

FCC TEST REPORT

For

Shanghai Wenheng Electronics Technology Co., Ltd.

LoRa Module

Model No.: WH-L101, WH-L100, WH-L102, WH-L103, WH-L104, WH-L105, WH-L106,
WH-L107, WH-L108, WH-L109, WH-L200, WH-L201, WH-L202, WH-L203, WH-L204,
WH-L205, WH-L206, WH-L207, WH-L208, WH-L209, WH-LR30, WH-LR31, WH-LR32,
WH-LR33, WH-LR34, WH-LR35, WH-LR36, WH-LR37, WH-LR38, WH-LR39

Prepared For : Shanghai Wenheng Electronics Technology Co., Ltd.
Address : Room 611, Building5, Xizi International Center No.898 Xiuwen Street,
Minhang District, ShangHai, China

Prepared By : Shenzhen Anbotech Compliance Laboratory Limited
Address : 1/F, Building D, Sogood Science and Technology Park, Sanwei
community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong,
China.518102

Tel: (86) 755-26066440 Fax: (86) 755-26014772

Report Number : SZAWW180912007-01

Date of Receipt : Sept. 12, 2018

Date of Test : Sept. 13~ Nov. 05, 2018

Date of Report : Nov. 05, 2018

Contents

1. General Information.....	4
1.1. Client Information.....	4
1.2. Description of Device (EUT).....	4
1.3. Auxiliary Equipment Used During Test.....	4
1.4. Description of Test Modes.....	5
1.5. List of channels.....	5
1.6. Description of Test Setup.....	6
1.7. Test Equipment List.....	7
1.8. Description of Test Facility.....	8
2. Summary of Test Results.....	9
3. Conducted Emission Test.....	10
3.1. Test Standard and Limit.....	10
3.2. Test Setup.....	10
3.3. Test Procedure.....	10
3.4. Test Data.....	10
4. Radiation Spurious Emission and Band Edge.....	15
4.1. Test Standard and Limit.....	15
4.2. Test Setup.....	16
4.3. Test Procedure.....	17
4.4. Test Data.....	17
5. 20dB Bandwidth Test.....	26
5.1. Test Standard and Limit.....	26
5.2. Test Setup.....	26
5.3. Test Procedure.....	26
5.4. Test Data.....	26
6. Antenna Requirement.....	29
6.1. Test Standard and Requirement.....	29
6.2. Antenna Connected Construction.....	29
APPENDIX I -- TEST SETUP PHOTOGRAPH.....	30
APPENDIX II -- EXTERNAL PHOTOGRAPH.....	32
APPENDIX III -- INTERNAL PHOTOGRAPH.....	35

TEST REPORT

Applicant : Shanghai Wenheng Electronics Technology Co., Ltd.

Manufacturer : Shanghai Wenheng Electronics Technology Co., Ltd.

Product Name : LoRa Module

Model No. : WH-L101, WH-L100, WH-L102, WH-L103, WH-L104, WH-L105, WH-L106,
WH-L107, WH-L108, WH-L109, WH-L200, WH-L201, WH-L202, WH-L203,
WH-L204, WH-L205, WH-L206, WH-L207, WH-L208, WH-L209, WH-LR30,
WH-LR31, WH-LR32, WH-LR33, WH-LR34, WH-LR35, WH-LR36, WH-LR37,
WH-LR38, WH-LR39

Trade Mark : N.A.

Rating(s) : Input: DC 1.8V~3.6V, 200mA

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 Anbotech 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 Anbotech 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 Anbotech Compliance Laboratory Limited.

Date of Test

Sept. 13~ Nov. 05, 2018

Prepared by



Oliay Yang

(Engineer / Oliay Yang)

Reviewer

Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer

Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	Shanghai Wenheng Electronics Technology Co., Ltd.
Address	:	Room 611, Building5, Xizi International Center No.898 Xiuwen Street, Minhang District, ShangHai, China
Manufacturer	:	Shanghai Wenheng Electronics Technology Co., Ltd.
Address	:	Room 611, Building5, Xizi International Center No.898 Xiuwen Street, Minhang District, ShangHai, China
Factory	:	Shanghai Wenheng Electronics Technology Co., Ltd.
Address	:	Room 611, Building5, Xizi International Center No.898 Xiuwen Street, Minhang District, ShangHai, China

1.2. Description of Device (EUT)

Product Name	:	LoRa Module	
Model No.	:	WH-L101, WH-L100, WH-L102, WH-L103, WH-L104, WH-L105, WH-L106, WH-L107, WH-L108, WH-L109, WH-L200, WH-L201, WH-L202, WH-L203, WH-L204, WH-L205, WH-L206, WH-L207, WH-L208, WH-L209, WH-LR30, WH-LR31, WH-LR32, WH-LR33, WH-LR34, WH-LR35, WH-LR36, WH-LR37, WH-LR38, WH-LR39 (Note: All samples are the same except the color of model appearance, the label and the name, so we prepare "WH-L101" for test only.)	
Trade Mark	:	N.A.	
Test Power Supply	:	AC 240V, 60Hz for adapter/ AC 120V, 60Hz for adapter	
Test Sample No.	:	S1(Normal Sample), S2(Engineering Sample)	
Product Description	:	Operation Frequency:	905MHz~925MHz
		Modulation Type:	Lora
		Antenna Type:	Column Antenna(Auxiliary Antenna)
		Antenna Gain(Peak):	1 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	:	P/N: DQS051-0501000-16312A MODEL:DQS051-0501200-HC INPUT:AC 100-240V~ 50/60Hz, 0.15A Max Output: DC 5V, 1A
---------	---	---

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	CH01
Mode 2	CH11
Mode 3	CH21
Mode 4	Keeping TX+ Charging Mode

For Conducted Emission	
Final Test Mode	Description
Mode 4	Keeping TX+ Charging Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	CH01
Mode 2	CH11
Mode 3	CH21
Mode 4	Keeping TX+ Charging Mode

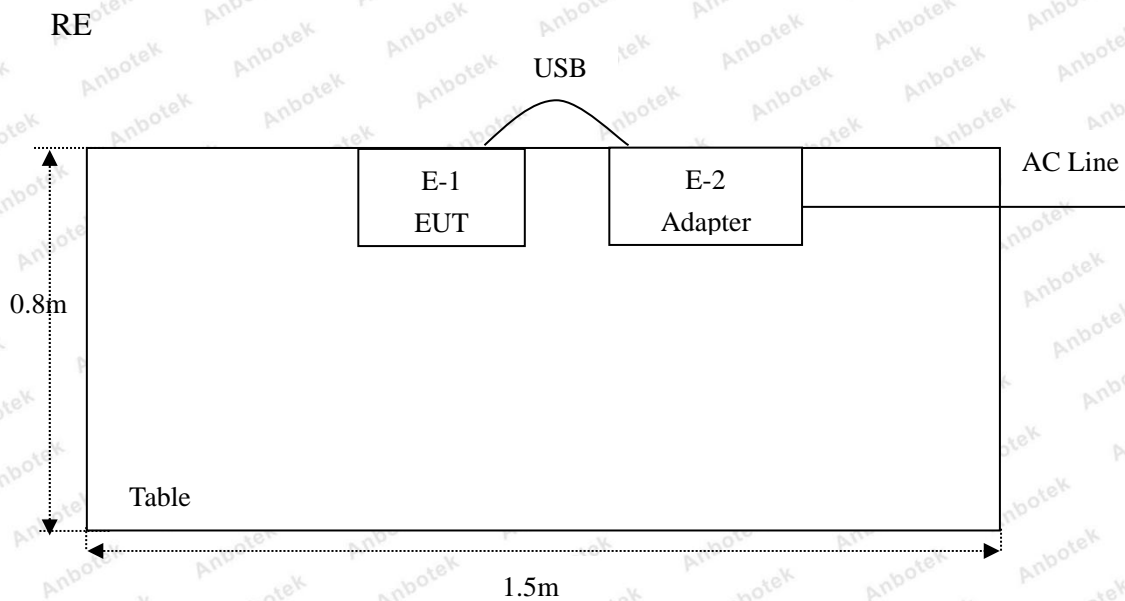
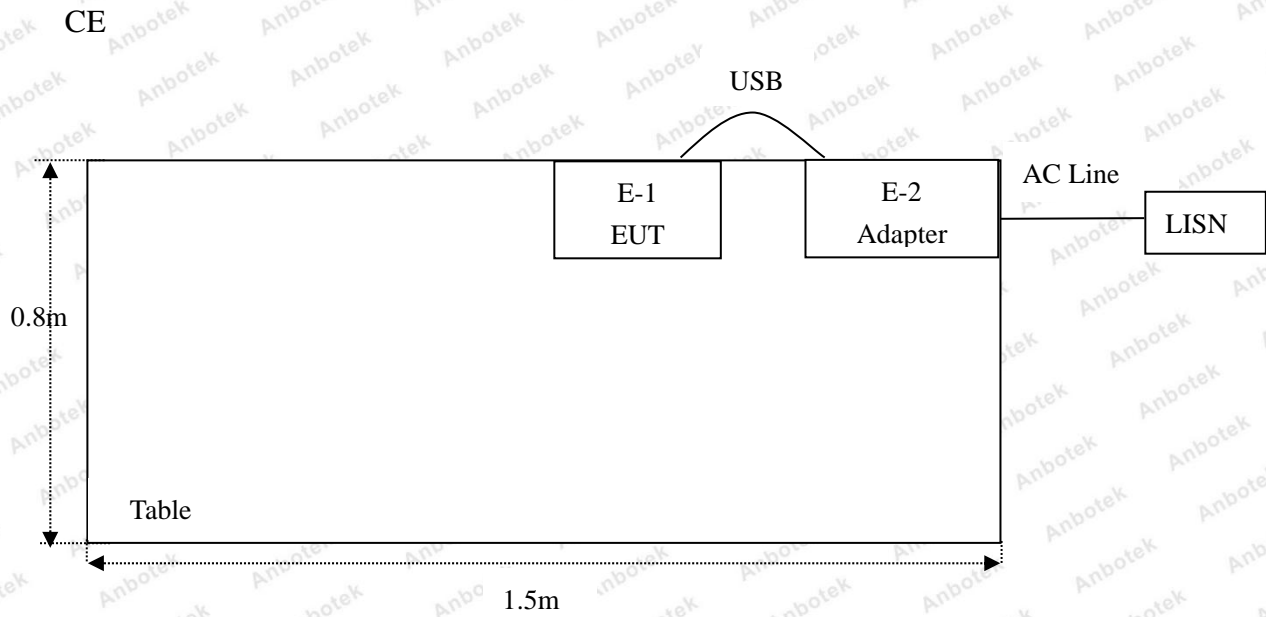
1.5. List of channels

Channel	Freq. (MHz)	Channel	Freq. (MHz)
01	905	12	916
02	906	13	917
03	907	14	918
04	908	15	919
05	909	16	920
06	910	17	921
07	911	18	922
08	912	19	923
09	913	20	924
10	914	21	925
11	915		

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.

1.6. Description of Test Setup



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	Nov. 05, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 05, 2018	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 19, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 19, 2018	1 Year
10.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Nov. 20, 2018	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Nov. 05, 2018	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 05, 2018	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 05, 2018	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 05, 2018	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Apr. 02, 2018	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 01, 2018	1 Year

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotech 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 Anbotech 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

Shenzhen Anbotech Compliance Laboratory Limited,
1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District,
Shenzhen, Guangdong, China.518102

2. Summary of Test Results

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

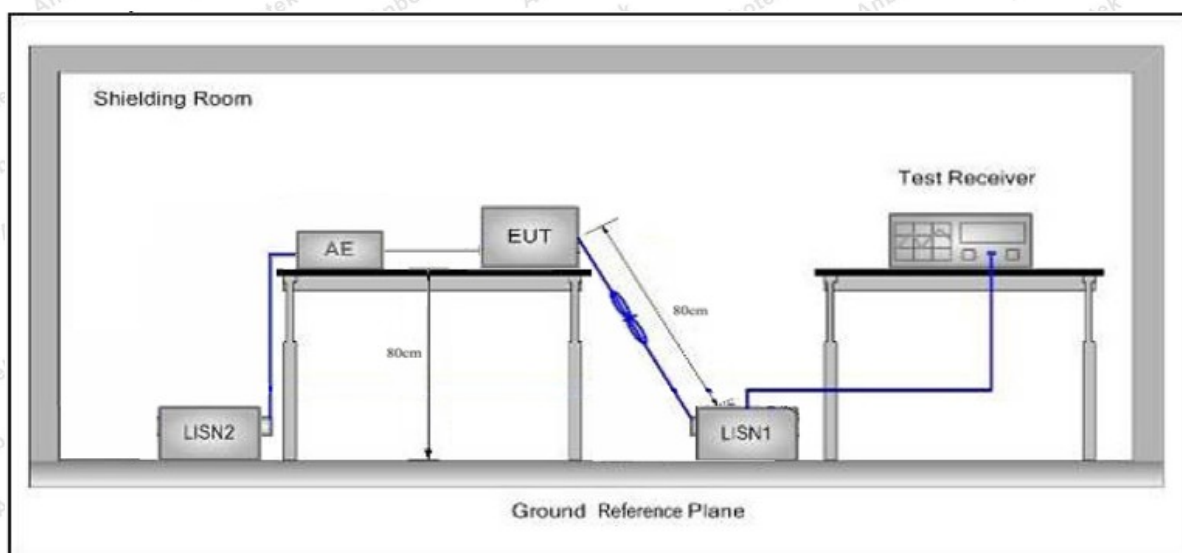
3. Conducted Emission Test

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.

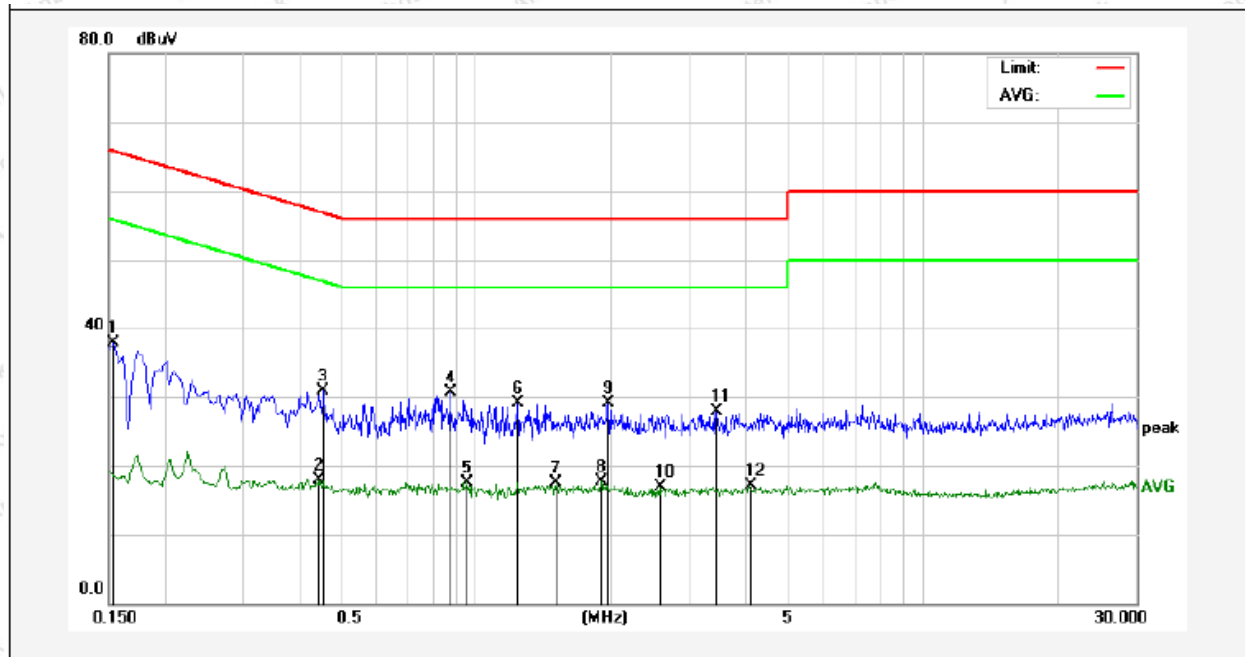
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages.

Conducted Emission Test Data

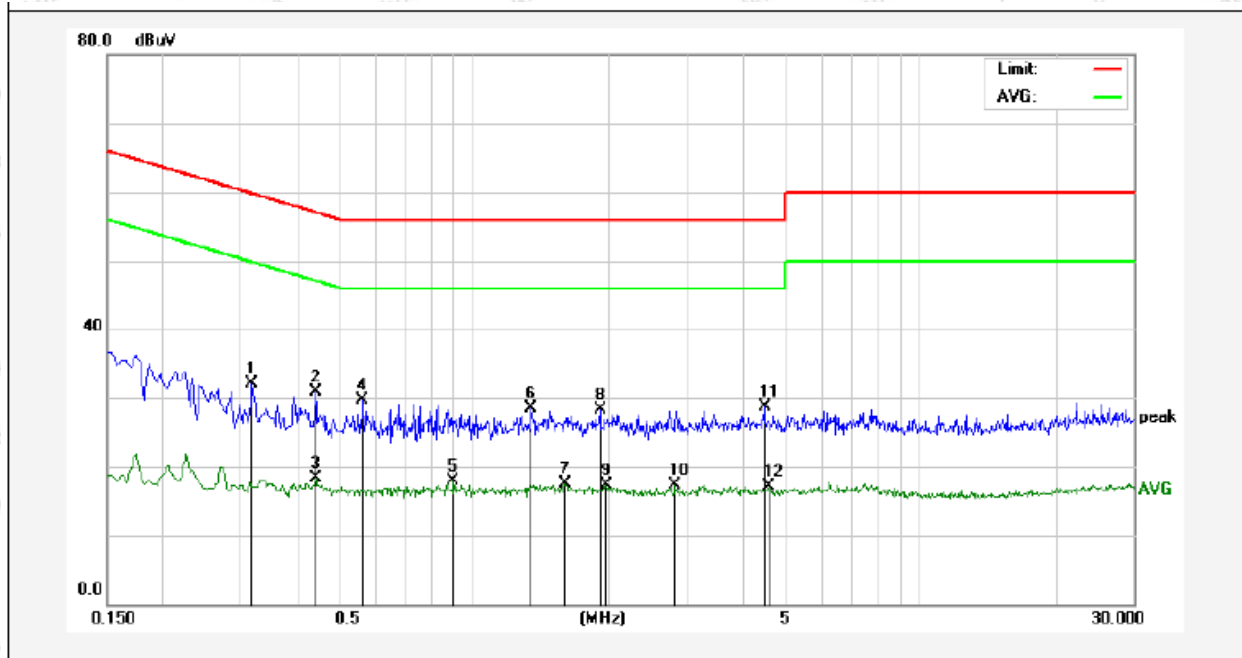
Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.: 24.8°C Hum.: 44%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1539	37.98	0.00	37.98	65.78	-27.80	QP	
2	0.4460	17.98	0.00	17.98	46.95	-28.97	AVG	
3	0.4540	30.97	0.00	30.97	56.80	-25.83	QP	
4	0.8740	30.71	0.00	30.71	56.00	-25.29	QP	
5	0.9540	17.60	0.00	17.60	46.00	-28.40	AVG	
6	1.2380	29.11	0.00	29.11	56.00	-26.89	QP	
7	1.5060	17.50	0.00	17.50	46.00	-28.50	AVG	
8	1.9060	17.61	0.00	17.61	46.00	-28.39	AVG	
9	1.9780	29.09	0.00	29.09	56.00	-26.91	QP	
10	2.5780	16.84	0.00	16.84	46.00	-29.16	AVG	
11	3.4420	27.90	0.00	27.90	56.00	-28.10	QP	
12	4.0820	17.05	0.00	17.05	46.00	-28.95	AVG	

Conducted Emission Test Data

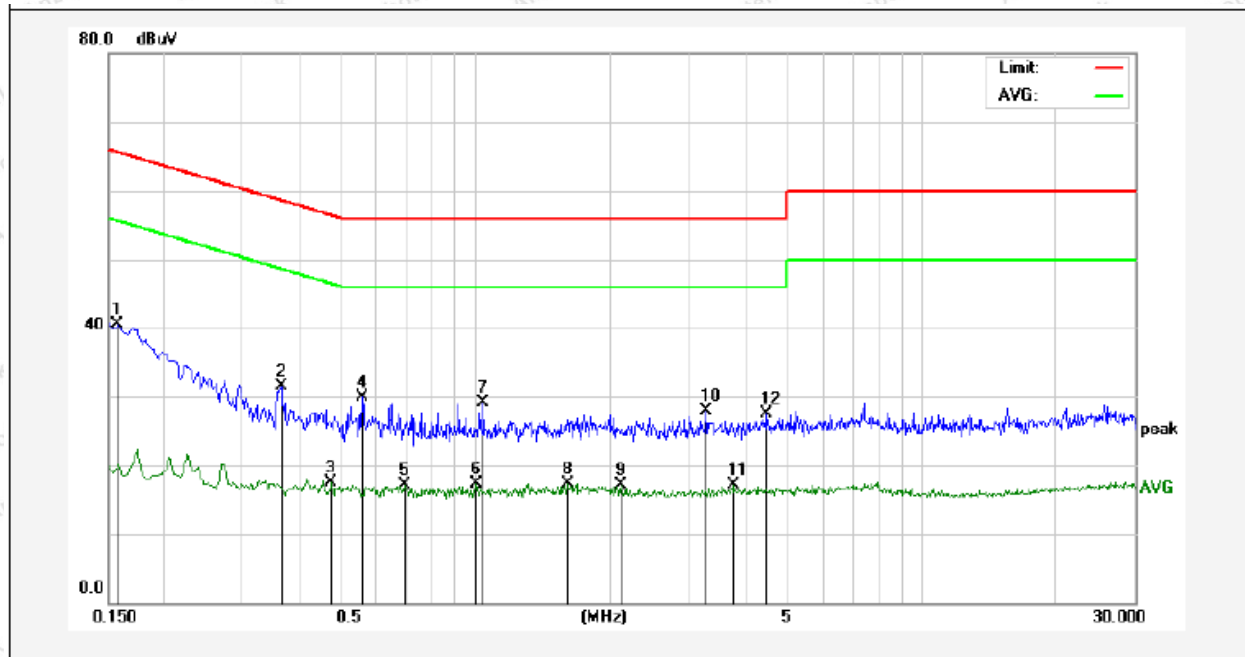
Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.: 24.8℃ Hum.: 44%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.3180	32.15	0.00	32.15	59.76	-27.61	QP	
2	0.4420	30.91	0.00	30.91	57.02	-26.11	QP	
3	0.4420	18.33	0.00	18.33	47.02	-28.69	AVG	
4	0.5620	29.73	0.00	29.73	56.00	-26.27	QP	
5	0.8980	17.96	0.00	17.96	46.00	-28.04	AVG	
6	1.3420	28.43	0.00	28.43	56.00	-27.57	QP	
7	1.5940	17.45	0.00	17.45	46.00	-28.55	AVG	
8	1.9180	28.37	0.00	28.37	56.00	-27.63	QP	
9	1.9780	17.29	0.00	17.29	46.00	-28.71	AVG	
10	2.8100	17.27	0.00	17.27	46.00	-28.73	AVG	
11	4.4699	28.74	0.00	28.74	56.00	-27.26	QP	
12	4.5700	17.13	0.00	17.13	46.00	-28.87	AVG	

Conducted Emission Test Data

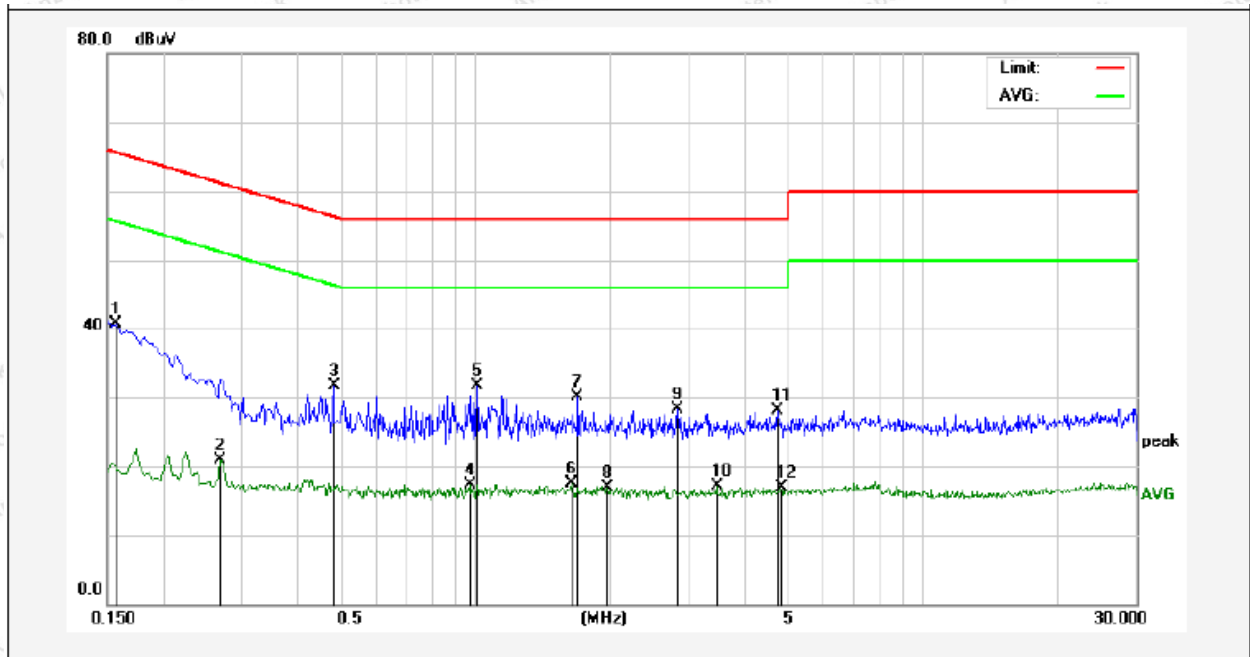
Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 24.8°C Hum.: 44%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1580	40.52	0.00	40.52	65.56	-25.04	QP	
2	0.3660	31.50	0.00	31.50	58.59	-27.09	QP	
3	0.4740	17.59	0.00	17.59	46.44	-28.85	AVG	
4	0.5580	29.84	0.00	29.84	56.00	-26.16	QP	
5	0.6900	17.06	0.00	17.06	46.00	-28.94	AVG	
6	1.0020	17.23	0.00	17.23	46.00	-28.77	AVG	
7	1.0380	29.04	0.00	29.04	56.00	-26.96	QP	
8	1.6100	17.33	0.00	17.33	46.00	-28.67	AVG	
9	2.1140	17.14	0.00	17.14	46.00	-28.86	AVG	
10	3.2900	27.86	0.00	27.86	56.00	-28.14	QP	
11	3.7740	17.04	0.00	17.04	46.00	-28.96	AVG	
12	4.4899	27.57	0.00	27.57	56.00	-28.43	QP	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Keeping TX+ Charging Mode
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 24.8°C Hum.: 44%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1580	40.68	0.00	40.68	65.56	-24.88	QP	
2	0.2700	20.84	0.00	20.84	51.12	-30.28	AVG	
3	0.4820	31.67	0.00	31.67	56.30	-24.63	QP	
4	0.9740	17.35	0.00	17.35	46.00	-28.65	AVG	
5	1.0060	31.68	0.00	31.68	56.00	-24.32	QP	
6	1.6420	17.44	0.00	17.44	46.00	-28.56	AVG	
7	1.6980	30.17	0.00	30.17	56.00	-25.83	QP	
8	1.9780	16.99	0.00	16.99	46.00	-29.01	AVG	
9	2.8260	28.23	0.00	28.23	56.00	-27.77	QP	
10	3.4580	17.08	0.00	17.08	46.00	-28.92	AVG	
11	4.7340	28.15	0.00	28.15	56.00	-27.85	QP	
12	4.8220	16.86	0.00	16.86	46.00	-29.14	AVG	

4. Radiation Spurious 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	Fundamental frequency (MHz)	Field Strength	Limit (microvolts/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	902~928	Fundamental	50	94.0	Quasi-peak	3
		Harmonics	500	74.0	Average	3
			-	94.0	Peak	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

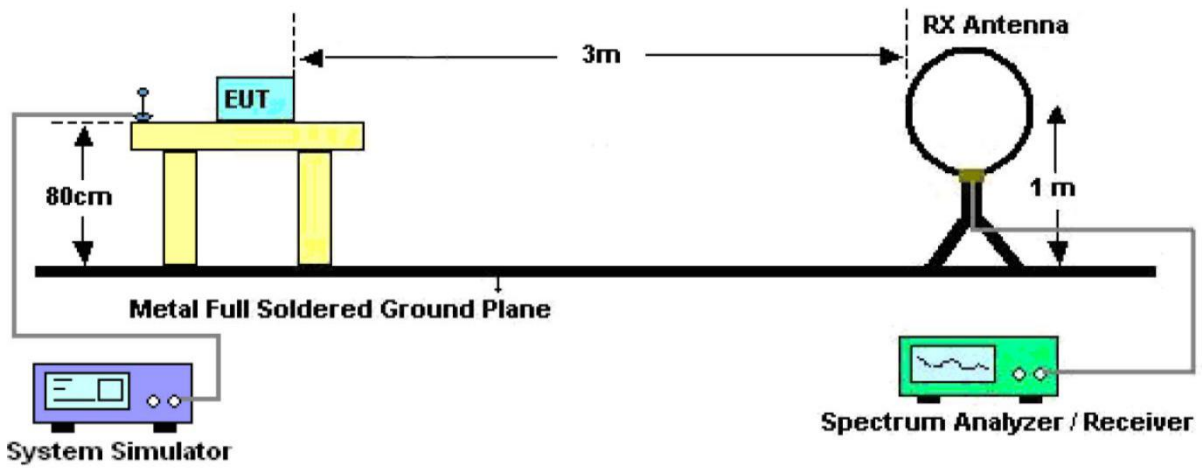


Figure 1. Below 30MHz

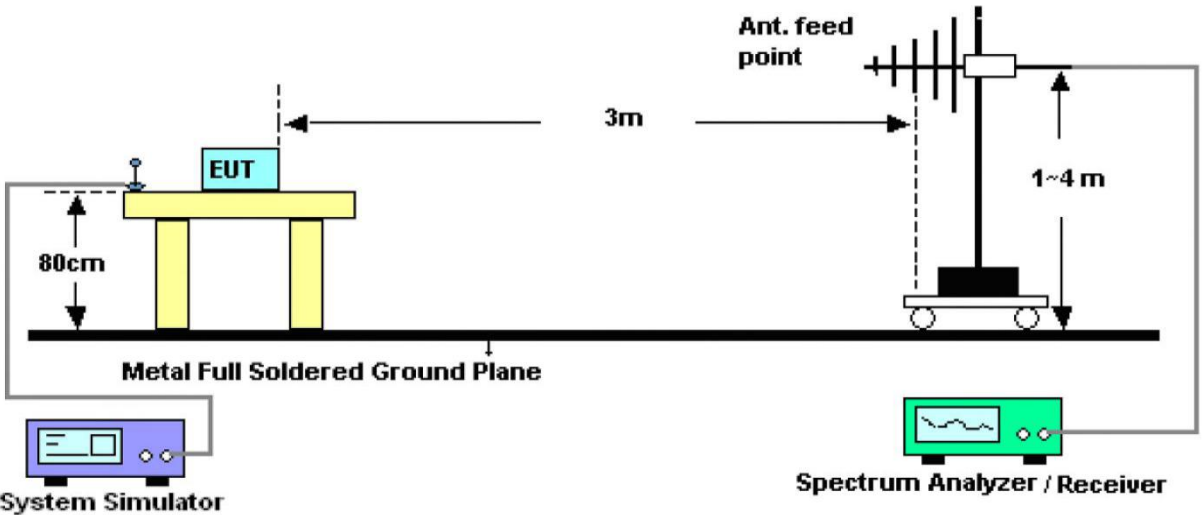


Figure 2. 30MHz to 1GHz

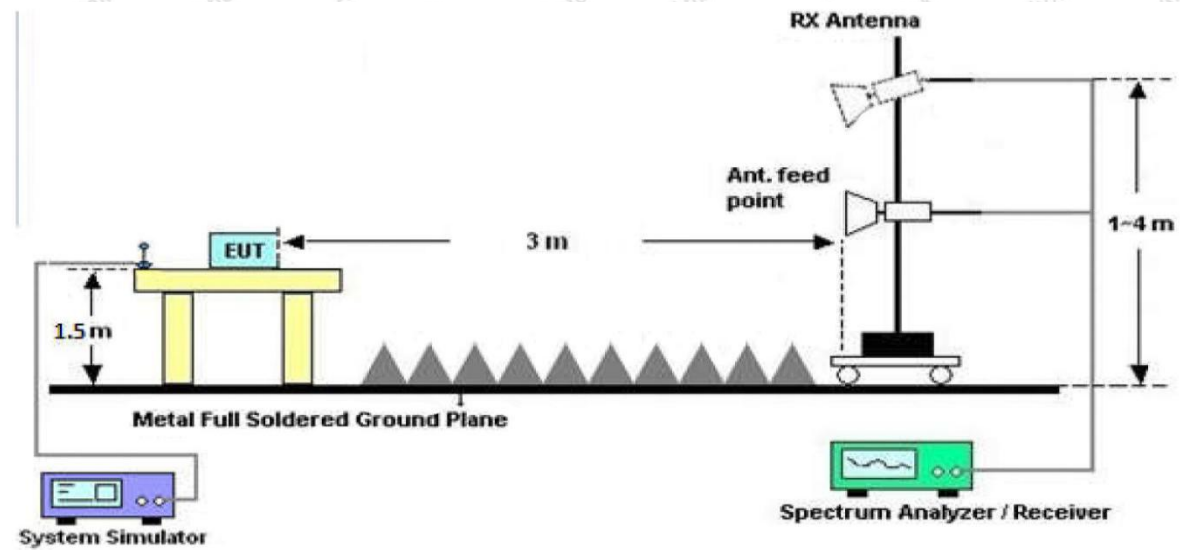


Figure 3. Above 1 GHz

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 = 120KHz, 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

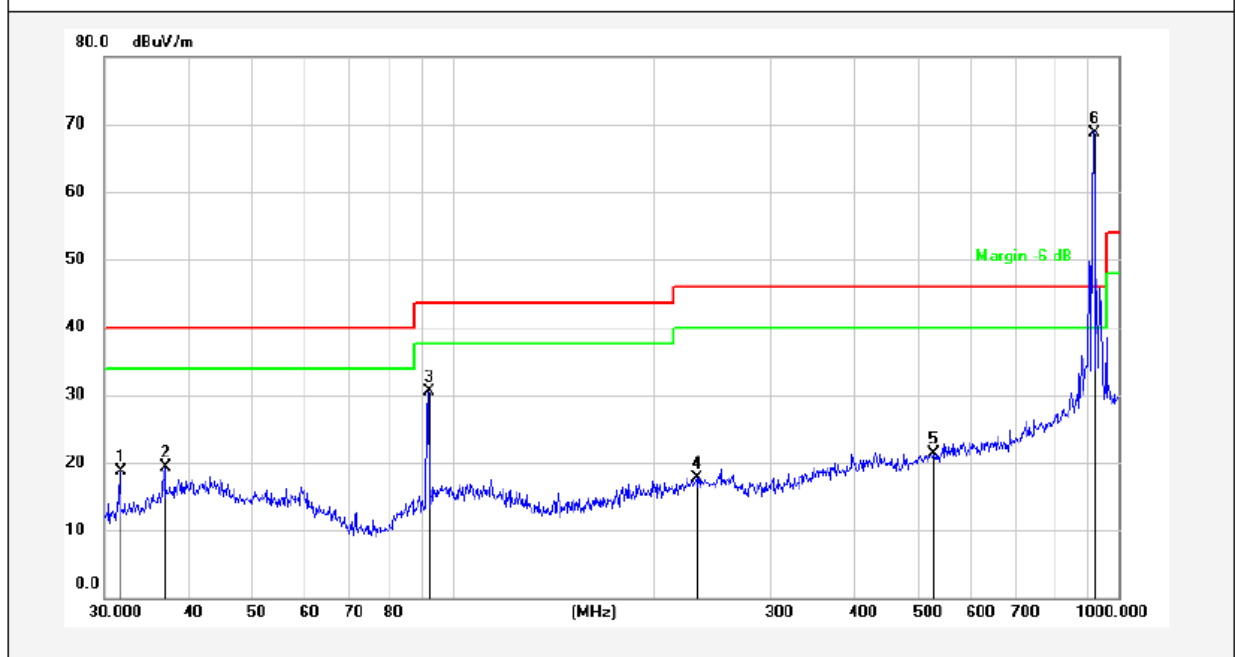
During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

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

Note: The Middle channel which is the worst case, only the worst case is recorded in the report.

Test Results (30~1000MHz)

Job No.: SZAWW180912007-01 Temp.(°C)/Hum.(%RH): 26.1°C/53%RH
Standard: FCC PART 15C Power Source: AC 240V, 60Hz for adapter
Test Mode: Keeping TX+ Charging Mode Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	31.6202	36.83	-18.08	18.75	40.00	-21.25	QP	300	0	
2	37.0248	35.27	-15.98	19.29	40.00	-20.71	QP	300	97	
3	91.8163	52.99	-22.54	30.45	43.50	-13.05	QP	300	128	
4	232.5318	35.82	-18.18	17.64	46.00	-28.36	QP	300	245	
5	528.2458	32.27	-11.04	21.23	46.00	-24.77	QP	300	298	
6	916.0687	73.23	-4.52	68.71	94.00	-25.29	QP	300	364	

Job No.: SZAWW180912007-01

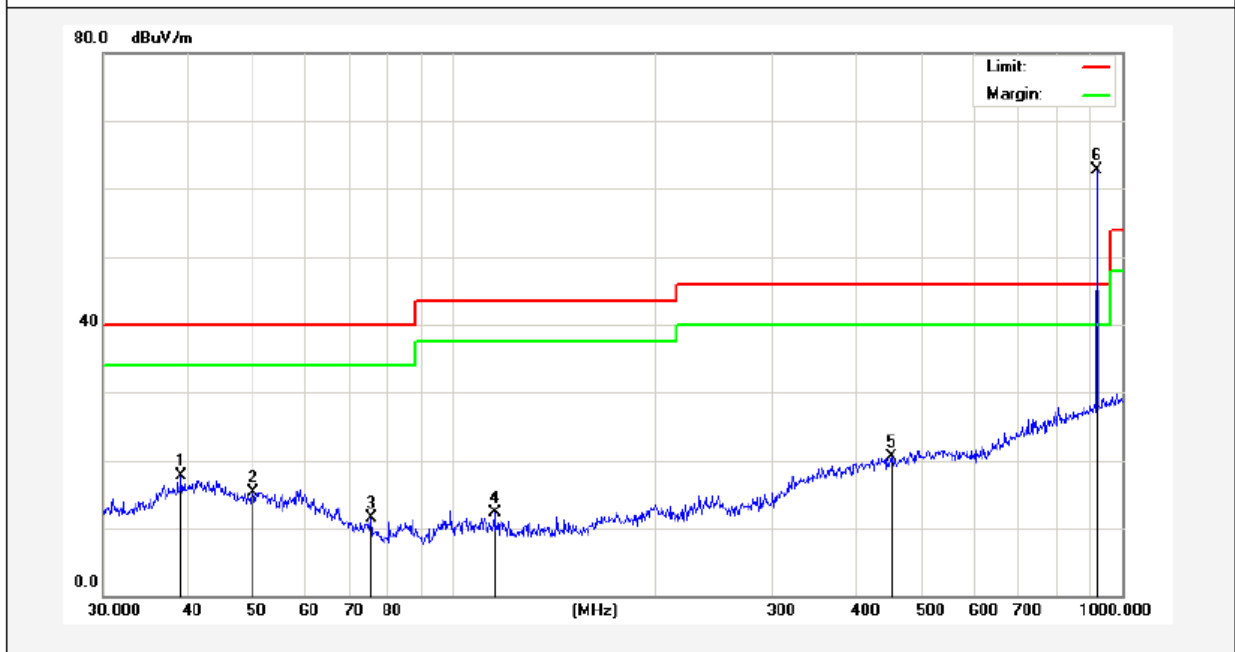
Temp.(°C)/Hum.(%RH): 26.1°C/53%RH

Standard: FCC PART 15C

Power Source: AC 240V, 60Hz for adapter

Test Mode: Keeping TX+ Charging Mode

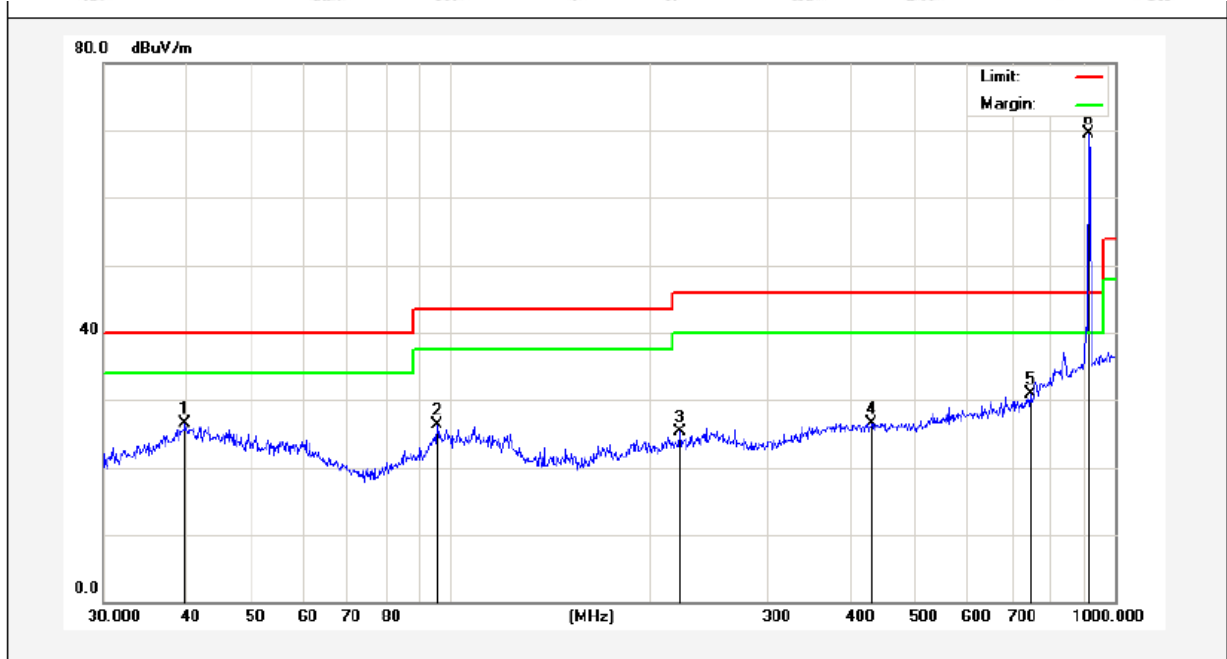
Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	39.2991	31.40	-13.76	17.64	40.00	-22.36	QP			
2	50.2324	30.94	-15.58	15.36	40.00	-24.64	QP			
3	75.4464	32.02	-20.52	11.50	40.00	-28.50	QP			
4	115.3205	27.39	-15.00	12.39	43.50	-31.11	QP			
5	452.7197	32.31	-11.78	20.53	46.00	-25.47	QP			
6	916.0687	66.19	-3.52	62.67	94.00	-31.33	QP			

Test Results (30~1000MHz)

Job No.: SZAWW180912007-01 Temp.(°C)/Hum.(%RH): 26.1°C/53%RH
Standard: FCC PART 15C Power Source: AC 120V, 60Hz for adapter
Test Mode: Keeping TX+ Charging Mode 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	39.8541	35.01	-8.45	26.56	40.00	-13.44	QP	300	0	
2	95.4270	41.51	-15.18	26.33	43.50	-17.17	QP	300	12	
3	221.3916	38.47	-13.18	25.29	46.00	-20.71	QP	300	23	
4	429.5228	32.87	-6.30	26.57	46.00	-19.43	QP	300	156	
5	744.8659	32.49	-1.60	30.89	46.00	-15.11	QP	300	235	
6	912.8618	68.15	1.44	69.59	94.00	-24.41	QP	300	360	

Job No.: SZAWW180912007-01

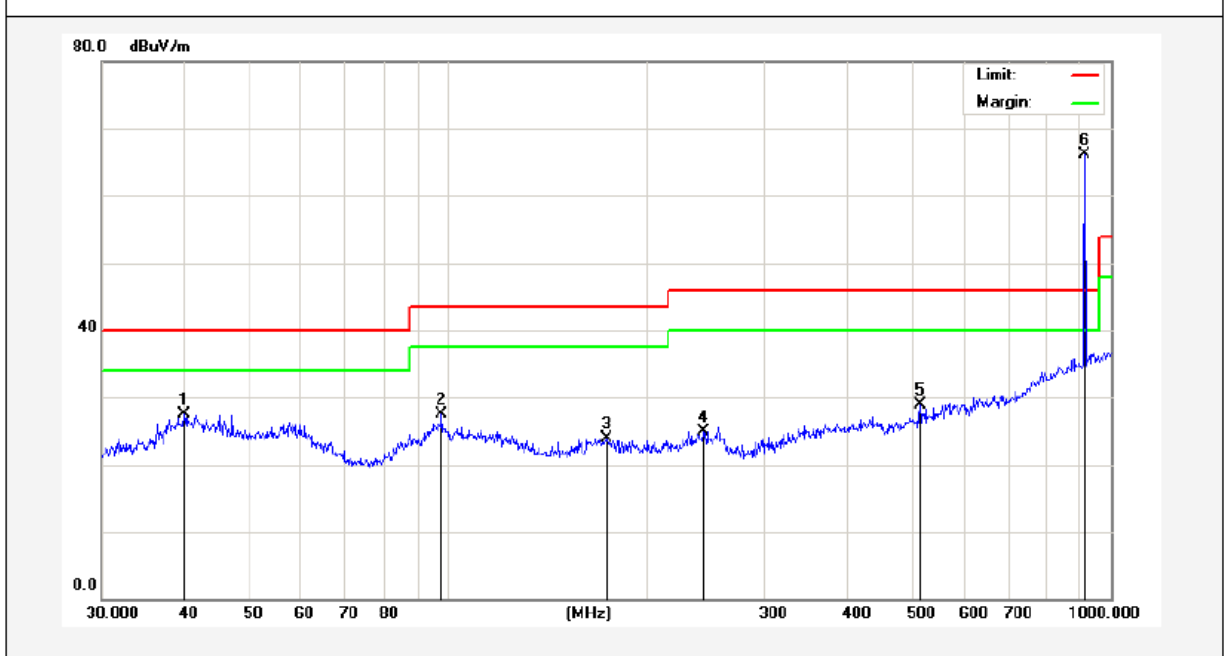
Temp.(°C)/Hum.(%RH): 26.1°C/53%RH

Standard: FCC PART 15C

Power Source: AC 120V, 60Hz for adapter

Test Mode: Keeping TX+ Charging Mode

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	39.9941	34.85	-7.37	27.48	40.00	-12.52	QP	300	0	
2	97.7980	36.46	-8.97	27.49	43.50	-16.01	QP	300	124	
3	173.8135	34.20	-10.29	23.91	43.50	-19.59	QP	300	135	
4	242.5252	32.39	-7.51	24.88	46.00	-21.12	QP	300	254	
5	515.4374	33.55	-4.68	28.87	46.00	-17.13	QP	300	302	
6	912.8618	63.72	2.44	66.16	94.00	-27.84	QP	300	360	

Harmonics Emissions

CH01

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Level	Limits	Margin	Det.
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Mode
1810.0000	H	49.76	7.39	28.73	26.31	59.57	74	-14.43	PK
1810.0000	H	39.62	7.39	28.73	26.31	49.43	54	-4.57	AV
2715.0000	H	48.04	8.10	29.71	27.01	58.84	74	-15.16	PK
2715.0000	H	37.34	8.10	29.71	27.01	48.14	54	-5.86	AV
3620.0000	H	--	--	--	--	--	--	--	PK
3620.0000	H	--	--	--	--	--	--	--	AV
1810.0000	V	45.52	7.39	28.73	26.31	55.33	74	-18.67	PK
1810.0000	V	38.76	7.39	28.73	26.31	48.57	54	-5.43	AV
2715.0000	V	45.48	8.10	29.71	27.01	56.28	74	-17.72	PK
2715.0000	V	37.44	8.10	29.71	27.01	48.24	54	-5.76	AV
3620.0000	V	--	--	--	--	--	--	--	PK
3620.0000	V	--	--	--	--	--	--	--	AV

CH11

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Level	Limits	Margin	Det.
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Mode
1830.0000	H	50.26	7.39	28.73	26.31	60.07	74	-13.93	PK
1830.0000	H	39.51	7.39	28.73	26.31	49.32	54	-4.68	AV
2745.0000	H	47.95	8.10	29.71	27.01	58.75	74	-15.25	PK
2745.0000	H	37.69	8.10	29.71	27.01	48.49	54	-5.51	AV
3660.0000	H	--	--	--	--	--	--	--	PK
3660.0000	H	--	--	--	--	--	--	--	AV
1830.0000	V	45.68	7.39	28.73	26.31	55.49	74	-18.51	PK
1830.0000	V	39.4	7.39	28.73	26.31	49.21	54	-4.79	AV
2745.0000	V	45.97	8.10	29.71	27.01	56.77	74	-17.23	PK
2745.0000	V	37.47	8.10	29.71	27.01	48.27	54	-5.73	AV
3660.0000	V	--	--	--	--	--	--	--	PK
3660.0000	V	--	--	--	--	--	--	--	AV

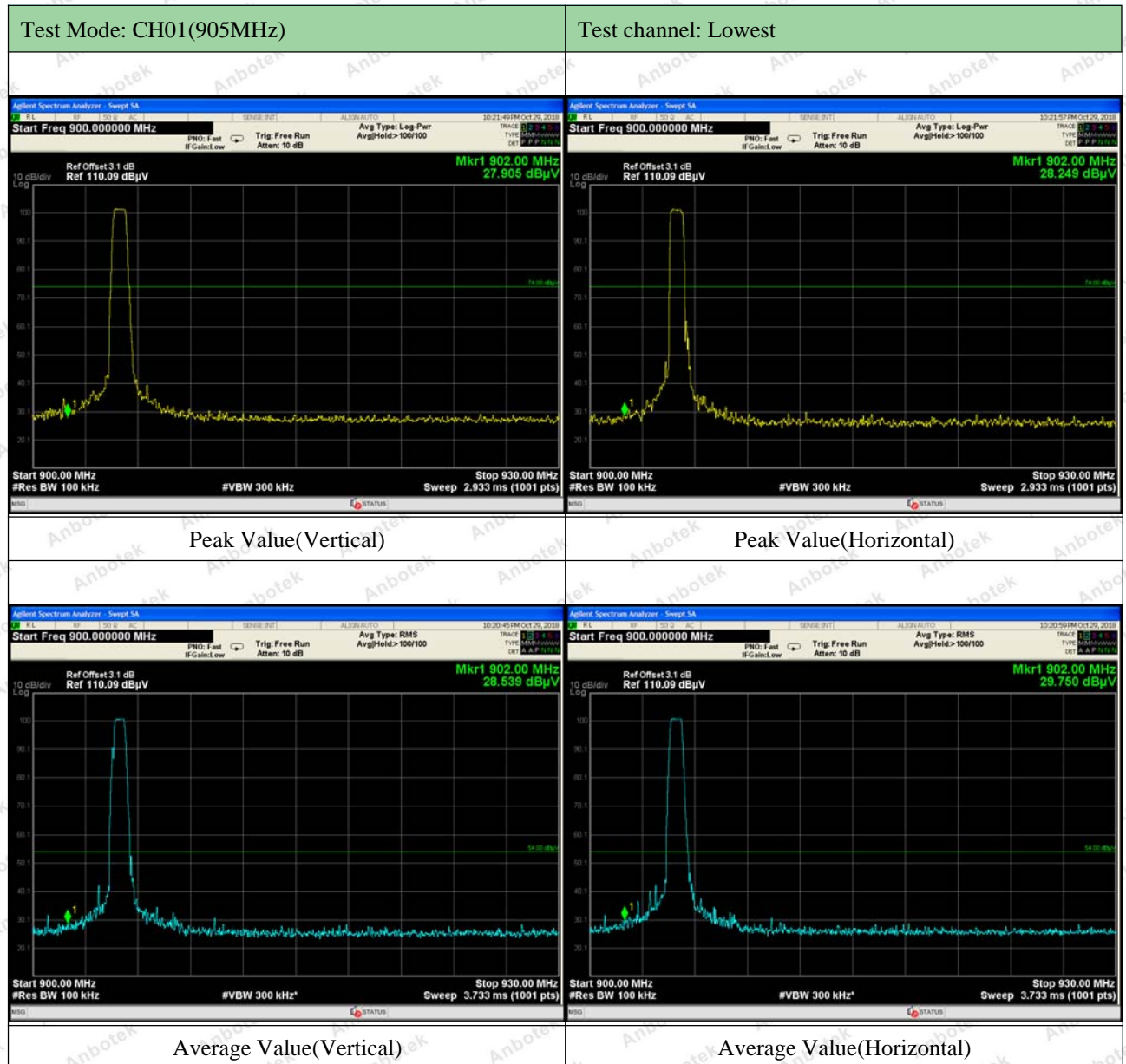
CH21

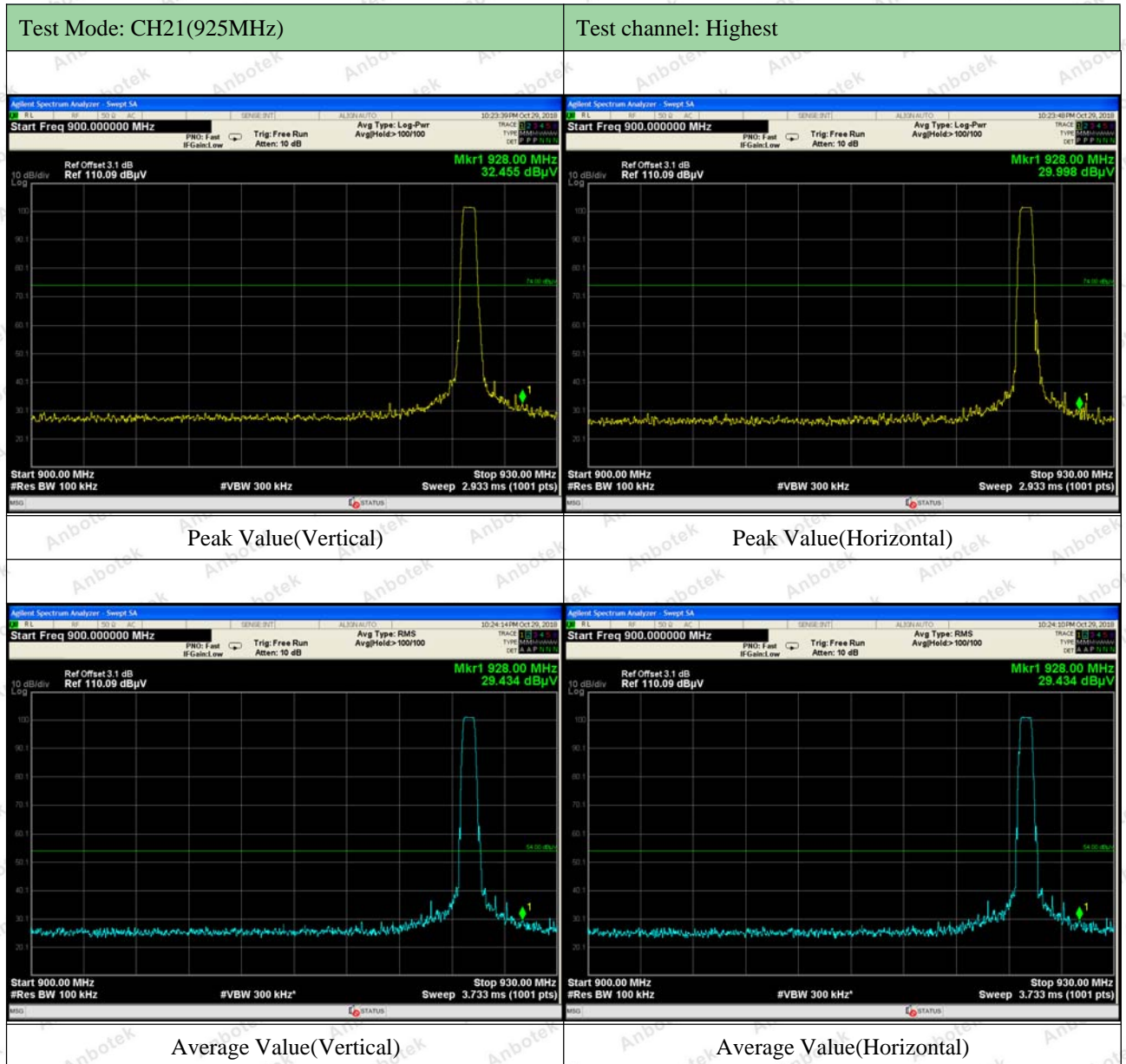
Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Level	Limits	Margin	Det.
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Mode
1850.0000	H	49.93	7.39	28.73	26.31	59.74	74	-14.26	PK
1850.0000	H	40.21	7.39	28.73	26.31	50.02	54	-3.98	AV
2775.0000	H	47.74	8.10	29.71	27.01	58.54	74	-15.46	PK
2775.0000	H	37.89	8.10	29.71	27.01	48.69	54	-5.31	AV
3700.0000	H	--	--	--	--	--	--	--	PK
3700.0000	H	--	--	--	--	--	--	--	AV
1850.0000	V	45.46	7.39	28.73	26.31	55.27	74	-18.73	PK
1850.0000	V	38.46	7.39	28.73	26.31	48.27	54	-5.73	AV
2775.0000	V	45.47	8.10	29.71	27.01	56.27	74	-17.73	PK
2775.0000	V	37.71	8.10	29.71	27.01	48.51	54	-5.49	AV
3700.0000	V	--	--	--	--	--	--	--	PK
3700.0000	V	--	--	--	--	--	--	--	AV

Remark:

1. Level = Reading + Cable Loss+Ant Factor-Amplifier
2. "--" Mark indicated Background Noise Level

Radiated Band Edge:



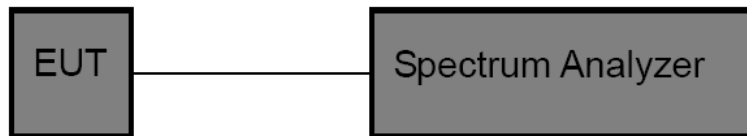


5. 20dB Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part 15 C Section 15.249
---------------	------------------------------

5.2. Test Setup



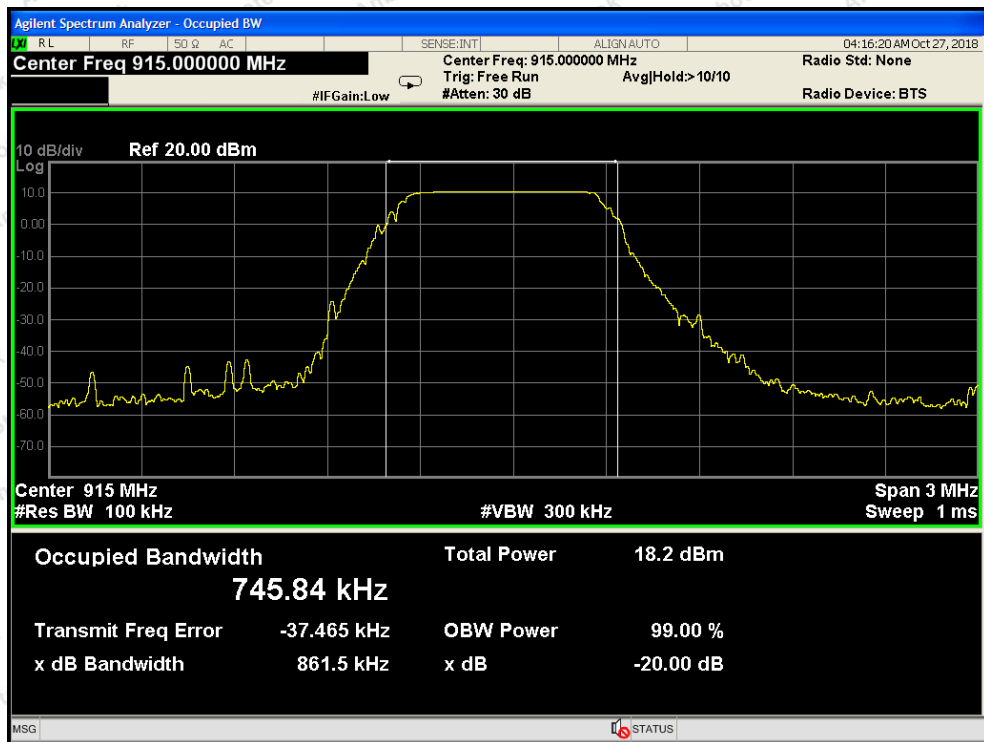
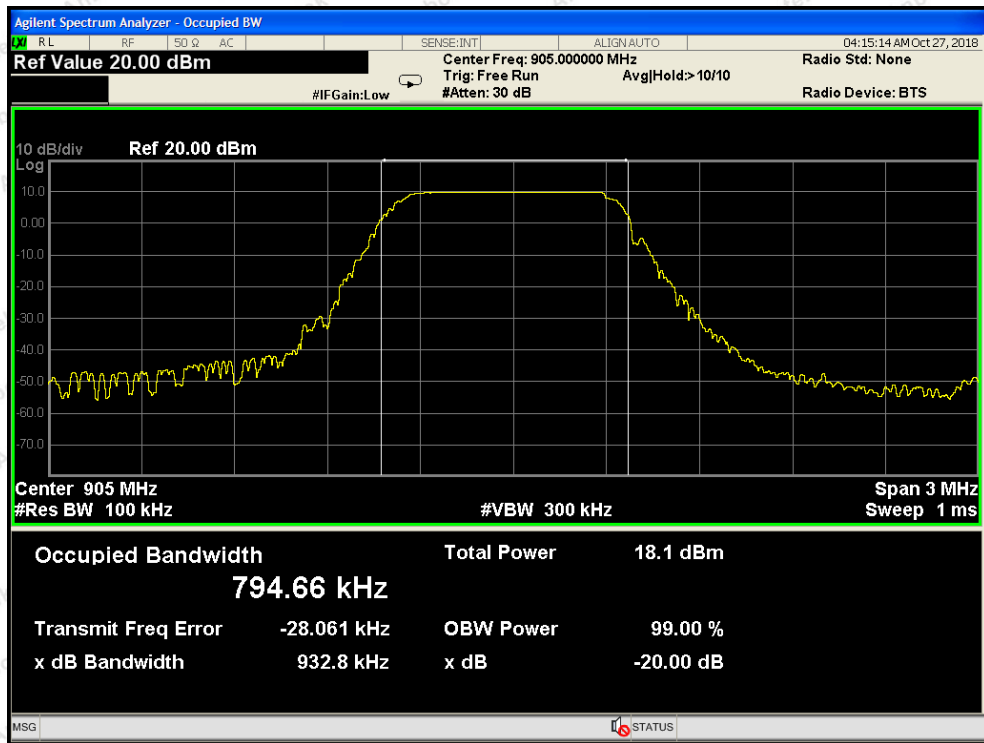
5.3. Test Procedure

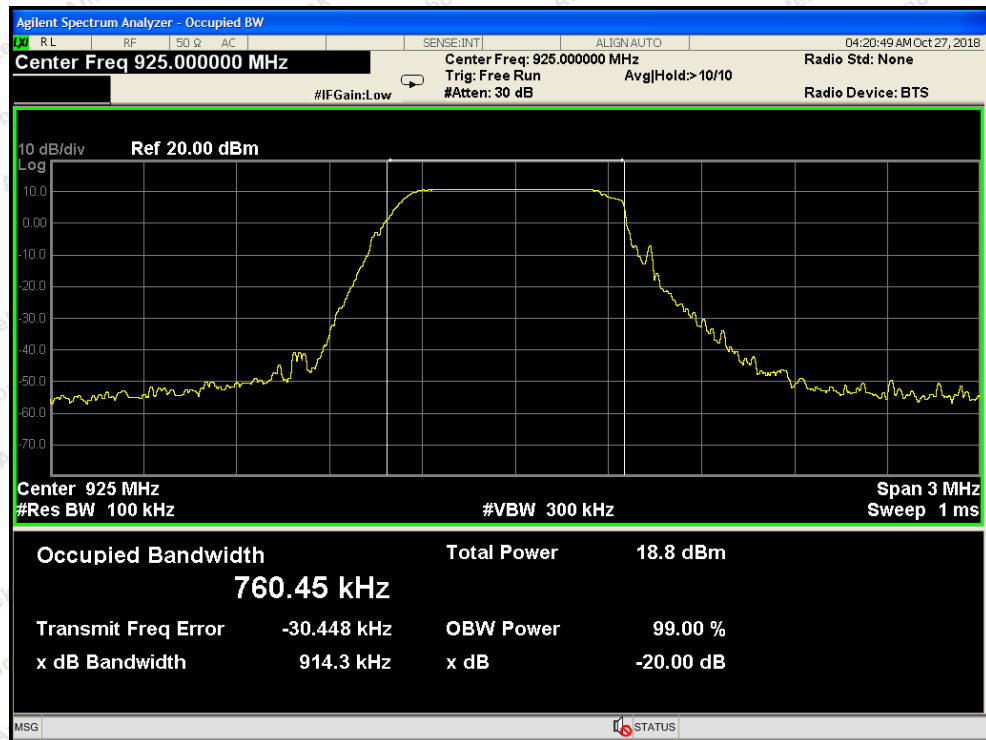
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
 RBW = 100kHz, VBW $\geq 3 \times$ RBW = 300kHz,
 Detector = peak
 Trace mode = Max 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	: AC 120V, 60Hz for adapter	Temperature	: 24°C
Test Result	: PASS	Humidity	: 55%RH

Frequency (MHz)	Bandwidth (kHz)	Result
905	932.8	PASS
915	861.5	PASS
925	914.3	PASS





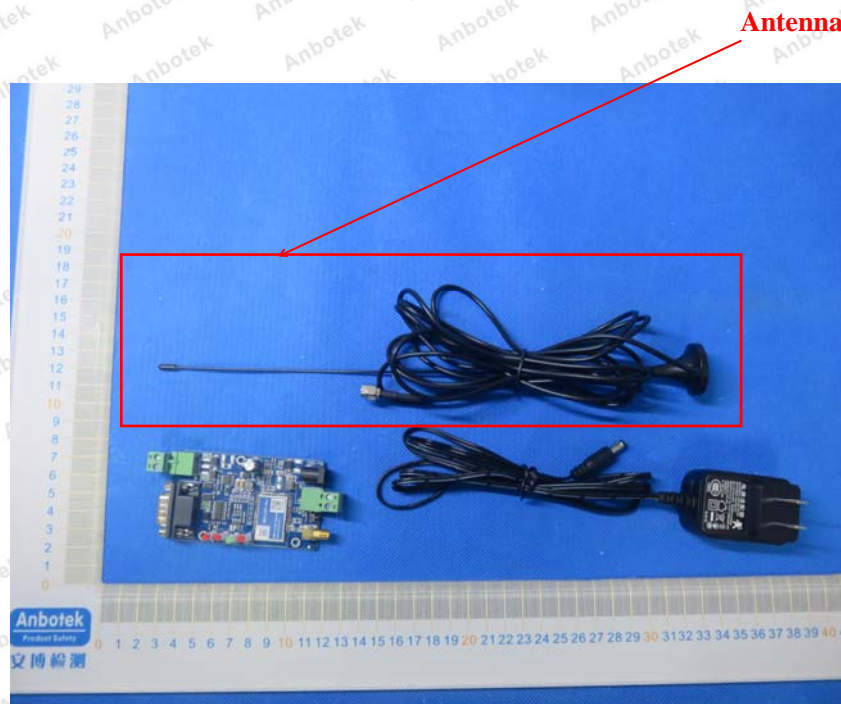
6. Antenna Requirement

6.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	<p>1) 15.203 requirement:</p> <p>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.</p>

6.2. Antenna Connected Construction

The antenna is a Column Antenna(Auxiliary Antenna) which permanently attached, and the best case gain of the antenna is 1 dBi. It complies with the standard requirement.

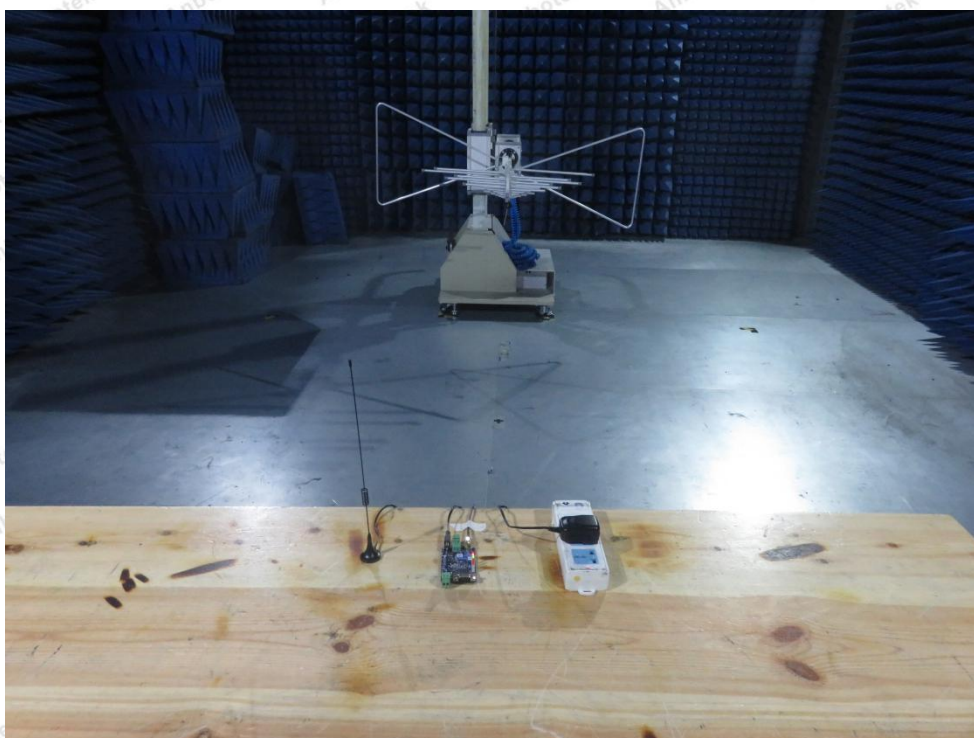


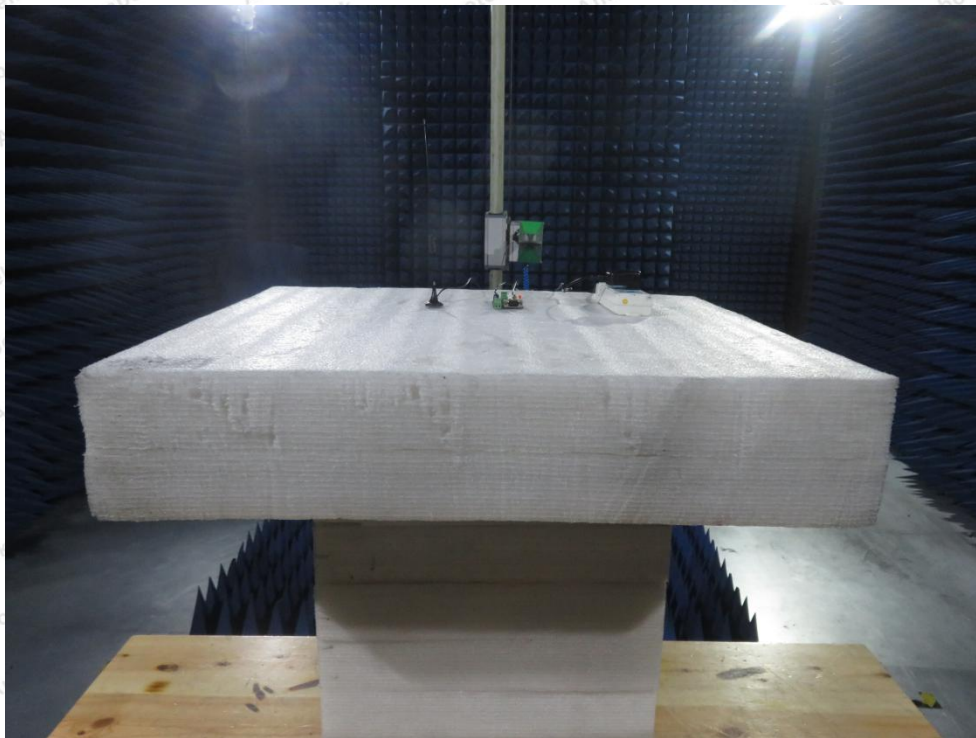
APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Power Line Conducted Emission Test

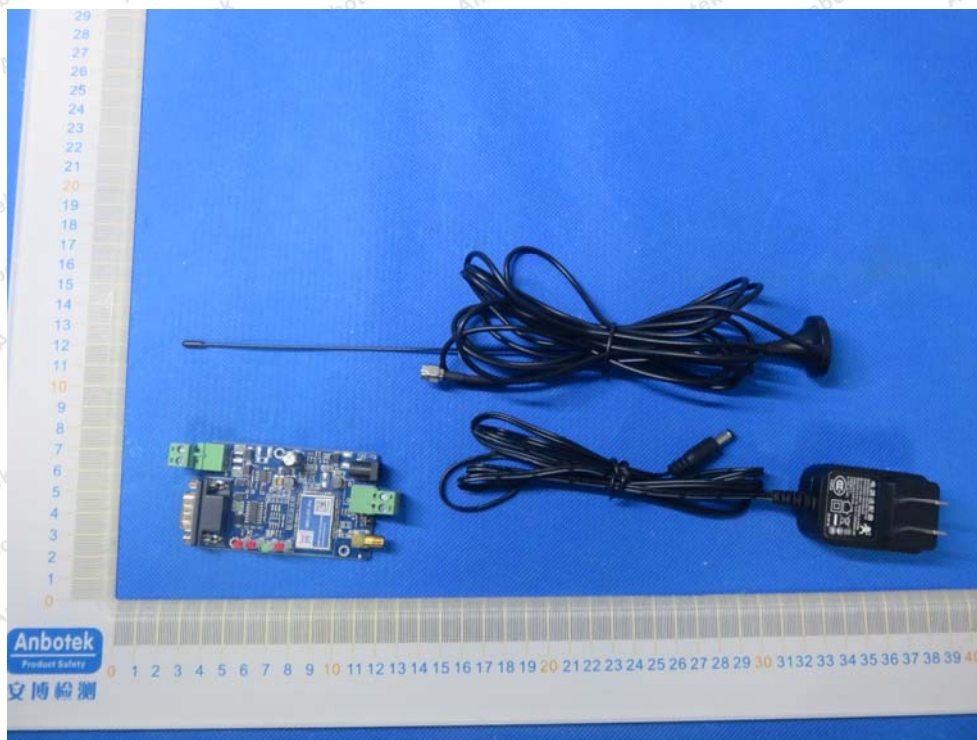


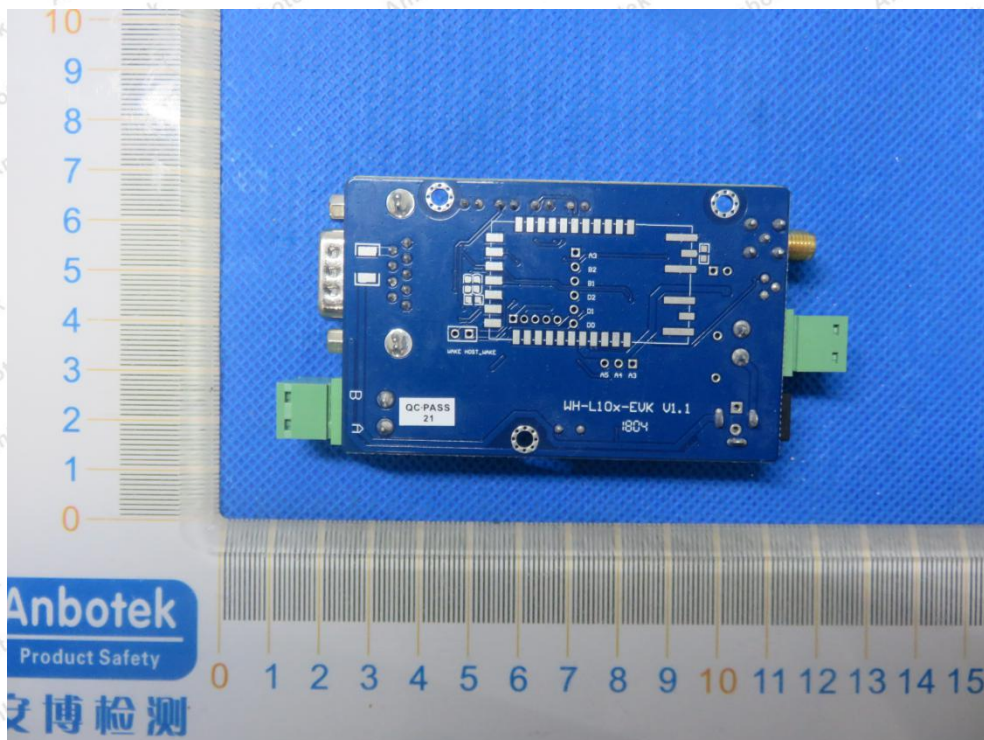
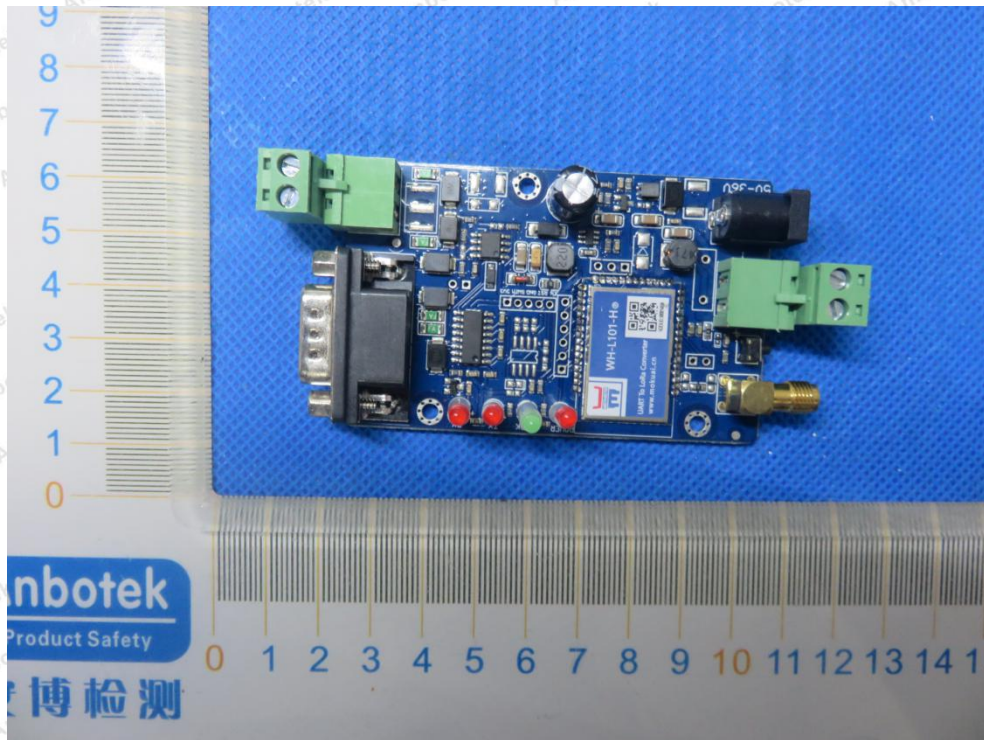
Photo of Radiation Emission Test

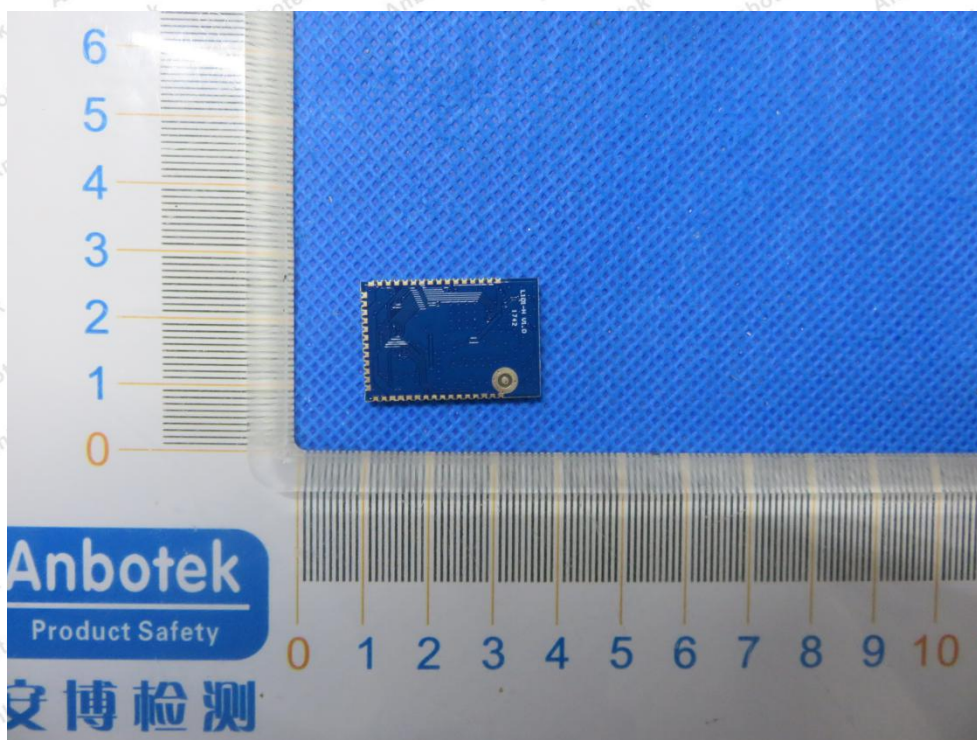
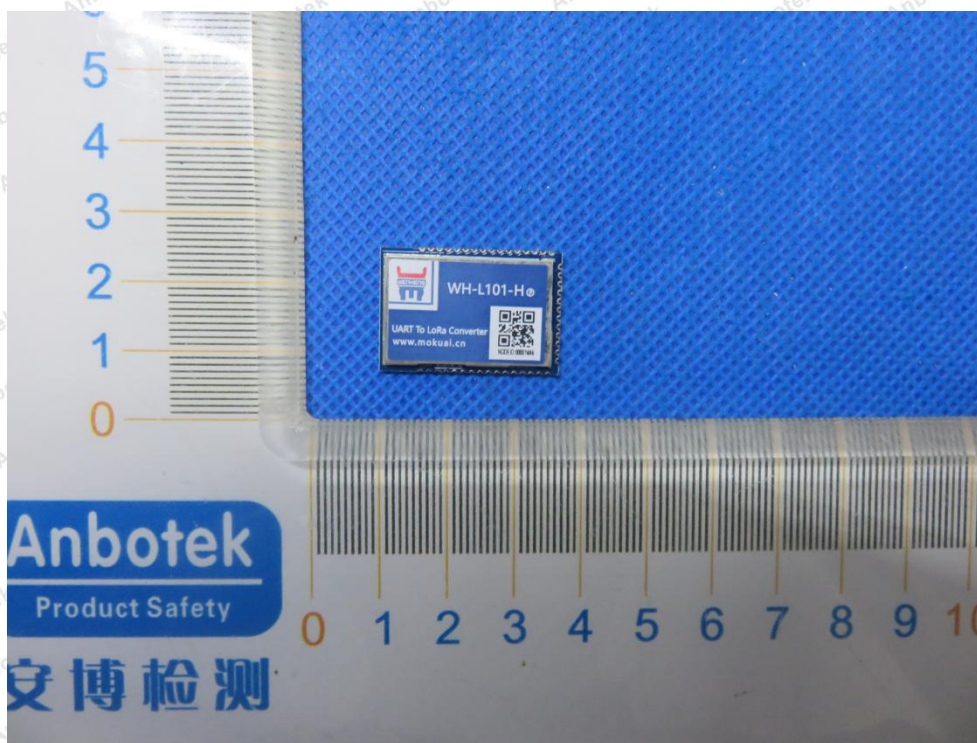




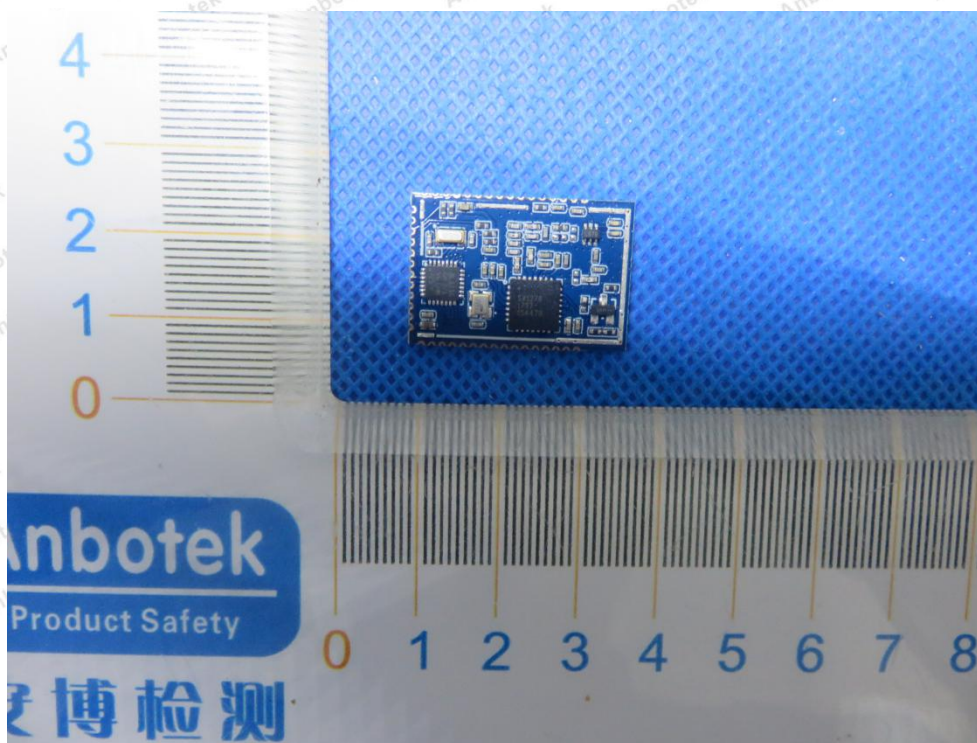
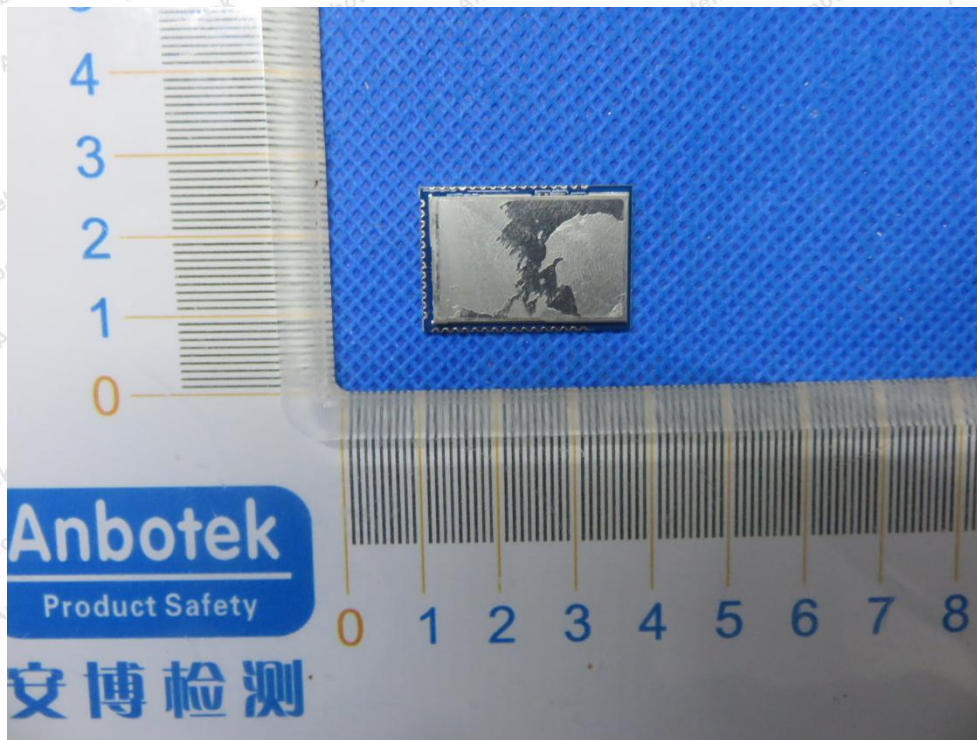
APPENDIX II -- EXTERNAL PHOTOGRAPH

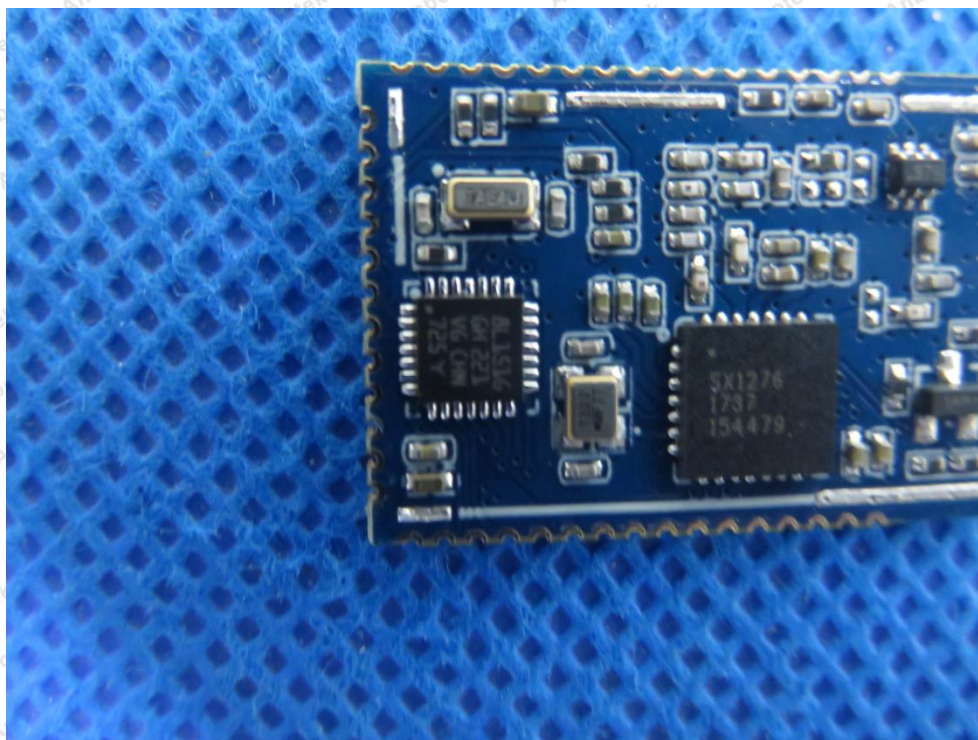






APPENDIX III -- INTERNAL PHOTOGRAPH





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