

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 1 of 37

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

Product Name : CONTROL BOX
Brand Name : N/A
Model No. : CB4620
Sample acquisition Method : Sent by Client
Sample No. : E23070104-01#02
E23070104-01#03
FCC ID : 2AVJ8-CB4620
ISED Number : 25804-CB4620

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 : 2023-07-24
Date of Test : 2023-07-27 ~ 2023-08-16
Date of Issue : 2023-08-16

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)

Reviewed by:



(Jennifer Zhou)

Approved by:



(Authorized signatory: Echo Mu)

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 2 of 37

Contents

1	GENERAL INFORMATION	3
1.1	TESTING LABORATORY	3
1.2	DETAILS OF APPLICATION	3
1.3	DETAILS OF EUT	3
1.4	TEST METHODOLOGY	5
1.5	TEST SUMMARY	5
2	TEST CONDITION	6
2.1	ENVIRONMENTAL CONDITIONS	6
2.2	EQUIPMENT LIST	6
2.3	MEASUREMENT UNCERTAINTY	7
3	TEST SET-UP AND OPERATION MODES	8
3.1	DETAILS OF TEST MODE	8
3.2	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	8
3.3	SUPPORT SOFTWARE	8
3.4	TEST SETUP DIAGRAM	9
4	TEST RESULTS	11
4.1	TRANSMITTER REQUIREMENT & TEST SUITES	11
4.1.1	<i>Antenna Requirement</i>	11
4.1.2	<i>Radiated Emission</i>	12
4.1.3	<i>Band Edge</i>	21
4.1.4	<i>20dB Bandwidth and 99% Bandwidth</i>	26
4.2	MAINS EMISSIONS	28
4.2.1	<i>Conducted Emission on AC Mains</i>	28
5	APPENDIXES	31
5.1	PHOTOGRAPHS OF THE SAMPLE	31
5.2	SET-UP FOR CONDUCTED EMISSIONS	36
5.3	SET-UP FOR SPURIOUS EMISSIONS BELOW 1GHZ	37
5.4	SET-UP FOR SPURIOUS EMISSIONS ABOVE 1GHZ	37

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 3 of 37

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 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 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 No.	CB4620
FCC ID	2AVJ8-CB4620
ISED Number	25804-CB4620
Operation Frequency	2403MHz ~ 2480MHz
Maximum Field Strength	79.80dBuV/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
Hardware Version	R6.210.00.2423AA

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 4 of 37

Software Version	V1.0
Test SW Version	BL410_R; BL410_E
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.
3. The original test report Ref.No.SHE23020075-02DE Mar. 15, 2023 was modified on Aug. 16, 2023 to include the following changes: Added 2 resistors, Refer to the comparison diagram in the sample photo for details, So added the worst case data of the Radiated Emission and Band Edge and bandwidth and Conducted Emission on AC Mains test item.

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		

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 5 of 37

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

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 6 of 37

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	/	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 REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 7 of 37

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 %

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 8 of 37

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	ZBPOWER	ZB-H290030-G	680028594H2230910301

3.3 Support Software

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

TEST REPORT

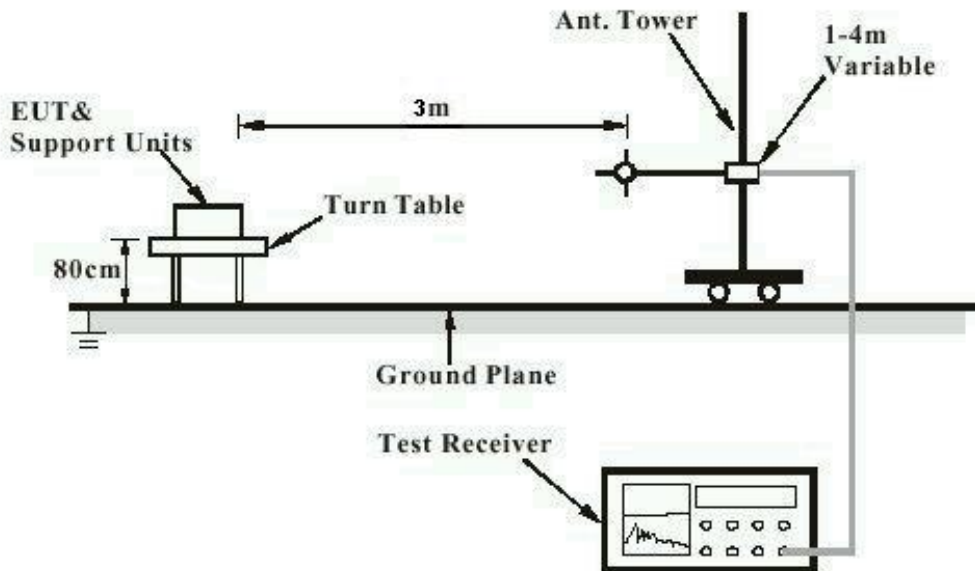
Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 9 of 37

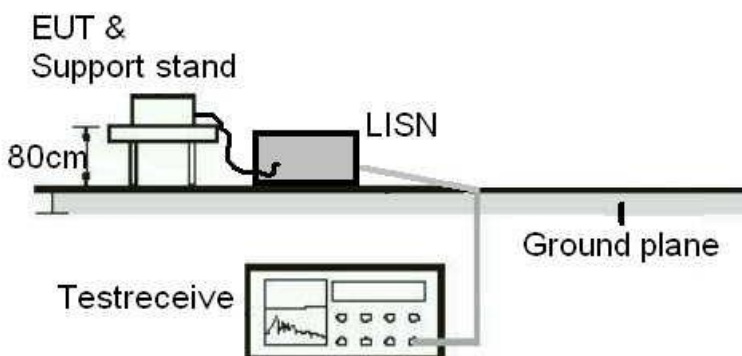
3.4 Test Setup Diagram

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



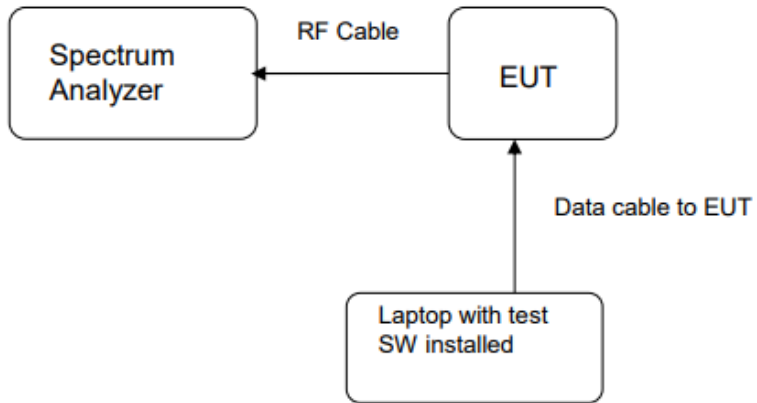
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 10 of 37

Diagram of Measurement Configuration for Transmitter Test



TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 11 of 37

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.

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 12 of 37

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.
4. All the models were tested and only the worst data was recorded in the report.

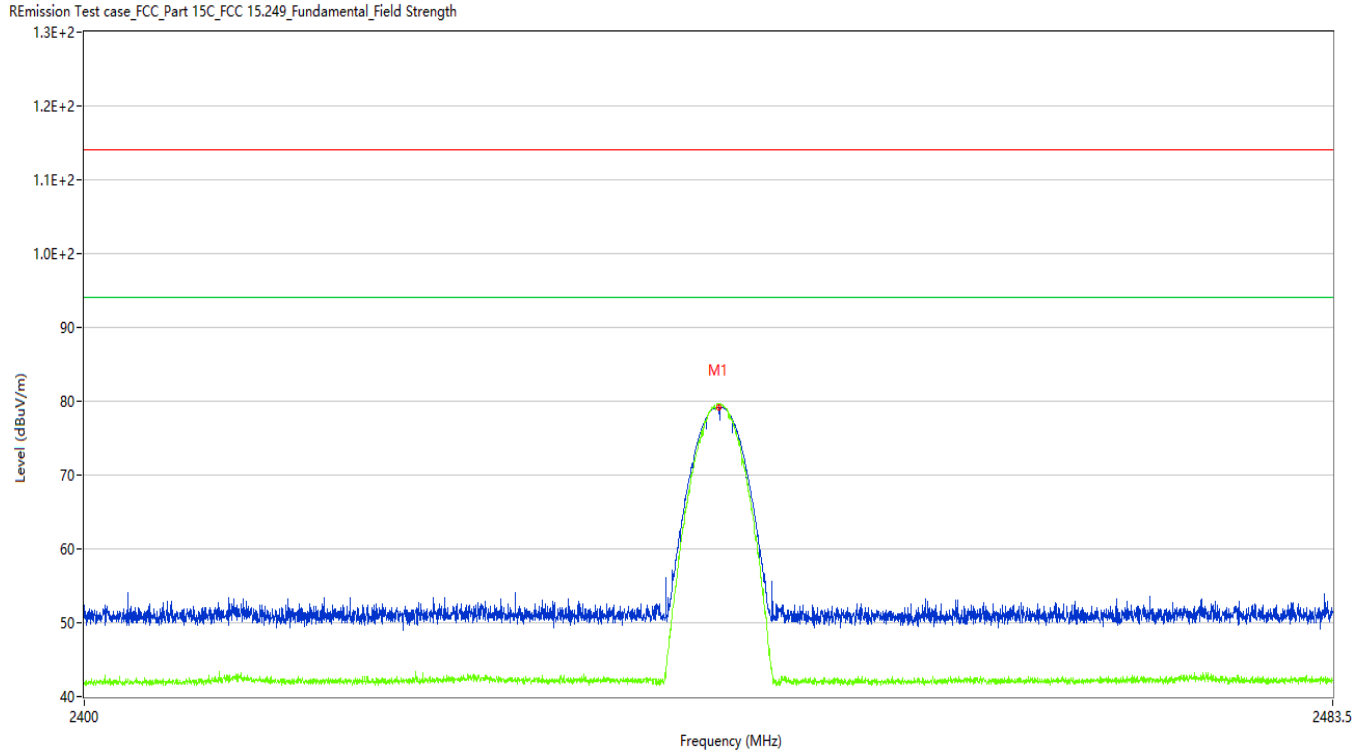
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 13 of 37

Figure 1: 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	2442.063	79.80	-9.93	114.0	34.20	Peak	91.60	150	Horizontal	Pass
1**	2442.063	79.64	-9.93	94.0	14.36	AV	91.60	150	Horizontal	Pass

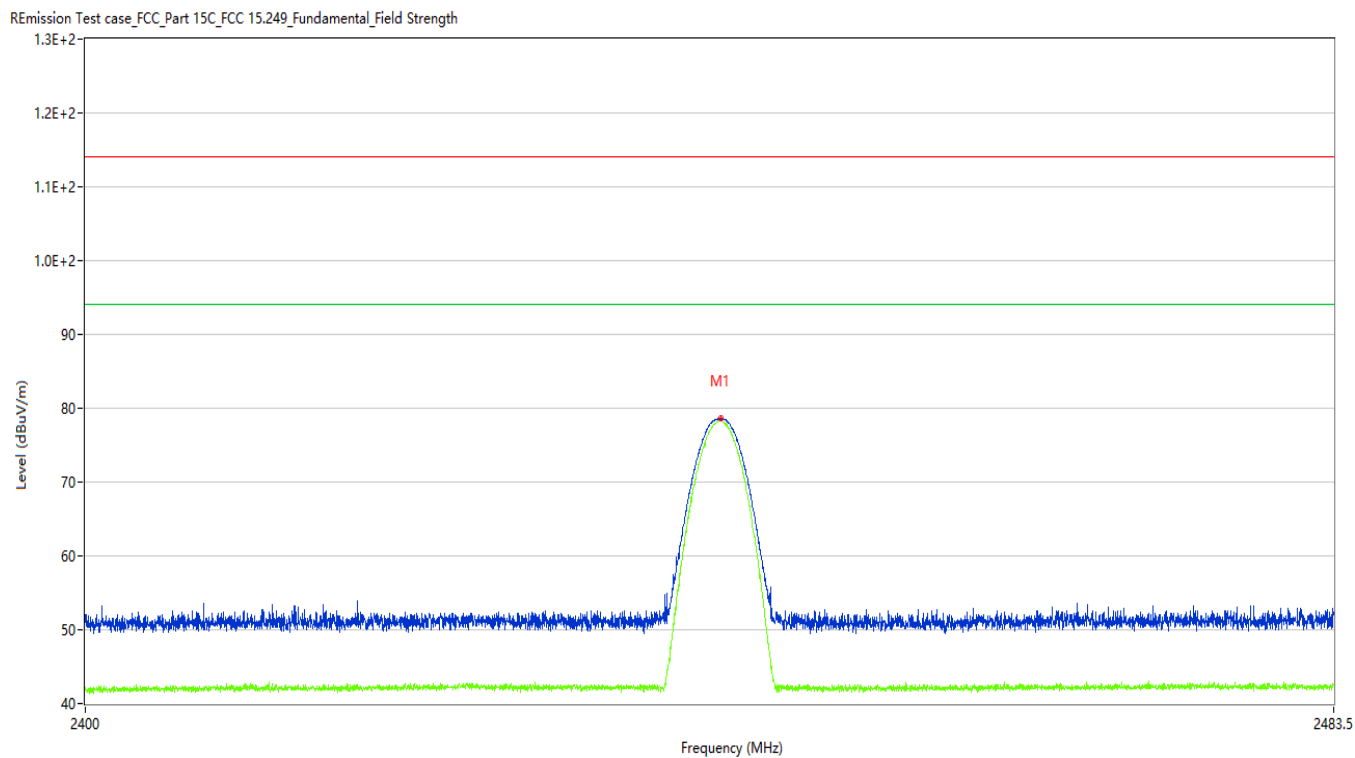
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 14 of 37

Figure 2: 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	2442.168	78.70	-9.93	114.0	35.30	Peak	206.20	100	Vertical	Pass
1**	2442.168	78.30	-9.93	94.0	15.70	AV	206.20	100	Vertical	Pass

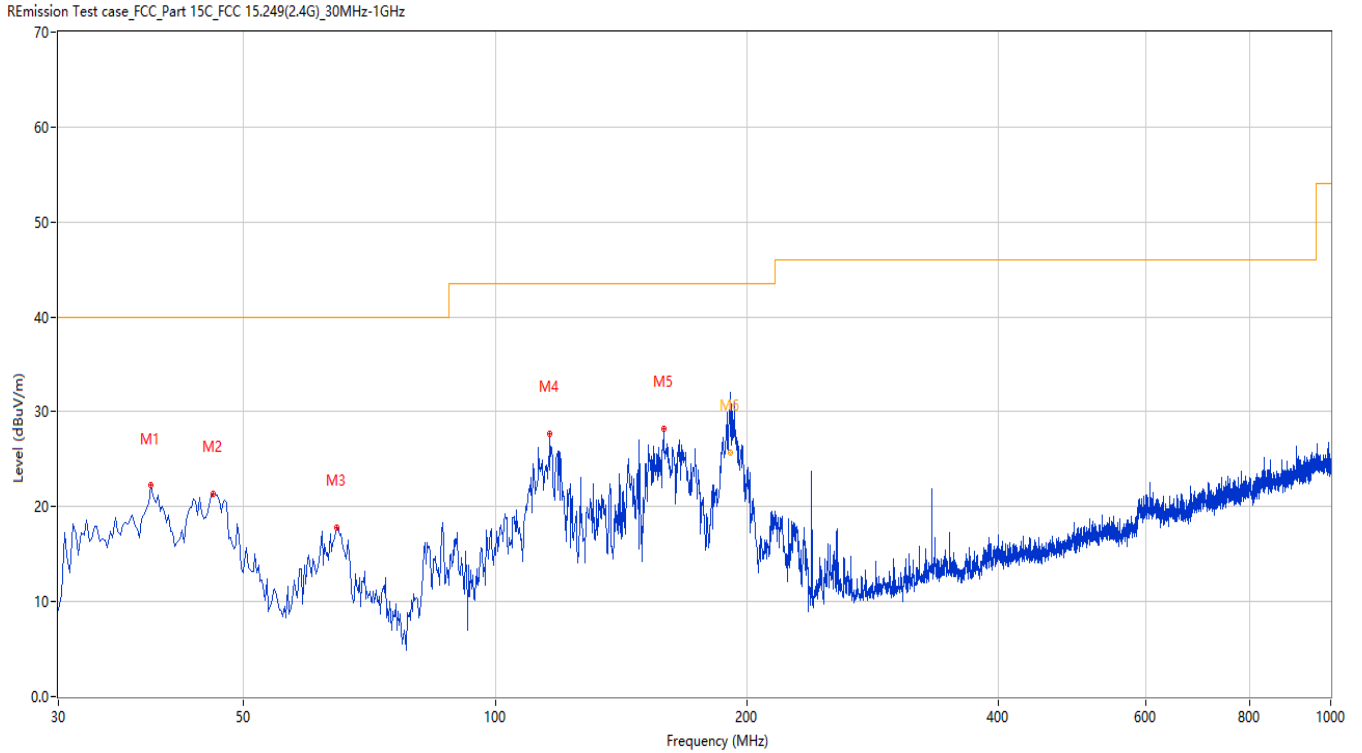
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 15 of 37

Figure 3: 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	38.728	22.22	-25.86	40.0	17.78	Peak	360.00	200	Horizontal	Pass
2	46.001	21.38	-24.24	40.0	18.62	Peak	58.40	100	Horizontal	Pass
3	64.669	17.82	-26.75	40.0	22.18	Peak	29.60	200	Horizontal	Pass
4	116.308	27.73	-26.81	43.5	15.77	Peak	186.10	200	Horizontal	Pass
5	158.978	28.19	-28.75	43.5	15.31	Peak	180.80	200	Horizontal	Pass
6	191.245	31.74	-26.18	43.5	11.76	Peak	175.60	195	Horizontal	Pass
6*	191.245	25.74	-26.18	43.5	17.76	QP	175.60	195	Horizontal	Pass

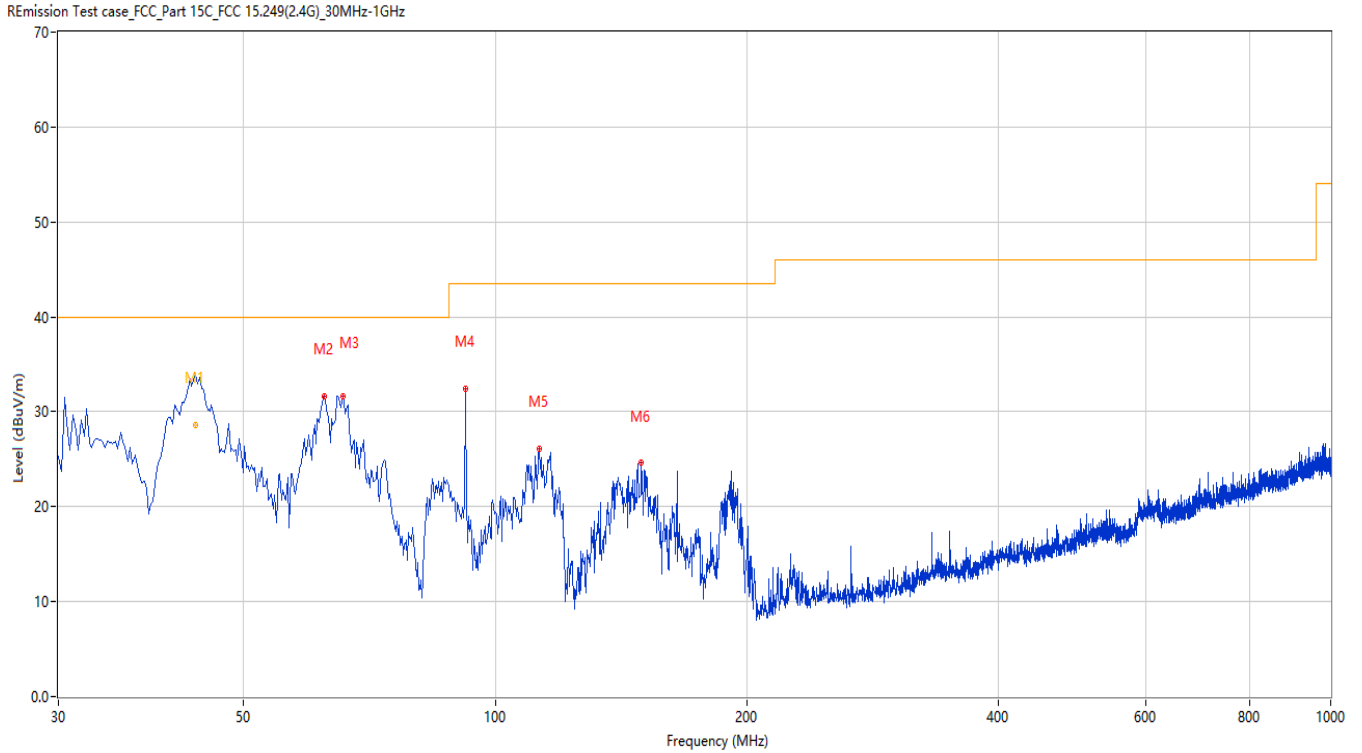
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 16 of 37

Figure 4: 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	43.766	36.05	-24.44	40.0	3.95	Peak	338.10	150	Vertical	Pass
1*	43.766	28.65	-24.44	40.0	11.35	QP	338.10	150	Vertical	Pass
2	62.487	31.62	-26.05	40.0	8.38	Peak	200.50	100	Vertical	Pass
3	65.639	31.57	-27.07	40.0	8.43	Peak	244.80	100	Vertical	Pass
4	92.064	32.48	-27.24	43.5	11.02	Peak	360.00	200	Vertical	Pass
5	112.914	26.10	-26.26	43.5	17.40	Peak	205.70	100	Vertical	Pass
6	149.523	24.59	-29.20	43.5	18.91	Peak	220.60	100	Vertical	Pass

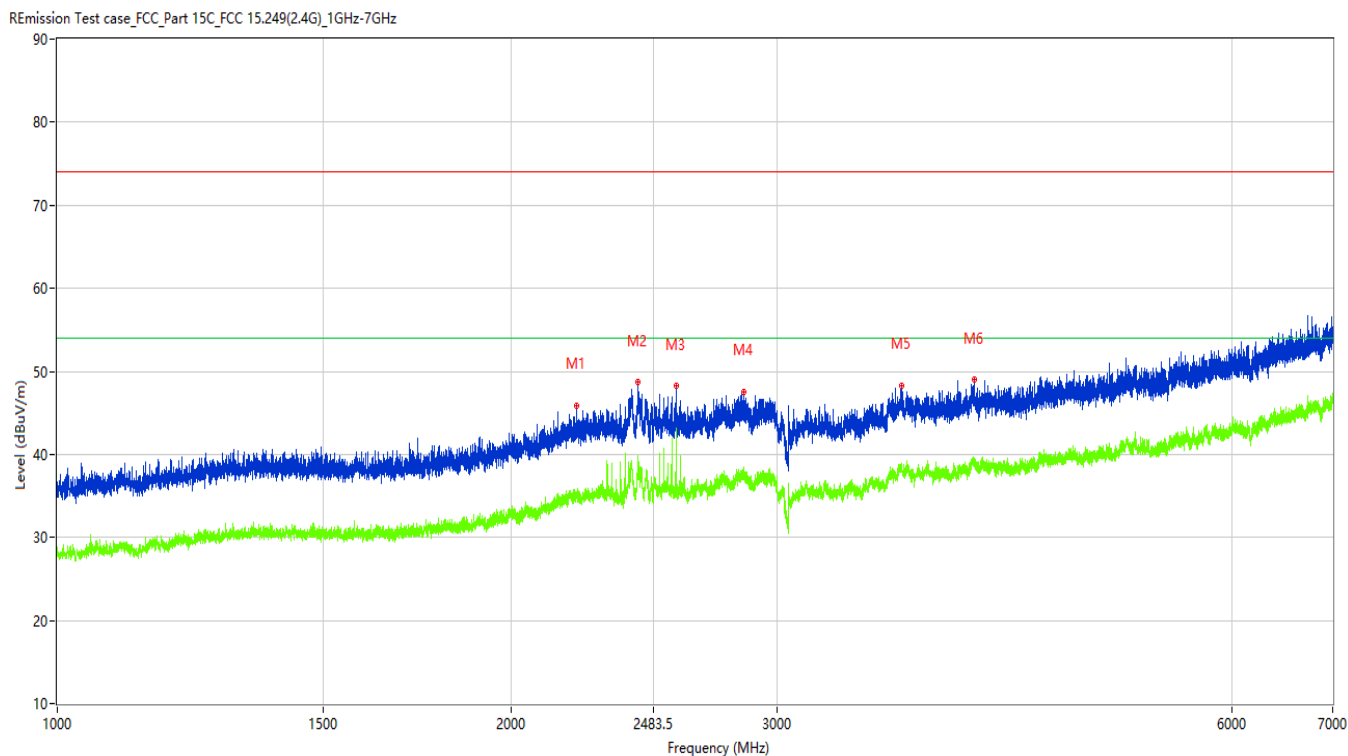
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 17 of 37

Figure 5: 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	2208.750	45.92	-8.14	74.0	28.08	Peak	168.10	100	Horizontal	Pass
1**	2208.750	34.70	-8.14	54.0	19.30	AV	168.10	100	Horizontal	Pass
2	2424.000	48.69	-5.14	74.0	25.31	Peak	79.20	100	Horizontal	Pass
2**	2424.000	37.23	-5.14	54.0	16.77	AV	79.20	100	Horizontal	Pass
3	2570.000	48.28	-7.08	74.0	25.72	Peak	79.20	100	Horizontal	Pass
3**	2570.000	42.24	-7.08	54.0	11.76	AV	79.20	100	Horizontal	Pass
4	2849.000	47.59	-4.26	74.0	26.41	Peak	360.00	100	Horizontal	Pass
4**	2849.000	37.58	-4.26	54.0	16.42	AV	360.00	100	Horizontal	Pass
5	3626.000	48.34	-2.23	74.0	25.66	Peak	230.60	100	Horizontal	Pass
5**	3626.000	38.09	-2.23	54.0	15.91	AV	230.60	100	Horizontal	Pass
6	4050.500	49.01	-1.49	74.0	24.99	Peak	230.60	100	Horizontal	Pass
6**	4050.500	38.69	-1.49	54.0	15.31	AV	230.60	100	Horizontal	Pass

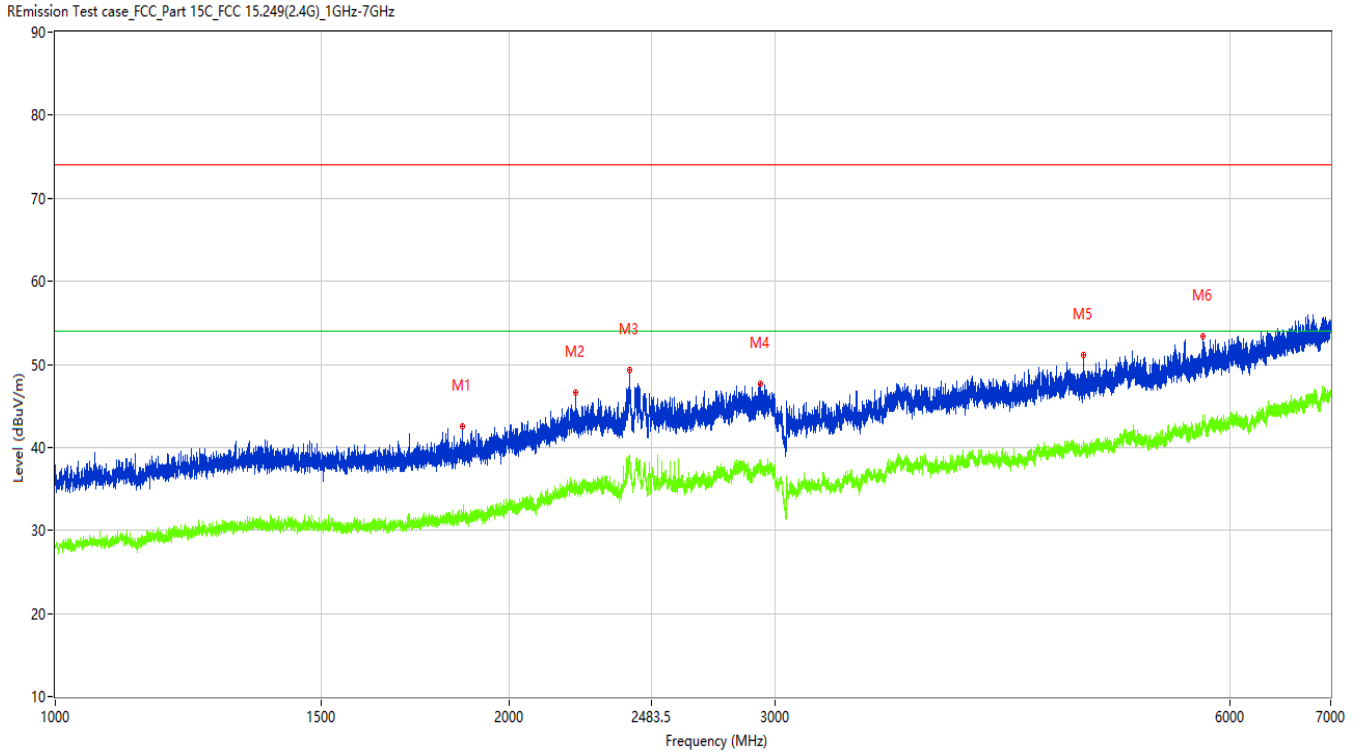
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 18 of 37

Figure 6: 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	1862.000	42.48	-12.06	74.0	31.52	Peak	47.40	100	Vertical	Pass
1**	1862.000	32.02	-12.06	54.0	21.98	AV	47.40	100	Vertical	Pass
2	2211.500	46.64	-8.18	74.0	27.36	Peak	189.50	100	Vertical	Pass
2**	2211.500	35.41	-8.18	54.0	18.59	AV	189.50	100	Vertical	Pass
3	2403.500	49.27	-4.74	74.0	24.73	Peak	205.80	100	Vertical	Pass
3**	2403.500	38.42	-4.74	54.0	15.58	AV	205.80	100	Vertical	Pass
4	2933.000	47.59	-4.57	74.0	26.41	Peak	95.70	100	Vertical	Pass
4**	2933.000	38.04	-4.57	54.0	15.96	AV	95.70	100	Vertical	Pass
5	4799.500	51.11	-1.42	74.0	22.89	Peak	360.00	100	Vertical	Pass
5**	4799.500	40.44	-1.42	54.0	13.56	AV	360.00	100	Vertical	Pass
6	5764.500	53.39	1.30	74.0	20.61	Peak	360.00	100	Vertical	Pass
6**	5764.500	42.78	1.30	54.0	11.22	AV	360.00	100	Vertical	Pass

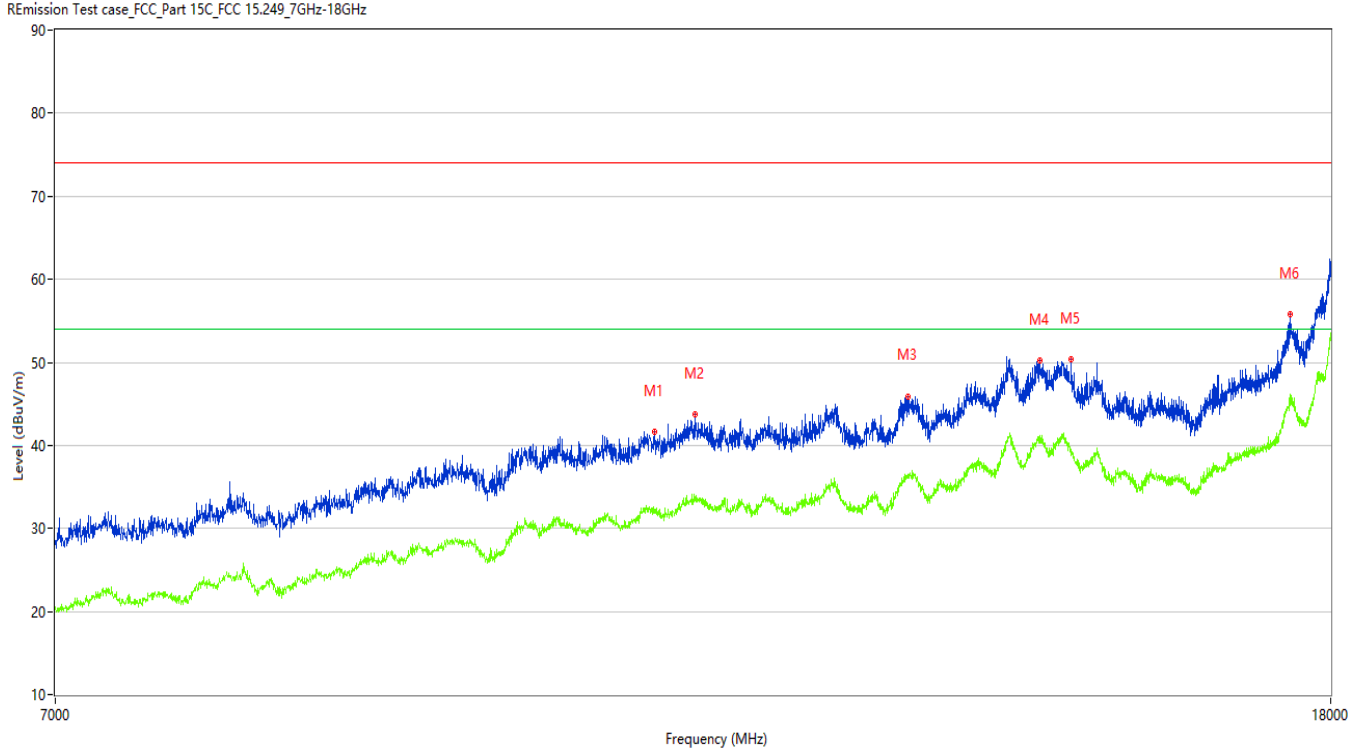
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 19 of 37

Figure 7: 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	10907.750	41.66	10.21	74.0	32.34	Peak	344.70	100	Horizontal	Pass
1**	10907.750	32.34	10.21	54.0	21.66	AV	344.70	100	Horizontal	Pass
2	11240.500	43.70	10.92	74.0	30.30	Peak	280.30	100	Horizontal	Pass
2**	11240.500	33.79	10.92	54.0	20.21	AV	280.30	100	Horizontal	Pass
3	13162.750	45.92	13.13	74.0	28.08	Peak	108.00	100	Horizontal	Pass
3**	13162.750	36.03	13.13	54.0	17.97	AV	108.00	100	Horizontal	Pass
4	14507.500	50.23	16.75	74.0	23.77	Peak	360.00	100	Horizontal	Pass
4**	14507.500	40.84	16.75	54.0	13.16	AV	360.00	100	Horizontal	Pass
5	14848.500	50.34	16.81	74.0	23.66	Peak	344.70	100	Horizontal	Pass
5**	14848.500	38.97	16.81	54.0	15.03	AV	344.70	100	Horizontal	Pass
6	17466.499	55.74	21.30	74.0	18.26	Peak	44.00	100	Horizontal	Pass
6**	17466.499	44.87	21.30	54.0	9.13	AV	44.00	100	Horizontal	Pass

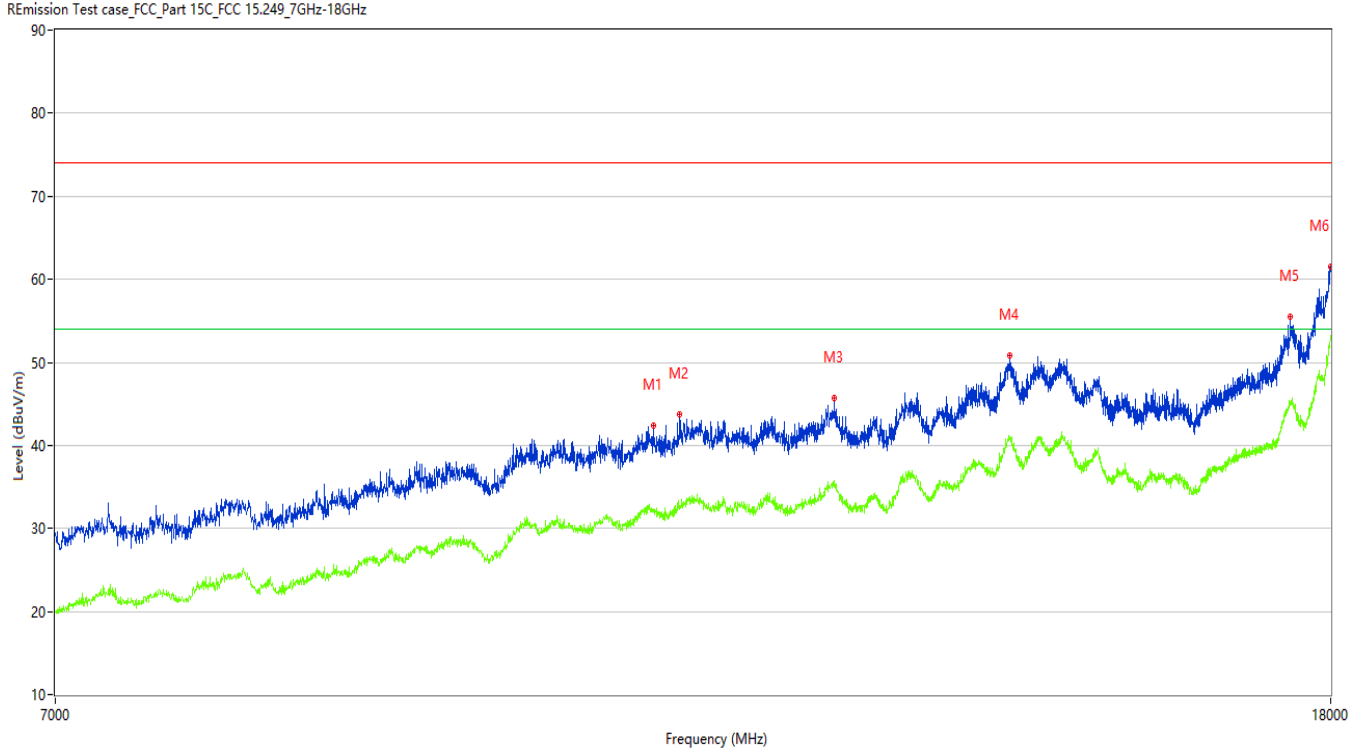
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 20 of 37

Figure 8: 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	10902.250	42.37	10.20	74.0	31.63	Peak	0.00	100	Vertical	Pass
1**	10902.250	32.26	10.20	54.0	21.74	AV	0.00	100	Vertical	Pass
2	11116.750	43.73	9.69	74.0	30.27	Peak	45.10	100	Vertical	Pass
2**	11116.750	32.55	9.69	54.0	21.45	AV	45.10	100	Vertical	Pass
3	12461.500	45.68	11.91	74.0	28.32	Peak	45.10	100	Vertical	Pass
3**	12461.500	35.74	11.91	54.0	18.26	AV	45.10	100	Vertical	Pass
4	14194.000	50.81	18.53	74.0	23.19	Peak	0.00	100	Vertical	Pass
4**	14194.000	41.06	18.53	54.0	12.94	AV	0.00	100	Vertical	Pass
5	17472.000	55.45	21.44	74.0	18.55	Peak	45.10	100	Vertical	Pass
5**	17472.000	45.19	21.44	54.0	8.81	AV	45.10	100	Vertical	Pass
6	17994.500	61.49	29.67	74.0	12.51	Peak	168.60	100	Vertical	Pass
6**	17994.500	52.68	29.67	54.0	1.32	AV	168.60	100	Vertical	Pass

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 21 of 37

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%

TEST REPORT

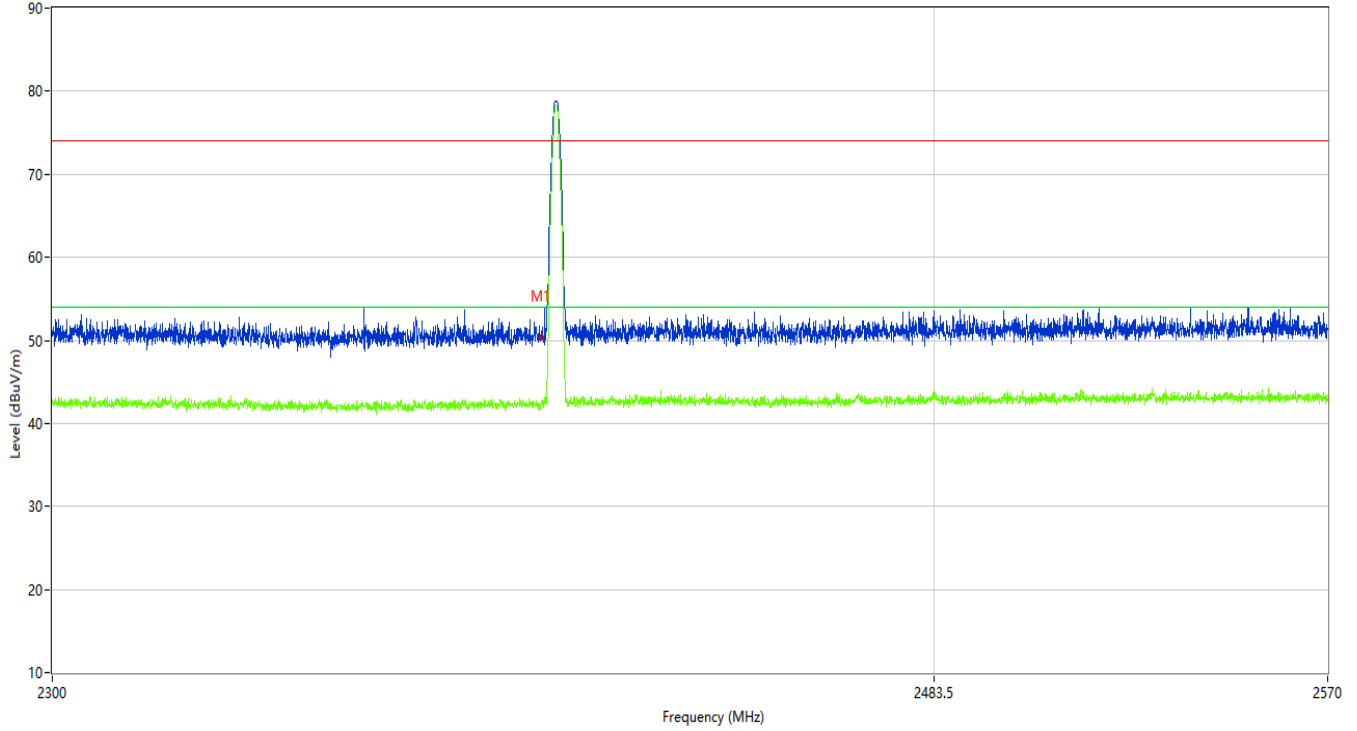
Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 22 of 37

Figure 9: Test plots of Band Edge, 2402MHz, 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	50.35	-10.13	74.0	23.65	Peak	182.53	150	Horizontal	Pass
1**	2400.000	42.45	-10.13	54.0	11.55	AV	182.53	150	Horizontal	Pass

TEST REPORT

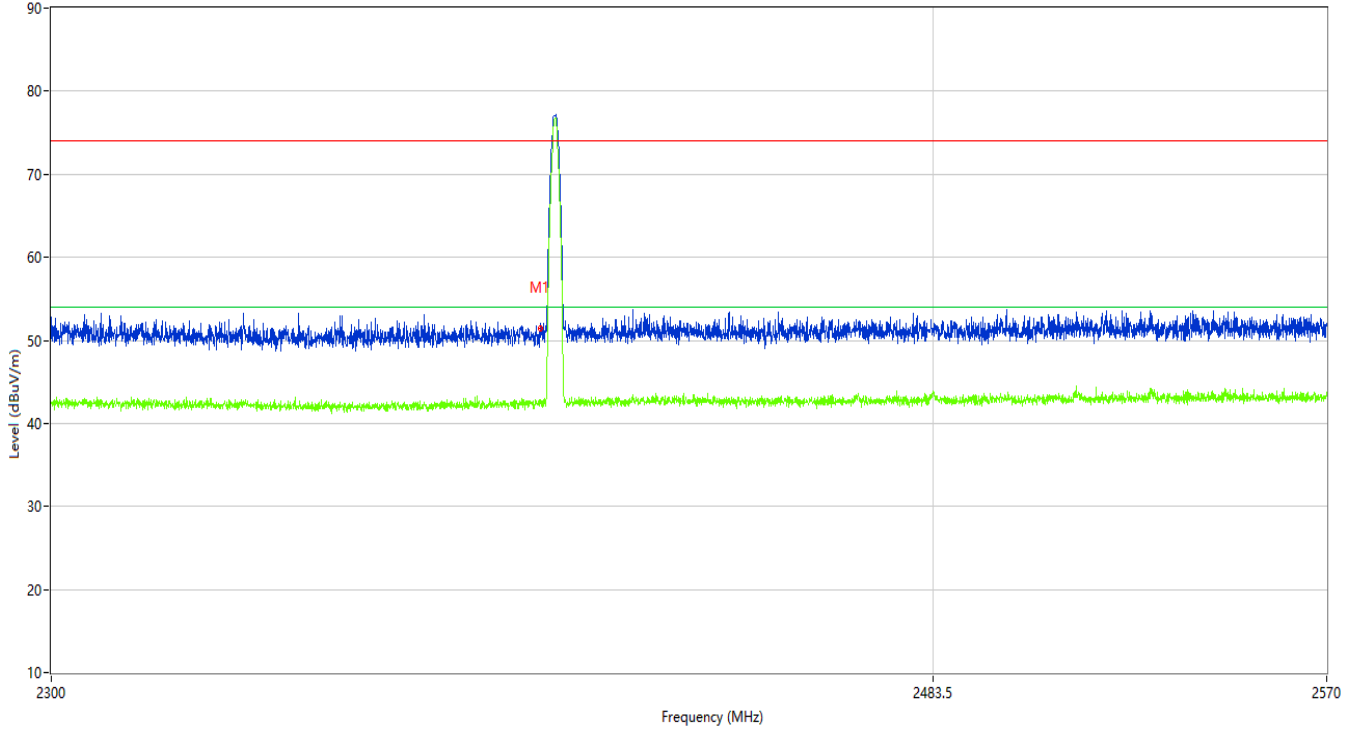
Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 23 of 37

Figure 10: Test plots of Band Edge, 2480MHz, Vertical 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	51.62	-10.13	74.0	22.38	Peak	45.20	150	Vertical	Pass
1**	2400.000	42.48	-10.13	54.0	11.52	AV	45.20	150	Vertical	Pass

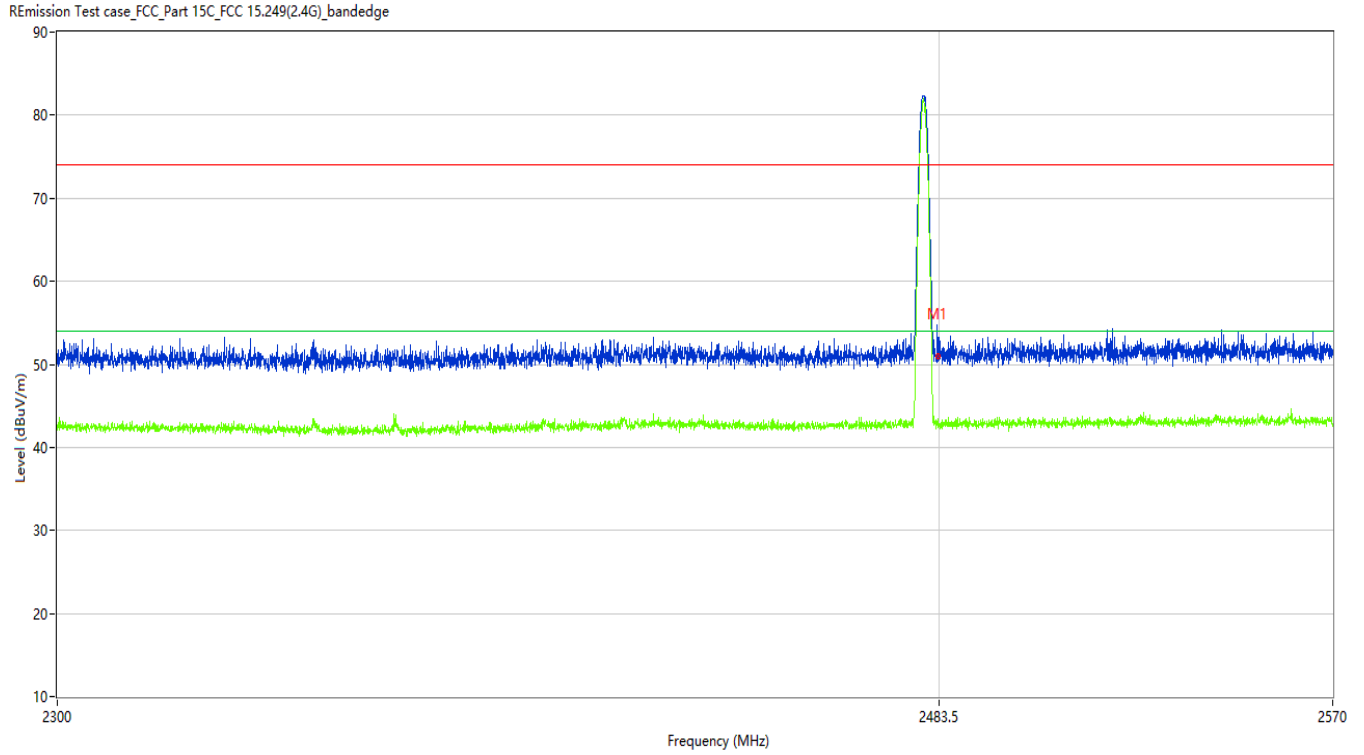
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 24 of 37

Figure 11: 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	51.04	-9.82	74.0	22.96	Peak	79.60	100	Horizontal	Pass
1**	2483.500	42.72	-9.82	54.0	11.28	AV	79.60	100	Horizontal	Pass

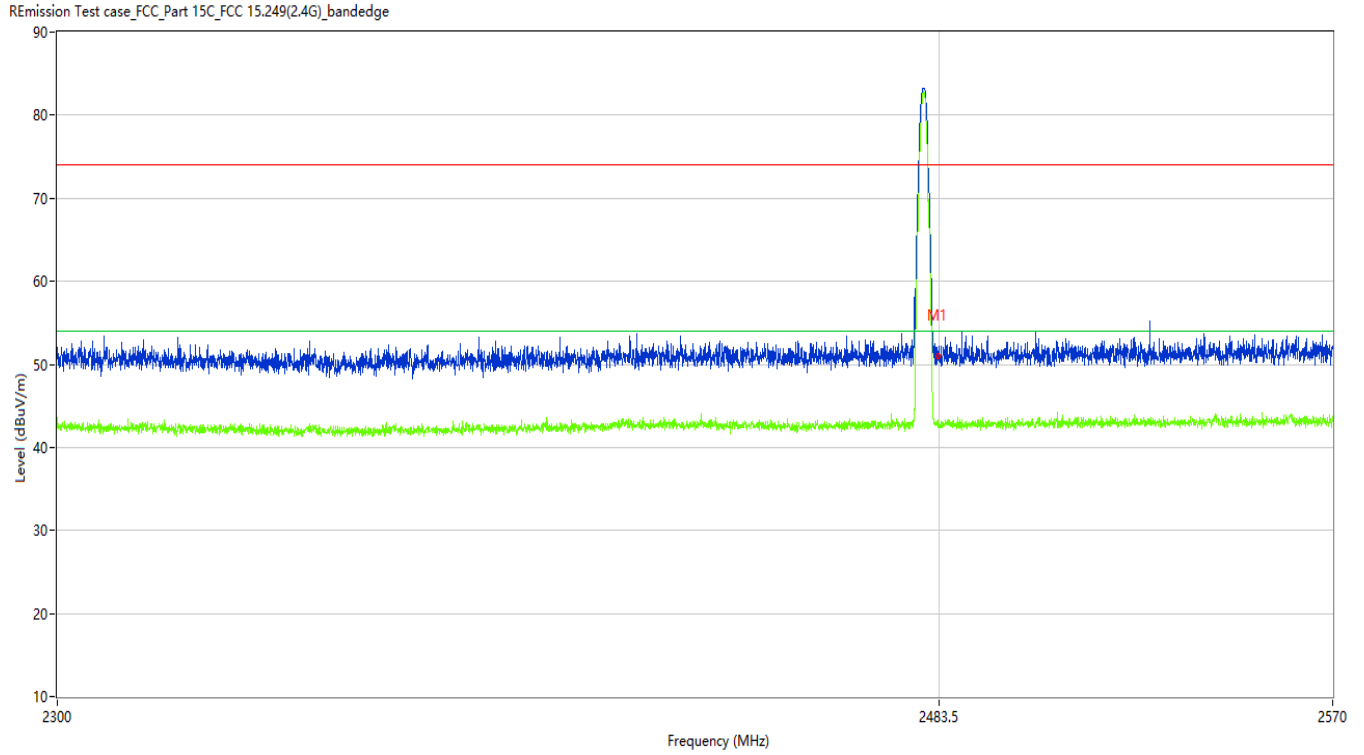
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 25 of 37

Figure 12: 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	51.13	-9.82	74.0	22.87	Peak	118.83	100	Vertical	Pass
1**	2483.500	42.60	-9.82	54.0	11.40	AV	118.83	100	Vertical	Pass

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 26 of 37

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

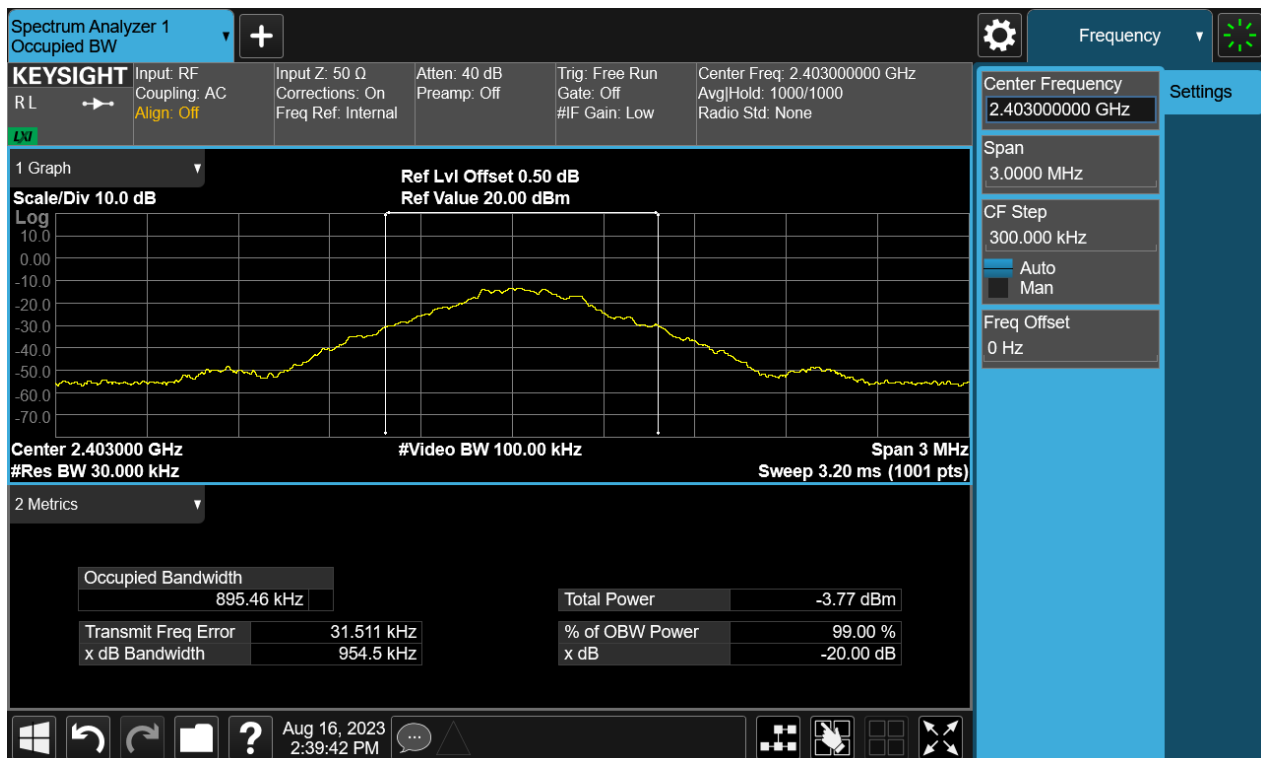
Test setup

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	2403	0.9545	0.8955
	2442	1.0160	0.9433
	2480	1.0320	0.9407

Figure 13: The plots of 20dB Bandwidth and 99% Bandwidth, 2403MHz



TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 27 of 37

Figure 14: The plots of 20dB Bandwidth and 99% Bandwidth, 2442MHz

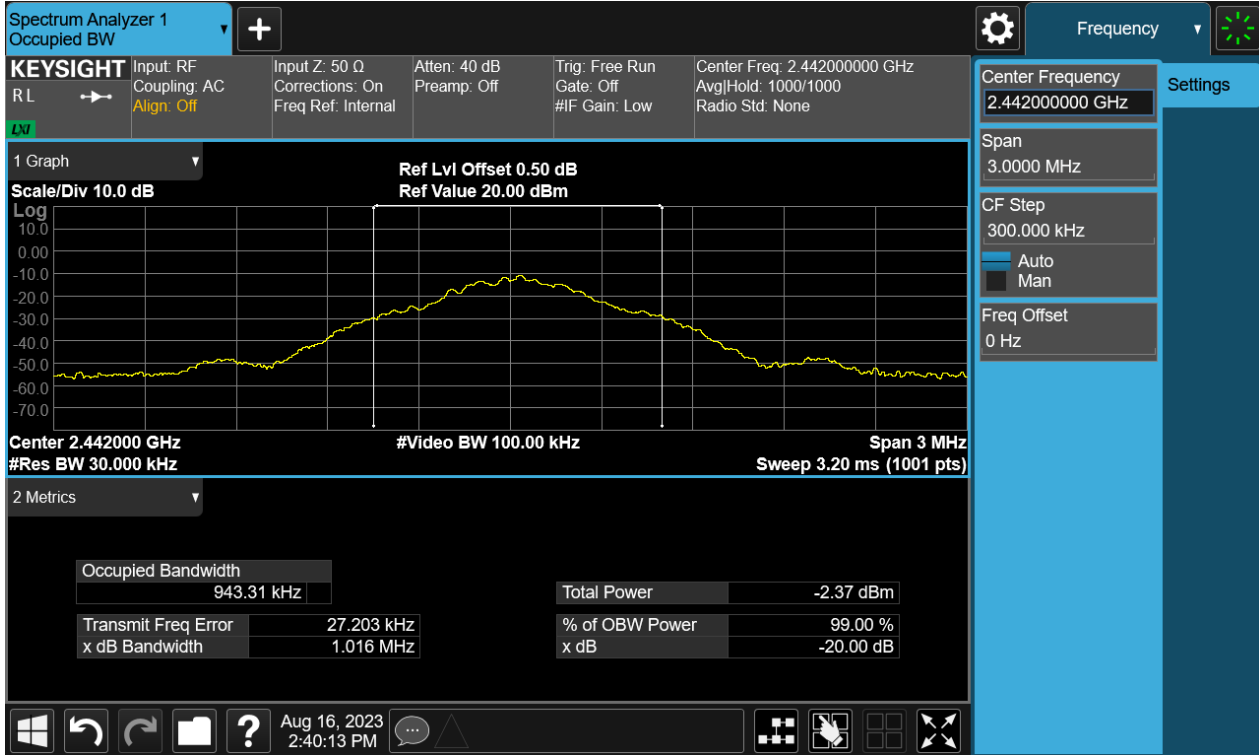


Figure 15: The plots of 20dB Bandwidth and 99% Bandwidth, 2480MHz



TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 28 of 37

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 : 24.4°C
Relative humidity : 54%

For details refer to following test plot.

TEST REPORT

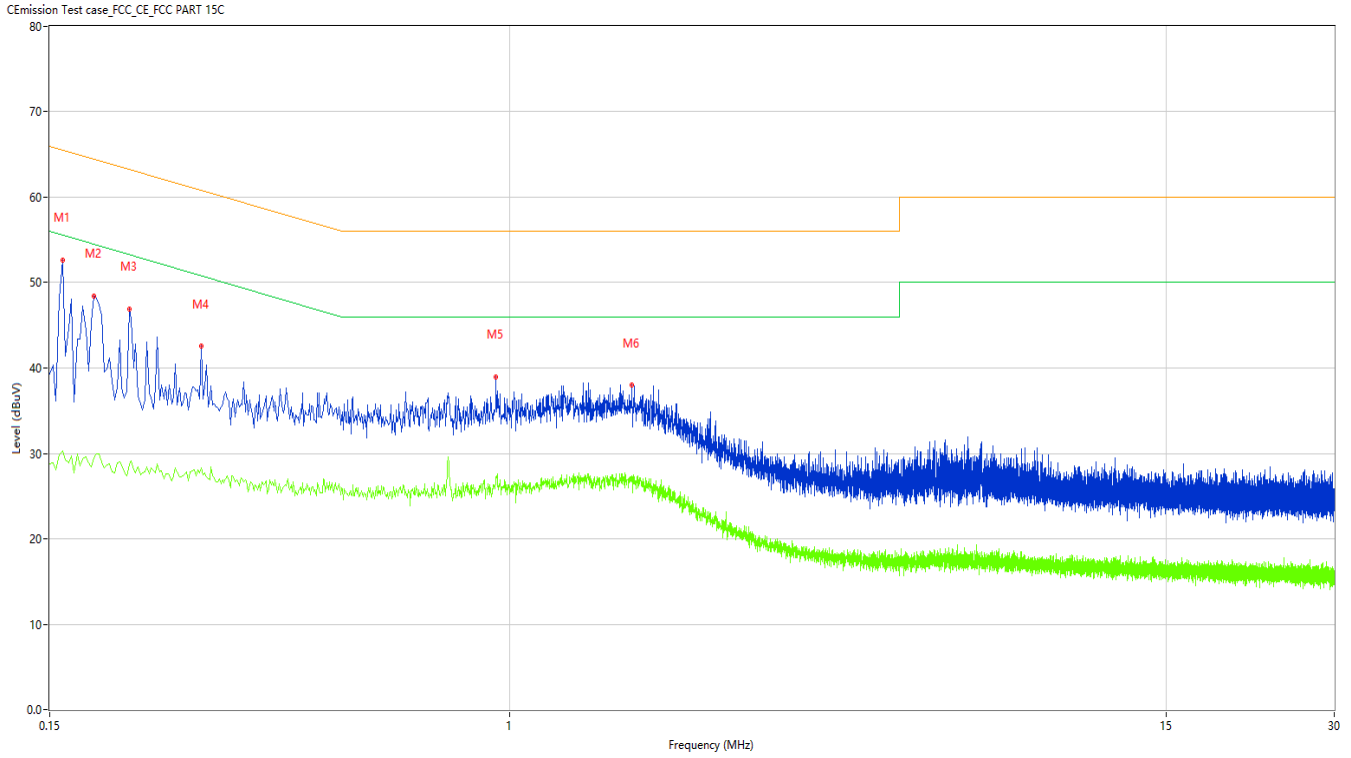
Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 29 of 37

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

Figure 16 Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.158	52.62	10.03	65.57	12.95	Peak	L	Pass
1**	0.158	30.34	10.03	55.57	25.23	AV	L	Pass
2	0.180	48.44	10.02	64.49	16.05	Peak	L	Pass
2**	0.180	29.42	10.02	54.49	25.07	AV	L	Pass
3	0.208	46.96	10.04	63.28	16.32	Peak	L	Pass
3**	0.208	28.60	10.04	53.28	24.68	AV	L	Pass
4	0.280	42.58	10.06	60.82	18.24	Peak	L	Pass
4**	0.280	28.28	10.06	50.82	22.54	AV	L	Pass
5	0.946	38.92	10.04	56.00	17.08	Peak	L	Pass
5**	0.946	27.29	10.04	46.00	18.71	AV	L	Pass
6	1.654	38.05	9.94	56.00	17.95	Peak	L	Pass
6**	1.654	27.38	9.94	46.00	18.62	AV	L	Pass

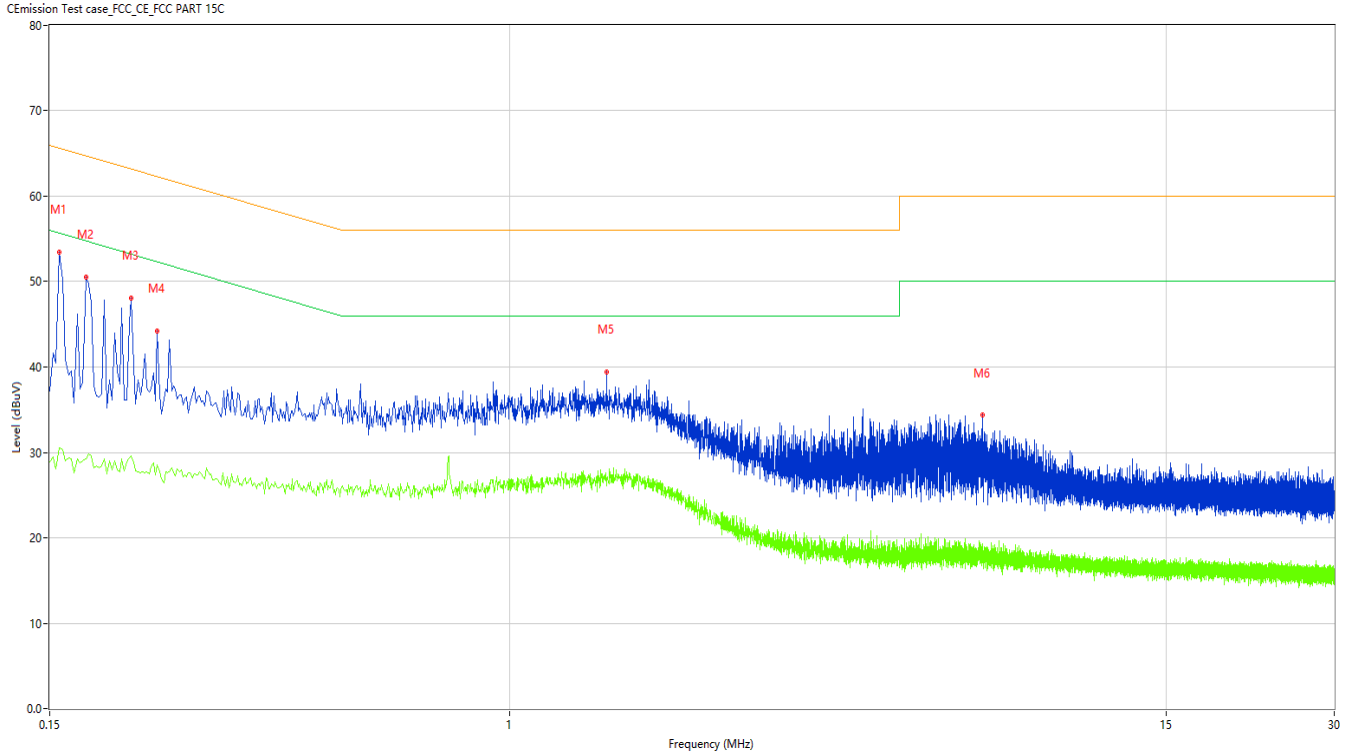
TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 30 of 37

Figure 17: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.156	53.47	10.03	65.67	12.20	Peak	N	Pass
1**	0.156	30.51	10.03	55.67	25.16	AV	N	Pass
2	0.174	50.55	10.02	64.77	14.22	Peak	N	Pass
2**	0.174	29.21	10.02	54.77	25.56	AV	N	Pass
3	0.210	48.06	10.04	63.21	15.15	Peak	N	Pass
3**	0.210	29.61	10.04	53.21	23.60	AV	N	Pass
4	0.234	44.20	10.05	62.31	18.11	Peak	N	Pass
4**	0.234	28.57	10.05	52.31	23.74	AV	N	Pass
5	1.492	39.38	9.94	56.00	16.62	Peak	N	Pass
5**	1.492	27.04	9.94	46.00	18.96	AV	N	Pass
6	7.040	34.37	9.84	60.00	25.63	Peak	N	Pass
6**	7.040	19.29	9.84	50.00	30.71	AV	N	Pass

TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

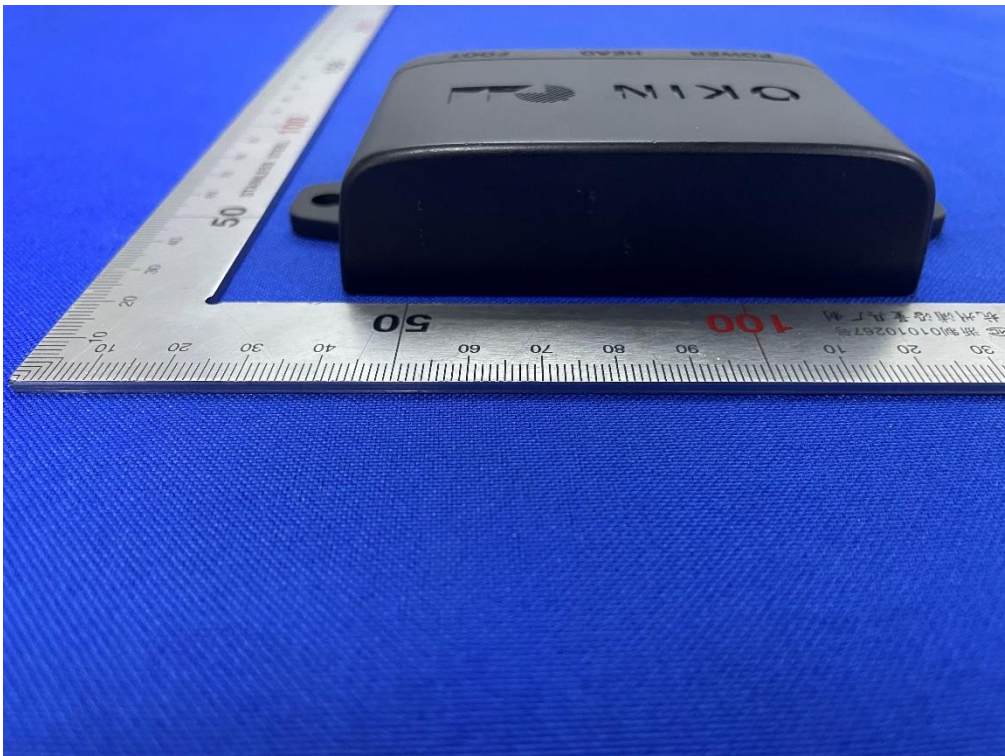
Page 31 of 37

5 Appendixes

5.1 Photographs of the Sample



Front of the sample



TEST REPORT

Report No.:

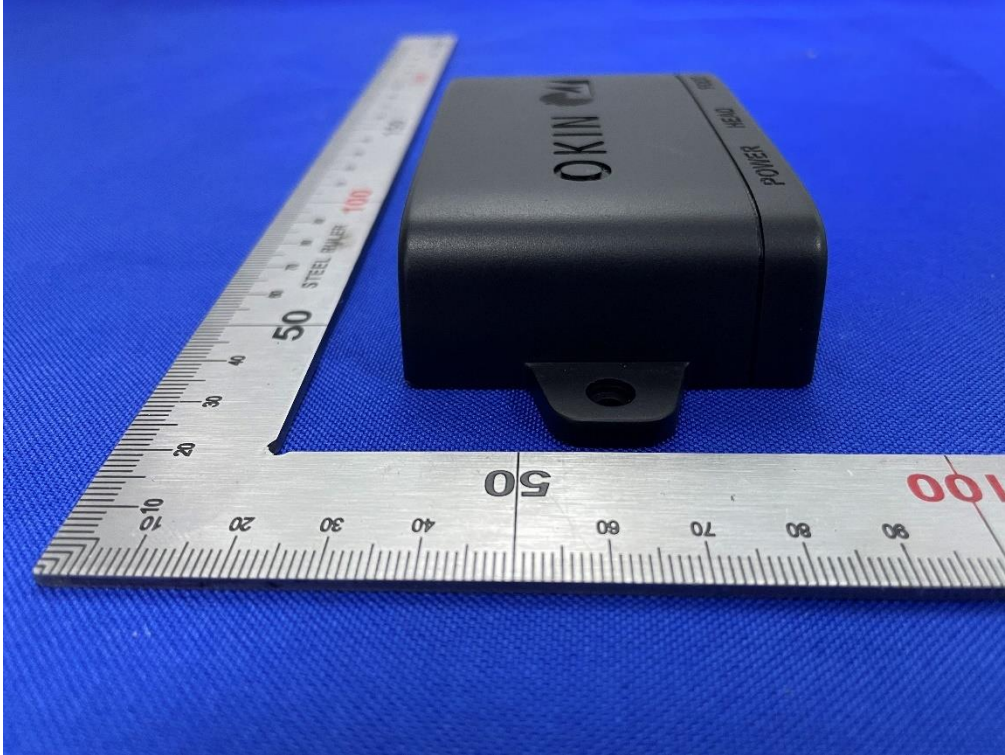
SHE23070104-02CE

Date:

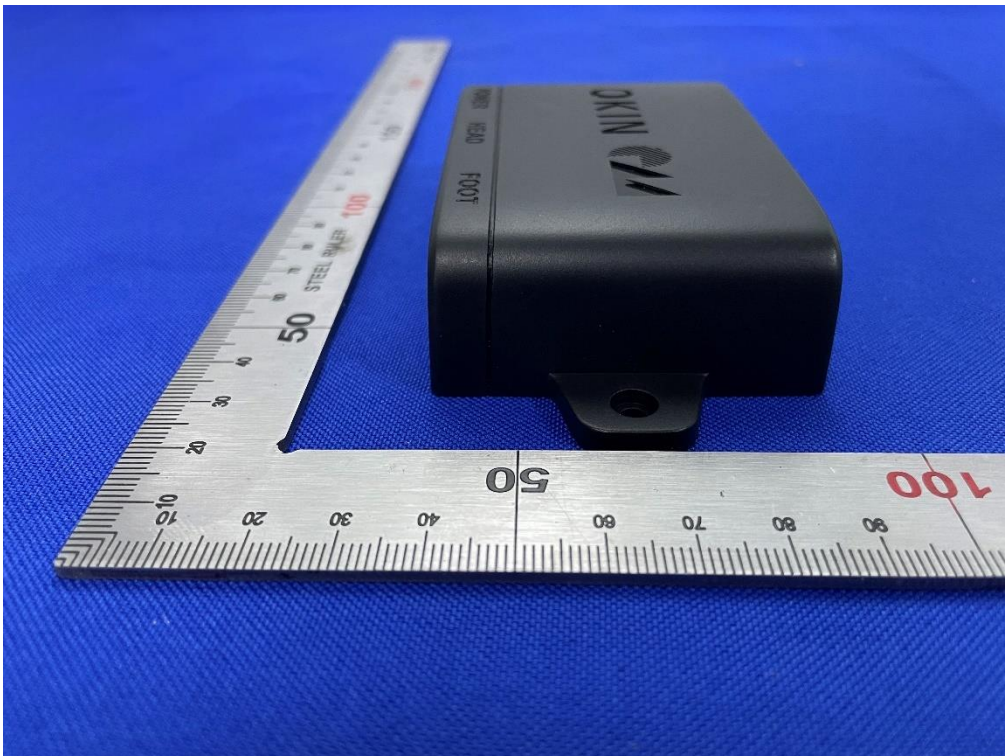
2023-08-16

Page 32 of 37

Back of the sample



Left of the sample



Right of the sample

TEST REPORT

Report No.:

SHE23070104-02CE

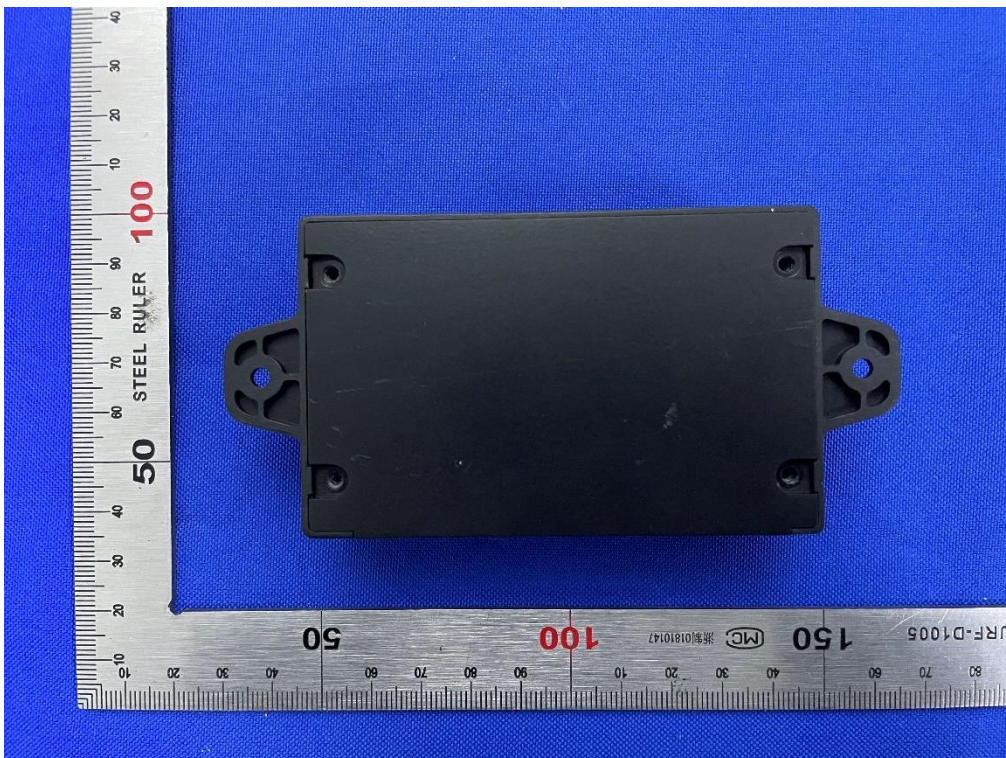
Date:

2023-08-16

Page 33 of 37



Top of the sample



Bottom of the sample

TEST REPORT

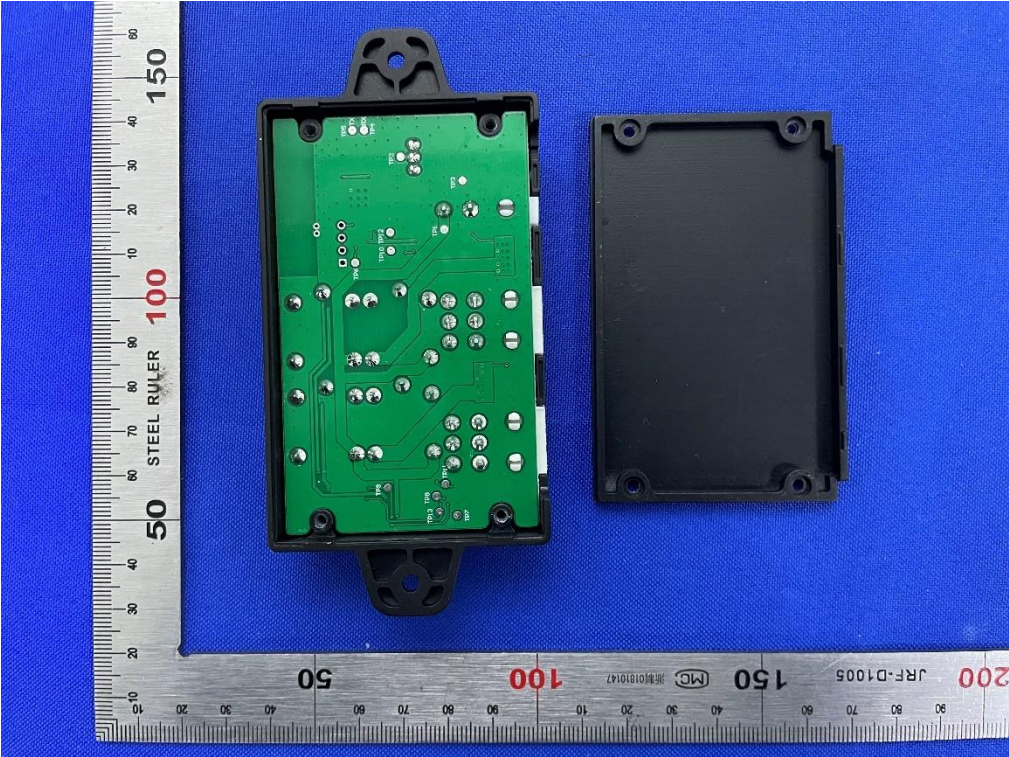
Report No.:

SHE23070104-02CE

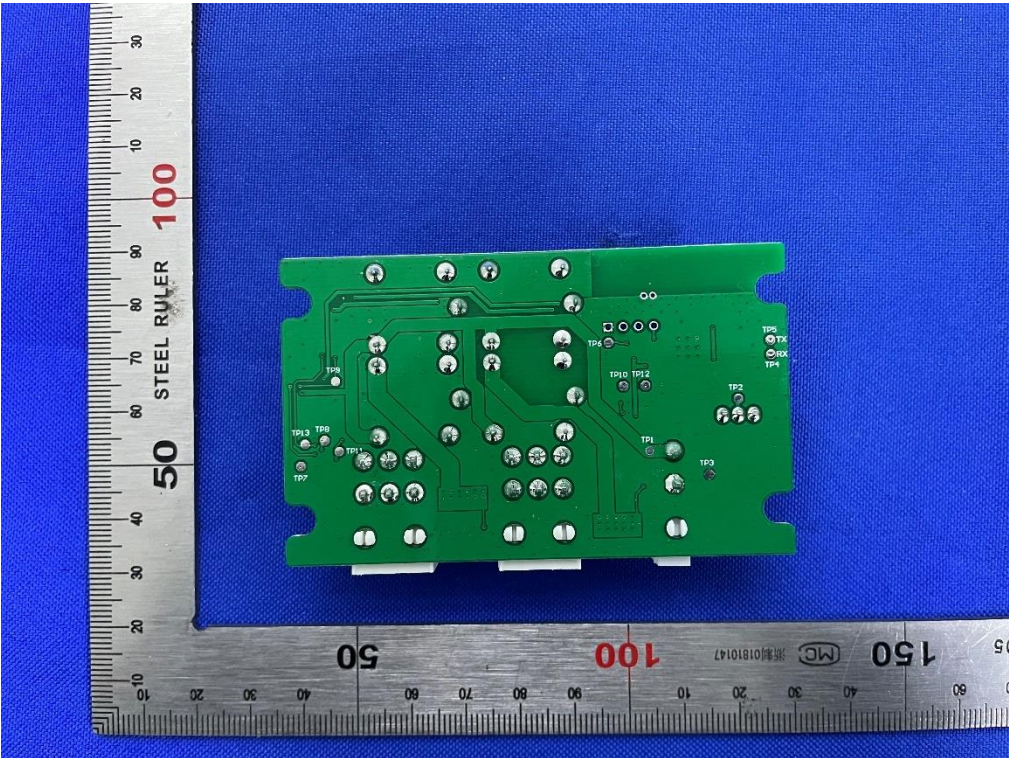
Date:

2023-08-16

Page 34 of 37



Open of the sample



Internal-1 of the sample

TEST REPORT

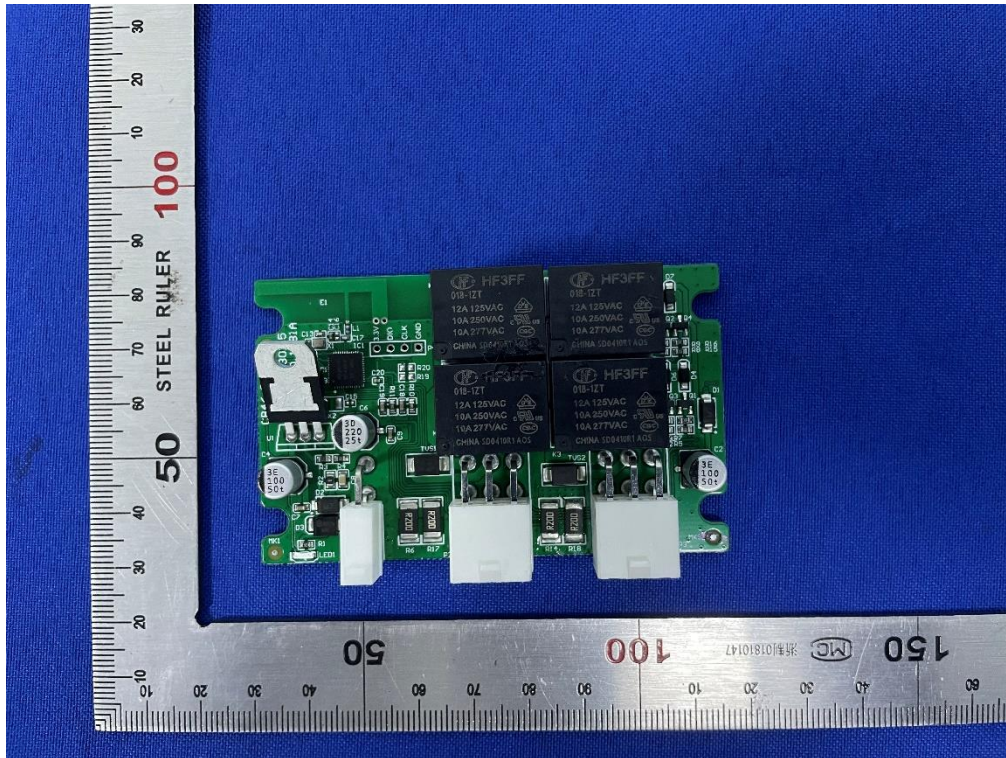
Report No.:

SHE23070104-02CE

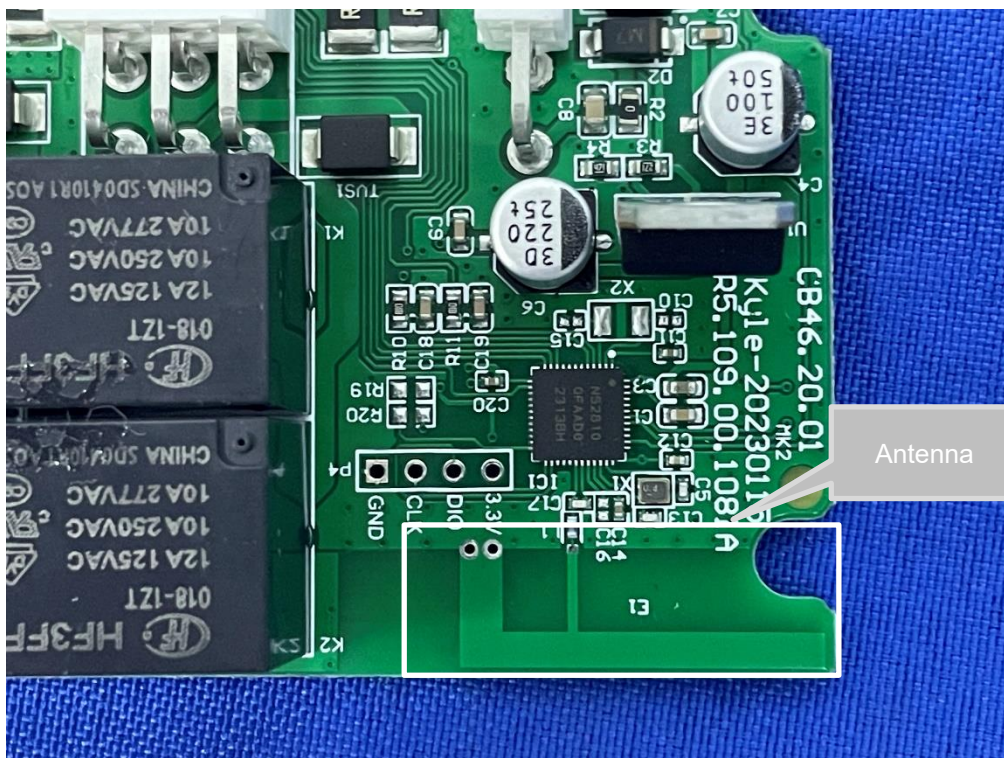
Date:

2023-08-16

Page 35 of 37



Internal-2 of the sample



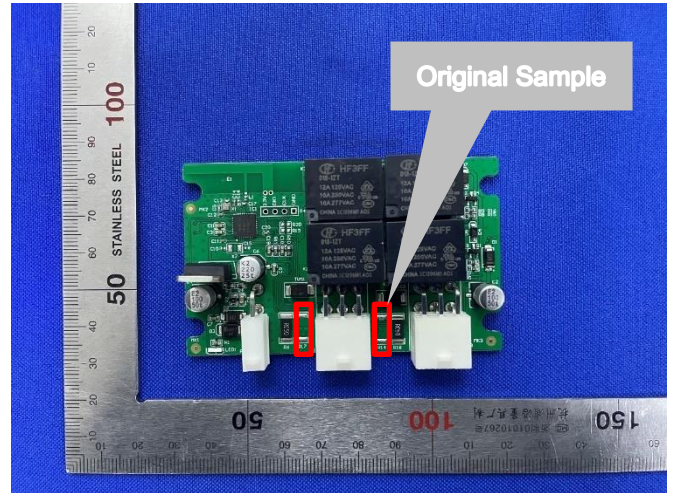
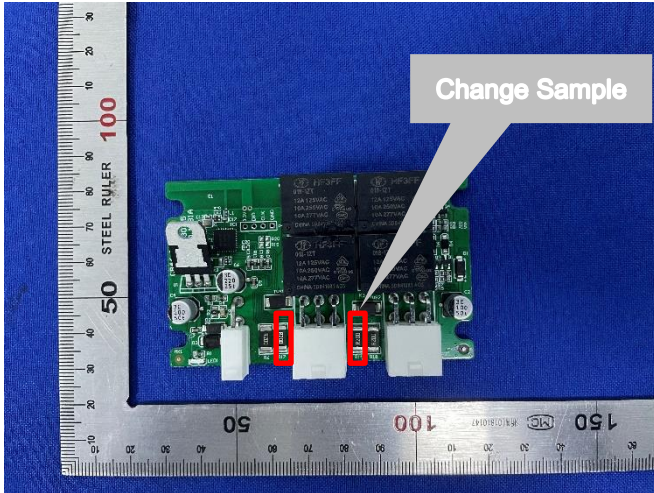
Antenna position of the sample

TEST REPORT

Report No.: SHE23070104-02CE

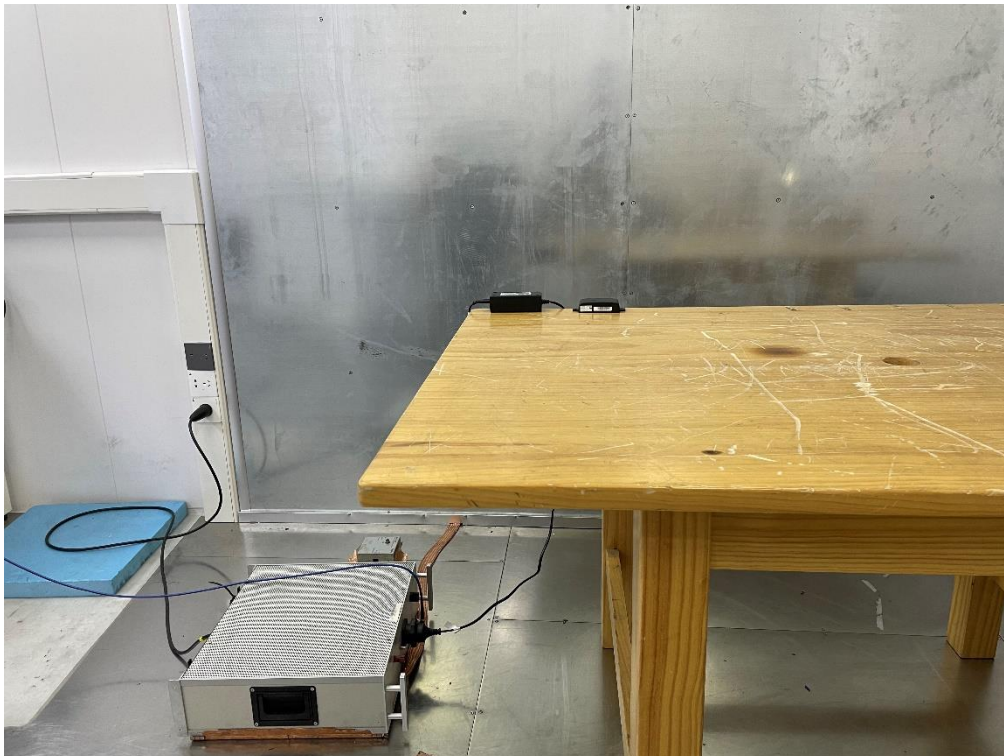
Date: 2023-08-16

Page 36 of 37



Sample difference comparison diagram

5.2 Set-up for Conducted Emissions



TEST REPORT

Report No.: SHE23070104-02CE

Date: 2023-08-16

Page 37 of 37

5.3 Set-up for Spurious Emissions below 1GHz



5.4 Set-up for Spurious Emissions above 1GHz



End of the report