



# TEST REPORT

**Report Number:** 13426664-E1V3

**Applicant :** LOGITECH INC.  
7700 GATEWAY BLVD,  
NEWARK, CA 94560, U.S.A.

**Model :** VR0014

**FCC ID :** JNZVR0014

**IC :** 4418A-VR0014

**EUT Description :** DOORBELL

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

**Date of Issue:**  
October 30, 2020

**Prepared by:**  
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NVLAP Lab code: 200065-0

## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	10/5/2020	Initial Issue	--
V2	10/20/2020	Revised report to address TCB's questions	Tina Chu
V3	10/30/2020	Corrected firwmware version	Tina Chu

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** LOGITECH INC.  
7700 GATEWAY BLVD,  
NEWARK, CA 94560, U.S.A.

**EUT DESCRIPTION:** DOORBELL

**MODEL:** VR0014

**SERIAL NUMBER:** 2031LZN1G3W8 (CONDUCTED)  
2031LZN1FXL8; 2031LZN1FXC8(RADIATED)

**DATE TESTED:** AUGUST 26, 2020 – OCTOBER 01, 2020


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



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Francisco DeAnda  
OPERATIONS LEAD  
UL Verification Services Inc.

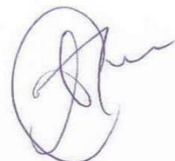
Prepared By:



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Eric Yu  
TEST ENGINEER  
UL Verification Services Inc.

Reviewed By:



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Tina Chu  
SENIOR PROJECT ENGINEER  
UL Verification Services Inc.

## 2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	ANSI C63.10 Section 11.6.
-	RSS-GEN 6.7	99% OBW	Reporting purposes only	ANSI C63.10 Section 6.9.3.
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW	Complies	None.
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Complies	None.
See Comment		Average power	Complies	Per ANSI C63.10, Section 11.9.2.3.2.
15.247 (e)	RSS-247 5.2 (b)	PSD	Complies	None.
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions	Complies	None.
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Complies	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Complies	None.

## 3. 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, KDB 662911 D01 Multiple Transmitter Output v02r01, RSS-GEN Issue 5, and RSS-247 Issue 2.

## 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions were measured at 47658 Kato Road 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
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input type="checkbox"/> Chamber I
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input type="checkbox"/> Chamber J
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F	<input checked="" type="checkbox"/> Chamber K
	<input type="checkbox"/> Chamber G	<input type="checkbox"/> Chamber L
	<input type="checkbox"/> Chamber H	<input type="checkbox"/> Chamber M

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: 2324B.

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

## 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 5.1. METROLOGICAL TRACEABILITY

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

### 5.2. DECISION RULES

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

### 5.3. MEASUREMENT UNCERTAINTY

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

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

PARAMETER	U <sub>Lab</sub>
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.39 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.07 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	4.26 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.39 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.19 dB

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

### 5.4. SAMPLE CALCULATION

#### **RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:

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

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

#### **MAINS CONDUCTED EMISSIONS**

Where relevant, the following sample calculation is provided:

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

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



## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is an outdoor doorbell with camera and 2.4G b/g/n HT20, 5G a/n HT20/HT40, 5G ac VHT20/VHT40/VHT80 2x2 radios, wall mounted device.

### 6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

#### 2.4GHz BAND

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
<b>2Tx</b>			
2412 - 2462	802.11b	20.64	115.88
	802.11n HT20 CDD	27.30	537.03

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes two PCB monopoles antennas, with a maximum gain of:

Frequency Band (MHz)	Antenna 1 Antenna Gain (dBi)	Antenna 2 Antenna Gain (dBi)
2412-2462	-0.79	2.15

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 7.35

The test utility software used during testing was Putty Release 0.70

## 6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

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

The EUT is a wall mounted device and only has one position which is portrait. Therefore, all final radiated testing was performed with the EUT in portrait orientation.

802.11g mode is covered by 802.11n HT20 mode since it has the same power as HT20. Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps

802.11n HT20mode: MCS0

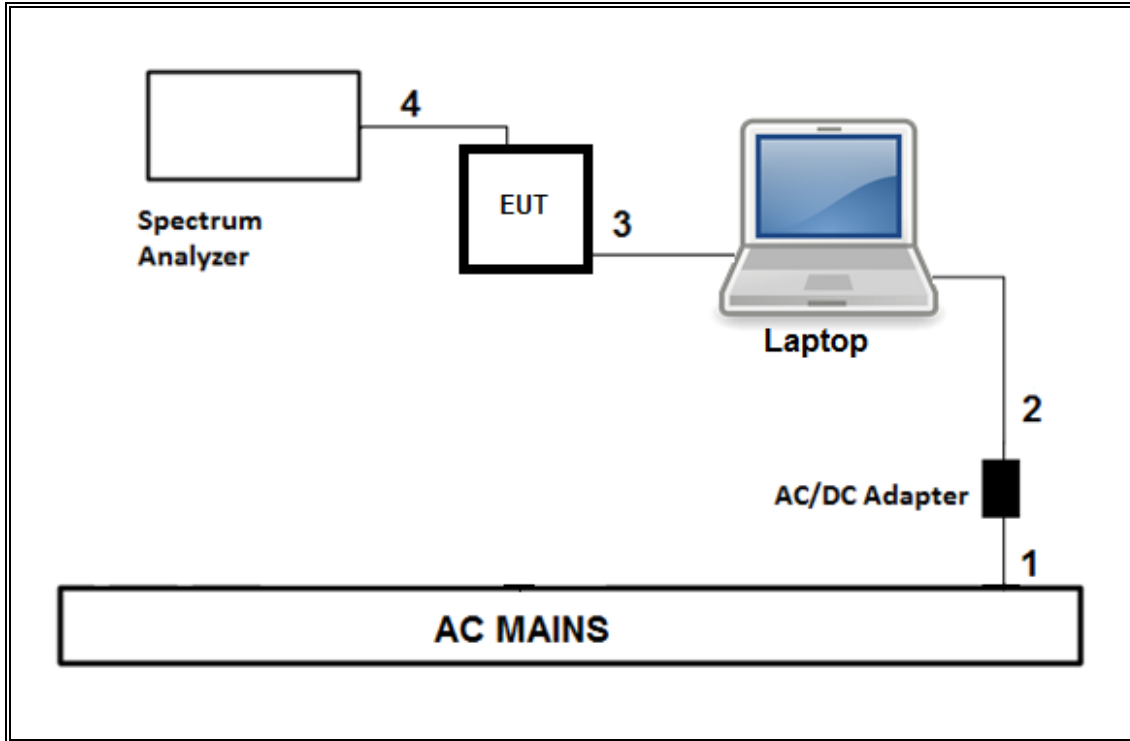
## 6.6. DESCRIPTION OF TEST SETUP

SUPPORT TEST EQUIPMENT						
Description	Manufacturer	Model	Serial Number	FCC ID/ DoC		
Laptop	Dell	Latitude E7240	669002989NB001	DoC		
Laptop AC/DC adapter	Dell	LP90PM111	CN-0Y4M8K-72438-32Q-5B21-A00	DoC		
Debug board	Logitech	210-002122_003	Version 003	DoC		
BellTransformer	Heath-Zenith	ZT-125	Not available	N/A		
Chime Box	Dongguan Smart Hero Electronic Products Co Ltd	3101-HD	Not available	N/A		
Chime Kit	Logitech	Z00008	C280	DoC		
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	1	AC Mains to AC/DC Adapter
2	DC	1	DC	Shielded	1.5	AC/DC Adapter to Laptop
3	USB	1	UART	Shielded	1.5	EUT to Laptop
4	Antenna	1	SMA	Un-shielded	1.1	To spectrum analyzer
I/O CABLES (RF RADIATED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	1	
2	DC	1	DC	Shielded	1.5	AC/DC Adapter to Laptop
3	USB	1	USB	Shielded	1	Laptop to debug board
3 (b)	USB	1	USB	Shielded	10	Laptop to debug board
4	USB	1	USB to Serial	Un-shielded	1	Debug board to EUT
5	AC	1	AC	Un-shielded	1	
6	DC	1	DC	Un-shielded	1.5	AC/DC Adapter to debug board
I/O CABLES (AC LINE CONDUCTED)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Un-shielded	0.2	
2	AC	1	AC	Un-shielded	2.0	Transformer -AC to EUT and Chime Kit
3	AC	1	AC	Un-shielded	0.2	Chime kit to chime box

**TEST SETUP-CONDUCTED TEST**

The EUT was connected to the test laptop via USB cable. Test software exercised the EUT.

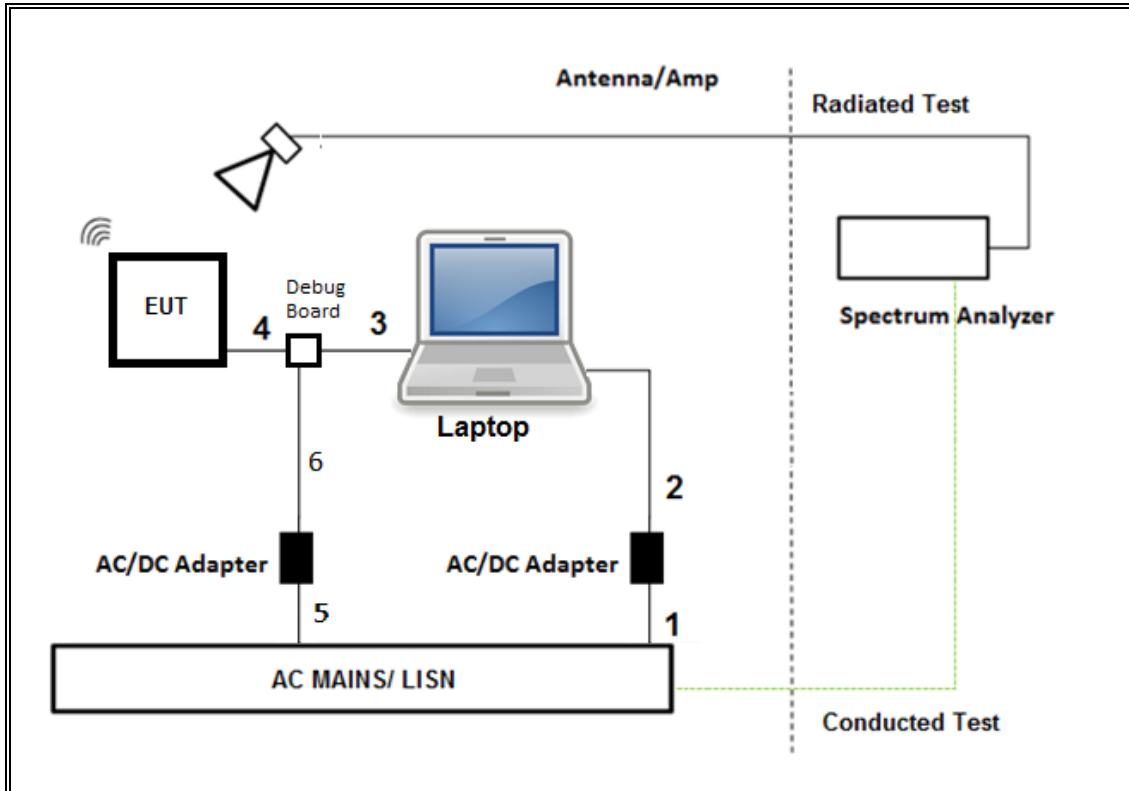
**SETUP DIAGRAM**



**TEST SETUP- RADIATED TEST ABOVE 1GHz**

The EUT was connected to laptop via debug board. Test software exercised the EUT.

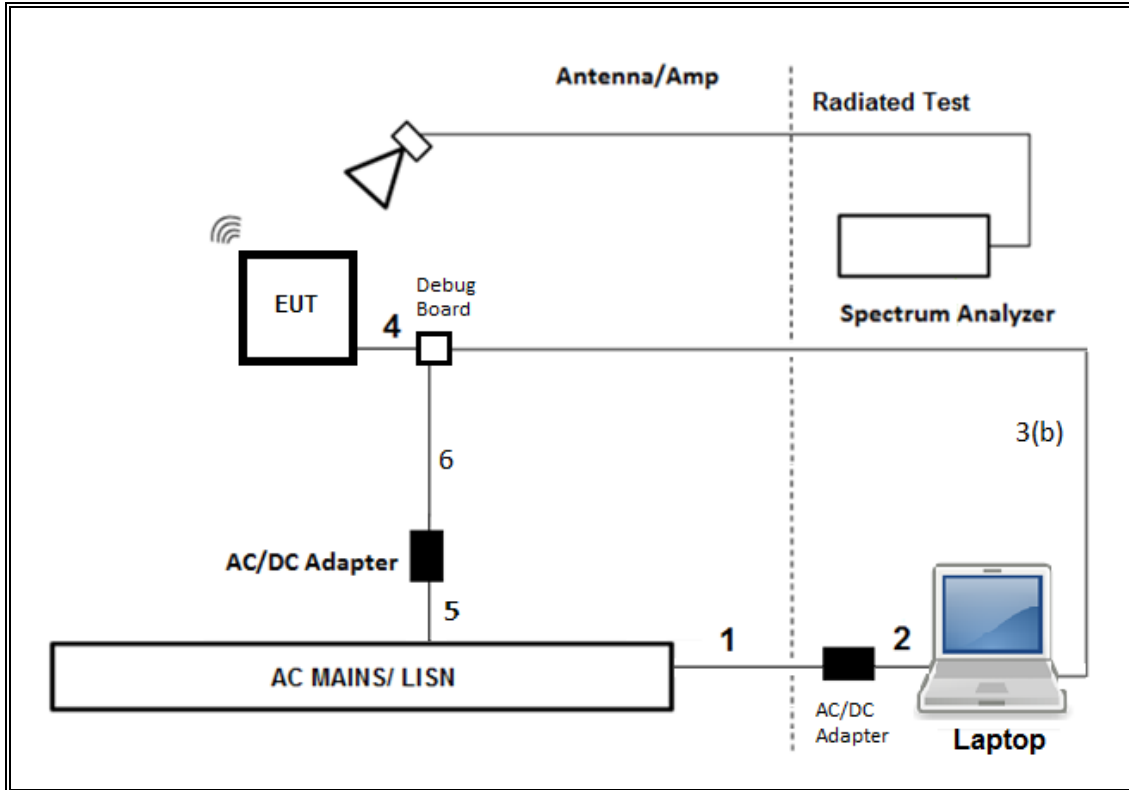
**SETUP DIAGRAM**



**TEST SETUP- RADIATED TEST FOR BELOW 1GHz TEST**

The EUT was connected to laptop via debug board. Test laptop was outside of the chamber. Test software exercised the EUT.

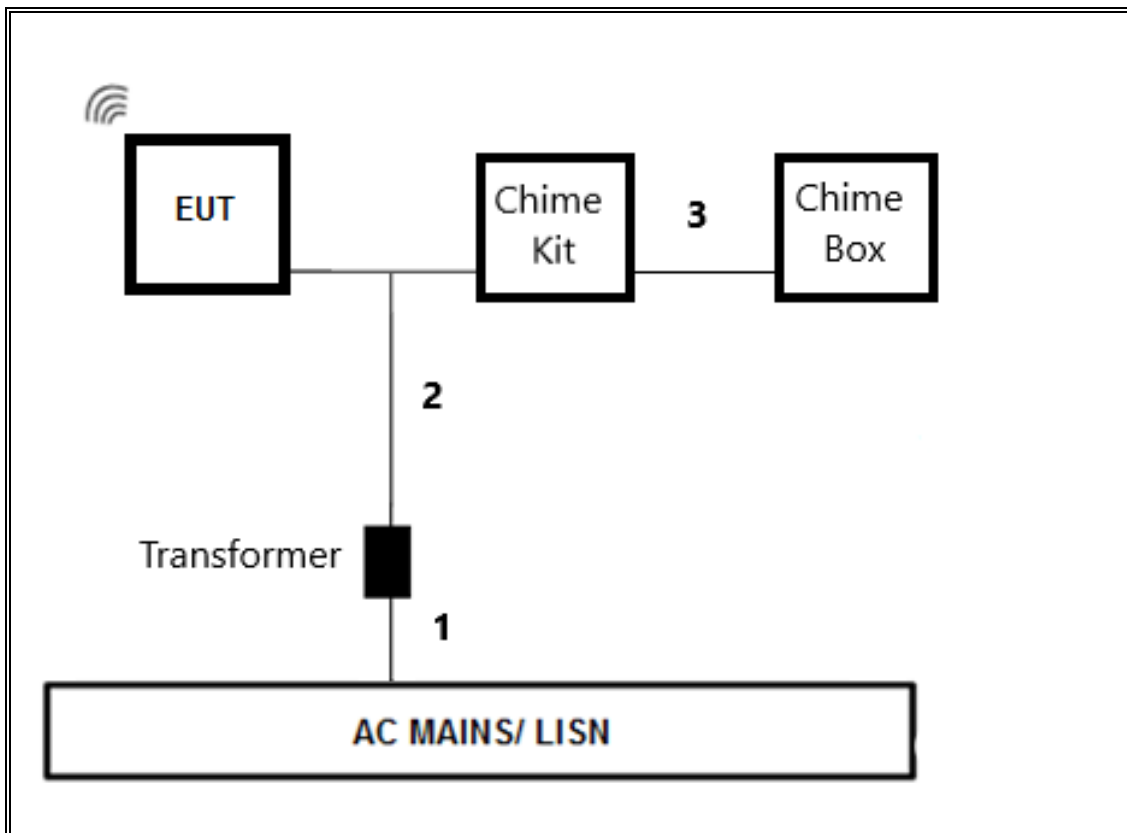
**SETUP DIAGRAM**



**TEST SETUP- AC LINE CONDUCTED TEST**

The EUT was connected Chime Kit, powered by a transformer. Test software exercised the EUT.

**SETUP DIAGRAM**



## 7. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10 Section 11.6

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

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



## 8. TEST AND MEASUREMENT EQUIPMENT

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

<b>TEST EQUIPMENT LIST</b>				
<b>Description</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Asset</b>	<b>Cal Due</b>
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO METRICS	EM-6871	PRE0179465	07/27/2021
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO METRICS	EM-6872	PRE0179467	07/27/2021
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T863	08/31/2021
Amplifier, 100MHz-18GHz	AMPLICAL	AMP0.1G18-47-20	PRE0197319	05/04/2021
Antenna, Broadband Hybrid, 30MHz to 3GHz	SunAR rf motion	JB3	PRE0181574	10/14/2020
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	175953	01/23/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179376	04/03/2021
Antenna Horn, 18 to 26GHz	ARA	SWH-28	T448	05/20/2021
High Frequency Amplifier Switch Box	Agilent Technology	8449B	PRE0183142	04/08/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1268	01/22/2021
Power Sensor, P-series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T413	02/26/2021
<b>AC Line Conducted</b>				
<b>Description</b>	<b>Manufacturer</b>	<b>Model</b>	<b>ID Num</b>	<b>Cal Due</b>
LISN	Fischer Custom Communications, Inc	FCC-LISN-50/250-25-2-01-480V	PRE0186446	01/21/2021
L.I.S.N	FCC INC.	FCC LISN 50/250	24	01/21/2021
EMI TEST RECEIVER	Rohde & Schwarz	ESR	T1436	02/20/2021
Transient Limiter	COM-POWER	LIT-930A	PRE0129246	01/23/2021
<b>UL AUTOMATION SOFTWARE</b>				
Radiated Software	UL	UL EMC	Rev 9.5, 30 Apr, 2020	
Antenna Port Software	UL	UL RF	AP2020.9.1	
AC Line Conducted Software	UL	UL EMC	Rev 9.5, 07 Jul 2020	

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

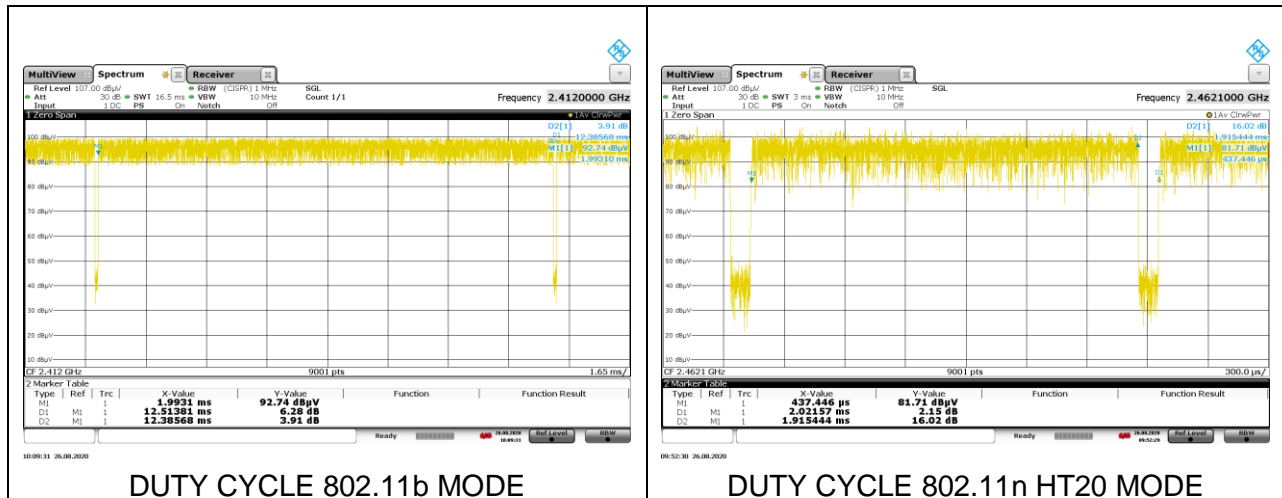
ANSI C63.10 Section 11.6 Zero-Span Spectrum Analyzer Method.

Tested by:	16080 ZS
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#### ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
<b>2.4GHz Band</b>						
802.11b 1TX	12.39	12.51	0.990	98.98%	0.00	0.010
802.11n HT20 1TX	1.92	2.02	0.947	94.75%	0.23	0.522

#### DUTY CYCLE PLOTS



## 9.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

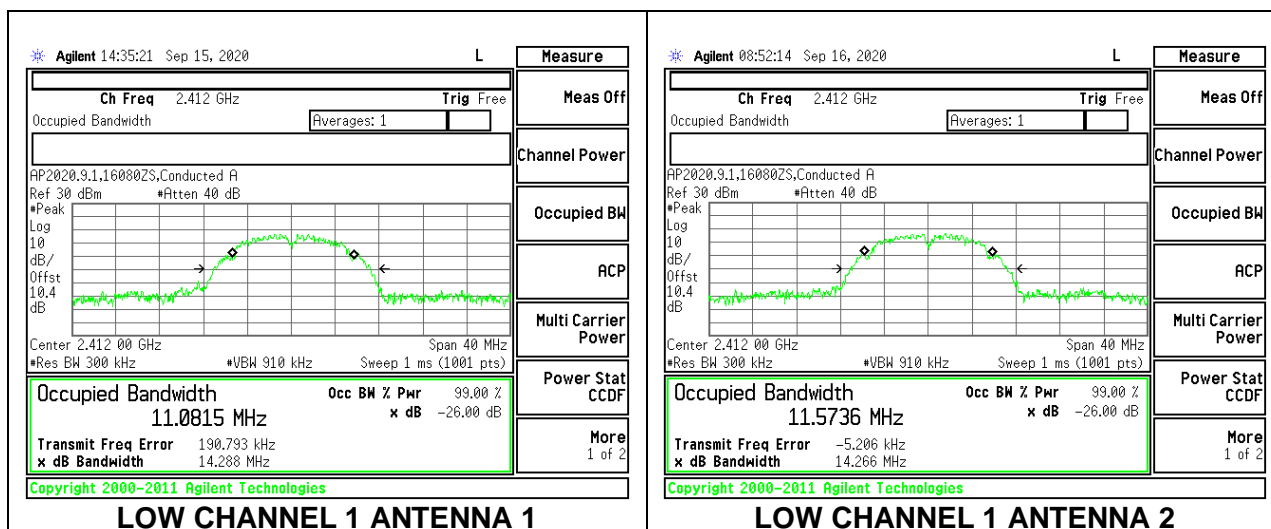
### RESULTS

#### 9.2.1. 802.11b MODE

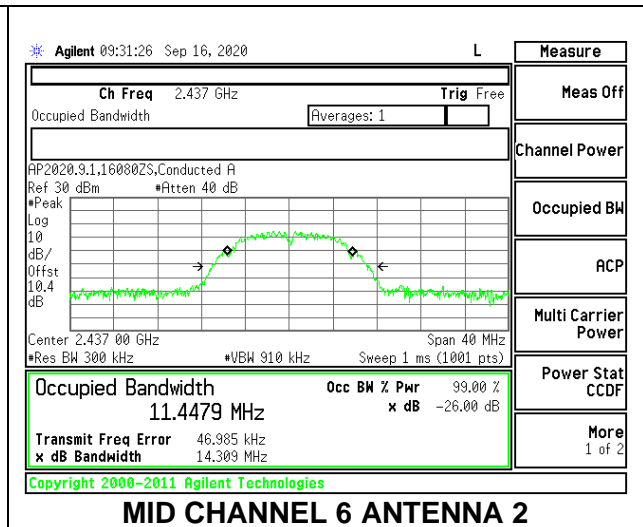
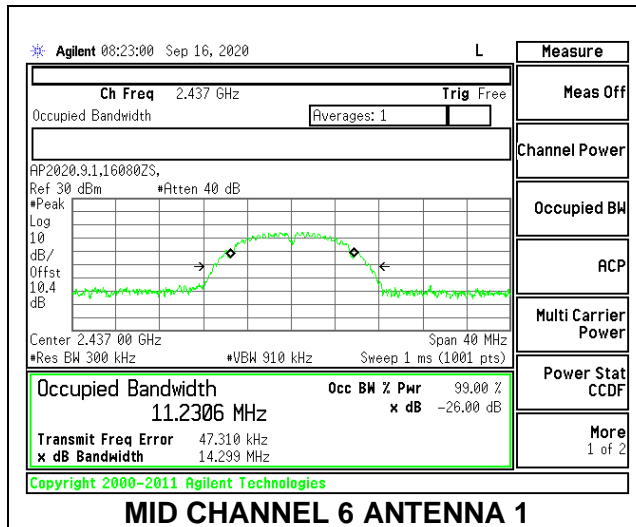
#### 2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low 1	2412	11.081	11.573
Mid 6	2437	11.230	11.447
High 11	2462	11.100	11.729

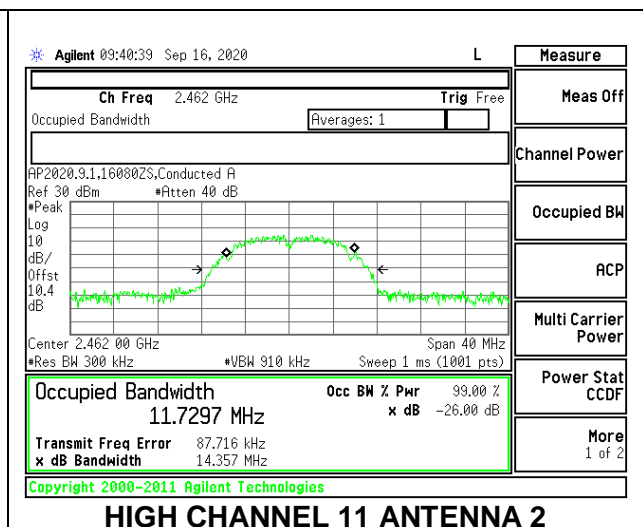
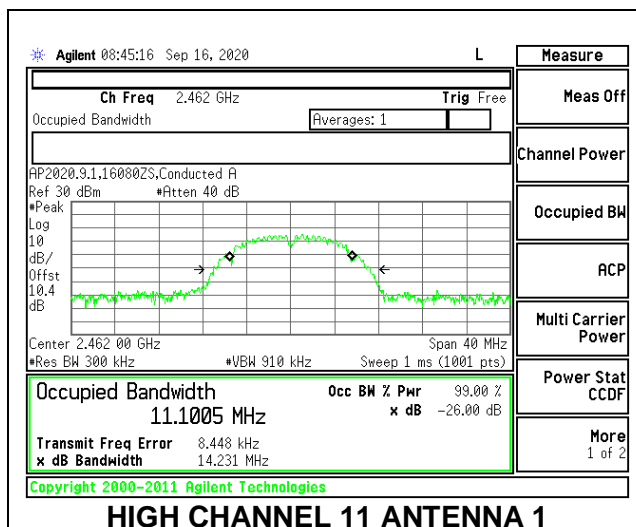
### LOW CHANNEL 1



### MID CHANNEL 6



### HIGH CHANNEL 11

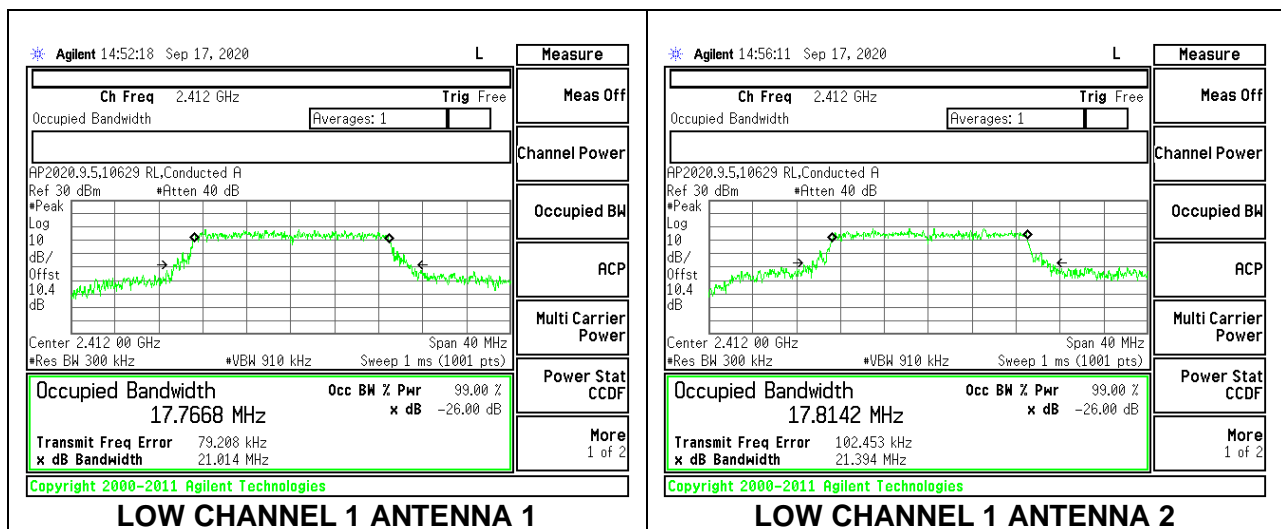


### 9.2.2. 802.11n HT20 MODE

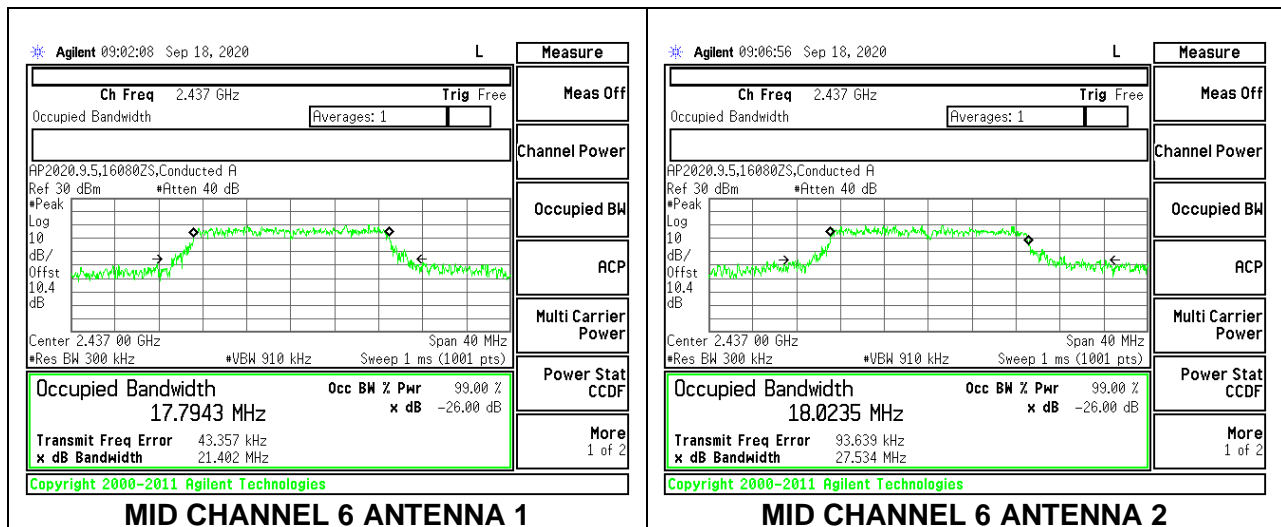
#### 2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	99% Bandwidth Antenna 1 (MHz)	99% Bandwidth Antenna 2 (MHz)
Low 1	2412	17.766	17.814
Mid 6	2437	17.794	18.023
High 11	2462	17.754	18.133

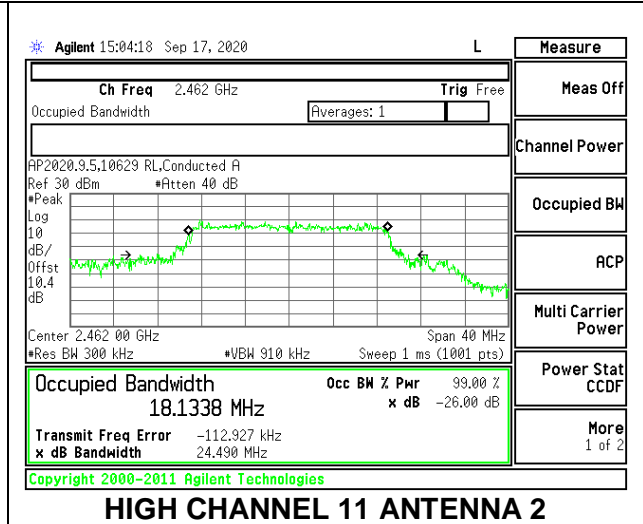
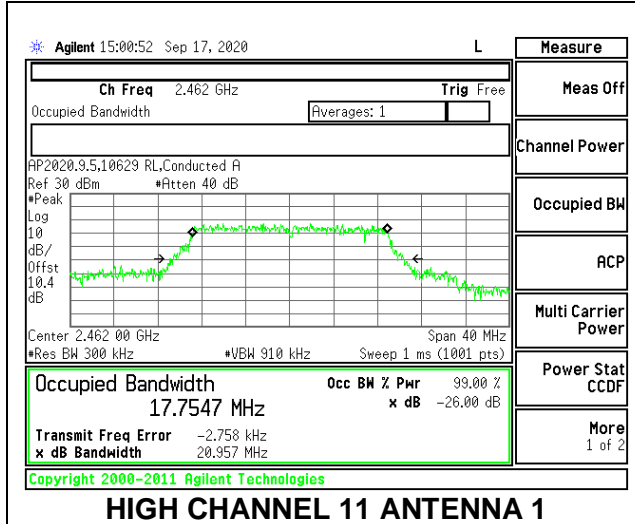
#### LOW CHANNEL 1



#### MID CHANNEL 6



### HIGH CHANNEL 11



### 9.3. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

RSS-247 5.2 (a)

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

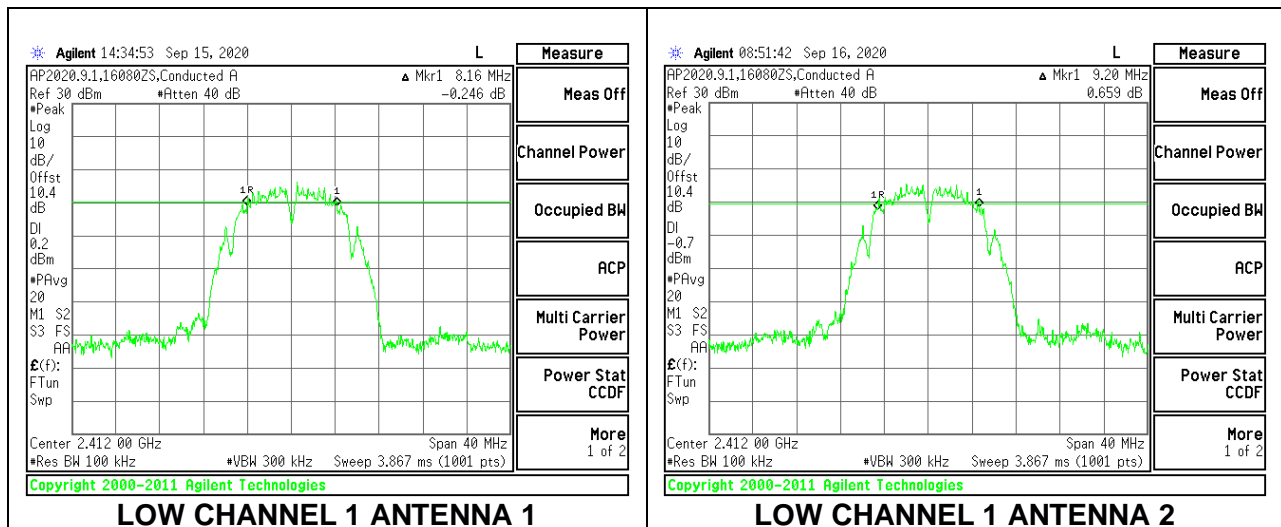
#### RESULTS

##### 9.3.1. 802.11b MODE

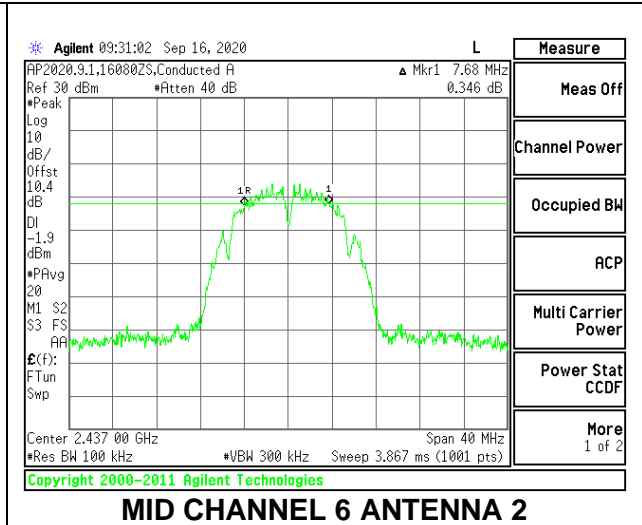
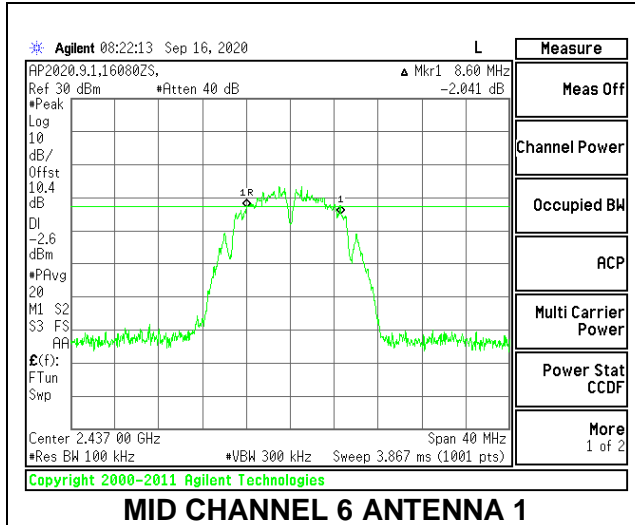
##### 2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	6 dB BW Antenna 1 (MHz)	6 dB BW Antenna 2 (MHz)	Minimum Limit (MHz)
Low 1	2412	8.16	9.20	0.5
Mid 6	2437	8.60	7.68	0.5
High 11	2462	8.60	8.56	0.5

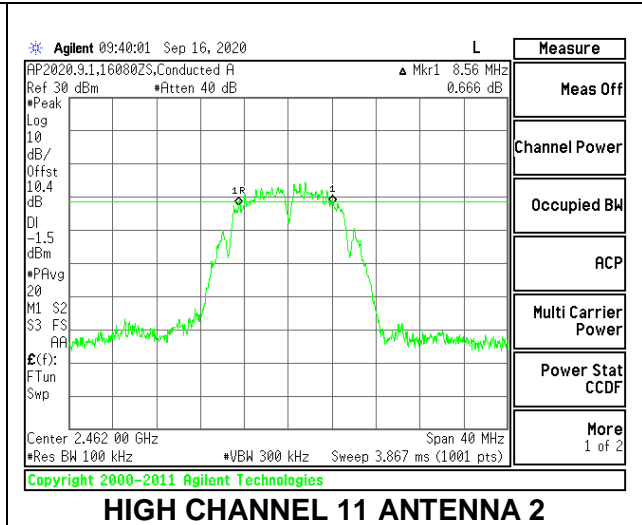
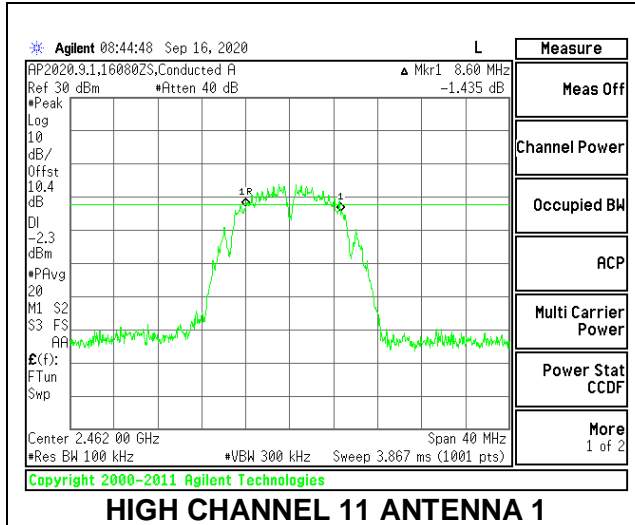
#### LOW CHANNEL 1



### MID CHANNEL 6



### HIGH CHANNEL 11



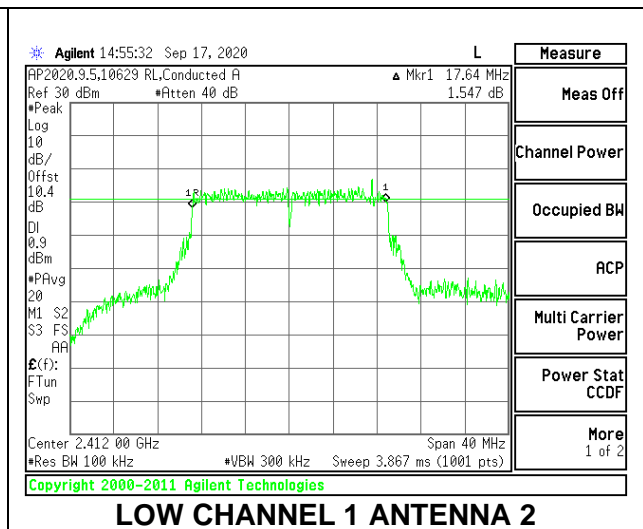
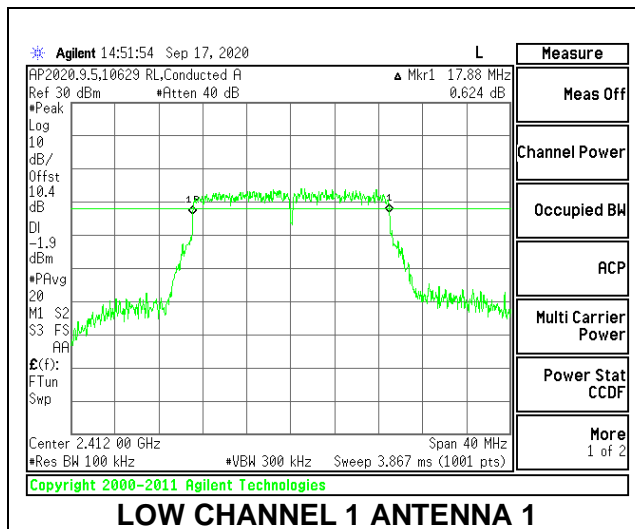


### 9.3.2. 802.11n HT20 MODE

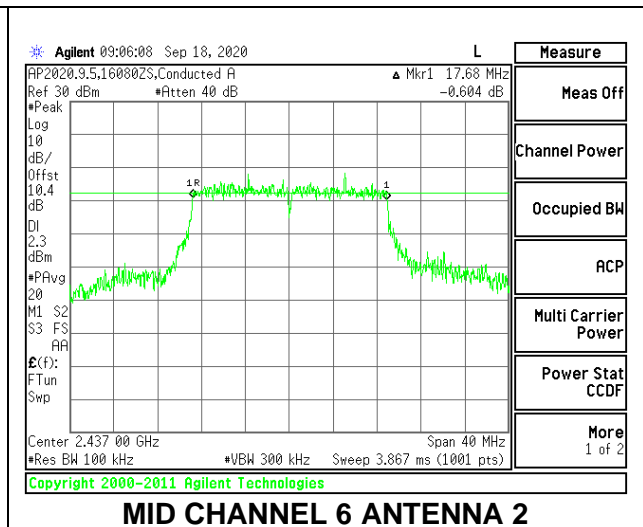
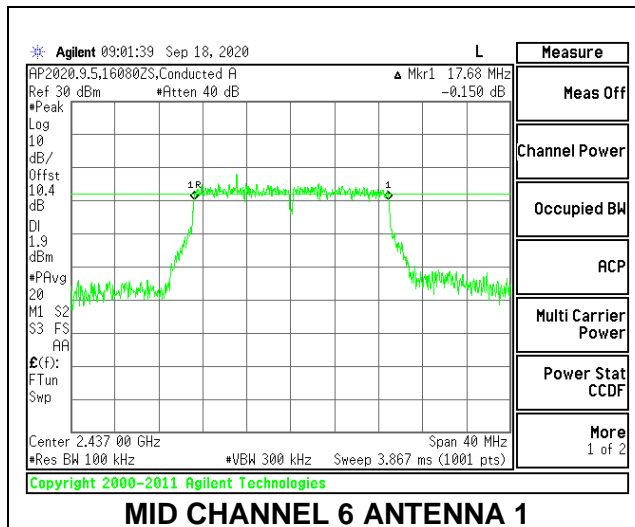
#### 2TX Antenna 1 + Antenna 2 CDD MODE

Channel	Frequency (MHz)	6 dB BW Antenna 1 (MHz)	6 dB BW Antenna 2 (MHz)	Minimum Limit (MHz)
Low 1	2412	17.88	17.64	0.5
Mid 6	2437	17.68	17.68	0.5
High 11	2462	17.80	16.76	0.5

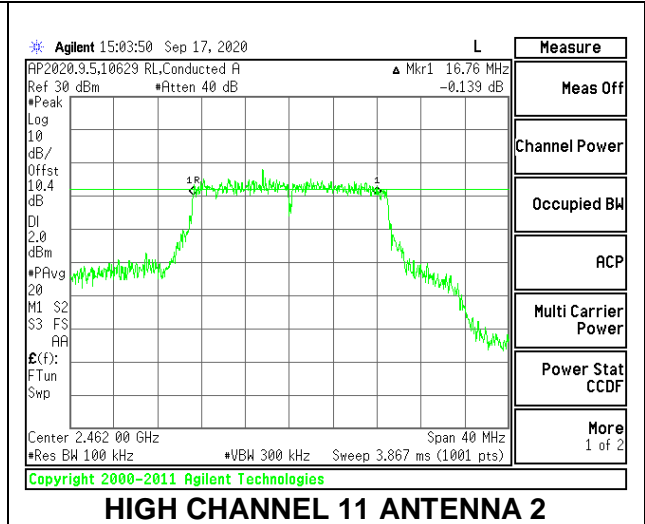
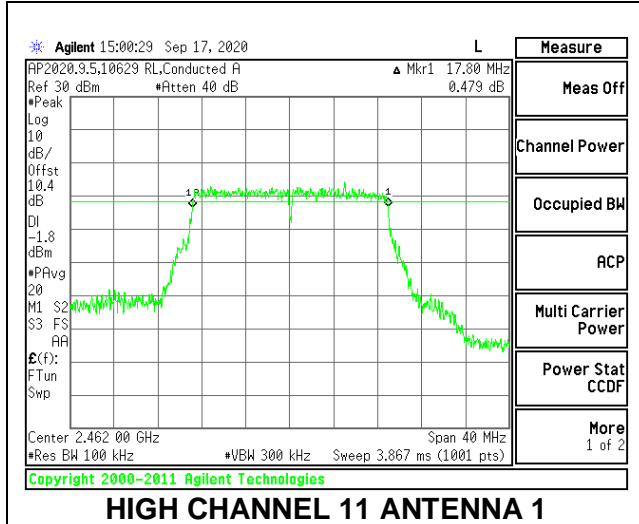
#### LOW CHANNEL 1



#### MID CHANNEL 6



### HIGH CHANNEL 11



## 9.4. OUTPUT POWER

### LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

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

### TEST PROCEDURE

The output power was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband peak power sensor.

Peak output power was read directly from power meter.

### DIRECTIONAL ANTENNA GAIN

For 2 TX:

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

<b>Band (GHz)</b>	<b>Antenna 1 Gain (dBi)</b>	<b>Antenna 2 Gain (dBi)</b>	<b>Uncorrelated Chains Directional Gain (dBi)</b>	<b>Correlated Chains Directional Gain (dBi)</b>
2.4	-0.79	2.15	0.92	3.81

**RESULTS**

**9.4.1. 802.11b MODE**

**2TX Antenna 1 + Antenna 2 CDD MODE**

<b>Test Engineer:</b>	16080
<b>Test Date:</b>	09/16/2020

**Limits**

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.92	30.00	36	30.00
Mid 6	2437	0.92	30.00	36	30.00
High 11	2462	0.92	30.00	36	30.00

**Results**

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	17.45	17.80	20.64	30.00	-9.36
Mid 6	2437	15.49	15.50	18.51	30.00	-11.49
High 11	2462	16.26	16.55	19.42	30.00	-10.58

**9.4.2. 802.11n HT20 MODE**

**2TX Antenna 1 + Antenna 2 CDD MODE**

<b>Test Engineer:</b>	16080
<b>Test Date:</b>	09/18/2020

**Limits**

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC/ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	0.92	30.00	36	30.00
Mid 6	2437	0.92	30.00	36	30.00
High 11	2462	0.92	30.00	36	30.00

**Results**

Channel	Frequency (MHz)	Antenna 1 Meas Power (dBm)	Antenna 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	24.03	23.87	26.96	30.00	-3.04
Mid 6	2437	24.31	24.27	27.30	30.00	-2.70
High 11	2462	24.28	23.77	27.04	30.00	-2.96

## 9.5. AVERAGE POWER

### LIMITS

None; for reporting purposes only

### TEST PROCEDURE

The output power was measured on the EUT antenna port using SMA cable with 10dB attenuator connected to a power meter via wideband average power sensor.

Gated average output power was read directly from power meter.

### RESULTS

#### 9.5.1. 802.11b MODE

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

<b>Test Engineer:</b>	16080
<b>Test Date:</b>	09/18/2020

Channel	Frequency (MHz)	Antenna 1 Power (dBm)	Antenna 2 Power (dBm)	Total Power (dBm)
Low 1	2412	13.90	14.18	17.05
Mid 6	2437	11.78	11.88	14.84
High 11	2462	12.61	12.92	15.78

#### 9.5.2. 802.11n HT20 MODE

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

<b>Test Engineer:</b>	16080
<b>Test Date:</b>	09/18/2020

Channel	Frequency (MHz)	Antenna 1 Power (dBm)	Antenna 2 Power (dBm)	Total Power (dBm)
Low 1	2412	19.05	19.03	22.05
Mid 6	2437	20.39	20.20	23.31
High 11	2462	19.44	19.88	22.68

## 9.6. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

RSS-247 (5.2) (b)

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

### RESULTS

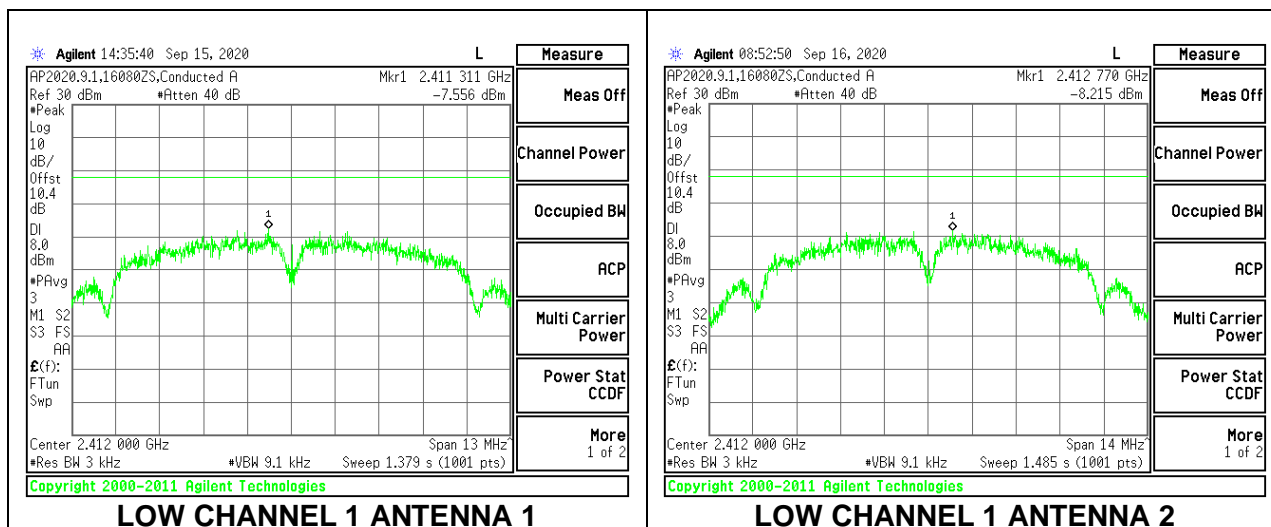
#### 9.6.1. 802.11b MODE

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

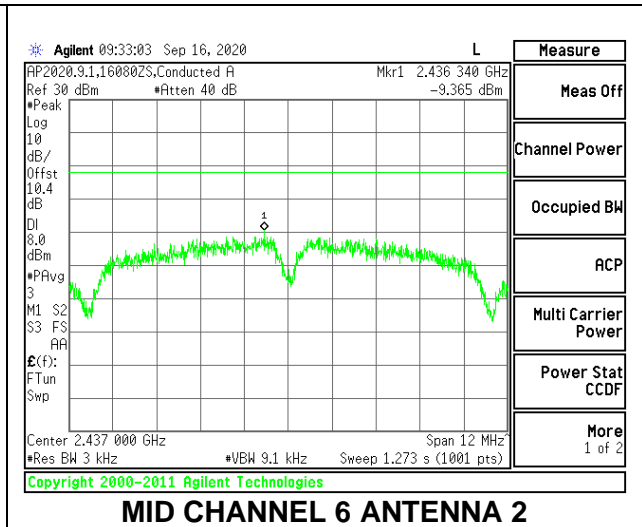
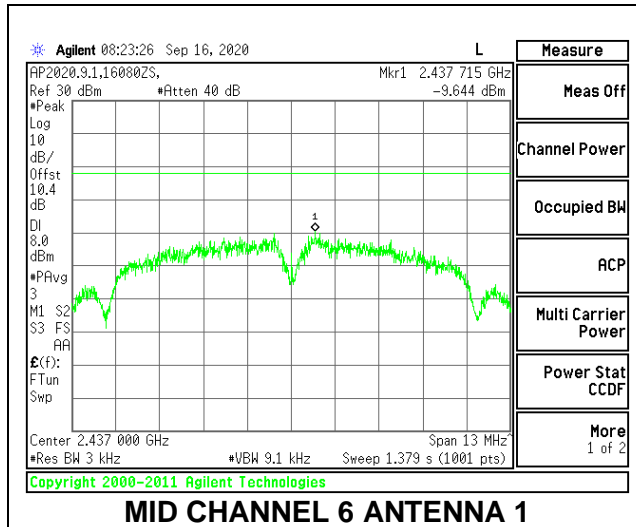
##### PSD Results

Channel	Frequency (MHz)	Antenna 1 Meas (dBm/3kHz)	Antenna 2 Meas (dBm/3kHz)	Total Corr'd PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low 1	2412	-7.56	-8.22	-4.86	8.0	-12.9
Mid 6	2437	-9.64	-9.37	-6.49	8.0	-14.5
High 11	2462	-10.22	-10.35	-7.27	8.0	-15.3

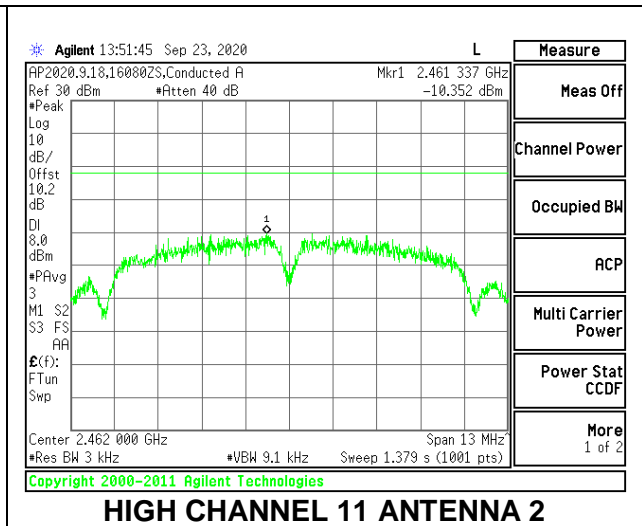
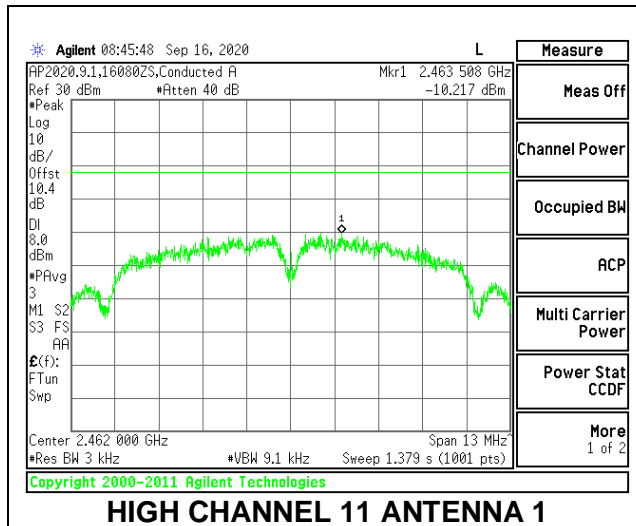
### LOW CHANNEL 1



### MID CHANNEL 6



### HIGH CHANNEL 11





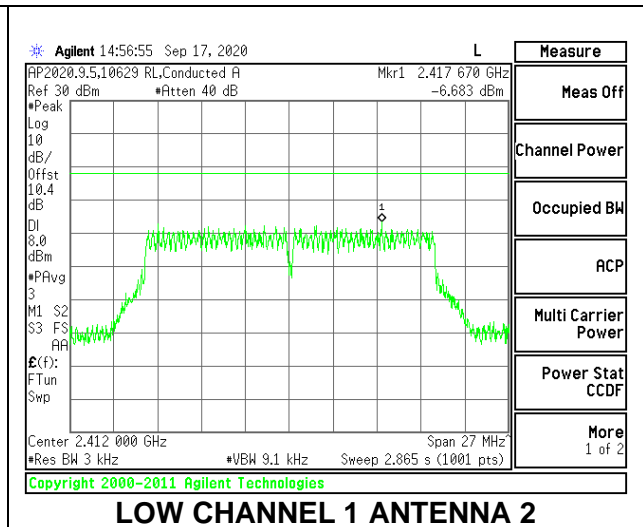
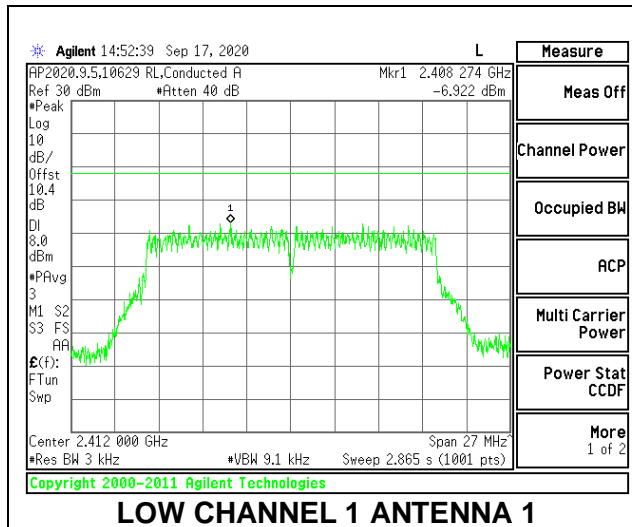
**9.6.2. 802.11n HT20 MODE**

**2TX Antenna 1 + Antenna 2 CDD MODE**

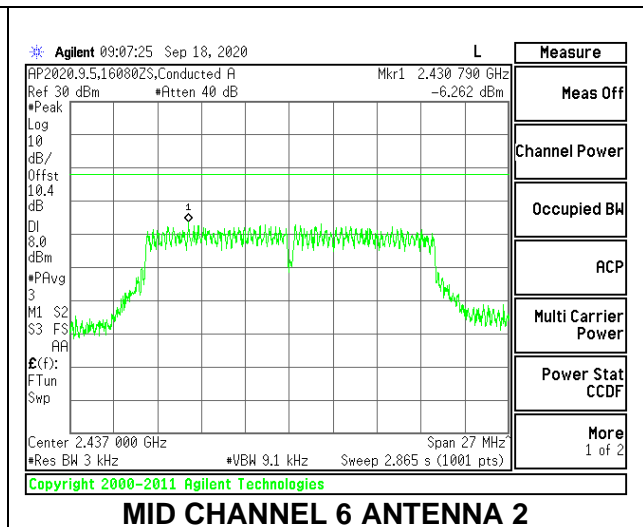
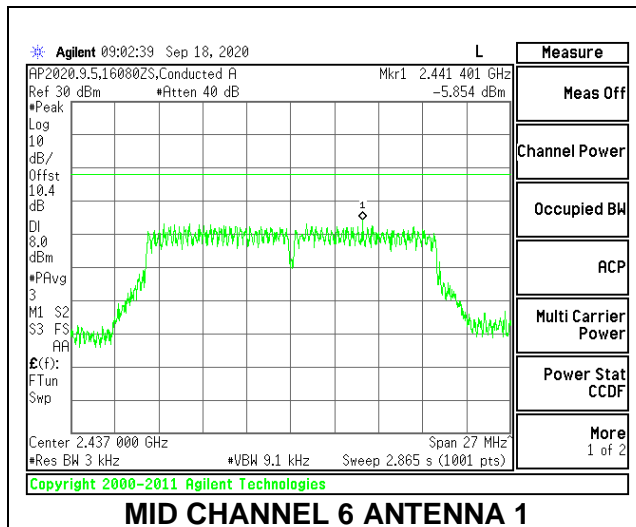
**PSD Results**

Channel	Frequency (MHz)	Antenna 1 Meas (dBm/ 3kHz)	Antenna 2 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-6.92	-6.68	-3.79	8.0	-11.8
Mid 6	2437	-5.85	-6.26	-3.04	8.0	-11.0
High 11	2462	-7.55	-6.86	-4.18	8.0	-12.2

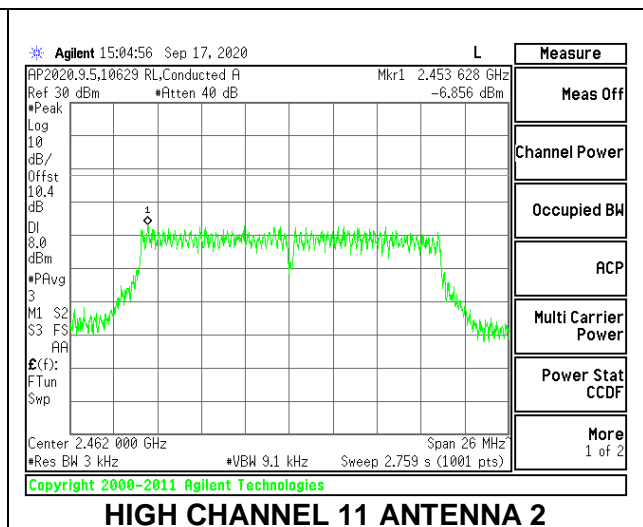
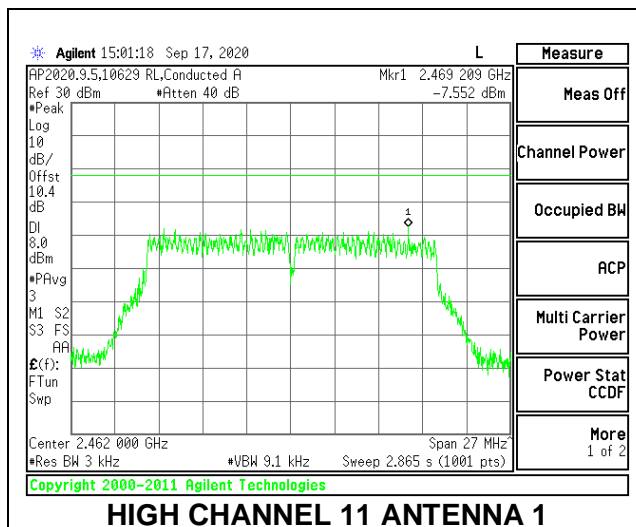
**LOW CHANNEL 1**



### MID CHANNEL 6



### HIGH CHANNEL 11



## **9.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

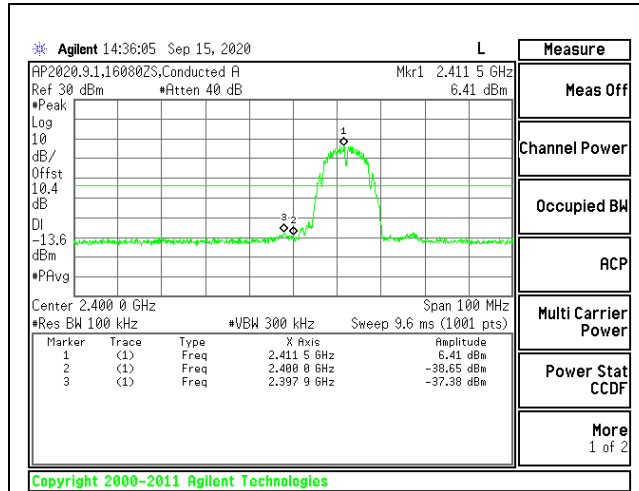
RSS-247 5.5

Output power was measured based on the use of peak measurement, therefore spurious emissions are required to be 20 dBc.

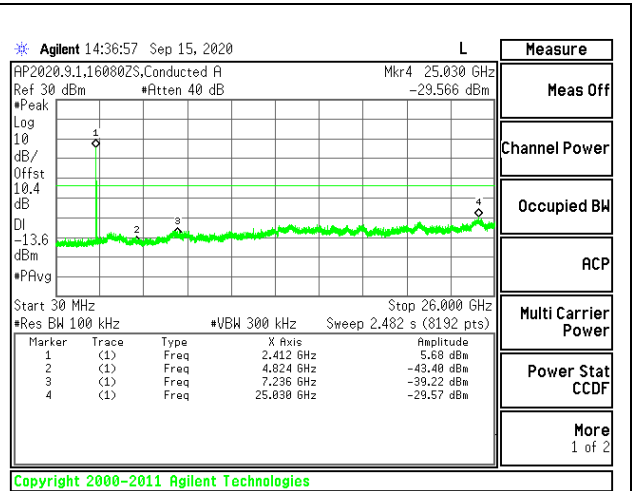
### **RESULTS**

### 9.7.1. 802.11b MODE

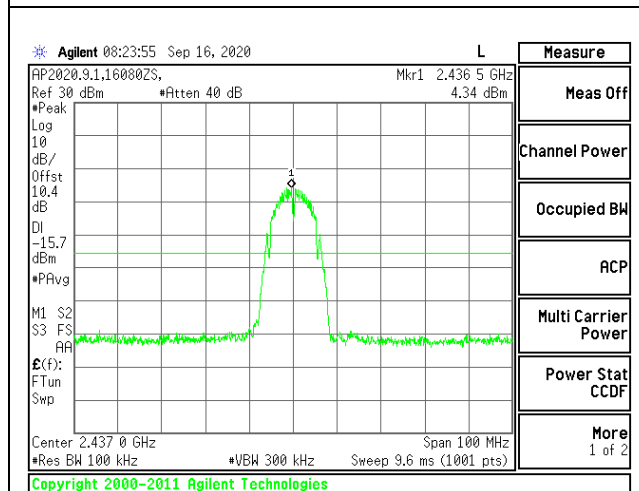
#### 2TX Antenna 1 + Antenna 2 CDD MODE



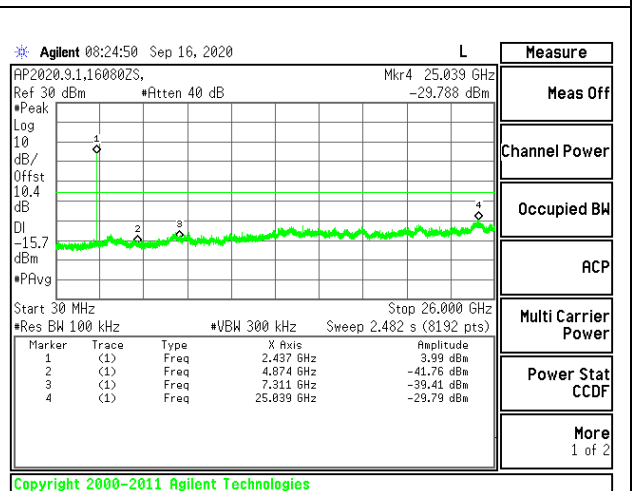
Copyright 2000-2011 Agilent Technologies  
**LOW CHANNEL 1 BANDEDGE ANTENNA 1**



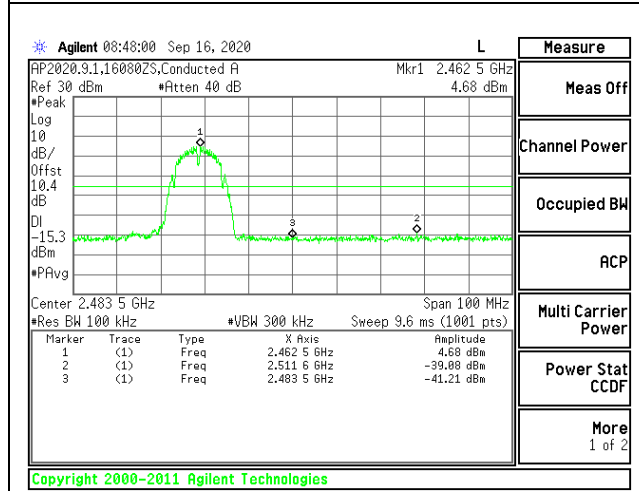
Copyright 2000-2011 Agilent Technologies  
**OUT-OF-BAND LOW CHANNEL 1 ANTENNA 1**



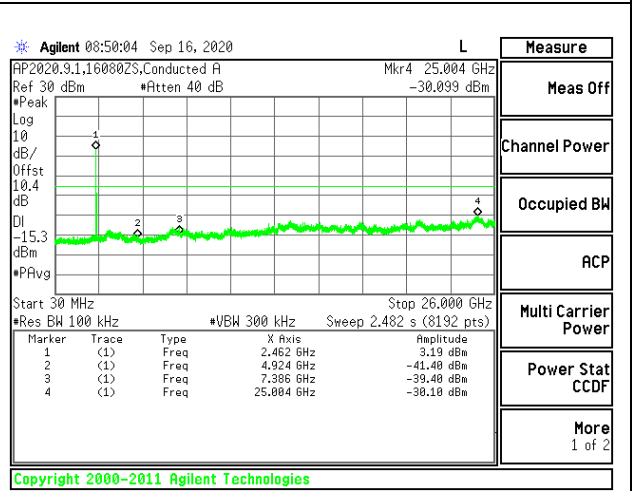
Copyright 2000-2011 Agilent Technologies  
**IN-BAND REFERENCE LEVEL ANTENNA 1**



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**OUT-OF-BAND MID CHANNEL ANTENNA 1**

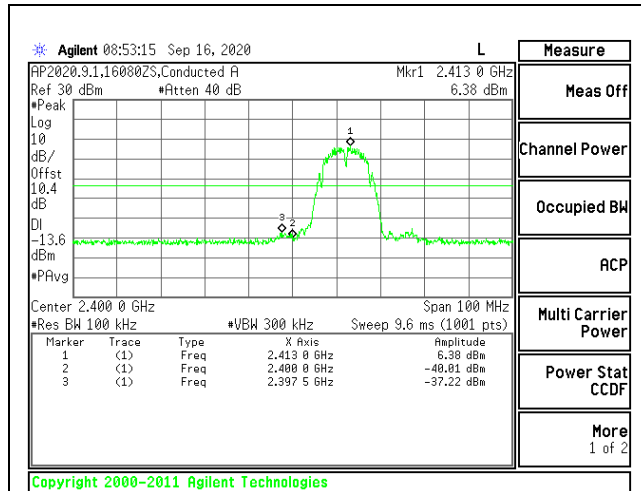


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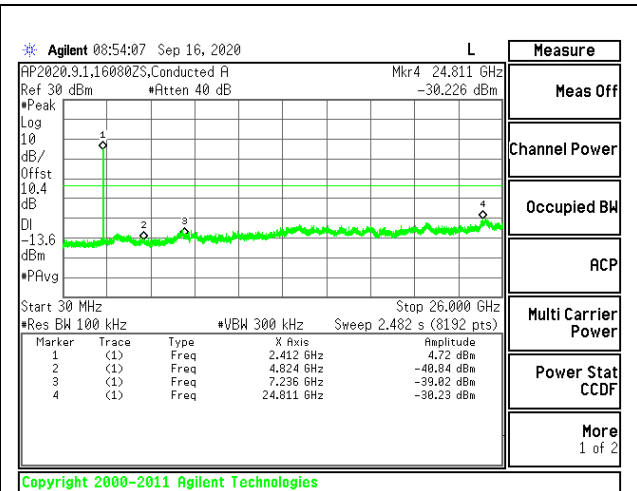


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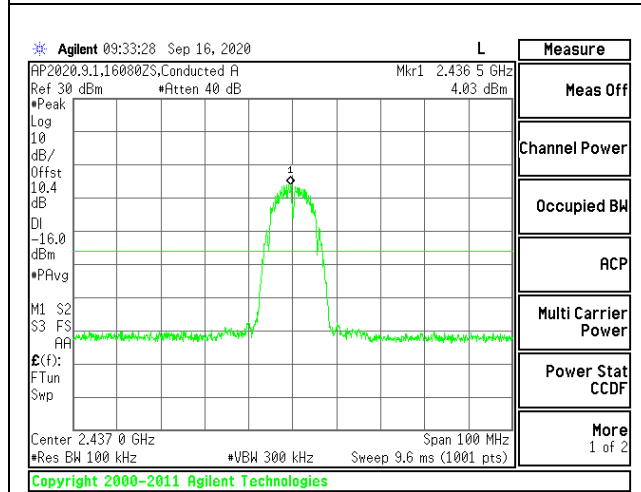
**HIGH CHANNEL 11 BANDEDGE ANTENNA 1**      **OUT-OF-BAND HIGH CHANNEL 11 ANTENNA 1**



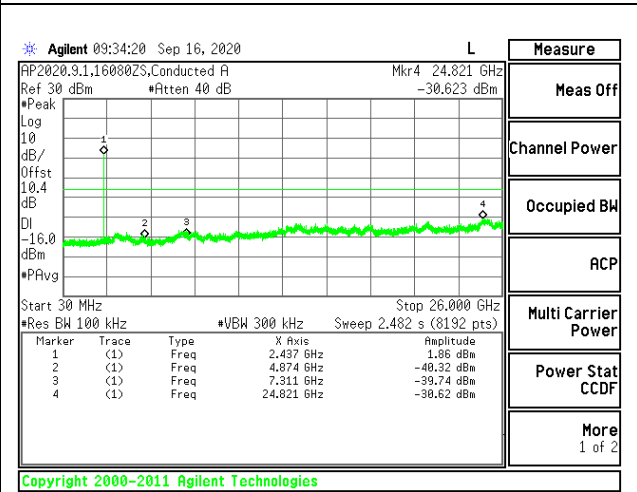
**LOW CHANNEL 1 BANDEDGE ANTENNA 2**



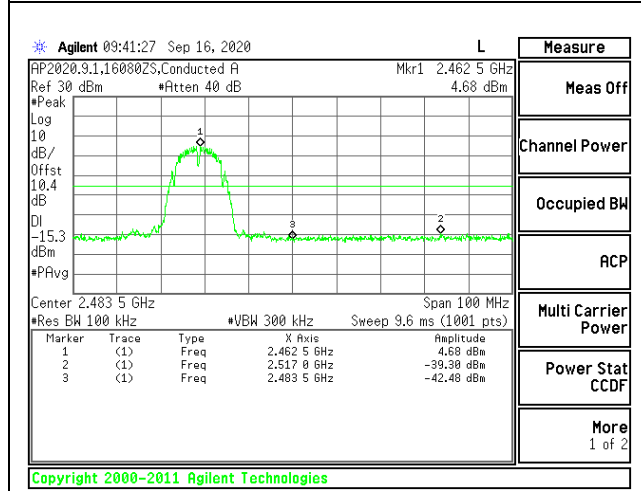
**OUT-OF-BAND LOW CHANNEL 1 ANTENNA 2**



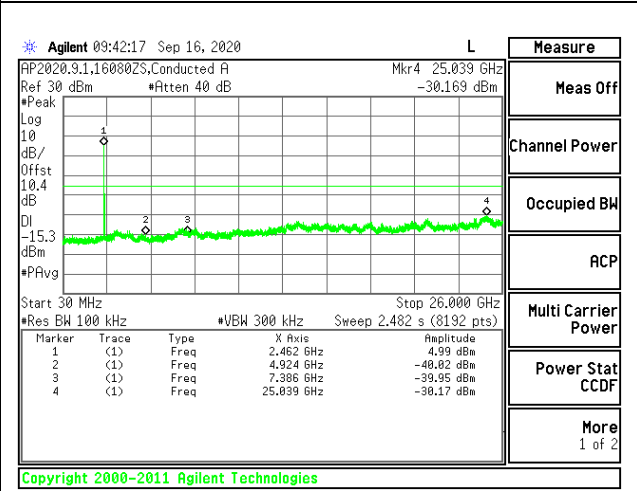
**IN-BAND REFERENCE LEVEL ANTENNA 2**



**OUT-OF-BAND MID CHANNEL ANTENNA 2**



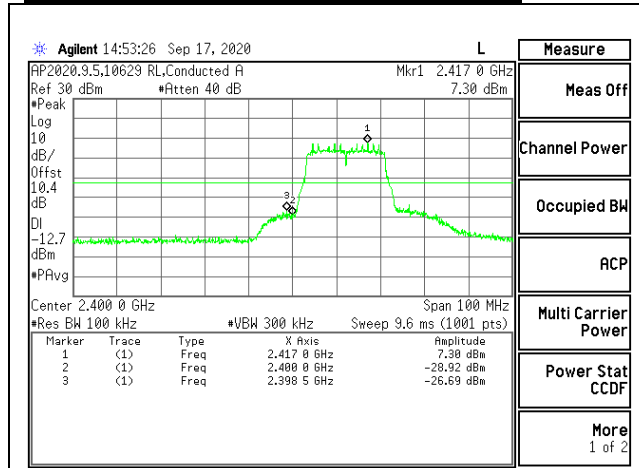
**HIGH CHANNEL 11 BANDEDGE ANTENNA 2**



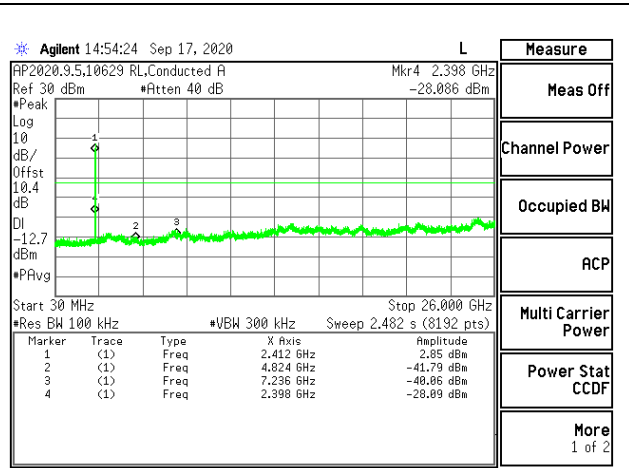
**OUT-OF-BAND HIGH CHANNEL 11 ANTENNA 2**

### 9.7.2. 802.11n HT20 MODE

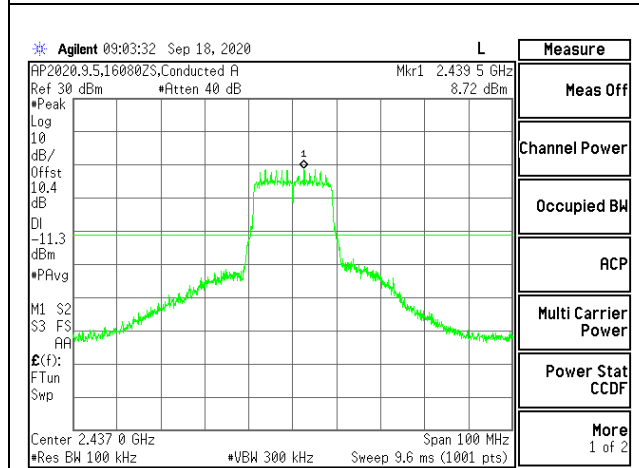
#### 2TX Antenna 1 + Antenna 2 CDD MODE



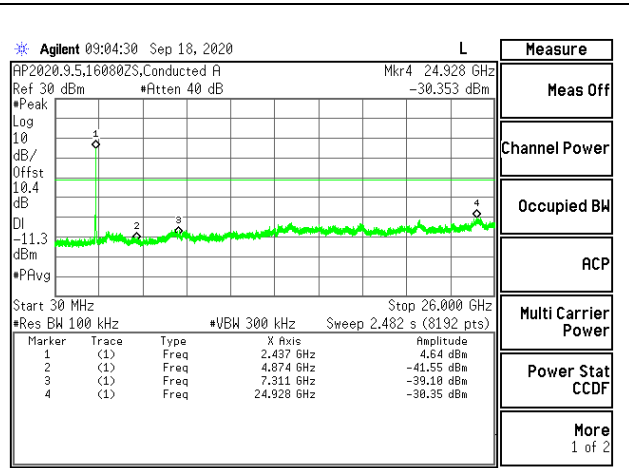
Copyright 2000-2011 Agilent Technologies  
**LOW CHANNEL 1 BANDEDGE ANTENNA 1**



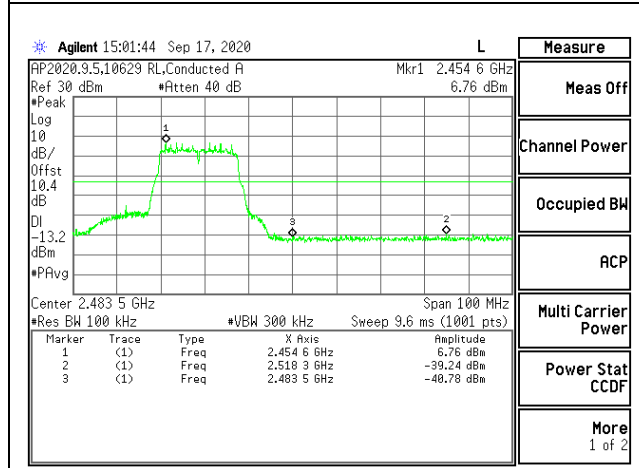
Copyright 2000-2011 Agilent Technologies  
**OUT-OF-BAND LOW CHANNEL 1 ANTENNA 1**



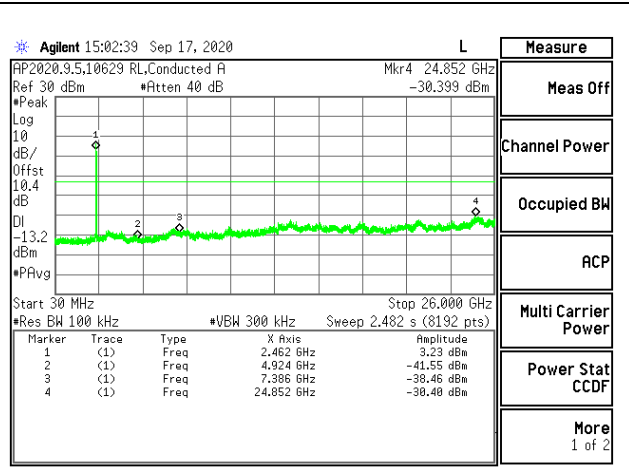
Copyright 2000-2011 Agilent Technologies  
**IN-BAND REFERENCE LEVEL ANTENNA 1**



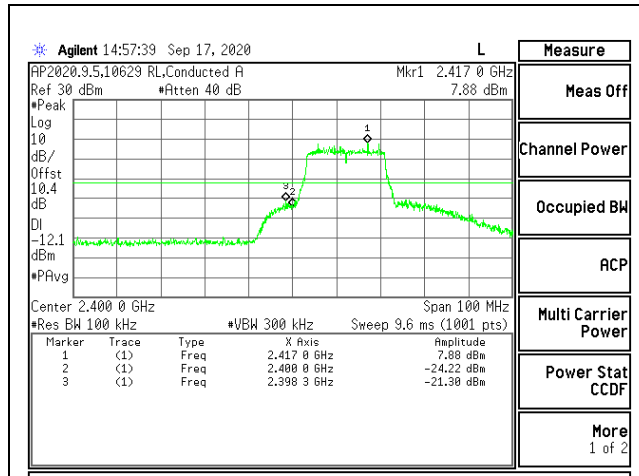
Copyright 2000-2011 Agilent Technologies  
**OUT-OF-BAND MID CHANNEL ANTENNA 1**



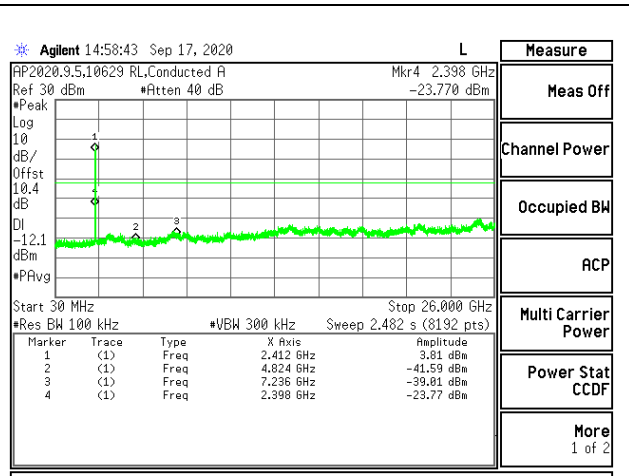
Copyright 2000-2011 Agilent Technologies  
**HIGH CHANNEL 11 BANDEDGE ANTENNA 1**



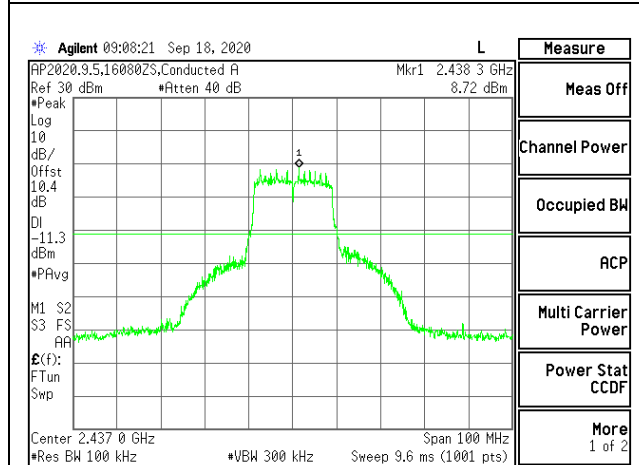
Copyright 2000-2011 Agilent Technologies  
**OUT-OF-BAND HIGH CHANNEL 11 ANTENNA 1**



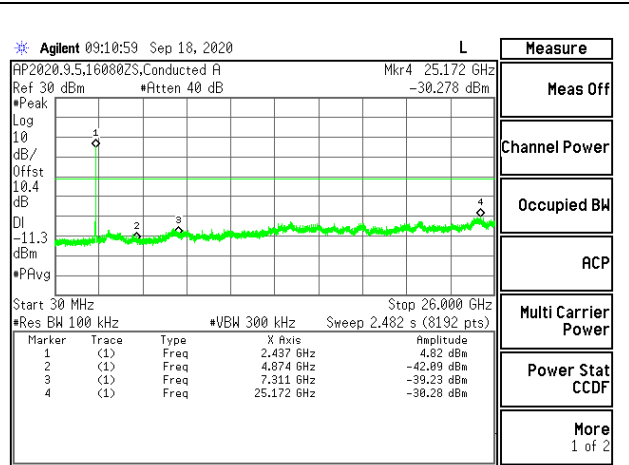
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**LOW CHANNEL 1 BANDEDGE ANTENNA 2**



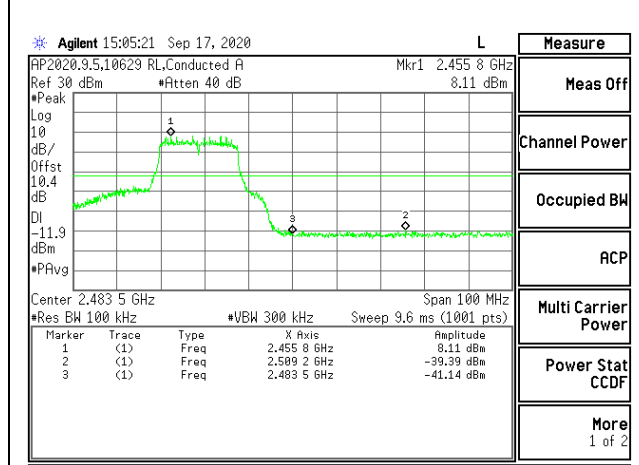
Copyright 2000-2011 Agilent Technologies  
**OUT-OF-BAND LOW CHANNEL 1 ANTENNA 2**



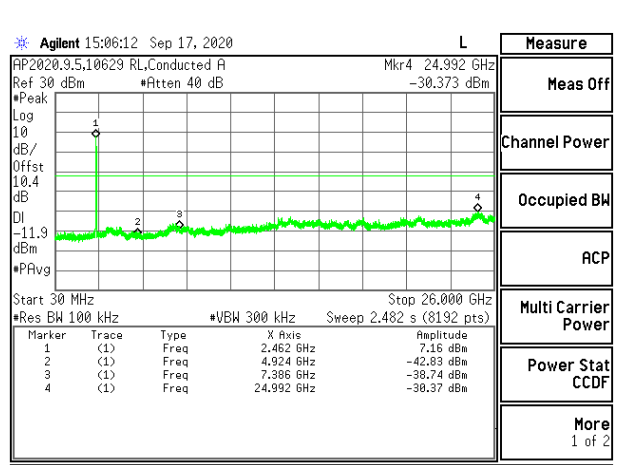
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**IN-BAND REFERENCE LEVEL ANTENNA 2**



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**OUT-OF-BAND MID CHANNEL ANTENNA 2**



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**HIGH CHANNEL 11 BANDEDGE ANTENNA 2**



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**OUT-OF-BAND HIGH CHANNEL 11 ANTENNA 2**

## 10. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10

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

### TEST PROCEDURE

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

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

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

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

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

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



2D antenna use - 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.

The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table), using the free space impedance of 377 Ohms. For example the measurement at frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to  $Y - 51.5 = Z$  dBuA/m, which has the same margin, W dB, to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

#### **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.

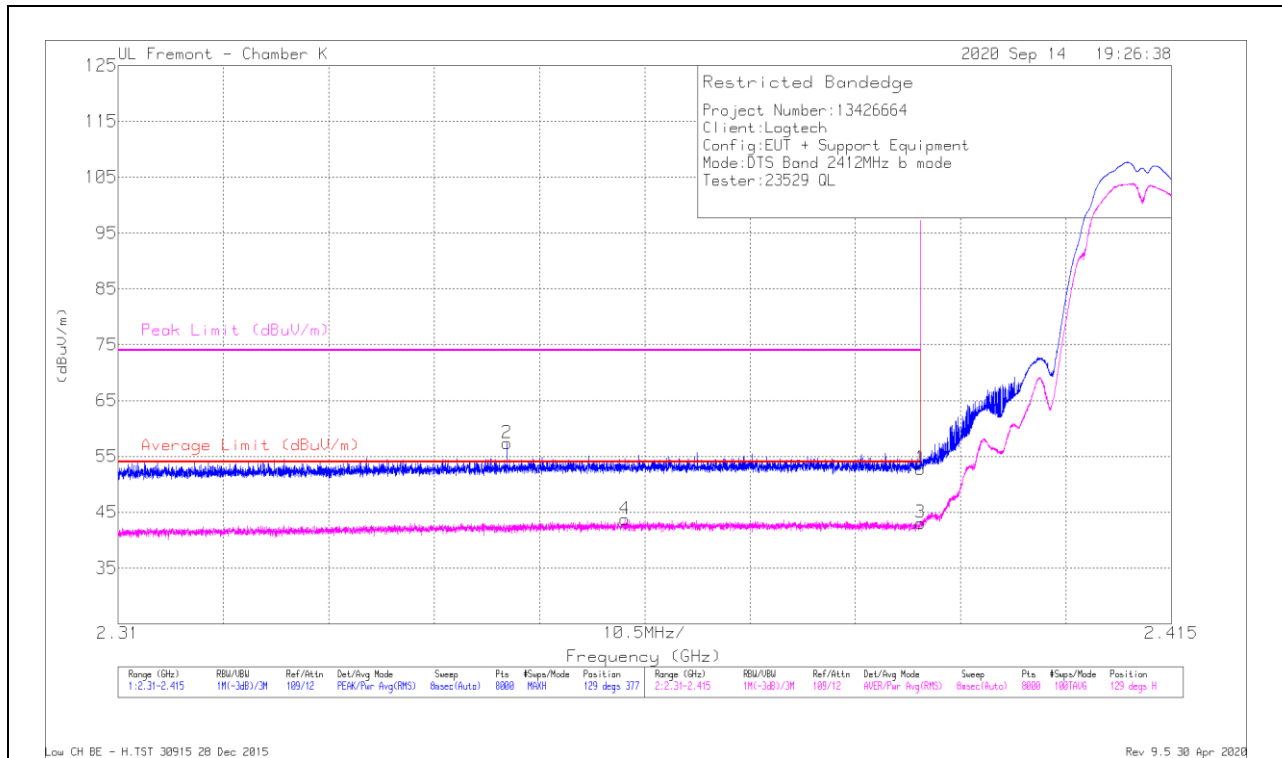
## 10.1. TRANSMITTER ABOVE 1 GHz

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

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

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

#### HORIZONTAL RESULT



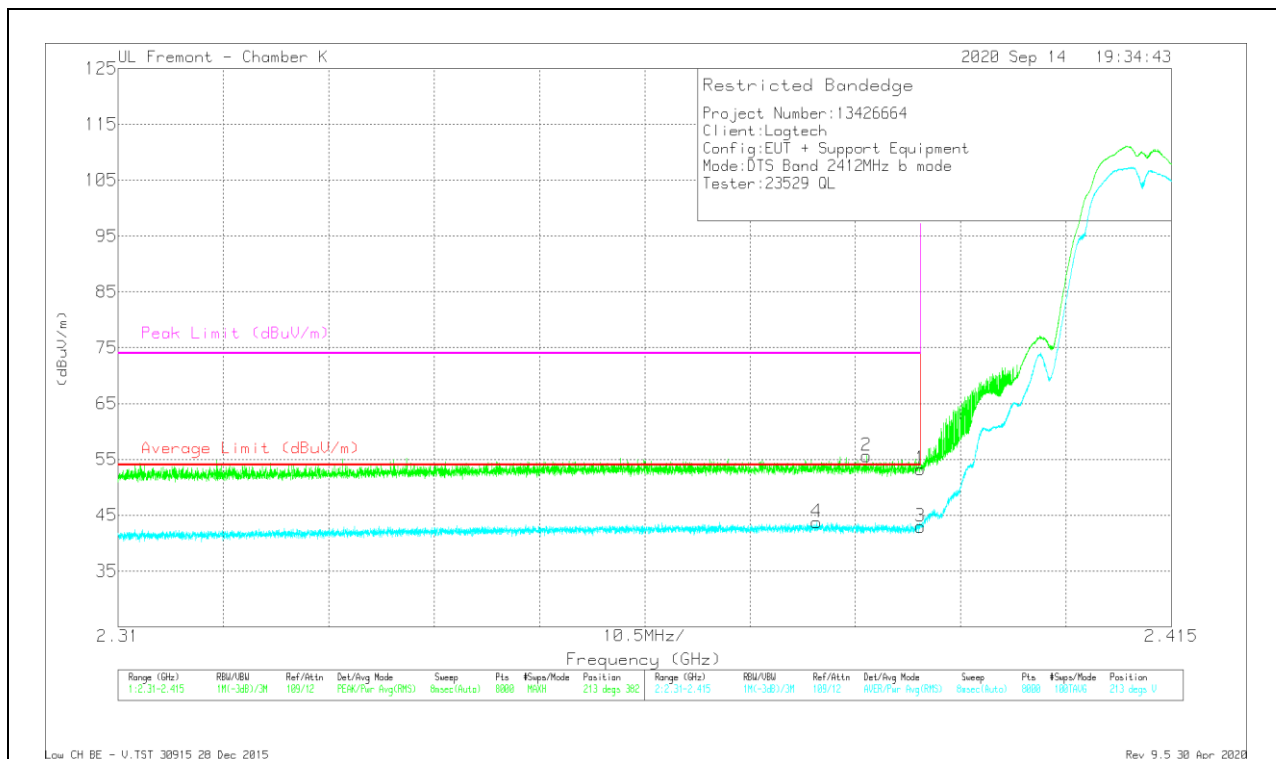
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/CM/Filt/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	31.98	Pk	32.4	-11.6	52.78	-	-	74	-21.22	129	377	H
2	* 2.34876	36.67	Pk	32.3	-11.6	57.37	-	-	74	-16.63	129	377	H
3	* 2.39	22.27	RMS	32.4	-11.6	43.07	54	-10.93	-	-	129	377	H
4	* 2.3605	22.92	RMS	32.4	-11.6	43.72	54	-10.28	-	-	129	377	H

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

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT

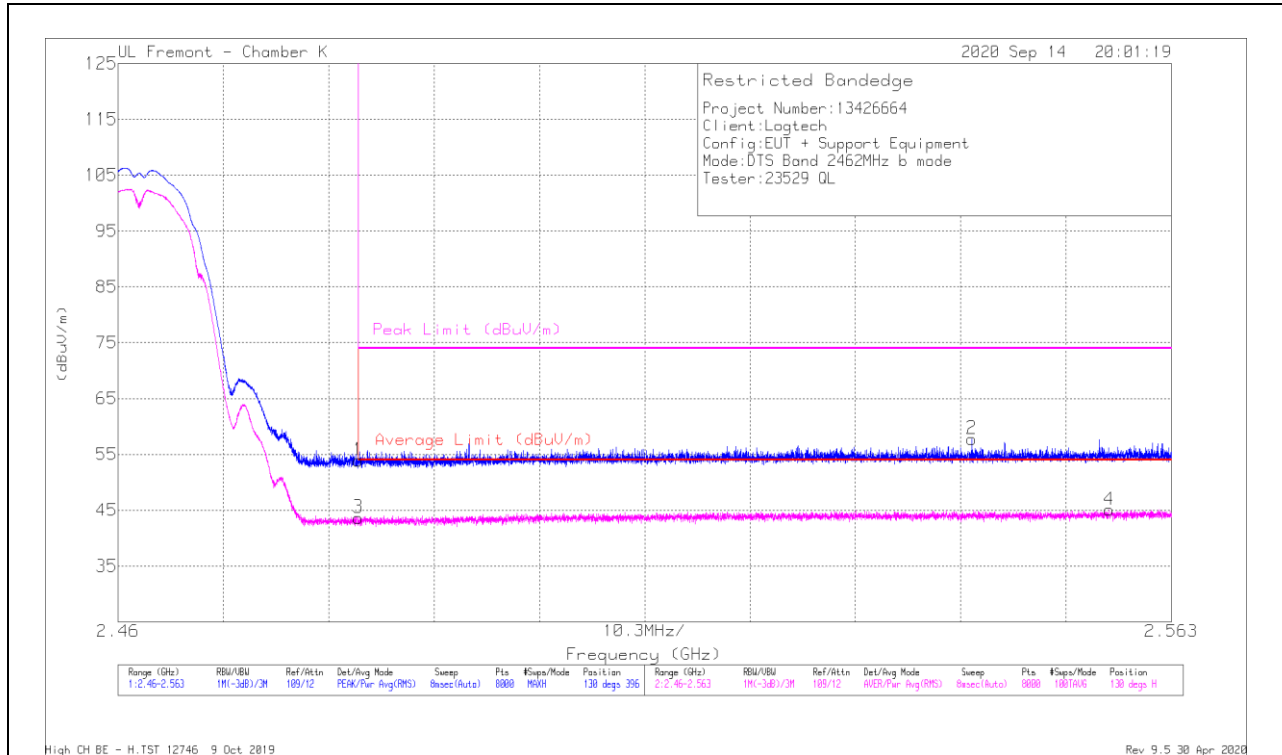


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T963 (dBm)	Amp/Cal/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	32.49	PK	32.4	-11.6	33.29	-	-	74	-20.71	213	382	V
2	* 2.38481	34.84	PK	32.4	-11.6	35.64	-	-	74	-18.36	213	382	V
3	* 2.39	22.17	RMS	32.4	-11.6	42.97	54	-11.03	-	-	213	382	V
4	* 2.37963	22.97	RMS	32.4	-11.6	43.77	54	-10.23	-	-	213	382	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

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

**HORIZONTAL RESULT**



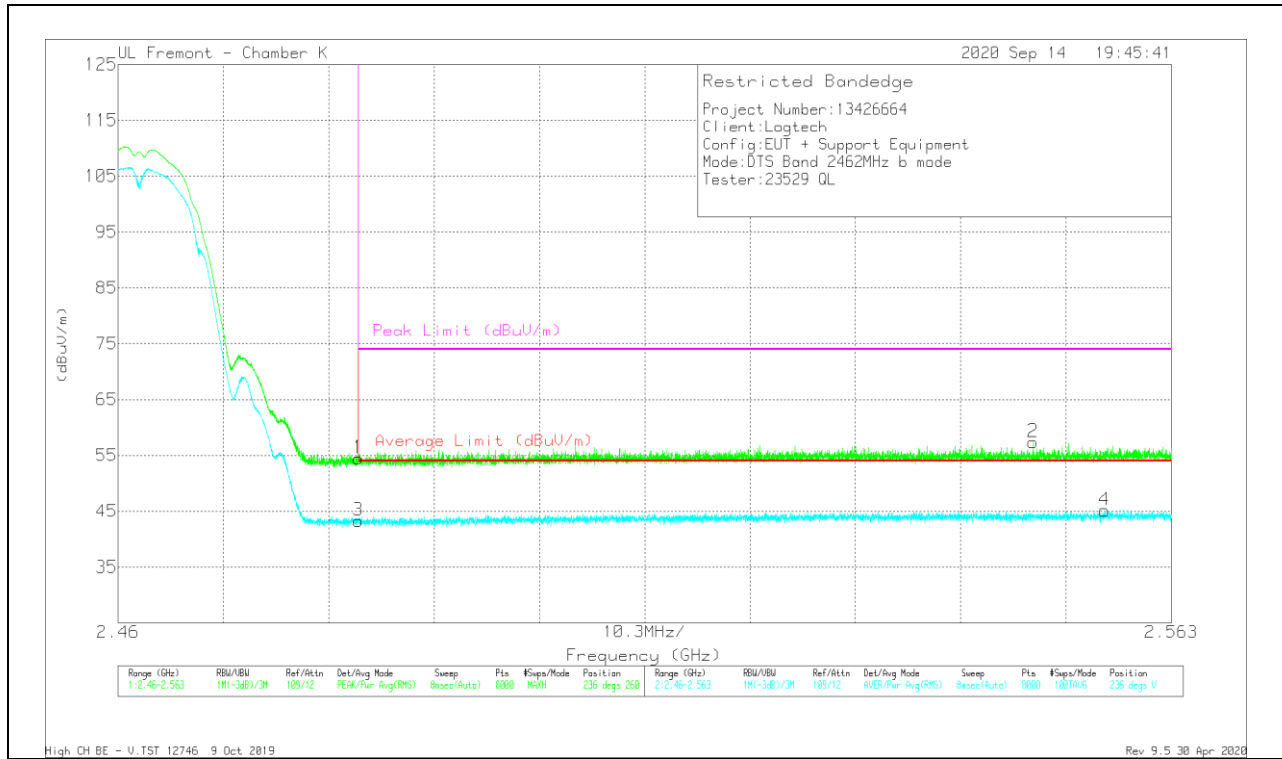
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cb/Ftr/Psd (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	32.62	Pk	32.5	-11.2	53.92	-	-	74	-20.08	130	396	H
2	2.54347	36.19	Pk	32.7	-11.1	57.79	-	-	74	-16.21	130	396	H
3	* 2.4835	22.35	RMS	32.5	-11.2	43.65	54	-10.35	-	-	130	396	H
4	2.55691	23.35	RMS	32.7	-11	45.05	54	-8.95	-	-	130	396	H

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

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT

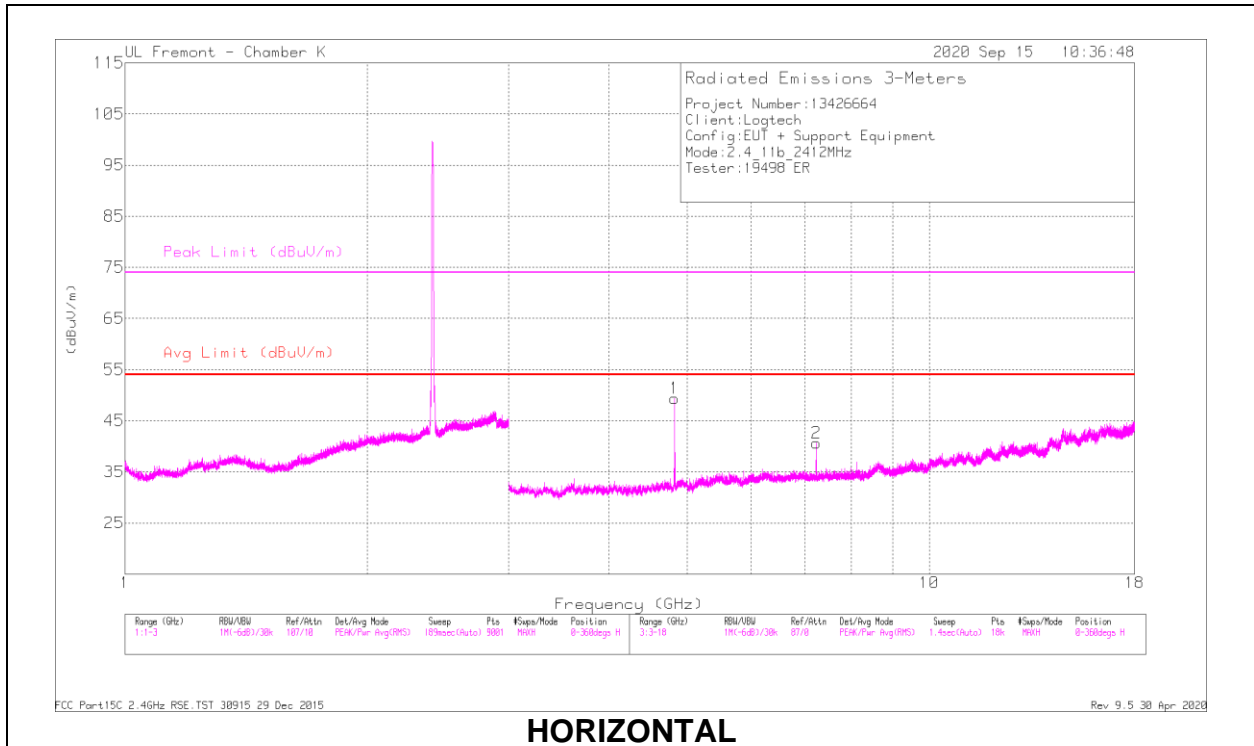


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Coil/Filter/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	33.18	Pk	32.5	-11.2	54.48	-	-	74	-19.52	236	260	V
2	2.54947	35.8	Pk	32.7	-11.1	57.4	-	-	74	-16.6	236	260	V
3	* 2.4835	22.01	RMS	32.5	-11.2	43.31	54	-10.69	-	-	236	260	V
4	2.55646	23.45	RMS	32.7	-11	45.15	54	-8.85	-	-	236	260	V

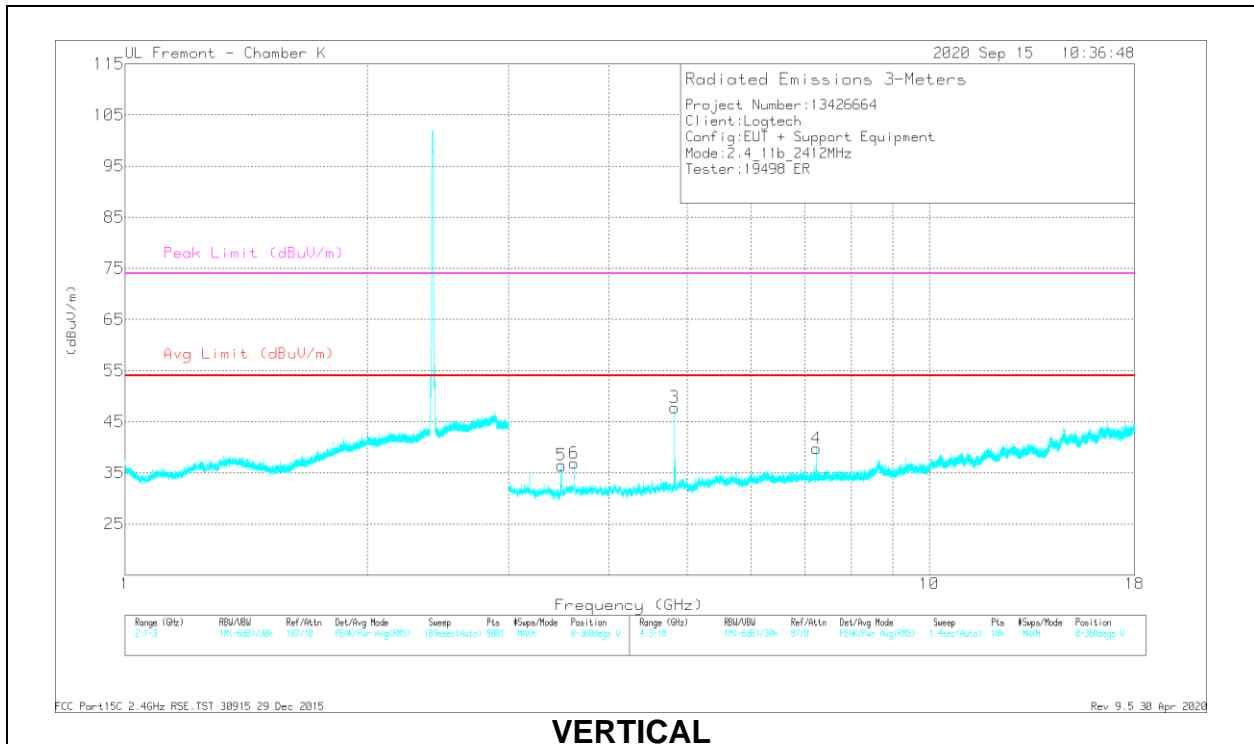
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

**HARMONICS AND SPURIOUS EMISSIONS**

**LOW CHANNEL, CH 1 RESULTS**



**HORIZONTAL**



**VERTICAL**

### RADIATED EMISSIONS

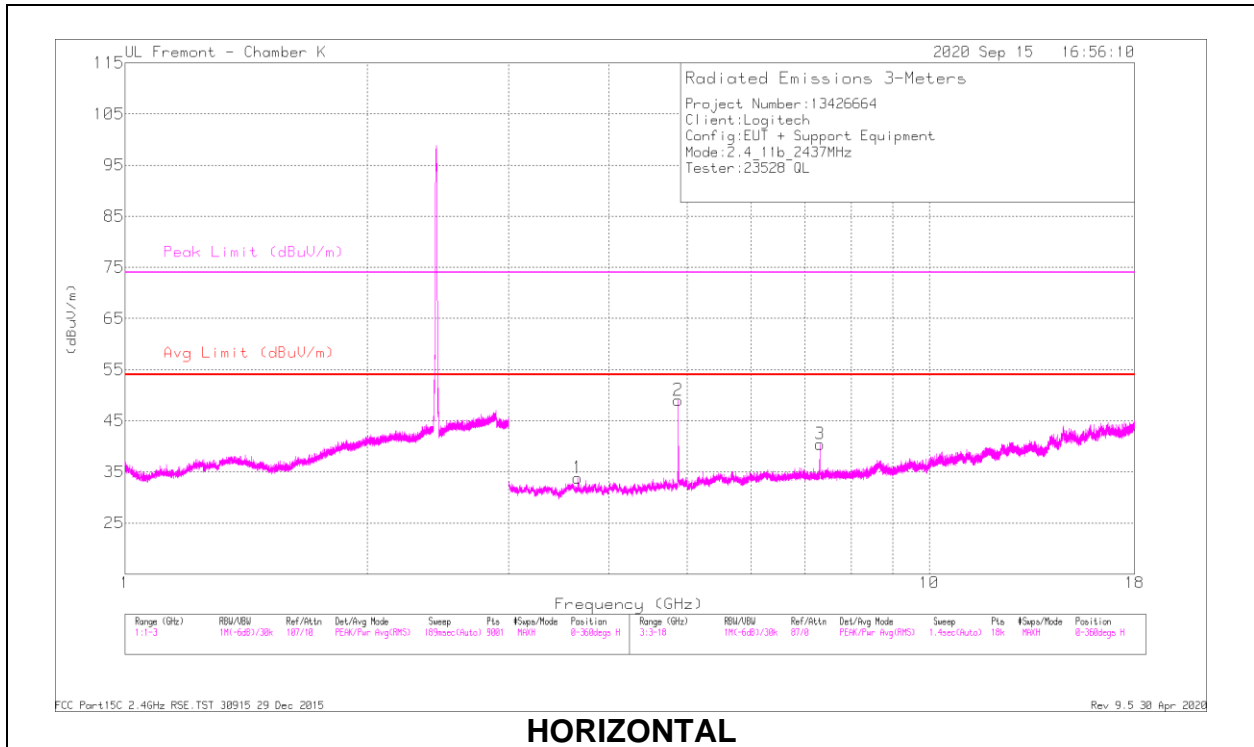
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.82396	58.5	PK2	34.4	-40.6	52.3	-	-	74	-21.7	95	202	H
* 4.824	55.45	MAv1	34.4	-40.6	49.25	54	-4.75	-	-	95	202	H
7.23502	51.25	PK2	36.1	-38.7	48.65	-	-	-	-	355	245	H
* 4.8241	57.6	PK2	34.4	-40.6	51.4	-	-	74	-22.6	30	96	V
* 4.8241	54.28	MAv1	34.4	-40.6	48.08	54	-5.92	-	-	30	96	V
* 3.6182	50.5	PK2	33.2	-41.6	42.1	-	-	74	-31.9	18	217	V
* 3.61803	41.45	MAv1	33.2	-41.6	33.05	54	-20.95	-	-	18	217	V
7.2372	49.26	PK2	36.1	-38.7	46.66	-	-	-	-	96	186	V
3.49001	54.74	PK2	32.8	-42.1	45.44	-	-	-	-	7	163	V

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

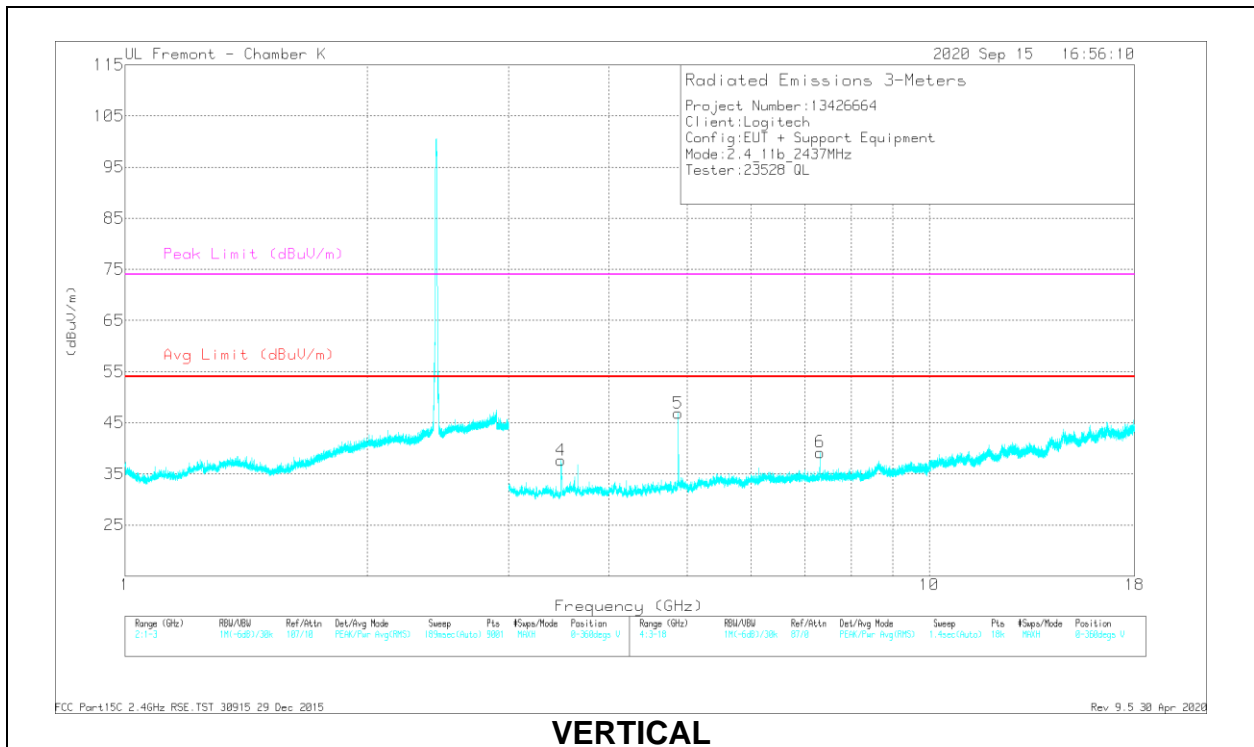
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### MID CHANNEL, CH 6 RESULTS



### HORIZONTAL



### VERTICAL



**RADIATED EMISSIONS**

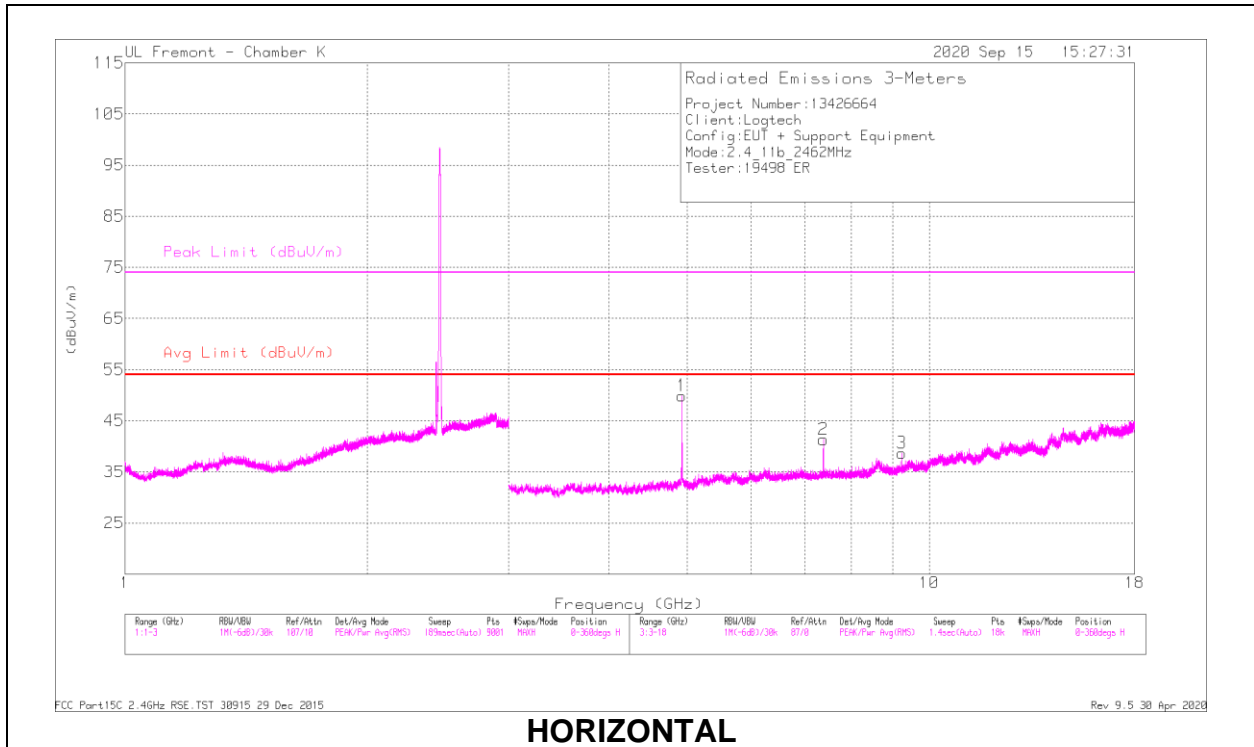
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 3.65566	48.89	PK2	33.3	-41.2	40.99	-	-	74	-33.01	241	173	H
* 3.65551	38.78	MAv1	33.3	-41.2	30.88	54	-23.12	-	-	241	173	H
* 4.874	58.41	PK2	34.4	-40.7	52.11	-	-	74	-21.89	110	222	H
* 4.87398	55.29	MAv1	34.4	-40.7	48.99	54	-5.01	-	-	110	222	H
* 7.30936	50.29	PK2	36.1	-38.3	48.09	-	-	74	-25.91	360	239	H
* 7.31018	41.69	MAv1	36.1	-38.3	39.49	54	-14.51	-	-	360	239	H
3.48762	55.99	PK2	32.8	-42.1	46.69	-	-	-	-	6	256	V
* 4.87396	54.03	PK2	34.4	-40.7	47.73	-	-	74	-26.27	301	158	V
* 4.87399	50.38	MAv1	34.4	-40.7	44.08	54	-9.92	-	-	301	158	V
* 7.31048	49.96	PK2	36.1	-38.3	47.76	-	-	74	-26.24	358	97	V
* 7.30995	41.25	MAv1	36.1	-38.3	39.05	54	-14.95	-	-	358	97	V

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

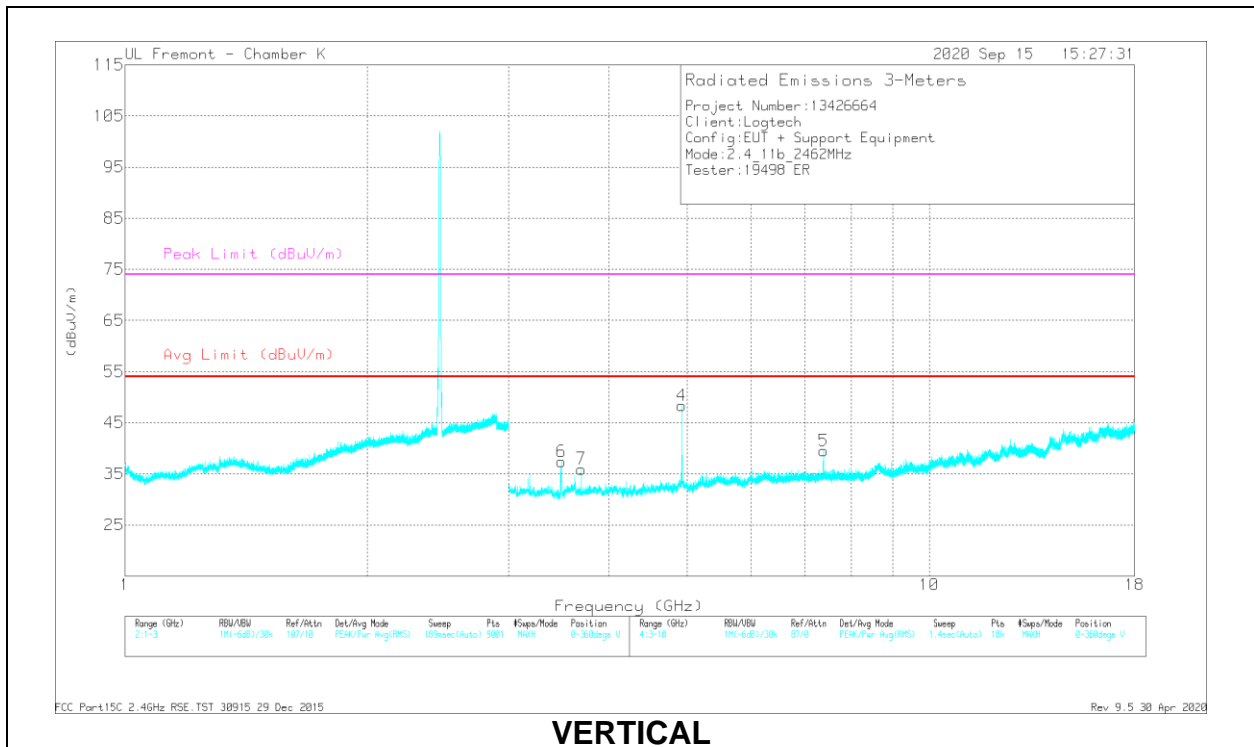
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### HIGH CHANNEL, CH 11 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cb/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 4.92404	58.97	PK2	34.4	-40.7	52.67	-	-	74	-21.33	87	205	H
* 4.924	56.15	MAv1	34.4	-40.7	49.85	54	-4.15	-	-	87	205	H
* 7.3862	50.21	PK2	36	-38	48.21	-	-	74	-25.79	343	232	H
* 7.38672	42.4	MAv1	36	-38	40.4	54	-13.6	-	-	343	232	H
9.23958	46.44	PK2	36.6	-37	46.04	-	-	-	-	98	138	H
* 4.924	56.41	PK2	34.4	-40.7	50.11	-	-	74	-23.89	303	251	V
* 4.92397	52.88	MAv1	34.4	-40.7	46.58	54	-7.42	-	-	303	251	V
* 7.38653	49.94	PK2	36	-38	47.94	-	-	74	-26.06	357	103	V
* 7.38527	41.17	MAv1	36	-38	39.17	54	-14.83	-	-	357	103	V
* 3.69306	50.4	PK2	33.5	-41.5	42.4	-	-	74	-31.6	340	194	V
* 3.69303	40.76	MAv1	33.5	-41.5	32.76	54	-21.24	-	-	340	194	V
3.48942	56.16	PK2	32.8	-42.1	46.86	-	-	-	-	2	203	V

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

PK2 - KDB558074 Method: Maximum Peak

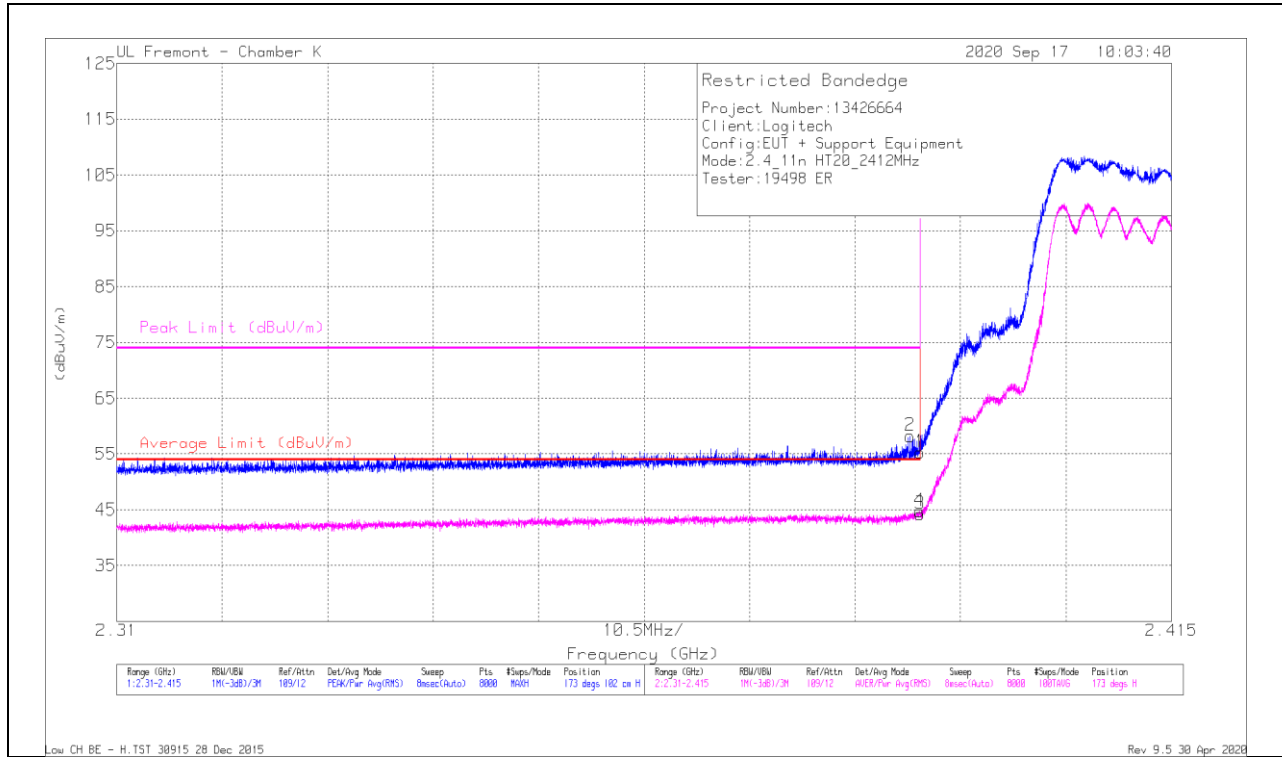
MAv1 - KDB558074 Option 1 Maximum RMS Average

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

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

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

#### HORIZONTAL RESULT



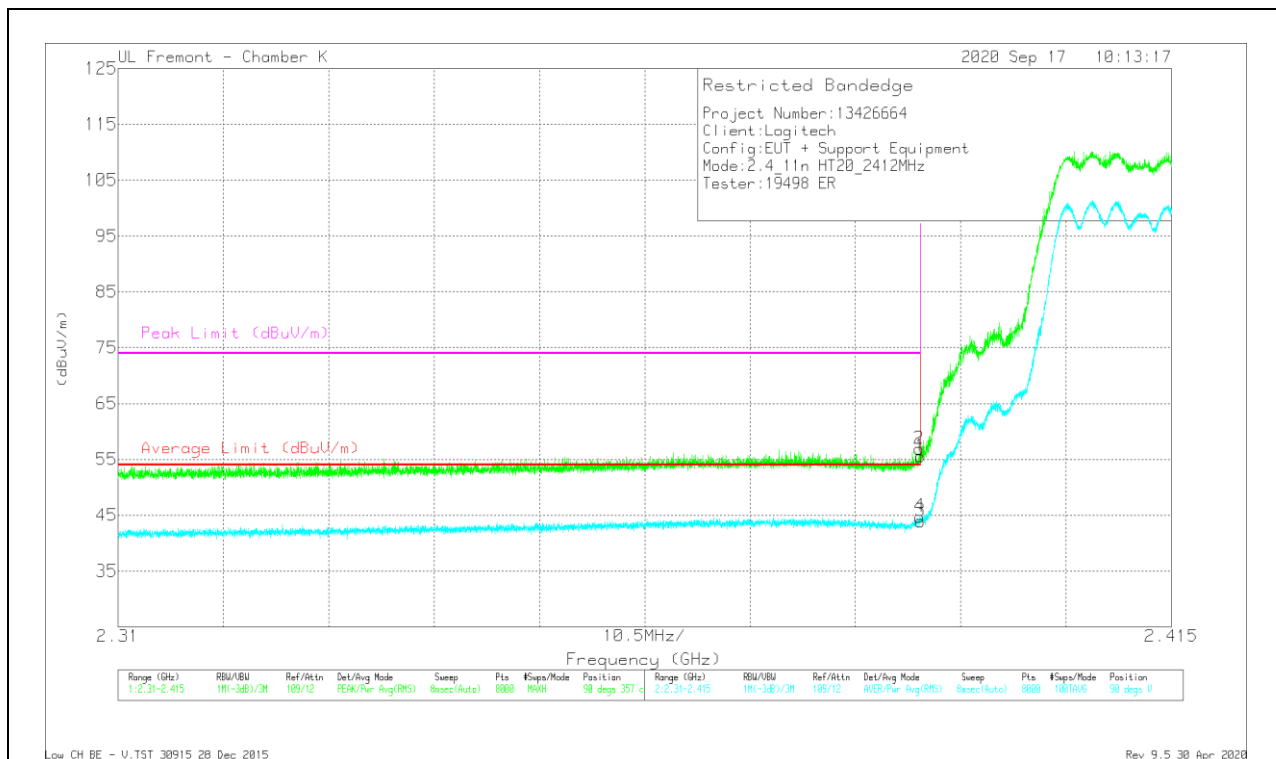
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/CM/Fit/Psd (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	34.5	Pk	32.4	-11.6	0	55.3	-	-	74	-18.7	173	102	H
2	* 2.38897	37.43	Pk	32.4	-11.6	0	58.23	-	-	74	-15.77	173	102	H
3	* 2.39	23.22	RMS	32.4	-11.6	23	44.25	54	-9.75	-	-	173	102	H
4	* 2.38993	23.73	RMS	32.4	-11.6	23	44.76	54	-9.24	-	-	173	102	H

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

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT

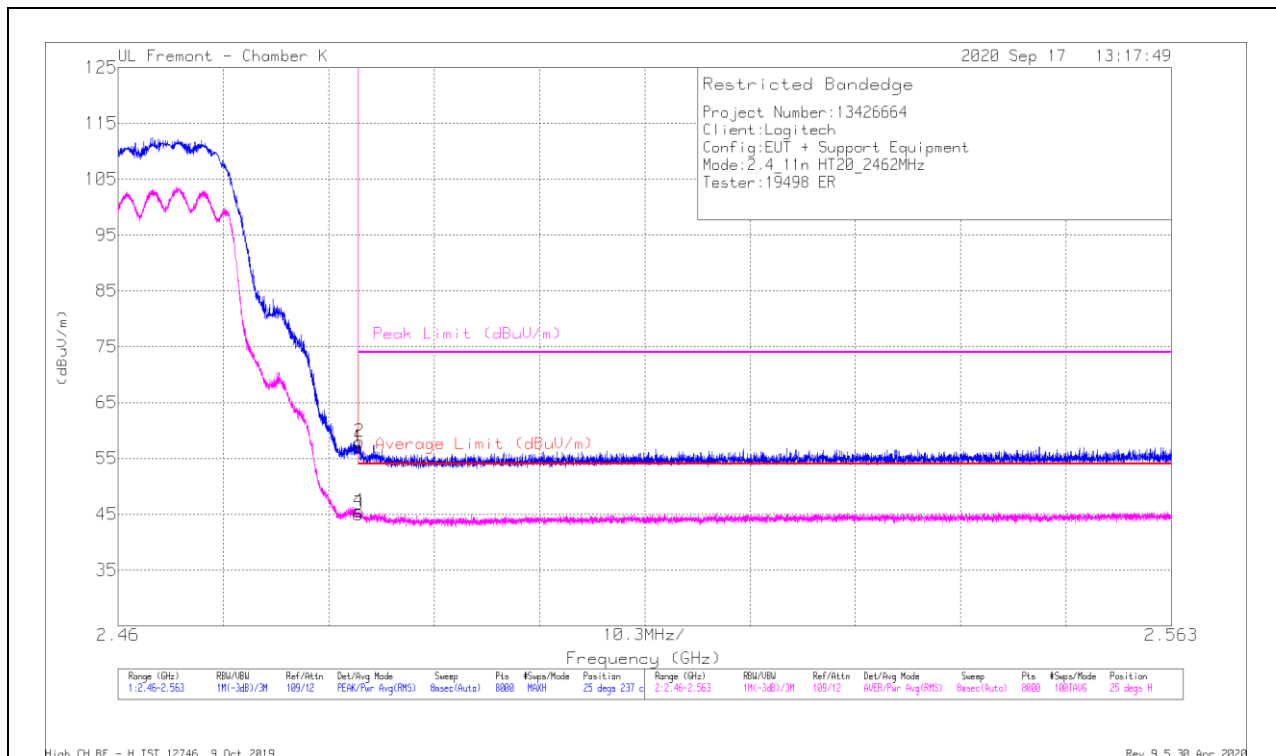


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cal/Fit/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	34.74	Pk	32.4	-11.6	0	55.54	-	-	74	-18.46	90	357	V
2	* 2.38986	36.08	Pk	32.4	-11.6	0	56.89	-	-	74	-17.11	90	357	V
3	* 2.39	22.92	RMS	32.4	-11.6	23	43.95	54	-10.05	-	-	90	357	V
4	* 2.38992	23.69	RMS	32.4	-11.6	23	44.72	54	-9.28	-	-	90	357	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

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

**HORIZONTAL RESULT**



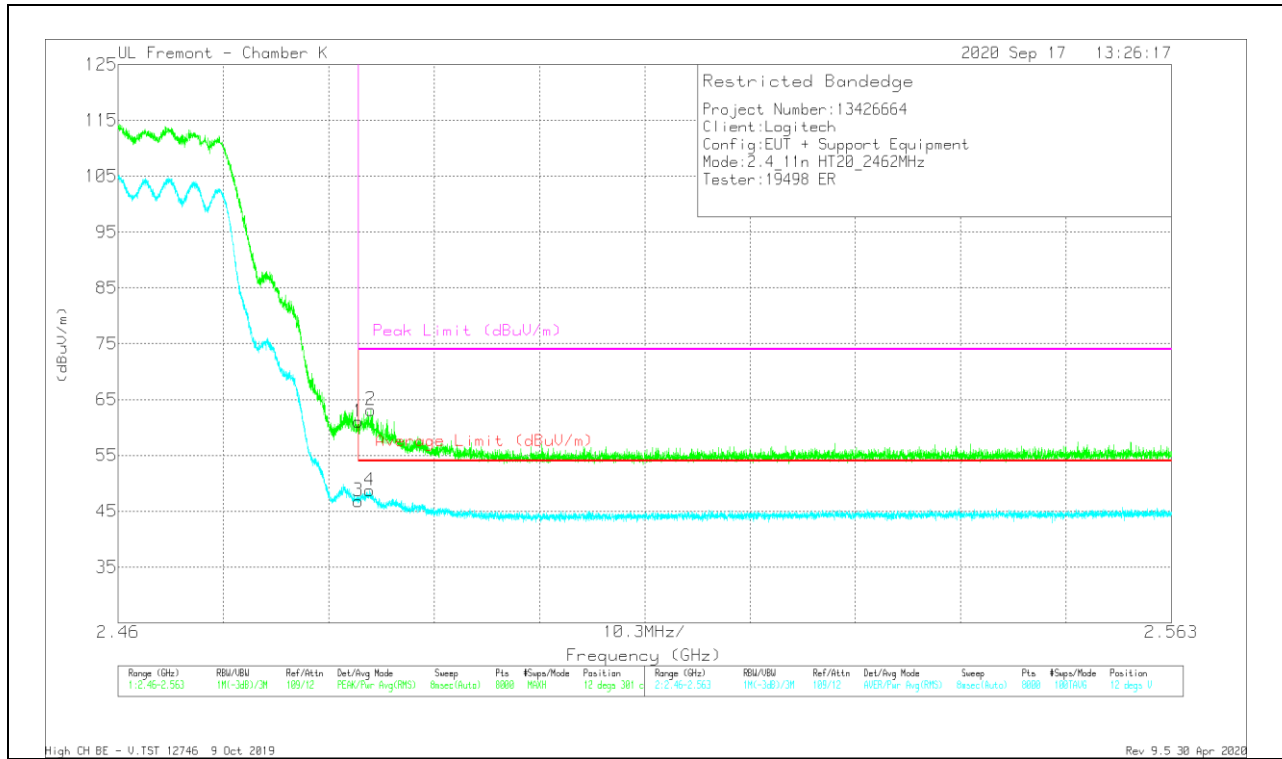
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	35.72	Pk	32.5	-11.2	0	57.02	-	-	74	-16.98	25	237	H
2	* 2.48353	36.69	Pk	32.5	-11.2	0	57.99	-	-	74	-16.01	25	237	H
3	* 2.4835	23.46	RMS	32.5	-11.2	23	44.99	54	-9.01	-	-	25	237	H
4	* 2.48355	24	RMS	32.5	-11.2	23	45.53	54	-8.47	-	-	25	237	H

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

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT

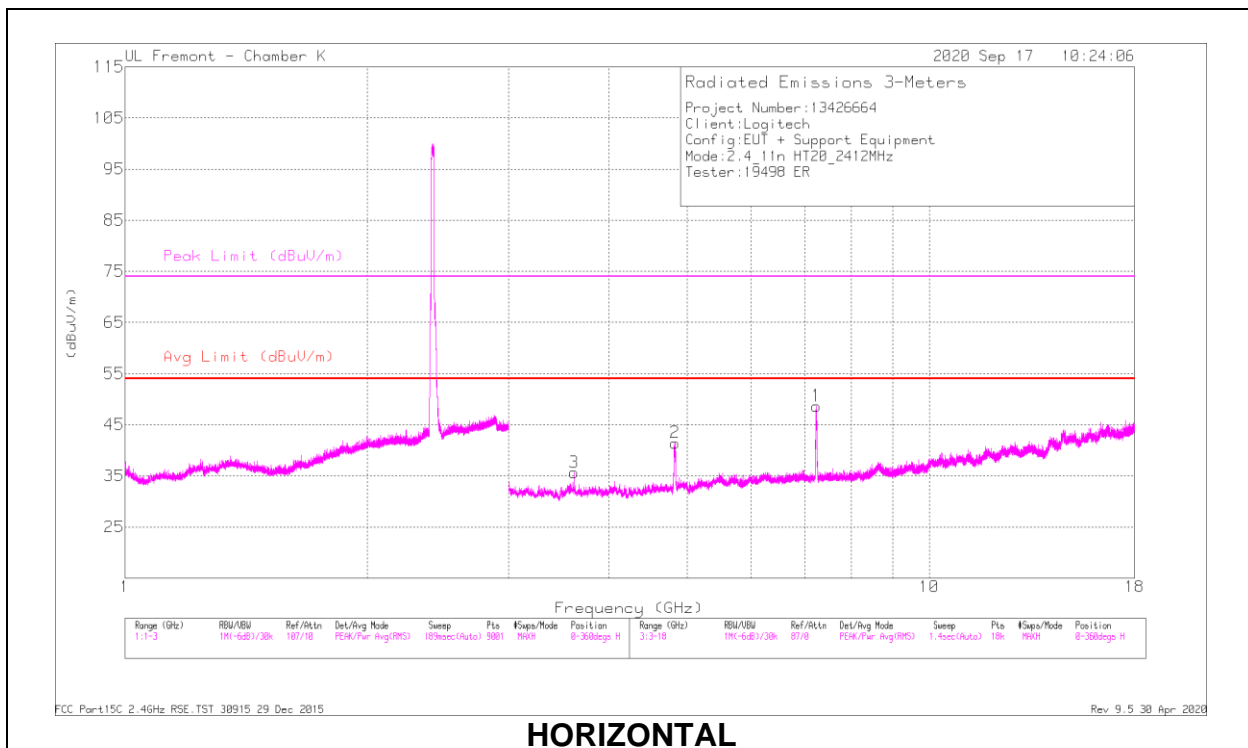


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T963 (dBm)	Amp/Cal/Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	39.74	PK	32.5	-11.2	0	61.04	-	-	74	-12.96	12	301	V
2	* 2.48472	41.84	PK	32.5	-11.2	0	63.14	-	-	74	-10.86	12	301	V
3	* 2.4835	25.29	RMS	32.5	-11.2	23	46.82	54	-7.18	-	-	12	301	V
4	* 2.48461	27.2	RMS	32.5	-11.2	23	48.73	54	-5.27	-	-	12	301	V

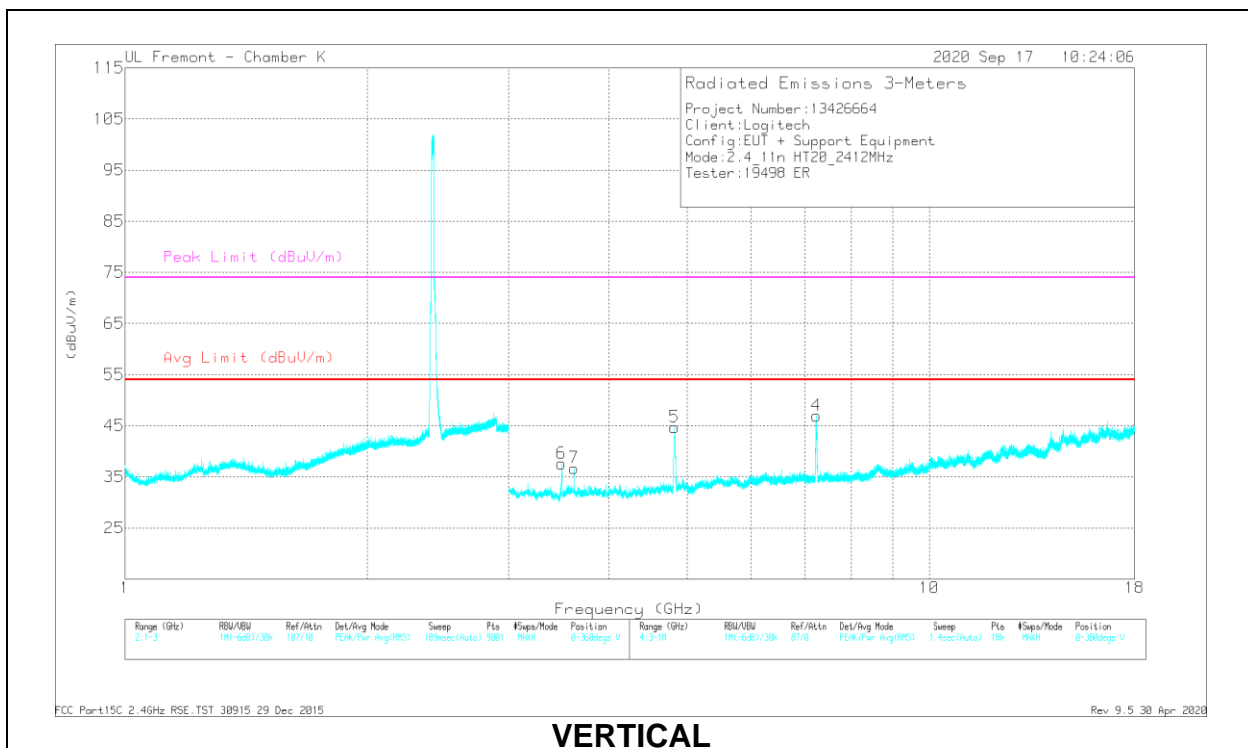
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL, CH 1 RESULTS



**HORIZONTAL**



**VERTICAL**



**RADIATED EMISSIONS**

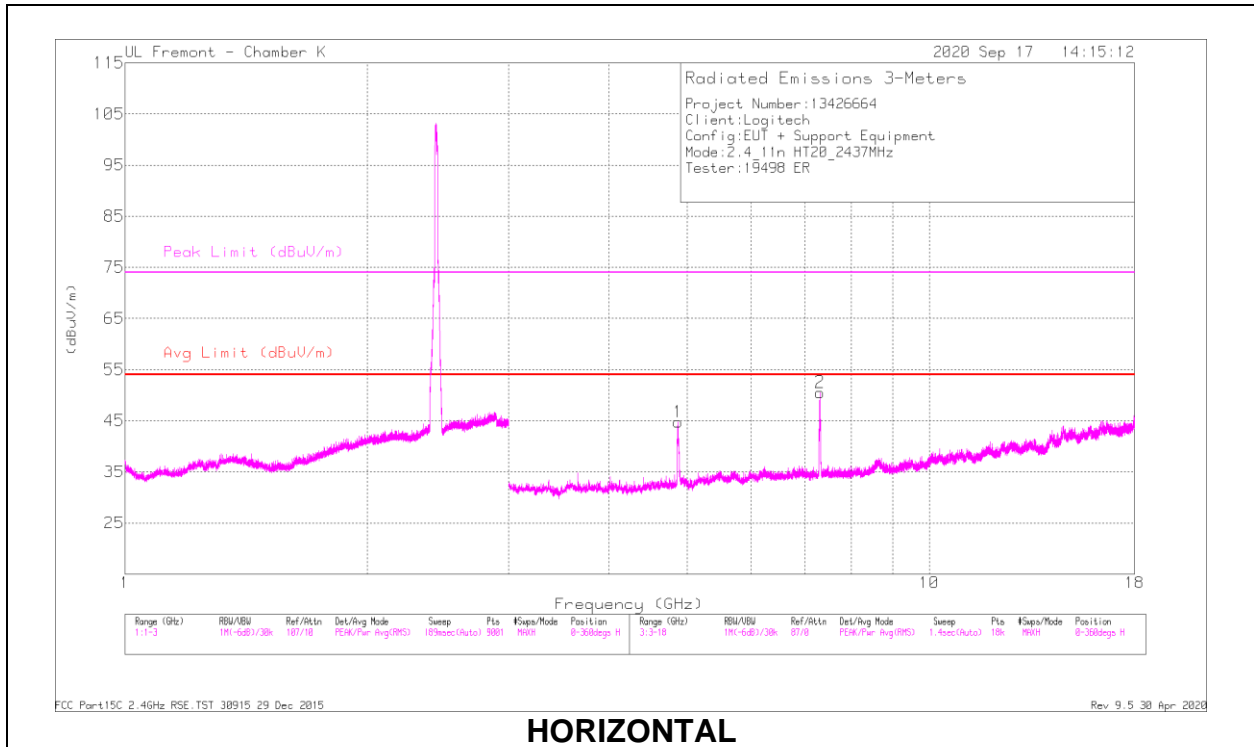
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
7.23534	61.18	PK2	36.1	-38.7	0	58.58	-	-	-	-	340	208	H
* 7.25277	55.29	PK2	36.1	-38.5	0	52.89	-	-	74	-21.11	340	207	H
* 7.25031	42.93	MAV1	36.1	-38.5	.23	40.76	54	-13.24	-	-	340	207	H
* 4.82423	58.21	PK2	34.4	-40.6	0	52.01	-	-	74	-21.99	44	175	H
* 4.82654	46.21	MAV1	34.4	-40.6	.23	40.24	54	-13.76	-	-	44	175	H
* 3.61818	49.87	PK2	33.2	-41.6	0	41.47	-	-	74	-32.53	336	164	H
* 3.61801	39.7	MAV1	33.2	-41.6	.23	31.53	54	-22.47	-	-	336	164	H
7.23718	59.02	PK2	36.1	-38.7	0	56.42	-	-	-	-	334	193	V
* 7.25229	56.5	PK2	36.1	-38.5	0	54.1	-	-	74	-19.9	334	193	V
* 7.25017	43.57	MAV1	36.1	-38.6	.23	41.3	54	-12.7	-	-	334	193	V
* 4.81917	60	PK2	34.4	-40.7	0	53.7	-	-	74	-20.3	34	100	V
* 4.82393	48.73	MAV1	34.4	-40.6	.23	42.76	54	-11.24	-	-	34	100	V
* 3.618	51.23	PK2	33.2	-41.6	0	42.83	-	-	74	-31.17	21	102	V
* 3.61803	42.92	MAV1	33.2	-41.6	.23	34.75	54	-19.25	-	-	21	102	V
3.49209	57.3	PK2	32.8	-42.1	0	48	-	-	-	-	357	215	V

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

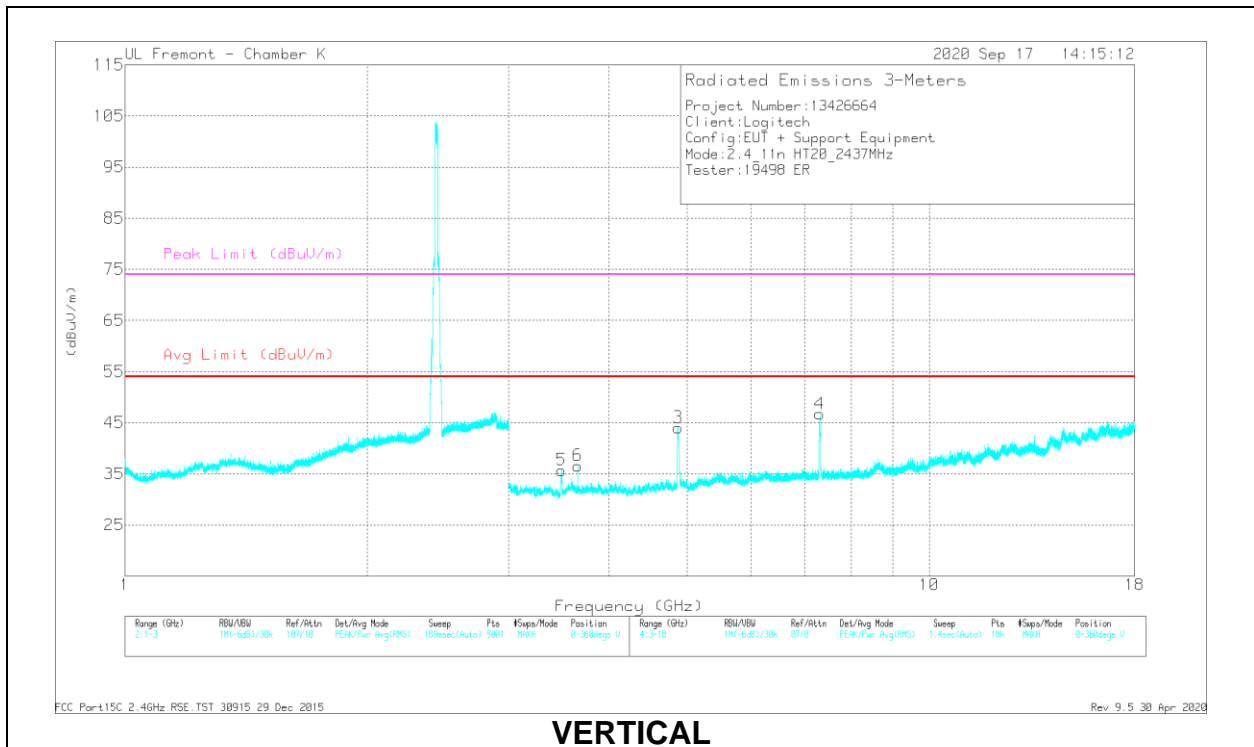
PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

### MID CHANNEL, CH 6 RESULTS



### HORIZONTAL



### VERTICAL

### RADIATED EMISSIONS

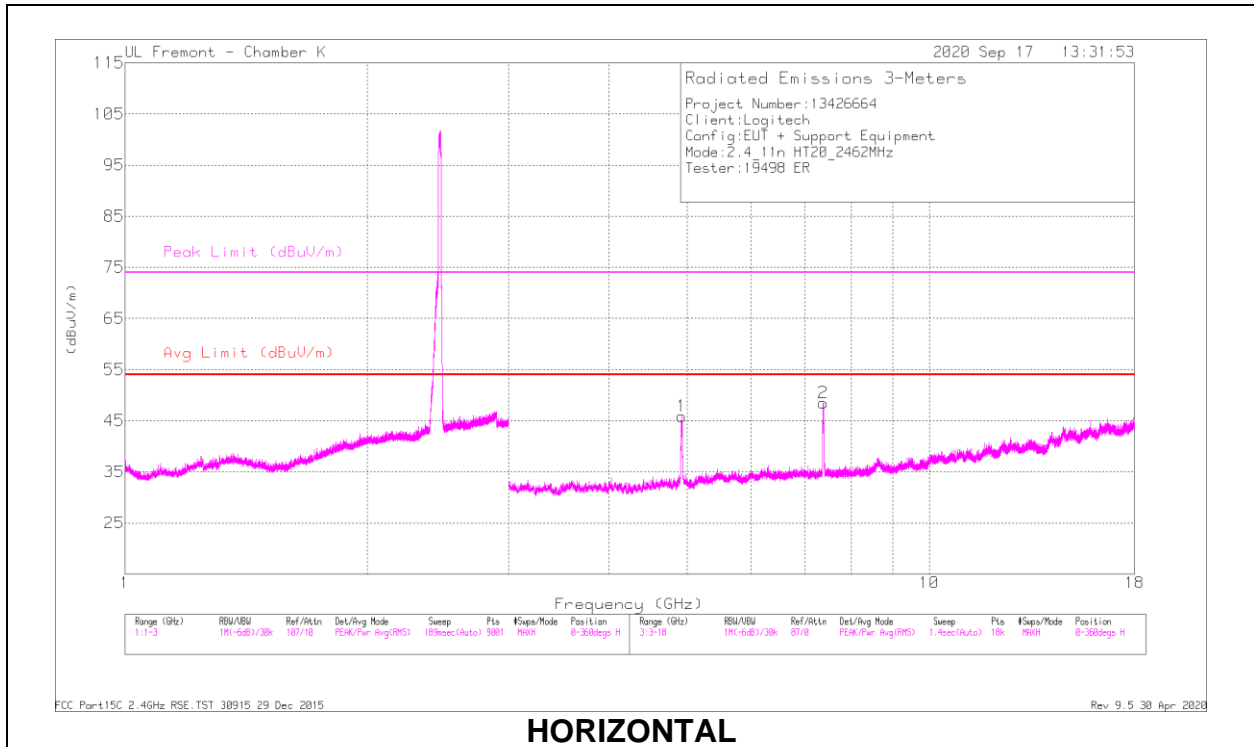
Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 7.30509	60.97	PK2	36.1	-38.4	0	58.67	-	-	74	-15.33	333	194	H
* 7.30527	48.88	MAv1	36.1	-38.4	.23	46.81	54	-7.19	-	-	333	194	H
* 4.86864	61.77	PK2	34.3	-40.6	0	55.47	-	-	74	-18.53	122	213	H
* 4.86625	48.55	MAv1	34.3	-40.6	.23	42.48	54	-11.52	-	-	122	213	H
* 7.30719	59.58	PK2	36.1	-38.4	0	57.28	-	-	74	-16.72	331	204	V
* 7.30503	48.06	MAv1	36.1	-38.4	.23	45.99	54	-8.01	-	-	331	204	V
* 4.8681	61.65	PK2	34.3	-40.6	0	55.35	-	-	74	-18.65	51	108	V
* 4.87126	48.93	MAv1	34.3	-40.7	.23	42.76	54	-11.24	-	-	51	108	V
* 3.65538	49.68	PK2	33.3	-41.2	0	41.78	-	-	74	-32.22	14	245	V
* 3.65554	40.03	MAv1	33.3	-41.2	.23	32.36	54	-21.64	-	-	14	245	V
3.48958	57.54	PK2	32.8	-42.1	0	48.24	-	-	-	-	354	268	V

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

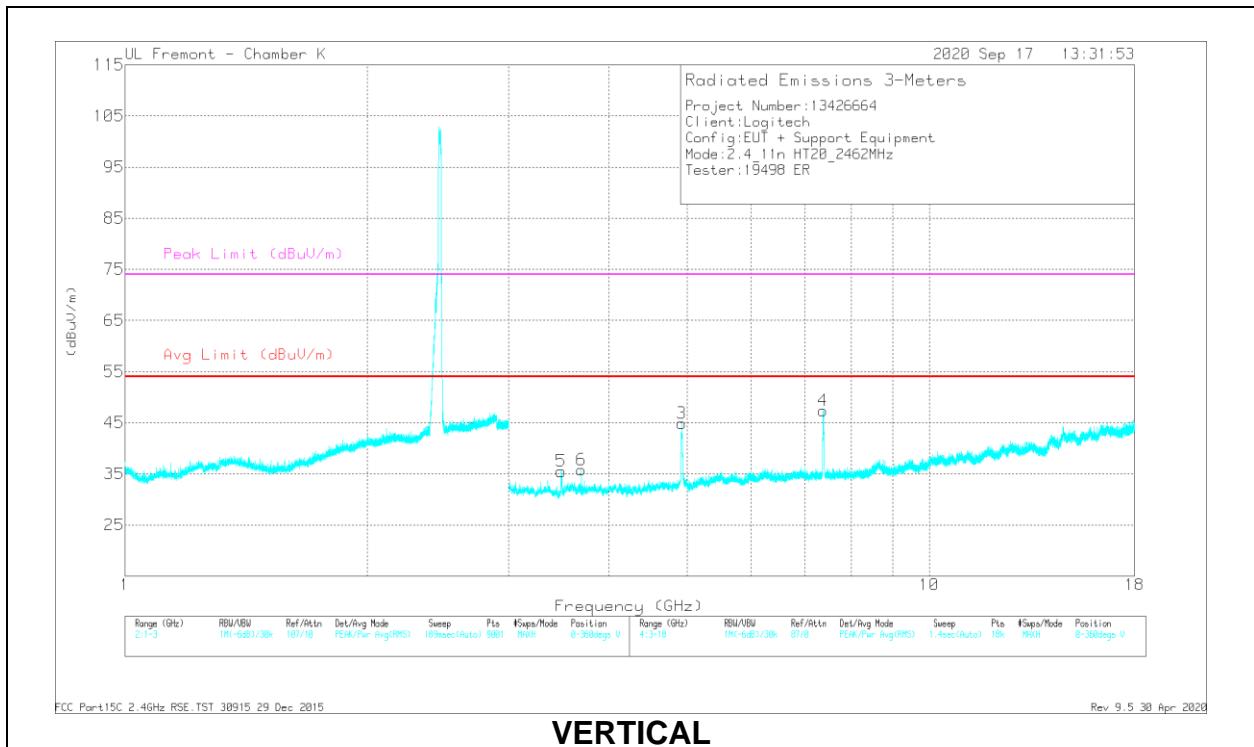
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### HIGH CHANNEL, CH 11 RESULTS



### HORIZONTAL



### VERTICAL

### RADIATED EMISSIONS

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Filtr/P ad (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
* 7.3853	61.71	PK2	36	-38	0	59.71	-	-	74	-14.29	352	225	H
* 7.38291	49.76	MAv1	36	-38	.23	47.99	54	-6.01	-	-	352	225	H
* 4.91905	63.67	PK2	34.3	-40.7	0	57.27	-	-	74	-16.73	95	257	H
* 4.92388	50.76	MAv1	34.4	-40.7	.23	44.69	54	-9.31	-	-	95	257	H
* 7.38237	59.78	PK2	36	-38.1	0	57.68	-	-	74	-16.32	331	197	V
* 7.38708	48.02	MAv1	36	-38	.23	46.25	54	-7.75	-	-	331	197	V
* 4.9266	62.87	PK2	34.4	-40.7	0	56.57	-	-	74	-17.43	7	107	V
* 4.9266	50.22	MAv1	34.4	-40.7	.23	44.15	54	-9.85	-	-	7	107	V
* 3.69321	50.04	PK2	33.5	-41.5	0	42.04	-	-	74	-31.96	353	101	V
* 3.69303	41.07	MAv1	33.5	-41.5	.23	33.3	54	-20.7	-	-	353	101	V
3.48882	56.71	PK2	32.8	-42.1	0	47.41	-	-	-	-	357	259	V

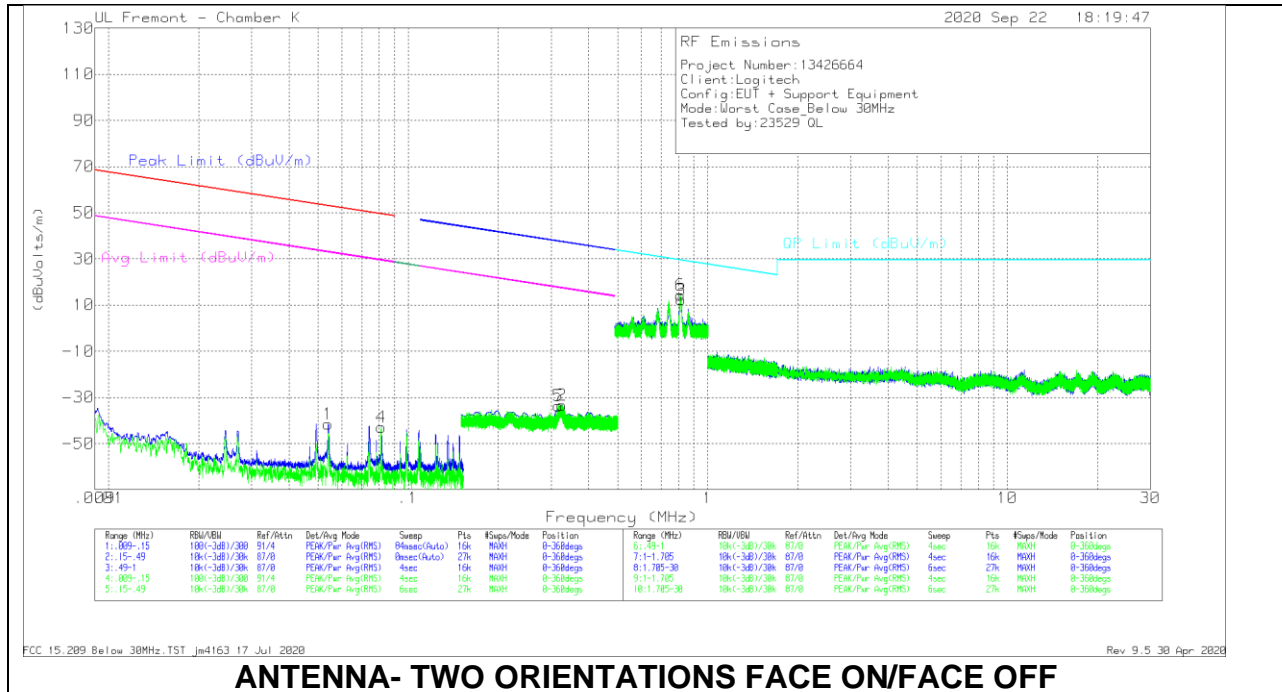
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## 10.2. WORST CASE BELOW 30MHZ

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



### ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

#### Below 30MHz Data

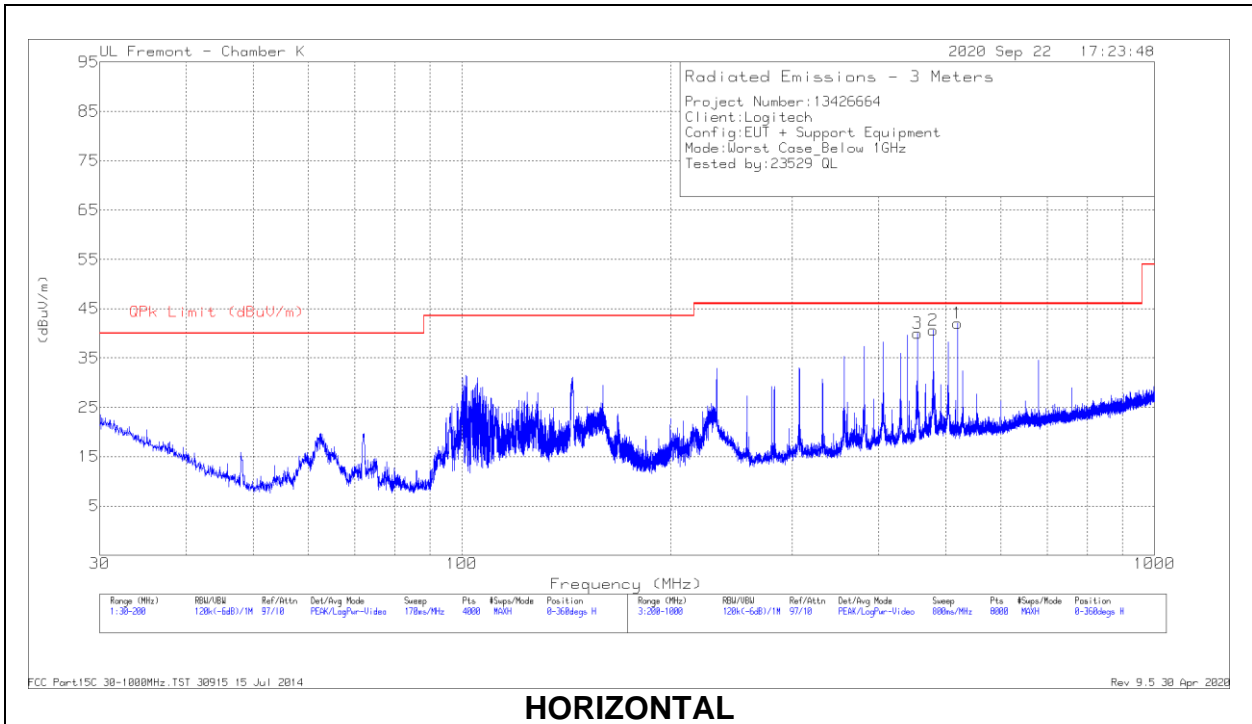
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.05418	14.14	Pk	55.5	-32.3	-80	-41.85	52.91	-94.57	32.91	-74.57	-	-	-	-	0-360
2	.32609	22.91	Pk	55.9	-32.2	-80	-33.39	-	-	-	-	37.34	-70.73	17.34	-50.73	0-360
4	.08127	13.71	Pk	55.5	-32.2	-80	-42.99	49.39	-92.38	29.39	-72.38	-	-	-	-	0-360
5	.31697	22.63	Pk	55.9	-32.2	-80	-33.67	-	-	-	-	37.59	-71.26	17.59	-51.26	0-360

Pk - Peak detector

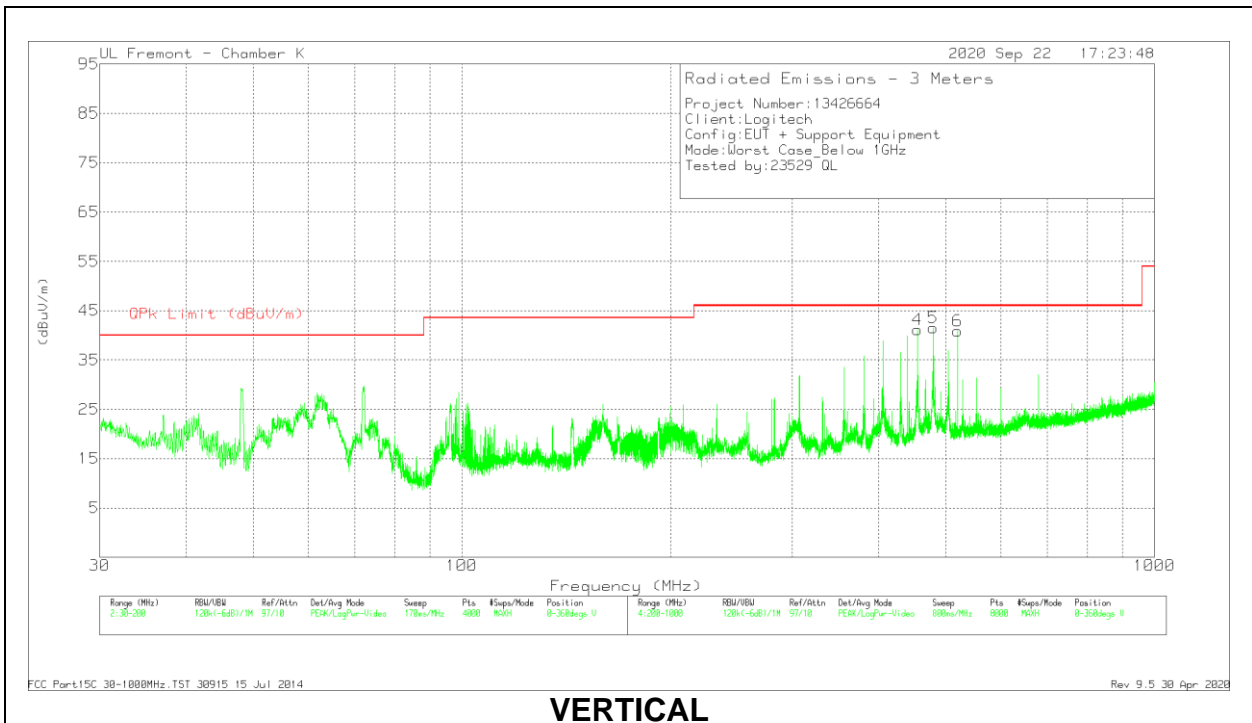
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (E ACF)	Amp/Cbl (dB)	Dist Corr 30m (dB)	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.8155	28.47	Pk	56	-32.1	-40	12.37	29.39	-17.02	0-360
6	.81125	30.61	Pk	56	-32.2	-40	14.41	29.43	-15.02	0-360

Pk - Peak detector

### 10.3. WORST CASE BELOW 1 GHZ



**HORIZONTAL**



**VERTICAL**

**Below 1GHz DATA**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0181574 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	519.9416	47.63	Pk	23.6	-29.2	42.03	46.02	-3.99	0-360	201	H
2	479.2363	46.27	Pk	23.6	-29.2	40.67	46.02	-5.35	0-360	201	H
3	454.6331	46.49	Pk	22.8	-29.3	39.99	46.02	-6.03	0-360	201	H
4	454.6331	47.66	Pk	22.8	-29.3	41.16	46.02	-4.86	0-360	201	V
5	479.2363	47.12	Pk	23.6	-29.2	41.52	46.02	-4.5	0-360	201	V
6	519.9416	46.56	Pk	23.6	-29.2	40.96	46.02	-5.06	0-360	99	V

Pk - Peak detector

**Radiated Emissions**

Frequency (MHz)	Meter Reading (dBuV)	Det	AF PRE0181574 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
*519.9884	49.73	Pk	23.6	-29.2	44.13	46.02	-1.89	319	160	H
*519.9884	49.05	Qp	23.6	-29.2	43.45	46.02	-2.57	319	160	H
479.2303	47.52	Pk	23.6	-29.2	41.92	46.02	-4.1	320	188	H
479.2303	46.64	Qp	23.6	-29.2	41.04	46.02	-4.98	320	188	H
454.6547	47.31	Pk	22.8	-29.3	40.81	46.02	-5.21	323	220	H
454.6547	46.43	Qp	22.8	-29.3	39.93	46.02	-6.09	323	220	H
454.6511	48.26	Pk	22.8	-29.3	41.76	46.02	-4.26	278	204	V
454.6511	47.38	Qp	22.8	-29.3	40.88	46.02	-5.14	278	204	V
479.2291	47.84	Pk	23.6	-29.2	42.24	46.02	-3.78	196	113	V
479.2291	47.38	Qp	22.8	-29.3	40.88	46.02	-5.14	196	113	V
*519.9991	47.44	Pk	23.6	-29.2	41.84	46.02	-4.18	272	167	V
*519.9991	46.38	Qp	22.8	-29.3	40.88	46.02	-5.14	272	167	V

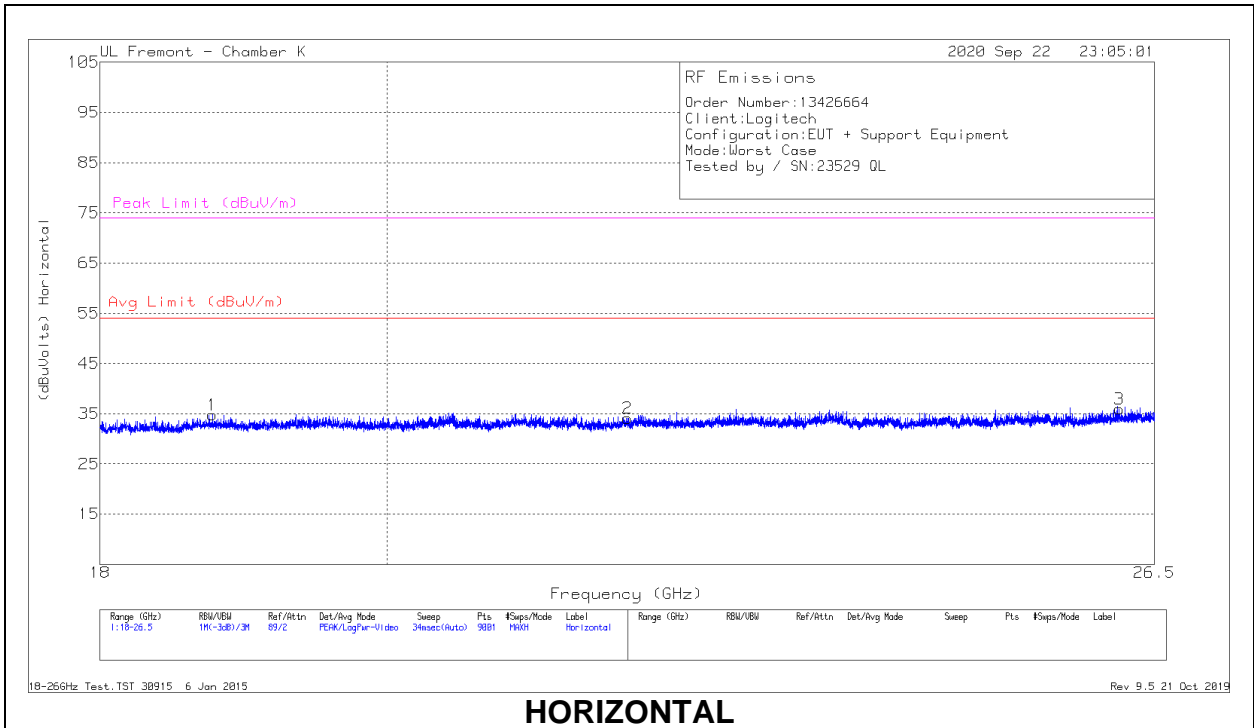
Pk - Peak detector

Qp - Quasi-Peak detector

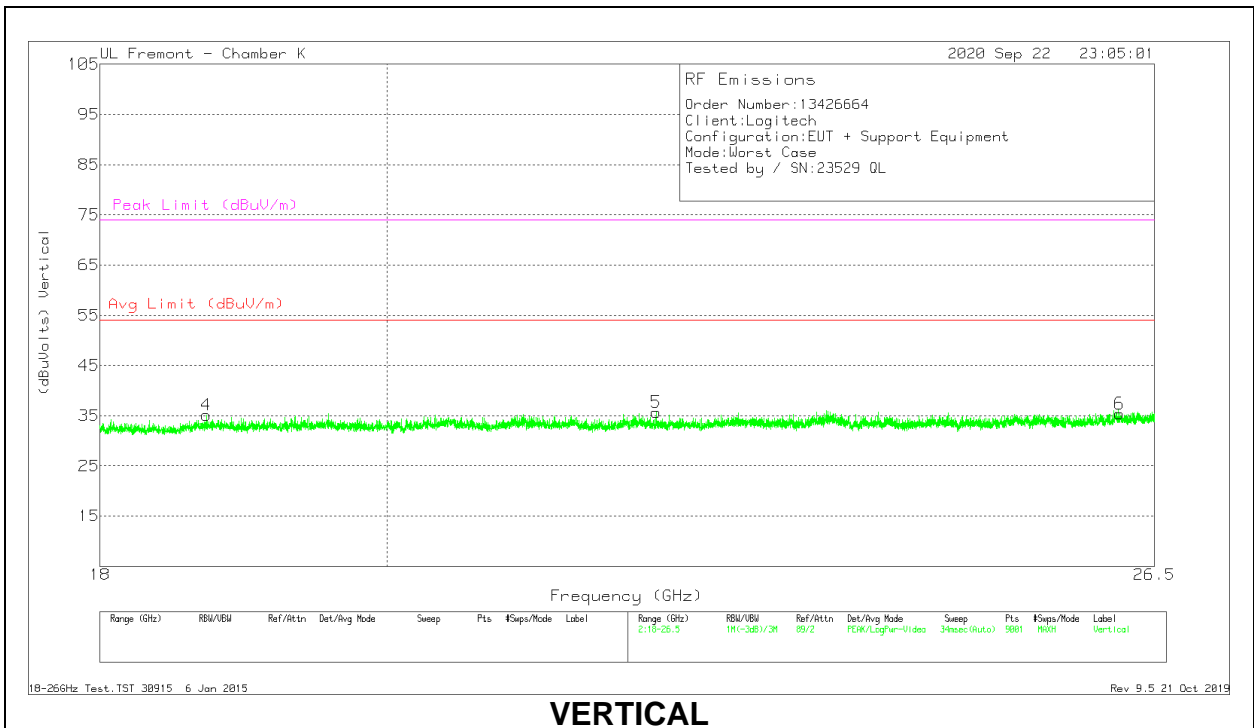
\* verification testing has been performed, this signal is not coming from radio.



### 10.4. WORST CASE 18-26 GHZ



**HORIZONTAL**



**VERTICAL**

**18 – 26GHz DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T448 AF (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	18.75744	70.36	Pk	32.4	-58.5	-9.5	34.76	54	-19.24	74	-39.24
2	21.842	67.8	Pk	33.3	-57.5	-9.5	34.1	54	-19.9	74	-39.9
3	26.16	66.01	Pk	34.5	-55.1	-9.5	35.91	54	-18.09	74	-38.09
4	18.71589	70.75	Pk	32.4	-58.5	-9.5	35.15	54	-18.85	74	-38.85
5	22.07528	69.38	Pk	33.5	-57.7	-9.5	35.68	54	-18.32	74	-38.32
6	26.16189	65.38	Pk	34.5	-55	-9.5	35.38	54	-18.62	74	-38.62

Pk - Peak detector

## 11. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	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

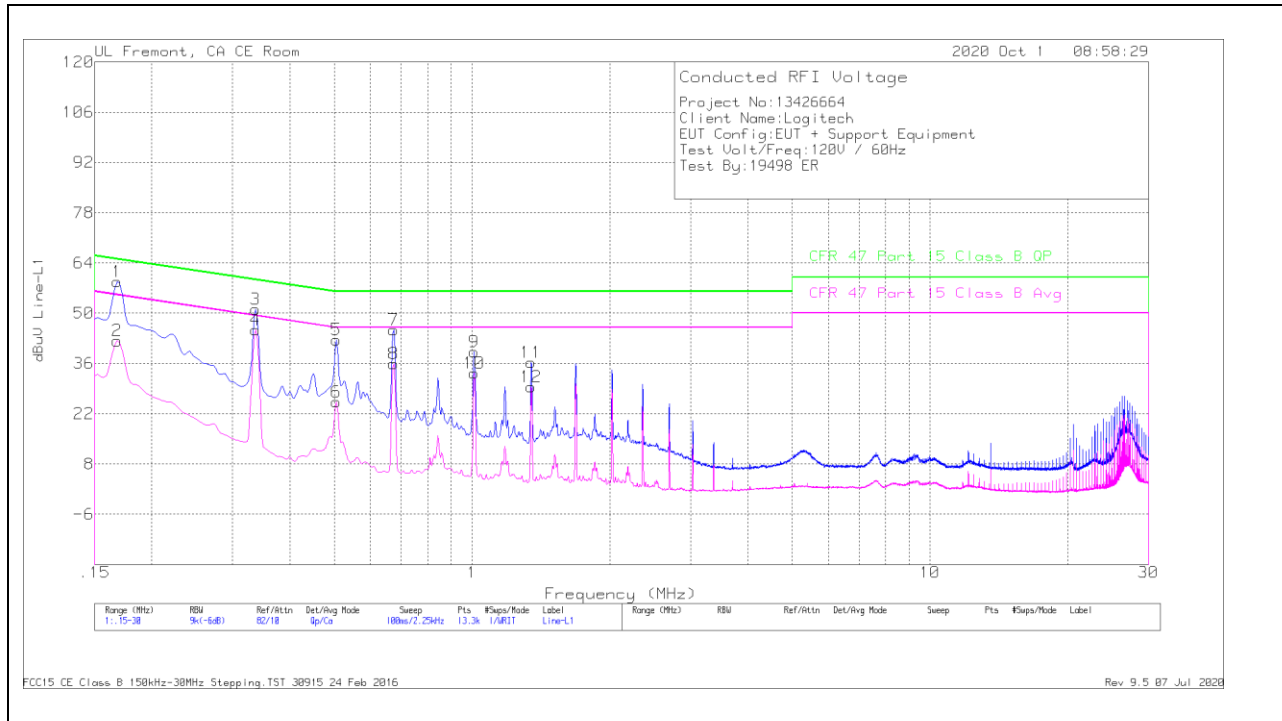
The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

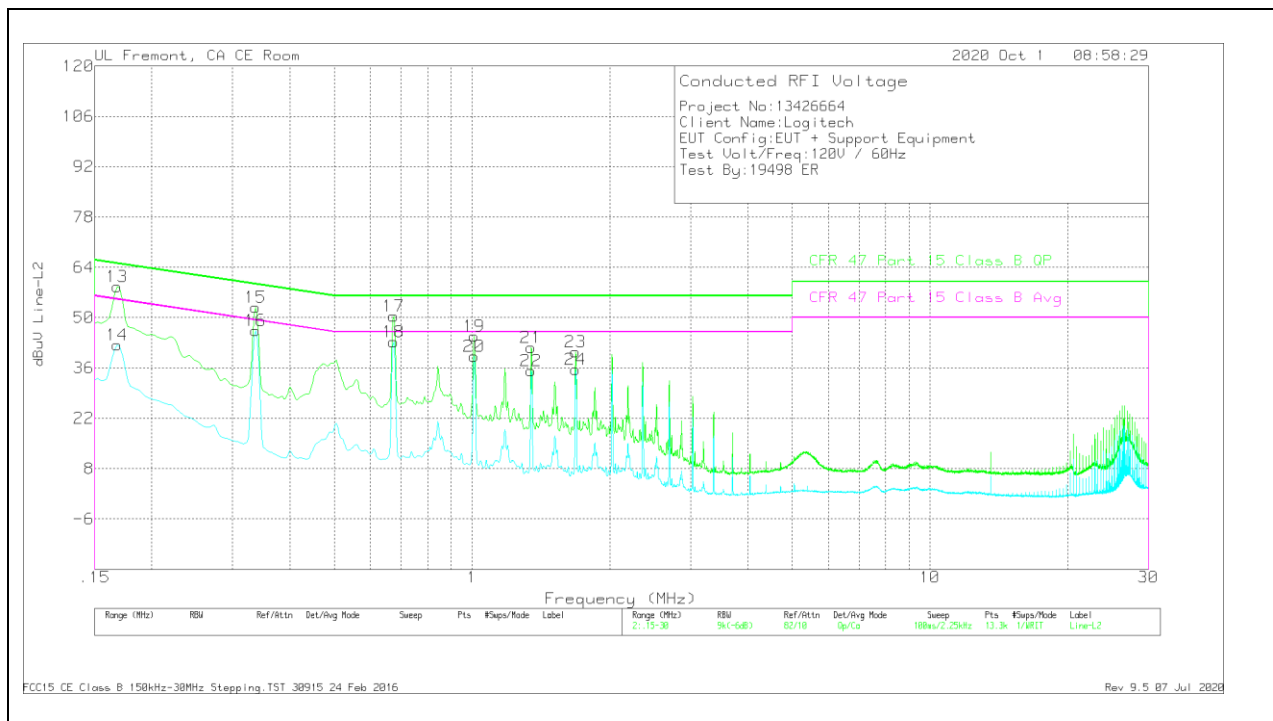
### LINE 1 RESULTS



Range 1: Line-L1 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 LISN L1	LC Cables C1&C3	Limiters (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	.168	48.83	Qp	0	0	10	58.83	65.06	-6.23	-	-
2	.168	32.32	Ca	0	0	10	42.32	-	-	55.06	-12.74
3	.33675	41.07	Qp	0	0	10	51.07	59.28	-8.21	-	-
4	.33675	35.42	Ca	0	0	10	45.42	-	-	49.28	-3.86
5	.5055	32.66	Qp	0	0	10	42.66	56	-13.34	-	-
6	.5055	15.23	Ca	0	0	10	25.23	-	-	46	-20.77
7	.67425	35.3	Qp	0	0	10	45.3	56	-10.7	-	-
8	.67425	25.87	Ca	0	0	10	35.87	-	-	46	-10.13
9	1.01175	29.11	Qp	0	.1	10	39.21	56	-16.79	-	-
10	1.01175	23.15	Ca	0	.1	10	33.25	-	-	46	-12.75
11	1.347	26.25	Qp	0	.1	10	36.35	56	-19.65	-	-
12	1.347	19.44	Ca	0	.1	10	29.54	-	-	46	-16.46

Qp - Quasi-Peak detector  
 Ca - CISPR average detection

### LINE 2 RESULTS



Range 2: Line-L2 .15 - 30MHz											
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	PRE018644 6 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)M argin (dB)
13	.168	48.66	Qp	0	0	10	58.66	65.06	-6.4	-	-
14	.168	32.4	Ca	0	0	10	42.4	-	-	55.06	-12.66
15	.33675	42.82	Qp	0	0	10	52.82	59.28	-6.46	-	-
16	.33675	36.48	Ca	0	0	10	46.48	-	-	49.28	-2.8
17	.67425	40.48	Qp	0	0	10	50.48	56	-5.52	-	-
18	.67425	33.28	Ca	0	0	10	43.28	-	-	46	-2.72
19	1.01175	34.69	Qp	0	.1	10	44.79	56	-11.21	-	-
20	1.01175	29.21	Ca	0	.1	10	39.31	-	-	46	-6.69
21	1.347	31.61	Qp	0	.1	10	41.71	56	-14.29	-	-
22	1.347	25.08	Ca	0	.1	10	35.18	-	-	46	-10.82
23	1.6845	30.34	Qp	0	.1	10	40.44	56	-15.56	-	-
24	1.6845	25.44	Ca	0	.1	10	35.54	-	-	46	-10.46

Qp - Quasi-Peak detector  
 Ca - CISPR average detection