

FCC TEST REPORT

For

Zhengzhou Easycube Intelligent Technology Co., Ltd

Easycube modular robotic

Model No.: Escb-001, ENG506c, ENG506d, 81001

Prepared For : Zhengzhou Easycube Intelligent Technology Co., Ltd
Address : Room 506-b, Baoguo Building, No.138 jing bei 1 road, Zhengzhou, China

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited
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Report Number : R0217100073W
Date of Test : Oct. 31~Nov. 10, 2017
Date of Report : Nov. 15, 2017

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TEST REPORT

Applicant : Zhengzhou Easycube Intelligent Technology Co., Ltd
Manufacturer : Zhengzhou Easycube Intelligent Technology Co., Ltd
Product Name : Easycube modular robotic
Model No. : Escb-001, ENG506c, ENG506d, 81001
Trade Mark : Easycube
Rating(s) : Input: DC 5V, 75mA (with DC 3.7V, 1300mAh Battery inside)

Test Standard(s) : FCC Part15 Subpart C, Paragraph 15.249

Test Method(s) : ANSI C63.10: 2013

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Test : Oct. 31~Nov. 10, 2017

Prepared by :



Winkey Wang

(Tested Engineer / Winkey Wang)

Reviewer :

Tangcy. T.

(Project Manager / Tangcy. T)

Approved & Authorized Signer :

Tom Chen

(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Zhengzhou Easycube Intelligent Technology Co., Ltd
Address	:	Room 506-b, Baoguo Building, No.138 jing bei 1 road, Zhengzhou, China
Manufacturer	:	Zhengzhou Easycube Intelligent Technology Co., Ltd
Address	:	Room 506-b, Baoguo Building, No.138 jing bei 1 road, Zhengzhou, China

1.2. Description of Device (EUT)

Product Name	:	Easycube modular robotic	
Model No.	:	Escb-001, ENG506c, ENG506d, 81001 (Note: All samples are the same except the model number and Color, so we prepare "Escb-001" for test only.)	
Trade Mark	:	Easycube	
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter DC 3.7V By Battery	
Product Description	:	Operation Frequency:	2400-2480MHz
		Number of Channel:	81 Channels
		Modulation Type:	GFSK
		Antenna Type:	PCB Antenna
		Antenna Gain(Peak):	2 dBi
Remark: 1)For a more detailed features description, please refer to the manufacturer’s specifications or the User’s Manual.			

1.3. Auxiliary Equipment Used During Test

Adapter	:	Manufacturer: ZTE M/N: STC-A2050I1000USBA-C S/N: 201202102100876 Input: 100-240V~50/60Hz 0.3A Output: DC 5V, 1000mA
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1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Keeping TX mode
Mode 2	CH01
Mode 3	CH41
Mode 4	CH81

For Conducted Emission	
Final Test Mode	Description
Mode 1	Keeping TX mode

For Radiated Emission	
Final Test Mode	Description
Mode 2	CH01
Mode 3	CH41
Mode 4	CH81

Note:

1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT built-in battery-powered, fully-charged battery use of the test battery.

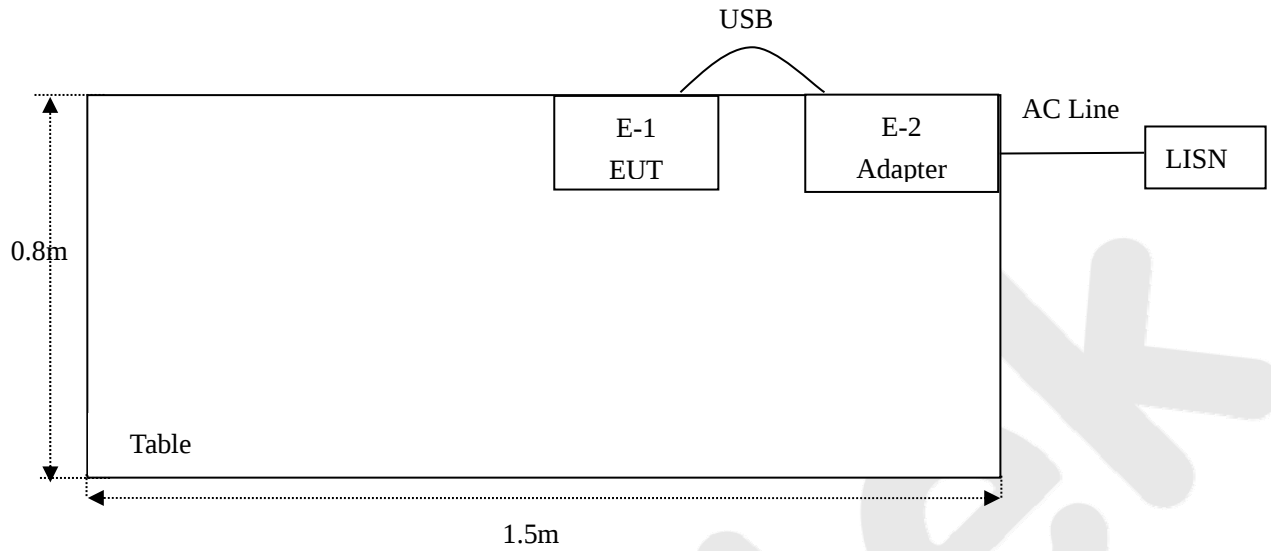
1.5. List of Channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	2400	22	2421	43	2442	64	2463
2	2401	23	2422	44	2443	65	2464
3	2402	24	2423	45	2444	66	2465
4	2403	25	2424	46	2445	67	2466
5	2404	26	2425	47	2446	68	2467
6	2405	27	2426	48	2447	69	2468
7	2406	28	2427	49	2448	70	2469
8	2407	29	2428	50	2449	71	2470
9	2408	30	2429	51	2450	72	2471

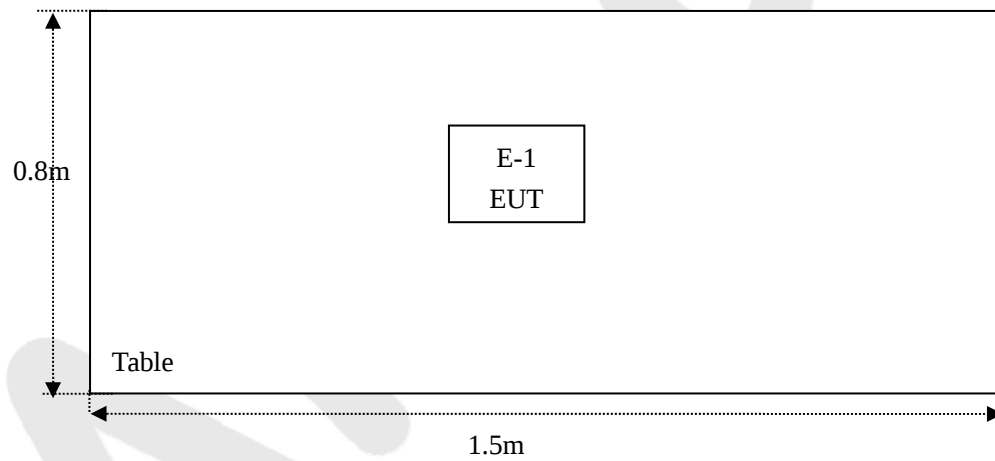
10	2409	31	2430	52	2451	73	2472
11	2410	32	2431	53	2452	74	2473
12	2411	33	2432	54	2453	75	2474
13	2412	34	2433	55	2454	76	2475
14	2413	35	2434	56	2455	77	2476
15	2414	36	2435	57	2456	78	2477
16	2415	37	2436	58	2457	79	2478
17	2416	38	2437	59	2458	80	2479
18	2417	39	2438	60	2459	81	2480
19	2418	40	2439	61	2460	/	/
20	2419	41	2440	62	2461	/	/
21	2420	42	2441	63	2462	/	/

1.6. Description of Test Setup

CE



RE



1.7. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	May 27, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	May 27, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	May 27, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	May 27, 2017	1 Year
5.	Spectrum Analysis	Agilent	N9038A	MY53227295	May 27, 2017	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	May 27, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	May 27, 2017	1 Year
8.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	May 31, 2017	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 31, 2017	1 Year
10.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Apr. 03, 2017	1 Year
11.	Horn Antenna	Schwarzbeck	BBHA9170	9170-375	May 27, 2017	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	May 27, 2017	1 Year
13.	Pre-amplifier	SKET Electronic	BK1G40G50 A	KD25352	May 27, 2017	1 Year
14.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
15.	Power Sensor	DAER	RPR3006W	15I00041SN045	May 27, 2017	1 Year
16.	Power Sensor	DAER	RPR3006W	15I00041SN046	May 27, 2017	1 Year
17.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	May 27, 2017	1 Year
18.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	May 27, 2017	1 Year
19.	Signal Generator	Agilent	E4421B	MY41000743	May 27, 2017	1 Year
20.	DC Power supply	IVYTECH	IV6003	1601D6030007	May 26, 2017	1 Year
21.	TEMP&HUMI PROGRAMMABLE CHAMBER	Sertep	ZJ-HWHS80 B	ZJ-17042804	Mar. 03, 2017	1 Year

Note: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

1.8. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 4.1 dB (Horizontal)
		Ur = 4.3 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4dB

1.9. Description of Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, July 31, 2017.

ISED-Registration No.: 8058A-1

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A-1, June 13, 2016.

Test Location

All Emissions tests were performed at

Shenzhen Anbotek Compliance Laboratory Limited.

at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China

2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.249	Radiated Emission	PASS
15.215(c)	20dB Bandwidth	PASS
15.249(c)	Band Edge	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

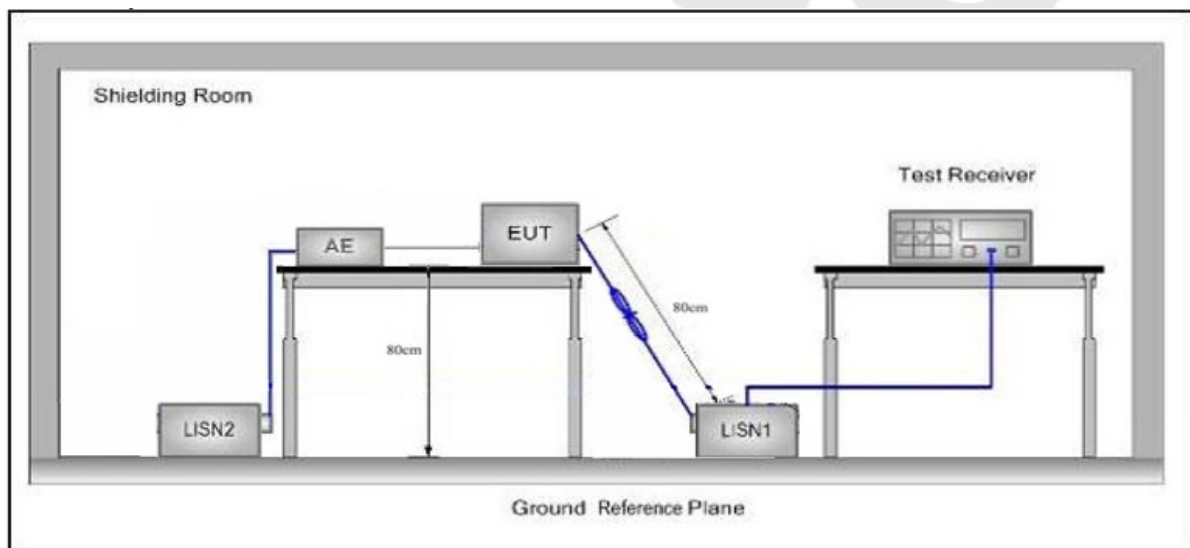
3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50

Remark: (1) *Decreasing linearly with logarithm of the frequency.
(2) The lower limit shall apply at the transition frequency.

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

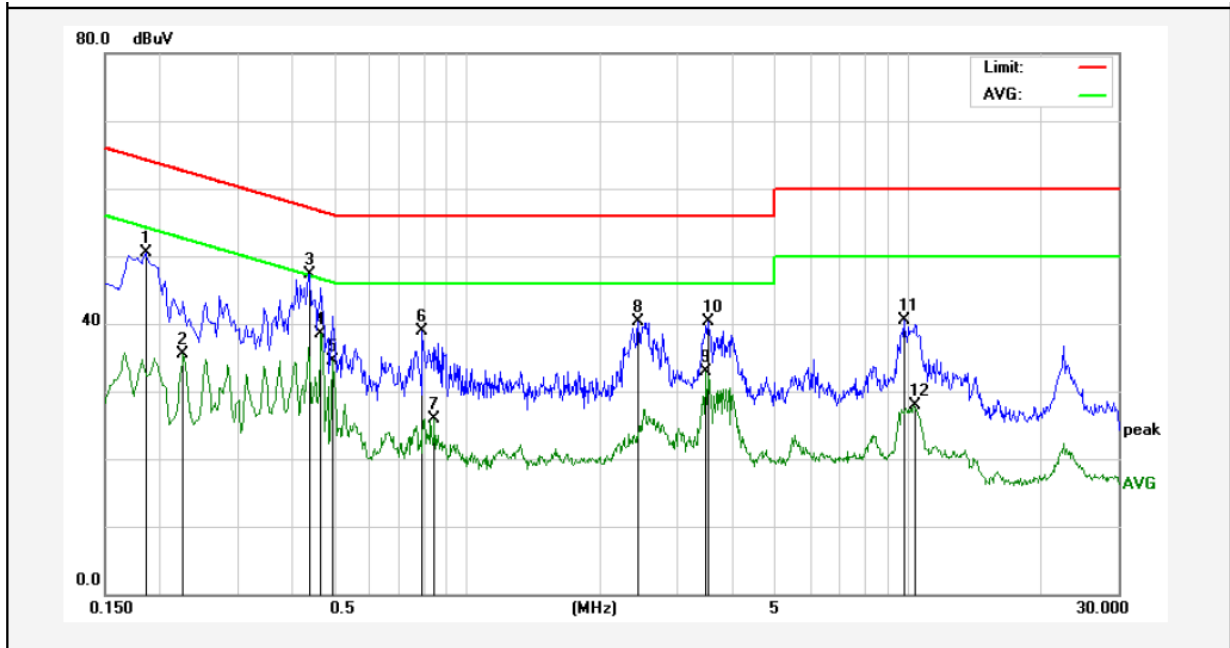
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

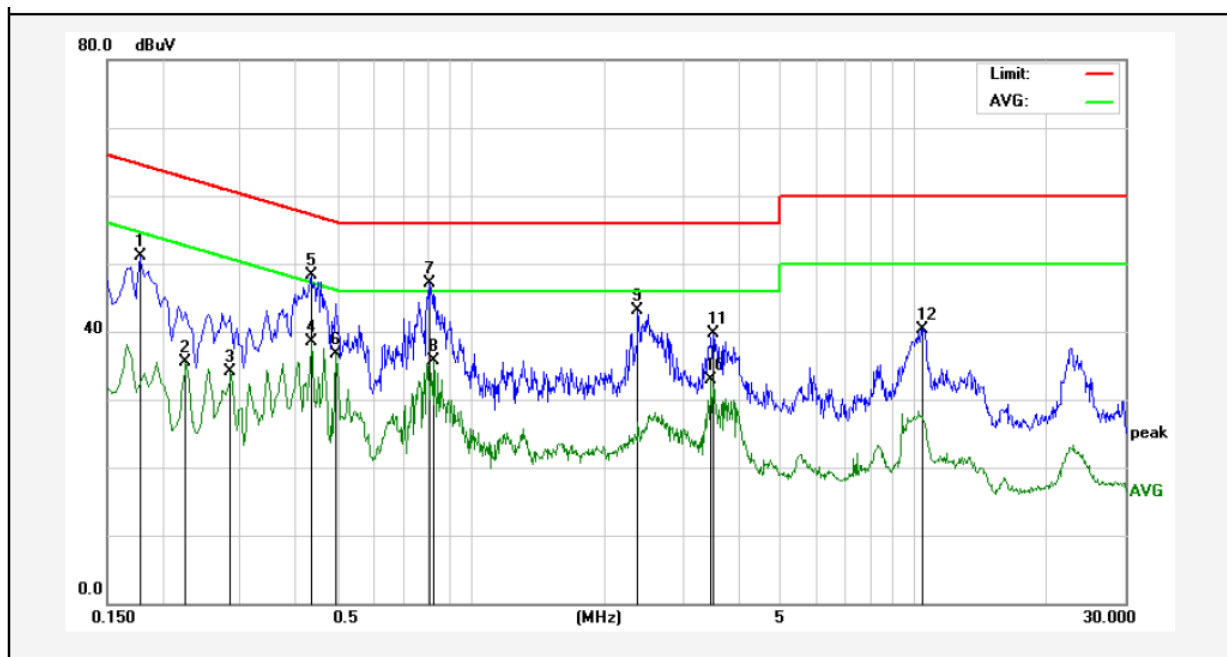
Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1860	30.52	19.90	50.42	64.21	-13.79	QP	
2	0.2260	15.64	19.89	35.53	52.59	-17.06	AVG	
3	0.4380	27.34	19.95	47.29	57.10	-9.81	QP	
4	0.4660	18.63	19.96	38.59	46.58	-7.99	AVG	
5	0.4940	14.46	19.98	34.44	46.10	-11.66	AVG	
6	0.7900	18.81	20.06	38.87	56.00	-17.13	QP	
7	0.8420	5.88	20.08	25.96	46.00	-20.04	AVG	
8	2.4420	20.19	20.15	40.34	56.00	-15.66	QP	
9	3.4860	12.69	20.17	32.86	46.00	-13.14	AVG	
10	3.5180	20.18	20.17	40.35	56.00	-15.65	QP	
11	9.7580	20.16	20.33	40.49	60.00	-19.51	QP	
12	10.3300	7.59	20.33	27.92	50.00	-22.08	AVG	

Conducted Emission Test Data

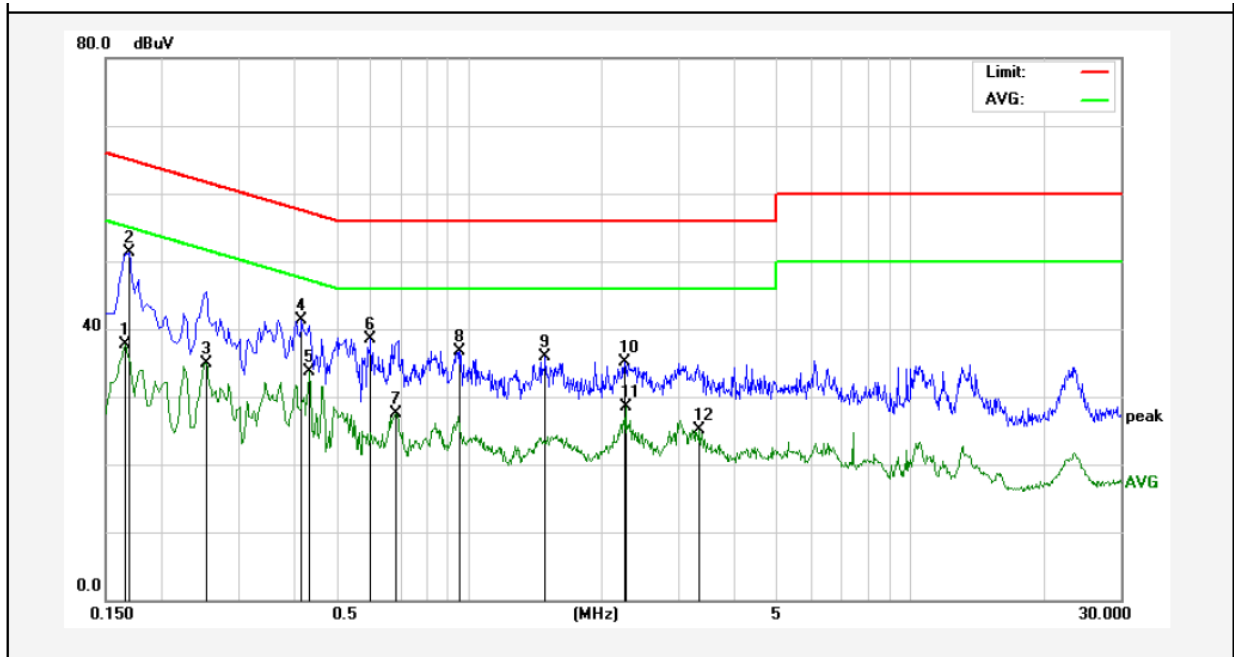
Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1780	31.17	19.90	51.07	64.57	-13.50	QP	
2	0.2260	15.60	19.89	35.49	52.59	-17.10	AVG	
3	0.2860	14.23	19.89	34.12	50.64	-16.52	AVG	
4	0.4339	18.46	19.95	38.41	47.18	-8.77	AVG	
5	0.4340	28.38	19.95	48.33	57.18	-8.85	QP	
6	0.4940	16.66	19.98	36.64	46.10	-9.46	AVG	
7	0.8059	27.07	20.07	47.14	56.00	-8.86	QP	
8	0.8260	15.56	20.07	35.63	46.00	-10.37	AVG	
9	2.3820	22.91	20.15	43.06	56.00	-12.94	QP	
10	3.4860	12.66	20.17	32.83	46.00	-13.17	AVG	
11	3.5180	19.60	20.17	39.77	56.00	-16.23	QP	
12	10.4540	20.05	20.33	40.38	60.00	-19.62	QP	

Conducted Emission Test Data

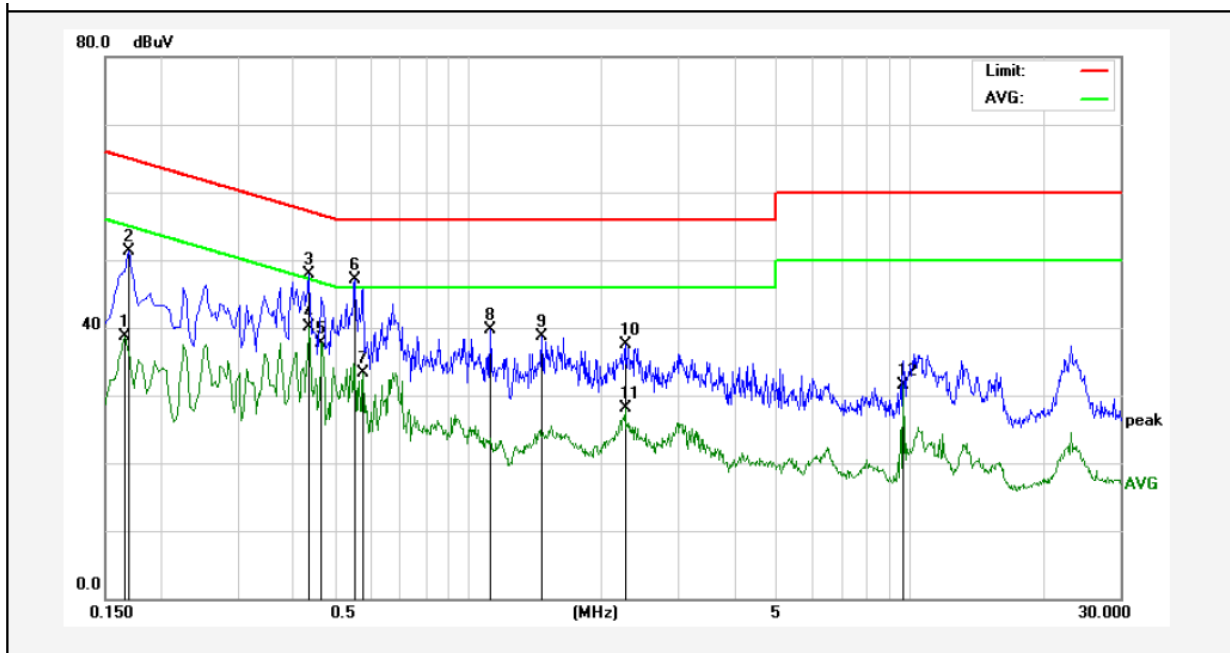
Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1660	17.72	19.90	37.62	55.15	-17.53	AVG	
2	0.1700	31.31	19.90	51.21	64.96	-13.75	QP	
3	0.2540	14.99	19.89	34.88	51.62	-16.74	AVG	
4	0.4180	21.43	19.94	41.37	57.49	-16.12	QP	
5	0.4340	13.66	19.95	33.61	47.18	-13.57	AVG	
6	0.5980	18.57	20.01	38.58	56.00	-17.42	QP	
7	0.6860	7.42	20.04	27.46	46.00	-18.54	AVG	
8	0.9540	16.53	20.11	36.64	56.00	-19.36	QP	
9	1.4900	15.72	20.13	35.85	56.00	-20.15	QP	
10	2.2580	14.92	20.15	35.07	56.00	-20.93	QP	
11	2.2700	8.26	20.15	28.41	46.00	-17.59	AVG	
12	3.3380	4.99	20.17	25.16	46.00	-20.84	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.:25℃ Hum.:50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1660	18.87	19.90	38.77	55.15	-16.38	AVG	
2	0.1700	31.37	19.90	51.27	64.96	-13.69	QP	
3	0.4340	27.96	19.95	47.91	57.18	-9.27	QP	
4	0.4340	20.16	19.95	40.11	47.18	-7.07	AVG	
5	0.4660	17.83	19.96	37.79	46.58	-8.79	AVG	
6	0.5540	27.07	20.00	47.07	56.00	-8.93	QP	
7	0.5780	13.34	20.00	33.34	46.00	-12.66	AVG	
8	1.1180	19.51	20.12	39.63	56.00	-16.37	QP	
9	1.4700	18.60	20.13	38.73	56.00	-17.27	QP	
10	2.2700	17.32	20.15	37.47	56.00	-18.53	QP	
11	2.2700	7.99	20.15	28.14	46.00	-17.86	AVG	
12	9.6580	11.12	20.33	31.45	50.00	-18.55	AVG	

4. Radiated Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Test Standard	FCC Part15 C Section 15.249					
Test Limit	Frequency (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	2400~2483.5	50	-	114.0	Peak	3
	2400~2483.5	50	-	94.0	Average	3
	2400~2483.5	-	500	74.0	Peak	3
	2400~2483.5	-	500	54.0	Average	3

Remark:

(1) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

Figure 1. Below 30MHz

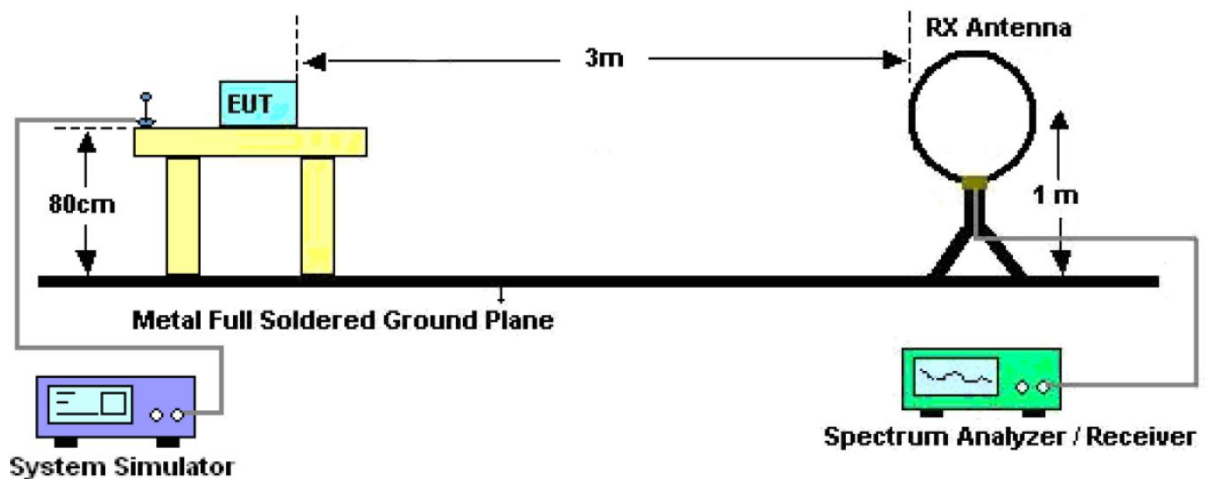


Figure 2. 30MHz to 1GHz

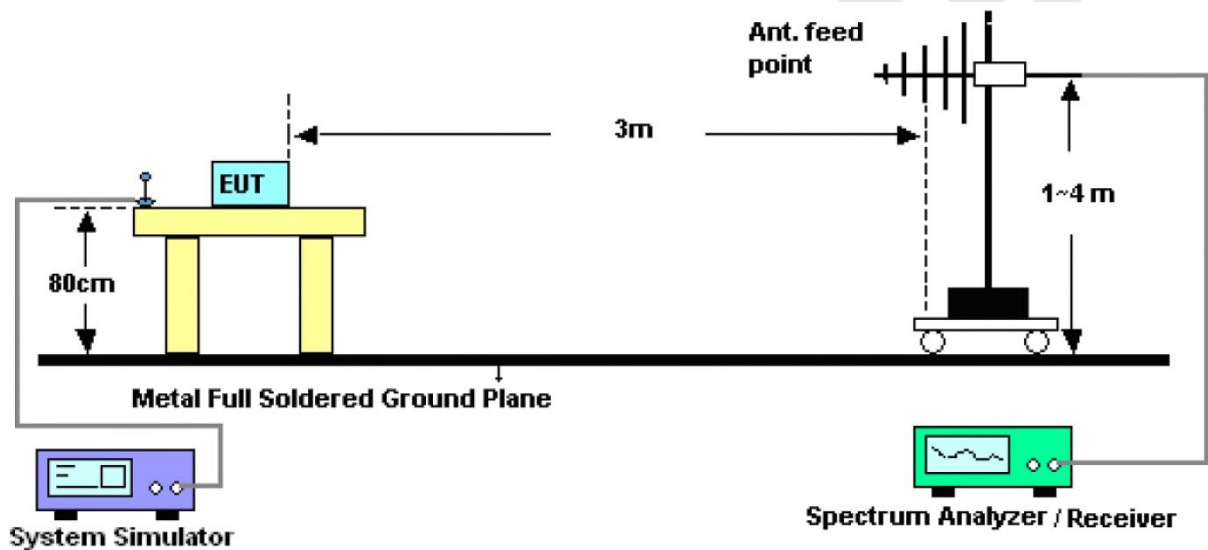
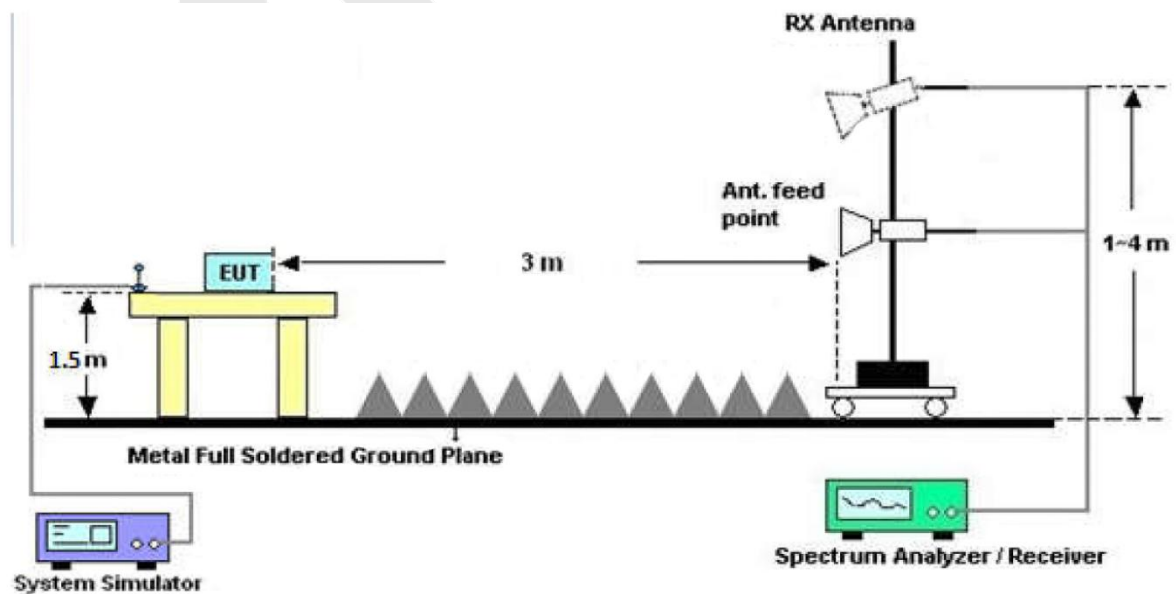


Figure 3. Above 1 GHz



4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

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.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

.

For above 1GHz,Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

4.4. Test Data

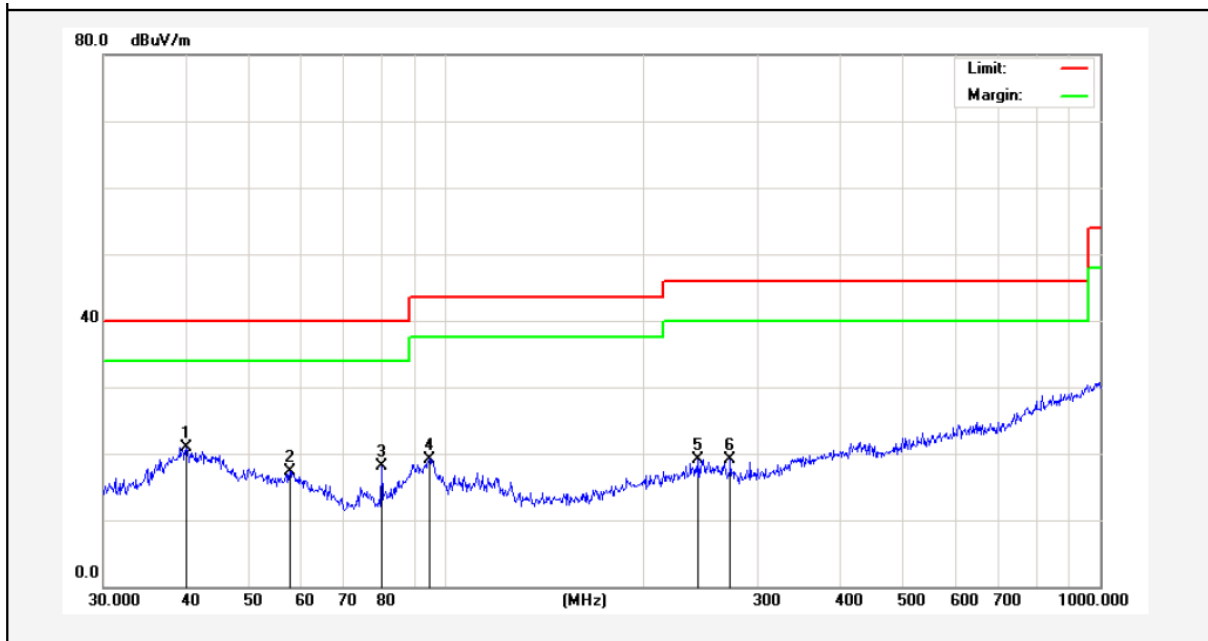
PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Results (30~1000MHz)

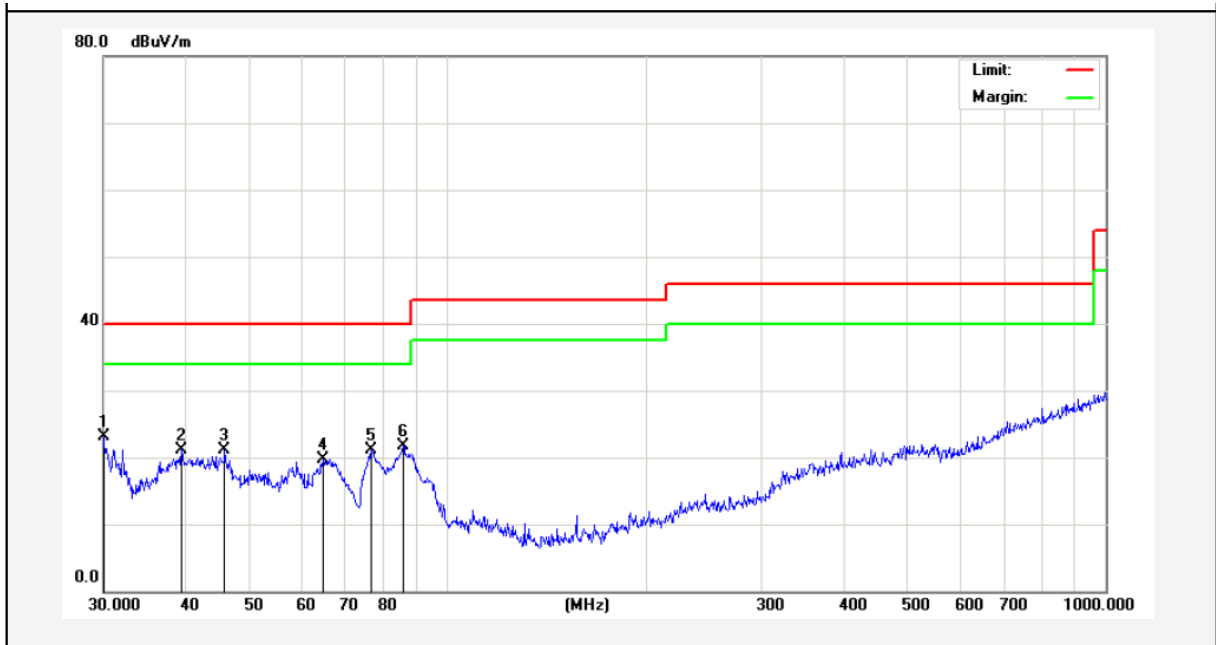
Job No.: 0217100073W Temp.(°C)/Hum.(%RH): 24.3°C/55%RH
Standard: FCC PART 15C Power Source: DC 3.7V
Test Mode: TX Mode Lowest CH Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	40.1347	31.89	-10.92	20.97	40.00	-19.03	QP	300	223	
2	57.7962	32.58	-15.19	17.39	40.00	-22.61	QP	300	214	
3	79.8003	39.96	-21.92	18.04	40.00	-21.96	QP	300	351	
4	94.4284	40.42	-21.22	19.20	43.50	-24.30	QP	300	246	
5	243.3772	37.28	-18.24	19.04	46.00	-26.96	QP	300	79	
6	272.2776	37.59	-18.52	19.07	46.00	-26.93	QP	300	99	

Test Results (30~1000MHz)

Job No.: 0217100073W Temp.(°C)/Hum.(%RH): 24.3°C/55%RH
Standard: FCC PART 15C Power Source: DC 3.7V
Test Mode: TX Mode Lowest CH Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	30.0000	40.07	-16.95	23.12	40.00	-16.88	QP	300	324	
2	39.4371	32.47	-11.27	21.20	40.00	-18.80	QP	300	247	
3	45.8553	34.09	-12.92	21.17	40.00	-18.83	QP	300	322	
4	64.6594	37.06	-17.33	19.73	40.00	-20.27	QP	300	144	
5	76.5121	41.57	-20.41	21.16	40.00	-18.84	QP	300	27	
6	85.5977	39.93	-18.28	21.65	40.00	-18.35	QP	300	34	

Test Results (1GHz-25GHz)

Test Mode: CH01 (Low channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2400.0000	93.31	31.09	2.10	35.23	91.27	114.00	-22.73	V	Peak
2400.0000	84.41	31.09	2.10	35.23	82.37	94.00	-11.63	V	AVG
4800.0000	47.42	33.98	2.49	34.54	49.35	74.00	-24.65	V	Peak
4800.0000	41.10	33.98	2.49	34.54	43.03	54.00	-10.97	V	AVG
7200.0000	40.48	36.01	2.78	34.89	44.38	74.00	-29.62	V	Peak
7200.0000	34.86	36.01	2.78	34.89	38.76	54.00	-15.24	V	AVG
9600.0000	*								
12000.0000	*								
14400.0000	*								
16800.0000	*								
2400.0000	90.39	31.09	2.10	35.23	88.35	114.00	-25.65	H	Peak
2400.0000	82.47	31.09	2.10	35.23	80.43	94.00	-13.57	H	AVG
4800.0000	44.65	33.98	2.49	34.54	46.58	74.00	-27.42	H	Peak
4800.0000	37.78	33.98	2.49	34.54	39.71	54.00	-14.29	H	AVG
7200.0000	40.12	36.01	2.78	34.89	44.02	74.00	-29.98	H	Peak
7200.0000	33.24	36.01	2.78	34.89	37.14	54.00	-16.86	H	AVG
9600.0000	*								
12000.0000	*								
14400.0000	*								
16800.0000	*								

Note:

1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Mode: CH41 (Middle channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2440.0000	92.42	31.12	2.20	34.51	91.23	114.00	-22.77	V	Peak
2440.0000	87.70	31.22	2.20	34.51	86.61	94.00	-7.39	V	AVG
4880.0000	47.40	34.98	2.49	34.14	50.73	74.00	-23.27	V	Peak
4880.0000	41.23	34.98	2.49	34.14	44.56	54.00	-9.44	V	AVG
7320.0000	38.54	36.01	3.01	34.56	43.00	74.00	-31.00	V	Peak
7320.0000	33.75	36.01	3.01	34.56	38.21	54.00	-15.79	V	AVG
9760.0000	*								
12200.0000	*								
14640.0000	*								
17080.0000	*								
2440.0000	89.87	31.12	2.20	34.51	88.68	114.00	-25.32	H	Peak
2440.0000	78.88	31.12	2.20	34.51	77.69	94.00	-16.31	H	AVG
4880.0000	42.54	34.98	2.49	34.14	45.87	74.00	-28.13	H	Peak
4880.0000	36.22	34.98	2.49	34.14	39.55	54.00	-14.45	H	AVG
7320.0000	35.65	36.01	3.01	34.56	40.11	74.00	-33.89	H	Peak
7320.0000	32.11	36.01	3.01	34.56	36.57	54.00	-17.43	H	AVG
9760.0000	*								
12200.0000	*								
14640.0000	*								
17080.0000	*								

Note:

1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Test Mode: CH81 (High channel)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.	Detector
2480.0000	93.01	31.66	2.23	36.08	90.82	114.00	-23.18	V	Peak
2480.0000	85.45	31.66	2.23	36.08	83.26	94.00	-10.74	V	AVG
4960.0000	48.21	35.06	2.61	34.94	50.94	74.00	-23.06	V	Peak
4960.0000	43.62	35.06	2.61	34.94	46.35	54.00	-7.65	V	AVG
7440.0000	37.93	36.20	3.12	35.12	42.13	74.00	-31.87	V	Peak
7440.0000	33.51	36.20	3.12	35.12	37.71	54.00	-16.29	V	AVG
9920.0000	*								
12400.0000	*								
14880.0000	*								
17360.0000	*								
2480.0000	90.67	31.66	2.23	36.08	88.48	114.00	-25.52	H	Peak
2480.0000	79.24	31.66	2.23	36.08	77.05	94.00	-16.95	H	AVG
4960.0000	44.55	35.06	2.61	34.94	47.28	74.00	-26.72	H	Peak
4960.0000	42.23	35.06	2.61	34.94	44.96	54.00	-9.04	H	AVG
7440.0000	38.65	36.20	3.12	35.12	42.85	74.00	-31.15	H	Peak
7440.0000	34.21	36.20	3.12	35.12	38.41	54.00	-15.59	H	AVG
9920.0000	*								
12400.0000	*								
14880.0000	*								
17360.0000	*								

Note:

1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

Radiated Band Edge:

Test Mode:					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	50.20	29.15	3.41	34.01	48.75	74.00	-25.25	V
2400.00	54.03	29.16	3.43	34.01	52.61	74.00	-21.39	V
2390.00	50.50	29.15	3.41	34.01	49.05	74.00	-24.95	H
2400.00	53.42	29.16	3.43	34.01	52.00	74.00	-22.00	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	40.48	29.15	3.41	34.01	39.03	54.00	-14.97	V
2400.00	43.78	29.16	3.43	34.01	42.36	54.00	-11.64	V
2390.00	40.12	29.15	3.41	34.01	38.67	54.00	-15.33	H
2400.00	42.85	29.16	3.43	34.01	41.43	54.00	-12.57	H

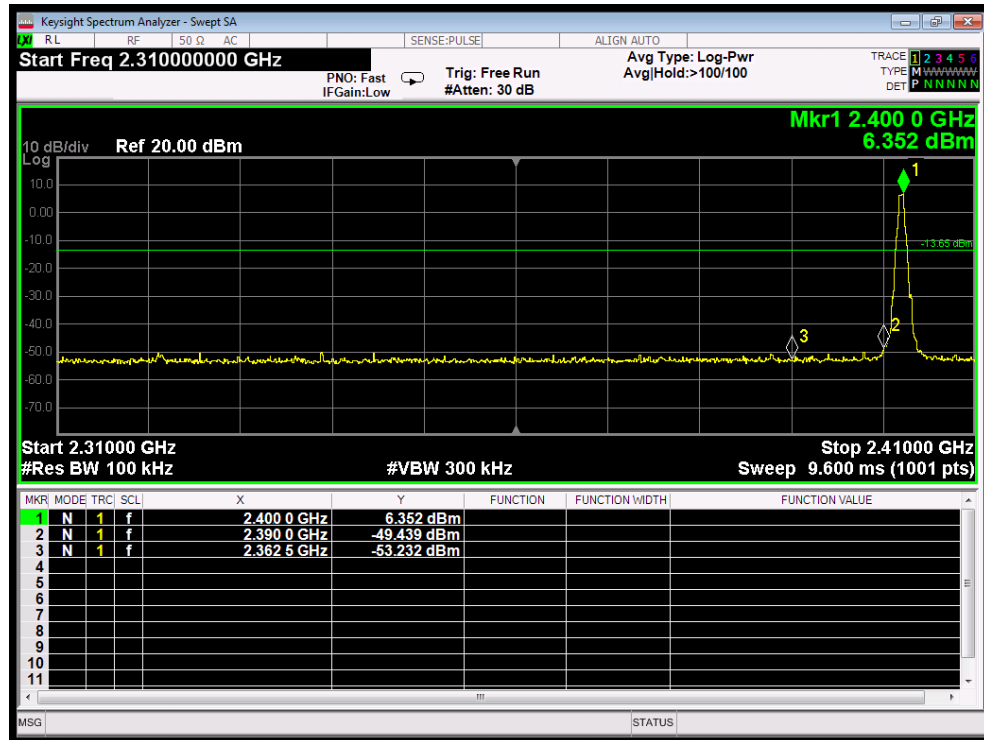
Test Mode:					Test channel: Highest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	55.32	29.28	3.53	34.03	54.10	74.00	-19.90	V
2500.00	51.41	29.30	3.56	34.03	50.24	74.00	-23.76	V
2483.50	56.24	29.28	3.53	34.03	55.02	74.00	-18.98	H
2500.00	54.63	29.30	3.56	34.03	53.46	74.00	-20.54	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2483.50	43.50	29.28	3.53	34.03	42.28	54.00	-11.72	V
2500.00	40.21	29.30	3.56	34.03	39.04	54.00	-14.96	V
2483.50	40.77	29.28	3.53	34.03	39.55	54.00	-14.45	H
2500.00	37.14	29.30	3.56	34.03	35.97	54.00	-18.03	H

Remark:

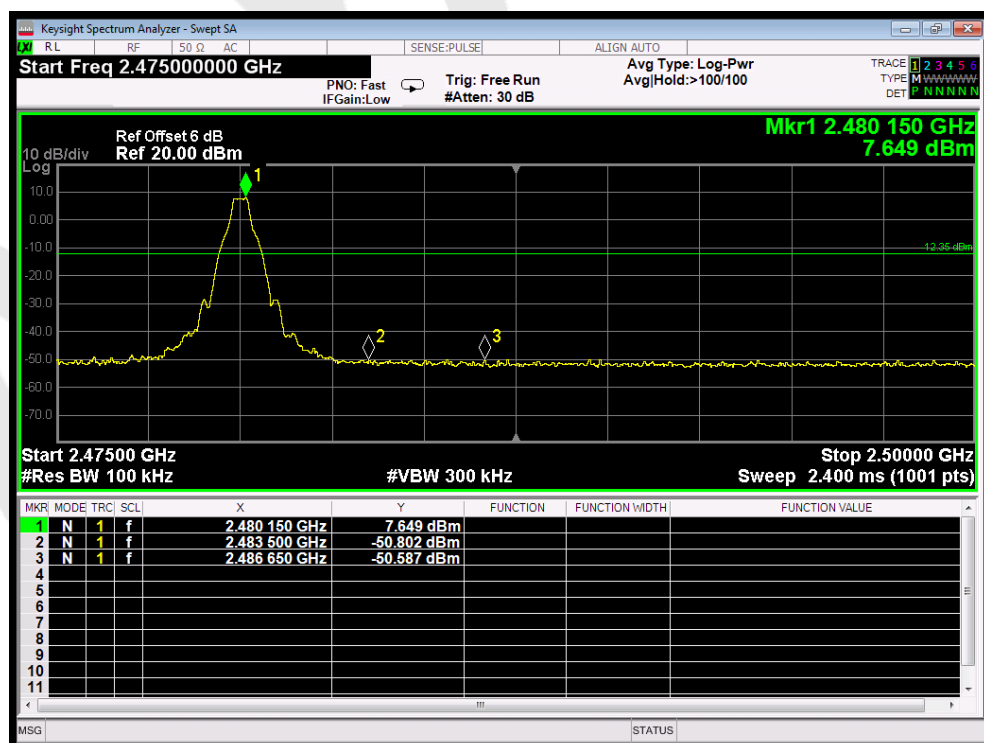
1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Conducted band edge

Frequency Band (MHz)	Delta Peak toBand Emission (dBc)	Limit (dBc)	Results
2400	55.791	>50	PASS
2480	58.451	>50	PASS

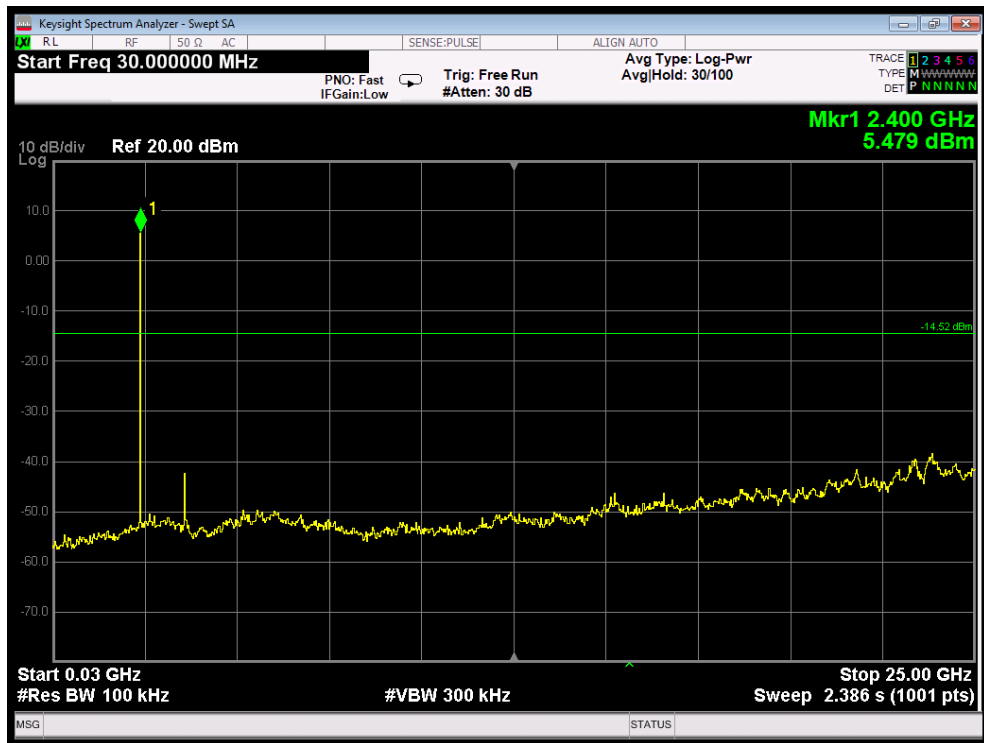


Lowest

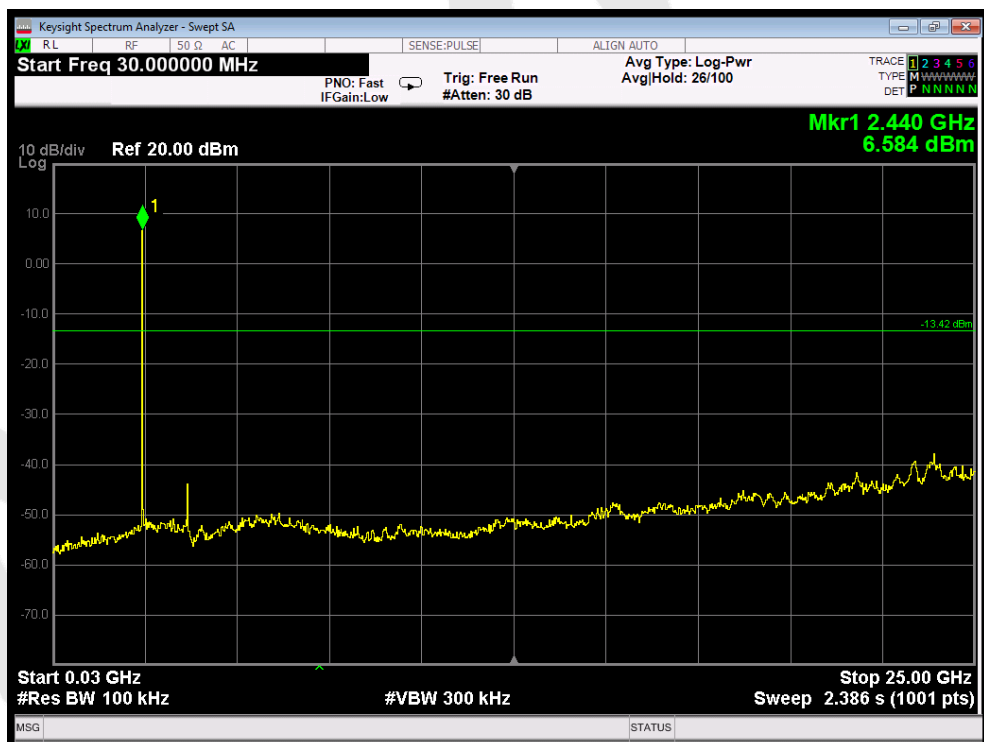


Highest

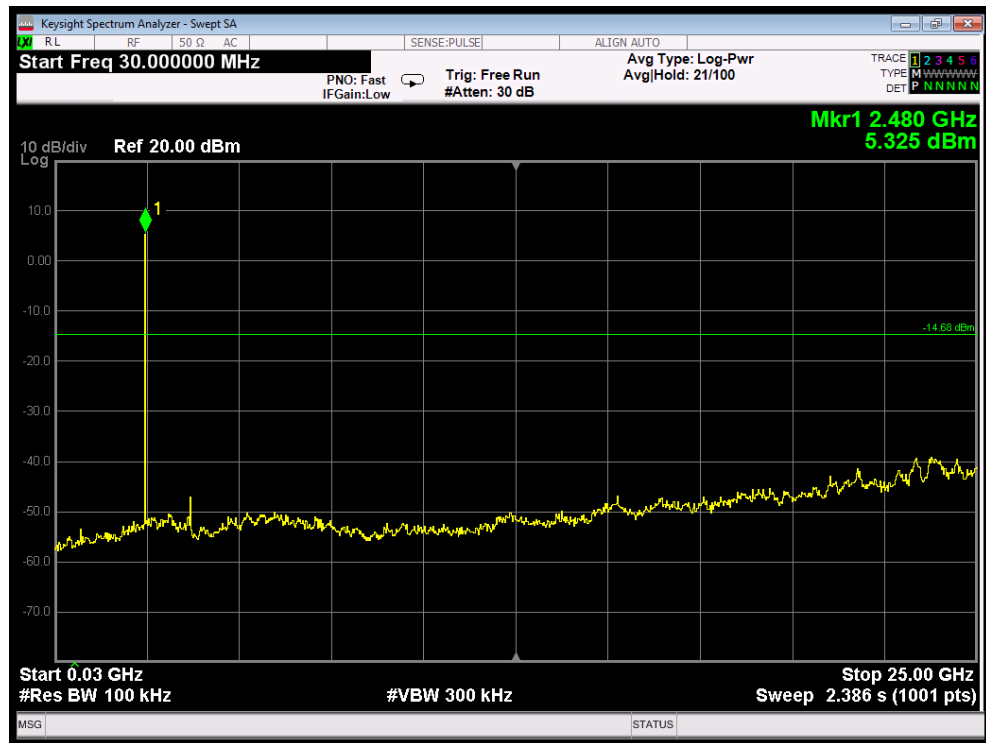
Conducted Emission Method



CH: Low



CH: Middle



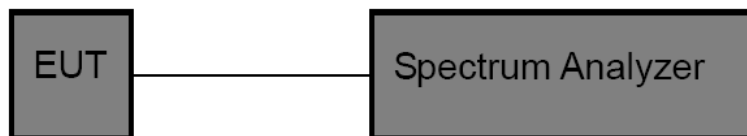
CH: High

5. 20dB Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.249
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5.2. Test Setup



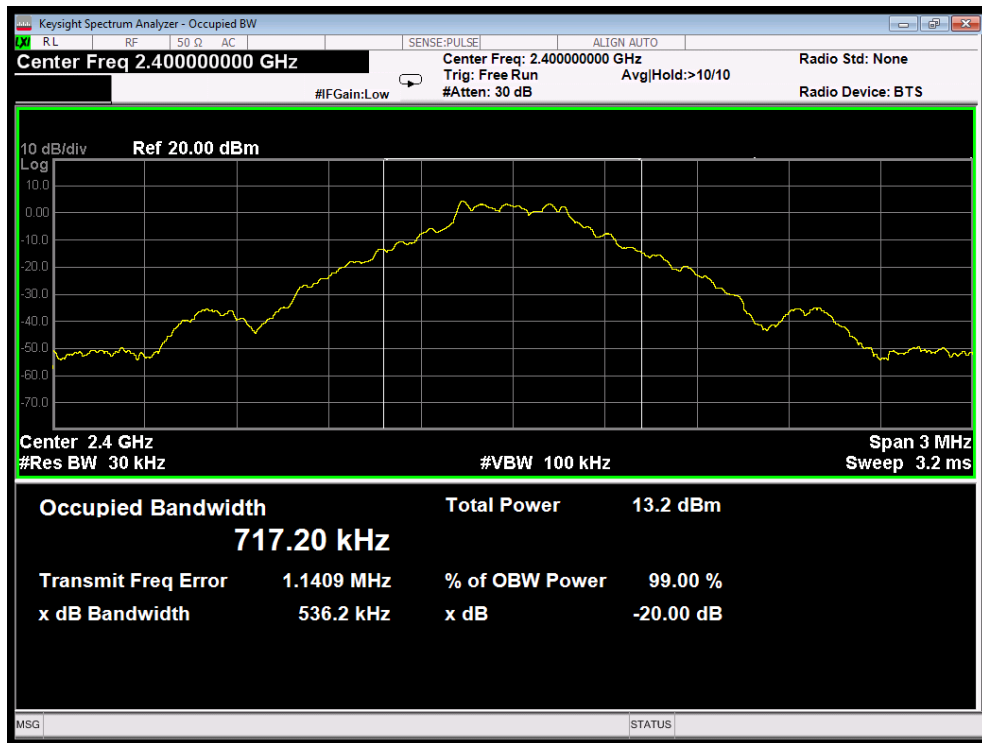
5.3. Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
RBW = 30kHz, VBW ≥ 3*RBW = 100kHz,
Detector= Average
Trace mode= Max hold.
Sweep- auto couple.
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

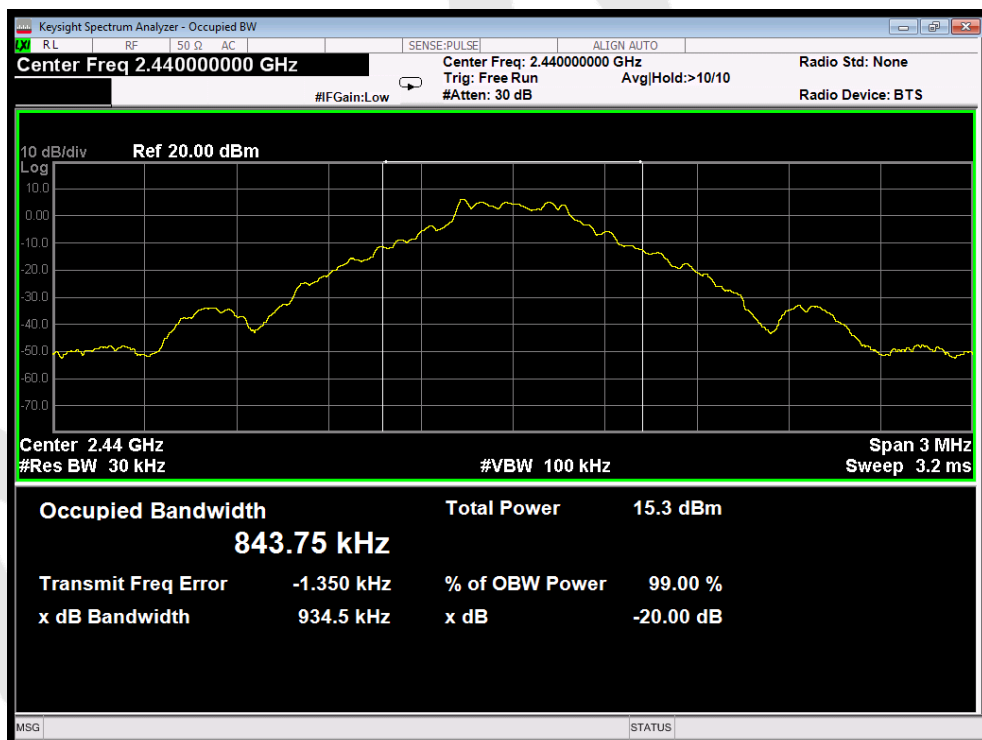
5.4. Test Data

Test Item	: 20dB Bandwidth	Test Mode	: TX Mode
Test Voltage	: DC 3.7V	Temperature	: 24℃
Test Result	: PASS	Humidity	: 55%RH

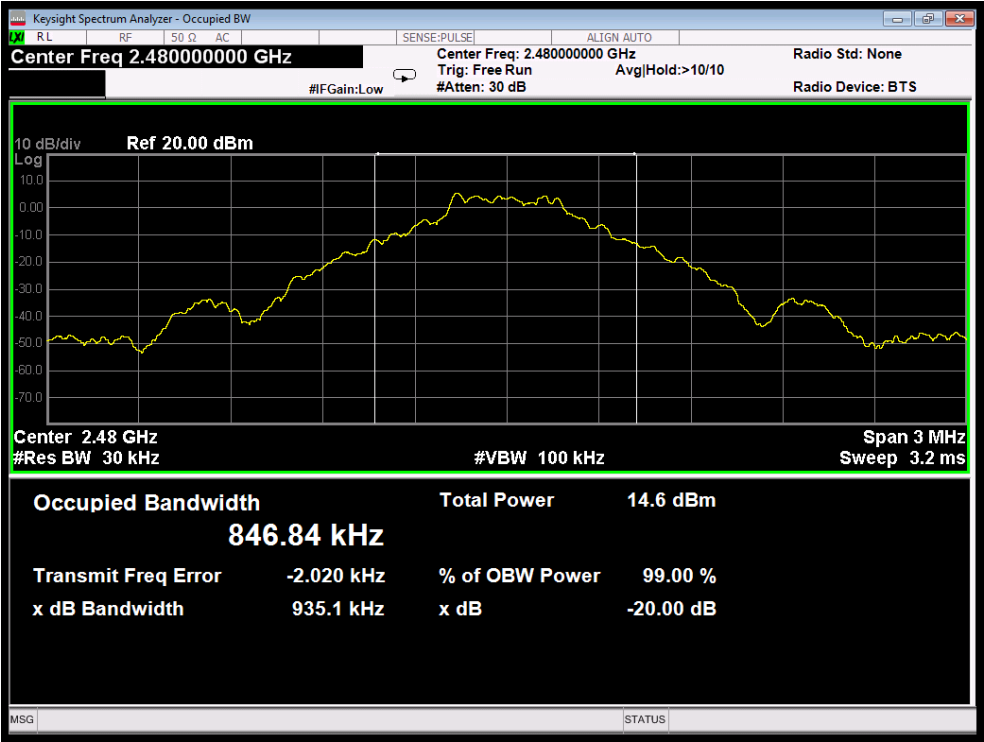
Frequency (MHz)	Bandwidth (kHz)	Result
2400MHZ	536.2	PASS
2440MHZ	934.5	PASS
2480MHZ	935.1	PASS



Test Mode: Low



Test Mode: Middle



Test Mode: High

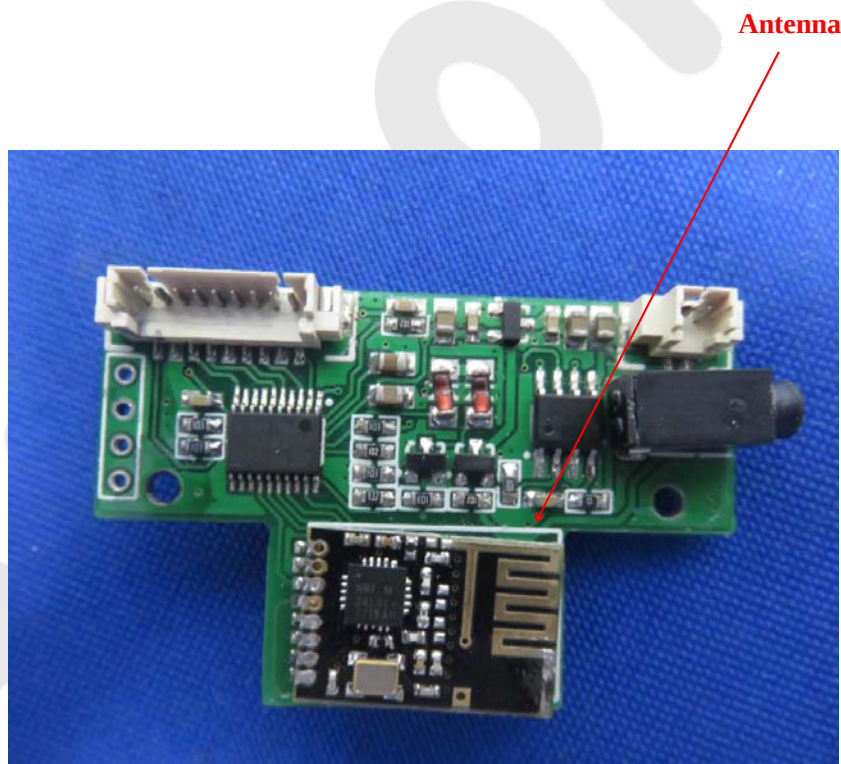
6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	1) 15.203 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, 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.

6.2. Antenna Connected Construction

The antenna is a PCB Antenna which permanently attached, and the best case gain of the antenna is 2 dBi. It complies with the standard requirement.

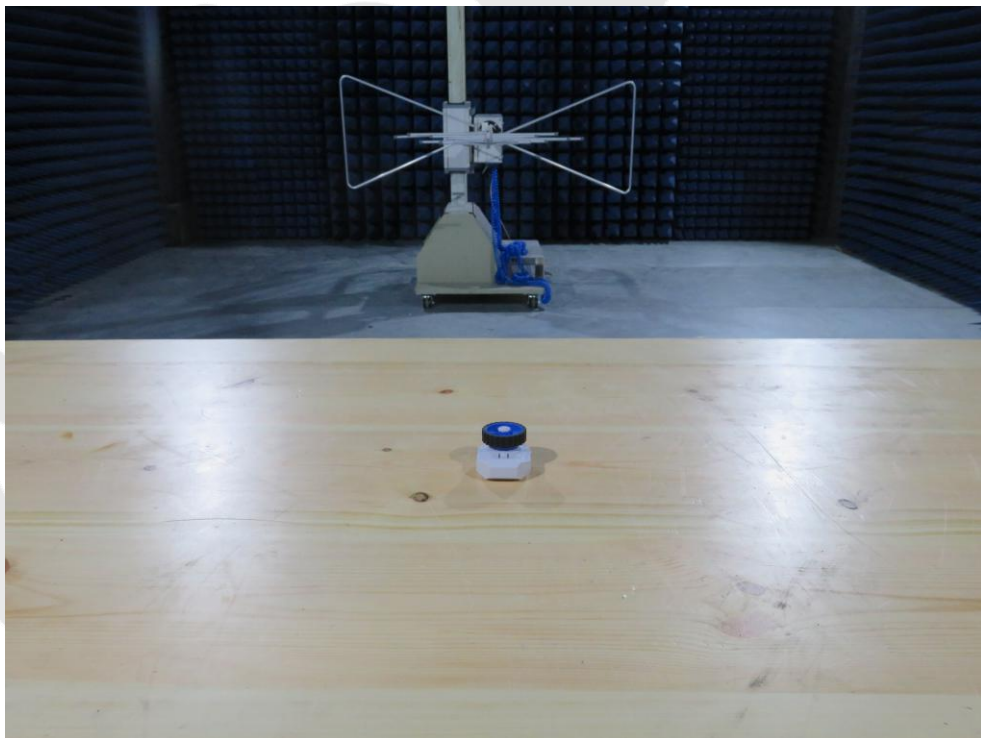


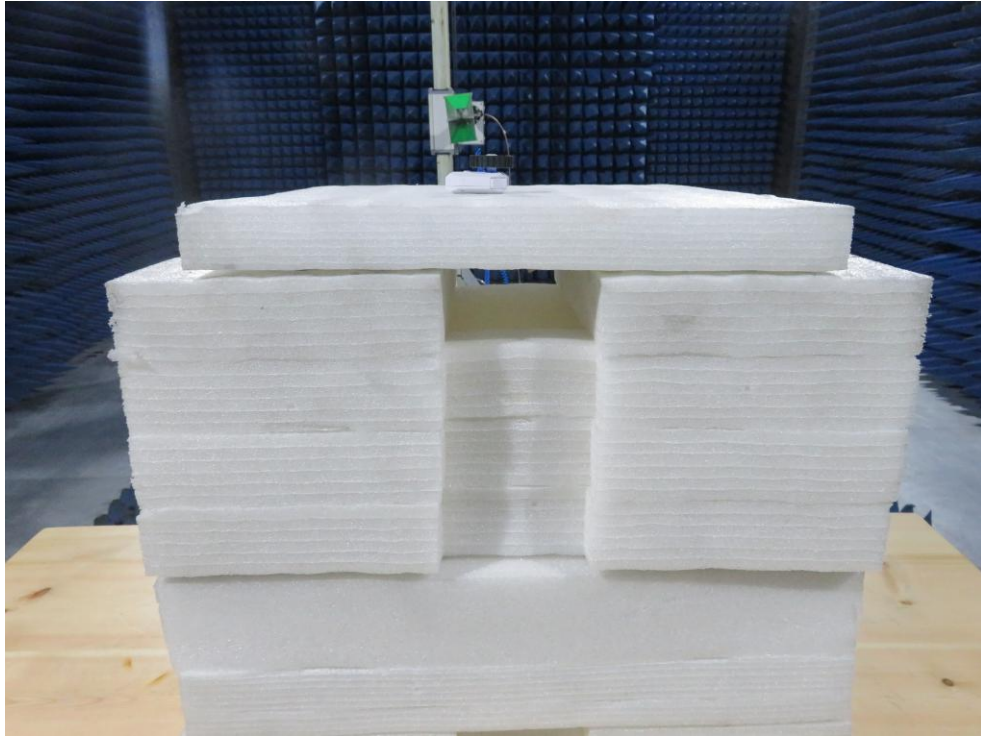
APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Conducted Emission Test



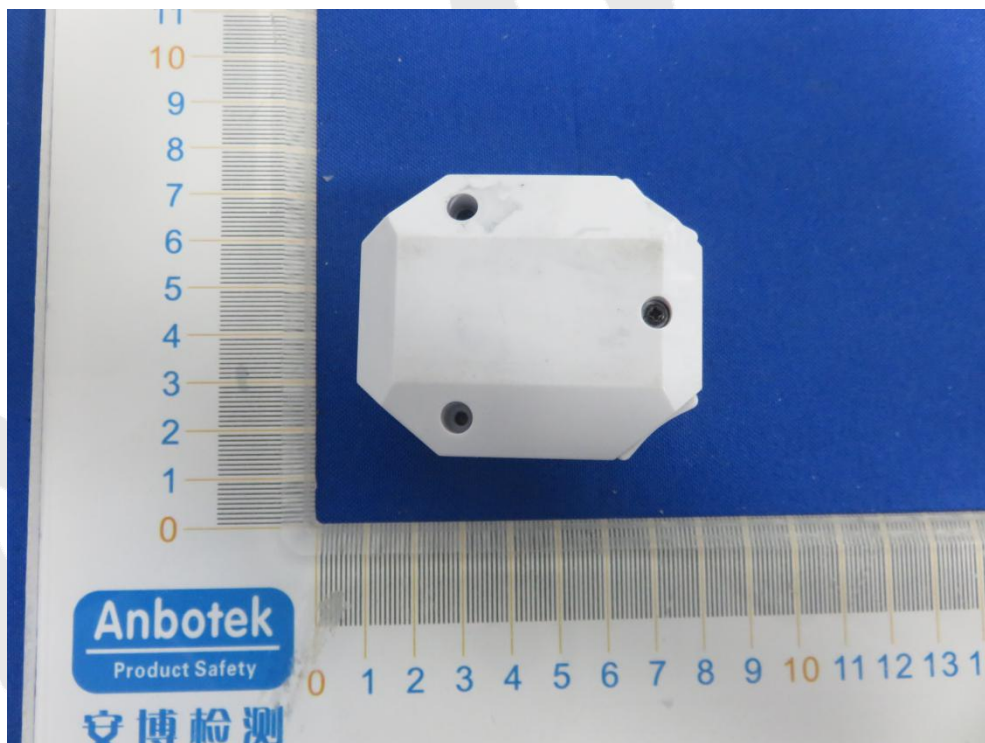
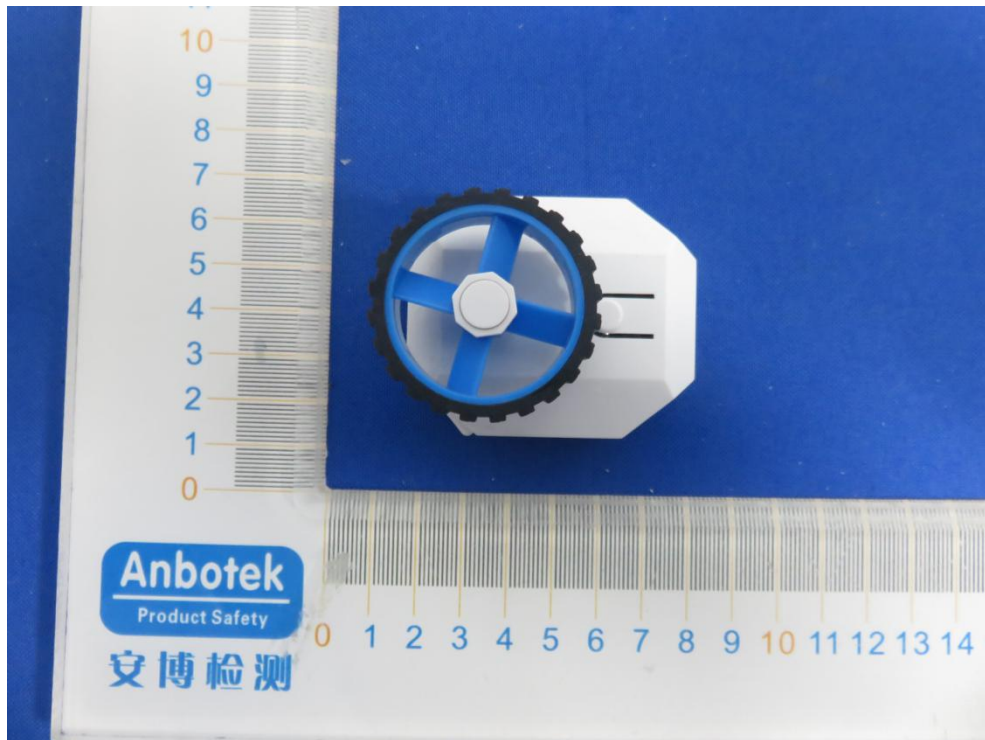
Photo of Radiation Emission Test

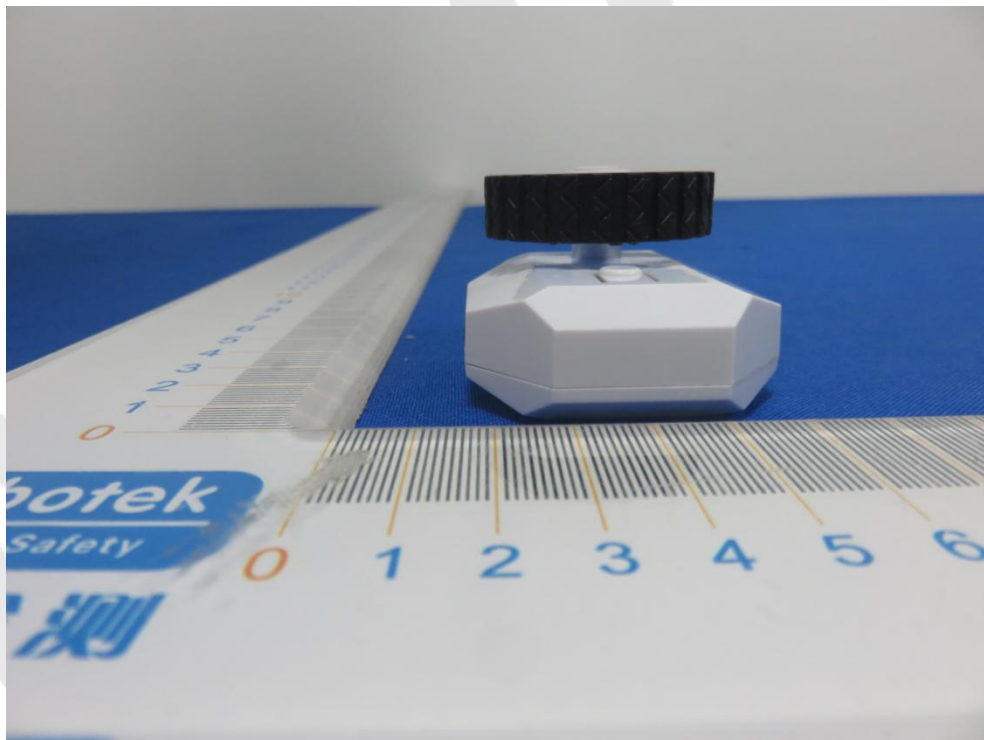
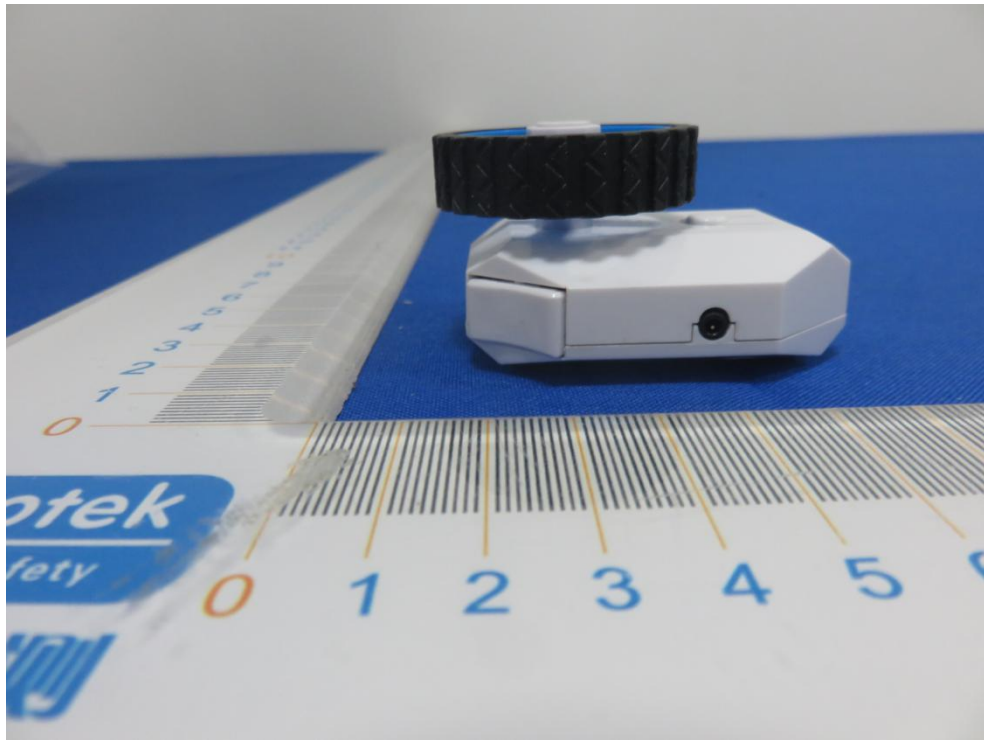


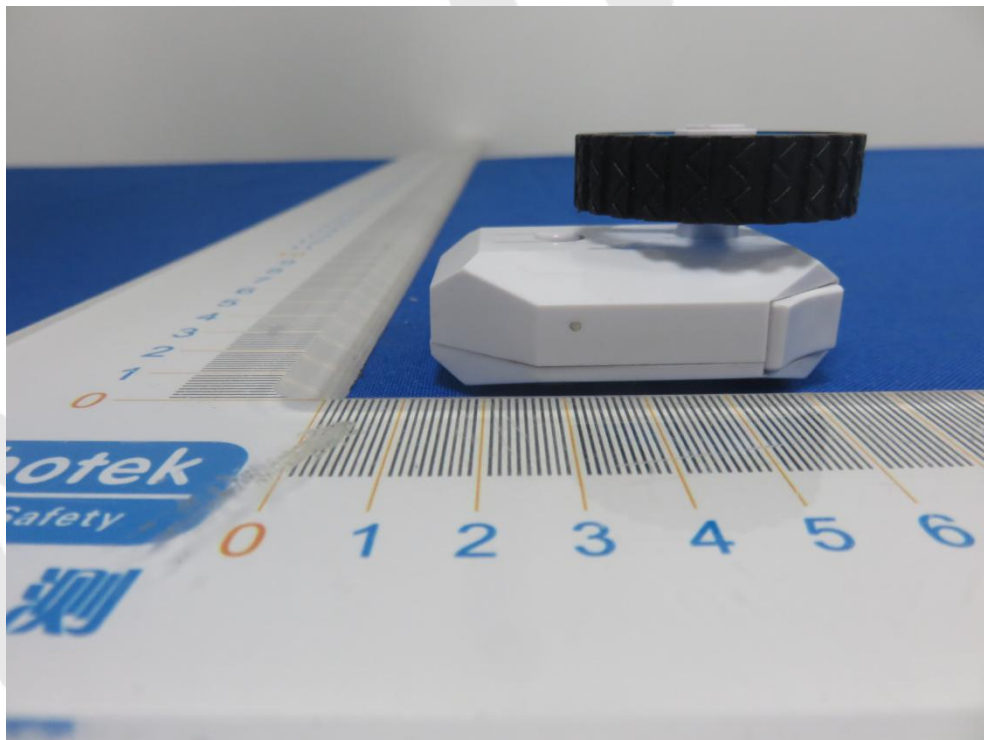
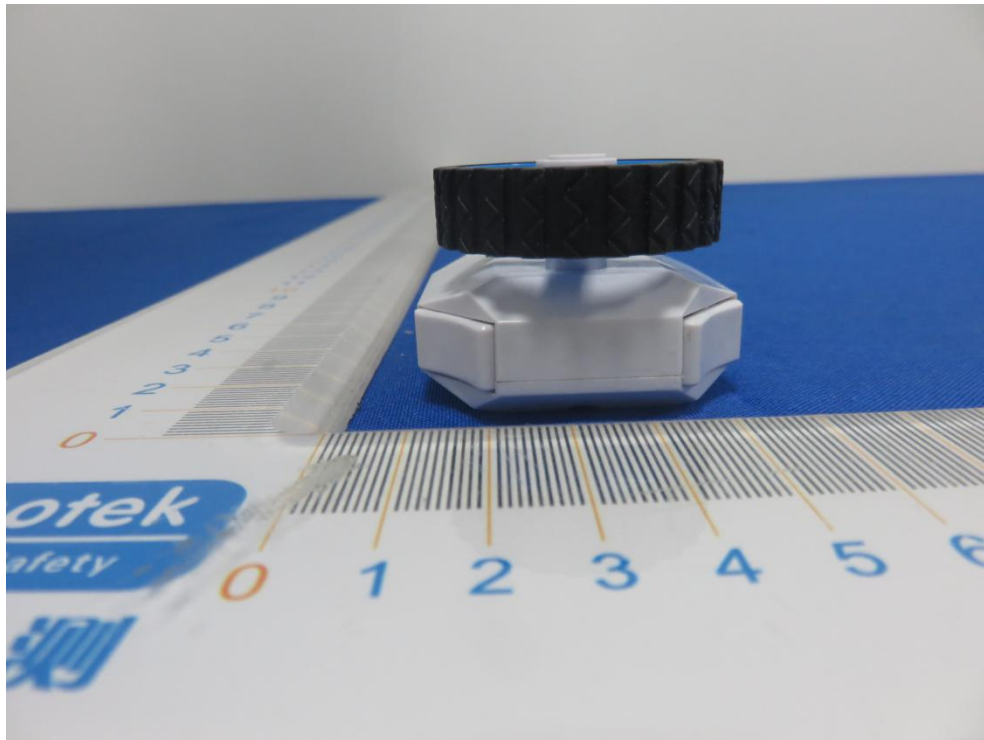


APPENDIX II -- EXTERNAL PHOTOGRAPH

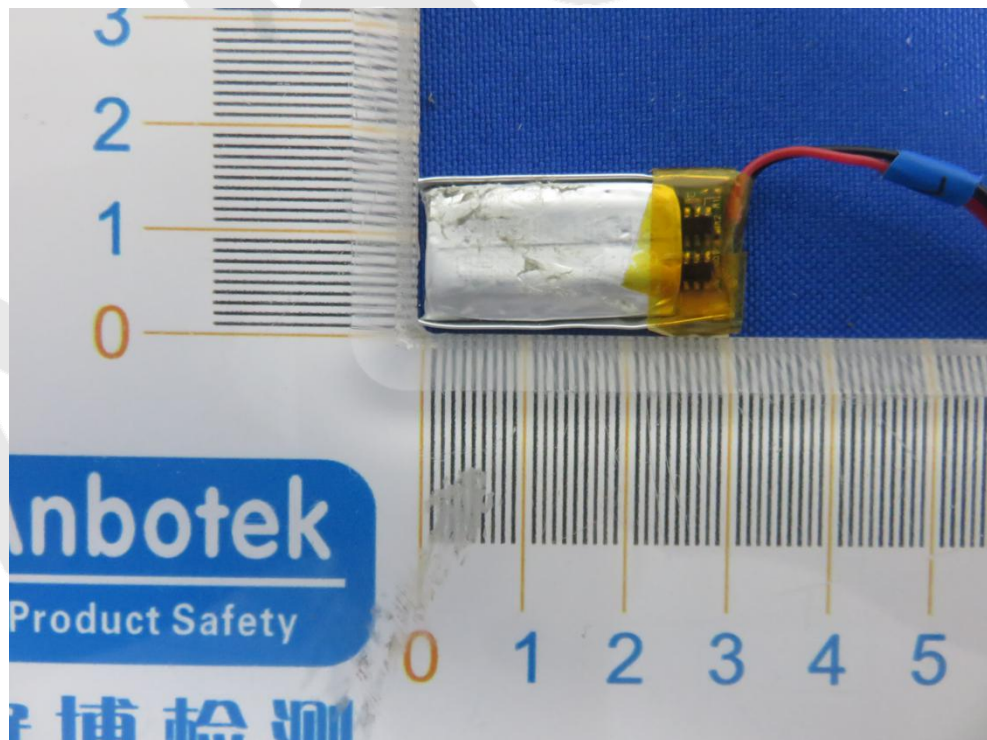
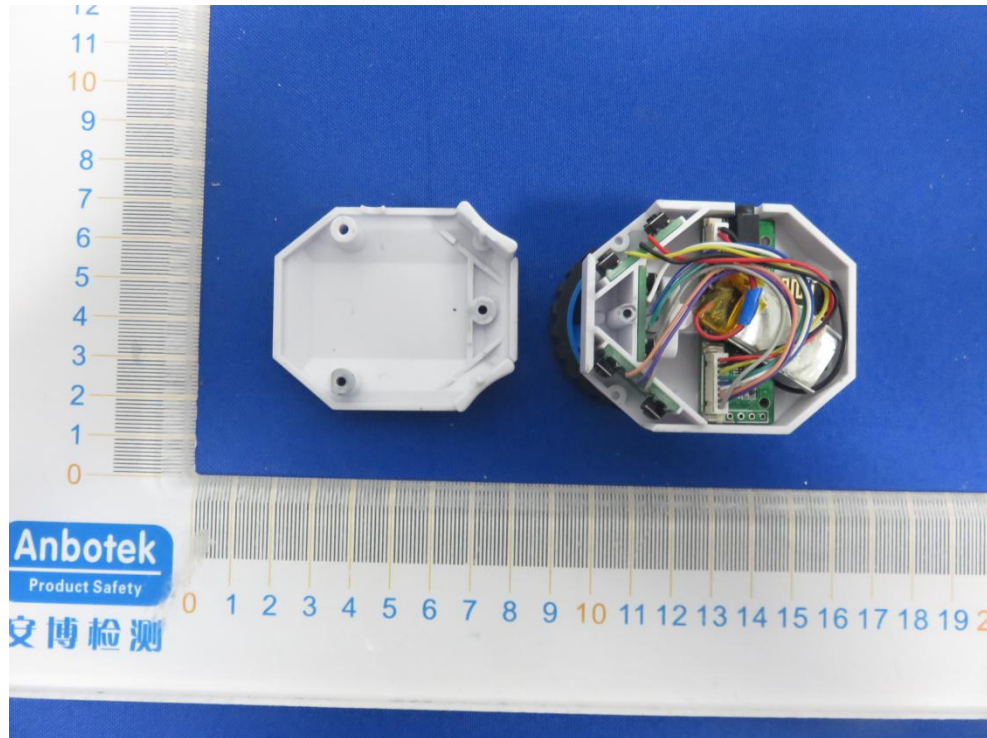


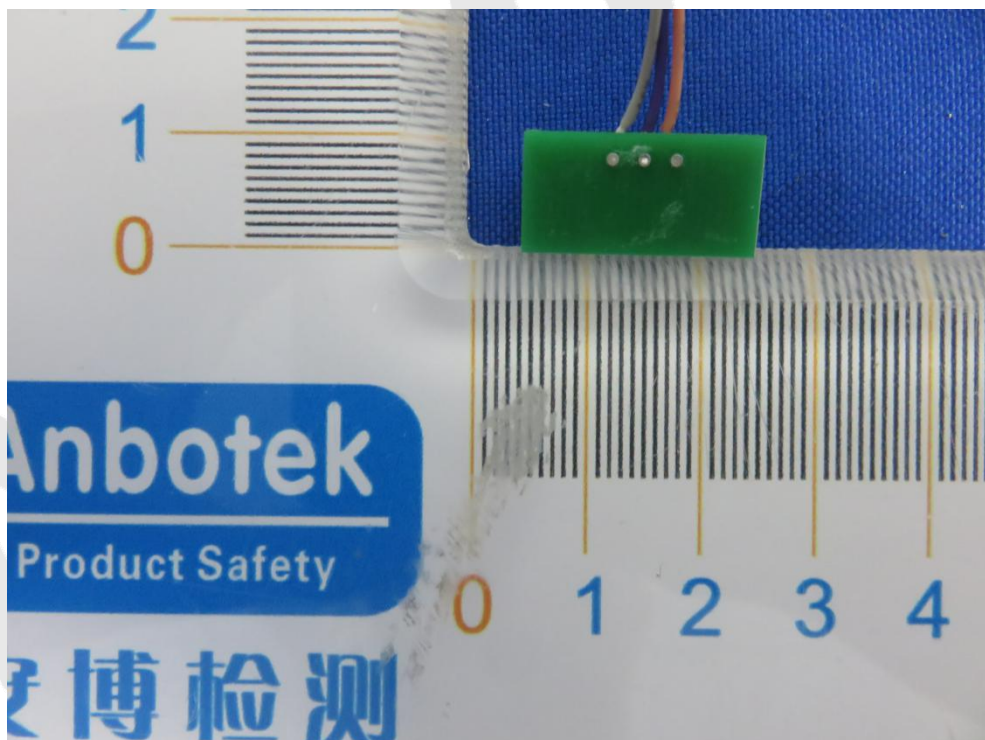
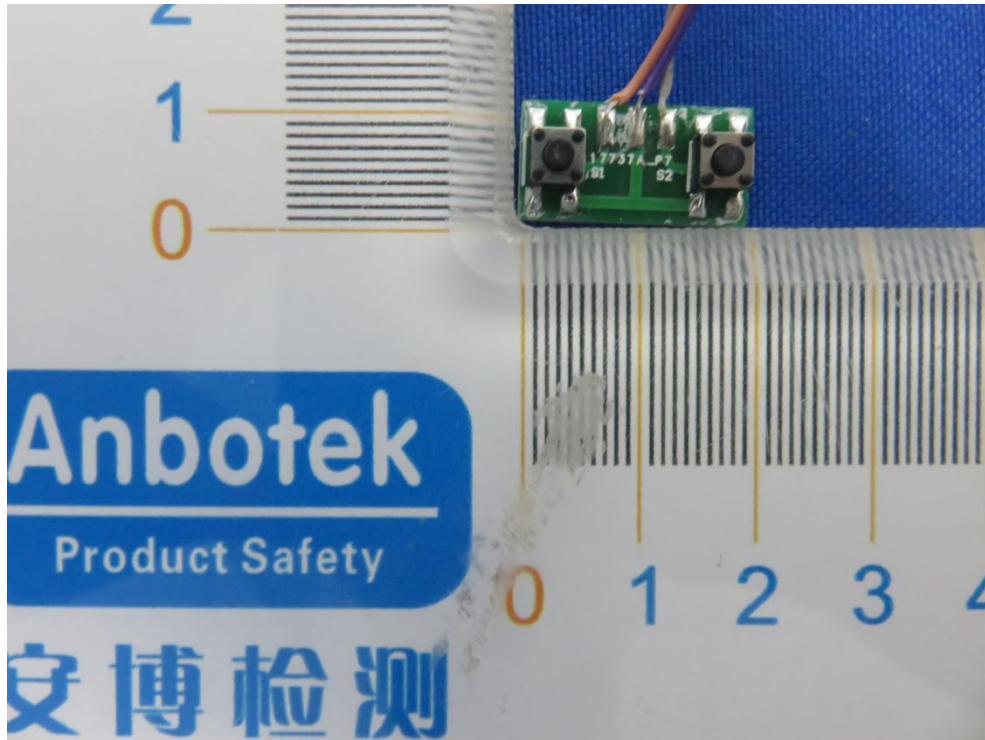


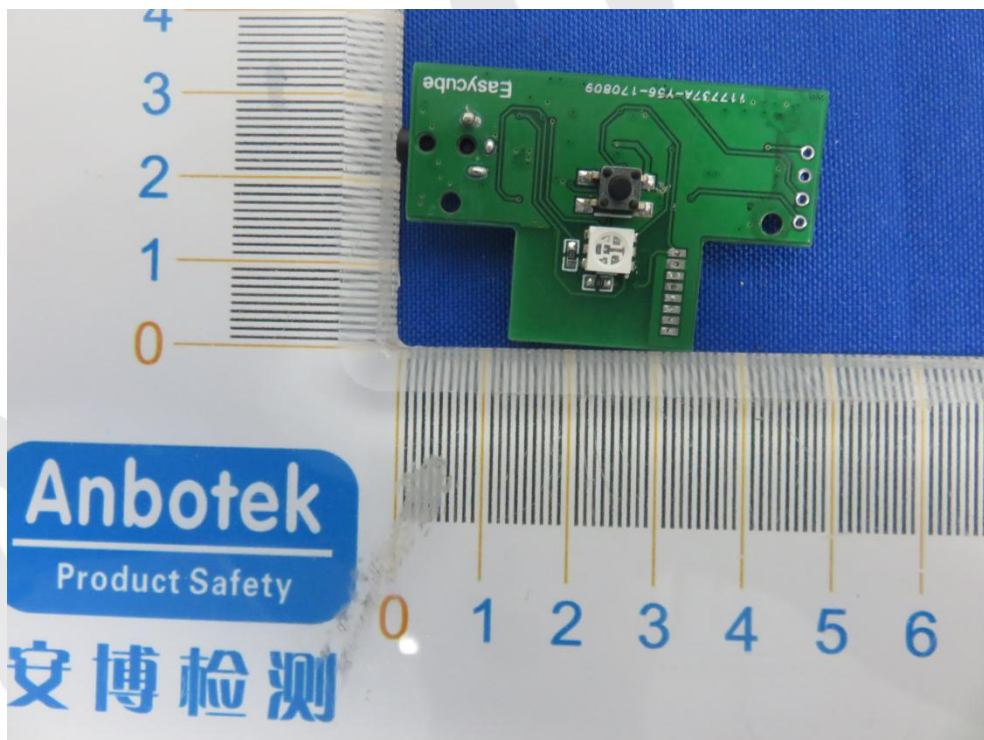
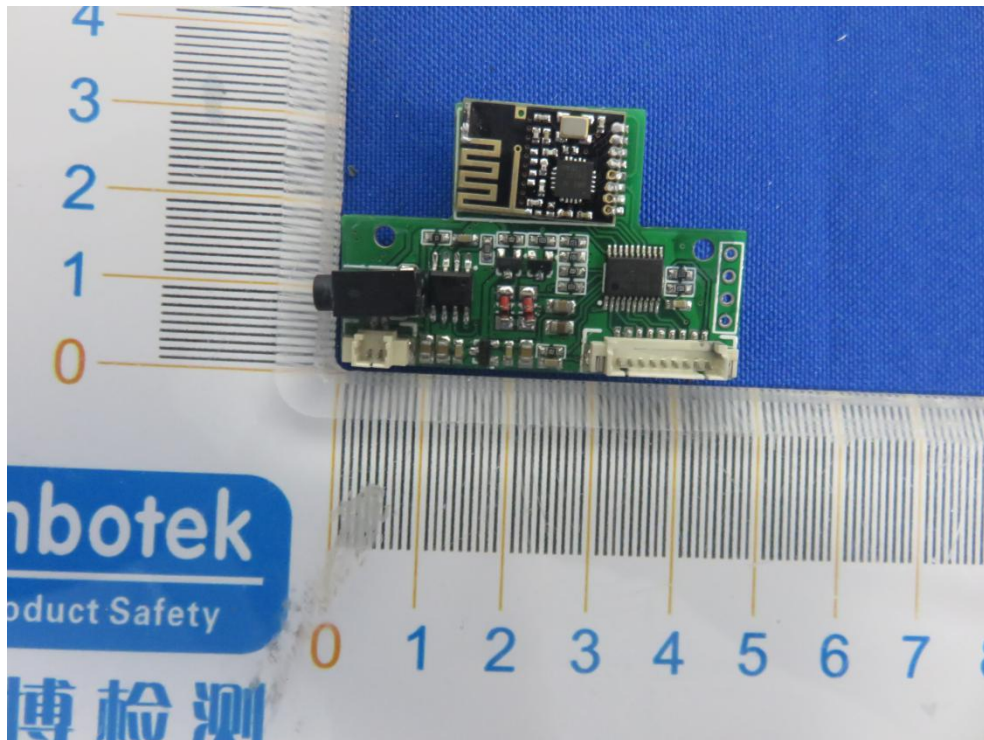


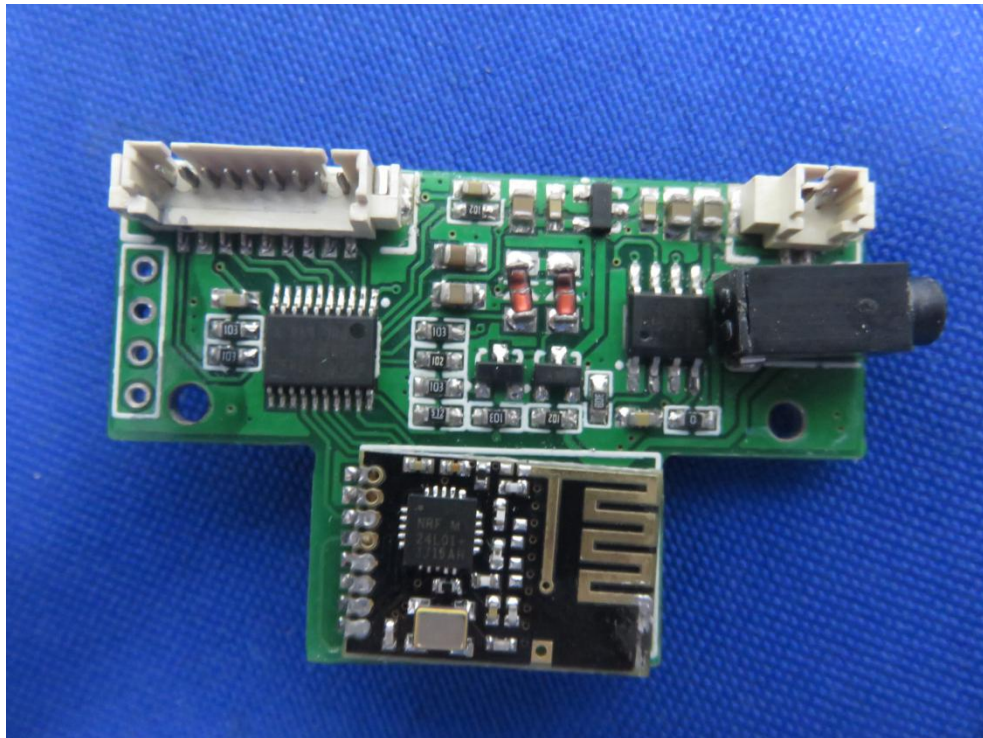


APPENDIX III -- INTERNAL PHOTOGRAPH









----- End of Report -----