



# **TEST REPORT**

**Report Number. :** R13687586-E2

**Applicant :** Sonos  
614 Chapala Street  
Santa Barbara, CA, 93101, U.S.A

**Model :** S36

**FCC ID :** SBVRM036

**IC :** 5373A-RM036

**EUT Description :** Wireless Smart Speaker

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C: 2021  
ISED RSS-247 ISSUE 2: 2017  
ISED RSS-GEN ISSUE 5 + A2: 2021

**Date Of Issue:**  
2022-03-08

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## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2021-05-26	Initial Issue	Haley Ackun
V2	2021-06-24	Updated output power table	Haley Ackun
V3	2021-11-17	Revised firmware information in Section 6.4	Brian T. Kiewra
V4	2022-02-07	Editorial corrections, simultaneous transmission	Niklas Haydon
V5	2022-03-08	Updated firmware in section 6.4	Lariah Ijames

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Sonos  
614 Chapala Street  
Santa Barbara, CA, 93101, U.S.A

**EUT DESCRIPTION:** Wireless Smart Speaker

**MODEL:** S36

**SERIAL NUMBER:** Radiated Samples: 00-0E-58-02-A8-F0:5  
Conducted Samples: 00-00-03-3F-66-BZ:6, 00-00-00-3F-5F-97:E

**SAMPLE RECEIPT DATE:** 2021-05-10

**DATE TESTED:** 2021-05-10 to 2021-05-25

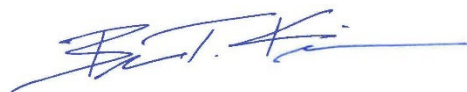
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2021	Complies
ISED RSS-247 Issue 2: 2017	Complies
ISED RSS-GEN Issue 5 + A2: 2021	Complies

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 a2La, NIST, or any agency of the U.S. government.

Approved & Released For  
UL LLC. By:



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Project Engineer  
Consumer Technology Division  
UL LLC.

Prepared By:



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Laboratory Engineer  
Consumer Technology Division  
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## 2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Complies	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Complies	None.
See Comment		Average power	Reporting purposes only	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Complies	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Complies	None.
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.

This report contains data provided by the applicant which can impact the validity of results. UL LLC is only responsible for the validity of results after the integration of the data provided by the customer.

## 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15: 2021, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, RSS-GEN Issue 5 + A2: 2021, and RSS-247 Issue 2: 2017.

## 4. FACILITIES AND ACCREDITATION

UL LLC is accredited by A2LA, certification # 0751.06 for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
<input type="checkbox"/>	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	703469
<input checked="" type="checkbox"/>	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A	US0067	2180C	703469

## 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

### 5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	6.01 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

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

### 5.4. SAMPLE CALCULATION

#### **RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

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

#### **MAINS CONDUCTED EMISSIONS**

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

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

## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is a wireless smart speaker that supports BLE, 2.4 GHz WLAN, 5 GHz WLAN, and NFC. This report covers full testing for 2.4 WLAN only.

### 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted peak output power as follows:

#### 2.4GHz BAND

Frequency Range (MHz)	Mode	Total Output Power (dB)	Total Output Power (mW)
<b>2Tx</b>			
2412 - 2462	802.11b	24.43	277.33
2412 - 2462	802.11g	27.81	603.95
2412 - 2462	802.11n HT20 CDD	27.75	596.15

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type, as provided by the manufacturer' are as follows:

The radio utilizes 2 MIMO WIFI Dual Band Di-pole antennas, with a maximum gain of 3.2 dBi for chain 0 and 4.8 dBi for chain 1.

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 64-0.13201-diag-S36-rel-202101050731 and 65.0.15290-diag-S36-rel-2021103292116..

### 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.

Radiated Band Edge between 1GHz and 18GHz were performed with the EUT set to transmit on channels 2412 MHz, 2417 MHz, 2457 MHz, and 2462 MHz since power stepping was performed on channels 1 and 11.



Radiated spurious emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The fundamental of the EUT was investigated in two orthogonal orientations X and Z; it was determined that X orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in X orientation. Y orientation is not used in the field as declared by the client.

All radios that can transmit simultaneously have been evaluated for radiated for all possible combinations of transmission and found to be in compliance. Worst case data is included in the report.

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

802.11b mode: 1 Mbps  
802.11g 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
Laptop	Lenovo	X220	R9LB8CG	QDS-BRCM1046
Laptop	Lenovo	T440p	PB0294NN	NA
AC Adapter	Lenovo	42T4438	NA	NA
AC Adapter	Lenovo	ADLX90NLC2A	NA	NA

### I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Ethernet	1	Ethernet	Un-shielded	>3m	Ethernet connected o laptop and EUT
2	2	1	I/O	Shielded	>3m	Connected to AC Mains

### TEST SETUP

Test software exercised the radio card.

### SETUP DIAGRAM

Please refer to R13687586-EP1 for setup diagrams

## 7. MEASUREMENT METHOD

Duty Cycle: ANSI C63.10 Section -11.6

6 dB BW: ANSI C63.10 Subclause -11.8.1

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter  
Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

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

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

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

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

## 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	2021-04-05	2022-04-05
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	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	2021-04-05	2022-04-05
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (2021-03-04)		
	<b>Miscellaneous (if needed)</b>				
LISN008	LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.)	Solar Electronics	8012-50-R-24-BNC	2020-08-08	2021-08-08

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	<b>0.009-30MHz</b>				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
	<b>30-1000 MHz</b>				
AT0075	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2020-10-27	2021-10-27
	<b>1-18 GHz</b>				
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-05-03	2022-05-03
	<b>18-40 GHz</b>				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2020-10-30	2021-10-30
	<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>				
197955	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-10	2022-03-10
SA0026	Spectrum Analyzer	Agilent	N9030A	2020-07-16	2021-07-16
ATA176	10dB, DC-18GHz, 5W	Mini-Circuits	BW-N10W5	2020-08-29	2021-08-29
SOFTEMI	EMI Software	UL	Version 9.5 (04 Mar 2021)		

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

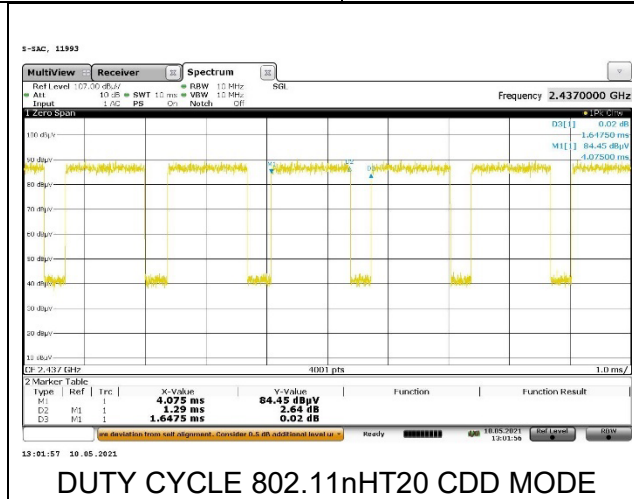
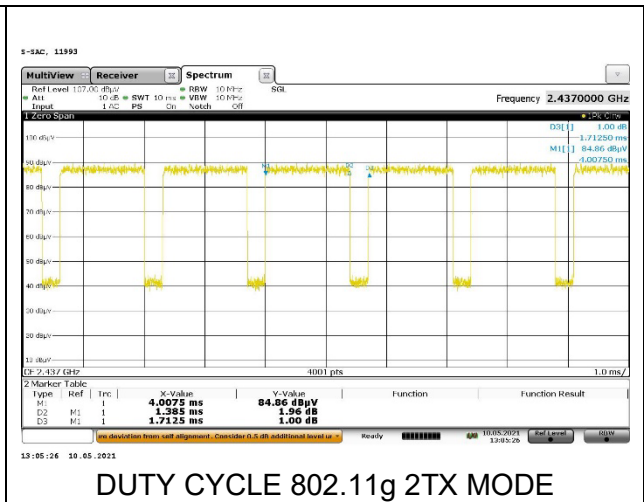
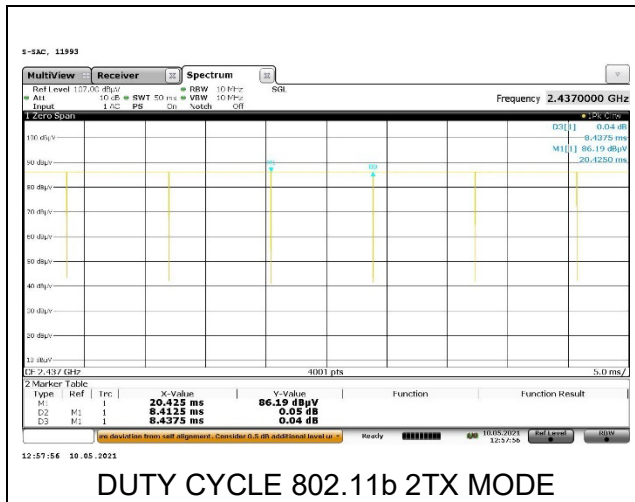
#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
<b>2.4GHz Band</b>						
802.11b 2TX	8.4125	8.4375	0.997	99.70%	0.00	0.010
802.11g 2TX	1.385	1.7125	0.809	80.88%	1.84	0.722
802.11n HT20 2TX	1.29	1.6475	0.783	78.30%	2.12	0.775

**DUTY CYCLE PLOTS**



## 9.2. 99% BANDWIDTH

### LIMITS

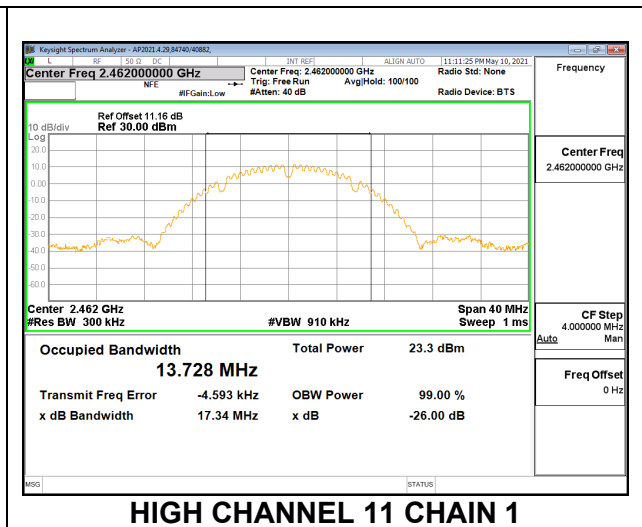
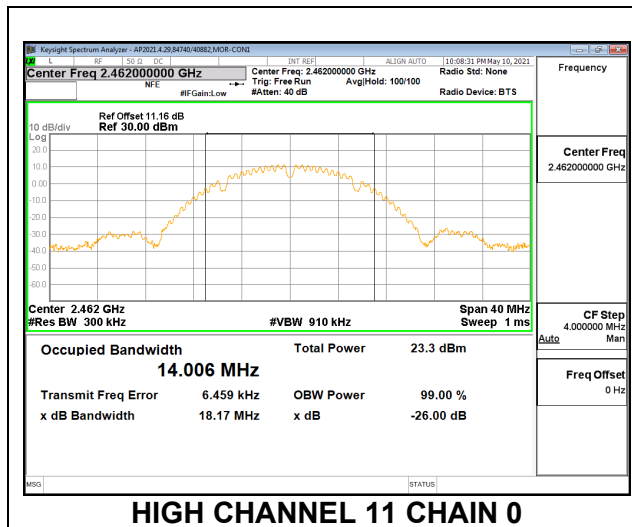
None; for reporting purposes only.

### RESULTS

#### 9.2.1. 802.11b MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	13.878	13.714
Mid 6	2437	13.975	13.719
High 11	2462	14.006	13.728

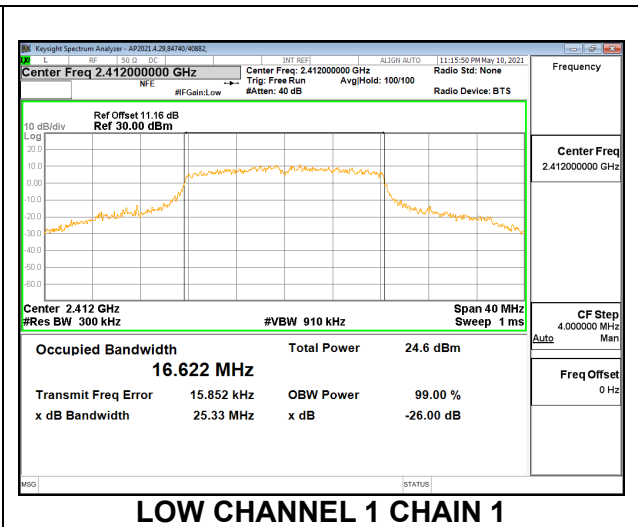
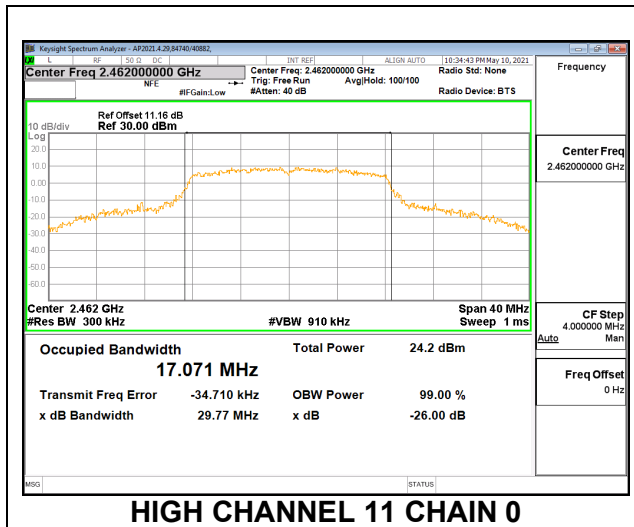




### 9.2.2. 802.11g MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

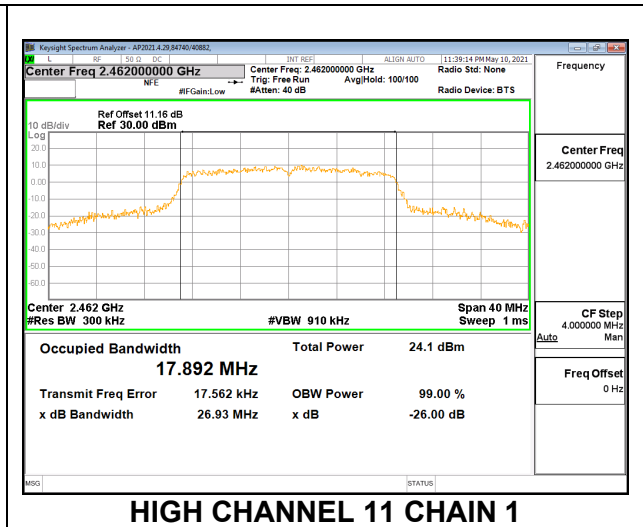
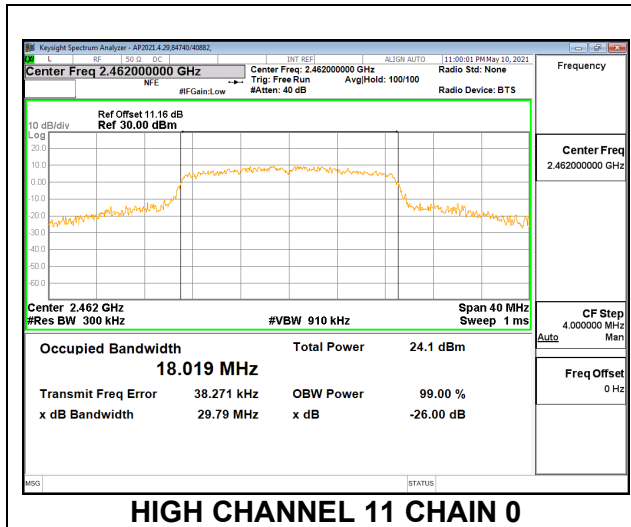
Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	16.974	16.622
Mid 6	2437	17.032	16.602
High 11	2462	17.071	16.588



### 9.2.3. 802.11n HT20 MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)
Low 1	2412	17.926	17.818
Mid 6	2437	17.985	17.809
High 11	2462	18.019	17.892



### **9.3. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

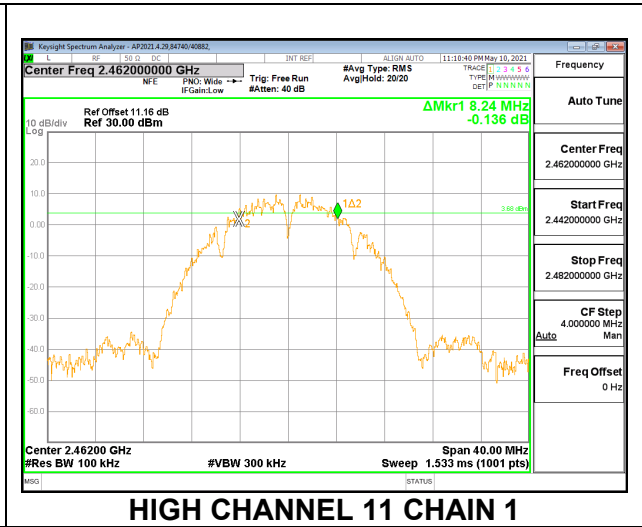
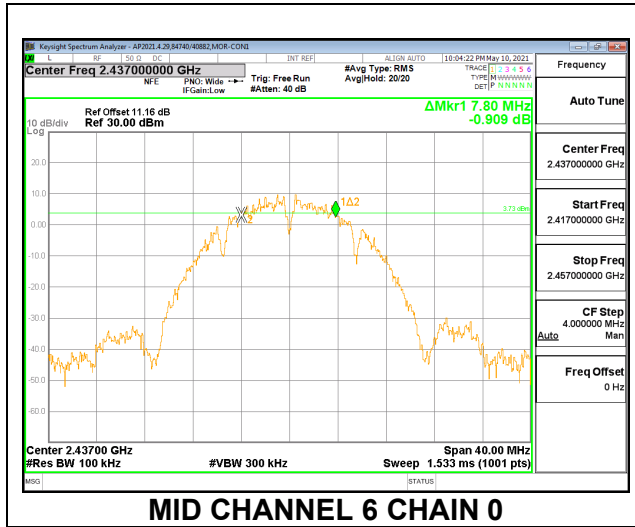
The minimum 6 dB bandwidth shall be at least 500 kHz.

#### **RESULTS**

### 9.3.1. 802.11b MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

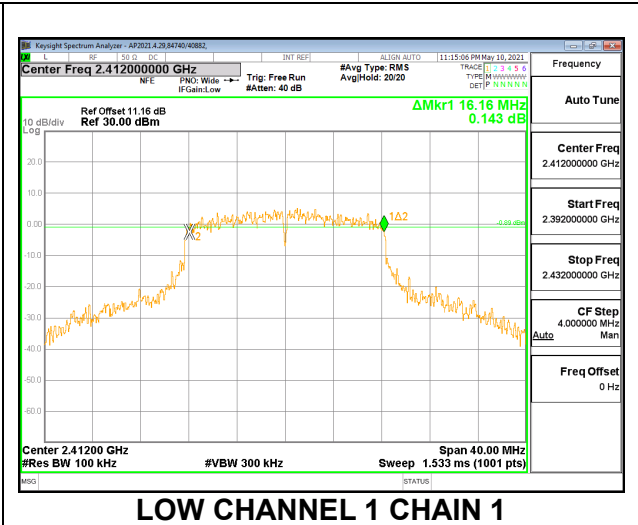
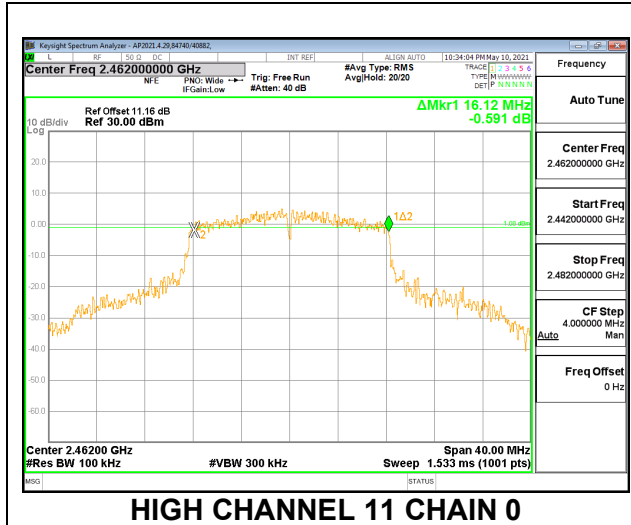
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	8.68	8.68	0.5
Mid 6	2437	7.80	8.68	0.5
High 11	2462	9.64	8.24	0.5



### 9.3.2. 802.11g MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

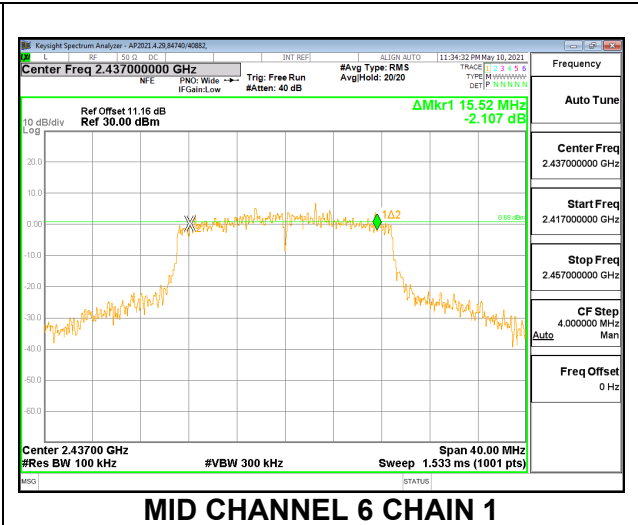
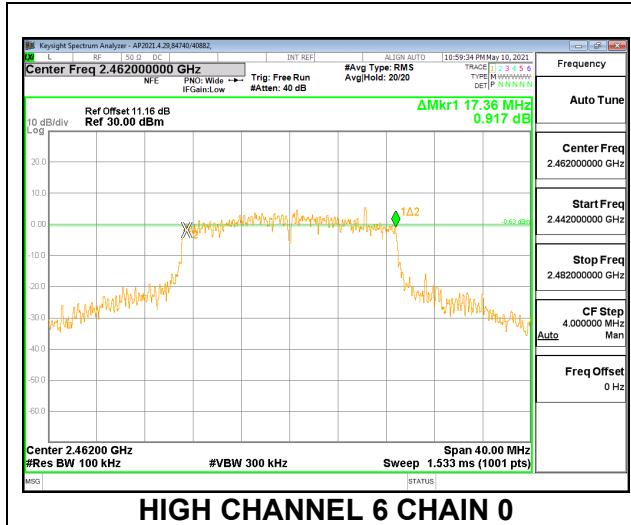
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	16.40	16.16	0.5
Mid 6	2437	16.44	16.16	0.5
High 11	2462	16.12	16.40	0.5



### 9.3.3. 802.11n HT20 MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.68	17.36	0.5
Mid 6	2437	17.64	15.52	0.5
High 11	2462	17.36	16.20	0.5



## 9.4. OUTPUT POWER

### LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.16 dB (including 10 dB pad, 0.76 dB EUT cable, and 0.40 dB test cable) was entered as an offset in the power meter to allow for a peak reading of power.

### DIRECTIONAL ANTENNA GAIN

Tx chains are uncorrelated for power and correlated for PSD due to the device supporting CDD in all MIMO modes. The directional gains are as follows:

Band (GHz)	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.4	3.2	4.8	4.07	7.05

**RESULTS**

**9.4.1. 802.11b MODE**

**2TX Chain 0+ Chain 1 CDD MODE**

<b>Test Engineer:</b>	24293/40882
<b>Test Date:</b>	2021-05-10 & 2021-05-12

**Limits**

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	4.07	30.00	36	30.00
Mid 6	2437	4.07	30.00	36	30.00
High 11	2462	4.07	30.00	36	30.00

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	21.40	21.32	24.37	30.00	-5.63
Mid 6	2437	21.35	21.48	24.43	30.00	-5.57
High 11	2462	21.33	21.40	24.38	30.00	-5.63



### 9.4.2. 802.11g MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

<b>Test Engineer:</b>	24293/40882
<b>Test Date:</b>	2021-05-10 & 2021-05-12

#### Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	4.07	30.00	36	30.00
Low 2	2417	4.07	30.00	36	30.00
Mid 6	2437	4.07	30.00	36	30.00
High 10	2457	4.07	30.00	36	30.00
High 11	2462	4.07	30.00	36	30.00

#### Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	23.72	25.01	27.42	30.00	-2.58
Low 2	2417	24.13	25.38	27.81	30.00	-2.19
Mid 6	2437	22.77	23.84	26.35	30.00	-3.65
High 10	2457	23.79	25.41	27.69	30.00	-2.31
High 11	2462	23.37	24.99	27.27	30.00	-2.73

### 9.4.3. 802.11n HT20 MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

<b>Test Engineer:</b>	24293/40882
<b>Test Date:</b>	2021-05-10 & 2021-05-12

#### Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	4.07	30.00	36	30.00
Low 2	2417	4.07	30.00	36	30.00
Mid 6	2437	4.07	30.00	36	30.00
High 10	2457	4.07	30.00	36	30.00
High 11	2462	4.07	30.00	36	30.00

#### Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	23.37	24.40	26.93	30.00	-3.07
Low 2	2417	24.27	25.17	27.75	30.00	-2.25
Mid 6	2437	23.48	24.52	27.04	30.00	-2.96
High 10	2457	24.19	25.03	27.64	30.00	-2.36
High 11	2462	23.75	24.60	27.21	30.00	-2.79

## **9.5. AVERAGE POWER**

### **LIMITS**

None; for reporting purposes only

### **TEST PROCEDURE**

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.16 dB (including 10 dB pad, 0.76 dB EUT cable, and 0.40 dB test cable) was entered as an offset in the power meter to allow for a gated average reading of power.

### **RESULTS**

### 9.5.1. 802.11b MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

<b>Test Engineer:</b>	24293/40882
<b>Test Date:</b>	2021-05-10 & 2021-05-12

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1	2412	19.38	19.17	22.29
Mid 6	2437	19.28	19.33	22.32
High 11	2462	19.48	19.27	22.39

### 9.5.2. 802.11g MODE

#### 2TX Chain 0+ Chain 1 CDD MODE

<b>Test Engineer:</b>	24293/40882
<b>Test Date:</b>	2021-05-10 & 2021-05-12

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low 1	2412	17.11	17.60	20.37
Low 2	2417	18.21	18.56	21.40
Mid 6	2437	18.28	18.66	21.48
High 10	2457	18.36	18.44	21.41
High 11	2462	16.90	17.38	20.16

### 9.5.3. 802.11n HT20 MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

<b>Test Engineer:</b>	24293/40882
<b>Test Date:</b>	2021-05-10 & 2021-05-12

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 Power (dBm)</b>	<b>Chain 1 Power (dBm)</b>	<b>Total Power (dBm)</b>
Low 1	2412	15.95	16.48	19.23
Low 2	2417	18.02	18.47	21.26
Mid 6	2437	18.63	18.53	21.59
High 10	2457	18.00	18.13	21.08
High 11	2462	16.61	16.66	19.65

## **9.6. POWER SPECTRAL DENSITY**

### **LIMITS**

FCC §15.247 (e)

RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

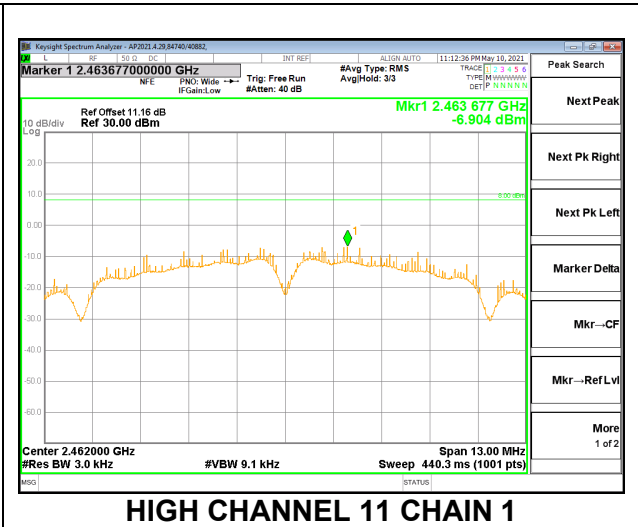
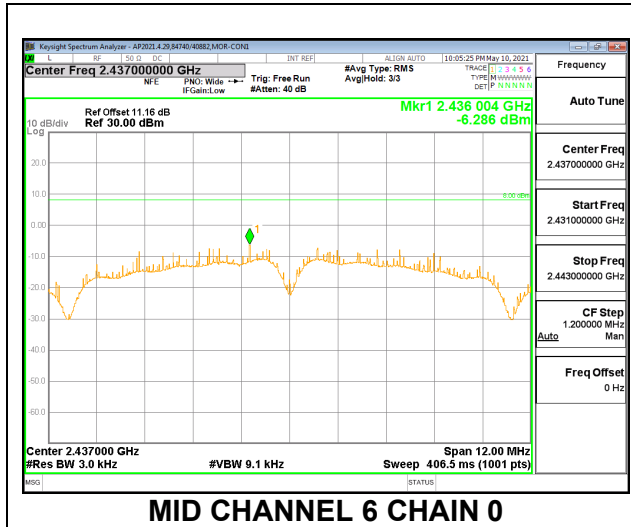
### **RESULTS**

**9.6.1. 802.11b MODE**

**2TX Chain 0 + Chain 1 CDD MODE**

**PSD Results**

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.924	-7.001	-3.95	8.0	-12.0
Mid 6	2437	-6.286	-7.550	-3.86	8.0	-11.9
High 11	2462	-7.679	-6.904	-4.26	8.0	-12.3

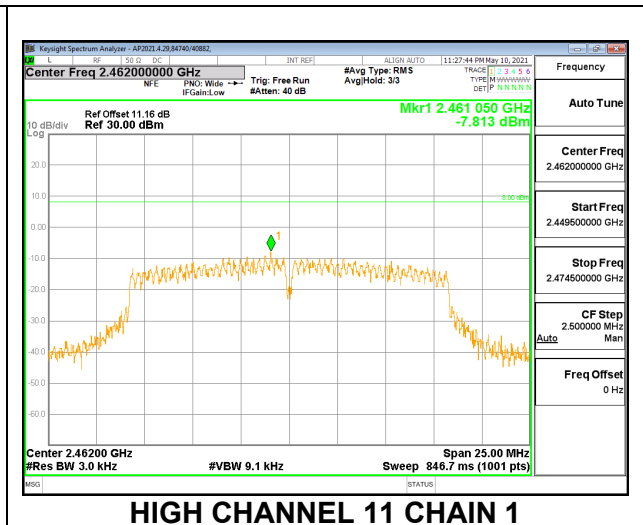
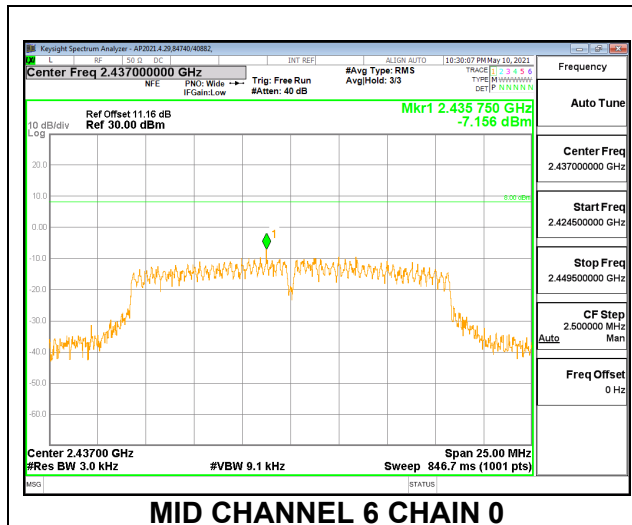


### 9.6.2. 802.11g MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

##### PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.178	-8.753	-5.45	8.0	-13.4
Mid 6	2437	-7.156	-9.326	-5.10	8.0	-13.1
High 11	2462	-9.001	-7.813	-5.36	8.0	-13.4



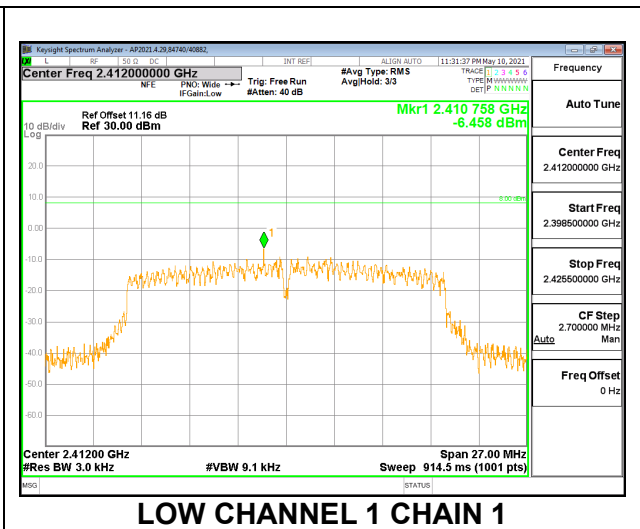
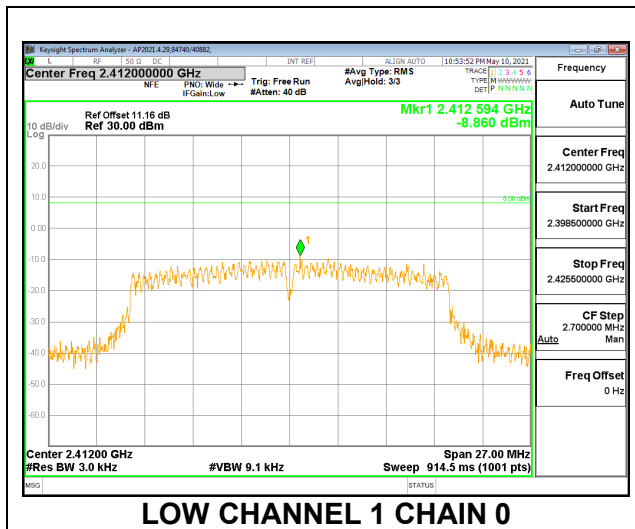


### 9.6.3. 802.11n HT20 MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

##### PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Chain 1 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.860	-6.458	-4.48	8.0	-12.5
Mid 6	2437	-8.994	-9.027	-6.00	8.0	-14.0
High 11	2462	-9.767	-9.883	-6.81	8.0	-14.8



## 9.7. CONDUCTED SPURIOUS EMISSIONS

### LIMITS

FCC §15.247 (d)

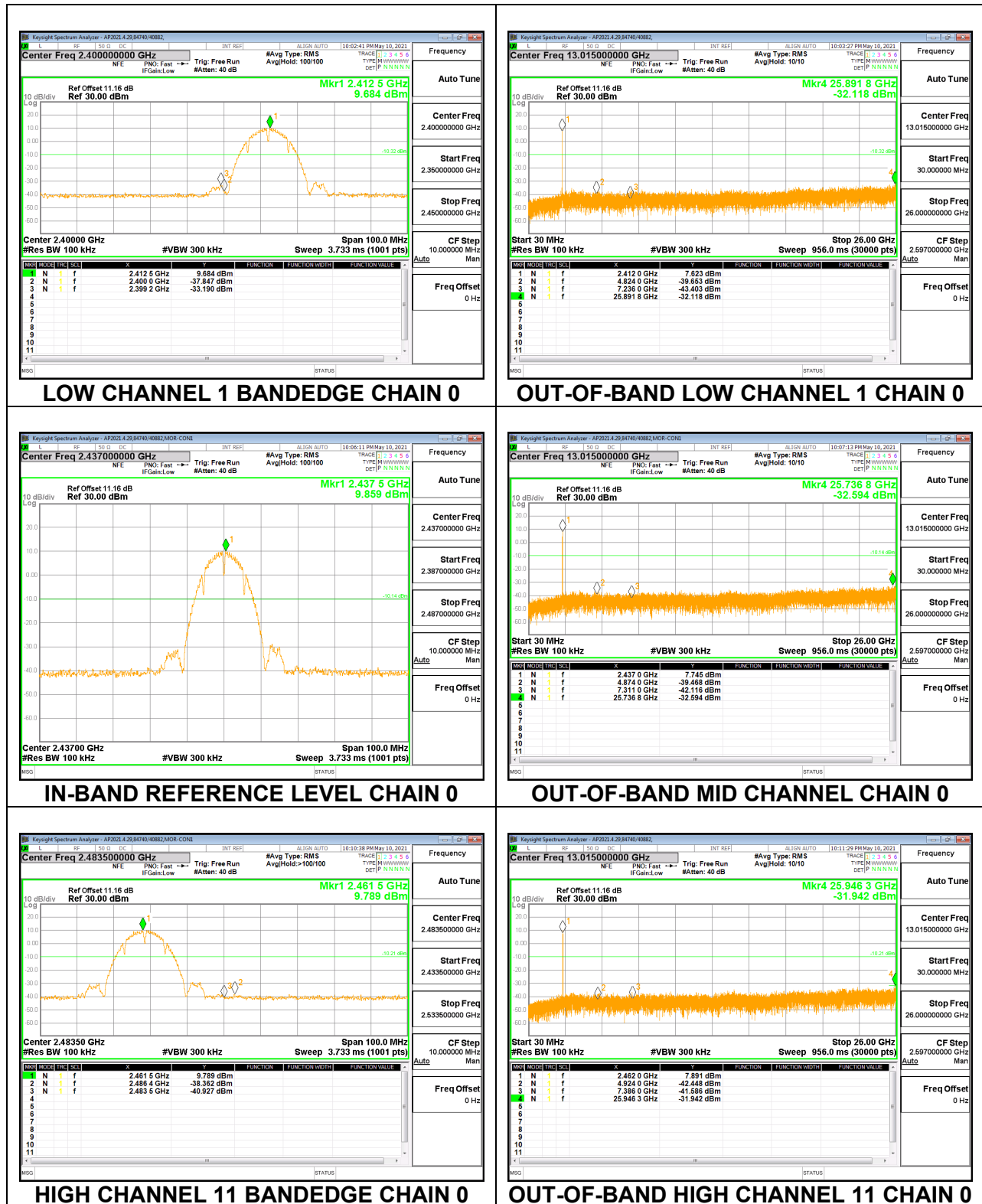
RSS-247 5.5

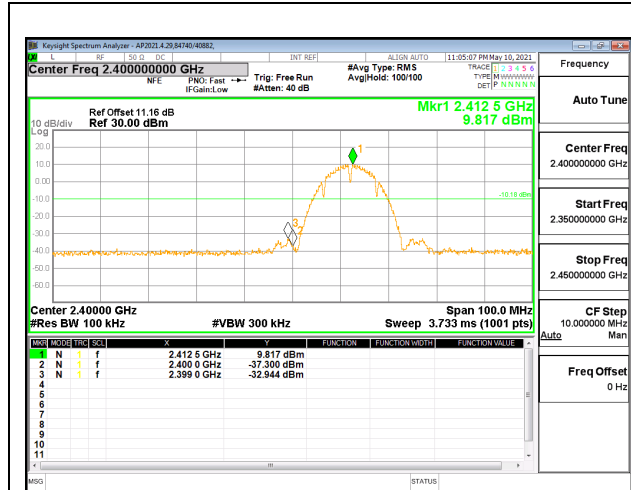
Output power was measured based on the use of peak measurement, therefore the required attenuation is 20 dBc.

### RESULTS

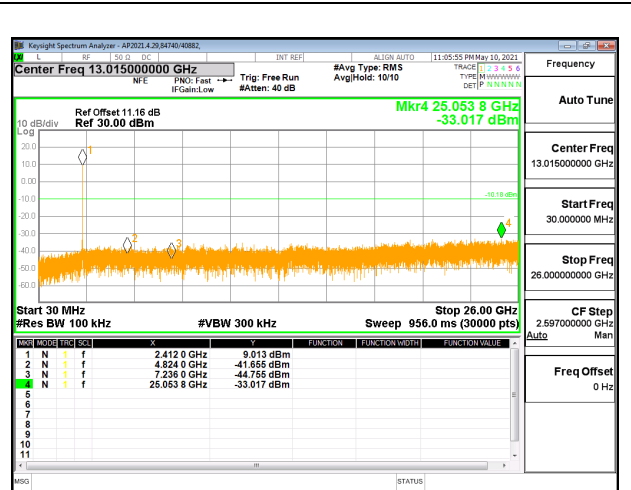
9.7.1. 802.11b MODE

2TX Chain 0 + Chain 1 CDD MODE

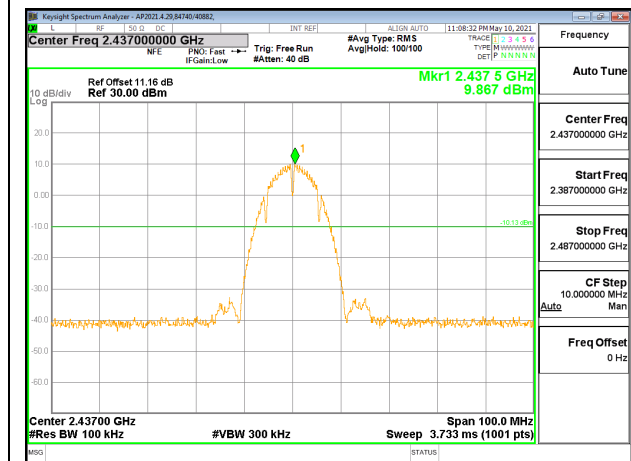




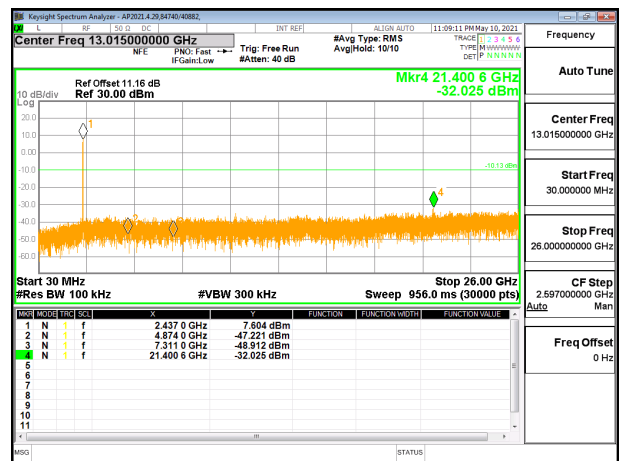
LOW CHANNEL 1 BANDEDGE CHAIN 1



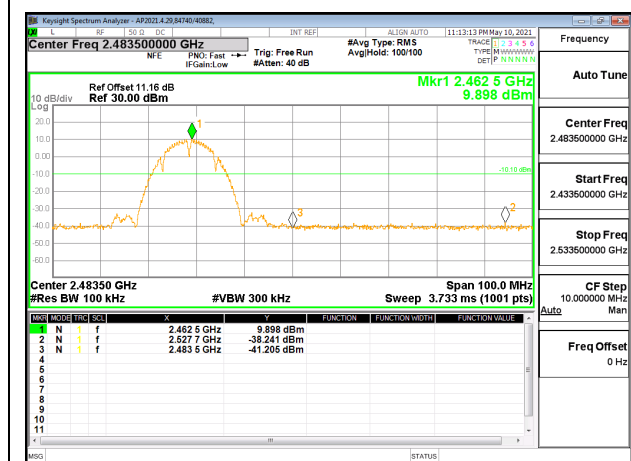
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



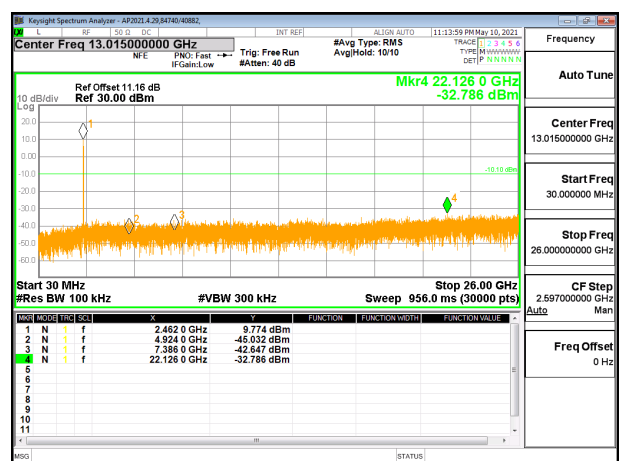
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL CHAIN 1



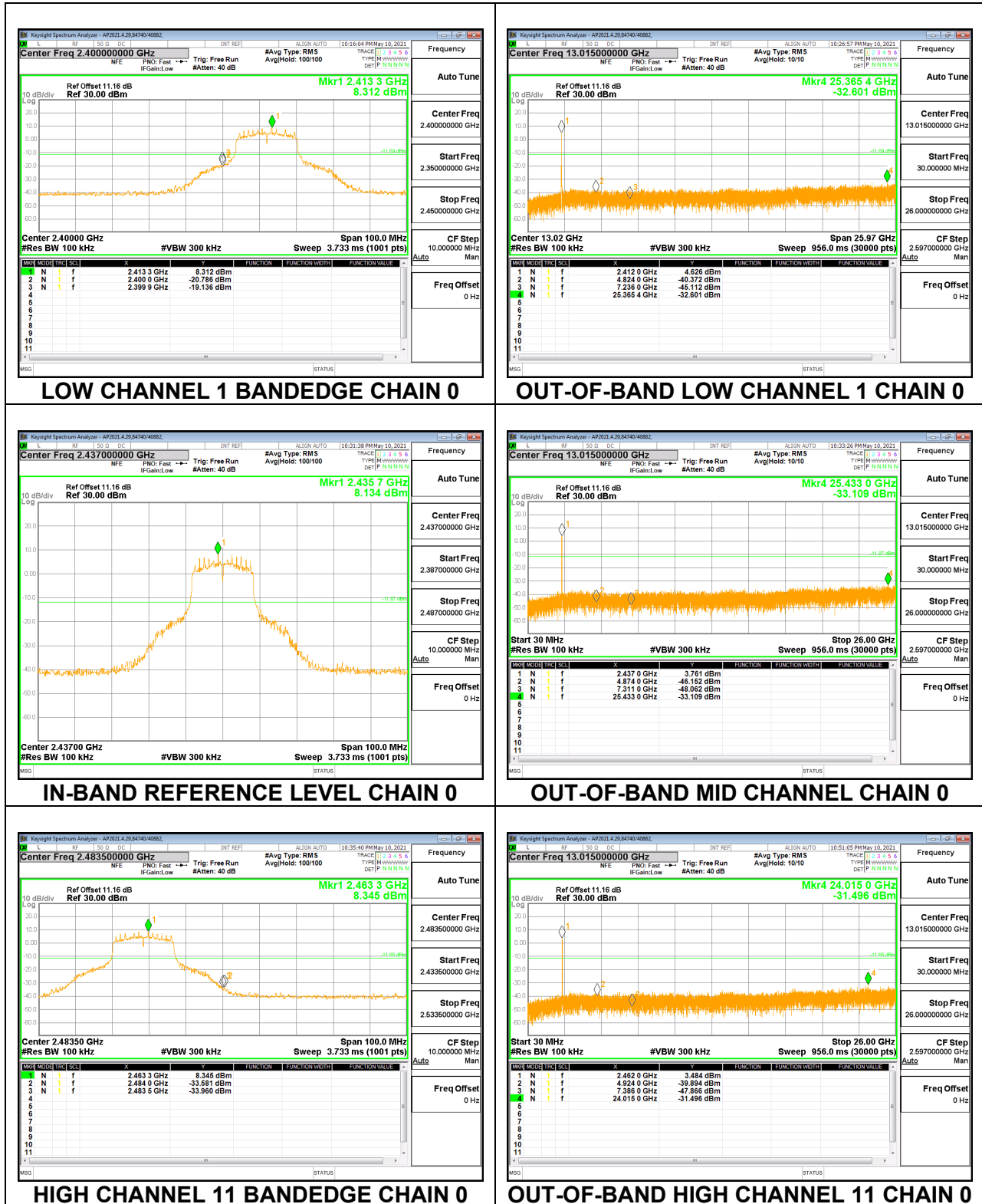
HIGH CHANNEL 11 BANDEDGE CHAIN 1

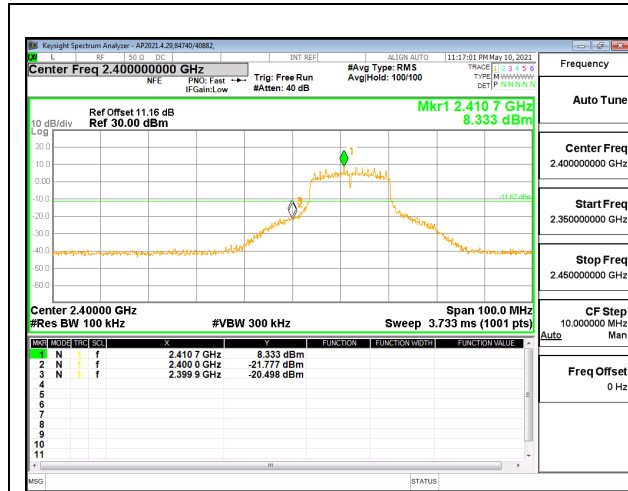


OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1

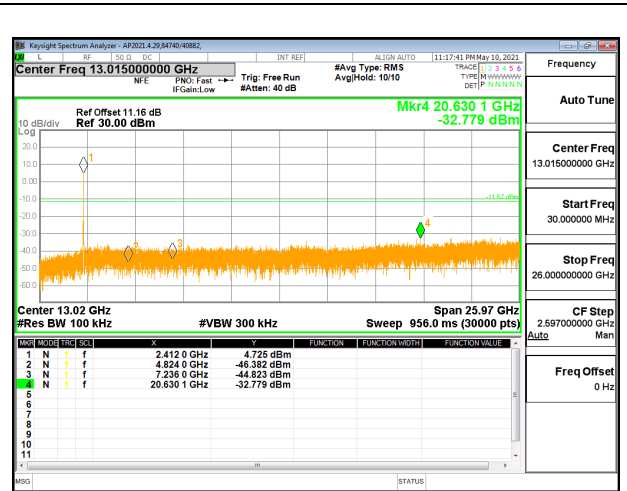
### 9.7.2. 802.11g MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

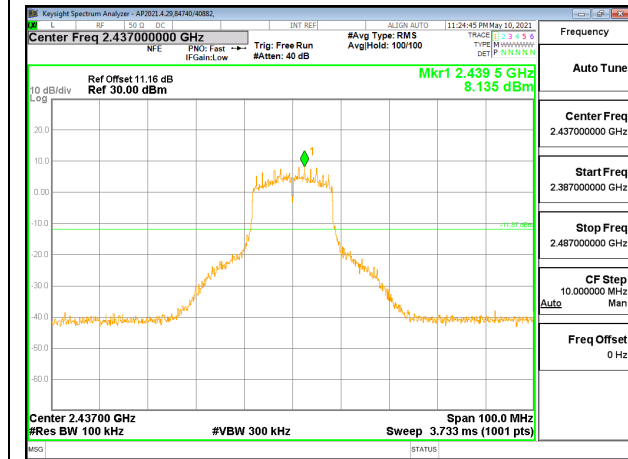




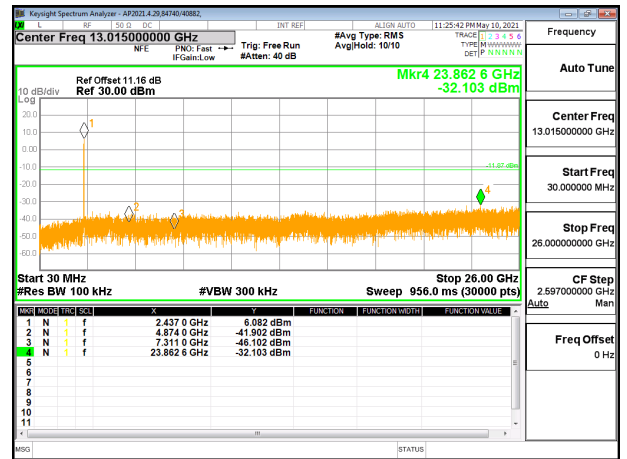
LOW CHANNEL 1 BANDEDGE CHAIN 1



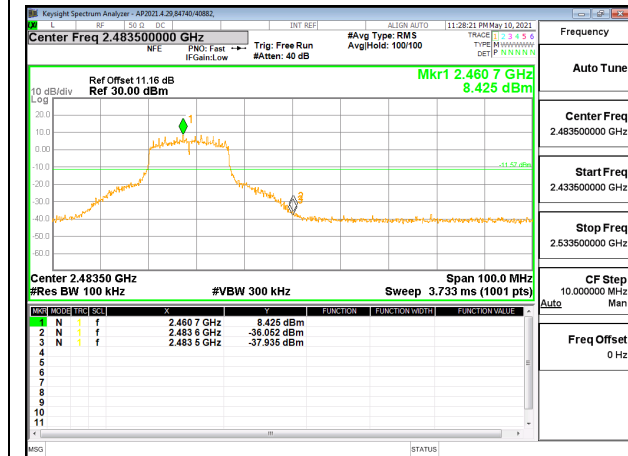
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



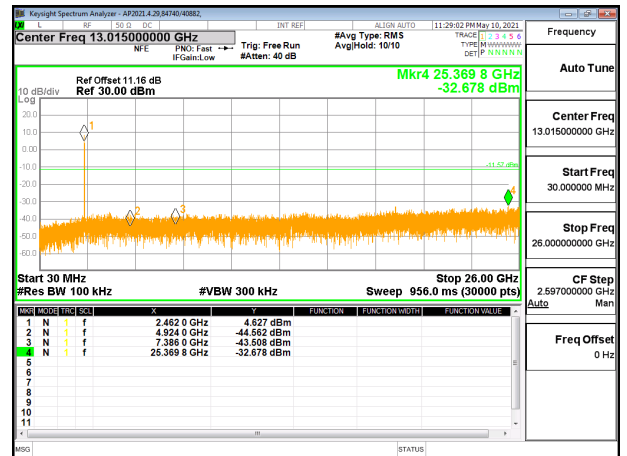
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL CHAIN 1



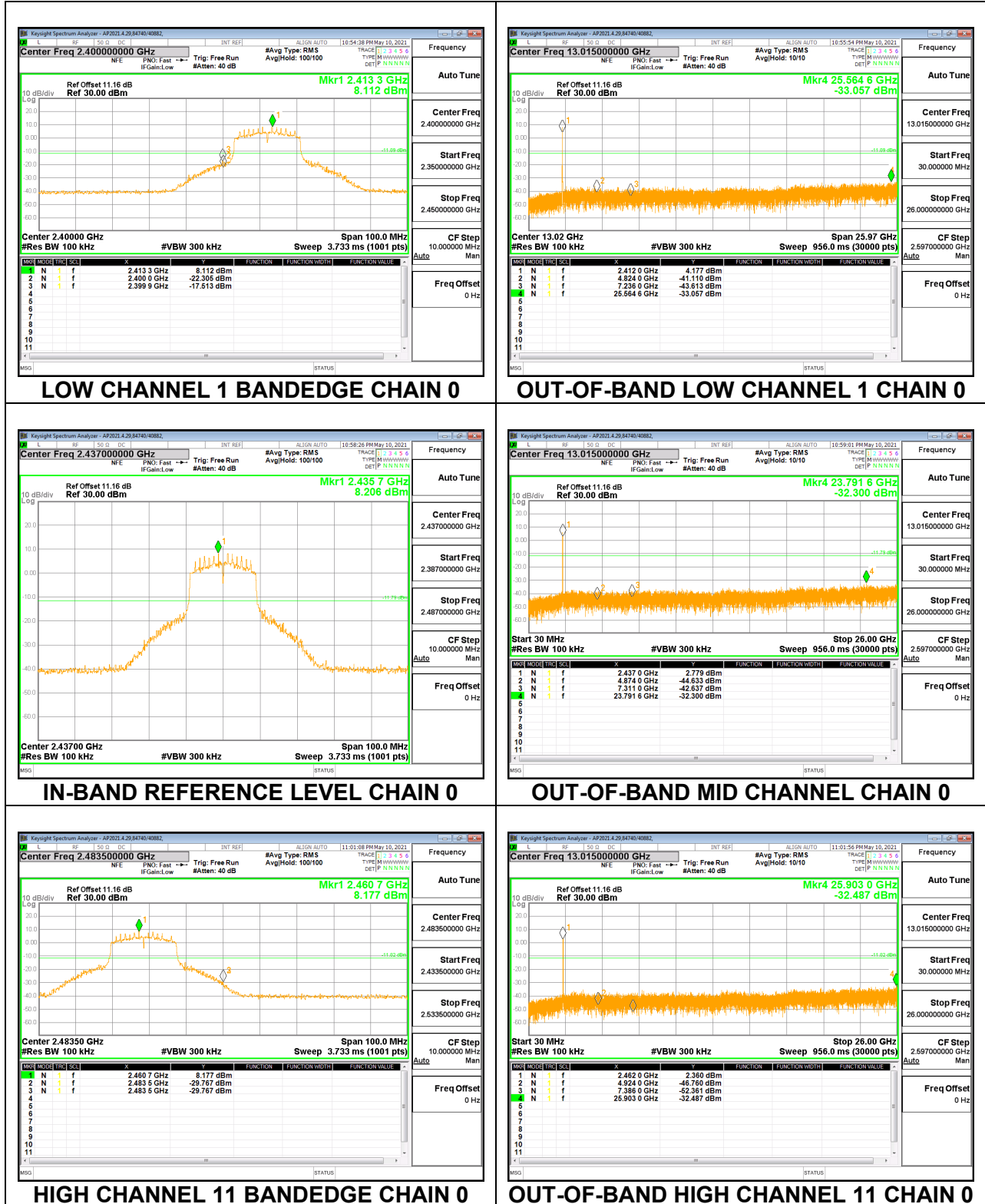
HIGH CHANNEL 11 BANDEDGE CHAIN 1

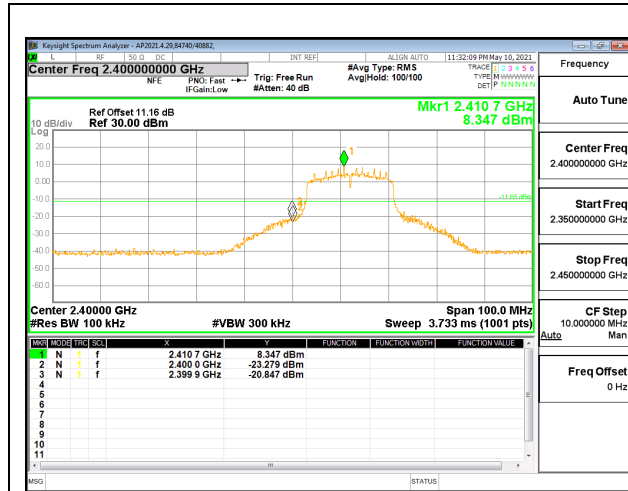


OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1

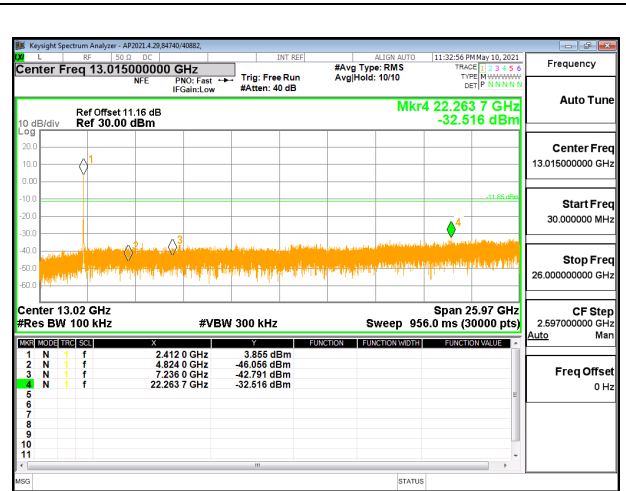
### 9.7.3. 802.11n HT20 MODE

#### 2TX Chain 0 + Chain 1 CDD MODE

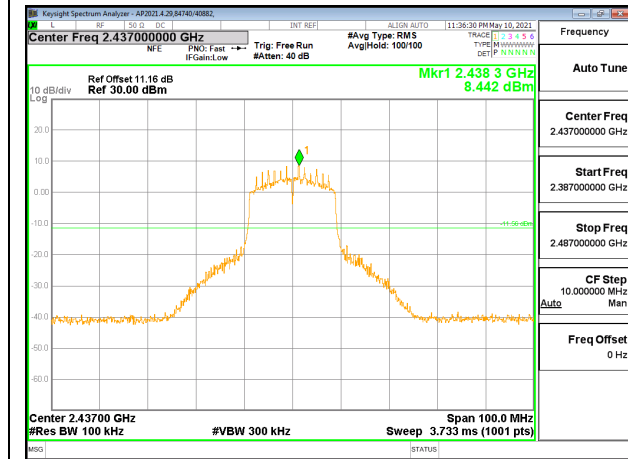




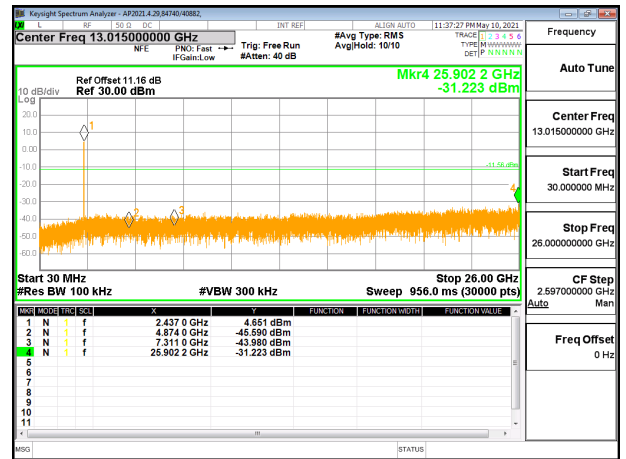
LOW CHANNEL 1 BANDEDGE CHAIN 1



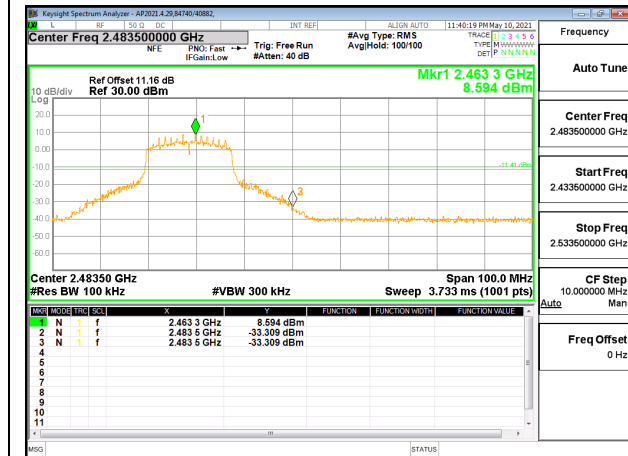
OUT-OF-BAND LOW CHANNEL 1 CHAIN 1



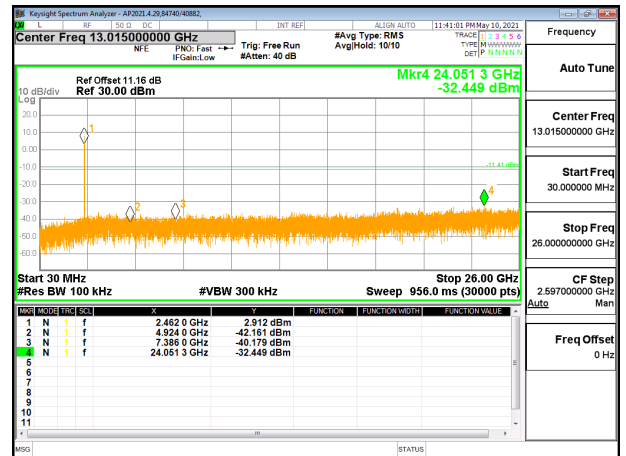
IN-BAND REFERENCE LEVEL CHAIN 1



OUT-OF-BAND MID CHANNEL CHAIN 1



HIGH CHANNEL 11 BANDEDGE CHAIN 1



OUT-OF-BAND HIGH CHANNEL 11 CHAIN 1



## 10. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

RSS-GEN, Section 8.9 and 8.10

Frequency Range (MHz)	Field Strength Limit (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 in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for linear voltage averaging measurements.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to MIMO on the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channels with the highest output power was tested.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

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

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

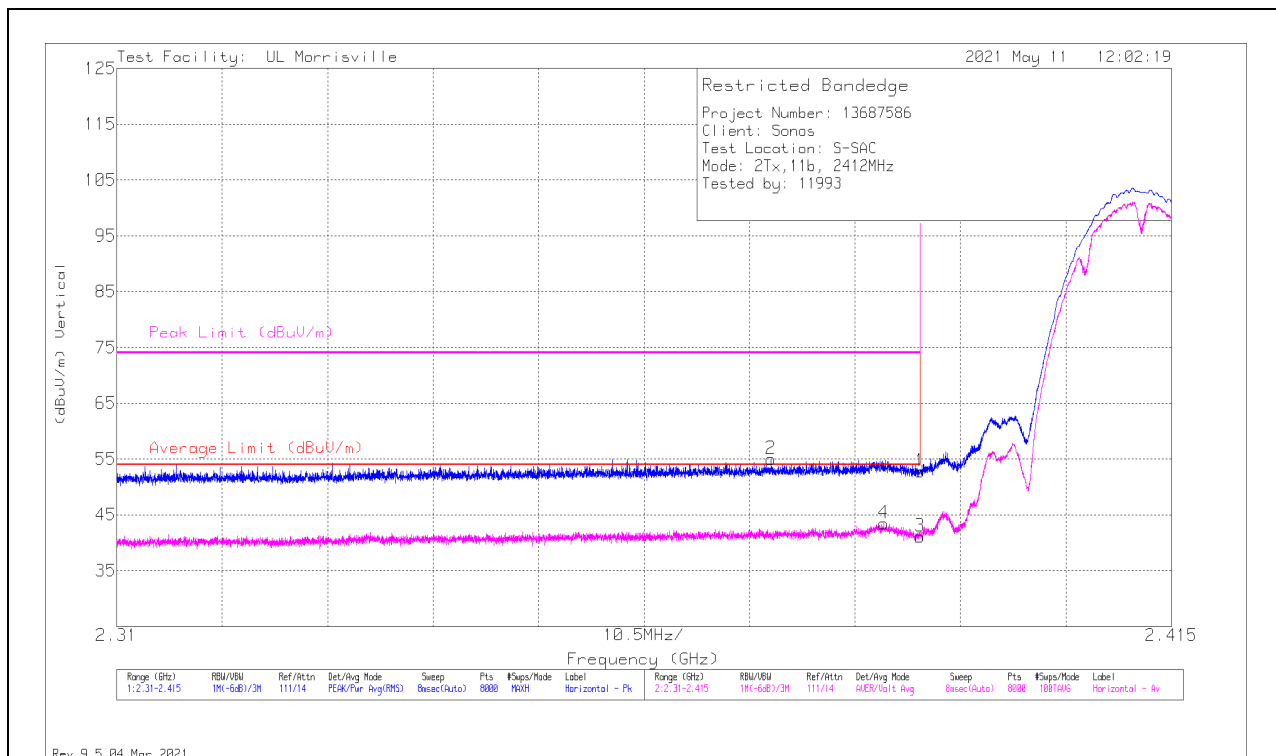
## 10.1. TRANSMITTER ABOVE 1 GHz

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

#### 2TX Chain 0 + Chain 1 CDD MODE

#### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	34.9	Pk	31.9	-24	10	52.8	-	-	74	-21.2	288	192	H
2	** * 2.37514	36.6	Pk	32.3	-23.9	10	55	-	-	74	-19	288	192	H
3	* ** 2.39	23.21	ADV	31.9	-24	10	41.11	54	-12.89	-	-	288	192	H
4	* ** 2.38633	25.22	ADV	32.1	-23.9	10	43.42	54	-10.58	-	-	288	192	H

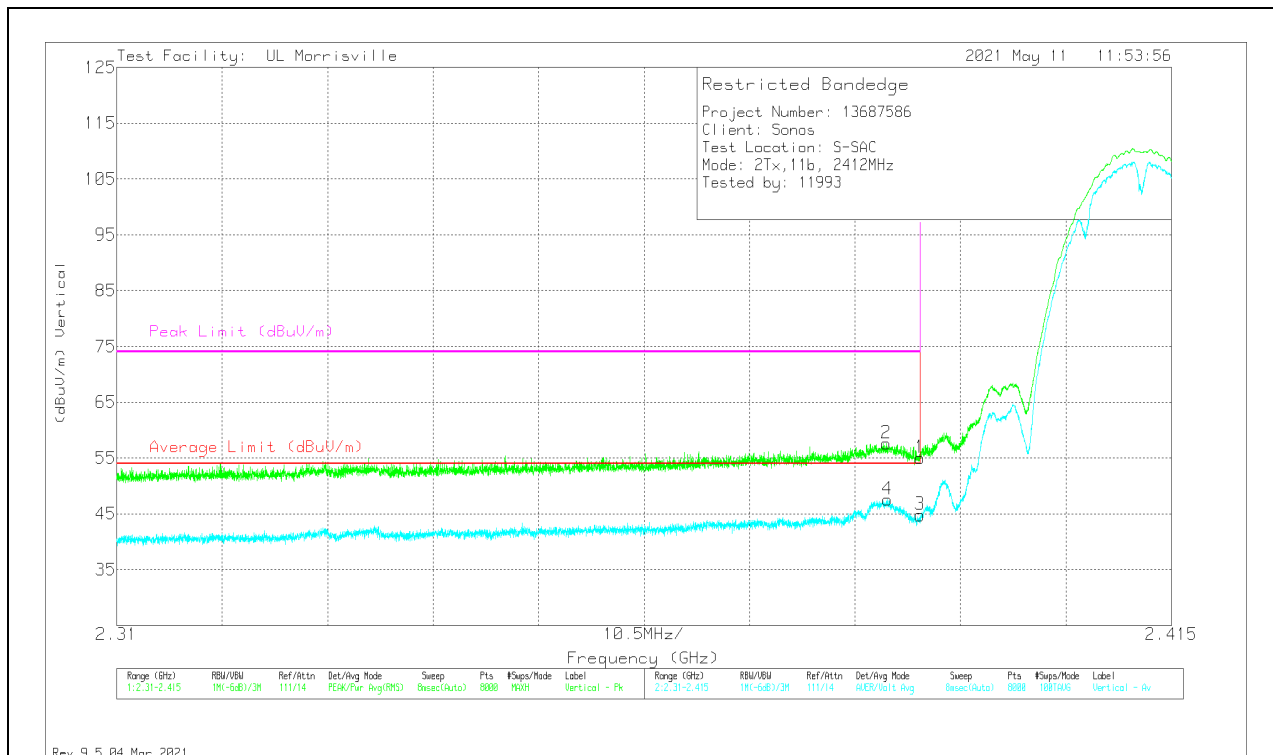
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	37.13	Pk	31.9	-24	10	55.03	-	-	74	-18.97	56	136	V
2	* ** 2.38664	39.5	Pk	32.1	-24	10	57.6	-	-	74	-16.4	56	136	V
3	* ** 2.39	26.87	ADV	31.9	-24	10	44.77	54	-9.23	-	-	56	136	V
4	* ** 2.38673	29.43	ADV	32.1	-24	10	47.53	54	-6.47	-	-	56	136	V

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

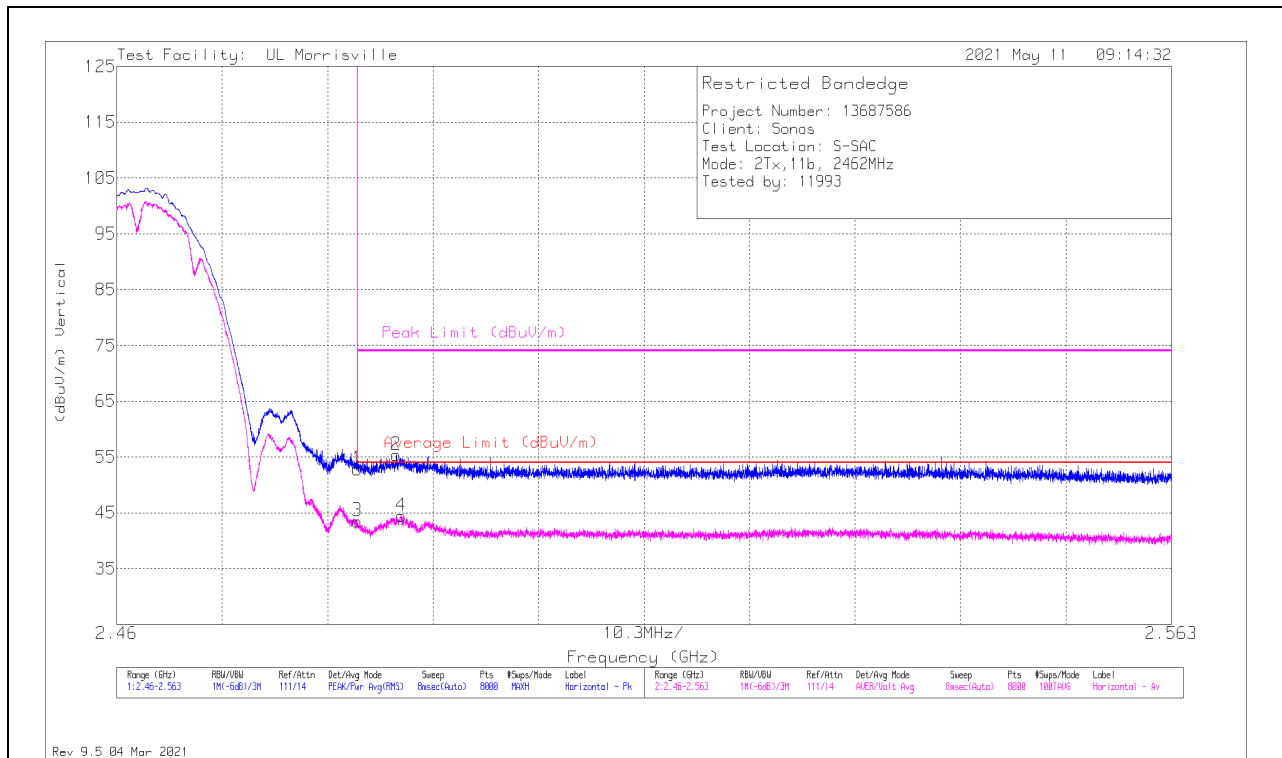
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

**BANDEDGE (HIGH CHANNEL, CH 11)**

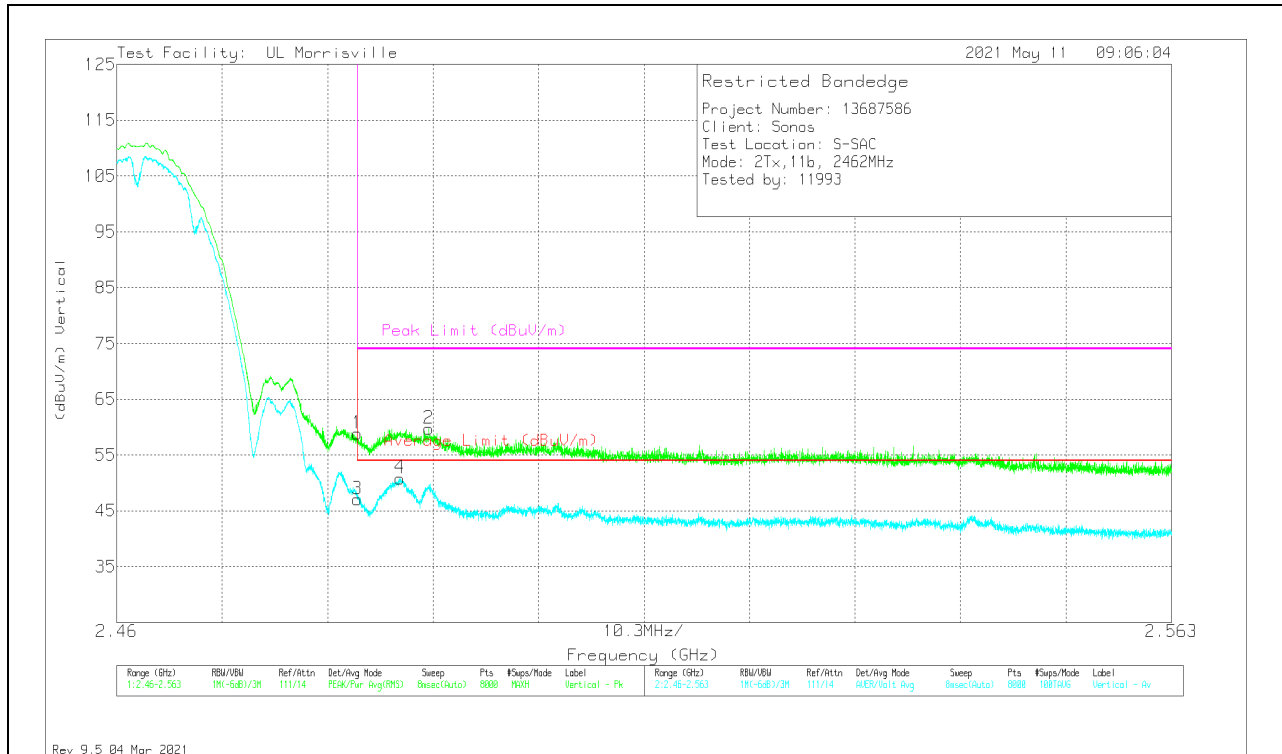
**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	34.74	Pk	32.5	-24.4	10	52.84	-	-	74	-21.16	287	180	H
2	*** 2.48729	37.37	Pk	32.5	-24.5	10	55.37	-	-	74	-18.63	287	180	H
3	*** 2.4835	25.42	ADV	32.5	-24.4	10	43.52	54	-10.48	-	-	287	180	H
4	*** 2.48778	26.58	ADV	32.5	-24.6	10	44.48	54	-9.52	-	-	287	180	H

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

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	40.71	Pk	32.5	-24.4	10	58.81	-	-	74	-15.19	49	131	V
2	* ** 2.49047	41.94	Pk	32.4	-24.6	10	59.74	-	-	74	-14.26	49	131	V
3	* ** 2.4835	28.99	ADV	32.5	-24.4	10	47.09	54	-6.91	-	-	49	131	V
4	* ** 2.48763	32.95	ADV	32.5	-24.6	10	50.85	54	-3.15	-	-	49	131	V

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

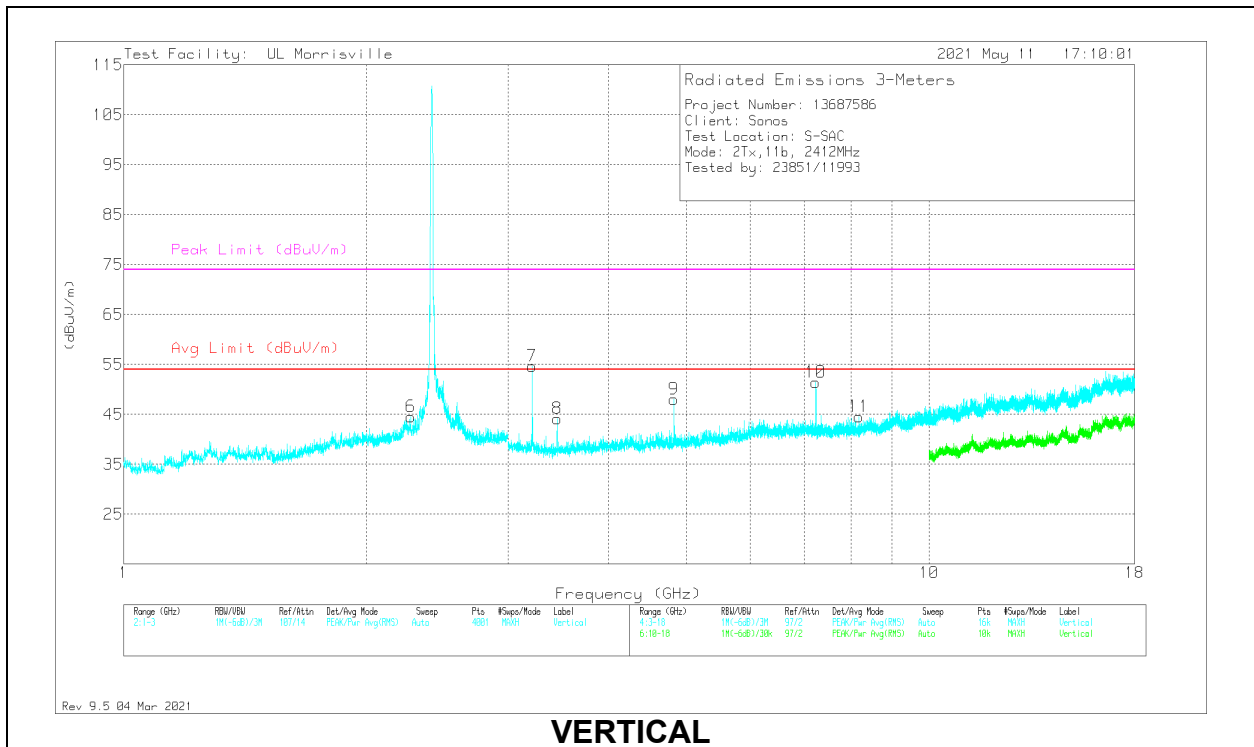
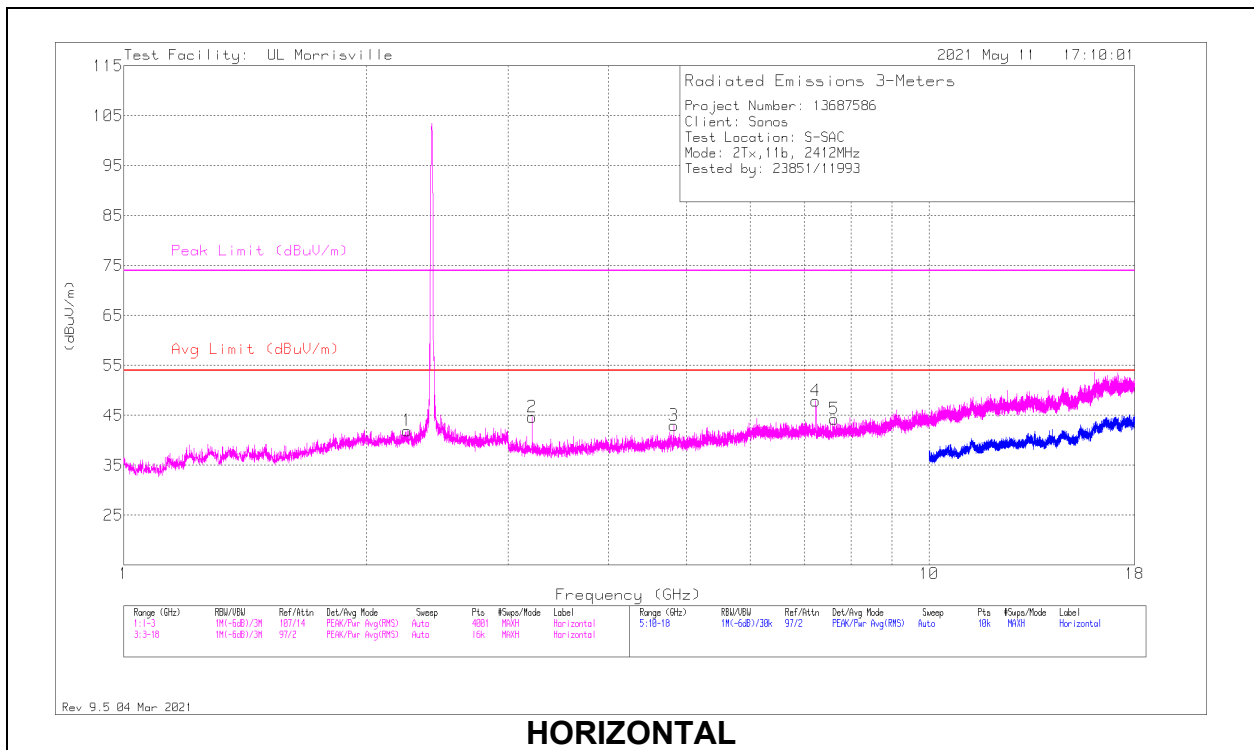
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL, CH 1 RESULTS



**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.2505	33.5	Pk	31.8	-23.4	41.9	54	-12.1	74	-32.1	0-360	101	H
6	*** 2.272	36.24	Pk	31.7	-23.4	44.54	54	-9.46	74	-29.46	0-360	200	V
3	*** 4.82344	39.67	Pk	34.1	-30.8	42.97	54	-11.03	74	-31.03	0-360	101	H
5	*** 7.62188	36.18	Pk	35.6	-27.5	44.28	54	-9.72	74	-29.72	0-360	200	H
9	*** 4.82402	48.57	PK2	34.1	-30.8	51.87	-	-	74	-22.13	76	113	V
	*** 4.82399	39.64	ADV	34.1	-30.8	42.94	54	-11.06	-	-	76	113	V
11	*** 8.17594	35.91	Pk	35.8	-27.2	44.51	54	-9.49	74	-29.49	0-360	101	V
2	3.21563	44.13	Pk	33.3	-32.8	44.63	-	-	-	-	0-360	101	H
7	3.21563	54.13	Pk	33.3	-32.8	54.63	-	-	-	-	0-360	101	V
8	3.45281	44.05	Pk	32.8	-32.7	44.15	-	-	-	-	0-360	101	V
4	7.23469	40.13	Pk	35.6	-27.8	47.93	-	-	-	-	0-360	101	H
10	7.23469	43.56	Pk	35.6	-27.8	51.36	-	-	-	-	0-360	101	V

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

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

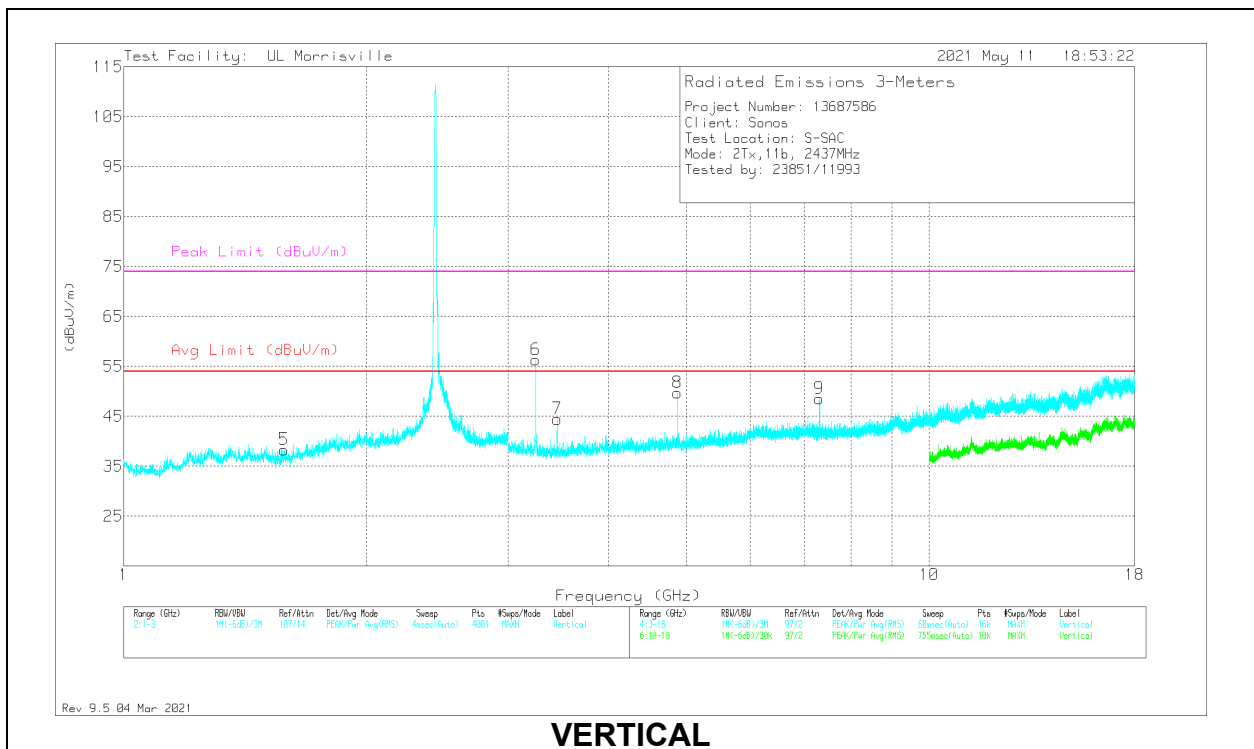
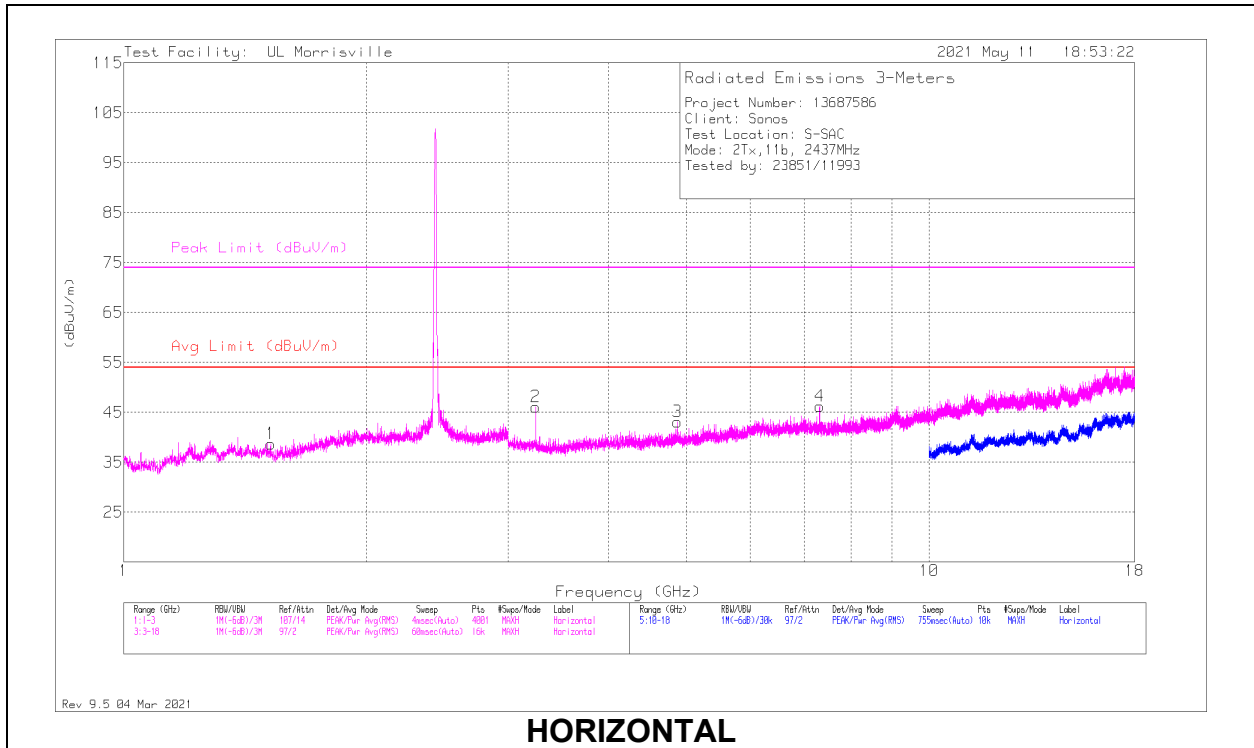
Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average



### MID CHANNEL, CH 6 RESULTS



**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 1.522	32.84	Pk	28.2	-22.4	38.64	54	-15.36	74	-35.36	0-360	200	H
5	** 1.5815	32.66	Pk	28	-22.3	38.36	54	-15.64	74	-35.64	0-360	101	V
3	*** 4.87406	39.77	Pk	34.2	-30.9	43.07	54	-10.93	74	-30.93	0-360	101	H
4	*** 7.3125	37.88	Pk	35.7	-27.4	46.18	54	-7.82	74	-27.82	0-360	101	H
8	*** 4.87401	48.98	PK2	34.2	-30.9	52.28	-	-	74	-21.72	41	131	V
	*** 4.87399	39.97	ADV	34.2	-30.9	43.27	54	-10.73	-	-	41	131	V
9	*** 7.31152	42.83	PK2	35.7	-27.5	51.03	-	-	74	-22.97	155	200	V
	*** 7.31024	36.79	ADV	35.7	-27.5	44.99	54	-9.01	-	-	155	200	V
6	3.24844	56.29	Pk	33.2	-33.1	56.39	-	-	-	-	0-360	101	V
2	3.24938	45.98	Pk	33.2	-33.1	46.08	-	-	-	-	0-360	101	H
7	3.45281	44.37	Pk	32.8	-32.7	44.47	-	-	-	-	0-360	101	V

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

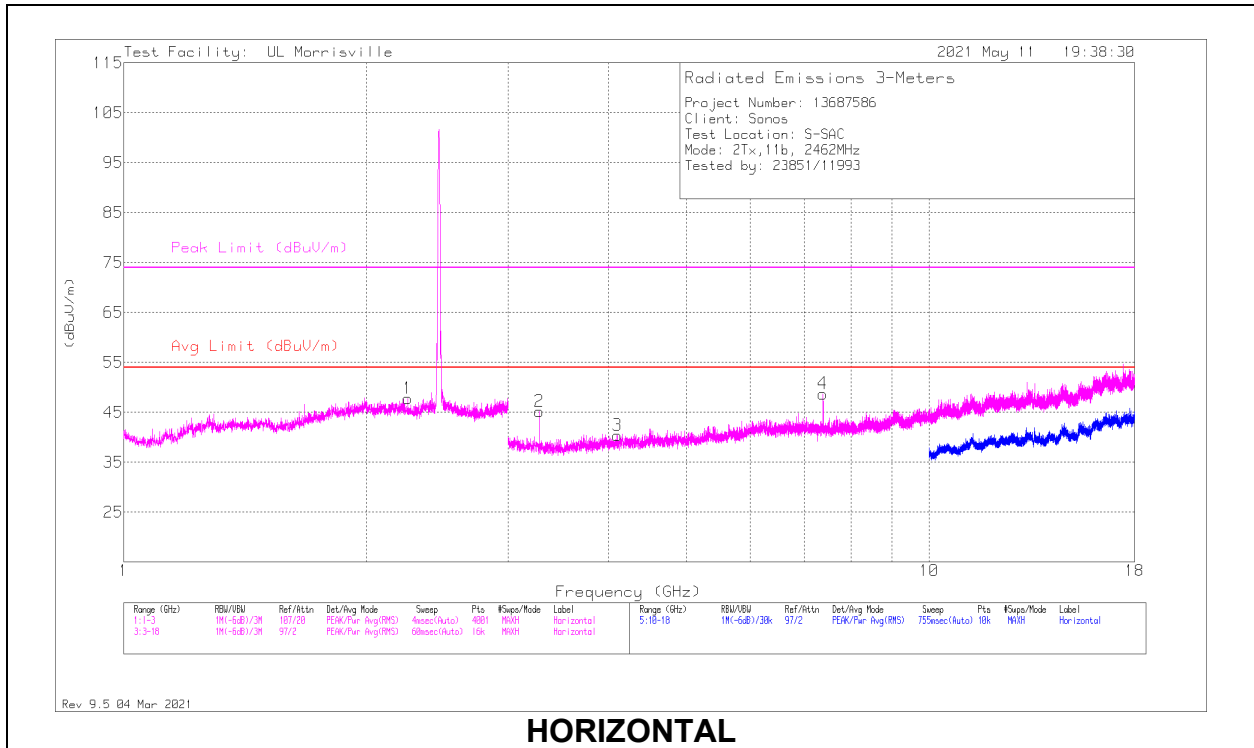
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

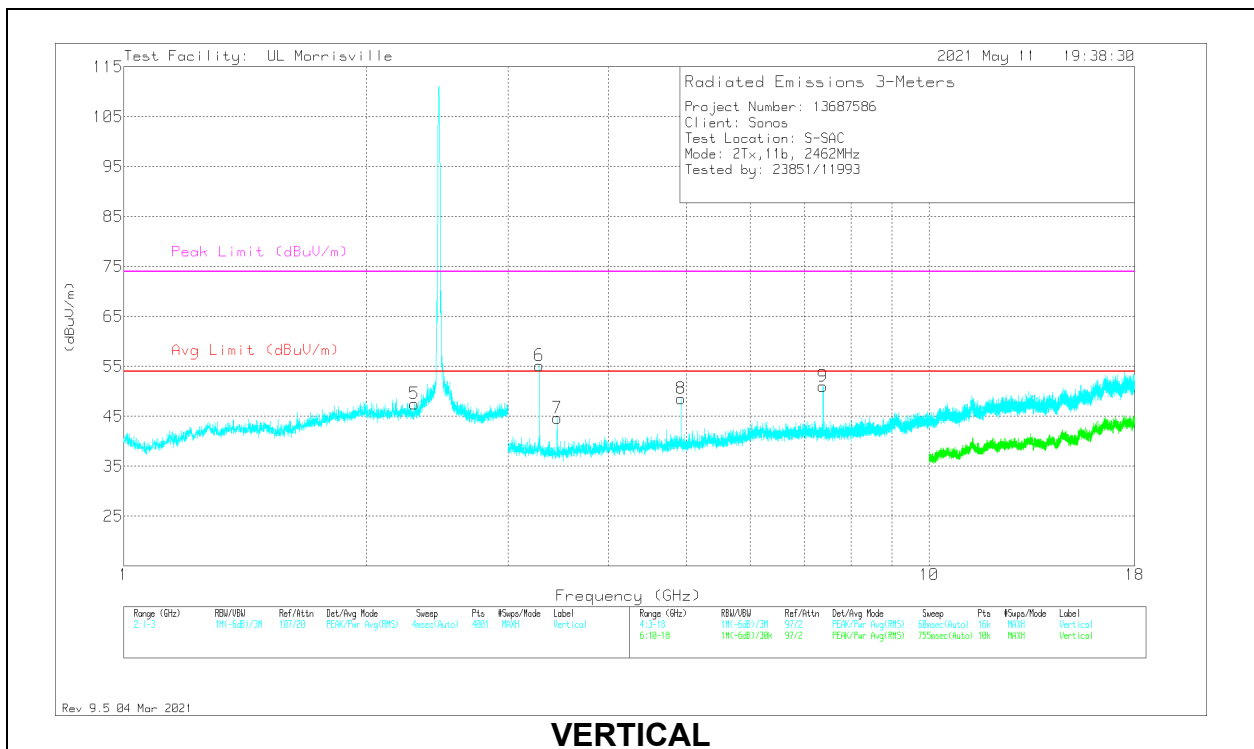
PK2 - Maximum Peak

ADV - Linear Voltage Average

### HIGH CHANNEL, CH 11 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.2535	39.4	Pk	31.8	-23.4	47.8	54	-6.2	74	-26.2	0-360	101	H
5	*** 2.2965	39.26	Pk	31.8	-23.5	47.56	54	-6.44	74	-26.44	0-360	200	V
3	*** 4.09969	38.97	Pk	33.6	-32.2	40.37	54	-13.63	74	-33.63	0-360	199	H
4	*** 7.38746	41.84	PK2	35.7	-27.5	50.04	-	-	74	-23.96	355	114	H
	*** 7.38687	35.14	ADV	35.7	-27.5	43.34	54	-10.66	-	-	355	114	H
8	*** 4.924	48.98	PK2	34.1	-30.9	52.18	-	-	74	-21.82	71	119	V
	*** 4.92401	39.9	ADV	34.1	-30.9	43.1	54	-10.9	-	-	71	119	V
9	*** 7.38517	45.41	PK2	35.7	-27.5	53.61	-	-	74	-20.39	156	201	V
	*** 7.38675	40.01	ADV	35.7	-27.5	48.21	54	-5.79	-	-	156	201	V
2	3.28219	45.2	Pk	33	-33	45.2	-	-	-	-	0-360	199	H
6	3.28219	55.23	Pk	33	-33	55.23	-	-	-	-	0-360	101	V
7	3.45281	44.58	Pk	32.8	-32.7	44.68	-	-	-	-	0-360	101	V

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

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

Pk - Peak detector

PK2 - Maximum Peak

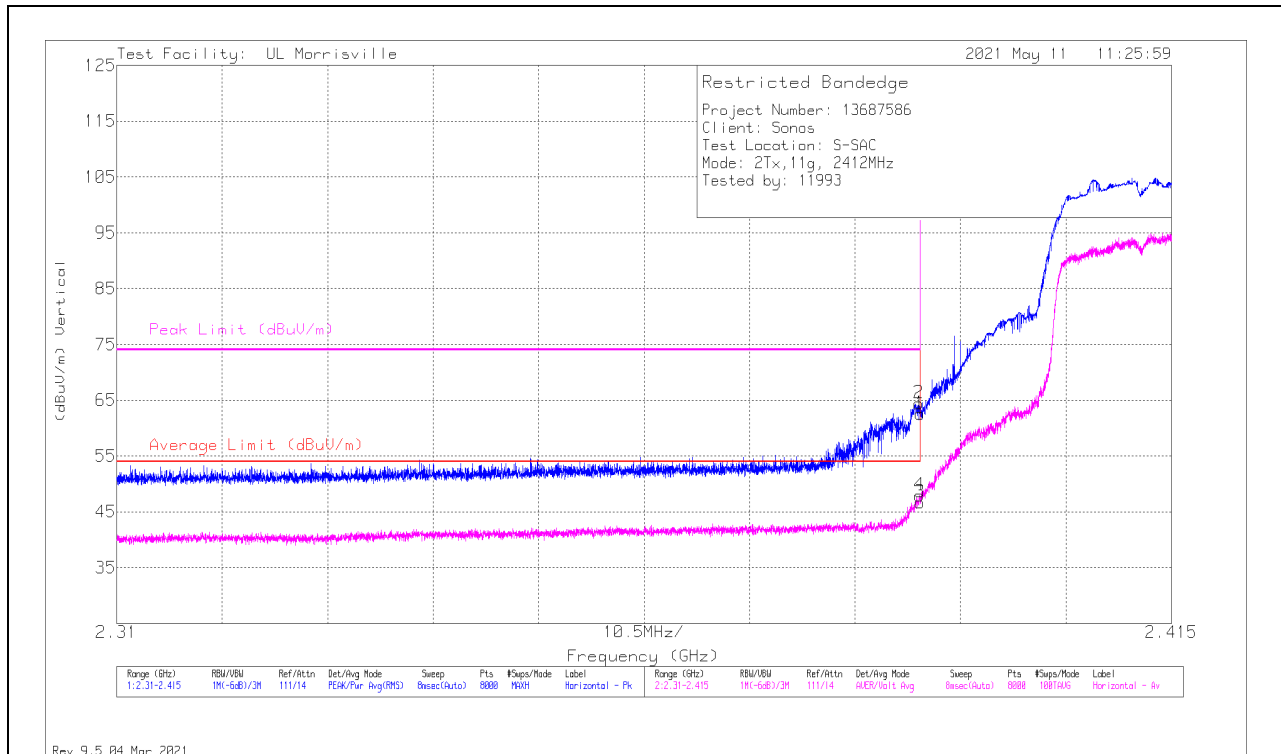
ADV - Linear Voltage Average

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

#### 2TX Chain 0 + Chain 1 CDD MODE

#### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	44.68	Pk	31.9	-24	10	0	62.58	-	-	74	-11.42	283	147	H
2	* ** 2.38984	46.59	Pk	31.9	-24	10	0	64.49	-	-	74	-9.51	283	147	H
3	* ** 2.39	26.9	ADV	31.9	-24	10	1.84	46.64	54	-7.36	-	-	283	147	H
4	* ** 2.38992	28.21	ADV	31.9	-24	10	1.84	47.95	54	-6.05	-	-	283	147	H

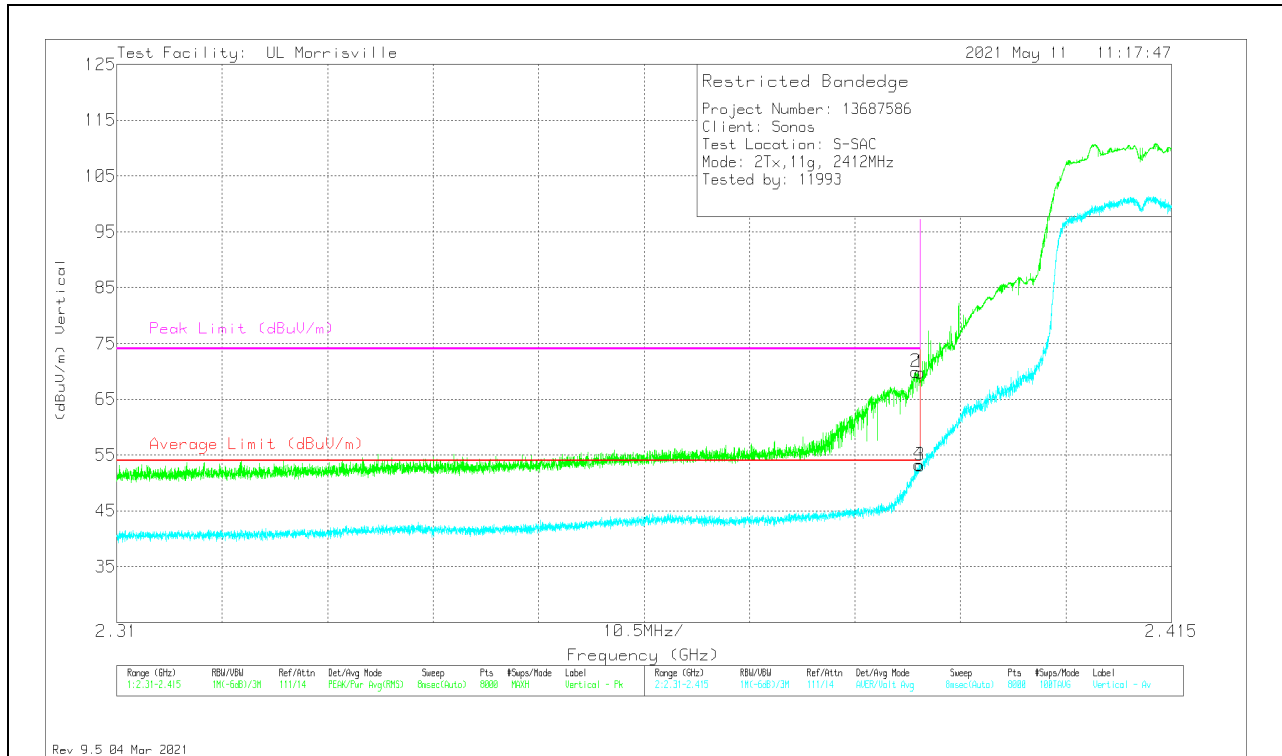
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	51.94	Pk	31.9	-24	10	0	69.84	-	-	74	-4.16	56	203	V
2	* ** 2.38952	51.96	Pk	31.9	-24	10	0	69.86	-	-	74	-4.14	56	203	V
3	* ** 2.39	33.44	ADV	31.9	-24	10	1.84	53.18	54	-82	-	-	56	203	V
4	* ** 2.38988	33.52	ADV	31.9	-24	10	1.84	53.26	54	-74	-	-	56	203	V

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

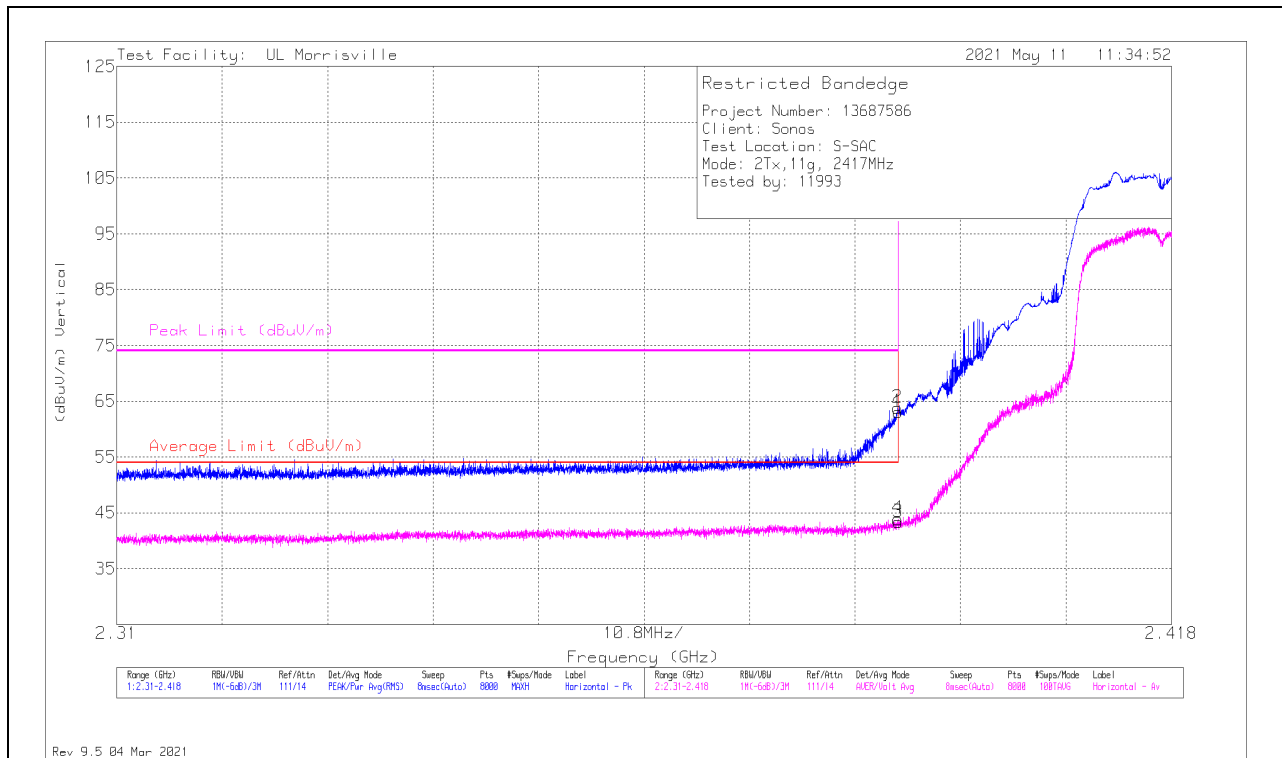
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

**BANDEDGE (LOW CHANNEL, CH 2)**

**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	45.14	Pk	31.9	-24	10	0	63.04	-	-	74	-10.96	284	197	H
2	* ** 2.38997	45.9	Pk	31.9	-24	10	0	63.8	-	-	74	-10.2	284	197	H
3	* ** 2.39	23.56	ADV	31.9	-24	10	1.84	43.3	54	-10.7	-	-	284	197	H
4	* ** 2.38999	24.16	ADV	31.9	-24	10	1.84	43.9	54	-10.1	-	-	284	197	H

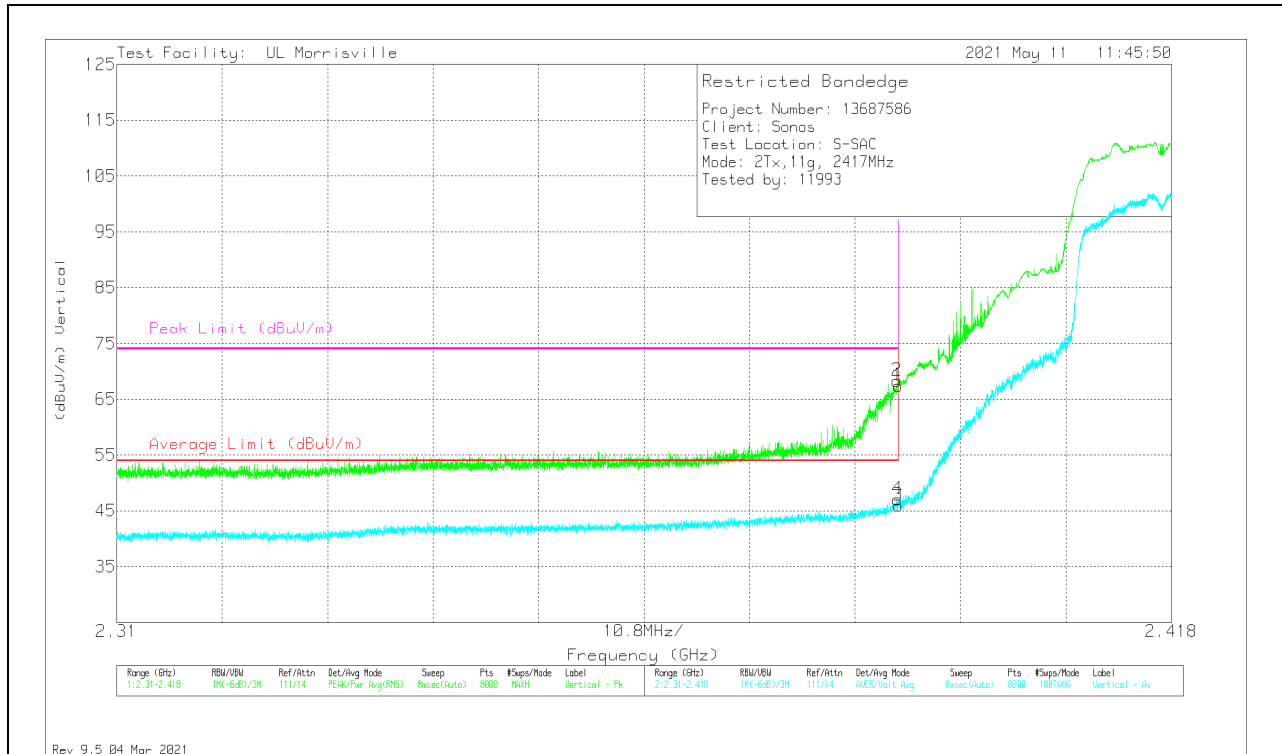
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	49.56	Pk	31.9	-24	10	0	67.46	-	-	74	-6.54	48	187	V
2	* ** 2.3899	50.37	Pk	31.9	-24	10	0	68.27	-	-	74	-5.73	48	187	V
3	* ** 2.39	26.21	ADV	31.9	-24	10	1.84	45.95	54	-8.05	-	-	48	187	V
4	* ** 2.38997	27.38	ADV	31.9	-24	10	1.84	47.12	54	-6.88	-	-	48	187	V

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

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

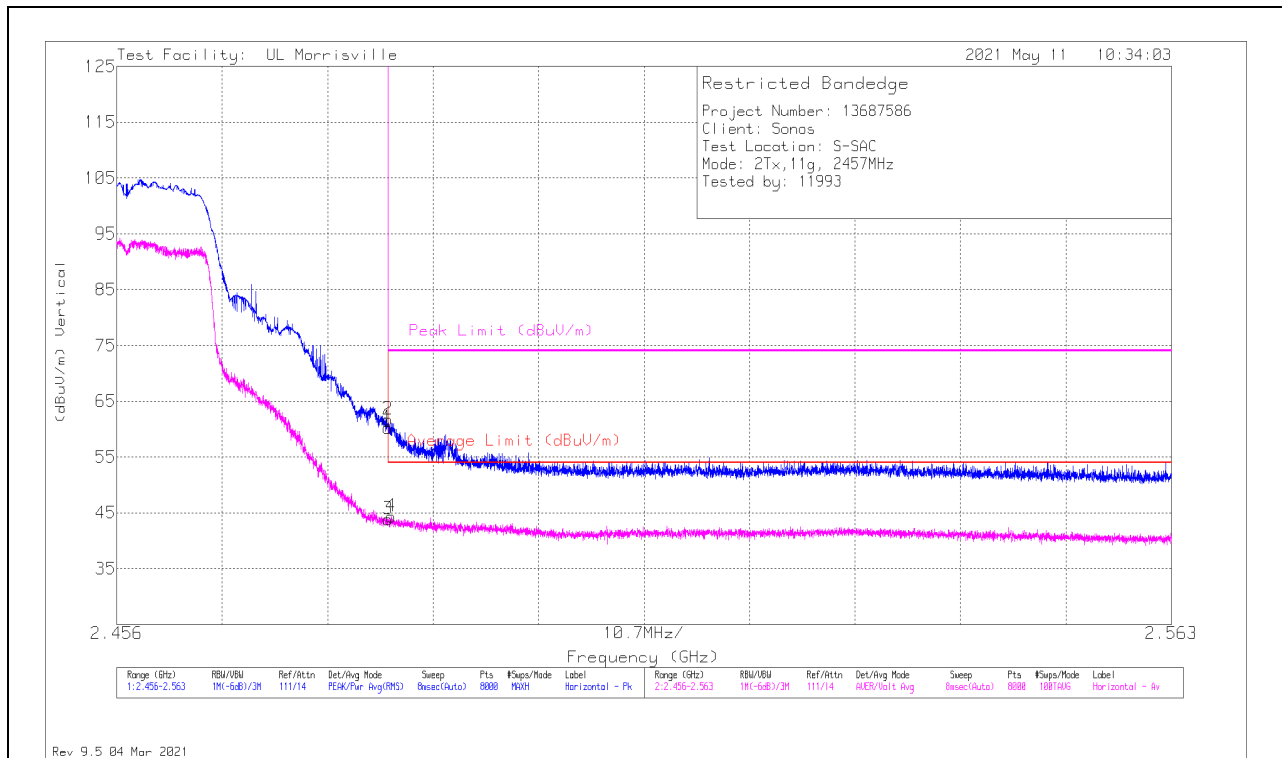
Pk - Peak detector

ADV - Linear Voltage Average



**BANDEDGE (HIGH CHANNEL, CH 10)**

**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	42.08	Pk	32.5	-24.4	10	0	60.18	-	-	74	-13.82	286	180	H
2	* ** 2.48353	43.6	Pk	32.5	-24.4	10	0	61.7	-	-	74	-12.3	286	180	H
3	* ** 2.4835	23.88	ADV	32.5	-24.4	10	1.84	43.82	54	-10.18	-	-	286	180	H
4	* ** 2.48381	24.39	ADV	32.5	-24.4	10	1.84	44.33	54	-9.67	-	-	286	180	H

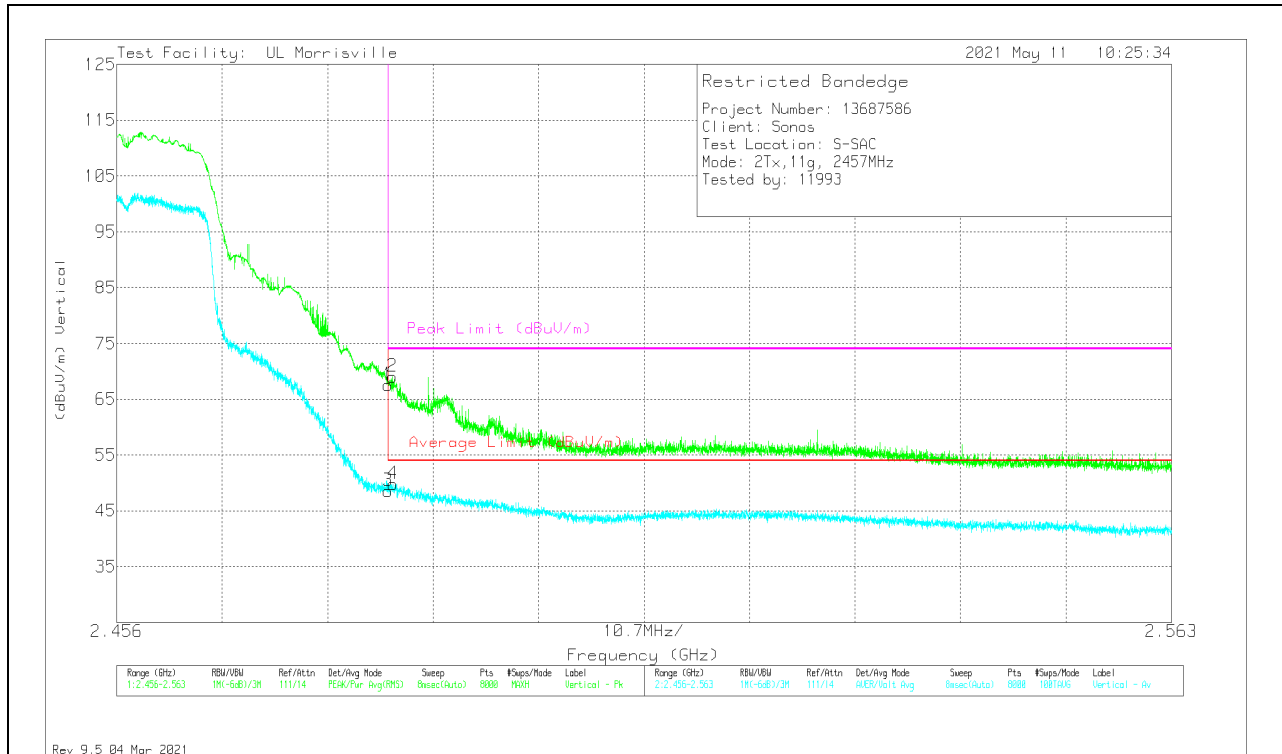
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	49.42	Pk	32.5	-24.4	10	0	67.52	-	-	74	-6.48	54	133	V
2	* ** 2.48397	50.97	Pk	32.5	-24.4	10	0	69.07	-	-	74	-4.93	54	133	V
3	* ** 2.4835	28.67	ADV	32.5	-24.4	10	1.84	48.61	54	-5.39	-	-	54	133	V
4	* ** 2.48404	29.84	ADV	32.5	-24.4	10	1.84	49.78	54	-4.22	-	-	54	133	V

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

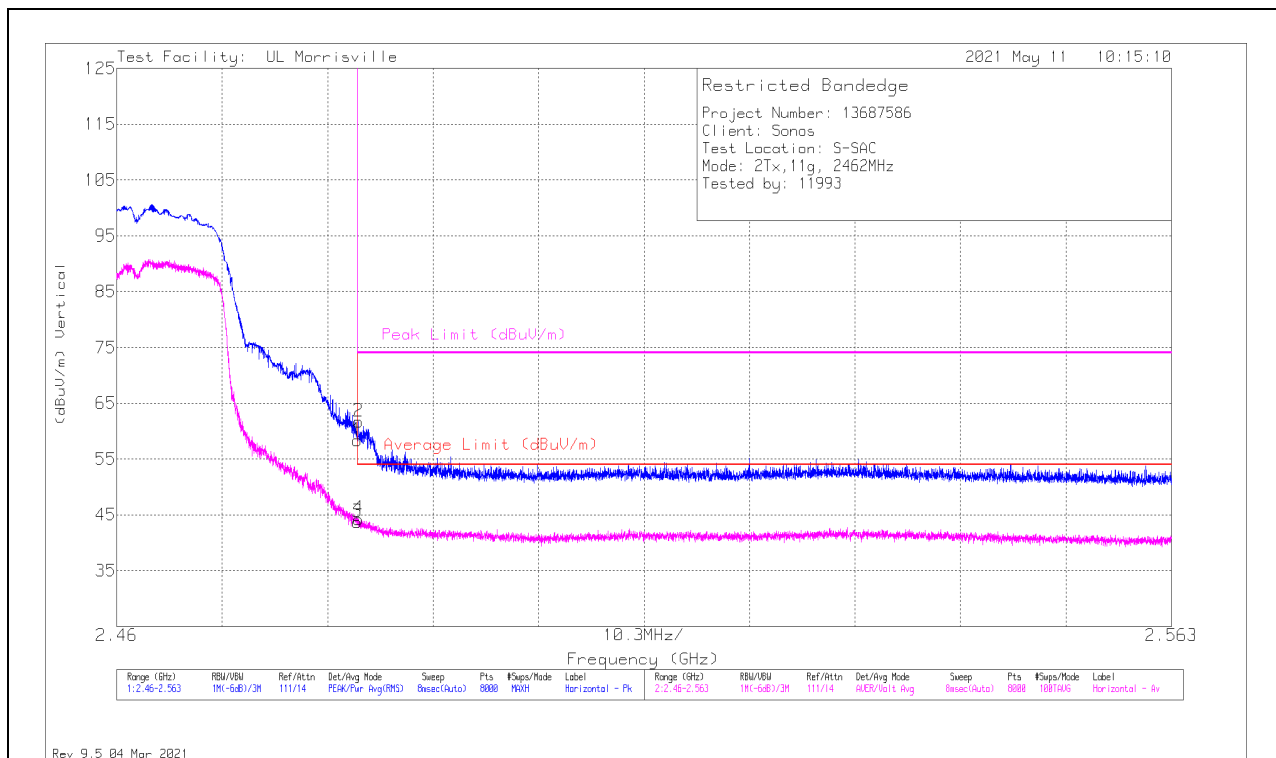
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

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/Filtr/Pad (dB)	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	40.31	Pk	32.5	-24.4	10	0	58.41	-	-	74	-15.59	170	146	H
2	* ** 2.48362	43.56	Pk	32.5	-24.4	10	0	61.66	-	-	74	-12.34	170	146	H
3	* ** 2.4835	23.75	ADV	32.5	-24.4	10	1.84	43.69	54	-10.31	-	-	170	146	H
4	* ** 2.48359	24.33	ADV	32.5	-24.4	10	1.84	44.27	54	-9.73	-	-	170	146	H

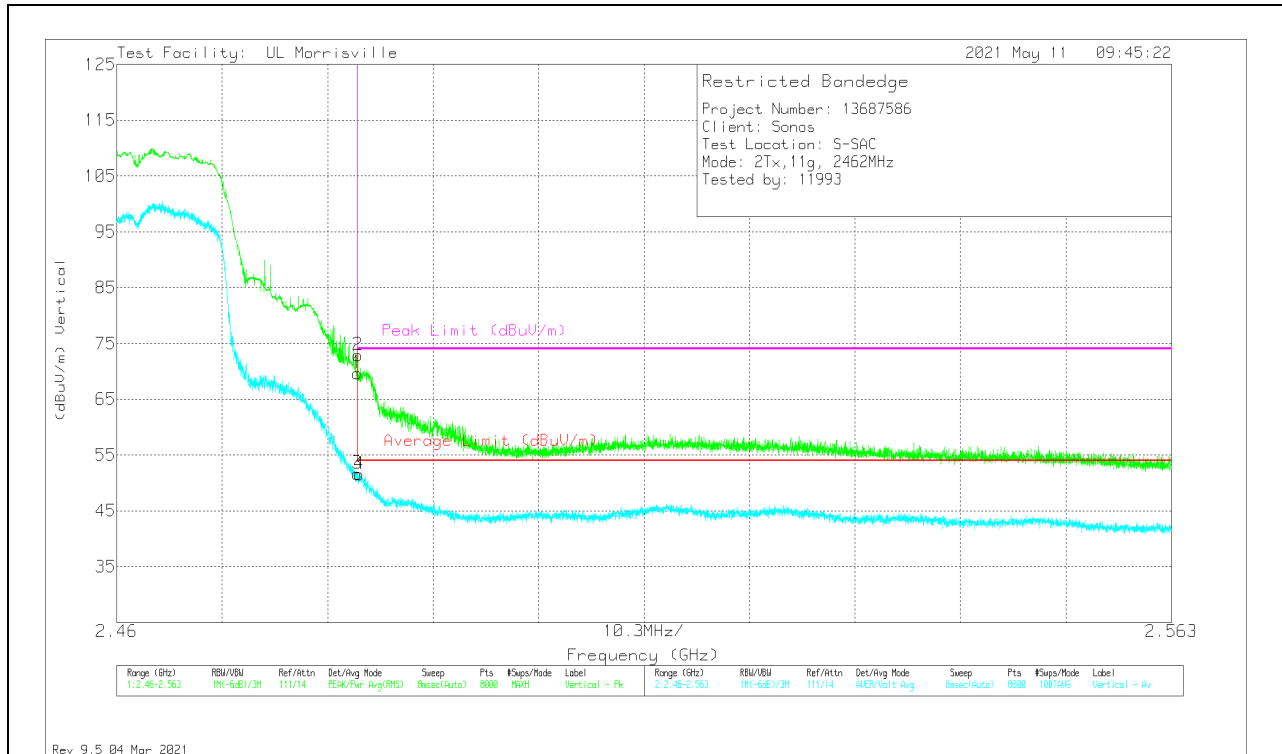
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	51.55	Pk	32.5	-24.4	10	0	69.65	-	-	74	-4.35	46	212	V
2	*** 2.48355	54.83	Pk	32.5	-24.4	10	0	72.93	-	-	74	-1.07	46	212	V
3	*** 2.4835	31.73	ADV	32.5	-24.4	10	1.84	51.67	54	-2.33	-	-	46	212	V
4	*** 2.48371	31.54	ADV	32.5	-24.4	10	1.84	51.48	54	-2.52	-	-	46	212	V

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

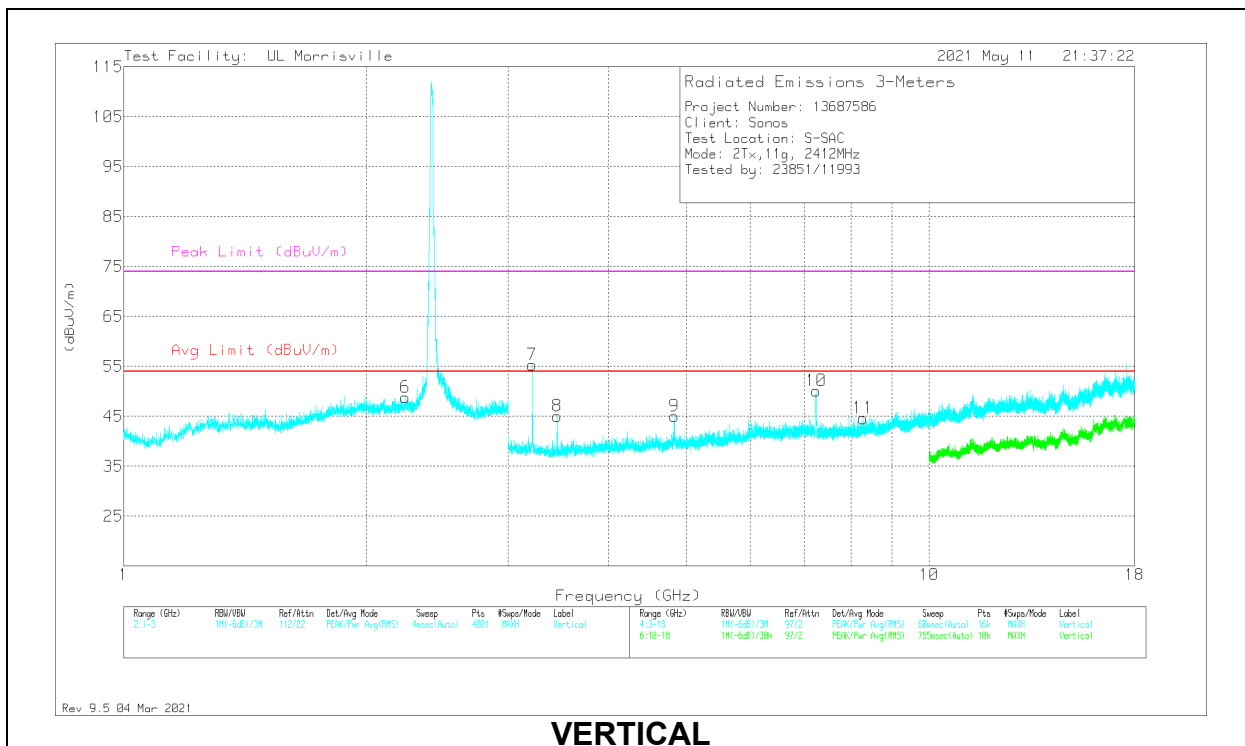
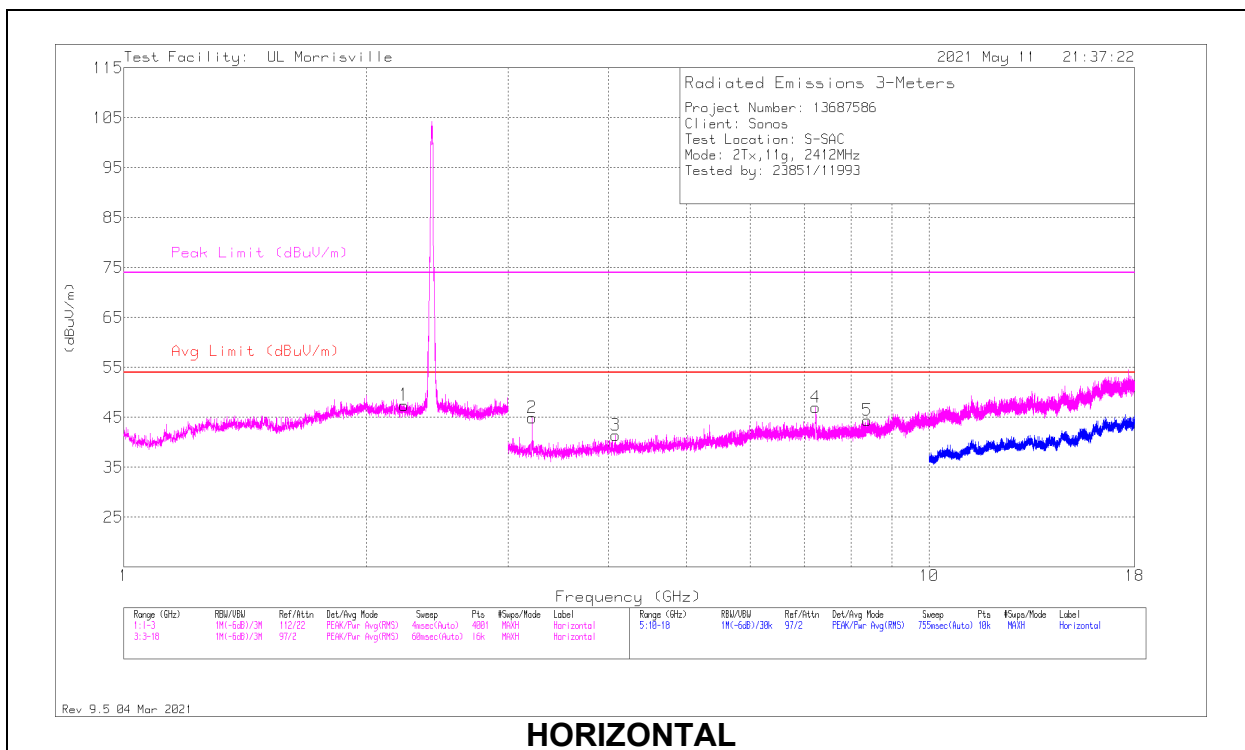
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL, CH 1 RESULTS



**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/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	* ** 2.2295	38.85	Pk	31.8	-23.2	0	47.45	54	-6.55	74	-26.55	0-360	199	H
6	* ** 2.2394	41.36	PK2	31.8	-23.3	0	49.86	-	-	74	-24.14	83	221	V
	* ** 2.23886	29.12	ADV	31.8	-23.3	1.84	39.46	54	-14.54	-	-	83	221	V
3	* ** 4.07813	40.45	Pk	33.6	-32.6	0	41.45	54	-12.55	74	-32.55	0-360	199	H
5	* ** 8.38781	35.72	Pk	35.8	-27.1	0	44.42	54	-9.58	74	-29.58	0-360	101	H
9	* ** 4.83094	41.68	Pk	34.2	-30.8	0	45.08	54	-8.92	74	-28.92	0-360	101	V
11	* ** 8.28094	36.2	Pk	35.9	-27.5	0	44.6	54	-9.4	74	-29.4	0-360	101	V
2	3.21563	44.48	Pk	33.3	-32.8	0	44.98	-	-	-	-	0-360	101	H
7	3.21563	54.86	Pk	33.3	-32.8	0	55.36	-	-	-	-	0-360	101	V
8	3.45281	44.99	Pk	32.8	-32.7	0	45.09	-	-	-	-	0-360	101	V
4	7.23281	39.18	Pk	35.6	-27.8	0	46.98	-	-	-	-	0-360	101	H
10	7.23984	42.16	Pk	35.6	-27.7	0	50.06	-	-	-	-	0-360	199	V

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

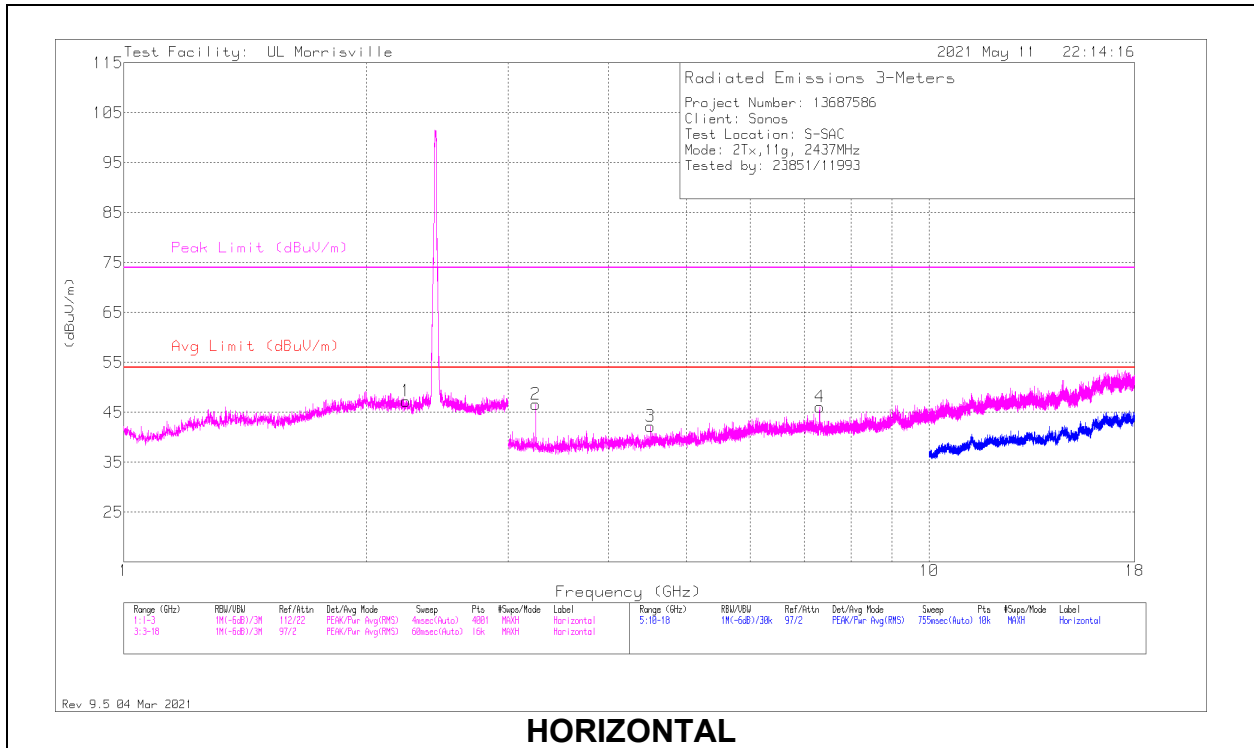
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

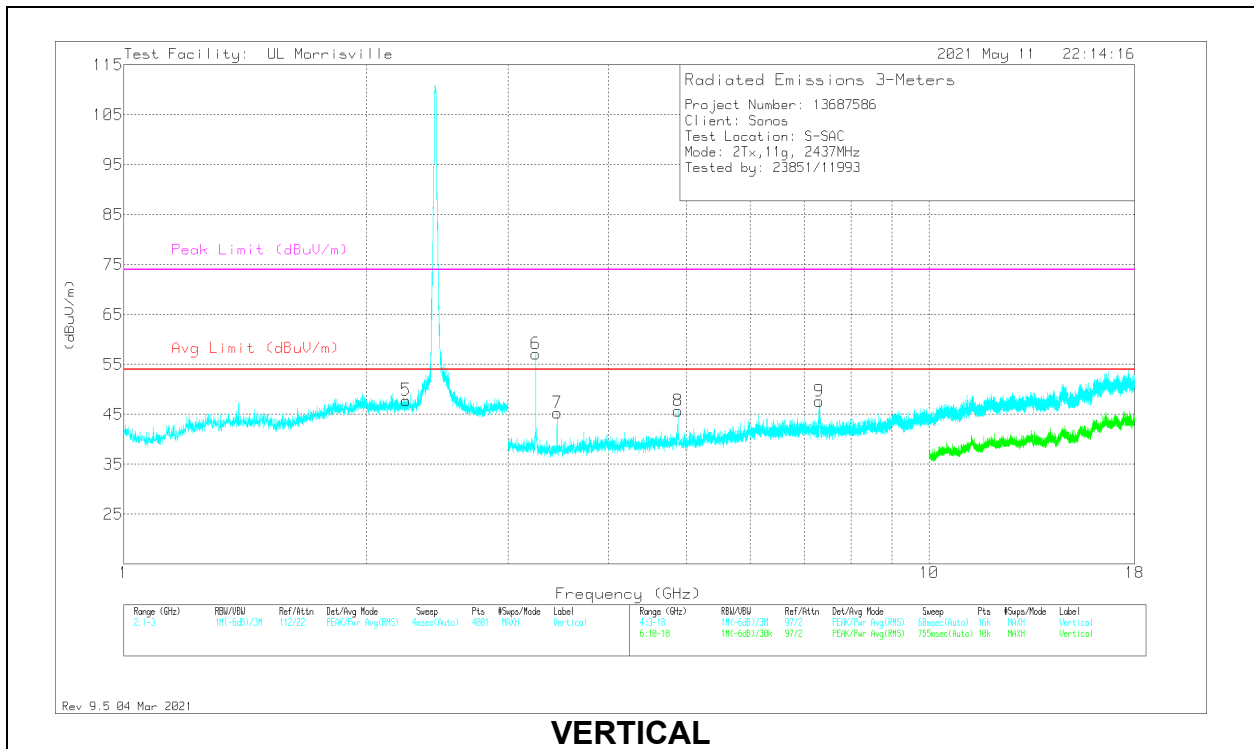
PK2 - Maximum Peak

ADV - Linear Voltage Average

### MID CHANNEL, CH 6 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.243	38.81	Pk	31.8	-23.3	47.31	54	-6.69	74	-26.69	0-360	200	H
5	** 2.24	39.34	Pk	31.8	-23.3	47.84	54	-6.16	74	-26.16	0-360	200	V
3	*** 4.51219	39.64	Pk	34	-31.4	42.24	54	-11.76	74	-31.76	0-360	101	H
4	*** 7.3125	37.83	Pk	35.7	-27.4	46.13	54	-7.87	74	-27.87	0-360	101	H
8	*** 4.87969	42.31	Pk	34.2	-30.8	45.71	54	-8.29	74	-28.29	0-360	101	V
9	*** 7.30875	39.43	Pk	35.7	-27.5	47.63	54	-6.37	74	-26.37	0-360	101	V
2	3.24844	46.46	Pk	33.2	-33.1	46.56	-	-	-	-	0-360	200	H
6	3.24938	56.99	Pk	33.2	-33.1	57.09	-	-	-	-	0-360	101	V
7	3.45281	45.22	Pk	32.8	-32.7	45.32	-	-	-	-	0-360	101	V

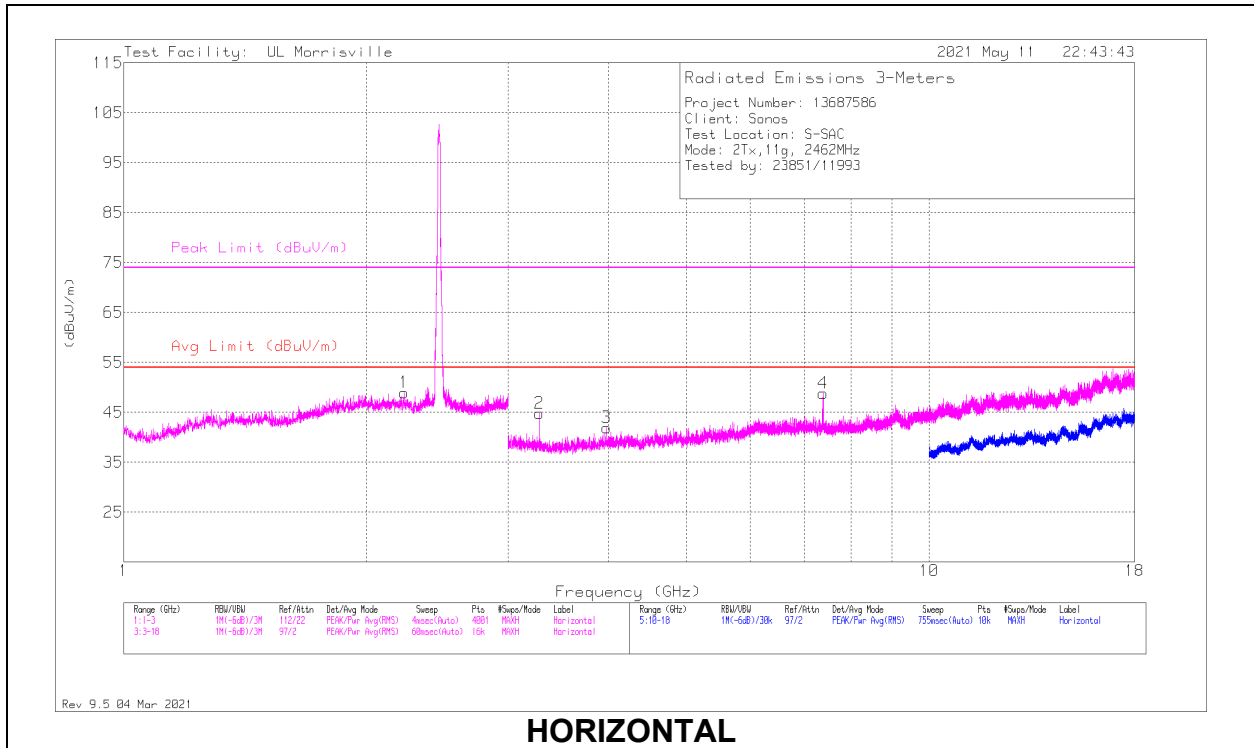
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

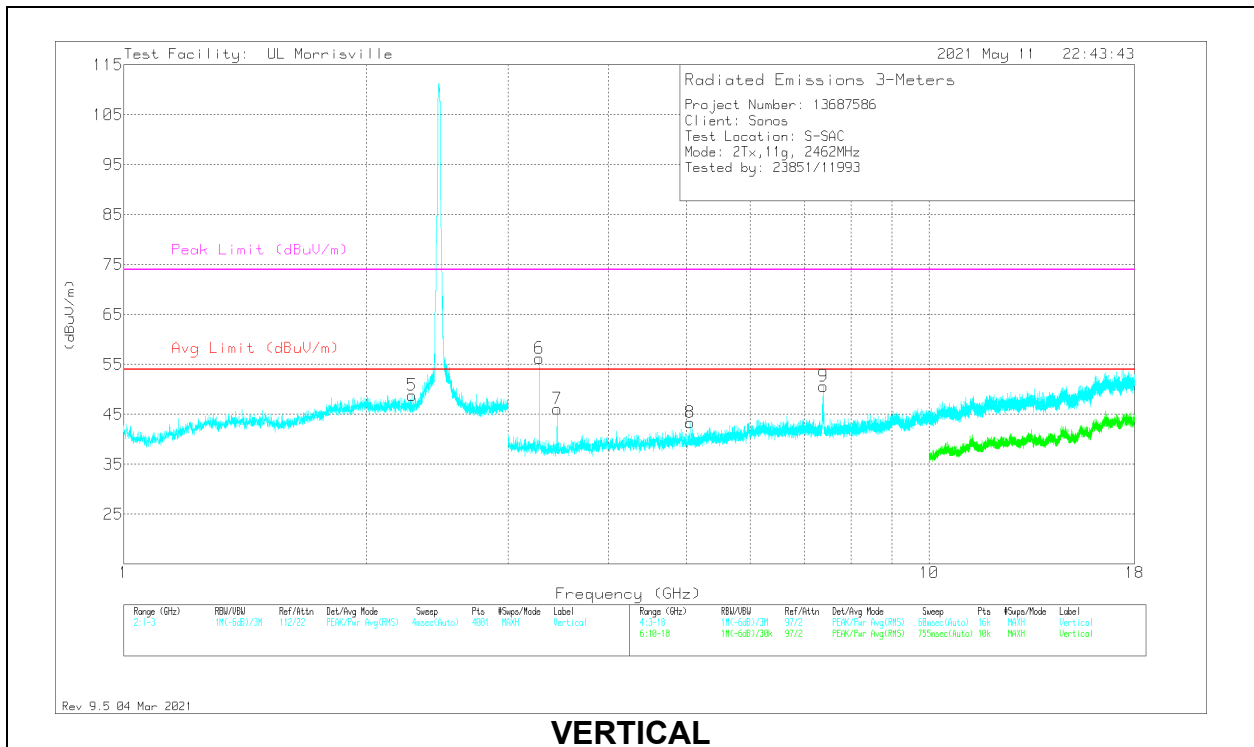
Pk - Peak detector



### HIGH CHANNEL, CH 11 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/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	* ** 2.23111	41.02	PK2	31.8	-23.3	0	49.52	-	-	74	-24.48	0	256	H
	* ** 2.23016	28.39	ADV	31.8	-23.3	1.84	38.73	54	15.27	-	-	0	256	H
5	* ** 2.28377	41.48	PK2	31.4	-23.5	0	49.38	-	-	74	-24.62	18	204	V
	* ** 2.28398	28.99	ADV	31.4	-23.5	1.84	38.73	54	15.27	-	-	18	204	V
3	* ** 3.975	40.08	Pk	33.6	-31.7	0	41.98	54	-12.02	74	-32.02	0-360	199	H
4	* ** 7.3874	44.74	PK2	35.7	-27.5	0	52.94	-	-	74	-21.06	356	104	H
	* ** 7.38734	29.56	ADV	35.7	-27.5	1.84	39.6	54	-14.4	-	-	356	104	H
8	* ** 5.05125	40.32	Pk	34.3	-31.2	0	43.42	54	-10.58	74	-30.58	0-360	101	V
9	* ** 7.39225	45.02	PK2	35.7	-27.5	0	53.22	-	-	74	-20.78	164	219	V
	* ** 7.39214	30.06	ADV	35.7	-27.5	1.84	40.1	54	-13.9	-	-	164	219	V
2	3.28219	44.85	Pk	33	-33	0	44.85	-	-	-	-	0-360	101	H
6	3.28219	56.27	Pk	33	-33	0	56.27	-	-	-	-	0-360	101	V
7	3.45281	46.02	Pk	32.8	-32.7	0	46.12	-	-	-	-	0-360	101	V

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

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

Pk - Peak detector

PK2 - Maximum Peak

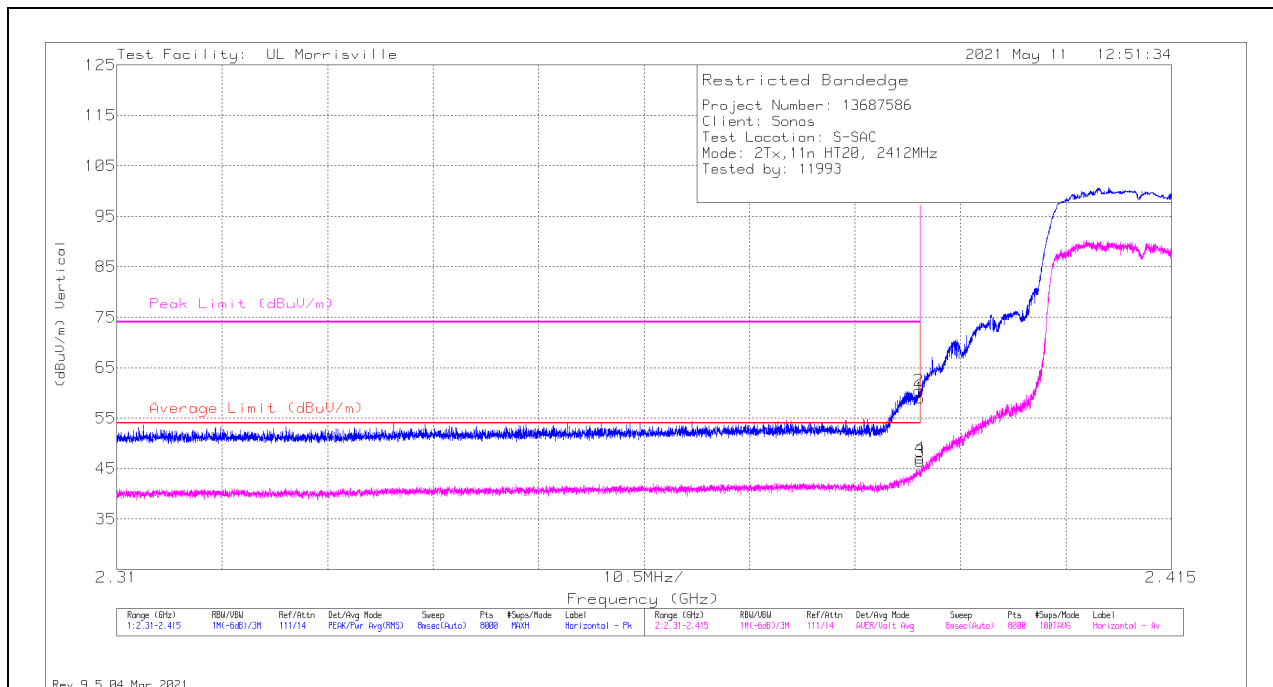
ADV - Linear Voltage Average

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

#### 2TX Antenna 1 + Antenna 2 CDD MODE

#### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	41.07	Pk	31.9	-24	10	0	58.97	-	-	74	-15.03	150	275	H
2	* ** 2.38983	42.54	Pk	31.9	-24	10	0	60.44	-	-	74	-13.56	150	275	H
3	* ** 2.39	26.42	ADV	31.9	-24	10	2.12	46.44	54	-7.56	-	-	150	275	H
4	* ** 2.38998	27.05	ADV	31.9	-24	10	2.12	47.07	54	-6.93	-	-	150	275	H

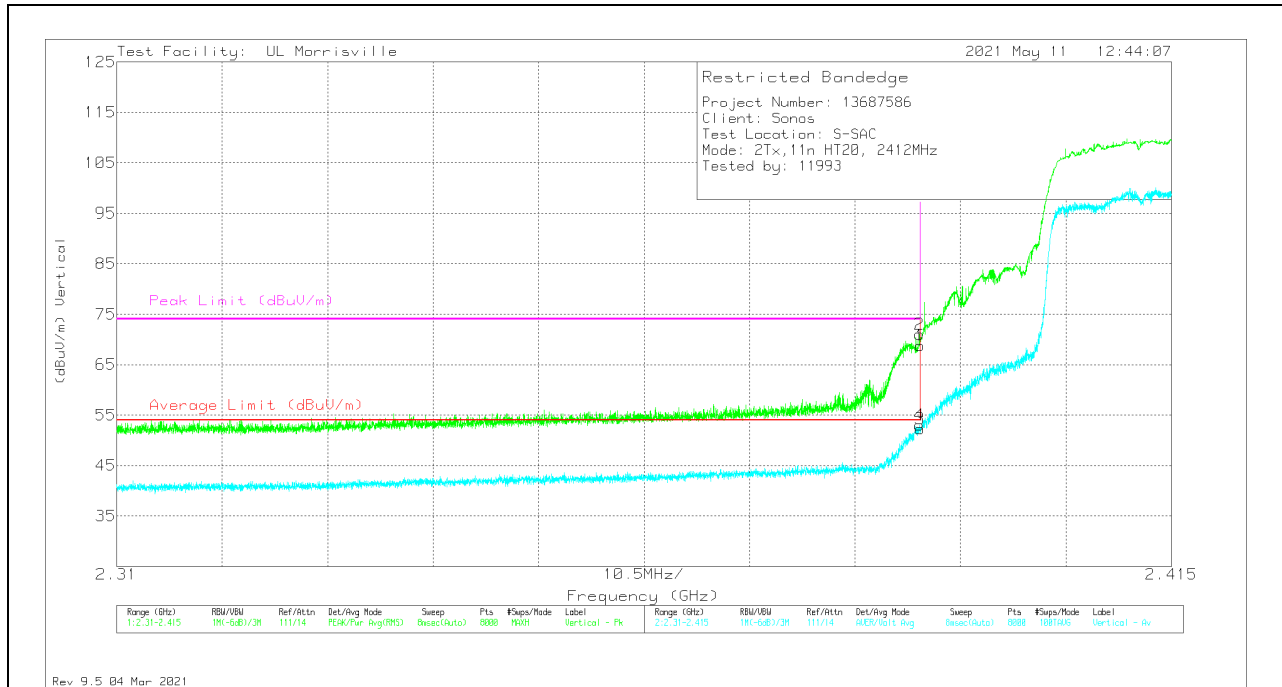
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	50.87	Pk	31.9	-24	10	0	68.77	-	-	74	-5.23	29	108	V
2	* ** 2.38989	53.16	Pk	31.9	-24	10	0	71.06	-	-	74	-2.94	29	108	V
3	* ** 2.39	32.26	ADV	31.9	-24	10	2.12	52.28	54	-1.72	-	-	29	108	V
4	* ** 2.3899	32.95	ADV	31.9	-24	10	2.12	52.97	54	-1.03	-	-	29	108	V

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

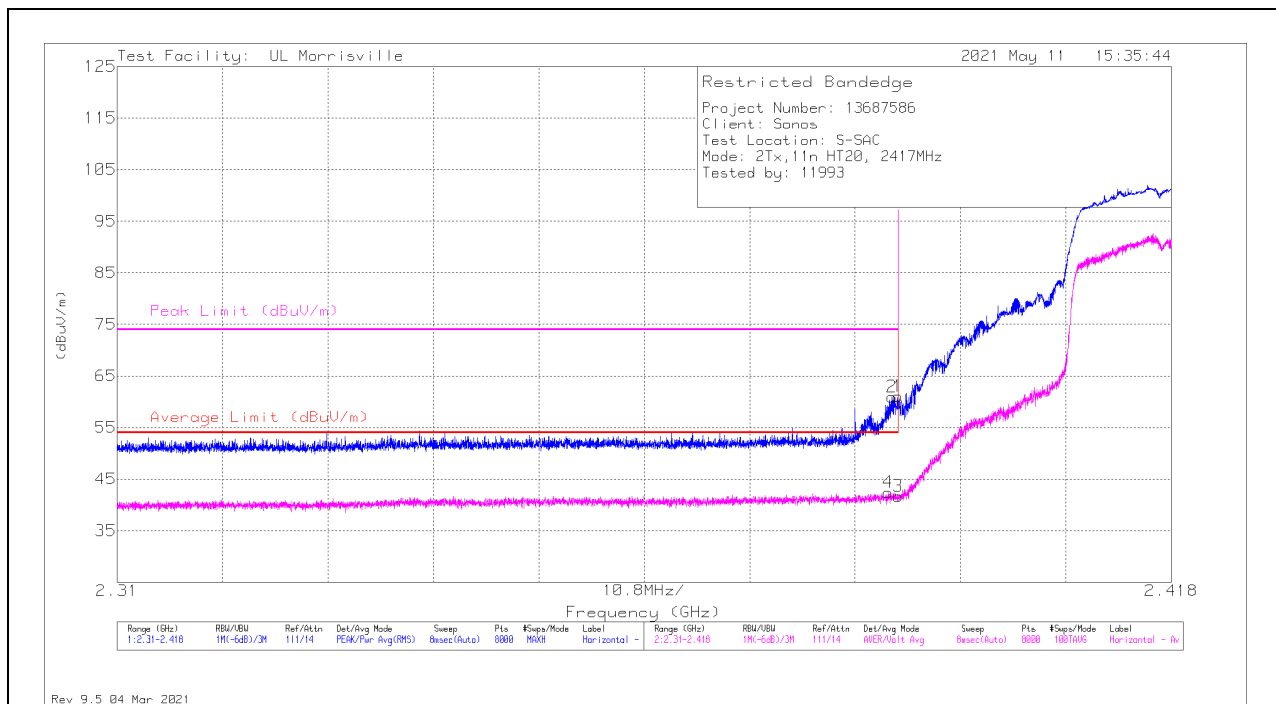
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

**BANDEDGE (LOW CHANNEL, CH 2)**

**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	43.15	Pk	31.9	-24	10	0	61.05	-	-	74	-12.95	160	312	H
2	* ** 2.38938	43.05	Pk	31.9	-24	10	0	60.95	-	-	74	-13.05	160	312	H
3	* ** 2.39	21.67	ADV	31.9	-24	10	2.12	41.69	54	-12.31	-	-	160	311	H
4	* ** 2.38896	22.43	ADV	31.9	-24	10	2.12	42.45	54	-11.55	-	-	160	311	H

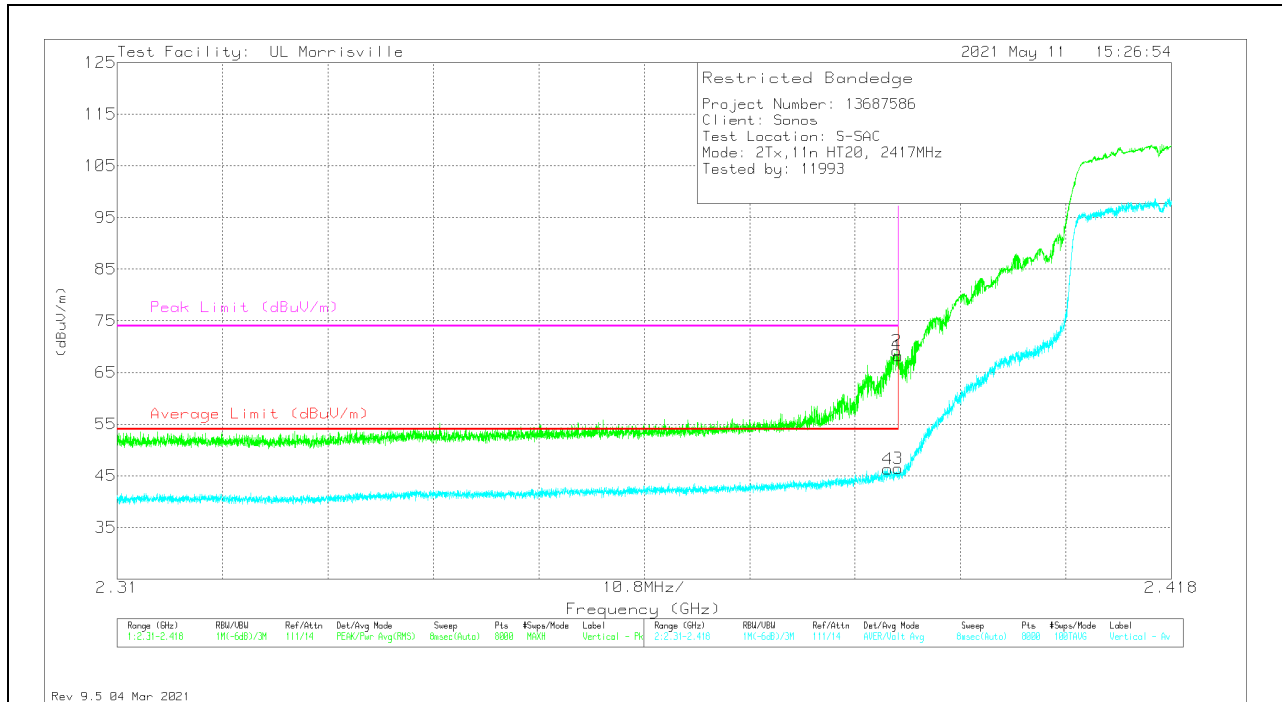
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	50.32	Pk	31.9	-24	10	0	68.22	-	-	74	-5.78	59	286	V
2	* ** 2.38989	51.29	Pk	31.9	-24	10	0	69.19	-	-	74	-4.81	59	286	V
3	* ** 2.39	26.38	ADV	31.9	-24	10	2.12	46.4	54	-7.6	-	-	59	286	V
4	* ** 2.38895	26.28	ADV	31.9	-24	10	2.12	46.3	54	-7.7	-	-	59	286	V

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

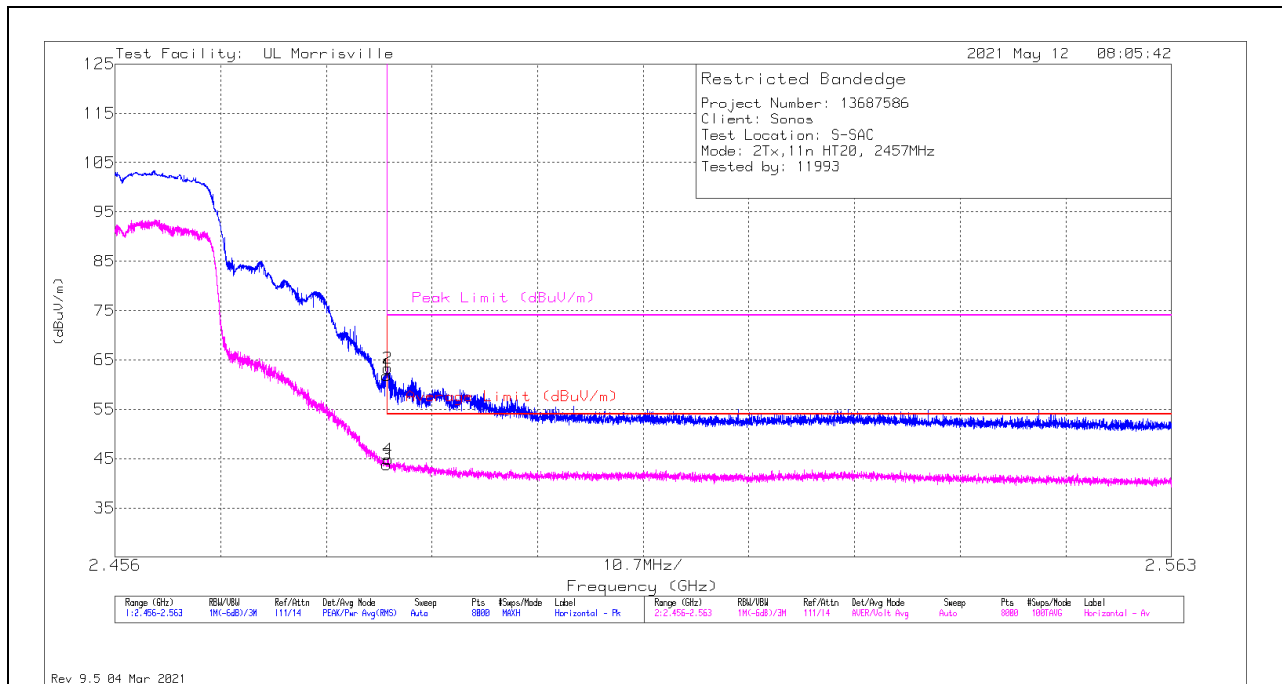
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

**BANDEDGE (HIGH CHANNEL, CH 10)**

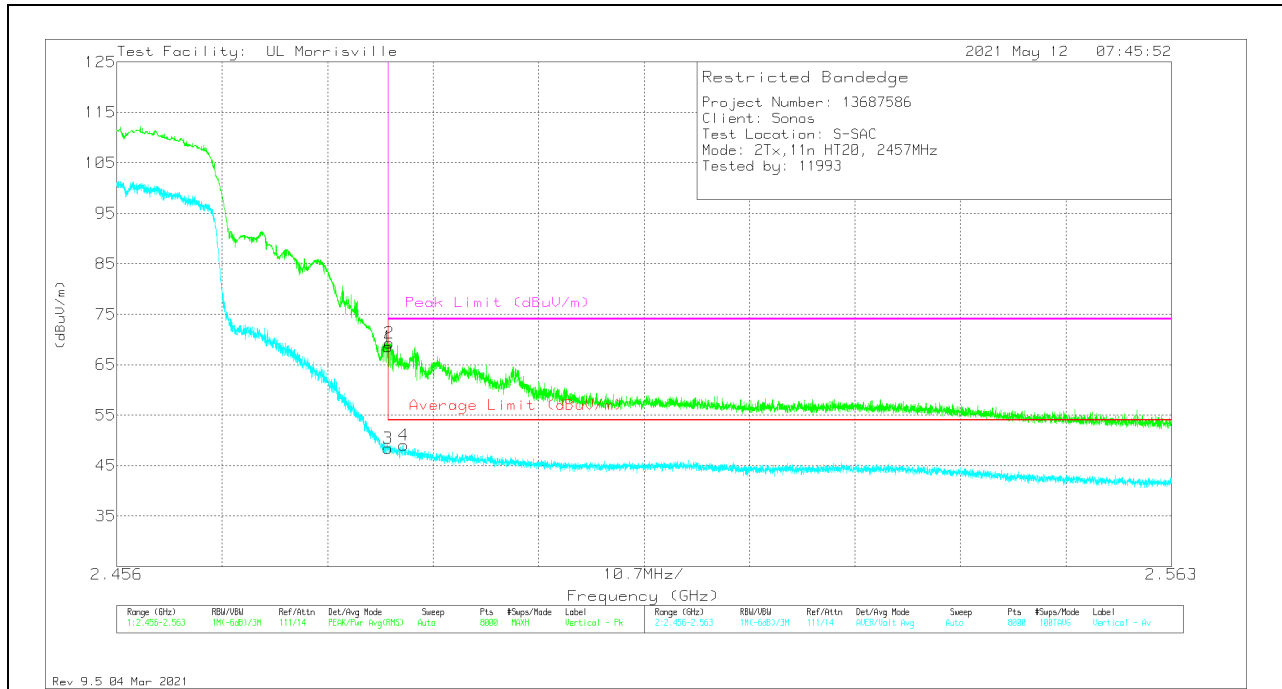
**HORIZONTAL RESULT**



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	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	43.7	Pk	32.5	-24.4	10	0	61.8	-	-	74	-12.2	284	200	H
2	* ** 2.48362	45.23	Pk	32.5	-24.4	10	0	63.33	-	-	74	-10.67	284	200	H
3	* ** 2.4835	23.59	ADV	32.5	-24.4	10	2.12	43.81	54	-10.19	-	-	284	200	H
4	* ** 2.48366	24.7	ADV	32.5	-24.4	10	2.12	44.92	54	-9.08	-	-	284	200	H

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

### VERTICAL RESULT



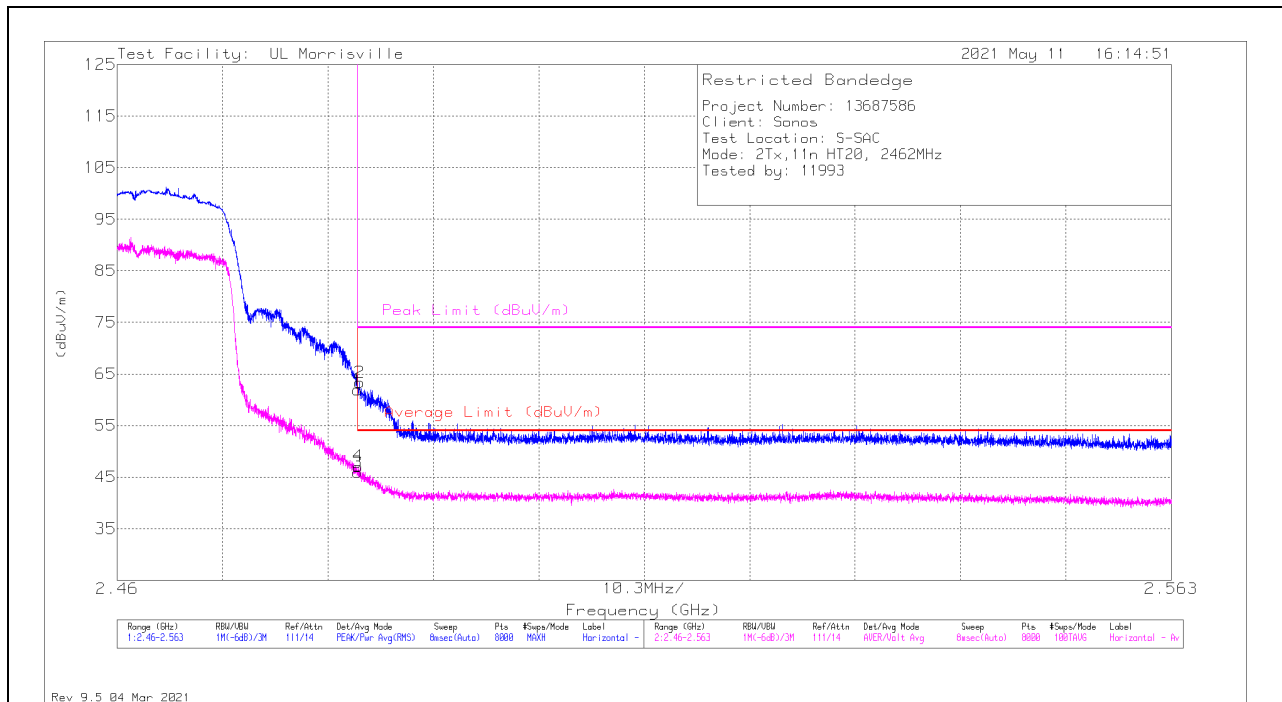
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	50.39	Pk	32.5	-24.4	10	0	68.49	-	-	74	-5.51	5	105	V
2	* ** 2.48368	51.18	Pk	32.5	-24.4	10	0	69.28	-	-	74	-4.72	5	105	V
3	* ** 2.4835	28.25	ADV	32.5	-24.4	10	2.12	48.47	54	-5.53	-	-	5	105	V
4	* ** 2.48511	28.84	ADV	32.5	-24.4	10	2.12	49.06	54	-4.94	-	-	5	105	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/Filtr/Pad (dB)	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	43.86	Pk	32.5	-24.4	10	0	61.96	-	-	74	-12.04	161	197	H
2	* ** 2.48369	45.23	Pk	32.5	-24.4	10	0	63.33	-	-	74	-10.67	161	197	H
3	* ** 2.4835	25.7	ADV	32.5	-24.4	10	2.12	45.92	54	-8.08	-	-	161	197	H
4	* ** 2.48356	26.86	ADV	32.5	-24.4	10	2.12	47.08	54	-6.92	-	-	161	197	H

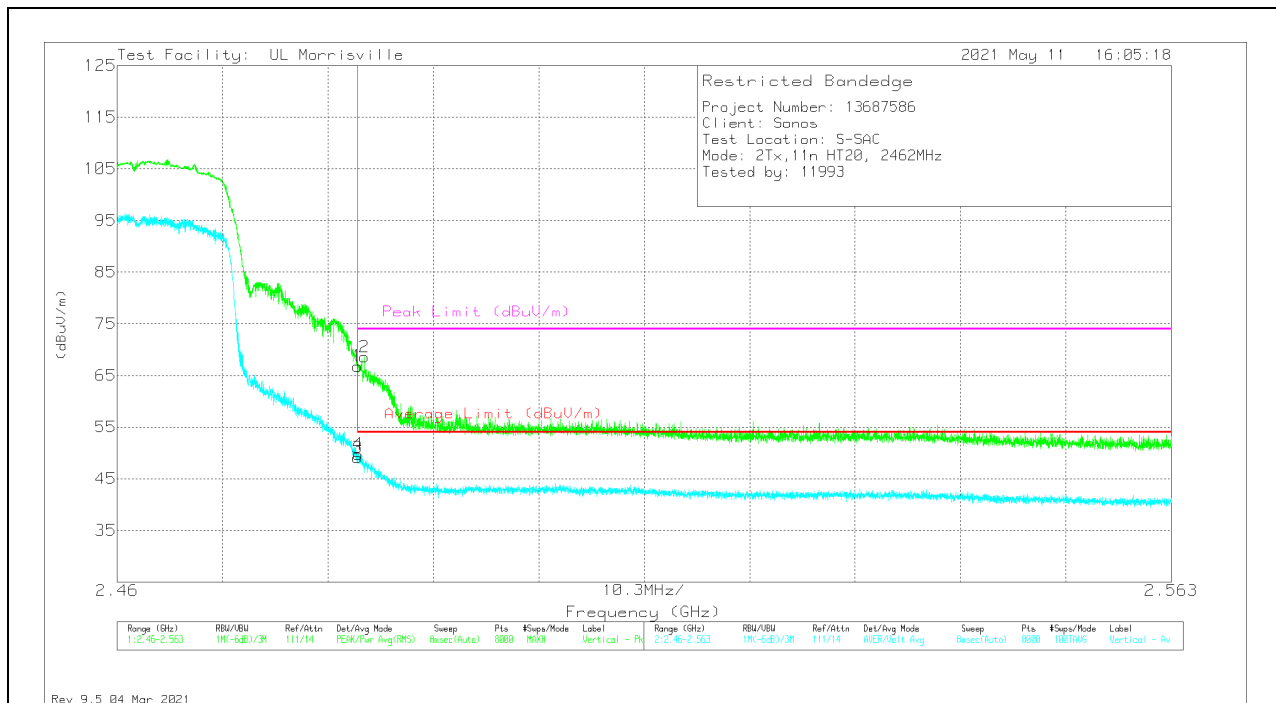
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

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

Pk - Peak detector

ADV - Linear Voltage Average

### VERTICAL RESULT

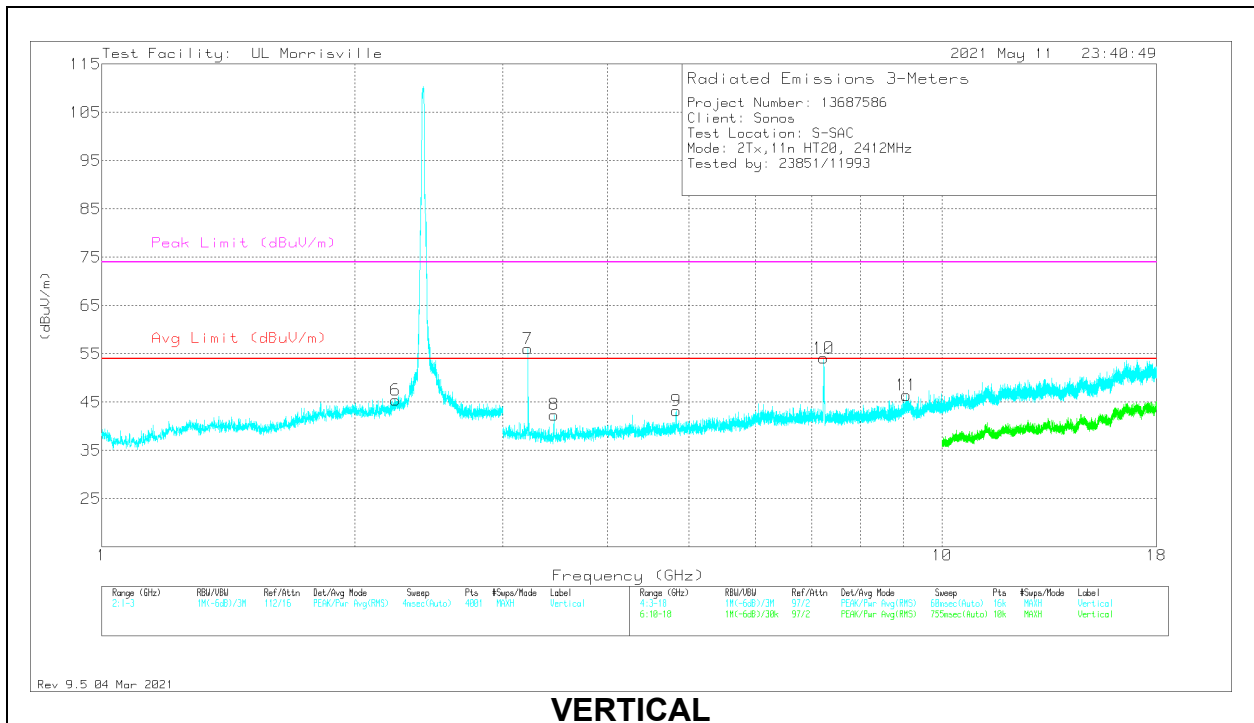
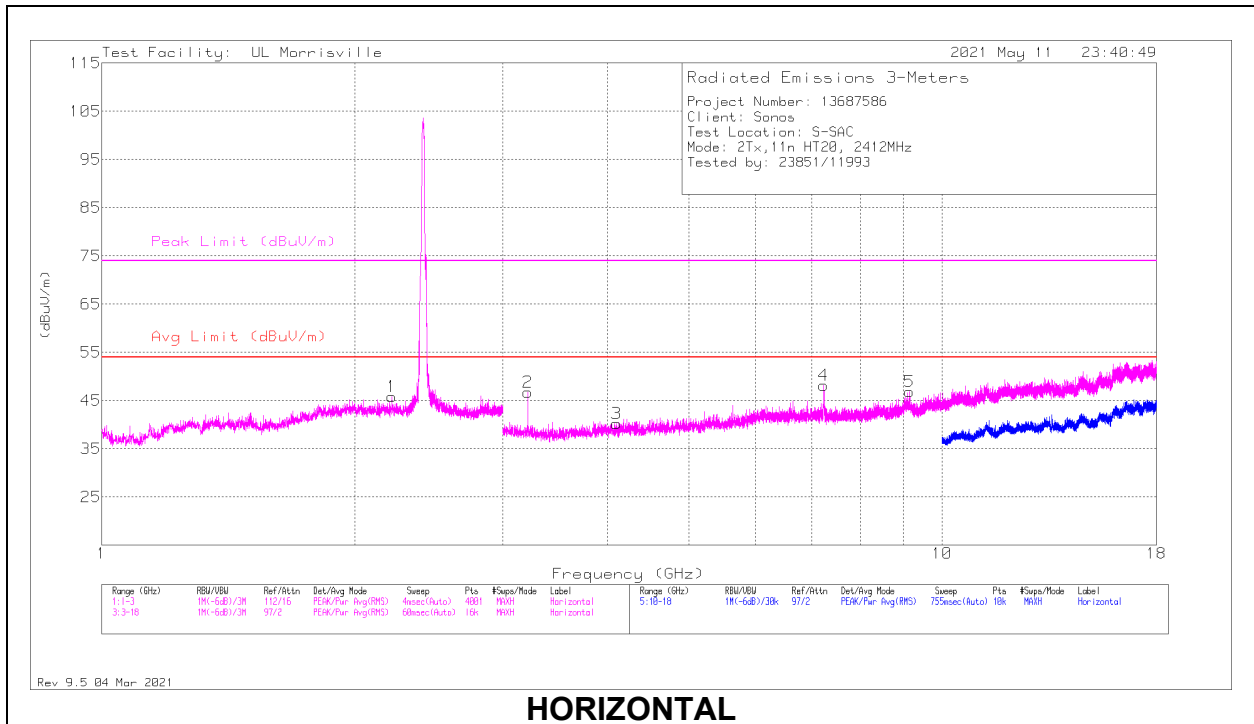


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	48.68	Pk	32.5	-24.4	10	0	66.78	-	-	74	-7.22	23	330	V
2	* ** 2.48416	50.48	Pk	32.5	-24.4	10	0	68.58	-	-	74	-5.42	23	330	V
3	* ** 2.4835	28.86	ADV	32.5	-24.4	10	2.12	49.08	54	-4.92	-	-	23	330	V
4	* ** 2.48356	29.52	ADV	32.5	-24.4	10	2.12	49.74	54	-4.26	-	-	23	330	V

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

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL, CH 1 RESULTS



**RADIATED EMISSIONS**

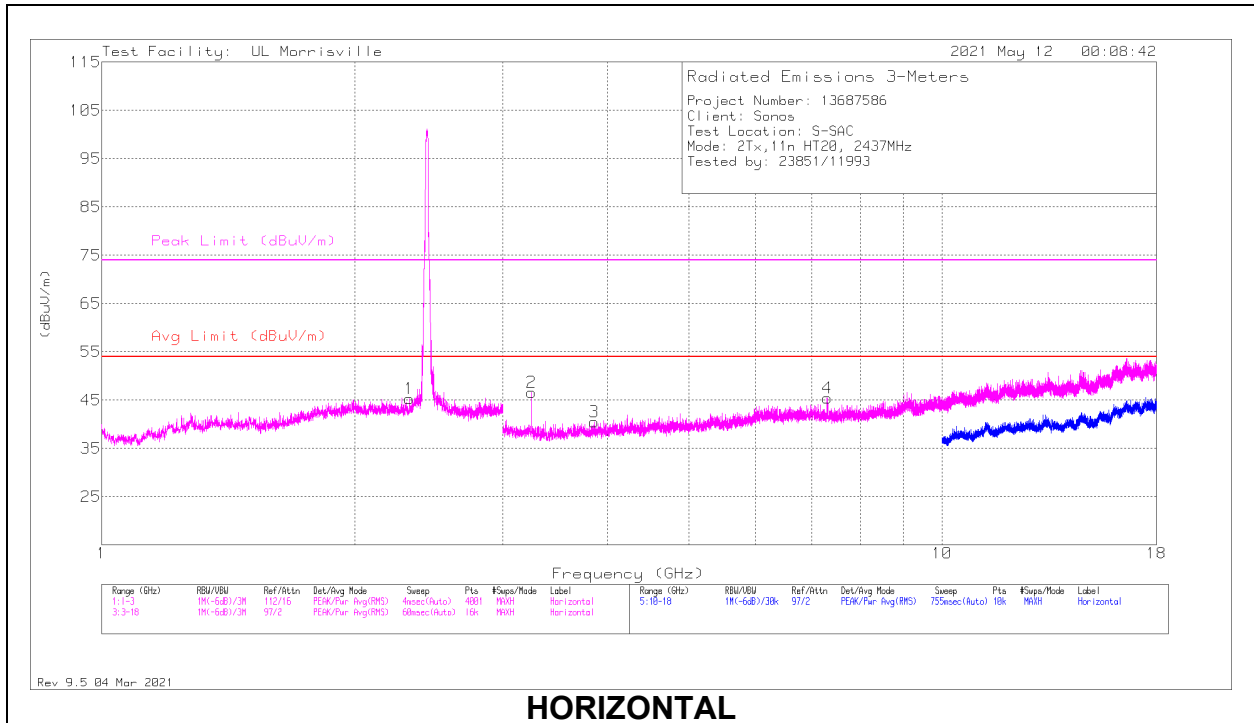
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.2145	37.08	Pk	31.9	-23.2	45.78	54	-8.22	74	-28.22	0-360	101	H
6	* ** 2.2385	36.96	Pk	31.8	-23.3	45.46	54	-8.54	74	-28.54	0-360	101	V
3	* ** 4.09875	38.84	Pk	33.6	-32.2	40.24	54	-13.76	74	-33.76	0-360	101	H
5	* ** 9.14813	36.63	Pk	36.3	-26.1	46.83	54	-7.17	74	-27.17	0-360	101	H
9	* ** 4.82719	39.88	Pk	34.1	-30.8	43.18	54	-10.82	74	-30.82	0-360	101	V
11	* ** 9.06375	36.42	Pk	36.3	-26.3	46.42	54	-7.58	74	-27.58	0-360	200	V
2	3.21563	46.22	Pk	33.3	-32.8	46.72	-	-	-	-	0-360	101	H
7	3.21563	55.54	Pk	33.3	-32.8	56.04	-	-	-	-	0-360	101	V
8	3.45281	42.29	Pk	32.8	-32.7	42.39	-	-	-	-	0-360	101	V
4	7.22625	40.28	Pk	35.7	-27.8	48.18	-	-	-	-	0-360	101	H
10	7.23281	46.33	Pk	35.6	-27.8	54.13	-	-	-	-	0-360	101	V

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

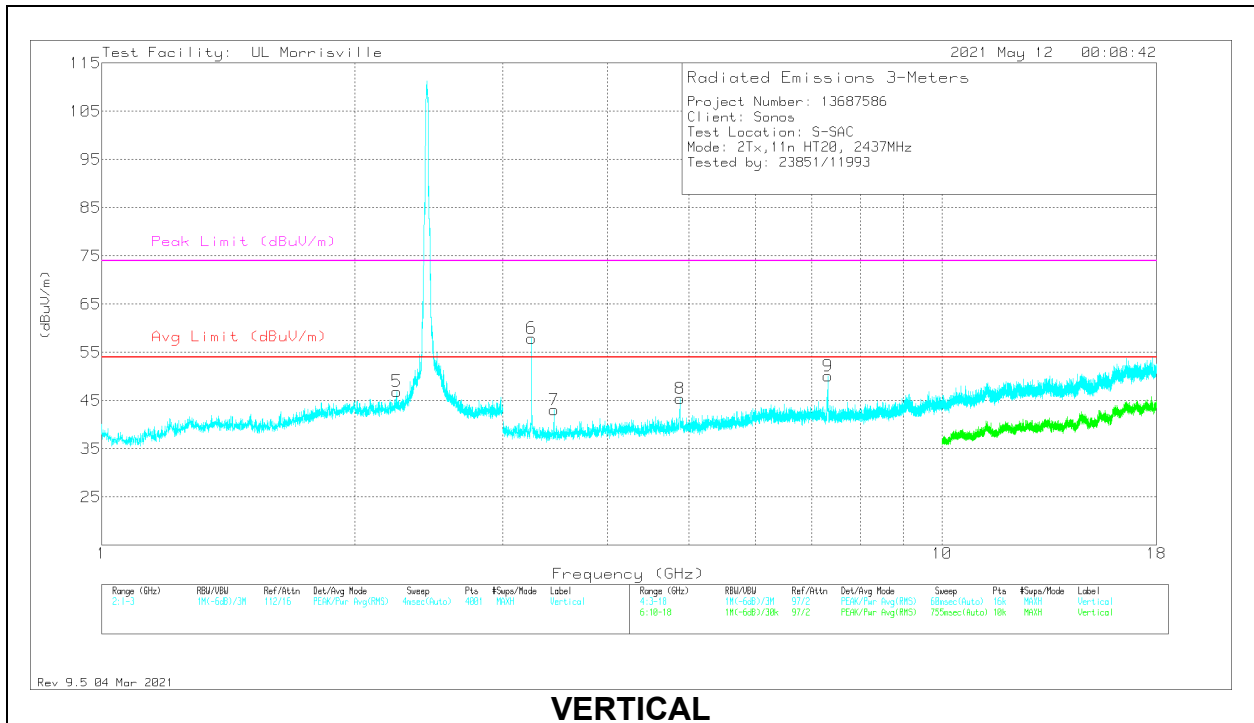
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

### MID CHANNEL, CH 6 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/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	*** 2.322	37.33	Pk	31.7	-23.7	0	45.33	54	-8.67	74	-28.67	0-360	200	H
5	*** 2.2435	38.43	Pk	31.8	-23.3	0	46.93	54	-7.07	74	-27.07	0-360	101	V
3	*** 3.85875	38.98	Pk	33.4	-31.9	0	40.48	54	-13.52	74	-33.52	0-360	199	H
4	*** 7.305	37.27	Pk	35.7	-27.5	0	45.47	54	-8.53	74	-28.53	0-360	101	H
8	*** 4.87688	42.18	Pk	34.2	-30.9	0	45.48	54	-8.52	74	-28.52	0-360	101	V
9	*** 7.31543	43.63	PK2	35.7	-27.4	0	51.93	-	-	74	-22.07	212	141	V
	*** 7.31437	27.82	ADV	35.7	-27.4	2.12	38.24	54	15.76	-	-	212	141	V
2	3.24938	46.51	Pk	33.2	-33.1	0	46.61	-	-	-	-	0-360	101	H
6	3.24938	57.87	Pk	33.2	-33.1	0	57.97	-	-	-	-	0-360	101	V
7	3.45281	42.95	Pk	32.8	-32.7	0	43.05	-	-	-	-	0-360	101	V

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

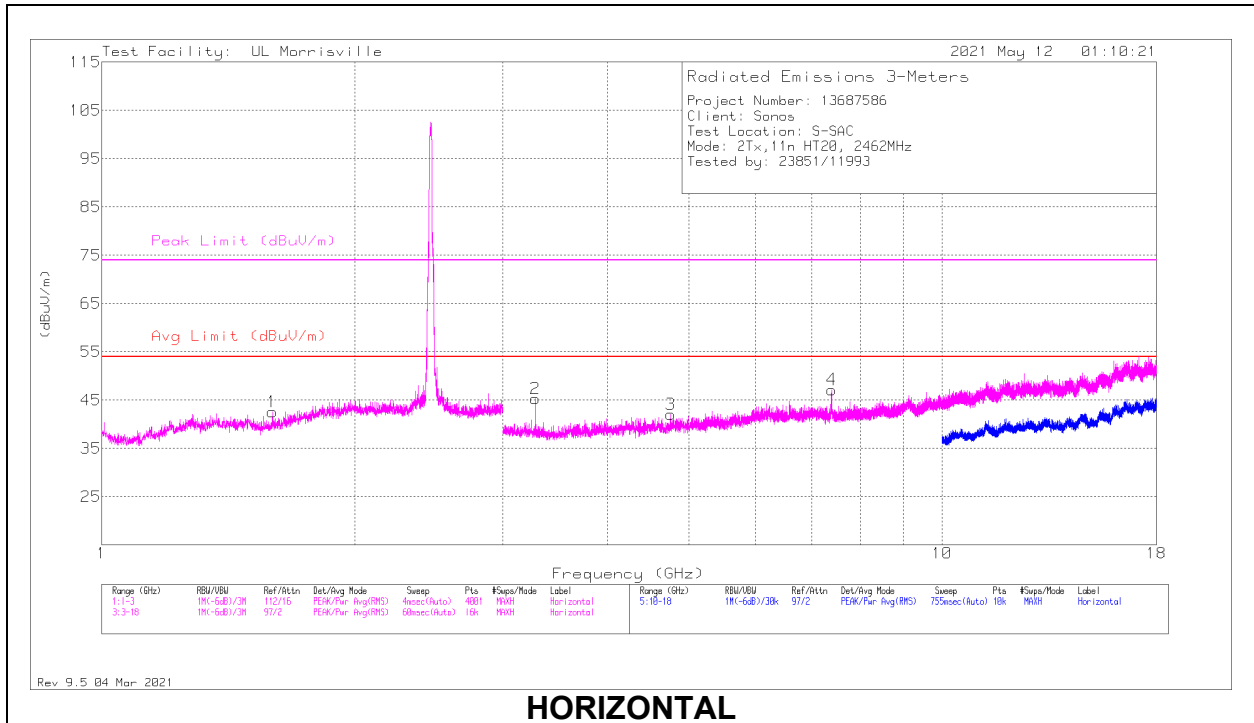
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

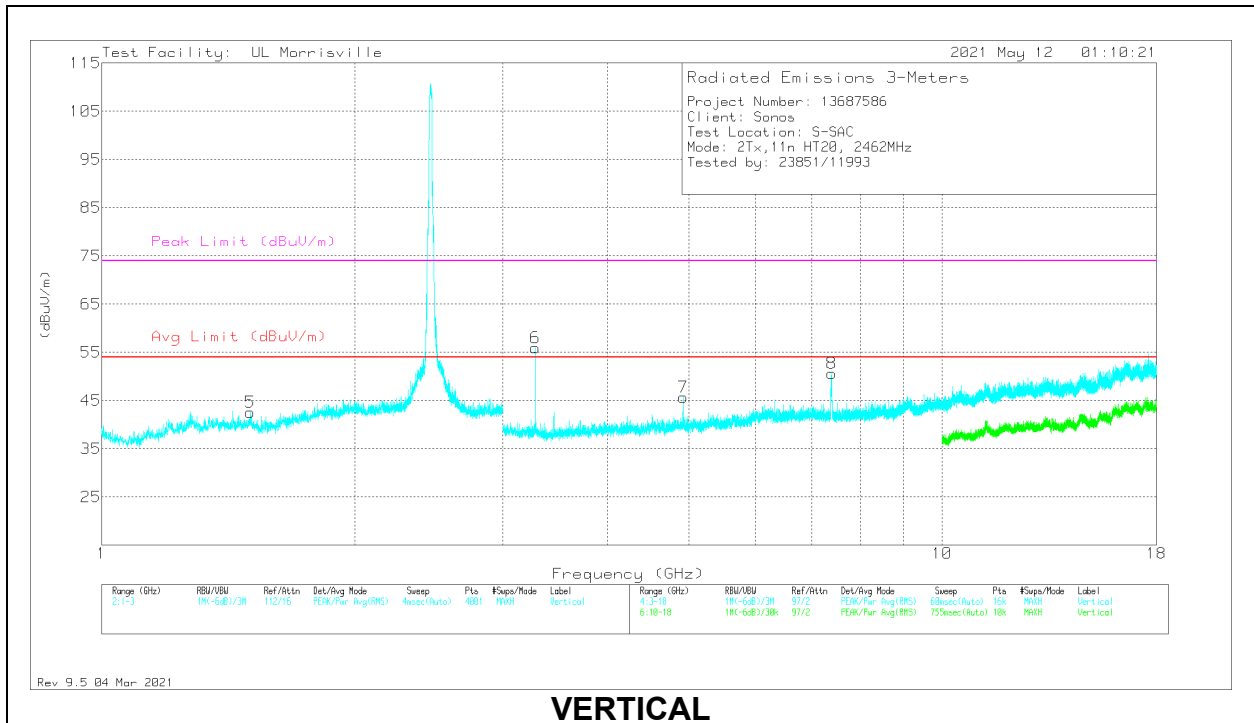
PK2 - Maximum Peak

ADV - Linear Voltage Average

### HIGH CHANNEL, CH 11 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/Filtr/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	* ** 1.5965	36.64	Pk	28.2	-22.2	0	42.64	54	-11.36	74	-31.36	0-360	200	H
5	* ** 1.502	36.43	Pk	28.6	-22.4	0	42.63	54	-11.37	74	-31.37	0-360	200	V
3	* ** 4.75594	39.48	Pk	34.1	-31.5	0	42.08	54	-11.92	74	-31.92	0-360	101	H
4	* ** 7.38844	38.99	Pk	35.7	-27.5	0	47.19	54	-6.81	74	-26.81	0-360	101	H
7	* ** 4.92469	42.46	Pk	34.1	-30.9	0	45.66	54	-8.34	74	-28.34	0-360	199	V
8	* ** 7.39138	46.77	PK2	35.7	-27.5	0	54.97	-	-	74	-19.03	39	111	V
	* ** 7.39082	29.58	ADV	35.7	-27.5	2.12	39.9	54	-14.1	-	-	39	111	V
2	3.28219	45.26	Pk	33	-33	0	45.26	-	-	-	-	0-360	101	H
6	3.28219	55.93	Pk	33	-33	0	55.93	-	-	-	-	0-360	101	V

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

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

Pk - Peak detector

PK2 - Maximum Peak

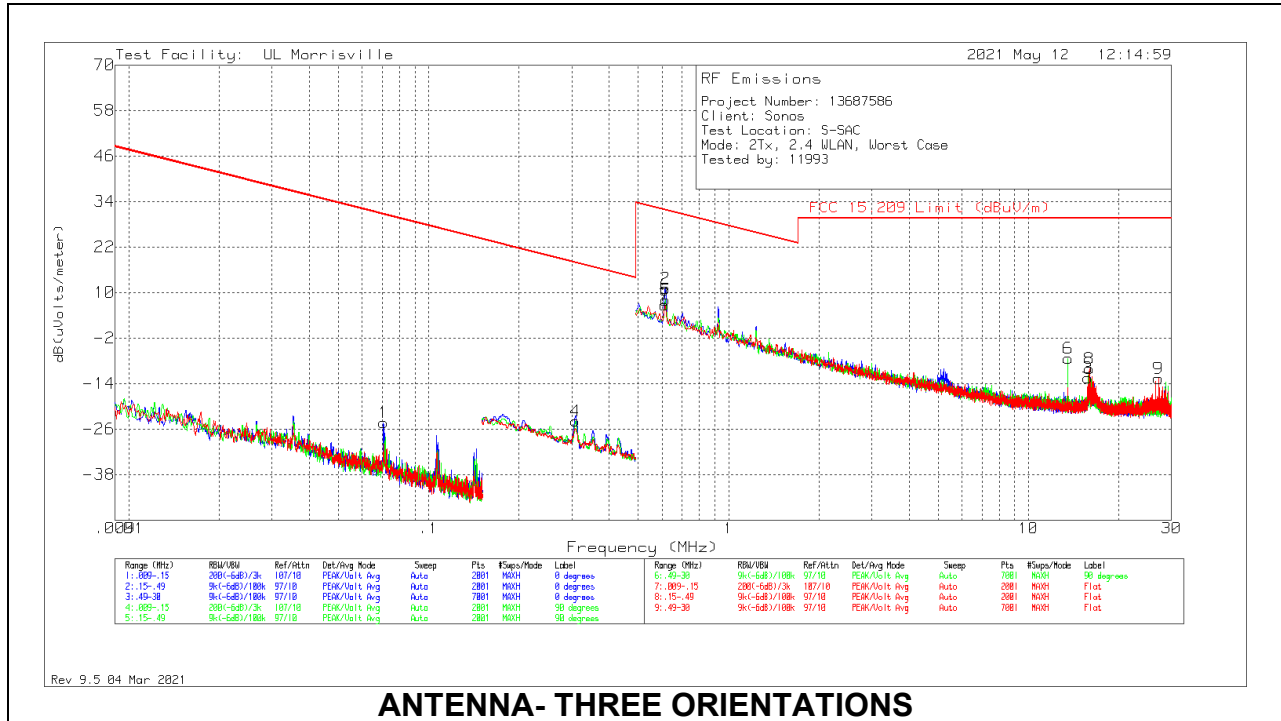
ADV - Linear Voltage Average



## 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\*Log (test distance / specification distance).

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



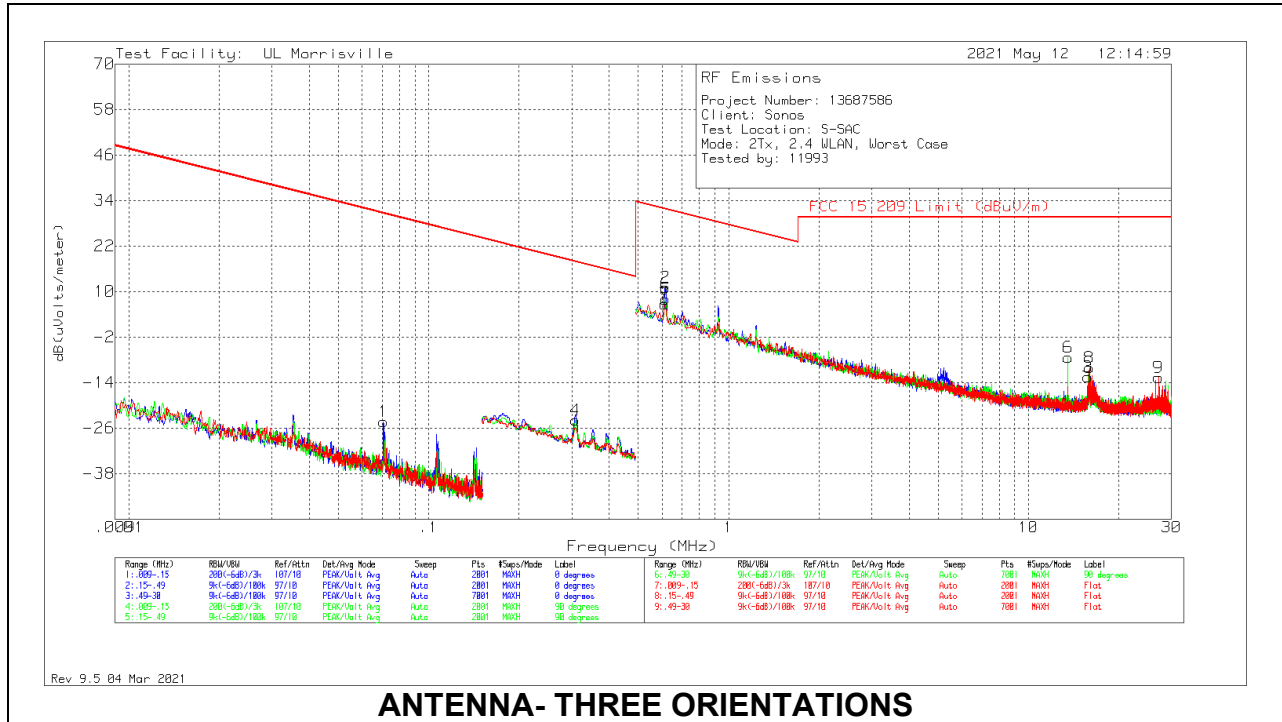
### ANTENNA- THREE ORIENTATIONS

#### Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 Qp/Av Limit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Face
1	.07063	44.34	Pk	11.2	.1	-80	-24.36	30.62	50.62	-54.98	0-360	On
2	.61648	40.1	Pk	10.8	.2	-40	11.1	31.81	-	-20.71	0-360	On
3	15.78143	16.37	Pk	10.3	.8	-40	-12.53	29.54	-	-42.07	0-360	On
4	.30861	45.26	Pk	10.7	.1	-80	-23.94	17.82	37.82	-41.76	0-360	Off
5	.61648	37.03	Pk	10.8	.2	-40	8.03	31.81	-	-23.78	0-360	Off
6	13.5596	21.49	Pk	10.4	.7	-40	-7.41	29.54	-	-36.95	0-360	Off
7	.61226	35.64	Pk	10.8	.2	-40	6.64	31.87	-	-25.23	0-360	Flat
8	15.96694	18.81	Pk	10.3	.8	-40	-10.09	29.54	-	-39.63	0-360	Flat
9	27.16042	17.7	Pk	8.6	1	-40	-12.7	29.54	-	-42.24	0-360	Flat

Pk - Peak detector

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

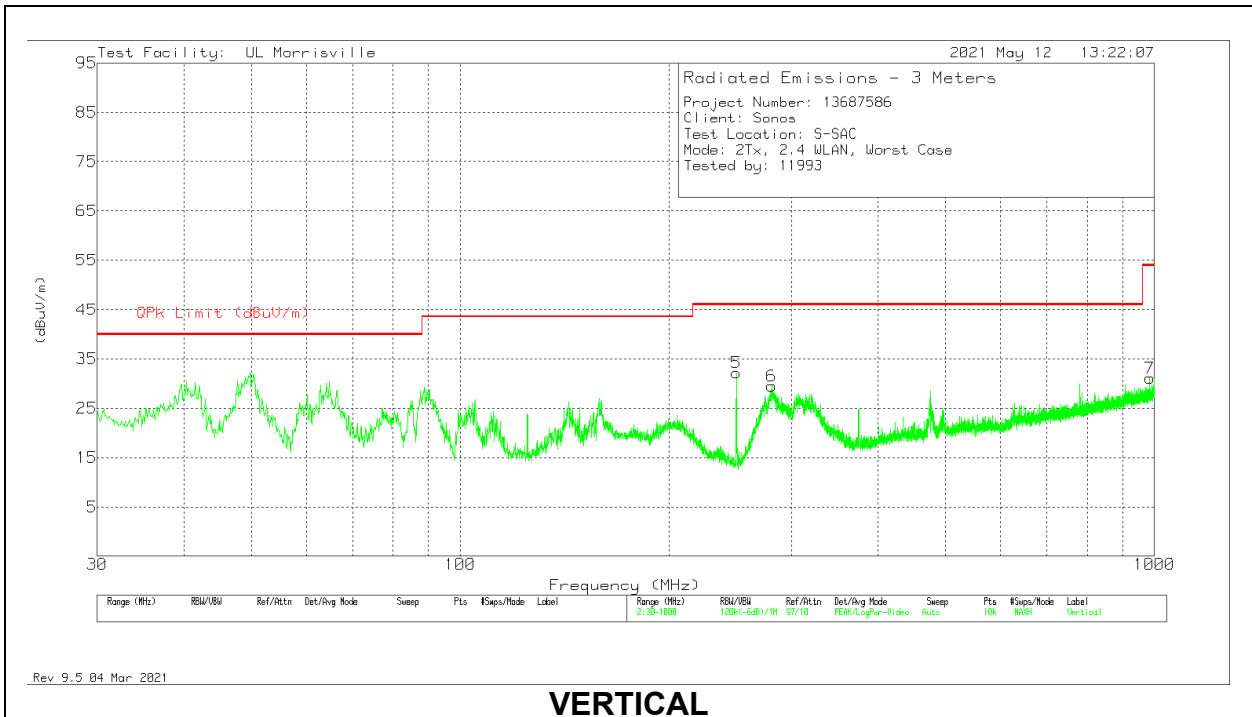
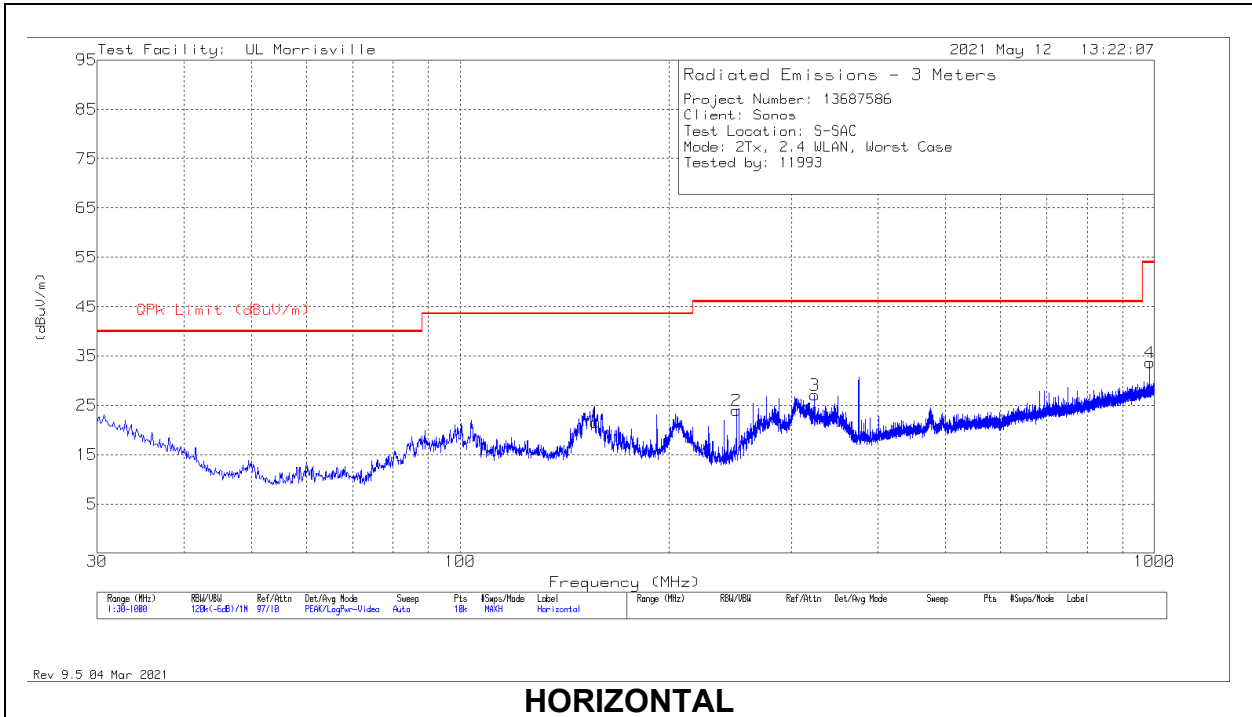


**Below 30MHz Data**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	RSS-GEN Qp/Av Limit (dBuA/m)	RSS-GEN Limit Pk (dBuA/m)	Margin (dB)	Azimuth (Degs)	Antenna Face
1	.07063	44.34	Pk	-40.3	.1	-80	-75.86	-20.88	-0.88	-54.98	0-360	On
2	.61648	40.1	Pk	-40.7	.2	-40	-40.4	-19.69	-	-20.71	0-360	On
3	15.78143	16.37	Pk	-41.2	.8	-40	-64.03	-21.96	-	-42.07	0-360	On
4	.30861	45.26	Pk	-40.8	.1	-80	-75.44	-33.68	-13.68	-41.76	0-360	Off
5	.61648	37.03	Pk	-40.7	.2	-40	-43.47	-19.69	-	-23.78	0-360	Off
6	13.5596	21.49	Pk	-41.1	.7	-40	-58.91	-21.96	-	-36.95	0-360	Off
7	.61226	35.64	Pk	-40.7	.2	-40	-44.86	-19.63	-	-25.23	0-360	Flat
8	15.96694	18.81	Pk	-41.2	.8	-40	-61.59	-21.96	-	-39.63	0-360	Flat
9	27.16042	17.7	Pk	-42.9	1	-40	-64.2	-21.96	-	-42.24	0-360	Flat

Pk - Peak detector

### 10.3. WORST CASE BELOW 1 GHZ

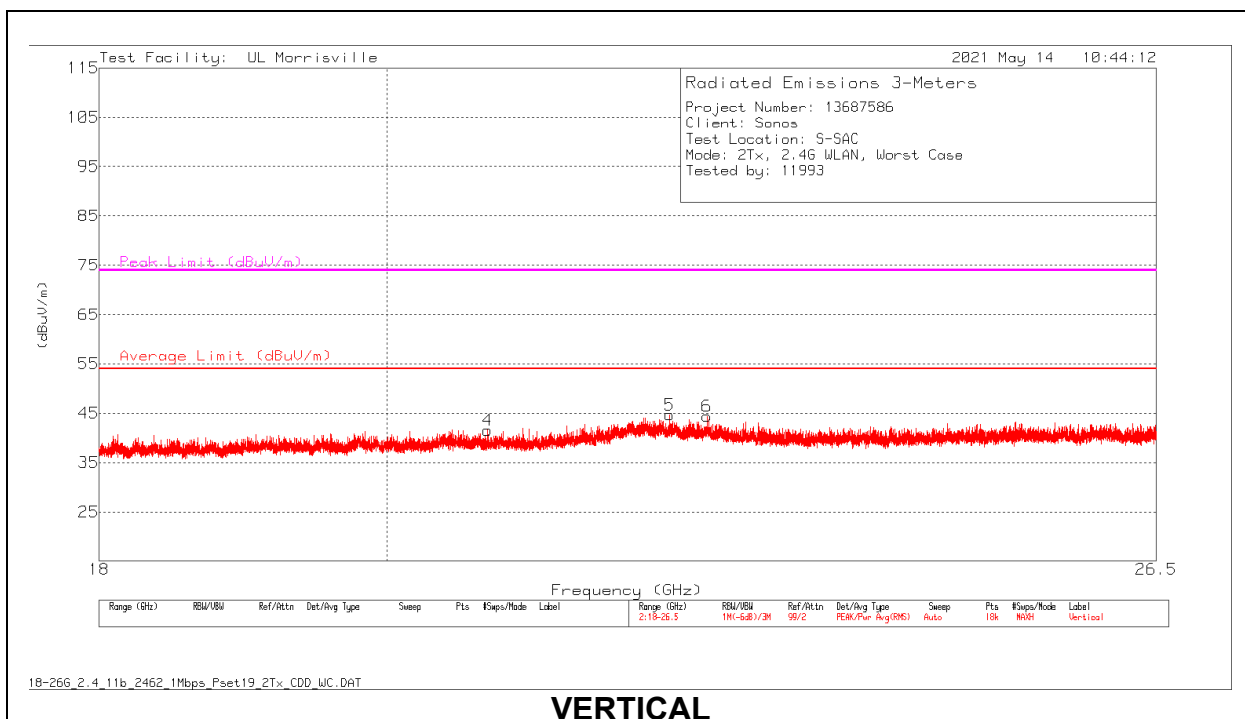
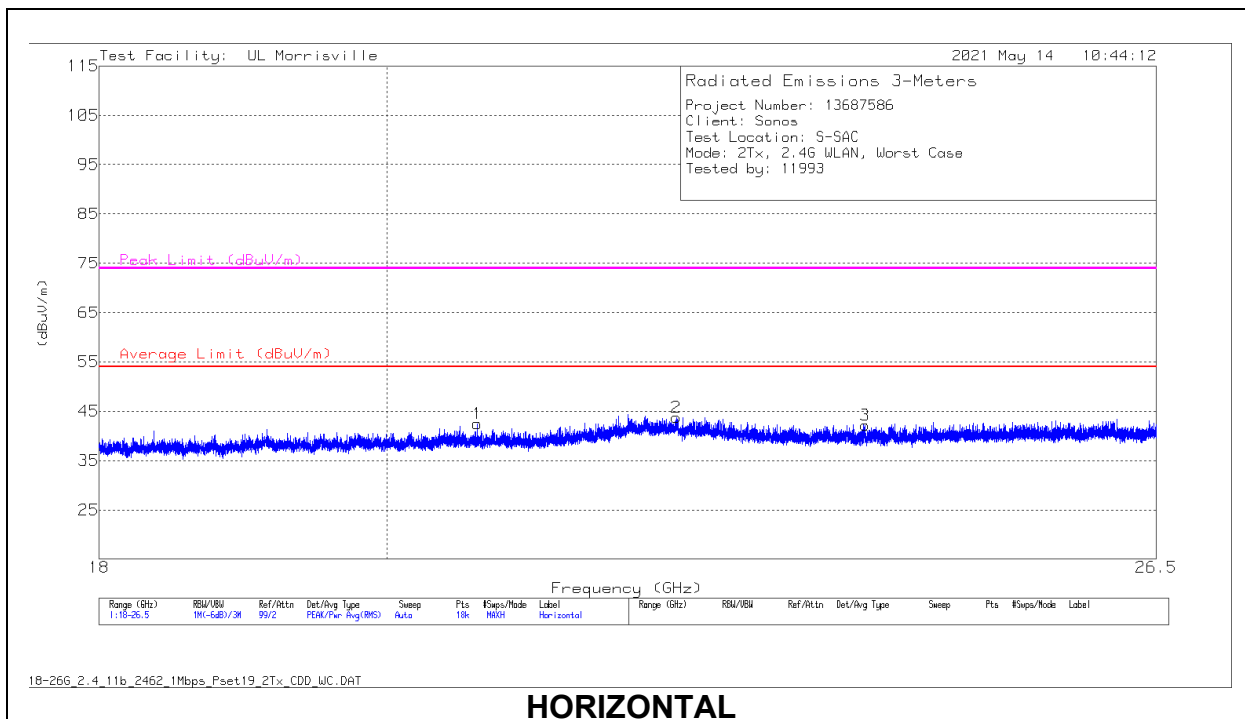


**Below 1GHz DATA**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0075 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 156.876	32.86	Pk	18.7	-30	21.56	43.52	-21.96	0-360	199	H
2	*** 249.996	35.47	Pk	17.6	-29.1	23.97	46.02	-22.05	0-360	101	H
3	*** 324.007	35.65	Pk	20.1	-28.7	27.05	46.02	-18.97	0-360	101	H
4	*** 984.868	28.86	Pk	29.2	-24.4	33.66	53.97	-20.31	0-360	101	H
5	*** 249.996	43.69	Pk	17.6	-29.1	32.19	46.02	-13.83	0-360	101	V
6	*** 281.133	39.03	Pk	19.4	-28.9	29.53	46.02	-16.49	0-360	101	V
7	*** 984.868	26.31	Pk	29.2	-24.4	31.11	53.97	-22.86	0-360	101	V

Pk - Peak detector

### 10.4. WORST CASE 18-26 GHZ



**18 – 26GHz DATA**

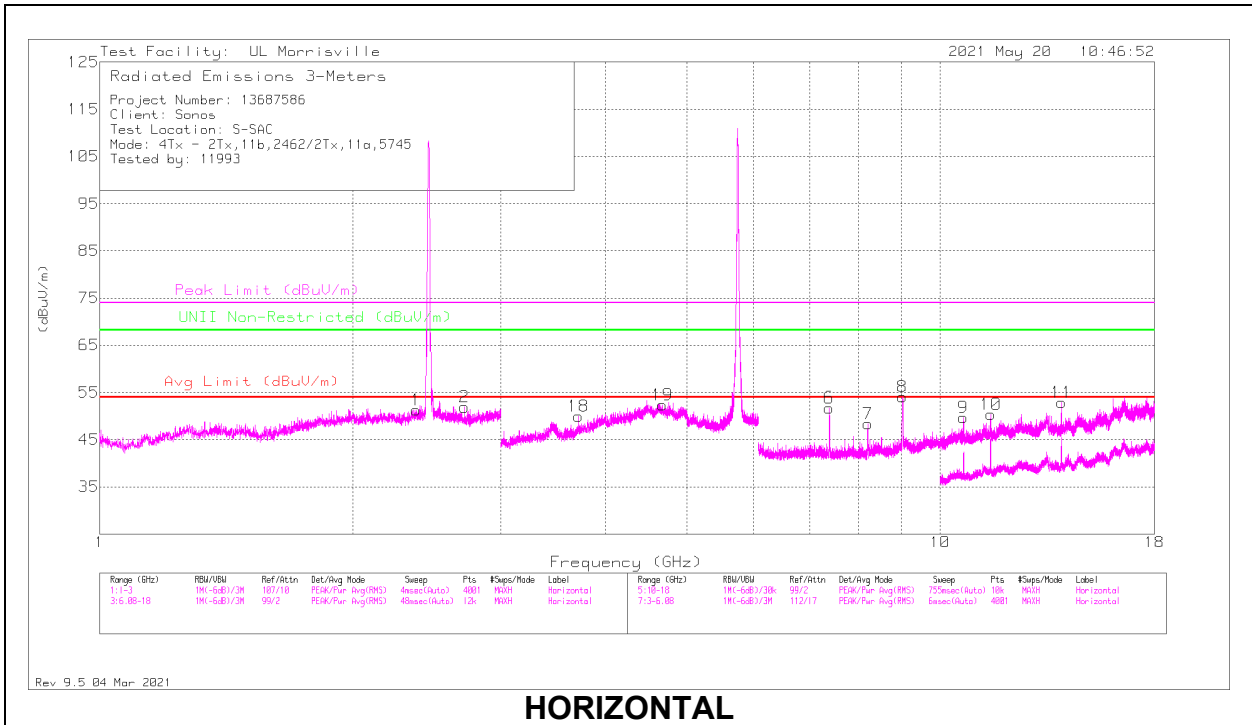
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0063 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 20.67103	47.26	Pk	34	-38.8	42.46	54	-11.54	74	-31.54	0-360	149	H
2	* ** 22.23181	46.06	Pk	36.6	-38.9	43.76	54	-10.24	74	-30.24	0-360	250	H
3	* ** 23.82235	45.97	Pk	34.8	-38.6	42.17	54	-11.83	74	-31.83	0-360	200	H
4	* ** 20.74707	46.89	Pk	34	-39.3	41.59	54	-12.41	74	-32.41	0-360	250	V
5	* ** 22.17751	47.35	Pk	36.7	-39.4	44.65	54	-9.35	74	-29.35	0-360	250	V
6	* ** 22.48163	46.82	Pk	36.4	-38.8	44.42	54	-9.58	74	-29.58	0-360	299	V

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

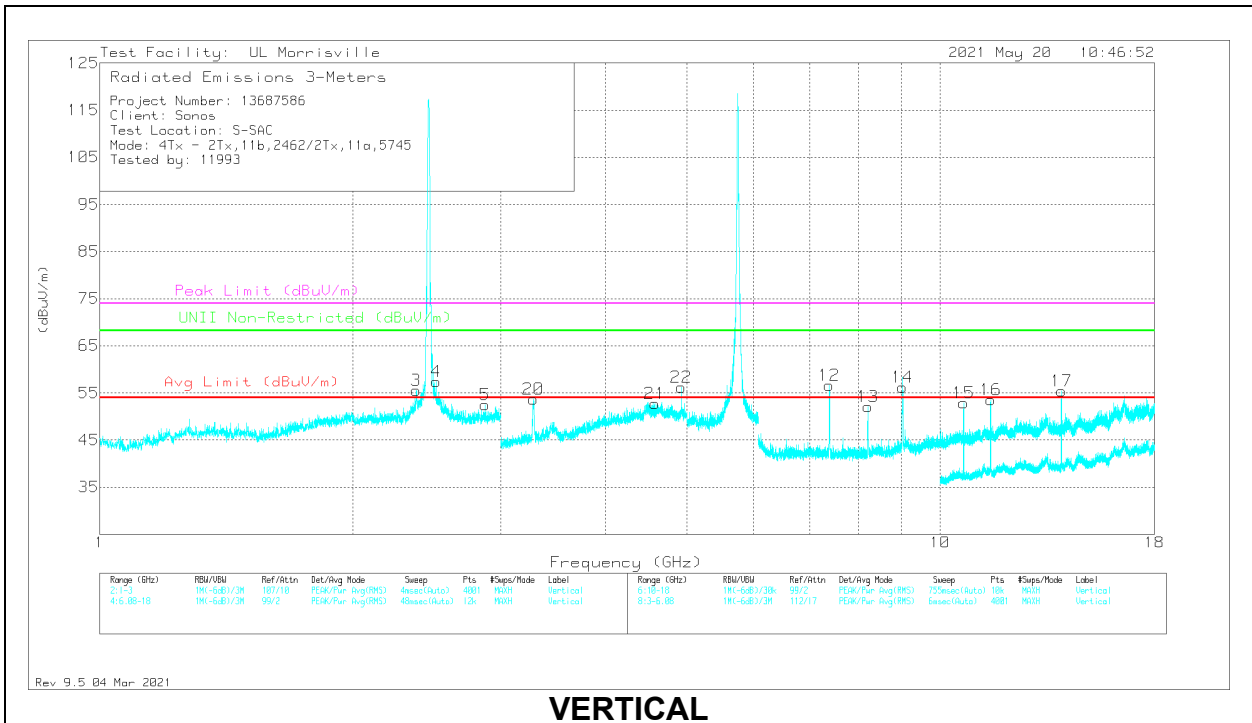
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

### 10.5. WORST CASE SIMULTANEOUS TRANSMISSION



**HORIZONTAL**



**VERTICAL**

**SIMULTANEOUS TRANSMISSION DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	Filter (dB)	Pad (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	*** 2.38331	35.23	PK2	32.3	-23.9	0	10	53.63	-	-	74	-20.37	-	-	293	140	H
	*** 2.38042	21.79	V1TV	32.5	-23.9	0	10	40.39	54	-13.61	-	-	-	-	293	140	H
2	*** 2.71684	35.68	PK2	32.5	-25.7	0	10	52.48	-	-	74	-21.52	-	-	268	141	H
	*** 2.71795	21.27	V1TV	32.5	-25.7	0	10	38.07	54	-15.93	-	-	-	-	268	141	H
3	*** 2.38004	35.94	PK2	32.5	-23.9	0	10	54.54	-	-	74	-19.46	-	-	17	395	V
	*** 2.38086	22.65	V1TV	32.5	-23.9	0	10	41.25	54	-12.75	-	-	-	-	17	395	V
4	** 2.51404	37.89	PK2	32.6	-24.6	0	10	55.89	-	-	74	-18.11	-	-	23	346	V
	** 2.51374	23.64	V1TV	32.7	-24.6	0	10	41.74	54	-12.26	-	-	-	-	23	346	V
5	*** 2.87421	35.87	PK2	32.5	-25.9	0	10	52.47	-	-	74	-21.53	-	-	268	327	V
	*** 2.8767	21.6	V1TV	32.6	-25.8	0	10	38.4	54	-15.6	-	-	-	-	268	327	V
10	*** 11.49174	44.37	PK2	38.1	-24.7	0	0	57.77	-	-	74	-16.23	-	-	322	222	H
	*** 11.49125	30.59	V1TV	38.1	-24.7	0	0	43.99	54	-10.01	-	-	-	-	322	222	H
9	*** 10.66837	40.61	PK2	37.7	-25.4	0	0	52.91	-	-	74	-21.09	-	-	334	113	H
	*** 10.66988	28.58	V1TV	37.7	-25.4	0	0	40.88	54	-13.12	-	-	-	-	334	113	H
8	*** 9.02888	48.58	PK2	36.2	-27.3	0	0	57.48	-	-	74	-16.52	-	-	71	312	H
	*** 9.02834	34.12	V1TV	36.2	-27.3	0	0	43.02	54	-10.98	-	-	-	-	71	312	H
7	*** 8.20791	45.72	PK2	35.8	-27.8	0	0	53.72	-	-	74	-20.28	-	-	261	220	H
	*** 8.20687	32	V1TV	35.8	-27.8	0	0	40	54	-14	-	-	-	-	261	220	H
6	*** 7.3844	45.94	PK2	35.7	-28.3	0	0	53.34	-	-	74	-20.66	-	-	25	115	H
	*** 7.38473	37.98	V1TV	35.7	-28.3	0	0	45.38	54	-8.62	-	-	-	-	25	115	H
12	*** 7.384	47.97	PK2	35.7	-28.3	0	0	55.37	-	-	74	-18.63	-	-	40	103	V
	*** 7.38426	39.01	V1TV	35.7	-28.3	0	0	46.41	54	-7.59	-	-	-	-	40	103	V
13	*** 8.20377	47.18	PK2	35.8	-27.8	0	0	55.18	-	-	74	-18.82	-	-	23	110	V
	*** 8.20585	34.19	V1TV	35.8	-27.8	0	0	42.19	54	-11.81	-	-	-	-	23	110	V
14	*** 9.02902	53.78	PK2	36.2	-27.3	0	0	62.68	-	-	74	-11.32	-	-	54	107	V
	*** 9.02867	39.42	V1TV	36.2	-27.3	0	0	48.32	54	-5.68	-	-	-	-	54	107	V
15	*** 10.67002	42.84	PK2	37.7	-25.4	0	0	55.14	-	-	74	-18.86	-	-	173	103	V
	*** 10.66802	30.57	V1TV	37.7	-25.4	0	0	42.87	54	-11.13	-	-	-	-	173	103	V
16	*** 11.49209	45.88	PK2	38.1	-24.7	0	0	59.28	-	-	74	-14.72	-	-	46	120	V
	*** 11.49199	32.87	V1TV	38.1	-24.7	0	0	46.27	54	-7.73	-	-	-	-	46	120	V
18	*** 3.71371	37.93	PK2	33.4	-22.1	.7	0	49.93	-	-	74	-24.07	-	-	298	257	H
	*** 3.71219	23.98	V1TV	33.4	-22.2	.7	0	35.88	54	-18.12	-	-	-	-	298	257	H
19	*** 4.67264	39.63	PK2	34	-21.1	.7	0	53.23	-	-	74	-20.77	-	-	359	326	H
	*** 4.67211	25.81	V1TV	34	-21.1	.7	0	39.41	54	-14.59	-	-	-	-	359	326	H
21	*** 4.5805	39.82	PK2	34.1	-21	.6	0	53.52	-	-	74	-20.48	-	-	236	251	V
	*** 4.58015	25.48	V1TV	34.1	-21	.6	0	39.18	54	-14.82	-	-	-	-	236	251	V
22	*** 4.92407	43.17	PK2	34.1	-21.8	.6	0	56.07	-	-	74	-17.93	-	-	46	124	V
	*** 4.92412	35.27	V1TV	34.1	-21.8	.6	0	48.17	54	-5.83	-	-	-	-	46	124	V
20	3.28013	47.97	PK-U	33	-23.7	.7	0	57.97	-	-	-	-	68.2	-10.23	10	102	V
11	13.95131	40.95	PK-U	38.6	-25.3	0	0	54.25	-	-	-	-	68.2	-13.95	21	101	H
17	13.95223	43.52	PK-U	38.6	-25.3	0	0	56.82	-	-	-	-	68.2	-11.38	23	296	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 \*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band  
 PK2 - Maximum Peak  
 PK-U - Maximum Peak  
 V1TV - VB=1/Ton, Linear Voltage Average where: Ton is packet duration



## 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.

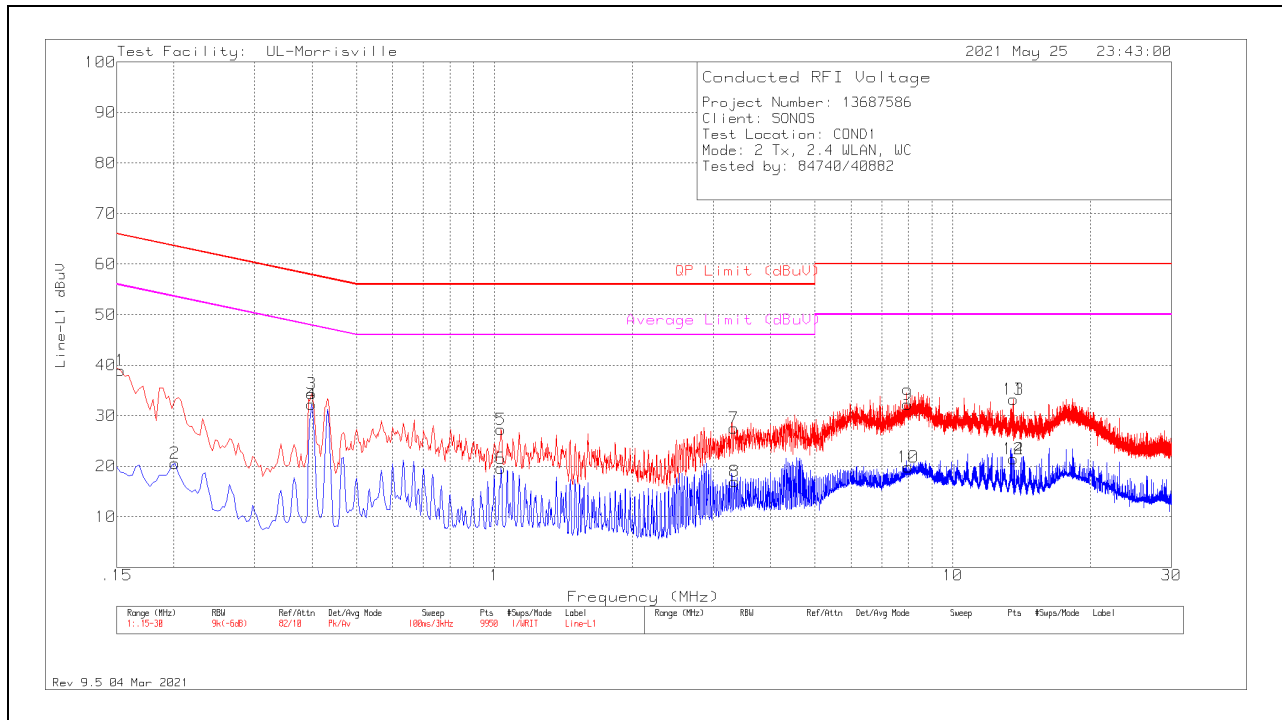
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

### 11.1.1. AC Power Line Host

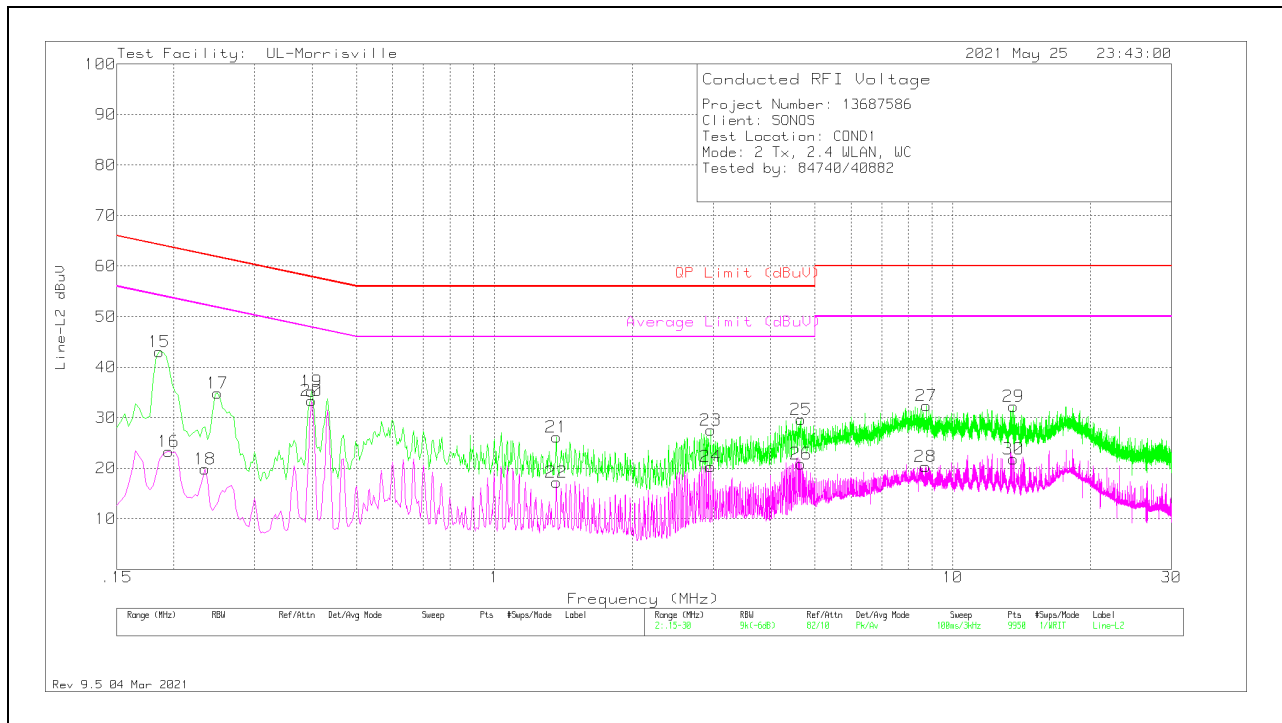
### LINE 1 RESULTS



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	.153	28.9	Pk	.2	9.8	38.9	65.84	-26.94	-	-
2	.201	10.71	Av	.1	9.8	20.61	-	-	53.57	-32.96
3	.399	24.4	Pk	.1	9.8	34.3	57.87	-23.57	-	-
4	.399	22.29	Av	.1	9.8	32.19	-	-	47.87	-15.68
5	1.032	17.44	Pk	0	9.8	27.24	56	-28.76	-	-
6	1.032	9.73	Av	0	9.8	19.53	-	-	46	-26.47
7	3.333	17.65	Pk	0	9.9	27.55	56	-28.45	-	-
8	3.342	7.06	Av	0	9.9	16.96	-	-	46	-29.04
9	7.965	22.09	Pk	.1	10	32.19	60	-27.81	-	-
10	8.001	9.75	Av	.1	10	19.85	-	-	50	-30.15
11	13.56	23	Pk	.1	10.1	33.2	60	-26.8	-	-
12	13.56	11.19	Av	.1	10.1	21.39	-	-	50	-28.61
13	13.56	23	Pk	.1	10.1	33.2	60	-26.8	-	-
14	13.56	11.19	Av	.1	10.1	21.39	-	-	50	-28.61

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)
15	.186	33.05	Pk	.2	9.8	43.05	64.21	-21.16	-	-
16	.195	13.27	Av	.2	9.8	23.27	-	-	53.82	-30.55
18	.234	9.88	Av	.1	9.8	19.78	-	-	52.31	-32.53
17	.249	24.92	Pk	.1	9.8	34.82	61.79	-26.97	-	-
19	.399	25.28	Pk	.1	9.8	35.18	57.87	-22.69	-	-
20	.399	23.42	Av	.1	9.8	33.32	-	-	47.87	-14.55
21	1.365	16.4	Pk	0	9.8	26.2	56	-29.8	-	-
22	1.365	7.44	Av	0	9.8	17.24	-	-	46	-28.76
24	2.964	10.58	Av	0	9.8	20.38	-	-	46	-25.62
23	2.967	17.72	Pk	0	9.8	27.52	56	-28.48	-	-
25	4.665	19.64	Pk	.1	9.9	29.64	56	-26.36	-	-
26	4.665	10.88	Av	.1	9.9	20.88	-	-	46	-25.12
28	8.718	10.17	Av	.1	10	20.27	-	-	50	-29.73
27	8.763	22.24	Pk	.1	10	32.34	60	-27.66	-	-
30	13.56	11.63	Av	.1	10.1	21.83	-	-	50	-28.17
29	13.563	22.05	Pk	.1	10.1	32.25	60	-27.75	-	-

Pk - Peak detector  
 Av - Average detection

## 12. SETUP PHOTOS

Please refer to R13687586-EP1 for setup photos

**END OF TEST REPORT**