

TEST REPORT

Report No.: SHE23010040-01AE

Date: 2023-03-10

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Applicant : GUARDIAN SHANGHAI CORP.
Address of Applicant : 368, Min Shen Rd, SongJiang, Shanghai, China

Product Name : Remote Control for Garage Door Opener
Brand Name : Guardian
Model Name : UTX, UTXBU, UTXD, UTXM, UTXP, UTXL, UTXHD
Sample Acquisition Method : Sent by Client
Sample No. : E23010040-01#01
E23010040-01#02
FCC ID : YJFUTX
Standards : FCC CFR47 Part 15, Subpart C Section 15.231

Date of Receipt : 2023-02-15
Date of Test : 2023-02-18~2023-03-10
Date of Issue : 2023-03-10

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:



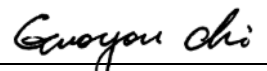
(Erik Yang)

Reviewed by:



(Jennifer Zhou)

Approved by:



(Authorized signatory: Guoyou Chi)

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1 General Information

1.1 Testing Laboratory

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	GUARDIAN SHANGHAI CORP.
Address	368, Min Shen Rd, SongJiang, Shanghai, China
Contact Person	Vincent Chan
Telephone	+86-21-57684828
Email	vincent@adhguardian.com
Manufacturer Company Name	GUARDIAN SHANGHAI CORP.
Address	368, Min Shen Rd, SongJiang, Shanghai, China
Factory Company Name	GUARDIAN SHANGHAI CORP.
Address	368, Min Shen Rd, SongJiang, Shanghai, China

1.3 Details of EUT

Product Name	Remote Control for Garage Door Opener
Brand Name	Guardian
Test Model Name	UTX
Series Model Name	UTXBU, UTXD, UTXM, UTXP, UTXL, UTXHD
Difference Description	All the models are completely electrically identical. The only difference is the model name for different customers/markets.
FCC ID	YJFUTX
Operation Frequency	303MHz-434.4MHz
Field Strength(3m)	303MHz: 60.58dBuV/m(peak)@3m 310MHz: 60.70dBuV/m(peak)@3m 315MHz: 59.39dBuV/m(peak)@3m 318MHz: 59.88dBuV/m(peak)@3m 390MHz: 58.11dBuV/m(peak)@3m 433.42MHz: 53.90dBuV/m(peak)@3m 433.92MHz: 55.13dBuV/m(peak)@3m

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	434.4MHz: 57.55dBuV/m(peak)@3m
Modulation Type	ASK(303MHz-433.92MHz) FSK(434.4MHz)
Number of channels	8
Hardware version	ver 01
Software version	ver 01
Antenna Type	Integral Antenna (Met 15.203 Antenna requirement)
Antenna Gain	-2dBi
Power Supply	DC 3V by battery(CR2032)

Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	303MHz	4	318MHz	7	433.92MHz
2	310MHz	5	390MHz	8	434.4MHz
3	315MHz	6	433.42MHz	--	--

1.4 Test Methodology

47 CFR Part 15, Subpart C	Telecommunication-Radio Frequency Devices-Intentional Radiators
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	Result
Antenna Requirement	§15.203	PASS
Manually operated transmitter	§15.231(a)(1)	PASS
Average Factor	§15.231(b)	PASS
Field Strength of Fundamental and Spurious Emission	§15.231(b) & §15.209	PASS
20dB Bandwidth	§15.231(c)	PASS
AC power-line conducted emissions	§15.207	N/A ^{note}

Note(s): The EUT is powered by battery (CR2032)

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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	2022-06-10	2023-06-09
Signal Generator	Rohde & Schwarz	SMR27	100184	2022-08-02	2023-08-01
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2022-06-10	2023-06-09
DC Power Supply	ITECH	IT6512A	N/A	2022-06-07	2024-06-06
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2023-06-07
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1775	2021-06-08	2023-06-07
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2022-06-10	2023-06-09
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2022-06-10	2023-06-09
EMC chamber 9*6*6(L*W*H)	CHANGNING	966	N/A	2022-06-10	2023-06-09
Test Software	BL	BL410_E	Version:1.0.0.117	N/A	N/A

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 expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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
Occupied Channel Bandwidth		± 5 %

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3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Channel	Frequency
1	303MHz
2	310MHz
3	315MHz
4	318MHz
5	390MHz
6	433.42MHz
7	433.92MHz
8	434.4MHz

Note(s): For Radiated Emission, 3axis were chosen for testing for each applicable mode.

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
N/A	N/A	N/A	N/A

3.3 Support Software

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

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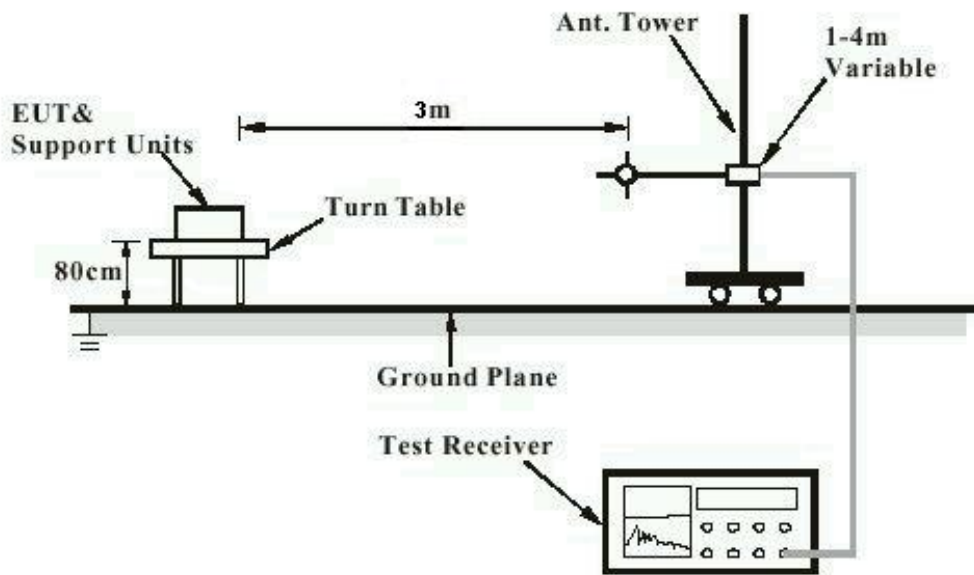
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3.4 Test Setup Diagram

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.

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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

Requirement : The use of approved antennas only with directional gains that do not exceed 6dBi

According to the manufacturer declaration, the EUT has an antenna with a gain of -2dBi. The antenna is an Integral 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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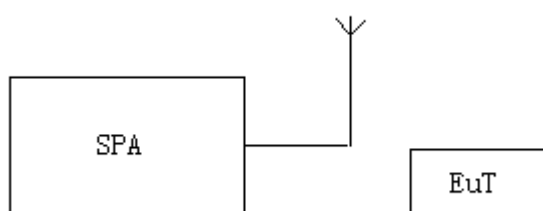
4.1.2 Provision For Momentary Operation

RESULT:

PASS

Test standard : §15.231(a)(1)
Requirement : ANSI C63.10-2013

Test Setup:



Measurement Procedure:

- Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=100kHz, VBW=300KHz
Span: 0Hz
Sweep time: 10s
- Set the EUT to transmit by manually operated. Use the "View" function of SPA to find the transmission time of being released.
- Record the data.

Test Data:

Frequency	Modulation Type	The Time of stopping transmission	Limit	Result
303MHz	ASK	0.586s	<5s	Pass
310MHz	ASK	1.646s	<5s	Pass
315MHz	ASK	1.146s	<5s	Pass
318MHz	ASK	1.630s	<5s	Pass
390MHz	ASK	1.736s	<5s	Pass
433.42MHz	ASK	1.535s	<5s	Pass
433.92MHz	ASK	0.472	<5s	Pass
434.4MHz	FSK	1.322	<5s	Pass

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Figure 1: Test plots of 303MHz

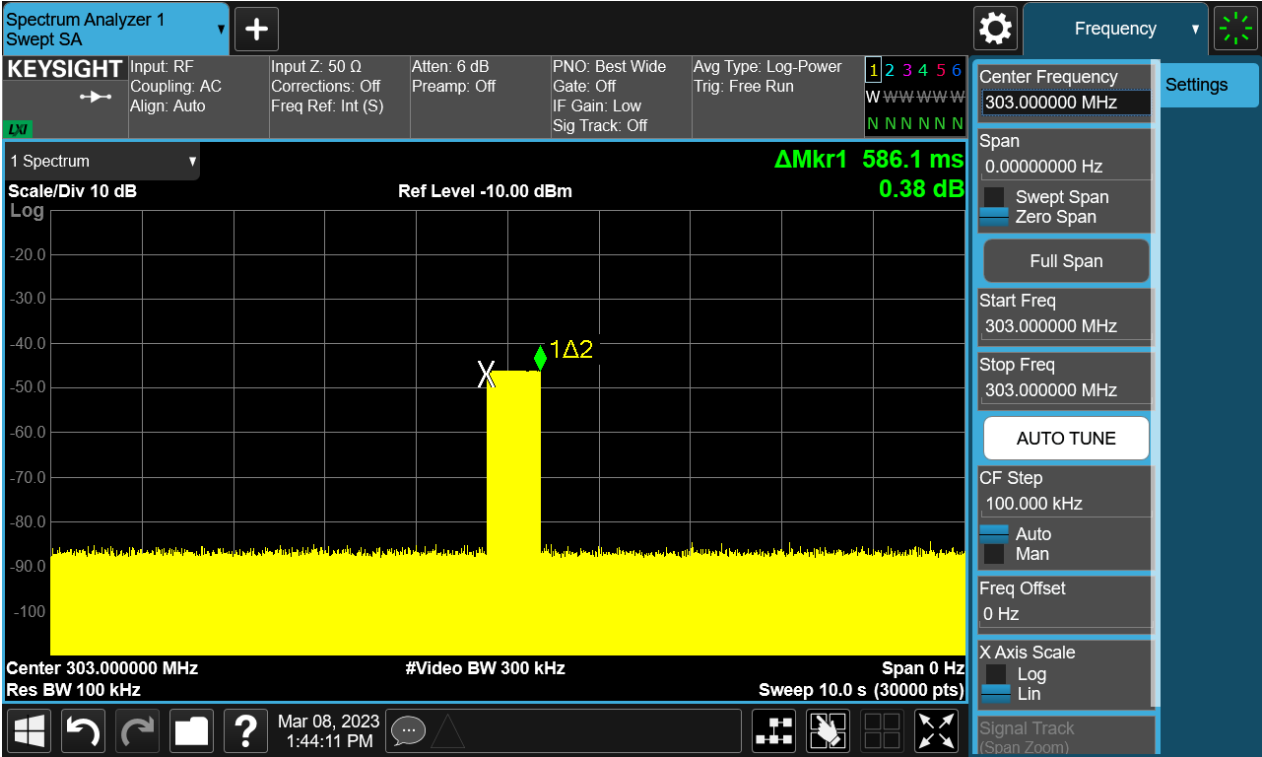
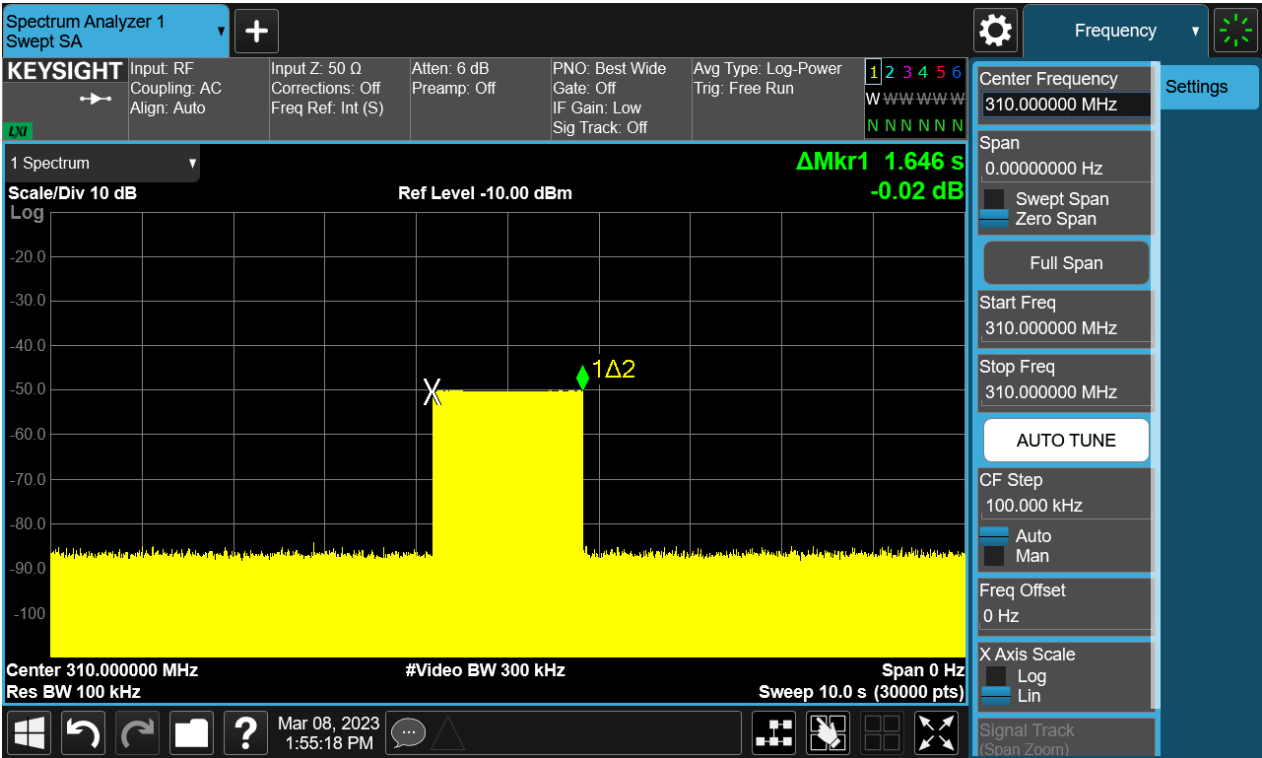


Figure 2: Test plots of 310MHz



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Figure 3: Test plots of 315MHz

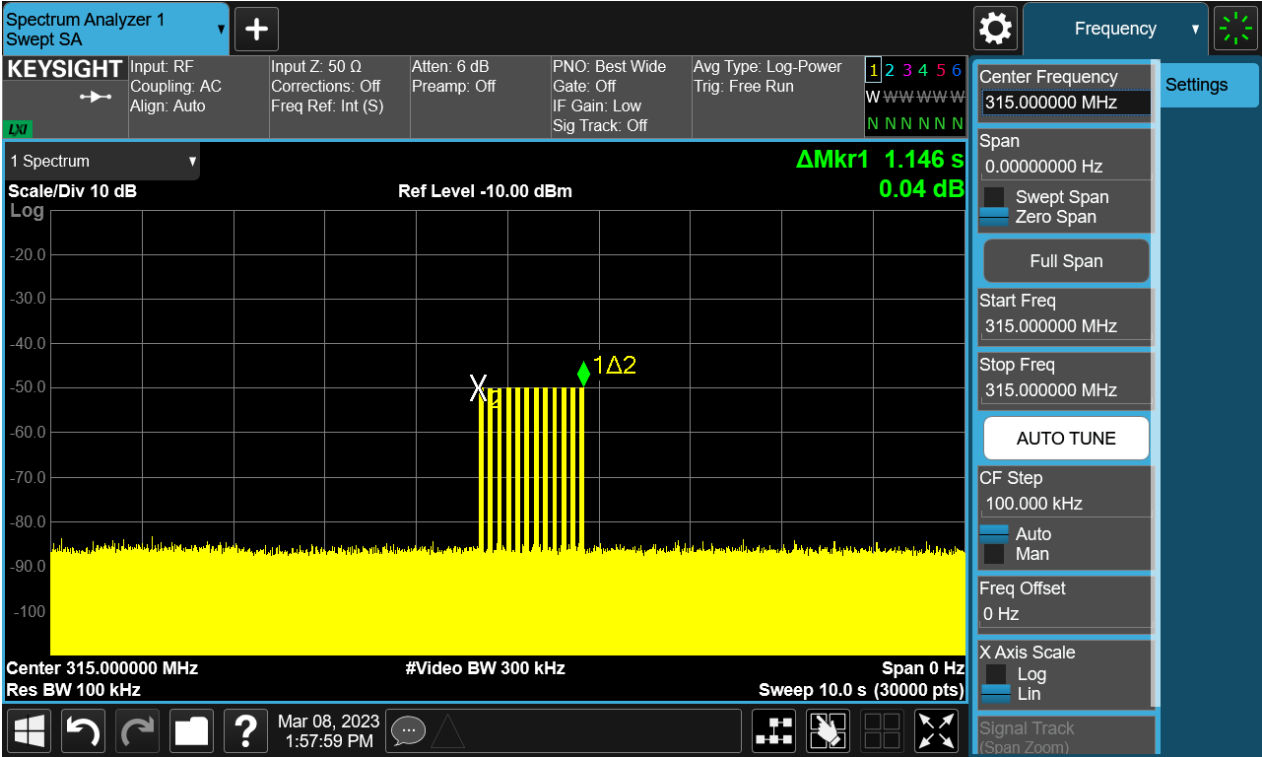
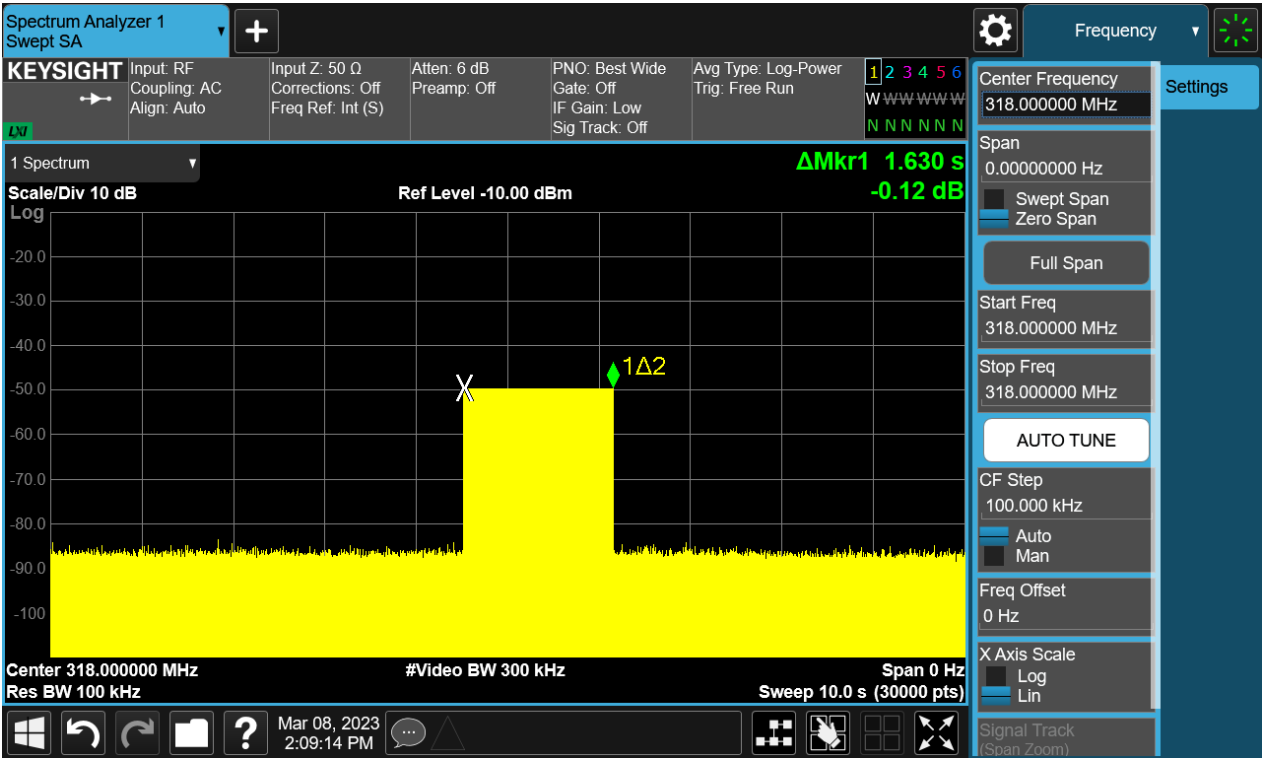


Figure 4: Test plots of 318MHz



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Figure 5: Test plots of 390MHz

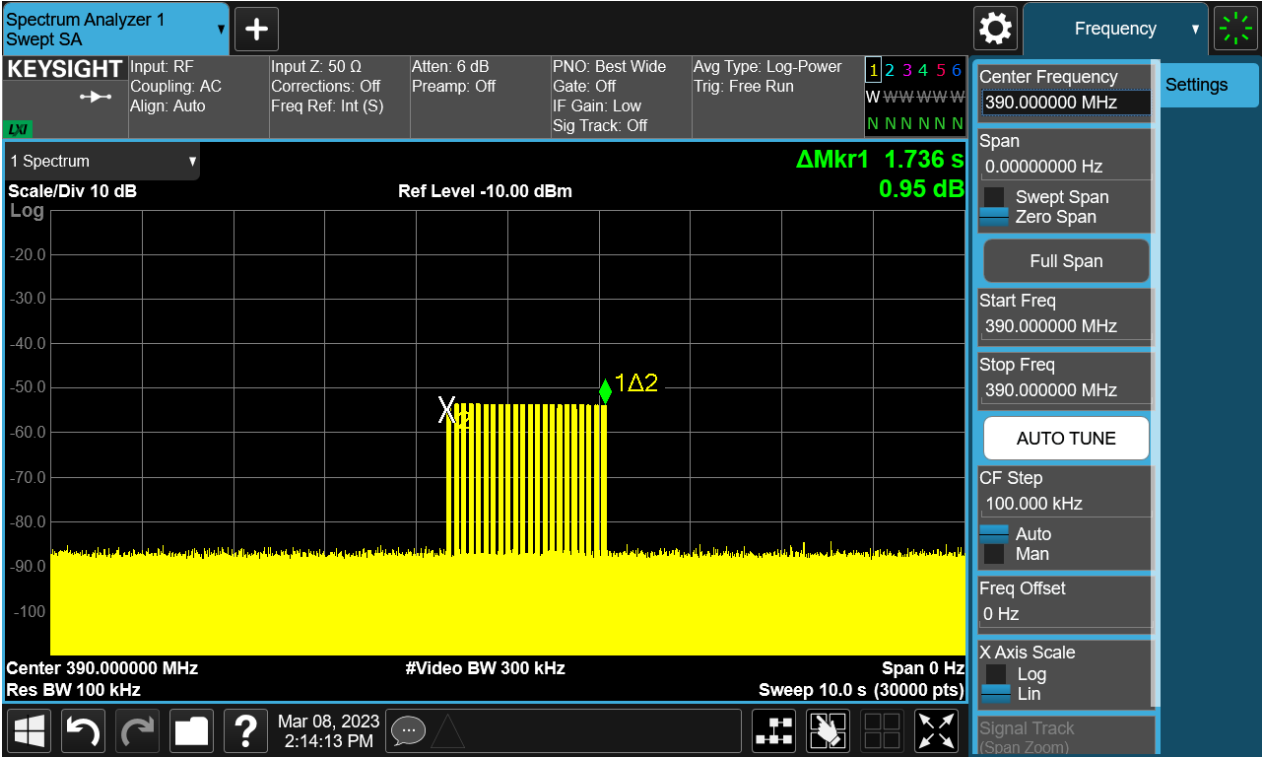
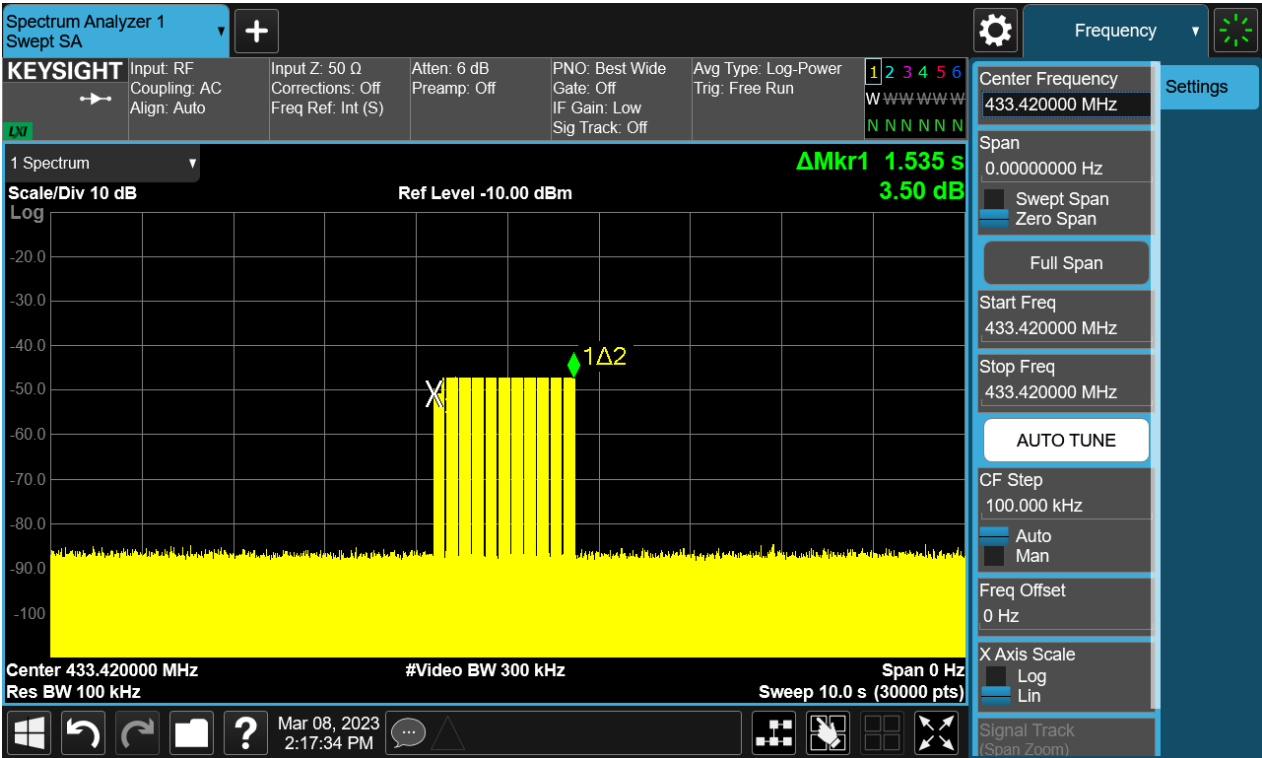


Figure 6: Test plots of 433.42MHz



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Figure 7: Test plots of 433.92MHz

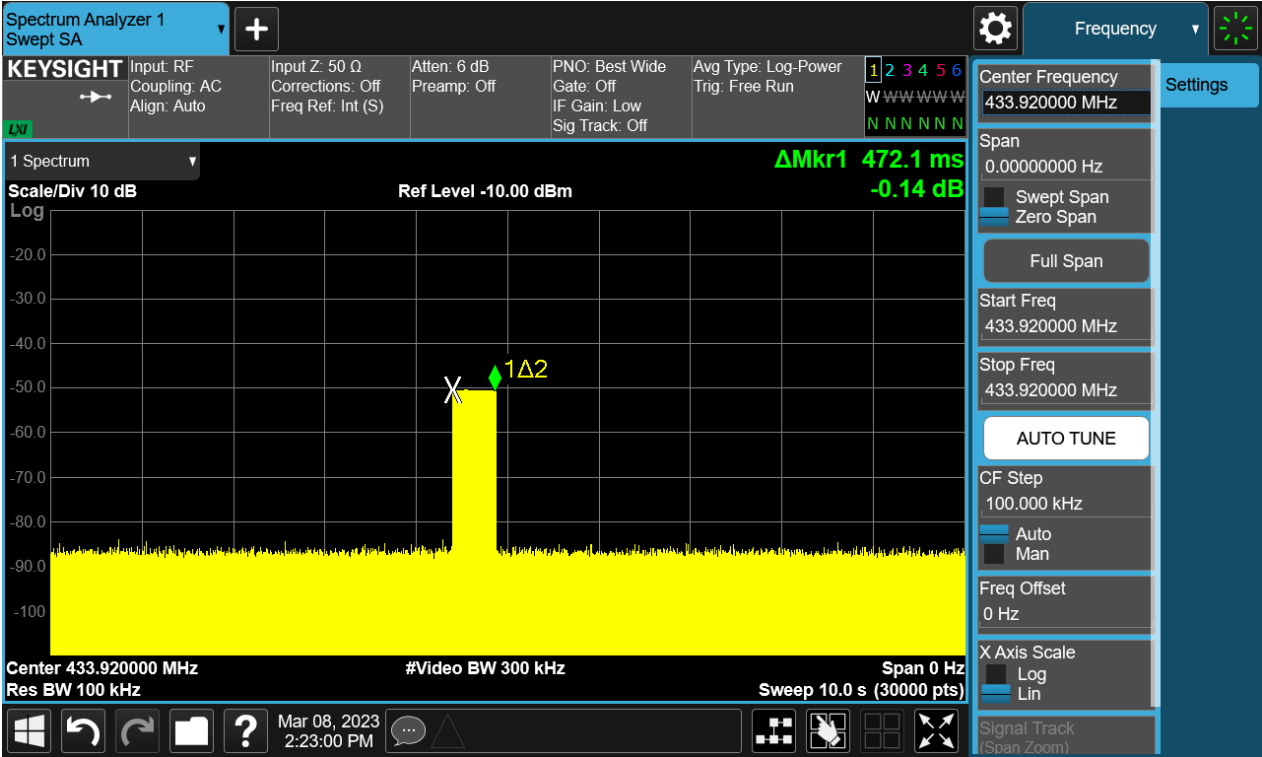
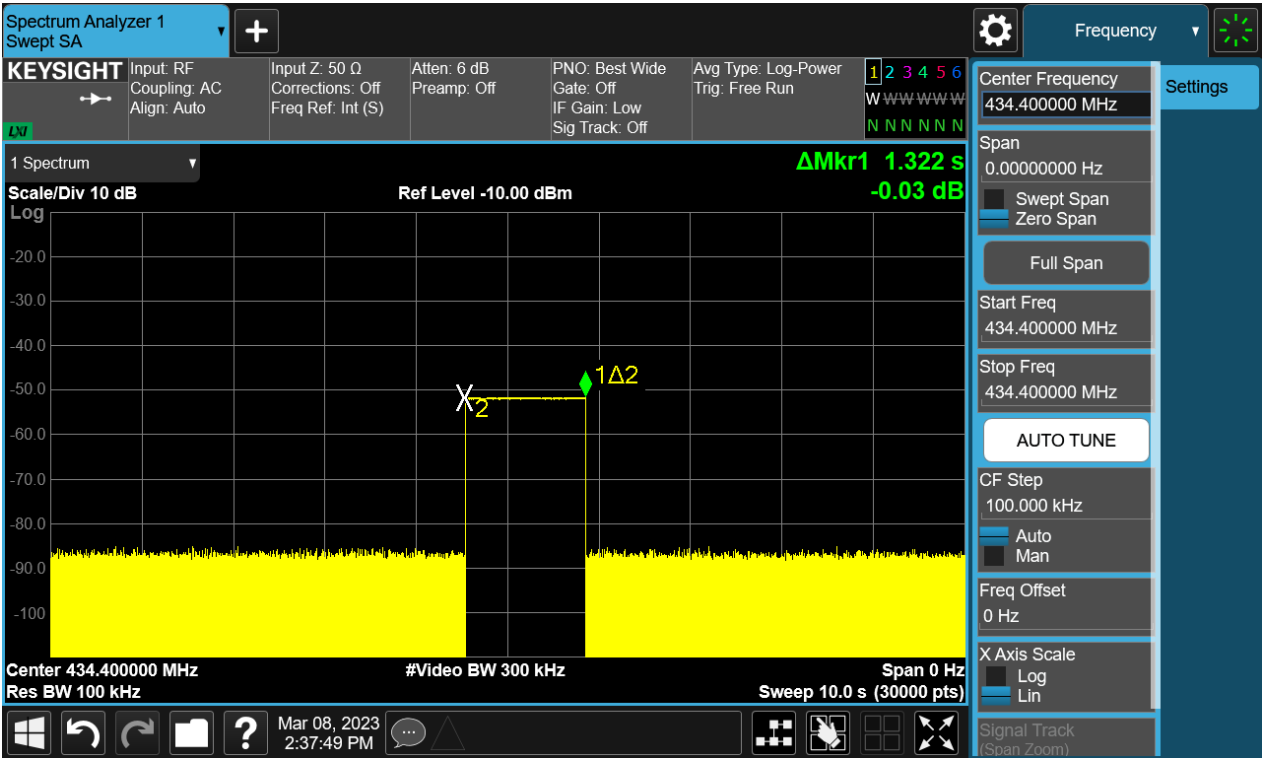


Figure 8: Test plots of 434.4MHz



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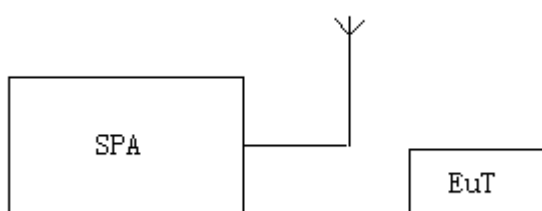
4.1.3 Duty Cycle Correction Factor

RESULT:

PASS

Test standard : §15.231(b)
Requirement : ANSI C63.10-2013

Test Setup



Measurement Procedure

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=100KHz; VBW=300KHz
Span: 0Hz
Sweep time: more than two pulse trains or more than each type of pulse occupancy time
2. Set the EUT to transmit. Use the "Delta mark" function of SPA to find the period time between two pulse trains and each type of pulse occupancy time.
3. Record the plots and Reported.

Test Data

Frequency	Modulation Type	Duty Cycle	Duty Cycle Correction Factor
303MHz	ASK	40.34%	-7.89
310MHz	ASK	17.00%	-15.39
315MHz	ASK	21.00%	-13.56
318MHz	ASK	17.00%	-15.39
390MHz	ASK	24.00%	-12.40
433.42MHz	ASK	50.80%	-5.88
433.92MHz	ASK	40.18%	-7.92
434.4MHz	FSK	100%	0.00

Note: Duty Cycle Correction factor= $20\log(\text{Duty Cycle})$

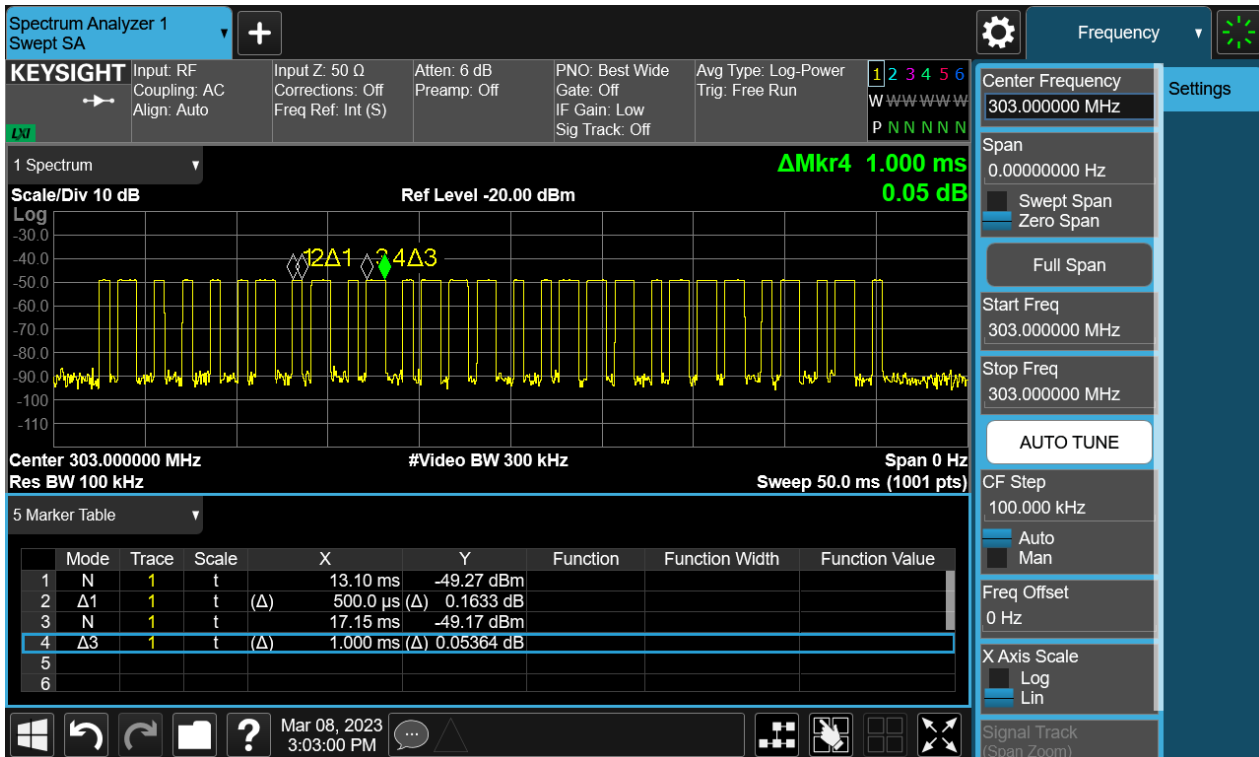
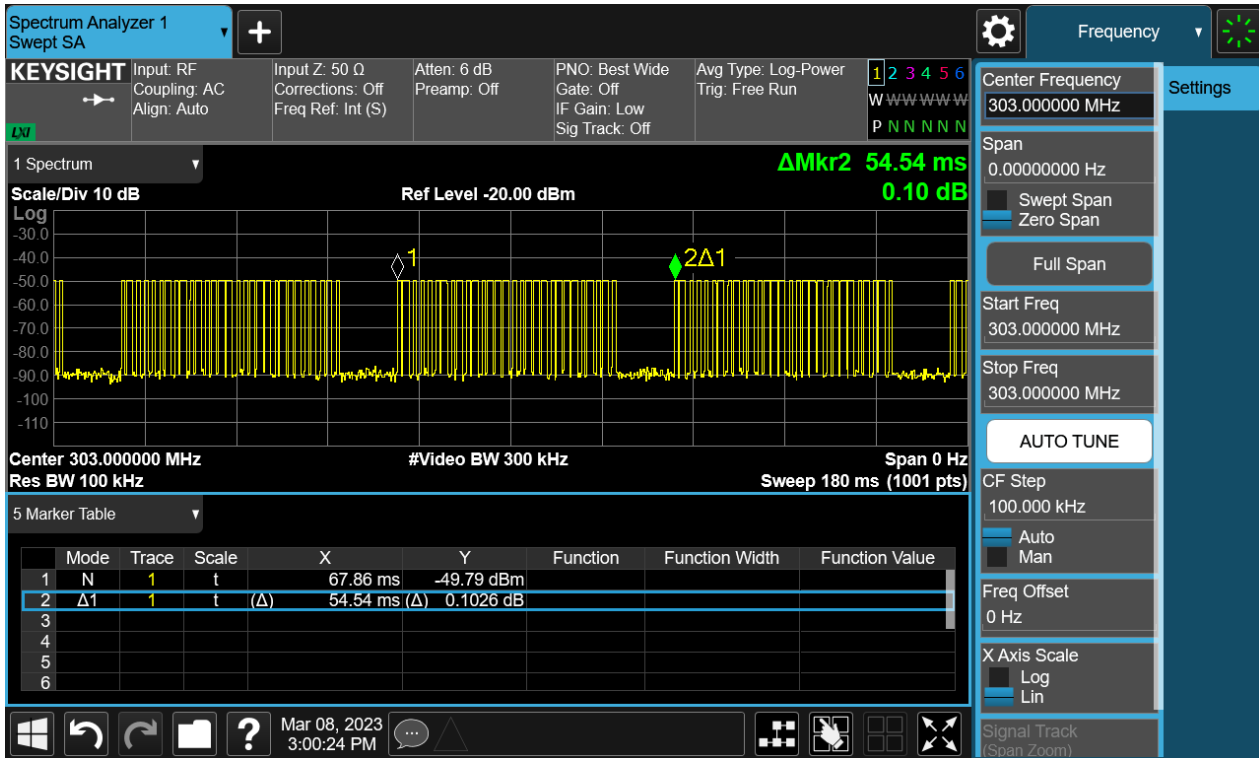
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Figure 9: Test plots of 303MHz



$$\text{Duty Cycle} = \frac{\text{Total Time(Ton)}}{(\text{Ton} + \text{Toff})} = \frac{(0.5 \times 14 + 1 \times 15) \text{ms}}{54.54 \text{ms}} = 40.34\%$$

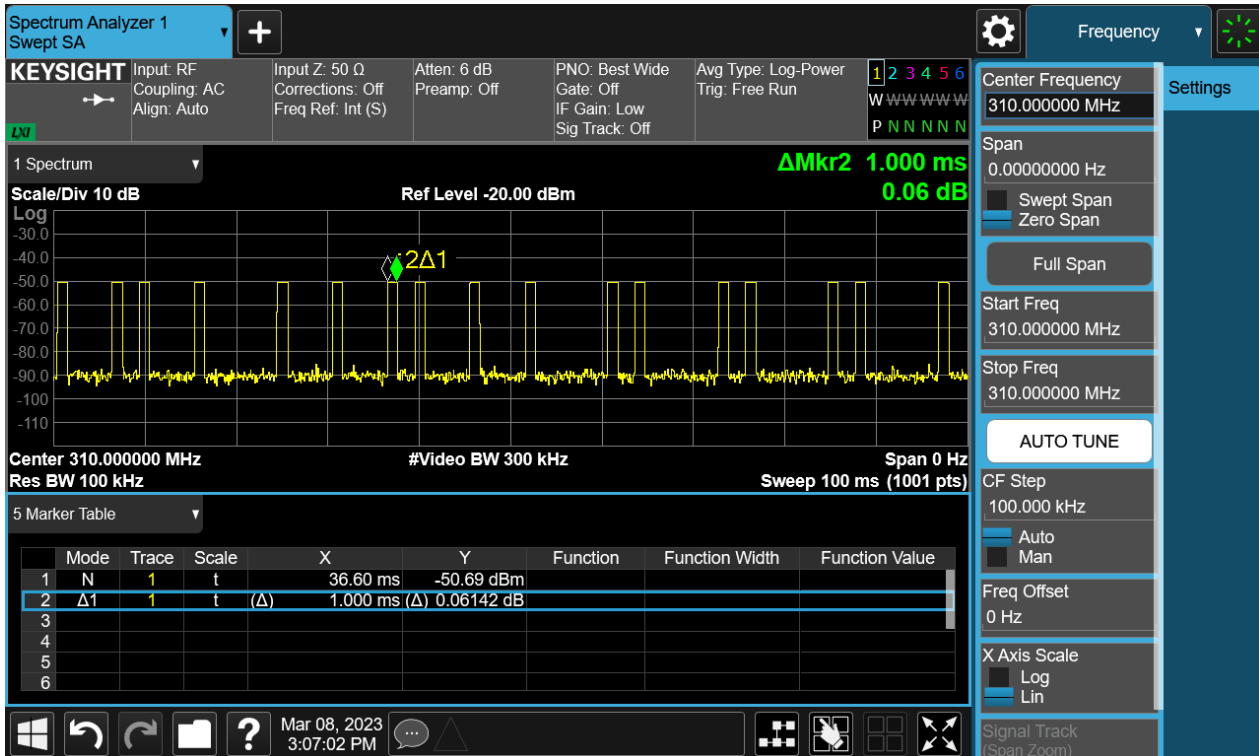
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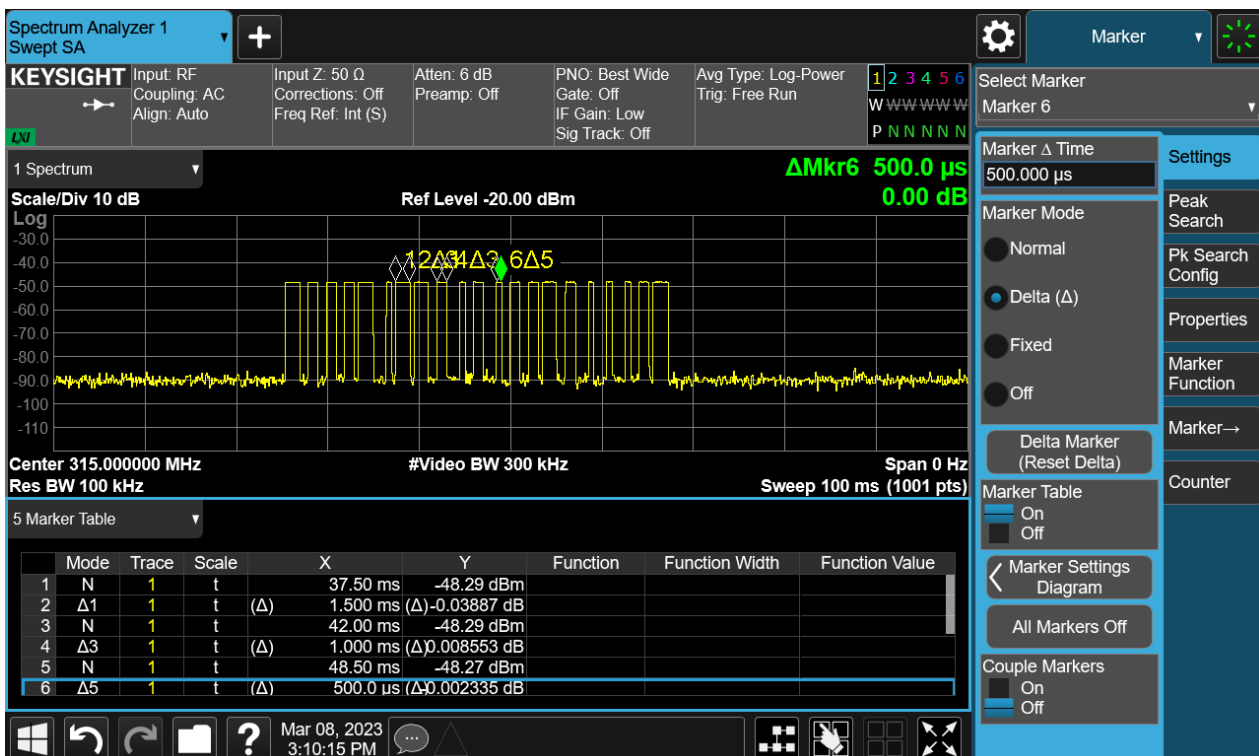
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Figure 10: Test plots of 310MHz



Duty Cycle=Total Time(Ton)/(Ton+Toff)=(1*17)ms/100ms=17%

Figure 11: Test plots of 315MHz



Duty Cycle=Total Time(Ton)/(Ton+Toff)=(1.5*6+1*9+0.5*6)ms/100ms=21%

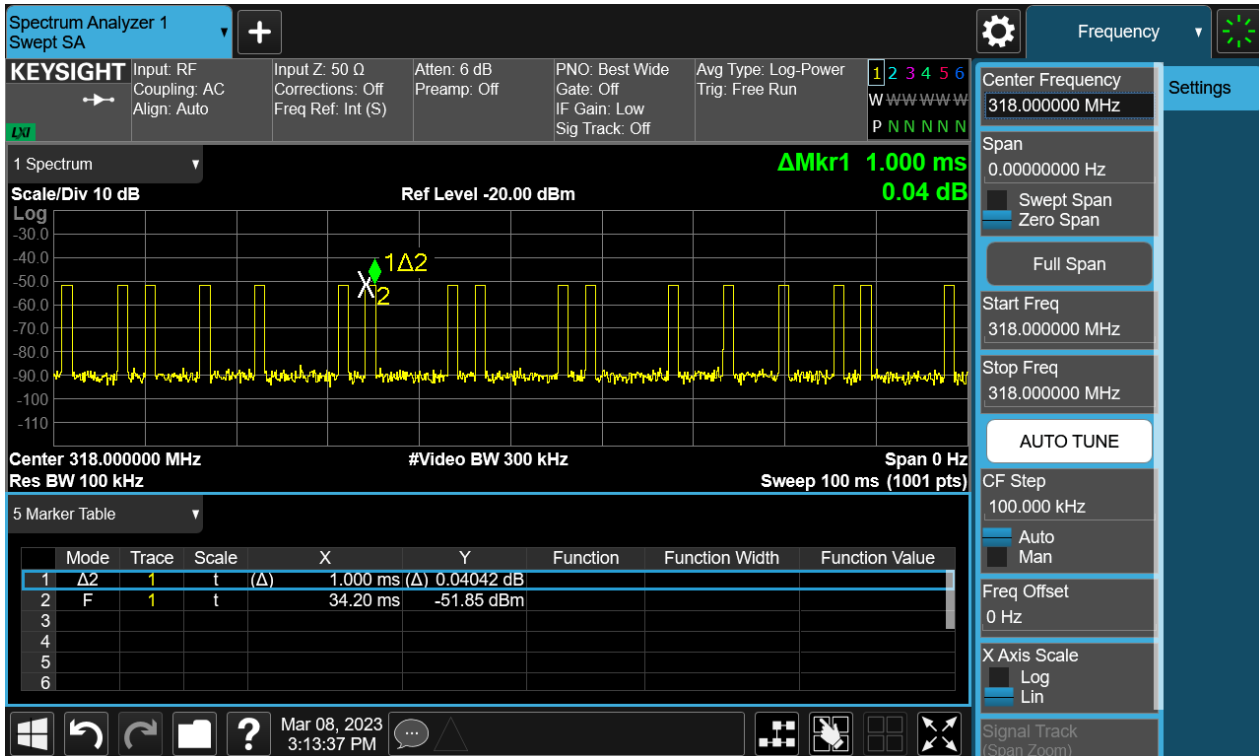
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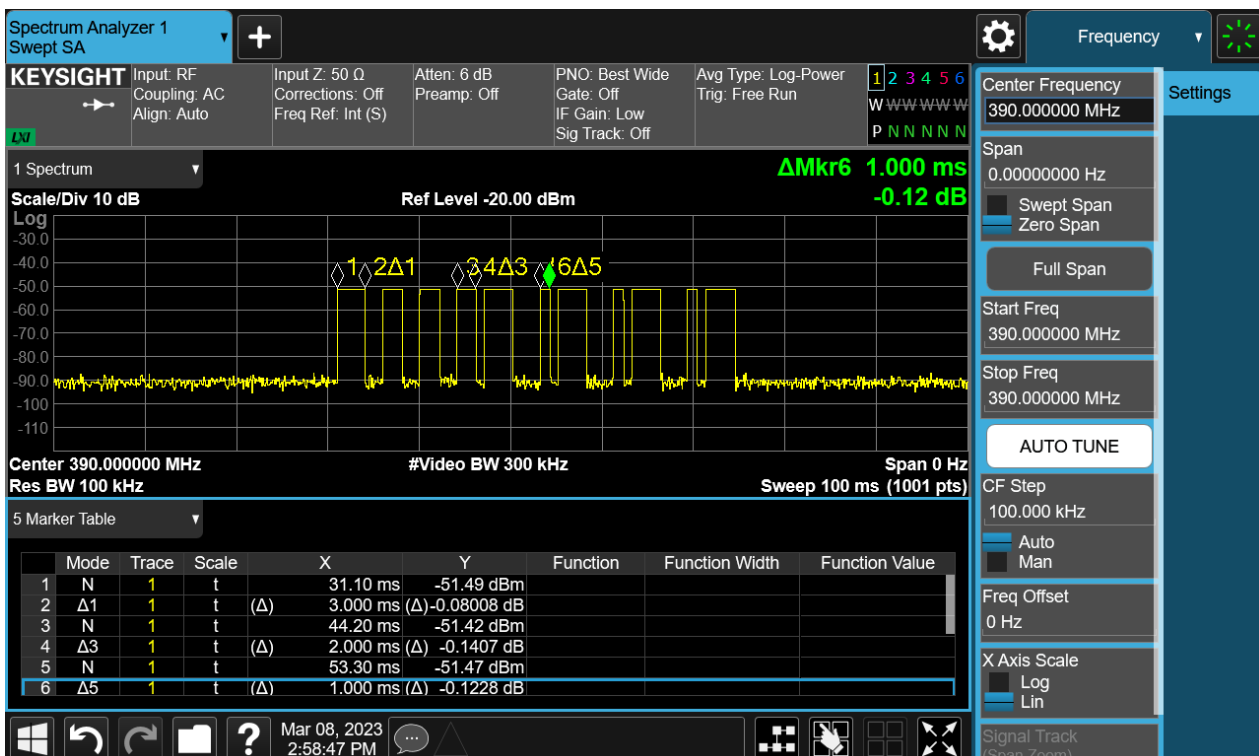
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Figure 12: Test plots of 318MHz



Duty Cycle=Total Time(Ton)/(Ton+Toff)=(1*17)ms/100ms=17%

Figure 13: Test plots of 390MHz



Duty Cycle=Total Time(Ton)/(Ton+Toff)=(3*5+2*3+1*3)ms/100ms=24%

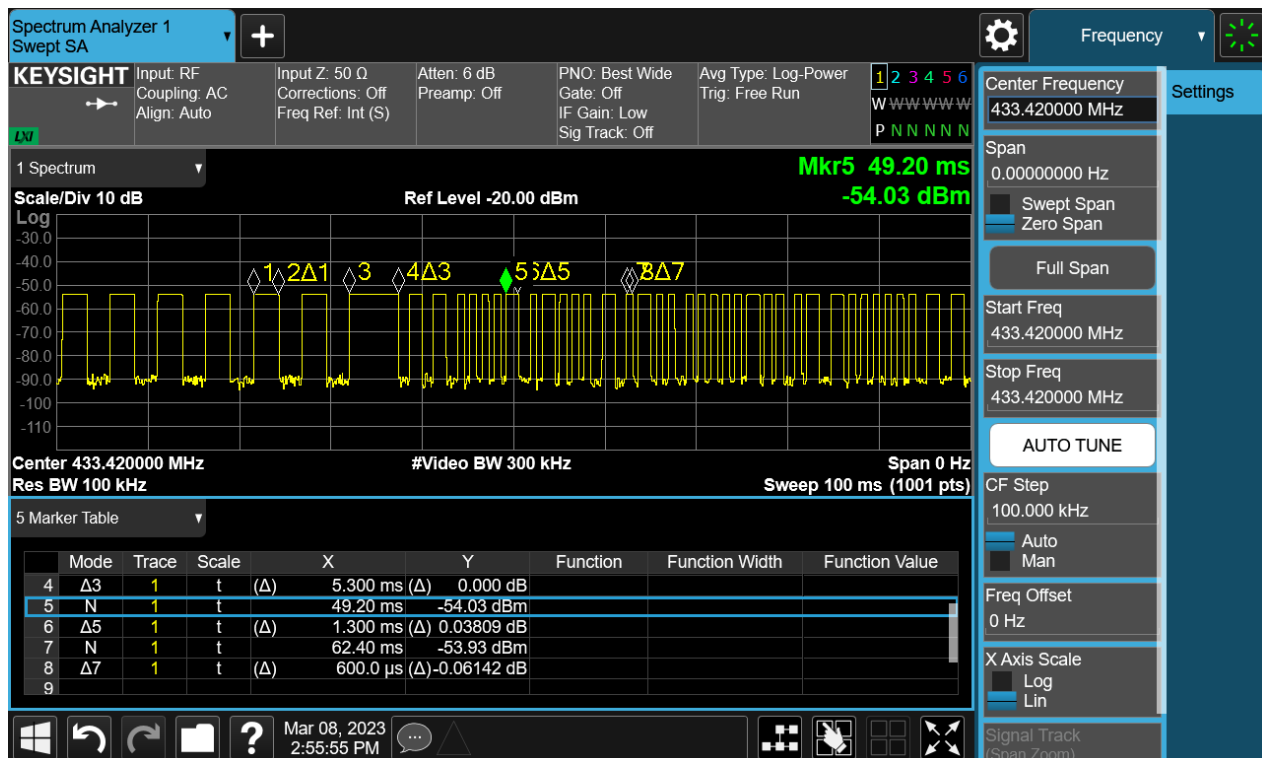
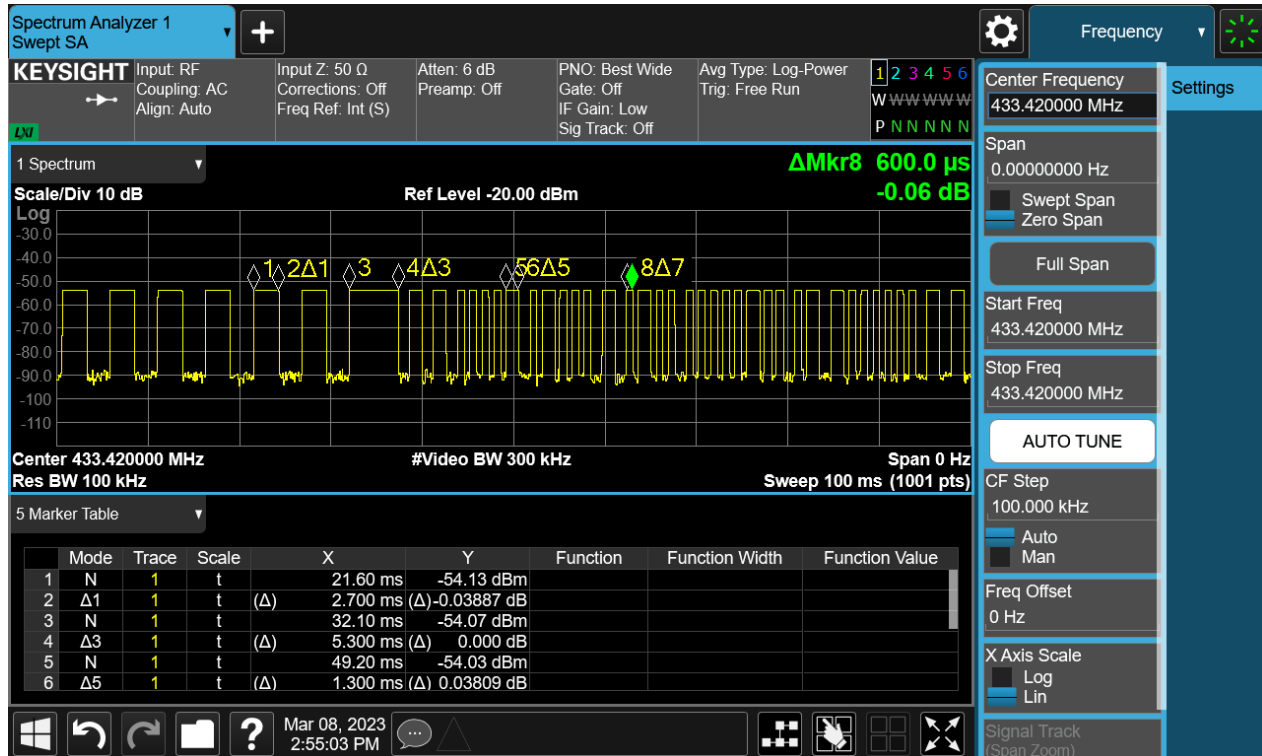
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Figure 14: Test plots of 433.42MHz



$$\text{Duty Cycle} = \frac{\text{Total Time(Ton)}}{(\text{Ton} + \text{Toff})} = \frac{(2.7 * 6 + 5.3 * 1 + 1.3 * 11 + 0.6 * 25) \text{ms}}{100 \text{ms}} = 50.80\%$$

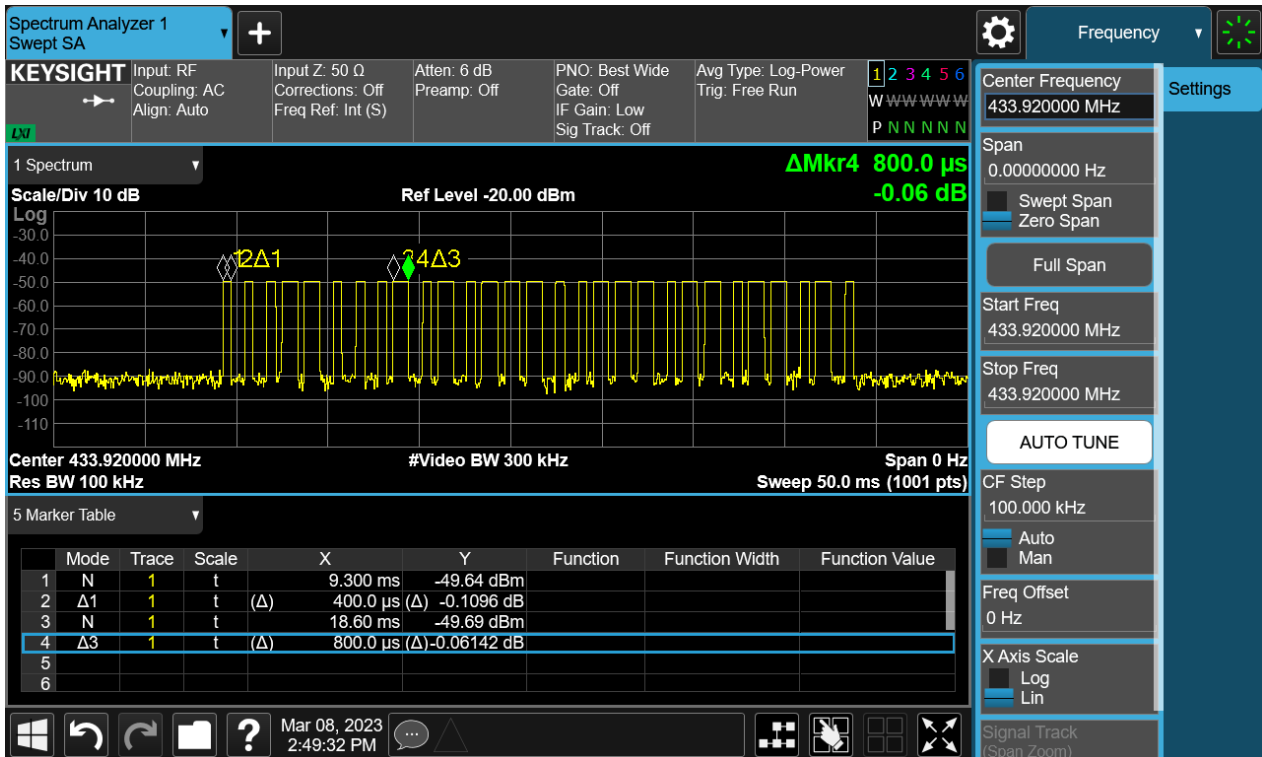
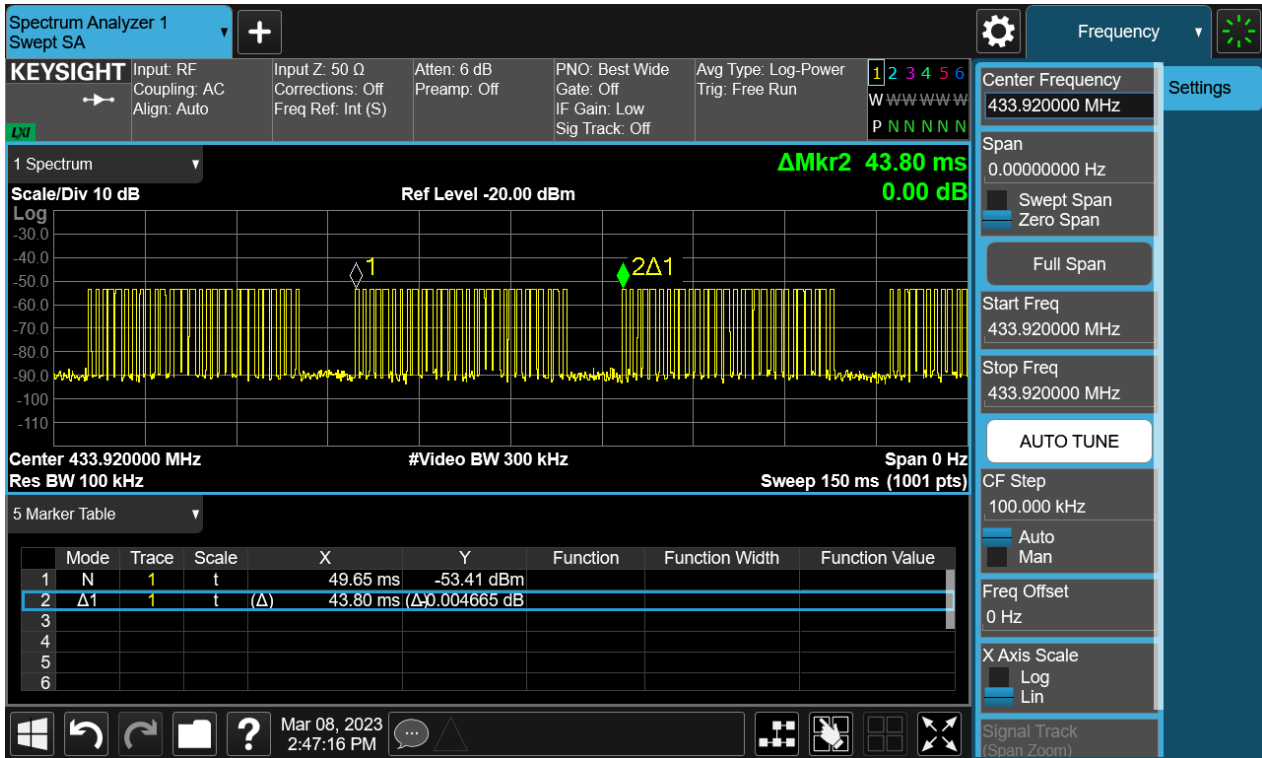
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Figure 15: Test plots of 433.92MHz



$$\text{Duty Cycle} = \frac{\text{Total Time(Ton)}}{(\text{Ton} + \text{Toff})} = \frac{(0.4 \times 14 + 0.8 \times 15) \text{ms}}{43.80 \text{ms}} = 40.18\%$$

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Figure 16: Test plots of 434.4MHz



Duty Cycle=Total Time(Ton)/(Ton+Toff)=100%

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4.1.4 Radiated Emission

RESULT:

PASS

Test standard : §15.231(b),§15.209
Requirement : ANSI C63.10-2013
Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Diagram : Clause 3.4
Operation Mode : Transmitting mode
Ambient temperature : 24°C
Relative humidity : 56%

Note(s): In addition to the provisions of §15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40.66-40.70	2250	225
70-130	1250	125
130-174	1250 to 3750*	125 to 375*
174-260	3750	375
260-470	3750 to 12500*	375 to 1250*
Above 470	12500	1250

*Linear interpolations

The above field strength limits are specified at a distance of 3 meters.

The limits on the field strength of the spurious emissions in the above table are based on the fundamental frequency of the intentional radiator. Spurious emissions shall be attenuated to the average (or, alternatively, CI SPR quasi-peak) limits shown in this table or to the general limits shown in §15.209, whichever limit permits a higher field strength.

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements start below or at the lowest crystal frequency.

Compliance with the provisions of §15.205 shall be demonstrated using the measurement instrumentation specified in that section.

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Measurement Procedure

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

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The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start Frequency	1000MHz
Stop Frequency	10 th carrier harmonic
RB / VB (emission in restricted band)	1MHz/1MHz for Peak, 1MHz/10Hz for Average

Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RBW 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RBW 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RBW 120KHz for QP

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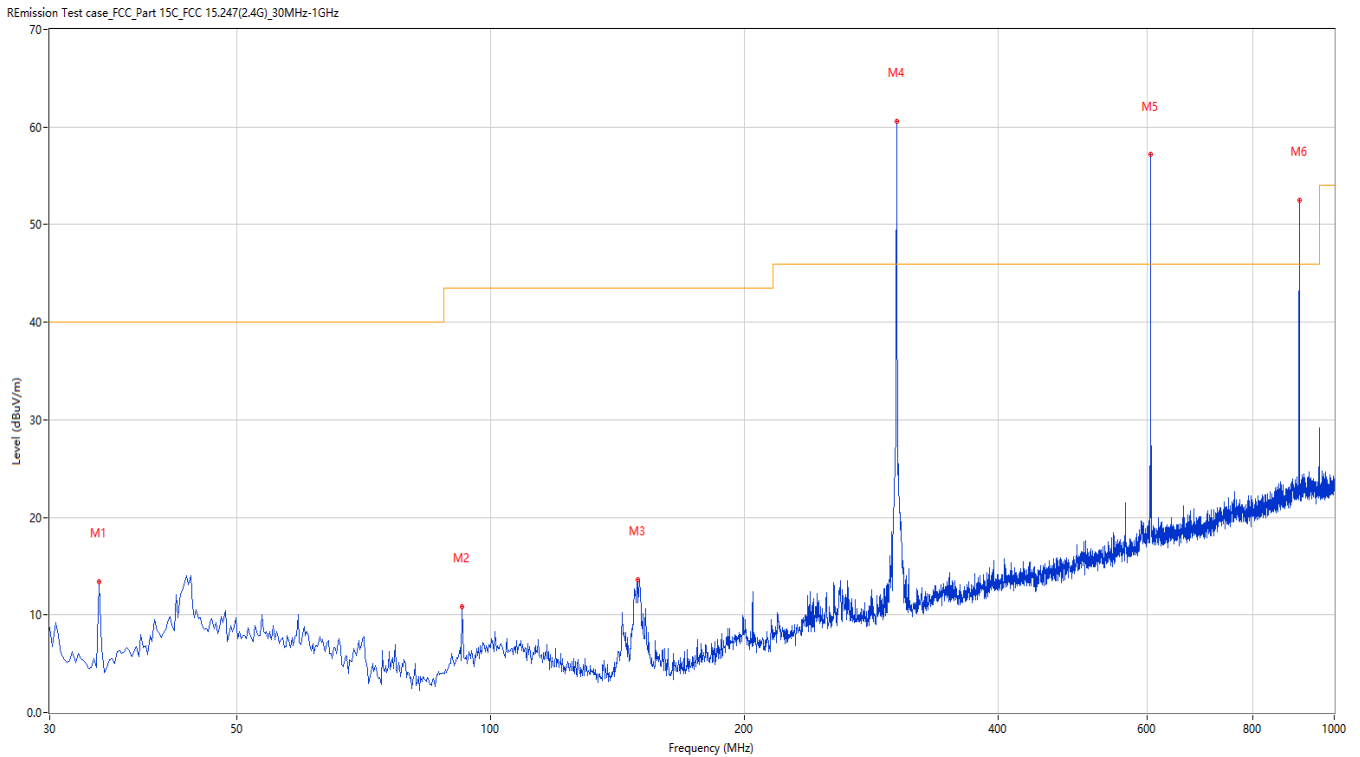
Test Data

Radiated Emission Below 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz.

Figure 17: Test plots of 303MHz

Radiated Emission Below 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	34.364	13.37	-28.28	40.0	26.63	Peak	0.00	200	Horizontal	Pass
2	92.549	10.83	-28.03	43.5	32.67	Peak	0.00	200	Horizontal	Pass
3	149.280	13.60	-29.96	43.5	29.90	Peak	153.10	100	Horizontal	Pass
4	302.987	60.58	-23.66	94.87	34.29	Peak	160.80	100	Horizontal	Pass
4*	302.987	52.69	-23.66	74.87	22.18	AV	160.80	100	Horizontal	Pass
5	605.794	57.16	-15.36	74.87	17.71	Peak	85.80	200	Horizontal	Pass
5*	605.794	49.27	-15.36	54.87	5.60	AV	85.80	200	Horizontal	Pass
6	908.843	52.52	-9.67	74.87	22.35	Peak	57.30	100	Horizontal	Pass
6*	908.843	44.63	-9.67	54.87	10.24	AV	57.30	100	Horizontal	Pass

Result: Pass

Note:

- Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
- The "Factor" value can be calculated automatically by software of measurement system.
- Average=peak+ Duty cycle correction factor, Final Average= peak-7.89.

TEST REPORT

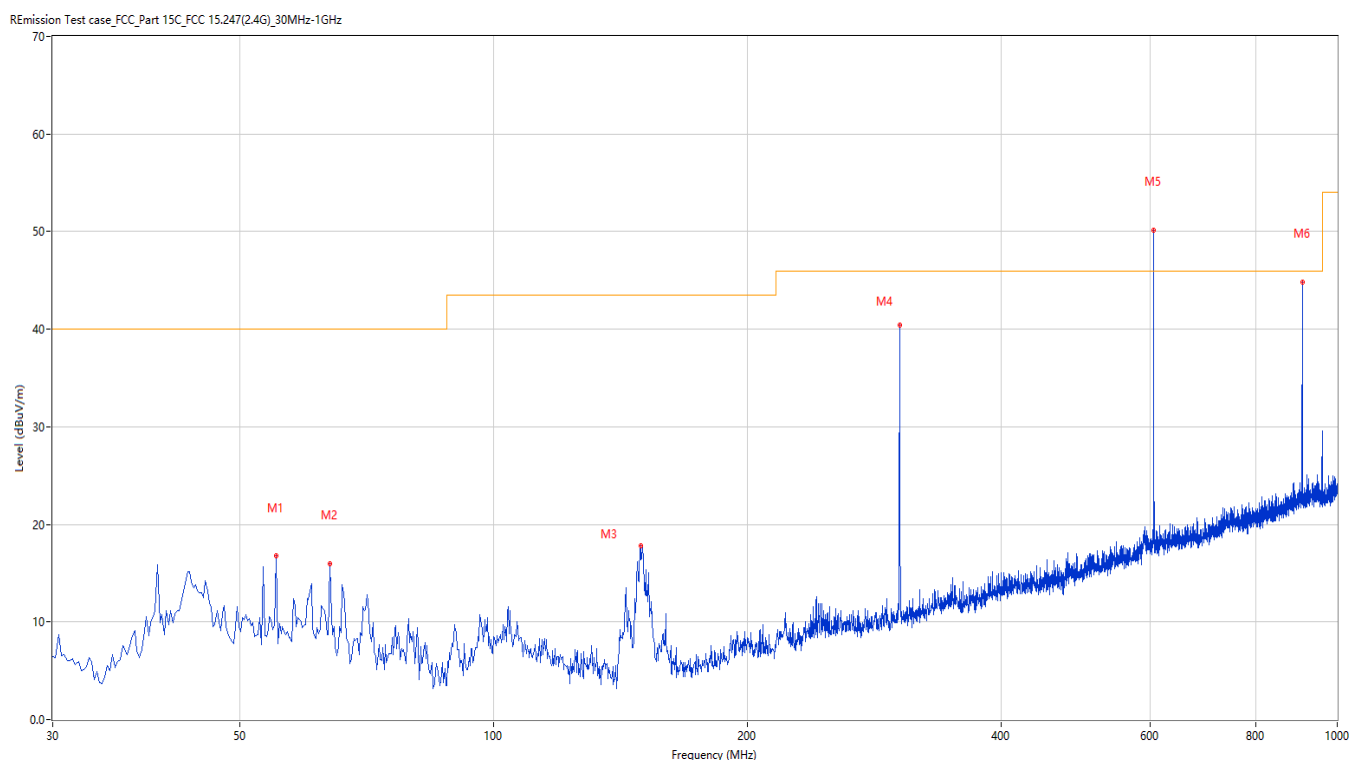
Report No.: SHE23010040-01AE

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Figure 18: Test plots of 303MHz

Radiated Emission Below 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	55.214	16.74	-25.42	40.0	23.26	Peak	0.00	200	Vertical	Pass
2	63.942	15.94	-27.34	40.0	24.06	Peak	149.30	100	Vertical	Pass
3	149.280	17.84	-29.96	43.5	25.66	Peak	169.00	100	Vertical	Pass
4	302.987	40.46	-23.66	94.87	54.41	Peak	186.90	200	Vertical	Pass
4*	302.987	32.57	-23.66	74.87	42.30	AV	186.90	200	Vertical	Pass
5	605.794	50.16	-15.36	74.87	24.71	Peak	77.90	100	Vertical	Pass
5*	605.794	42.27	-15.36	54.87	12.60	AV	77.90	100	Vertical	Pass
6	908.843	44.82	-9.67	74.87	30.05	Peak	197.10	200	Vertical	Pass
6*	908.843	36.93	-9.67	54.87	17.94	AV	197.10	200	Vertical	Pass

Result: Pass

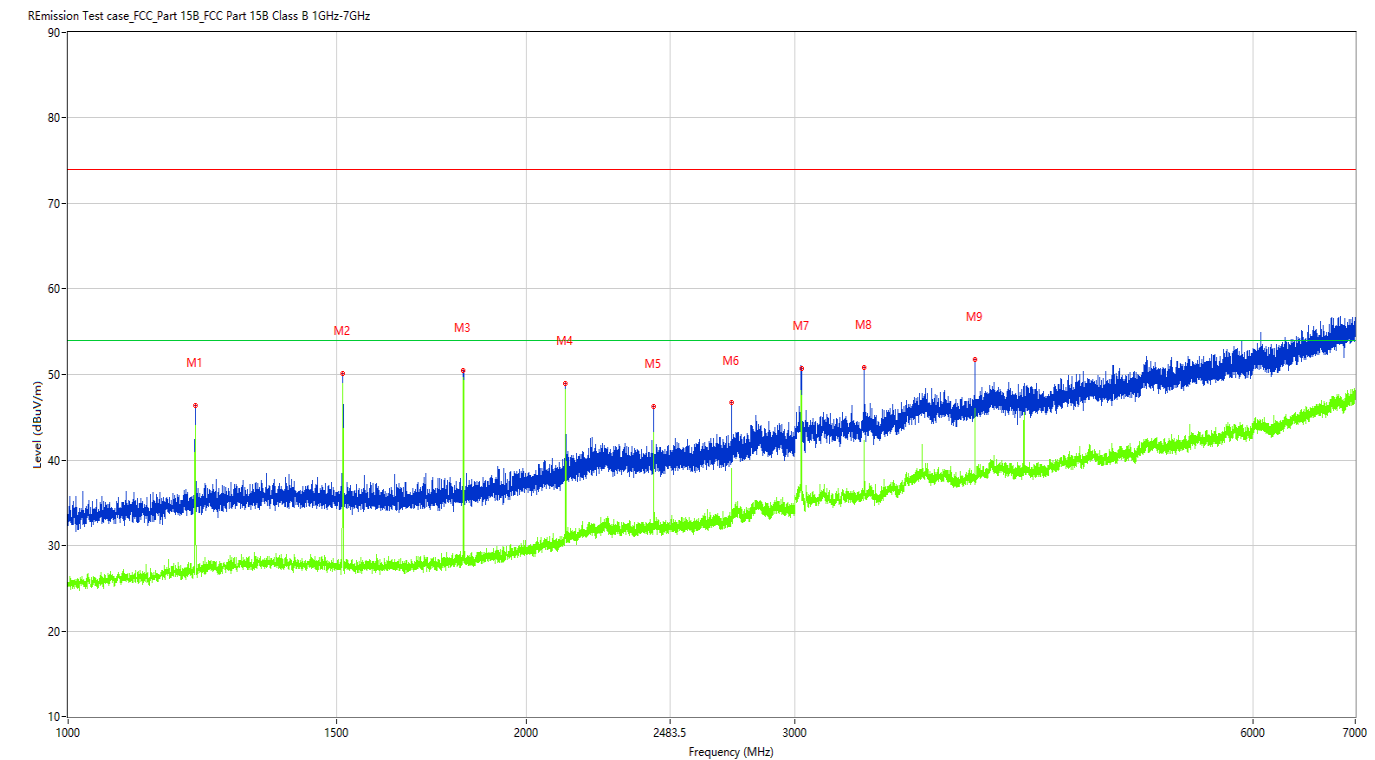
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-7.89.

TEST REPORT

Figure 19: Test plots of 303MHz

Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1212.000	46.40	-15.03	74.00	27.60	Peak	354.80	100	Horizontal	Pass
1**	1212.000	44.05	-15.03	54.00	9.95	AV	354.80	100	Horizontal	Pass
2	1514.750	50.16	-14.87	74.00	23.84	Peak	289.10	100	Horizontal	Pass
2**	1514.750	48.73	-14.87	54.00	5.27	AV	289.10	100	Horizontal	Pass
3	1817.750	50.47	-14.35	74.87	24.4	Peak	0.00	100	Horizontal	Pass
3**	1817.750	47.87	-14.35	54.87	7.00	AV	0.00	100	Horizontal	Pass
4	2121.000	48.93	-11.45	74.87	25.94	Peak	222.40	100	Horizontal	Pass
4**	2121.000	48.29	-11.45	54.87	6.58	AV	222.40	100	Horizontal	Pass
5	2424.250	46.25	-9.41	74.87	28.62	Peak	64.90	100	Horizontal	Pass
5**	2424.250	42.49	-9.41	54.87	12.38	AV	64.90	100	Horizontal	Pass
6	2726.750	46.68	-8.07	74.00	27.32	Peak	235.30	100	Horizontal	Pass
6**	2726.750	37.67	-8.07	54.00	16.33	AV	235.30	100	Horizontal	Pass
7	3030.000	50.74	-4.35	74.87	24.13	Peak	285.00	100	Horizontal	Pass
7**	3030.000	47.21	-4.35	54.87	7.66	AV	285.00	100	Horizontal	Pass
8	3333.000	50.81	-4.37	74.00	23.19	Peak	299.60	100	Horizontal	Pass
8**	3333.000	42.31	-4.37	54.00	11.69	AV	299.60	100	Horizontal	Pass
9	3939.000	51.76	-1.96	74.00	22.24	Peak	285.00	100	Horizontal	Pass
9**	3939.000	45.98	-1.96	54.00	8.02	AV	285.00	100	Horizontal	Pass

TEST REPORT

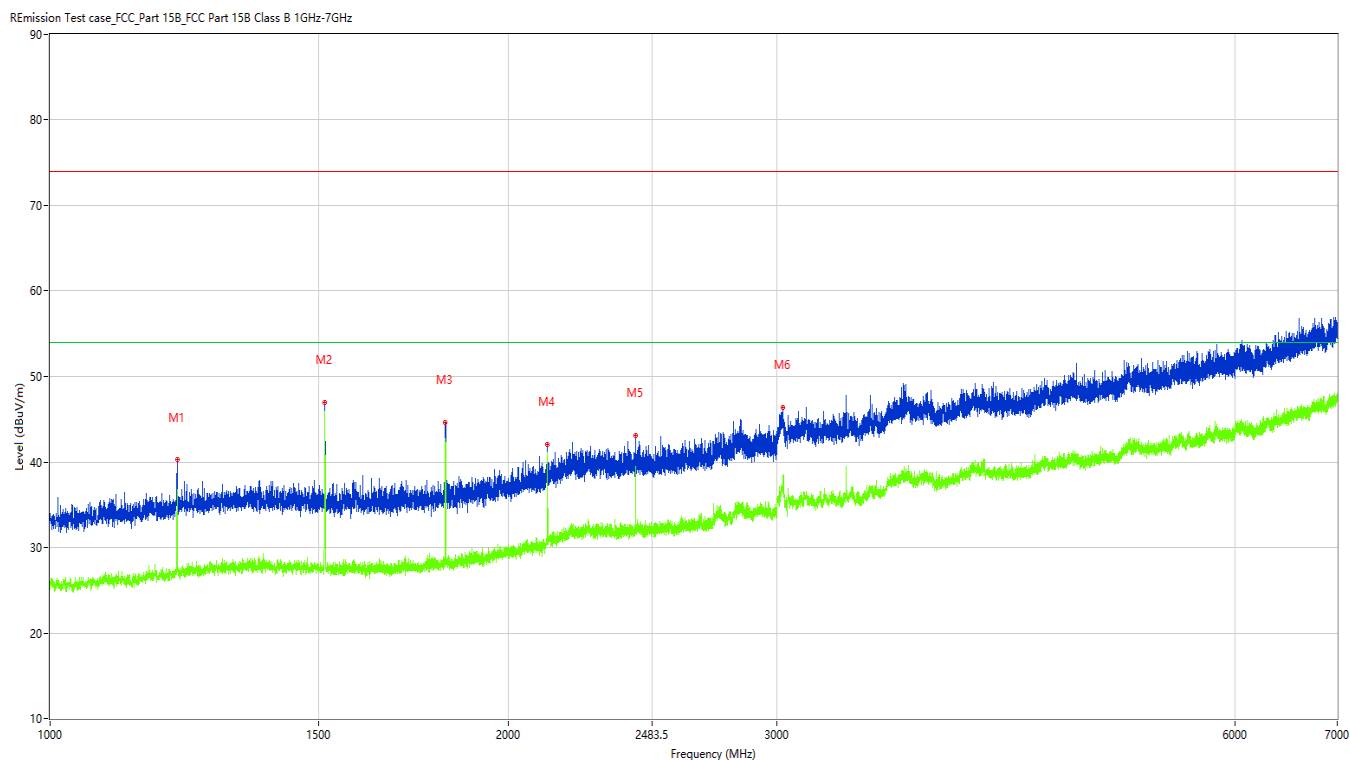
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Figure 20: Test plots of 303MHz

Radiated Emission above 1GHz-Vertical



Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

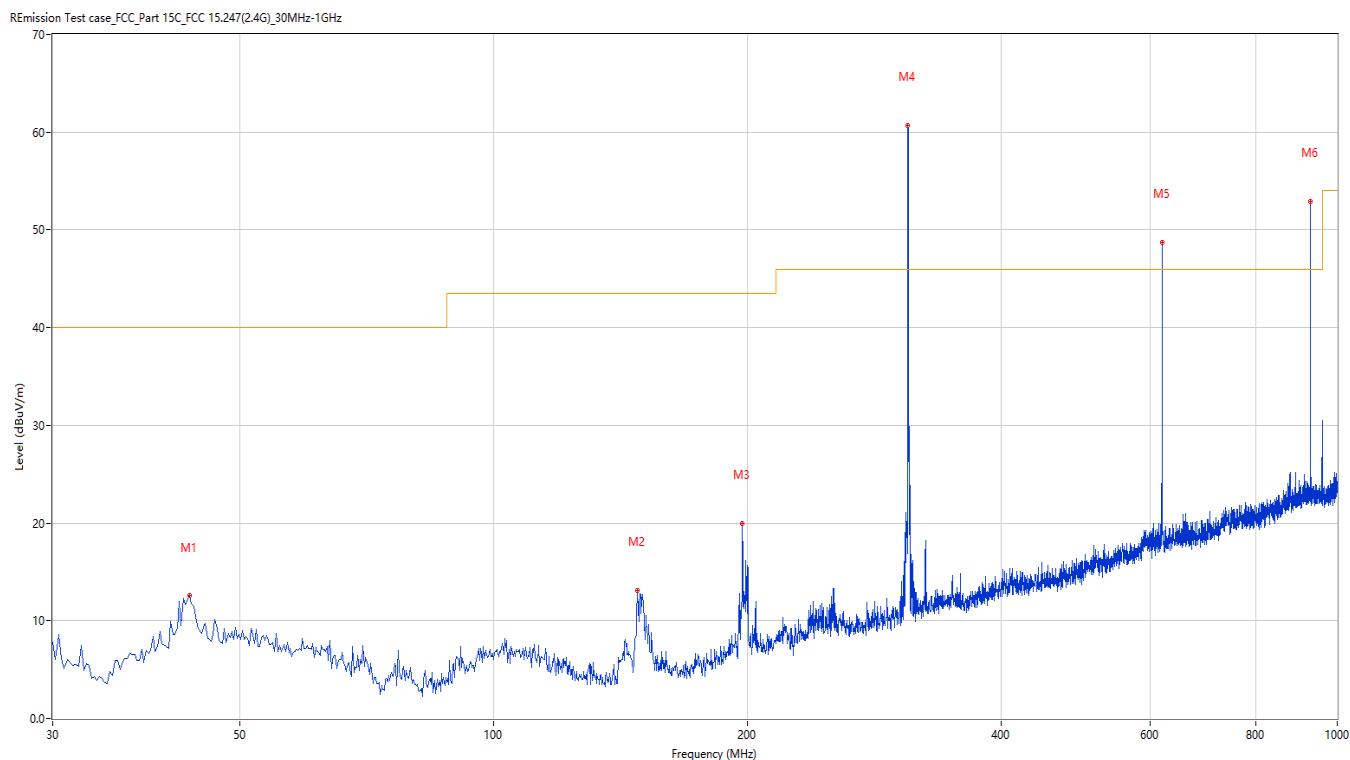
Report No.: SHE23010040-01AE

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Figure 21: Test plots of 310MHz

Radiated Emission Below 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.577	12.55	-25.41	40.0	27.45	Peak	141.30	100	Horizontal	Pass
2	148.068	13.06	-29.98	43.5	30.44	Peak	351.30	200	Horizontal	Pass
3	197.041	19.94	-26.10	43.5	23.56	Peak	0.00	200	Horizontal	Pass
4	309.775	60.70	-23.49	95.32	34.62	Peak	261.20	100	Horizontal	Pass
4*	309.775	45.31	-23.49	75.32	30.01	AV	261.20	100	Horizontal	Pass
5	619.855	48.73	-15.41	75.32	26.59	Peak	98.10	200	Horizontal	Pass
5*	619.855	33.34	-15.41	55.32	21.98	AV	98.10	200	Horizontal	Pass
6	929.935	52.94	-9.11	75.32	22.38	Peak	141.30	100	Horizontal	Pass
6*	929.935	37.55	-9.11	55.32	17.77	AV	141.30	100	Horizontal	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-15.39.

TEST REPORT

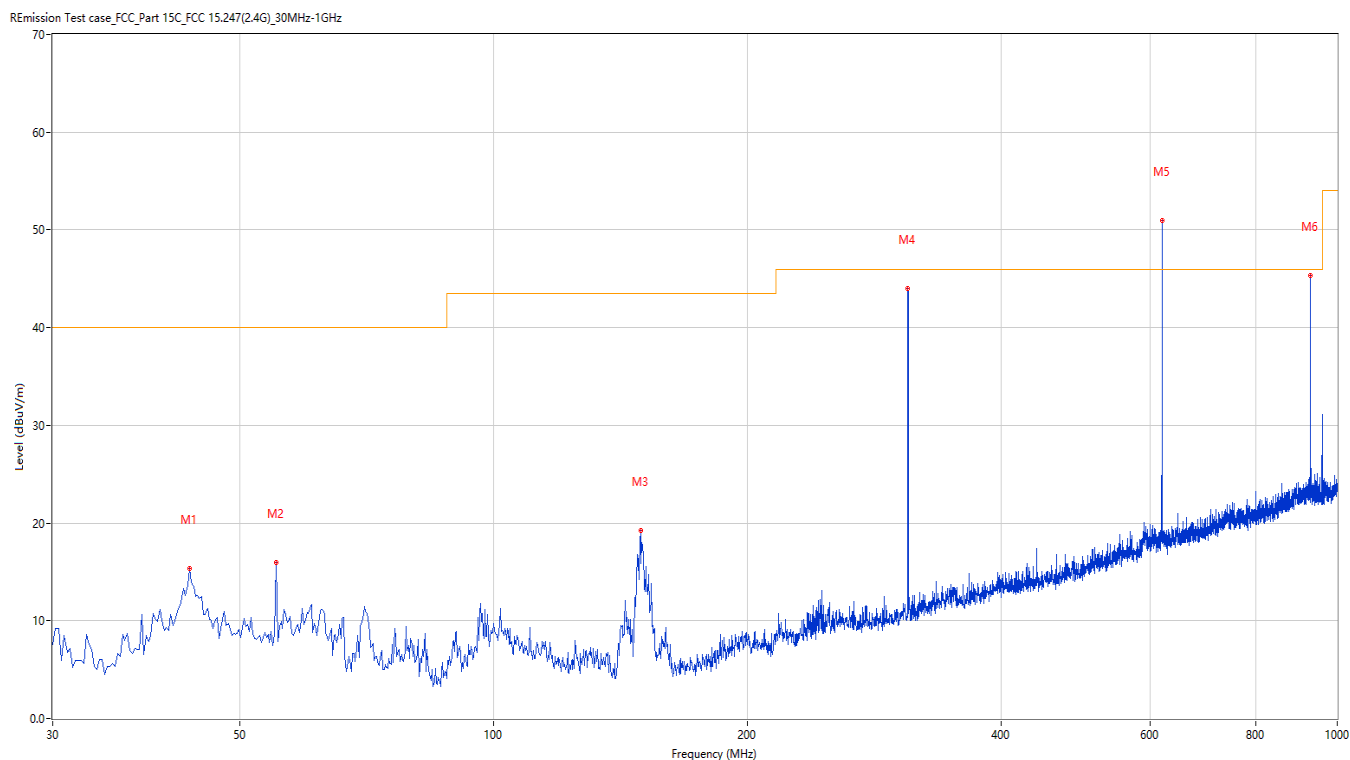
Report No.: SHE23010040-01AE

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Figure 22: Test plots of 310MHz

Radiated Emission Below 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.577	15.40	-25.41	40.0	24.60	Peak	0.00	200	Vertical	Pass
2	55.214	15.95	-25.42	40.0	24.05	Peak	0.00	200	Vertical	Pass
3	149.280	19.25	-29.96	43.5	24.25	Peak	0.00	200	Vertical	Pass
4	309.775	44.00	-23.49	95.32	51.32	Peak	168.50	200	Vertical	Pass
4*	309.775	28.61	-23.49	75.32	46.71	AV	168.50	200	Vertical	Pass
5	619.855	50.99	-15.41	75.32	24.33	Peak	90.30	100	Vertical	Pass
5*	619.855	35.60	-15.41	55.32	19.72	AV	90.30	100	Vertical	Pass
6	929.935	45.33	-9.11	75.32	29.99	Peak	211.10	200	Vertical	Pass
6*	929.935	29.94	-9.11	55.32	25.38	AV	211.10	200	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The “Factor” value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-15.39.

TEST REPORT

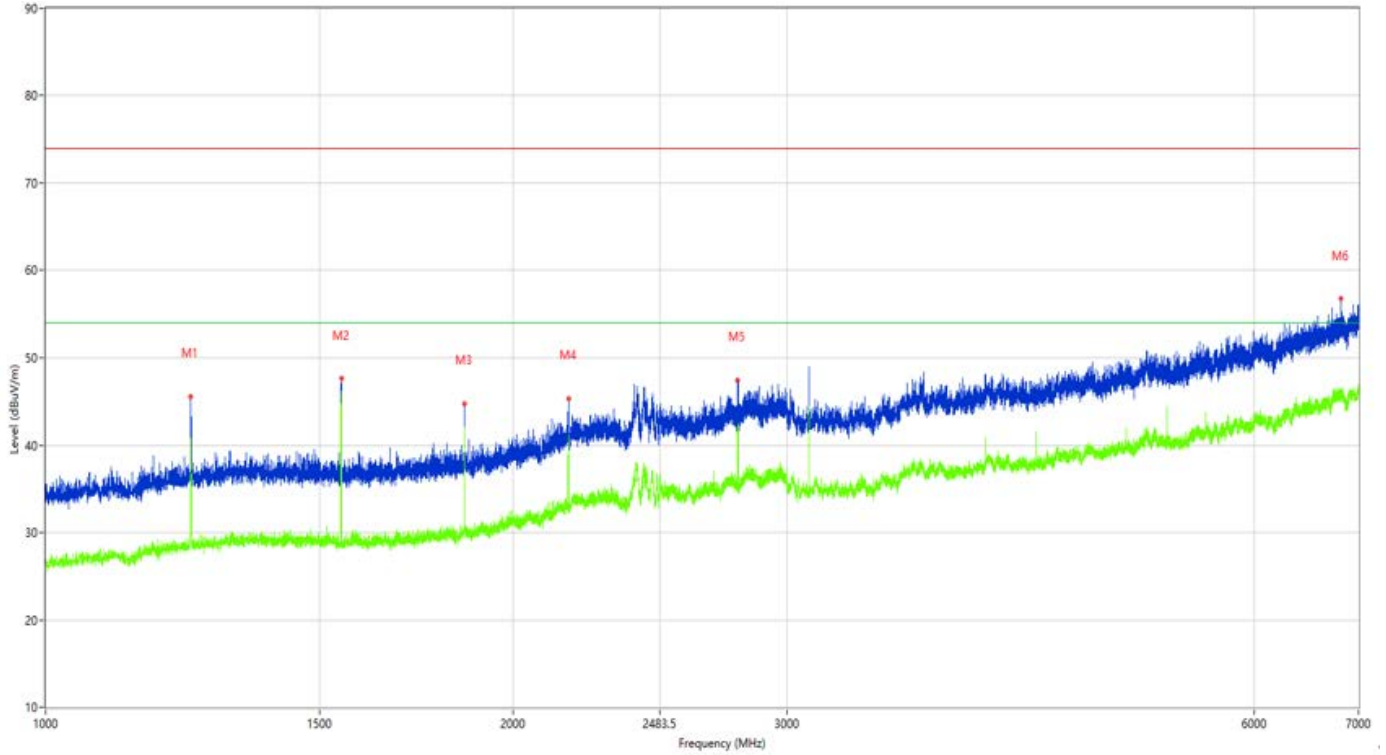
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Figure 23: Test plots of 310MHz

Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1239.750	45.54	-13.18	74.00	28.46	Peak	0.00	100	Horizontal	Pass
1**	1239.750	40.70	-13.18	54.00	13.30	AV	0.00	100	Horizontal	Pass
2	1550.000	47.61	-13.20	74.00	26.39	Peak	276.90	100	Horizontal	Pass
2**	1550.000	46.10	-13.20	54.00	7.90	AV	276.90	100	Horizontal	Pass
3	1860.000	44.76	-12.10	75.32	30.56	Peak	125.50	100	Horizontal	Pass
3**	1860.000	42.02	-12.10	55.32	13.30	AV	125.50	100	Horizontal	Pass
4	2169.750	45.30	-8.46	75.32	30.02	Peak	72.10	100	Horizontal	Pass
4**	2169.750	40.10	-8.46	55.32	15.22	AV	72.10	100	Horizontal	Pass
5	2789.750	47.41	-4.22	74.00	26.59	Peak	0.00	100	Horizontal	Pass
5**	2789.750	41.69	-4.22	54.00	12.31	AV	0.00	100	Horizontal	Pass
6	6823.000	56.78	5.10	74.00	17.22	Peak	357.40	100	Horizontal	Pass
6**	6823.000	46.13	5.10	54.00	7.87	AV	357.40	100	Horizontal	Pass

TEST REPORT

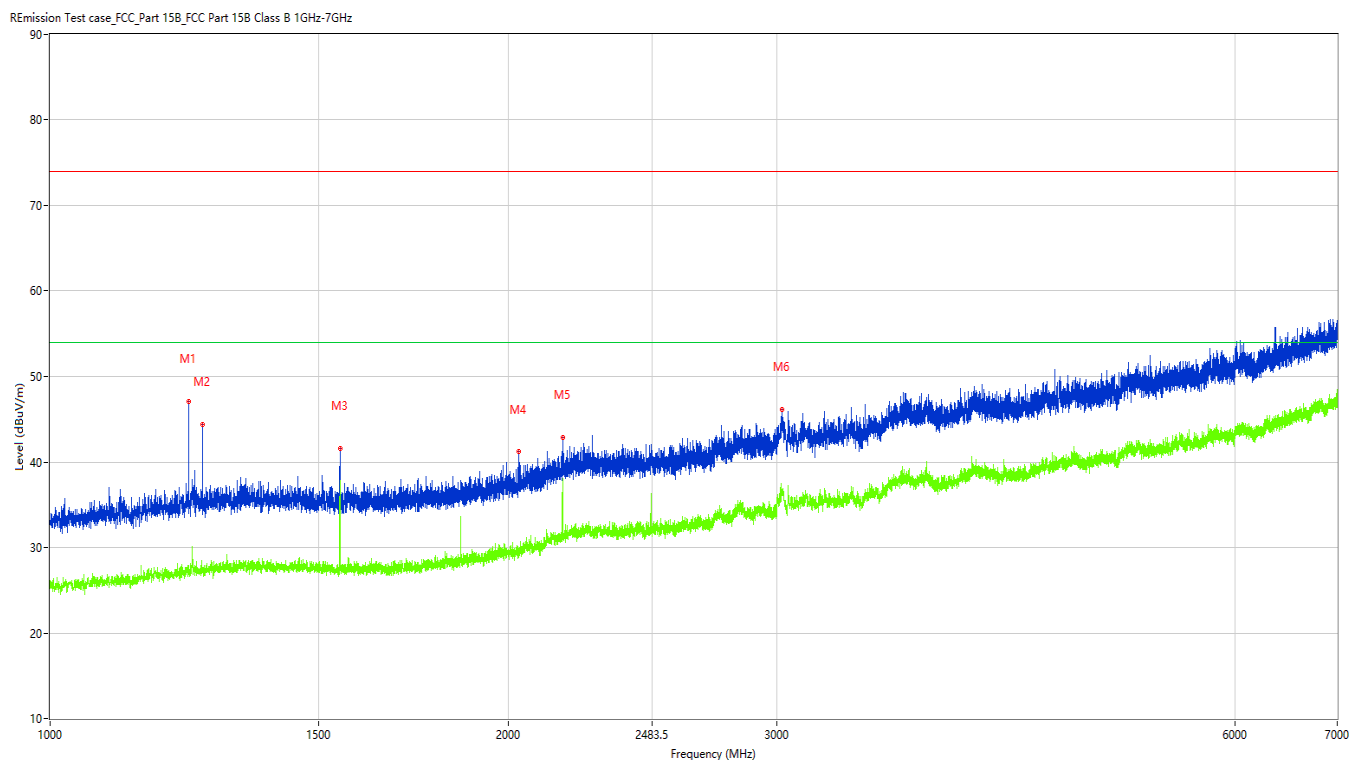
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Figure 24: Test plots of 310MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1233.250	47.09	-14.72	74.00	26.91	Peak	203.00	100	Vertical	Pass
1**	1233.250	27.08	-14.72	54.00	26.92	AV	203.00	100	Vertical	Pass
2	1258.750	44.43	-14.83	74.00	29.57	Peak	203.00	100	Vertical	Pass
2**	1258.750	27.27	-14.83	54.00	26.73	AV	203.00	100	Vertical	Pass
3	1550.000	41.61	-14.89	74.00	32.39	Peak	284.90	100	Vertical	Pass
3**	1550.000	37.83	-14.89	54.00	16.17	AV	284.90	100	Vertical	Pass
4	2030.250	41.19	-12.85	74.00	32.81	Peak	0.90	100	Vertical	Pass
4**	2030.250	29.63	-12.85	54.00	24.37	AV	0.90	100	Vertical	Pass
5	2170.250	42.81	-10.92	75.32	32.51	Peak	0.00	100	Vertical	Pass
5**	2170.250	37.74	-10.92	55.32	17.58	AV	0.00	100	Vertical	Pass
6	3024.000	46.17	-4.51	74.00	27.83	Peak	166.40	100	Vertical	Pass
6**	3024.000	36.17	-4.51	54.00	17.83	AV	166.40	100	Vertical	Pass

Result: Pass

Note:

- Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
- The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

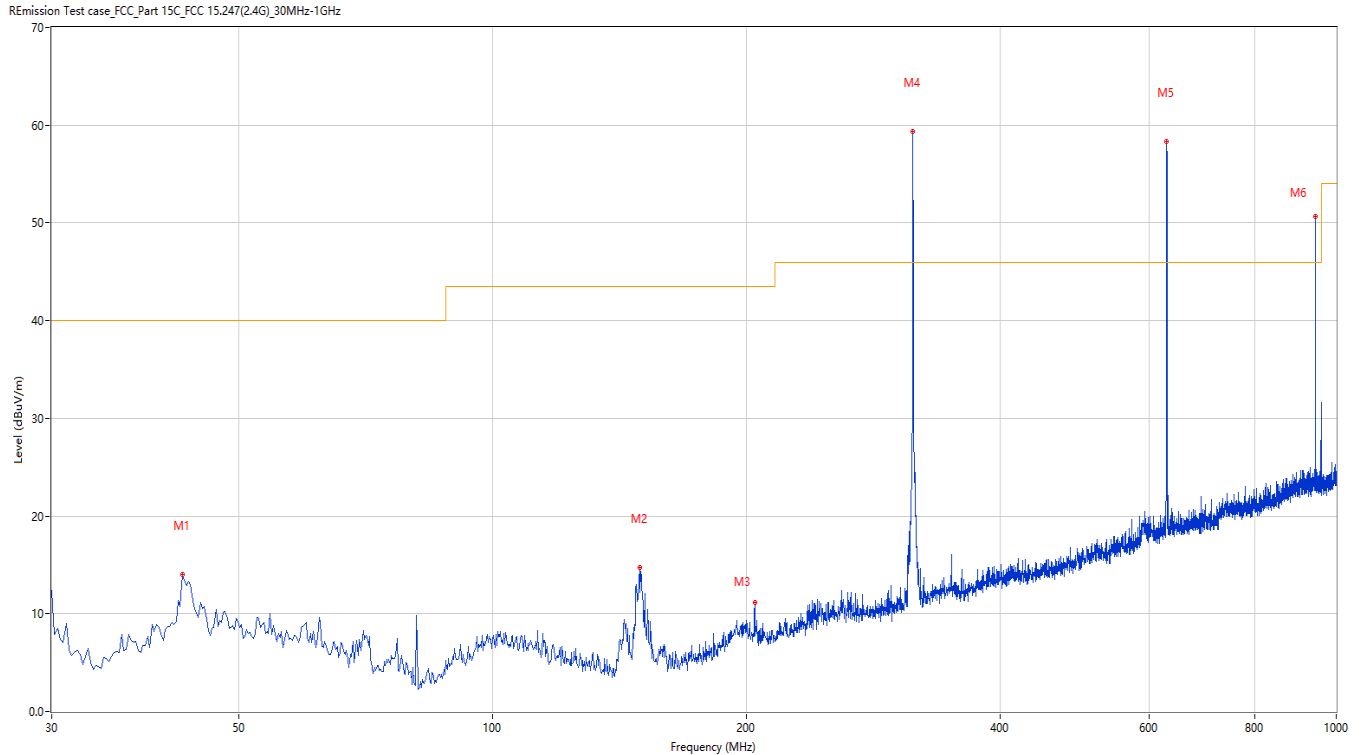
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Figure 25: Test plots of 315MHz

Radiated Emission Below 1GHz-Horizontal



Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-13.56.

TEST REPORT

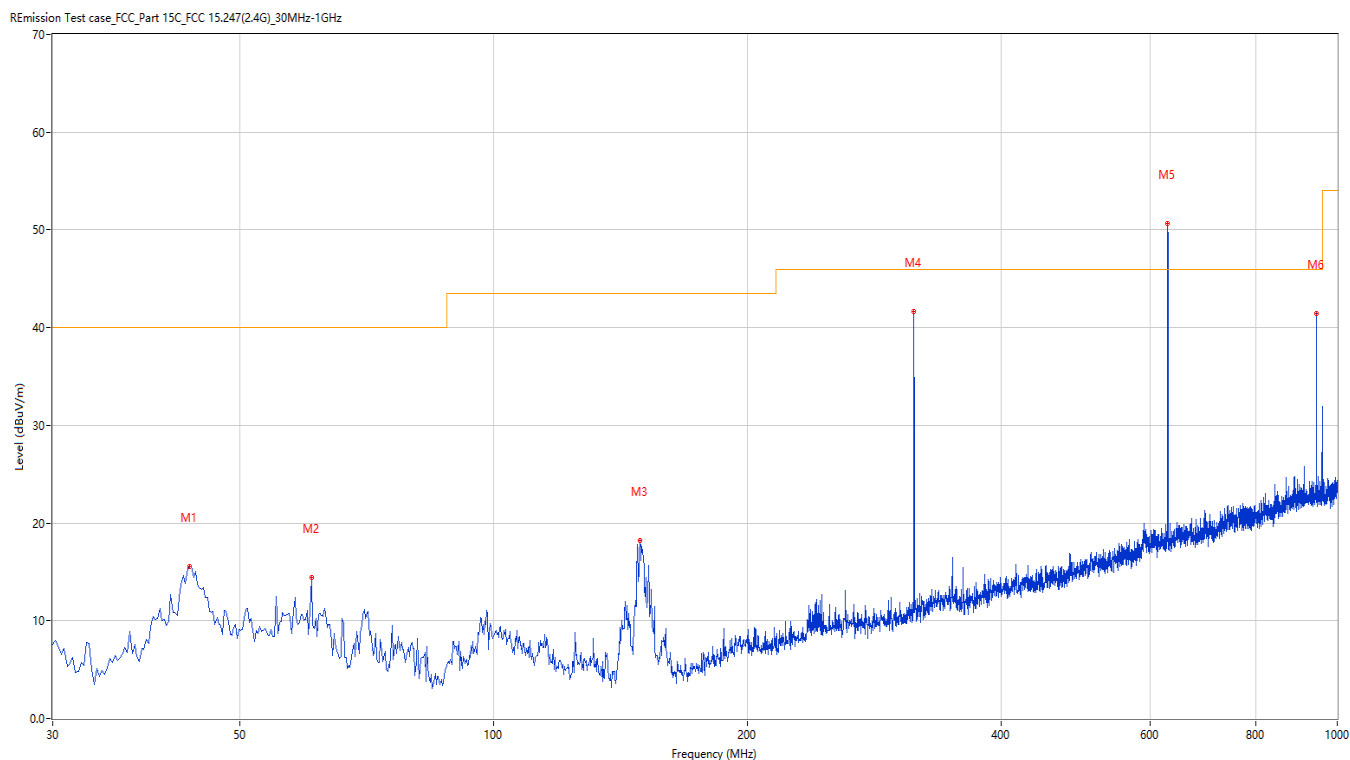
Report No.: SHE23010040-01AE

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Figure 26: Test plots of 315MHz

Radiated Emission Below 1GHz-Vertical



Result: Pass

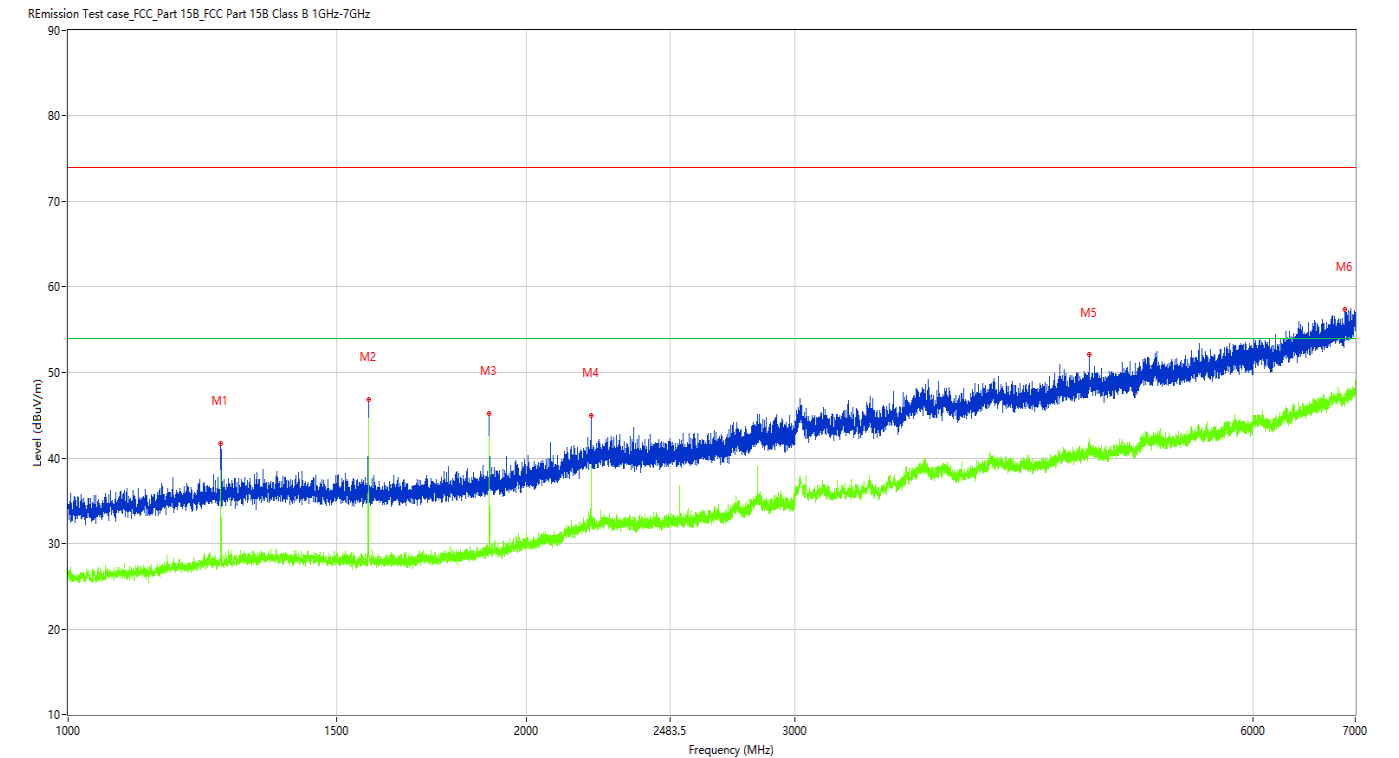
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-13.56.

TEST REPORT

Figure 27: Test plots of 315MHz

Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1260.000	41.75	-14.82	75.63	33.88	Peak	254.90	100	Horizontal	Pass
1**	1260.000	35.88	-14.82	55.63	19.75	AV	254.90	100	Horizontal	Pass
2	1575.000	46.87	-14.82	74.00	27.13	Peak	214.10	100	Horizontal	Pass
2**	1575.000	44.66	-14.82	54.00	9.34	AV	214.10	100	Horizontal	Pass
3	1890.250	45.23	-13.80	75.63	30.4	Peak	30.30	100	Horizontal	Pass
3**	1890.250	41.91	-13.80	55.63	13.72	AV	30.30	100	Horizontal	Pass
4	2205.000	44.99	-10.36	74.00	29.01	Peak	241.30	100	Horizontal	Pass
4**	2205.000	39.24	-10.36	54.00	14.76	AV	241.30	100	Horizontal	Pass
5	4683.500	52.07	-0.09	74.00	21.93	Peak	0.00	100	Horizontal	Pass
5**	4683.500	41.14	-0.09	54.00	12.86	AV	0.00	100	Horizontal	Pass
6	6891.500	57.36	5.10	74.00	16.64	Peak	220.10	100	Horizontal	Pass
6**	6891.500	47.16	5.10	54.00	6.84	AV	220.10	100	Horizontal	Pass

TEST REPORT

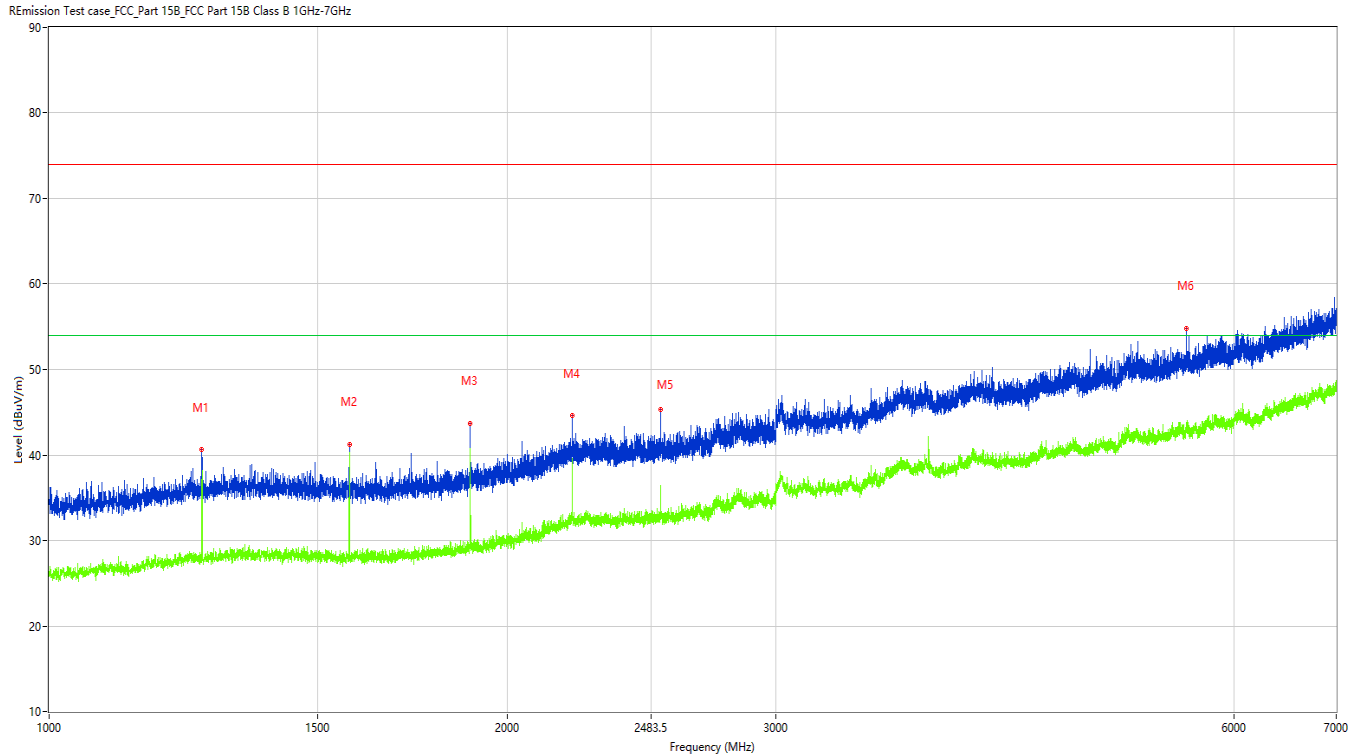
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Figure 28: Test plots of 315MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1260.000	40.60	-14.82	75.63	35.03	Peak	10.90	100	Vertical	Pass
1**	1260.000	36.09	-14.82	55.63	19.54	AV	10.90	100	Vertical	Pass
2	1574.750	41.28	-14.82	74.00	32.72	Peak	288.30	100	Vertical	Pass
2**	1574.750	39.64	-14.82	54.00	14.36	AV	288.30	100	Vertical	Pass
3	1890.250	43.74	-13.80	75.63	31.89	Peak	129.80	100	Vertical	Pass
3**	1890.250	39.52	-13.80	55.63	16.11	AV	129.80	100	Vertical	Pass
4	2205.000	44.58	-10.36	75.63	31.05	Peak	288.30	100	Vertical	Pass
4**	2205.000	39.54	-10.36	55.63	16.09	AV	288.30	100	Vertical	Pass
5	2520.750	45.34	-9.38	75.63	30.29	Peak	10.90	100	Vertical	Pass
5**	2520.750	34.52	-9.38	55.63	21.11	AV	10.90	100	Vertical	Pass
6	5582.000	54.82	1.43	74.00	19.18	Peak	241.40	100	Vertical	Pass
6**	5582.000	43.76	1.43	54.00	10.24	AV	241.40	100	Vertical	Pass

Result: Pass

Note:

- Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
- The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

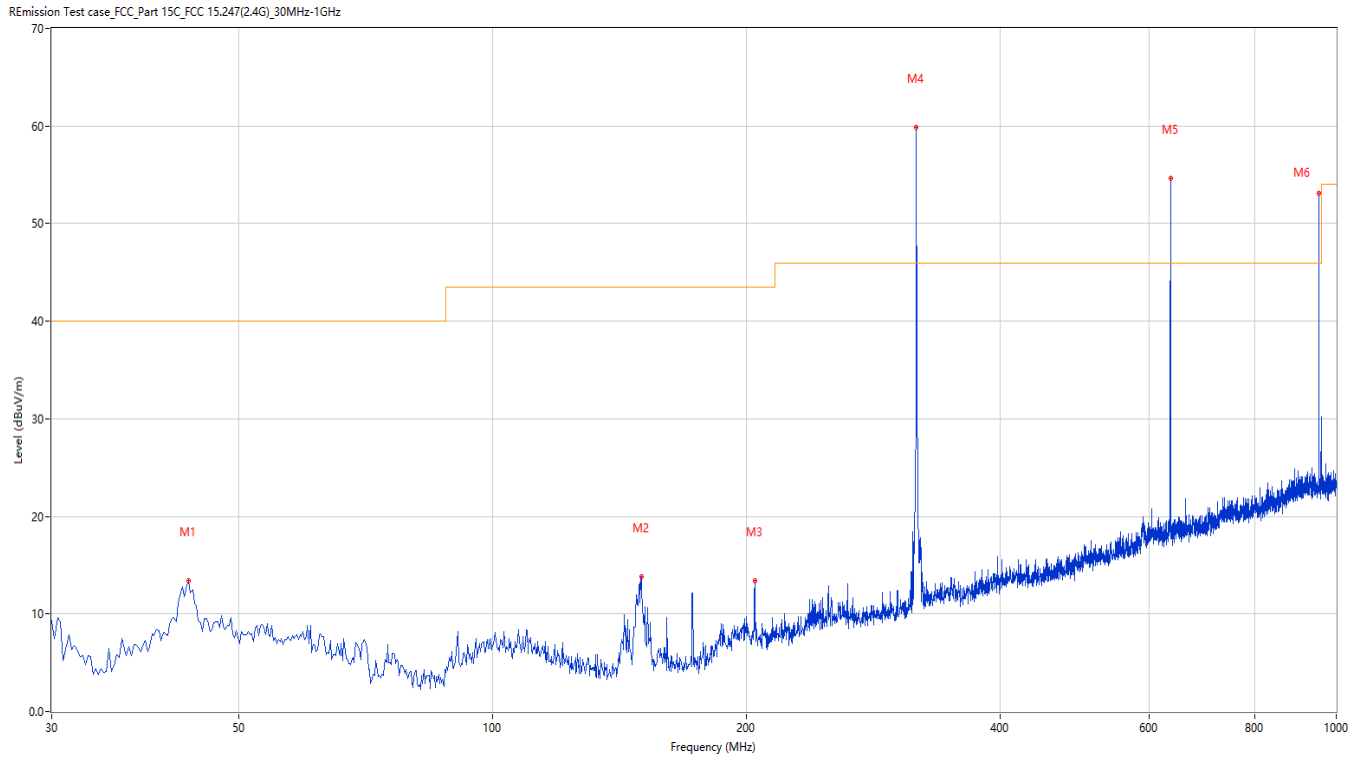
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Figure 29: Test plots of 318MHz

Radiated Emission Below 1GHz-Horizontal



Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-15.39.

TEST REPORT

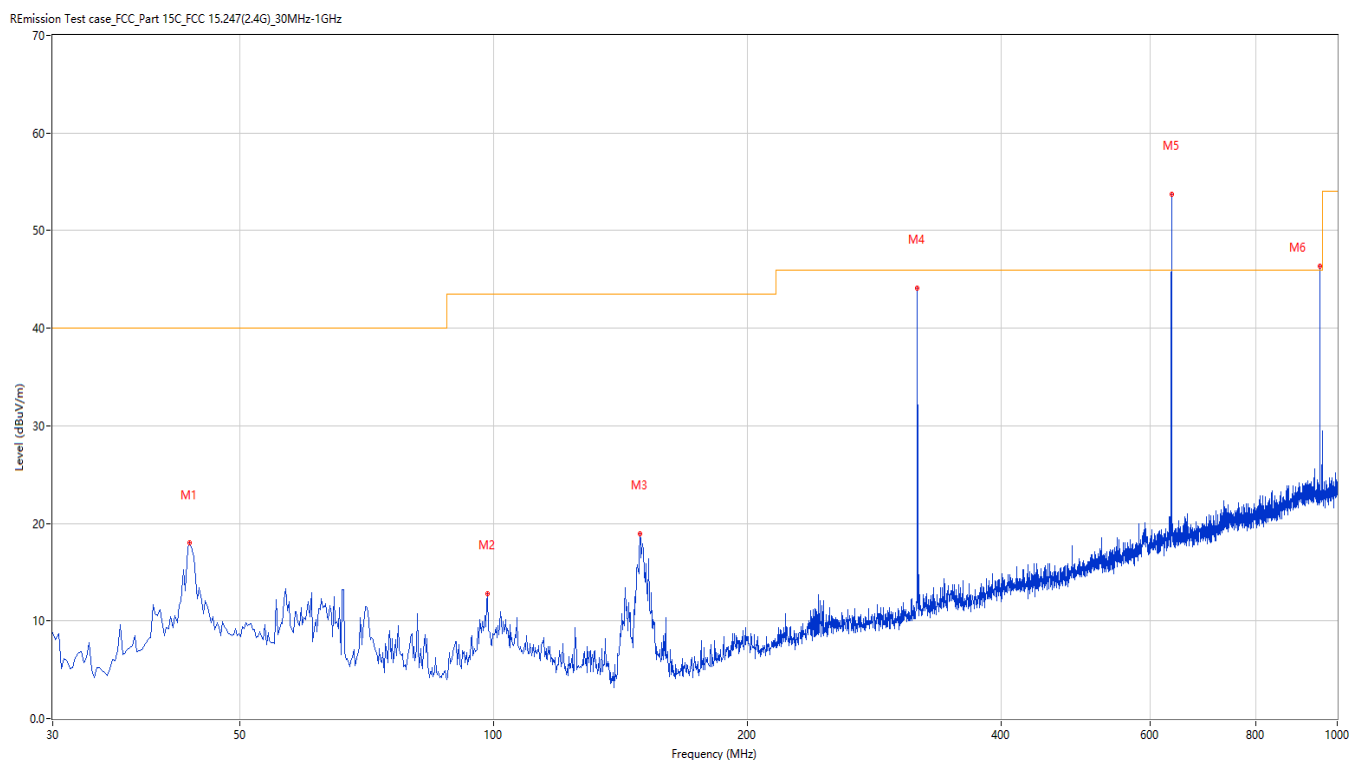
Report No.: SHE23010040-01AE

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Figure 30: Test plots of 318MHz

Radiated Emission Below 1GHz-Vertical



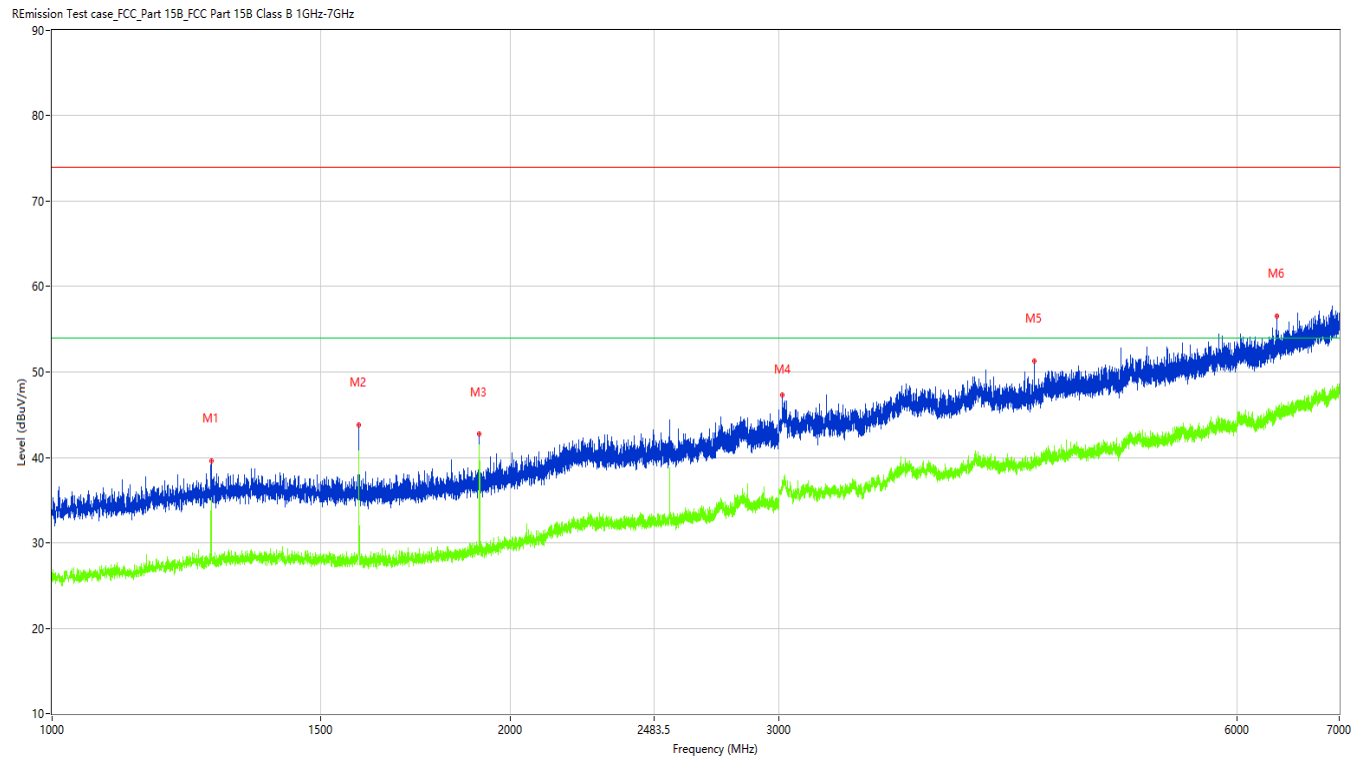
Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-15.39.

TEST REPORT

Figure 31: Test plots of 318MHz
Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1271.750	39.64	-14.55	75.80	36.16	Peak	291.90	100	Horizontal	Pass
1**	1271.750	34.53	-14.55	55.80	21.27	AV	291.90	100	Horizontal	Pass
2	1590.000	43.78	-14.85	74.00	30.22	Peak	246.80	100	Horizontal	Pass
2**	1590.000	40.71	-14.85	54.00	13.29	AV	246.80	100	Horizontal	Pass
3	1907.500	42.69	-13.72	75.80	33.11	Peak	114.00	100	Horizontal	Pass
3**	1907.500	30.50	-13.72	55.80	25.3	AV	114.00	100	Horizontal	Pass
4	3015.500	47.34	-4.73	74.00	26.66	Peak	22.10	100	Horizontal	Pass
4**	3015.500	37.34	-4.73	54.00	16.66	AV	22.10	100	Horizontal	Pass
5	4415.000	51.29	-1.16	74.00	22.71	Peak	88.50	100	Horizontal	Pass
5**	4415.000	39.06	-1.16	54.00	14.94	AV	88.50	100	Horizontal	Pass
6	6373.500	56.57	3.56	74.00	17.43	Peak	101.80	100	Horizontal	Pass
6**	6373.500	45.28	3.56	54.00	8.72	AV	101.80	100	Horizontal	Pass

TEST REPORT

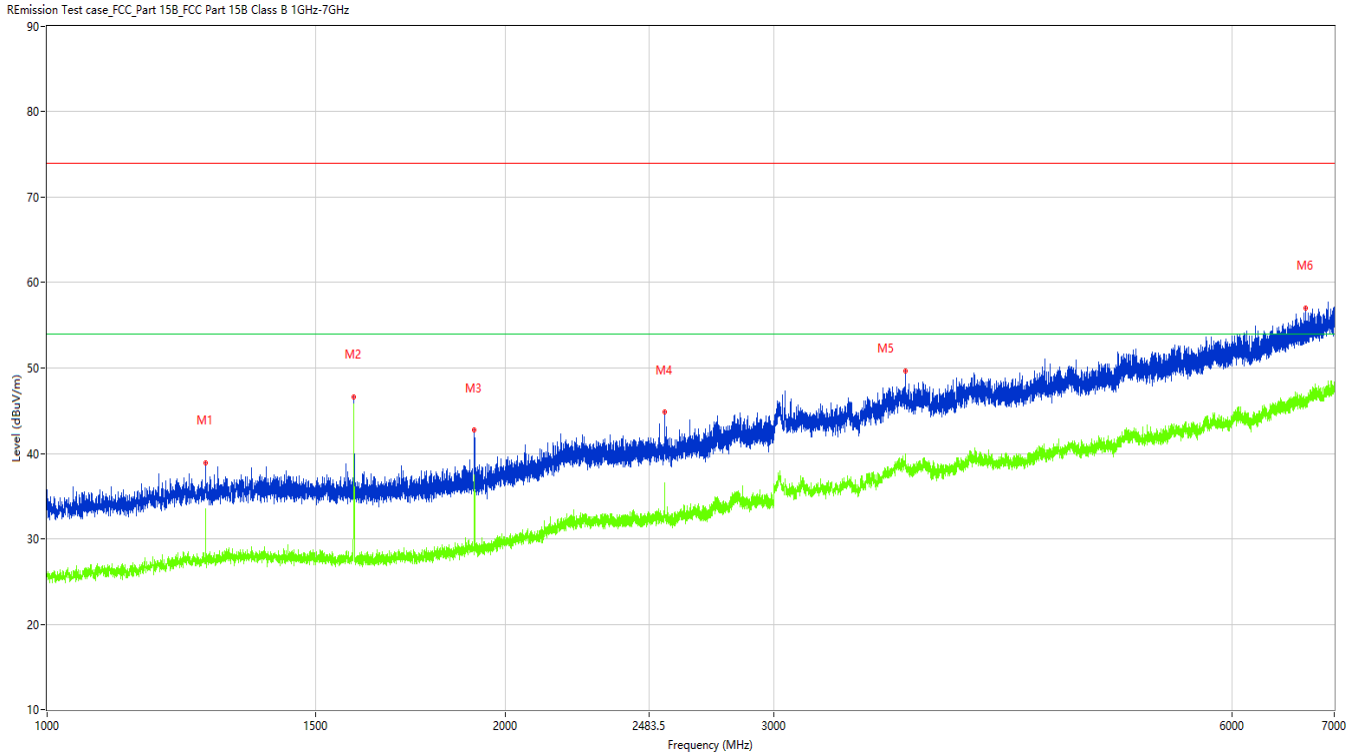
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Figure 32: Test plots of 318MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1271.250	38.87	-14.55	75.80	36.93	Peak	45.30	100	Vertical	Pass
1**	1271.250	33.56	-14.55	55.80	22.24	AV	45.30	100	Vertical	Pass
2	1589.750	46.59	-14.85	74.00	27.41	Peak	84.20	100	Vertical	Pass
2**	1589.750	45.36	-14.85	54.00	8.64	AV	84.20	100	Vertical	Pass
3	1908.250	42.72	-13.72	75.80	33.08	Peak	125.00	100	Vertical	Pass
3**	1908.250	36.98	-13.72	55.80	18.82	AV	125.00	100	Vertical	Pass
4	2544.000	44.81	-9.35	75.80	30.99	Peak	110.80	100	Vertical	Pass
4**	2544.000	36.52	-9.35	55.80	19.28	AV	110.80	100	Vertical	Pass
5	3660.000	49.61	-1.62	74.00	24.39	Peak	127.30	100	Vertical	Pass
5**	3660.000	39.90	-1.62	54.00	14.1	AV	127.30	100	Vertical	Pass
6	6703.500	56.99	4.48	74.00	17.01	Peak	360.00	100	Vertical	Pass
6**	6703.500	46.65	4.48	54.00	7.35	AV	360.00	100	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

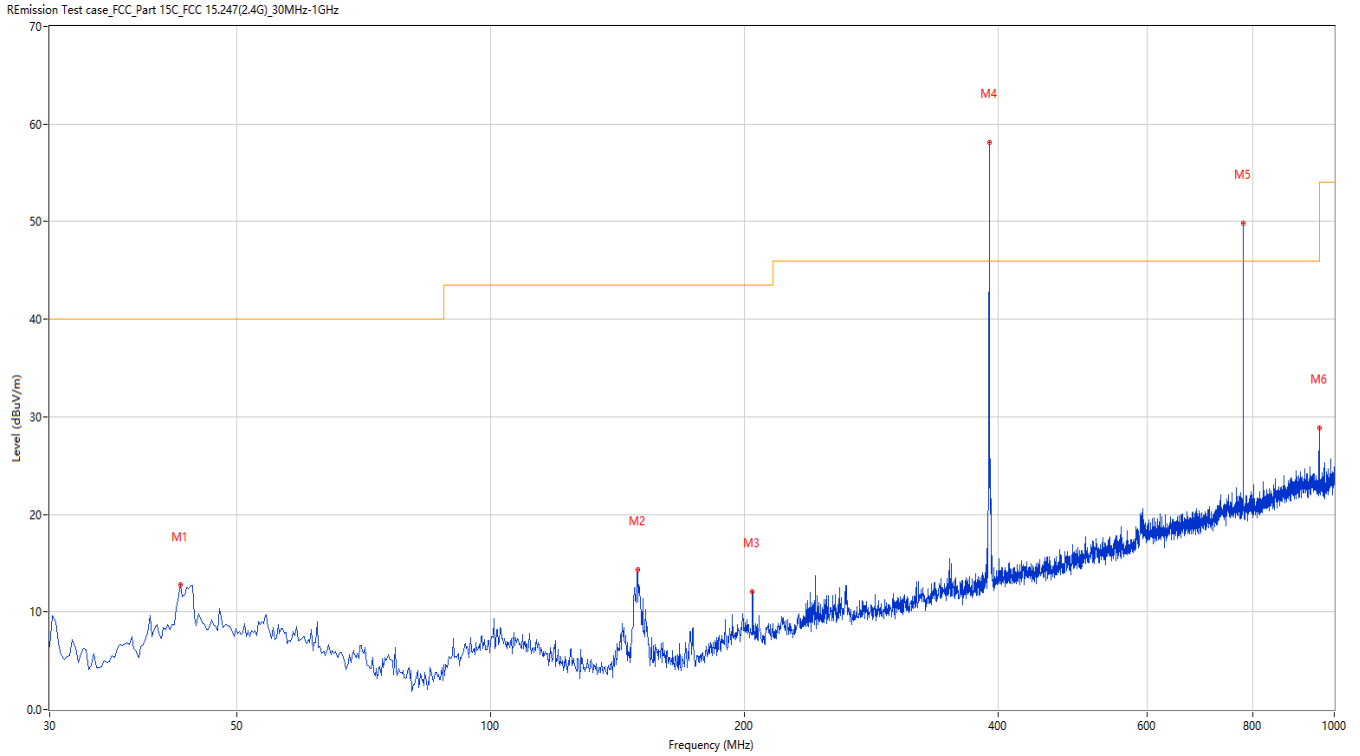
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Figure 33: Test plots of 390MHz

Radiated Emission Below 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	42.849	12.74	-25.52	40.0	27.26	Peak	59.70	100	Horizontal	Pass
2	149.280	14.38	-29.96	43.5	29.12	Peak	143.90	200	Horizontal	Pass
3	204.314	12.11	-26.67	43.5	31.39	Peak	0.00	200	Horizontal	Pass
4	389.780	58.11	-21.25	99.25	41.14	Peak	232.60	100	Horizontal	Pass
4*	389.780	45.71	-21.25	79.25	33.54	AV	232.60	100	Horizontal	Pass
5	779.865	49.87	-12.58	79.25	29.38	Peak	288.80	100	Horizontal	Pass
5*	779.865	37.47	-12.58	59.25	21.78	AV	288.80	100	Horizontal	Pass
6	959.755	28.90	-9.31	46.0	17.10	Peak	0.00	200	Horizontal	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-12.40.

TEST REPORT

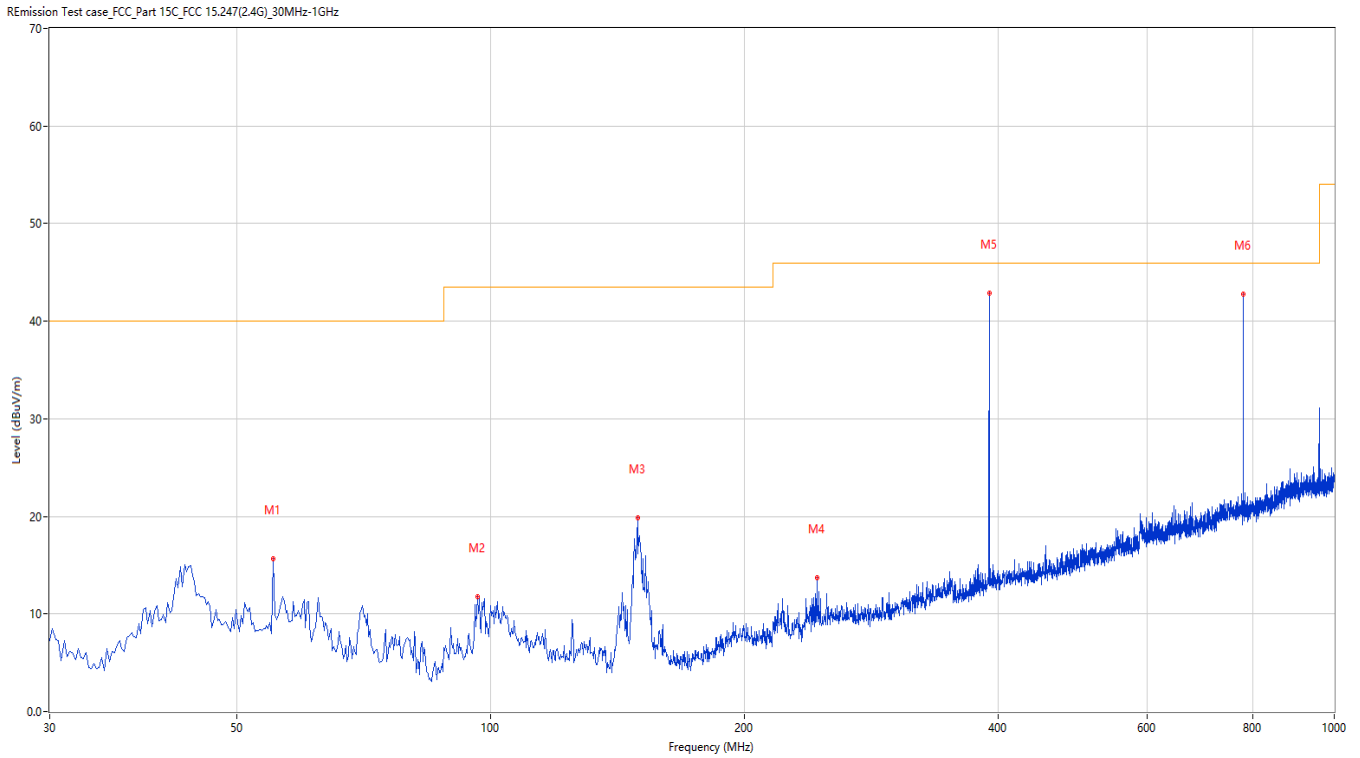
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Figure 34: Test plots of 390MHz

Radiated Emission Below 1GHz-Vertical



Result: Pass

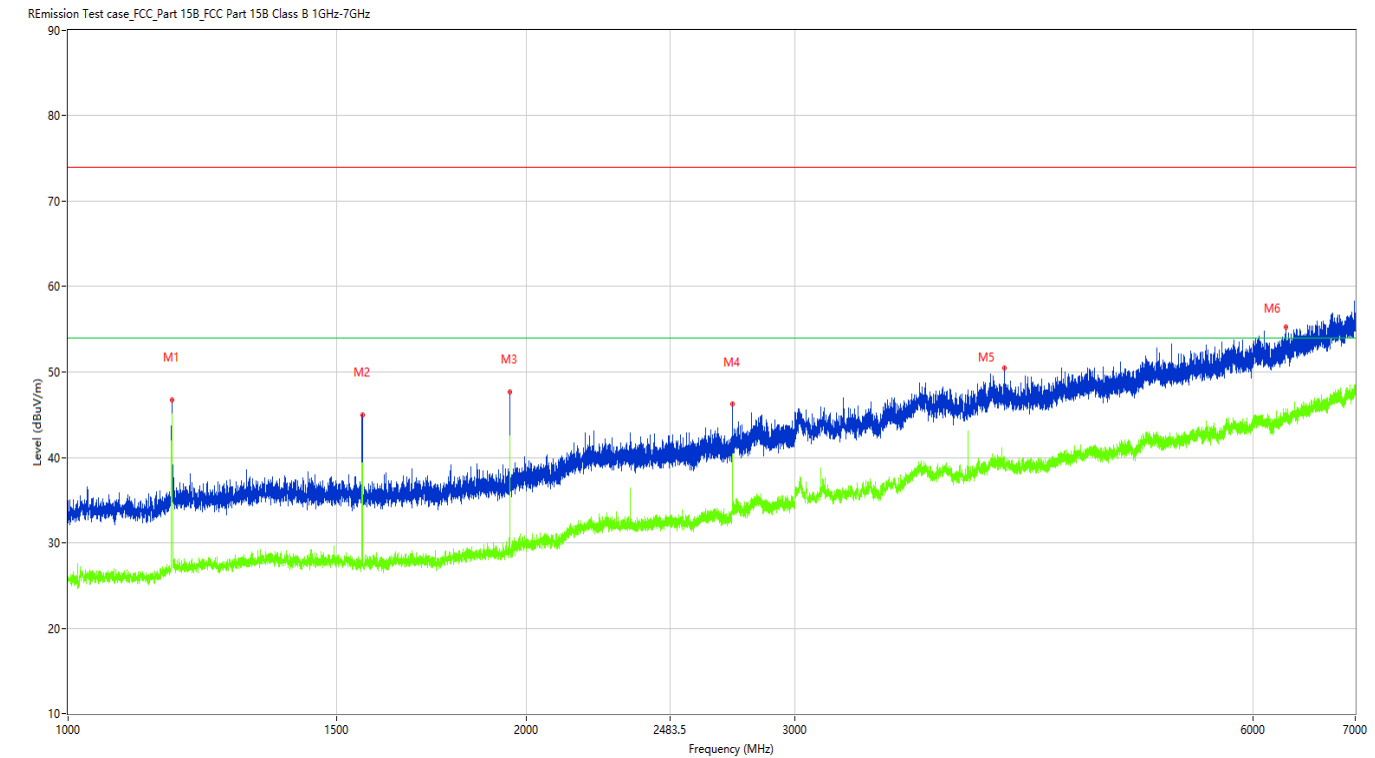
Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-12.40.

TEST REPORT

Figure 35: Test plots of 390MHz

Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1170.000	46.70	-15.00	74.00	27.30	Peak	111.00	100	Horizontal	Pass
1**	1170.000	45.12	-15.00	54.00	8.88	AV	111.00	100	Horizontal	Pass
2	1560.000	44.98	-14.86	74.00	29.02	Peak	272.30	100	Horizontal	Pass
2**	1560.000	39.33	-14.86	54.00	14.67	AV	272.30	100	Horizontal	Pass
3	1950.250	47.61	-13.45	79.25	31.64	Peak	111.00	100	Horizontal	Pass
3**	1950.250	36.83	-13.45	59.25	22.42	AV	111.00	100	Horizontal	Pass
4	2730.000	46.22	-7.99	74.00	27.78	Peak	272.30	100	Horizontal	Pass
4**	2730.000	38.77	-7.99	54.00	15.23	AV	272.30	100	Horizontal	Pass
5	4120.000	50.44	-1.21	74.00	23.56	Peak	139.50	100	Horizontal	Pass
5**	4120.000	40.10	-1.21	54.00	13.9	AV	139.50	100	Horizontal	Pass
6	6300.500	55.21	3.39	74.00	18.79	Peak	57.70	100	Horizontal	Pass
6**	6300.500	44.68	3.39	54.00	9.32	AV	57.70	100	Horizontal	Pass

TEST REPORT

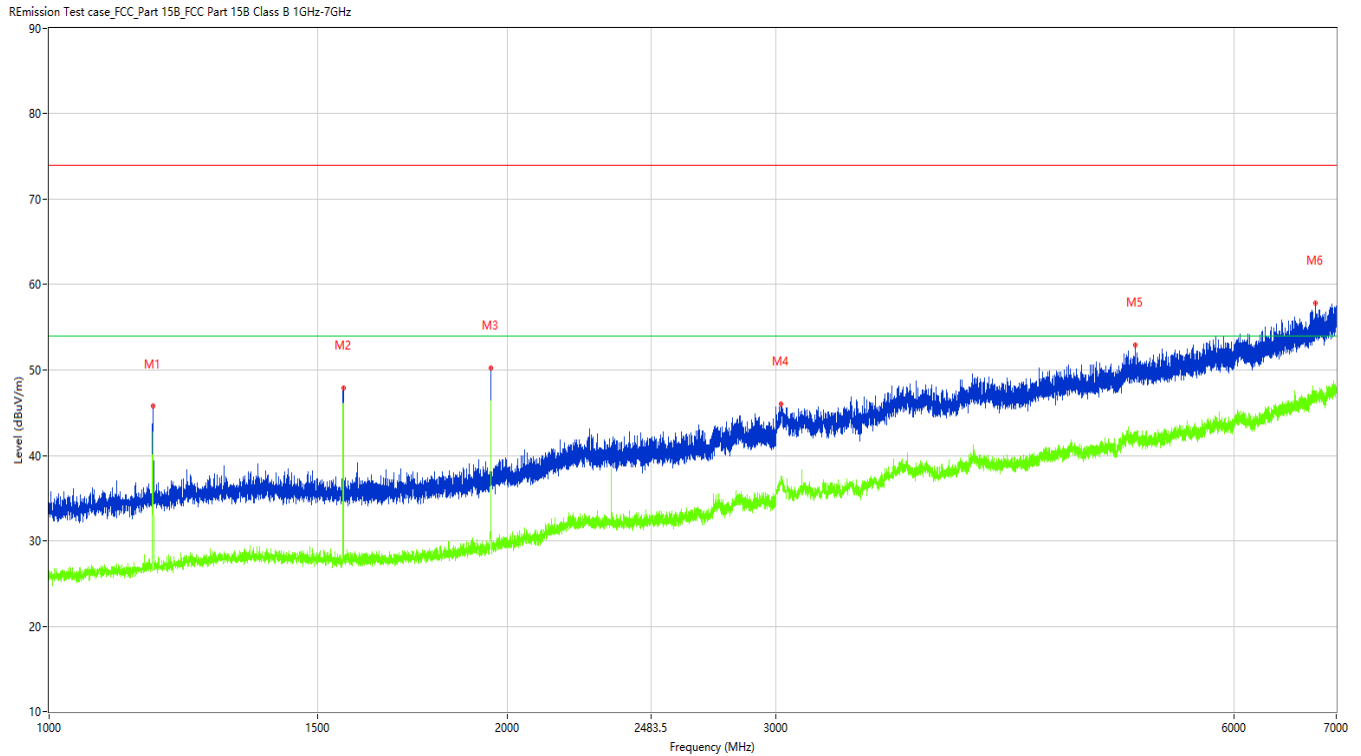
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Figure 36: Test plots of 390MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1170.000	45.76	-15.00	74.00	28.24	Peak	360.00	100	Vertical	Pass
1**	1170.000	42.72	-15.00	54.00	11.28	AV	360.00	100	Vertical	Pass
2	1560.000	47.91	-14.86	74.00	26.09	Peak	289.20	100	Vertical	Pass
2**	1560.000	46.20	-14.86	54.00	7.80	AV	289.20	100	Vertical	Pass
3	1949.750	50.26	-13.46	79.25	28.99	Peak	100.30	100	Vertical	Pass
3**	1949.750	45.68	-13.46	59.25	13.57	AV	100.30	100	Vertical	Pass
4	3025.500	46.02	-4.47	74.00	27.98	Peak	34.80	100	Vertical	Pass
4**	3025.500	37.59	-4.47	54.00	16.41	AV	34.80	100	Vertical	Pass
5	5163.000	52.90	1.13	74.00	21.10	Peak	34.80	100	Vertical	Pass
5**	5163.000	42.00	1.13	54.00	12.00	AV	34.80	100	Vertical	Pass
6	6787.500	57.84	5.20	74.00	16.16	Peak	184.00	100	Vertical	Pass
6**	6787.500	47.31	5.20	54.00	6.69	AV	184.00	100	Vertical	Pass

Result: Pass

Note:

- Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
- The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

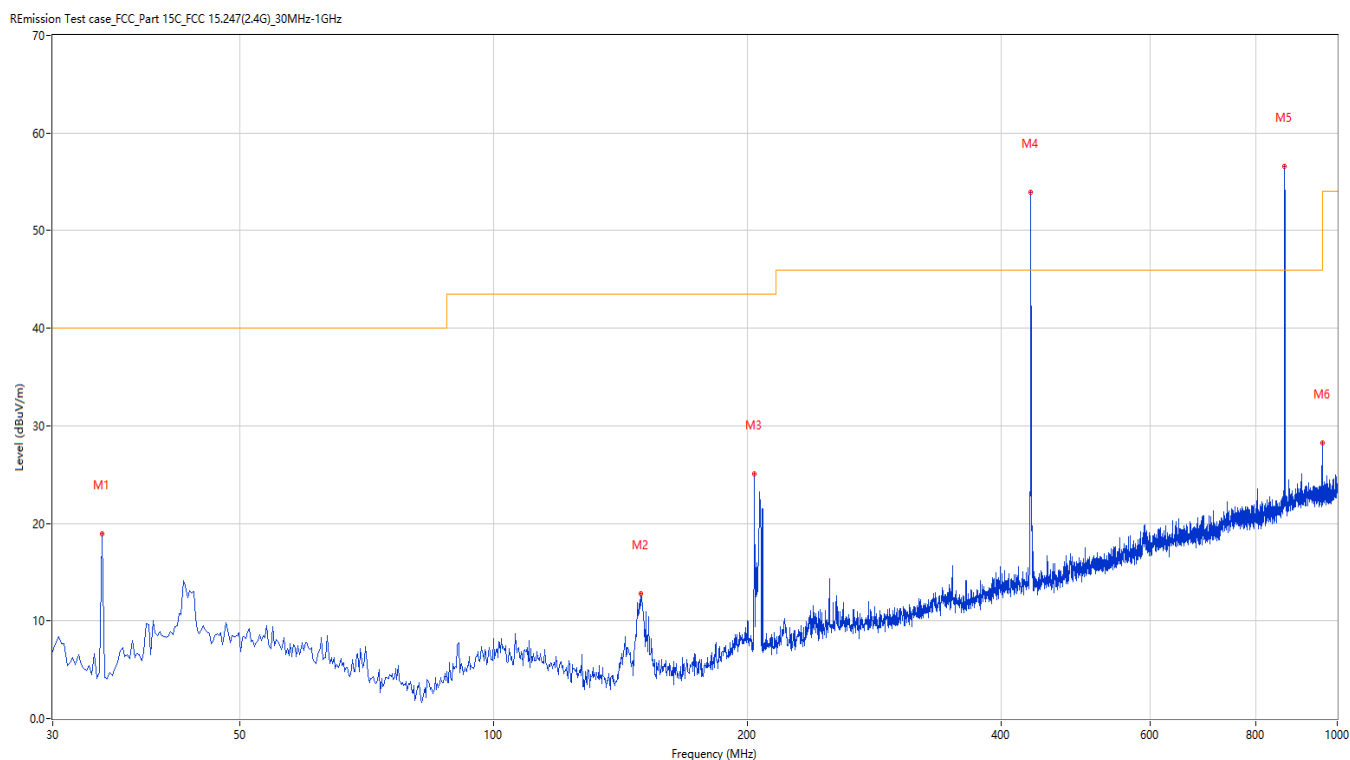
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Figure 37: Test plots of 433.42MHz

Radiated Emission Below 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	34.364	18.96	-28.28	40.0	21.04	Peak	0.00	200	Horizontal	Pass
2	149.280	12.80	-29.96	43.5	30.70	Peak	106.10	200	Horizontal	Pass
3	203.829	25.04	-26.63	43.5	18.46	Peak	0.40	100	Horizontal	Pass
4	433.419	53.90	-20.29	100.81	46.91	Peak	252.50	100	Horizontal	Pass
4*	433.419	48.02	-20.29	80.81	32.79	AV	252.50	100	Horizontal	Pass
5	866.658	56.64	-10.59	80.81	24.17	Peak	145.30	200	Horizontal	Pass
5*	866.658	50.76	-10.59	60.81	10.05	AV	145.30	200	Horizontal	Pass
6	959.513	28.27	-9.31	46.0	17.73	Peak	327.90	100	Horizontal	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-5.88.

TEST REPORT

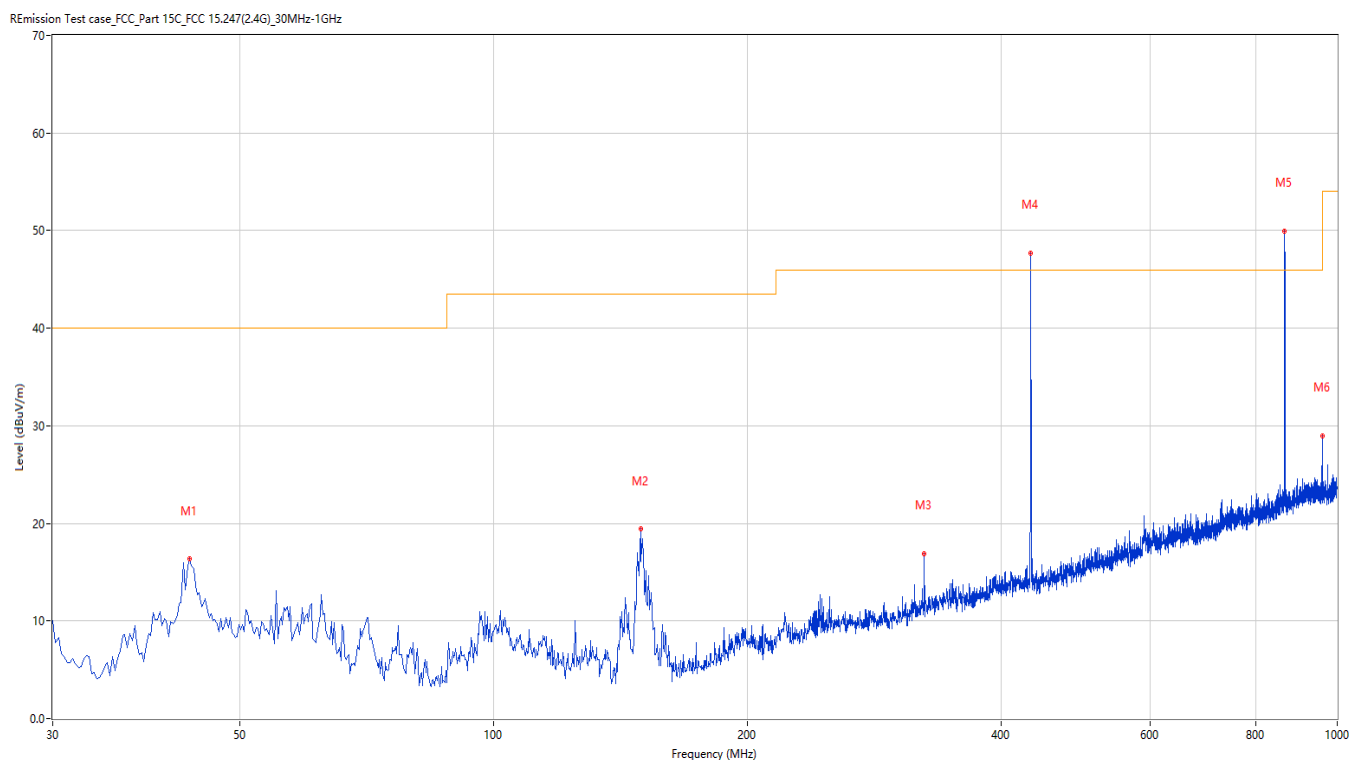
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Figure 38: Test plots of 433.42MHz

Radiated Emission Below 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.577	16.33	-25.41	40.0	23.67	Peak	2.30	100	Vertical	Pass
2	149.280	19.39	-29.96	43.5	24.11	Peak	170.10	100	Vertical	Pass
3	323.837	16.91	-22.97	46.0	29.09	Peak	0.00	200	Vertical	Pass
4	433.419	47.69	-20.29	100.81	53.12	Peak	26.50	100	Vertical	Pass
4*	433.419	41.81	-20.29	80.81	39.00	AV	26.50	100	Vertical	Pass
5	866.658	49.93	-10.59	80.81	30.88	Peak	93.80	100	Vertical	Pass
5*	866.658	44.05	-10.59	60.81	16.76	AV	93.80	100	Vertical	Pass
6	959.513	28.99	-9.31	46.0	17.01	Peak	329.20	100	Vertical	Pass

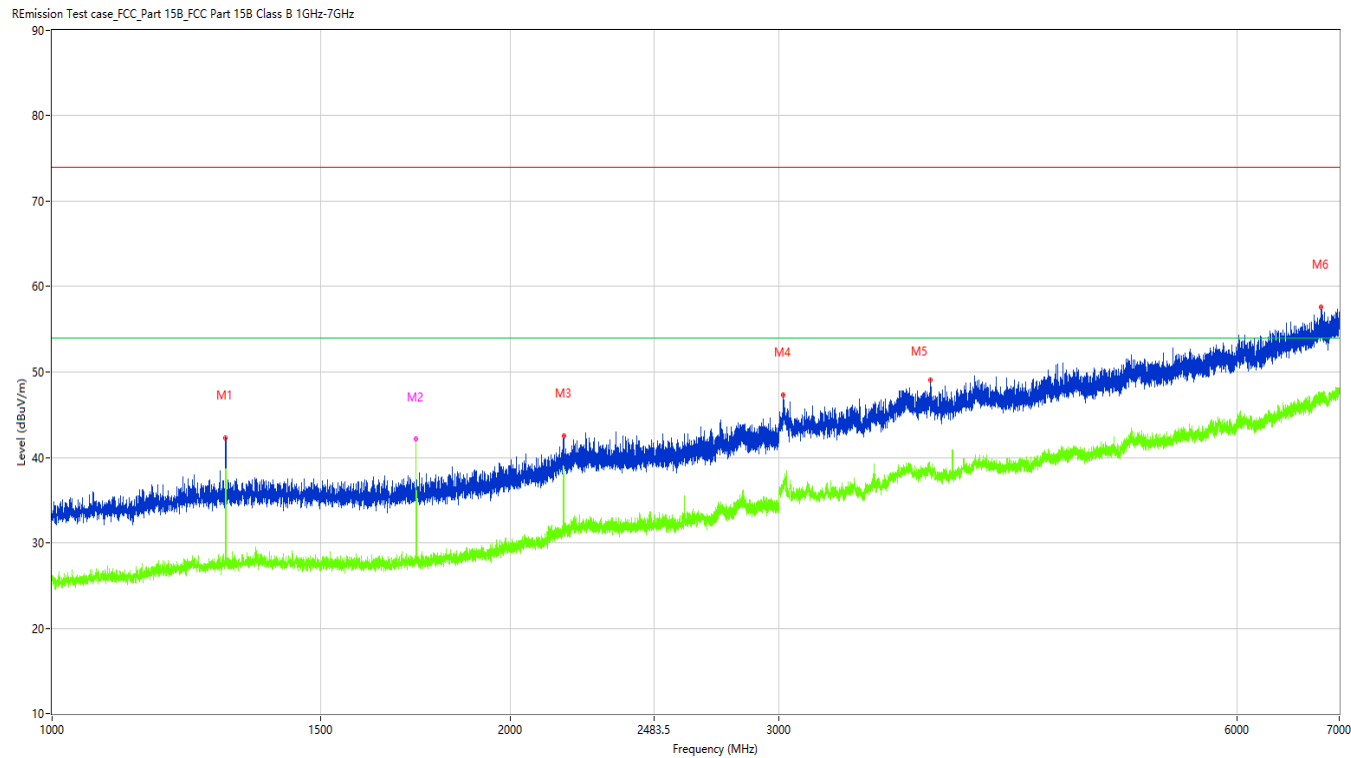
Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-5.88.

TEST REPORT

Figure 39: Test plots of 433.42MHz
Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1299.750	42.29	-14.42	80.81	38.52	Peak	6.20	100	Horizontal	Pass
1**	1299.750	36.81	-14.42	60.81	24.00	AV	6.20	100	Horizontal	Pass
2	1733.750	39.05	-14.47	80.81	41.76	Peak	231.80	100	Horizontal	Pass
2**	1733.750	42.13	-14.47	60.81	18.68	AV	231.80	100	Horizontal	Pass
3	2167.000	42.54	-10.94	80.81	38.27	Peak	142.50	100	Horizontal	Pass
3**	2167.000	38.68	-10.94	60.81	22.13	AV	142.50	100	Horizontal	Pass
4	3020.500	47.29	-4.61	74.00	26.71	Peak	169.40	100	Horizontal	Pass
4**	3020.500	36.69	-4.61	54.00	17.31	AV	169.40	100	Horizontal	Pass
5	3770.500	49.08	-1.77	74.00	24.92	Peak	0.00	100	Horizontal	Pass
5**	3770.500	38.43	-1.77	54.00	15.57	AV	0.00	100	Horizontal	Pass
6	6813.500	57.57	5.13	74.00	16.43	Peak	313.30	100	Horizontal	Pass
6**	6813.500	46.44	5.13	54.00	7.56	AV	313.30	100	Horizontal	Pass

TEST REPORT

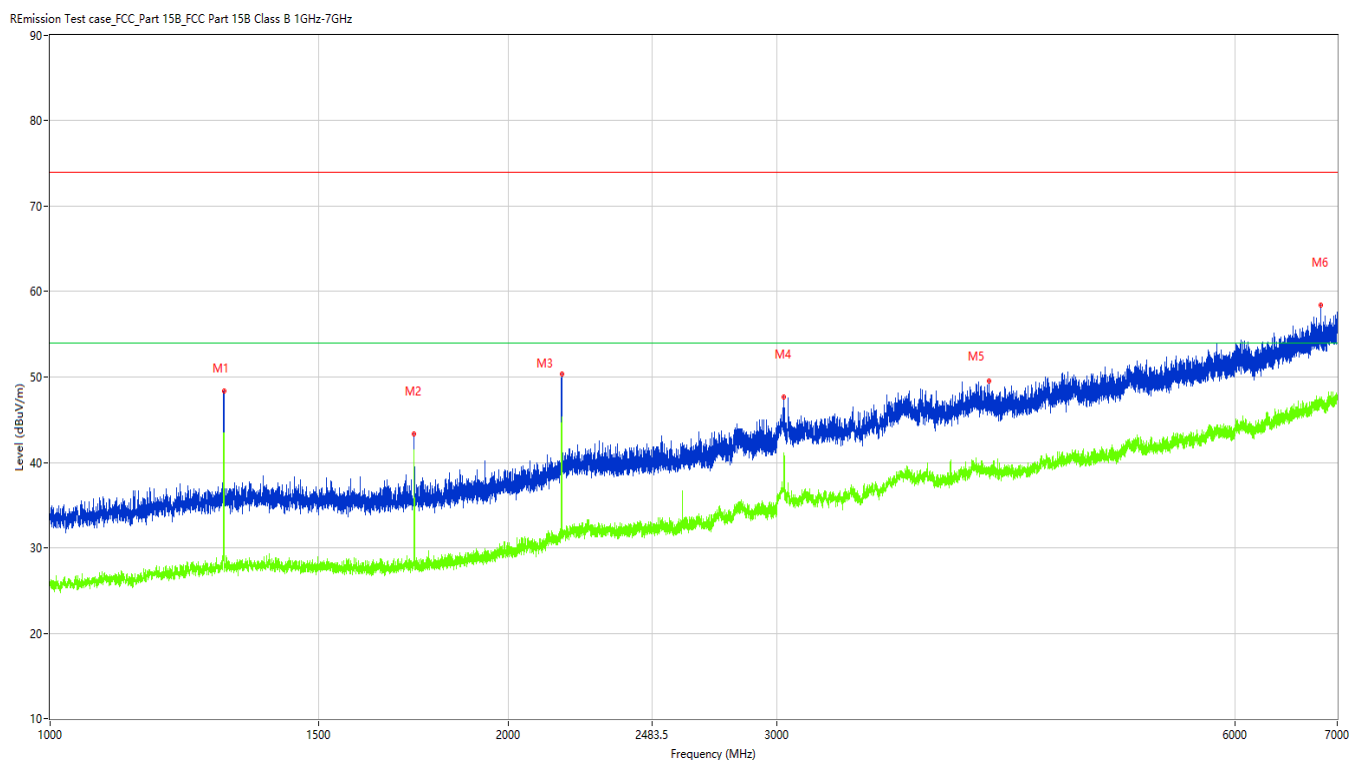
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Figure 40: Test plots of 433.42MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1300.250	48.35	-14.42	74.00	25.65	Peak	132.30	100	Vertical	Pass
1**	1300.250	43.50	-14.42	54.00	10.50	AV	132.30	100	Vertical	Pass
2	1733.500	43.39	-14.47	80.81	37.42	Peak	50.10	100	Vertical	Pass
2**	1733.500	41.50	-14.47	60.81	19.31	AV	50.10	100	Vertical	Pass
3	2167.000	50.33	-10.94	80.81	30.48	Peak	223.40	100	Vertical	Pass
3**	2167.000	45.33	-10.94	60.81	15.48	AV	223.40	100	Vertical	Pass
4	3033.500	47.63	-4.44	80.81	33.18	Peak	220.40	100	Vertical	Pass
4**	3033.500	41.16	-4.44	60.81	19.65	AV	220.40	100	Vertical	Pass
5	4134.000	49.54	-1.29	74.00	24.46	Peak	101.80	100	Vertical	Pass
5**	4134.000	39.15	-1.29	54.00	14.85	AV	101.80	100	Vertical	Pass
6	6830.500	58.44	5.09	74.00	15.56	Peak	101.80	100	Vertical	Pass
6**	6830.500	47.02	5.09	54.00	6.98	AV	101.80	100	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

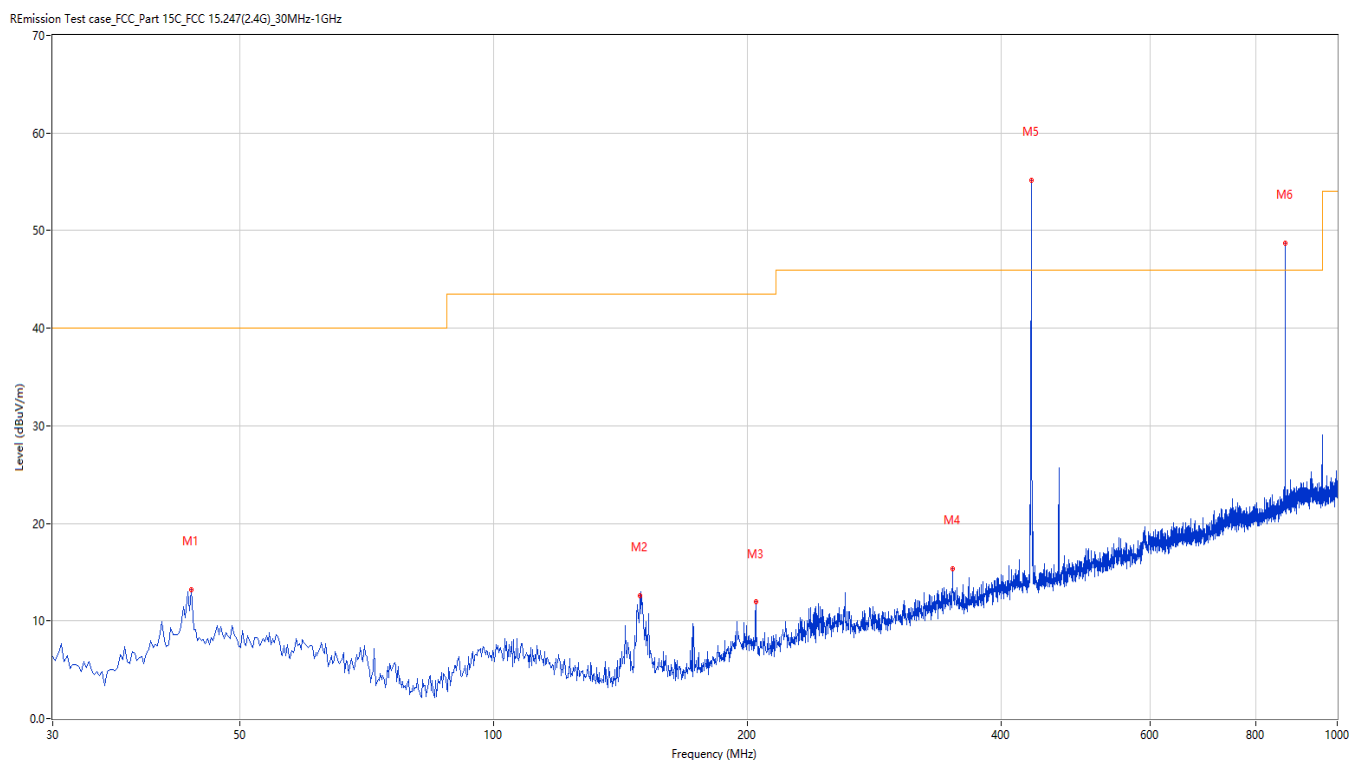
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Figure 41: Test plots of 433.92MHz

Radiated Emission Below 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.819	13.17	-25.37	40.0	26.83	Peak	59.20	200	Horizontal	Pass
2	149.038	12.59	-29.97	43.5	30.91	Peak	189.90	100	Horizontal	Pass
3	204.556	11.93	-26.69	43.5	31.57	Peak	159.90	100	Horizontal	Pass
4	349.778	15.39	-21.67	46.0	30.61	Peak	0.00	200	Horizontal	Pass
5	433.904	55.13	-20.27	100.83	45.70	Peak	273.70	100	Horizontal	Pass
5*	433.904	47.21	-20.27	80.83	33.62	AV	273.70	100	Horizontal	Pass
6	867.628	48.68	-10.55	80.83	32.15	Peak	127.10	200	Horizontal	Pass
6*	867.628	40.76	-10.55	60.83	20.07	AV	127.10	200	Horizontal	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-7.92.

TEST REPORT

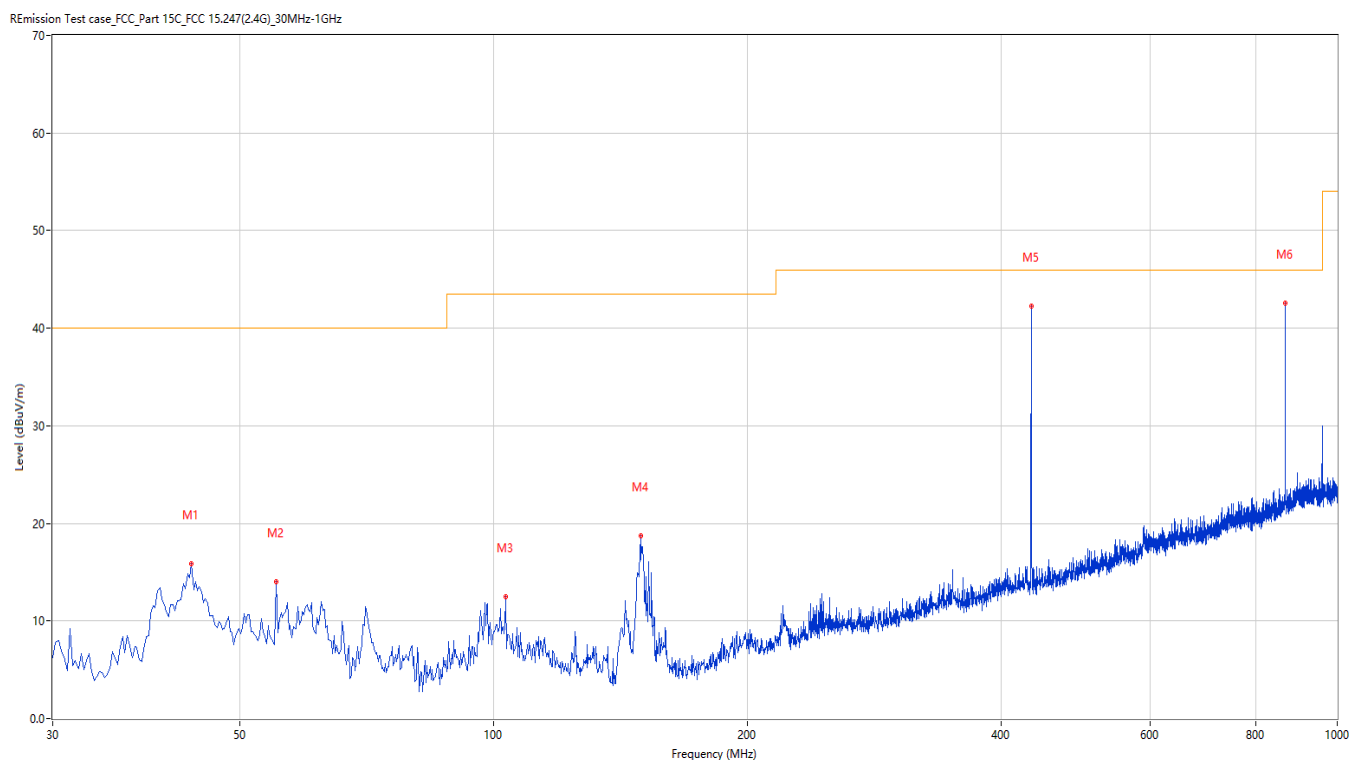
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Figure 42: Test plots of 433.92MHz

Radiated Emission Below 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.819	15.83	-25.37	40.0	24.17	Peak	161.80	100	Vertical	Pass
2	55.214	14.05	-25.42	40.0	25.95	Peak	0.00	200	Vertical	Pass
3	103.217	12.45	-26.55	43.5	31.05	Peak	0.00	200	Vertical	Pass
4	149.280	18.73	-29.96	43.5	24.77	Peak	0.00	200	Vertical	Pass
5	433.904	42.23	-20.27	100.83	58.60	Peak	0.00	200	Vertical	Pass
5*	433.904	34.31	-20.27	80.83	46.52	AV	0.00	200	Vertical	Pass
6	867.628	42.58	-10.55	80.83	38.25	Peak	194.20	100	Vertical	Pass
6*	867.628	34.66	-10.55	60.83	26.17	AV	194.20	100	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-7.92.

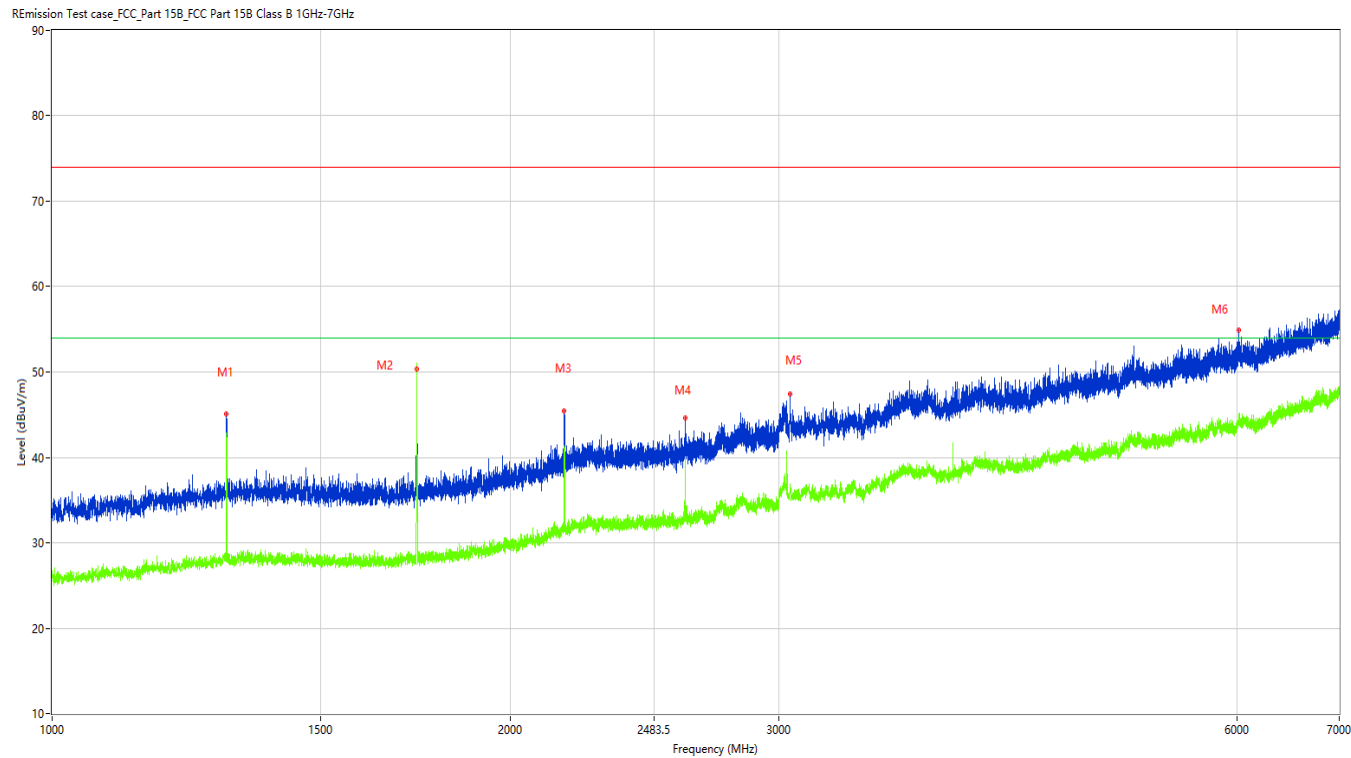
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Figure 43: Test plots of 433.92MHz
Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1301.500	45.04	-14.42	74.00	28.96	Peak	51.70	100	Horizontal	Pass
1**	1301.500	42.70	-14.42	54.00	11.30	AV	51.70	100	Horizontal	Pass
2	1735.500	50.41	-14.45	80.83	30.42	Peak	237.30	100	Horizontal	Pass
2**	1735.500	50.85	-14.45	60.83	9.98	AV	237.30	100	Horizontal	Pass
3	2169.250	45.47	-10.92	80.83	35.36	Peak	266.70	100	Horizontal	Pass
3**	2169.250	40.37	-10.92	60.83	20.46	AV	266.70	100	Horizontal	Pass
4	2603.750	44.66	-8.71	80.83	36.17	Peak	266.70	100	Horizontal	Pass
4**	2603.750	39.76	-8.71	60.83	21.07	AV	266.70	100	Horizontal	Pass
5	3051.500	47.38	-4.92	74.00	26.62	Peak	38.50	100	Horizontal	Pass
5**	3051.500	36.71	-4.92	54.00	17.29	AV	38.50	100	Horizontal	Pass
6	6010.500	54.91	2.73	74.00	19.09	Peak	1.00	100	Horizontal	Pass
6**	6010.500	44.61	2.73	54.00	9.39	AV	1.00	100	Horizontal	Pass

TEST REPORT

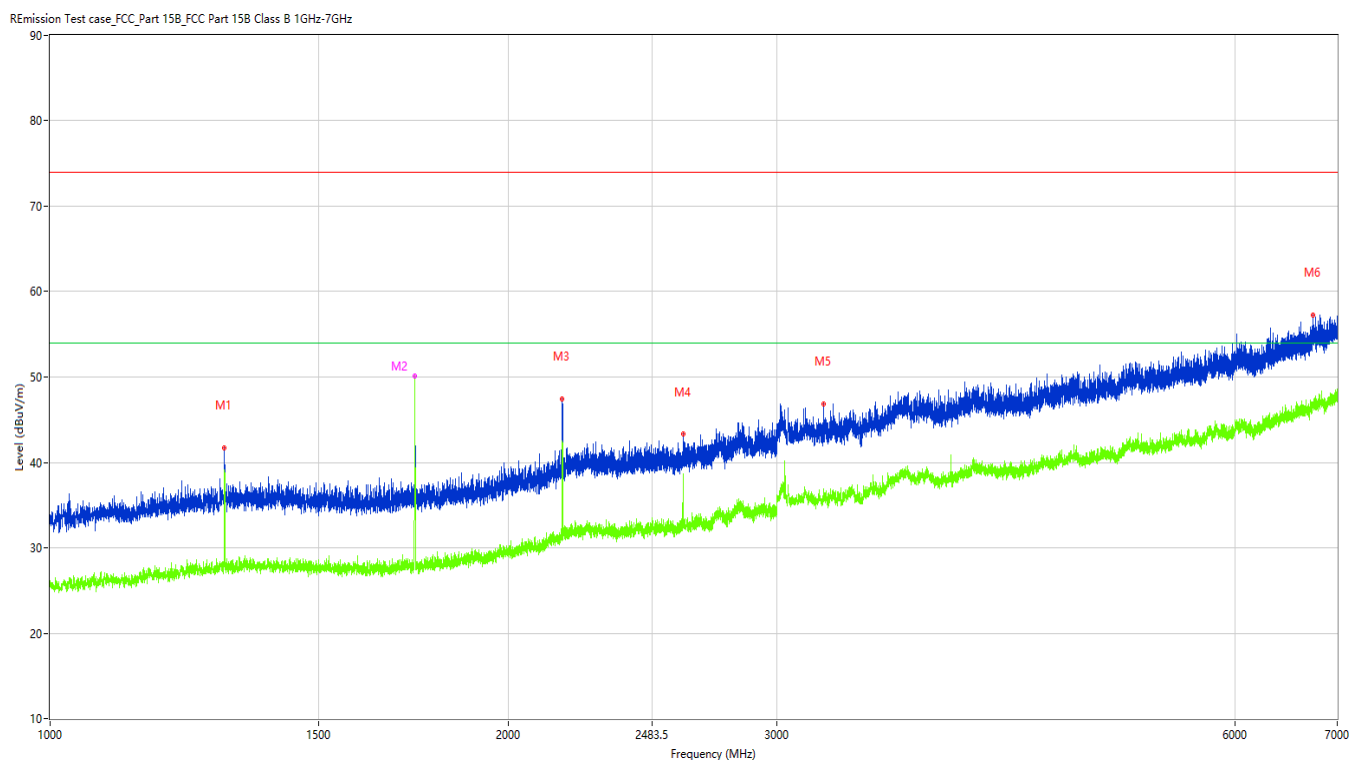
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Figure 44: Test plots of 433.92MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1301.250	41.72	-14.42	74.00	32.28	Peak	72.30	100	Vertical	Pass
1**	1301.250	37.49	-14.42	54.00	16.51	AV	72.30	100	Vertical	Pass
2	1735.750	49.19	-14.45	80.83	31.64	Peak	87.50	100	Vertical	Pass
2**	1735.750	50.14	-14.45	60.83	10.69	AV	87.50	100	Vertical	Pass
3	2169.500	47.42	-10.92	80.83	33.41	Peak	0.00	100	Vertical	Pass
3**	2169.500	42.51	-10.92	60.83	18.32	AV	0.00	100	Vertical	Pass
4	2604.000	43.38	-8.71	80.83	37.45	Peak	72.30	100	Vertical	Pass
4**	2604.000	37.69	-8.71	60.83	23.14	AV	72.30	100	Vertical	Pass
5	3221.000	46.88	-4.85	74.00	27.12	Peak	332.80	100	Vertical	Pass
5**	3221.000	35.73	-4.85	54.00	18.27	AV	332.80	100	Vertical	Pass
6	6752.000	57.25	4.87	74.00	16.75	Peak	49.30	100	Vertical	Pass
6**	6752.000	46.81	4.87	54.00	7.19	AV	49.30	100	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.

TEST REPORT

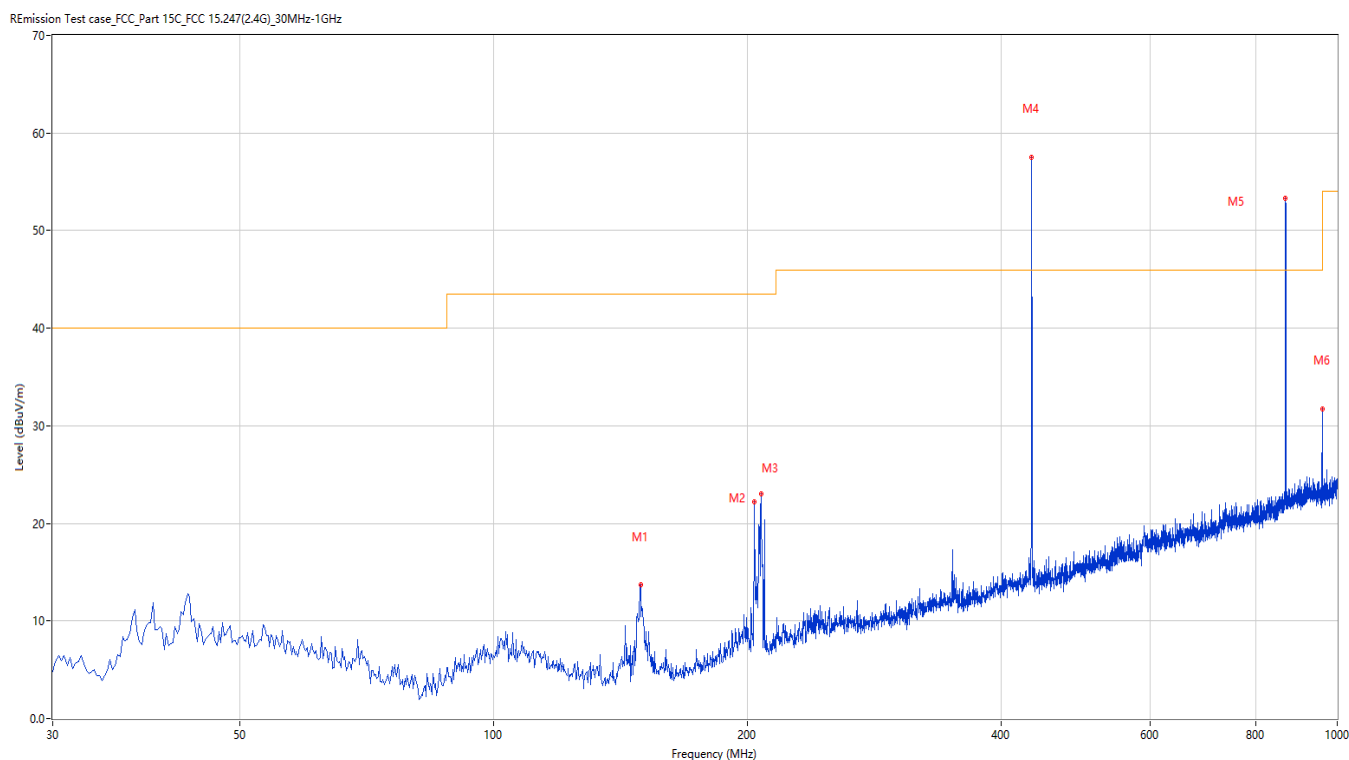
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Figure 45: Test plots of 434.4MHz

Radiated Emission Below 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	149.280	13.76	-29.96	43.5	29.74	Peak	232.40	200	Horizontal	Pass
2	203.829	22.24	-26.63	43.5	21.26	Peak	290.50	100	Horizontal	Pass
3	207.466	23.02	-26.79	43.5	20.48	Peak	290.50	100	Horizontal	Pass
4	434.389	57.55	-20.26	100.84	43.29	Peak	265.20	100	Horizontal	Pass
4*	434.389	57.55	-20.26	80.84	23.29	AV	265.20	100	Horizontal	Pass
5	868.598	53.30	-10.53	80.84	27.54	Peak	59.80	100	Horizontal	Pass
5*	868.598	53.30	-10.53	60.84	7.54	AV	59.80	100	Horizontal	Pass
6	959.513	31.68	-9.31	46.0	14.32	Peak	263.90	100	Horizontal	Pass

Result: Pass

Note:

- Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
- The "Factor" value can be calculated automatically by software of measurement system.
- Average=peak+ Duty cycle correction factor, Final Average= peak-0.

TEST REPORT

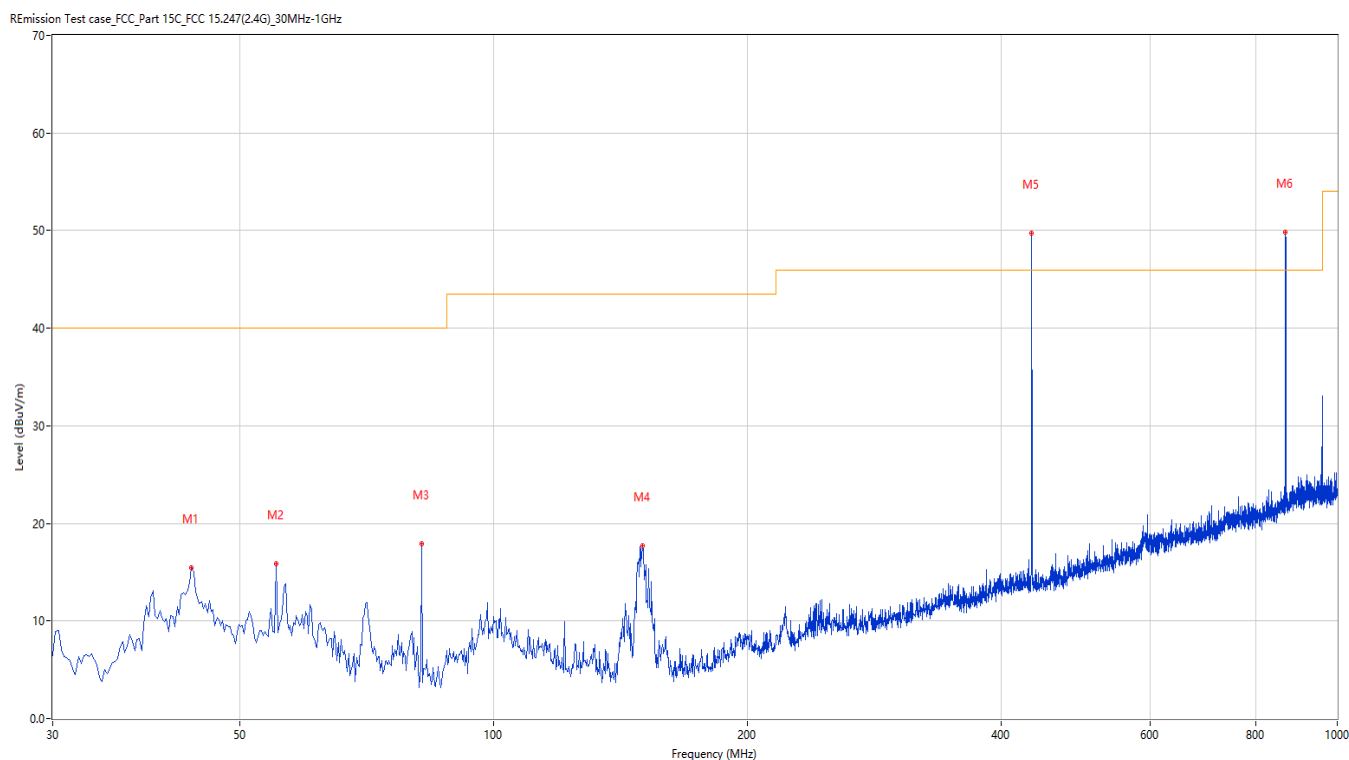
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Figure 46: Test plots of 434.4MHz

Radiated Emission Below 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	43.819	15.49	-25.37	40.0	24.51	Peak	33.10	100	Vertical	Pass
2	55.214	15.89	-25.42	40.0	24.11	Peak	0.00	200	Vertical	Pass
3	82.124	17.91	-31.26	40.0	22.09	Peak	222.40	200	Vertical	Pass
4	150.250	17.67	-29.94	43.5	25.83	Peak	0.00	200	Vertical	Pass
5	434.389	49.73	-20.26	100.84	51.11	Peak	35.60	100	Vertical	Pass
5*	434.389	49.73	-20.26	80.84	31.11	AV	35.60	100	Vertical	Pass
6	868.598	49.80	-10.53	80.84	31.04	Peak	98.90	100	Vertical	Pass
6*	868.598	49.80	-10.53	60.84	11.04	AV	98.90	100	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Margin= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.
3. Average=peak+ Duty cycle correction factor, Final Average= peak-0.

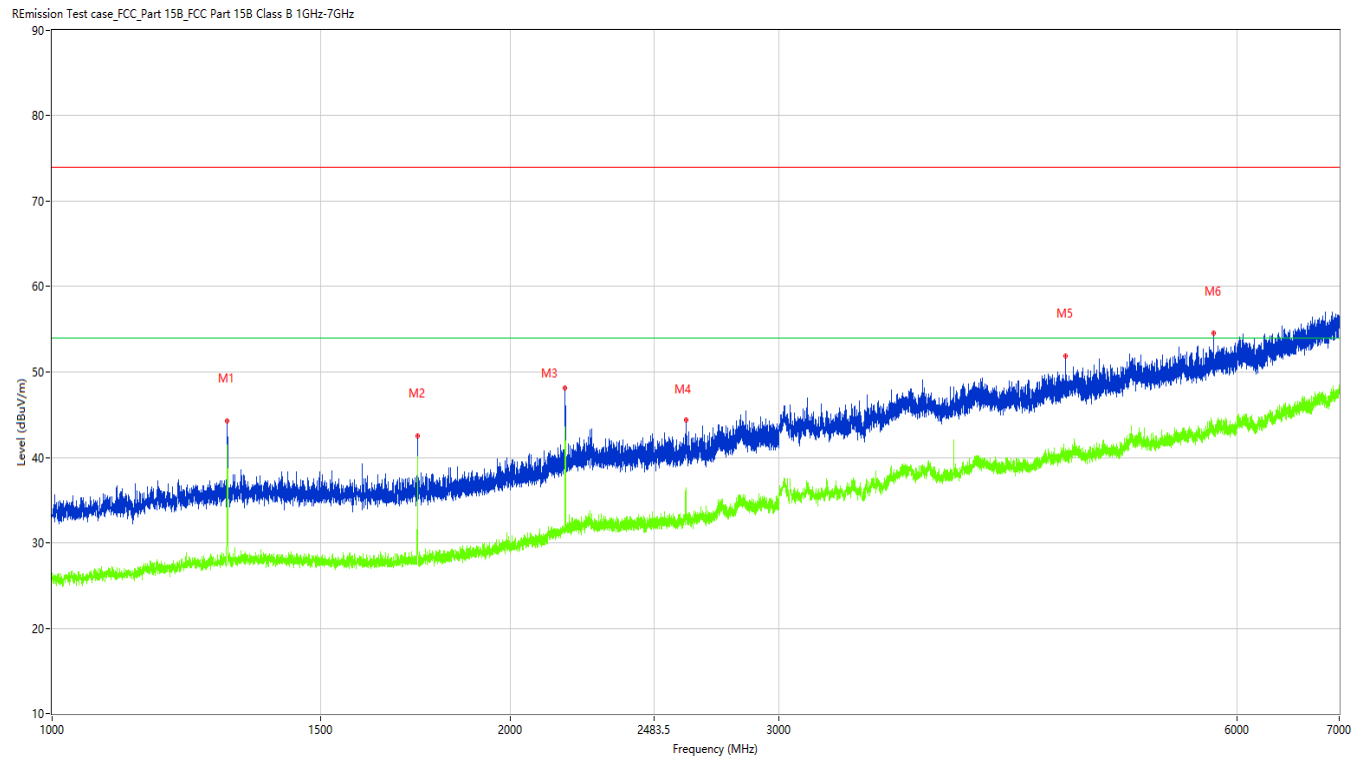
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Figure 47: Test plots of 434.4MHz
Radiated Emission above 1GHz-Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1303.250	44.33	-14.42	74.00	29.67	Peak	106.70	100	Horizontal	Pass
1**	1303.250	41.47	-14.42	54.00	12.53	AV	106.70	100	Horizontal	Pass
2	1737.500	42.54	-14.43	80.84	38.30	Peak	106.70	100	Horizontal	Pass
2**	1737.500	40.09	-14.43	60.84	20.75	AV	106.70	100	Horizontal	Pass
3	2172.000	48.15	-10.91	80.84	32.69	Peak	225.90	100	Horizontal	Pass
3**	2172.000	43.57	-10.91	60.84	17.27	AV	225.90	100	Horizontal	Pass
4	2606.750	44.33	-8.64	80.84	36.51	Peak	121.20	100	Horizontal	Pass
4**	2606.750	35.92	-8.64	60.84	24.92	AV	121.20	100	Horizontal	Pass
5	4628.000	51.89	-0.42	74.00	22.11	Peak	231.20	100	Horizontal	Pass
5**	4628.000	40.48	-0.42	54.00	13.52	AV	231.20	100	Horizontal	Pass
6	5788.000	54.51	2.47	74.00	19.49	Peak	201.80	100	Horizontal	Pass
6**	5788.000	43.22	2.47	54.00	10.78	AV	201.80	100	Horizontal	Pass

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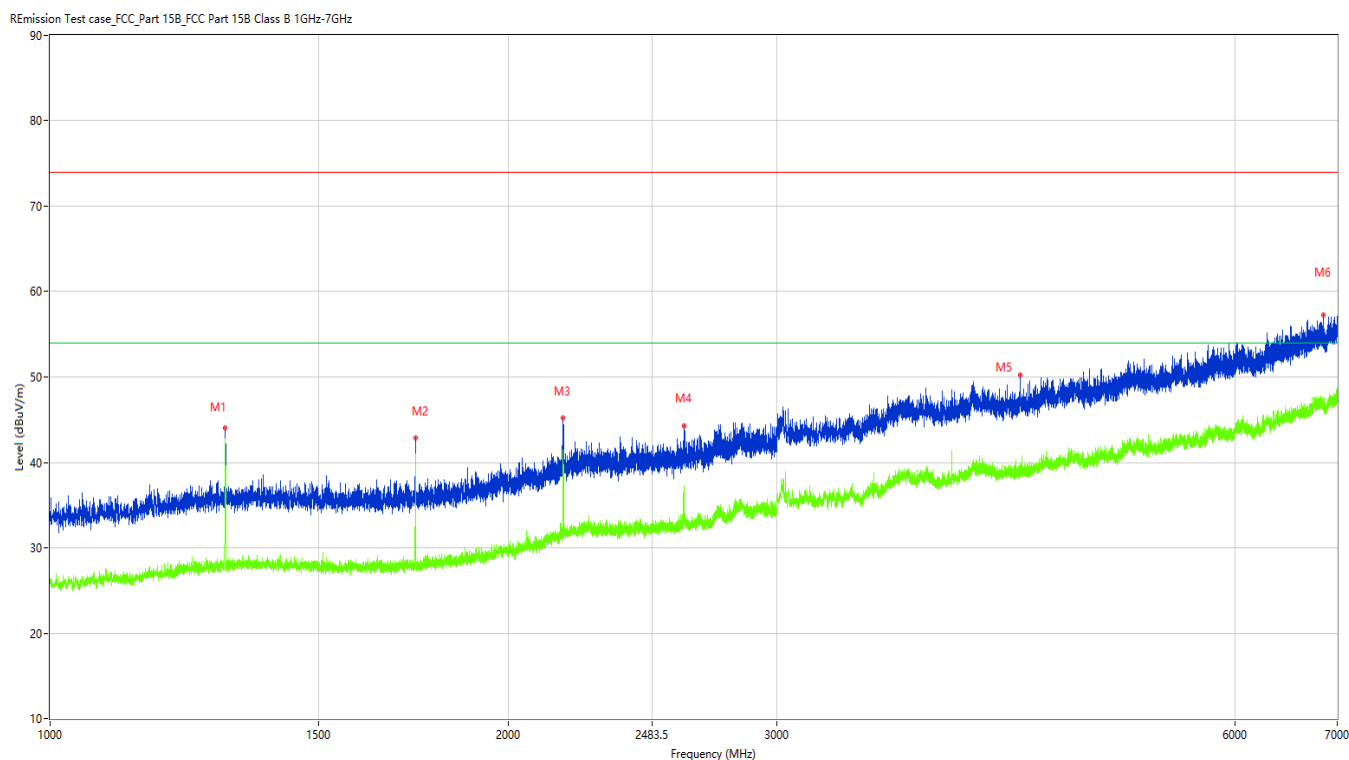
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Figure 48: Test plots of 434.4MHz

Radiated Emission above 1GHz-Vertical



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Margin (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	1303.000	43.99	-14.42	74.00	30.01	Peak	130.50	100	Vertical	Pass
1**	1303.000	42.75	-14.42	54.00	11.25	AV	130.50	100	Vertical	Pass
2	1737.750	42.88	-14.43	80.84	37.96	Peak	130.50	100	Vertical	Pass
2**	1737.750	40.31	-14.43	60.84	20.53	AV	130.50	100	Vertical	Pass
3	2172.250	45.24	-10.90	80.84	35.60	Peak	24.20	100	Vertical	Pass
3**	2172.250	40.72	-10.90	60.84	20.12	AV	24.20	100	Vertical	Pass
4	2607.250	44.24	-8.63	80.84	36.60	Peak	278.10	100	Vertical	Pass
4**	2607.250	33.88	-8.63	60.84	26.96	AV	278.10	100	Vertical	Pass
5	4332.500	50.22	-1.36	74.00	23.78	Peak	170.10	100	Vertical	Pass
5**	4332.500	38.69	-1.36	54.00	15.31	AV	170.10	100	Vertical	Pass
6	6857.000	57.26	5.05	74.00	16.74	Peak	359.80	100	Vertical	Pass
6**	6857.000	46.83	5.05	54.00	7.17	AV	359.80	100	Vertical	Pass

Result: Pass

Note:

1. Factor=Antenna Factor + Cable loss - Amplifier gain, Over Limit= Results- Limit.
2. The "Factor" value can be calculated automatically by software of measurement system.

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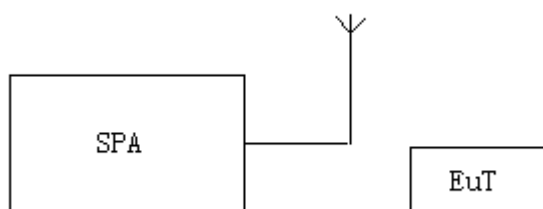
4.1.5 20dB Bandwidth

RESULT:

PASS

Test standard : §15.231(c)
Requirement : ANSI C63.10-2013

Test setup



Test procedure

1. Set the parameters of SPA as below:
Centre frequency = Operation Frequency
RBW=470Hz
VBW=1.5KHz
Span: 50KHz
Sweep time: Auto
2. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
3. Record the plots and Reported.

Test Data

Channel Frequency	Modulation Type	20dB Bandwidth	Limit	Result
303MHz	ASK	6.640KHz	757.5KHz	Pass
310MHz	ASK	5.247KHz	775KHz	Pass
315MHz	ASK	4.787KHz	787.5KHz	Pass
318MHz	ASK	3.779KHz	795KHz	Pass
390MHz	ASK	3.325KHz	975KHz	Pass
433.42MHz	ASK	4.712KHz	1083.55KHz	Pass
433.92MHz	ASK	8.043KHz	1084.8KHz	Pass
434.4MHz	FSK	23.63KHz	1086KHz	Pass

Note: Limit= Operation Frequency ×0.25%

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Figure 49-Test plots of 303MHz

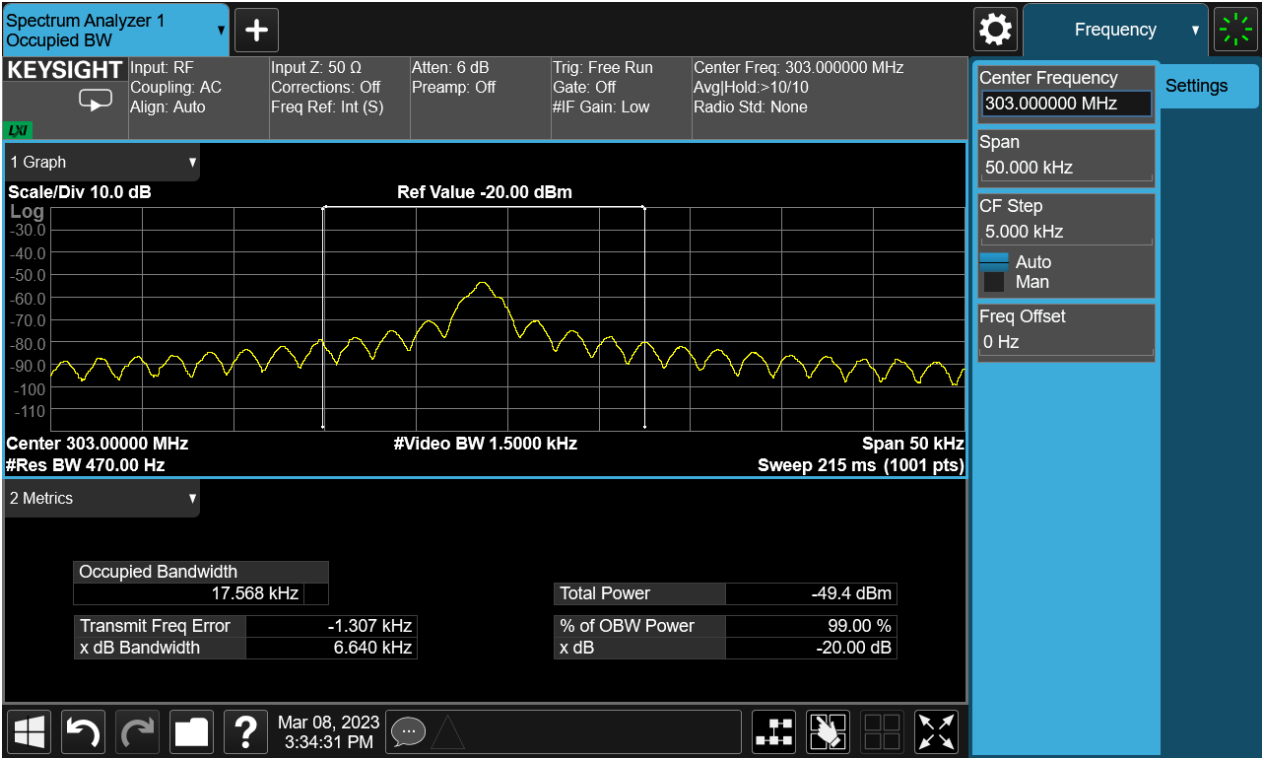
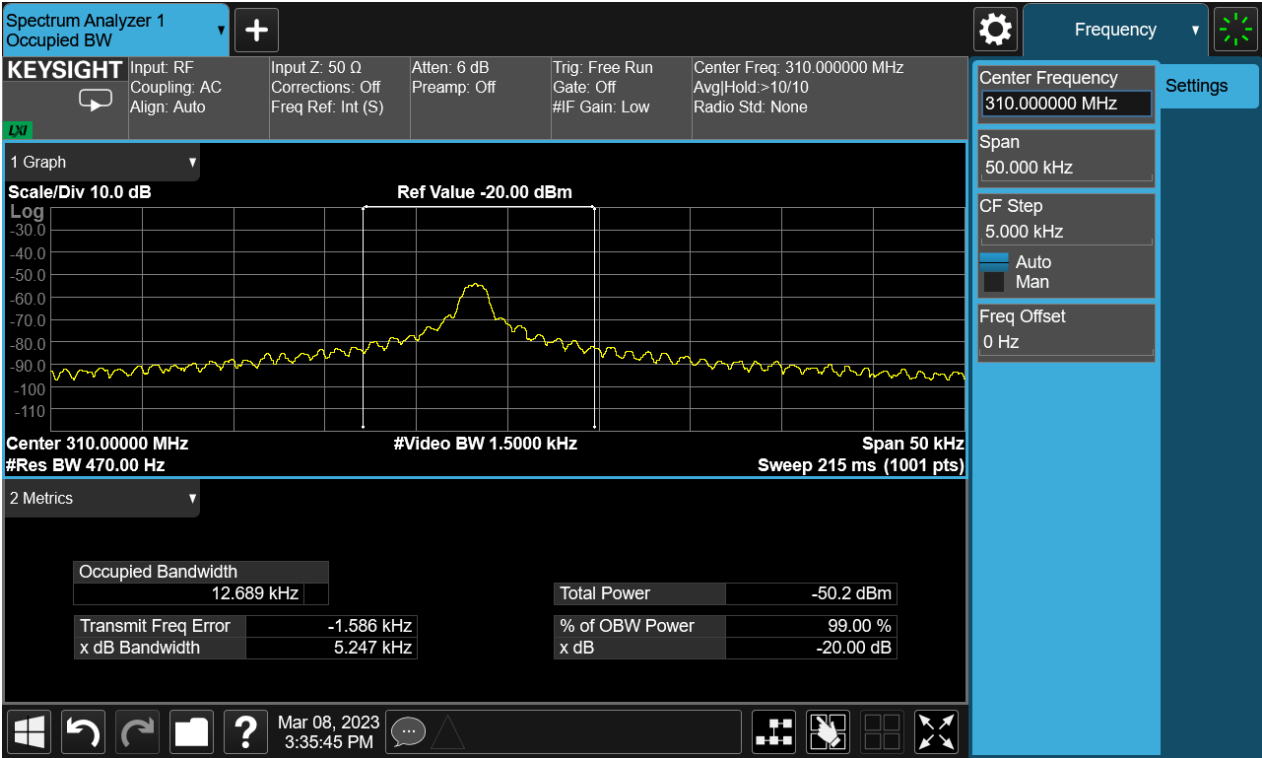


Figure 50-Test plots of 310MHz



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Figure 51-Test plots of 315MHz

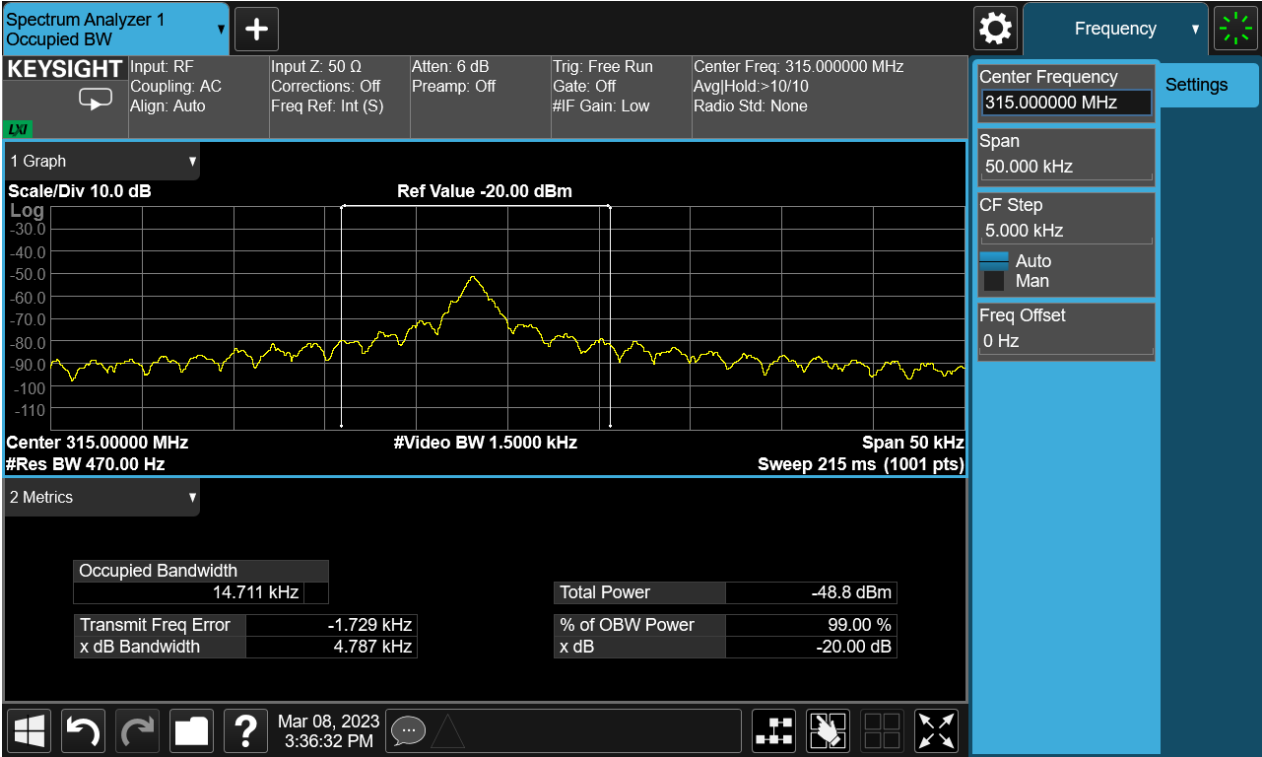
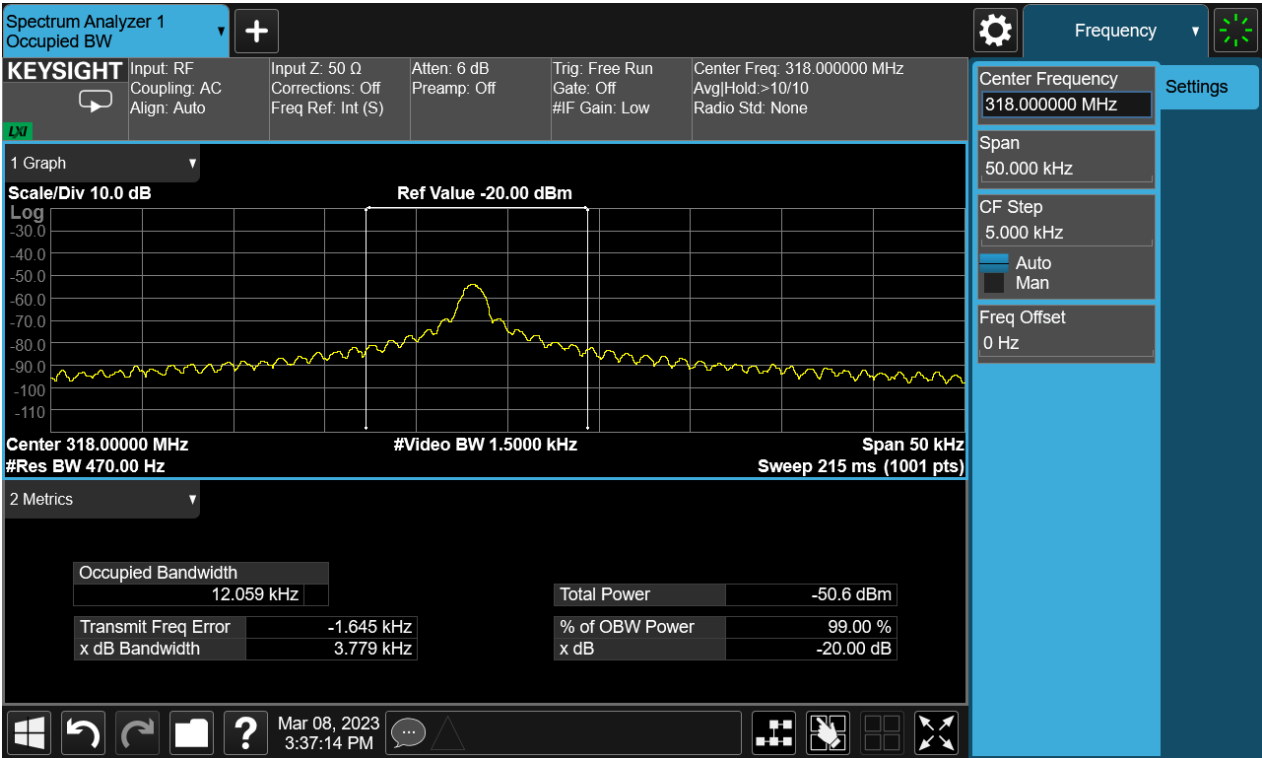


Figure 52-Test plots of 318MHz



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Figure 53-Test plots of 390MHz

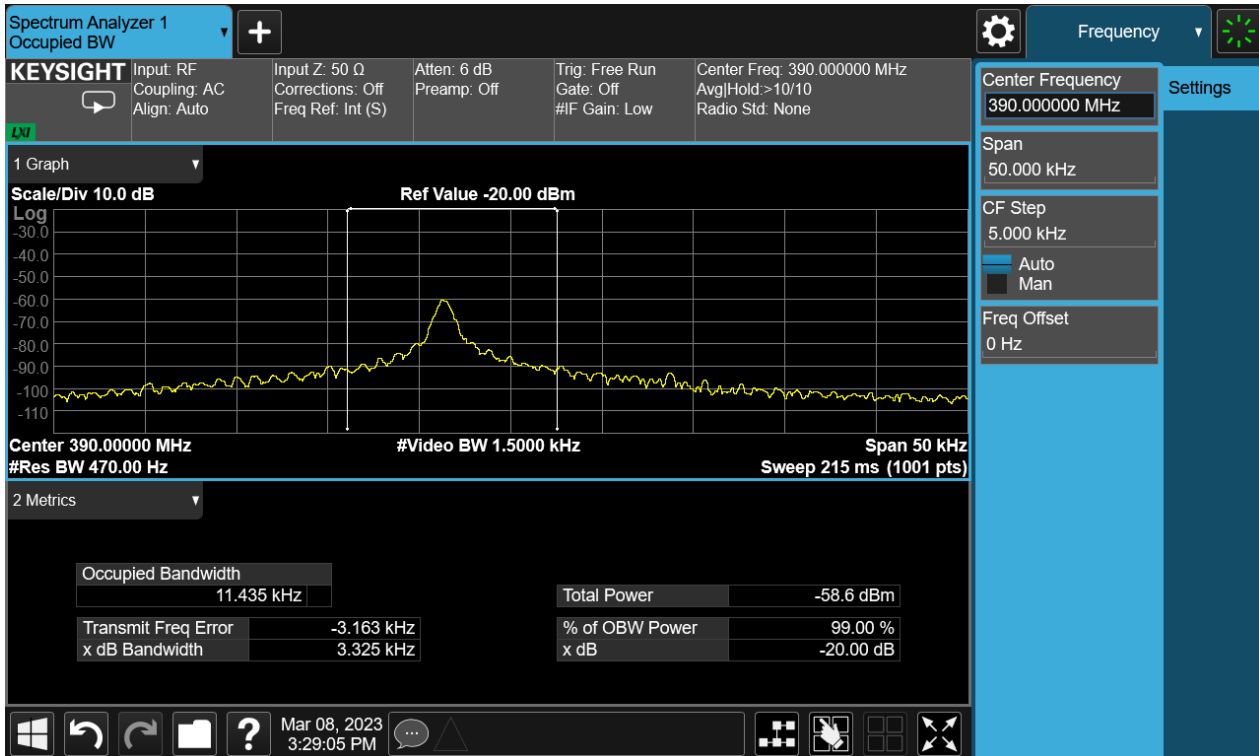
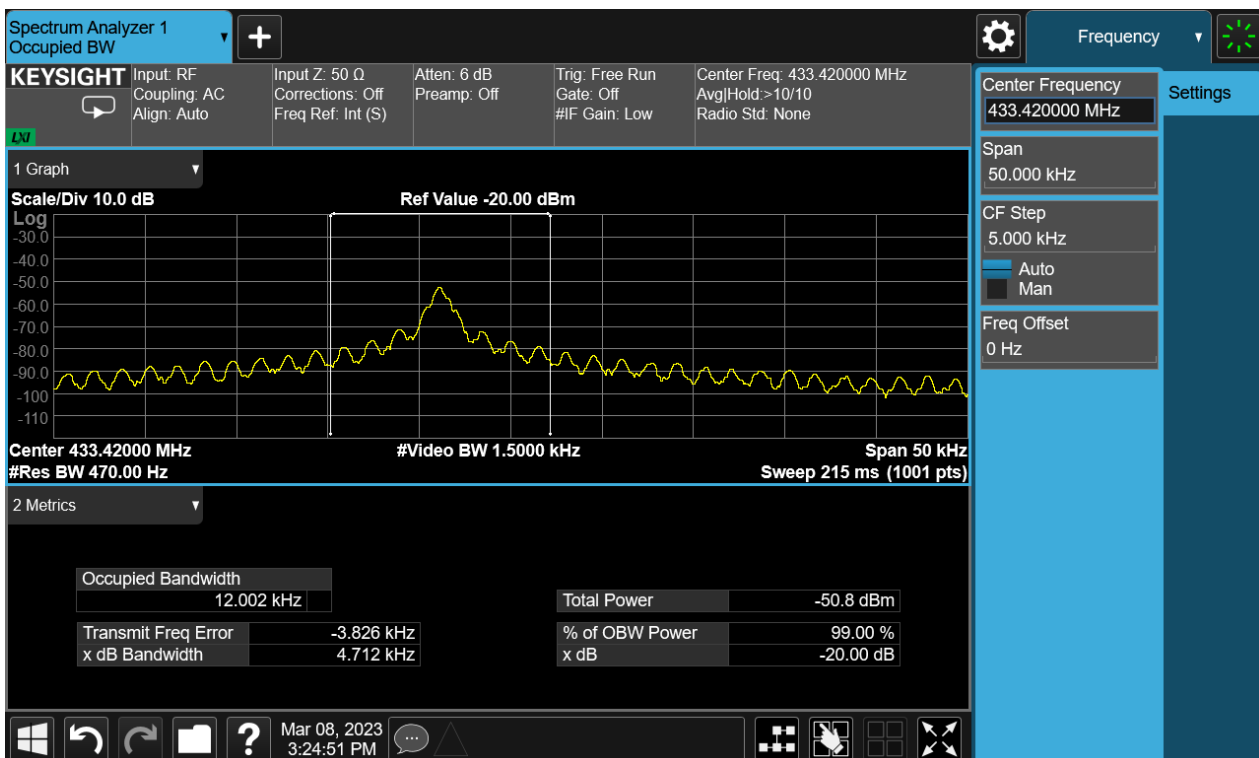


Figure 54-Test plots of 433.42MHz



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Figure 55-Test plots of 433.92MHz

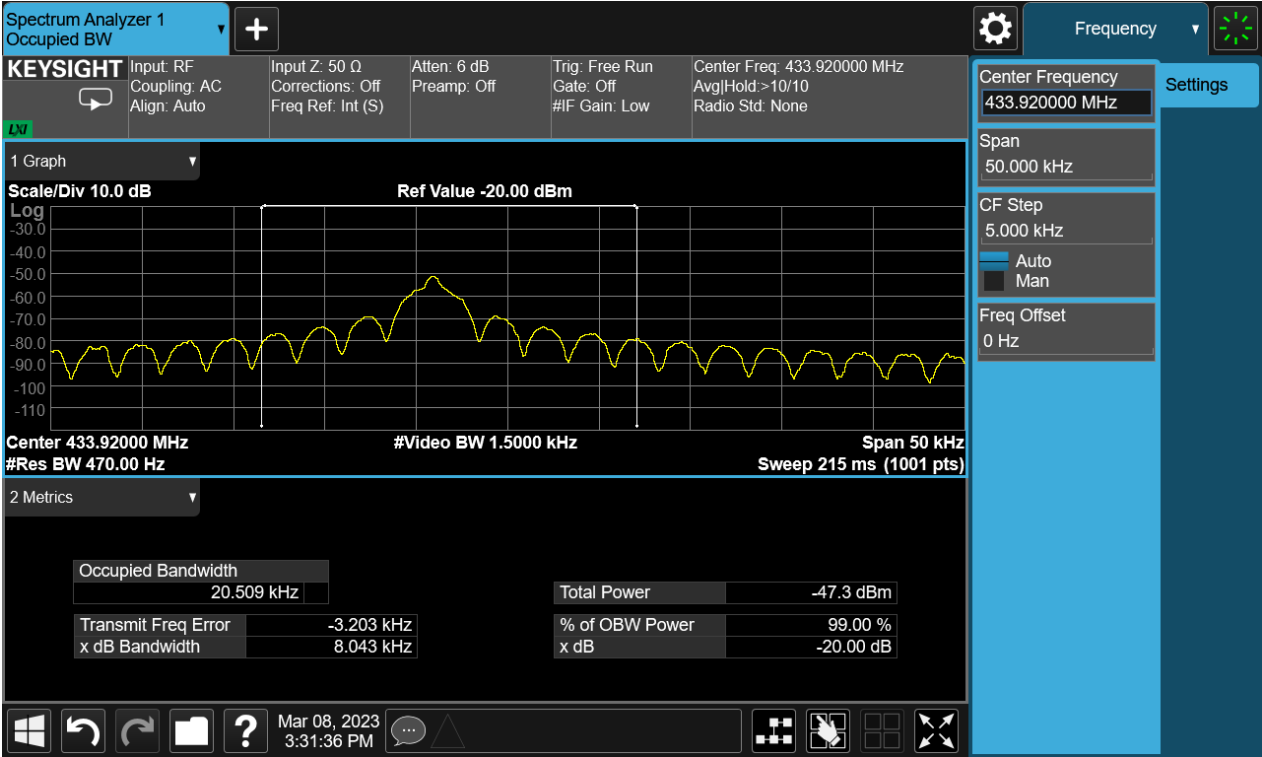
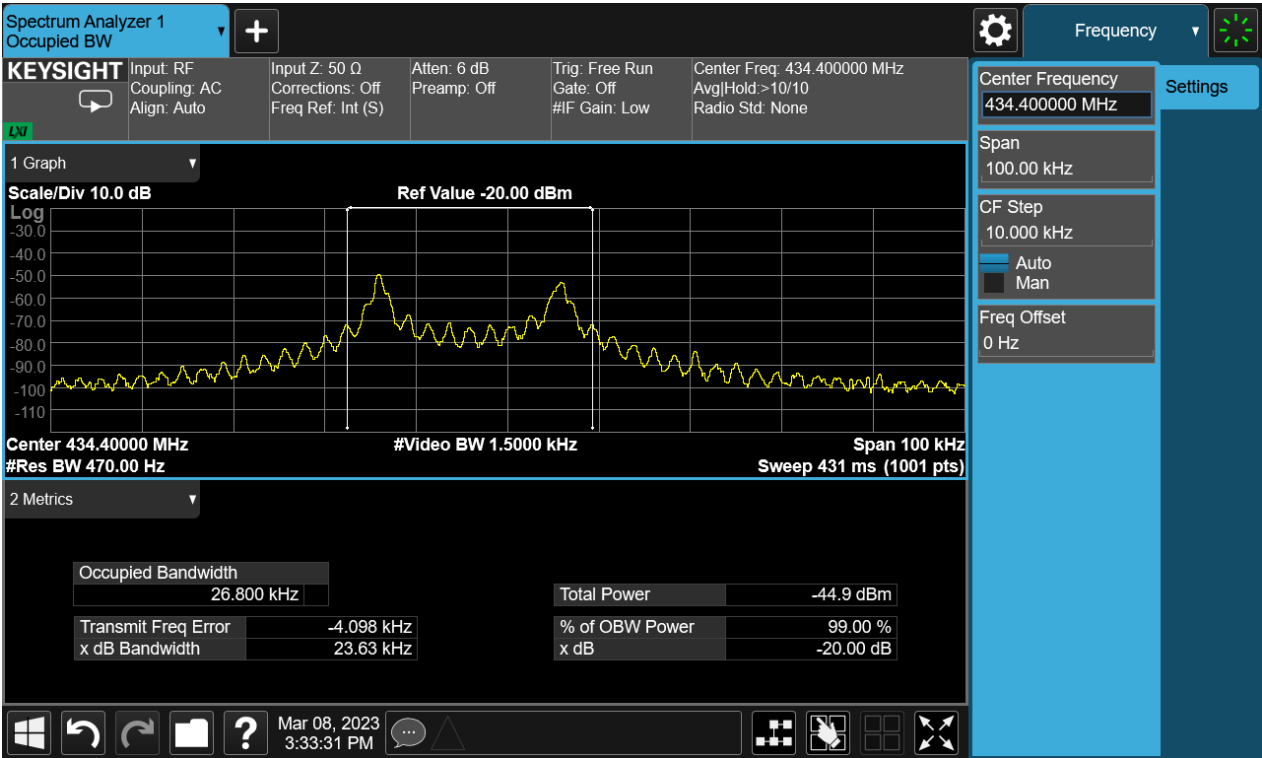


Figure 56-Test plots of 434.4MHz



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5 Appendixes

5.1 Photographs of the Sample



Front view of EUT



Back view of EUT

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Top view of EUT



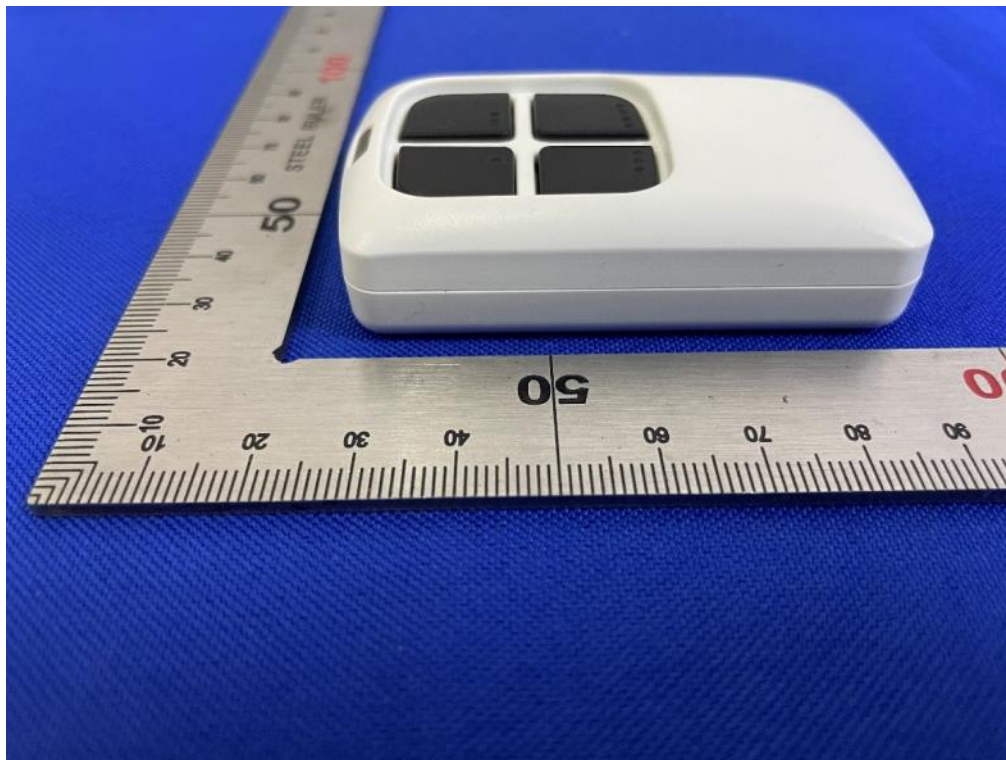
Bottom view of EUT

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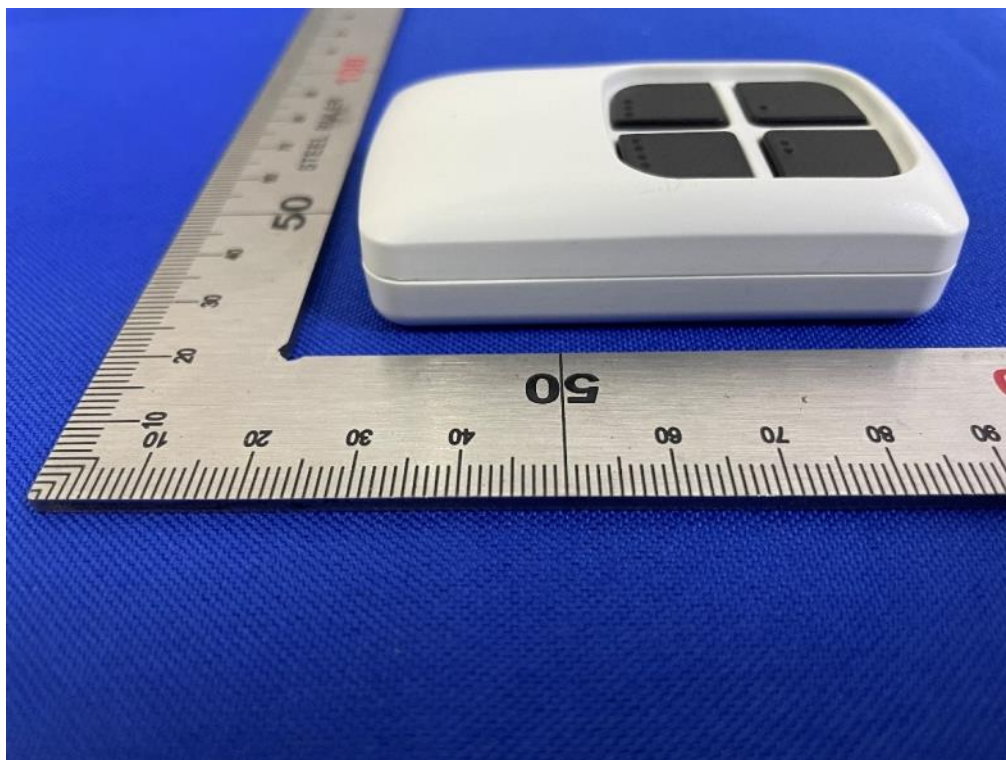
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Left view of EUT



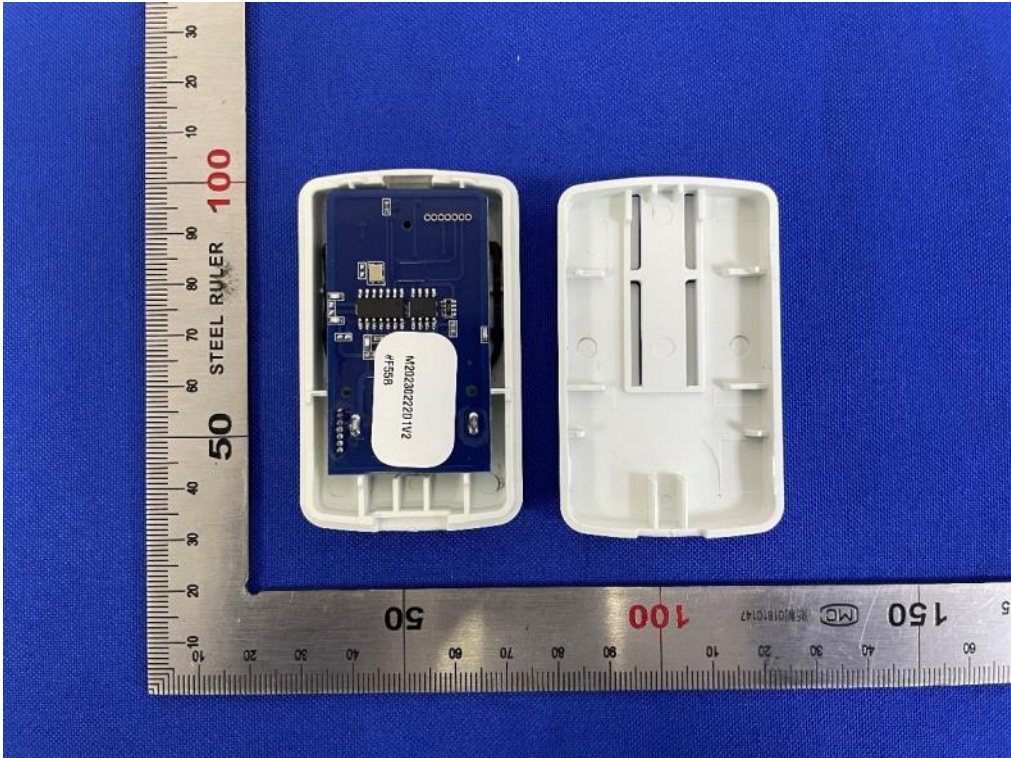
Right view of EUT

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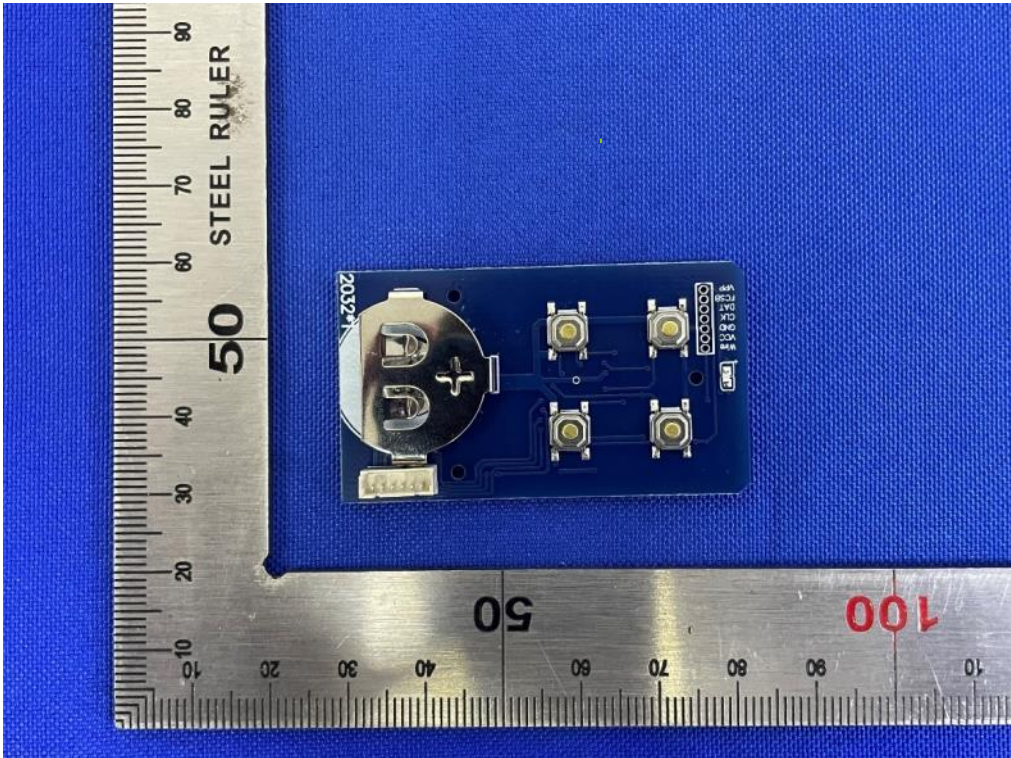
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Open view of EUT



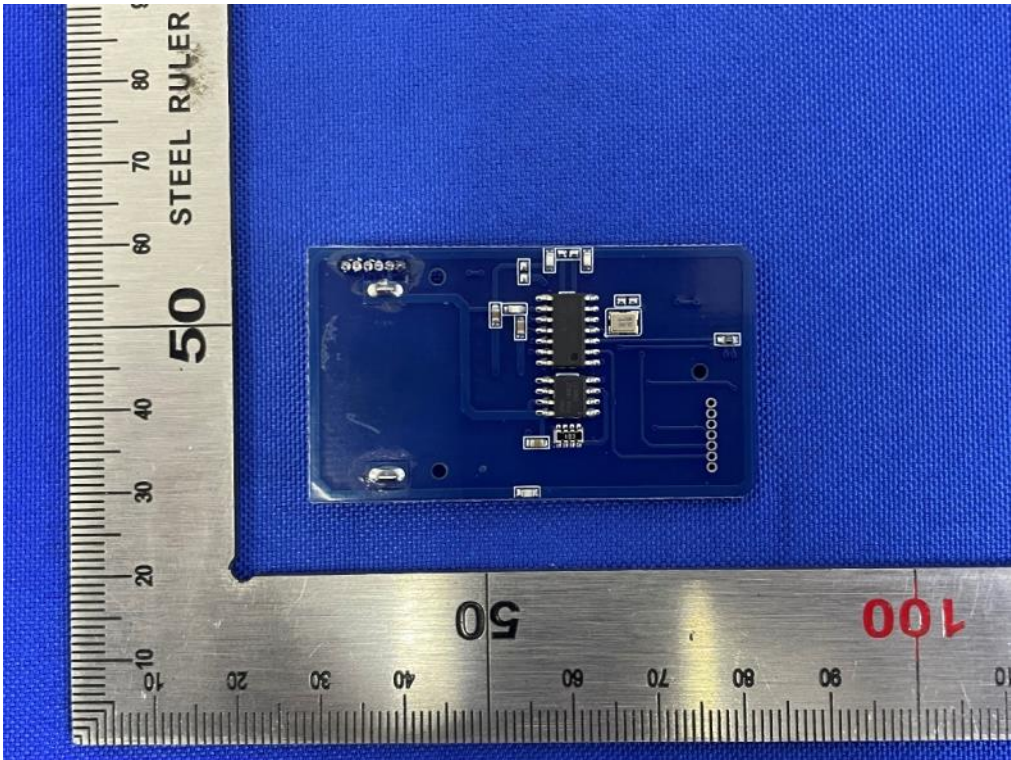
Internal view of EUT-1

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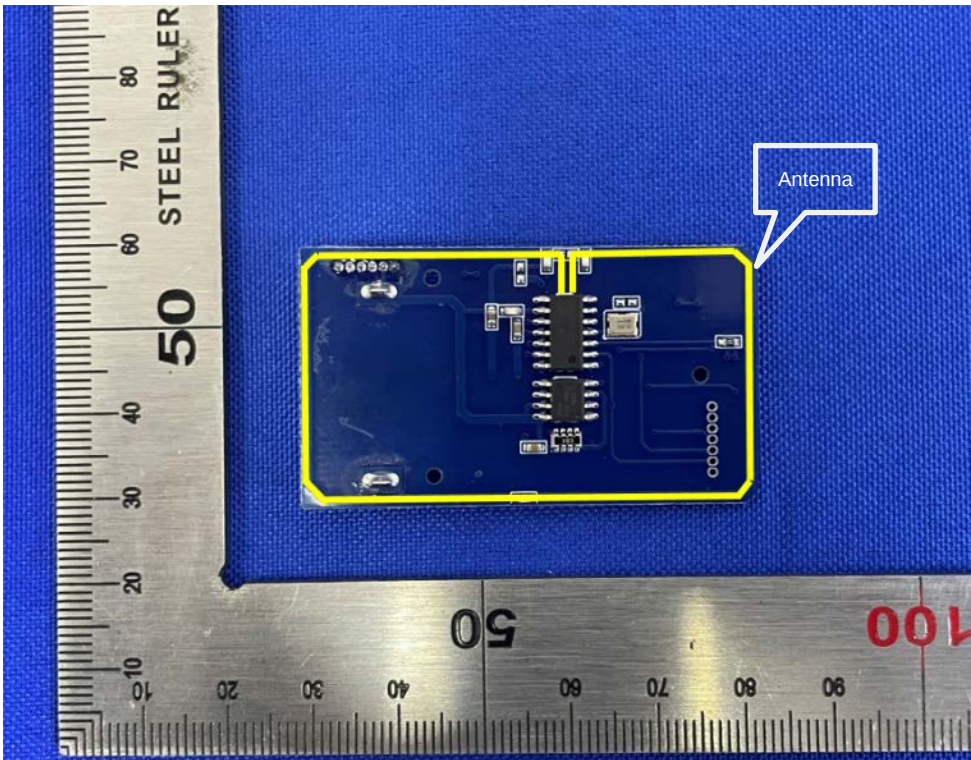
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Internal view of EUT-2



Antenna Position of EUT

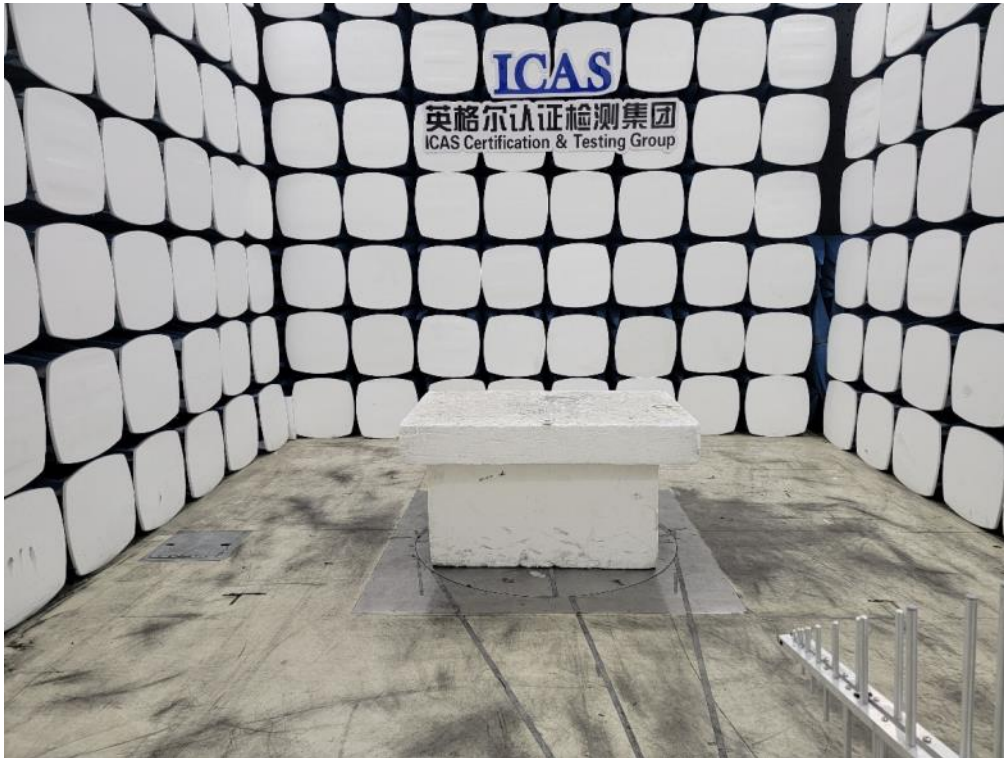
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5.2 Photographs of the Test Set-up



FCC Radiated Emission Test Setup-below 1GHz



FCC Radiated Emission Test Setup-above 1GHz

End of the report