TEST REPORT

Report Number. : R13430045-E1

Applicant	:	SharkNinja Operating LLC 89 A Street, Suite 100 Needham, MA 02494, USA
Model	:	AI Robot
FCC ID	:	2ASV9-M8723SN1
IC	:	24909-BLM8723SN1
EUT Description	:	Wireless Vacuum
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C: 2020 ISED RSS-247 ISSUE 2: 2017 ISED RSS-GEN ISSUE 5+ Amendment 1: 2019

Date Of Issue:
2021-05-27

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

NVLAP TESTING

NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2020-11-25	Initial Issue	Haley Ackun
V2	2021-05-27	Updated power section info and test methodology.	Haley Ackun

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SharkNinja Operating LLC
89 A Street, Suite 100
Needham, MA 02494, USA

EUT DESCRIPTION: Wireless Vacuum

MODEL: AI Robot

SERIAL NUMBER: K28K3088Z6U1 -Radiated Sample
N191009-012-001-002 -Conducted Sample

SAMPLE RECEIPT DATE: 2020-08-06, 2020-08-18, 2020-11-05

DATE TESTED: 2020-11-12 to 2020-11-17

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C: 2020	Complies
ISED RSS-247 Issue 2: 2017	Complies
ISED RSS-GEN Issue 5 + Amendment 1: 2019	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:

Jeff Moser
Operations Manager
Consumer Technology Division
UL LLC

Prepared By:

Haley Ackun
Laboratory 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	Not Performed	See Note 1.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW		
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power		
See Comment		Average power		
15.247 (e)	RSS-247 5.2 (b)	PSD		
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None.

Note 1 – These power was checked prior to Radiated and Line Conducted Emissions testing to ensure the device was operating at the same or higher power as declared for the module to ensure worst-case results.

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, 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 Suite Perimeter Park Dr.
☐ 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	1.22%
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	2.26°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

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

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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 wireless vacuum.

6.2. MAXIMUM OUTPUT POWER

Power was checked prior to Radiated and Line Conducted Emissions testing to ensure the device was operating at the same or higher power as declared for the module to ensure worst-case results.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an multilayer ceramic antenna, with a maximum peak gain of 3.12 dBi.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware/software is as follows:

Wifi chip firmware version: v47
Wifi driver version: v5.6.5_31752.20181221 (test utility software)

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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, middle and high channels.

Since the EUT only operates in X orientation, all final radiated scans were performed with the EUT in X orientation.

The EUT has the fuctionality to transmit while charging. The EUT was checked for worst-case emissions in battery and charging modes. All final radiated scans were performed with the EUT set to transmit while charging as worst-case scenario.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charging Dock	SharkNinja	GQ24-190070-AU	N/A	N/A

I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	1	1	UART	UART	<3m	None.

TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM

Please refer to R13430045-EP1 for setup diagrams

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7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10 Section 11.6

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

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

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 - 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	2020-03-26	2021-03-26
HI0091	Environmental Meter	Fisher Scientific	14-650-118	2020-06-26	2021-06-26
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2020-08-18	2021-08-18
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2020-08-18	2021-08-18
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2020-03-26	2021-03-26
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5		
	Miscellaneous (if needed)				
CDECABLE001	ANSI C63.4 1m extension cable.	UL	Per Annex B of ANSI C63.4	2020-08-08	2021-08-08

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2020-06-10	2021-06-10
MM0165	True RMS Multimeter	Agilent	U1232A	2020-08-19	2021-08-19
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	NA	NA
SOFTEMI	EMC Software	UL	Version 2020-10-22		

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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 (In @ 0800 09/02/2020)	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
	18-40 GHz				
AT0063 (In @ 0800 11/04/2020)	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2020-10-30	2021-10-30
	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
N-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-07-31	2021-07-31
	Receiver & Software				
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-07-16	2021-07-16
SOFTEMI	EMI Software	UL	Version 9.5		
	Additional Equipment used				
s/n 200037610	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

	B (msec)	(msec)	x (linear)	Cycle (%)	Correction Factor (dB)	Minimum VBW (kHz)
2.4GHz Band						
802.11b 1TX	12.420	12.520	0.992	99.20%	0.00	0.010
802.11g 1TX	2.065	2.200	0.939	93.86%	0.55	0.484
802.11n HT20 1TX	1.920	2.080	0.923	92.31%	0.70	0.521
802.11n HT40 1TX	0.942	1.069	0.882	88.16%	1.09	1.061

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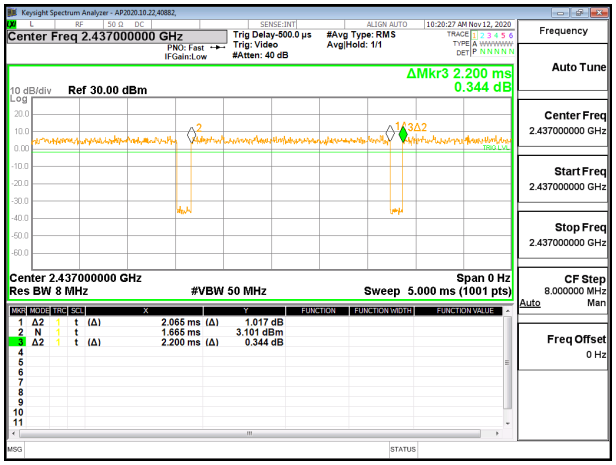
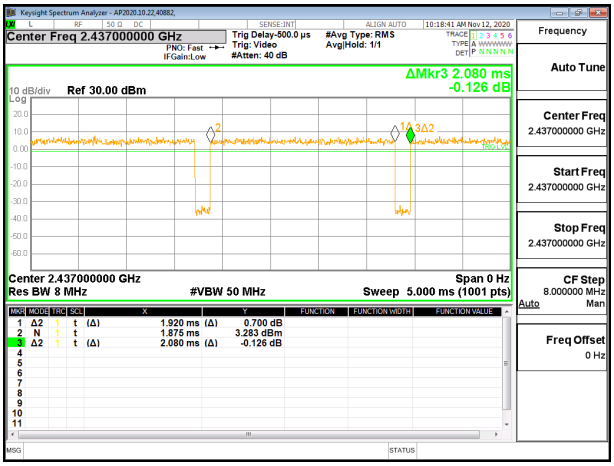
DUTY CYCLE PLOTS

DUTY CYCLE 802.11b 1TX MODE



DUTY CYCLE 802.11g 1TX MODE



DUTY CYCLE 802.11n HT20 1TX MODE

DUTY CYCLE 802.11n HT40 1TX MODE

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10. RADIATED TEST RESULTS

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.

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. 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. For average measurements, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz and average voltage detection was used.

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

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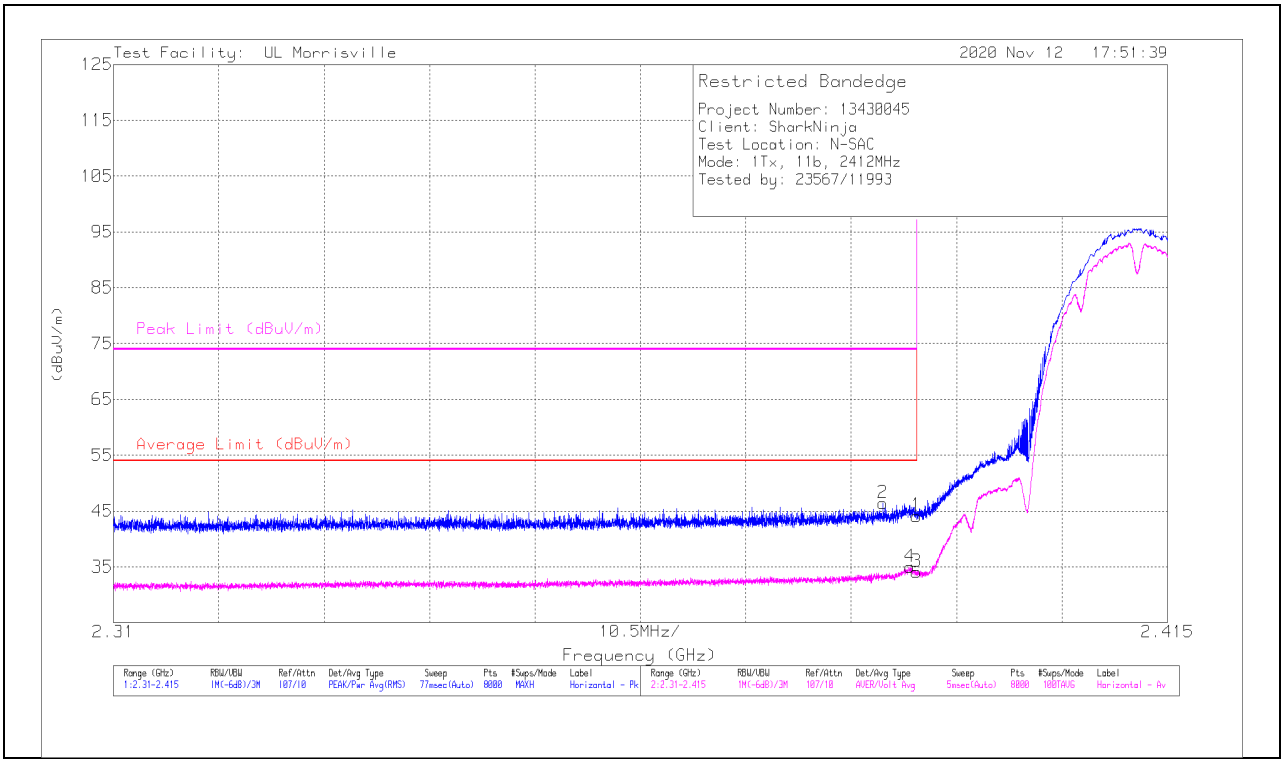
10.1. TRANSMITTER ABOVE 1 GHz

10.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/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	36.72	Pk	31.8	-24.4	44.12	-	-	74	-29.88	350	259	H
2	* ** 2.38666	39.01	Pk	31.8	-24.4	46.41	-	-	74	-27.59	350	259	H
3	* ** 2.39	26.7	ADV	31.8	-24.4	34.1	54	-19.9	-	-	350	259	H
4	* ** 2.38933	27.57	ADV	31.8	-24.4	34.97	54	-19.03	-	-	350	259	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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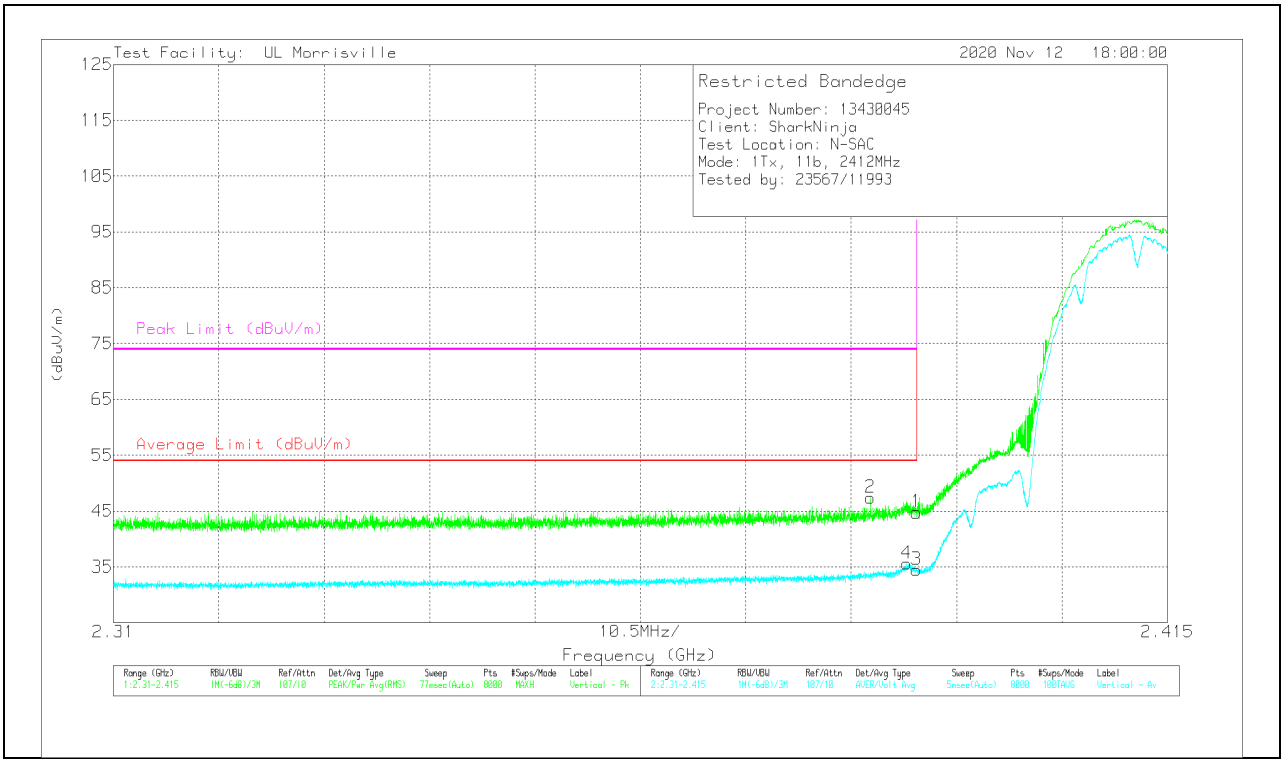
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/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	37.37	Pk	31.8	-24.4	44.77	-	-	74	-29.23	298	152	V
2	* ** 2.38539	39.96	Pk	31.8	-24.4	47.36	-	-	74	-26.64	298	152	V
3	* ** 2.39	27.07	ADV	31.8	-24.4	34.47	54	-19.53	-	-	298	152	V
4	* ** 2.38902	28.16	ADV	31.8	-24.4	35.56	54	-18.44	-	-	298	152	V

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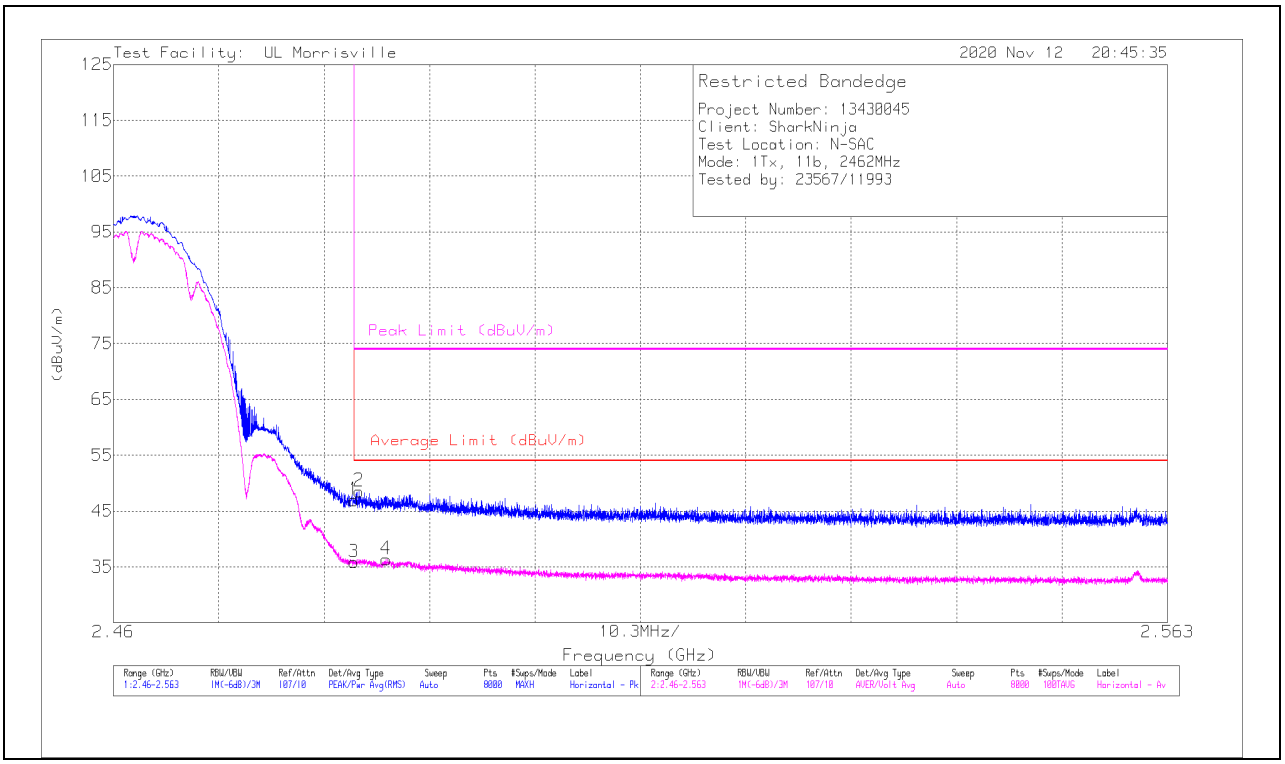
BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/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	38.87	Pk	32.4	-24.3	46.97	-	-	74	-27.03	354	282	H
2	* ** 2.484	40.44	Pk	32.4	-24.3	48.54	-	-	74	-25.46	354	282	H
3	* ** 2.4835	27.73	ADV	32.4	-24.3	35.83	54	-18.17	-	-	354	282	H
4	* ** 2.48666	28.17	ADV	32.5	-24.3	36.37	54	-17.63	-	-	354	282	H

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Pk - Peak detector
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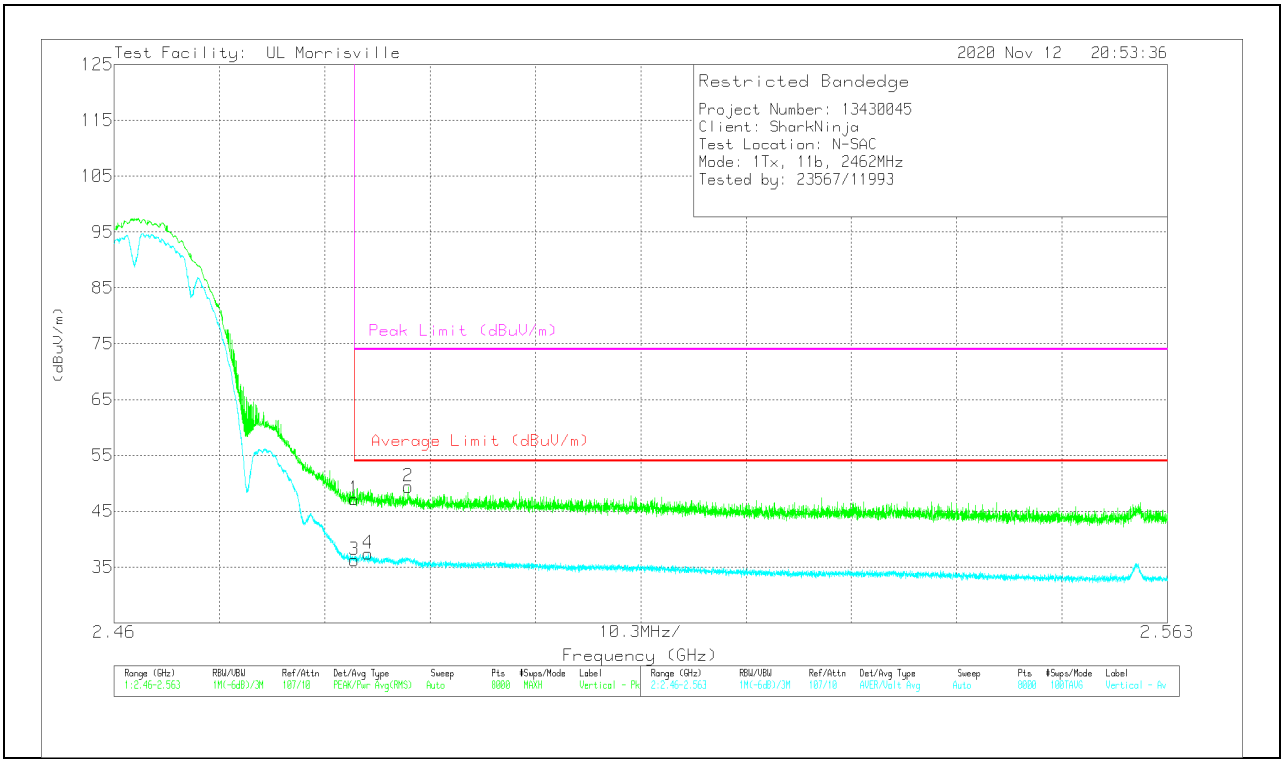
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/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	39.11	Pk	32.4	-24.3	47.21	-	-	74	-26.79	35	328	V
2	* ** 2.48874	41.21	Pk	32.5	-24.3	49.41	-	-	74	-24.59	35	328	V
3	* ** 2.4835	28.16	ADV	32.4	-24.3	36.26	54	-17.74	-	-	35	328	V
4	* ** 2.48483	29.24	ADV	32.5	-24.3	37.44	54	-16.56	-	-	35	328	V

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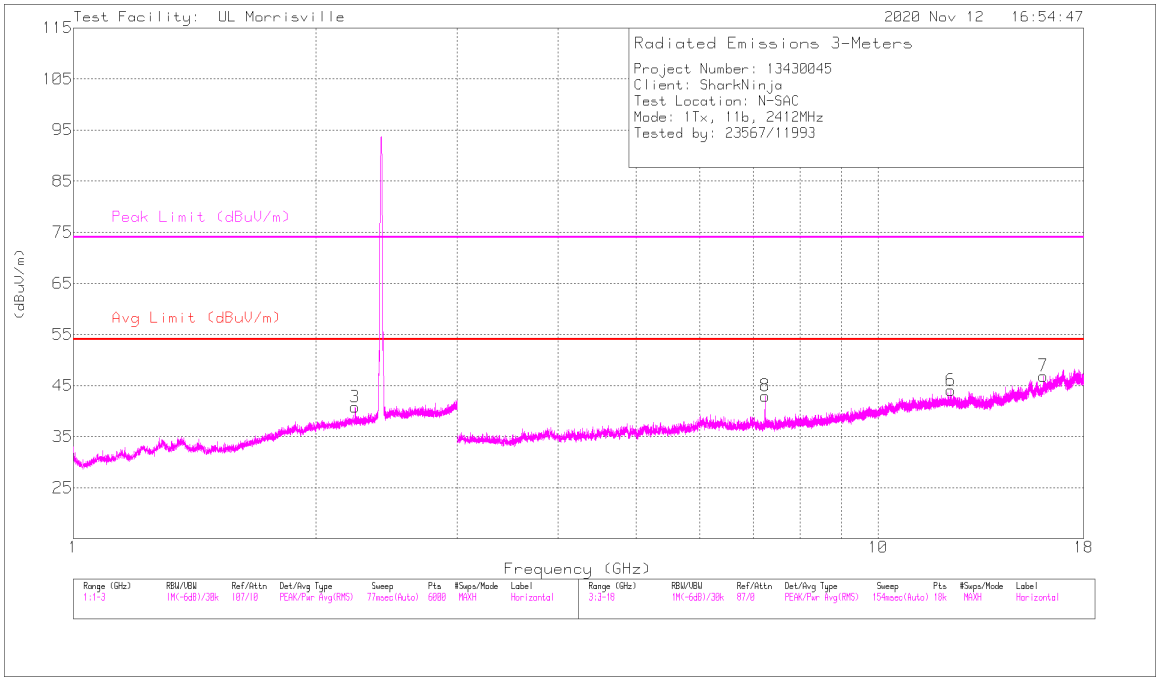
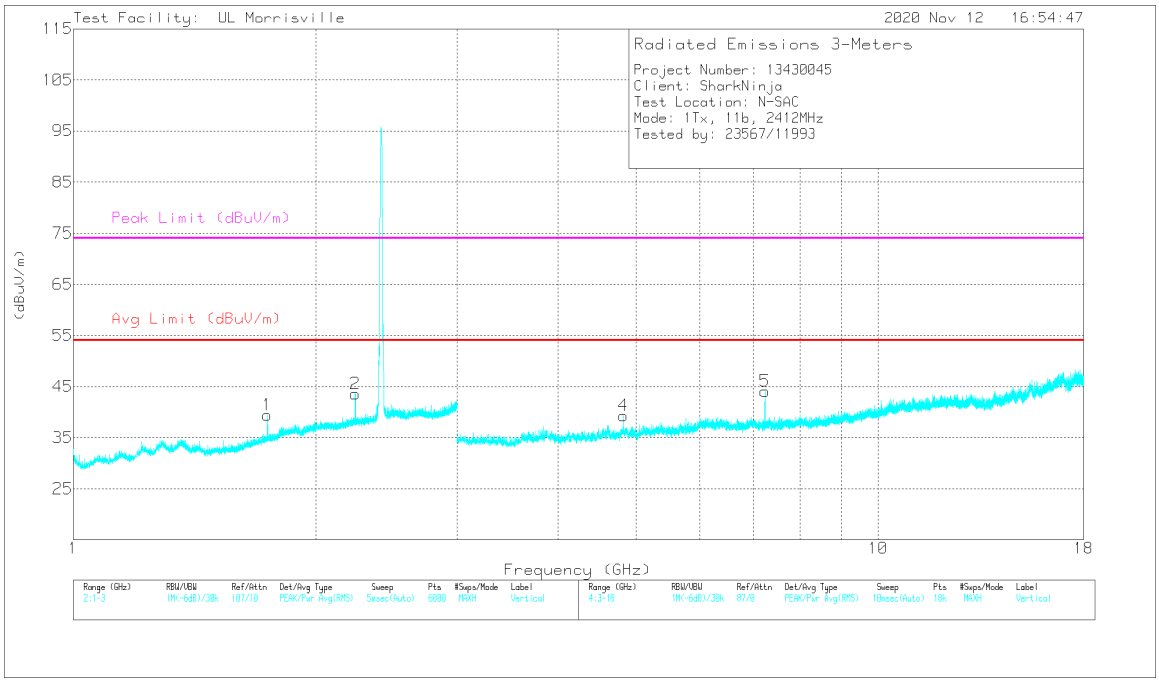
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



HORIZONTAL



VERTICAL

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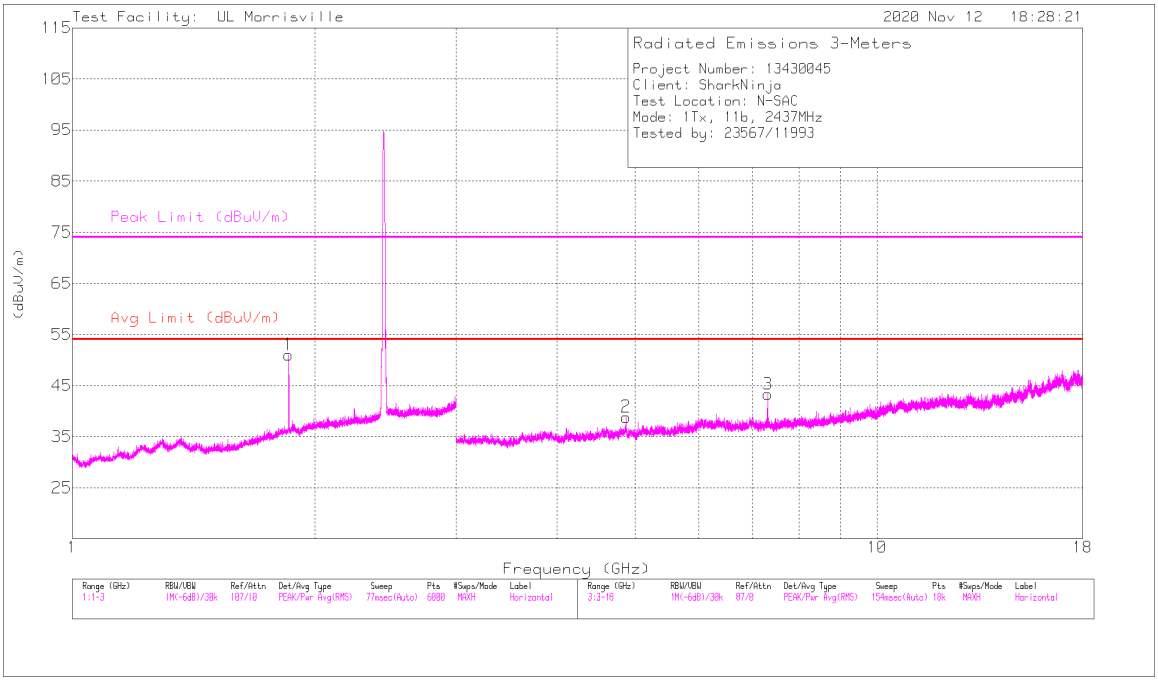
RADIATED EMISSIONS

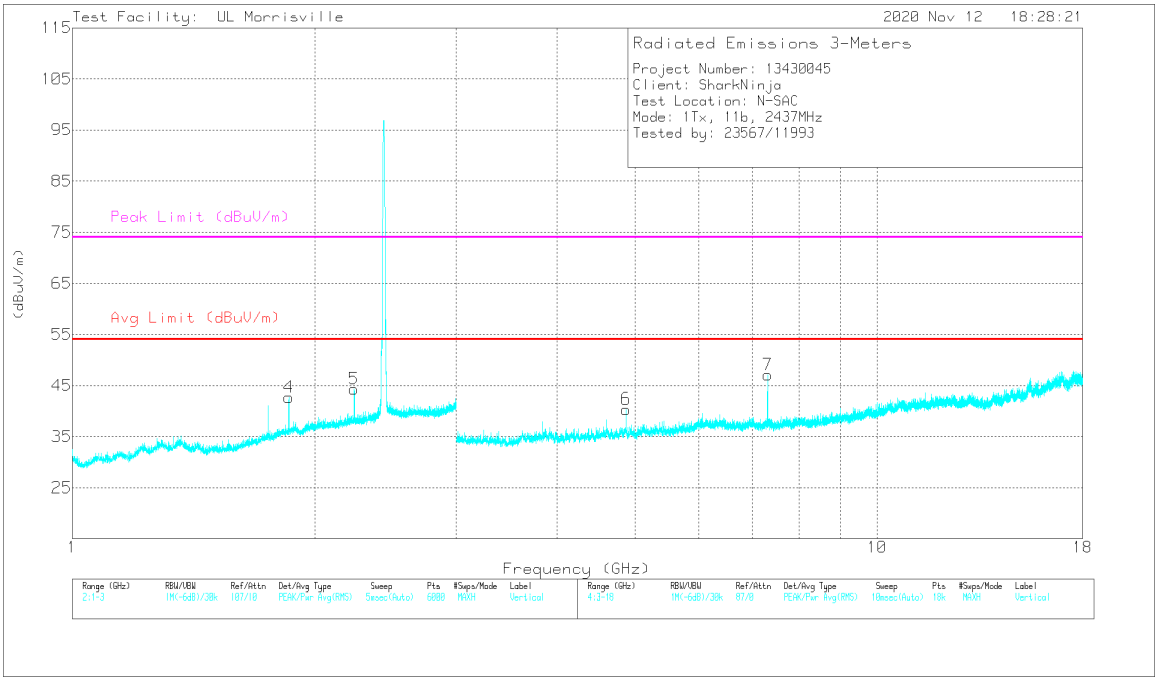
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* ** 2.23983	39.97	PK2	31.7	-24.3	47.37	-	-	74	-26.63	30	219	H
	* ** 2.23995	30.62	ADV	31.7	-24.3	38.02	54	-15.98	-	-	30	219	H
1	** 1.74224	41.44	PK2	29.5	-24.3	46.64	-	-	74	-27.36	215	139	V
	** 1.74215	23.51	ADV	29.5	-24.3	28.71	54	-25.29	-	-	215	139	V
2	* ** 2.23991	40.78	PK2	31.7	-24.3	48.18	-	-	74	-25.82	298	101	V
	* ** 2.23997	33.79	ADV	31.7	-24.3	41.19	54	-12.81	-	-	298	101	V
6	* ** 12.3099	36.8	PK2	38.9	-25.8	49.9	-	-	74	-24.1	72	244	H
	* ** 12.30848	23.02	ADV	38.9	-25.8	36.12	54	-17.88	-	-	72	244	H
7	* ** 16.03099	37.63	PK2	40.4	-26.3	51.73	-	-	74	-22.27	125	250	H
	* ** 16.03101	24.82	ADV	40.4	-26.3	38.92	54	-15.08	-	-	125	250	H
4	* ** 4.82386	42.97	PK2	34.2	-31.4	45.77	-	-	74	-28.23	44	204	V
	* ** 4.82395	34.89	ADV	34.2	-31.4	37.69	54	-16.31	-	-	44	204	V
5	7.23357	37.97	Pk	35.7	-29.6	44.07	-	-	-	-	0-360	200	V
8	7.2369	36.9	Pk	35.7	-29.6	43	-	-	-	-	0-360	200	H

* - 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

MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/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	** 1.85981	36.08	PK2	30.9	-24.3	42.68	-	-	74	-31.32	301	279	H
	** 1.85961	23.17	ADV	30.9	-24.3	29.77	54	-24.23	-	-	301	279	H
4	** 1.85566	36.44	PK2	31	-24.3	43.14	-	-	74	-30.86	71	345	V
	** 1.85494	23.17	ADV	31	-24.3	29.87	54	-24.13	-	-	71	345	V
5	* ** 2.23976	41.02	PK2	31.7	-24.3	48.42	-	-	74	-25.58	302	103	V
	* ** 2.23999	34.26	ADV	31.7	-24.3	41.66	54	-12.34	-	-	302	103	V
2	* ** 4.87391	43.74	PK2	34.1	-31.3	46.54	-	-	74	-27.46	214	129	H
	* ** 4.87402	33.95	ADV	34.1	-31.3	36.75	54	-17.25	-	-	214	129	H
3	* ** 7.30997	41.75	PK2	35.7	-29.3	48.15	-	-	74	-25.85	329	175	H
	* ** 7.31019	33.47	ADV	35.7	-29.3	39.87	54	-14.13	-	-	329	175	H
6	* ** 4.87393	44.62	PK2	34.1	-31.3	47.42	-	-	74	-26.58	41	327	V
	* ** 4.87398	37.72	ADV	34.1	-31.3	40.52	54	-13.48	-	-	41	327	V
7	* ** 7.31018	44.84	PK2	35.7	-29.3	51.24	-	-	74	-22.76	228	202	V
	* ** 7.31019	38.29	ADV	35.7	-29.3	44.69	54	-9.31	-	-	228	202	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

UL LLC
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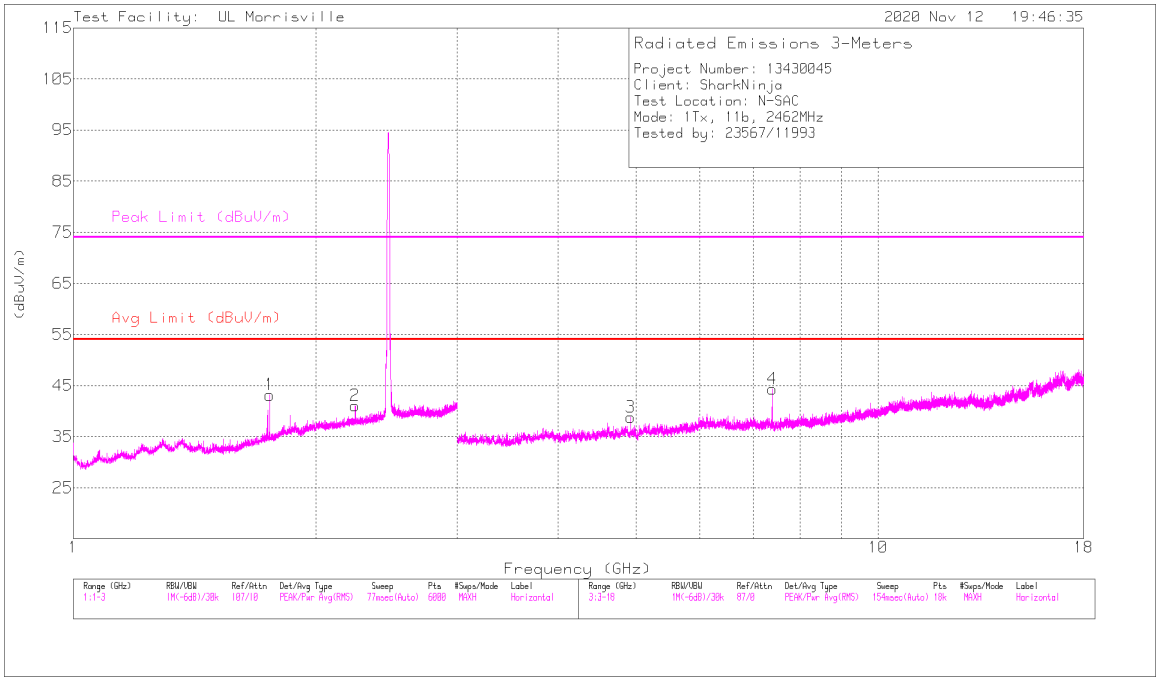
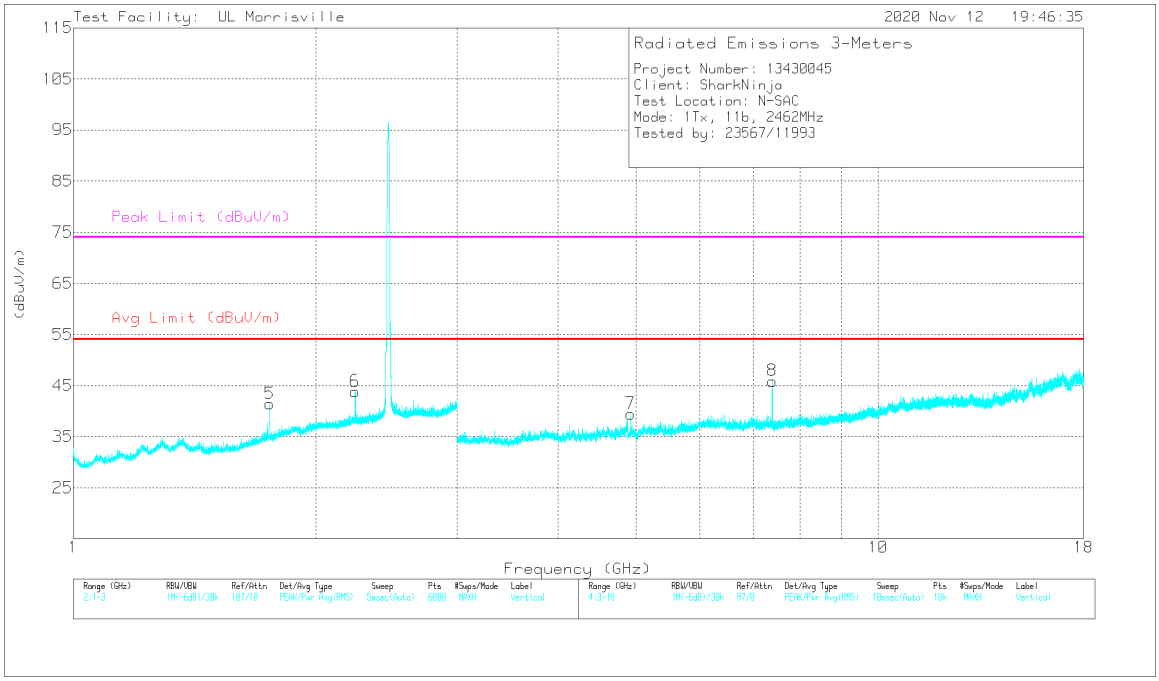
HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



VERTICAL

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/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	** 1.75325	36.67	PK2	29.6	-24.4	41.87	-	-	74	-32.13	257	182	H
	** 1.75221	23.41	ADV	29.6	-24.4	28.61	54	-25.39	-	-	257	182	H
2	* ** 2.2401	39.38	PK2	31.7	-24.3	46.78	-	-	74	-27.22	105	131	H
	* ** 2.23996	30.04	ADV	31.7	-24.3	37.44	54	-16.56	-	-	105	131	H
5	** 1.75352	42.94	PK2	29.6	-24.4	48.14	-	-	74	-25.86	231	394	V
	** 1.75409	23.4	ADV	29.6	-24.4	28.6	54	-25.4	-	-	231	394	V
6	* ** 2.24002	41.49	PK2	31.7	-24.3	48.89	-	-	74	-25.11	303	101	V
	* ** 2.23993	34.75	ADV	31.7	-24.3	42.15	54	-11.85	-	-	303	101	V
3	* ** 4.92369	43.55	PK2	34	-31.8	45.75	-	-	74	-28.25	214	113	H
	* ** 4.92403	35.07	ADV	34	-31.9	37.17	54	-16.83	-	-	214	113	H
4	* ** 7.38449	42.74	PK2	35.7	-29.2	49.24	-	-	74	-24.76	345	189	H
	* ** 7.3851	34.67	ADV	35.7	-29.2	41.17	54	-12.83	-	-	345	189	H
7	* ** 4.92396	45.24	PK2	34	-31.9	47.34	-	-	74	-26.66	38	320	V
	* ** 4.92399	38.53	ADV	34	-31.9	40.63	54	-13.37	-	-	38	320	V
8	* ** 7.38579	45	PK2	35.7	-29.2	51.5	-	-	74	-22.5	227	193	V
	* ** 7.38677	38.06	ADV	35.7	-29.2	44.56	54	-9.44	-	-	227	193	V

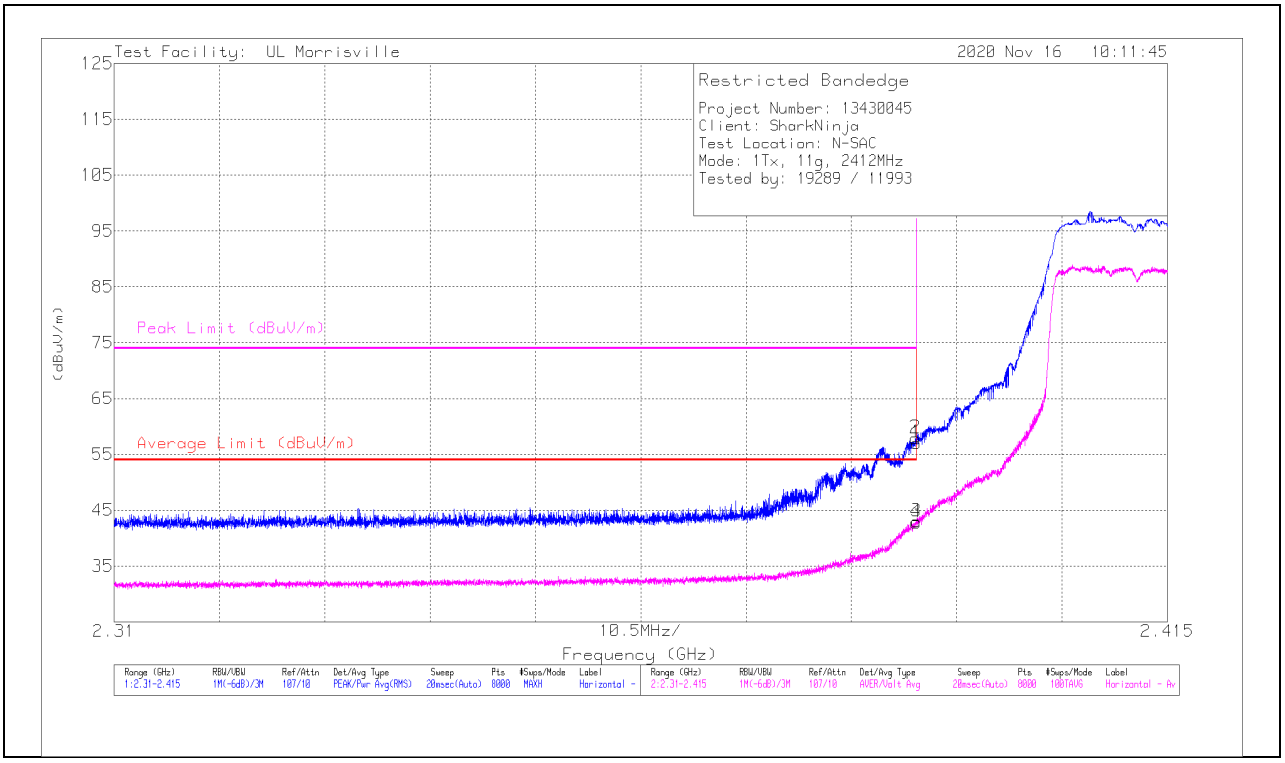
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average

10.1.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 1)

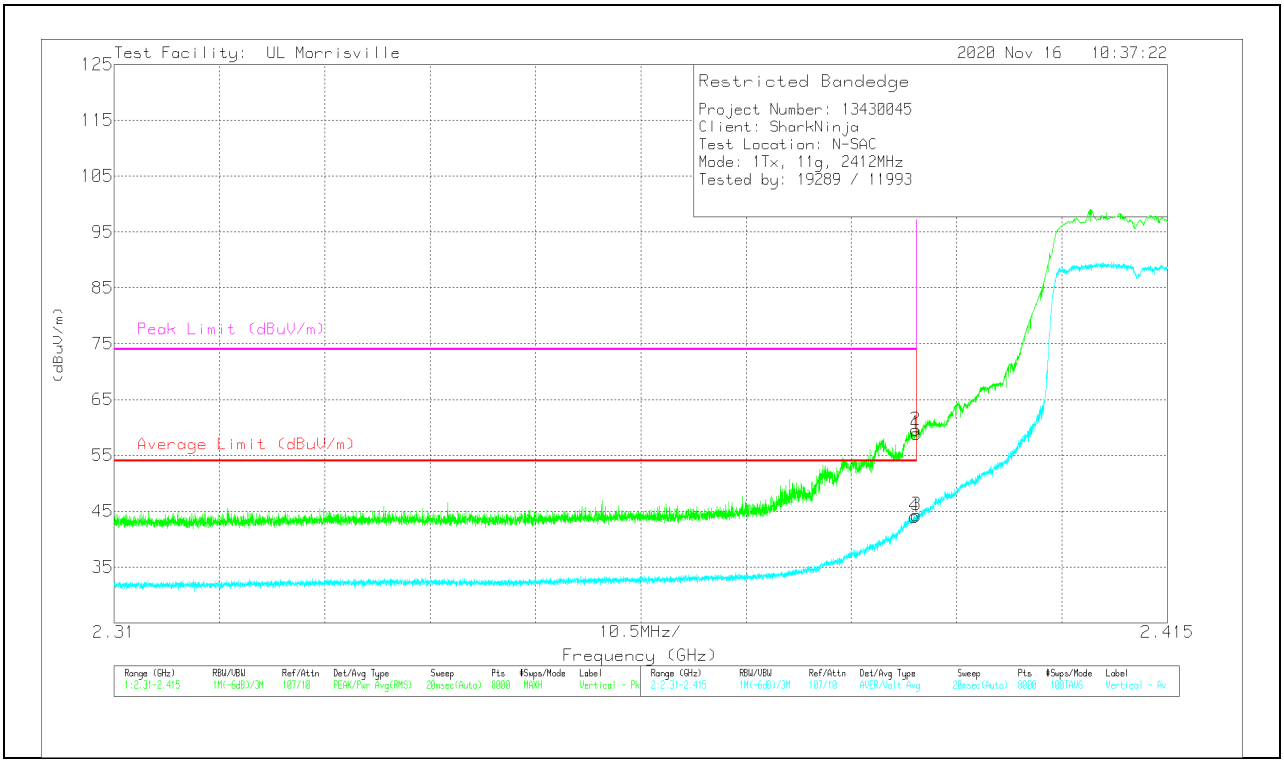
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.39	49.67	Pk	31.8	-24.4	0	57.07	-	-	74	-16.93	117	135	H
2	* ** 2.38988	50.49	Pk	31.8	-24.4	0	57.89	-	-	74	-16.11	117	135	H
3	* ** 2.39	35.03	ADV	31.8	-24.4	.55	42.98	54	-11.02	-	-	117	135	H
4	* ** 2.38994	34.89	ADV	31.8	-24.4	.55	42.84	54	-11.16	-	-	117	135	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/Fltr/Pad (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	* ** 2.39	51.53	Pk	31.8	-24.4	0	58.93	-	-	74	-15.07	323	168	V
2	* ** 2.3899	52.15	Pk	31.8	-24.4	0	59.55	-	-	74	-14.45	323	168	V
3	* ** 2.39	36.36	ADV	31.8	-24.4	.55	44.31	54	-9.69	-	-	323	168	V
4	* ** 2.3898	36.11	ADV	31.8	-24.4	.55	44.06	54	-9.94	-	-	323	168	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

UL LLC
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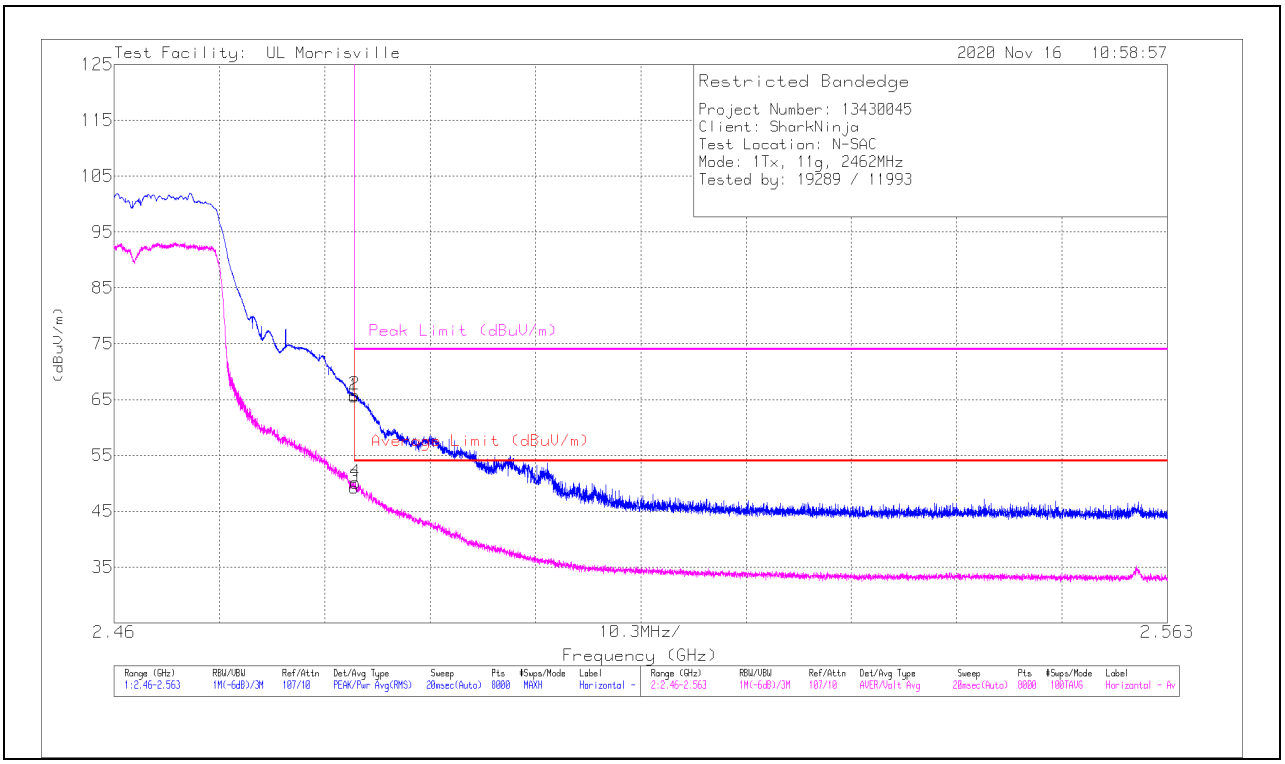
BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT

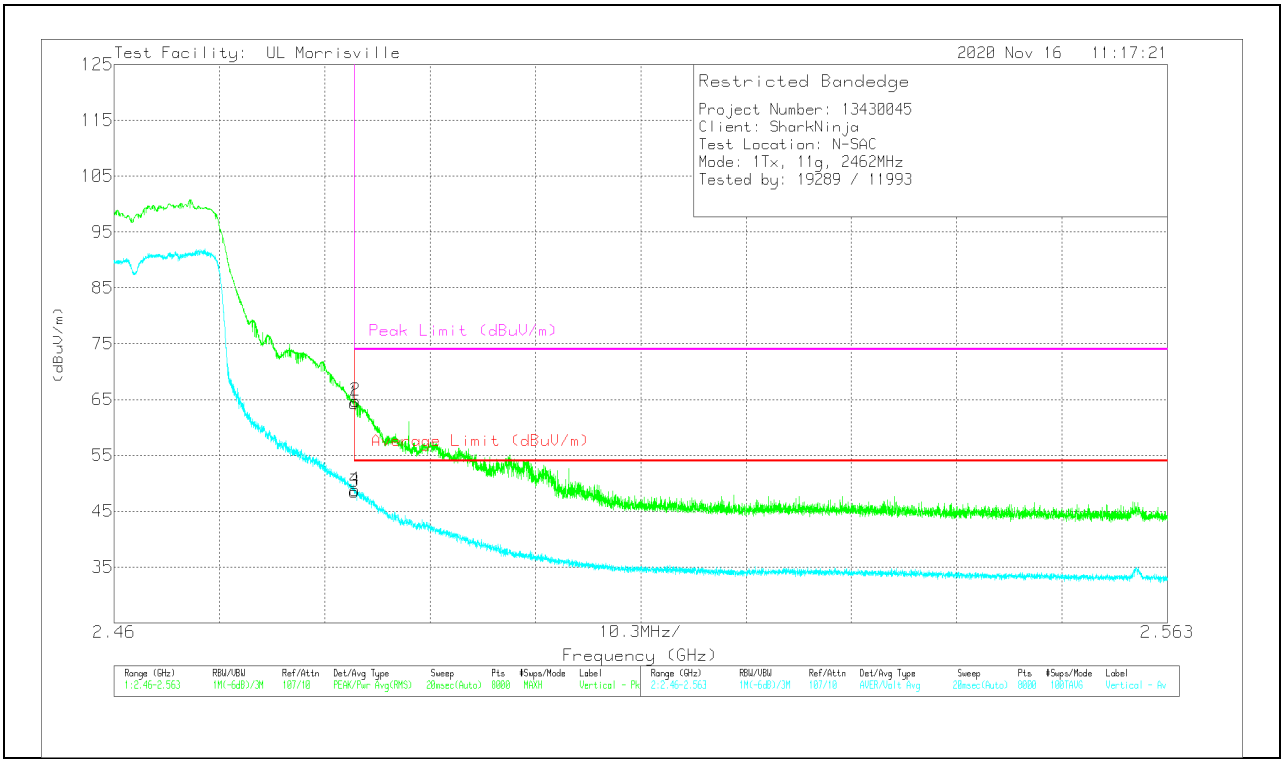


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	57.48	Pk	32.4	-24.3	0	65.58	-	-	74	-8.42	3	259	H
2	* ** 2.48351	57.75	Pk	32.4	-24.3	0	65.85	-	-	74	-8.15	3	259	H
3	* ** 2.4835	40.56	ADV	32.4	-24.3	.55	49.21	54	-4.79	-	-	3	259	H
4	* ** 2.4836	41.49	ADV	32.4	-24.3	.55	50.14	54	-3.86	-	-	3	259	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

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.4835	56.24	Pk	32.4	-24.3	0	64.34	-	-	74	-9.66	21	228	V
2	* ** 2.4836	56.66	Pk	32.4	-24.3	0	64.76	-	-	74	-9.24	21	228	V
3	* ** 2.4835	39.83	ADV	32.4	-24.3	.55	48.48	54	-5.52	-	-	21	228	V
4	* ** 2.48354	40.16	ADV	32.4	-24.3	.55	48.81	54	-5.19	-	-	21	228	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

UL LLC
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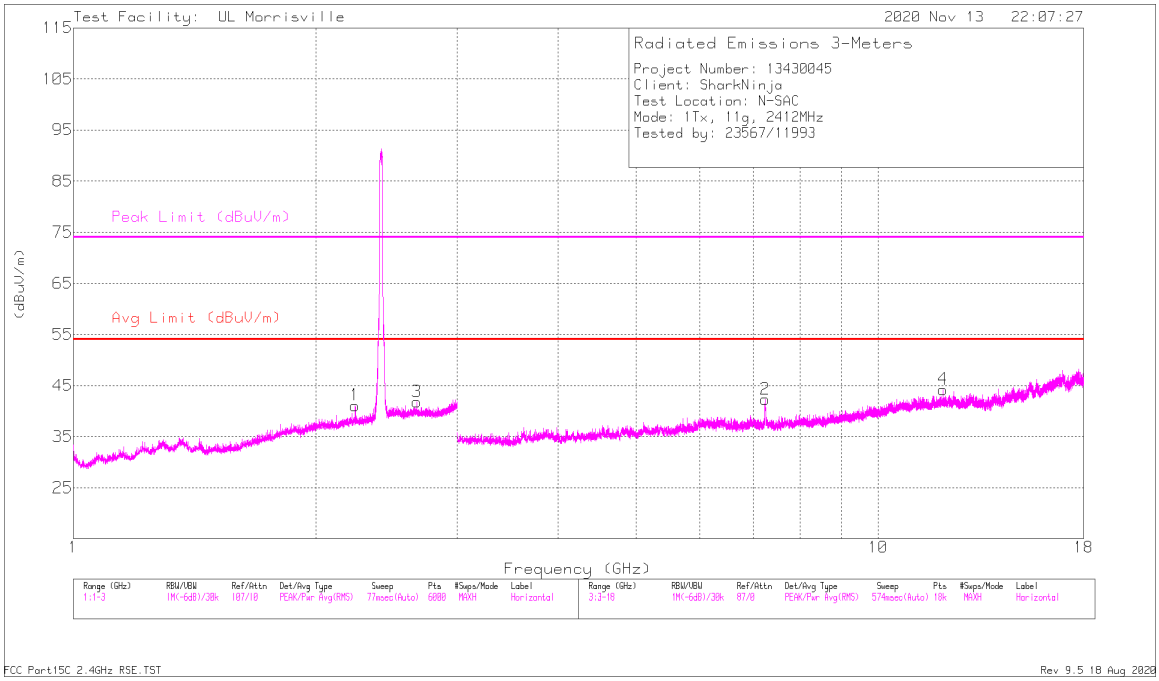
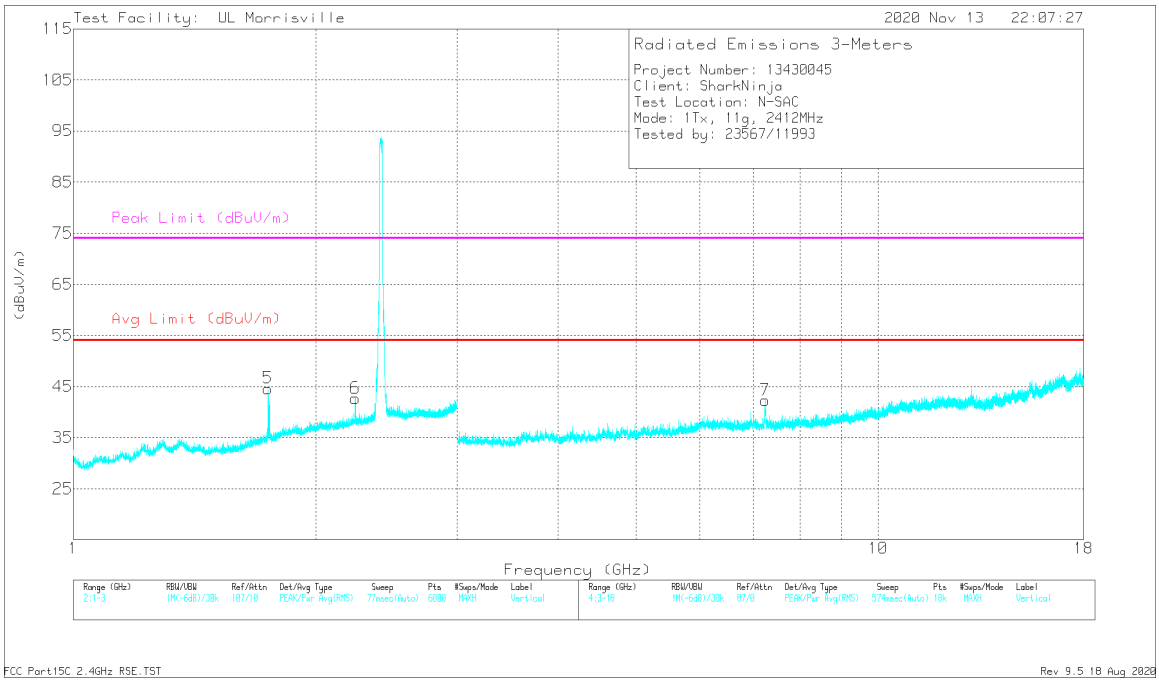
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



HORIZONTAL



VERTICAL

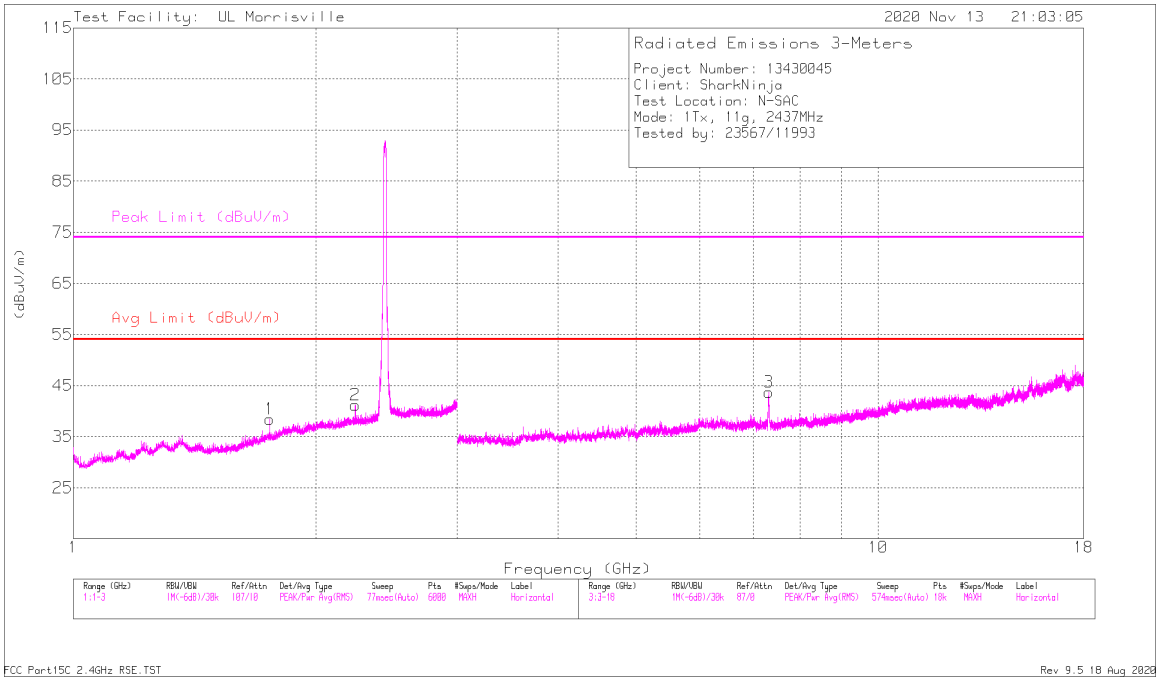
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

RADIATED EMISSIONS

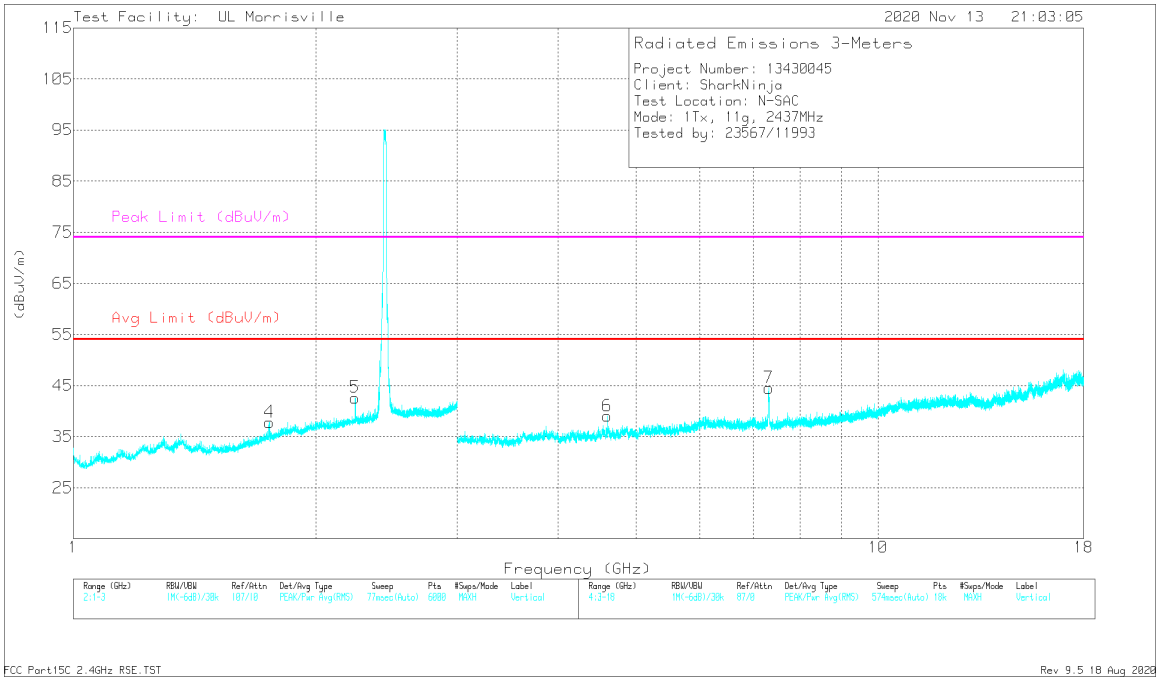
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.23969	39.76	PK2	31.7	-24.3	0	47.16	-	-	74	-26.84	38	245	H
	* ** 2.24001	31.12	ADV	31.7	-24.3	.55	39.07	54	-14.93	-	-	38	245	H
3	* ** 2.67095	37.49	PK2	32.5	-24	0	45.99	-	-	74	-28.01	215	154	H
	* ** 2.6689	24.63	ADV	32.5	-24	.55	33.68	54	-20.32	-	-	215	154	H
5	** 1.74323	36.37	PK2	29.5	-24.3	0	41.57	-	-	74	-32.43	348	343	V
	** 1.74482	23.39	ADV	29.5	-24.3	.55	29.14	54	-24.86	-	-	348	343	V
6	* ** 2.24018	39.81	PK2	31.7	-24.3	0	47.21	-	-	74	-26.79	322	166	V
	* ** 2.23993	30.46	ADV	31.7	-24.3	.55	38.41	54	-15.59	-	-	322	166	V
4	* ** 12.03403	36.53	PK2	38.7	-25.7	0	49.53	-	-	74	-24.47	76	209	H
	* ** 12.03266	23.49	ADV	38.7	-25.8	.55	36.94	54	-17.06	-	-	76	209	H
2	7.23524	36.18	Pk	35.7	-29.6	0	42.28	-	-	-	-	0-360	200	H
7	7.23774	36.34	Pk	35.6	-29.6	0	42.34	-	-	-	-	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

MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

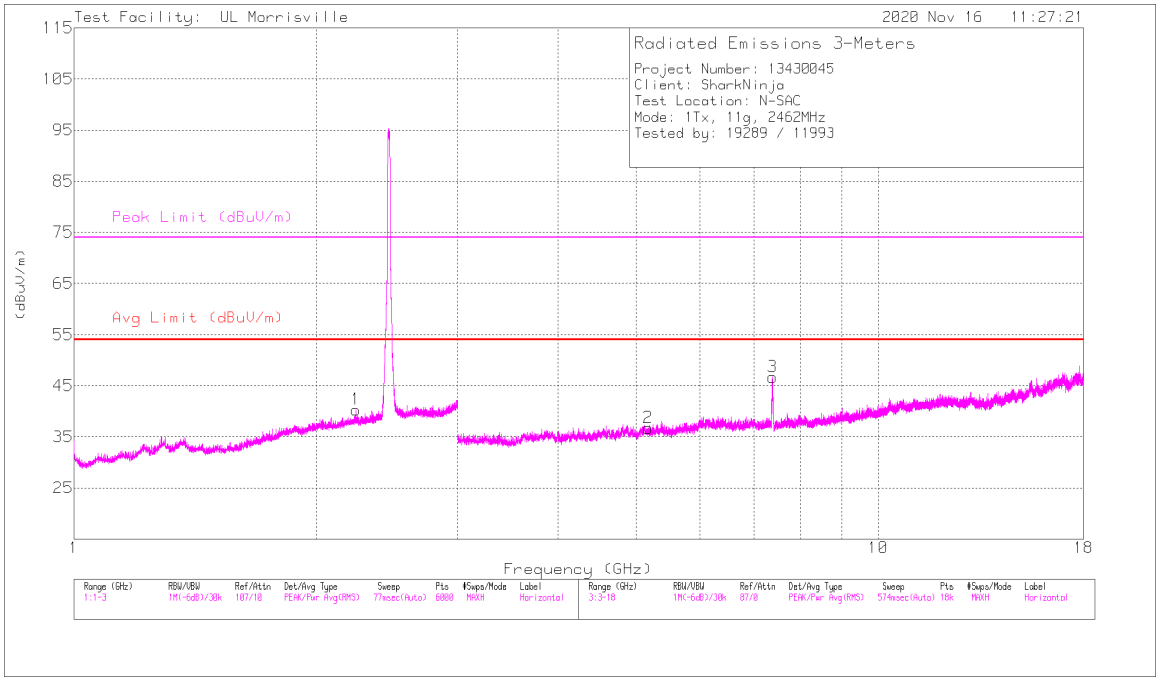
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	** 1.75353	36.91	PK2	29.6	-24.4	0	42.11	-	-	74	-31.89	83	369	H
	** 1.7529	23.4	ADV	29.6	-24.4	.55	29.15	54	-24.85	-	-	83	369	H
2	* ** 2.23998	39.88	PK2	31.7	-24.3	0	47.28	-	-	74	-26.72	29	229	H
	* ** 2.23996	30.65	ADV	31.7	-24.3	.55	38.6	54	-15.4	-	-	29	229	H
4	** 1.75362	42.48	PK2	29.6	-24.4	0	47.68	-	-	74	-26.32	353	240	V
	** 1.7521	23.42	ADV	29.7	-24.4	.55	29.27	54	-24.73	-	-	353	240	V
5	* ** 2.24005	40.26	PK2	31.7	-24.3	0	47.66	-	-	74	-26.34	317	124	V
	* ** 2.24	31.72	ADV	31.7	-24.3	.55	39.67	54	-14.33	-	-	317	124	V
3	* ** 7.31367	45.25	PK2	35.6	-29.3	0	51.55	-	-	74	-22.45	267	209	H
	* ** 7.31328	29.9	ADV	35.6	-29.3	.55	36.75	54	-17.25	-	-	267	209	H
6	* ** 4.60802	43.48	PK2	34.2	-32.4	0	45.28	-	-	74	-28.72	317	226	V
	* ** 4.60786	33.32	ADV	34.2	-32.4	.55	35.67	54	-18.33	-	-	317	226	V
7	* ** 7.3135	47.6	PK2	35.6	-29.3	0	53.9	-	-	74	-20.1	217	248	V
	* ** 7.31356	32.7	ADV	35.6	-29.3	.55	39.55	54	-14.45	-	-	217	248	V

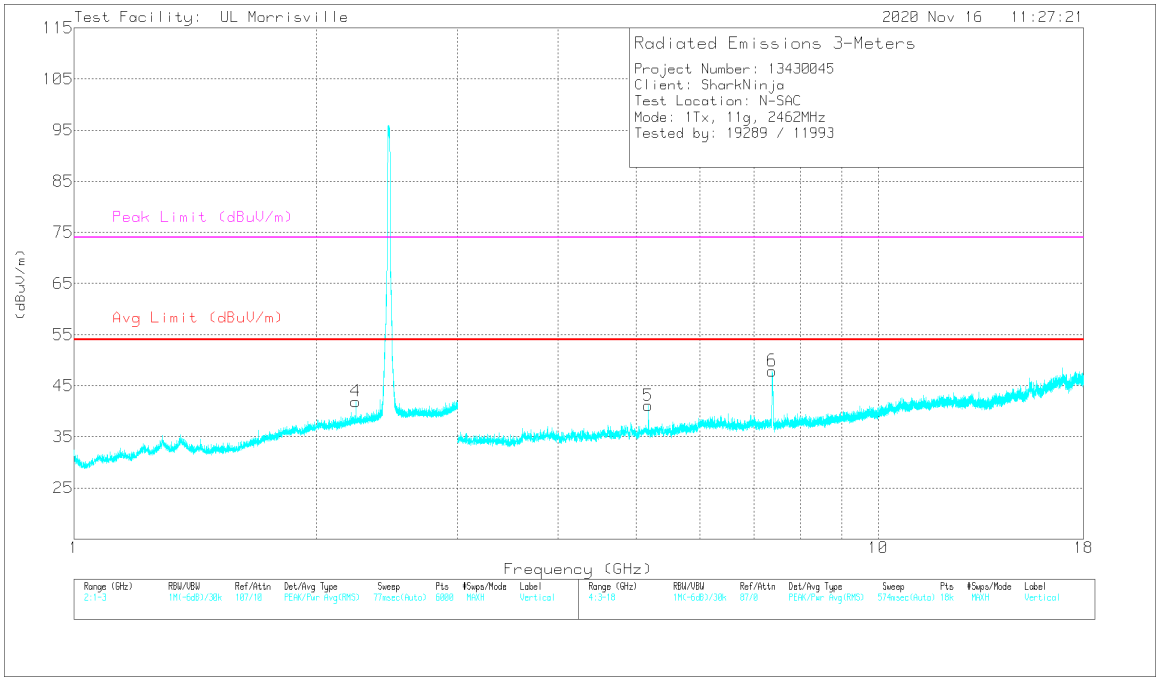
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



VERTICAL

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.24008	40.18	PK2	31.7	-24.3	0	47.58	-	-	74	-26.42	38	171	H
	* ** 2.23995	30.55	ADV	31.7	-24.3	.55	38.5	54	-15.5	-	-	38	171	H
4	* ** 2.23986	40.08	PK2	31.7	-24.3	0	47.48	-	-	74	-26.52	319	101	V
	* ** 2.24003	30.99	ADV	31.7	-24.3	.55	38.94	54	-15.06	-	-	319	101	V
2	** 5.17725	43.72	PK2	34.3	-32.1	0	45.92	-	-	74	-28.08	233	305	H
	** 5.17764	28.5	ADV	34.3	-32.2	.55	31.15	54	-22.85	-	-	233	305	H
3	* ** 7.38807	45.11	PK2	35.7	-29.2	0	51.61	-	-	74	-22.39	342	239	H
	* ** 7.38787	31.47	ADV	35.7	-29.2	.55	38.52	54	-15.48	-	-	342	239	H
5	** 5.17613	43.82	PK2	34.3	-32.1	0	46.02	-	-	74	-27.98	221	233	V
	** 5.17618	28.49	ADV	34.3	-32.1	.55	31.24	54	-22.76	-	-	221	233	V
6	* ** 7.38973	49.24	PK2	35.6	-29.2	0	55.64	-	-	74	-18.36	235	244	V
	* ** 7.38993	36	ADV	35.6	-29.2	.55	42.95	54	-11.05	-	-	235	244	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

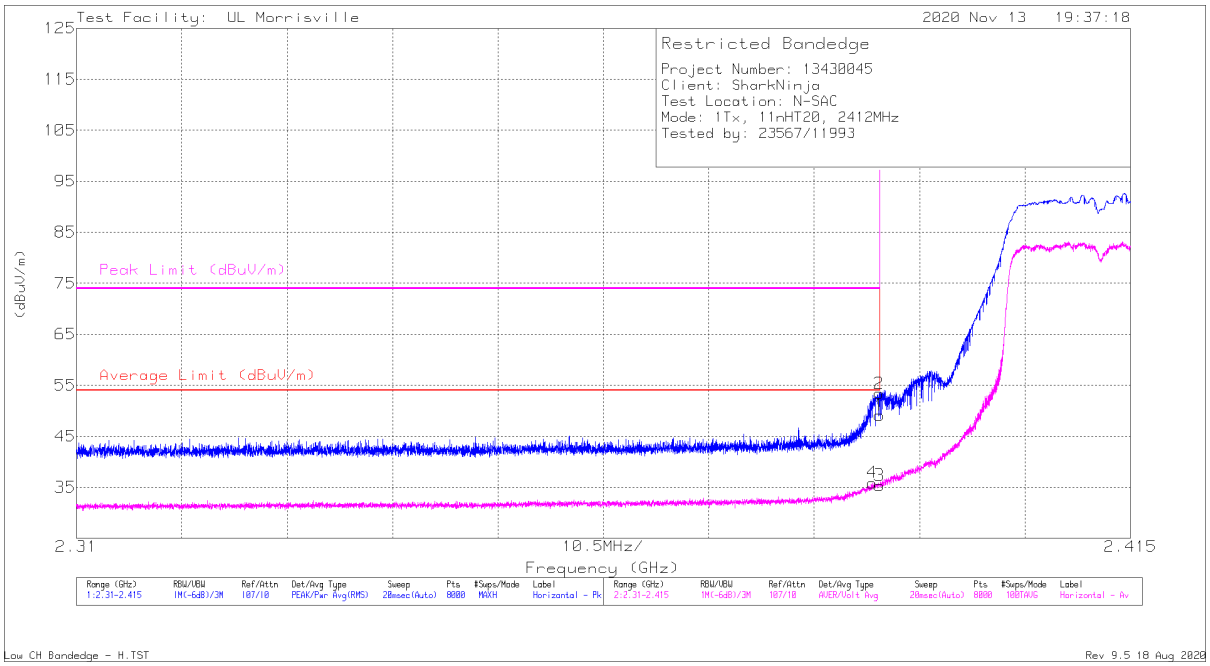
UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

10.1.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 1)

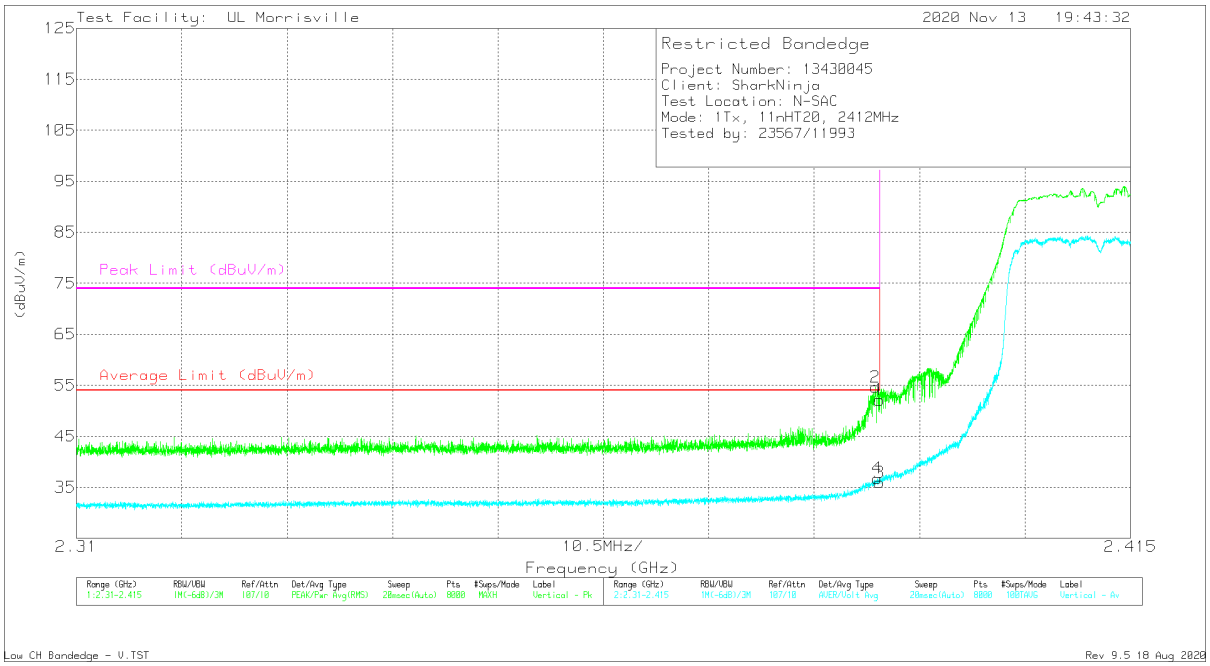
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.39	41.69	Pk	31.8	-24.4	0	49.09	-	-	74	-24.91	1	340	H
2	* ** 2.38997	46.01	Pk	31.8	-24.4	0	53.41	-	-	74	-20.59	1	340	H
3	* ** 2.39	27.28	ADV	31.8	-24.4	.7	35.38	54	-18.62	-	-	1	340	H
4	* ** 2.3893	27.8	ADV	31.8	-24.4	.7	35.9	54	-18.1	-	-	1	340	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

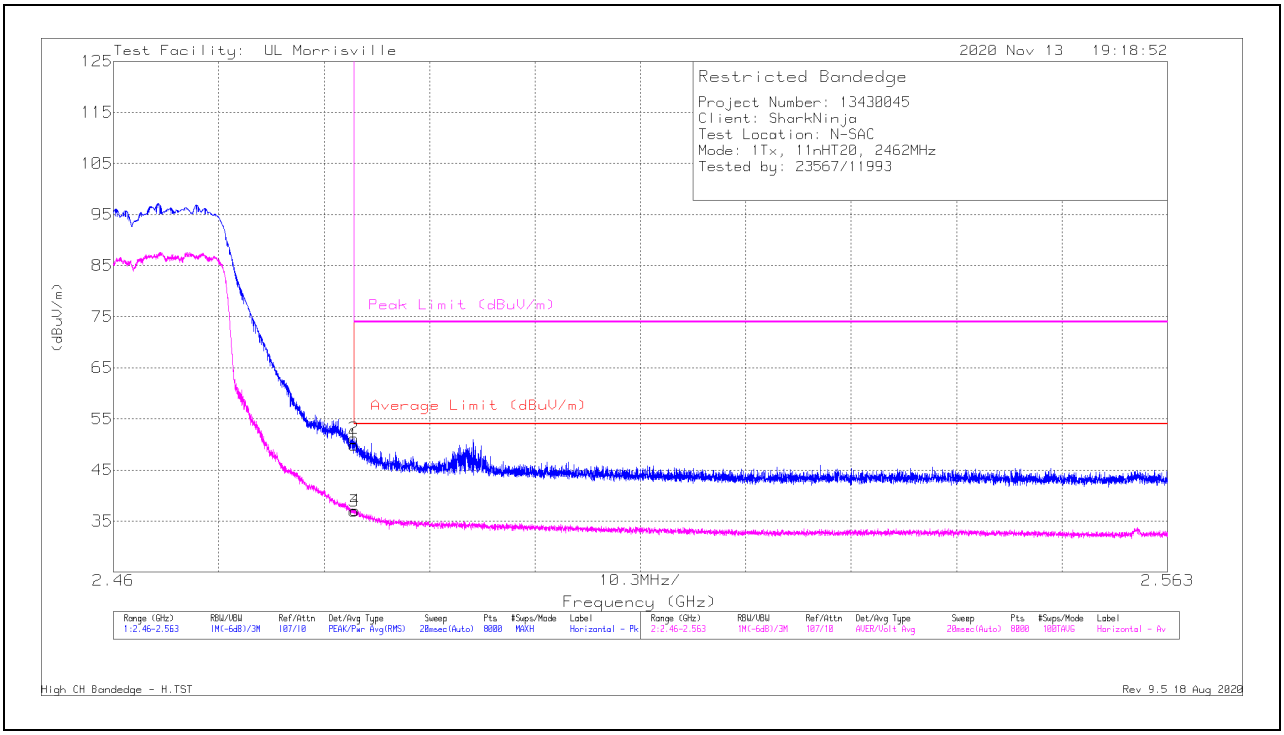


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	44.74	Pk	31.8	-24.4	0	52.14	-	-	74	-21.86	350	326	V
2	* ** 2.38962	47.24	Pk	31.8	-24.4	0	54.64	-	-	74	-19.36	350	326	V
3	* ** 2.39	27.87	ADV	31.8	-24.4	.7	35.97	54	-18.03	-	-	350	326	V
4	* ** 2.3898	28.66	ADV	31.8	-24.4	.7	36.76	54	-17.24	-	-	350	326	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, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.4835	41.78	Pk	32.4	-24.3	0	49.88	-	-	74	-24.12	359	360	H
2	* ** 2.48353	43.12	Pk	32.4	-24.3	0	51.22	-	-	74	-22.78	359	360	H
3	* ** 2.4835	28.14	ADV	32.4	-24.3	.7	36.94	54	-17.06	-	-	359	360	H
4	* ** 2.48362	28.28	ADV	32.4	-24.3	.7	37.08	54	-16.92	-	-	359	360	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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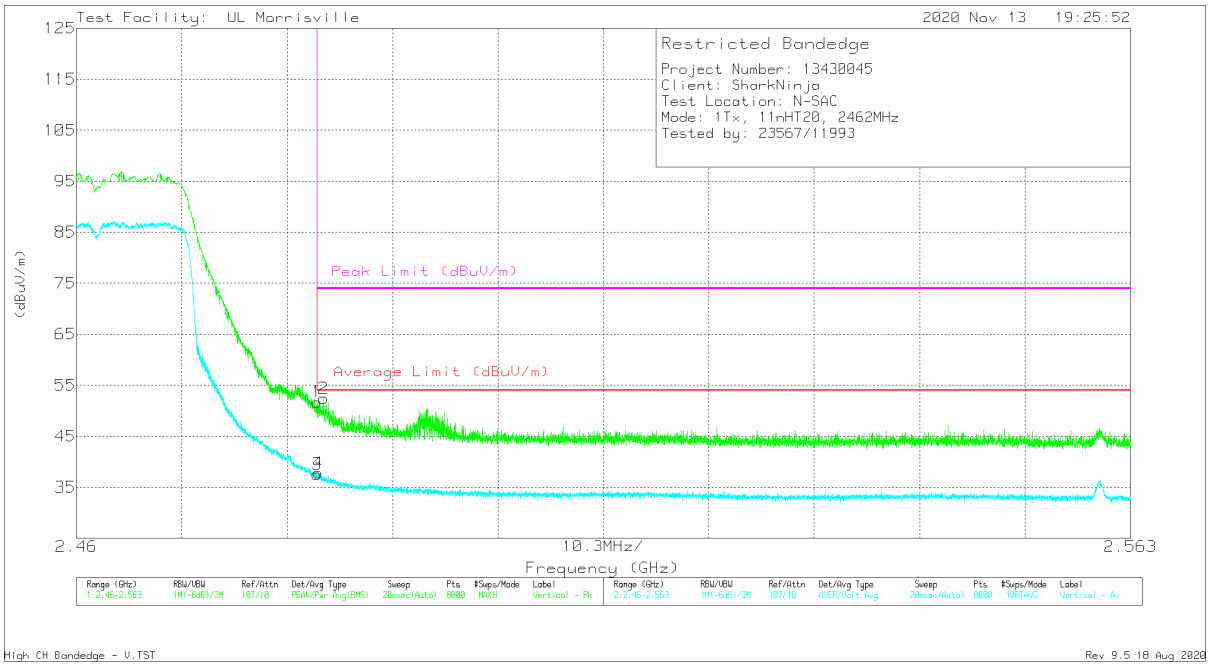
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.4835	43.66	Pk	32.4	-24.3	0	51.76	-	-	74	-22.24	177	367	V
2	* ** 2.48414	44.34	Pk	32.4	-24.3	0	52.44	-	-	74	-21.56	177	367	V
3	* ** 2.4835	28.8	ADV	32.4	-24.3	.7	37.6	54	-16.4	-	-	177	367	V
4	* ** 2.48363	28.97	ADV	32.4	-24.3	.7	37.77	54	-16.23	-	-	177	367	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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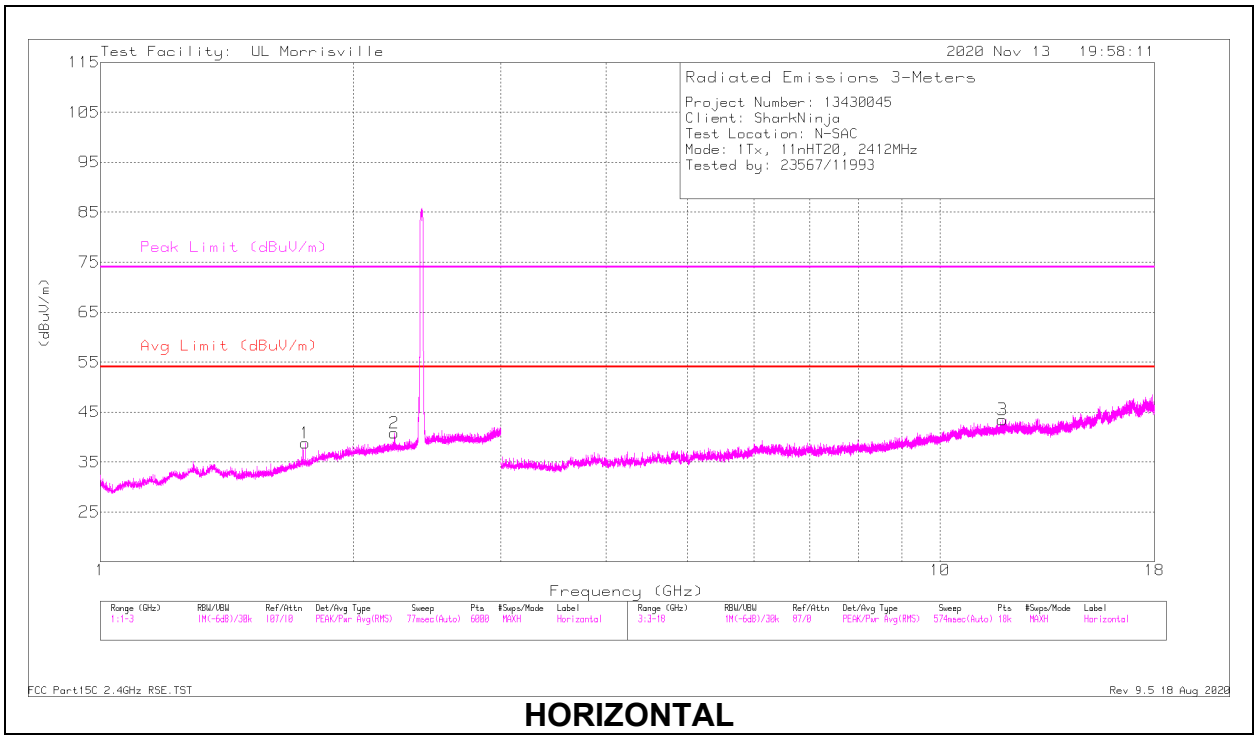
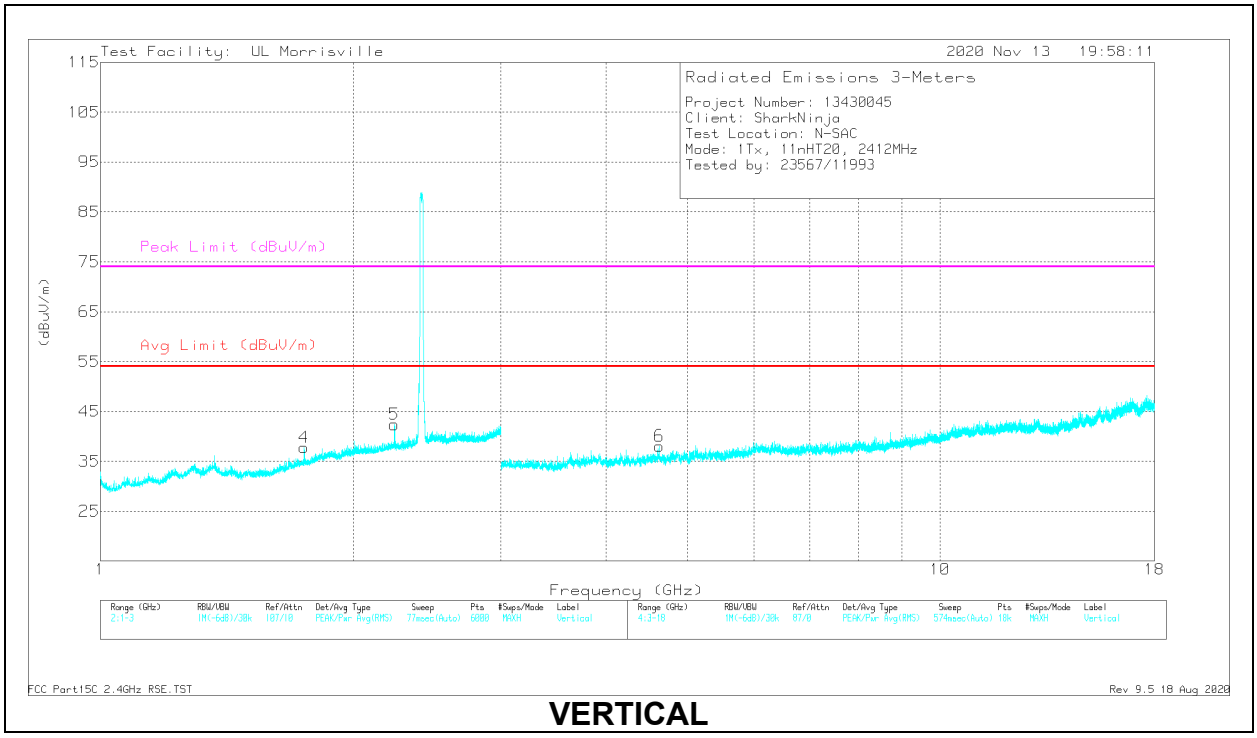
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



HORIZONTAL



VERTICAL

UL LLC
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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	** 1.75346	37.72	PK2	29.6	-24.4	0	42.92	-	-	74	-31.08	359	132	H
	** 1.7527	23.36	ADV	29.6	-24.4	.7	29.26	54	-24.74	-	-	359	132	H
2	* ** 2.23999	38.56	PK2	31.7	-24.3	0	45.96	-	-	74	-28.04	42	121	H
	* ** 2.24	29.24	ADV	31.7	-24.3	.7	37.34	54	-16.66	-	-	42	121	H
4	** 1.74986	36.55	PK2	29.6	-24.3	0	41.85	-	-	74	-32.15	48	268	V
	** 1.74918	23.5	ADV	29.6	-24.3	.7	29.5	54	-24.5	-	-	48	268	V
5	* ** 2.24014	40.14	PK2	31.7	-24.3	0	47.54	-	-	74	-26.46	308	115	V
	* ** 2.23995	32.32	ADV	31.7	-24.3	.7	40.42	54	-13.58	-	-	308	115	V
3	* ** 11.86312	36.15	PK2	38.5	-25.8	0	48.85	-	-	74	-25.15	289	321	H
	* ** 11.86286	23.2	ADV	38.5	-25.8	.7	36.6	54	-17.4	-	-	289	321	H
6	* ** 4.62871	41.68	PK2	34.2	-32.6	0	43.28	-	-	74	-30.72	55	246	V
	* ** 4.62759	28.94	ADV	34.2	-32.6	.7	31.24	54	-22.76	-	-	55	246	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

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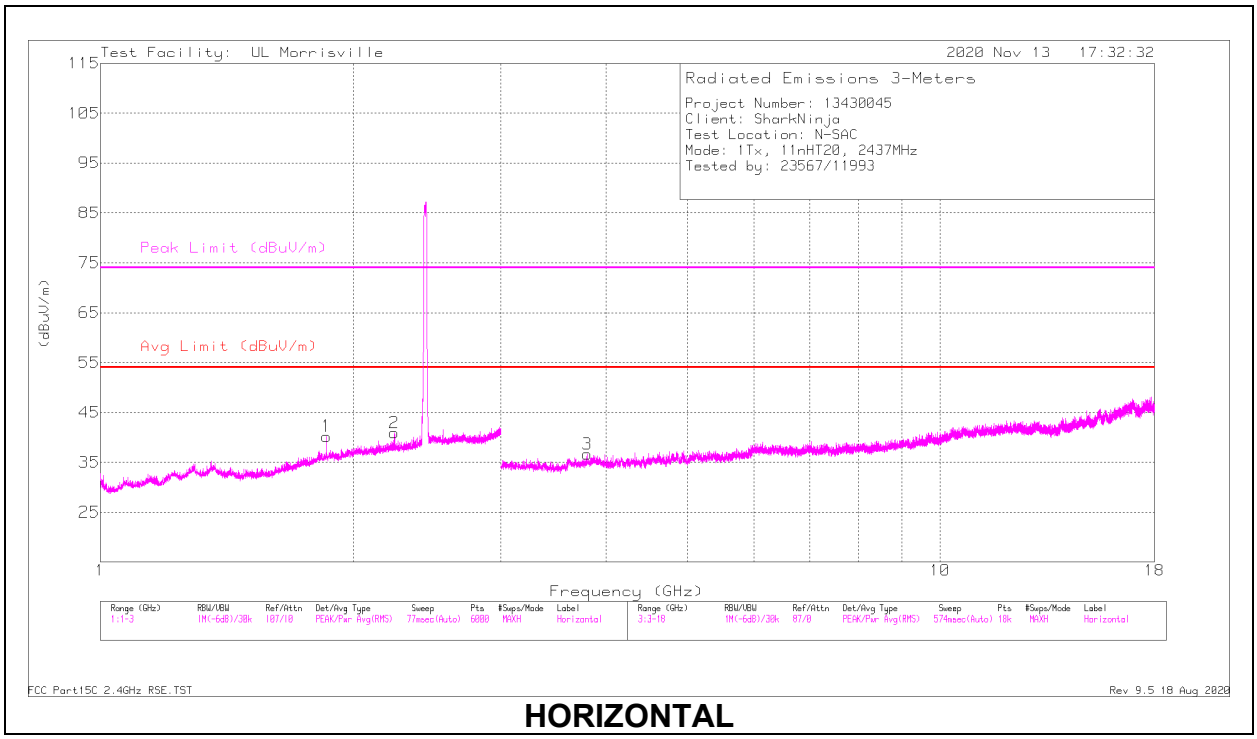
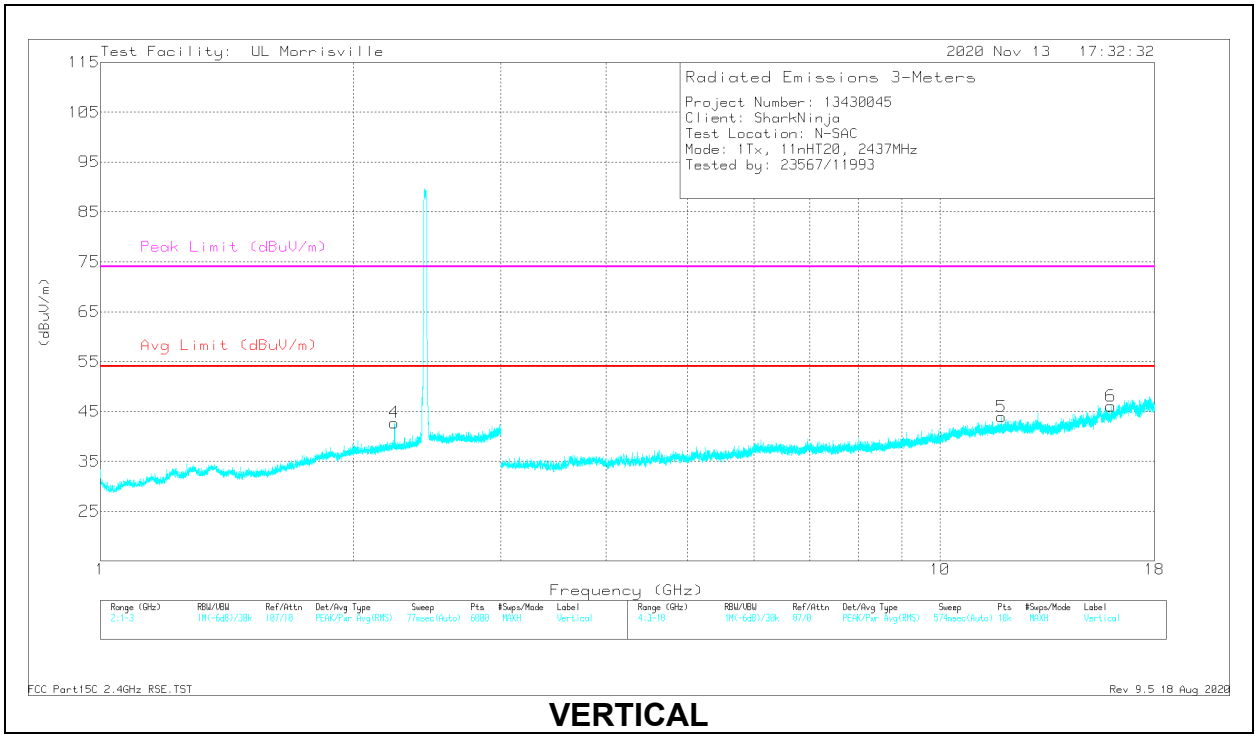
MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

UL LLC
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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	** 1.86029	36.72	PK2	30.9	-24.3	0	43.32	-	-	74	-30.68	86	288	H
	** 1.85754	23.11	ADV	30.9	-24.3	.7	30.41	54	-23.59	-	-	86	288	H
2	* ** 2.23975	39.26	PK2	31.7	-24.3	0	46.66	-	-	74	-27.34	28	226	H
	* ** 2.23995	30.64	ADV	31.7	-24.3	.7	38.74	54	-15.26	-	-	28	226	H
4	* ** 2.24009	40.48	PK2	31.7	-24.3	0	47.88	-	-	74	-26.12	311	103	V
	* ** 2.24003	32.64	ADV	31.7	-24.3	.7	40.74	54	-13.26	-	-	311	103	V
3	* ** 3.79695	42.05	PK2	33.6	-33	0	42.65	-	-	74	-31.35	180	132	H
	* ** 3.79764	29.03	ADV	33.6	-33	.7	30.33	54	-23.67	-	-	180	132	H
5	* ** 11.82938	36.26	PK2	38.5	-25.8	0	48.96	-	-	74	-25.04	312	209	V
	* ** 11.82916	23.52	ADV	38.5	-25.8	.7	36.92	54	-17.08	-	-	312	209	V
6	* ** 15.97403	38.43	PK2	40.3	-27	0	51.73	-	-	74	-22.27	250	175	V
	* ** 15.97266	25.18	ADV	40.3	-27.1	.7	39.08	54	-14.92	-	-	250	175	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

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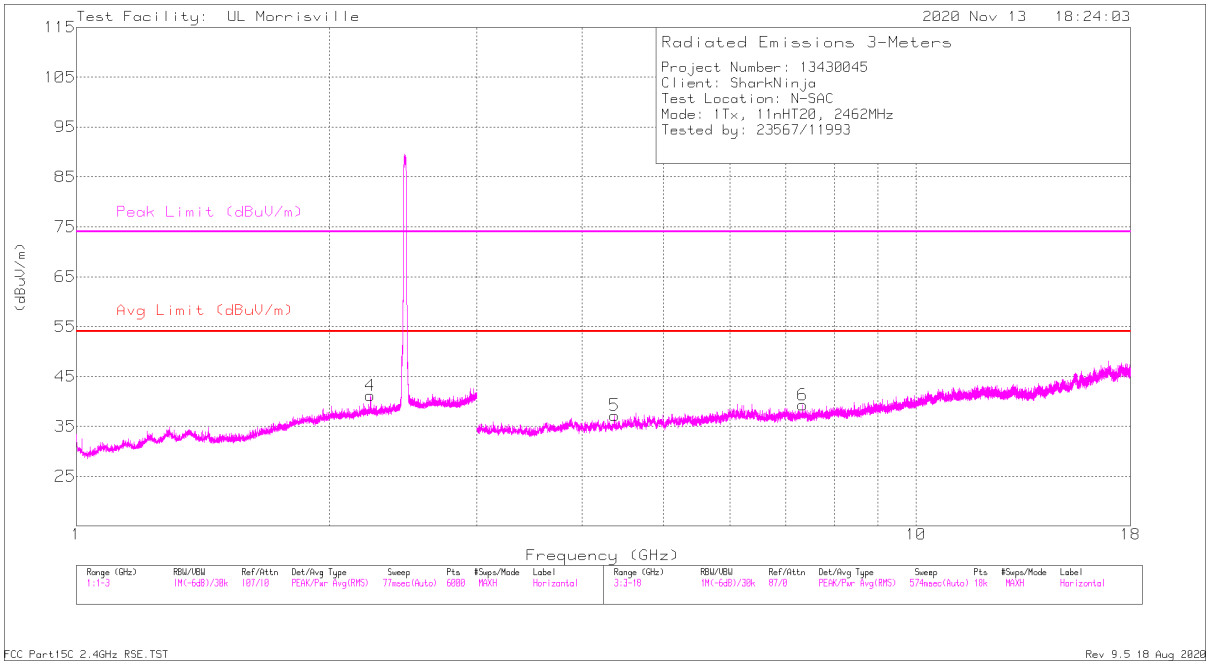
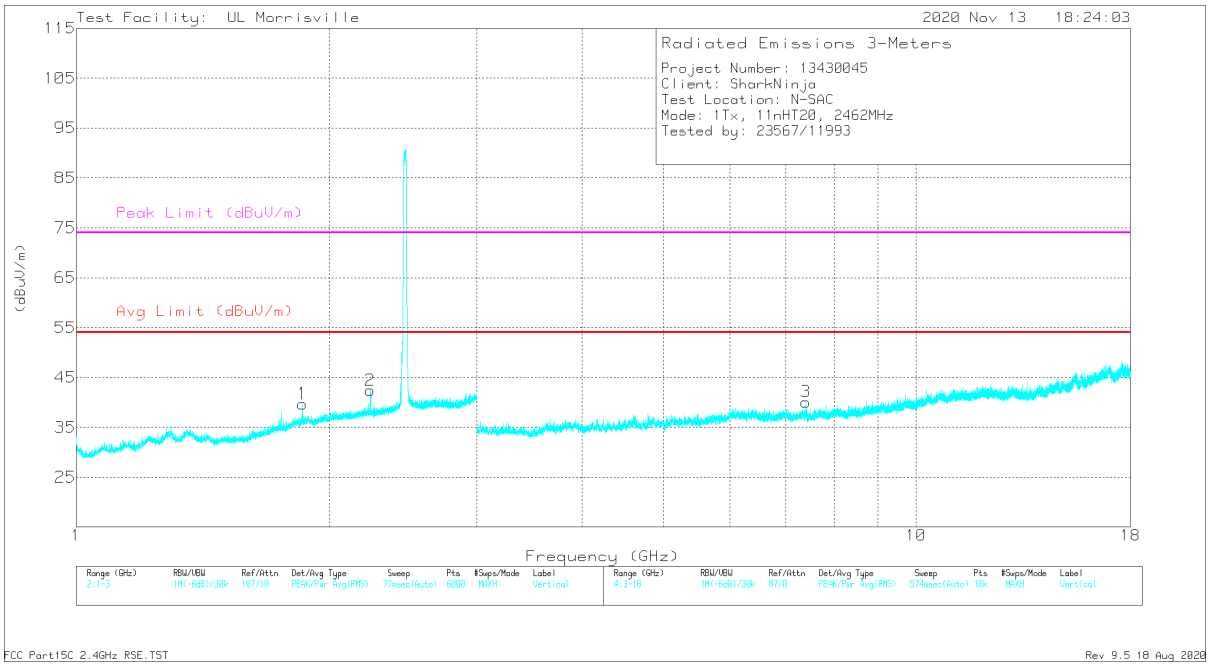
HIGH CHANNEL, CH 11 RESULTS



HORIZONTAL



VERTICAL

UL LLC
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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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
4	* ** 2.24002	40.26	PK2	31.7	-24.3	0	47.66	-	-	74	-26.34	35	227	H
	* ** 2.24005	31.05	ADV	31.7	-24.3	.7	39.15	54	-14.85	-	-	35	227	H
1	** 1.85728	36.01	PK2	31	-24.3	0	42.71	-	-	74	-31.29	332	363	V
	** 1.85998	23.14	ADV	30.9	-24.3	.7	30.44	54	-23.56	-	-	332	363	V
2	* ** 2.23998	40.09	PK2	31.7	-24.3	0	47.49	-	-	74	-26.51	313	115	V
	* ** 2.23999	31.97	ADV	31.7	-24.3	.7	40.07	54	-13.93	-	-	313	115	V
5	* ** 4.37382	41.83	PK2	33.6	-32.6	0	42.83	-	-	74	-31.17	0	326	H
	* ** 4.3741	28.66	ADV	33.6	-32.6	.7	30.36	54	-23.64	-	-	0	326	H
6	* ** 7.32853	38.17	PK2	35.7	-29.2	0	44.67	-	-	74	-29.33	166	116	H
	* ** 7.32725	25.41	ADV	35.7	-29.2	.7	32.61	54	-21.39	-	-	166	116	H
3	* ** 7.38695	41.66	PK2	35.7	-29.2	0	48.16	-	-	74	-25.84	212	394	V
	* ** 7.38561	26.68	ADV	35.7	-29.2	.7	33.88	54	-20.12	-	-	212	394	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

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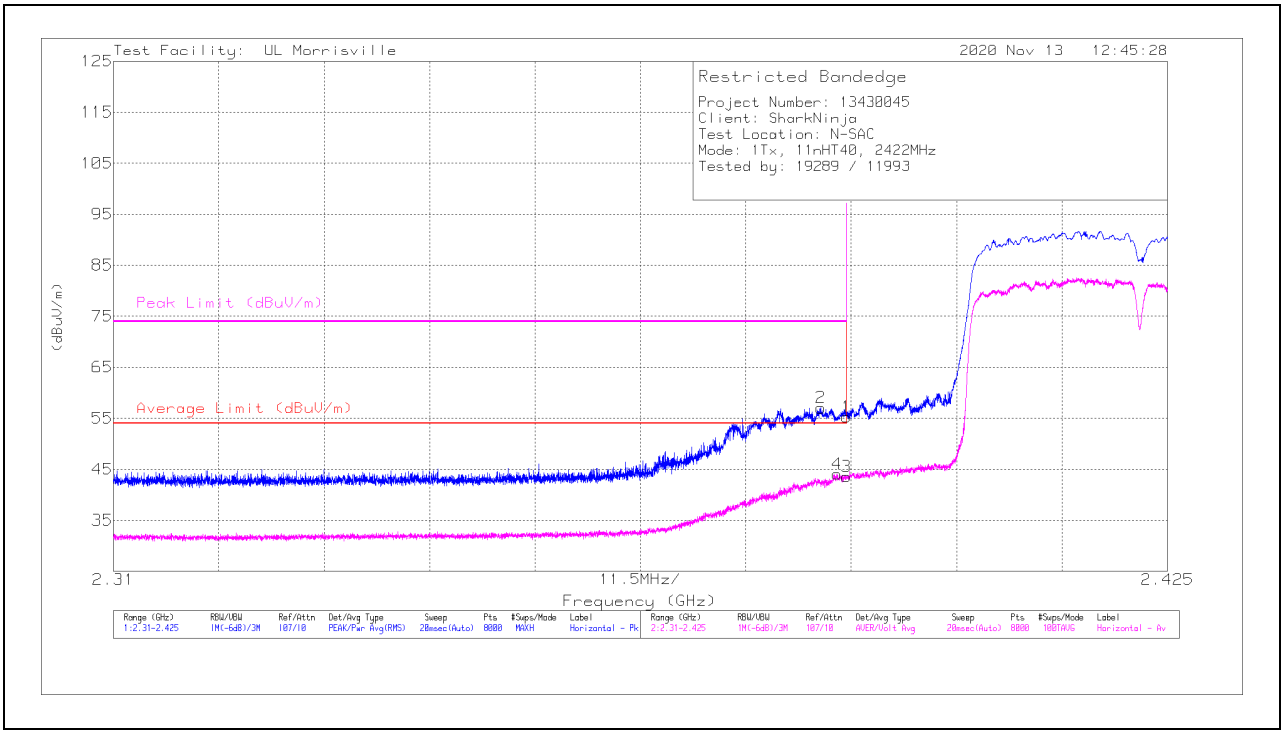
10.1.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 2.4 GHz BAND

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 3)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.38999	47.82	Pk	31.8	-24.4	0	55.22	-	-	74	-18.78	30	225	H
2	* ** 2.3872	49.65	Pk	31.8	-24.4	0	57.05	-	-	74	-16.95	30	225	H
3	* ** 2.38999	35.06	ADV	31.8	-24.4	1.09	43.55	54	-10.45	-	-	30	225	H
4	* ** 2.38897	35.61	ADV	31.8	-24.4	1.09	44.1	54	-9.9	-	-	30	225	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

UL LLC
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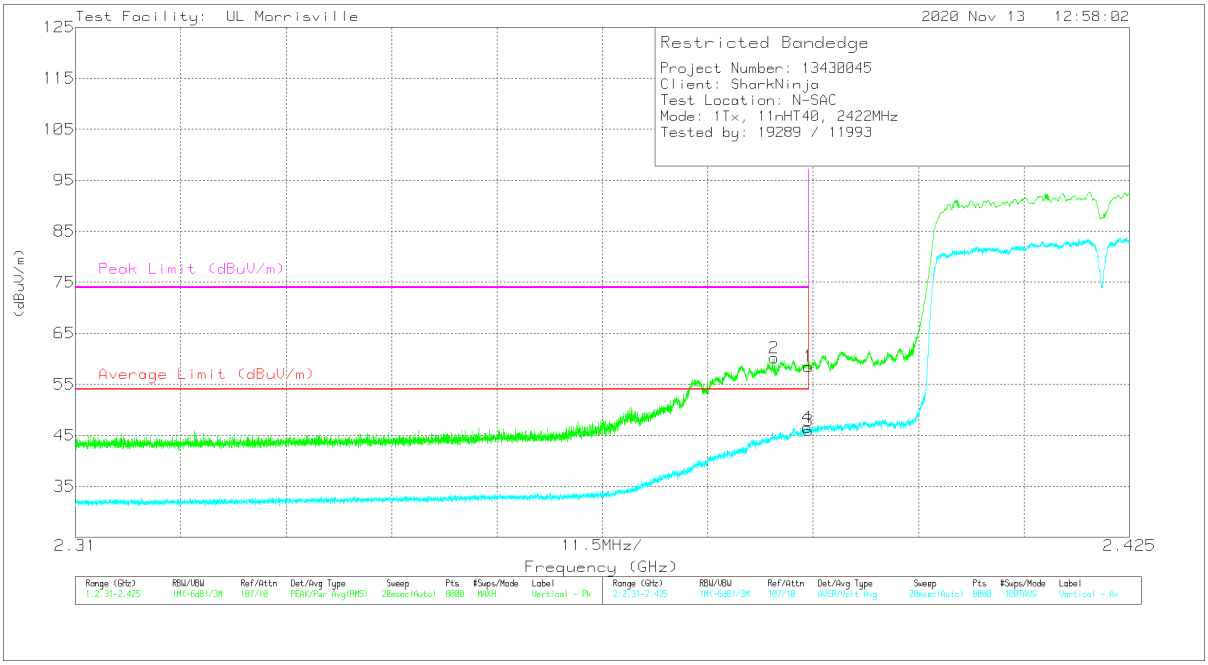
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.38999	51.09	Pk	31.8	-24.4	0	58.49	-	-	74	-15.51	45	260	V
2	* ** 2.38626	52.79	Pk	31.8	-24.4	0	60.19	-	-	74	-13.81	45	260	V
3	* ** 2.38999	37.41	ADV	31.8	-24.4	1.09	45.9	54	-8.1	-	-	45	260	V
4	* ** 2.38986	38.07	ADV	31.8	-24.4	1.09	46.56	54	-7.44	-	-	45	260	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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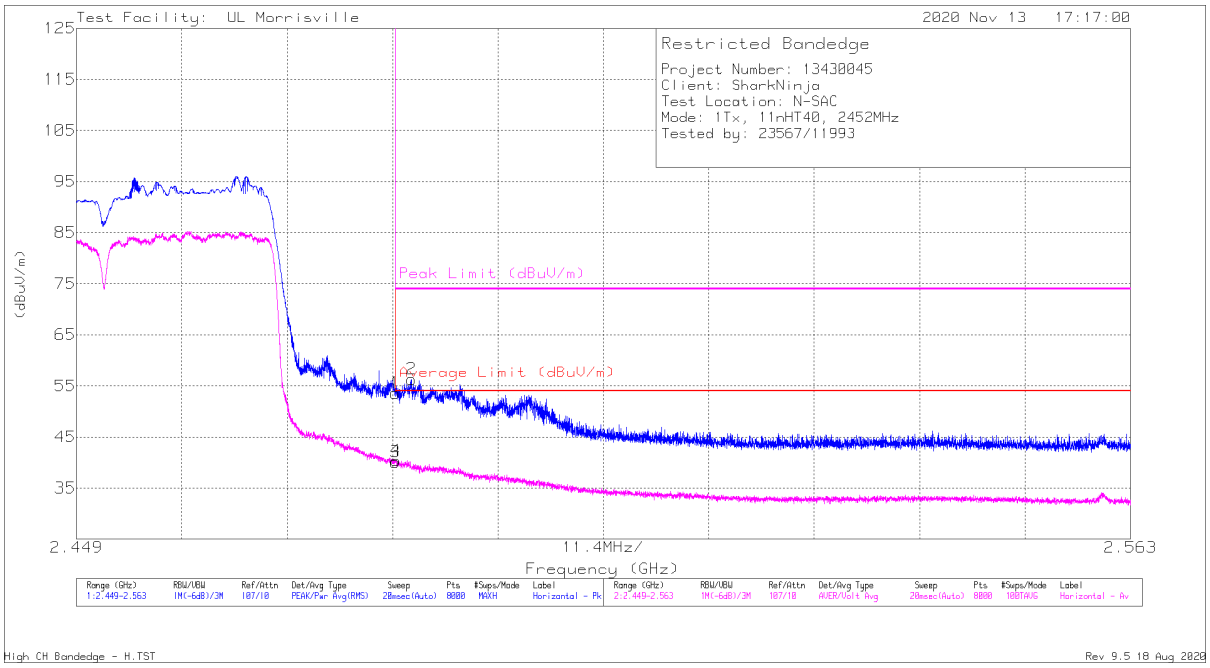
BANDEDGE (HIGH CHANNEL, CH 9)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.4835	45.51	Pk	32.4	-24.3	0	53.61	-	-	74	-20.39	359	362	H
2	* ** 2.48523	48.11	Pk	32.5	-24.3	0	56.31	-	-	74	-17.69	359	362	H
3	* ** 2.4835	30.89	ADV	32.4	-24.3	1.1	40.09	54	-13.91	-	-	359	362	H
4	* ** 2.48353	31.2	ADV	32.4	-24.3	1.1	40.4	54	-13.6	-	-	359	362	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

UL LLC
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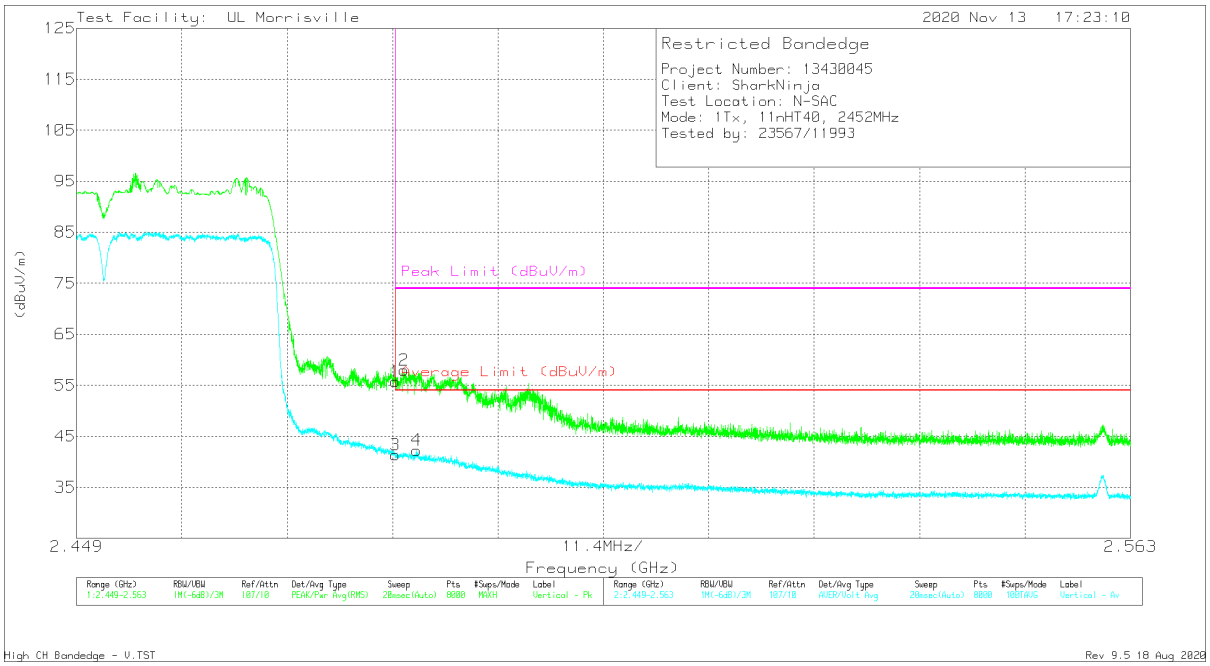
VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.4835	47.67	Pk	32.4	-24.3	0	55.77	-	-	74	-18.23	169	359	V
2	* ** 2.48446	49.88	Pk	32.4	-24.3	0	57.98	-	-	74	-16.02	169	359	V
3	* ** 2.4835	32.19	ADV	32.4	-24.3	1.1	41.39	54	-12.61	-	-	169	359	V
4	* ** 2.48577	32.98	ADV	32.5	-24.3	1.1	42.28	54	-11.72	-	-	169	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

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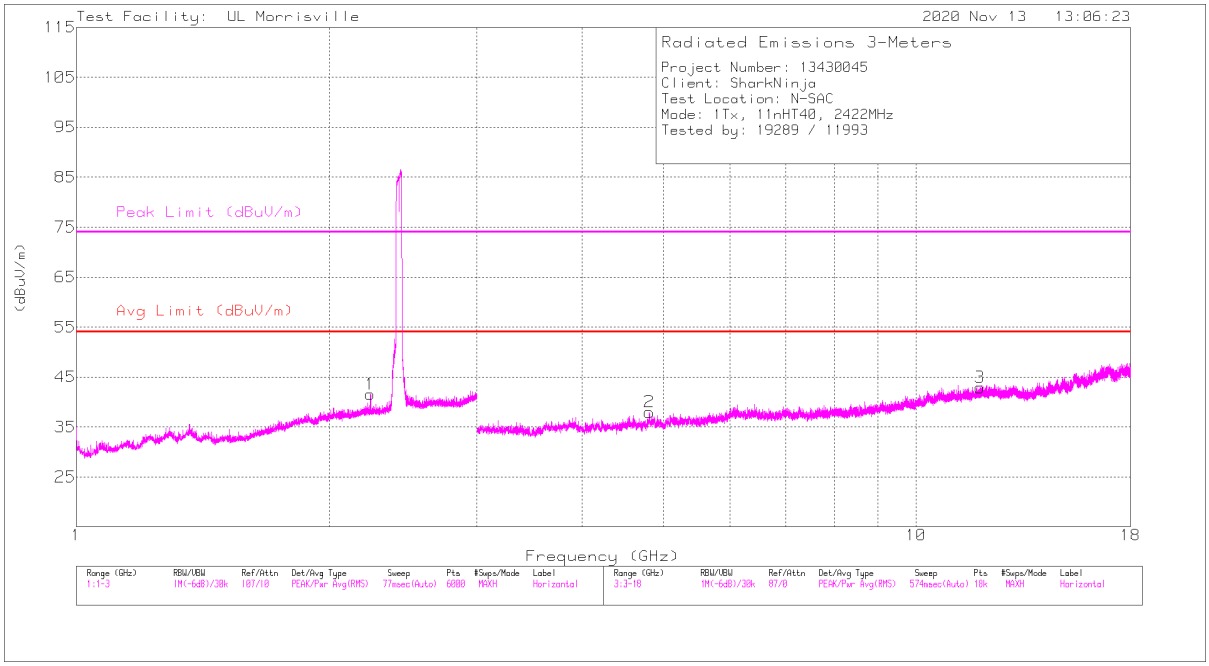
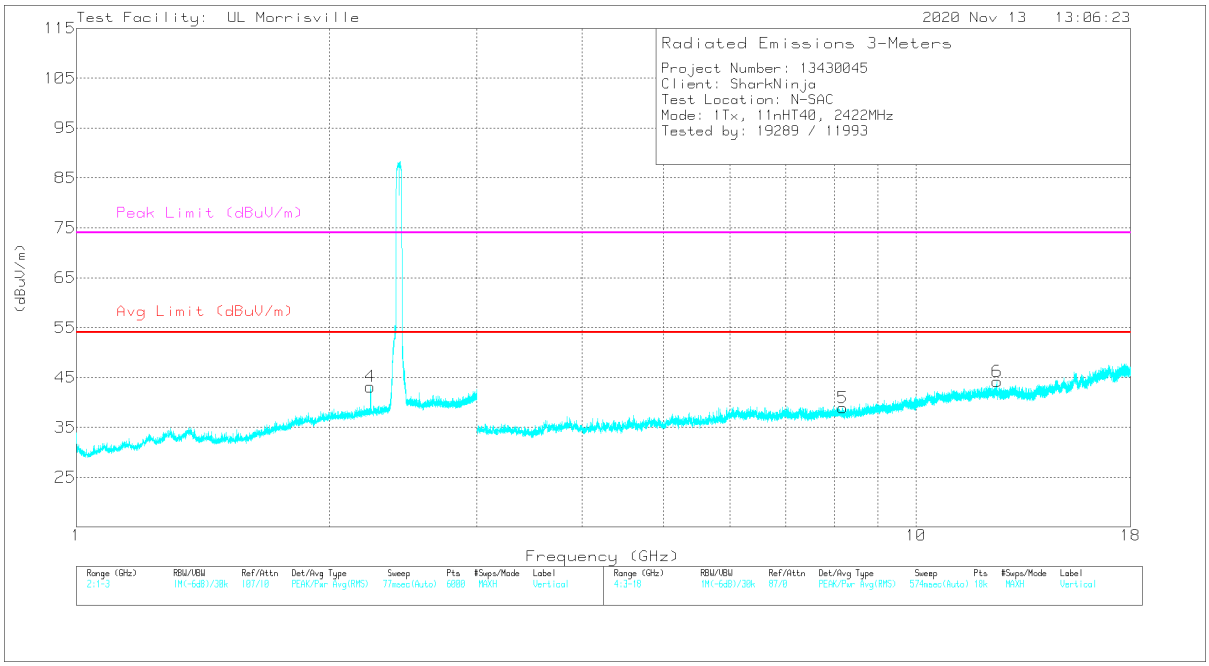
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 3 RESULTS



HORIZONTAL



VERTICAL

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12 Laboratory Dr., RTP, NC 27709; USA TEL:(919) 549-1400

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.2401	39.85	PK2	31.7	-24.3	0	47.25	-	-	74	-26.75	37	224	H
	* ** 2.24	31.13	ADV	31.7	-24.3	1.09	39.62	54	-14.38	-	-	37	224	H
4	* ** 2.24005	40.67	PK2	31.7	-24.3	0	48.07	-	-	74	-25.93	335	267	V
	* ** 2.24004	32.38	ADV	31.7	-24.3	1.09	40.87	54	-13.13	-	-	335	267	V
2	* ** 4.81262	40.83	PK2	34.1	-31.4	0	43.53	-	-	74	-30.47	40	282	H
	* ** 4.81258	27.79	ADV	34.1	-31.4	1.09	31.58	54	-22.42	-	-	40	282	H
3	* ** 11.91001	36.75	PK2	38.6	-26.3	0	49.05	-	-	74	-24.95	358	176	H
	* ** 11.9098	23.67	ADV	38.6	-26.3	1.09	37.06	54	-16.94	-	-	358	176	H
5	* ** 8.17697	38.57	PK2	35.9	-29.2	0	45.27	-	-	74	-28.73	3	237	V
	* ** 8.17682	25.27	ADV	35.9	-29.2	1.09	33.06	54	-20.94	-	-	3	237	V
6	* ** 12.49258	36.69	PK2	39	-26.1	0	49.59	-	-	74	-24.41	260	182	V
	* ** 12.49307	23.45	ADV	39	-26.1	1.09	37.44	54	-16.56	-	-	260	182	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Voltage Average

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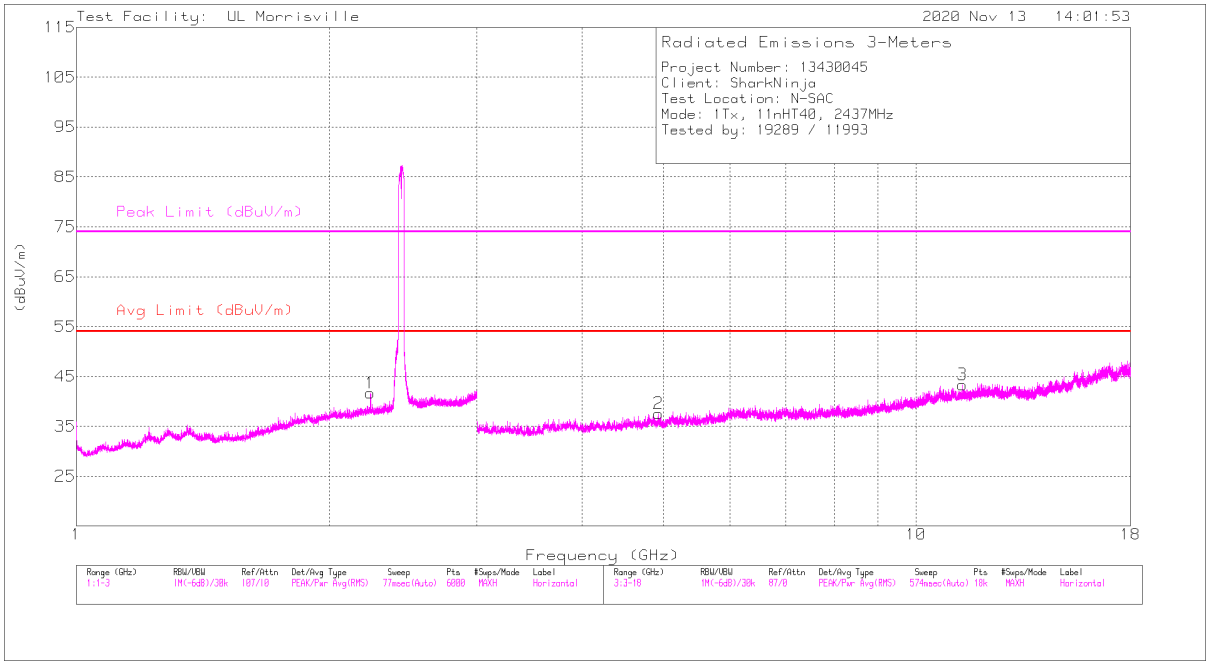
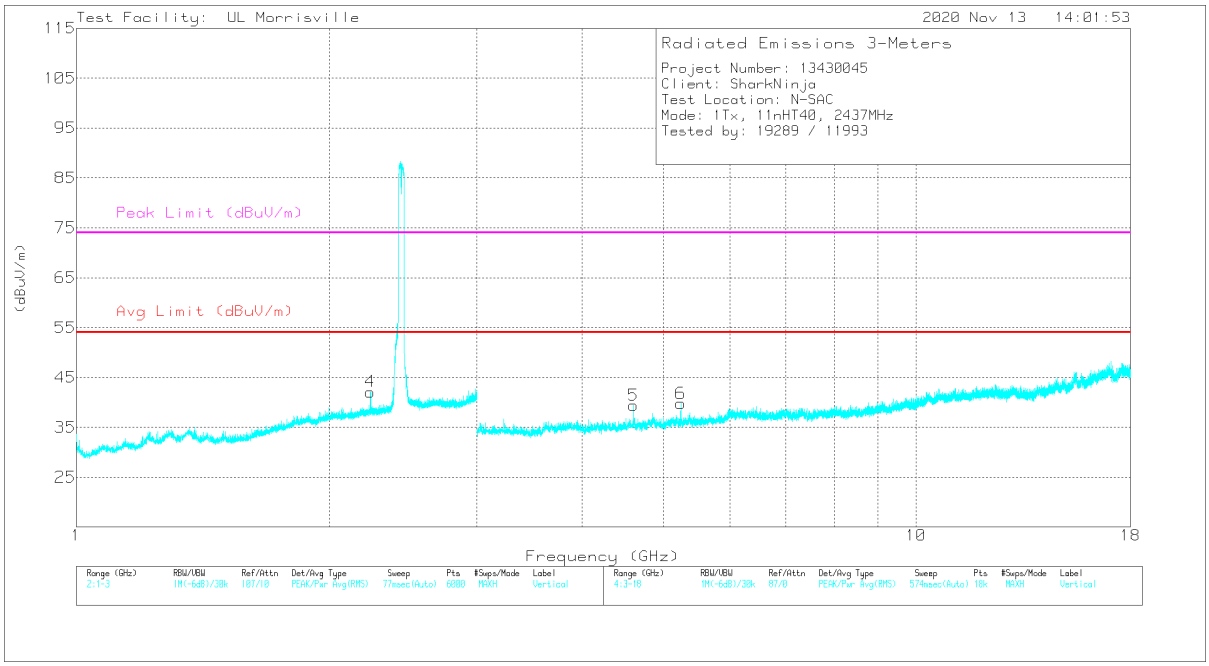
MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.24002	40.3	PK2	31.7	-24.3	0	47.7	-	-	74	-26.3	39	251	H
	* ** 2.23998	31.43	ADV	31.7	-24.3	1.09	39.92	54	-14.08	-	-	39	251	H
4	* ** 2.23969	41.01	PK2	31.7	-24.3	0	48.41	-	-	74	-25.59	330	238	V
	* ** 2.24005	32.76	ADV	31.7	-24.3	1.09	41.25	54	-12.75	-	-	330	238	V
2	* ** 4.93149	41.77	PK2	34.1	-32.1	0	43.77	-	-	74	-30.23	279	176	H
	* ** 4.93148	28.25	ADV	34.1	-32.1	1.09	31.34	54	-22.66	-	-	279	176	H
3	* ** 11.35668	36.23	PK2	38	-25.2	0	49.03	-	-	74	-24.97	79	110	H
	* ** 11.35622	22.9	ADV	38	-25.2	1.09	36.79	54	-17.21	-	-	79	110	H
5	* ** 4.60786	43.29	PK2	34.2	-32.4	0	45.09	-	-	74	-28.91	28	140	V
	* ** 4.60784	31.38	ADV	34.2	-32.4	1.09	34.27	54	-19.73	-	-	28	140	V
6	** 5.2455	41.53	PK2	34.3	-32.2	0	43.63	-	-	74	-30.37	15	396	V
	** 5.24554	28.6	ADV	34.3	-32.2	1.09	31.79	54	-22.21	-	-	15	396	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

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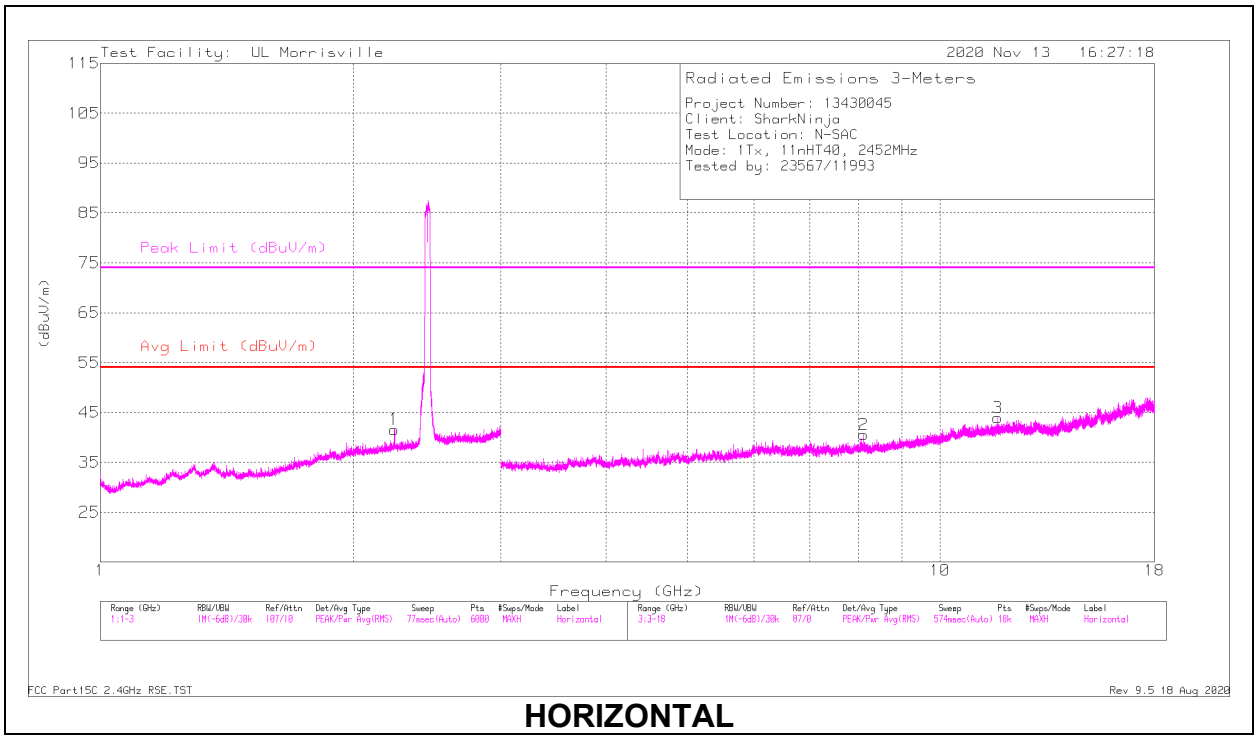
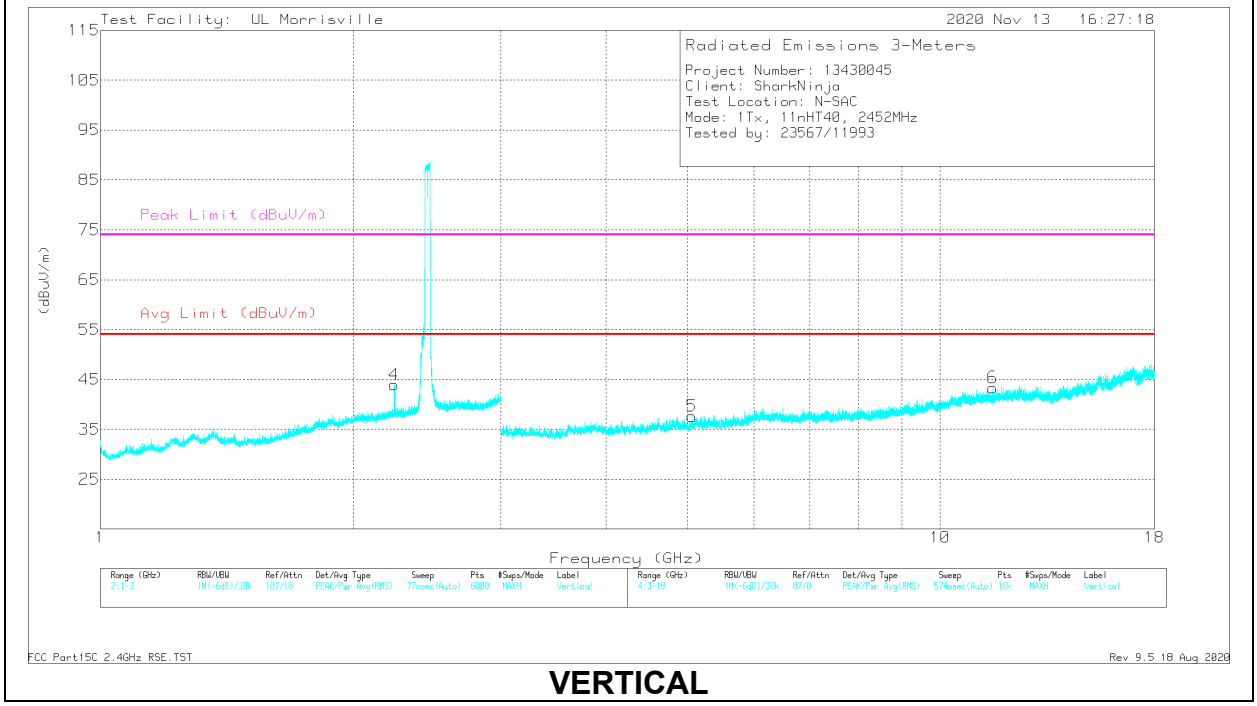
HIGH CHANNEL, CH 9 RESULTS



HORIZONTAL



VERTICAL

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RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 dB(/m)	Amp/Cbl/Fltr/Pad (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	* ** 2.23998	40.33	PK2	31.7	-24.3	0	47.73	-	-	74	-26.27	357	239	H
	* ** 2.23997	32.25	ADV	31.7	-24.3	1.09	40.74	54	-13.26	-	-	357	239	H
4	* ** 2.24007	40.91	PK2	31.7	-24.3	0	48.31	-	-	74	-25.69	317	103	V
	* ** 2.23996	33.55	ADV	31.7	-24.3	1.09	42.04	54	-11.96	-	-	317	103	V
2	* ** 8.10295	38.71	PK2	35.9	-28.9	0	45.71	-	-	74	-28.29	208	165	H
	* ** 8.10204	25.29	ADV	35.9	-28.9	1.09	33.38	54	-20.62	-	-	208	165	H
3	* ** 11.7189	36.49	PK2	38.4	-25.6	0	49.29	-	-	74	-24.71	294	213	H
	* ** 11.71879	23.18	ADV	38.4	-25.6	1.09	37.07	54	-16.93	-	-	294	213	H
5	* ** 5.0597	41.48	PK2	34.2	-31.9	0	43.78	-	-	74	-30.22	23	130	V
	* ** 5.05969	28.04	ADV	34.2	-31.9	1.09	31.43	54	-22.57	-	-	23	130	V
6	* ** 11.56134	36.43	PK2	38.2	-26	0	48.63	-	-	74	-25.37	325	369	V
	* ** 11.56087	23.25	ADV	38.2	-26	1.09	36.54	54	-17.46	-	-	325	369	V

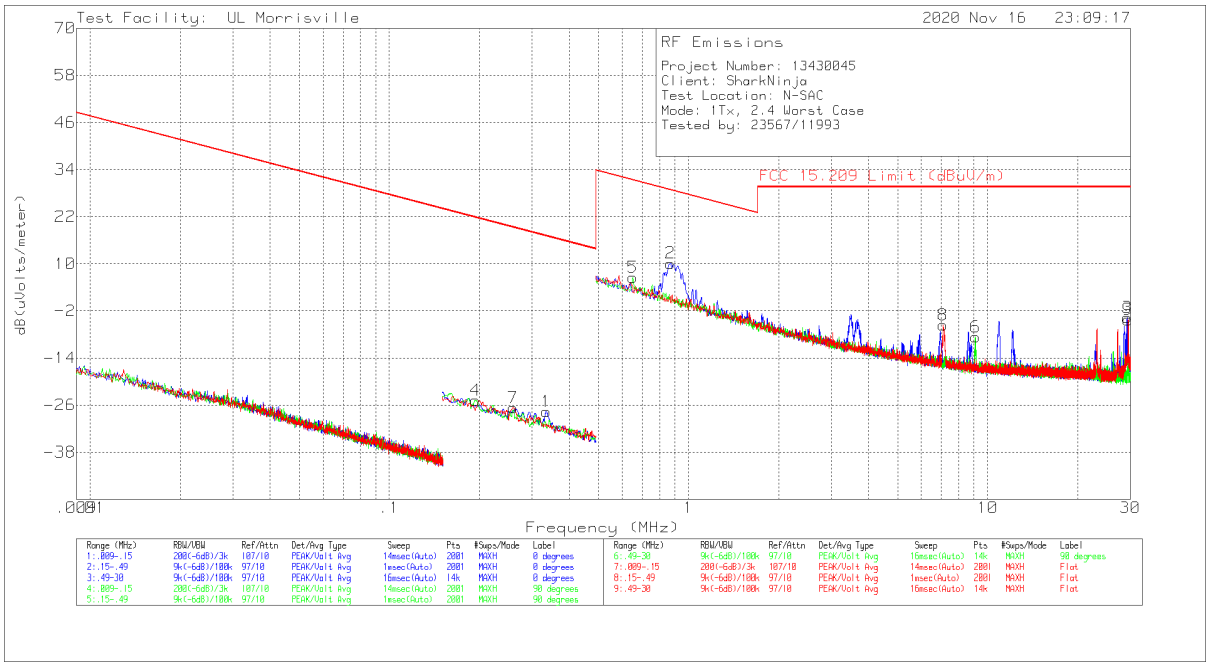
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average

10.2. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / 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 194.29 kHz resulted in a level of -24.75 dBuV/m, which is equivalent to -24.75-51.5 = -76.25 dBuA/m, which has the same margin, -46.59 dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit



ANTENNA- THREE ORIENTATIONS

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Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uV/m)	FCC 15.209 QP/AV Limit (dBuV/m)	FCC 15.209 PK Limit (dBuV/m	Margin (dB)	Azimuth (Degs)
4	.19429	44.35	Pk	10.8	.1	-80	-24.75	21.84	41.84	-46.59	0-360
7	.25914	42.51	Pk	10.7	.1	-80	-26.69	19.33	39.33	-46.02	0-360
1	.33454	41.55	Pk	10.7	.1	-80	-27.65	17.12	37.12	-44.77	0-360
5	.65126	35.48	Pk	10.8	.2	-40	6.48	31.33	-	-24.85	0-360
2	.87049	39.02	Pk	10.9	.2	-40	10.12	28.81	-	-18.69	0-360
8	7.09015	23.08	Pk	10.8	.5	-40	-5.62	29.54	-	-35.16	0-360
6	9.09907	20.31	Pk	10.4	.6	-40	-8.69	29.54	-	-38.23	0-360
3	29.25893	27.17	Pk	8	1.1	-40	-3.73	29.54	-	-33.27	0-360
9	29.47605	26.65	Pk	8	1.1	-40	-4.25	29.54	-	-33.79	0-360

Pk - Peak detector

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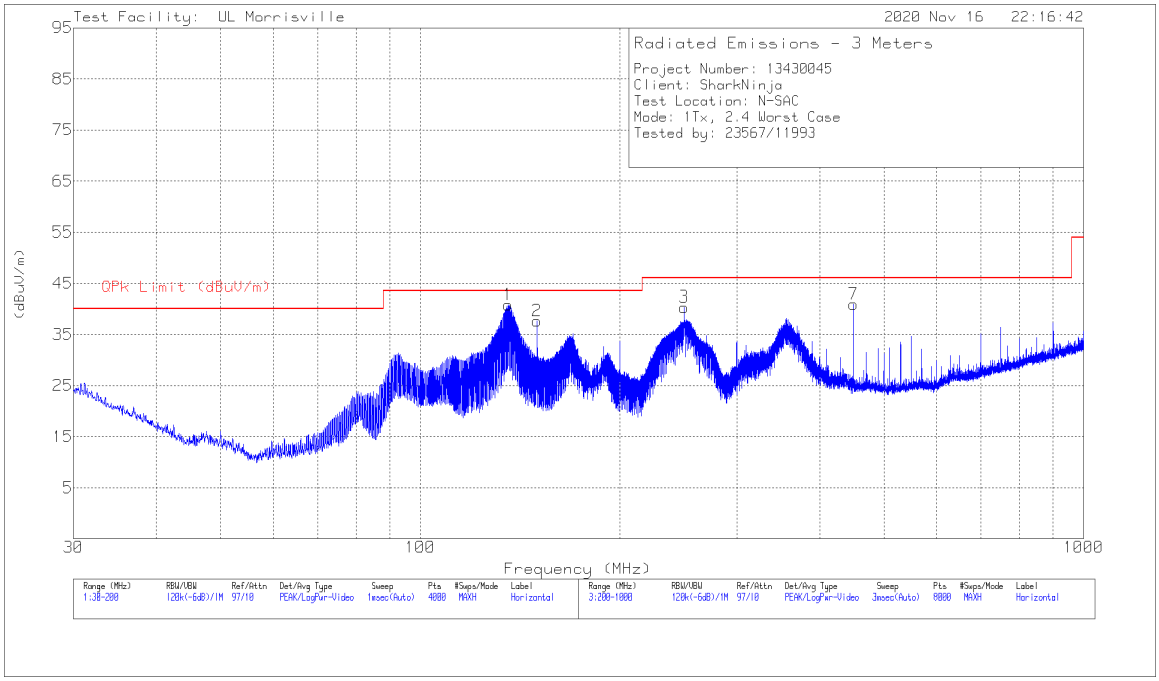
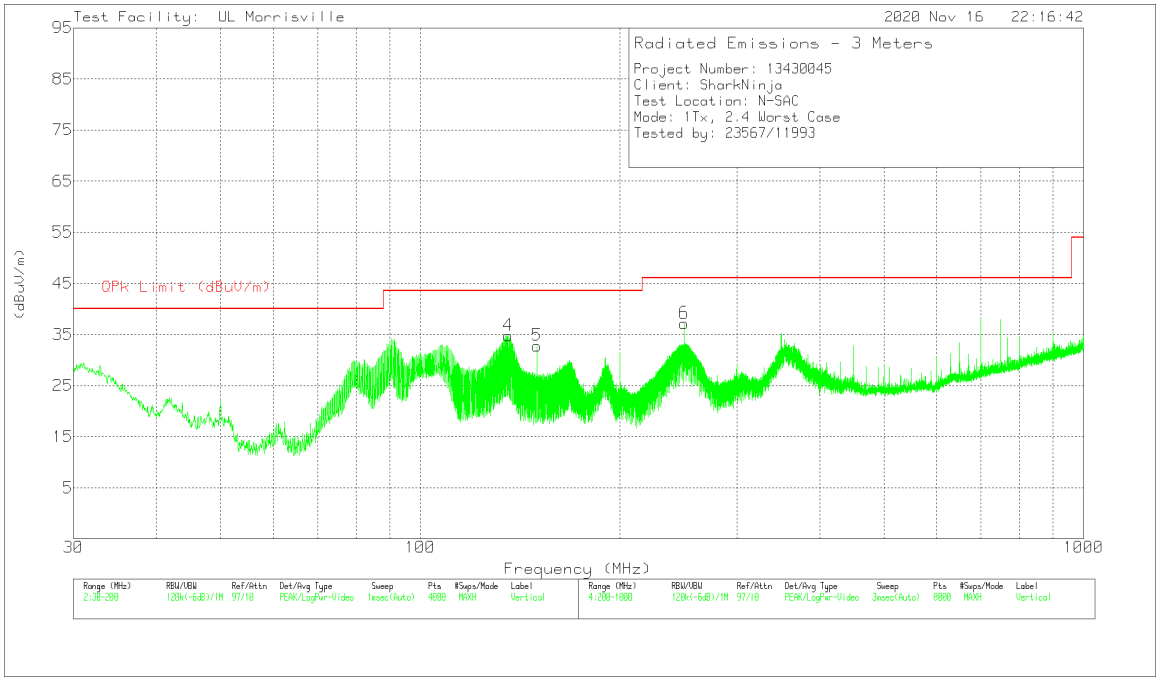
10.3. WORST CASE BELOW 1 GHZ



HORIZONTAL



VERTICAL

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	* ** 135.4339	50.84	Qp	19.5	-30	40.34	43.52	-3.18	300	217	H
2	* ** 149.9961	50.28	Qp	18.7	-29.9	39.08	43.52	-4.44	308	247	H
4	* ** 135.7249	45.39	Pk	19.4	-30	34.79	43.52	-8.73	0-360	100	V
5	* ** 150.0086	44.01	Pk	18.7	-29.9	32.81	43.52	-10.71	0-360	100	V
3	* ** 249.9921	53.11	Qp	17.6	-29	41.71	46.02	-4.31	149	103	H
6	* ** 250.0065	48.6	Pk	17.6	-29	37.2	46.02	-8.82	0-360	200	V
7	449.9325	45.64	Pk	22.9	-27.6	40.94	46.02	-5.08	0-360	100	H

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

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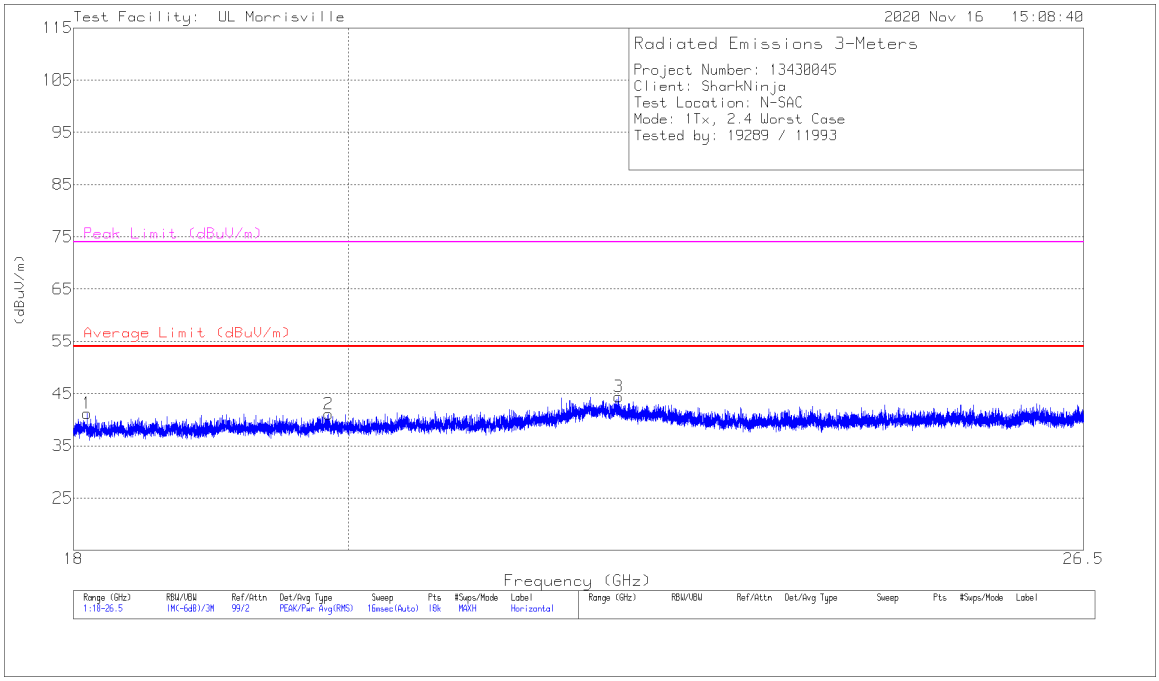
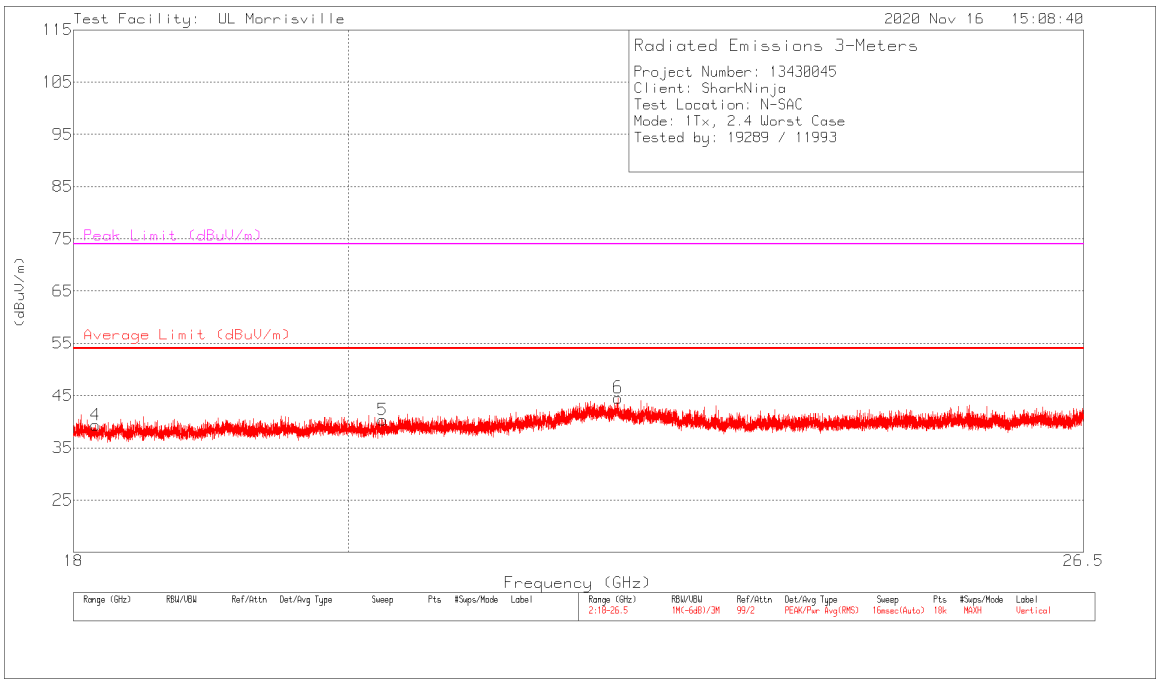
10.4. WORST CASE 18-26 GHZ



HORIZONTAL



VERTICAL

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18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0063 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	* ** 18.09303	48.62	Pk	33	-40.4	41.22	54	-12.78	74	-32.78	0-360	249	H
2	* ** 19.84791	48.07	Pk	33.6	-40.6	41.07	54	-12.93	74	-32.93	0-360	300	H
3	* ** 22.17892	48.96	Pk	36.7	-41.3	44.36	54	-9.64	74	-29.64	0-360	300	H
4	* ** 18.15443	46.58	Pk	33	-40.2	39.38	54	-14.62	74	-34.62	0-360	101	V
5	* ** 20.26112	47.15	Pk	33.9	-40.7	40.35	54	-13.65	74	-33.65	0-360	300	V
6	* ** 22.17184	48.77	Pk	36.7	-40.9	44.57	54	-9.43	74	-29.43	0-360	150	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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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 C63.10.

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 NEUTRAL and HOT lines.

RESULTS

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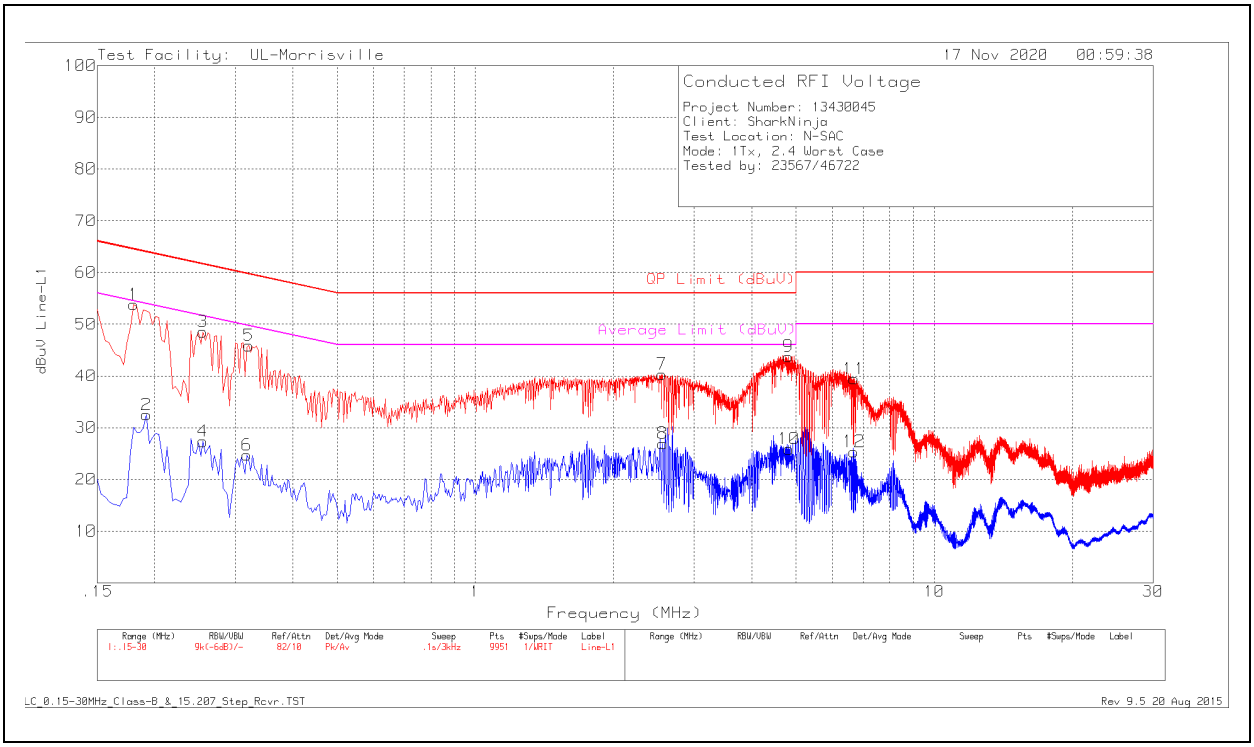
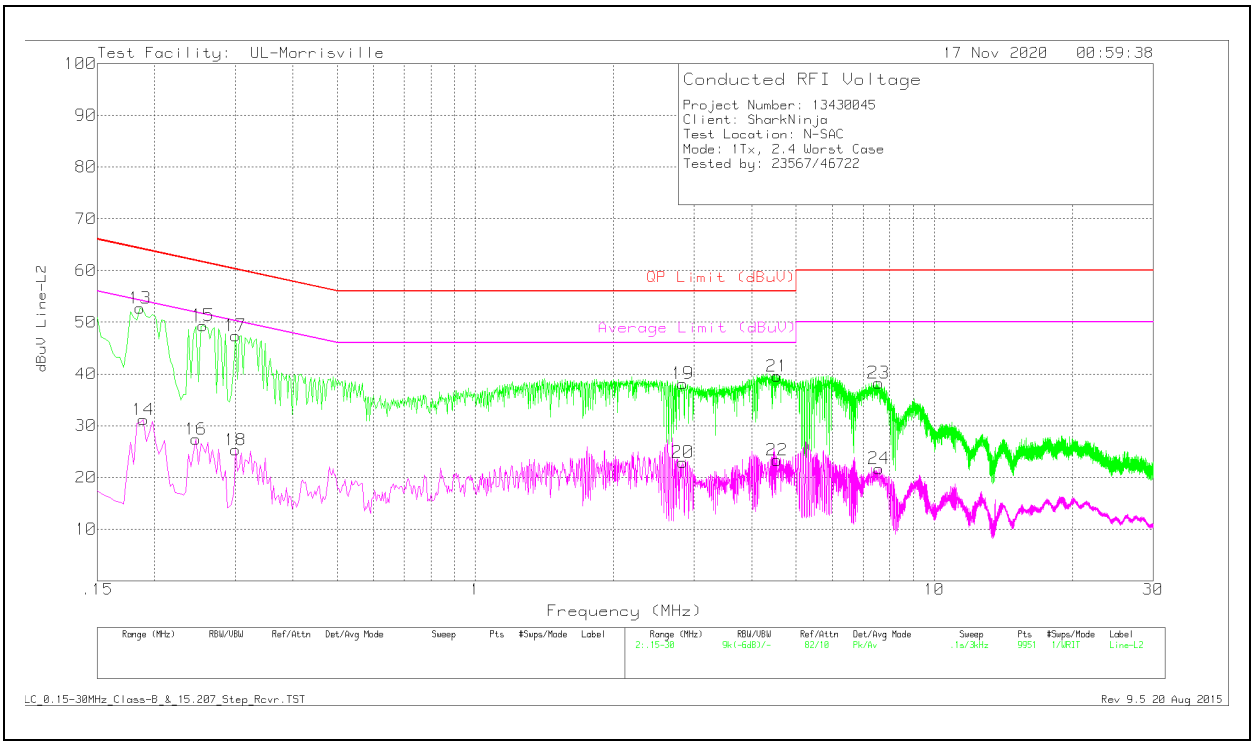
11.1.1. AC POWER LINE HOST
LINE 1 RESULTS



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	.18	43.89	Pk	.2	9.7	53.79	64.49	-10.7	-	-
2	.192	22.6	Av	.2	9.7	32.5	-	-	53.95	-21.45
3	.255	38.73	Pk	.1	9.7	48.53	61.59	-13.06	-	-
4	.255	17.55	Av	.1	9.7	27.35	-	-	51.59	-24.24
5	.321	35.96	Pk	.1	9.8	45.86	59.68	-13.82	-	-
6	.318	14.78	Av	.1	9.8	24.68	-	-	49.76	-25.08
7	2.553	30.51	Pk	0	9.8	40.31	56	-15.69	-	-
8	2.562	17.13	Av	0	9.8	26.93	-	-	46	-19.07
9	4.812	33.83	Pk	0	9.9	43.73	56	-12.27	-	-
10	4.824	15.98	Av	0	9.9	25.88	-	-	46	-20.12
11	6.69	29.43	Pk	.1	9.9	39.43	60	-20.57	-	-
12	6.684	15.36	Av	.1	9.9	25.36	-	-	50	-24.64

Pk - Peak detector
Av - Average detection

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	.186	42.8	Pk	.2	9.7	52.7	64.21	-11.51	-	-
14	.189	21.26	Av	.2	9.7	31.16	-	-	54.08	-22.92
15	.255	39.55	Pk	.1	9.7	49.35	61.59	-12.24	-	-
16	.246	17.58	Av	.1	9.7	27.38	-	-	51.89	-24.51
17	.3	37.61	Pk	.1	9.7	47.41	60.24	-12.83	-	-
18	.3	15.49	Av	.1	9.7	25.29	-	-	50.24	-24.95
19	2.832	28.32	Pk	0	9.8	38.12	56	-17.88	-	-
20	2.832	13.11	Av	0	9.8	22.91	-	-	46	-23.09
21	4.548	29.55	Pk	.1	9.9	39.55	56	-16.45	-	-
22	4.545	13.32	Av	.1	9.9	23.32	-	-	46	-22.68
23	7.566	28.25	Pk	.1	9.9	38.25	60	-21.75	-	-
24	7.575	11.71	Av	.1	9.9	21.71	-	-	50	-28.29

Pk - Peak detector
Av - Average detection

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12. SETUP PHOTOS

Please refer to R13430045-EP1 for setup photos

END OF TEST REPORT