

# TEST REPORT

Report No.: SHE23110025-01AE

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**Applicant** : DewertOkin Technology Group Co., Ltd.  
**Address of Applicant** : No.1507, Taoyuan Road, Gaozhao Street, Xiuzhou District, Jiaxing City, Zhejiang Province, China

**Product Name** : CONTROL BOX  
**Brand Name** : N/A  
**Model Name** : CB2742  
**Sample acquisition Method** : Sent by Client  
**Sample No.** : E23110025-01#02  
E23110025-01#03  
**FCC ID** : 2AVJ8-CB2742  
**ISED Number** : 25804-CB2742

**Standards** : FCC CFR47 Part 15, Subpart C Section 15.249  
RSS-Gen (Issue 5, Amd.2-Feb 2021)  
RSS-210 (Issue 10, Amendment-Apr 2020)

**Date of Receipt** : 2023-11-06  
**Date of Test** : 2023-11-09 ~ 2023-11-23  
**Date of Issue** : 2023-11-24

**Remark:**

*This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.*

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Reviewed by: Jennifer Zhou  
(Jennifer Zhou)

Approved by: Echo Mu  
(Authorized signatory: Echo Mu)

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## 1 General Information

### 1.1 Testing Laboratory

ISED CAB identifier #	CN0081
Company Name	ICAS Testing Technology Service (Shanghai) Co., Ltd.
Address	No.1298 Pingan Road, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

### 1.2 Details of Application

Applicant Company Name	DewertOkin Technology Group Co., Ltd.
Address	No.1507, Taoyuan Road, Gaozhao Street, Xiuzhou District, Jiaxing City, Zhejiang Province, China
Contact Person	Mia Ye
Telephone	+86-573-82281072
Email	Mia.Ye@refinedchina.com
Manufacturer Company Name	DewertOkin Technology Group Co., Ltd.
Address	No.1507, Taoyuan Road, Gaozhao Street, Xiuzhou District, Jiaxing City, Zhejiang Province, China
Factory Company Name	DewertOkin Technology Group Co., Ltd.
Address	No.1507, Taoyuan Road, Gaozhao Street, Xiuzhou District, Jiaxing City, Zhejiang Province, China

### 1.3 Details of EUT

Product Name	CONTROL BOX
Brand Name	N/A
Test Model Name	CB2742
FCC ID	2AVJ8-CB2742
ISED Number	25804-CB2742
Operation Frequency	2403MHz ~ 2480MHz
Maximum Field Strength	87.55dBuV/m(peak)@3m
Number of Channels	78
Modulation Type	GFSK
Antenna Type	PCB Antenna
Antenna Gain	1.225dBi
Extreme Temperature Range	-10°C ~ +40°C
Test Voltage	DC 29V supply by adapter

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<b>Hardware Version</b>	R5.109.00.1162B
<b>Software Version</b>	V1.0
<b>Test SW Version</b>	BL410_R; BL410_E
<b>RF power setting in TEST SW</b>	Enter the fixed frequency mode by pressing the key_Default power

Note:

1. The above information was declared by the manufacture.
2. For more details, please refer to the User's manual of the EUT.

## Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2.403GHz	28	2.430GHz	55	2.457GHz
2	2.404GHz	29	2.431GHz	56	2.458GHz
3	2.405GHz	30	2.432GHz	57	2.459GHz
4	2.406GHz	31	2.433GHz	58	2.460GHz
5	2.407GHz	32	2.434GHz	59	2.461GHz
6	2.408GHz	33	2.435GHz	60	2.462GHz
7	2.409GHz	34	2.436GHz	61	2.463GHz
8	2.410GHz	35	2.437GHz	62	2.464GHz
9	2.411GHz	36	2.438GHz	63	2.465GHz
10	2.412GHz	37	2.439GHz	64	2.466GHz
11	2.413GHz	38	2.440GHz	65	2.467GHz
12	2.414GHz	39	2.441GHz	66	2.468GHz
13	2.415GHz	40	2.442GHz	67	2.469GHz
14	2.416GHz	41	2.443GHz	68	2.470GHz
15	2.417GHz	42	2.444GHz	69	2.471GHz
16	2.418GHz	43	2.445GHz	70	2.472GHz
17	2.419GHz	44	2.446GHz	71	2.473GHz
18	2.420GHz	45	2.447GHz	72	2.474GHz
19	2.421GHz	46	2.448GHz	73	2.475GHz
20	2.422GHz	47	2.449GHz	74	2.476GHz
21	2.423GHz	48	2.450GHz	75	2.477GHz
22	2.424GHz	49	2.451GHz	76	2.478GHz
23	2.425GHz	50	2.452GHz	77	2.479GHz
24	2.426GHz	51	2.453GHz	78	2.480GHz
25	2.427GHz	52	2.454GHz		
26	2.428GHz	53	2.455GHz		
27	2.429GHz	54	2.456GHz		

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## 1.4 Test Methodology

47 CFR Part 15, Subpart C	Telecommunication-Radio Frequency Devices-Intentional Radiators
RSS-Gen (Issue 5, Amd.2-Feb 2021)	General Requirements for Compliance of Radio Apparatus
RSS-210 (Issue 10, Amendment-Apr 2020)	Licence-Exempt Radio Apparatus: Category I Equipment
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

### Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

## 1.5 Test Summary

Test Item	FCC Rules	ISED Rules	Result
Antenna Requirement	Part 15.203	RSS-GEN 6.8	PASS
Radiated Emission	FCC Part 15.249(a),15.209	RSS-210 B.10(a) RSS-GEN 8.9	PASS
Band Edge	FCC Part 15.249(d),15.209	RSS-210 B.10(b) RSS-GEN 8.10	PASS
20dB Bandwidth and 99% Bandwidth	FCC Part 15.215(c)	RSS-GEN 6.7	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	RSS-Gen 8.8	PASS

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## 2 Test Condition

### 2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

### 2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2023-07-27	2024-07-26
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2023-06-08	2024-06-07
Signal Generator	Rohde & Schwarz	SMR27	100184	2023-07-27	2024-07-26
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2023-06-08	2024-06-07
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2023-06-08	2024-06-07
V-network	SCHWARZBECK	NSLK8127	8127-902	2023-06-07	2024-06-06
Attenuator	SCHWARZBECK	VTSD 9561-FN	/	2023-06-06	2024-06-05
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2023-03-22	2025-03-21
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1775	2023-06-13	2025-06-12
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2023-06-09	2024-06-08
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2023-06-18	2025-06-17
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2023-06-08	2024-06-07
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2023-06-09	2025-06-08
Shielded Enclosure 8*5*4 (L*W*H)	CHANGNING	854	N/A	2023-06-09	2025-06-08
Test Software	BL	BL410_E	Version:1.0.0.117	N/A	N/A
Test Software	BL	BL410_R	Version:2.1.1.409	N/A	N/A

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## 2.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI. The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95.45%.

Parameter		Uncertainty
Antenna Port Conducted Emission	< 1GHz	$\pm 1.5$ dB
	> 1GHz	$\pm 1.5$ dB
Radiated Emission	9KHz – 30MHz	$\pm 3.42$ dB
	30 MHz – 1GHz	$\pm 5.00$ dB
	> 1GHz	$\pm 4.88$ dB
Conducted Emission on AC Mains	150kHz-30MHz	$\pm 2.68$ dB
Occupied Channel Bandwidth		$\pm 5$ %

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## 3 Test Set-up and Operation Modes

### 3.1 Details of Test Mode

Enter the fixed frequency mode by pressing the key was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

Channel	Frequency
The lowest channel(CH1)	2403MHz
The middle channel(CH40)	2442MHz
The Highest channel(CH78)	2480MHz

The basic operation modes are:

- A. Transmitting
  - i. Low Channel
  - ii. Middle Channel
  - iii. High Channel

### 3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Adapter	GRP POWER	GRP-A290020-A	680024554D8282501729

### 3.3 Support Software

Description	Manufacturer	Software Name
N/A	N/A	N/A



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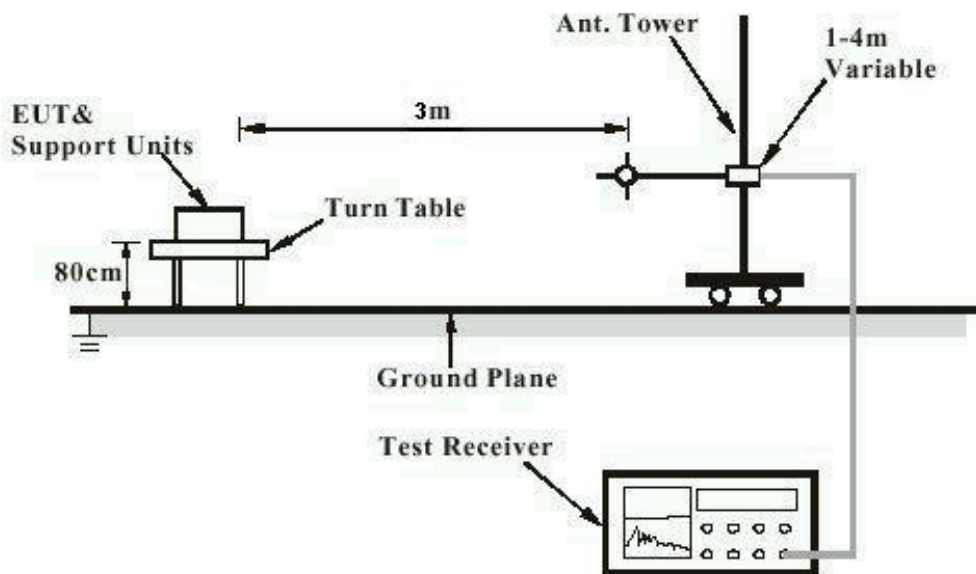
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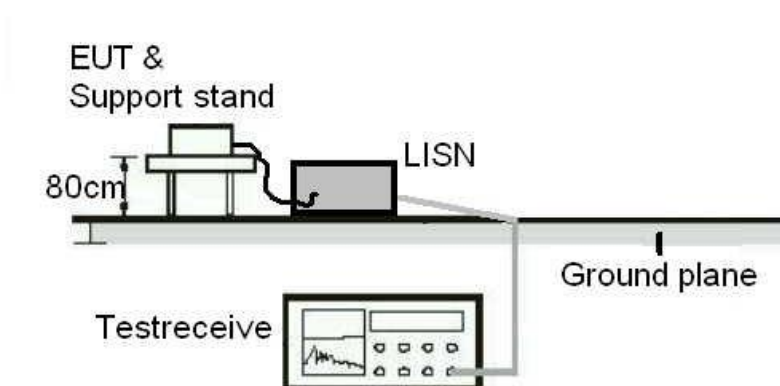
## 3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Configuration for Conduction Test



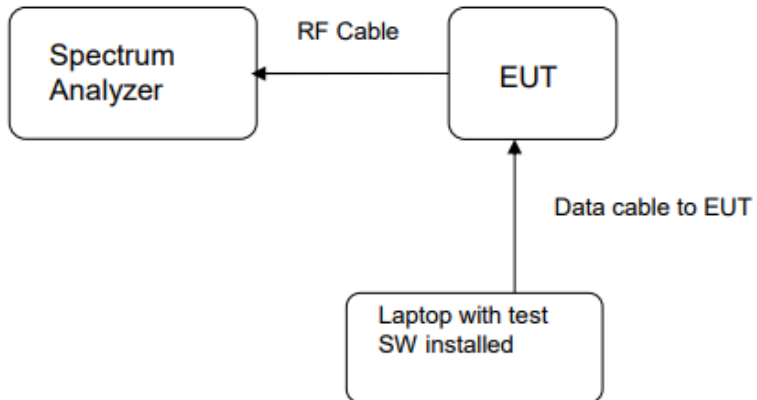
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## Diagram of Measurement Configuration for Transmitter Test



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## 4 Test Results

### 4.1 Transmitter Requirement & Test Suites

#### 4.1.1 Antenna Requirement

RESULT:

**PASS**

Test standard	: Part 15.203, RSS-GEN 6.8
Requirement	: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator 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.

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 1.225dBi. The antenna is pcb antenna with no possibility of replacement with a non-approved antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

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## 4.1.2 Radiated Emission

RESULT:

**PASS**

Test standard : FCC Part 15.249(a), 15.209  
RSS-210 B.10(a), RSS-GEN 8.9

Requirement : ANSI C63.10-2013

Kind of test site : 3m Semi-Anechoic Chamber

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A.i/ii/iii

Ambient temperature : 22.1°C

Relative humidity : 47%

### Notes

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
3. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

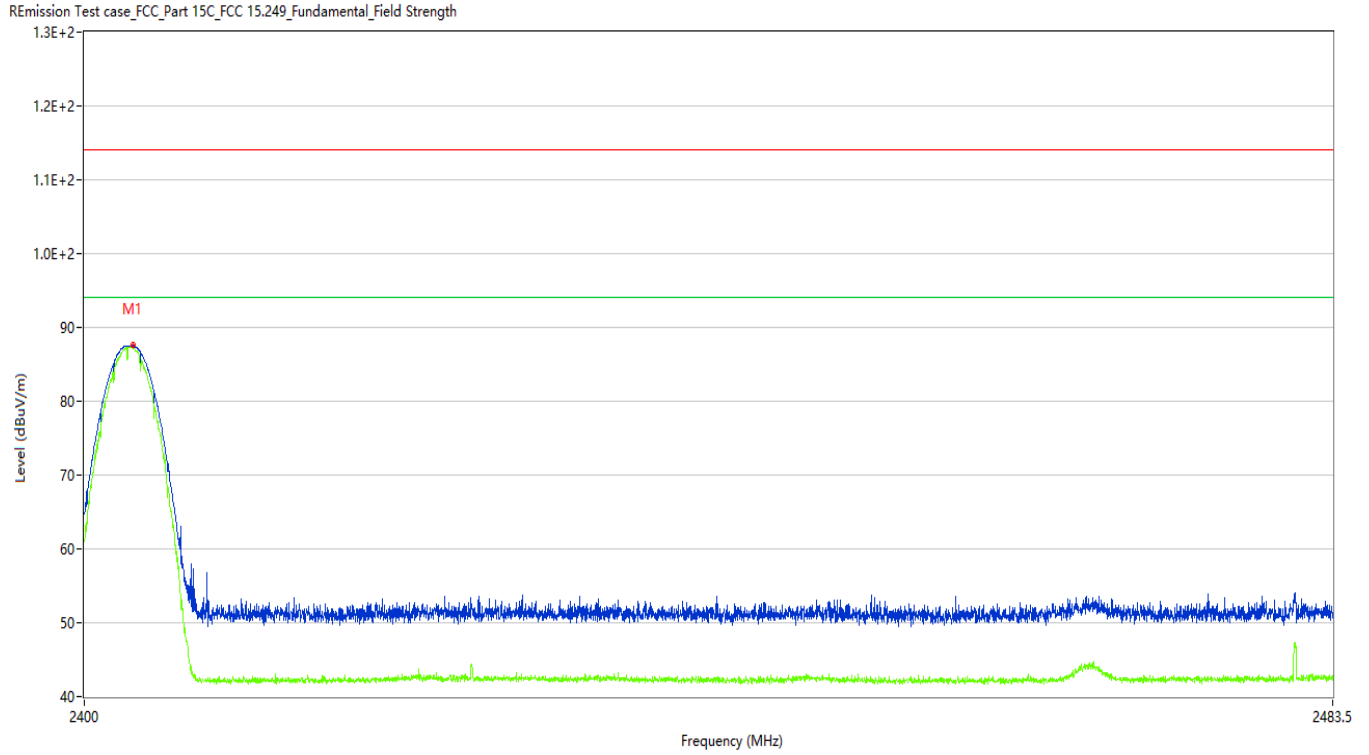
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**Figure 1: Test plots of Field strength of fundamental, 2403MHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2403.215	87.55	-10.07	114.0	26.45	Peak	135.60	100	Horizontal	Pass
1**	2403.215	87.22	-10.07	94.0	6.78	AV	135.60	100	Horizontal	Pass

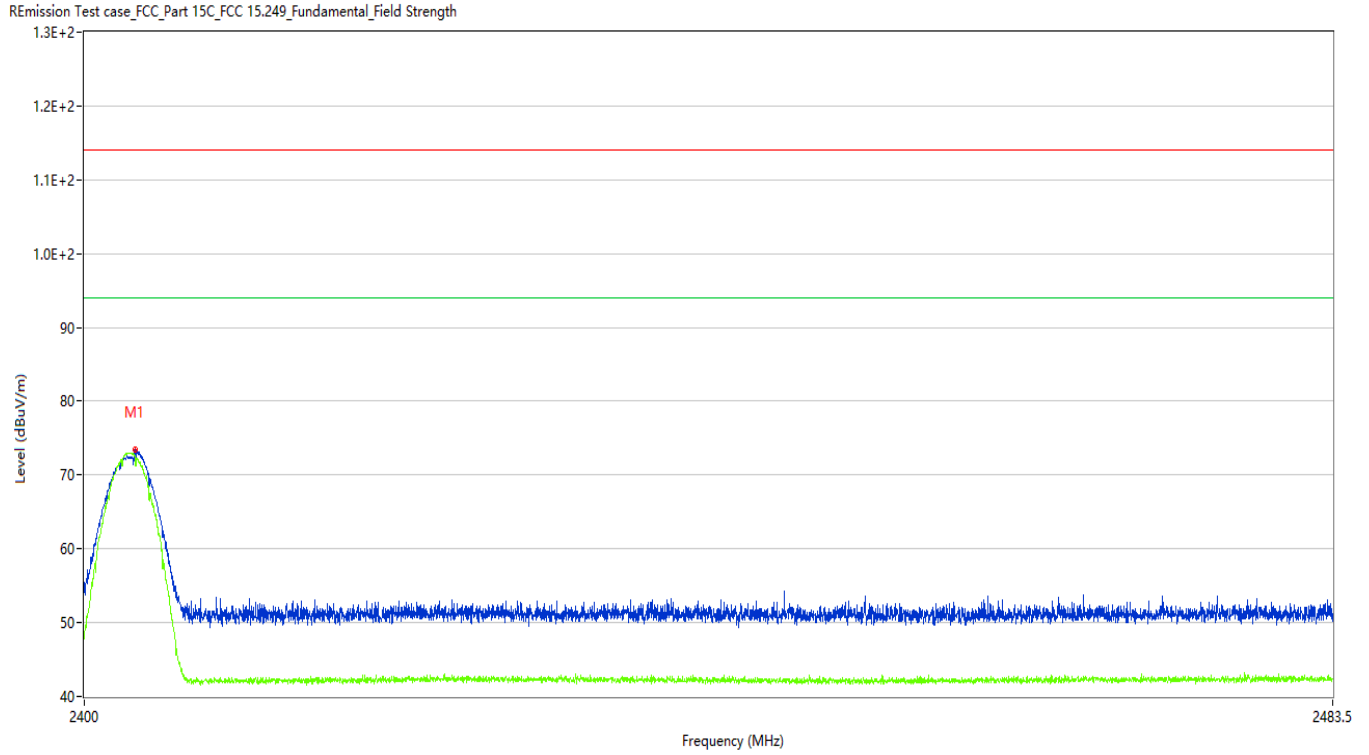
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**Figure 2: Test plots of Field strength of fundamental, 2403MHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2403.319	73.48	-10.07	114.0	40.52	Peak	171.10	100	Vertical	Pass
1**	2403.319	72.56	-10.07	94.0	21.44	AV	171.10	100	Vertical	Pass

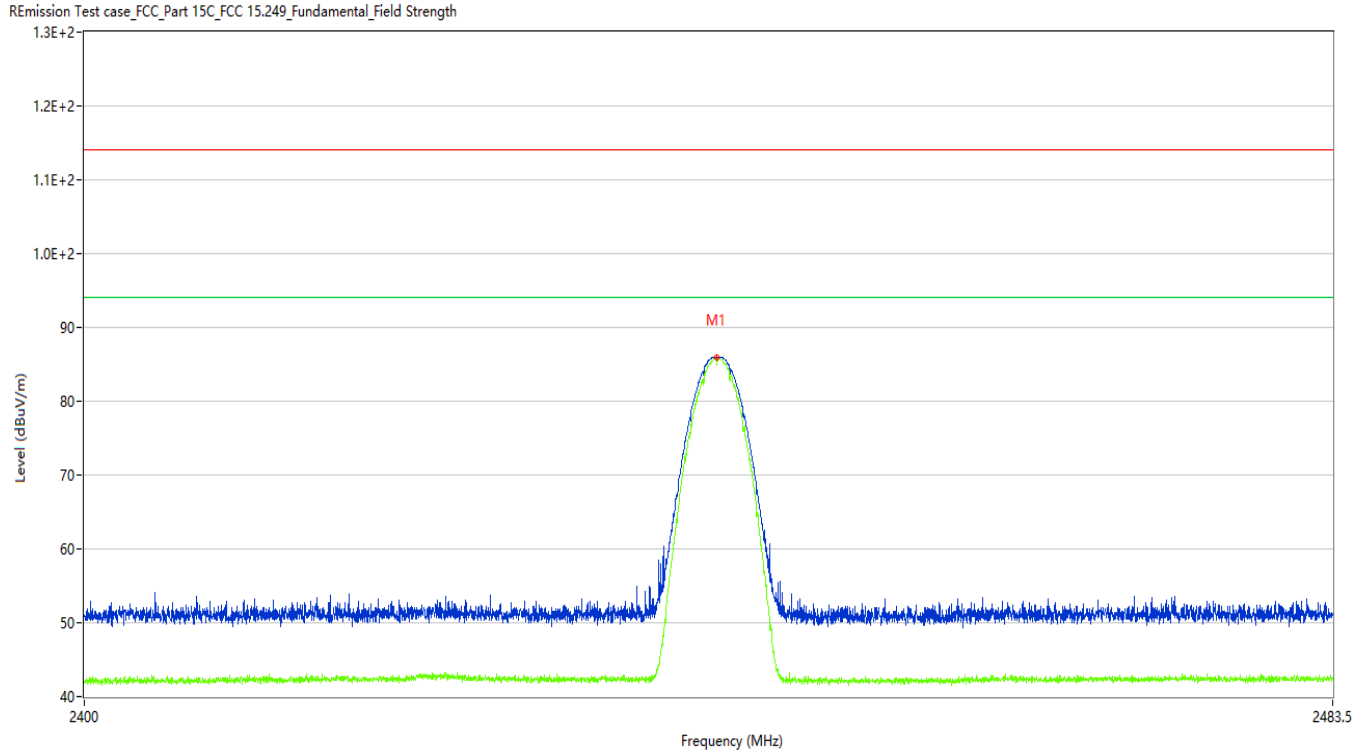
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**Figure 3: Test plots of Field strength of fundamental, 2442MHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2441.917	86.01	-9.93	114.0	27.99	Peak	125.20	100	Horizontal	Pass
1**	2441.917	85.80	-9.93	94.0	8.20	AV	125.20	100	Horizontal	Pass

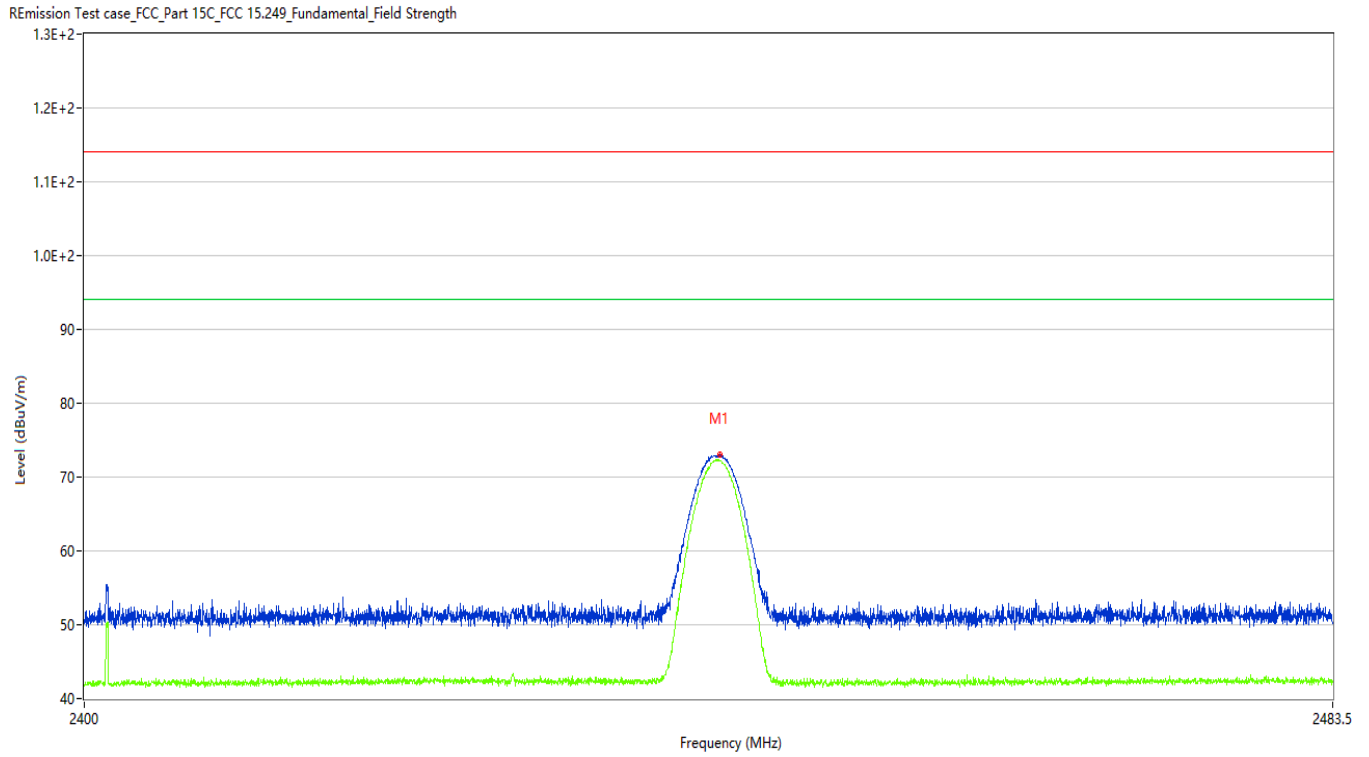
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**Figure 4: Test plots of Field strength of fundamental, 2442MHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2442.126	72.97	-9.93	114.0	41.03	Peak	359.60	100	Vertical	Pass
1**	2442.126	72.25	-9.93	94.0	21.75	AV	359.60	100	Vertical	Pass



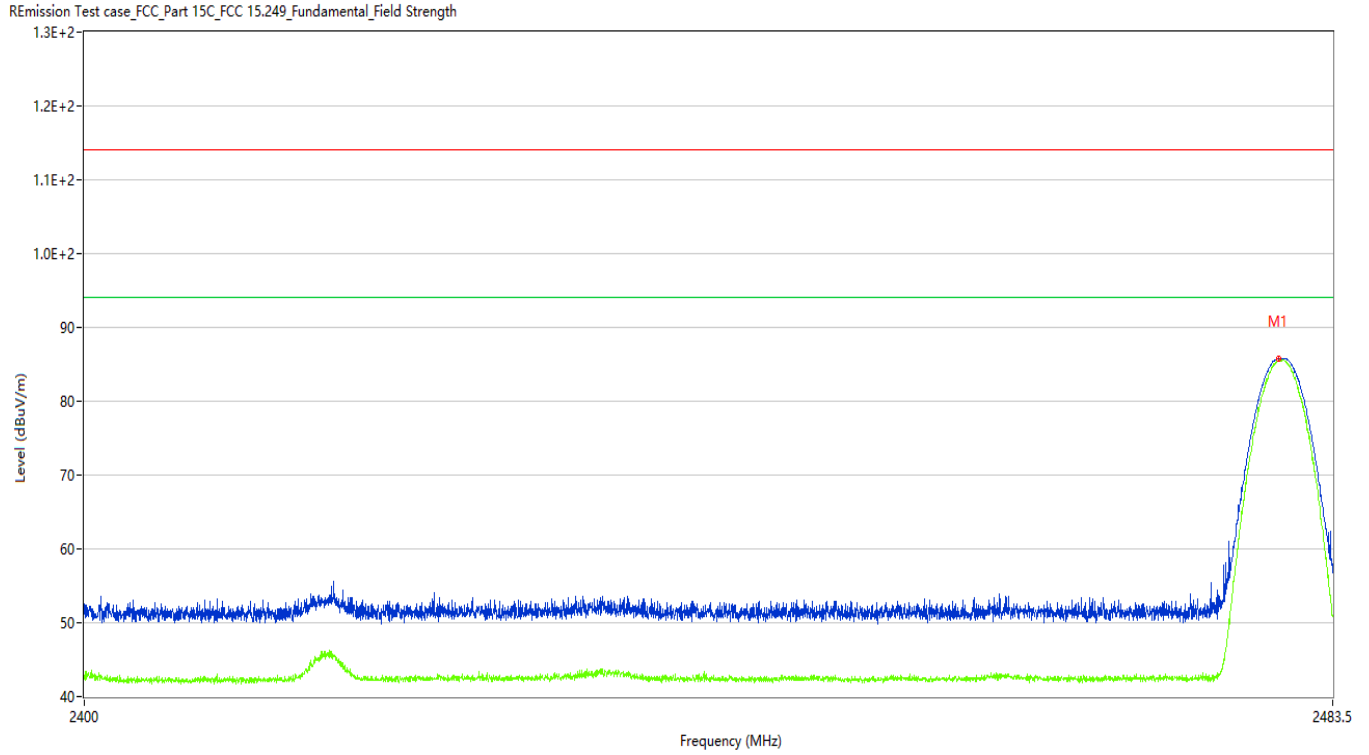
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**Figure 5: Test plots of Field strength of fundamental, 2480MHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2479.805	85.83	-9.82	114.0	28.17	Peak	0.00	100	Horizontal	Pass
1**	2479.805	85.55	-9.82	94.0	8.45	AV	0.00	100	Horizontal	Pass

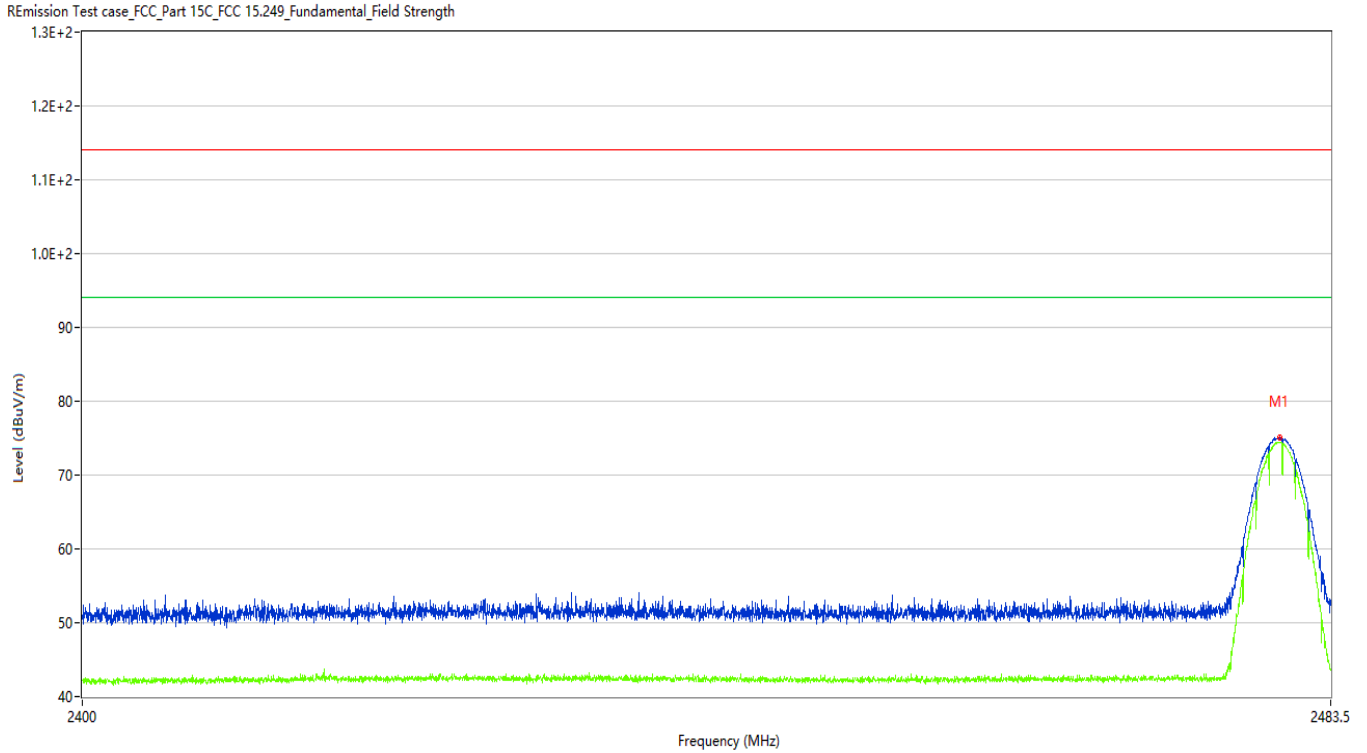
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**Figure 6: Test plots of Field strength of fundamental, 2480MHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2480.014	75.06	-9.82	114.0	38.94	Peak	246.60	100	Vertical	Pass
1**	2480.014	74.43	-9.82	94.0	19.57	AV	246.60	100	Vertical	Pass

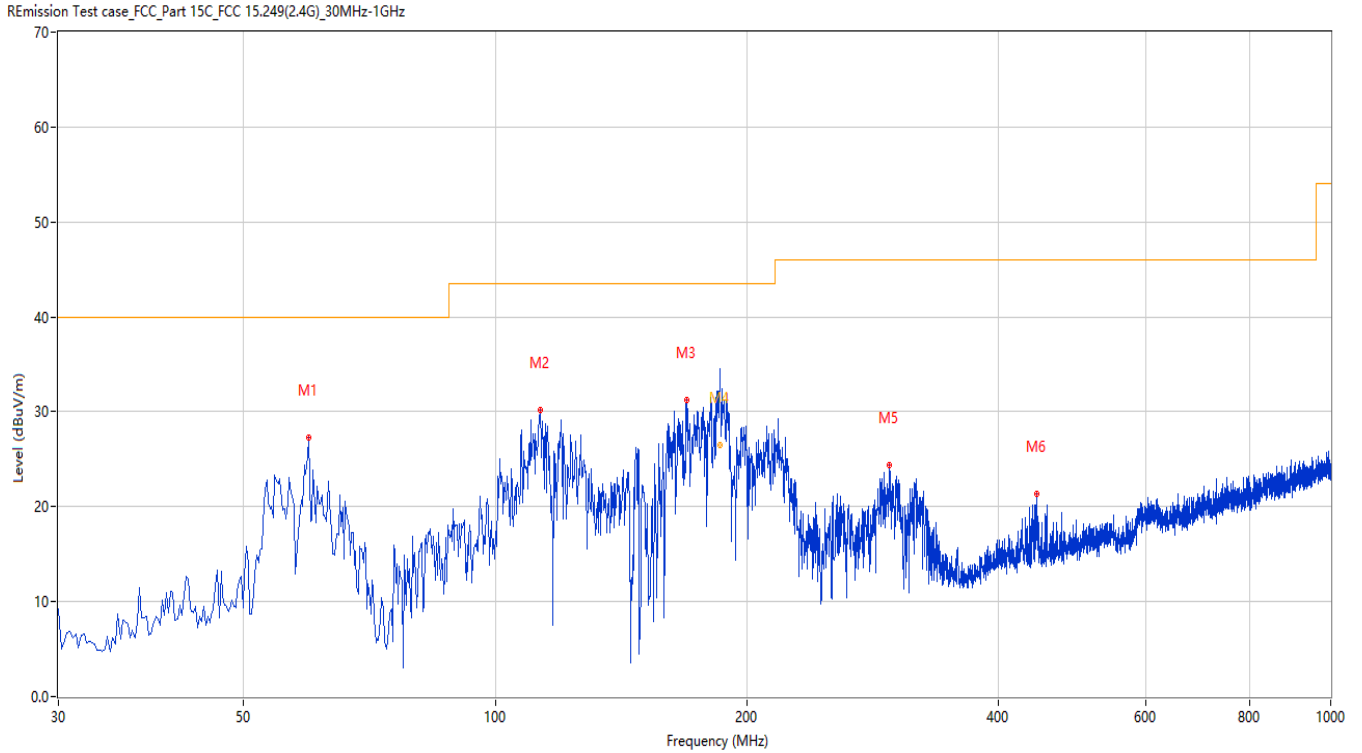
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**Figure 7: Test plots of Field strength of harmonics, 2403MHz, 30MHz-1GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	59.820	27.29	-25.35	40.0	12.71	Peak	61.50	100	Horizontal	Pass
2	113.157	30.23	-26.29	43.5	13.27	Peak	315.40	100	Horizontal	Pass
3	169.403	31.24	-28.24	43.5	12.26	Peak	40.70	100	Horizontal	Pass
4	185.941	33.72	-26.97	43.5	9.78	Peak	56.00	165	Horizontal	Pass
4*	185.941	26.53	-26.97	43.5	16.97	QP	56.00	165	Horizontal	Pass
5	296.198	24.35	-22.53	46.0	21.65	Peak	152.30	100	Horizontal	Pass
6	444.329	21.31	-18.81	46.0	24.69	Peak	260.20	100	Horizontal	Pass

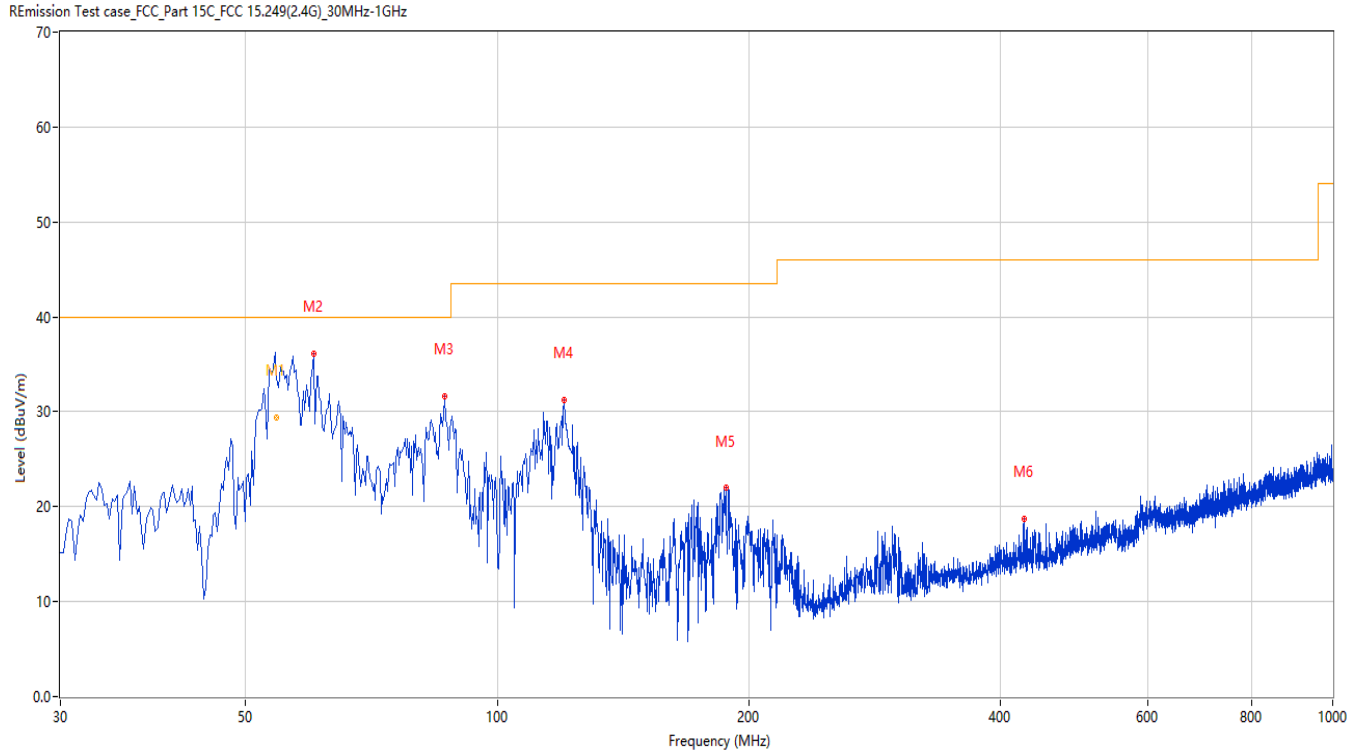
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**Figure 8: Test plots of Field strength of harmonics, 2403MHz, 30MHz-1GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	54.477	37.22	-24.33	40.0	2.78	Peak	284.60	102	Vertical	Pass
1*	54.477	29.46	-24.33	40.0	10.54	QP	284.60	102	Vertical	Pass
2	60.305	36.07	-25.48	40.0	3.93	Peak	226.10	100	Vertical	Pass
3	86.488	31.61	-28.80	40.0	8.39	Peak	226.10	100	Vertical	Pass
4	120.187	31.21	-27.40	43.5	12.29	Peak	244.70	100	Vertical	Pass
5	187.828	21.95	-26.68	43.5	21.55	Peak	102.20	100	Vertical	Pass
6	427.601	18.72	-18.80	46.0	27.28	Peak	95.90	100	Vertical	Pass

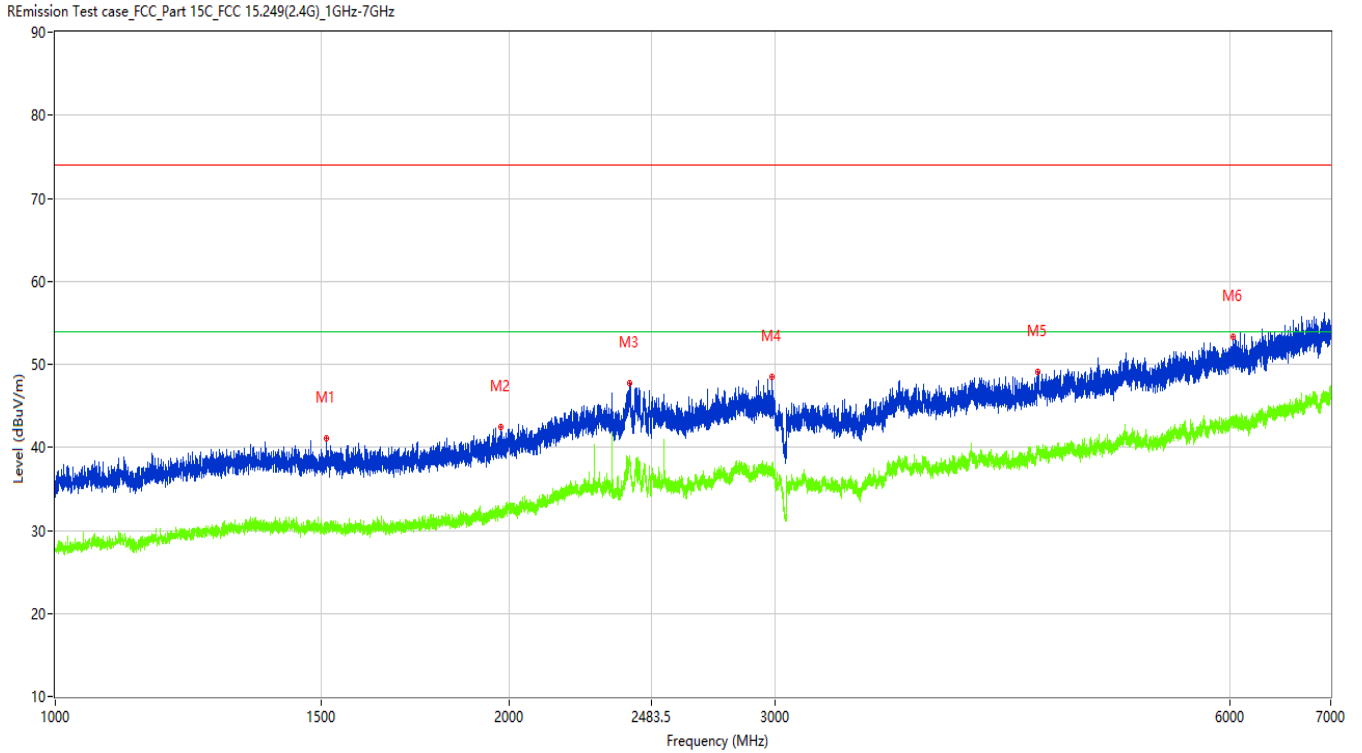
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**Figure 9: Test plots of Field strength of harmonics, 2403MHz, 1GHz-7GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1513.250	41.07	-13.05	74.0	32.93	Peak	297.00	100	Horizontal	Pass
1**	1513.250	30.08	-13.05	54.0	23.92	AV	297.00	100	Horizontal	Pass
2	1973.750	42.45	-11.20	74.0	31.55	Peak	196.90	100	Horizontal	Pass
2**	1973.750	31.91	-11.20	54.0	22.09	AV	196.90	100	Horizontal	Pass
3	2403.500	47.77	-4.74	74.0	26.23	Peak	0.00	100	Horizontal	Pass
3**	2403.500	38.58	-4.74	54.0	15.42	AV	0.00	100	Horizontal	Pass
4	2985.500	48.54	-3.60	74.0	25.46	Peak	92.30	100	Horizontal	Pass
4**	2985.500	37.42	-3.60	54.0	16.58	AV	92.30	100	Horizontal	Pass
5	4474.500	49.11	-1.50	74.0	24.89	Peak	261.50	100	Horizontal	Pass
5**	4474.500	39.59	-1.50	54.0	14.41	AV	261.50	100	Horizontal	Pass
6	6034.500	53.38	1.91	74.0	20.62	Peak	43.80	100	Horizontal	Pass
6**	6034.500	43.25	1.91	54.0	10.75	AV	43.80	100	Horizontal	Pass

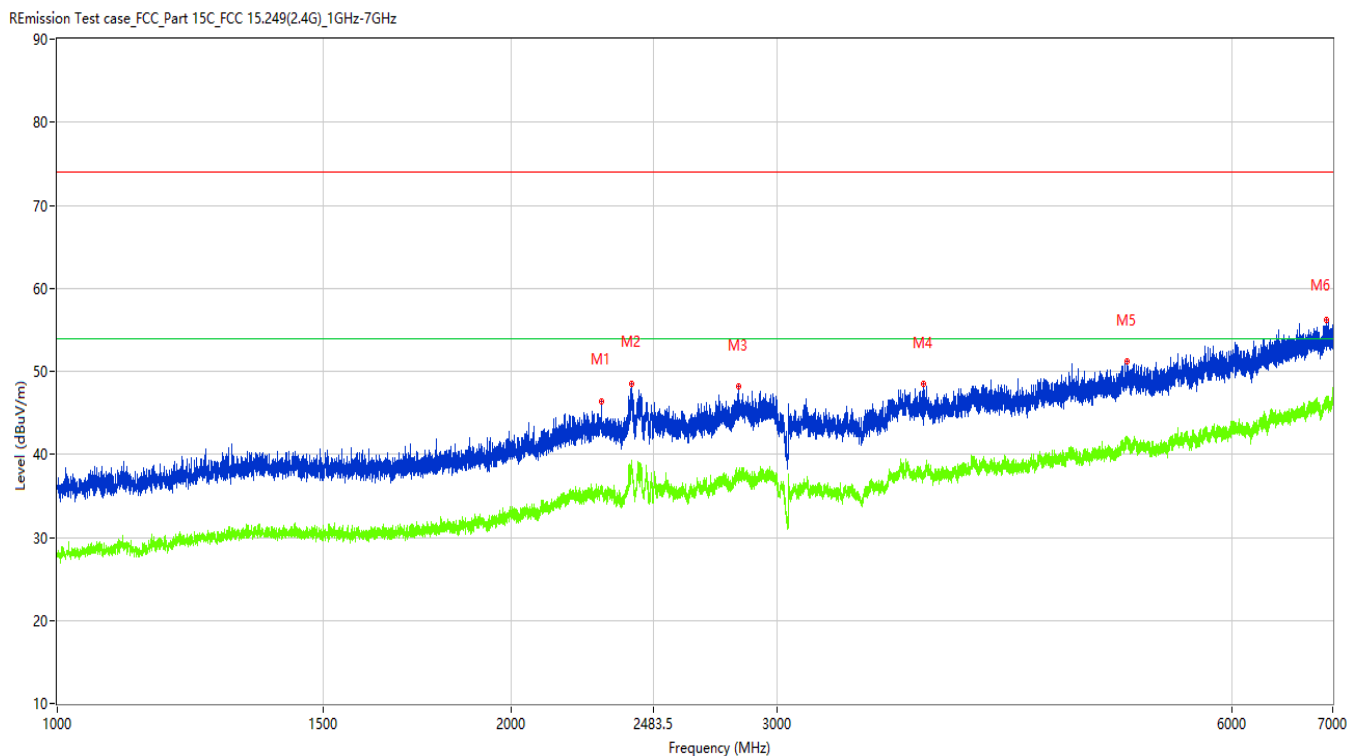
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**Figure 10: Test plots of Field strength of harmonics, 2403MHz, 1GHz-7GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2292.750	46.41	-7.56	74.0	27.59	Peak	168.30	100	Vertical	Pass
1**	2292.750	36.06	-7.56	54.0	17.94	AV	168.30	100	Vertical	Pass
2	2401.250	48.56	-4.69	74.0	25.44	Peak	168.30	100	Vertical	Pass
2**	2401.250	38.80	-4.69	54.0	15.20	AV	168.30	100	Vertical	Pass
3	2828.750	48.15	-4.59	74.0	25.85	Peak	282.90	100	Vertical	Pass
3**	2828.750	36.96	-4.59	54.0	17.04	AV	282.90	100	Vertical	Pass
4	3752.000	48.42	-2.56	74.0	25.58	Peak	30.00	100	Vertical	Pass
4**	3752.000	37.28	-2.56	54.0	16.72	AV	30.00	100	Vertical	Pass
5	5118.500	51.19	0.38	74.0	22.81	Peak	144.60	100	Vertical	Pass
5**	5118.500	41.49	0.38	54.0	12.51	AV	144.60	100	Vertical	Pass
6	6938.500	56.22	4.22	74.0	17.78	Peak	62.30	100	Vertical	Pass
6**	6938.500	46.98	4.22	54.0	7.02	AV	62.30	100	Vertical	Pass

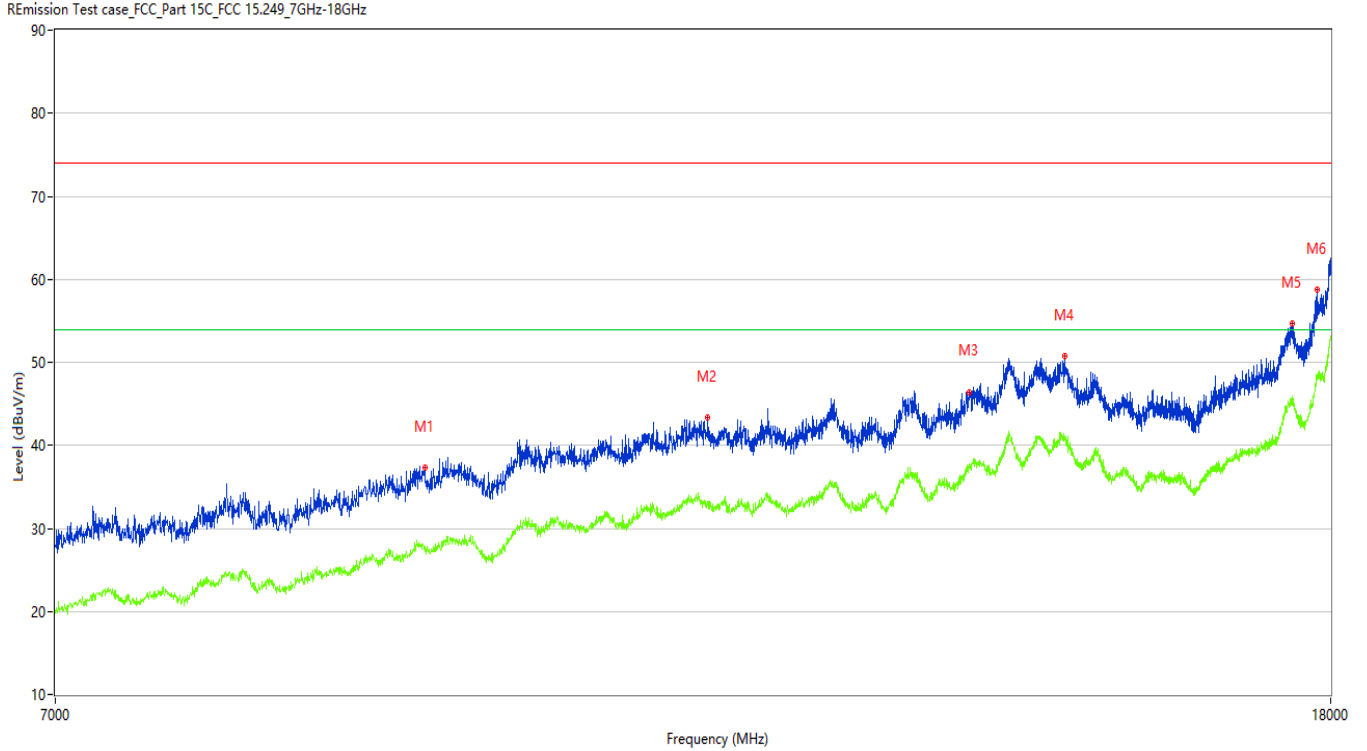
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**Figure 11: Test plots of Field strength of harmonics, 2403MHz, 7GHz-18GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	9202.750	37.28	5.83	74.0	36.72	Peak	55.40	100	Horizontal	Pass
1**	9202.750	27.85	5.83	54.0	26.15	AV	55.40	100	Horizontal	Pass
2	11350.500	43.35	11.07	74.0	30.65	Peak	0.00	100	Horizontal	Pass
2**	11350.500	33.11	11.07	54.0	20.89	AV	0.00	100	Horizontal	Pass
3	13773.250	46.44	13.96	74.0	27.56	Peak	55.40	100	Horizontal	Pass
3**	13773.250	37.05	13.96	54.0	16.95	AV	55.40	100	Horizontal	Pass
4	14785.250	50.76	17.68	74.0	23.24	Peak	55.40	100	Horizontal	Pass
4**	14785.250	41.12	17.68	54.0	12.88	AV	55.40	100	Horizontal	Pass
5	17488.501	54.67	21.68	74.0	19.33	Peak	123.50	100	Horizontal	Pass
5**	17488.501	45.03	21.68	54.0	8.97	AV	123.50	100	Horizontal	Pass
6	17826.750	58.78	23.17	74.0	15.22	Peak	8.10	100	Horizontal	Pass
6**	17826.750	48.55	23.17	54.0	5.45	AV	8.10	100	Horizontal	Pass

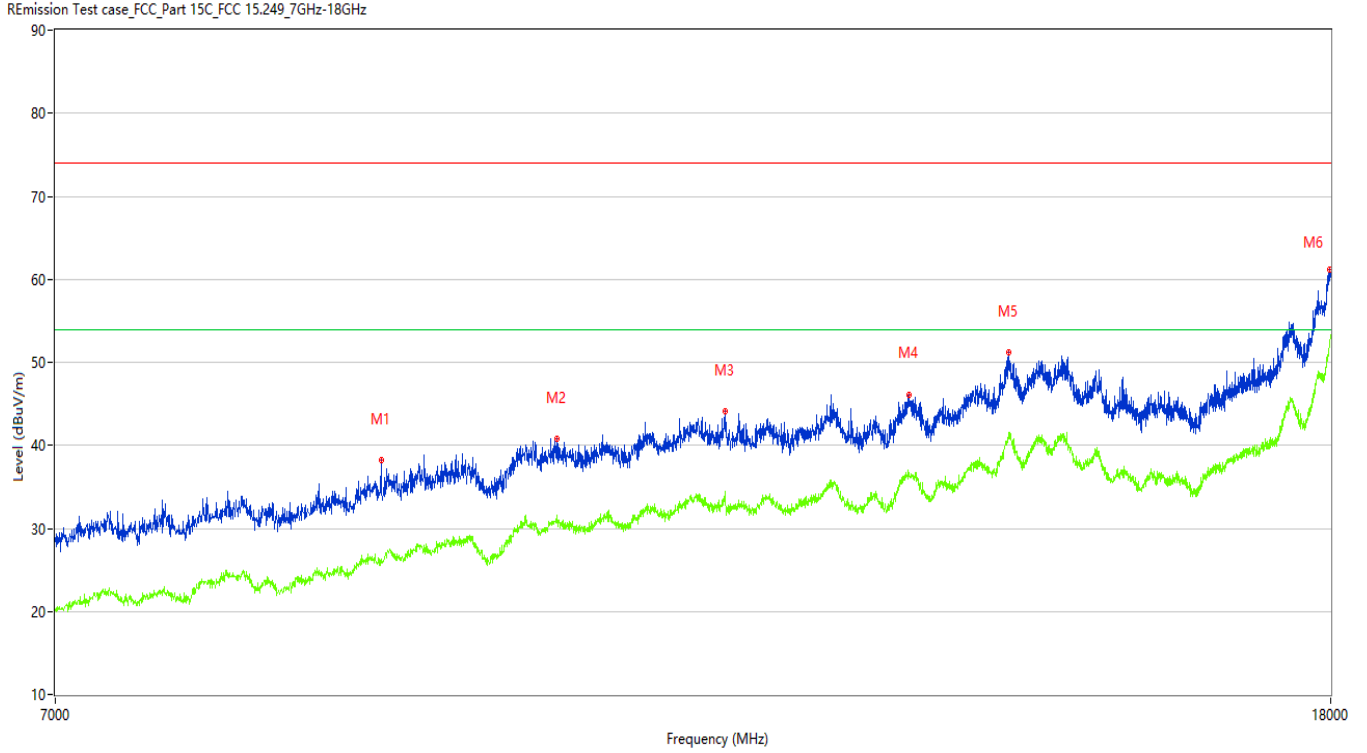
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**Figure 12: Test plots of Field strength of harmonics, 2403MHz, 7GHz-18GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8911.250	38.15	5.04	74.0	35.85	Peak	359.40	100	Vertical	Pass
1**	8911.250	25.91	5.04	54.0	28.09	AV	359.40	100	Vertical	Pass
2	10151.500	40.81	8.38	74.0	33.19	Peak	3.00	100	Vertical	Pass
2**	10151.500	31.52	8.38	54.0	22.48	AV	3.00	100	Vertical	Pass
3	11499.000	44.12	11.10	74.0	29.88	Peak	359.40	100	Vertical	Pass
3**	11499.000	33.26	11.10	54.0	20.74	AV	359.40	100	Vertical	Pass
4	13173.750	46.14	13.15	74.0	27.86	Peak	303.10	100	Vertical	Pass
4**	13173.750	36.64	13.15	54.0	17.36	AV	303.10	100	Vertical	Pass
5	14177.500	51.24	18.32	74.0	22.76	Peak	61.20	100	Vertical	Pass
5**	14177.500	41.09	18.32	54.0	12.91	AV	61.20	100	Vertical	Pass
6	17991.750	61.16	29.49	74.0	12.84	Peak	303.10	100	Vertical	Pass
6**	17991.750	52.53	29.49	54.0	1.47	AV	303.10	100	Vertical	Pass



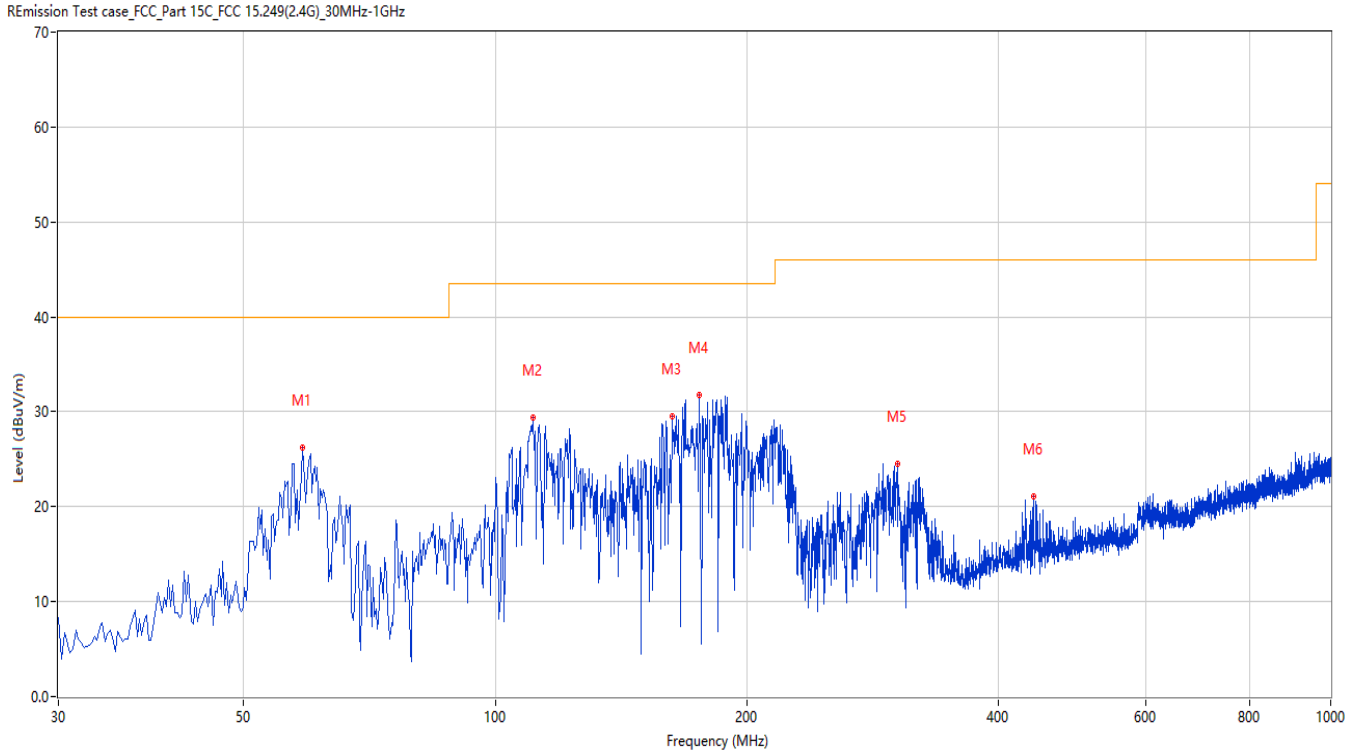
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**Figure 13: Test plots of Field strength of harmonics, 2442MHz, 30MHz-1GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	58.850	26.23	-25.12	40.0	13.77	Peak	31.70	100	Horizontal	Pass
2	110.975	29.37	-25.99	43.5	14.13	Peak	340.80	100	Horizontal	Pass
3	162.857	29.49	-28.49	43.5	14.01	Peak	91.20	100	Horizontal	Pass
4	175.221	31.75	-28.05	43.5	11.75	Peak	52.90	100	Horizontal	Pass
5	302.744	24.52	-22.71	46.0	21.48	Peak	229.90	100	Horizontal	Pass
6	440.935	21.07	-18.78	46.0	24.93	Peak	275.00	100	Horizontal	Pass

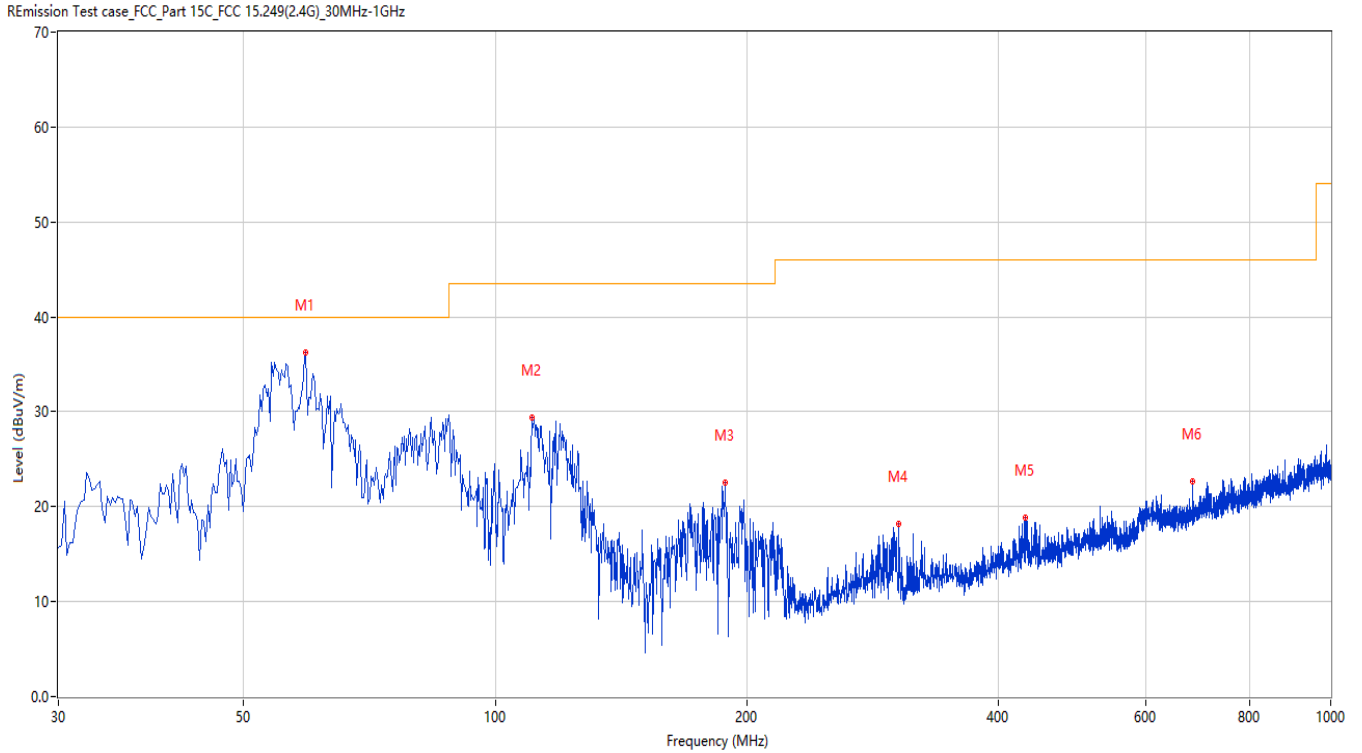
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**Figure 14: Test plots of Field strength of harmonics, 2442MHz, 30MHz-1GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	59.335	36.24	-25.24	40.0	3.76	Peak	161.40	100	Vertical	Pass
2	110.732	29.45	-25.97	43.5	14.05	Peak	318.60	100	Vertical	Pass
3	188.555	22.60	-26.57	43.5	20.90	Peak	87.40	100	Vertical	Pass
4	304.199	18.23	-22.67	46.0	27.77	Peak	213.50	100	Vertical	Pass
5	431.480	18.83	-18.90	46.0	27.17	Peak	76.20	100	Vertical	Pass
6	683.132	22.66	-13.46	46.0	23.34	Peak	360.00	100	Vertical	Pass

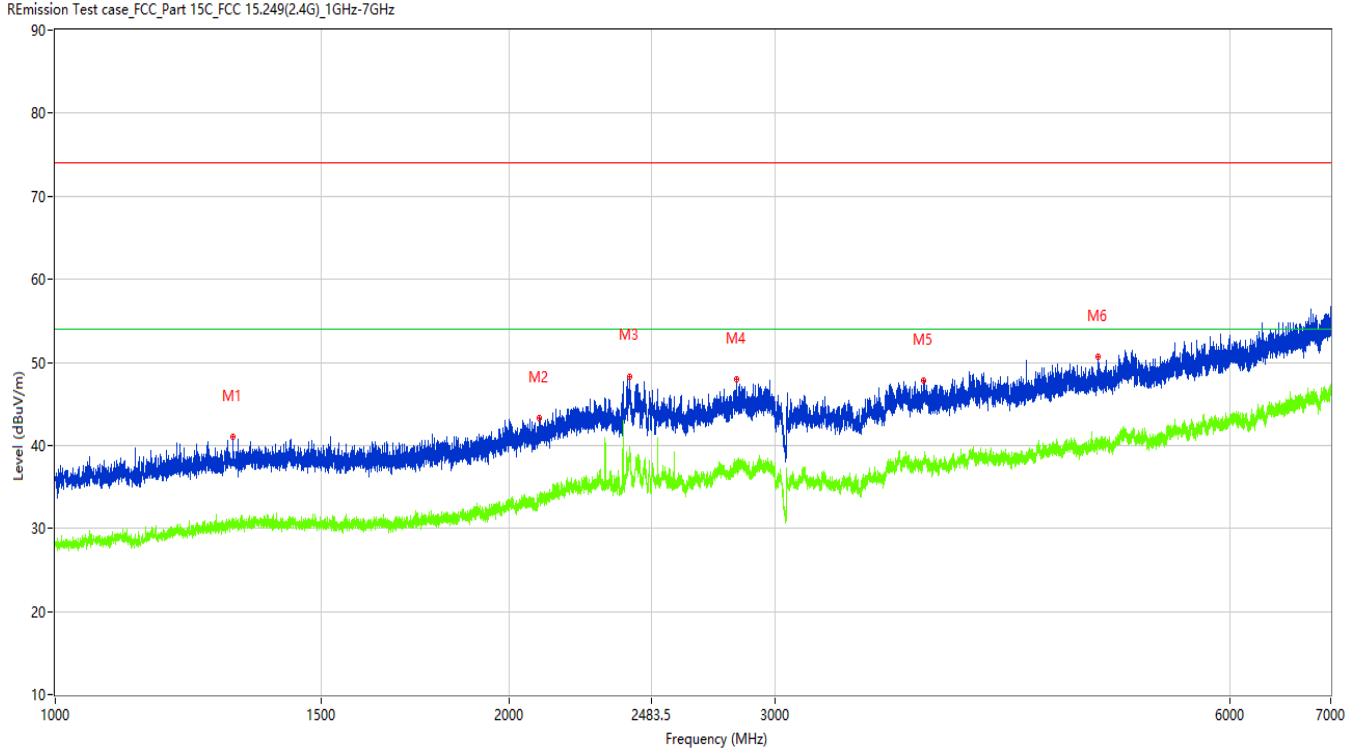
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**Figure 15: Test plots of Field strength of harmonics, 2442MHz, 1GHz-7GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1310.750	40.99	-12.81	74.0	33.01	Peak	159.30	100	Horizontal	Pass
1**	1310.750	30.36	-12.81	54.0	23.64	AV	159.30	100	Horizontal	Pass
2	2092.500	43.34	-9.42	74.0	30.66	Peak	264.20	100	Horizontal	Pass
2**	2092.500	33.31	-9.42	54.0	20.69	AV	264.20	100	Horizontal	Pass
3	2401.500	48.33	-4.70	74.0	25.67	Peak	81.20	100	Horizontal	Pass
3**	2401.500	38.74	-4.70	54.0	15.26	AV	81.20	100	Horizontal	Pass
4	2828.500	47.99	-4.59	74.0	26.01	Peak	173.00	100	Horizontal	Pass
4**	2828.500	37.91	-4.59	54.0	16.09	AV	173.00	100	Horizontal	Pass
5	3763.500	47.85	-2.50	74.0	26.15	Peak	283.40	100	Horizontal	Pass
5**	3763.500	38.45	-2.50	54.0	15.55	AV	283.40	100	Horizontal	Pass
6	4908.500	50.64	-0.78	74.0	23.36	Peak	283.40	100	Horizontal	Pass
6**	4908.500	40.29	-0.78	54.0	13.71	AV	283.40	100	Horizontal	Pass

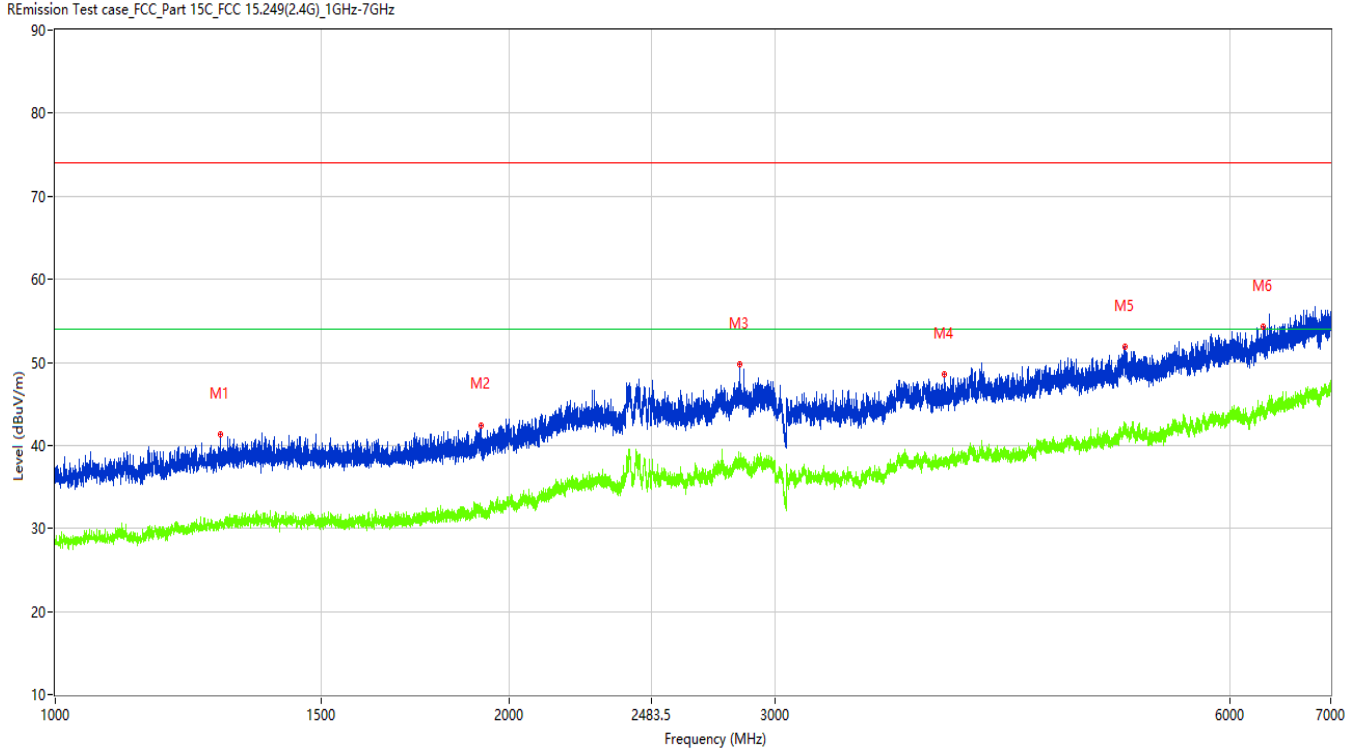
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**Figure 16: Test plots of Field strength of harmonics, 2442MHz, 1GHz-7GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1286.750	41.30	-13.02	74.0	32.70	Peak	279.60	100	Vertical	Pass
1**	1286.750	31.14	-13.02	54.0	22.86	AV	279.60	100	Vertical	Pass
2	1913.750	42.45	-11.62	74.0	31.55	Peak	45.80	100	Vertical	Pass
2**	1913.750	32.57	-11.62	54.0	21.43	AV	45.80	100	Vertical	Pass
3	2842.500	49.81	-4.31	74.0	24.19	Peak	80.00	100	Vertical	Pass
3**	2842.500	38.11	-4.31	54.0	15.89	AV	80.00	100	Vertical	Pass
4	3884.000	48.58	-2.72	74.0	25.42	Peak	311.30	100	Vertical	Pass
4**	3884.000	38.45	-2.72	54.0	15.55	AV	311.30	100	Vertical	Pass
5	5115.000	51.86	0.40	74.0	22.14	Peak	58.00	100	Vertical	Pass
5**	5115.000	42.19	0.40	54.0	11.81	AV	58.00	100	Vertical	Pass
6	6316.500	54.29	2.42	74.0	19.71	Peak	168.10	100	Vertical	Pass
6**	6316.500	44.36	2.42	54.0	9.64	AV	168.10	100	Vertical	Pass

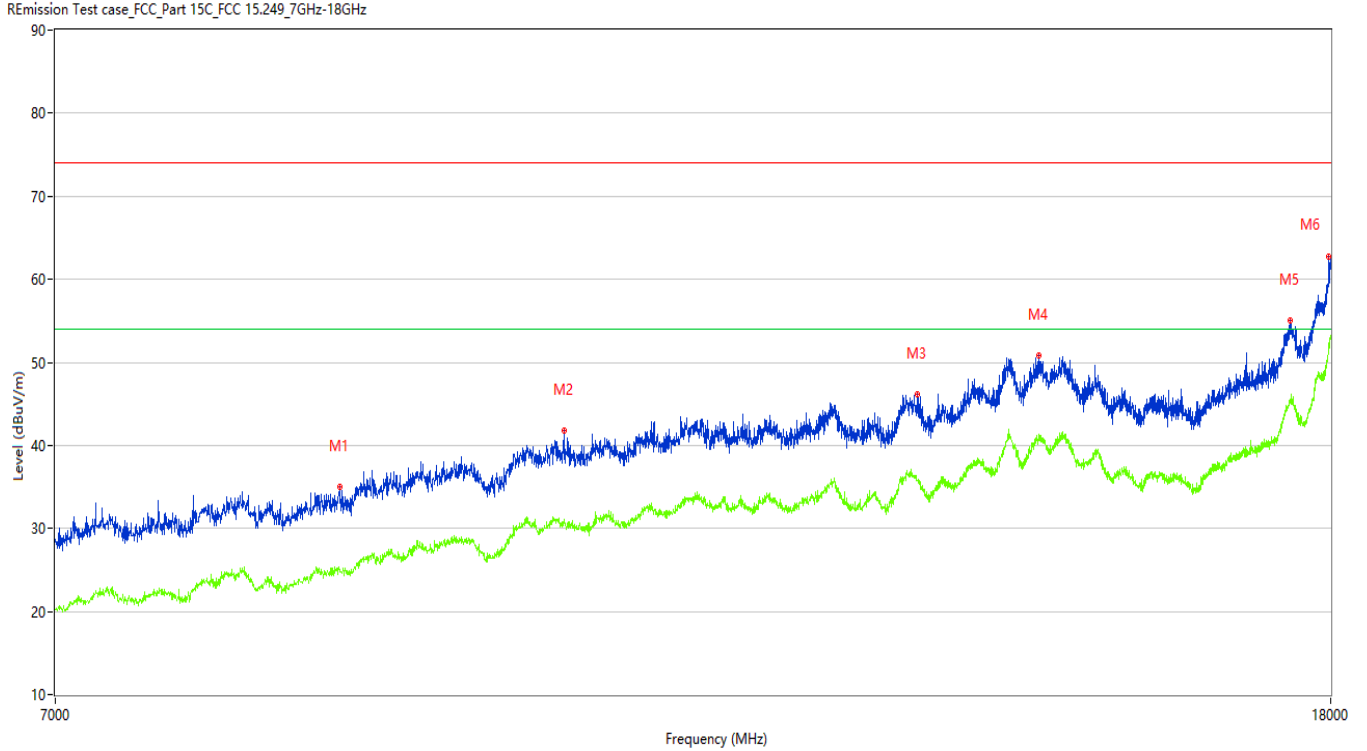
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**Figure 17: Test plots of Field strength of harmonics, 2442MHz, 7GHz-18GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8644.500	34.96	3.81	74.0	39.04	Peak	359.80	100	Horizontal	Pass
1**	8644.500	24.84	3.81	54.0	29.16	AV	359.80	100	Horizontal	Pass
2	10201.000	41.74	8.29	74.0	32.26	Peak	169.70	100	Horizontal	Pass
2**	10201.000	30.66	8.29	54.0	23.34	AV	169.70	100	Horizontal	Pass
3	13256.250	46.12	13.02	74.0	27.88	Peak	262.30	100	Horizontal	Pass
3**	13256.250	35.82	13.02	54.0	18.18	AV	262.30	100	Horizontal	Pass
4	14499.250	50.87	16.82	74.0	23.13	Peak	262.30	100	Horizontal	Pass
4**	14499.250	41.34	16.82	54.0	12.66	AV	262.30	100	Horizontal	Pass
5	17463.751	54.97	21.24	74.0	19.03	Peak	322.20	100	Horizontal	Pass
5**	17463.751	45.41	21.24	54.0	8.59	AV	322.20	100	Horizontal	Pass
6	17972.500	62.72	28.24	74.0	11.28	Peak	93.00	100	Horizontal	Pass
6**	17972.500	51.40	28.24	54.0	2.60	AV	93.00	100	Horizontal	Pass

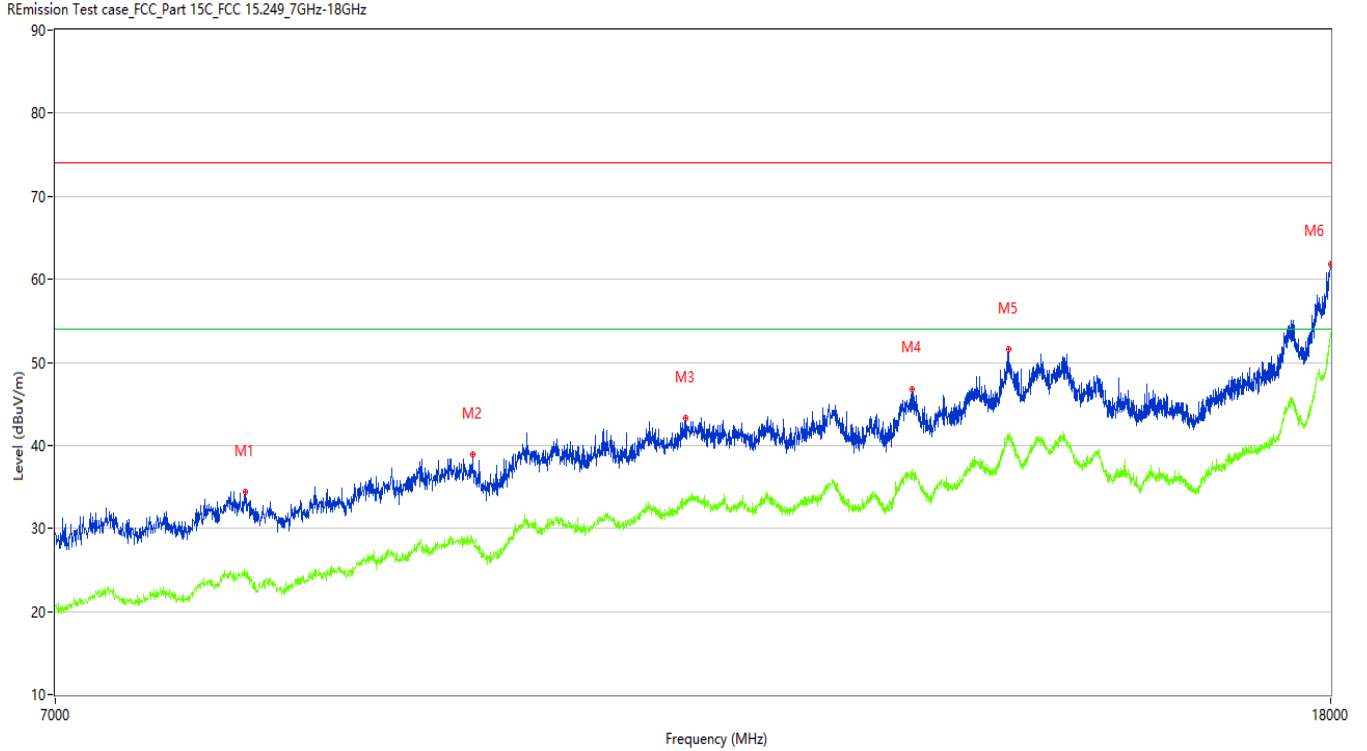
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**Figure 18: Test plots of Field strength of harmonics, 2442MHz, 7GHz-18GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8058.750	34.42	3.62	74.0	39.58	Peak	352.00	100	Vertical	Pass
1**	8058.750	24.69	3.62	54.0	29.31	AV	352.00	100	Vertical	Pass
2	9532.750	38.94	7.20	74.0	35.06	Peak	320.70	100	Vertical	Pass
2**	9532.750	28.70	7.20	54.0	25.30	AV	320.70	100	Vertical	Pass
3	11166.250	43.28	10.12	74.0	30.72	Peak	48.40	100	Vertical	Pass
3**	11166.250	33.55	10.12	54.0	20.45	AV	48.40	100	Vertical	Pass
4	13204.000	46.81	13.22	74.0	27.19	Peak	254.90	100	Vertical	Pass
4**	13204.000	36.39	13.22	54.0	17.61	AV	254.90	100	Vertical	Pass
5	14180.250	51.55	18.41	74.0	22.45	Peak	0.00	100	Vertical	Pass
5**	14180.250	41.04	18.41	54.0	12.96	AV	0.00	100	Vertical	Pass
6	17994.500	61.88	29.67	74.0	12.12	Peak	0.00	100	Vertical	Pass
6**	17994.500	53.23	29.67	54.0	0.77	AV	0.00	100	Vertical	Pass

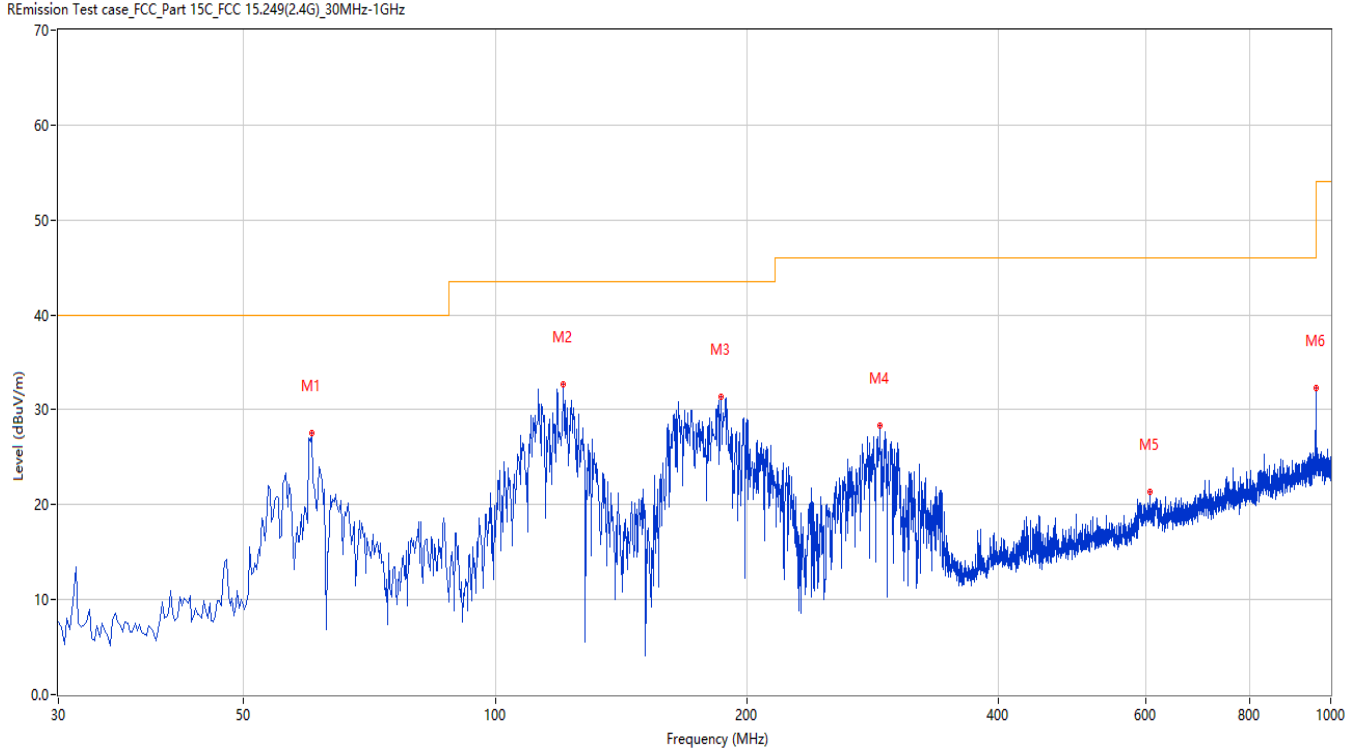
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**Figure 19: Test plots of Field strength of harmonics, 2480MHz, 30MHz-1GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	60.305	27.58	-25.48	40.0	12.42	Peak	198.70	100	Horizontal	Pass
2	120.672	32.69	-27.46	43.5	10.81	Peak	119.10	100	Horizontal	Pass
3	186.373	31.43	-26.90	43.5	12.07	Peak	123.20	100	Horizontal	Pass
4	288.683	28.41	-22.60	46.0	17.59	Peak	176.40	100	Horizontal	Pass
5	607.733	21.39	-13.43	46.0	24.61	Peak	131.40	100	Horizontal	Pass
6	959.513	32.34	-7.59	46.0	13.66	Peak	189.10	100	Horizontal	Pass

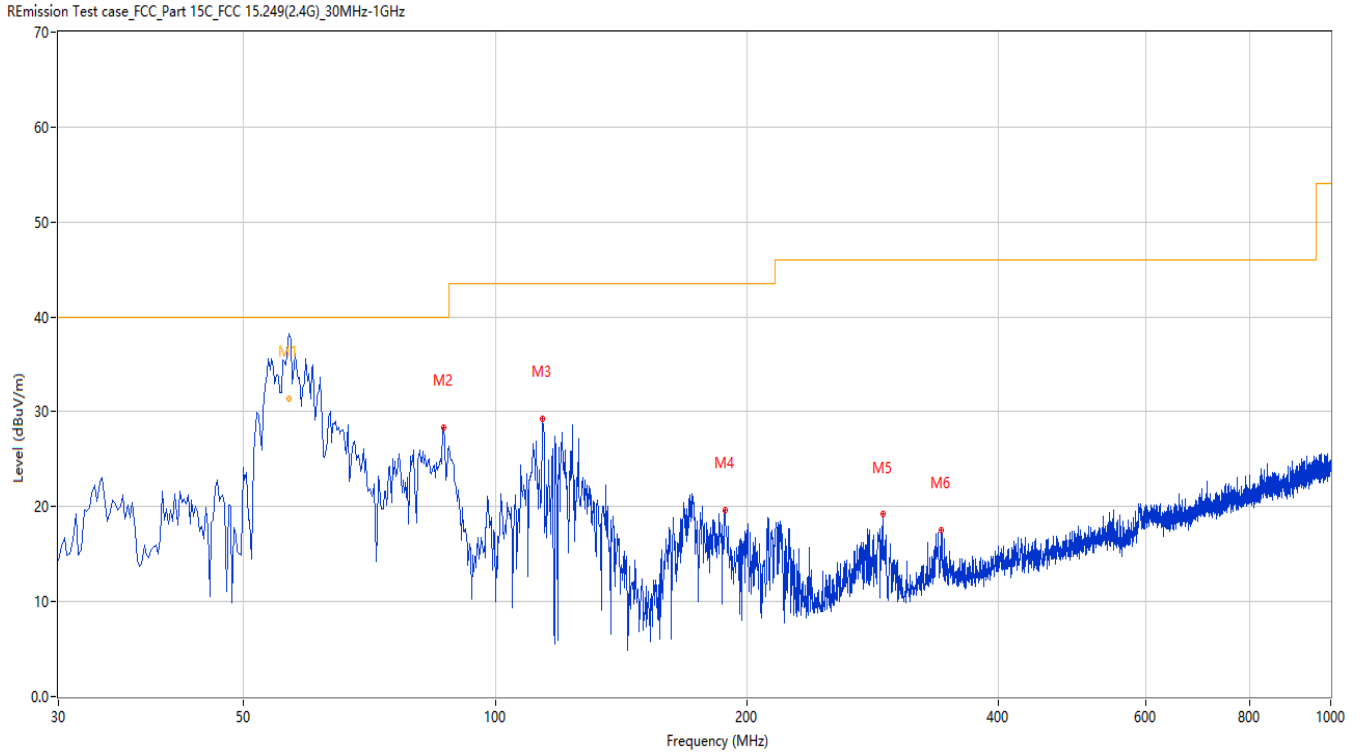
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**Figure 20: Test plots of Field strength of harmonics, 2480MHz, 30MHz-1GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	56.690	38.54	-24.68	40.0	1.46	Peak	278.80	100	Vertical	Pass
1*	56.690	31.34	-24.68	40.0	8.66	QP	278.80	100	Vertical	Pass
2	86.731	28.35	-28.70	40.0	11.65	Peak	357.90	100	Vertical	Pass
3	113.884	29.28	-26.41	43.5	14.22	Peak	235.30	100	Vertical	Pass
4	188.313	19.67	-26.61	43.5	23.83	Peak	67.80	100	Vertical	Pass
5	290.865	19.19	-22.56	46.0	26.81	Peak	0.70	100	Vertical	Pass
6	341.777	17.51	-20.62	46.0	28.49	Peak	320.80	100	Vertical	Pass



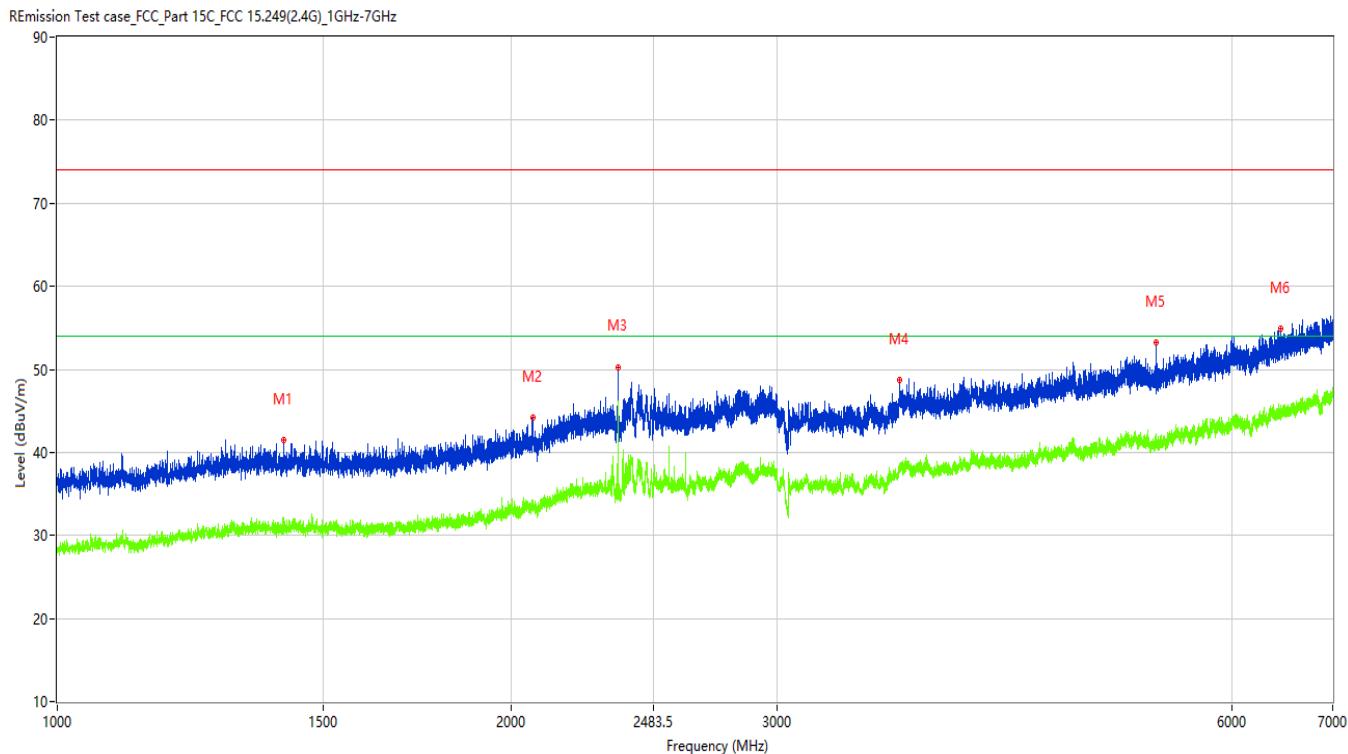
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**Figure 21: Test plots of Field strength of harmonics, 2480MHz, 1GHz-7GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1412.000	41.49	-12.71	74.0	32.51	Peak	6.00	100	Horizontal	Pass
1**	1412.000	31.03	-12.71	54.0	22.97	AV	6.00	100	Horizontal	Pass
2	2067.250	44.21	-9.85	74.0	29.79	Peak	6.00	100	Horizontal	Pass
2**	2067.250	33.38	-9.85	54.0	20.62	AV	6.00	100	Horizontal	Pass
3	2352.250	50.29	-8.20	74.0	23.71	Peak	119.50	100	Horizontal	Pass
3**	2352.250	46.23	-8.20	54.0	7.77	AV	119.50	100	Horizontal	Pass
4	3617.500	48.65	-2.42	74.0	25.35	Peak	106.70	100	Horizontal	Pass
4**	3617.500	38.03	-2.42	54.0	15.97	AV	106.70	100	Horizontal	Pass
5	5346.000	53.17	-0.55	74.0	20.83	Peak	348.50	100	Horizontal	Pass
5**	5346.000	41.55	-0.55	54.0	12.45	AV	348.50	100	Horizontal	Pass
6	6468.000	54.89	2.86	74.0	19.11	Peak	137.90	100	Horizontal	Pass
6**	6468.000	44.88	2.86	54.0	9.12	AV	137.90	100	Horizontal	Pass

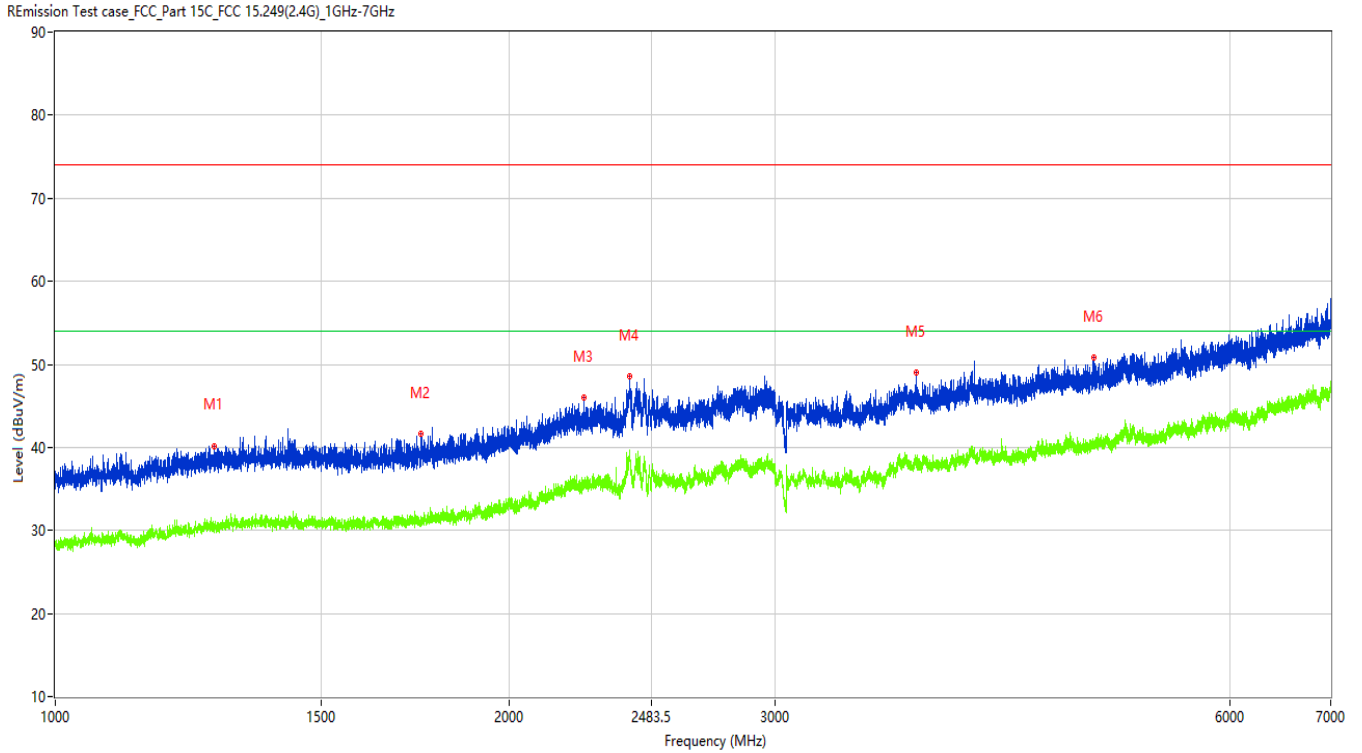
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**Figure 22: Test plots of Field strength of harmonics, 2480MHz, 1GHz-7GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1274.500	40.19	-13.10	74.0	33.81	Peak	207.70	100	Vertical	Pass
1**	1274.500	30.51	-13.10	54.0	23.49	AV	207.70	100	Vertical	Pass
2	1748.000	41.67	-12.57	74.0	32.33	Peak	176.80	100	Vertical	Pass
2**	1748.000	31.65	-12.57	54.0	22.35	AV	176.80	100	Vertical	Pass
3	2241.250	45.99	-8.07	74.0	28.01	Peak	192.80	100	Vertical	Pass
3**	2241.250	35.84	-8.07	54.0	18.16	AV	192.80	100	Vertical	Pass
4	2402.750	48.53	-4.72	74.0	25.47	Peak	269.10	100	Vertical	Pass
4**	2402.750	38.78	-4.72	54.0	15.22	AV	269.10	100	Vertical	Pass
5	3722.000	49.01	-2.67	74.0	24.99	Peak	344.80	100	Vertical	Pass
5**	3722.000	38.47	-2.67	54.0	15.53	AV	344.80	100	Vertical	Pass
6	4876.500	50.86	-0.84	74.0	23.14	Peak	88.50	100	Vertical	Pass
6**	4876.500	40.47	-0.84	54.0	13.53	AV	88.50	100	Vertical	Pass

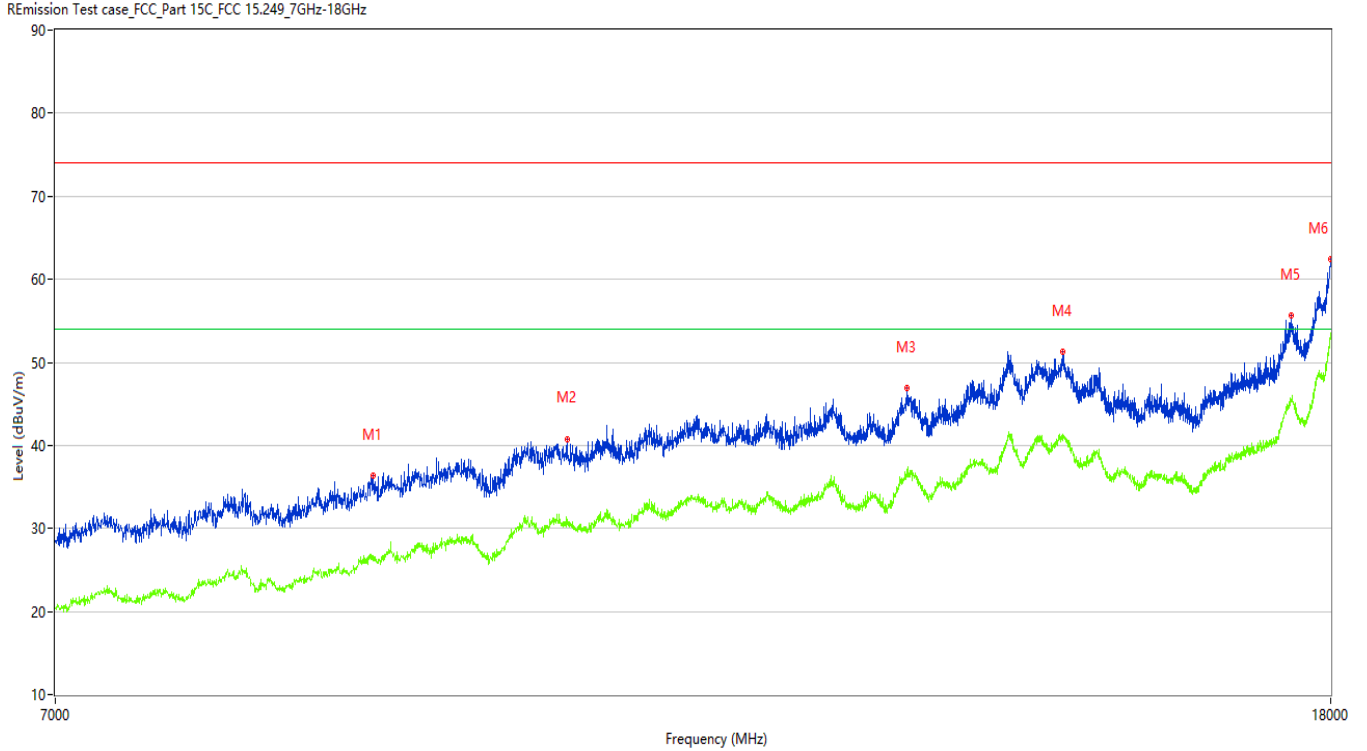
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**Figure 23: Test plots of Field strength of harmonics, 2480MHz, 7GHz-18GHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8856.250	36.29	4.42	74.0	37.71	Peak	292.60	100	Horizontal	Pass
1**	8856.250	26.68	4.42	54.0	27.32	AV	292.60	100	Horizontal	Pass
2	10225.750	40.80	8.30	74.0	33.20	Peak	19.80	100	Horizontal	Pass
2**	10225.750	30.55	8.30	54.0	23.45	AV	19.80	100	Horizontal	Pass
3	13154.500	46.93	13.11	74.0	27.07	Peak	360.00	100	Horizontal	Pass
3**	13154.500	36.89	13.11	54.0	17.11	AV	360.00	100	Horizontal	Pass
4	14763.250	51.29	17.97	74.0	22.71	Peak	244.20	100	Horizontal	Pass
4**	14763.250	40.95	17.97	54.0	13.05	AV	244.20	100	Horizontal	Pass
5	17483.000	55.72	21.70	74.0	18.28	Peak	87.20	100	Horizontal	Pass
5**	17483.000	45.34	21.70	54.0	8.66	AV	87.20	100	Horizontal	Pass
6	17997.251	62.42	29.85	74.0	11.58	Peak	150.40	100	Horizontal	Pass
6**	17997.251	52.90	29.85	54.0	1.10	AV	150.40	100	Horizontal	Pass

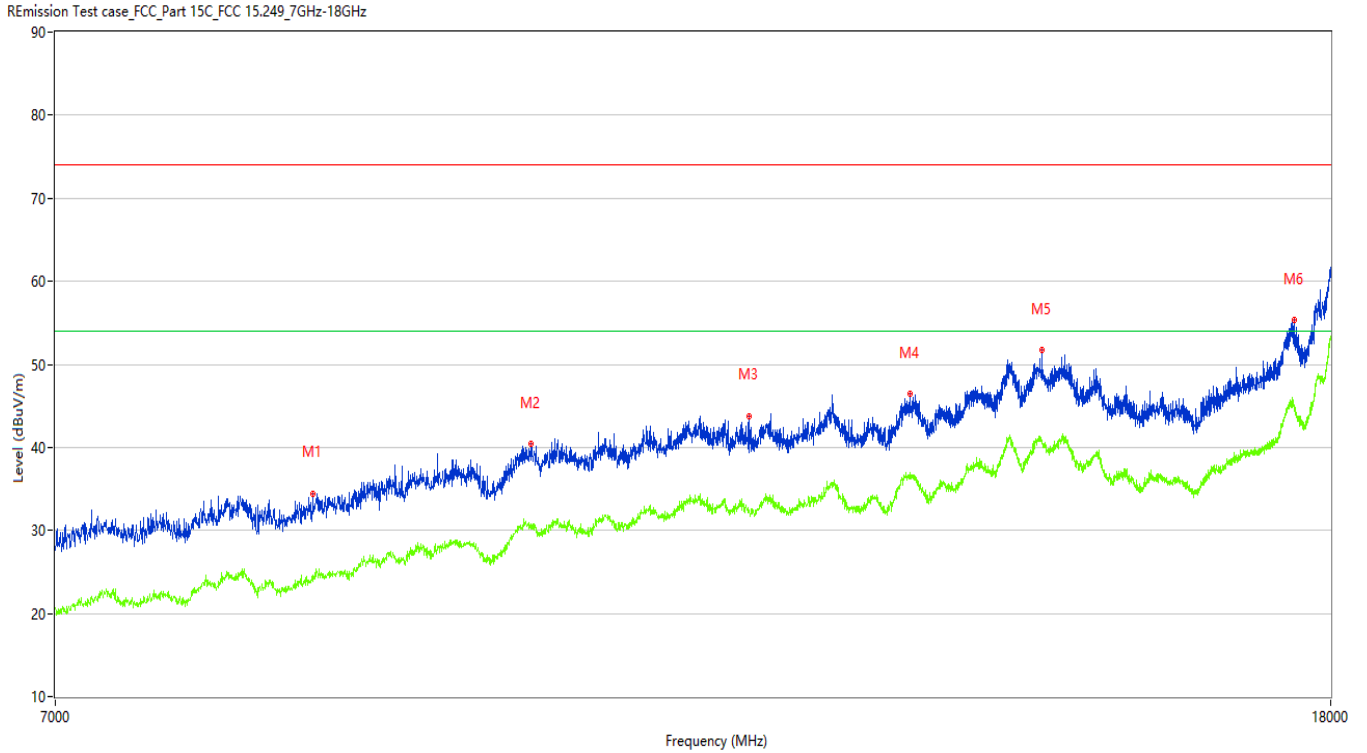
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**Figure 24: Test plots of Field strength of harmonics, 2480MHz, 7GHz-18GHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8471.250	34.46	2.85	74.0	39.54	Peak	107.30	100	Vertical	Pass
1**	8471.250	24.41	2.85	54.0	29.59	AV	107.30	100	Vertical	Pass
2	9959.000	40.41	8.70	74.0	33.59	Peak	230.60	100	Vertical	Pass
2**	9959.000	30.56	8.70	54.0	23.44	AV	230.60	100	Vertical	Pass
3	11697.000	43.81	10.33	74.0	30.19	Peak	279.00	100	Vertical	Pass
3**	11697.000	32.40	10.33	54.0	21.60	AV	279.00	100	Vertical	Pass
4	13179.250	46.50	13.16	74.0	27.50	Peak	29.20	100	Vertical	Pass
4**	13179.250	36.32	13.16	54.0	17.68	AV	29.20	100	Vertical	Pass
5	14537.750	51.67	16.51	74.0	22.33	Peak	44.80	100	Vertical	Pass
5**	14537.750	40.81	16.51	54.0	13.19	AV	44.80	100	Vertical	Pass
6	17518.750	55.32	21.09	74.0	18.68	Peak	279.00	100	Vertical	Pass
6**	17518.750	45.05	21.09	54.0	8.95	AV	279.00	100	Vertical	Pass

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## 4.1.3 Band Edge

RESULT:

**PASS**

Test standard : FCC Part 15.249(d), 15.209  
RSS-210 B.10(b), RSS-GEN 8.10

Requirement : ANSI C63.10-2013

Kind of test site : 3m Semi-Anechoic Chamber

### Test setup

Test Channel : Low/High

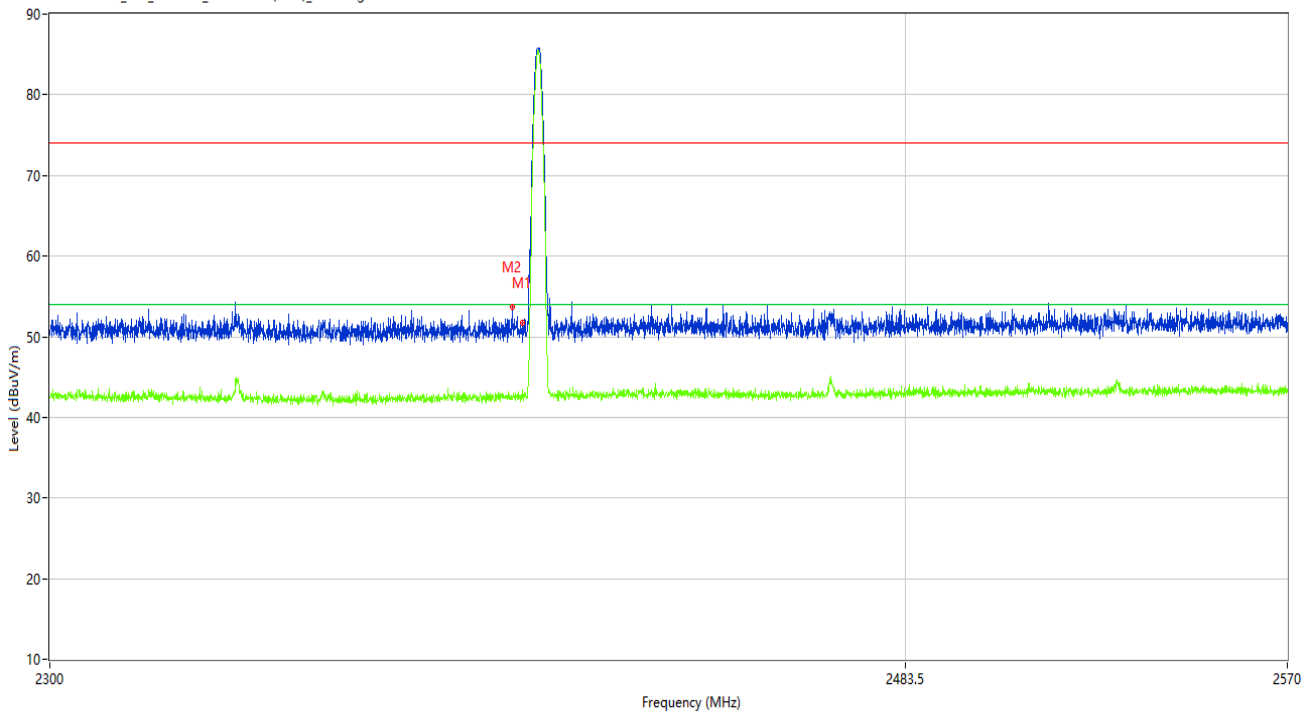
Operation Mode : A.i/iii

Ambient temperature : 22.5°C

Relative humidity : 48%

Figure 25: Test plots of Band Edge, 2403MHz, Horizontal polarization

REmission Test case\_FCC\_Part 15C\_FCC 15.249(2.4G)\_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2400.000	51.39	-10.13	74.0	22.61	Peak	360.00	100	Horizontal	Pass
1**	2400.000	42.91	-10.13	54.0	11.09	AV	360.00	100	Horizontal	Pass
2	2397.470	53.73	-10.17	74.0	20.27	Peak	314.10	100	Horizontal	Pass
2**	2397.470	42.55	-10.17	54.0	11.45	AV	314.10	100	Horizontal	Pass

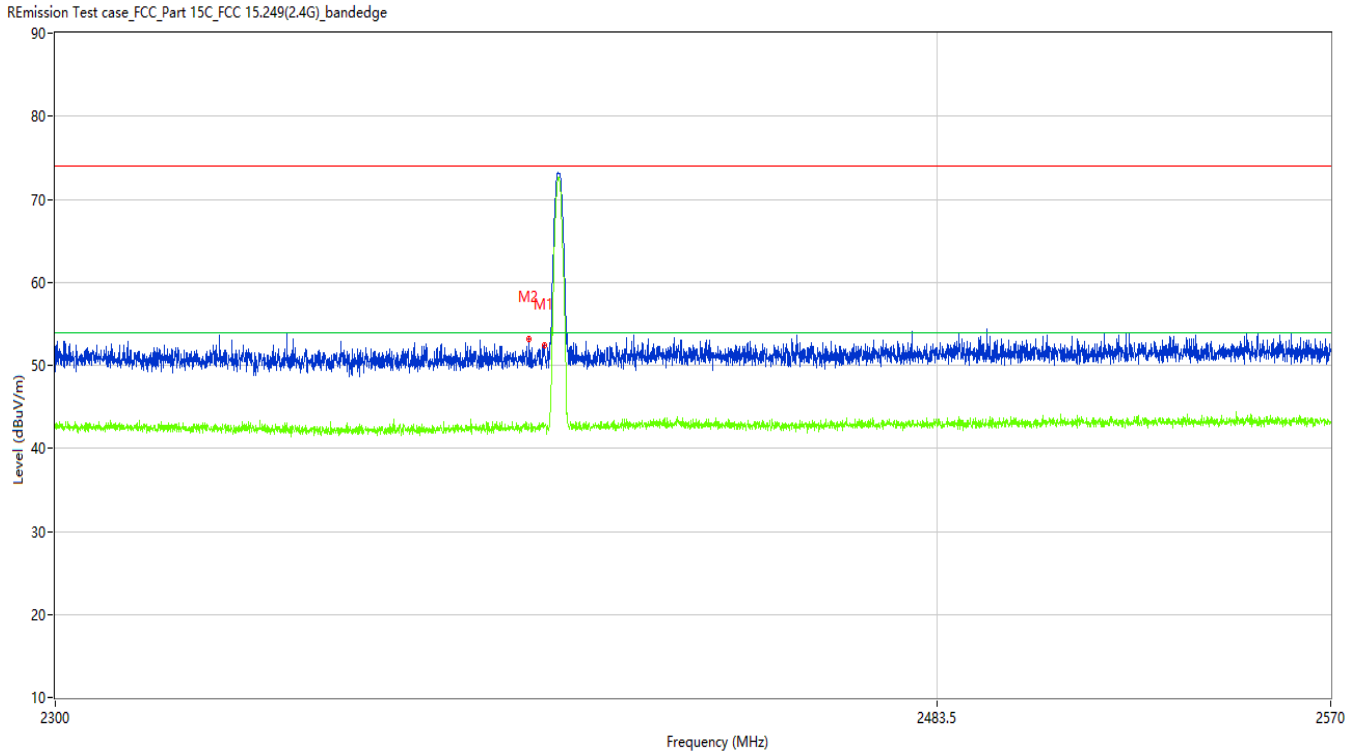
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**Figure 26: Test plots of Band Edge, 2403MHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2400.000	52.44	-10.13	74.0	21.56	Peak	44.35	100	Vertical	Pass
1**	2400.000	42.70	-10.13	54.0	11.30	AV	44.35	100	Vertical	Pass
2	2396.795	53.14	-10.18	74.0	20.86	Peak	86.80	100	Vertical	Pass
2**	2396.795	42.90	-10.18	54.0	11.10	AV	86.80	100	Vertical	Pass

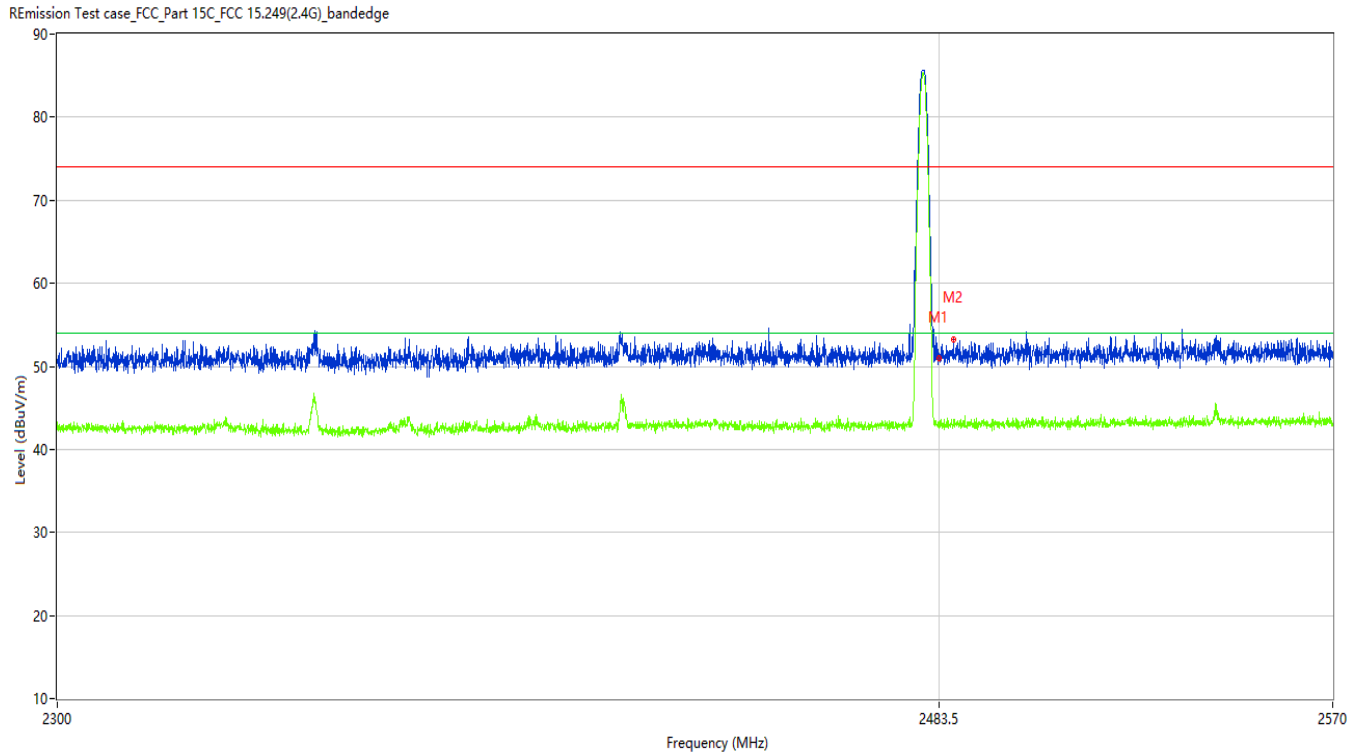
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**Figure 27: Test plots of Band Edge, 2480MHz, Horizontal polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	51.00	-9.82	74.0	23.00	Peak	281.10	100	Horizontal	Pass
1**	2483.500	42.65	-9.82	54.0	11.35	AV	281.10	100	Horizontal	Pass
2	2486.570	53.20	-9.82	74.0	20.80	Peak	0.00	100	Horizontal	Pass
2**	2486.570	42.90	-9.82	54.0	11.10	AV	0.00	100	Horizontal	Pass

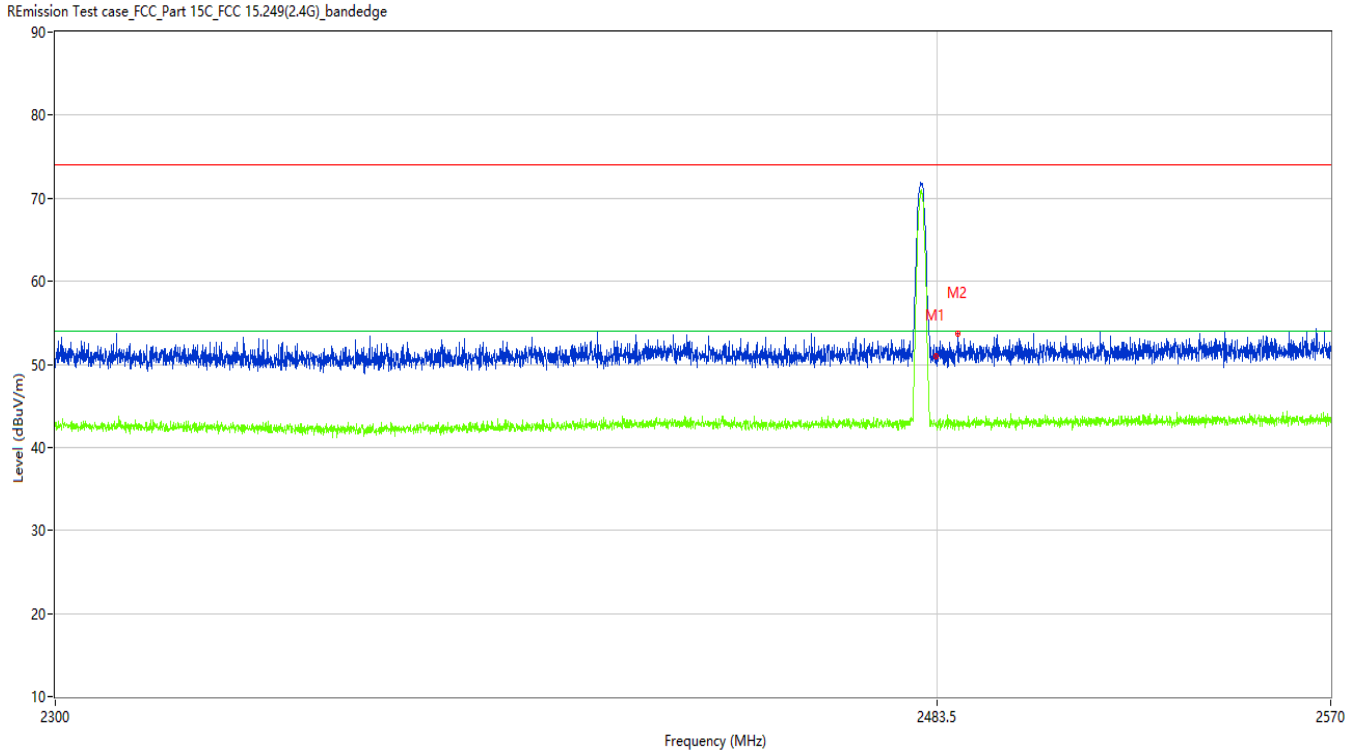
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**Figure 28: Test plots of Band Edge, 2480MHz, Vertical polarization**



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	50.93	-9.82	74.0	23.07	Peak	134.48	100	Vertical	Pass
1**	2483.500	42.35	-9.82	54.0	11.65	AV	134.48	100	Vertical	Pass
2	2488.055	53.72	-9.82	74.0	20.28	Peak	319.40	100	Vertical	Pass
2**	2488.055	42.80	-9.82	54.0	11.20	AV	319.40	100	Vertical	Pass



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## 4.1.4 20dB Bandwidth and 99% Bandwidth

RESULT:

PASS

Test standard : FCC Part 15.215(c), RSS-GEN 6.7

Requirement : ANSI C63.10-2013

Kind of test site : Shielded room

### Test setup

Test Channel : Low/Middle/High

Operation Mode : A.i/ii/iii

Ambient temperature : 22.8°C

Relative humidity : 50%

Table 1: 20dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
GFSK	2403	1.038	0.933
	2442	1.023	0.917
	2480	0.980	0.907

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Figure 29: The plots of 20dB Bandwidth and 99% Bandwidth, 2403MHz

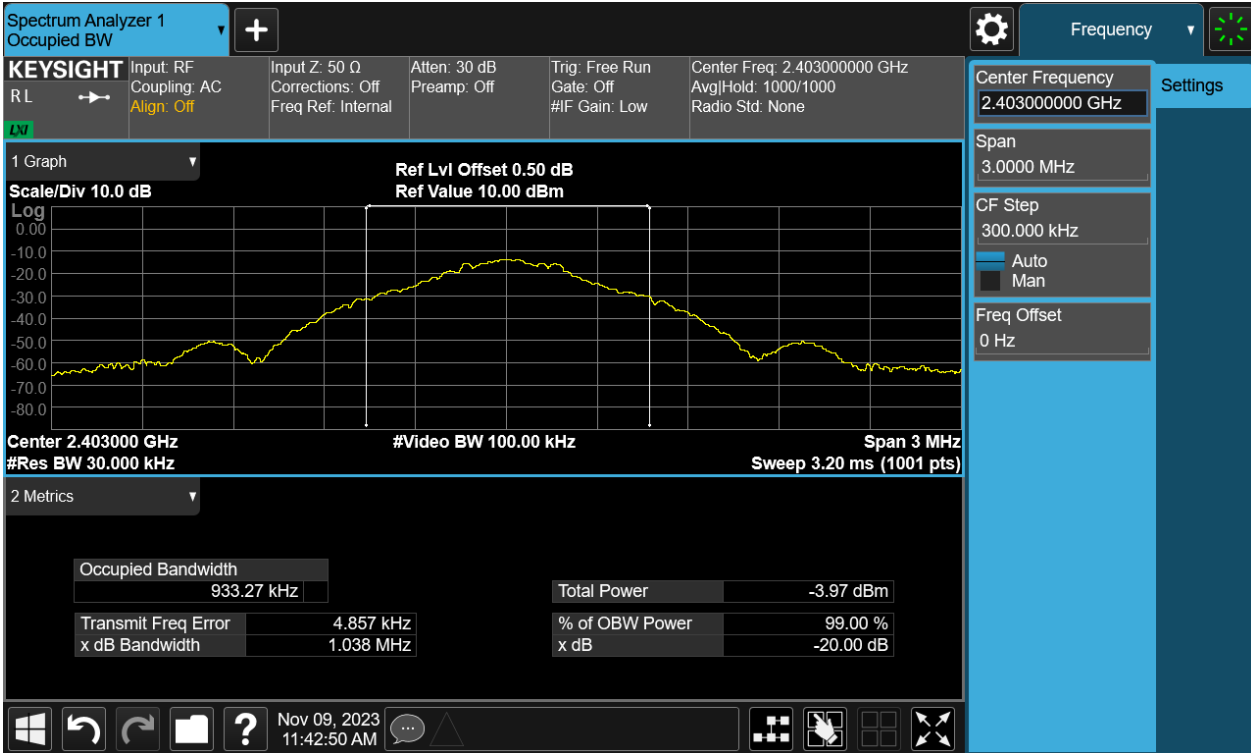
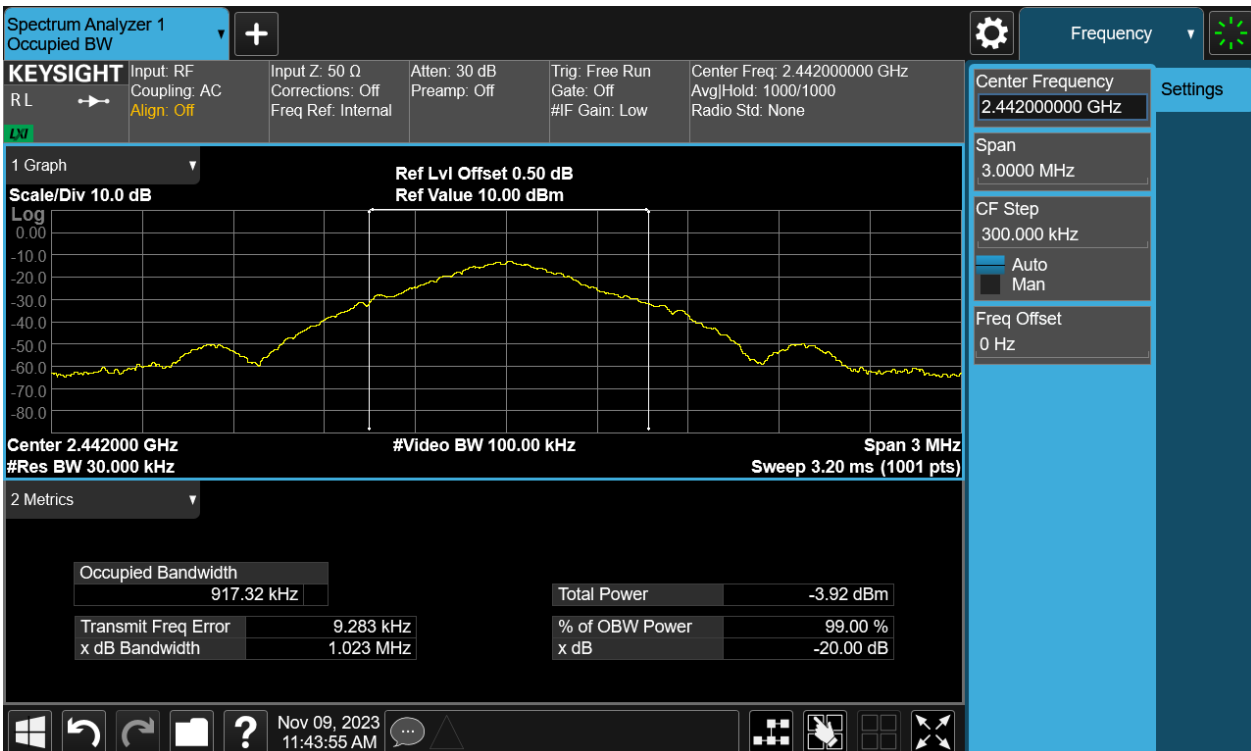


Figure 30: The plots of 20dB Bandwidth and 99% Bandwidth, 2442MHz



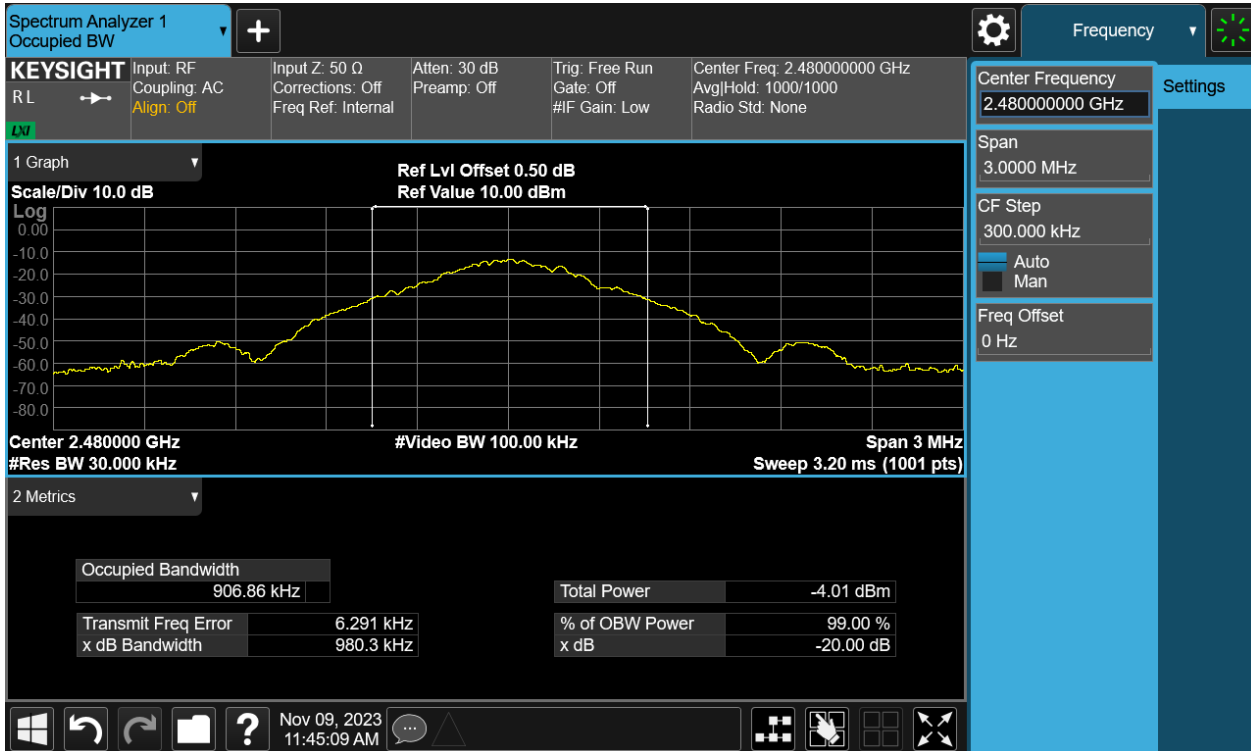
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Figure 31: The plots of 20dB Bandwidth and 99% Bandwidth, 2480MHz



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## 4.2 Mains Emissions

### 4.2.1 Conducted Emission on AC Mains

RESULT:

**PASS**

Test standard : FCC Part 15.207(a), RSS-Gen 8.8  
Requirement : ANSI C63.10-2013 clause 6.2  
Kind of test site : Shielded room

#### Test setup

Input Voltage : DC 29V supply by adapter (which received  
AC 120V, 60Hz)  
Operation Mode : A.i/ii/iii  
Earthing : Not Connected  
Ambient temperature : 25°C  
Relative humidity : 43%

For details refer to following test plot.

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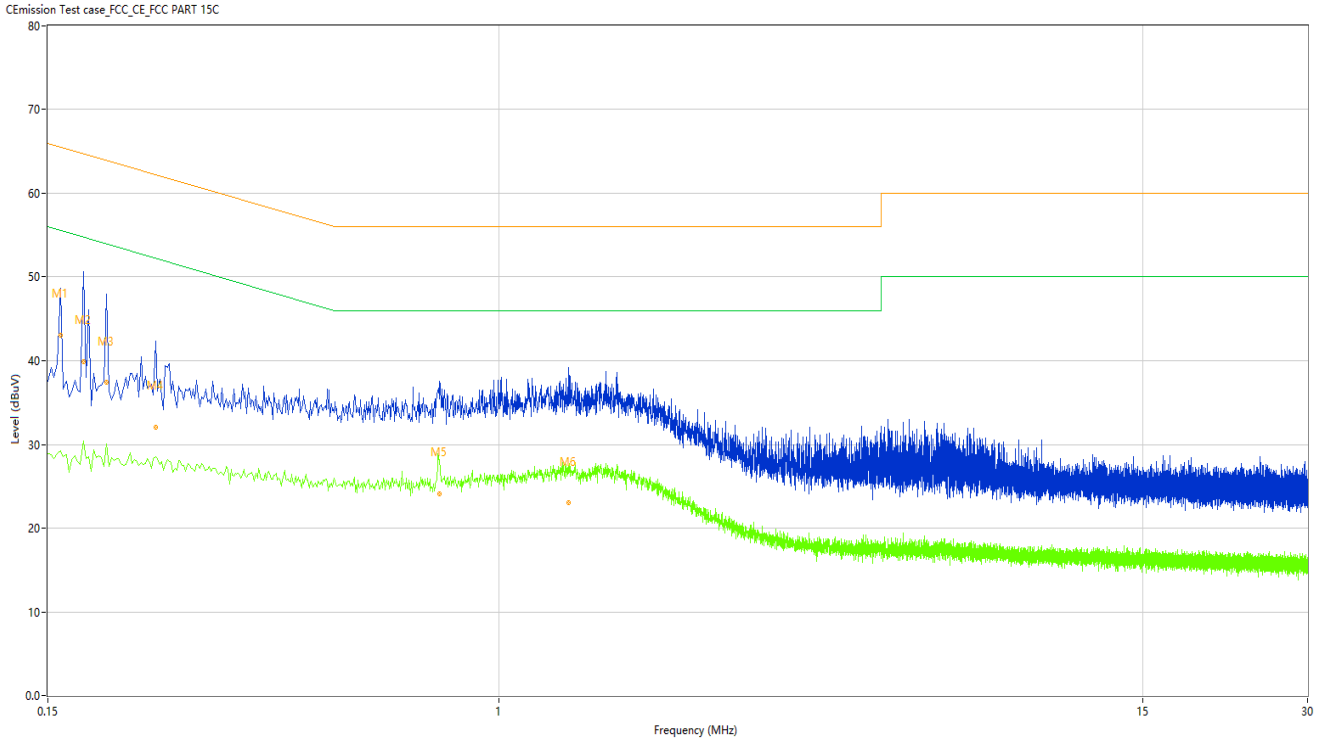
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Note: The all configurations were tested respectively, but only the worst configuration shown here.

**Figure 32: Conducted Emission on AC Mains, L Phase**



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.158	55.22	9.93	65.57	10.35	Peak	L	Pass
1*	0.158	43.09	9.93	65.57	22.48	QP	L	Pass
1**	0.158	29.27	9.93	55.57	26.30	AV	L	Pass
2	0.174	53.14	9.93	64.77	11.63	Peak	L	Pass
2*	0.174	39.92	9.93	64.77	24.85	QP	L	Pass
2**	0.174	30.35	9.93	54.77	24.42	AV	L	Pass
3	0.192	50.78	9.94	63.95	13.17	Peak	L	Pass
3*	0.192	37.39	9.94	63.95	26.56	QP	L	Pass
3**	0.192	30.05	9.94	53.95	23.90	AV	L	Pass
4	0.236	45.31	9.96	62.24	16.93	Peak	L	Pass
4*	0.236	32.05	9.96	62.24	30.19	QP	L	Pass
4**	0.236	28.54	9.96	52.24	23.70	AV	L	Pass
5	0.780	31.49	9.94	56.00	24.51	Peak	L	Pass
5*	0.780	24.08	9.94	56.00	31.92	QP	L	Pass
5**	0.780	28.13	9.94	46.00	17.87	AV	L	Pass
6	1.338	31.66	9.84	56.00	24.34	Peak	L	Pass
6*	1.338	23.08	9.84	56.00	32.92	QP	L	Pass
6**	1.338	26.79	9.84	46.00	19.21	AV	L	Pass

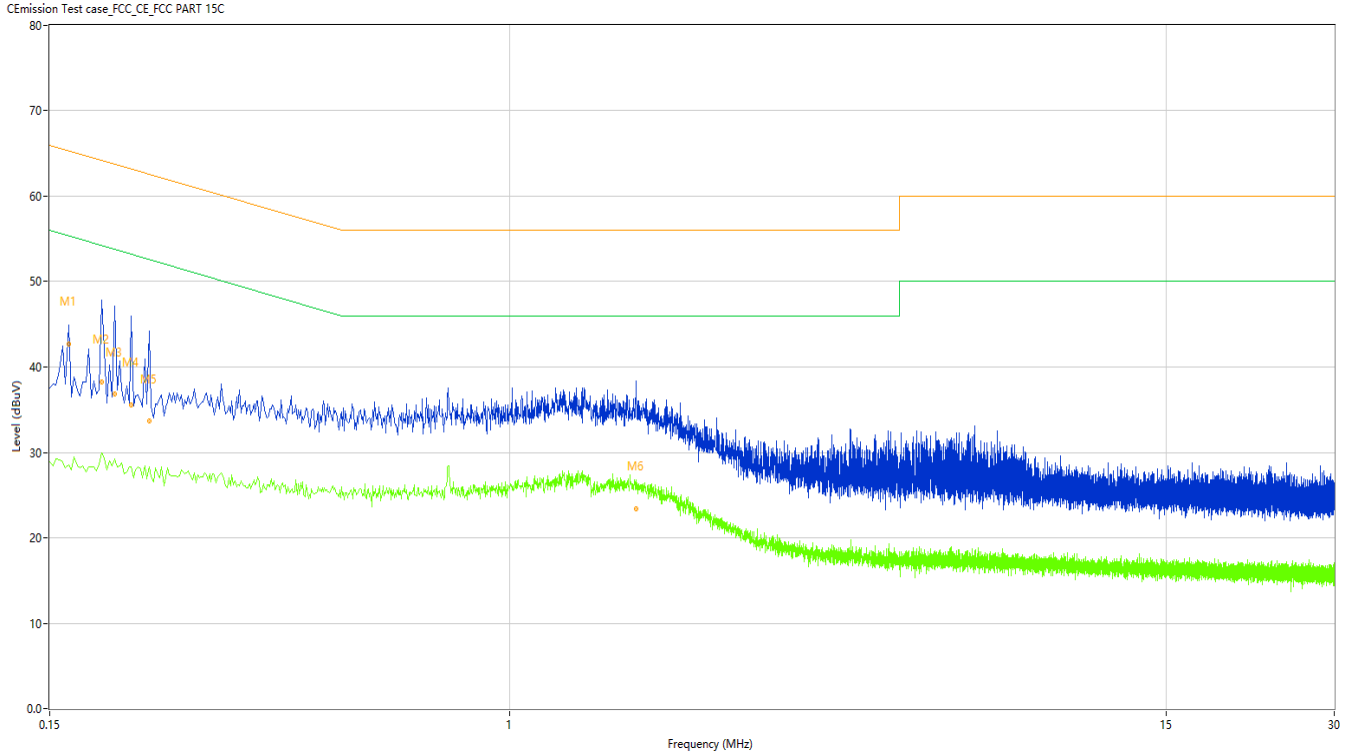
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Figure 33: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.162	53.77	10.03	65.36	11.59	Peak	N	Pass
1*	0.162	42.69	10.03	65.36	22.67	QP	N	Pass
1**	0.162	28.57	10.03	55.36	26.79	AV	N	Pass
2	0.186	50.90	10.03	64.21	13.31	Peak	N	Pass
2*	0.186	38.25	10.03	64.21	25.96	QP	N	Pass
2**	0.186	29.95	10.03	54.21	24.26	AV	N	Pass
3	0.196	49.15	10.03	63.78	14.63	Peak	N	Pass
3*	0.196	36.84	10.03	63.78	26.94	QP	N	Pass
3**	0.196	29.26	10.03	53.78	24.52	AV	N	Pass
4	0.210	48.05	10.04	63.21	15.16	Peak	N	Pass
4*	0.210	35.55	10.04	63.21	27.66	QP	N	Pass
4**	0.210	28.31	10.04	53.21	24.90	AV	N	Pass
5	0.226	46.42	10.05	62.60	16.18	Peak	N	Pass
5*	0.226	33.72	10.05	62.60	28.88	QP	N	Pass
5**	0.226	28.27	10.05	52.60	24.33	AV	N	Pass
6	1.682	32.64	9.94	56.00	23.36	Peak	N	Pass
6*	1.682	23.40	9.94	56.00	32.60	QP	N	Pass
6**	1.682	26.73	9.94	46.00	19.27	AV	N	Pass

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## 5 Appendixes

### 5.1 Photographs of the Sample



Front of the sample



Back of the sample

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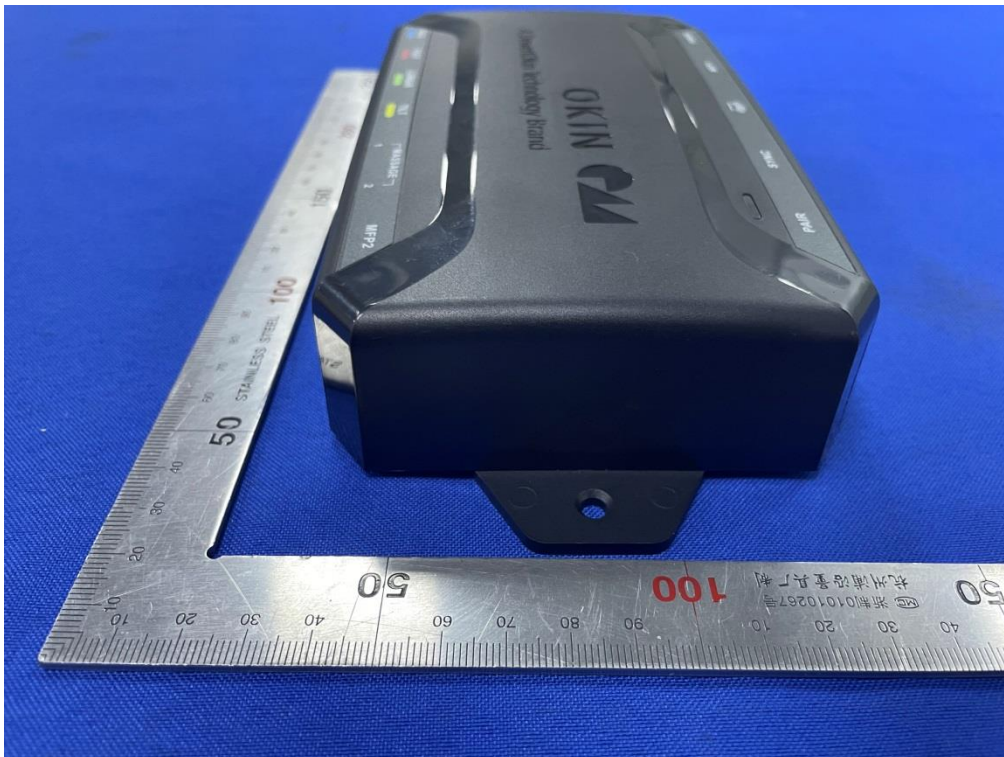
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Left of the sample



Right of the sample



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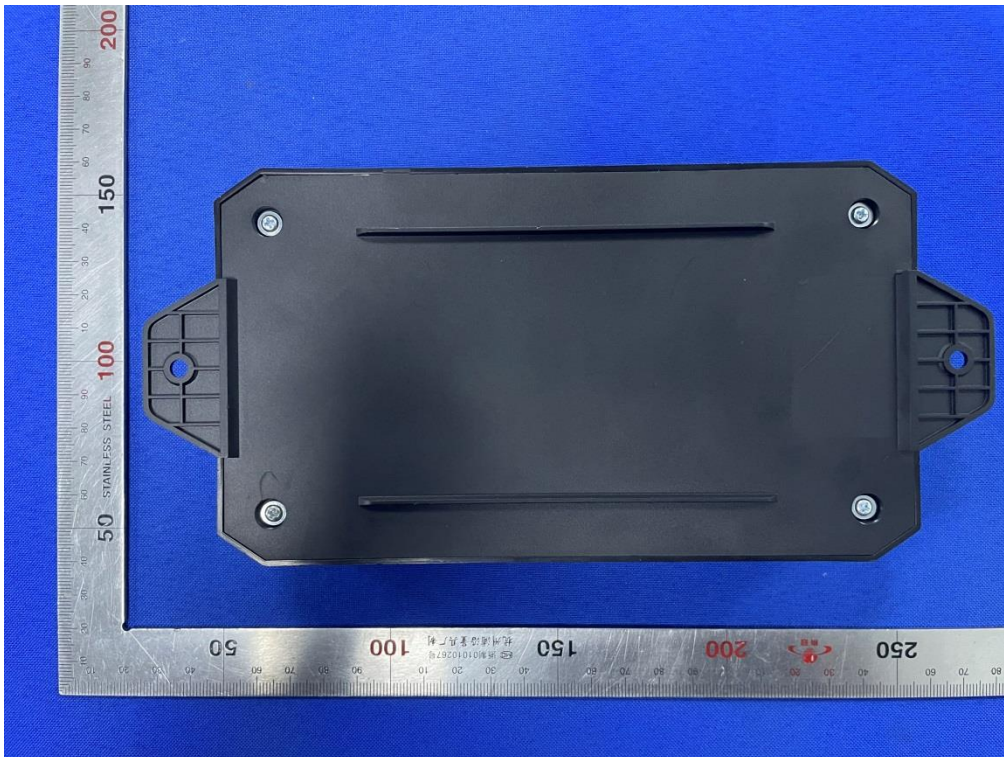
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Top of the sample



Bottom of the sample

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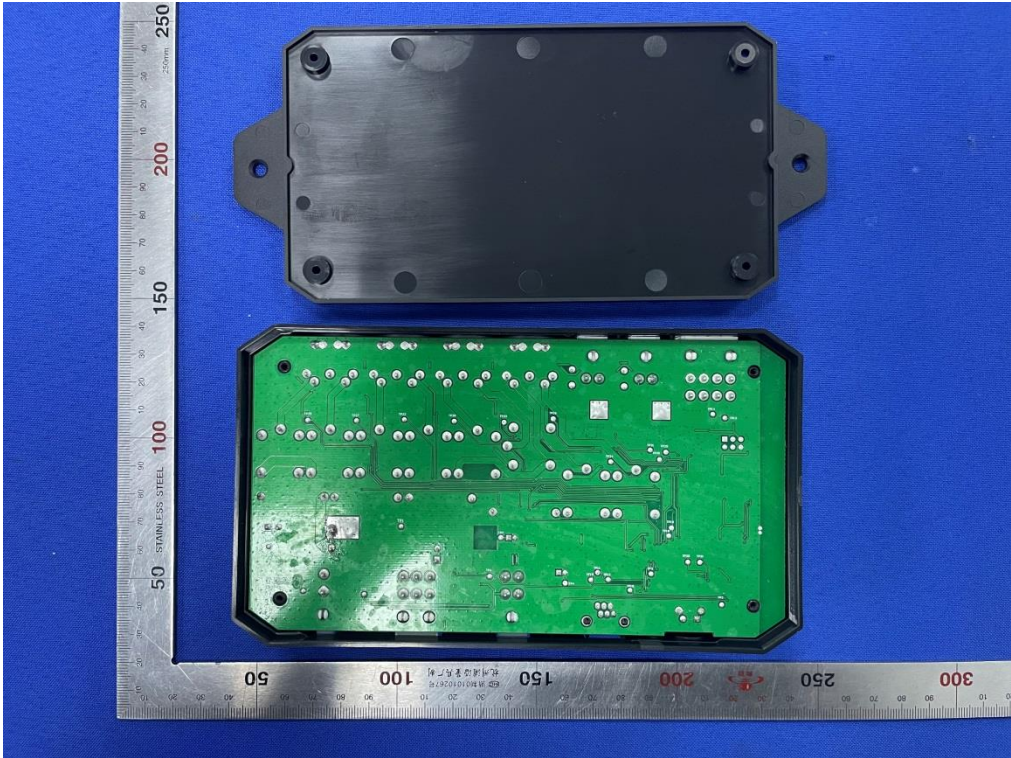
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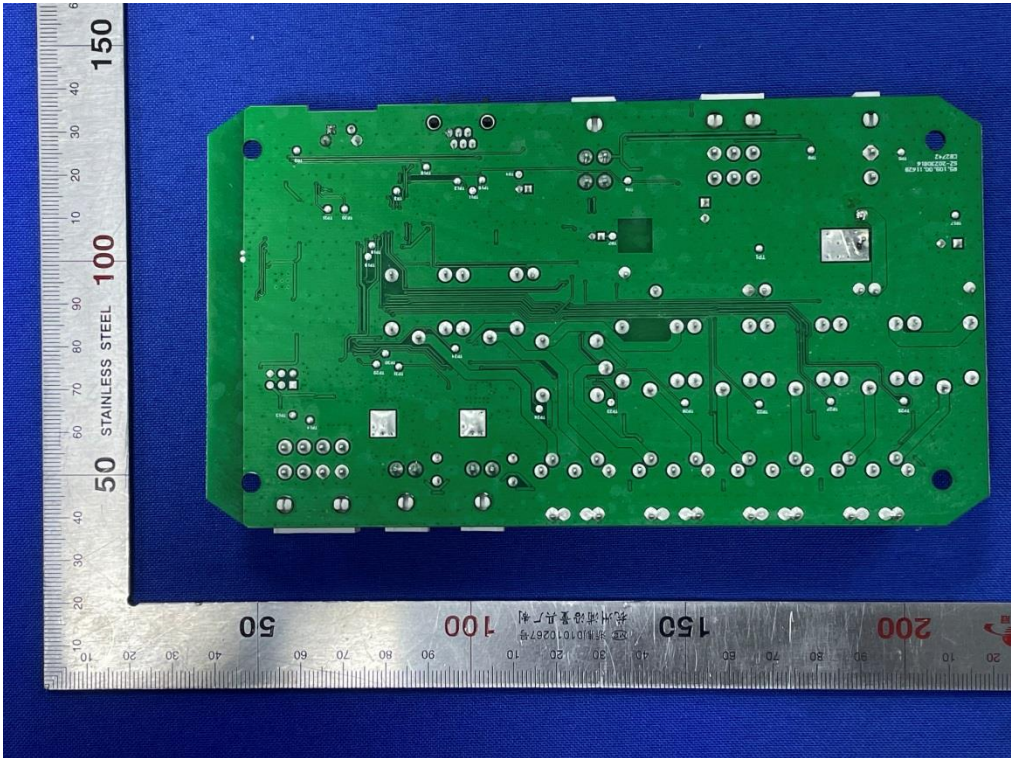
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Open of the sample



Internal-1 of the sample

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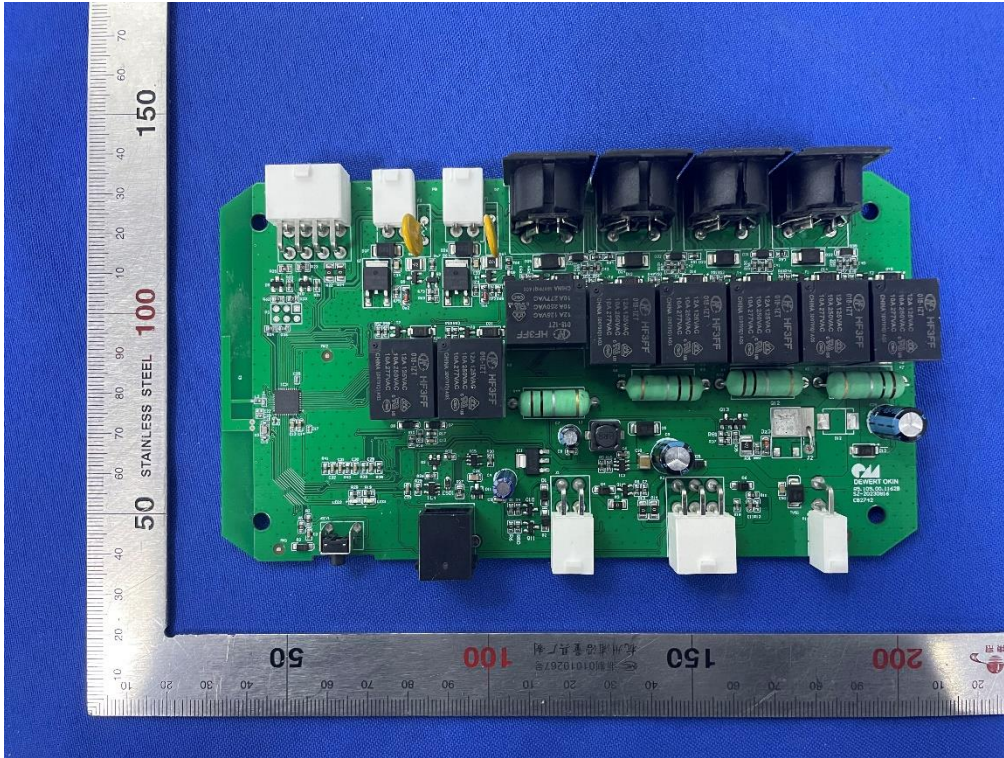
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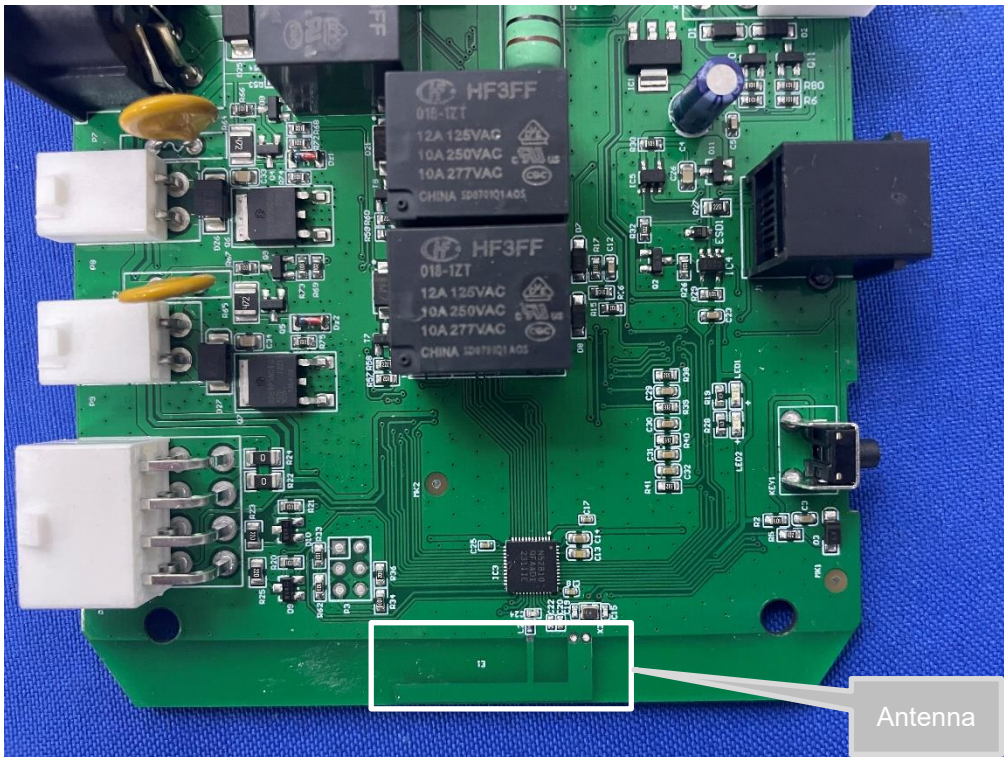
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Internal-2 of the sample



Antenna position of the sample

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## 5.2 Set-up for Conducted Emissions



## 5.3 Set-up for Spurious Emissions below 1GHz



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## 5.4 Set-up for Spurious Emissions above 1GHz



\*\*\*End of the report\*\*\*