

TEST REPORT

Report Number: R14089411-E2

Applicant : Ademco Inc.
251 Little Falls Drive
Wilmington, DE 19808, USA

Model : Caspian

FCC ID : HS9-VBSP02L5

IC : 573R-VBSP02L5

HVIN : VB-SP02Y-002

EUT Description : Water Shutoff Actuator

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:
2022-12-06

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



REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2022-07-18	Initial Issue	Niklas Haydon
V2	2022-08-12	Revised section 6.2.	Brian Kiewra
V3	2022-10-12	Added HVIN	Brian Kiewra
V4	2022-12-06	Revised antenna gain	Brian Kiewra

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Ademco Inc.
251 Little Falls Drive
Wilmington, DE 19808, USA

EUT DESCRIPTION: Water Shutoff Actuator

MODEL: Caspian

HVIN: VB-SP02Y-002

SERIAL NUMBER: 2129110263, 2201BAA00437

SAMPLE RECEIPT DATE: 2021-12-03

DATE TESTED: 2021-12-07 to 2021-12-20

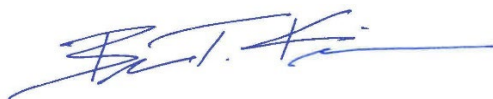
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C: 2021	See Section 2
ISED RSS-247 Issue 2: 2017	See Section 2
ISED RSS-GEN Issue 5 + A2: 2021	See Section 2

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

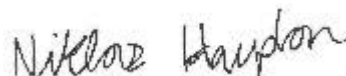
This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document.

Approved & Released
For UL LLC By:



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

Prepared By:



Niklas Haydon
Operations Leader
Consumer, Medical and IT Segment
UL LLC

2. TEST RESULTS SUMMARY

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.

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.
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.

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
☐	Building: 12 Laboratory Dr RTP, NC 27709, U.S.A	US0067	2180C	825374
☒	Building: 2800 Perimeter Park Dr. Suite B Morrisville, NC 27560, U.S.A		27265	

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

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

5.2. DECISION RULES

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

5.3. MEASUREMENT UNCERTAINTY

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

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

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
 $36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

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

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a water shutoff actuator that supports BLE and diversity for 2.4 WLAN. This test reports covers full emissions testing for 2.4 WLAN.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

2.4GHz BAND

Antenna 1

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
1Tx			
2412 - 2462	802.11b	13.68	23.33
2412 - 2462	802.11g	13.22	20.99
2412 - 2462	802.11n HT20	13.25	21.13

Antenna 2

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
1Tx			
2412 - 2462	802.11b	13.93	24.72
2412 - 2462	802.11g	13.71	23.50
2412 - 2462	802.11n HT20	13.48	22.28

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna type and gain as provided by the manufacturer, is as follows:

The radio utilizes 2 inverted-f antennas, that support diversity, antenna 1 has a maximum gains of 0.71 dBi and antenna 2 has a maximum gain of 4.68.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v1.16.

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT supports 2 diversity antennas that only operate in SISO mode. All final antenna-port conducted emissions testing was performed on the worst-case antenna and this was determined based on the antenna with the highest output power. Therefore, all final antenna-port conducted emissions testing was performed on antenna 2.

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit on the worst-case antenna based on the worst-case emissions in the 1-18 GHz range. Once the worst-case antenna was determined, the channel with highest output power as chosen as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels on each antenna.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z for each antenna. It was determined that Y orientation was worst-case orientation for antenna 1 and X orientation was worst-case orientation for antenna 2; therefore, all final radiated testing was performed with the EUT in Y orientation for antenna 1 and X orientation for antenna 2.

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	T450	PC0AUQT	-

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Power	1	Barrel	Power	1	None
2	Data	2	Auxiliary	Communication	1	Used for test configuration only.

TEST SETUP

Test software exercised the radio card.

SETUP DIAGRAM

Please refer to R14089411-EP2 for setup diagrams

7. MEASUREMENT METHOD

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

6dB BW: ANSI C63.10-2013: Section 6.9.2

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 Sections 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 - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2021-06-25	2022-06-25
PWM005	RF Power Meter	Keysight Technologies	N1912A	2021-07-27	2022-07-27
PWS002	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2021-09-07	2022-09-07
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2021-07-12	2022-07-12
SOFTEMI	Antenna Port Software	UL	Version 2021.11.03	NA	NA
PWM005	RF Power Meter	Keysight Technologies	N1912A	2021-07-27	2022-07-27
PWS002	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2021-09-07	2022-09-07

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

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	18-40 GHz				
AT0063	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2021-11-04	2022-11-04
	Gain-Loss Chains				
N-SAC04	Gain-loss string: 18-40GHz	Various	Various	2021-07-20	2022-07-20
	Receiver & Software				
197954	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-30	2022-03-30
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
s/n 200037610	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2021-09-27	2022-09-27

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville – Chamber 4)

Equip. ID	Description	Manufacturer/Brand	Model Number	Last Cal.	Next Cal.
	0.009-30MHz				
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2021-08-19	2022-08-19
	30-1000 MHz				
206210	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2021-03-11	2022-03-11
	1-18 GHz				
206211	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2021-03-11	2022-03-11
	Gain-Loss Chains				
C4-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2021-05-07	2022-05-07
C4-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2021-05-07	2022-05-07
C4-SAC03	Gain-loss string: 1-18GHz	Various	Various	2021-05-07	2022-05-07
	Receiver & Software				
206496	Spectrum Analyzer	Rohde & Schwarz	ESW44	2021-03-09	2022-03-09
SOFTEMI	EMI Software	UL	Version 9.5 (18 Oct 2021)		
	Additional Equipment used				
210642	Environmental Meter	Fisher Brand	s/n 210701942	2021-8-16	2023-08-16

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

Equipment ID	Description	Manufacturer/Brand	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
HI0094	Environmental Meter	Fisher Scientific	06-662-4	2020-01-21	2022-01-21
LISN003	LISN, 50-ohm/50-uH, 250uH 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50/250-25-2-01	2021-08-16	2022-08-16
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2021-08-17	2022-08-17
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 (18 Oct 2021)		

9. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ANSI C63.10 Section 11.6

ON TIME AND DUTY CYCLE RESULTS

Antenna 1

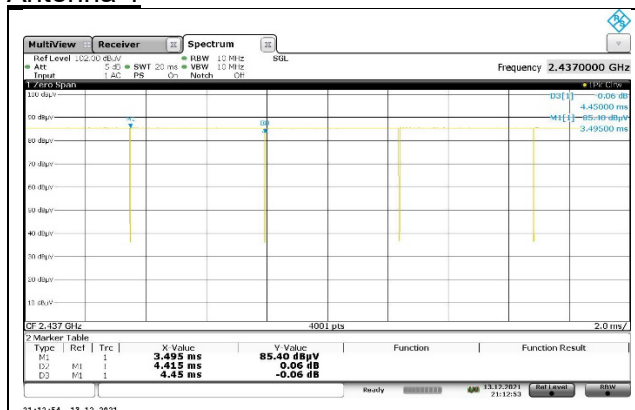
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b 1TX	4.415	4.450	0.992	99.21%	0.00	0.010
802.11g 1TX	0.721	0.770	0.937	93.66%	0.57	1.387
802.11n HT20 1TX	0.683	0.736	0.927	92.71%	0.66	1.465

Antenna 2

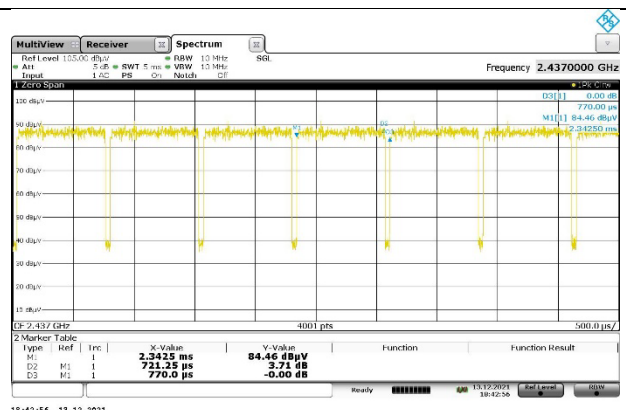
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b 1TX	4.400	4.455	0.988	98.77%	0.00	0.010
802.11g 1TX	0.7275	0.770	0.945	94.48%	0.49	1.375
802.11n HT20 1TX	0.68875	0.73375	0.939	93.87%	0.55	1.452

DUTY CYCLE PLOTS

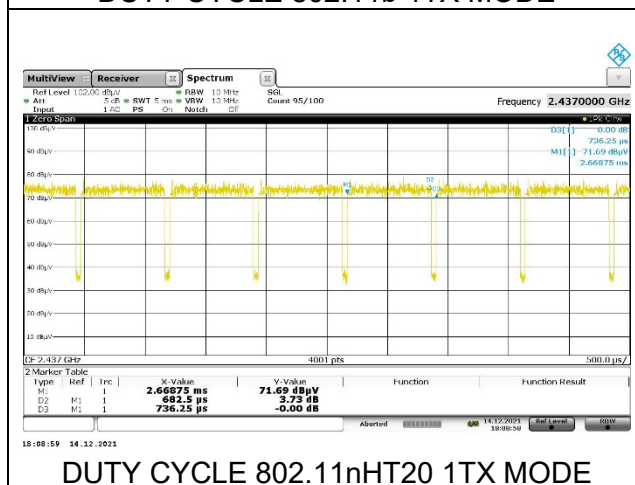
Antenna 1



DUTY CYCLE 802.11b 1TX MODE



DUTY CYCLE 802.11g 1TX MODE



DUTY CYCLE 802.11nHT20 1TX MODE

TEST INFORMATION

Tester: 23567

Date: 2021-12-13 and 2021-12-14

Location: N-SAC

Top Left: DUTY CYCLE 802.11b 1TX MODE

Frequency: 2.4370000 GHz

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1	1		4.58 ns	92.55 dBμV		
D2	M1	1	4.4 ms	0.04 dB		
D3	M1	1	4.455 ms	0.02 dB		

Top Right: DUTY CYCLE 802.11g 1TX MODE

Frequency: 2.4120000 GHz

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1	1		298.5 μs	83.28 dBμV		
D2	M1	1	722.5 μs	-2.43 dB		
D3	M1	1	770.0 μs	-0.08 dB		

Bottom Left: DUTY CYCLE 802.11nHT20 1TX MODE

Frequency: 2.4370000 GHz

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1	1		1.2475 ms	80.97 dBμV		
D2	M1	1	688.75 μs	2.28 dB		
D3	M1	1	733.75 μs	0.07 dB		

Bottom Right: DUTY CYCLE 802.11n 1TX MODE

Frequency: 2.4120000 GHz

Type	Ref	Trc	X-Value	Y-Value	Function	Function Result
M1	1		298.5 μs	83.28 dBμV		
D2	M1	1	722.5 μs	-2.43 dB		
D3	M1	1	770.0 μs	-0.08 dB		

Tester: 23567
Date: 2021-12-13 and 2021-12-15
Location: N-SAC

10. ANTENNA PORT TEST RESULTS

10.1. 99% BANDWIDTH

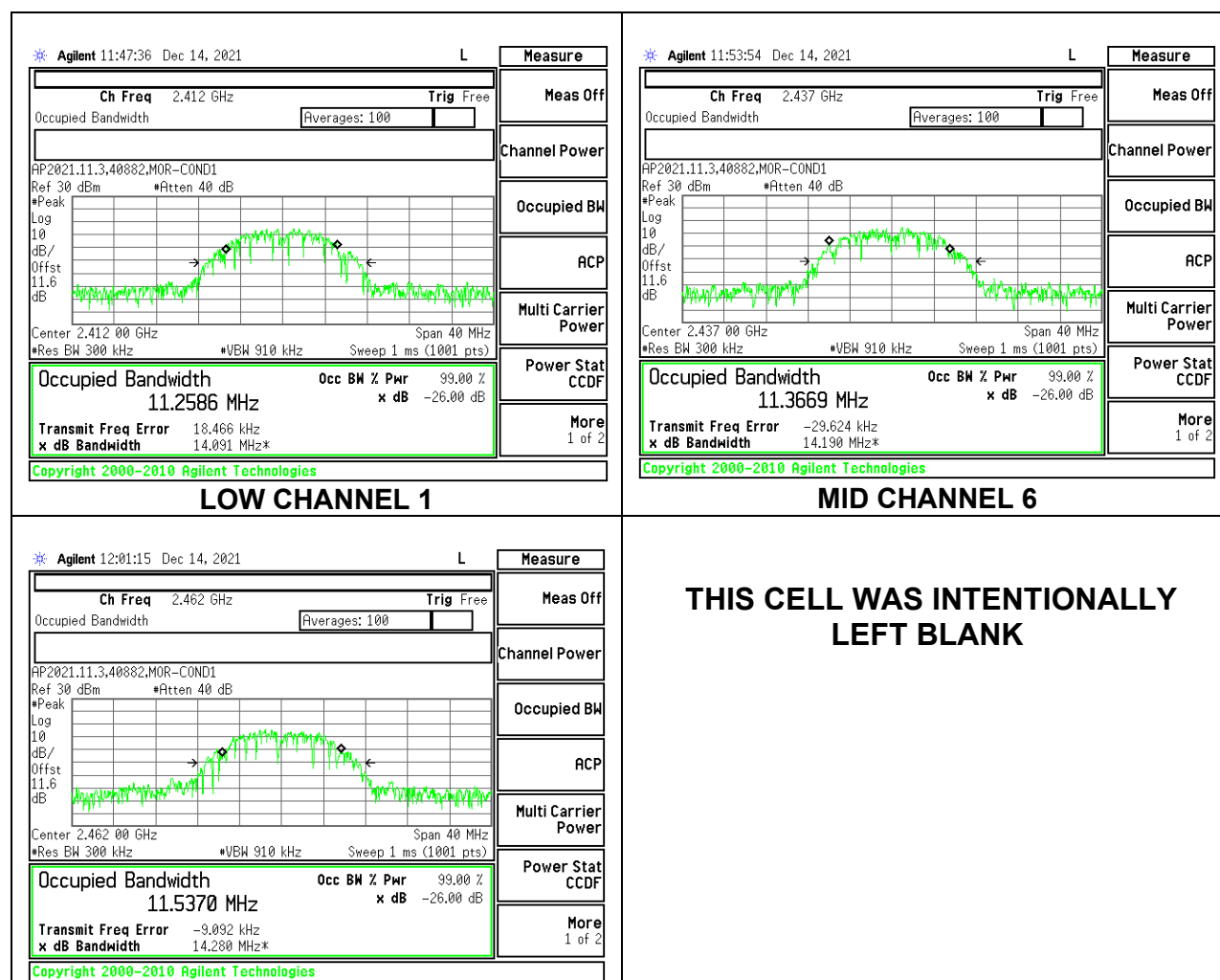
LIMITS

None; for reporting purposes only.

RESULTS

10.1.1. 802.11b MODE

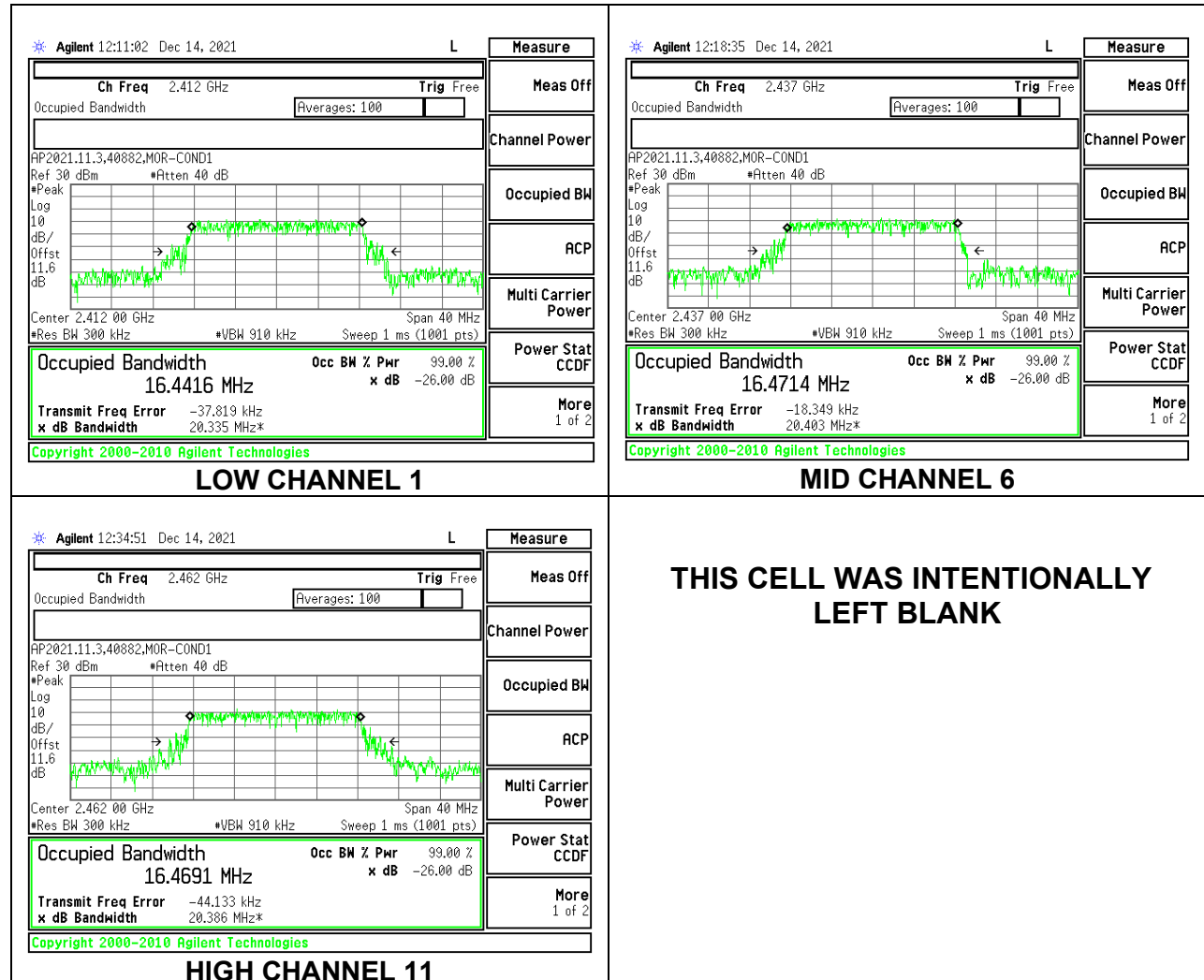
Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low 1	2412	11.2586
Mid 6	2437	11.3669
High 11	2462	11.5370



HIGH CHANNEL 11

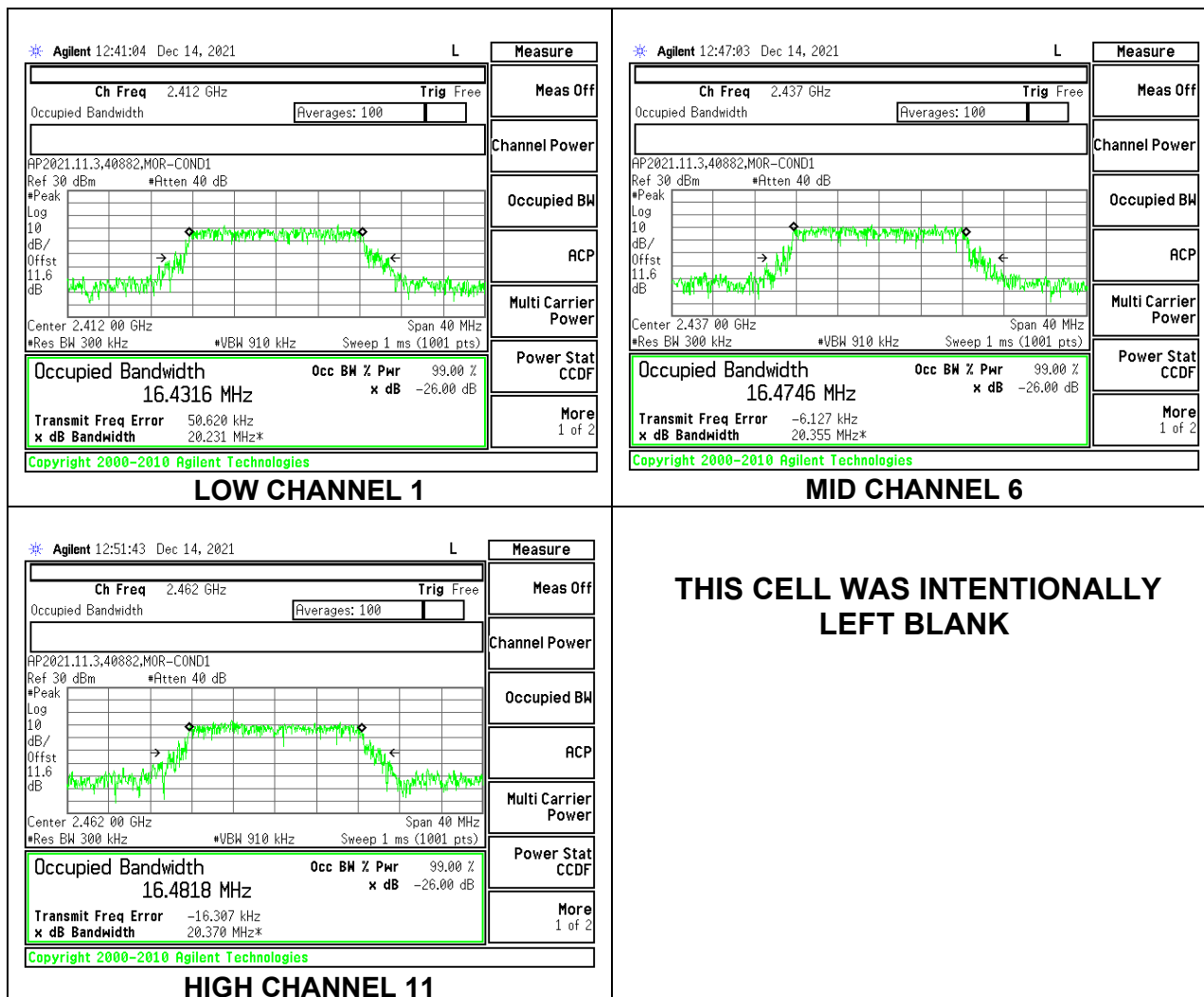
10.1.2. 802.11g MODE

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low 1	2412	16.4416
Mid 6	2437	16.4714
High 11	2462	16.4691



10.1.3. 802.11n HT20 MODE

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low 1	2412	16.4316
Mid 6	2437	16.4746
High 11	2462	16.4818



10.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

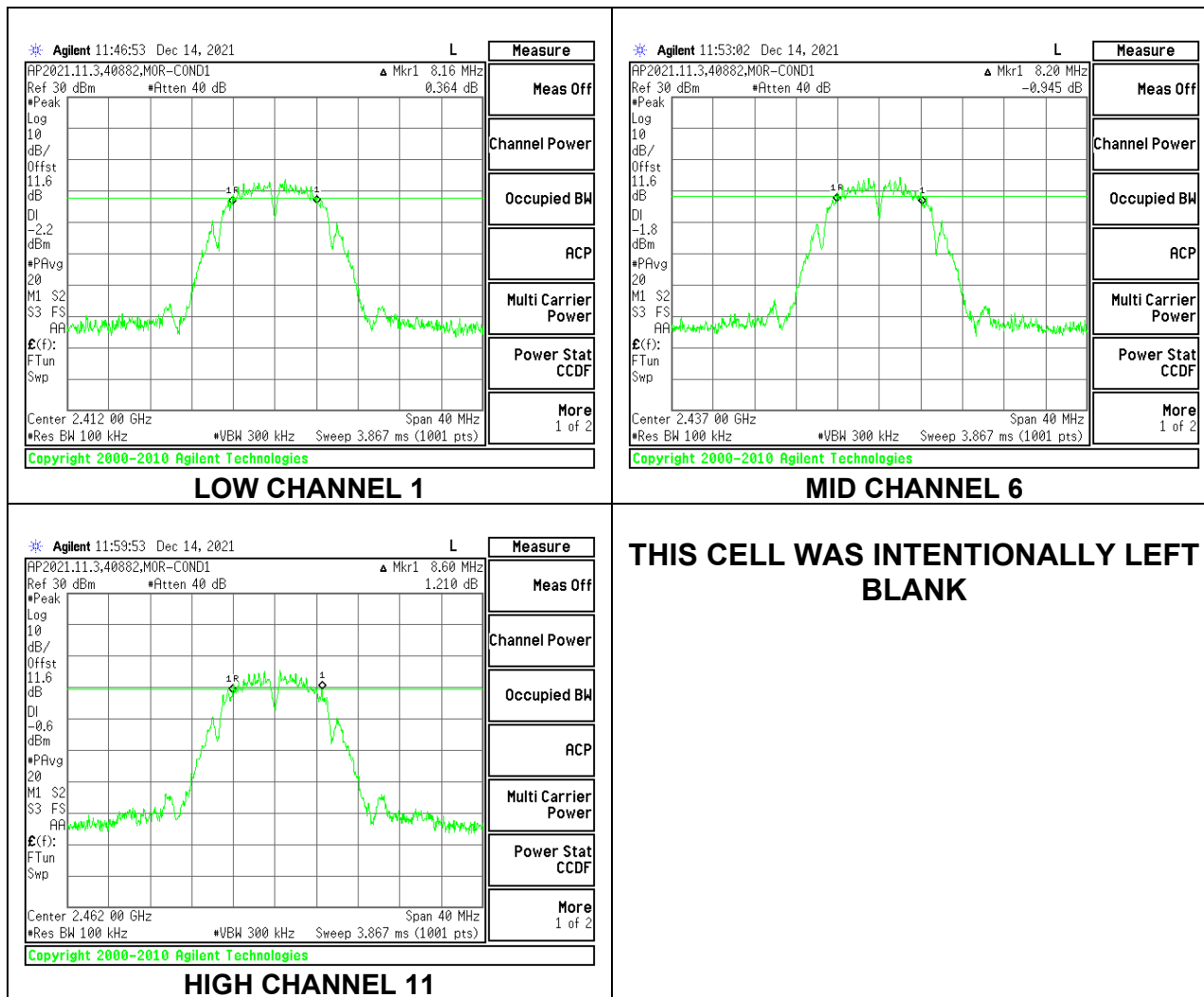
RSS-247 5.2 (a)

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

RESULTS

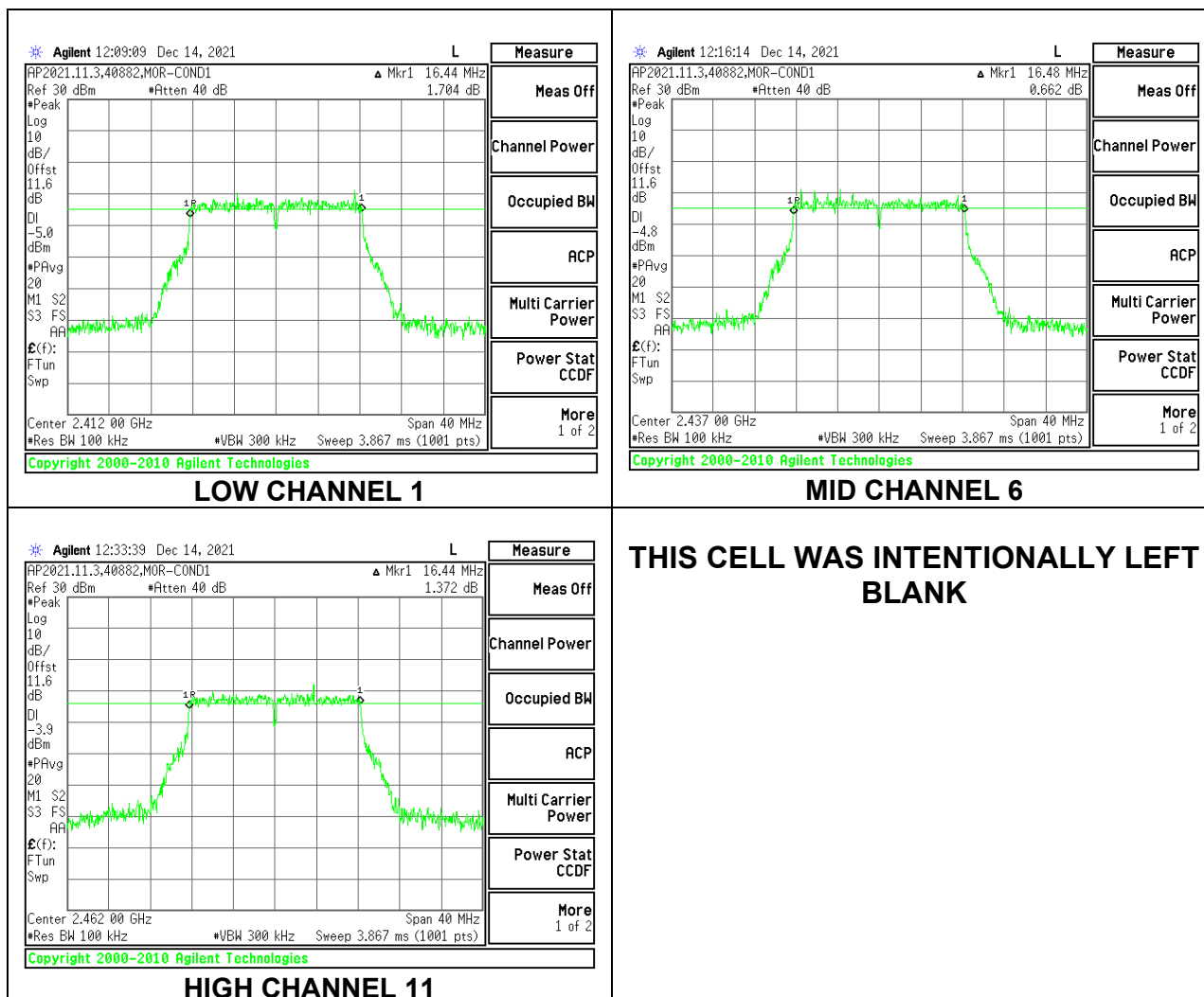
10.2.1. 802.11b MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	8.16	0.5
Mid 6	2437	8.20	0.5
High 11	2462	8.60	0.5



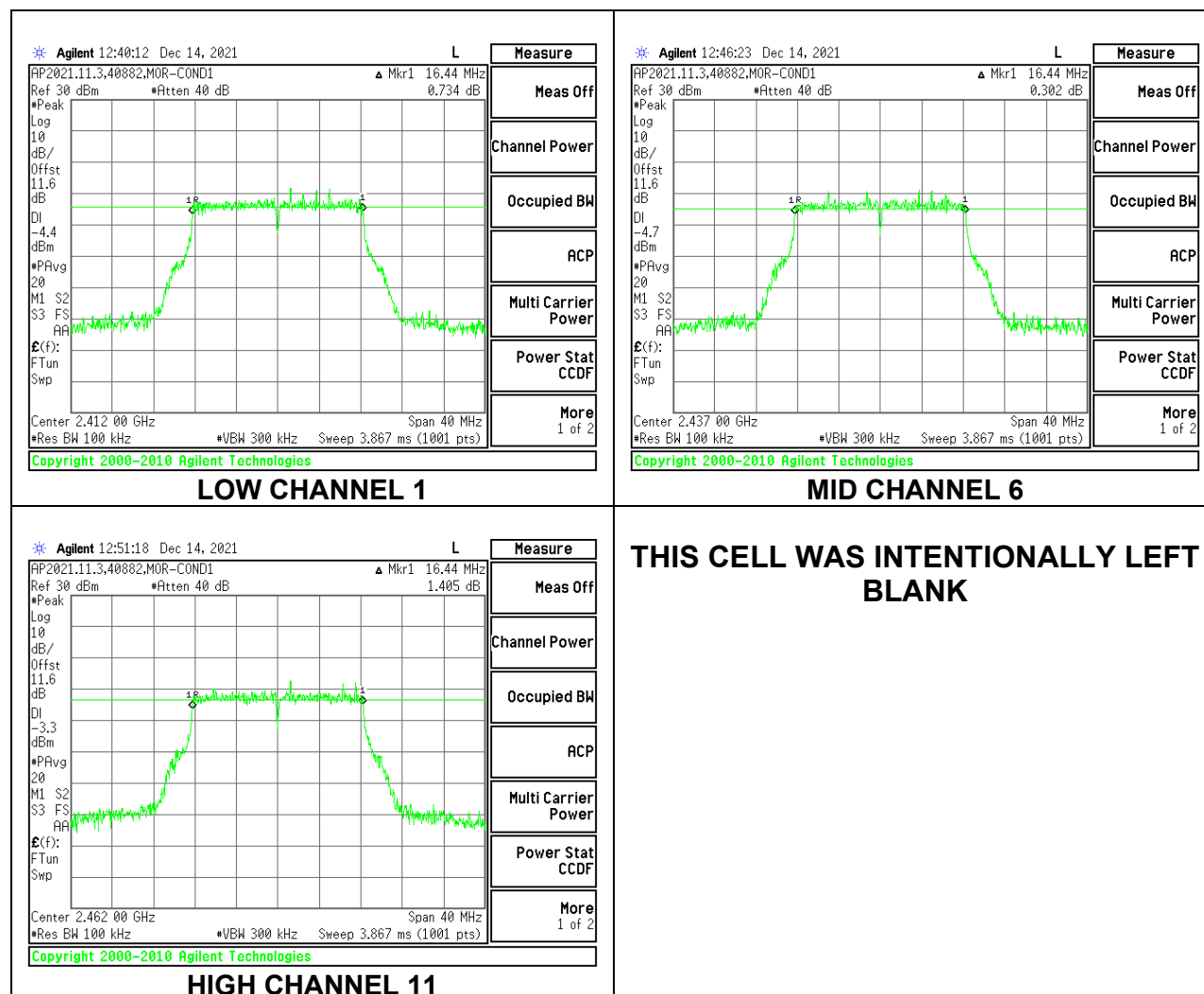
10.2.2. 802.11g MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	16.44	0.5
Mid 6	2437	16.48	0.5
High 11	2462	16.44	0.5



10.2.3. 802.11n HT20 MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	16.44	0.5
Mid 6	2437	16.44	0.5
High 11	2462	16.44	0.5



10.3. 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 gated-average power meter.

The cable assembly insertion loss of 11.62 dB (including 9.79 dB pad and 1.83 dB cable) was entered as an offset in the power meter.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

10.3.1. 802.11b MODE

1TX Antenna 1 MODE

Test Engineer:	40882
Test Date:	2021-12-07

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30.00	30	36	30.00
Mid 6	2437	3.80	30.00	30	36	30.00
High 11	2462	3.80	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	12.38	12.38	30.00	-17.62
Mid 6	2437	12.42	12.42	30.00	-17.58
High 11	2462	13.68	13.68	30.00	-16.32

1TX Antenna 2 MODE

Test Engineer:	40882
Test Date:	2021-12-07

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30	36	30.00
Mid 6	2437	3.80	30	36	30.00
High 11	2462	3.80	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	12.58	30.00	-17.42
Mid 6	2437	12.69	30.00	-17.31
High 11	2462	13.93	30.00	-16.07

10.3.2. 802.11g MODE

1TX Antenna 1 MODE

Test Engineer:	40882
Test Date:	2021-12-07

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30	36	30.00
Mid 6	2437	3.80	30	36	30.00
High 11	2462	3.80	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	12.34	30.00	-17.66
Mid 6	2437	12.15	30.00	-17.85
High 11	2462	13.22	30.00	-16.78

1TX Antenna 2 MODE

Test Engineer:	40882
Test Date:	2021-12-07

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30	36	30.00
Mid 6	2437	3.80	30	36	30.00
High 11	2462	3.80	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	12.35	30.00	-17.65
Mid 6	2437	12.80	30.00	-17.20
High 11	2462	13.71	30.00	-16.29

10.3.3. 802.11n HT20 MODE

1TX Antenna 1 MODE

Test Engineer:	40882
Test Date:	2021-12-07

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30	36	30.00
Mid 6	2437	3.80	30	36	30.00
High 11	2462	3.80	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	12.50	30.00	-17.50
Mid 6	2437	12.58	30.00	-17.42
High 11	2462	13.25	30.00	-16.75

1TX Antenna 2 MODE

Test Engineer:	40882
Test Date:	2021-12-07

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	3.80	30	36	30.00
Mid 6	2437	3.80	30	36	30.00
High 11	2462	3.80	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	12.62	30.00	-17.38
Mid 6	2437	13.05	30.00	-16.95
High 11	2462	13.48	30.00	-16.52

10.4. 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.

*Note: Peak power spectral density data was taken and included in this report to represent worst-case.

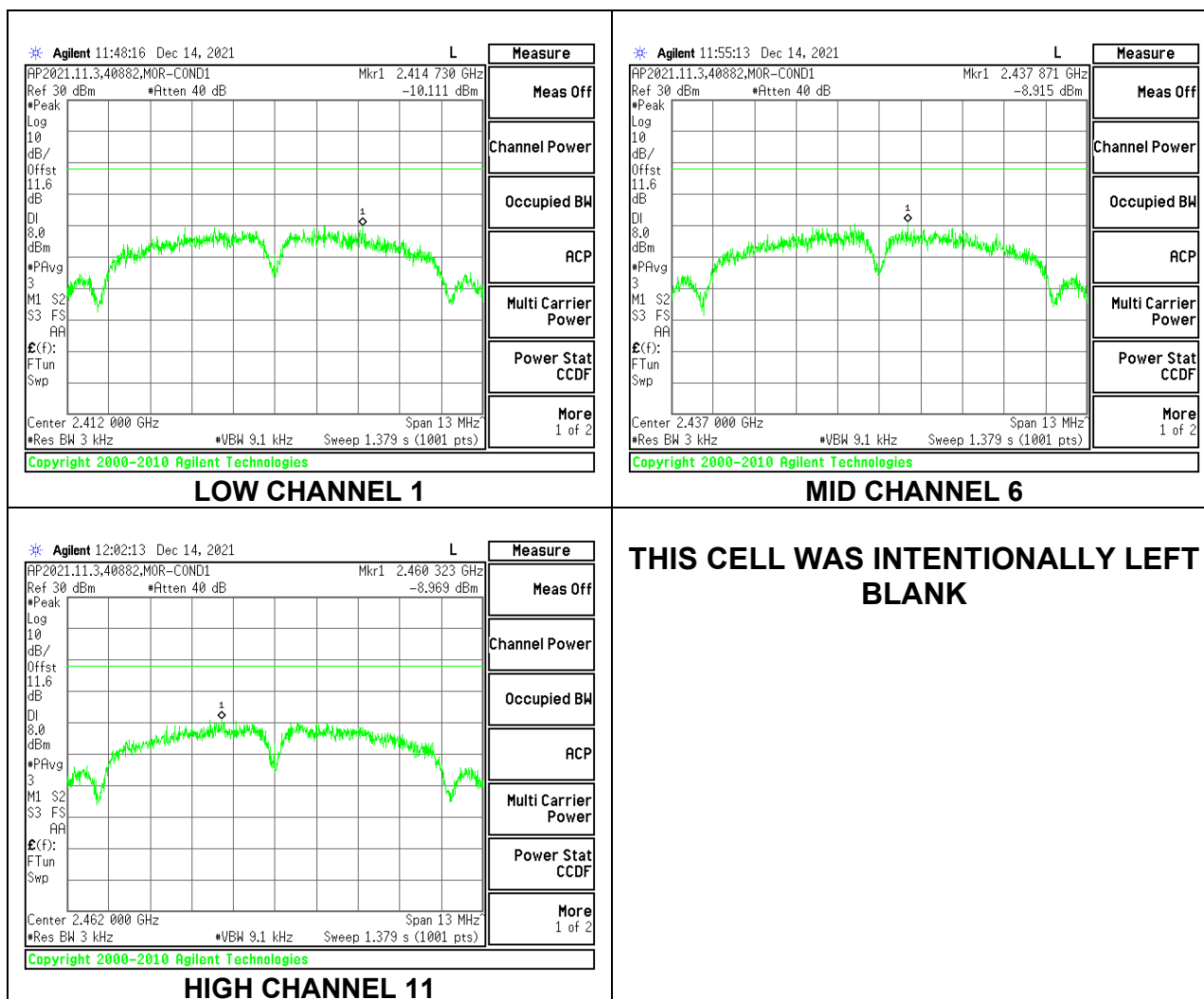
RESULTS

10.4.1. 802.11b MODE

1TX Antenna 2 MODE

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-10.111	-10.11	8.0	-18.1
Mid 6	2437	-8.915	-8.92	8.0	-16.9
High 11	2462	-8.969	-8.97	8.0	-17.0

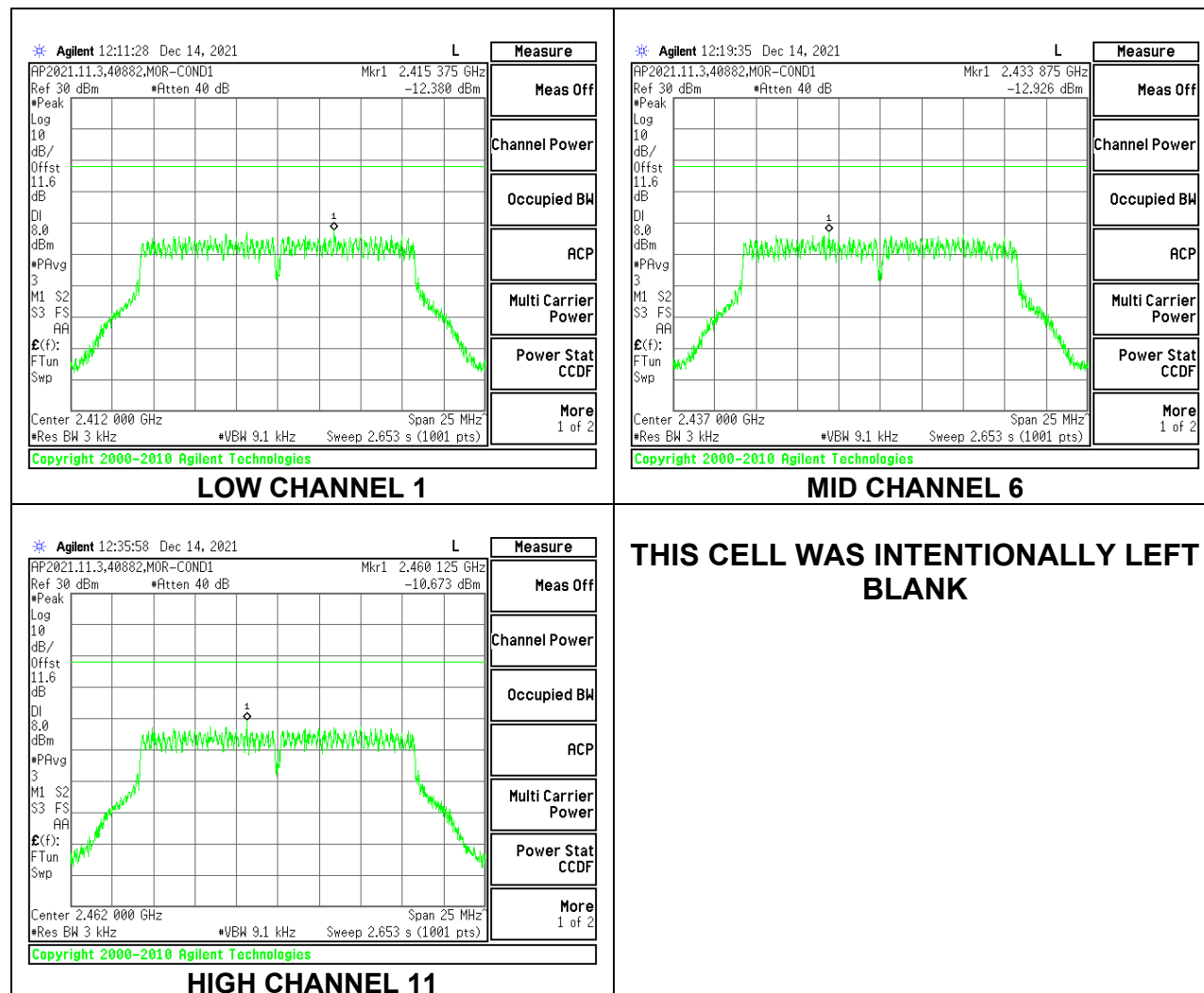


10.4.2. 802.11g MODE

1TX Antenna 2 MODE

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-12.380	-12.38	8.0	-20.4
Mid 6	2437	-12.926	-12.93	8.0	-20.9
High 11	2462	-10.673	-10.67	8.0	-18.7

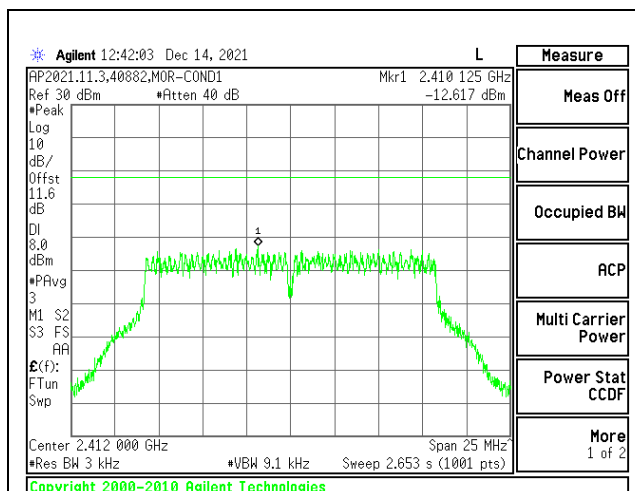


10.4.3. 802.11n HT20 MODE

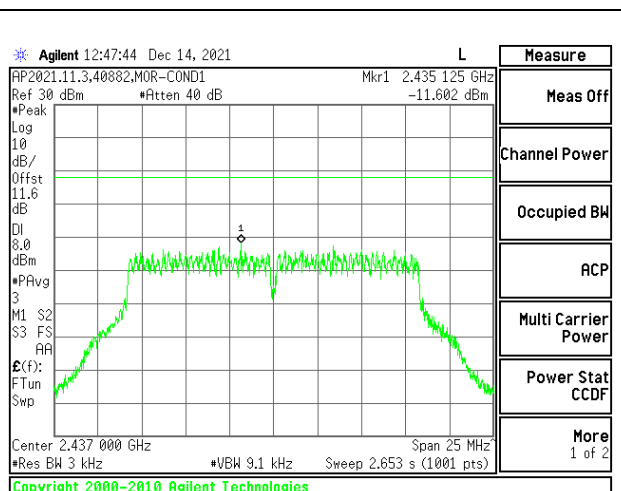
1TX Antenna 2 MODE

PSD Results

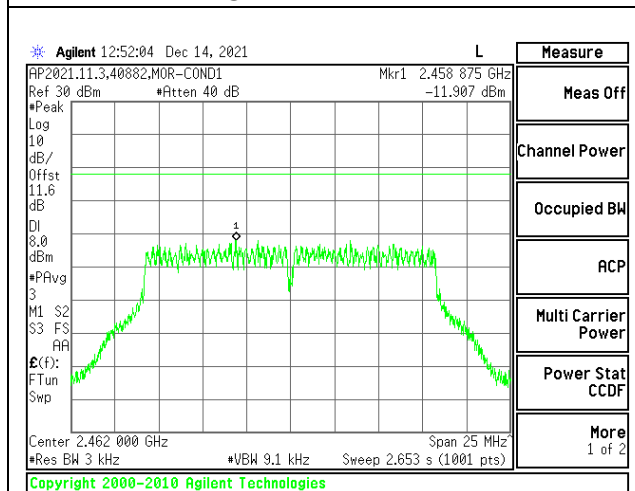
Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-12.617	-12.62	8.0	-20.6
Mid 6	2437	-11.602	-11.60	8.0	-19.6
High 11	2462	-11.907	-11.91	8.0	-19.9



LOW CHANNEL 1



MID CHANNEL 6



HIGH CHANNEL 11

THIS CELL WAS INTENTIONALLY LEFT BLANK

10.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

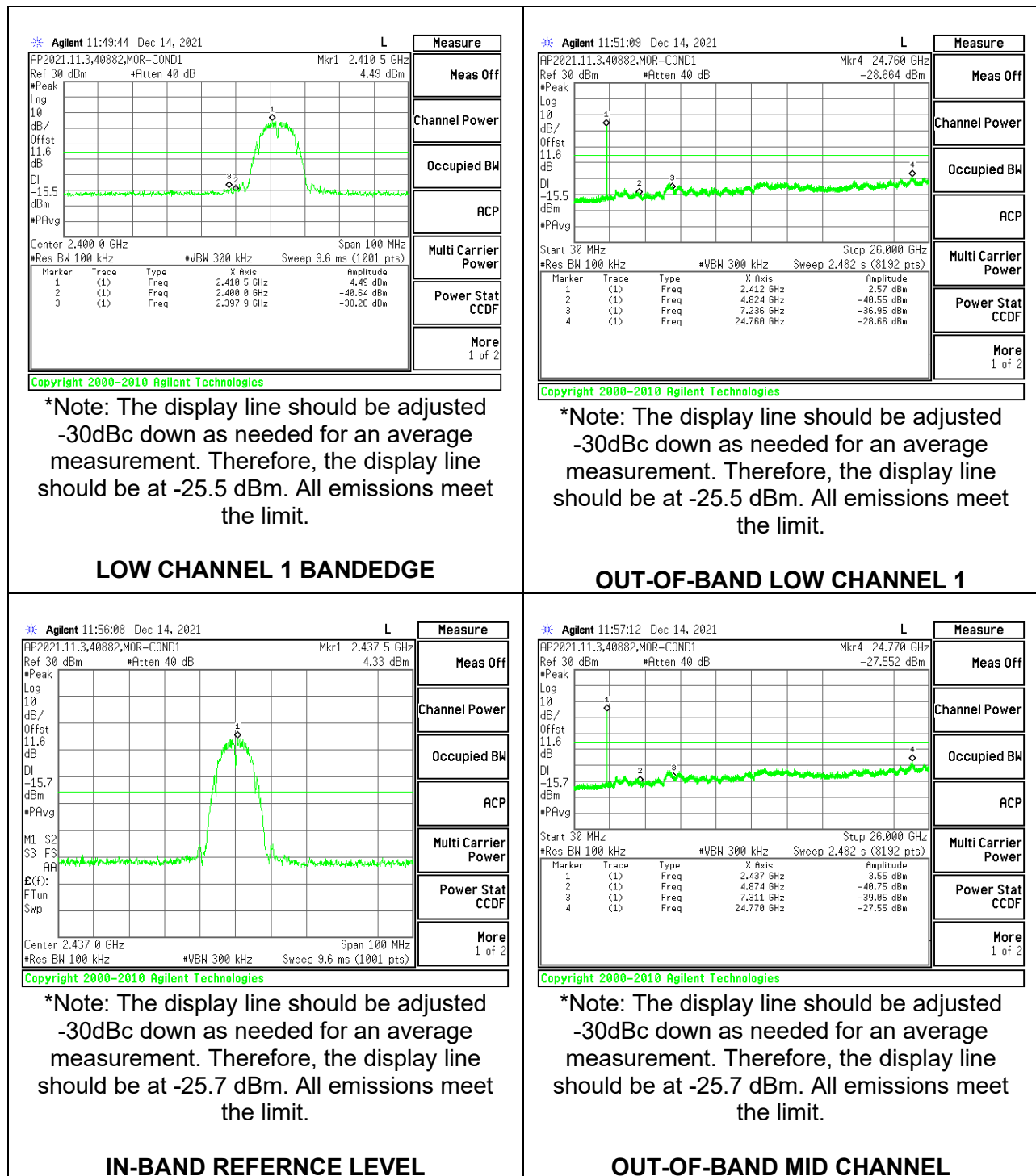
RSS-247 5.5

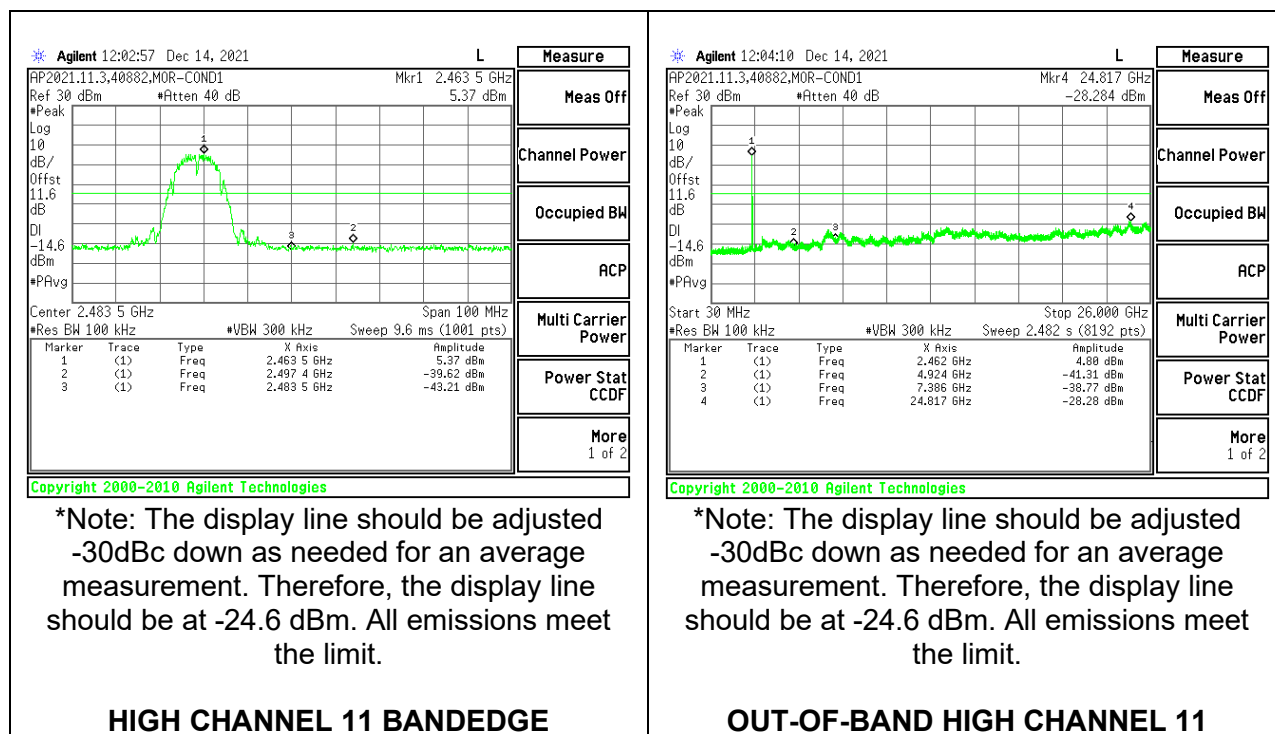
Output power was measured based on the use of average measurement, therefore the required attenuation is -30 dBc.

RESULTS

10.5.1. 802.11b MODE

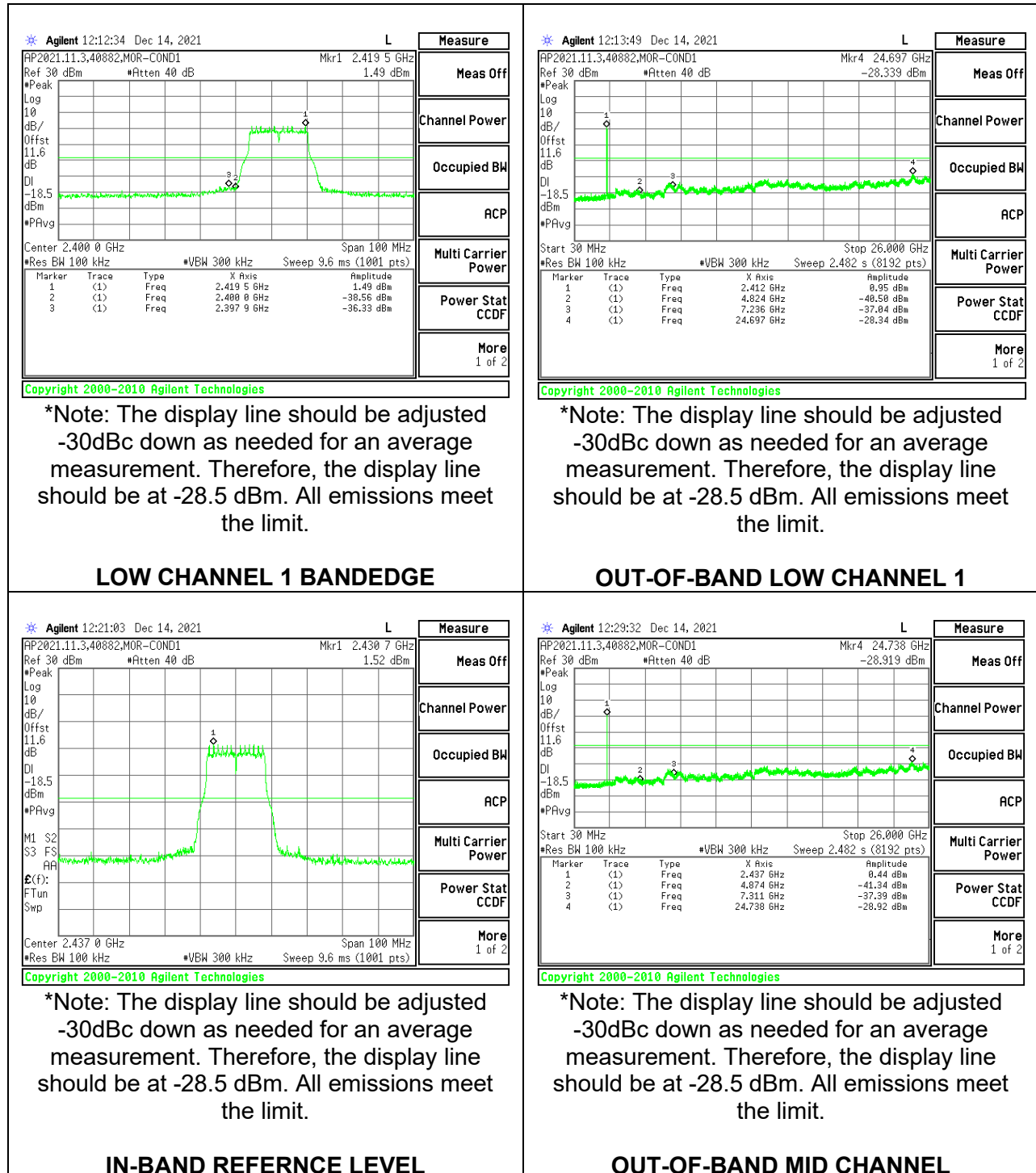
1TX Antenna 2 MODE

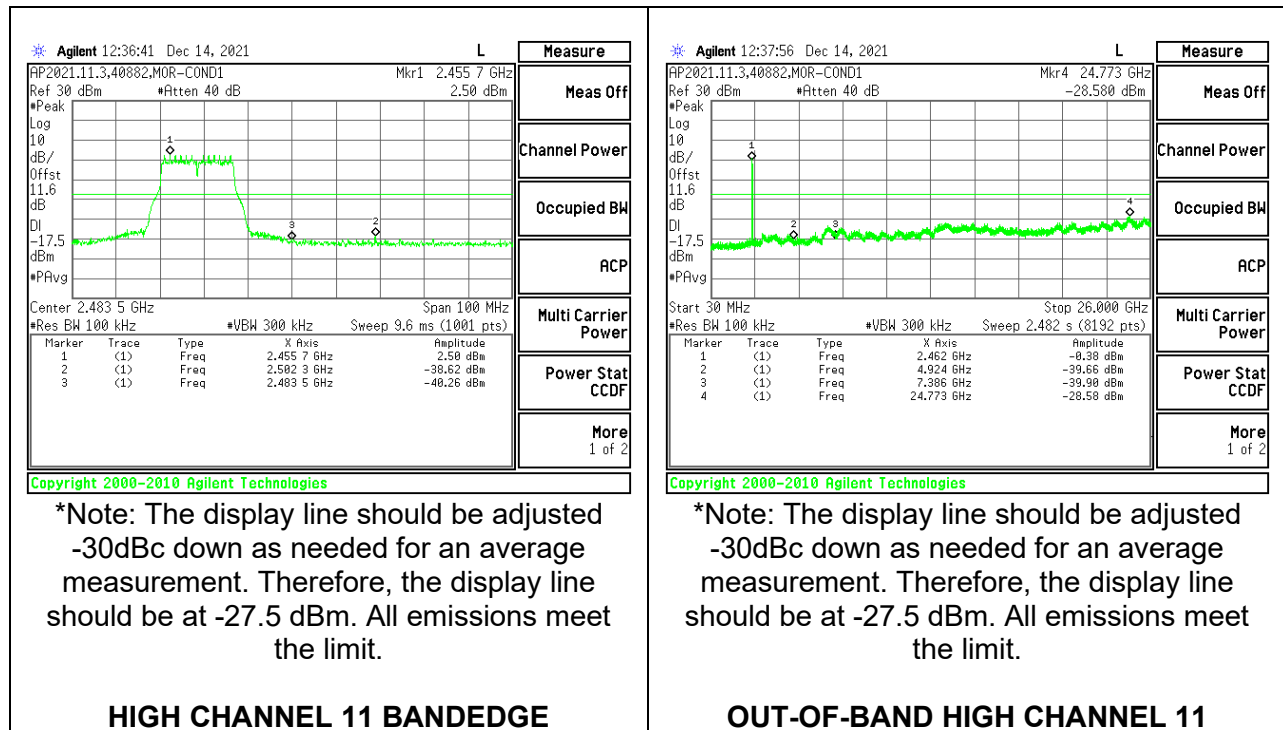




10.5.2. 802.11g MODE

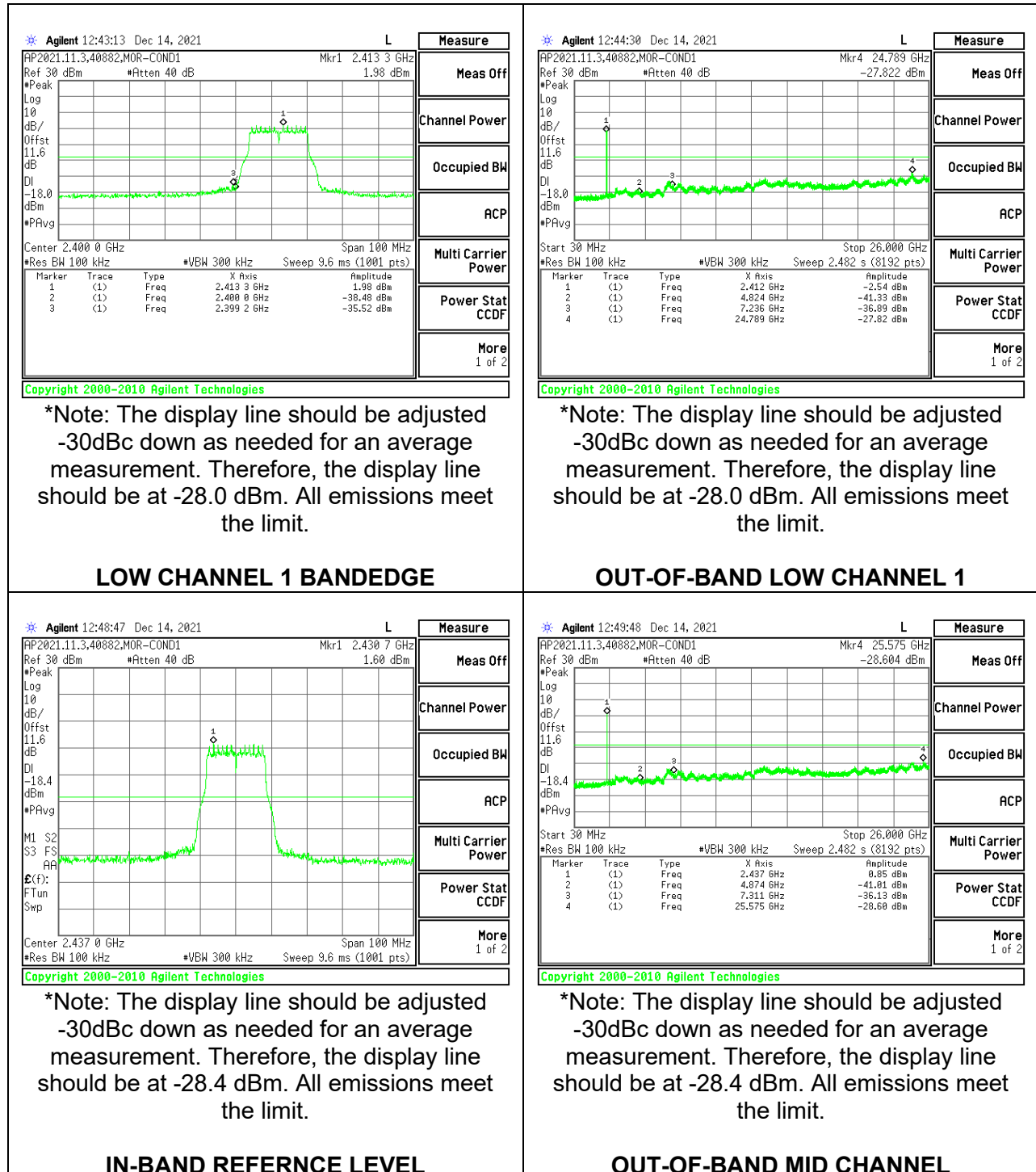
1TX Antenna 2 MODE

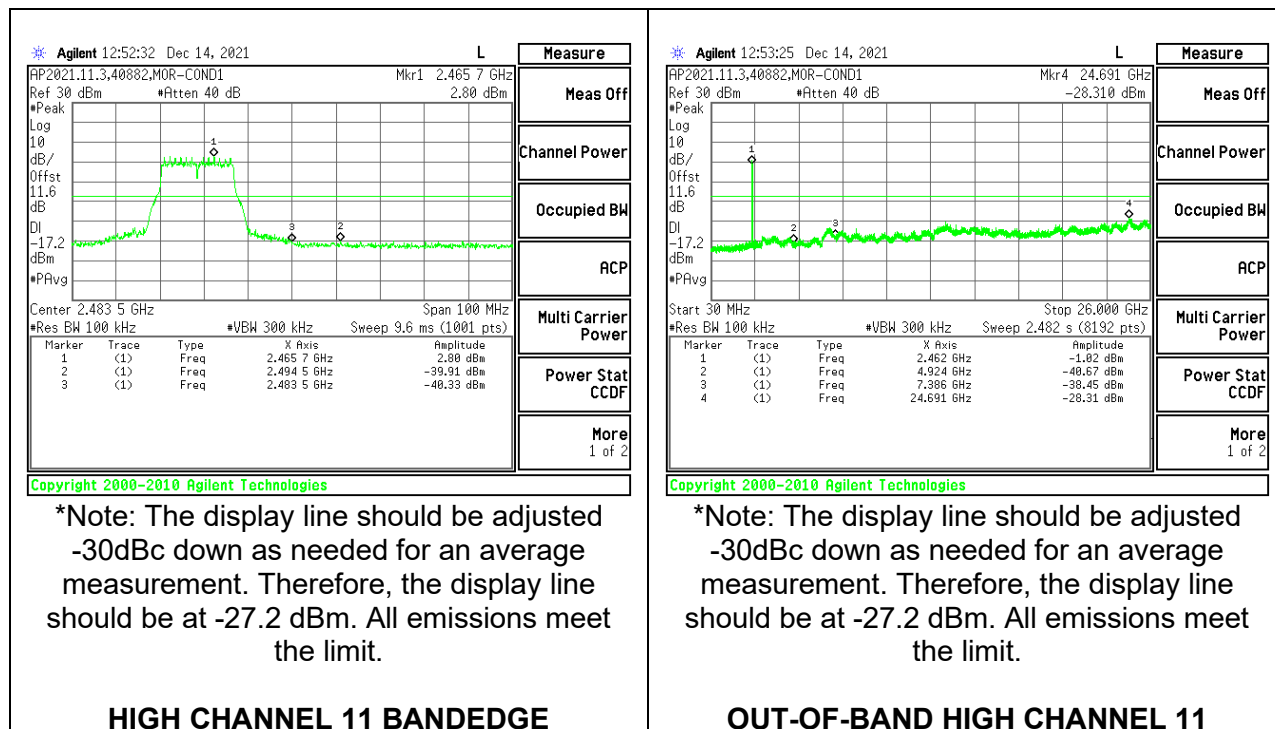




10.5.3. 802.11n HT20 MODE

1TX Antenna 2 MODE





11. 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 (uA/m) at 3 m	Field Strength Limit (dBuA/m) at 3 m
0.009-0.490	6.37/F(kHz) @ 300 m	-
0.490-1.705	63.7/F(kHz) @ 30 m	-
1.705 - 30	0.08 @ 30m	-
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak or average (9-90kHz and 110-490kHz).

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

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

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels, on each antenna, in each applicable band. Below 1GHz and above 18GHz emissions, the worst-case antenna, based on 1-18GHz spurious emissions measurements and the channel with the highest output power was tested.

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

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

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

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

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

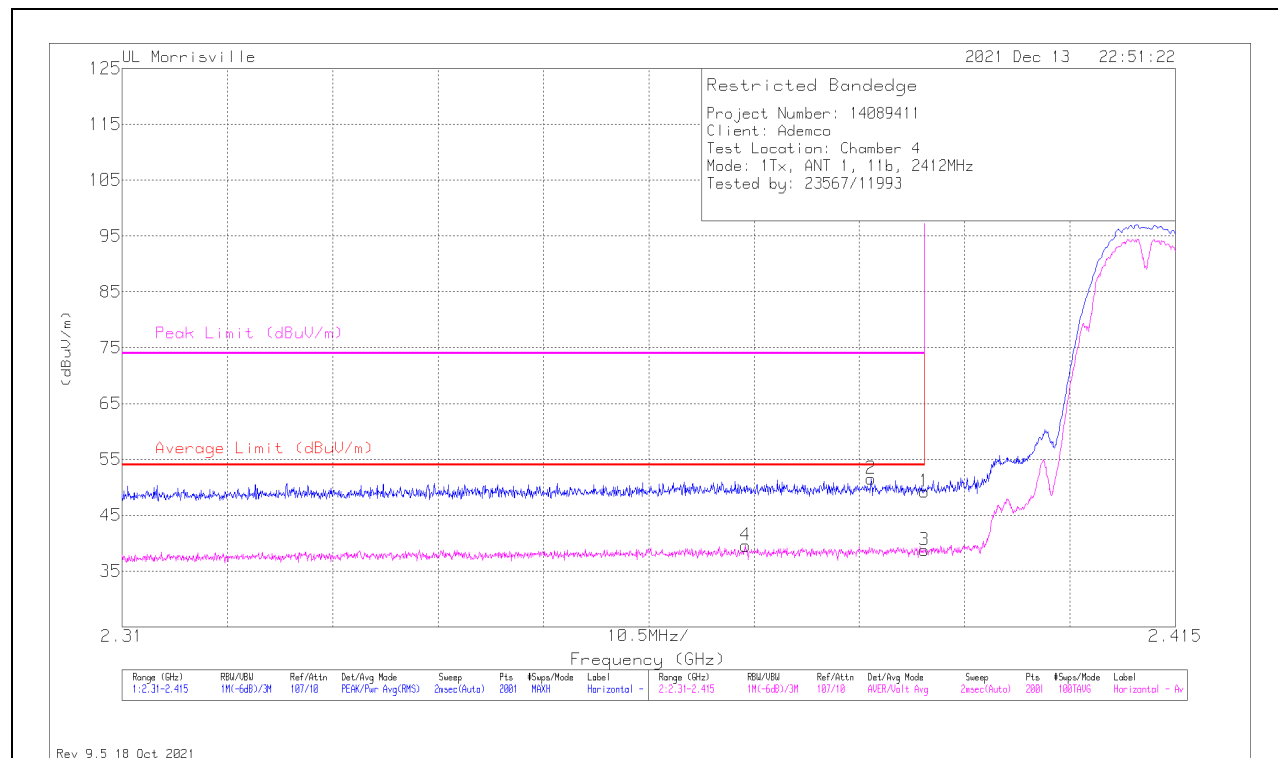
11.1. TRANSMITTER ABOVE 1 GHz

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

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	31	Pk	32	-13.8	49.2	-	-	74	-24.8	335	285	H
2	* ** 2.38466	33.32	Pk	32	-13.8	51.52	-	-	74	-22.48	335	285	H
3	* ** 2.38996	20.53	ADV	32	-13.8	38.73	54	-15.27	-	-	335	285	H
4	* ** 2.37216	21.45	ADV	32	-13.9	39.55	54	-14.45	-	-	335	285	H

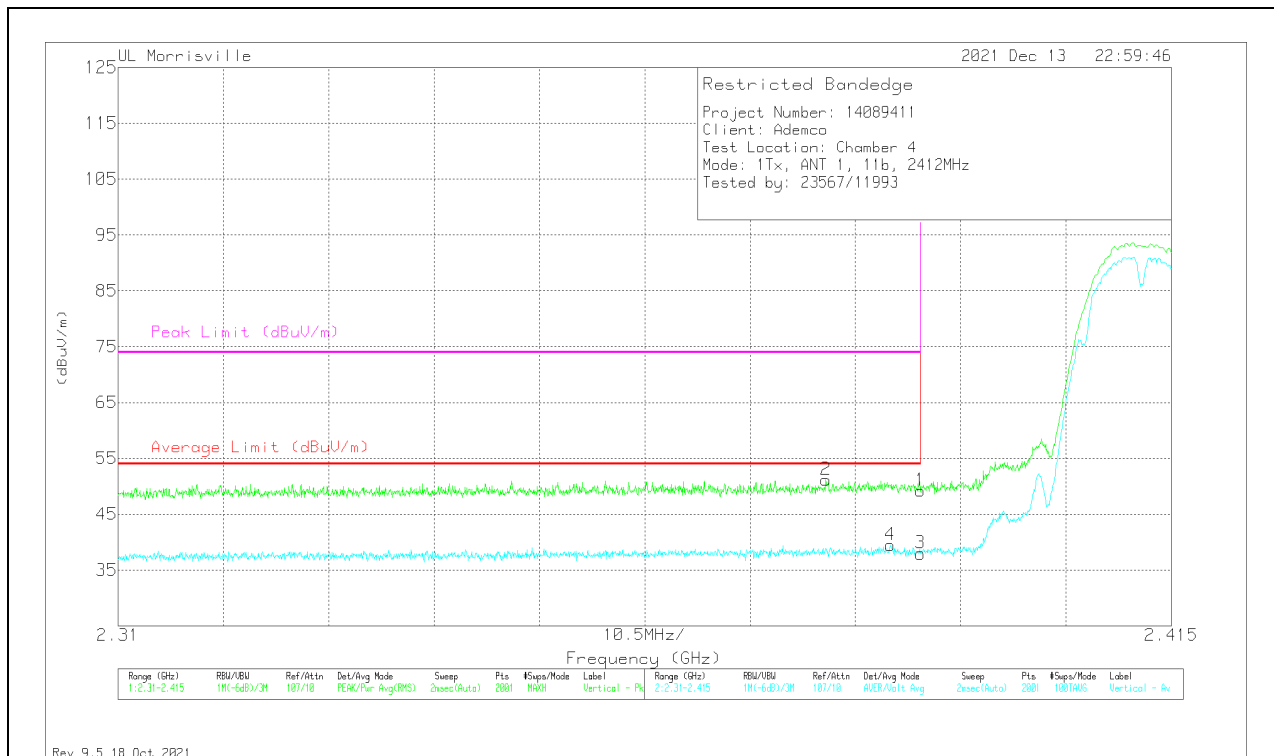
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	31.02	Pk	32	-13.8	49.22	-	-	74	-24.78	53	312	V
2	* ** 2.38056	33.05	Pk	32	-13.9	51.15	-	-	74	-22.85	53	312	V
3	* ** 2.38996	19.76	ADV	32	-13.8	37.96	54	-16.04	-	-	53	312	V
4	* ** 2.38697	21.27	ADV	32	-13.8	39.47	54	-14.53	-	-	53	312	V

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

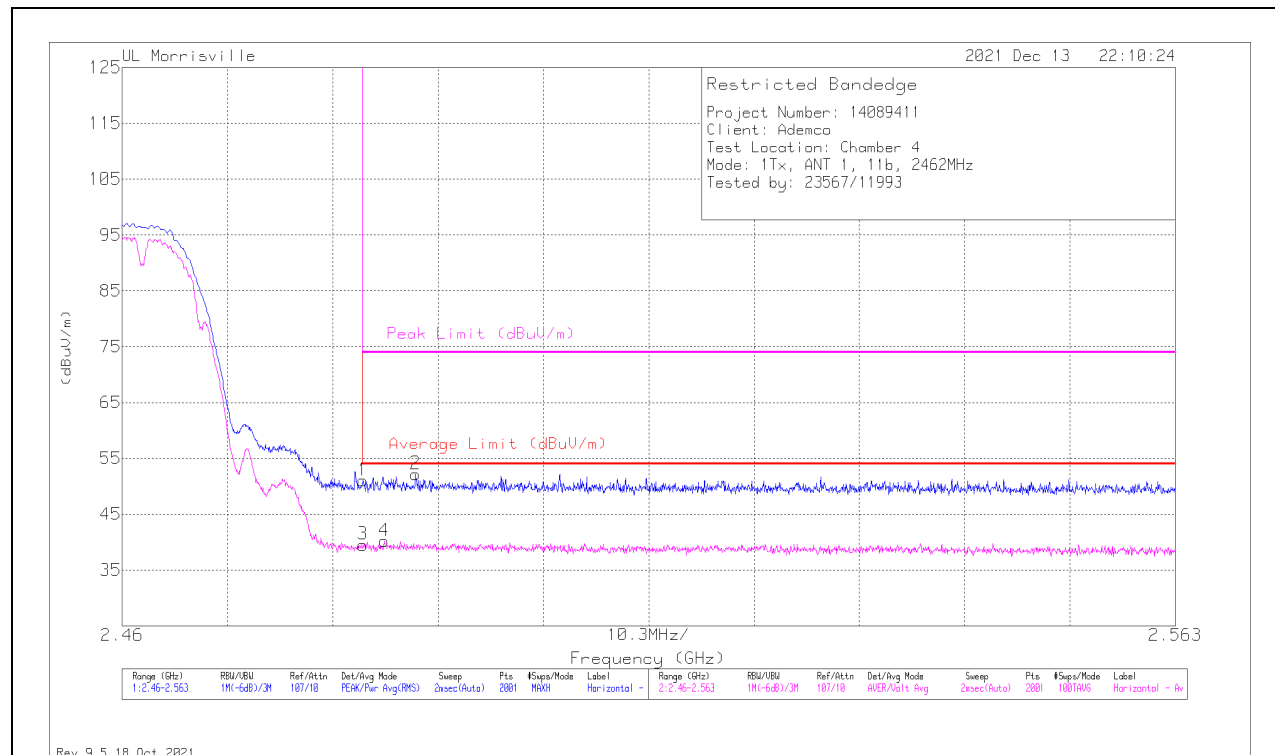
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	32.15	Pk	32.6	-13.7	51.05	-	-	74	-22.95	337	270	H
2	* ** 2.48869	33.28	Pk	32.6	-13.7	52.18	-	-	74	-21.82	337	270	H
3	* ** 2.48354	20.63	ADV	32.6	-13.7	39.53	54	-14.47	-	-	337	270	H
4	* ** 2.48565	21.29	ADV	32.6	-13.7	40.19	54	-13.81	-	-	337	270	H

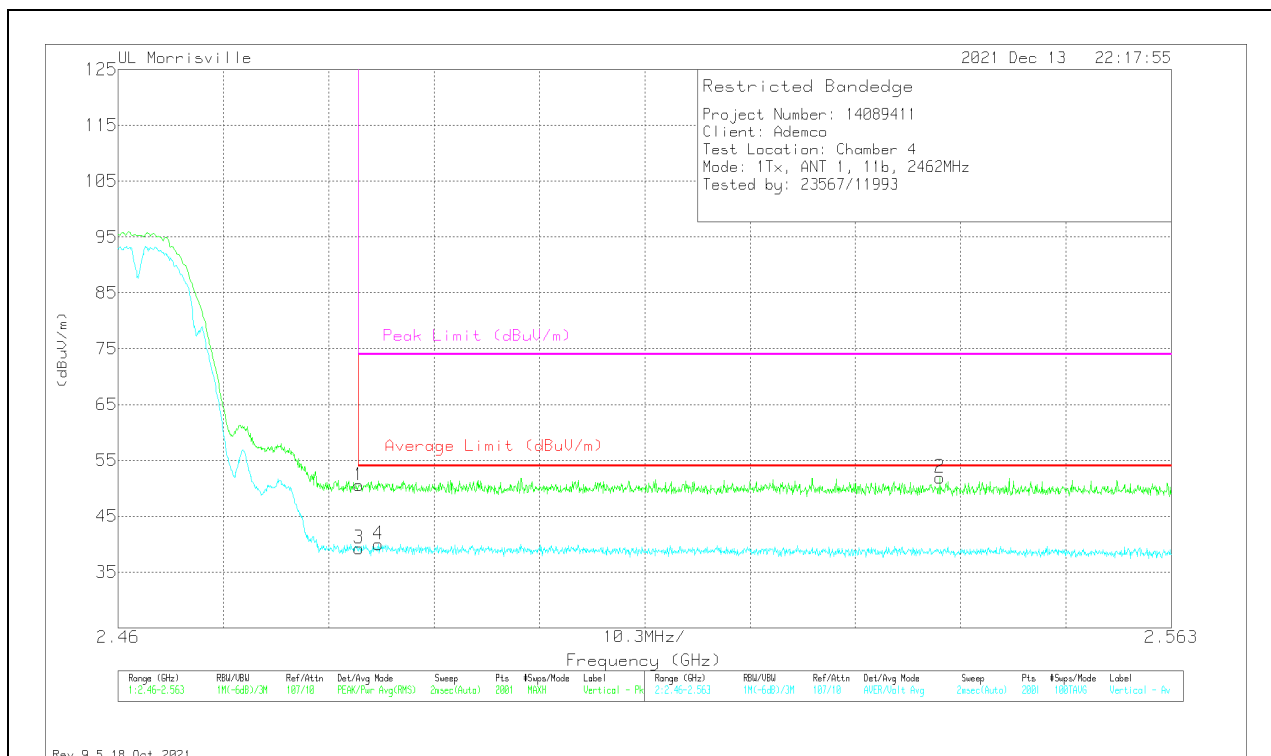
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	31.65	Pk	32.6	-13.7	50.55	-	-	74	-23.45	332	127	V
2	** 2.54034	33.14	Pk	32.4	-13.6	51.94	-	-	74	-22.06	332	127	V
3	* ** 2.48354	20.38	ADV	32.6	-13.7	39.28	54	-14.72	-	-	332	127	V
4	* ** 2.48544	21.09	ADV	32.6	-13.7	39.99	54	-14.01	-	-	332	127	V

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

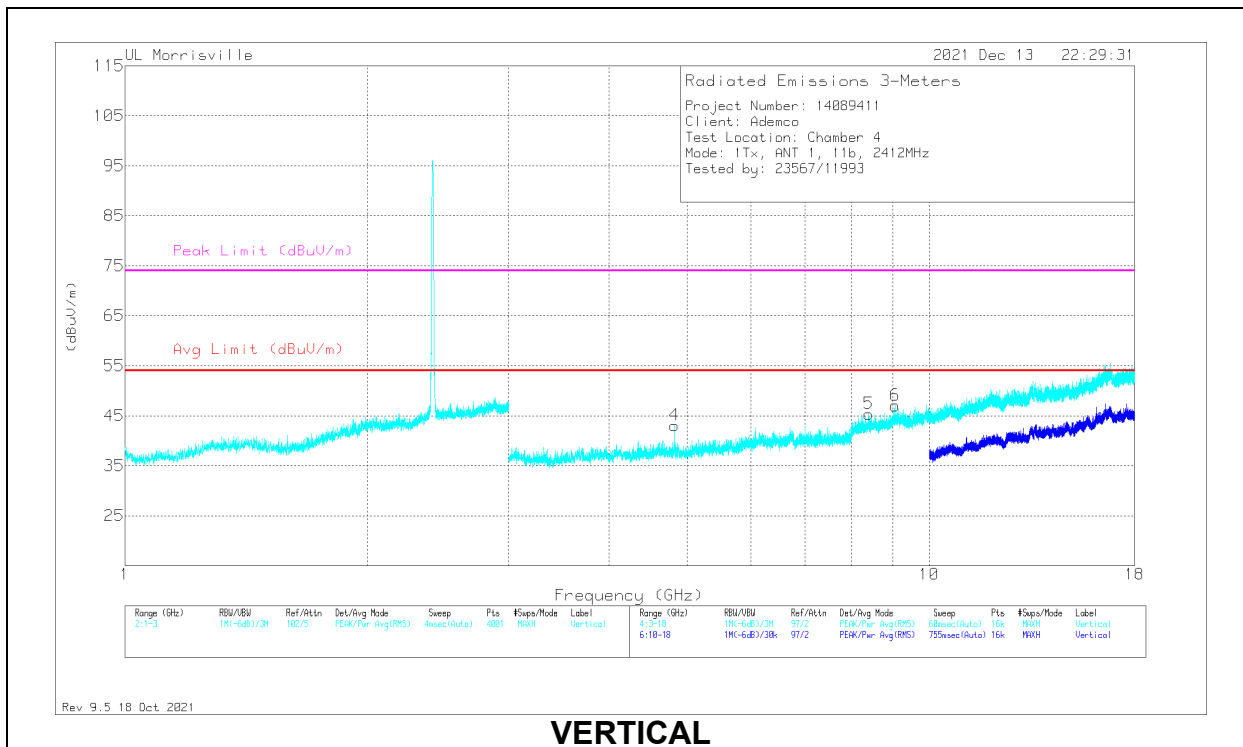
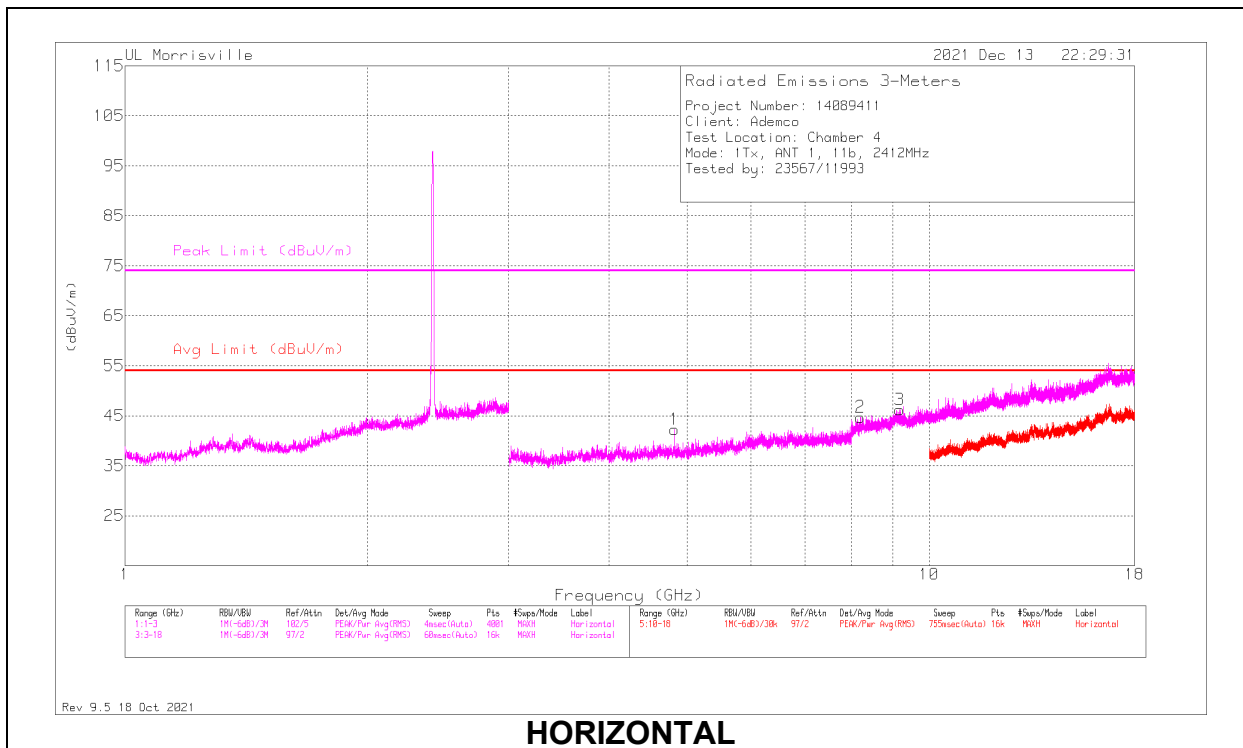
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

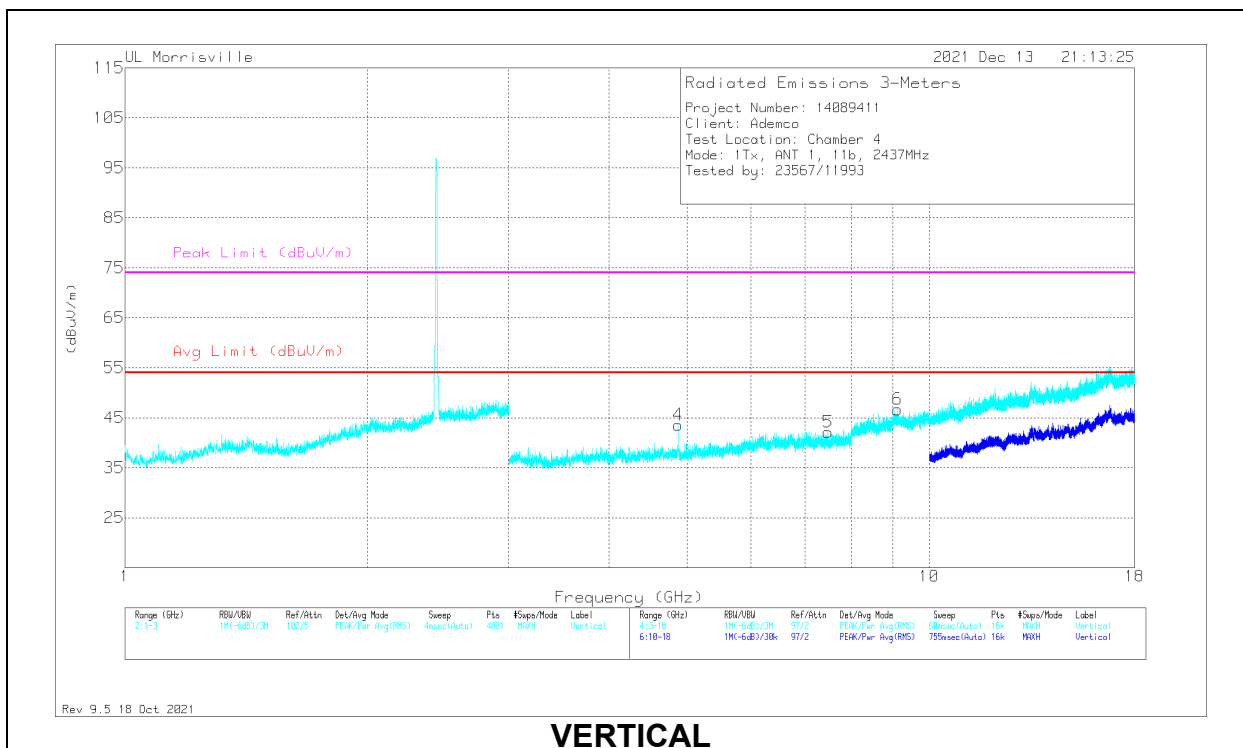
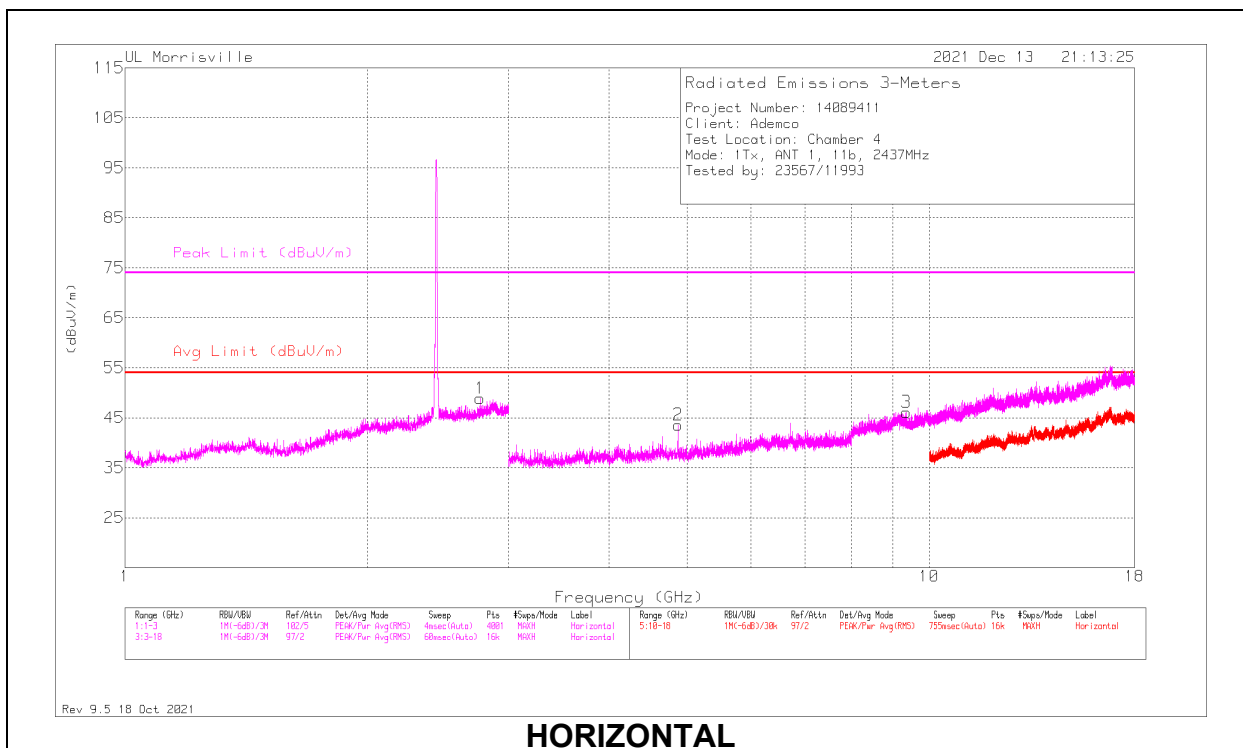
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.82391	40.75	Pk	34	-32.5	42.25	54	-11.75	74	-31.75	0-360	100	H
2	* ** 8.2125	36.78	Pk	35.7	-27.8	44.68	54	-9.32	74	-29.32	0-360	100	H
3	* ** 9.1875	36.7	Pk	36.2	-26.7	46.2	54	-7.8	74	-27.8	0-360	100	H
4	* ** 4.82344	41.57	Pk	34	-32.5	43.07	54	-10.93	74	-30.93	0-360	200	V
5	* ** 8.41125	37.17	Pk	35.7	-27.5	45.37	54	-8.63	74	-28.63	0-360	200	V
6	* ** 9.07406	36.45	Pk	36	-25.4	47.05	54	-6.95	74	-26.95	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

MID CHANNEL, CH 6 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.76214	29.31	PK2	32	-13.2	48.11	-	-	74	-25.89	234	301	H
	* ** 2.76092	16.69	ADV	32	-13.2	35.49	54	-18.51	-	-	234	301	H
2	* ** 4.87406	41.84	Pk	33.9	-32.2	43.54	54	-10.46	74	-30.46	0-360	100	H
3	* ** 9.36469	35.58	Pk	36.4	-25.9	46.08	54	-7.92	74	-27.92	0-360	100	H
4	* ** 4.87406	41.84	Pk	33.9	-32.2	43.54	54	-10.46	74	-30.46	0-360	200	V
5	* ** 7.485	35.62	Pk	35.6	-29.1	42.12	54	-11.88	74	-31.88	0-360	200	V
6	* ** 9.13219	36.77	Pk	36.2	-26.3	46.67	54	-7.33	74	-27.33	0-360	200	V

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

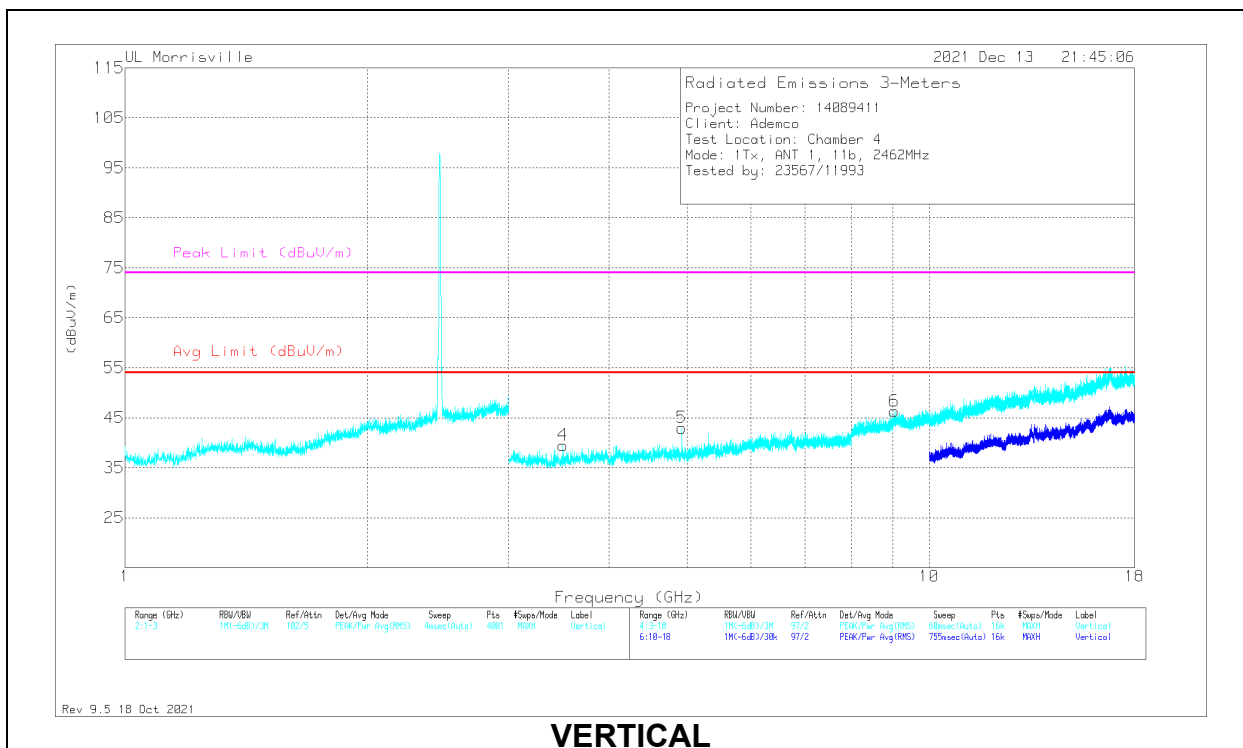
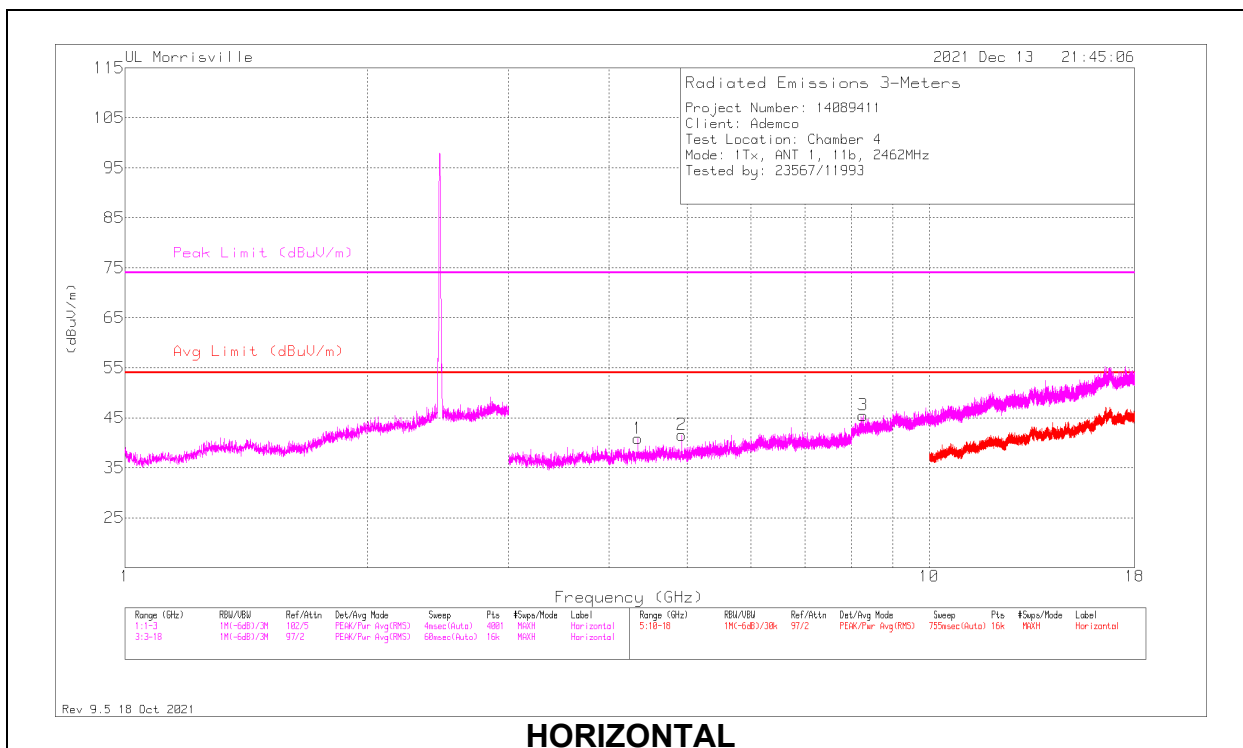
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.3425	39.93	Pk	33.5	-32.6	40.83	54	-13.17	74	-33.17	0-360	100	H
2	* ** 4.92375	39.86	Pk	33.9	-32.2	41.56	54	-12.44	74	-32.44	0-360	100	H
3	* ** 8.2725	37.59	Pk	35.7	-27.8	45.49	54	-8.51	74	-28.51	0-360	100	H
4	* ** 3.50344	41.29	Pk	32.7	-34.5	39.49	54	-14.51	74	-34.51	0-360	200	V
5	* ** 4.92375	41.28	Pk	33.9	-32.2	42.98	54	-11.02	74	-31.02	0-360	200	V
6	* ** 9.04594	35.91	Pk	35.9	-25.5	46.31	54	-7.69	74	-27.69	0-360	200	V

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

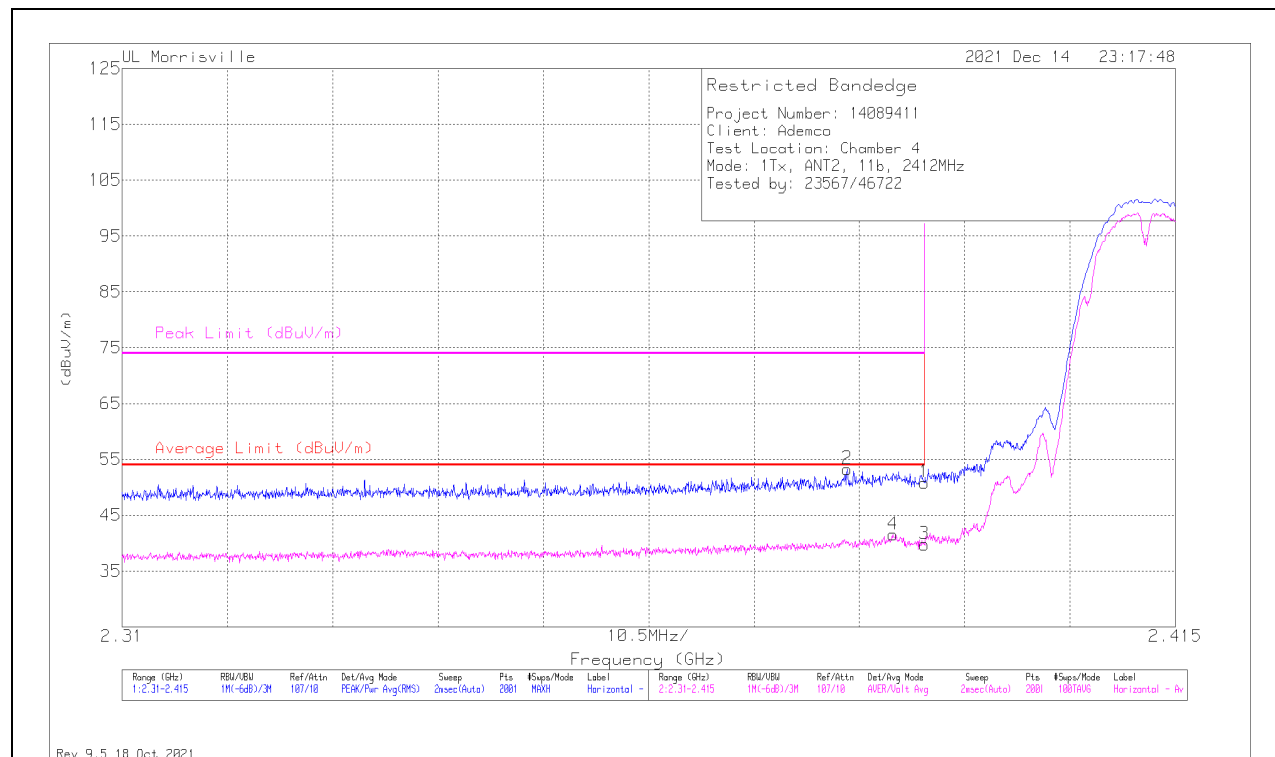
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

1TX Antenna 2 MODE

BANEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 2.38996	32.67	Pk	32	-13.8	50.87	-	-	74	-23.13	88	272	H
2	*** 2.38229	35.06	Pk	32	-13.8	53.26	-	-	74	-20.74	88	272	H
3	*** 2.38996	21.59	ADV	32	-13.8	39.79	54	-14.21	-	-	88	272	H
4	*** 2.38686	23.34	ADV	32	-13.8	41.54	54	-12.46	-	-	88	272	H

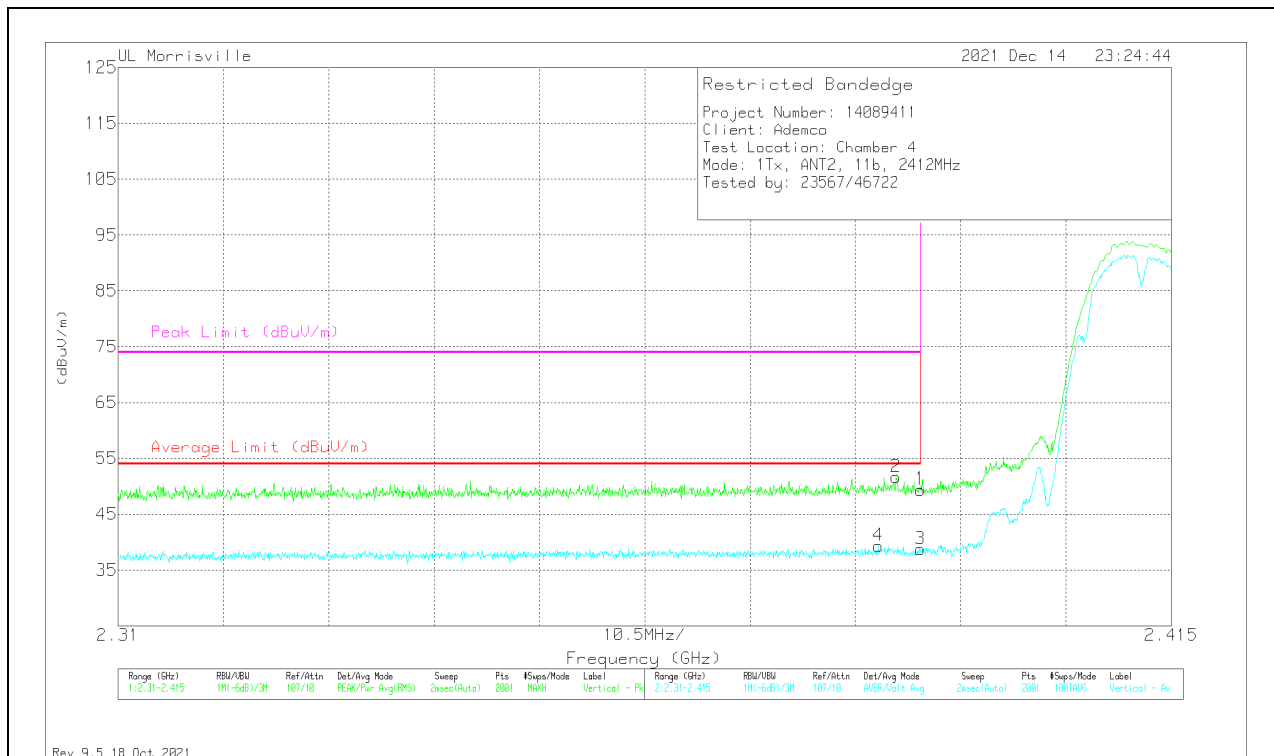
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.38996	31.19	Pk	32	-13.8	49.39	-	-	74	-24.61	358	296	V
2	* ** 2.38754	33.45	Pk	32	-13.8	51.65	-	-	74	-22.35	358	296	V
3	* ** 2.38996	20.54	ADV	32	-13.8	38.74	54	-15.26	-	-	358	296	V
4	* ** 2.38581	21.15	ADV	32	-13.8	39.35	54	-14.65	-	-	358	296	V

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

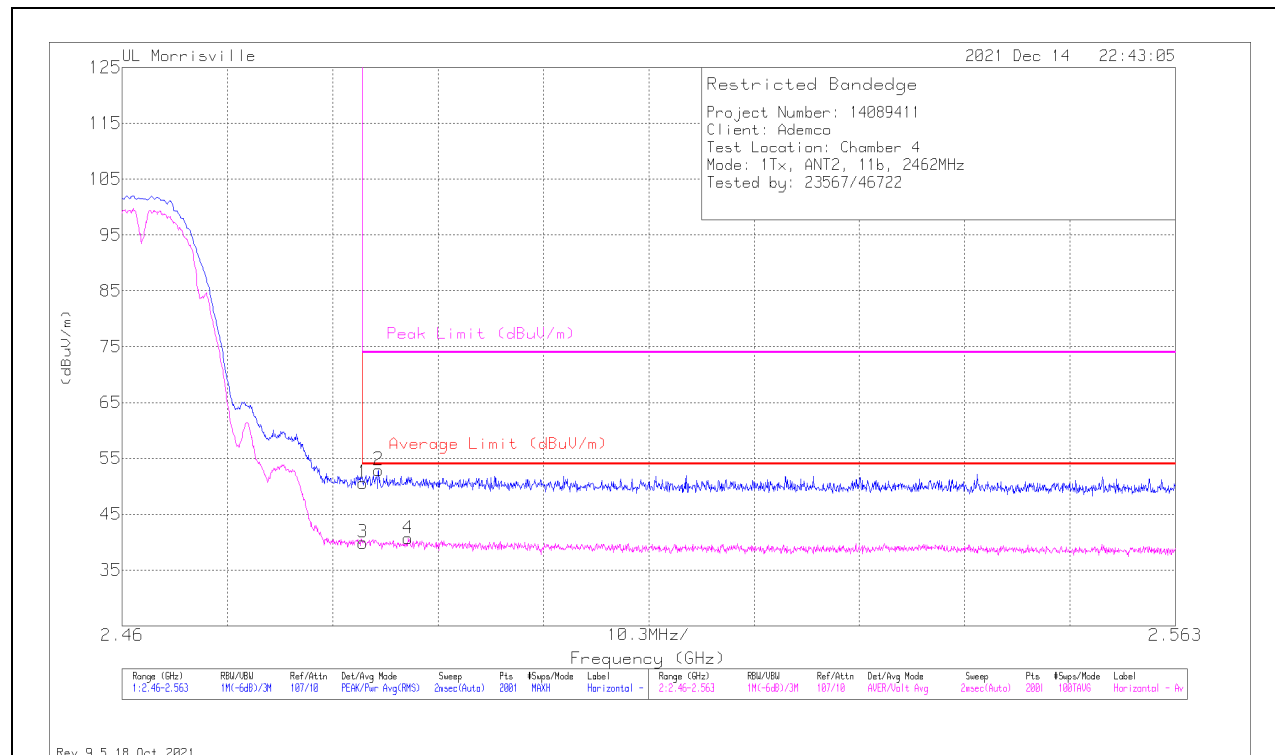
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	31.71	Pk	32.6	-13.7	50.61	-	-	74	-23.39	73	254	H
2	* ** 2.48508	34	Pk	32.6	-13.7	52.9	-	-	74	-21.1	73	254	H
3	* ** 2.48354	21.01	ADV	32.6	-13.7	39.91	54	-14.09	-	-	73	254	H
4	* ** 2.48796	21.77	ADV	32.6	-13.7	40.67	54	-13.33	-	-	73	254	H

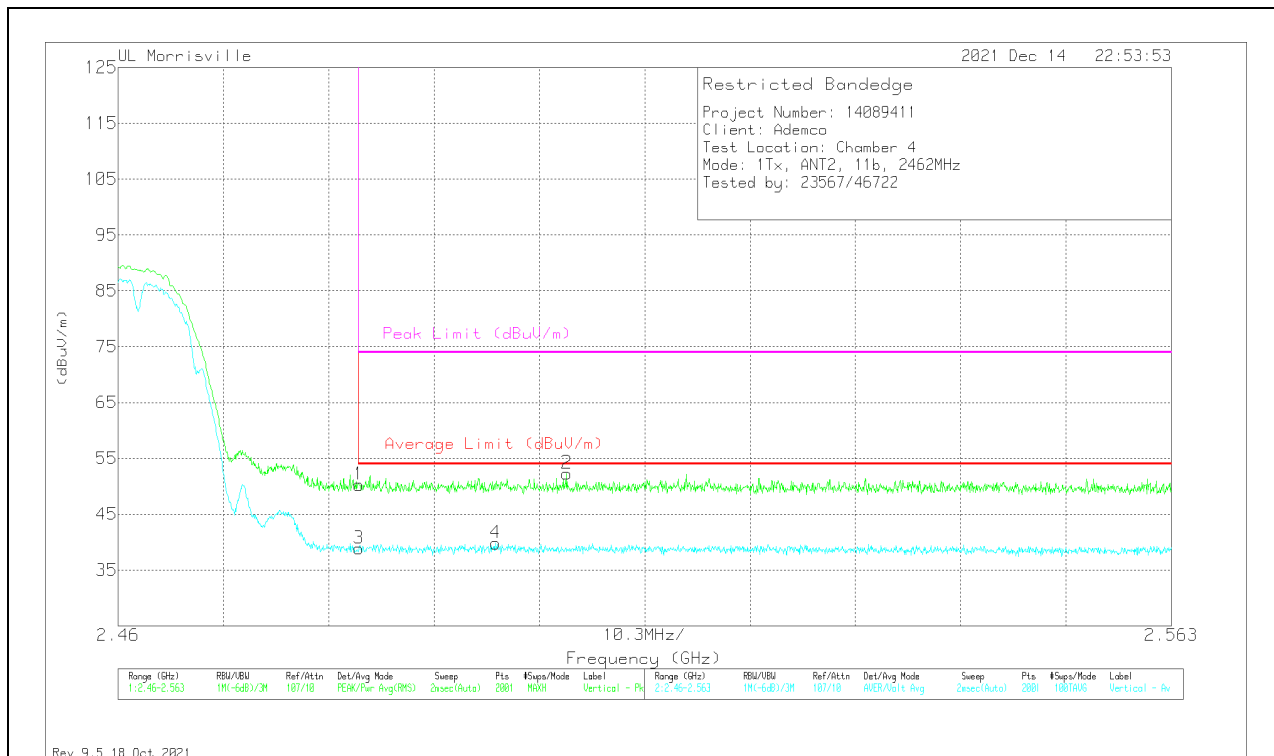
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.48354	31.37	Pk	32.6	-13.7	50.27	-	-	74	-23.73	47	175	V
2	** 2.50388	33.38	Pk	32.6	-13.7	52.28	-	-	74	-21.72	47	175	V
3	* ** 2.48354	19.97	ADV	32.6	-13.7	38.87	54	-15.13	-	-	47	175	V
4	* ** 2.49693	20.91	ADV	32.6	-13.7	39.81	54	-14.19	-	-	47	175	V

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

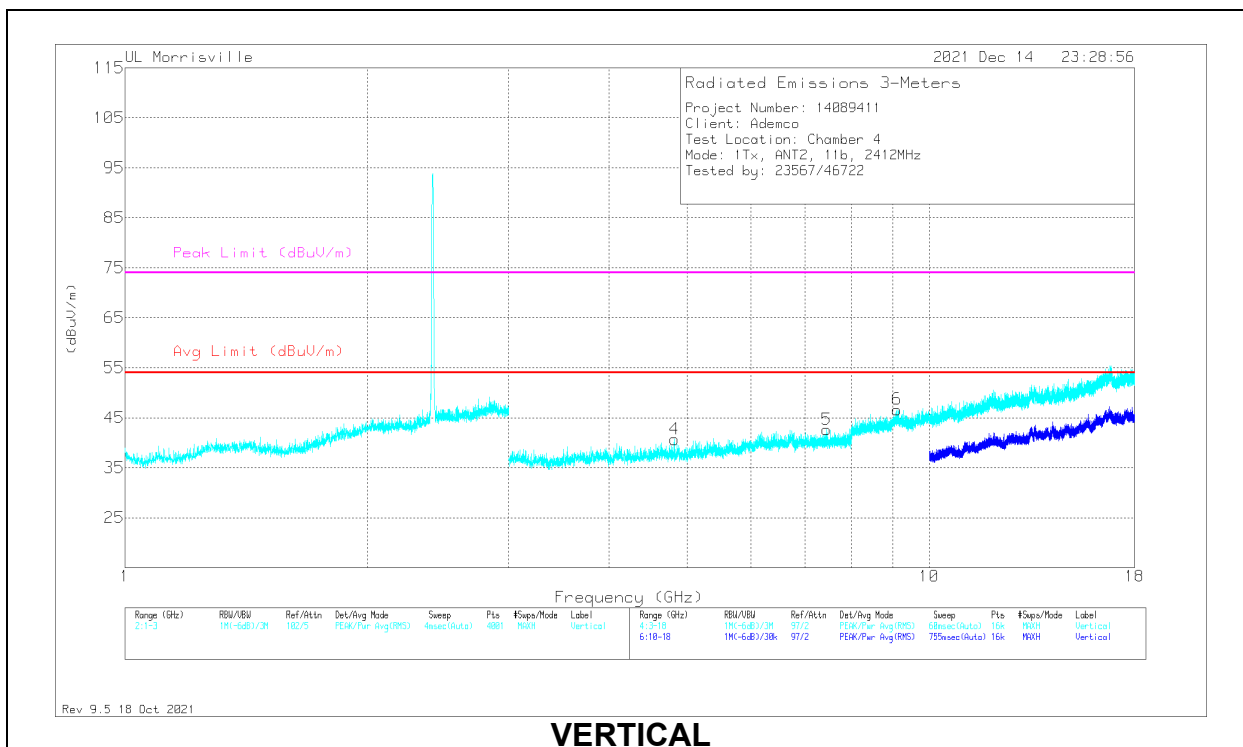
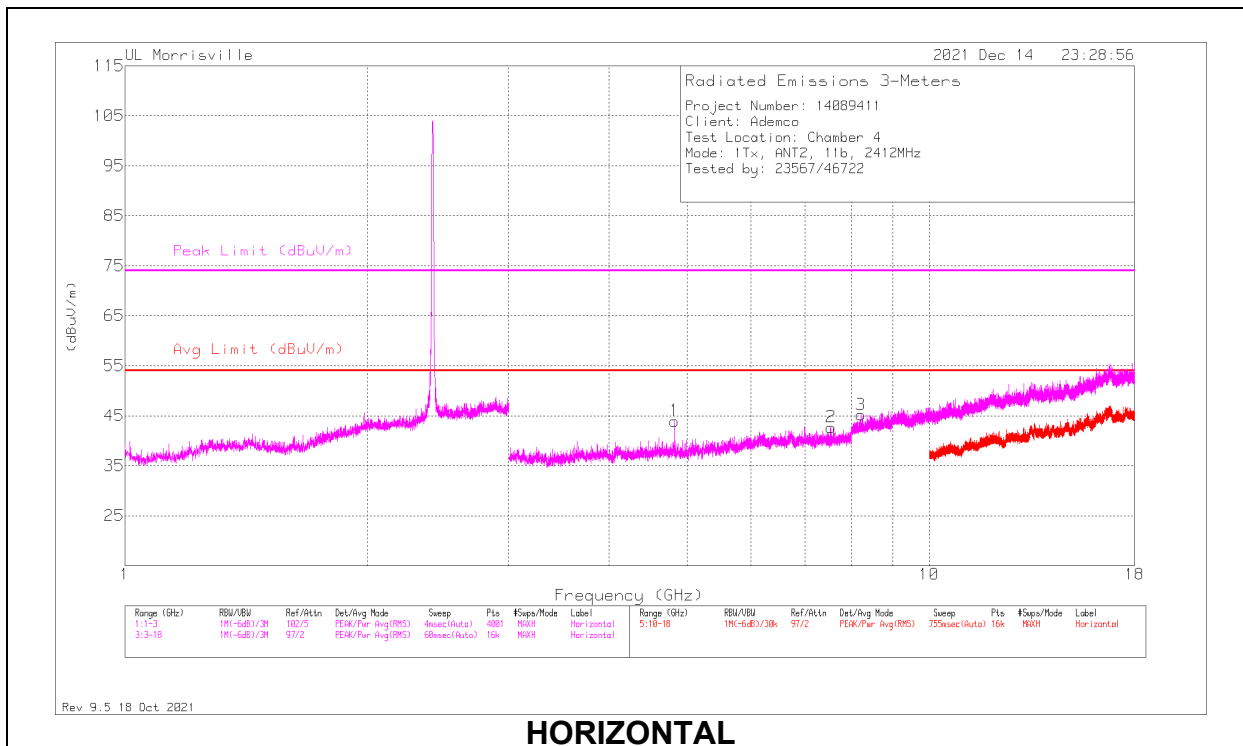
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

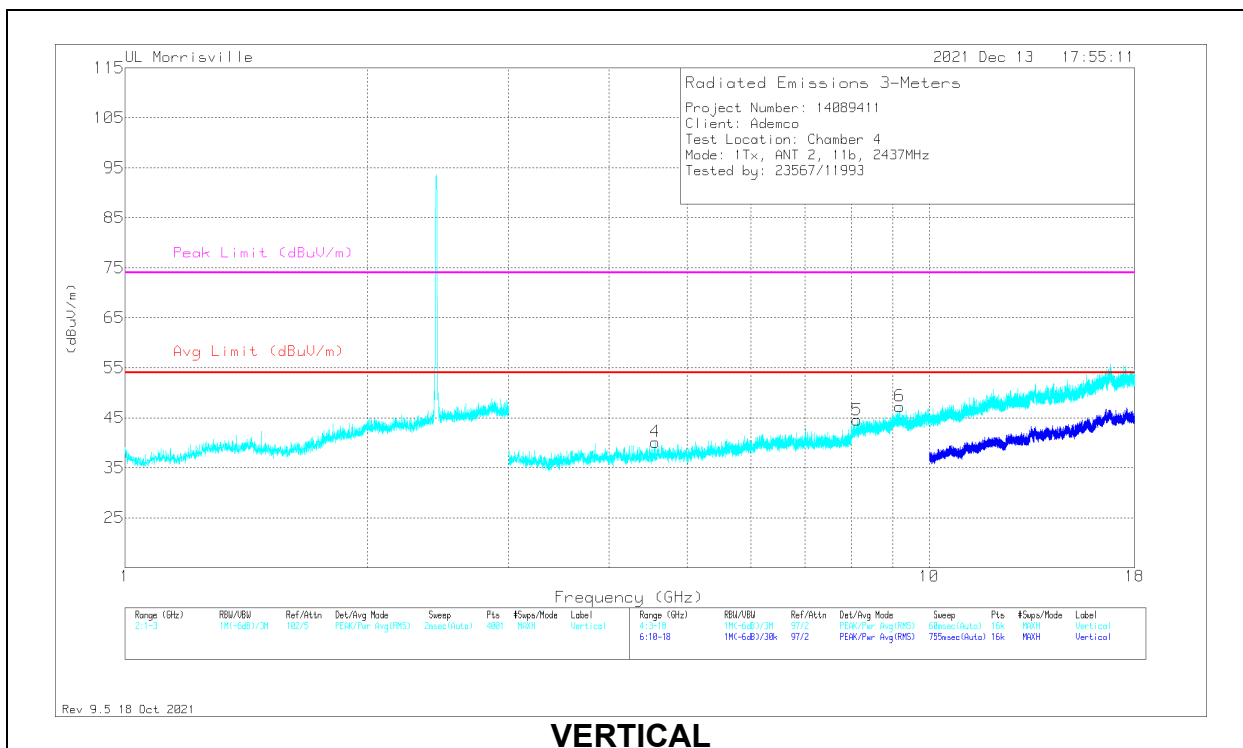
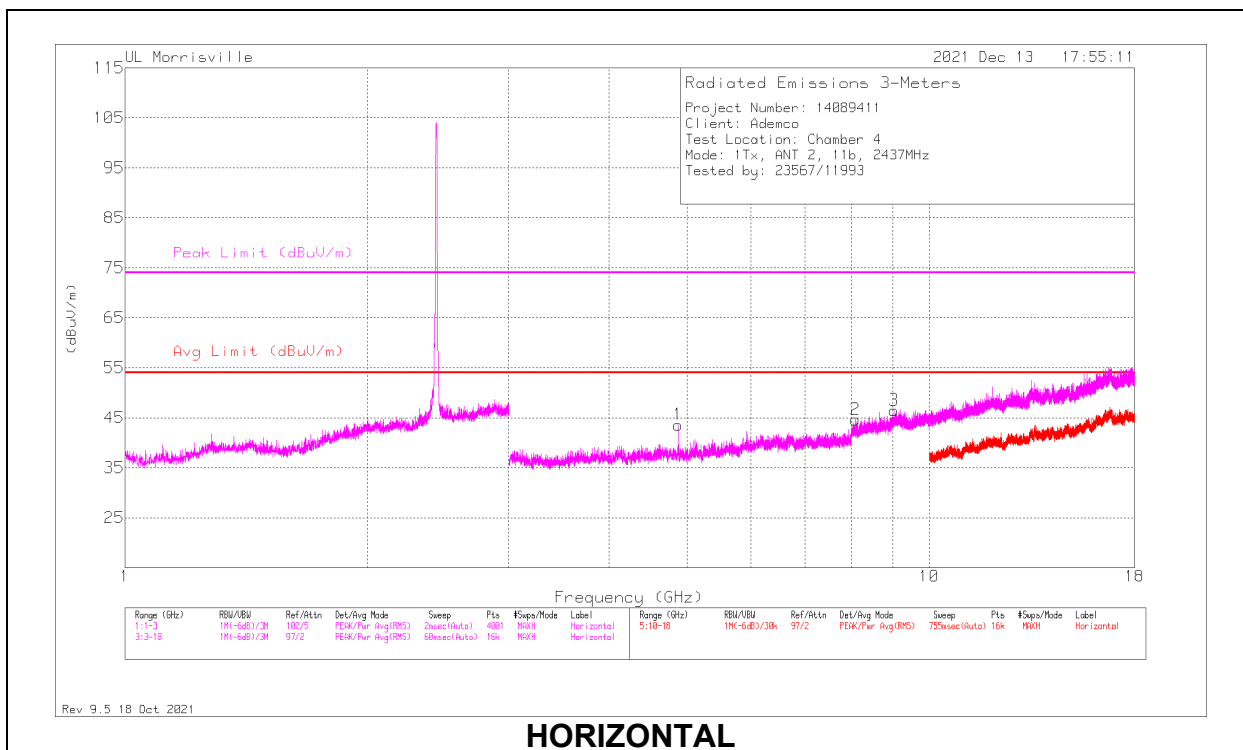
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.82344	42.47	Pk	34	-32.5	43.97	54	-10.03	74	-30.03	0-360	100	H
2	* ** 7.54969	35.9	Pk	35.6	-28.8	42.7	54	-11.3	74	-31.3	0-360	100	H
3	* ** 8.22188	37.27	Pk	35.7	-27.8	45.17	54	-8.83	74	-28.83	0-360	100	H
4	* ** 4.82344	39.19	Pk	34	-32.5	40.69	54	-13.31	74	-33.31	0-360	200	V
5	* ** 7.455	36.01	Pk	35.6	-29	42.61	54	-11.39	74	-31.39	0-360	200	V
6	* ** 9.1125	36.65	Pk	36.1	-26.1	46.65	54	-7.35	74	-27.35	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

MID CHANNEL, CH 6 RESULTS



RADIATED EMISSIONS

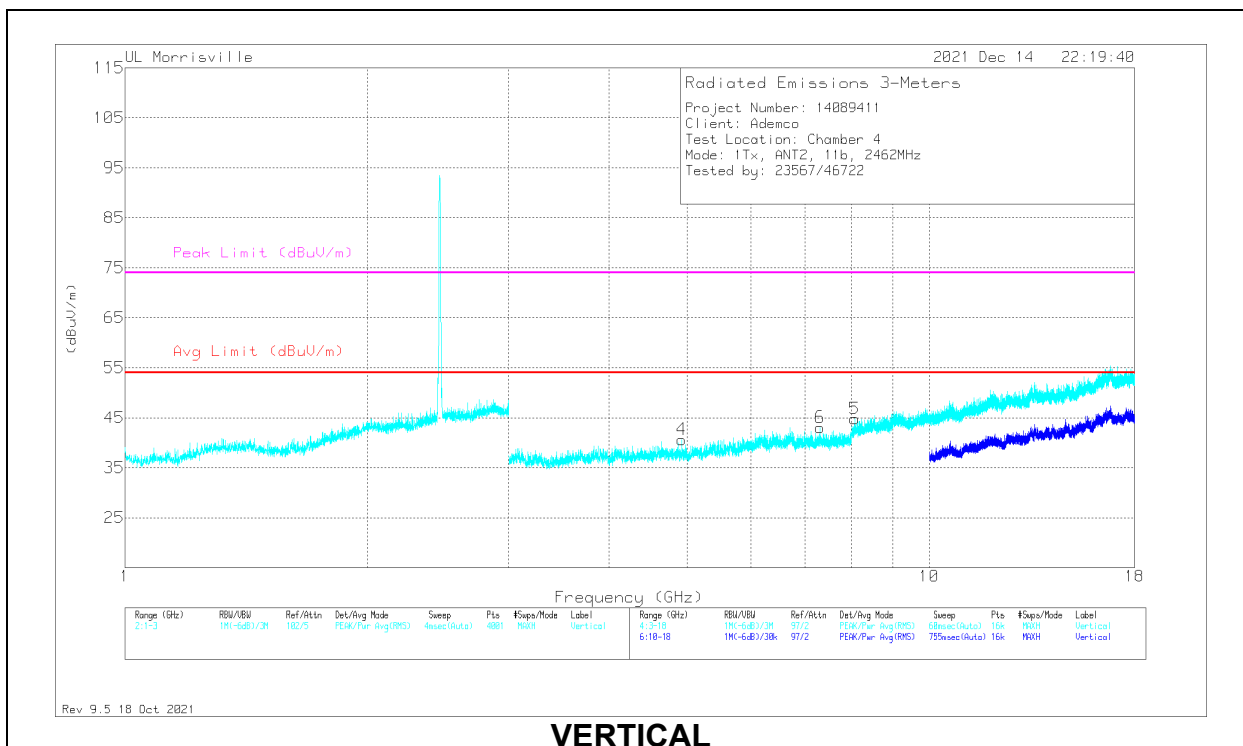
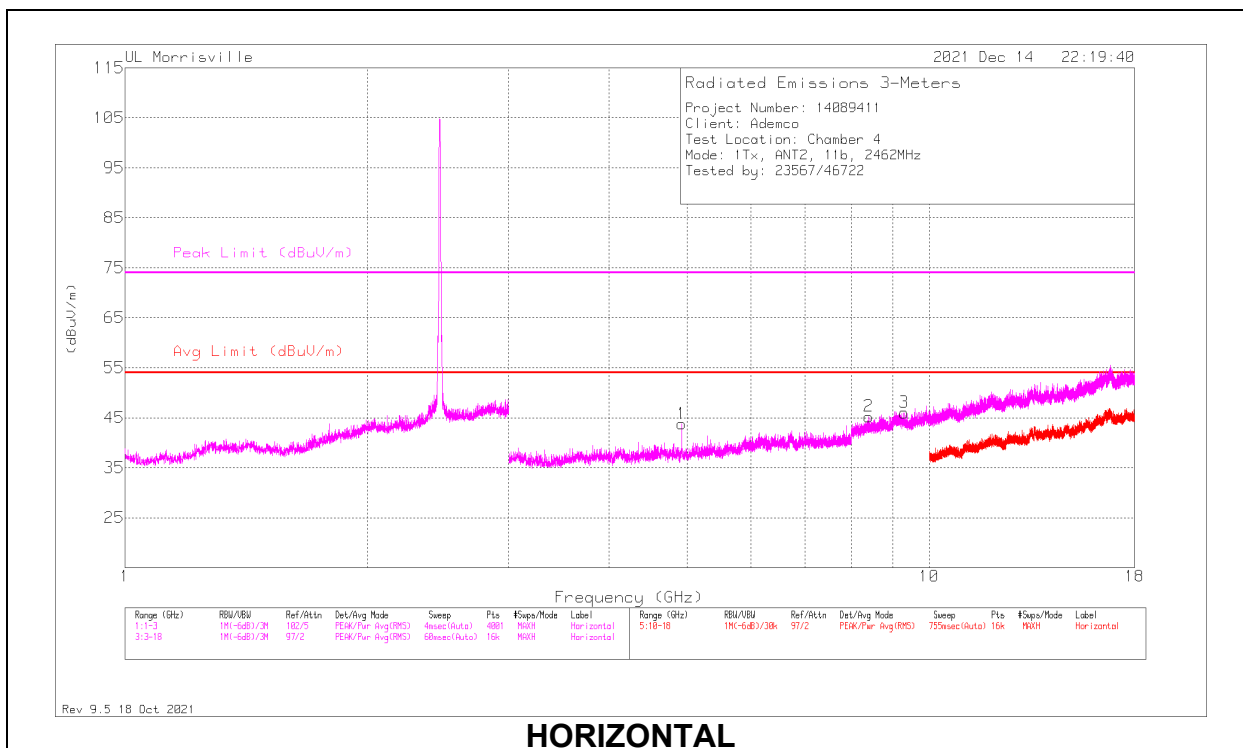
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.87406	41.88	Pk	33.9	-32.2	43.58	54	-10.42	74	-30.42	0-360	100	H
2	* ** 8.0925	37.23	Pk	35.7	-28.3	44.63	54	-9.37	74	-29.37	0-360	100	H
3	* ** 9.03375	36.17	Pk	35.9	-25.6	46.47	54	-7.53	74	-27.53	0-360	100	H
4	* ** 4.56094	38.55	Pk	34	-32.4	40.15	54	-13.85	74	-33.85	0-360	200	V
5	* ** 8.13188	36.92	Pk	35.7	-28.1	44.52	54	-9.48	74	-29.48	0-360	200	V
6	* ** 9.18844	37.78	Pk	36.2	-26.7	47.28	54	-6.72	74	-26.72	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.92375	42.05	Pk	33.9	-32.2	43.75	54	-10.25	74	-30.25	0-360	100	H
2	* ** 8.41219	37.04	Pk	35.7	-27.5	45.24	54	-8.76	74	-28.76	0-360	100	H
3	* ** 9.31219	35.72	Pk	36.4	-26.1	46.02	54	-7.98	74	-27.98	0-360	100	H
4	* ** 4.92375	38.93	Pk	33.9	-32.2	40.63	54	-13.37	74	-33.37	0-360	200	V
5	* ** 8.07563	37.59	Pk	35.7	-28.5	44.79	54	-9.21	74	-29.21	0-360	200	V
6	* ** 7.31625	36.23	Pk	35.6	-28.8	43.03	54	-10.97	74	-30.97	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

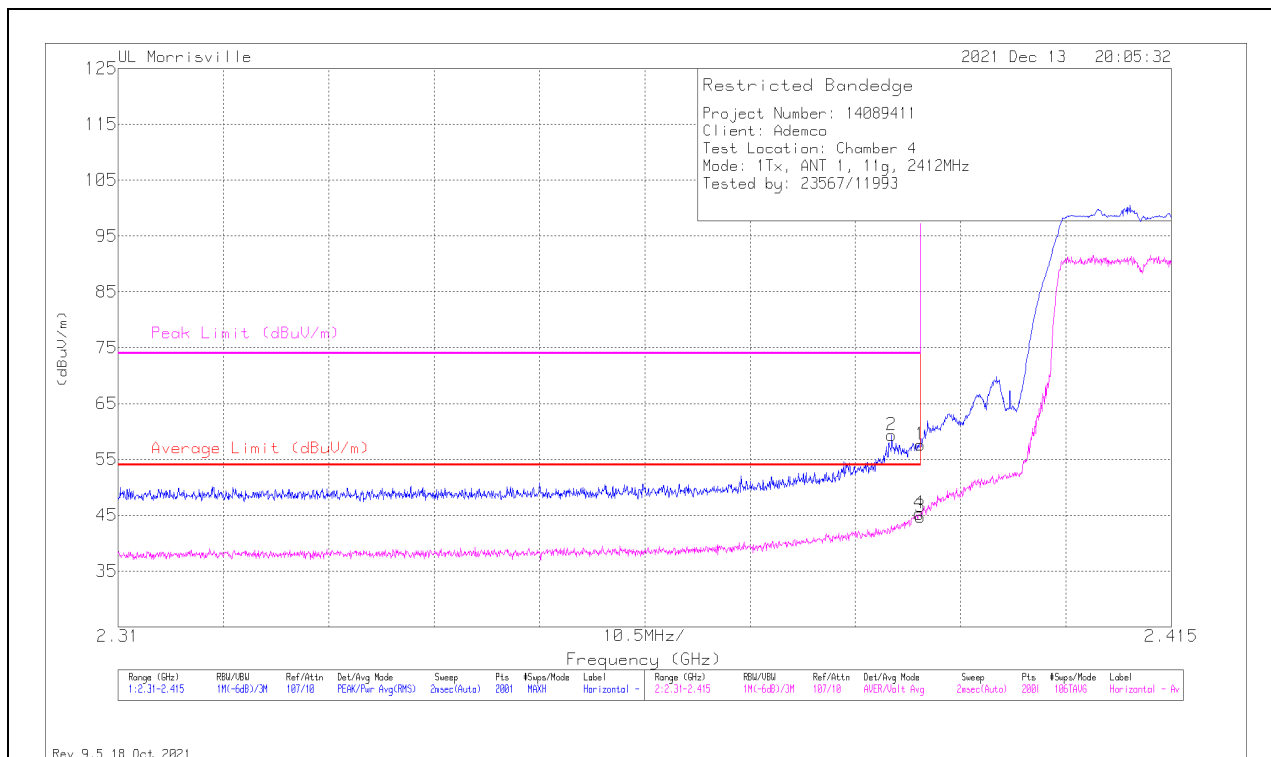
Pk - Peak detector

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

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.38996	39.4	Pk	32	-13.8	0	57.6	-	-	74	-16.4	322	400	H
2	*** 2.38712	41.13	Pk	32	-13.8	0	59.33	-	-	74	-14.67	322	400	H
3	*** 2.38996	25.93	ADV	32	-13.8	.57	44.70	54	-9.30	-	-	322	400	H
4	*** 2.38985	26.51	ADV	32	-13.8	.57	45.28	54	-8.72	-	-	322	400	H

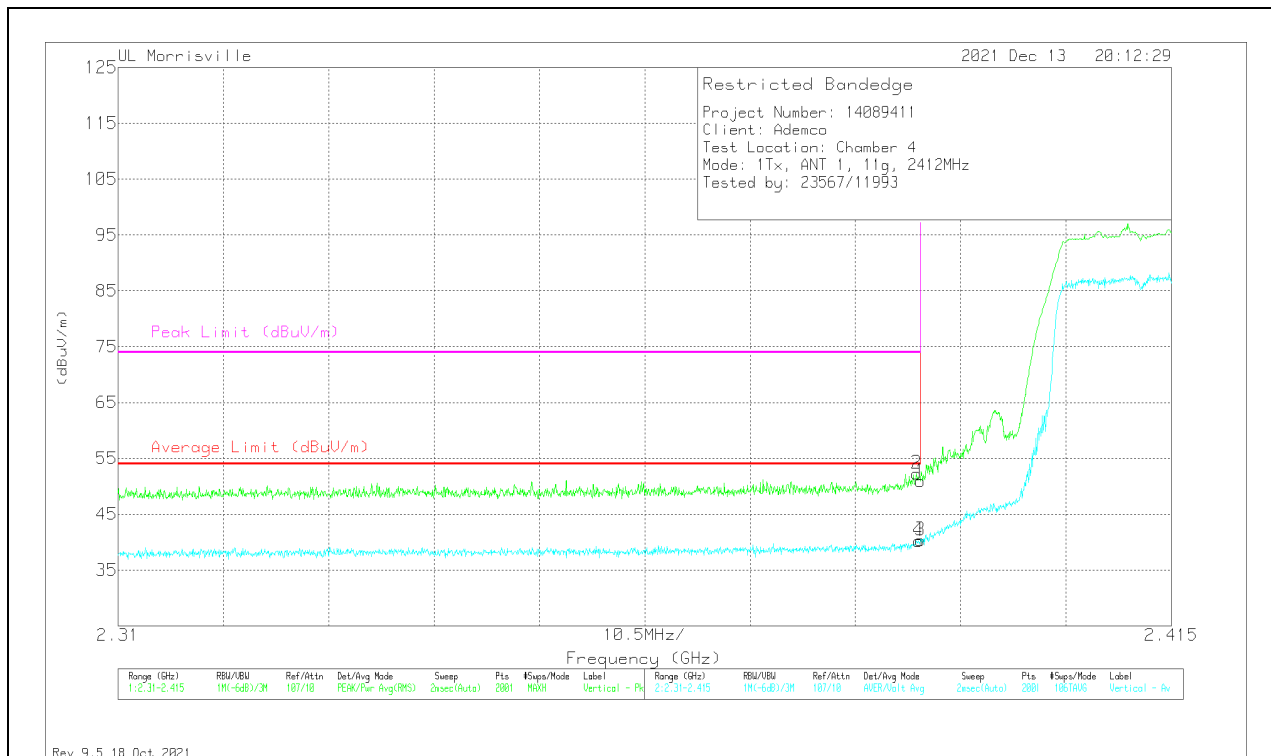
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.38996	32.7	Pk	32	-13.8	0	50.9	-	-	74	-23.1	37	389	V
2	* ** 2.38959	34.08	Pk	32	-13.8	0	52.28	-	-	74	-21.72	37	389	V
3	* ** 2.38996	21.59	ADV	32	-13.8	.57	40.36	54	-13.64	-	-	37	389	V
4	* ** 2.3898	21.48	ADV	32	-13.8	.57	40.25	54	-13.75	-	-	37	389	V

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

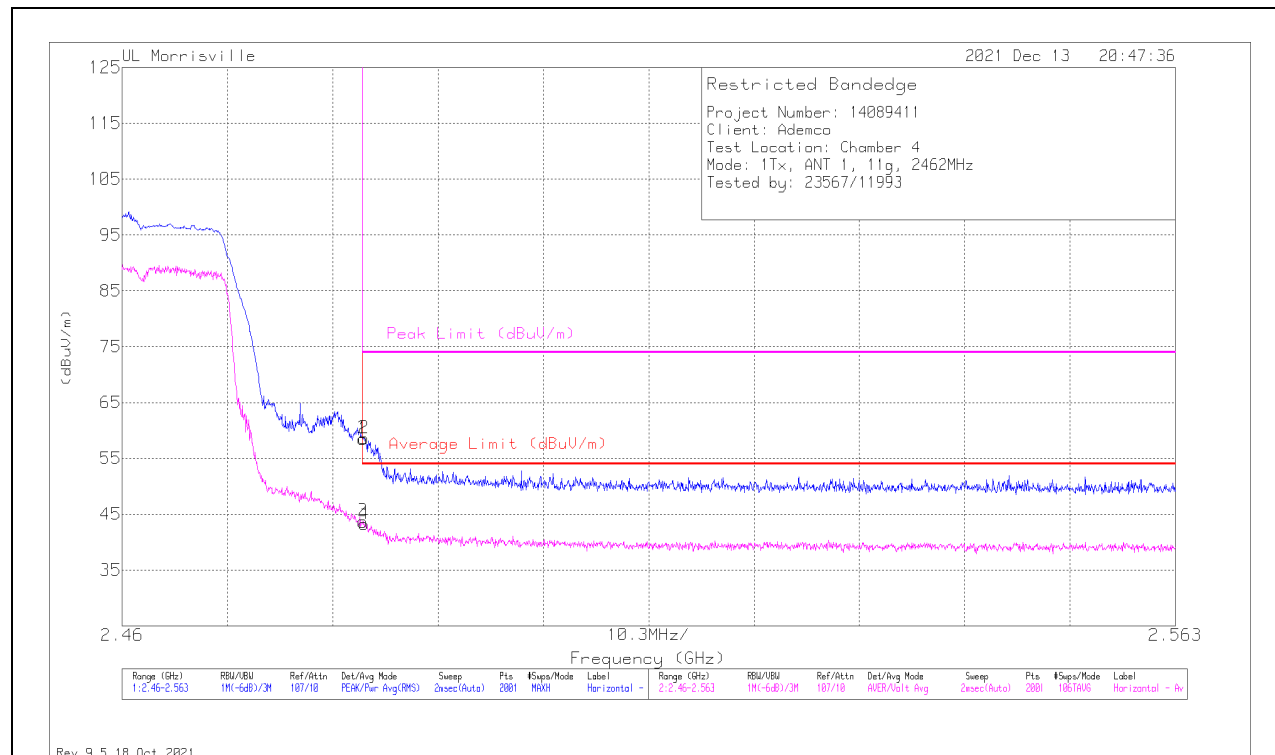
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.48354	39.57	Pk	32.6	-13.7	0	58.47	-	-	74	-15.53	324	270	H
2	* ** 2.48364	39.67	Pk	32.6	-13.7	0	58.57	-	-	74	-15.43	324	270	H
3	* ** 2.48354	24.23	ADV	32.6	-13.7	.57	43.70	54	-10.30	-	-	324	270	H
4	* ** 2.48369	23.77	ADV	32.6	-13.7	.57	43.24	54	-10.76	-	-	324	270	H

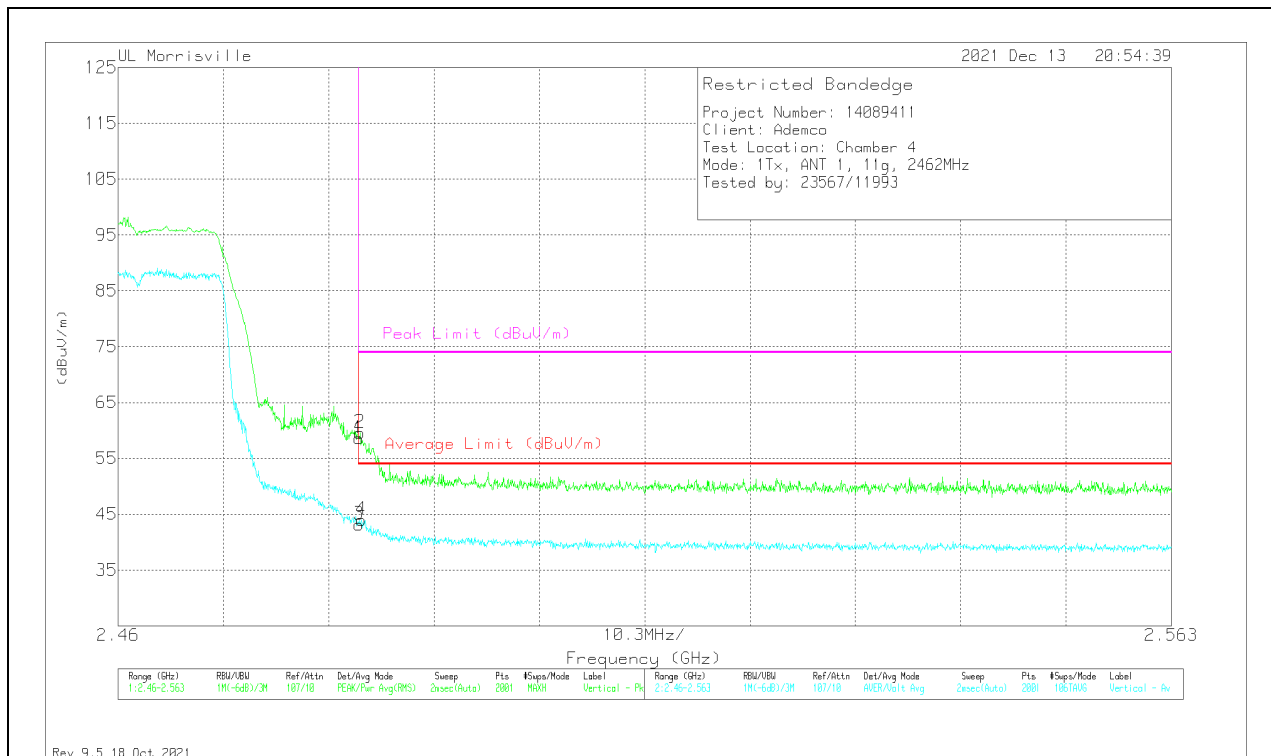
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.48354	39.7	Pk	32.6	-13.7	0	58.6	-	-	74	-15.4	357	128	V
2	*** 2.48364	40.7	Pk	32.6	-13.7	0	59.6	-	-	74	-14.4	357	128	V
3	*** 2.48354	23.72	ADV	32.6	-13.7	.57	43.19	54	-10.81	-	-	357	128	V
4	*** 2.48379	24.55	ADV	32.6	-13.7	.57	44.02	54	-9.98	-	-	357	128	V

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

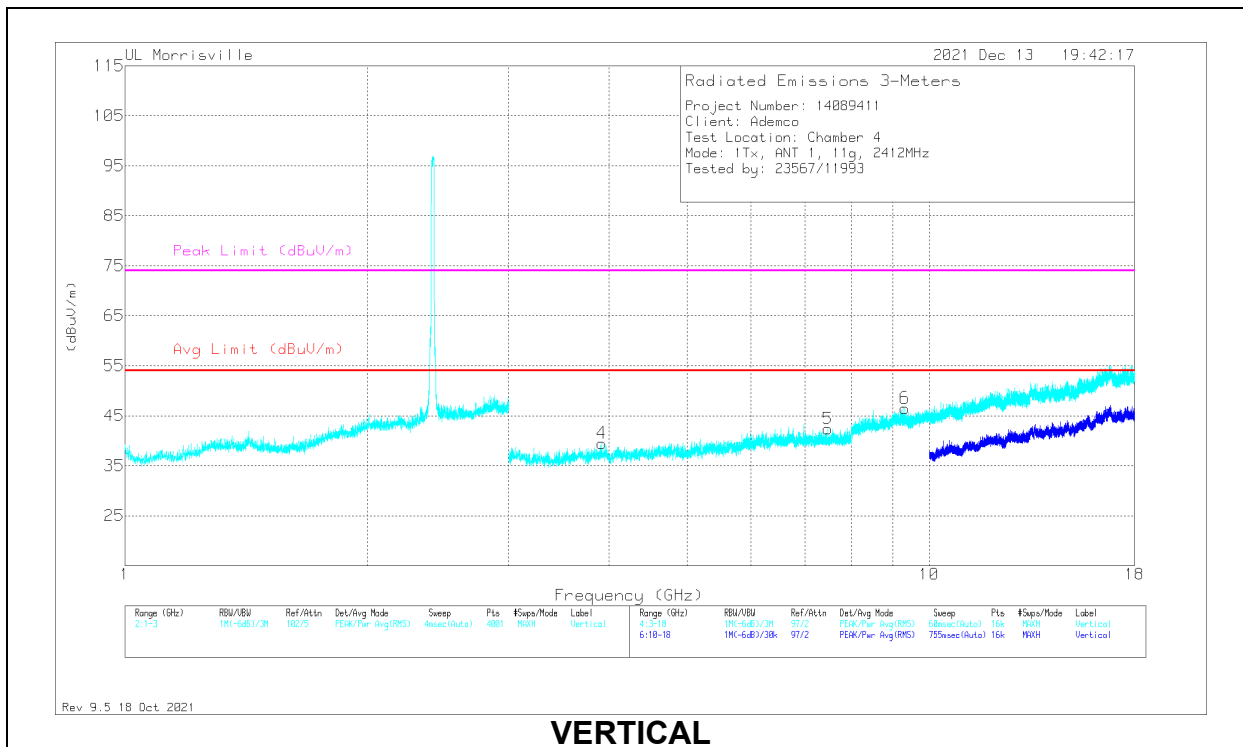
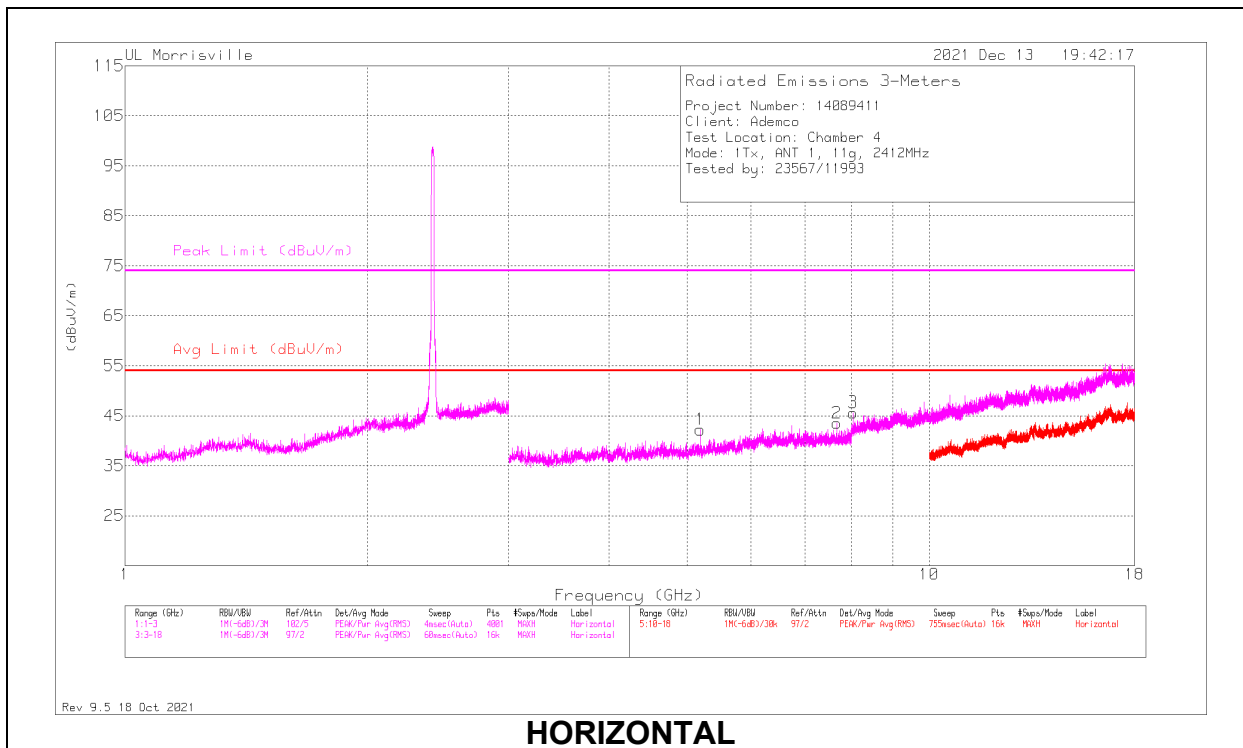
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

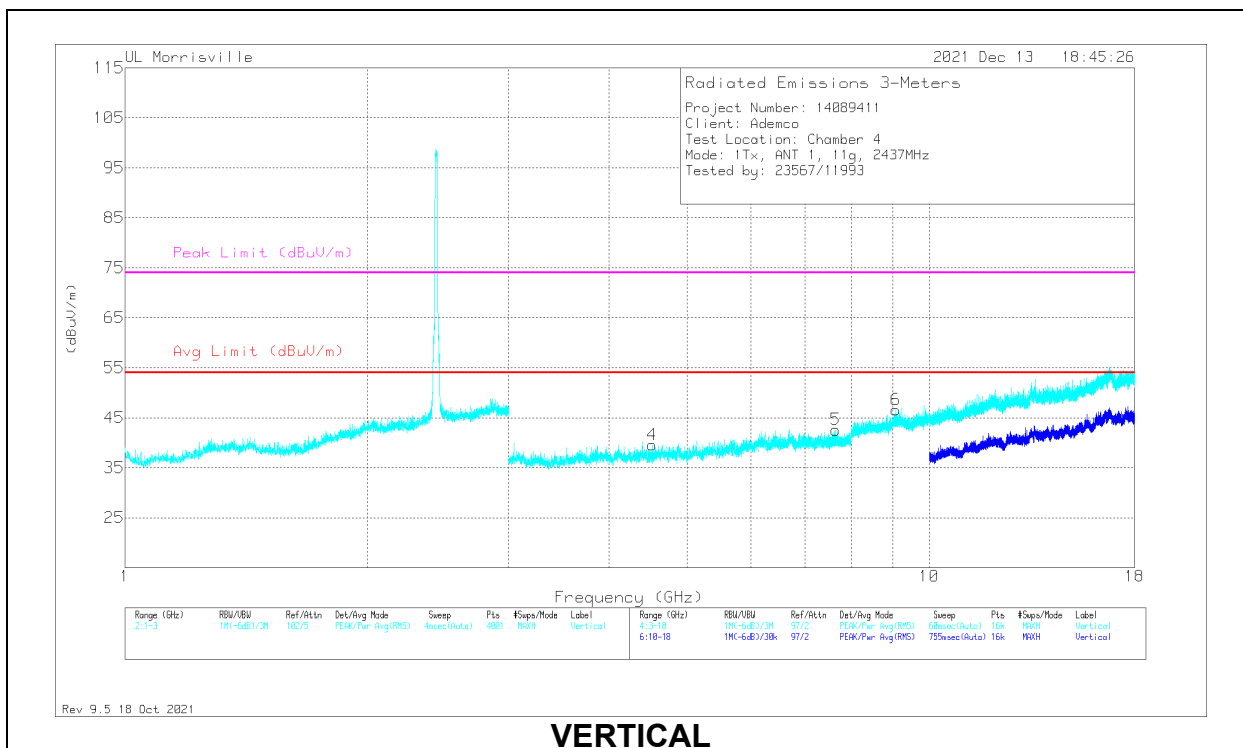
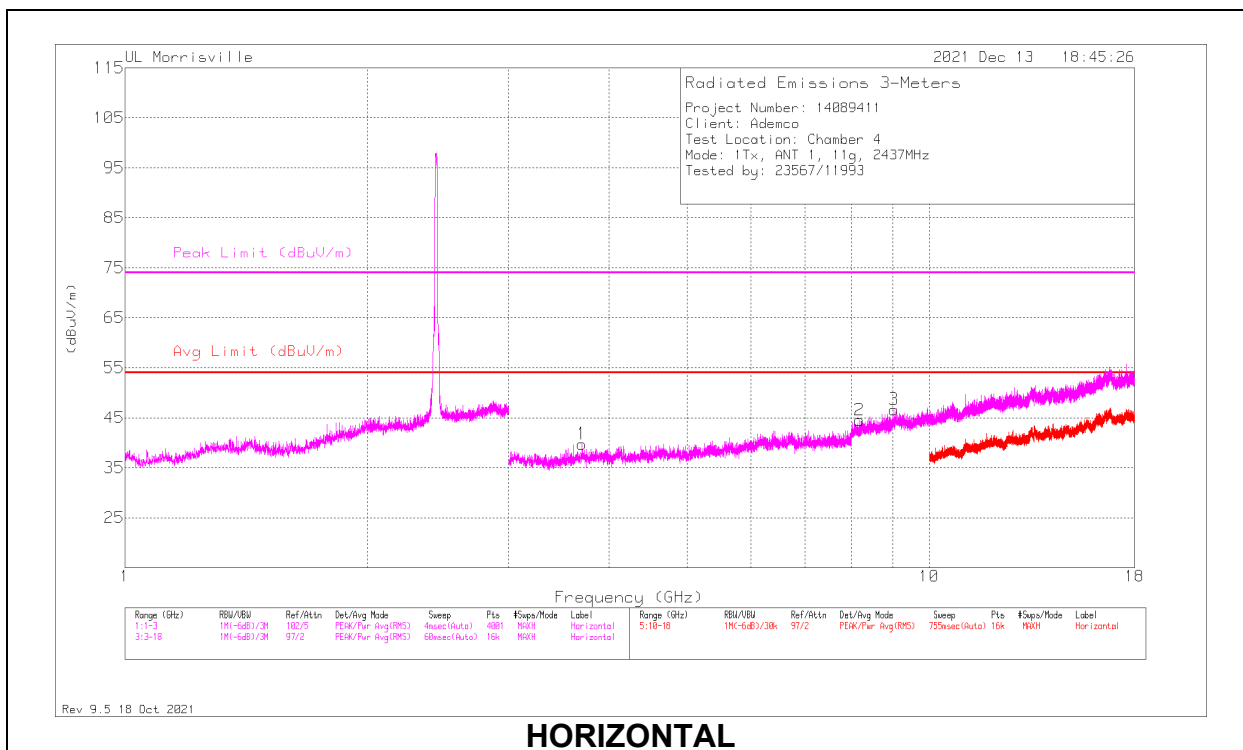
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	** 5.18906	39.72	Pk	34.2	-31.7	42.22	54	-11.78	74	-31.78	0-360	100	H
2	* ** 7.67906	36.62	Pk	35.6	-28.7	43.52	54	-10.48	74	-30.48	0-360	100	H
3	* ** 8.04	38.41	Pk	35.7	-28.5	45.61	54	-8.39	74	-28.39	0-360	100	H
4	*** 3.91594	39.47	Pk	33.3	-33.3	39.47	54	-14.53	74	-34.53	0-360	200	V
5	*** 7.48031	35.78	Pk	35.6	-29	42.38	54	-11.62	74	-31.62	0-360	200	V
6	*** 9.32906	35.89	Pk	36.4	-25.8	46.49	54	-7.51	74	-27.51	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

MID CHANNEL, CH 6 RESULTS



RADIATED EMISSIONS

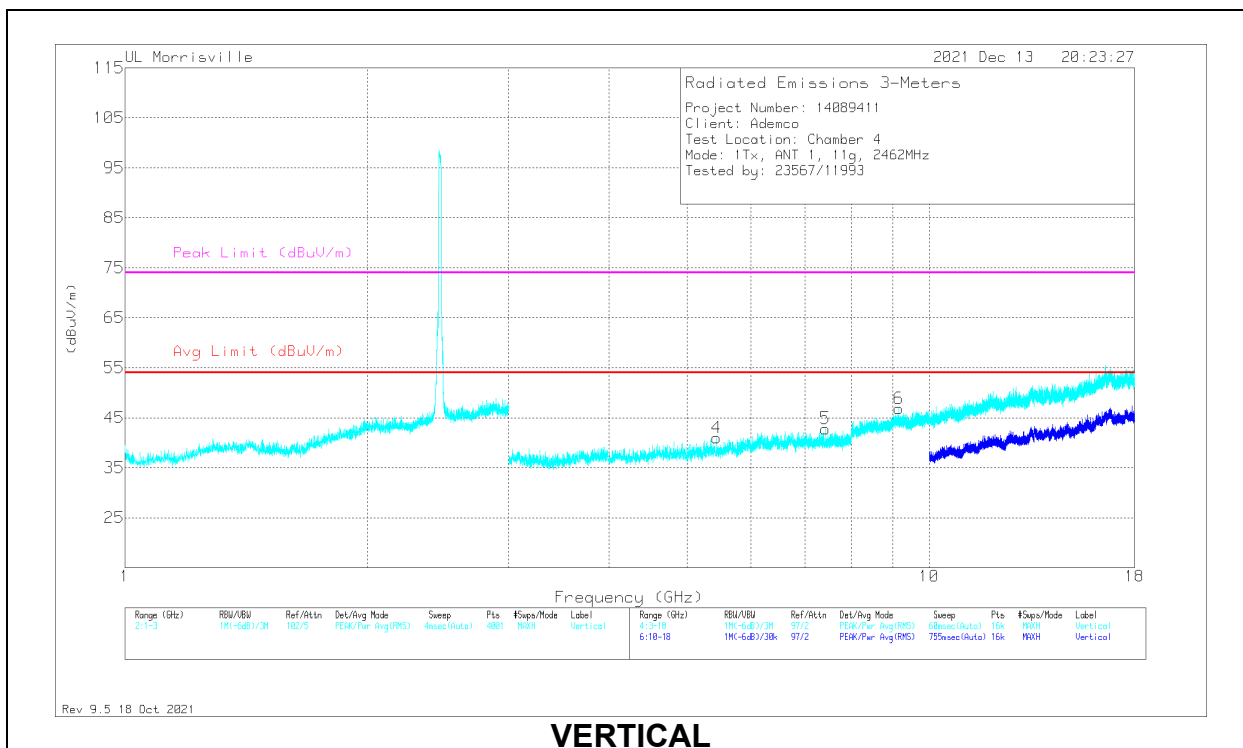
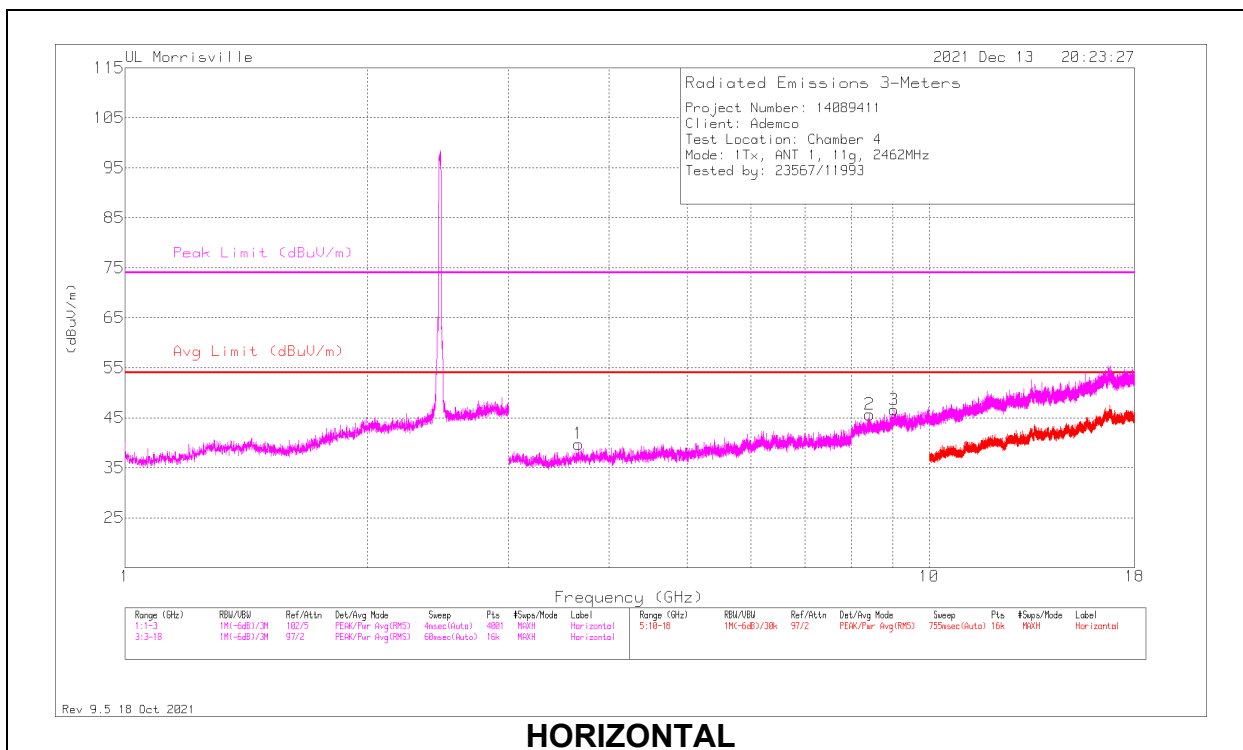
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 3.69938	40.44	Pk	33.1	-33.8	39.74	54	-14.26	74	-34.26	0-360	100	H
2	* ** 8.18625	36.71	Pk	35.7	-27.9	44.51	54	-9.49	74	-29.49	0-360	100	H
3	* ** 9.0375	36.33	Pk	35.9	-25.6	46.63	54	-7.37	74	-27.37	0-360	100	H
4	* ** 4.52438	38.16	Pk	33.8	-32.4	39.56	54	-14.44	74	-34.44	0-360	200	V
5	* ** 7.65	35.58	Pk	35.6	-28.6	42.58	54	-11.42	74	-31.42	0-360	200	V
6	* ** 9.0825	36.18	Pk	36	-25.6	46.58	54	-7.42	74	-27.42	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 3.66375	40.76	Pk	33.1	-34.1	39.76	54	-14.24	74	-34.24	0-360	100	H
2	* ** 8.42906	37.44	Pk	35.7	-27.5	45.64	54	-8.36	74	-28.36	0-360	100	H
3	* ** 9.04313	36.28	Pk	35.9	-25.6	46.58	54	-7.42	74	-27.42	0-360	100	H
4	* ** 5.43938	37.88	Pk	34.4	-31.3	40.98	54	-13.02	74	-33.02	0-360	200	V
5	* ** 7.42969	36.19	Pk	35.6	-29	42.79	54	-11.21	74	-31.21	0-360	200	V
6	* ** 9.165	37.11	Pk	36.2	-26.5	46.81	54	-7.19	74	-27.19	0-360	200	V

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

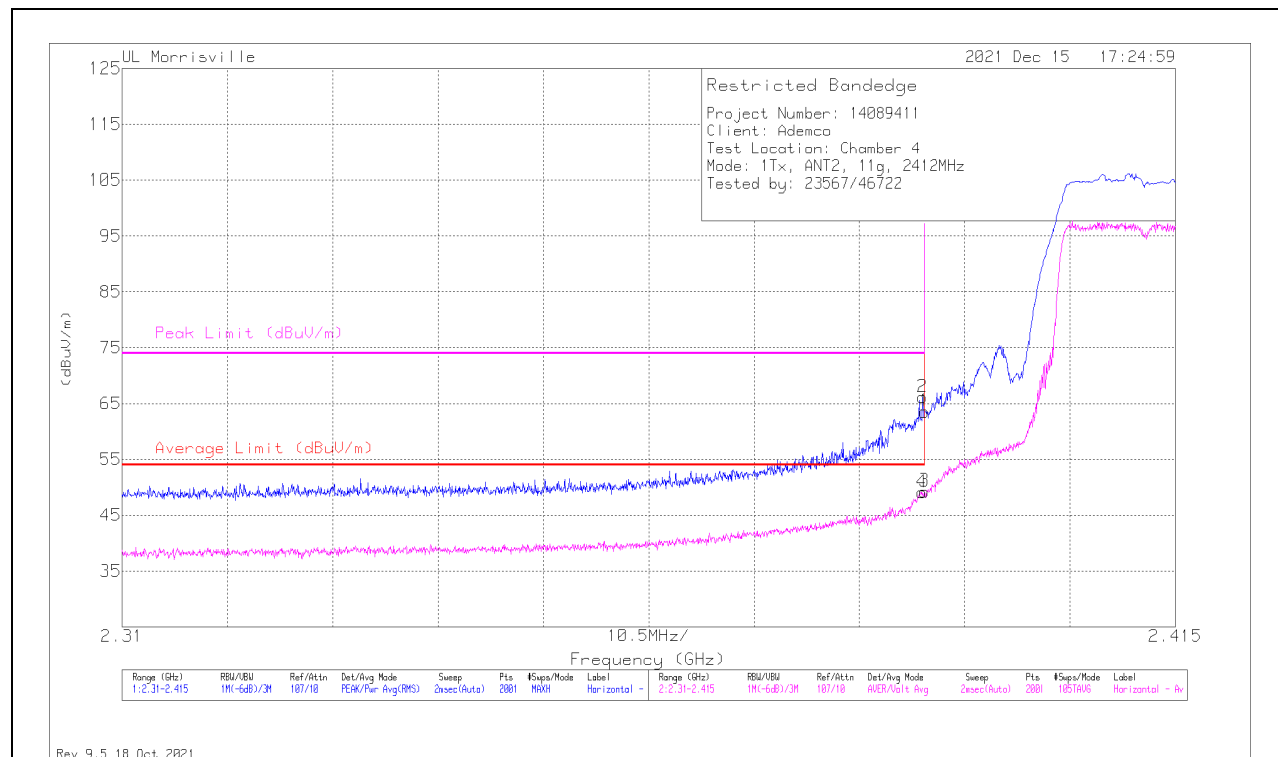
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

1TX Antenna 2 MODE

BANEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.38996	45.35	Pk	32	-13.8	0	63.55	-	-	74	-10.45	77	103	H
2	* ** 2.3898	47.93	Pk	32	-13.8	0	66.13	-	-	74	-7.87	77	103	H
3	* ** 2.38996	30.57	ADV	32	-13.8	.49	49.26	54	-4.74	-	-	77	103	H
4	* ** 2.38975	30.38	ADV	32	-13.8	.49	49.07	54	-4.93	-	-	77	103	H

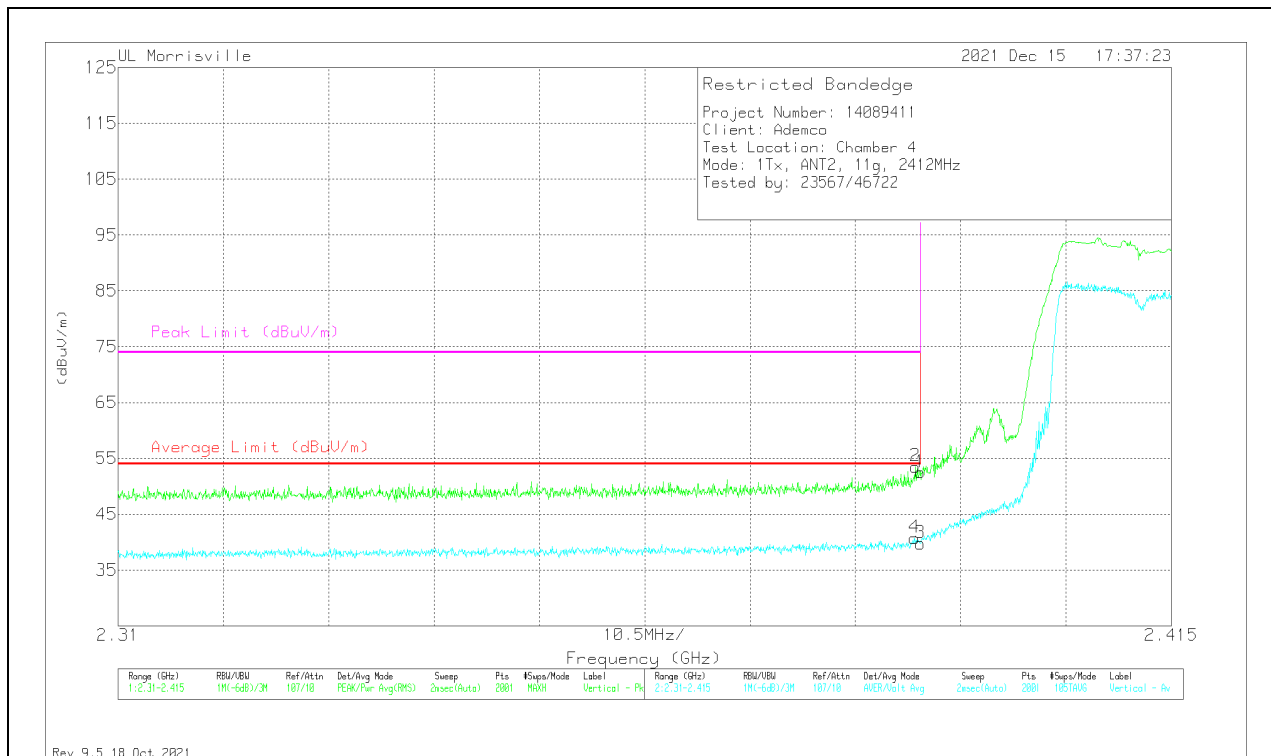
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.38996	34.3	Pk	32	-13.8	0	52.5	-	-	74	-21.5	350	239	V
2	*** 2.38949	35.34	Pk	32	-13.8	0	53.54	-	-	74	-20.46	350	239	V
3	*** 2.38996	21.09	ADV	32	-13.8	.49	39.78	54	-14.22	-	-	350	239	V
4	*** 2.38938	22.05	ADV	32	-13.8	.49	40.74	54	-13.26	-	-	350	239	V

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

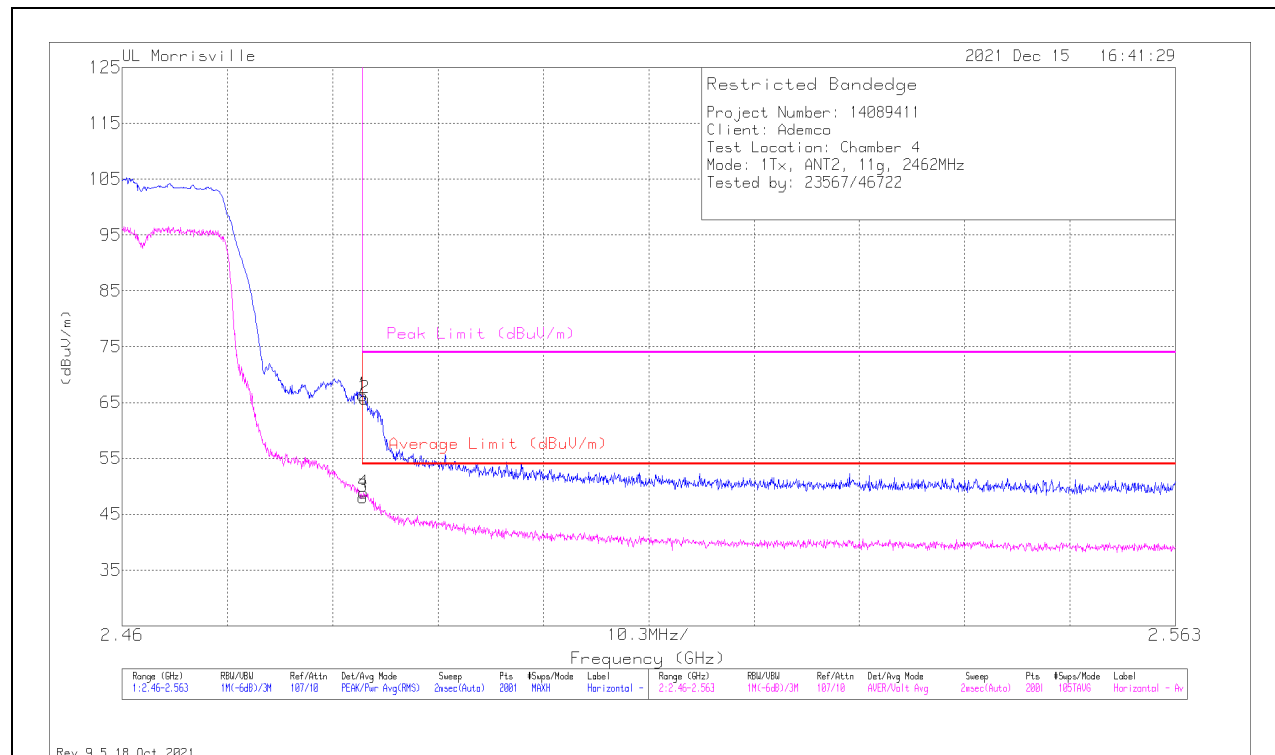
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.48354	47.41	Pk	32.6	-13.7	0	66.31	-	-	74	-7.69	79	120	H
2	* ** 2.48374	46.85	Pk	32.6	-13.7	0	65.75	-	-	74	-8.25	79	120	H
3	* ** 2.48354	28.66	ADV	32.6	-13.7	.49	48.05	54	-5.95	-	-	79	120	H
4	* ** 2.48359	29.45	ADV	32.6	-13.7	.49	48.84	54	-5.16	-	-	79	120	H

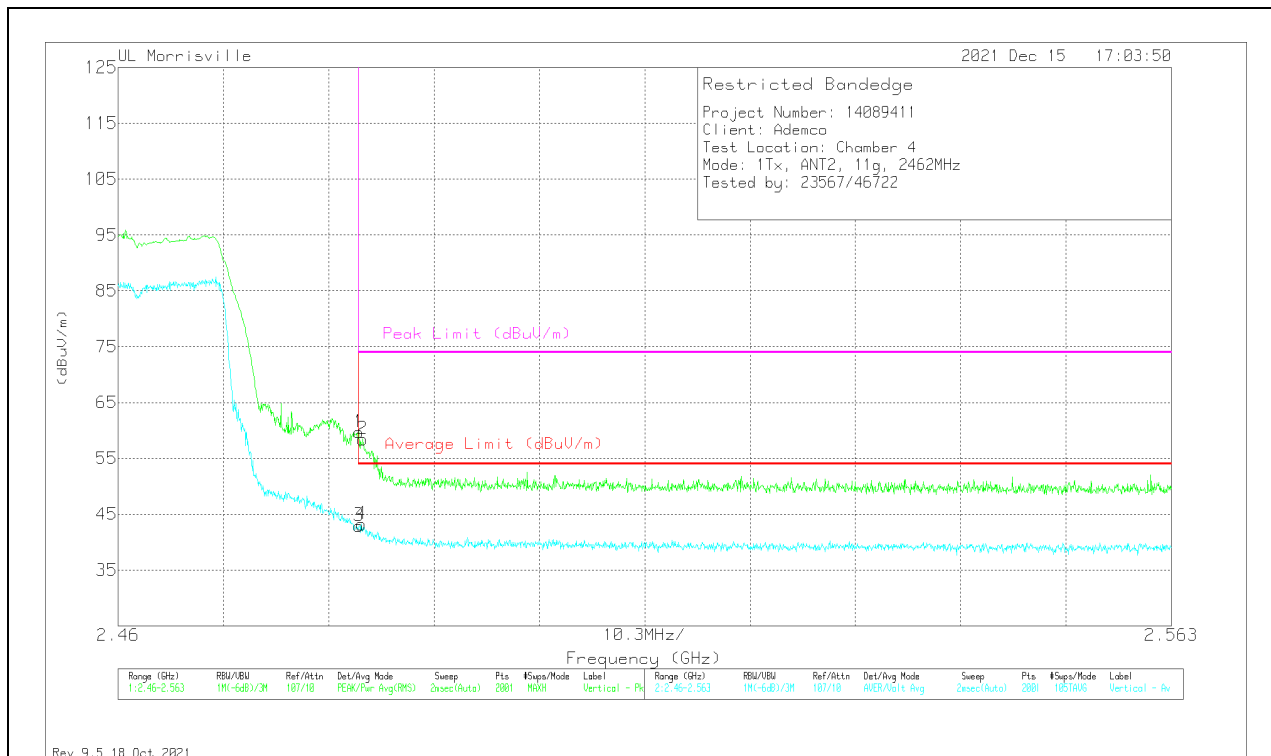
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.48354	40.78	Pk	32.6	-13.7	0	59.68	-	-	74	-14.32	278	100	V
2	*** 2.4839	39.54	Pk	32.6	-13.7	0	58.44	-	-	74	-15.56	278	100	V
3	*** 2.48354	23.51	ADV	32.6	-13.7	.49	42.90	54	-11.10	-	-	278	100	V
4	*** 2.48379	23.82	ADV	32.6	-13.7	.49	43.21	54	-10.79	-	-	278	100	V

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

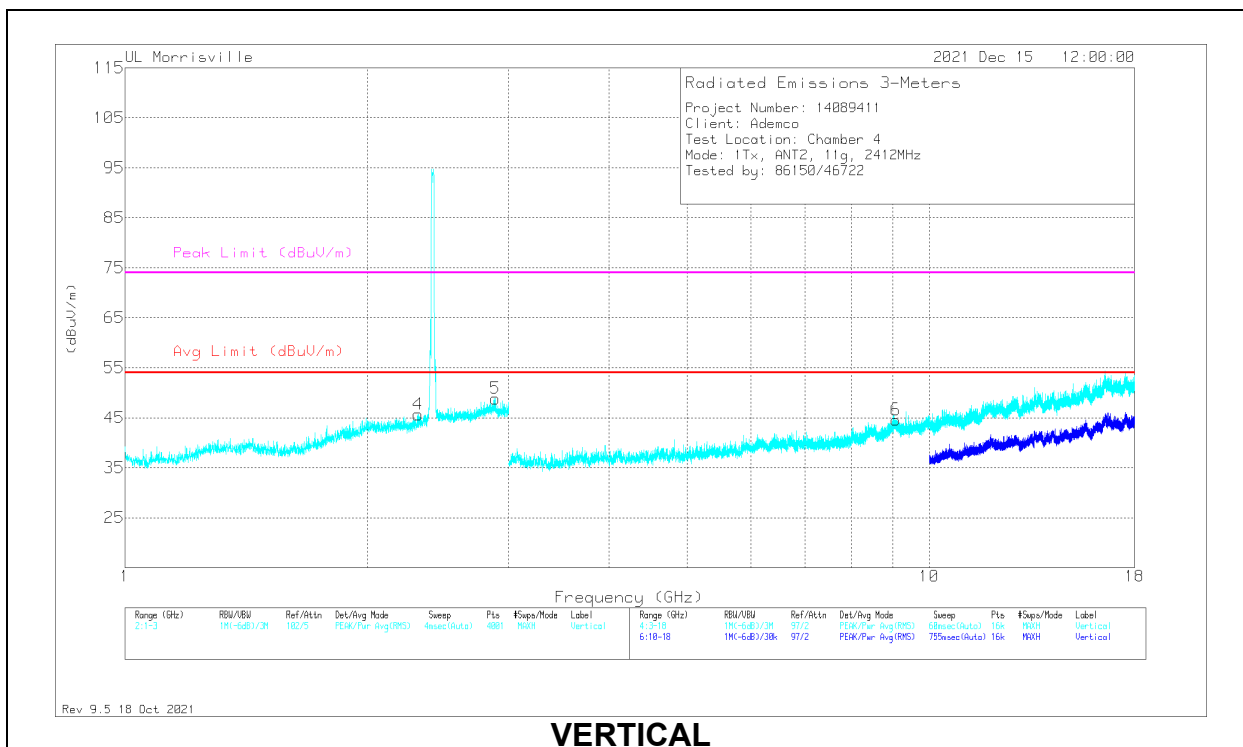
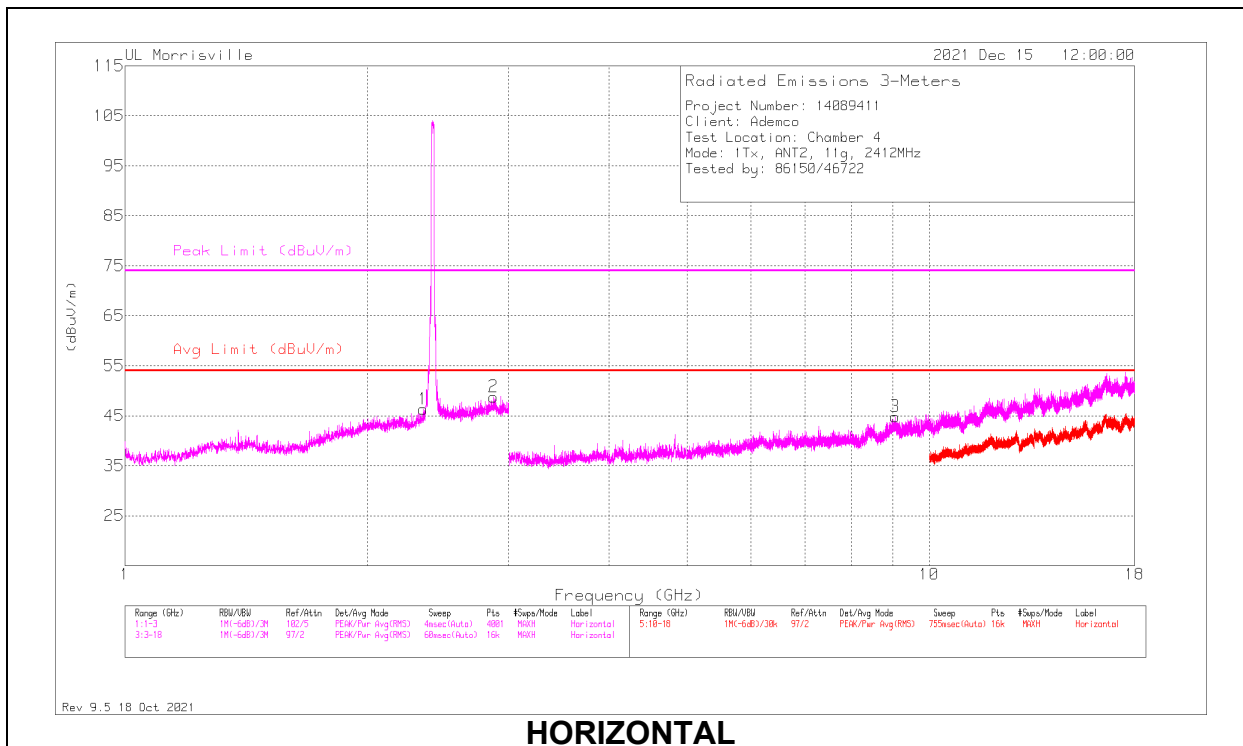
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

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	206211 (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	* ** 2.3495	28.21	Pk	32	-13.9	0	46.31	54	-7.69	74	-27.69	0-360	100	H
2	* ** 2.87457	29.68	PK2	32.5	-12.8	0	49.38	-	-	74	-24.62	149	332	H
	* ** 2.87271	17	ADV	32.5	-12.8	0.49	37.19	54	-16.81	-	-	149	332	H
4	* ** 2.314	27.65	Pk	31.9	-13.9	0	45.65	54	-8.35	74	-28.35	0-360	200	V
5	* ** 2.88835	29.53	PK2	32.5	-12.8	0	49.23	-	-	74	-24.77	162	341	V
	* ** 2.88841	16.83	ADV	32.5	-12.8	0.49	37.02	54	-16.98	-	-	162	341	V
3	* ** 9.06563	34.32	Pk	36	-25.5	0	44.82	54	-9.18	74	-29.18	0-360	100	H
6	* ** 9.09094	34.26	Pk	36.1	-25.8	0	44.56	54	-9.44	74	-29.44	0-360	200	V

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

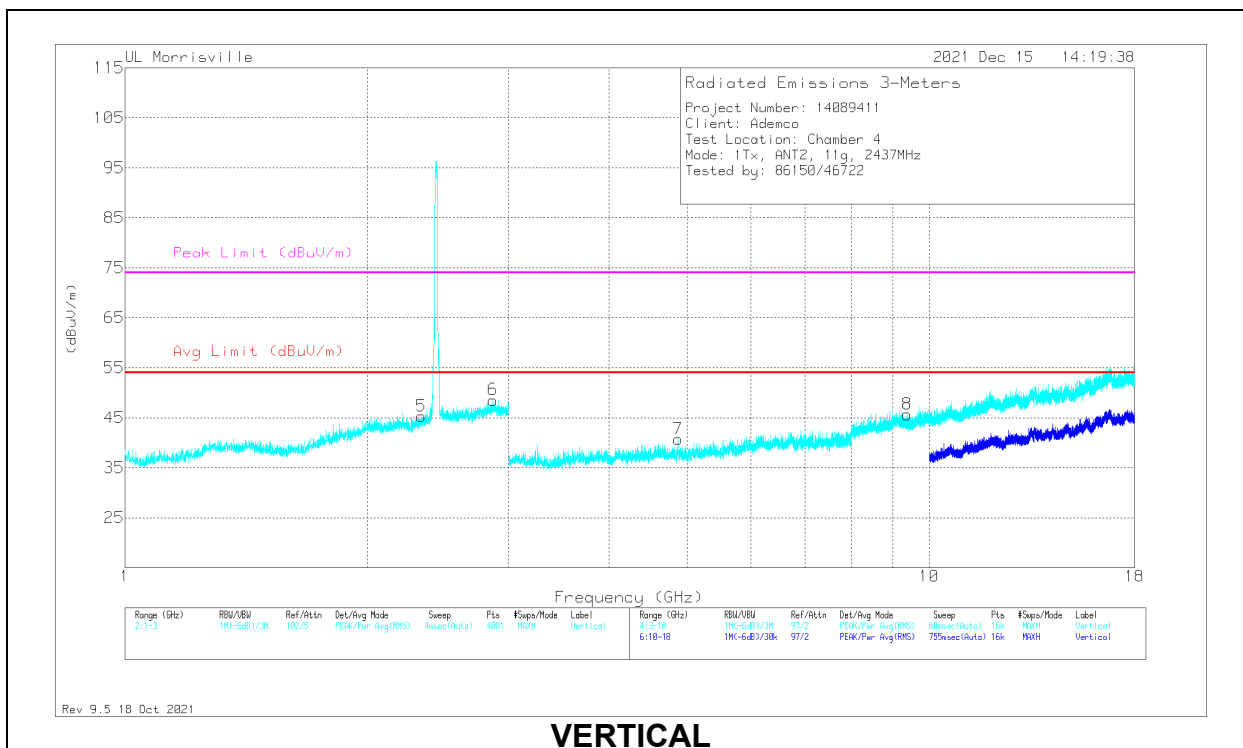
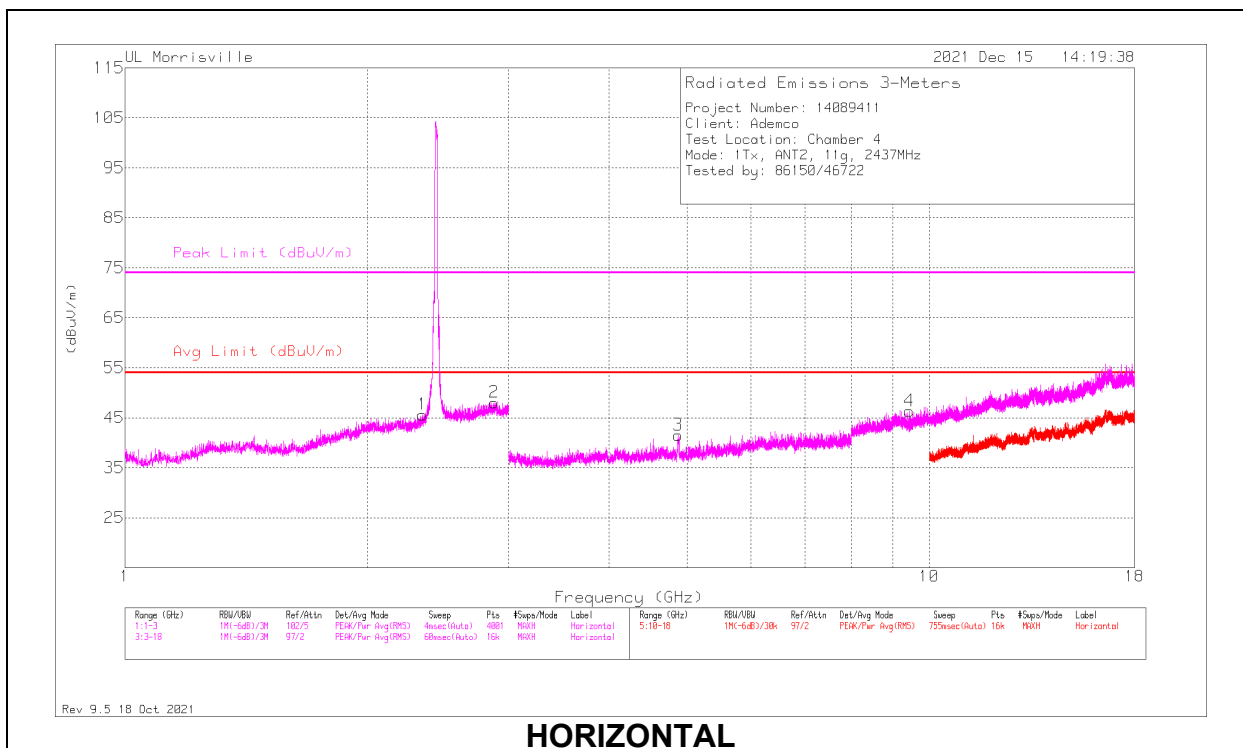
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

MID CHANNEL, CH 6 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.3425	27.52	Pk	32	-13.9	0	45.62	54	-8.38	74	-28.38	0-360	100	H
2	* ** 2.88002	29.44	PK2	32.5	-12.8	0	49.14	-	-	74	-24.86	271	324	H
	* ** 2.87965	16.85	ADV	32.5	-12.8	0.49	37.04	54	-16.96	-	-	271	324	H
5	* ** 2.337	27.18	Pk	32	-13.9	0	45.28	54	-8.72	74	-28.72	0-360	200	V
6	* ** 2.86845	29.25	PK2	32.4	-12.8	0	48.85	-	-	74	-25.15	136	358	V
	* ** 2.86752	16.8	ADV	32.4	-12.8	0.49	36.89	54	-17.11	-	-	136	358	V
3	* ** 4.86938	39.72	Pk	33.9	-32.1	0	41.52	54	-12.48	74	-32.48	0-360	100	H
4	* ** 9.44438	36.34	Pk	36.5	-26.5	0	46.34	54	-7.66	74	-27.66	0-360	100	H
7	* ** 4.86938	38.92	Pk	33.9	-32.1	0	40.72	54	-13.28	74	-33.28	0-360	200	V
8	* ** 9.38625	35.24	Pk	36.4	-26	0	45.64	54	-8.36	74	-28.36	0-360	200	V

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

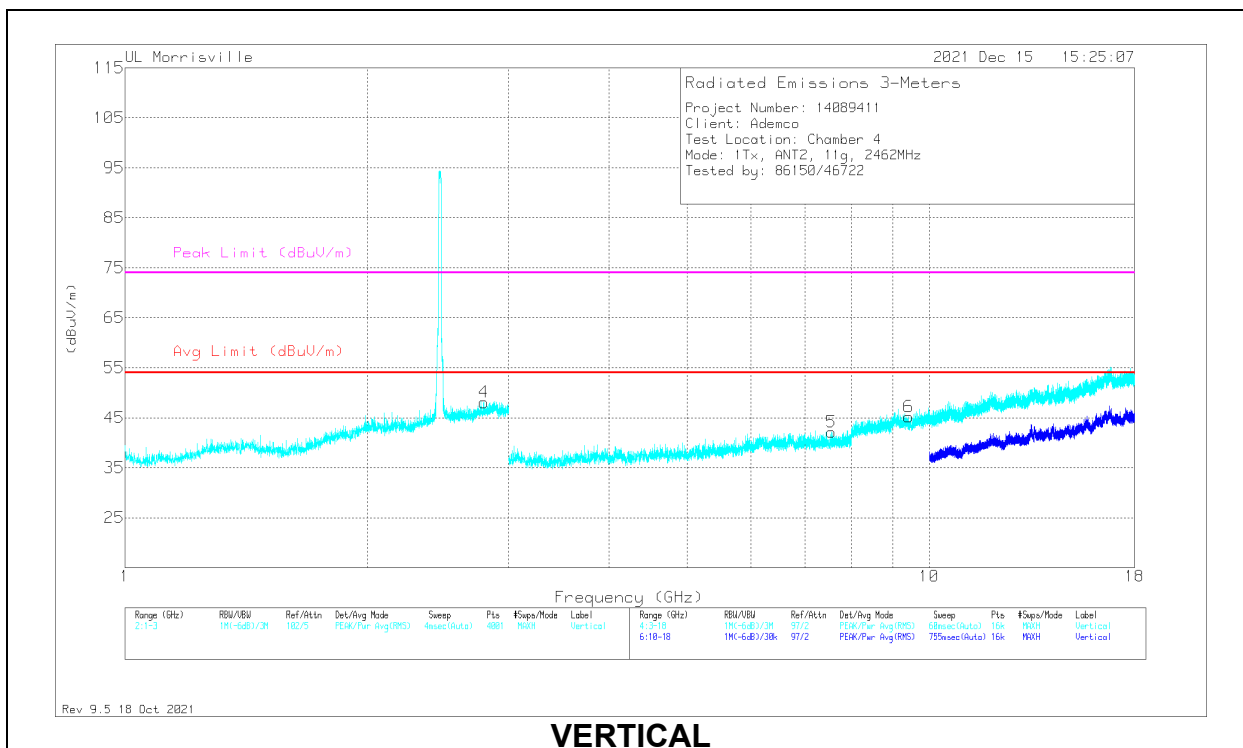
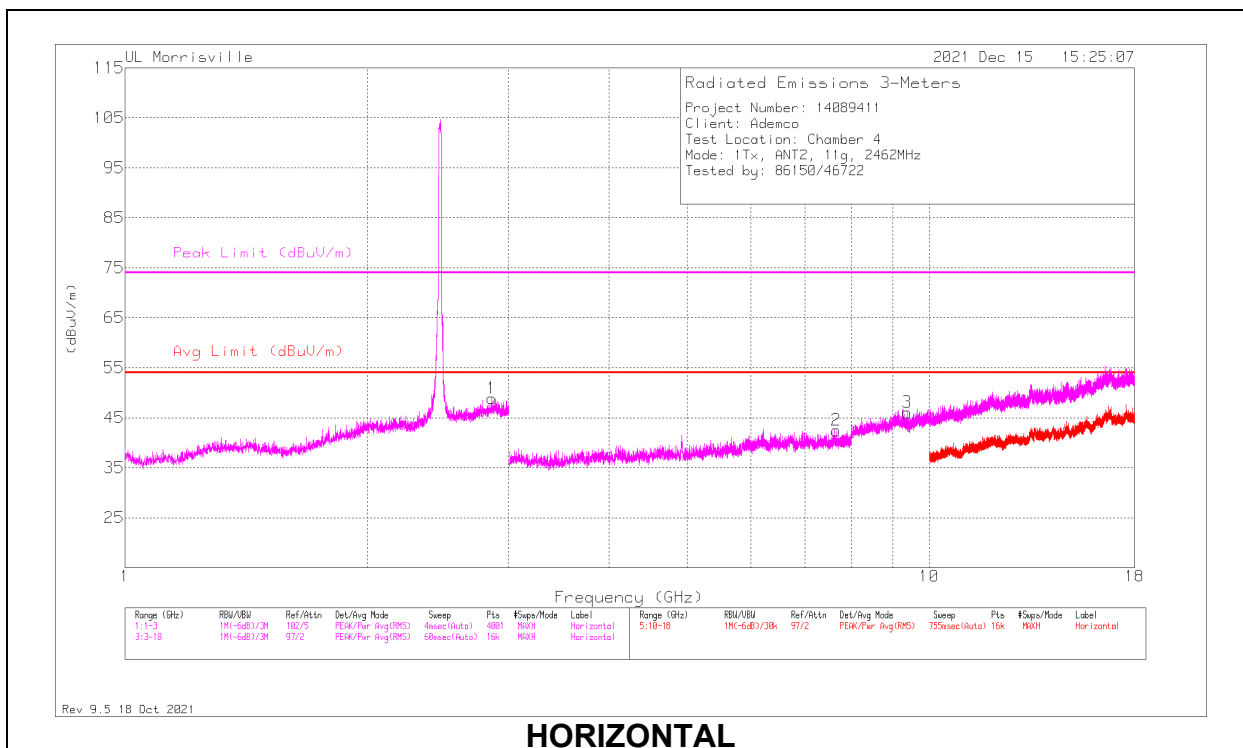
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.85632	29.78	PK2	32.4	-12.9	0	49.28	-	-	74	-24.72	233	100	H
	* ** 2.85746	16.78	ADV	32.4	-12.9	0.49	36.77	54	-17.23	-	-	233	100	H
4	* ** 2.79559	29.6	PK2	32.2	-13.1	0	48.7	-	-	74	-25.3	220	357	V
	* ** 2.79366	16.65	ADV	32.2	-13.1	0.49	36.24	54	-17.76	-	-	220	357	V
2	* ** 7.66125	35.45	Pk	35.6	-28.6	0	42.45	54	-11.55	74	-31.55	0-360	100	H
3	* ** 9.38625	35.64	Pk	36.4	-26	0	46.04	54	-7.96	74	-27.96	0-360	100	H
5	* ** 7.56	35.41	Pk	35.6	-28.9	0	42.11	54	-11.89	74	-31.89	0-360	200	V
6	* ** 9.4275	35.25	Pk	36.4	-26.5	0	45.15	54	-8.85	74	-28.85	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

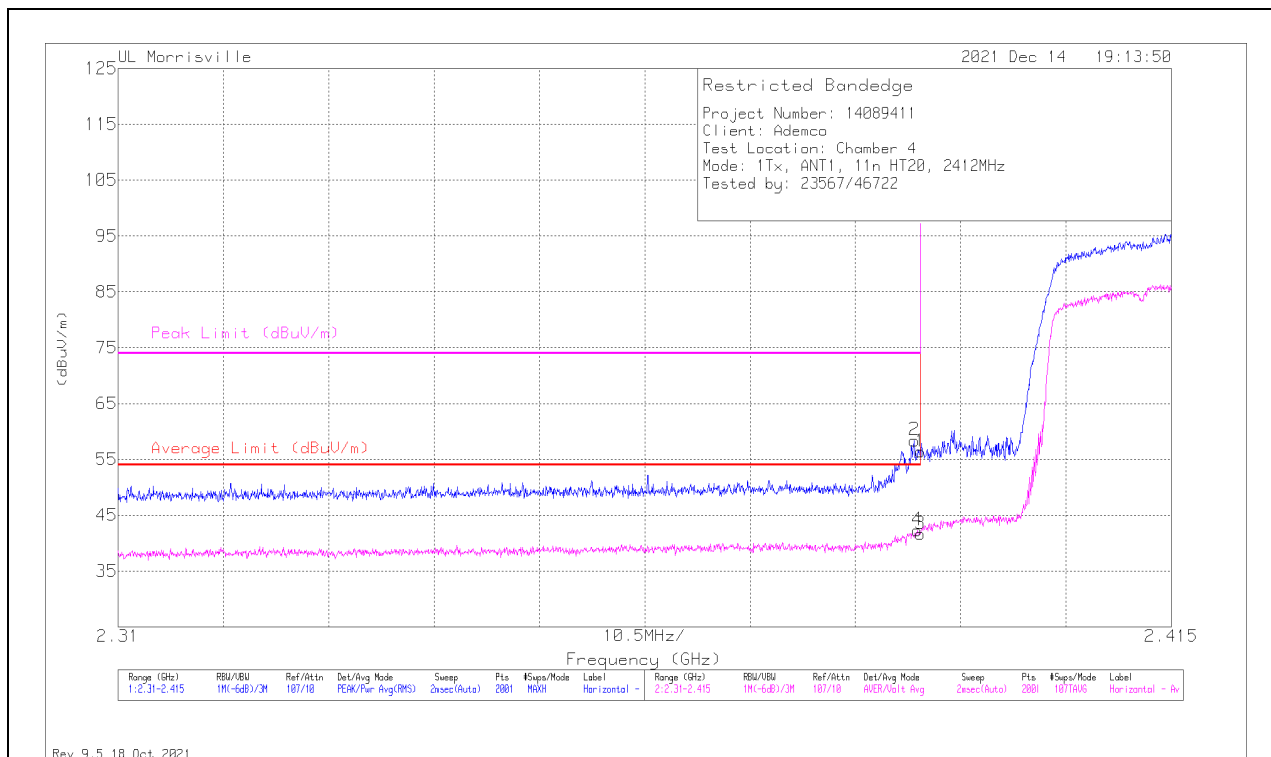
ADV - Linear Voltage Average

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

1TX Antenna 1 MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.38996	38.19	Pk	32	-13.8	0	56.39	-	-	74	-17.61	89	324	H
2	*** 2.38938	40.21	Pk	32	-13.8	0	58.41	-	-	74	-15.59	89	324	H
3	*** 2.38996	22.78	ADV	32	-13.8	.66	41.64	54	-12.36	-	-	89	324	H
4	*** 2.38964	23.43	ADV	32	-13.8	.66	42.29	54	-11.71	-	-	89	324	H

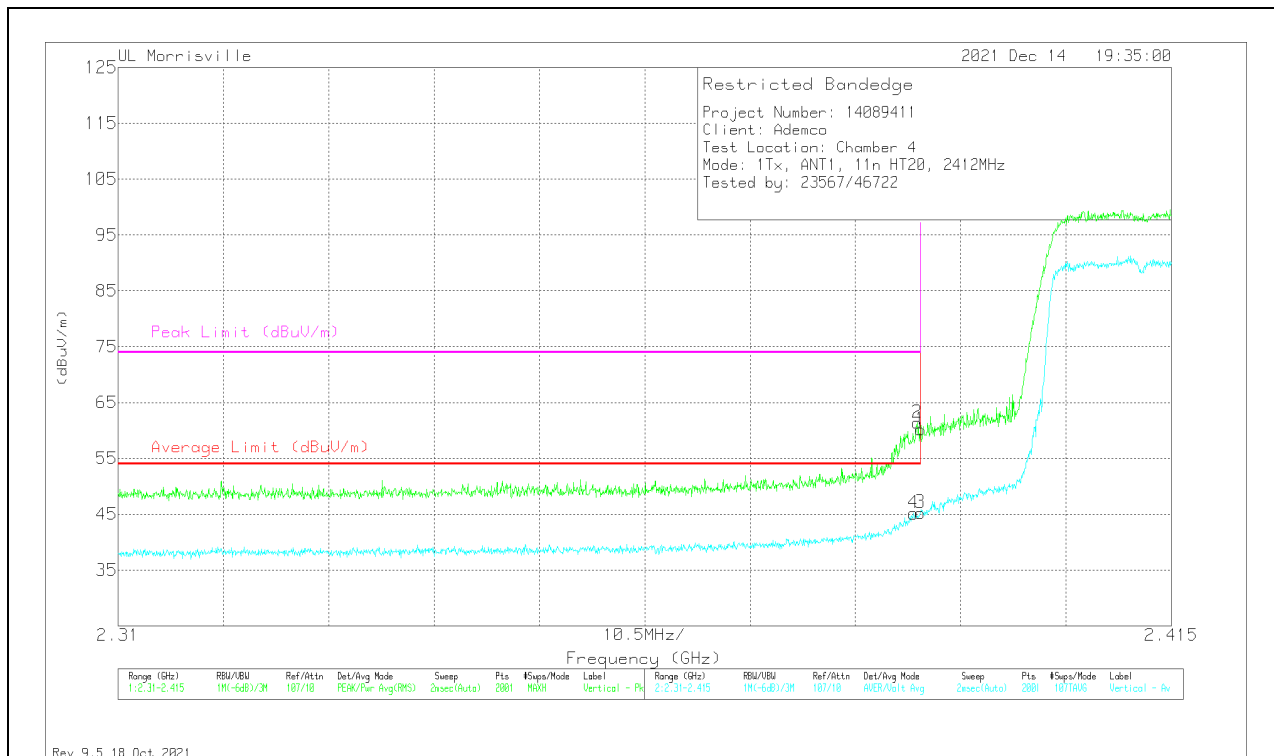
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.38996	41.98	Pk	32	-13.8	0	60.18	-	-	74	-13.82	45	373	V
2	*** 2.38964	43.19	Pk	32	-13.8	0	61.39	-	-	74	-12.61	45	373	V
3	*** 2.38996	26.38	ADV	32	-13.8	.66	45.24	54	-8.76	-	-	45	373	V
4	*** 2.38928	26.3	ADV	32	-13.8	.66	45.16	54	-8.84	-	-	45	373	V

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

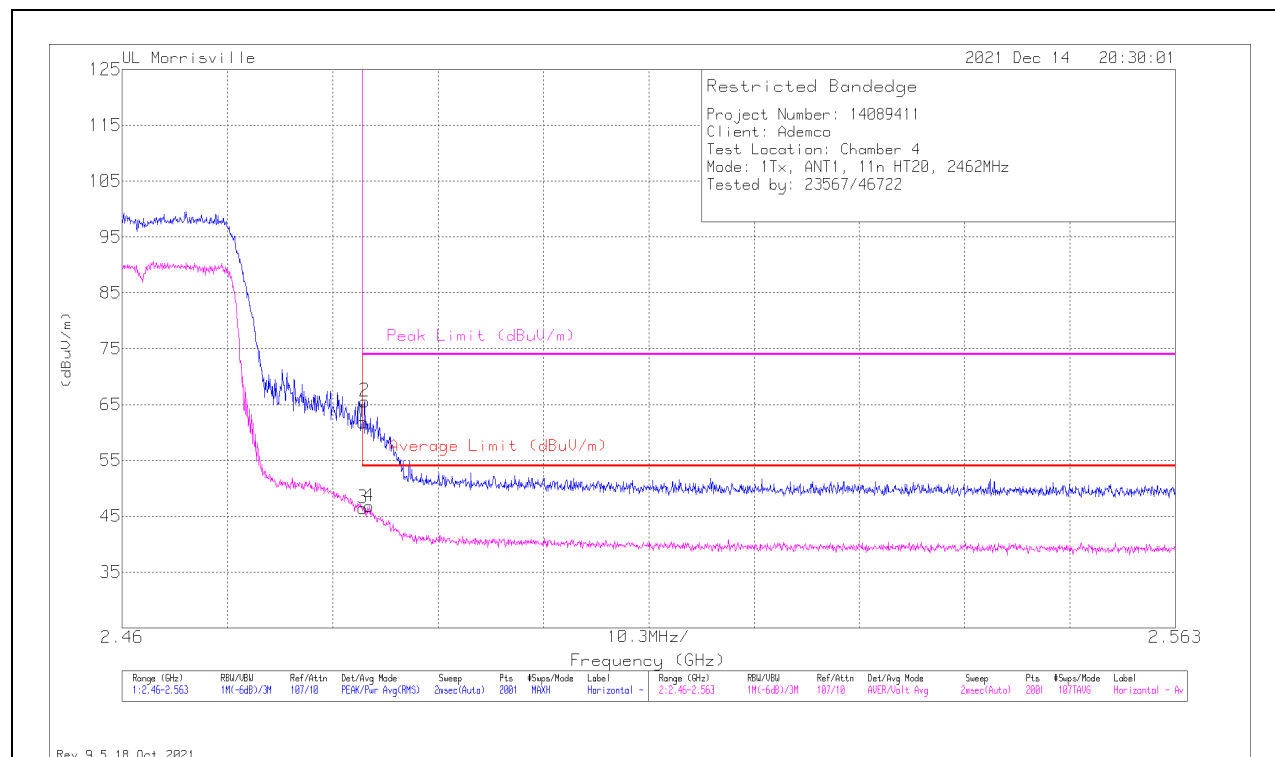
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.48354	42.94	Pk	32.6	-13.7	0	61.84	-	-	74	-12.16	74	100	H
2	* ** 2.48374	46.67	Pk	32.6	-13.7	0	65.57	-	-	74	-8.43	74	100	H
3	* ** 2.48354	26.9	ADV	32.6	-13.7	.66	46.46	54	-7.54	-	-	74	100	H
4	* ** 2.48415	27.2	ADV	32.6	-13.7	.66	46.76	54	-7.24	-	-	74	100	H

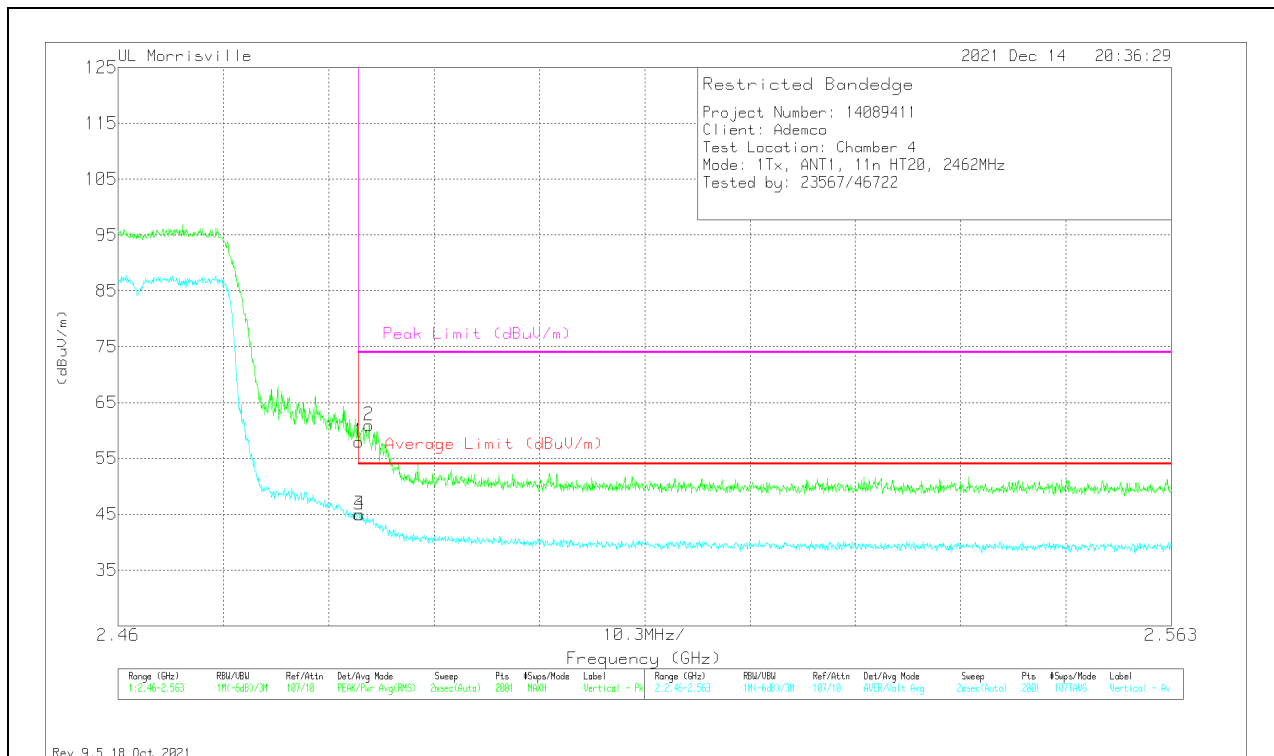
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.48354	39.12	Pk	32.6	-13.7	0	58.02	-	-	74	-15.98	54	338	V
2	* ** 2.48451	42.06	Pk	32.6	-13.7	0	60.96	-	-	74	-13.04	54	338	V
3	* ** 2.48354	25.44	ADV	32.6	-13.7	.66	45	54	-9	-	-	54	338	V
4	* ** 2.48364	25.44	ADV	32.6	-13.7	.66	45	54	-9	-	-	54	338	V

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

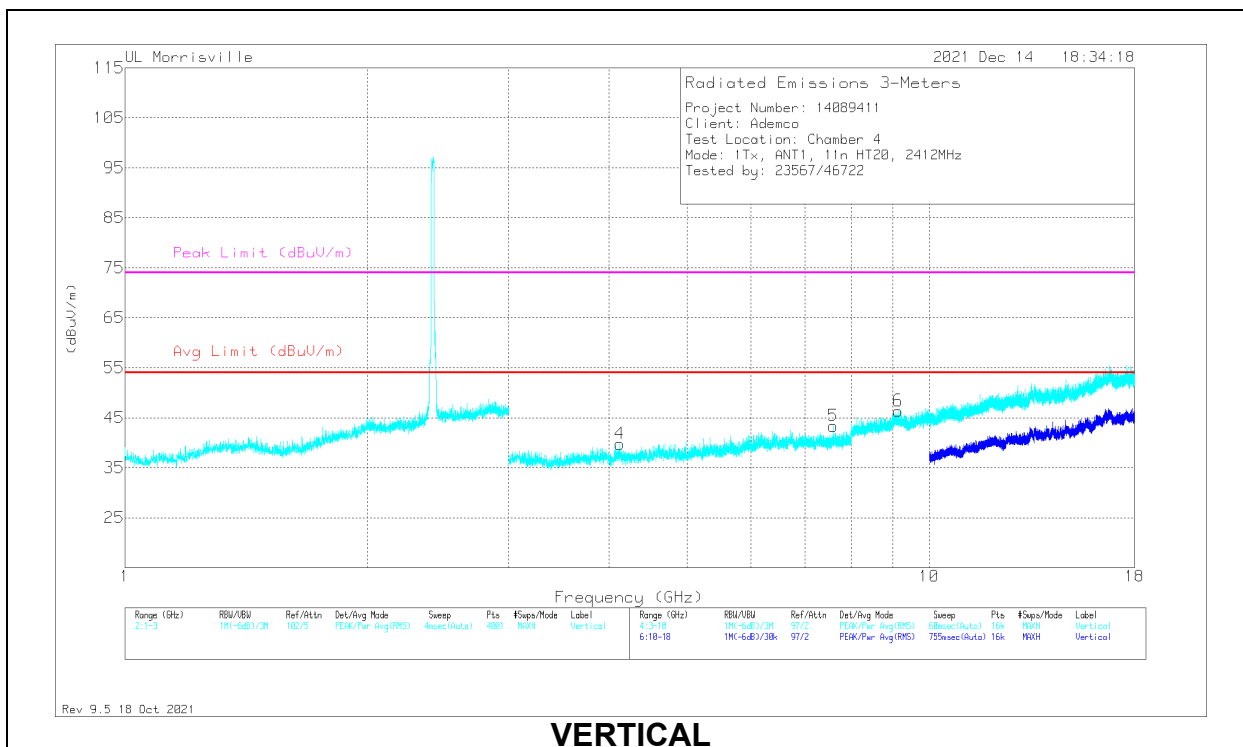
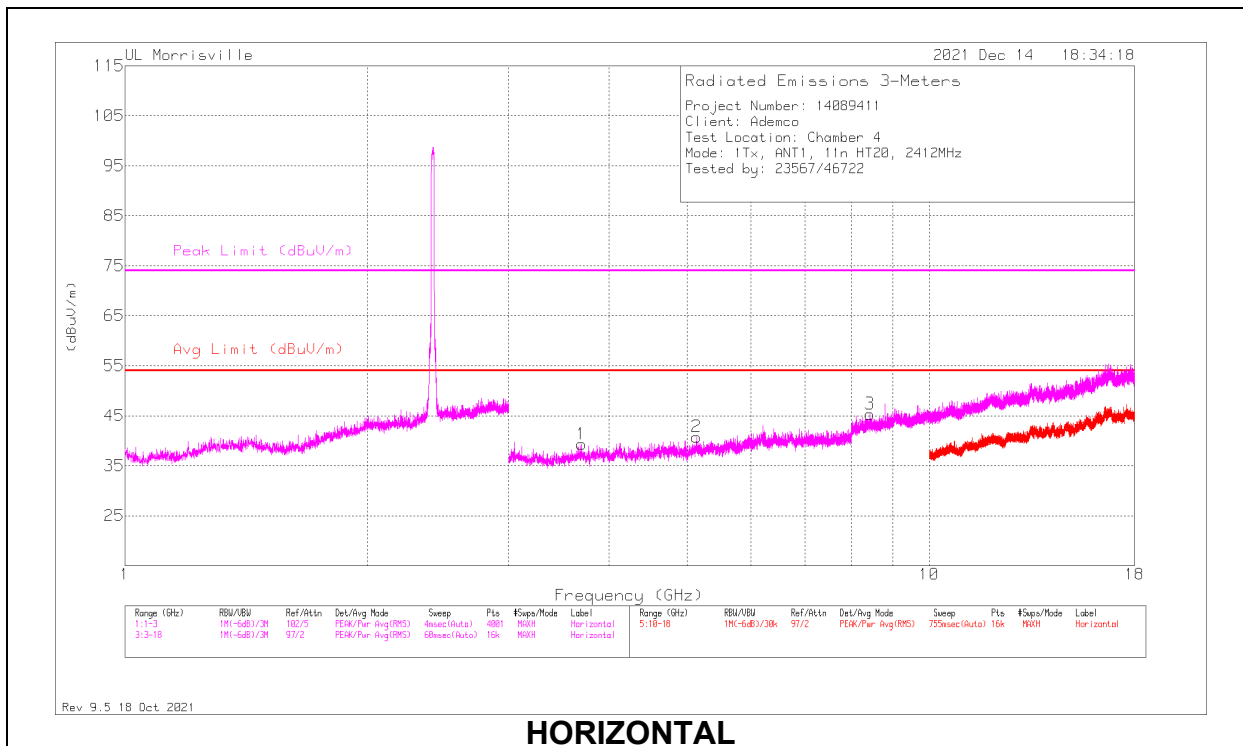
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

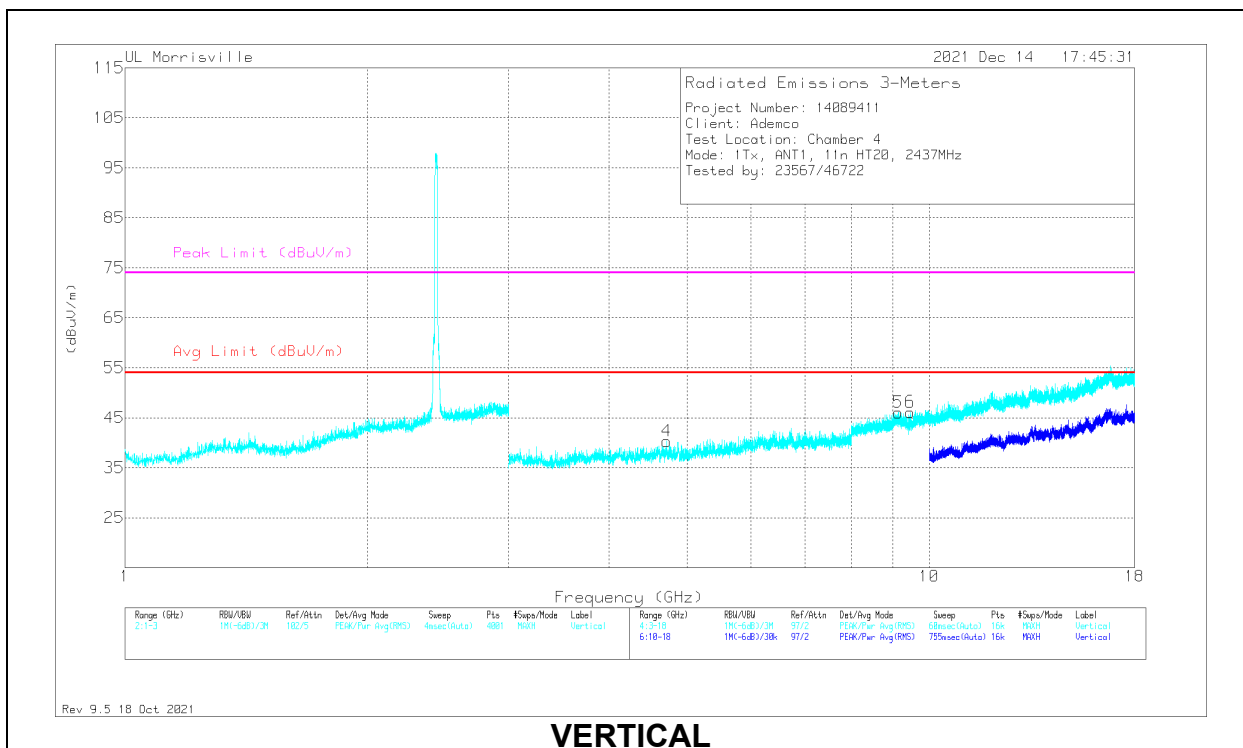
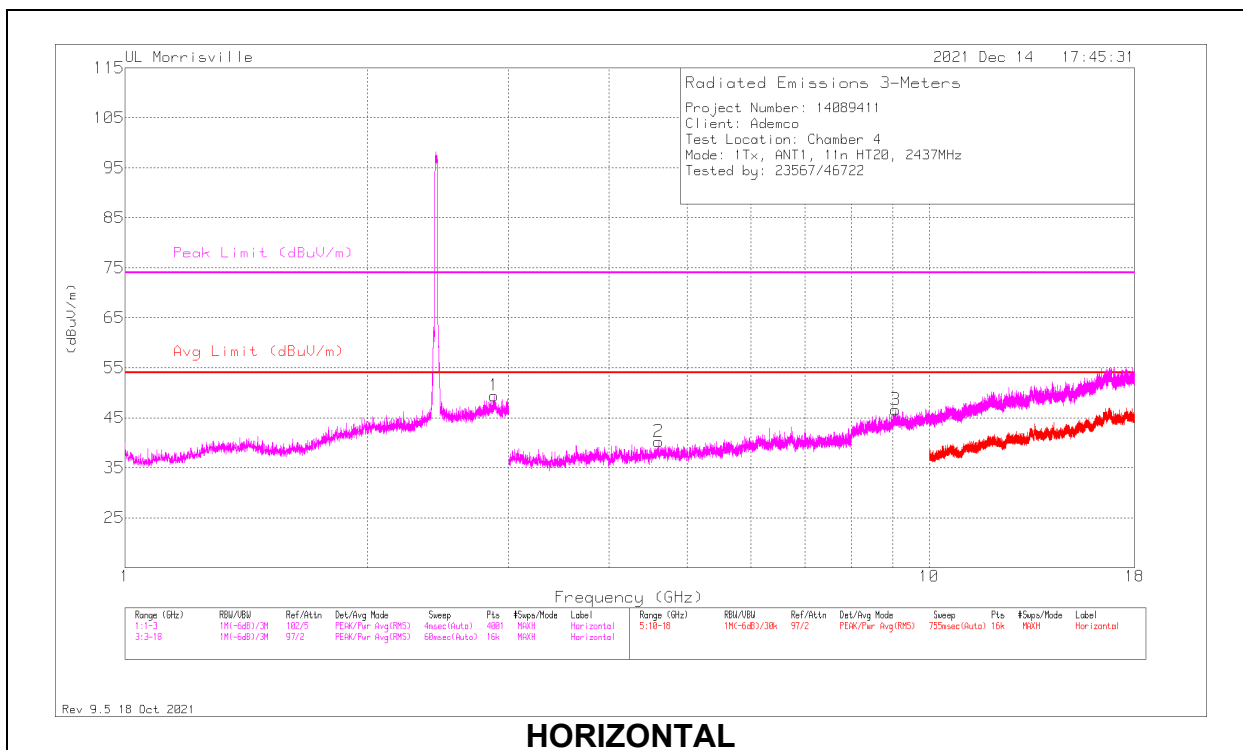
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 3.69563	40.01	Pk	33.1	-33.8	39.31	54	-14.69	74	-34.69	0-360	100	H
2	* ** 5.13563	38.48	Pk	34.2	-31.9	40.78	54	-13.22	74	-33.22	0-360	100	H
3	* ** 8.43469	37.15	Pk	35.7	-27.5	45.35	54	-8.65	74	-28.65	0-360	100	H
4	* ** 4.12219	39.19	Pk	33.4	-32.8	39.79	54	-14.21	74	-34.21	0-360	200	V
5	* ** 7.59938	36.46	Pk	35.6	-28.7	43.36	54	-10.64	74	-30.64	0-360	200	V
6	* ** 9.15469	36.55	Pk	36.2	-26.4	46.35	54	-7.65	74	-27.65	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

MID CHANNEL, CH 6 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.87245	29.25	PK2	32.5	-12.8	0	48.95	-	-	74	-25.05	209	199	H
	* ** 2.87574	17.11	ADV	32.5	-12.8	.66	37.47	54	-16.53	-	-	209	199	H
2	* ** 4.60688	38.65	Pk	34.2	-32.6	0	40.25	54	-13.75	74	-33.75	0-360	100	H
3	* ** 9.07781	36.1	Pk	36	-25.5	0	46.6	54	-7.4	74	-27.4	0-360	100	H
4	* ** 4.71656	38.5	Pk	34.1	-32.3	0	40.3	54	-13.7	74	-33.7	0-360	200	V
5	* ** 9.14438	36.24	Pk	36.2	-26.4	0	46.04	54	-7.96	74	-27.96	0-360	200	V
6	* ** 9.4725	36.11	Pk	36.5	-26.5	0	46.11	54	-7.89	74	-27.89	0-360	200	V

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

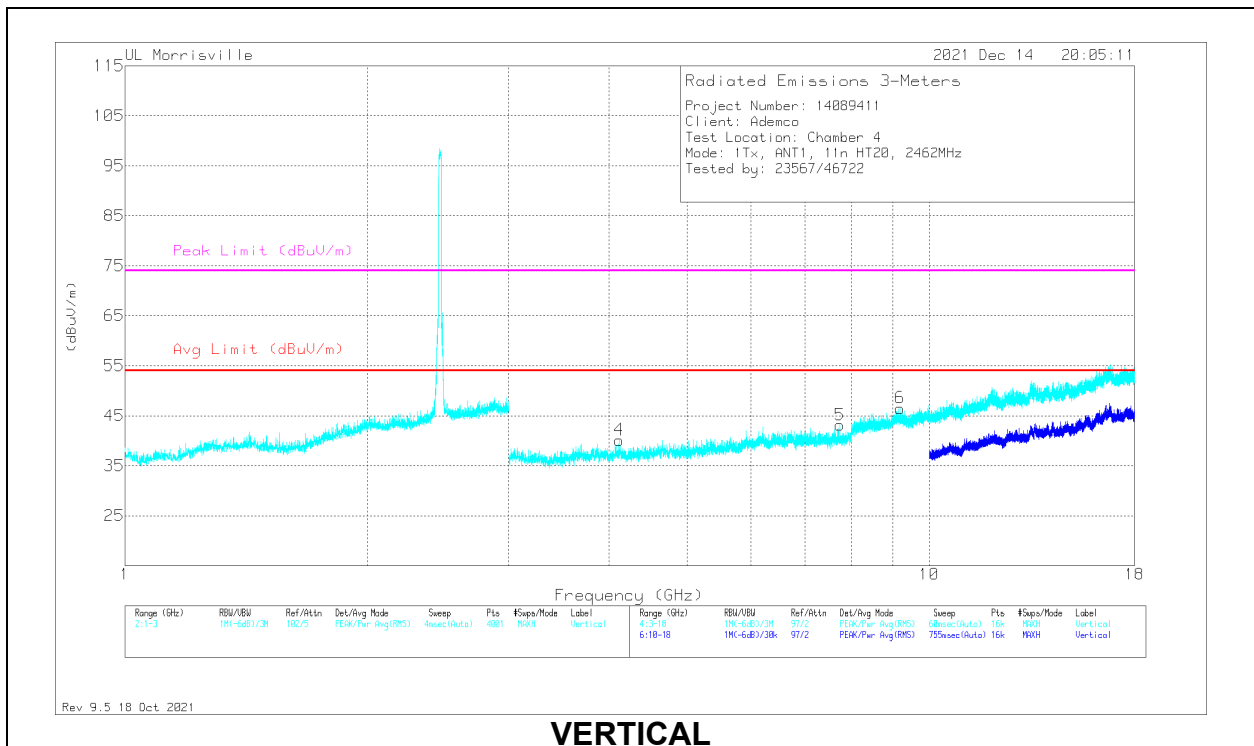
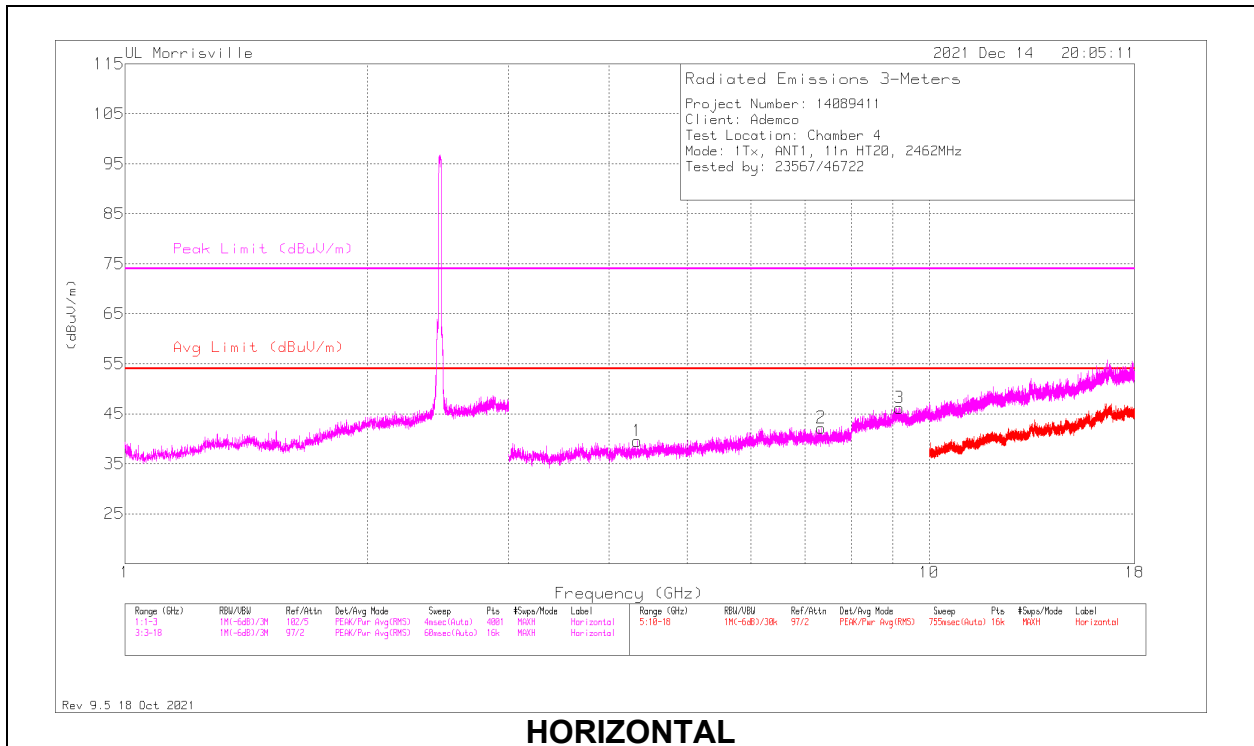
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.33594	38.53	Pk	33.5	-32.5	39.53	54	-14.47	74	-34.47	0-360	100	H
2	* ** 7.3425	35.46	Pk	35.6	-28.9	42.16	54	-11.84	74	-31.84	0-360	100	H
3	* ** 9.18563	36.65	Pk	36.2	-26.7	46.15	54	-7.85	74	-27.85	0-360	100	H
4	* ** 4.11469	39.63	Pk	33.4	-32.9	40.13	54	-13.87	74	-33.87	0-360	200	V
5	* ** 7.74094	36.33	Pk	35.7	-28.9	43.13	54	-10.87	74	-30.87	0-360	200	V
6	* ** 9.19781	37.02	Pk	36.2	-26.7	46.52	54	-7.48	74	-27.48	0-360	200	V

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

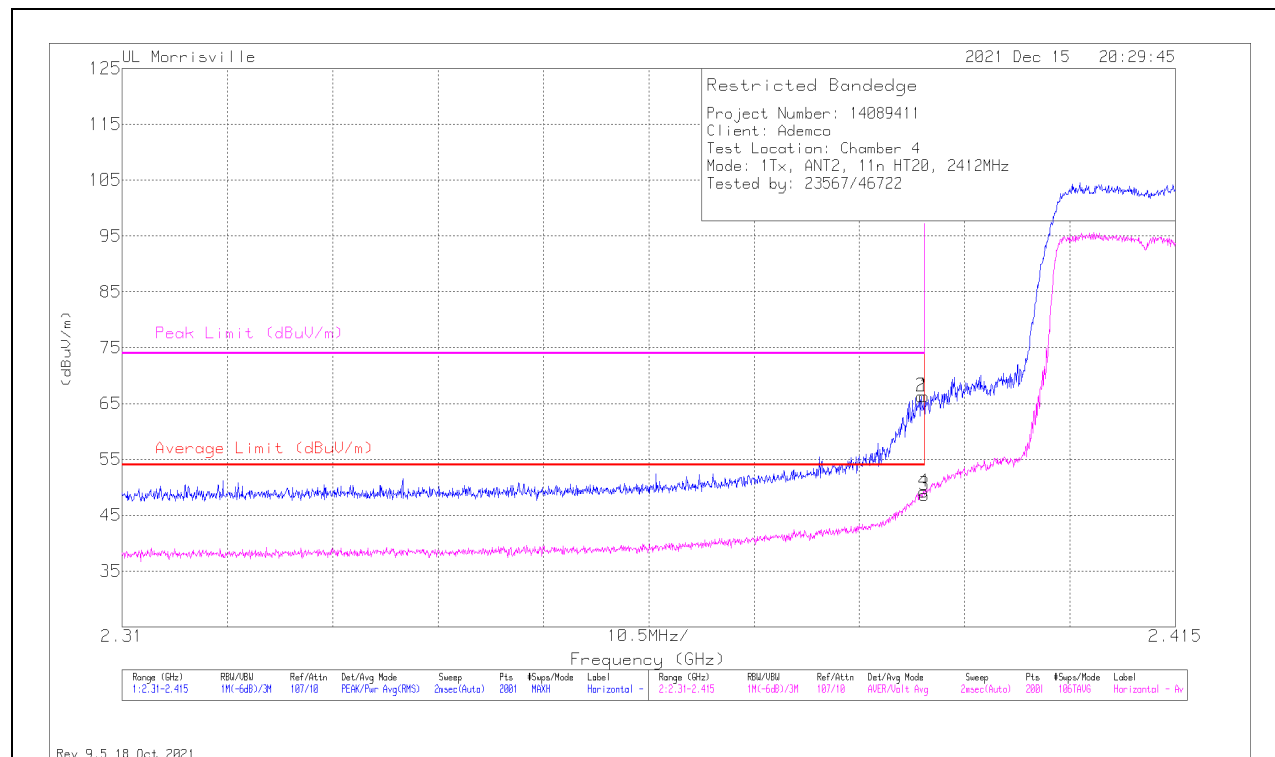
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

1TX Antenna 2 MODE

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	*** 2.38996	48.12	Pk	32	-13.8	0	66.32	-	-	74	-7.68	105	103	H
2	*** 2.38964	48.12	Pk	32	-13.8	0	66.32	-	-	74	-7.68	105	103	H
3	*** 2.38996	29.89	ADV	32	-13.8	.55	48.64	54	-5.36	-	-	105	103	H
4	*** 2.38991	30.47	ADV	32	-13.8	.55	49.22	54	-4.78	-	-	105	103	H

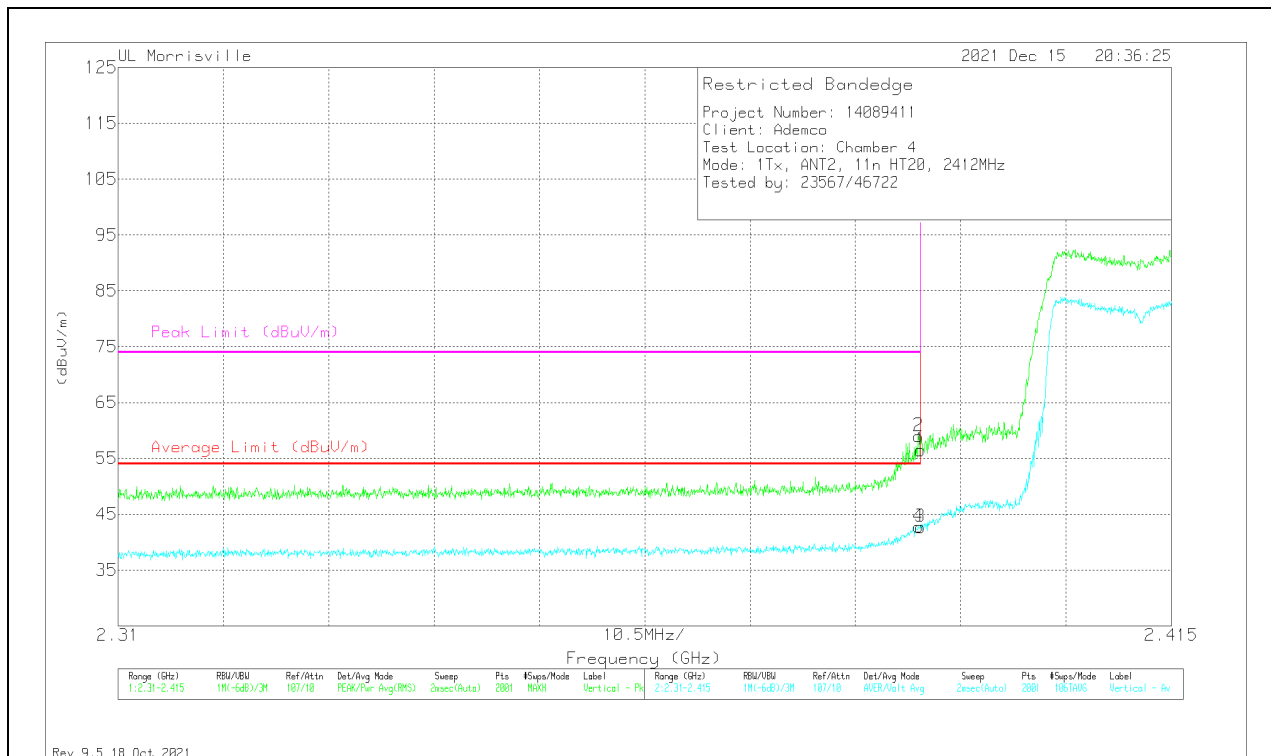
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.38996	38.29	Pk	32	-13.8	0	56.49	-	-	74	-17.51	354	246	V
2	* ** 2.3898	40.78	Pk	32	-13.8	0	58.98	-	-	74	-15.02	354	246	V
3	* ** 2.38996	23.97	ADV	32	-13.8	.55	42.72	54	-11.28	-	-	354	246	V
4	* ** 2.3898	24.03	ADV	32	-13.8	.55	42.78	54	-11.22	-	-	354	246	V

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

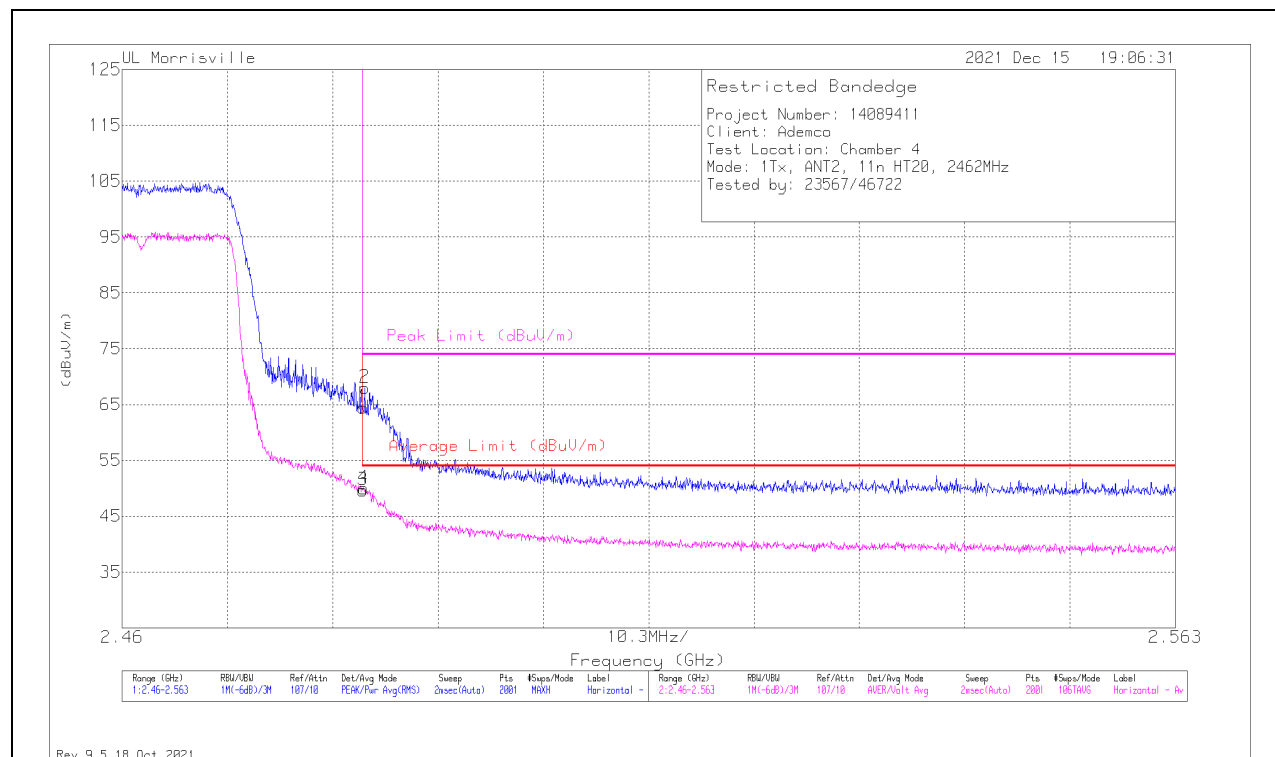
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	206211 (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	* ** 2.48354	45.57	Pk	32.6	-13.7	0	64.47	-	-	74	-9.53	80	107	H
2	* ** 2.48374	49.12	Pk	32.6	-13.7	0	68.02	-	-	74	-5.98	80	107	H
3	* ** 2.48354	30.22	ADV	32.6	-13.7	.55	49.67	54	-4.33	-	-	80	107	H
4	* ** 2.48359	30.59	ADV	32.6	-13.7	.55	50.04	54	-3.96	-	-	80	107	H

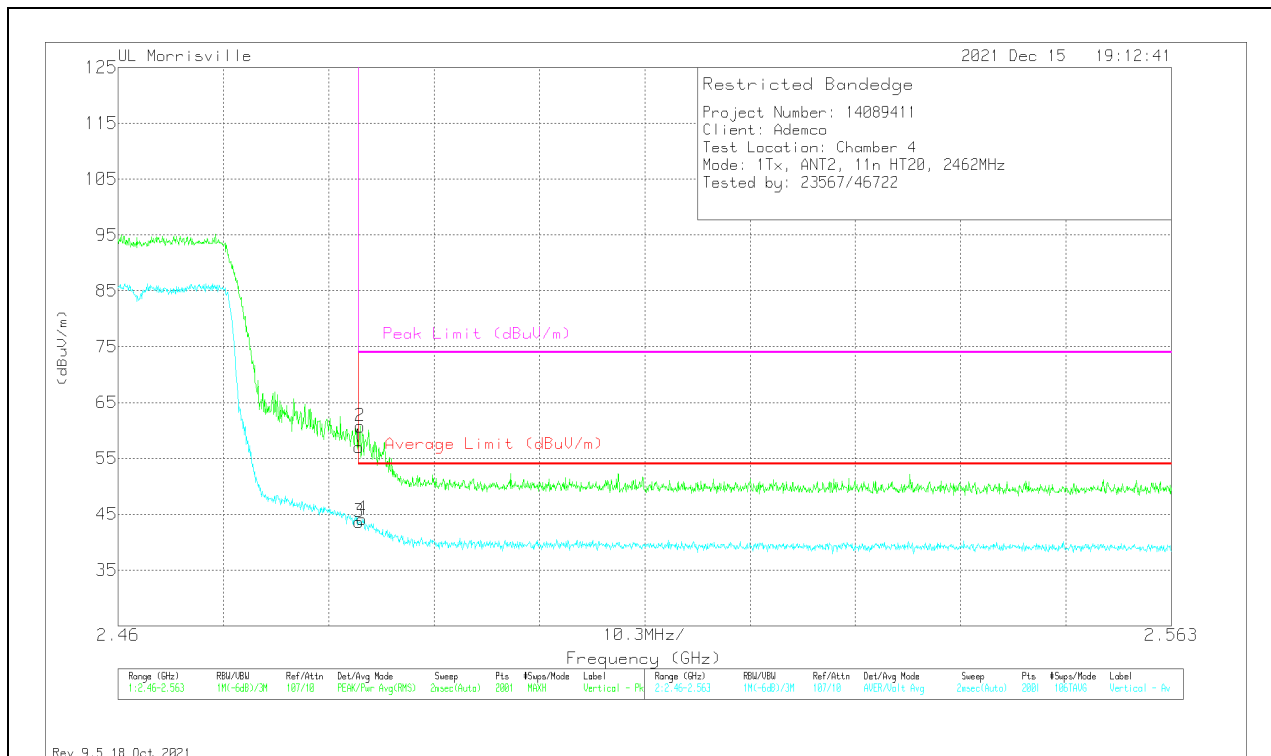
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.48354	38.14	Pk	32.6	-13.7	0	57.04	-	-	74	-16.96	285	100	V
2	* ** 2.48369	41.85	Pk	32.6	-13.7	0	60.75	-	-	74	-13.25	285	100	V
3	* ** 2.48354	24.2	ADV	32.6	-13.7	.55	43.65	54	-10.35	-	-	285	100	V
4	* ** 2.48384	24.7	ADV	32.6	-13.7	.55	44.15	54	-9.85	-	-	285	100	V

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

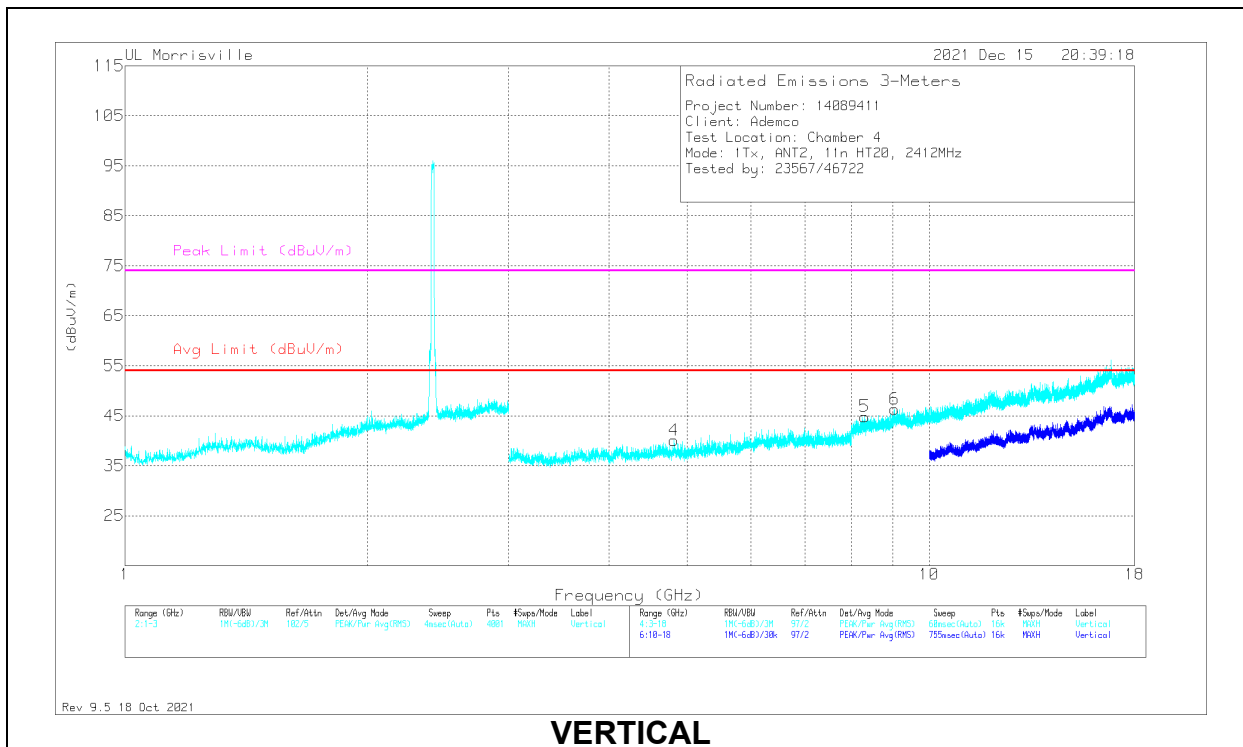
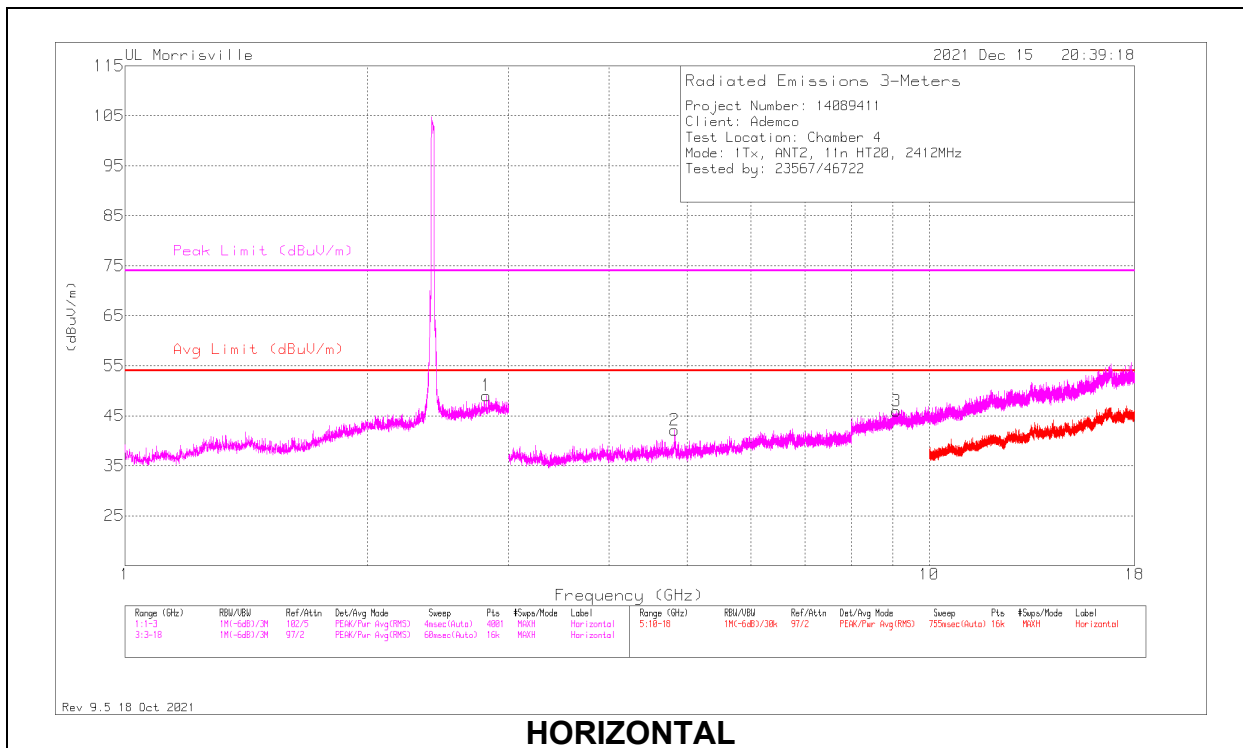
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

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	206211 (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	* ** 2.81346	29.38	PK2	32.4	-13	0	48.78	-	-	74	-25.22	70	400	H
	* ** 2.81634	16.61	ADV	32.4	-13	.55	36.56	54	-17.44	-	-	70	400	H
2	* ** 4.8225	40.6	Pk	34	-32.5	0	42.1	54	-11.9	74	-31.9	0-360	100	H
3	* ** 9.10594	35.83	Pk	36.1	-26	0	45.93	54	-8.07	74	-28.07	0-360	100	H
4	* ** 4.81594	38.57	Pk	34	-32.5	0	40.07	54	-13.93	74	-33.93	0-360	200	V
5	* ** 8.31375	36.92	Pk	35.7	-27.8	0	44.82	54	-9.18	74	-29.18	0-360	200	V
6	* ** 9.05813	35.81	Pk	36	-25.5	0	46.31	54	-7.69	74	-27.69	0-360	200	V

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

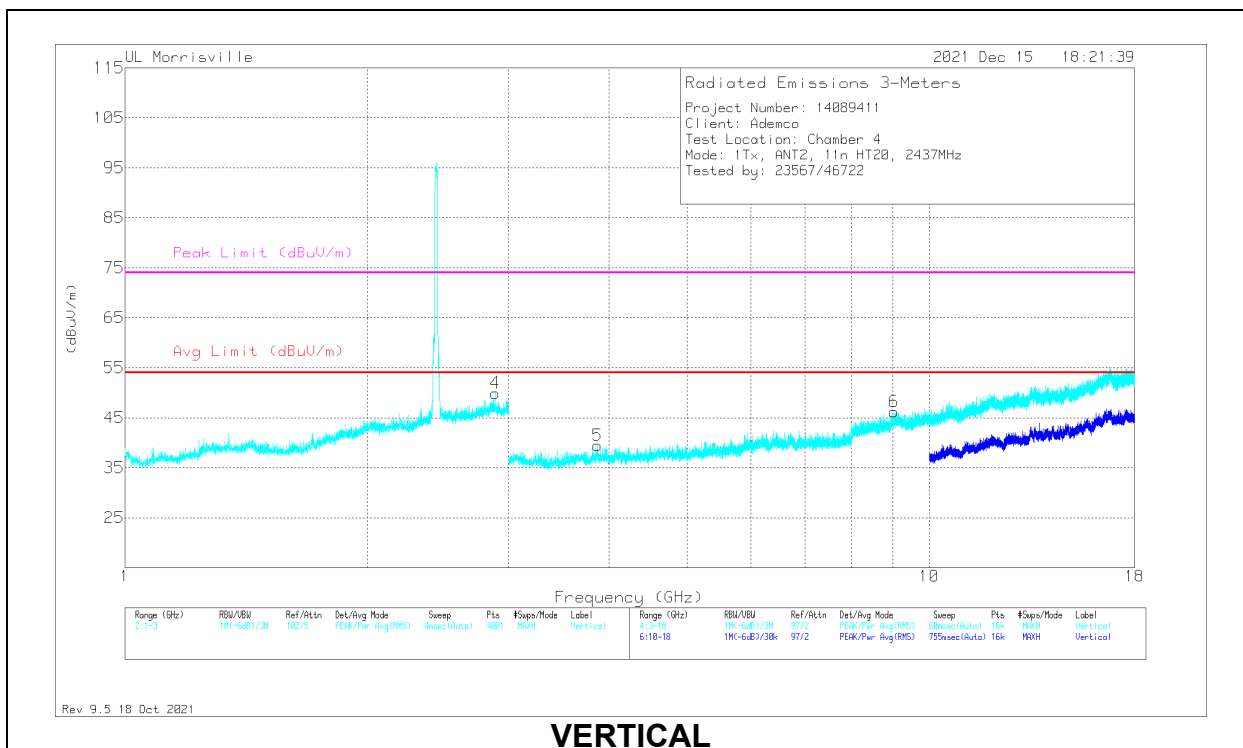
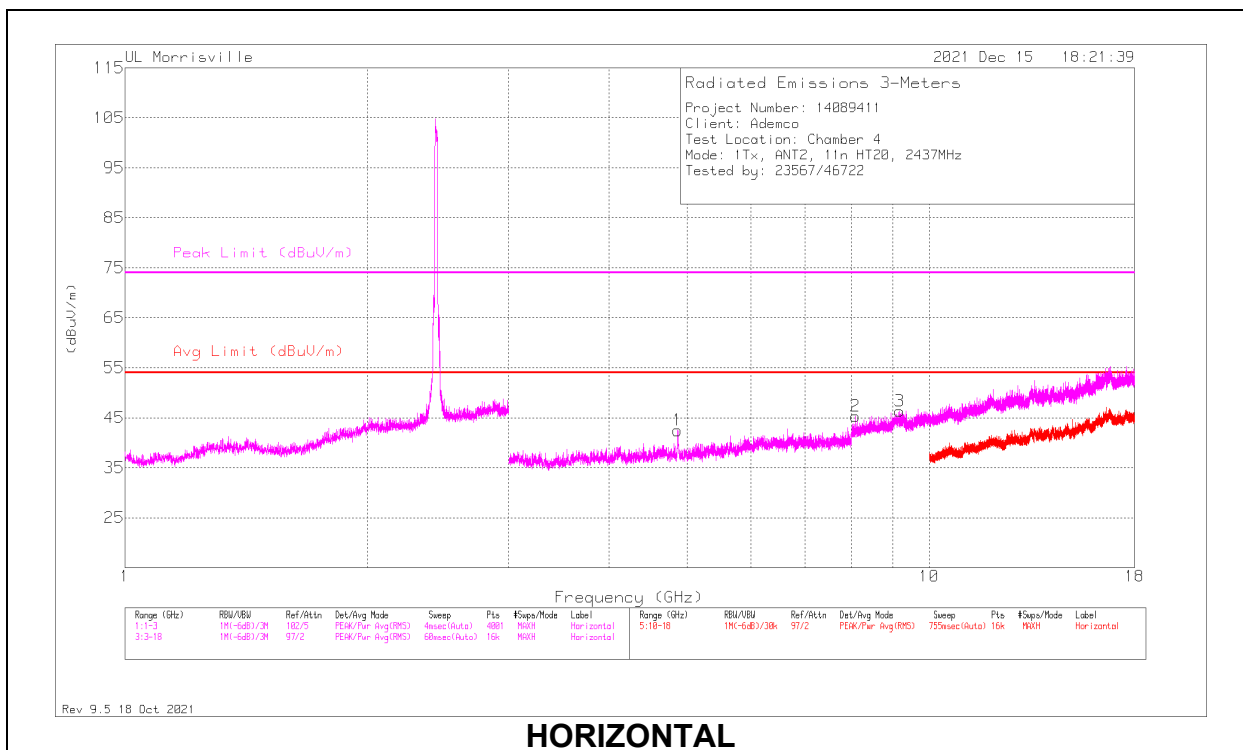
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

MID CHANNEL, CH 6 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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
4	* ** 2.88768	29.43	PK2	32.5	-12.8	0	49.13	-	-	74	-24.87	308	373	V
	* ** 2.88855	16.67	ADV	32.5	-12.8	.55	36.92	54	-17.08	-	-	308	373	V
1	* ** 4.86281	40.77	Pk	33.9	-32.2	0	42.47	54	-11.53	74	-31.53	0-360	100	H
2	* ** 8.09906	37.89	Pk	35.7	-28.3	0	45.29	54	-8.71	74	-28.71	0-360	100	H
3	* ** 9.18656	36.82	Pk	36.2	-26.7	0	46.32	54	-7.68	74	-27.68	0-360	100	H
5	* ** 3.86813	39.65	Pk	33.3	-33.5	0	39.45	54	-14.55	74	-34.55	0-360	200	V
6	* ** 9.03656	35.9	Pk	35.9	-25.6	0	46.2	54	-7.8	74	-27.8	0-360	200	V

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

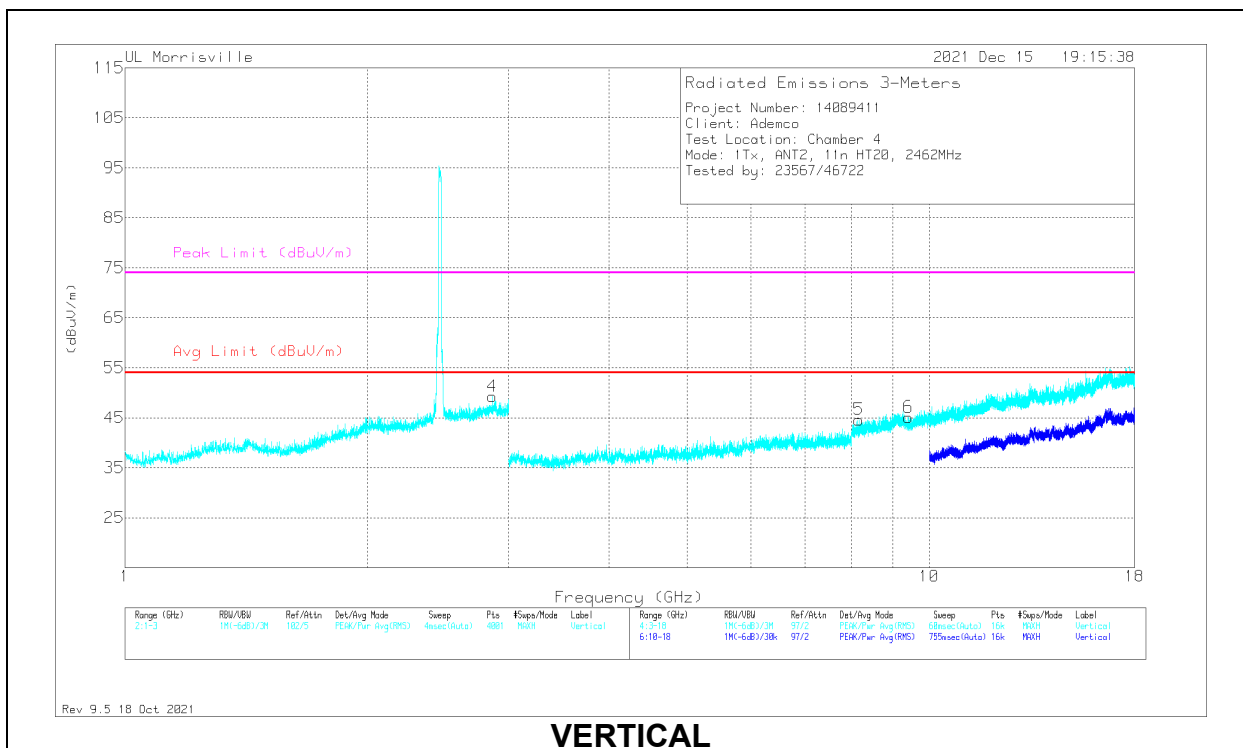
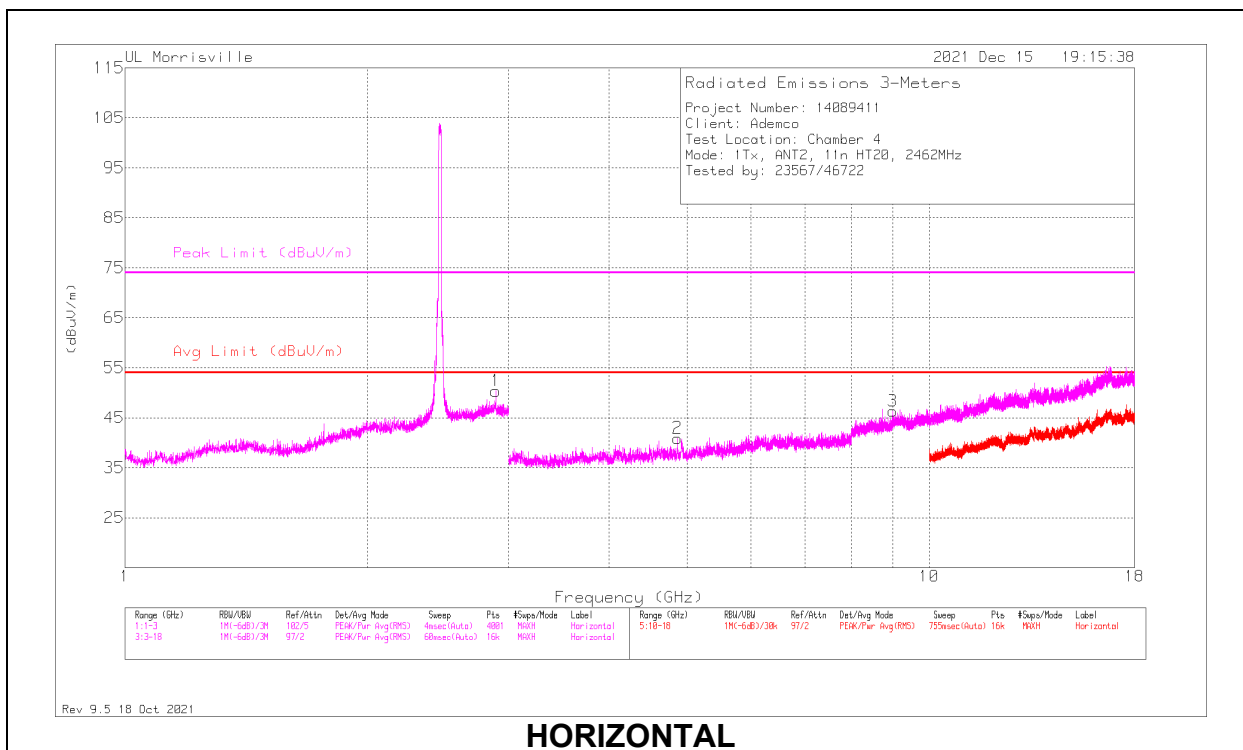
** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

ADV - Linear Voltage Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	206211 (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	* ** 2.89306	29.56	PK2	32.5	-12.8	0	49.26	-	-	74	-24.74	294	239	H
	* ** 2.88954	16.76	ADV	32.5	-12.8	0.55	37.01	54	-16.99	-	-	294	239	H
4	* ** 2.86284	29.74	PK2	32.4	-12.9	0	49.24	-	-	74	-24.76	354	211	V
	* ** 2.86365	16.64	ADV	32.4	-12.9	0.55	36.69	54	-17.31	-	-	354	211	V
2	* ** 4.86469	39.1	Pk	33.9	-32.1	0	40.9	54	-13.1	74	-33.1	0-360	100	H
3	* ** 9.00375	36.41	Pk	35.9	-26	0	46.31	54	-7.69	74	-27.69	0-360	100	H
5	* ** 8.17406	36.81	Pk	35.7	-27.9	0	44.61	54	-9.39	74	-29.39	0-360	200	V
6	* ** 9.42094	35.1	Pk	36.4	-26.4	0	45.1	54	-8.9	74	-28.9	0-360	200	V

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

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

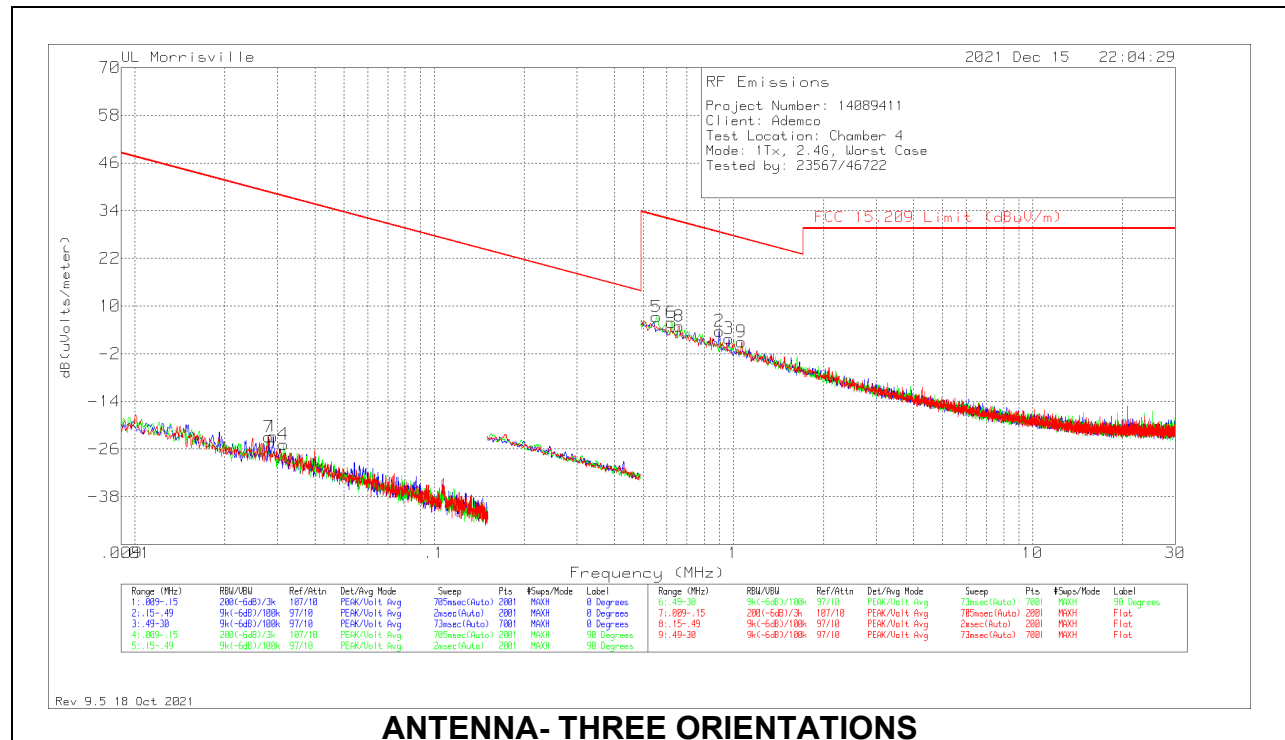
PK2 - Maximum Peak

ADV - Linear Voltage Average

11.2. 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)



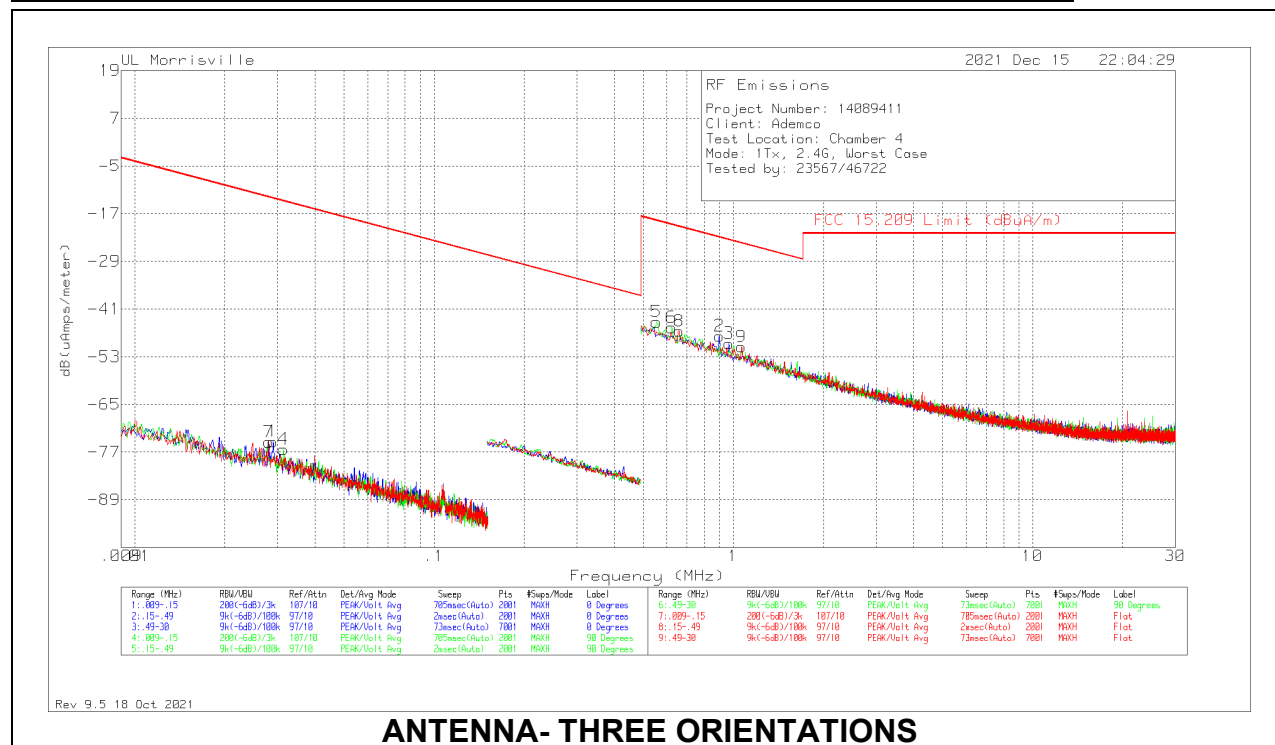
ANTENNA- THREE ORIENTATIONS

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)	Height (cm)	Loop Angle
7	.02796	43.45	Pk	13.5	.1	-80	-22.95	38.67	58.67	-61.62	0-360	400	Flat
1	.02895	43.67	Pk	13.4	.1	-80	-22.83	38.37	58.37	-61.2	0-360	400	0 degs
4	.03137	41.91	Pk	13.2	.1	-80	-24.79	37.68	57.68	-62.47	0-360	400	90 degs
5	.55324	35.87	Pk	11.2	.2	-40	7.27	32.75	-	-25.48	0-360	400	90 degs
6	.6207	34.46	Pk	11.2	.2	-40	5.86	31.75	-	-25.89	0-360	400	90 degs
8	.65864	33.42	Pk	11.3	.2	-40	4.92	31.23	-	-26.31	0-360	400	Flat
2	.89895	32.2	Pk	11.3	.2	-40	3.7	28.53	-	-24.83	0-360	400	0 degs
3	.96641	30.32	Pk	11.3	.2	-40	1.82	27.9	-	-26.08	0-360	400	0 degs
9	1.06338	29.49	Pk	11.3	.2	-40	.99	27.07	-	-26.08	0-360	400	Flat

Pk - Peak detector

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



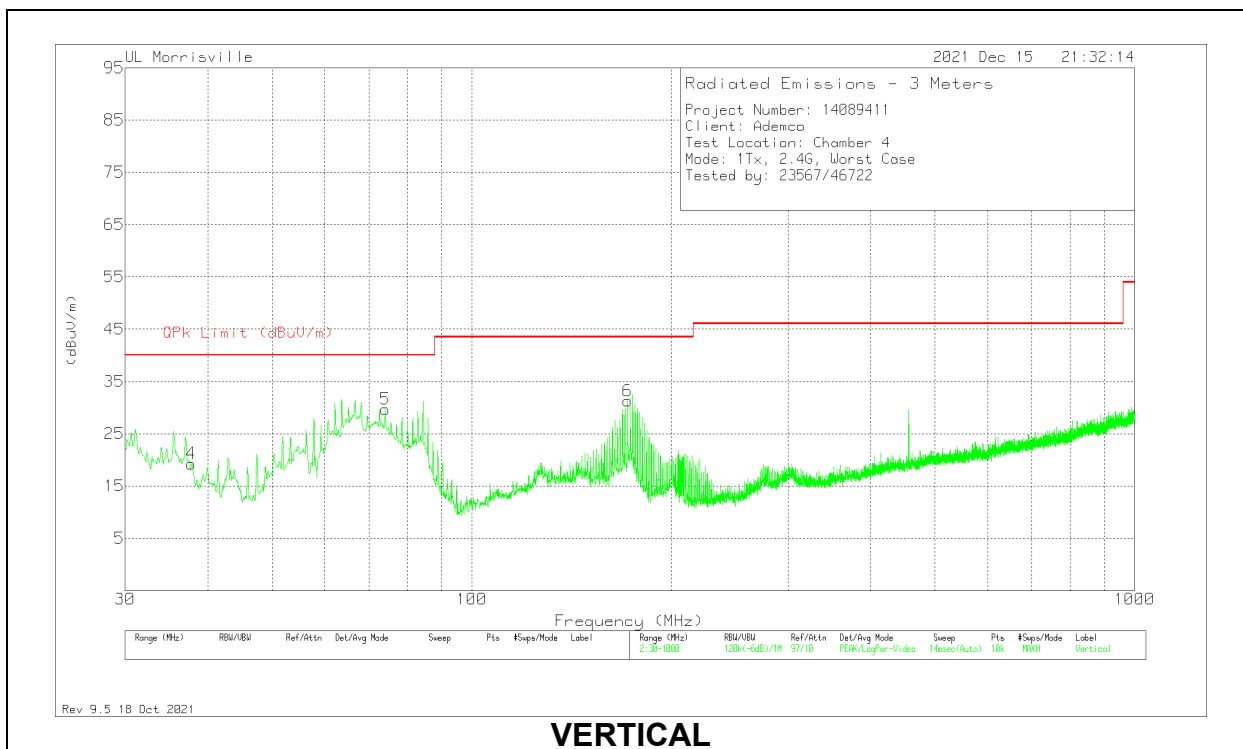
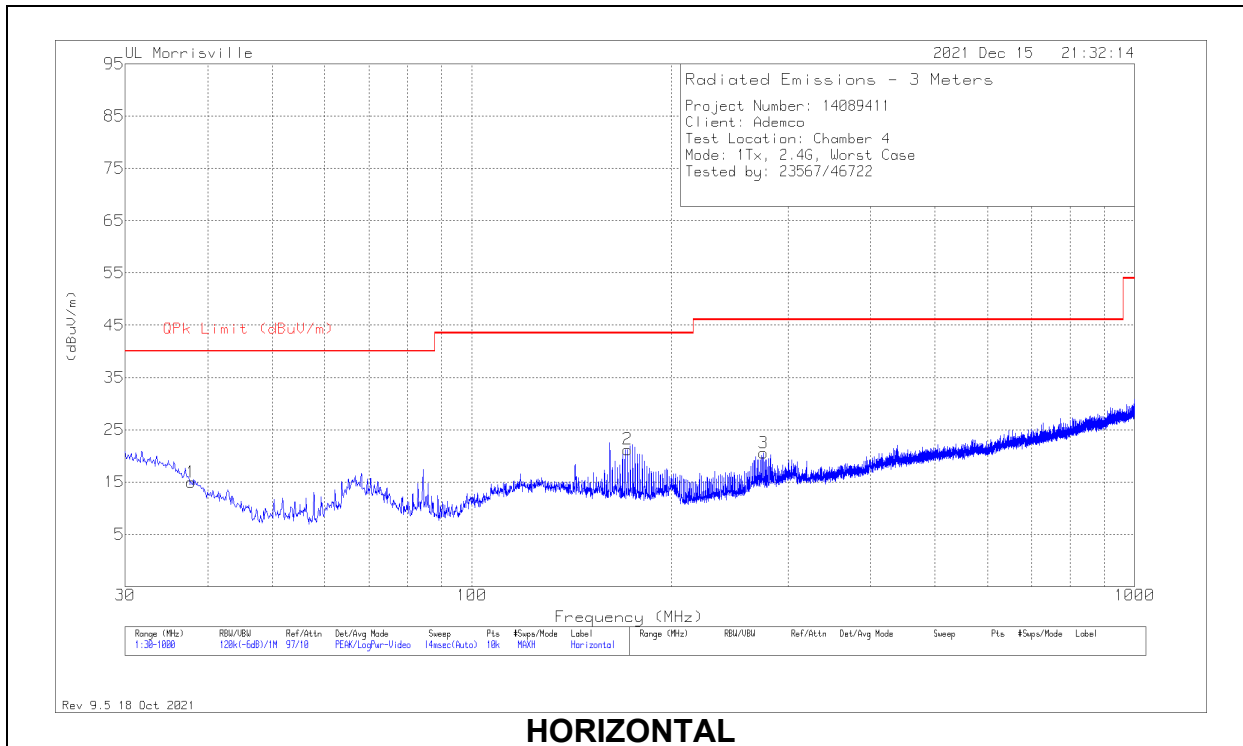
ANTENNA- THREE ORIENTATIONS

Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uAmps/meter)	RSS-GEN Qp/Av Limit (dBuA/m)	RSS-GEN Pk Limit (dBuA/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Loop Angle
7	.02796	43.45	Pk	-38	.1	-80	-74.45	-12.83	7.17	-61.62	0-360	400	Flat
1	.02895	43.67	Pk	-38.1	.1	-80	-74.33	-13.13	6.87	-61.2	0-360	400	0 degs
4	.03137	41.91	Pk	-38.3	.1	-80	-76.29	-13.82	6.18	-62.47	0-360	400	90 degs
5	.55324	35.87	Pk	-40.3	.2	-40	-44.23	-18.75	-	-25.48	0-360	400	90 degs
6	.6207	34.46	Pk	-40.3	.2	-40	-45.64	-19.75	-	-25.89	0-360	400	90 degs
8	.65864	33.42	Pk	-40.2	.2	-40	-46.58	-20.27	-	-26.31	0-360	400	Flat
2	.89895	32.2	Pk	-40.2	.2	-40	-47.8	-22.97	-	-24.83	0-360	400	0 degs
3	.96641	30.32	Pk	-40.2	.2	-40	-49.68	-23.6	-	-26.08	0-360	400	0 degs
9	1.06338	29.49	Pk	-40.2	.2	-40	-50.51	-24.43	-	-26.08	0-360	400	Flat

Pk - Peak detector

11.3. WORST CASE BELOW 1 GHZ

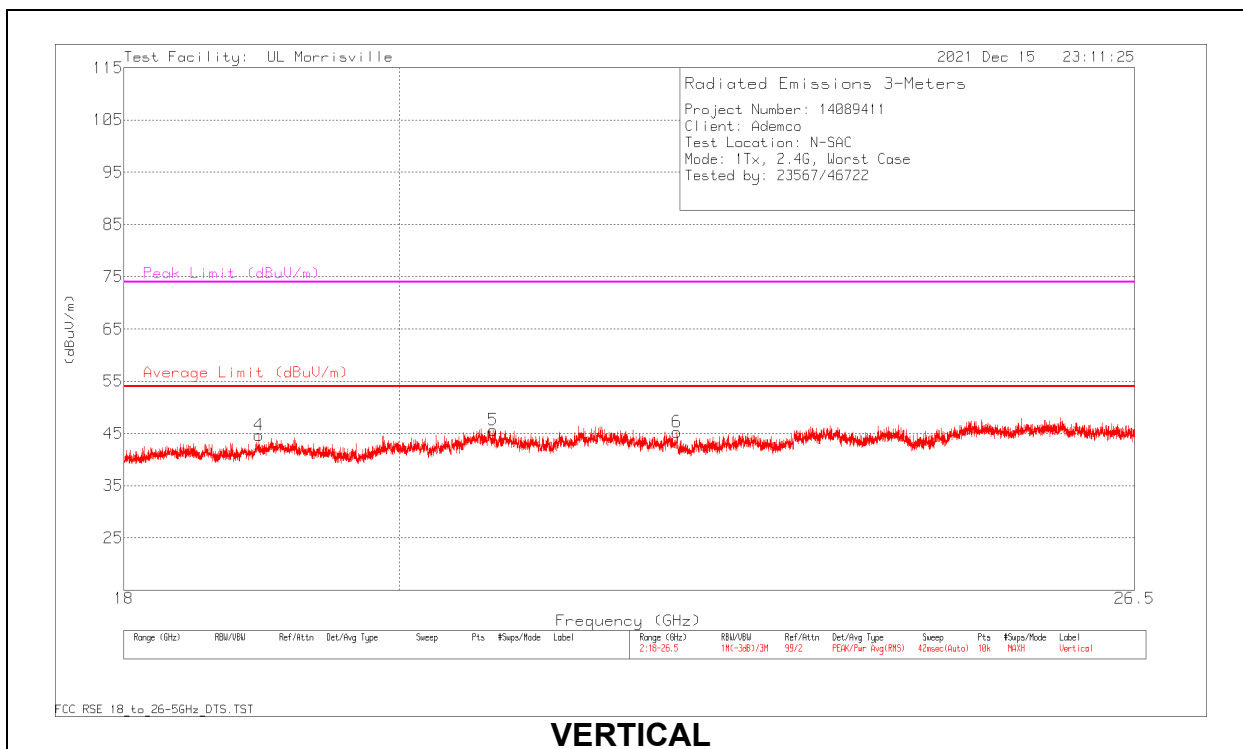
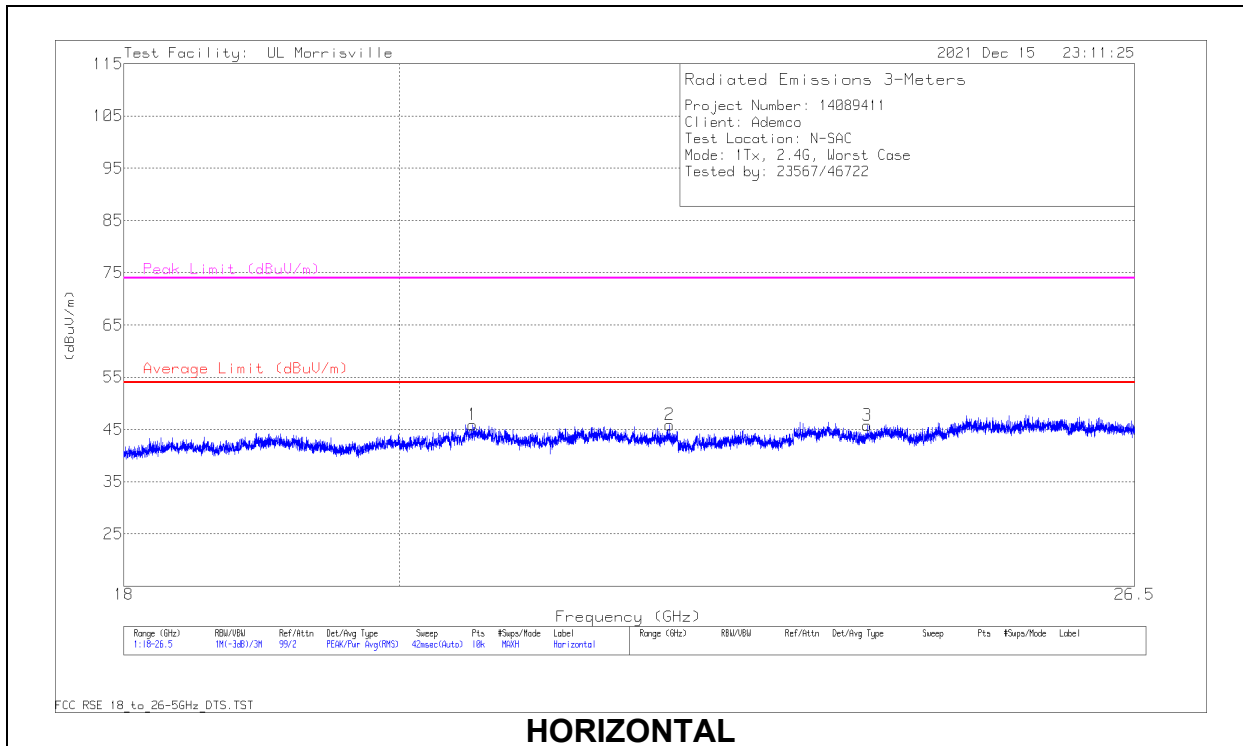


Below 1GHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	206210 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	*** 37.76	26.54	Pk	19.5	-31.1	14.94	40	-25.06	0-360	100	H
2	*** 171.814	34.83	Pk	15.7	-29.3	21.23	43.52	-22.29	0-360	100	H
3	*** 275.604	31.56	Pk	17.4	-28.4	20.56	46.02	-25.46	0-360	100	H
4	*** 37.76	30.85	Pk	19.5	-31.1	19.25	40	-20.75	0-360	100	V
5	*** 74.038	48.08	Pk	12.1	-30.5	29.68	40	-10.32	0-360	100	V
6	*** 171.911	44.86	Pk	15.7	-29.3	31.26	43.52	-12.26	0-360	100	V

Pk - Peak detector

11.4. WORST CASE 18-26 GHZ



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	204704 (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	*** 20.57099	51.53	Pk	33.9	-39.6	45.83	54	-8.17	74	-28.17	0-360	200	H
2	*** 22.18158	50.73	Pk	34.7	-39.5	45.93	54	-8.07	74	-28.07	0-360	101	H
3	*** 23.92306	49.58	Pk	35	-38.8	45.78	54	-8.22	74	-28.22	0-360	101	H
4	*** 18.95445	49.93	Pk	33.6	-38.9	44.63	54	-9.37	74	-29.37	0-360	251	V
5	*** 20.72993	51.41	Pk	33.9	-39.7	45.61	54	-8.39	74	-28.39	0-360	201	V
6	*** 22.24278	49.89	Pk	34.7	-39.3	45.29	54	-8.71	74	-28.71	0-360	150	V

Pk - Peak detector

12. 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.

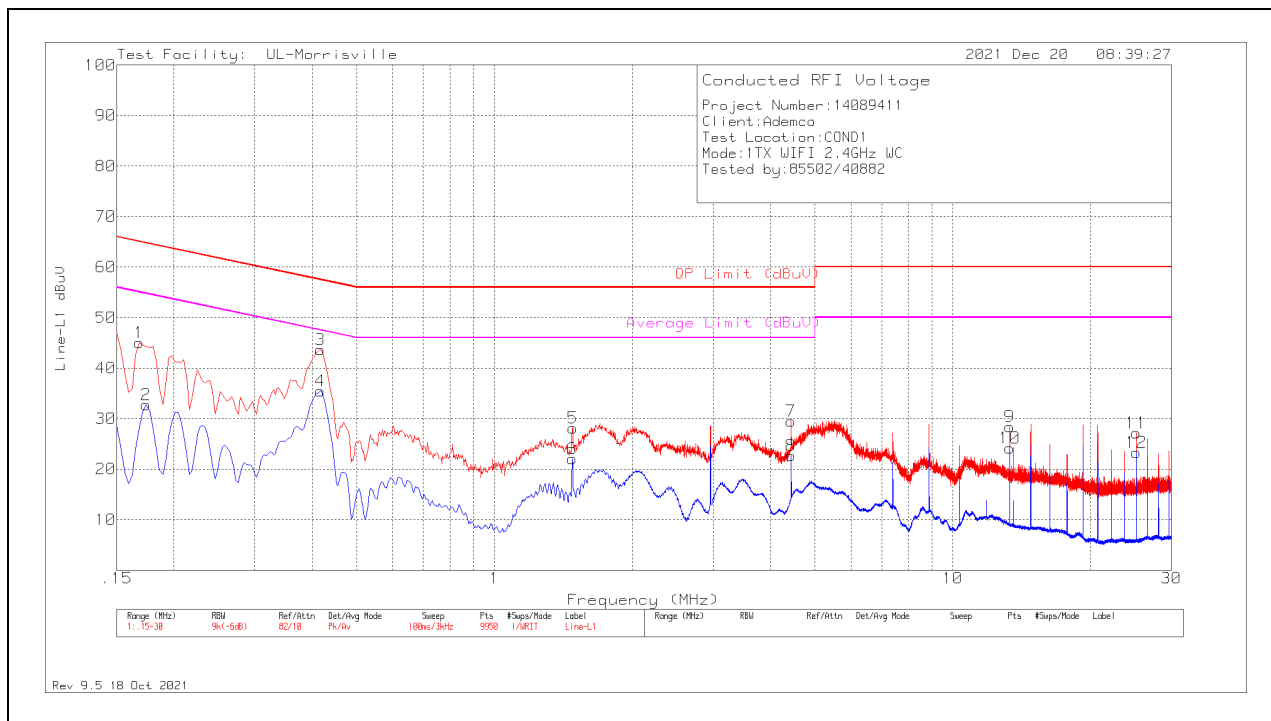
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

12.1.1. AC Power Line Norm

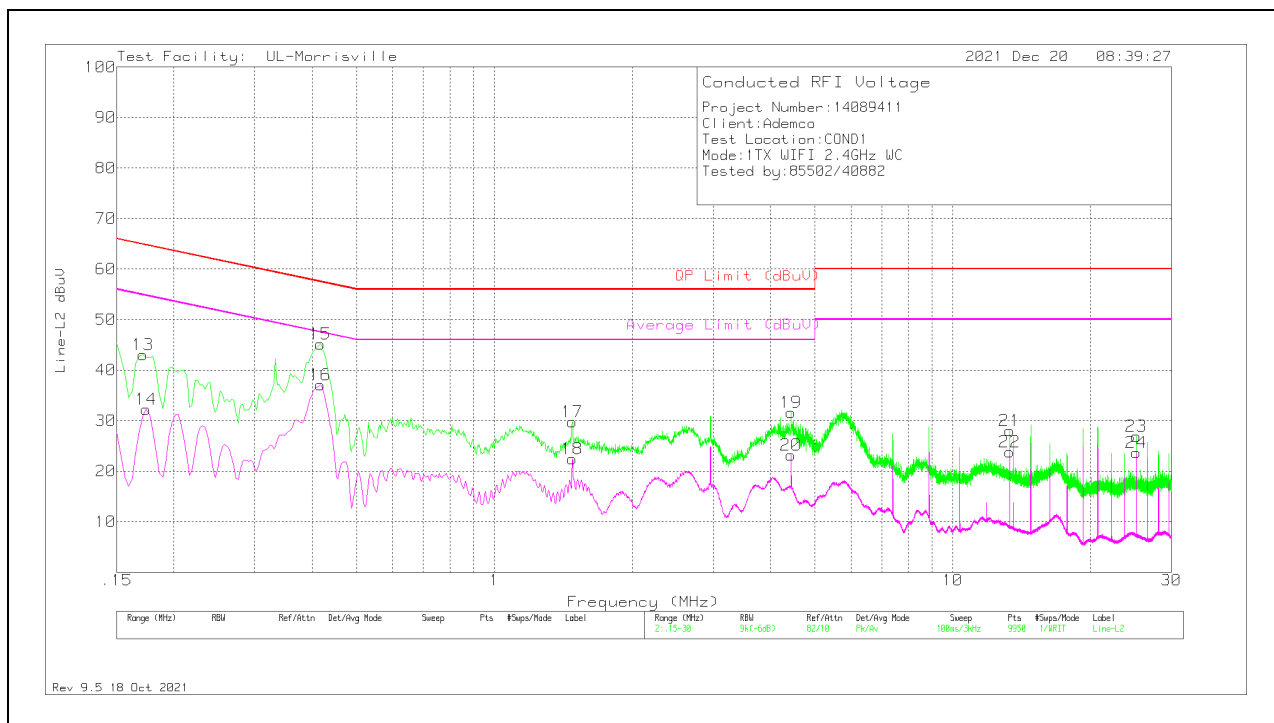
LINE 1 RESULTS



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	.168	35.04	Pk	.2	9.8	45.04	65.06	-20.02	-	-
2	.174	22.71	Av	.2	9.8	32.71	-	-	54.77	-22.06
3	.417	33.73	Pk	.1	9.8	43.63	57.51	-13.88	-	-
4	.417	25.59	Av	.1	9.8	35.49	-	-	47.51	-12.02
6	1.479	12.28	Av	0	9.8	22.08	-	-	46	-23.92
5	1.482	18.35	Pk	0	9.8	28.15	56	-27.85	-	-
7	4.44	19.56	Pk	0	9.9	29.46	56	-26.54	-	-
8	4.44	12.8	Av	0	9.9	22.7	-	-	46	-23.3
9	13.317	18.25	Pk	.1	10.1	28.45	60	-31.55	-	-
10	13.317	13.99	Av	.1	10.1	24.19	-	-	50	-25.81
12	25.155	12.78	Av	.3	10.2	23.28	-	-	50	-26.72
11	25.158	16.67	Pk	.3	10.2	27.17	60	-32.83	-	-

Pk - Peak detector
Av - Average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
13	.171	33.08	Pk	.2	9.8	43.08	64.91	-21.83	-	-
14	.174	22.23	Av	.2	9.8	32.23	-	-	54.77	-22.54
15	.417	35.29	Pk	.1	9.8	45.19	57.51	-12.32	-	-
16	.417	27.17	Av	.1	9.8	37.07	-	-	47.51	-10.44
17	1.479	19.99	Pk	0	9.8	29.79	56	-26.21	-	-
18	1.479	12.63	Av	0	9.8	22.43	-	-	46	-23.57
19	4.44	21.76	Pk	0	9.9	31.66	56	-24.34	-	-
20	4.44	13.25	Av	0	9.9	23.15	-	-	46	-22.85
21	13.32	17.87	Pk	.1	10.1	28.07	60	-31.93	-	-
22	13.32	13.56	Av	.1	10.1	23.76	-	-	50	-26.24
23	25.158	16.43	Pk	.3	10.2	26.93	60	-33.07	-	-
24	25.158	13.14	Av	.3	10.2	23.64	-	-	50	-26.36

Pk - Peak detector
Av - Average detection

13. SETUP PHOTOS

Please refer to R14089411-EP2 for setup photos.

END OF TEST REPORT