



TEST REPORT

Report Number. : R13407793-E3

Applicant : ANELTO INC.
6270 MORNINGSTAR DRIVE, SUITE 100
THE COLONY, TEXAS, 75056, USA

Model : ANW0720

FCC ID : 2AGPI-ANW0720

IC : 20951-ANW0720

EUT Description : BLE WEARABLE DEVICE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5 + Amendment 1

Date Of Issue:
2020-12-14

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



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2020-10-15	Initial Issue	Mike Antola
V2	2020-11-19	Added antenna port conducted data	Cristian Melara
V3	2020-12-07	Updated Maximum Output Power statement in section 6.2	Cristian Melara
V4	2020-12-14	Replaced Maximum Output Power data in sections 6.2 & 9.4	Mike Antola

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ANELTO INC.
6270 MORNINGSTAR DRIVE, SUITE 100
THE COLONY, TEXAS, 75056, USA

EUT DESCRIPTION: BLE WEARABLE DEVICE

MODEL: ANW0720

SERIAL NUMBER: 200901

DATE TESTED: 2020-09-27 TO 2020-11-19

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5 + Amendment 1	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. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.

Approved & Released For
UL LLC By:

Prepared By:



Brian Kiewra
Project Engineer
Consumer Technology Division
UL LLC

Mike Antola
Staff Engineer
Consumer Technology Division
UL LLC

2. TEST RESULTS SUMMARY

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	Compliant	None
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	Not applicable	EUT is battery powered only

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2020, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + Amendment 1: 2019, and RSS-247 Issue 2:2017

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

12 Laboratory Dr.	2800 Perimeter Park Dr., Suite B
☐ Chamber A RTP	☒ North Chamber
☐ Chamber C RTP	☒ South Chamber

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

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	1.82%
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	2.26°C
Humidity	6.79%
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 wearable BLE device.

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	0.92	1.24

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PIFA antenna, with a maximum gain of -2 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was S140V7.0.1 Rev 191107.

The test utility software used during testing was NA.

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 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, middle and high channels.

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.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

NA

I/O CABLES

NA

TEST SETUP

The EUT is a stand-alone device. Test software exercised the radio.

SETUP DIAGRAMS

Please refer to E13407793-EP1 for setup diagrams

7. MEASUREMENT 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 -11.9.1.1 RBW $\geq$ DTS Bandwidth Method

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 -11.10.2 Method PKPSD (peak PSD)

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

Emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1, 6.10.5

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

On Time and Duty Cycle: ANSI C63.10: 2013 Section 11.6

8. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	(Loop Ant.)			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
	30-1000 MHz				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-07-27	2021-07-27
	1-18 GHz				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-27	2021-04-27
	Gain-Loss Chains				
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-29	2021-07-29
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-29	2021-07-29
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-28	2021-07-28
	Receiver & Software				
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-07-16	2021-07-16
SOFTEMI	EMI Software	UL	Version 9.5 (2020-07-07)		
	Additional Equipment used				
s/n 200037610	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-28	2021-04-28
	18-40 GHz				
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2019-11-07	2020-11-07
	Gain-Loss Chains				
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-06	2021-07-06
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-07-07	2021-07-07
	Receiver & Software				
SA0027	Spectrum Analyzer	Agilent	N9030A	2020-06-10	2021-06-10
SOFTEMI	EMI Software	UL	Version 9.5 (2020-07-07)		
	Additional Equipment used				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22

Test Equipment Used - Wireless Conducted Measurement Equipment

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Common Equipment				
	Conducted Room 1				
PWS001 (PRE0137347)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2020-05-27	2021-05-27
PWM002 (PRE0137344)	RF Power Meter	Keysight Technologies	N1911A	2020-07-31	2021-07-31
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
	Conducted Room 2				
SA0027 (PRE0126407)	Spectrum Analyzer	Keysight Technologies	N9030A	2020-06-10	2021-06-10
HI0090 (PRE0191271)	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
SOFTEMI	EMC Software	UL	Version 2020.10.22	NA	NA

9. ANTENNA PORT TEST RESULTS

9.1. DUTY CYCLE

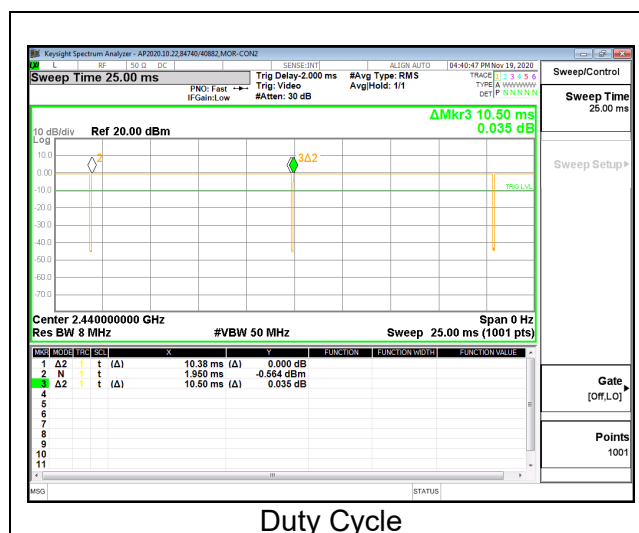
LIMITS

None, for reporting purposes only

TEST PROCEDURE

ANSI C63.10 Zero Span Method.

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Voltage Averaging Duty Cycle Correction Factor (dB)
2.4GHz Band					
BLE 1mbps	10.380	10.500	0.989	98.86%	0.00



9.2. 99% BANDWIDTH

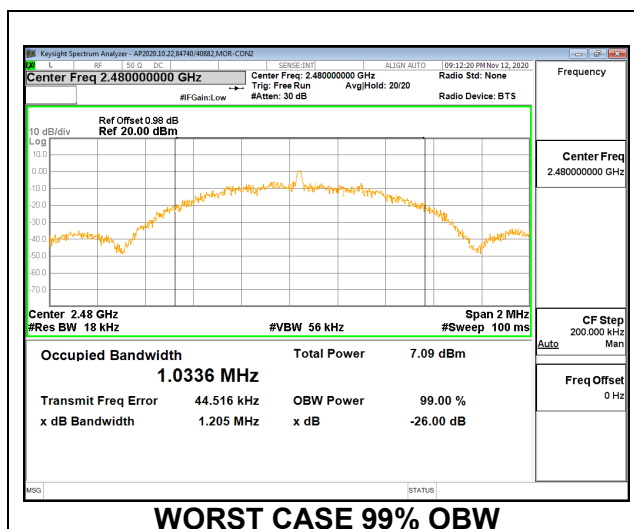
LIMITS

None; for reporting purposes only.

RESULTS

9.2.1. BLE (1Mbps)

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0384
Middle	2440	1.0374
High	2480	1.0336



9.3. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

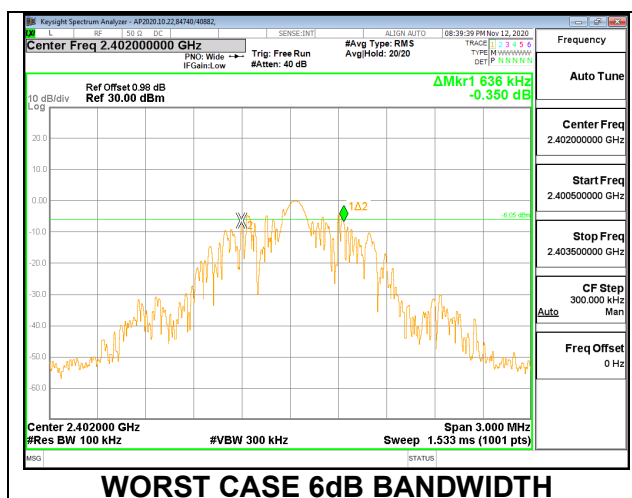
RSS-247 5.2 (a)

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	0.6360	0.5
Middle	2440	0.6420	0.5
High	2480	0.6480	0.5



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.

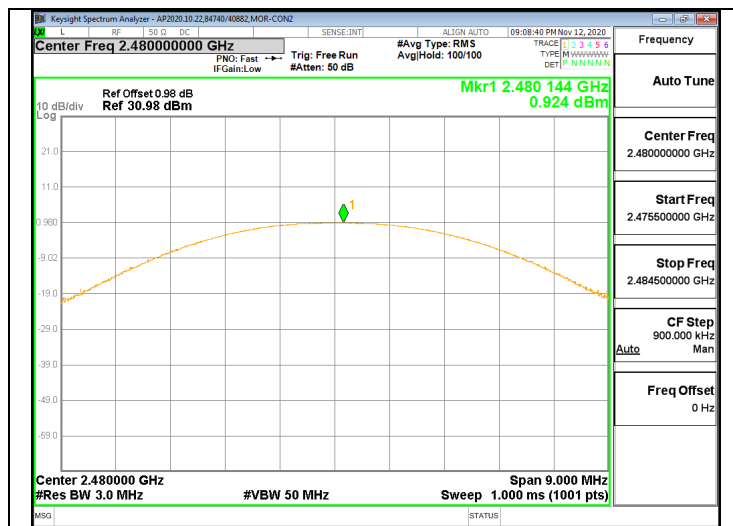
TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

RESULTS

9.4.1. BLE (1Mbps)

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	0.356	30	-29.644
Middle	2440	0.747	30	-29.253
High	2480	0.924	30	-29.076



WORST CASE OUTPUT POWER

9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 0.98 (0.98 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

9.5.1. BLE (1Mbps)

Tested By:	84740/40882
Date:	2020-11-12

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	0.07
Middle	2440	0.19
High	2480	0.45

9.6. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

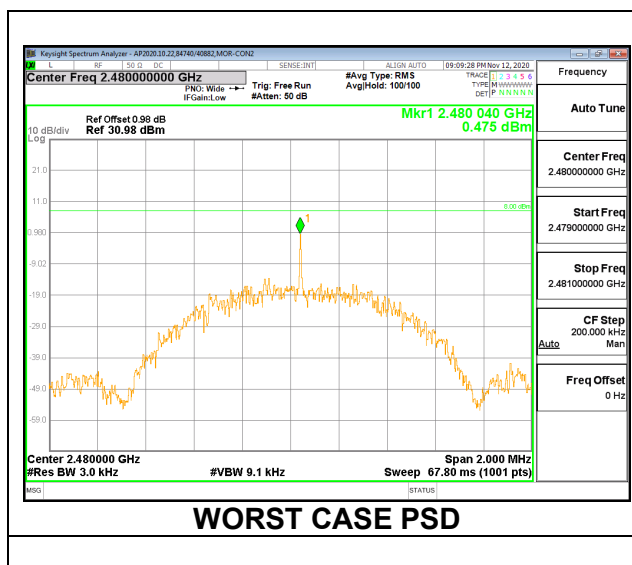
RSS-247 (5.2) (b)

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	-0.10	8	-8.10
Middle	2440	0.36	8	-7.64
High	2480	0.48	8	-7.53



9.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

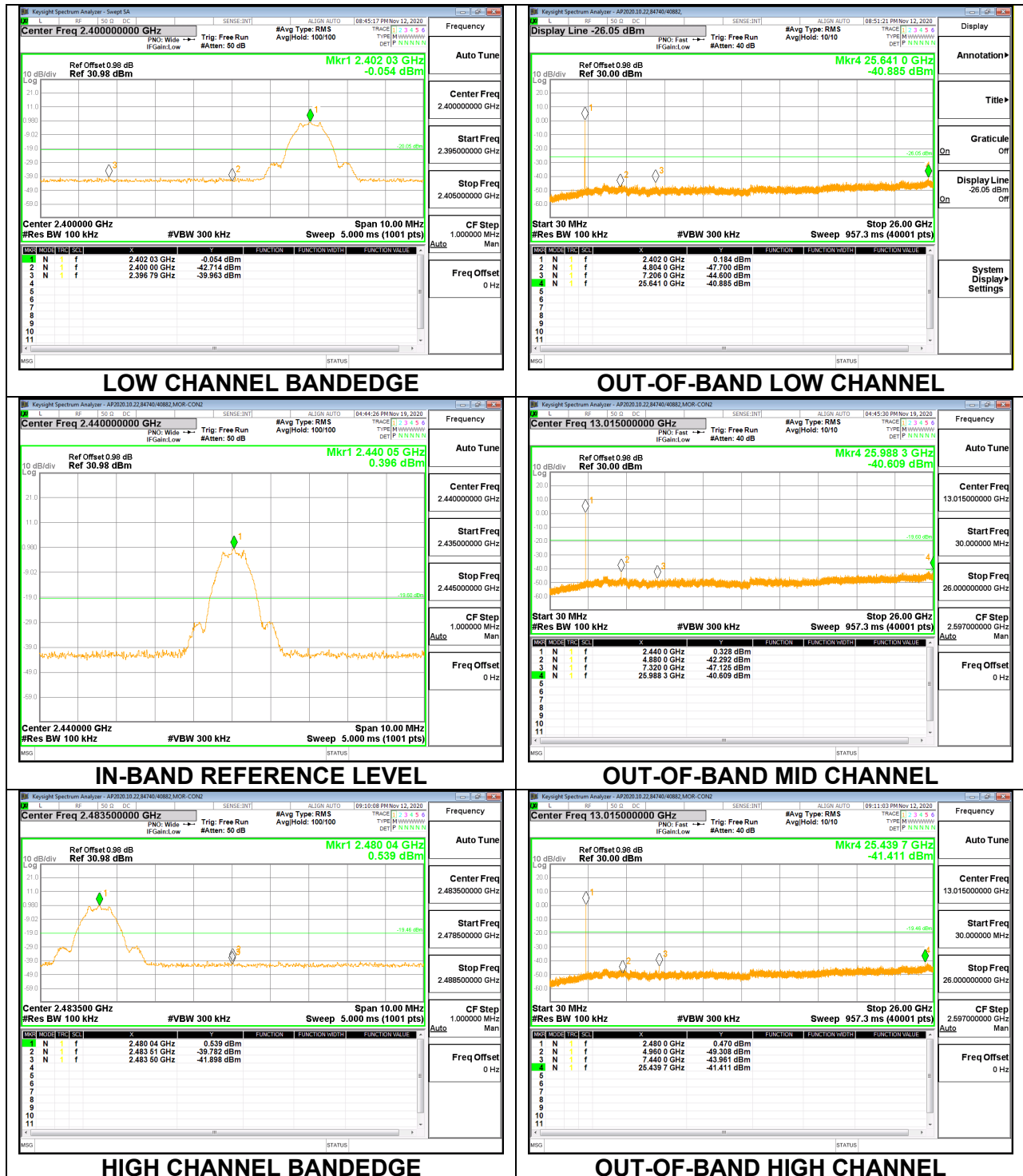
RSS-247 5.5

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

RESULTS

9.7.1. BLE (1Mbps)

*Note – For low channel conducted spurious emissions, the limit line does not match the reference limit as determined by the low channel bandedge plot. However, the current conducted spurious emission limit line is lower and therefore can be used as a worst case.



10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

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

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.

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 9-150kHz range. Peak detection is used unless otherwise noted as quasi-peak.

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 (voltage averaging).

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.

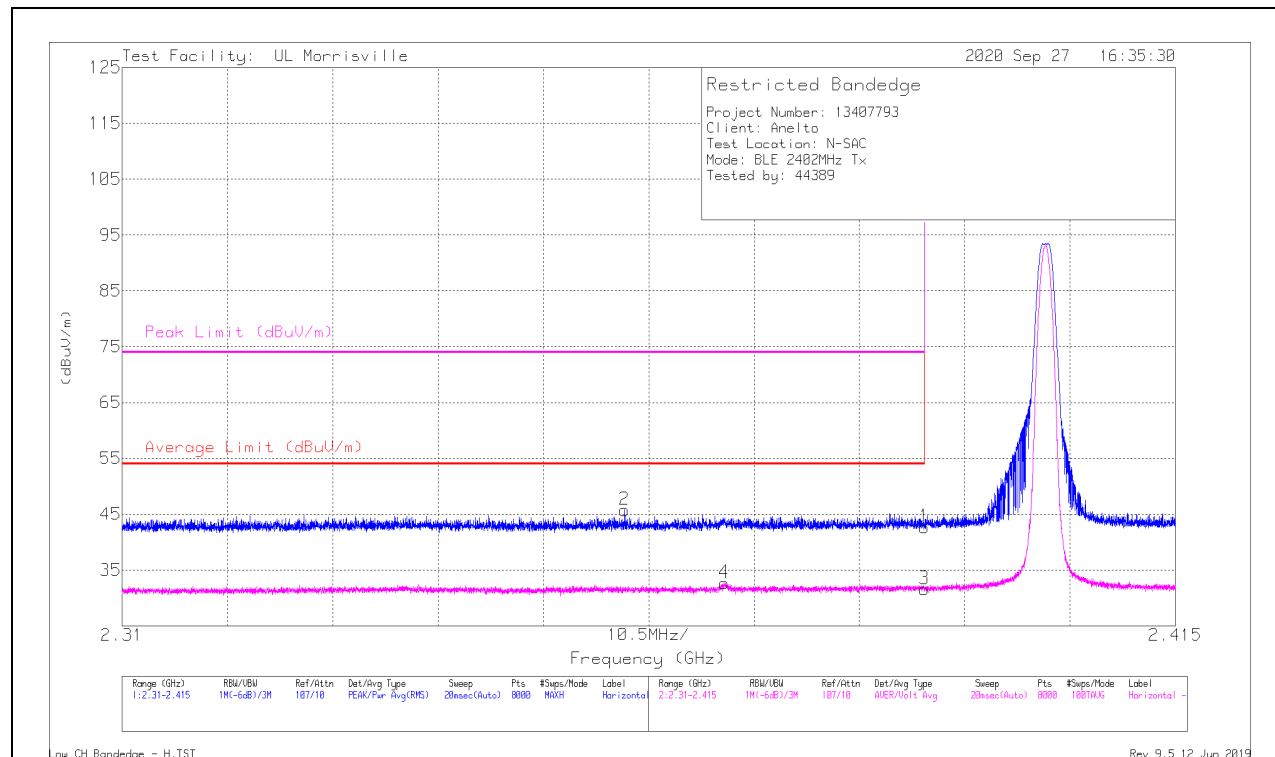
10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE (1Mbps)

Antenna 1

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	35.29	PK	31.8	-24.4	42.69	-	-	74	-31.31	158	172	H
2	* ** 2.36011	38.46	PK	31.7	-24.4	45.76	-	-	74	-28.24	158	172	H
3	* ** 2.39	24.2	ADV	31.8	-24.4	31.6	54	-22.4	-	-	158	172	H
4	* ** 2.37004	25.38	ADV	31.7	-24.4	32.68	54	-21.32	-	-	158	172	H

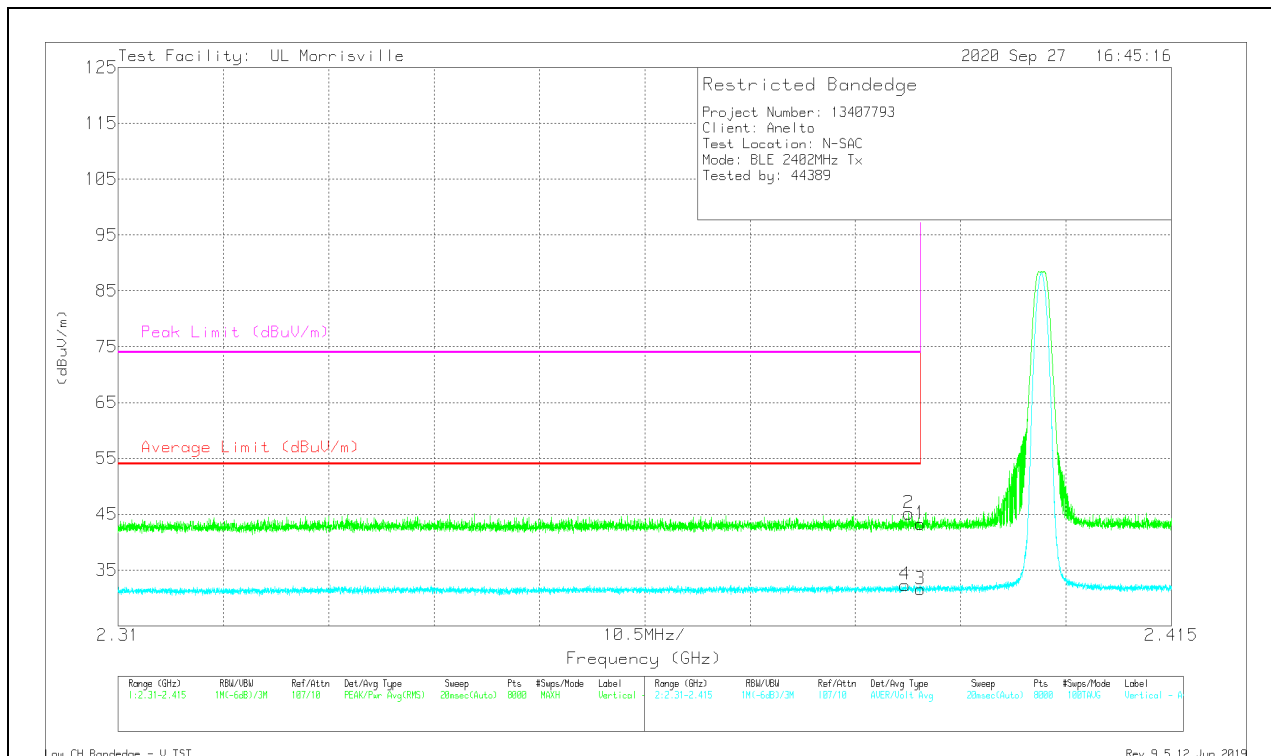
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	35.86	Pk	31.8	-24.4	43.26	-	-	74	-30.74	101	399	V
2	* ** 2.38882	37.77	Pk	31.8	-24.4	45.17	-	-	74	-28.83	101	399	V
3	* ** 2.39	24.15	ADV	31.8	-24.4	31.55	54	-22.45	-	-	101	399	V
4	* ** 2.38845	24.95	ADV	31.8	-24.4	32.35	54	-21.65	-	-	101	399	V

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

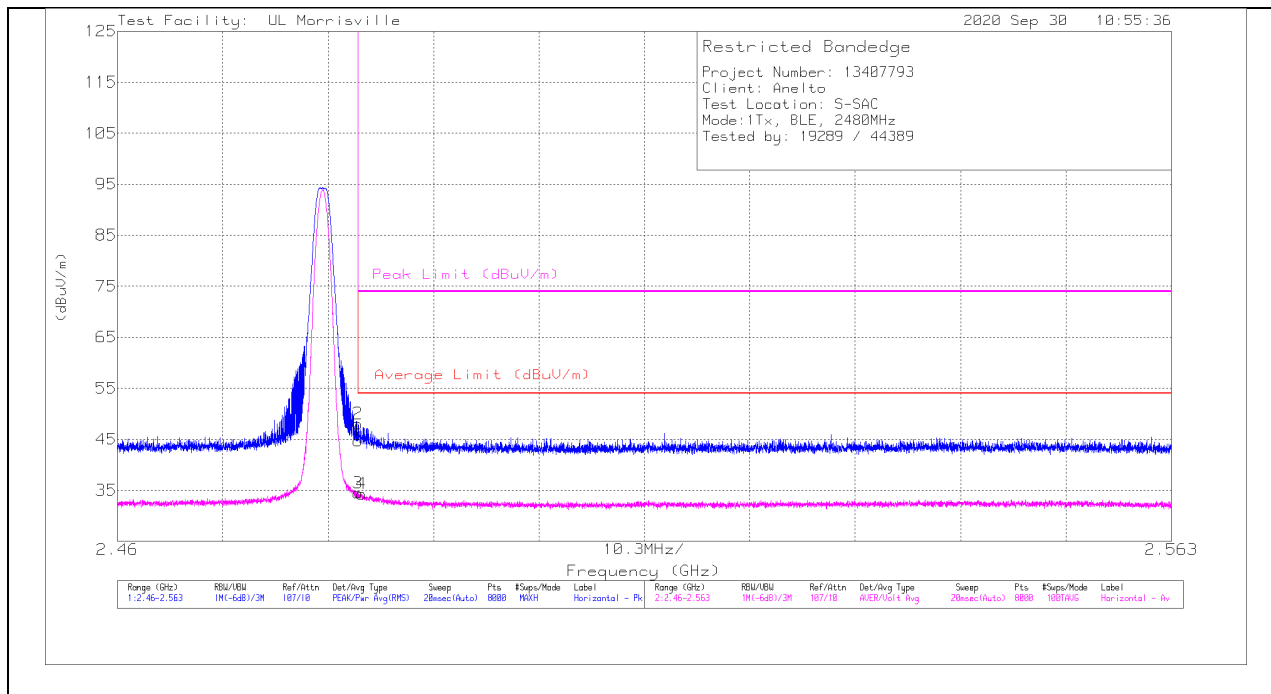
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(m)	Amp/Cb1/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	36.68	PK	32.4	-24.4	44.68	-	-	74	-29.32	61	258	H
2	* ** 2.48353	40.06	PK	32.4	-24.4	48.06	-	-	74	-25.94	61	258	H
3	* ** 2.4835	26.5	ADV	32.4	-24.4	34.5	54	-19.5	-	-	61	258	H
4	* ** 2.48387	26.31	ADV	32.4	-24.4	34.31	54	-19.69	-	-	61	258	H

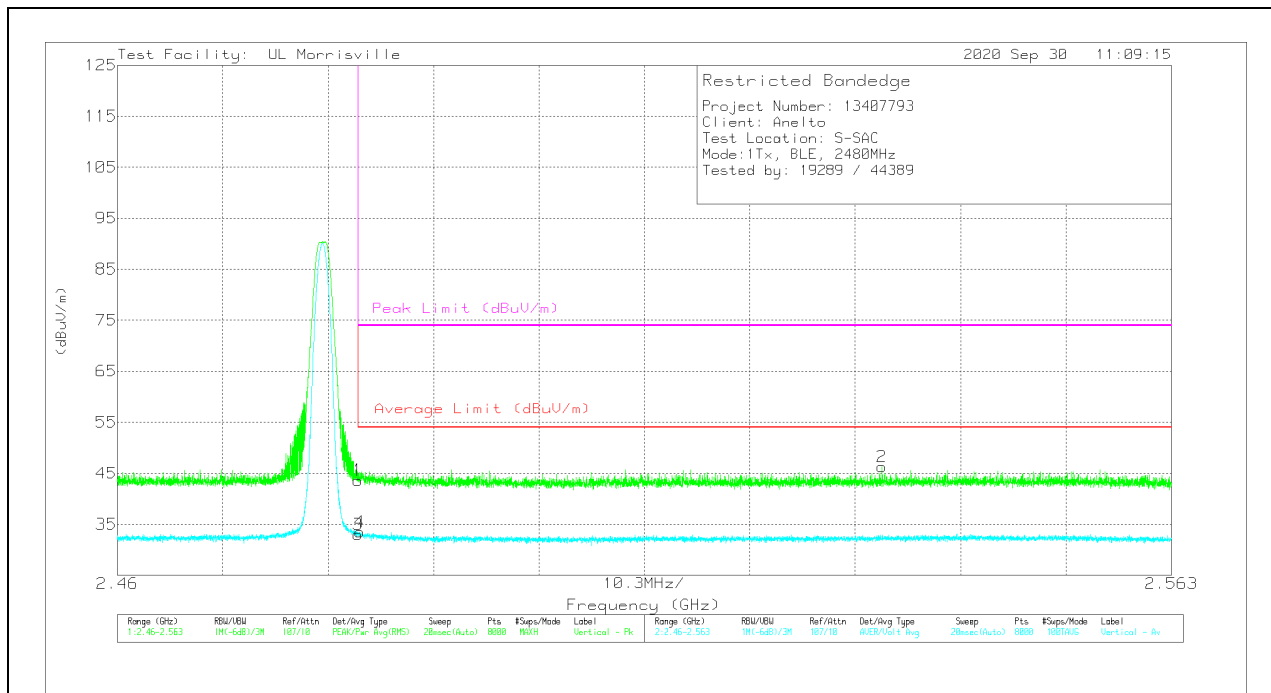
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	35.64	Pk	32.4	-24.4	43.64	-	-	74	-30.36	325	359	V
2	** 2.53471	38.46	Pk	32.6	-24.8	46.26	-	-	74	-27.74	325	359	V
3	* ** 2.4835	25.04	ADV	32.4	-24.4	33.04	54	-20.96	-	-	325	359	V
4	* ** 2.48369	25.53	ADV	32.4	-24.4	33.53	54	-20.47	-	-	325	359	V

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

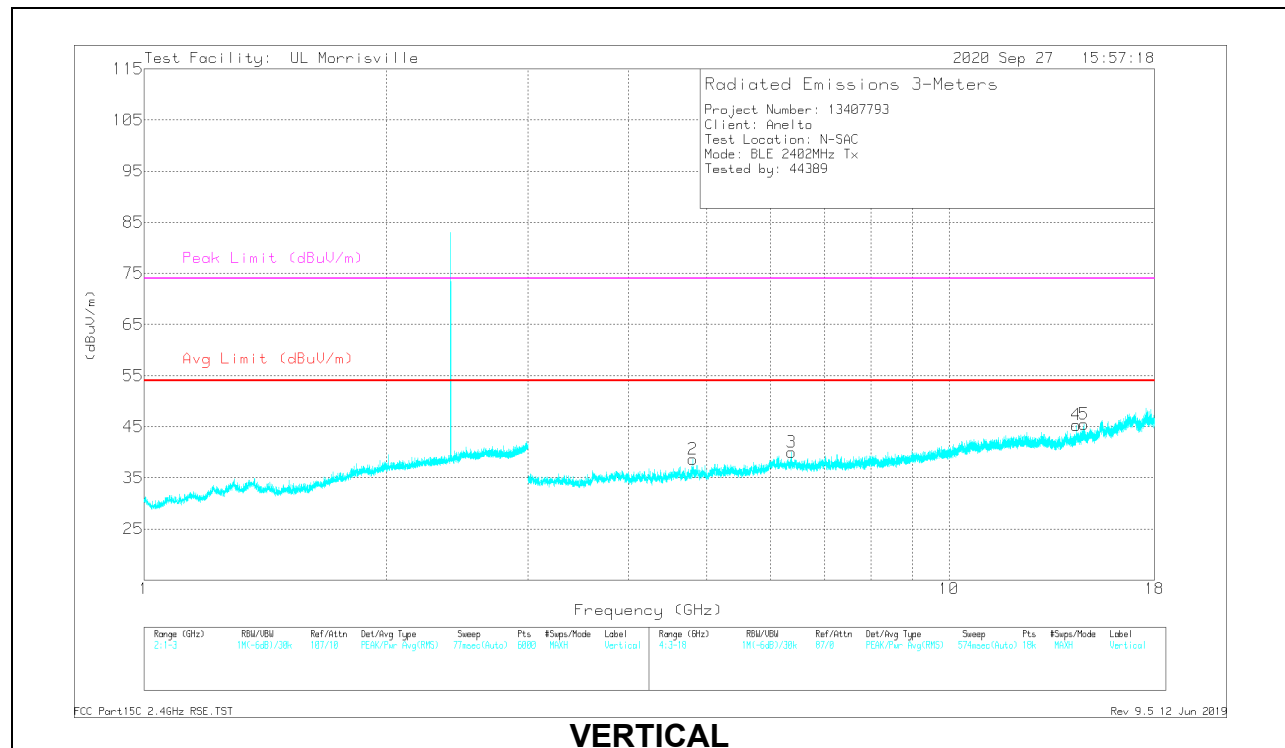
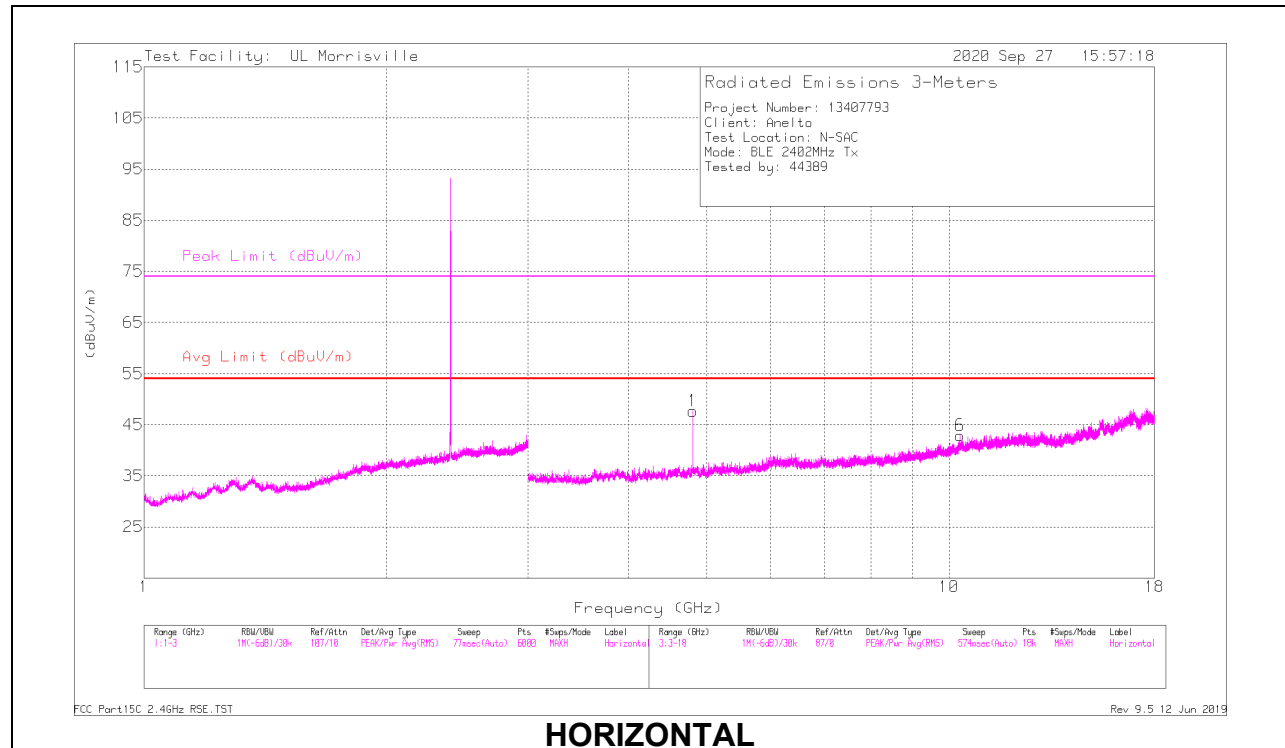
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.8041	48.26	PK2	34.3	-31.5	51.06	-	-	74	-22.94	245	117	H
	* ** 4.80409	43.75	ADV	34.3	-31.5	46.55	54	-7.45	-	-	245	117	H
2	* ** 4.80413	43.14	PK2	34.3	-31.5	45.94	-	-	74	-28.06	288	376	V
	* ** 4.80402	35.35	ADV	34.3	-31.5	38.15	54	-15.85	-	-	288	376	V
3	6.37602	34.22	Pk	35.6	-29.8	40.02	-	-	-	-	0-360	102	V
6	10.32208	30.89	Pk	37.5	-25.5	42.89	-	-	-	-	0-360	102	H
4	14.3848	33.22	Pk	39.2	-27.1	45.32	-	-	-	-	0-360	102	V
5	14.71066	31.8	Pk	39.7	-26	45.5	-	-	-	-	0-360	198	V

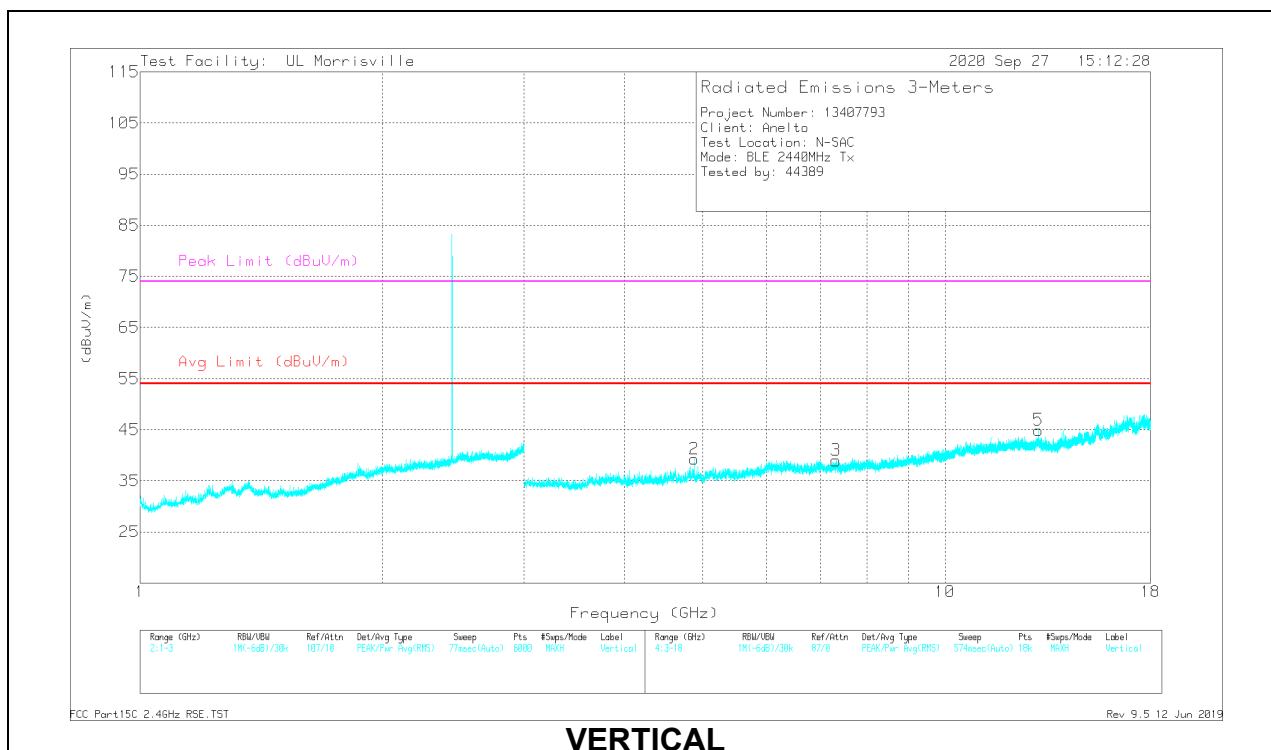
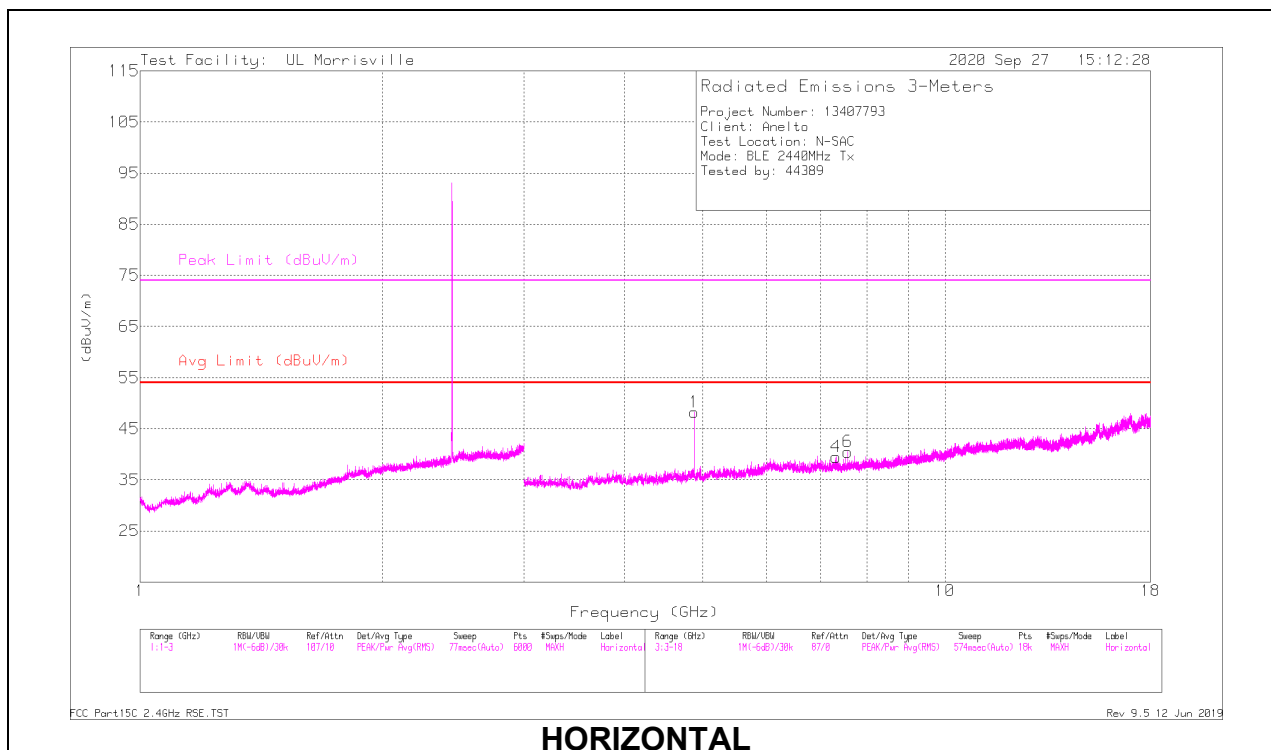
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.88007	48.67	PK2	34.1	-31.4	51.37	-	-	74	-22.63	244	105	H
	* ** 4.8801	44.37	ADV	34.1	-31.4	47.07	54	-6.93	-	-	244	105	H
4	* ** 7.32036	38.25	PK2	35.6	-29.2	44.65	-	-	74	-29.35	107	357	H
	* ** 7.32028	26.94	ADV	35.6	-29.2	33.34	54	-20.66	-	-	107	357	H
6	* ** 7.5692	38.3	PK2	35.7	-29.6	44.4	-	-	74	-29.6	191	110	H
	* ** 7.56873	25.65	ADV	35.7	-29.6	31.75	54	-22.25	-	-	191	110	H
2	* ** 4.88011	44.05	PK2	34.1	-31.4	46.75	-	-	74	-27.25	288	389	V
	* ** 4.88003	36.76	ADV	34.1	-31.4	39.46	54	-14.54	-	-	288	389	V
3	* ** 7.31937	38.53	PK2	35.6	-29.3	44.83	-	-	74	-29.17	318	370	V
	* ** 7.32027	26.46	ADV	35.6	-29.2	32.86	54	-21.14	-	-	318	370	V
5	13.06973	32.1	Pk	39.1	-26.3	44.9	-	-	-	-	0-360	102	V

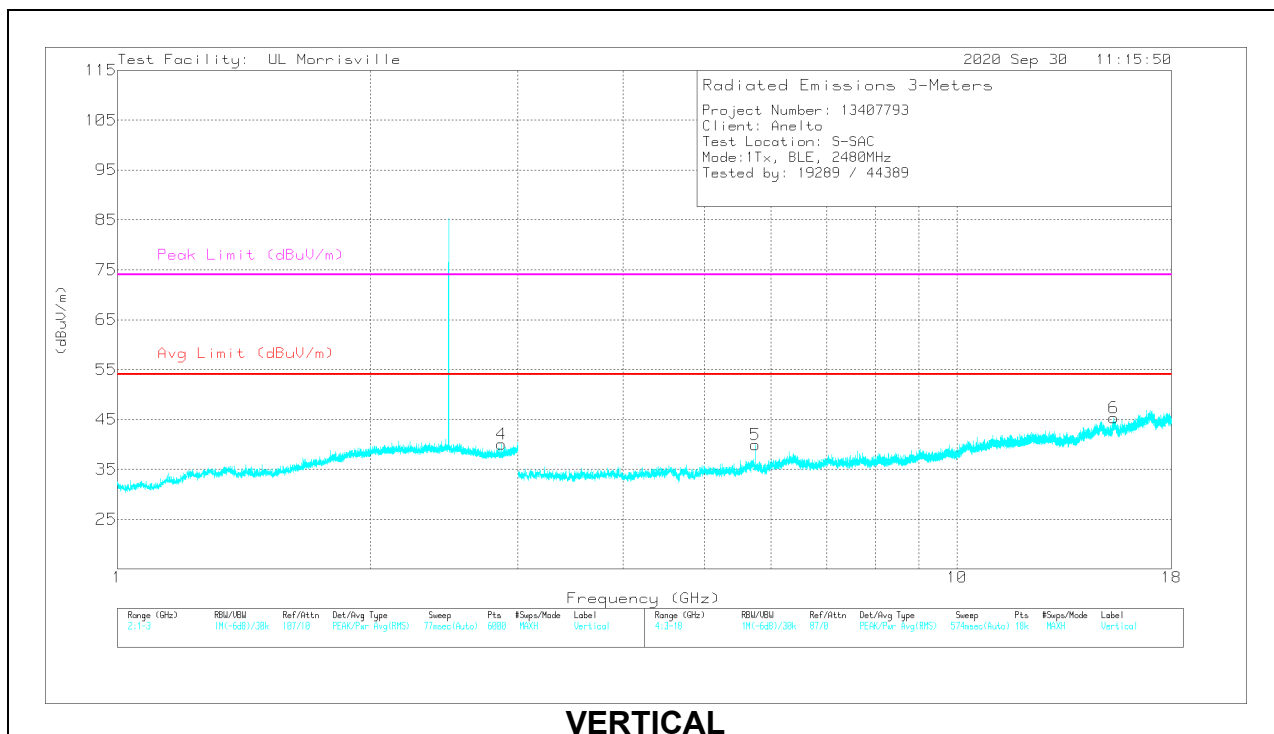
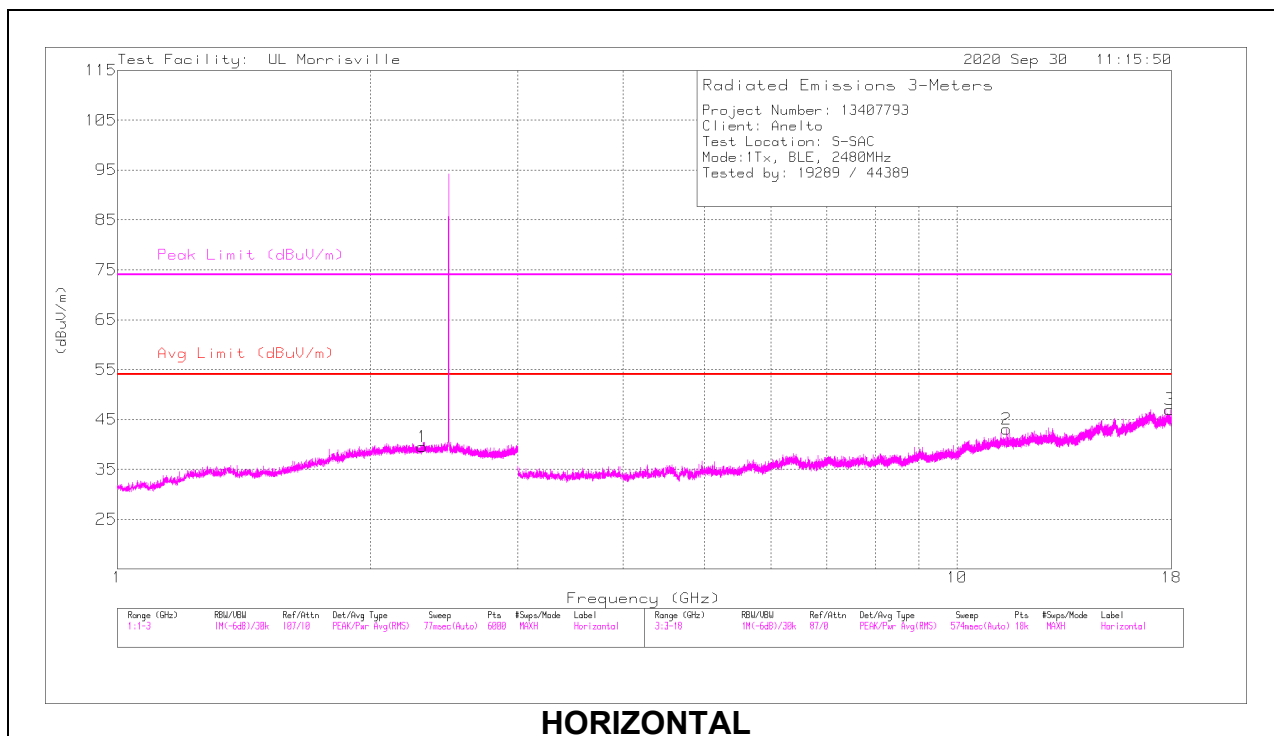
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/C bl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV /m)	Margin (dB)	Peak Limit (dBuV /m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	*** 2.86735	38.02	PK2	32.6	-25.9	44.72	-	-	74	-29.28	49	220	V
	*** 2.86742	24.74	ADV	32.6	-25.9	31.44	54	-22.56	-	-	49	220	V
2	*** 11.45609	33.24	PK2	38.2	-24.2	47.24	-	-	74	-26.76	6	258	H
	*** 11.45648	20.91	ADV	38.2	-24.2	34.91	54	-19.09	-	-	6	258	H
3	*** 17.92417	33.18	PK2	41.2	-22.2	52.18	-	-	74	-21.82	4	213	H
	*** 17.92369	20.67	ADV	41.2	-22.2	39.67	54	-14.33	-	-	4	213	H
6	*** 15.37659	33	PK2	40.3	-22.7	50.6	-	-	74	-23.4	206	209	V
	*** 15.37654	20.71	ADV	40.3	-22.7	38.31	54	-15.69	-	-	206	209	V
1	2.30688	31.15	Pk	32	-23.6	39.55	-	-	-	-	0-360	101	H
5	5.74599	35.43	Pk	34.6	-30.1	39.93	-	-	-	-	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

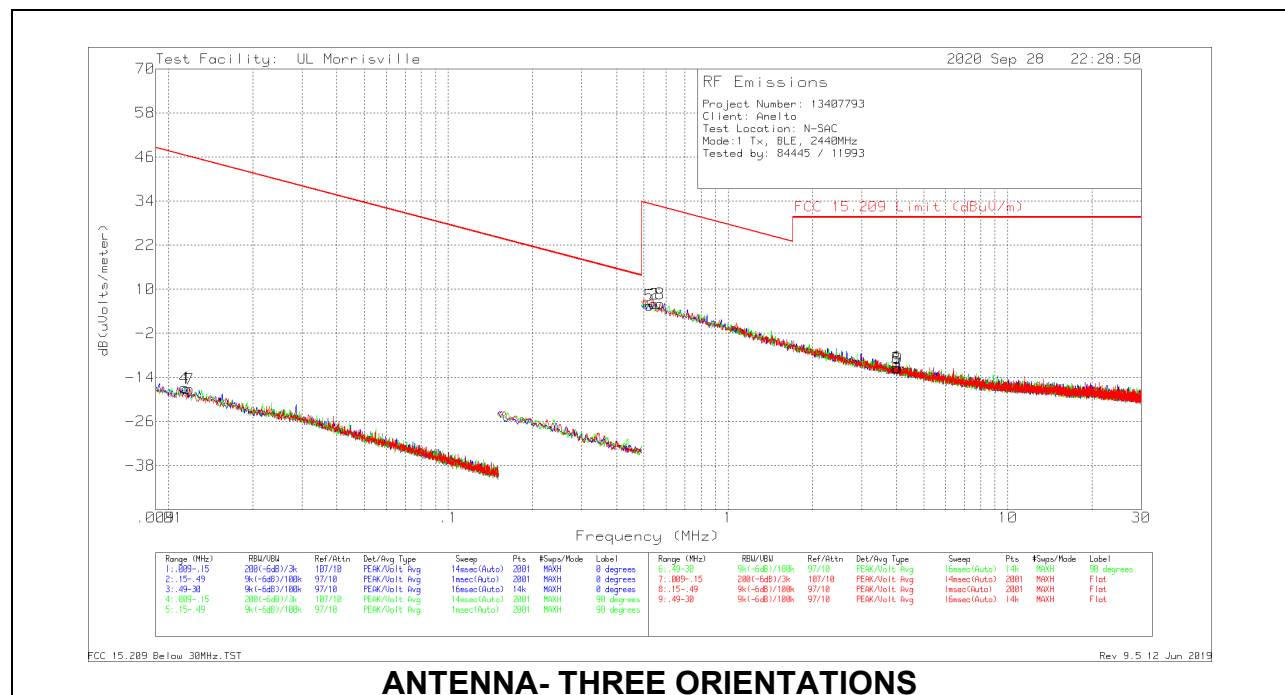
Pk - Peak detector

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 $40 \cdot \log(\text{test distance} / \text{specification distance})$.

The below 30 MHz limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency 11.41 KHz resulted in a level of -16.75 dBuV/m, which is equivalent to $-16.75 - 51.5 = -68.25$ dBuA/m, which has the same margin, -63.21 dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- THREE ORIENTATIONS

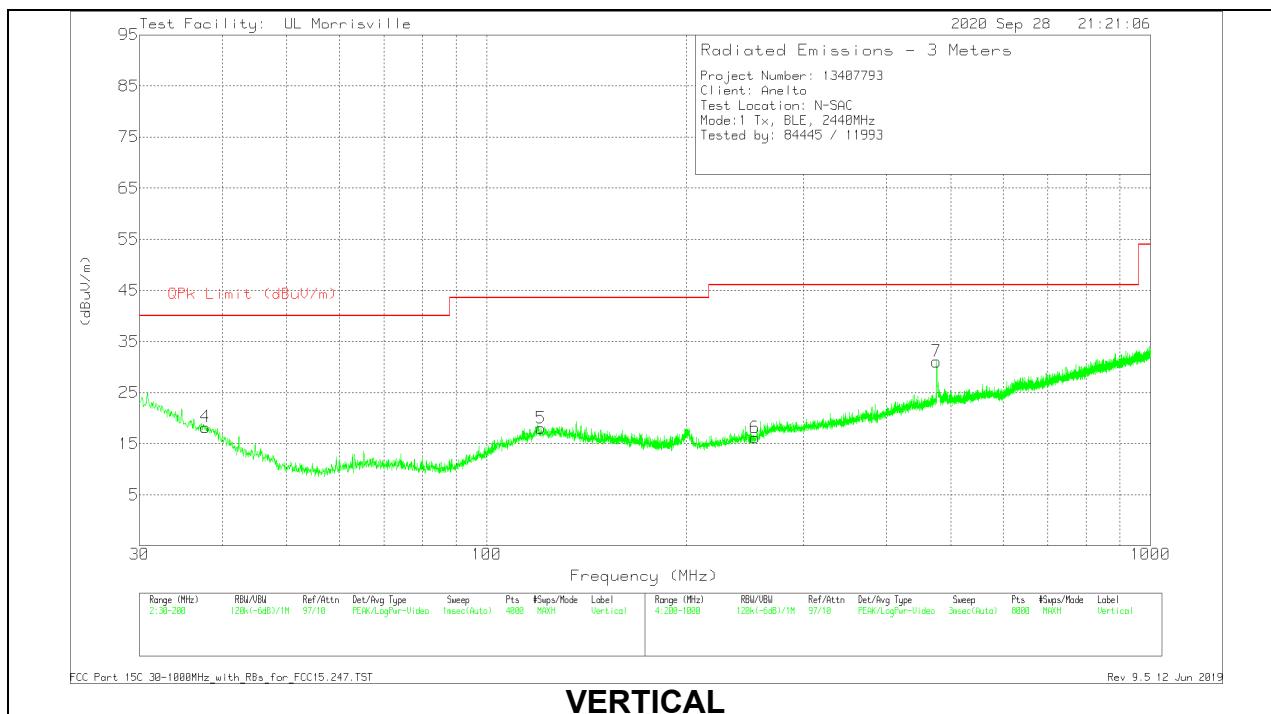
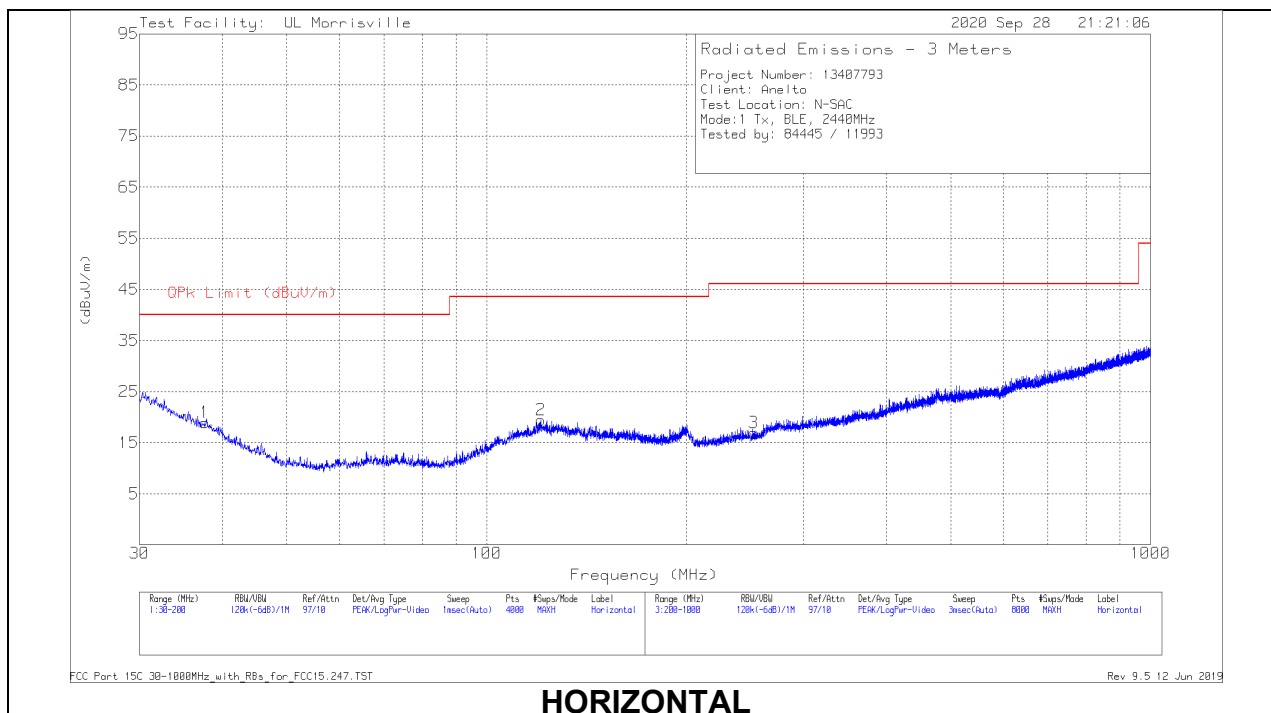
Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 QP/AV Limit (dBuV/m)	FCC 15.209 PK Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)
4	.01141	45.85	Pk	17.3	.1	-80	-16.75	46.46	66.46	-63.21	0-360
1	.01163	45.67	Pk	17.2	.1	-80	-17.03	46.3	66.3	-63.33	0-360
7	.01191	45.63	Pk	17.1	.1	-80	-17.17	46.09	66.09	-63.26	0-360
5	.52373	34.61	Pk	10.8	.2	-40	5.61	33.22	-	-27.61	0-360
2	.54586	35.04	Pk	10.8	.2	-40	6.04	32.86	-	-26.82	0-360
8	.57221	35.09	Pk	10.8	.2	-40	6.09	32.45	-	-26.36	0-360
3	3.9682	17.07	Pk	11.2	.4	-40	-11.33	29.54	-	-40.87	0-360
6	4.01036	17.12	Pk	11.2	.4	-40	-11.28	29.54	-	-40.82	0-360
9	4.05463	16.91	Pk	11.2	.4	-40	-11.49	29.54	-	-41.03	0-360

Pk - Peak detector

10.4. WORST CASE BELOW 1 GHZ

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

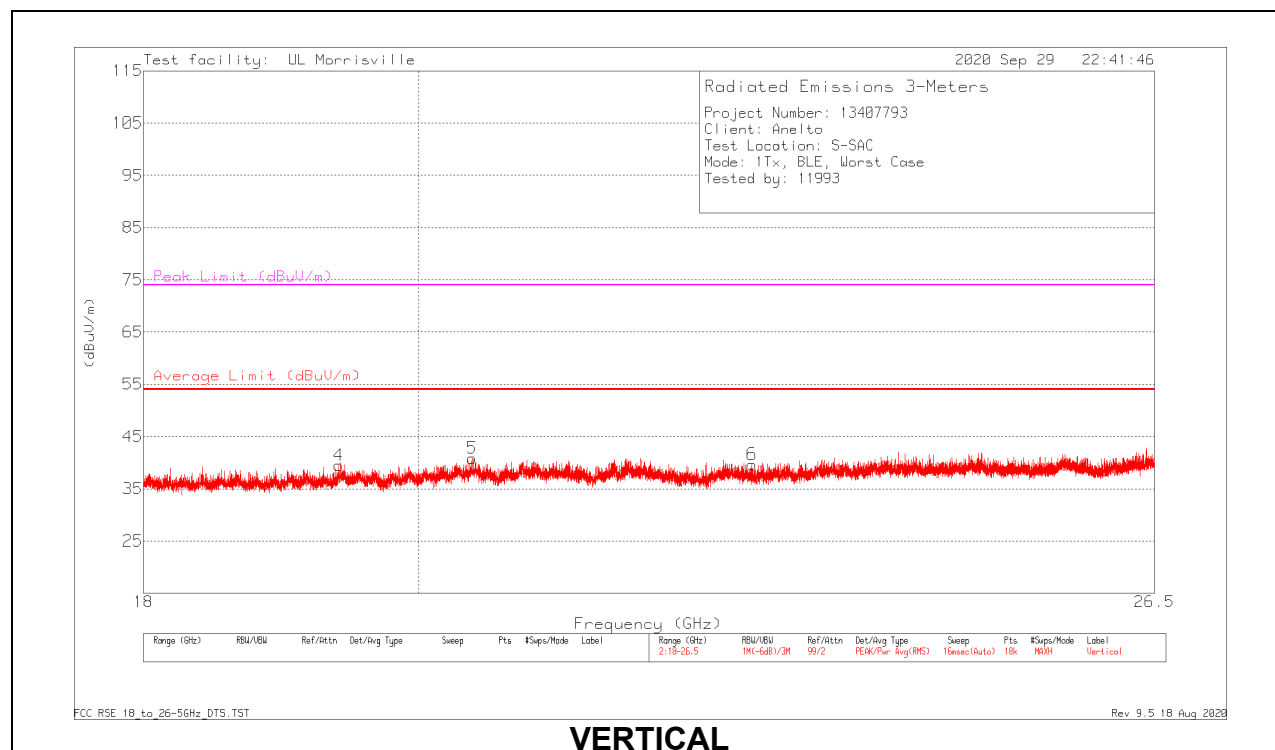
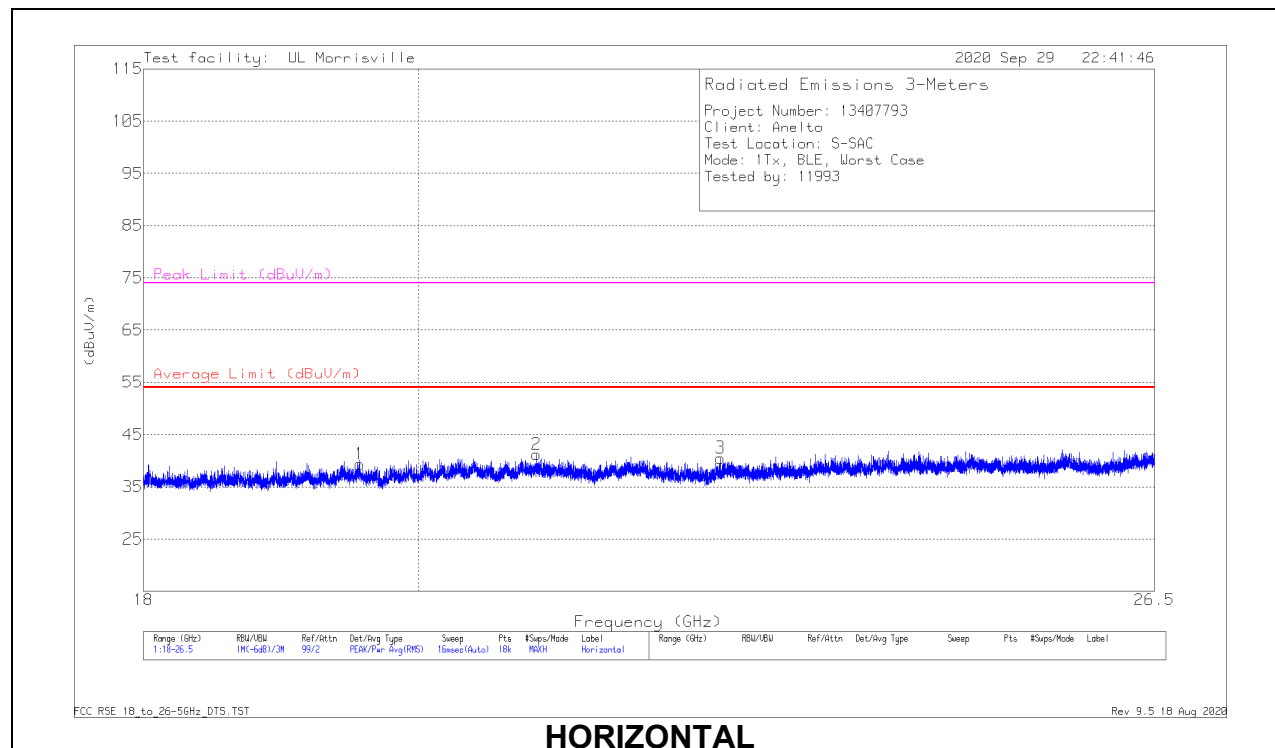


Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 37.6095	28.83	Pk	21.4	-31.3	18.93	40	-21.07	0-360	199	H
2	* ** 120.8035	29.61	Pk	20	-30.2	19.41	43.52	-24.11	0-360	399	H
4	* ** 37.737	28.13	Pk	21.4	-31.3	18.23	40	-21.77	0-360	102	V
5	* ** 120.8035	28.26	Pk	20	-30.2	18.06	43.52	-25.46	0-360	102	V
3	* ** 252.7069	28.18	Pk	17.6	-28.9	16.88	46.02	-29.14	0-360	102	H
6	* ** 253.607	27.45	Pk	17.6	-28.9	16.15	46.02	-29.87	0-360	299	V
7	476.3359	34.86	Pk	23.7	-27.5	31.06	46.02	-14.96	0-360	102	V

10.5. WORST CASE 18-26 GHZ

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



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 19.5537	45.51	Pk	32.8	-39	39.31	54	-14.69	74	-34.69	0-360	149	H
2	* ** 20.91944	46.97	Pk	33.2	-39	41.17	54	-12.83	74	-32.83	0-360	300	H
3	* ** 22.44574	46.32	Pk	33.6	-39.4	40.52	54	-13.48	74	-33.48	0-360	250	H
4	* ** 19.39597	45.79	Pk	32.8	-39.1	39.49	54	-14.51	74	-34.51	0-360	150	V
5	* ** 20.41319	46.43	Pk	33.1	-38.7	40.83	54	-13.17	74	-33.17	0-360	101	V
6	* ** 22.71823	45.05	Pk	33.6	-39	39.65	54	-14.35	74	-34.35	0-360	101	V

11. SETUP PHOTOS

Please refer to R13407793-EP1 for setup photos

END OF TEST REPORT