



TESTING LABORATORY  
CERTIFICATE#4323.01



## FCC PART 15.247

## TEST REPORT

For

### ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD.

Suite 204, Block 2, 690 Bibo Road, Zhang Jiang Hi-Tech Park, Shanghai,  
China (201203)

**FCC ID: 2AC7Z-RIGEL**

<b>Report Type:</b> CIIPC	<b>Product Type:</b> Wi-Fi& Bluetooth Internet of Things Module
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<b>Report Number:</b> RSHD190323001-00A	
<b>Report Date:</b> 2019-04-03	
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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant	ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD.
Tested Model	RIGEL
Product Type	Wi-Fi& Bluetooth Internet of Things Module
Dimension	26.5 mm (L)* 63 mm (W)*3.4 mm(H)
Power Supply	DC 3.3V

*\*All measurement and test data in this report was gathered from production sample serial number: 20190323001. (Assigned by the BACL. The EUT supplied by the applicant was received on 2019-01-09)*

### Objective

This report is prepared on behalf of ESPRESSIF SYSTEMS (SHANGHAI) CO., LTD. in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions rules.

The tests were performed in order to determine Compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.209 and 15.247 rules.

This is a CIIPC report base on the original report RSHA180913005-00A with FCC ID: 2AC7Z-RIGEL, the differences between the original device and the current one are as follows:

1. Added three Fakra Antennas to test, one is W10436069, another is W10806955, the third is W10474143.

The above differences will affect “part of tests”, SPURIOUS EMISSIONS were presented in this report, and other data were referred to the original report.

### Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS submissions with FCC ID: 2AC7Z-RIGEL.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 15.247 Meas Guidance v05r01.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

**Measurement Uncertainty**

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

**Test Facility**

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

**SYSTEM TEST CONFIGURATION**

**Description of Test Configuration**

Test channel list is as below:

For 802.11b, 802.11g and 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11;

For 802.11n-HT40 mode, EUT was tested with Channel 3, 6 and 9.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

For BLE mode, EUT was tested with channel 0, 19 and 39.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	...	...
...	...	...	...
...	...	...	...
18	2438	38	2478
19	2440	39	2480

**Equipment Modifications**

No modification was made to the EUT tested.

**EUT Exercise Software**

RF test tool: espRFTool

Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	Power Level
802.11b	1 Mbps	20
802.11g	6 Mbps	14
802.11n-HT20	MCS0	14
802.11n-HT40	MCS0	18
BLE	1Mbps	5

**Support Equipment List and Details**

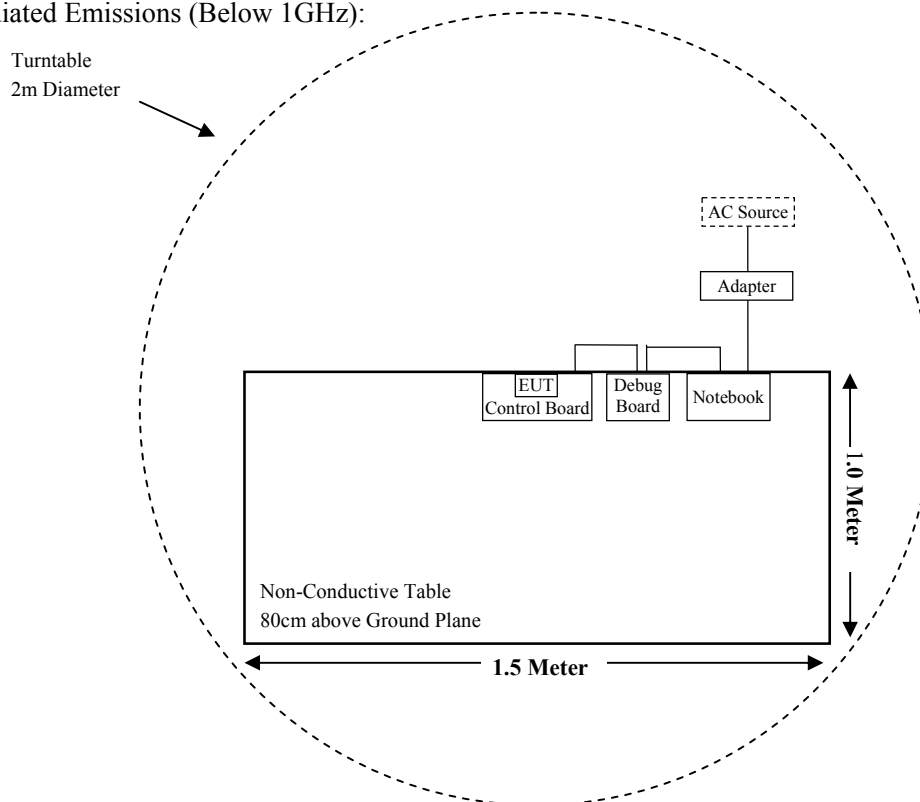
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152
DELL	Adapter	LA65NS0-00	DF263
ESPRESSIF SYSTEMS	Control Board	/	/
ESPRESSIF SYSTEMS	Debug Board	ESP-WROOM-03	/

**External I/O Cable**

Cable Description	Length (m)	From Port	To
Power Cable	1.2	Notebook	Adapter
USB Cable	0.8	Notebook	Debug Board
Data Cable	0.3	Debug Board	Control Board

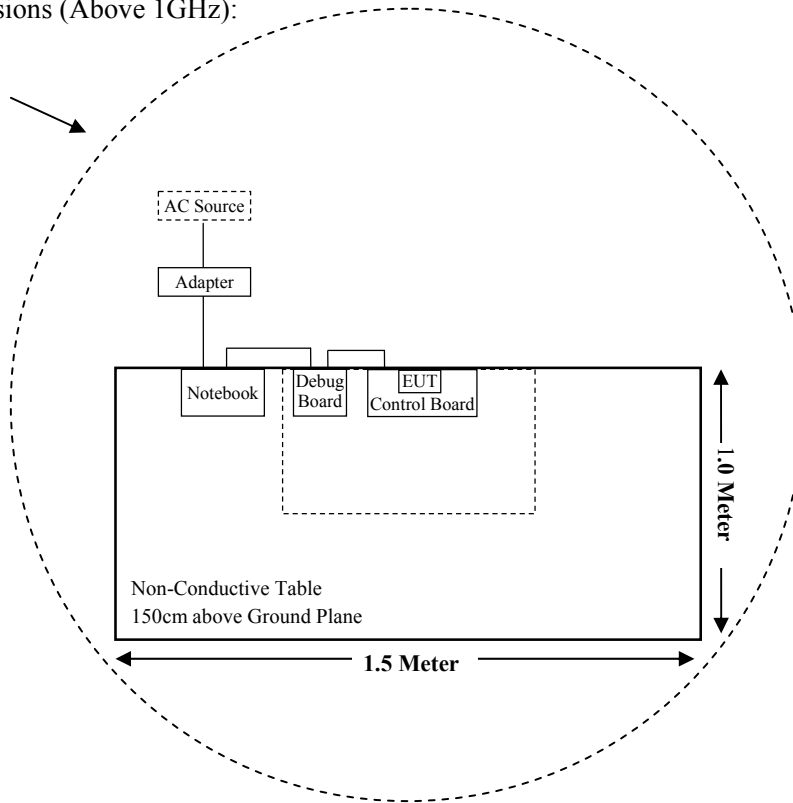
**Block Diagram of Test Setup**

For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):

Turntable  
2m Diameter



## **SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§15.247 (I), §1.1310 & §2.1091	MAXIMUM PERMISSIBLE EXPOSURE (MPE)	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant (See Note 1)
§15.247(d)	Spurious Emissions at Antenna Port	Compliant (See Note 1)
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth	Compliant (See Note 1)
§15.247(b)(3)	Maximum Conducted Output Power	Compliant (See Note 1)
§15.247(d)	Band Edge	Compliant (See Note 1)
§15.247(e)	Power Spectral Density	Compliant (See Note 1)

**Note 1:** For these items, all the test data please refer to the original report RSHA180913005-00A with FCC ID: 2AC7Z-RIGEL.



**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test (Chamber 1#)</b>					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2018-11-30	2019-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2016-12-26	2019-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2018-08-14	2019-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-8	008	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2018-08-15	2019-08-14
<b>Radiated Emission Test (Chamber 2#)</b>					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2018-08-27	2019-08-26
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2017-07-15	2020-07-14
ETS-LINDGREN	Horn Antenna	3116	00084159	2016-12-12	2019-12-11
A.H.Systems, inc	Amplifier	2641-1	466	2018-09-11	2019-09-10
A.H.Systems, inc	Amplifier	2641-1	491	2019-02-20	2020-02-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2018-03-22	2019-03-21
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2018-08-05	2019-08-04
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-11	011	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2018-08-15	2019-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2018-08-15	2019-08-14

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

**FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 15.247 (i) and subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; \* = Plane-wave equivalent power density

**Calculated Formulary:**

Predication of MPE limit at a given distance

S = PG/4πR<sup>2</sup> = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

**Calculated Data (worst case):**

Mode	Frequency Range (MHz)	Maximum Antenna Gain		Tune-up Conducted Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
Wi-Fi	2412-2462	4.20	2.63	22.00	158.49	20	0.0829	1.00
	2422-2452	4.20	2.63	21.00	125.89	20	0.0659	1.00
BLE	2402-2480	4.20	2.63	0.00	1.00	20	0.0005	1.00
Bluetooth	2402-2480	4.20	2.63	3.00	2.00	20	0.0010	1.00

**Conclusion:** The EUT meets exemption requirement- RF exposure evaluation greater than 20cm distance specified in § 2.1091. If the device built into a host as a portable usage, the additional RF exposure evaluation may be required as specified by § 2.1093.

## **FCC §15.203 - ANTENNA REQUIREMENT**

### **Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine Compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

- a. Antenna must be permanently attached to the unit.
- b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **Antenna Connector Construction**

<b>Antenna</b>	<b>Antenna Type</b>	<b>Max. Antenna Gain</b>	<b>Description</b>	<b>Result</b>
W10436069	Fakra	4.20 dBi	use a unique type of connector to attach to the EUT	Compliant
W10806955	Fakra	1.24 dBi	use a unique type of connector to attach to the EUT	Compliant
W10474143	Fakra	1.30 dBi	use a unique type of connector to attach to the EUT	Compliant

**Result:** Compliant.

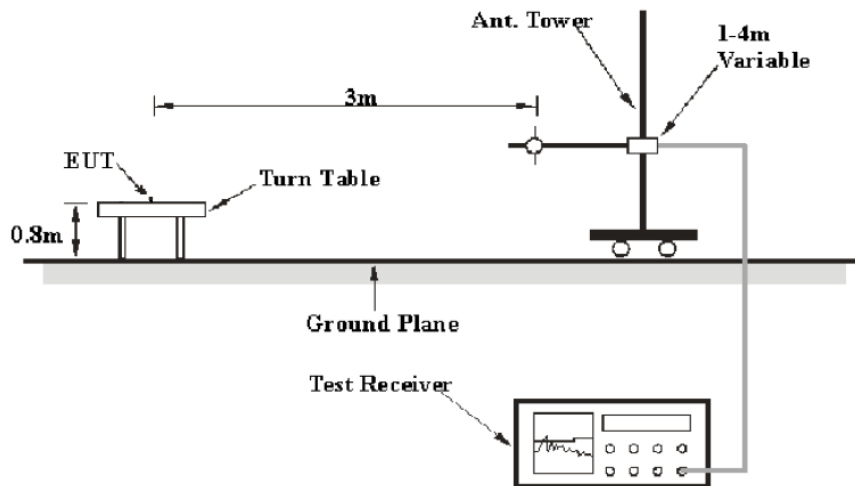
## FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

### Applicable Standard

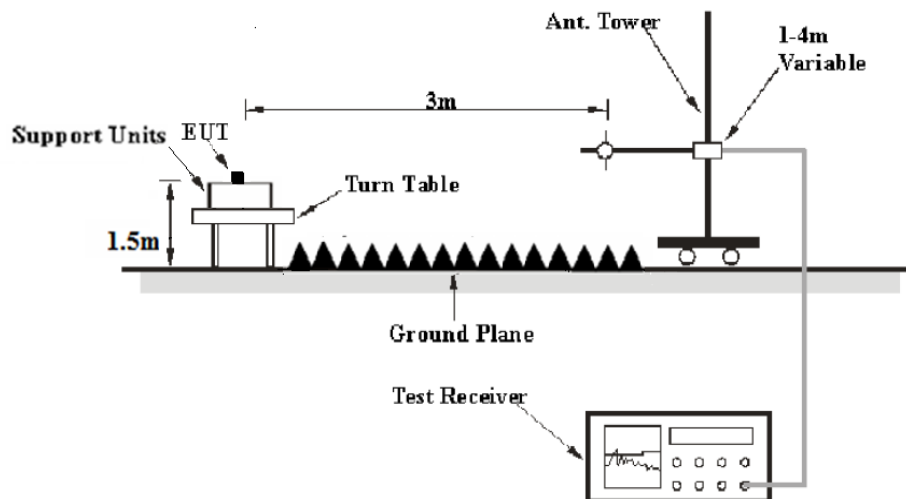
FCC §15.247 (d); §15.209; §15.205;

### EUT Setup

#### Below 1 GHz:



#### Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver Setup was set with the following configurations:

Frequency Range	RBW	VBW	Detector	Duty Cycle	Measurement method
30 MHz - 1000 MHz	120 kHz	/	QP	/	QP
Above 1GHz	1MHz	3 MHz	PK	/	PK
	1MHz	3 MHz	RMS	≥98%	Ave
	1MHz	1/T	PK	<98%	Ave

## Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection mode for frequencies above 1 GHz.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude (dBμV /m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The “**Margin**” column of the following data tables indicates the degree of Compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.1 °C~24.5°C
<b>Relative Humidity:</b>	50 %~52 %
<b>ATM Pressure:</b>	101.2kPa~101.5kPa

The testing was performed by Hope Zhang from 2019-01-23 to 2019-04-02.

**Test Result:** Compliant.

EUT operation mode: Transmitting

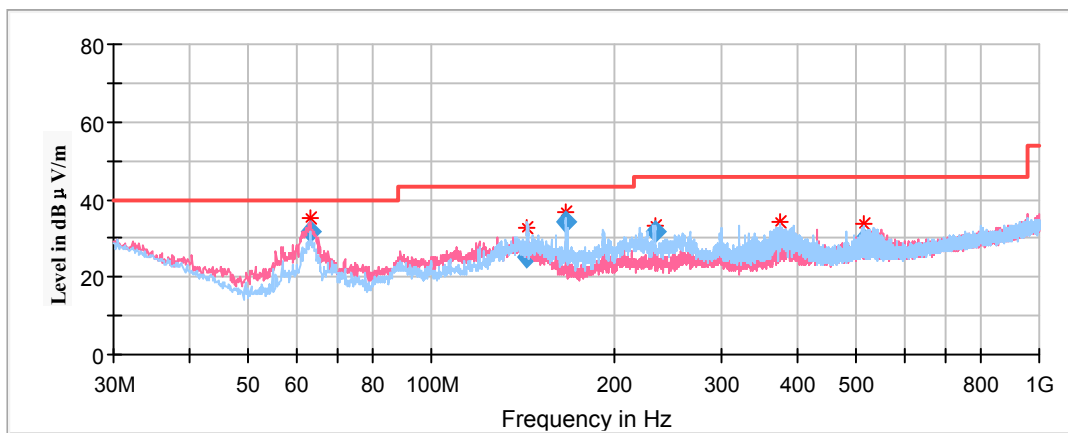
For Wi-Fi Mode:

**Spurious Emission Test:**

For Antenna W10436069:

**30MHz-1GHz:**

Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case low channel of 802.11b mode in X-axis of orientation was recorded



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
63.341950	31.78	101.0	V	54.0	-17.7	40.00	8.22
143.282600	25.08	199.0	H	107.0	-12.1	43.50	18.42
165.969300	34.00	199.0	H	96.0	-13.0	43.50	9.50
233.101250	31.51	101.0	H	140.0	-12.2	46.00	14.49
374.612550	29.43	199.0	H	159.0	-8.7	46.00	16.57
513.503350	29.93	199.0	H	50.0	-6.0	46.00	16.07

**1GHz-18GHz:**

**802.11b Mode:**

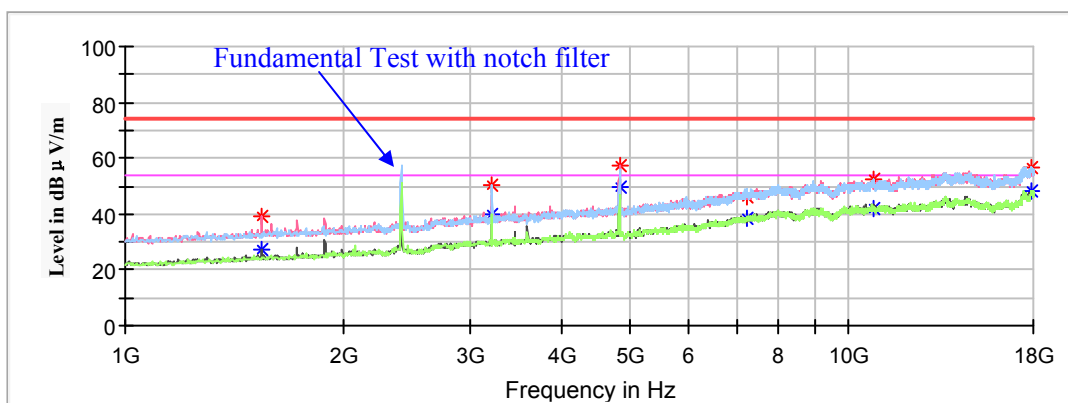
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

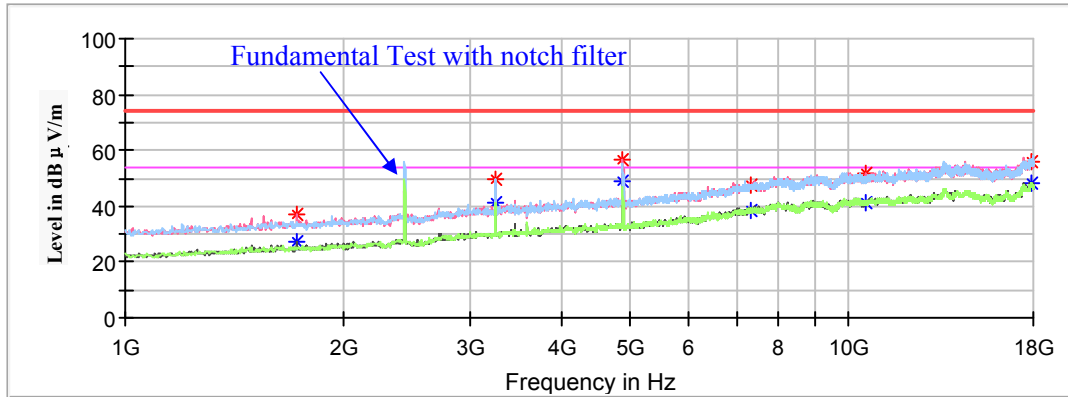
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1544.000000	---	27.00	250.0	V	174.0	-7.4	54.00	27.00
1544.000000	39.48	---	250.0	V	174.0	-7.4	74.00	34.52
3213.400000	---	40.08	200.0	H	292.0	-1.3	54.00	13.92
3213.400000	50.03	---	200.0	H	292.0	-1.3	74.00	23.97
4824.000000	57.09	---	200.0	H	170.0	1.9	74.00	16.91
4824.000000	---	49.40	200.0	H	170.0	1.9	54.00	4.60
7236.000000	46.28	---	200.0	H	0.0	9.0	74.00	27.72
7236.000000	---	38.39	200.0	H	0.0	9.0	54.00	15.61
10829.400000	---	42.01	250.0	H	213.0	13.2	54.00	11.99
10829.400000	52.74	---	250.0	H	213.0	13.2	74.00	21.26
17891.200000	---	48.16	200.0	V	31.0	17.6	54.00	5.84
17891.200000	56.38	---	200.0	V	31.0	17.6	74.00	17.62

**Middle Channel: 2437MHz**

Full Spectrum

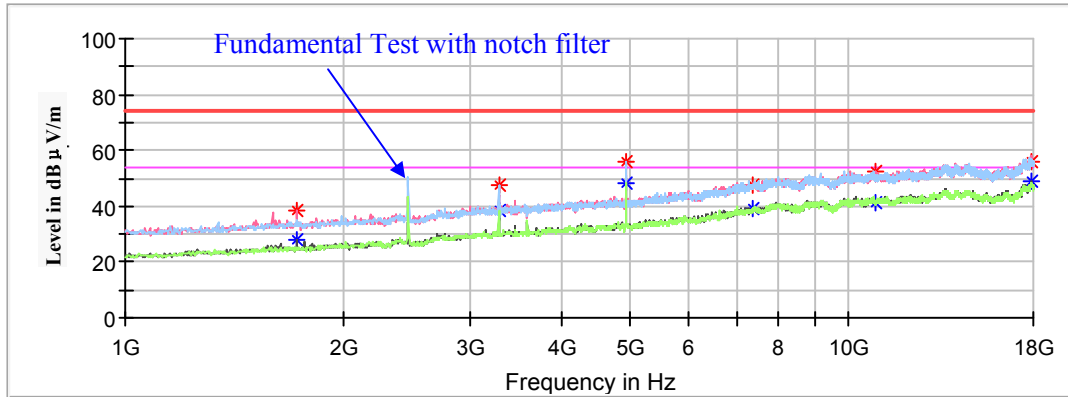


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1727.600000	---	27.61	250.0	V	99.0	-6.8	54.00	26.39
1727.600000	36.86	---	250.0	V	99.0	-6.8	74.00	37.14
3247.400000	---	41.09	200.0	H	297.0	-1.2	54.00	12.91
3247.400000	49.75	---	200.0	H	297.0	-1.2	74.00	24.25
4874.000000	---	48.63	250.0	H	211.0	1.9	54.00	5.37
4874.000000	56.84	---	250.0	H	211.0	1.9	74.00	17.16
7311.000000	---	38.44	150.0	H	207.0	9.2	54.00	15.56
7311.000000	47.75	---	150.0	H	207.0	9.2	74.00	26.25
10571.000000	---	41.23	150.0	V	7.0	12.8	54.00	12.77
10571.000000	51.97	---	150.0	V	7.0	12.8	74.00	22.03
17887.800000	55.80	---	150.0	H	153.0	17.6	74.00	18.20
17887.800000	---	48.16	150.0	H	153.0	17.6	54.00	5.84



**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	---	27.85	250.0	V	100.0	-6.8	54.00	26.15
1724.200000	38.22	---	250.0	V	100.0	-6.8	74.00	35.78
3281.400000	---	38.32	150.0	H	239.0	-1.2	54.00	15.68
3281.400000	47.89	---	150.0	H	239.0	-1.2	74.00	26.11
4924.000000	---	48.02	150.0	H	154.0	2.0	54.00	5.98
4924.000000	56.14	---	150.0	H	154.0	2.0	74.00	17.86
7386.000000	47.39	---	200.0	H	21.0	9.4	74.00	26.61
7386.000000	---	39.44	200.0	H	21.0	9.4	54.00	14.56
10877.000000	---	41.05	250.0	V	358.0	13.3	54.00	12.95
10877.000000	52.80	---	250.0	V	358.0	13.3	74.00	21.20
17911.600000	56.05	---	250.0	V	325.0	17.6	74.00	17.95
17911.600000	---	48.66	250.0	V	325.0	17.6	54.00	5.34

**802.11g Mode:**

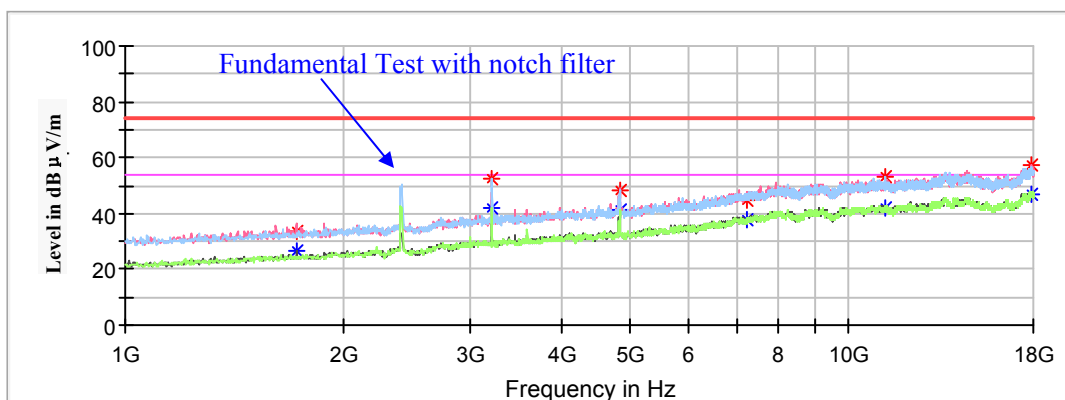
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

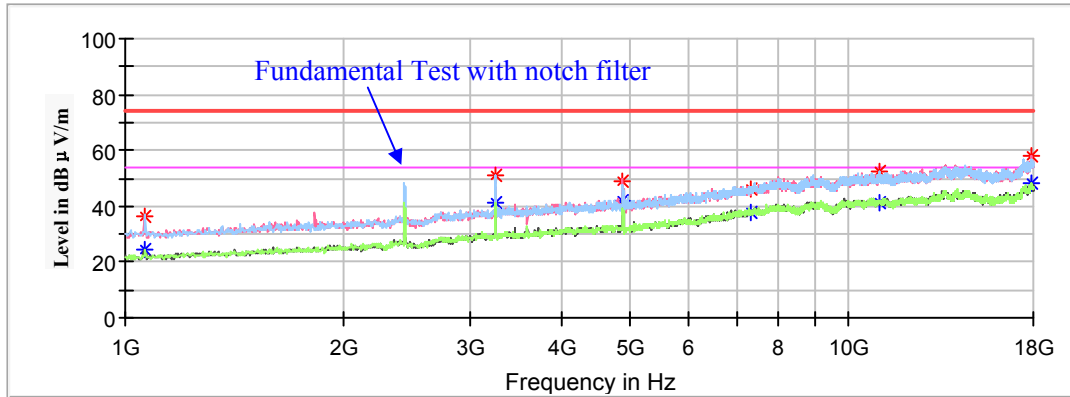
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	33.77	---	200.0	V	249.0	-6.8	74.00	40.23
1724.200000	---	26.23	200.0	V	249.0	-6.8	54.00	27.77
3213.400000	52.21	---	200.0	H	292.0	-1.3	74.00	21.79
3213.400000	---	41.71	200.0	H	292.0	-1.3	54.00	12.29
4824.000000	48.51	---	200.0	H	249.0	1.9	74.00	25.49
4824.000000	---	40.95	200.0	H	249.0	1.9	54.00	13.05
7236.000000	45.02	---	200.0	H	206.0	9.0	74.00	28.98
7236.000000	---	37.85	200.0	H	206.0	9.0	54.00	16.15
11240.800000	---	41.87	200.0	H	121.0	13.2	54.00	12.13
11240.800000	53.46	---	200.0	H	121.0	13.2	74.00	20.54
17911.600000	---	46.92	200.0	V	238.0	17.6	54.00	7.08
17911.600000	57.48	---	200.0	V	238.0	17.6	74.00	16.52

**Middle Channel: 2437MHz**

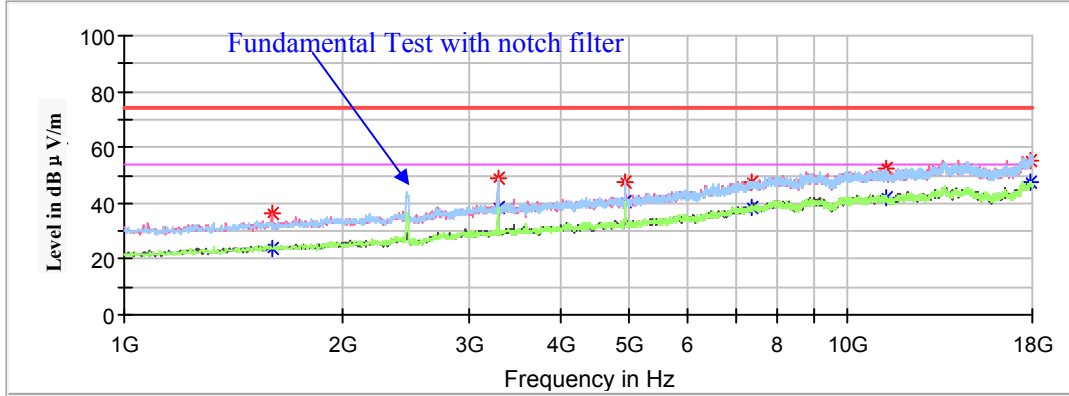
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1061.200000	36.50	---	200.0	V	201.0	-10.1	74.00	37.50
1061.200000	---	24.68	200.0	V	201.0	-10.1	54.00	29.32
3247.400000	---	41.52	200.0	H	304.0	-1.2	54.00	12.48
3247.400000	51.02	---	200.0	H	304.0	-1.2	74.00	22.98
4874.000000	48.90	---	200.0	V	212.0	1.9	74.00	25.10
4874.000000	---	41.78	200.0	V	212.0	1.9	54.00	12.22
7311.000000	46.41	---	200.0	V	287.0	9.2	74.00	27.59
7311.000000	---	37.77	200.0	V	287.0	9.2	54.00	16.23
10999.400000	---	41.55	200.0	H	138.0	13.5	54.00	12.45
10999.400000	52.25	---	200.0	H	138.0	13.5	74.00	21.75
17898.000000	---	48.07	200.0	V	359.0	17.6	54.00	5.93
17898.000000	58.39	---	200.0	V	359.0	17.6	74.00	15.61

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1598.400000	---	23.71	200.0	V	196.0	-7.2	54.00	30.29
1598.400000	36.21	---	200.0	V	196.0	-7.2	74.00	37.79
3281.400000	48.98	---	200.0	H	303.0	-1.2	74.00	25.02
3281.400000	---	38.69	200.0	H	303.0	-1.2	54.00	15.31
4924.000000	47.88	---	200.0	H	142.0	2.0	74.00	26.12
4924.000000	---	40.70	200.0	H	142.0	2.0	54.00	13.30
7386.000000	---	38.38	200.0	H	153.0	9.4	54.00	15.62
7386.000000	47.50	---	200.0	H	153.0	9.4	74.00	26.50
11271.400000	---	42.01	200.0	H	110.0	13.1	54.00	11.99
11271.400000	52.28	---	200.0	H	110.0	13.1	74.00	21.72
17911.600000	55.50	---	200.0	V	121.0	17.6	74.00	18.50
17911.600000	---	47.63	200.0	V	121.0	17.6	54.00	6.37

**802.11n-HT20 Mode:**

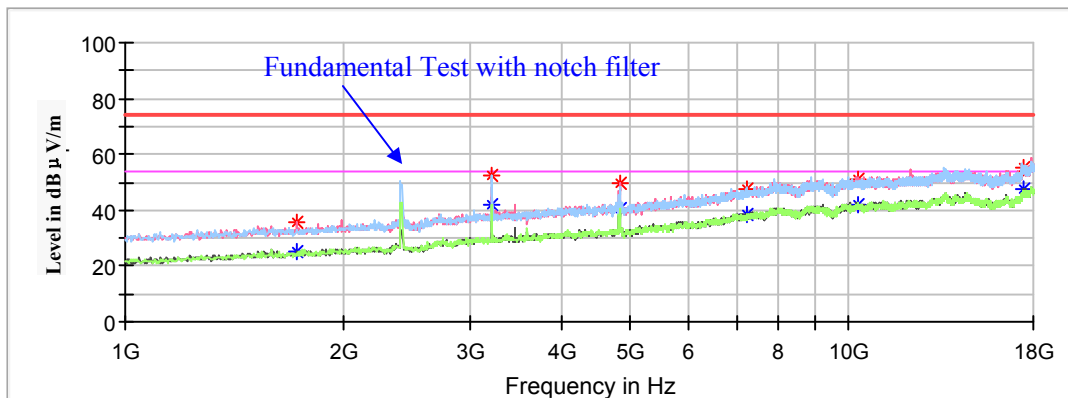
*(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)*

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

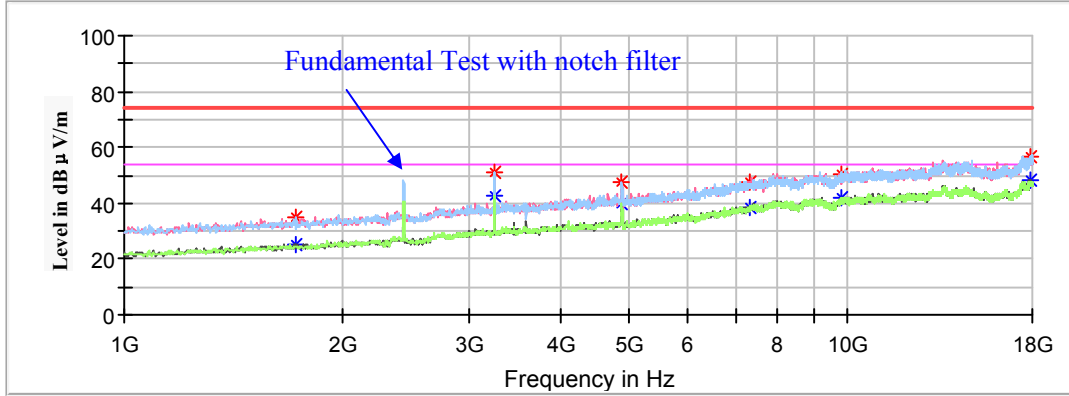
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	35.57	---	200.0	V	281.0	-6.8	74.00	38.43
1724.200000	---	25.03	200.0	V	281.0	-6.8	54.00	28.97
3213.400000	52.32	---	200.0	H	304.0	-1.3	74.00	21.68
3213.400000	---	41.91	200.0	H	304.0	-1.3	54.00	12.09
4824.000000	---	40.38	200.0	V	153.0	1.9	54.00	13.62
4824.000000	49.81	---	200.0	V	153.0	1.9	74.00	24.19
7236.000000	47.37	---	200.0	V	164.0	9.0	74.00	26.63
7236.000000	---	38.19	200.0	V	164.0	9.0	54.00	15.81
10299.000000	51.22	---	200.0	V	292.0	12.7	74.00	22.78
10299.000000	---	42.24	200.0	V	292.0	12.7	54.00	11.76
17469.600000	55.09	---	200.0	V	164.0	17.0	74.00	18.91
17469.600000	---	47.30	200.0	V	164.0	17.0	54.00	6.70

**Middle Channel: 2437MHz**

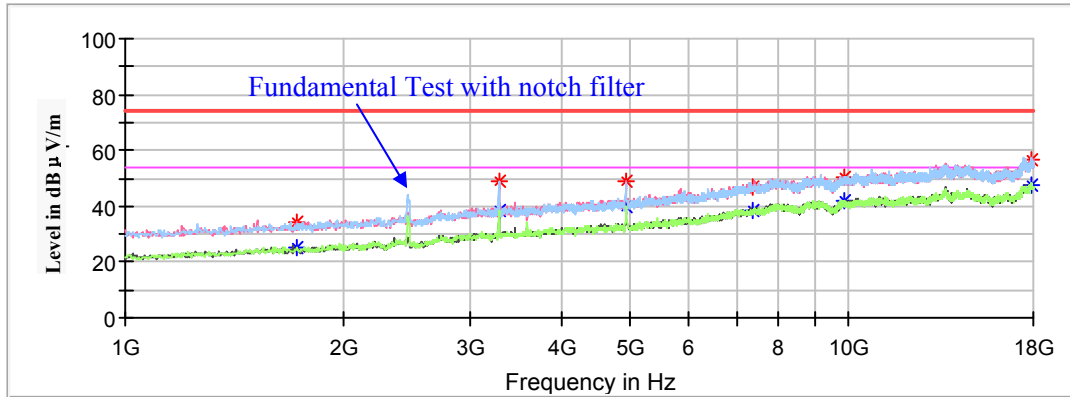
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	35.24	---	200.0	V	250.0	-6.8	74.00	38.76
1727.600000	---	25.30	200.0	V	250.0	-6.8	54.00	28.70
3247.400000	51.04	---	200.0	H	292.0	-1.2	74.00	22.96
3247.400000	---	42.39	200.0	H	292.0	-1.2	54.00	11.61
4874.000000	---	40.16	200.0	H	132.0	1.9	54.00	13.84
4874.000000	47.60	---	200.0	H	132.0	1.9	74.00	26.40
7311.000000	47.55	---	200.0	H	292.0	9.2	74.00	26.45
7311.000000	---	38.17	200.0	H	292.0	9.2	54.00	15.83
9802.600000	50.02	---	200.0	H	0.0	12.1	74.00	23.98
9802.600000	---	41.71	200.0	H	0.0	12.1	54.00	12.29
17908.200000	---	48.03	200.0	V	11.0	17.6	54.00	5.97
17908.200000	56.56	---	200.0	V	11.0	17.6	74.00	17.44

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1724.200000	34.60	---	200.0	V	241.0	-6.8	74.00	39.40
1724.200000	---	25.35	200.0	V	241.0	-6.8	54.00	28.65
3281.400000	48.67	---	200.0	H	303.0	-1.2	74.00	25.33
3281.400000	---	38.72	200.0	H	303.0	-1.2	54.00	15.28
4924.000000	49.27	---	200.0	V	241.0	2.0	74.00	24.73
4924.000000	---	40.14	200.0	V	241.0	2.0	54.00	13.86
7386.000000	---	38.54	200.0	V	80.0	9.4	54.00	15.46
7386.000000	46.66	---	200.0	V	80.0	9.4	74.00	27.34
9853.600000	50.30	---	200.0	H	62.0	12.3	74.00	23.70
9853.600000	---	41.76	200.0	H	62.0	12.3	54.00	12.24
17884.400000	56.61	---	200.0	V	0.0	17.6	74.00	17.39
17884.400000	---	47.54	200.0	V	0.0	17.6	54.00	6.46

**802.11n-HT40 Mode:**

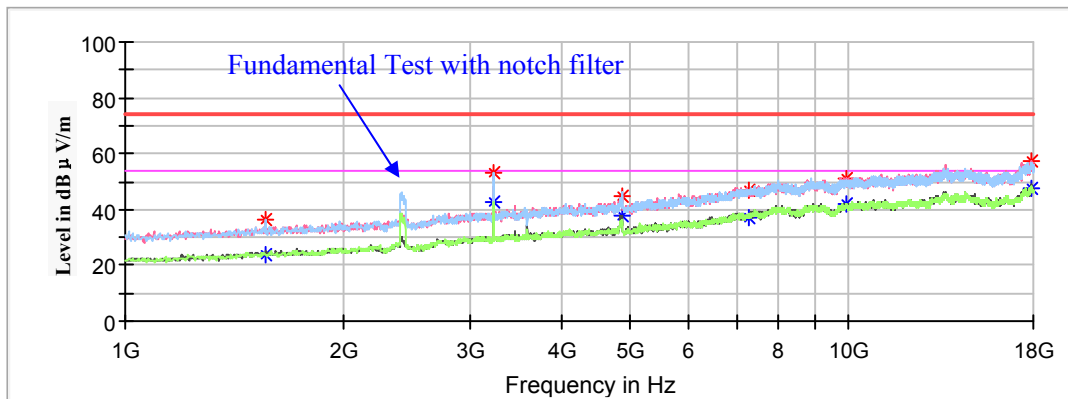
*(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)*

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)  
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

**Low Channel: 2422MHz**

Full Spectrum

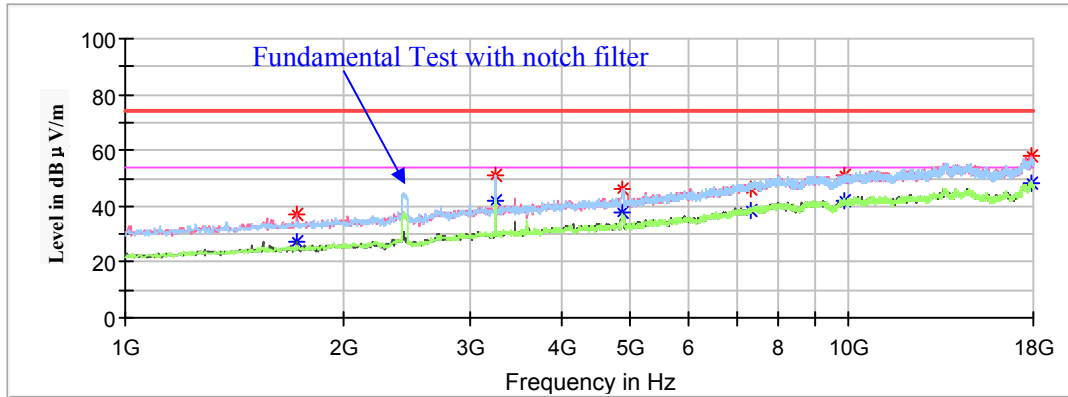


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1564.400000	36.26	---	200.0	H	230.0	-7.3	74.00	37.74
1564.400000	---	24.06	200.0	H	230.0	-7.3	54.00	29.94
3227.000000	52.80	---	200.0	H	294.0	-1.2	74.00	21.20
3227.000000	---	42.57	200.0	H	294.0	-1.2	54.00	11.43
4844.000000	---	37.53	200.0	V	311.0	1.9	54.00	16.47
4844.000000	45.08	---	200.0	V	311.0	1.9	74.00	28.92
7266.000000	46.63	---	200.0	V	301.0	9.1	74.00	27.37
7266.000000	---	37.38	200.0	V	301.0	9.1	54.00	16.62
9911.400000	50.93	---	200.0	V	179.0	12.4	74.00	23.07
9911.400000	---	41.82	200.0	V	179.0	12.4	54.00	12.18
17857.200000	57.10	---	200.0	V	311.0	17.6	74.00	16.90
17857.200000	---	47.36	200.0	V	311.0	17.6	54.00	6.64



**Middle Channel: 2437MHz**

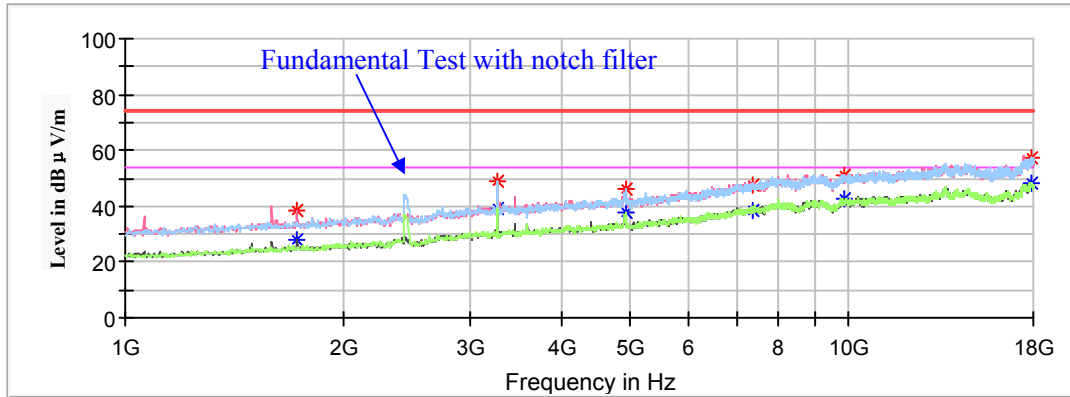
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	37.18	---	250.0	V	101.0	-6.8	74.00	36.82
1727.600000	---	27.26	250.0	V	101.0	-6.8	54.00	26.74
3247.400000	51.34	---	200.0	H	292.0	-1.2	74.00	22.66
3247.400000	---	41.72	200.0	H	292.0	-1.2	54.00	12.28
4874.000000	45.88	---	150.0	V	45.0	1.9	74.00	28.12
4874.000000	---	37.76	150.0	V	45.0	1.9	54.00	16.24
7311.000000	46.47	---	150.0	V	169.0	9.2	74.00	27.53
7311.000000	---	38.77	150.0	V	169.0	9.2	54.00	15.23
9850.200000	51.15	---	250.0	V	165.0	12.2	74.00	22.85
9850.200000	---	42.31	250.0	V	165.0	12.2	54.00	11.69
17891.200000	---	48.02	250.0	V	255.0	17.6	54.00	5.98
17891.200000	57.88	---	250.0	V	255.0	17.6	74.00	16.12

**High Channel: 2452MHz**

Full Spectrum

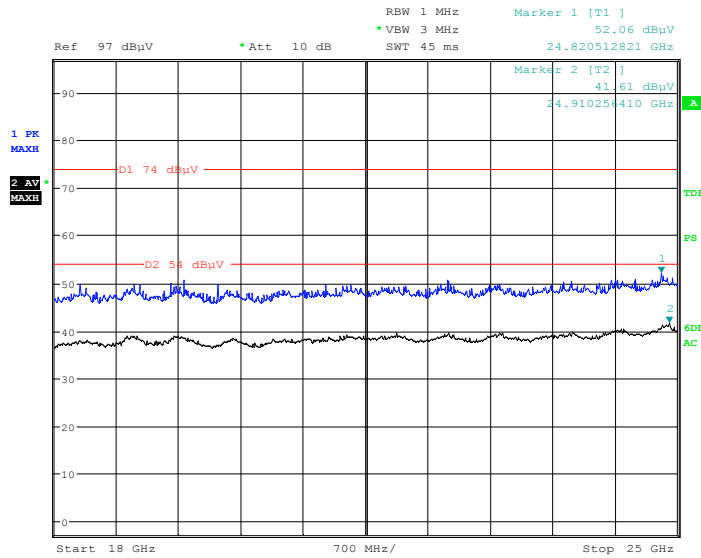


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1724.200000	38.30	---	250.0	V	89.0	-6.8	74.00	35.70
1724.200000	---	28.22	250.0	V	89.0	-6.8	54.00	25.78
3267.800000	48.92	---	200.0	H	287.0	-1.2	74.00	25.08
3267.800000	---	39.41	200.0	H	287.0	-1.2	54.00	14.59
4904.000000	46.10	---	150.0	H	142.0	2.0	74.00	27.90
4904.000000	---	37.52	150.0	H	142.0	2.0	54.00	16.48
7356.000000	47.55	---	150.0	H	78.0	9.3	74.00	26.45
7356.000000	---	38.71	150.0	H	78.0	9.3	54.00	15.29
9840.000000	---	42.64	200.0	V	242.0	12.2	54.00	11.36
9840.000000	51.10	---	200.0	V	242.0	12.2	74.00	22.90
17860.600000	57.52	---	200.0	H	186.0	17.6	74.00	16.48
17860.600000	---	47.95	200.0	H	186.0	17.6	54.00	6.05

**18GHz-25GHz:**

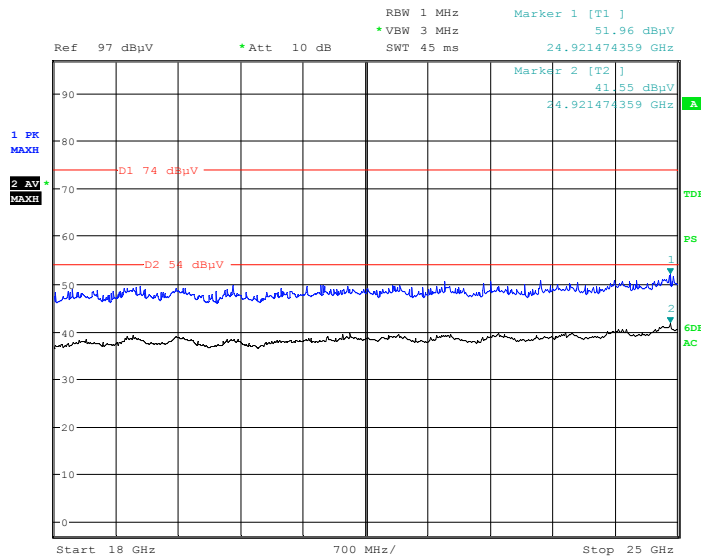
*Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case low channel of 802.11b mode in X-axis of orientation was recorded*

**Horizontal**



Date: 23.JAN.2019 17:20:32

**Vertical**



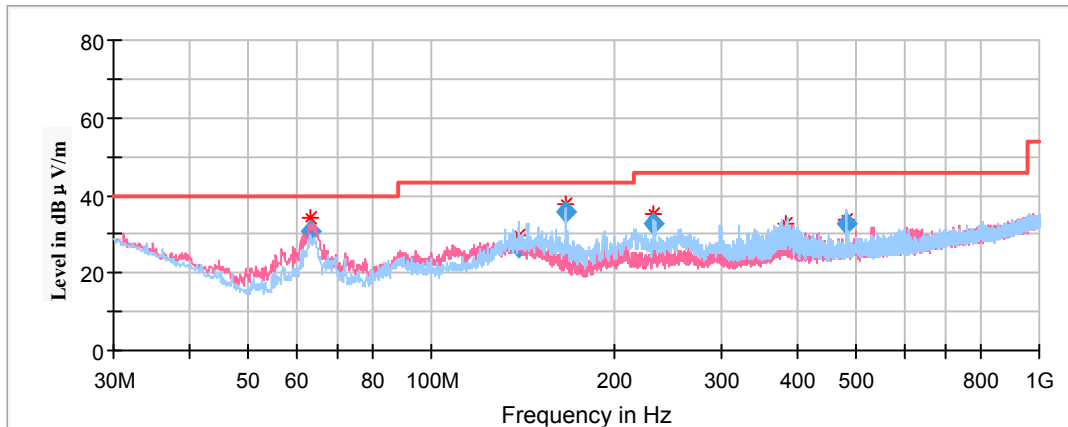
Date: 23.JAN.2019 17:40:59

### Spurious Emission Test

**For Antenna W10806955:**

**30MHz-1GHz:**

*Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case low channel of 802.11b mode in X-axis of orientation was recorded*



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
63.410900	30.78	101.0	V	39.0	-17.7	40.00	9.22
139.346650	26.81	199.0	H	87.0	-11.9	43.50	16.69
166.011300	35.71	199.0	H	97.0	-13.0	43.50	7.79
232.376500	32.63	101.0	H	118.0	-12.2	46.00	13.37
384.394600	27.91	199.0	H	188.0	-8.4	46.00	18.09
480.001350	32.54	199.0	H	300.0	-6.7	46.00	13.46

**1GHz-18GHz:**

**802.11b Mode:**

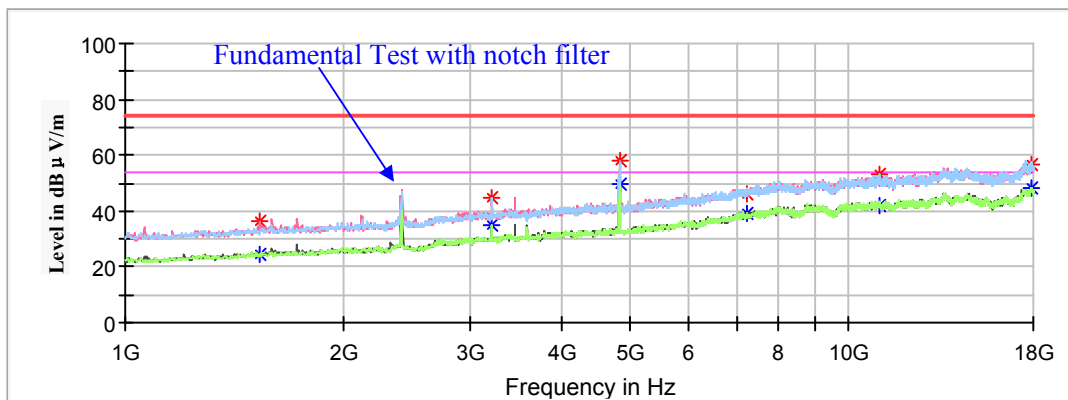
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

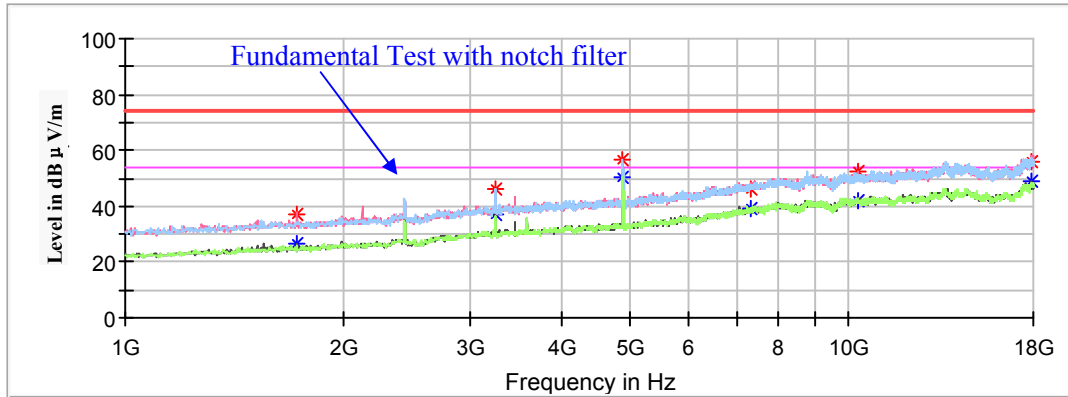
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1537.200000	---	24.30	250.0	V	0.0	-7.4	54.00	29.70
1537.200000	36.38	---	250.0	V	0.0	-7.4	74.00	37.62
3213.400000	---	35.14	250.0	V	127.0	-1.3	54.00	18.86
3213.400000	44.76	---	250.0	V	127.0	-1.3	74.00	29.24
4824.000000	58.13	---	150.0	H	47.0	1.9	74.00	15.87
4824.000000	---	49.70	150.0	H	47.0	1.9	54.00	4.30
7236.000000	46.25	---	250.0	H	335.0	9.0	74.00	27.75
7236.000000	---	39.05	250.0	H	335.0	9.0	54.00	14.95
11013.000000	---	42.07	150.0	H	207.0	13.5	54.00	11.93
11013.000000	53.14	---	150.0	H	207.0	13.5	74.00	20.86
17925.200000	56.56	---	150.0	V	100.0	17.6	74.00	17.44
17925.200000	---	48.26	150.0	V	100.0	17.6	54.00	5.74

**Middle Channel: 2437MHz**

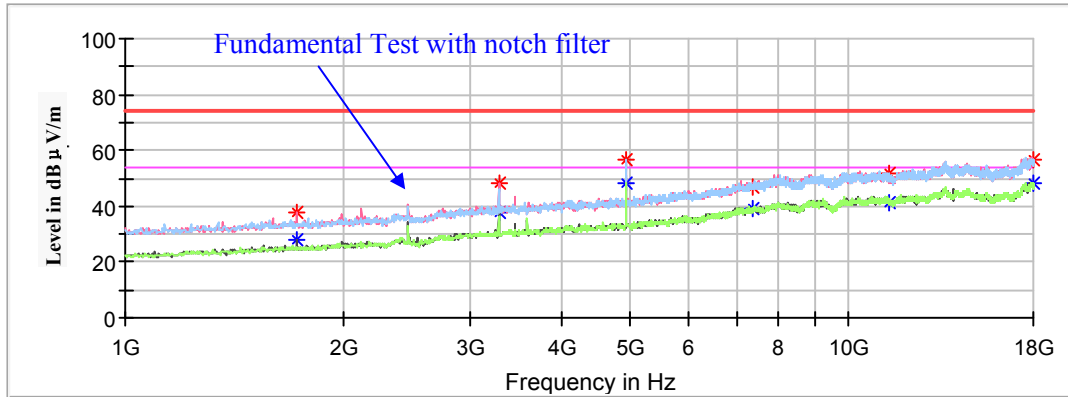
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1724.200000	---	26.77	250.0	V	84.0	-6.8	54.00	27.23
1724.200000	36.85	---	250.0	V	84.0	-6.8	74.00	37.15
3247.400000	---	36.87	250.0	V	159.0	-1.2	54.00	17.13
3247.400000	46.05	---	250.0	V	159.0	-1.2	74.00	27.95
4874.000000	56.89	---	150.0	H	222.0	1.9	74.00	17.11
4874.000000	---	50.54	150.0	H	222.0	1.9	54.00	3.46
7311.000000	46.46	---	200.0	H	1.0	9.2	74.00	27.54
7311.000000	---	39.21	200.0	H	1.0	9.2	54.00	14.79
10319.400000	---	41.84	200.0	V	6.0	12.7	54.00	12.16
10319.400000	52.61	---	200.0	V	6.0	12.7	74.00	21.39
17918.400000	55.79	---	150.0	V	170.0	17.6	74.00	18.21
17918.400000	---	48.62	150.0	V	170.0	17.6	54.00	5.38

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	---	27.91	250.0	V	89.0	-6.8	54.00	26.09
1724.200000	37.90	---	250.0	V	89.0	-6.8	74.00	36.10
3281.400000	---	37.67	150.0	V	222.0	-1.2	54.00	16.33
3281.400000	47.91	---	150.0	V	222.0	-1.2	74.00	26.09
4924.000000	56.42	---	150.0	H	222.0	2.0	74.00	17.58
4924.000000	---	48.32	150.0	H	222.0	2.0	54.00	5.68
7386.000000	46.87	---	250.0	H	1.0	9.4	74.00	27.13
7386.000000	---	39.29	250.0	H	1.0	9.4	54.00	14.71
11363.200000	---	41.47	250.0	H	180.0	13.0	54.00	12.53
11363.200000	52.10	---	250.0	H	180.0	13.0	74.00	21.90
17966.000000	56.45	---	150.0	V	72.0	17.7	74.00	17.55
17966.000000	---	48.55	150.0	V	72.0	17.7	54.00	5.45

**802.11g Mode:**

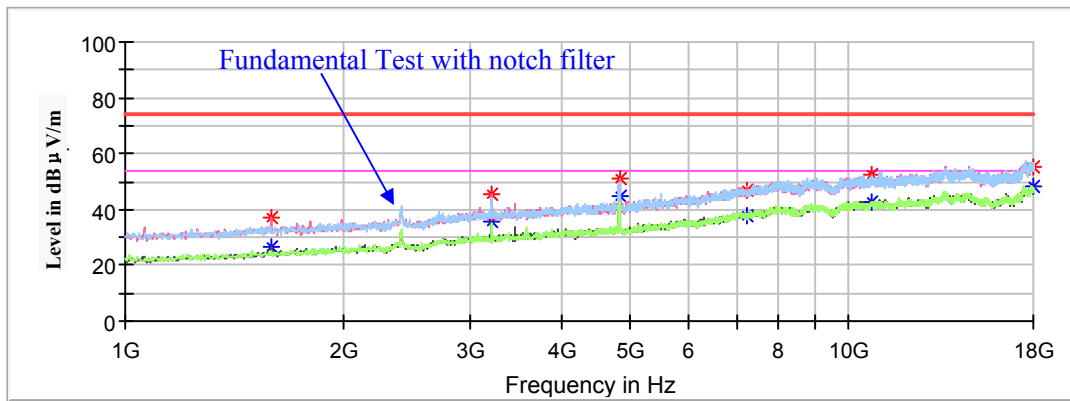
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

Full Spectrum

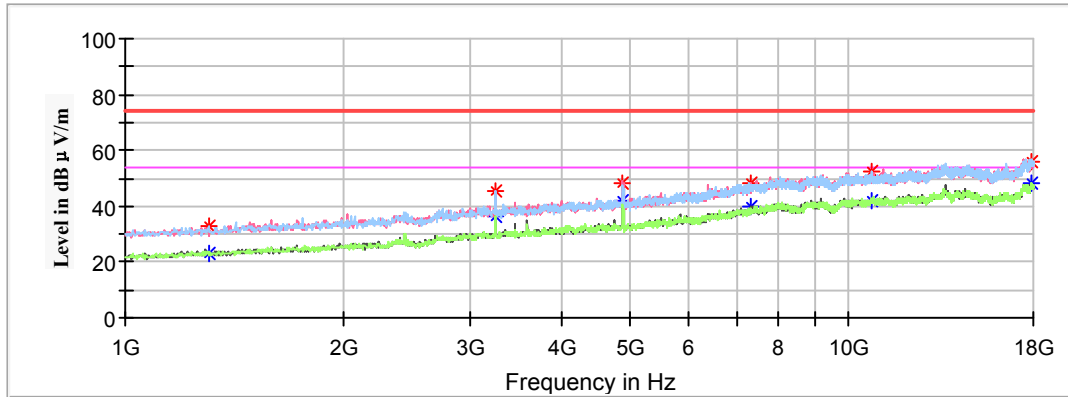


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	36.87	---	150.0	V	342.0	-7.2	74.00	37.13
1591.600000	---	26.54	150.0	V	342.0	-7.2	54.00	27.46
3213.400000	45.55	---	150.0	V	320.0	-1.3	74.00	28.45
3213.400000	---	35.46	150.0	V	320.0	-1.3	54.00	18.54
4824.000000	---	44.46	150.0	V	42.0	1.9	54.00	9.54
4824.000000	51.29	---	150.0	V	42.0	1.9	74.00	22.71
7236.000000	---	37.83	150.0	V	11.0	9.0	54.00	16.17
7236.000000	46.93	---	150.0	V	11.0	9.0	74.00	27.07
10744.400000	---	42.36	150.0	H	57.0	13.1	54.00	11.64
10744.400000	52.18	---	150.0	H	57.0	13.1	74.00	21.82
17949.000000	54.92	---	150.0	V	42.0	17.7	74.00	19.08
17949.000000	---	47.92	150.0	V	42.0	17.7	54.00	6.08



**Middle Channel: 2437MHz**

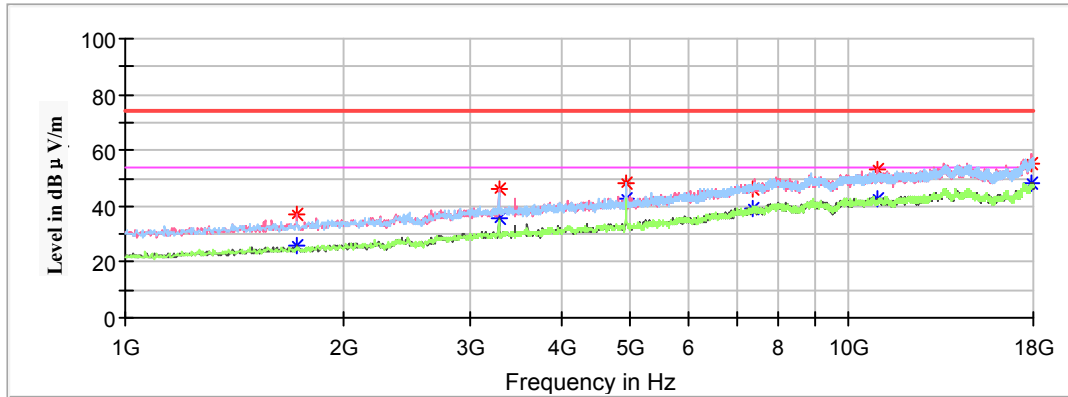
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1302.600000	---	23.30	150.0	H	153.0	-8.7	54.00	30.70
1302.600000	33.05	---	150.0	H	153.0	-8.7	74.00	40.95
3247.400000	---	36.36	150.0	V	249.0	-1.2	54.00	17.64
3247.400000	45.57	---	150.0	V	249.0	-1.2	74.00	28.43
4874.000000	48.39	---	150.0	V	239.0	1.9	74.00	25.61
4874.000000	---	41.87	150.0	V	239.0	1.9	54.00	12.13
7311.000000	---	39.96	150.0	V	334.0	9.2	54.00	14.04
7311.000000	48.01	---	150.0	V	334.0	9.2	74.00	25.99
10768.200000	---	42.04	150.0	H	195.0	13.1	54.00	11.96
10768.200000	52.71	---	150.0	H	195.0	13.1	74.00	21.29
17908.200000	56.02	---	150.0	H	174.0	17.6	74.00	17.98
17908.200000	---	47.95	150.0	H	174.0	17.6	54.00	6.05

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1727.600000	---	25.76	150.0	V	249.0	-6.8	54.00	28.24
1727.600000	36.85	---	150.0	V	249.0	-6.8	74.00	37.15
3281.400000	---	35.94	150.0	V	249.0	-1.2	54.00	18.06
3281.400000	46.34	---	150.0	V	249.0	-1.2	74.00	27.66
4924.000000	48.47	---	150.0	H	223.0	2.0	74.00	25.53
4924.000000	---	42.36	150.0	H	223.0	2.0	54.00	11.64
7386.000000	46.22	---	150.0	H	164.0	9.4	74.00	27.78
7386.000000	---	38.86	150.0	H	164.0	9.4	54.00	15.14
10982.400000	---	42.82	150.0	V	153.0	13.5	54.00	11.18
10982.400000	52.83	---	150.0	V	153.0	13.5	74.00	21.17
17887.800000	55.38	---	150.0	V	0.0	17.6	74.00	18.62
17887.800000	---	48.35	150.0	V	0.0	17.6	54.00	5.65

**802.11n-HT20 Mode:**

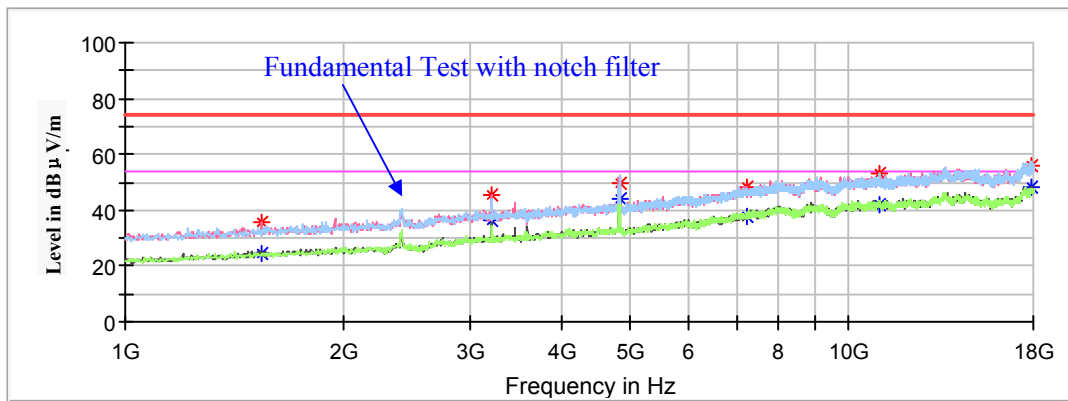
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBμV /m) = Corrected Factor (dB/m) + Reading (dBμV)  
 Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV /m)

**Low Channel: 2412MHz**

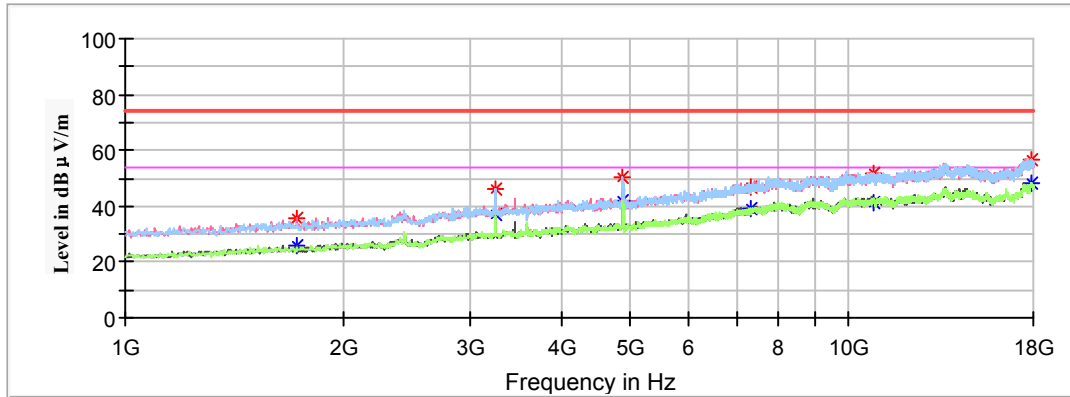
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1544.000000	---	24.17	150.0	V	349.0	-7.4	54.00	29.83
1544.000000	35.79	---	150.0	V	349.0	-7.4	74.00	38.21
3213.400000	45.14	---	150.0	V	116.0	-1.3	74.00	28.86
3213.400000	---	36.14	150.0	V	116.0	-1.3	54.00	17.86
4824.000000	49.77	---	150.0	V	239.0	1.9	74.00	24.23
4824.000000	---	44.16	150.0	V	239.0	1.9	54.00	9.84
7236.000000	---	37.84	150.0	V	95.0	9.0	54.00	16.16
7236.000000	48.07	---	150.0	V	95.0	9.0	74.00	25.93
11043.600000	---	42.01	150.0	H	282.0	13.4	54.00	11.99
11043.600000	52.94	---	150.0	H	282.0	13.4	74.00	21.06
17935.400000	56.06	---	150.0	V	138.0	17.7	74.00	17.94
17935.400000	---	48.18	150.0	V	138.0	17.7	54.00	5.82

**Middle Channel: 2437MHz**

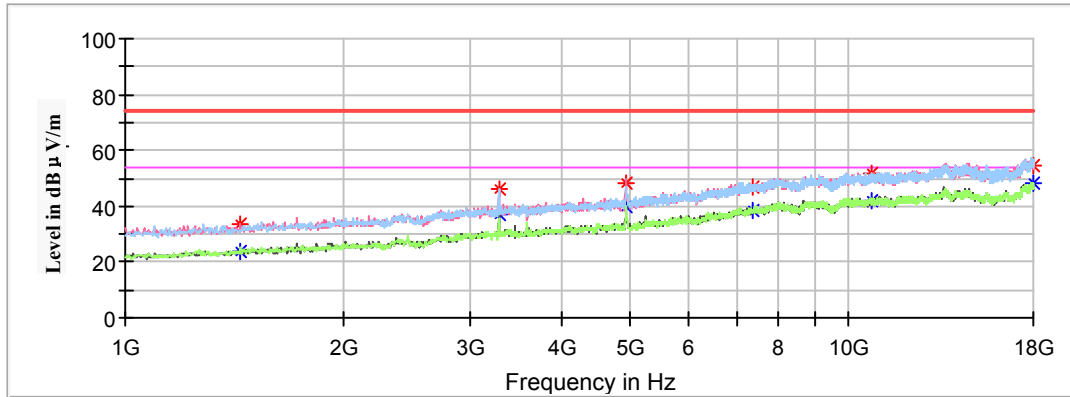
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	35.93	---	150.0	V	1.0	-6.8	74.00	38.07
1724.200000	---	25.77	150.0	V	1.0	-6.8	54.00	28.23
3247.400000	46.09	---	150.0	V	248.0	-1.2	74.00	27.91
3247.400000	---	36.91	150.0	V	248.0	-1.2	54.00	17.09
4874.000000	---	41.68	150.0	H	222.0	1.9	54.00	12.32
4874.000000	50.52	---	150.0	H	222.0	1.9	74.00	23.48
7311.000000	---	38.93	150.0	H	114.0	9.2	54.00	15.07
7311.000000	46.83	---	150.0	H	114.0	9.2	74.00	27.17
10812.400000	51.70	---	150.0	H	105.0	13.2	74.00	22.30
10812.400000	---	41.48	150.0	H	105.0	13.2	54.00	12.52
17894.600000	---	47.94	150.0	V	1.0	17.6	54.00	6.06
17894.600000	56.91	---	150.0	V	1.0	17.6	74.00	17.09

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1442.000000	33.29	---	150.0	V	20.0	-7.9	74.00	40.71
1442.000000	---	23.76	150.0	V	20.0	-7.9	54.00	30.24
3281.400000	---	37.15	150.0	V	250.0	-1.2	54.00	16.85
3281.400000	46.32	---	150.0	V	250.0	-1.2	74.00	27.68
4924.000000	---	40.01	150.0	H	228.0	2.0	54.00	13.99
4924.000000	48.07	---	150.0	H	228.0	2.0	74.00	25.93
7386.000000	---	38.18	150.0	H	287.0	9.4	54.00	15.82
7386.000000	46.85	---	150.0	H	287.0	9.4	74.00	27.15
10737.600000	---	41.70	150.0	V	132.0	13.1	54.00	12.30
10737.600000	51.77	---	150.0	V	132.0	13.1	74.00	22.23
17949.000000	54.67	---	150.0	V	111.0	17.7	74.00	19.33
17949.000000	---	48.36	150.0	V	111.0	17.7	54.00	5.64

**802.11n-HT40 Mode:**

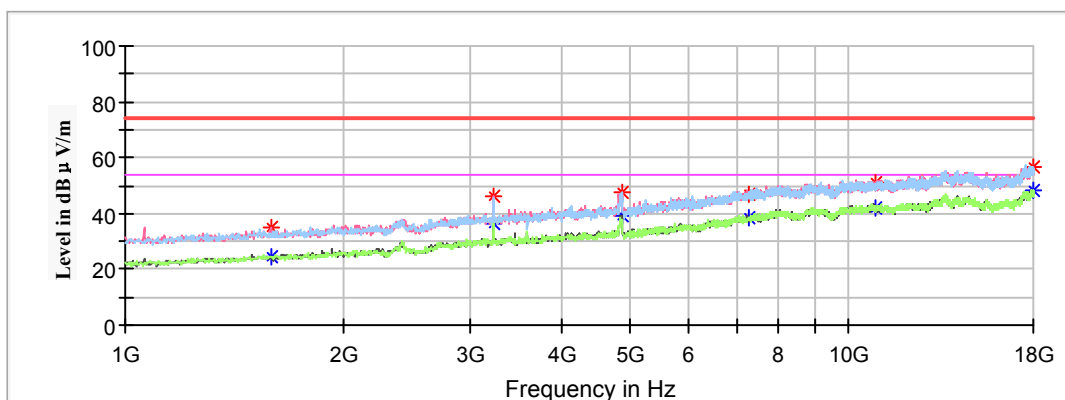
*(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)*

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2422MHz**

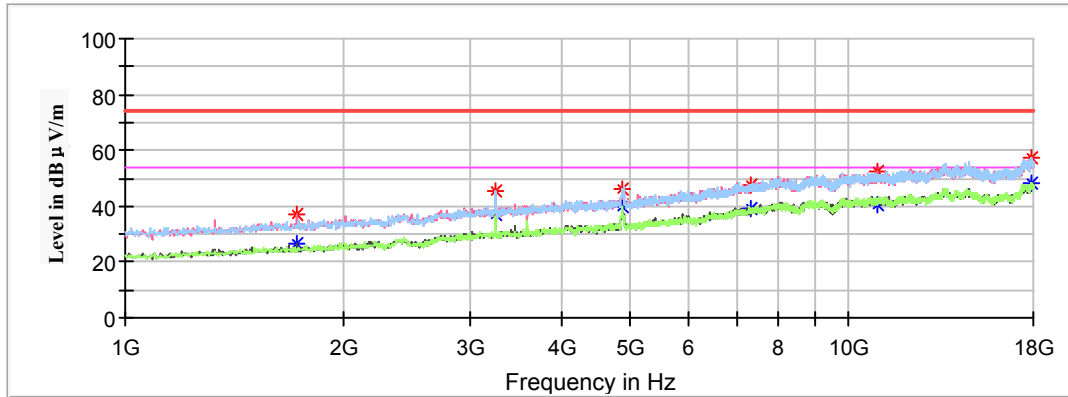
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1588.200000	---	24.26	150.0	V	271.0	-7.3	54.00	29.74
1588.200000	34.97	---	150.0	V	271.0	-7.3	74.00	39.03
3227.000000	---	36.11	150.0	V	78.0	-1.2	54.00	17.89
3227.000000	45.95	---	150.0	V	78.0	-1.2	74.00	28.05
4844.000000	47.51	---	150.0	H	57.0	1.9	74.00	26.49
4844.000000	---	39.21	150.0	H	57.0	1.9	54.00	14.79
7266.000000	46.95	---	150.0	H	111.0	9.1	74.00	27.05
7266.000000	---	38.39	150.0	H	111.0	9.1	54.00	15.61
10870.200000	---	41.94	150.0	V	57.0	13.3	54.00	12.06
10870.200000	51.34	---	150.0	V	57.0	13.3	74.00	22.66
17945.600000	56.35	---	150.0	H	276.0	17.7	74.00	17.65
17945.600000	---	48.35	150.0	H	276.0	17.7	54.00	5.65

**Middle Channel: 2437MHz**

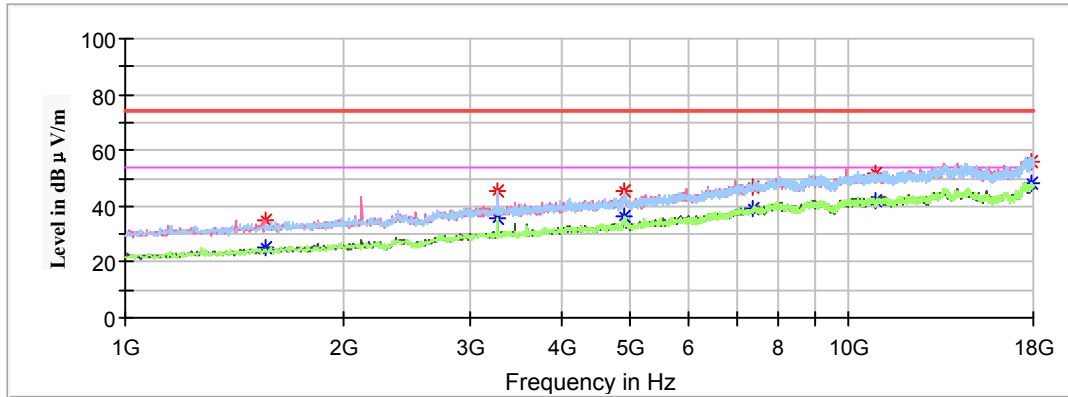
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1727.600000	---	26.31	150.0	V	142.0	-6.8	54.00	27.69
1727.600000	36.87	---	150.0	V	142.0	-6.8	74.00	37.13
3247.400000	45.77	---	150.0	V	291.0	-1.2	74.00	28.23
3247.400000	---	36.99	150.0	V	291.0	-1.2	54.00	17.01
4874.000000	45.84	---	150.0	H	210.0	1.9	74.00	28.16
4874.000000	---	40.19	150.0	H	210.0	1.9	54.00	13.81
7311.000000	47.36	---	150.0	H	227.0	9.2	74.00	26.64
7311.000000	---	38.94	150.0	H	227.0	9.2	54.00	15.06
10958.600000	---	40.84	150.0	V	185.0	13.4	54.00	13.16
10958.600000	52.62	---	150.0	V	185.0	13.4	74.00	21.38
17887.800000	57.23	---	150.0	V	342.0	17.6	74.00	16.77
17887.800000	---	48.27	150.0	V	342.0	17.6	54.00	5.73

**High Channel: 2452MHz**

Full Spectrum



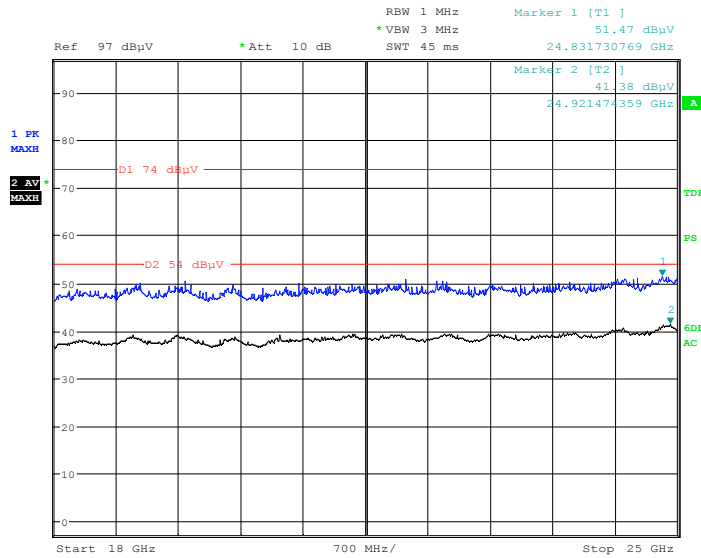
Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1561.000000	35.31	---	150.0	V	0.0	-7.4	74.00	38.69
1561.000000	---	25.00	150.0	V	0.0	-7.4	54.00	29.00
3267.800000	45.13	---	150.0	H	272.0	-1.2	74.00	28.87
3267.800000	---	35.45	150.0	H	272.0	-1.2	54.00	18.55
4904.000000	---	36.36	150.0	H	35.0	2.0	54.00	17.64
4904.000000	45.41	---	150.0	H	35.0	2.0	74.00	28.59
7356.000000	47.19	---	150.0	H	100.0	9.3	74.00	26.81
7356.000000	---	39.20	150.0	H	100.0	9.3	54.00	14.80
10911.000000	---	42.26	150.0	H	18.0	13.4	54.00	11.74
10911.000000	51.71	---	150.0	H	18.0	13.4	74.00	22.29
17925.200000	55.80	---	150.0	V	79.0	17.6	74.00	18.20
17925.200000	---	48.17	150.0	V	79.0	17.6	54.00	5.83



**18GHz-25GHz:**

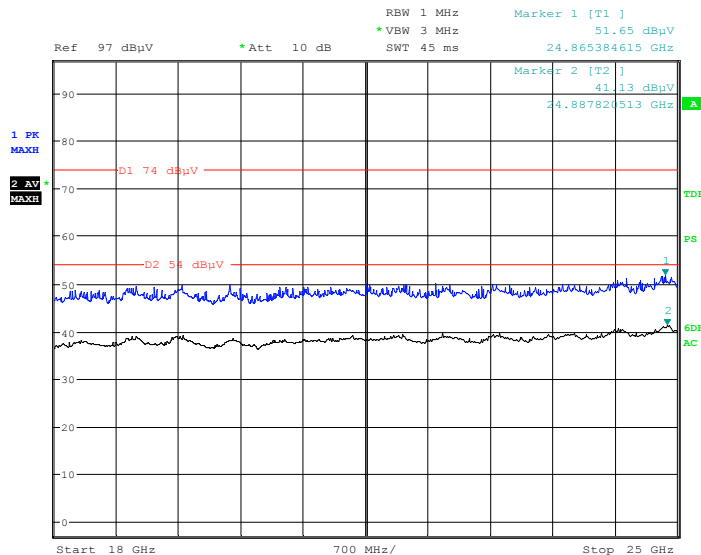
Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case **low channel of 802.11b mode in X-axis of orientation** was recorded

**Horizontal**



Date: 23.JAN.2019 14:59:28

**Vertical**



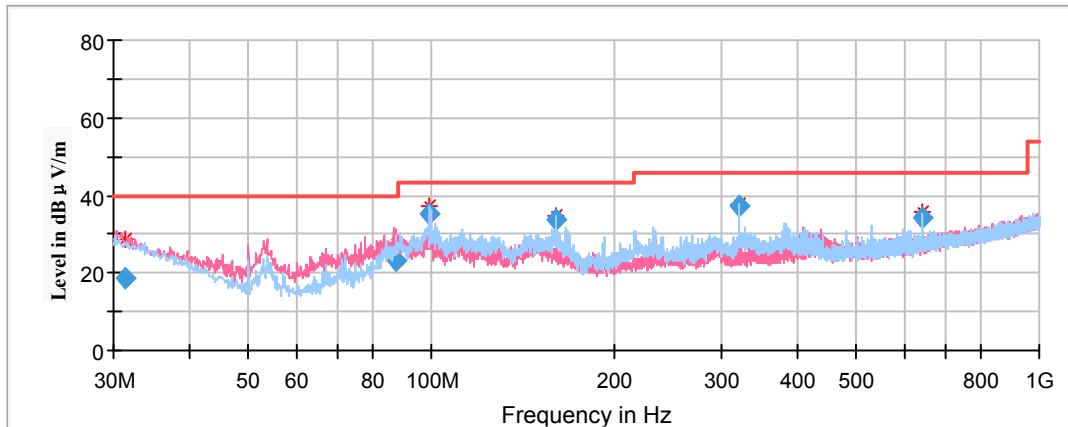
Date: 23.JAN.2019 15:16:53

**Spurious Emission Test**

**For Antenna W10474143:**

**30MHz-1GHz:**

*Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case low channel of 802.11b mode in X-axis of orientation was recorded*



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	QuasiPeak (dBμV/m)	Height (cm)	Polar (H/V)				
31.410502	18.80	199.0	V	88.0	-4.9	40.00	21.20
87.635650	23.15	101.0	V	21.0	-17.6	40.00	16.85
99.546750	35.42	199.0	H	188.0	-15.0	43.50	8.08
159.994700	33.57	199.0	H	203.0	-12.7	43.50	9.93
319.997900	37.23	101.0	H	234.0	-10.1	46.00	8.77
640.008750	34.23	199.0	H	137.0	-4.4	46.00	11.77

**1GHz-18GHz:**

**802.11b Mode:**

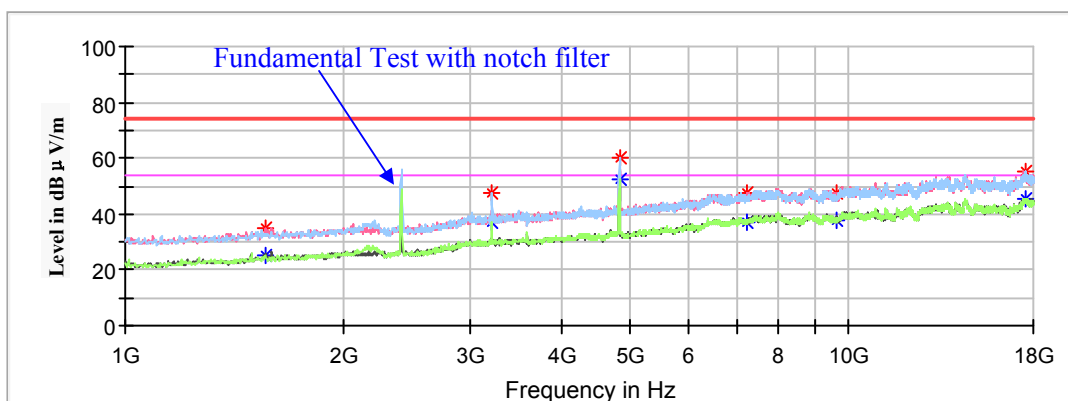
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

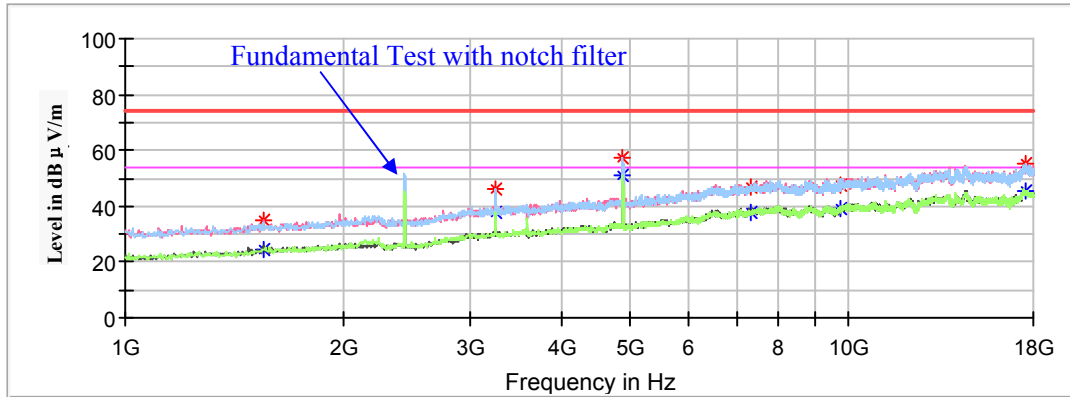
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1561.000000	---	25.01	200.0	V	318.0	-9.7	54.00	28.99
1561.000000	34.70	---	200.0	V	318.0	-9.7	74.00	39.30
3213.400000	---	37.24	200.0	H	137.0	-4.0	54.00	16.76
3213.400000	47.69	---	200.0	H	137.0	-4.0	74.00	26.31
4824.000000	---	50.91	150.0	H	184.0	-0.5	54.00	3.09
4824.000000	59.82	---	150.0	H	184.0	-0.5	74.00	14.18
7236.000000	---	36.87	150.0	H	156.0	5.7	54.00	17.13
7236.000000	47.35	---	150.0	H	156.0	5.7	74.00	26.65
9649.600000	---	37.48	200.0	V	303.0	7.8	54.00	16.52
9649.600000	47.22	---	200.0	V	303.0	7.8	74.00	26.78
17564.800000	---	45.18	150.0	H	331.0	14.2	54.00	8.82
17564.800000	55.14	---	150.0	H	331.0	14.2	74.00	18.86

**Middle Channel: 2437MHz**

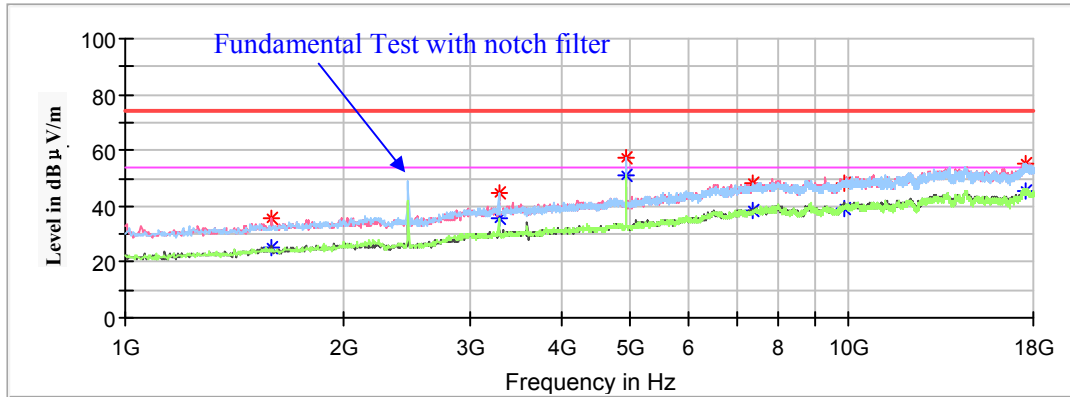
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1554.200000	---	24.58	150.0	V	338.0	-9.7	54.00	29.42
1554.200000	35.27	---	150.0	V	338.0	-9.7	74.00	38.73
3247.400000	---	37.46	150.0	H	330.0	-4.0	54.00	16.54
3247.400000	46.43	---	150.0	H	330.0	-4.0	74.00	27.57
4874.000000	---	50.71	150.0	H	176.0	-0.5	54.00	3.29
4874.000000	57.25	---	150.0	H	176.0	-0.5	74.00	16.75
7311.000000	---	37.79	150.0	H	44.0	5.8	54.00	16.21
7311.000000	47.15	---	150.0	H	44.0	5.8	74.00	26.85
9744.800000	---	38.84	200.0	H	136.0	7.9	54.00	15.16
9744.800000	47.43	---	200.0	H	136.0	7.9	74.00	26.57
17554.600000	---	45.18	200.0	H	263.0	14.2	54.00	8.82
17554.600000	55.08	---	200.0	H	263.0	14.2	74.00	18.92

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	25.18	150.0	V	227.0	-9.6	54.00	28.82
1591.600000	35.64	---	150.0	V	227.0	-9.6	74.00	38.36
3281.400000	---	35.48	150.0	H	329.0	-3.9	54.00	18.52
3281.400000	44.47	---	150.0	H	329.0	-3.9	74.00	29.53
4924.000000	---	50.87	150.0	H	188.0	-0.4	54.00	3.13
4924.000000	57.42	---	150.0	H	188.0	-0.4	74.00	16.58
7386.000000	---	38.16	200.0	H	219.0	6.0	54.00	15.84
7386.000000	48.27	---	200.0	H	219.0	6.0	74.00	25.73
9846.800000	---	39.47	150.0	V	299.0	8.0	54.00	14.53
9846.800000	48.55	---	150.0	V	299.0	8.0	74.00	25.45
17551.200000	---	45.71	200.0	H	9.0	14.2	54.00	8.29
17551.200000	55.15	---	200.0	H	9.0	14.2	74.00	18.85

**802.11g Mode:**

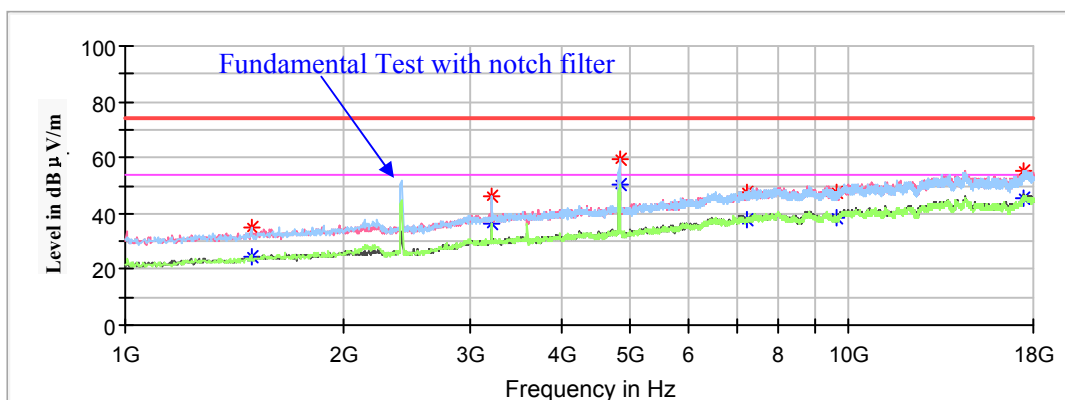
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

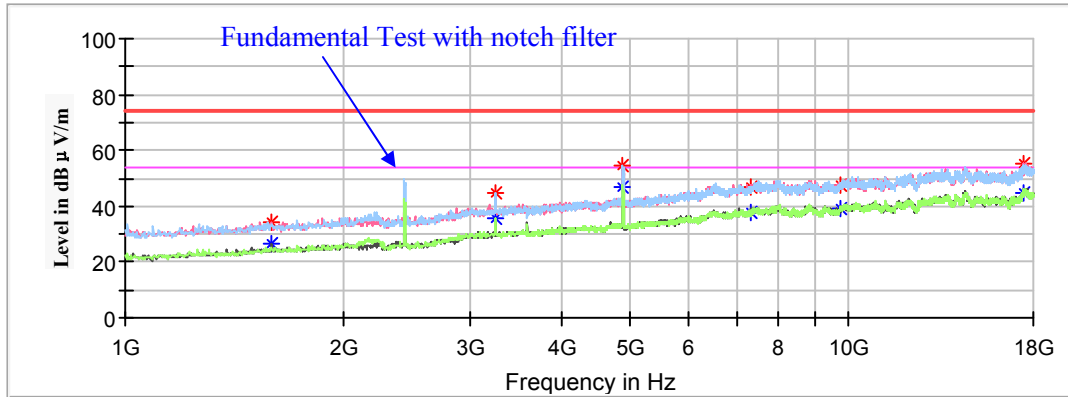
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1496.400000	---	24.40	150.0	H	217.0	-9.9	54.00	29.60
1496.400000	34.97	---	150.0	H	217.0	-9.9	74.00	39.03
3213.400000	---	36.19	200.0	H	305.0	-4.0	54.00	17.81
3213.400000	46.36	---	200.0	H	305.0	-4.0	74.00	27.64
4824.000000	59.14	---	150.0	H	104.0	-0.5	74.00	14.86
4824.000000	---	50.08	150.0	H	104.0	-0.5	54.00	3.92
7236.000000	---	37.50	200.0	H	177.0	5.7	54.00	16.50
7236.000000	47.75	---	200.0	H	177.0	5.7	74.00	26.25
9646.200000	---	38.34	150.0	V	9.0	7.8	54.00	15.66
9646.200000	47.54	---	150.0	V	9.0	7.8	74.00	26.46
17479.800000	---	45.29	200.0	V	13.0	14.2	54.00	8.71
17479.800000	55.48	---	200.0	V	13.0	14.2	74.00	18.52

**Middle Channel: 2437MHz**

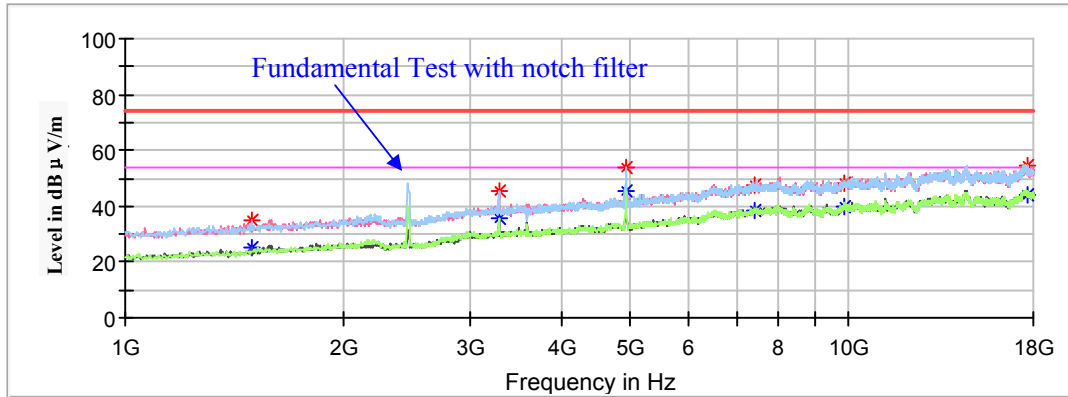
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1595.000000	34.57	---	200.0	V	0.0	-9.6	74.00	39.43
1595.000000	---	26.51	200.0	V	0.0	-9.6	54.00	27.49
3247.400000	44.89	---	200.0	H	171.0	-4.0	74.00	29.11
3247.400000	---	35.48	200.0	H	171.0	-4.0	54.00	18.52
4874.000000	---	47.12	200.0	H	129.0	-0.5	54.00	6.88
4874.000000	54.48	---	200.0	H	129.0	-0.5	74.00	19.52
7311.000000	---	37.85	150.0	H	170.0	5.8	54.00	16.15
7311.000000	46.98	---	150.0	H	170.0	5.8	74.00	27.02
9738.000000	---	39.22	150.0	V	176.0	7.9	54.00	14.78
9738.000000	47.67	---	150.0	V	176.0	7.9	74.00	26.33
17503.600000	---	44.92	150.0	V	3.0	14.3	54.00	9.08
17503.600000	55.49	---	150.0	V	3.0	14.3	74.00	18.51

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1496.400000	---	25.15	150.0	V	92.0	-9.9	54.00	28.85
1496.400000	35.20	---	150.0	V	92.0	-9.9	74.00	38.80
3281.400000	---	35.59	150.0	H	310.0	-3.9	54.00	18.41
3281.400000	45.73	---	150.0	H	310.0	-3.9	74.00	28.27
4924.000000	---	45.13	200.0	H	113.0	-0.4	54.00	8.87
4924.000000	53.51	---	200.0	H	113.0	-0.4	74.00	20.49
7386.000000	---	38.16	200.0	H	269.0	6.0	54.00	15.84
7386.000000	47.28	---	200.0	H	269.0	6.0	74.00	26.72
9843.400000	---	39.56	200.0	H	113.0	8.0	54.00	14.44
9843.400000	48.52	---	200.0	H	113.0	8.0	74.00	25.48
17670.200000	---	44.01	150.0	H	7.0	14.0	54.00	9.99
17670.200000	54.80	---	150.0	H	7.0	14.0	74.00	19.20



**802.11n-HT20 Mode:**

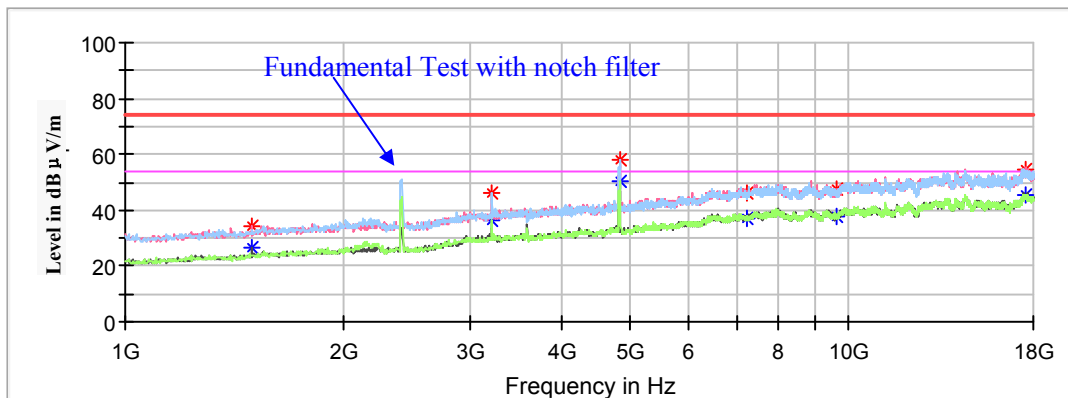
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2412MHz**

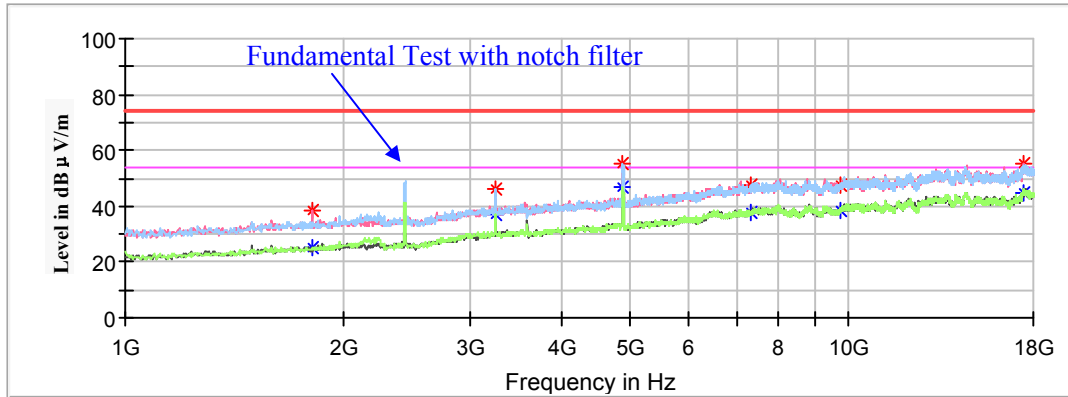
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1496.400000	---	26.73	150.0	V	105.0	-9.9	54.00	27.27
1496.400000	34.48	---	150.0	V	105.0	-9.9	74.00	39.52
3213.400000	---	36.15	200.0	H	305.0	-4.0	54.00	17.85
3213.400000	46.22	---	200.0	H	305.0	-4.0	74.00	27.78
4824.000000	---	50.05	150.0	H	105.0	-0.5	54.00	3.95
4824.000000	57.90	---	150.0	H	105.0	-0.5	74.00	16.10
7236.000000	---	37.12	200.0	H	253.0	5.7	54.00	16.88
7236.000000	46.31	---	200.0	H	253.0	5.7	74.00	27.69
9649.600000	---	37.51	150.0	V	0.0	7.8	54.00	16.49
9649.600000	47.44	---	150.0	V	0.0	7.8	74.00	26.56
17510.400000	---	45.14	200.0	V	281.0	14.3	54.00	8.86
17510.400000	54.78	---	200.0	V	281.0	14.3	74.00	19.22

**Middle Channel: 2437MHz**

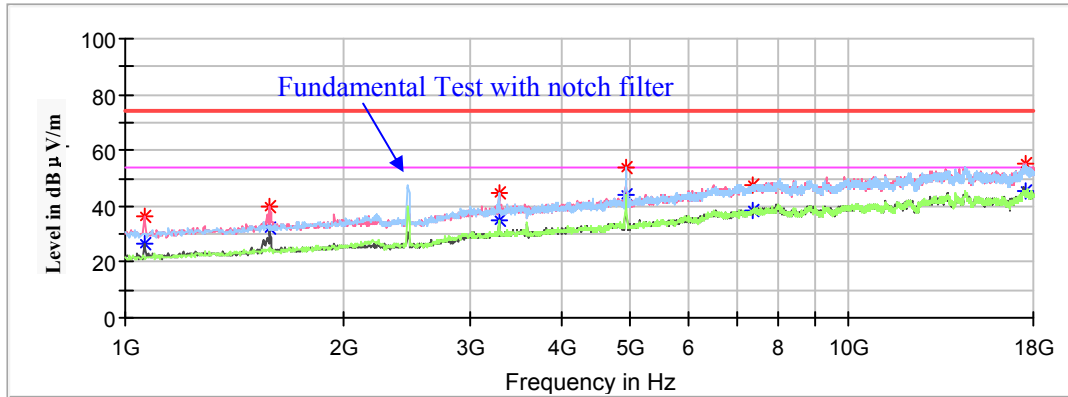
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1812.600000	---	25.07	200.0	V	198.0	-8.9	54.00	28.93
1812.600000	38.31	---	200.0	V	198.0	-8.9	74.00	35.69
3247.400000	---	36.74	200.0	H	144.0	-4.0	54.00	17.26
3247.400000	45.88	---	200.0	H	144.0	-4.0	74.00	28.12
4874.000000	---	47.17	200.0	H	130.0	-0.5	54.00	6.83
4874.000000	55.40	---	200.0	H	130.0	-0.5	74.00	18.60
7311.000000	---	37.79	150.0	H	348.0	5.8	54.00	16.21
7311.000000	47.83	---	150.0	H	348.0	5.8	74.00	26.17
9744.800000	---	38.71	150.0	H	184.0	7.9	54.00	15.29
9744.800000	47.57	---	150.0	H	184.0	7.9	74.00	26.43
17452.600000	---	44.81	150.0	V	317.0	14.0	54.00	9.19
17452.600000	55.27	---	150.0	V	317.0	14.0	74.00	18.73

**High Channel: 2462MHz**

Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1061.200000	---	26.90	150.0	V	232.0	-12.3	54.00	27.10
1061.200000	36.50	---	150.0	V	232.0	-12.3	74.00	37.50
1581.400000	---	32.00	150.0	V	276.0	-9.7	54.00	22.00
1581.400000	39.74	---	150.0	V	276.0	-9.7	74.00	34.26
3281.400000	---	35.27	200.0	H	339.0	-3.9	54.00	18.73
3281.400000	44.86	---	200.0	H	339.0	-3.9	74.00	29.14
4924.000000	---	44.17	200.0	H	134.0	-0.4	54.00	9.83
4924.000000	53.98	---	200.0	H	134.0	-0.4	74.00	20.02
7386.000000	---	38.49	150.0	H	184.0	6.0	54.00	15.51
7386.000000	47.51	---	150.0	H	184.0	6.0	74.00	26.49
17541.000000	---	45.22	200.0	V	70.0	14.2	54.00	8.78
17541.000000	55.40	---	200.0	V	70.0	14.2	74.00	18.60

**802.11n-HT40 Mode:**

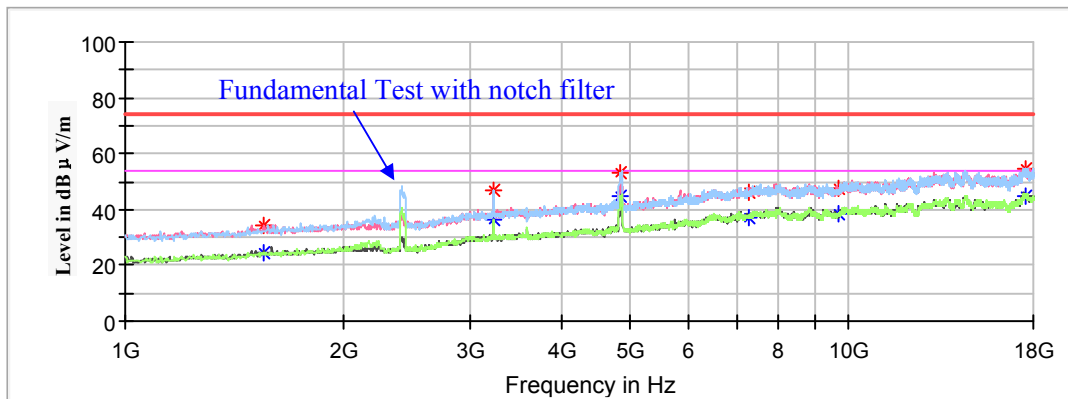
*(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)*

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2422MHz**

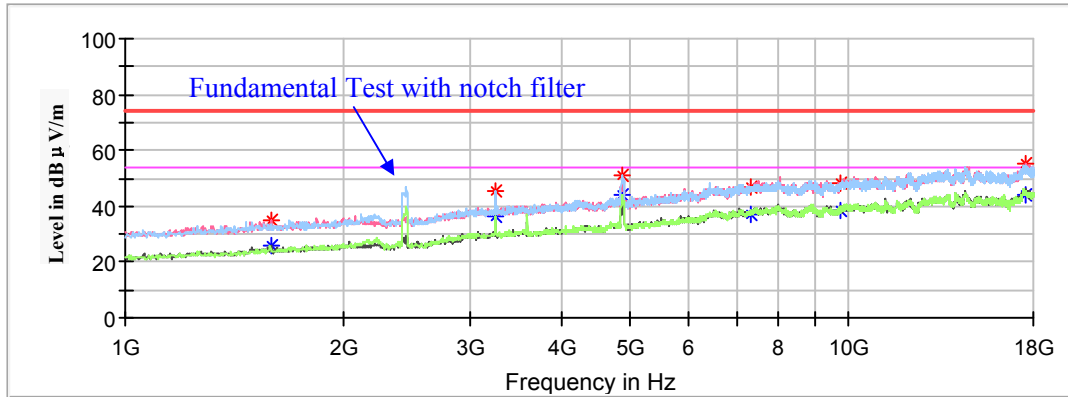
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1557.600000	---	24.75	200.0	V	239.0	-9.7	54.00	29.25
1557.600000	34.41	---	200.0	V	239.0	-9.7	74.00	39.59
3227.000000	---	36.65	200.0	H	146.0	-4.0	54.00	17.35
3227.000000	46.91	---	200.0	H	146.0	-4.0	74.00	27.09
4844.000000	---	44.74	200.0	H	118.0	-0.5	54.00	9.26
4844.000000	53.47	---	200.0	H	118.0	-0.5	74.00	20.53
7266.000000	---	37.10	150.0	H	193.0	5.8	54.00	16.90
7266.000000	45.90	---	150.0	H	193.0	5.8	74.00	28.10
9690.400000	---	38.23	150.0	V	179.0	7.9	54.00	15.77
9690.400000	47.39	---	150.0	V	179.0	7.9	74.00	26.61
17513.800000	---	44.78	200.0	H	4.0	14.3	54.00	9.22
17513.800000	54.64	---	200.0	H	4.0	14.3	74.00	19.36

**Middle Channel: 2437MHz**

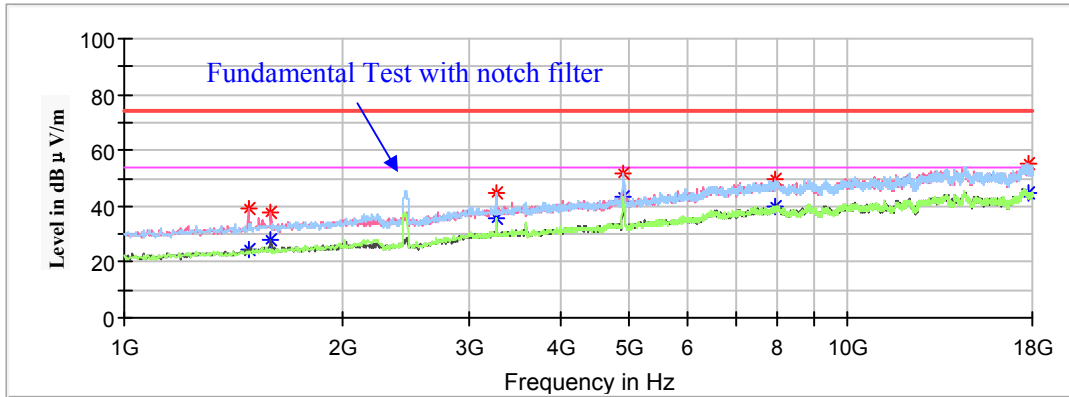
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	26.16	150.0	V	0.0	-9.6	54.00	27.84
1591.600000	34.67	---	150.0	V	0.0	-9.6	74.00	39.33
3247.400000	---	36.68	200.0	H	155.0	-4.0	54.00	17.32
3247.400000	45.80	---	200.0	H	155.0	-4.0	74.00	28.20
4874.000000	---	43.82	200.0	H	127.0	-0.5	54.00	10.18
4874.000000	51.24	---	200.0	H	127.0	-0.5	74.00	22.76
7311.000000	---	37.39	150.0	H	0.0	5.8	54.00	16.61
7311.000000	47.09	---	150.0	H	0.0	5.8	74.00	26.91
9744.800000	---	38.73	200.0	H	43.0	7.9	54.00	15.27
9744.800000	47.93	---	200.0	H	43.0	7.9	74.00	26.07
17530.800000	---	44.29	200.0	V	184.0	14.2	54.00	9.71
17530.800000	55.20	---	200.0	V	184.0	14.2	74.00	18.80

**High Channel: 2452MHz**

Full Spectrum

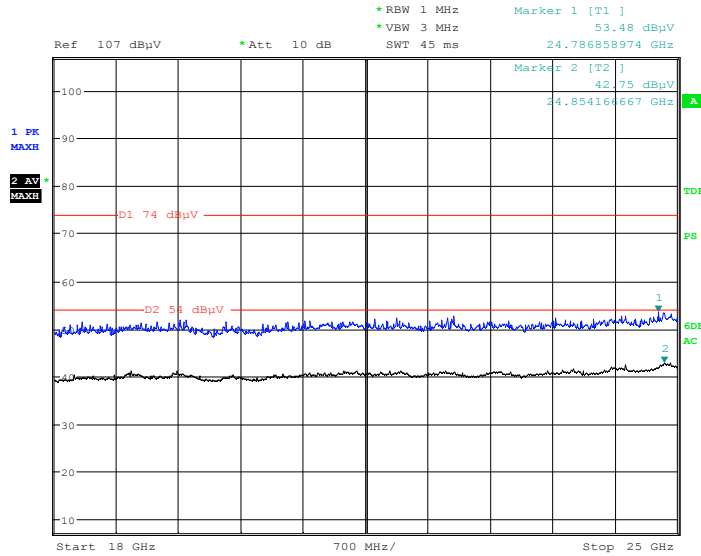


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
	MaxPeak (dBμV /m)	Average (dBμV /m)	Height (cm)	Polar (H/V)				
1482.800000	---	24.64	200.0	V	184.0	-10.0	54.00	29.36
1482.800000	39.21	---	200.0	V	184.0	-10.0	74.00	34.79
1595.000000	---	27.83	200.0	V	114.0	-9.6	54.00	26.17
1595.000000	37.50	---	200.0	V	114.0	-9.6	74.00	36.50
3267.800000	---	35.83	150.0	V	225.0	-3.9	54.00	18.17
3267.800000	44.68	---	150.0	V	225.0	-3.9	74.00	29.32
4904.000000	---	43.44	200.0	H	140.0	-0.4	54.00	10.56
4904.000000	51.56	---	200.0	H	140.0	-0.4	74.00	22.44
7356.000000	---	39.54	200.0	H	99.0	7.0	54.00	14.46
7356.000000	49.34	---	200.0	H	99.0	7.0	74.00	24.66
17738.200000	---	44.58	200.0	V	7.0	13.9	54.00	9.42
17738.200000	55.16	---	200.0	V	7.0	13.9	74.00	18.84

**18GHz-25GHz:**

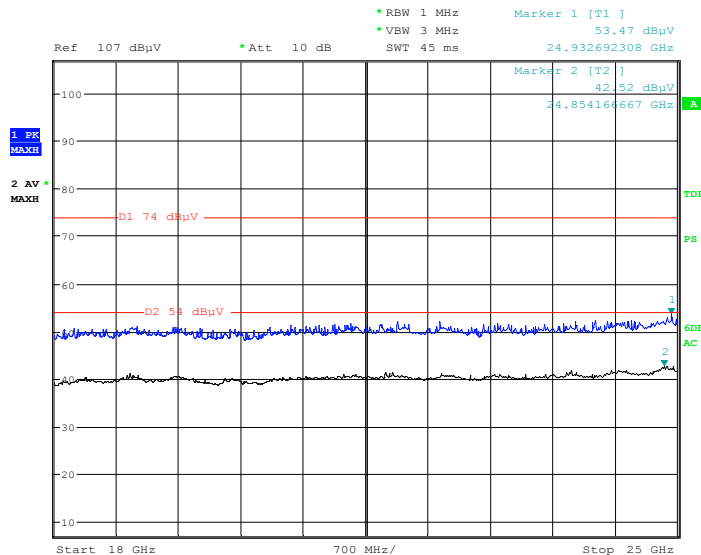
*Pre-scan with 802.11b, 802.11g, 802.11n-HT20 and 802.11n-HT40 modes of operation in the X,Y and Z axes of orientation, the worst case low channel of 802.11b mode in X-axis of orientation was recorded*

**Horizontal**



Date: 2.APR.2019 19:13:04

**Vertical**



Date: 2.APR.2019 19:30:47

**Fundamental Test & Restricted Bands Emissions Test:**

**For Antenna W10436069:**

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**802.11b Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	110.80	---	200.0	H	315.0	6.1	/	/
2412.000000	---	104.44	200.0	H	315.0	6.1	/	/
2412.000000	105.57	---	100.0	V	181.0	6.1	/	/
2412.000000	---	99.19	100.0	V	181.0	6.1	/	/
2390.000000	---	42.52	200.0	H	35.0	6.0	54.00	11.48
2390.000000	51.71	---	200.0	H	35.0	6.0	74.00	22.29
Middle Channel: 2437MHz								
2437.000000	108.55	---	150.0	H	257.0	6.1	/	/
2437.000000	---	102.11	150.0	H	257.0	6.1	/	/
2437.000000	103.21	---	250.0	V	220.0	6.1	/	/
2437.000000	---	96.73	250.0	V	220.0	6.1	/	/
High Channel: 2462MHz								
2462.000000	109.24	---	200.0	H	115.0	6.2	/	/
2462.000000	---	102.75	200.0	H	115.0	6.2	/	/
2462.000000	103.76	---	100.0	V	126.0	6.2	/	/
2462.000000	---	97.39	100.0	V	126.0	6.2	/	/
2483.500000	51.70	---	200.0	H	255.0	6.3	74.00	22.30
2483.500000	---	42.81	200.0	H	255.0	6.3	54.00	11.19



**802.11g Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	105.22	---	150.0	H	283.0	6.1	/	/
2412.000000	---	98.22	150.0	H	283.0	6.1	/	/
2412.000000	99.84	---	150.0	V	21.0	6.1	/	/
2412.000000	---	92.78	150.0	V	21.0	6.1	/	/
2390.000000	---	43.26	200.0	H	323.0	6.0	54.00	10.74
2390.000000	52.22	---	200.0	H	323.0	6.0	74.00	21.78
Middle Channel: 2437MHz								
2437.000000	105.13	---	200.0	H	165.0	6.1	/	/
2437.000000	---	98.34	200.0	H	165.0	6.1	/	/
2437.000000	99.91	---	200.0	V	165.0	6.1	/	/
2437.000000	---	93.06	200.0	V	165.0	6.1	/	/
High Channel: 2462MHz								
2462.000000	105.11	---	100.0	H	162.0	6.2	/	/
2462.000000	---	98.16	100.0	H	162.0	6.2	/	/
2462.000000	99.87	---	150.0	V	67.0	6.2	/	/
2462.000000	---	92.71	150.0	V	67.0	6.2	/	/
2483.500000	56.07	---	100.0	H	110.0	6.3	74.00	17.93
2483.500000	---	47.00	100.0	H	110.0	6.3	54.00	7.00

**802.11n-HT20 Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	104.55	---	200.0	H	231.0	6.1	/	/
2412.000000	---	96.92	200.0	H	231.0	6.1	/	/
2412.000000	99.28	---	200.0	V	82.0	6.1	/	/
2412.000000	---	91.66	200.0	V	82.0	6.1	/	/
2390.000000	---	43.90	250.0	H	353.0	6.0	54.00	10.10
2390.000000	51.50	---	250.0	H	353.0	6.0	74.00	22.50
Middle Channel: 2437MHz								
2437.000000	104.21	---	200.0	H	276.0	6.1	/	/
2437.000000	---	96.84	200.0	H	276.0	6.1	/	/
2437.000000	98.88	---	200.0	V	160.0	6.1	/	/
2437.000000	---	91.51	200.0	V	160.0	6.1	/	/
High Channel: 2462MHz								
2462.000000	104.62	---	100.0	H	82.0	6.2	/	/
2462.000000	---	96.99	100.0	H	82.0	6.2	/	/
2462.000000	99.24	---	150.0	V	38.0	6.2	/	/
2462.000000	---	91.60	150.0	V	38.0	6.2	/	/
2483.500000	57.41	---	250.0	H	248.0	6.3	74.00	16.59
2483.500000	---	47.15	250.0	H	248.0	6.3	54.00	6.85

**802.11n-HT40 Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2422MHz								
2412.000000	101.16	---	200.0	H	243.0	6.1	/	/
2412.000000	---	93.42	200.0	H	243.0	6.1	/	/
2412.000000	95.69	---	150.0	V	235.0	6.1	/	/
2412.000000	---	88.17	150.0	V	235.0	6.1	/	/
2390.000000	---	49.88	200.0	H	158.0	6.0	54.00	4.12
2390.000000	58.97	---	200.0	H	158.0	6.0	74.00	15.03
Middle Channel: 2437MHz								
2437.000000	101.21	---	200.0	H	93.0	6.1	/	/
2437.000000	---	93.48	200.0	H	93.0	6.1	/	/
2437.000000	95.89	---	150.0	V	212.0	6.1	/	/
2437.000000	---	88.06	150.0	V	212.0	6.1	/	/
High Channel: 2452MHz								
2462.000000	101.18	---	150.0	H	27.0	6.2	/	/
2462.000000	---	93.42	150.0	H	27.0	6.2	/	/
2462.000000	95.75	---	250.0	V	275.0	6.2	/	/
2462.000000	---	87.96	250.0	V	275.0	6.2	/	/
2483.500000	58.97	---	200.0	H	125.0	6.3	74.00	15.03
2483.500000	---	49.88	200.0	H	125.0	6.3	54.00	4.12

**For Antenna W10806955:**

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**802.11b Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	102.61	---	150.0	H	86.0	6.1	/	/
2412.000000	---	96.70	150.0	H	86.0	6.1	/	/
2412.000000	99.31	---	200.0	V	103.0	6.1	/	/
2412.000000	---	93.49	200.0	V	103.0	6.1	/	/
2390.000000	---	40.57	200.0	H	226.0	6.0	54.00	13.43
2390.000000	49.09	---	200.0	H	226.0	6.0	74.00	24.91
Middle Channel: 2437MHz								
2437.000000	104.11	---	150.0	H	168.0	6.1	/	/
2437.000000	---	98.24	150.0	H	168.0	6.1	/	/
2437.000000	100.61	---	200.0	V	186.0	6.1	/	/
2437.000000	---	94.94	200.0	V	186.0	6.1	/	/
High Channel: 2462MHz								
2462.000000	108.47	---	100.0	H	76.0	6.2	/	/
2462.000000	---	102.61	100.0	H	76.0	6.2	/	/
2462.000000	105.11	---	250.0	V	223.0	6.2	/	/
2462.000000	---	99.18	250.0	V	223.0	6.2	/	/
2483.500000	53.42	---	100.0	H	144.0	6.3	74.00	20.58
2483.500000	---	44.95	100.0	H	144.0	6.3	54.00	9.05

**802.11g Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	99.17	---	200.0	H	208.0	6.1	/	/
2412.000000	---	91.51	200.0	H	208.0	6.1	/	/
2412.000000	95.77	---	150.0	V	209.0	6.1	/	/
2412.000000	---	88.11	150.0	V	209.0	6.1	/	/
2390.000000	---	42.79	250.0	H	292.0	6.0	54.00	11.21
2390.000000	51.09	---	250.0	H	292.0	6.0	74.00	22.91
Middle Channel: 2437MHz								
2437.000000	101.53	---	100.0	H	254.0	6.1	/	/
2437.000000	---	93.97	100.0	H	254.0	6.1	/	/
2437.000000	98.08	---	200.0	V	149.0	6.1	/	/
2437.000000	---	90.51	200.0	V	149.0	6.1	/	/
High Channel: 2462MHz								
2462.000000	102.07	---	150.0	H	155.0	6.2	/	/
2462.000000	---	94.69	150.0	H	155.0	6.2	/	/
2462.000000	98.72	---	200.0	V	63.0	6.2	/	/
2462.000000	---	91.38	200.0	V	63.0	6.2	/	/
2483.500000	56.07	---	200.0	H	204.0	6.3	74.00	17.93
2483.500000	---	47.00	200.0	H	204.0	6.3	54.00	7.00

**802.11n-HT20 Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	99.86	---	200.0	H	122.0	6.1	/	/
2412.000000	---	92.24	200.0	H	122.0	6.1	/	/
2412.000000	96.38	---	100.0	V	347.0	6.1	/	/
2412.000000	---	88.98	100.0	V	347.0	6.1	/	/
2390.000000	---	44.39	200.0	H	127.0	6.0	54.00	9.61
2390.000000	55.25	---	200.0	H	127.0	6.0	74.00	18.75
Middle Channel: 2437MHz								
2437.000000	102.11	---	200.0	H	358.0	6.1	/	/
2437.000000	---	94.47	200.0	H	358.0	6.1	/	/
2437.000000	98.84	---	250.0	V	348.0	6.1	/	/
2437.000000	---	91.15	250.0	V	348.0	6.1	/	/
High Channel: 2462MHz								
2462.000000	103.44	---	200.0	H	343.0	6.2	/	/
2462.000000	---	95.80	200.0	H	343.0	6.2	/	/
2462.000000	99.97	---	200.0	V	97.0	6.2	/	/
2462.000000	---	92.58	200.0	V	97.0	6.2	/	/
2483.500000	58.46	---	150.0	H	176.0	6.3	74.00	15.54
2483.500000	---	49.15	150.0	H	176.0	6.3	54.00	4.85

**802.11n-HT40 Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2422MHz								
2412.000000	98.24	---	150.0	H	347.0	6.1	/	/
2412.000000	---	90.16	150.0	H	347.0	6.1	/	/
2412.000000	94.95	---	200.0	V	288.0	6.1	/	/
2412.000000	---	86.88	200.0	V	288.0	6.1	/	/
2390.000000	---	45.04	150.0	H	357.0	6.0	54.00	8.96
2390.000000	53.85	---	150.0	H	357.0	6.0	74.00	20.15
Middle Channel: 2437MHz								
2437.000000	98.89	---	200.0	H	169.0	6.1	/	/
2437.000000	---	90.71	200.0	H	169.0	6.1	/	/
2437.000000	95.50	---	150.0	V	39.0	6.1	/	/
2437.000000	---	87.24	150.0	V	39.0	6.1	/	/
High Channel: 2452MHz								
2462.000000	99.57	---	250.0	H	281.0	6.2	/	/
2462.000000	---	91.44	250.0	H	281.0	6.2	/	/
2462.000000	96.11	---	100.0	V	360.0	6.2	/	/
2462.000000	---	88.00	100.0	V	360.0	6.2	/	/
2483.500000	60.09	---	200.0	H	93.0	6.3	74.00	13.91
2483.500000	---	50.90	200.0	H	93.0	6.3	54.00	3.10

**For Antenna W10474143:**

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**802.11b Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	108.58	---	200.0	H	208.0	2.8	/	/
2412.000000	---	102.46	200.0	H	208.0	2.8	/	/
2412.000000	106.25	---	250.0	V	161.0	2.8	/	/
2412.000000	---	100.17	250.0	V	161.0	2.8	/	/
2390.000000	---	38.89	150.0	H	90.0	2.8	54.00	15.11
2390.000000	47.53	---	150.0	H	90.0	2.8	74.00	26.47
Middle Channel: 2437MHz								
2437.000000	108.93	---	150.0	H	276.0	2.8	/	/
2437.000000	---	102.87	150.0	H	276.0	2.8	/	/
2437.000000	106.93	---	200.0	V	125.0	2.8	/	/
2437.000000	---	100.71	200.0	V	125.0	2.8	/	/
High Channel: 2462MHz								
2462.000000	107.97	---	100.0	H	55.0	3.0	/	/
2462.000000	---	101.75	100.0	H	55.0	3.0	/	/
2462.000000	105.87	---	200.0	V	174.0	3.0	/	/
2462.000000	---	99.50	200.0	V	174.0	3.0	/	/
2483.500000	53.02	---	100.0	H	240.0	3.0	74.00	20.98
2483.500000	---	44.55	100.0	H	240.0	3.0	54.00	9.45



**802.11g Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	102.32	---	100.0	H	173.0	2.9	/	/
2412.000000	---	95.01	100.0	H	173.0	2.9	/	/
2412.000000	100.32	---	150.0	V	331.0	2.9	/	/
2412.000000	---	92.84	150.0	V	331.0	2.9	/	/
2390.000000	---	39.35	200.0	H	339.0	2.8	54.00	14.65
2390.000000	49.01	---	200.0	H	339.0	2.8	74.00	24.99
Middle Channel: 2437MHz								
2437.000000	102.17	---	150.0	H	193.0	2.9	/	/
2437.000000	---	95.20	150.0	H	193.0	2.9	/	/
2437.000000	99.81	---	150.0	V	44.0	2.9	/	/
2437.000000	---	93.18	150.0	V	44.0	2.9	/	/
High Channel: 2462MHz								
2462.000000	101.67	---	200.0	H	150.0	3.0	/	/
2462.000000	---	94.15	200.0	H	150.0	3.0	/	/
2462.000000	99.32	---	200.0	V	93.0	3.0	/	/
2462.000000	---	91.89	200.0	V	93.0	3.0	/	/
2483.500000	61.54	---	250.0	H	227.0	3.0	74.00	12.46
2483.500000	---	50.99	250.0	H	227.0	3.0	54.00	3.01

**802.11n-HT20 Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2412MHz								
2412.000000	102.09	---	200.0	H	260.0	2.9	/	/
2412.000000	---	94.39	200.0	H	260.0	2.9	/	/
2412.000000	99.98	---	150.0	V	255.0	2.9	/	/
2412.000000	---	91.94	150.0	V	255.0	2.9	/	/
2390.000000	---	45.50	150.0	H	65.0	2.8	54.00	8.50
2390.000000	56.59	---	150.0	H	65.0	2.8	74.00	17.41
Middle Channel: 2437MHz								
2437.000000	101.63	---	250.0	H	339.0	2.9	/	/
2437.000000	---	94.57	250.0	H	339.0	2.9	/	/
2437.000000	99.50	---	200.0	V	48.0	2.9	/	/
2437.000000	---	92.14	200.0	V	48.0	2.9	/	/
High Channel: 2462MHz								
2462.000000	101.76	---	150.0	H	137.0	3.0	/	/
2462.000000	---	93.74	150.0	H	137.0	3.0	/	/
2462.000000	99.73	---	100.0	V	75.0	3.0	/	/
2462.000000	---	91.56	100.0	V	75.0	3.0	/	/
2483.500000	65.02	---	150.0	H	6.0	3.0	74.00	8.98
2483.500000	---	50.97	150.0	H	6.0	3.0	54.00	3.03

**802.11n-HT40 Mode:** (Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2422MHz								
2412.000000	97.82	---	150.0	H	19.0	2.9	/	/
2412.000000	---	89.75	150.0	H	19.0	2.9	/	/
2412.000000	95.57	---	200.0	V	238.0	2.9	/	/
2412.000000	---	87.51	200.0	V	238.0	2.9	/	/
2390.000000	---	49.56	250.0	H	105.0	2.8	54.00	4.44
2390.000000	58.30	---	250.0	H	105.0	2.8	74.00	15.70
Middle Channel: 2437MHz								
2437.000000	97.87	---	250.0	H	21.0	2.9	/	/
2437.000000	---	90.73	250.0	H	21.0	2.9	/	/
2437.000000	95.49	---	250.0	V	306.0	2.9	/	/
2437.000000	---	88.31	250.0	V	306.0	2.9	/	/
High Channel: 2452MHz								
2462.000000	97.76	---	150.0	H	106.0	3.0	/	/
2462.000000	---	90.09	150.0	H	106.0	3.0	/	/
2462.000000	95.33	---	100.0	V	258.0	3.0	/	/
2462.000000	---	87.94	100.0	V	258.0	3.0	/	/
2483.500000	61.79	---	150.0	H	173.0	3.0	74.00	12.21
2483.500000	---	50.94	150.0	H	173.0	3.0	54.00	3.06

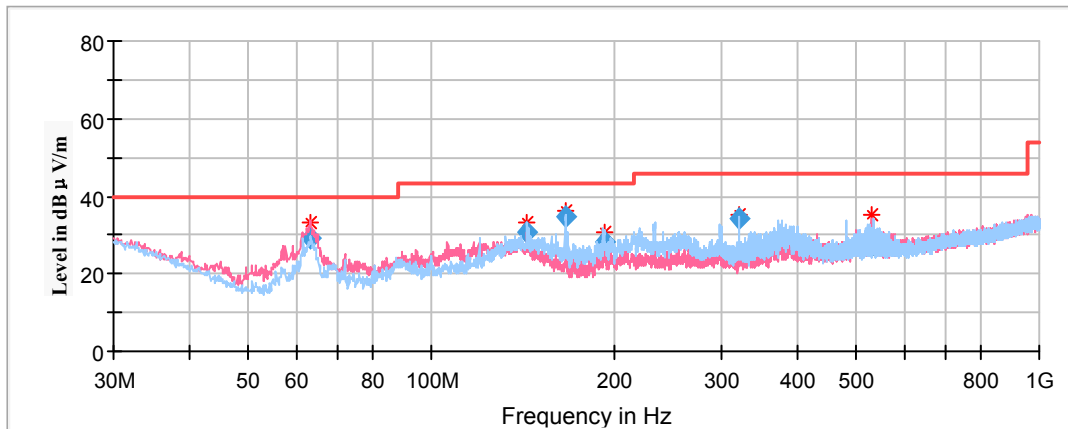
**For BLE Mode:**

**Spurious Emission Test:**

**For Antenna W10436069:**

**30MHz-1GHz**

*(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the X axis of orientation was recorded)*



Frequency (MHz)	Corrected Amplitude	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	QuasiPeak (dBµV/m)	Height (cm)	Polar (H/V)				
63.230050	29.31	101.0	V	106.0	-17.7	40.00	10.69
143.929050	30.87	199.0	H	113.0	-12.1	43.50	12.63
166.012100	34.95	199.0	H	93.0	-13.0	43.50	8.55
192.071850	28.42	199.0	H	304.0	-12.8	43.50	15.08
319.987400	34.32	101.0	H	0.0	-10.1	46.00	11.68
531.664750	27.39	101.0	V	60.0	-5.8	46.00	18.61

**1GHz-18GHz**

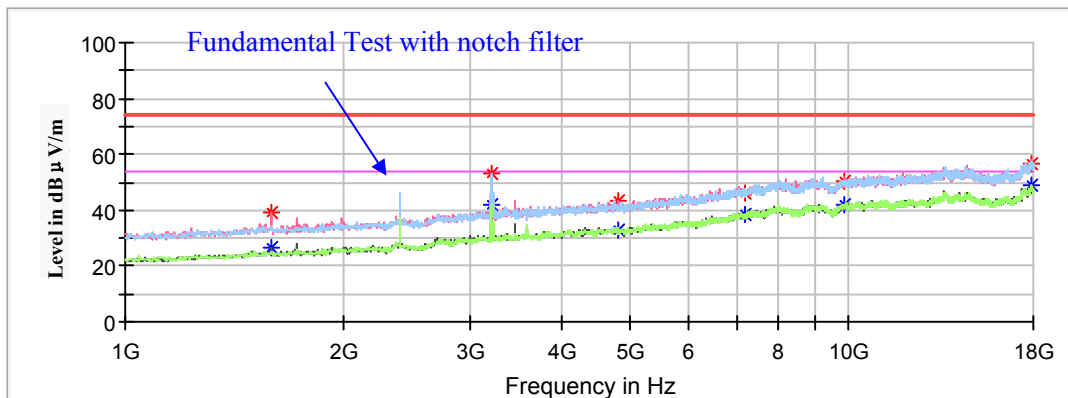
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2402MHz**

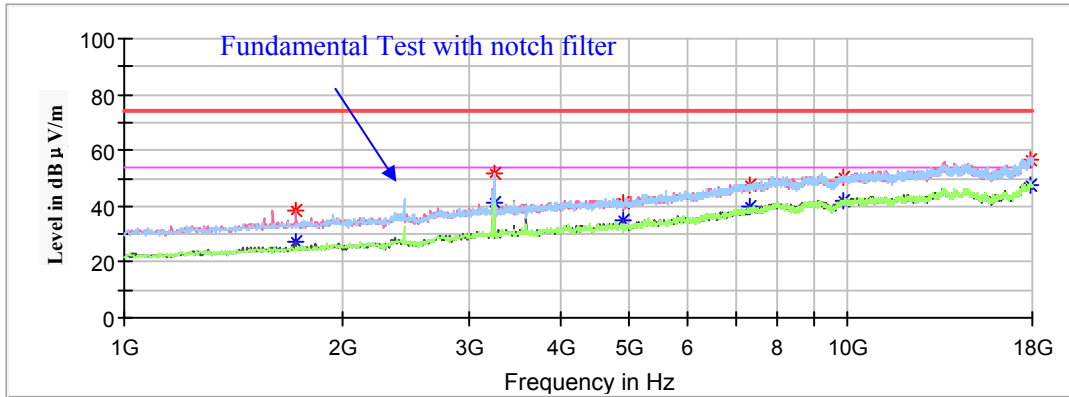
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	38.87	---	250.0	V	349.0	-7.2	74.00	35.13
1591.600000	---	26.36	250.0	V	349.0	-7.2	54.00	27.64
3199.800000	52.86	---	150.0	H	304.0	-1.3	74.00	21.14
3199.800000	---	42.31	150.0	H	304.0	-1.3	54.00	11.69
4804.000000	---	32.83	150.0	V	170.0	1.8	54.00	21.17
4804.000000	43.60	---	150.0	V	170.0	1.8	74.00	30.40
7206.000000	46.11	---	200.0	V	16.0	8.9	74.00	27.89
7206.000000	---	38.20	200.0	V	16.0	8.9	54.00	15.80
9857.000000	50.10	---	150.0	V	148.0	12.3	74.00	23.90
9857.000000	---	42.29	150.0	V	148.0	12.3	54.00	11.71
17901.400000	56.49	---	150.0	H	358.0	17.6	74.00	17.51
17901.400000	---	48.65	150.0	H	358.0	17.6	54.00	5.35

**Middle Channel: 2440MHz**

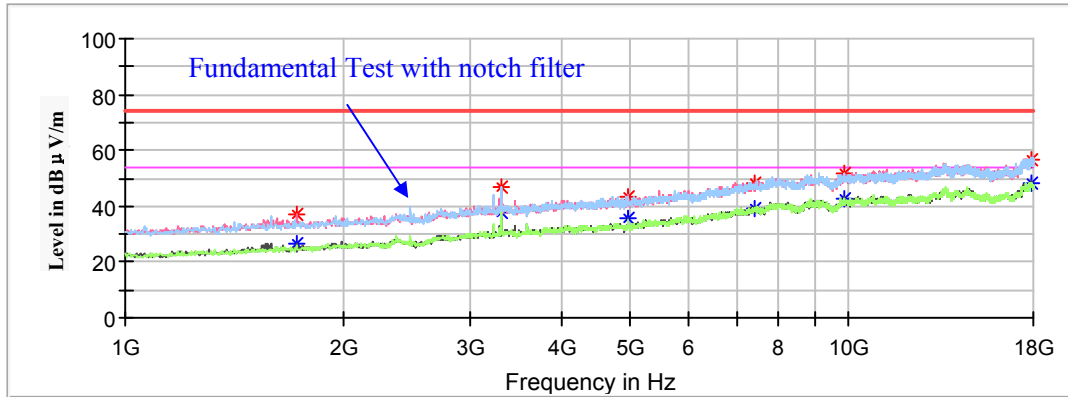
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	38.41	---	250.0	V	110.0	-6.8	74.00	35.59
1724.200000	---	27.62	250.0	V	110.0	-6.8	54.00	26.38
3250.800000	51.40	---	200.0	H	282.0	-1.2	74.00	22.60
3250.800000	---	41.21	200.0	H	282.0	-1.2	54.00	12.79
4880.000000	41.22	---	250.0	V	206.0	1.9	74.00	32.78
4880.000000	---	34.96	250.0	V	206.0	1.9	54.00	19.04
7320.000000	47.64	---	250.0	V	271.0	9.2	74.00	26.36
7320.000000	---	40.05	250.0	V	271.0	9.2	54.00	13.95
9846.800000	50.38	---	200.0	V	255.0	12.2	74.00	23.62
9846.800000	---	42.27	200.0	V	255.0	12.2	54.00	11.73
17874.200000	56.63	---	200.0	V	31.0	17.6	74.00	17.37
17874.200000	---	47.67	200.0	V	31.0	17.6	54.00	6.33

**High Channel: 2480MHz**

Full Spectrum

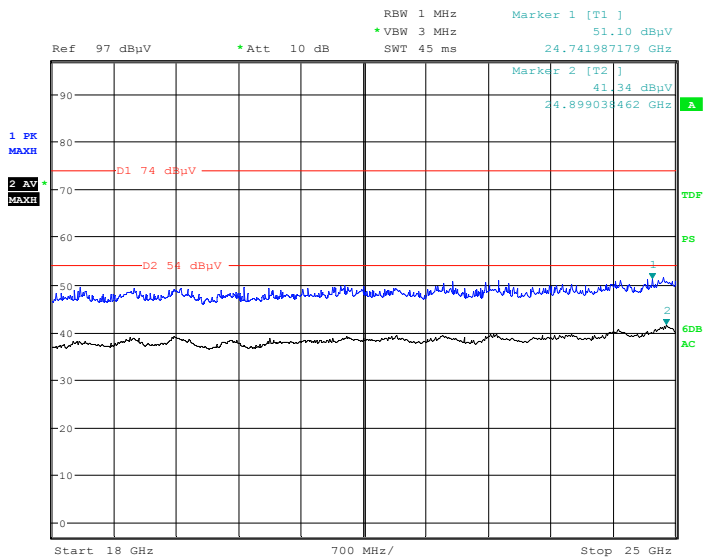


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	36.77	---	250.0	V	83.0	-6.8	74.00	37.23
1724.200000	---	26.78	250.0	V	83.0	-6.8	54.00	27.22
3305.200000	---	37.76	150.0	H	228.0	-1.1	54.00	16.24
3305.200000	47.16	---	150.0	H	228.0	-1.1	74.00	26.84
4960.000000	---	35.33	250.0	V	158.0	2.0	54.00	18.67
4960.000000	43.19	---	250.0	V	158.0	2.0	74.00	30.81
7440.000000	---	39.00	250.0	V	169.0	9.6	54.00	15.00
7440.000000	48.20	---	250.0	V	169.0	9.6	74.00	25.80
9843.400000	51.60	---	150.0	H	228.0	12.2	74.00	22.40
9843.400000	---	42.76	150.0	H	228.0	12.2	54.00	11.24
17867.400000	---	47.91	250.0	H	78.0	17.6	54.00	6.09
17867.400000	56.41	---	250.0	H	78.0	17.6	74.00	17.59

**18GHz-25GHz**

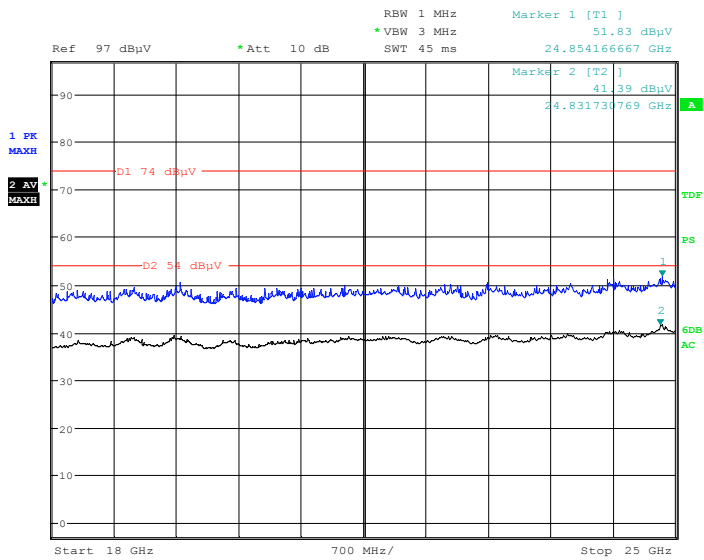
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the X axis of orientation was recorded)

**Horizontal**



Date: 23.JAN.2019 16:49:34

**Vertical**



Date: 23.JAN.2019 17:06:05

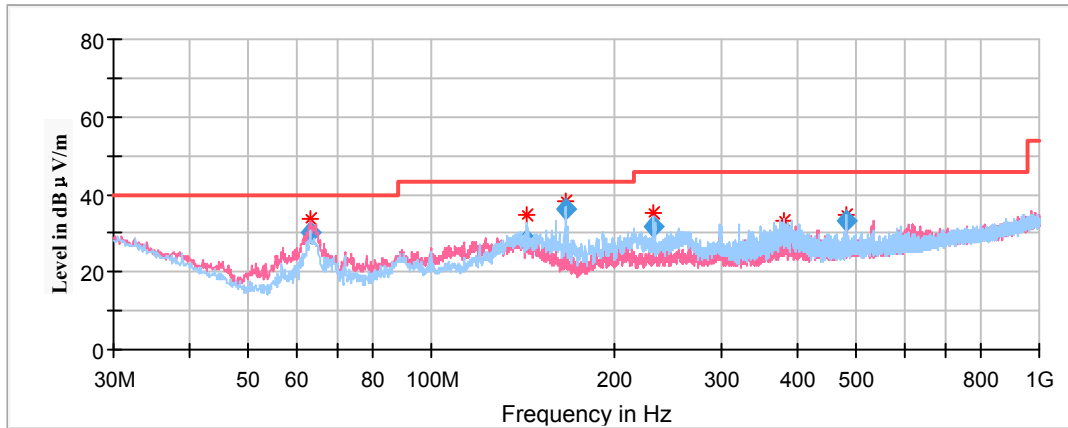


**Spurious Emission Test:**

**For Antenna W10806955:**

**30MHz-1GHz**

*(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the X axis of orientation was recorded)*



Frequency (MHz)	Corrected Amplitude QuasiPeak (dBμV/m)	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
		Height (cm)	Polar (H/V)				
63.362350	30.10	101.0	V	66.0	-17.7	40.00	9.90
143.699300	28.22	199.0	H	103.0	-12.1	43.50	15.28
166.486800	36.45	199.0	H	87.0	-13.0	43.50	7.05
232.362350	31.82	101.0	H	140.0	-12.2	46.00	14.18
380.383600	27.28	101.0	H	181.0	-8.5	46.00	18.72
480.027800	33.27	199.0	H	280.0	-6.7	46.00	12.73

**1GHz-18GHz**

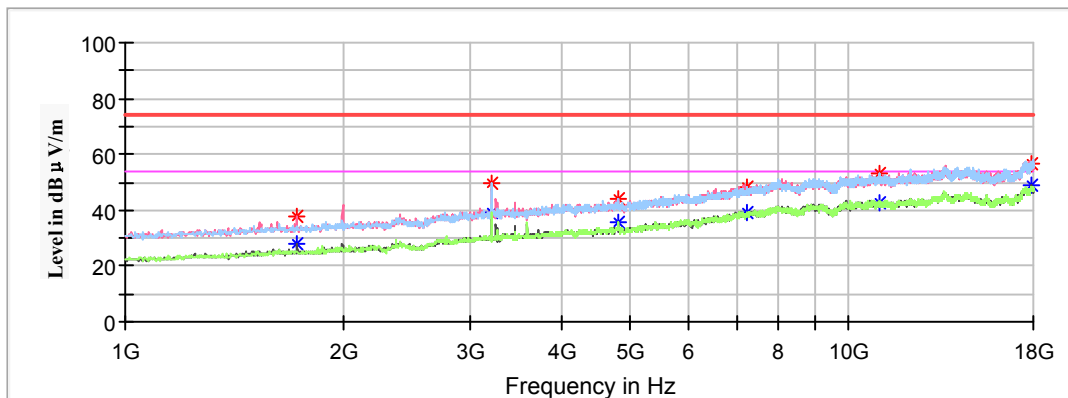
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2402MHz**

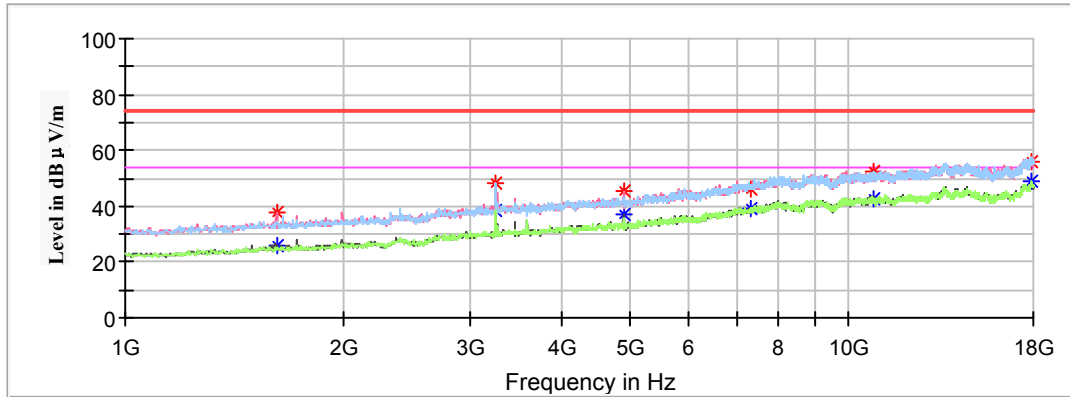
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1724.200000	---	28.00	250.0	V	110.0	-6.8	54.00	26.00
1724.200000	37.44	---	250.0	V	110.0	-6.8	74.00	36.56
3203.200000	---	39.15	250.0	H	57.0	-1.3	54.00	14.85
3203.200000	49.32	---	250.0	H	57.0	-1.3	74.00	24.68
4804.000000	44.35	---	150.0	V	62.0	1.8	74.00	29.65
4804.000000	---	35.80	150.0	V	62.0	1.8	54.00	18.20
7206.000000	48.47	---	150.0	V	239.0	8.9	74.00	25.53
7206.000000	---	38.95	150.0	V	239.0	8.9	54.00	15.05
11016.400000	---	42.45	200.0	H	40.0	13.5	54.00	11.55
11016.400000	52.80	---	200.0	H	40.0	13.5	74.00	21.20
17925.200000	56.34	---	150.0	V	342.0	17.6	74.00	17.66
17925.200000	---	48.64	150.0	V	342.0	17.6	54.00	5.36

**Middle Channel: 2440MHz**

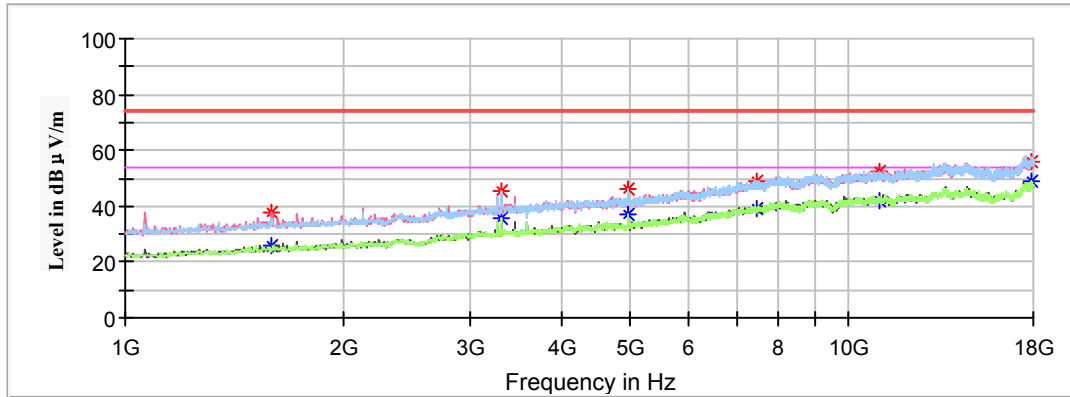
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1618.800000	---	26.14	200.0	V	201.0	-7.1	54.00	27.86
1618.800000	37.87	---	200.0	V	201.0	-7.1	74.00	36.13
3250.800000	48.33	---	200.0	H	57.0	-1.2	74.00	25.67
3250.800000	---	38.31	200.0	H	57.0	-1.2	54.00	15.69
4880.000000	---	37.40	200.0	V	223.0	1.9	54.00	16.60
4880.000000	45.69	---	200.0	V	223.0	1.9	74.00	28.31
7320.000000	---	39.33	200.0	V	0.0	9.2	54.00	14.67
7320.000000	46.35	---	200.0	V	0.0	9.2	74.00	27.65
10856.600000	52.19	---	250.0	H	330.0	13.3	74.00	21.81
10856.600000	---	42.55	250.0	H	330.0	13.3	54.00	11.45
17904.800000	55.64	---	200.0	H	57.0	17.6	74.00	18.36
17904.800000	---	48.94	200.0	H	57.0	17.6	54.00	5.06

**High Channel: 2480MHz**

Full Spectrum

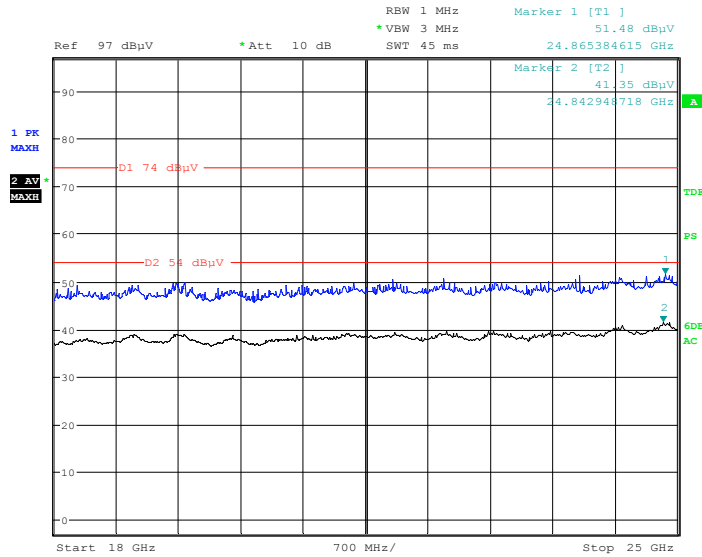


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	25.88	200.0	V	319.0	-7.2	54.00	28.12
1591.600000	37.69	---	200.0	V	319.0	-7.2	74.00	36.31
3305.200000	---	35.90	250.0	H	244.0	-1.1	54.00	18.10
3305.200000	45.38	---	250.0	H	244.0	-1.1	74.00	28.62
4960.000000	---	36.94	150.0	H	217.0	2.0	54.00	17.06
4960.000000	46.12	---	150.0	H	217.0	2.0	74.00	27.88
7440.000000	---	38.99	200.0	H	89.0	9.6	54.00	15.01
7440.000000	49.22	---	200.0	H	89.0	9.6	74.00	24.78
10999.400000	---	42.01	250.0	V	99.0	13.5	54.00	11.99
10999.400000	52.60	---	250.0	V	99.0	13.5	74.00	21.40
17884.400000	55.77	---	200.0	H	41.0	17.6	74.00	18.23
17884.400000	---	48.73	200.0	H	41.0	17.6	54.00	5.27

**18GHz-25GHz**

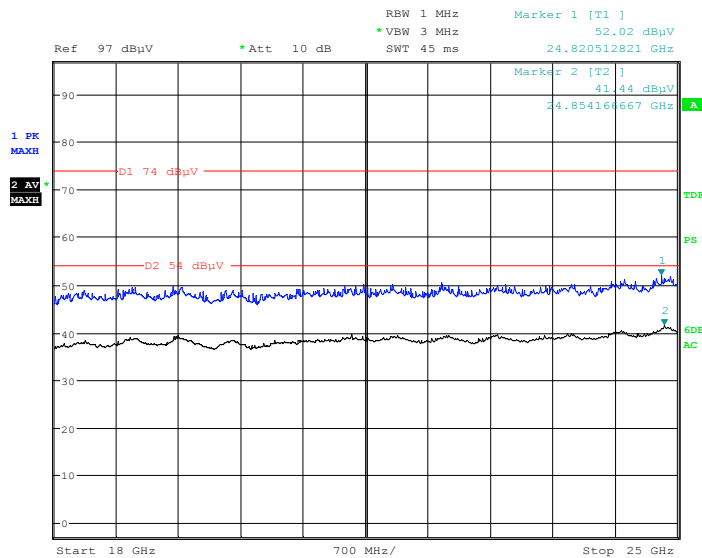
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the X axis of orientation was recorded)

**Horizontal**



Date: 23.JAN.2019 16:10:25

**Vertical**



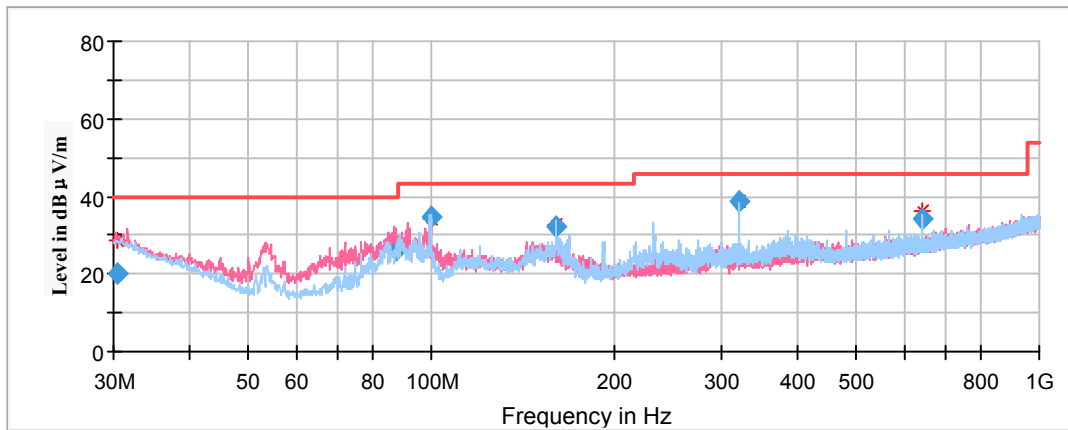
Date: 23.JAN.2019 16:28:54

**Spurious Emission Test:**

**For Antenna W10474143:**

**30MHz-1GHz**

*(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the X axis of orientation was recorded)*



Frequency (MHz)	Corrected Amplitude QuasiPeak (dBμV/m)	Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBμV/m)	Margin (dB)
		Height (cm)	Polar (H/V)				
30.509500	20.31	101.0	V	153.0	-4.3	40.00	19.69
87.310900	26.03	101.0	V	47.0	-17.6	40.00	13.97
99.605850	34.59	199.0	H	211.0	-15.0	43.50	8.91
160.022000	32.10	199.0	H	216.0	-12.7	43.50	11.40
320.000600	38.66	101.0	H	342.0	-10.1	46.00	7.34
639.973950	34.15	199.0	H	131.0	-4.4	46.00	11.85

**1GHz-18GHz**

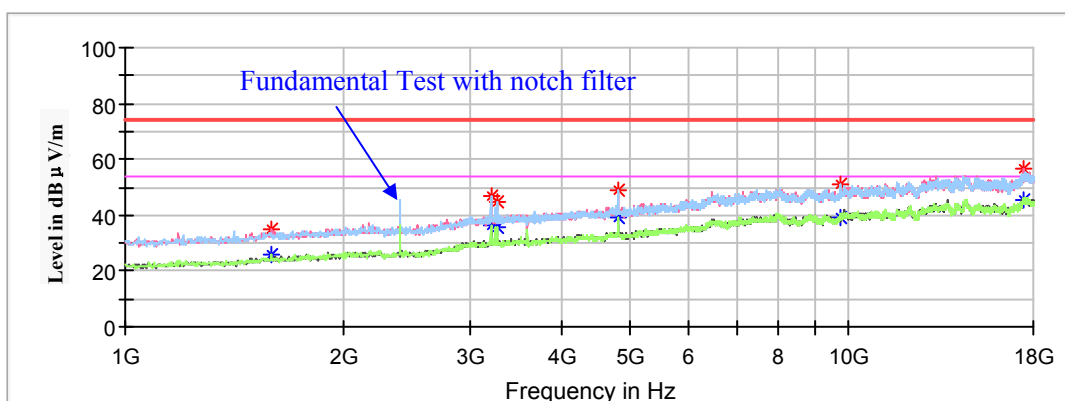
(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)

Note:

1. This test was performed with the 2.4-2.5GHz notch filter.
2. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)  
 Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)  
 Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

**Low Channel: 2402MHz**

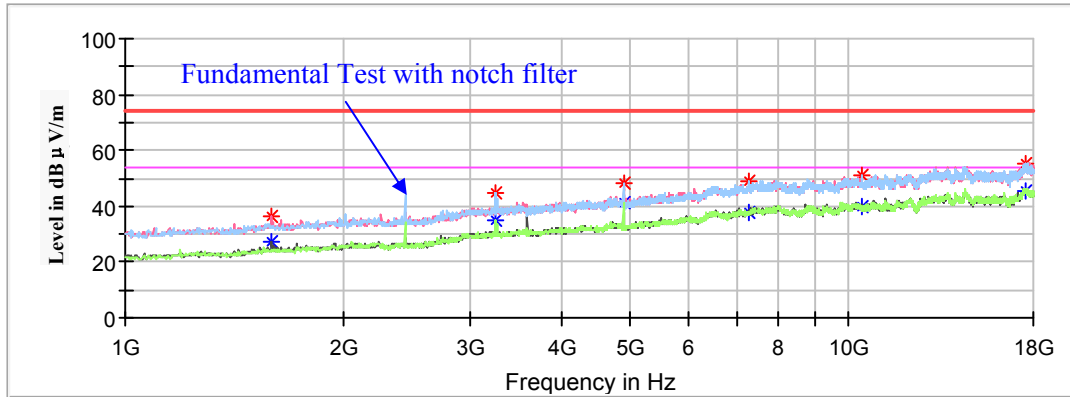
Full Spectrum



Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	25.89	150.0	V	347.0	-9.6	54.00	28.11
1591.600000	34.66	---	150.0	V	347.0	-9.6	74.00	39.34
3199.800000	---	36.69	200.0	H	142.0	-4.0	54.00	17.31
3199.800000	47.13	---	200.0	H	142.0	-4.0	74.00	26.87
3267.800000	---	35.59	200.0	H	200.0	-3.9	54.00	18.41
3267.800000	44.43	---	200.0	H	200.0	-3.9	74.00	29.57
4804.000000	---	39.41	200.0	H	130.0	-0.6	54.00	14.59
4804.000000	49.23	---	200.0	H	130.0	-0.6	74.00	24.77
9717.600000	---	39.15	200.0	H	154.0	7.9	54.00	14.85
9717.600000	50.74	---	200.0	H	154.0	7.9	74.00	23.26
17483.200000	---	45.26	150.0	V	29.0	14.2	54.00	8.74
17483.200000	56.60	---	150.0	V	29.0	14.2	74.00	17.40

**Middle Channel: 2440MHz**

Full Spectrum

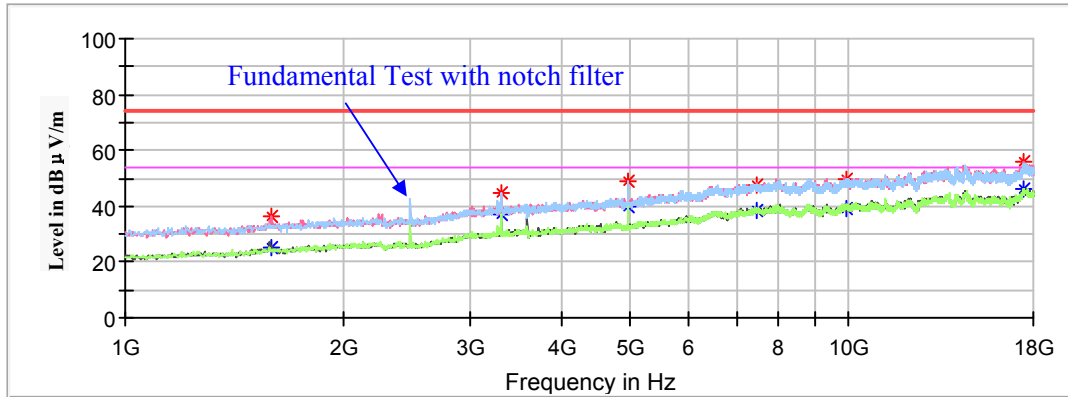


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	27.40	200.0	V	328.0	-9.6	54.00	26.60
1591.600000	36.43	---	200.0	V	328.0	-9.6	74.00	37.57
3244.000000	---	34.84	200.0	H	177.0	-4.0	54.00	19.16
3244.000000	44.86	---	200.0	H	177.0	-4.0	74.00	29.14
4880.000000	---	41.06	150.0	H	136.0	-0.4	54.00	12.94
4880.000000	48.39	---	150.0	H	136.0	-0.4	74.00	25.61
7320.000000	---	38.11	200.0	H	25.0	5.8	54.00	15.89
7320.000000	48.66	---	200.0	H	25.0	5.8	74.00	25.34
10431.600000	---	40.00	200.0	H	339.0	8.9	54.00	14.00
10431.600000	51.30	---	200.0	H	339.0	8.9	74.00	22.70
17581.800000	---	45.25	200.0	H	247.0	14.1	54.00	8.75
17581.800000	55.51	---	200.0	H	247.0	14.1	74.00	18.49



**High Channel: 2480MHz**

Full Spectrum

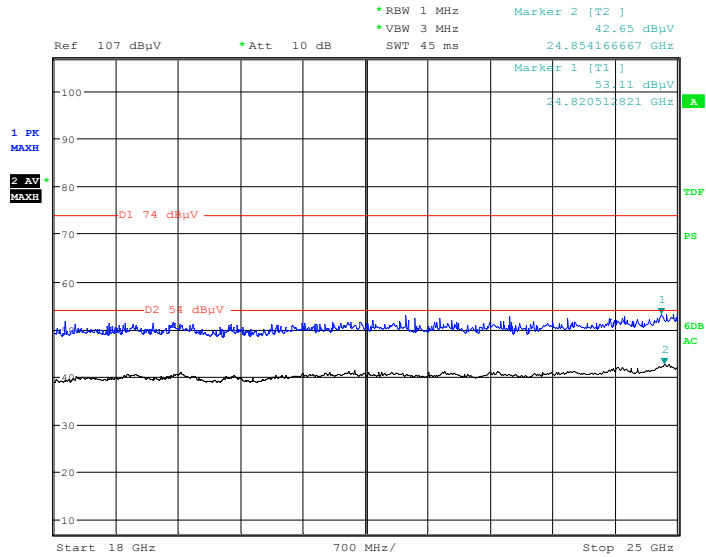


Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
1591.600000	---	25.37	150.0	V	195.0	-9.6	54.00	28.63
1591.600000	36.30	---	150.0	V	195.0	-9.6	74.00	37.70
3305.200000	---	36.88	200.0	H	4.0	-3.9	54.00	17.12
3305.200000	45.05	---	200.0	H	4.0	-3.9	74.00	28.95
4960.000000	---	40.17	200.0	H	126.0	-0.3	54.00	13.83
4960.000000	49.27	---	200.0	H	126.0	-0.3	74.00	24.73
7440.000000	---	38.57	150.0	H	345.0	6.0	54.00	15.43
7440.000000	47.38	---	150.0	H	345.0	6.0	74.00	26.62
9921.600000	---	39.04	200.0	H	79.0	8.1	54.00	14.96
9921.600000	49.54	---	200.0	H	79.0	8.1	74.00	24.46
17486.600000	---	45.83	150.0	V	242.0	14.2	54.00	8.17
17486.600000	56.26	---	150.0	V	242.0	14.2	74.00	17.74

**18GHz-25GHz**

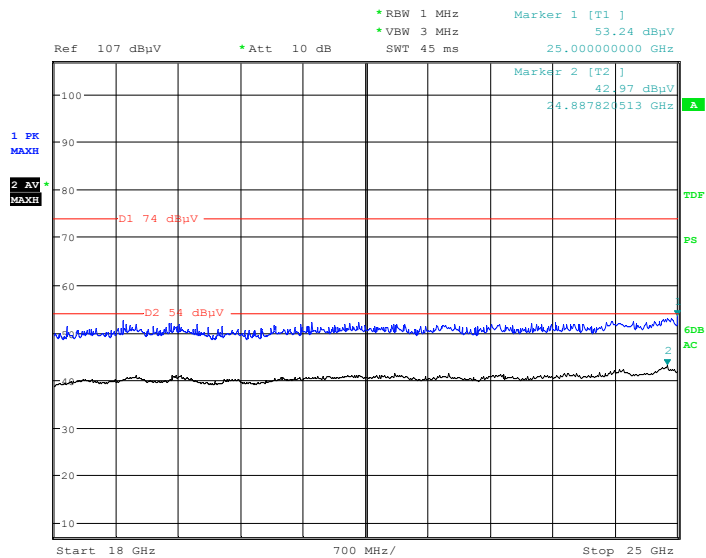
(Pre-scan with low, middle and high channels of operation in the X,Y and Z axes of orientation, the worst case **high** channel of operation in the X axis of orientation was recorded)

**Horizontal**



Date: 2.APR.2019 19:46:25

**Vertical**



Date: 2.APR.2019 20:00:13

**Fundamental Test & Restricted Bands Emissions Test:**

*(Pre-scan in the X,Y and Z axes of orientation, the worst case X-axis of orientation was recorded)*

**For Antenna W10436069:**

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2402.000000	96.78	---	100.0	H	169.0	6.0	/	/
2402.000000	---	96.01	100.0	H	169.0	6.0	/	/
2402.000000	92.54	---	150.0	V	120.0	6.0	/	/
2402.000000	---	91.58	150.0	V	120.0	6.0	/	/
2390.000000	---	41.83	200.0	H	1.0	6.0	54.00	12.17
2390.000000	57.89	---	200.0	H	1.0	6.0	74.00	16.11
Middle Channel: 2440MHz								
2440.000000	96.31	---	100.0	H	337.0	6.2	/	/
2440.000000	---	95.82	100.0	H	337.0	6.2	/	/
2440.000000	91.90	---	150.0	V	95.0	6.2	/	/
2440.000000	---	91.50	150.0	V	95.0	6.2	/	/
High Channel: 2480MHz								
2480.000000	96.26	---	150.0	H	339.0	6.3	/	/
2480.000000	---	95.77	150.0	H	339.0	6.3	/	/
2480.000000	91.77	---	200.0	V	128.0	6.3	/	/
2480.000000	---	91.40	200.0	V	128.0	6.3	/	/
2483.500000	68.24	---	100.0	H	345.0	6.3	74.00	5.76
2483.500000	---	46.81	100.0	H	345.0	6.3	54.00	7.19

**For Antenna W10806955:**

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2402.000000	91.71	---	200.0	H	139.0	6.0	/	/
2402.000000	---	91.34	200.0	H	139.0	6.0	/	/
2402.000000	87.36	---	150.0	V	289.0	6.0	/	/
2402.000000	---	86.93	150.0	V	289.0	6.0	/	/
2390.000000	---	40.97	200.0	H	49.0	6.0	54.00	13.03
2390.000000	49.49	---	200.0	H	49.0	6.0	74.00	24.51
Middle Channel: 2440MHz								
2440.000000	94.11	---	150.0	H	245.0	6.2	/	/
2440.000000	---	93.98	150.0	H	245.0	6.2	/	/
2440.000000	89.85	---	250.0	V	188.0	6.2	/	/
2440.000000	---	89.67	250.0	V	188.0	6.2	/	/
High Channel: 2480MHz								
2480.000000	96.55	---	200.0	H	97.0	6.3	/	/
2480.000000	---	96.11	200.0	H	97.0	6.3	/	/
2480.000000	92.24	---	100.0	V	322.0	6.3	/	/
2480.000000	---	91.72	100.0	V	322.0	6.3	/	/
2483.500000	66.77	---	150.0	H	68.0	6.3	74.00	7.23
2483.500000	---	46.26	150.0	H	68.0	6.3	54.00	7.74

**For Antenna W10474143:**

Note:

1. Corrected Factor (dB/m) = Antenna factor (RX) (dB/m) + Cable Loss (dB) – Amplifier Factor (dB)

Corrected Amplitude (dBµV /m) = Corrected Factor (dB/m) + Reading (dBµV)

Margin (dB) = Limit (dBµV/m) – Corrected Amplitude (dBµV /m)

Frequency (MHz)	Corrected Amplitude		Rx Antenna		Turntable Degree	Corrected Factor (dB/m)	Limit (dBµV/m)	Margin (dB)
	MaxPeak (dBµV /m)	Average (dBµV /m)	Height (cm)	Polar (H/V)				
Low Channel: 2402MHz								
2402.000000	94.75	---	150.0	H	89.0	2.8	/	/
2402.000000	---	93.87	150.0	H	89.0	2.8	/	/
2402.000000	92.68	---	200.0	V	220.0	2.8	/	/
2402.000000	---	91.81	200.0	V	220.0	2.8	/	/
2390.000000	---	37.34	250.0	H	168.0	2.8	54.00	16.66
2390.000000	46.64	---	250.0	H	168.0	2.8	74.00	27.36
Middle Channel: 2440MHz								
2440.000000	94.21	---	200.0	H	117.0	2.8	/	/
2440.000000	---	93.37	200.0	H	117.0	2.8	/	/
2440.000000	91.94	---	200.0	V	133.0	2.8	/	/
2440.000000	---	91.00	200.0	V	133.0	2.8	/	/
High Channel: 2480MHz								
2480.000000	94.75	---	150.0	H	214.0	3.0	/	/
2480.000000	---	93.98	150.0	H	214.0	3.0	/	/
2480.000000	92.27	---	150.0	V	1.0	3.0	/	/
2480.000000	---	91.83	150.0	V	1.0	3.0	/	/
2483.500000	60.28	---	250.0	H	329.0	3.0	74.00	13.72
2483.500000	---	41.91	250.0	H	329.0	3.0	54.00	12.09

**\*\*\*\*\* END OF REPORT \*\*\*\*\***