

TEST REPORT

Report Number: R13949462-E5

Applicant : Hunter Industries
1940 Diamond St.
San Marcos, CA 92078-5120, USA

Model : A2C-LORA

FCC ID : M3UA2CLORA

IC : 2772A-A2CLORA

EUT Description : LoRa Radio Module

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 4
ISED RSS-GEN ISSUE 5 + A2

Date Of Issue:
2026-03-19

Prepared by:
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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2023-02-28	Initial Issue	Charles Moody
V2	2025-04-28	Updated Issue Date	Charles Moody
V3	2026-01-22	Editorial Revisions	Chandler Stanley
V4	2026-03-16	Updated Antenna Gain	Chandler Stanley
V5	2026-03-19	Added Errata for C63.10	Chandler Stanley

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Hunter Industries
1940 Diamond Street
San Marcos, CA 92078-5120, USA

EUT DESCRIPTION: LoRa Radio Module

MODEL: A2C-LORA

SERIAL NUMBER: 10017900, 4709612

SAMPLE RECEIVED DATE: 2022-03-04 TO 2023-02-06

DATE TESTED: 2022-06-03 TO 2023-02-22

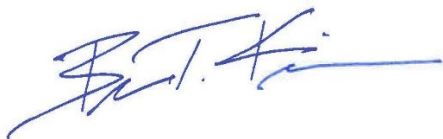
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 4	Complies
ISED RSS-GEN Issue 5 + A2	Complies

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.

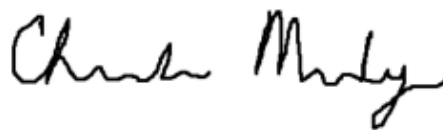
This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:



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

Prepared By:



Charles Moody
Electrical Engineer
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

This report contains data/info provided by the customer 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/info provided by the customer:

- 1) Antenna gain and type (see section 6.3)

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 Sections 6.9.2 and 6.9.3
15.247 (a) (2)	RSS-247 6.3.1 (a)	6dB BW	Compliant	None
15.247 (b)(3)	RSS-247 6.3.2	Output Power		
15.247 (e)	RSS-247 6.3.1 (b)	PSD		
15.247 (d)	RSS-247 6.6	Conducted Spurious Emissions		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions		
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2025, FCC ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024, ISED ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A2: 2021, and RSS-247 Issue 4.

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 Durham, NC 27713, 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	UNCERTAINTY
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%
Time	3.39%

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a LoRa radio module that depends on a connection with a host device. For this testing, the radio module was tested in standalone mode in which the radio module was connected to the host device using an extension cable.

6.2. MAXIMUM OUTPUT POWER

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
915-921	LoRa	15.37	34.43

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a helix antenna, with a maximum gain of -1.30 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed for Constant Tx was: VConst_Tx_xx_xx

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 30 MHz were performed with the EUT set to transmit at the channel with the highest power spectral density. This was found to be low channel, 915 MHz. For radiated emissions between 30 MHz and 10 GHz the EUT was set to transmit on low and high channels at the highest power.

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 the X orientation.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
UCE Housing Device	Hunter	UCE	0D12761617	QOQBGM13P

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Serial	1	12-Pin Connector	Serial	<3m	Connects the LoRa radio module to the UCE housing device
2	AC Mains	2	AC Mains	Power	<3m	Used to connect housing device to AC Mains

TEST SETUP

The LoRa radio module was connected to Universal Control Equipment (UCE) which is used as a host device for the radio module. This was connected via an extension cable allowing the module to be tested separately of the UCE. For transmission testing, the transmission channel was altered by power cycling the EUT.

SETUP DIAGRAMS

Please refer to R13949462-EP1 for setup diagrams

7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10 Section 11.6

6 dB BW: ANSI C63.10 Subclause -11.8.1

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

Output Power: 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 -11.10.3 Method AVGPS-1 (Average PSD)

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

Emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

General Radiated Spurious Emissions: ANSI C63.10 Sections 6.3 to 6.6

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

8. TEST AND MEASUREMENT EQUIPMENT

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

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2021-08-19	2022-08-19
	30-1000 MHz				
AT0066	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB1	2022-03-01	2023-03-01
	1-18 GHz				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2022-05-11	2023-05-11
	Gain-Loss Chains				
C1-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2022-05-05	2023-05-05
C1-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2022-05-05	2023-05-05
C1-SAC03	Gain-loss string: 1-18GHz	Various	Various	2022-05-05	2023-05-05
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2022-04-14	2023-04-14
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2021-09-27	2022-09-27
BRF007	902-928MHz notch filter, 2W, $F_{high} = 1.5\text{GHz}$	Micro-Tronics	BRC17691	2021-07-21	2022-07-21
HPF009	1GHz high-pass filter, 2W, $F_{high} = 10\text{GHz}$	Micro-Tronics	HPM17672	2022-02-17	2023-02-17
PS215	AC Power Source	Elgar	CW2501M (s/n 1523A02397)	NA	NA

*NOTE: All radiated emissions testing was performed between 2022-06-03 and 2022-06-07. Therefore, at the time of testing, all equipment was in calibration.

Test Equipment Used - Wireless Conducted Measurement Equipment**

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0025	Spectrum Analyzer	Keysight Technologies	N9030A	2022-05-02	2023-05-02
PWM003	RF Power Meter	Keysight Technologies	N1911A	2022-09-10	2023-09-10
PWS001 (PRE0137347)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2022-07-07	2023-07-07
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
SOFTEMI	Antenna Port Software	UL	Version 2022.8.16	NA	NA
226563	SMA Coaxial 10dB Attenuator 25MHz-18GHz	CentricRF	C18S2-10	2022-05-03	2023-05-03

**NOTE: Wireless conducted measurements were performed on 2023-02-06. Therefore, at the time of testing, all equipment was in calibration.

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2022-04-05	2023-04-05
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2022-07-20	2023-07-20
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2022-08-01	2023-08-01
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2022-08-03	2023-08-03
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2022-04-05	2023-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		

***NOTE: AC Line Conducted Emissions was performed on 2023-02-22. Therefore, at the time of testing, all equipment was in calibration.

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

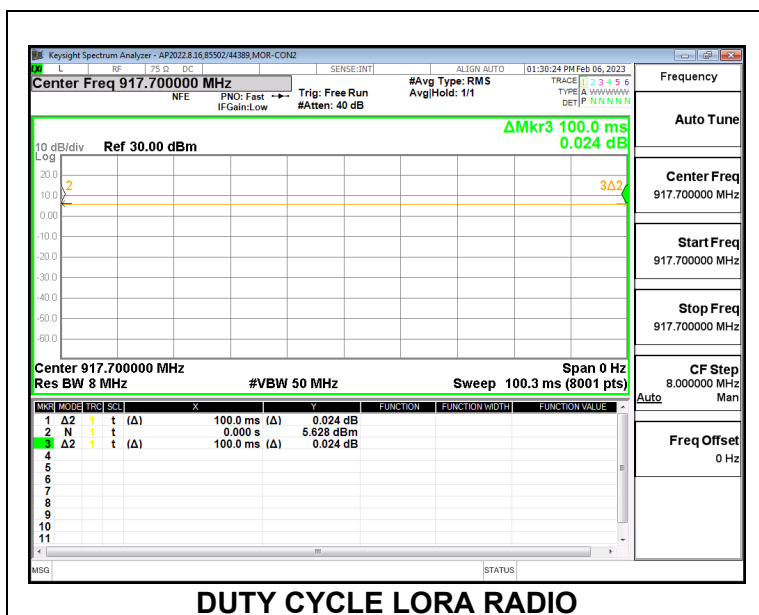
PROCEDURE

ANSI C63.10 Section 11.6 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	RMS Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
900 MHz Band						
LoRa Radio	100.0	100.0	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



9.2. 99% BANDWIDTH

LIMITS

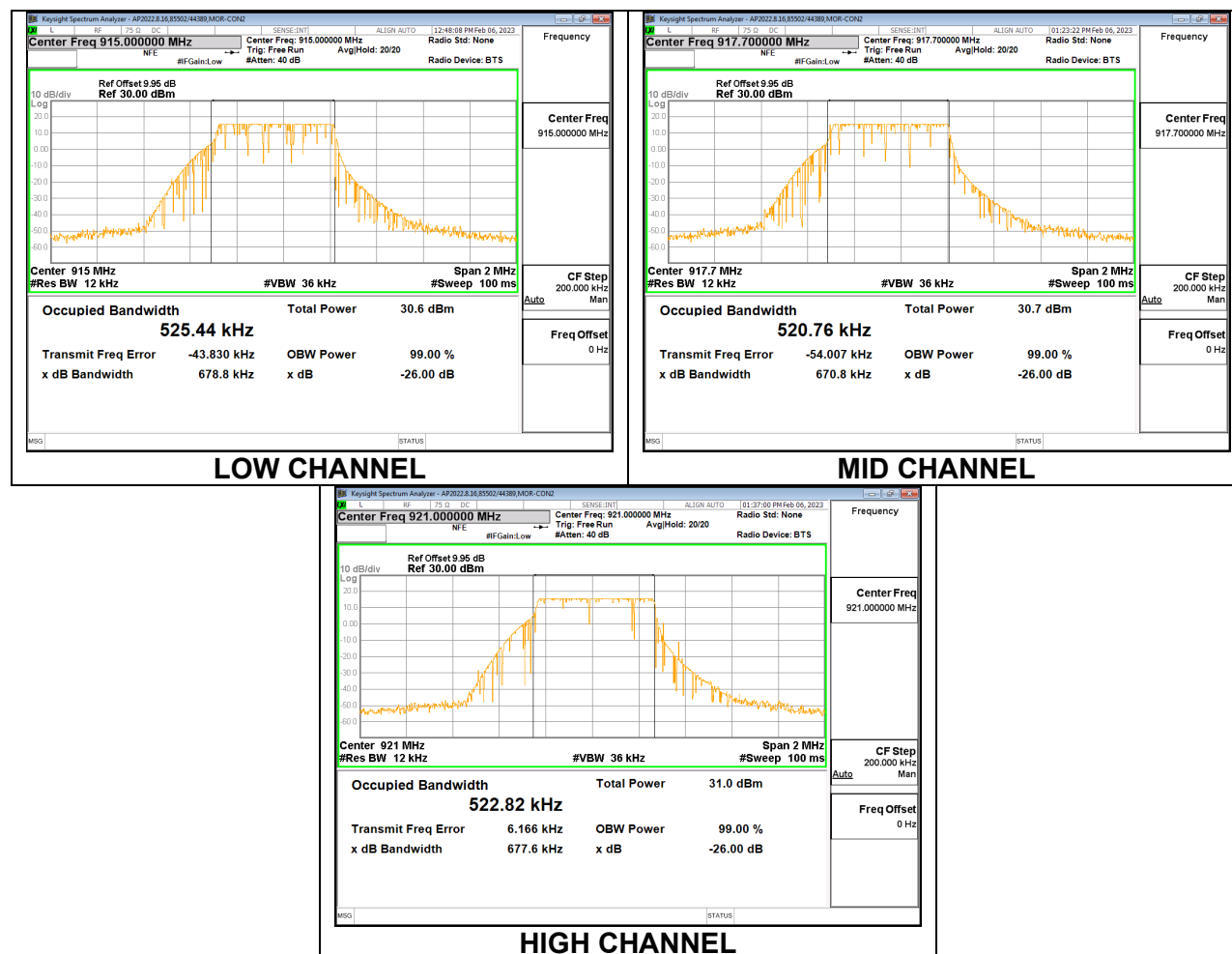
None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to between 1-5% of the OBW. The VBW is set to $>3 \times \text{RBW}$. The sweep time is coupled.

9.2.1. LoRa

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	915	0.52544
Middle	917.7	0.52076
High	921	0.52282



9.3. 6 dB BANDWIDTH

LIMITS

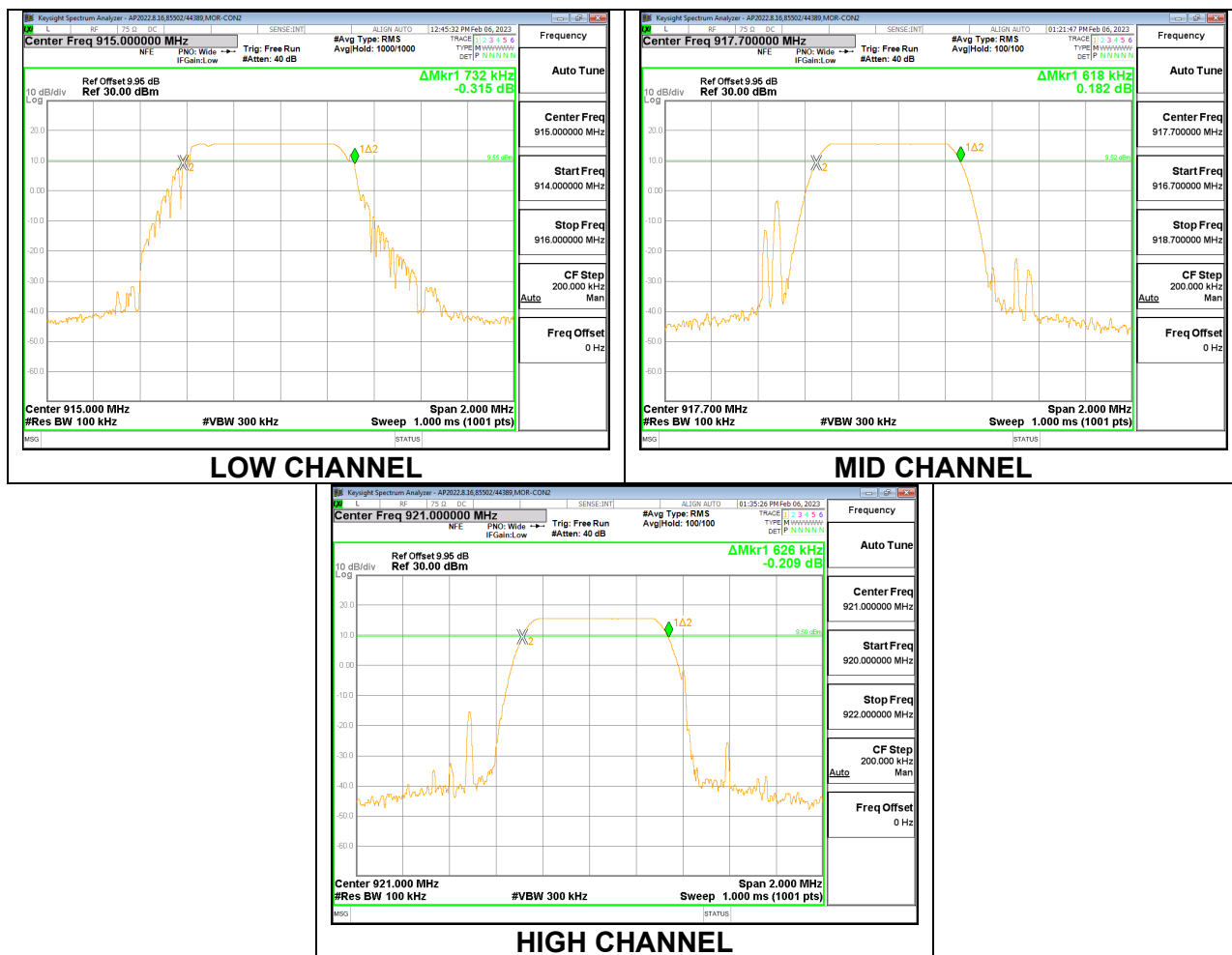
FCC §15.247 (a) (2)
RSS-247 6.3.1 (a)

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

RESULTS

9.3.1. LoRa

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
Low	915	0.732
Middle	917.7	0.618
High	921	0.626



9.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (2) and (3)
RSS-247 6.3.2

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 gated-average power meter.

The cable assembly insertion loss of 9.95 dB, 0.35 dB (test cable) and a 9.60 (attenuator), was entered as an offset in the power meter.

RESULTS

9.4.1. LoRa

Tested By:	85502/40882
Date:	2023-02-06

Channel	Frequency (MHz)	AV power (dBm)	Limit (dBm)	Margin (dB)
Low	915	15.23	30	-14.77
Middle	917.7	15.18	30	-14.82
High	921	15.37	30	-14.63

9.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

RSS-247 6.3.1 (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.

FCC §15.247 (f)

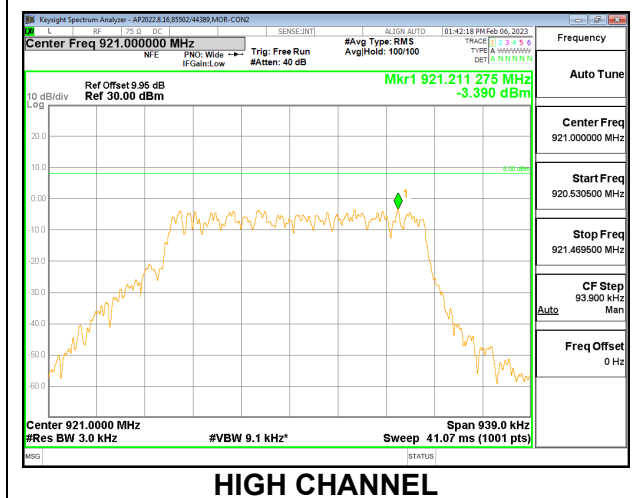
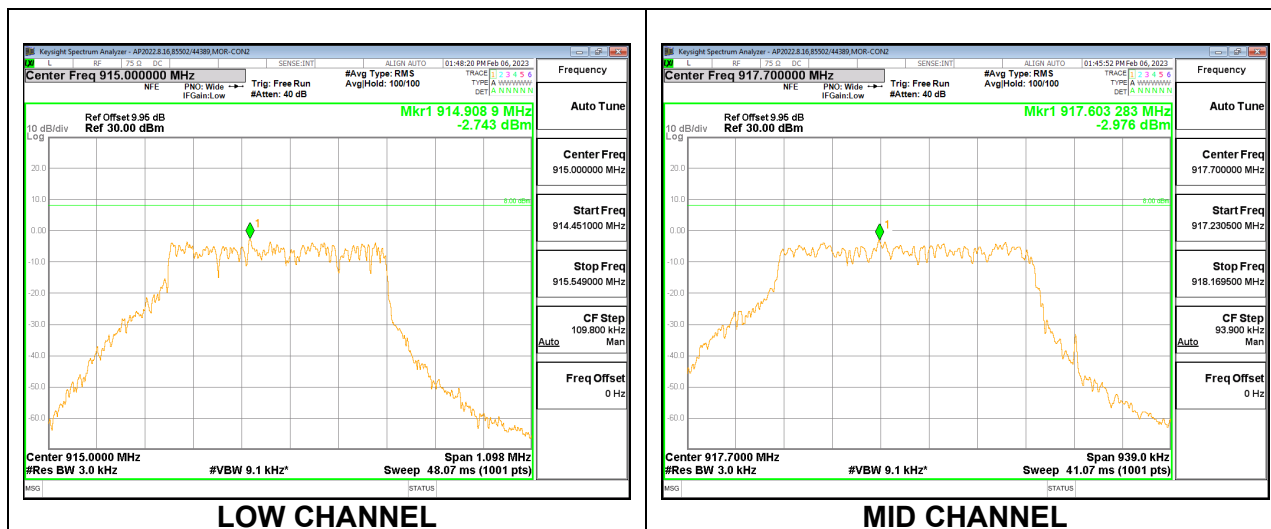
RSS-247 (5.3) (b)

The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the system, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

9.5.1. LoRa

Channel	Frequency (MHz)	PSD (dBm/3kHz)	DCCF (dB)	Corrected PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	915	-2.743	0.00	-2.743	8	-10.74
Middle	917.7	-2.976	0.00	-2.976	8	-10.98
High	921	-3.390	0.00	-3.390	8	-11.39



9.6. CONDUCTED SPURIOUS EMISSIONS

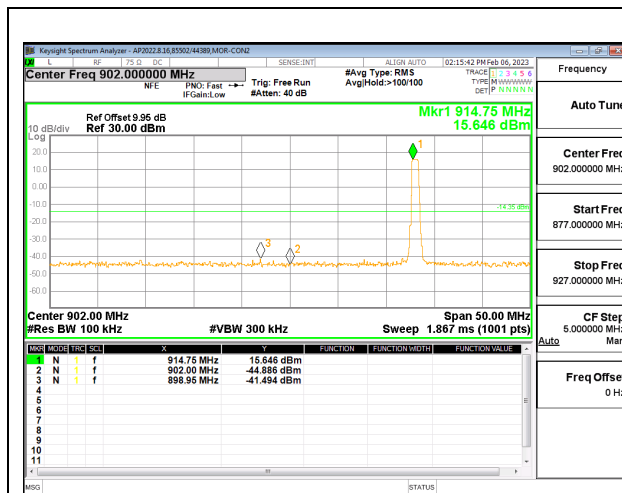
LIMITS

FCC §15.247 (d)

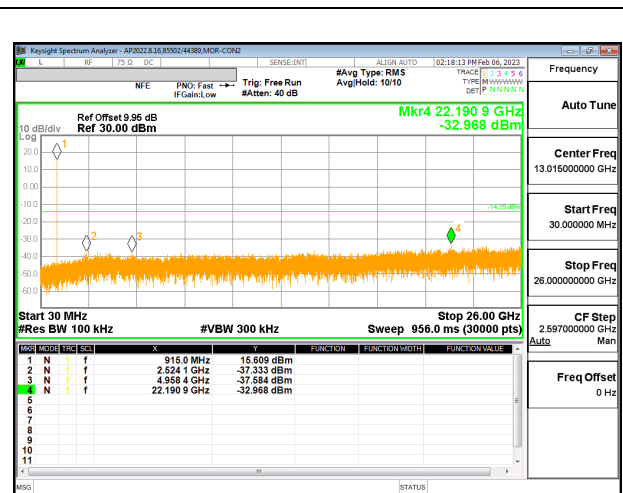
RSS-247 6.6

Output power was measured based on the use of an average measurement; therefore, the required attenuation is -30dBc.

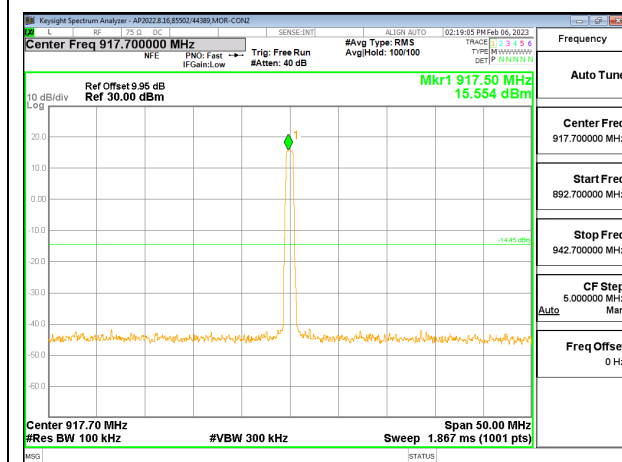
9.6.1. LoRa – 125kHz



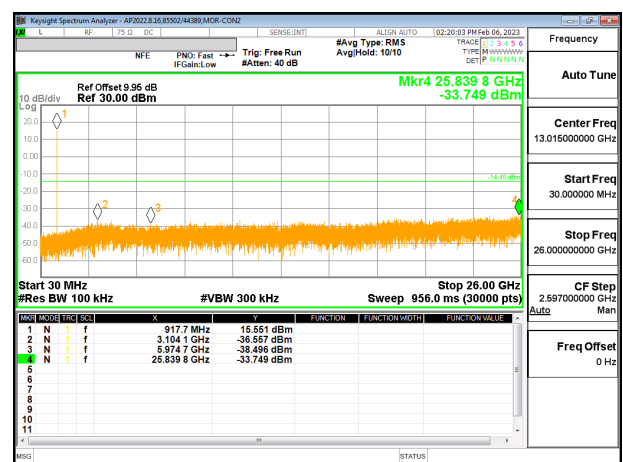
LOW CHANNEL BANDEDGE



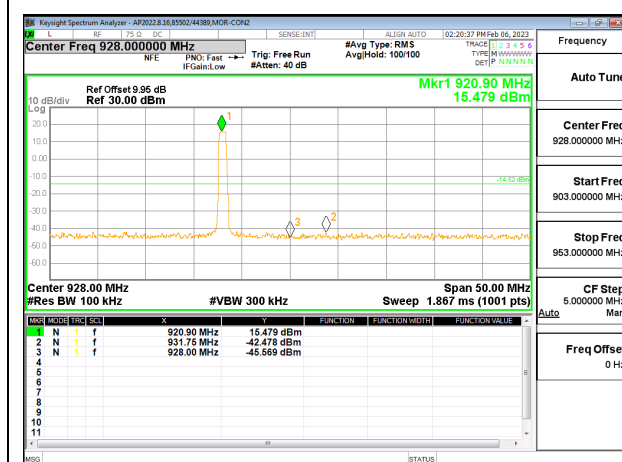
OUT-OF-BAND LOW CHANNEL



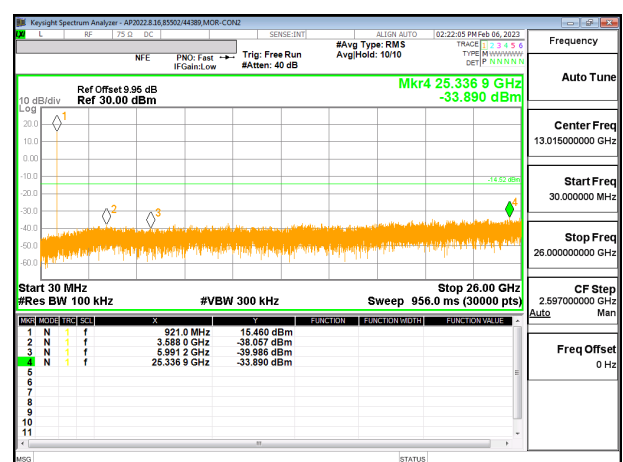
IN-BAND REFERENCE LEVEL



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 linear voltage averaging measurements.

The spectrum from 30 MHz to 1000 MHz and 1 GHz to 10 GHz is investigated with the transmitter set to the lowest and highest channels in each applicable band. Below 30 MHz 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).

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.

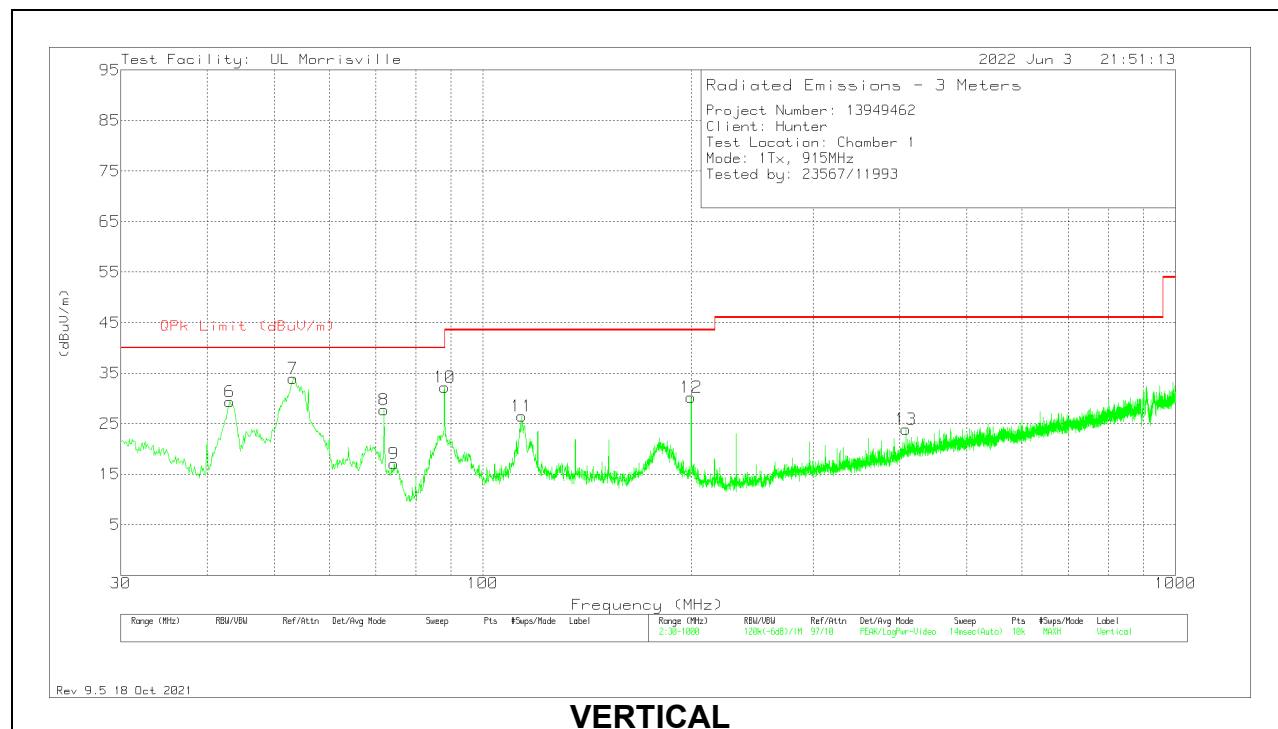
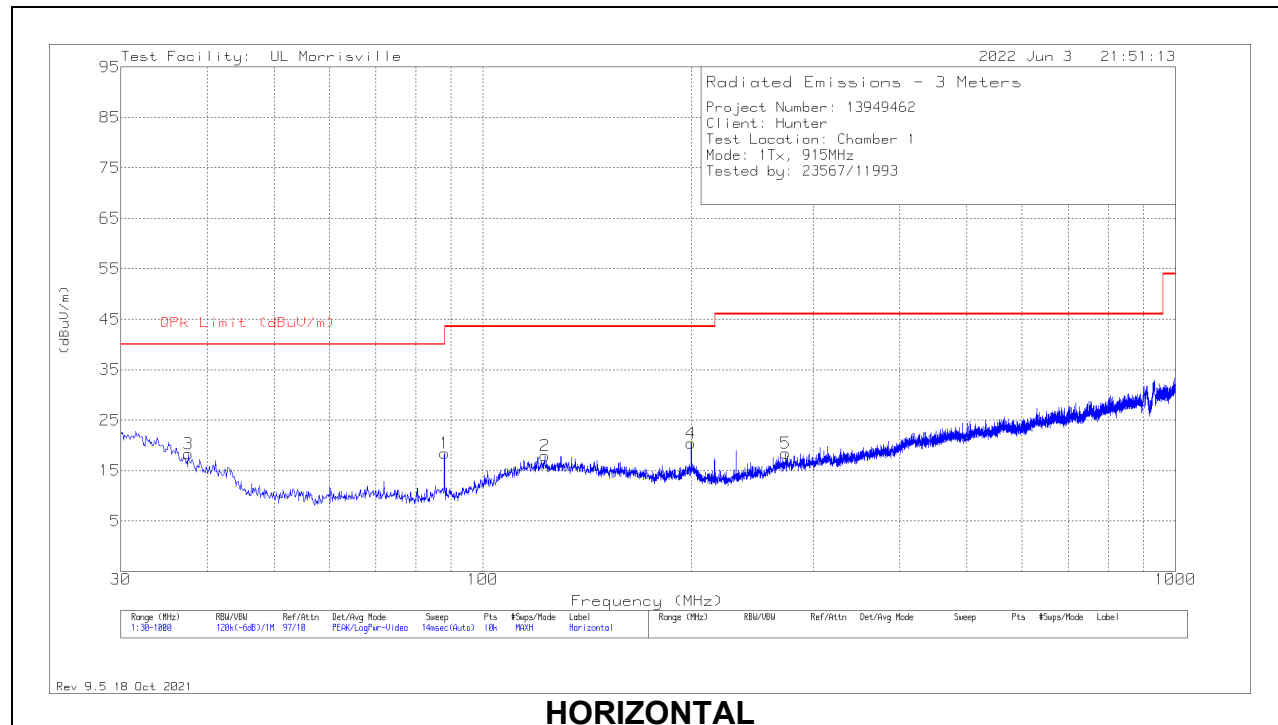
KDB 414788 Open Field Site (OFS) and Chamber Correlation Justification

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

10.2. LoRa

10.2.1. TRANSMITTER BELOW 1GHz HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

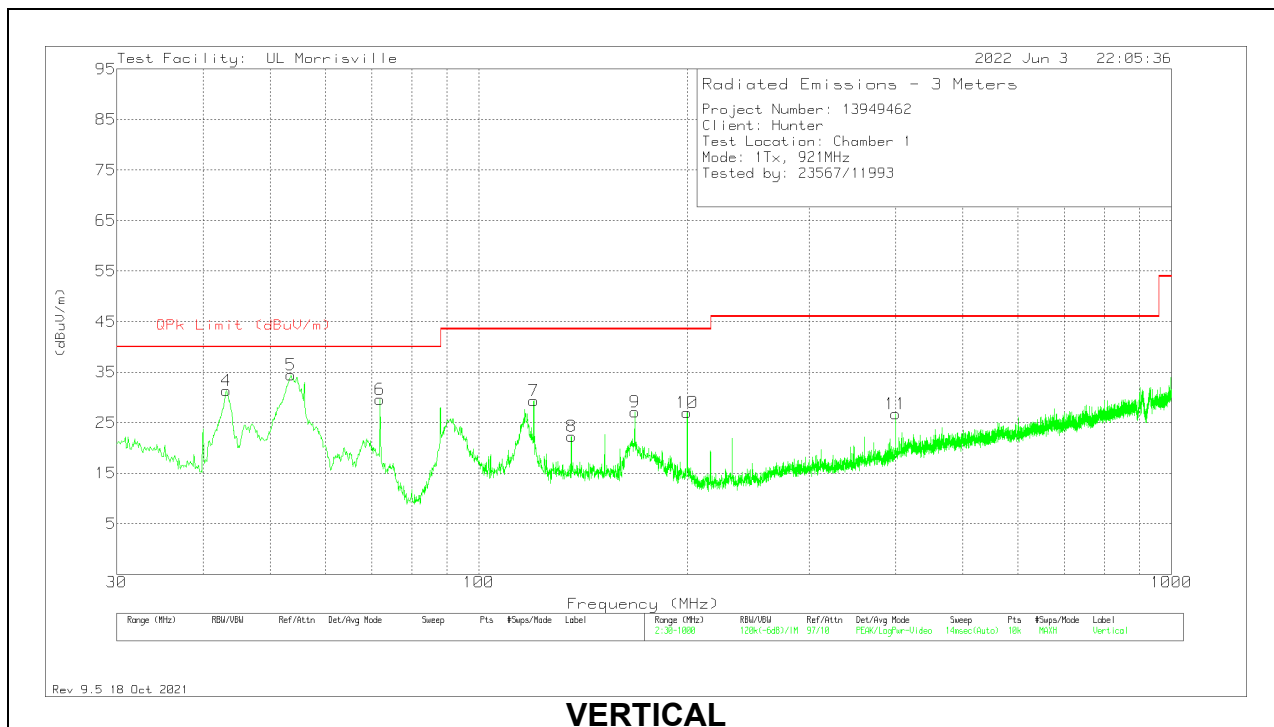
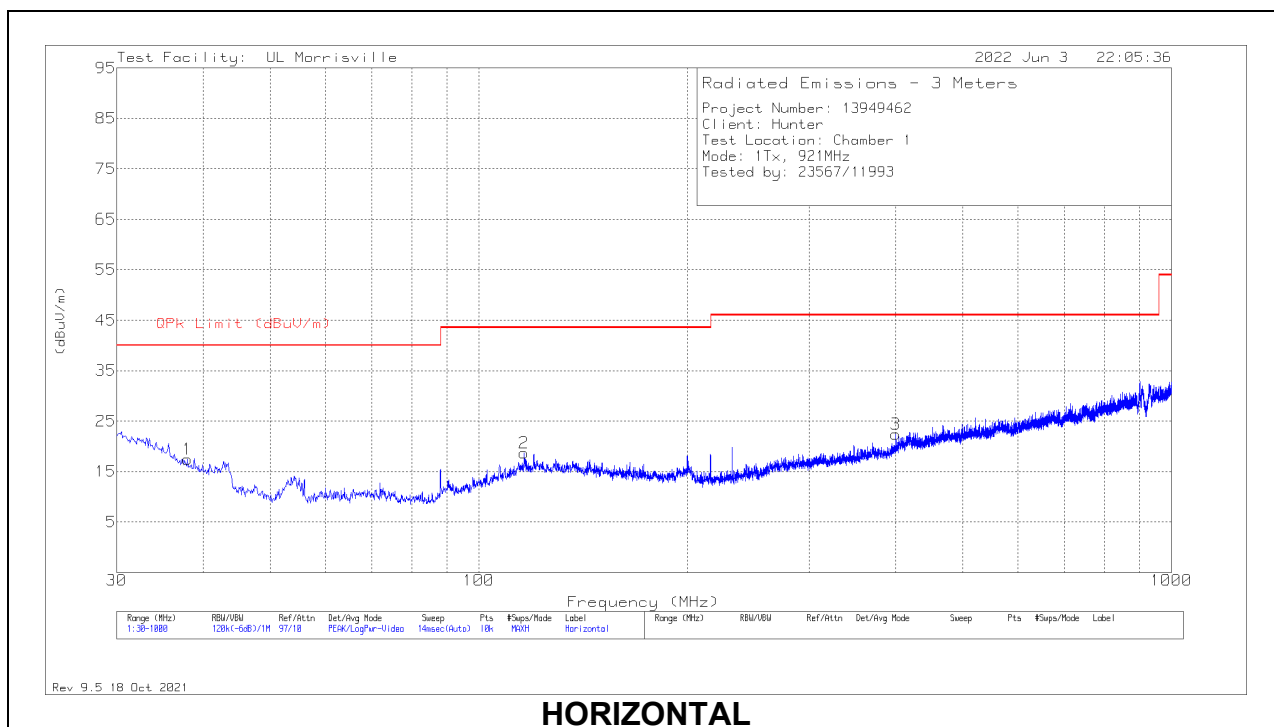
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0066 (dB/m)	Gain/Loss (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* ** 122.926	27.92	Pk	19.6	-30	.4	17.92	43.52	-25.6	0-360	199	H
3	* ** 37.566	27.64	Pk	21.8	-31.2	.1	18.34	40	-21.66	0-360	199	H
5	* ** 273.47	27.38	Pk	19.1	-28.5	.4	18.38	46.02	-27.64	0-360	100	H
9	* ** 74.426	33.41	Pk	14.1	-30.7	.2	17.01	40	-22.99	0-360	100	V
11	* ** 113.808	37.16	Pk	18.8	-29.8	.3	26.46	43.52	-17.06	0-360	100	V
13	* ** 408.009	28.82	Pk	21.7	-27.3	.7	23.92	46.02	-22.1	0-360	100	V
6	43.095	42.66	Pk	17.6	-31	.1	29.36	-	-	0-360	100	V
7	53.183	51.56	Pk	13.1	-30.8	.1	33.96	-	-	0-360	100	V
8	72.001	43.89	Pk	14.3	-30.6	.2	27.79	-	-	0-360	100	V
1	88.006	35.07	Pk	13.4	-30.2	.2	18.47	-	-	0-360	399	H
10	88.006	48.8	Pk	13.4	-30.2	.2	32.2	-	-	0-360	100	V
4	199.944	30.86	Pk	18.3	-29.1	.4	20.46	-	-	0-360	100	H
12	199.944	40.67	Pk	18.3	-29.1	.4	30.27	-	-	0-360	100	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0066 (dB/m)	Gain/Loss (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 37.954	26.9	Pk	21.5	-31.1	.1	17.4	40	-22.6	0-360	300	H
2	* ** 116.233	29.34	Pk	19	-30	.3	18.64	43.52	-24.88	0-360	200	H
3	* ** 399.958	27.7	Pk	21.3	-27.3	.7	22.4	46.02	-23.62	0-360	200	H
7	* ** 120.016	39.49	Pk	19.4	-29.9	.4	29.39	43.52	-14.13	0-360	100	V
8	* ** 136.021	32.6	Pk	19.3	-30	.4	22.3	43.52	-21.22	0-360	100	V
9	* ** 168.031	38.66	Pk	17.6	-29.4	.3	27.16	43.52	-16.36	0-360	100	V
11	* ** 400.055	32.02	Pk	21.3	-27.3	.7	26.72	46.02	-19.3	0-360	100	V
4	43.192	44.79	Pk	17.5	-31	.1	31.39	-	-	0-360	100	V
5	53.571	52.18	Pk	13	-30.8	.1	34.48	-	-	0-360	100	V
6	72.001	45.69	Pk	14.3	-30.6	.2	29.59	-	-	0-360	100	V
10	199.944	37.41	Pk	18.3	-29.1	.4	27.01	-	-	0-360	100	V

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

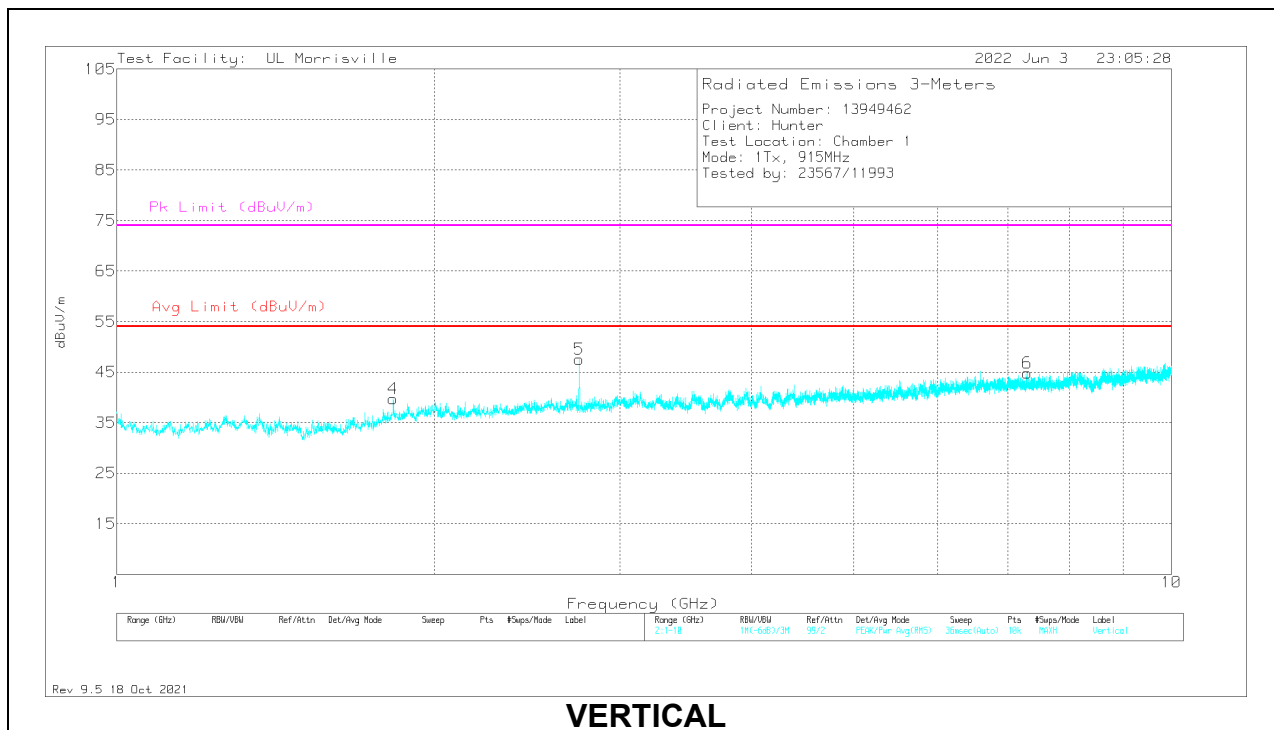
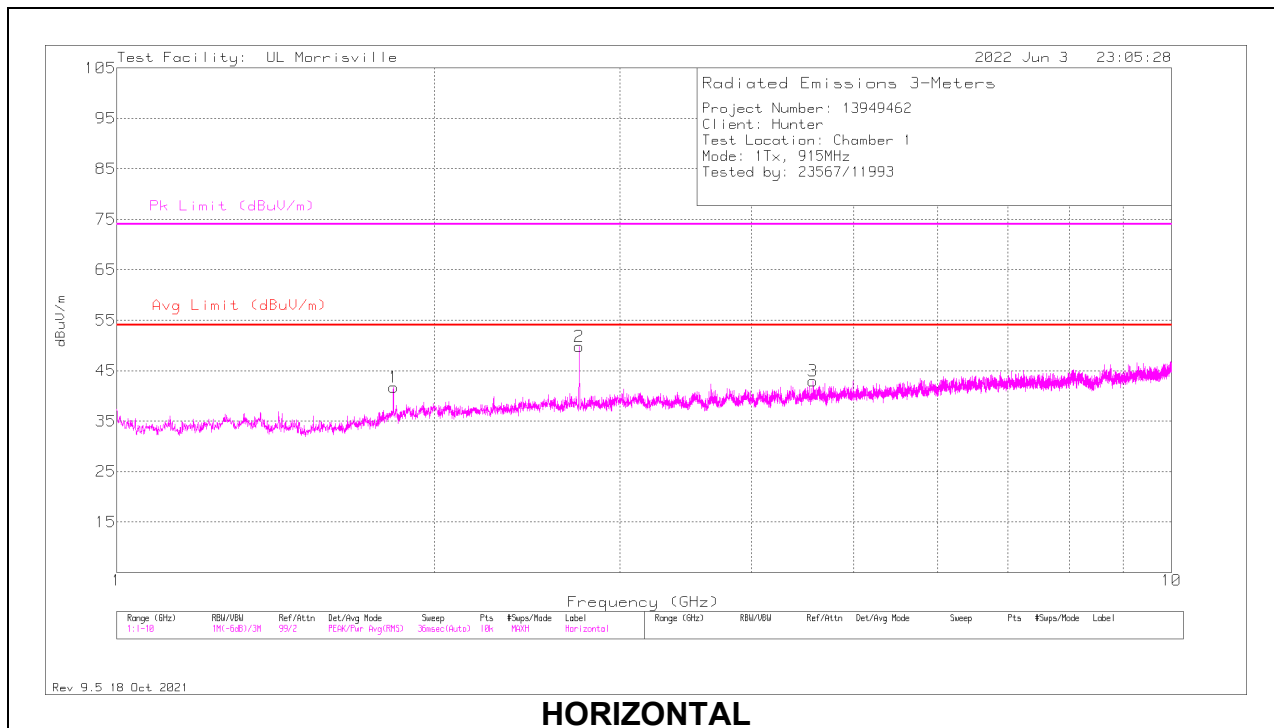
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

10.2.2. TRANSMITTER ABOVE 1 GHz

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Gain/Loss (dB)	Filter (dB)	Corrected Reading dBuV/m	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.8298	45.57	Pk	30.7	-35	.5	41.77	54	-12.23	74	-32.23	0-360	199	H
2	*** 2.74532	51.28	PK2	32.5	-33.9	.5	50.38	-	-	74	-23.62	250	178	H
	* ** 2.74488	44.85	ADV	32.5	-33.8	.5	44.05	54	-9.95	-	-	250	178	H
3	*** 4.5739	41.66	Pk	34	-32.9	.2	42.96	54	-11.04	74	-31.04	0-360	199	H
4	** 1.8289	43.55	Pk	30.7	-35	.5	39.75	54	-14.25	74	-34.25	0-360	400	V
5	*** 2.7451	48.5	Pk	32.5	-33.9	.5	47.6	54	-6.4	74	-26.4	0-360	400	V
6	*** 7.2955	38.6	Pk	35.7	-29.9	.4	44.8	54	-9.2	74	-29.2	0-360	200	V

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

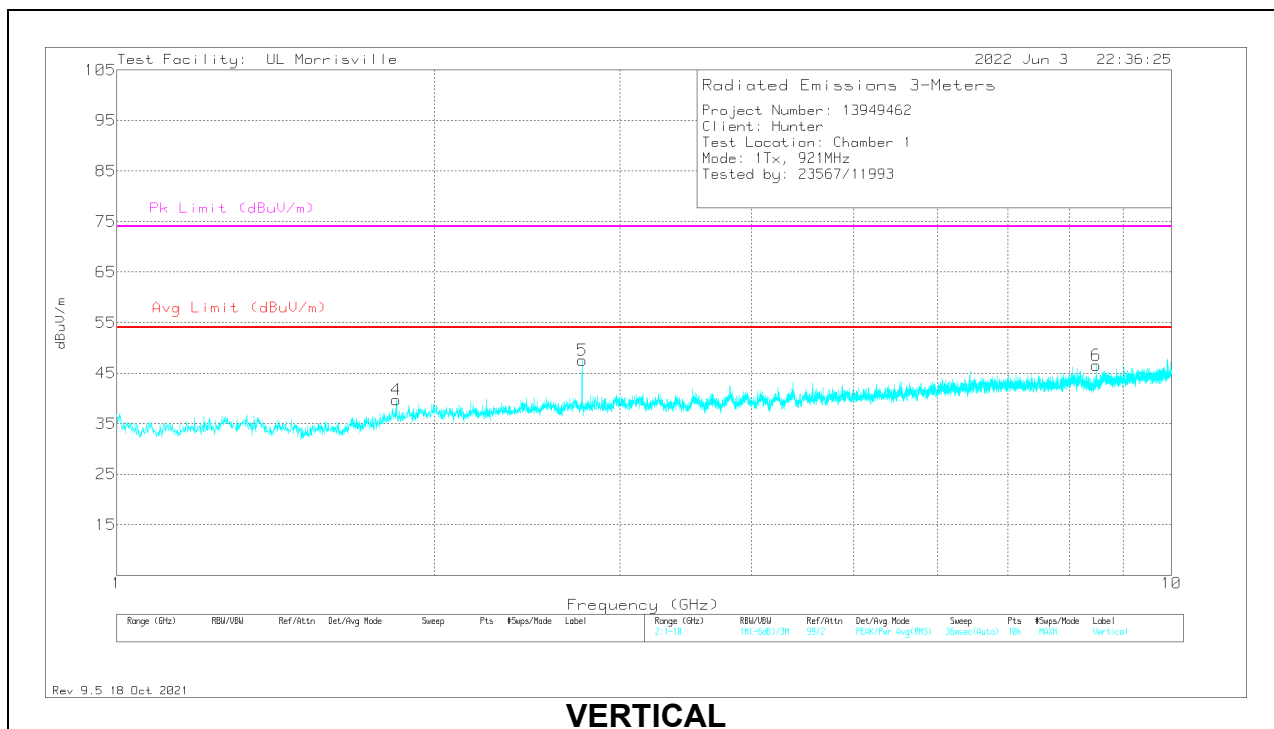
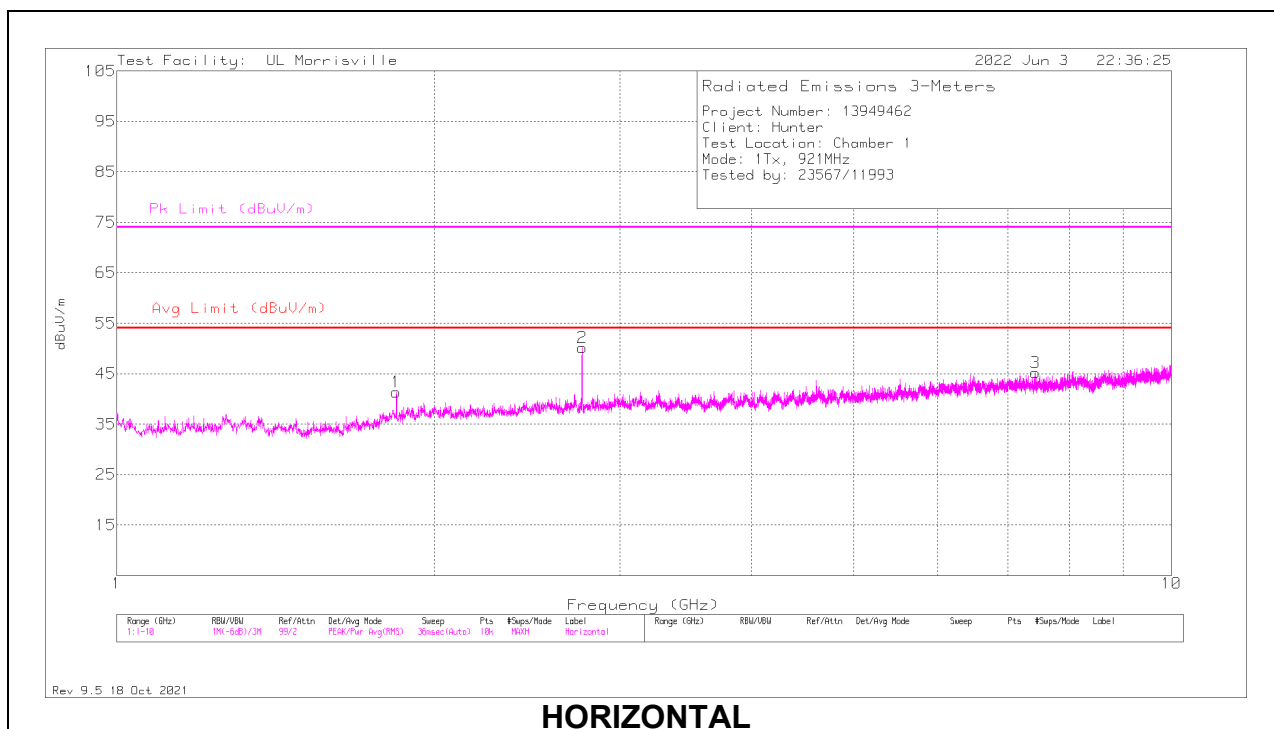
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Gain/Loss (dB)	Filter (dB)	Corrected Reading dBuV/m	Avg Limit (dBuV/m)	Margin (dB)	Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	** 1.8415	44.55	Pk	30.9	-34.6	.5	41.35	54	-12.65	74	-32.65	0-360	399	H
2	*** 2.7632	52.22	PK2	32.5	-33.7	.5	51.52	-	-	74	-22.48	241	399	H
	*** 2.7631	46.28	ADV	32.5	-33.7	.5	45.58	54	-8.42	-	-	241	399	H
3	*** 7.4269	38.84	Pk	35.6	-29.7	.4	45.14	54	-8.86	74	-28.86	0-360	100	H
4	** 1.8415	42.92	Pk	30.9	-34.6	.5	39.72	54	-14.28	74	-34.28	0-360	400	V
5	*** 2.7622	48.26	Pk	32.5	-33.7	.5	47.56	54	-6.44	74	-26.44	0-360	300	V
6	*** 8.4826	39.85	Pk	35.8	-29.4	.3	46.55	54	-7.45	74	-27.45	0-360	400	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

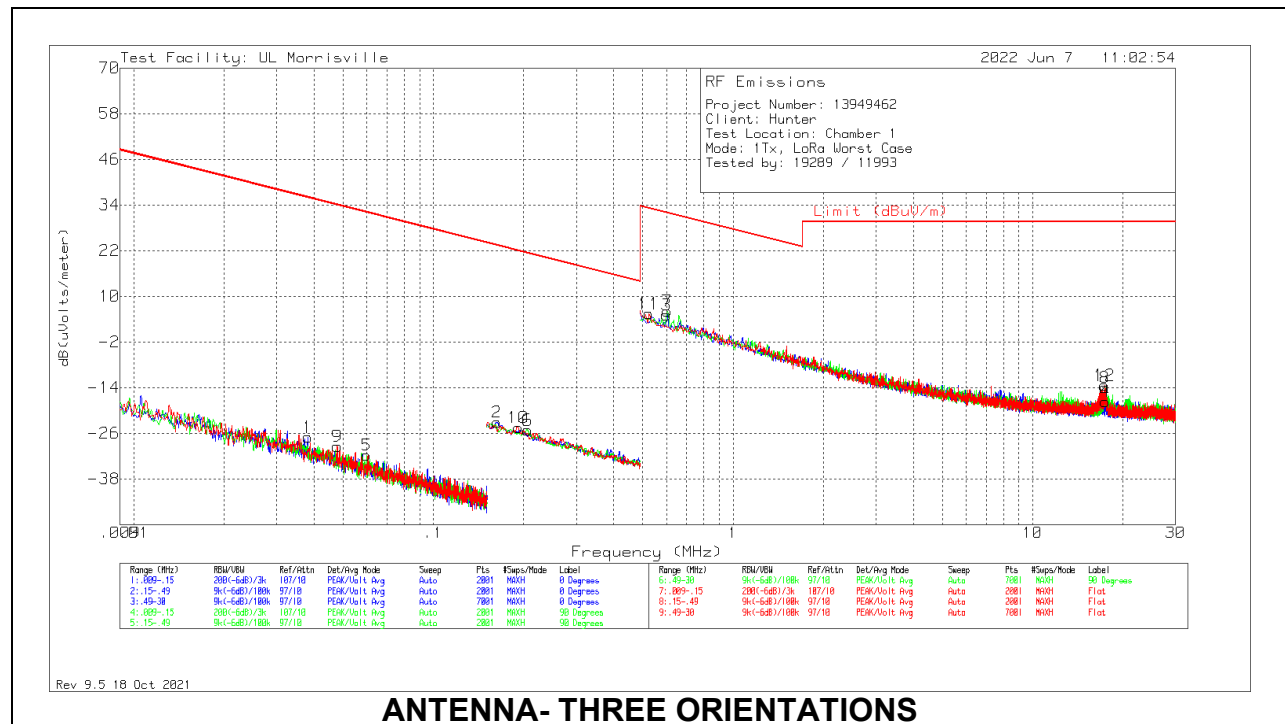
PK2 - Maximum Peak

ADV - Linear Voltage Average

10.3. WORST CASE BELOW 30MHZ

Note for below 30 MHz scans: 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 $40 \cdot \log(\text{test distance} / \text{specification distance})$.

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION E-FIELD)



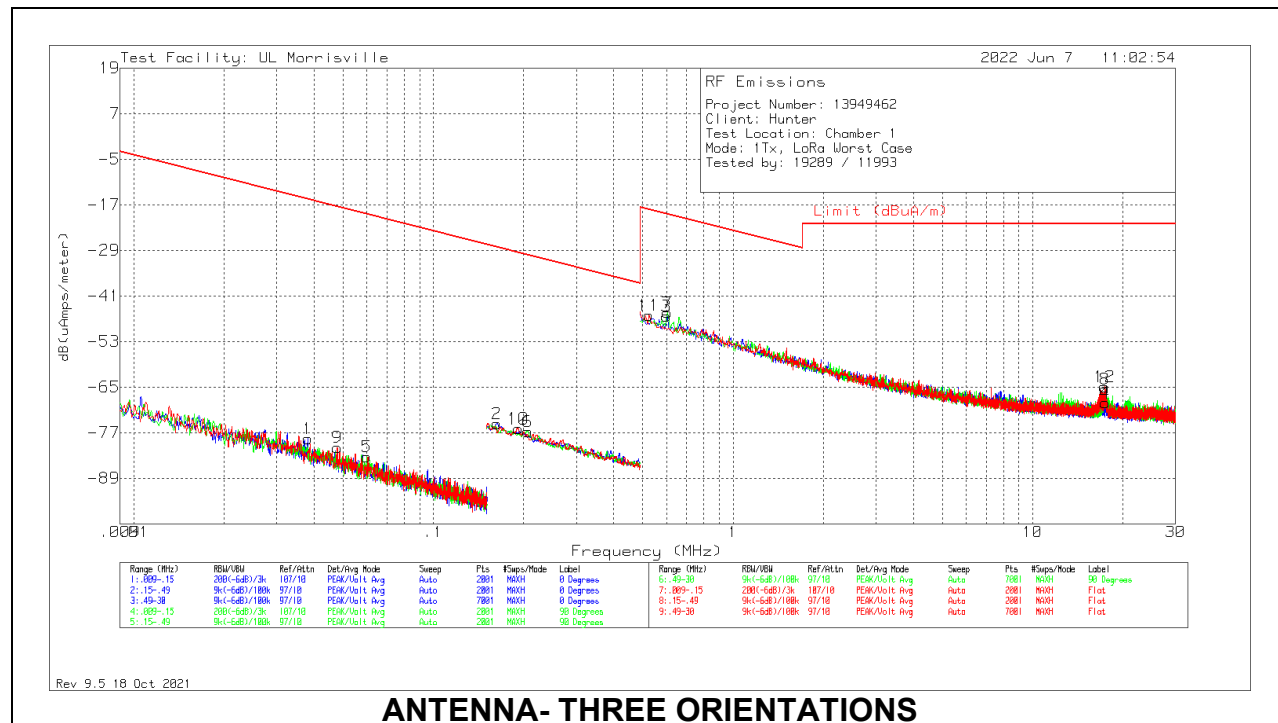
ANTENNA- THREE ORIENTATIONS

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0059 (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
1	.03811	40.52	Pk	12.3	.1	-80	-27.08	35.98	55.98	-63.06	0-360	0 degs
9	.04777	39.15	Pk	11.3	.1	-80	-29.45	34.02	54.02	-63.47	0-360	Flat
5	.05984	36.99	Pk	11.1	.1	-80	-31.81	32.07	52.07	-63.88	0-360	90 degs
2	.16301	46.56	Pk	10.2	.1	-80	-23.14	23.36	43.36	-46.5	0-360	0 degs
10	.19216	45.15	Pk	10.2	.1	-80	-24.55	21.93	41.93	-46.48	0-360	Flat
6	.20661	44.47	Pk	10.2	.1	-80	-25.23	21.3	41.3	-46.53	0-360	90 degs
11	.52373	34.98	Pk	10.2	.2	-40	5.38	33.22	-	-27.84	0-360	Flat
3	.59962	34.71	Pk	10.2	.2	-40	5.11	32.05	-	-26.94	0-360	0 degs
7	.60383	35.66	Pk	10.2	.2	-40	6.06	31.99	-	-25.93	0-360	90 degs
12	17.39616	15.16	Pk	10.5	.9	-40	-13.44	29.54	-	-42.98	0-360	Flat
8	17.42567	14.57	Pk	10.5	.9	-40	-14.03	29.54	-	-43.57	0-360	90 degs
4	17.50156	11	Pk	10.4	.9	-40	-17.7	29.54	-	-47.24	0-360	0 degs

Pk - Peak detector

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION H-FIELD)



ANTENNA- THREE ORIENTATIONS

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuA)	Det	AT0059 (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
1	.03811	40.52	Pk	-39.2	.1	-80	-78.58	-15.52	4.48	-63.06	0-360	0 degs
9	.04777	39.15	Pk	-40.2	.1	-80	-80.95	-17.48	2.52	-63.47	0-360	Flat
5	.05984	36.99	Pk	-40.4	.1	-80	-83.31	-19.43	0.57	-63.88	0-360	90 degs
2	.16301	46.56	Pk	-41.3	.1	-80	-74.64	-28.14	-8.14	-46.5	0-360	0 degs
10	.19216	45.15	Pk	-41.3	.1	-80	-76.05	-29.57	-9.57	-46.48	0-360	Flat
6	.20661	44.47	Pk	-41.3	.1	-80	-76.73	-30.2	-10.2	-46.53	0-360	90 degs
11	.52373	34.98	Pk	-41.3	.2	-40	-46.12	-18.28	-	-27.84	0-360	Flat
3	.59962	34.71	Pk	-41.3	.2	-40	-46.39	-19.45	-	-26.94	0-360	0 degs
7	.60383	35.66	Pk	-41.3	.2	-40	-45.44	-19.51	-	-25.93	0-360	90 degs
12	17.39616	15.16	Pk	-41	.9	-40	-64.94	-21.96	-	-42.98	0-360	Flat
8	17.42567	14.57	Pk	-41	.9	-40	-65.53	-21.96	-	-43.57	0-360	90 degs
4	17.50156	11	Pk	-41.1	.9	-40	-69.2	-21.96	-	-47.24	0-360	0 degs

Pk - Peak detector

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

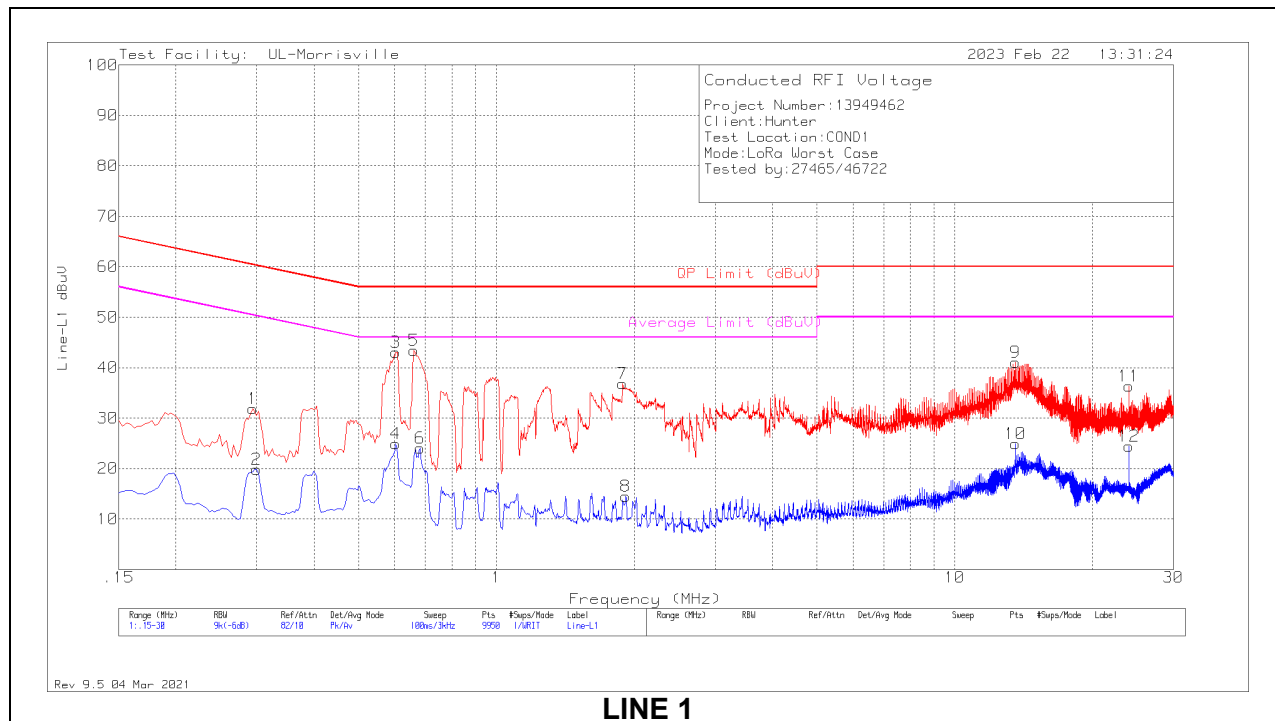
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak Detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both lines.

RESULTS

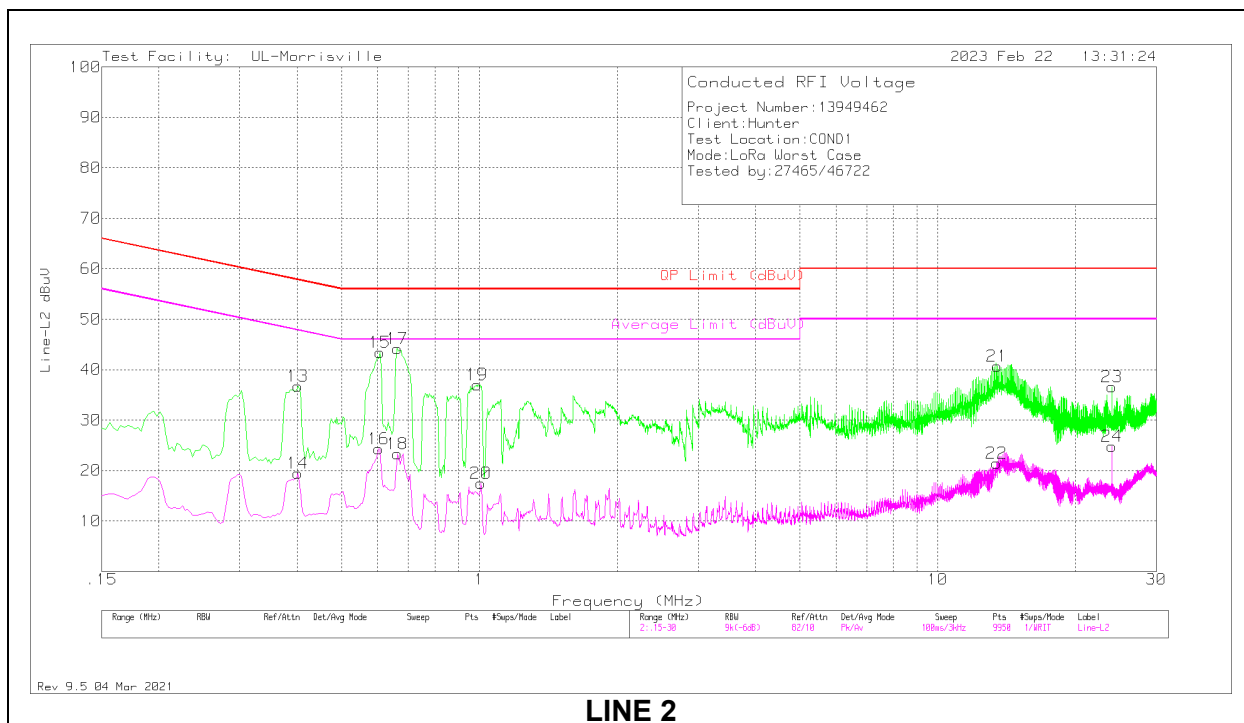
11.1.1. AC Power Line Norm



LINE 1 RESULTS

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.294	21.95	Pk	.1	9.8	31.85	60.41	-28.56	-	-
2	.3	9.89	Av	.1	9.8	19.79	-	-	50.24	-30.45
3	.603	33.3	Pk	0	9.8	43.1	56	-12.9	-	-
4	.603	15.1	Av	0	9.8	24.9	-	-	46	-21.1
5	.66	33.6	Pk	0	9.8	43.4	56	-12.6	-	-
6	.681	14.2	Av	0	9.8	24	-	-	46	-22
7	1.887	27.02	Pk	0	9.8	36.82	56	-19.18	-	-
8	1.917	4.72	Av	0	9.8	14.52	-	-	46	-31.48
9	13.56	30.94	Pk	.1	10	41.04	60	-18.96	-	-
10	13.56	14.79	Av	.1	10	24.89	-	-	50	-25.11
11	24	25.91	Pk	.2	10.2	36.31	60	-23.69	-	-
12	24	13.98	Av	.2	10.2	24.38	-	-	50	-25.62

Pk - Peak detector
Av - Average detection



LINE 2

LINE 2 RESULTS

Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
13	.402	26.92	Pk	0	9.8	36.72	57.81	-21.09	-	-
14	.402	9.65	Av	0	9.8	19.45	-	-	47.81	-28.36
15	.606	33.6	Pk	0	9.8	43.4	56	-12.6	-	-
16	.603	14.47	Av	0	9.8	24.27	-	-	46	-21.73
17	.663	34.33	Pk	0	9.8	44.13	56	-11.87	-	-
18	.663	13.55	Av	0	9.8	23.35	-	-	46	-22.65
19	.987	27.22	Pk	0	9.8	37.02	56	-18.98	-	-
20	1.008	7.68	Av	0	9.8	17.48	-	-	46	-28.52
21	13.482	30.57	Pk	.1	10	40.67	60	-19.33	-	-
22	13.452	11.39	Av	.1	10	21.49	-	-	50	-28.51
23	24	26.15	Pk	.2	10.2	36.55	60	-23.45	-	-
24	24	14.4	Av	.2	10.2	24.8	-	-	50	-25.2

Pk - Peak detector
Av - Average detection

12. SETUP PHOTOS

Please refer to R13949462-EP1 for setup photos

END OF TEST REPORT