



# FCC Test Report

<b>Application No.:</b>	DNT2507250227R8033-10098
<b>Applicant:</b>	Jubilee(Guangzhou)E-commerce Co., Ltd
<b>Address of Applicant:</b>	No. 613-1, No. 6, Huibin Second Street Hengli Town, Nansha District, Guangzhou, China
<b>EUT Description:</b>	MINI Doorbell
<b>Model No.:</b>	X12
<b>Additional Model(s):</b>	X16,X17
<b>FCC ID:</b>	2BMNV-X12
<b>Power Supply:</b>	Input:DC 5V;DC 3.7V from rechargeable lithium-ion battery
<b>Trade Mark:</b>	N/A
<b>Standards:</b>	47 CFR Part 2, Subpart J 47 CFR Part 15, Subpart C ANSI C63.10: 2013
<b>Date of Receipt:</b>	2025/7/25
<b>Date of Test:</b>	2025/7/26 to 2025/8/18
<b>Date of Issue:</b>	2025/8/19
<b>Test Result:</b>	<b>PASS</b>

**Prepared By:** Wayne Lin (Testing Engineer)



**Reviewed By:** Pencils Chen (Project Engineer)

**Approved By:** Wayne Chen (Manager)

Note: If there is any objection to the results in this report, please submit a written inquiry to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp, and is issued by the company in accordance with the requirements of the "Conditions of Issuance of Test Reports" printed in the attached page. Unless otherwise stated, the results presented in this report only apply to the samples tested this time. Partial reproduction of this report is not allowed unless approved by the company in writing.

**Dongguan DN Testing Co., Ltd.**

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**Report Revise Record**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V2.0	/	August 19, 2025	Valid	Original Report



## 1 Test Summary

Test Item	Test Requirement	Test Method	Test Result	Result
<b>Antenna Requirement</b>	15.203/247(b)	--	Clause 3.1	PASS
<b>AC Power Line Conducted Emission</b>	15.207	ANSI C63.10: 2013	Clause 3.2	PASS
<b>Duty Cycle</b>	--	--	Clause 3.3	PASS
<b>DTS (6 dB) Bandwidth</b>	15.247 (a)(2)	ANSI C63.10: 2013	Clause 3.4	PASS
<b>Conducted Output Power</b>	15.247 (b)(3)	ANSI C63.10: 2013	Clause 3.5	PASS
<b>Power Spectral Density</b>	15.247 (e)	ANSI C63.10: 2013	Clause 3.6	PASS
<b>Band-edge for RF Conducted Emissions</b>	15.247(d)	ANSI C63.10: 2013	Clause 3.7	PASS
<b>RF Conducted Spurious Emissions</b>	15.247(d)	ANSI C63.10: 2013	Clause 3.8	PASS
<b>Radiated Spurious Emissions</b>	15.247(d);15.205/15.209	ANSI C63.10: 2013	Clause 3.9	PASS
<b>Restricted bands around fundamental frequency (Radiated Emission)</b>	15.247(d);15.205/15.209	ANSI C63.10: 2013	Clause 3.10	PASS

Note:

1. "N/A" denotes test is not applicable in this test report.



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## 2 General Information

### 2.1 Test Location

Company:	Dongguan DN Testing Co., Ltd
Address:	No. 1, West Fourth Street, South Xingfa Road, Wusha Liwu, Chang 'an Town, Dongguan City, Guangdong P.R.China
Test engineer:	Wayne Lin



## 2.2 General Description of EUT

Manufacturer:	Guangzhou Hongde Jiazhi Technology Service Co., Ltd.
Address of Manufacturer:	No. 349, Xinlu, Nansha District, Guangzhou
EUT Description:	MINI Doorbell
Model No.:	X12
Additional Model(s):	X16,X17
Power Supply:	Input:DC 5V;DC 3.7V from rechargeable lithium-ion battery
Chip Type:	BK7252NQN481
Trade Mark:	N/A
Hardware Version:	V1.0
Software Version:	V1.0
Serial number	PR2507250227R8033
IEEE 802.11 WLAN Mode Supported	<input checked="" type="checkbox"/> 802.11b (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11g (20 MHz channel bandwidth) <input checked="" type="checkbox"/> 802.11n HT(20 MHz channel bandwidth)
Operation Frequency:	2412-2462MHz
Type of Modulation:	IEEE for 802.11b: DSSS IEEE for 802.11g : OFDM IEEE for 802.11n(HT20) : OFDM
Sample Type:	<input type="checkbox"/> Portable Device, <input type="checkbox"/> Module, <input checked="" type="checkbox"/> Mobile Device
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated
Antenna Ports	<input checked="" type="checkbox"/> Ant 1, <input type="checkbox"/> Ant 2, <input type="checkbox"/> Ant 3
Smart System	<input checked="" type="checkbox"/> SISO (for 802.11b/g/n), <input type="checkbox"/> MIMO (for 802.11 b/g/n): 2 Tx & 2 Rx, <input type="checkbox"/> Diversity (for 802.11b/g) : Tx & Rx
Antenna Gain*:	<input checked="" type="checkbox"/> Provided by applicant 3.85dBi
RF Cable*:	<input checked="" type="checkbox"/> Provided by applicant 0.5dB(0.6~1GHz); 0.8dB(1.4~2GHz); 1.0dB(2.1~2.7GHz); 1.5dB(3~4GHz); 1.8dB(4.4~6GHz);
Remark:	<p>*All models are just color and appearance differences, motherboard, PCB circuit board, chip, electronic components is all the same.</p> <p>*Since the above data and/or information is provided by the applicant relevant results or conclusions of this report are only made for these data and/or information , DNT is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion.</p>



## 2.3 Channel List

Operation Frequency of each channel (802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

### Remark:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency for 802.11 b/g/n (HT20))
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

## 2.4 Test Environment and Mode

Operating Environment:	
Temperature:	20~25.0 °C
Humidity:	45~56 % RH
Atmospheric Pressure:	101.0~101.30 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

## 2.5 Power Setting of Test Software

Software Name	Wifi Test Tool v1.6.5		
Frequency(MHz)	2412	2437	2462
IEEE 802.11b Setting	Default	Default	Default
IEEE 802.11g Setting	Default	Default	Default
IEEE 802.11n HT20 Setting	Default	Default	Default

## 2.6 Description of Support Units

The EUT has been tested independent unit.



## 2.7 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

**Lab A:**

- FCC, USA

Designation Number: CN1348

- A2LA (Certificate No. 7050.01)

DONGGUAN DN TESTING CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 7050.01.

- Innovation, Science and Economic Development Canada

DONGGUAN DN TESTING CO., LTD. EMC Laboratory has been recognized by ISED as an accredited testing laboratory. CAB identifier is CN0149.

IC#: 30755.

## 2.8 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	DTS Bandwidth	±0.0196%
2	Maximum Conducted Output Power	±0.686 dB
3	Maximum Power Spectral Density Level	±0.743 dB
4	Band-edge Compliance	±1.328 dB
5	Unwanted Emissions In Non-restricted Freq Bands	9KHz-1GHz:±0.746dB 1GHz-26GHz: ±1.328dB

No.	Item	Measurement Uncertainty
1	Conduction Emission	± 3.0dB (150kHz to 30MHz)
2	Radiated Emission	± 4.8dB (Below 1GHz)
		± 4.8dB (1GHz to 6GHz)
		± 4.5dB (6GHz to 18GHz)
		± 5.02dB (Above 18GHz)



## 2.9 Equipment List

For Connect EUT Antenna Terminal Test					
Description	Manufacturer	Model	Serial Number	Cal date	Due date
Signal Generator	Keysight	N5181A-6G	MY48180415	2024-10-23	2025-10-22
Signal Generator	Keysight	N5182B	MY57300617	2024-10-23	2025-10-22
Power supply	Keysight	E3640A	ZB2022656	2024-10-23	2025-10-22
Radio Communication Tester	R&S	CMW500	105082	2024-10-23	2025-10-22
Spectrum Analyzer	Agilent	N9010A	MY52220200	2024-10-23	2025-10-22
BT/WIFI Test Software	Tonscend	JS1120 V3.1.83	NA	NA	NA
RF Control Unit	Tonscend	JS0806-2	22F8060581	NA	NA
Power Sensor	Anritsu	ML2495A	2129005	2024-10-23	2025-10-22
Pulse Power Sensor	Anritsu	MA2411B	1911397	2024-10-23	2025-10-22
temperature and humidity box	SCOTEK	SCD-C40-80PRO	6866682020008	2024-10-23	2025-10-22
RF Cable	ETS-LINDGREN	RFC-NMS-100-NMS-350-IN	NA	2024-10-23	2025-10-22

Test Equipment for Conducted Emission					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESCI3	101152	2024-10-23	2025-10-22
LISN	R&S	ENV216	102874	2024-10-23	2025-10-22
ISN	R&S	ENY81-CA6	1309.8590.03	2024-10-23	2025-10-22
RF Cable	ETS-LINDGREN	Cable-CE TS01	/	2024-10-23	2025-10-22

Test Equipment for Radiated Emission(30MHz-1000MHz)					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESR7	102497	2024-10-23	2025-10-22
Test Software	ETS-LINDGREN	TiLE-FULL	NA	NA	NA
RF Cable	ETS-LINDGREN	RE Cable-TS01	NA	2024-10-23	2025-10-22
Log periodic antenna	ETS-LINDGREN	VULB 9168	01475	2022-11-28	2025-11-27



Pre-amplifier	Schwarzbeck	BBV9743B	00423	2024-10-23	2025-10-22
Attenuator 1	Shanghai Huaxiang	TS2-6-18-A	22061803	2025-5-6	2026-5-5
Attenuator 2	Shanghai Huaxiang	TS2-6-6-A	230927163	2025-5-6	2026-5-5

Test Equipment for Radiated Emission(Above 1000MHz)					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Frequency analyser	Keysight	N9010A	MY52221458	2024-10-23	2025-10-22
RF Cable	ETS-LINDGREN	RE Cable-TS02	NA	2024-10-23	2025-10-22
Horn Antenna	ETS-LINDGREN	3117	00252567	2022-11-28	2025-11-27
Double ridged waveguide antenna	ETS-LINDGREN	3116C	00251780	2022-11-28	2025-11-27
Test Software	ETS-LINDGREN	TiLE-FULL	NA	NA	NA
Pre-amplifier	ETS-LINDGREN	3117-PA	252567	2024-10-23	2025-10-22
Pre-amplifier	ETS-LINDGREN	3116C-PA	251780	2024-10-23	2025-10-22

## 2.10 Assistant equipment used for test

Code	Equipment	Manufacturer	Model No.	Equipment No.
2	Adapter	HUAWEI	HW-100225C00	NA
2	Computer	acer	N22C8	EMC notebook01



### 3 Test results and Measurement Data

#### 3.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
The PCB antenna is externally connected to the motherboard, The best case gain of the antenna is 3.85dBi.	



## 3.2 Duty Cycle

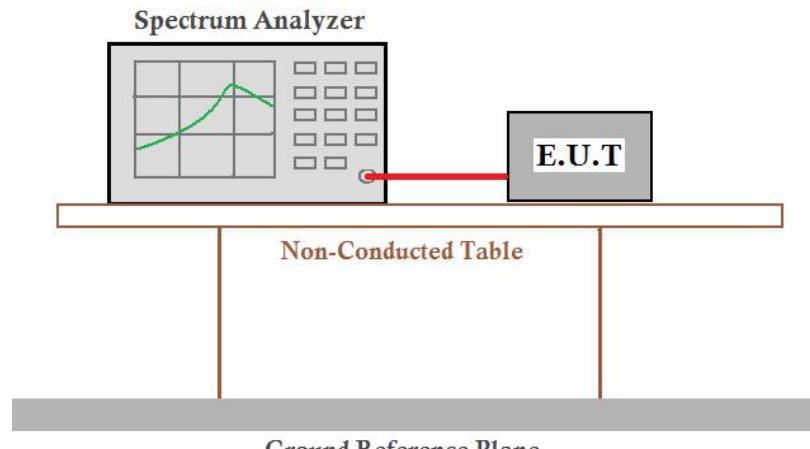
Refer to section : **Appendix A**

Note:

- 1.If duty cycle  $< 98\%$ , the conducted average output power and average power spectral density should be add duty factor.
- 2.If duty cycle  $\geq 98\%$ , the EUT is consider to be transmitting continuously, the conducted average output power and average power spectral density no need to add duty factor (consider to be zero).
- 3.The conducted peak output power and peak power spectral density no need to consider duty factor.
- 4.The on-time time is transmission duration(T).



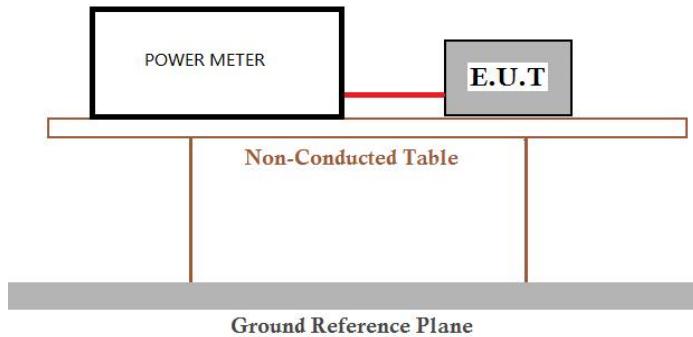
### 3.3 DTS (6 dB) Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013 Section 11.8.1 Option 1
Test Setup:	
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11B; 6Mbps of rate is the worst case of 802.11G ; 6.5Mbps of rate is the worst case of 802.11N(HT20);
Limit:	$\geq 500$ kHz
Test Results:	Pass

The detailed test data see: **Appendix B**

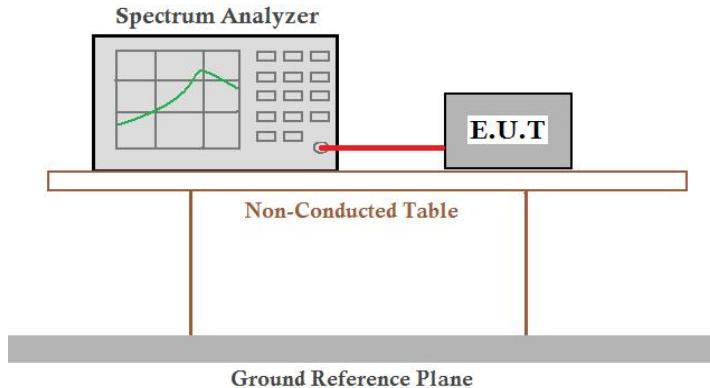


### 3.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10: 2013 Section 11.9.1.3
Test Setup:	
Test Instruments:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20);
Limit:	30dBm
Test Results:	Pass

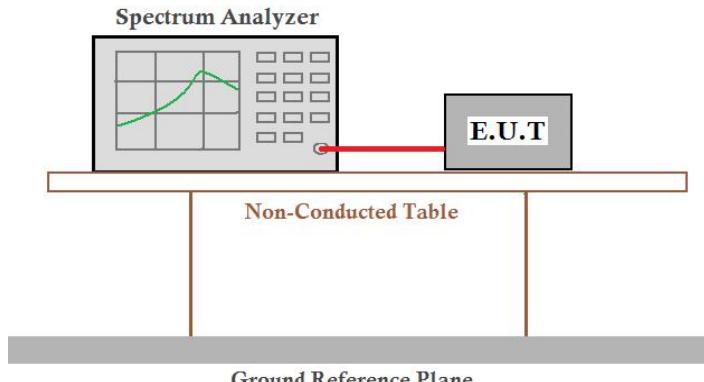
The detailed test data see: **Appendix C**

### 3.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10: 2013 Section 11.10.2
Test Setup:	
Test Instruments:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20);
Limit:	$\leq 8.00 \text{dBm}/3\text{kHz}$
Test Results:	Pass

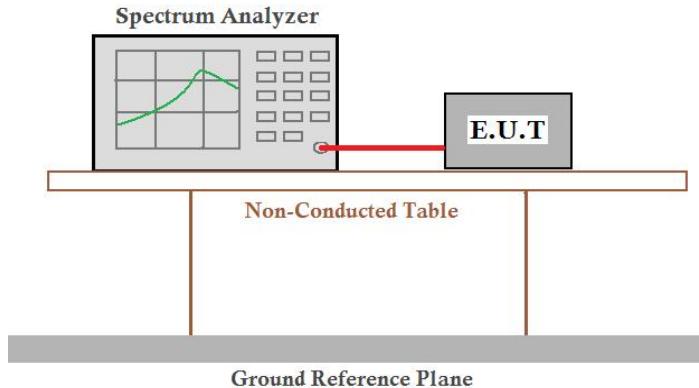
The detailed test data see: **Appendix D**

### 3.6 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.13
Test Setup:	
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20);
Limit:	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, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

The detailed test data see: **Appendix E**

### 3.7 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013 Section 11.11
Test Setup:	
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20);
Limit:	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, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

The detailed test data see: **Appendix F**



### 3.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013 Section 11.12				
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)				
Receiver Setup:	Frequency	Detector	RBW	VBW	Remark
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Peak	1MHz	10Hz (DC $\geq$ 0.98) $\geq$ 1/T (DC<0.98)	Average
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Remark: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

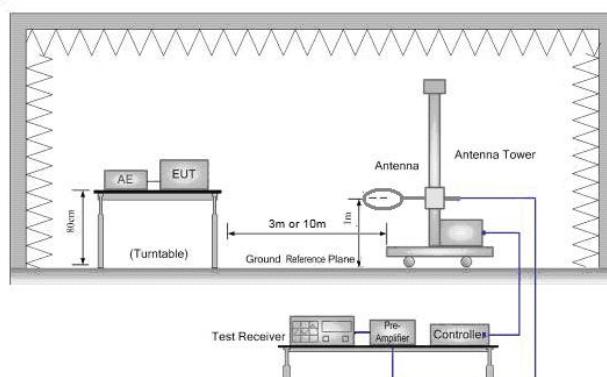
**Test Setup:**


Figure 1. Below 30MHz

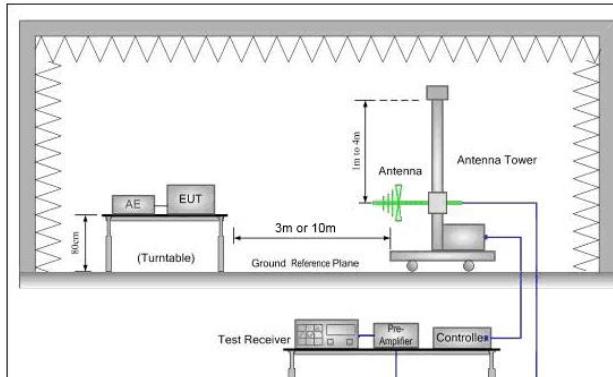


Figure 2. 30MHz to 1GHz

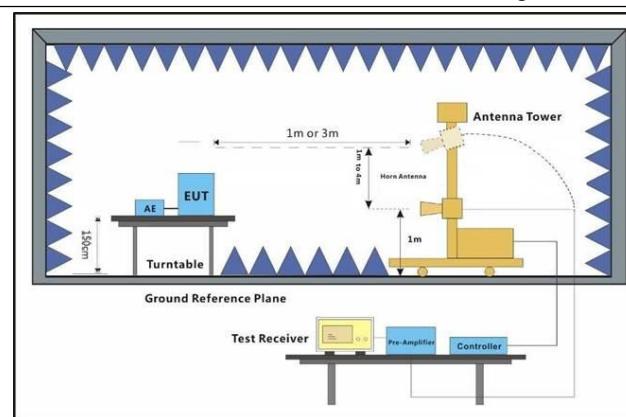


Figure 3. Above 1 GHz

**Test Procedure:**

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters(for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
- Repeat above procedures until all frequencies measured was complete.

**Test Configuration:**

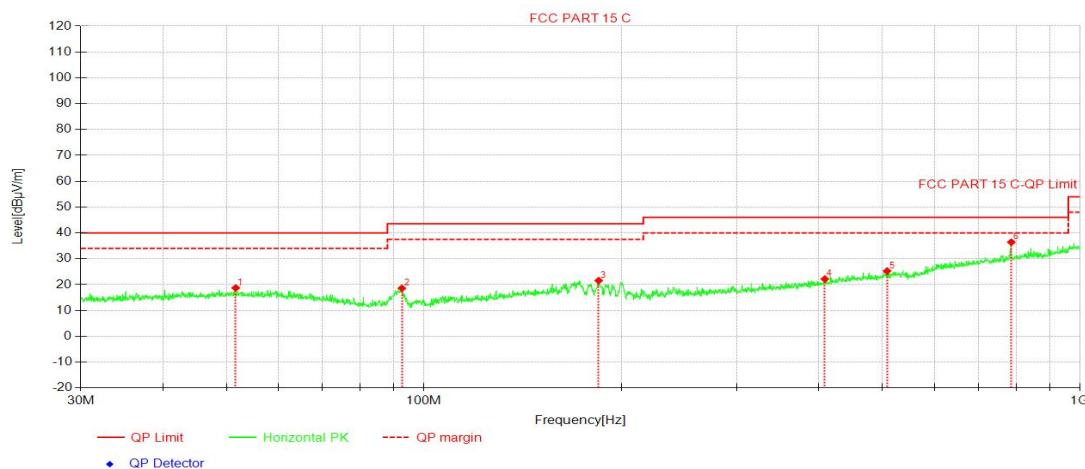
Measurements Below 1000MHz



	<ul style="list-style-type: none"><li>• RBW = 120 kHz</li><li>• VBW = 300 kHz</li><li>• Detector = Peak</li><li>• Trace mode = max hold</li></ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"><li>• RBW = 1 MHz</li><li>• VBW <math>\geq 3</math> MHz</li><li>• Detector = Peak</li><li>• Sweep time = auto</li><li>• Trace mode = max hold</li></ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"><li>• RBW = 1 MHz</li><li>• VBW = 10 Hz, when duty cycle is no less than 98 percent.</li><li>• VBW <math>\geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li></ul>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Charge + Transmitting mode.
Final Test Mode:	Pretest the EUT at Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); For below 1GHz, through Pre-scan, find the 1Mbps of rate of 802.11b is the worst case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass

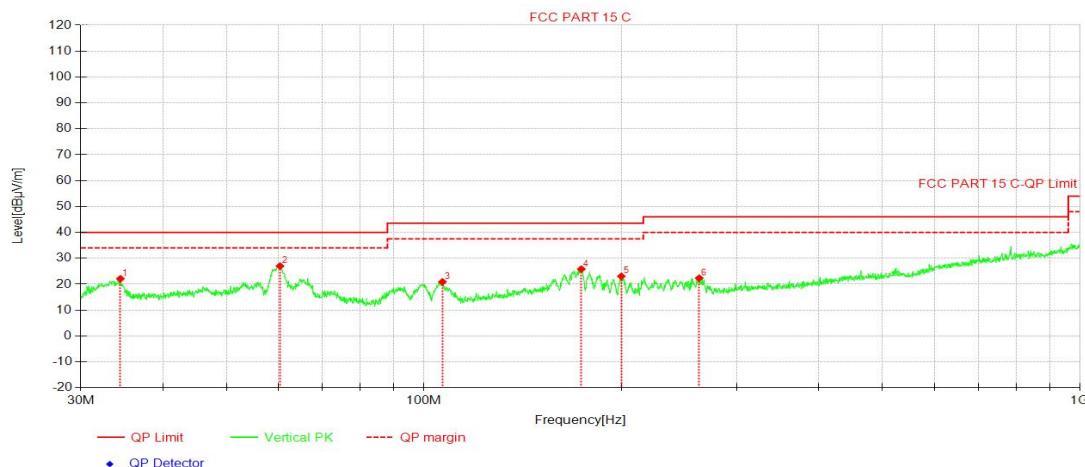
**Test data****For 30-1000MHz**

Horizontal:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	51.66	26.80	-8.09	18.71	40.00	21.29	200	161
2	92.57	32.22	-13.66	18.56	43.50	24.94	200	360
3	184.71	31.49	-9.93	21.56	43.50	21.94	200	354
4	408.47	26.34	-4.17	22.17	46.00	23.83	200	360
5	508.26	26.90	-1.64	25.26	46.00	20.74	200	293
6	786.01	32.38	4.03	36.41	46.00	9.59	200	88

Vertical :



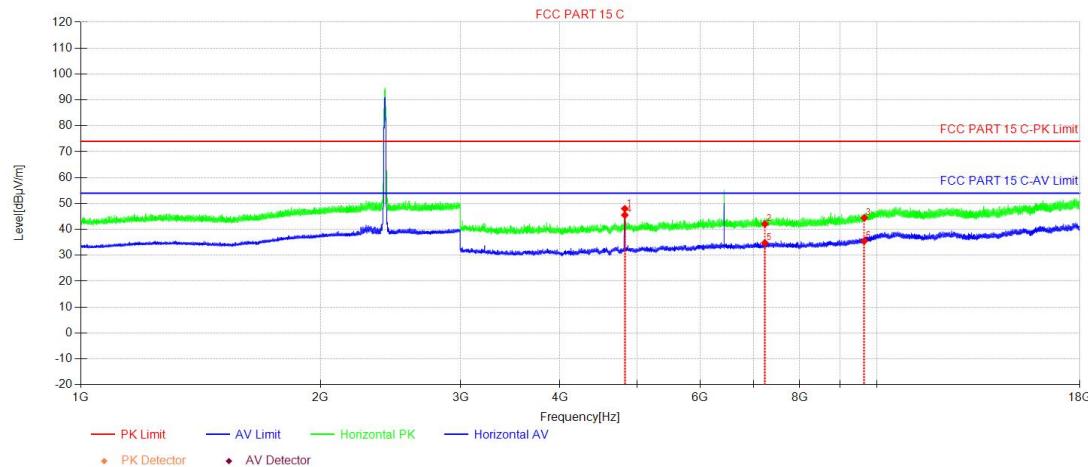
NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	34.48	31.47	-9.38	22.09	40.00	17.91	100	14
2	60.35	35.79	-8.80	26.99	40.00	13.01	100	190
3	106.76	32.51	-11.61	20.90	43.50	22.60	100	291
4	173.81	34.45	-8.63	25.82	43.50	17.68	100	324
5	199.99	34.16	-11.09	23.07	43.50	20.43	100	355
6	262.90	30.79	-8.47	22.32	46.00	23.68	100	319



For above 1GHz

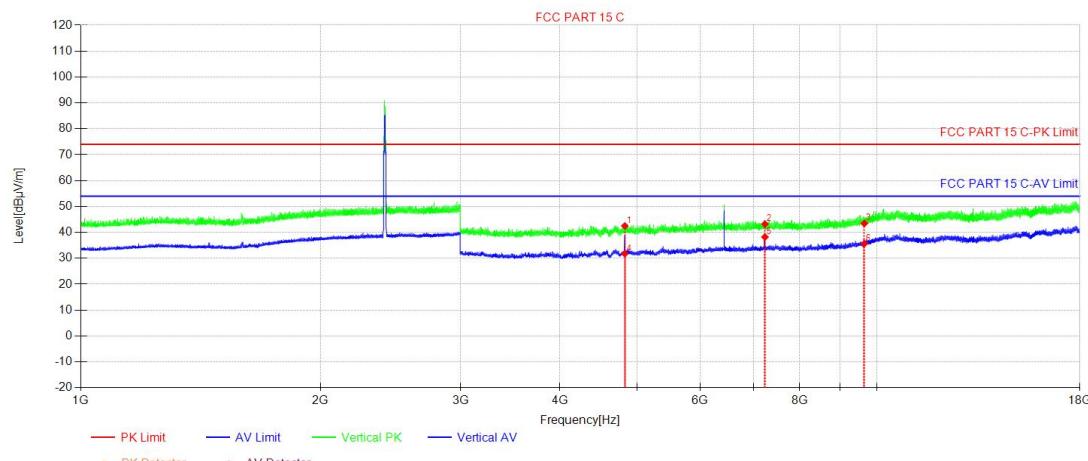
11B 2412MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	4824.09	52.62	-4.63	47.99	74.00	26.01	150	290
2	7236.21	43.79	-1.70	42.09	74.00	31.91	150	82
3	9648.33	43.36	1.07	44.43	74.00	29.57	150	133
4	4824.84	50.18	-4.63	45.55	54.00	8.45	150	308
5	7236.21	36.49	-1.70	34.79	54.00	19.21	150	82
6	9648.33	34.49	1.07	35.56	54.00	18.44	150	82

Vertical:

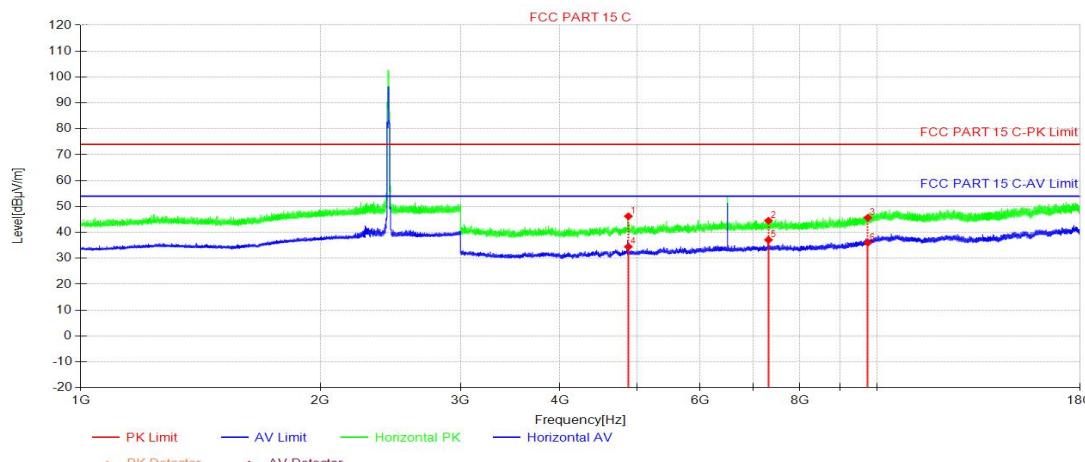


NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	4824.09	47.13	-4.63	42.50	74.00	31.50	150	321
2	7236.21	44.91	-1.70	43.21	74.00	30.79	150	76
3	9648.33	42.40	1.07	43.47	74.00	30.53	150	43
4	4824.09	36.40	-4.63	31.77	54.00	22.23	150	128
5	7236.21	39.92	-1.70	38.22	54.00	15.78	150	76
6	9648.33	34.61	1.07	35.68	54.00	18.32	150	356



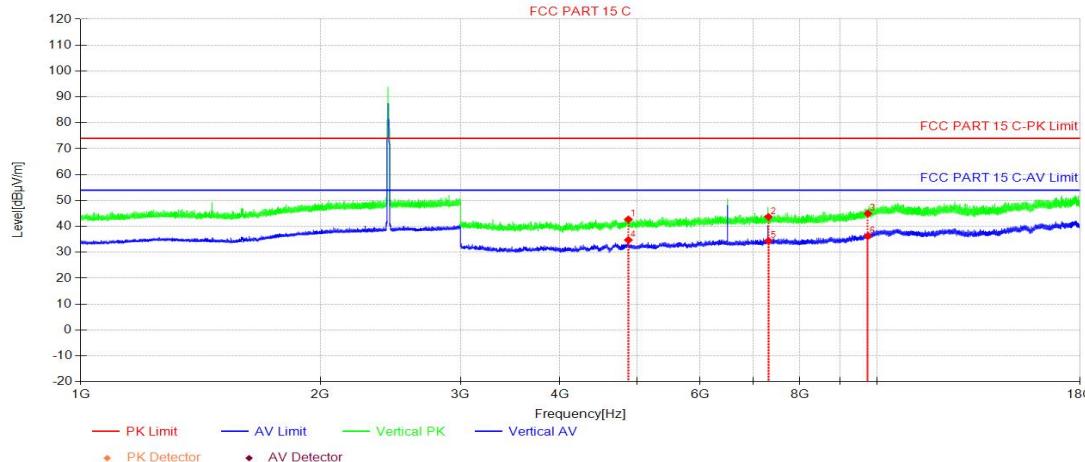
11B 2437MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	4874.34	50.93	-4.70	46.23	74.00	27.77	150	44
2	7311.22	46.06	-1.53	44.53	74.00	29.47	150	99
3	9748.09	44.11	1.56	45.67	74.00	28.33	150	44
4	4874.34	39.14	-4.70	34.44	54.00	19.56	150	44
5	7311.22	38.63	-1.53	37.10	54.00	16.90	150	116
6	9748.09	34.43	1.56	35.99	54.00	18.01	150	44

Vertical:

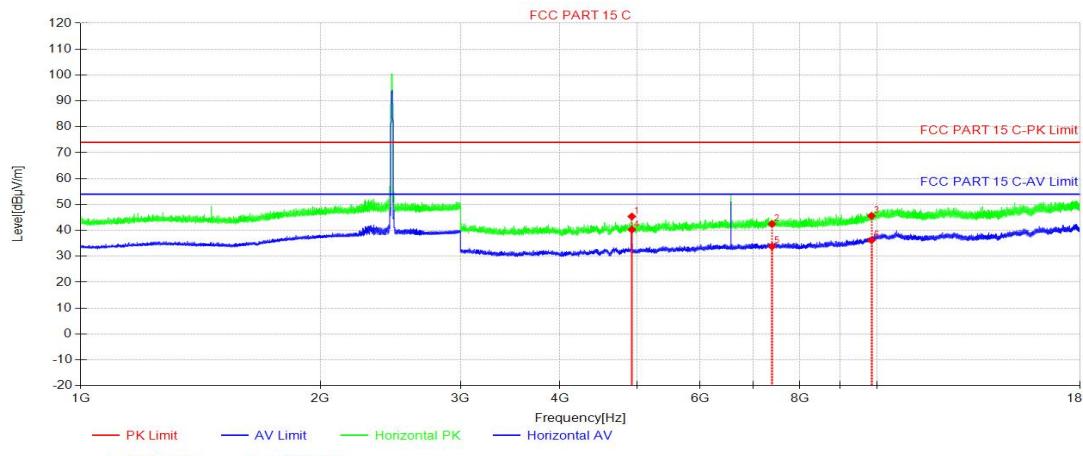


NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	4874.34	47.41	-4.70	42.71	74.00	31.29	150	98
2	7311.22	45.21	-1.53	43.68	74.00	30.32	150	148
3	9748.09	43.42	1.56	44.98	74.00	29.02	150	1
4	4874.34	39.45	-4.70	34.75	54.00	19.25	150	28
5	7311.22	35.98	-1.53	34.45	54.00	19.55	150	180
6	9748.09	34.69	1.56	36.25	54.00	17.75	150	148



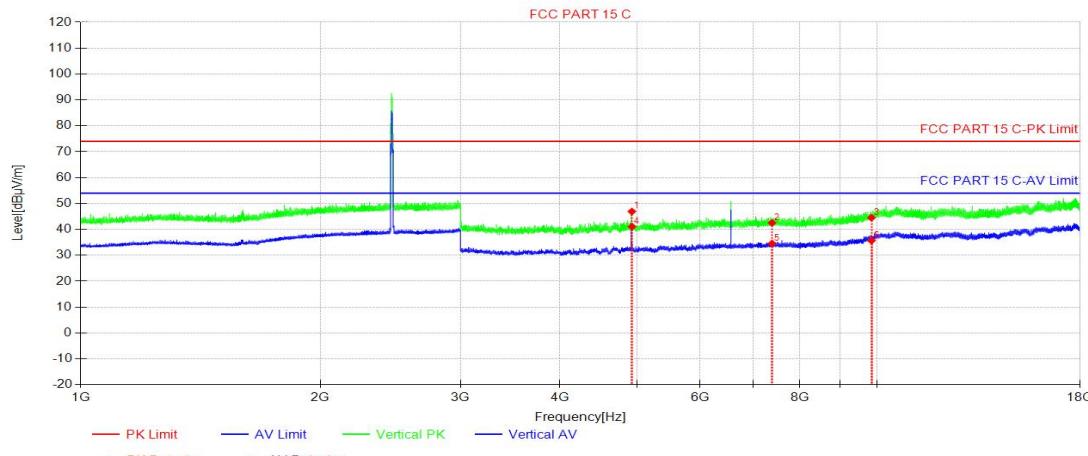
## 11B 2462MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	4923.85	50.18	-4.79	45.39	74.00	28.61	150	100
2	7386.22	43.80	-1.32	42.48	74.00	31.52	150	63
3	9848.59	43.61	2.00	45.61	74.00	28.39	150	288
4	4924.60	45.05	-4.79	40.26	54.00	13.74	150	340
5	7386.22	35.13	-1.32	33.81	54.00	20.19	150	10
6	9848.59	34.21	2.00	36.21	54.00	17.79	150	255

Vertical:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	4924.60	51.69	-4.79	46.90	74.00	27.10	150	70
2	7386.22	43.84	-1.32	42.52	74.00	31.48	150	89
3	9848.59	42.52	2.00	44.52	74.00	29.48	150	170
4	4925.35	45.89	-4.80	41.09	54.00	12.91	150	70
5	7386.22	35.88	-1.32	34.56	54.00	19.44	150	52
6	9848.59	33.68	2.00	35.68	54.00	18.32	150	52



## Note:

1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including Ant.Factor, Cable Factor etc. )

2. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

3. The amplitude of 18GHz to 25GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be report.

4. All channels had been pre-test,only the worst case was reported.

### 3.9 Restricted bands around fundamental frequency

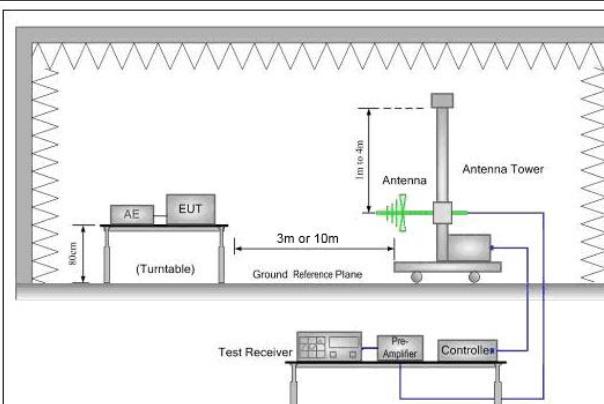
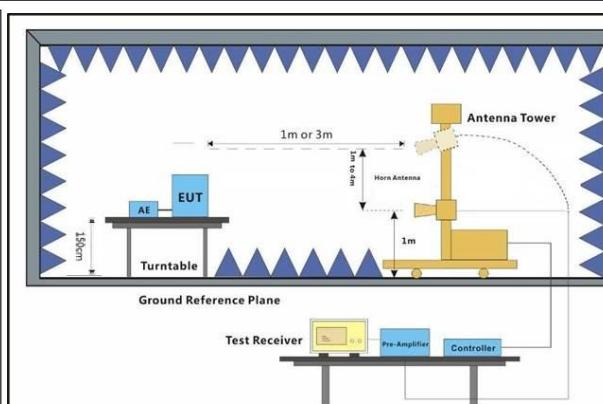
Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2013 Section 11.12		
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value
Test Setup:			
			
			

Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

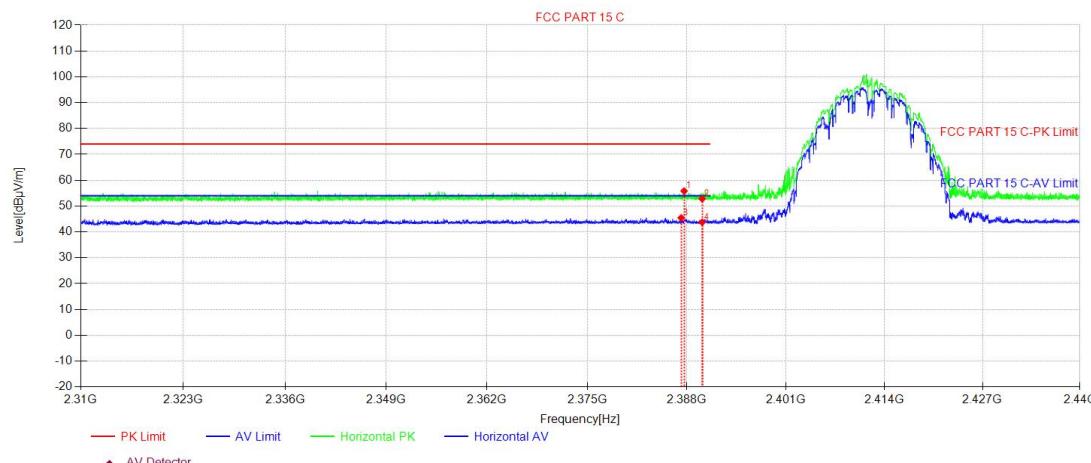


Test Procedure:	<ol style="list-style-type: none"><li>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li><li>h. Test the EUT in the lowest channel , the Highest channel</li><li>i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</li><li>j. Repeat above procedures until all frequencies measured was complete.</li></ol>
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"><li>• RBW = 120 kHz</li><li>• VBW = 300 kHz</li><li>• Detector = Peak</li><li>• Trace mode = max hold</li></ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"><li>• RBW = 1 MHz</li><li>• VBW <math>\geq 3</math> MHz</li><li>• Detector = Peak</li><li>• Sweep time = auto</li><li>• Trace mode = max hold</li></ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"><li>• RBW = 1 MHz</li><li>• VBW = 10 Hz, when duty cycle is no less than 98 percent.</li><li>• VBW <math>\geq 1/T</math>, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</li></ul>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates. Transmitting mode.
Final Test Mode:	Pretest the EUT at Charge + Transmitting mode. Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); Only the worst case is recorded in the report.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass



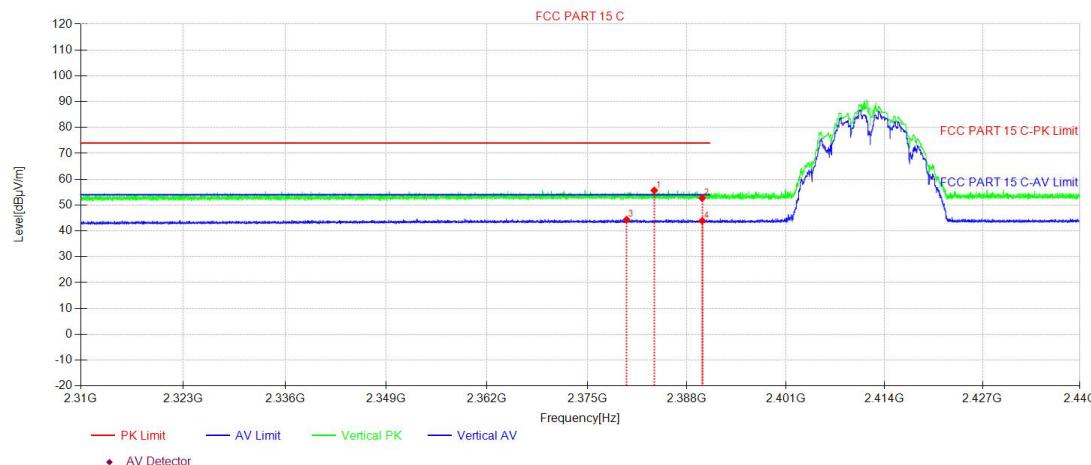
**Test Date  
1B 2412MHz**

Horizontal:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	2387.64	56.63	-0.80	55.83	74.00	18.17	150	214
2	2390.01	53.60	-0.80	52.80	74.00	21.20	150	181
3	2387.27	46.22	-0.80	45.42	54.00	8.58	150	87
4	2390.01	44.53	-0.80	43.73	54.00	10.27	150	224

Vertical:

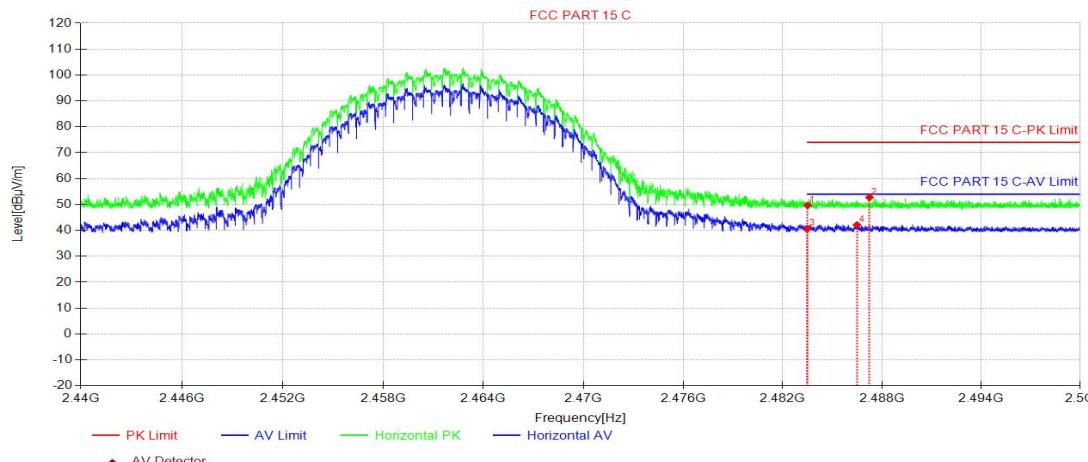


NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	2383.74	56.48	-0.82	55.66	74.00	18.34	150	175
2	2390.01	53.48	-0.80	52.68	74.00	21.32	150	154
3	2380.13	45.20	-0.83	44.37	54.00	9.63	150	216
4	2390.01	44.71	-0.80	43.91	54.00	10.09	150	216



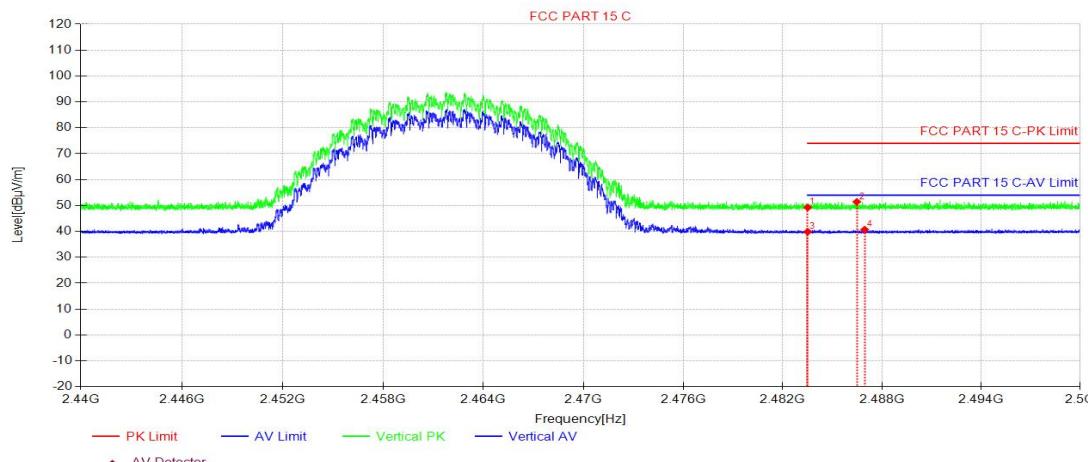
## 11B 2462MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	2483.50	49.96	-0.29	49.67	74.00	24.33	150	58
2	2487.24	53.00	-0.26	52.74	74.00	21.26	150	242
3	2483.50	41.00	-0.29	40.71	54.00	13.29	150	231
4	2486.48	42.37	-0.26	42.11	54.00	11.89	150	91

Vertical:

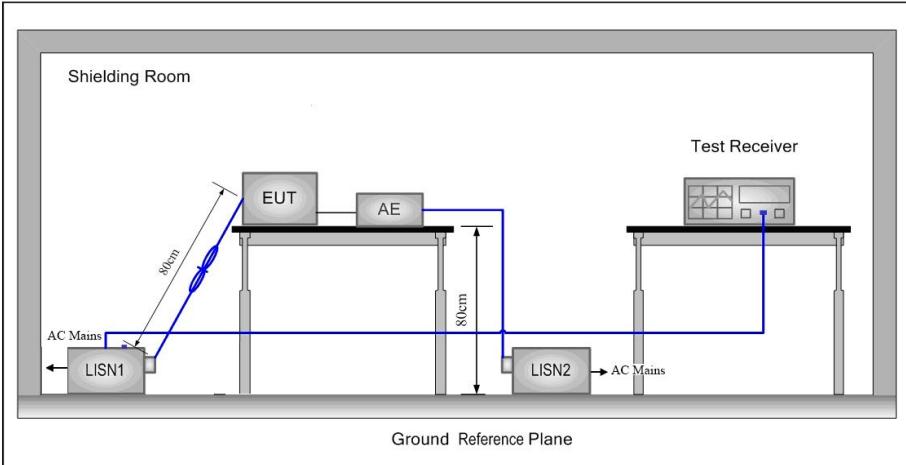


NO.	Freq. [MHz]	Reading Level [dB $\mu$ V]	Correct Factor [dB/m]	Result Level [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]	Height [cm]	Angle [°]
1	2483.51	49.53	-0.29	49.24	74.00	24.76	150	176
2	2486.47	51.67	-0.26	51.41	74.00	22.59	150	187
3	2483.51	40.16	-0.29	39.87	54.00	14.13	150	335
4	2486.95	40.95	-0.26	40.69	54.00	13.31	150	0

Note:

1. The 802.11B is the worse case.
2. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:  
Result Level= Reading Level + Correct Factor(including Ant.Factor ,Cable Factor etc. )

### 3.10AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2013		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
	0.15-0.5	Quasi-peak	Average
	0.5-5	66 to 56*	56 to 46*
	5-30	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<p>1) The mains terminal disturbance voltage test was conducted in a shielded room.</p> <p>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a <math>50\Omega/50\mu\text{H} + 5\Omega</math> linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</p> <p>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</p> <p>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 2013 on conducted measurement.</p>		
Test Setup:			
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and		



	highest channel. Charge + Transmitting mode.
Final Test Mode:	Charge + Transmitting mode. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass

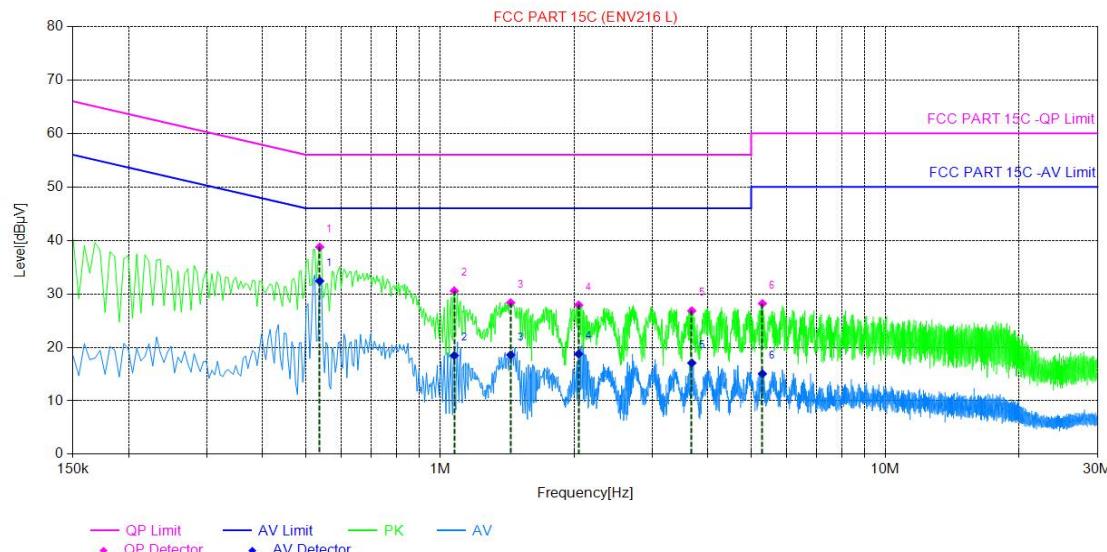


## Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live Line:

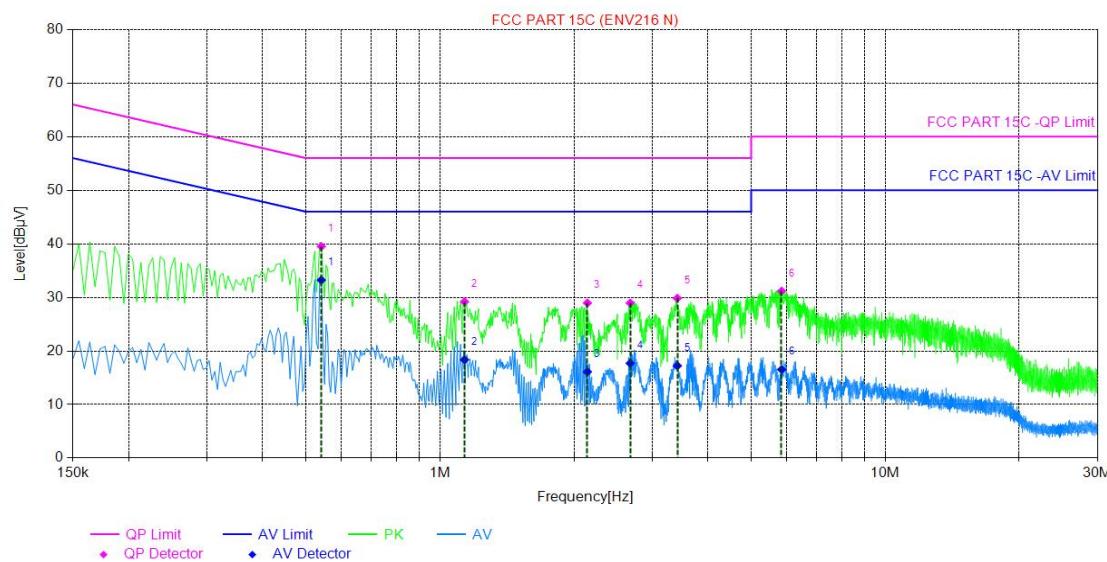


## Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dB $\mu$ V]	QP Limit [dB $\mu$ V]	QP Margin [dB]	AV Value [dB $\mu$ V]	AV Limit [dB $\mu$ V]	AV Margin [dB]	Verdict
1	0.537	9.85	38.75	56.00	17.25	32.41	46.00	13.59	PASS
2	1.077	9.72	30.56	56.00	25.44	18.47	46.00	27.53	PASS
3	1.4415	9.73	28.35	56.00	27.65	18.58	46.00	27.42	PASS
4	2.049	9.73	27.92	56.00	28.08	18.76	46.00	27.24	PASS
5	3.678	9.75	26.83	56.00	29.17	17.08	46.00	28.92	PASS
6	5.298	9.80	28.20	60.00	31.80	15.05	50.00	34.95	PASS



Neutral Line:



### Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dB $\mu$ V]	QP Limit [dB $\mu$ V]	QP Margin [dB]	AV Value [dB $\mu$ V]	AV Limit [dB $\mu$ V]	AV Margin [dB]	Verdict
1	0.5415	9.74	39.52	56.00	16.48	33.23	46.00	12.77	PASS
2	1.1355	9.70	29.20	56.00	26.80	18.36	46.00	27.64	PASS
3	2.1435	9.79	28.95	56.00	27.05	16.11	46.00	29.89	PASS
4	2.6745	9.84	28.95	56.00	27.05	17.71	46.00	28.29	PASS
5	3.4125	9.91	29.85	56.00	26.15	17.23	46.00	28.77	PASS
6	5.8515	9.98	31.17	60.00	28.83	16.54	50.00	33.46	PASS

#### Remark:

1. The 802.11B is the worse case.
2. The following Quasi-Peak and Average measurements were performed on the EUT:
3. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including LISN Factor and the Cable Factor etc.), The basic equation is as follows:

Result Level= Reading Level + Correct Factor(including LISN Factor, Cable Factor etc. )



## 4 Appendix

### Appendix A: Duty Cycle

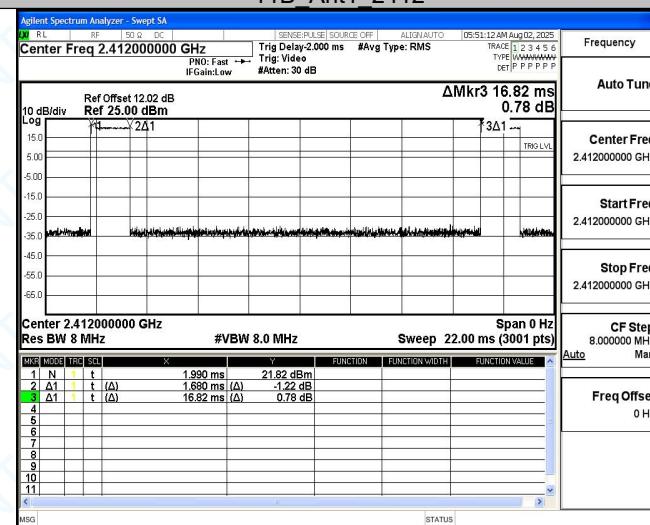
#### Test Result

TestMode	Antenna	Frequency[MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]
11B	Ant1	2412	1.68	16.82	9.99
		2437	1.68	16.82	9.99
		2462	1.68	16.82	9.99
11G	Ant1	2412	1.39	13.97	9.95
		2437	1.40	13.98	10.01
		2462	1.40	13.98	10.01
11N20SISO	Ant1	2412	1.30	13.05	9.96
		2437	1.29	13.05	9.89
		2462	1.30	13.06	9.95

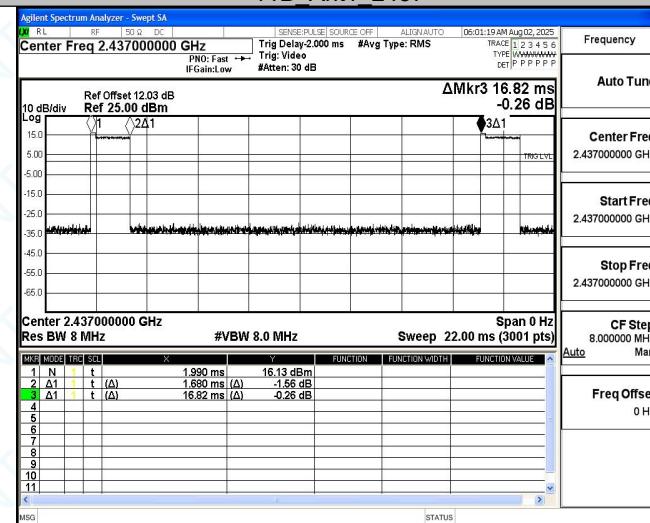


## Test Graphs

## 11B\_Ant1\_2412



## 11B\_Ant1\_2437



## 11B\_Ant1\_2462

