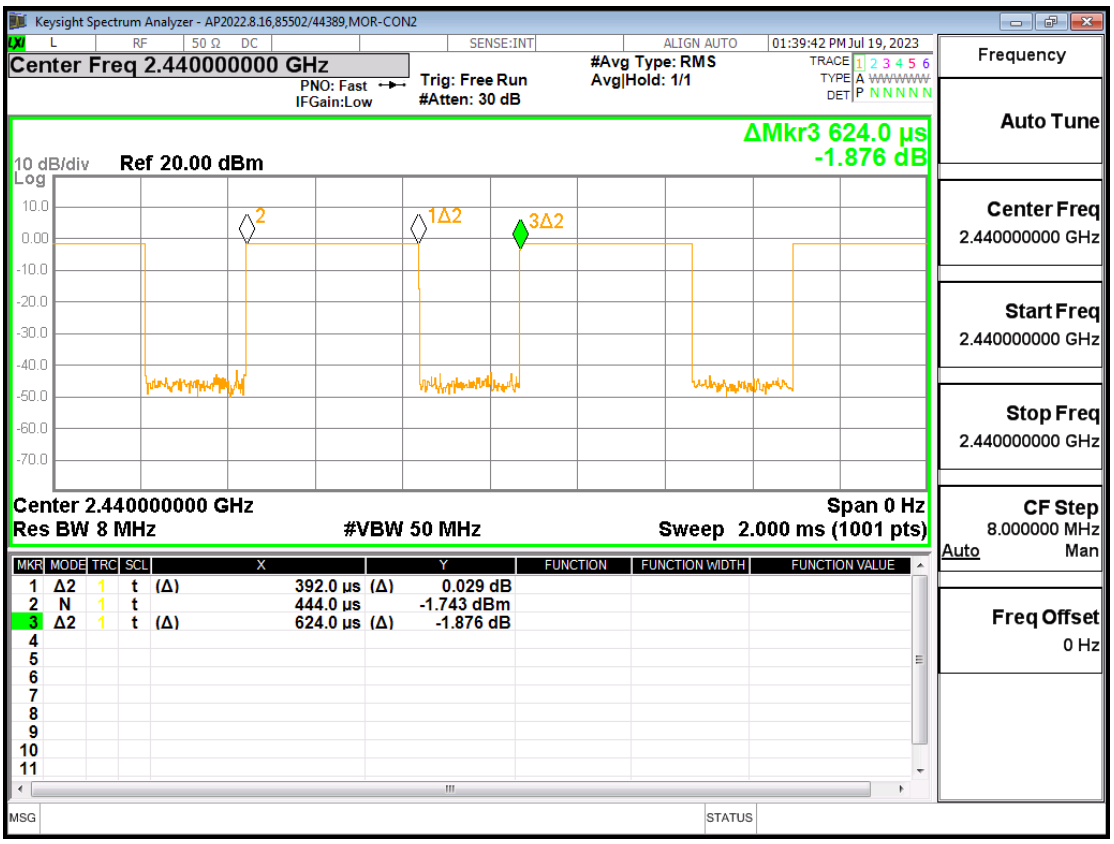
LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
2.4GHz Band					
BLE	0.392	0.624	0.628	62.82	4.04



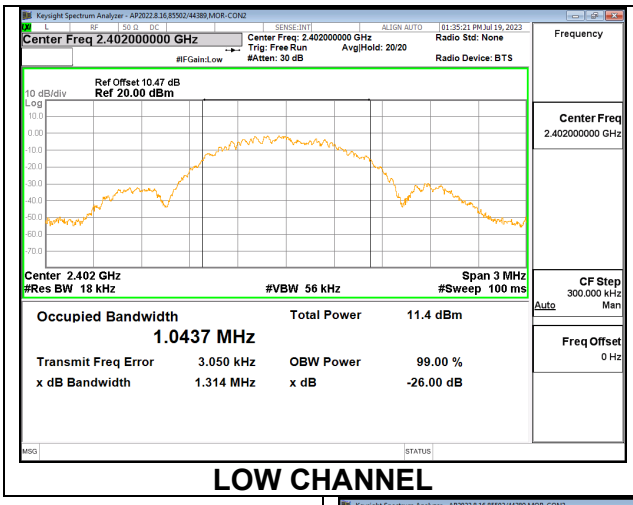
DUTY CYCLE BLE

9.2. 99% BANDWIDTH

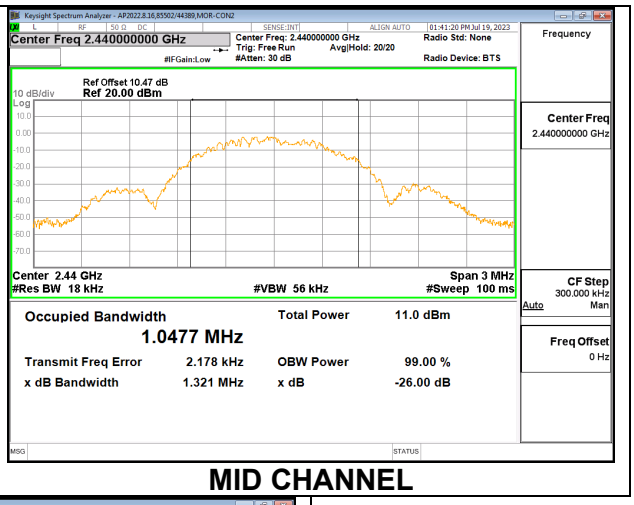
LIMITS

None; for reporting purposes only.

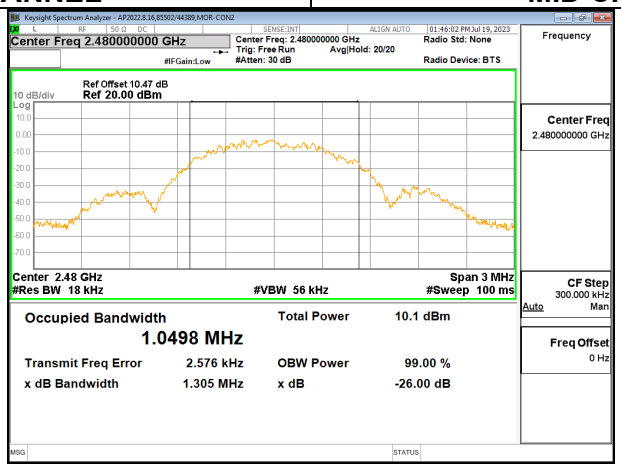
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0437
Middle	2440	1.0477
High	2480	1.0498



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

9.3. 6 dB BANDWIDTH

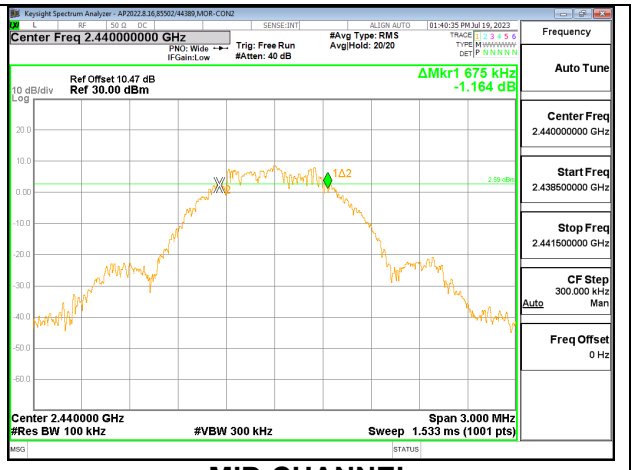
LIMITS

FCC §15.247 (a) (2)
RSS-247 5.2 (a)

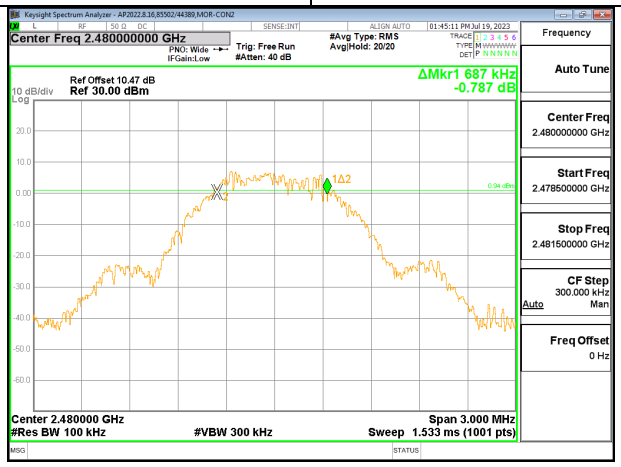
The minimum 6 dB bandwidth shall be at least 500 kHz.

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.675	0.5
Middle	2440	0.675	0.5
High	2480	0.687	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 10.47 dB (including 9.72 dB pad and 0.75 dB 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 power meter.

Tested By:	85502/44389
Date:	2023-08-01

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	6.01	30	-23.990
Middle	2440	5.36	30	-24.640
High	2480	4.60	30	-25.400

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 10.47 dB (including 9.72 dB pad and 0.75 dB 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.

Tested By:	85502/44389
Date:	2023-08-01

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	5.91
Middle	2440	5.26
High	2480	4.48

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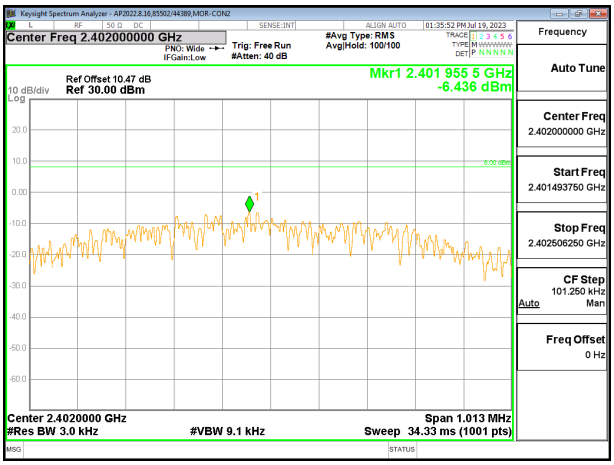
9.6. POWER SPECTRAL DENSITY

LIMITS

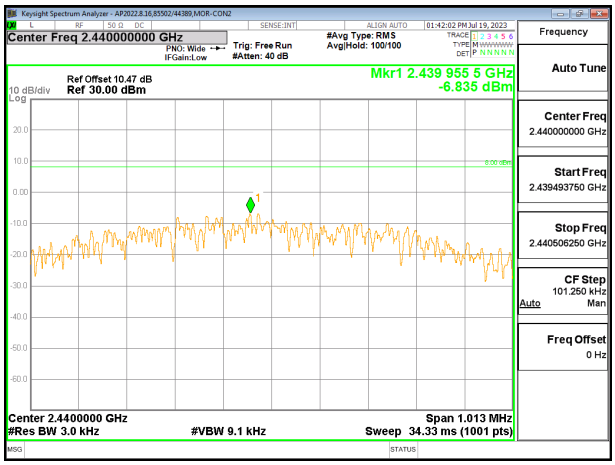
FCC §15.247 (e)
RSS-247 (5.2) (b)

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.

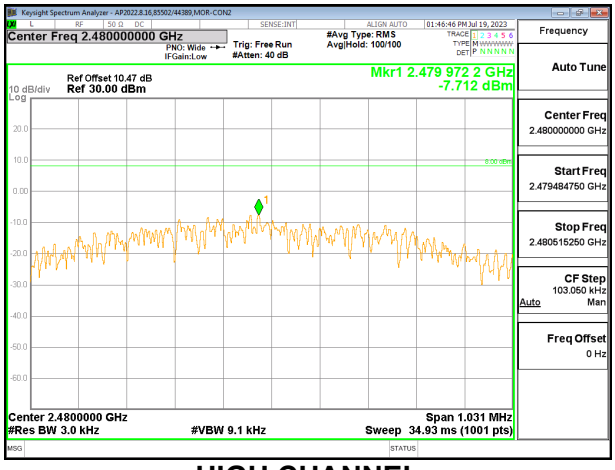
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	-6.436	8	-14.44
Middle	2440	-6.835	8	-14.84
High	2480	-7.712	8	-15.71



LOW CHANNEL



MID CHANNEL



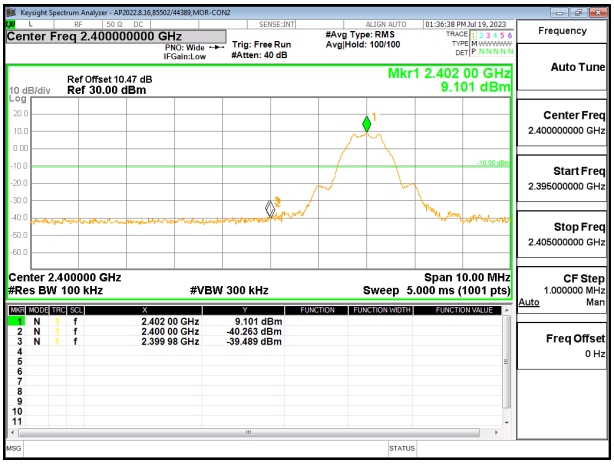
HIGH CHANNEL

9.7. CONDUCTED SPURIOUS EMISSIONS

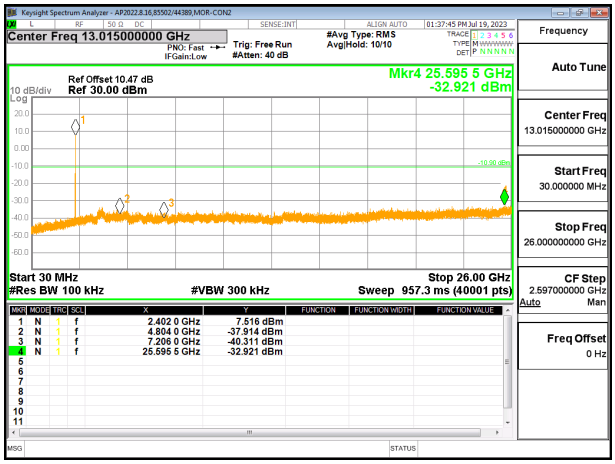
LIMITS

FCC §15.247 (d)
RSS-247 5.5

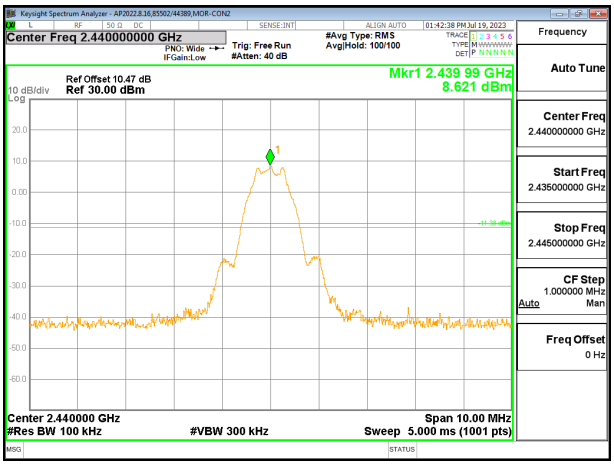
Output power was measured based on the use of a peak measurement, therefore the required attenuation is -20dBc.



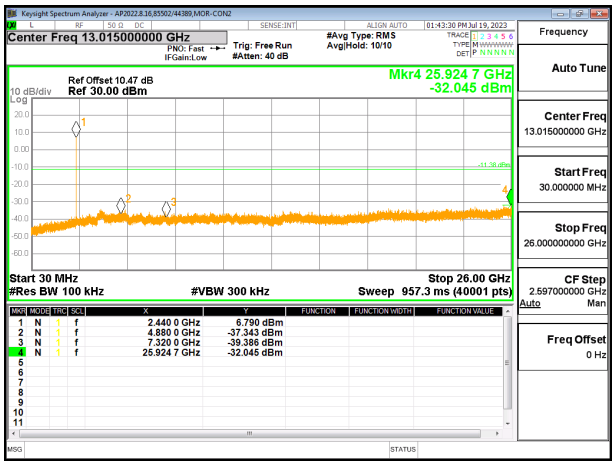
LOW CHANNEL BANDEDGE



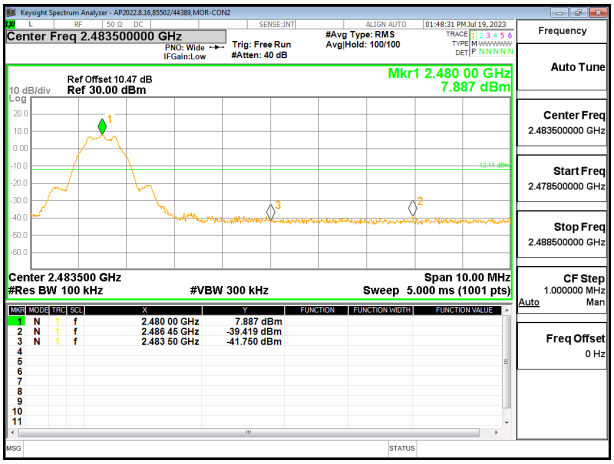
OUT-OF-BAND LOW CHANNEL



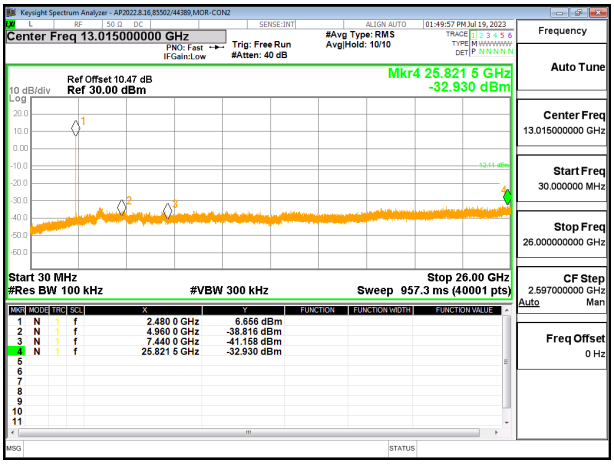
IN-BAND REFERENCE LEVEL



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 30 KHz 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.

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 output power 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).

Base 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.

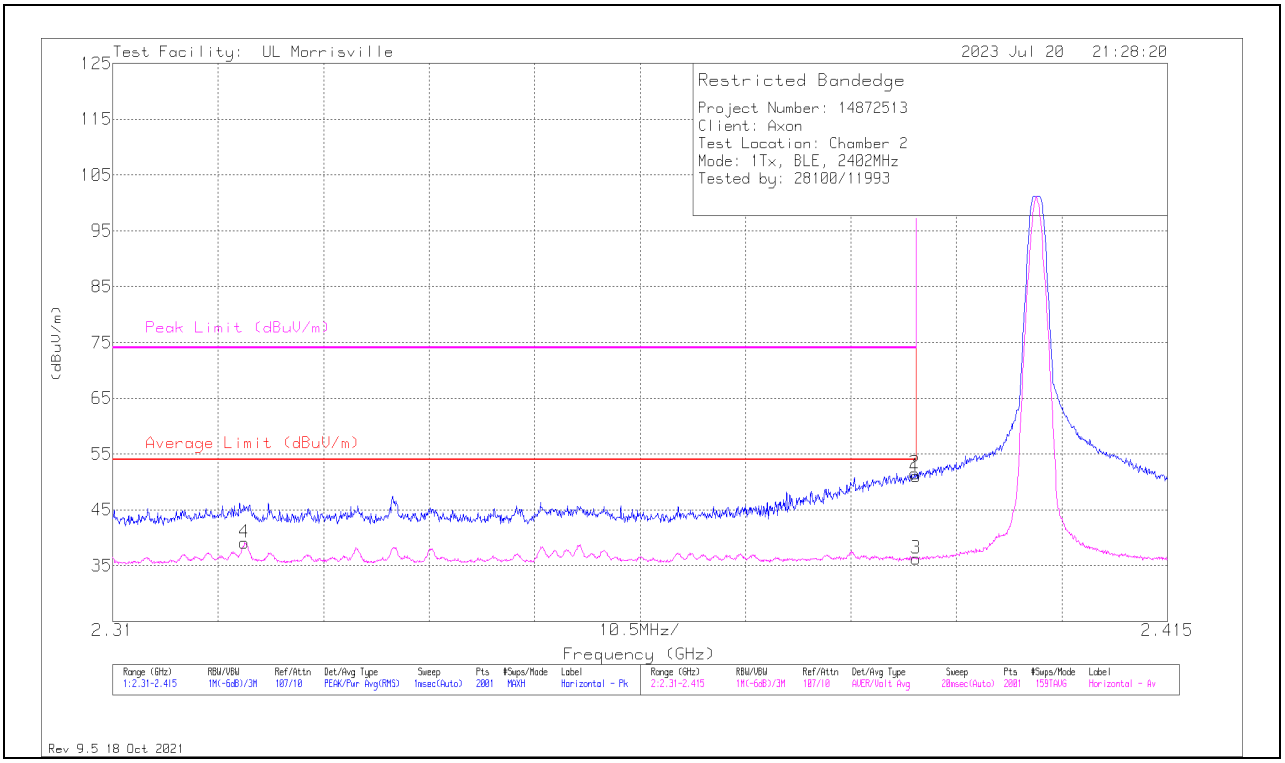
KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

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. BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	88761 (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	43.46	Pk	31.8	-24.2	0	51.06	-	-	74	-22.94	77	126	H
2	* ** 2.38985	43.94	Pk	31.8	-24.2	0	51.54	-	-	74	-22.46	77	126	H
3	* ** 2.38996	24.64	ADV	31.8	-24.2	4.04	36.28	54	-17.72	-	-	77	126	H
4	* ** 2.32313	26.97	ADV	31.9	-23.8	4.04	39.11	54	-14.89	-	-	77	126	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

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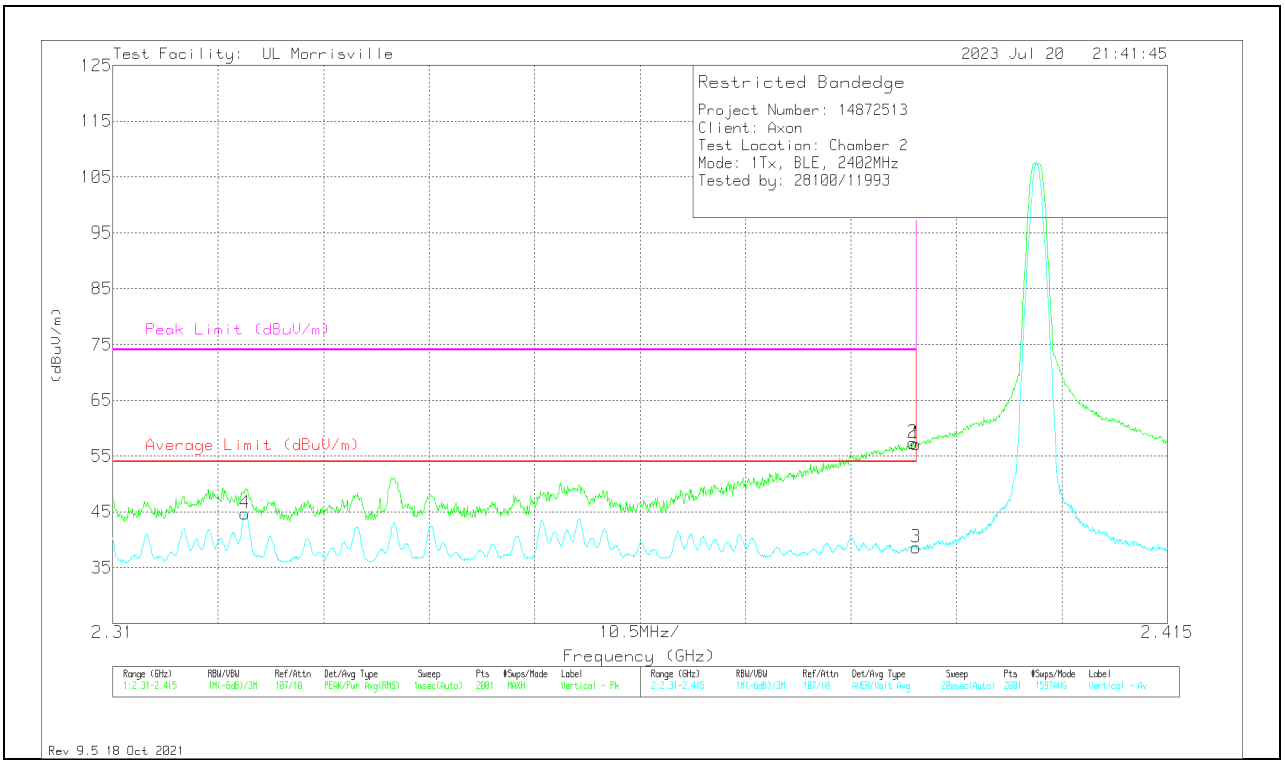
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	88761 (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	49.49	Pk	31.8	-24.2	0	57.09	-	-	74	-16.91	109	101	V
2	* ** 2.38964	49.75	Pk	31.8	-24.2	0	57.35	-	-	74	-16.65	109	101	V
3	* ** 2.38996	26.95	ADV	31.8	-24.2	4.04	38.59	54	-15.41	-	-	109	101	V
4	* ** 2.32318	32.6	ADV	31.9	-23.8	4.04	44.74	54	-9.26	-	-	109	101	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

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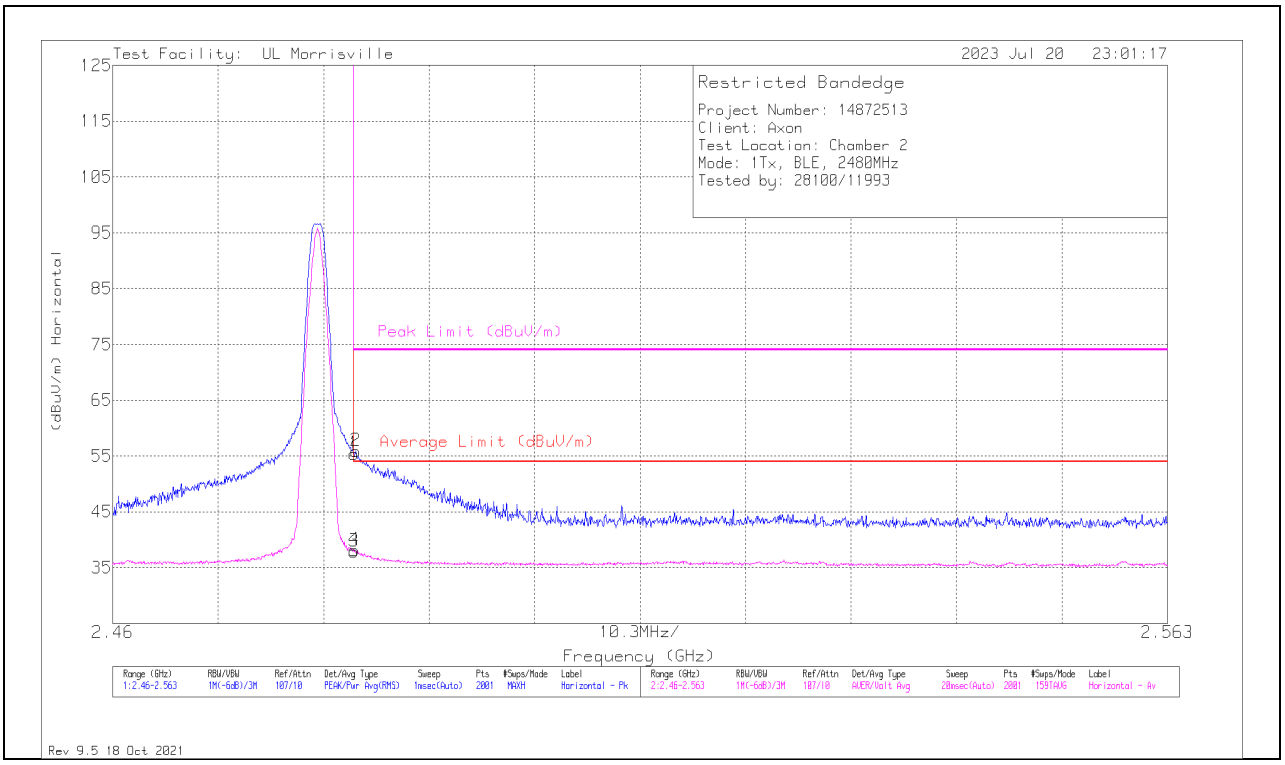
10.2.2. BANDEDGE (HIGH CHANNEL)

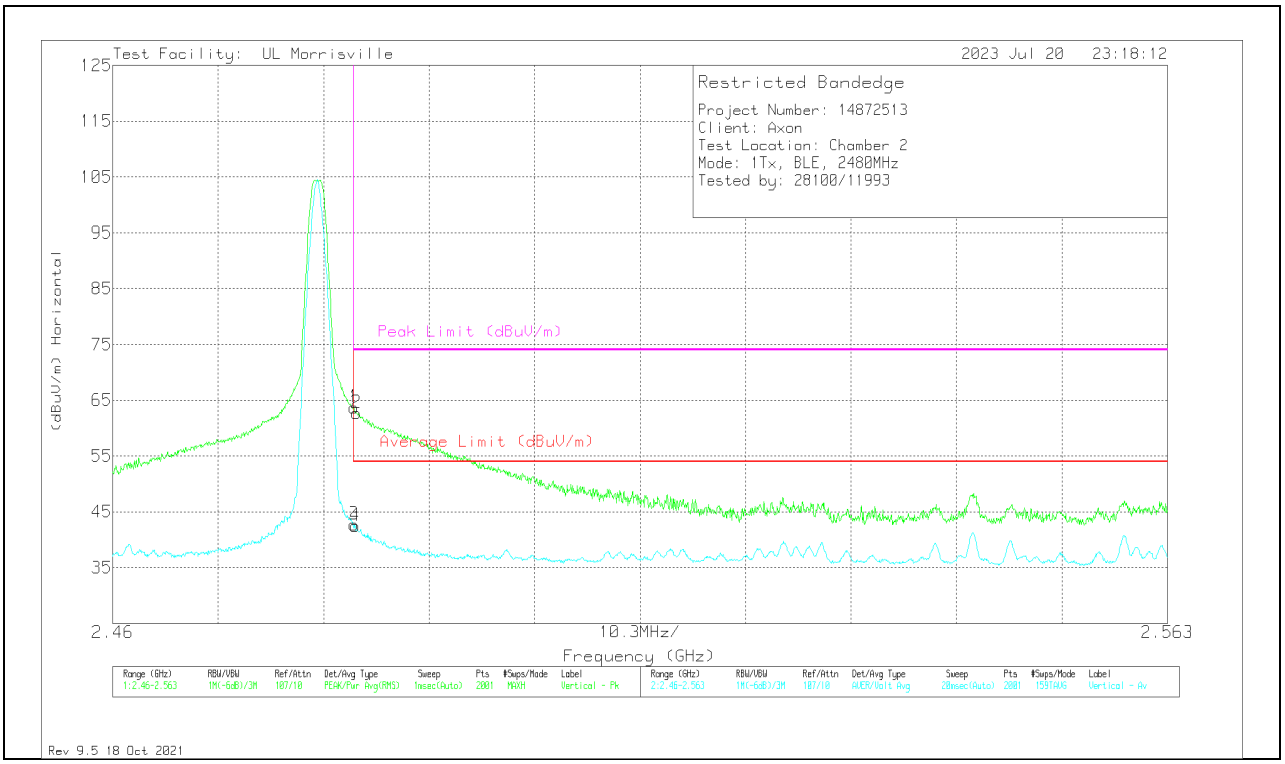
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	88761 (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	47.54	Pk	32.3	-24.5	0	55.34	-	-	74	-18.66	77	121	H
2	* ** 2.48374	48.08	Pk	32.3	-24.5	0	55.88	-	-	74	-18.12	77	121	H
3	* ** 2.48354	26	ADV	32.3	-24.5	4.04	37.84	54	-16.16	-	-	77	121	H
4	* ** 2.48359	26.27	ADV	32.3	-24.5	4.04	38.11	54	-15.89	-	-	77	121	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	88761 (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	55.92	Pk	32.3	-24.5	0	63.72	-	-	74	-10.28	112	112	V
2	* ** 2.48379	54.91	Pk	32.3	-24.5	0	62.71	-	-	74	-11.29	112	112	V
3	* ** 2.48354	30.9	ADV	32.3	-24.5	4.04	42.74	54	-11.26	-	-	112	112	V
4	* ** 2.48369	30.62	ADV	32.3	-24.5	4.04	42.46	54	-11.54	-	-	112	112	V

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

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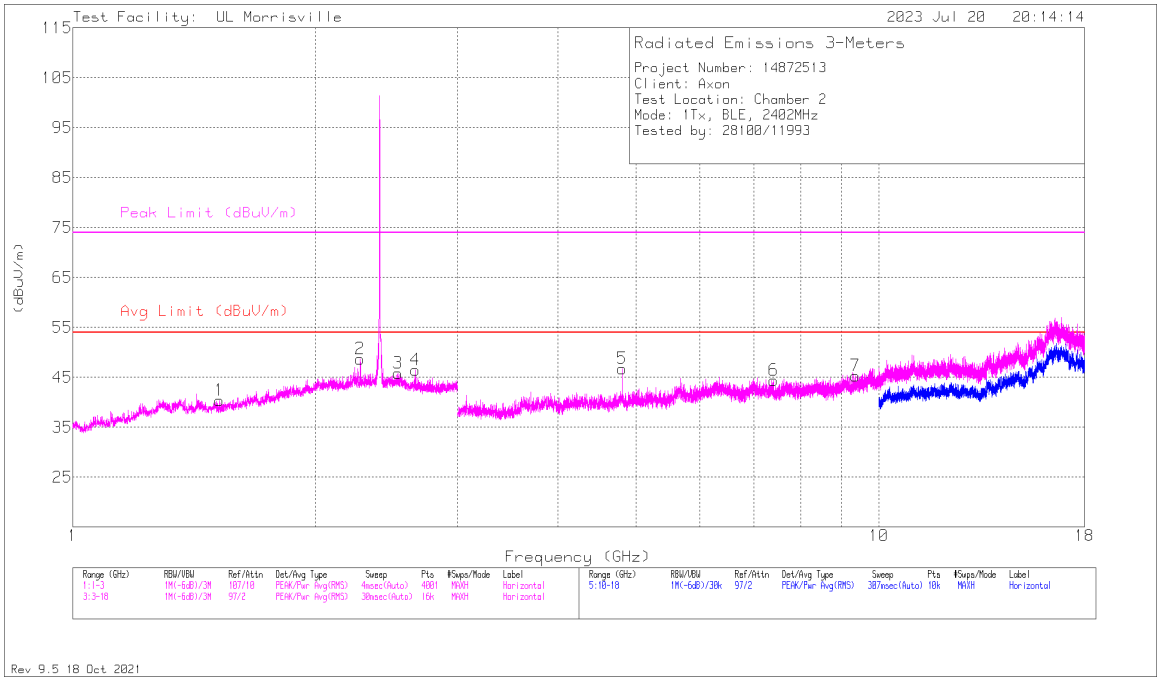
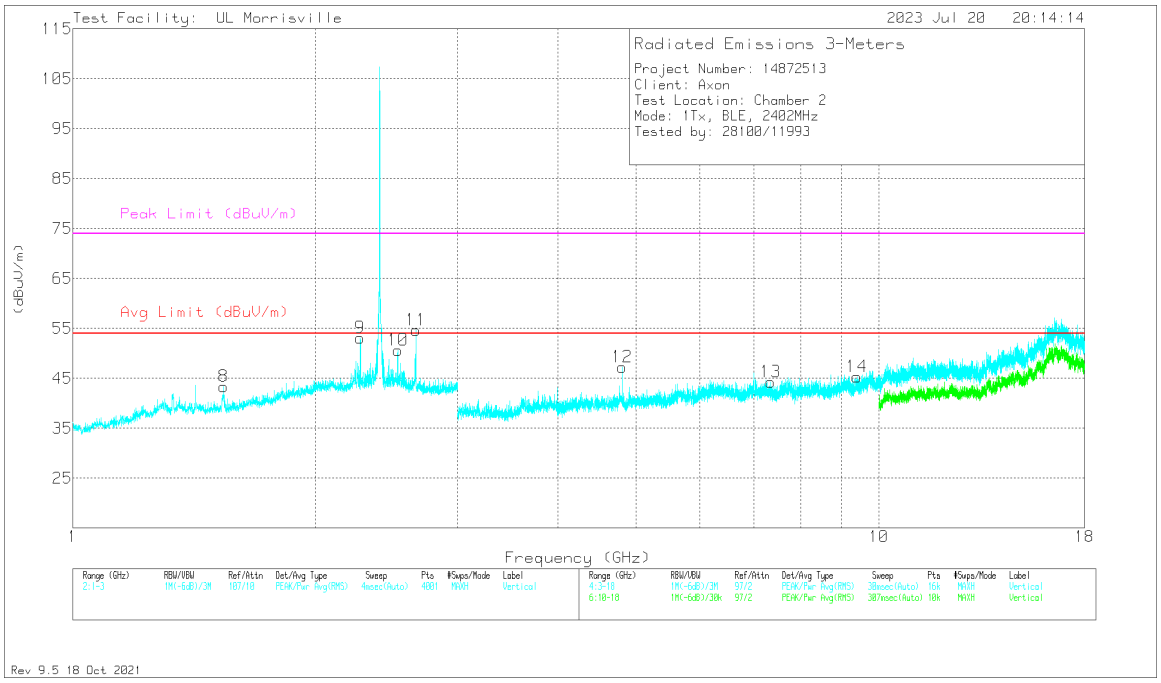
10.2.3. HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	88761 (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	* ** 1.5195	35.37	Pk	27.7	-22.7	0	40.37	54	-13.63	74	-33.63	0-360	199	H
2	* ** 2.27374	43.65	PK2	31.7	-23.6	0	51.75	-	-	74	-22.25	49	101	H
	* ** 2.27392	33.72	ADV	31.7	-23.6	4.04	45.86	54	-8.14	-	-	49	101	H
3	** 2.53	38.27	Pk	32.4	-24.8	0	45.87	54	-8.13	74	-28.13	0-360	199	H
4	* ** 2.66	39.76	Pk	32.2	-25.5	0	46.46	54	-7.54	74	-27.54	0-360	199	H
8	* ** 1.5395	38.3	Pk	27.8	-22.7	0	43.4	54	-10.6	74	-30.6	0-360	199	V
9	* ** 2.27386	46.51	PK2	31.7	-23.6	0	54.61	-	-	74	-19.39	106	112	V
	* ** 2.27397	37.28	ADV	31.7	-23.6	4.04	49.42	54	-4.58	-	-	106	112	V
10	** 2.52981	46.36	PK2	32.4	-24.8	0	53.96	-	-	74	-20.04	113	119	V
	** 2.5299	36.14	ADV	32.4	-24.8	4.04	47.78	54	-6.22	-	-	113	119	V
11	* ** 2.66514	54.59	PK2	32.2	-25.6	0	61.19	-	-	74	-12.81	225	127	V
	* ** 2.66521	25.16	ADV	32.2	-25.6	4.04	35.8	54	-18.2	-	-	225	127	V
5	* ** 4.80375	42.68	Pk	34	-30	0	46.68	54	-7.32	74	-27.32	0-360	200	H
6	* ** 7.40438	35.36	Pk	35.6	-26.6	0	44.36	54	-9.64	74	-29.64	0-360	200	H
7	* ** 9.34969	34.16	Pk	36.6	-25.5	0	45.26	54	-8.74	74	-28.74	0-360	200	H
12	* ** 4.80375	43.26	Pk	34	-30	0	47.26	54	-6.74	74	-26.74	0-360	101	V
13	* ** 7.33781	35.02	Pk	35.5	-26.3	0	44.22	54	-9.78	74	-29.78	0-360	101	V
14	* ** 9.39563	34.39	Pk	36.6	-25.7	0	45.29	54	-8.71	74	-28.71	0-360	101	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

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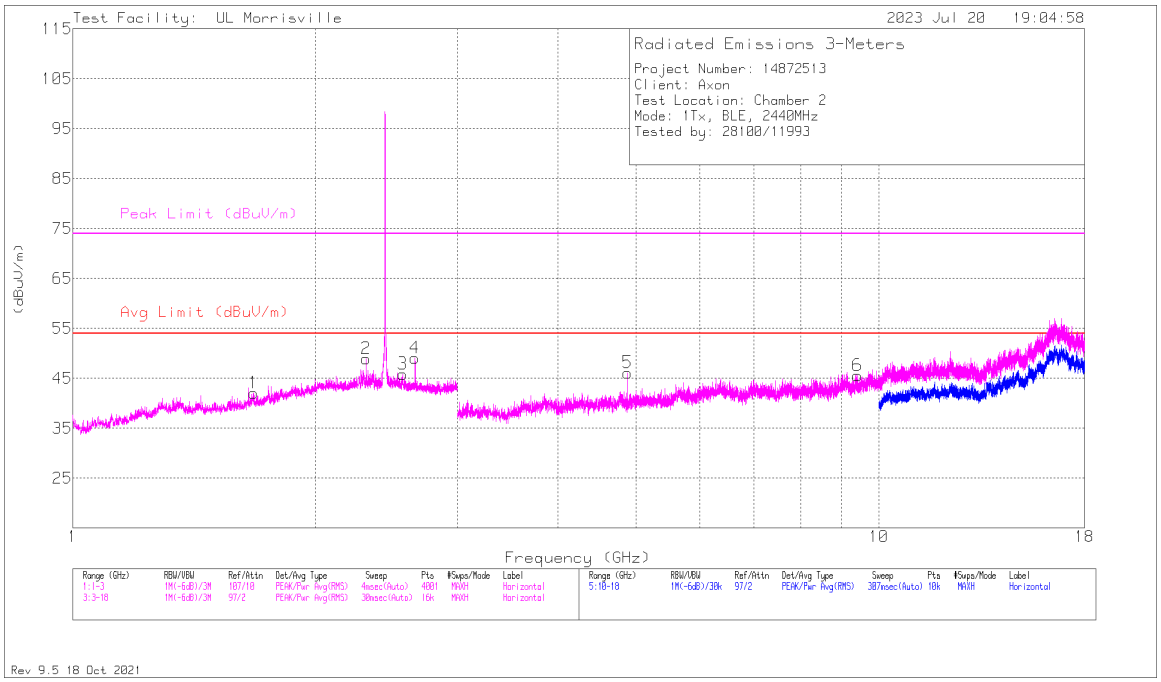
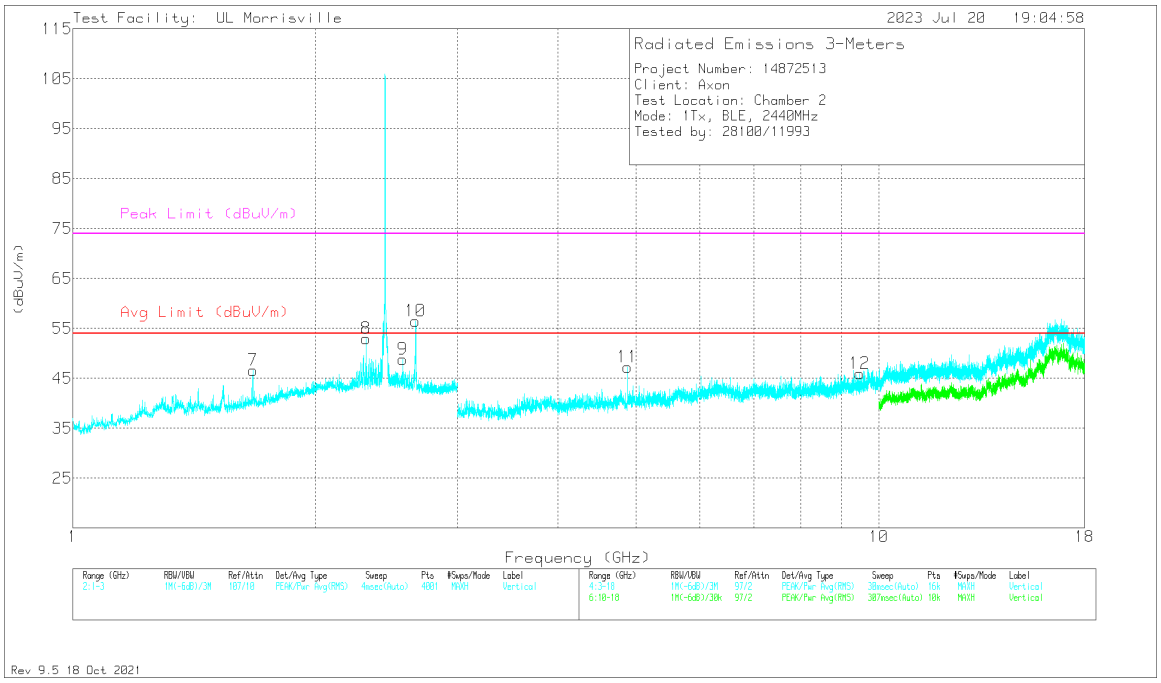
MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	88761 (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	* ** 1.6765	35.92	Pk	28.7	-22.5	0	42.12	54	-11.88	74	-31.88	0-360	101	H
2	* ** 2.31182	43.84	PK2	31.9	-24	0	51.74	-	-	74	-22.26	53	109	H
	* ** 2.31205	33.82	ADV	31.9	-24	4.04	45.76	54	-8.24	-	-	53	109	H
3	** 2.568	38.49	Pk	32.3	-24.9	0	45.89	54	-8.11	74	-28.11	0-360	199	H
4	* ** 2.65621	46.8	PK2	32.2	-25.5	0	53.5	-	-	74	-20.5	295	115	H
	* ** 2.65666	24.56	ADV	32.2	-25.5	4.04	35.3	54	-18.7	-	-	295	115	H
7	* ** 1.6725	40.47	Pk	28.6	-22.5	0	46.57	54	-7.43	74	-27.43	0-360	101	V
8	* ** 2.31209	48.46	PK2	31.9	-24	0	56.36	-	-	74	-17.64	110	103	V
	* ** 2.312	38.55	ADV	31.9	-24	4.04	50.49	54	-3.51	-	-	110	103	V
9	** 2.56822	45.61	PK2	32.3	-24.9	0	53.01	-	-	74	-20.99	113	111	V
	** 2.56795	37	ADV	32.3	-24.9	4.04	48.44	54	-5.56	-	-	113	111	V
10	* ** 2.65983	54.04	PK2	32.2	-25.5	0	60.74	-	-	74	-13.26	228	127	V
	* ** 2.66105	25.45	ADV	32.2	-25.5	4.04	36.19	54	-17.81	-	-	228	127	V
5	* ** 4.87969	42.55	Pk	34	-30.4	0	46.15	54	-7.85	74	-27.85	0-360	199	H
6	* ** 9.41156	34.23	Pk	36.6	-25.3	0	45.53	54	-8.47	74	-28.47	0-360	101	H
11	* ** 4.87969	43.64	Pk	34	-30.4	0	47.24	54	-6.76	74	-26.76	0-360	101	V
12	* ** 9.465	34.84	Pk	36.6	-25.5	0	45.94	54	-8.06	74	-28.06	0-360	101	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

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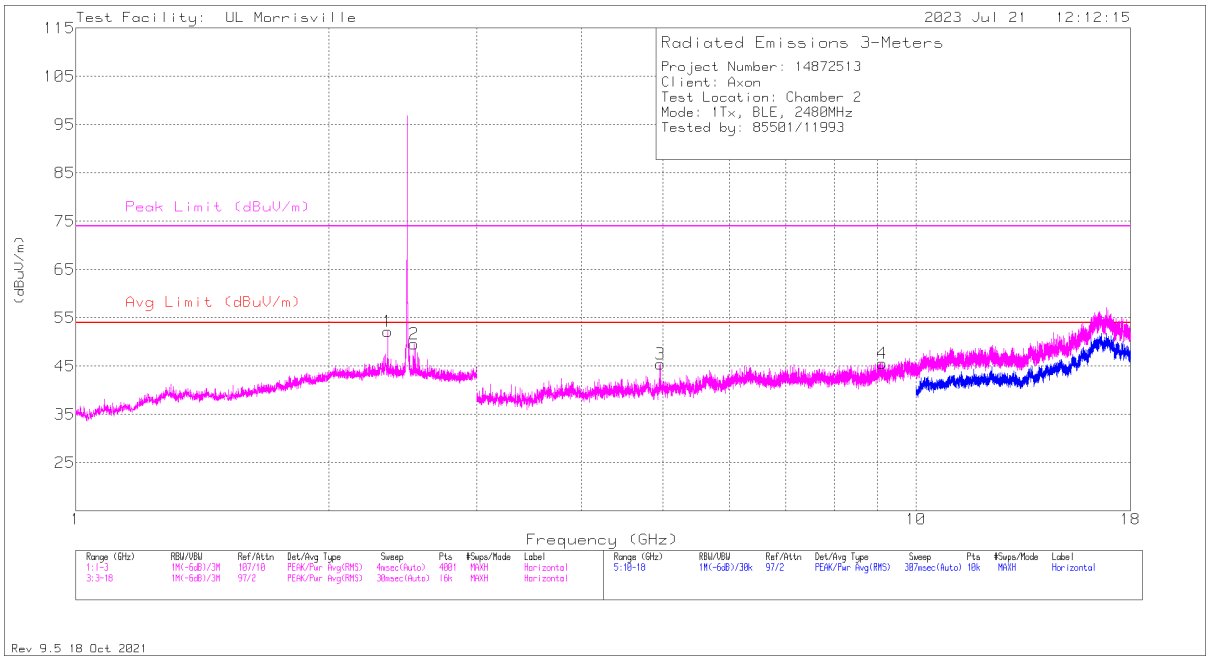
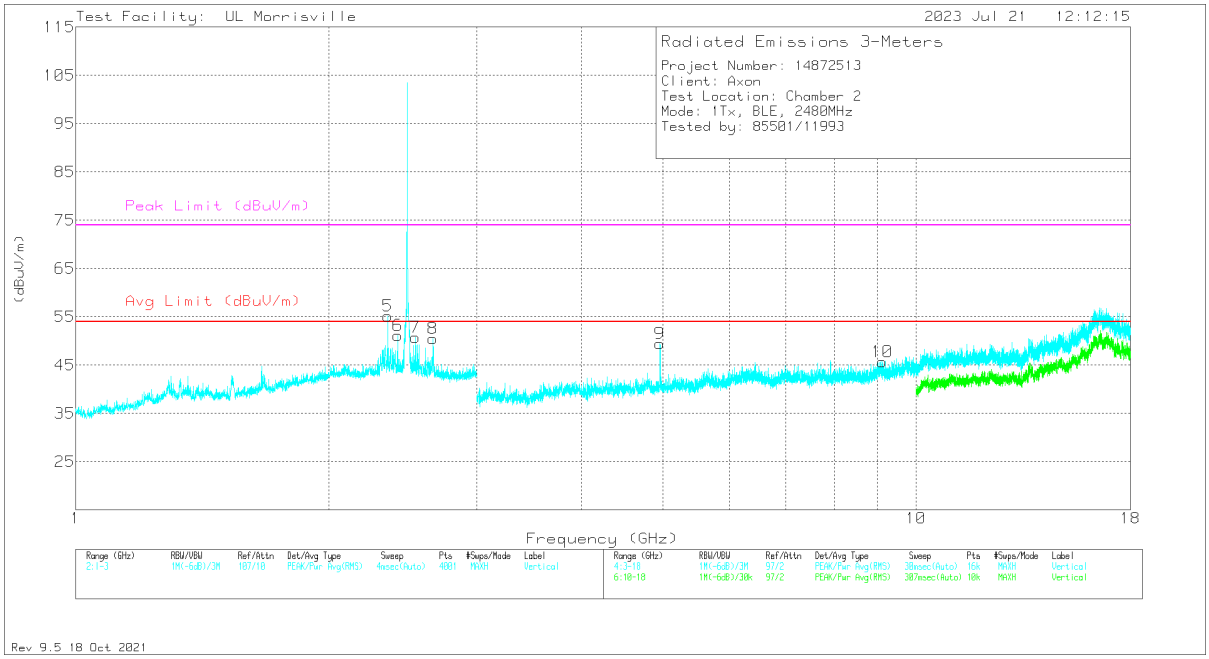
HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	88761 (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	* ** 2.35197	45.37	PK2	31.9	-23.9	0	53.37	-	-	74	-20.63	296	251	H
	* ** 2.35198	35.83	ADV	31.9	-23.9	4.04	47.87	54	-6.13	-	-	296	251	H
2	** 2.53095	37.82	PK2	32.4	-24.9	0	45.32	-	-	74	-28.68	138	391	H
	** 2.5292	24.88	ADV	32.4	-24.8	4.04	36.52	54	-17.48	-	-	138	391	H
5	* ** 2.35171	46.43	PK2	31.9	-23.9	0	54.43	-	-	74	-19.57	53	325	V
	* ** 2.35191	38.92	ADV	31.9	-23.9	4.04	50.96	54	-3.04	-	-	53	325	V
7	* ** 2.35178	47.12	PK2	31.9	-23.9	0	55.12	-	-	74	-18.88	55	286	V
	* ** 2.35202	40.08	ADV	31.9	-23.9	4.04	52.12	54	-1.88	-	-	55	286	V
8	** 2.53511	40.16	PK2	32.4	-24.9	0	47.66	-	-	74	-26.34	20	354	V
	** 2.53633	24.16	ADV	32.4	-24.9	4.04	35.7	54	-18.3	-	-	20	354	V
3	* ** 4.96031	41.81	Pk	33.9	-30.3	0	45.41	54	-8.59	74	-28.59	0-360	101	H
4	* ** 9.11906	34.67	Pk	36.2	-25.3	0	45.57	54	-8.43	74	-28.43	0-360	101	H
9	* ** 4.95987	44.96	PK2	33.9	-30.3	0	48.56	-	-	74	-25.44	73	223	V
	* ** 4.95981	34.72	ADV	33.9	-30.3	4.04	42.36	54	-11.64	-	-	73	223	V
10	* ** 9.12281	34.74	Pk	36.2	-25.2	0	45.74	54	-8.26	74	-28.26	0-360	101	V
6	2.416	43.53	Pk	31.9	-24.3	0	51.13	54	-2.87	74	-22.87	0-360	101	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

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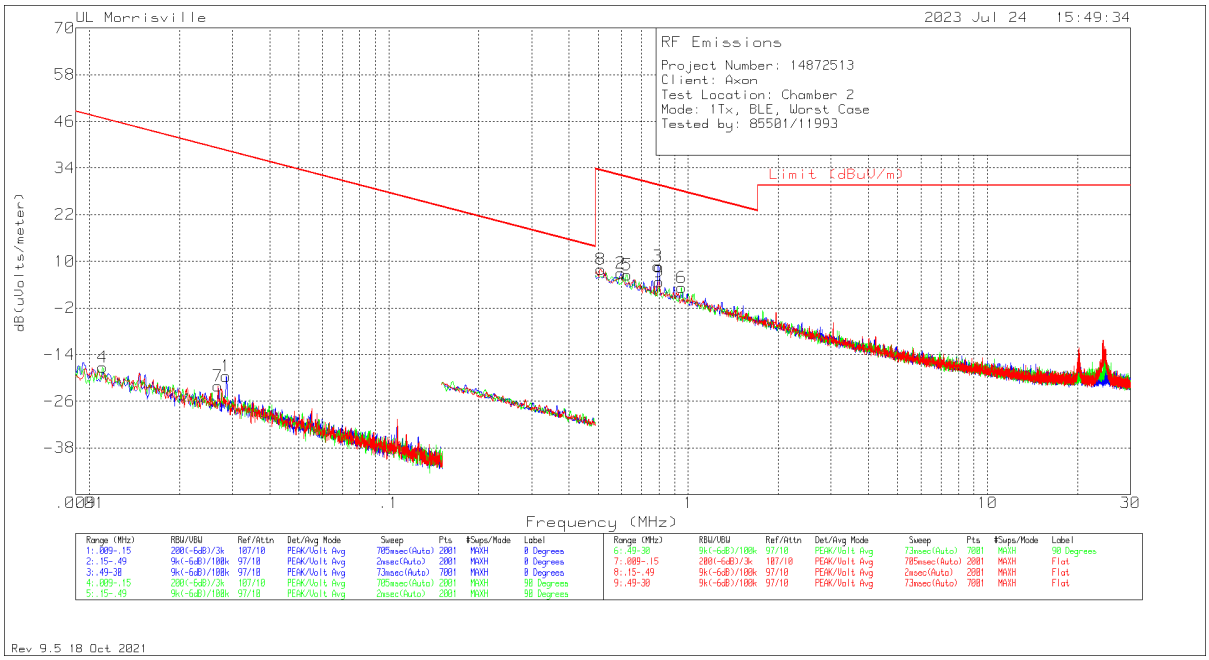
10.3. WORST CASE

10.3.1. SPURIOUS EMISSIONS BELOW 30 MHz

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*Log (test distance / specification distance).

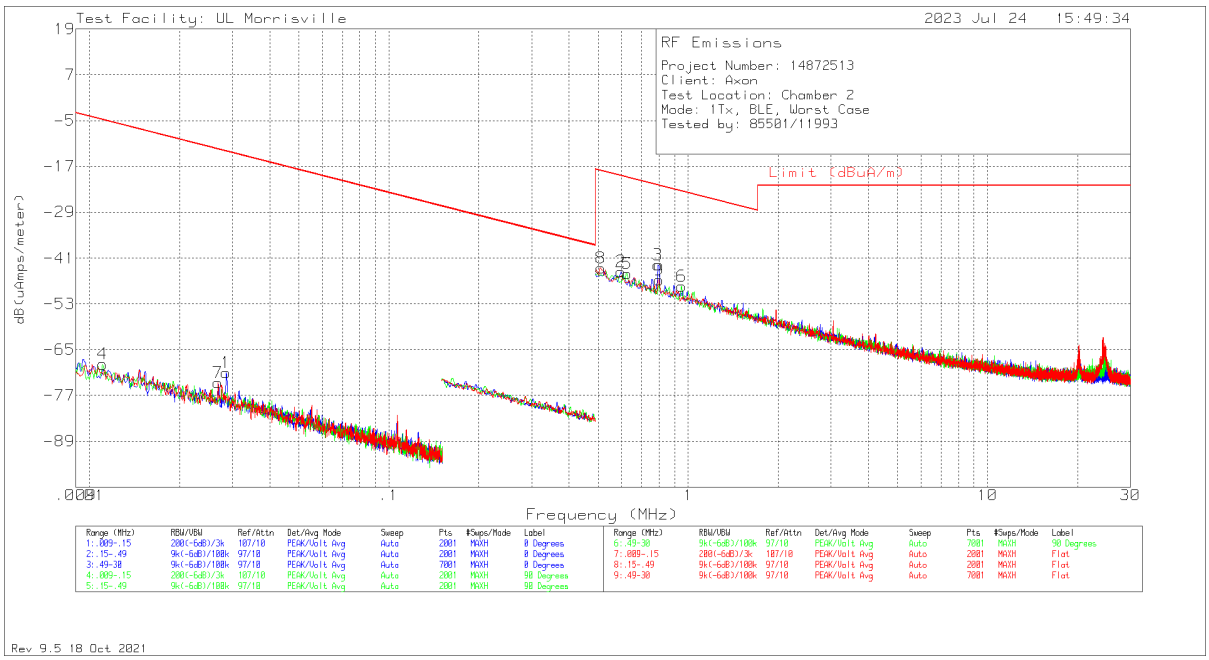


ANTENNA- THREE ORIENTATIONS

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
4	.01106	43.8	Pk	18.8	.1	-80	-17.3	46.73	66.73	-64.03	0-360	90 degs
7	.02689	43.38	Pk	14.4	.1	-80	-22.12	39.01	59.01	-61.13	0-360	Flat
1	.02867	46.12	Pk	14.2	.1	-80	-19.58	38.46	58.46	-58.04	0-360	0 degs
8	.51108	35.47	Pk	12.2	.2	-40	7.87	33.43	-	-25.56	0-360	Flat
2	.5954	34.57	Pk	12.2	.2	-40	6.97	32.11	-	-25.14	0-360	0 degs
5	.62491	34.05	Pk	12.2	.2	-40	6.45	31.69	-	-25.24	0-360	90 degs
3	.79355	36.27	Pk	12.2	.2	-40	8.67	29.61	-	-20.94	0-360	0 degs
9	.79777	32.29	Pk	12.2	.2	-40	4.69	29.57	-	-24.88	0-360	Flat
6	.94954	30.78	Pk	12.2	.2	-40	3.18	28.05	-	-24.87	0-360	90 degs

Pk - Peak detector



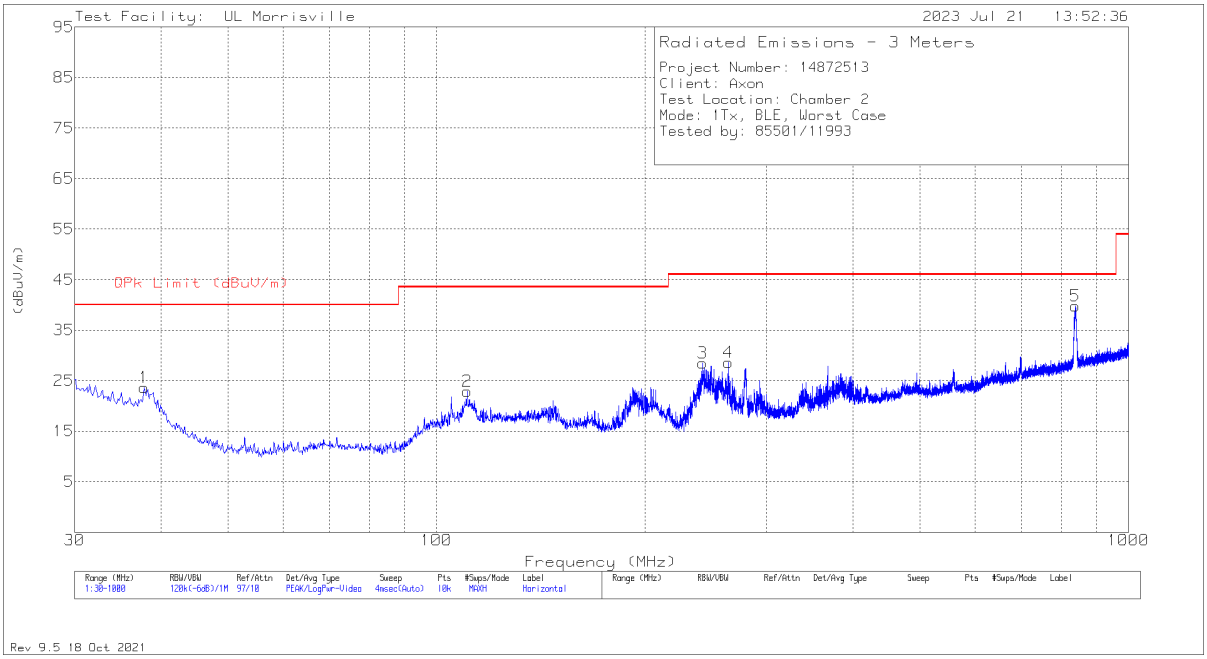
ANTENNA- THREE ORIENTATIONS (H-FIELD)

Below 30MHz Data

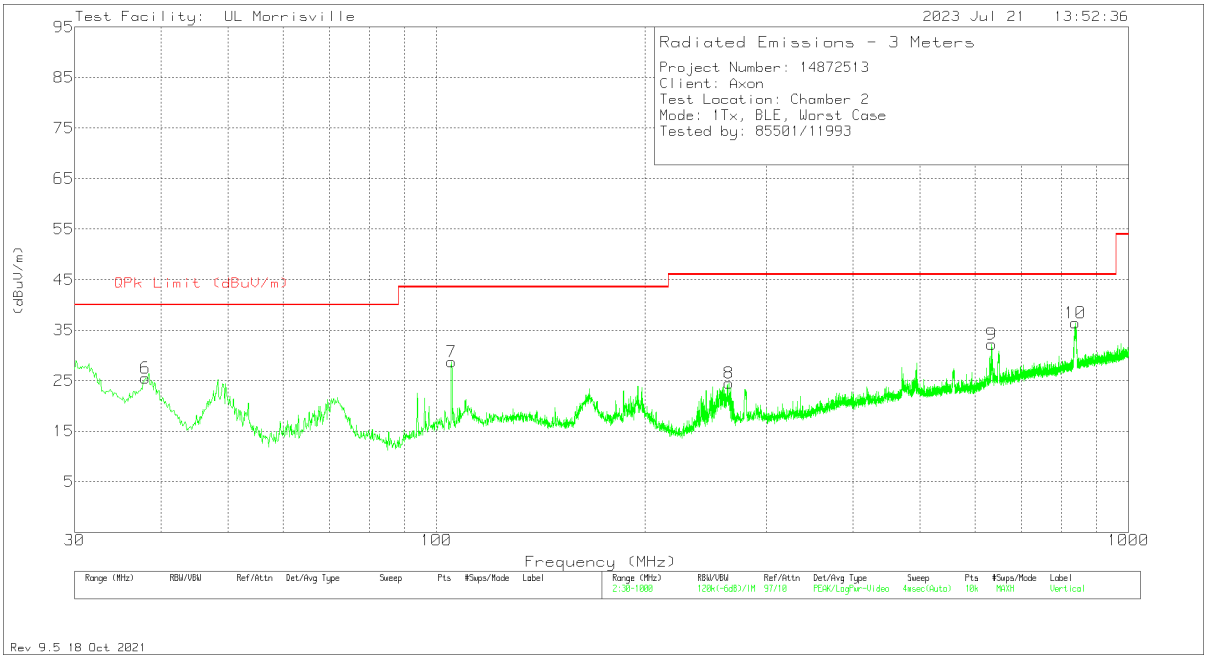
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	135144 (dB/m)	Gain/Loss (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	QP/AV Limit (dBuA/m)	PK Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Loop Angle
4	.01106	43.8	Pk	-32.7	.1	-80	-68.8	-4.77	15.23	-64.03	0-360	90 degs
7	.02689	43.38	Pk	-37.1	.1	-80	-73.62	-12.49	7.51	-61.13	0-360	Flat
1	.02867	46.12	Pk	-37.3	.1	-80	-71.08	-13.04	6.96	-58.04	0-360	0 degs
8	.51108	35.47	Pk	-39.3	.2	-40	-43.63	-18.07	-	-25.56	0-360	Flat
2	.5954	34.57	Pk	-39.3	.2	-40	-44.53	-19.39	-	-25.14	0-360	0 degs
5	.62491	34.05	Pk	-39.3	.2	-40	-45.05	-19.81	-	-25.24	0-360	90 degs
3	.79355	36.27	Pk	-39.3	.2	-40	-42.83	-21.89	-	-20.94	0-360	0 degs
9	.79777	32.29	Pk	-39.3	.2	-40	-46.81	-21.93	-	-24.88	0-360	Flat
6	.94954	30.78	Pk	-39.3	.2	-40	-48.32	-23.45	-	-24.87	0-360	90 degs

Pk - Peak detector

10.3.2. SPURIOUS EMISSIONS 30 TO 1000 MHz



HORIZONTAL



VERTICAL

Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	90627 (dB/m)	Gain/Loss (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 37.76	33.79	Pk	21.6	-31.7	23.69	40	-16.31	0-360	301	H
2	* ** 110.801	35.07	Pk	18.8	-31	22.87	43.52	-20.65	0-360	193	H
3	* ** 242.43	40.37	Pk	17.8	-29.7	28.47	46.02	-17.55	0-360	100	H
4	* ** 264.061	39.57	Pk	18.5	-29.5	28.57	46.02	-17.45	0-360	100	H
5	** 837.04	39.31	Pk	27.5	-27	39.81	46.02	-6.21	0-360	100	H
6	* ** 37.954	35.7	Pk	21.5	-31.7	25.5	40	-14.5	0-360	99	V
8	* ** 264.74	35.48	Pk	18.6	-29.6	24.48	46.02	-21.54	0-360	99	V
10	** 836.846	35.87	Pk	27.5	-26.9	36.47	46.02	-9.55	0-360	99	V
7	105.175	41.64	Pk	17.9	-30.8	28.74	43.52	-14.78	0-360	99	V
9	634.213	34.48	Pk	25.6	-27.9	32.18	46.02	-13.84	0-360	99	V

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

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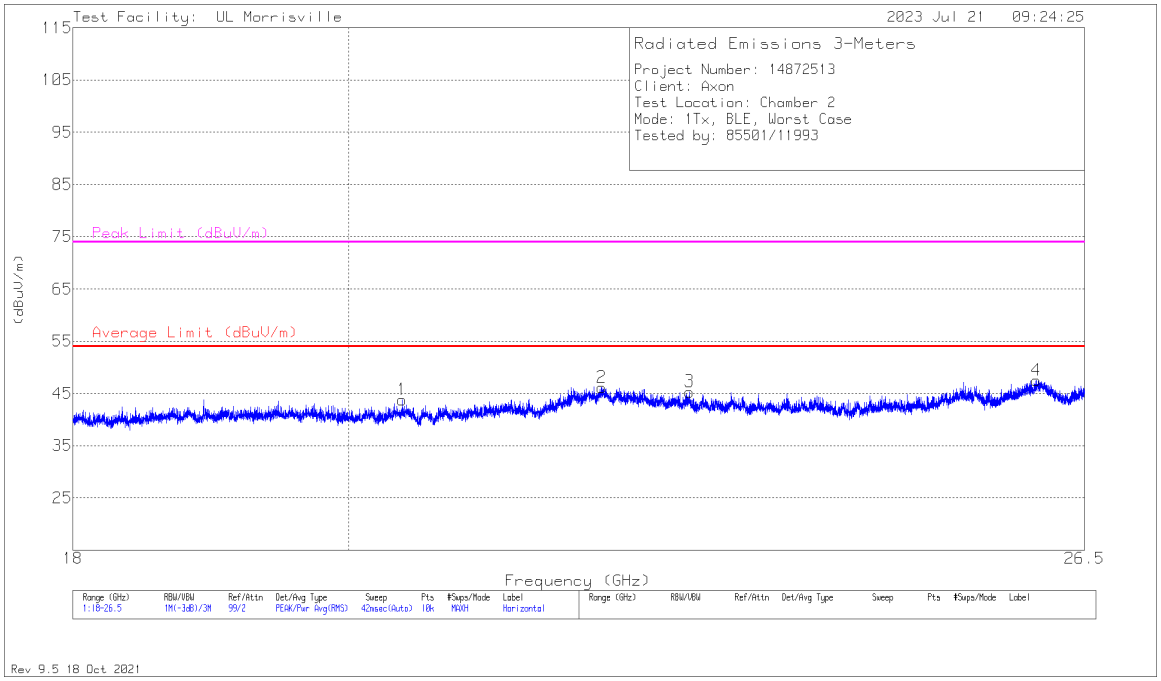
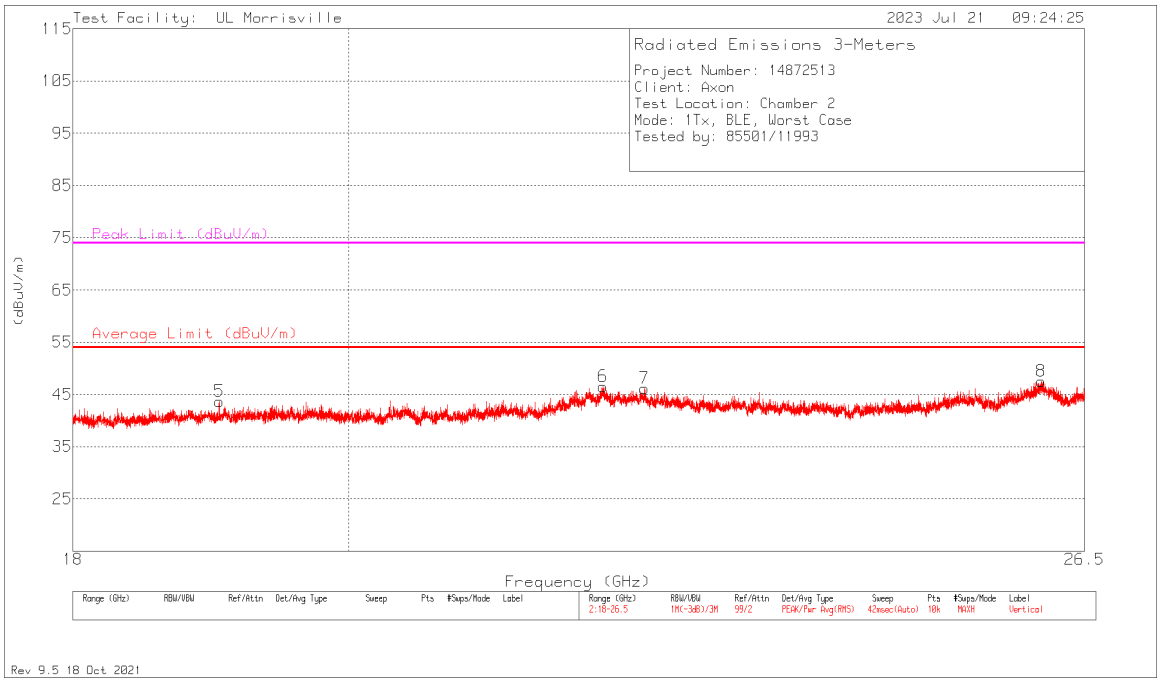
10.3.3. SPURIOUS EMISSIONS 18-26 GHz



HORIZONTAL



VERTICAL

18 – 26GHz Data

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	78835 (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	* ** 20.41716	48.27	Pk	33.3	-37.8	43.77	54	-10.23	74	-30.23	0-360	299	H
2	* ** 22.032	47.38	Pk	36.5	-37.7	46.18	54	-7.82	74	-27.82	0-360	250	H
3	* ** 22.78417	47.32	Pk	35.2	-37.2	45.32	54	-8.68	74	-28.68	0-360	150	H
5	* ** 19.03605	49.14	Pk	33	-38.5	43.64	54	-10.36	74	-30.36	0-360	101	V
6	* ** 22.04645	47.94	Pk	36.5	-37.9	46.54	54	-7.46	74	-27.46	0-360	101	V
7	* ** 22.39576	48.05	Pk	35.8	-37.7	46.15	54	-7.85	74	-27.85	0-360	101	V
4	26.0164	49.01	Pk	34.6	-36.1	47.51	54	-6.49	74	-26.49	0-360	299	H
8	26.06739	48.55	Pk	34.7	-35.8	47.45	54	-6.55	74	-26.55	0-360	299	V

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

UL LLC
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11. SETUP PHOTOS

Please refer to R14872513-EP1 for setup photos

END OF TEST REPORT

UL LLC
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