



CERTIFICATION TEST REPORT

Report Number. : 12743821-E3V3

Applicant : PI INC.
1111 BAYHILL DR.
SUITE 235
SAN BRUNO, CA 94066, U.S.A.

Model : SOURCE

FCC ID : 2ASP901EH1

EUT Description : WIRELESS CHARGER

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C

Date Of Issue:

May 17, 2019

Prepared by:

UL Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538 U.S.A.
TEL: (510) 319-4000
FAX: (510) 661-0888



NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	5/13/2019	Initial Issue	--
V2	5/16/2019	Revised report to address TCB's questions	Tina Chu
V3	5/17/2019	Revised report to address TCB's question	Tina Chu

1. ATTESTATION OF TEST RESULTS	5
2. TEST METHODOLOGY	7
3. FACILITIES AND ACCREDITATION	7
4. CALIBRATION AND UNCERTAINTY	8
4.1. MEASURING INSTRUMENT CALIBRATION	8
4.2. SAMPLE CALCULATION	8
4.3. MEASUREMENT UNCERTAINTY	8
5. EQUIPMENT UNDER TEST	9
5.1. EUT DESCRIPTION	9
5.2. MAXIMUM OUTPUT POWER	9
5.3. DESCRIPTION OF AVAILABLE ANTENNAS	9
5.4. SOFTWARE AND FIRMWARE	9
5.5. WORST-CASE CONFIGURATION AND MODE	10
5.6. DESCRIPTION OF TEST SETUP	11
6. MEASUREMENT METHOD	15
7. TEST AND MEASUREMENT EQUIPMENT	16
8. ANTENNA PORT TEST RESULTS	17
8.1. ON TIME AND DUTY CYCLE	17
8.2. 6 dB BANDWIDTH	18
8.2.1. 802.11b MODE	18
8.2.2. 802.11g MODE	19
8.2.3. 802.11n HT20 MODE	20
8.3. OUTPUT POWER	21
8.3.1. 802.11b MODE	22
8.3.2. 802.11g MODE	22
8.3.3. 802.11n HT20 MODE	23
8.4. POWER SPECTRAL DENSITY	24
8.4.1. 802.11b MODE	25
8.4.2. 802.11g MODE	26
8.4.3. 802.11n HT20 MODE	27
8.5. CONDUCTED SPURIOUS EMISSIONS	28
8.5.1. 802.11b MODE	29
8.5.2. 802.11g MODE	30
8.5.3. 802.11n HT20 MODE	31
9. RADIATED TEST RESULTS	32
9.1. TRANSMITTER ABOVE 1 GHz	34
9.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND	34

9.1.2.	TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND	44
9.1.3.	TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND.....	54
9.2.	WORST CASE BELOW 30MHz.....	64
9.3.	WORST CASE BELOW 1 GHz.....	65
9.4.	WORST CASE 18-26 GHz.....	67
10.	AC POWER LINE CONDUCTED EMISSIONS	69
11.	SETUP PHOTOS.....	72

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PI INC
1111 BAYHILL DR.
SUITE 235
SAN BRUNO, CA 94066, U.S.A.

EUT DESCRIPTION: WIRELESS CHARGER

MODEL: SOURCE

SERIAL NUMBER: EH119030000049

DATE TESTED: APRIL 25, 2019 – MAY 01, 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Complies

UL Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released For
UL Verification Services Inc. By:



THU CHAN
PROJECT LEAD
UL Verification Services Inc.

Prepared By:



ERIC YU
TEST ENGINEER
UL Verification Services Inc.

Reviewed By:



TINA CHU
SENIOR PROJECT ENGINEER
UL Verification Services Inc.
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
☐ Chamber A (ISED:2324B-1)	☐ Chamber D (ISED:22541-1)	☐ Chamber I (ISED: 2324A-5)
☐ Chamber B (ISED:2324B-2)	☐ Chamber E (ISED:22541-2)	☐ Chamber J (ISED: 2324A-6)
☐ Chamber C (ISED:2324B-3)	☐ Chamber F (ISED:22541-3)	☒ Chamber K (ISED: 2324A-1)
	☐ Chamber G (ISED:22541-4)	☐ Chamber L (ISED: 2324A-3)
	☐ Chamber H (ISED:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1.MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2.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.
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

4.3.MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

5. EQUIPMENT UNDER TEST

5.1.EUT DESCRIPTION

The EUT is a Qi compatible wireless charger for cellphone. Up to 4 devices can be charged through wireless charging + 2 High Power USB charging ports. Total 8 coils (4 pairs of Tx/Rx). Operating Frequency range = 113kHz-230kHz.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
1Tx			
2412 - 2462	802.11b	-15.27	0.03
	802.11g	-15.14	0.03
	802.11n HT20	-13.45	0.05

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an PCB trace antenna, with a maximum gain of 1.5 dBi.

5.4.SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was PVT_v2.0.2.

The test utility software used during testing was ESPRFTesttool.

5.5. WORST-CASE CONFIGURATION AND MODE

Band edge were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

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

The EUT can only be setup in desktop orientation; therefore, all radiated testing was performed with the EUT in desktop orientation.

For above 1GHz radiated emissions, worst case radiated configuration was investigated with/without phones charged by WPT; with/without phones charged by EUT via USB cable. The worst case configuration was EUT standalone.

For below 1GHz radiated emissions, worst configuration was EUT with 4 phones charged by WPT and 2 phones charged by EUT via USB cable.

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

802.11b mode: 11 Mbps

802.11g mode: 54 Mbps

802.11n HT20mode: MCS0

Wifi 2.4G and WPT can transmit simultaneously, investigation was performed but no noticeable new emission was found.

5.6. DESCRIPTION OF TEST SETUP

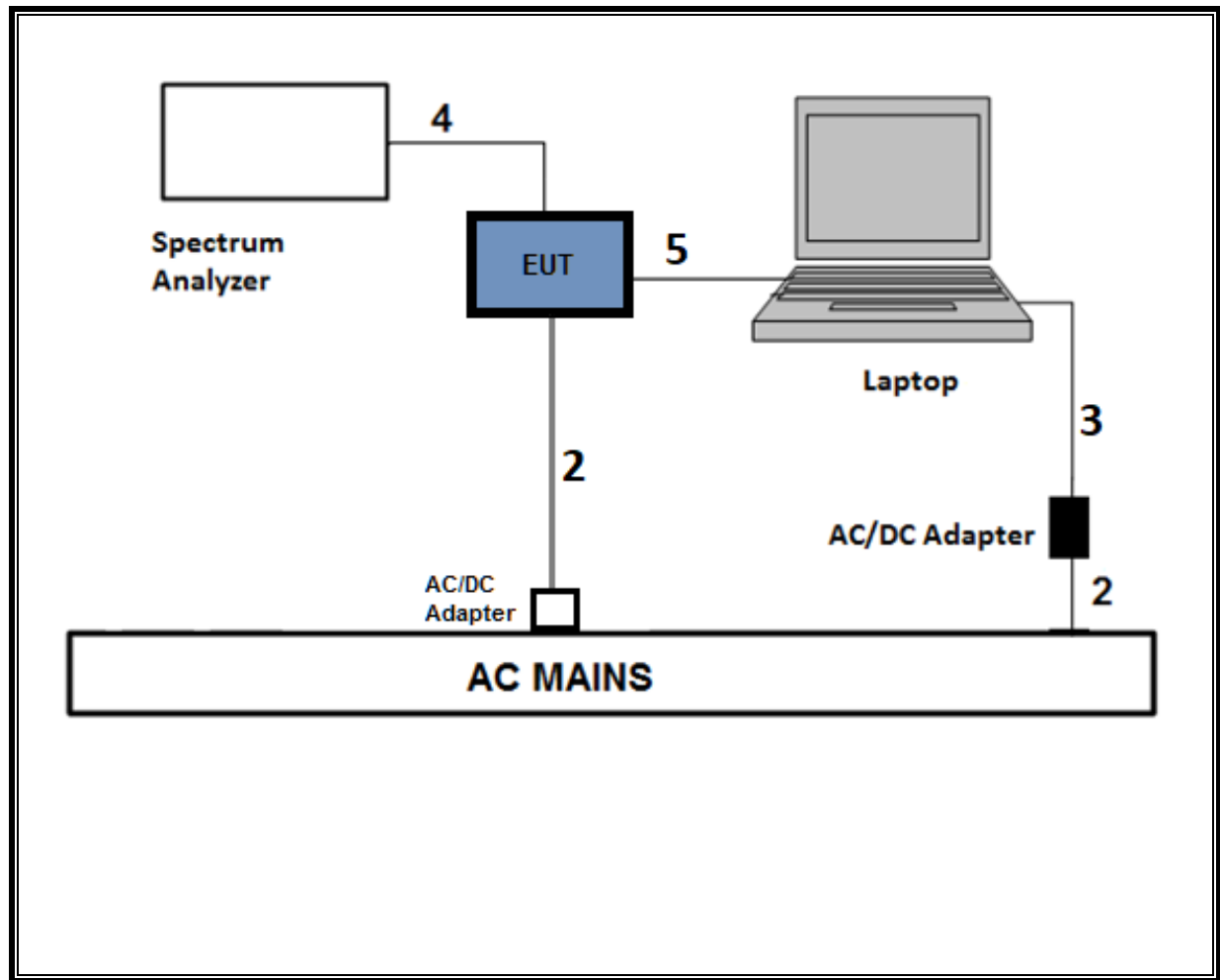
SUPPORT EQUIPMENT

SUPPORT EQUIPMENT & PERIPHERALS LIST				
Description	Manufacturer	Model	Serial Number	FCC ID/SDoC
Laptop	Lenovo	Thinkpad	20KHCTO1WW	SDoC
Laptop AC/DC adapter	Lenovo	Powerport PD60	A2015	SDoC
WPT Phone	Apple	iPhone XS	DNQX9C2BKFPF	BCG-E3218A
WPT Phone	Apple	iPhone X	DNPVQ0RQJCLG	BCG-E3175A
WPT Phone	Apple	iPhone XR	DNPXNBLMKXKR	BCG-E3220A
WPT Phone	Apple	iPhone XS Max	F2LXFGP7KPHF	BCG-E3219A
USB Phone	Samsung	Samsung Galaxy S7	R38H30GL1QR	A3LSMG930US
USB Phone	Samsung	Samsung Galaxy S6	R28G52V694T	A3LSMG920V
EUT AC/DC Adapter	Delta Electronics	ADP-65DW Y2C	6IEW8CS006T	SDoC
USB-A to USB Micro B Cables	Startech	UUSBHAUB6IN	N/A	SDoC

I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	2	USB-A to USB micro-B	Shielded	1	EUT's USB ports to Phones' USB Micro B ports
2	AC	1	2-prong	Un-shielded	1.2	
3	DC	1	DC	Shielded	1	
4	Antenna	1	SMA	Un-shielded	0.2	To analyzer
5	USB	1	Type C	Un-shielded	1	Laptop to EUT

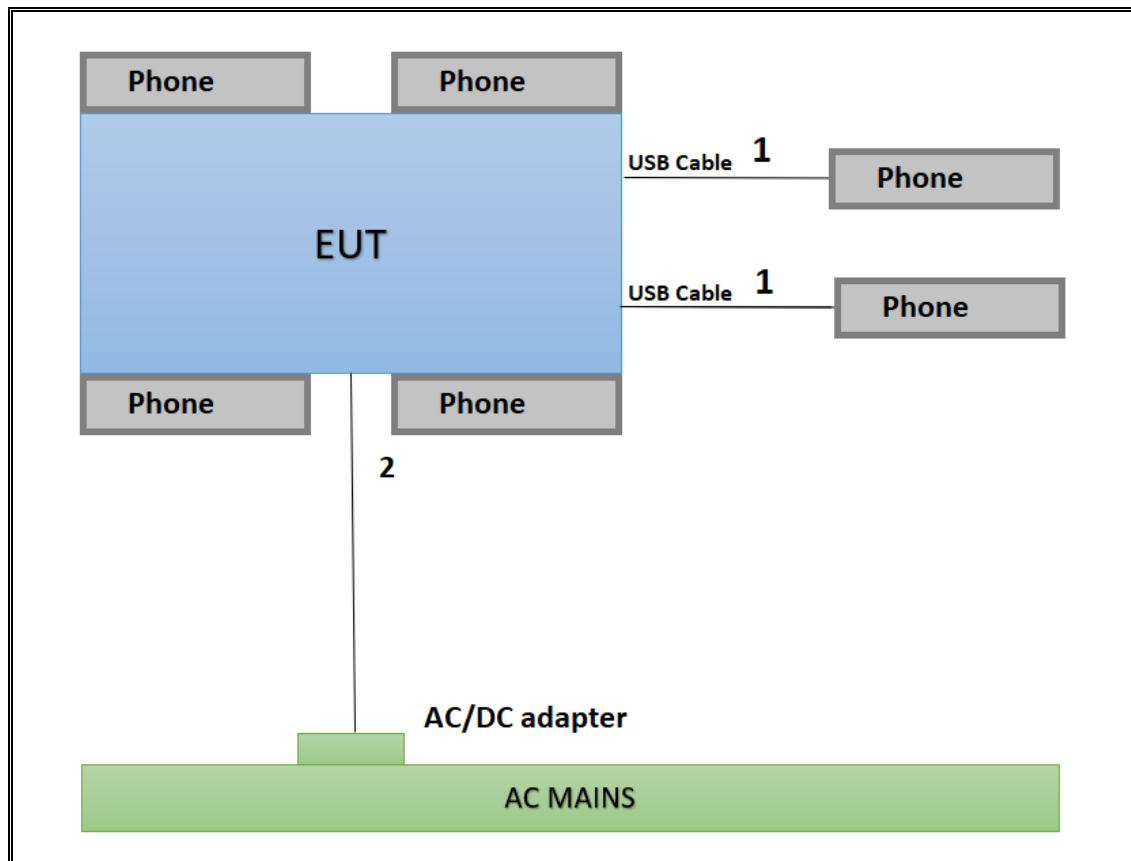
CONDCUTED TEST SETUP DIAGRAM



TEST SETUP

For conducted tests: the EUT was connected to a laptop. The test software exercises the radio.

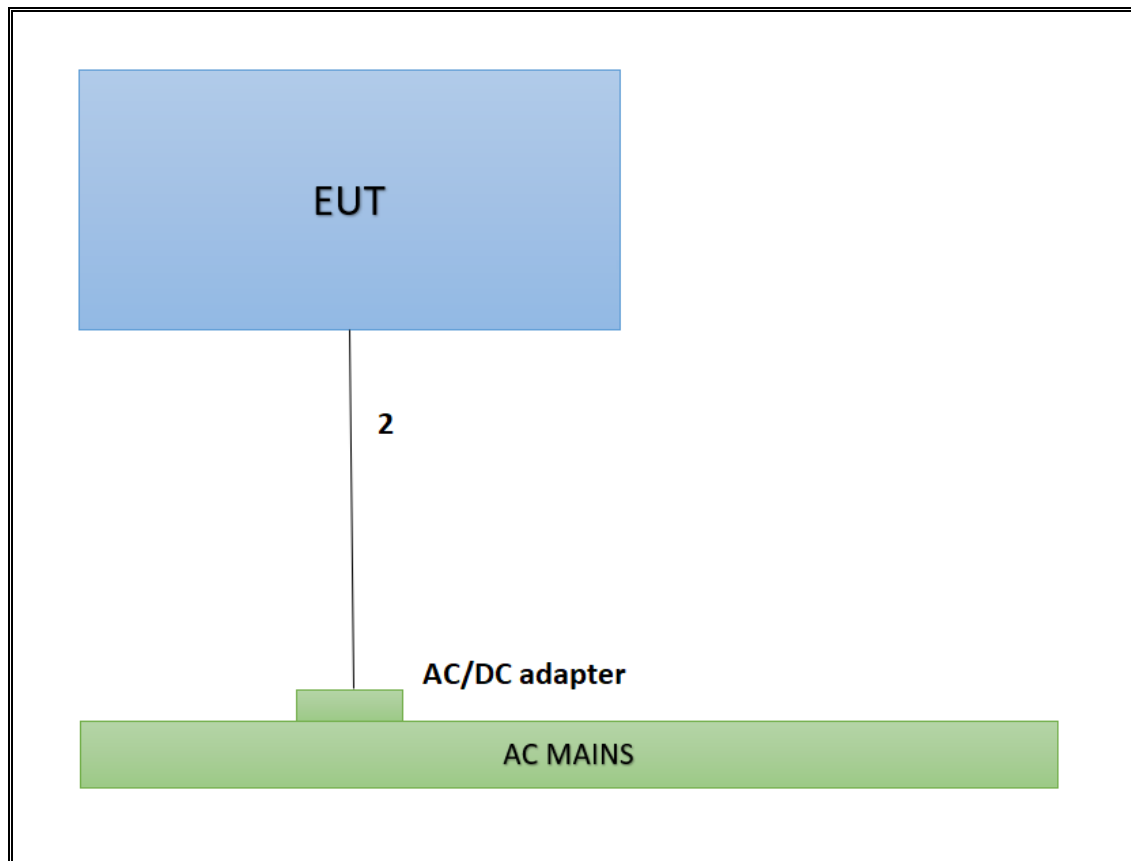
RADIATED FOR BELOW 1GHz AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM



TEST SETUP

EUT is powered by AC/AC adapter, it is charging 4 phones via WPT and 2 phones via USB cables. The test software exercises the radio.

RADIATED FOR ABOVE 1GHz EMISSIONS SETUP DIAGRAM



TEST SETUP

The EUT is a stand alone unit and it is powered AC/DC adapter. Test software exercised the radio card.

6. MEASUREMENT METHOD

6 dB BW: ANSI C63.10 Subclause -11.8.1

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

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Average 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)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Subclause -11.11

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

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Subclause -11.13.3.4 Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction

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

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	ID Num	Cal Due	Last Cal
Power Meter, P-series single channel	Agilent (Keysight) Technologies	N1911A	T1265	01/29/2020	01/29/2019
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Agilent (Keysight) Technologies	N1921A	T1227	02/05/2020	02/05/2019
Antenna, Passive Loop 30Hz to 1MHz	ELETRO METRICS	EM-6871	PRE0179465	05/22/2019	05/22/2018
Antenna, Passive Loop 100kHz to 30MHz	ELETRO METRICS	EM-6872	PRE0179467	05/22/2019	05/22/2018
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	04/30/2019	04/30/2018
Amplifier, 1 to 18GHz, 35dB	AMOLICAL	AMP1G18-35	T1569	06/03/2019	06/03/2018
Hybrid Antenna, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0184052	10/24/2019	10/24/2018
Amplifier, 100kHz to 1GHz, 32 dB	Agilent (Keysight) Technologies	8447D	PRE0186650	12/13/2019	12/13/2018
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	PRE0182188	08/29/2019	08/29/2018
Rf Amplifier, 18-26.5GHz, 60dB gain	Ampical	AMP18G26.5-60	PRE0181238	05/01/2020	05/01/2019
EMI Test Receiver	Rohde & Schwarz	ESW44	PRE0179367	02/14/2020	02/14/2019
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent (Keysight) Technologies	N9030A	T908	01/23/2020	01/23/2019
AC Line Conducted					
EMI Receiver	Rohde & Schwarz	ESR	T1436	02/14/2020	02/14/2019
LISN for Conducted Emissions CISPR-16	FCC INC.	FCC LISN 50/250	T1310	01/24/2020	01/24/2019
Test Software List					
Radiated Software	UL	UL EMC	Ver 9.5, June 22, 2018		
Antenna Port Software	UL	UL RF	Ver 9.6, April 18, 2019		
AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015		

8. ANTENNA PORT TEST RESULTS

8.1.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

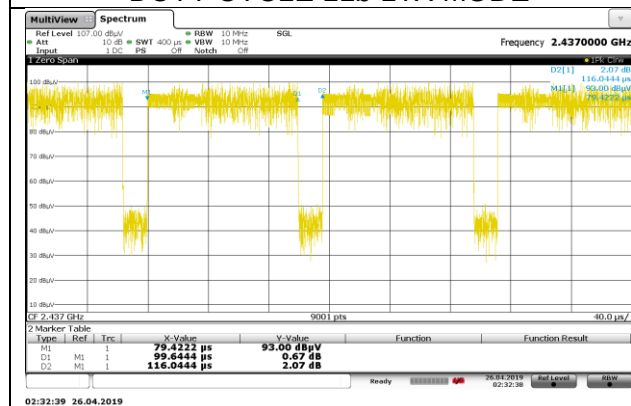
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.11b 1TX	0.555	0.620	0.896	89.57%	0.48	1.801
802.11g 1TX	0.095	0.112	0.848	84.85%	0.71	10.482
802.11n HT20 1TX	0.100	0.116	0.859	85.87%	0.66	10.036



DUTY CYCLE 11b 1TX MODE



DUTY CYCLE 11g CDD MODE



DUTY CYCLE 802.11n HT20 SDM MODE

8.2.6 dB BANDWIDTH

LIMITS

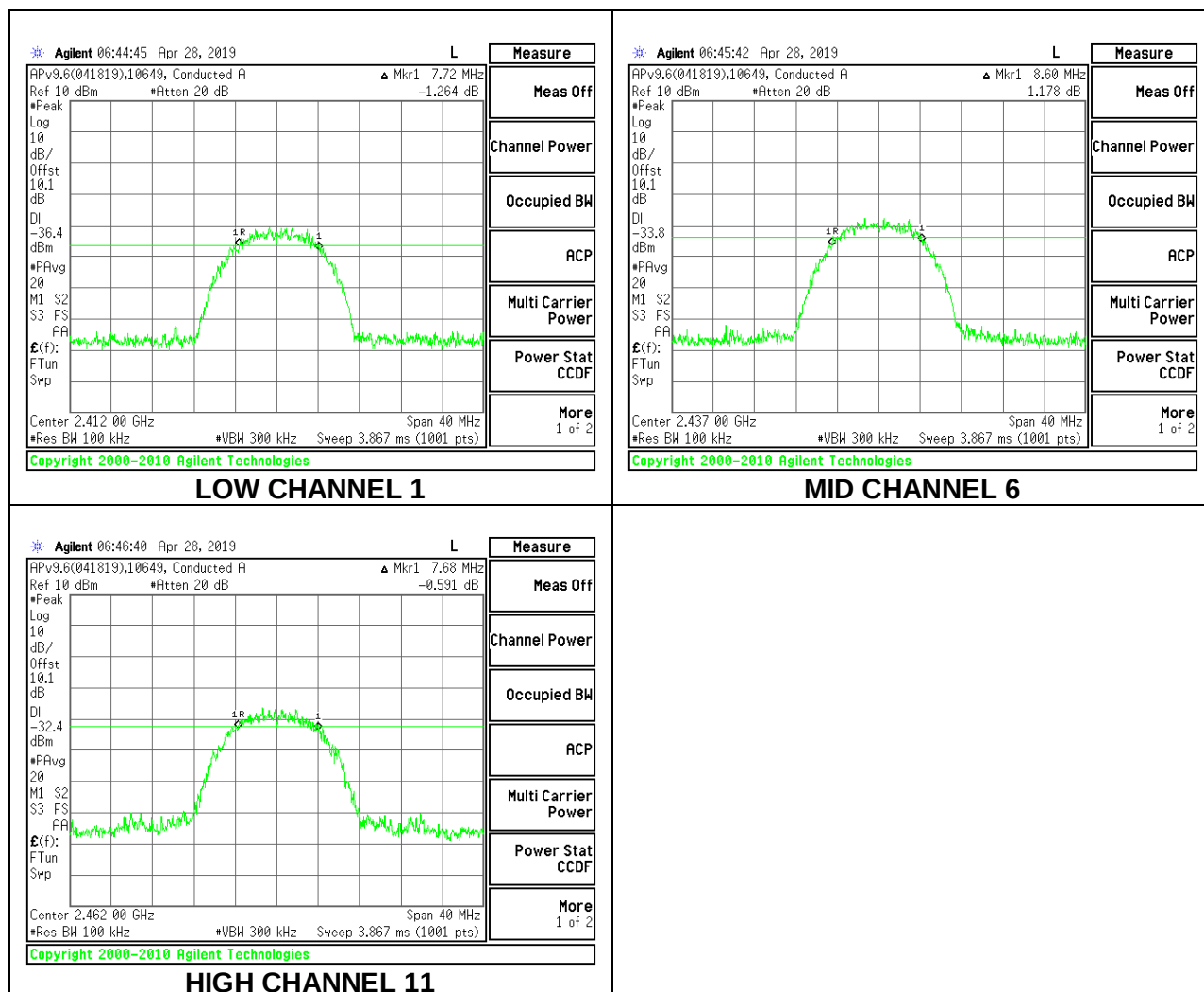
FCC §15.247 (a) (2)

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

RESULTS

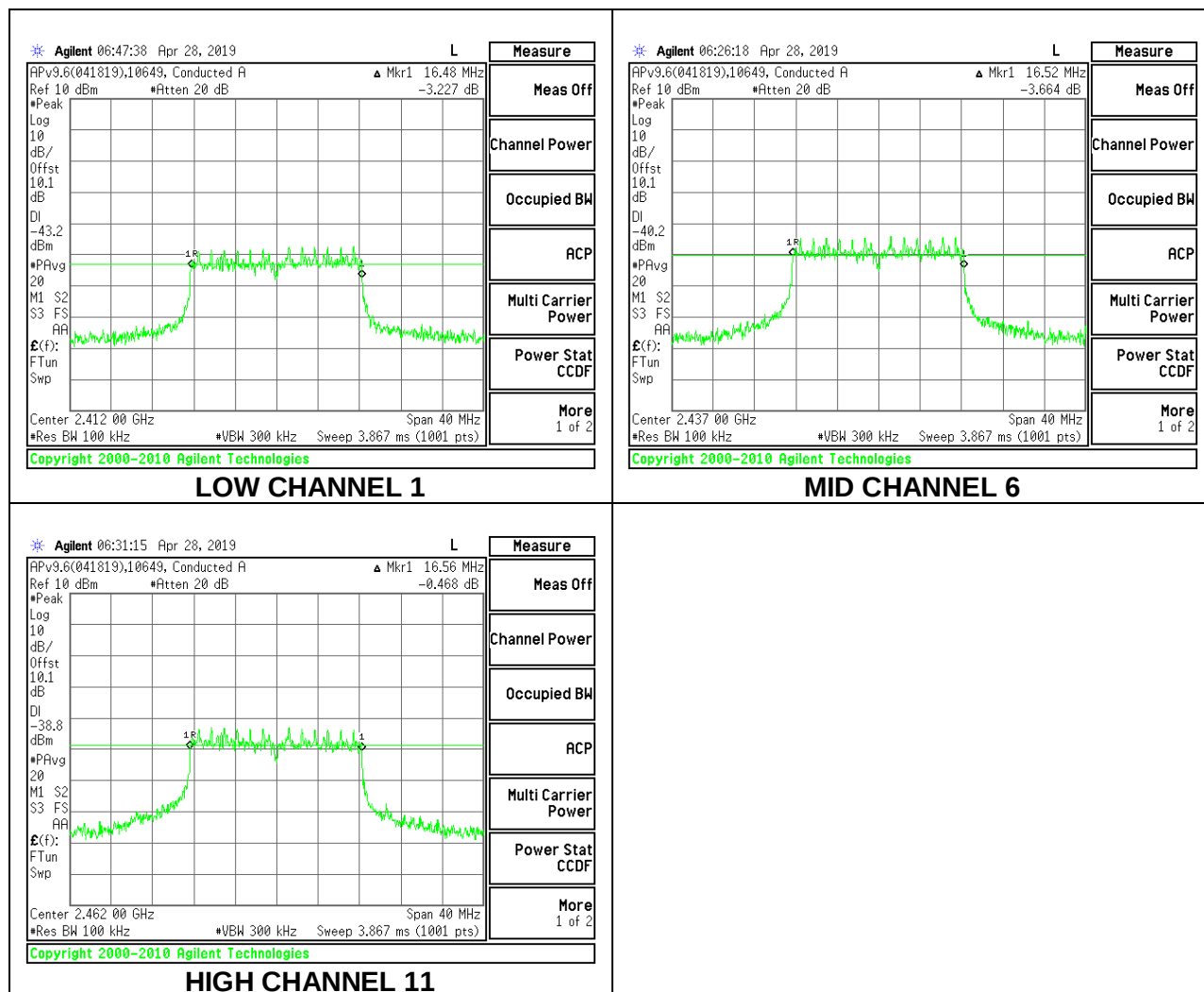
8.2.1. 802.11b MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low 1	2412	7.720	0.5
Mid 6	2437	8.600	0.5
High 11	2462	7.680	0.5



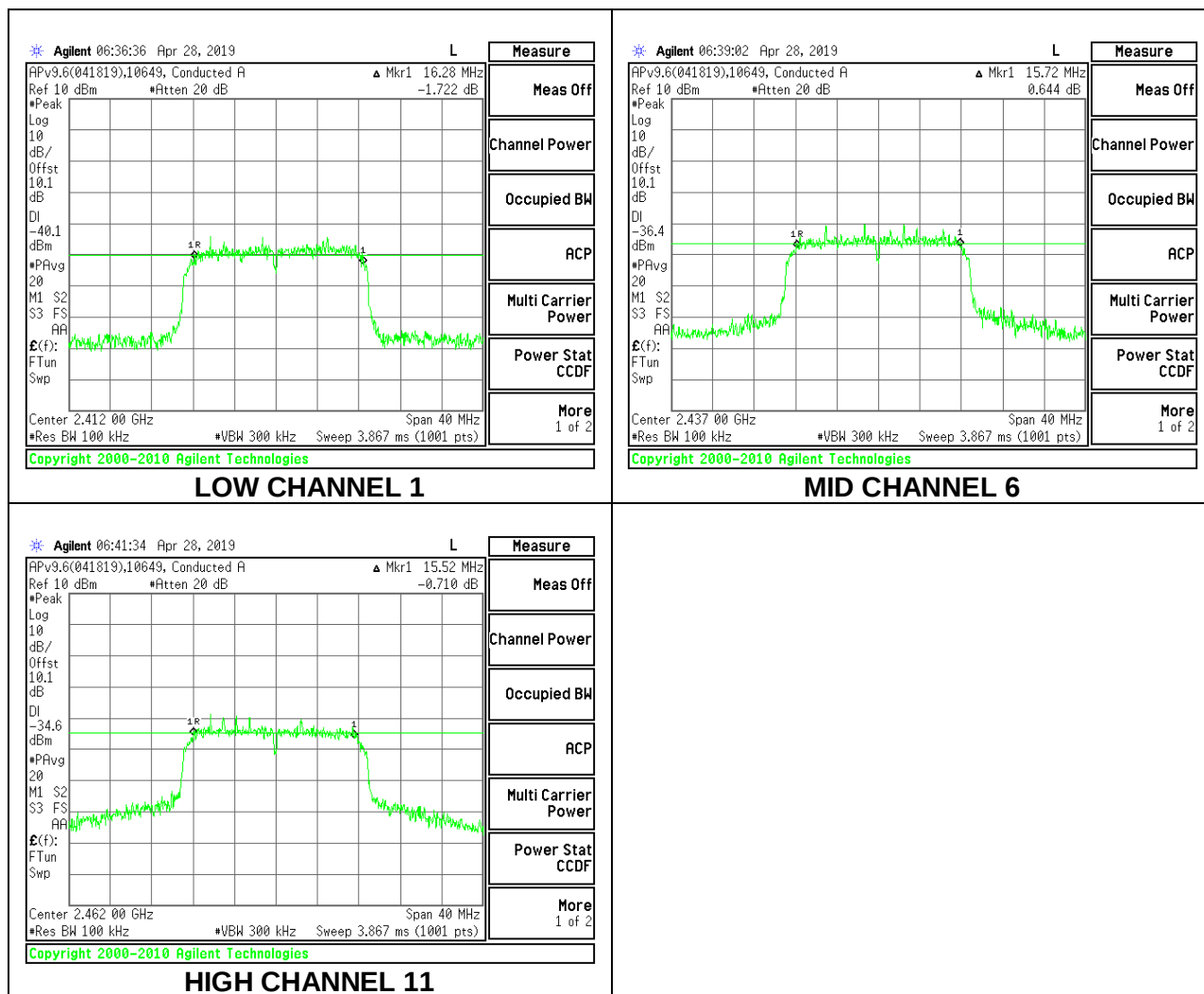
8.2.2. 802.11g MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	16.480	0.5
Mid 6	2437	16.520	0.5
High 11	2462	16.560	0.5



8.2.3. 802.11n HT20 MODE

Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low 1	2412	16.280	0.5
Mid 6	2437	15.720	0.5
High 11	2462	15.520	0.5



8.3.OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

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 10.1 dB (including 10 dB pad and 0.1 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

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

Tested By:	10649 JR
Date:	05/01/2019

RESULTS

8.3.1. 802.11b MODE

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	1.50	30.00	30	36	30.00
Mid 6	2437	1.50	30.00	30	36	30.00
High 11	2462	1.50	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	-15.79	-15.79	30.00	-45.79
Mid 6	2437	-15.39	-15.39	30.00	-45.39
High 11	2462	-15.27	-15.27	30.00	-45.27

8.3.2. 802.11g MODE

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	1.50	30.00	30	36	30.00
Mid 6	2437	1.50	30.00	30	36	30.00
High 11	2462	1.50	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	-15.66	-15.66	30.00	-45.66
Mid 6	2437	-15.36	-15.36	30.00	-45.36
High 11	2462	-15.14	-15.14	30.00	-45.14

8.3.3. 802.11n HT20 MODE

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	1.50	30.00	30	36	30.00
Mid 6	2437	1.50	30.00	30	36	30.00
High 11	2462	1.50	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	-14.54	-14.54	30.00	-44.54
Mid 6	2437	-14.88	-14.88	30.00	-44.88
High 11	2462	-13.45	-13.45	30.00	-43.45

8.4.POWER SPECTRAL DENSITY

LIMITS

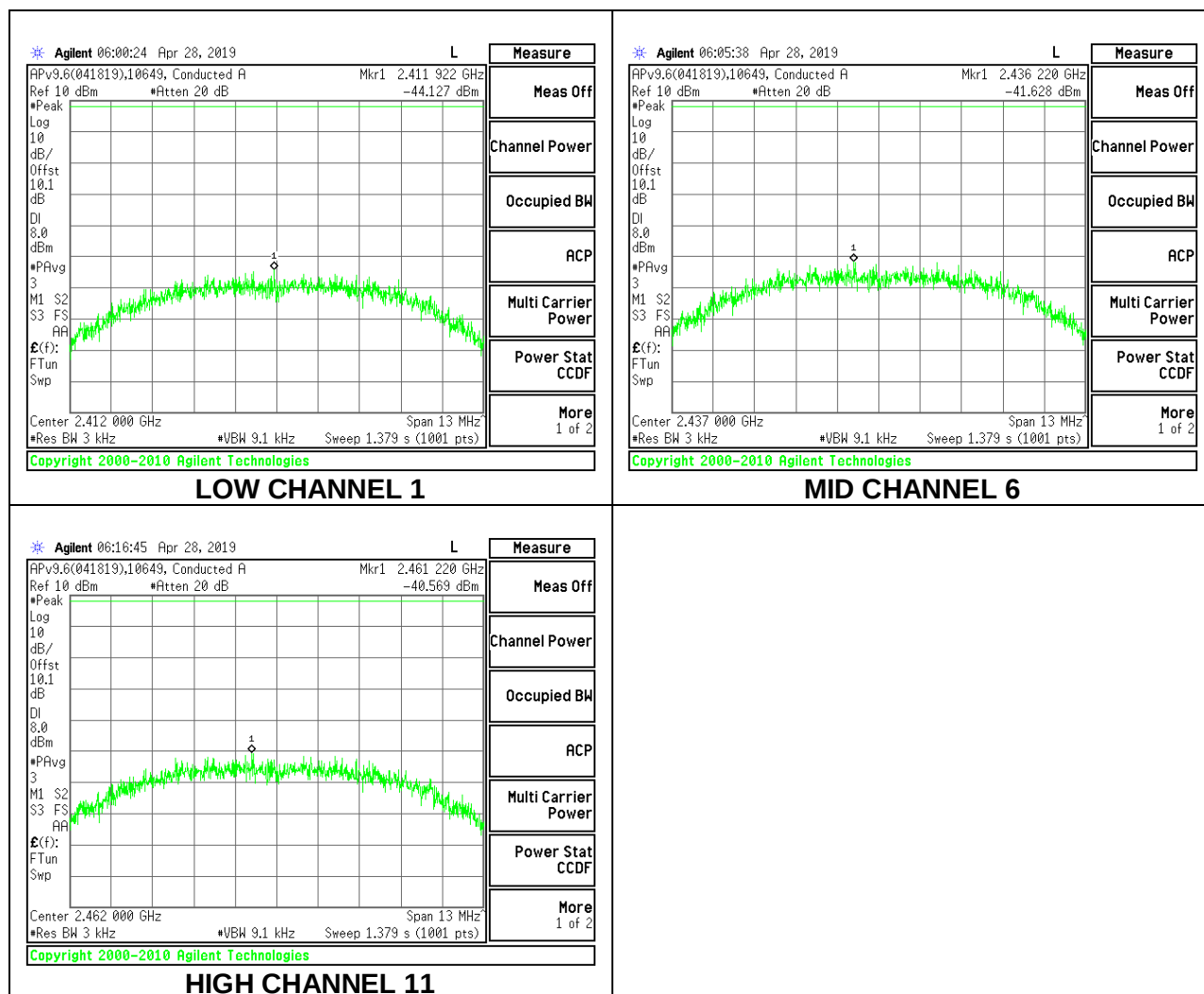
FCC §15.247 (e)

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

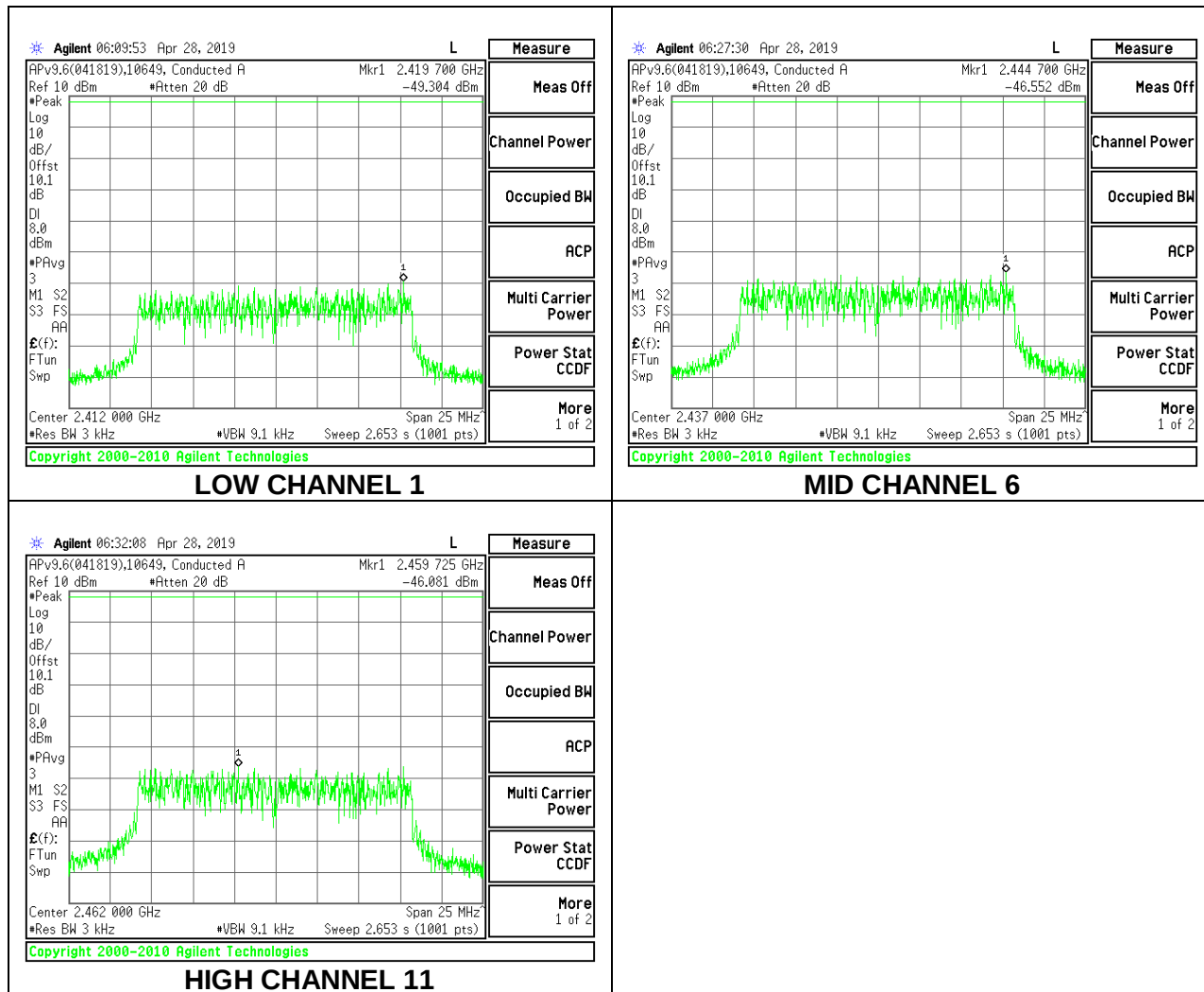
8.4.1. 802.11b MODE

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-44.13	-44.13	8.0	-52.1
Mid 6	2437	-41.63	-41.63	8.0	-49.6
High 11	2462	-40.57	-40.57	8.0	-48.6



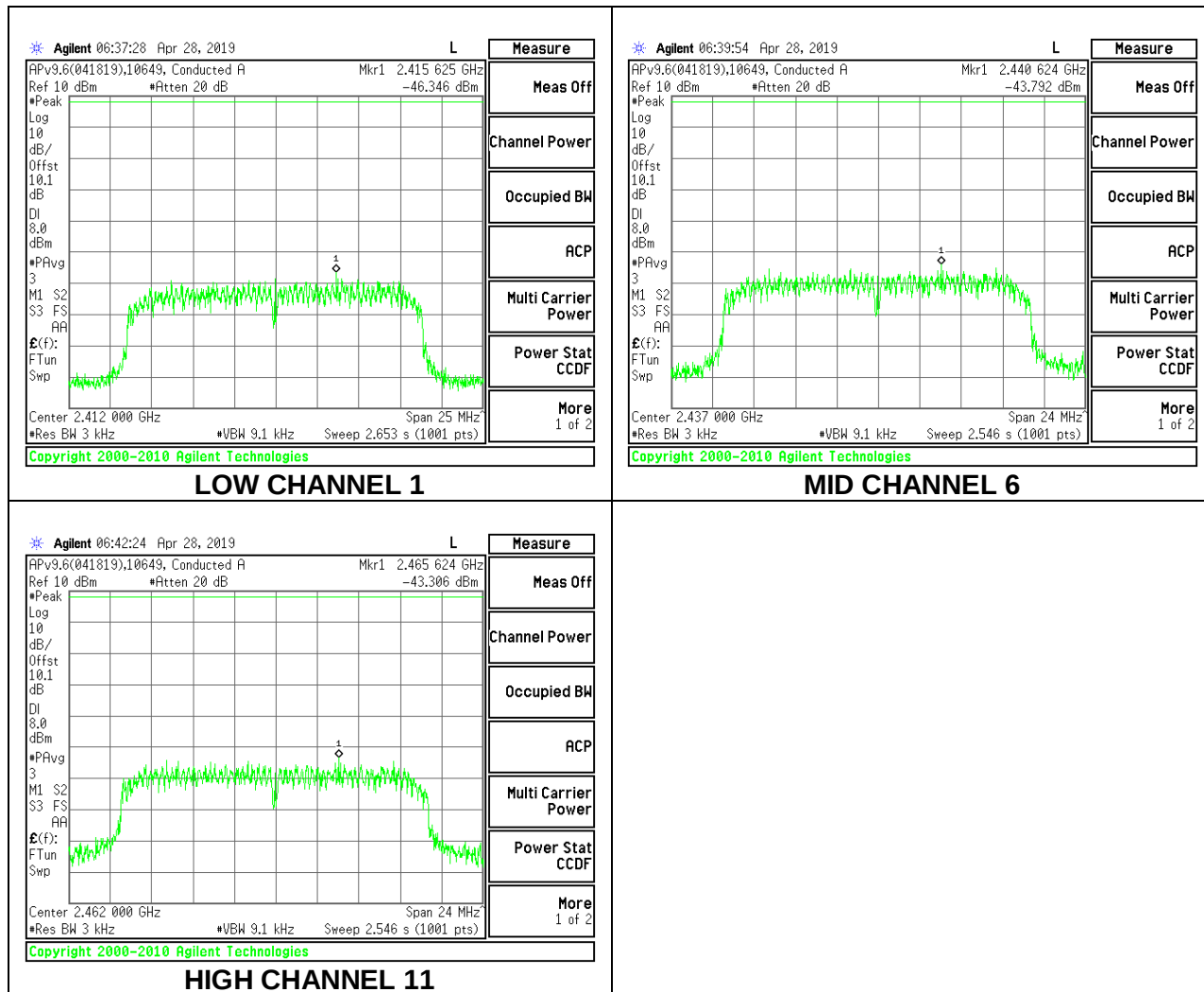
8.4.2. 802.11g MODE

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-49.30	-49.30	8.0	-57.3
Mid 6	2437	-46.55	-46.55	8.0	-54.6
High 11	2462	-46.08	-46.08	8.0	-54.1



8.4.3. 802.11n HT20 MODE

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-46.35	-46.35	8.0	-54.4
Mid 6	2437	-43.79	-43.79	8.0	-51.8
High 11	2462	-43.31	-43.31	8.0	-51.3



8.5.CONDUCTED SPURIOUS EMISSIONS

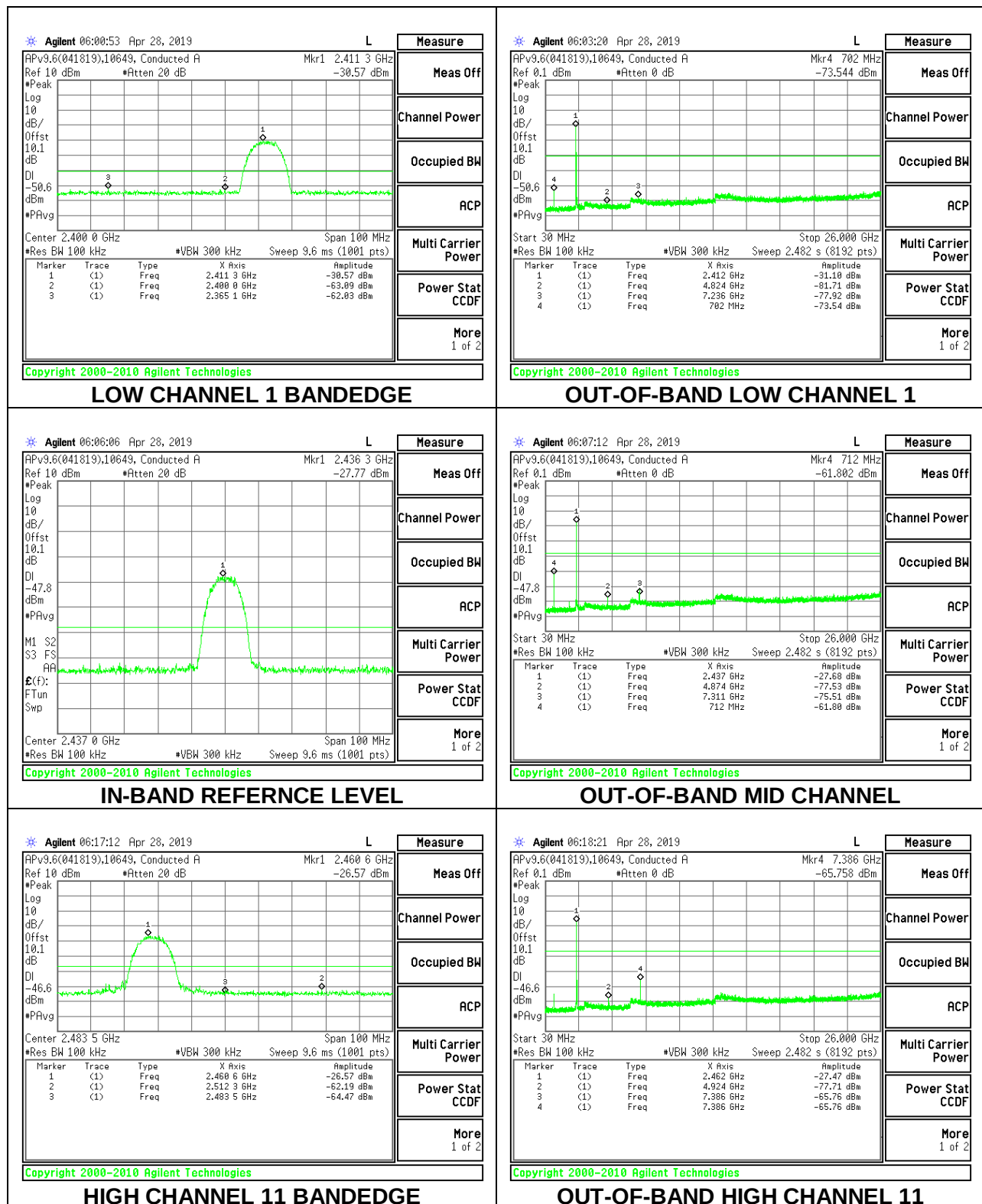
LIMITS

FCC §15.247 (d)

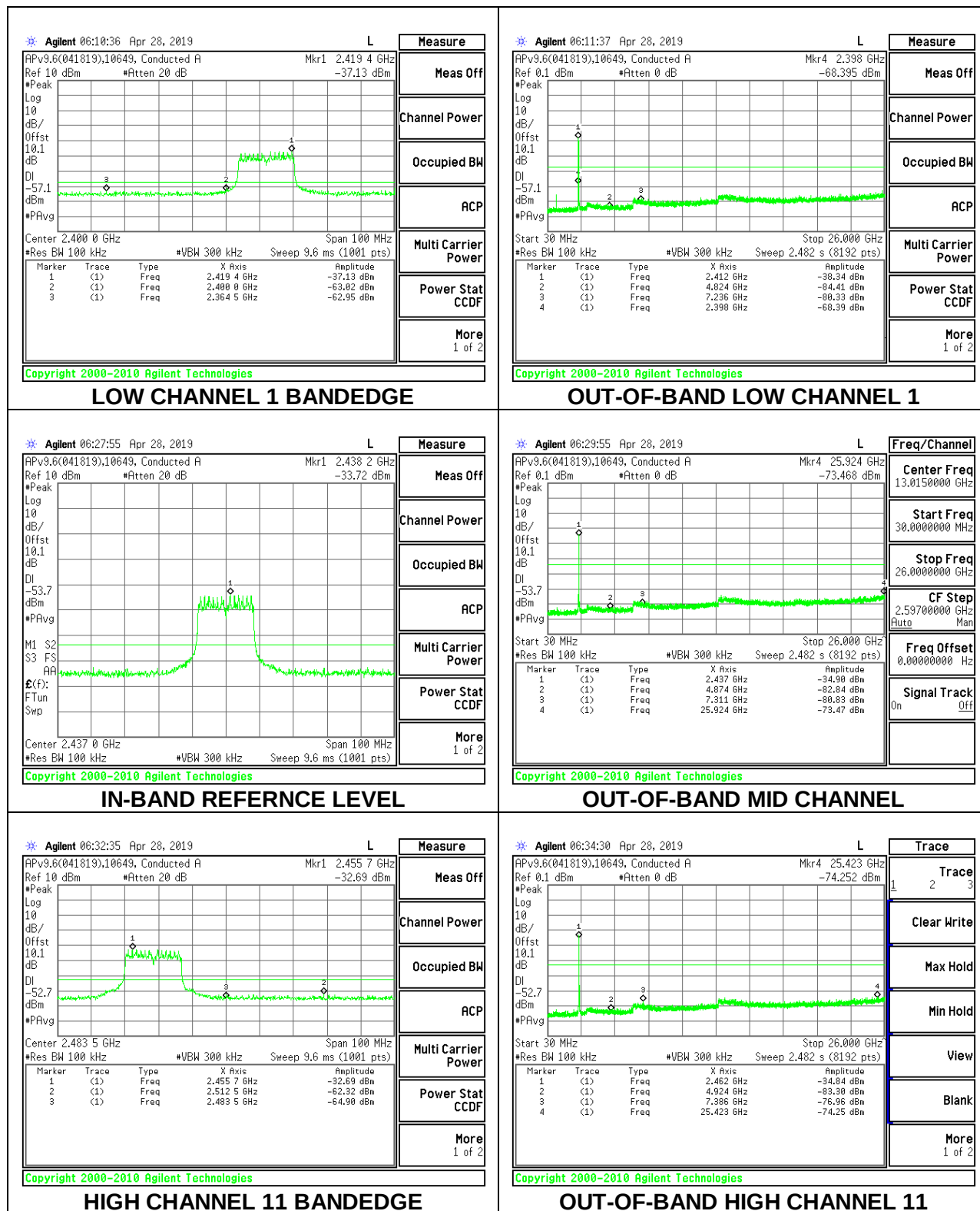
Output power was measured based on the use of peak measurement, therefore the required attenuation is 20 dB.

RESULTS

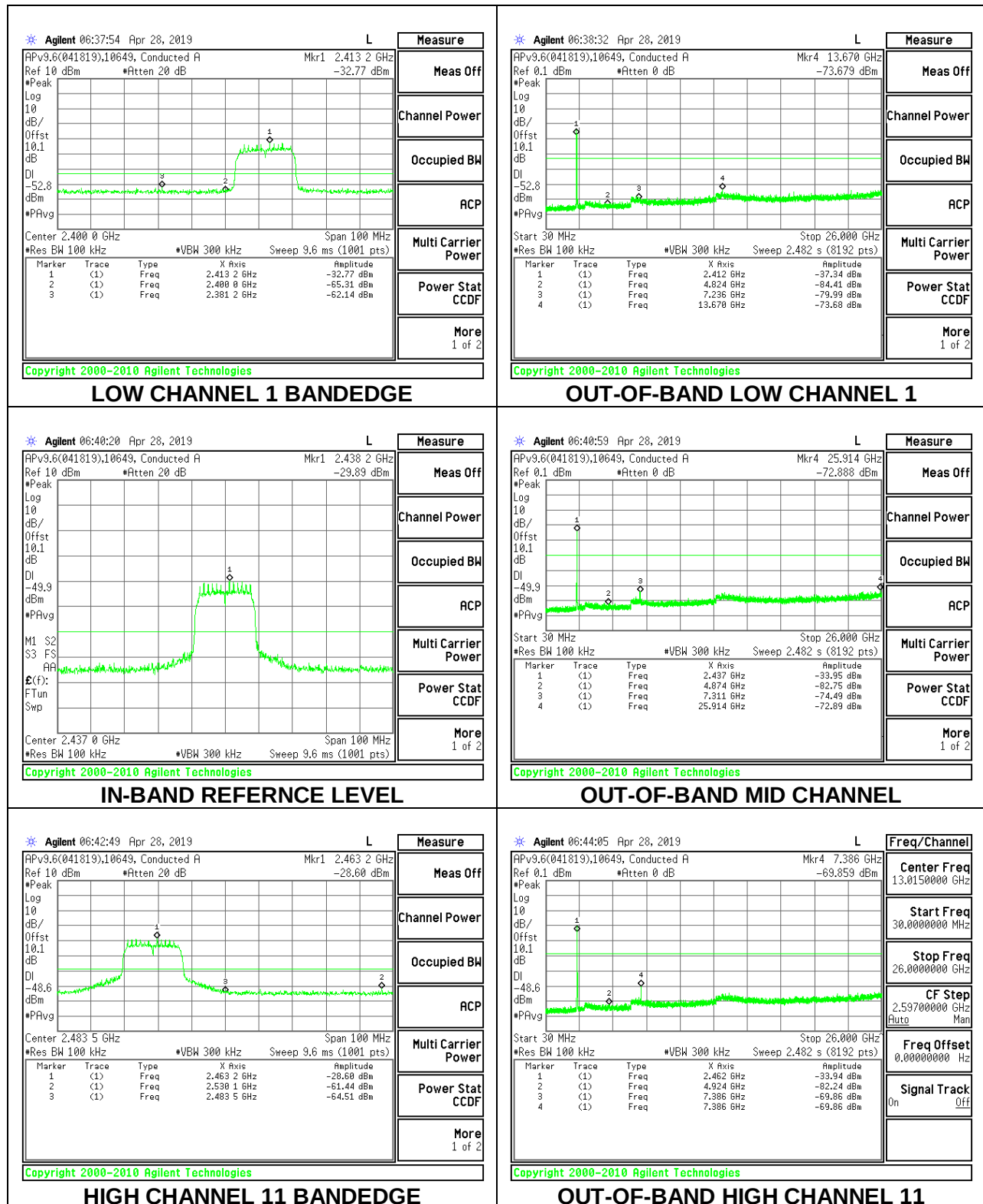
8.5.1. 802.11b MODE



8.5.2. 802.11g MODE



8.5.3. 802.11n HT20 MODE



9. 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

TEST PROCEDURE

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

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

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

Band edge were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

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

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.

For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

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

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.

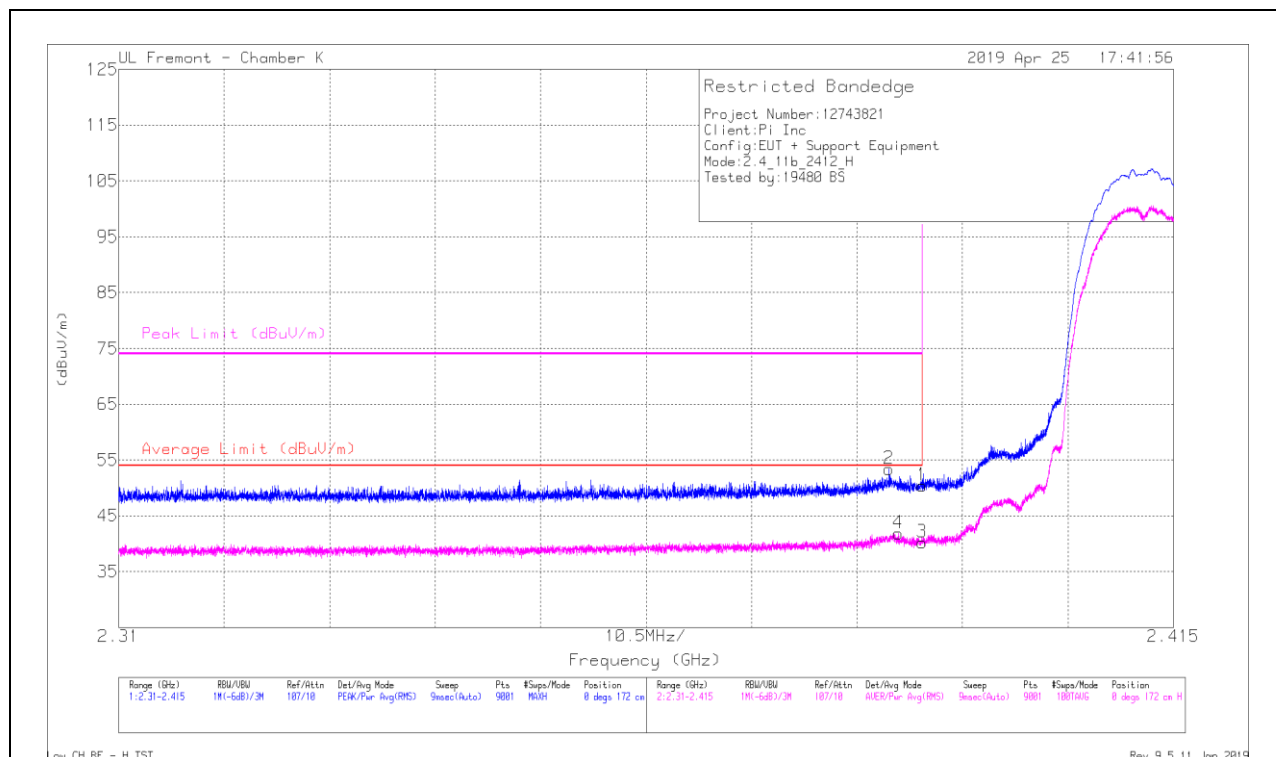
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

9.1. TRANSMITTER ABOVE 1 GHz

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

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



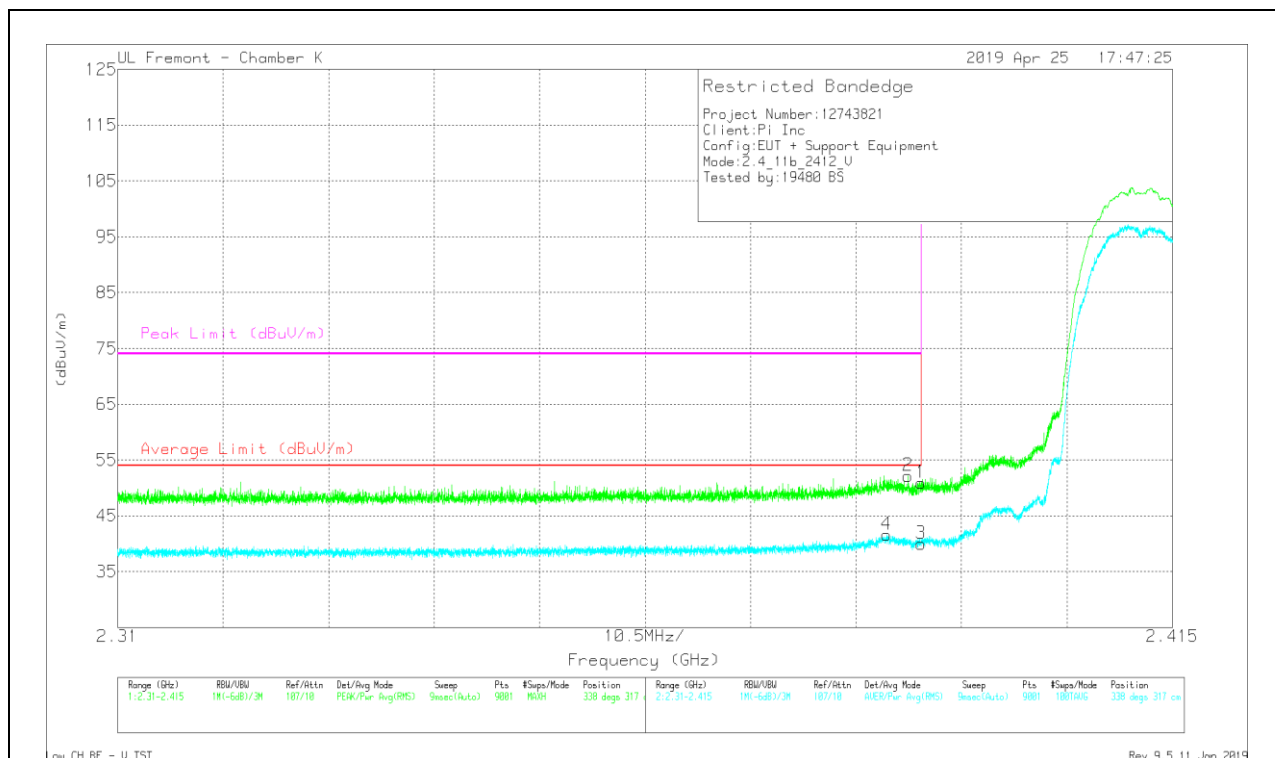
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/CbI/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.25	Pk	31.9	-24.7	0	50.46	-	-	74	-23.54	0	172	H
2	* 2.387	48.07	Pk	31.9	-24.6	0	53.37	-	-	74	-20.63	0	172	H
3	* 2.39	32.58	RMS	31.9	-24.7	-48	40.26	54	-13.74	-	-	0	172	H
4	* 2.388	34.05	RMS	31.9	-24.6	-48	41.83	54	-12.17	-	-	0	172	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbll/Ftr/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	43.67	Pk	31.9	-24.7	0	50.87	-	-	74	-23.13	338	317	V
2	* 2.389	44.98	Pk	31.9	-24.7	0	52.18	-	-	74	-21.82	338	317	V
3	* 2.39	32.3	RMS	31.9	-24.7	.48	39.98	54	-14.02	-	-	338	317	V
4	* 2.387	33.84	RMS	31.9	-24.6	.48	41.62	54	-12.38	-	-	338	317	V

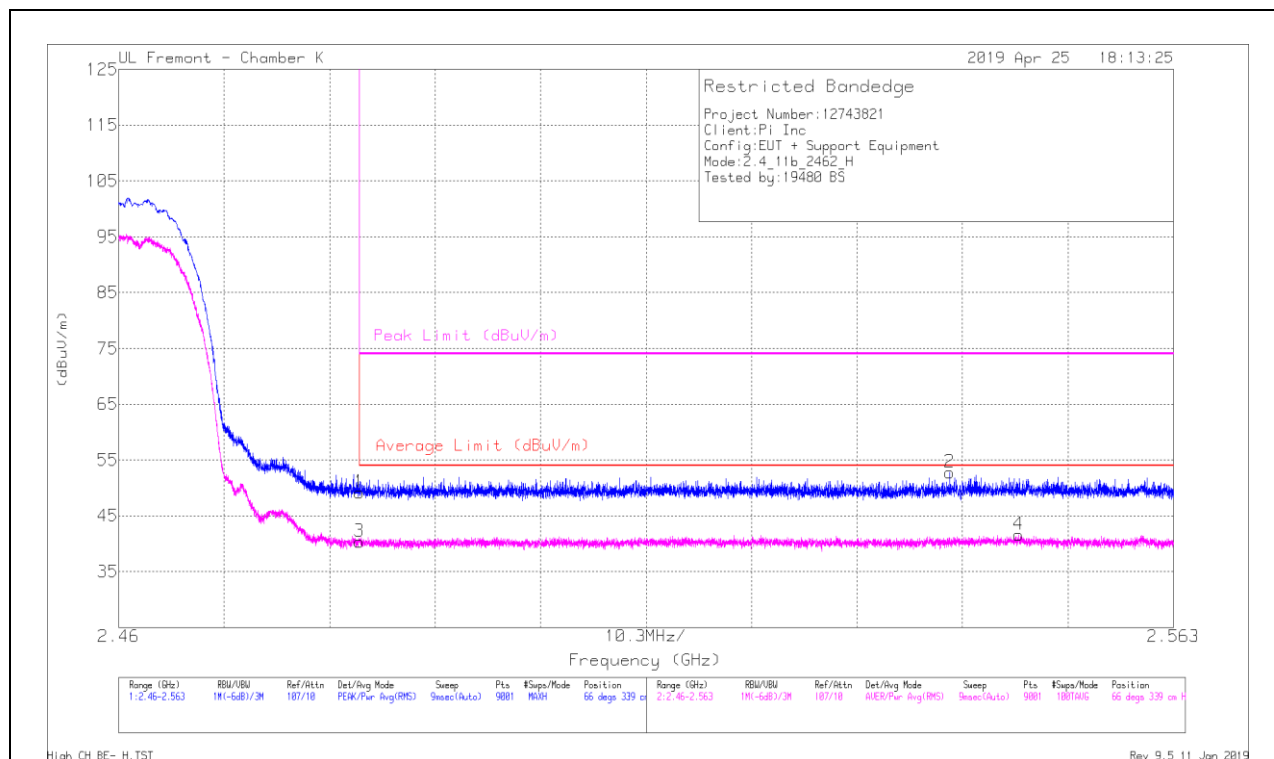
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



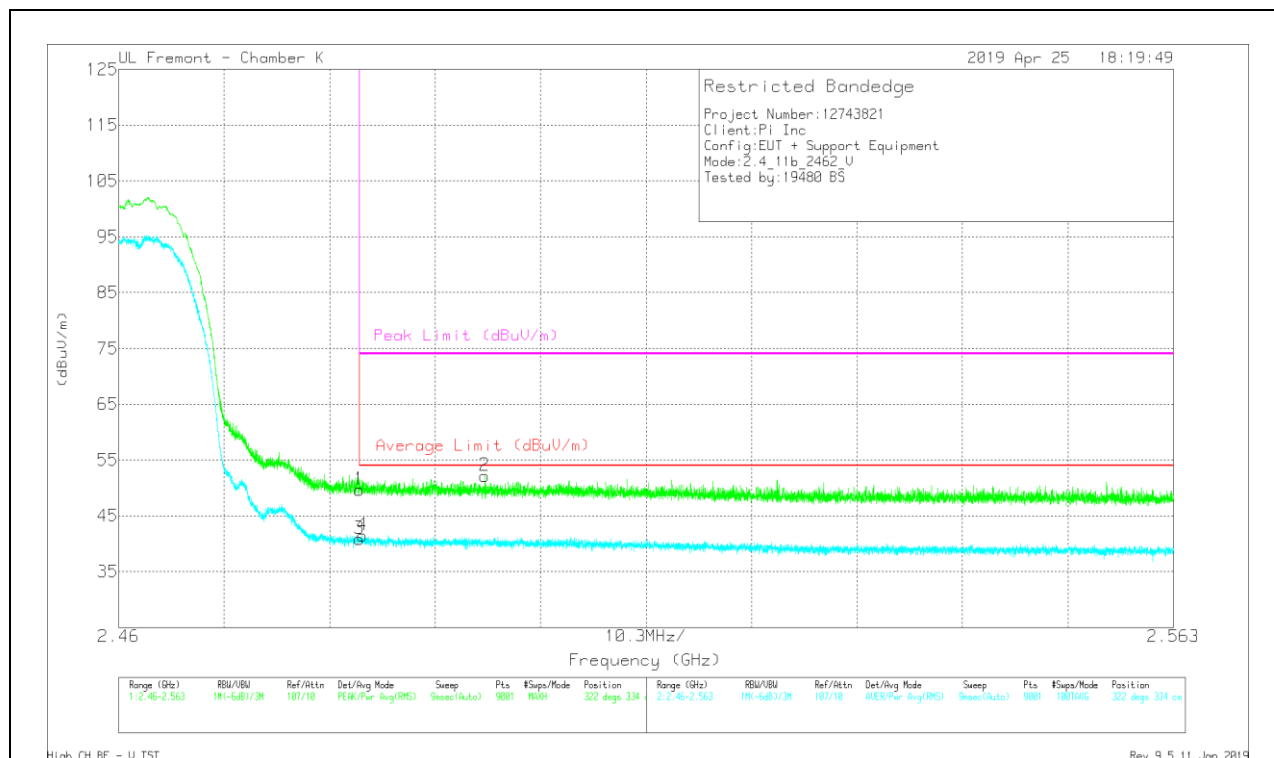
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/CbI/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	41.72	Pk	32.3	-24.8	0	49.22	-	-	74	-24.78	66	339	H
2	2.541	45.29	Pk	32.3	-24.8	0	52.79	-	-	74	-21.21	66	339	H
3	* 2.484	32.36	RMS	32.3	-24.8	.48	40.34	54	-13.66	-	-	66	339	H
4	2.548	33.61	RMS	32.3	-24.8	.48	41.59	54	-12.41	-	-	66	339	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	* 2.484	42.22	Pk	32.3	-24.8	0	49.72	-	-	74	-24.28	322	334	V
2	* 2.496	44.67	Pk	32.3	-24.8	0	52.17	-	-	74	-21.83	322	334	V
3	* 2.484	32.83	RMS	32.3	-24.8	.48	40.81	54	-13.19	-	-	322	334	V
4	* 2.484	33.47	RMS	32.3	-24.8	.48	41.45	54	-12.55	-	-	322	334	V

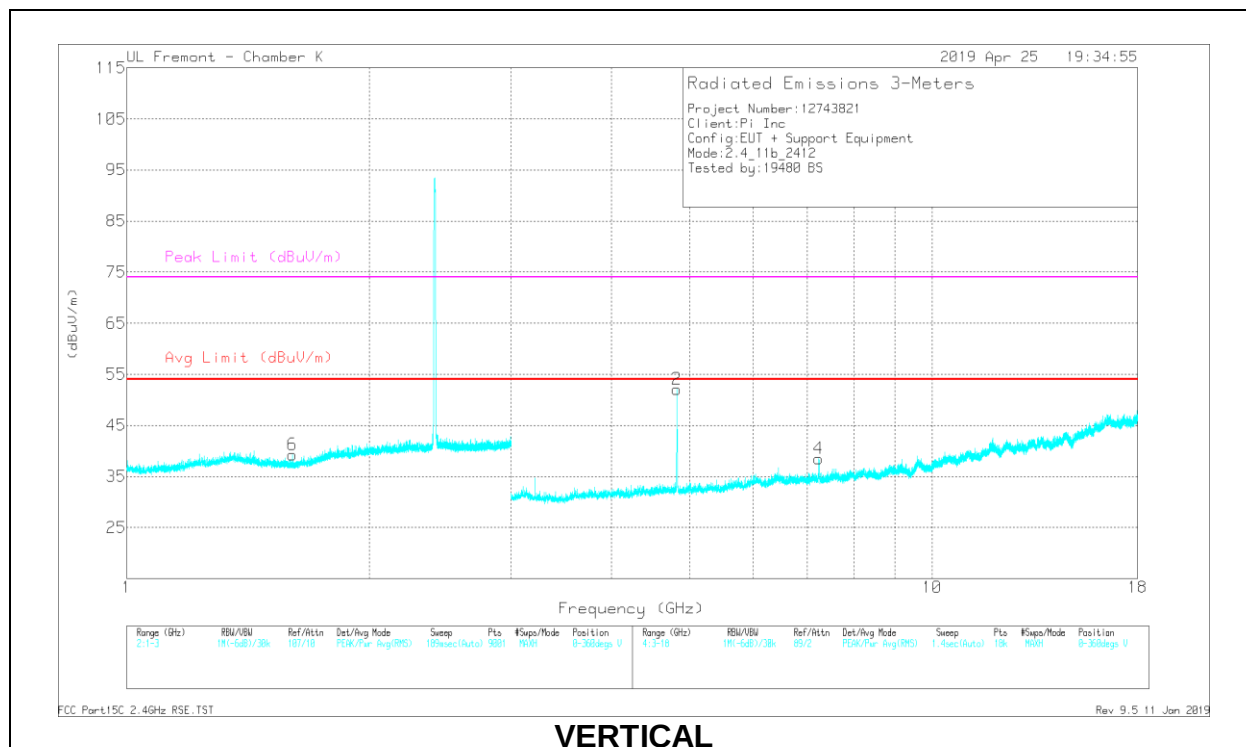
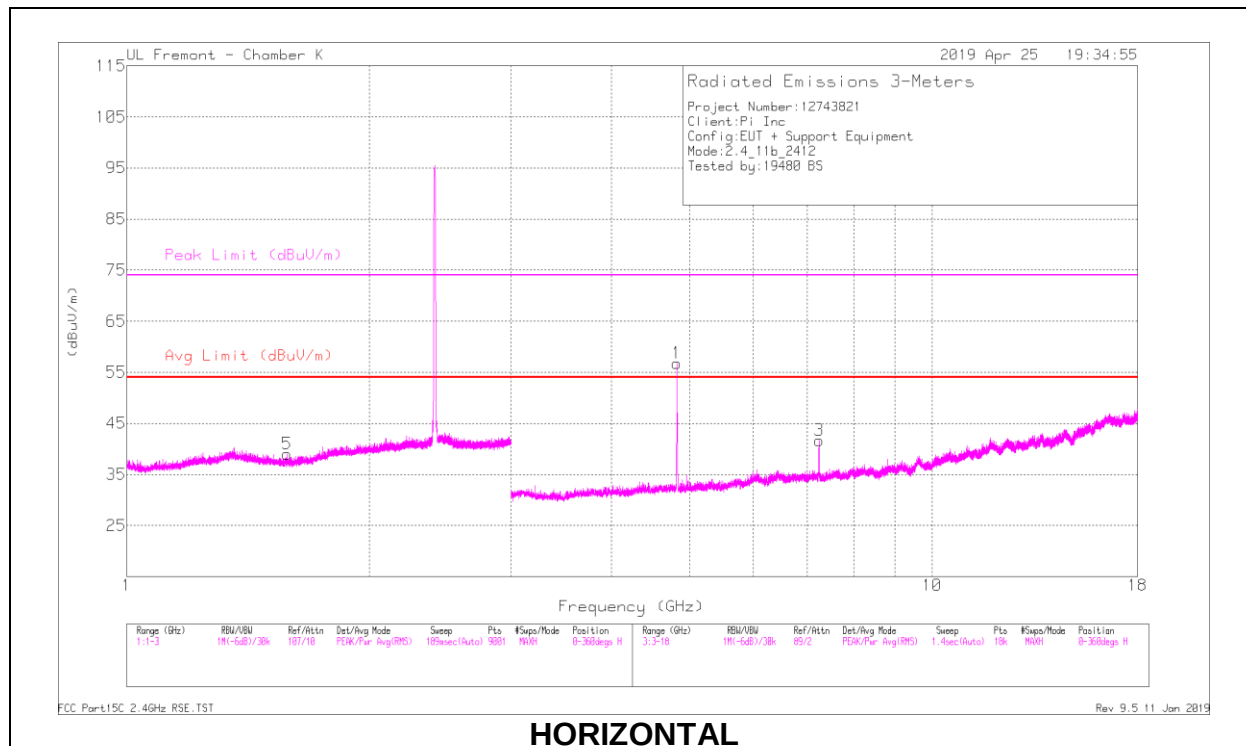
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

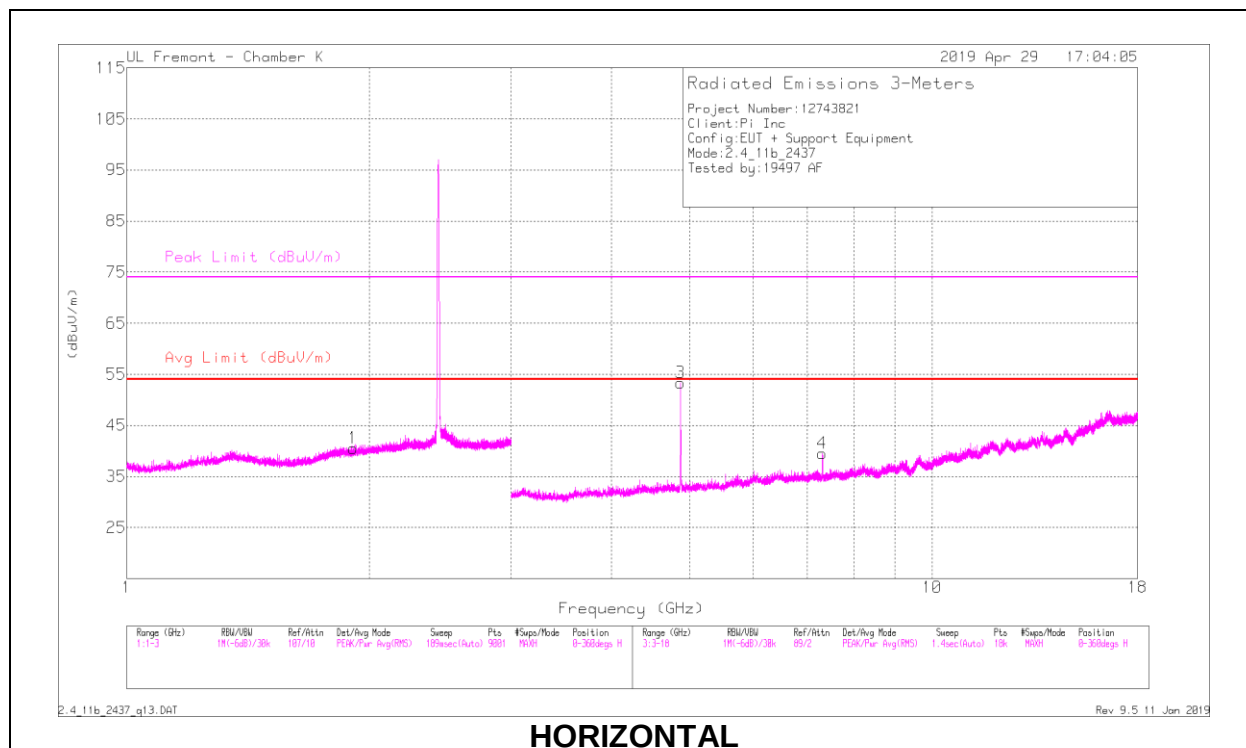
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 1.58	41.48	PK2	28	-23.9	0	45.58	-	-	74	-28.42	136	164	H
	* 1.58	31.6	MAv1	28	-23.9	.48	36.18	54	-17.82	-	-	136	164	H
6	* 1.605	40.13	PK2	28.1	-24	0	44.23	-	-	74	-29.77	93	319	V
	* 1.606	31.22	MAv1	28.1	-24	.48	35.8	54	-18.2	-	-	93	319	V
1	* 4.824	54.66	PK2	34.1	-30.4	0	58.36	-	-	74	-15.64	132	240	H
	* 4.824	49.37	MAv1	34.1	-30.4	.48	53.55	54	-.45	-	-	132	240	H
3	7.237	39.75	PK2	35.5	-26.3	0	48.95	-	-	-	-	104	105	H
2	* 4.824	52.84	PK2	34.1	-30.4	0	56.54	-	-	74	-17.46	200	101	V
	* 4.824	47.08	MAv1	34.1	-30.4	.48	51.26	54	-2.74	-	-	200	101	V
4	7.236	37.07	PK2	35.5	-26.3	0	46.27	-	-	-	-	212	103	V

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

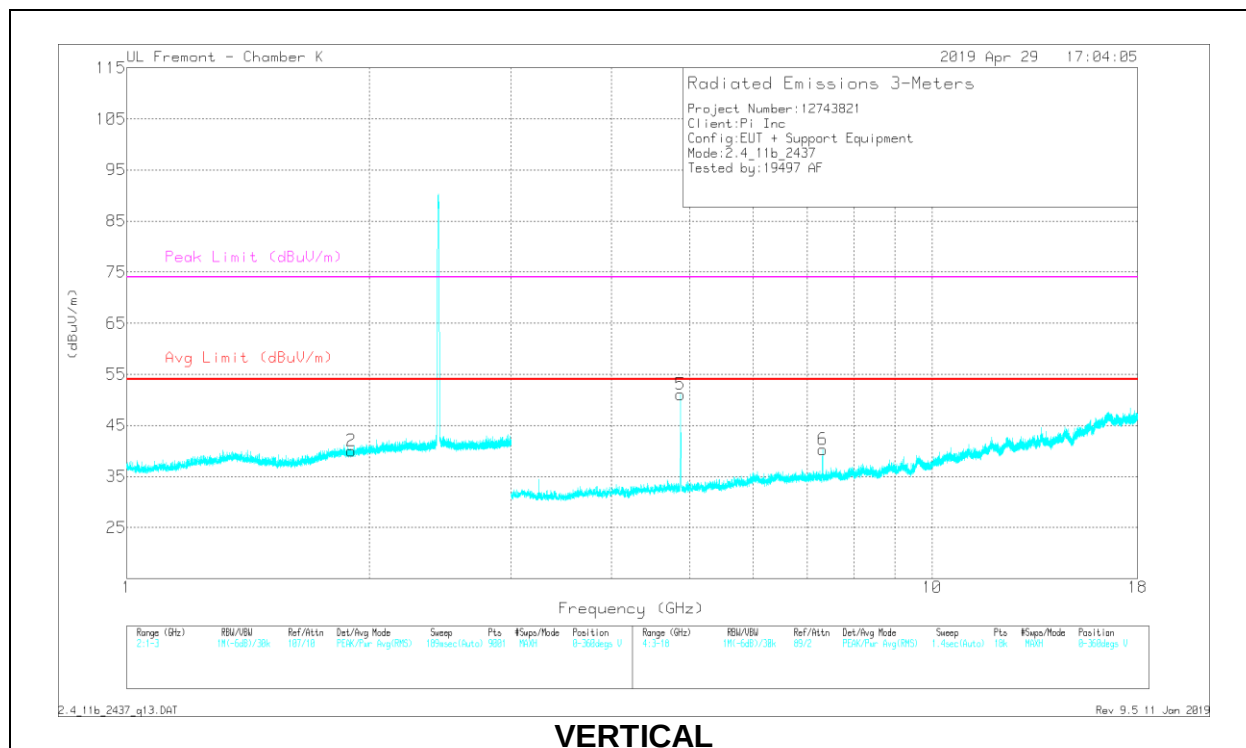
PK2 - Maximum Peak

MAv1 - Maximum RMS Average

MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/FI tr/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	1.911	34.27	Pk	30.5	-24.3	0	40.47	-	-	-	-	0-360	101	H
2	1.902	33.91	Pk	30.4	-24.3	0	40.01	-	-	-	-	0-360	200	V
3	* 4.874	52.03	PK2	34.1	-30.5	0	55.63	-	-	74	-18.37	133	209	H
	* 4.874	42.7	MAv1	34.1	-30.5	.48	46.78	54	-7.22	-	-	133	209	H
4	* 7.309	35.99	PK2	35.5	-26.3	0	45.19	-	-	74	-28.81	115	239	H
	* 7.31	27.79	MAv1	35.5	-26.3	.48	37.47	54	-16.53	-	-	115	239	H
5	* 4.873	36.29	PK2	34.1	-30.5	0	39.89	-	-	74	-34.11	47	202	V
	* 4.872	26.91	MAv1	34.1	-30.5	.48	30.99	54	-23.01	-	-	47	202	V
6	* 7.312	33.21	PK2	35.5	-26.3	0	42.41	-	-	74	-31.59	222	203	V
	* 7.313	23.34	MAv1	35.5	-26.3	.48	33.02	54	-20.98	-	-	222	203	V

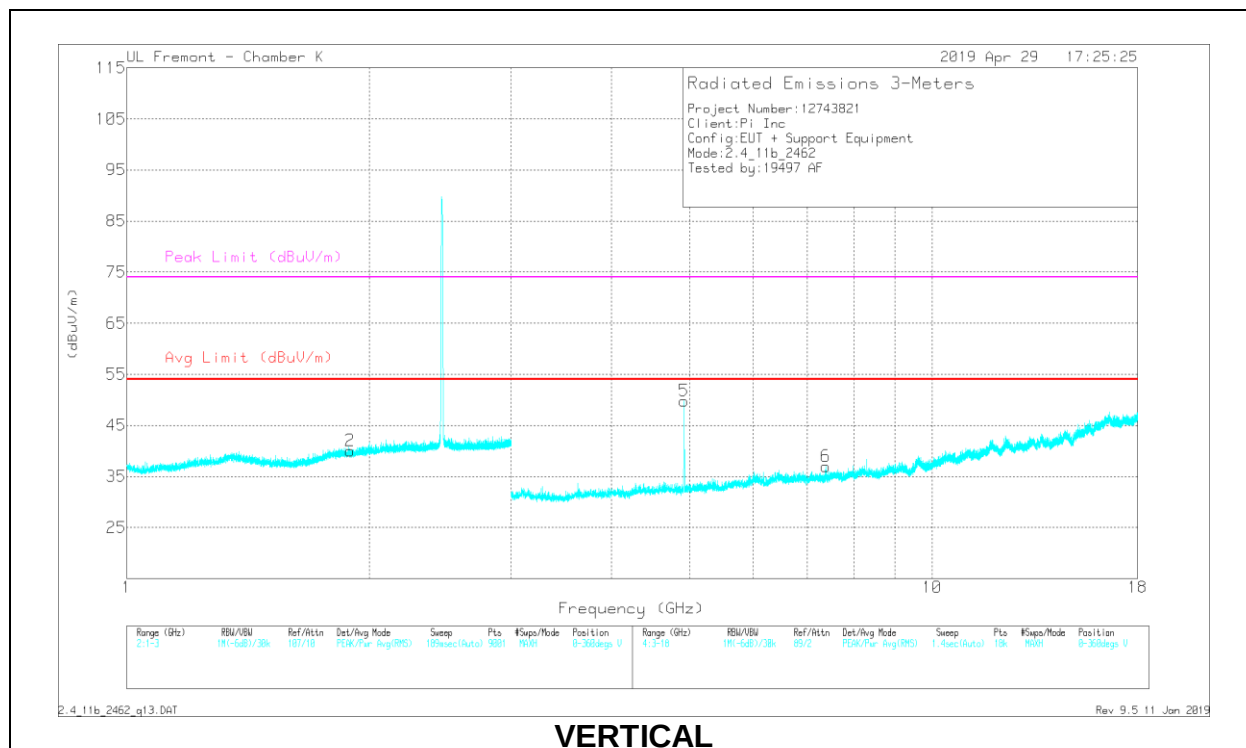
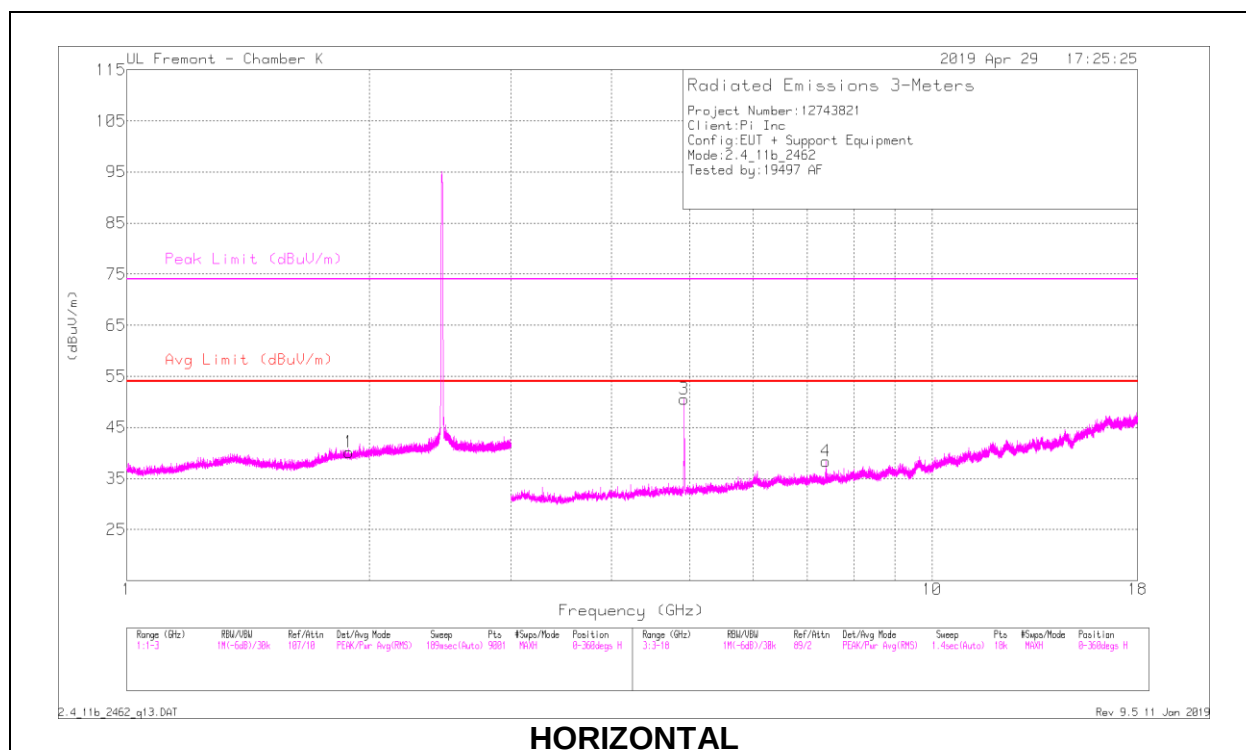
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

MAv1 - RMS Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/FI tr/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	1.889	33.89	Pk	30.4	-24.2	0	40.09	-	-	-	-	0-360	200	H
2	1.895	33.86	Pk	30.4	-24.3	0	39.96	-	-	-	-	0-360	101	V
3	* 4.924	49.89	PK2	34.2	-30.6	0	53.49	-	-	74	-20.51	136	182	H
	* 4.924	41.95	MAv1	34.2	-30.6	.48	46.03	54	-7.97	-	-	136	182	H
4	* 7.383	34.55	PK2	35.5	-26.5	0	43.55	-	-	74	-30.45	354	104	H
	* 7.385	25.71	MAv1	35.5	-26.5	.48	35.19	54	-18.81	-	-	354	104	H
5	* 4.924	48.35	PK2	34.2	-30.6	0	51.95	-	-	74	-22.05	198	103	V
	* 4.924	41.31	MAv1	34.2	-30.6	.48	45.39	54	-8.61	-	-	198	103	V
6	* 7.385	36.43	PK2	35.5	-26.5	0	45.43	-	-	74	-28.57	267	102	V
	* 7.385	25.58	MAv1	35.5	-26.5	.48	35.06	54	-18.94	-	-	267	102	V

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

Pk - Peak detector

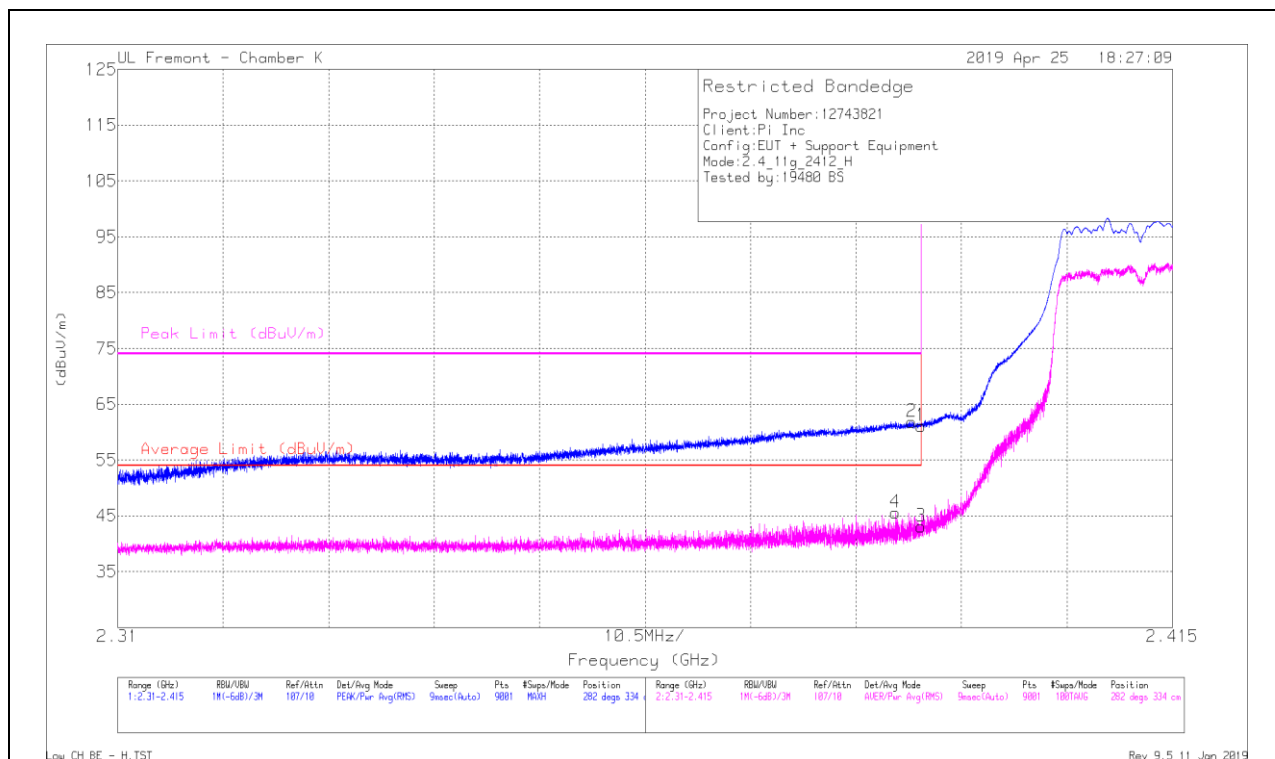
PK2 - Maximum Peak

MAv1 - RMS Average

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

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



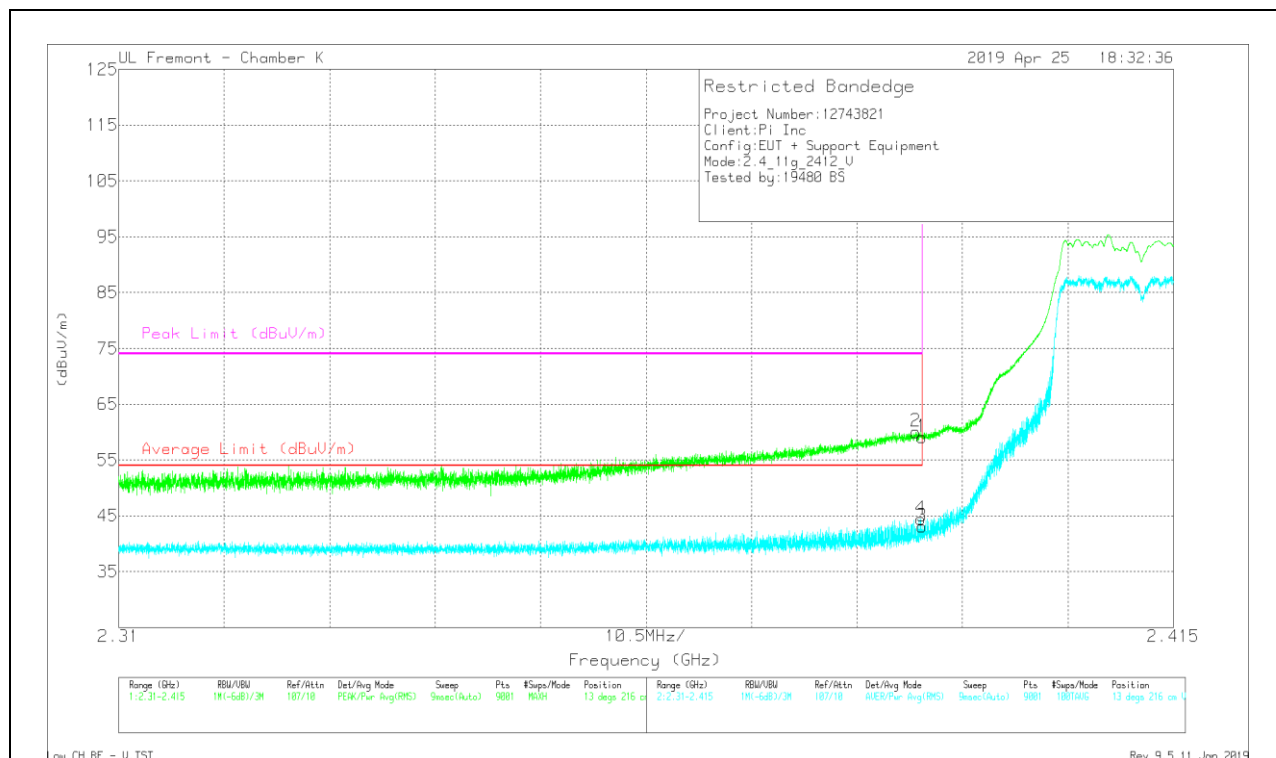
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/CbIFtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	53.89	Pk	31.9	-24.7	0	61.09	-	-	74	-12.91	282	334	H
2	* 2.389	54.63	Pk	31.9	-24.7	0	61.83	-	-	74	-12.17	282	334	H
3	* 2.39	35.15	RMS	31.9	-24.7	.71	43.06	54	-10.94	-	-	282	334	H
4	* 2.387	37.53	RMS	31.9	-24.6	.71	45.54	54	-8.46	-	-	282	334	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



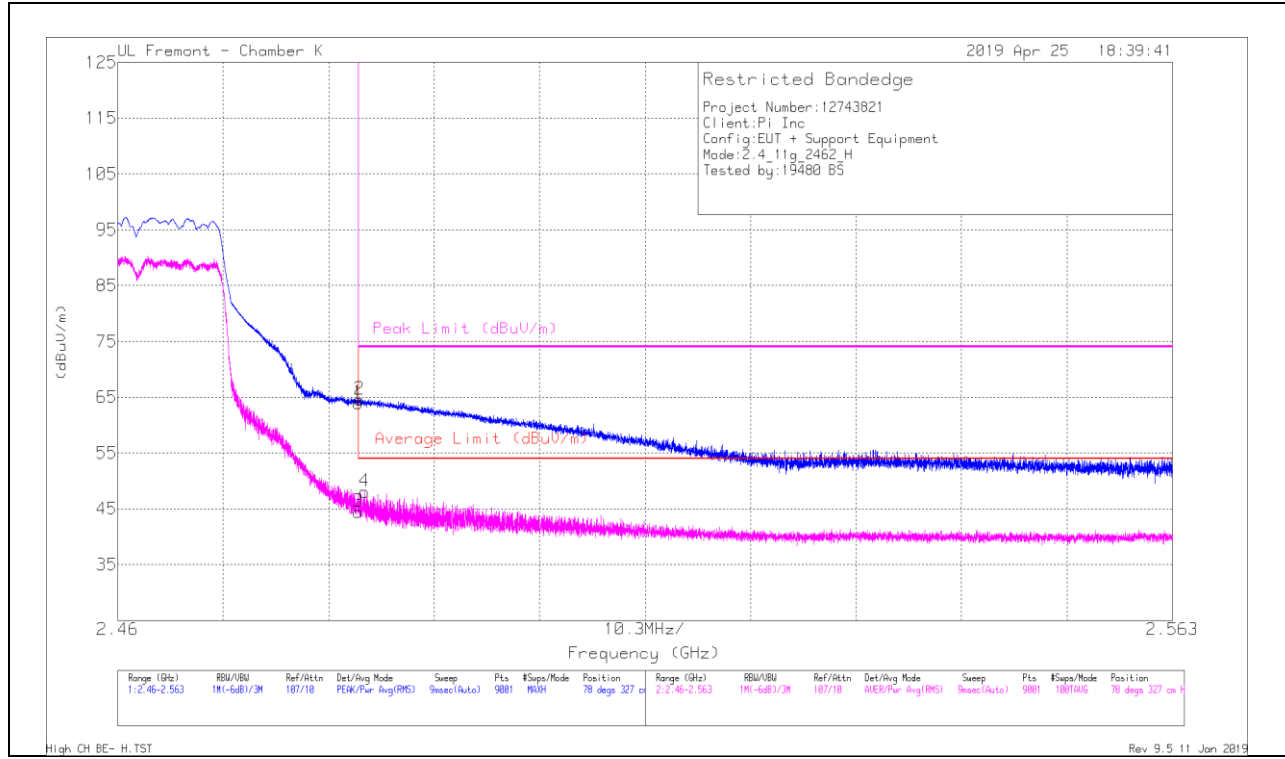
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



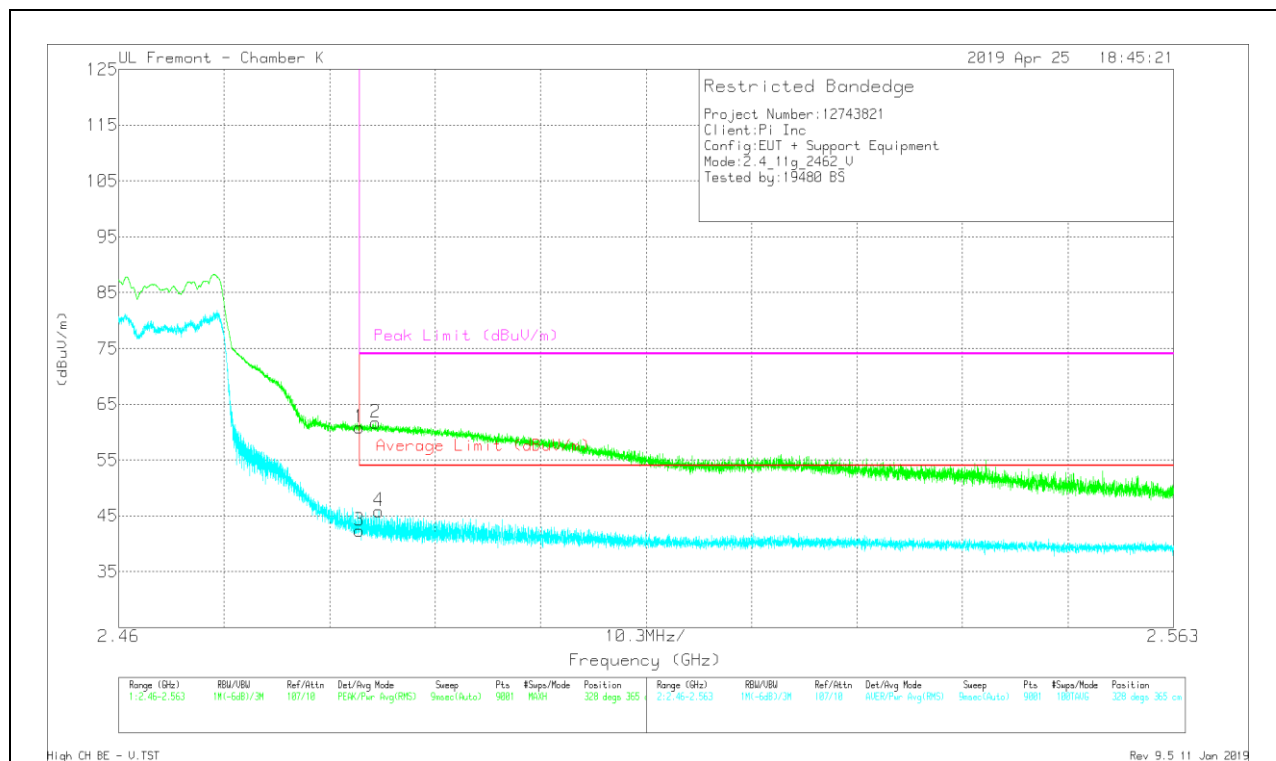
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dBm)	Ampl/CbI/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	56.46	Pk	32.3	-24.8	0	63.96	-	-	74	-10.04	78	327	H
2	* 2.484	57.12	Pk	32.3	-24.8	0	64.62	-	-	74	-9.38	78	327	H
3	* 2.484	36.2	RMS	32.3	-24.8	.71	44.41	54	-9.59	-	-	78	327	H
4	* 2.484	39.85	RMS	32.3	-24.8	.71	48.06	54	-5.94	-	-	78	327	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dBm)	Amp/Cb/Filt/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	* 2.484	53.4	PK	32.3	-24.8	0	60.9	-	-	74	-13.1	328	365	V
2	* 2.485	54.24	PK	32.3	-24.8	0	61.74	-	-	74	-12.26	328	365	V
3	* 2.484	34.19	RMS	32.3	-24.8	.71	42.4	54	-11.6	-	-	328	365	V
4	* 2.485	37.67	RMS	32.3	-24.8	.71	45.88	54	-8.12	-	-	328	365	V

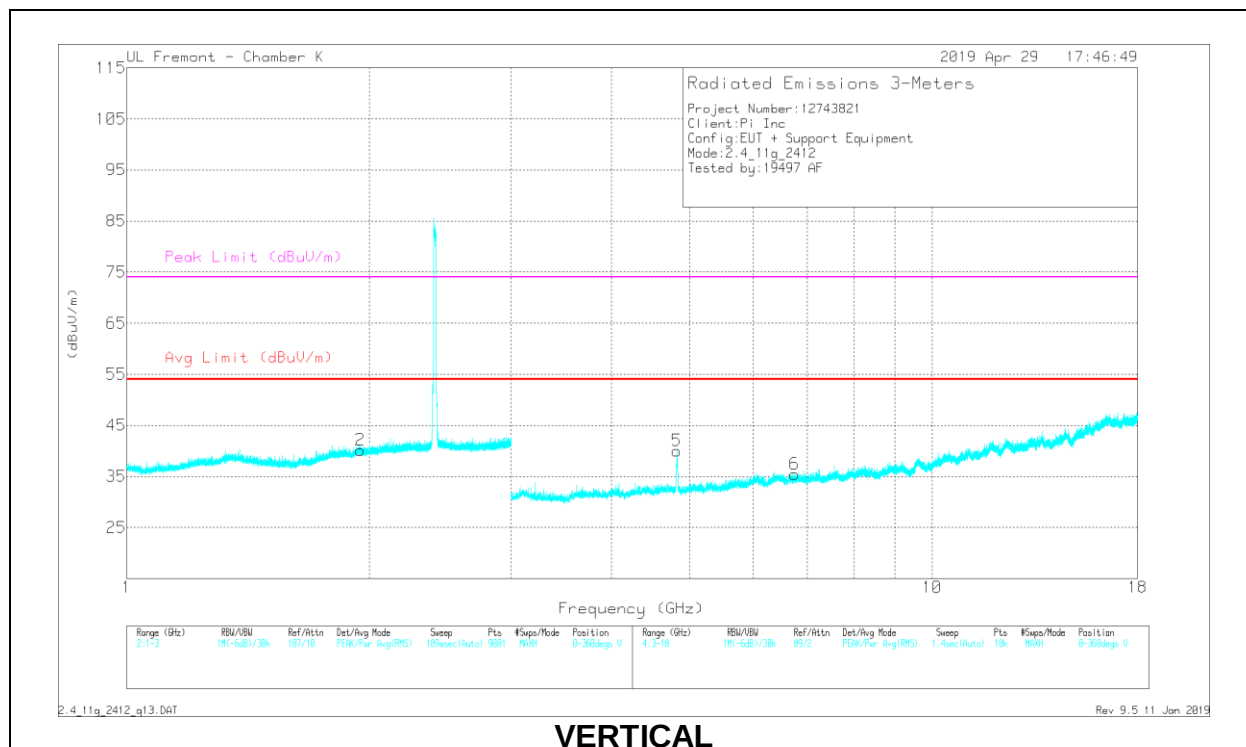
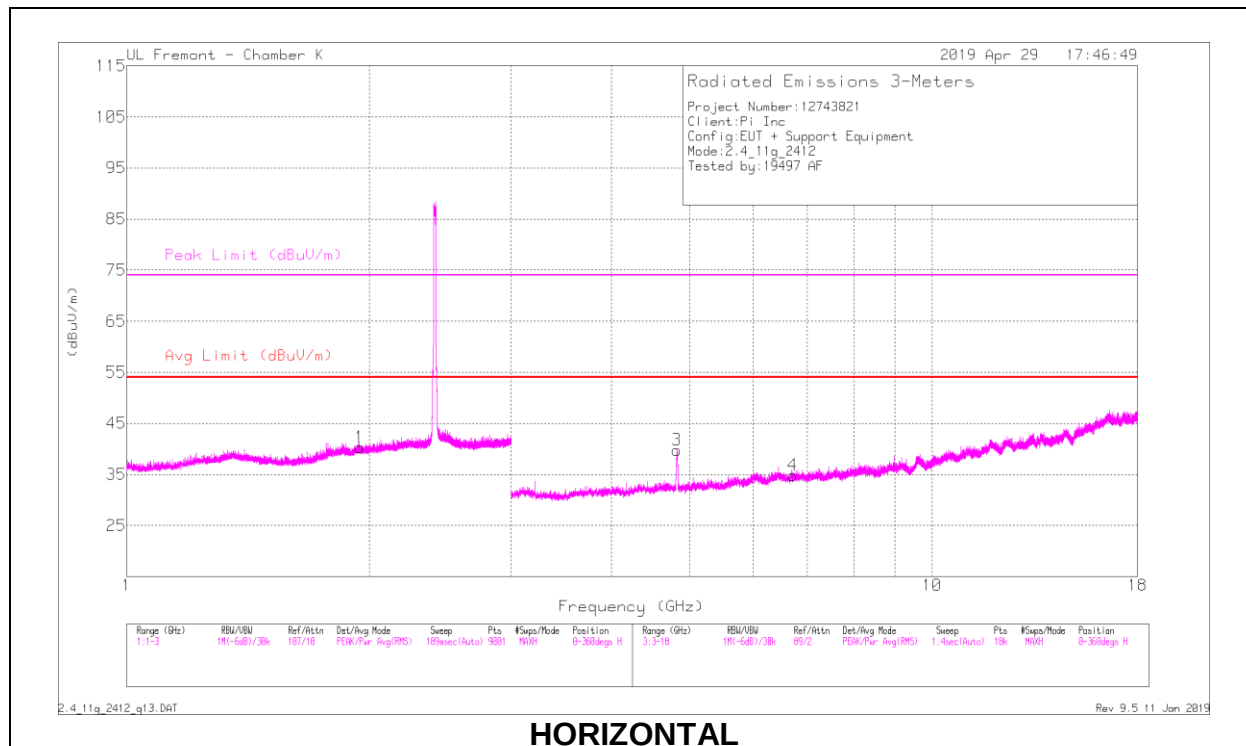
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	1.946	33.55	Pk	30.8	-24.1	0	40.25	-	-	-	-	0-360	200	H
2	1.95	33.63	Pk	30.8	-24.3	0	40.13	-	-	-	-	0-360	101	V
3	* 4.823	44.82	PK2	34.1	-30.4	0	48.52	-	-	74	-25.48	120	126	H
	* 4.825	34.79	MAv1	34.1	-30.4	.71	39.2	54	-14.8	-	-	120	126	H
4	6.713	26.13	Pk	35.5	-26.8	0	34.83	-	-	-	-	0-360	101	H
5	* 4.924	38.59	PK2	34.2	-30.6	0	42.19	-	-	74	-31.81	193	117	V
	* 4.924	29.32	MAv1	34.2	-30.6	.71	33.63	54	-20.37	-	-	193	117	V
6	6.756	26.52	Pk	35.5	-26.6	0	35.42	-	-	-	-	0-360	200	V

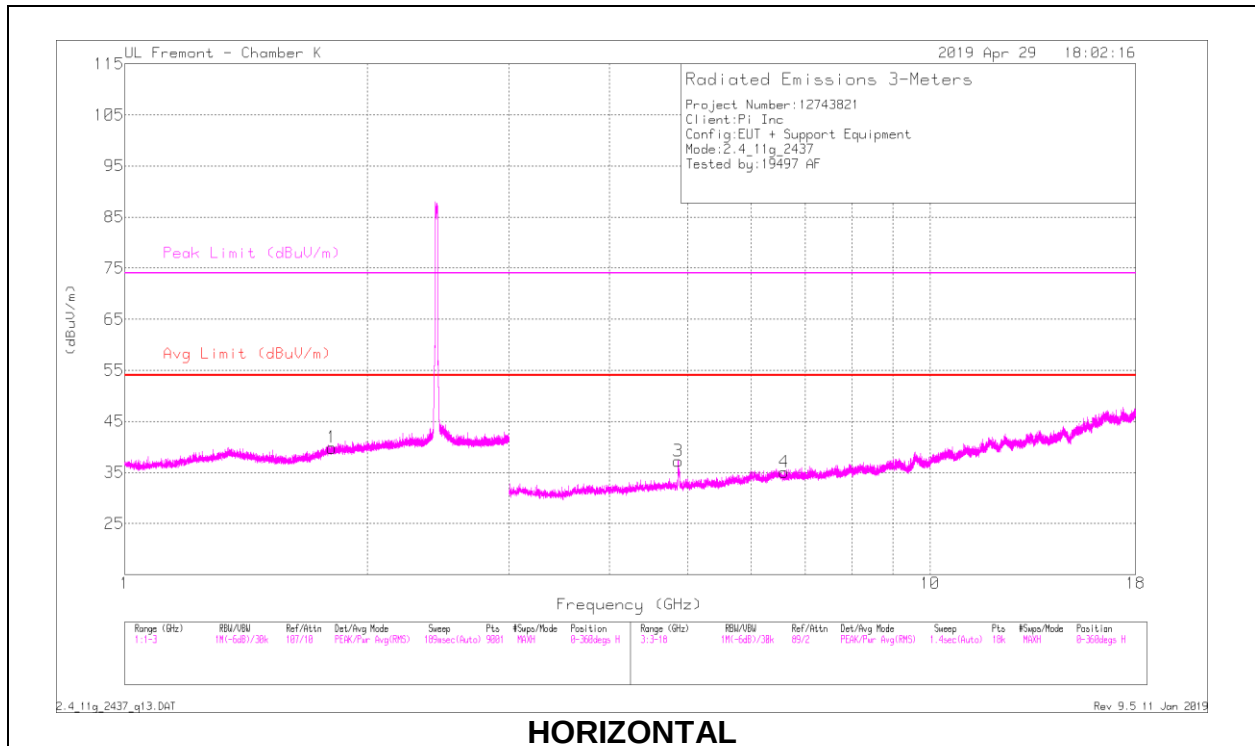
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

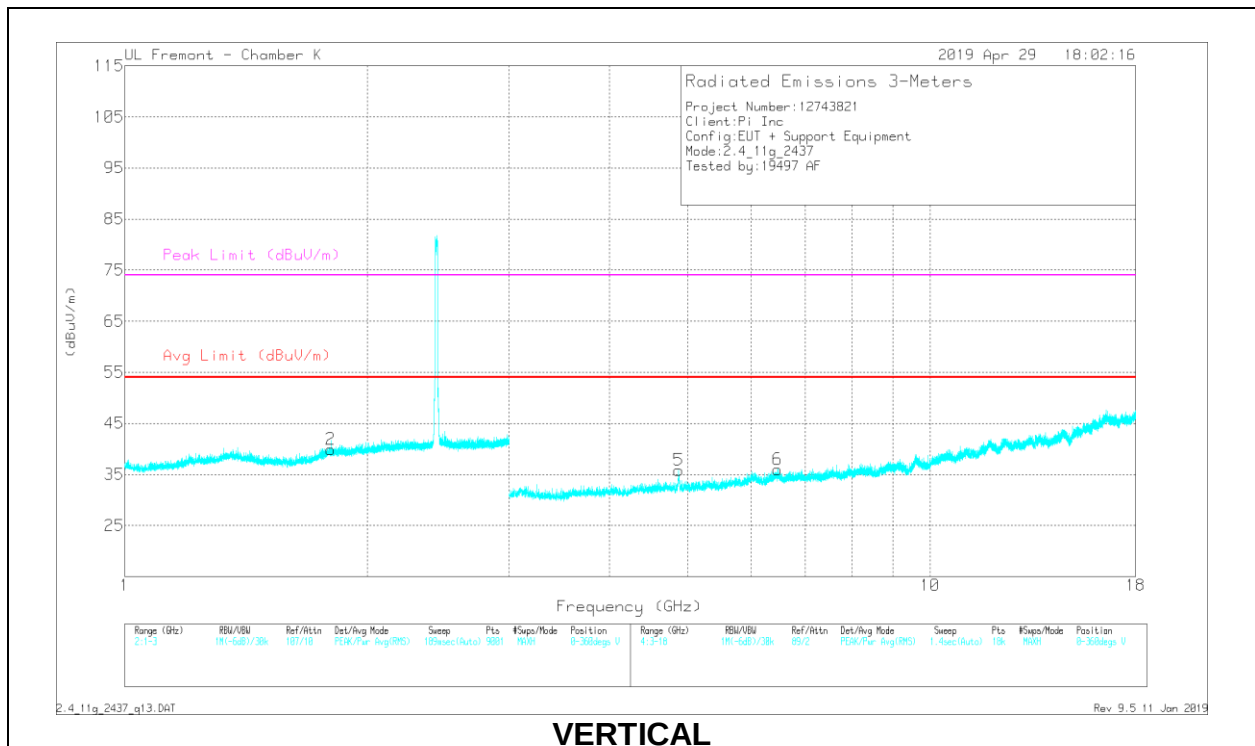
PK2 - Maximum Peak

MAv1 - RMS Average

MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	1.809	33.73	Pk	30.2	-24.1	0	39.83	-	-	-	-	0-360	200	H
2	1.802	33.92	Pk	30.1	-24.1	0	39.92	-	-	-	-	0-360	200	V
3	* 4.866	40.2	PK2	34.1	-30.6	0	43.7	-	-	74	-30.3	135	101	H
	* 4.868	30.46	MAV1	34.1	-30.6	.71	34.67	54	-19.33	-	-	135	101	H
4	6.59	26.89	Pk	35.5	-27.3	0	35.09	-	-	-	-	0-360	200	H
5	* 4.924	38.59	PK2	34.2	-30.6	0	42.19	-	-	74	-31.81	193	117	V
	* 4.924	29.32	MAV1	34.2	-30.6	.71	33.63	54	-20.37	-	-	193	117	V
6	6.463	27.01	Pk	35.4	-26.4	0	36.01	-	-	-	-	0-360	200	V

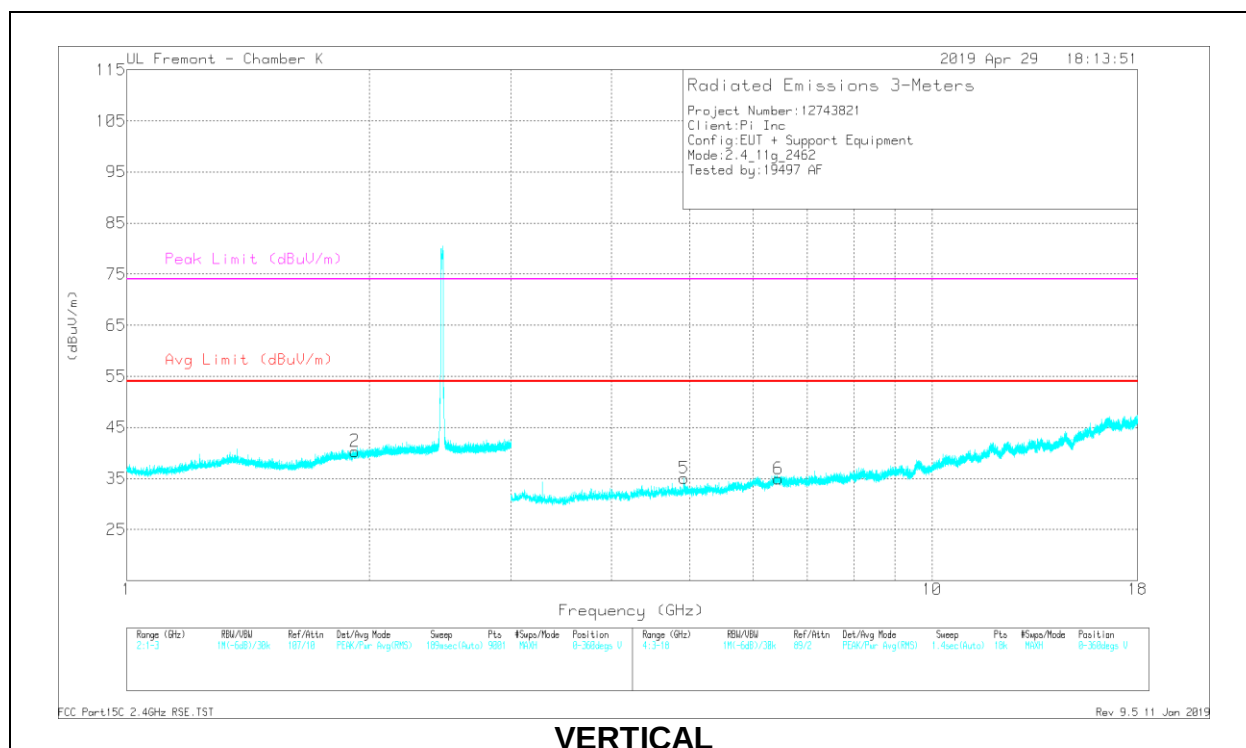
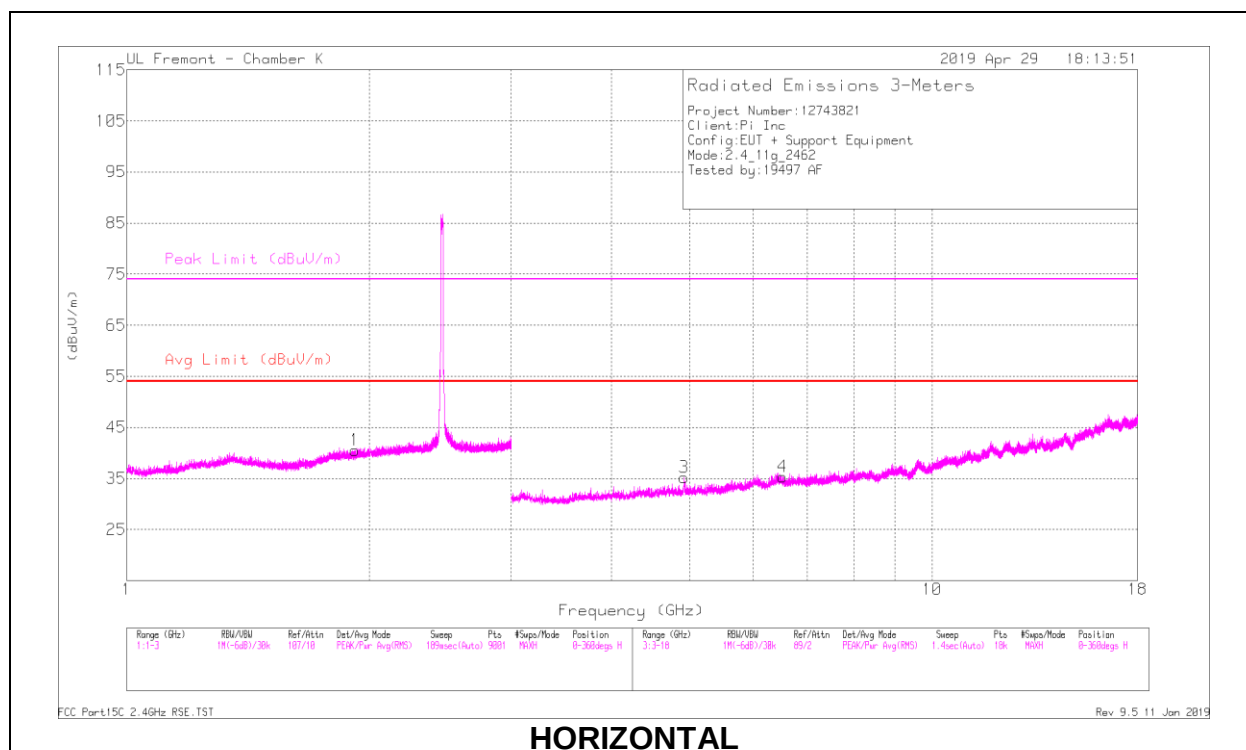
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

MAV1 - RMS Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	1.92	34.12	Pk	30.6	-24.2	0	40.52	-	-	-	-	0-360	101	H
2	1.919	33.93	Pk	30.6	-24.2	0	40.33	-	-	-	-	0-360	101	V
3	* 4.922	39.52	PK2	34.2	-30.6	0	43.12	-	-	74	-30.88	147	159	H
	* 4.923	29.35	MAv1	34.2	-30.6	.71	33.66	54	-20.34	-	-	147	159	H
4	6.527	26.69	Pk	35.4	-26.8	0	35.29	-	-	-	-	0-360	200	H
5	* 4.924	38.59	PK2	34.2	-30.6	0	42.19	-	-	74	-31.81	193	117	V
	* 4.924	29.32	MAv1	34.2	-30.6	.71	33.63	54	-20.37	-	-	193	117	V
6	6.449	25.9	Pk	35.4	-26.4	0	34.9	-	-	-	-	0-360	101	V

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

Pk - Peak detector

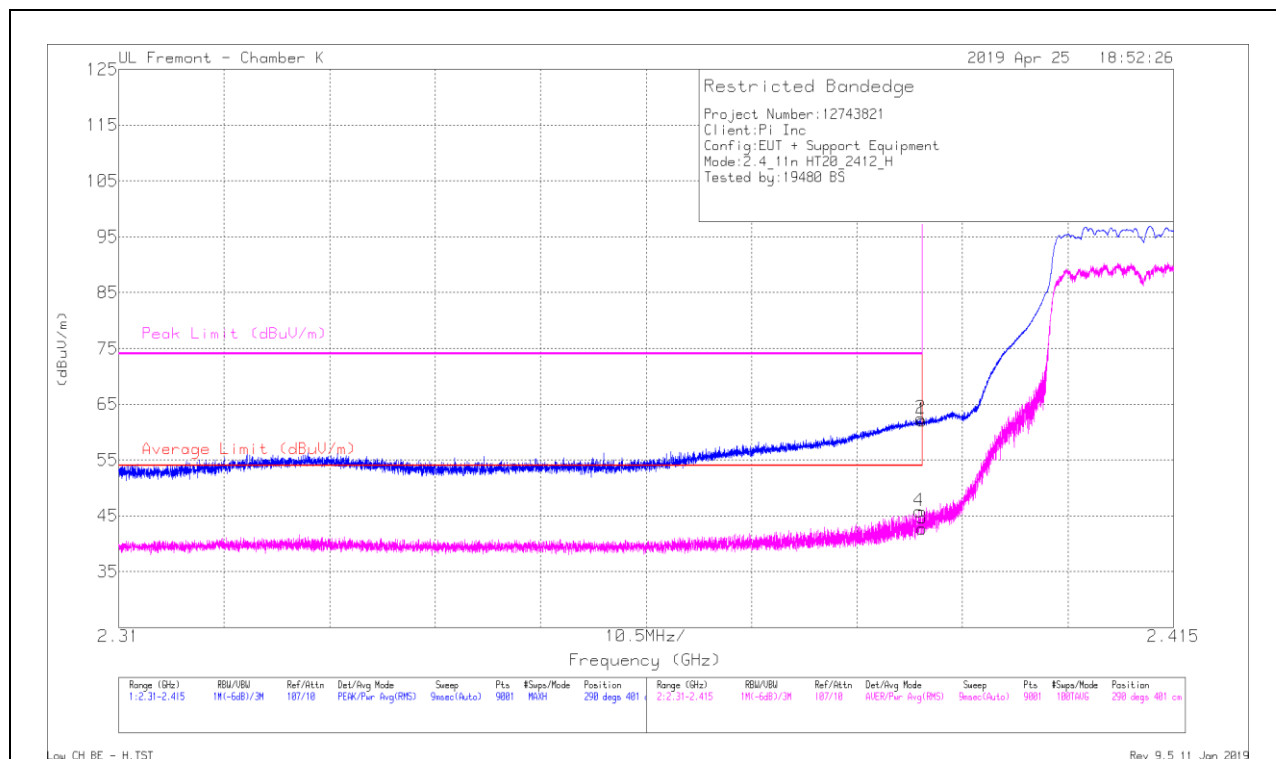
PK2 - Maximum Peak

MAv1 - RMS Average

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

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



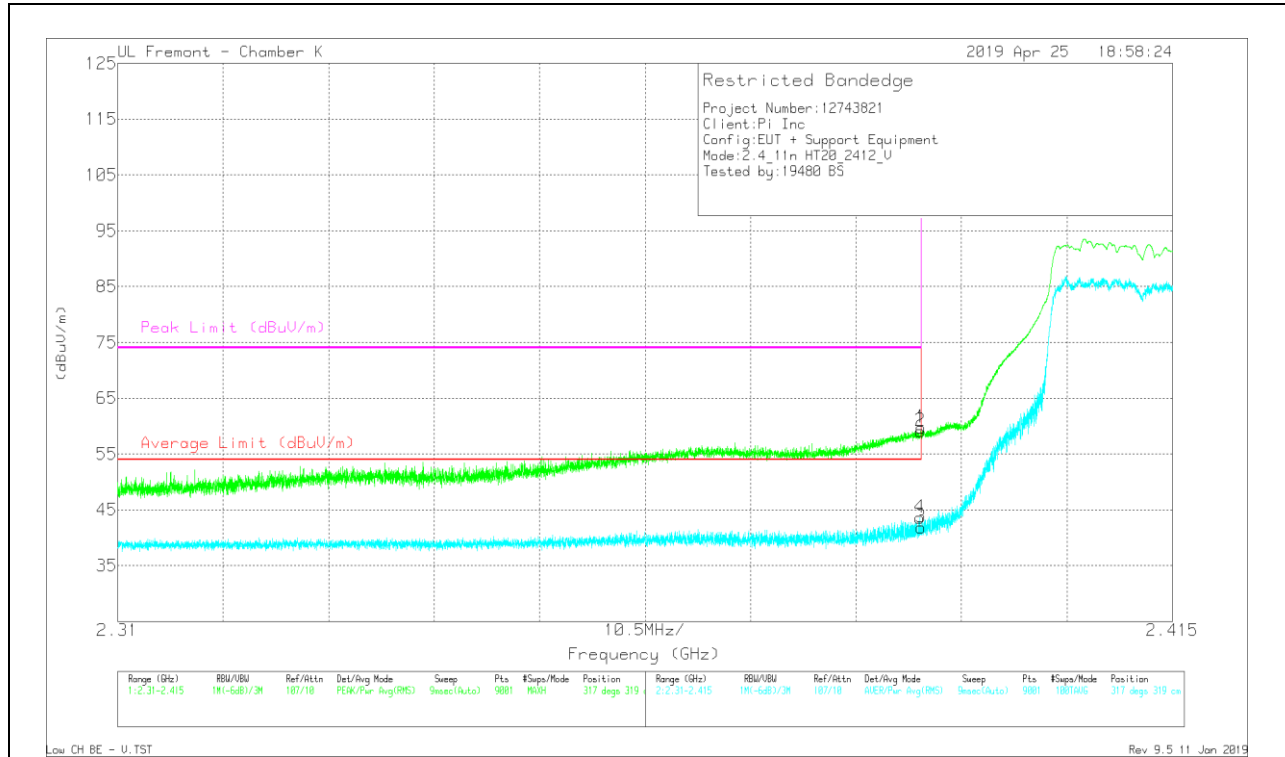
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/CbIFtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	54.93	Pk	31.9	-24.7	0	62.13	-	-	74	-11.87	290	401	H
2	* 2.39	55.28	Pk	31.9	-24.7	0	62.48	-	-	74	-11.52	290	401	H
3	* 2.39	34.86	RMS	31.9	-24.7	.66	42.72	54	-11.28	-	-	290	401	H
4	* 2.39	37.93	RMS	31.9	-24.7	.66	45.79	54	-8.21	-	-	290	401	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbll/Ftr/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	52.49	Pk	31.9	-24.7	0	59.69	-	-	74	-14.31	317	319	V
2	* 2.39	51.92	Pk	31.9	-24.7	0	59.12	-	-	74	-14.88	317	319	V
3	* 2.39	34.04	RMS	31.9	-24.7	.66	41.9	54	-12.1	-	-	317	319	V
4	* 2.39	35.74	RMS	31.9	-24.7	.66	43.6	54	-10.4	-	-	317	319	V

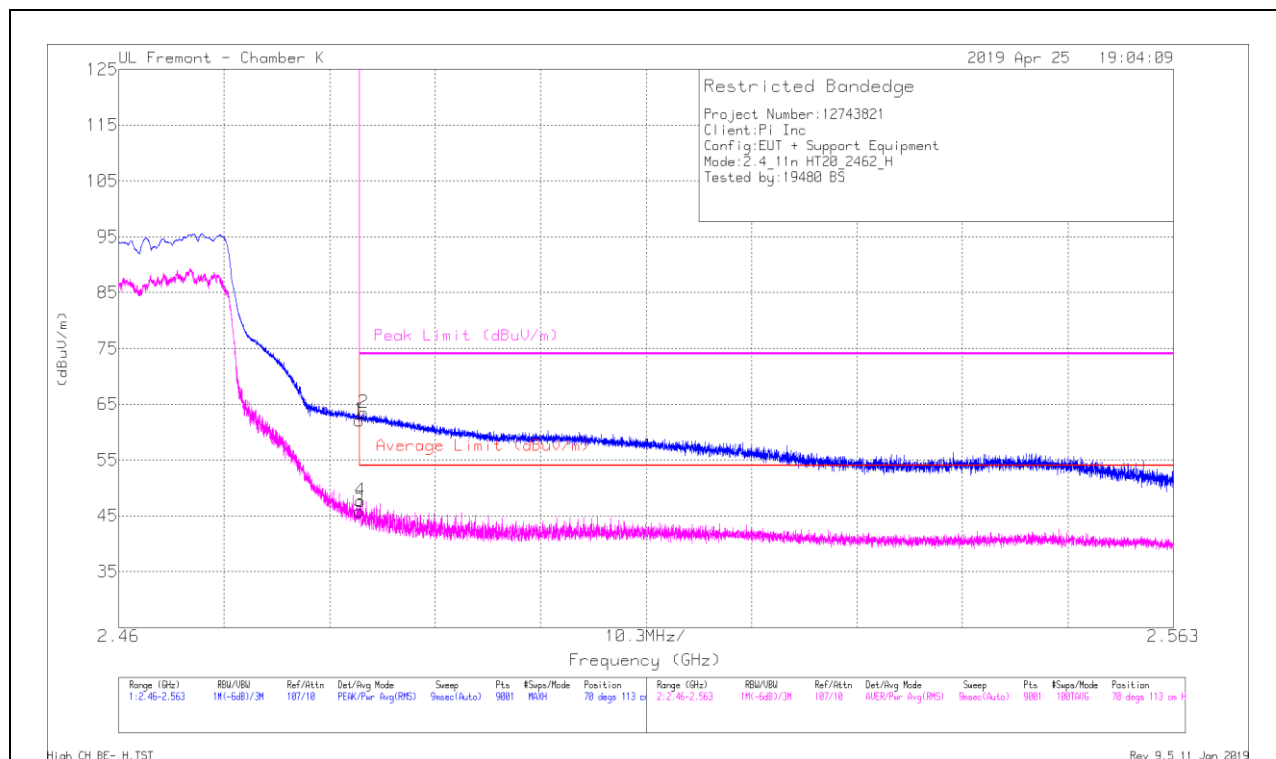
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



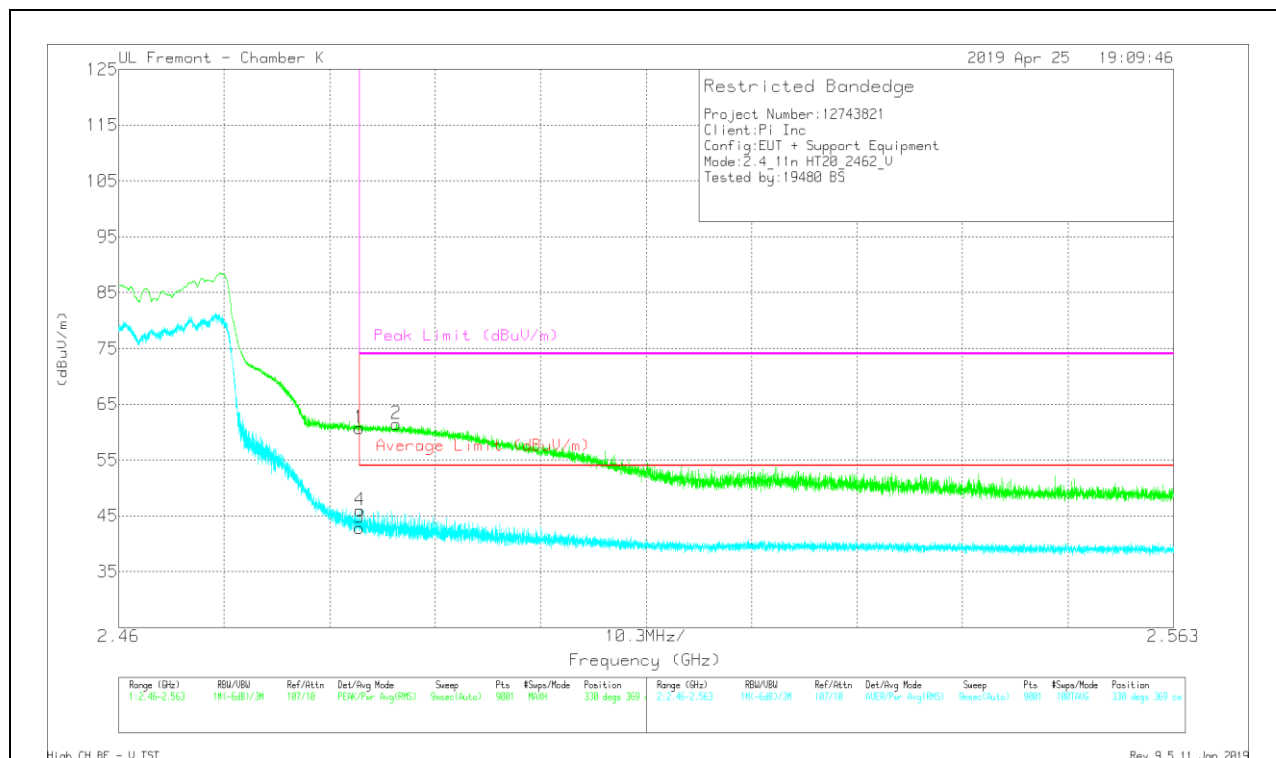
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/CbI/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	54.58	Pk	32.3	-24.8	0	62.08	-	-	74	-11.92	70	113	H
2	* 2.484	55.96	Pk	32.3	-24.8	0	63.46	-	-	74	-10.54	70	113	H
3	* 2.484	37.63	RMS	32.3	-24.8	.66	45.79	54	-8.21	-	-	70	113	H
4	* 2.484	39.57	RMS	32.3	-24.8	.66	47.73	54	-6.27	-	-	70	113	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbll/Ftr/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	* 2.484	53.21	Pk	32.3	-24.8	0	60.71	-	-	74	-13.29	330	369	V
2	* 2.487	53.95	Pk	32.3	-24.8	0	61.45	-	-	74	-12.55	330	369	V
3	* 2.484	34.74	RMS	32.3	-24.8	.66	42.9	54	-11.1	-	-	330	369	V
4	* 2.484	37.79	RMS	32.3	-24.8	.66	45.95	54	-8.05	-	-	330	369	V

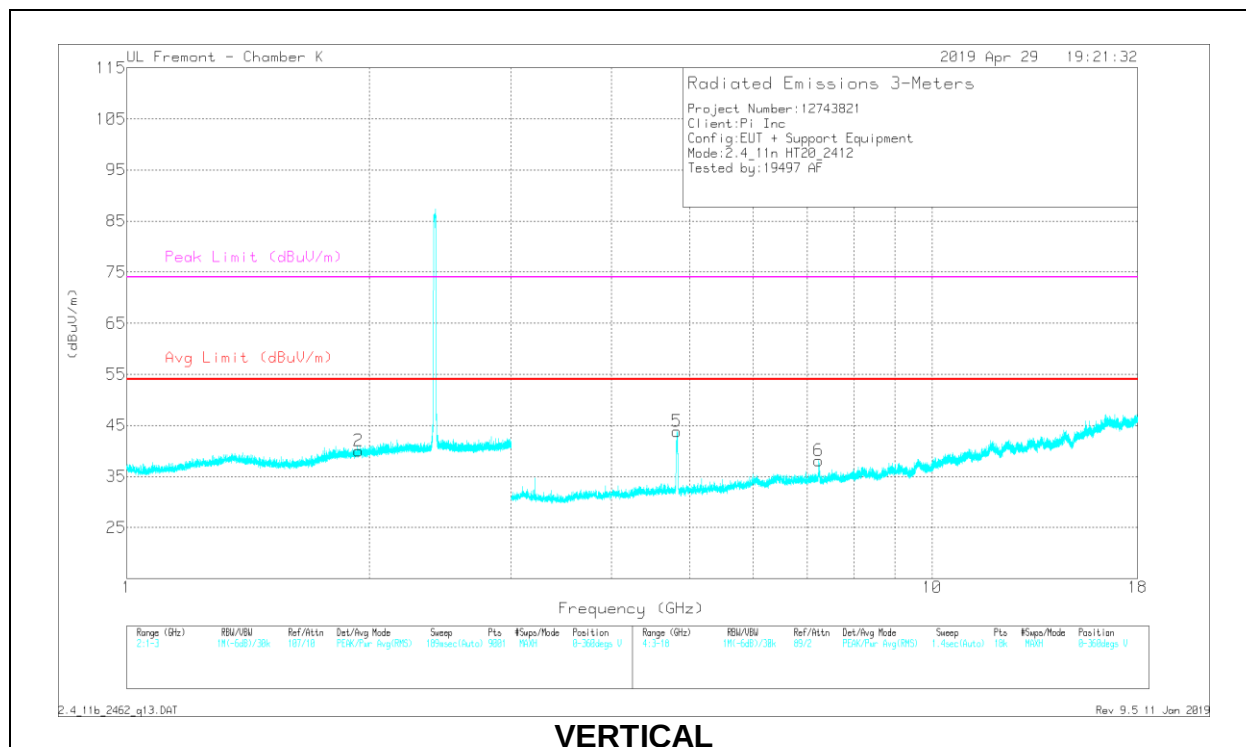
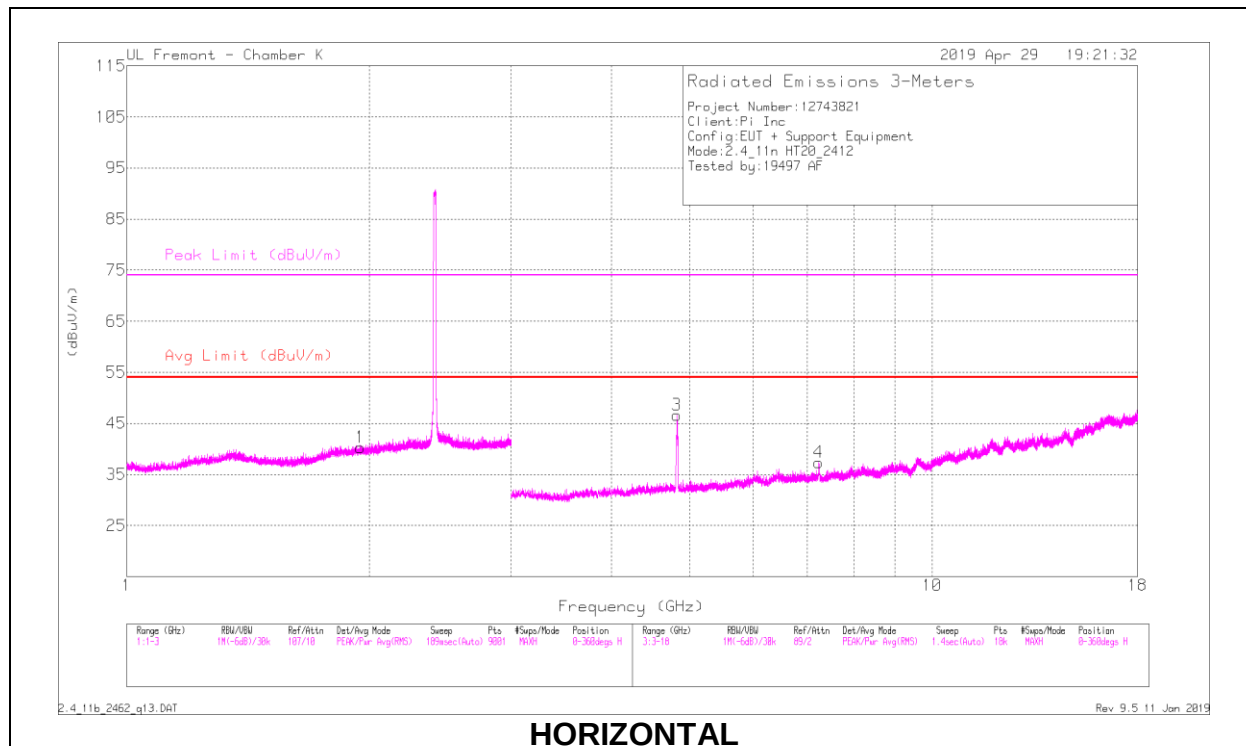
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	1.951	33.77	Pk	30.8	-24.3	0	40.27	-	-	-	-	0-360	102	H
2	1.939	33.55	Pk	30.7	-24.2	0	40.05	-	-	-	-	0-360	200	V
3	* 4.825	38.21	PK2	34.1	-30.4	0	41.91	-	-	74	-32.09	194	124	H
	* 4.826	28.41	MAV1	34.1	-30.4	.66	32.77	54	-21.23	-	-	194	124	H
4	7.232	28.15	Pk	35.5	-26.3	0	37.35	-	-	-	-	0-360	101	H
5	* 4.823	48.28	PK2	34.2	-30.4	0	52.08	-	-	74	-21.92	190	107	V
	* 4.823	37.94	MAV1	34.2	-30.4	.66	42.4	54	-11.6	-	-	190	107	V
6	7.235	28.86	Pk	35.5	-26.3	0	38.06	-	-	-	-	0-360	101	V

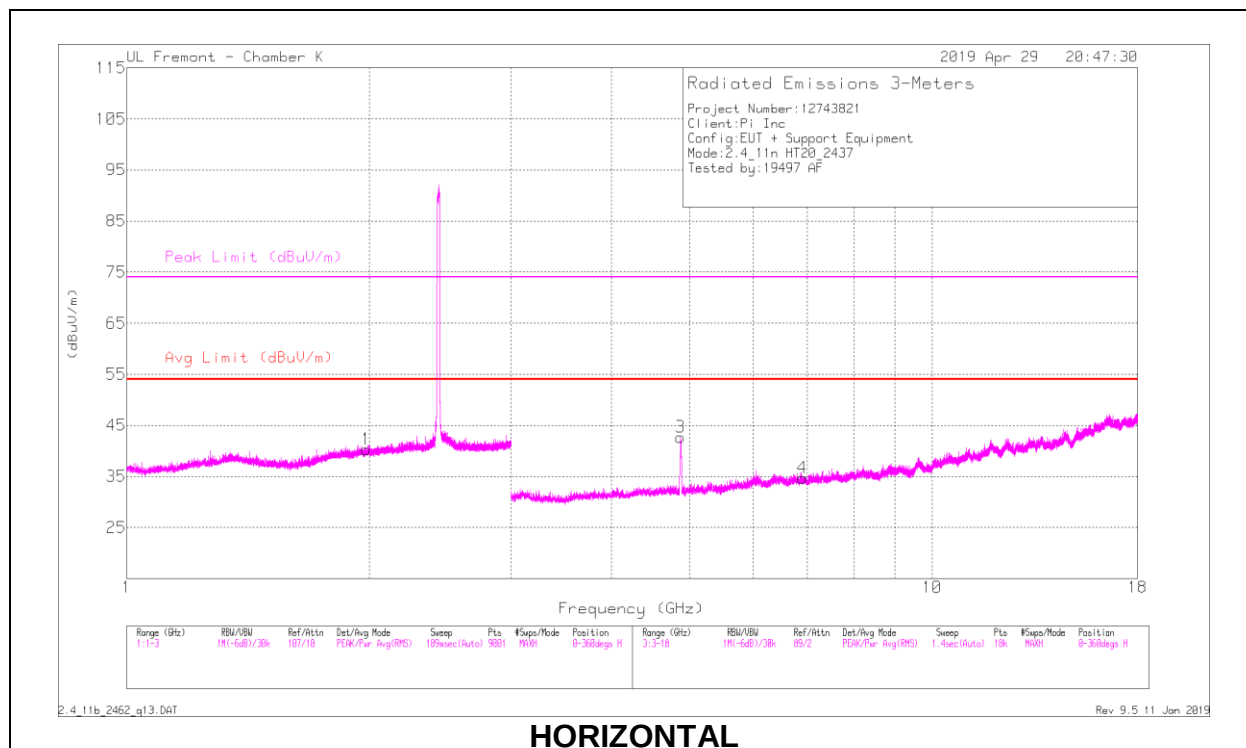
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

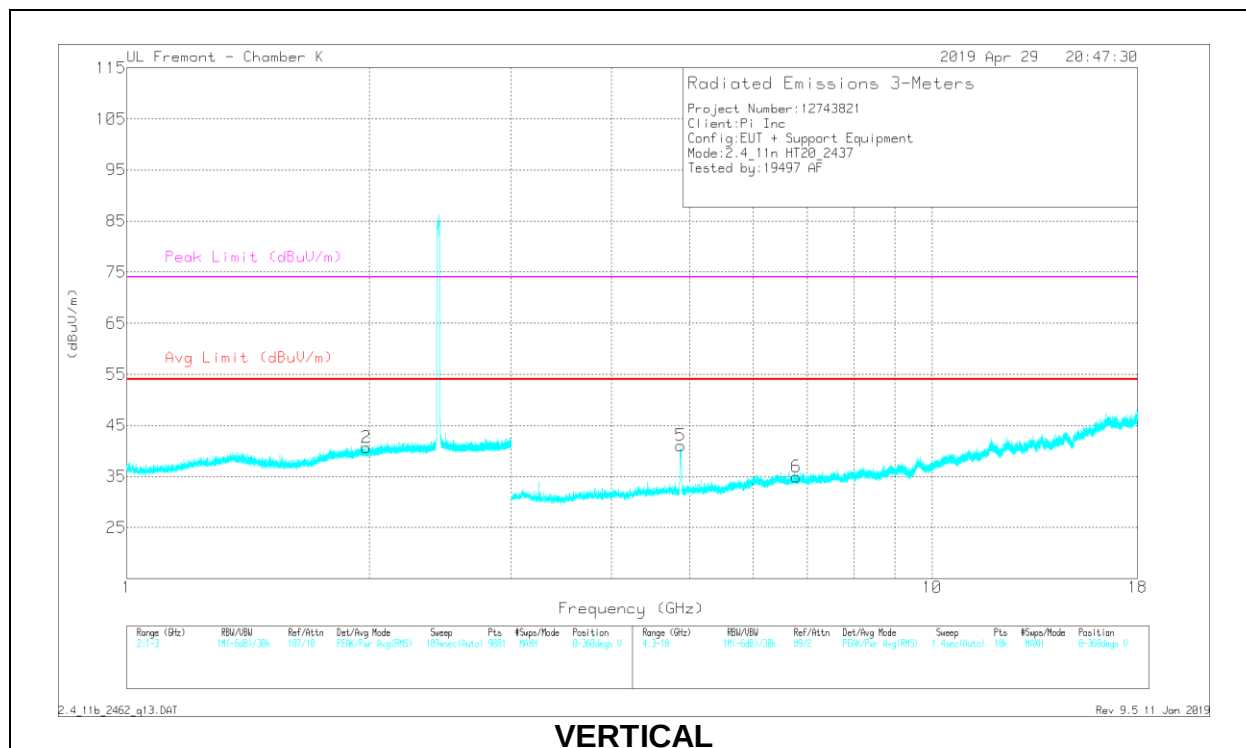
PK2 - Maximum Peak

MAV1 - RMS Average

MID CHANNEL, CH 6 RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	1.984	33.73	Pk	30.9	-24.4	0	40.23	-	-	-	-	0-360	101	H
2	1.983	34.18	Pk	30.9	-24.4	0	40.68	-	-	-	-	0-360	200	V
3	* 4.872	49.16	PK2	34.1	-30.5	0	52.76	-	-	74	-21.24	140	230	H
	* 4.876	36.48	MAv1	34.1	-30.5	.66	40.74	54	-13.26	-	-	140	230	H
4	6.906	25.67	Pk	35.5	-26.5	0	34.67	-	-	-	-	0-360	200	H
5	* 4.875	46.44	PK2	34.1	-30.5	0	50.04	-	-	74	-23.96	196	102	V
	* 4.875	36.29	MAv1	34.1	-30.5	.66	40.55	54	-13.45	-	-	196	102	V
6	6.786	26.24	Pk	35.5	-26.8	0	34.94	-	-	-	-	0-360	200	V

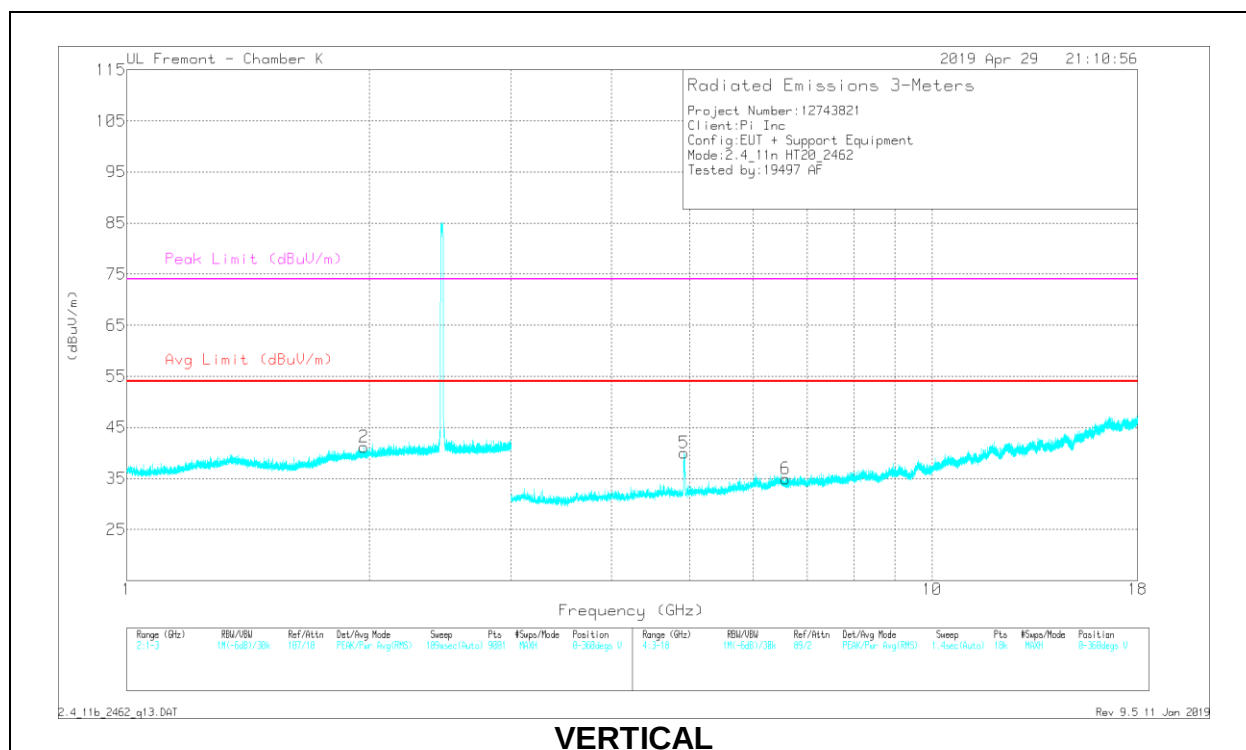
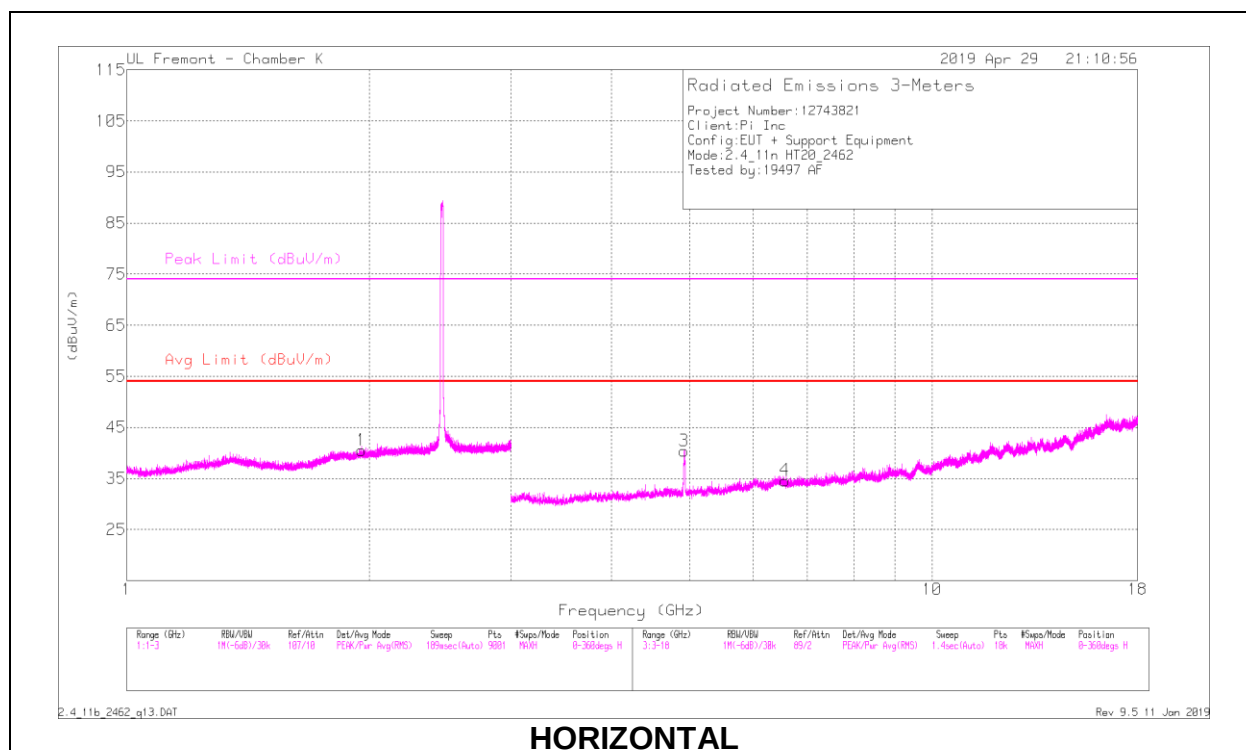
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

PK2 - Maximum Peak

MAv1 - RMS Average

HIGH CHANNEL, CH 11 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Ftr/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	1.958	34.01	Pk	30.8	-24.3	0	40.51	-	-	-	-	0-360	102	H
2	1.971	34.67	Pk	30.9	-24.4	0	41.17	-	-	-	-	0-360	200	V
3	* 4.925	46.05	PK2	34.2	-30.6	0	49.65	-	-	74	-24.35	138	201	H
	* 4.921	36.02	MAv1	34.1	-30.6	.66	40.18	54	-13.82	-	-	138	201	H
4	6.567	26.32	Pk	35.4	-27.1	0	34.62	-	-	-	-	0-360	200	H
5	* 4.922	44.48	PK2	34.1	-30.6	0	47.98	-	-	74	-26.02	200	110	V
	* 4.923	35.23	MAv1	34.2	-30.6	.66	39.49	54	-14.51	-	-	200	110	V
6	6.581	26.69	Pk	35.5	-27.3	0	34.89	-	-	-	-	0-360	101	V

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

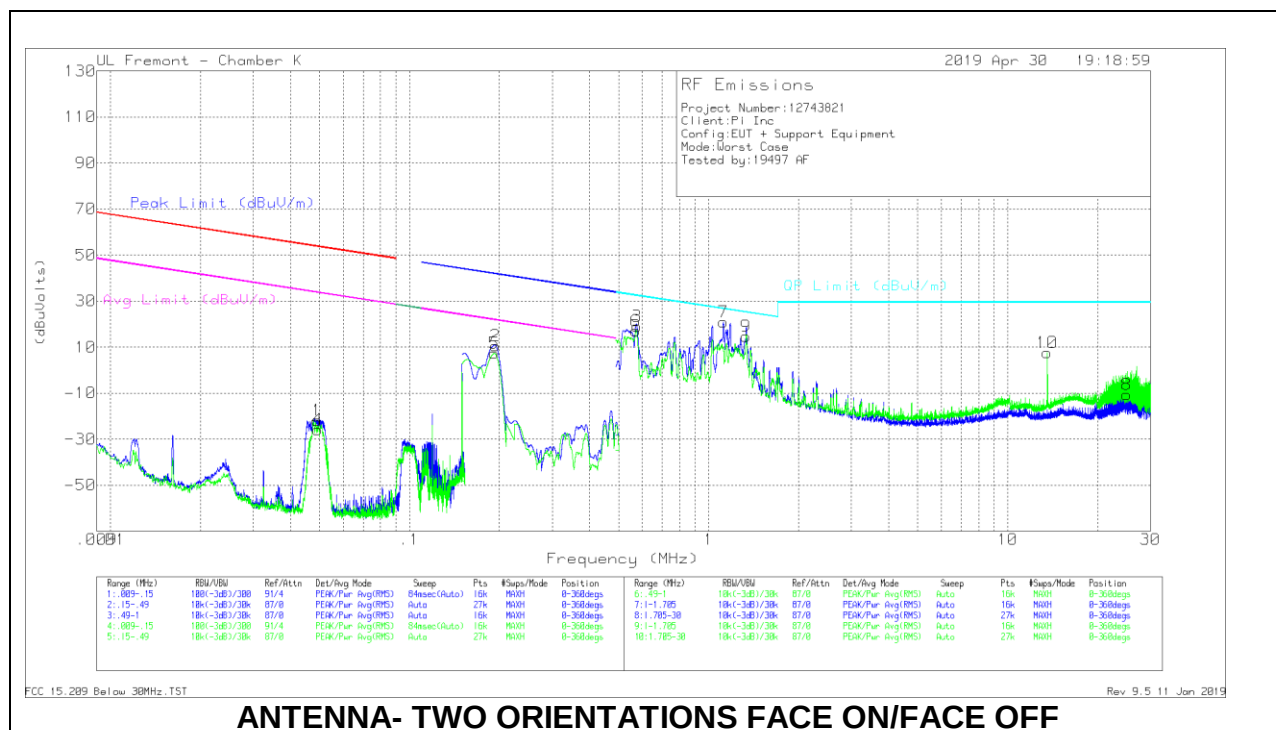
Pk - Peak detector

PK2 - Maximum Peak

MAv1 - RMS Average

9.2.WORST CASE BELOW 30MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

Below 30MHz Data

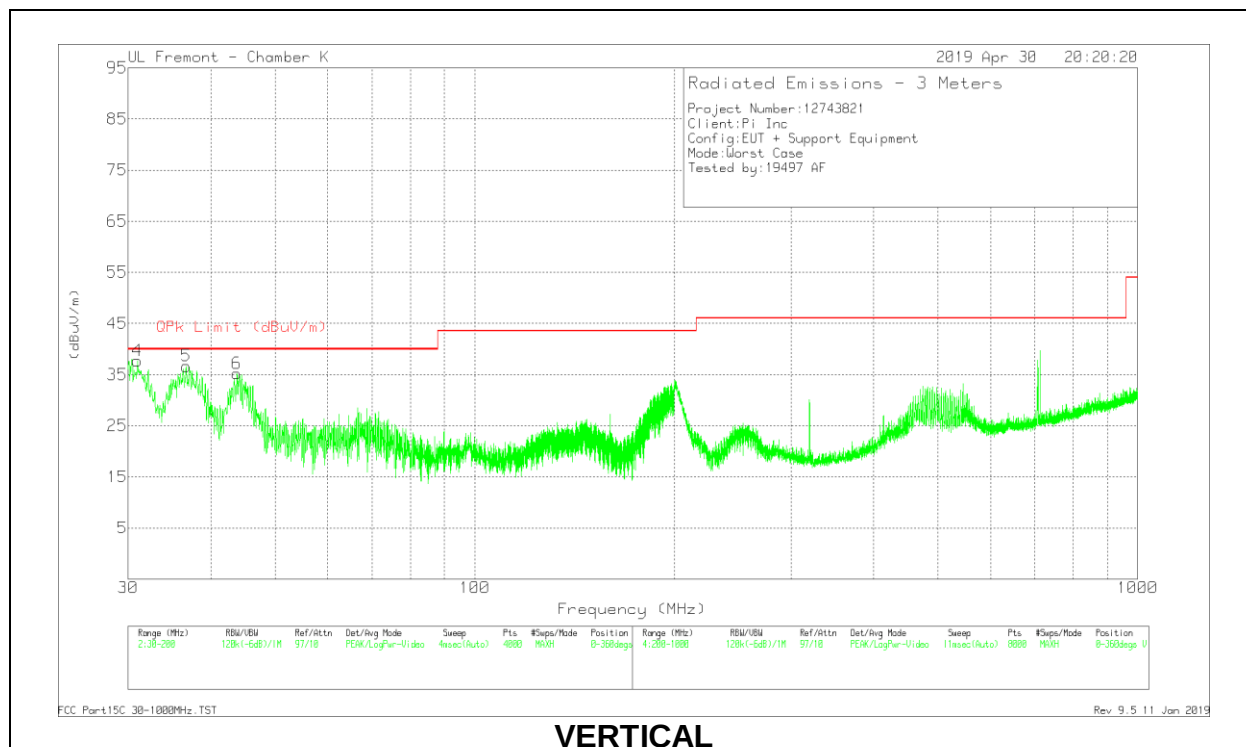
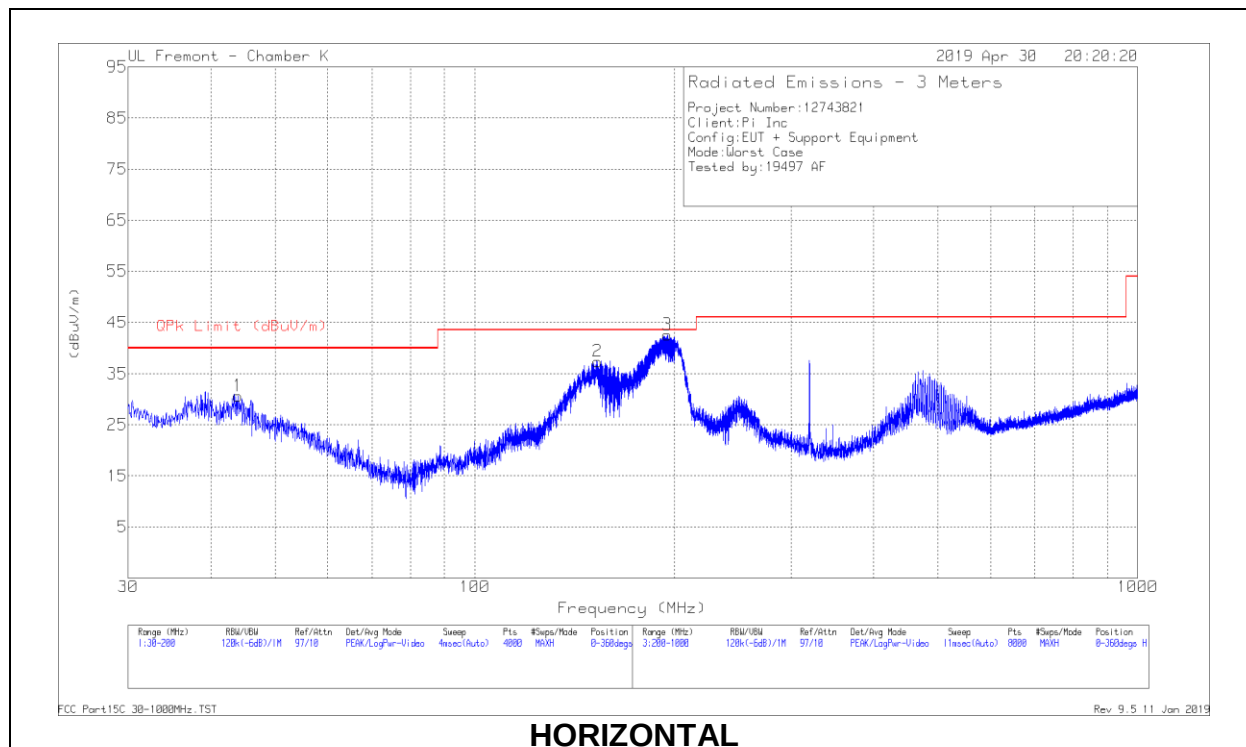
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.04906	33.2	Pk	57.1	-32.2	-80	-21.9	53.77	-75.67	33.77	-55.67	-	-	-	-	0-360
2	.19379	66.5	Pk	56.3	-32.1	-80	10.7	-	-	-	-	41.87	-31.17	21.87	-11.17	0-360
4	.04936	29.22	Pk	57.1	-32.2	-80	-25.88	53.72	-79.6	33.72	-59.6	-	-	-	-	0-360
5	.19204	63.17	Pk	56.2	-32.1	-80	7.27	-	-	-	-	41.95	-34.68	21.95	-14.68	0-360

Pk - Peak detector

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (ACF)	Cables w/ PRE0186650	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.57605	34.92	Pk	56.3	-32.1	-40	19.12	32.4	-13.28	0-360
6	.57083	32.93	Pk	56.3	-32.1	-40	17.13	32.48	-15.35	0-360
7	1.12054	47.14	Pk	45.8	-32.1	-40	20.84	26.64	-5.8	0-360
8	24.97794	26.7	Pk	34.2	-31.6	-40	-10.7	29.5	-40.2	0-360
9	1.33312	41.99	Pk	44.7	-32.1	-40	14.59	25.13	-10.54	0-360
10	13.55998	45.17	Pk	34.3	-31.8	-40	7.67	29.5	-21.83	0-360

Pk - Peak detector

9.3.WORST CASE BELOW 1 GHz



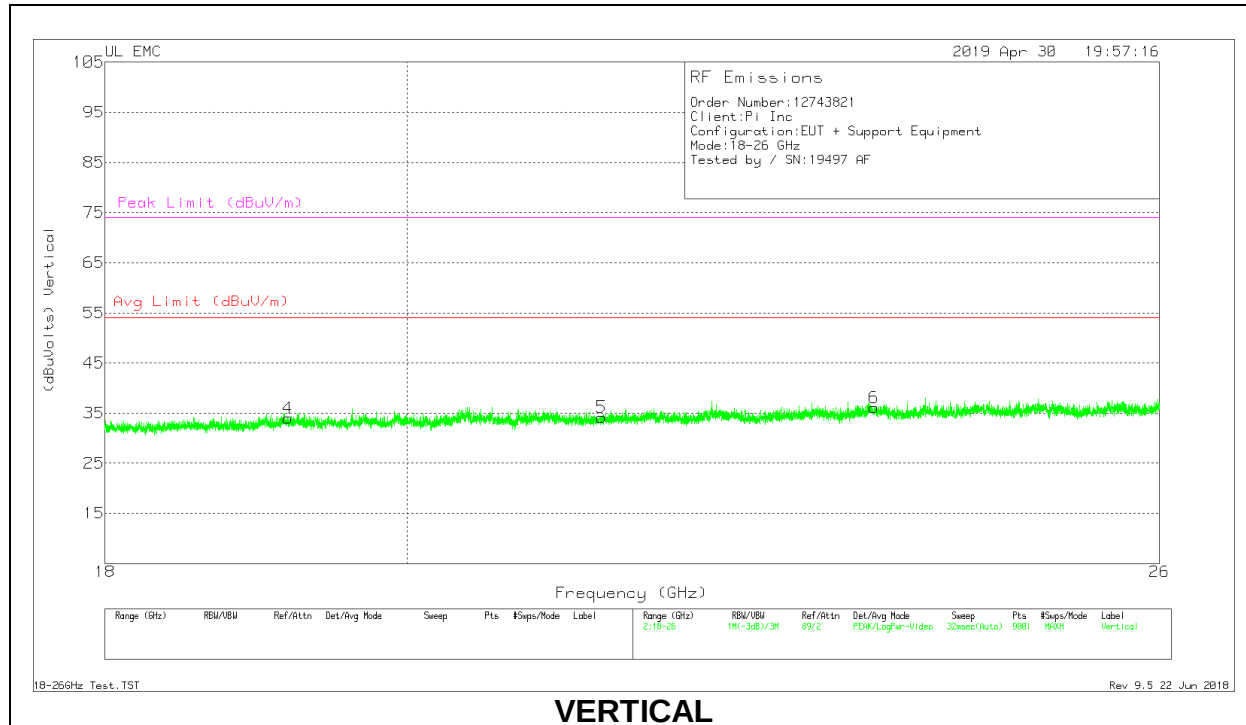
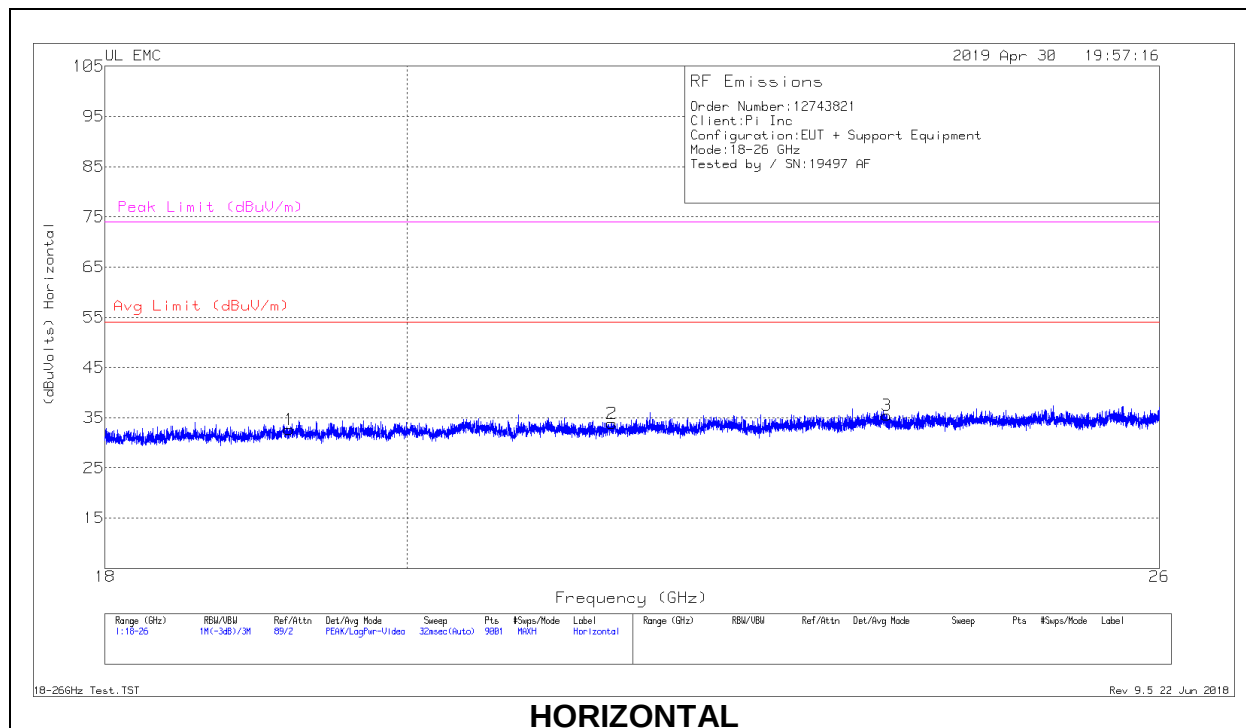
Below 1GHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0184052 (dB/m)	Ampl/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	43.9436	45.32	Pk	16.7	-31.4	30.62	40	-9.38	0-360	399	H
2	153.3244	49.58	Pk	18.3	-30.5	37.38	43.52	-6.14	0-360	199	H
3	195.2269	55.83	Pk	17.7	-30.2	43.33	43.52	-.19	100	164	H
	195.2269	54.73	Qp	17.7	-30.2	42.23	43.52	-1.29	100	164	H
4	31.0641	44.03	Pk	25.9	-31.6	38.33	40	-1.67	33	136	V
	31.0641	39.96	Qp	25.9	-31.6	34.26	40	-5.74	33	136	V
5	36.7613	45.9	Pk	22	-31.4	36.5	40	-3.5	242	102	V
	36.7613	45.12	Qp	22	-31.4	35.72	40	-4.28	242	102	V
6	43.707	51.26	Pk	16.9	-31.4	36.76	40	-3.24	45	104	V
	43.707	46.31	Qp	16.9	-31.4	31.81	40	-8.19	45	104	V

Pk - Peak detector

Qp - Quasi-Peak detector

9.4.WORST CASE 18-26 GHz



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF PRE0182188 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.194	66.55	Pk	33.1	-57.5	-9.5	32.65	54	-21.35	74	-41.35
2	21.48	66.87	Pk	33.7	-57.2	-9.5	33.87	54	-20.13	74	-40.13
3	23.641	67.46	Pk	34.5	-57	-9.5	35.46	54	-18.54	74	-38.54
4	19.185	67.42	Pk	33.2	-57.1	-9.5	34.02	54	-19.98	74	-39.98
5	21.403	67.28	Pk	33.6	-57.2	-9.5	34.18	54	-19.82	74	-39.82
6	23.536	68.21	Pk	34.5	-57.1	-9.5	36.11	54	-17.89	74	-37.89

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	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

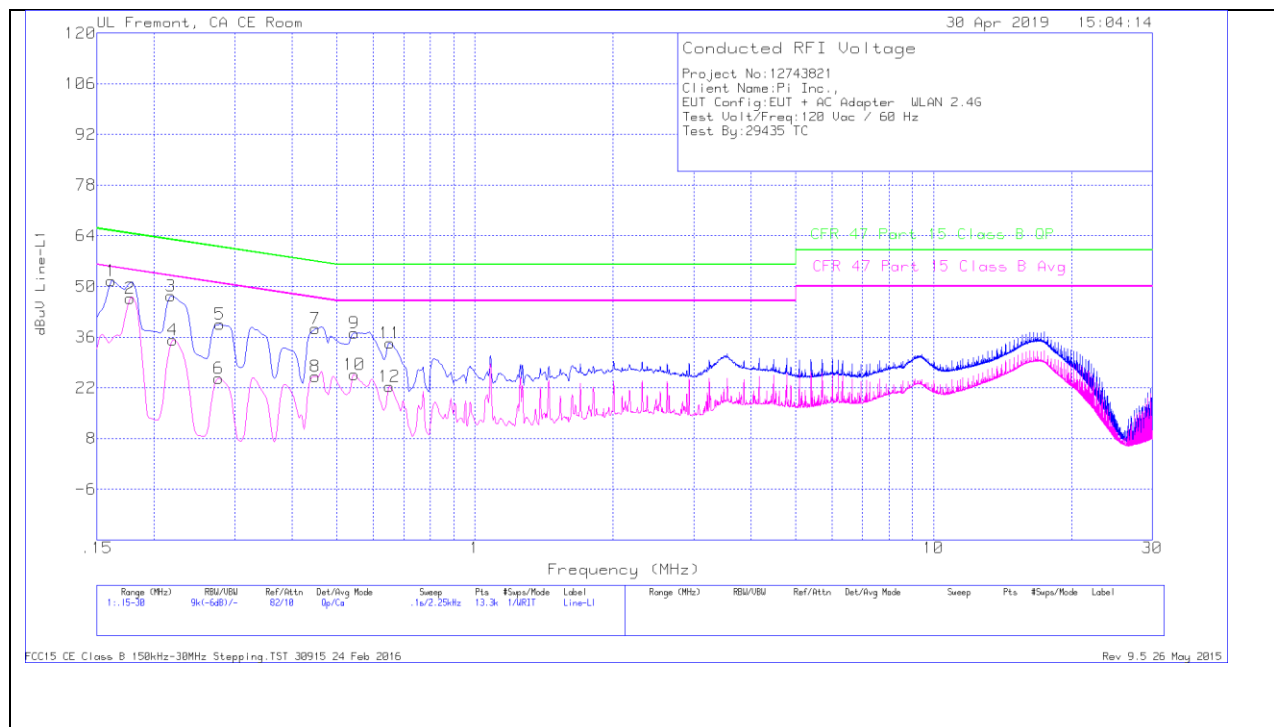
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

LINE 1 RESULTS



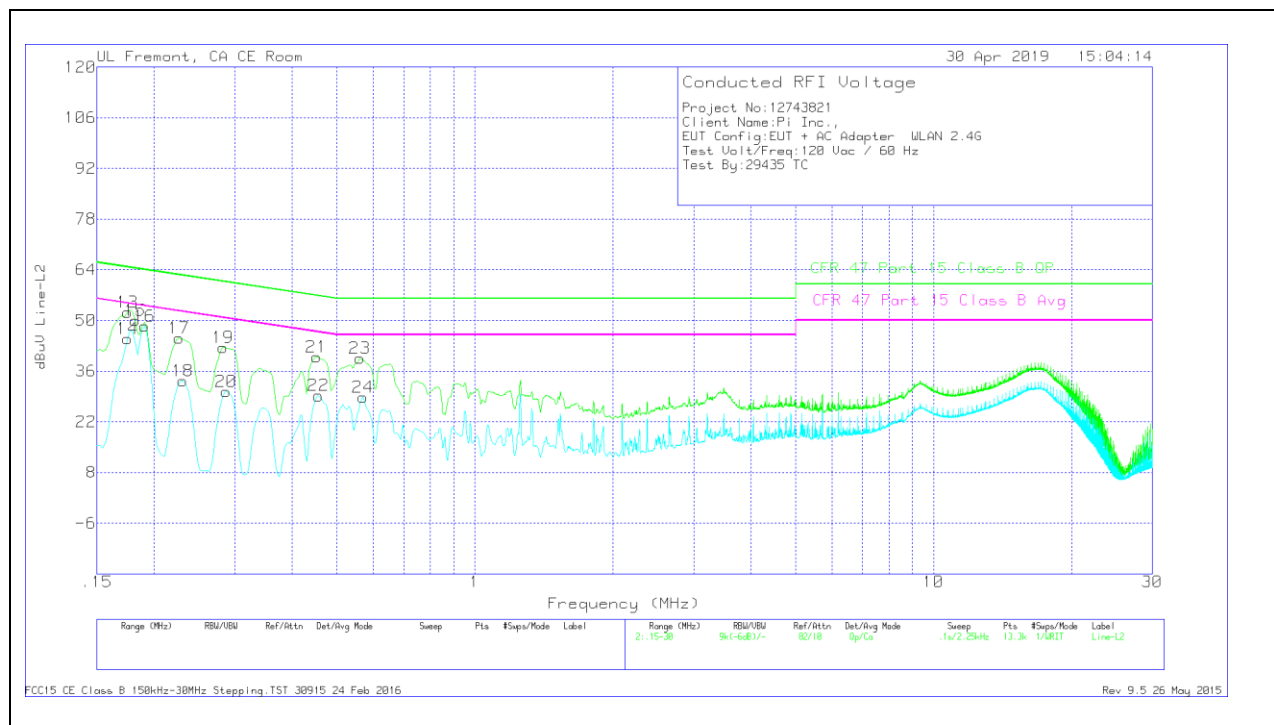
Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables C1&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.16125	41.33	Qp	.1	0	10.1	51.53	65.4	-13.87	-	-
2	.177	36.6	Ca	0	0	10.1	46.7	-	-	54.63	-7.93
3	.2175	37.24	Qp	0	0	10.1	47.34	62.91	-15.57	-	-
4	.21975	25.05	Ca	0	0	10.1	35.15	-	-	52.83	-17.68
5	.27825	29.44	Qp	0	0	10.1	39.54	60.87	-21.33	-	-
6	.276	14.5	Ca	0	0	10.1	24.6	-	-	50.94	-26.34
7	.44925	28.24	Qp	0	0	10.1	38.34	56.89	-18.55	-	-
8	.44925	15.11	Ca	0	0	10.1	25.21	-	-	46.89	-21.68
9	.546	27.09	Qp	0	0	10.1	37.19	56	-18.81	-	-
10	.546	15.59	Ca	0	0	10.1	25.69	-	-	46	-20.31
11	.654	24.32	Qp	0	0	10.1	34.42	56	-21.58	-	-
12	.65175	12.24	Ca	0	0	10.1	22.34	-	-	46	-23.66

Qp - Quasi-Peak detector

Ca - CISPR average detection

LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables C2&C3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
13	.17475	42.08	Qp	0	0	10.1	52.18	64.73	-12.55	-	-
14	.17475	34.92	Ca	0	0	10.1	45.02	-	-	54.73	-9.71
15	.1815	39.94	Qp	0	0	10.1	50.04	64.42	-14.38	-	-
16	.1905	38.39	Ca	0	0	10.1	48.49	-	-	54.01	-5.52
17	.2265	35.05	Qp	0	0	10.1	45.15	62.58	-17.43	-	-
18	.231	23.19	Ca	0	0	10.1	33.29	-	-	52.41	-19.12
19	.28275	32.47	Qp	0	0	10.1	42.57	60.73	-18.16	-	-
20	.28725	20.23	Ca	0	0	10.1	30.33	-	-	50.6	-20.27
21	.4515	29.86	Qp	0	0	10.1	39.96	56.85	-16.89	-	-
22	.456	19.13	Ca	0	0	10.1	29.23	-	-	46.77	-17.54
23	.56175	29.42	Qp	0	0	10.1	39.52	56	-16.48	-	-
24	.57075	18.67	Ca	0	0	10.1	28.77	-	-	46	-17.23

Qp - Quasi-Peak detector

Ca - CISPR average detection