

FCC TEST REPORT

For

SHENZHEN YONGNUO PHOTOGRAPHIC EQUIPMENT CO., LTD.

Pro LED Video light

Model No.: YN508S

Prepared For : SHENZHEN YONGNUO PHOTOGRAPHIC EQUIPMENT CO., LTD.
Address : Building A, Shenfubao modern optics factory, Kengzi Street, Pingshan
District, Shenzhen, China

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Date of Test : Mar. 06~15, 2018
Date of Report : Mar. 16, 2018

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TEST REPORT

Applicant : SHENZHEN YONGNUO PHOTOGRAPHIC EQUIPMENT CO., LTD.
Manufacturer : Shenzhen Yongnuo photographic equipment Co., Ltd Dalang plant
Product Name : Pro LED Video light
Model No. : YN508S
Trade Mark : YONGNUO
Rating(s) : Input DC 12V, 2A

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 : Mar. 06~15, 2018

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	:	SHENZHEN YONGNUO PHOTOGRAPHIC EQUIPMENT CO., LTD.
Address	:	Building A, Shenfubao modern optics factory, Kengzi Street, Pingshan District, Shenzhen, China
Manufacturer	:	Shenzhen Yongnuo photographic equipment Co., Ltd Dalang plant
Address	:	4/F, 5/F East Building 2, Donglongxing Technology Park, East Huaning Road, Dalang Street, Longhua District, Shenzhen, Guangdong. P.R. China.

1.2. Description of Device (EUT)

Product Name	:	Pro LED Video light
Model No.	:	YN508S
Trade Mark	:	YONGNUO
Test Power Supply	:	DC 12V via AC/DC
Product Description	Operation Frequency:	2405MHz
	Number of Channel:	1 Channel
	Modulation Type:	GFSK
	Antenna Type:	PCB Antenna
	Antenna Gain(Peak):	1.05 dBi
Remark: 1)For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2) This report is for 2.4GHz module.		

1.3. Auxiliary Equipment Used During Test

Adapter	:	Manufacturer: ZTE M/N: STC-A2050I1025-C S/N: 201202102100953 Input: 100-240V~50/60Hz 0.3A Output: DC 12V, 2000mA
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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 + Charging mode
Mode 2	CH01

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

For Radiated Emission	
Final Test Mode	Description
Mode 2	Keeping TX + Charging mode
	CH01

Note:

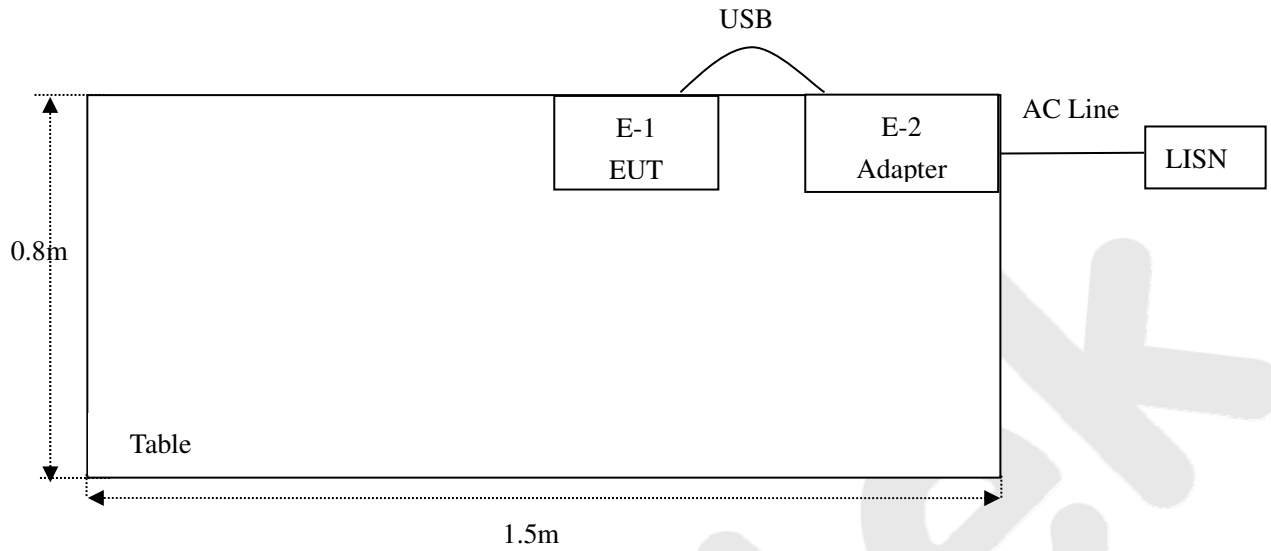
1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.
2. EUT built-in battery-powered, fully-charged battery use of the test battery.

1.5. List of Channels

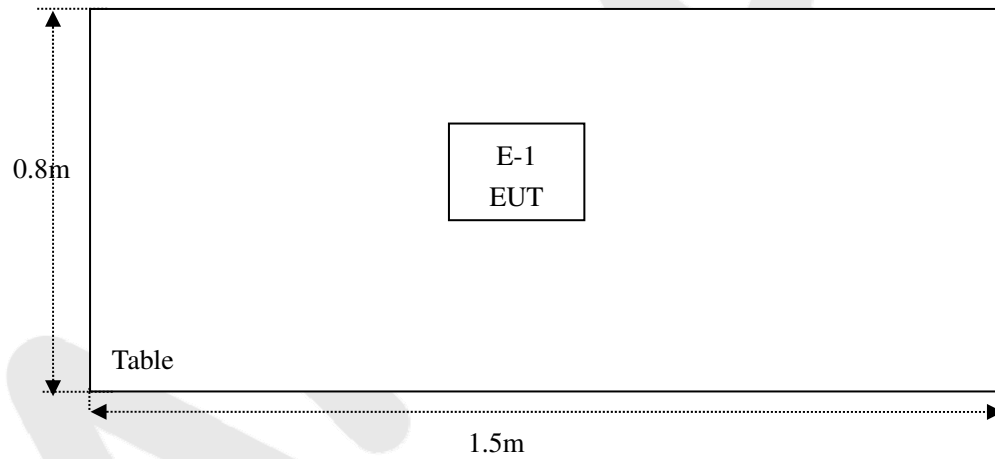
Channel	Freq. (MHz)
1	2405

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	Nov.17, 2017	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov.17, 2017	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov.17, 2017	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov.17, 2017	1 Year
5.	Spectrum Analysis	Agilent	N9038A	MY53227295	Nov.17, 2017	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Nov.17, 2017	1 Year
7.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	Nov.17, 2017	1 Year
8.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov.20, 2017	1 Year
9.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 20, 2017	1 Year
10.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Nov.17, 2017	1 Year
11.	Horn Antenna	Schwarzbeck	BBHA9170	9170-375	Nov.17, 2017	1 Year
12.	Pre-amplifier	SONOMA	310N	186860	Nov.17, 2017	1 Year
13.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
14.	RF Test Control System	YIHENG	YH3000	2017430	Nov.18, 2017	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov.17, 2017	1 Year
16.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov.17, 2017	1 Year
17.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov.18, 2017	1 Year
18.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov.18, 2017	1 Year
19.	Signal Generator	Agilent	E4421B	MY41000743	Nov.18, 2017	1 Year
20.	DC Power Supply	LW	TPR-6410D	349315	Nov.01, 2017	1 Year
21.	Constant Temperature Humidity Chamber	Sertep	ZJ-HWHS80 B	ZJ-17042804	Nov.01, 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

ShenzhenAnbotekComplianceLaboratoryLimited,EMCLaboratoryhasbeenregisteredandfullydescribedinareportfiled withthe(FCC)FederalCommunicationsCommission.TheacceptanceletterfromtheFCCismaintainedinourfiles.Registr ation No. 184111,July31,2017.

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 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	Radiated Emission	PASS
15.215(c)	20dB Bandwidth	PASS
15.249(c)	Band Edge	PASS
Remark: “N/A” is an abbreviation for Not Applicable.		

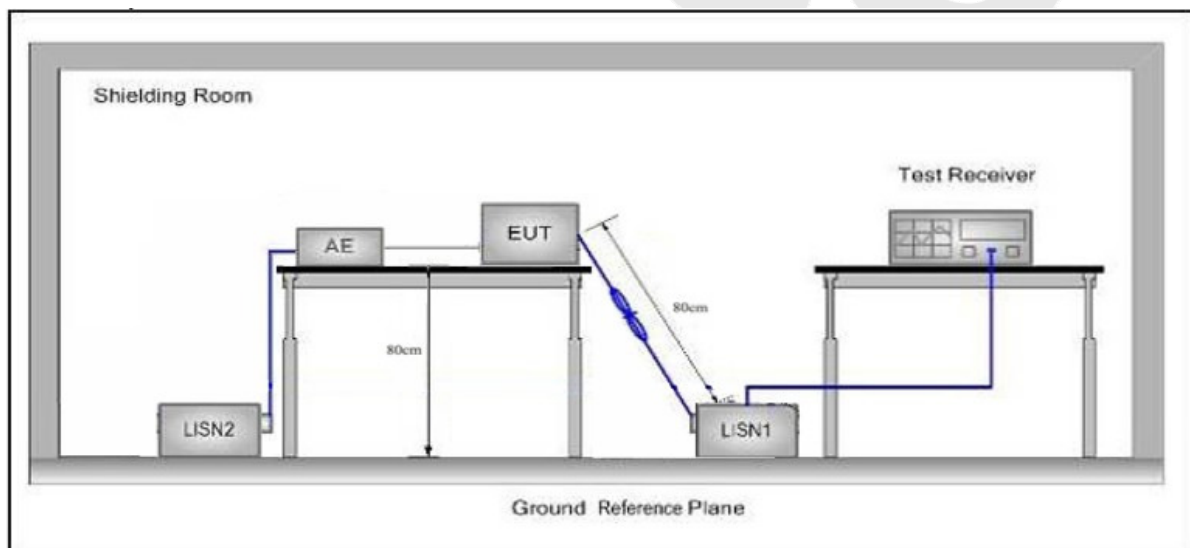
3. Conducted Emission Test

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

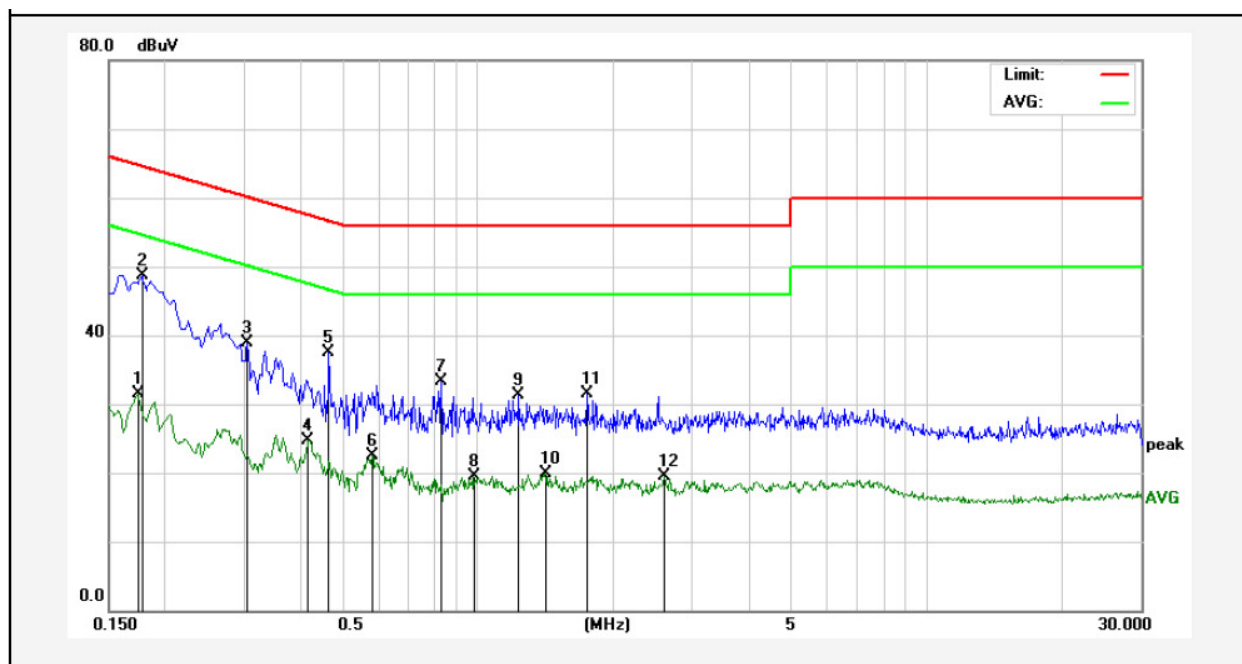
PASS

The EUT should be compliance to the limit of Class B

Only the worst case data was showed in the report, please to see the following pages

Test Results (30~1000MHz)

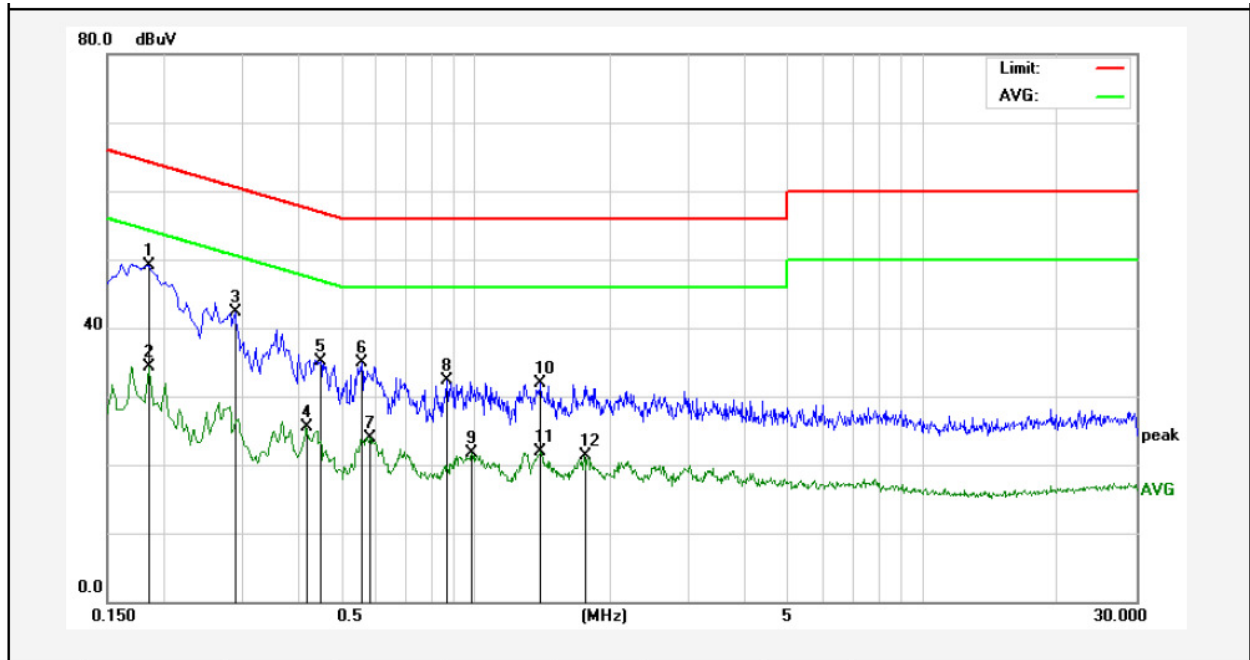
Test Site: 1# Shielded Room
Operating Condition: Keeping TX + Charging mode
Test Specification: DC 12V via AD/DC
Comment: Live Line
Tem.:25.4℃ Hum.:54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1740	11.69	19.90	31.59	54.76	-23.17	AVG	
2	0.1780	28.75	19.90	48.65	64.57	-15.92	QP	
3	0.3060	19.06	19.89	38.95	60.08	-21.13	QP	
4	0.4180	4.84	19.94	24.78	47.49	-22.71	AVG	
5	0.4660	17.51	19.96	37.47	56.58	-19.11	QP	
6	0.5820	2.45	20.00	22.45	46.00	-23.55	AVG	
7	0.8300	13.26	20.07	33.33	56.00	-22.67	QP	
8	0.9780	-0.54	20.11	19.57	46.00	-26.43	AVG	
9	1.2300	11.10	20.12	31.22	56.00	-24.78	QP	
10	1.4100	-0.24	20.13	19.89	46.00	-26.11	AVG	
11	1.7500	11.36	20.13	31.49	56.00	-24.51	QP	
12	2.6060	-0.68	20.15	19.47	46.00	-26.53	AVG	

Test Results (30~1000MHz)

Test Site: 1# Shielded Room
Operating Condition: Keeping TX + Charging mode
Test Specification: DC 12V via AD/DC
Comment: Neutral Line
Tem.:25.4℃ Hum.:54%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1860	29.23	19.90	49.13	64.21	-15.08	QP	
2	0.1860	14.37	19.90	34.27	54.21	-19.94	AVG	
3	0.2900	22.33	19.89	42.22	60.52	-18.30	QP	
4	0.4180	5.49	19.94	25.43	47.49	-22.06	AVG	
5	0.4500	15.22	19.96	35.18	56.87	-21.69	QP	
6	0.5580	15.00	20.00	35.00	56.00	-21.00	QP	
7	0.5820	3.94	20.00	23.94	46.00	-22.06	AVG	
8	0.8660	12.24	20.08	32.32	56.00	-23.68	QP	
9	0.9820	1.61	20.12	21.73	46.00	-24.27	AVG	
10	1.4020	11.84	20.13	31.97	56.00	-24.03	QP	
11	1.4020	1.81	20.13	21.94	46.00	-24.06	AVG	
12	1.7460	1.17	20.13	21.30	46.00	-24.70	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

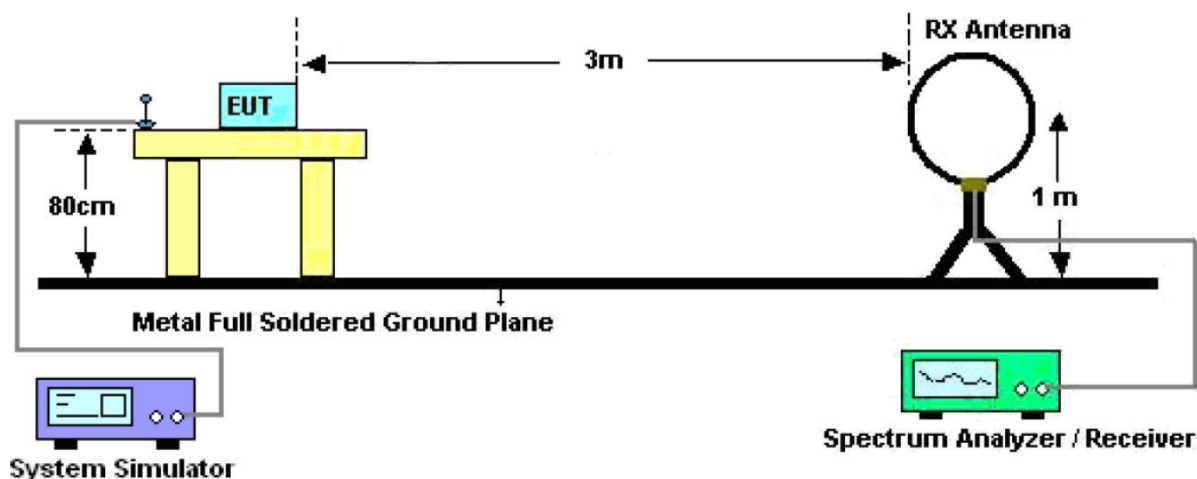


Figure 2. 30MHz to 1GHz

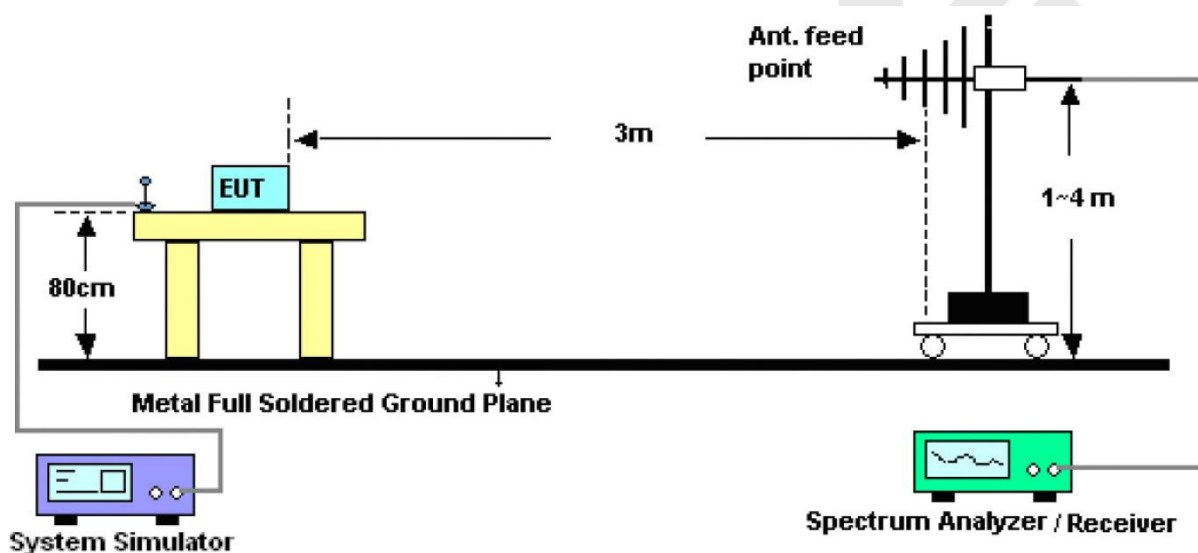
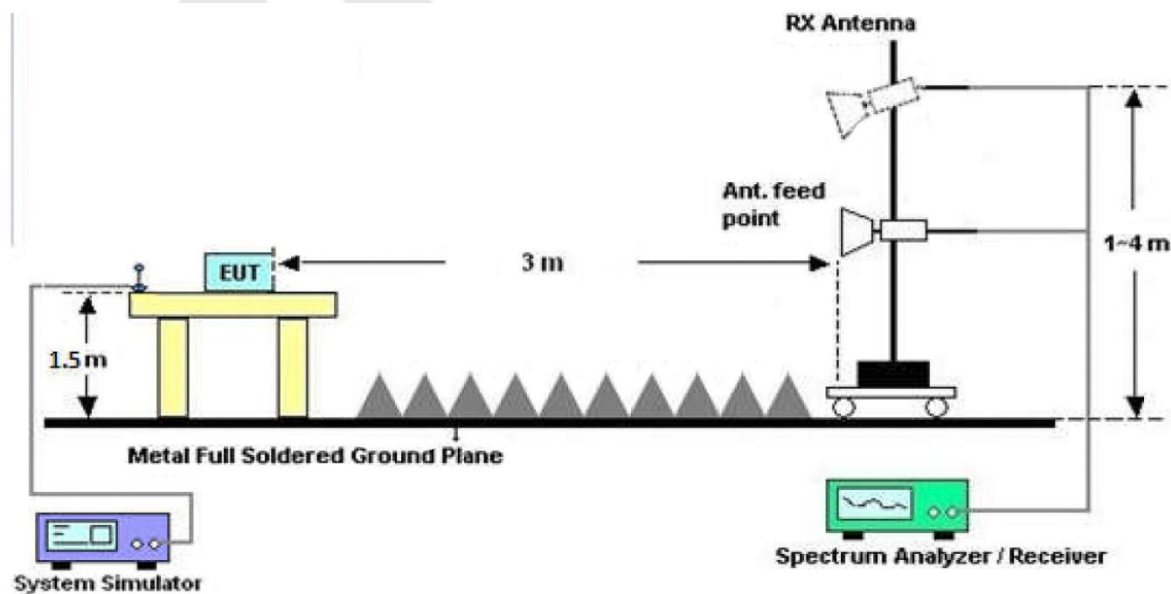


Figure 3. Above 1 GHz



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

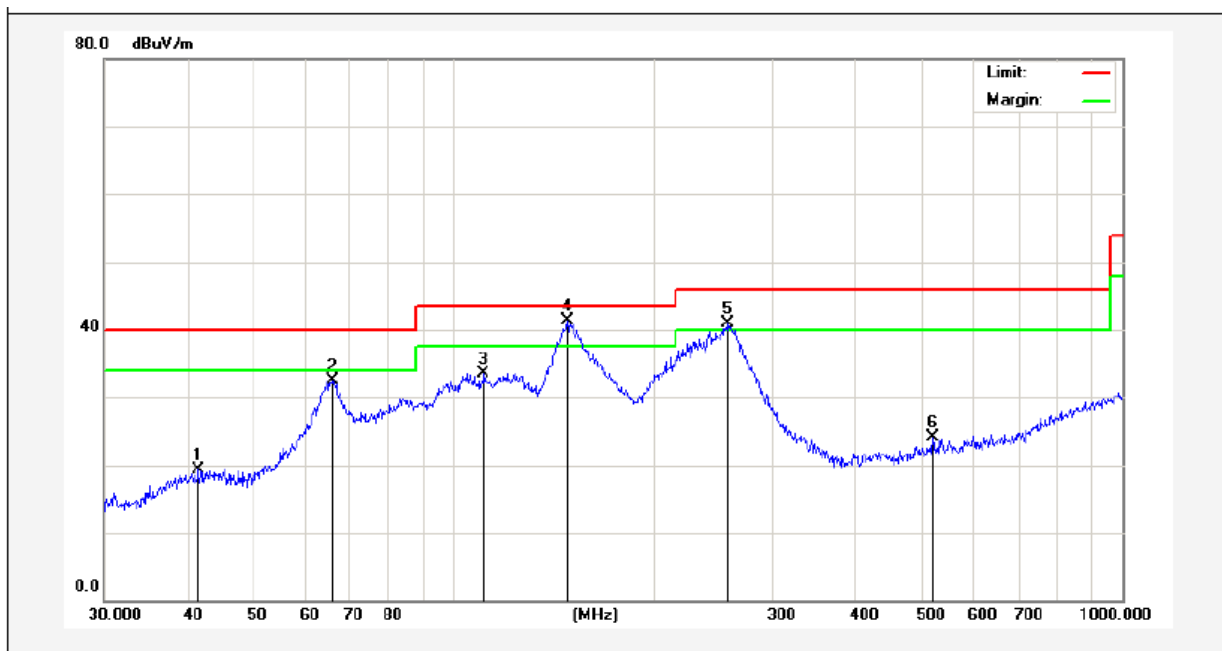
PASS

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)

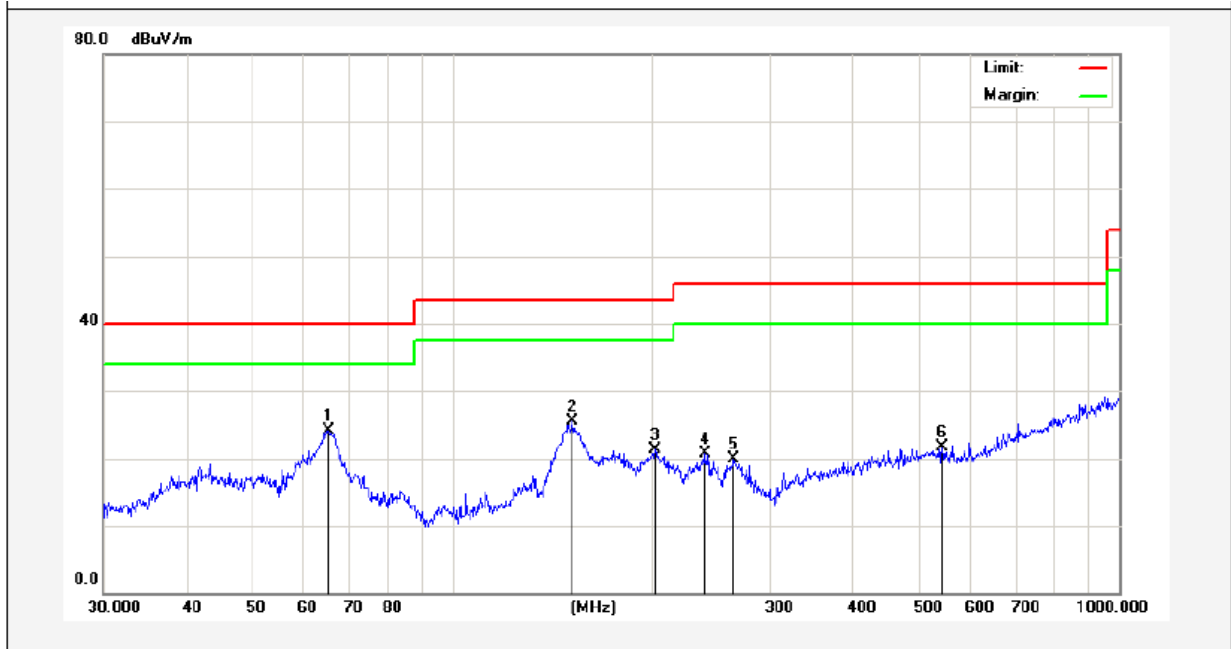
Job No.: SZAWW180306004 Temp.(°C)/Hum.(%RH): 24.3°C/55%RH
Standard: FCC PART 15C Power Source: DC 12V
Test Mode: TX Mode Lowest CH Polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	41.5670	34.03	-14.67	19.36	40.00	-20.64	QP	300	71	
2	66.0342	51.78	-19.28	32.50	40.00	-7.50	QP	300	93	
3	110.9571	54.27	-20.69	33.58	43.50	-9.92	QP	300	147	
4	147.9214	62.63	-21.37	41.26	43.50	-2.24	QP	300	169	
5	257.4222	59.31	-18.46	40.85	46.00	-5.15	QP	300	246	
6	520.8881	35.20	-11.01	24.19	46.00	-21.81	QP	300	360	

Test Results (30~1000MHz)

Job No.: SZAWW180306004 Temp.(°C)/Hum.(%RH): 24.3°C/55%RH
Standard: FCC PART 15C Power Source: DC 12V
Test Mode: TX Mode Lowest CH Polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	65.3432	42.06	-18.00	24.06	40.00	-15.94	QP	300	47	
2	151.5972	42.74	-17.27	25.47	43.50	-18.03	QP	300	93	
3	201.3930	36.10	-14.83	21.27	43.50	-22.23	QP	300	167	
4	239.1473	34.28	-13.52	20.76	46.00	-25.24	QP	300	247	
5	264.7457	33.90	-13.93	19.97	46.00	-26.03	QP	300	293	
6	543.2742	31.84	-10.20	21.64	46.00	-24.36	QP	300	360	

Test Results (1GHz-25GHz)

Test Mode: CH01									
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
2405.0000	94.52	31.21	2.17	35.30	92.60	114.00	-21.40	V	Peak
2405.0000	89.65	31.21	2.17	35.30	87.73	94.00	-6.27	V	AVG
4810.0000	58.20	34.01	2.56	34.71	60.06	74.00	-13.94	V	Peak
4810.0000	45.69	34.01	2.56	34.71	47.55	54.00	-6.45	V	AVG
7215.0000	44.01	36.16	2.98	35.15	48.00	74.00	-26.00	V	Peak
7215.0000	38.95	36.16	2.98	35.15	42.94	54.00	-11.06	V	AVG
9620.0000	*								
12025.0000	*								
14430.0000	*								
16835.0000	*								
2405.0000	93.47	31.21	2.17	35.30	91.55	114.00	-22.45	H	Peak
2405.0000	84.28	31.21	2.17	35.30	82.36	94.00	-11.64	H	AVG
4810.0000	47.21	34.01	2.56	34.71	49.07	74.00	-24.93	H	Peak
4810.0000	44.95	34.01	2.56	34.71	46.81	54.00	-7.19	H	AVG
7215.0000	42.21	36.16	2.98	35.15	46.20	74.00	-27.80	H	Peak
7215.0000	35.21	36.16	2.98	35.15	39.20	54.00	-14.80	H	AVG
9620.0000	*								
12025.0000	*								
14430.0000	*								
16835.0000	*								

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:

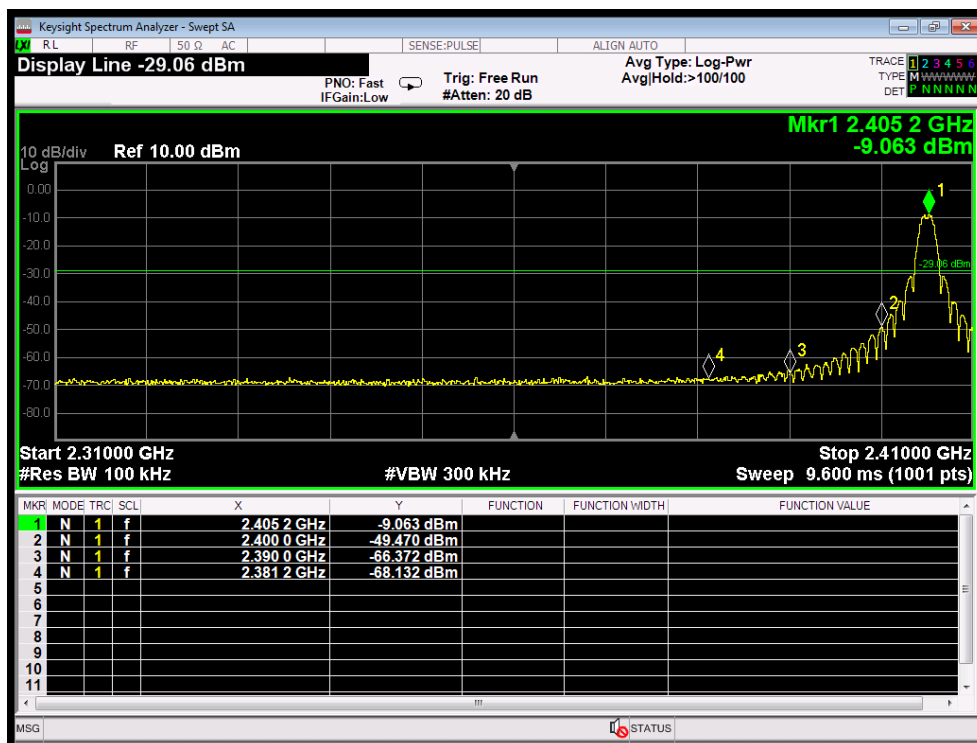
Test Mode:					Test channel: CH 01			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
2390.00	55.21	29.15	3.41	34.01	53.76	74.00	-20.24	V
2400.00	60.10	29.16	3.43	34.01	58.68	74.00	-15.32	V
2390.00	54.20	29.15	3.41	34.01	52.75	74.00	-21.25	H
2400.00	63.12	29.16	3.43	34.01	61.70	74.00	-12.30	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
				(dB)				
2390.00	41.63	29.15	3.41	34.01	40.18	54.00	-13.82	V
2400.00	45.21	29.16	3.43	34.01	43.79	54.00	-10.21	V
2390.00	41.22	29.15	3.41	34.01	39.77	54.00	-14.23	H
2400.00	44.96	29.16	3.43	34.01	43.54	54.00	-10.46	H

Remark:

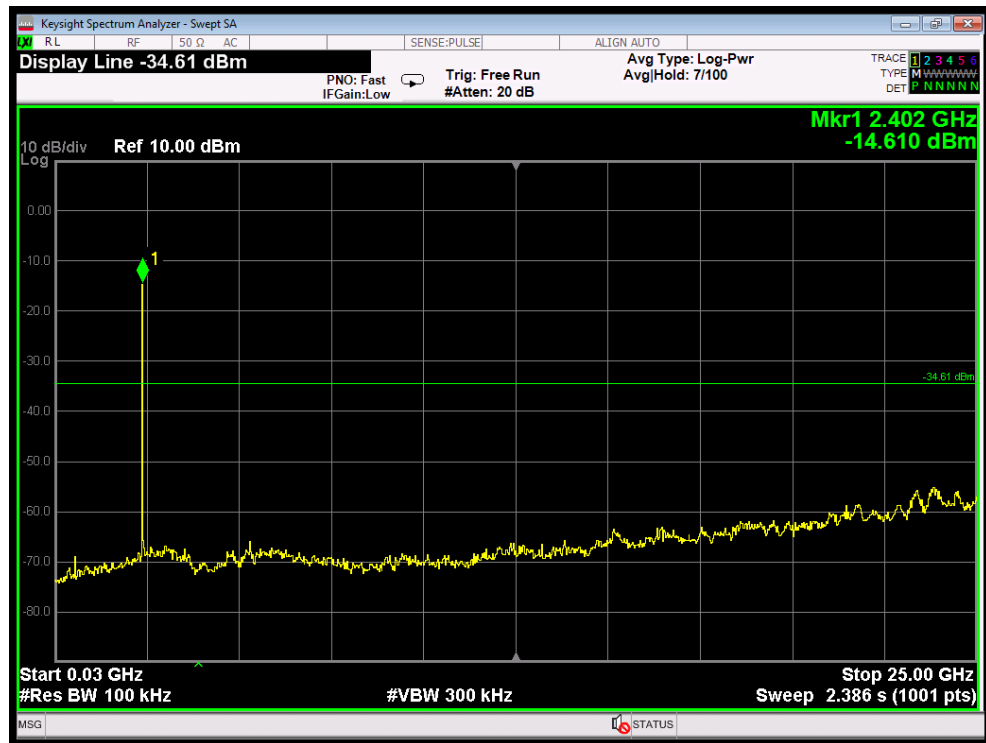
1. Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

Conducted band edge

Left



Conducted Emission Method

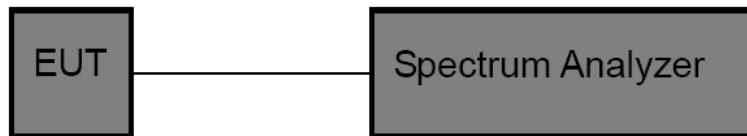


5. 20dB Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.249
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5.2. Test Setup



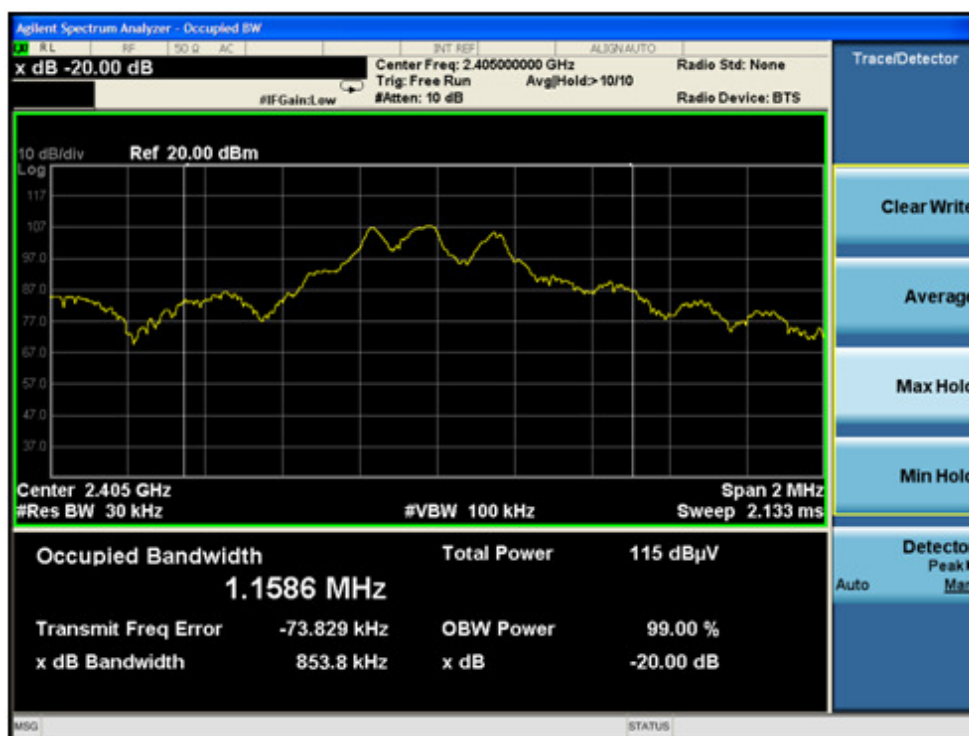
5.3. Test Procedure

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:
 $RBW = 30\text{kHz}$, $VBW \geq 3 * RBW = 100\text{kHz}$,
 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 12V	Temperature	: 24°C
Test Result	: PASS	Humidity	: 55%RH

Frequency (MHz)	Bandwidth (kHz)	Result
2405MHZ	853.8	PASS



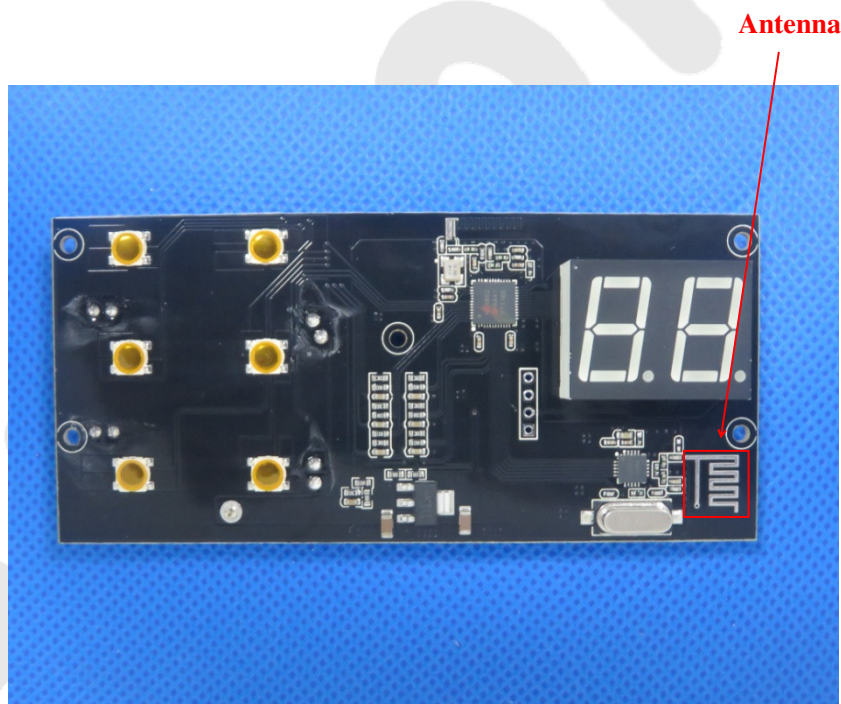
6. Antenna Requirement

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 1.05 dBi. It complies with the standard requirement.



APPENDIX I -- TEST SETUP PHOTOGRAPH

Please see the test report of SZAWW180306004-01

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APPENDIX II -- EXTERNAL PHOTOGRAPH

Please see the test report of SZAWW180306004-01

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APPENDIX III -- INTERNAL PHOTOGRAPH

Please see the test report of SZAWW180306004-01

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