TEST REPORT

Application No.:	DNT2409090092R1545-02222
Applicant:	ZHENGGUANG PLASTIC TOY CO.LTD
Address of Applicant:	SHANGCUN INDUSTRIAL ZONE, LIANXIA TOWN, CHENGHAI DISTRICT, SHANTOU, China
EUT Description:	Remote control vehicle series
Model No.:	UD2173A
FCC ID:	2AOMVUD2237
Power Supply	DC 3V
Trade Mark:	/
Standards:	47 CFR FCC Part 2, Subpart J 47 CFR Part 15, Subpart C ANSI C63.10: 2013
Date of Receipt:	2024/9/11
Date of Test:	2024/9/12 to 2024/9/17
Date of Issue:	2024/9/19
Test Result:	**PASS**

Prepared By: Wayne.Lin (Testing Engineer)

Reviewed By: Pencils.Chen (Project Engineer)

Approved By: Steve 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.

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	N/A

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2 General Information

2.1 Test Location

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

2.2 General Description of EUT

Manufacturer:	ZHENGGUANG PLASTIC TOY CO.LTD
Address of Manufacturer:	SHANGCUN INDUSTRIAL ZONE, LIANXIA TOWN, CHENGHAI DISTRICT, SHANTOU, China
EUT Description:	Remote control vehicle series
Test Model No.:	UD2173A
Additional Model(s):	UD2097A,UD2097B,UD2100C,UD2101C,UD2105A,UD2108A,UD2126A, UD2168A, UD2169A,UD2169A-1,UD2169B,UD2169AN,UD2170A,UD2171A, UD2171B,UD2172A,UD2173A,UD2175A,UD2178A,UD2175B,UD2175AS, UD2176A,UD2179A,UD2179B,UD2180A,UD2181A,UD2182A,UD2183A, UD2189A,TRM897875,UD2190A,UD2191A,UD2192A,UD2193A,UD2195A, UD2196A,UD2196AN,UD2197A,UD2198A,UD2199A,UD2200A,UD2200A-1, UD2200A-D,UD2200AS,UD2200B,UD2200B-1,UD2200BS,UD2200BS-1, UD2201A,UD2201AS,UD2201B,UD2201BS,UD2202A,UD2203AJ,UD2203BJ, UD2203CJ,UD2205A,UD2205B,UD2805A,UD2805B,UD2206A,UD2206B, UD2206C,UD2206D,UD2210A,UD2219A,UD2220A,UD2221A,UD2222A, UD2223A,UD2196PW,UD3001A,UD3002A,UD3003A,UD2261A,UD2231A, UD2803A,UD2803B,UD2300A,UD2300B,UD2305A,UD2305B,UD2303A, UD2303B,UD2500A,UD3005A,UD3005B,UD2800A,UD2800B,UD2801A, UD2802A,UD2802B,UD001A,UD002A,UD003A,UD005A,UD006A,UD007A, UD009A,UD001B,UD001C,UD001D,UD001E,UD001F,UD001G,UD001H, UD001I,UD001J,UD002B,UD002C,UD002D,UD002E,UD002F,UD003B, UD003C,UD003D,UD003E,UD003F,UD003G,UD003H,UD003I,UD003J, UD005B,UD005C,UD005D,UD005E,UD005F,UD006B,UD006C,UD006D, UD006E,UD006F,UD006G,UD006H,UD006I,UD006J,UD007B,UD007C, UD007D,UD007E,UD007F,UD007G,UD007H,UD008B,UD008C,UD008D, UD008E,UD008F,UD009A,UD009B,UD009C,UD009D,UD2225A,UD2226A, UD2227A,UD2228A,UD2229A,UD2233A,UD2235A,UD2236A,UD2237A, UD2238A,UD2239A,UD3100A,UD3101A,UD3102A,UD3103A,UD3105A, UD3106A,UD3107A,UD3108A,UD3109A,UD3110A,UD2305A,UD2305B, UD2306A,UD2306B,UD2307A,UD2307B,UD2301A,UD2301B,UD2302A, UD2302B,UD2501A,UD2502A,UD2303A,UD2303B,UD2803A,UD2803B, UD2805A,UD2805B,UD2806A,UD2806B,UD2808A,UD2808B.
Power Supply	DC 3V
Chip Type:	B000950
Serial number:	PR2409090092R1545
Trade Mark:	/
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	2410MHz-2470MHz
Type of Modulation:	GFSK
Sample Type:	Prototype production
Antenna Type:	☐ External, ☒ Integrated
Antenna Ports	☒ Ant 1, ☐ Ant 2, ☐ Ant 3
Antenna Gain*:	☒ Provided by applicant

	0dBi
RF Cable*:	☒ 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	N/A		
Frequency(MHz)	2410	2442	2470
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**
1	2410MHZ	16	2425MHZ	31	2440MHZ	46	2455MHZ
2	2411MHZ	17	2426MHZ	32	2441MHZ	47	2456MHZ
3	2412MHZ	18	2427MHZ	33	2442MHZ	48	2457MHZ
4	2413MHZ	19	2428MHZ	34	2443MHZ	49	2458MHZ
5	2414MHZ	20	2429MHZ	35	2444MHZ	50	2459MHZ
6	2415MHZ	21	2430MHZ	36	2445MHZ	51	2460MHZ
7	2416MHZ	22	2431MHZ	37	2446MHZ	52	2461MHZ
8	2417MHZ	23	2432MHZ	38	2447MHZ	53	2462MHZ
9	2418MHZ	24	2433MHZ	39	2448MHZ	54	2463MHZ
10	2419MHZ	25	2434MHZ	40	2449MHZ	55	2464MHZ
11	2420MHZ	26	2435MHZ	41	2450MHZ	56	2465MHZ
12	2421MHZ	27	2436MHZ	42	2451MHZ	57	2466MHZ
13	2422MHZ	28	2437MHZ	43	2452MHZ	58	2467MHZ
14	2423MHZ	29	2438MHZ	44	2453MHZ	59	2468MHZ
15	2424MHZ	30	2439MHZ	45	2454MHZ	60	2469MHZ
						61	2470MHZ

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	±0.41dB
2	RF power density, conducted	±1.96dB

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	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

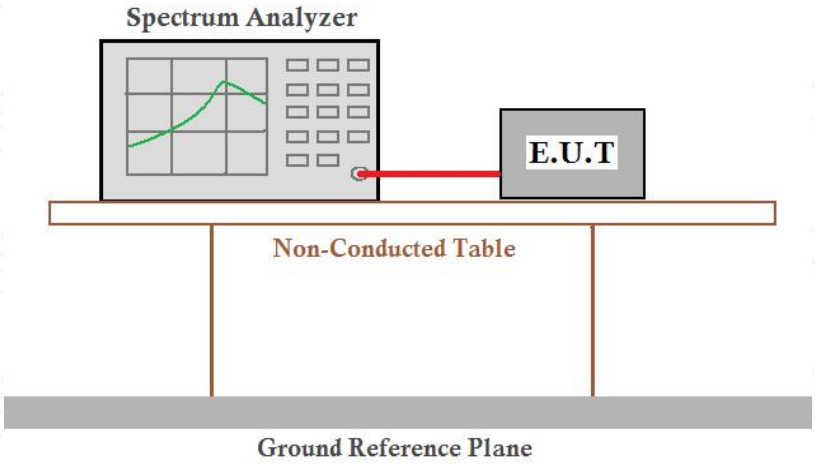
Code	Equipment	Manufacturer	Model No.	Equipment No.
1	1	Adapter	Chenyang	ICSO1

3 Test results and Measurement Data

3.1 Antenna requirements

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
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.	
The antenna is welded on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.17dBi.	

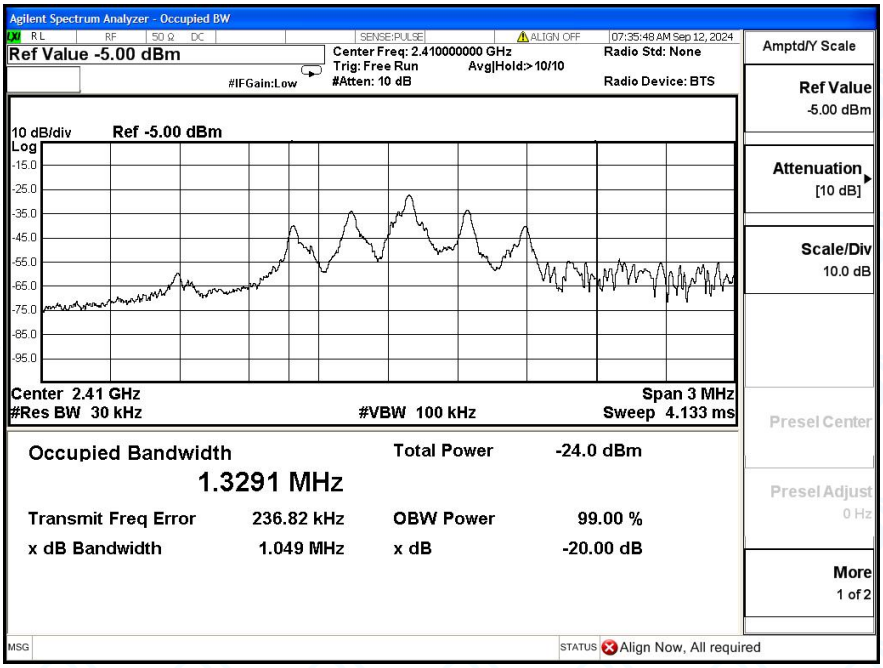
3.2 20dB Occupied Bandwidth

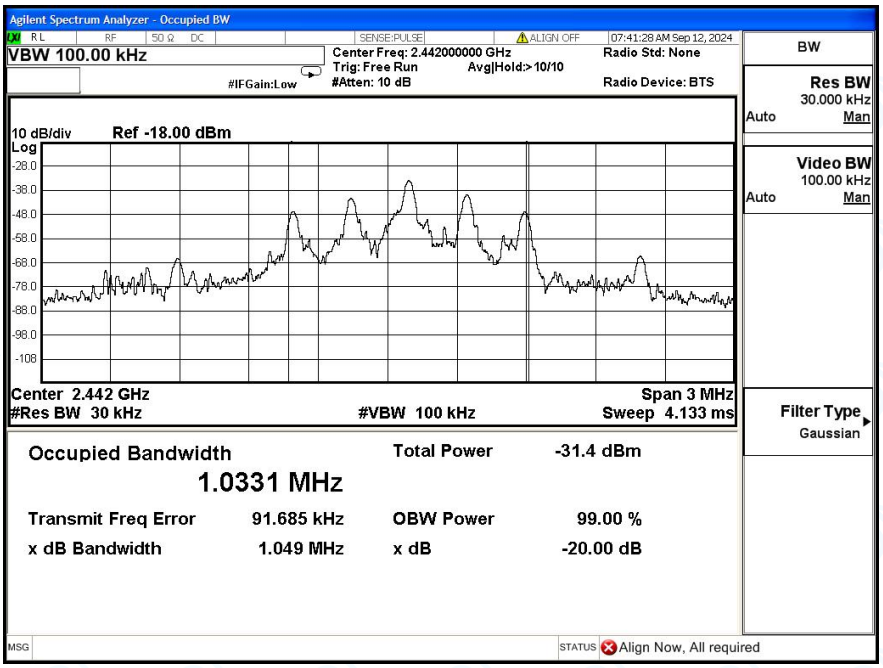
Test Requirement:	47 CFR Part 15C Section 15.215
Test Method:	ANSI C63.10:2013 Section 7.8.7
Test Setup:	
Instruments Used:	Refer to section 2.9 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the worst case
Limit:	no wider than 0.25% of the center frequency
Test Results:	Pass

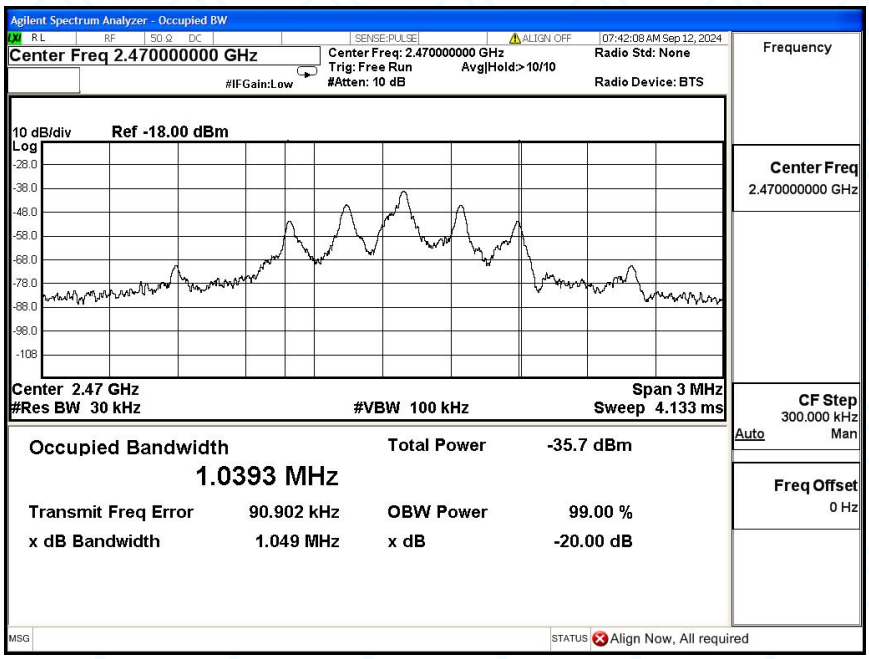
Test Data:

Test Frequency (MHz)	20dB Bandwidth (MHz)	Result
2410	1.049	Pass
2442	1.049	Pass
2470	1.049	Pass

Test Graphs

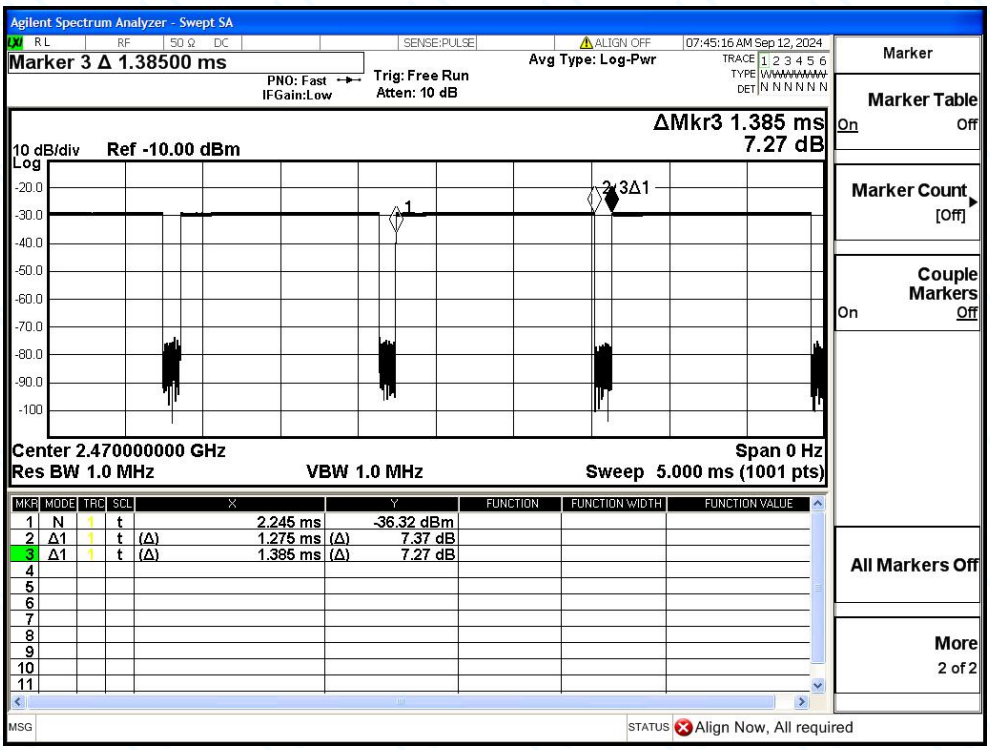

Agilent Spectrum Analyzer - Occupied BW
Ref Value -5.00 dBm
Center Freq: 2.410000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
07:35:48 AM Sep 12, 2024
10 dB/div
Ref -5.00 dBm
Center 2.41 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 4.133 ms
Occupied Bandwidth
1.3291 MHz
Total Power -24.0 dBm
Transmit Freq Error 236.82 kHz
OBW Power 99.00 %
x dB Bandwidth 1.049 MHz
x dB -20.00 dB
Amptd/Y Scale
Ref Value -5.00 dBm
Attenuation [10 dB]
Scale/Div 10.0 dB
Presel Center
Presel Adjust 0 Hz
More 1 of 2
Align Now, All required


Agilent Spectrum Analyzer - Occupied BW
VBW 100.00 kHz
Center Freq: 2.442000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#Atten: 10 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
07:41:28 AM Sep 12, 2024
10 dB/div
Ref -18.00 dBm
Center 2.442 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 4.133 ms
Occupied Bandwidth
1.0331 MHz
Total Power -31.4 dBm
Transmit Freq Error 91.685 kHz
OBW Power 99.00 %
x dB Bandwidth 1.049 MHz
x dB -20.00 dB
BW
Res BW 30.000 kHz
Auto Man
Video BW 100.00 kHz
Auto Man
Filter Type Gaussian
Align Now, All required

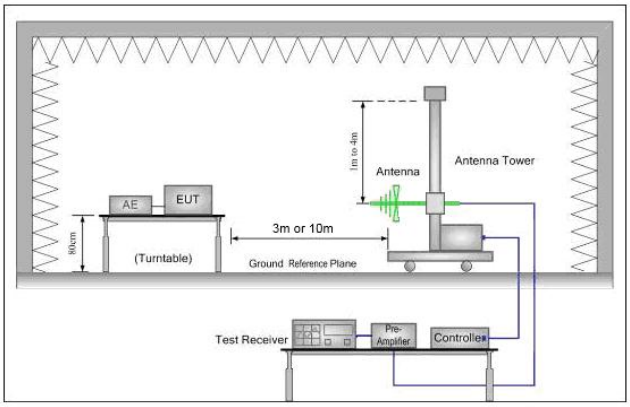

Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.470000000 GHz
Center Freq: 2.470000000 GHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 10 dB
Radio Std: None
Radio Device: BTS
07:42:08 AM Sep 12, 2024
10 dB/div
Ref -18.00 dBm
Log
-28.0
-38.0
-48.0
-58.0
-68.0
-78.0
-88.0
-98.0
-108
Center 2.47 GHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 4.133 ms
Occupied Bandwidth
1.0393 MHz
Total Power -35.7 dBm
Transmit Freq Error 90.902 kHz
OBW Power 99.00 %
x dB Bandwidth 1.049 MHz
x dB -20.00 dB
Frequency
Center Freq
2.470000000 GHz
CF Step
300.000 kHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS
Align Now, All required

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:

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:

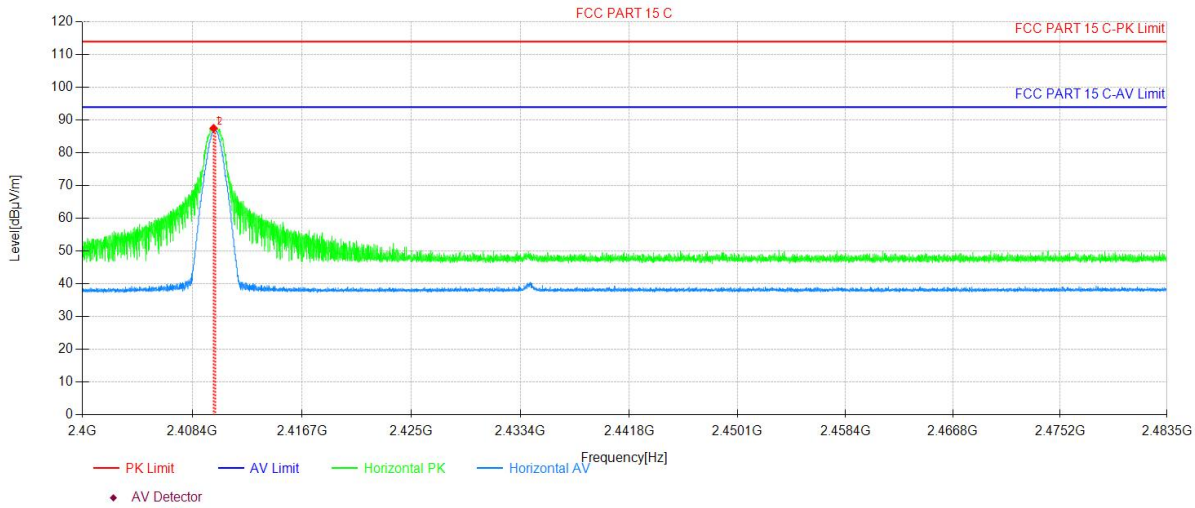
RBW: ⩾OBW
VBW: 3XRBW
Start frequency: 2400MHz
Stop frequency: 2483.5MHz
Sweep Time: Auto
Detector: PEAK/AVG

	Trace Mode: Max Hold
Test Procedure:	a. the EUT was placed on the top of a rotating table 1 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation 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. 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. 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. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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. 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. r. Repeat above procedures until all frequencies measured was complete.
Test Results:	Pass

Test Data

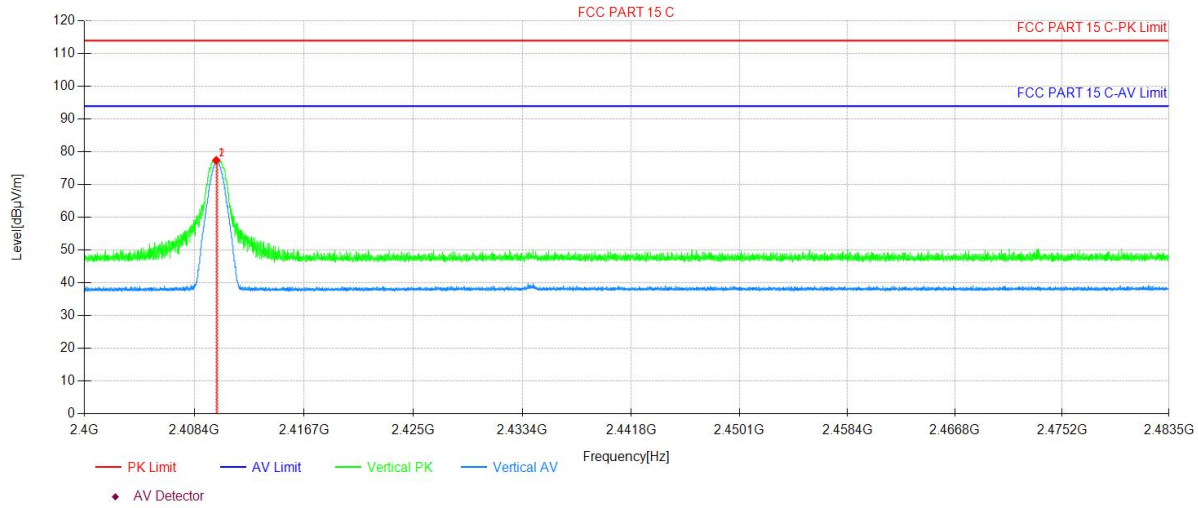
2410MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2409.96	88.18	-0.67	87.51	114.00	26.49	150	346	PK
2	2410.08	87.86	-0.67	87.19	94.00	6.81	150	346	AV

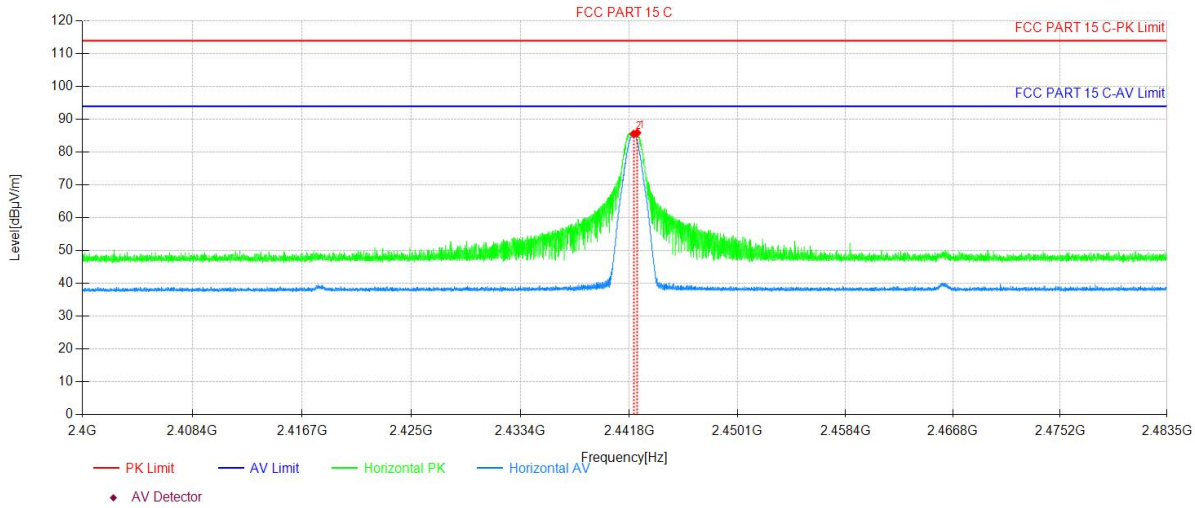
Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2410.01	78.10	-0.67	77.43	114.00	36.57	150	94	PK
2	2410.08	77.69	-0.67	77.02	94.00	16.98	150	106	AV

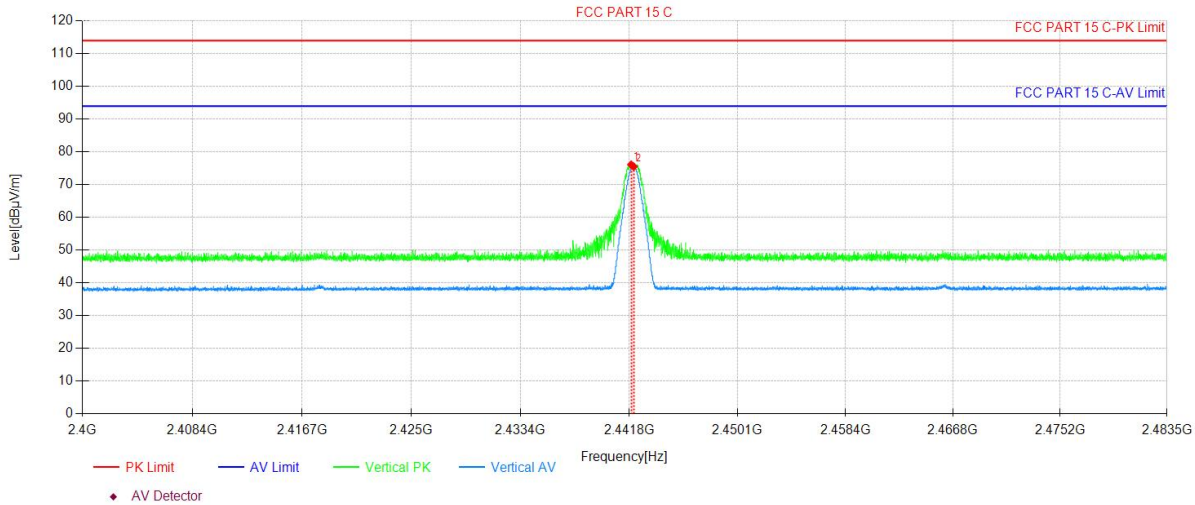
2442MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2442.36	86.37	-0.47	85.90	114.00	28.10	150	181	PK
2	2442.08	86.04	-0.47	85.57	94.00	8.43	150	181	AV

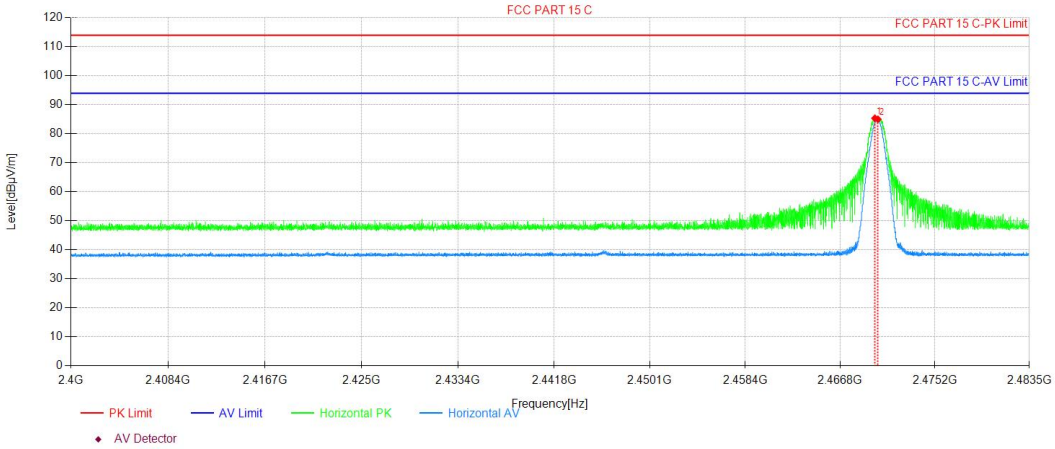
Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dB μ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2441.89	76.56	-0.47	76.09	114.00	37.91	150	175	PK
2	2442.08	75.98	-0.47	75.51	94.00	18.49	150	175	AV

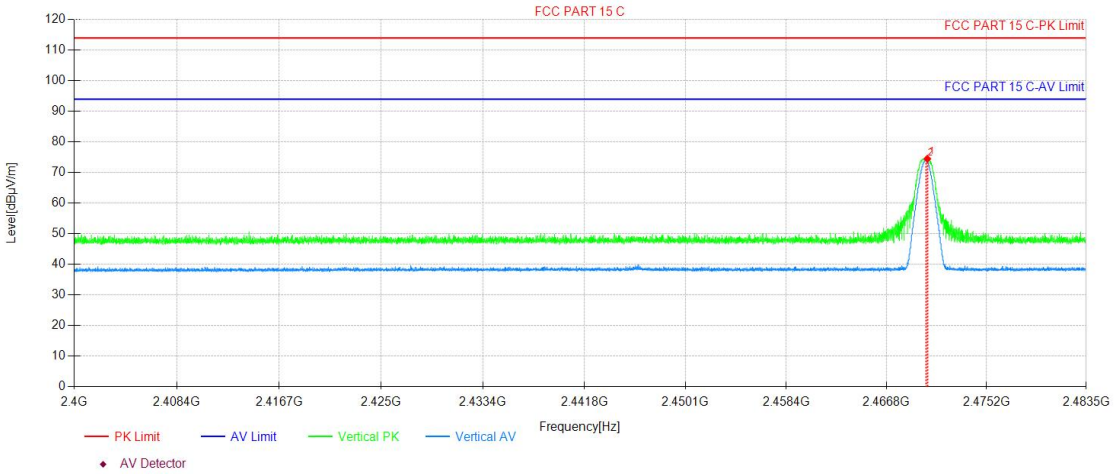
2470MHz

Horizontal:



NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	Limit [dB µ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2469.85	85.74	-0.36	85.38	114.00	28.62	150	194	PK
2	2470.12	85.37	-0.36	85.01	94.00	8.99	150	185	AV

Vertical:



NO.	Freq. [MHz]	Reading Level [dBµV]	Correct Factor [dB/m]	Result Level [dBµV/m]	Limit [dB µ V/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2470.20	74.85	-0.36	74.49	114.00	39.51	150	171	PK
2	2470.10	74.37	-0.36	74.01	94.00	19.99	150	171	AV

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
	Above 1GHz	Peak	1MHz	3MHz	Peak
Limit:	15.209 **Radiated emission limits**				
	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×log[1000×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
[1]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	([2])

Test Setup:

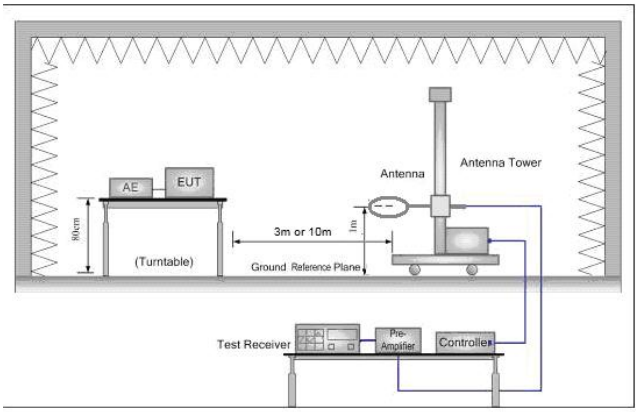


Figure 1. Below 30MHz

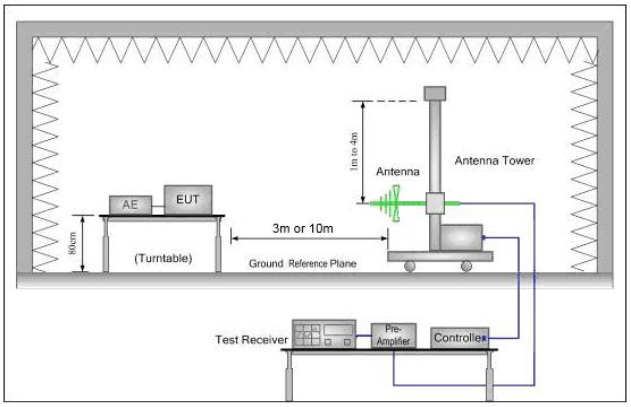


Figure 2. 30MHz to 1GHz

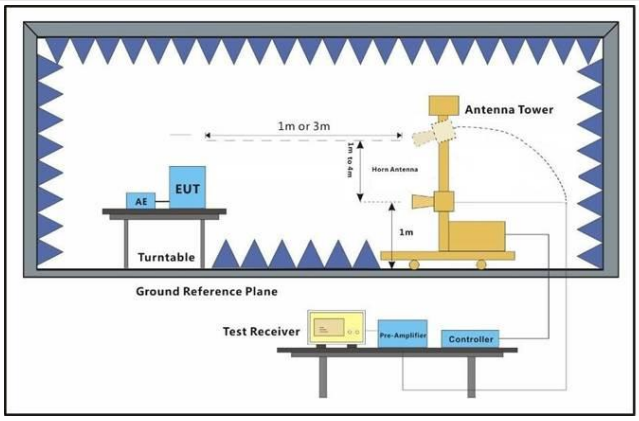


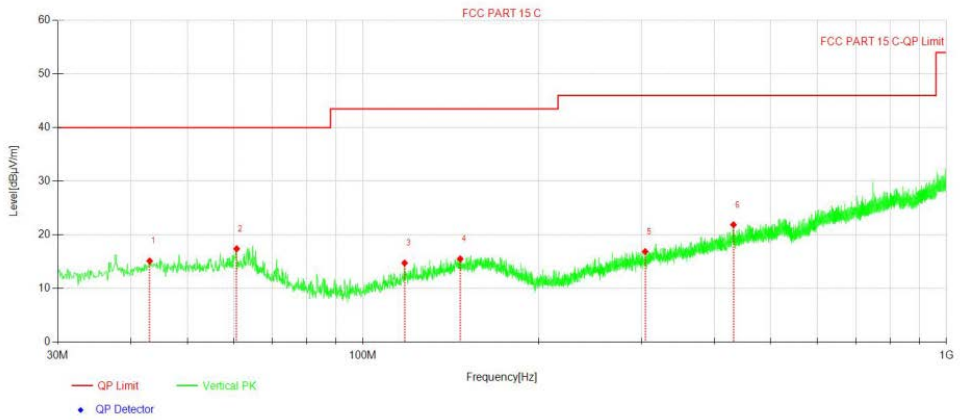
Figure 3. Above 1 GHz

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 camber. 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 camber. 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

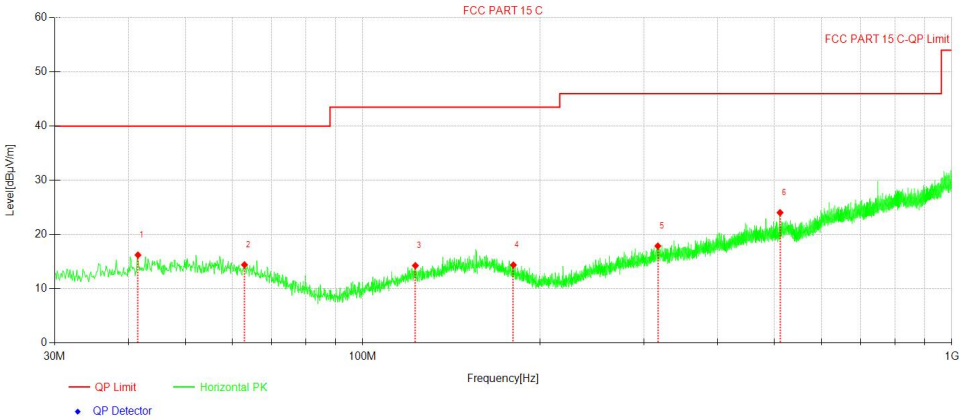
For 30-1000MHz TX

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	43.09	23.52	-8.41	15.11	40.00	24.89	200	358	Peak
2	60.75	26.23	-8.84	17.39	40.00	22.61	200	97	Peak
3	117.89	25.18	-10.45	14.73	43.50	28.77	100	42	Peak
4	146.79	23.57	-8.06	15.51	43.50	27.99	100	45	Peak
5	304.63	23.71	-6.84	16.87	46.00	29.13	200	78	Peak
6	431.62	25.18	-3.30	21.88	46.00	24.12	100	139	Peak

Horizontal:

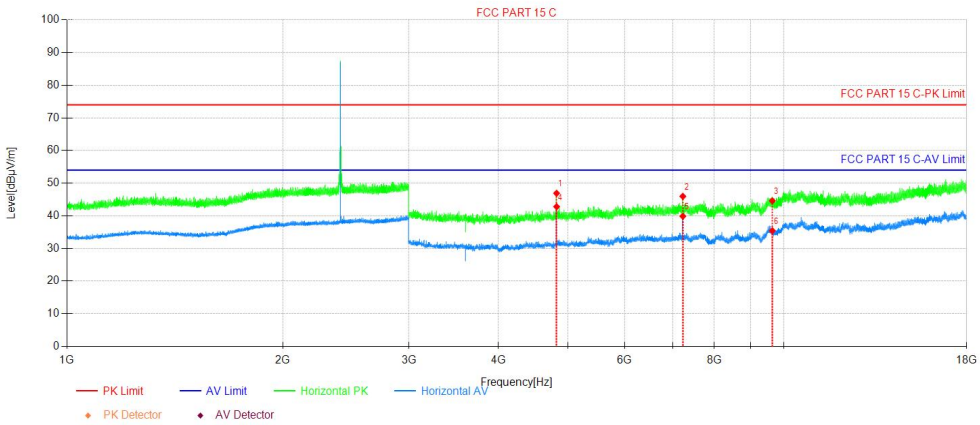


NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	41.54	24.79	-8.58	16.21	40.00	23.79	200	360	Peak
2	62.98	23.50	-9.10	14.40	40.00	25.60	200	360	Peak
3	122.83	24.28	-10.03	14.25	43.50	29.25	200	74	Peak
4	180.17	23.72	-9.35	14.37	43.50	29.13	100	200	Peak
5	316.85	24.28	-6.41	17.87	46.00	28.13	200	238	Peak
6	510.87	25.57	-1.54	24.03	46.00	21.97	100	65	Peak

For above 1GHz TX

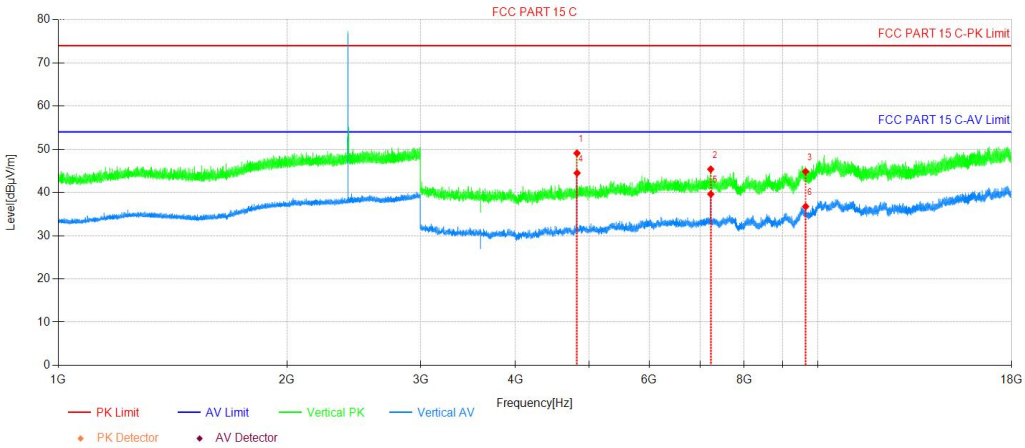
2410MHz

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	4820.34	51.54	-4.63	46.91	74.00	27.09	150	245	PK
2	7230.96	47.68	-1.71	45.97	74.00	28.03	150	345	PK
3	9640.08	43.56	1.03	44.59	74.00	29.41	150	74	PK
4	4821.09	47.43	-4.63	42.80	54.00	11.20	150	164	PK
5	7230.96	41.59	-1.71	39.88	54.00	14.12	150	1	PK
6	9640.08	34.40	1.03	35.43	54.00	18.57	150	233	PK

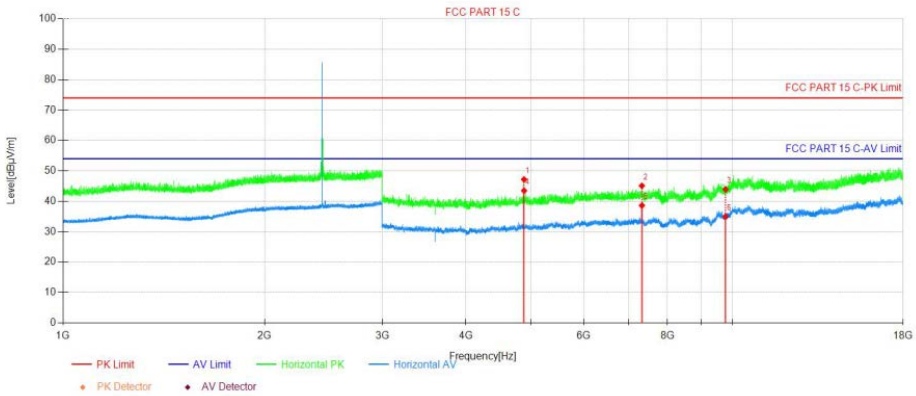
Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4819.59	53.73	-4.63	49.10	74.00	24.90	150	87	PK
2	7229.46	47.10	-1.71	45.39	74.00	28.61	150	357	PK
3	9640.08	43.80	1.03	44.83	74.00	29.17	150	176	PK
4	4821.09	49.12	-4.63	44.49	54.00	9.51	150	75	PK
5	7230.96	41.33	-1.71	39.62	54.00	14.38	150	0	PK
6	9640.08	35.73	1.03	36.76	54.00	17.24	150	176	PK

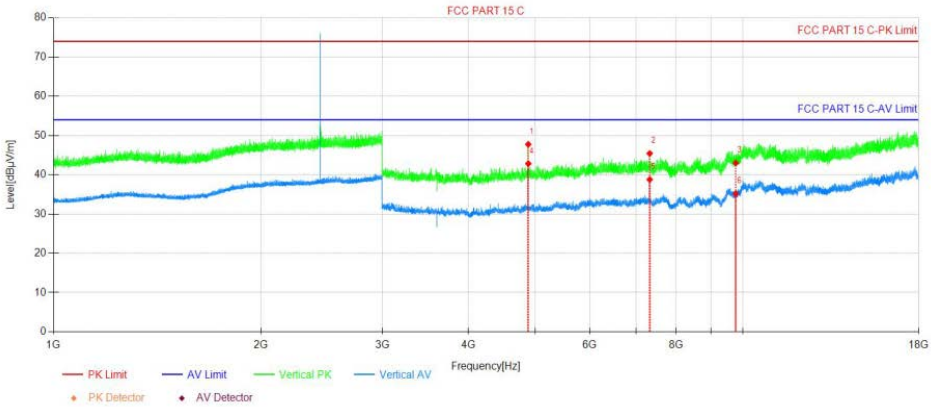
2442MHz

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	4884.09	51.92	-4.72	47.20	74.00	26.80	150	250	PK
2	7326.21	46.58	-1.48	45.10	74.00	28.90	150	24	PK
3	9768.33	42.26	1.67	43.93	74.00	30.07	150	142	PK
4	4884.84	48.21	-4.72	43.49	54.00	10.51	150	325	PK
5	7326.96	40.10	-1.48	38.62	54.00	15.38	150	99	PK
6	9768.33	33.30	1.67	34.97	54.00	19.03	150	228	PK

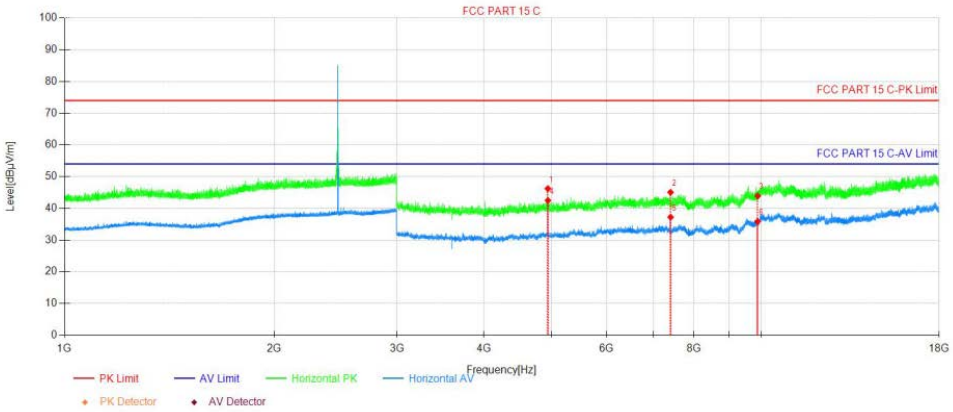
Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4884.09	52.48	-4.72	47.76	74.00	26.24	150	175	PK
2	7326.96	46.91	-1.48	45.43	74.00	28.57	150	89	PK
3	9768.33	41.34	1.67	43.01	74.00	30.99	150	175	PK
4	4884.84	47.55	-4.72	42.83	54.00	11.17	150	186	PK
5	7326.96	40.26	-1.48	38.78	54.00	15.22	150	89	PK
6	9768.33	33.50	1.67	35.17	54.00	18.83	150	335	PK

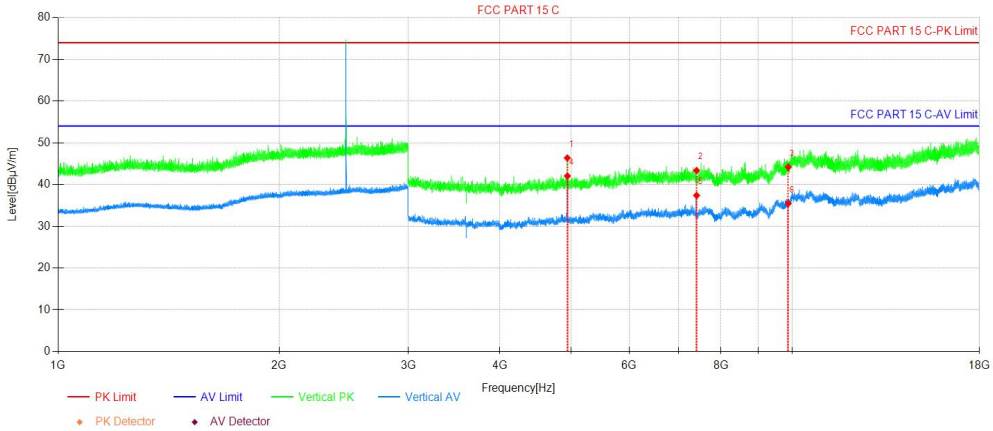
2470MHz

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	4939.59	51.06	-4.83	46.23	74.00	27.77	150	322	PK
2	7409.47	46.37	-1.31	45.06	74.00	28.94	150	256	PK
3	9880.09	41.81	2.12	43.93	74.00	30.07	150	235	PK
4	4941.09	47.32	-4.83	42.49	54.00	11.51	150	322	PK
5	7410.97	38.52	-1.31	37.21	54.00	16.79	150	17	PK
6	9880.09	33.75	2.12	35.87	54.00	18.13	150	288	PK

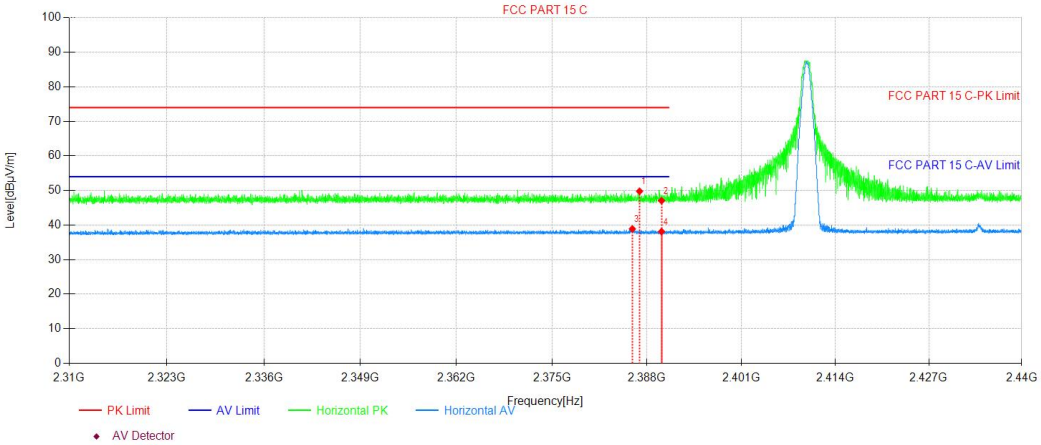
Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	4940.34	51.20	-4.83	46.37	74.00	27.63	150	185	PK
2	7410.22	44.68	-1.31	43.37	74.00	30.63	150	185	PK
3	9880.09	42.06	2.12	44.18	74.00	29.82	150	78	PK
4	4941.09	46.87	-4.83	42.04	54.00	11.96	150	185	PK
5	7410.97	38.69	-1.31	37.38	54.00	16.62	150	175	PK
6	9880.09	33.36	2.12	35.48	54.00	18.52	150	196	PK

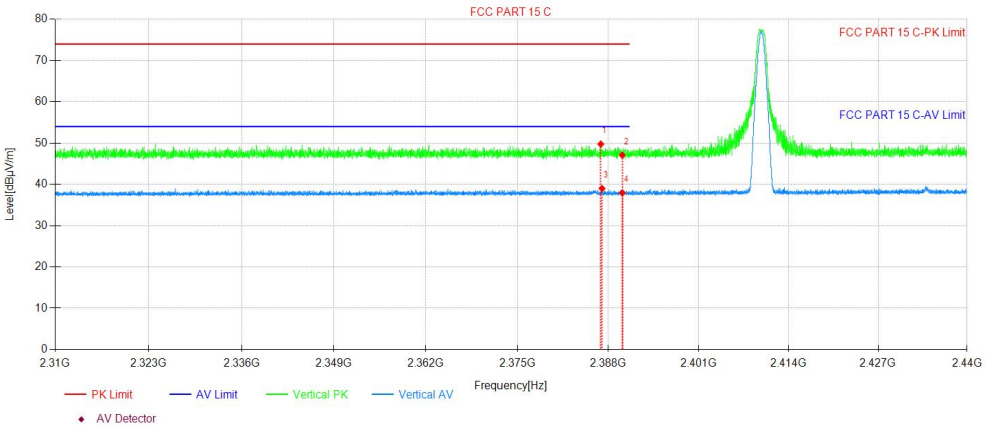
2410MHz

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	2386.99	50.59	-0.81	49.78	74.00	24.22	150	355	PK
2	2390.01	47.85	-0.80	47.05	74.00	26.95	150	355	PK
3	2386.00	39.69	-0.81	38.88	54.00	15.12	150	235	AV
4	2390.01	38.91	-0.80	38.11	54.00	15.89	150	20	AV

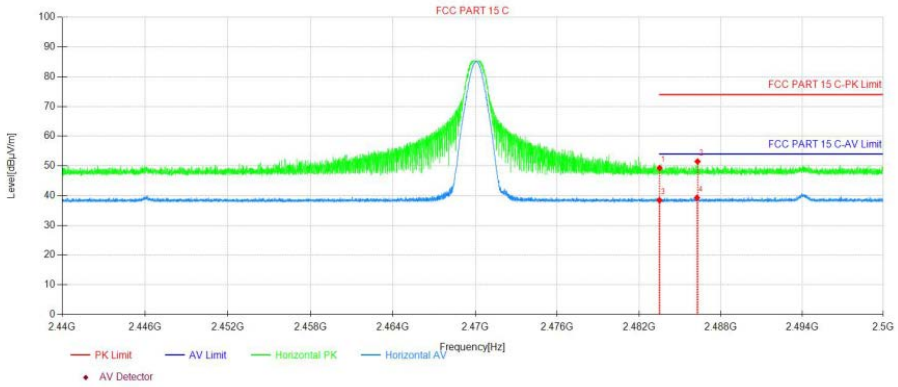
Vertical:



NO.	Freq. [MHz]	Reading Level [dBμV]	Correct Factor [dB/m]	Result Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Remark
1	2386.92	50.57	-0.81	49.76	74.00	24.24	150	327	PK
2	2390.01	47.89	-0.80	47.09	74.00	26.91	150	22	PK
3	2387.11	39.81	-0.81	39.00	54.00	15.00	150	222	AV
4	2390.01	38.72	-0.80	37.92	54.00	16.08	150	204	AV

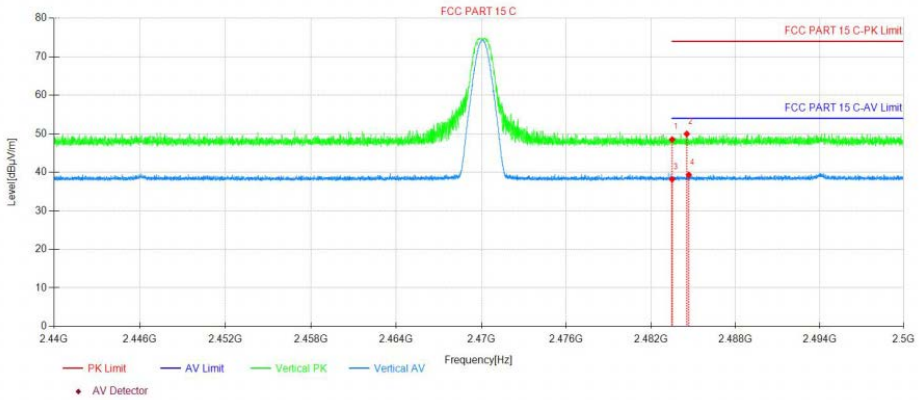
2470MHz

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	2483.50	49.58	-0.29	49.29	74.00	24.71	150	114	PK
2	2486.30	51.74	-0.26	51.48	74.00	22.52	150	200	PK
3	2483.50	38.71	-0.29	38.42	54.00	15.58	150	106	AV
4	2486.25	39.53	-0.26	39.27	54.00	14.73	150	11	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
1	2483.50	48.78	-0.29	48.49	74.00	25.51	150	250	PK
2	2484.54	50.23	-0.28	49.95	74.00	24.05	150	357	PK
3	2483.50	38.48	-0.29	38.19	54.00	15.81	150	298	AV
4	2484.69	39.62	-0.27	39.35	54.00	14.65	150	357	AV

Note:

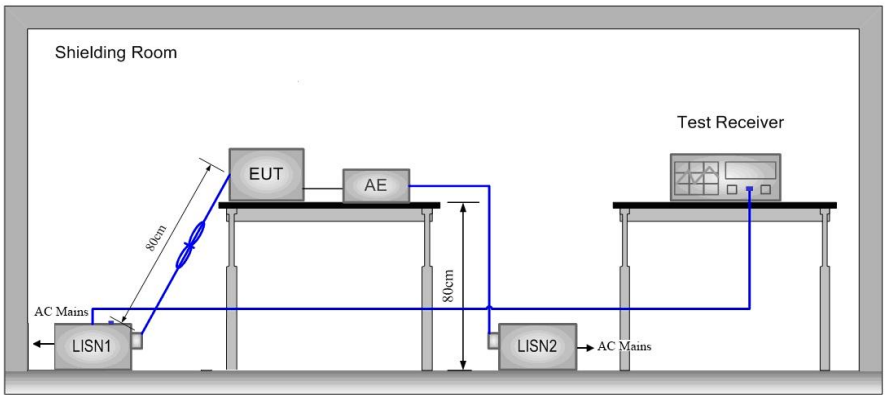
1. The Measurement (Result Level) is calculated by Reading Level adding the Correct Factor(maybe including Ant.Factor and the Cable Factor etc.), The basic equation is as follows:

   Measurement Level= Reading Level + Correct Factor(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:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω 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. 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, 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.		
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:	N/a

---END REPORT---