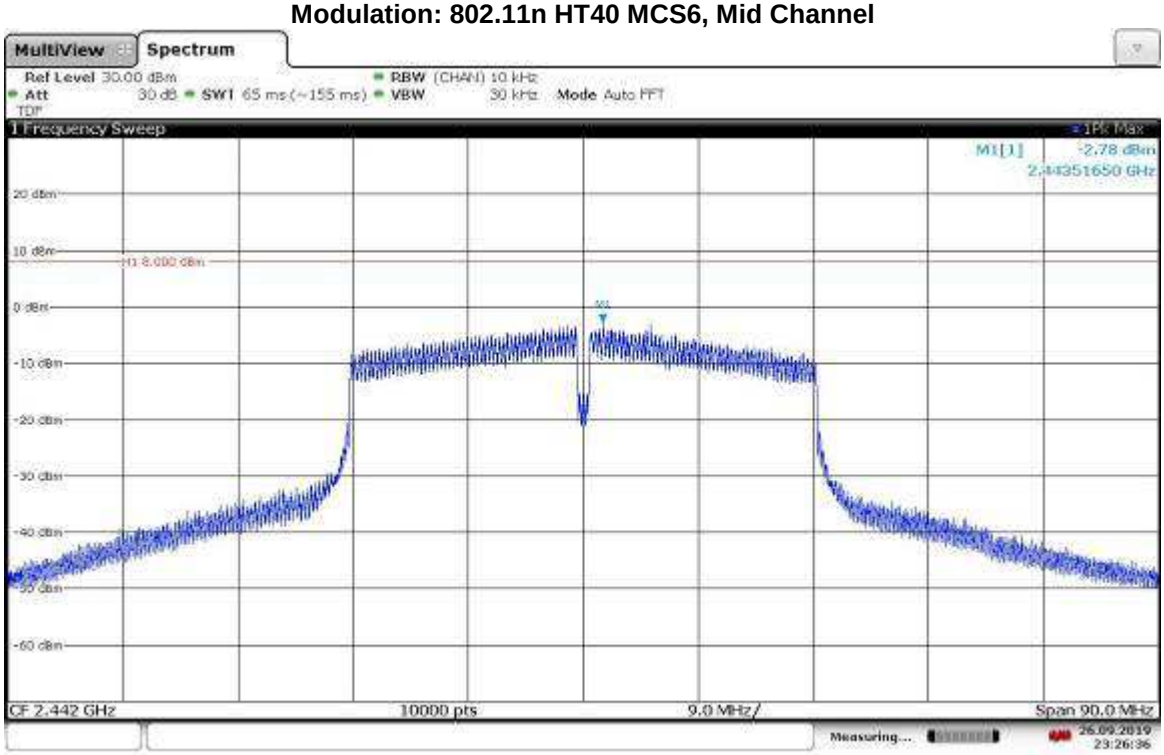
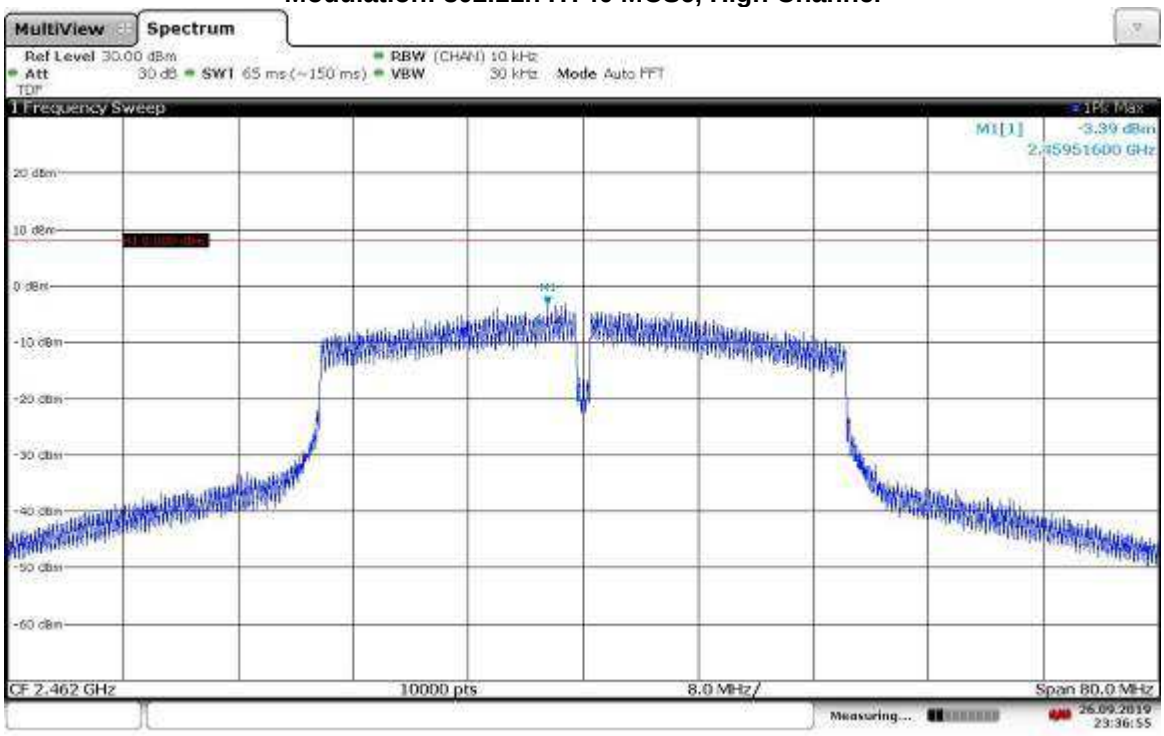
Modulation: 802.11n HT40 MCS6, Mid Channel



23:26:36 26.09.2019

Modulation: 802.11n HT40 MCS6, High Channel



23:36:55 26.09.2019

Modulation: 802.11n HT40 MCS7, Low Channel

FCC Part 47 §15.247 2400-2483.5 MHz 2016

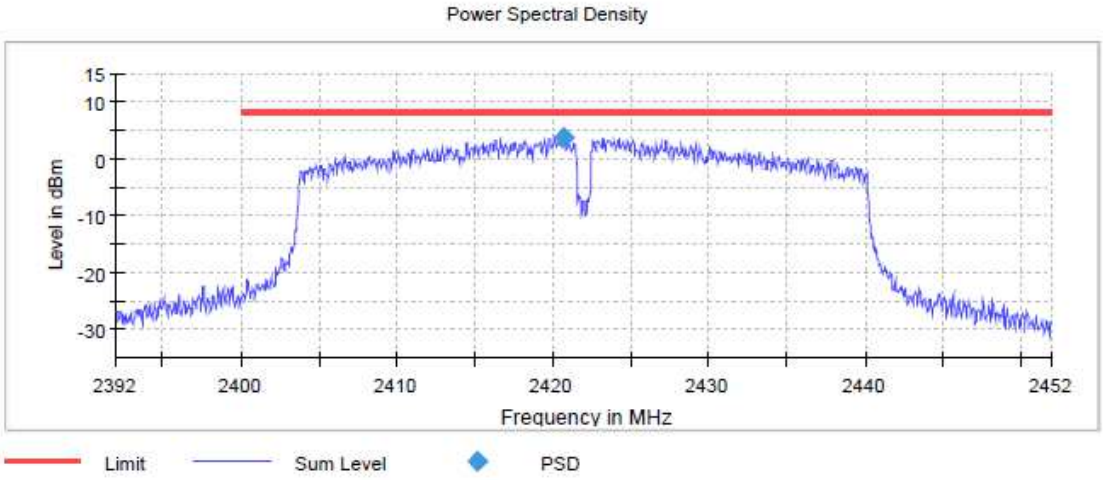
Peak Power Spectral Density (2422 MHz; 25.000 dBm; 40 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.1 dB

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2422.000000	2420.675000	3.763	8.0	PASS



PSD Connector 1

Modulation: 802.11n HT40 MCS7, Mid Channel

FCC Part 47 §15.247 2400-2483.5 MHz 2016

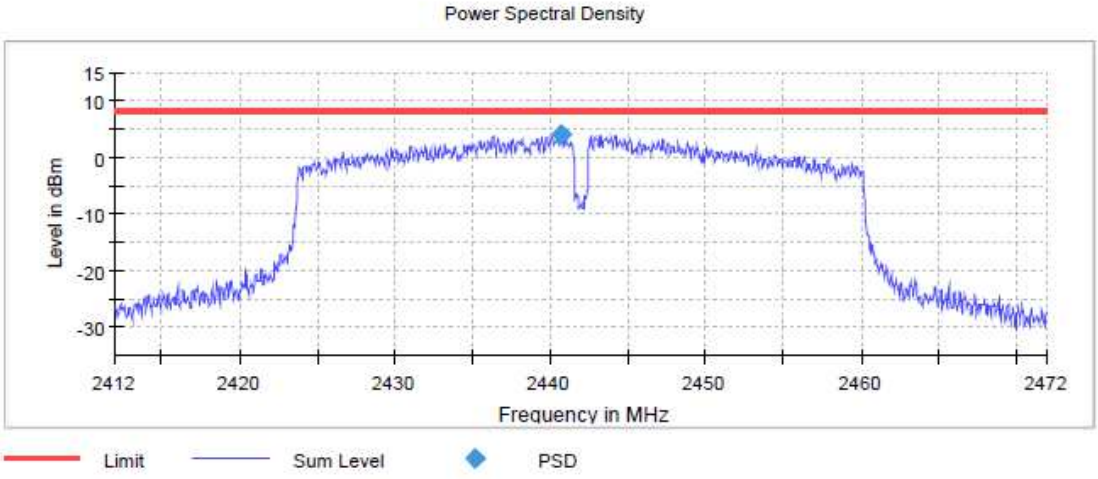
Peak Power Spectral Density (2442 MHz; 25.000 dBm; 40 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.1 dB

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2442.000000	2440.675000	3.981	8.0	PASS



PSD Connector 1

Modulation: 802.11n HT40 MCS7, High Channel

FCC Part 47 §15.247 2400-2483.5 MHz 2016

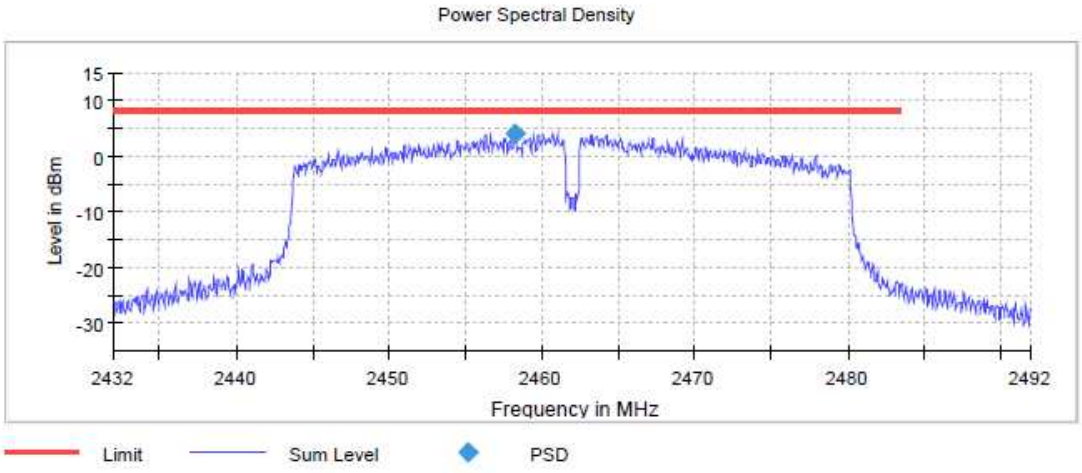
Peak Power Spectral Density (2462 MHz; 25.000 dBm; 40 MHz)

Test according to FCC title 47 part 15 §15.247(a), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 1.1 dB

Result

DUT Frequency (MHz)	Frequency (MHz)	PSD (dBm)	Limit Max (dBm)	Result
2462.000000	2458.225000	4.105	8.0	PASS



PSD Connector 1

Test Personnel:	Kouma Sinn KPS Vathana Ven VSV	Test Date:	07/16/2019 09/26/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	CFR47 FCC Part 15.247	Limit Applied:	See report section 9.3
Input Voltage:	5 VDC (USB)	Ambient Temperature:	22 ºC
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Relative Humidity:	62 %
		Atmospheric Pressure:	1010 mbars

Deviations, Additions, or Exclusions: None

10 Band Edge Compliance

10.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, ANSI C63.10, and KDB 558074.

TEST SITE: EMC Lab & 10m ALSE

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DS40'	Temp, humidity, pressure gauge	Digi Sense	68000-49	181717625	11/06/2018	11/06/2019
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/15/2018	10/15/2019
ROS005-4'	Control Platform	Rodhe and Schwarz	OSP120	101428	11/20/2018	11/20/2019
None'	Coaxial Cable (DUT1)	UTIFLEX MICRO-COAX	UFA210A-1-0787-300300	101709	02/01/2019	02/01/2020
None'	20 dB Attenuator (DUT1)	Pasternack	E7004-20	None	02/01/2019	02/01/2020
None'	Coaxial Cable (Receiver/RF In	Micro-coax	UFA210A-0-0-0196-300300	101706	02/01/2019	02/01/2020
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	02/01/2019	02/01/2020
CBLHF2012-2M-1'	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/01/2019	02/01/2020

Software Utilized:

Name	Manufacturer	Version
R&S EMC32/AMS32/WMS32	Rohde & Schwarz	10.30.00

Radiated measurement

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001'	Weather Station	Davis Instruments	7400	PE80519A61	01/23/2019	01/23/2020
EMC02'	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	3115	2784	08/16/2018	08/16/2019
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/28/2019	03/28/2020
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2019	07/25/2020

Software Utilized:

Name	Manufacturer	Version
None	--	--

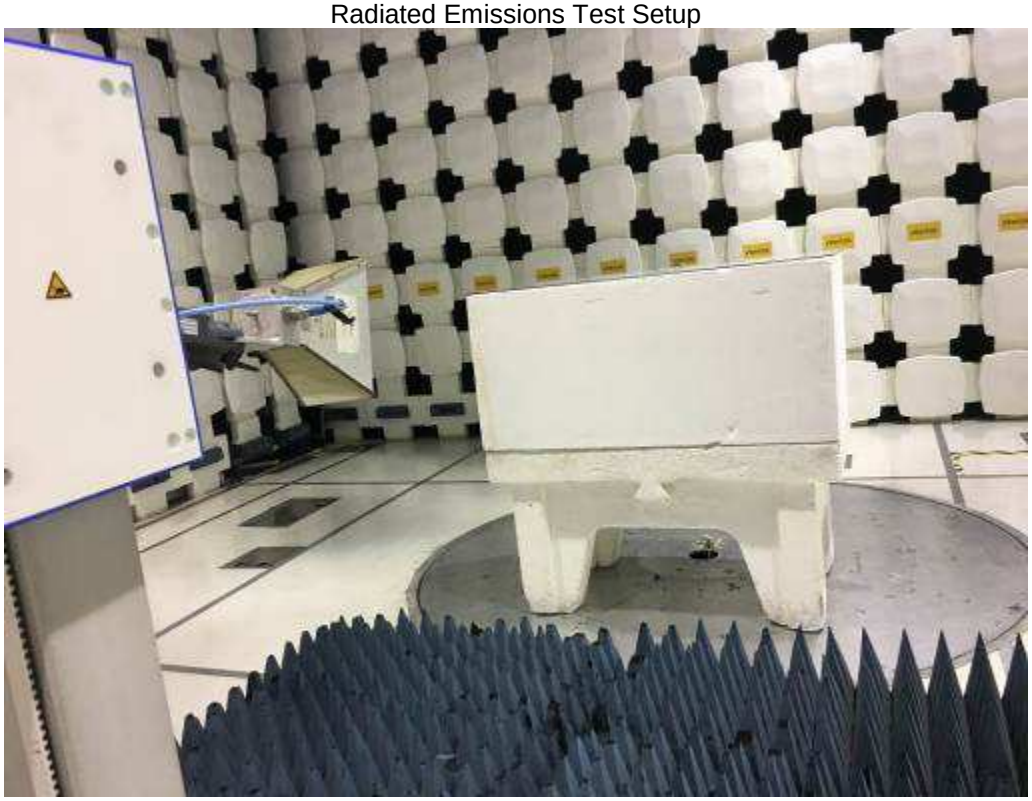
10.3 Results:

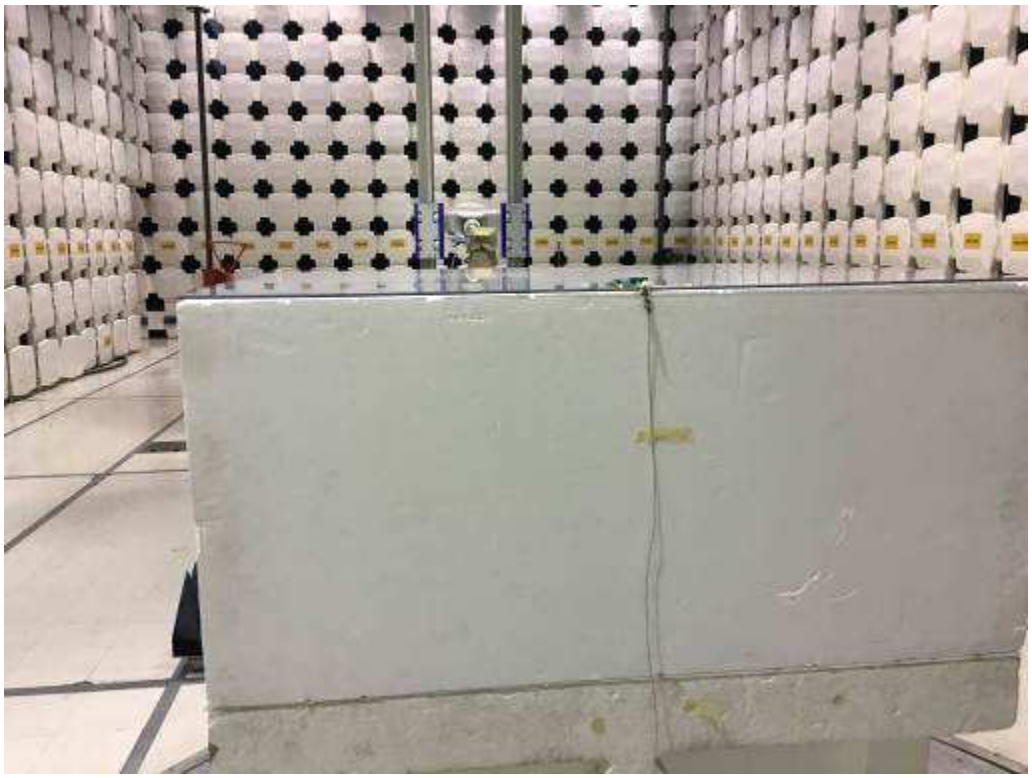
The sample tested was found to Comply.

15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

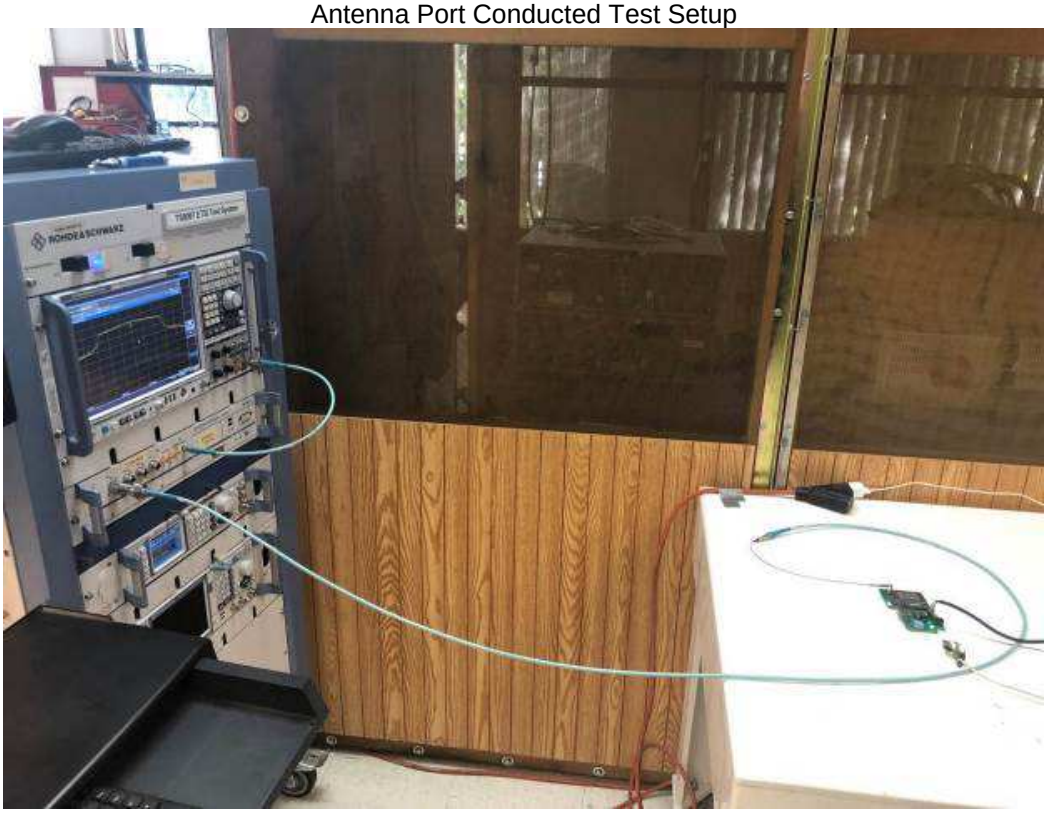
10.4 Setup Photographs:

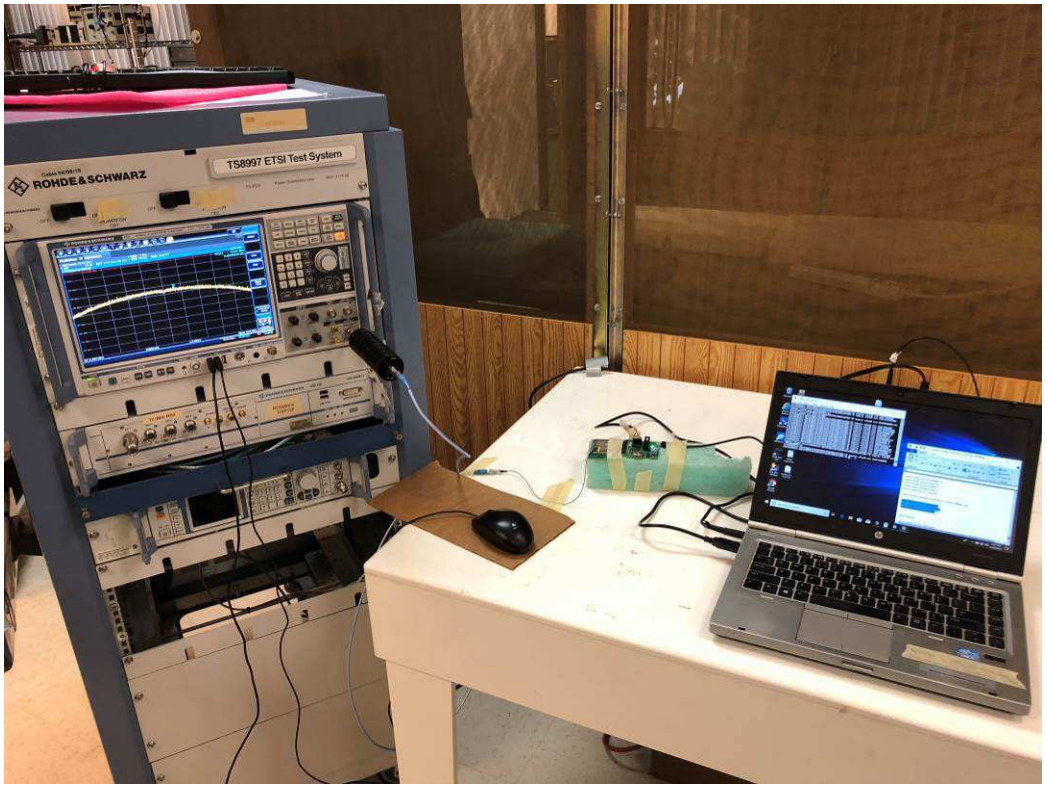
Radiated Emissions Test Setup





Antenna Port Conducted Test Setup





10.5 Plots/Data:

Modulation: 802.11b, Bandwidth: 20 MHz, 1 Mbps, Lower Band Edge

FCC Part 47 §15.247 2400-2483.5 MHz 2016

Band Edge low (2412 MHz; 25.000 dBm; 20 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.6 dB

Result

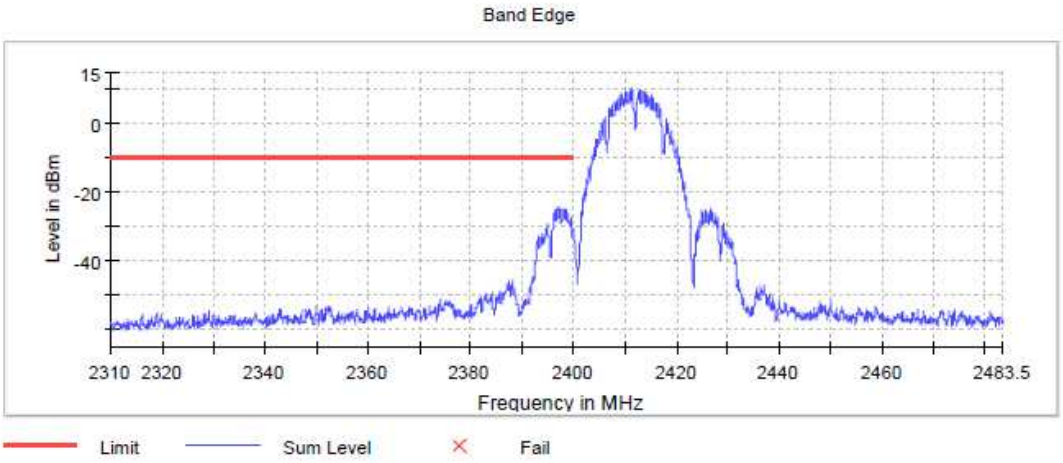
DUT Frequency (MHz)	Result
2412.000000	PASS

Inband Peak

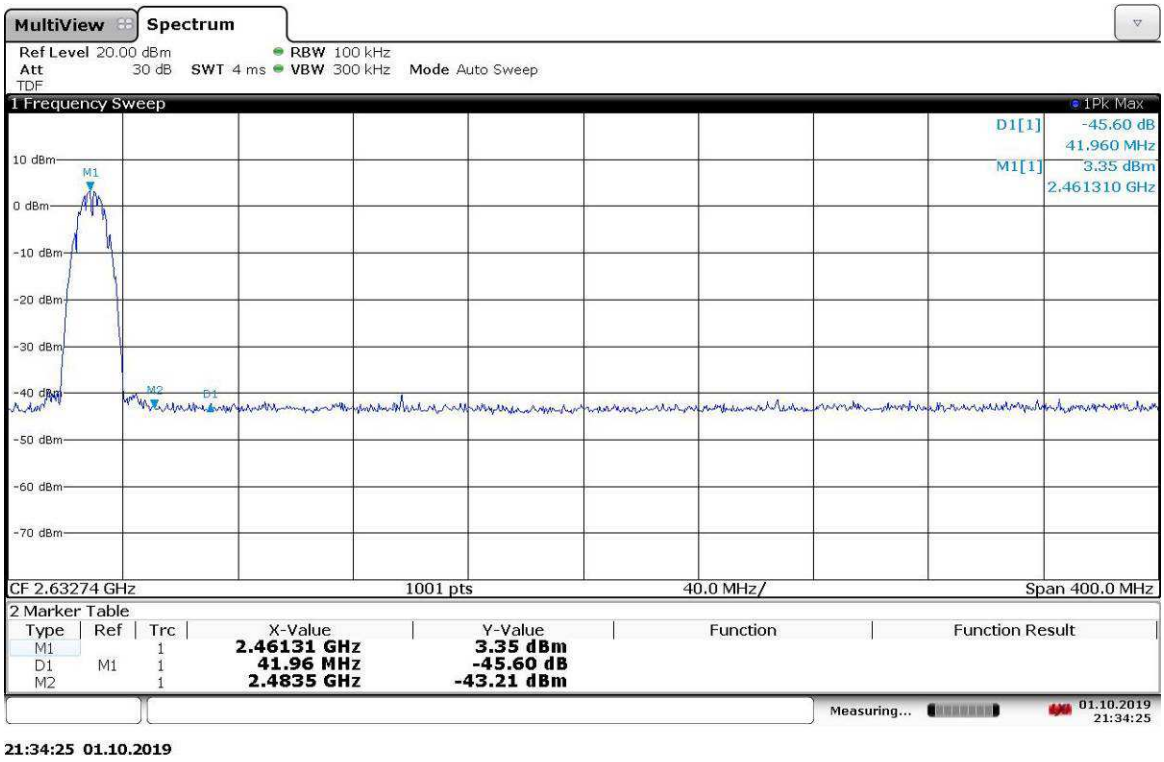
Frequency (MHz)	Level (dBm)
2411.475000	10.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2396.975000	-24.7	14.7	-10.0	PASS
2398.475000	-24.9	14.9	-10.0	PASS
2397.975000	-24.9	14.9	-10.0	PASS
2396.475000	-24.9	15.0	-10.0	PASS
2397.475000	-25.0	15.0	-10.0	PASS
2398.025000	-25.1	15.1	-10.0	PASS
2397.025000	-25.2	15.2	-10.0	PASS
2396.925000	-25.2	15.3	-10.0	PASS
2396.525000	-25.4	15.5	-10.0	PASS
2397.525000	-25.7	15.7	-10.0	PASS
2398.525000	-25.7	15.7	-10.0	PASS
2395.975000	-25.8	15.9	-10.0	PASS
2398.975000	-26.0	16.0	-10.0	PASS
2397.925000	-26.0	16.1	-10.0	PASS
2398.425000	-26.2	16.2	-10.0	PASS



Modulation: 802.11b, Bandwidth: 20 MHz, 1 Mbps, Upper Band Edge



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Modulation: 802.11b, Bandwidth: 20 MHz, 2 Mbps, Lower Band Edge

FCC Part 47 §15.247 2400-2483.5 MHz 2016

Band Edge low (2412 MHz; 25.000 dBm; 20 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.6 dB

Result

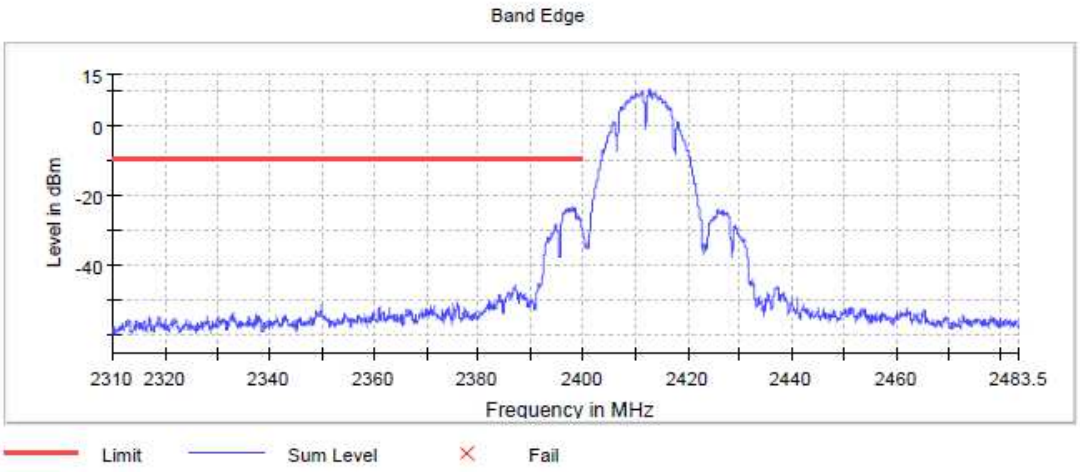
DUT Frequency (MHz)	Result
2412.000000	PASS

Inband Peak

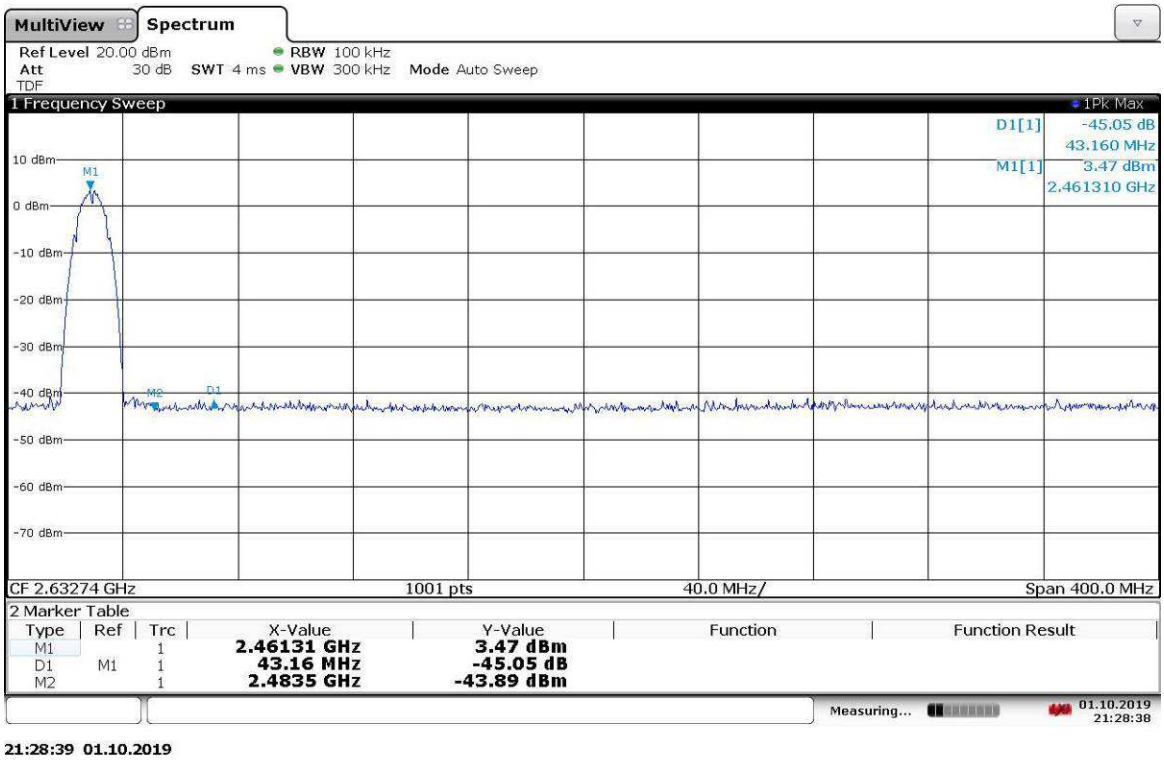
Frequency (MHz)	Level (dBm)
2412.775000	10.4

Measurements

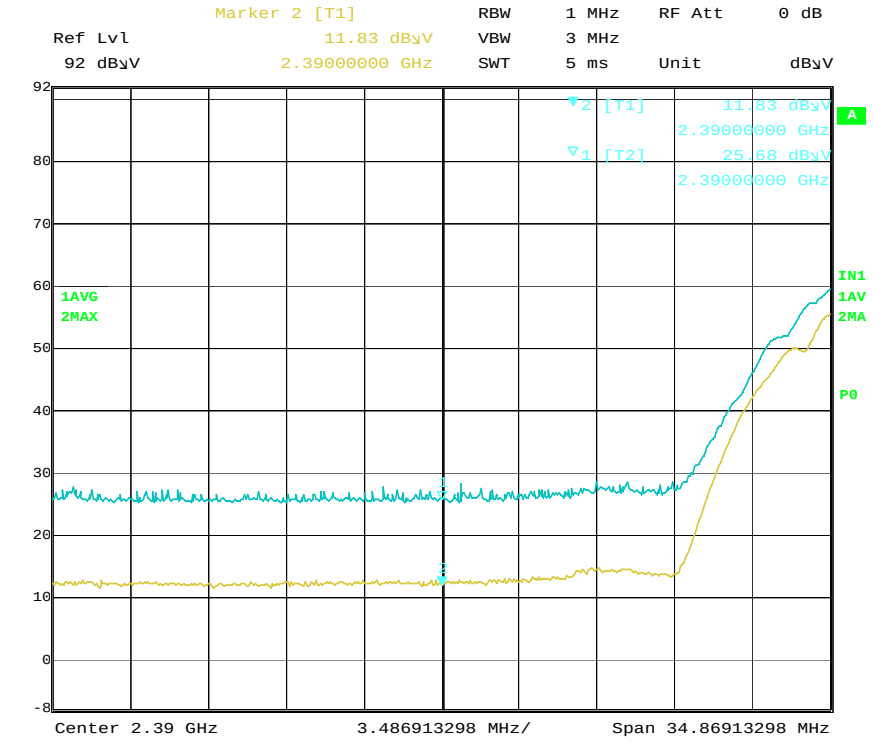
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2397.725000	-23.1	13.5	-9.6	PASS
2398.225000	-23.4	13.7	-9.6	PASS
2397.025000	-23.4	13.7	-9.6	PASS
2397.075000	-23.4	13.8	-9.6	PASS
2398.325000	-23.4	13.8	-9.6	PASS
2398.375000	-23.7	14.0	-9.6	PASS
2397.475000	-23.7	14.1	-9.6	PASS
2398.275000	-23.7	14.1	-9.6	PASS
2397.125000	-23.8	14.1	-9.6	PASS
2397.325000	-23.8	14.2	-9.6	PASS
2396.925000	-23.9	14.2	-9.6	PASS
2397.525000	-23.9	14.2	-9.6	PASS
2398.175000	-24.0	14.3	-9.6	PASS
2397.825000	-24.0	14.3	-9.6	PASS
2396.625000	-24.0	14.3	-9.6	PASS



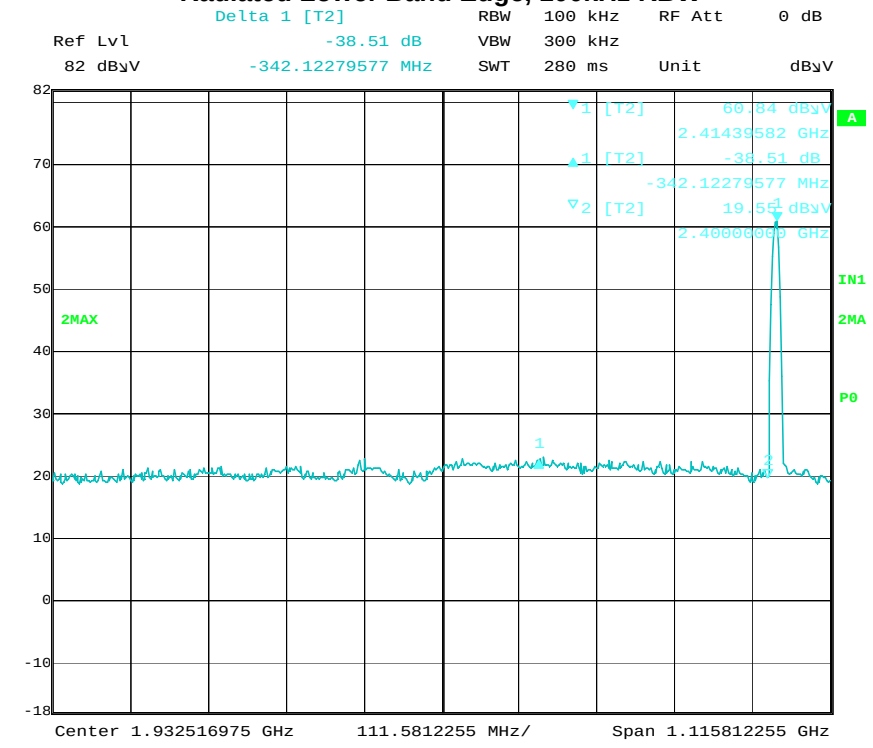
Modulation: 802.11b, Bandwidth: 20 MHz, 2 Mbps, Upper Band Edge



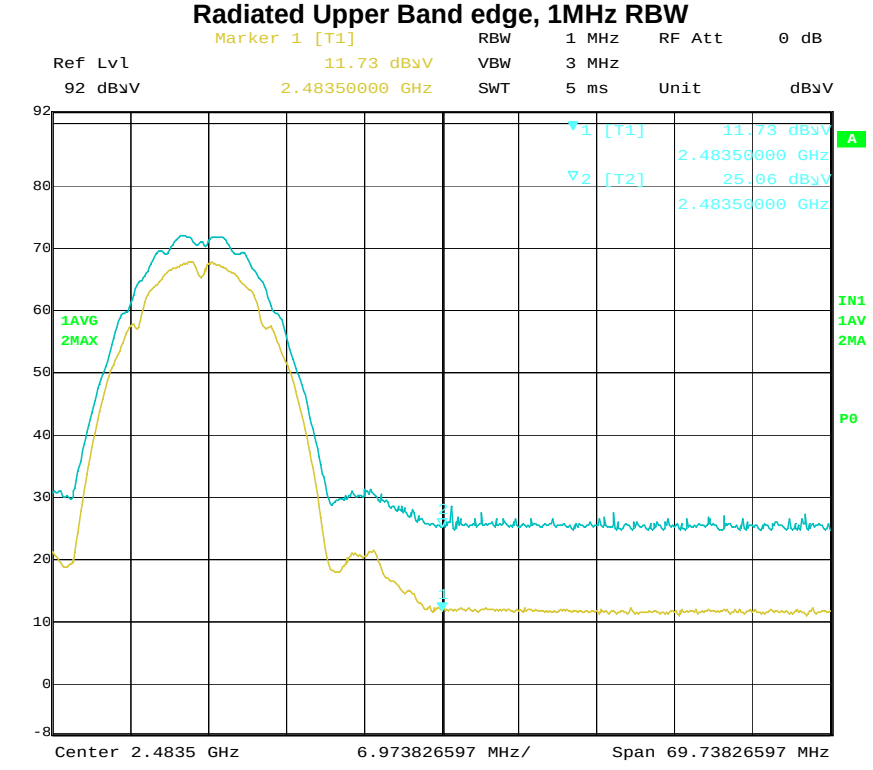
Radiated Lower Band Edge, 1MHz RBW



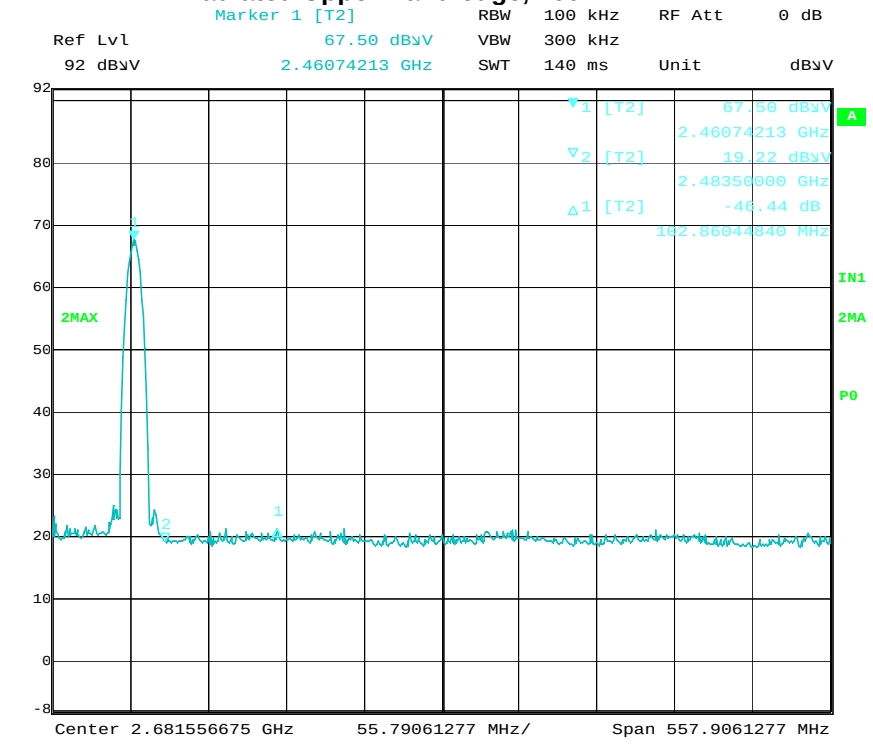
Radiated Lower Band Edge, 100kHz RBW



Radiated Upper Band edge, 1MHz RBW



Radiated Upper Band edge, 100kHz RBW



Note: Worst-case modulation and power was used

Modulation: OFDM 802.11g, Bandwidth: 20 MHz, 24 Mbps, Lower Band Edge

FCC Part 47 §15.247 2400-2483.5 MHz 2016

Band Edge low (2412 MHz; 25.000 dBm; 20 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.6 dB

Result

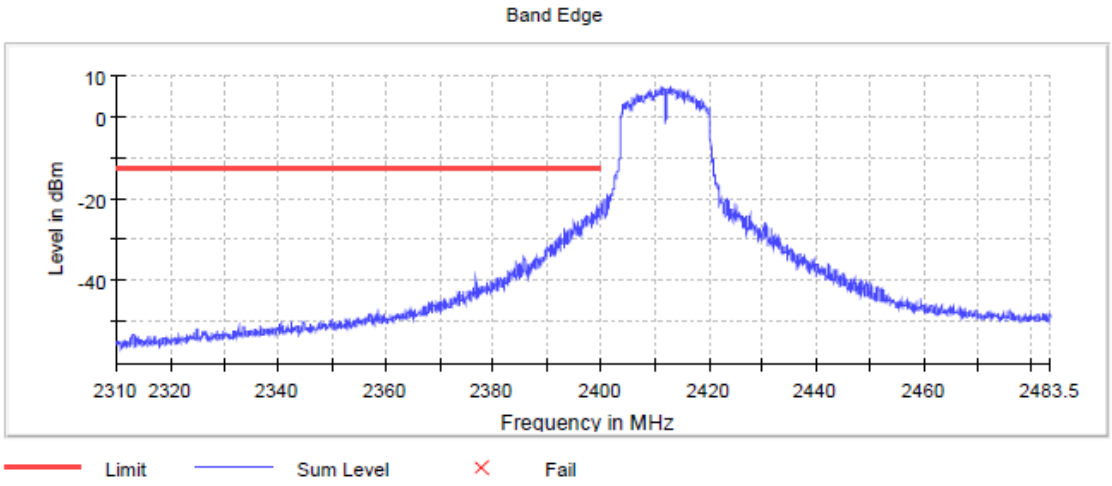
DUT Frequency (MHz)	Result
2412.000000	PASS

Inband Peak

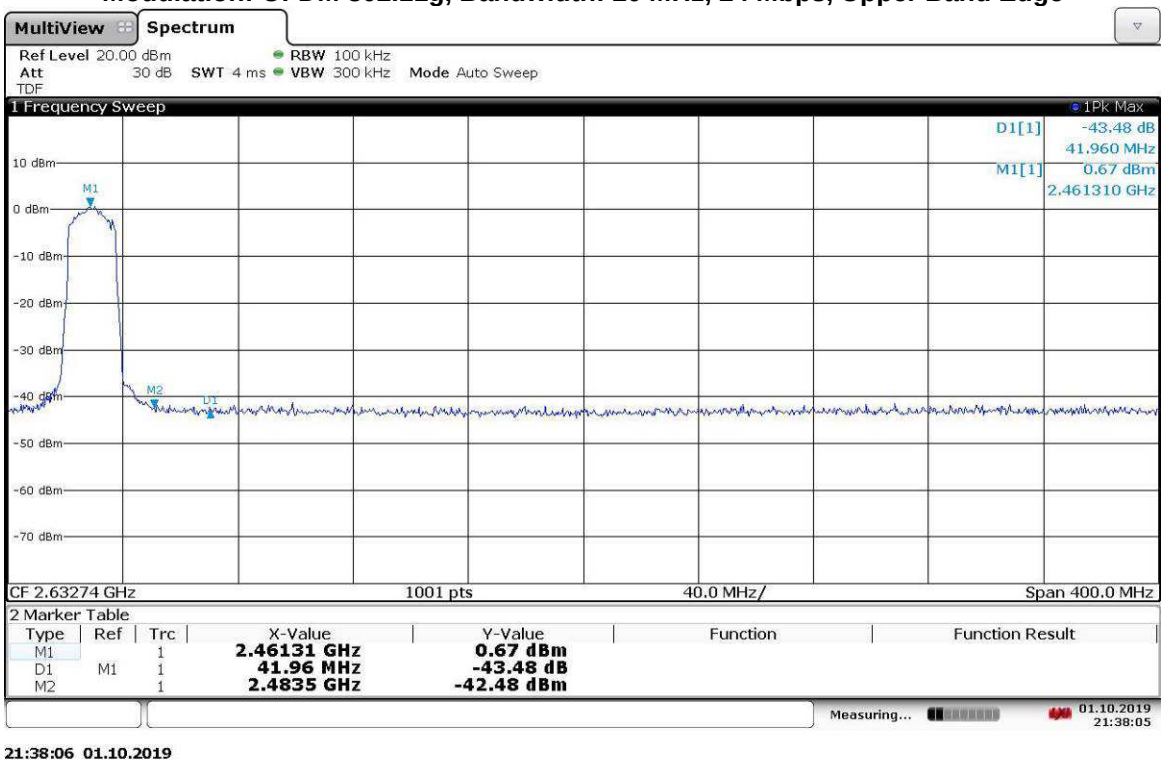
Frequency (MHz)	Level (dBm)
2412.925000	7.3

Measurements

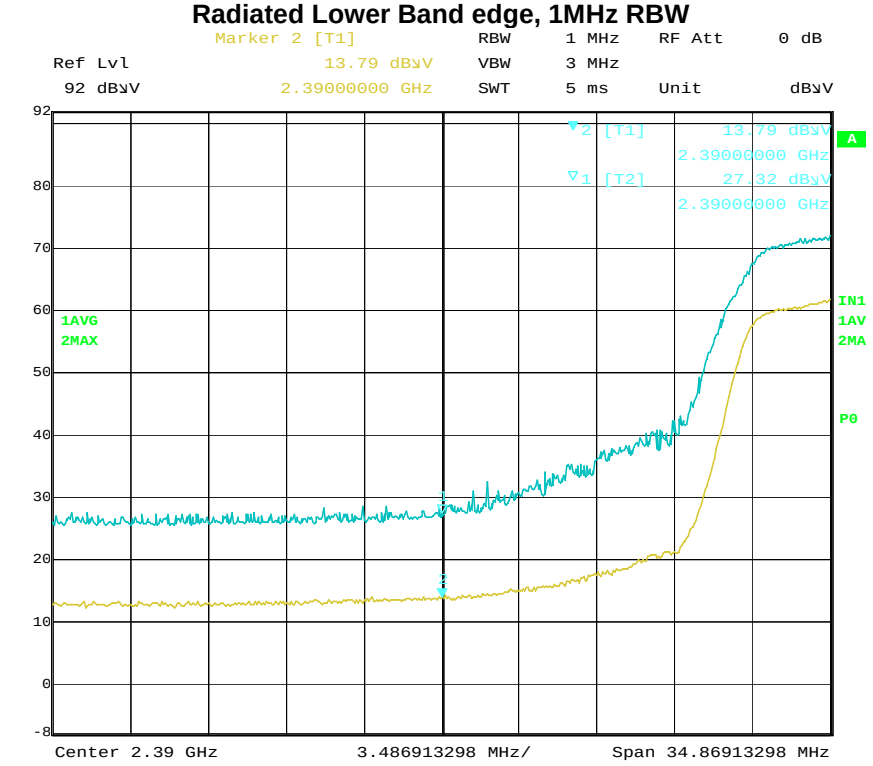
Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.225000	-21.6	8.9	-12.7	PASS
2399.175000	-21.6	9.0	-12.7	PASS
2399.125000	-21.9	9.2	-12.7	PASS
2399.725000	-22.2	9.6	-12.7	PASS
2399.775000	-22.3	9.7	-12.7	PASS
2399.425000	-22.3	9.7	-12.7	PASS
2399.825000	-22.4	9.8	-12.7	PASS
2399.475000	-22.8	10.1	-12.7	PASS
2399.525000	-23.1	10.4	-12.7	PASS
2399.375000	-23.3	10.6	-12.7	PASS
2398.875000	-23.4	10.7	-12.7	PASS
2398.225000	-23.4	10.8	-12.7	PASS
2398.825000	-23.8	11.2	-12.7	PASS
2398.575000	-23.8	11.2	-12.7	PASS
2399.025000	-23.9	11.2	-12.7	PASS



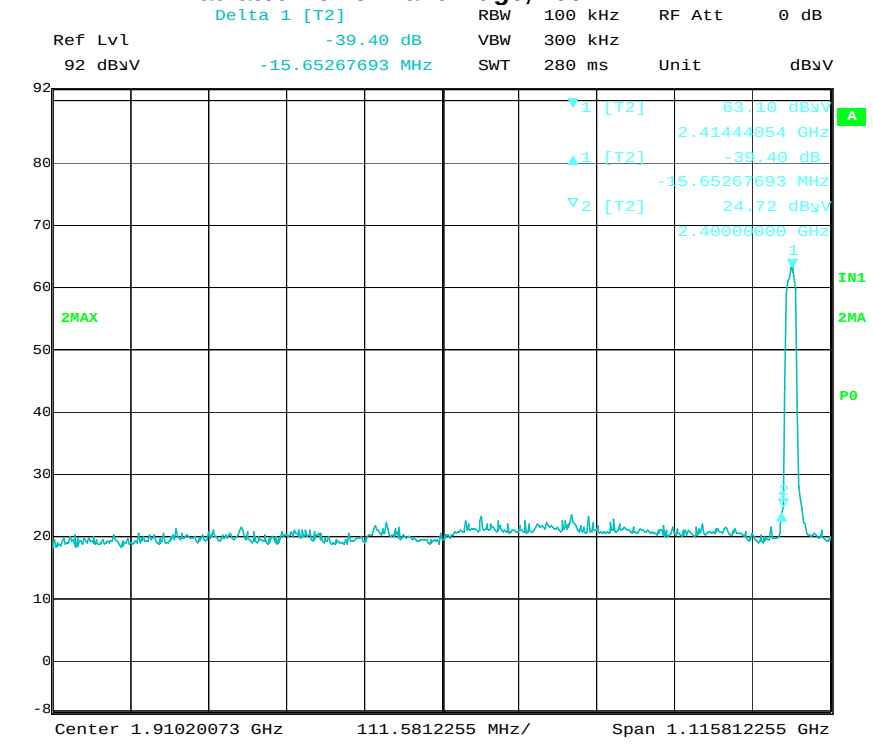
Modulation: OFDM 802.11g, Bandwidth: 20 MHz, 24 Mbps, Upper Band Edge



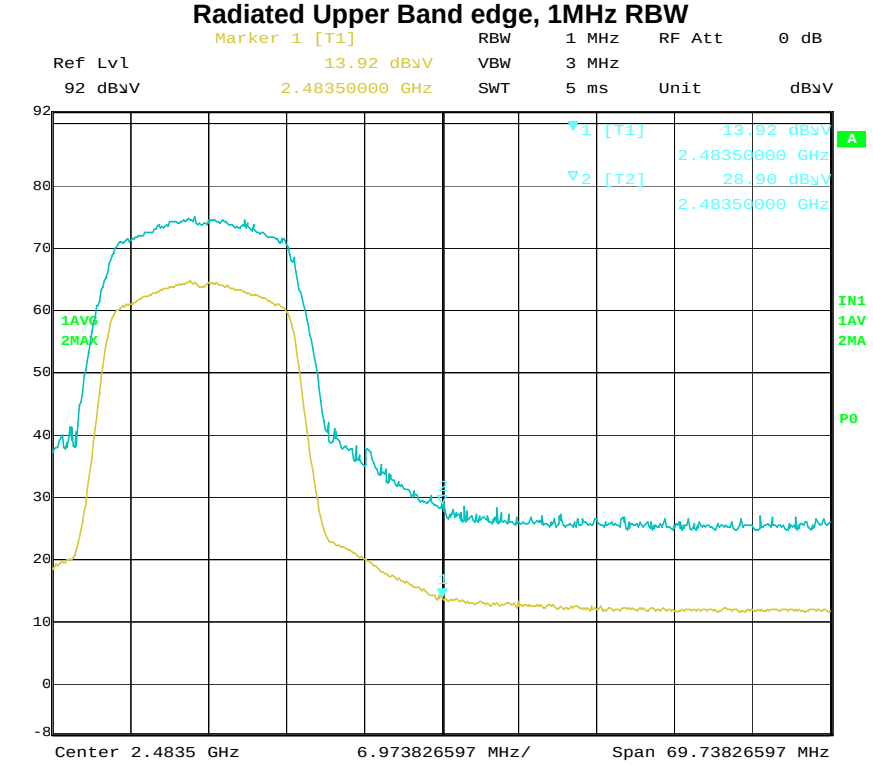
Radiated Lower Band edge, 1MHz RBW



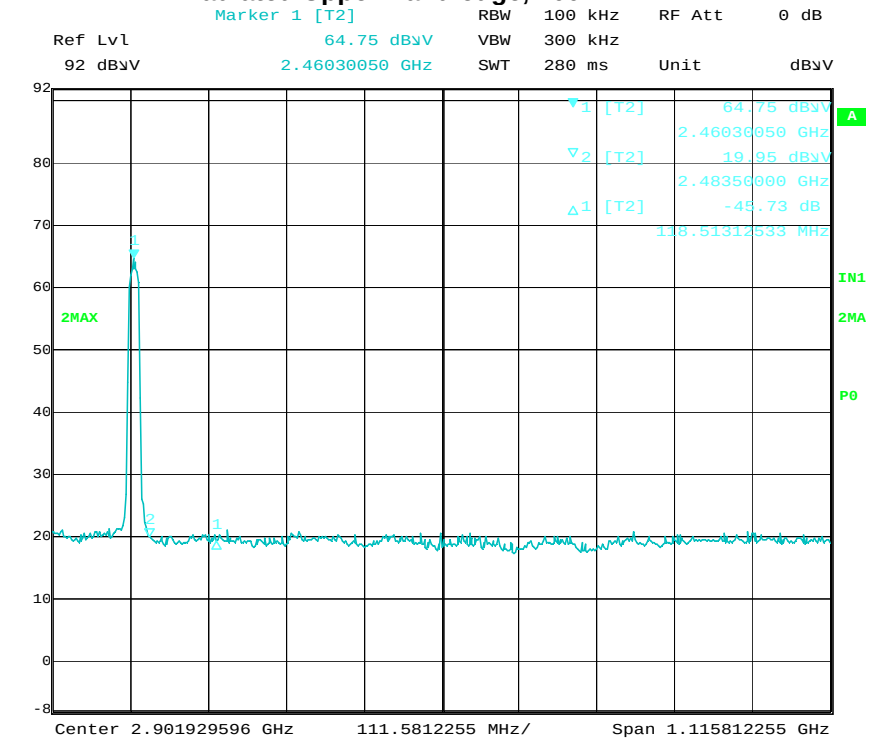
Radiated Lower Band Edge, 100kHz RBW



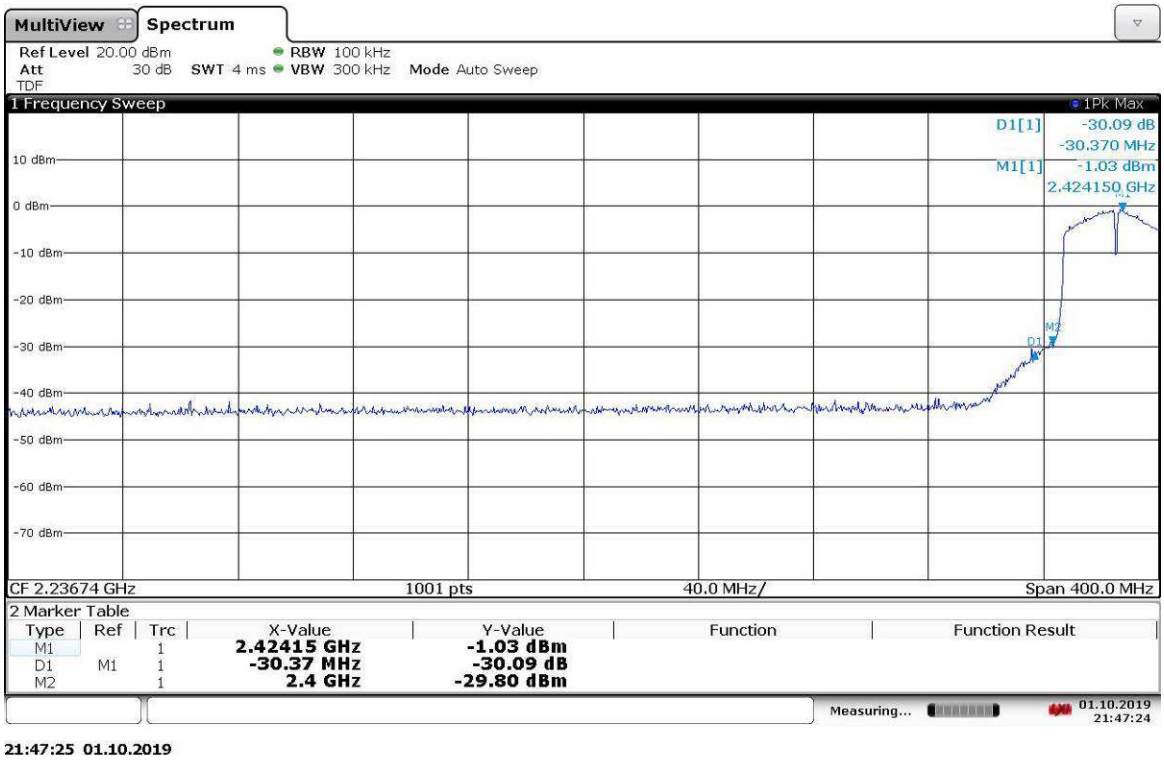
Radiated Upper Band edge, 1MHz RBW



Radiated Upper Band edge, 100kHz RBW



Modulation: 802.11n HT40 MCS0, Lower Band Edge



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Modulation: 802.11n HT40 MCS0, Upper Band Edge

FCC Part 47 §15.247 2400-2483.5 MHz 2016

Band Edge high (2462 MHz; 25.000 dBm; 40 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.6 dB

Result

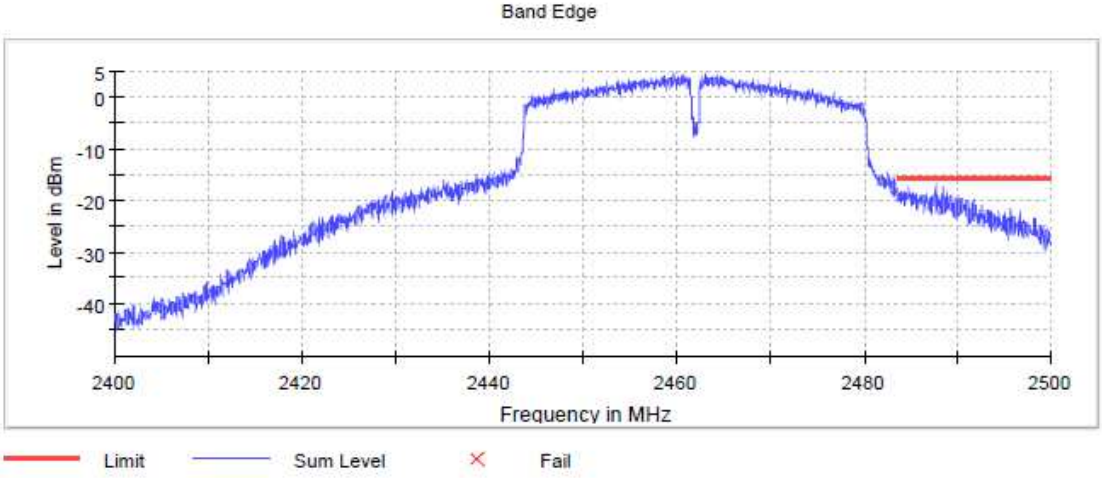
DUT Frequency (MHz)	Result
2462.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2464.225000	4.3

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2488.525000	-17.5	1.8	-15.7	PASS
2483.575000	-17.6	1.9	-15.7	PASS
2483.525000	-17.6	1.9	-15.7	PASS
2487.625000	-17.7	2.0	-15.7	PASS
2484.875000	-18.0	2.3	-15.7	PASS
2484.825000	-18.0	2.3	-15.7	PASS
2488.475000	-18.1	2.3	-15.7	PASS
2484.475000	-18.2	2.5	-15.7	PASS
2484.225000	-18.4	2.7	-15.7	PASS
2483.925000	-18.4	2.7	-15.7	PASS
2484.425000	-18.5	2.7	-15.7	PASS
2484.525000	-18.5	2.8	-15.7	PASS
2483.825000	-18.6	2.8	-15.7	PASS
2483.875000	-18.6	2.9	-15.7	PASS
2485.675000	-18.6	2.9	-15.7	PASS



Modulation: 802.11n HT40 MCS7, Lower Band Edge

FCC Part 47 §15.247 2400-2483.5 MHz 2016

Band Edge low (2422 MHz; 25.000 dBm; 40 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.6 dB

Result

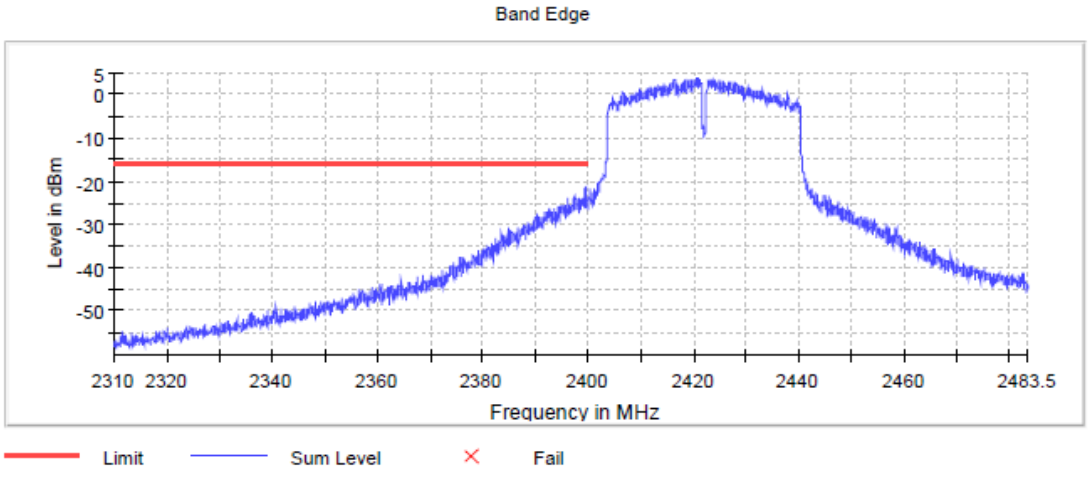
DUT Frequency (MHz)	Result
2422.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2420.675000	4.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2399.475000	-21.5	5.4	-16.0	PASS
2399.425000	-22.0	5.9	-16.0	PASS
2399.525000	-23.2	7.2	-16.0	PASS
2397.325000	-23.6	7.5	-16.0	PASS
2398.225000	-23.6	7.6	-16.0	PASS
2399.175000	-23.7	7.7	-16.0	PASS
2397.375000	-23.8	7.8	-16.0	PASS
2396.025000	-23.8	7.8	-16.0	PASS
2399.125000	-23.9	7.9	-16.0	PASS
2397.625000	-23.9	7.9	-16.0	PASS
2398.825000	-24.0	8.0	-16.0	PASS
2397.575000	-24.0	8.0	-16.0	PASS
2396.075000	-24.1	8.0	-16.0	PASS
2398.275000	-24.1	8.1	-16.0	PASS
2398.525000	-24.1	8.1	-16.0	PASS



Modulation: 802.11n HT40 MCS7, Upper Band Edge

FCC Part 47 §15.247 2400-2483.5 MHz 2016

Band Edge high (2462 MHz; 25.000 dBm; 40 MHz)

Test according to FCC title 47 part 15 §15.247(d), KDB 558074 D01 DTS Meas Guidance v03r05 and ANSI C63.10

Measurement uncertainty calculated in accordance with ETSI TR 100 028-1.
Expanded Uncertainty (K=2) < 0.6 dB

Result

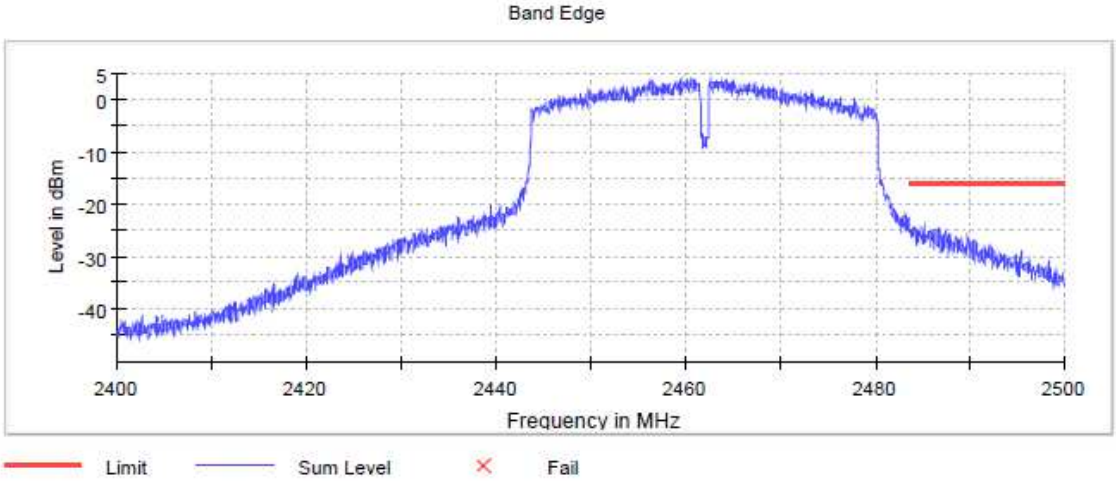
DUT Frequency (MHz)	Result
2462.000000	PASS

Inband Peak

Frequency (MHz)	Level (dBm)
2460.675000	4.0

Measurements

Frequency (MHz)	Level (dBm)	Margin (dB)	Limit (dBm)	Result
2483.575000	-22.9	7.0	-16.0	PASS
2483.525000	-23.5	7.6	-16.0	PASS
2484.225000	-24.3	8.3	-16.0	PASS
2485.175000	-24.3	8.3	-16.0	PASS
2484.175000	-24.3	8.3	-16.0	PASS
2485.125000	-24.3	8.4	-16.0	PASS
2484.825000	-24.4	8.4	-16.0	PASS
2486.725000	-24.5	8.5	-16.0	PASS
2483.625000	-24.6	8.6	-16.0	PASS
2484.075000	-24.6	8.7	-16.0	PASS
2484.125000	-24.6	8.7	-16.0	PASS
2483.675000	-24.7	8.8	-16.0	PASS
2485.225000	-24.8	8.8	-16.0	PASS
2486.325000	-24.9	8.9	-16.0	PASS
2486.375000	-24.9	8.9	-16.0	PASS



Radiated Emissions

Company: iRobot
Model #: AXF-Y1
Serial #: FCC #1
Engineers: Vathana Ven
Project #: G103991615
Standard: FCC Part 15 Subpart B Class B
Receiver: R&S ESI (145-128) 03-28-2020
PreAmp: BONN001_01-23-2020.txt

Location: 10M
Date(s): 09/24/19
Limit Distance (m): 3
Test Distance (m): 1

Antenna & Cables: HF Bands: N, LF, HF, SHF
Antenna: HORN3__3M vert__5-30-2020.txt HORN3__3M hor__5-30-2020.txt
Cable(s): 145-416__7-22-2020.txt NONE.
Barometer: DAV001 Filter: NONE
Temp/Humidity/Pressure: 22 deg C 43% 997 mB

PreAmp Used? (Y or N): N Voltage/Frequency: DC Power Frequency Range: See below

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)

Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
Lower BEC, 802.11n, 40MHz BW, Data rate MCS0													
PK	H	2390.000	34.30	28.35	-7.23	0.00	9.54	45.88	74.00	-28.12	1/3 MHz	RB	RB
AVG	H	2390.000	19.40	28.35	-7.23	0.00	9.54	30.98	54.00	-23.02	1/3 MHz	RB	RB
Upper BEC, 802.11n, 40MHz BW, Data rate MCS0													
PK	V	2483.500	49.93	28.56	-7.25	0.00	9.54	61.70	74.00	-12.30	1/3 MHz	RB	
AVG	V	2483.500	36.50	28.56	-7.25	0.00	9.54	48.27	54.00	-5.73	1/3 MHz	RB	
Lower BEC, 802.11b, 20MHz BW, Data rate 2Mbps													
PK	H	2390.000	25.70	28.35	-7.23	0.00	9.54	37.28	74.00	-36.72	1/3 MHz	RB	RB
AVG	H	2390.000	13.00	28.35	-7.23	0.00	9.54	24.58	54.00	-29.42	1/3 MHz	RB	RB
Upper BEC, 802.11b, 20MHz BW, Data rate 2Mbps													
PK	V	2483.500	24.73	28.56	-7.25	0.00	9.54	36.50	74.00	-37.50	1/3 MHz	RB	
AVG	V	2483.500	11.70	28.56	-7.25	0.00	9.54	23.47	54.00	-30.53	1/3 MHz	RB	
Lower BEC, 802.11g, 20MHz BW, Data rate 24 Mbps													
PK	H	2390.000	27.32	28.35	-7.23	0.00	9.54	38.90	74.00	-35.10	1/3 MHz	RB	RB
AVG	H	2390.000	14.30	28.35	-7.23	0.00	9.54	25.88	54.00	-28.12	1/3 MHz	RB	RB
Upper BEC, 802.11g, 20MHz BW, Data rate 24 Mbps													
PK	V	2483.500	29.00	28.56	-7.25	0.00	9.54	40.77	74.00	-33.23	1/3 MHz	RB	
AVG	V	2483.500	14.00	28.56	-7.25	0.00	9.54	25.77	54.00	-28.23	1/3 MHz	RB	

Test Personnel: Kouma Sinn KPS / Vathana Ven VFV
Supervising/Reviewing Engineer: (Where Applicable) N/A

Test Date: 07/16/2019 / 09/24/2019

Product Standard: CFR47 FCC Part 15.247
Input Voltage: 5 VDC (USB)
Pretest Verification w/ Ambient Signals or BB Source: **N/A**

Limit Applied: See report section 10.3
Ambient Temperature: 22, 22 ºC
Relative Humidity: 62, 43 %
Atmospheric Pressure: 1010, 997 mbars

Deviations, Additions, or Exclusions: None

11 Transmitter spurious emissions

11.1 Method

Tests are performed in accordance with CFR47 FCC Part 15.247, ANSI C63.10, ANSI C 63.4, and KDB 558074.

TEST SITE: EMC Lab & 10m ALSE

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when BAT-EMC Emission Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. The “Correction” includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the “Level” column.

11.2 Test Equipment Used:

Equipment for Conducted Spurious in EMC Lab

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DS40'	Temp, humidity, pressure gauge	Digi Sense	68000-49	181717625	11/06/2018	11/06/2019
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/15/2018	10/15/2019
ROS005-4'	Control Platform	Rodhe and Schwarz	OSP120	101428	11/20/2018	11/20/2019
None'	Coaxial Cable (DUT1)	UTIFLEX MICRO-COAX	UFA210A-1-0787-300300	101709	02/01/2019	02/01/2020
None'	20 dB Attenuator (DUT1)	Pasternack	E7004-20	None	02/01/2019	02/01/2020
None'	Coaxial Cable (Receiver/RF In	Micro-coax	UFA210A-0-0-0196-300300	101706	02/01/2019	02/01/2020
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	02/01/2019	02/01/2020

Equipment for Radiated Spurious in 10m Chamber

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001'	Weather Station	Davis Instruments	7400	PE80519A61	01/23/2019	01/23/2020
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/28/2019	03/28/2020
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	10m Track A Cables	multiple	07/25/2019	07/25/2020
PRE11'	50dB gain pre-amp	Keith H	PRE11	PRE11	10/27/2018	10/27/2019
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	06/12/2019	06/12/2020
HORN3	HORN ANTENNA	EMCO	3115	9610-4980	05/30/2019	05/30/2020
BON001'	METER, POWER	Boonton	4232A	55601	01/23/2019	01/23/2020
REA008'	band reject filter 2.4GHz	Reactel, Inc	12RX7-2441.75-x140 S	17-01	07/11/2019	07/11/2020
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2019	07/25/2020
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	10/26/2018	10/26/2019
REA004'	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	02/25/2019	02/25/2020
CBLSHF103'	Cable, SMA - SMA, < 18GHz	Sucoflex (Huber Suhn	104PE	CBLSHF103	02/25/2019	02/25/2020
CBLSHF102'	Cable, SMA - SMA, 9kHz-40GHz (Cable Kit 5)	Sucoflex (Huber Suhn	104PE	CBLSHF102	08/25/2017	10/25/2019
PRE8'	PREAMPLFIER 1- 40 GHz	MITEQ	NSP4000-NF	507145	10/25/2018	10/25/2019

Software Utilized:

Name	Manufacturer	Version
BAT EMC (10m Chamber)	Nexio	3.18.0.16
EMI Boxborough.xls	Intertek	08/27/2010

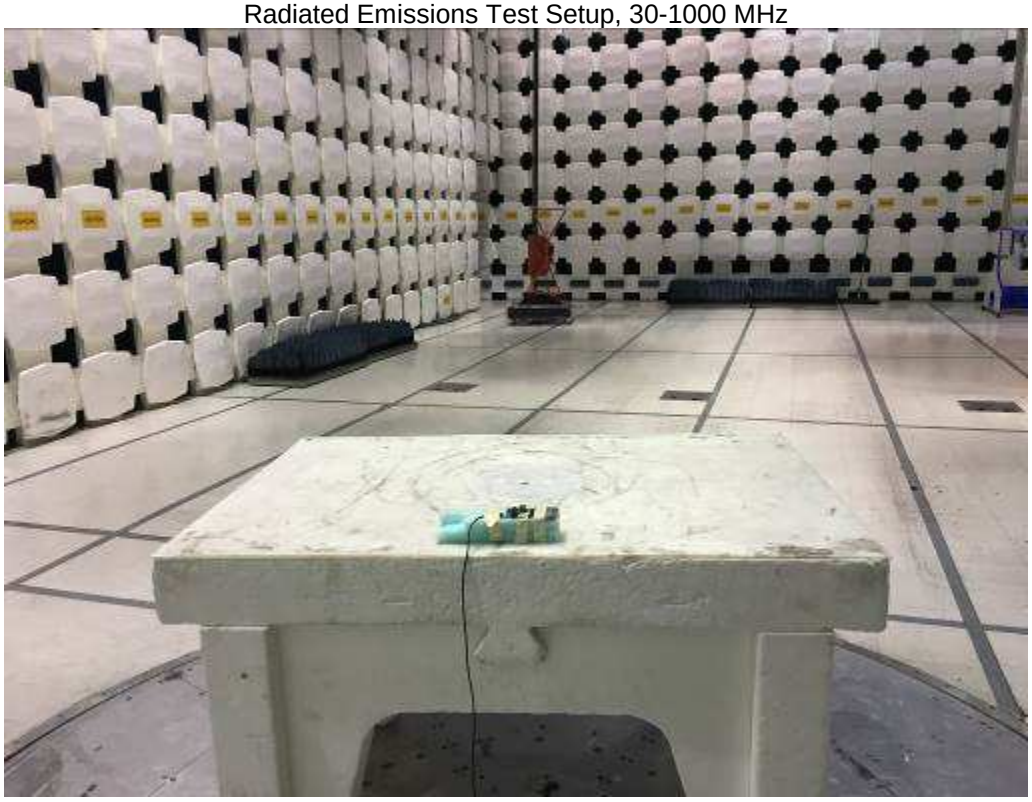
11.3 Results:

The sample tested was found to Comply.

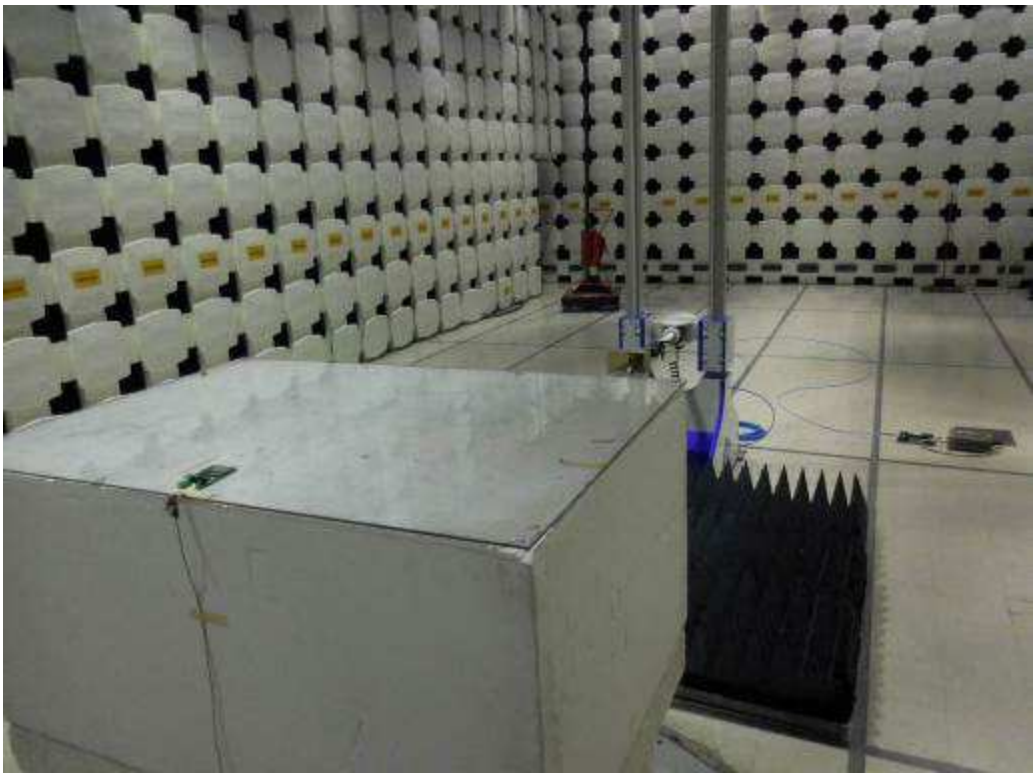
15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))

11.4 Setup Photographs:

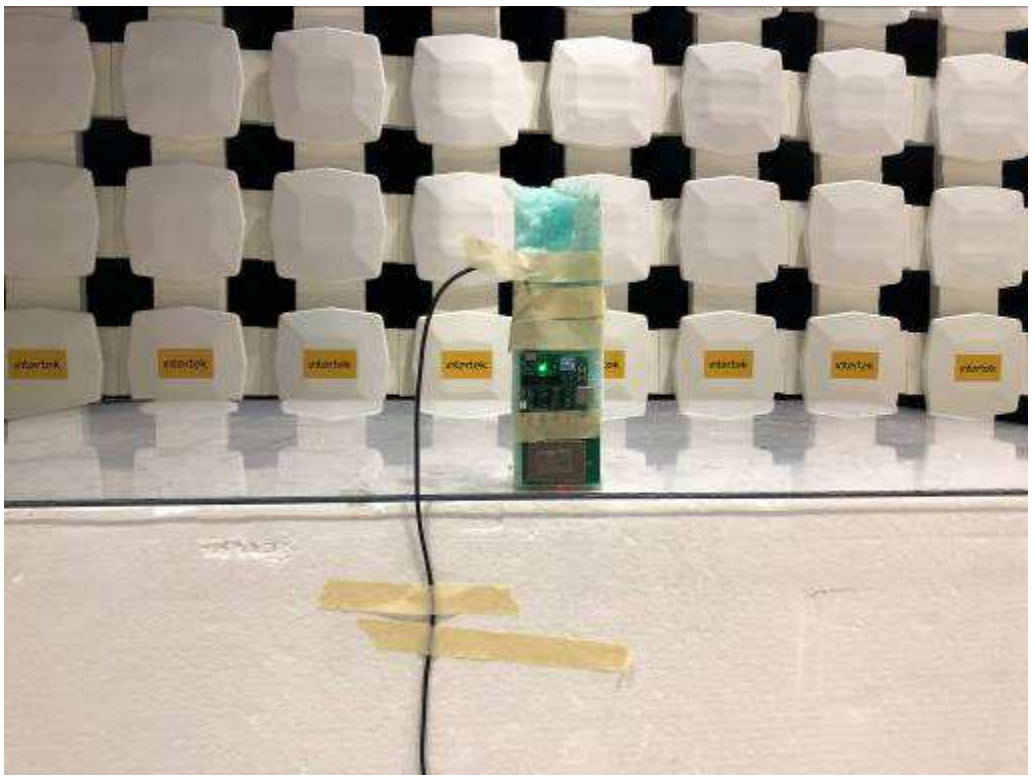
Radiated Emissions Test Setup, 30-1000 MHz



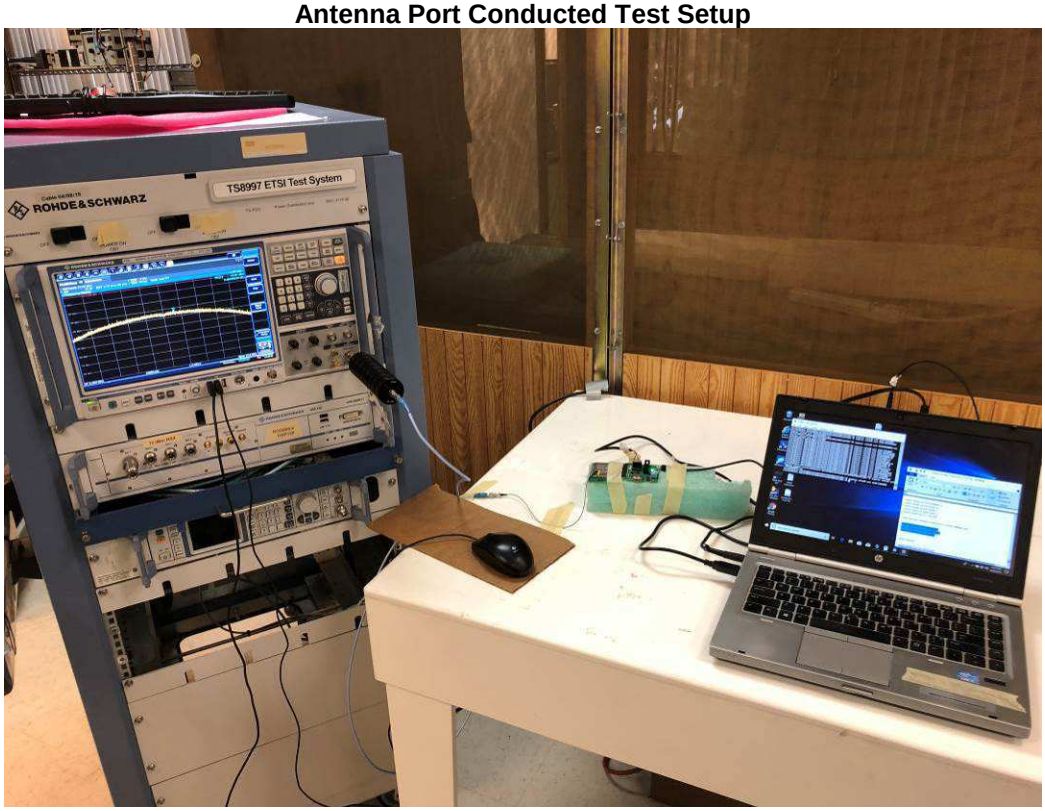
Radiated Emissions Test Setup, 1-18 GHz



Manual Testing From 18-25 GHz

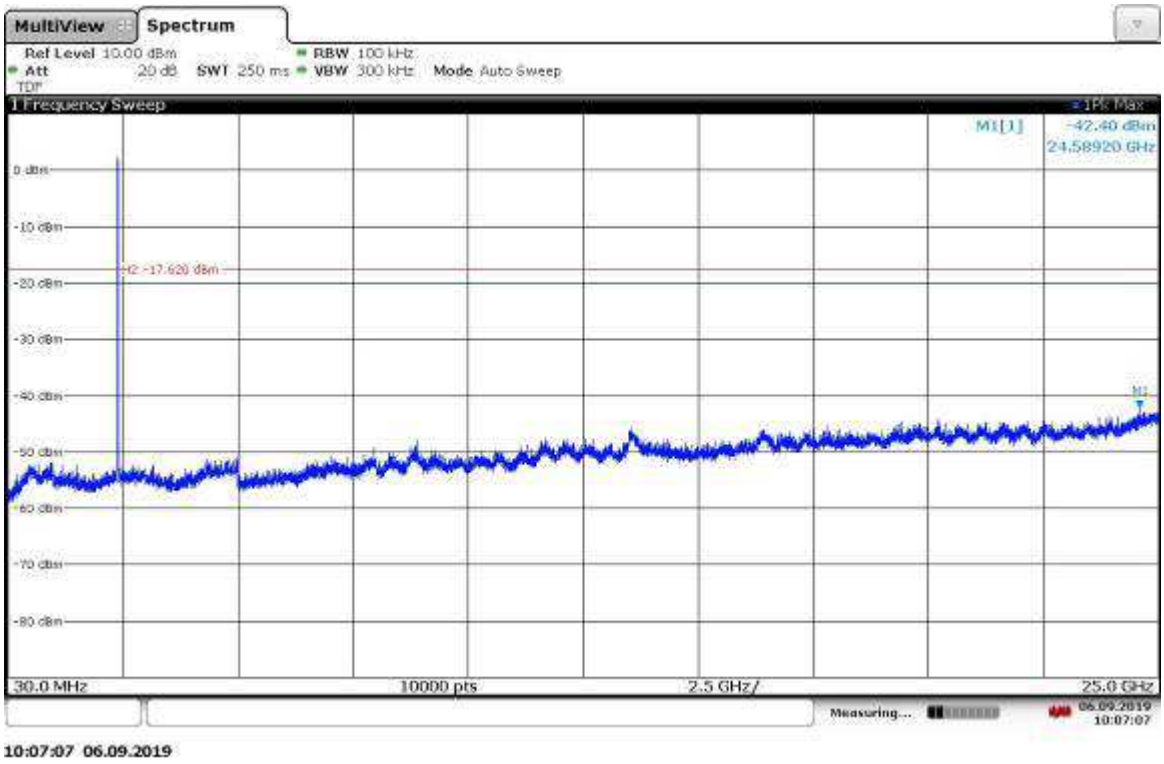


Antenna Port Conducted Test Setup

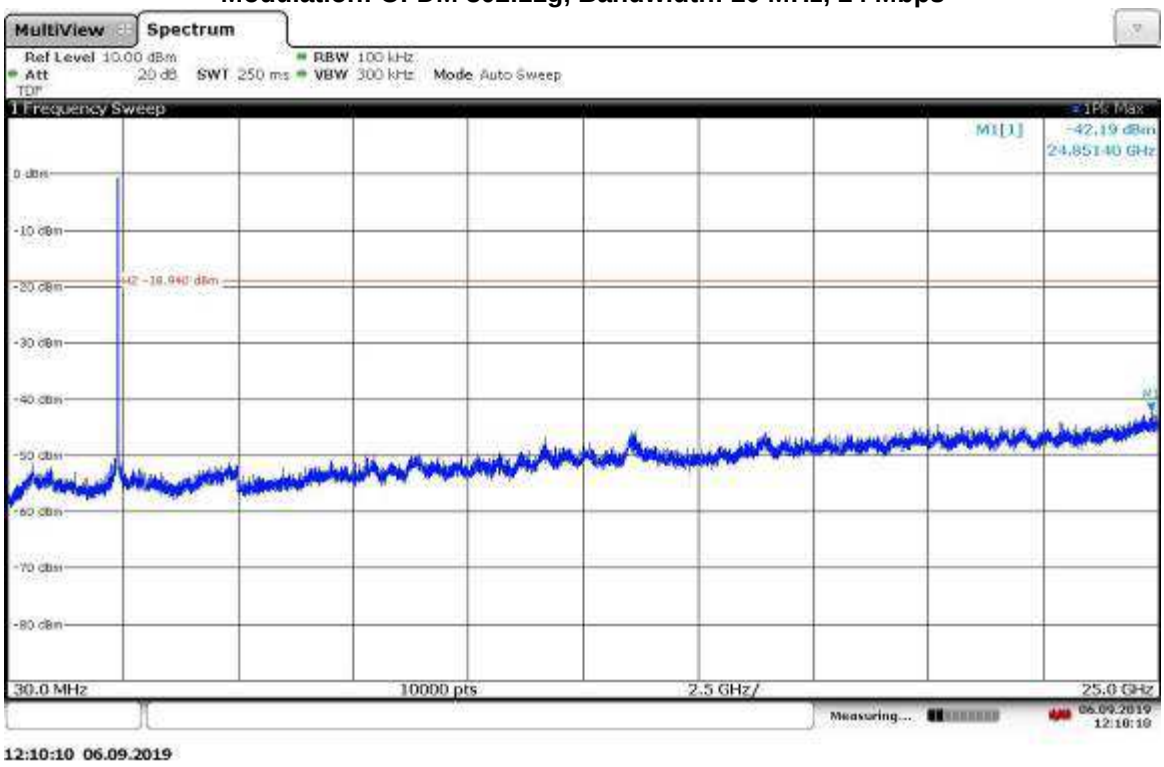


11.5 Plots/Data:

Antenna Port Conducted Emissions, 30 MHz-25 GHz
Modulation: 802.11b, Bandwidth: 20 MHz, 2 Mbps, worst-case

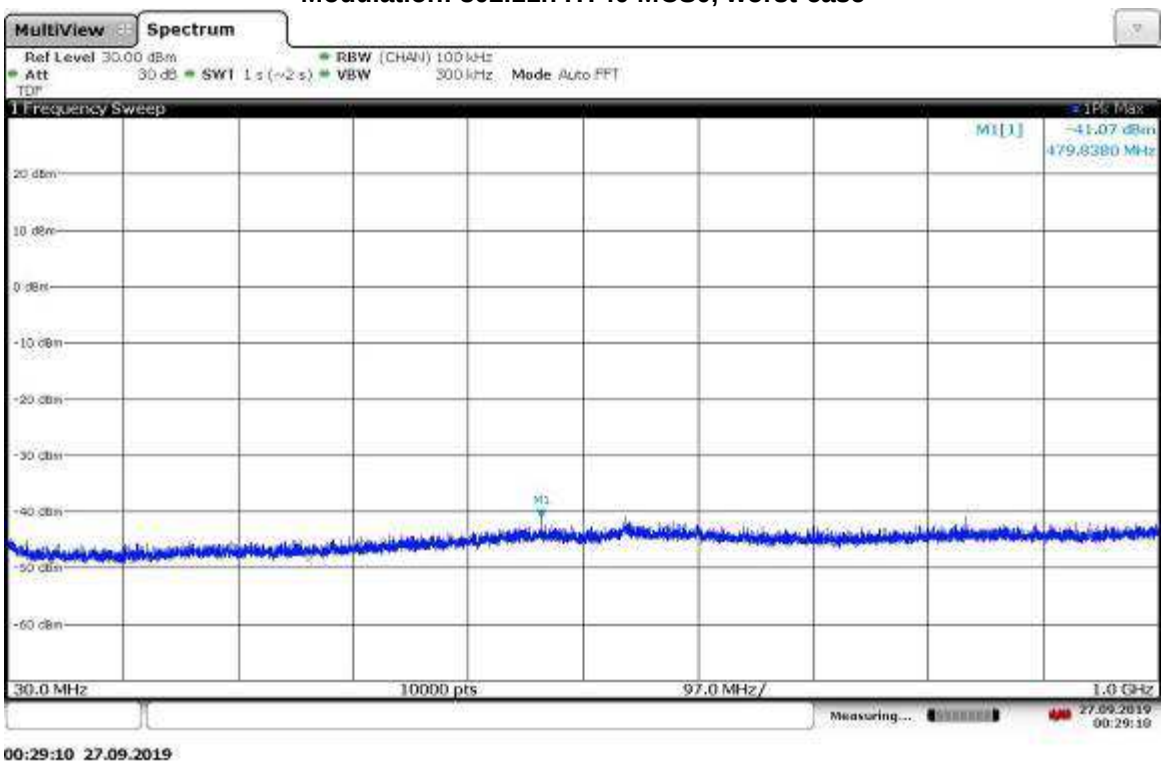


Antenna Port Conducted Emissions, 30 MHz-25 GHz
Modulation: OFDM 802.11g, Bandwidth: 20 MHz, 24 Mbps



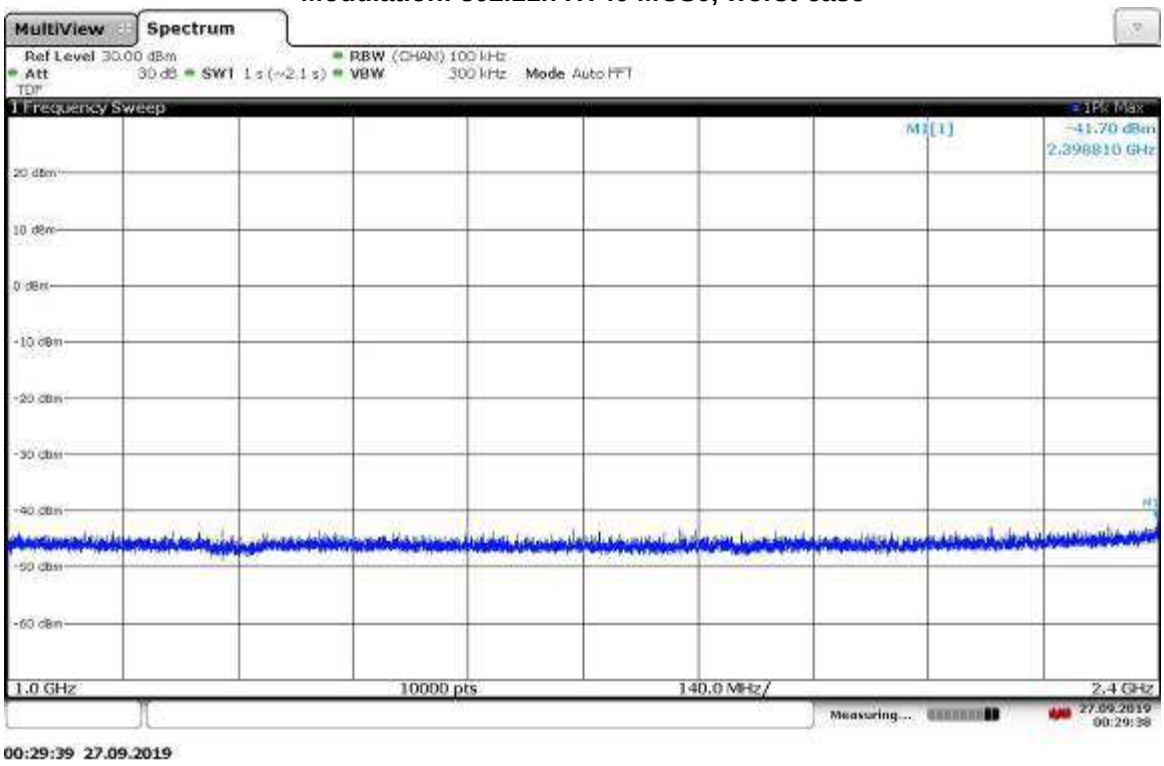
12:10:10 06.09.2019

Antenna Port Conducted Emissions, 30-1000 MHz
Modulation: 802.11n HT40 MCS0, worst-case



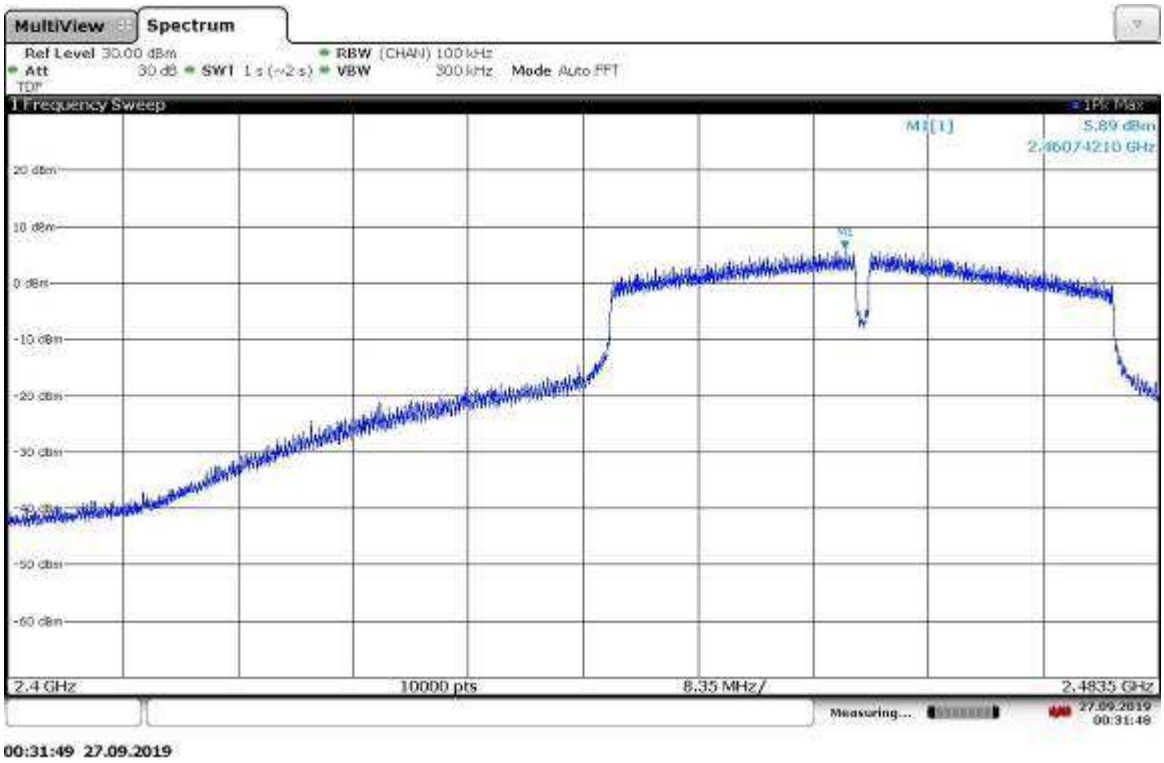
00:29:10 27.09.2019

Antenna Port Conducted Emissions, 1-2.4 GHz
Modulation: 802.11n HT40 MCS0, worst-case



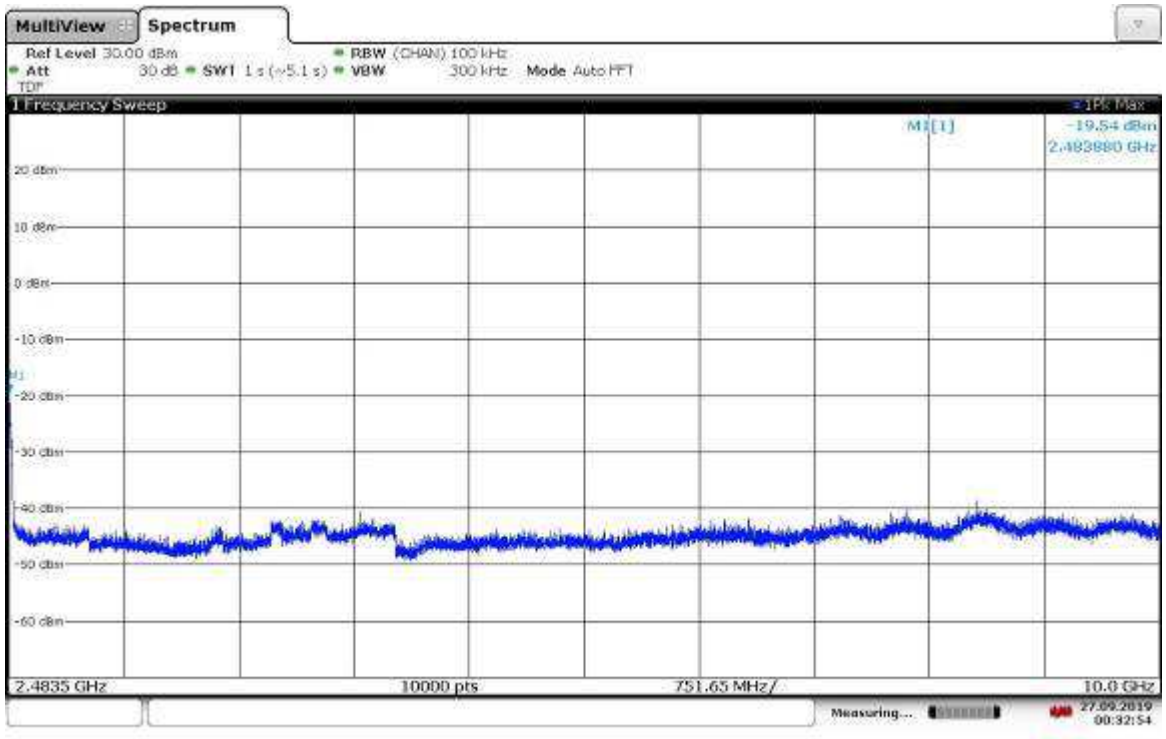
00:29:39 27.09.2019

Antenna Port Conducted Emissions, 2.4-2.4835 GHz
Modulation: 802.11n HT40 MCS0, worst-case



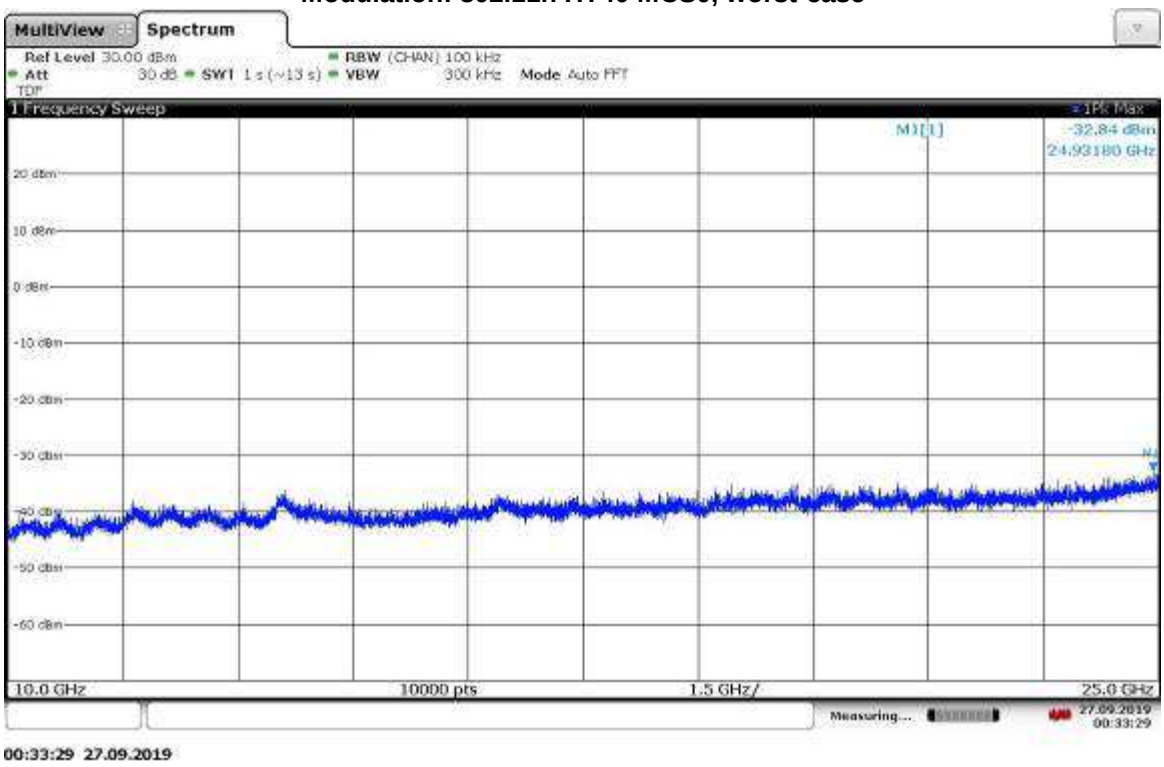
00:31:49 27.09.2019

Antenna Port Conducted Emissions, 2.4835-10 GHz
Modulation: 802.11n HT40 MCS0, worst-case



00:32:54 27.09.2019

Antenna Port Conducted Emissions, 10-25 GHz
Modulation: 802.11n HT40 MCS0, worst-case

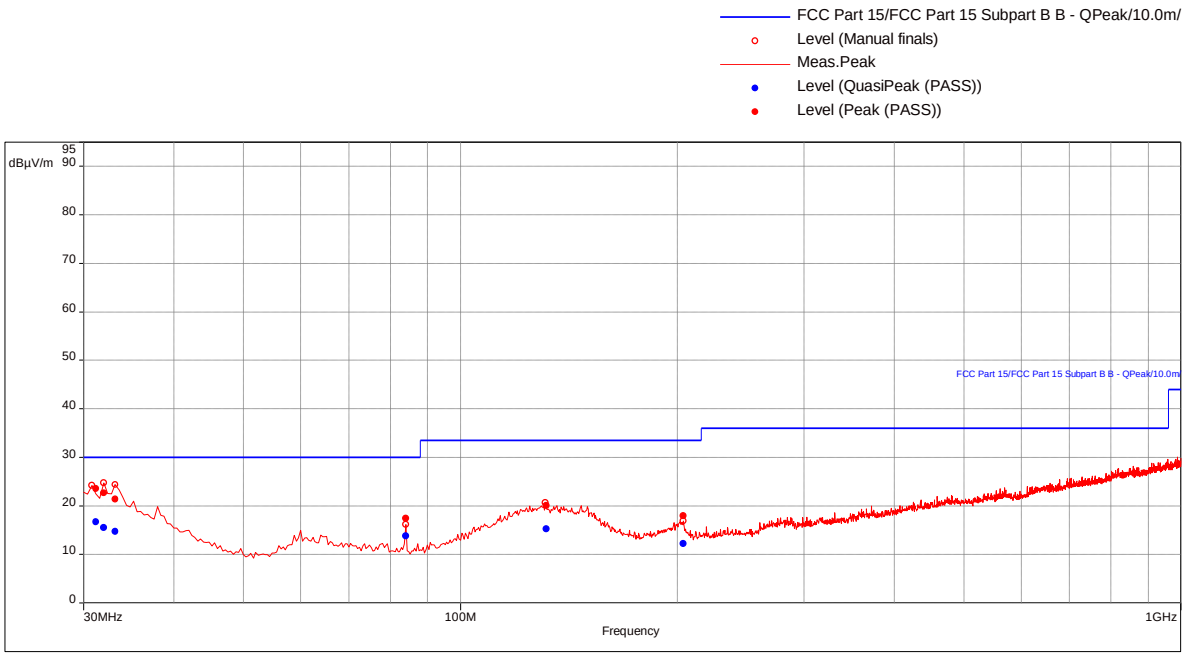


802.11b (2 Mbps, worst-case), EUT on its short side, Tx @ Low Channel, 30-1000MHz

Test Information:

Date and Time	9/3/2019 3:00:59 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	802.11b (2 Mbps, worst-case), EUT on its short side, Tx @ Low Channel, 30-1000MHz SA mode

Graph:



Results:

QuasiPeak (PASS) (6)

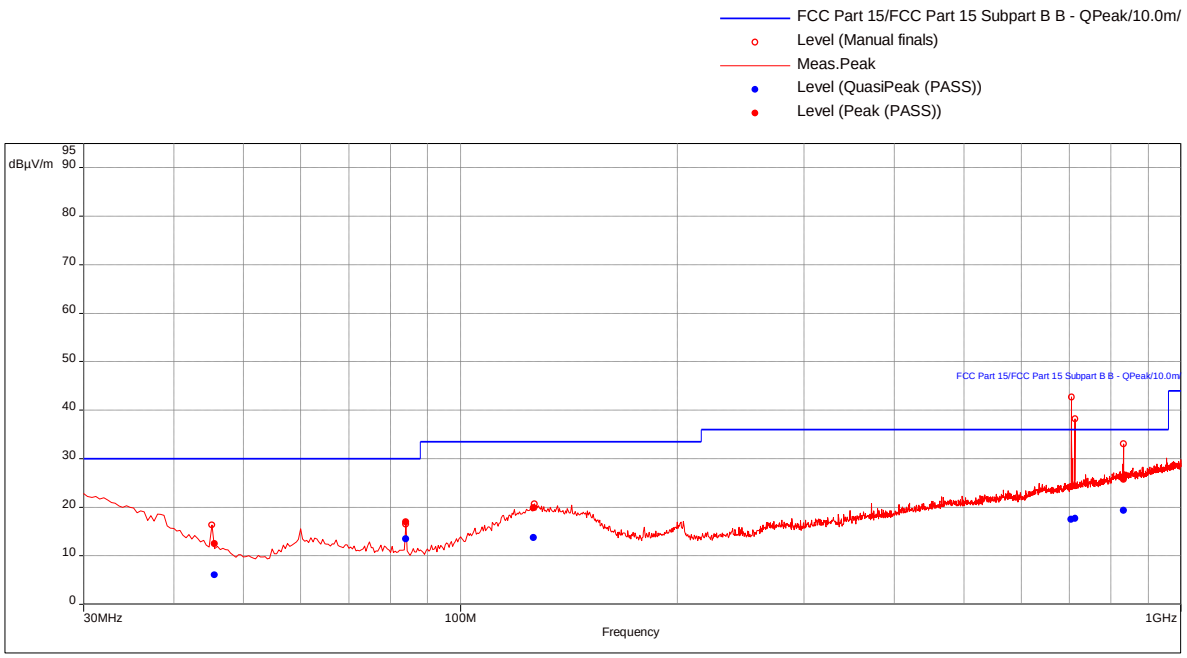
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
31.11578947	16.72	30.00	-13.28	290.00	2.26	Vertical	120000.00	-13.01
32.18947368	15.54	30.00	-14.46	0.00	2.20	Horizontal	120000.00	-13.76
33.32631579	14.71	30.00	-15.29	217.00	1.07	Horizontal	120000.00	-14.58
84	13.85	30.00	-16.15	276.00	2.41	Vertical	120000.00	-25.41
131.4210526	15.31	33.50	-18.19	77.00	2.33	Vertical	120000.00	-18.52
203.9684211	12.22	33.50	-21.28	303.00	2.00	Vertical	120000.00	-20.51

802.11g (24 Mbps, worst-case), EUT on its short side, Tx @ Low Channel, 30-1000MHz

Test Information:

Date and Time	9/3/2019 2:06:54 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	802.11g (24 Mbps, worst-case), EUT on its short side, Tx @ Low Channel, 30-1000MHz SA mode

Graph:



Results:

QuasiPeak (PASS) (6)

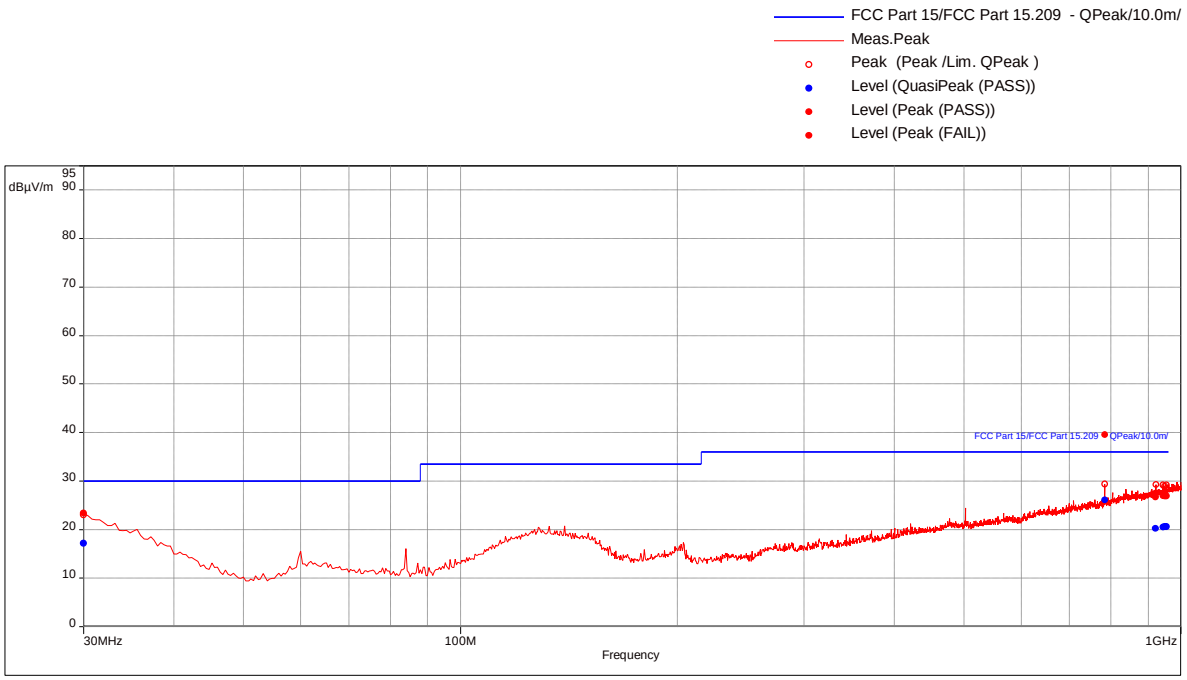
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
45.51578947	6.05	30.00	-23.95	32.00	1.36	Horizontal	120000.00	-23.09
84	13.43	30.00	-16.57	25.00	3.88	Vertical	120000.00	-25.41
126.3894737	13.73	33.50	-19.77	84.00	3.97	Vertical	120000.00	-18.31
704.5789474	17.54	36.00	-18.46	357.00	3.22	Horizontal	120000.00	-9.24
712.6105263	17.72	36.00	-18.28	69.00	3.28	Horizontal	120000.00	-9.06
832.4	19.38	36.00	-16.62	306.00	2.31	Vertical	120000.00	-6.93

802.11n (MCS0, worst-case), EUT on its short side, Tx @ Low Channel, 30-1000MHz

Test Information:

Date and Time	9/3/2019 4:30:59 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	802.11n (MCS0, worst-case), EUT on its short side, Tx @ Low Channel, 30-1000MHz

Graph:



Results:

QuasiPeak (PASS) (6)

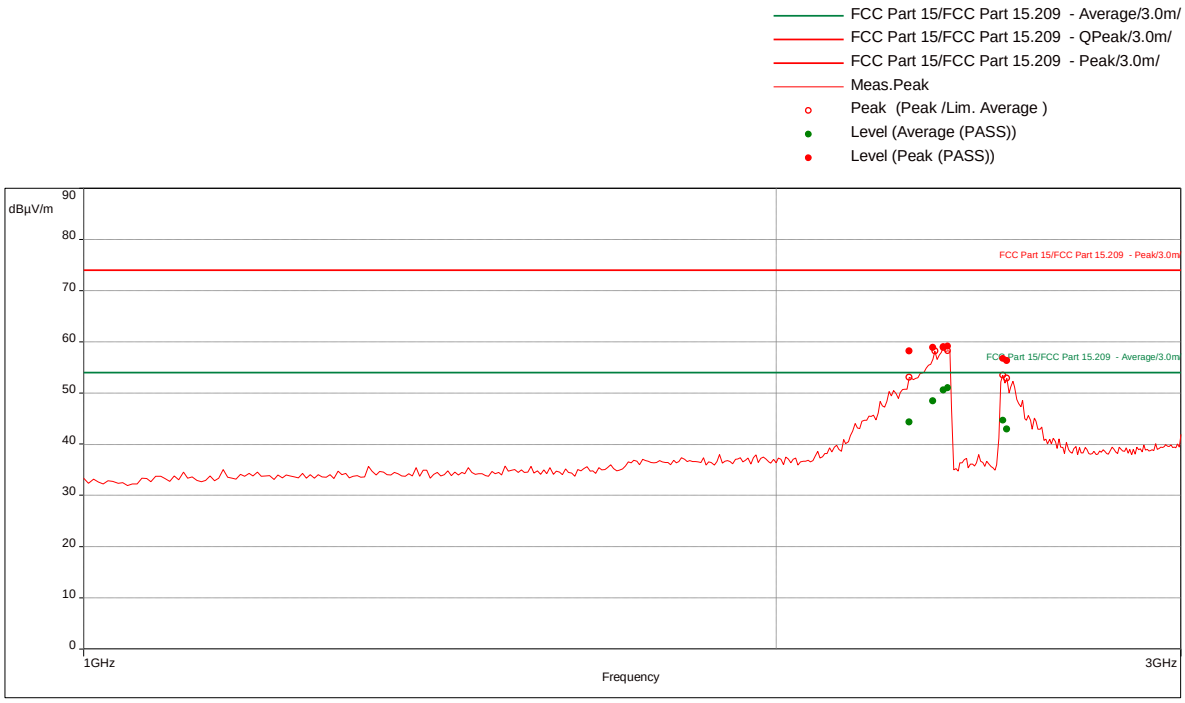
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
30.18947368	17.15	30.00	-12.85	172.00	1.90	Vertical	120000.00	-12.54
783.9157895	26.06	36.00	-9.94	202.00	3.14	Horizontal	120000.00	-7.92
922.6947368	20.26	36.00	-15.74	262.00	3.51	Vertical	120000.00	-5.54
944.5263158	20.52	36.00	-15.48	0.00	1.90	Horizontal	120000.00	-5.36
949.1052632	20.63	36.00	-15.37	261.00	1.58	Vertical	120000.00	-5.24
955.7263158	20.61	36.00	-15.39	262.00	2.44	Vertical	120000.00	-5.11

Low Channel, X-Axis, 802.11g: 1 to 3 GHz

Test Information:

Date and Time	7/18/2019 8:39:36 AM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Low Ch - X-Axis - RE 1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2285.789474	58.17	74.00	-15.83	327.00	1.45	Horizontal	1000000.00	-22.28
2340.789474	58.91	74.00	-15.09	334.00	1.35	Horizontal	1000000.00	-21.86
2365.526316	59.08	74.00	-14.92	327.00	1.25	Horizontal	1000000.00	-21.69
2374.210526	59.13	74.00	-14.87	328.00	1.65	Horizontal	1000000.00	-21.63
2509.210526	56.75	74.00	-17.25	314.00	1.50	Horizontal	1000000.00	-21.23
2520.789474	56.32	74.00	-17.68	321.00	1.70	Horizontal	1000000.00	-21.18

Average (PASS) (6)

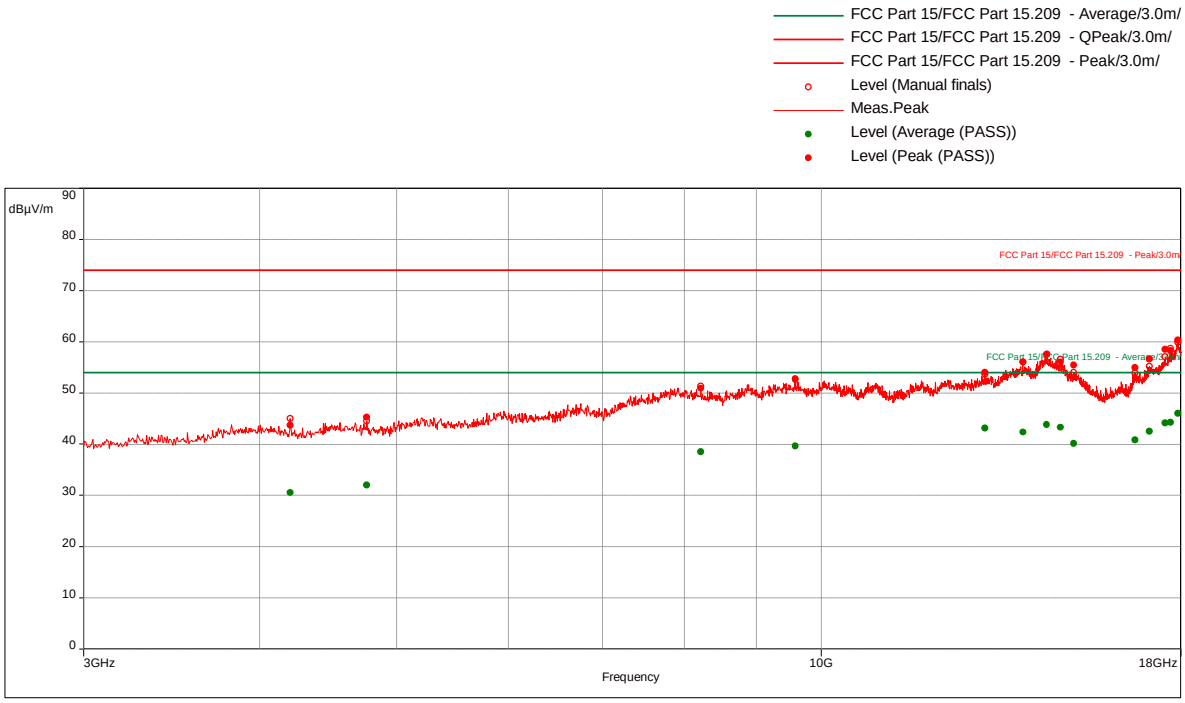
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2285.789474	44.32	54.00	-9.68	327.00	1.45	Horizontal	1000000.00	-22.28
2340.789474	48.40	54.00	-5.60	334.00	1.35	Horizontal	1000000.00	-21.86
2365.526316	50.58	54.00	-3.42	327.00	1.25	Horizontal	1000000.00	-21.69
2374.210526	51.00	54.00	-3.00	328.00	1.65	Horizontal	1000000.00	-21.63
2509.210526	44.66	54.00	-9.34	314.00	1.50	Horizontal	1000000.00	-21.23
2520.789474	42.91	54.00	-11.09	321.00	1.70	Horizontal	1000000.00	-21.18

Low Channel, X-Axis, 802.11g: 3 to 18 GHz

Test Information:

Date and Time	7/18/2019 9:36:43 AM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Low Ch - X-Axis - RE 3 to 18 GHz SA mode

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
4206.842105	43.73	74.00	-30.27	283.00	3.25	Vertical	1000000.00	-14.46
4762.631579	45.29	74.00	-28.71	254.00	2.15	Vertical	1000000.00	-12.65
8220.263158	50.91	74.00	-23.09	99.00	1.70	Vertical	1000000.00	-4.89
9588.421053	52.83	74.00	-21.17	47.00	2.80	Vertical	1000000.00	-2.57
13067.36842	54.02	74.00	-19.98	225.00	1.40	Horizontal	1000000.00	2.19
13906.84211	56.03	74.00	-17.97	320.00	1.00	Vertical	1000000.00	4.20
14455.78947	57.46	74.00	-16.54	54.00	1.80	Horizontal	1000000.00	5.63
14782.89474	56.05	74.00	-17.95	0.00	1.95	Vertical	1000000.00	5.53
15103.42105	55.43	74.00	-18.57	82.00	1.70	Vertical	1000000.00	3.33
16700.26316	54.89	74.00	-19.11	305.00	1.01	Vertical	1000000.00	1.83
17098.42105	56.61	74.00	-17.39	343.00	1.61	Vertical	1000000.00	3.56
17542.63158	58.50	74.00	-15.50	1.00	1.01	Horizontal	1000000.00	5.58
17688.68421	58.28	74.00	-15.72	350.00	3.65	Horizontal	1000000.00	6.32
17912.63158	60.28	74.00	-13.72	172.00	2.10	Horizontal	1000000.00	8.05

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
4206.842105	30.58	54.00	-23.42	283.00	3.25	Vertical	1000000.00	-14.46
4762.631579	31.99	54.00	-22.01	254.00	2.15	Vertical	1000000.00	-12.65
8220.263158	38.54	54.00	-15.46	99.00	1.70	Vertical	1000000.00	-4.89
9588.421053	39.60	54.00	-14.40	47.00	2.80	Vertical	1000000.00	-2.57
13067.36842	43.11	54.00	-10.89	225.00	1.40	Horizontal	1000000.00	2.19
13906.84211	42.31	54.00	-11.69	320.00	1.00	Vertical	1000000.00	4.20
14455.78947	43.81	54.00	-10.19	54.00	1.80	Horizontal	1000000.00	5.63
14782.89474	43.30	54.00	-10.70	0.00	1.95	Vertical	1000000.00	5.53
15103.42105	40.15	54.00	-13.85	82.00	1.70	Vertical	1000000.00	3.33
16700.26316	40.82	54.00	-13.18	305.00	1.01	Vertical	1000000.00	1.83
17098.42105	42.56	54.00	-11.44	343.00	1.61	Vertical	1000000.00	3.56
17542.63158	44.19	54.00	-9.81	1.00	1.01	Horizontal	1000000.00	5.58
17688.68421	44.27	54.00	-9.73	350.00	3.65	Horizontal	1000000.00	6.32
17912.63158	46.01	54.00	-7.99	172.00	2.10	Horizontal	1000000.00	8.05

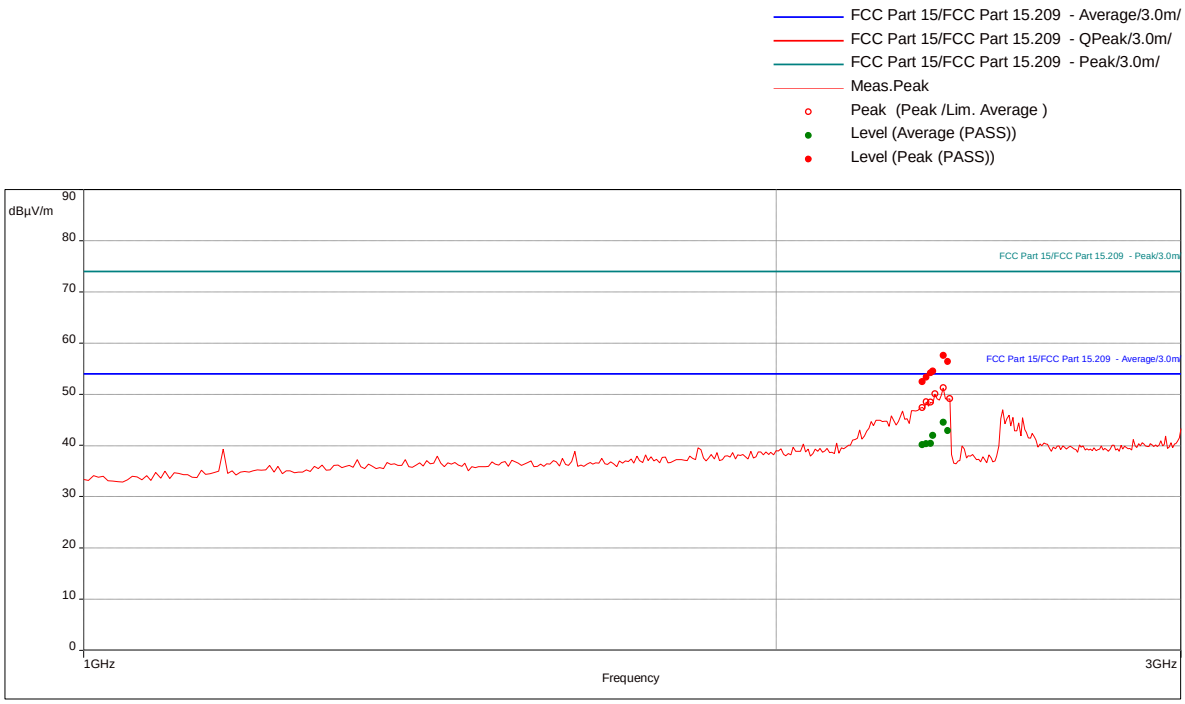
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Y-Axis, 802.11g: 1 to 3 GHz

Test Information:

Date and Time	9/3/2019 6:31:22 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 1 to 3GHz_802.11b (2 Mbps, worst-case), Y-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2313.157895	52.45	74.00	-21.55	202.00	1.50	Horizontal	1000000.00	-20.48
2323.684211	53.27	74.00	-20.73	194.00	1.55	Horizontal	1000000.00	-20.37
2335.526316	54.16	74.00	-19.84	195.00	1.55	Horizontal	1000000.00	-20.24
2341.842105	54.52	74.00	-19.48	201.00	1.80	Horizontal	1000000.00	-20.18
2365	57.56	74.00	-16.44	203.00	1.50	Horizontal	1000000.00	-20.01
2376.315789	56.40	74.00	-17.60	196.00	1.75	Horizontal	1000000.00	-19.95

Average (PASS) (6)

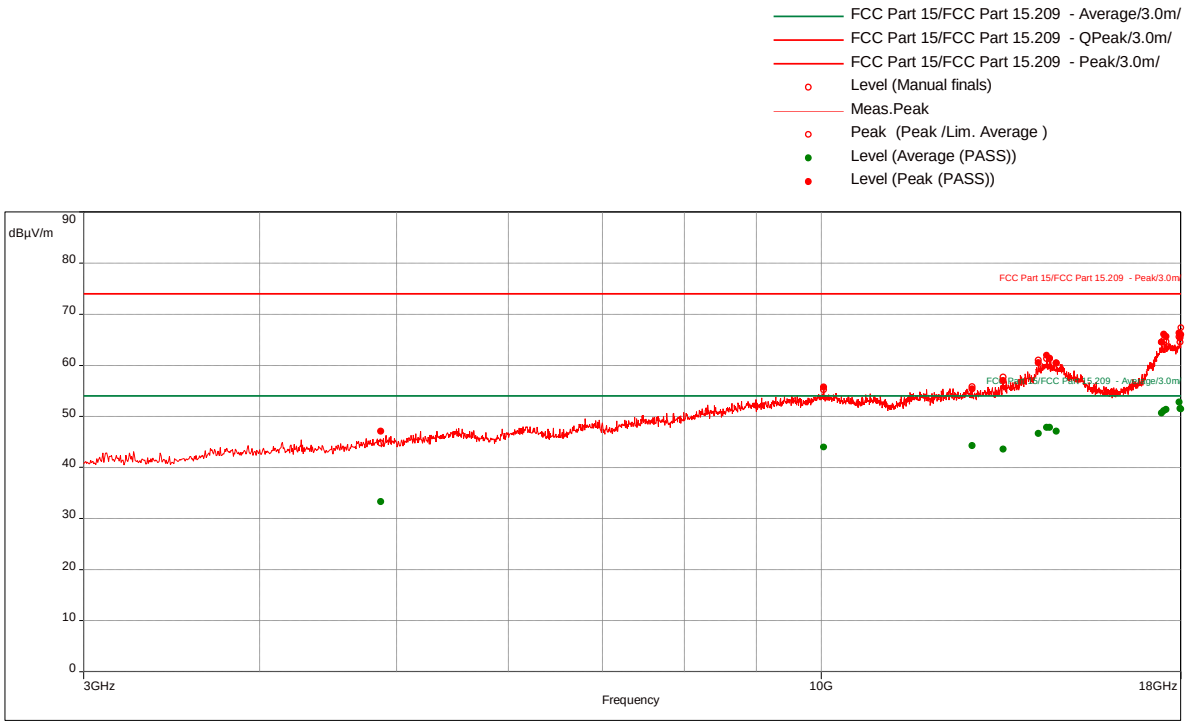
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2313.157895	40.12	54.00	-13.88	202.00	1.50	Horizontal	1000000.00	-20.48
2323.684211	40.33	54.00	-13.67	194.00	1.55	Horizontal	1000000.00	-20.37
2335.526316	40.37	54.00	-13.63	195.00	1.55	Horizontal	1000000.00	-20.24
2341.842105	41.96	54.00	-12.04	201.00	1.80	Horizontal	1000000.00	-20.18
2365	44.50	54.00	-9.50	203.00	1.50	Horizontal	1000000.00	-20.01
2376.315789	42.84	54.00	-11.16	196.00	1.75	Horizontal	1000000.00	-19.95

Low Channel, Y-Axis, 802.11g: 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 4:28:24 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11g (24Mbps, worst-case), Y-axis, Tx @ Mid CH

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4873.684211	47.10	74.00	-26.90	143.00	3.00	Vertical	1000000.00	-10.93
10047.10526	55.68	74.00	-18.32	121.00	1.00	Vertical	1000000.00	0.58
12798.42105	55.36	74.00	-18.64	269.00	3.74	Horizontal	1000000.00	3.69
13470	57.01	74.00	-16.99	25.00	1.05	Vertical	1000000.00	5.61
14260	60.50	74.00	-13.50	10.00	1.65	Horizontal	1000000.00	9.10
14455.26316	61.93	74.00	-12.07	319.00	3.79	Horizontal	1000000.00	9.59
14526.57895	61.38	74.00	-12.62	142.00	2.40	Vertical	1000000.00	9.72
14683.15789	60.41	74.00	-13.59	290.00	2.05	Horizontal	1000000.00	9.53
17443.68421	64.55	74.00	-9.45	54.00	3.30	Vertical	1000000.00	11.52
17510.52632	66.08	74.00	-7.92	247.00	1.85	Horizontal	1000000.00	12.02
17569.73684	65.58	74.00	-8.42	343.00	3.79	Vertical	1000000.00	12.42
17951.57895	66.31	74.00	-7.69	136.00	1.00	Vertical	1000000.00	14.38
17976.57895	65.37	74.00	-8.63	18.00	3.39	Vertical	1000000.00	14.49
17996.71053	65.98	74.00	-8.02	4.00	3.89	Vertical	1000000.00	14.58

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4873.684211	33.28	54.00	-20.72	143.00	3.00	Vertical	1000000.00	-10.93
10047.10526	43.99	54.00	-10.01	121.00	1.00	Vertical	1000000.00	0.58
12798.42105	44.21	54.00	-9.79	269.00	3.74	Horizontal	1000000.00	3.69
13470	43.56	54.00	-10.44	25.00	1.05	Vertical	1000000.00	5.61
14260	46.60	54.00	-7.40	10.00	1.65	Horizontal	1000000.00	9.10
14455.26316	47.83	54.00	-6.17	319.00	3.79	Horizontal	1000000.00	9.59
14526.57895	47.80	54.00	-6.20	142.00	2.40	Vertical	1000000.00	9.72
14683.15789	47.03	54.00	-6.97	290.00	2.05	Horizontal	1000000.00	9.53
17443.68421	50.62	54.00	-3.38	54.00	3.30	Vertical	1000000.00	11.52
17510.52632	51.10	54.00	-2.90	247.00	1.85	Horizontal	1000000.00	12.02
17569.73684	51.36	54.00	-2.64	343.00	3.79	Vertical	1000000.00	12.42
17951.57895	52.76	54.00	-1.24	136.00	1.00	Vertical	1000000.00	14.38
17976.57895	51.53	54.00	-2.47	18.00	3.39	Vertical	1000000.00	14.49
17996.71053	51.46	54.00	-2.54	4.00	3.89	Vertical	1000000.00	14.58

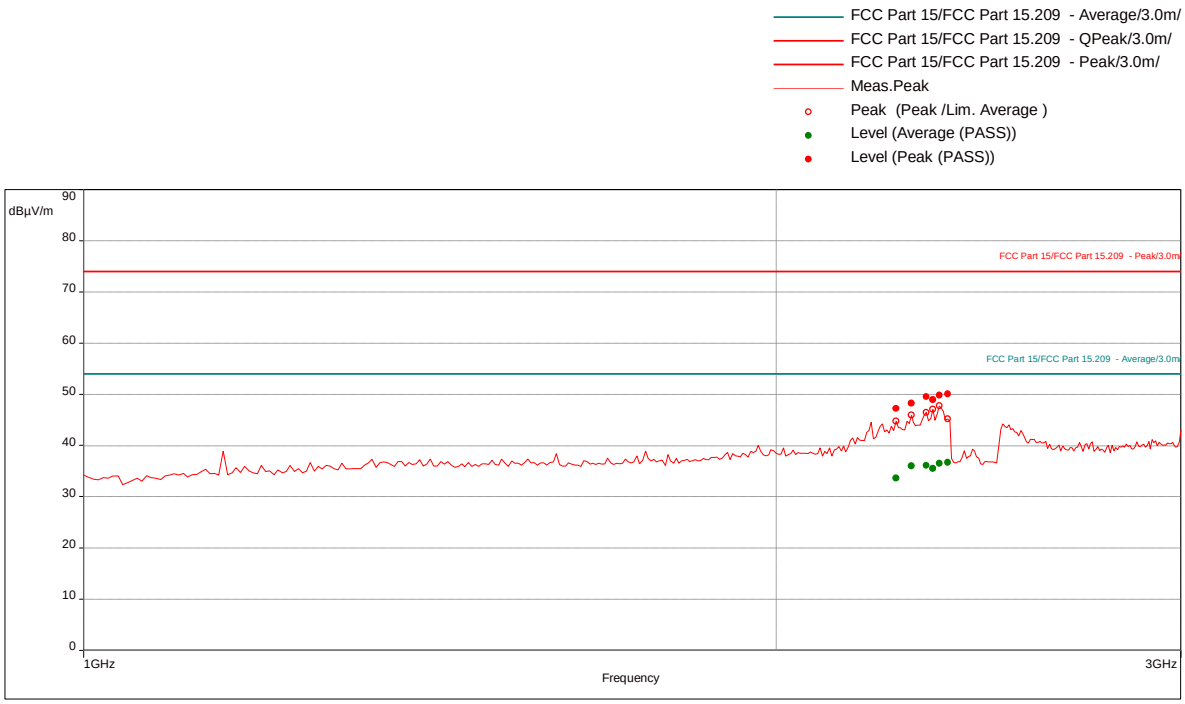
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Z-Axis, 802.11g: 1 to 3 GHz

Test Information:

Date and Time	9/3/2019 8:58:25 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 1 to 3GHz_802.11b (2 Mbps, worst-case), EUT on its long side Z-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2253.421053	47.24	74.00	-26.76	224.00	1.15	Vertical	1000000.00	-20.79
2291.052632	48.24	74.00	-25.76	225.00	1.10	Vertical	1000000.00	-20.66
2325.789474	49.54	74.00	-24.46	218.00	1.01	Vertical	1000000.00	-20.35
2340.789474	48.95	74.00	-25.05	238.00	1.46	Vertical	1000000.00	-20.19
2356.052632	49.83	74.00	-24.17	225.00	1.20	Vertical	1000000.00	-20.06
2376.578947	50.02	74.00	-23.98	143.00	1.65	Vertical	1000000.00	-19.95

Average (PASS) (6)

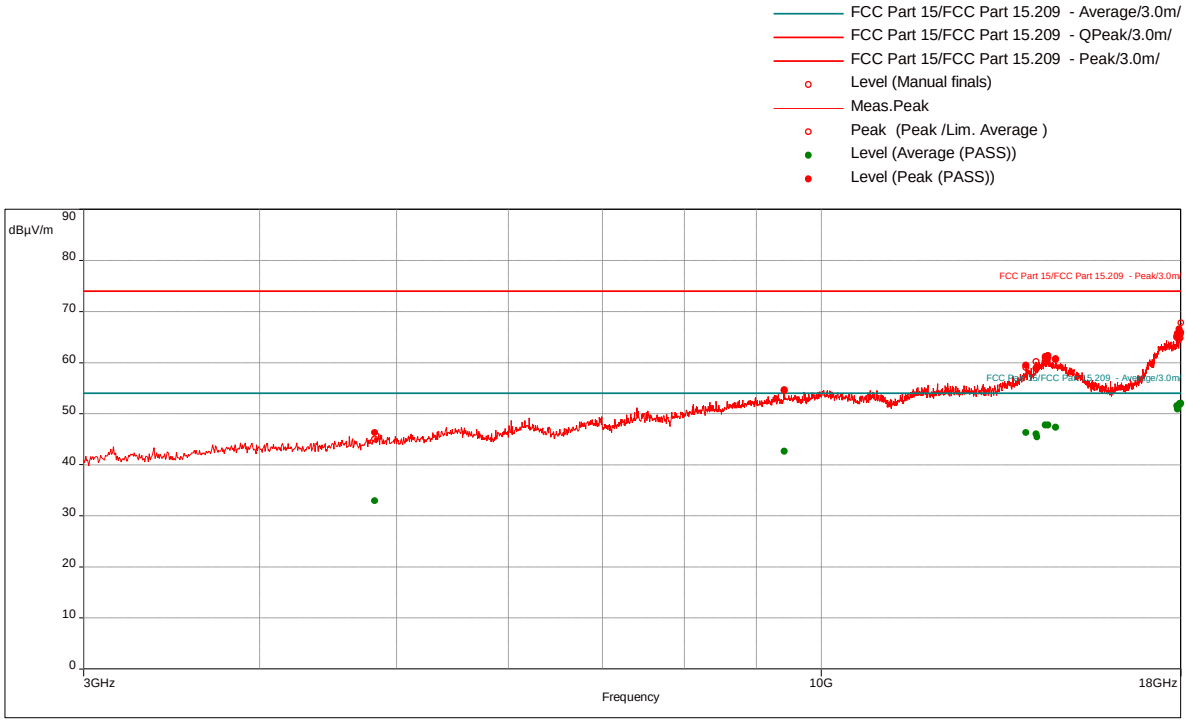
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2253.421053	33.66	54.00	-20.34	224.00	1.15	Vertical	1000000.00	-20.79
2291.052632	36.04	54.00	-17.96	225.00	1.10	Vertical	1000000.00	-20.66
2325.789474	36.15	54.00	-17.85	218.00	1.01	Vertical	1000000.00	-20.35
2340.789474	35.53	54.00	-18.47	238.00	1.46	Vertical	1000000.00	-20.19
2356.052632	36.51	54.00	-17.49	225.00	1.20	Vertical	1000000.00	-20.06
2376.578947	36.74	54.00	-17.26	143.00	1.65	Vertical	1000000.00	-19.95

Low Channel, Z-Axis, 802.11g: 3 to 18 GHz

Test Information:

Date and Time	9/3/2019 7:54:30 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 3 to 18GHz_802.11b (2 Mbps, worst-case), EUT on its long side Z-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4827.368421	46.33	74.00	-27.67	297.00	1.85	Vertical	1000000.00	-11.07
9422.368421	54.70	74.00	-19.30	201.00	1.45	Horizontal	1000000.00	-0.79
13979.21053	59.44	74.00	-14.56	114.00	2.35	Horizontal	1000000.00	7.78
14210.26316	58.85	74.00	-15.15	157.00	3.49	Horizontal	1000000.00	8.88
14223.94737	58.92	74.00	-15.08	25.00	3.34	Horizontal	1000000.00	8.95
14419.21053	61.19	74.00	-12.81	202.00	1.35	Vertical	1000000.00	9.53
14490.78947	61.33	74.00	-12.67	55.00	1.30	Horizontal	1000000.00	9.66
14670	60.71	74.00	-13.29	173.00	2.05	Horizontal	1000000.00	9.57
17878.42105	65.24	74.00	-8.76	32.00	2.00	Horizontal	1000000.00	14.10
17894.73684	65.70	74.00	-8.30	61.00	2.35	Vertical	1000000.00	14.16
17948.42105	66.57	74.00	-7.43	320.00	2.55	Horizontal	1000000.00	14.37
17961.05263	65.96	74.00	-8.04	327.00	3.15	Vertical	1000000.00	14.42
17974.21053	65.49	74.00	-8.51	209.00	2.90	Vertical	1000000.00	14.48
17997.76316	65.85	74.00	-8.15	47.00	3.30	Horizontal	1000000.00	14.58

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4827.368421	32.93	54.00	-21.07	297.00	1.85	Vertical	1000000.00	-11.07
9422.368421	42.65	54.00	-11.35	201.00	1.45	Horizontal	1000000.00	-0.79
13979.21053	46.29	54.00	-7.71	114.00	2.35	Horizontal	1000000.00	7.78
14210.26316	46.05	54.00	-7.95	157.00	3.49	Horizontal	1000000.00	8.88
14223.94737	45.43	54.00	-8.57	25.00	3.34	Horizontal	1000000.00	8.95
14419.21053	47.71	54.00	-6.29	202.00	1.35	Vertical	1000000.00	9.53
14490.78947	47.78	54.00	-6.22	55.00	1.30	Horizontal	1000000.00	9.66
14670	47.28	54.00	-6.72	173.00	2.05	Horizontal	1000000.00	9.57
17878.42105	51.52	54.00	-2.48	32.00	2.00	Horizontal	1000000.00	14.10
17894.73684	50.93	54.00	-3.07	61.00	2.35	Vertical	1000000.00	14.16
17948.42105	51.79	54.00	-2.21	320.00	2.55	Horizontal	1000000.00	14.37
17961.05263	51.92	54.00	-2.08	327.00	3.15	Vertical	1000000.00	14.42
17974.21053	51.86	54.00	-2.14	209.00	2.90	Vertical	1000000.00	14.48
17997.76316	52.00	54.00	-2.00	47.00	3.30	Horizontal	1000000.00	14.58

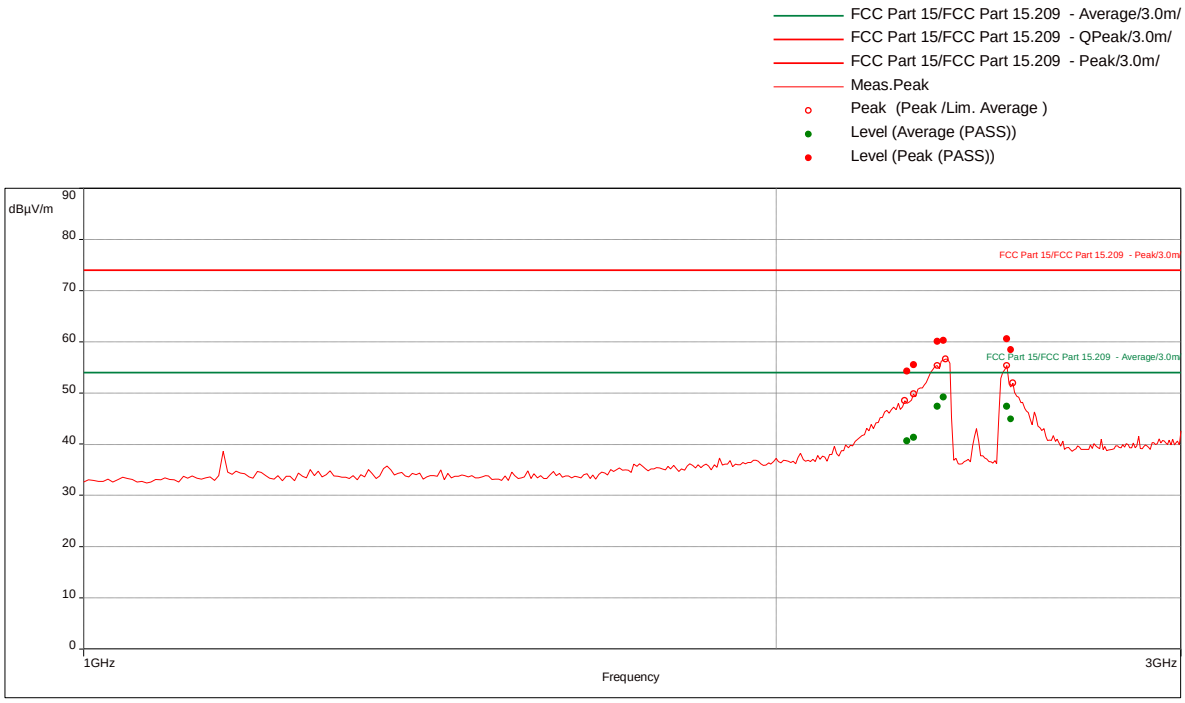
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, X-Axis, 802.11g, 1 to 3 GHz

Test Information:

Date and Time	7/18/2019 1:53:46 PM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Mid Ch - X-Axis - 802.11g - RE 1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2278.684211	54.21	74.00	-19.79	329.00	1.70	Horizontal	1000000.00	-21.45
2295.526316	55.51	74.00	-18.49	328.00	1.75	Horizontal	1000000.00	-21.34
2347.631579	60.03	74.00	-13.97	327.00	1.35	Horizontal	1000000.00	-20.73
2367.368421	60.25	74.00	-13.75	328.00	1.65	Horizontal	1000000.00	-20.51
2517.631579	60.59	74.00	-13.41	328.00	1.45	Horizontal	1000000.00	-19.85
2531.578947	58.41	74.00	-15.59	328.00	1.45	Horizontal	1000000.00	-19.82

Average (PASS) (6)

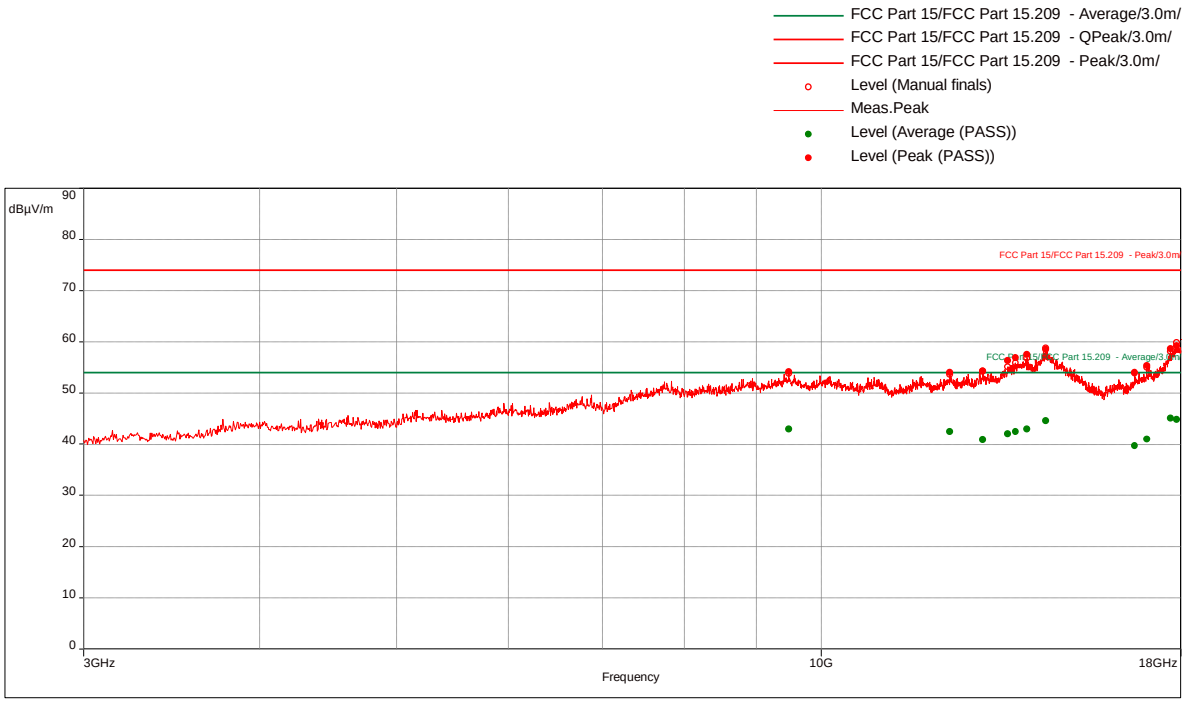
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2278.684211	40.67	54.00	-13.33	329.00	1.70	Horizontal	1000000.00	-21.45
2295.526316	41.36	54.00	-12.64	328.00	1.75	Horizontal	1000000.00	-21.34
2347.631579	47.38	54.00	-6.62	327.00	1.35	Horizontal	1000000.00	-20.73
2367.368421	49.19	54.00	-4.81	328.00	1.65	Horizontal	1000000.00	-20.51
2517.631579	47.44	54.00	-6.56	328.00	1.45	Horizontal	1000000.00	-19.85
2531.578947	44.95	54.00	-9.05	328.00	1.45	Horizontal	1000000.00	-19.82

Mid Channel, X-Axis, 802.11g, 3 to 18 GHz

Test Information:

Date and Time	7/18/2019 2:18:20 PM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Mid Ch - X-Axis - 802.11g - RE 3 to 18 GHz SA mode

Graph:



Results:

Peak (PASS) (11)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
9483.157895	54.14	74.00	-19.86	239.00	3.84	Horizontal	1000000.00	-1.26
12341.57895	54.03	74.00	-19.97	218.00	1.45	Vertical	1000000.00	1.66
13023.42105	54.21	74.00	-19.79	290.00	1.55	Vertical	1000000.00	2.64
13567.10526	56.31	74.00	-17.69	159.00	1.50	Horizontal	1000000.00	4.48
13735	56.94	74.00	-17.06	77.00	3.64	Horizontal	1000000.00	4.97
14000.78947	57.49	74.00	-16.51	240.00	3.30	Vertical	1000000.00	5.52
14434.47368	58.54	74.00	-15.46	85.00	2.30	Vertical	1000000.00	6.84
16688.15789	54.01	74.00	-19.99	300.00	1.80	Vertical	1000000.00	1.50
17022.10526	55.33	74.00	-18.67	356.00	2.65	Horizontal	1000000.00	2.82
17687.89474	58.64	74.00	-15.36	129.00	1.60	Vertical	1000000.00	7.73
17876.57895	59.25	74.00	-14.75	209.00	2.30	Horizontal	1000000.00	8.48

Average (PASS) (11)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
9483.157895	42.92	54.00	-11.08	239.00	3.84	Horizontal	1000000.00	-1.26
12341.57895	42.47	54.00	-11.53	218.00	1.45	Vertical	1000000.00	1.66
13023.42105	40.90	54.00	-13.10	290.00	1.55	Vertical	1000000.00	2.64
13567.10526	42.00	54.00	-12.00	159.00	1.50	Horizontal	1000000.00	4.48
13735	42.43	54.00	-11.57	77.00	3.64	Horizontal	1000000.00	4.97
14000.78947	42.93	54.00	-11.07	240.00	3.30	Vertical	1000000.00	5.52
14434.47368	44.57	54.00	-9.43	85.00	2.30	Vertical	1000000.00	6.84
16688.15789	39.74	54.00	-14.26	300.00	1.80	Vertical	1000000.00	1.50
17022.10526	40.95	54.00	-13.05	356.00	2.65	Horizontal	1000000.00	2.82
17687.89474	45.13	54.00	-8.87	129.00	1.60	Vertical	1000000.00	7.73
17876.57895	44.82	54.00	-9.18	209.00	2.30	Horizontal	1000000.00	8.48

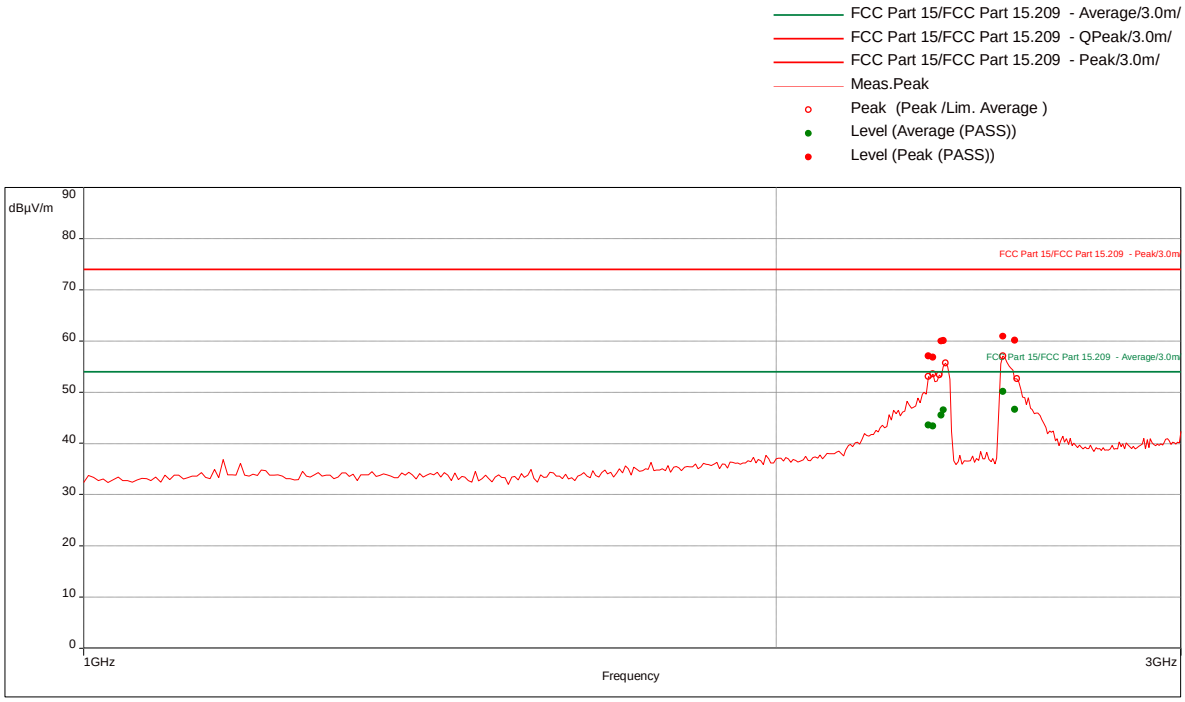
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, X-Axis, 802.11g: 1 to 3 GHz

Test Information:

Date and Time	7/18/2019 3:15:47 PM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	High Ch - X-Axis - 802.11g - RE 1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Co rrection (dB)
2329.736842	57.03	74.00	-16.97	328.00	1.40	Horizontal	1000000.00	-20.95
2342.368421	56.83	74.00	-17.17	329.00	1.10	Horizontal	1000000.00	-20.79
2357.631579	59.98	74.00	-14.02	322.00	1.55	Horizontal	1000000.00	-20.62
2366.842105	60.08	74.00	-13.92	328.00	1.65	Horizontal	1000000.00	-20.52
2511.315789	60.90	74.00	-13.10	328.00	1.50	Horizontal	1000000.00	-19.87
2541.578947	60.17	74.00	-13.83	324.00	1.45	Horizontal	1000000.00	-19.80

Average (PASS) (6)

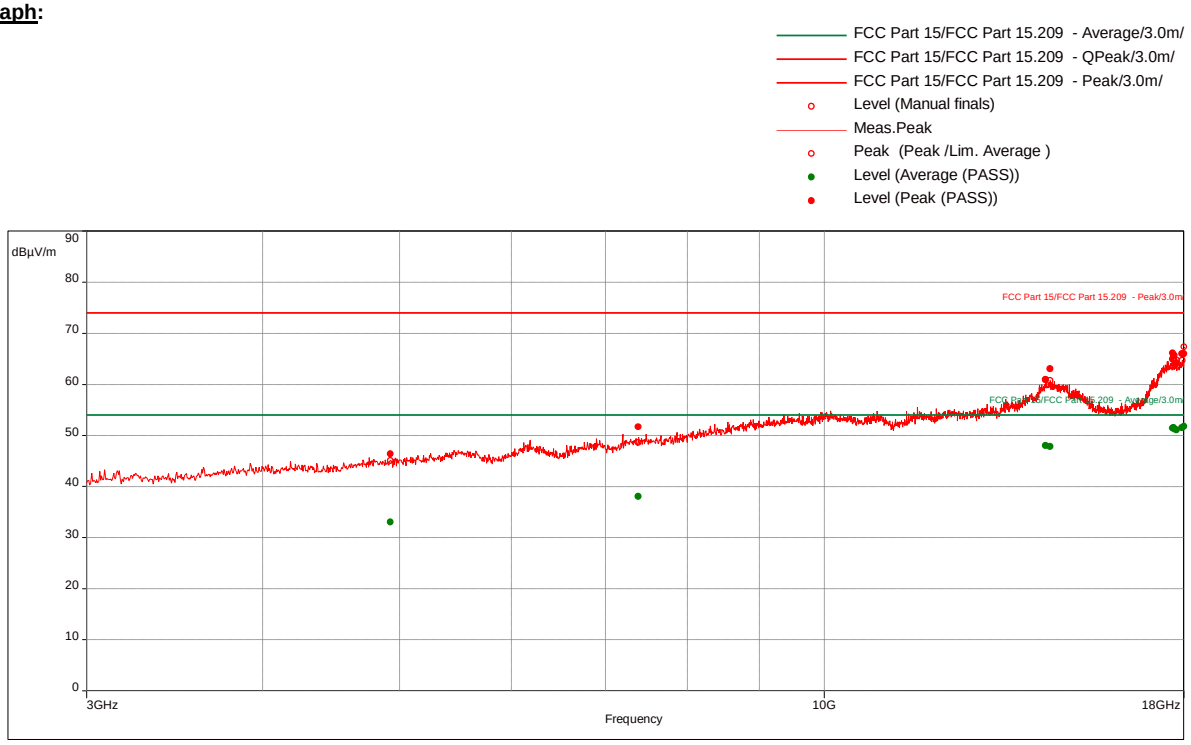
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2329.736842	43.59	54.00	-10.41	328.00	1.40	Horizontal	1000000.00	-20.95
2342.368421	43.35	54.00	-10.65	329.00	1.10	Horizontal	1000000.00	-20.79
2357.631579	45.53	54.00	-8.47	322.00	1.55	Horizontal	1000000.00	-20.62
2366.842105	46.53	54.00	-7.47	328.00	1.65	Horizontal	1000000.00	-20.52
2511.315789	50.15	54.00	-3.85	328.00	1.50	Horizontal	1000000.00	-19.87
2541.578947	46.64	54.00	-7.36	324.00	1.45	Horizontal	1000000.00	-19.80

High Channel, X-Axis, 802.11g: 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 9:57:53 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11g (24Mbps, worst-case), Tx @ High CH

Graph:



Results:

Peak (PASS) (10)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4923.157895	46.41	74.00	-27.59	83.00	3.15	Vertical	1000000.00	-10.87
7385	51.70	74.00	-22.30	359.00	1.20	Vertical	1000000.00	-5.20
14358.94737	60.89	74.00	-13.11	121.00	3.49	Horizontal	1000000.00	9.36
14461.84211	63.02	74.00	-10.98	106.00	1.70	Horizontal	1000000.00	9.60
17666.57895	66.10	74.00	-7.90	121.00	2.15	Vertical	1000000.00	13.21
17689.73684	65.46	74.00	-8.54	91.00	1.05	Vertical	1000000.00	13.40
17716.31579	65.74	74.00	-8.26	4.00	3.20	Vertical	1000000.00	13.54
17780.26316	64.07	74.00	-9.93	215.00	2.85	Horizontal	1000000.00	13.71
17940.52632	66.00	74.00	-8.00	98.00	2.95	Horizontal	1000000.00	14.34
17997.63158	65.99	74.00	-8.01	47.00	1.75	Horizontal	1000000.00	14.58

Average (PASS) (10)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4923.157895	33.01	54.00	-20.99	83.00	3.15	Vertical	1000000.00	-10.87
7385	38.06	54.00	-15.94	359.00	1.20	Vertical	1000000.00	-5.20
14358.94737	48.01	54.00	-5.99	121.00	3.49	Horizontal	1000000.00	9.36
14461.84211	47.79	54.00	-6.21	106.00	1.70	Horizontal	1000000.00	9.60
17666.57895	51.41	54.00	-2.59	121.00	2.15	Vertical	1000000.00	13.21
17689.73684	51.48	54.00	-2.52	91.00	1.05	Vertical	1000000.00	13.40
17716.31579	51.24	54.00	-2.76	4.00	3.20	Vertical	1000000.00	13.54
17780.26316	51.08	54.00	-2.92	215.00	2.85	Horizontal	1000000.00	13.71
17940.52632	51.52	54.00	-2.48	98.00	2.95	Horizontal	1000000.00	14.34
17997.63158	51.75	54.00	-2.25	47.00	1.75	Horizontal	1000000.00	14.58

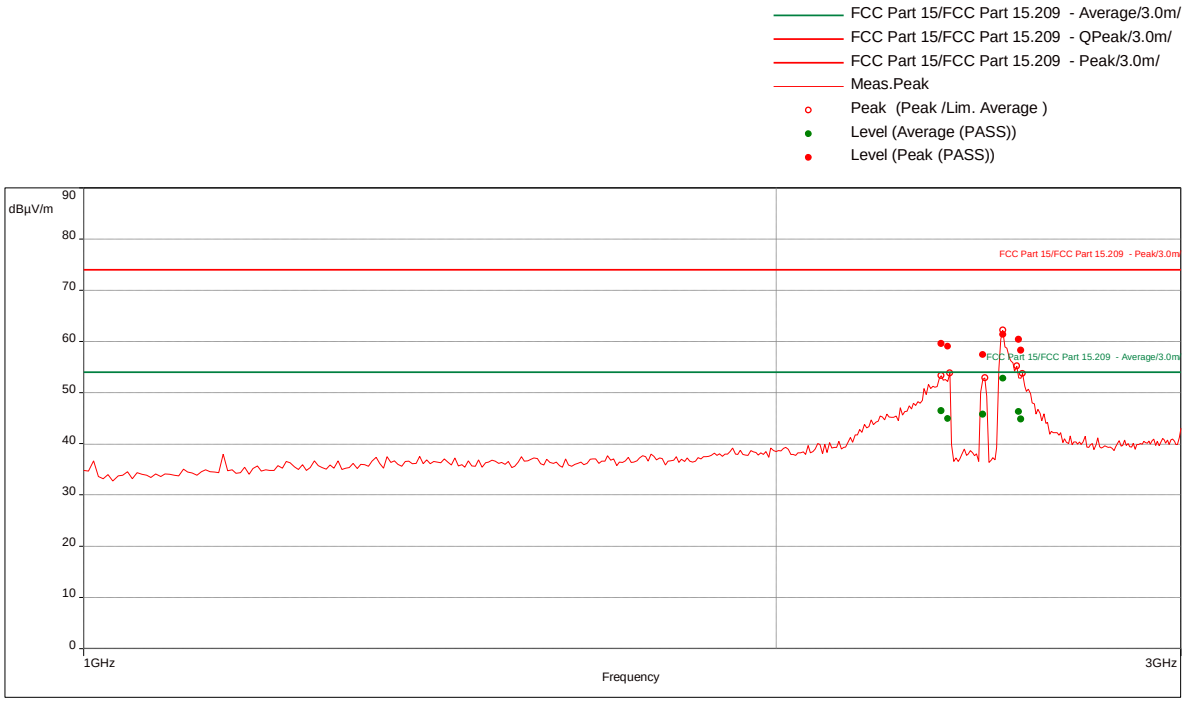
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, Y-Axis, 802.11g: 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 8:35:58 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11g (24Mbps, worst-case), EUT on its long side Y-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2358.947368	59.57	74.00	-14.43	201.00	1.70	Horizontal	1000000.00	-20.04
2375.526316	59.04	74.00	-14.96	193.00	1.95	Horizontal	1000000.00	-19.96
2460.789474	57.42	74.00	-16.58	276.00	2.75	Horizontal	1000000.00	-19.62
2507.894737	61.37	74.00	-12.63	202.00	1.80	Horizontal	1000000.00	-19.40
2548.421053	60.40	74.00	-13.60	201.00	1.55	Horizontal	1000000.00	-19.21
2556.052632	58.26	74.00	-15.74	195.00	1.55	Horizontal	1000000.00	-19.19

Average (PASS) (6)

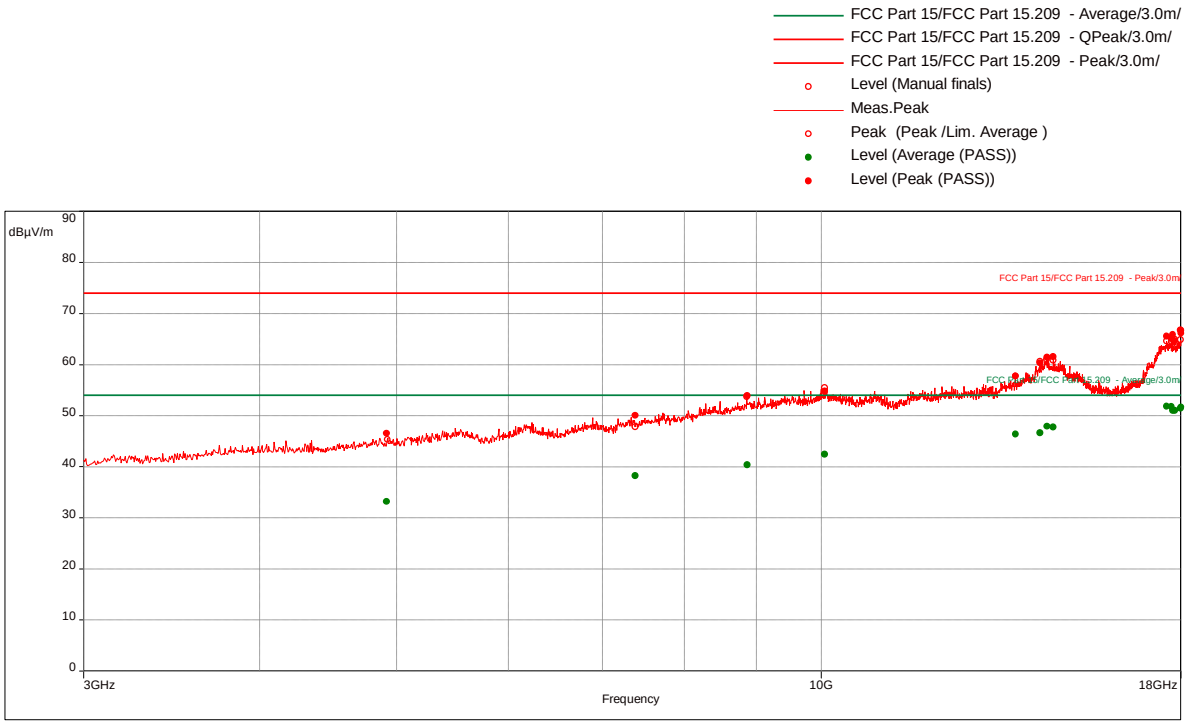
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2358.947368	46.43	54.00	-7.57	201.00	1.70	Horizontal	1000000.00	-20.04
2375.526316	44.89	54.00	-9.11	193.00	1.95	Horizontal	1000000.00	-19.96
2460.789474	45.78	54.00	-8.22	276.00	2.75	Horizontal	1000000.00	-19.62
2507.894737	52.79	54.00	-1.21	202.00	1.80	Horizontal	1000000.00	-19.40
2548.421053	46.28	54.00	-7.72	201.00	1.55	Horizontal	1000000.00	-19.21
2556.052632	44.83	54.00	-9.17	195.00	1.55	Horizontal	1000000.00	-19.19

High Channel, Y-Axis, 802.11g: 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 9:00:09 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11g (24Mbps, worst-case), EUT on its long side Y-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4921.578947	46.53	74.00	-27.47	290.00	3.34	Vertical	1000000.00	-10.87
7387.368421	50.03	74.00	-23.97	149.00	2.10	Horizontal	1000000.00	-5.20
8863.421053	53.94	74.00	-20.06	298.00	1.80	Vertical	1000000.00	-1.80
10060	54.79	74.00	-19.21	62.00	1.30	Horizontal	1000000.00	0.61
13736.05263	57.71	74.00	-16.29	0.00	1.70	Horizontal	1000000.00	6.44
14305.26316	60.33	74.00	-13.67	290.00	2.75	Vertical	1000000.00	9.19
14457.89474	61.39	74.00	-12.61	210.00	1.25	Horizontal	1000000.00	9.59
14609.73684	61.49	74.00	-12.51	255.00	3.49	Vertical	1000000.00	9.70
17585.26316	65.55	74.00	-8.45	194.00	1.55	Horizontal	1000000.00	12.52
17712.63158	65.19	74.00	-8.81	55.00	3.74	Vertical	1000000.00	13.53
17754.21053	65.84	74.00	-8.16	202.00	2.15	Horizontal	1000000.00	13.64
17812.63158	64.57	74.00	-9.43	76.00	1.30	Vertical	1000000.00	13.82
17988.15789	66.74	74.00	-7.26	98.00	2.30	Horizontal	1000000.00	14.54
17998.81579	66.12	74.00	-7.88	54.00	1.30	Horizontal	1000000.00	14.59

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4921.578947	33.21	54.00	-20.79	290.00	3.34	Vertical	1000000.00	-10.87
7387.368421	38.23	54.00	-15.77	149.00	2.10	Horizontal	1000000.00	-5.20
8863.421053	40.41	54.00	-13.59	298.00	1.80	Vertical	1000000.00	-1.80
10060	42.44	54.00	-11.56	62.00	1.30	Horizontal	1000000.00	0.61
13736.05263	46.40	54.00	-7.60	0.00	1.70	Horizontal	1000000.00	6.44
14305.26316	46.63	54.00	-7.37	290.00	2.75	Vertical	1000000.00	9.19
14457.89474	47.89	54.00	-6.11	210.00	1.25	Horizontal	1000000.00	9.59
14609.73684	47.74	54.00	-6.26	255.00	3.49	Vertical	1000000.00	9.70
17585.26316	51.83	54.00	-2.17	194.00	1.55	Horizontal	1000000.00	12.52
17712.63158	51.78	54.00	-2.22	55.00	3.74	Vertical	1000000.00	13.53
17754.21053	50.97	54.00	-3.03	202.00	2.15	Horizontal	1000000.00	13.64
17812.63158	50.97	54.00	-3.03	76.00	1.30	Vertical	1000000.00	13.82
17988.15789	51.42	54.00	-2.58	98.00	2.30	Horizontal	1000000.00	14.54
17998.81579	51.65	54.00	-2.35	54.00	1.30	Horizontal	1000000.00	14.59

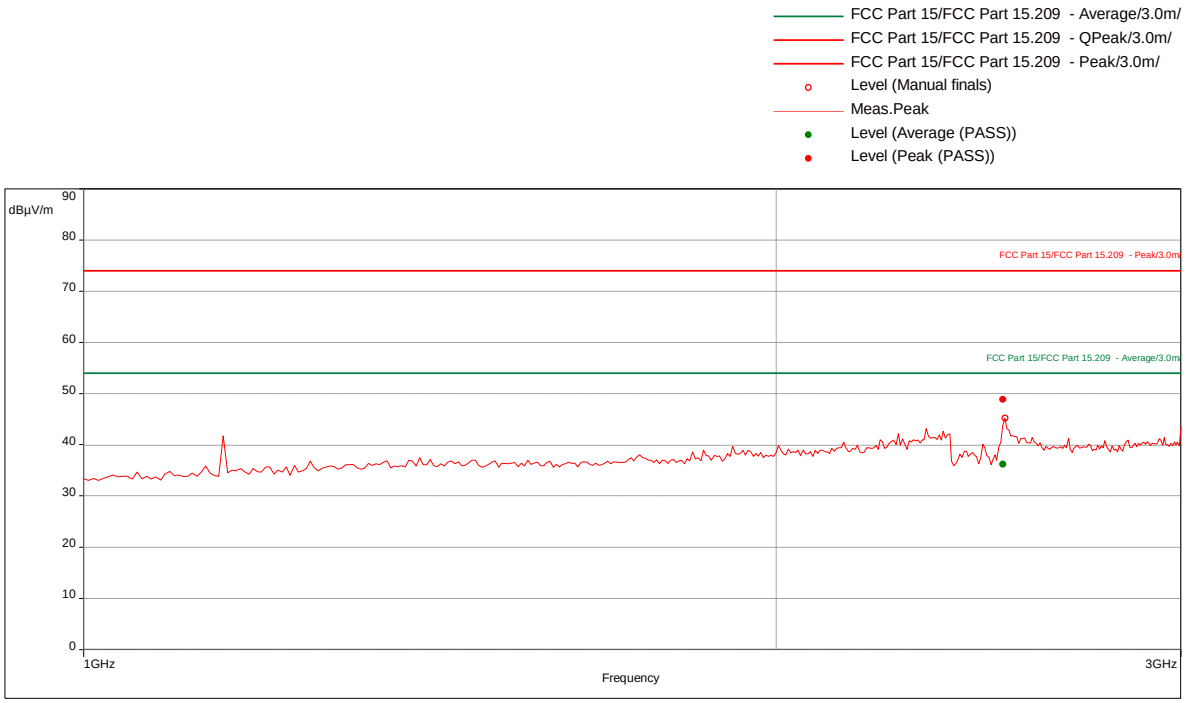
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, Z-Axis, 802.11g: 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 2:27:42 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), Z-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2511.315789	48.86	74.00	-25.14	210.00	1.50	Vertical	1000000.00	-19.38

Average (PASS) (1)

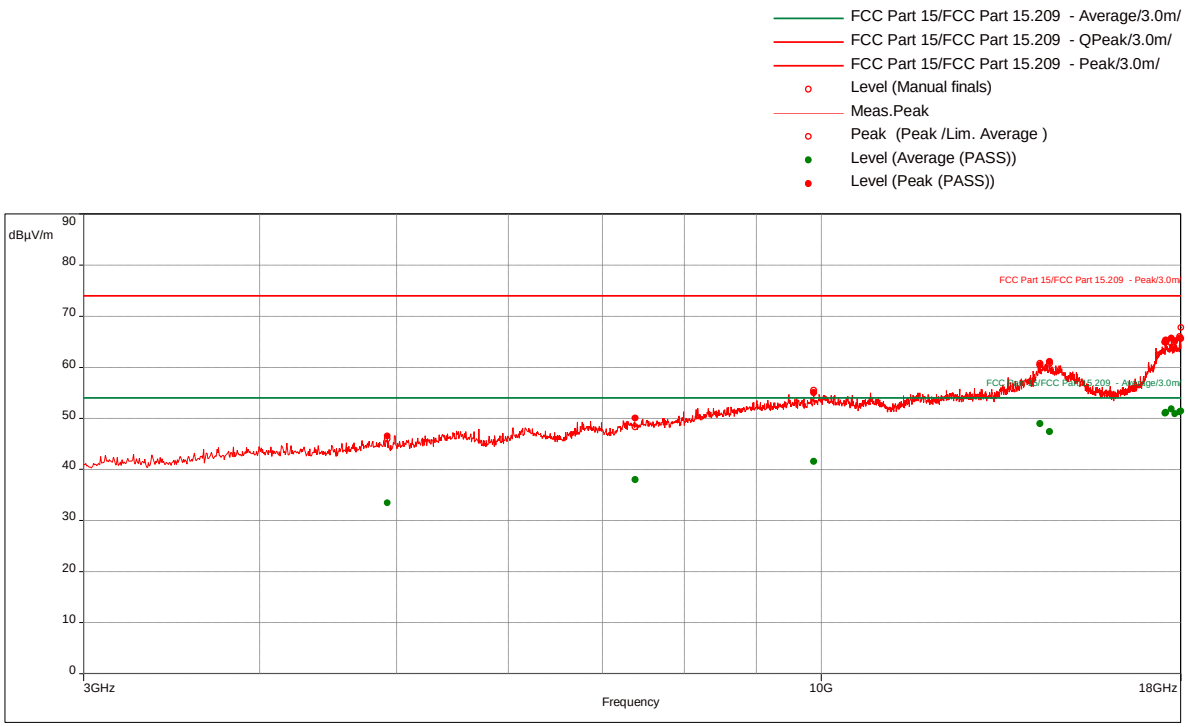
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2511.315789	36.20	54.00	-17.80	210.00	1.50	Vertical	1000000.00	-19.38

High Channel, Z-Axis, 802.11g: 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 10:41:52 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11g (24Mbps, worst-case), EUT on its long side Z-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (11)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4926.578947	46.54	74.00	-27.46	142.00	2.60	Horizontal	1000000.00	-10.87
7384.473684	50.03	74.00	-23.97	0.00	3.79	Horizontal	1000000.00	-5.20
9879.473684	55.04	74.00	-18.96	193.00	3.59	Horizontal	1000000.00	0.07
14296.31579	60.44	74.00	-13.56	246.00	2.05	Vertical	1000000.00	9.17
14530	61.13	74.00	-12.87	10.00	2.05	Vertical	1000000.00	9.72
17537.89474	64.96	74.00	-9.04	107.00	2.15	Horizontal	1000000.00	12.21
17562.10526	65.26	74.00	-8.74	114.00	2.60	Vertical	1000000.00	12.37
17716.57895	65.74	74.00	-8.26	157.00	1.75	Vertical	1000000.00	13.54
17812.89474	65.23	74.00	-8.77	172.00	1.55	Horizontal	1000000.00	13.82
17964.47368	65.71	74.00	-8.29	232.00	2.70	Vertical	1000000.00	14.44
17998.55263	65.59	74.00	-8.41	17.00	3.05	Vertical	1000000.00	14.59

Average (PASS) (11)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4926.578947	33.50	54.00	-20.50	142.00	2.60	Horizontal	1000000.00	-10.87
7384.473684	37.99	54.00	-16.01	0.00	3.79	Horizontal	1000000.00	-5.20
9879.473684	41.59	54.00	-12.41	193.00	3.59	Horizontal	1000000.00	0.07
14296.31579	48.95	54.00	-5.05	246.00	2.05	Vertical	1000000.00	9.17
14530	47.37	54.00	-6.63	10.00	2.05	Vertical	1000000.00	9.72
17537.89474	50.98	54.00	-3.02	107.00	2.15	Horizontal	1000000.00	12.21
17562.10526	51.14	54.00	-2.86	114.00	2.60	Vertical	1000000.00	12.37
17716.57895	51.85	54.00	-2.15	157.00	1.75	Vertical	1000000.00	13.54
17812.89474	50.93	54.00	-3.07	172.00	1.55	Horizontal	1000000.00	13.82
17964.47368	51.27	54.00	-2.73	232.00	2.70	Vertical	1000000.00	14.44
17998.55263	51.46	54.00	-2.54	17.00	3.05	Vertical	1000000.00	14.59

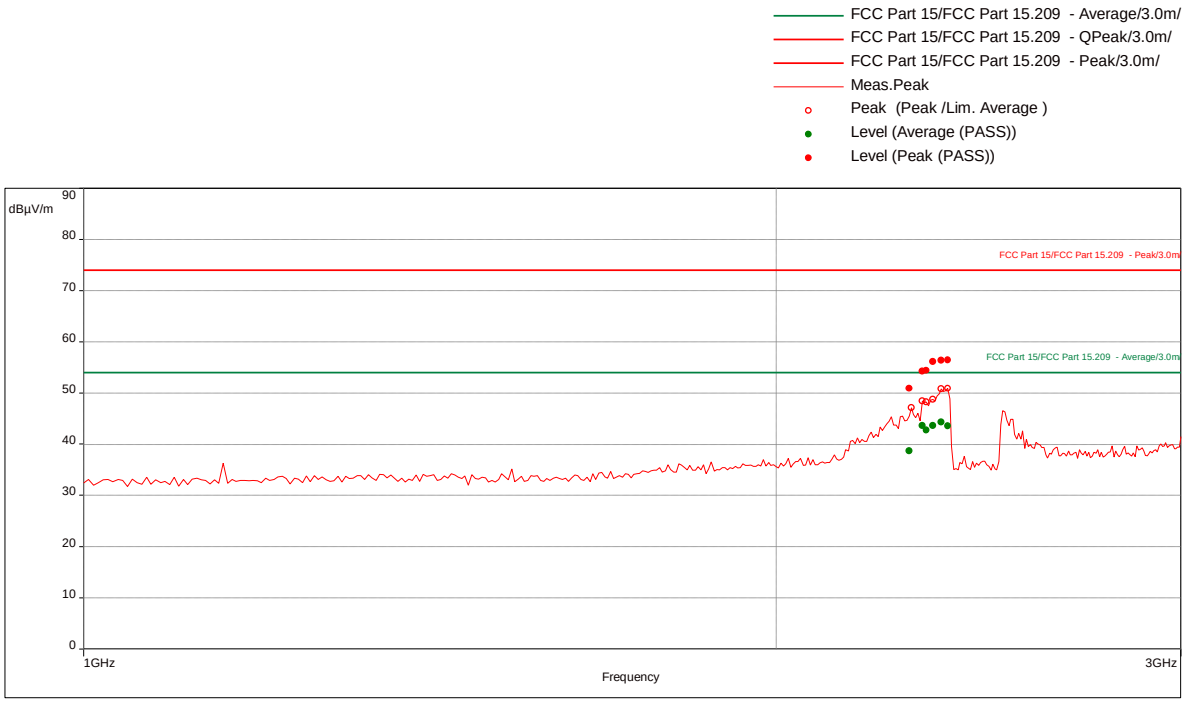
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, X-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	7/18/2019 10:40:15 AM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Low Ch - X-Axis - 802.11b - RE 1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2286.578947	50.93	74.00	-23.07	326.00	1.70	Horizontal	1000000.00	-22.27
2312.631579	54.21	74.00	-19.79	328.00	1.65	Horizontal	1000000.00	-22.08
2326.842105	54.42	74.00	-19.58	334.00	1.35	Horizontal	1000000.00	-21.97
2337.894737	56.10	74.00	-17.90	328.00	1.70	Horizontal	1000000.00	-21.88
2360	56.38	74.00	-17.62	327.00	1.40	Horizontal	1000000.00	-21.72
2374.473684	56.48	74.00	-17.52	328.00	1.65	Horizontal	1000000.00	-21.63

Average (PASS) (6)

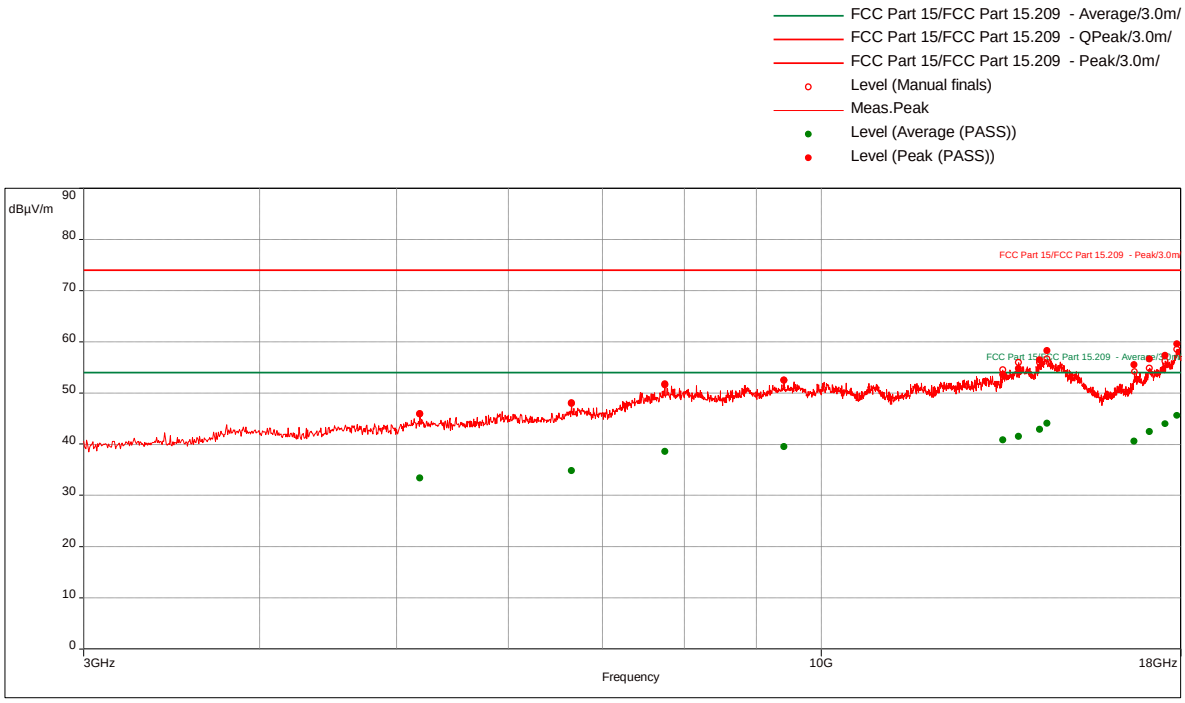
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2286.578947	38.72	54.00	-15.28	326.00	1.70	Horizontal	1000000.00	-22.27
2312.631579	43.67	54.00	-10.33	328.00	1.65	Horizontal	1000000.00	-22.08
2326.842105	42.79	54.00	-11.21	334.00	1.35	Horizontal	1000000.00	-21.97
2337.894737	43.60	54.00	-10.40	328.00	1.70	Horizontal	1000000.00	-21.88
2360	44.28	54.00	-9.72	327.00	1.40	Horizontal	1000000.00	-21.72
2374.473684	43.52	54.00	-10.48	328.00	1.65	Horizontal	1000000.00	-21.63

Low Channel, X-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	7/18/2019 11:03:54 AM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Low Ch - X-Axis - 802.11b - RE 3 to 18 GHz SA mode

Graph:



Results:

Peak (PASS) (12)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
5196.052632	45.89	74.00	-28.11	33.00	1.70	Vertical	1000000.00	-11.32
6656.315789	48.09	74.00	-25.91	150.00	3.79	Horizontal	1000000.00	-8.61
7748.947368	51.75	74.00	-22.25	194.00	1.55	Horizontal	1000000.00	-4.05
9413.947368	52.55	74.00	-21.45	91.00	2.40	Vertical	1000000.00	-2.84
13453.42105	53.58	74.00	-20.42	202.00	2.15	Horizontal	1000000.00	2.94
13808.42105	54.78	74.00	-19.22	166.00	3.89	Vertical	1000000.00	4.01
14285.52632	56.49	74.00	-17.51	255.00	3.69	Vertical	1000000.00	5.59
14462.36842	58.27	74.00	-15.73	193.00	2.20	Vertical	1000000.00	5.62
16681.31579	55.53	74.00	-18.47	187.00	2.65	Vertical	1000000.00	1.57
17100	56.64	74.00	-17.36	282.00	3.34	Horizontal	1000000.00	3.58
17543.15789	57.29	74.00	-16.71	338.00	1.65	Vertical	1000000.00	5.59
17892.10526	59.52	74.00	-14.48	261.00	2.55	Vertical	1000000.00	8.08

Average (PASS) (12)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
5196.052632	33.34	54.00	-20.66	33.00	1.70	Vertical	1000000.00	-11.32
6656.315789	34.81	54.00	-19.19	150.00	3.79	Horizontal	1000000.00	-8.61
7748.947368	38.59	54.00	-15.41	194.00	1.55	Horizontal	1000000.00	-4.05
9413.947368	39.52	54.00	-14.48	91.00	2.40	Vertical	1000000.00	-2.84
13453.42105	40.84	54.00	-13.16	202.00	2.15	Horizontal	1000000.00	2.94
13808.42105	41.52	54.00	-12.48	166.00	3.89	Vertical	1000000.00	4.01
14285.52632	42.89	54.00	-11.11	255.00	3.69	Vertical	1000000.00	5.59
14462.36842	44.05	54.00	-9.95	193.00	2.20	Vertical	1000000.00	5.62
16681.31579	40.54	54.00	-13.46	187.00	2.65	Vertical	1000000.00	1.57
17100	42.45	54.00	-11.55	282.00	3.34	Horizontal	1000000.00	3.58
17543.15789	43.97	54.00	-10.03	338.00	1.65	Vertical	1000000.00	5.59
17892.10526	45.56	54.00	-8.44	261.00	2.55	Vertical	1000000.00	8.08

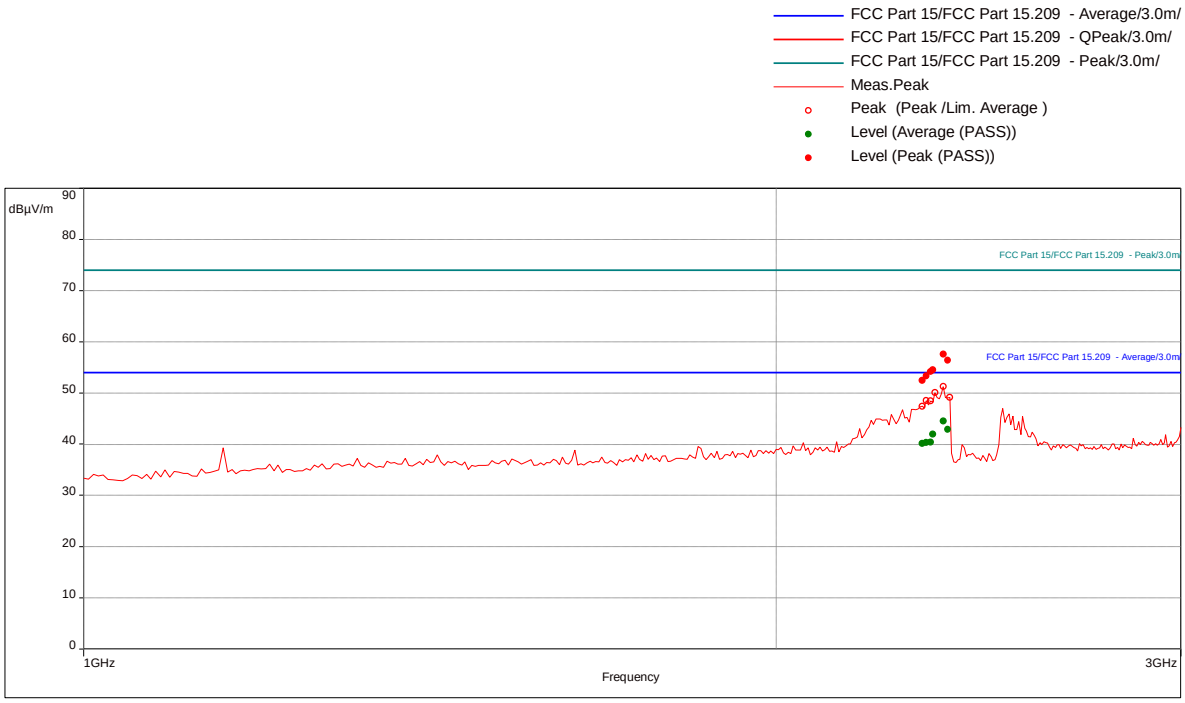
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Y-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/3/2019 6:31:22 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 1 to 3GHz_802.11b (2 Mbps, worst-case), Y-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2313.157895	52.45	74.00	-21.55	202.00	1.50	Horizontal	1000000.00	-20.48
2323.684211	53.27	74.00	-20.73	194.00	1.55	Horizontal	1000000.00	-20.37
2335.526316	54.16	74.00	-19.84	195.00	1.55	Horizontal	1000000.00	-20.24
2341.842105	54.52	74.00	-19.48	201.00	1.80	Horizontal	1000000.00	-20.18
2365	57.56	74.00	-16.44	203.00	1.50	Horizontal	1000000.00	-20.01
2376.315789	56.40	74.00	-17.60	196.00	1.75	Horizontal	1000000.00	-19.95

Average (PASS) (6)

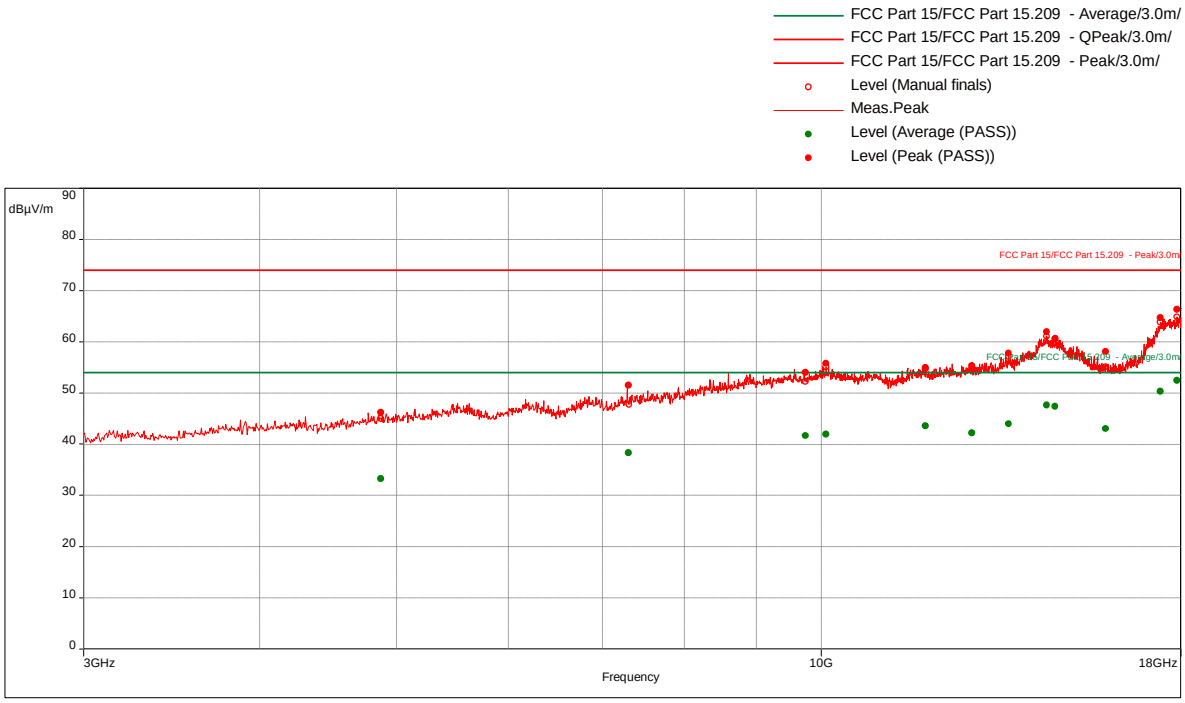
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2313.157895	40.12	54.00	-13.88	202.00	1.50	Horizontal	1000000.00	-20.48
2323.684211	40.33	54.00	-13.67	194.00	1.55	Horizontal	1000000.00	-20.37
2335.526316	40.37	54.00	-13.63	195.00	1.55	Horizontal	1000000.00	-20.24
2341.842105	41.96	54.00	-12.04	201.00	1.80	Horizontal	1000000.00	-20.18
2365	44.50	54.00	-9.50	203.00	1.50	Horizontal	1000000.00	-20.01
2376.315789	42.84	54.00	-11.16	196.00	1.75	Horizontal	1000000.00	-19.95

Low Channel, Y-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 3:33:36 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11b (2Mbps, worst-case), Y-axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (12)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4873.684211	46.23	74.00	-27.77	99.00	2.70	Horizontal	1000000.00	-10.93
7307.368421	51.52	74.00	-22.48	144.00	2.20	Vertical	1000000.00	-5.38
9747.894737	54.01	74.00	-19.99	121.00	2.70	Horizontal	1000000.00	-0.30
10085.26316	55.75	74.00	-18.25	232.00	3.74	Vertical	1000000.00	0.65
11860.26316	54.93	74.00	-19.07	92.00	2.55	Vertical	1000000.00	3.00
12790	55.34	74.00	-18.66	18.00	1.25	Vertical	1000000.00	3.68
13585.78947	57.79	74.00	-16.21	350.00	1.10	Horizontal	1000000.00	5.99
14450.26316	61.92	74.00	-12.08	142.00	1.80	Horizontal	1000000.00	9.58
14657.36842	60.49	74.00	-13.51	55.00	3.15	Horizontal	1000000.00	9.62
15916.05263	58.08	74.00	-15.92	239.00	1.65	Horizontal	1000000.00	4.53
17405.78947	64.69	74.00	-9.31	297.00	3.74	Vertical	1000000.00	11.27
17880.52632	66.31	74.00	-7.69	201.00	2.20	Horizontal	1000000.00	14.11

Average (PASS) (12)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4873.684211	33.28	54.00	-20.72	99.00	2.70	Horizontal	1000000.00	-10.93
7307.368421	38.32	54.00	-15.68	144.00	2.20	Vertical	1000000.00	-5.38
9747.894737	41.70	54.00	-12.30	121.00	2.70	Horizontal	1000000.00	-0.30
10085.26316	41.94	54.00	-12.06	232.00	3.74	Vertical	1000000.00	0.65
11860.26316	43.53	54.00	-10.47	92.00	2.55	Vertical	1000000.00	3.00
12790	42.18	54.00	-11.82	18.00	1.25	Vertical	1000000.00	3.68
13585.78947	44.02	54.00	-9.98	350.00	1.10	Horizontal	1000000.00	5.99
14450.26316	47.69	54.00	-6.31	142.00	1.80	Horizontal	1000000.00	9.58
14657.36842	47.38	54.00	-6.62	55.00	3.15	Horizontal	1000000.00	9.62
15916.05263	43.02	54.00	-10.98	239.00	1.65	Horizontal	1000000.00	4.53
17405.78947	50.33	54.00	-3.67	297.00	3.74	Vertical	1000000.00	11.27
17880.52632	52.47	54.00	-1.53	201.00	2.20	Horizontal	1000000.00	14.11

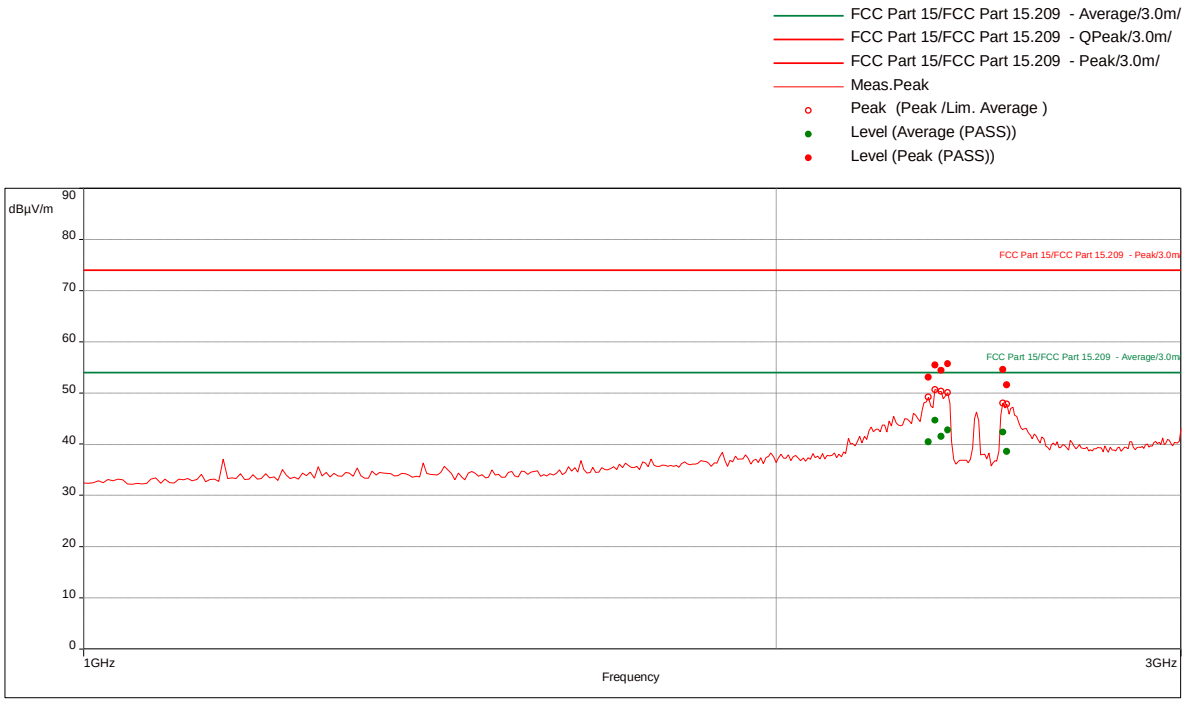
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, X-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	7/18/2019 12:03:11 PM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Mid Ch - X-Axis - 802.11b - RE 1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2331.315789	53.02	74.00	-20.98	335.00	1.35	Horizontal	1000000.00	-20.93
2342.894737	55.41	74.00	-18.59	328.00	1.65	Horizontal	1000000.00	-20.79
2362.368421	54.39	74.00	-19.61	330.00	1.25	Horizontal	1000000.00	-20.57
2373.157895	55.74	74.00	-18.26	327.00	1.55	Horizontal	1000000.00	-20.45
2510.789474	54.57	74.00	-19.43	328.00	1.50	Horizontal	1000000.00	-19.87
2521.052632	51.57	74.00	-22.43	343.00	1.40	Horizontal	1000000.00	-19.84

Average (PASS) (6)

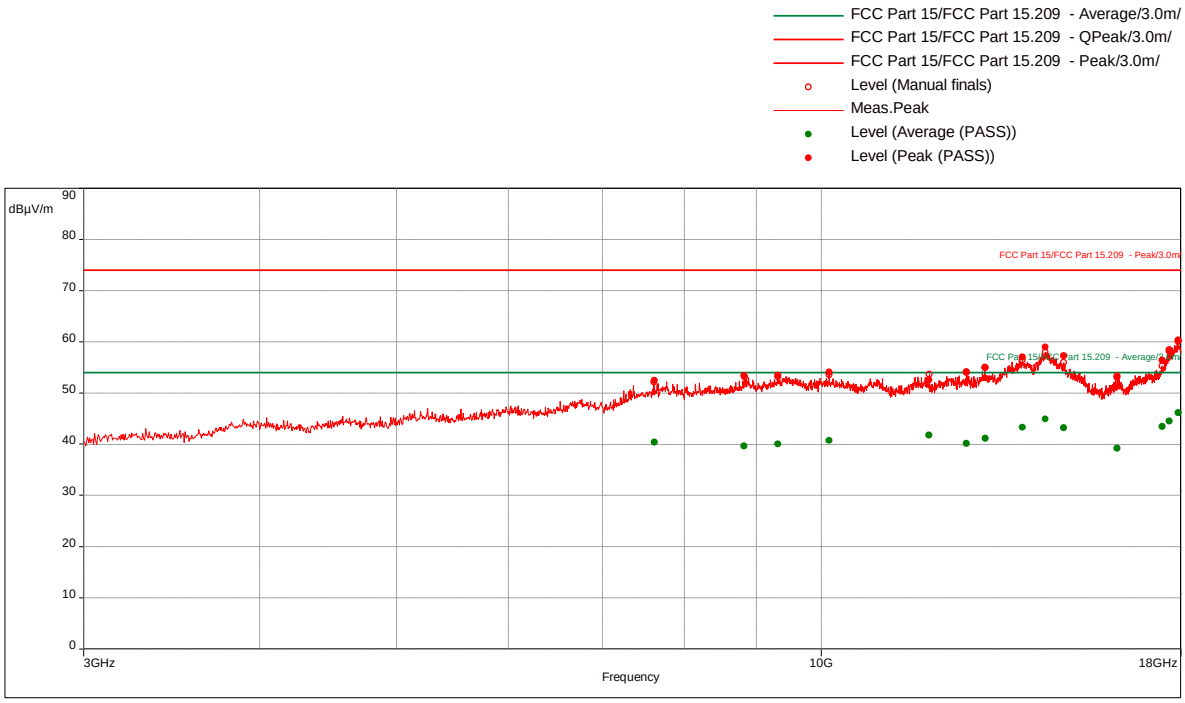
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2331.315789	40.49	54.00	-13.51	335.00	1.35	Horizontal	1000000.00	-20.93
2342.894737	44.65	54.00	-9.35	328.00	1.65	Horizontal	1000000.00	-20.79
2362.368421	41.49	54.00	-12.51	330.00	1.25	Horizontal	1000000.00	-20.57
2373.157895	42.81	54.00	-11.19	327.00	1.55	Horizontal	1000000.00	-20.45
2510.789474	42.36	54.00	-11.64	328.00	1.50	Horizontal	1000000.00	-19.87
2521.052632	38.60	54.00	-15.40	343.00	1.40	Horizontal	1000000.00	-19.84

Mid Channel, X-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	7/18/2019 12:26:16 PM
Client and Project Number	iRobot - G103991615
Engineer	Ken Lee
Temperature	22 ℃
Humidity	67 %
Atmospheric Pressure	1006 mbars
Comments	Mid Ch - X-Axis - 802.11b - RE 3 to 18 GHz SA mode

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
7617.894737	52.44	74.00	-21.56	241.00	1.30	Horizontal	1000000.00	-3.75
8821.842105	53.43	74.00	-20.57	142.00	2.15	Horizontal	1000000.00	-2.62
9320.789474	53.19	74.00	-20.81	70.00	2.15	Horizontal	1000000.00	-1.82
10137.10526	54.07	74.00	-19.93	84.00	2.80	Vertical	1000000.00	-1.06
11932.10526	52.52	74.00	-21.48	40.00	1.00	Horizontal	1000000.00	1.22
12683.15789	54.14	74.00	-19.86	194.00	2.45	Vertical	1000000.00	1.63
13073.15789	54.91	74.00	-19.09	186.00	3.34	Vertical	1000000.00	2.81
13898.15789	57.02	74.00	-16.98	350.00	1.60	Vertical	1000000.00	5.32
14419.21053	58.94	74.00	-15.06	121.00	1.40	Horizontal	1000000.00	6.84
14863.94737	57.20	74.00	-16.80	129.00	3.15	Horizontal	1000000.00	5.37
16213.42105	53.02	74.00	-20.98	4.00	3.64	Horizontal	1000000.00	0.51
17450.52632	56.38	74.00	-17.62	84.00	1.00	Vertical	1000000.00	5.47
17651.57895	58.14	74.00	-15.86	254.00	2.30	Vertical	1000000.00	7.37
17920.78947	60.33	74.00	-13.67	11.00	2.00	Horizontal	1000000.00	8.50

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
7617.894737	40.39	54.00	-13.61	241.00	1.30	Horizontal	1000000.00	-3.75
8821.842105	39.60	54.00	-14.40	142.00	2.15	Horizontal	1000000.00	-2.62
9320.789474	40.06	54.00	-13.94	70.00	2.15	Horizontal	1000000.00	-1.82
10137.10526	40.70	54.00	-13.30	84.00	2.80	Vertical	1000000.00	-1.06
11932.10526	41.80	54.00	-12.20	40.00	1.00	Horizontal	1000000.00	1.22
12683.15789	40.12	54.00	-13.88	194.00	2.45	Vertical	1000000.00	1.63
13073.15789	41.14	54.00	-12.86	186.00	3.34	Vertical	1000000.00	2.81
13898.15789	43.33	54.00	-10.67	350.00	1.60	Vertical	1000000.00	5.32
14419.21053	44.90	54.00	-9.10	121.00	1.40	Horizontal	1000000.00	6.84
14863.94737	43.19	54.00	-10.81	129.00	3.15	Horizontal	1000000.00	5.37
16213.42105	39.16	54.00	-14.84	4.00	3.64	Horizontal	1000000.00	0.51
17450.52632	43.44	54.00	-10.56	84.00	1.00	Vertical	1000000.00	5.47
17651.57895	44.50	54.00	-9.50	254.00	2.30	Vertical	1000000.00	7.37
17920.78947	46.08	54.00	-7.92	11.00	2.00	Horizontal	1000000.00	8.50

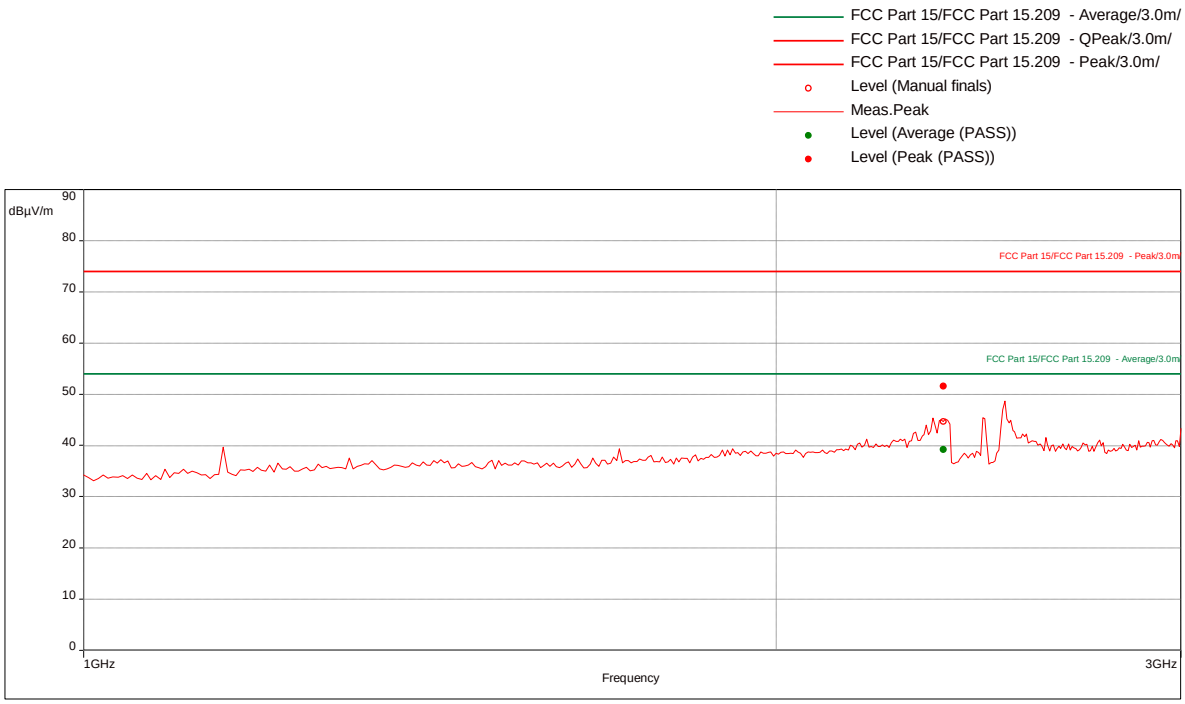
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, X-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 12:17:02 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), X-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2363.947368	51.61	74.00	-22.39	136.00	1.80	Horizontal	1000000.00	-20.02

Average (PASS) (1)

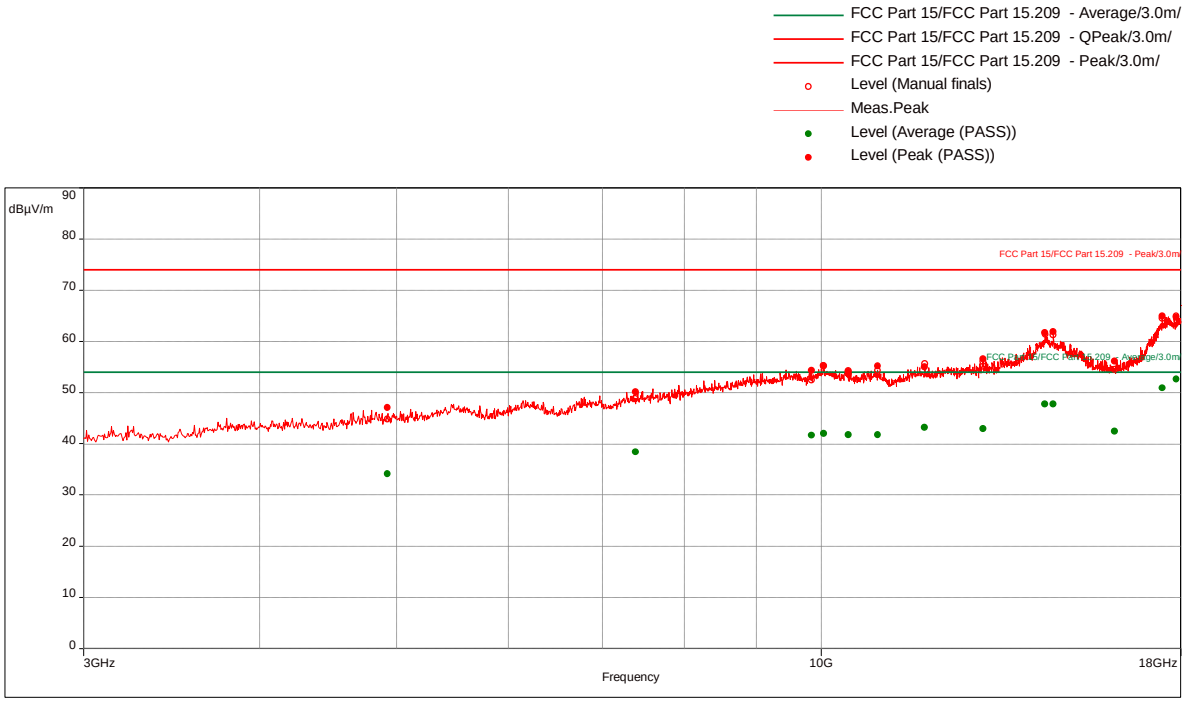
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2363.947368	39.16	54.00	-14.84	136.00	1.80	Horizontal	1000000.00	-20.02

High Channel, X-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 12:27:06 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11b (2Mbps, worst-case), EUT on its back X-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4923.421053	47.03	74.00	-26.97	41.00	1.20	Horizontal	1000000.00	-10.87
7387.631579	50.16	74.00	-23.84	238.00	1.05	Vertical	1000000.00	-5.19
9850	54.32	74.00	-19.68	105.00	1.00	Vertical	1000000.00	0.01
10042.63158	55.15	74.00	-18.85	150.00	1.55	Vertical	1000000.00	0.57
10461.57895	54.11	74.00	-19.89	158.00	1.80	Vertical	1000000.00	0.69
10971.57895	55.16	74.00	-18.84	0.00	2.05	Horizontal	1000000.00	0.97
11847.36842	55.03	74.00	-18.97	238.00	2.05	Vertical	1000000.00	2.97
13027.63158	56.58	74.00	-17.42	270.00	3.39	Horizontal	1000000.00	4.24
14415.26316	61.72	74.00	-12.28	187.00	2.95	Vertical	1000000.00	9.52
14616.05263	61.89	74.00	-12.11	172.00	2.60	Vertical	1000000.00	9.69
16144.73684	56.13	74.00	-17.87	0.00	1.15	Vertical	1000000.00	4.20
17460.52632	64.94	74.00	-9.06	47.00	3.98	Horizontal	1000000.00	11.65
17867.10526	64.67	74.00	-9.33	4.00	2.00	Horizontal	1000000.00	14.06

Average (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4923.421053	34.11	54.00	-19.89	41.00	1.20	Horizontal	1000000.00	-10.87
7387.631579	38.38	54.00	-15.62	238.00	1.05	Vertical	1000000.00	-5.19
9850	41.68	54.00	-12.32	105.00	1.00	Vertical	1000000.00	0.01
10042.63158	42.03	54.00	-11.97	150.00	1.55	Vertical	1000000.00	0.57
10461.57895	41.77	54.00	-12.23	158.00	1.80	Vertical	1000000.00	0.69
10971.57895	41.77	54.00	-12.23	0.00	2.05	Horizontal	1000000.00	0.97
11847.36842	43.22	54.00	-10.78	238.00	2.05	Vertical	1000000.00	2.97
13027.63158	43.00	54.00	-11.00	270.00	3.39	Horizontal	1000000.00	4.24
14415.26316	47.77	54.00	-6.23	187.00	2.95	Vertical	1000000.00	9.52
14616.05263	47.75	54.00	-6.25	172.00	2.60	Vertical	1000000.00	9.69
16144.73684	42.47	54.00	-11.53	0.00	1.15	Vertical	1000000.00	4.20
17460.52632	50.89	54.00	-3.11	47.00	3.98	Horizontal	1000000.00	11.65
17867.10526	52.62	54.00	-1.38	4.00	2.00	Horizontal	1000000.00	14.06

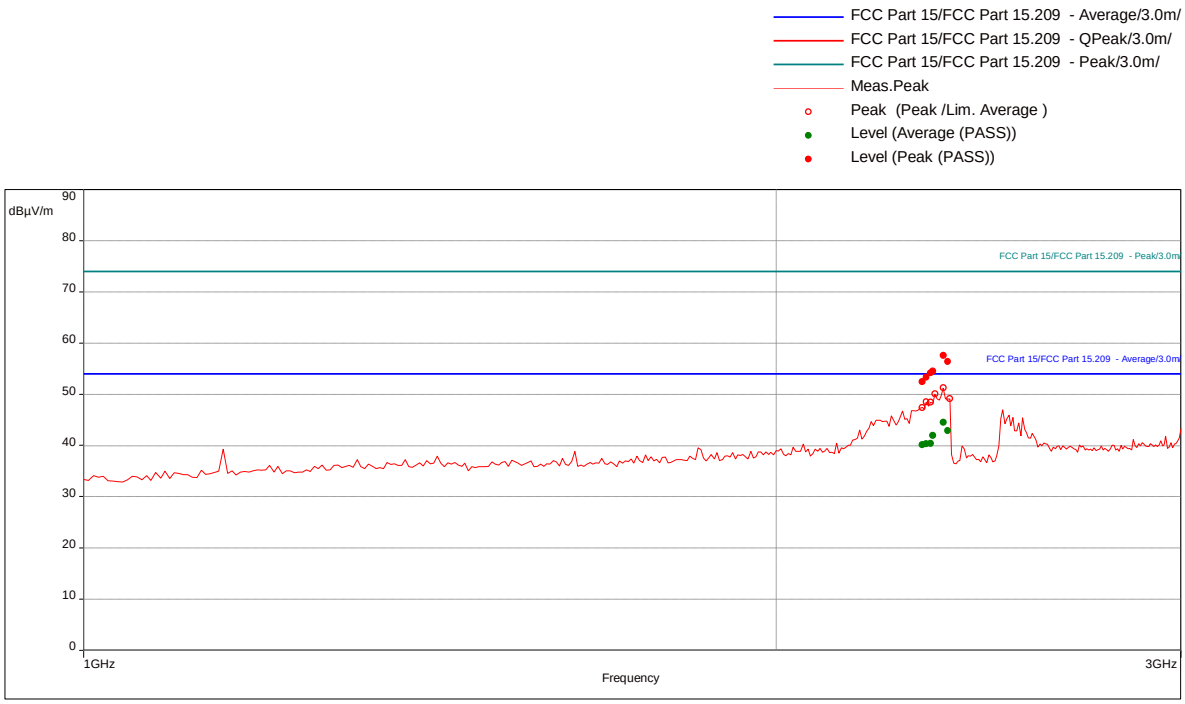
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Y-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/3/2019 6:31:22 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 1 to 3GHz_802.11b (2 Mbps, worst-case), Y-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2313.157895	52.45	74.00	-21.55	202.00	1.50	Horizontal	1000000.00	-20.48
2323.684211	53.27	74.00	-20.73	194.00	1.55	Horizontal	1000000.00	-20.37
2335.526316	54.16	74.00	-19.84	195.00	1.55	Horizontal	1000000.00	-20.24
2341.842105	54.52	74.00	-19.48	201.00	1.80	Horizontal	1000000.00	-20.18
2365	57.56	74.00	-16.44	203.00	1.50	Horizontal	1000000.00	-20.01
2376.315789	56.40	74.00	-17.60	196.00	1.75	Horizontal	1000000.00	-19.95

Average (PASS) (6)

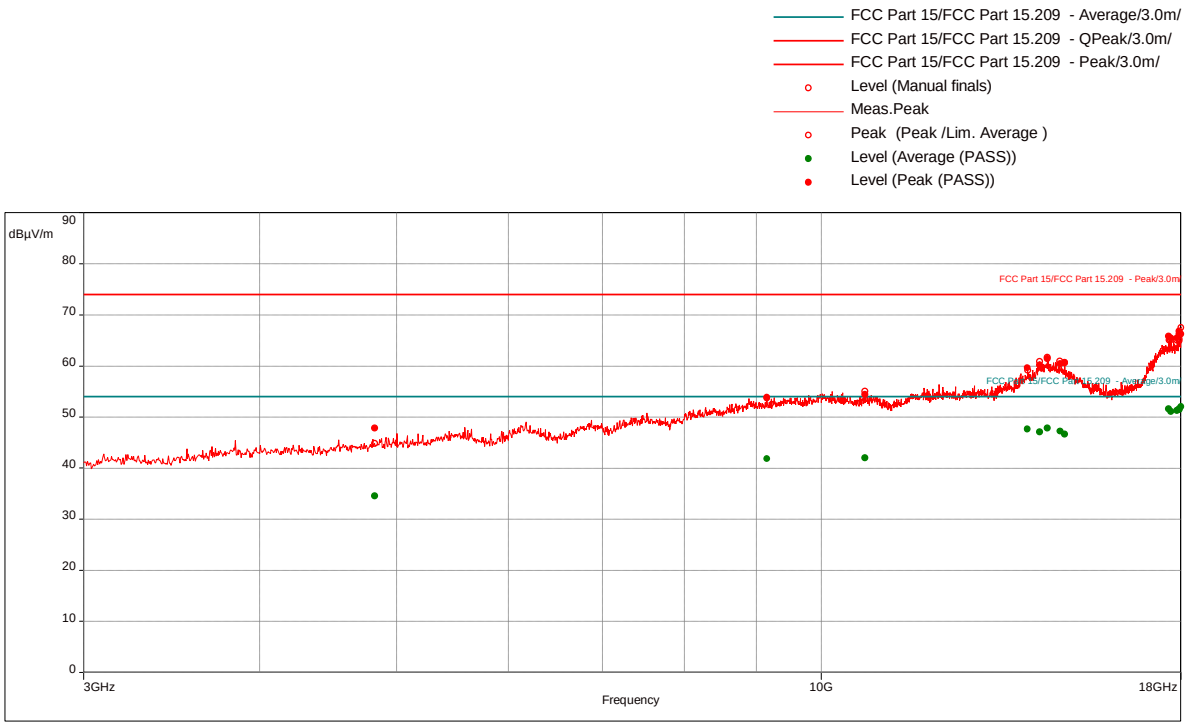
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2313.157895	40.12	54.00	-13.88	202.00	1.50	Horizontal	1000000.00	-20.48
2323.684211	40.33	54.00	-13.67	194.00	1.55	Horizontal	1000000.00	-20.37
2335.526316	40.37	54.00	-13.63	195.00	1.55	Horizontal	1000000.00	-20.24
2341.842105	41.96	54.00	-12.04	201.00	1.80	Horizontal	1000000.00	-20.18
2365	44.50	54.00	-9.50	203.00	1.50	Horizontal	1000000.00	-20.01
2376.315789	42.84	54.00	-11.16	196.00	1.75	Horizontal	1000000.00	-19.95

Low Channel, Y-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/3/2019 6:56:12 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 3 to 18GHz_802.11b (2 Mbps, worst-case), Y-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4824.210526	47.79	74.00	-26.21	195.00	1.80	Vertical	1000000.00	-11.09
9156.842105	53.77	74.00	-20.23	350.00	3.59	Vertical	1000000.00	-1.58
10745.26316	54.38	74.00	-19.62	25.00	3.89	Vertical	1000000.00	0.58
14012.36842	59.65	74.00	-14.35	39.00	3.69	Vertical	1000000.00	7.98
14290.52632	60.17	74.00	-13.83	55.00	1.90	Horizontal	1000000.00	9.16
14481.31579	61.44	74.00	-12.56	151.00	2.25	Horizontal	1000000.00	9.64
14772.89474	60.38	74.00	-13.62	120.00	3.94	Vertical	1000000.00	9.24
14886.84211	60.69	74.00	-13.31	11.00	2.95	Horizontal	1000000.00	8.89
17646.84211	65.79	74.00	-8.21	305.00	2.30	Horizontal	1000000.00	13.04
17704.47368	65.43	74.00	-8.57	230.00	3.54	Horizontal	1000000.00	13.50
17891.57895	65.42	74.00	-8.58	218.00	1.30	Horizontal	1000000.00	14.15
17946.05263	66.83	74.00	-7.17	106.00	2.45	Vertical	1000000.00	14.36
17953.68421	66.19	74.00	-7.81	267.00	1.30	Horizontal	1000000.00	14.39
17999.21053	66.25	74.00	-7.75	77.00	3.25	Horizontal	1000000.00	14.59

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4824.210526	34.53	54.00	-19.47	195.00	1.80	Vertical	1000000.00	-11.09
9156.842105	41.85	54.00	-12.15	350.00	3.59	Vertical	1000000.00	-1.58
10745.26316	42.03	54.00	-11.97	25.00	3.89	Vertical	1000000.00	0.58
14012.36842	47.67	54.00	-6.33	39.00	3.69	Vertical	1000000.00	7.98
14290.52632	47.04	54.00	-6.96	55.00	1.90	Horizontal	1000000.00	9.16
14481.31579	47.86	54.00	-6.14	151.00	2.25	Horizontal	1000000.00	9.64
14772.89474	47.21	54.00	-6.79	120.00	3.94	Vertical	1000000.00	9.24
14886.84211	46.67	54.00	-7.33	11.00	2.95	Horizontal	1000000.00	8.89
17646.84211	51.61	54.00	-2.39	305.00	2.30	Horizontal	1000000.00	13.04
17704.47368	51.08	54.00	-2.92	230.00	3.54	Horizontal	1000000.00	13.50
17891.57895	51.27	54.00	-2.73	218.00	1.30	Horizontal	1000000.00	14.15
17946.05263	51.42	54.00	-2.58	106.00	2.45	Vertical	1000000.00	14.36
17953.68421	51.59	54.00	-2.41	267.00	1.30	Horizontal	1000000.00	14.39
17999.21053	52.03	54.00	-1.97	77.00	3.25	Horizontal	1000000.00	14.59

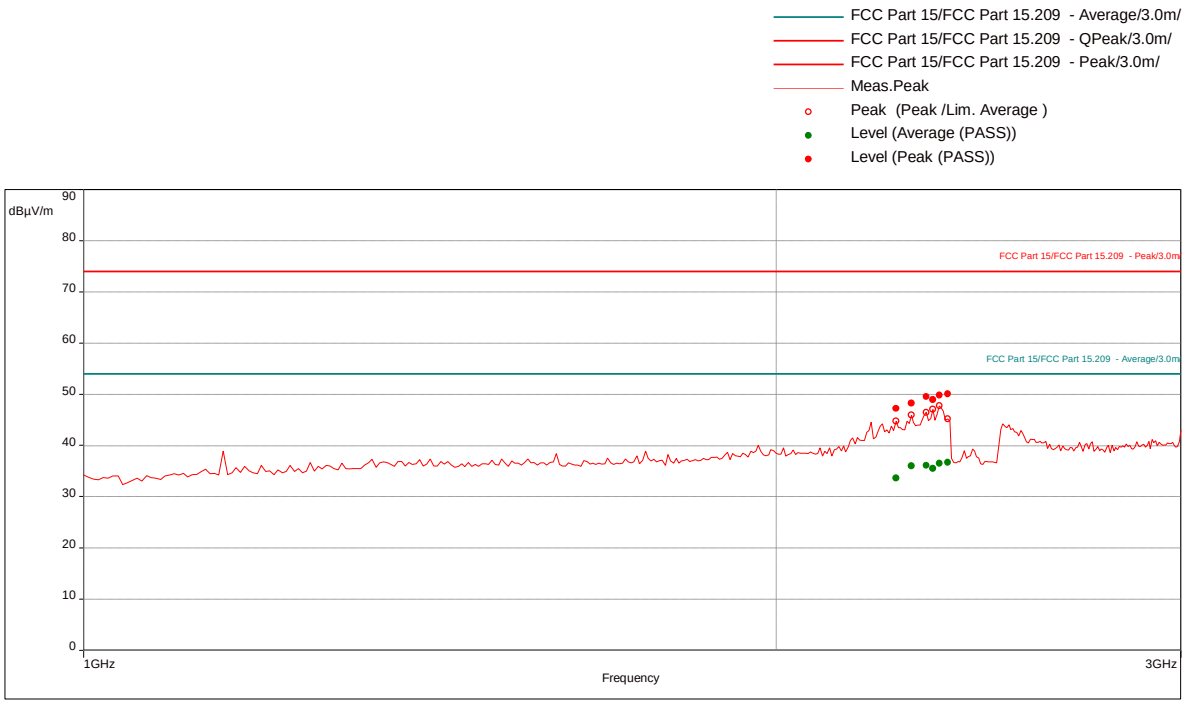
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Z-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/3/2019 8:58:25 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 1 to 3GHz_802.11b (2 Mbps, worst-case), Z-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2253.421053	47.24	74.00	-26.76	224.00	1.15	Vertical	1000000.00	-20.79
2291.052632	48.24	74.00	-25.76	225.00	1.10	Vertical	1000000.00	-20.66
2325.789474	49.54	74.00	-24.46	218.00	1.01	Vertical	1000000.00	-20.35
2340.789474	48.95	74.00	-25.05	238.00	1.46	Vertical	1000000.00	-20.19
2356.052632	49.83	74.00	-24.17	225.00	1.20	Vertical	1000000.00	-20.06
2376.578947	50.02	74.00	-23.98	143.00	1.65	Vertical	1000000.00	-19.95

Average (PASS) (6)

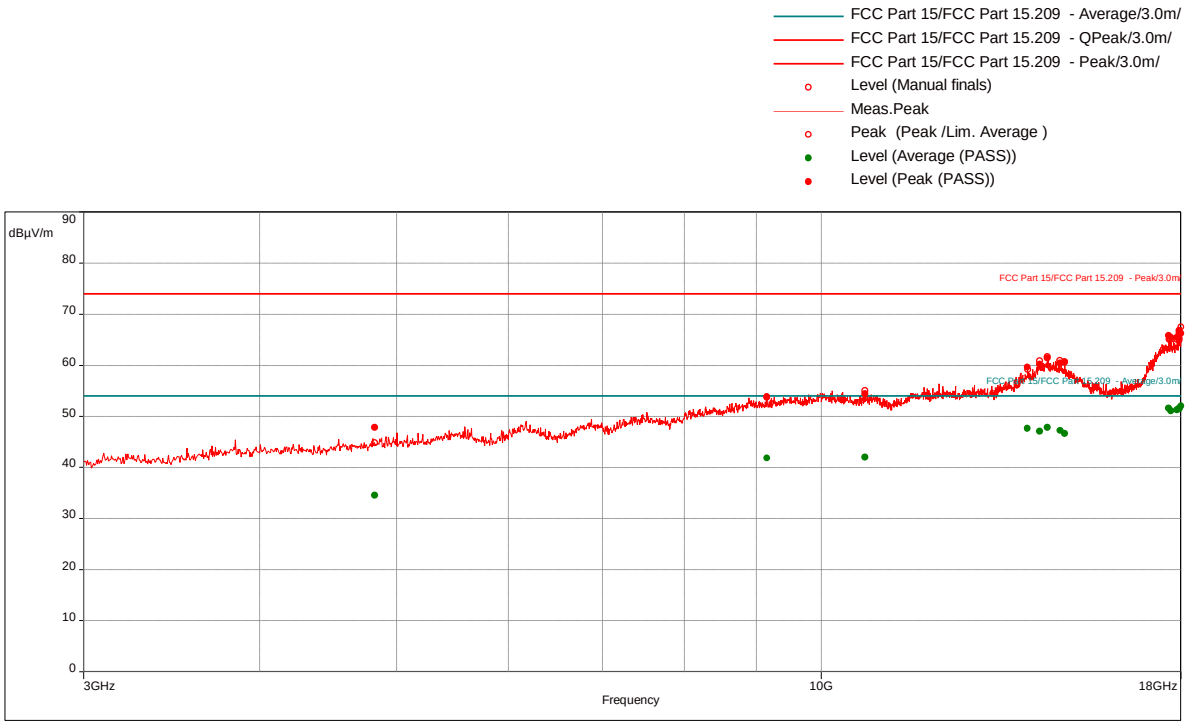
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2253.421053	33.66	54.00	-20.34	224.00	1.15	Vertical	1000000.00	-20.79
2291.052632	36.04	54.00	-17.96	225.00	1.10	Vertical	1000000.00	-20.66
2325.789474	36.15	54.00	-17.85	218.00	1.01	Vertical	1000000.00	-20.35
2340.789474	35.53	54.00	-18.47	238.00	1.46	Vertical	1000000.00	-20.19
2356.052632	36.51	54.00	-17.49	225.00	1.20	Vertical	1000000.00	-20.06
2376.578947	36.74	54.00	-17.26	143.00	1.65	Vertical	1000000.00	-19.95

Low Channel, Z-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/3/2019 6:56:12 PM
Client and Project Number	iRobot
Engineer	Vathana Ven
Temperature	22C
Humidity	69%
Atmospheric Pressure	1007mbar
Comments	RE 3 to 18GHz_802.11b (2 Mbps, worst-case), Z-Axis, Tx @ Low CH

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4824.210526	47.79	74.00	-26.21	195.00	1.80	Vertical	1000000.00	-11.09
9156.842105	53.77	74.00	-20.23	350.00	3.59	Vertical	1000000.00	-1.58
10745.26316	54.38	74.00	-19.62	25.00	3.89	Vertical	1000000.00	0.58
14012.36842	59.65	74.00	-14.35	39.00	3.69	Vertical	1000000.00	7.98
14290.52632	60.17	74.00	-13.83	55.00	1.90	Horizontal	1000000.00	9.16
14481.31579	61.44	74.00	-12.56	151.00	2.25	Horizontal	1000000.00	9.64
14772.89474	60.38	74.00	-13.62	120.00	3.94	Vertical	1000000.00	9.24
14886.84211	60.69	74.00	-13.31	11.00	2.95	Horizontal	1000000.00	8.89
17646.84211	65.79	74.00	-8.21	305.00	2.30	Horizontal	1000000.00	13.04
17704.47368	65.43	74.00	-8.57	230.00	3.54	Horizontal	1000000.00	13.50
17891.57895	65.42	74.00	-8.58	218.00	1.30	Horizontal	1000000.00	14.15
17946.05263	66.83	74.00	-7.17	106.00	2.45	Vertical	1000000.00	14.36
17953.68421	66.19	74.00	-7.81	267.00	1.30	Horizontal	1000000.00	14.39
17999.21053	66.25	74.00	-7.75	77.00	3.25	Horizontal	1000000.00	14.59

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4824.210526	34.53	54.00	-19.47	195.00	1.80	Vertical	1000000.00	-11.09
9156.842105	41.85	54.00	-12.15	350.00	3.59	Vertical	1000000.00	-1.58
10745.26316	42.03	54.00	-11.97	25.00	3.89	Vertical	1000000.00	0.58
14012.36842	47.67	54.00	-6.33	39.00	3.69	Vertical	1000000.00	7.98
14290.52632	47.04	54.00	-6.96	55.00	1.90	Horizontal	1000000.00	9.16
14481.31579	47.86	54.00	-6.14	151.00	2.25	Horizontal	1000000.00	9.64
14772.89474	47.21	54.00	-6.79	120.00	3.94	Vertical	1000000.00	9.24
14886.84211	46.67	54.00	-7.33	11.00	2.95	Horizontal	1000000.00	8.89
17646.84211	51.61	54.00	-2.39	305.00	2.30	Horizontal	1000000.00	13.04
17704.47368	51.08	54.00	-2.92	230.00	3.54	Horizontal	1000000.00	13.50
17891.57895	51.27	54.00	-2.73	218.00	1.30	Horizontal	1000000.00	14.15
17946.05263	51.42	54.00	-2.58	106.00	2.45	Vertical	1000000.00	14.36
17953.68421	51.59	54.00	-2.41	267.00	1.30	Horizontal	1000000.00	14.39
17999.21053	52.03	54.00	-1.97	77.00	3.25	Horizontal	1000000.00	14.59

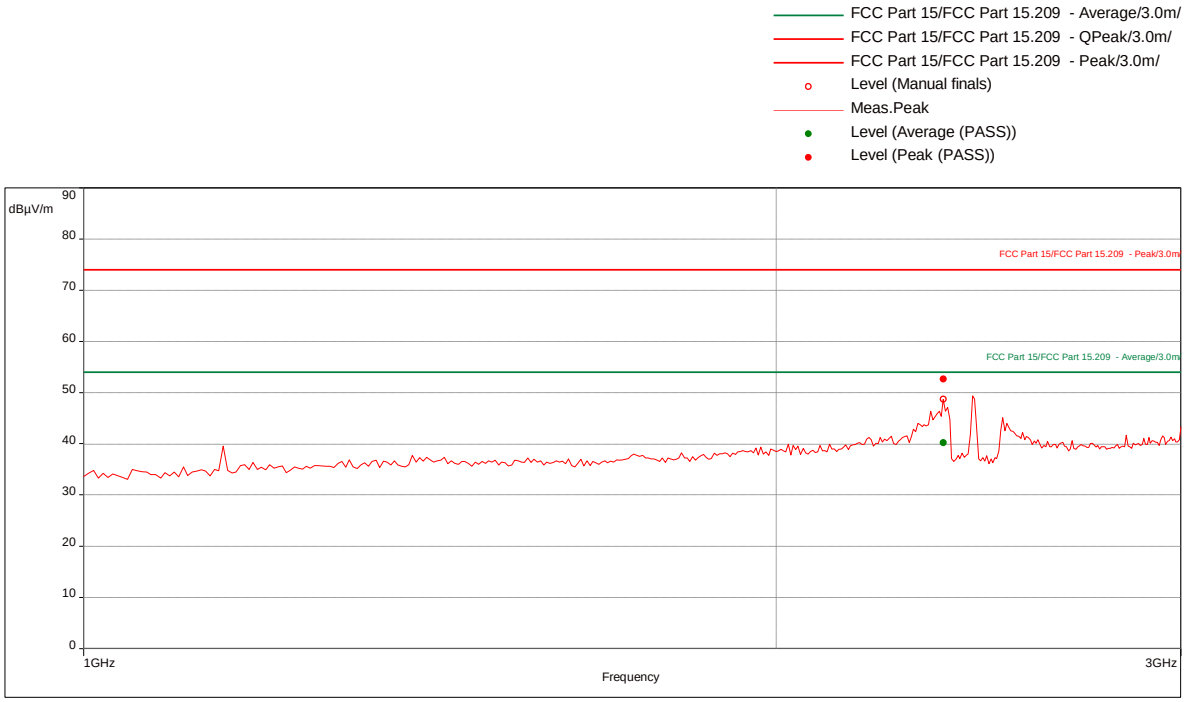
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, X-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 11:58:21 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), EUT on its back X-axis, Tx @ Mid CH: 2437 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2365	52.64	74.00	-21.36	158.00	1.40	Horizontal	1000000.00	-20.01

Average (PASS) (1)

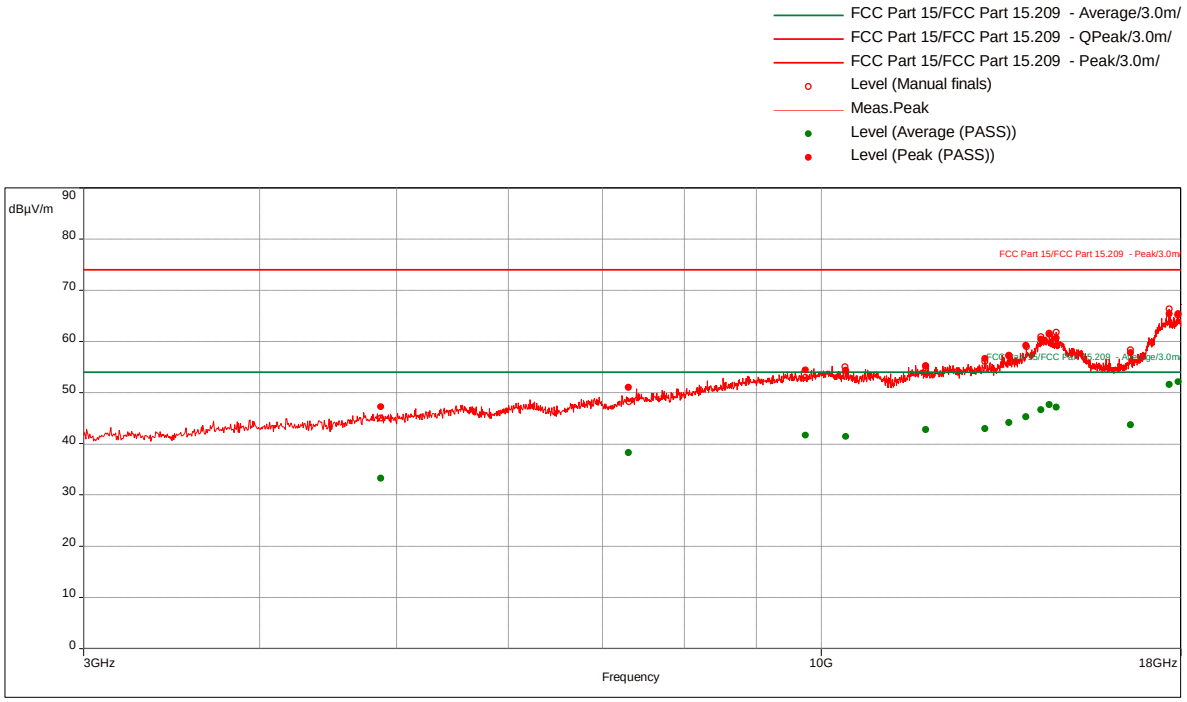
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2365	40.23	54.00	-13.77	158.00	1.40	Horizontal	1000000.00	-20.01

Mid Channel, X-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 10:57:51 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3 to 18 GHz_802.11b (2Mbps, worst-case), EUT on its back X-axis, Tx @ Mid CH: 2437 MHz

Graph:



Results:

Peak (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4875.526316	47.22	74.00	-26.78	164.00	3.64	Vertical	1000000.00	-10.93
7306.052632	51.00	74.00	-23.00	121.00	3.25	Horizontal	1000000.00	-5.39
9749.473684	54.41	74.00	-19.59	157.00	2.35	Vertical	1000000.00	-0.30
10407.89474	54.37	74.00	-19.63	350.00	3.98	Vertical	1000000.00	0.70
11862.89474	55.21	74.00	-18.79	4.00	1.50	Vertical	1000000.00	3.01
13063.94737	56.68	74.00	-17.32	39.00	1.45	Vertical	1000000.00	4.34
13589.73684	57.28	74.00	-16.72	283.00	1.25	Vertical	1000000.00	6.01
13982.10526	59.20	74.00	-14.80	187.00	2.70	Vertical	1000000.00	7.80
14324.47368	60.39	74.00	-13.61	283.00	2.60	Horizontal	1000000.00	9.25
14520.52632	61.38	74.00	-12.62	173.00	3.89	Horizontal	1000000.00	9.71
14681.05263	60.67	74.00	-13.33	47.00	2.30	Horizontal	1000000.00	9.53
16586.57895	57.72	74.00	-16.28	32.00	1.95	Horizontal	1000000.00	5.24
17649.21053	65.40	74.00	-8.60	48.00	3.69	Horizontal	1000000.00	13.06
17919.47368	65.39	74.00	-8.61	158.00	2.50	Vertical	1000000.00	14.25

Average (PASS) (14)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4875.526316	33.30	54.00	-20.70	164.00	3.64	Vertical	1000000.00	-10.93
7306.052632	38.26	54.00	-15.74	121.00	3.25	Horizontal	1000000.00	-5.39
9749.473684	41.65	54.00	-12.35	157.00	2.35	Vertical	1000000.00	-0.30
10407.89474	41.38	54.00	-12.62	350.00	3.98	Vertical	1000000.00	0.70
11862.89474	42.80	54.00	-11.20	4.00	1.50	Vertical	1000000.00	3.01
13063.94737	42.92	54.00	-11.08	39.00	1.45	Vertical	1000000.00	4.34
13589.73684	44.14	54.00	-9.86	283.00	1.25	Vertical	1000000.00	6.01
13982.10526	45.26	54.00	-8.74	187.00	2.70	Vertical	1000000.00	7.80
14324.47368	46.67	54.00	-7.33	283.00	2.60	Horizontal	1000000.00	9.25
14520.52632	47.64	54.00	-6.36	173.00	3.89	Horizontal	1000000.00	9.71
14681.05263	47.13	54.00	-6.87	47.00	2.30	Horizontal	1000000.00	9.53
16586.57895	43.72	54.00	-10.28	32.00	1.95	Horizontal	1000000.00	5.24
17649.21053	51.56	54.00	-2.44	48.00	3.69	Horizontal	1000000.00	13.06
17919.47368	52.09	54.00	-1.91	158.00	2.50	Vertical	1000000.00	14.25

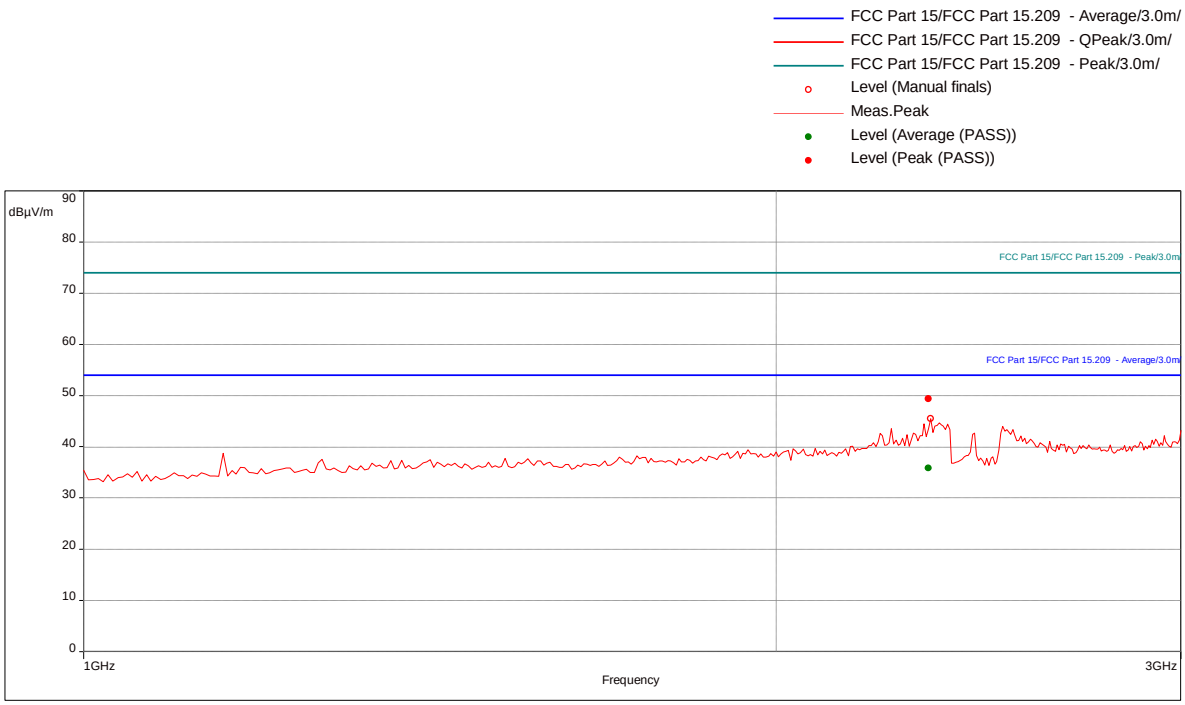
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, Y-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 9:24:21 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1 to 3 GHz_802.11b (2Mbps, worst-case), EUT on its short side Y-axis, Tx @ Mid CH: 2437 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2331.842105	49.34	74.00	-24.66	194.00	1.45	Horizontal	1000000.00	-20.28

Average (PASS) (1)

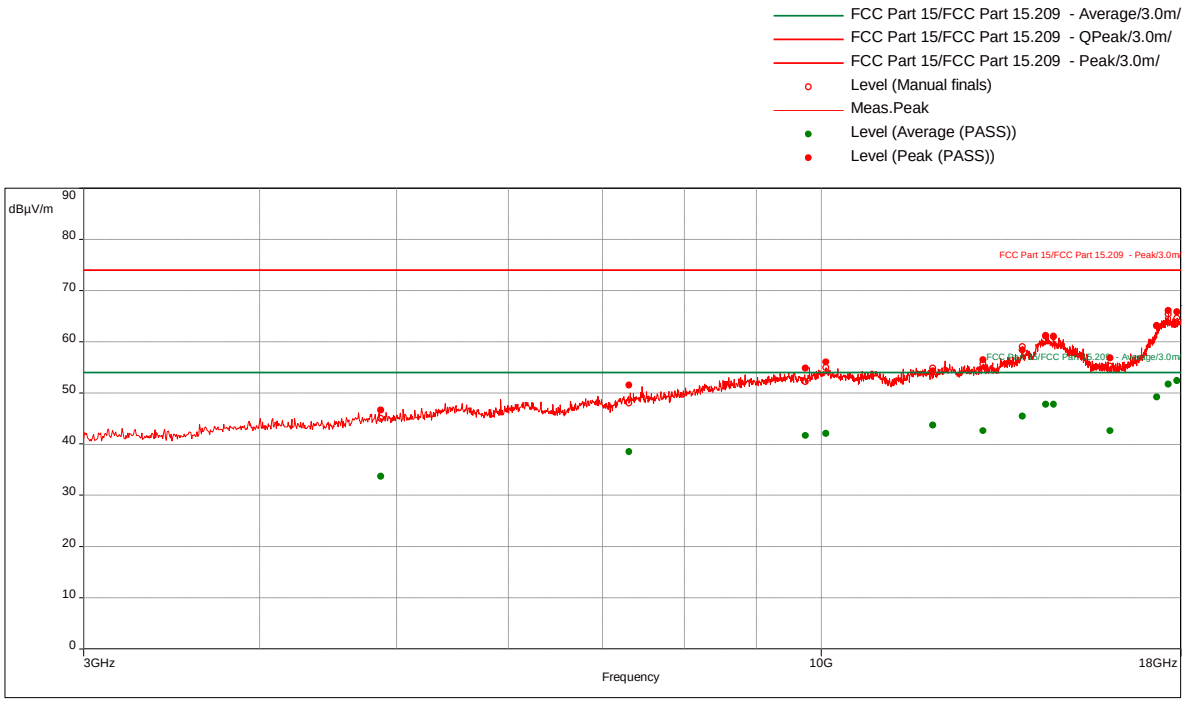
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2331.842105	35.82	54.00	-18.18	194.00	1.45	Horizontal	1000000.00	-20.28

Mid Channel, Y-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 9:48:21 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3 to 18 GHz_802.11b (2Mbps, worst-case), EUT on its short side Y-axis, Tx @ Mid CH: 2437 MHz

Graph:



Results:

Peak (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4874.473684	46.60	74.00	-27.40	252.00	3.84	Horizontal	1000000.00	-10.93
7312.368421	51.53	74.00	-22.47	245.00	1.75	Horizontal	1000000.00	-5.37
9749.473684	54.80	74.00	-19.20	0.00	1.95	Horizontal	1000000.00	-0.30
10080.78947	56.00	74.00	-18.00	357.00	3.64	Horizontal	1000000.00	0.64
12000.52632	54.22	74.00	-19.78	25.00	1.50	Vertical	1000000.00	3.21
13030.52632	56.45	74.00	-17.55	210.00	1.01	Horizontal	1000000.00	4.25
13898.94737	58.34	74.00	-15.66	47.00	1.41	Vertical	1000000.00	7.33
14431.84211	61.08	74.00	-12.92	10.00	1.45	Horizontal	1000000.00	9.55
14622.63158	60.95	74.00	-13.05	282.00	2.40	Horizontal	1000000.00	9.68
16031.57895	56.81	74.00	-17.19	222.00	3.00	Horizontal	1000000.00	4.33
17308.68421	63.18	74.00	-10.82	274.00	2.45	Horizontal	1000000.00	10.42
17627.63158	66.03	74.00	-7.97	4.00	1.05	Horizontal	1000000.00	12.87
17884.47368	65.79	74.00	-8.21	47.00	1.25	Vertical	1000000.00	14.12

Average (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4874.473684	33.71	54.00	-20.29	252.00	3.84	Horizontal	1000000.00	-10.93
7312.368421	38.49	54.00	-15.51	245.00	1.75	Horizontal	1000000.00	-5.37
9749.473684	41.68	54.00	-12.32	0.00	1.95	Horizontal	1000000.00	-0.30
10080.78947	42.08	54.00	-11.92	357.00	3.64	Horizontal	1000000.00	0.64
12000.52632	43.73	54.00	-10.27	25.00	1.50	Vertical	1000000.00	3.21
13030.52632	42.63	54.00	-11.37	210.00	1.01	Horizontal	1000000.00	4.25
13898.94737	45.41	54.00	-8.59	47.00	1.41	Vertical	1000000.00	7.33
14431.84211	47.79	54.00	-6.21	10.00	1.45	Horizontal	1000000.00	9.55
14622.63158	47.72	54.00	-6.28	282.00	2.40	Horizontal	1000000.00	9.68
16031.57895	42.59	54.00	-11.41	222.00	3.00	Horizontal	1000000.00	4.33
17308.68421	49.23	54.00	-4.77	274.00	2.45	Horizontal	1000000.00	10.42
17627.63158	51.69	54.00	-2.31	4.00	1.05	Horizontal	1000000.00	12.87
17884.47368	52.38	54.00	-1.62	47.00	1.25	Vertical	1000000.00	14.12

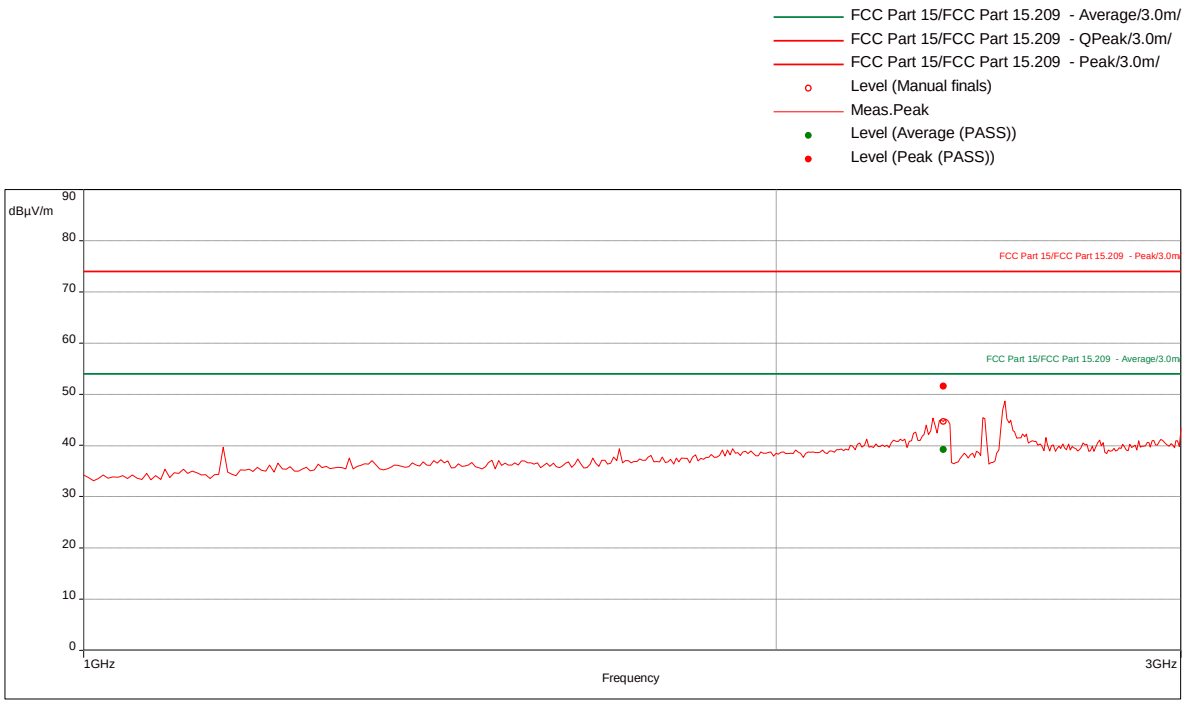
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, X-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 12:17:02 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2363.947368	51.61	74.00	-22.39	136.00	1.80	Horizontal	1000000.00	-20.02

Average (PASS) (1)

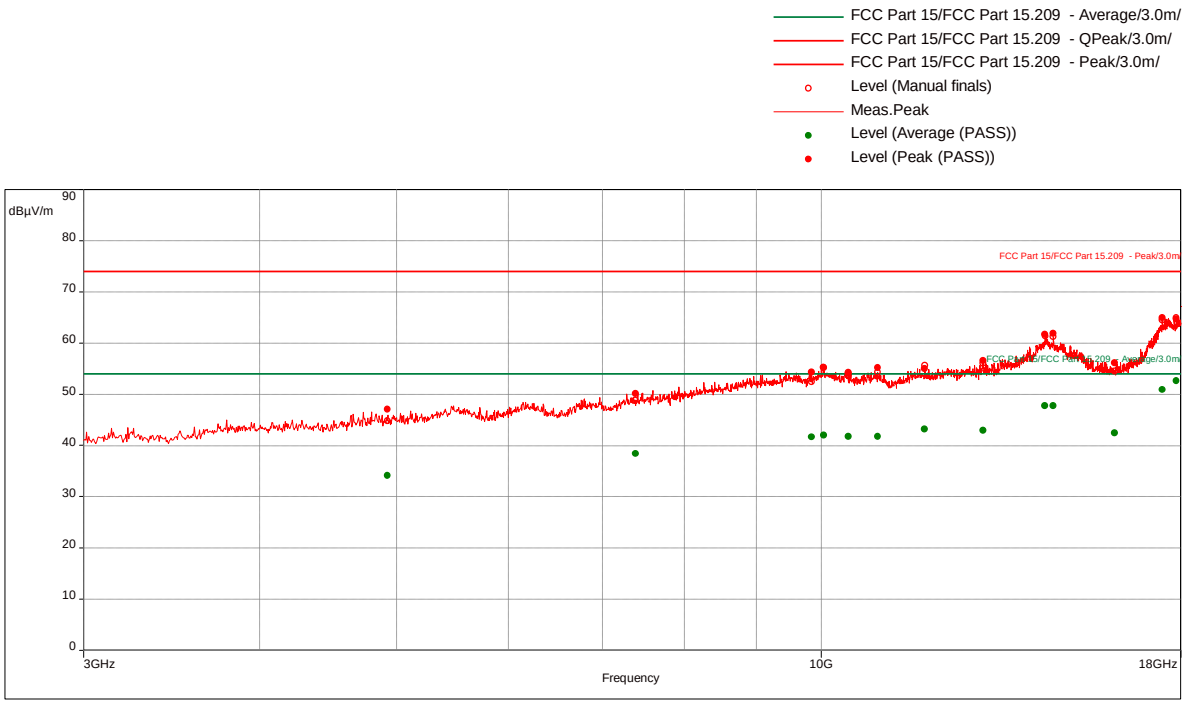
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2363.947368	39.16	54.00	-14.84	136.00	1.80	Horizontal	1000000.00	-20.02

High Channel, X-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 12:27:06 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11b (2Mbps, worst-case), X-axis, Tx @ High CH

Graph:



Results:

Peak (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4923.421053	47.03	74.00	-26.97	41.00	1.20	Horizontal	1000000.00	-10.87
7387.631579	50.16	74.00	-23.84	238.00	1.05	Vertical	1000000.00	-5.19
9850	54.32	74.00	-19.68	105.00	1.00	Vertical	1000000.00	0.01
10042.63158	55.15	74.00	-18.85	150.00	1.55	Vertical	1000000.00	0.57
10461.57895	54.11	74.00	-19.89	158.00	1.80	Vertical	1000000.00	0.69
10971.57895	55.16	74.00	-18.84	0.00	2.05	Horizontal	1000000.00	0.97
11847.36842	55.03	74.00	-18.97	238.00	2.05	Vertical	1000000.00	2.97
13027.63158	56.58	74.00	-17.42	270.00	3.39	Horizontal	1000000.00	4.24
14415.26316	61.72	74.00	-12.28	187.00	2.95	Vertical	1000000.00	9.52
14616.05263	61.89	74.00	-12.11	172.00	2.60	Vertical	1000000.00	9.69
16144.73684	56.13	74.00	-17.87	0.00	1.15	Vertical	1000000.00	4.20
17460.52632	64.94	74.00	-9.06	47.00	3.98	Horizontal	1000000.00	11.65
17867.10526	64.67	74.00	-9.33	4.00	2.00	Horizontal	1000000.00	14.06

Average (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4923.421053	34.11	54.00	-19.89	41.00	1.20	Horizontal	1000000.00	-10.87
7387.631579	38.38	54.00	-15.62	238.00	1.05	Vertical	1000000.00	-5.19
9850	41.68	54.00	-12.32	105.00	1.00	Vertical	1000000.00	0.01
10042.63158	42.03	54.00	-11.97	150.00	1.55	Vertical	1000000.00	0.57
10461.57895	41.77	54.00	-12.23	158.00	1.80	Vertical	1000000.00	0.69
10971.57895	41.77	54.00	-12.23	0.00	2.05	Horizontal	1000000.00	0.97
11847.36842	43.22	54.00	-10.78	238.00	2.05	Vertical	1000000.00	2.97
13027.63158	43.00	54.00	-11.00	270.00	3.39	Horizontal	1000000.00	4.24
14415.26316	47.77	54.00	-6.23	187.00	2.95	Vertical	1000000.00	9.52
14616.05263	47.75	54.00	-6.25	172.00	2.60	Vertical	1000000.00	9.69
16144.73684	42.47	54.00	-11.53	0.00	1.15	Vertical	1000000.00	4.20
17460.52632	50.89	54.00	-3.11	47.00	3.98	Horizontal	1000000.00	11.65
17867.10526	52.62	54.00	-1.38	4.00	2.00	Horizontal	1000000.00	14.06

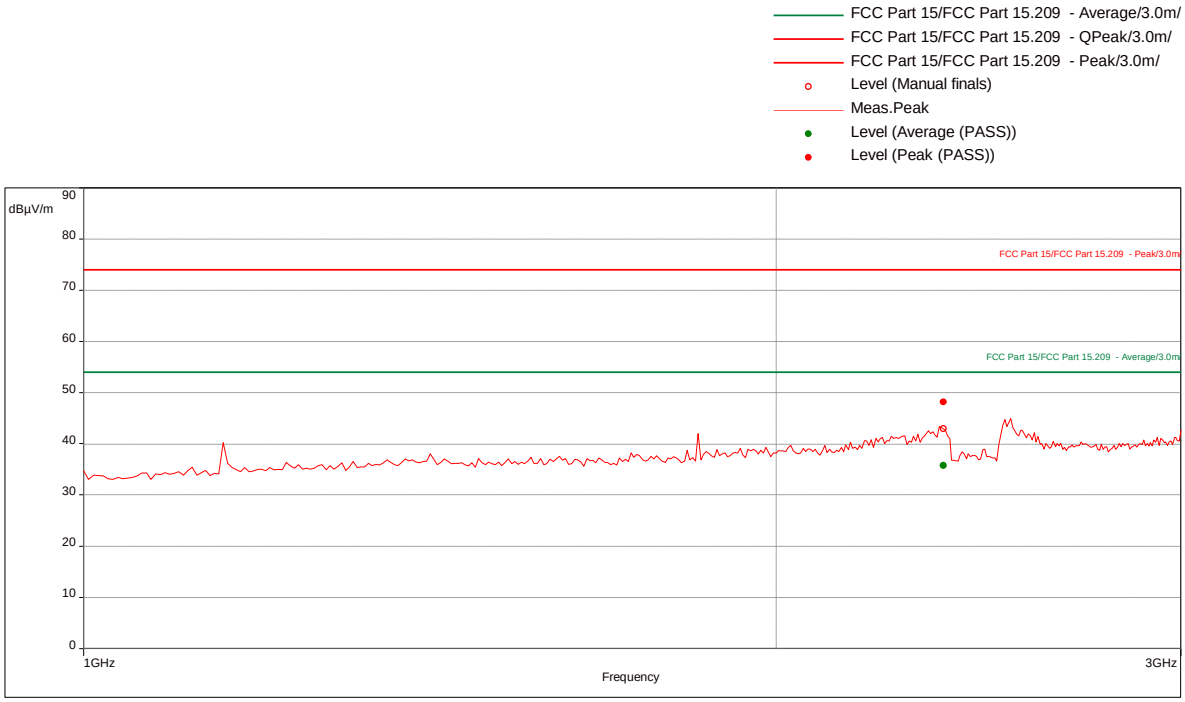
Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, Y-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 2:19:04 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), EUT on its short side Y-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2365.263158	48.14	74.00	-25.86	194.00	1.55	Horizontal	1000000.00	-20.01

Average (PASS) (1)

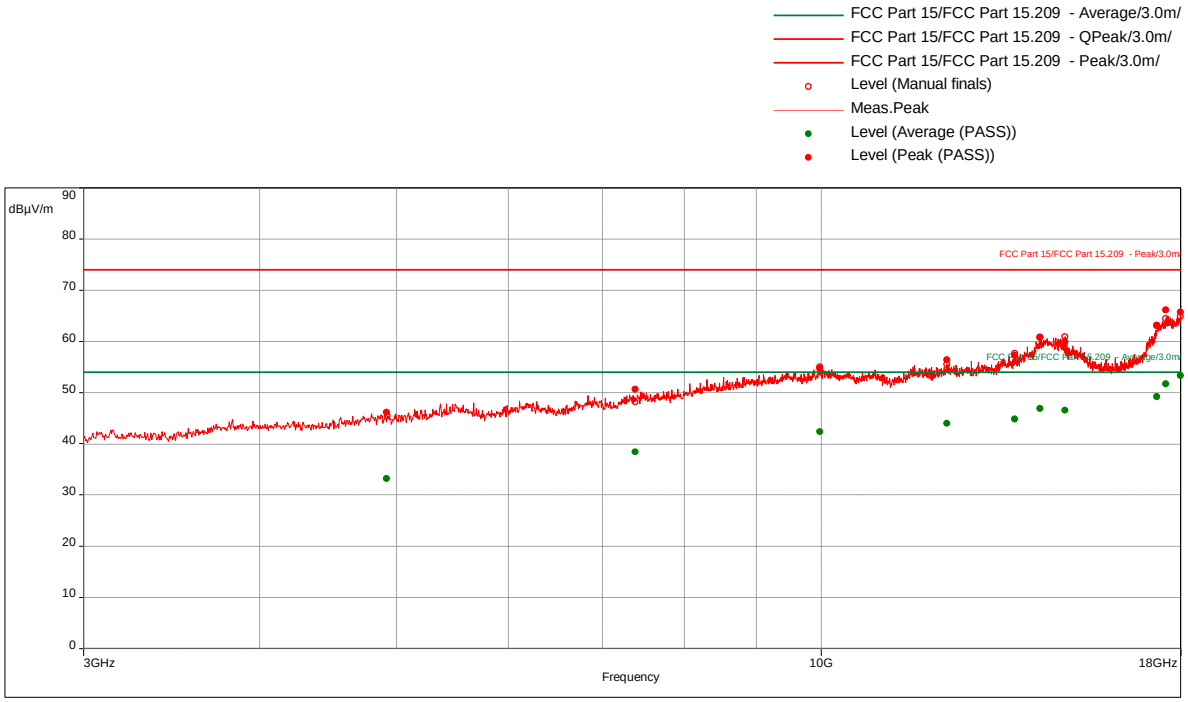
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2365.263158	35.73	54.00	-18.27	194.00	1.55	Horizontal	1000000.00	-20.01

High Channel, Y-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 1:26:38 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	3-18 GHz_802.11b (2Mbps, worst-case), EUT on its short side Y-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (10)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4921.052632	46.15	74.00	-27.85	350.00	1.40	Horizontal	1000000.00	-10.87
7386.315789	50.68	74.00	-23.32	11.00	2.15	Vertical	1000000.00	-5.20
9982.105263	54.71	74.00	-19.29	291.00	1.55	Horizontal	1000000.00	0.40
12284.73684	56.38	74.00	-17.62	165.00	2.85	Vertical	1000000.00	3.35
13719.73684	57.25	74.00	-16.75	297.00	3.00	Vertical	1000000.00	6.37
14296.57895	60.84	74.00	-13.16	150.00	1.00	Vertical	1000000.00	9.17
14892.63158	59.87	74.00	-14.13	180.00	3.49	Vertical	1000000.00	8.87
17308.15789	63.17	74.00	-10.83	121.00	2.00	Horizontal	1000000.00	10.42
17558.94737	66.15	74.00	-7.85	320.00	3.20	Horizontal	1000000.00	12.35
17990	65.69	74.00	-8.31	32.00	3.10	Horizontal	1000000.00	14.55

Average (PASS) (10)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4921.052632	33.24	54.00	-20.76	350.00	1.40	Horizontal	1000000.00	-10.87
7386.315789	38.38	54.00	-15.62	11.00	2.15	Vertical	1000000.00	-5.20
9982.105263	42.34	54.00	-11.66	291.00	1.55	Horizontal	1000000.00	0.40
12284.73684	43.94	54.00	-10.06	165.00	2.85	Vertical	1000000.00	3.35
13719.73684	44.80	54.00	-9.20	297.00	3.00	Vertical	1000000.00	6.37
14296.57895	46.90	54.00	-7.10	150.00	1.00	Vertical	1000000.00	9.17
14892.63158	46.56	54.00	-7.44	180.00	3.49	Vertical	1000000.00	8.87
17308.15789	49.20	54.00	-4.80	121.00	2.00	Horizontal	1000000.00	10.42
17558.94737	51.70	54.00	-2.30	320.00	3.20	Horizontal	1000000.00	12.35
17990	53.29	54.00	-0.71	32.00	3.10	Horizontal	1000000.00	14.55

Notes: From 18-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, Z-Axis, 802.11b, 1 to 3 GHz

Test Information:

Date and Time	9/4/2019 2:27:42 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), EUT on its long side Z-axis, Tx @ High CH: 2462 MHz

Graph:

Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2511.315789	48.86	74.00	-25.14	210.00	1.50	Vertical	1000000.00	-19.38

Average (PASS) (1)

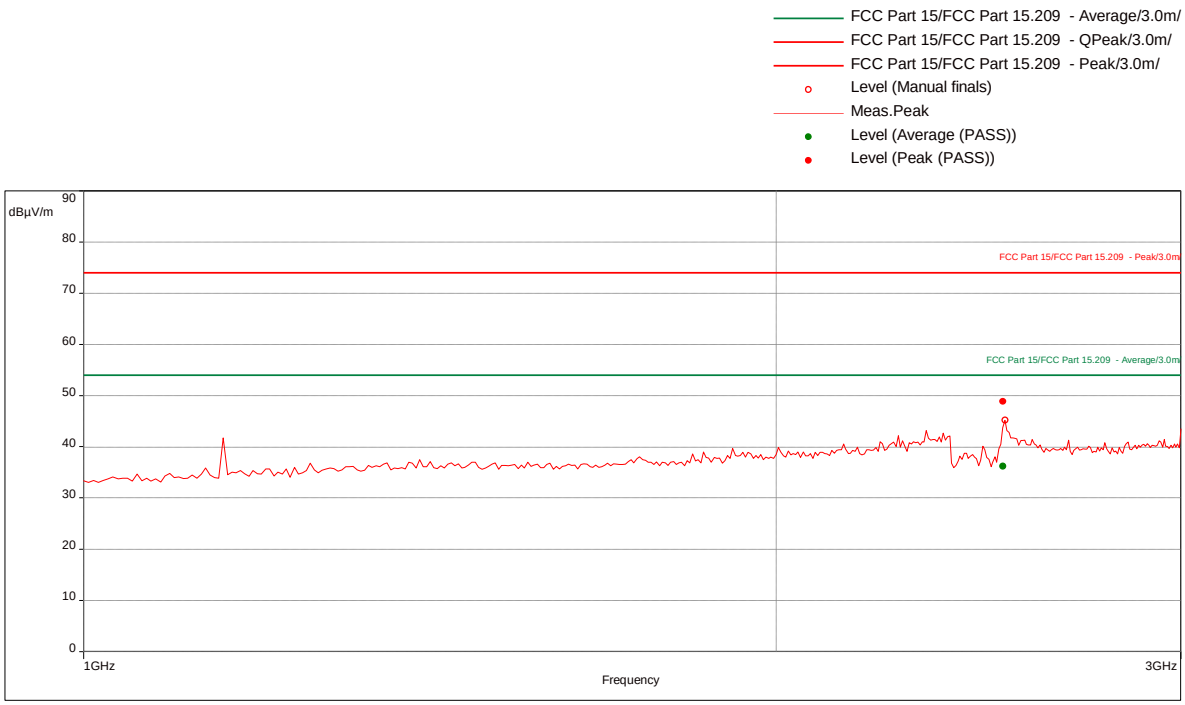
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2511.315789	36.20	54.00	-17.80	210.00	1.50	Vertical	1000000.00	-19.38

High Channel, Z-Axis, 802.11b, 3 to 18 GHz

Test Information:

Date and Time	9/4/2019 2:27:42 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	63%
Atmospheric Pressure	1005mbar
Comments	1-3 GHz_802.11b (2Mbps, worst-case), EUT on its long side Z-axis, Tx @ High CH: 2462 MHz

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2511.315789	48.86	74.00	-25.14	210.00	1.50	Vertical	1000000.00	-19.38

Average (PASS) (1)

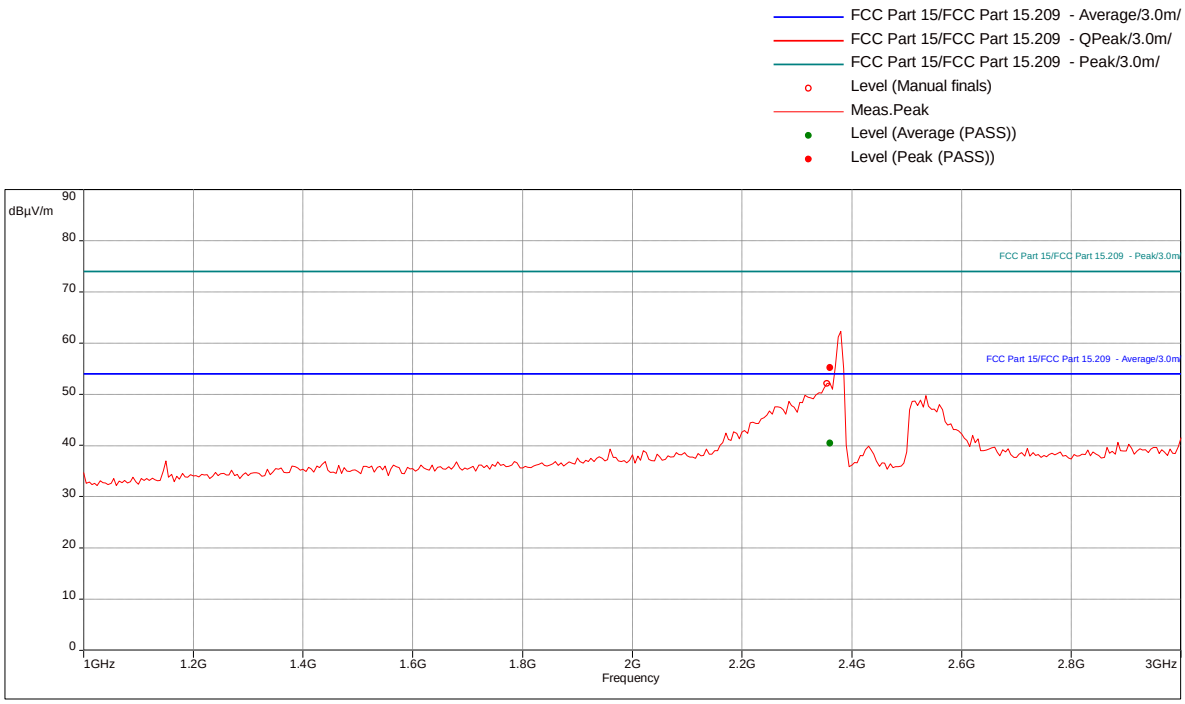
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2511.315789	36.20	54.00	-17.80	210.00	1.50	Vertical	1000000.00	-19.38

Low Channel, X-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 4:10:46 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Low Ch (3)_2422 MHz_Flat_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2358.421053	55.17	74.00	-18.83	166.00	1.55	Horizontal	1000000.00	-20.05

Average (PASS) (1)

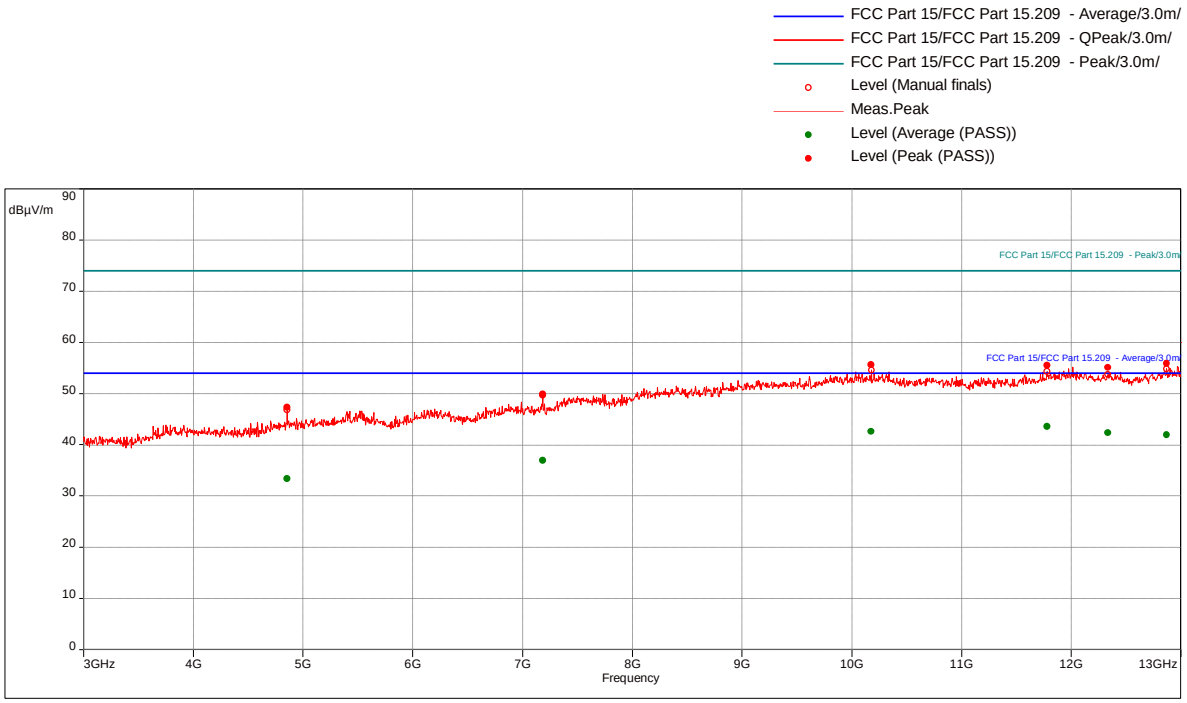
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2358.421053	40.45	54.00	-13.55	166.00	1.55	Horizontal	1000000.00	-20.05

Low Channel, X-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 1:52:21 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Low Ch (3)_2422 MHz_Flat_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4855.526316	47.33	74.00	-26.67	268.00	1.55	Horizontal	1000000.00	-10.95
7186.578947	49.91	74.00	-24.09	91.00	3.98	Horizontal	1000000.00	-6.02
10177.36842	55.58	74.00	-18.42	290.00	3.05	Vertical	1000000.00	0.71
11778.94737	55.50	74.00	-18.50	108.00	1.65	Vertical	1000000.00	2.75
12334.21053	55.14	74.00	-18.86	91.00	1.10	Horizontal	1000000.00	3.40
12870.52632	55.88	74.00	-18.12	359.00	2.15	Horizontal	1000000.00	3.85

Average (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4855.526316	33.41	54.00	-20.59	268.00	1.55	Horizontal	1000000.00	-10.95
7186.578947	36.98	54.00	-17.02	91.00	3.98	Horizontal	1000000.00	-6.02
10177.36842	42.63	54.00	-11.37	290.00	3.05	Vertical	1000000.00	0.71
11778.94737	43.51	54.00	-10.49	108.00	1.65	Vertical	1000000.00	2.75
12334.21053	42.34	54.00	-11.66	91.00	1.10	Horizontal	1000000.00	3.40
12870.52632	41.91	54.00	-12.09	359.00	2.15	Horizontal	1000000.00	3.85

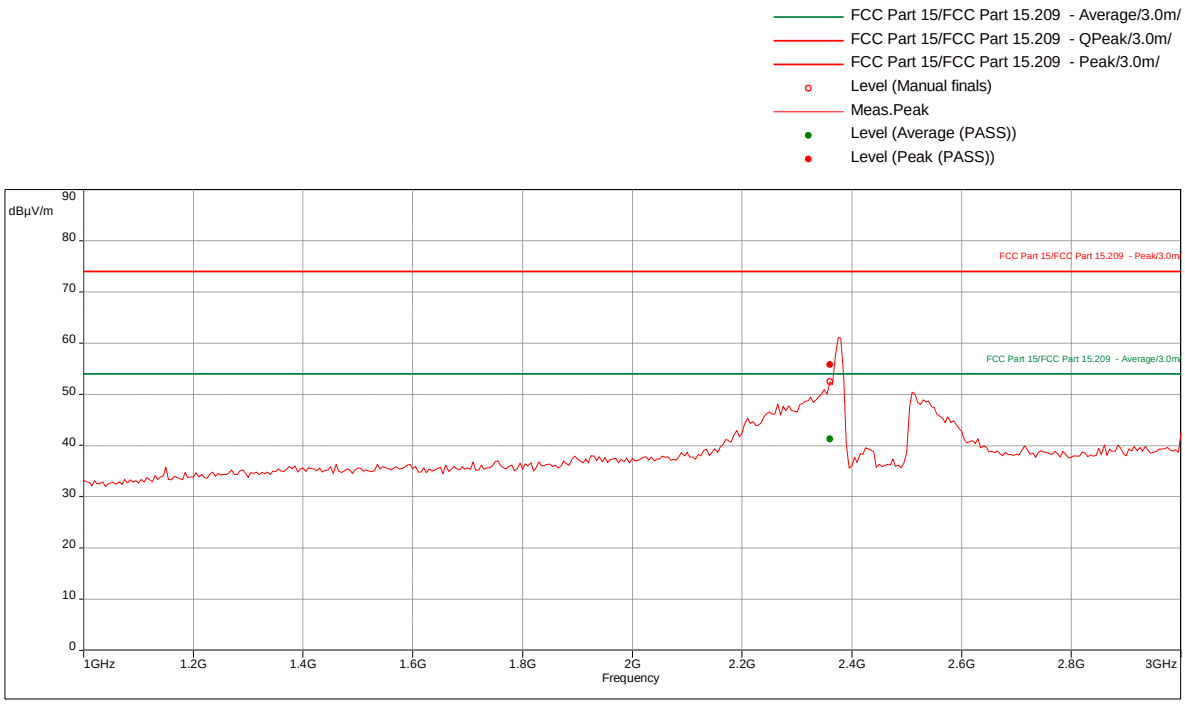
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Y-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 4:25:31 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Low Ch (3)_2422 MHz_long side_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2359.736842	55.79	74.00	-18.21	142.00	1.05	Vertical	1000000.00	-20.04

Average (PASS) (1)

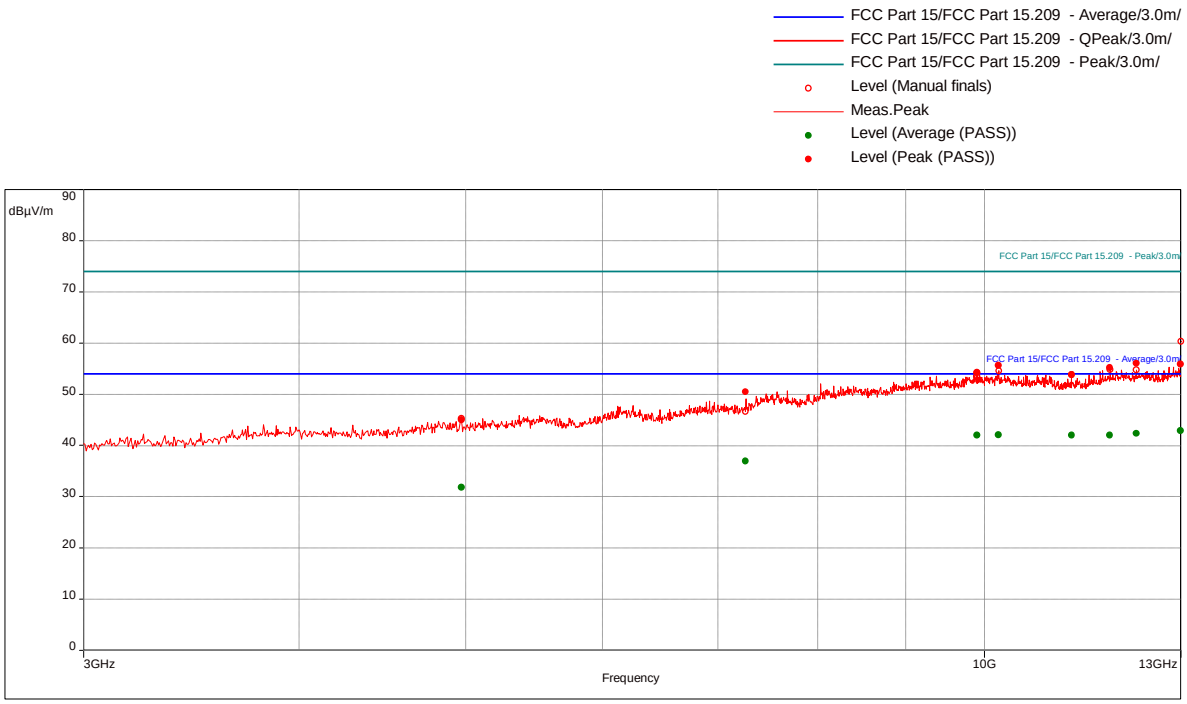
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2359.736842	41.25	54.00	-12.75	142.00	1.05	Vertical	1000000.00	-20.04

Low Channel, Y-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 10:11:09 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Low Ch (3)_2422 MHz_Long Side_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (8)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4968.421053	45.02	74.00	-28.98	142.00	3.40	Vertical	1000000.00	-10.77
7265.526316	50.48	74.00	-23.52	0.00	3.94	Vertical	1000000.00	-5.58
9898.157895	54.26	74.00	-19.74	283.00	1.00	Horizontal	1000000.00	0.11
10186.84211	55.58	74.00	-18.42	288.00	1.00	Horizontal	1000000.00	0.71
11230.78947	53.78	74.00	-20.22	321.00	3.74	Vertical	1000000.00	1.31
11821.84211	55.21	74.00	-18.79	274.00	2.30	Vertical	1000000.00	2.89
12249.21053	56.07	74.00	-17.93	268.00	2.40	Horizontal	1000000.00	3.31
12993.28947	55.89	74.00	-18.11	0.00	1.50	Vertical	1000000.00	4.15

Average (PASS) (8)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4968.421053	31.86	54.00	-22.14	142.00	3.40	Vertical	1000000.00	-10.77
7265.526316	36.97	54.00	-17.03	0.00	3.94	Vertical	1000000.00	-5.58
9898.157895	42.06	54.00	-11.94	283.00	1.00	Horizontal	1000000.00	0.11
10186.84211	42.10	54.00	-11.90	288.00	1.00	Horizontal	1000000.00	0.71
11230.78947	42.03	54.00	-11.97	321.00	3.74	Vertical	1000000.00	1.31
11821.84211	42.00	54.00	-12.00	274.00	2.30	Vertical	1000000.00	2.89
12249.21053	42.35	54.00	-11.65	268.00	2.40	Horizontal	1000000.00	3.31
12993.28947	42.89	54.00	-11.11	0.00	1.50	Vertical	1000000.00	4.15

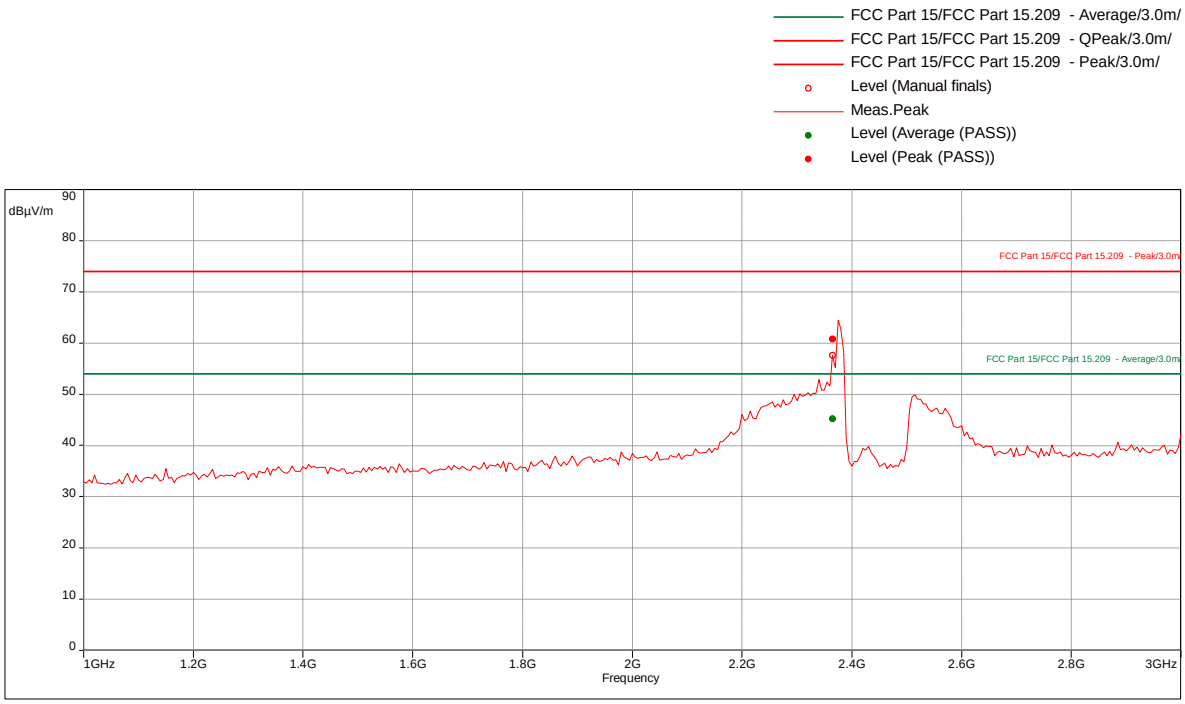
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Low Channel, Z-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 4:17:56 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Low Ch (3)_2422 MHz_short side_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2367.368421	60.77	74.00	-13.23	193.00	1.80	Horizontal	1000000.00	-20.00

Average (PASS) (1)

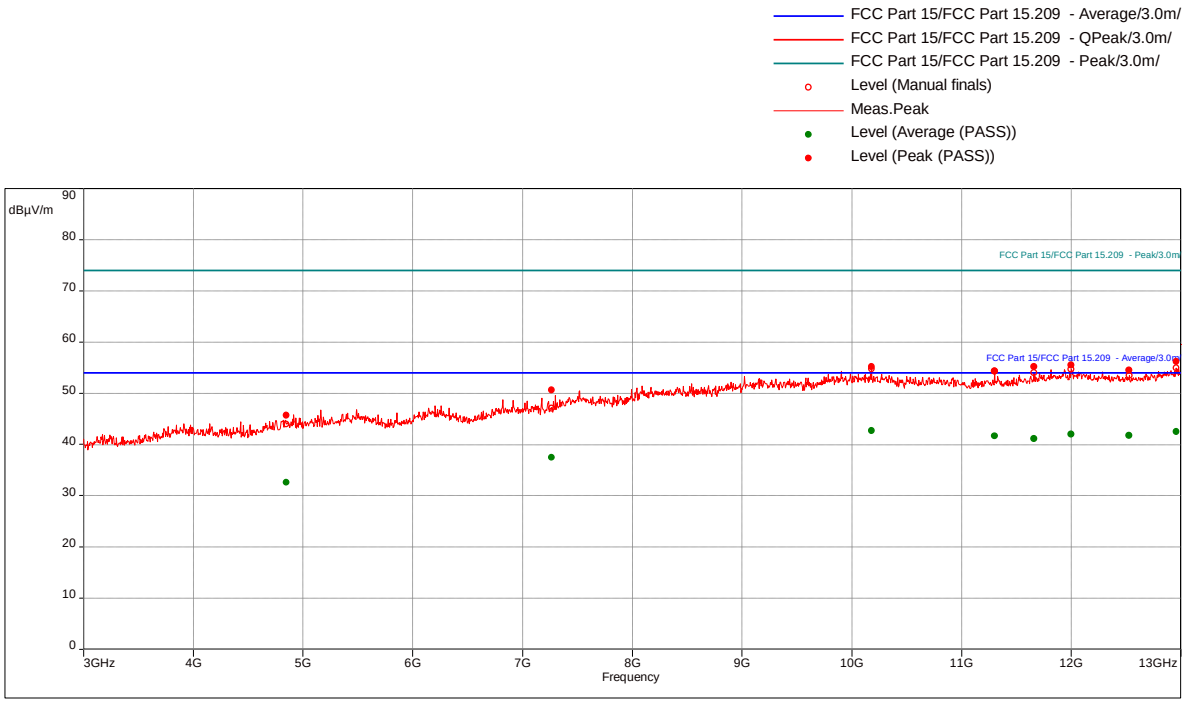
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2367.368421	45.21	54.00	-8.79	193.00	1.80	Horizontal	1000000.00	-20.00

Low Channel, Z-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 1:15:09 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Low Ch (3)_2422 MHz_Short Side_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (8)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4845.789474	45.73	74.00	-28.27	239.00	1.70	Vertical	1000000.00	-10.98
7267.368421	50.62	74.00	-23.38	0.00	3.20	Vertical	1000000.00	-5.57
10180	55.15	74.00	-18.85	40.00	2.85	Vertical	1000000.00	0.71
11297.89474	54.37	74.00	-19.63	120.00	2.95	Horizontal	1000000.00	1.32
11658.15789	55.19	74.00	-18.81	84.00	1.55	Horizontal	1000000.00	2.29
12000	55.53	74.00	-18.47	150.00	3.89	Horizontal	1000000.00	3.21
12527.10526	54.52	74.00	-19.48	172.00	1.45	Vertical	1000000.00	3.34
12953.94737	56.19	74.00	-17.81	150.00	3.30	Vertical	1000000.00	4.02

Average (PASS) (8)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4845.789474	32.59	54.00	-21.41	239.00	1.70	Vertical	1000000.00	-10.98
7267.368421	37.47	54.00	-16.53	0.00	3.20	Vertical	1000000.00	-5.57
10180	42.74	54.00	-11.26	40.00	2.85	Vertical	1000000.00	0.71
11297.89474	41.67	54.00	-12.33	120.00	2.95	Horizontal	1000000.00	1.32
11658.15789	41.14	54.00	-12.86	84.00	1.55	Horizontal	1000000.00	2.29
12000	41.98	54.00	-12.02	150.00	3.89	Horizontal	1000000.00	3.21
12527.10526	41.74	54.00	-12.26	172.00	1.45	Vertical	1000000.00	3.34
12953.94737	42.54	54.00	-11.46	150.00	3.30	Vertical	1000000.00	4.02

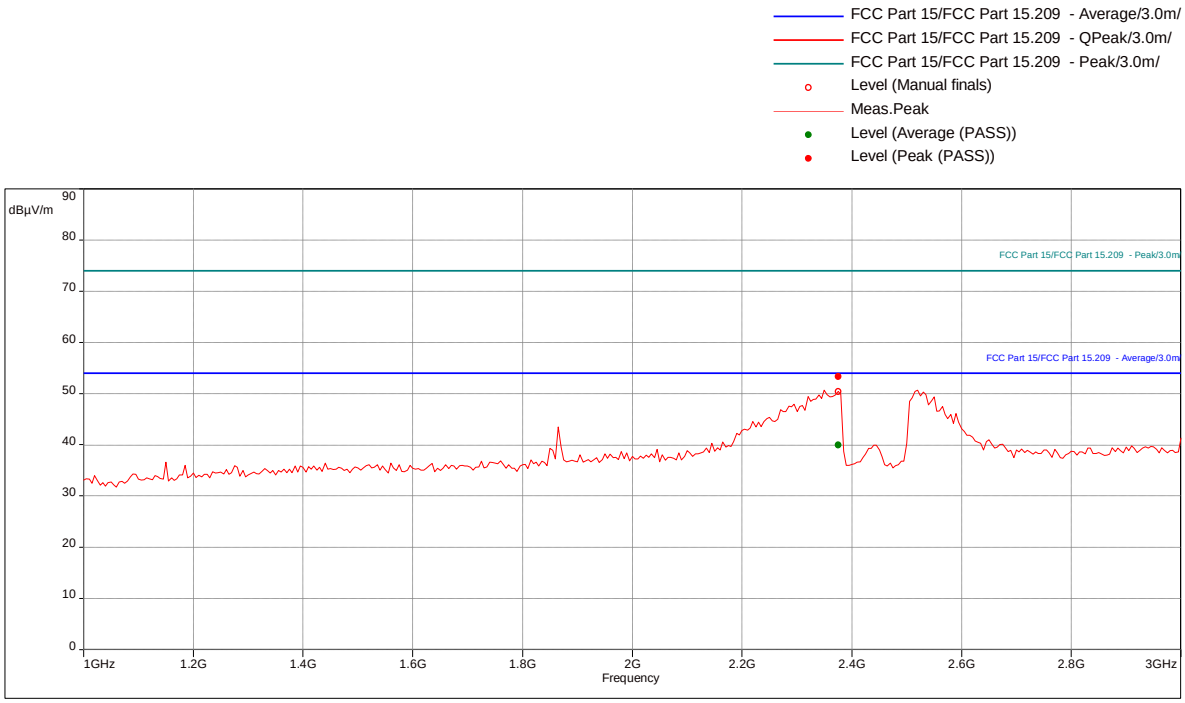
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, X-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 4:03:05 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Mid Ch (7)_2462 MHz_Flat_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2374.736842	53.33	74.00	-20.67	157.00	1.00	Horizontal	1000000.00	-19.96

Average (PASS) (1)

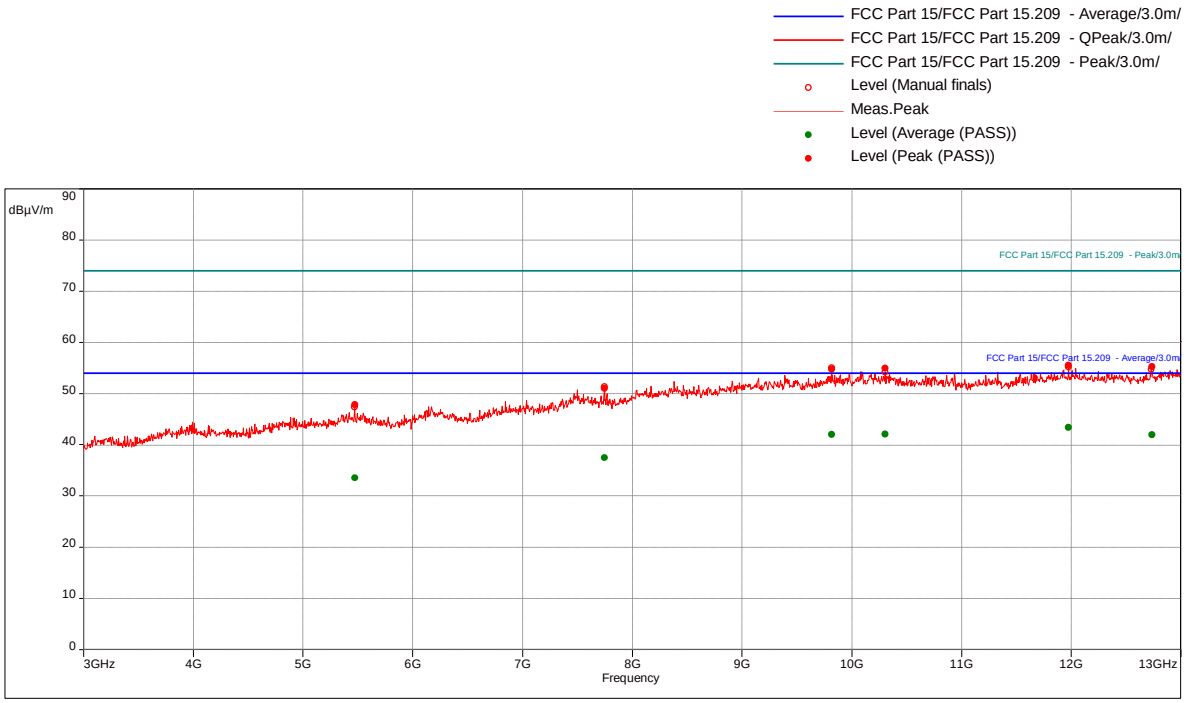
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2374.736842	39.96	54.00	-14.04	157.00	1.00	Horizontal	1000000.00	-19.96

Mid Channel, X-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 2:22:38 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Mid Ch (7)_2442 MHz_Flat_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
5472.631579	47.83	74.00	-26.17	164.00	1.85	Vertical	1000000.00	-8.88
7746.842105	51.03	74.00	-22.97	247.00	1.05	Horizontal	1000000.00	-4.90
9814.210526	54.80	74.00	-19.20	173.00	1.30	Vertical	1000000.00	-0.07
10304.47368	54.92	74.00	-19.08	350.00	1.25	Horizontal	1000000.00	0.76
11976.31579	55.50	74.00	-18.50	350.00	1.50	Vertical	1000000.00	3.19
12734.21053	55.29	74.00	-18.71	4.00	1.30	Horizontal	1000000.00	3.55

Average (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
5472.631579	33.52	54.00	-20.48	164.00	1.85	Vertical	1000000.00	-8.88
7746.842105	37.47	54.00	-16.53	247.00	1.05	Horizontal	1000000.00	-4.90
9814.210526	41.98	54.00	-12.02	173.00	1.30	Vertical	1000000.00	-0.07
10304.47368	42.11	54.00	-11.89	350.00	1.25	Horizontal	1000000.00	0.76
11976.31579	43.38	54.00	-10.62	350.00	1.50	Vertical	1000000.00	3.19
12734.21053	41.91	54.00	-12.09	4.00	1.30	Horizontal	1000000.00	3.55

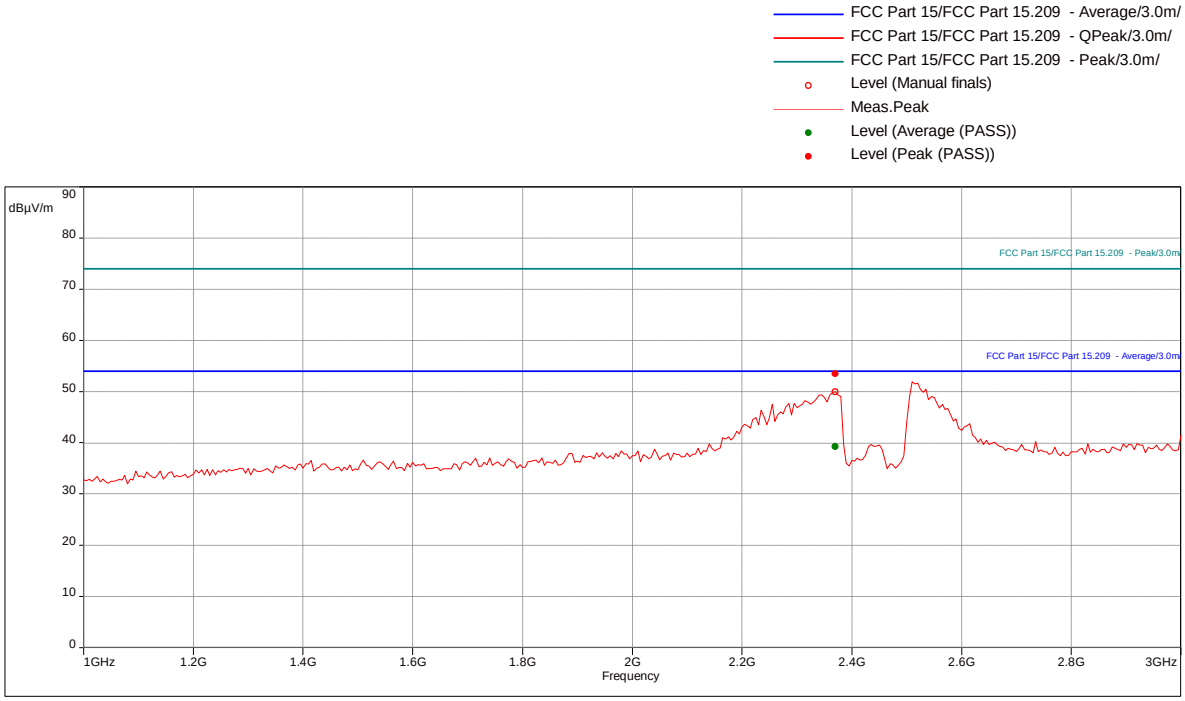
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, Y-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 3:48:20 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Mid Ch (7)_2462 MHz_Long side_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2372.368421	53.45	74.00	-20.55	158.00	1.00	Vertical	1000000.00	-19.97

Average (PASS) (1)

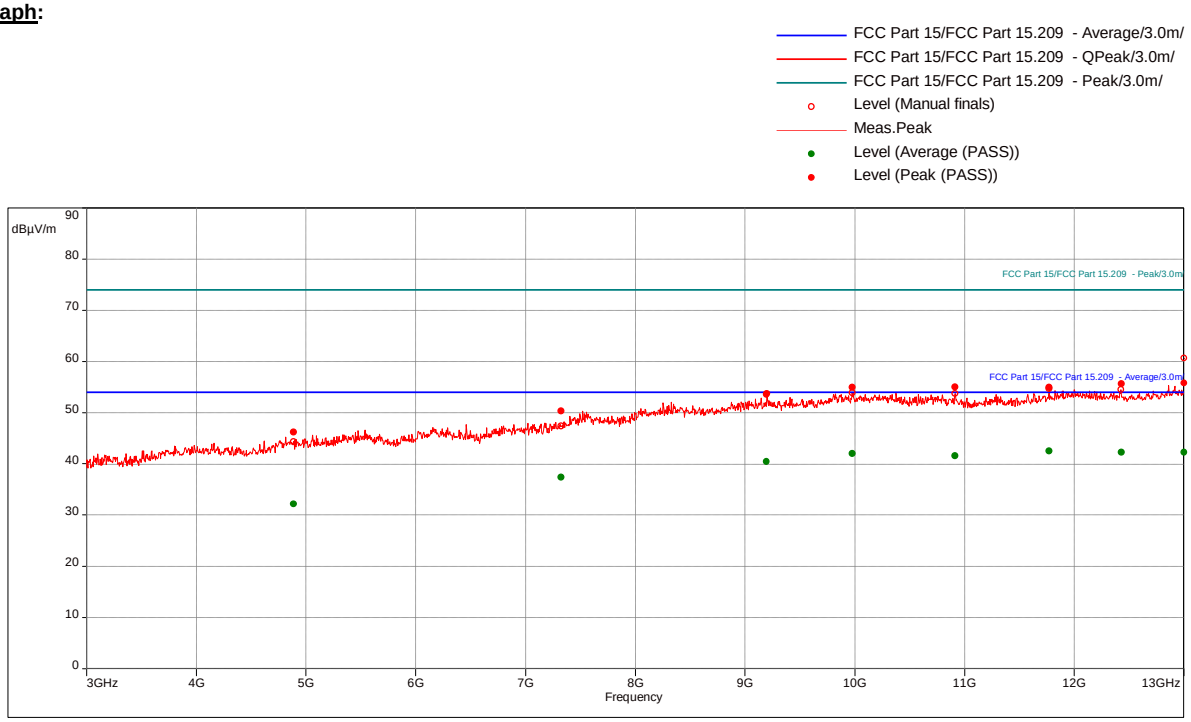
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2372.368421	39.25	54.00	-14.75	158.00	1.00	Vertical	1000000.00	-19.97

Mid Channel, Y-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 10:20:06 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Mid Ch (7)_2442 MHz_Long Side_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (8)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4887.105263	46.19	74.00	-27.81	150.00	1.30	Vertical	1000000.00	-10.91
7325.263158	50.34	74.00	-23.66	245.00	1.60	Vertical	1000000.00	-5.32
9195.263158	53.55	74.00	-20.45	0.00	1.55	Horizontal	1000000.00	-1.59
9972.894737	54.95	74.00	-19.05	83.00	2.25	Vertical	1000000.00	0.37
10914.21053	54.99	74.00	-19.01	157.00	1.75	Horizontal	1000000.00	0.84
11771.05263	54.89	74.00	-19.11	0.00	1.40	Horizontal	1000000.00	2.72
12427.89474	55.65	74.00	-18.35	92.00	2.60	Vertical	1000000.00	3.48
12997.89474	55.77	74.00	-18.23	77.00	1.90	Horizontal	1000000.00	4.17

Average (PASS) (8)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4887.105263	32.16	54.00	-21.84	150.00	1.30	Vertical	1000000.00	-10.91
7325.263158	37.43	54.00	-16.57	245.00	1.60	Vertical	1000000.00	-5.32
9195.263158	40.47	54.00	-13.53	0.00	1.55	Horizontal	1000000.00	-1.59
9972.894737	42.01	54.00	-11.99	83.00	2.25	Vertical	1000000.00	0.37
10914.21053	41.56	54.00	-12.44	157.00	1.75	Horizontal	1000000.00	0.84
11771.05263	42.56	54.00	-11.44	0.00	1.40	Horizontal	1000000.00	2.72
12427.89474	42.26	54.00	-11.74	92.00	2.60	Vertical	1000000.00	3.48
12997.89474	42.30	54.00	-11.70	77.00	1.90	Horizontal	1000000.00	4.17

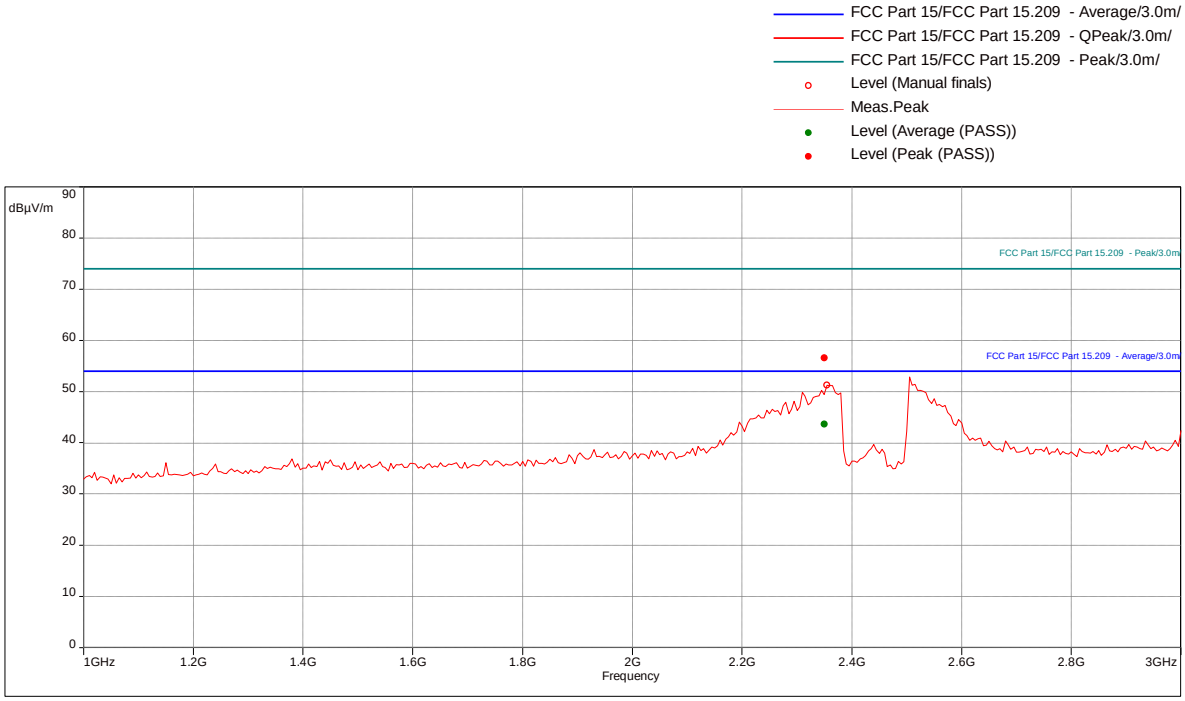
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Mid Channel, Z-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 3:55:40 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Mid Ch (7)_2462 MHz_Short side_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2351.052632	56.58	74.00	-17.42	203.00	1.75	Horizontal	1000000.00	-20.09

Average (PASS) (1)

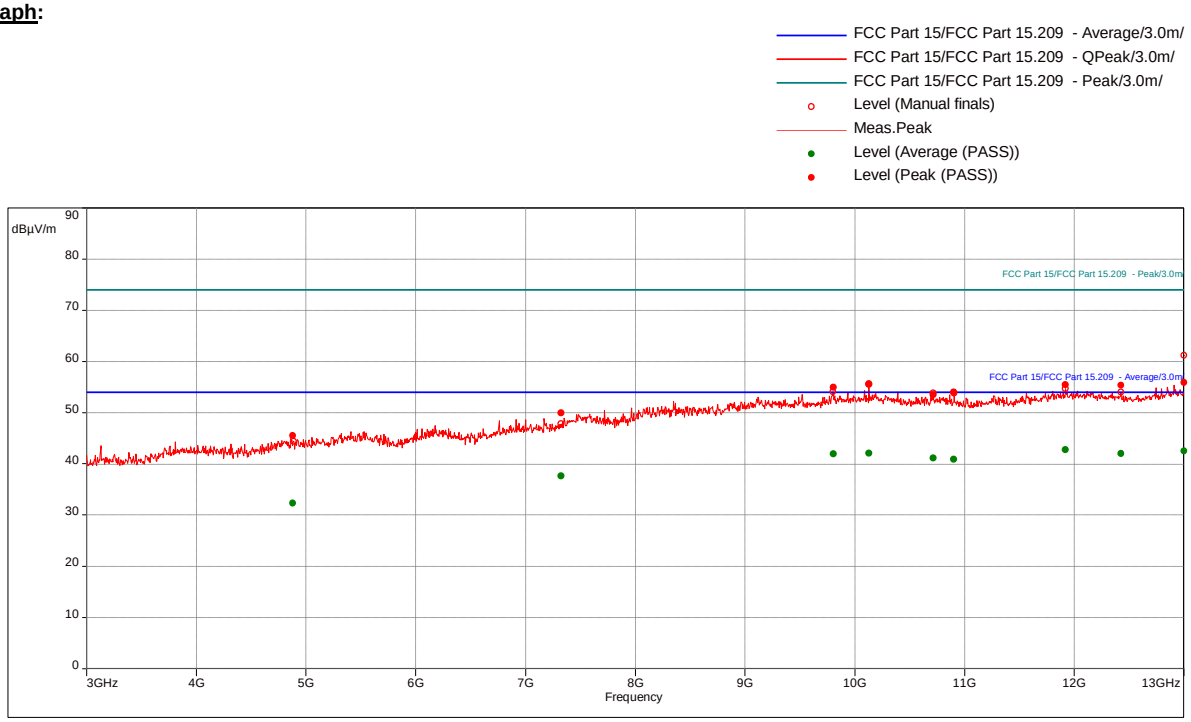
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2351.052632	43.62	54.00	-10.38	203.00	1.75	Horizontal	1000000.00	-20.09

Mid Channel, Z-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 12:32:01 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Mid Ch (7)_2442 MHz_Short Side_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (9)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4881.052632	45.53	74.00	-28.47	314.00	2.05	Vertical	1000000.00	-10.92
7326.315789	49.95	74.00	-24.05	47.00	3.79	Horizontal	1000000.00	-5.32
9803.684211	54.92	74.00	-19.08	99.00	1.20	Vertical	1000000.00	-0.09
10128.94737	55.55	74.00	-18.45	187.00	2.05	Vertical	1000000.00	0.68
10715	53.48	74.00	-20.52	128.00	1.00	Vertical	1000000.00	0.58
10902.36842	54.00	74.00	-20.00	129.00	1.40	Horizontal	1000000.00	0.81
11917.63158	55.44	74.00	-18.56	62.00	1.25	Horizontal	1000000.00	3.12
12423.68421	55.37	74.00	-18.63	224.00	2.05	Vertical	1000000.00	3.48
12997.89474	55.91	74.00	-18.09	179.00	2.65	Vertical	1000000.00	4.17

Average (PASS) (9)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4881.052632	32.35	54.00	-21.65	314.00	2.05	Vertical	1000000.00	-10.92
7326.315789	37.63	54.00	-16.37	47.00	3.79	Horizontal	1000000.00	-5.32
9803.684211	41.97	54.00	-12.03	99.00	1.20	Vertical	1000000.00	-0.09
10128.94737	42.08	54.00	-11.92	187.00	2.05	Vertical	1000000.00	0.68
10715	41.18	54.00	-12.82	128.00	1.00	Vertical	1000000.00	0.58
10902.36842	40.92	54.00	-13.08	129.00	1.40	Horizontal	1000000.00	0.81
11917.63158	42.78	54.00	-11.22	62.00	1.25	Horizontal	1000000.00	3.12
12423.68421	42.00	54.00	-12.00	224.00	2.05	Vertical	1000000.00	3.48
12997.89474	42.51	54.00	-11.49	179.00	2.65	Vertical	1000000.00	4.17

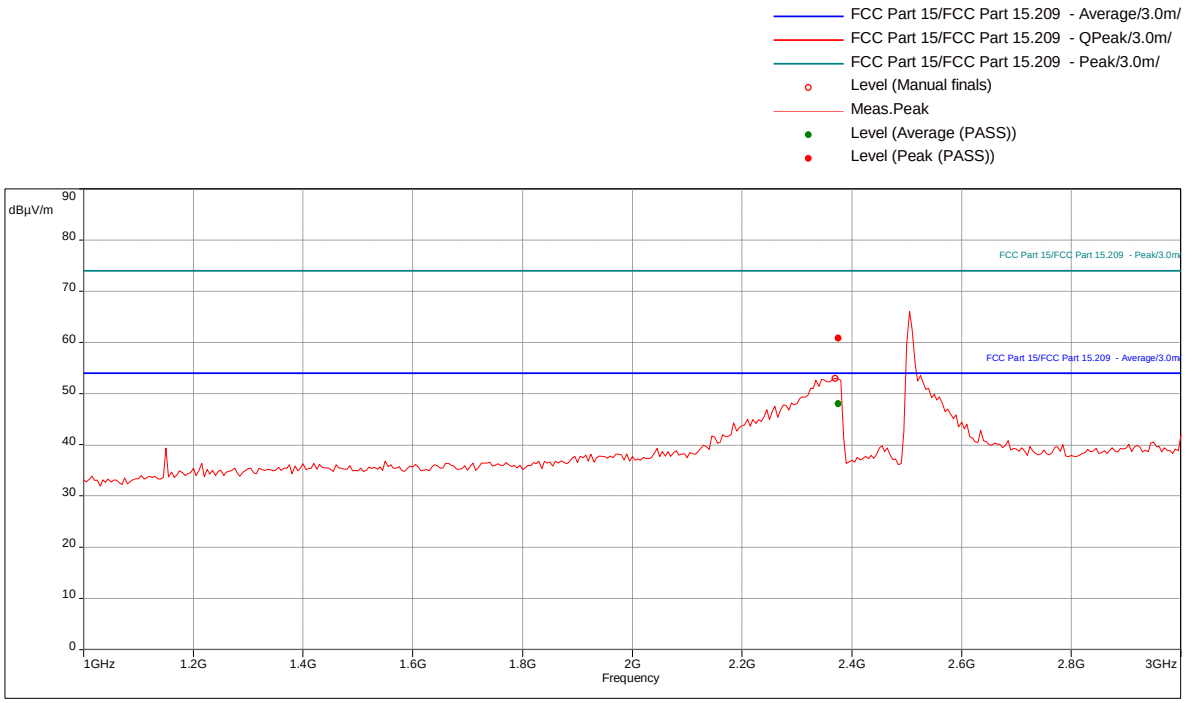
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, X-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 3:22:46 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Hiigh Ch (11)_2462 MHz_Flat_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2372.894737	60.79	74.00	-13.21	144.00	1.45	Horizontal	1000000.00	-19.97

Average (PASS) (1)

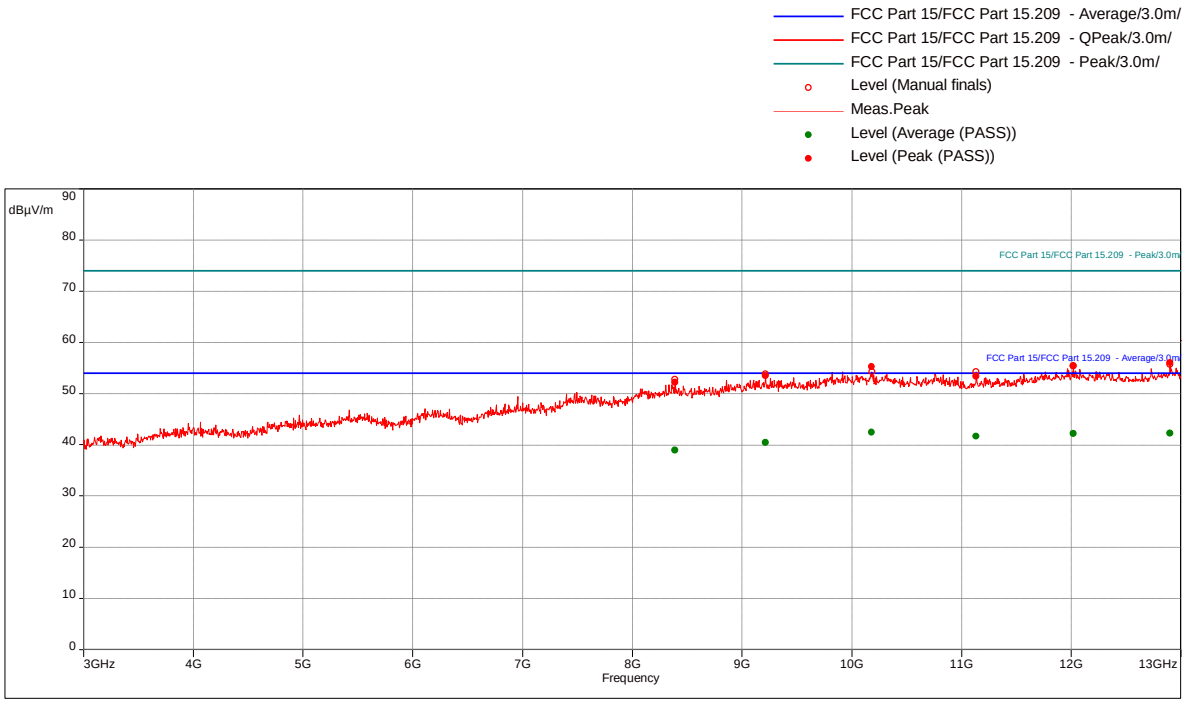
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2372.894737	47.96	54.00	-6.04	144.00	1.45	Horizontal	1000000.00	-19.97

High Channel, X-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 2:52:42 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Hiigh Ch (11)_2462 MHz_Flat_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
8391.052632	52.18	74.00	-21.82	225.00	1.75	Horizontal	1000000.00	-3.22
9212.631579	53.45	74.00	-20.55	350.00	1.90	Horizontal	1000000.00	-1.56
10181.31579	55.29	74.00	-18.71	106.00	3.94	Horizontal	1000000.00	0.71
11134.47368	53.39	74.00	-20.61	336.00	1.70	Vertical	1000000.00	1.22
12019.47368	55.39	74.00	-18.61	18.00	3.54	Vertical	1000000.00	3.22
12900	56.06	74.00	-17.94	218.00	3.25	Vertical	1000000.00	3.89

Average (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
8391.052632	38.91	54.00	-15.09	225.00	1.75	Horizontal	1000000.00	-3.22
9212.631579	40.50	54.00	-13.50	350.00	1.90	Horizontal	1000000.00	-1.56
10181.31579	42.40	54.00	-11.60	106.00	3.94	Horizontal	1000000.00	0.71
11134.47368	41.65	54.00	-12.35	336.00	1.70	Vertical	1000000.00	1.22
12019.47368	42.14	54.00	-11.86	18.00	3.54	Vertical	1000000.00	3.22
12900	42.30	54.00	-11.70	218.00	3.25	Vertical	1000000.00	3.89

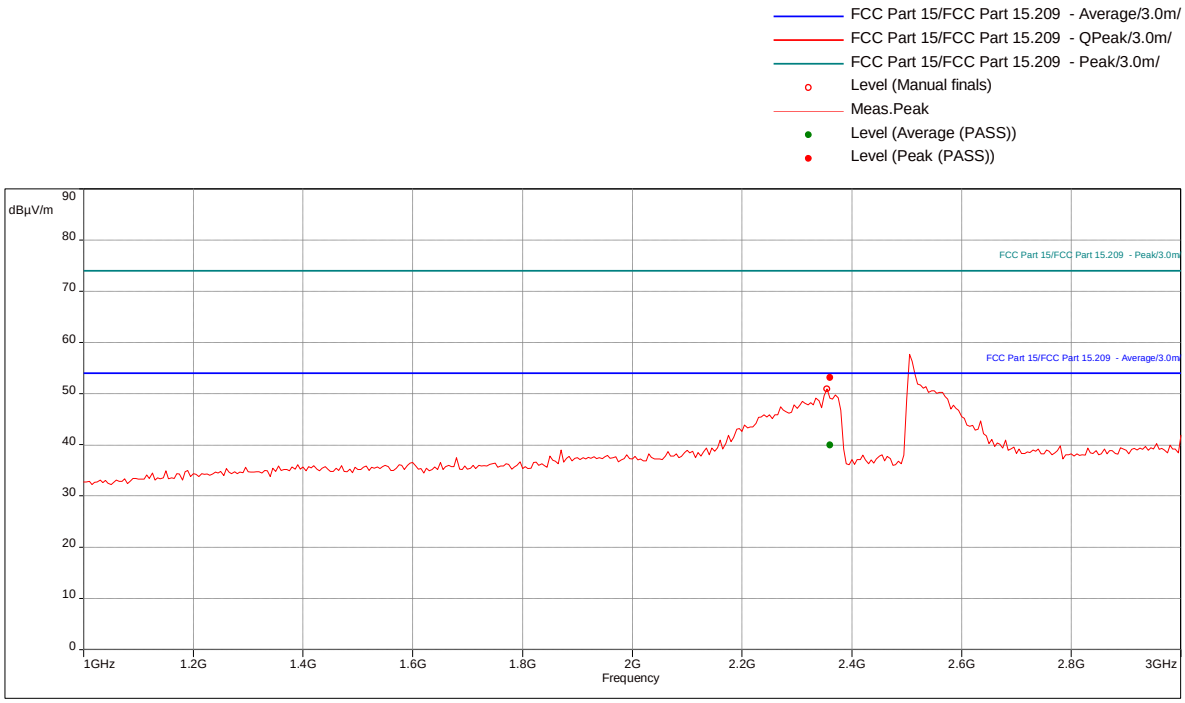
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, Y-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 3:40:31 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Hiigh Ch (11)_2462 MHz_Long side_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2357.631579	53.11	74.00	-20.89	150.00	1.05	Vertical	1000000.00	-20.05

Average (PASS) (1)

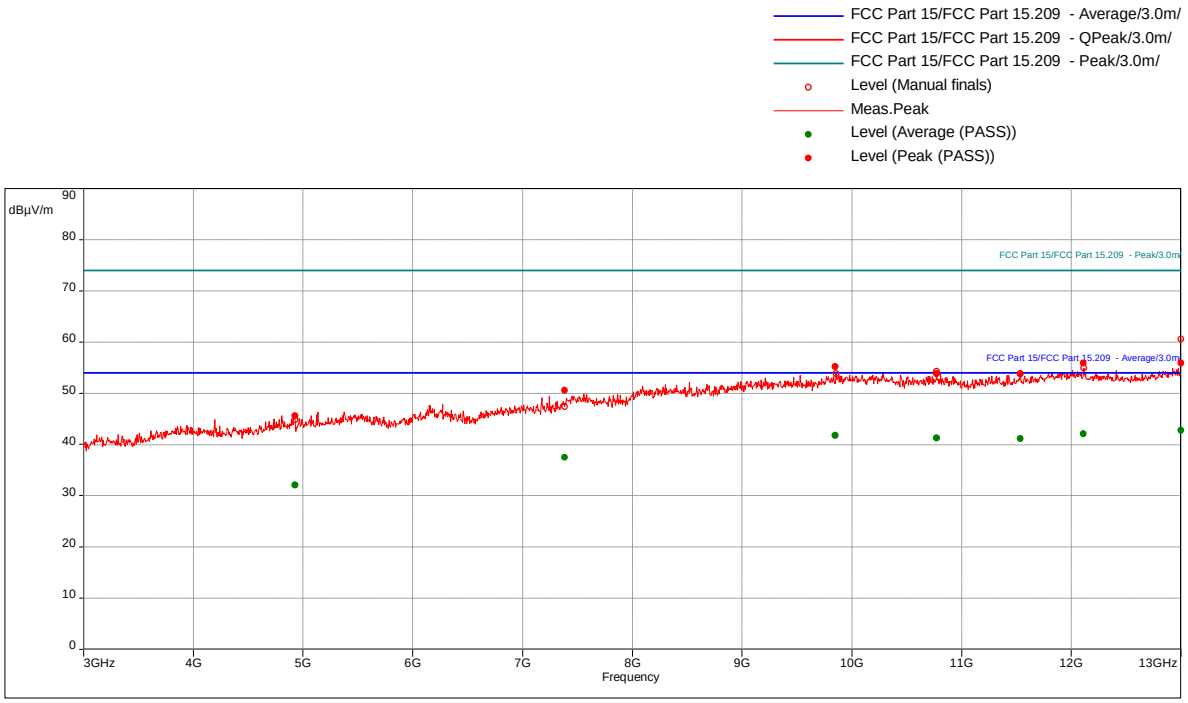
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2357.631579	39.97	54.00	-14.03	150.00	1.05	Vertical	1000000.00	-20.05

High Channel, Y-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 11:12:37 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_High Ch (1)_2462 MHz_Long Side_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (7)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4925.263158	45.58	74.00	-28.42	24.00	3.64	Vertical	1000000.00	-10.87
7384.210526	50.60	74.00	-23.40	61.00	1.90	Horizontal	1000000.00	-5.20
9852.368421	55.16	74.00	-18.84	225.00	3.69	Horizontal	1000000.00	0.01
10773.42105	53.78	74.00	-20.22	157.00	1.01	Horizontal	1000000.00	0.59
11537.10526	53.83	74.00	-20.17	342.00	1.86	Horizontal	1000000.00	1.66
12110.52632	55.84	74.00	-18.16	180.00	3.59	Vertical	1000000.00	3.23
12998.02632	55.91	74.00	-18.09	341.00	3.15	Horizontal	1000000.00	4.17

Average (PASS) (7)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4925.263158	32.07	54.00	-21.93	24.00	3.64	Vertical	1000000.00	-10.87
7384.210526	37.50	54.00	-16.50	61.00	1.90	Horizontal	1000000.00	-5.20
9852.368421	41.80	54.00	-12.20	225.00	3.69	Horizontal	1000000.00	0.01
10773.42105	41.24	54.00	-12.76	157.00	1.01	Horizontal	1000000.00	0.59
11537.10526	41.17	54.00	-12.83	342.00	1.86	Horizontal	1000000.00	1.66
12110.52632	42.07	54.00	-11.93	180.00	3.59	Vertical	1000000.00	3.23
12998.02632	42.75	54.00	-11.25	341.00	3.15	Horizontal	1000000.00	4.17

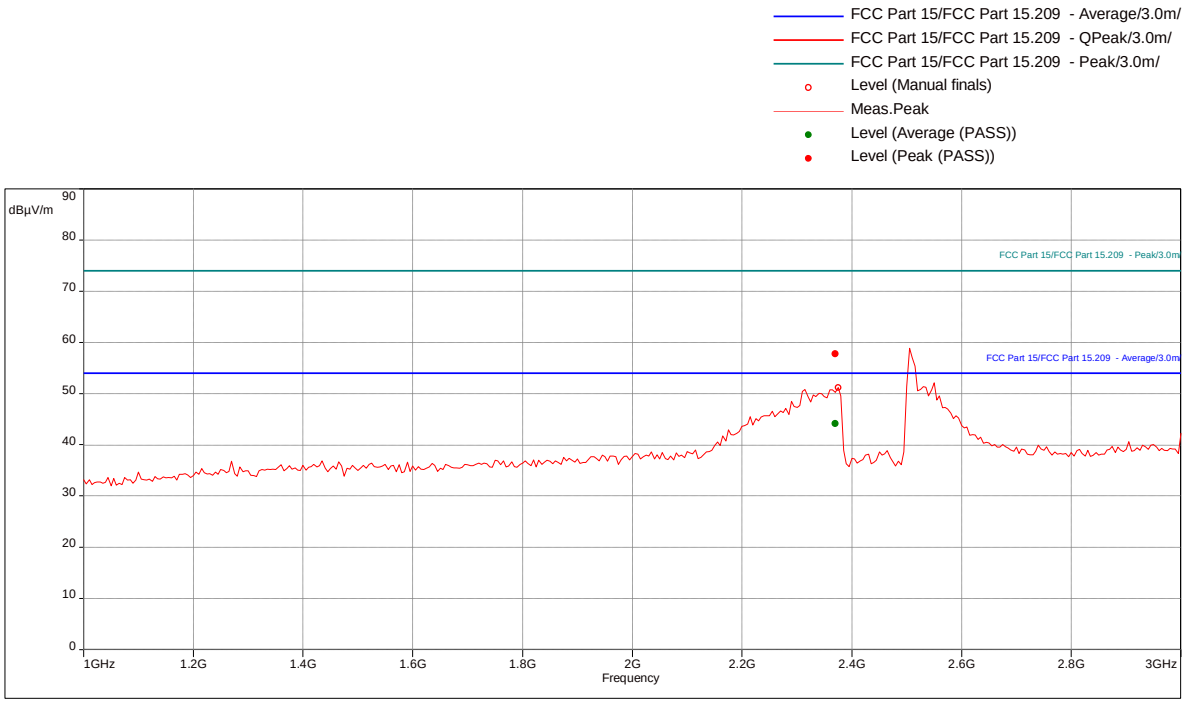
Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

High Channel, Z-Axis, 802.11n HT40, 1 to 3 GHz

Test Information:

Date and Time	9/24/2019 3:32:29 PM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_Hiigh Ch (11)_2462 MHz_Short side_1 to 3 GHz SA mode

Graph:



Results:

Peak (PASS) (1)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2371.842105	57.78	74.00	-16.22	201.00	1.70	Horizontal	1000000.00	-19.98

Average (PASS) (1)

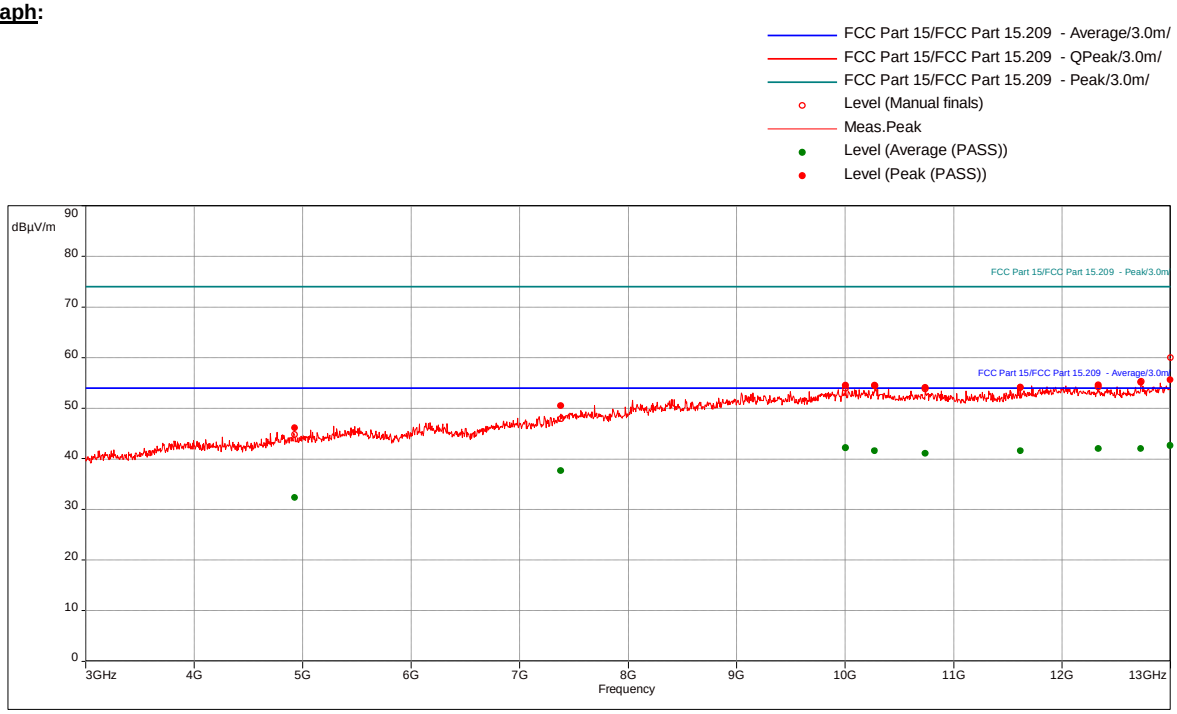
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2371.842105	44.11	54.00	-9.89	201.00	1.70	Horizontal	1000000.00	-19.98

High Channel, Z-Axis, 802.11n HT40, 3 to 13 GHz

Test Information:

Date and Time	9/24/2019 11:50:32 AM
Client and Project Number	iRobot
Engineer	Kouma Sinn
Temperature	23C
Humidity	53%
Atmospheric Pressure	996mbar
Comments	802.11n HT40 (MCS0)_High Ch (1)_2462 MHz_Short Side_3 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (9)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4922.894737	46.10	74.00	-27.90	298.00	3.69	Horizontal	1000000.00	-10.87
7381.842105	50.46	74.00	-23.54	356.00	1.25	Vertical	1000000.00	-5.20
10003.42105	54.48	74.00	-19.52	71.00	1.20	Vertical	1000000.00	0.47
10271.57895	54.48	74.00	-19.52	341.00	1.15	Vertical	1000000.00	0.74
10740.26316	54.04	74.00	-19.96	120.00	2.35	Horizontal	1000000.00	0.58
11615.26316	54.10	74.00	-19.90	31.00	3.25	Horizontal	1000000.00	2.08
12333.15789	54.57	74.00	-19.43	136.00	1.55	Horizontal	1000000.00	3.40
12725.26316	55.12	74.00	-18.88	260.00	2.15	Horizontal	1000000.00	3.53
12994.86842	55.62	74.00	-18.38	202.00	2.25	Horizontal	1000000.00	4.16

Average (PASS) (9)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
4922.894737	32.31	54.00	-21.69	298.00	3.69	Horizontal	1000000.00	-10.87
7381.842105	37.67	54.00	-16.33	356.00	1.25	Vertical	1000000.00	-5.20
10003.42105	42.14	54.00	-11.86	71.00	1.20	Vertical	1000000.00	0.47
10271.57895	41.55	54.00	-12.45	341.00	1.15	Vertical	1000000.00	0.74
10740.26316	41.10	54.00	-12.90	120.00	2.35	Horizontal	1000000.00	0.58
11615.26316	41.60	54.00	-12.40	31.00	3.25	Horizontal	1000000.00	2.08
12333.15789	42.00	54.00	-12.00	136.00	1.55	Horizontal	1000000.00	3.40
12725.26316	42.01	54.00	-11.99	260.00	2.15	Horizontal	1000000.00	3.53
12994.86842	42.59	54.00	-11.41	202.00	2.25	Horizontal	1000000.00	4.16

Notes: From 13-25 GHz test was performed manually with no emissions were detected above the instrument noise floor.

Special Radiated Emissions

Company: iRobot
Model #: AXF-Y1
Serial #: FCC #1
Engineers: Vathana Ven
Project #: G103991615
Standard: FCC Part 15 Subpart B Class B
Receiver: R&S ESI (145-128) 03-28-2020
PreAmp: BONN001_01-23-2020.txt
PreAmp Used? (Y or N): Y
Antenna & Cables: HF Bands: N, LF, HF, SHF
Antenna: HORN3__3M vert__5-30-2020.txt HORN3__3M hor__5-30-2020.txt
Cable(s): 145-416__7-22-2020.txt NONE.
Location: 10M Barometer: DAV001 Filter: REA004
Date(s): 09/24/19
Temp/Humidity/Pressure: 22 deg C 43% 997 mB
Limit Distance (m): 3
Test Distance (m): 3
Voltage/Frequency: DC Frequency Range: 13-18GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
No emissions were detected above the measuring equipment noise floor.													

Special Radiated Emissions

Company: iRobot
Model #: AXF-Y1
Serial #: FCC #1
Engineers: Vathana Ven
Project #: G103991615
Standard: FCC Part 15 Subpart B Class B
Receiver: R&S ESI (145-128) 03-28-2020
PreAmp: PRE8_10_25_2019.txt
PreAmp Used? (Y or N): Y
Antenna & Cables: SHF Bands: N, LF, HF, SHF
Antenna: EMC04_1MV_10-26-2019.txt EMC04_1MH_10-26-2019.txt
Cable(s): CBLSHF103_11_15_2019.txt CBLHF2012-5M-2_2-14-2020 Factors.txt
Location: 10M Barometer: DAV001 Filter: REA006
Date(s): 09/24/19
Temp/Humidity/Pressure: 22 deg C 43% 997 mB
Limit Distance (m): 3
Test Distance (m): 0.2
Voltage/Frequency: DC Frequency Range: 18-25GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
Hand scan was performed at 20cm. No emissions were detected above the measuring equipment noise floor.													

Test Personnel:	Kenneth Lee Vathana Ven VSV Kouma Sinn KPS	Test Date:	07/18/2019 09/24/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	CFR47 FCC Part 15.247	Limit Applied:	See report section 11.3
Input Voltage:	120 VAC @ 60 Hz		
		Ambient Temperature:	22, 21 ºC
Pretest Verification w/ Ambient Signals or BB Source:	BB Source	Relative Humidity:	67, 22 %
		Atmospheric Pressure:	1006, 1005 mbars

Deviations, Additions, or Exclusions:

Testing performed was to ensure no restricted band spurious emissions were present.

12 Digital Device and Receiver Radiated Spurious Emissions

12.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B and ANSI C 63.4.

TEST SITE: 10m ALSE

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when BAT-EMC Emission Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. The “Correction” includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the “Level” column.

12.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV001'	Weather Station	Davis Instruments	7400	PE80519A61	01/23/2019	01/23/2020
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/28/2019	03/28/2020
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	10m Track A Cables	multiple	07/25/2018	07/25/2019
PRE11'	50dB gain pre-amp	Keith H	PRE11	PRE11	10/27/2018	10/27/2019
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	06/12/2019	06/12/2020
EMC02'	ANTENNA, RIDGED GUIDE, 1-18 GHZ	EMCO	3115	2784	08/16/2018	08/16/2019
BON001'	METER, POWER	Boonton	4232A	55601	01/23/2019	01/23/2020
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2018	07/25/2019
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	10/26/2018	10/26/2019

Software Utilized:

Name	Manufacturer	Version
BAT EMC (10m Chamber)	Nexio	3.18.0.16

12.3 Results:

The sample tested was found to Comply.

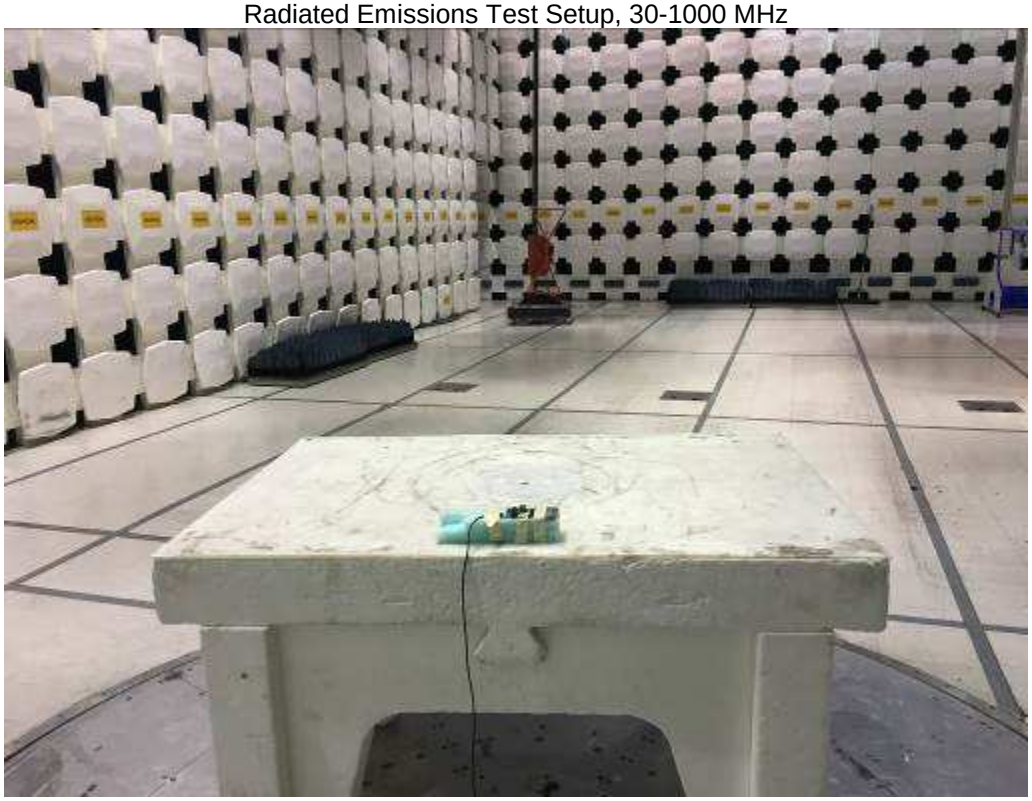
§15.109 Radiated emission limits.

The field strength of radiated emissions form unintentional radiators at a distance of 3 meters shall not exceed the following values.

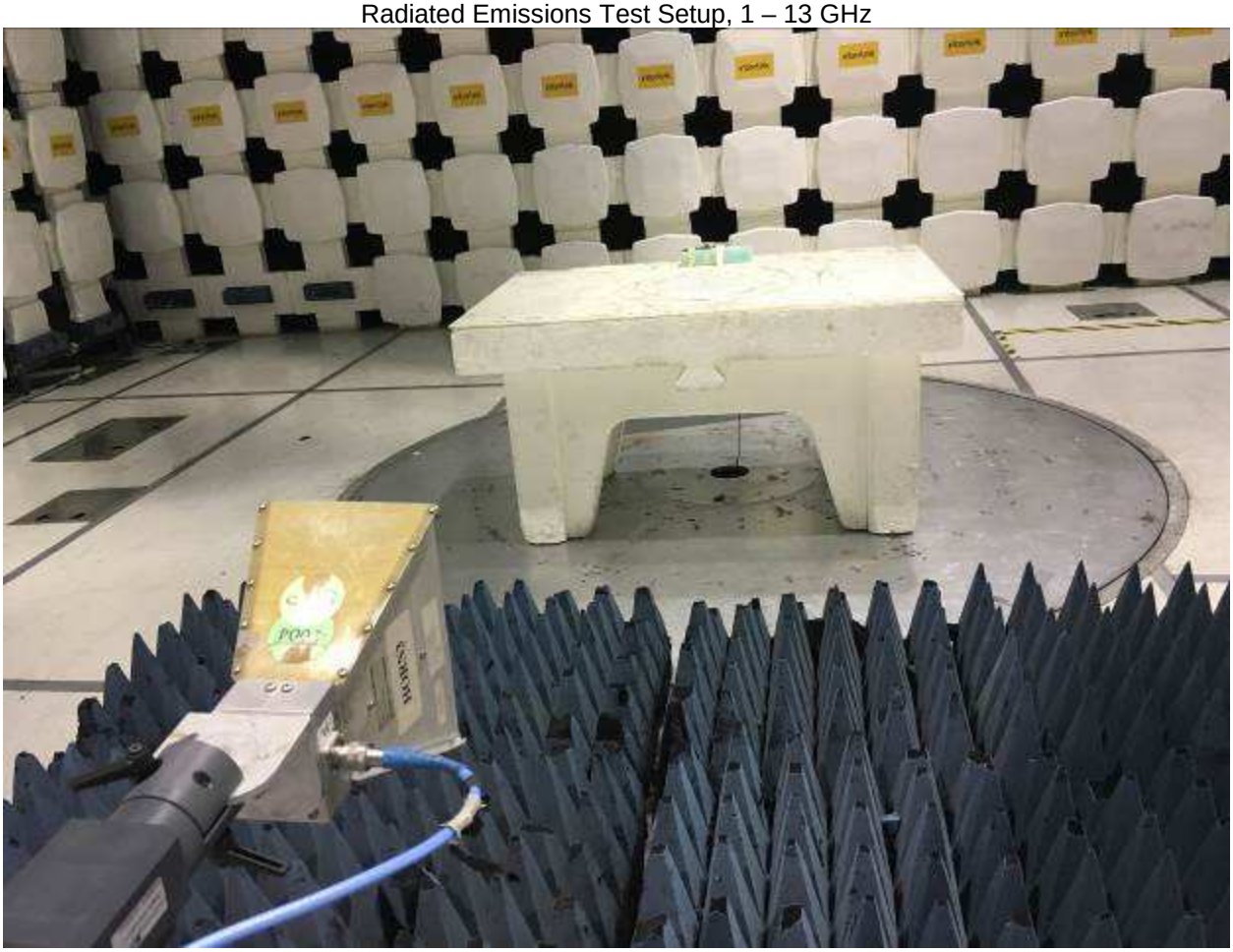
Frequency of emission (MHz)	Field strength (microvolts/meter)	Field strength (dBµV/m)
30-88	100	40.00
88-216	150	43.52
216-960	200	46.02
Above 960	500	54.00

12.4 Setup Photographs:

Radiated Emissions Test Setup, 30-1000 MHz



Radiated Emissions Test Setup, 1 – 13 GHz



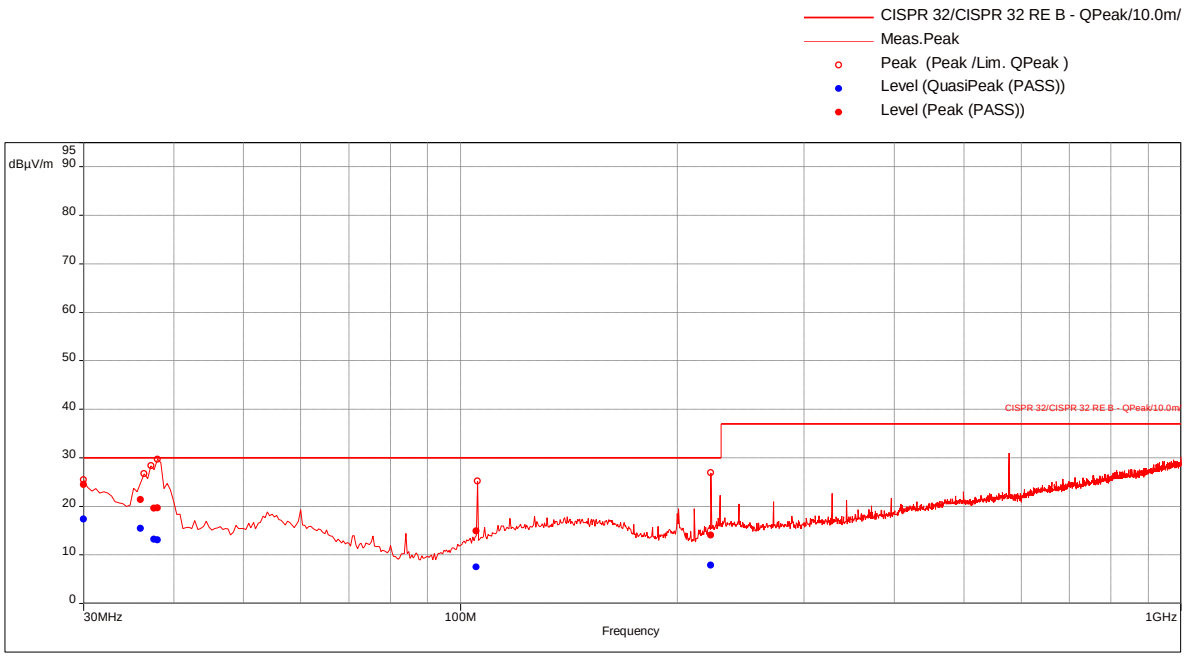
12.5 Plots/Data:

30-1000MHz, Receive Mode, 802.11g, Low Channel, X-Axis

Test Information:

Date and Time	7/19/2019 8:15:19 PM
Client and Project Number	iRobot - G103991615
Engineer	Vathana Ven
Temperature	26 deg C
Humidity	49%
Atmospheric Pressure	1000 mB
Comments	RE 30-1000MHz_Rx mode_802.11g_Low Ch_X-Axis

Graph:



Results:

QuasiPeak (PASS) (6)

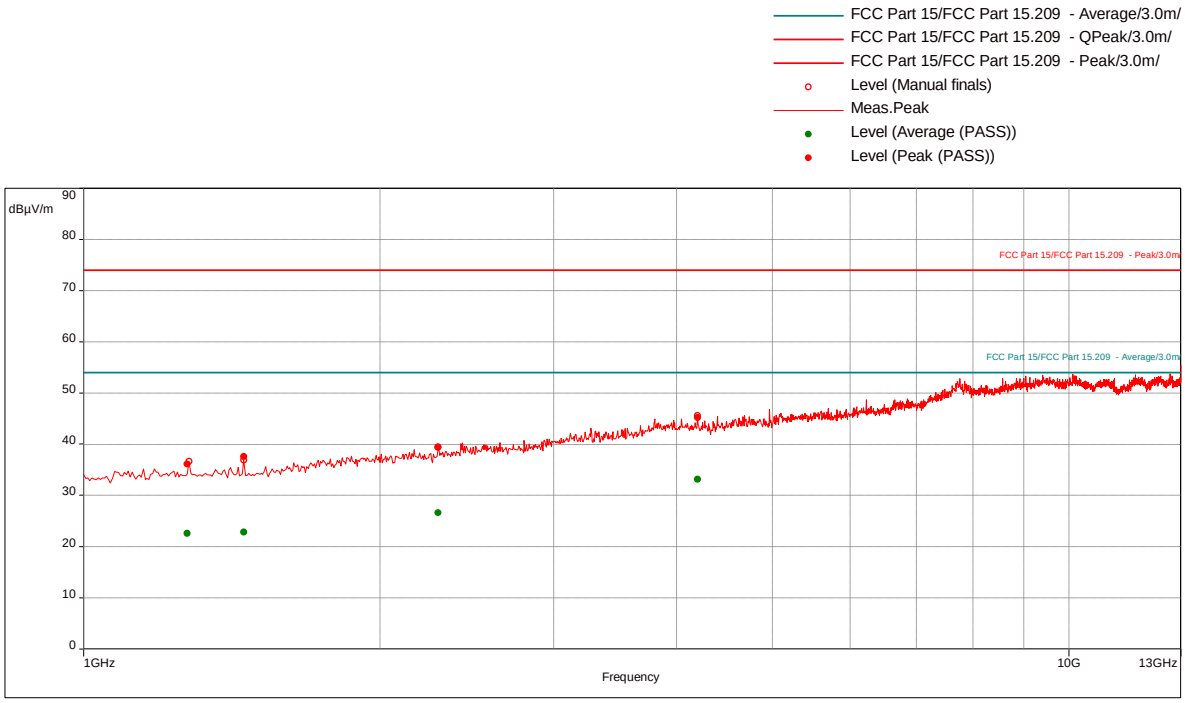
Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
30.15789474	17.35	30.00	-12.65	10.00	3.20	Vertical	120000.00	-12.43
36.02105263	15.44	30.00	-14.56	24.00	2.34	Vertical	120000.00	-16.38
37.54736842	13.23	30.00	-16.77	25.00	3.52	Vertical	120000.00	-17.53
37.93684211	13.08	30.00	-16.92	25.00	3.99	Vertical	120000.00	-17.80
105.3473684	7.51	30.00	-22.49	342.00	2.50	Horizontal	120000.00	-21.27
222.7052632	7.90	30.00	-22.10	336.00	1.96	Vertical	120000.00	-21.09

1-13 GHz, Receive Mode, 802.11g, Low Channel, X-Axis

Test Information:

Date and Time	7/18/2019 11:32:36 PM
Client and Project Number	iRobot - G103991615
Engineer	Vathana Ven
Temperature	22 deg C
Humidity	67%
Atmospheric Pressure	1006 mB
Comments	RE 1 to 13 GHz_Rx mode_802.11g_Low Ch_X-Axis

Graph:



Results:

Peak (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
1275.789474	36.09	74.00	-37.91	47.00	3.00	Horizontal	1000000.00	-25.98
1454.736842	37.56	74.00	-36.44	188.00	1.40	Vertical	1000000.00	-25.65
2291.315789	39.43	74.00	-34.57	165.00	1.01	Vertical	1000000.00	-21.37
4199.473684	45.20	74.00	-28.80	100.00	3.16	Horizontal	1000000.00	-13.23

Average (PASS) (4)

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
1275.789474	22.62	54.00	-31.38	47.00	3.00	Horizontal	1000000.00	-25.98
1454.736842	22.86	54.00	-31.14	188.00	1.40	Vertical	1000000.00	-25.65
2291.315789	26.58	54.00	-27.42	165.00	1.01	Vertical	1000000.00	-21.37
4199.473684	33.13	54.00	-20.87	100.00	3.16	Horizontal	1000000.00	-13.23

Test Personnel:	Vathana Ven VJV	Test Date:	07/19/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	CFR47 FCC Part 15.247	Limit Applied:	See report section 12.3
Input Voltage:	5VDC(USB)		
		Ambient Temperature:	21 ºC
Pretest Verification w/ Ambient Signals or BB Source:	BB Source	Relative Humidity:	22 %
		Atmospheric Pressure:	1005 mbars

Deviations, Additions, or Exclusions: None

13 AC Mains Conducted Emissions

13.1 Method

Tests are performed in accordance with FCC Part 15 Subpart B and ANSI C 63.4.

TEST SITE: EMC Lab

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
AC Line Conducted Emissions	150 kHz - 30 MHz	1.2 dB	3.4 dB
Telco Port Emissions	150 kHz - 30 MHz	2.8 dB	5.0 dB

As shown in the table above our conducted emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculations

The following is how net line-conducted readings were determined:

NF = RF + LF + CF + AF
Where NF = Net Reading in dBµV
RF = Reading from receiver in dBµV
LF = LISN or ISN Correction Factor in dB
CF = Cable Correction Factor in dB
AF = Attenuator Loss Factor in dB

To convert from dBµV to µV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in µV
NF = Net Reading in dBµV

Example:
NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 dBµV
$UF = 10^{(49.1\ dB\mu V / 20)}$ = 285.1 µV/m

Alternately, when C5 Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. “TF” is the Transducer Factor; in this case LISN or ISN loss.

13.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DS40'	Temp, humidity, pressure gauge	Digi Sense	68000-49	181717625	11/06/2018	11/06/2019
DS27'	Attenuator, 20dB	Mini Circuits	20dB, 50 ohm	DS27	10/25/2019	10/25/2020
ROS002'	9kHz to 3GHz EMI Test Receiver	Rohde & Schwartz	ESCI 1166.5950K03	100067	06/12/2019	06/12/2020
CBLBNC2012-4'	50 Ohm Coaxial Cable	Pomona	RG58C/U	CBLBCN2012-4	05/07/2019	05/07/2020
LISN31'	LISN - CISPR16 Compliant 9kHz-30MHz	Com-Power	LI-215A	191957	05/05/2019	05/05/2020

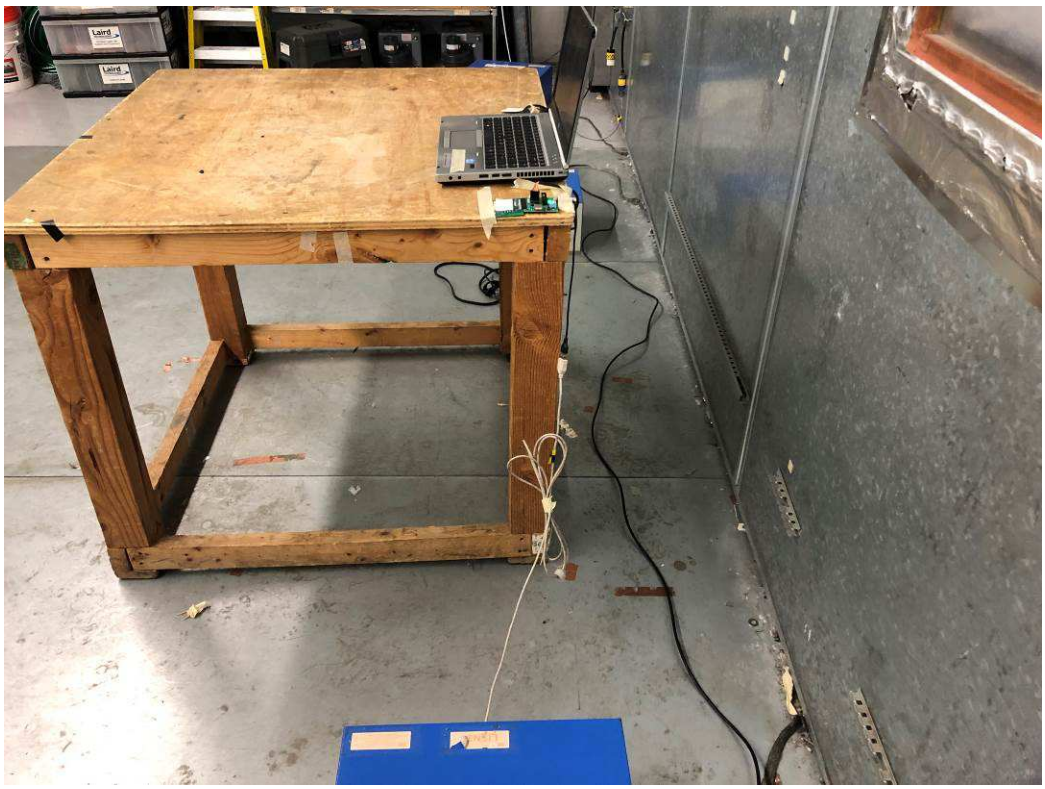
Software Utilized:

Name	Manufacturer	Version
Compliance 5	Teseq	5.26.46.46

13.3 Results:

The sample tested was found to Comply.

13.4 Setup Photographs:



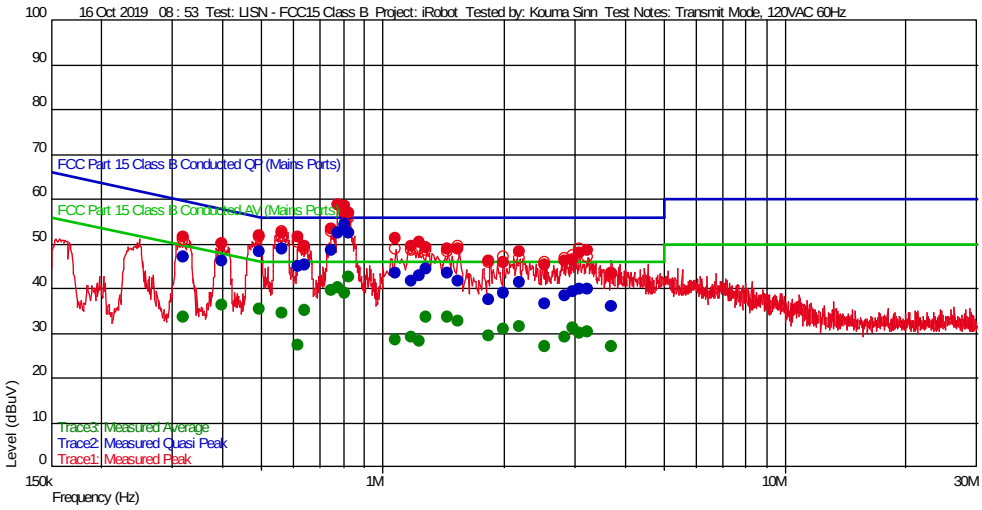
13.5 Plots/Data:

Transmit Mode

Test Information

Test Details	User Entry	Additional Information
Test:	LISN - FCC15 Class B	
Project:	iRobot	
Test Notes:	Transmit Mode, 120VAC 60Hz	
Temperature:	22C	
Humidity:	31%, 1009mbar	
Tested by:	Kouma Sinn	
Test Started:	16 Oct 2019 08 : 53	

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable

- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
3.727 M	35.98	0.062	20.382	56.000	-20.02	9 k		L1
2.53 M	36.46	0.054	20.328	56.000	-19.54	9 k		L1
1.846 M	37.45	0.048	20.298	56.000	-18.55	9 k		N
2.836 M	38.44	0.056	20.342	56.000	-17.56	9 k		L1
1.999 M	38.87	0.050	20.305	56.000	-17.13	9 k		N
2.98 M	39.12	0.057	20.349	56.000	-16.88	9 k		N
3.232 M	39.86	0.058	20.360	56.000	-16.14	9 k		L1
3.088 M	39.86	0.057	20.353	56.000	-16.14	9 k		L1
2.188 M	41.49	0.051	20.313	56.000	-14.51	9 k		L1
1.549 M	41.69	0.045	20.285	56.000	-14.31	9 k		N
1.18 M	41.71	0.042	20.268	56.000	-14.29	9 k		L1
1.234 M	42.89	0.042	20.270	56.000	-13.11	9 k		L1
320.85 k	46.95	0.049	20.115	59.685	-12.73	9 k		L1
1.45 M	43.37	0.045	20.280	56.000	-12.63	9 k		N
1.081 M	43.56	0.041	20.264	56.000	-12.44	9 k		L1
400.75 k	46.09	0.047	20.135	57.838	-11.75	9 k		N
1.288 M	44.38	0.043	20.273	56.000	-11.62	9 k		N
616.65 k	45.04	0.040	20.183	56.000	-10.96	9 k		L1
641.3 k	45.32	0.040	20.188	56.000	-10.68	9 k		N
495.1 k	48.26	0.043	20.158	56.082	-7.82	9 k		N
748.4 k	48.62	0.040	20.209	56.000	-7.38	9 k		N
563.95 k	48.75	0.041	20.172	56.000	-7.25	9 k		L1
828.3 k	52.29	0.040	20.226	56.000	-3.71	9 k		N
774.75 k	52.43	0.040	20.215	56.000	-3.57	9 k		N
807.9 k	54.22	0.040	20.221	56.000	-1.78	9 k		L1

Trace3: Measured Average

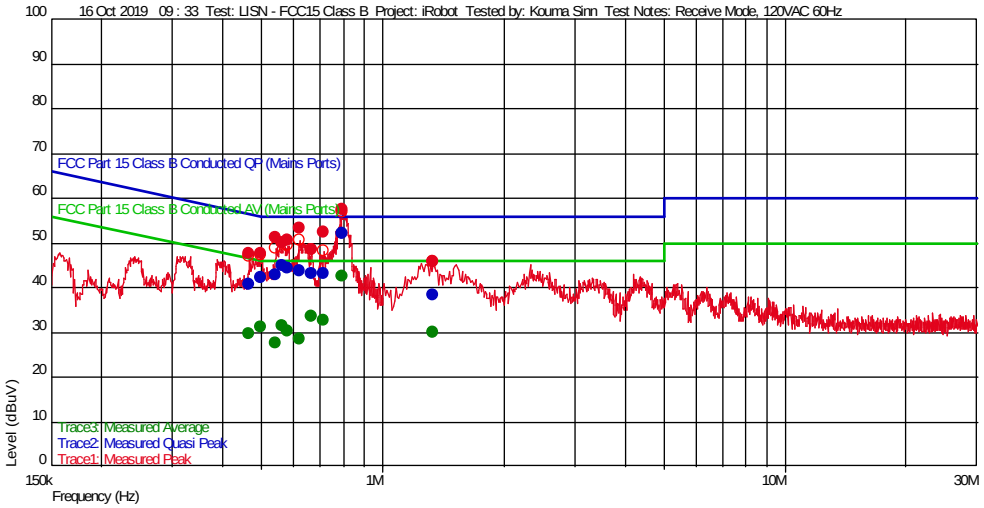
Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
3.727 M	27.00	0.062	20.382	46.000	-19.00	9 k		L1
2.53 M	27.14	0.054	20.328	46.000	-18.86	9 k		L1
616.65 k	27.19	0.040	20.183	46.000	-18.81	9 k		L1
1.234 M	28.35	0.042	20.270	46.000	-17.65	9 k		L1
1.081 M	28.53	0.041	20.264	46.000	-17.47	9 k		L1
1.18 M	29.17	0.042	20.268	46.000	-16.83	9 k		L1
2.836 M	29.23	0.056	20.342	46.000	-16.77	9 k		L1
1.846 M	29.36	0.048	20.298	46.000	-16.64	9 k		N
320.85 k	33.70	0.049	20.115	49.685	-15.98	9 k		L1
3.088 M	30.15	0.057	20.353	46.000	-15.85	9 k		L1
3.232 M	30.29	0.058	20.360	46.000	-15.71	9 k		L1
1.999 M	31.00	0.050	20.305	46.000	-15.00	9 k		N
2.98 M	31.33	0.057	20.349	46.000	-14.67	9 k		N
2.188 M	31.43	0.051	20.313	46.000	-14.57	9 k		L1
1.549 M	32.70	0.045	20.285	46.000	-13.30	9 k		N
1.45 M	33.49	0.045	20.280	46.000	-12.51	9 k		N
1.288 M	33.71	0.043	20.273	46.000	-12.29	9 k		N
563.95 k	34.35	0.041	20.172	46.000	-11.65	9 k		L1
400.75 k	36.38	0.047	20.135	47.838	-11.46	9 k		N
641.3 k	35.18	0.040	20.188	46.000	-10.82	9 k		N
495.1 k	35.45	0.043	20.158	46.082	-10.63	9 k		N
807.9 k	39.00	0.040	20.221	46.000	-7.00	9 k		L1
748.4 k	39.54	0.040	20.209	46.000	-6.46	9 k		N
774.75 k	40.09	0.040	20.215	46.000	-5.91	9 k		N
828.3 k	42.48	0.040	20.226	46.000	-3.52	9 k		N

Receive Mode

Test Information

Test Details	User Entry	Additional Information
Test:	LISN - FCC15 Class B	
Project:	iRobot	
Test Notes:	Receive Mode, 120VAC 60Hz	
Temperature:	22C	
Humidity:	31%, 1009mbar	
Tested by:	Kouma Sinn	
Test Started:	16 Oct 2019 09 : 33	

Prescan Emission Graph



- Measured Peak Value
- Measured Quasi Peak Value
- Measured Average Value
- Maximum Value of Mast and Turntable
- Swept Peak Data
- Swept Quasi Peak Data
- Swept Average Data

Emissions Test Data

Trace2: Measured Quasi Peak

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
1.333 M	38.33	0.043	20.275	56.000	-17.67	9 k		L1
466.2 k	40.67	0.044	20.151	56.581	-15.91	9 k		L1
497.65 k	42.38	0.043	20.159	56.039	-13.66	9 k		L1
544.4 k	42.85	0.042	20.168	56.000	-13.15	9 k		N
665.95 k	43.13	0.040	20.193	56.000	-12.87	9 k		L1
715.25 k	43.16	0.040	20.203	56.000	-12.84	9 k		L1
622.6 k	43.69	0.040	20.184	56.000	-12.31	9 k		N
581.8 k	44.20	0.041	20.176	56.000	-11.80	9 k		N
565.65 k	44.82	0.041	20.173	56.000	-11.18	9 k		N
794.3 k	52.17	0.040	20.219	56.000	-3.83	9 k		L1

Trace3: Measured Average

Frequency(Hz)	Level(dBuV)	TF	PA+CL	Limit(dBuV)	Margin(dBuV)	RBW(Hz)	Comment	LINE
544.4 k	27.67	0.042	20.168	46.000	-18.33	9 k		N
622.6 k	28.50	0.040	20.184	46.000	-17.50	9 k		N
466.2 k	29.75	0.044	20.151	46.581	-16.83	9 k		L1
1.333 M	30.05	0.043	20.275	46.000	-15.95	9 k		L1
581.8 k	30.24	0.041	20.176	46.000	-15.76	9 k		N
497.65 k	31.06	0.043	20.159	46.039	-14.98	9 k		L1
565.65 k	31.41	0.041	20.173	46.000	-14.59	9 k		N
715.25 k	32.80	0.040	20.203	46.000	-13.20	9 k		L1
665.95 k	33.72	0.040	20.193	46.000	-12.28	9 k		L1
794.3 k	42.66	0.040	20.219	46.000	-3.34	9 k		L1

Test Personnel:	Kouma Sinn KPS	Test Date:	10/16/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 15 Subpart B	Limit Applied:	Class B
Input Voltage:	120VAC 60Hz		
Pretest Verification w/ Ambient Signals or BB Source:	**Signal Generator @ -20 dBm**	Ambient Temperature:	22 ºC
		Relative Humidity:	31 %
		Atmospheric Pressure:	1009 mbars

Deviations, Additions, or Exclusions: None

14 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	10/03/2019	104076035BOX-001c	VFV	KPS	Original Issue
1	11/04/2019	104076035BOX-001c	VFV	KPS	Corrected the model number and added line conducted emissions data