



## TEST REPORT

**Application No.:** DNT2408230173R1158-02143  
**Applicant:** Shenzhen DYscan Technology Co., Ltd  
**Address of Applicant:** Room 206 chuangkehui, Jinhedian Business Center, Longhuan 3 Road, Longhua District, Shenzhen, 518109, China  
**EUT Description:** Bar-code Scanner  
**Model No.:** SM2806BG-2D-ZJ  
**FCC ID:** 2A5LB-DYZN5R745  
**Power Supply** DC 3.7V From Battery; DC 5V From Adapter  
**Trade Mark:** /  
47 CFR FCC Part 2, Subpart J  
**Standards:** 47 CFR Part 15, Subpart C  
ANSI C63.10: 2013  
**Date of Receipt:** 2024/9/8  
**Date of Test:** 2024/9/9 to 2024/9/18  
**Date of Issue:** 2024/9/19  
**Test Result:** **PASS**

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

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

**Approved By:** Heise Shen (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.**

Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

Web: [www.dn-testing.com](http://www.dn-testing.com)

Tel: +86-769-88087383

E-mail: [service@dn-testing.com](mailto:service@dn-testing.com)



Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V2.0	/	Sep.19, 2024	Valid	Original Report



1 Test Summary

Test Item	Standard Section	Test Result
Antenna Requirement	15.203	PASS
20dB Occupied Bandwidth	15.215	PASS
Duty Cycle	N/A	PASS
Field Strength	15.249(a)	PASS
Radiated Spurious Emissions And Band Edge	15.205, 15.209, 15.249(a)(c)(d)(e), 15.35(b)	PASS
AC Power Line Conducted Emissions	15.207	PASS



Contents

1 Test Summary ..... 3

2 General Information ..... 5

    2.1 Test Location ..... 5

    2.2 General Description of EUT ..... 6

    2.3 Power Setting of Test Software ..... 7

    2.4 Test Environment and Mode ..... 7

    2.5 Channel List ..... 7

    2.6 Description of Support Units ..... 7

    2.7 Test Facility ..... 8

    2.8 Measurement Uncertainty (95% confidence levels, k=2) ..... 8

    2.9 Equipment List ..... 9

    2.10 Assistant equipment used for test ..... 10

3 Test results and Measurement Data ..... 11

    3.1 Antenna requirements ..... 11

    3.2 20dB Occupied Bandwidth ..... 12

    3.3 Duty Cycle ..... 14

    3.4 Field Strength of Fundamental ..... 15

    3.5 Radiated Spurious Emissions ..... 20

    3.6 AC Power Line Conducted Emissions ..... 30



2 General Information

2.1 Test Location

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



## 2.2 General Description of EUT

Manufacturer:	Shenzhen DYscan Technology Co., Ltd
Address of Manufacturer:	L306, Jinhetian Business Center, Longhuan 3 Road, Longhua District, Shenzhen, China
EUT Description:	Bar-code Scanner
Test Model No.:	SM2806BG-2D-ZJ
Additional Model(s):	SM2806-2D-YXZJ, SM2806G-1D-ZJ, SM2806-2D-YX2m, SM2806BG-2D-ZJ, SM2806G-2D, SM2806-2D-USBZJ, B09TW7KB75, B09TW8YQM2, B0BF9M18KH, B0BLJDR2DC, B0C4H3MH26, B09TW7KB75, B0D5CTFSPV, SM2806BG-2D, VT6310G-1D, VT6310BG-1D, SU2806LG-1D-Y-HW, SU2806G-2D-Y-HW, SU2806BG-2D-Y-HW, S2806G, S2806BG, V2806G, V2806BG, 2806BG-2D, 2806BG-1D, 2806G-2D, 2806G-1D, 2806G-LS, 2806BG-LS, DS6100B, DS5100B, DSXXXXX, DI9010, DI9120, DI9130, DI9160, DI9150, DI9180, DIXXXX, DS6510B, DS6520B, DS5600B, DS6600B, DS5900B
Power Supply	DC 3.7V From Battery; DC 5V From Adapter
Chip Type:	YC3020
Serial number:	PR2408230173R1158
Trade Mark:	/
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	2402MHz-2480MHz
Type of Modulation:	GFSK
Sample Type:	Prototype production
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
Antenna Gain*:	<input checked="" type="checkbox"/> Provided by applicant 3dBi
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:

\*All models are just color differences, motherboard, PCB circuit board, chip, electronic components, appearance is all the same.

\*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.



## 2.3 Power Setting of Test Software

Software Name	fcc_test_tool		
Frequency(MHz)	2402	2441	2480
Setting	Default	Default	Default

## 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 Channel List

Operation Frequency of each channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

## 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.

• **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	Total RF power, conducted	$\pm 0.41\text{dB}$
2	RF power density, conducted	$\pm 1.96\text{dB}$

No.	Item	Measurement Uncertainty
1	Conduction Emission	$\pm 3.0\text{dB}$ (150kHz to 30MHz)
2	Radiated Emission	$\pm 4.8\text{dB}$ (Below 1GHz)
		$\pm 4.8\text{dB}$ (1GHz to 6GHz)
		$\pm 4.5\text{dB}$ (6GHz to 18GHz)
		$\pm 5.02\text{dB}$ (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	2023-10-25	2024-10-24
Signal Generator	Keysight	N5182B	MY57300617	2023-10-25	2024-10-24
Power supply	Keysight	E3640A	ZB2022656	2023-10-25	2024-10-24
Spectrum Analyzer	Aglient	N9010A	MY52221458	2023-10-25	2024-10-24
BT/WIFI Test Software	Tonscend	JS1120 V3.1.83	NA	NA	NA
RF Control Unit	Tonscend	JS0806-2	22F8060581	NA	NA
temperature and humidity box	SCOTEK	SCD-C40-80PRO	6866682020008	2023-10-25	2024-10-24

Test Equipment for Conducted Emission					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESCI3	101152	2023-10-24	2024-10-23
LISN	R&S	ENV216	102874	2023-10-24	2024-10-23
ISN	R&S	ENY81-CA6	1309.8590.03	2023-10-24	2024-10-23

Test Equipment for Radiated Emission(below 1000MHz)					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Receiver	R&S	ESR7	102497	2023-10-24	2024-10-23
Test Software	ETS-LINDGREN	TILE-FULL	NA	NA	NA
RF Cable	ETS-LINDGREN	RFC-NMS-100-NMS-350-IN	NA	2023-10-24	2024-10-23
Log periodic antenna	ETS-LINDGREN	VULB 9168	01475	2023-10-24	2024-10-23
Pre-amplifier	Schwarzbeck	BBV9743B	00423	2023-10-24	2024-10-23
Single ring magnetic field ring antenna	ETS-LINDGREN	6502	6502	2023-10-24	2024-10-23



Test Equipment for Radiated Emission(Above 1000MHz)					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Frequency analyser	Keysight	N9010A	MY52221458	2023-10-24	2024-10-23
RF Cable	ETS-LINDGREN	RFC-NMS-100- NMS-350-IN	NA	2023-10-24	2024-10-23
Horn Antenna	ETS-LINDGREN	3117	00252567	2023-10-24	2024-10-23
Double ridged waveguide antenna	ETS-LINDGREN	3116C	00251780	2023-10-24	2024-10-23
Test Software	ETS-LINDGREN	TiLE-FULL	NA	NA	NA
Pre-amplifier	ETS-LINDGREN	3117-PA	252567	2023-10-24	2024-10-23
Pre-amplifier	ETS-LINDGREN	3116C-PA	251780	2023-10-24	2024-10-23

## 2.10 Assistant equipment used for test

Code	Equipment	Manufacturer	Model No.	Equipment No.
1	1	Adapter	Chenyang	ICSO1



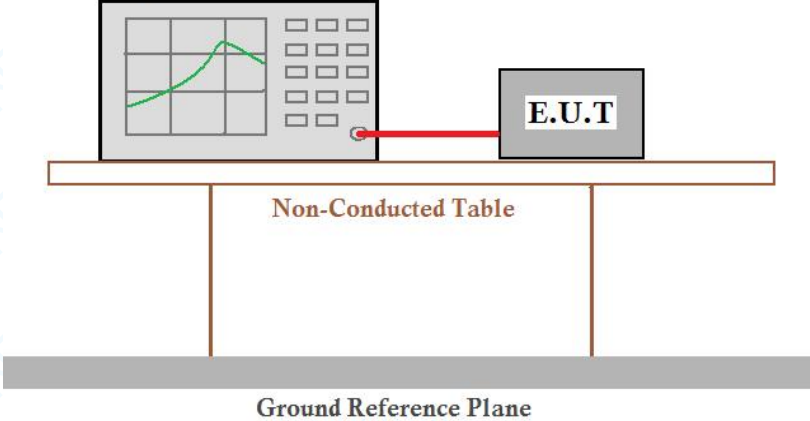
### 3 Test results and Measurement Data

#### 3.1 Antenna requirements

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203 /247(c)
<p>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§15.211, 15.213, 15.217, 15.219, 15.221, or §15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.</p>	
<p>The antenna is welded on the main PCB and no consideration of replacement. The best case gain of the antenna is 3dBi.</p>	



3.2 20dB Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013 Section 7.8.7
Test Setup:	<div><p>Spectrum Analyzer</p><p>Non-Conducted Table</p><p>Ground Reference Plane</p></div>
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 worst case
Limit:	no wider than 0.25% of the center frequency
Test Results:	Pass

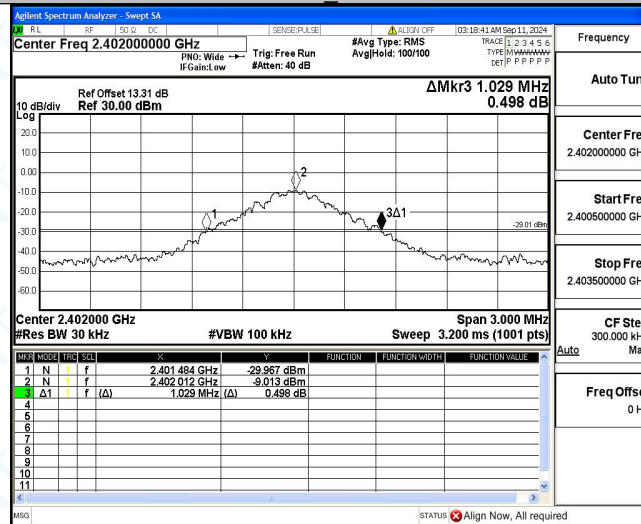
Test Data:

Test Frequency (MHz)	20dB Bandwidth (MHz)	Result
2402	1.029	Pass
2441	1.053	Pass
2480	1.026	Pass

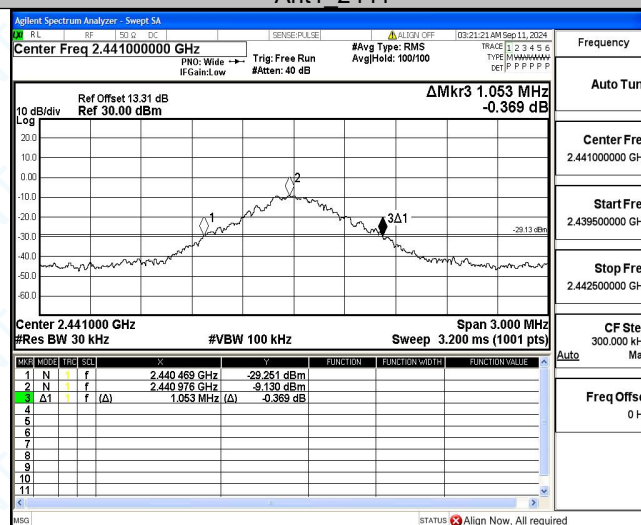


## Test Graphs

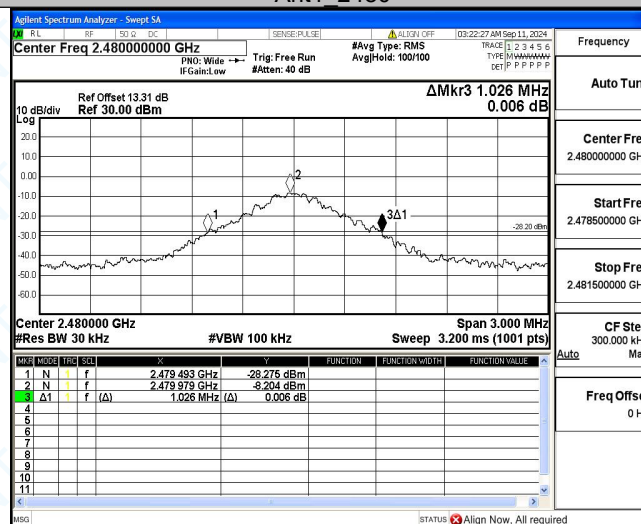
Ant1\_2402



Ant1\_2441



Ant1\_2480



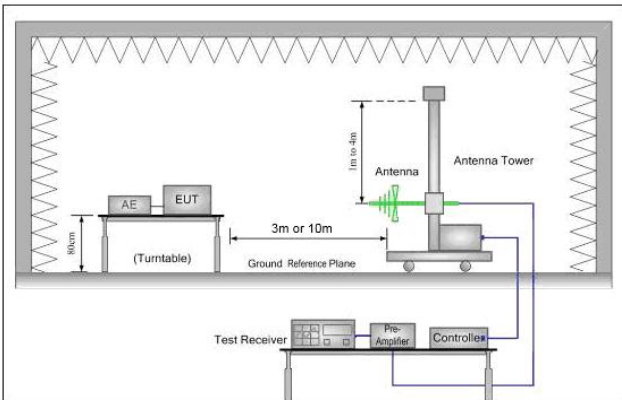


### 3.3 Duty Cycle

Limit :N/A



### 3.4 Field Strength of Fundamental

Test Requirement:	47 CFR Part 15C Section 15.249(a)																															
Test Method:	ANSI C63.10 :2020 Section 11.12																															
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 worst case																															
Limit:	<table><tr><th>Fundamental frequency</th><th colspan="2">Field strength of fundamental@3m (microvolts/meter)</th></tr><tr><td>902-928MHz</td><td colspan="2">50</td></tr><tr><td>2400-2483.5MHz</td><td colspan="2">50</td></tr><tr><td>5725-5875MHz</td><td colspan="2">50</td></tr><tr><td>24.0-24.25</td><td colspan="2">250</td></tr><tr><td colspan="3">The EUT fundamental frequency is in 2400-2483.5MHz,So the Average Limit&amp; Peak Limit is show in below table:</td></tr><tr><th rowspan="2">Fundamental frequency</th><th colspan="2">Field strength of fundamental@3m (dBμV/m)</th></tr><tr><th>Average Limit</th><th>Peak Limit</th></tr><tr><td>2400-2483.5MHz</td><td>94</td><td>114</td></tr><tr><td colspan="3">Note: 1. Average Limit (dBμV/m)=20×log[1000×Field Strength (mV/m)]. 2. Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB</td></tr></table>			Fundamental frequency	Field strength of fundamental@3m (microvolts/meter)		902-928MHz	50		2400-2483.5MHz	50		5725-5875MHz	50		24.0-24.25	250		The EUT fundamental frequency is in 2400-2483.5MHz,So the Average Limit& Peak Limit is show in below table:			Fundamental frequency	Field strength of fundamental@3m (dBμV/m)		Average Limit	Peak Limit	2400-2483.5MHz	94	114	Note: 1. Average Limit (dBμV/m)=20×log[1000×Field Strength (mV/m)]. 2. Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB		
Fundamental frequency	Field strength of fundamental@3m (microvolts/meter)																															
902-928MHz	50																															
2400-2483.5MHz	50																															
5725-5875MHz	50																															
24.0-24.25	250																															
The EUT fundamental frequency is in 2400-2483.5MHz,So the Average Limit& Peak Limit is show in below table:																																
Fundamental frequency	Field strength of fundamental@3m (dBμV/m)																															
	Average Limit	Peak Limit																														
2400-2483.5MHz	94	114																														
Note: 1. Average Limit (dBμV/m)=20×log[1000×Field Strength (mV/m)]. 2. Peak Limit (dBμV/m)= Average Limit (dBμV/m)+20dB																																
Test Configuration:	RBW: ≥OBW VBW: 3XRBW Start frequency: 2400MHz Stop frequency: 2483.5MHz Sweep Time: Auto Detector: PEAK/AVG																															





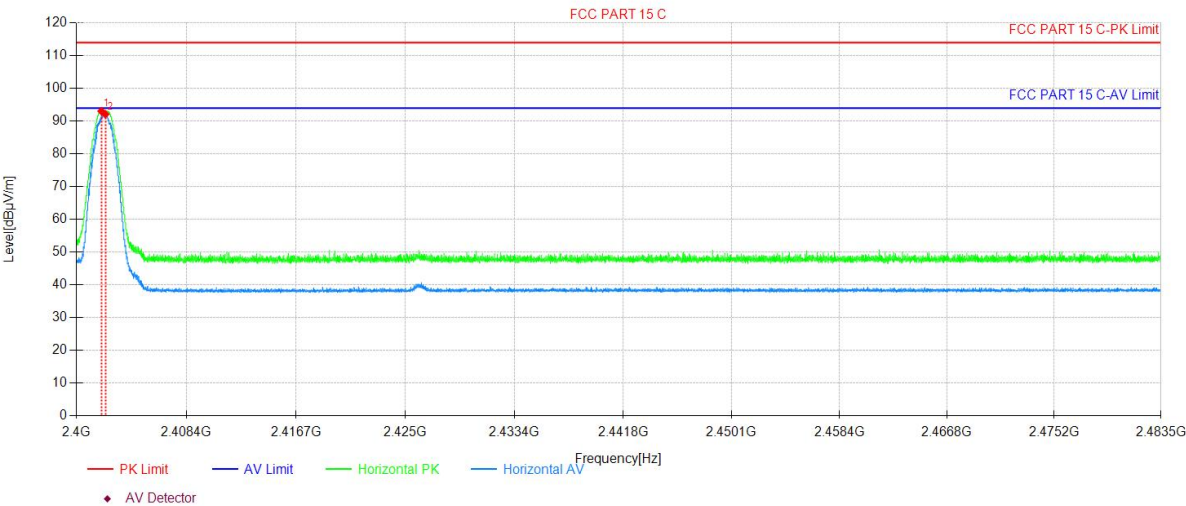
	Trace Mode: Max Hold
Test Procedure:	<ul style="list-style-type: none"><li>a. the EUT was placed on the top of a rotating table 1 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation</li><li>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>c. 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>d. 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.</li><li>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>f. 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.</li><li>g. 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>r. Repeat above procedures until all frequencies measured was complete.</li></ul>
Test Results:	Pass



Test Data

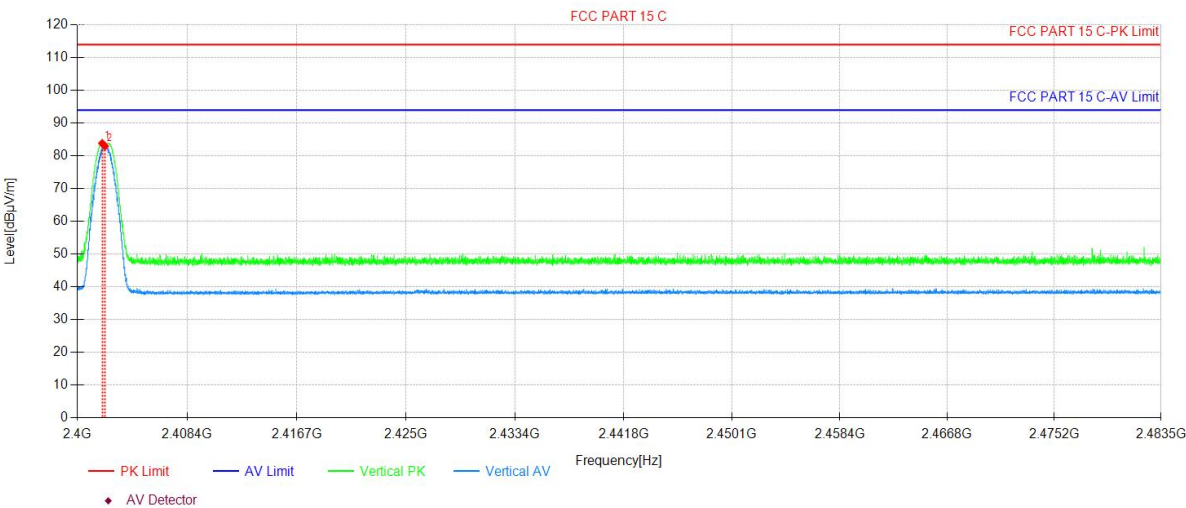
2402MHz

Horizontal:



NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
1	2401.90	93.78	-0.72	93.06	114.00	20.94	150	209	PK	PASS
2	2402.20	92.86	-0.72	92.14	94.00	1.86	150	209	AV	PASS

Vertical:

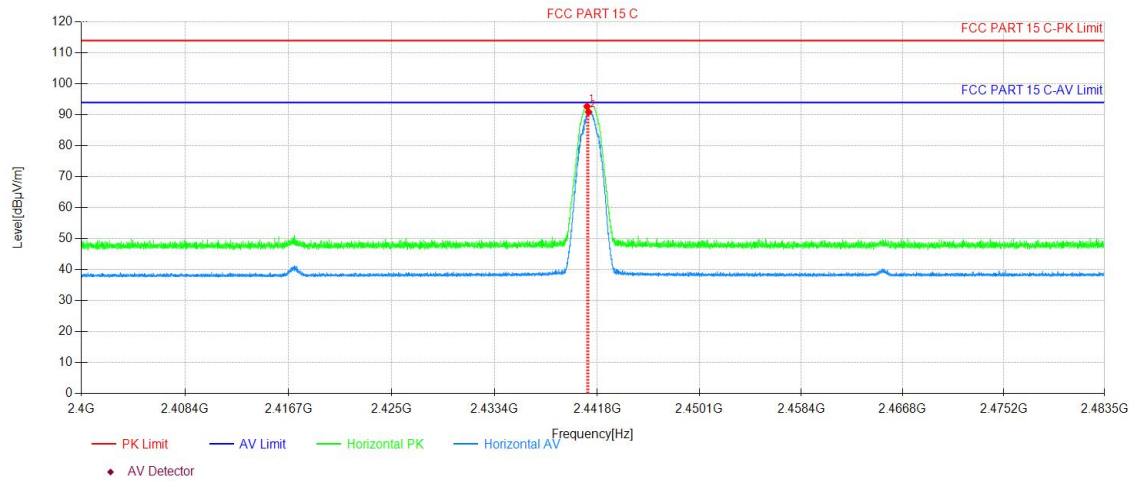


NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
1	2401.89	84.58	-0.72	83.86	114.00	30.14	150	182	PK	PASS
2	2402.09	83.70	-0.72	82.98	94.00	11.02	150	193	AV	PASS



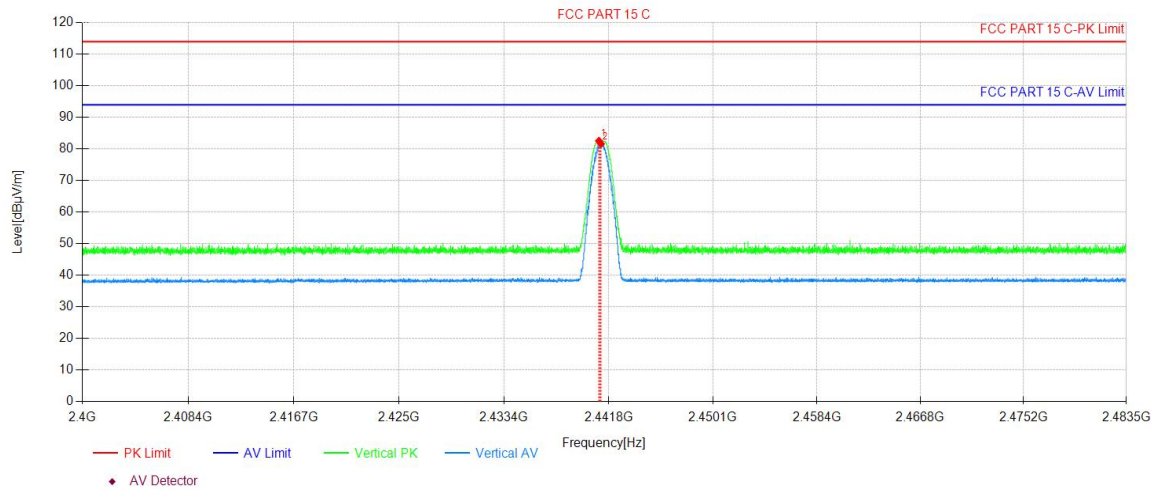
2441MHz

Horizontal:



NO.	Freq. [MHz]	Readin g [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
1	2440.91	93.23	-0.47	92.76	114.00	21.24	150	208	PK	PASS
2	2441.04	91.40	-0.47	90.93	94.00	3.07	150	208	AV	PASS

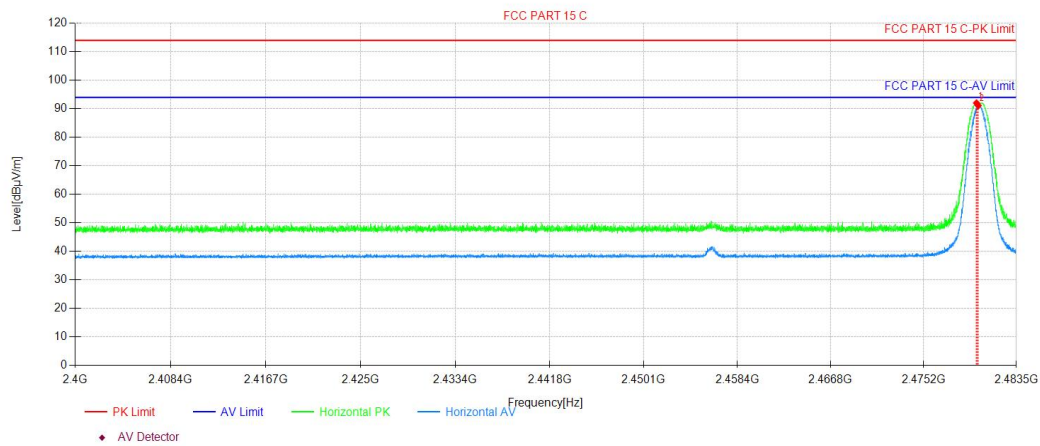
Vertical:



NO.	Freq. [MHz]	Readin g [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
1	2440.96	83.02	-0.47	82.55	114.00	31.45	150	251	PK	PASS
2	2441.12	82.09	-0.47	81.62	94.00	12.38	150	251	AV	PASS

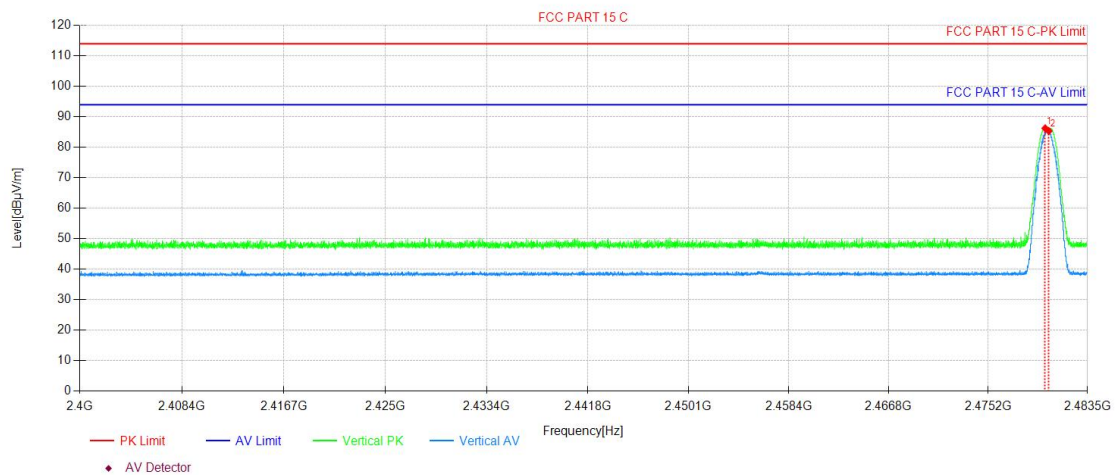
**2480MHz**

Horizontal:



NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
1	2479.90	92.35	-0.31	92.04	114.00	21.96	150	210	PK	PASS
2	2480.06	91.46	-0.31	91.15	94.00	2.85	150	198	AV	PASS

Vertical:



NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
1	2479.94	86.55	-0.31	86.24	114.00	27.76	150	103	PK	PASS
2	2480.24	85.67	-0.31	85.36	94.00	8.64	150	114	AV	PASS

**Note**

1. 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 Ant.Factor ,Cable Factor etc. )

2. Average Level=Peak Level + 20log(Duty cycle)



### 3.5 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.249(a) 47 CFR Part 15C Section 15.209 47 CFR Part 15C Section 15.205				
Test Method:	ANSI C63.10 :2020 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
Limit:	Above 1GHz	Peak	1MHz	3MHz	Peak
	<b>15.209 Radiated emission limits</b>				
	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: 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.				
	The limits on the field strength of the spurious emissions in the below table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.				





Fundamental frequency	Field strength of harmonics@3m (microvolts/meter)
902-928MHz	500
2400-2483.5MHz	500
5725-5875MHz	500
24.0-24.25	2500

The EUT fundamental frequency is 2400-2483.5MHz, So the Average Limit & Peak Limit is show in below table:

Fundamental frequency (MHz)	Field strength of spurious emission@3m (dBμV/m)	
	Average Limit	Peak Limit
2400-2483.5	54	74

Note:

1. Average Limit (dBμV/m) =  $20 \times \log[1000 \times \text{Field Strength (mV/m)}]$ .

2. Peak Limit (dBμV/m) = Average Limit (dBμV/m) + 20dB

#### 15.205 Restricted frequency band

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> )

Test Setup:

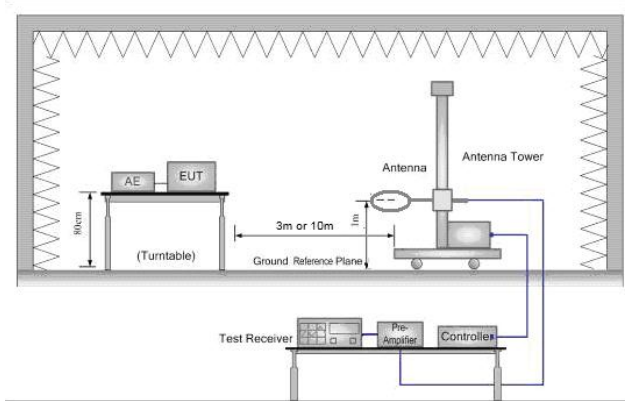


Figure 1. Below 30MHz

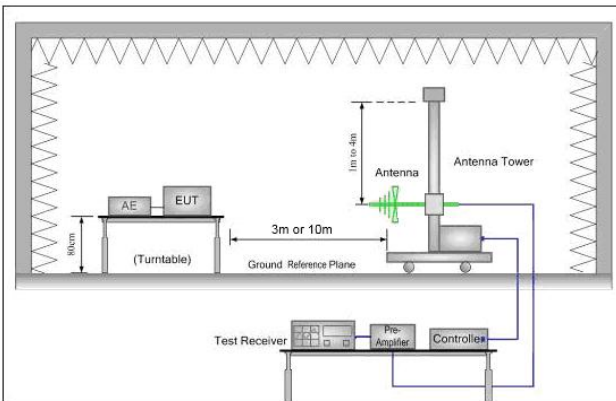


Figure 2. 30MHz to 1GHz

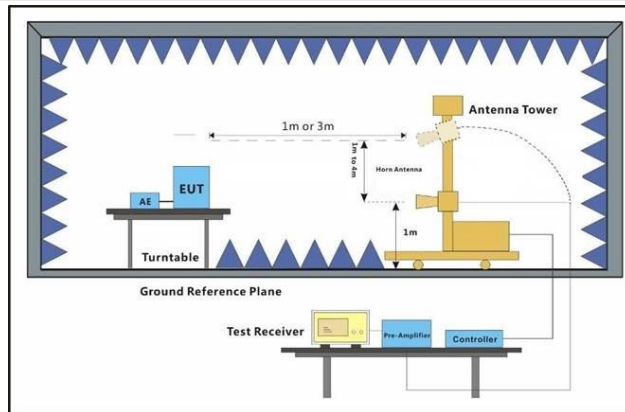


Figure 3. Above 1 GHz

**Test Procedure:**

- h. 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.
- i. 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
- j. 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.
- k. 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.
- l. 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.
- m. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- n. 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.
- o. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- p. 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.
- q. Repeat above procedures until all frequencies measured was complete.

**Exploratory Test Mode:**

Transmitting with all kind of modulations, data rates. Transmitting mode.





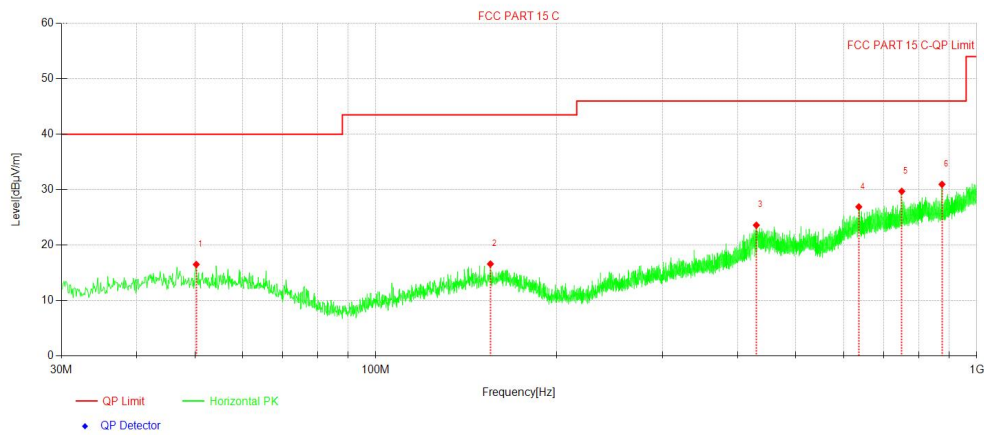
Final Test Mode:	Pretest the EUT at Transmitting mode. Through Pre-scan, find the worst case.
Instruments Used:	Refer to section 2.9 for details
Test Results:	Pass



## Test data

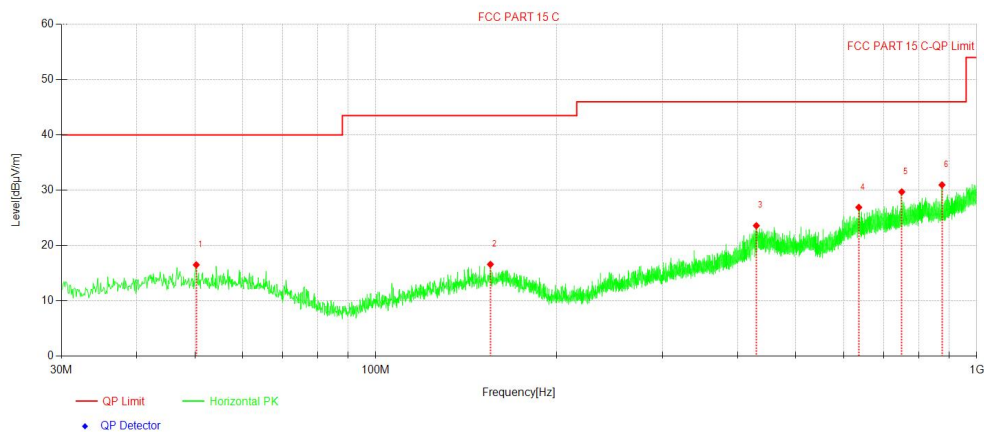
## For 30-1000MHz TX

Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	48.91	24.50	-8.08	16.42	40.00	23.58	100	1	Peak
2	163.67	24.14	-7.90	16.24	43.50	27.26	100	1	Peak
3	393.01	24.46	-4.44	20.02	46.00	25.98	100	0	Peak
4	497.48	25.07	-2.04	23.03	46.00	22.97	100	163	Peak
5	632.33	24.19	1.18	25.37	46.00	20.63	100	128	Peak
6	750.10	26.31	3.41	29.72	46.00	16.28	100	37	Peak

Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	50.275	24.57	-8.07	16.50	40.00	23.50	100	338	Peak
2	155.14	24.38	-7.79	16.59	43.50	26.91	100	360	Peak
3	429.68	26.94	-3.36	23.58	46.00	22.42	100	80	Peak
4	636.31	25.65	1.25	26.90	46.00	19.10	100	94	Peak
5	750.00	26.29	3.41	29.70	46.00	16.30	100	210	Peak
6	875.14	26.43	4.53	30.96	46.00	15.04	100	360	Peak

Dongguan DN Testing Co., Ltd.

Add: No. 1, West Fourth Street, Xingfa South Road, Wusha Community, Chang 'an Town, Dongguan City, Guangdong P.R.China

Web: [www.dn-testing.com](http://www.dn-testing.com)

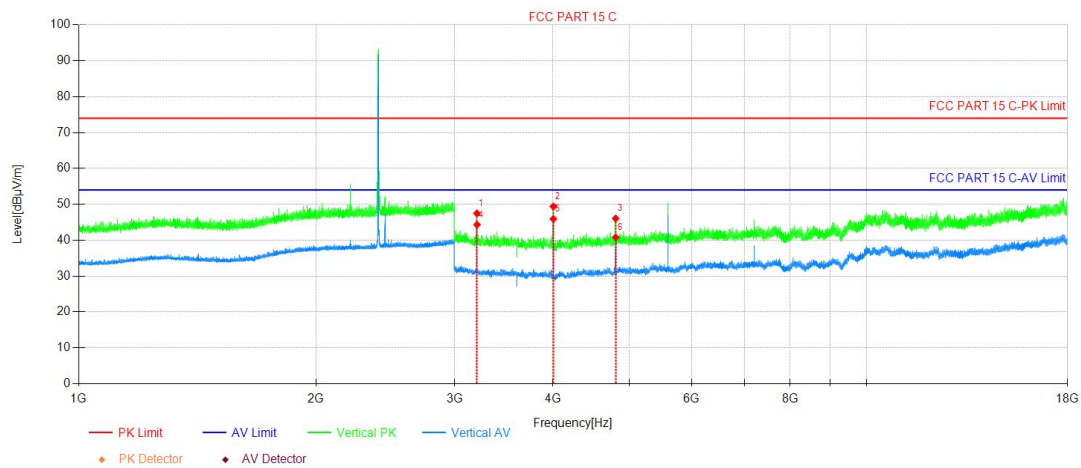
Tel: +86-769-88087383

E-mail: [service@dn-testing.com](mailto:service@dn-testing.com)

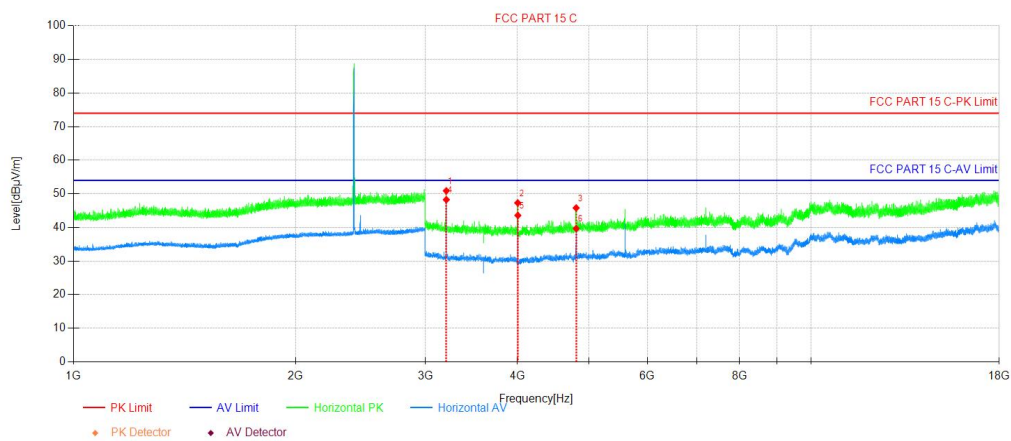


## For above 1GHz TX

## 2402MHz



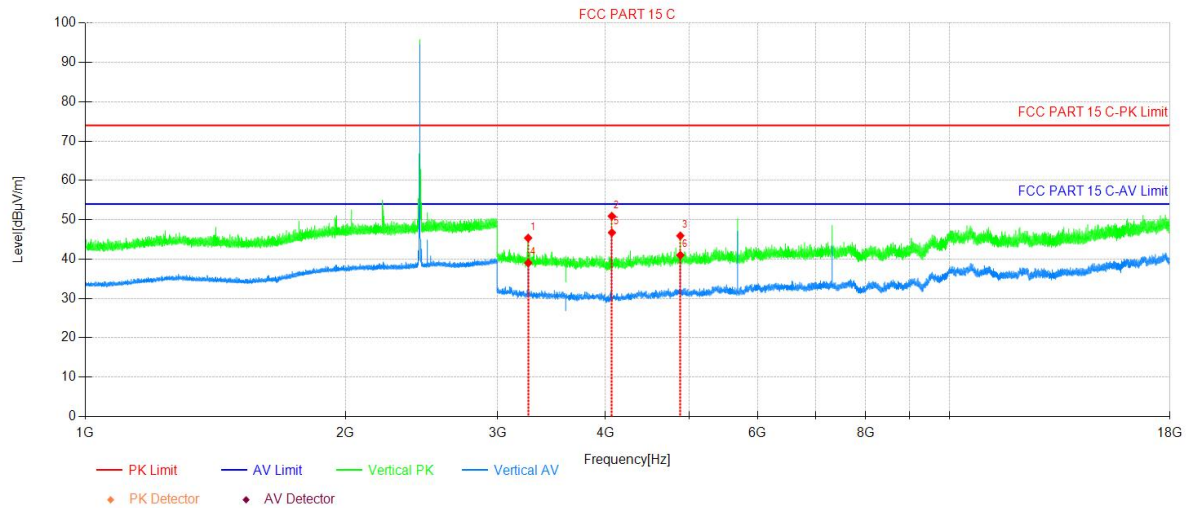
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	3202.51	54.65	-7.18	47.47	74.00	26.53	150	316	Peak	Vertical
2	4003.55	55.56	-6.15	49.41	74.00	24.59	150	227	Peak	Vertical
3	4803.84	50.67	-4.61	46.06	74.00	27.94	150	227	Peak	Vertical
4	3203.26	51.50	-7.18	44.32	54.00	9.68	150	316	AV	Vertical
5	4004.30	52.07	-6.15	45.92	54.00	8.08	150	242	AV	Vertical
6	4804.59	45.41	-4.61	40.80	54.00	13.20	150	227	AV	Vertical



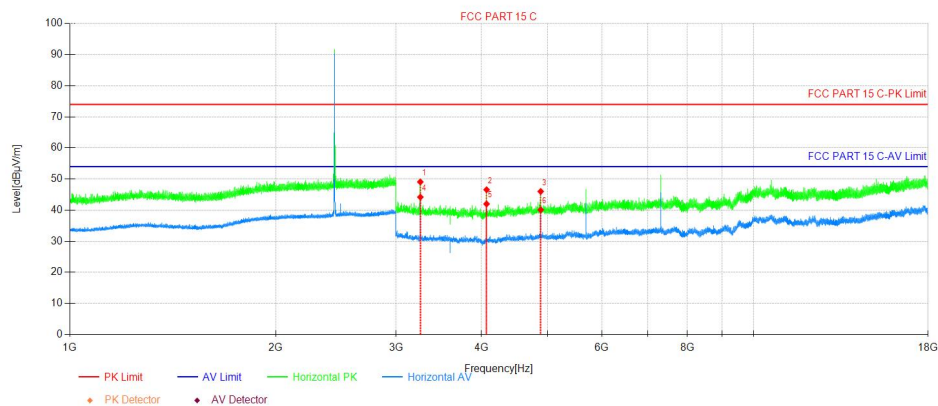
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	3202.51	58.09	-7.18	50.91	74.00	23.09	150	345	Peak	Horizon
2	4002.80	53.46	-6.15	47.31	74.00	26.69	150	220	Peak	Horizon
3	4803.84	50.42	-4.61	45.81	74.00	28.19	150	249	Peak	Horizon
4	3203.26	55.44	-7.18	48.26	54.00	5.74	150	220	AV	Horizon
5	4004.30	49.73	-6.15	43.58	54.00	10.42	150	4	AV	Horizon
6	4804.59	44.28	-4.61	39.67	54.00	14.33	150	249	AV	Horizon



## 2441MHz



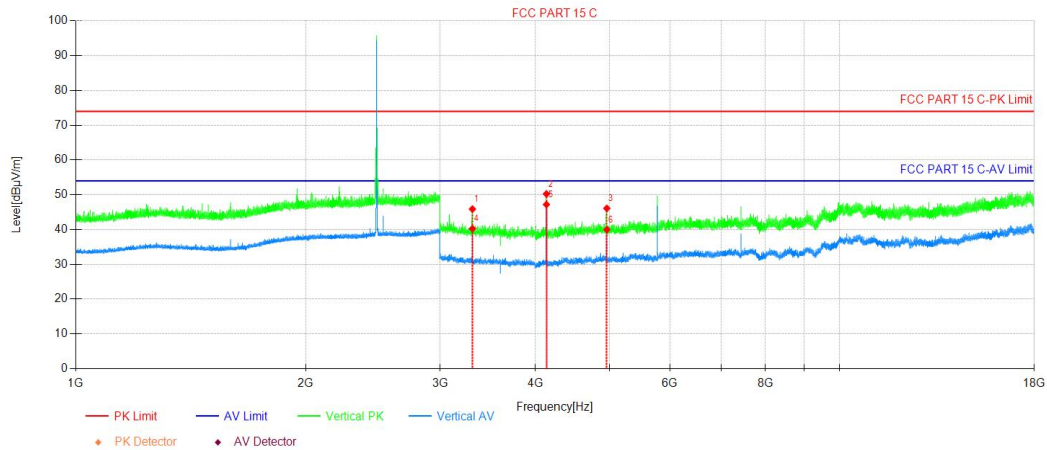
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	3255.01	52.63	-7.26	45.37	74.00	28.63	150	173	Peak	Vertical
2	4068.05	57.08	-6.16	50.92	74.00	23.08	150	230	Peak	Vertical
3	4882.59	50.65	-4.72	45.93	74.00	28.07	150	230	Peak	Vertical
4	3255.76	46.29	-7.26	39.03	54.00	14.97	150	331	AV	Vertical
5	4068.80	52.89	-6.16	46.73	54.00	7.27	150	230	AV	Vertical
6	4882.59	45.72	-4.72	41.00	54.00	13.00	150	230	AV	Vertical



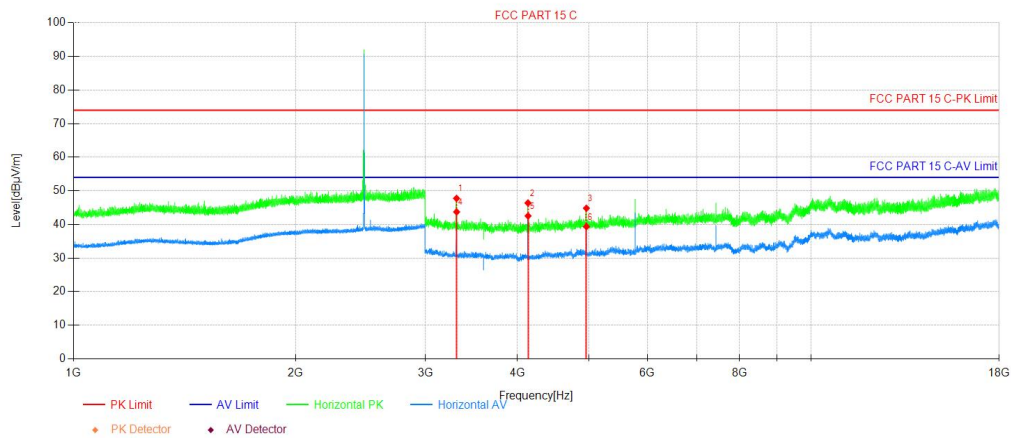
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	3255.01	56.34	-7.26	49.08	74.00	24.92	150	357	Peak	Horizon
2	4068.80	52.74	-6.16	46.58	74.00	27.42	150	107	Peak	Horizon
3	4882.59	50.73	-4.72	46.01	74.00	27.99	150	122	Peak	Horizon
4	3255.76	51.45	-7.26	44.19	54.00	9.81	150	342	AV	Horizon
5	4068.80	48.15	-6.16	41.99	54.00	12.01	150	222	AV	Horizon
6	4882.59	44.81	-4.72	40.09	54.00	13.91	150	122	AV	Horizon



## 2480MHz



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	3306.76	53.19	-7.29	45.90	74.00	28.10	150	227	Peak	Vertical
2	4133.30	56.41	-6.16	50.25	74.00	23.75	150	227	Peak	Vertical
3	4959.84	50.95	-4.86	46.09	74.00	27.91	150	227	Peak	Vertical
4	3307.51	47.55	-7.29	40.26	54.00	13.74	150	227	AV	Vertical
5	4134.05	53.36	-6.16	47.20	54.00	6.80	150	227	AV	Vertical
6	4960.59	44.84	-4.86	39.98	54.00	14.02	150	227	AV	Vertical

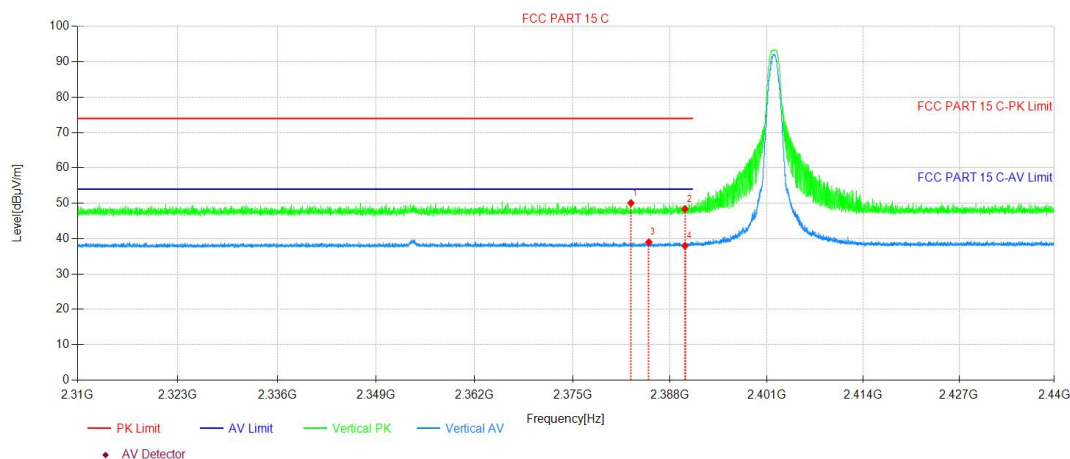


NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	3306.76	55.04	-7.29	47.75	74.00	26.25	150	0	Peak	Horizon
2	4133.30	52.55	-6.16	46.39	74.00	27.61	150	213	Peak	Horizon
3	4959.84	49.68	-4.86	44.82	74.00	29.18	150	128	Peak	Horizon
4	3307.51	51.01	-7.29	43.72	54.00	10.28	150	356	AV	Horizon
5	4134.05	48.68	-6.16	42.52	54.00	11.48	150	213	AV	Horizon
6	4960.59	44.20	-4.86	39.34	54.00	14.66	150	128	AV	Horizon

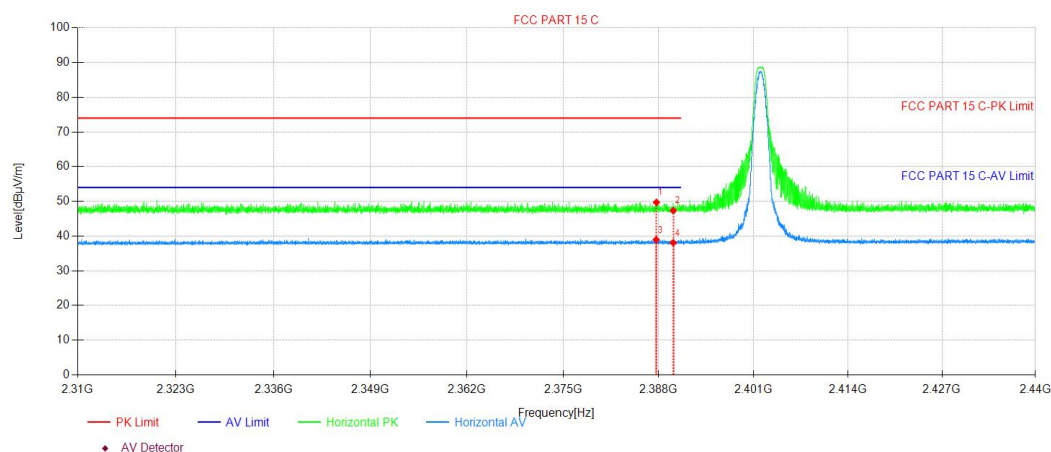




## 2402MHz



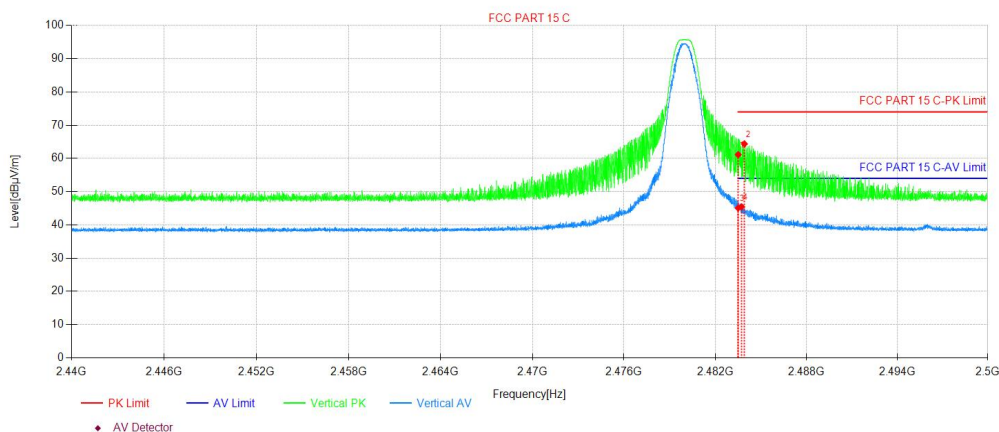
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	AV Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	2382.78	50.89	-0.83	50.06	74.00	23.94	150	239	Peak	Vertical
2	2390.01	49.18	-0.80	48.38	74.00	25.62	150	167	Peak	Vertical
3	2385.17	39.81	-0.81	39.00	54.00	15.00	150	8	AV	Vertical
4	2390.01	38.78	-0.80	37.98	54.00	16.02	150	239	AV	Vertical



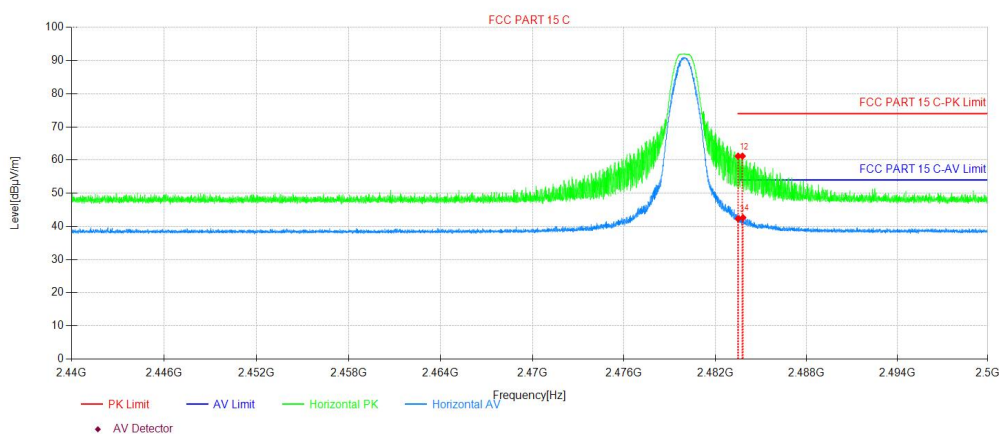
NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	AV Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	2387.70	50.51	-0.80	49.71	74.00	24.29	150	185	Peak	Horizon
2	2390.01	48.16	-0.80	47.36	74.00	26.64	150	227	Peak	Horizon
3	2387.68	39.75	-0.80	38.95	54.00	15.05	150	344	AV	Horizon
4	2390.01	38.89	-0.80	38.09	54.00	15.91	150	194	AV	Horizon



## 2480MHz



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	2483.51	61.43	-0.29	61.14	74.00	12.86	150	245	Peak	Vertical
2	2483.91	64.65	-0.28	64.37	74.00	9.63	150	219	Peak	Vertical
3	2483.51	45.38	-0.29	45.09	54.00	8.91	150	210	AV	Vertical
4	2483.73	45.74	-0.29	45.45	54.00	8.55	150	219	AV	Vertical



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark	Polarity
1	2483.50	61.47	-0.29	61.18	74.00	12.82	150	318	Peak	Horizon
2	2483.78	61.47	-0.28	61.19	74.00	12.81	150	309	Peak	Horizon
3	2483.50	42.62	-0.29	42.33	54.00	11.67	150	300	AV	Horizon
4	2483.82	42.91	-0.28	42.63	54.00	11.37	150	300	AV	Horizon

## 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:

$$\text{Measurement Level} = \text{Reading Level} + \text{Correct Factor}(\text{including LISN Factor, Cable Factor etc.})$$

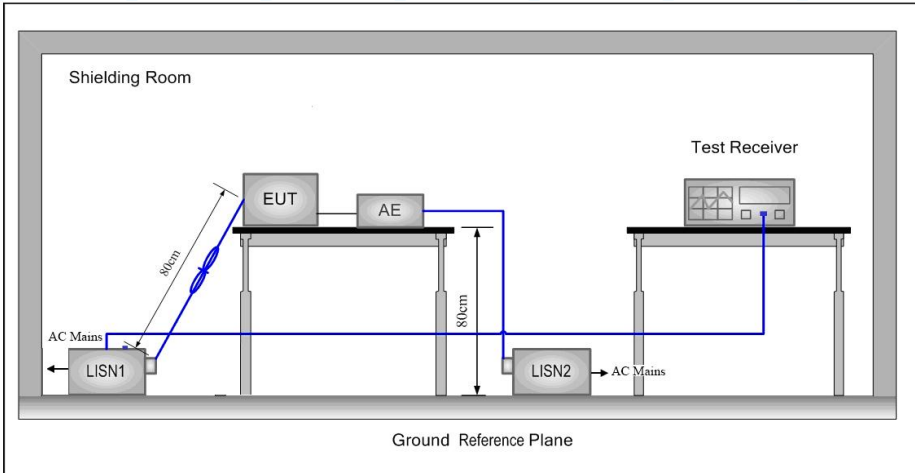
2. Average Level=Peak Level + 20log(Duty cycle)

3. 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.





### 3.6 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2020		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
	* Decreases with the logarithm of the frequency.		
Test Procedure:	<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.		



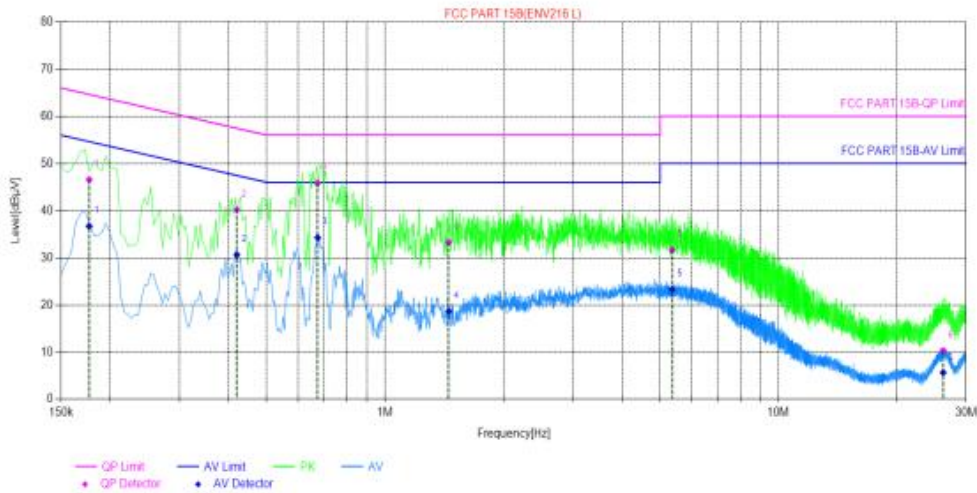
	Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the 6.5Mbps of rate of 802.11n(HT20) at lowest channel is the worst case. Charge + Transmitting mode. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 2.9 for details
Test Results:	PASS



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.

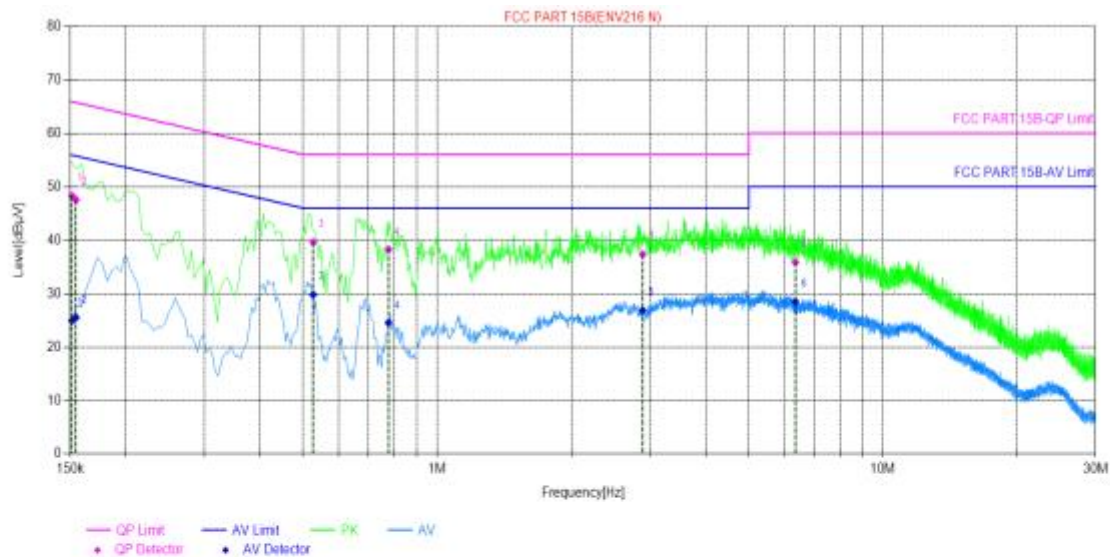
Live Line:



Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBuV]	QP Limit [dBuV]	QP Margin [dB]	AV Value [dBuV]	AV Limit [dBuV]	AV Margin [dB]	Verdict
1	0.1768	9.91	46.57	64.63	18.06	36.71	54.63	17.92	PASS
2	0.4198	9.79	40.19	57.45	17.26	30.63	47.45	16.82	PASS
3	0.6736	9.78	45.88	56.00	10.12	34.27	46.00	11.73	PASS
4	1.4508	9.73	33.26	56.00	22.74	18.62	46.00	27.38	PASS
5	5.3671	9.81	31.68	60.00	28.32	23.31	50.00	26.69	PASS
6	26.2359	10.23	10.31	60.00	49.69	5.67	50.00	44.33	PASS



Neutral Line:



Final Data List									
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBuV]	QP Limit [dBuV]	QP Margin [dB]	AV Value [dBuV]	AV Limit [dBuV]	AV Margin [dB]	Verdict
1	0.1514	9.79	48.28	65.92	17.64	24.94	55.92	30.98	PASS
2	0.1545	9.80	47.56	65.75	18.19	25.53	55.75	30.22	PASS
3	0.5265	9.73	39.62	56.00	16.38	29.81	46.00	16.19	PASS
4	0.7770	9.81	38.27	56.00	17.73	24.54	46.00	21.46	PASS
5	2.8890	9.86	37.37	56.00	18.63	26.87	46.00	19.13	PASS
6	6.3582	9.98	35.88	60.00	24.12	28.47	50.00	21.53	PASS

emark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. 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

---END REPORT---