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FCC 15.249
2.4GHz Report

for

Chungear Industrial Co., Ltd

12 Jingke 8th Rd Nantun District Taichung 40852 Taiwan

Product Name	**:**	**Ceiling Fan Remote Controller (Transmitter)**
Model Name	**:**	**TR245A**
FCC ID	**:**	**KUJCE11001**

Prepared by: **:** **AUDIX Technology Corporation, EMC Department**

Testing Laboratory
1724

TESTING
NVLAP LAB CODE 200077-0

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. Government.

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TEST REPORT CERTIFICATION

Applicant	:	Chungear Industrial Co., Ltd
Manufacturer #1	:	Chungear Industrial Co., Ltd
Manufacturer #2	:	SATELLITE ELECTRONIC (ZHONGSHAN)., LTD.
Manufacturer #3	:	ZHONGSHAN AMITY ELECTRONIC LTD.,
EUT Description		
(1) Product	:	Ceiling Fan Remote Controller (Transmitter)
(2) Model	:	TR245A
(3) Brand	:	KUJCE11001
(4) Power Rating	:	DC 3V

Applicable Standards:

47CFRFCC Part 15 Subpart C
ANSI C63.10:2020

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.
Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2021. 05. 31

Reviewed by: Annie Yu (Annie Yu/Administrator)

Approved by: Johnny Hsueh (Johnny Hsueh/Section Manager)

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1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2021. 05. 31	Original Report	EM-F210379

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**N/A, Note**
15.205/ 15.209/ 15.249(a)	Radiated Band Edge and Radiated Spurious Emission Fundamental Frequency	**PASS**
15.215	Emission Bandwidth	**PASS**
15.203	Antenna Requirement	**PASS**
Note: The EUT only employs battery power for operation, so it is unnecessary to test.		

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3. GENERAL INFORMATION

3.1. Description of Application

Applicant	Chungear Industrial Co., Ltd 12 Jingke 8th Rd Nantun District Taichung 40852 Taiwan
Manufacturer #1	Chungear Industrial Co., Ltd 12 Jingke 8th Rd Nantun District Taichung 40852 Taiwan
Manufacturer #2	SATELLITE ELECTRONIC (ZHONGSHAN)., LTD. 8 CHUANG YE RD.TORCH DEVELOPMENT ZONE. ZHONGSHAN.GUANGDONG.528437 CHINA
Manufacturer #3	ZHONGSHAN AMITY ELECTRONIC LTD., NO.16,TORCH HI-TECH INDUSTRIAL DEVELOPMENT ZONE, ZHONGSHAN CITY GUANGDONG PROVINCE CHINA
Product	Ceiling Fan Remote Controller (Transmitter)
Model	TR245A

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3.2. Description of EUT

Test Model	TR245A
Serial Number	N/A
Power Rating	DC 3V
RF Features	2.4G
Transmit Type	1T1R
Sample Status	Production
Date of Receipt	2021. 04. 14
Date of Test	2021. 04. 22~ 05. 21
Interface Ports of EUT	None
Accessories Supplied	None

3.3. Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	---	---	PCB	2400-2500	1.45dBi

3.4. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate
2.4G	2410-2425	3	FSK	500bps

Channel List	
Channel Number	Frequency (MHz)
01	2410
02	2420
03	2425

3.5. Description of Key Components

None

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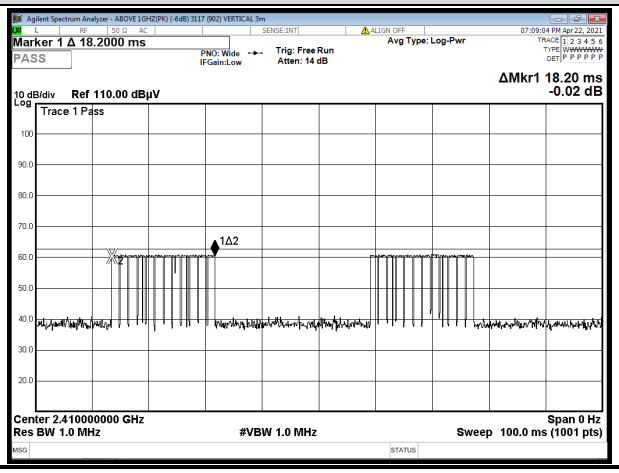
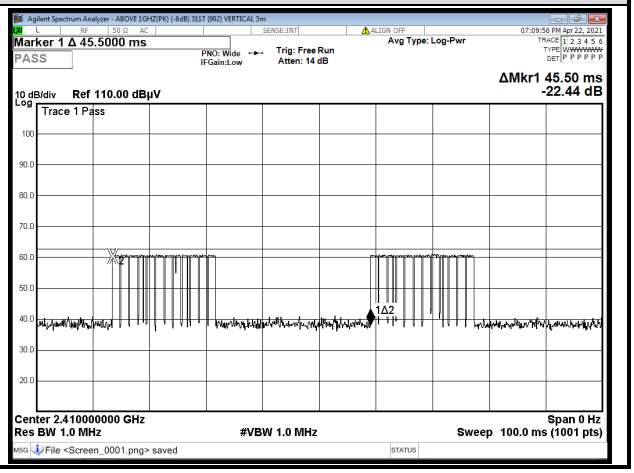
3.6. Test Configuration

TX_{on}(ms)	TX_{on+off} (ms)	Duty Cycle Factor (dB)
18.2	45.5	-7.96
Duuty Cycle Factor = 20loog (TX_{on}/TX_{on+off})		

TX_{on}	TX_{on+off}
	

Item		Mode	Test Channel
Radiated Test Case	Radiated Band Edge Note1	2.4G	01/03
	Radiated Spurious Emission (30MHz-1GHz) Note1	2.4G	01
	Radiated Spurious Emission (Above 1GHz) Note1	2.4G	01/02/03
	Fundamental Frequency	2.4G	01/02/03
	Occupied Bandwidth 99% Power	2.4G	01/02/03

Note 1: ☐Mobile Device

■Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: ■ Lie ☐ Side☐ Stand

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3.7. Tested Supporting System List

None

3.8. Setup Configuration

3.9. Operating Condition of EUT

To press the button of EUT is used for enabling EUT RF function under continues transmitting and choosing data rate/ channel.

3.10.Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 (1) No. 5 Semi-Anechoic Chamber (2) Fully Anechoic Chamber (IC Test Site Registration No.:5183B-4)

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3.11.Measurement Uncertainty

Test Items/Facilities			Frequency Range	Uncertainty
Radiation Test	☐	No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.8dB
			200MHz-1000MHz, 3m, Horizontal	±4.1dB
			30MHz-200MHz, 3m, Vertical	±4.5dB
			200MHz-1000MHz, 3m, Vertical	±4.5dB
			1GHz-6GHz, 3m	±4.7dB
			6GHz-18GHz, 3m	±4.1dB
	☐	No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.9dB
			200MHz-1000MHz, 3m, Horizontal	±4.2dB
			30MHz-200MHz, 3m, Vertical	±4.3dB
			200MHz-1000MHz, 3m, Vertical	±4.5dB
	☐	No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.1dB
			200MHz-1000MHz, 3m, Horizontal	±4.5dB
			30MHz-200MHz, 3m, Vertical	±4.4dB
			200MHz-1000MHz, 3m, Vertical	±4.8dB
			1GHz-6GHz, 3m	±5.0dB
			6GHz-18GHz, 3m	±4.7dB
	☒	No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.2dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
			30MHz-200MHz, 3m, Vertical	±4.3dB
			200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
	☒	Fully Anechoic Chamber	30MHz~1000MHz	±4.6dB
			1GHz~18GHz	±5.4dB
			18GHz~40GHz	±3.52dB
			40GHz~260GHz	±3.56dB

Remark：Uncertainty = $ku_c(y)$

Test Item	Uncertainty
Occupied Bandwidth 99% Power	±1kHz

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4. MEASUREMENT EQUIPMENTLIST

4.1. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-507	MY52220264	2020. 08. 04	1 Year
2.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2021. 04. 14	1 Year
3.	Test Receiver	R&S	ESR7	101967	2020. 10. 29	1 Year
4.	Amplifier	Sonoma	310N	187158	2020. 12. 19	1 Year
5.	Amplifier	HP	8449B	3008A02678	2021. 02. 19	1 Year
6.	Microwave Amplifier	Keysight	83051A	MY53010042	2020. 08. 08	1 Year
7.	Bilog Antenna	Schwarzbeck	VULB 9168	862	2021. 01. 15	1 Year
8.	Loop Antenna	R&S	HFH2-Z2	891847/27	2019. 12. 16	2 Years
9.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2021. 03. 19	1 Year
10.	Horn Antenna	COM-POWER	AH-840	101092	2021. 01. 05	1 Year
11.	2.4GHz Notch Filter	K&L	7NSL10-2441.5E130.5-00	1	2020. 07. 24	1 Year
12.	3GHz Notch Filter	Microwave	H3G018G1	484796	2020. 08. 20	1 Year
13.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.5 3m A/C	2021. 04. 15	1 Year
14.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2021. 04. 15	1 Year
15.	Cable	Yeida	CFD400-E	RE-19	2021. 01. 29	1 Year
16.	Cable	HUBER+SUHNER	SUCOFLEX 104	RE-29	2020. 09. 19	1 Year
17.	Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2020. 09. 19	1 Year
18.	Test Software	Audix	e3	V9.20170603	N.C.R.	N.C.R.
19.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

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5. CONDUCTED EMISSION MEASUREMET

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC 15.207】

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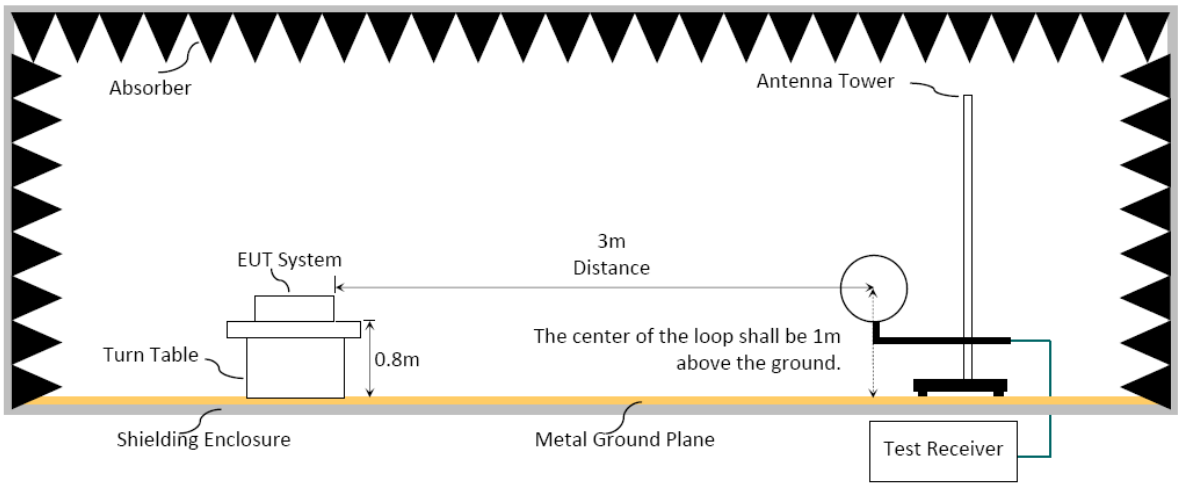
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

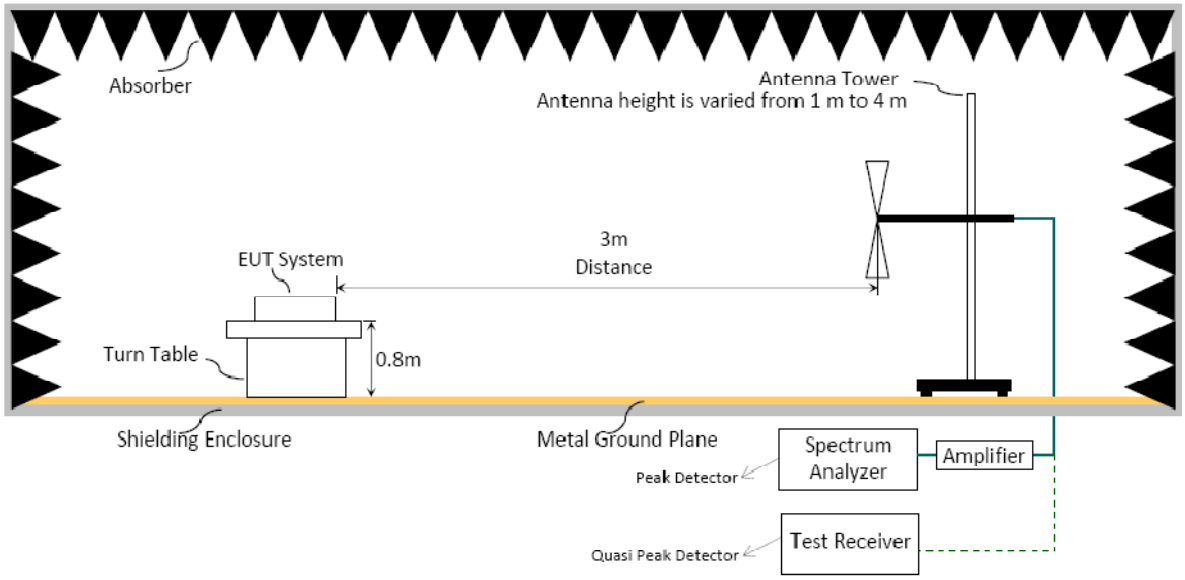
6.1.1. Block Diagram of EUT

Indicated as section 3.8

6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000MHz



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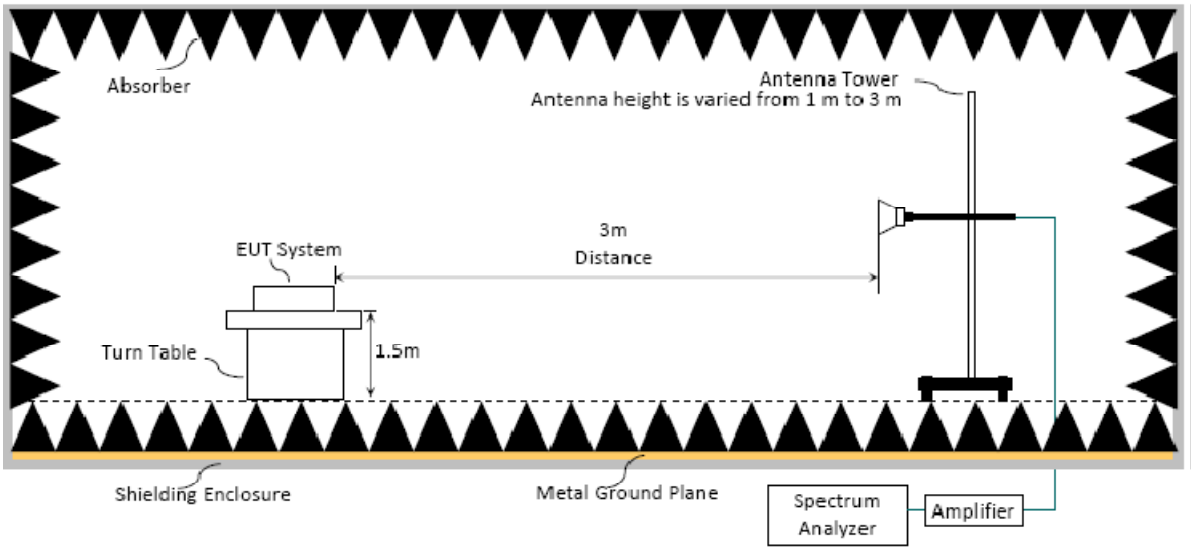
6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

6.2.1. General Limit

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in FCC Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance(m)	Limits	
		dBµV/m	µV/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dBµV/m (Peak) 54.0 dBµV/m (Average)	

Remark：(1) dBµV/m = 20 log (µV/m)
(2) The tighter limit applies to the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) Fundamental and emission fall within operation band are exempted from this section.
(5) Pursuant to ANSI C63.10: 6.6.4.3,if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

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6.2.2. Limite for Fundamental & Harmonics Frequency

Fundamental Frequency	Field strength of fundamental		Field strength of harmonics	
	mV/m	dBμV/m	μV/m	dBμV/m
902-928MHz	50	94(Quasi-Peak)	500	74 (Peak)
				54(Average)
2400-2483.5MHz	50	114 (Peak)	500	74 (Peak)
		94(Average)		54(Average)
5725-5875MHz	50	114 (Peak)	500	74 (Peak)
		94(Average)		54(Average)
24.0-24.25GHz	250	128 (Peak)	2500	88 (Peak)
		108(Average)		68(Average)

Remark: mV/m=1000μV/m; dBμV/m = 20 log (μV/m)

6.3. Test Procedure

Frequency Range 9kHz~30MHz:
The EUT setup on the turntable which has 80cm height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2020 regulation.

(1) RBW = 9kHz with peak and average detector.

(2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 25GHz:
The EUT setup on the turntable which has 80 cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2020 regulation.

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Frequency below 1GHz:

Spectrum Analyzer is used for pre-testing with following setting:

(1)RBW = 120kHz

(2)VBW ≥ 3 x RBW.

(3)Detector = Peak.

(4)Sweep time = auto.

(5)Trace mode = max hold.

(6)Allow sweeps to continue until the trace stabilizes.

Note 1: When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.

Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Frequency above 1GHz to 10th harmonic (up to 25 GHz):

Peak Detector:

(1)RBW = 1MHz for field strength of harmonics; 2MHz for field strength of fundamental

(2)VBW ≥ 3 x RBW.

(3)Detector = Peak.

(4)Sweep time = auto.

(5)Trace mode = max hold.

(6)Allow sweeps to continue until the trace stabilizes.

Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

Average Detector:

☐**Option 1:**

(1)RBW = 1MHz

(2)VBW ≥ 1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting (kHz)
---	---	---	---

N/A: 1/ T is not implemented when duty cycle presented in section 3.7 is ≥98%.

(1)Detector = Peak.

(2)Sweep time = auto.

(3)Trace mode = max hold.

(4)Allow sweeps to continue until the trace stabilizes.

■**Option 2:**

Average Emission Level= Peak Emission Level+ D.C.C.F.

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6.5. Measurement Result Explanation

■Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading
□Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading
■Average Emission Level= Peak Emission Level+ DCCF
Duty Cycle Correction Factor (DCCF)= 20log(TX_{on}/TX_{on+off}) presented in section 3.7
□ERP= Peak Emission Level-95.2dB-2.14dB

6.6. Test Results

Please refer to Appendix A.

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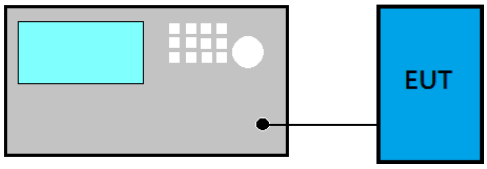
7. EMISSION BANDWIDTH MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Test Procedure

(1) Set RBW close to 1-5 % of 20dB BW.
(2) Set VBW≥RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -20dB to record the final bandwidth.

7.3. Test Results

Please refer to Appendix A

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8. DEVIATION TO TEST SPECIFICATIONS

【NONE】

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APPDNDIX A

TEST DATA AND PLOTS

(Model: TR245A)

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A.1 RADIATED EMISSION

Test Date	2021/05/20 ~ 21	Temp./Hum.	23 ~ 24℃/57 ~ 61%
Test Voltage	DC 3V (Via Battery)		

A.1.1 Emissions Applied to General Requirement

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.1.2 Frequency Below 1GHz

Mode	2.4G	Frequency	TX 2410MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
53.280	20.26	0.68	32.64	37.01	25.31	40.00	14.69	Peak
148.340	19.67	1.05	32.50	29.77	17.99	43.50	25.51	Peak
288.020	19.59	1.50	32.47	40.10	28.72	46.00	17.28	Peak
746.830	28.22	2.93	32.21	30.61	29.55	46.00	16.45	Peak
871.960	29.39	3.09	31.81	28.62	29.29	46.00	16.71	Peak
968.960	30.33	3.22	31.07	27.69	30.17	54.00	23.83	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
54.250	20.23	0.69	32.64	37.47	25.75	40.00	14.25	Peak
137.670	19.18	1.01	32.51	38.56	26.24	43.50	17.26	Peak
339.430	21.03	1.67	32.46	28.65	18.89	46.00	27.11	Peak
472.320	23.69	2.13	32.44	28.84	22.22	46.00	23.78	Peak
742.950	28.17	2.93	32.21	29.75	28.64	46.00	17.36	Peak
976.720	30.40	3.23	31.07	27.73	30.29	54.00	23.71	Peak

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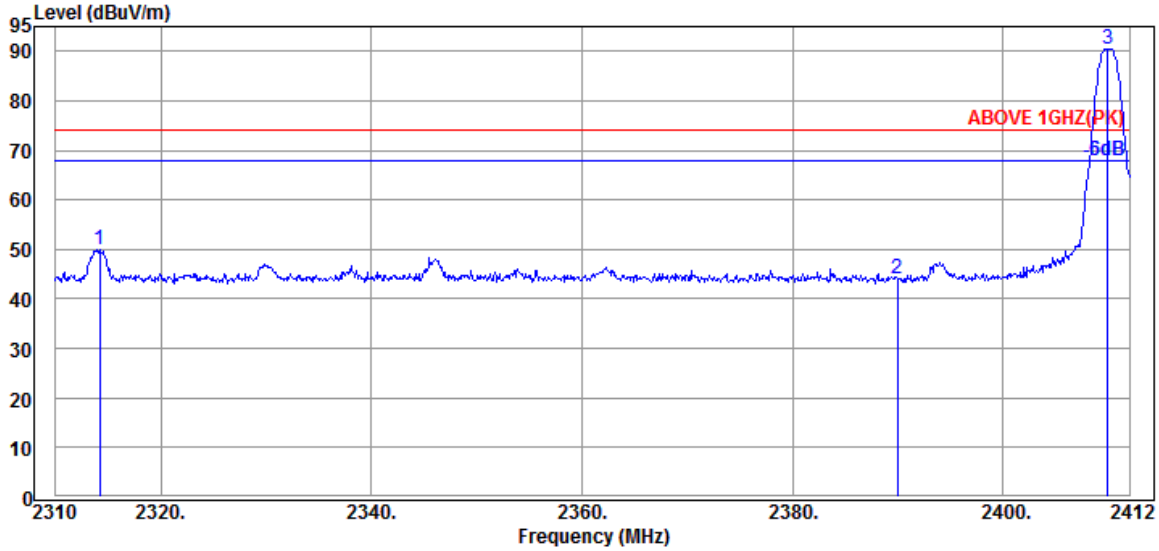
A.2.1.3 Frequency Above 1 GHz to 10th harmonics

Band Edge:

Mode	2.4G	Frequency	TX 2410MHz



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	2314.182	31.95	7.91	34.52	44.70	50.04	74.00	23.96	Peak
	2389.968	31.89	7.95	34.54	38.63	43.93	74.00	30.07	Peak
@	2409.960	31.87	7.96	34.54	85.16	90.45	---	---	Peak

Emission Frequency (MHz)	Peak Emission Level (dBμV/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
2314.182	50.04	-7.96	42.08	54.00	11.92	Average
2389.968	43.93	-7.96	35.97	54.00	18.03	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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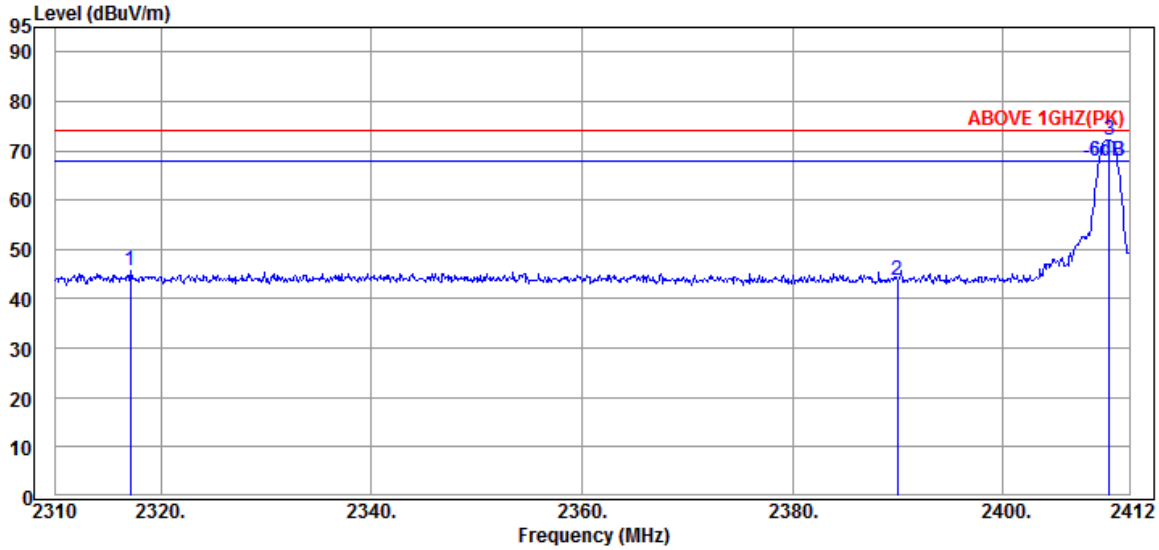
Mode	2.4G	Frequency	TX 2410MHz



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
	2317.140	31.97	7.92	34.52	40.38	45.75	74.00	28.25	Peak
	2389.968	31.89	7.95	34.54	38.44	43.74	74.00	30.26	Peak
@	2410.062	31.87	7.96	34.54	66.85	72.14	---	---	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
2317.140	45.75	-7.96	37.79	54.00	16.21	Average
2389.968	43.74	-7.96	35.78	54.00	18.22	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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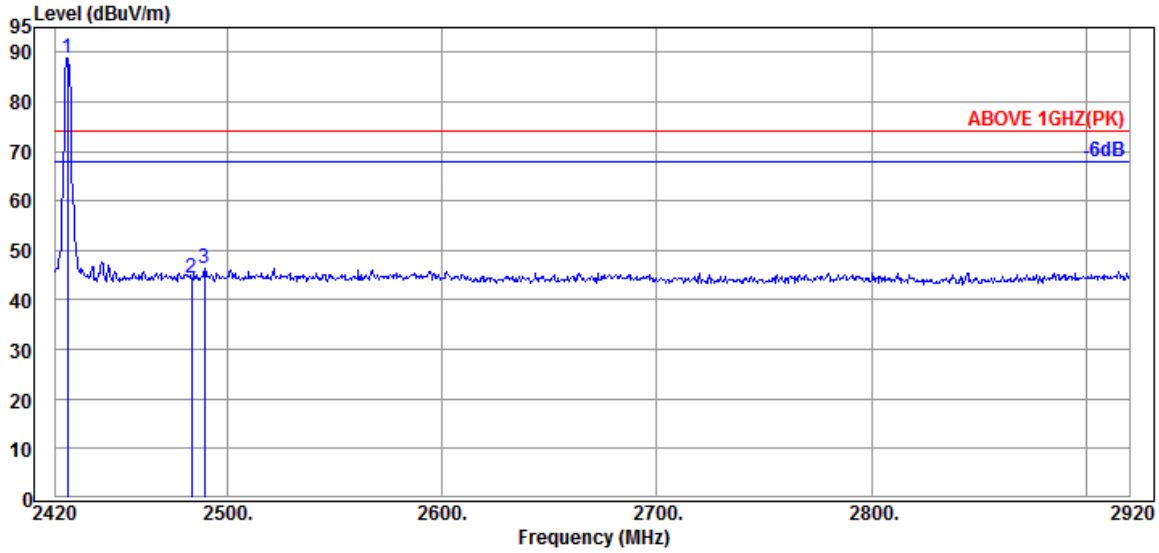
Mode	2.4G	Frequency	TX 2425MHz



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
@	2425.500	32.09	7.97	34.54	83.37	88.89	---	---	Peak
	2483.500	32.30	7.99	34.55	38.53	44.27	74.00	29.73	Peak
	2489.500	32.30	8.00	34.55	40.67	46.42	74.00	27.58	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
2483.500	44.27	-7.96	36.31	54.00	17.69	Average
2489.500	46.42	-7.96	38.46	54.00	15.54	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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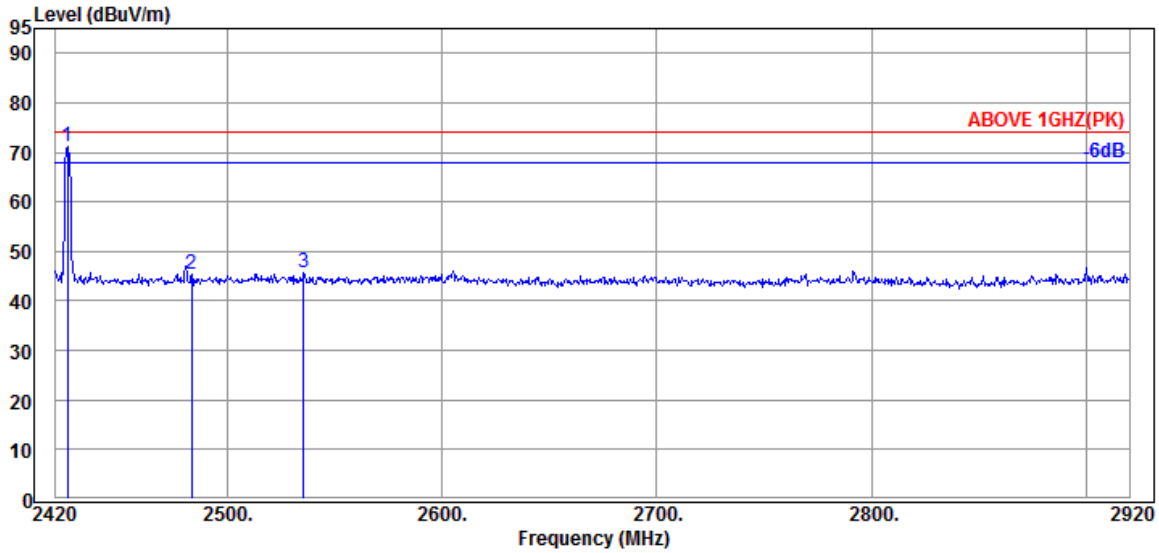
Mode	2.4G	Frequency	TX 2425MHz



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Reading Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
@ 2425.500	32.09	7.97	34.54	65.64	71.16	---	---	Peak
2483.500	32.30	7.99	34.55	39.50	45.24	74.00	28.76	Peak
2535.500	32.44	8.02	34.57	39.81	45.70	74.00	28.30	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
2483.500	45.24	-7.96	37.28	54.00	16.72	Average
2535.500	45.70	-7.96	37.74	54.00	16.26	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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A.2.1.3 Frequency Above 1GHz

Mode	2.4G	Frequency	TX 2410MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4820.000	33.67	10.49	34.44	47.38	57.10	74.00	16.90	Peak
7230.000	35.50	12.25	34.65	42.54	55.64	74.00	18.36	Peak
9640.000	37.00	14.37	35.17	36.20	52.40	74.00	21.60	Peak

Emission Frequency (MHz)	Peak Emission Level (dBμV/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4820.00	57.10	-7.96	49.14	54.00	4.86	Average
7230.00	55.64	-7.96	47.68	54.00	6.32	Average
9640.00	52.40	-7.96	44.44	54.00	9.56	Average

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4820.000	33.67	10.49	34.44	41.90	51.62	74.00	22.38	Peak
7230.000	35.50	12.25	34.65	44.96	58.06	74.00	15.94	Peak
9640.000	37.00	14.37	35.17	35.73	51.93	74.00	22.07	Peak

Emission Frequency (MHz)	Peak Emission Level (dBμV/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4820.00	51.62	-7.96	43.66	54.00	10.34	Average
7230.00	58.06	-7.96	50.10	54.00	3.90	Average
9640.00	51.9	-7.96	43.94	54.00	10.06	Average

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Mode	2.4G	Frequency	TX 2420MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4840.000	33.80	10.51	34.43	46.42	56.30	74.00	17.70	Peak
7260.000	35.43	12.27	34.66	39.97	53.01	74.00	20.99	Peak
9680.000	37.00	14.42	35.17	35.76	52.01	74.00	21.99	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
4840.00	56.30	-7.96	48.34	54.00	5.66	Average
7260.00	53.01	-7.96	45.05	54.00	8.95	Average
9680.00	52.01	-7.96	44.05	54.00	9.95	Average

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
4840.000	33.80	10.51	34.43	41.07	50.95	74.00	23.05	Peak
7260.000	35.43	12.27	34.66	40.92	53.96	74.00	20.04	Peak
9680.000	37.00	14.42	35.17	34.61	50.86	74.00	23.14	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
4840.00	50.95	-7.96	42.99	54.00	11.01	Average
7260.00	53.96	-7.96	46.00	54.00	8.00	Average
9680.00	50.86	-7.96	42.90	54.00	11.10	Average

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Mode	2.4G	Frequency	TX 2425MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4850.000	33.80	10.51	34.43	46.56	56.44	74.00	17.56	Peak
7275.000	35.47	12.27	34.67	43.75	56.82	74.00	17.18	Peak
9700.000	37.00	14.42	35.17	36.36	52.61	74.00	21.39	Peak

Emission Frequency (MHz)	Peak Emission Level (dBμV/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4850.00	56.44	-7.96	48.48	54.00	5.52	Average
7275.00	56.82	-7.96	48.86	54.00	5.14	Average
9700.00	52.61	-7.96	44.65	54.00	9.35	Average

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4850.000	33.80	10.51	34.43	41.67	51.55	74.00	22.45	Peak
7275.000	35.47	12.27	34.67	43.33	56.40	74.00	17.60	Peak
9700.000	37.00	14.42	35.17	33.81	50.06	74.00	23.94	Peak

Emission Frequency (MHz)	Peak Emission Level (dBμV/m)	DCCF (dB)	Average Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
4850.00	51.55	-7.96	43.59	54.00	10.41	Average
7275.00	56.40	-7.96	48.44	54.00	5.56	Average
9700.00	50.06	-7.96	42.10	54.00	11.90	Average

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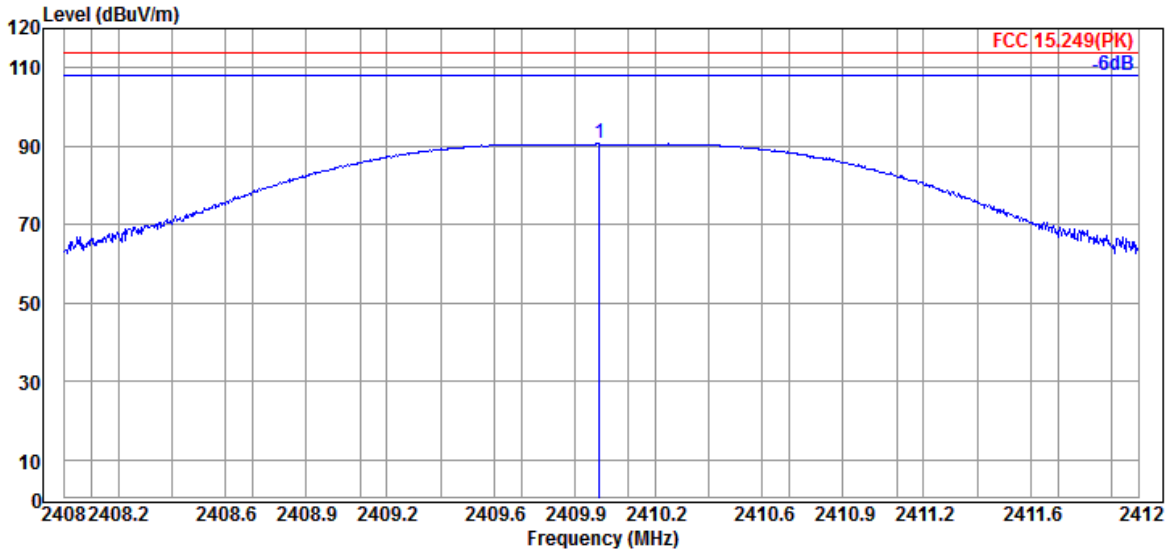
A.1.2 Fundamental Frequency

Mode	2.4G	Frequency	TX 2410MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2409.992	31.87	7.96	34.54	85.23	90.52	114.0	23.48	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
2409.992	90.52	-7.96	82.56	94.0	11.44	Average

Remark: Horizontal is the strongest polarization and peak value has complied with average limit, so vertical won't be listed in test report.

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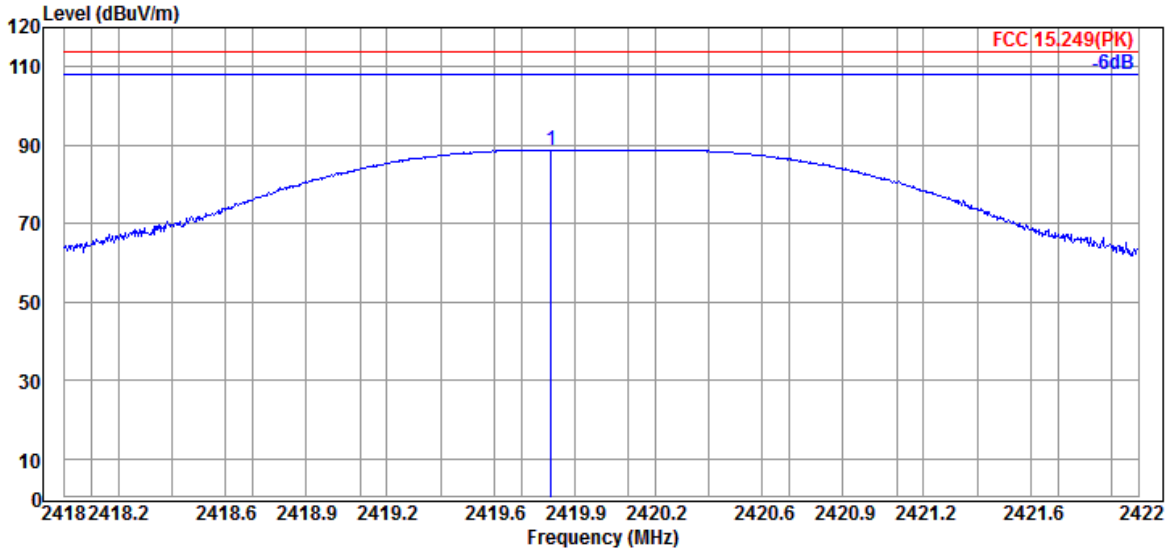
Mode	2.4G	Frequency	TX 2420MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2419.812	32.01	7.96	34.54	83.35	88.78	114.0	25.22	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
2419.812	88.78	-7.96	80.82	94.0	13.18	Average

Remark: Horizontal is the strongest polarization and peak value has complied with average limit, so vertical won't be listed in test report.

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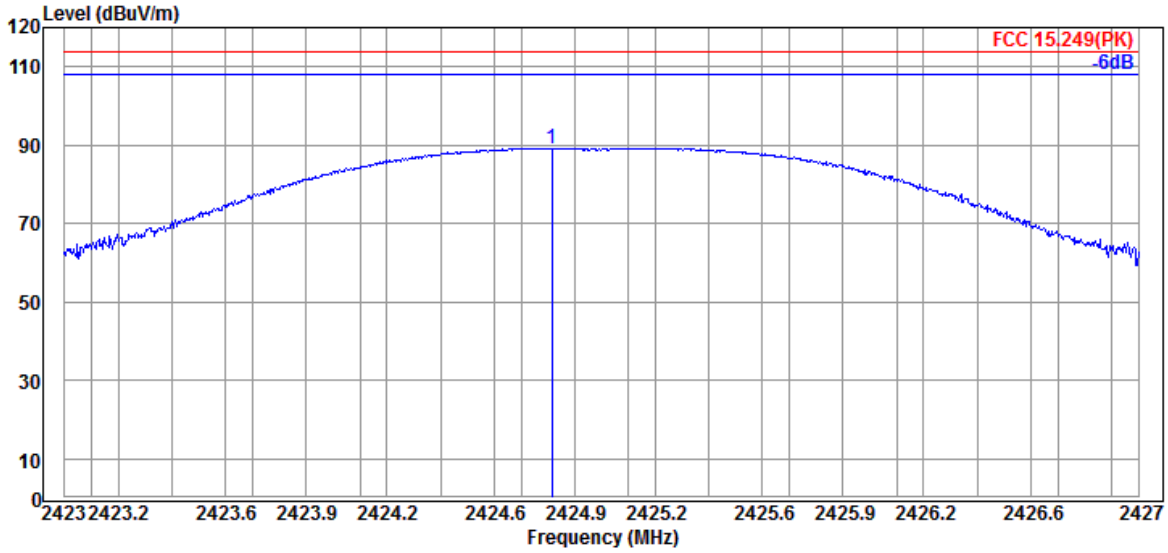
Mode	2.4G	Frequency	TX 2425MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
2424.816	32.01	7.97	34.54	83.66	89.10	114.0	24.90	Peak

Emission Frequency (MHz)	Peak Emission Level (dBµV/m)	DCCF (dB)	Average Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
2424.816	89.1	-7.96	81.14	94.0	12.86	Average

Remark: Horizontal is the strongest polarization and peak value has complied with average limit, so vertical won't be listed in test report.

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A.2 EMISSION BANDWIDTH MEASUREMENT

Test Date	2021/04/22	Temp./Hum.	23℃/56%
Test Voltage	DC 3V (Via Battery)		

A.2.1 Emission Bandwidth

Mode	Centre Frequency (MHz)	20dBOccupied Bandwidth (MHz)	99%Occupied Bandwidth (MHz)
2.4G	2410	1.019	1.0052
	2420	1.018	1.0035
	2425	1.017	1.0053

A.2.2 Measurement Plots