



# TEST REPORT

**Report Number:** R13244152-E3

**Applicant :** Covidien LLC  
15 Hampshire Street  
Mansfield, MA 02048 USA

**Model :** DS1.2

**CONTAINS FCC ID :** P7G-DS1

**CONTAINS IC :** 23825-DS1

**EUT Description :** Multimedia device

**Test Standard(s) :** FCC 47 CFR Part 15 Subpart E (EXCEPT DFS)  
ISED RSS-247 Issue 2  
ISED RSS-GEN Issue 5

**Date Of Issue:**  
2020-08-19

**Prepared by:**  
UL LLC  
12 Laboratory DR.  
Research Triangle Park, NC 27709 USA  
TEL: (919) 549-1400



NVLAP Lab code: 200246-0

## REPORT REVISION HISTORY

Ver.	Issue Date	Revisions	Revised By
1	2020-07-31	Initial Issue	Brian T. Kiewra
2	2020-08-19	Updated EUT description	Niklas Haydon

## TABLE OF CONTENTS

<b>REPORT REVISION HISTORY .....</b>	<b>2</b>
<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>1. ATTESTATION OF TEST RESULTS .....</b>	<b>5</b>
<b>2. TEST RESULT SUMMARY .....</b>	<b>6</b>
<b>3. TEST METHODOLOGY .....</b>	<b>7</b>
<b>4. FACILITIES AND ACCREDITATION .....</b>	<b>7</b>
<b>5. DECISION RULES AND MEASUREMENT UNCERTAINTY .....</b>	<b>8</b>
5.1. METROLOGICAL TRACEABILITY .....	8
5.2. DECISION RULES.....	8
5.3. MEASUREMENT UNCERTAINTY.....	8
5.4. SAMPLE CALCULATION .....	8
<b>6. EQUIPMENT UNDER TEST .....</b>	<b>9</b>
6.1. EUT DESCRIPTION .....	9
6.2. MAXIMUM OUTPUT POWER.....	9
6.3. DESCRIPTION OF AVAILABLE ANTENNAS .....	9
6.4. SOFTWARE AND FIRMWARE.....	9
6.5. WORST-CASE CONFIGURATION AND MODE.....	9
6.6. DESCRIPTION OF TEST SETUP.....	10
<b>7. MEASUREMENT METHOD.....</b>	<b>11</b>
<b>8. TEST AND MEASUREMENT EQUIPMENT .....</b>	<b>12</b>
<b>9. ANTENNA PORT TEST RESULTS.....</b>	<b>14</b>
9.1. ON TIME AND DUTY CYCLE.....	14
<b>10. RADIATED TEST RESULTS.....</b>	<b>15</b>
10.1. TRANSMITTER ABOVE 1 GHz.....	17
10.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND .....	17
10.1.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND.....	37
10.2. WORST CASE BELOW 30MHZ.....	47
10.3. WORST CASE BELOW 1 GHZ.....	49
10.4. WORST CASE 18-26 GHZ.....	51
10.5. WORST CASE 26-40 GHZ.....	53
<b>11. AC POWER LINE CONDUCTED EMISSIONS.....</b>	<b>55</b>

11.1.1. AC Power Line Norm .....56

**12. SETUP PHOTOS.....58**

**END OF TEST REPORT .....58**

# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Covidien llc  
15 Hampshire Street  
Mansfield, MA 02048 USA

**EUT DESCRIPTION:** Multimedia Device

**MODEL:** DS1.2

**SERIAL NUMBER:** 078fa22dbc9b

**DATE TESTED:** 2020-07-21 to 2020-07-28

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E (EXCEPT DFS)	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	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.

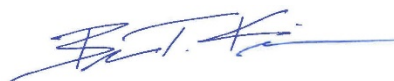
This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.

Approved & Released  
For UL LLC By:



Dan Corona  
Operations Leader  
Consumer Technology Division  
UL LLC

Prepared By:



Brian T. Kiewra  
Project Engineer  
Consumer Technology Division  
UL LLC

## 2. TEST RESULT SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	RSS-GEN 6.7	26dB BW/99% OBW	See comment	See Note 1.
15.407 (e)	RSS-247 6.2.4.1	6 dB BW		
15.407 (a) (1-4), (h) (1)	RSS-247 6.2	Output Power		
15.407 (a) (1-3, 5)	RSS-247 6.2	PSD		
15.209, 15.205, 15.407 (b)	RSS-GEN 8.9, 8.10, RSS-247 6.2	Radiated Emissions	Compliant	None
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		

Note 1: This report covers radiated and AC mains conducted for a C2PC due to antenna change. The remaining test results can be found in the original filing report which is the responsibility of the manufacturer to provide upon request.

### 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC KDB 662911 D01 v02r01, FCC KDB 789033 D02 v02r01, ANSI C63.10-2013, RSS-GEN Issue 5, and RSS-247 Issue 2

### 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 Suite Perimeter Park Dr., 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.
<b>Site Code: 2180C</b>	
<input type="checkbox"/> Chamber A RTP	<input type="checkbox"/> North Chamber
<input type="checkbox"/> Chamber C RTP	<input checked="" type="checkbox"/> South Chamber

The above test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code.

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	$U_{Lab}$
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 dB
Worst Case Radiated Disturbance, 9kHz to 40GHz	5.17 dB

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

### 5.4. SAMPLE CALCULATION

#### **RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:

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

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

#### **MAINS CONDUCTED EMISSIONS**

Where relevant, the following sample calculation is provided:

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

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$



## **6. EQUIPMENT UNDER TEST**

### **6.1. EUT DESCRIPTION**

The EUT is a multimedia device that contains an 802.11 a/ac/n 5GHz WLAN module FCC ID: P7G-DS1/ IC: 23825-DS1. The EUT only operates in the 5.2GHz band and only supports 802.11a SISO, 802.11nHT20 and 802.11acVHT20 MIMO.

### **6.2. MAXIMUM OUTPUT POWER**

Conducted Power was not measured in this report. Radiated and AC Mains emissions performed for a C2PC due to antenna change. The power settings used for testing were the same as those in the original filing report.

### **6.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes two Molex 2.4/5GHz Balance Flex Antenna, part number 2042810200 antennas, with a maximum gain of 2.8 dBi.

### **6.4. SOFTWARE AND FIRMWARE**

The EUT firmware installed during testing was L4T-28.1

### **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 based on original filing report.

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 selected EUT configuration was chosen to maximize emissions. EUT intended to operate in only one orientation. Therefore, all testing performed with the EUT in its intended orientation.

The worst-case data rate for each mode is determined to be as follows, based on input from the manufacturer of the radio.

802.11a mode: 6 Mbps  
802.11n HT20mode: MCS0

## 6.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Router	Netgear	AC1200	4YK175BH030C4	PY316400360
Laptop	HP	14-dk1003dx	5CG016B3DL	TX2-RTL8821CE

### I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Mains	1	Barrel	Unshielded	<3m	Connects to power supply
2	ENET	1	RJ45	Shielded	<3m	Goes to router
3	HDMI	1	HDMI	Unshielded	<3m	Goes into laptop for population

### SETUP DIAGRAM

Please refer to R13244152-EP3 for setup diagram.

## 7. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.1, G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.2, G.3, G.4, and G.5.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

General Radiated Emissions: ANSI C63.10-2013 Section 6.3-6.6, 6.10

## 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 - South Chamber)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
<b>0.009-30MHz (Loop Ant.)</b>					
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2019-08-08	2020-08-08
<b>30-1000 MHz</b>					
AT0081	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2019-11-20	2020-11-20
<b>1-18 GHz</b>					
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-28	2021-04-28
<b>18-40 GHz</b>					
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2019-11-07	2020-11-07
AT0077	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2019-11-07	2020-11-07
<b>Gain-Loss Chains</b>					
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-10	2021-07-10
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-10	2021-07-10
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
<b>Receiver &amp; Software</b>					
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-06-24	2021-06-24
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
<b>Additional Equipment used</b>					
s/n 161024885	Environmental Meter	Fisher Scientific	15-077-963	2018-09-04	2020-09-04

Test Equipment Used – Conducted Disturbance Emissions Test Equipment (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
s/n 161024885	Environmental Meter	Fisher Scientific	15-0770-963	2018-09-04	2020-09-04
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2019-08-19	2020-08-19
75141 (PRE0101521)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2019-08-20	2020-08-20
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 (2015-08-20)		
76021	DC Power Supply	Circuit Specialists	CSI3005X5	NA	NA

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

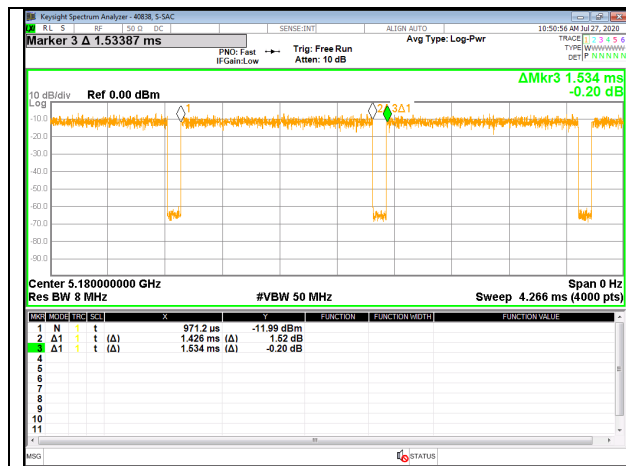
#### LIMITS

None; for reporting purposes only.

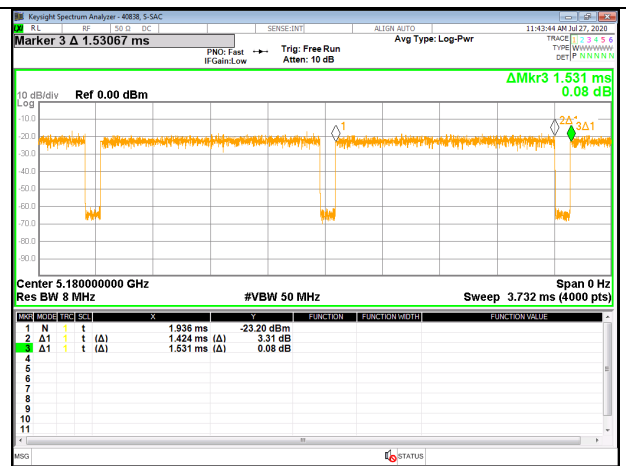
#### PROCEDURE

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

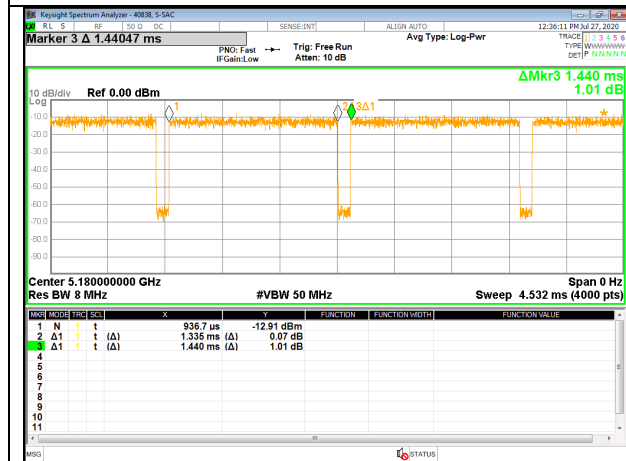
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
802.11a ANT1	1.426	1.534	0.930	93.0%	0.63
802.11a ANT2	1.424	1.531	0.930	93.0%	0.63
802.11n HT20 MIMO	1.335	1.440	0.927	92.7%	0.66



802.11a – ANT 1



802.11a ANT2



802.11nHT20 MIMO

INTENTIONALLY LEFT BLANK

## 10. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209 -Restricted bands  
FCC §15.407(b)(1-3) -Un-Restricted bands

### After January 01, 2019 for Outside of the Restricted Bands Emissions

RSS 247 Issue 2 Sections  
6.2.1.2 (for 5150-5250 MHz band)  
6.2.2.2 (for 5250-5350 MHz band)  
6.2.3.2 (for 5470-5600 MHz and 5650-5725 MHz bands)  
6.2.4.2 (for 5725-5850 MHz band)

NCC LP0002 §2.7 and §2.8

Frequency Range (MHz)	Field Strength Limit ( $\mu\text{V}/\text{m}$ ) 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 and as applicable for voltage average measurements.

The spectrum from 30 MHz to 1GHz and 18GHz to 40 GHz is investigated with the transmitter set to transmit at the channel with highest output power as worst-case scenario determined by original filing report. 1GHz to 18GHz was set to the lowest, middle, and highest channels in the 5.2 GHz band.

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.



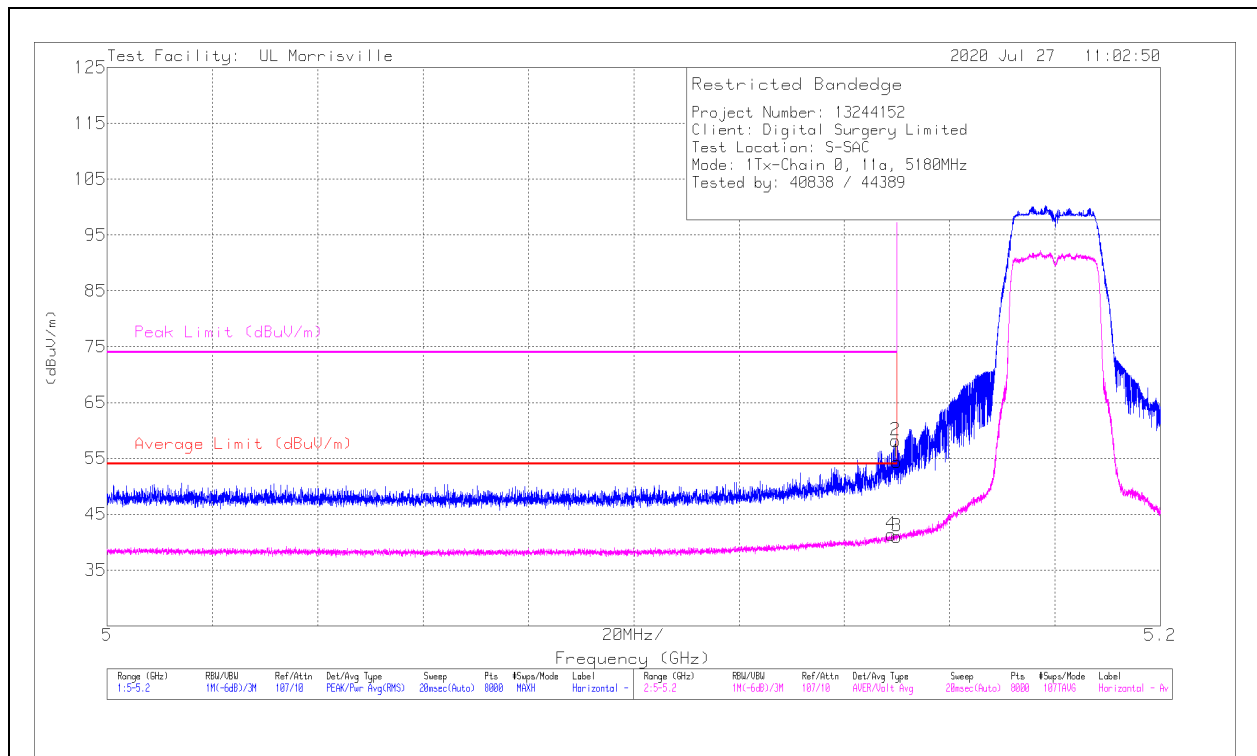
## 10.1. TRANSMITTER ABOVE 1 GHz

### 10.1.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

#### 1TX SISO ANTENNA 1

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	*** 5.14999	42.59	Pk	34.2	-22.4	0	54.39	-	-	74	-19.61	181	397	H
2	*** 5.14969	46.38	PK	34.2	-22.4	0	58.18	-	-	74	-15.82	181	397	H
3	*** 5.14999	28.58	ADV	34.2	-22.4	.63	41.01	54	-12.99	-	-	181	397	H
4	*** 5.14884	28.95	ADV	34.2	-22.4	.63	41.38	54	-12.62	-	-	181	397	H

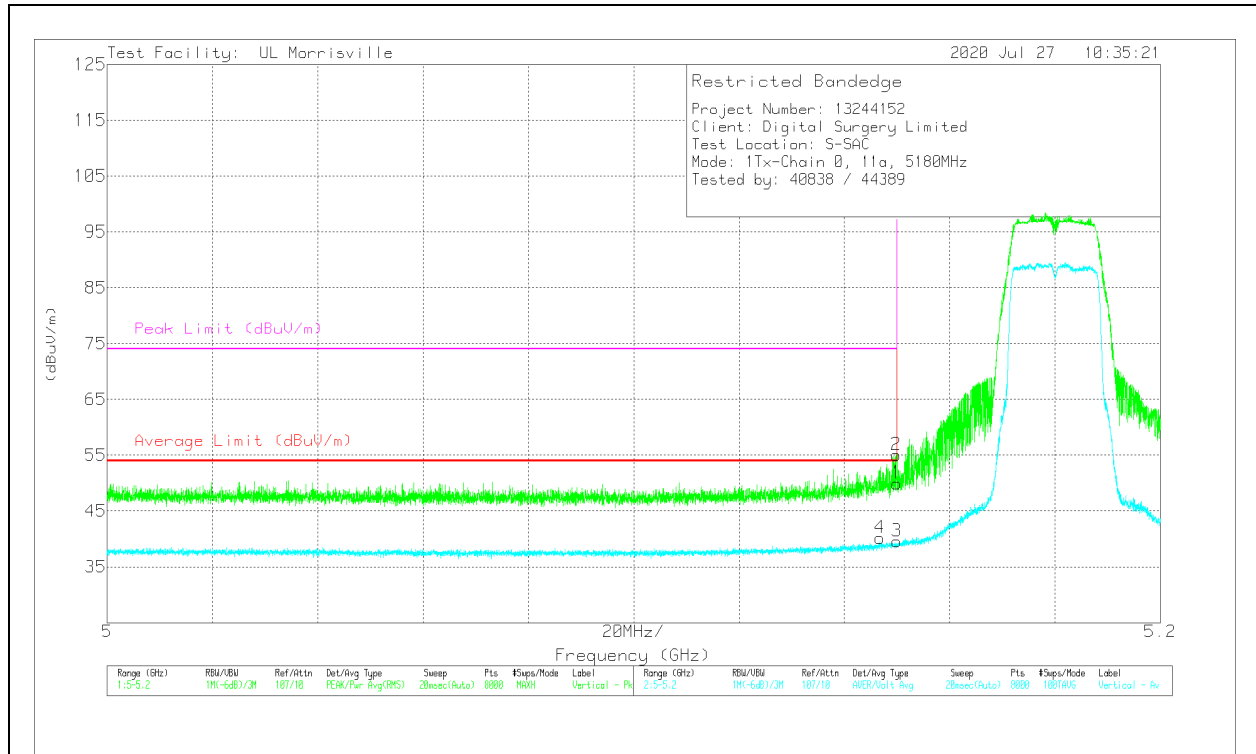
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	*** 5.14999	38.15	Pk	34.2	-22.4	0	49.95	-	-	74	-24.05	219	336	V
2	*** 5.14982	43.24	Pk	34.2	-22.4	0	55.04	-	-	74	-18.96	219	336	V
3	*** 5.14999	27.13	ADV	34.2	-22.4	.63	39.56	54	-14.44	-	-	219	336	V
4	*** 5.14672	27.71	ADV	34.2	-22.4	.63	40.14	54	-13.86	-	-	219	336	V

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

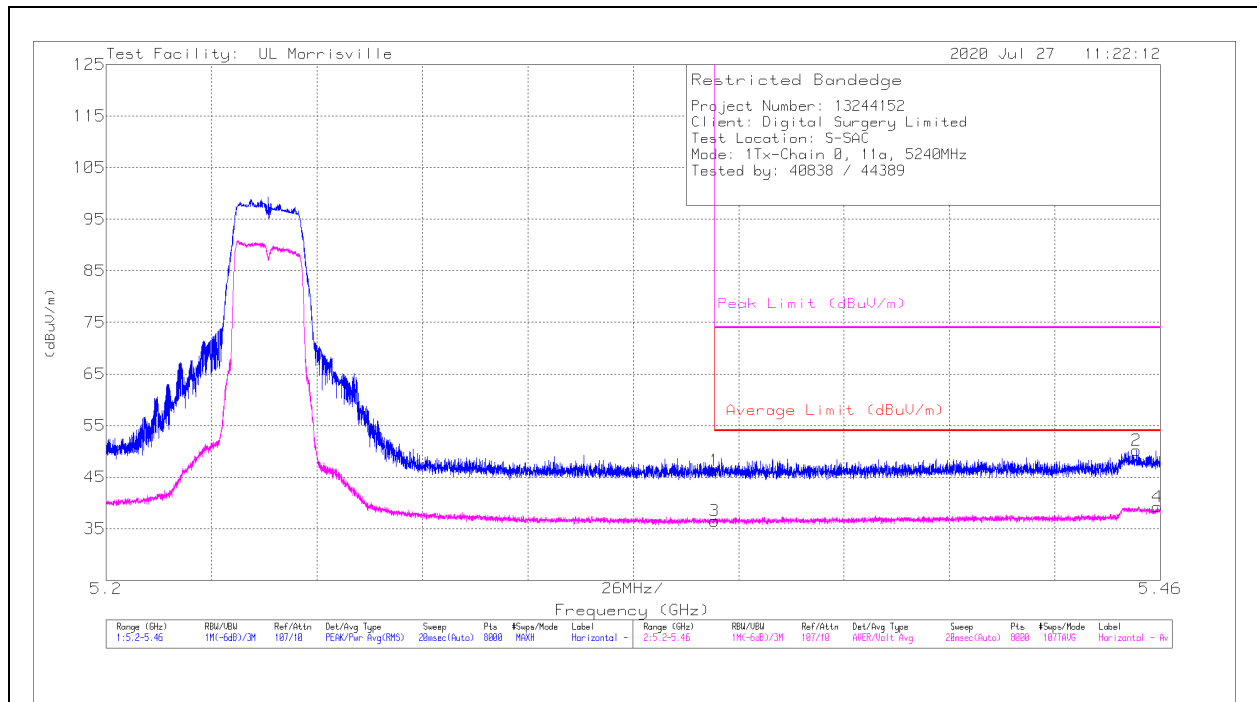
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

**BANDEDGE (HIGH CHANNEL)**

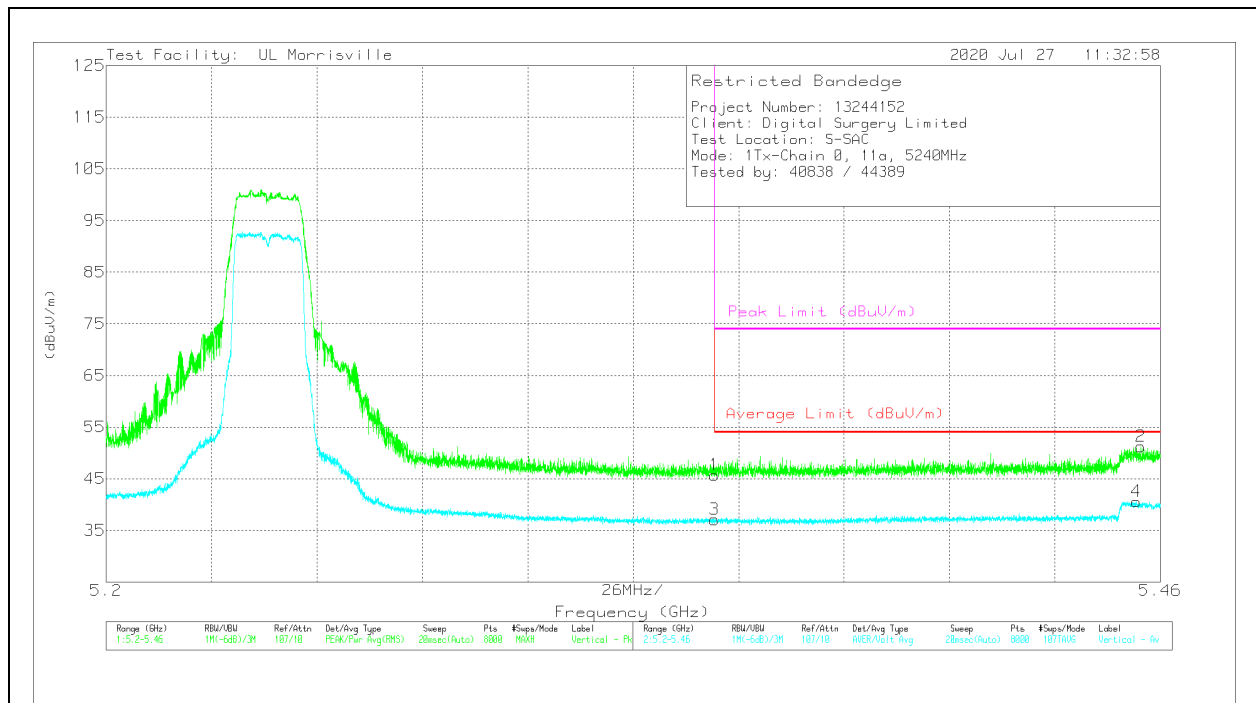
**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	*** 5.35001	34.98	Pk	34.5	-23.2	0	46.28	-	-	74	-27.72	193	371	H
2	*** 5.45415	39.09	Pk	34.5	-23.4	0	50.19	-	-	74	-23.81	193	371	H
3	*** 5.35001	24.59	ADV	34.5	-23.2	.63	36.52	54	-17.48	-	-	193	371	H
4	*** 5.45928	27.58	ADV	34.5	-23.5	.63	39.21	54	-14.79	-	-	193	371	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 Pk - Peak detector  
 ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT

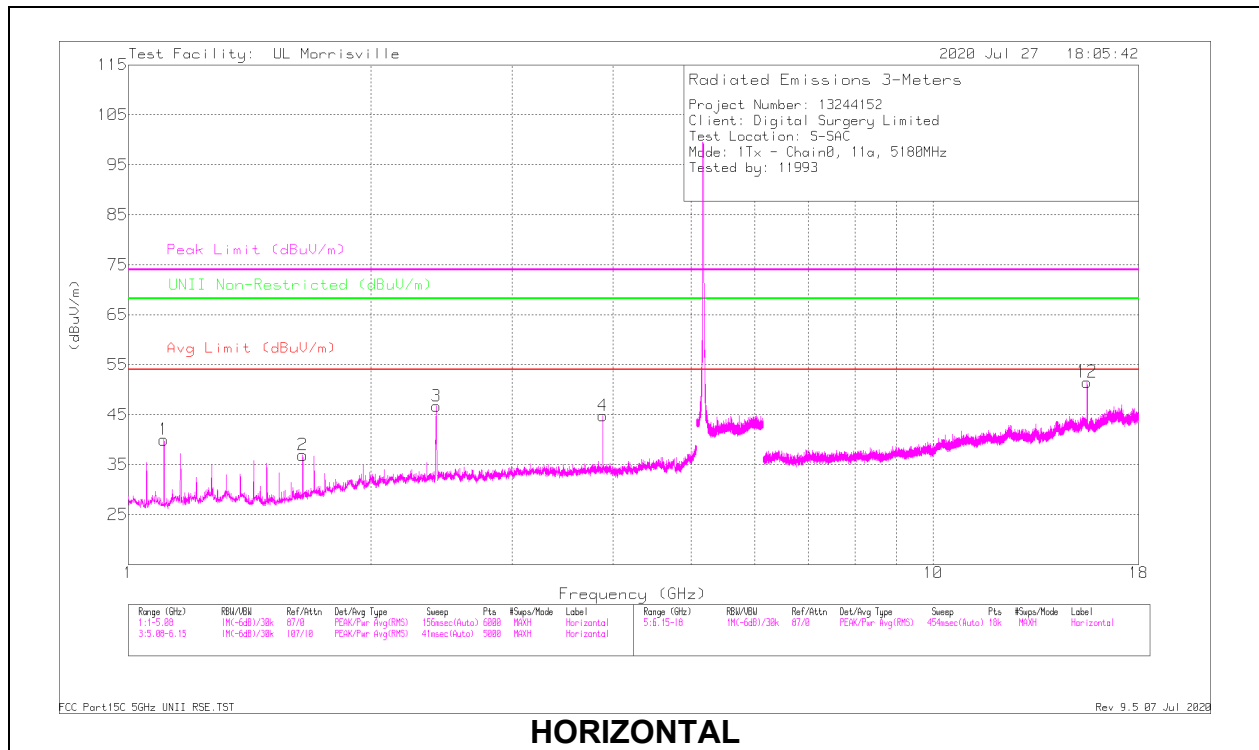


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 5.35001	34.44	Pk	34.5	-23.2	0	45.74	-	-	74	-28.26	202	321	V
2	*** 5.45519	40.24	Pk	34.5	-23.5	0	51.24	-	-	74	-22.76	202	321	V
3	*** 5.35001	25.18	ADV	34.5	-23.2	.63	37.11	54	-16.89	-	-	202	321	V
4	*** 5.45415	28.86	ADV	34.5	-23.4	.63	40.59	54	-13.41	-	-	202	321	V

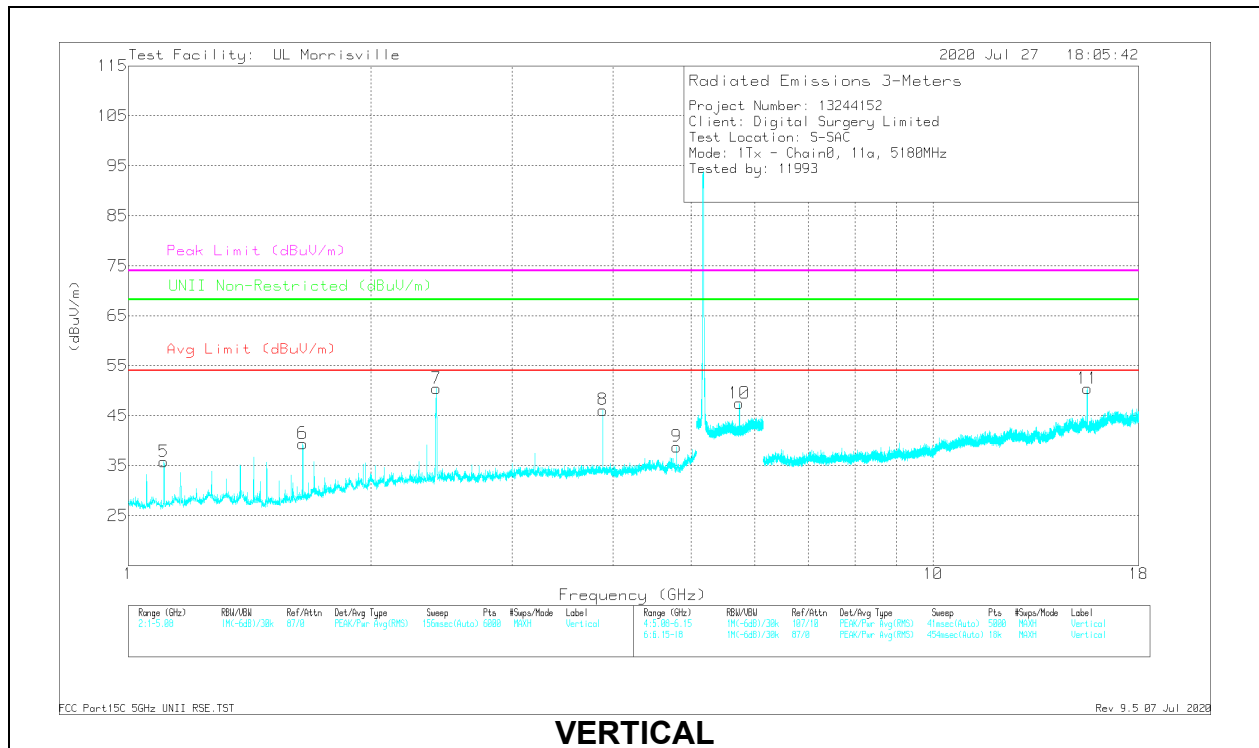
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 Pk - Peak detector  
 ADV - U-NII AD primary method, Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.107	51.8	PK-U	27.7	-35.2	0	44.3	-	-	74	-29.7	-	-	198	184	H
	*** 1.10701	48.97	ADV	27.7	-35.2	.63	42.1	54	-11.9	-	-	-	-	198	184	H
4	*** 3.88496	49.18	PK-U	33.4	-32.5	0	50.08	-	-	74	-23.92	-	-	168	345	H
	*** 3.88498	45.54	ADV	33.4	-32.5	.63	47.07	54	-6.93	-	-	-	-	168	345	H
5	*** 1.10694	50.17	PK-U	27.7	-35.2	0	42.67	-	-	74	-31.33	-	-	265	226	V
	*** 1.10701	46.53	ADV	27.7	-35.2	.63	39.66	54	-14.34	-	-	-	-	265	226	V
8	*** 3.88488	49.81	PK-U	33.4	-32.5	0	50.71	-	-	74	-23.29	-	-	360	336	V
	*** 3.88496	46.42	ADV	33.4	-32.5	.63	47.95	54	-6.05	-	-	-	-	360	336	V
9	*** 4.80001	41.95	PK-U	34	-30.6	0	45.35	-	-	74	-28.65	-	-	259	208	V
	*** 4.79998	33.94	ADV	34	-30.6	.63	37.97	54	-16.03	-	-	-	-	259	208	V
12	*** 15.53405	45.35	PK-U	40.3	-25.1	0	60.55	-	-	74	-13.45	-	-	181	101	H
	*** 15.53435	30.14	ADV	40.3	-25.1	.63	45.97	54	-8.03	-	-	-	-	181	101	H
11	*** 15.54314	45.75	PK-U	40.3	-25.1	0	60.95	-	-	74	-13.05	-	-	110	186	V
	*** 15.54179	30.13	ADV	40.3	-25.1	.63	45.96	54	-8.04	-	-	-	-	110	186	V
2	1.64705	47.57	PK-U	28.7	-34.4	0	41.87	-	-	-	-	68.2	-26.33	281	146	H
6	1.64705	49.5	PK-U	28.7	-34.4	0	43.8	-	-	-	-	68.2	-24.4	99	274	V
3	2.41315	63.64	PK-U	32.2	-34.1	0	61.74	-	-	-	-	68.2	-6.46	357	221	H
7	2.41369	66.6	PK-U	32.2	-34.1	0	64.7	-	-	-	-	68.2	-3.5	249	288	V
10	5.74296	44.53	PK-U	34.6	-23.5	0	55.63	-	-	-	-	68.2	-12.57	22	315	V

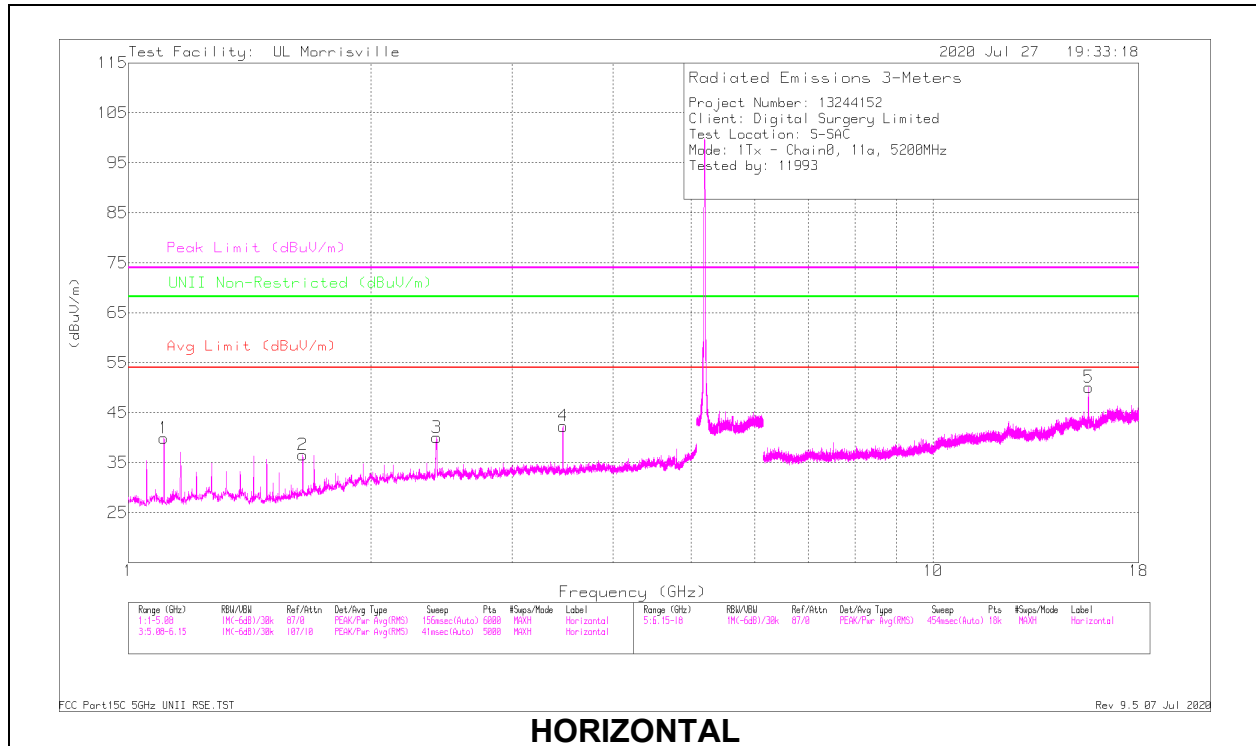
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

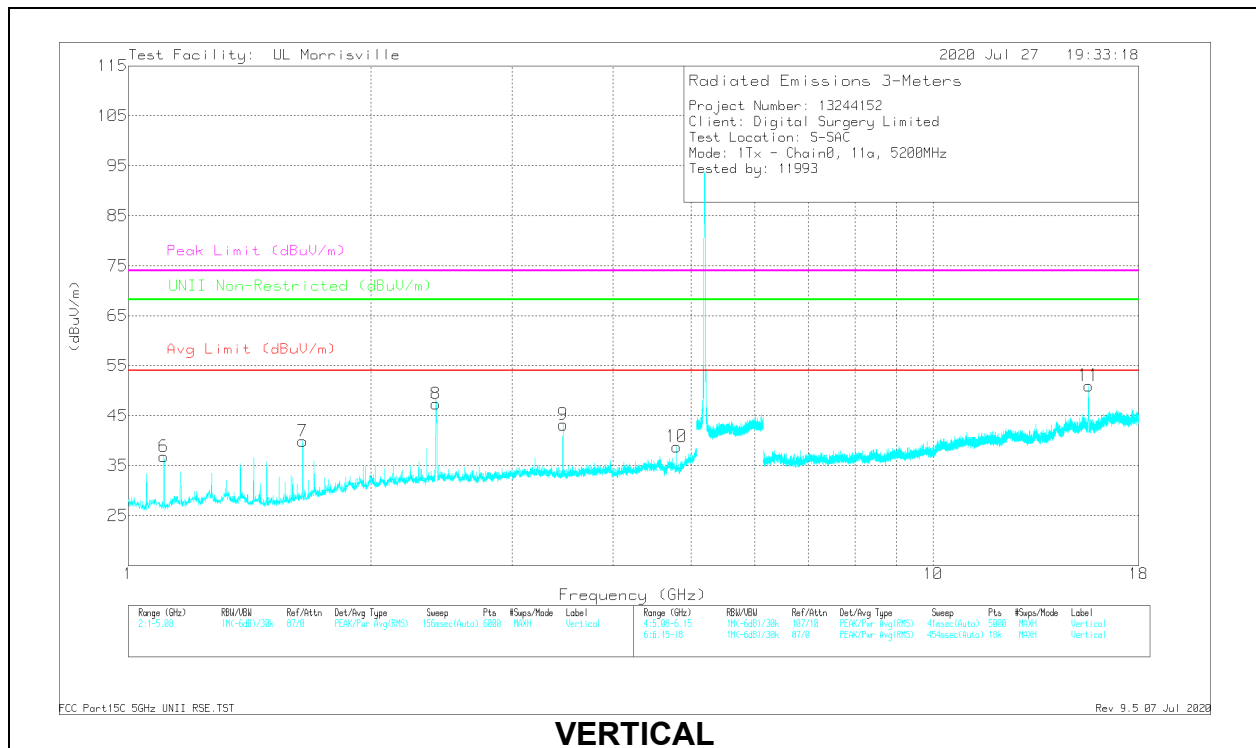
PK-U - U-NII: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

### MID CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.10702	52	PK-U	27.7	-35.2	0	44.5	-	-	74	-29.5	-	-	199	234	H
	* ** 1.10701	48.69	ADV	27.7	-35.2	.63	41.82	54	-12.18	-	-	-	-	199	234	H
6	* ** 1.10702	49.98	PK-U	27.7	-35.2	0	42.48	-	-	74	-31.52	-	-	255	233	V
	* ** 1.107	46.65	ADV	27.7	-35.2	.63	39.78	54	-14.22	-	-	-	-	255	233	V
10	* ** 4.79972	41.73	PK-U	34	-30.6	0	45.13	-	-	74	-28.87	-	-	261	268	V
	* ** 4.8	33.82	ADV	34	-30.6	.63	37.85	54	-16.15	-	-	-	-	261	268	V
5	* ** 15.5988	43.4	PK-U	40.2	-25.1	0	58.5	-	-	74	-15.5	-	-	179	101	H
	* ** 15.59715	29.89	ADV	40.2	-25.1	.63	45.62	54	-8.38	-	-	-	-	179	101	H
11	* ** 15.60317	47.36	PK-U	40.2	-25	0	62.56	-	-	74	-11.44	-	-	112	219	V
	* ** 15.60305	31.48	ADV	40.2	-25	.63	47.31	54	-6.69	-	-	-	-	112	219	V
2	1.6469	47.95	PK-U	28.7	-34.4	0	42.25	-	-	-	-	68.2	-25.95	288	128	H
7	1.647	49.27	PK-U	28.7	-34.4	0	43.57	-	-	-	-	68.2	-24.63	97	275	V
8	2.40772	56.77	PK-U	32.2	-34.1	0	54.87	-	-	-	-	68.2	-13.33	159	152	V
3	2.41526	58.21	PK-U	32.2	-34.1	0	56.31	-	-	-	-	68.2	-11.89	90	190	H
4	3.46659	48.54	PK-U	32.8	-33	0	48.34	-	-	-	-	68.2	-19.86	331	258	H
9	3.46662	50.59	PK-U	32.8	-33	0	50.39	-	-	-	-	68.2	-17.81	75	102	V

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

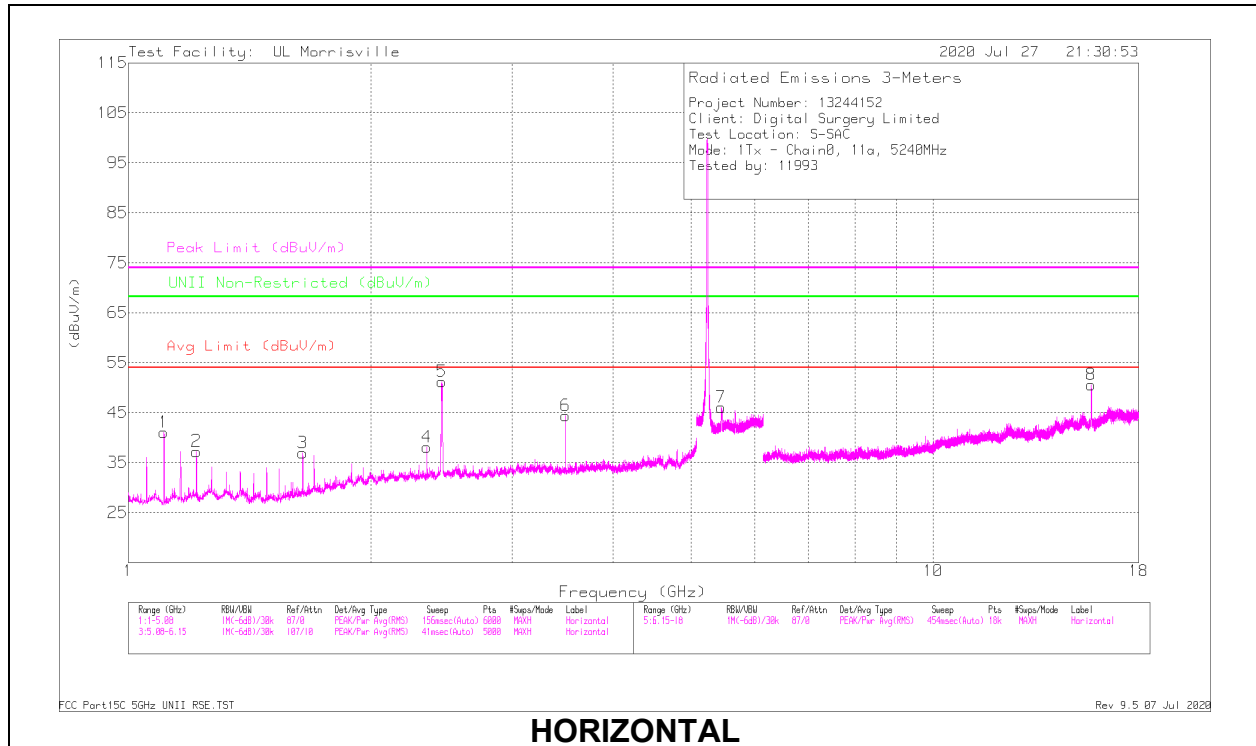
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK-U - U-NII: Maximum Peak

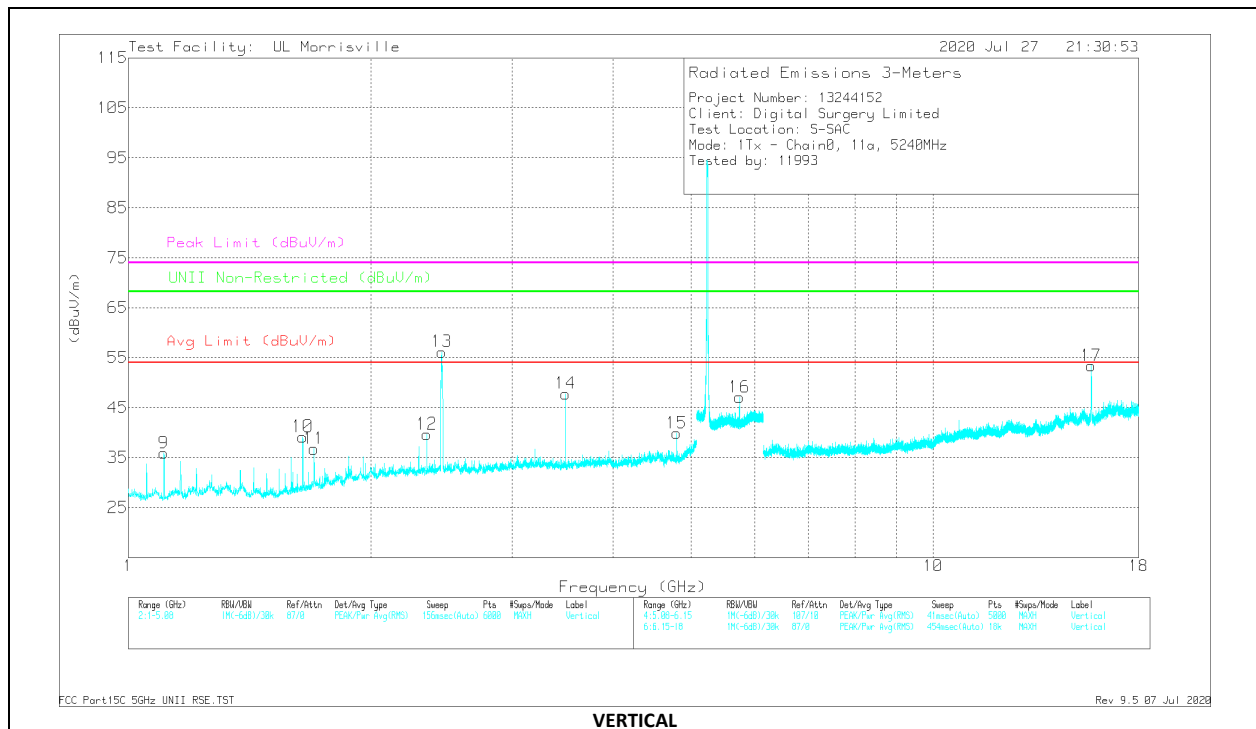
ADV - U-NII AD primary method, Linear Voltage Average



### HIGH CHANNEL RESULTS



### HORIZONTAL



### VERTICAL

**RADIATED EMISSIONS**

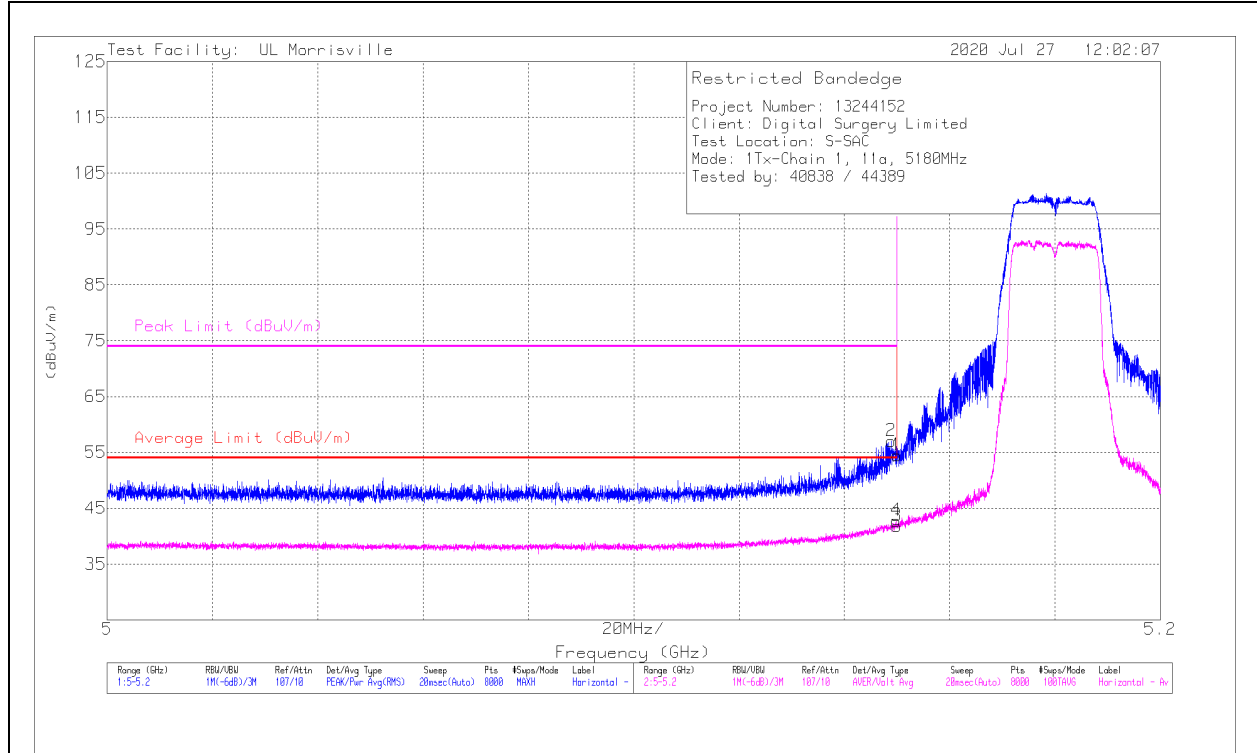
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.10705	50.9	PK-U	27.7	-35.2	0	43.4	-	-	74	-30.6	-	-	188	193	H
	*** 1.10701	47.83	ADV	27.7	-35.2	.63	40.96	54	-13.04	-	-	-	-	188	193	H
2	*** 1.21507	47.22	PK-U	28.7	-35.2	0	40.72	-	-	74	-33.28	-	-	17	139	H
	*** 1.21501	41.39	ADV	28.7	-35.2	.63	35.52	54	-18.48	-	-	-	-	17	139	H
4	*** 2.34908	45	PK-U	32.2	-34.1	0	43.1	-	-	74	-30.9	-	-	238	230	H
	*** 2.34894	37.92	ADV	32.2	-34.1	.63	36.65	54	-17.35	-	-	-	-	238	230	H
9	*** 1.10696	48.36	PK-U	27.7	-35.2	0	40.86	-	-	74	-33.14	-	-	128	132	V
	*** 1.107	44.08	ADV	27.7	-35.2	.63	37.21	54	-16.79	-	-	-	-	128	132	V
11	*** 1.70113	47.25	PK-U	29.5	-34.5	0	42.25	-	-	74	-31.75	-	-	106	120	V
	*** 1.701	41	ADV	29.5	-34.5	.63	36.63	54	-17.37	-	-	-	-	106	120	V
12	*** 2.3491	46.1	PK-U	32.2	-34.1	0	44.2	-	-	74	-29.8	-	-	112	103	V
	*** 2.34896	38.63	ADV	32.2	-34.1	.63	37.36	54	-16.64	-	-	-	-	112	103	V
15	*** 4.79999	42.02	PK-U	34	-30.6	0	45.42	-	-	74	-28.58	-	-	257	277	V
	*** 4.79992	33.4	ADV	34	-30.6	.63	37.43	54	-16.57	-	-	-	-	257	277	V
7	*** 5.45544	43.64	PK-U	34.5	-23.5	0	54.64	-	-	74	-19.36	-	-	146	341	H
	*** 5.45504	31.46	ADV	34.5	-23.5	.63	43.09	54	-10.91	-	-	-	-	146	341	H
8	*** 15.71388	45.37	PK-U	40.2	-23.9	0	61.67	-	-	74	-12.33	-	-	178	125	H
	*** 15.71415	29.9	ADV	40.2	-23.9	.63	46.83	54	-7.17	-	-	-	-	178	125	H
17	*** 15.72294	47.83	PK-U	40.2	-23.9	0	64.13	-	-	74	-9.87	-	-	107	211	V
	*** 15.72247	31.94	ADV	40.2	-23.9	.63	48.87	54	-5.13	-	-	-	-	107	211	V
3	1.64696	47.69	PK-U	28.7	-34.4	0	41.99	-	-	-	-	68.2	-26.21	287	147	H
10	1.64696	49.1	PK-U	28.7	-34.4	0	43.4	-	-	-	-	68.2	-24.8	99	277	V
13	2.45081	62.24	PK-U	32.5	-34.1	0	60.64	-	-	-	-	68.2	-7.56	264	266	V
5	2.45438	60.37	PK-U	32.5	-34.1	0	58.77	-	-	-	-	68.2	-9.43	0	321	H
6	3.4933	53.92	PK-U	32.8	-33.2	0	53.52	-	-	-	-	68.2	-14.68	347	329	V
14	3.49331	50.4	PK-U	32.8	-33.2	0	50	-	-	-	-	68.2	-18.2	330	249	H
16	5.74367	43.96	PK-U	34.6	-23.5	0	55.06	-	-	-	-	68.2	-13.14	312	275	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 PK-U - U-NII: Maximum Peak  
 ADV - U-NII AD primary method, Linear Voltage Average

**1TX SISO ANTENNA 2**

**BANEDGE (LOW CHANNEL)**

**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	* ** 5.14999	42.64	Pk	34.2	-22.4	0	54.44	-	-	74	-19.56	47	257	H
2	* ** 5.14884	45.21	Pk	34.2	-22.4	0	57.01	-	-	74	-16.99	47	257	H
3	* ** 5.14999	29.37	ADV	34.2	-22.4	.63	41.8	54	-12.2	-	-	47	257	H
4	* ** 5.14982	30.28	ADV	34.2	-22.4	.63	42.71	54	-11.29	-	-	47	257	H

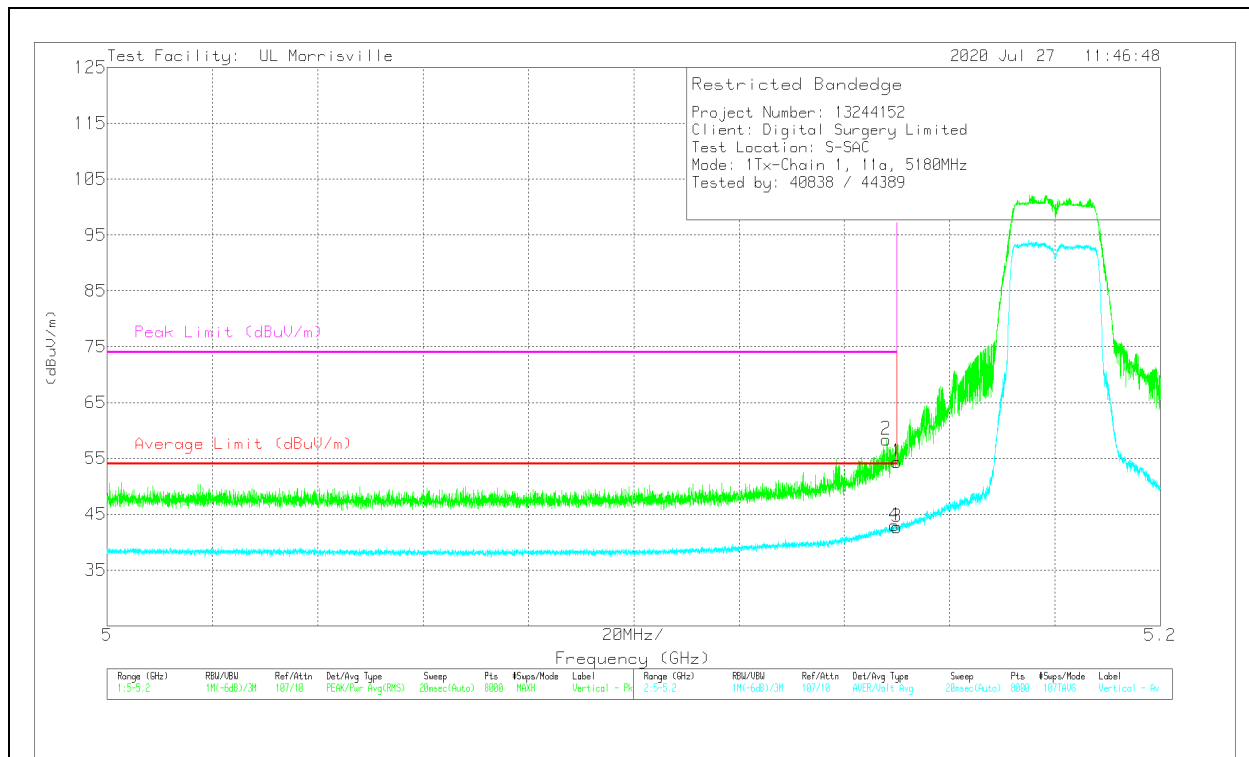
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	*** 5.14999	42.6	Pk	34.2	-22.4	0	54.4	-	-	74	-19.6	131	233	V
2	*** 5.14792	46.58	Pk	34.2	-22.4	0	58.38	-	-	74	-15.62	131	233	V
3	*** 5.14999	30.28	ADV	34.2	-22.4	.63	42.71	54	-11.29	-	-	131	233	V
4	*** 5.14947	30.58	ADV	34.2	-22.4	.63	43.01	54	-10.99	-	-	131	233	V

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

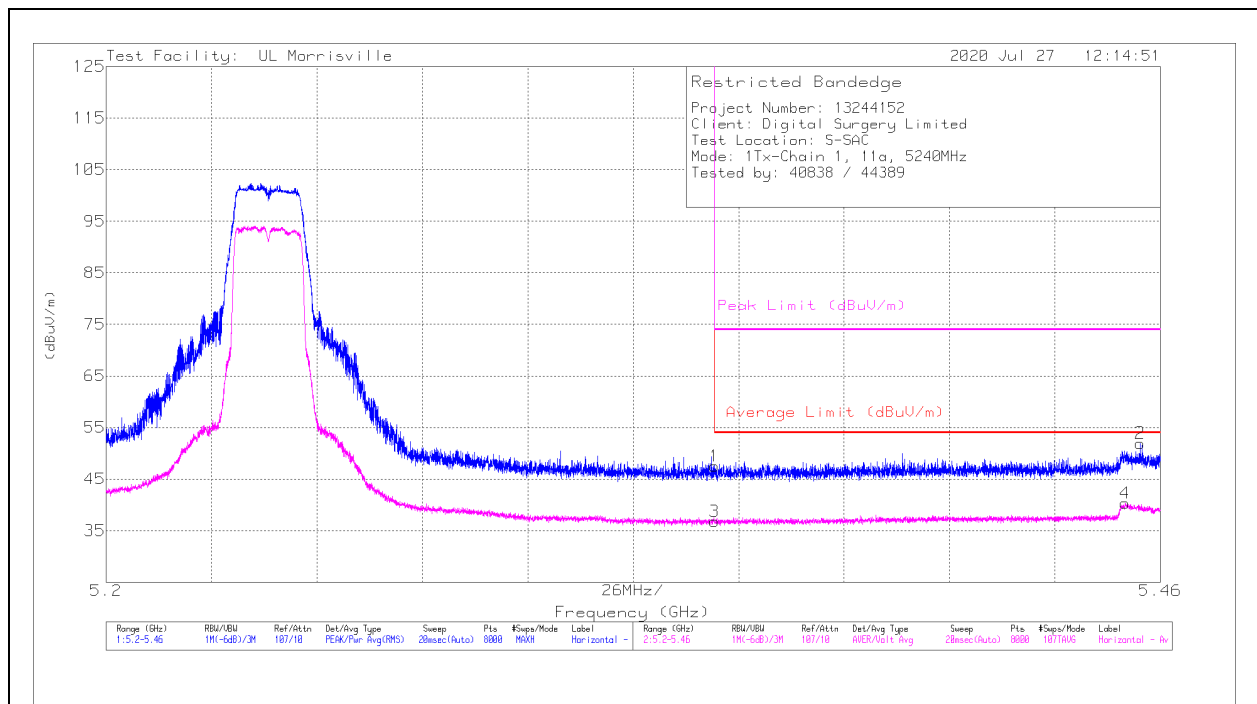
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

**BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/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	*** 5.35001	36.19	Pk	34.5	-23.2	0	47.49	-	-	74	-26.51	54	238	H
2	*** 5.45506	40.92	Pk	34.5	-23.5	0	51.92	-	-	74	-22.08	54	238	H
3	*** 5.35001	24.86	ADV	34.5	-23.2	.63	36.79	54	-17.21	-	-	54	238	H
4	*** 5.45129	28.58	ADV	34.5	-23.4	.63	40.31	54	-13.69	-	-	54	238	H

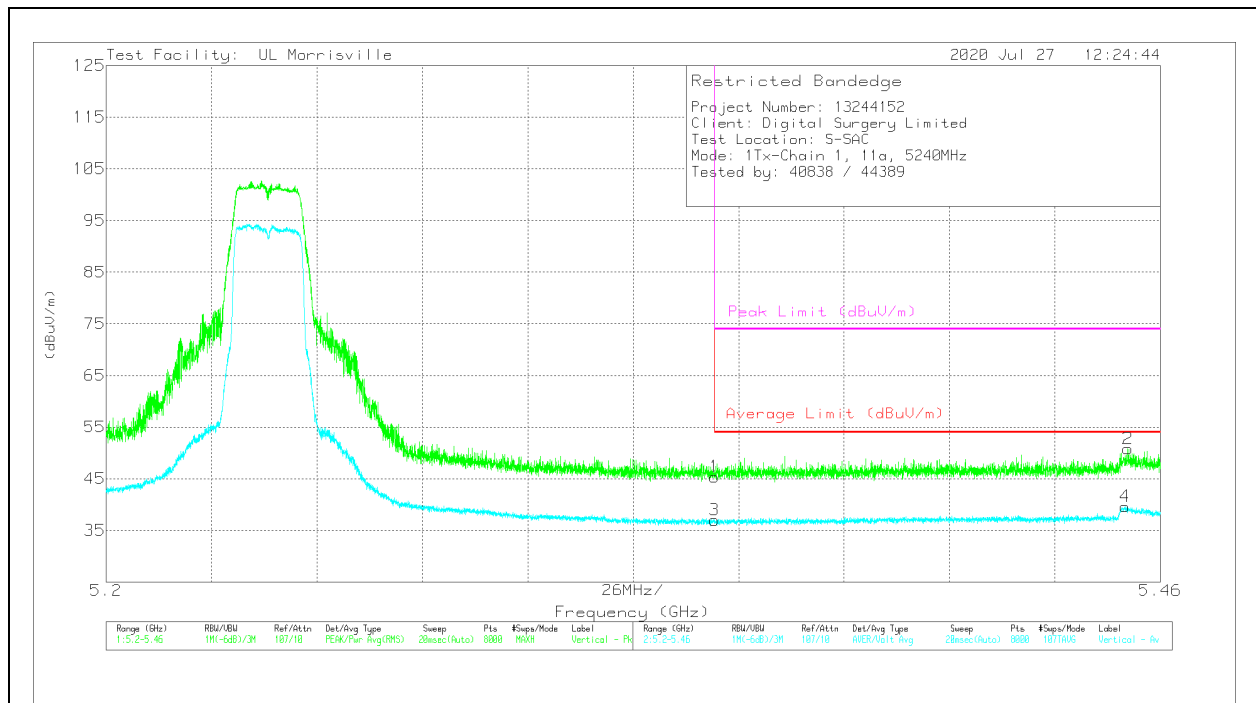
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT

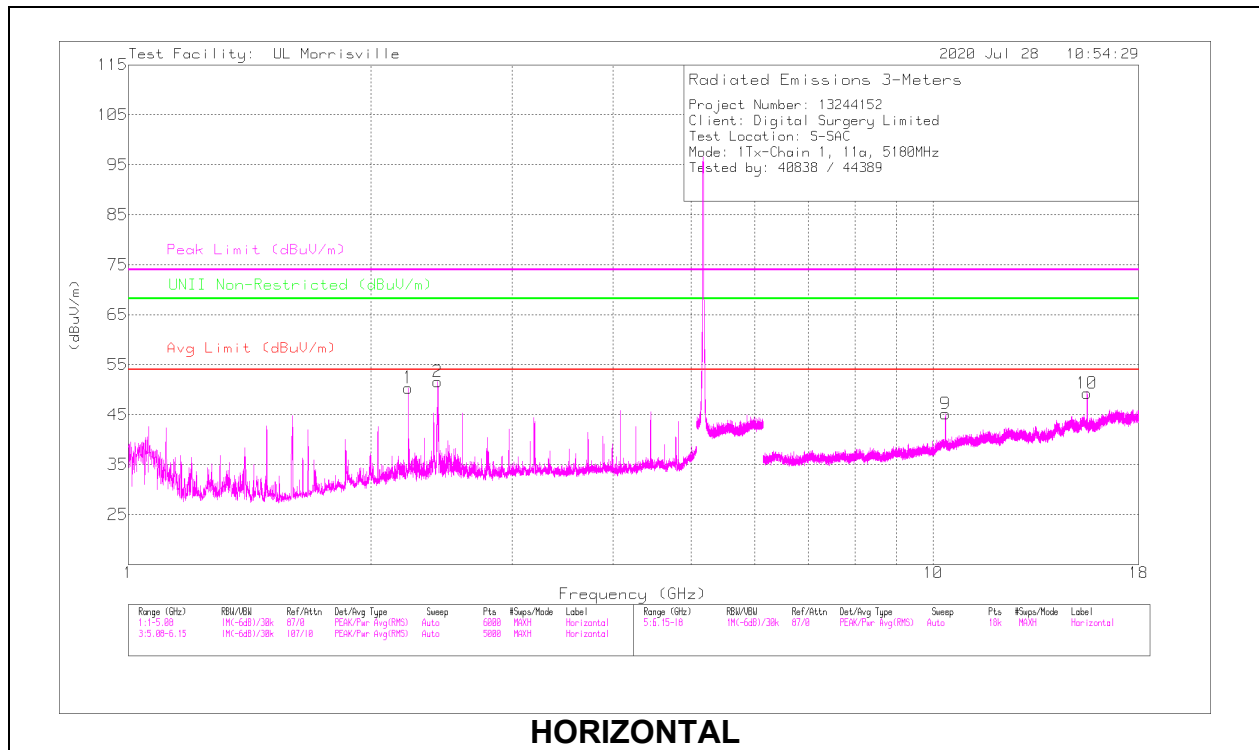


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 5.35001	34.04	Pk	34.5	-23.2	0	45.34	-	-	74	-28.66	142	297	V
2	* ** 5.452	39.68	Pk	34.5	-23.4	0	50.78	-	-	74	-23.22	142	297	V
3	* ** 5.35001	25.08	ADV	34.5	-23.2	.63	37.01	54	-16.99	-	-	142	297	V
4	* ** 5.45132	27.89	ADV	34.5	-23.4	.63	39.62	54	-14.38	-	-	142	297	V

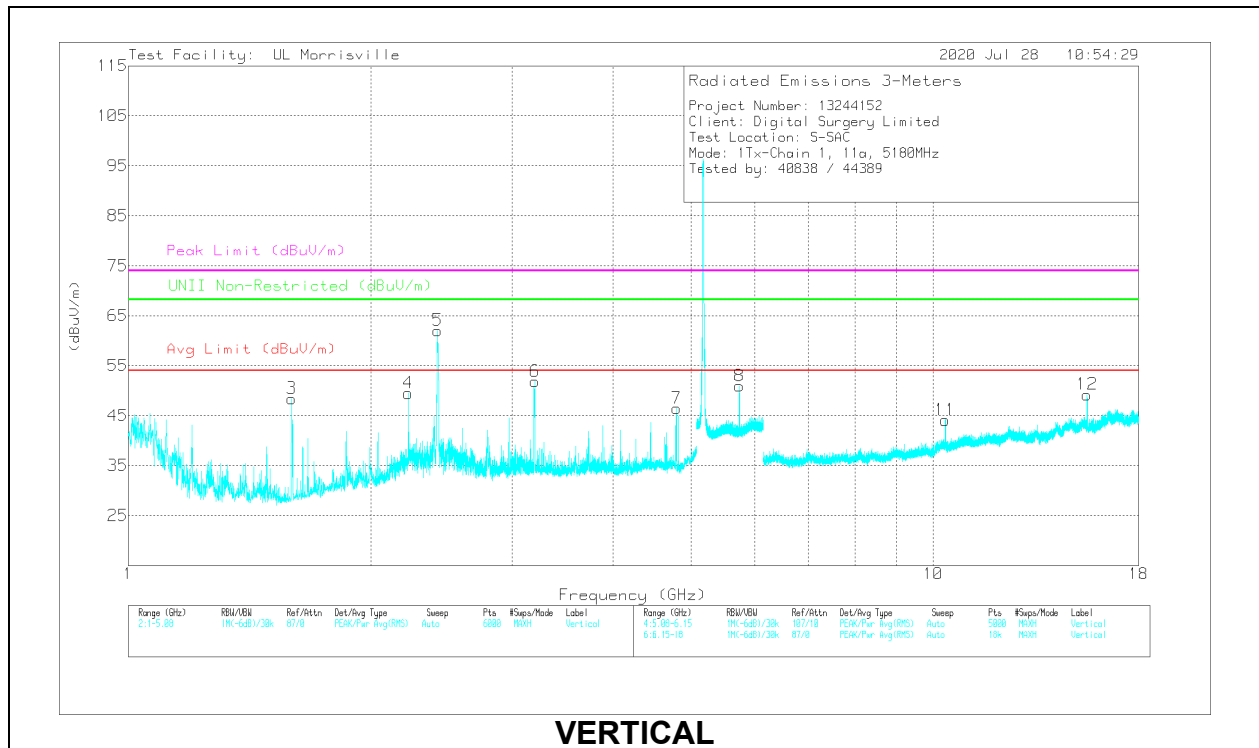
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 Pk - Peak detector  
 ADV - U-NII AD primary method, Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.22629	42.25	PK-U	32	-34	0	40.25	-	-	74	-33.75	-	-	200	334	H
	*** 2.22701	28.51	ADV	32	-33.9	.63	27.24	54	-26.76	-	-	-	-	200	334	H
3	*** 1.59295	44.31	PK-U	28.3	-34.6	0	38.01	-	-	74	-35.99	-	-	81	266	V
	*** 1.593	35.68	ADV	28.3	-34.6	.63	30.01	54	-23.99	-	-	-	-	81	266	V
4	*** 2.22793	41.85	PK-U	32	-33.9	0	39.95	-	-	74	-34.05	-	-	238	230	V
	*** 2.22763	28.47	ADV	32	-33.9	.63	27.2	54	-26.8	-	-	-	-	238	230	V
7	*** 4.79985	42.11	PK-U	34	-30.6	0	45.51	-	-	74	-28.49	-	-	266	269	V
	*** 4.79995	33.01	ADV	34	-30.6	.63	37.04	54	-16.96	-	-	-	-	266	269	V
10	*** 15.53406	43.83	PK-U	40.3	-25.1	0	59.03	-	-	74	-14.97	-	-	105	293	H
	*** 15.53413	28.19	ADV	40.3	-25.1	.63	44.02	54	-9.98	-	-	-	-	105	293	H
12	*** 15.53724	43.97	PK-U	40.3	-25.1	0	59.17	-	-	74	-14.83	-	-	103	241	V
	*** 15.53721	30.54	ADV	40.3	-25.1	.63	46.37	54	-7.63	-	-	-	-	103	241	V
5	2.42244	68.53	PK-U	32.3	-34.1	0	66.73	-	-	-	-	68.2	-1.47	196	306	V
2	2.42268	68.71	PK-U	32.3	-34.1	0	66.91	-	-	-	-	68.2	-1.29	207	321	H
6	3.19994	43.73	PK-U	33.2	-33.5	0	43.43	-	-	-	-	68.2	-24.77	292	144	V
8	5.74458	47.09	PK-U	34.6	-23.5	0	58.19	-	-	-	-	68.2	-10.01	93	351	V
11	10.35608	41.33	PK-U	37.6	-25.4	0	53.53	-	-	-	-	68.2	-14.67	151	329	V
9	10.35859	43.58	PK-U	37.6	-25.4	0	55.78	-	-	-	-	68.2	-12.42	191	398	H

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

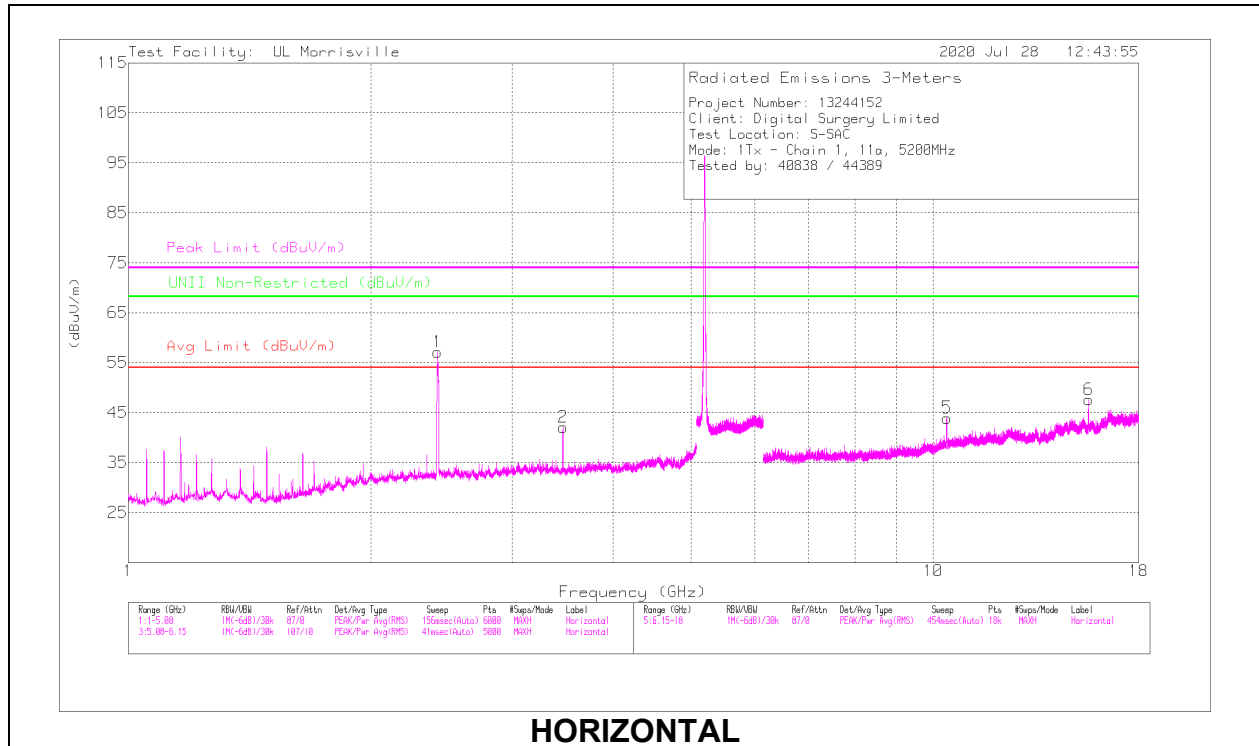
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK-U - U-NII: Maximum Peak

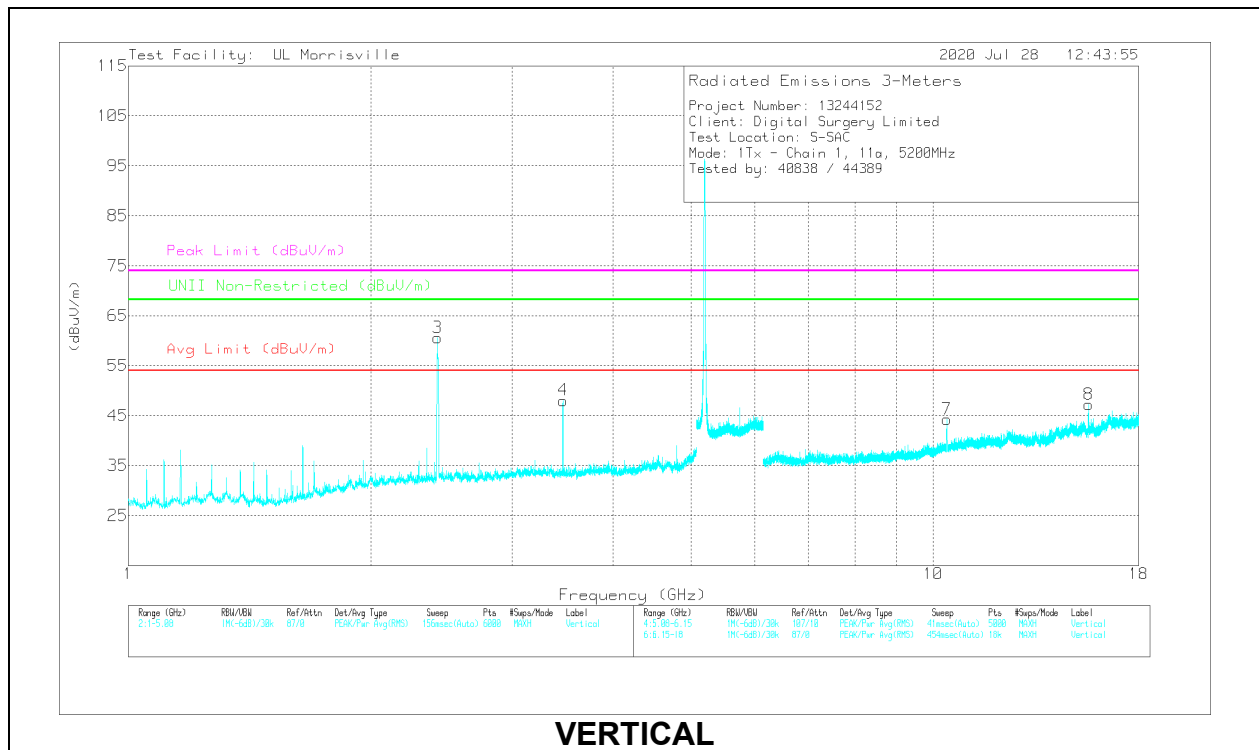
ADV - U-NII AD primary method, Linear Voltage Average



### MID CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	*** 15.60295	42.07	PK-U	40.2	-25	0	57.27	-	-	74	-16.73	-	-	182	259	H
	** 15.60346	26.19	ADV	40.2	-25	.63	42.02	54	-11.98	-	-	-	-	182	259	H
8	*** 15.60316	43.21	PK-U	40.2	-25	0	58.41	-	-	74	-15.59	-	-	99	255	V
	** 15.6024	27.02	ADV	40.2	-25	.63	42.85	54	-11.15	-	-	-	-	99	255	V
3	2.42395	67.55	PK-U	32.3	-34.1	0	65.75	-	-	-	-	68.2	-2.45	293	205	V
1	2.42423	64.62	PK-U	32.3	-34.1	0	62.82	-	-	-	-	68.2	-5.38	203	224	H
2	3.46659	49.87	PK-U	32.8	-33	0	49.67	-	-	-	-	68.2	-18.53	351	350	H
4	3.46665	52.72	PK-U	32.8	-33	0	52.52	-	-	-	-	68.2	-15.68	350	340	V
7	10.39851	44.87	PK-U	37.6	-25.6	0	56.87	-	-	-	-	68.2	-11.33	152	342	V
5	10.40143	42.58	PK-U	37.6	-25.6	0	54.58	-	-	-	-	68.2	-13.62	191	380	H

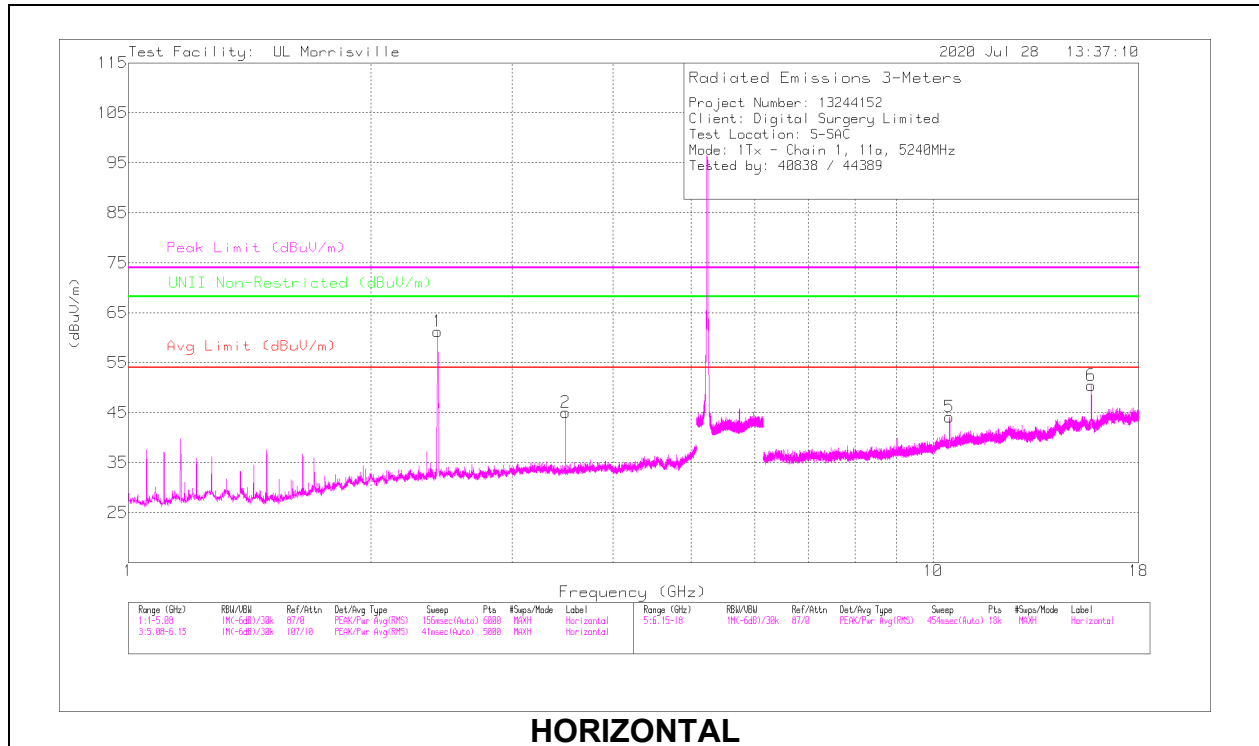
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

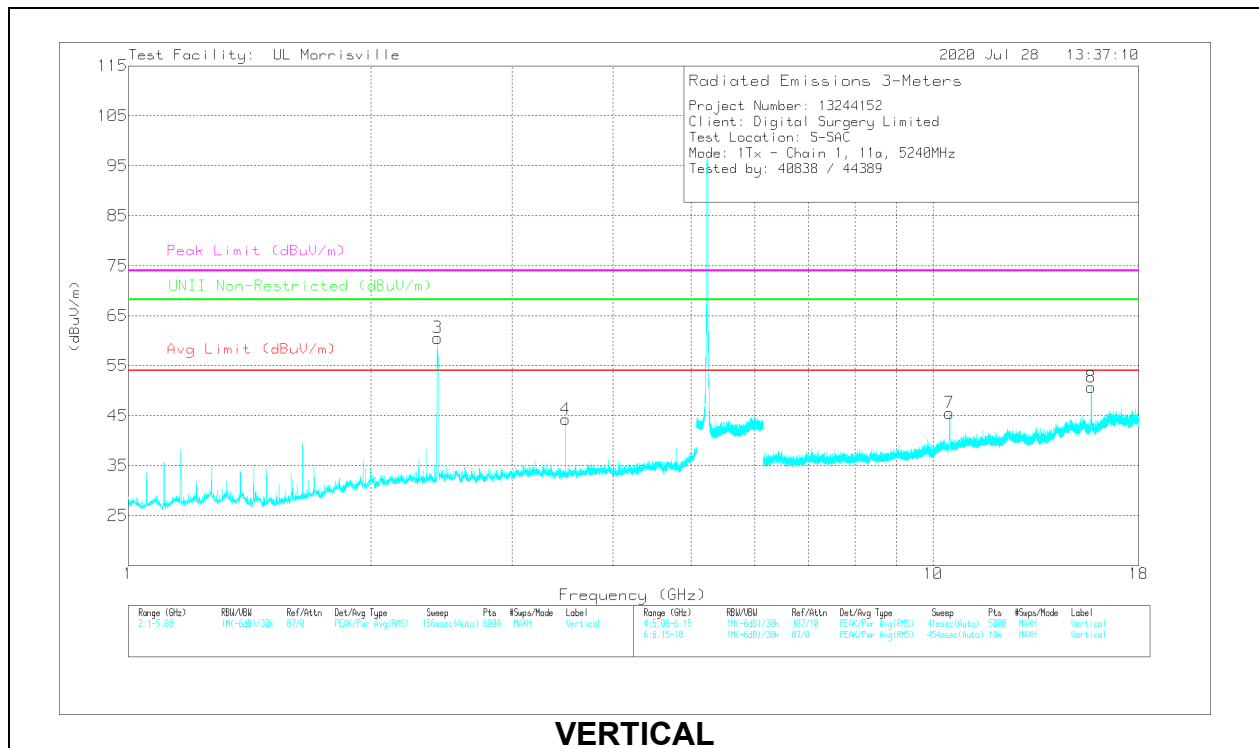
PK-U - U-NII: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

### HIGH CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	*** 15.72299	44.08	PK-U	40.2	-23.9	0	60.38	-	-	74	-13.62	-	-	262	342	H
	** 15.72291	28.19	ADV	40.2	-23.9	.63	45.12	54	-8.88	-	-	-	-	262	342	H
8	*** 15.71402	38.32	PK-U	40.2	-23.9	0	54.62	-	-	74	-19.38	-	-	0	295	V
	** 15.71397	23.56	ADV	40.2	-23.9	.63	40.49	54	-13.51	-	-	-	-	0	295	V
3	2.42197	67.3	PK-U	32.3	-34.1	0	65.5	-	-	-	-	68.2	-2.7	4	259	V
1	2.42258	68.03	PK-U	32.3	-34.1	0	66.23	-	-	-	-	68.2	-1.97	207	329	H
2	3.49325	50.09	PK-U	32.8	-33.2	0	49.69	-	-	-	-	68.2	-18.51	289	302	H
4	3.49333	54.09	PK-U	32.8	-33.2	0	53.69	-	-	-	-	68.2	-14.51	355	328	V
5	10.4784	43.25	PK-U	37.7	-25.5	0	55.45	-	-	-	-	68.2	-12.75	192	361	H
7	10.47879	43.82	PK-U	37.7	-25.5	0	56.02	-	-	-	-	68.2	-12.18	153	347	V

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK-U - U-NII: Maximum Peak

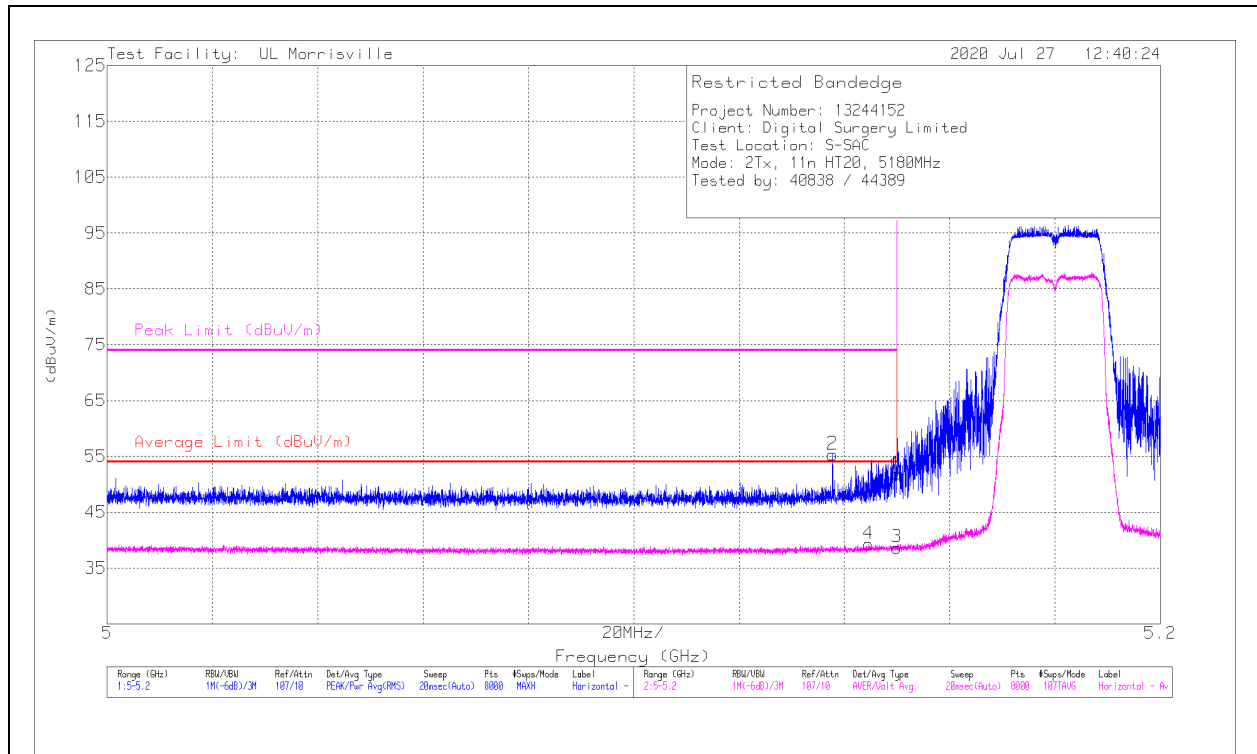
ADV - U-NII AD primary method, Linear Voltage Average

### 10.1.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

#### 2TX MIMO MODE

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/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	*** 5.14999	40.09	Pk	34.2	-22.4	0	51.89	-	-	74	-22.11	51	345	H
2	*** 5.13774	43.74	Pk	34.1	-22.5	0	55.34	-	-	74	-18.66	51	345	H
3	*** 5.14999	26.23	ADV	34.2	-22.4	.66	38.69	54	-15.31	-	-	51	345	H
4	*** 5.14457	27.04	ADV	34.1	-22.5	.66	39.3	54	-14.7	-	-	51	345	H

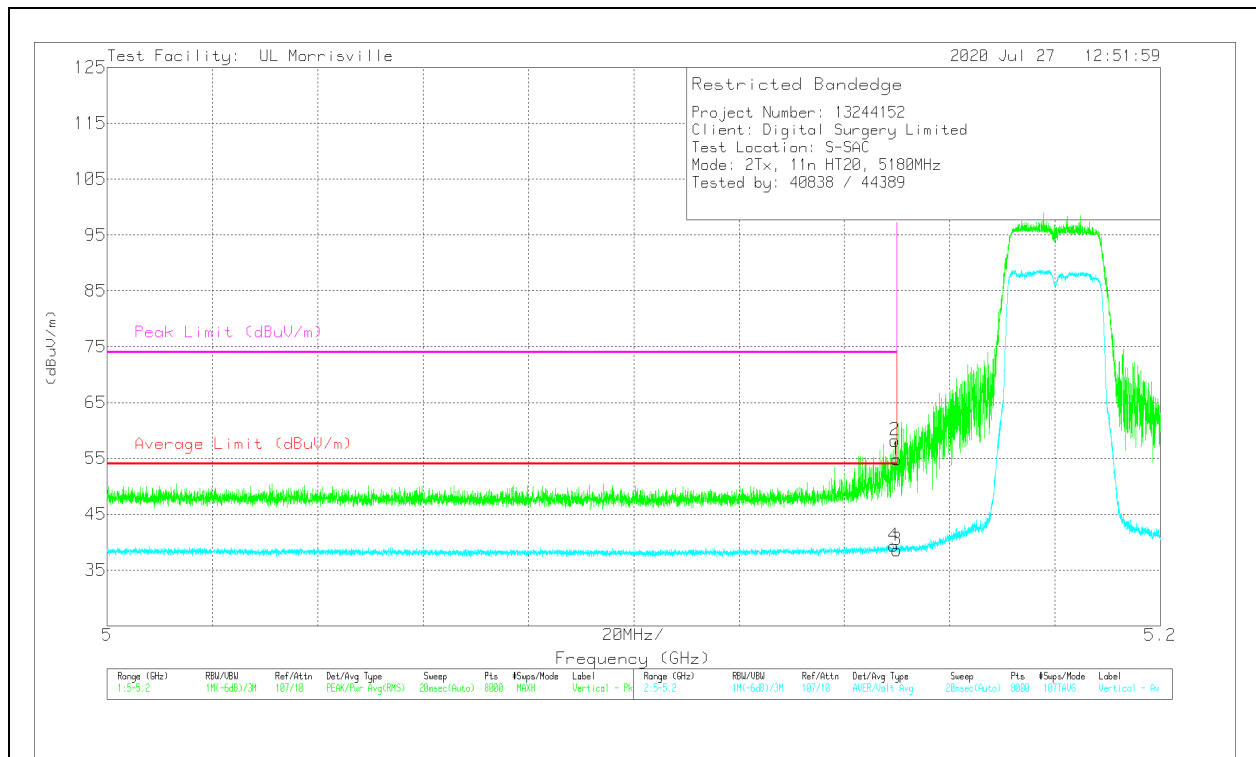
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	*** 5.14999	43.02	Pk	34.2	-22.4	0	54.82	-	-	74	-19.18	126	265	V
2	*** 5.14959	46.4	Pk	34.2	-22.4	0	58.2	-	-	74	-15.8	126	265	V
3	*** 5.14999	26.13	ADV	34.2	-22.4	.66	38.59	54	-15.41	-	-	126	265	V
4	*** 5.14932	26.9	ADV	34.2	-22.4	.66	39.36	54	-14.64	-	-	126	265	V

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

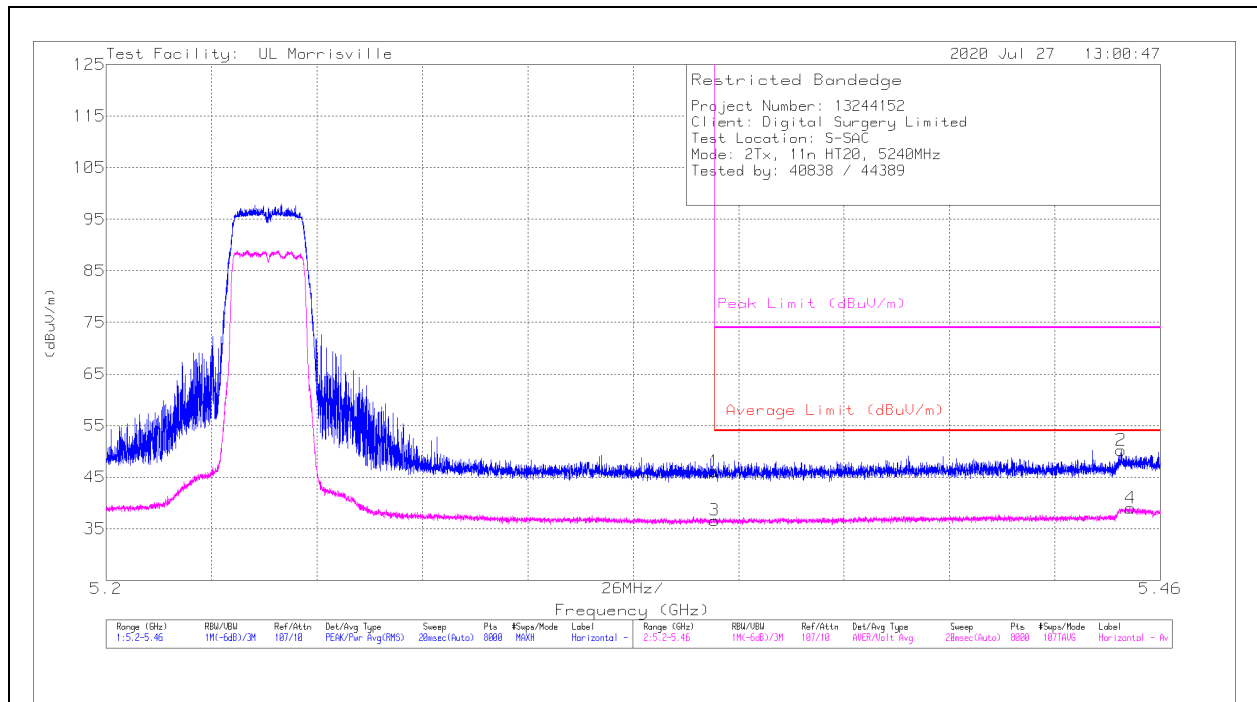
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

**BANDEDGE (HIGH CHANNEL)**

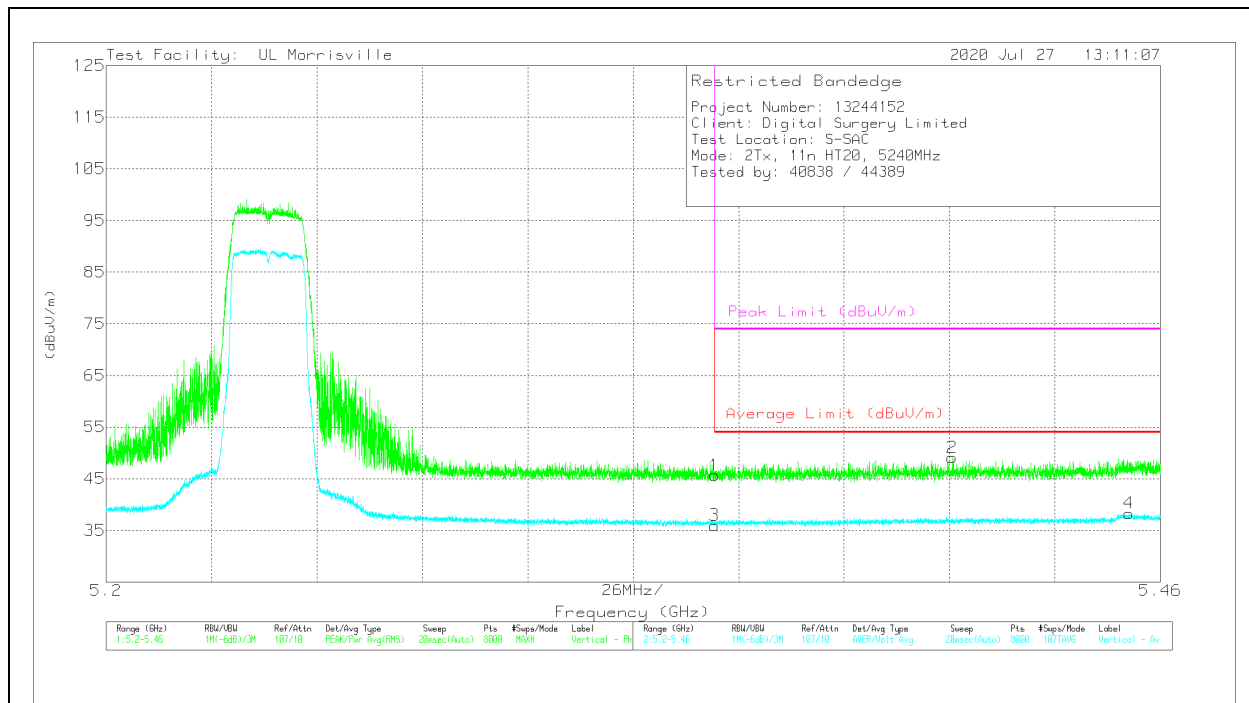
**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fitr/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	*** 5.35001	34.83	Pk	34.5	-23.2	0	46.13	-	-	74	-27.87	65	321	H
2	*** 5.45031	39.11	Pk	34.5	-23.4	0	50.21	-	-	74	-23.79	65	321	H
3	*** 5.35001	24.65	ADV	34.5	-23.2	.66	36.61	54	-17.39	-	-	65	320	H
4	*** 5.45262	27.24	ADV	34.5	-23.4	.66	39	54	-15	-	-	65	320	H

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 Pk - Peak detector  
 ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT



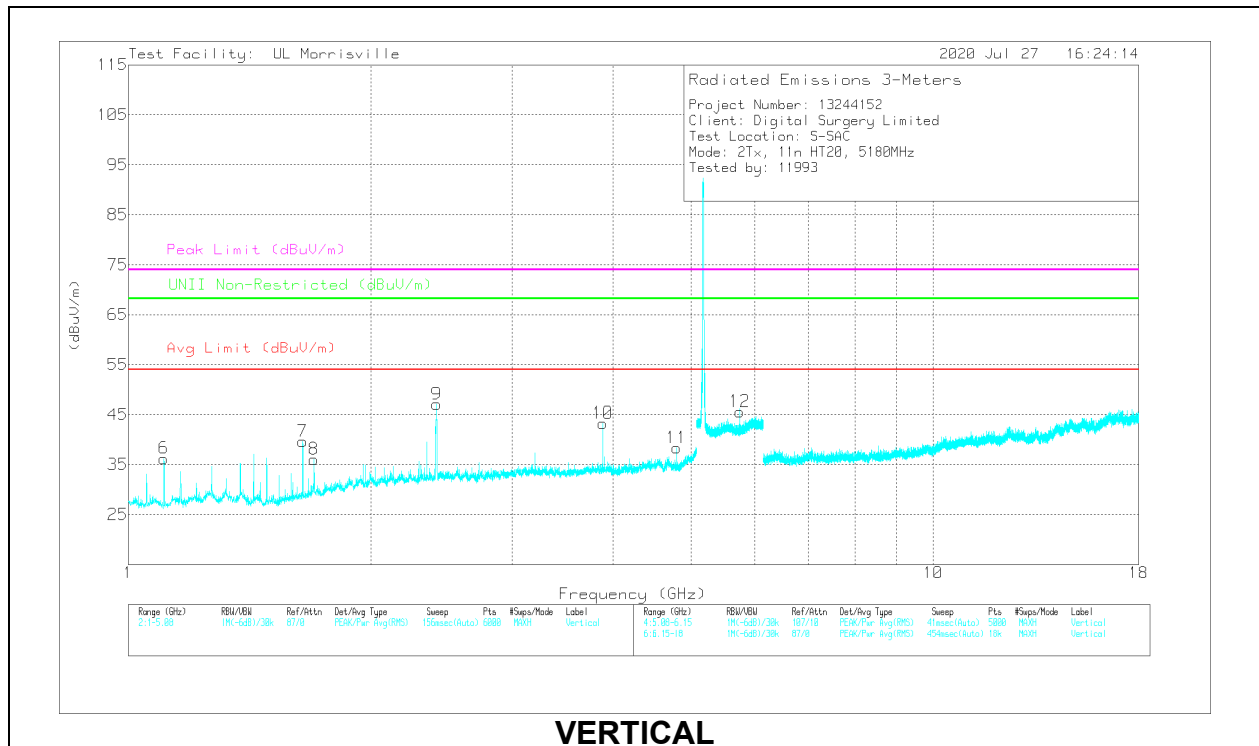
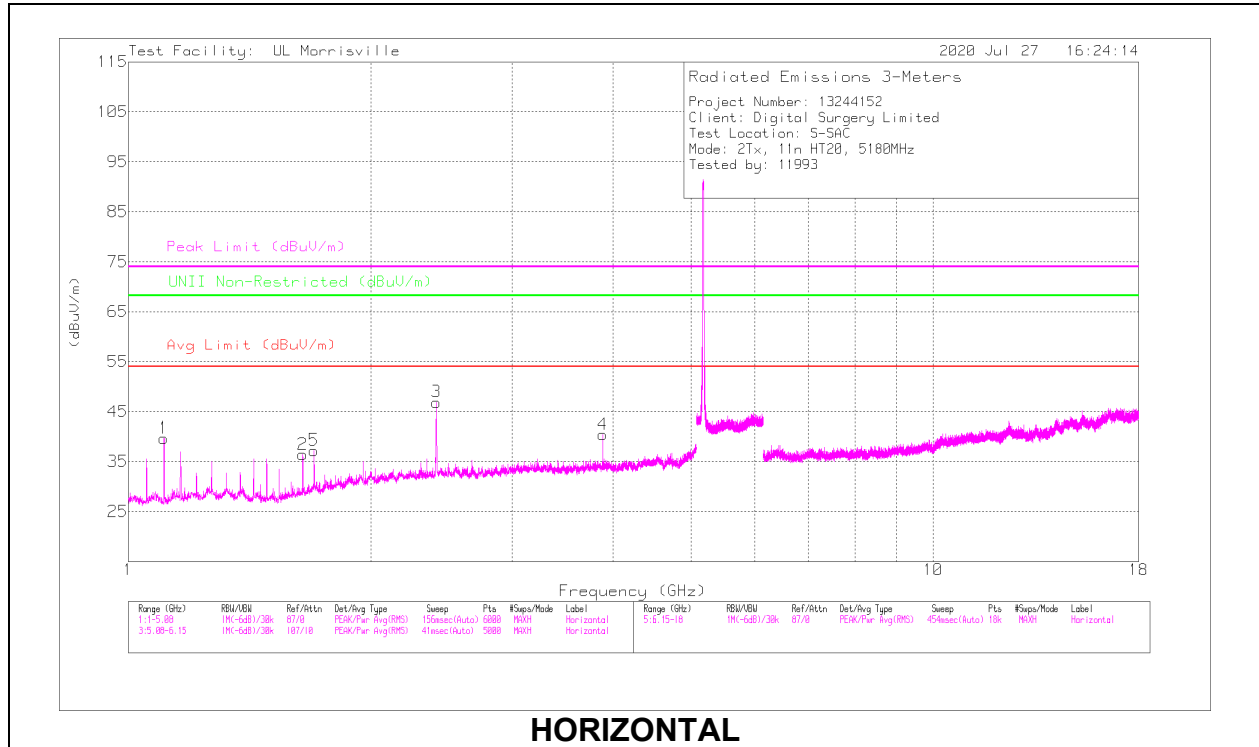
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 5.35001	34.37	Pk	34.5	-23.2	0	45.67	-	-	74	-28.33	134	397	V
2	*** 5.40864	37.9	Pk	34.5	-23.3	0	49.1	-	-	74	-24.9	134	397	V
3	*** 5.35001	24.01	ADV	34.5	-23.2	.66	35.97	54	-18.03	-	-	134	397	V
4	*** 5.45223	26.55	ADV	34.5	-23.4	.66	38.31	54	-15.69	-	-	134	397	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 Pk - Peak detector  
 ADV - U-NII AD primary method, Linear Voltage Average



# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL RESULTS



**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.10697	52.12	PK-U	27.7	-35.2	0	44.62	-	-	74	-29.38	-	-	202	181	H
	*** 1.10701	48.85	ADV	27.7	-35.2	.66	42.01	54	-11.99	-	-	-	-	202	181	H
4	*** 3.88482	46.25	PK-U	33.4	-32.5	0	47.15	-	-	74	-26.85	-	-	157	256	H
	*** 3.88498	36.39	ADV	33.4	-32.5	.66	37.95	54	-16.05	-	-	-	-	157	256	H
5	*** 1.70086	46.35	PK-U	29.5	-34.5	0	41.35	-	-	74	-32.65	-	-	188	204	H
	*** 1.70098	40.22	ADV	29.5	-34.5	.66	35.88	54	-18.12	-	-	-	-	188	204	H
6	*** 1.10695	50.25	PK-U	27.7	-35.2	0	42.75	-	-	74	-31.25	-	-	261	231	V
	*** 1.10699	47	ADV	27.7	-35.2	.66	40.16	54	-13.84	-	-	-	-	261	231	V
8	*** 1.70082	47.46	PK-U	29.5	-34.5	0	42.46	-	-	74	-31.54	-	-	93	356	V
	*** 1.70097	41.96	ADV	29.5	-34.5	.66	37.62	54	-16.38	-	-	-	-	93	356	V
10	*** 3.88507	46.02	PK-U	33.4	-32.5	0	46.92	-	-	74	-27.08	-	-	360	322	V
	*** 3.88497	35.48	ADV	33.4	-32.5	.66	37.04	54	-16.96	-	-	-	-	360	322	V
11	*** 4.80026	41.93	PK-U	34	-30.7	0	45.23	-	-	74	-28.77	-	-	241	321	V
	*** 4.79993	32.74	ADV	34	-30.6	.66	36.8	54	-17.2	-	-	-	-	241	321	V
2	1.64685	47.56	PK-U	28.7	-34.4	0	41.86	-	-	-	-	68.2	-26.34	281	107	H
7	1.64705	49.57	PK-U	28.7	-34.4	0	43.87	-	-	-	-	68.2	-24.33	96	272	V
3	2.41521	55.41	PK-U	32.2	-34.1	0	53.51	-	-	-	-	68.2	-14.69	343	397	H
9	2.41516	60.56	PK-U	32.2	-34.1	0	58.66	-	-	-	-	68.2	-9.54	143	199	V
12	5.74951	43.39	PK-U	34.6	-23.5	0	54.49	-	-	-	-	68.2	-13.71	176	183	V

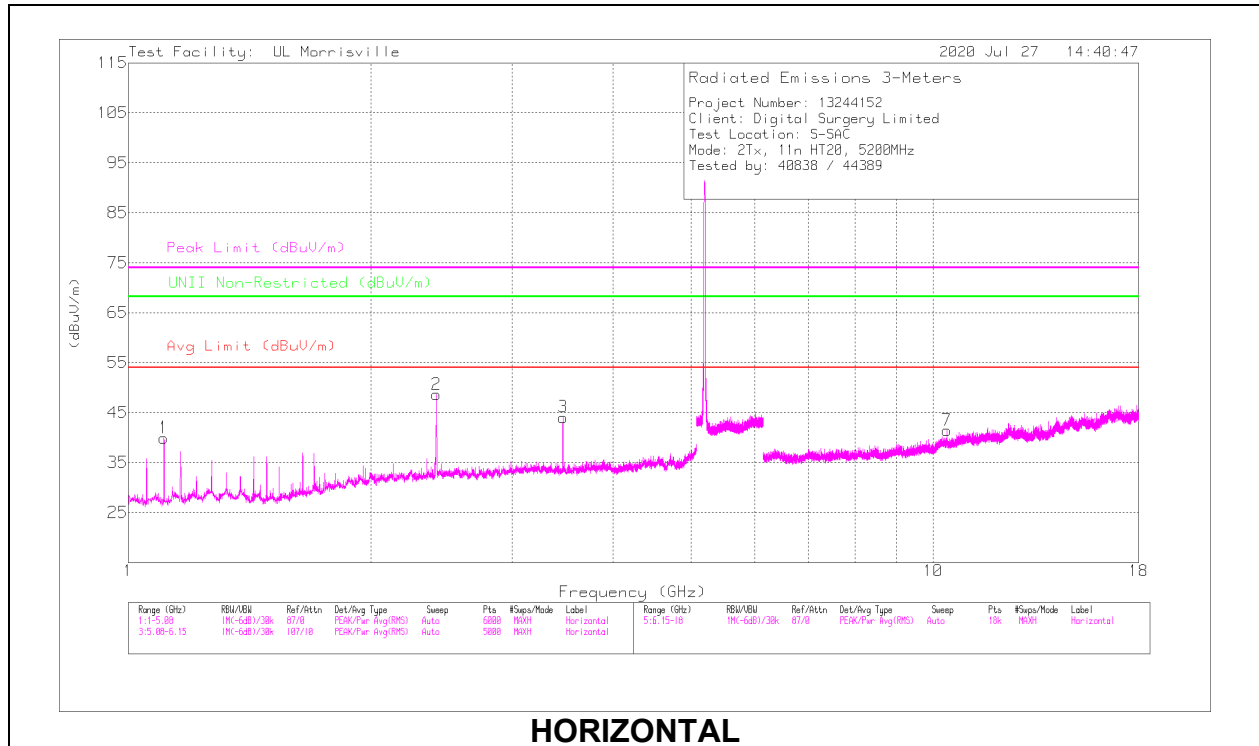
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

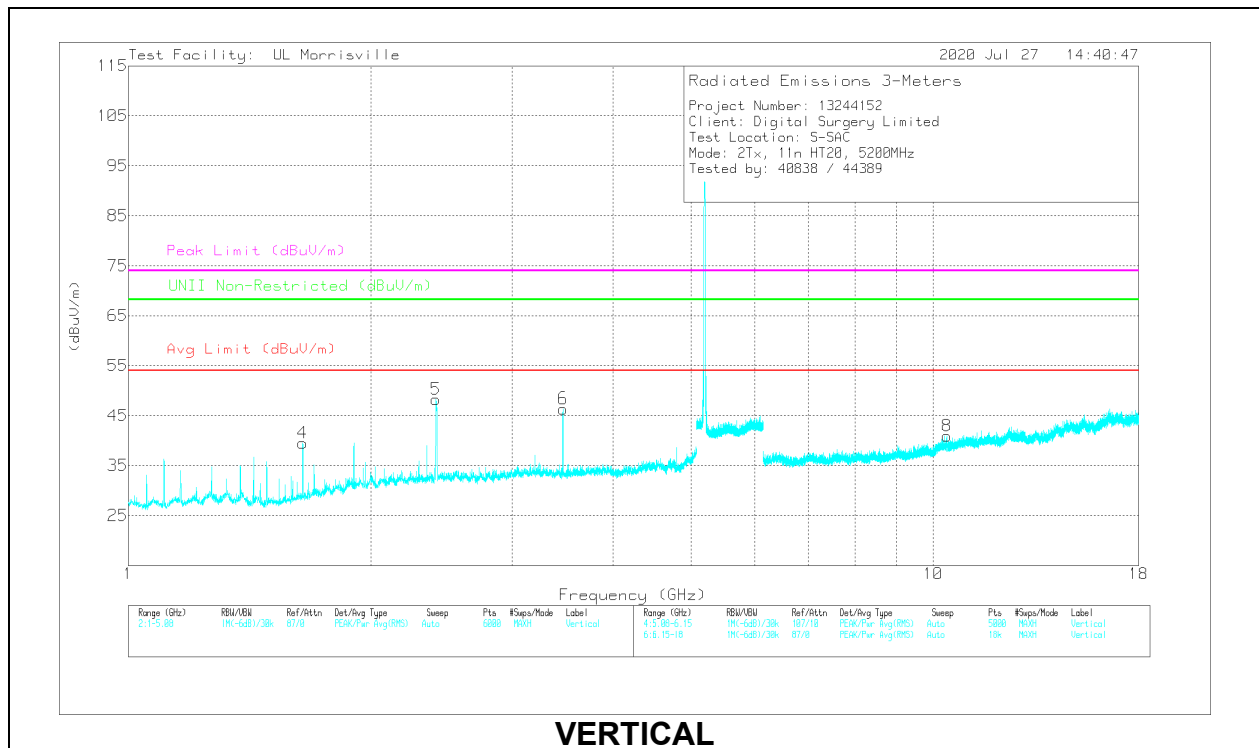
PK-U - U-NII: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

### MID CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.10695	52.35	PK-U	27.7	-35.2	0	44.85	-	-	74	-29.15	-	-	194	182	H
	* ** 1.10698	49.14	ADV	27.7	-35.2	.66	42.3	54	-11.7	-	-	-	-	194	182	H
4	1.64697	48.58	PK-U	28.7	-34.4	0	42.88	-	-	-	-	68.2	-25.32	78	373	V
5	2.41042	64.14	PK-U	32.2	-34.1	0	62.24	-	-	-	-	68.2	-5.96	354	113	V
2	2.41457	62.81	PK-U	32.2	-34.1	0	60.91	-	-	-	-	68.2	-7.29	227	381	H
6	3.46664	51.01	PK-U	32.8	-33	0	50.81	-	-	-	-	68.2	-17.39	85	108	V
3	3.46667	49.69	PK-U	32.8	-33	0	49.49	-	-	-	-	68.2	-18.71	42	381	H
8	10.40087	37.3	PK-U	37.6	-25.6	0	49.3	-	-	-	-	68.2	-18.9	161	318	V
7	10.40158	36.68	PK-U	37.6	-25.6	0	48.68	-	-	-	-	68.2	-19.52	123	101	H

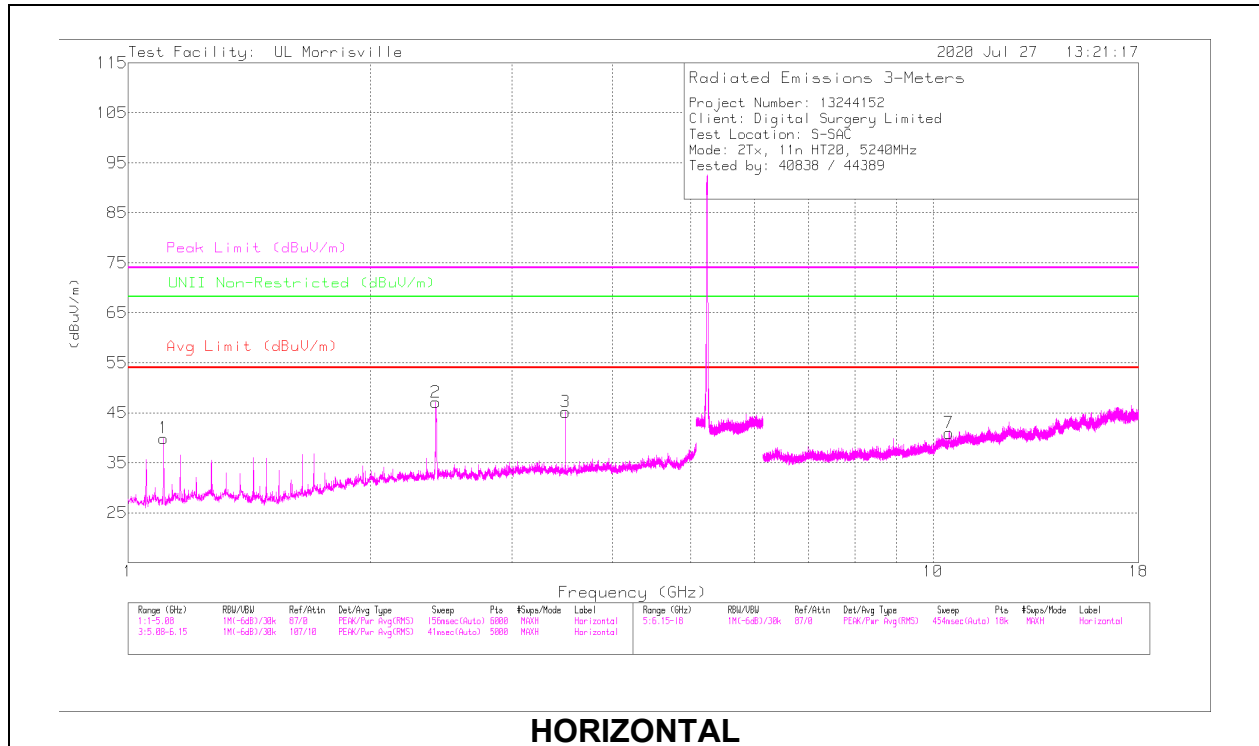
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

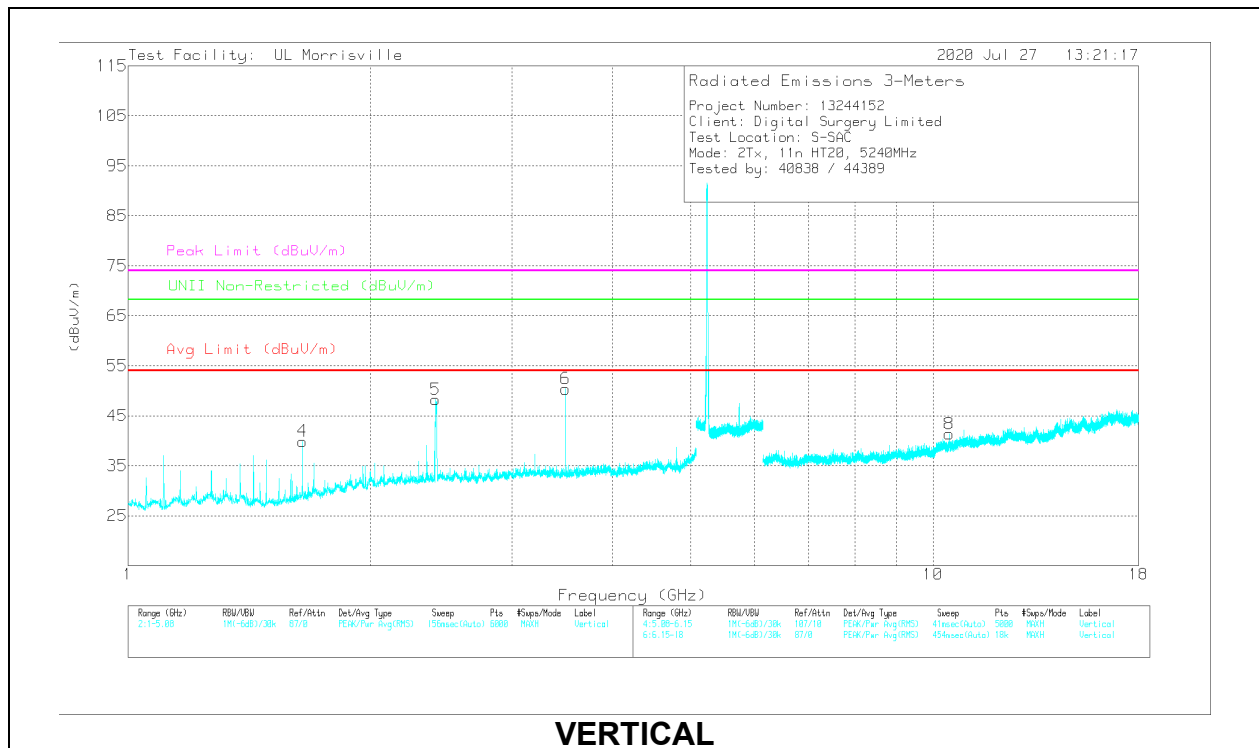
PK-U - U-NII: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

### HIGH CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (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)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.10702	52.17	PK-U	27.7	-35.2	0	44.67	-	-	74	-29.33	-	-	195	183	H
	* ** 1.10698	49.14	ADV	27.7	-35.2	.66	42.3	54	-11.7	-	-	-	-	195	183	H
4	1.64699	49.38	PK-U	28.7	-34.4	0	43.68	-	-	-	-	68.2	-24.52	87	269	V
2	2.40961	66.39	PK-U	32.2	-34.1	0	64.49	-	-	-	-	68.2	-3.71	327	248	H
5	2.41018	69.45	PK-U	32.2	-34.1	0	67.55	-	-	-	-	68.2	-6.5	70	181	V
6	3.4933	52.36	PK-U	32.8	-33.2	0	51.96	-	-	-	-	68.2	-16.24	85	106	V
3	3.49331	50.64	PK-U	32.8	-33.2	0	50.24	-	-	-	-	68.2	-17.96	14	273	H
7	10.46947	34.95	PK-U	37.7	-25.5	0	47.15	-	-	-	-	68.2	-21.05	267	166	H
8	10.47563	37.63	PK-U	37.7	-25.5	0	49.83	-	-	-	-	68.2	-18.37	89	194	V

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK-U - U-NII: Maximum Peak

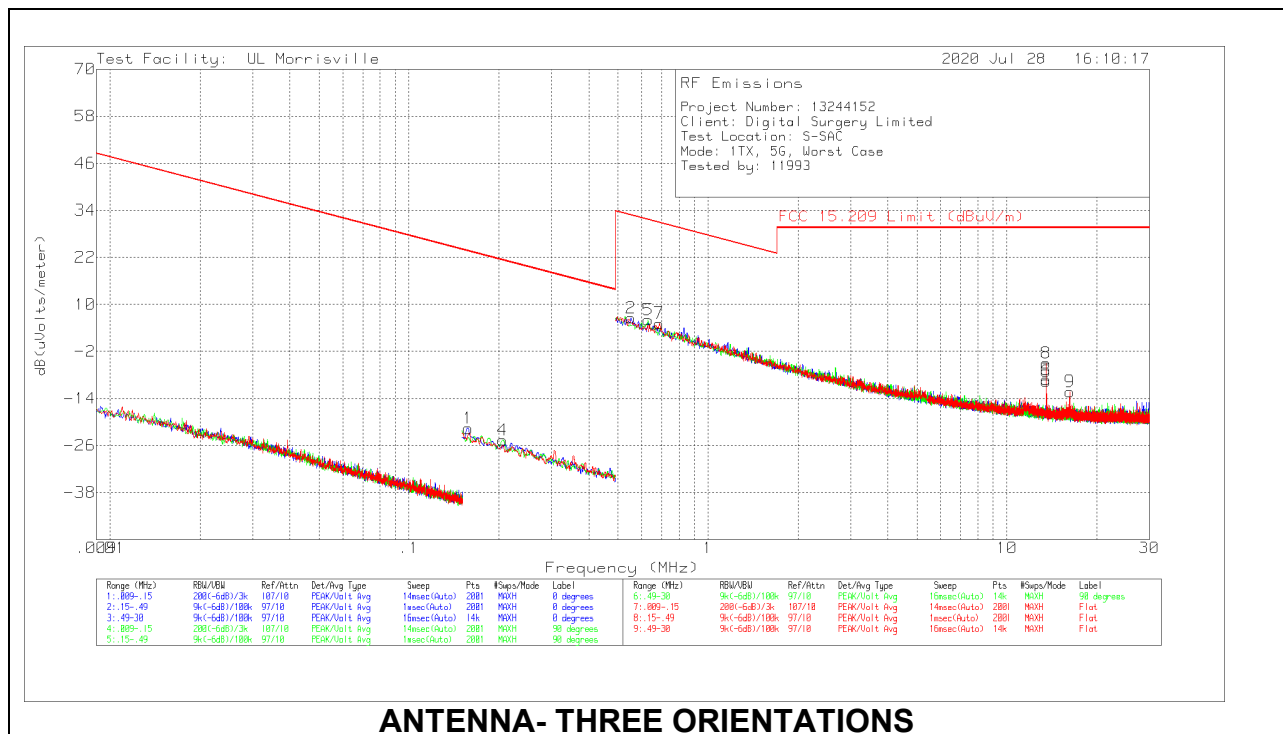
ADV - U-NII AD primary method, Linear Voltage Average

## 10.2. 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  $40 \cdot \log$  (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  $377\Omega$ . For example, the measurement frequency 157.65 kHz resulted in a level of -21.65 dBuV/m, which is equivalent to  $-21.65 - 51.5 = -73.15$  dBuA/m, which has the same margin, -45.3 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)



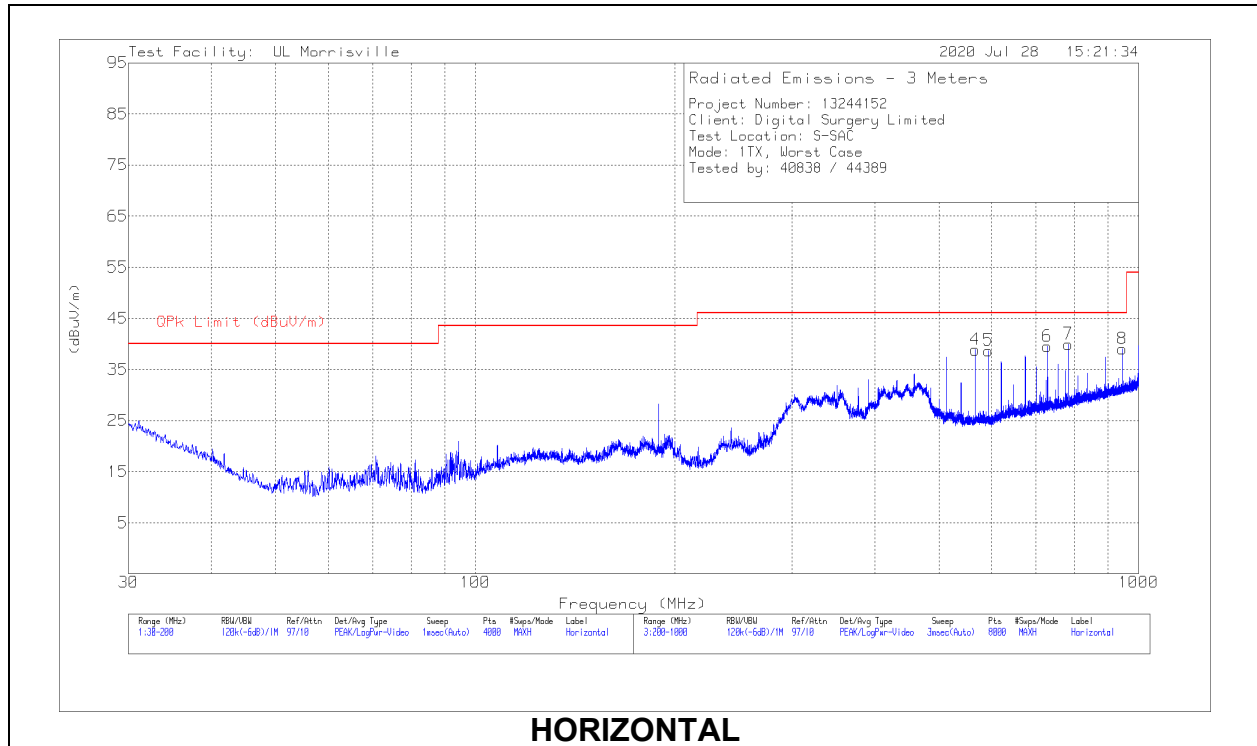
**Below 30MHz Data**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (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)
1	.15765	47.25	Pk	11	.1	-80	-21.65	23.65	43.65	-45.3	0-360
4	.20551	44.23	Pk	11	.1	-80	-24.67	21.35	41.35	-46.02	0-360
2	.55324	35.41	Pk	11	.1	-40	6.51	32.75	-	-26.24	0-360
5	.63124	34.84	Pk	11	.2	-40	6.04	31.6	-	-25.56	0-360
7	.68815	33.95	Pk	11	.2	-40	5.15	30.85	-	-25.7	0-360
3	13.5596	20.17	Pk	10	.7	-40	-9.13	29.54	-	-38.67	0-360
8	13.5596	24.36	Pk	10	.7	-40	-4.94	29.54	-	-34.48	0-360
6	13.56171	19.65	Pk	10	.7	-40	-9.65	29.54	-	-39.19	0-360
9	16.23044	17.22	Pk	9.7	.8	-40	-12.28	29.54	-	-41.82	0-360

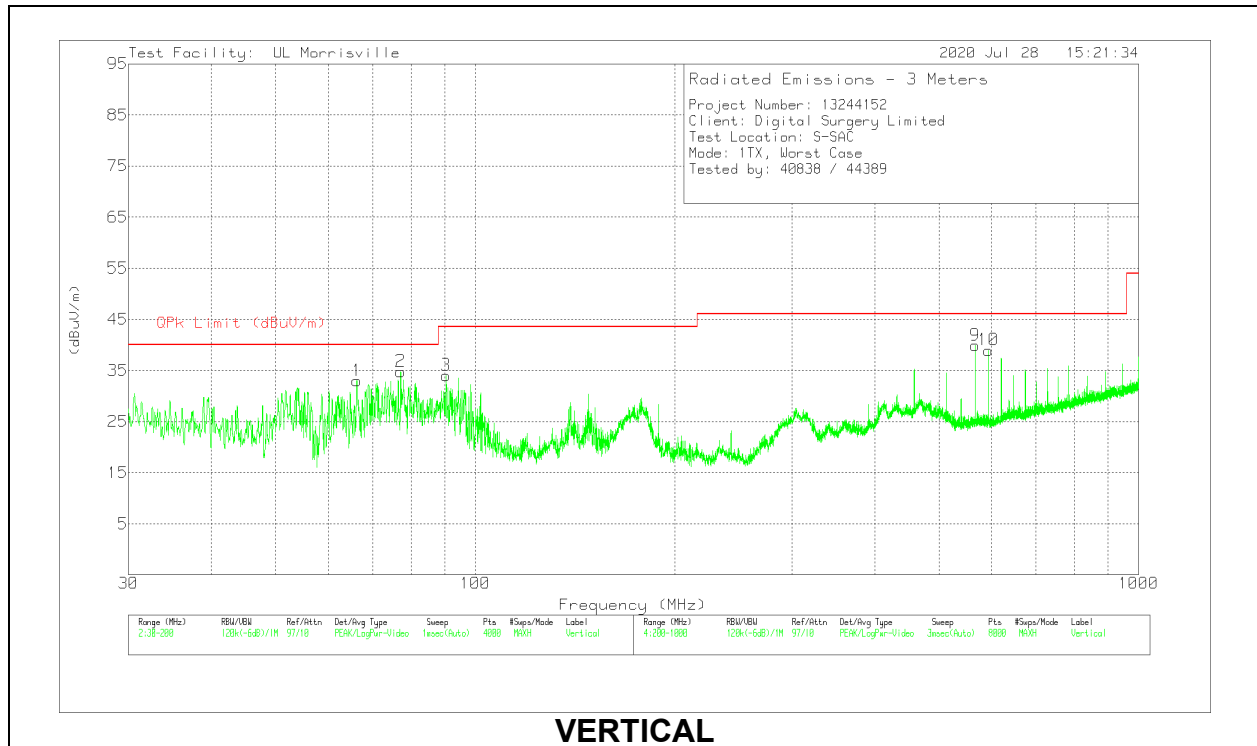
Pk - Peak detector



### 10.3. WORST CASE BELOW 1 GHZ



**HORIZONTAL**



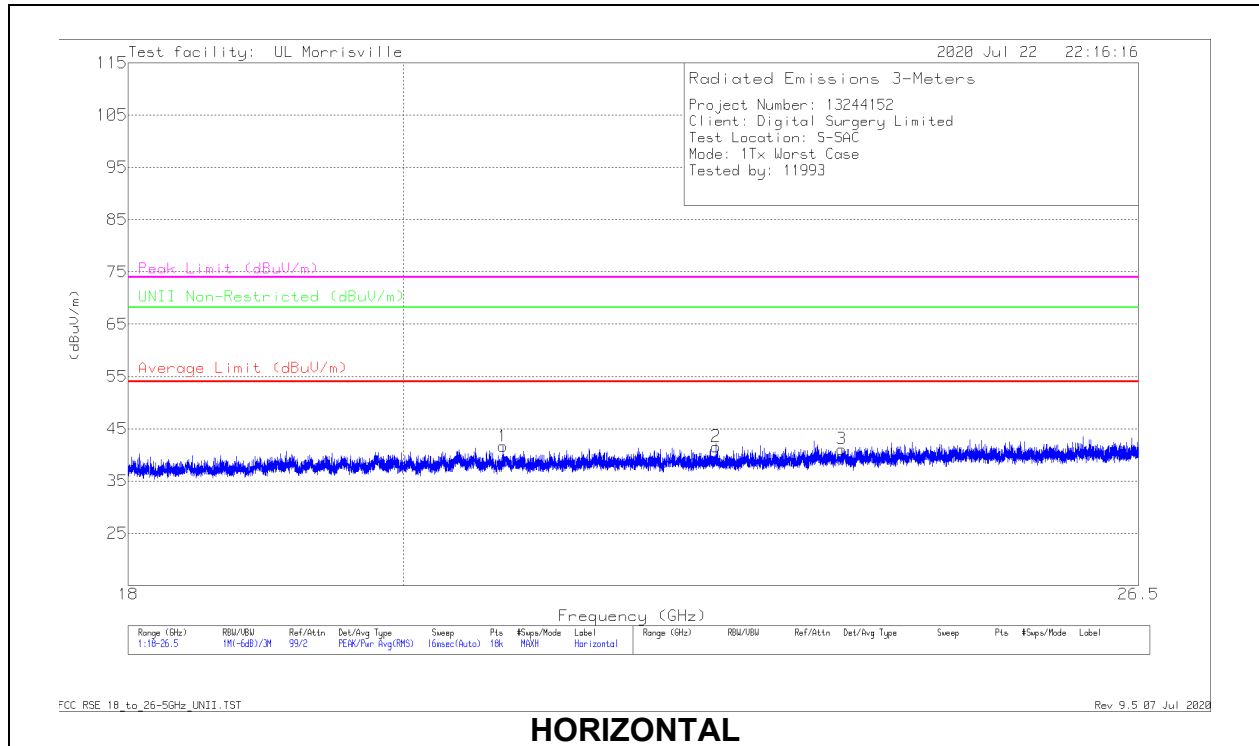
**VERTICAL**

**Below 1GHz DATA**

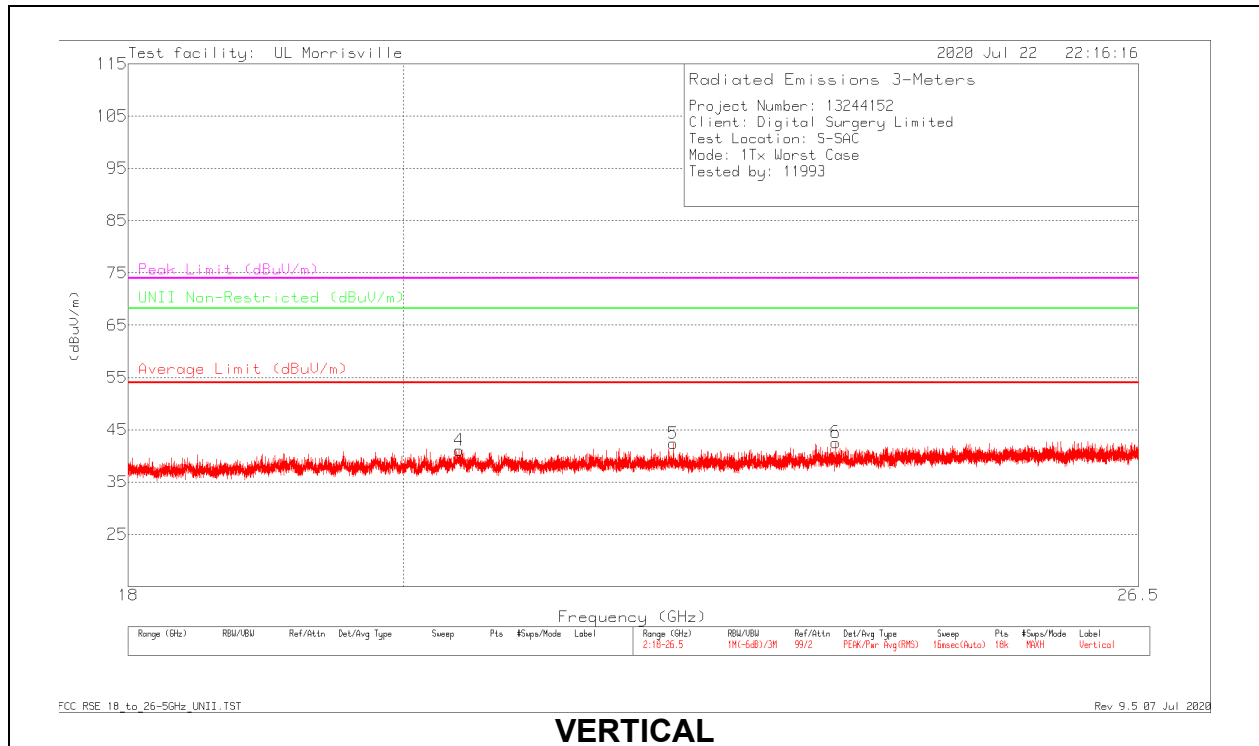
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0081 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	66.3044	49.68	Pk	14.3	-31	32.98	40	-7.02	0-360	101	V
2	77.2032	50.47	Qp	14.1	-30.9	33.67	40	-6.33	242	114	V
3	90.3656	50.74	Pk	14	-30.7	34.04	43.52	-9.48	0-360	101	V
9	566.9477	42.77	Pk	24.6	-27.5	39.87	46.02	-6.15	0-360	101	V
4	567.0477	41.76	Pk	24.6	-27.5	38.86	46.02	-7.16	0-360	200	H
10	593.9512	42.17	Pk	24.3	-27.5	38.97	46.02	-7.05	0-360	101	V
5	594.0512	41.91	Pk	24.3	-27.5	38.71	46.02	-7.31	0-360	200	H
6	728.9688	39.84	Pk	26.7	-27	39.54	46.02	-6.48	0-360	101	H
7	782.9758	39.35	Pk	27.3	-26.7	39.95	46.02	-6.07	0-360	101	H
8	944.9968	35.21	Pk	28.8	-25	39.01	46.02	-7.01	0-360	101	H

PK – Peak

### 10.4. WORST CASE 18-26 GHZ



**HORIZONTAL**



**VERTICAL**

**18 – 26GHz DATA**

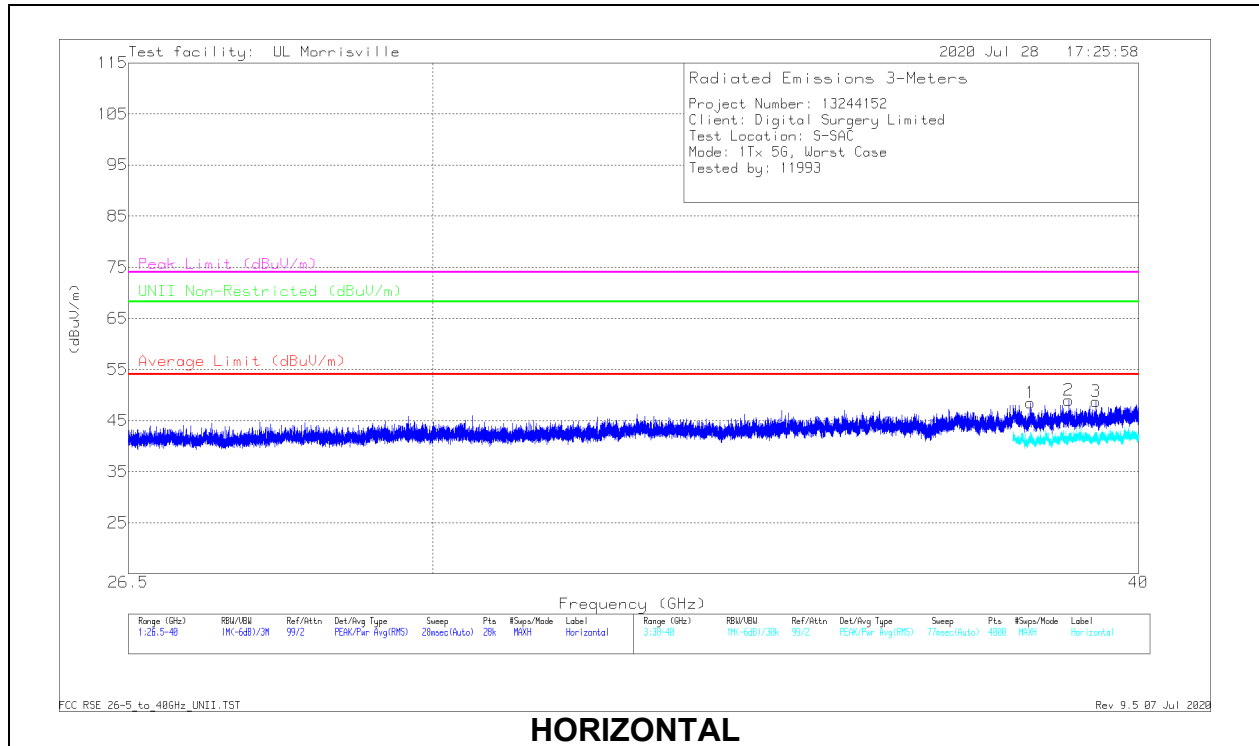
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 20.77682	47.66	Pk	33.1	-39.1	41.66	54	-12.34	74	-32.34	-	-	0-360	199	H
2	* ** 22.54066	47.16	Pk	33.6	-39.2	41.56	54	-12.44	74	-32.44	-	-	0-360	101	H
3	* ** 23.65375	45.81	Pk	34	-38.7	41.11	54	-12.89	74	-32.89	-	-	0-360	250	H
4	* ** 20.43161	46.57	Pk	33.2	-38.7	41.07	54	-12.93	74	-32.93	-	-	0-360	250	V
5	* ** 22.17751	48.18	Pk	33.6	-39.4	42.38	54	-11.62	74	-31.62	-	-	0-360	200	V
6	* ** 23.60181	47.34	Pk	34	-38.8	42.54	54	-11.46	74	-31.46	-	-	0-360	250	V

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

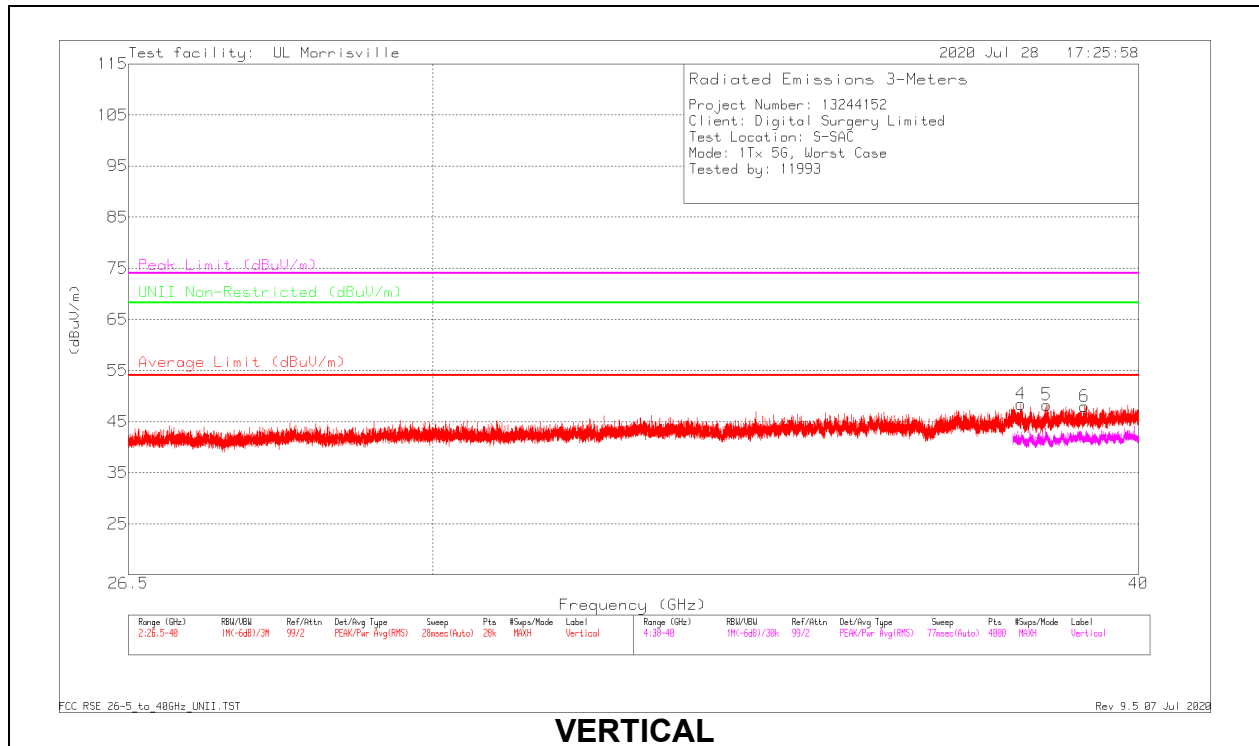
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK – Peak

### 10.5. WORST CASE 26-40 GHZ



**HORIZONTAL**



**VERTICAL**

**26 – 40GHz DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0077 AF (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* ** 38.87441	47.69	PK-U	38.6	-37.4	0	48.89	-	-	74	-25.11	-	-	219	196	H
	* ** 38.87441	34.36	ADV	38.6	-37.4	.63	36.19	54	-17.81	-	-	-	-	219	196	H
3	* ** 39.31406	46.8	PK-U	38.5	-36.8	0	48.5	-	-	74	-25.5	-	-	130	141	H
	* ** 39.31354	33.61	ADV	38.5	-36.8	.63	35.94	54	-18.06	-	-	-	-	130	141	H
6	* ** 39.13225	46.28	PK-U	38.5	-37	0	47.78	-	-	74	-26.22	-	-	343	165	V
	* ** 39.13217	33.18	ADV	38.5	-37	.63	35.31	54	-18.69	-	-	-	-	343	165	V
4	38.12773	47.03	PK-U	38.1	-37.6	0	47.53	-	-	-	-	68.2	-20.67	198	254	V
1	38.27796	46.12	PK-U	38.3	-37.3	0	47.12	-	-	-	-	68.2	-21.08	259	264	H
5	38.53006	47.65	PK-U	38.5	-37.3	0	48.85	-	-	-	-	68.2	-19.35	279	312	V

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK-U - U-NII: Maximum Peak

ADV - U-NII AD primary method, Linear Voltage Average

## 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.

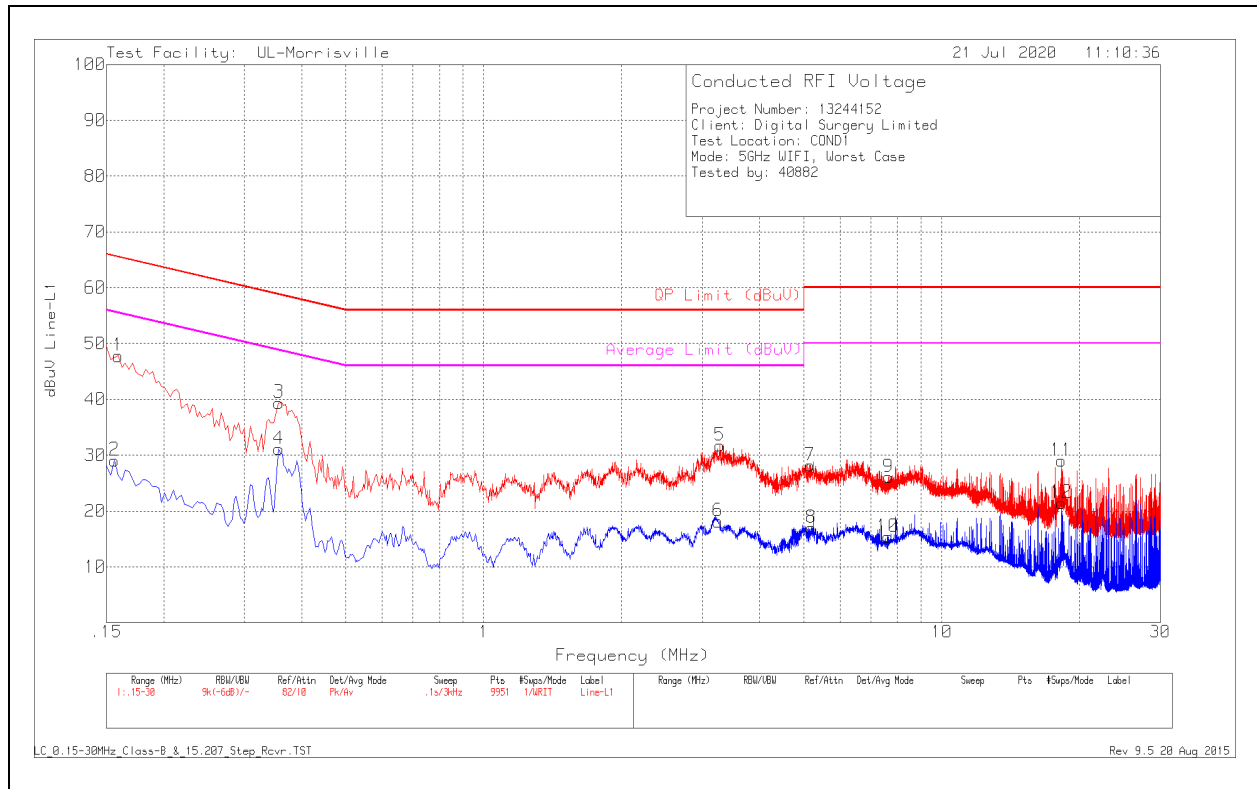
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both lines.

### RESULTS

### 11.1.1. AC Power Line Norm

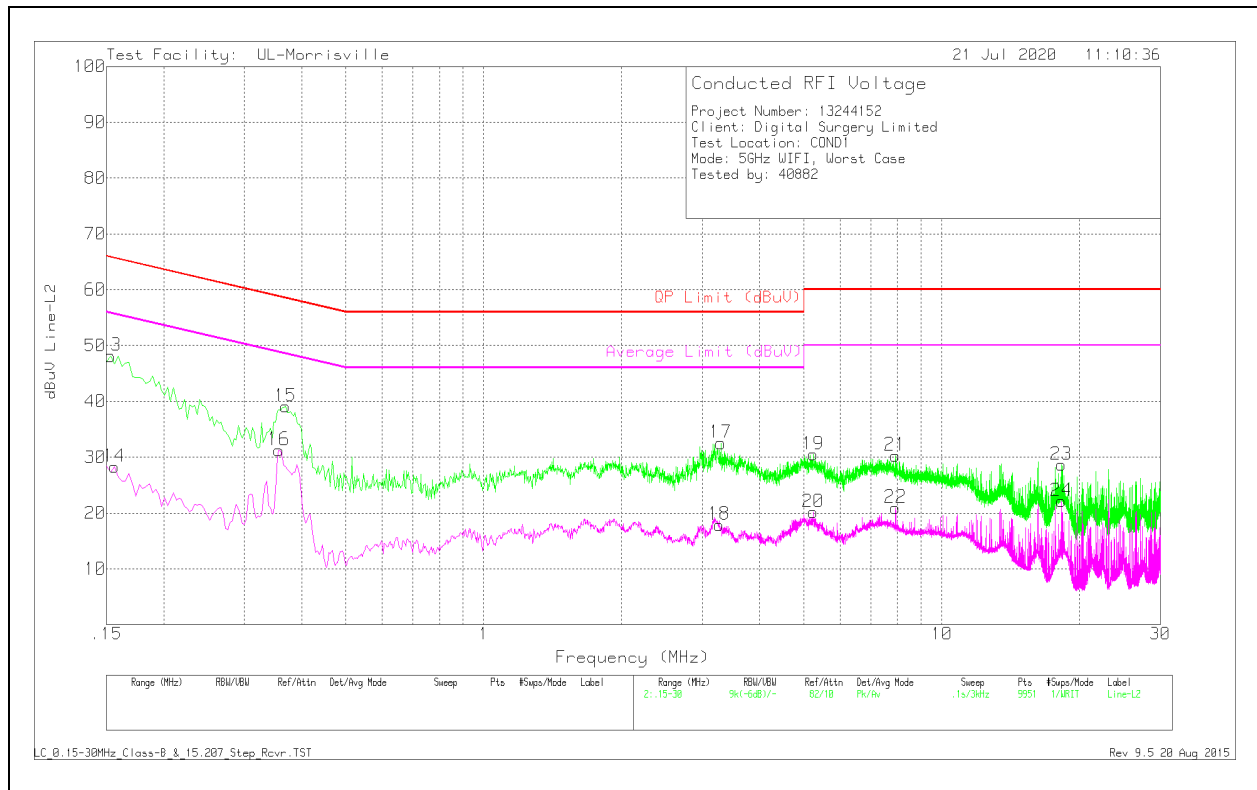
### LINE 1 RESULTS



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	.159	37.89	Pk	.2	9.7	47.79	65.52	-17.73	-	-
2	.156	19.17	Av	.2	9.7	29.07	-	-	55.67	-26.6
3	.357	29.61	Pk	.1	9.7	39.41	58.8	-19.39	-	-
4	.357	21.3	Av	.1	9.7	31.1	-	-	48.8	-17.7
5	3.279	21.81	Pk	.1	9.8	31.71	56	-24.29	-	-
6	3.249	8.27	Av	.1	9.8	18.17	-	-	46	-27.83
7	5.157	18.2	Pk	.1	9.9	28.2	60	-31.8	-	-
8	5.187	6.99	Av	.1	9.9	16.99	-	-	50	-33.01
9	7.641	15.95	Pk	.1	10	26.05	60	-33.95	-	-
10	7.632	5.29	Av	.1	10	15.39	-	-	50	-34.61
11	18.243	18.81	Pk	.1	10.1	29.01	60	-30.99	-	-
12	18.243	11.25	Av	.1	10.1	21.45	-	-	50	-28.55



### 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	.153	38.25	Pk	.2	9.7	48.15	65.84	-17.69	-	-
14	.156	18.41	Av	.2	9.7	28.31	-	-	55.67	-27.36
15	.369	29.31	Pk	.1	9.7	39.11	58.52	-19.41	-	-
16	.357	21.48	Av	.1	9.7	31.28	-	-	48.8	-17.52
17	3.291	22.74	Pk	0	9.8	32.54	56	-23.46	-	-
18	3.267	8.1	Av	0	9.8	17.9	-	-	46	-28.1
19	5.238	20.47	Pk	.1	9.9	30.47	60	-29.53	-	-
20	5.235	10.2	Av	.1	9.9	20.2	-	-	50	-29.8
21	7.923	20.21	Pk	.1	10	30.31	60	-29.69	-	-
22	7.923	10.85	Av	.1	10	20.95	-	-	50	-29.05
23	18.243	18.49	Pk	.1	10.1	28.69	60	-31.31	-	-
24	18.243	11.93	Av	.1	10.1	22.13	-	-	50	-27.87

## 12. SETUP PHOTOS

Please refer to R13244152-EP3 for setup photos.

**END OF TEST REPORT**