



# RF TEST REPORT

**Applicant** Honeywell International Inc  
**FCC ID** HS9-TH6220WF01DB  
**Product** Honeywell Home Wi-Fi Thermostat  
**Model** RCHT8610WF2006DB  
**Report No.** RXA1707-0207RF01R2  
**Issue Date** November 24, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (2017)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Performed by: Xianqing Li

Approved by: Kai Xu

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## TA Technology (Shanghai) Co., Ltd.

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## Summary of measurement results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Maximum Average conducted output power	15.247(b)(3)	PASS
2	6 dB bandwidth	15.247(a)(2)	PASS
3	Power spectral density	15.247(e)	PASS
4	Band Edge	15.247(d)	PASS
5	Spurious RF Conducted Emissions	15.247(d)	PASS
6	Radiated Emissions in restricted frequency bands	15.247(d),15.205,15.209	PASS
7	Radiated Emissions	15.247(d),15.205,15.209	PASS
8	Conducted Emissions	15.207	PASS
Date of Testing: July 5, 2017~November 24, 2017			



## 1. Test Laboratory

### 1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by any government agencies.

### 1.2. Test facility

#### **CNAS (accreditation number: L2264)**

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

#### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### **IC (recognition number is 8510A)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

#### **VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

#### **A2LA (Certificate Number: 3857.01)**

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.



### 1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
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Fax: +86-021-50791141/2/3-8000  
Website: <http://www.ta-shanghai.com>  
E-mail: [xukai@ta-shanghai.com](mailto:xukai@ta-shanghai.com)

## 2. General Description of Equipment under Test

### Client Information

Applicant	Honeywell International Inc.
Applicant address	2 Corporate Center Drive Melville NY USA
Manufacturer	Jabil Circuit de Mexico
Manufacturer address	Valdepeñas 1993 Zapopan Mexico

### General information

EUT Description	
Model:	RCHT8610WF2006DB
SN:	/
Hardware Version:	200-01841B
Software Version:	2.6.5
Power Supply:	AC Power Supply
Antenna Type:	Internal Antenna
Antenna Connector:	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)
Antenna Gain:	Antenna 1: 4.32 dbi Antenna 2: 4.32 dbi
Test Mode:	802.11b 802.11g, 802.11n(HT20/HT40);
Modulation Type:	802.11b: DSSS; 802.11g/n(HT20/HT40): OFDM
Max. Conducted Power	Wi-Fi 2.4G : 17.80dBm
Operating Frequency Range(s)	802.11b/g/n(HT20): 2412 ~ 2462 MHz 802.11n(HT40): 2422 ~ 2452 MHz
Note: The information of the EUT is declared by the manufacturer.	



### 3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

#### Test standards

- **FCC CFR47 Part 15C (2017) Radio Frequency Devices**
- **ANSI C63.10 (2013)**
- **KDB 558074 D01 DTS Meas Guidance v04**
- **KDB 662911 D01 Multiple Transmitter Output v02r01**

## 4. Test Configuration

### Test Mode

The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

The worst case Antenna mode for each of the following tests for Wi-Fi 2.4G

Test Cases	Antenna 1	Antenna 2
Average Power Output –Conducted	O	O
6dB Bandwidth	O	--
Band Edge	O	--
Power Spectral Density	O	O
Spurious RF Conducted Emissions	O	O
Radiates Emission in the Restricted Band	O	--
Radiates Emission	O	--
Conducted Emission	O	--
Note: "O": test all bands		



## 5. Test Case Results

### 5.1. Average Power Output –Conducted

#### Ambient condition

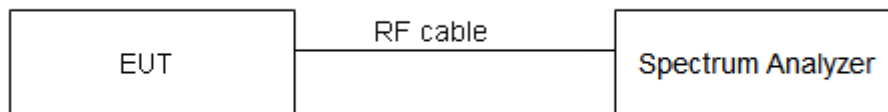
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

During the process of the testing, The EUT was connected to Spectrum Analyzer with a known loss. The EUT is max power transmission with proper modulation. The Average detector is used. We use Maximum Average Conducted Output Power Level Method in KDB 558074 D01 for this test

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

#### Test Setup



#### Limits

Rule Part 15.247 (b) (3) specifies that " For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz: 1 Watt."

Average Output Power	$\leq 1W$ (30dBm)
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#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.44$  dB.

**Test Results**

	Antenna 1 Power Index			Antenna 2 Power Index		
Packet Type	CH1	CH6	CH11	CH1	CH6	CH11
802.11b	17	17	17	17	17	17
802.11g	15	15	15	15	15	15
802.11n HT20	14	14	14	14	14	14
Packet Type	CH3	CH6	CH9	CH3	CH6	CH9
802.11n HT40	13	13	13	13	13	13

**Antenna 1**

Network Standards	Carrier frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11b	2412	17.80	30	PASS
	2437	17.59	30	PASS
	2462	17.59	30	PASS
802.11g	2412	14.52	30	PASS
	2437	14.52	30	PASS
	2462	14.42	30	PASS
802.11n HT20	2412	15.10	30	PASS
	2437	15.41	30	PASS
	2462	15.26	30	PASS
802.11n HT40	2422	13.05	30	PASS
	2437	12.94	30	PASS
	2452	12.97	30	PASS

**Antenna2**

Network Standards	Carrier frequency (MHz)	Average Output Power (dBm)	Limit (dBm)	Conclusion
802.11b	2412	17.58	30	PASS
	2437	17.42	30	PASS
	2462	17.25	30	PASS
802.11g	2412	14.97	30	PASS
	2437	14.92	30	PASS
	2462	14.75	30	PASS
802.11n HT20	2412	14.63	30	PASS
	2437	14.64	30	PASS
	2462	14.57	30	PASS
802.11n HT40	2422	12.83	30	PASS
	2437	12.78	30	PASS
	2452	12.84	30	PASS

## 5.2. 6dB Bandwidth

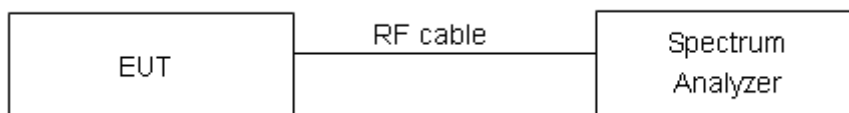
### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 100 kHz; VBW is set to 300 kHz on spectrum analyzer.

### Test Setup



### Limits

Rule Part 15.247 (a) (2) specifies that “Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.”

minimum 6 dB bandwidth	≥ 500 kHz
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### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 936$  Hz.

**Test Results:****Antenna 1**

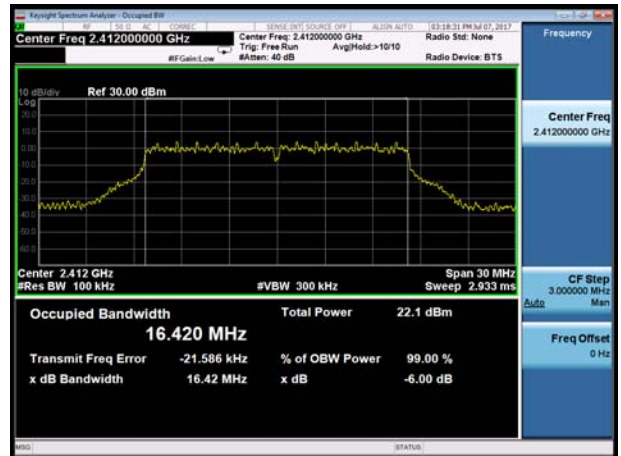
Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11b	2412	11.612	8.904	500	PASS
	2437	11.646	8.128	500	PASS
	2462	11.600	8.467	500	PASS
802.11g	2412	16.420	16.42	500	PASS
	2437	16.425	16.41	500	PASS
	2462	16.423	16.42	500	PASS
802.11n HT20	2412	17.666	17.32	500	PASS
	2437	17.620	17.06	500	PASS
	2462	17.640	17.29	500	PASS
802.11n HT40	2422	36.199	36.49	500	PASS
	2437	36.198	36.50	500	PASS
	2452	36.233	36.52	500	PASS



802.11b, Carrier frequency (MHz): 2412



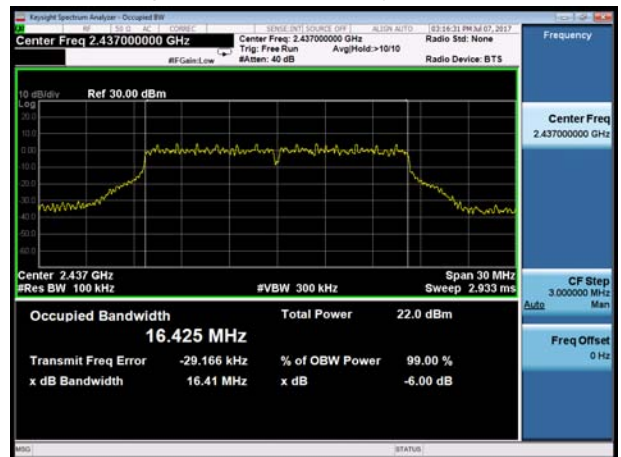
802.11g, Carrier frequency (MHz): 2412



802.11b, Carrier frequency (MHz): 2437



802.11g, Carrier frequency (MHz): 2437



802.11b, Carrier frequency (MHz): 2462



802.11g, Carrier frequency (MHz): 2462





802.11n(HT20), Carrier frequency (MHz): 2412



802.11n(HT40), Carrier frequency (MHz): 2422



802.11n(HT20), Carrier frequency (MHz): 2437



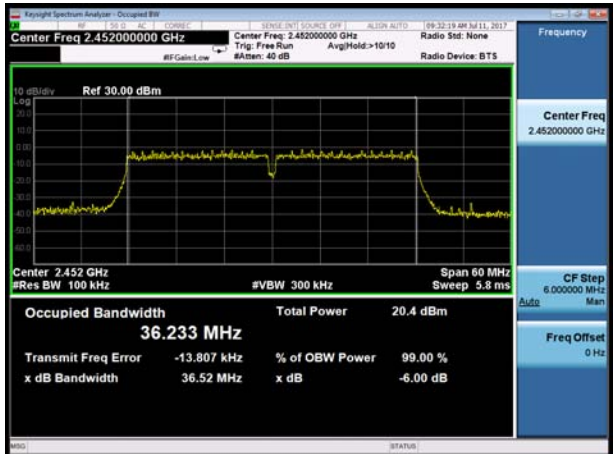
802.11n(HT40), Carrier frequency (MHz): 2437



802.11n(HT20), Carrier frequency (MHz):2462



802.11n(HT40), Carrier frequency (MHz):2452



### 5.3. Band Edge

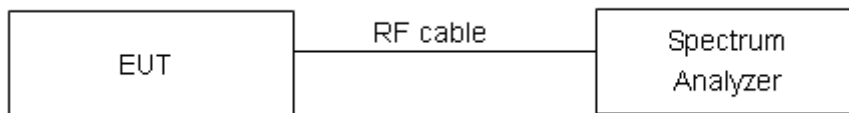
#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable the band edge of the lowest and highest channels were measured. The peak detector is used and RBW is set to 100 kHz and VBW is set to 300 kHz on spectrum analyzer. Spectrum analyzer plots are included on the following pages.

#### Test Setup



#### Limits

Rule Part 15.247(d) specifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.”

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

Frequency	Uncertainty
2GHz-3GHz	1.407 dB

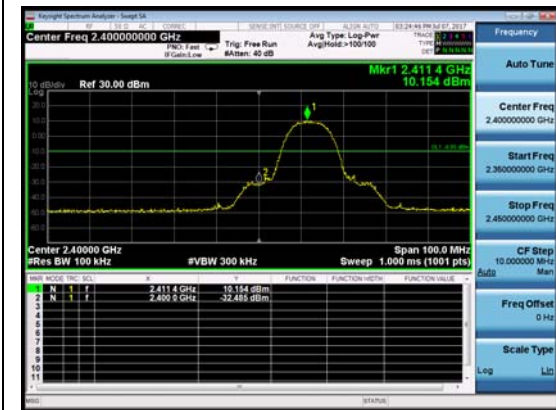




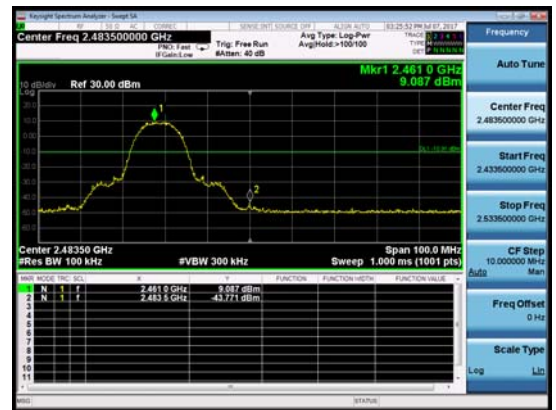
Test Results: PASS

Antenna 1

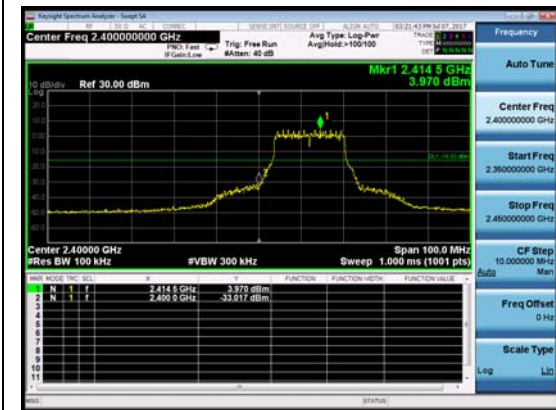
802.11b, Channel No.: 1



802.11b, Channel No.: 11



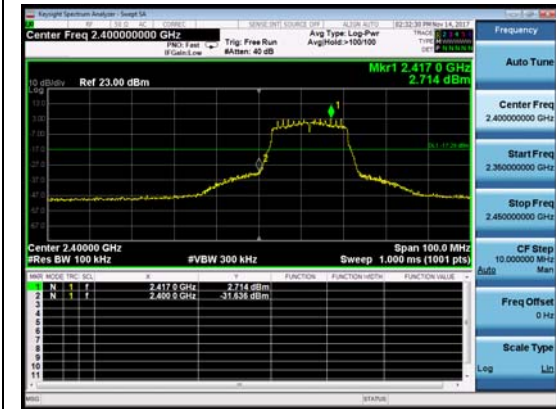
802.11g, Channel No.: 1



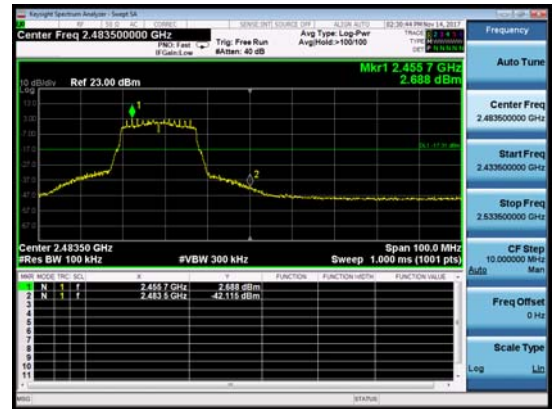
802.11g, Channel No.: 11



802.11n(HT20), Channel No.: 1



802.11n(HT20), Channel No.: 11





802.11n(HT40), Channel No.: 3



802.11n(HT40), Channel No.: 9



### 5.4. Power Spectral Density

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

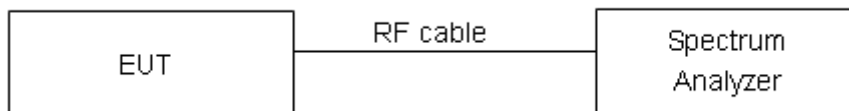
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

RBW is set to 3 kHz and VBW is set to 10 kHz for BLE/ Wi-Fi 2.4G on spectrum analyzer.

Set the span to 1.5 times the DTS channel bandwidth. Sweep time = auto couple. Trace mode = max hold. The Average power spectral density is recorded.

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

#### Test setup



#### Limits

Rule Part 15.247(e) specifies that” For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. ”

Limits	≤ 8 dBm / 3kHz
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#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 0.75\text{dB}$ .

**Test Results:****Antenna 1**

Network Standards	Channel Number	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11b	1	-15.146	8	PASS
	6	-15.063	8	PASS
	11	-15.163	8	PASS
802.11g	1	-18.135	8	PASS
	6	-17.989	8	PASS
	11	-18.220	8	PASS
802.11n HT20	1	-18.866	8	PASS
	6	-18.497	8	PASS
	11	-18.687	8	PASS
802.11n HT40	3	-24.227	8	PASS
	6	-24.324	8	PASS
	9	-24.638	8	PASS

**Antenna 2**

Network Standards	Channel Number	Power Spectral Density (dBm / 3kHz)	Limit (dBm / 3kHz)	Conclusion
802.11b	1	-15.256	8	PASS
	6	-15.216	8	PASS
	11	-15.566	8	PASS
802.11g	1	-18.250	8	PASS
	6	-18.176	8	PASS
	11	-18.344	8	PASS
802.11n HT20	1	-19.035	8	PASS
	6	-19.153	8	PASS
	11	-19.119	8	PASS
802.11n HT40	3	-24.597	8	PASS
	6	-24.451	8	PASS
	9	-24.712	8	PASS

### 5.5. Spurious RF Conducted Emissions

**Ambient condition**

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

**Method of Measurement**

The EUT was connected to the spectrum analyzer with a known loss. The spectrum analyzer scans from 30MHz to the 10th harmonic of the carrier. The peak detector is used. Set RBW to100kHz and VBW to 300 kHz, Sweep is set to ATUO.

The test is in transmitting mode.

**Test setup**



**Limits**

Rule Part 15.247(d) pacifies that “In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.”

**Antenna 1**

Network Standards	Carrier frequency (MHz)	Reference value (dBm)	Limit
802.11b	2412	7.500	-12.500
	2437	7.616	-12.384
	2462	6.710	-13.290
802.11g	2412	2.396	-17.604
	2437	3.128	-16.872
	2462	3.122	-16.878
802.11n HT20	2412	0.583	-19.417
	2437	1.249	-18.751
	2462	0.940	-19.060
802.11n HT40	2422	-2.142	-22.142
	2437	-1.862	-21.862
	2452	-1.964	-21.964

**Antenna 2**

Network Standards	Carrier frequency (MHz)	Reference value (dBm)	Limit
802.11b	2412	7.404	-12.596
	2437	7.423	-12.577
	2462	6.995	-13.005
802.11g	2412	2.278	-17.722
	2437	2.569	-17.431
	2462	2.236	-17.764
802.11n HT20	2412	0.398	-19.602
	2437	1.058	-18.942
	2462	0.953	-19.047
802.11n HT40	2422	-2.434	-22.434
	2437	-2.293	-22.293
	2452	-2.215	-22.215

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

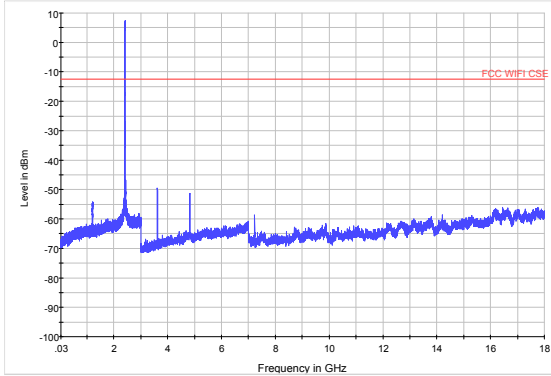
Frequency	Uncertainty
100kHz-2GHz	0.684 dB
2GHz-26GHz	1.407 dB



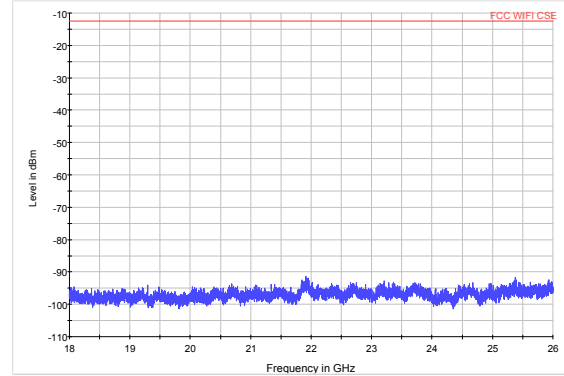
**Test Results:**

If disturbances were found more than 20dB below limit line, the mark is not required for the EUT.  
The signal beyond the limit is carrier.

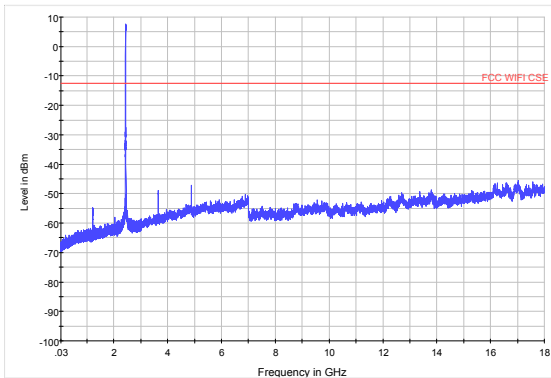
**Antenna 1**



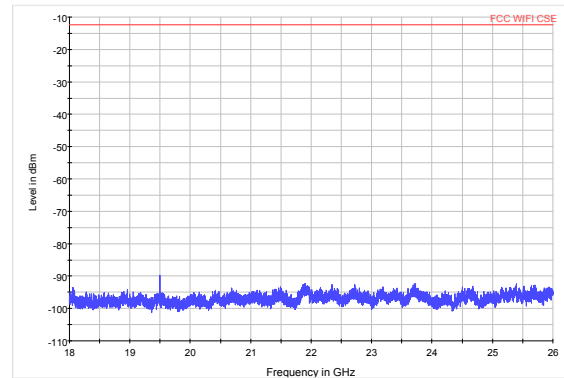
802.11b CH1 30MHz to 18GHz



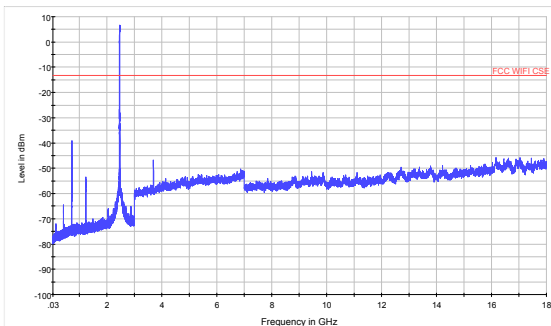
802.11b CH1 18GHz to 26.5GHz



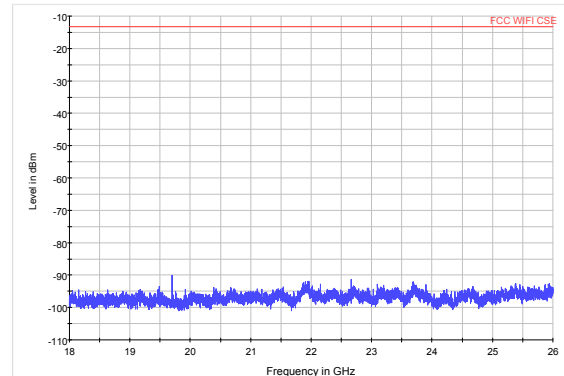
802.11b CH6 30MHz to 18GHz



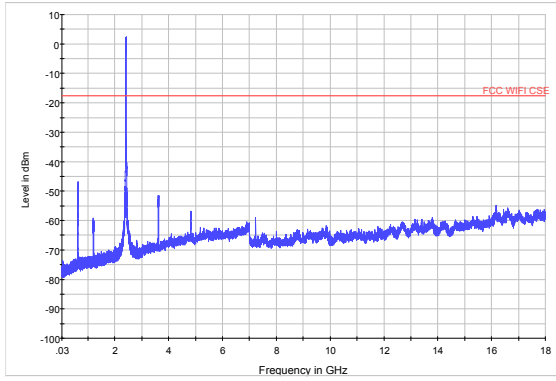
802.11b CH6 18GHz to 26.5GHz



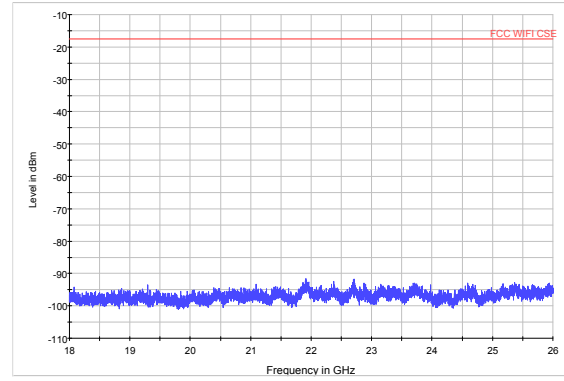
802.11b CH11 30MHz to 18GHz



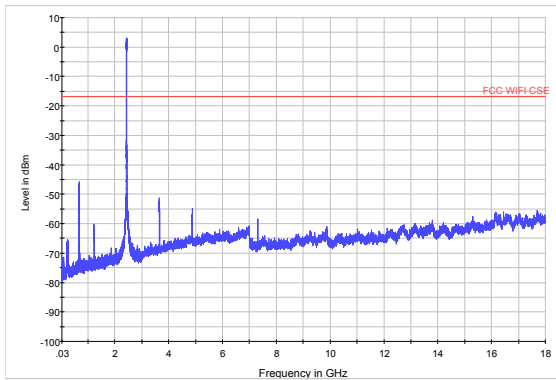
802.11b CH11 18GHz to 26.5GHz



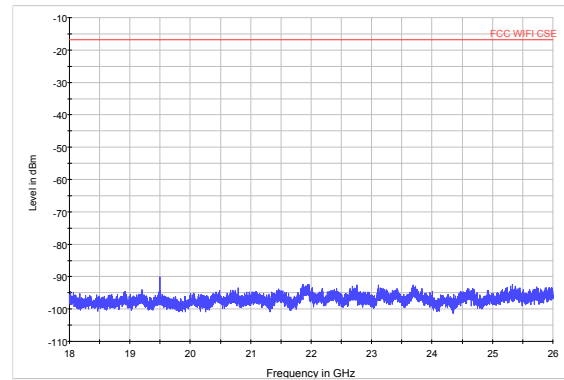
802.11g CH1 30MHz to 18GHz



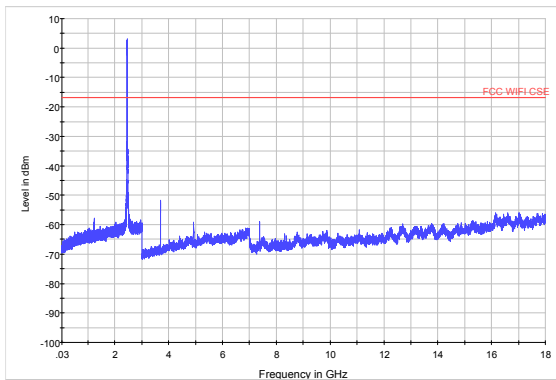
802.11g CH1 18GHz to 26.5GHz



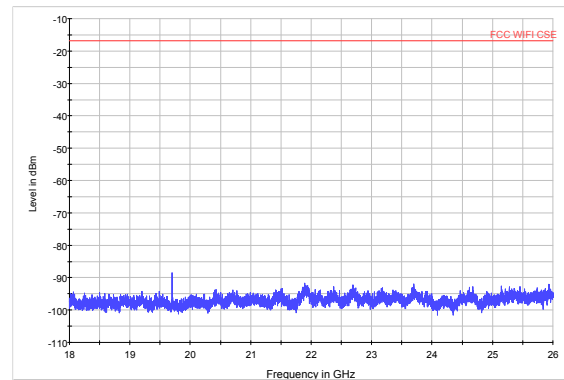
802.11g CH6 30MHz to 18GHz



802.11g CH6 18GHz to 26.5GHz

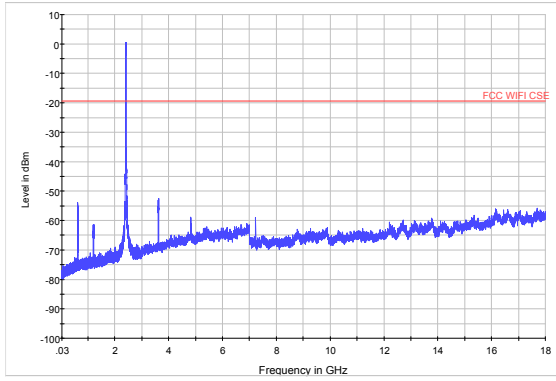


802.11g CH11 30MHz to 18GHz

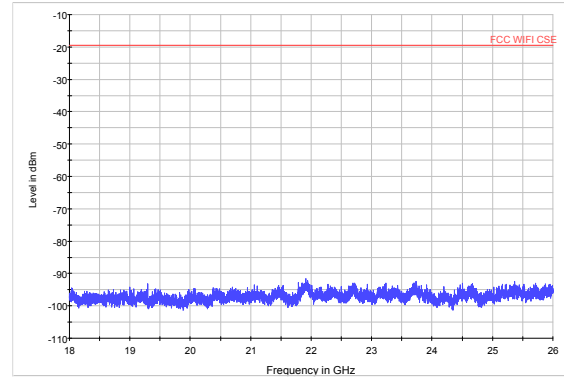


802.11g CH11 18GHz to 26.5GHz

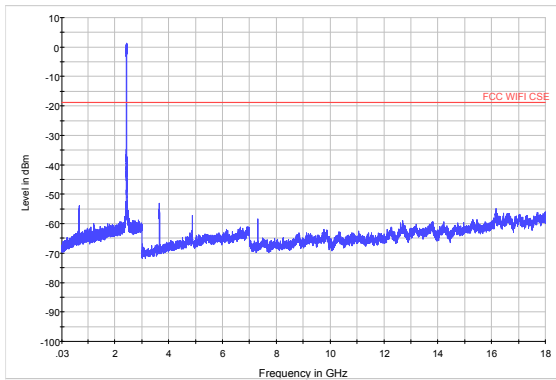




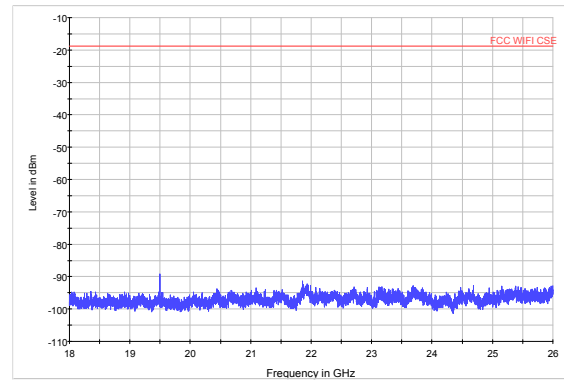
802.11n (HT20) CH1 30MHz to 18GHz



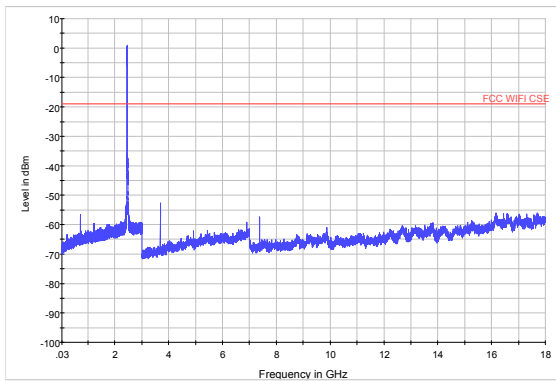
802.11n (HT20) CH1 18GHz to 26.5GHz



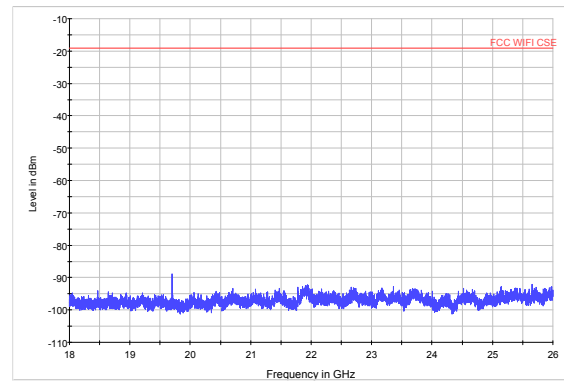
802.11n (HT20) CH6 30MHz to 18GHz



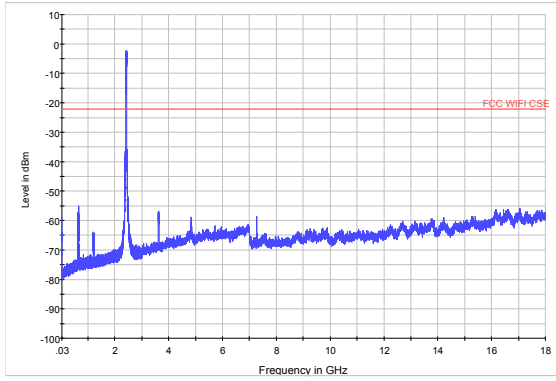
802.11n (HT20) CH6 18GHz to 26.5GHz



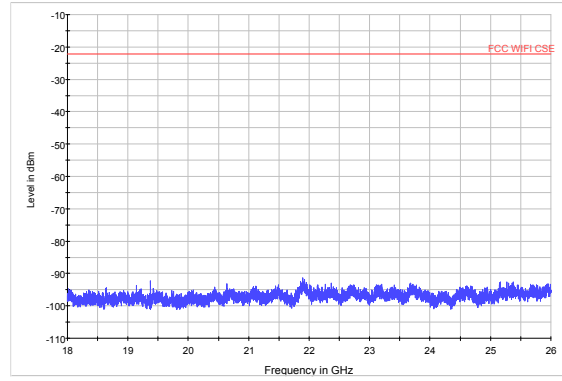
802.11n (HT20) CH11 30MHz to 18GHz



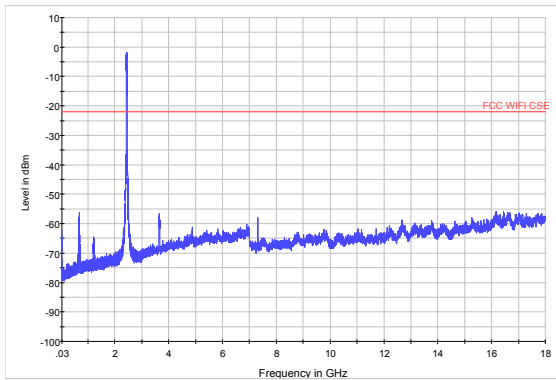
802.11n (HT20) CH11 18GHz to 26.5GHz



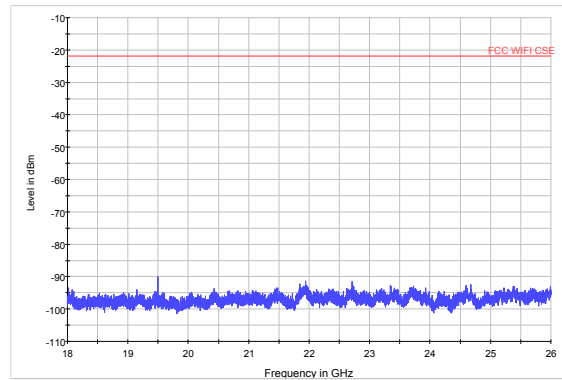
802.11n (HT40) CH3 30MHz to 18GHz



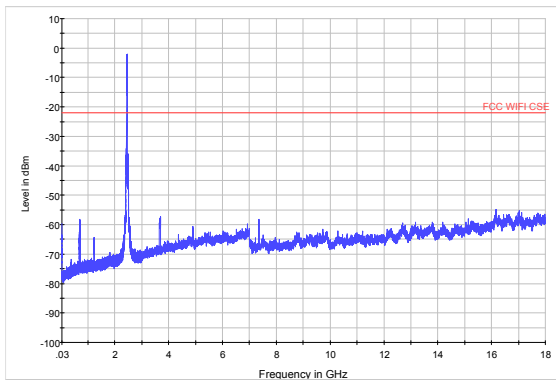
802.11n (HT40) CH3 18GHz to 26.5GHz



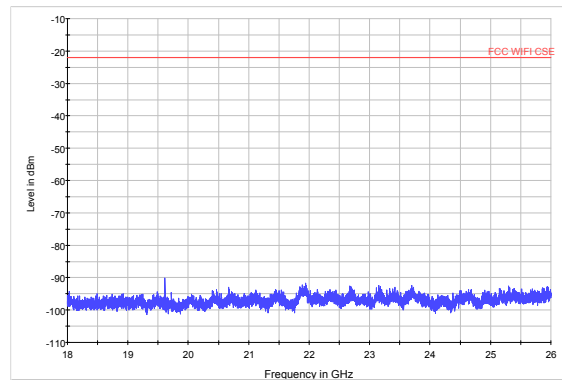
802.11n (HT40) CH6 30MHz to 18GHz



802.11n (HT40) CH6 18GHz to 26.5GHz



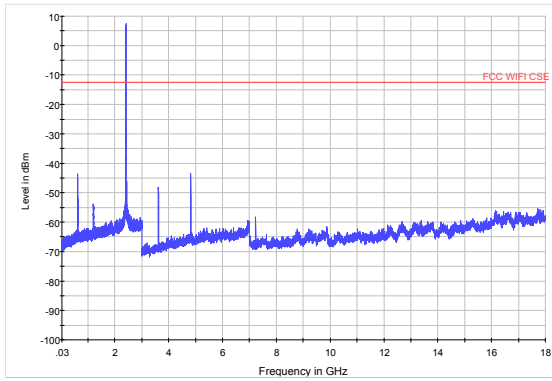
802.11n (HT40) CH9 30MHz to 18GHz



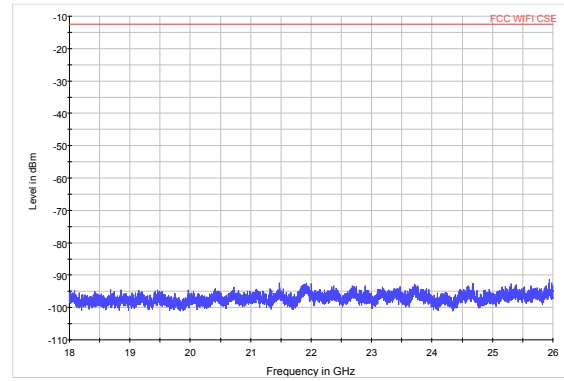
802.11n (HT40) CH9 18GHz to 26.5GHz



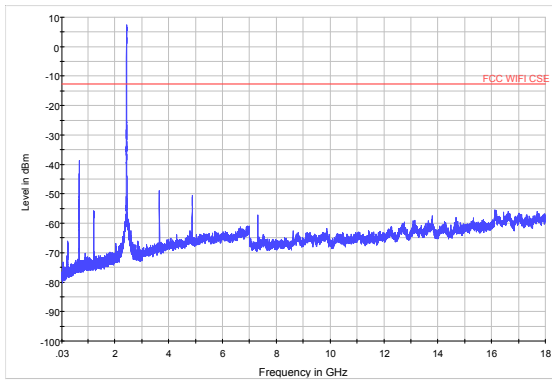
### Antenna 2



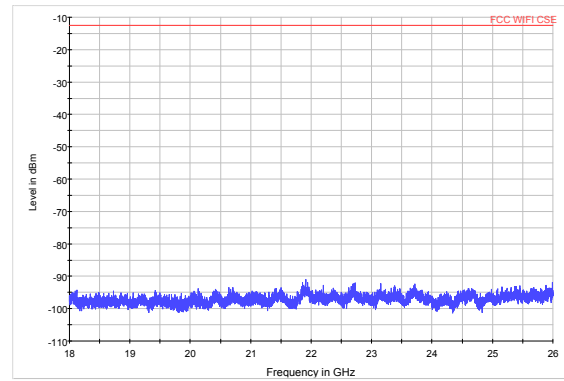
802.11b CH1 30MHz to 18GHz



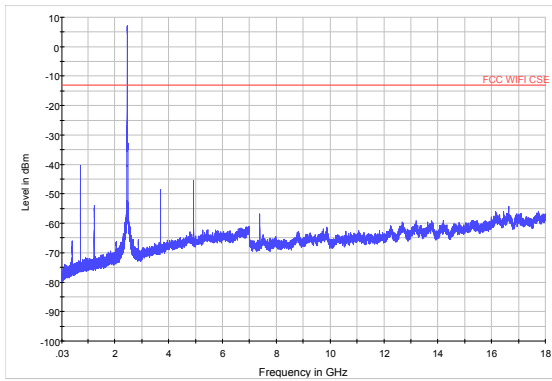
802.11b CH1 18GHz to 26.5GHz



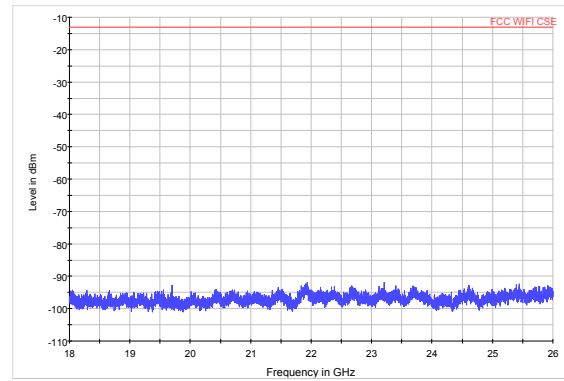
802.11b CH6 30MHz to 18GHz



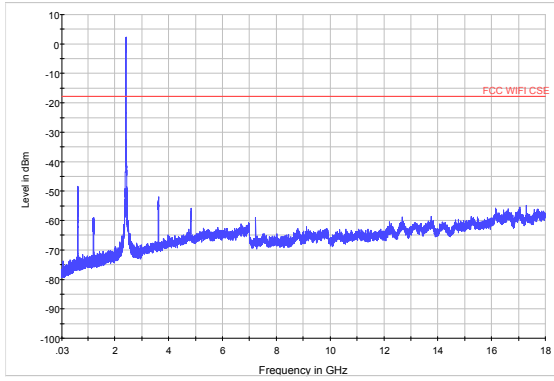
802.11b CH6 18GHz to 26.5GHz



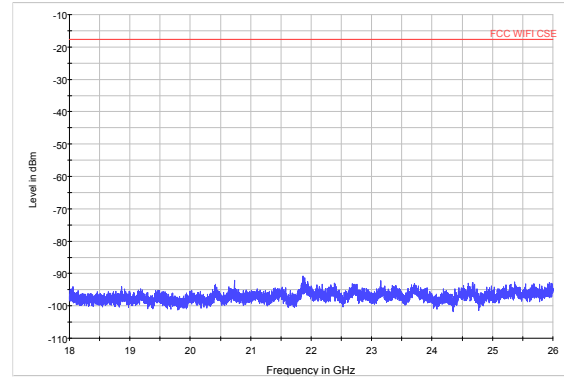
802.11b CH11 30MHz to 18GHz



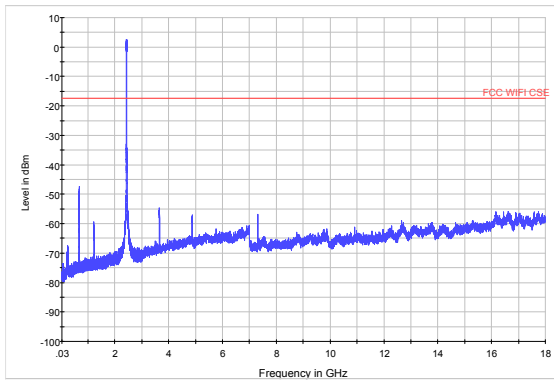
802.11b CH11 18GHz to 26.5GHz



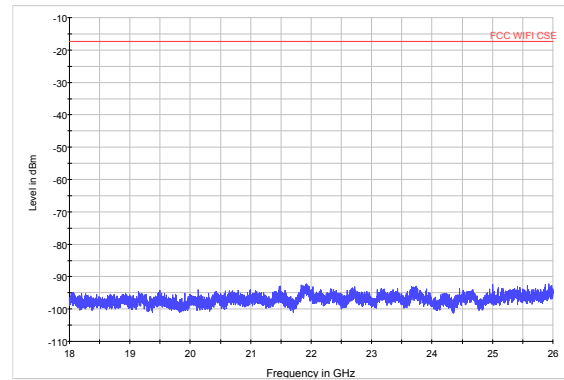
802.11g CH1 30MHz to 18GHz



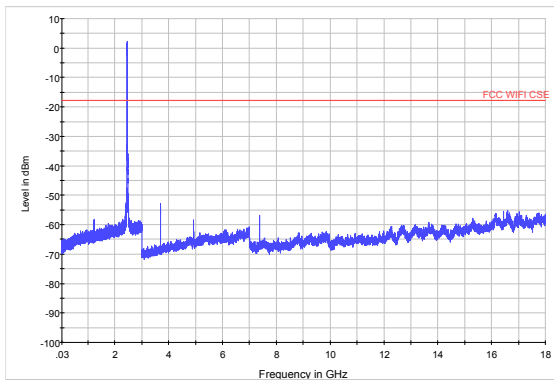
802.11g CH1 18GHz to 26.5GHz



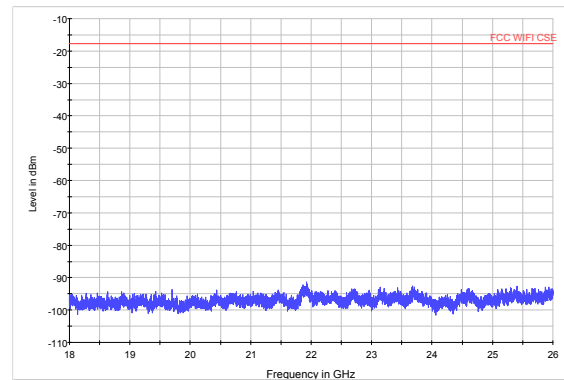
802.11g CH6 30MHz to 18GHz



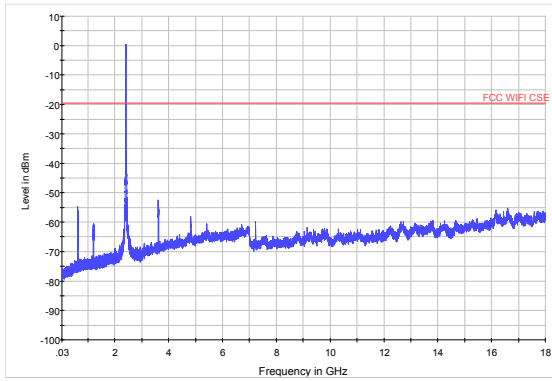
802.11g CH6 18GHz to 26.5GHz



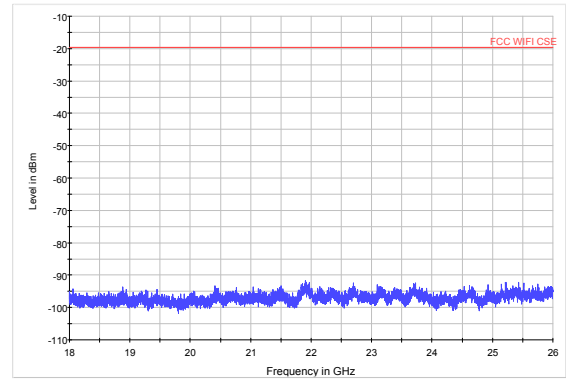
802.11g CH11 30MHz to 18GHz



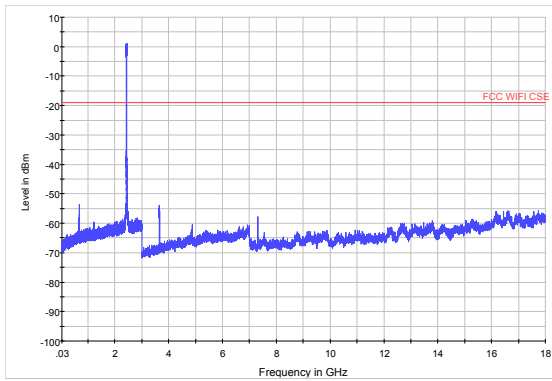
802.11g CH11 18GHz to 26.5GHz



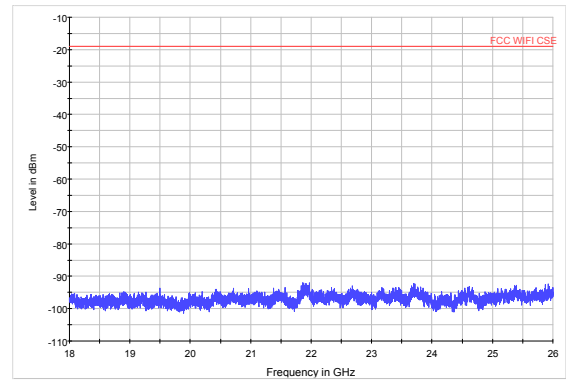
802.11n (HT20) CH1 30MHz to 18GHz



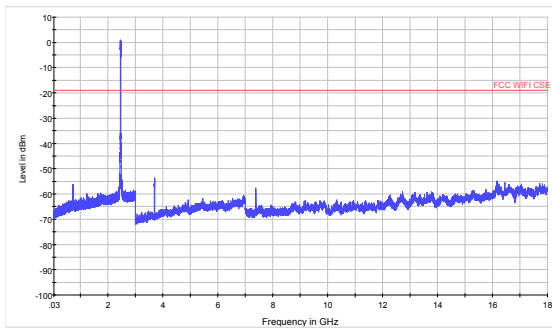
802.11n (HT20) CH1 18GHz to 26.5GHz



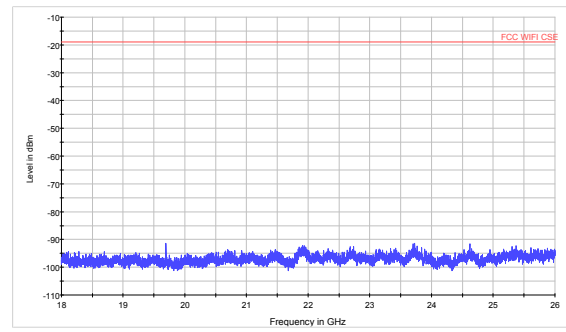
802.11n (HT20) CH6 30MHz to 18GHz



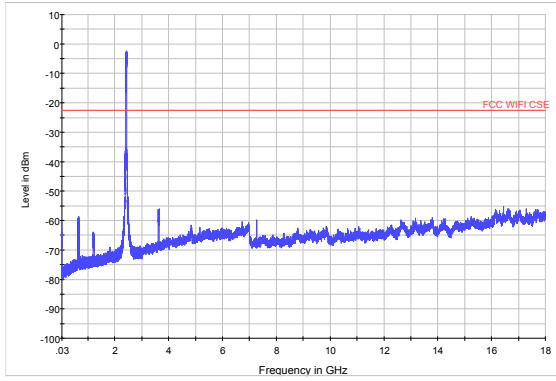
802.11n (HT20) CH6 18GHz to 26.5GHz



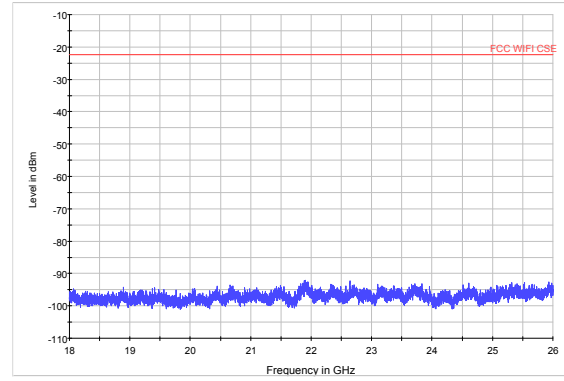
802.11n (HT20) CH11 30MHz to 18GHz



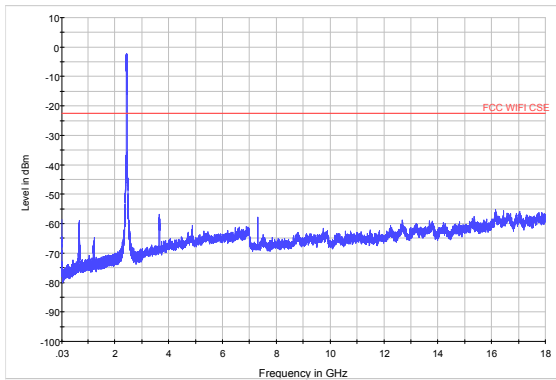
802.11n (HT20) CH11 18GHz to 26.5GHz



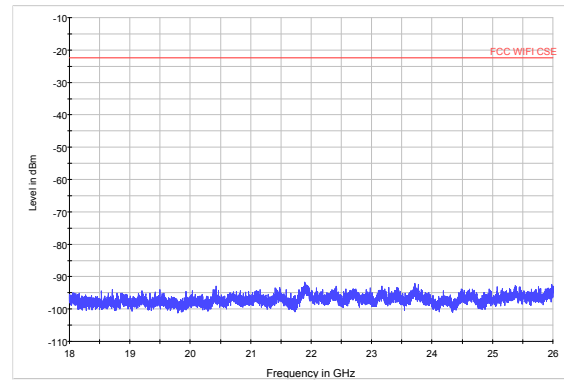
802.11n (HT40) CH3 30MHz to 18GHz



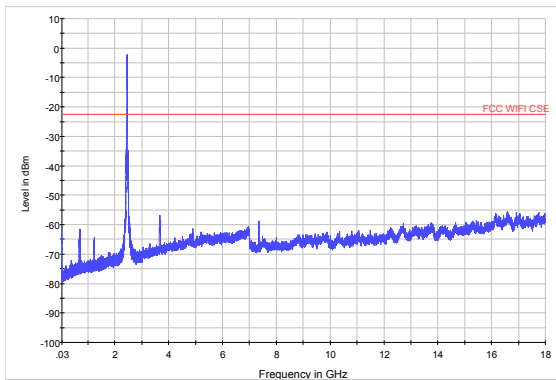
802.11n (HT40) CH3 18GHz to 26.5GHz



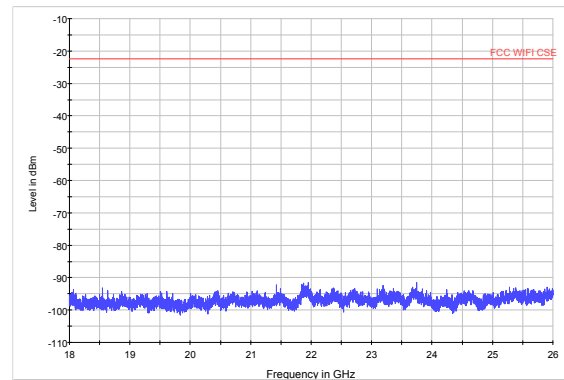
802.11n (HT40) CH6 30MHz to 18GHz



802.11n (HT40) CH6 18GHz to 26.5GHz



802.11n (HT40) CH9 30MHz to 18GHz



802.11n (HT40) CH9 18GHz to 26.5GHz

### 5.6. Radiated Emissions in the Restricted Band

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. RBW is set to 100kHz. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

Set the spectrum analyzer in the following:

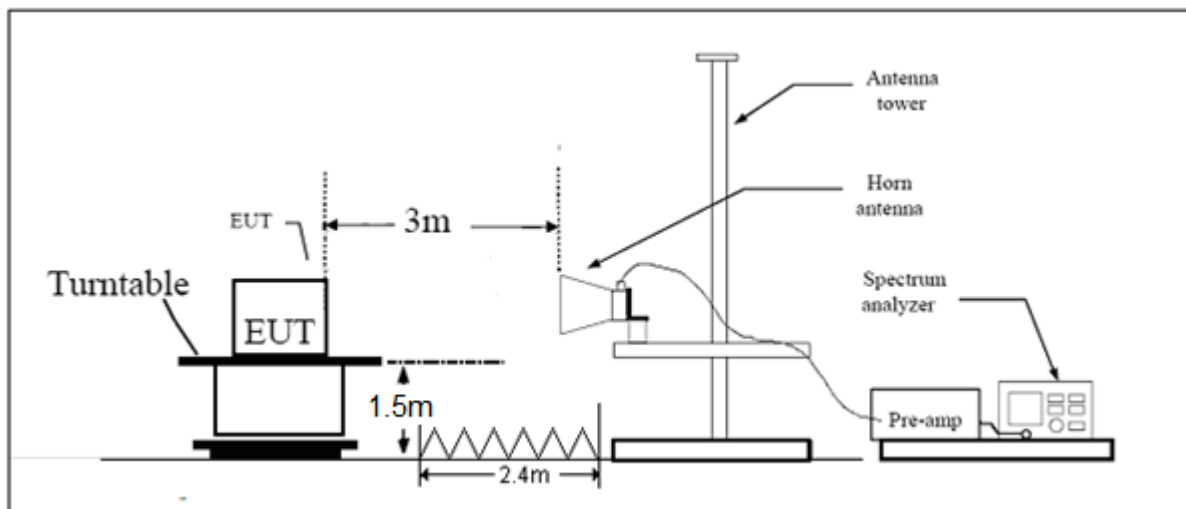
- (a) PEAK: RBW=1MHz /VBW=3MHz / Sweep=AUTO
- (b) AVERAGE: RBW=1MHz /VBW=3MHz / Sweep=AUTO

This setting method can refer to **KDB 558074**.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Y axis) and the antenna is vertical.

The test is in transmitting mode.

#### Test setup



Note: Area side: 2.4mX3.6m

**Limits**

Spurious Radiated Emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

Peak Limit=74 dBuV/m

Average Limit=54 dBuV/m

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 3.55$  dB.



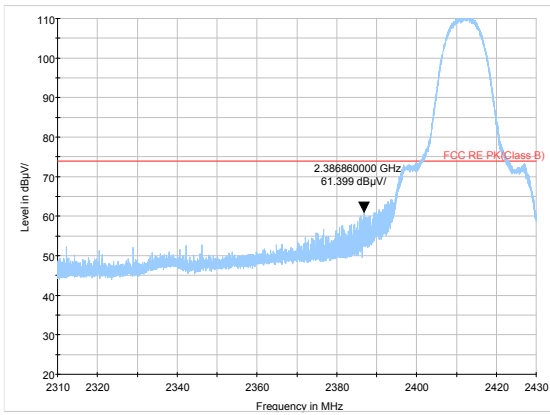


**Test Results:**

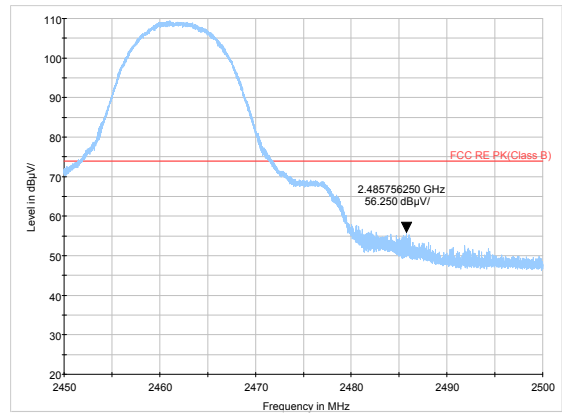
**Antenna 1**

The signal beyond the limit is carrier.

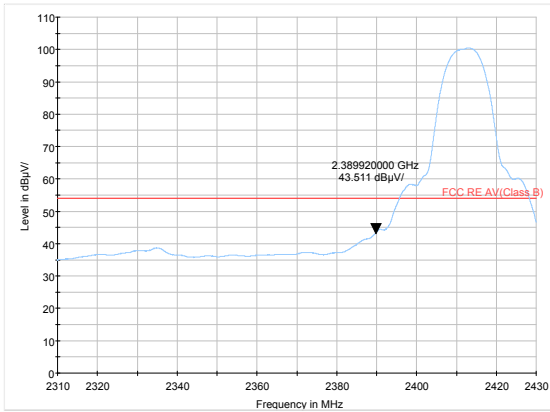
**802.11b-Channel 1: Peak**



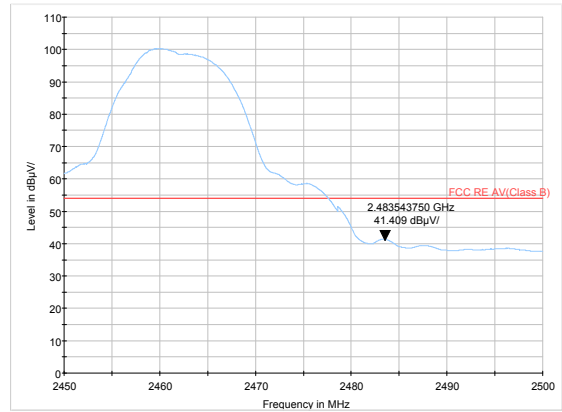
**802.11b-Channel 11: Peak**



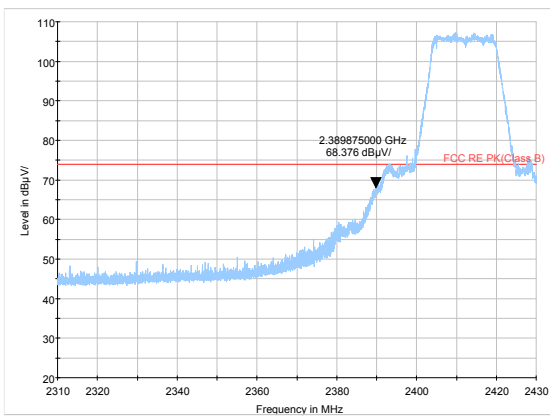
**802.11b-Channel 1: Average**



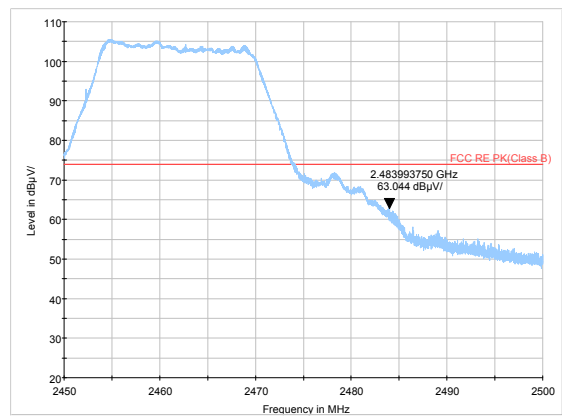
**802.11b-Channel 11: Average**



**802.11g-Channel 1: Peak**

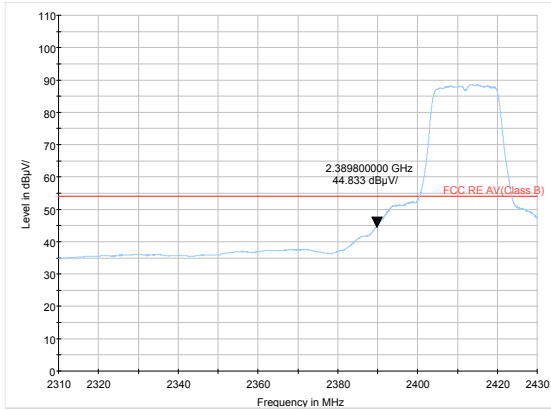


**802.11g-Channel 11: Peak**

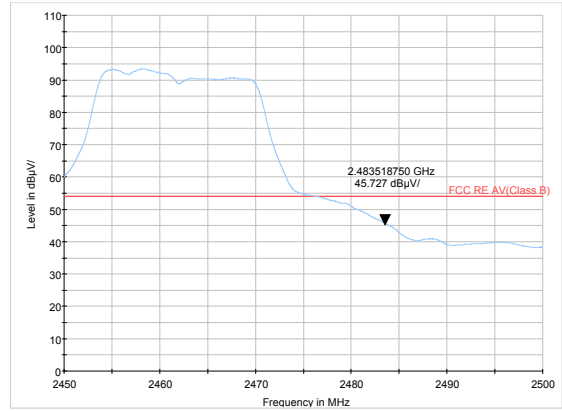




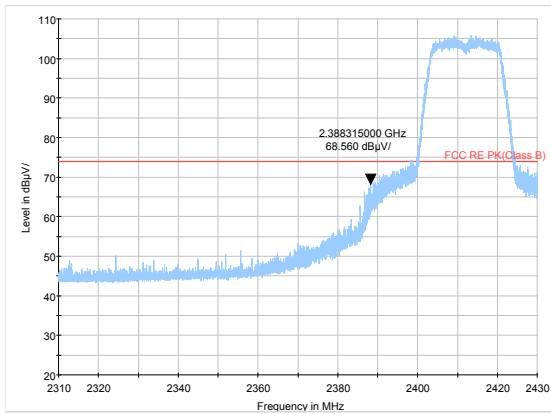
802.11g-Channel 1: Average



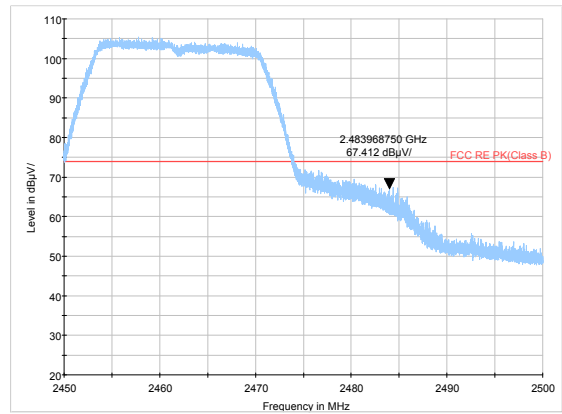
802.11g-Channel 11: Average



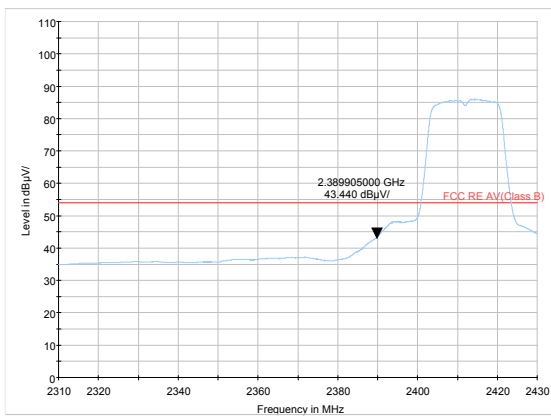
802.11n HT20 -Channel 1: Peak



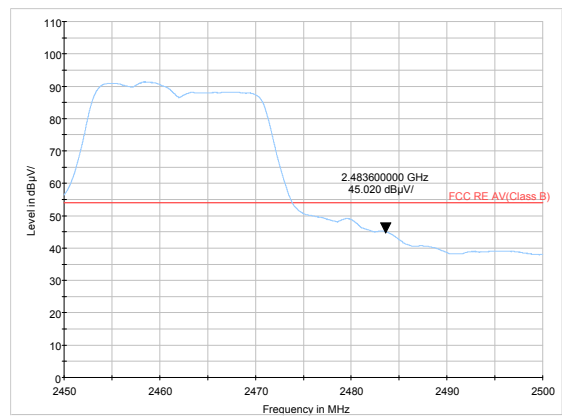
802.11n HT20-Channel 11: Peak



802.11n HT20-Channel 1: Average

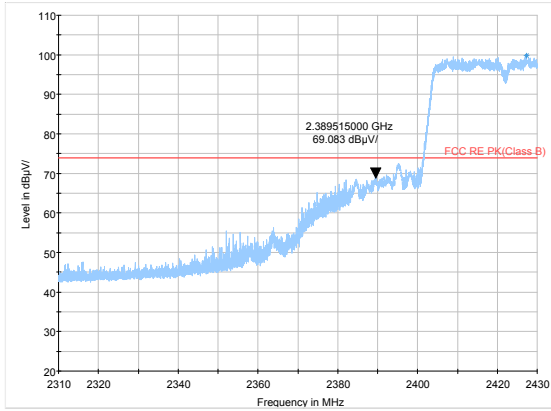


802.11n HT20-Channel 11: Average

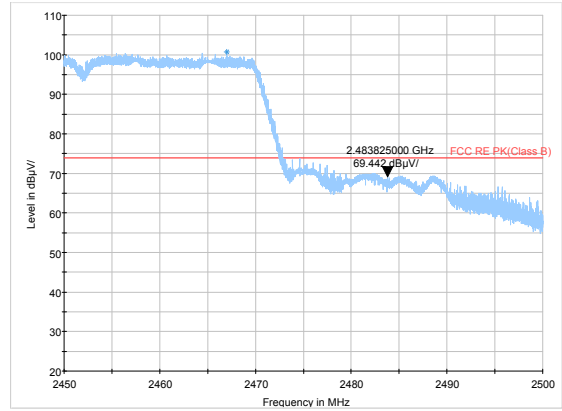




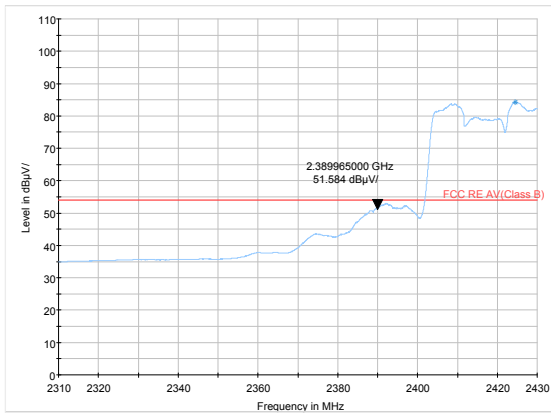
802.11n HT40 -Channel 3: Peak



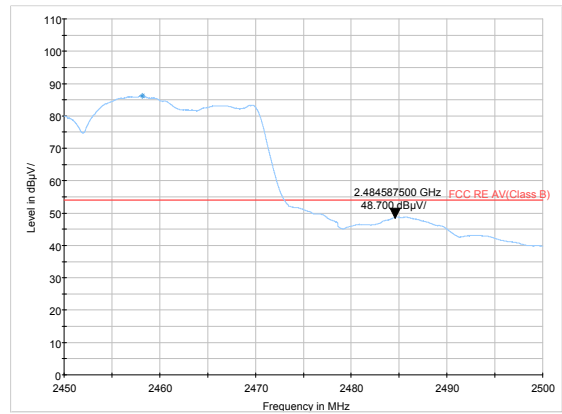
802.11n HT40-Channel 9: Peak



802.11n HT40-Channel 3: Average



802.11n HT40-Channel 9: Average



## 5.7. Radiates Emission

### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	102.5kPa

### Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10-2013. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, below 30MHz, the center of the loop shall be 1 meters; above 30MHz, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

Below 1GHz (detector: Peak and Quasi-Peak)

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz (detector: Peak):

(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

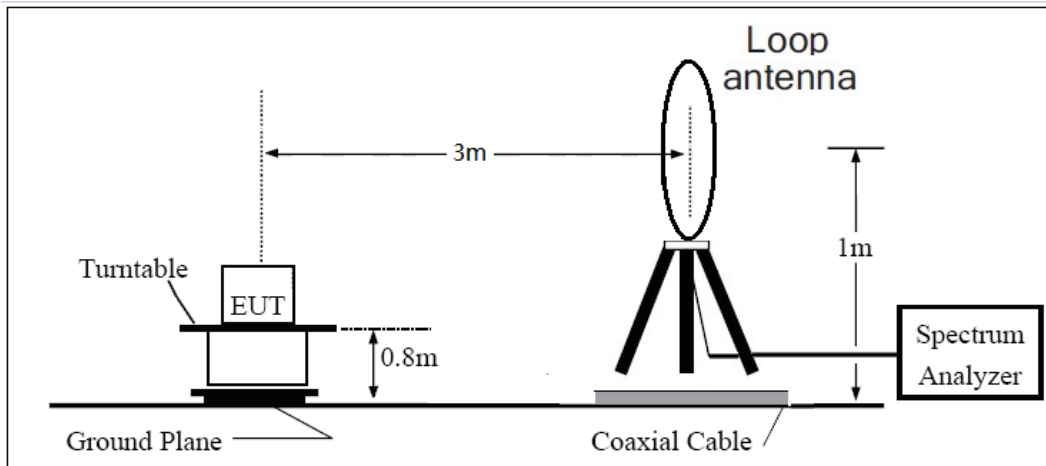
(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

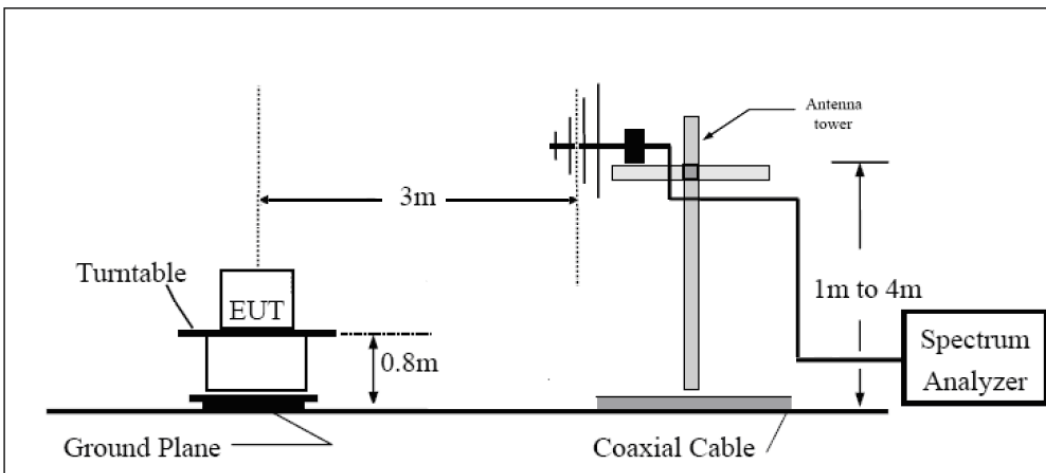
The test is in transmitting mode.

**Test setup**

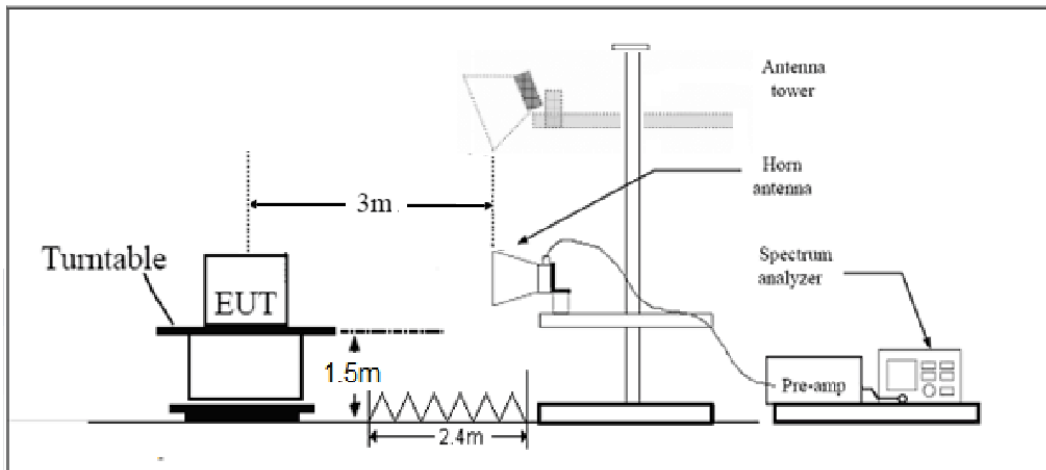
**9KHz ~ 30MHz**



**30MHz ~ 1GHz**



**Above 1GHz**



Note: Area side:2.4mX3.6m

**Limits**

Rule Part 15.247(d) specifies that “In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).”

Limit in restricted band

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

§15.35(b)

There is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
Above 1GHz	3.68 dB



**Test result**

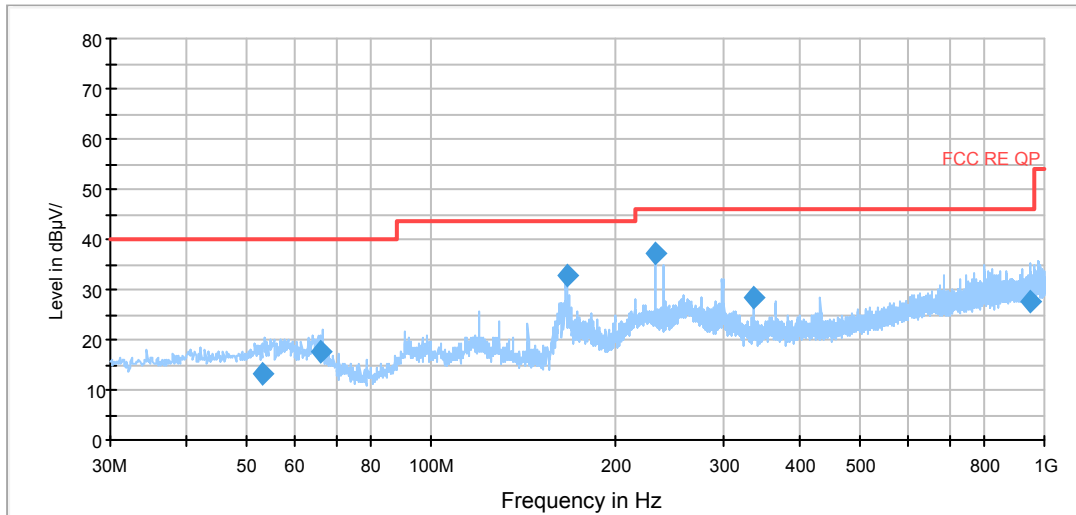
Sweep from 9 kHz to 30MHz, and the emissions more than 20 dB below the permissible value are not reported.

The following graphs display the maximum values of horizontal and vertical by software.

For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

**Continuous TX mode:**

FCC RE 0.03-1GHz QP Class B

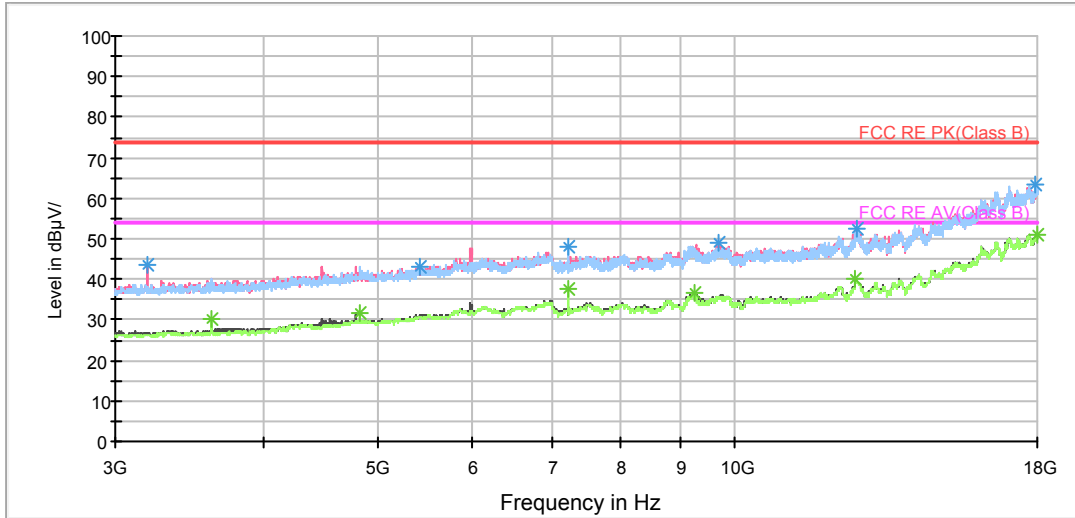


Radiates Emission from 30MHz to 1GHz



SISO Antenna 1

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3189.375000	43.8	102.0	V	165.0	46.7	-2.9	30.2	74
5418.750000	43.3	102.0	H	198.0	40.6	2.7	30.7	74
7237.500000	47.9	102.0	H	221.0	41.0	6.9	26.1	74
9678.750000	48.9	202.0	V	128.0	39.4	9.5	25.1	74
12663.750000	52.5	202.0	H	0.0	38.6	13.9	21.5	74
17915.625000	63.3	102.0	H	129.0	37.7	25.6	10.7	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

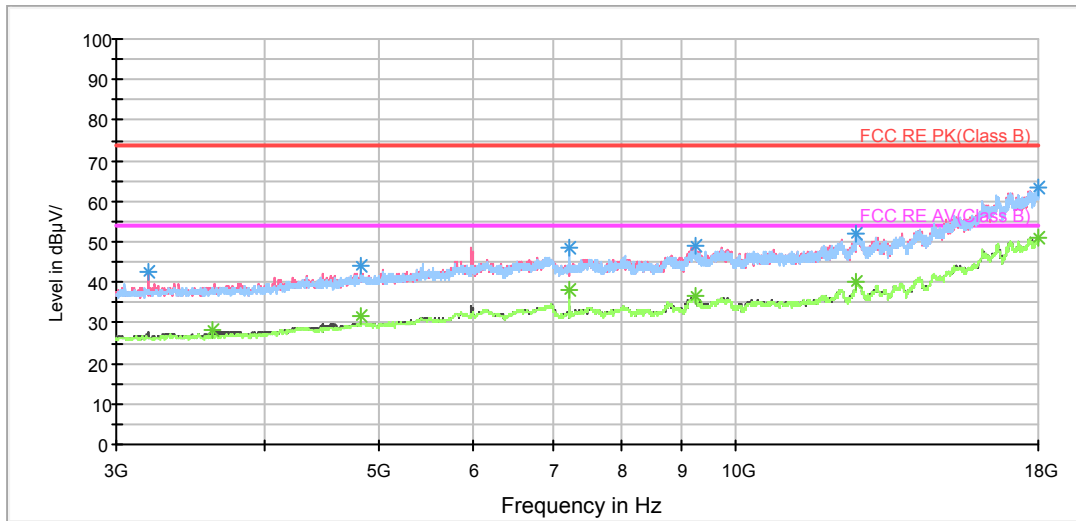
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3618.750000	30.3	102.0	H	198.0	32.3	-2.0	23.7	54
4822.500000	31.8	102.0	H	152.0	30.5	1.3	22.2	54
7233.750000	37.8	102.0	H	221.0	31.0	6.8	16.2	54
9234.375000	36.6	102.0	V	165.0	26.7	9.9	17.4	54
12645.000000	40.3	102.0	V	0.0	25.9	14.4	13.7	54
18000.000000	51.2	102.0	H	0.0	25.7	25.5	2.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)



**SISO Antenna 2**

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3189.375000	42.6	102.0	V	72.0	45.5	-2.9	31.4	74
4822.500000	44.0	102.0	H	35.0	42.7	1.3	30.0	74
7235.625000	48.7	102.0	H	221.0	41.9	6.8	25.3	74
9234.375000	48.9	102.0	V	189.0	39.0	9.9	25.1	74
12641.250000	52.1	202.0	V	0.0	37.6	14.5	21.9	74
17990.625000	63.5	202.0	H	162.0	38.3	25.2	10.5	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3618.750000	28.4	102.0	V	0.0	30.4	-2.0	25.6	54
4822.500000	31.5	102.0	H	35.0	30.2	1.3	22.5	54
7233.750000	37.9	102.0	H	60.0	31.1	6.8	16.1	54
9238.125000	36.5	202.0	V	61.0	26.6	9.9	17.5	54
12639.375000	40.2	102.0	H	128.0	25.7	14.5	13.8	54
17998.125000	51.2	102.0	V	0.0	25.8	25.4	2.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

After the pre test, Antenna 2 was selected as the worst antenna.



802.11b CH1

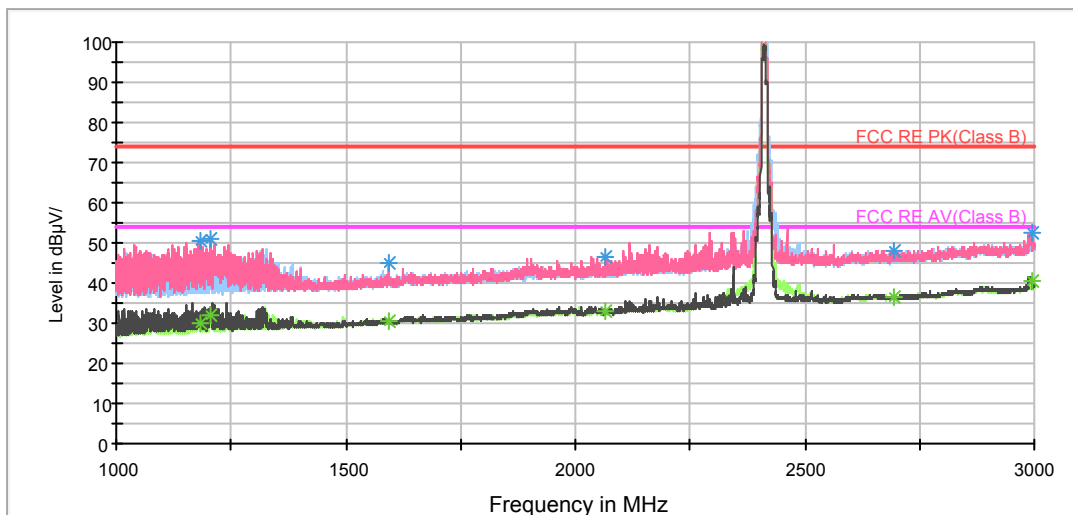
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1184.250000	50.6	102.0	V	33.0	58.7	-8.1	23.4	74
1207.000000	51.1	102.0	V	0.0	59.2	-8.1	22.9	74
1594.000000	45.1	102.0	H	0.0	51.5	-6.4	28.9	74
2066.000000	46.5	102.0	V	181.0	49.6	-3.1	27.5	74
2695.250000	48.2	102.0	V	60.0	48.2	0.0	25.8	74
2994.000000	52.4	102.0	V	33.0	50.1	2.3	21.6	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1184.250000	30.0	102.0	V	33.0	38.1	-8.1	24.0	54
1207.000000	32.1	102.0	V	0.0	40.2	-8.1	21.9	54
1594.000000	30.5	102.0	H	0.0	36.9	-6.4	23.5	54
2066.000000	33.1	102.0	V	181.0	36.2	-3.1	20.9	54
2695.250000	36.3	102.0	V	60.0	36.3	0.0	17.7	54
2994.000000	40.5	102.0	V	33.0	38.2	2.3	13.5	54

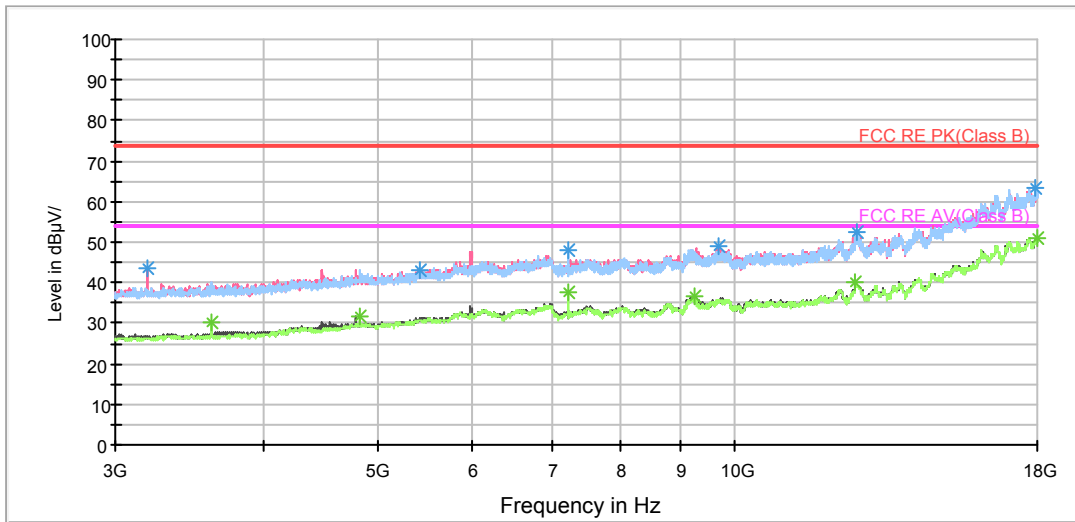
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



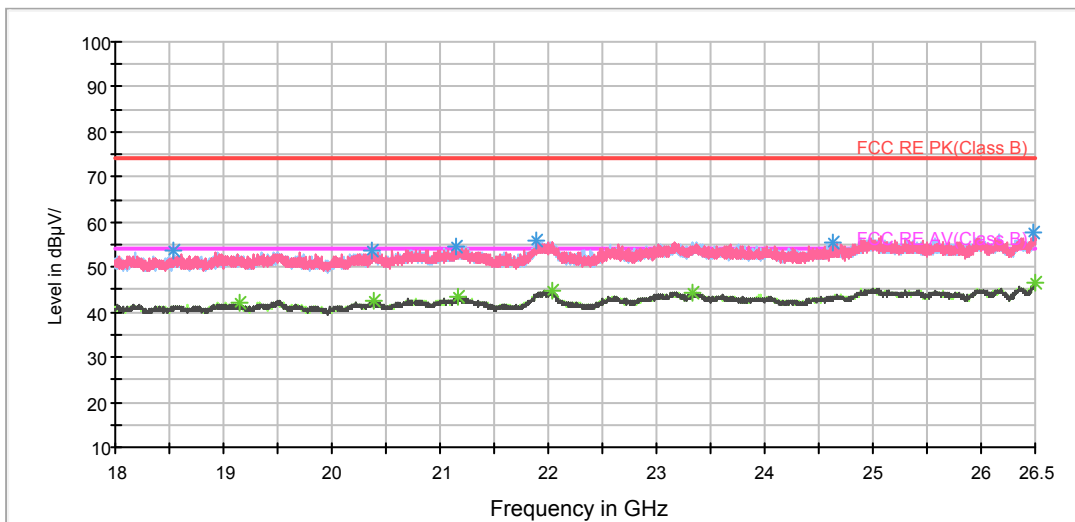
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11b CH6

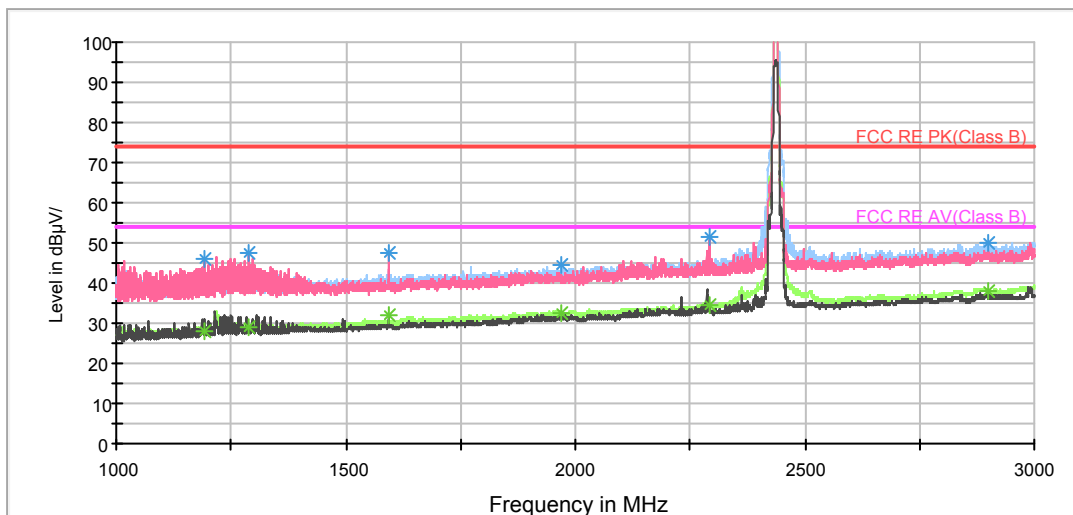
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1190.500000	45.8	102.0	V	317.0	54.0	-8.2	28.2	74
1289.000000	47.6	102.0	V	0.0	55.3	-7.7	26.4	74
1594.500000	47.7	102.0	V	239.0	54.1	-6.4	26.3	74
1967.750000	44.7	102.0	H	0.0	48.2	-3.5	29.3	74
2293.500000	51.4	102.0	V	0.0	53.3	-1.9	22.6	74
2897.500000	50.0	102.0	H	296.0	47.9	2.1	24.0	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1190.500000	28.1	102.0	V	317.0	36.3	-8.2	25.9	54
1289.000000	28.9	102.0	H	342.0	36.6	-7.7	25.1	54
1594.500000	31.8	102.0	V	239.0	38.2	-6.4	22.2	54
1967.750000	32.4	102.0	H	0.0	35.9	-3.5	21.6	54
2293.500000	34.4	102.0	V	0.0	36.3	-1.9	19.6	54
2897.500000	38.2	102.0	H	296.0	36.1	2.1	15.8	54

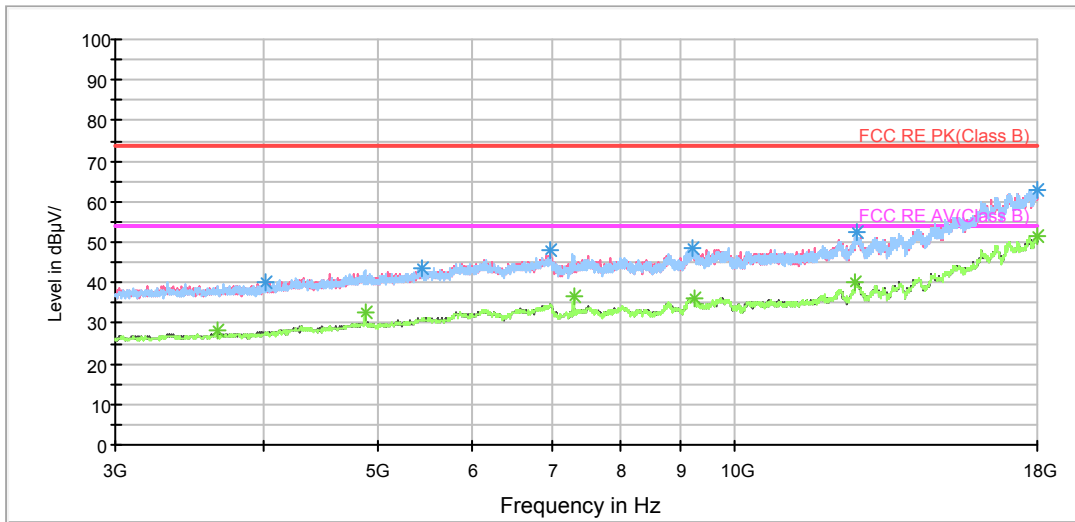
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



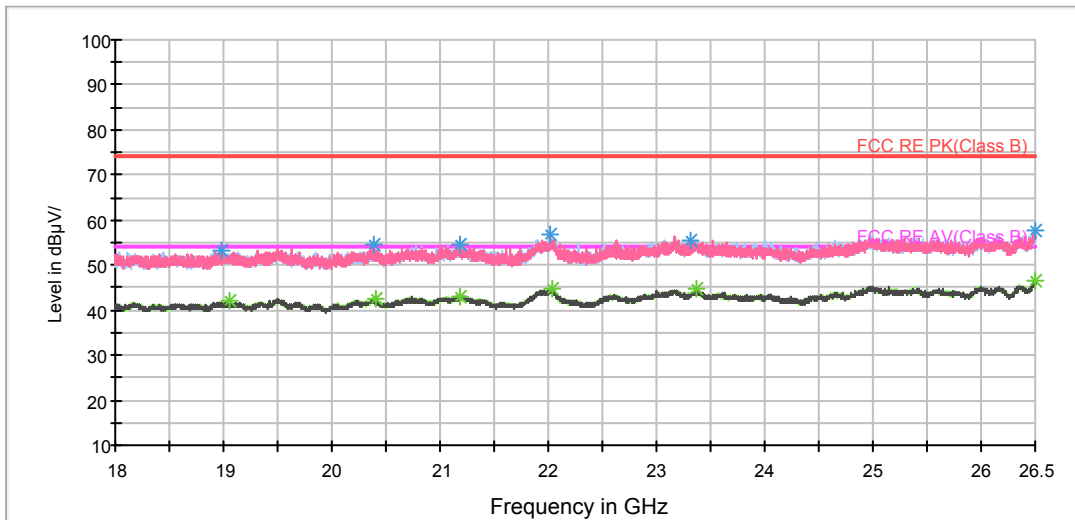
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11b CH11

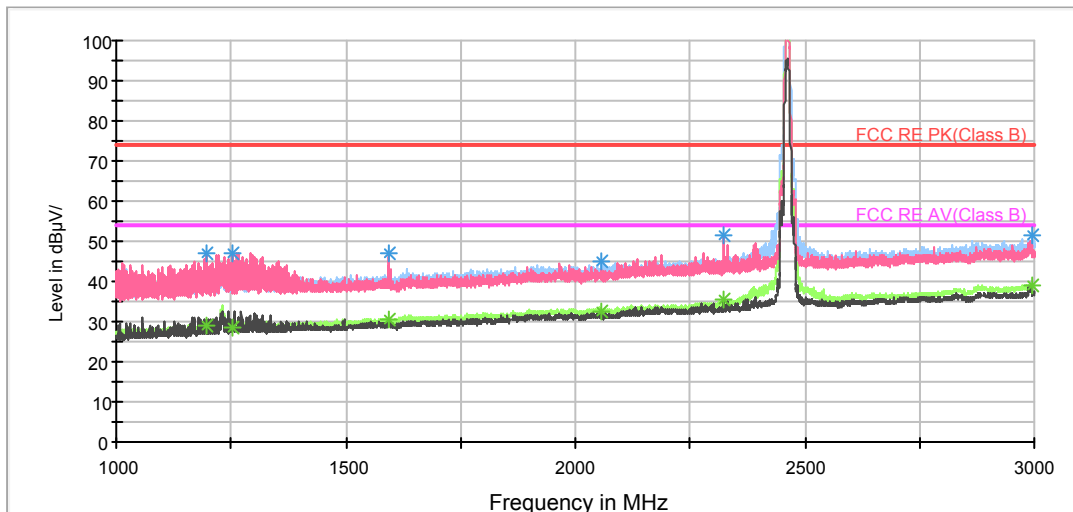
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1198.000000	46.9	102.0	V	0.0	55.1	-8.2	27.1	74
1252.250000	46.9	102.0	V	339.0	54.9	-8.0	27.1	74
1595.250000	47.0	102.0	V	236.0	53.4	-6.4	27.0	74
2056.250000	45.0	102.0	H	269.0	48.2	-3.2	29.0	74
2323.250000	51.5	102.0	V	339.0	53.2	-1.7	22.5	74
2995.000000	51.3	102.0	H	243.0	49.0	2.3	22.7	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1198.000000	28.8	102.0	V	0.0	37.0	-8.2	25.2	54
1252.250000	28.5	102.0	H	252.0	36.5	-8.0	25.5	54
1595.250000	30.7	102.0	V	236.0	37.1	-6.4	23.3	54
2056.250000	32.5	102.0	H	269.0	35.7	-3.2	21.5	54
2323.250000	35.5	102.0	V	339.0	37.2	-1.7	18.5	54
2995.000000	39.2	102.0	H	243.0	36.9	2.3	14.8	54

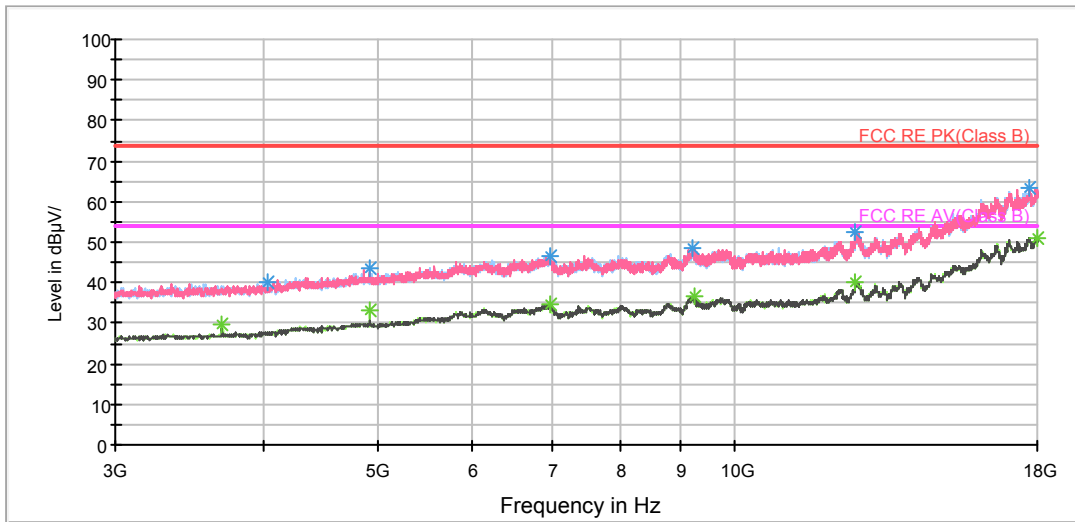
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



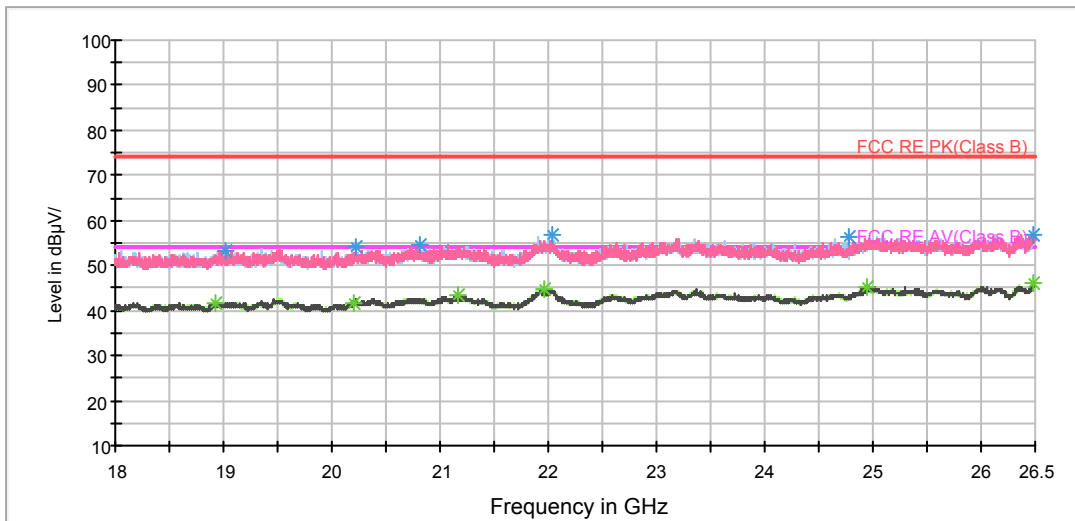
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11g CH1

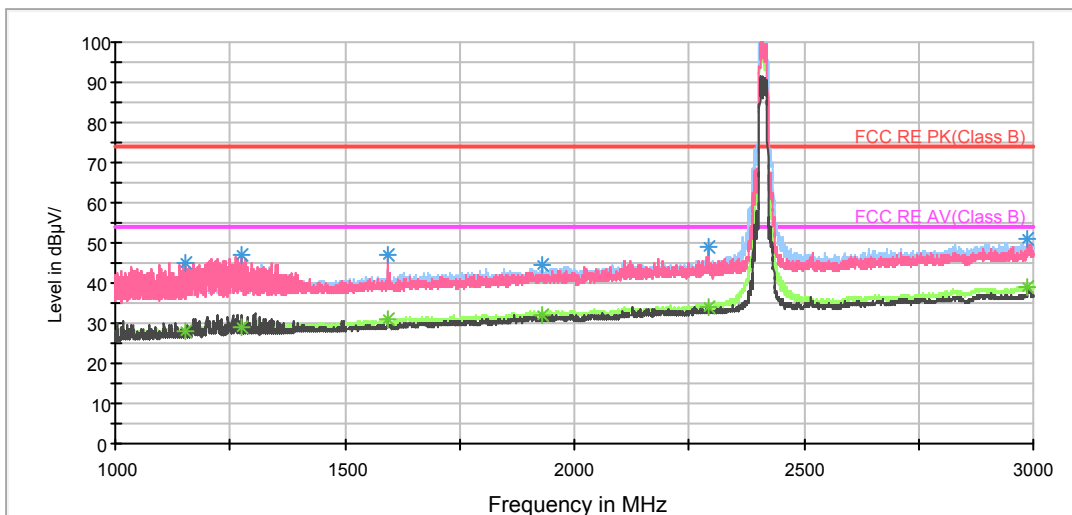
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1152.250000	45.2	102.0	V	0.0	53.7	-8.5	28.8	74
1276.250000	47.2	102.0	V	0.0	54.8	-7.6	26.8	74
1594.250000	46.8	102.0	V	246.0	53.2	-6.4	27.2	74
1929.250000	44.3	102.0	H	326.0	47.9	-3.6	29.7	74
2293.250000	48.9	102.0	V	0.0	50.8	-1.9	25.1	74
2988.750000	51.0	102.0	H	326.0	48.8	2.2	23.0	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1152.250000	27.8	102.0	H	326.0	36.3	-8.5	26.2	54
1276.250000	28.8	102.0	H	0.0	36.4	-7.6	25.2	54
1594.250000	31.1	102.0	V	246.0	37.5	-6.4	22.9	54
1929.250000	32.2	102.0	H	326.0	35.8	-3.6	21.8	54
2293.250000	34.0	102.0	H	124.0	35.9	-1.9	20.0	54
2988.750000	38.9	102.0	H	326.0	36.7	2.2	15.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

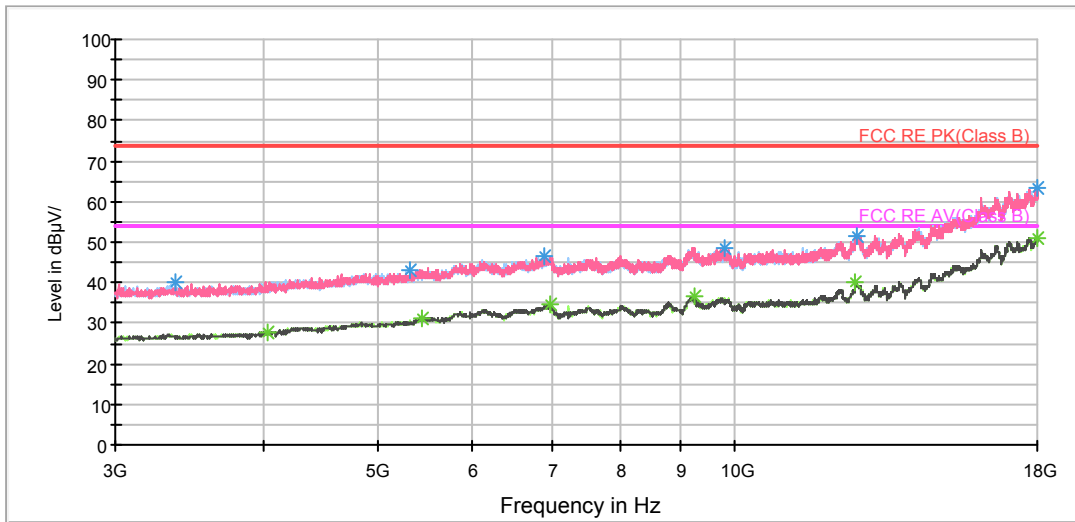
RE 1G-3GHz PK+AV



Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

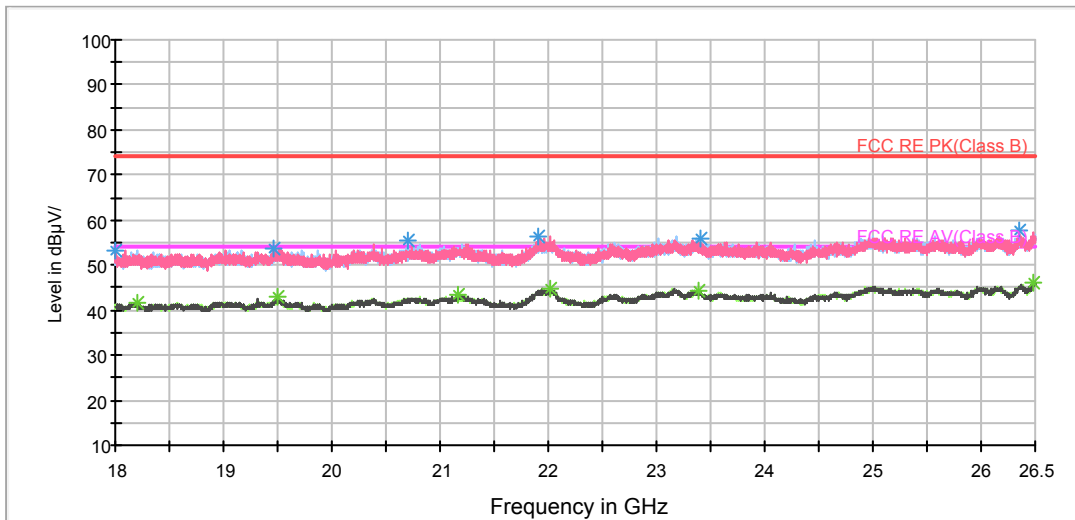


RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11g CH6

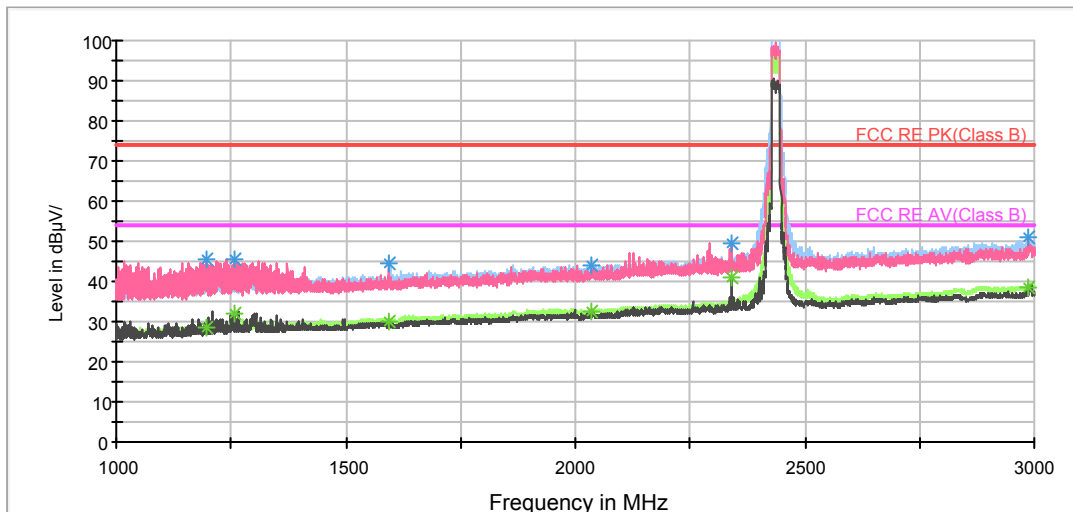
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1196.500000	45.5	102.0	V	1.0	53.7	-8.2	28.5	74
1257.000000	45.5	102.0	V	0.0	53.3	-7.8	28.5	74
1594.500000	44.5	102.0	V	229.0	50.9	-6.4	29.5	74
2034.750000	44.1	102.0	H	265.0	47.4	-3.3	29.9	74
2341.000000	49.4	102.0	V	0.0	50.7	-1.3	24.6	74
2987.500000	51.1	102.0	V	27.0	48.9	2.2	22.9	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1196.500000	28.5	102.0	H	265.0	36.7	-8.2	25.5	54
1257.000000	32.0	102.0	V	0.0	39.8	-7.8	22.0	54
1594.500000	30.2	102.0	H	239.0	36.6	-6.4	23.8	54
2034.750000	32.5	102.0	H	265.0	35.8	-3.3	21.5	54
2341.000000	40.8	102.0	V	0.0	42.1	-1.3	13.2	54
2987.500000	38.4	102.0	H	211.0	36.2	2.2	15.6	54

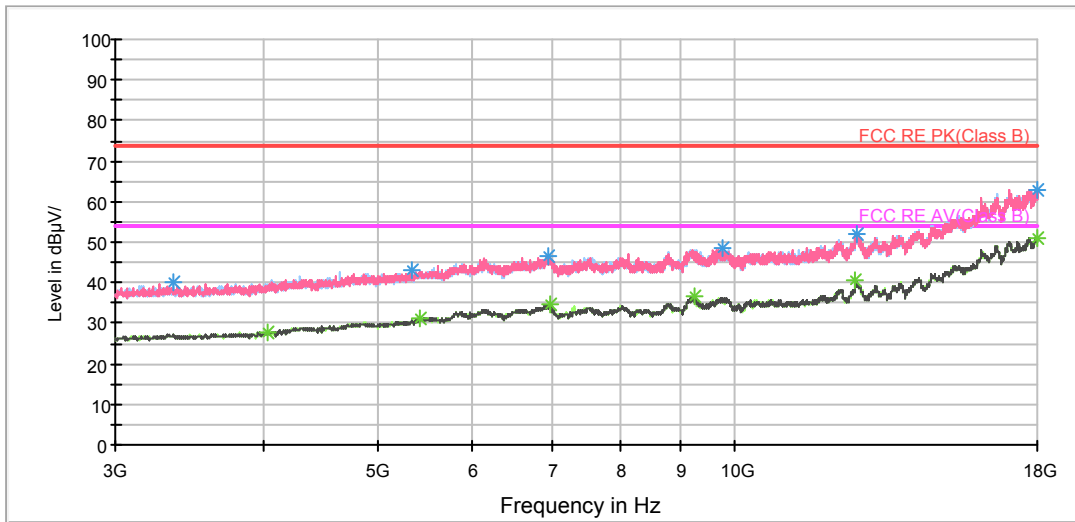
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



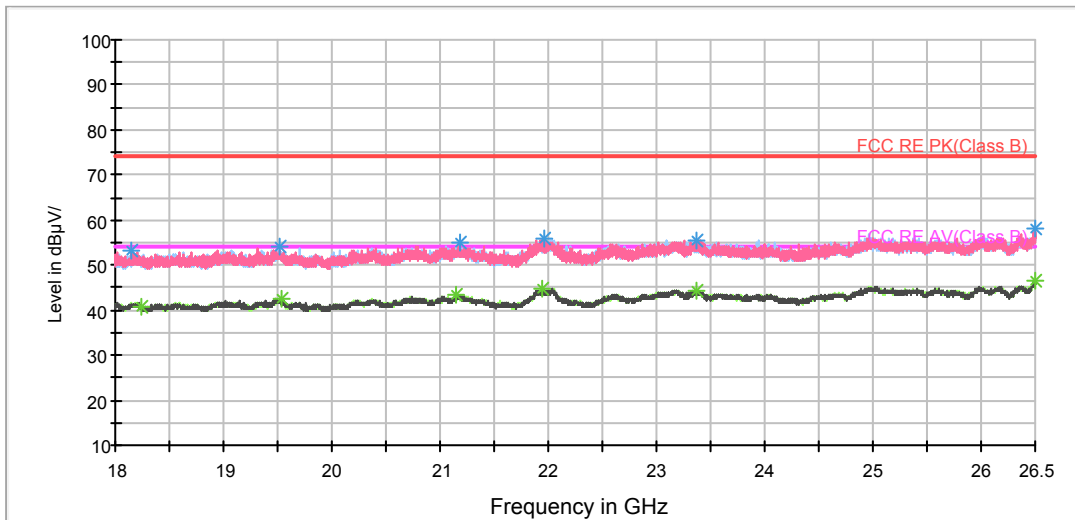
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11g CH11

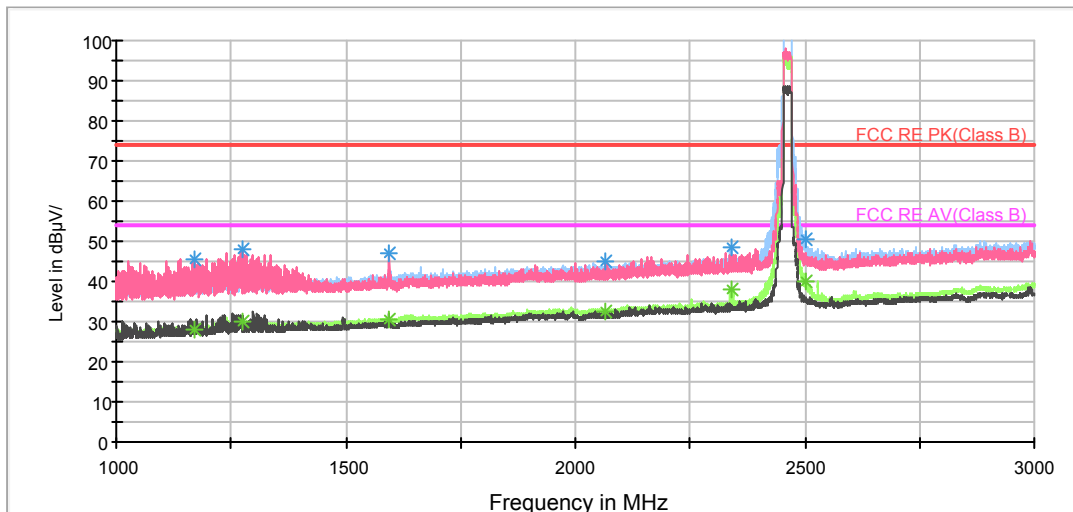
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1168.750000	45.6	102.0	V	0.0	53.7	-8.1	28.4	74
1277.250000	47.9	102.0	V	0.0	55.5	-7.6	26.1	74
1596.000000	47.0	102.0	V	238.0	53.4	-6.4	27.0	74
2066.750000	45.0	102.0	V	0.0	48.1	-3.1	29.0	74
2339.500000	48.7	102.0	H	250.0	50.0	-1.3	25.3	74
2500.750000	50.7	102.0	H	332.0	50.9	-0.2	23.3	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1168.750000	28.2	102.0	H	323.0	36.3	-8.1	25.8	54
1277.250000	30.2	102.0	V	0.0	37.8	-7.6	23.8	54
1596.000000	30.6	102.0	V	238.0	37.0	-6.4	23.4	54
2066.750000	32.7	102.0	H	186.0	35.8	-3.1	21.3	54
2339.500000	37.9	102.0	H	250.0	39.2	-1.3	16.1	54
2500.750000	40.1	102.0	H	332.0	40.3	-0.2	13.9	54

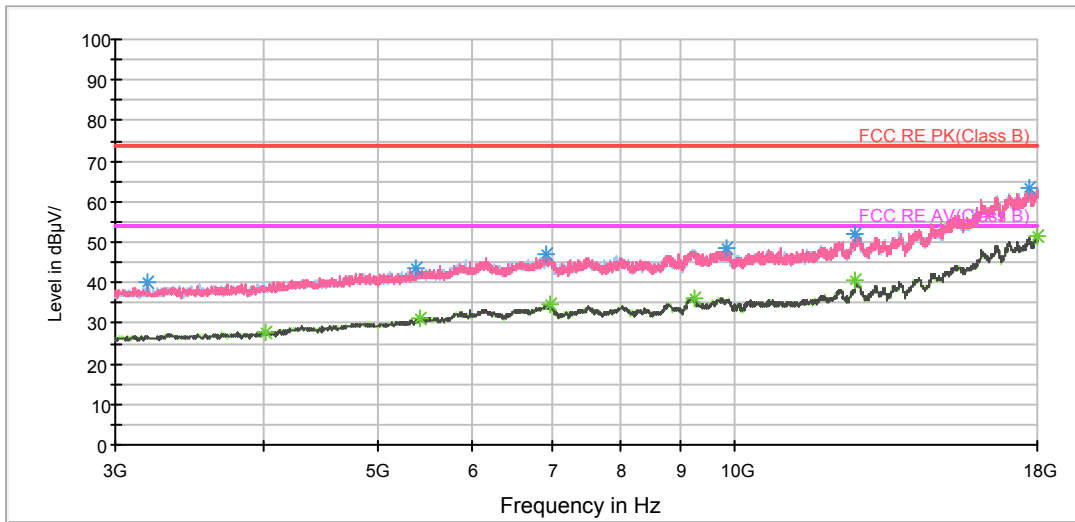
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



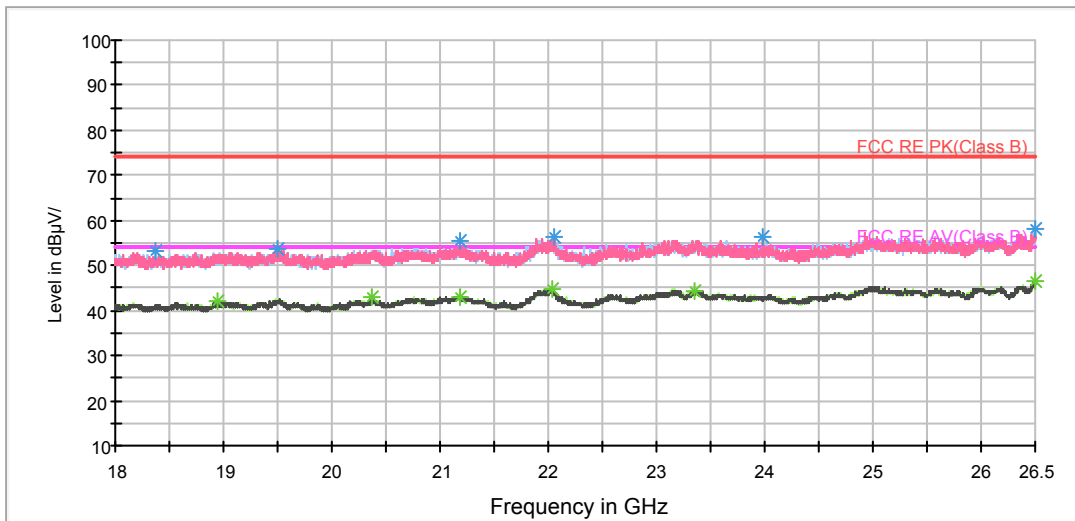
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11n (HT20) CH1

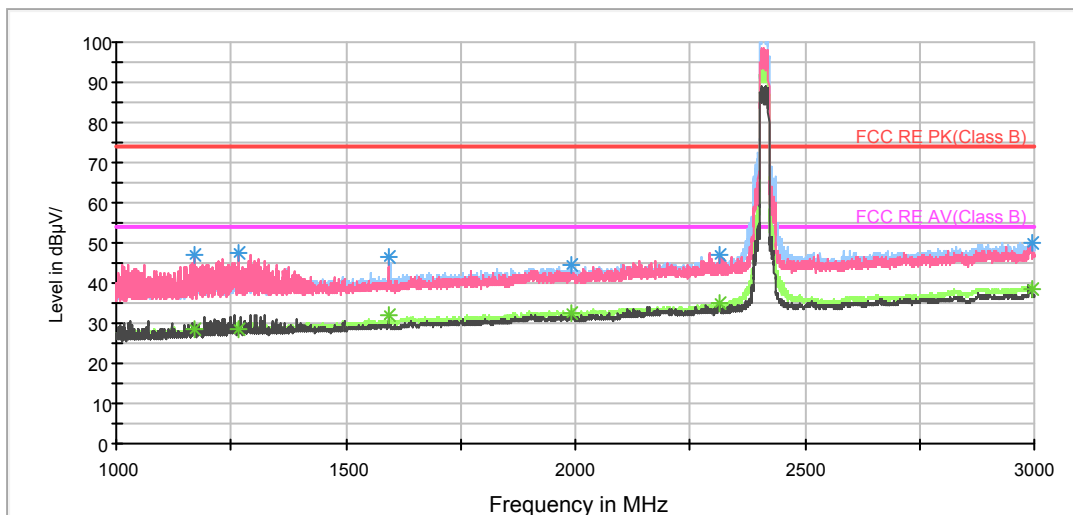
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1171.750000	46.8	102.0	V	0.0	54.9	-8.1	27.2	74
1266.500000	47.3	102.0	V	317.0	55.0	-7.7	26.7	74
1593.500000	46.6	102.0	V	238.0	53.0	-6.4	27.4	74
1991.000000	44.5	102.0	H	169.0	47.8	-3.3	29.5	74
2314.750000	47.0	102.0	V	0.0	48.8	-1.8	27.0	74
2995.250000	50.2	102.0	H	281.0	47.9	2.3	23.8	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1171.750000	28.6	102.0	V	0.0	36.7	-8.1	25.4	54
1266.500000	28.7	102.0	H	281.0	36.4	-7.7	25.3	54
1593.500000	31.9	102.0	V	238.0	38.3	-6.4	22.1	54
1991.000000	32.7	102.0	H	169.0	36.0	-3.3	21.3	54
2314.750000	34.8	102.0	V	0.0	36.6	-1.8	19.2	54
2995.250000	38.6	102.0	H	281.0	36.3	2.3	15.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

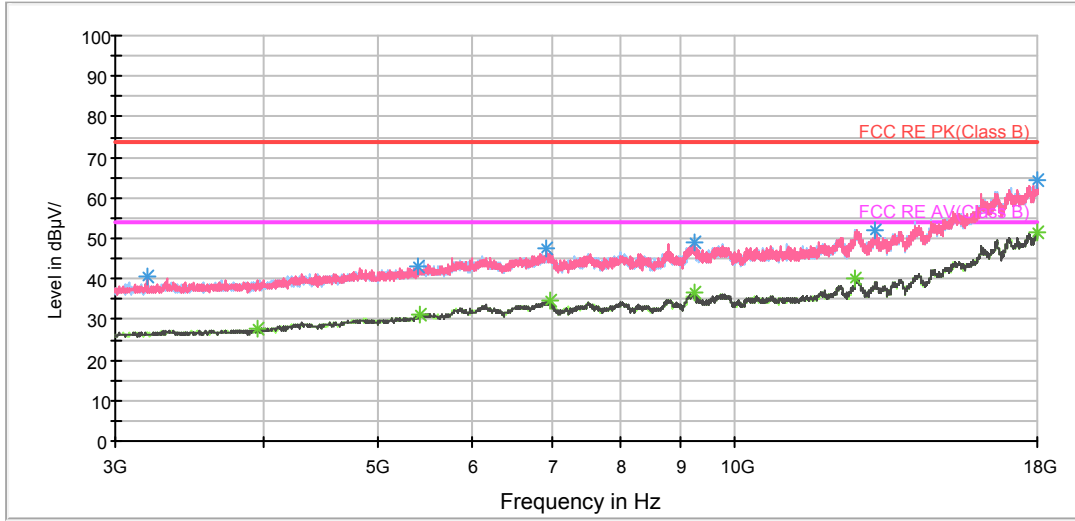
RE 1G-3GHz PK+AV



Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

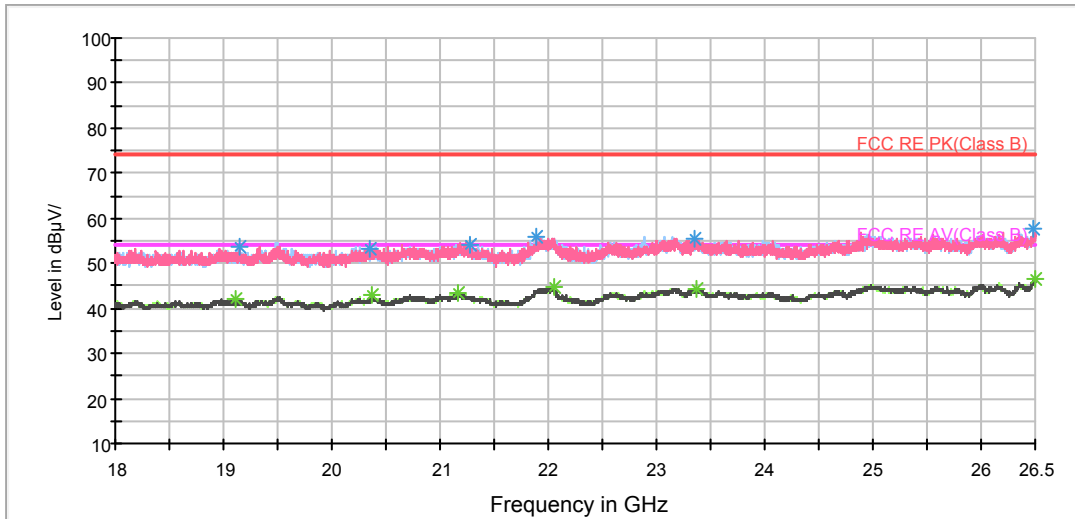
### Radiates Emission from 3

RE 3-18GHz PK+AV



GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11n (HT20) CH6

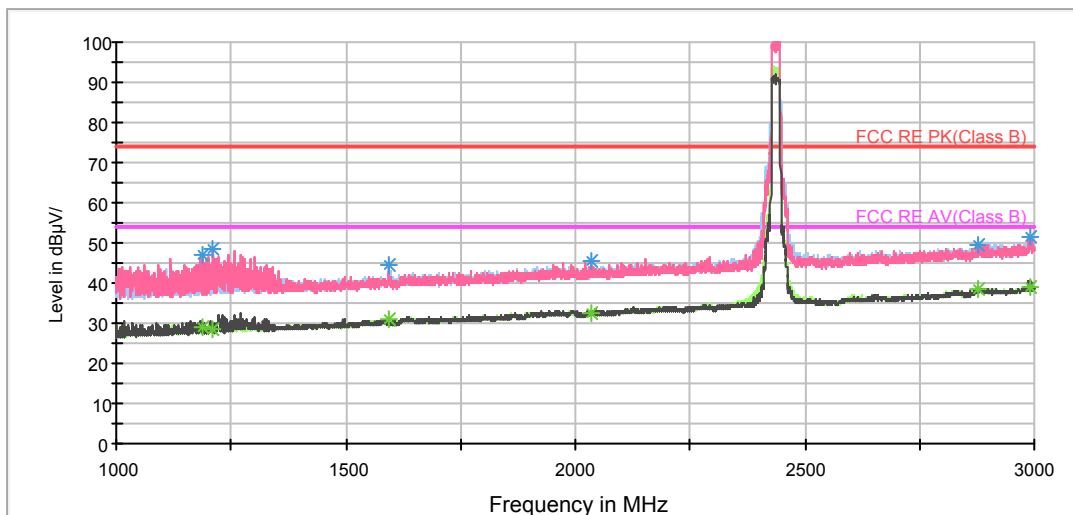
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1187.750000	47.0	202.0	V	280.0	55.1	-8.1	27.0	74
1211.750000	48.4	202.0	V	288.0	56.4	-8.0	25.6	74
1595.750000	44.6	102.0	V	183.0	51.0	-6.4	29.4	74
2036.000000	45.3	202.0	V	288.0	48.6	-3.3	28.7	74
2878.500000	49.7	102.0	H	243.0	47.4	2.3	24.3	74
2989.250000	51.6	102.0	V	0.0	49.4	2.2	22.4	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1187.750000	29.1	202.0	V	280.0	37.2	-8.1	24.9	54
1211.750000	28.4	202.0	H	82.0	36.4	-8.0	25.6	54
1595.750000	31.0	102.0	V	183.0	37.4	-6.4	23.0	54
2036.000000	32.6	102.0	V	0.0	35.9	-3.3	21.4	54
2878.500000	38.3	202.0	H	82.0	36.0	2.3	15.7	54
2989.250000	39.2	102.0	V	0.0	37.0	2.2	14.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

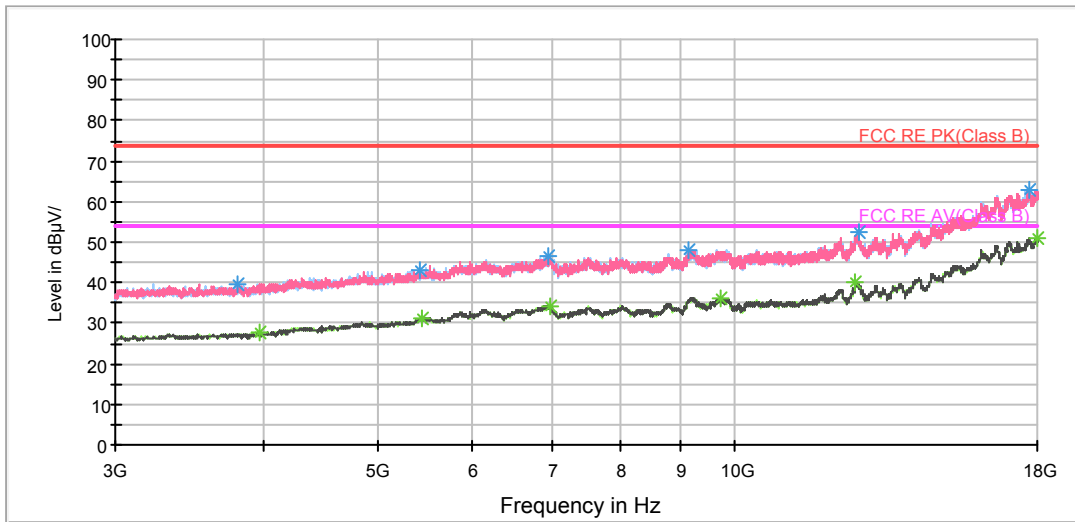
RE 1G-3GHz PK+AV



Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

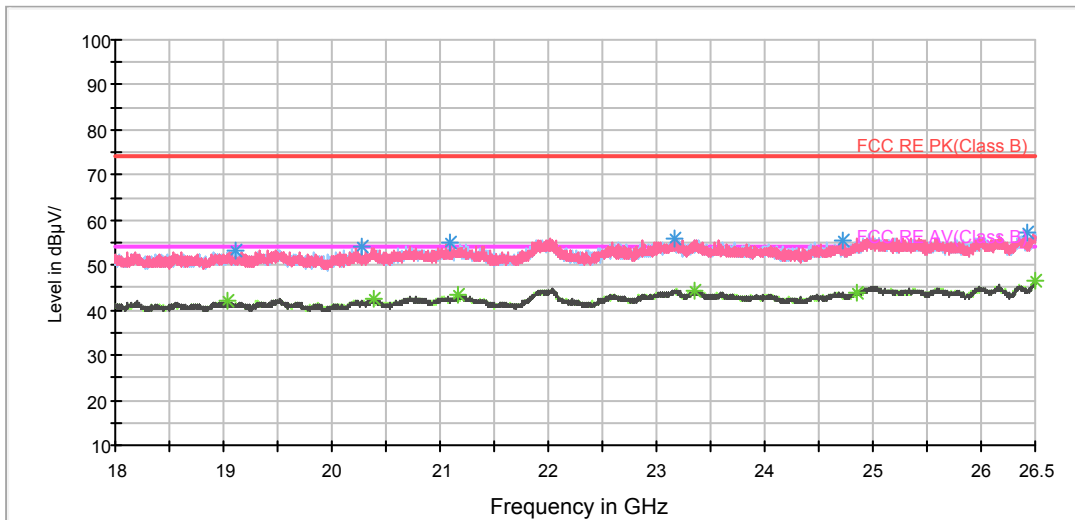


RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11n (HT20) CH11

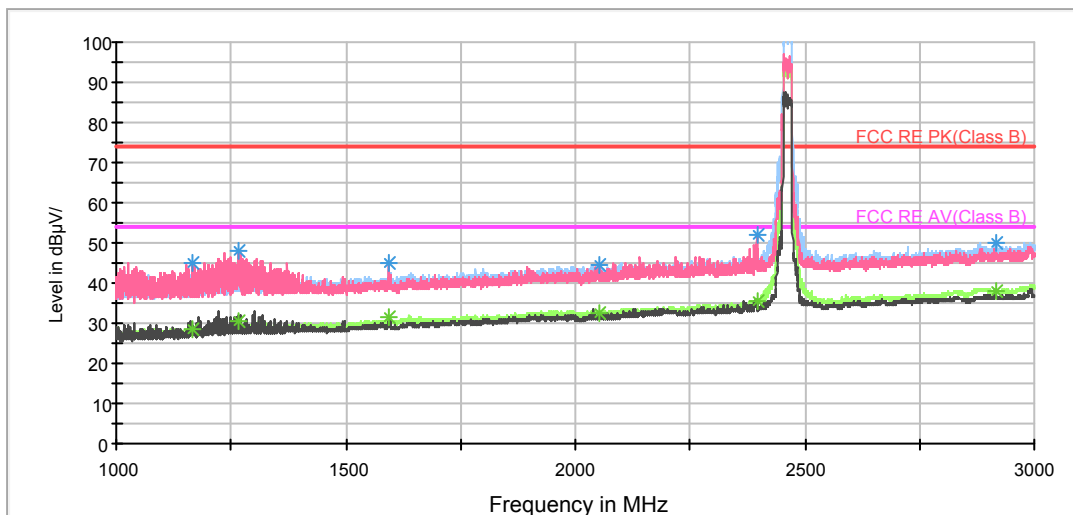
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1165.250000	45.2	102.0	V	0.0	53.4	-8.2	28.8	74
1266.250000	48.2	102.0	V	0.0	55.9	-7.7	25.8	74
1594.250000	45.1	102.0	V	237.0	51.5	-6.4	28.9	74
2052.000000	44.6	102.0	V	12.0	47.8	-3.2	29.4	74
2395.250000	51.8	102.0	V	0.0	53.1	-1.3	22.2	74
2919.000000	50.2	102.0	H	358.0	48.4	1.8	23.8	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1165.250000	28.4	102.0	H	349.0	36.6	-8.2	25.6	54
1266.250000	30.6	102.0	V	0.0	38.3	-7.7	23.4	54
1594.250000	31.7	102.0	H	282.0	38.1	-6.4	22.3	54
2052.000000	32.3	102.0	H	358.0	35.5	-3.2	21.7	54
2395.250000	35.6	102.0	V	0.0	36.9	-1.3	18.4	54
2919.000000	37.9	102.0	H	358.0	36.1	1.8	16.1	54

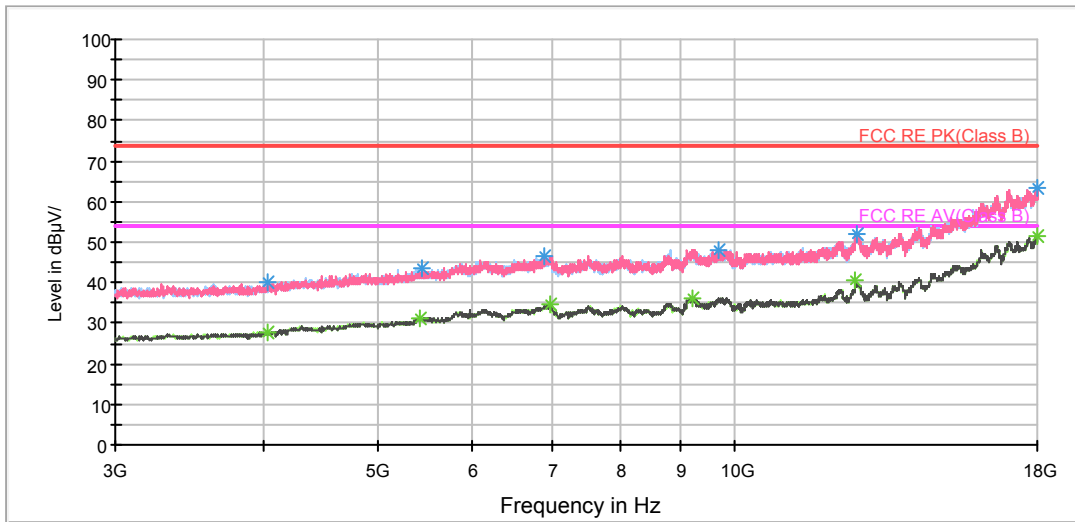
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



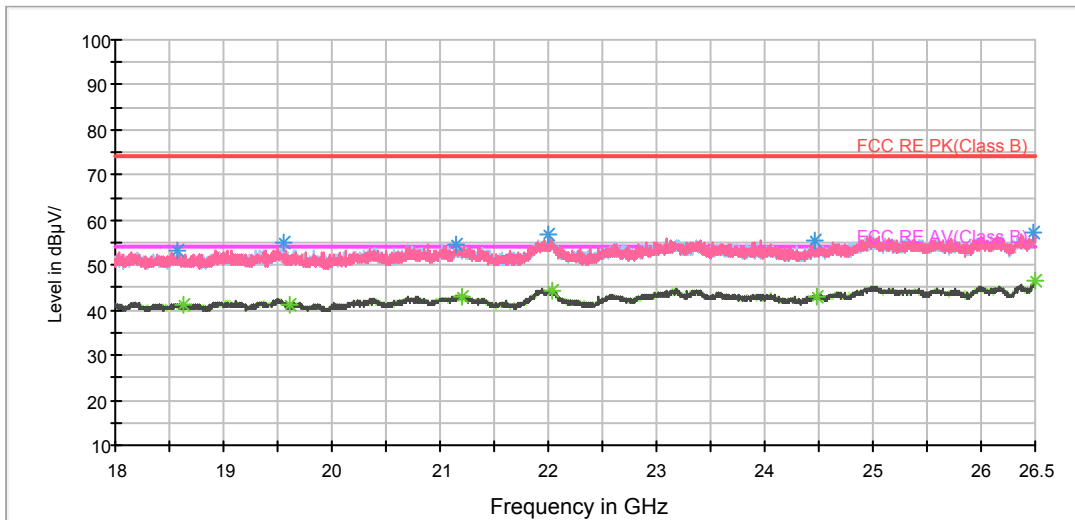
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11n (HT40) CH3

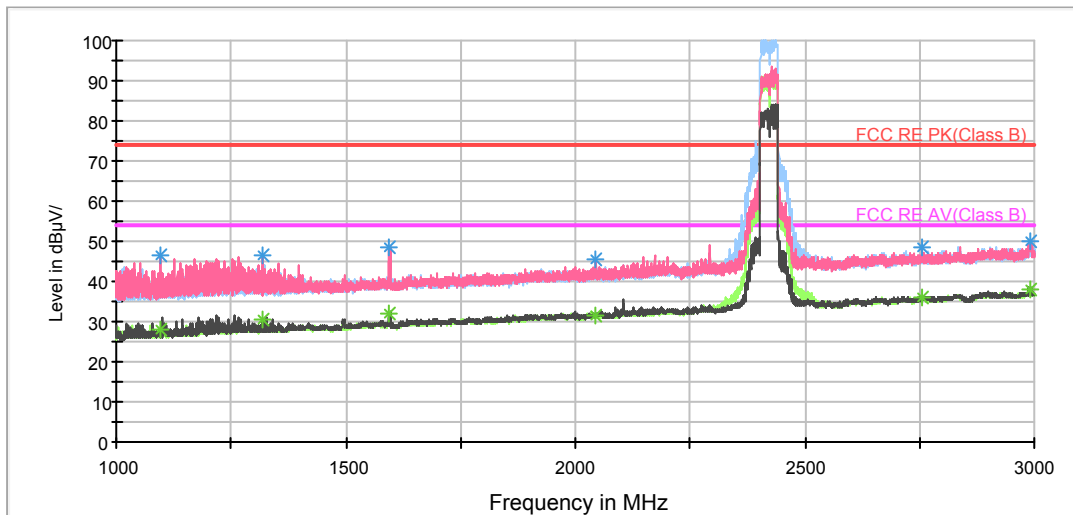
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1096.250000	46.7	102.0	V	250.0	55.6	-8.9	27.3	74
1317.750000	46.3	102.0	V	309.0	53.7	-7.4	27.7	74
1593.500000	48.5	102.0	V	240.0	54.9	-6.4	25.5	74
2045.750000	45.5	102.0	V	0.0	48.7	-3.2	28.5	74
2756.750000	48.5	102.0	V	126.0	47.6	0.9	25.5	74
2992.250000	49.9	102.0	V	28.0	47.7	2.2	24.1	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1096.250000	28.1	102.0	V	250.0	37.0	-8.9	25.9	54
1317.750000	30.5	102.0	V	309.0	37.9	-7.4	23.5	54
1593.500000	32.0	102.0	V	240.0	38.4	-6.4	22.0	54
2045.750000	31.5	102.0	H	0.0	34.7	-3.2	22.5	54
2756.750000	36.1	102.0	V	126.0	35.2	0.9	17.9	54
2992.250000	37.9	102.0	V	28.0	35.7	2.2	16.1	54

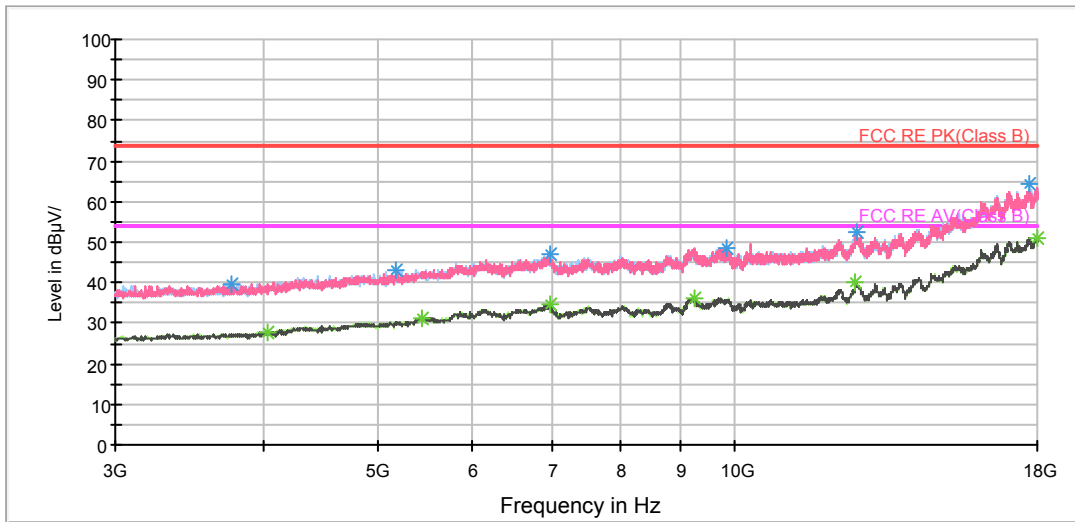
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



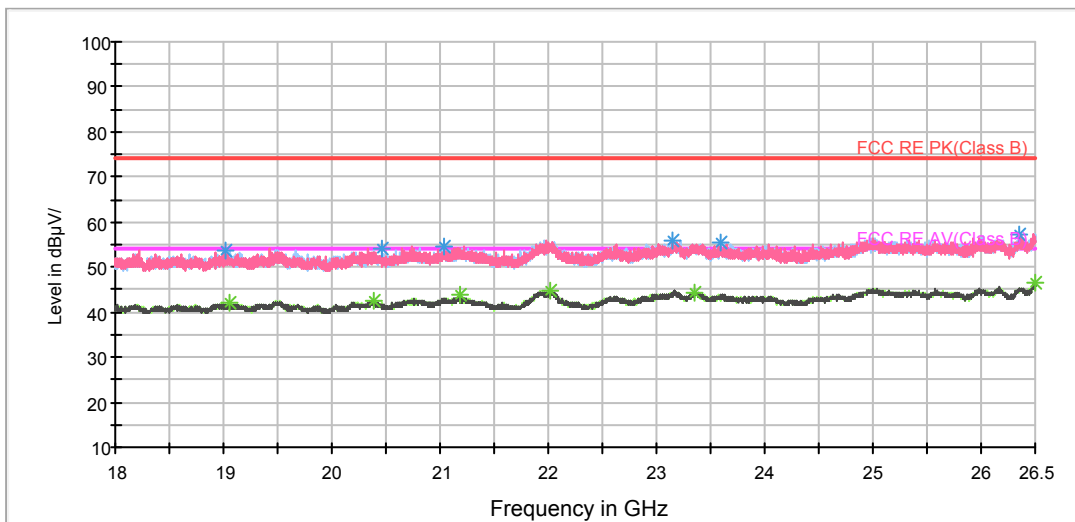
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11n (HT40) CH6

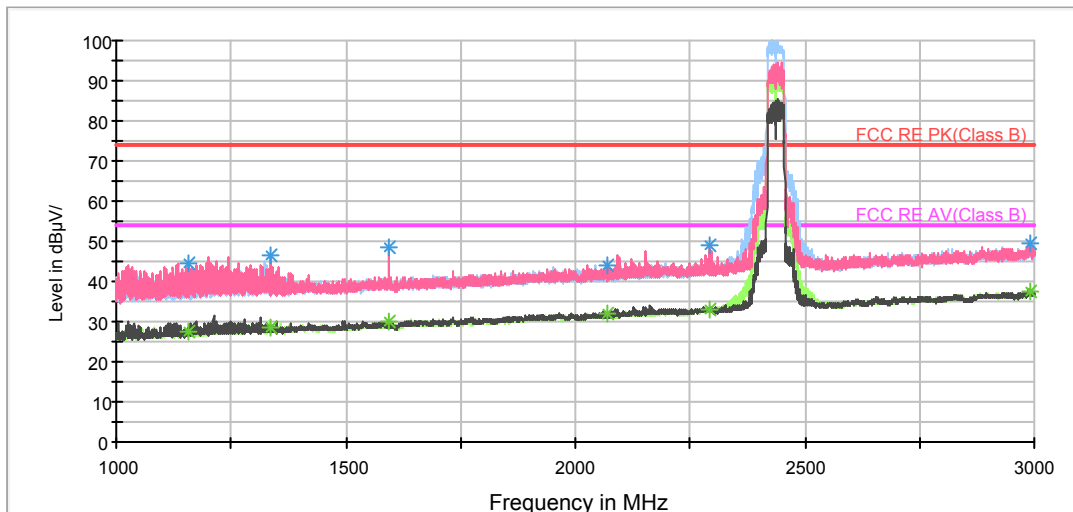
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1158.000000	44.7	102.0	V	7.0	53.1	-8.4	29.3	74
1336.750000	46.3	102.0	V	341.0	53.7	-7.4	27.7	74
1595.500000	48.7	102.0	V	42.0	55.1	-6.4	25.3	74
2070.750000	44.2	102.0	V	0.0	47.3	-3.1	29.8	74
2291.250000	48.8	102.0	V	42.0	50.6	-1.8	25.2	74
2990.250000	49.4	102.0	V	50.0	47.2	2.2	24.6	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1158.000000	27.7	102.0	H	109.0	36.1	-8.4	26.3	54
1336.750000	28.4	102.0	V	341.0	35.8	-7.4	25.6	54
1595.500000	30.2	102.0	V	42.0	36.6	-6.4	23.8	54
2070.750000	31.8	102.0	V	0.0	34.9	-3.1	22.2	54
2291.250000	33.2	102.0	V	42.0	35.0	-1.8	20.8	54
2990.250000	37.3	102.0	V	50.0	35.1	2.2	16.7	54

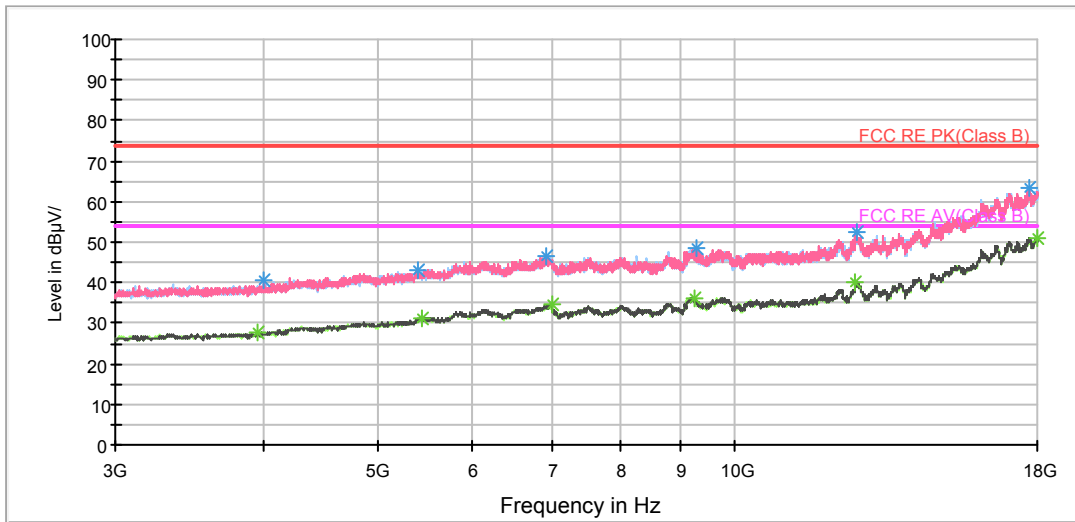
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

RE 1G-3GHz PK+AV



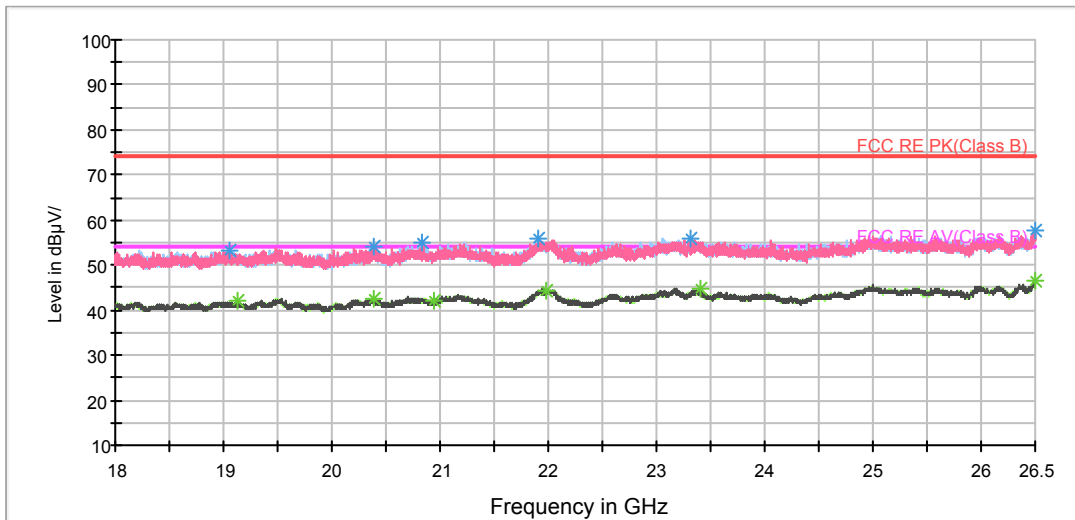
Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



802.11n (HT40) CH9

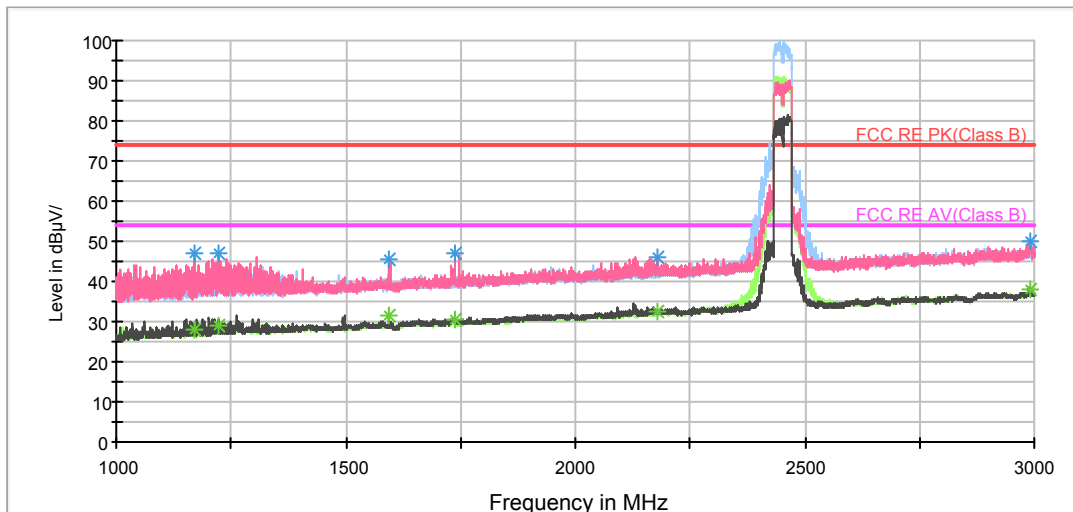
Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1171.250000	46.8	102.0	V	48.0	54.9	-8.1	27.2	74
1222.250000	47.2	102.0	V	88.0	55.0	-7.8	26.8	74
1593.500000	45.6	102.0	V	251.0	52.0	-6.4	28.4	74
1737.750000	47.1	102.0	V	105.0	51.7	-4.6	26.9	74
2178.000000	45.9	102.0	V	143.0	48.1	-2.2	28.1	74
2993.250000	49.8	102.0	V	13.0	47.6	2.2	24.2	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1171.250000	27.9	102.0	V	48.0	36.0	-8.1	26.1	54
1222.250000	28.9	102.0	V	88.0	36.7	-7.8	25.1	54
1593.500000	31.3	102.0	V	251.0	37.7	-6.4	22.7	54
1737.750000	30.3	102.0	V	105.0	34.9	-4.6	23.7	54
2178.000000	32.4	102.0	V	143.0	34.6	-2.2	21.6	54
2993.250000	37.9	102.0	V	13.0	35.7	2.2	16.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

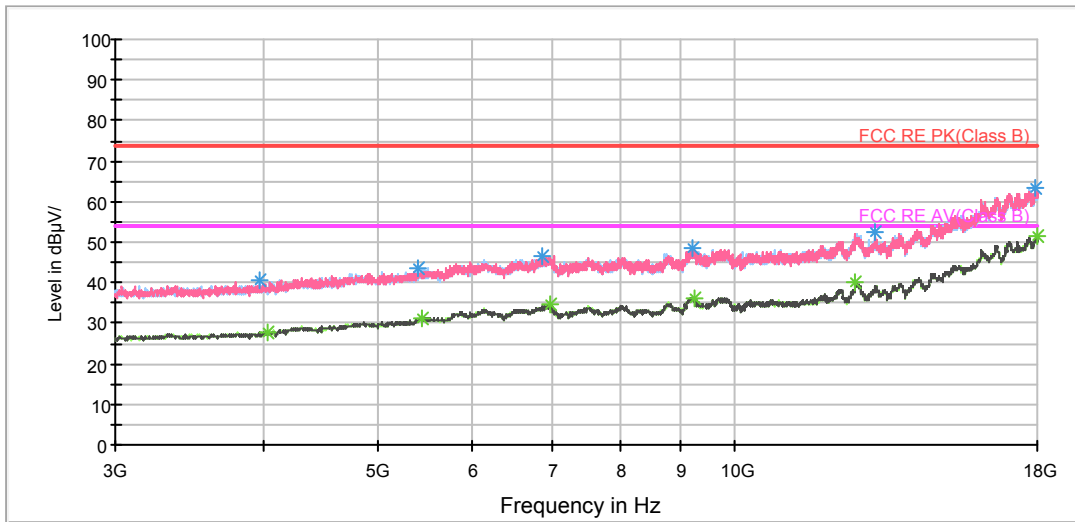
RE 1G-3GHz PK+AV



Note: The signal beyond the limit is carrier.  
Radiates Emission from 1GHz to 3GHz

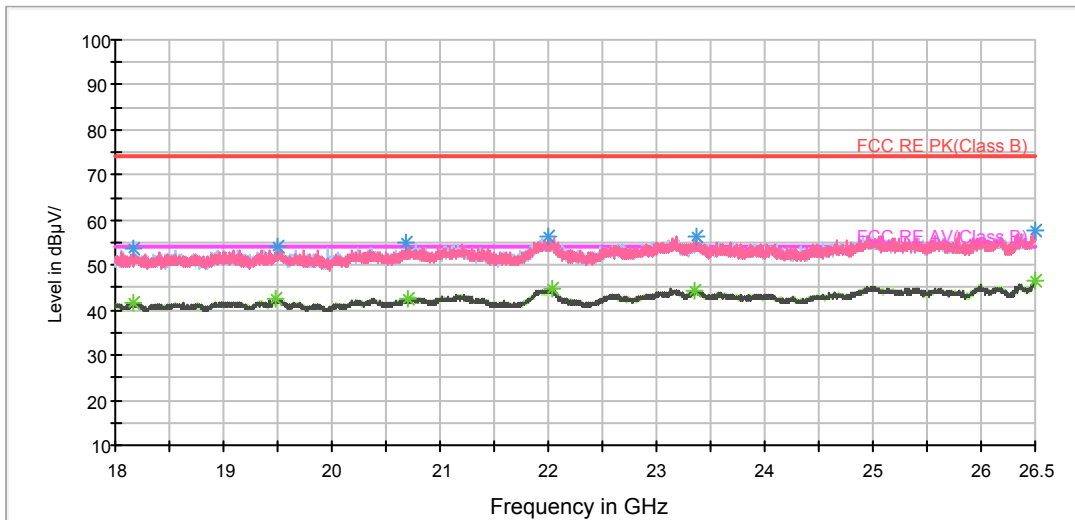


RE 3-18GHz PK+AV



Radiates Emission from 3GHz to 18GHz

BELL\_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz

### 5.8. Conducted Emission

#### Ambient condition

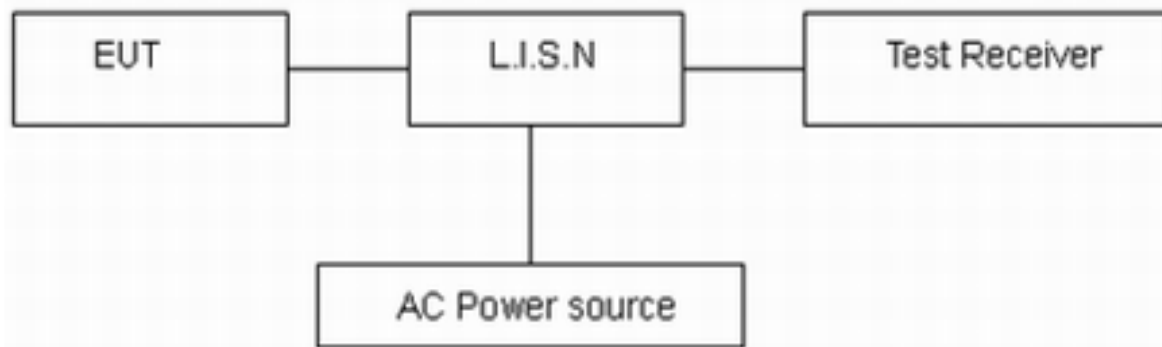
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10-2013. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

The test is in transmitting mode.

#### Test Setup



Note: AC Power source is used to change the voltage 110V/60Hz.

#### Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

\*: Decreases with the logarithm of the frequency.

#### Measurement Uncertainty

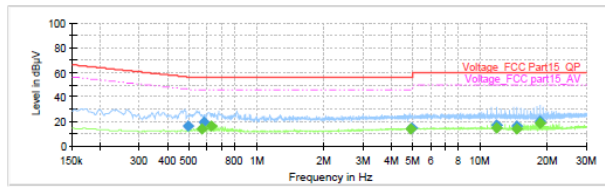
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ ,  $U = 2.69$  dB.



**Test Results:**

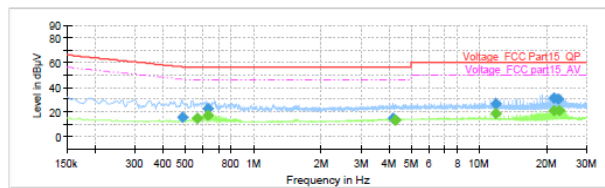
Following plots, Blue trace uses the peak detection and Green trace uses the average detection.

**L Line**



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.492000	15.92	---	56.13	40.22	1000.0	9.000	L1	ON	19.2
0.566250	---	14.16	46.00	31.84	1000.0	9.000	L1	ON	19.3
0.584250	19.21	---	56.00	36.79	1000.0	9.000	L1	ON	19.3
0.629250	---	16.46	46.00	29.54	1000.0	9.000	L1	ON	19.3
4.890750	---	13.63	46.00	32.37	1000.0	9.000	L1	ON	19.1
4.947900	14.77	---	56.00	41.23	1000.0	9.000	L1	ON	19.1
11.818500	17.34	---	60.00	42.66	1000.0	9.000	L1	ON	19.4
11.818500	---	14.81	50.00	35.19	1000.0	9.000	L1	ON	19.4
14.631000	---	13.80	50.00	36.20	1000.0	9.000	L1	ON	19.5
14.632500	16.08	---	60.00	43.92	1000.0	9.000	L1	ON	19.5
18.575250	19.77	---	60.00	40.23	1000.0	9.000	L1	ON	19.6
18.582000	---	18.68	50.00	31.32	1000.0	9.000	L1	ON	19.6

**N Line**



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.487500	15.69	---	56.21	40.52	1000.0	9.000	N	ON	19.2
0.566250	---	14.83	46.00	31.17	1000.0	9.000	N	ON	19.3
0.629250	---	17.47	46.00	28.53	1000.0	9.000	N	ON	19.3
0.629250	22.51	---	56.00	33.49	1000.0	9.000	N	ON	19.3
4.159500	14.83	---	56.00	41.17	1000.0	9.000	N	ON	19.1
4.240500	---	13.44	46.00	32.56	1000.0	9.000	N	ON	19.1
11.823000	26.37	---	60.00	33.63	1000.0	9.000	N	ON	19.4
11.825250	---	18.62	50.00	31.38	1000.0	9.000	N	ON	19.4
21.394500	31.14	---	60.00	28.86	1000.0	9.000	N	ON	19.5
21.396750	---	21.39	50.00	28.61	1000.0	9.000	N	ON	19.5
22.519500	30.07	---	60.00	29.93	1000.0	9.000	N	ON	19.5
22.656750	---	21.31	50.00	28.69	1000.0	9.000	N	ON	19.5

## 6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
BT Base Station Simulator	R&S	CBT	100271	2017-05-14	2018-05-13
Spectrum Analyzer	R&S	FSV30	100815	2016-12-16	2017-12-15
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	9163-201	2014-12-06	2017-12-05
Double Ridged Waveguide Horn Antenna	R&S	HF907	100126	2014-12-06	2017-12-05
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-02-18	2020-02-17
Standard Gain Horn	ETS-Lindgren	3160-09	00102644	2015-01-30	2018-01-29
EMI Test Receiver	R&S	ESCS30	100138	2016-12-16	2017-12-15
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Spectrum Analyzer	Agilent	N9010A	MY47191109	2017-05-20	2018-05-19
RF Cable	Agilent	SMA 15cm	0001	2017-06-03	2017-12-02

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

## ANNEX A: EUT Appearance and Test Setup

### A.1 EUT Appearance



Front Side



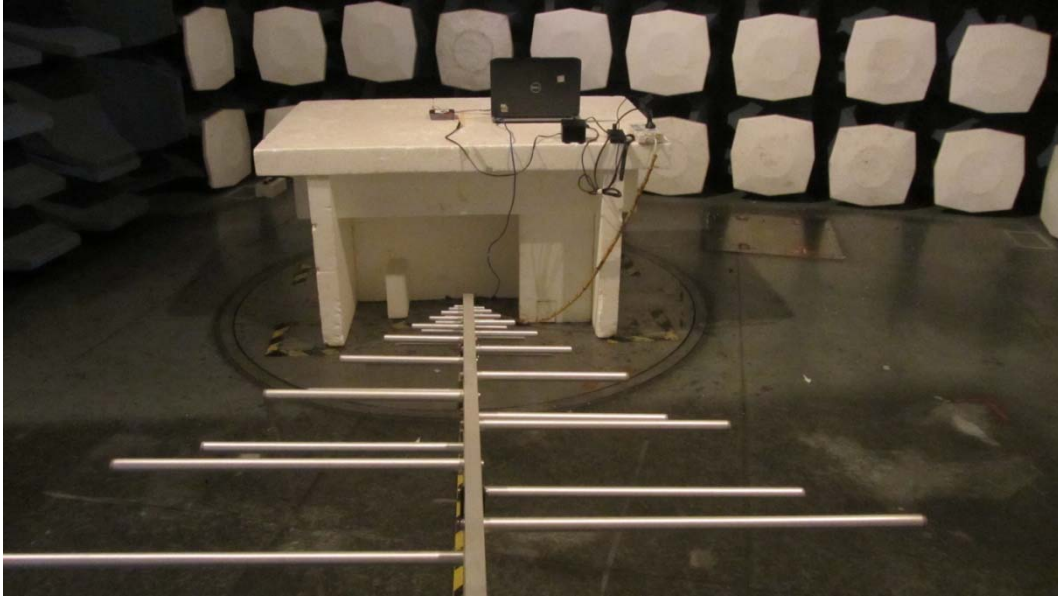
Back Side

a: EUT

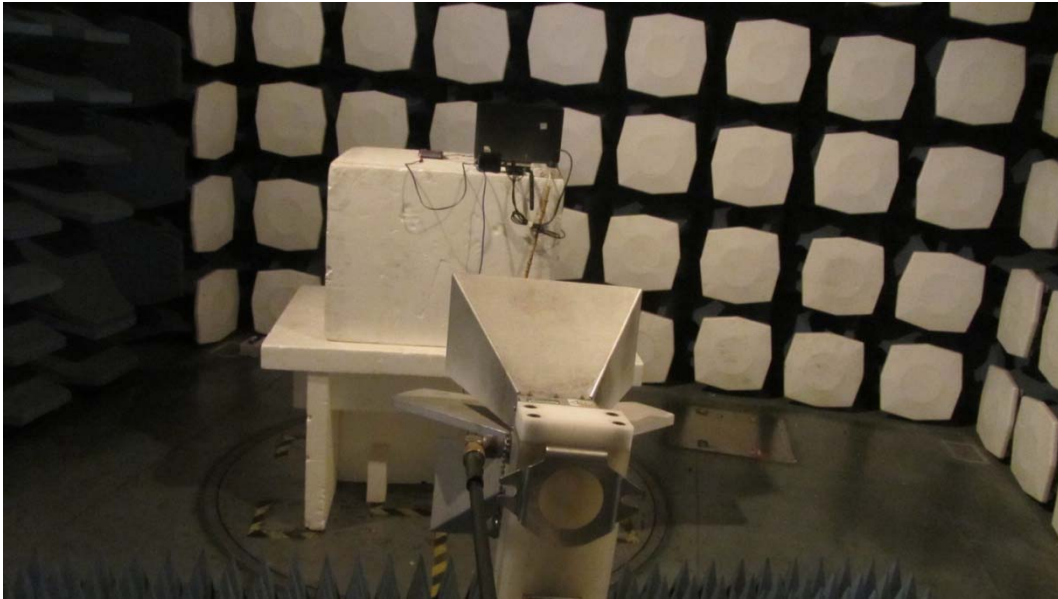
Picture 1 EUT and Accessory



## A.2 Test Setup



30MHz-1GHz



Above 1GHz

**Picture 2 Radiated Emission Test Setup**



Picture 3 Conducted Emission Test Setup