

TEST REPORT

Report No.: SHE23070040-01AE

Date: 2023-08-15

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Applicant : DewertOkin Technology Group Co., Ltd.
Address of Applicant : Room 247, Floor 6, Jiaxing Photovoltaic Science and Innovation Park, 1288 Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Province 314016 China

Product Name : Sleep Control Box
Brand Name : N/A
Model Name : FP2601
Sample Acquisition Method : Sent by Client
Sample No. : E23070040-01#01
E23070040-01#02

FCC ID : 2AVJ8-FP2601
ISED Number : 25804-FP2601

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 : 2023-07-11
Date of Test : 2023-07-11 ~ 2023-08-15
Date of Issue : 2023-08-15

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.

Prepared by: Erik Yang (Erik Yang)
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 Rd, 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	Room 247, Floor 6, Jiaxing Photovoltaic Science and Innovation Park, 1288 Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Province 314016 China
Contact Person	Mia Ye
Telephone	+86-573-82281072
Email	Mia.Ye@refinedchina.com
Manufacturer Company Name	DewertOkin Technology Group Co., Ltd.
Address	Room 247, Floor 6, Jiaxing Photovoltaic Science and Innovation Park, 1288 Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Province 314016 China
Factory Company Name	DewertOkin Technology Group Co., Ltd.
Address	Room 247, Floor 6, Jiaxing Photovoltaic Science and Innovation Park, 1288 Kanghe Road, Xiuzhou District, Jiaxing City, Zhejiang Province 314016 China

1.3 Details of EUT

Product Name	Sleep Control Box
Brand Name	N/A
Test Model Name	FP2601
FCC ID	2AVJ8-FP2601
ISED Number	25804-FP2601
Mode of Operation	Bluetooth Version 5.1
Operation Frequency Range	2402MHz ~ 2480MHz
Number of Channels	40(at intervals of 2 MHz)
Modulation Type	BLE ☒ GFSK 1Mbps ☐ GFSK 2Mbps
Maximum Field Strength	88.36dBuV/m(Peak)@3m
Antenna Type	PCB Antenna
Antenna Gain	1.225dBi

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Extreme Temperature Range	-10℃~ +40℃
Test Voltage	DC 29V
Hardware Version	R5.109.00.1070B
Software Version	V1.0
RF power setting in TEST SW	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
0	2.402GHz	14	2.430GHz	28	2.458GHz
1	2.404GHz	15	2.432GHz	29	2.460GHz
2	2.406GHz	16	2.434GHz	30	2.462GHz
3	2.408GHz	17	2.436GHz	31	2.464GHz
4	2.410GHz	18	2.438GHz	32	2.466GHz
5	2.412GHz	19	2.440GHz	33	2.468GHz
6	2.414GHz	20	2.442GHz	34	2.470GHz
7	2.416GHz	21	2.444GHz	35	2.472GHz
8	2.418GHz	22	2.446GHz	36	2.474GHz
9	2.420GHz	23	2.448GHz	37	2.476GHz
10	2.422GHz	24	2.450GHz	38	2.478GHz
11	2.424GHz	25	2.452GHz	39	2.480GHz
12	2.426GHz	26	2.454GHz		
13	2.428GHz	27	2.456GHz		

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.

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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	2022-08-02	2023-08-01
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2023-06-08	2024-06-07
Signal Generator	Rohde & Schwarz	SMR27	100184	2022-08-02	2023-08-01
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-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2023-06-13	2025-06-12
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2023-06-18	2025-06-17
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2022-07-02	2024-07-01
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	2026-06-08
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

Equipment Calibration Date Updated:

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Keysight	N9020B	MY59260184	2023-07-27	2024-07-26
Signal Generator	Rohde & Schwarz	SMR27	100184	2023-07-27	2024-07-26

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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	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	9KHz – 30MHz	± 3.42 dB
	30 MHz – 1GHz	± 5.00 dB
	> 1GHz	± 4.88 dB
Conducted Emission on AC Mains	150kHz-30MHz	± 2.68 dB
Occupied Channel Bandwidth		± 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(CH0)	2402MHz
The middle channel(CH19)	2440MHz
The highest channel(CH39)	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 Name	Serial No.
AC/DC Switching Power Supply	DewertOkin	SW-4052	2302153201953
CONTROL BOX	DewertOkin	CB1542	CB154229C23707110109

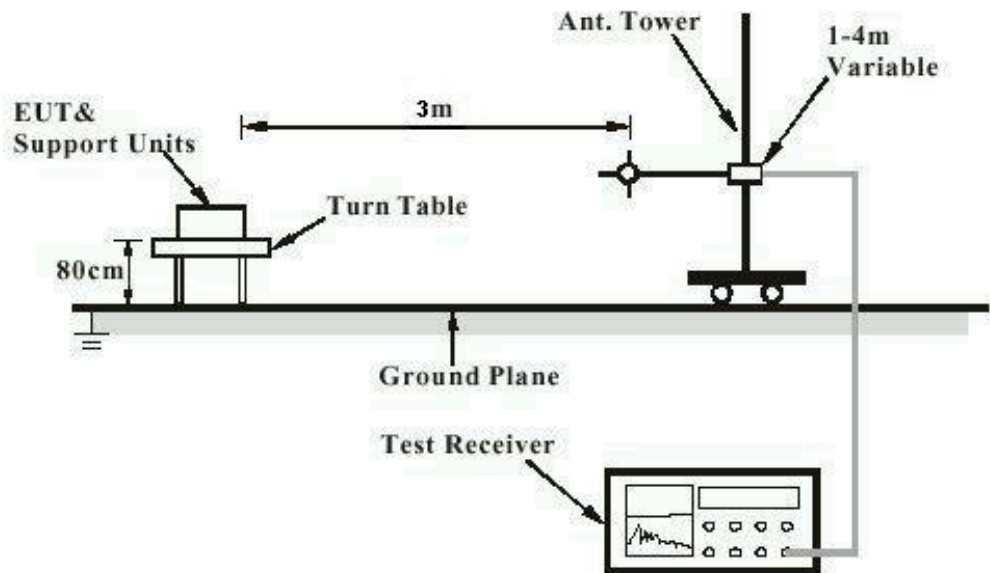
3.3 Support Software

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

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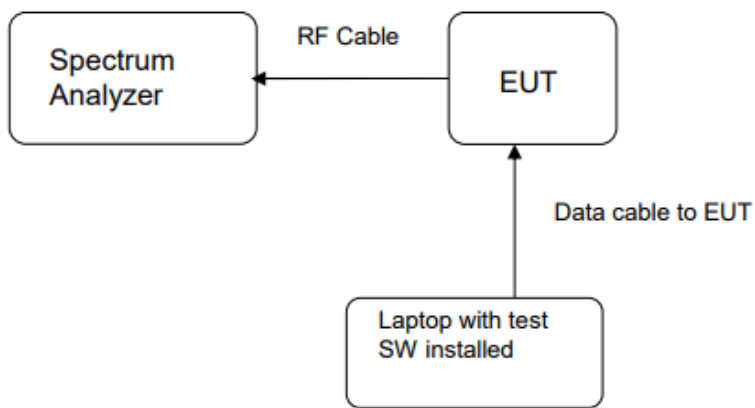
3.4 Test Setup Diagram

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 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 : 25.2°C

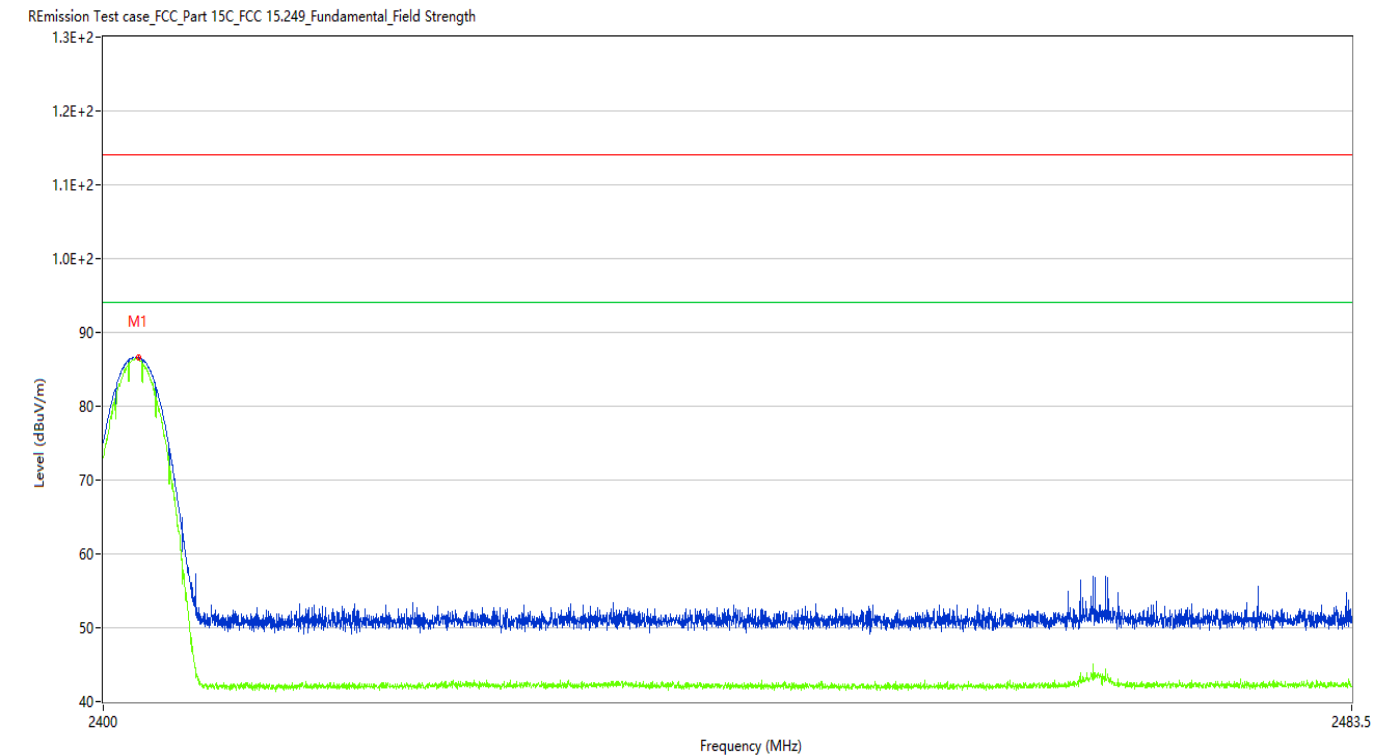
Relative humidity : 53%

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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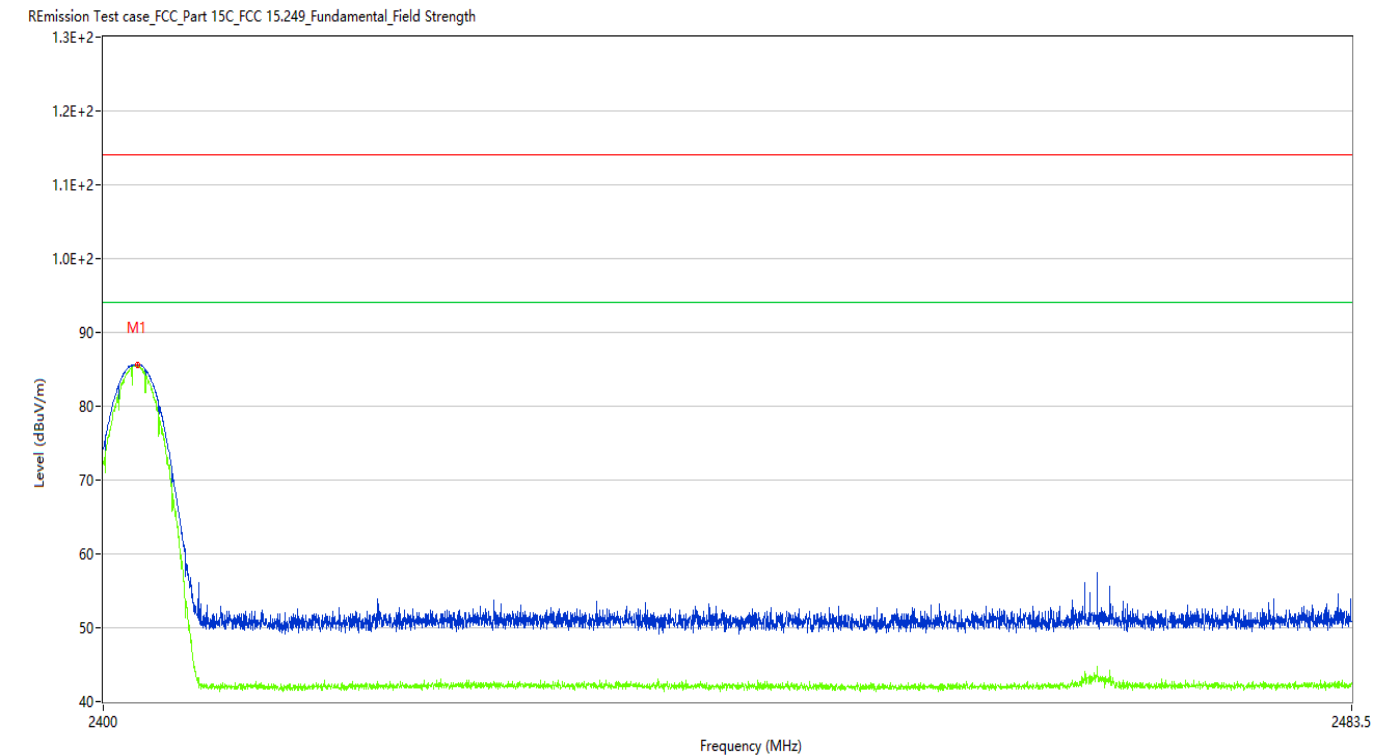
Figure 1: Test plots of Field strength of fundamental, 2402MHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2402.296	86.58	-10.09	114.0	27.42	Peak	248.60	100	Horizontal	Pass
1**	2402.296	86.37	-10.09	94.0	7.63	AV	248.60	100	Horizontal	Pass

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Figure 2: Test plots of Field strength of fundamental, 2402MHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2402.234	85.65	-10.09	114.0	28.35	Peak	289.60	100	Vertical	Pass
1**	2402.234	85.44	-10.09	94.0	8.56	AV	289.60	100	Vertical	Pass

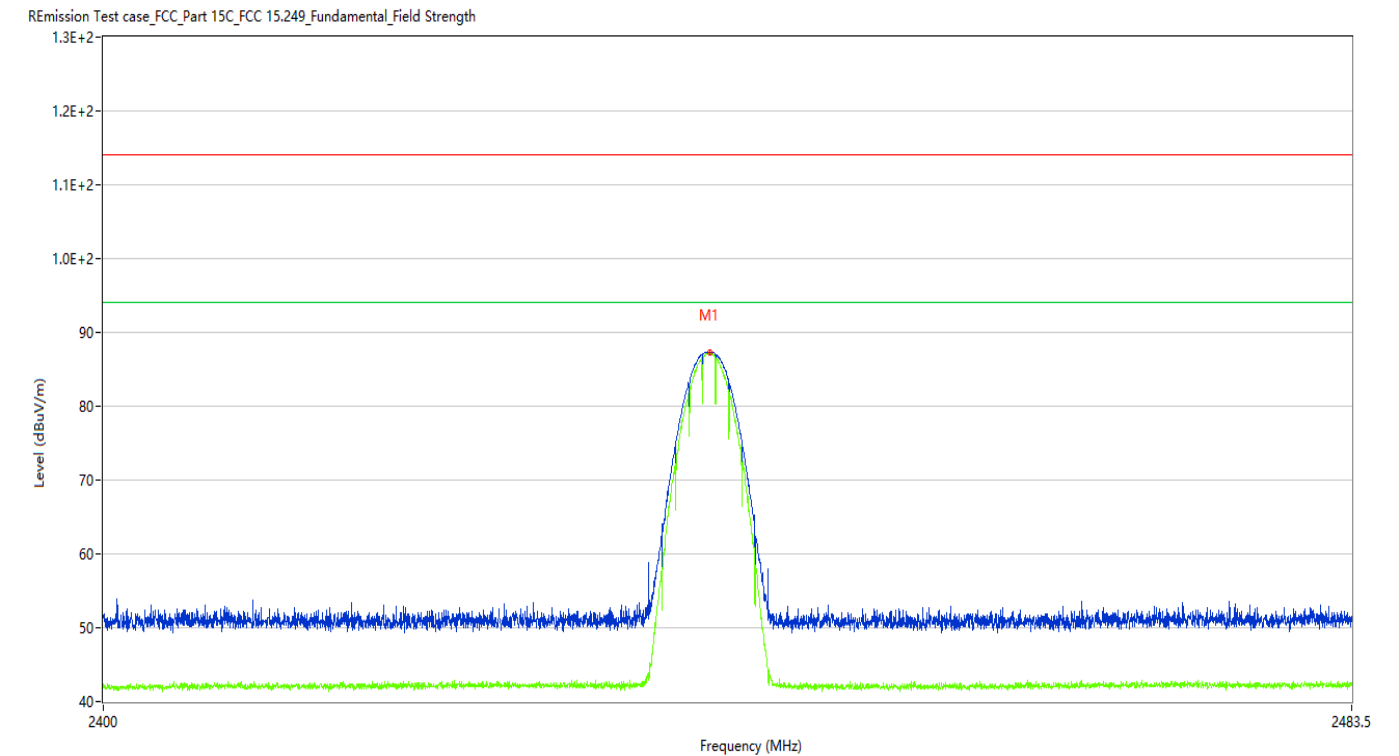
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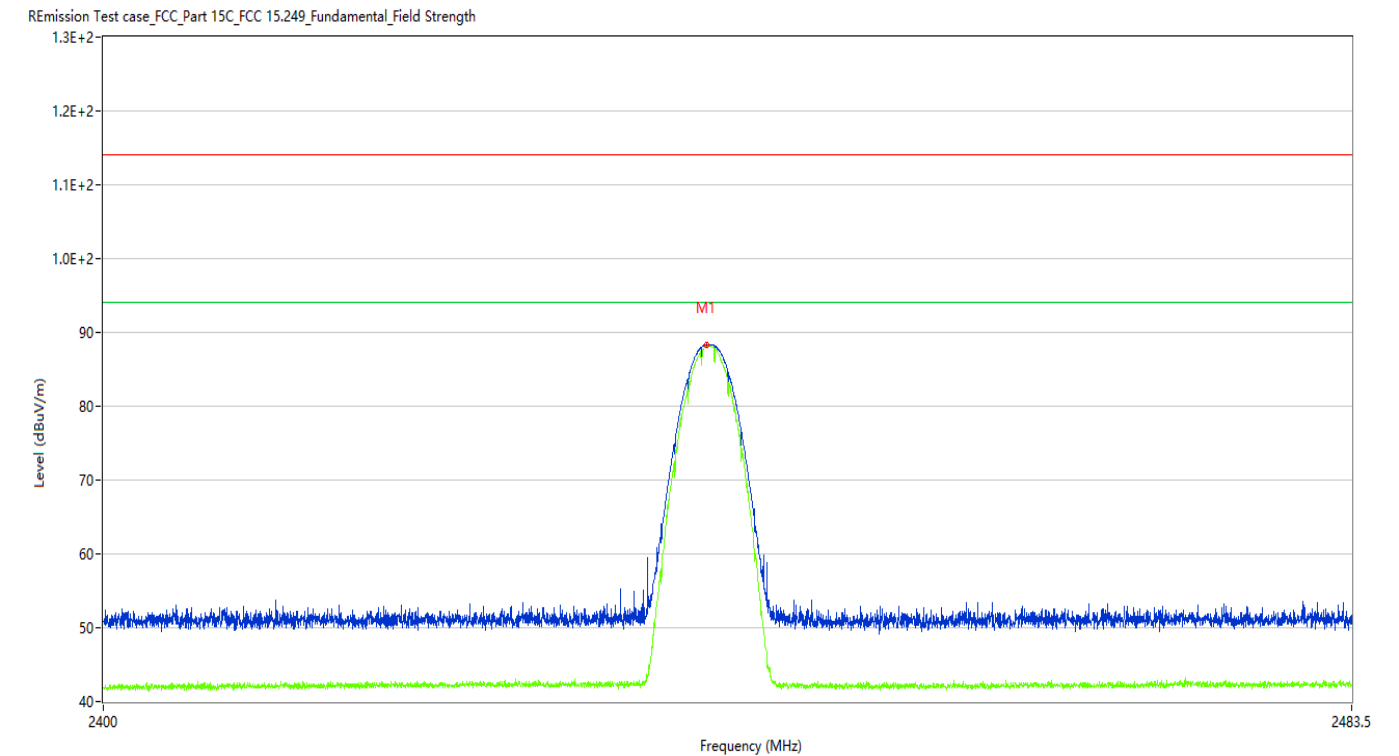
Figure 3: Test plots of Field strength of fundamental, 2440MHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2440.247	87.34	-9.91	114.0	26.66	Peak	346.10	100	Horizontal	Pass
1**	2440.247	87.15	-9.91	94.0	6.85	AV	346.10	100	Horizontal	Pass

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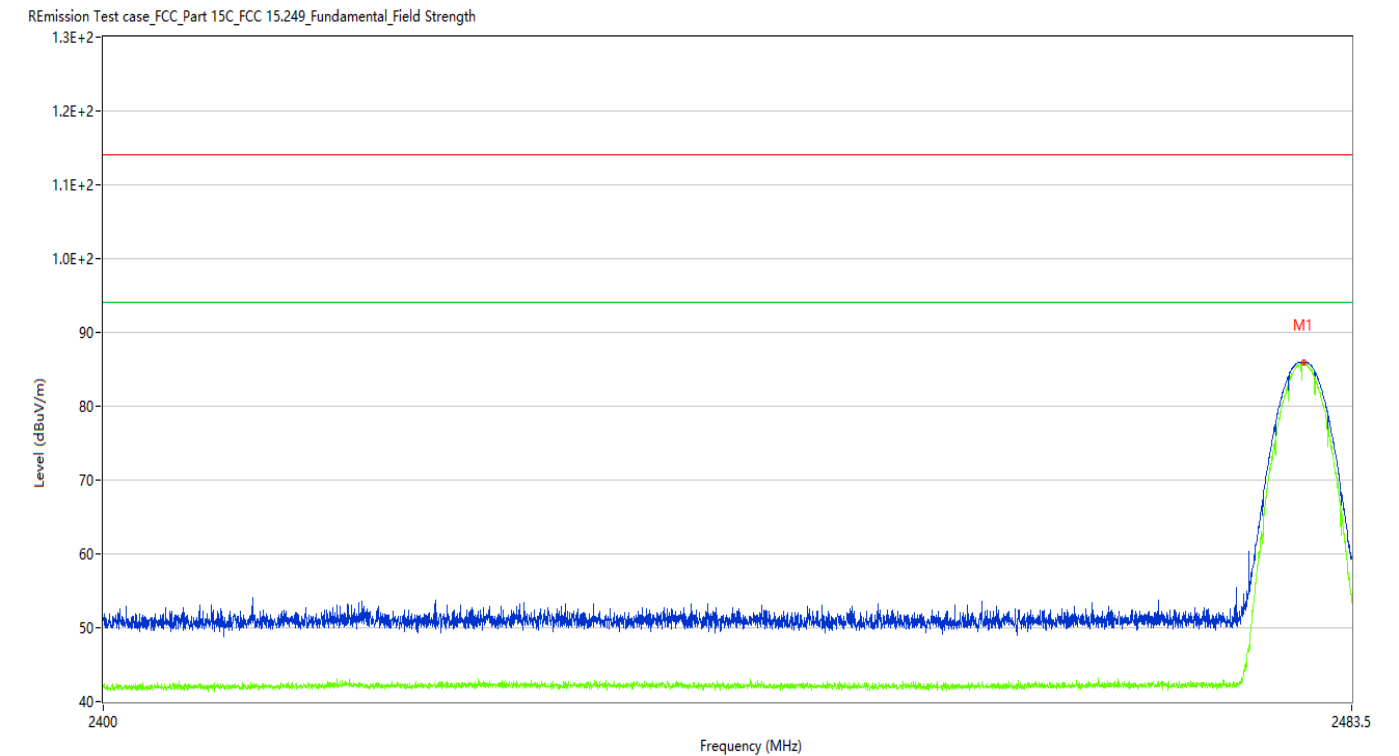
Figure 4: Test plots of Field strength of fundamental, 2440MHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2440.017	88.36	-9.90	114.0	25.64	Peak	240.40	100	Vertical	Pass
1**	2440.017	88.19	-9.90	94.0	5.81	AV	240.40	100	Vertical	Pass

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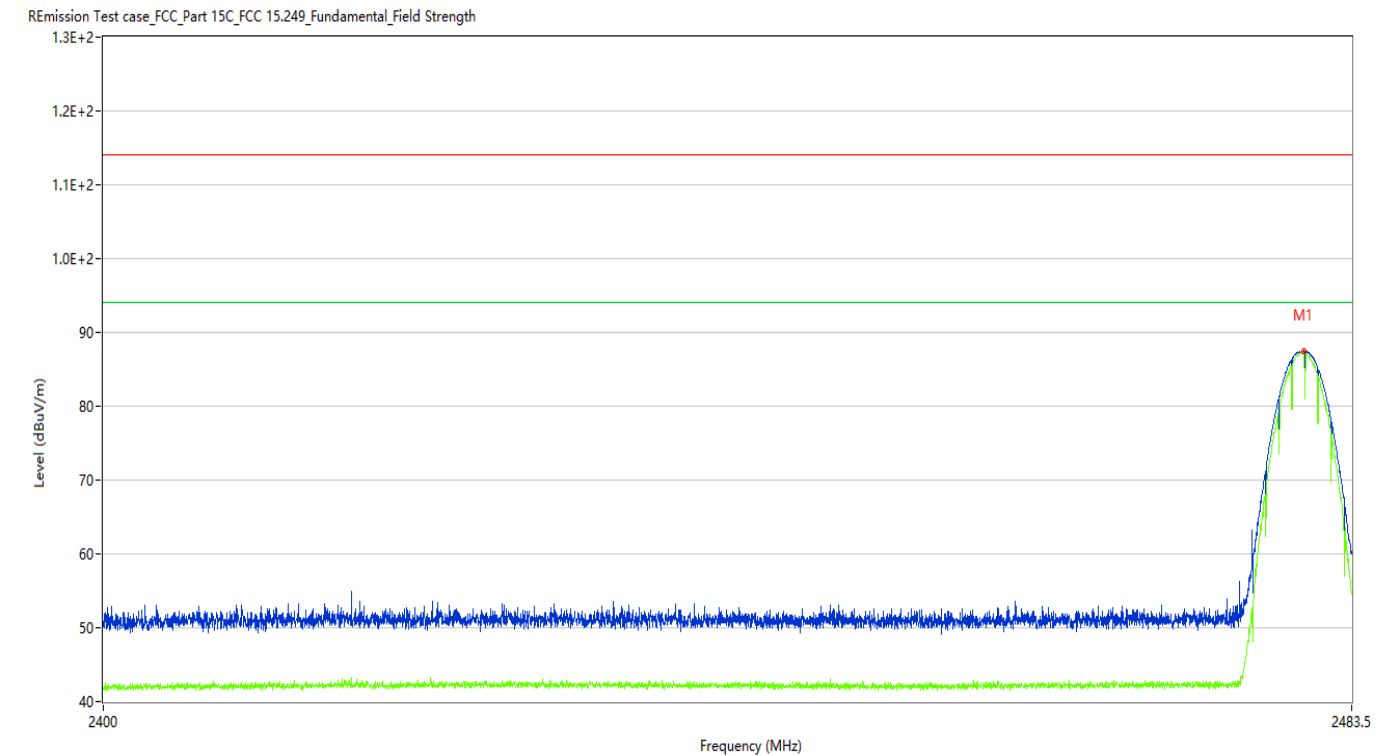
Figure 5: Test plots of Field strength of fundamental, 2480MHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2480.223	85.96	-9.82	114.0	28.04	Peak	331.70	100	Horizontal	Pass
1**	2480.223	85.81	-9.82	94.0	8.19	AV	331.70	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	2480.285	87.40	-9.82	114.0	26.60	Peak	310.90	100	Vertical	Pass
1**	2480.285	87.20	-9.82	94.0	6.80	AV	310.90	100	Vertical	Pass

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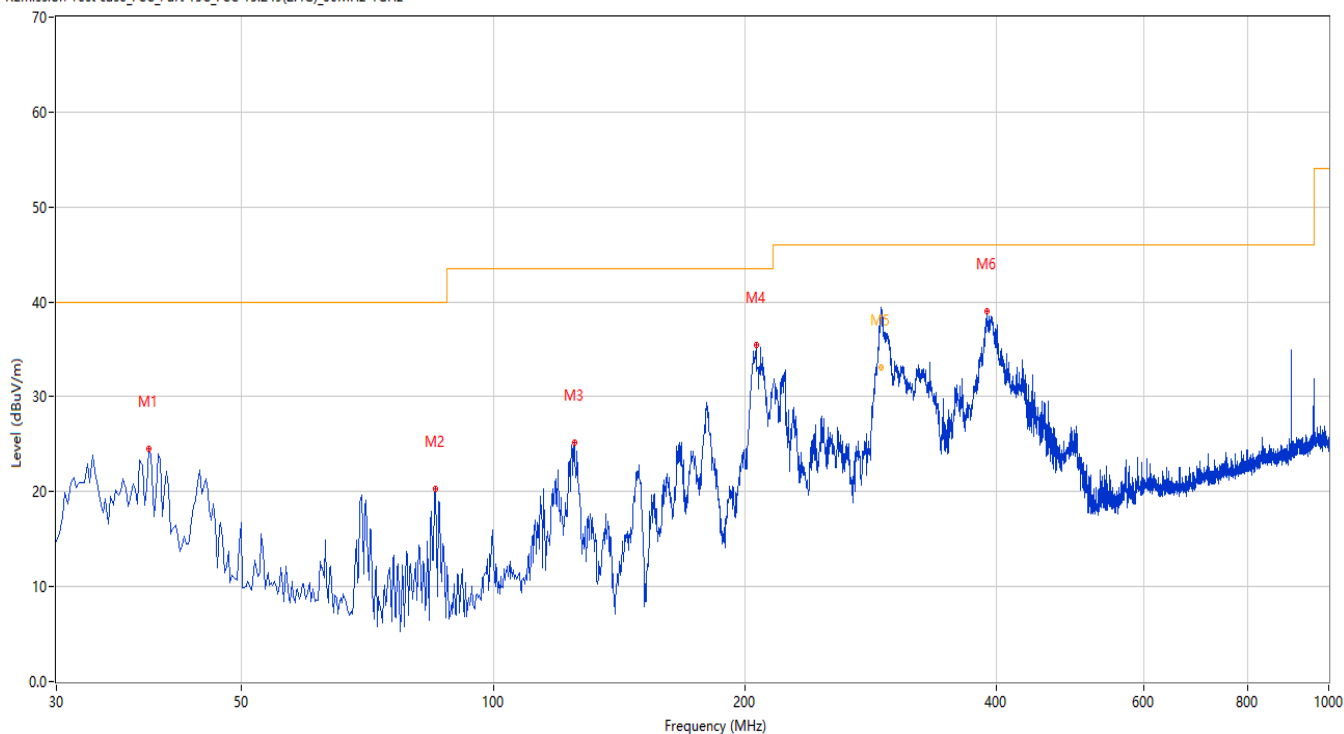
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Figure 7: Test plots of Field strength of harmonics, 2402MHz, 30MHz-1GHz, Horizontal polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	38.728	24.49	-25.86	40.0	15.51	Peak	164.30	100	Horizontal	Pass
2	85.276	20.26	-29.29	40.0	19.74	Peak	84.50	200	Horizontal	Pass
3	125.036	25.17	-28.12	43.5	18.33	Peak	0.00	200	Horizontal	Pass
4	206.253	35.47	-25.58	43.5	8.03	Peak	0.00	200	Horizontal	Pass
5	291.219	38.74	-22.57	46.0	7.26	Peak	20.30	101	Horizontal	Pass
5*	291.219	33.15	-22.57	46.0	12.85	QP	20.30	101	Horizontal	Pass
6	389.780	39.00	-20.03	46.0	7.00	Peak	313.20	100	Horizontal	Pass

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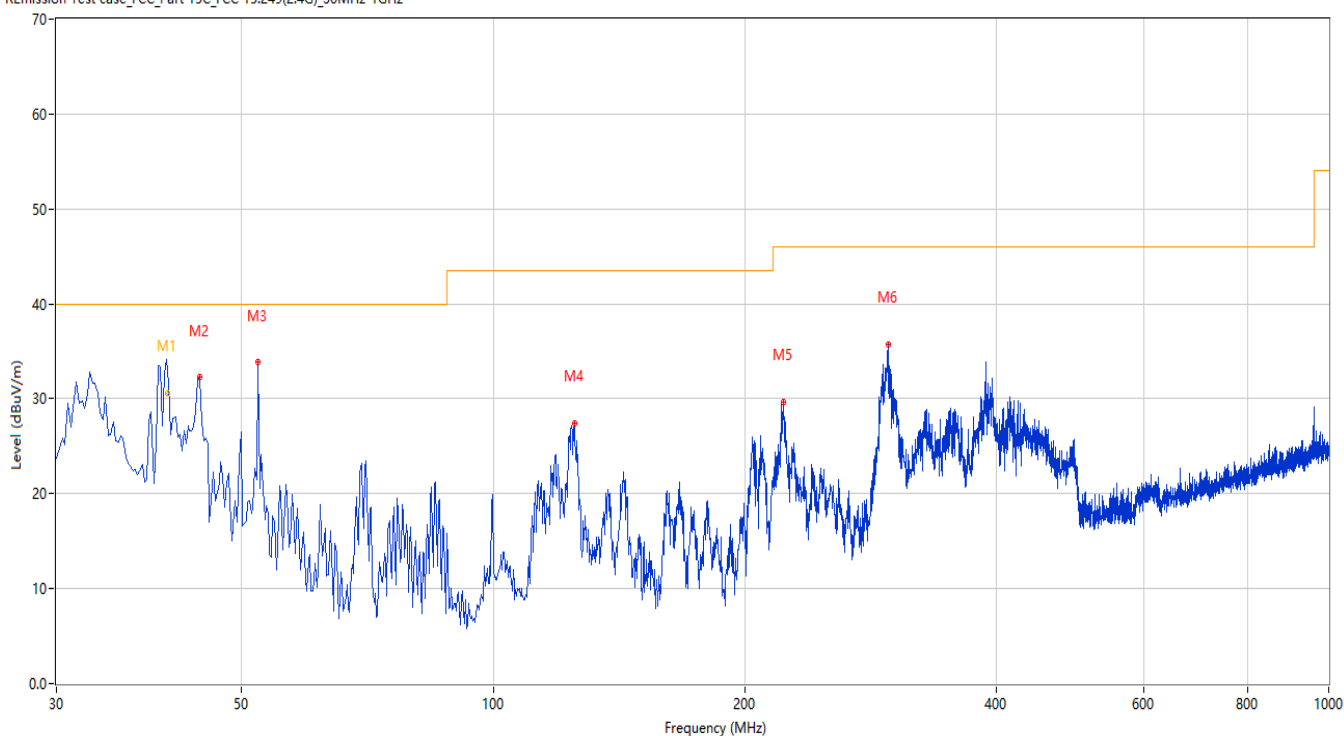
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Figure 8: Test plots of Field strength of harmonics, 2402MHz, 30MHz-1GHz, Vertical polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	40.712	33.44	-25.16	40.0	6.56	Peak	240.20	100	Vertical	Pass
1*	40.712	30.57	-25.16	40.0	9.43	QP	240.20	100	Vertical	Pass
2	44.546	32.24	-24.37	40.0	7.76	Peak	0.00	100	Vertical	Pass
3	52.304	33.82	-24.08	40.0	6.18	Peak	83.50	100	Vertical	Pass
4	125.036	27.40	-28.12	43.5	16.10	Peak	279.60	100	Vertical	Pass
5	222.739	29.70	-25.03	46.0	16.30	Peak	227.40	200	Vertical	Pass
6	296.683	35.74	-22.55	46.0	10.26	Peak	192.70	200	Vertical	Pass

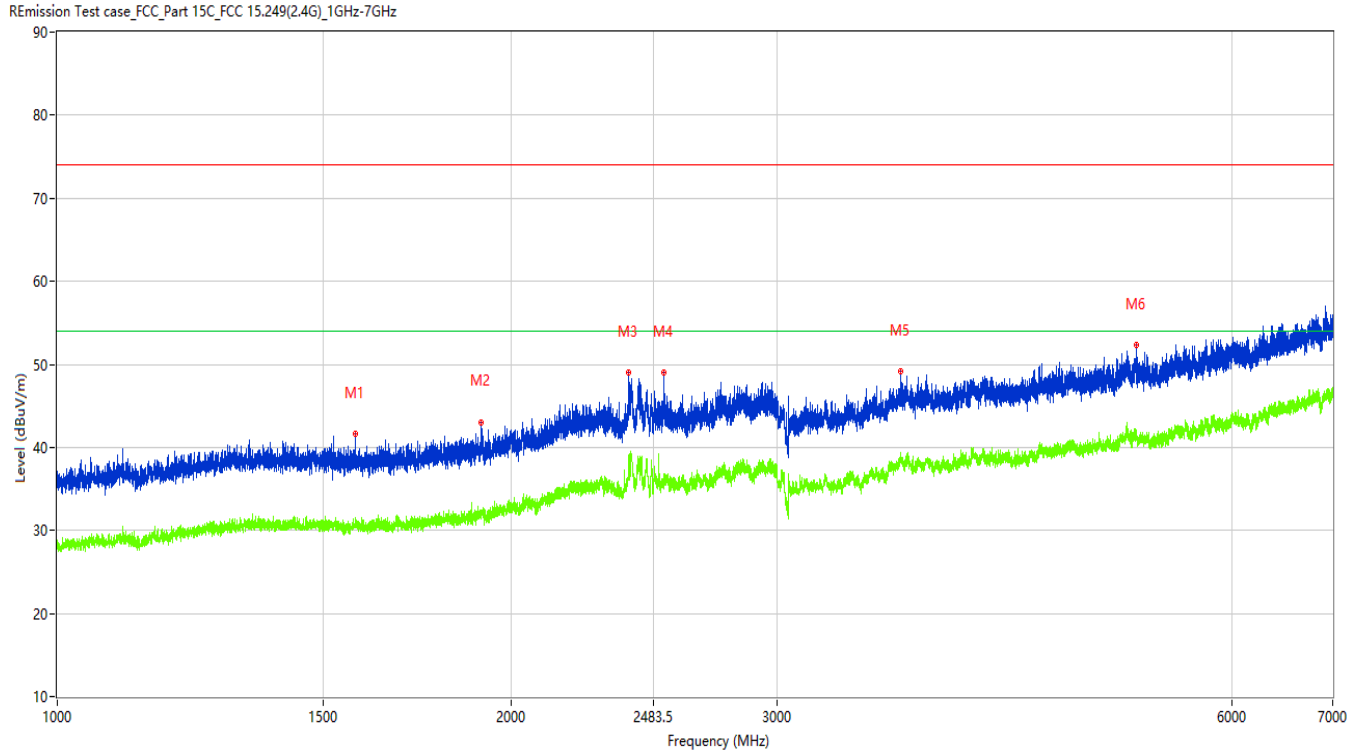
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Figure 9: Test plots of Field strength of harmonics, 2402MHz, 1GHz-7GHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1576.000	41.64	-13.05	74.0	32.36	Peak	185.00	100	Horizontal	Pass
1**	1576.000	30.89	-13.05	54.0	23.11	AV	185.00	100	Horizontal	Pass
2	1908.000	43.05	-11.68	74.0	30.95	Peak	92.30	100	Horizontal	Pass
2**	1908.000	32.33	-11.68	54.0	21.67	AV	92.30	100	Horizontal	Pass
3	2391.750	49.03	-4.84	74.0	24.97	Peak	215.20	100	Horizontal	Pass
3**	2391.750	38.43	-4.84	54.0	15.57	AV	215.20	100	Horizontal	Pass
4	2522.750	48.98	-7.16	74.0	25.02	Peak	154.20	100	Horizontal	Pass
4**	2522.750	36.08	-7.16	54.0	17.92	AV	154.20	100	Horizontal	Pass
5	3623.500	49.16	-2.25	74.0	24.84	Peak	0.00	100	Horizontal	Pass
5**	3623.500	38.91	-2.25	54.0	15.09	AV	0.00	100	Horizontal	Pass
6	5192.000	52.31	0.16	74.0	21.69	Peak	0.40	100	Horizontal	Pass
6**	5192.000	40.96	0.16	54.0	13.04	AV	0.40	100	Horizontal	Pass

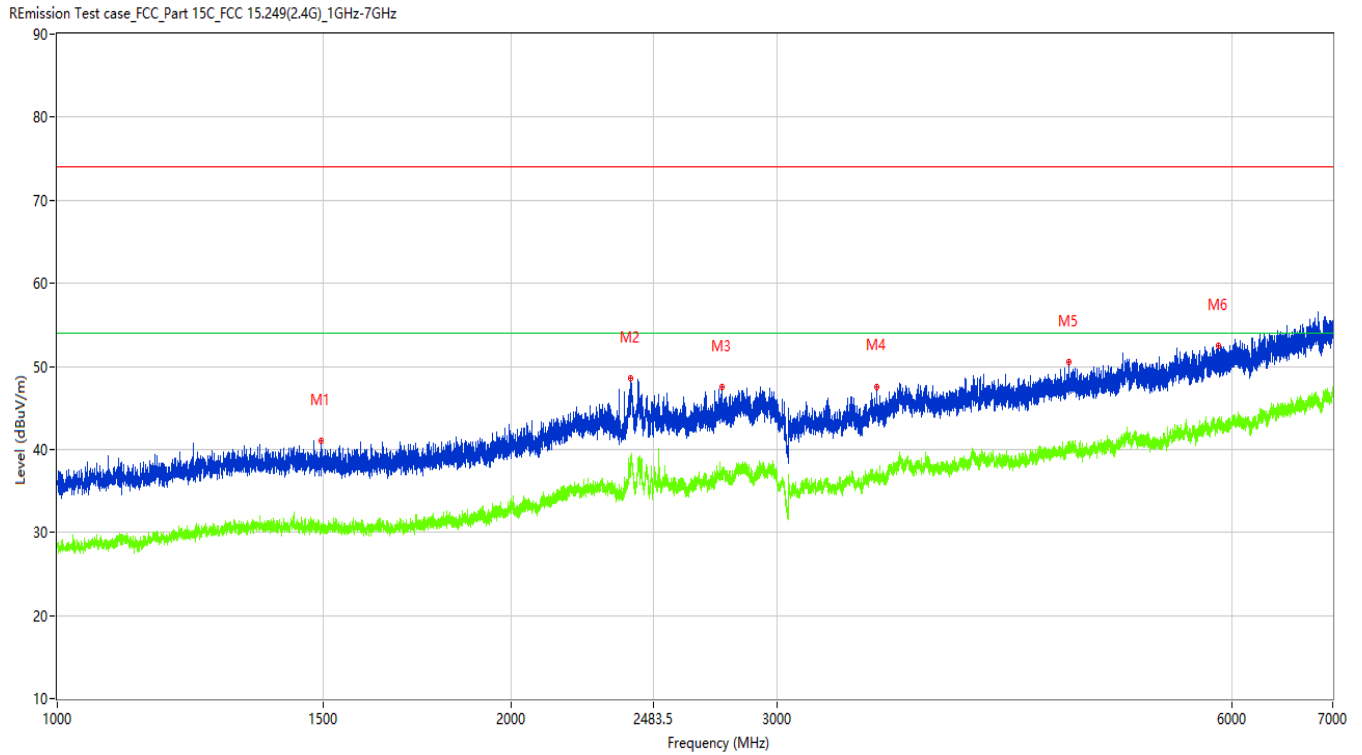
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Figure 10: Test plots of Field strength of harmonics, 2402MHz, 1GHz-7GHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1495.250	41.01	-13.04	74.0	32.99	Peak	51.00	100	Vertical	Pass
1**	1495.250	31.08	-13.04	54.0	22.92	AV	51.00	100	Vertical	Pass
2	2399.750	48.53	-4.66	74.0	25.47	Peak	51.00	100	Vertical	Pass
2**	2399.750	38.59	-4.66	54.0	15.41	AV	51.00	100	Vertical	Pass
3	2757.000	47.46	-5.29	74.0	26.54	Peak	278.00	100	Vertical	Pass
3**	2757.000	37.91	-5.29	54.0	16.09	AV	278.00		Vertical	Pass
4	3490.000	47.58	-4.38	74.0	26.42	Peak	266.30	100	Vertical	Pass
4**	3490.000	37.59	-4.38	54.0	16.41	AV	266.30	100	Vertical	Pass
5	4679.000	50.51	-0.88	74.0	23.49	Peak	42.60	100	Vertical	Pass
5**	4679.000	40.84	-0.88	54.0	13.16	AV	42.60	100	Vertical	Pass
6	5881.500	52.53	1.23	74.0	21.47	Peak	281.90	100	Vertical	Pass
6**	5881.500	43.45	1.23	54.0	10.55	AV	281.90	100	Vertical	Pass

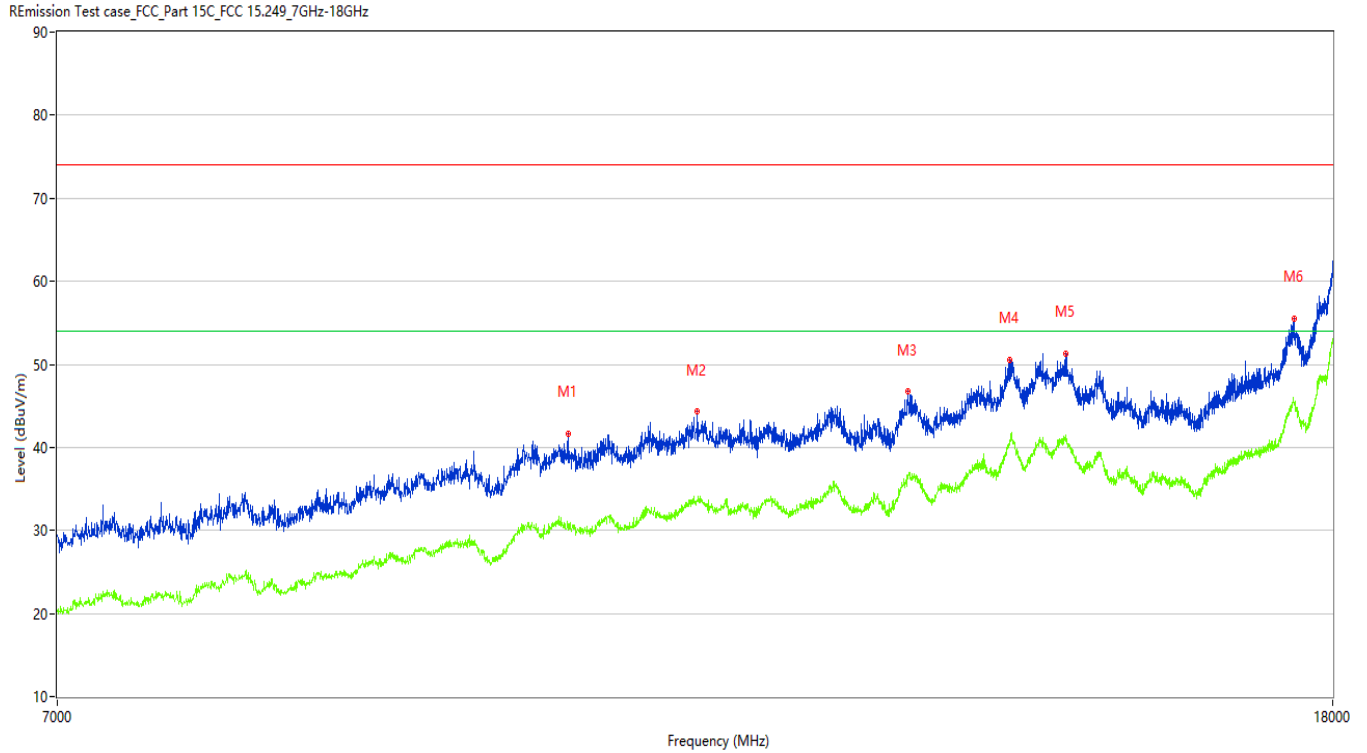
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Figure 11: Test plots of Field strength of harmonics, 2402MHz, 7GHz-18GHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	10217.500	41.65	8.27	74.0	32.35	Peak	207.30	100	Horizontal	Pass
1**	10217.500	30.00	8.27	54.0	24.00	AV	207.30	100	Horizontal	Pass
2	11246.000	44.32	10.99	74.0	29.68	Peak	360.00	100	Horizontal	Pass
2**	11246.000	33.46	10.99	54.0	20.54	AV	360.00	100	Horizontal	Pass
3	13143.500	46.74	13.08	74.0	27.26	Peak	33.90	100	Horizontal	Pass
3**	13143.500	36.53	13.08	54.0	17.47	AV	33.90	100	Horizontal	Pass
4	14166.500	50.56	17.96	74.0	23.44	Peak	207.30	100	Horizontal	Pass
4**	14166.500	40.41	17.96	54.0	13.59	AV	207.30	100	Horizontal	Pass
5	14771.500	51.35	17.88	74.0	22.65	Peak	337.10	100	Horizontal	Pass
5**	14771.500	41.37	17.88	54.0	12.63	AV	337.10	100	Horizontal	Pass
6	17491.249	55.49	21.63	74.0	18.51	Peak	33.90	100	Horizontal	Pass
6**	17491.249	45.42	21.63	54.0	8.58	AV	33.90	100	Horizontal	Pass

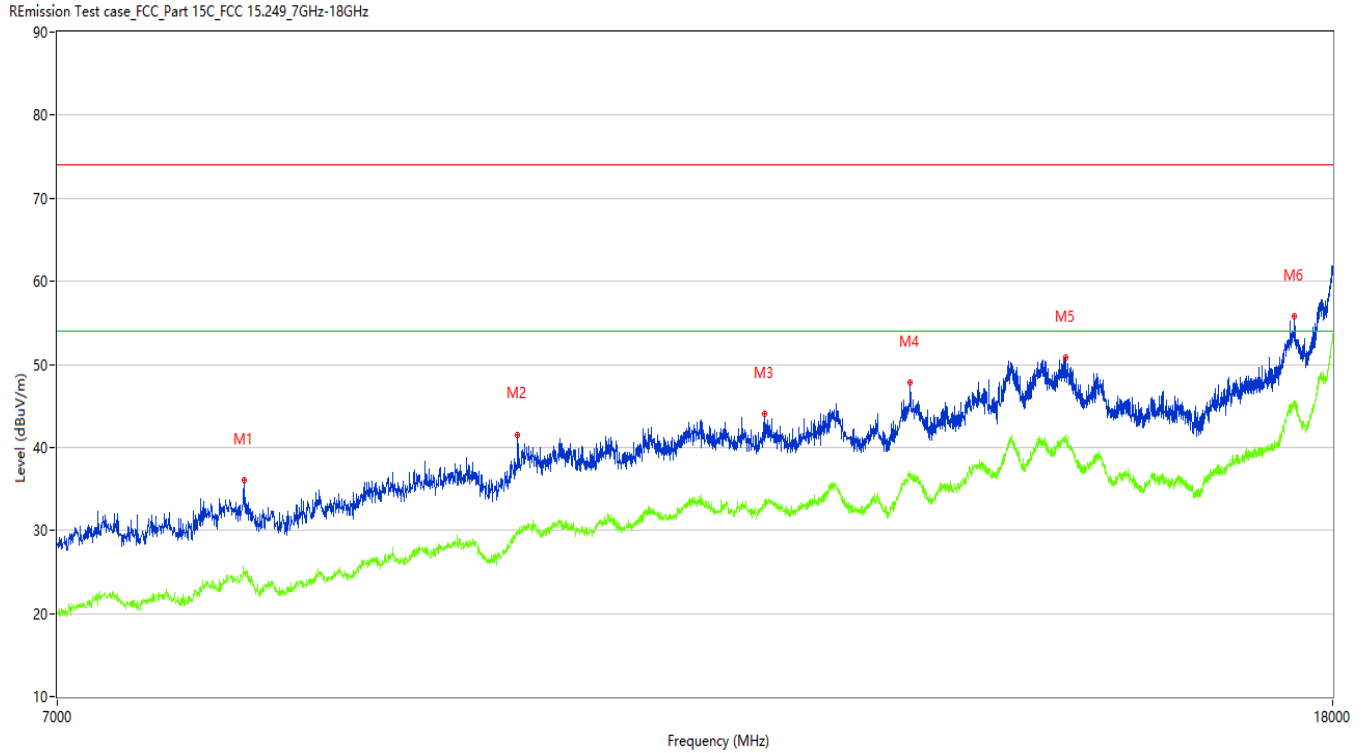
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Figure 12: Test plots of Field strength of harmonics, 2402MHz, 7GHz-18GHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	8036.750	36.04	3.73	74.0	37.96	Peak	106.10	100	Vertical	Pass
1**	8036.750	24.72	3.73	54.0	29.28	AV	106.10	100	Vertical	Pass
2	9843.500	41.47	7.87	74.0	32.53	Peak	313.40	100	Vertical	Pass
2**	9843.500	29.80	7.87	54.0	24.20	AV	313.40	100	Vertical	Pass
3	11815.250	44.02	10.57	74.0	29.98	Peak	0.00	100	Vertical	Pass
3**	11815.250	33.60	10.57	54.0	20.40	AV	0.00	100	Vertical	Pass
4	13165.500	47.88	13.13	74.0	26.12	Peak	250.50	100	Vertical	Pass
4**	13165.500	36.78	13.13	54.0	17.22	AV	250.50	100	Vertical	Pass
5	14771.500	50.86	17.88	74.0	23.14	Peak	106.10	100	Vertical	Pass
5**	14771.500	41.43	17.88	54.0	12.57	AV	106.10	100	Vertical	Pass
6	17496.750	55.74	21.54	74.0	18.26	Peak	188.70	100	Vertical	Pass
6**	17496.750	45.15	21.54	54.0	8.85	AV	188.70	100	Vertical	Pass

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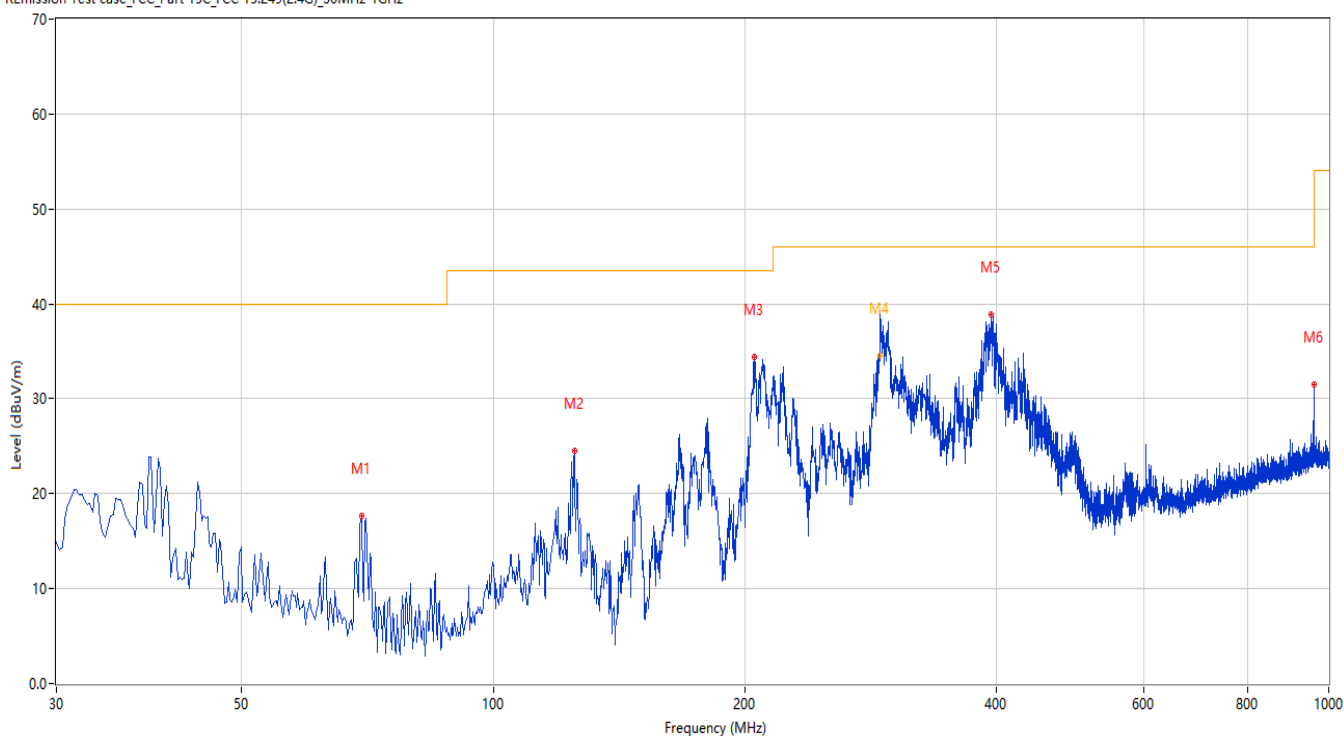
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Figure 13: Test plots of Field strength of harmonics, 2440MHz, 30MHz-1GHz, Horizontal polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	69.518	17.65	-28.51	40.0	22.35	Peak	12.20	100	Horizontal	Pass
2	125.036	24.48	-28.12	43.5	19.02	Peak	203.40	100	Horizontal	Pass
3	205.284	34.45	-25.53	43.5	9.05	Peak	0.50	100	Horizontal	Pass
4	290.521	39.28	-22.56	46.0	6.72	Peak	29.70	100	Horizontal	Pass
4*	290.521	34.53	-22.56	46.0	11.47	QP	29.70	100	Horizontal	Pass
5	394.629	38.87	-19.58	46.0	7.13	Peak	313.90	100	Horizontal	Pass
6	959.513	31.56	-7.59	46.0	14.44	Peak	233.60	100	Horizontal	Pass

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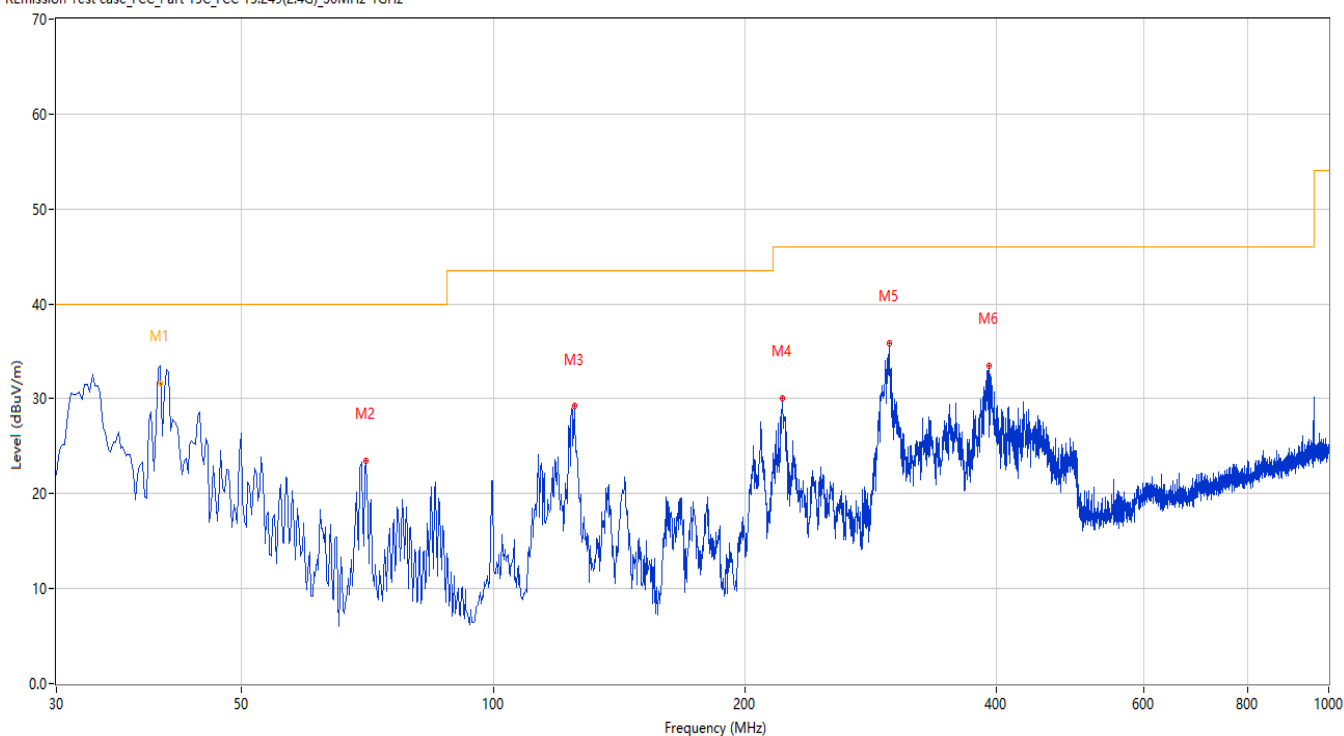
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Figure 14: Test plots of Field strength of harmonics, 2440MHz, 30MHz-1GHz, Vertical polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	39.909	33.99	-25.39	40.0	6.01	Peak	207.80	100	Vertical	Pass
1*	39.909	31.58	-25.39	40.0	8.42	QP	207.80	100	Vertical	Pass
2	70.487	23.50	-28.93	40.0	16.50	Peak	359.90	100	Vertical	Pass
3	125.036	29.20	-28.12	43.5	14.30	Peak	0.00	200	Vertical	Pass
4	222.012	30.07	-25.08	46.0	15.93	Peak	227.30	200	Vertical	Pass
5	297.653	35.82	-22.57	46.0	10.18	Peak	173.40	200	Vertical	Pass
6	392.689	33.54	-19.76	46.0	12.46	Peak	130.20	200	Vertical	Pass

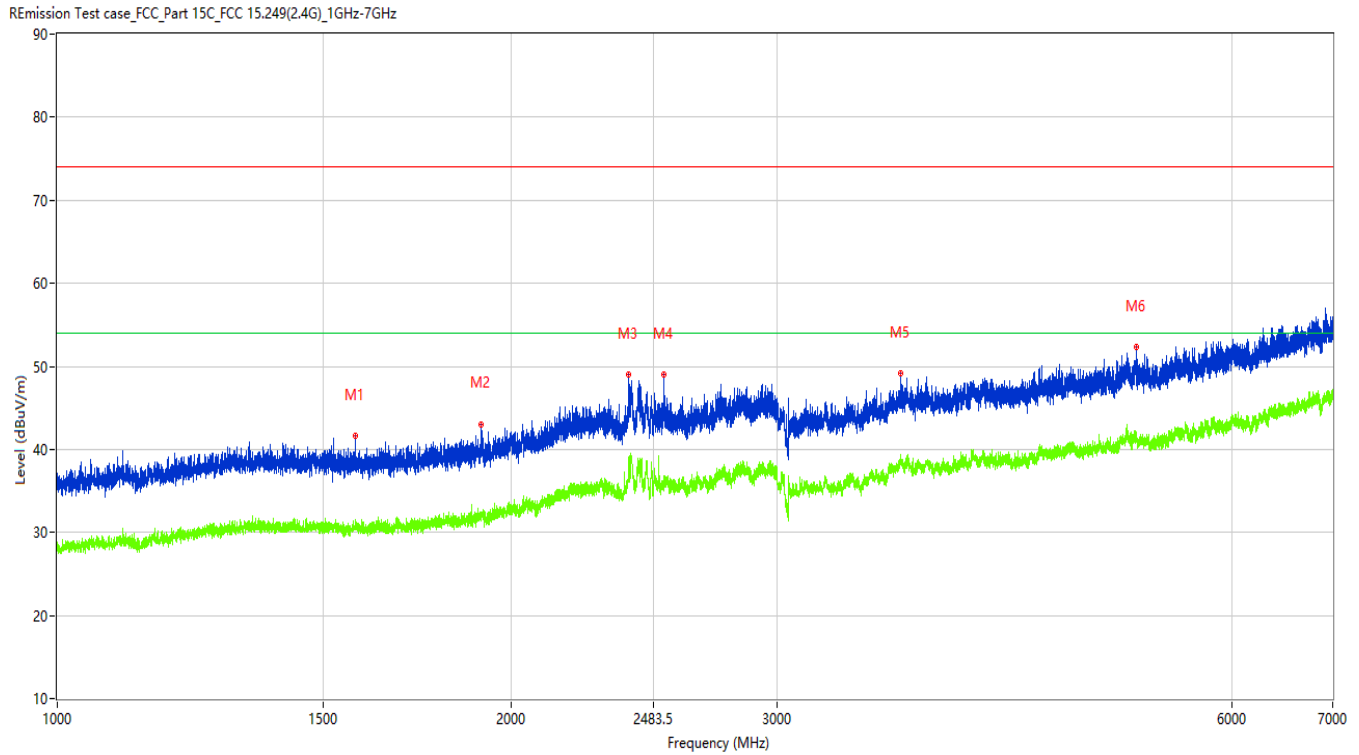
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Figure 15: Test plots of Field strength of harmonics, 2440MHz, 1GHz-7GHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1576.000	41.64	-13.05	74.0	32.36	Peak	185.00	100	Horizontal	Pass
1**	1576.000	30.89	-13.05	54.0	23.11	AV	185.00	100	Horizontal	Pass
2	1908.000	43.05	-11.68	74.0	30.95	Peak	92.30	100	Horizontal	Pass
2**	1908.000	32.33	-11.68	54.0	21.67	AV	92.30	100	Horizontal	Pass
3	2391.750	49.03	-4.84	74.0	24.97	Peak	215.20	100	Horizontal	Pass
3**	2391.750	38.43	-4.84	54.0	15.57	AV	215.20	100	Horizontal	Pass
4	2522.750	48.98	-7.16	74.0	25.02	Peak	154.20	100	Horizontal	Pass
4**	2522.750	36.08	-7.16	54.0	17.92	AV	154.20	100	Horizontal	Pass
5	3623.500	49.16	-2.25	74.0	24.84	Peak	0.00	100	Horizontal	Pass
5**	3623.500	38.91	-2.25	54.0	15.09	AV	0.00	100	Horizontal	Pass
6	5192.000	52.31	0.16	74.0	21.69	Peak	0.40	100	Horizontal	Pass
6**	5192.000	40.96	0.16	54.0	13.04	AV	0.40	100	Horizontal	Pass

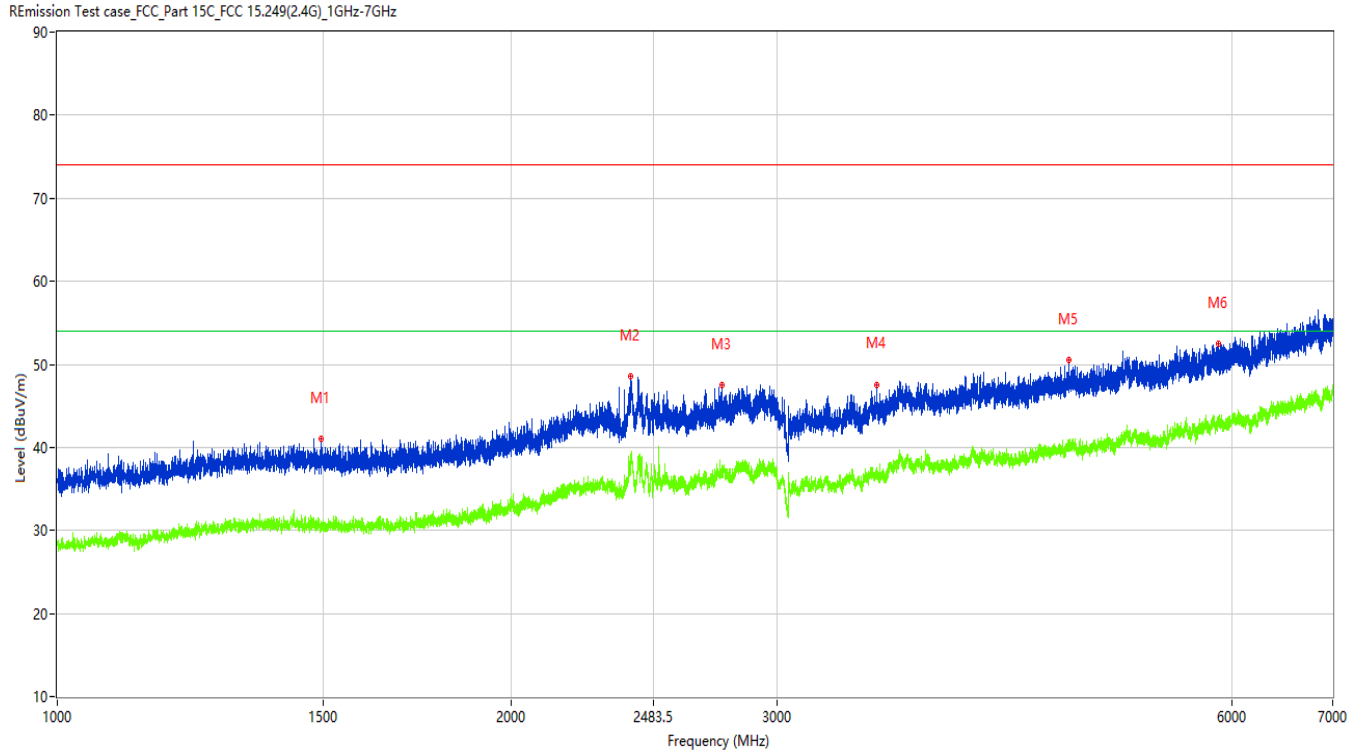
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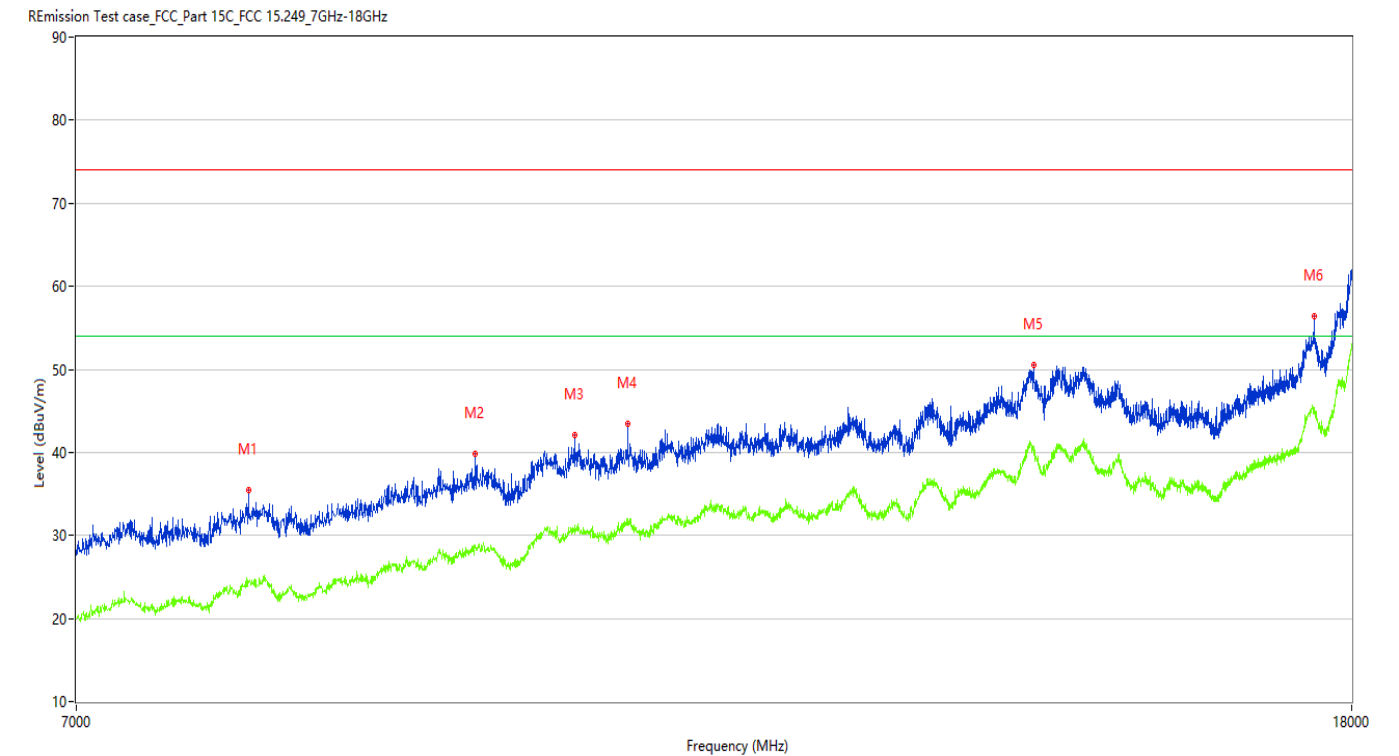
Figure 16: Test plots of Field strength of harmonics, 2440MHz, 1GHz-7GHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1495.250	41.01	-13.04	74.0	32.99	Peak	51.00	100	Vertical	Pass
1**	1495.250	31.08	-13.04	54.0	22.92	AV	51.00	100	Vertical	Pass
2	2399.750	48.53	-4.66	74.0	25.47	Peak	51.00	100	Vertical	Pass
2**	2399.750	38.59	-4.66	54.0	15.41	AV	51.00	100	Vertical	Pass
3	2757.000	47.46	-5.29	74.0	26.54	Peak	278.00	100	Vertical	Pass
3**	2757.000	37.91	-5.29	54.0	16.09	AV	278.00	100	Vertical	Pass
4	3490.000	47.58	-4.38	74.0	26.42	Peak	266.30	100	Vertical	Pass
4**	3490.000	37.59	-4.38	54.0	16.41	AV	266.30	100	Vertical	Pass
5	4679.000	50.51	-0.88	74.0	23.49	Peak	42.60	100	Vertical	Pass
5**	4679.000	40.84	-0.88	54.0	13.16	AV	42.60	100	Vertical	Pass
6	5881.500	52.53	1.23	74.0	21.47	Peak	281.90	100	Vertical	Pass
6**	5881.500	43.45	1.23	54.0	10.55	AV	281.90	100	Vertical	Pass

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Figure 17: Test plots of Field strength of harmonics, 2440MHz, 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	7951.500	35.43	2.70	74.0	38.57	Peak	3.00	100	Horizontal	Pass
1**	7951.500	24.25	2.70	54.0	29.75	AV	3.00	100	Horizontal	Pass
2	9406.250	39.84	6.71	74.0	34.16	Peak	109.60	100	Horizontal	Pass
2**	9406.250	28.78	6.71	54.0	25.22	AV	109.60	100	Horizontal	Pass
3	10126.750	42.09	8.55	74.0	31.91	Peak	230.90	100	Horizontal	Pass
3**	10126.750	31.14	8.55	54.0	22.86	AV	230.90	100	Horizontal	Pass
4	10531.000	43.44	9.46	74.0	30.56	Peak	109.60	100	Horizontal	Pass
4**	10531.000	31.96	9.46	54.0	22.04	AV	109.60	100	Horizontal	Pass
5	14221.500	50.50	17.96	74.0	23.50	Peak	342.50	100	Horizontal	Pass
5**	14221.500	40.69	17.96	54.0	13.31	AV	342.50	100	Horizontal	Pass
6	17507.750	56.33	21.32	74.0	17.67	Peak	3.00	100	Horizontal	Pass
6**	17507.750	45.15	21.32	54.0	8.85	AV	3.00	100	Horizontal	Pass

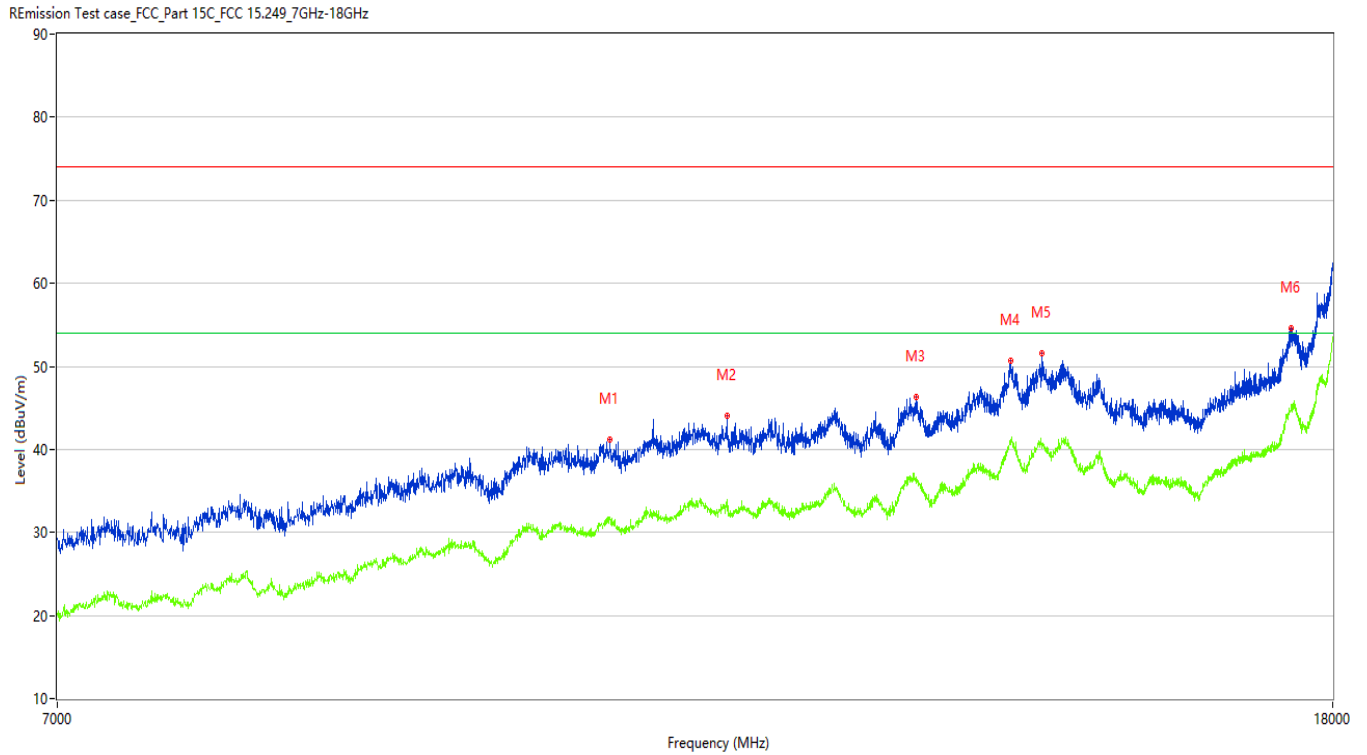
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Figure 18: Test plots of Field strength of harmonics, 2440MHz, 7GHz-18GHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	10539.250	41.12	9.47	74.0	32.88	Peak	93.80	100	Vertical	Pass
1**	10539.250	31.86	9.47	54.0	22.14	AV	93.80	100	Vertical	Pass
2	11493.500	44.05	11.08	74.0	29.95	Peak	93.80	100	Vertical	Pass
2**	11493.500	33.89	11.08	54.0	20.11	AV	93.80	100	Vertical	Pass
3	13220.500	46.32	13.26	74.0	27.68	Peak	190.60	100	Vertical	Pass
3**	13220.500	36.66	13.26	54.0	17.34	AV	190.60	100	Vertical	Pass
4	14177.500	50.66	18.32	74.0	23.34	Peak	331.10	100	Vertical	Pass
4**	14177.500	41.21	18.32	54.0	12.79	AV	331.10	100	Vertical	Pass
5	14515.750	51.60	16.68	74.0	22.40	Peak	0.00	100	Vertical	Pass
5**	14515.750	40.52	16.68	54.0	13.48	AV	0.00	100	Vertical	Pass
6	17450.000	54.60	20.91	74.0	19.40	Peak	331.10	100	Vertical	Pass
6**	17450.000	44.65	20.91	54.0	9.35	AV	331.10	100	Vertical	Pass

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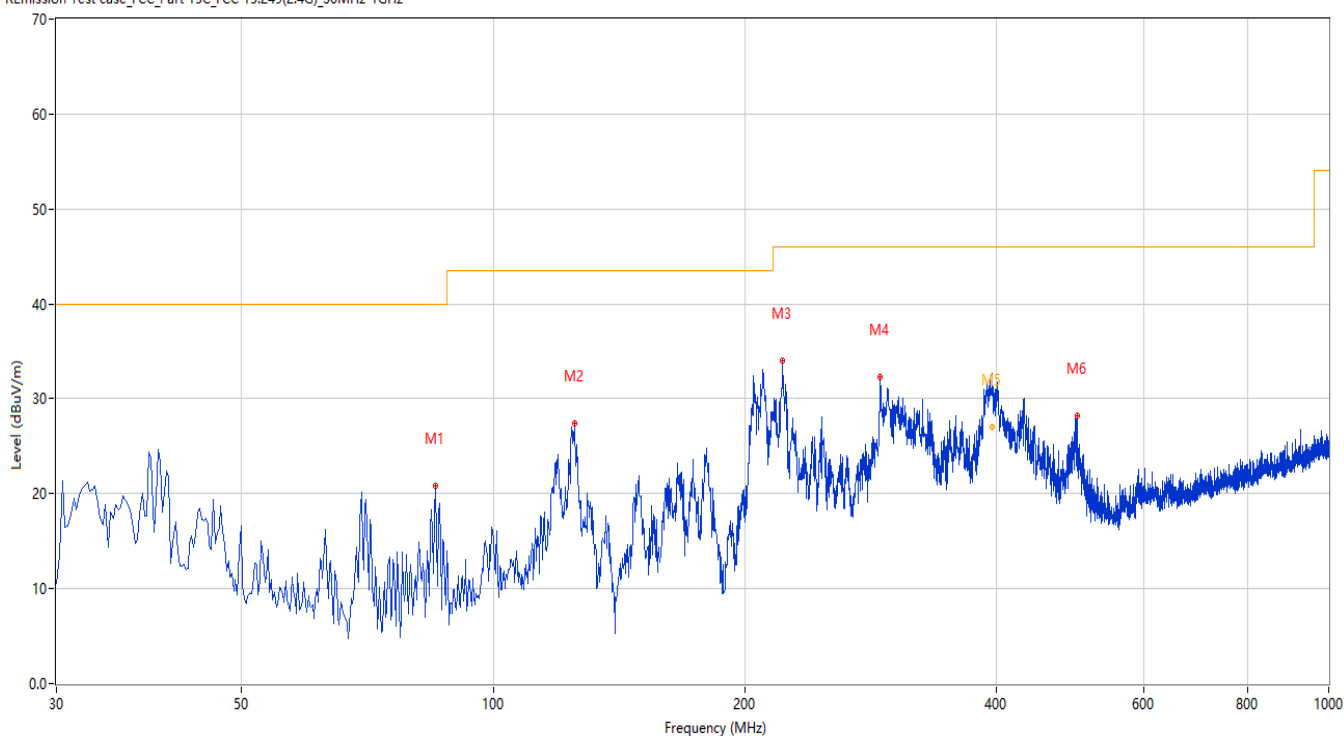
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Figure 19: Test plots of Field strength of harmonics, 2480MHz, 30MHz-1GHz, Horizontal polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	85.276	20.84	-29.29	40.0	19.16	Peak	81.30	200	Horizontal	Pass
2	125.036	27.37	-28.12	43.5	16.13	Peak	1.60	200	Horizontal	Pass
3	222.012	34.03	-25.08	46.0	11.97	Peak	242.00	200	Horizontal	Pass
4	290.380	32.32	-22.56	46.0	13.68	Peak	172.80	200	Horizontal	Pass
5	395.353	33.05	-19.55	46.0	12.95	Peak	215.60	197	Horizontal	Pass
5*	395.353	27.06	-19.55	46.0	18.94	QP	215.60	197	Horizontal	Pass
6	499.848	28.22	-17.39	46.0	17.78	Peak	44.80	200	Horizontal	Pass

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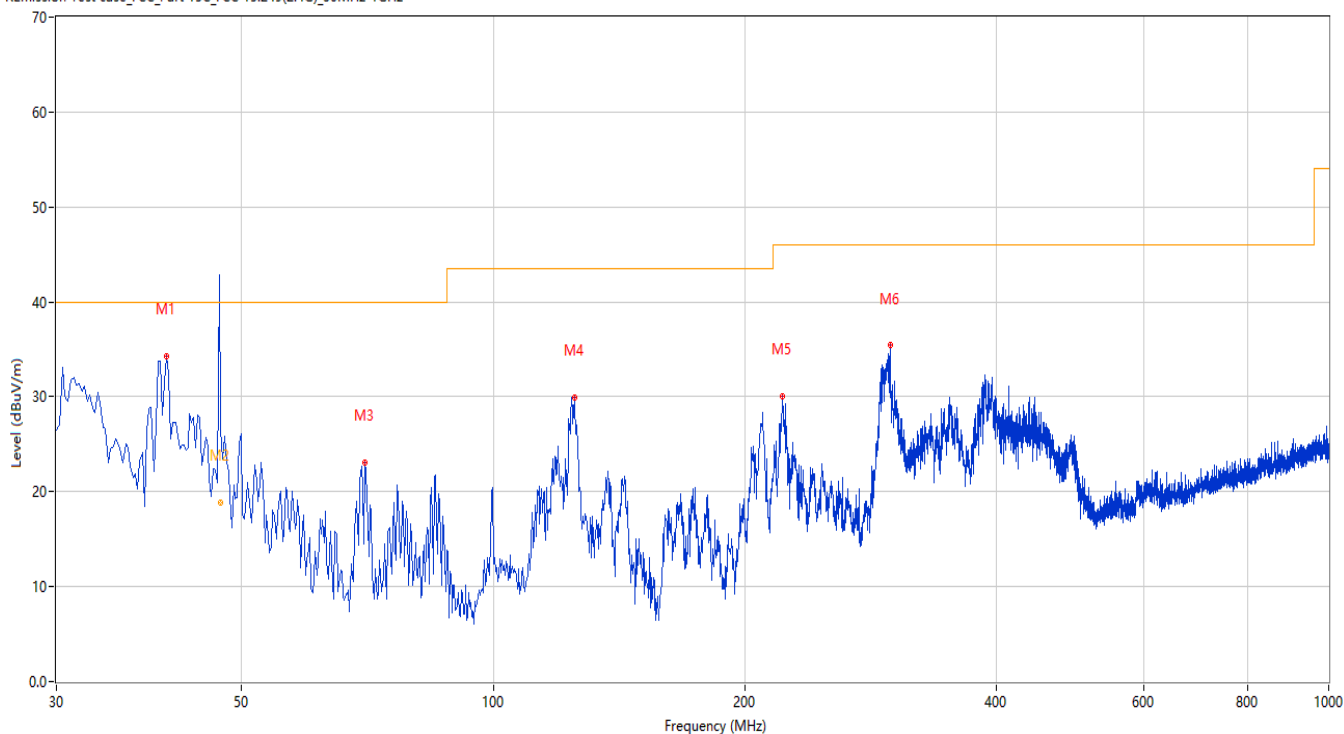
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Figure 20: Test plots of Field strength of harmonics, 2480MHz, 30MHz-1GHz, Vertical polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_30MHz-1GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	40.667	34.27	-25.16	40.0	5.73	Peak	356.00	100	Vertical	Pass
2*	47.127	18.84	-24.14	40.0	21.16	QP	0.00	159	Vertical	Pass
3	70.245	23.11	-28.82	40.0	16.89	Peak	309.00	100	Vertical	Pass
4	125.036	29.92	-28.12	43.5	13.58	Peak	0.00	200	Vertical	Pass
5	222.012	30.04	-25.08	46.0	15.96	Peak	222.40	200	Vertical	Pass
6	298.380	35.40	-22.59	46.0	10.60	Peak	179.30	200	Vertical	Pass

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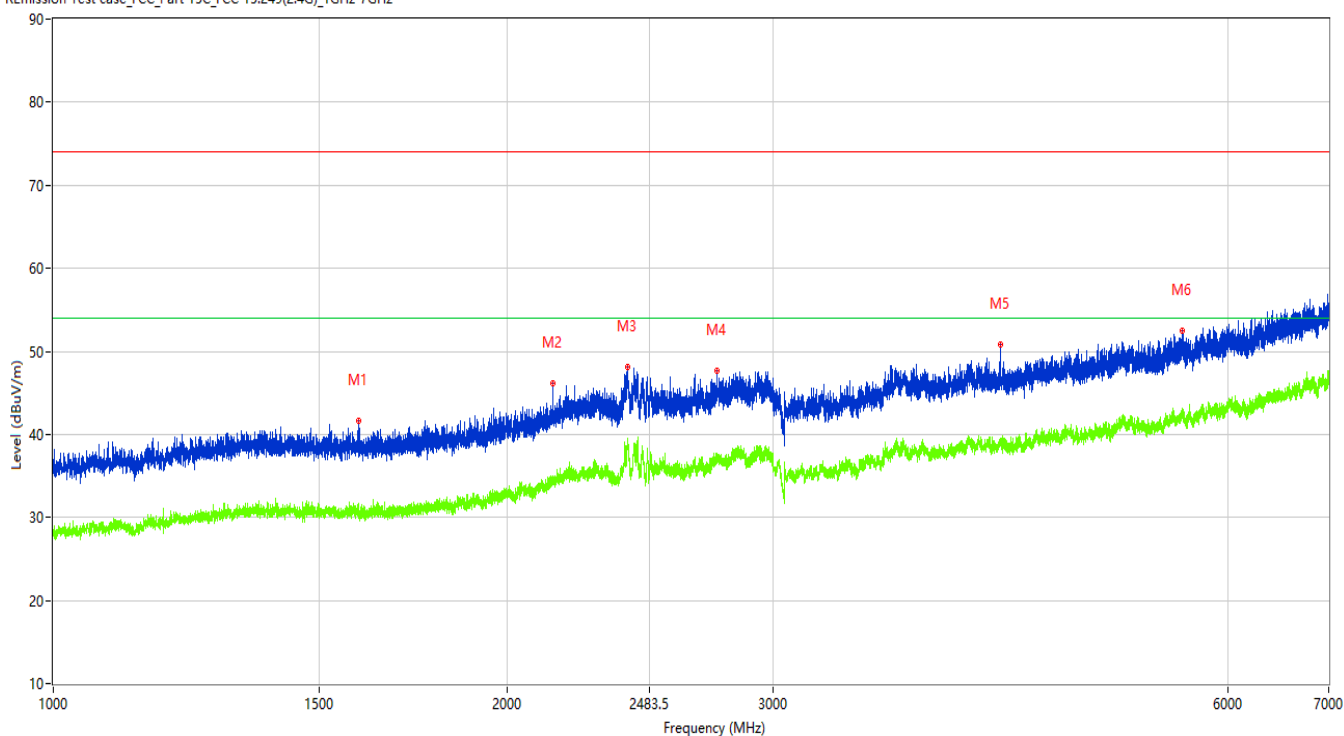
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Figure 21: Test plots of Field strength of harmonics, 2480MHz, 1GHz-7GHz, Horizontal polarization

REmission Test case_FCC_Part 15C_FCC 15.249(2.4G)_1GHz-7GHz



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1594.500	41.67	-13.07	74.0	32.33	Peak	136.10	100	Horizontal	Pass
1**	1594.500	31.68	-13.07	54.0	22.32	AV	136.10	100	Horizontal	Pass
2	2144.000	46.15	-9.03	74.0	27.85	Peak	275.70	100	Horizontal	Pass
2**	2144.000	34.82	-9.03	54.0	19.18	AV	275.70	100	Horizontal	Pass
3	2402.250	48.05	-4.71	74.0	25.95	Peak	257.80	100	Horizontal	Pass
3**	2402.250	39.58	-4.71	54.0	14.42	AV	257.80	100	Horizontal	Pass
4	2754.250	47.64	-5.36	74.0	26.36	Peak	305.50	100	Horizontal	Pass
4**	2754.250	37.38	-5.36	54.0	16.62	AV	305.50	100	Horizontal	Pass
5	4239.500	50.77	-2.23	74.0	23.23	Peak	320.30	100	Horizontal	Pass
5**	4239.500	39.16	-2.23	54.0	14.84	AV	320.30	100	Horizontal	Pass
6	5594.500	52.44	0.65	74.0	21.56	Peak	91.80	100	Horizontal	Pass
6**	5594.500	42.01	0.65	54.0	11.99	AV	91.80	100	Horizontal	Pass

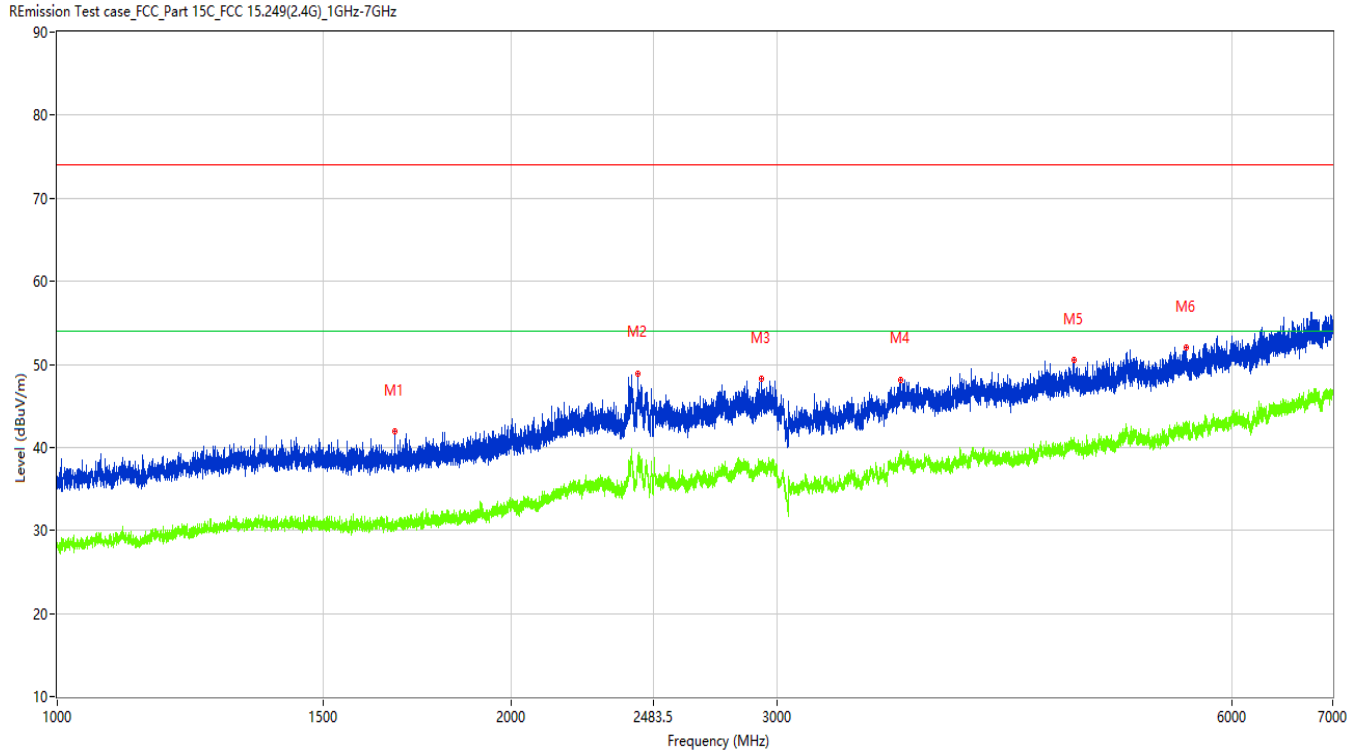
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Figure 22: Test plots of Field strength of harmonics, 2480MHz, 1GHz-7GHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1674.500	41.98	-13.02	74.0	32.02	Peak	0.00	100	Vertical	Pass
1**	1674.500	30.66	-13.02	54.0	23.34	AV	0.00	100	Vertical	Pass
2	2425.500	48.94	-5.17	74.0	25.06	Peak	3.40	100	Vertical	Pass
2**	2425.500	38.91	-5.17	54.0	15.09	AV	3.40	100	Vertical	Pass
3	2929.000	48.23	-4.69	74.0	25.77	Peak	0.00	100	Vertical	Pass
3**	2929.000	37.65	-4.69	54.0	16.35	AV	0.00	100	Vertical	Pass
4	3623.000	48.19	-2.26	74.0	25.81	Peak	134.90	100	Vertical	Pass
4**	3623.000	38.14	-2.26	54.0	15.86	AV	134.90	100	Vertical	Pass
5	4716.000	50.50	-0.87	74.0	23.50	Peak	0.00	100	Vertical	Pass
5**	4716.000	40.74	-0.87	54.0	13.26	AV	0.00	100	Vertical	Pass
6	5594.500	52.00	0.65	74.0	22.00	Peak	118.90	100	Vertical	Pass
6**	5594.500	42.17	0.65	54.0	11.83	AV	118.90	100	Vertical	Pass

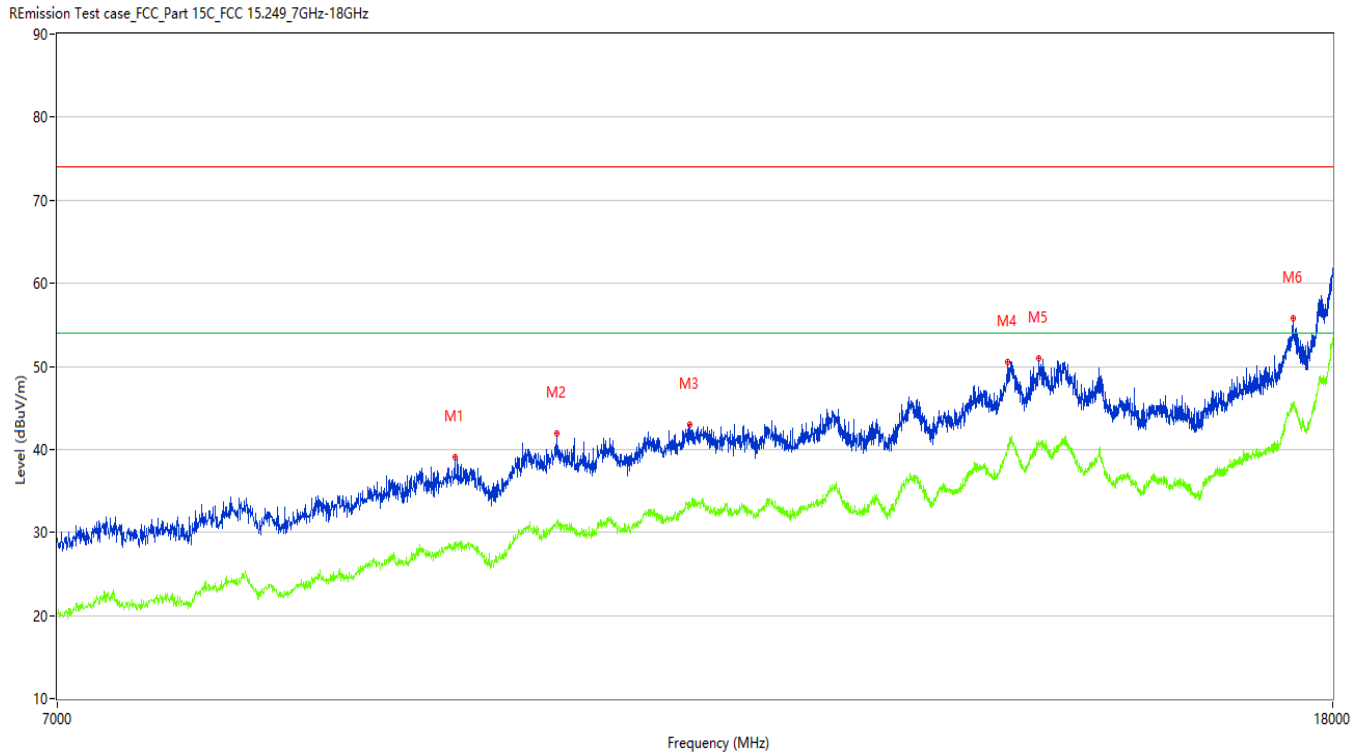
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Figure 23: Test plots of Field strength of harmonics, 2480MHz, 7GHz-18GHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	9395.250	39.12	6.72	74.0	34.88	Peak	0.30	100	Horizontal	Pass
1**	9395.250	28.79	6.72	54.0	25.21	AV	0.30	100	Horizontal	Pass
2	10135.000	41.86	8.49	74.0	32.14	Peak	360.00	100	Horizontal	Pass
2**	10135.000	31.34	8.49	54.0	22.66	AV	360.00	100	Horizontal	Pass
3	11180.000	42.99	10.24	74.0	31.01	Peak	230.00	100	Horizontal	Pass
3**	11180.000	33.65	10.24	54.0	20.35	AV	230.00	100	Horizontal	Pass
4	14150.000	50.49	17.42	74.0	23.51	Peak	230.00	100	Horizontal	Pass
4**	14150.000	39.98	17.42	54.0	14.02	AV	230.00	100	Horizontal	Pass
5	14482.750	50.91	16.98	74.0	23.09	Peak	344.30	100	Horizontal	Pass
5**	14482.750	40.99	16.98	54.0	13.01	AV	344.30	100	Horizontal	Pass
6	17477.501	55.79	21.57	74.0	18.21	Peak	102.00	100	Horizontal	Pass
6**	17477.501	45.08	21.57	54.0	8.92	AV	102.00	100	Horizontal	Pass

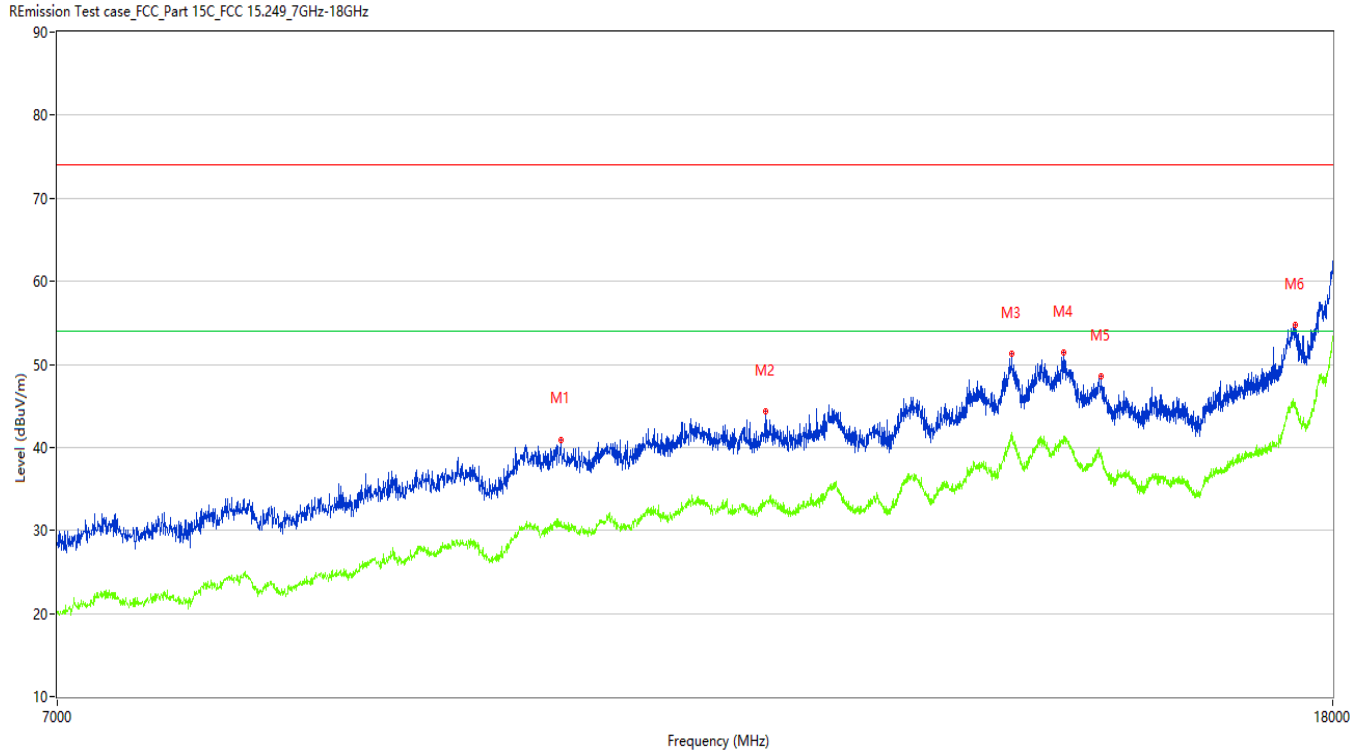
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Figure 24: Test plots of Field strength of harmonics, 2480MHz, 7GHz-18GHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	10162.500	40.95	8.33	74.0	33.05	Peak	188.40	100	Vertical	Pass
1**	10162.500	30.80	8.33	54.0	23.20	AV	188.40	100	Vertical	Pass
2	11823.500	44.39	10.72	74.0	29.61	Peak	110.00	100	Vertical	Pass
2**	11823.500	33.49	10.72	54.0	20.51	AV	110.00	100	Vertical	Pass
3	14191.250	51.33	18.59	74.0	22.67	Peak	354.00	100	Vertical	Pass
3**	14191.250	40.90	18.59	54.0	13.10	AV	354.00	100	Vertical	Pass
4	14752.250	51.44	17.84	74.0	22.56	Peak	270.70	100	Vertical	Pass
4**	14752.250	40.77	17.84	54.0	13.23	AV	270.70	100	Vertical	Pass
5	15167.500	48.51	14.02	74.0	25.49	Peak	110.00	100	Vertical	Pass
5**	15167.500	39.40	14.02	54.0	14.60	AV	110.00	100	Vertical	Pass
6	17513.251	54.70	21.21	74.0	19.30	Peak	204.40	100	Vertical	Pass
6**	17513.251	45.11	21.21	54.0	8.89	AV	204.40	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

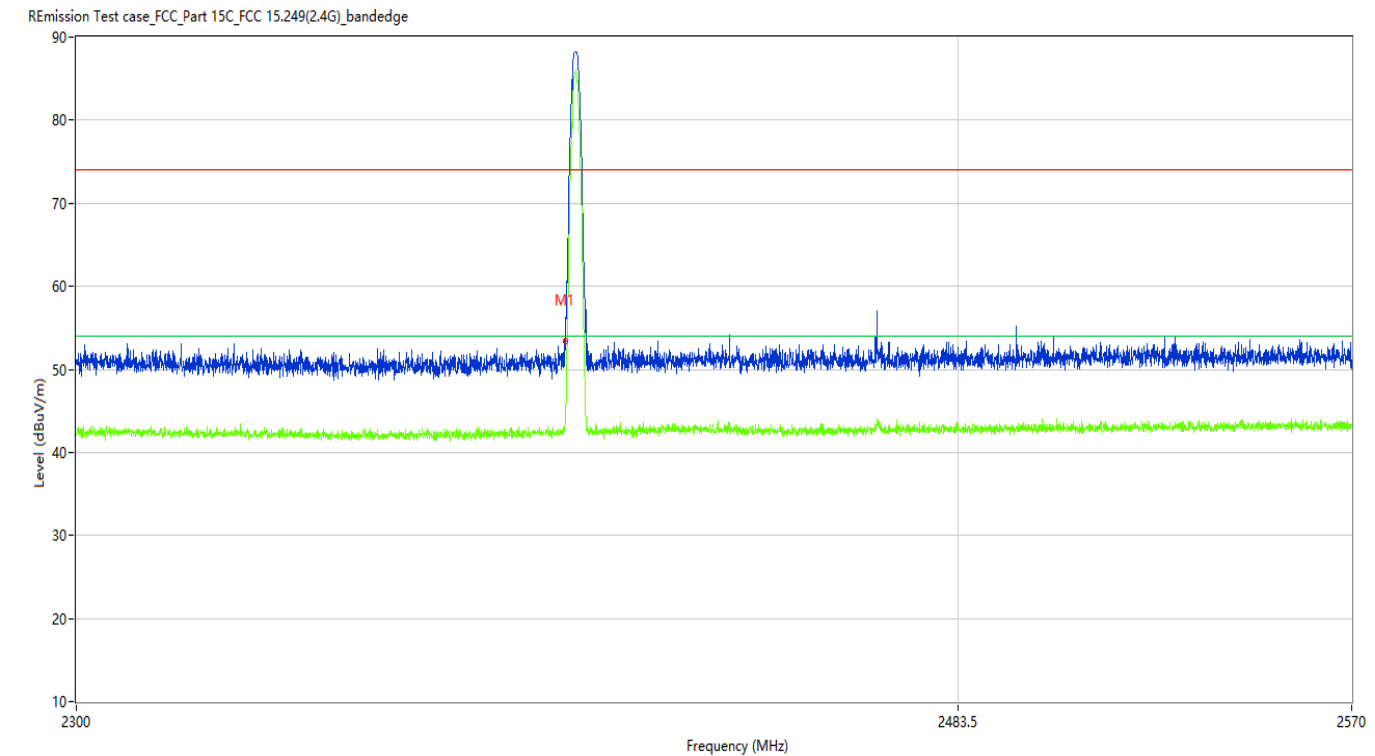
: 25.2°C

Relative humidity

: 53%

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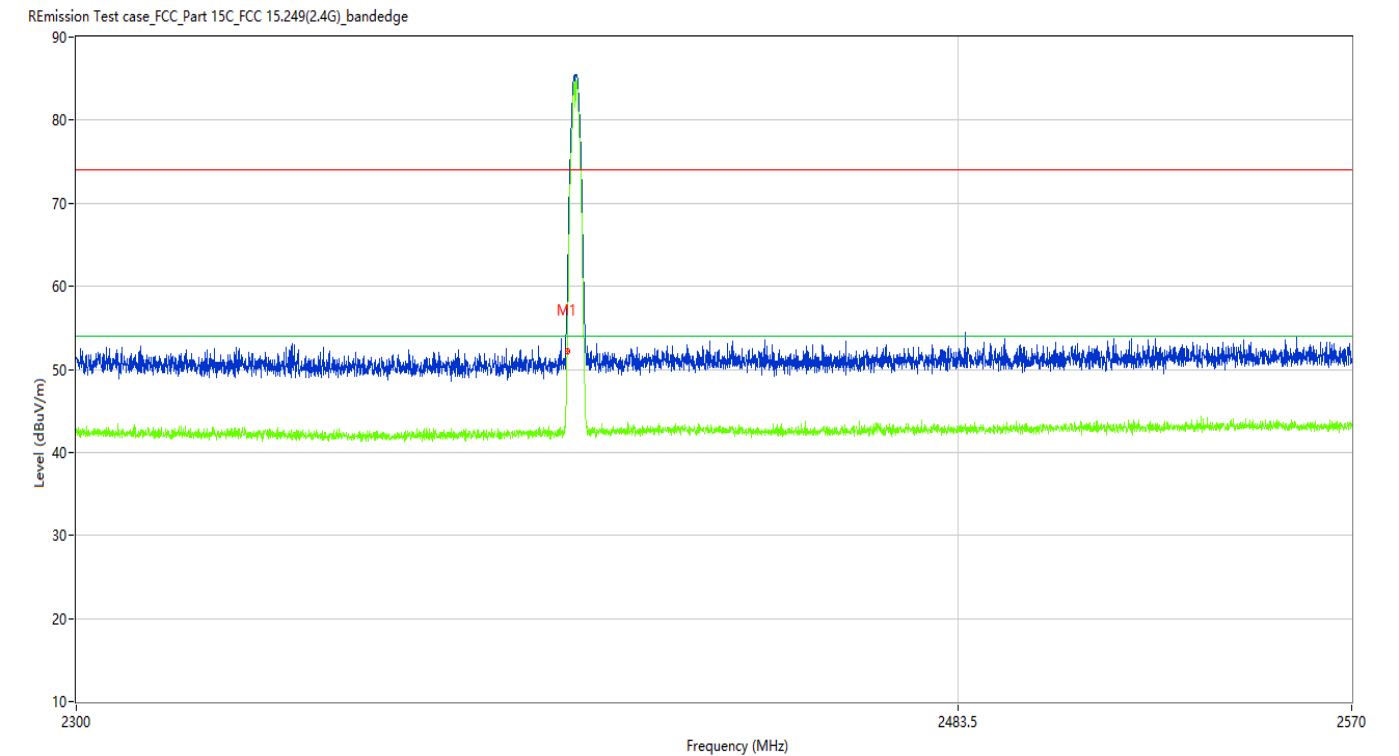
Figure 25: Test plots of Band Edge, 2402MHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2400.000	52.89	-10.13	74.0	21.11	Peak	163.90	100	Horizontal	Pass
1**	2400.000	43.84	-10.13	54.0	10.16	AV	163.90	100	Horizontal	Pass

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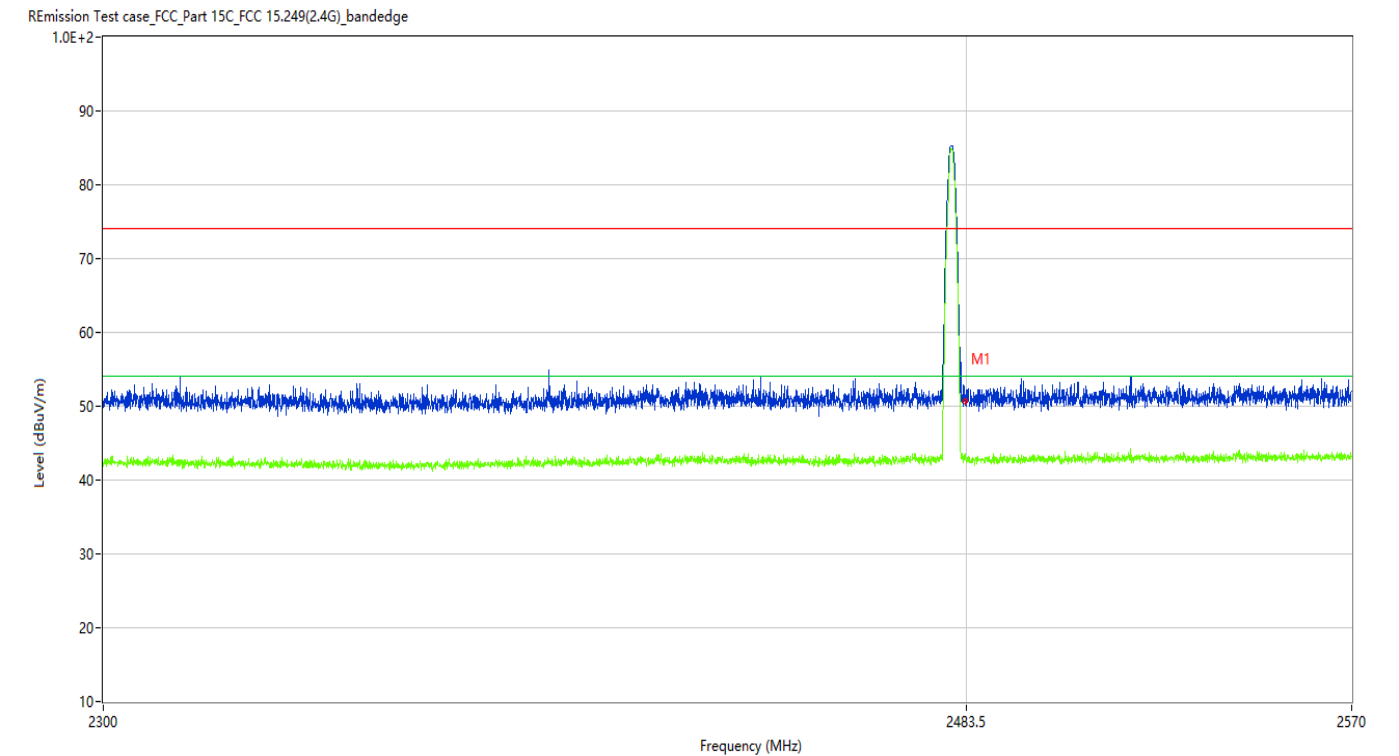
Figure 26: Test plots of Band Edge, 2402MHz, Vertical polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2400.000	51.75	-10.13	74.0	22.25	Peak	142.04	100	Vertical	Pass
1**	2400.000	43.66	-10.13	54.0	10.34	AV	142.04	100	Vertical	Pass

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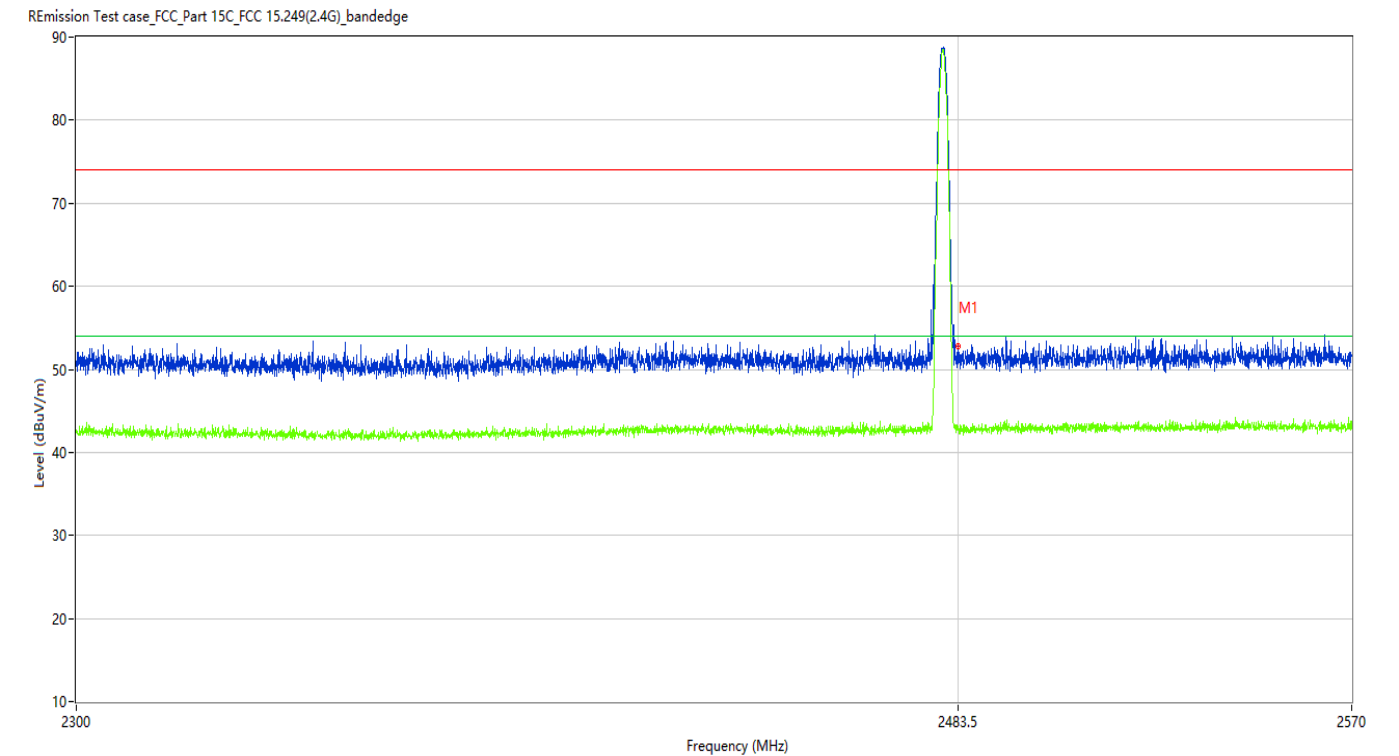
Figure 27: Test plots of Band Edge, 2480MHz, Horizontal polarization



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	2483.500	50.78	-9.82	74.0	23.22	Peak	156.37	100	Horizontal	Pass
1**	2483.500	42.71	-9.82	54.0	11.29	AV	156.37	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	52.48	-9.82	74.0	21.52	Peak	301.46	100	Vertical	Pass
1**	2483.500	42.92	-9.82	54.0	11.08	AV	301.46	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 : 23.5°C

Relative humidity : 49%

Table 1: 20dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
GFSK	2402	0.978	0.925
	2440	1.020	0.930
	2480	1.039	0.957

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Figure 29: The plots of 20dB Bandwidth and 99% Bandwidth, 2402MHz

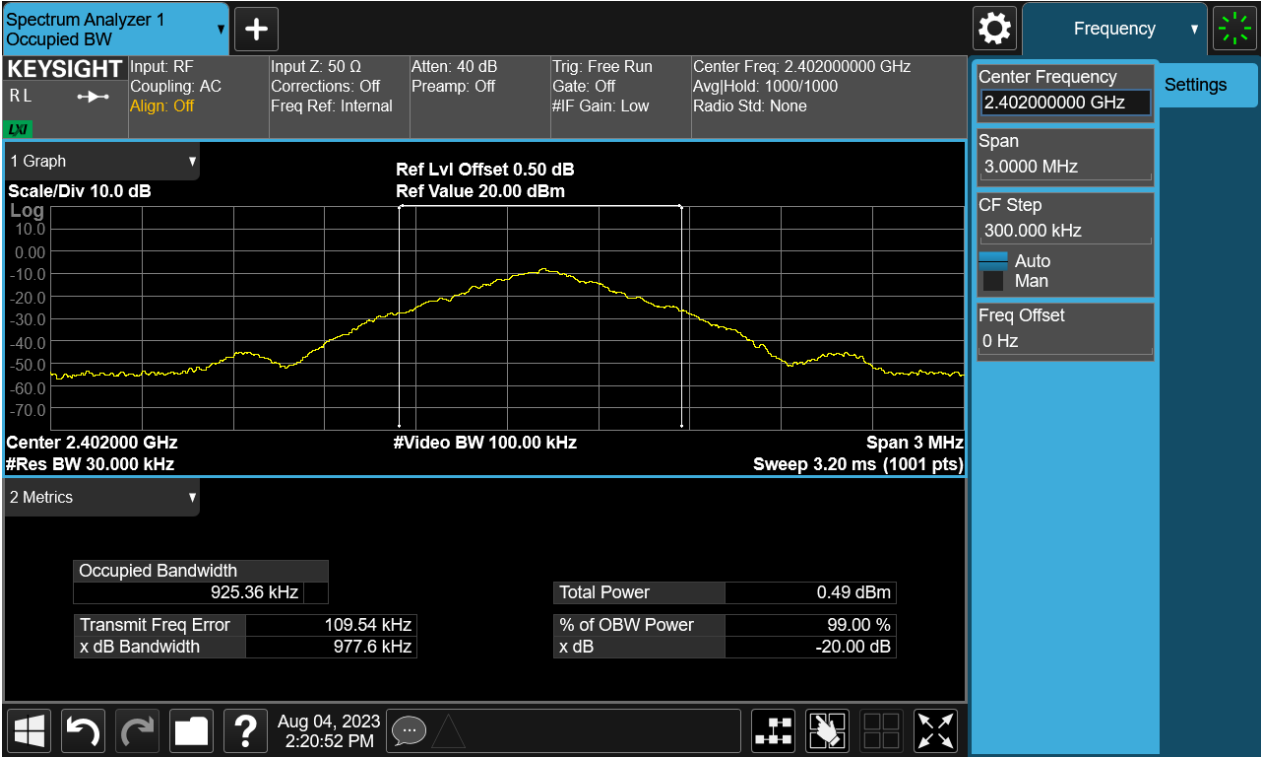


Figure 30: The plots of 20dB Bandwidth and 99% Bandwidth, 2440MHz



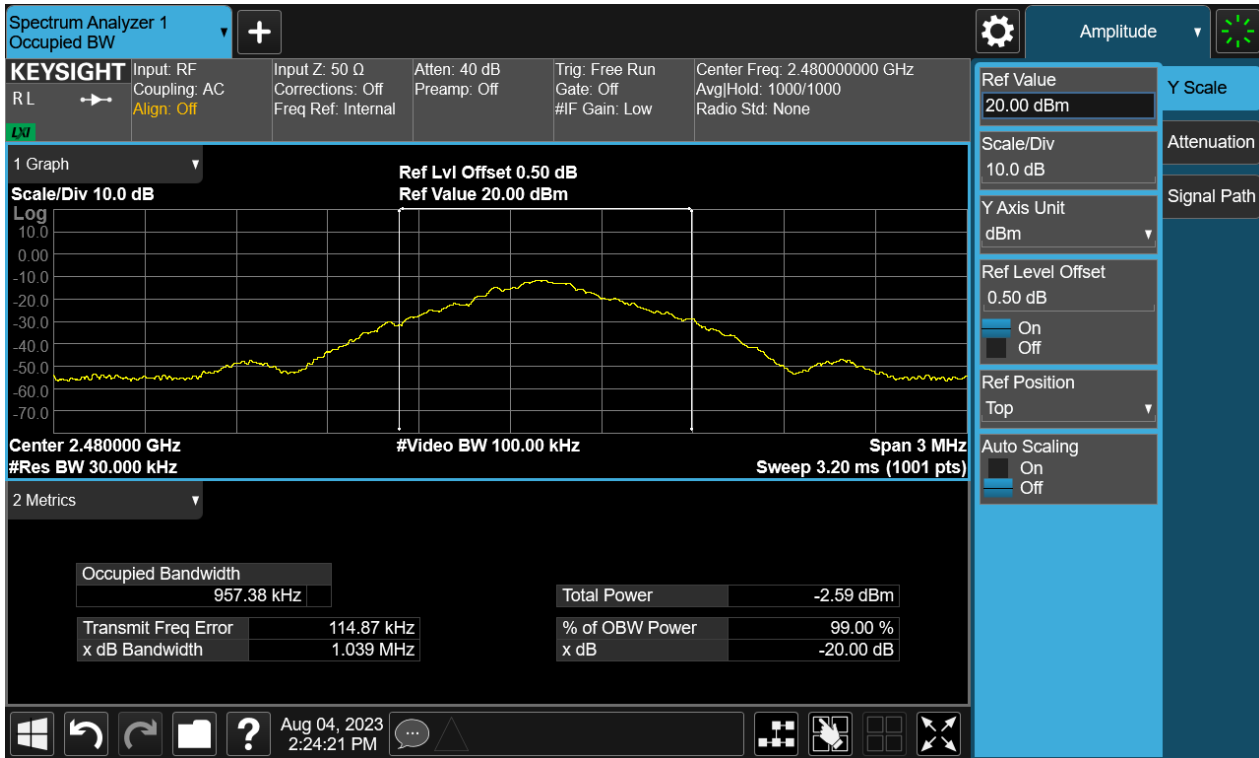
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Figure 31: The plots of 20dB Bandwidth and 99% Bandwidth, 2480MHz



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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	: which received AC 120V, 60Hz Power
Operation Mode	: A.1.a
Earthing	: Not Connected
Ambient temperature	: 24.4°C
Relative humidity	: 54%

For details refer to following test plot.

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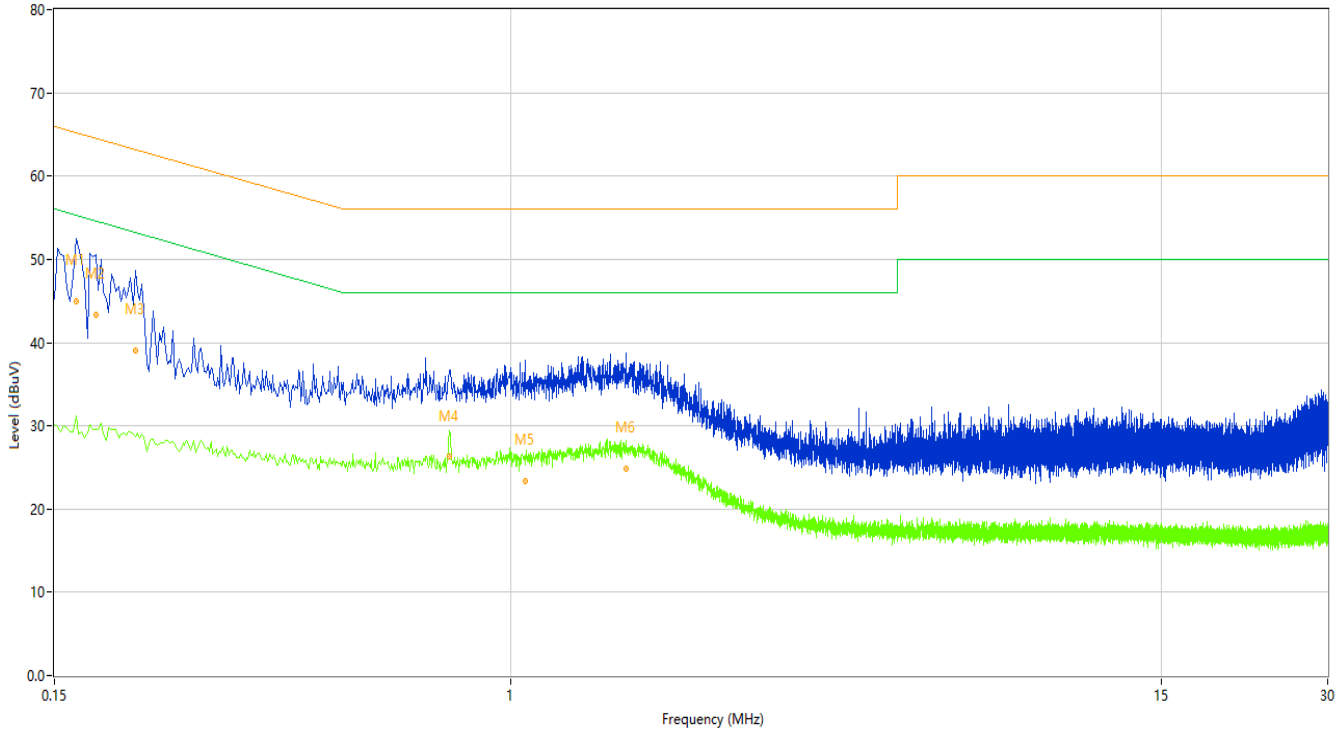
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Note: The all configurations were tested respectively, but only the worst configuration shown here.

Figure 32: Conducted Emission on AC Mains, L Phase

CEmission Test case_FCC_CE_FCC PART 15C



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.164	56.27	9.94	65.26	8.99	Peak	L	Pass
1*	0.164	45.00	9.94	65.26	20.26	QP	L	Pass
1**	0.164	31.16	9.94	55.26	24.10	AV	L	Pass
2	0.178	54.42	9.93	64.58	10.16	Peak	L	Pass
2*	0.178	43.28	9.93	64.58	21.30	QP	L	Pass
2**	0.178	29.64	9.93	54.58	24.94	AV	L	Pass
3	0.210	50.12	9.95	63.21	13.09	Peak	L	Pass
3*	0.210	39.02	9.95	63.21	24.19	QP	L	Pass
3**	0.210	28.75	9.95	53.21	24.46	AV	L	Pass
4	0.776	35.49	9.94	56.00	20.51	Peak	L	Pass
4*	0.776	26.39	9.94	56.00	29.61	QP	L	Pass
4**	0.776	29.49	9.94	46.00	16.51	AV	L	Pass
5	1.062	34.57	9.83	56.00	21.43	Peak	L	Pass
5*	1.062	23.35	9.83	56.00	32.65	QP	L	Pass
5**	1.062	26.35	9.83	46.00	19.65	AV	L	Pass
6	1.618	37.18	9.85	56.00	18.82	Peak	L	Pass
6*	1.618	24.85	9.85	56.00	31.15	QP	L	Pass
6**	1.618	28.22	9.85	46.00	17.78	AV	L	Pass

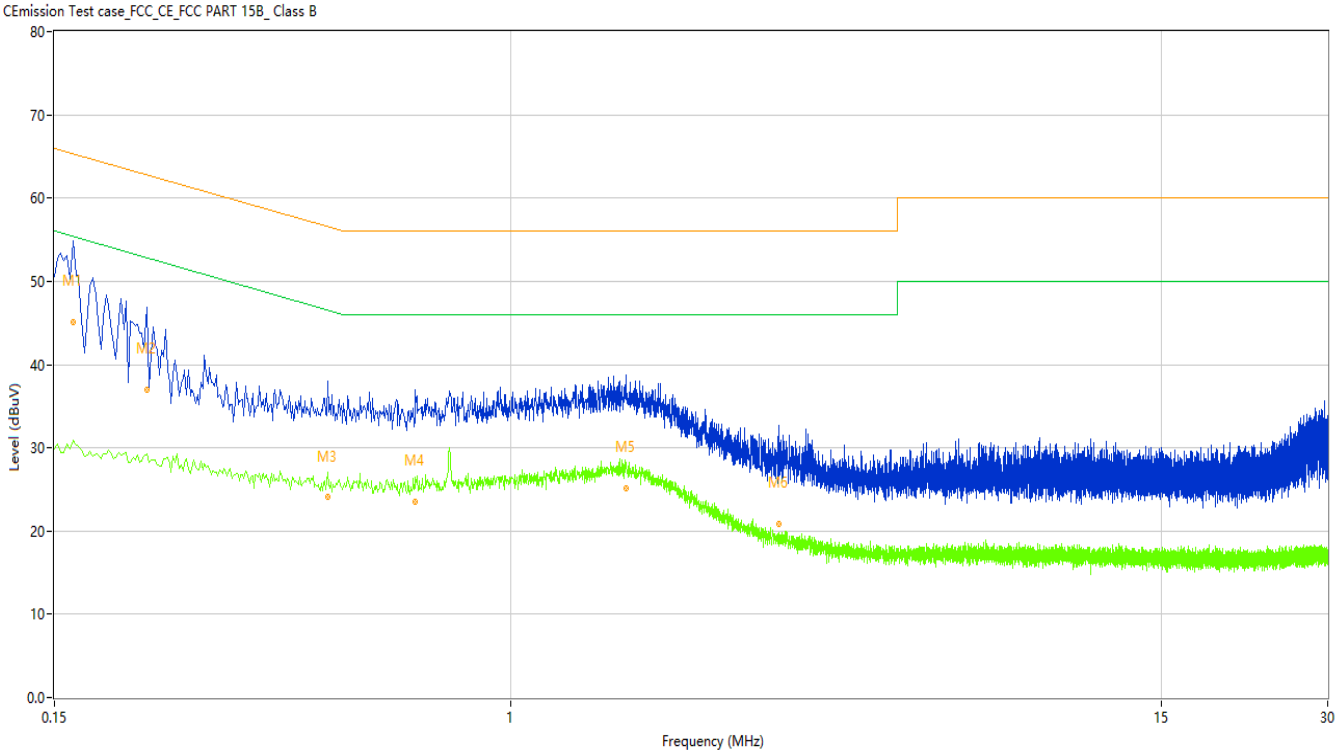
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Figure 33: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.162	56.13	10.03	65.36	9.23	Peak	N	Pass
1*	0.162	45.12	10.03	65.36	20.24	QP	N	Pass
1**	0.162	30.98	10.03	55.36	24.38	AV	N	Pass
2	0.220	48.63	10.05	62.82	14.19	Peak	N	Pass
2*	0.220	37.04	10.05	62.82	25.78	QP	N	Pass
2**	0.220	29.22	10.05	52.82	23.60	AV	N	Pass
3	0.468	34.66	10.07	56.55	21.89	Peak	N	Pass
3*	0.468	24.05	10.07	56.55	32.50	QP	N	Pass
3**	0.468	27.04	10.07	46.55	19.51	AV	N	Pass
4	0.674	33.59	10.05	56.00	22.41	Peak	N	Pass
4*	0.674	23.44	10.05	56.00	32.56	QP	N	Pass
4**	0.674	26.41	10.05	46.00	19.59	AV	N	Pass
5	1.616	36.47	9.94	56.00	19.53	Peak	N	Pass
5*	1.616	25.19	9.94	56.00	30.81	QP	N	Pass
5**	1.616	28.28	9.94	46.00	17.72	AV	N	Pass
6	3.054	30.29	9.91	56.00	25.71	Peak	N	Pass
6*	3.054	20.87	9.91	56.00	35.13	QP	N	Pass
6**	3.054	19.41	9.91	46.00	26.59	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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Left of the sample

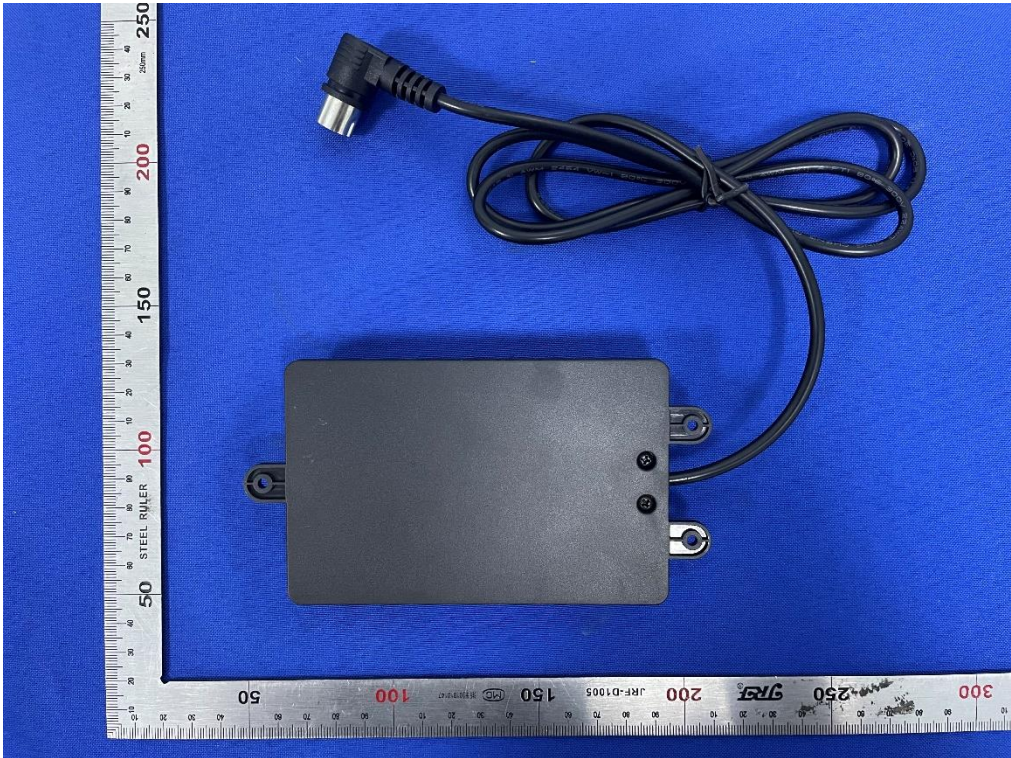


Right of the sample

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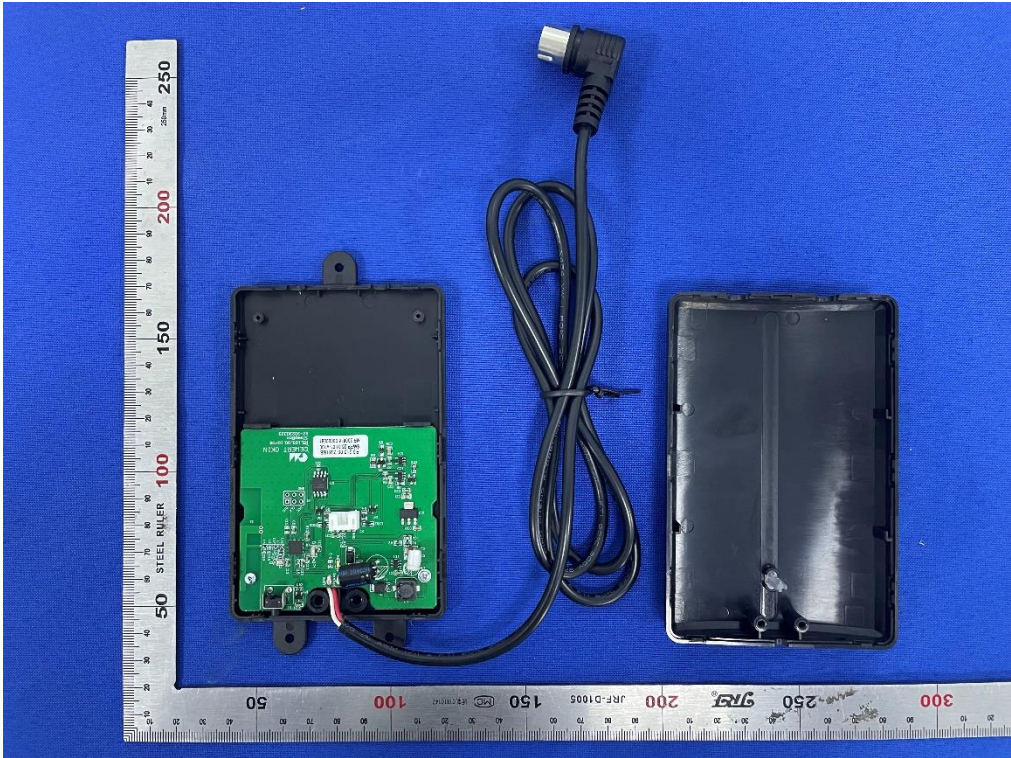


Top of the sample

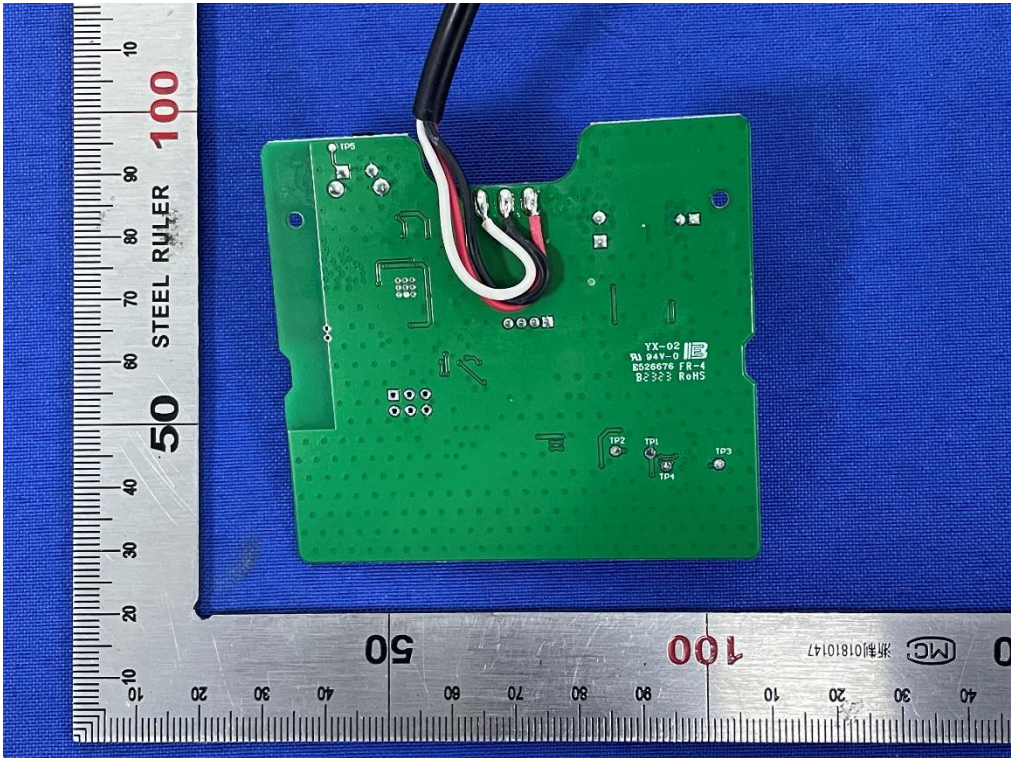


Bottom of the sample

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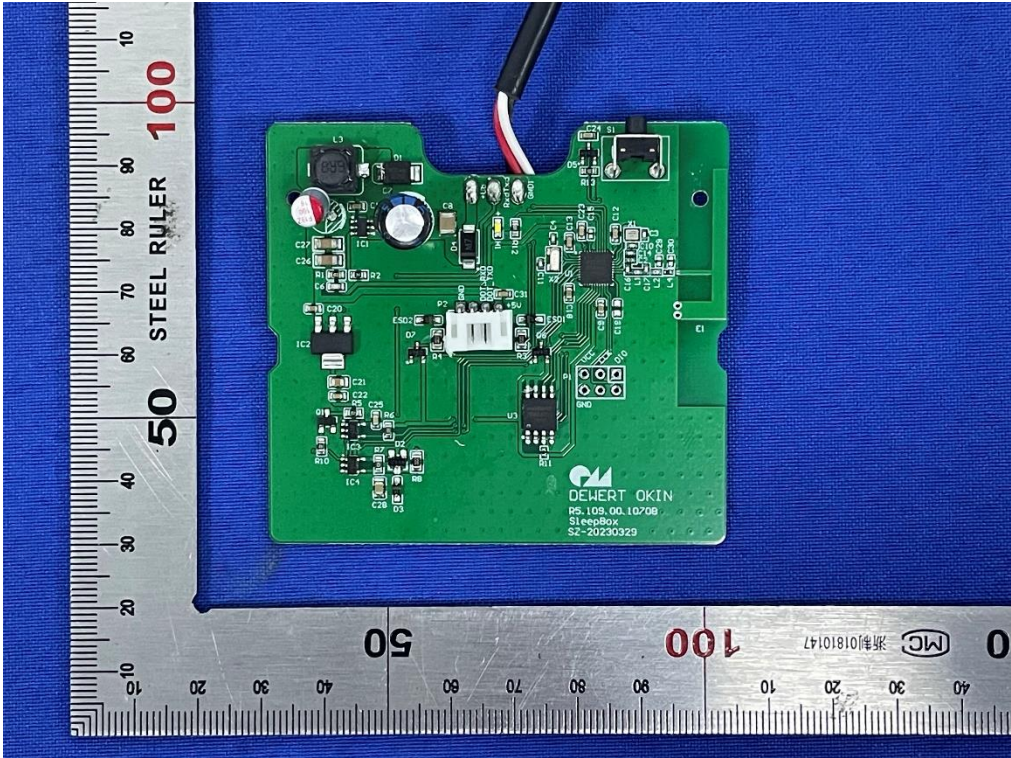


Open of the sample

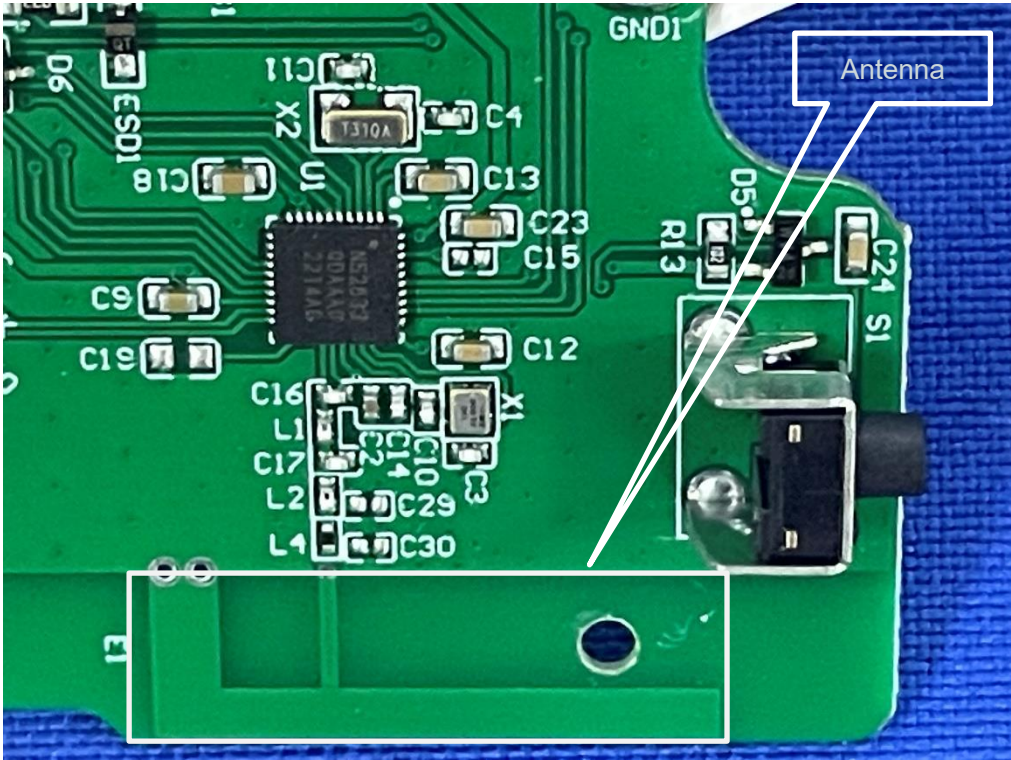


Internal-1 of the sample

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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