

FCC TEST REPORT
for
Shenzhen Pixel Technology Limited

Speedlite
Model No.: X900C, X900N, X900S

Prepared for : Shenzhen Pixel Technology Limited
Address : 1411 Rm, Meili AAA Building, Renmin Road, Longhua District,
Shenzhen City, China

Prepared By : Shenzhen Anbotek Compliance Laboratory Limited
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Report Number : R0116111041I
Date of Test : Jun. 25~Jul. 10, 2017
Date of Report : Jul. 10, 2017

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TEST REPORT

Applicant : Shenzhen Pixel Technology Limited
Manufacturer : Shenzhen Pixel Technology Limited
EUT : Speedlite
Model No. : X900C, X900N, X900S
Serial No. : N.A.
Trade Mark : 
Rating : Input: DC 7.4V or 9V
(Lithium battery DC 7.4V, 5200mAh, DC 9V by "AA" battery*6)

Measurement Procedure Used:

FCC Part15 Subpart C, Paragraph 15.207, 15.249 & 15.209

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 : Jun. 25~Jul. 10, 2017

Prepared by :



Winkey Wang

(Tested Engineer / Winkey Wang)

Reviewer :

Amy Ding

(Project Manager / Amy Ding)

Approved & Authorized Signer :

Tom Chen

(Manager / Tom Chen)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT : Speedlite

Model Number : X900C, X900N, X900S
(Note: All samples are the same except the model number and colour, so we prepare “X900C” for test only.)

Test Power Supply : DC 9V

Frequency : 2411~2471MHz

No. of Channels : 15
(2411.0MHz, 2419.5MHz, 2428.0MHz, 2436.5MHz, 2445.0MHz, 2453.5MHz, 2462.0MHz, 2411.5MHz, 2420.0MHz, 2428.5MHz, 2437.0MHz, 2445.5MHz, 2454.0MHz, 2462.5MHz, 2471.0MHz)

Antenna Specification : PCB Antenna:0 dBi

Applicant : Shenzhen Pixel Technology Limited
Address : 1411 Rm, Meili AAA Building, Renmin Road, Longhua District, Shenzhen City, China

Manufacturer : Shenzhen Pixel Technology Limited
Address : 1411 Rm, Meili AAA Building, Renmin Road, Longhua District, Shenzhen City, China

Factory : Shenzhen Pixel Technology Limited
Address : 1411 Rm, Meili AAA Building, Renmin Road, Longhua District, Shenzhen City, China

Date of receipt : Jun. 25, 2017

Date of Test : Jun. 25~Jul. 10, 2017

1.2. Auxiliary Equipment Used during Test

N/A

1.3. Description of Test Facility

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

FCC-Registration No.: 752021

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 752021, July 06, 2016.

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

1.4. Measurement Uncertainty

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

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC Part 15, Paragraph 15.249.

2.1. Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
§15.207 (a)	Conducted Emission	-	N/A (see note)
§15.205	Restricted Band of Operation	PASS	Complies
§15.209 §15.249(a)	Radiated Emission	PASS	Complies
§15.215(c)	20dB Bandwidth Test	PASS	Complies
§15.203	Antenna Requirement	PASS	Complies

Note: This product is low voltage products. It is using the battery as a power source.

2.2. Description of Test Modes

The EUT has been tested under operating condition.

Manual control the EUT for staying in continuous transmitting mode.

Channel Low(2411MHz), Channel Middle(2445MHz) and Channel High(2471MHz) are chosen for the final testing.

3. Test Procedure

GENERAL: This report shall NOT be reproduced except in full without the written approval of Shenzhen Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.10-2013 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:

Freq (MHz) METER READING + ACF = FS
20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.10-2013 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

4. Radiation Interference

4.1. Requirements (15.249, 15.209):

FIELD STRENGTH of Fundamental: @3M	FIELD STRENGTH of Harmonics	S15.209	
902-928 MHZ		30 - 88 MHz	40 dBuV/m
2.4-2.4835 GHz		88 - 216 MHz	43.5
94 dB μ V/m @3m	54 dB μ V/m @3m	216 - 960 MHz	46
		ABOVE 960 MHz	54dBuV/m

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

4.2. Test Procedure

For below 1GHz, the EUT is placed on a turn table which is 0.8 meter high above the ground. For above 1GHz, the EUT is placed on a turn table which is 1.5 meter high above the ground. 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. Both horizontal and vertical polarization of the antenna are set on test.

All readings from 30MHz to 1GHz are quasi-peak values with a resolution bandwidth of 120kHz. All reading are above 1GHz, peak & average values with a resolution bandwidth of 1MHz. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation. The test results are listed in Section 4.3.

4.3 Test Equipment

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.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	May 27, 2017	1 Year
6.	EMI Test Receiver	Rohde & Schwarz	ESPI	101604	May 27, 2017	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	May 31, 2017	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	May 31, 2017	1 Year
9.	Loop Antenna	Schwarzbeck	HFH2-Z2	100047	Apr. 03, 2017	1 Year
10.	Pre-amplifier	SONOMA	310N	186860	May 27, 2017	1 Year
11.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
12.	Power Sensor	DAER	RPR3006W	15I00041SN045	May 27, 2017	1 Year
13.	Power Sensor	DAER	RPR3006W	15I00041SN046	May 27, 2017	1 Year
14.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	May 27, 2017	1 Year
15.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	May 27, 2017	1 Year
16.	Signal Generator	Agilent	E4421B	MY41000743	May 27, 2017	1 Year
17.	DC Power supply	IVYTECH	IV6003	1601D6030007	May 26, 2017	1 Year
18.	TEMP&HUMI PROGRAMMABLE CHAMBER	Sertep	ZJ-HWHS80B	ZJ-17042804	Mar. 03, 2017	1 Year

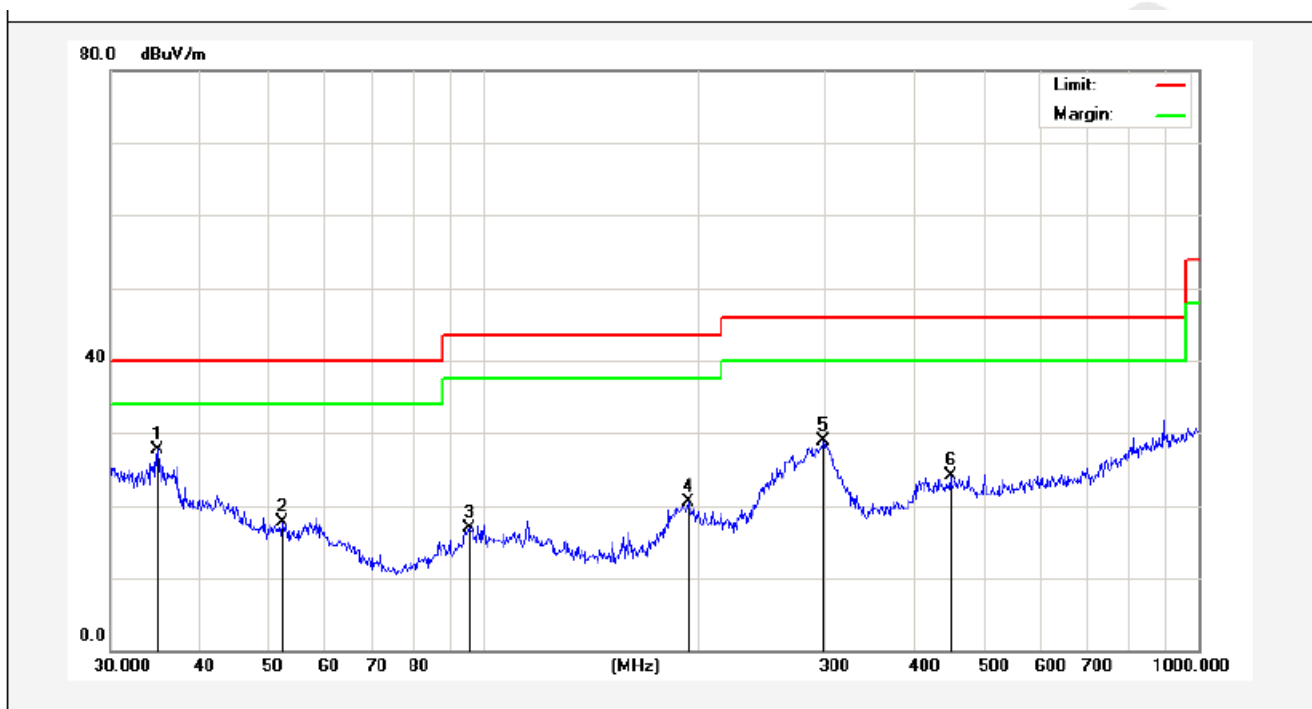
4.4. Test Results

PASS.

Please refer the following pages. Only the worst case (x orientation).

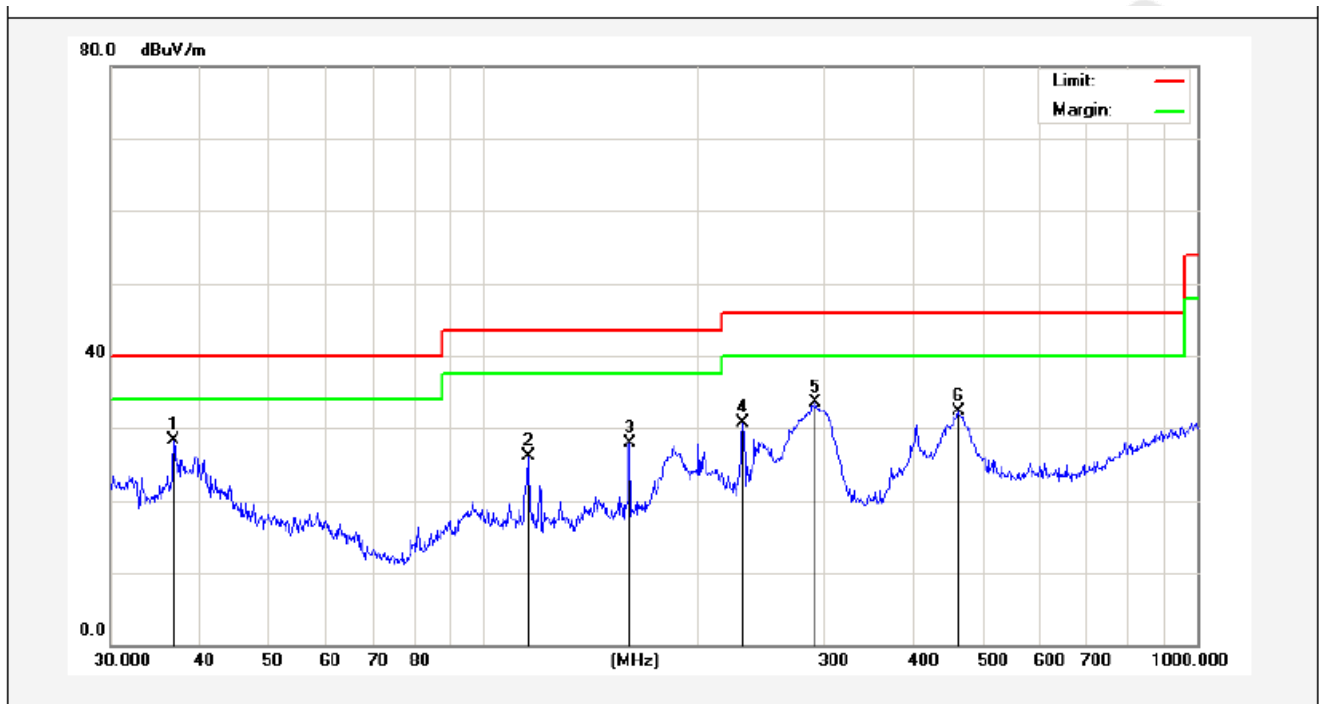
Below 1GHz:

Job No.:	0116111041I	Polarziation:	Horizontal
Standard:	(RE)FCC PART15 C _3m	Power Source:	DC 9V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.5(C)/52%RH
Mode:	ON	Distance:	3m
Note:	30-1000MHz		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	34.8823	42.06	-14.35	27.71	40.00	-12.29	QP	300	360	
2	52.2079	32.37	-14.73	17.64	40.00	-22.36	QP	300	120	
3	95.4270	37.87	-20.99	16.88	43.50	-26.62	QP	300	360	
4	193.0945	41.32	-20.91	20.41	43.50	-23.09	QP	300	90	
5	298.2681	46.66	-17.73	28.93	46.00	-17.07	QP	300	180	
6	449.5558	36.25	-12.16	24.09	46.00	-21.91	QP	300	240	

Job No.:	01161110411	Polarization:	Vertical
Standard:	(RE)FCC PART15 C_3m	Power Source:	DC 9V
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.5(C)/52%RH
Mode:	ON	Distance:	3m
Note:	30-1000MHz		



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	36.7661	41.14	-12.91	28.23	40.00	-11.77	QP	300	360	
2	115.3204	42.02	-16.00	26.02	43.50	-17.48	QP	300	180	
3	160.3456	45.79	-17.86	27.93	43.50	-15.57	QP	300	100	
4	230.9068	45.28	-14.55	30.73	46.00	-15.27	QP	300	120	
5	292.0582	48.48	-14.90	33.58	46.00	-12.42	QP	300	90	
6	462.3455	44.36	-12.03	32.33	46.00	-13.67	QP	300	150	

Above 1 GHz:

Horizontal CH Low (2411MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2411.000	2.17	31.21	35.30	85.25	83.33	114.0	-30.67	Peak
2411.000	2.17	31.21	35.30	75.96	74.04	94.0	-19.96	AV
4822.330	2.56	34.01	34.71	46.89	48.75	74.0	-25.25	Peak
4822.330	2.56	34.01	34.71	37.41	39.27	54.0	-14.73	AV
7233.590	2.98	36.16	35.15	45.32	49.31	74.0	-24.69	Peak
7233.590	2.98	36.16	35.15	36.74	40.73	54.0	-13.27	AV
9644.000	---	---	---	---	---	---	---	---
12055.00	---	---	---	---	---	---	---	---
14466.00	---	---	---	---	---	---	---	---
16877.00	---	---	---	---	---	---	---	---

Vertical CH Low (2411MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2411.000	2.17	31.21	35.30	87.24	85.32	114.0	-28.68	Peak
2411.000	2.17	31.21	35.30	80.52	78.60	94.0	-15.40	AV
4822.330	2.56	34.01	34.71	48.96	50.82	74.0	-23.18	Peak
4822.330	2.56	34.01	34.71	38.50	40.36	54.0	-13.64	AV
7233.590	2.98	36.16	35.15	44.17	48.16	74.0	-25.84	Peak
7233.590	2.98	36.16	35.15	35.88	39.87	54.0	-14.13	AV
9644.000	---	---	---	---	---	---	---	---
12055.00	---	---	---	---	---	---	---	---
14466.00	---	---	---	---	---	---	---	---
16877.00	---	---	---	---	---	---	---	---

Horizontal CH Middle (2445MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2445.000	2.19	31.22	34.60	86.95	85.76	114.0	-28.24	Peak
2445.000	2.19	31.22	34.60	78.58	77.39	94.0	-16.61	AV
4890.090	2.57	35.00	34.58	49.82	52.81	74.0	-21.19	Peak
4890.090	2.57	35.00	34.58	40.23	43.22	54.0	-10.78	AV
7335.570	3.00	36.17	35.14	44.01	48.04	74.0	-25.96	Peak
7335.570	3.00	36.17	35.14	33.36	37.39	54.0	-16.61	AV
9780.000	---	---	---	---	---	---	---	---
12225.00	---	---	---	---	---	---	---	---
14670.00	---	---	---	---	---	---	---	---
17115.00	---	---	---	---	---	---	---	---

Vertical CH Middle (2445MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2445.000	2.19	31.22	34.60	89.97	88.78	114.0	-25.22	Peak
2445.000	2.19	31.22	34.60	80.67	79.48	94.0	-14.52	AV
4890.090	2.57	35.00	34.58	50.52	53.51	74.0	-20.49	Peak
4890.090	2.57	35.00	34.58	38.69	41.68	54.0	-12.32	AV
7335.570	3.00	36.17	35.14	49.85	53.88	74.0	-20.12	Peak
7335.570	3.00	36.17	35.14	40.63	44.66	54.0	-9.34	AV
9780.000	---	---	---	---	---	---	---	---
12225.00	---	---	---	---	---	---	---	---
14670.00	---	---	---	---	---	---	---	---
17115.00	---	---	---	---	---	---	---	---

Horizontal CH High (2471MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2471.000	2.20	31.65	36.00	91.14	88.99	114.0	-25.01	Peak
2471.000	2.20	31.65	36.00	82.54	80.39	94.0	-13.61	AV
4942.350	2.58	35.06	34.79	53.96	56.81	74.0	-17.19	Peak
4942.350	2.58	35.06	34.79	33.60	36.45	54.0	-17.55	AV
7413.890	3.02	36.19	34.90	47.79	52.10	74.0	-21.90	Peak
7413.890	3.02	36.20	35.20	38.97	42.99	54.0	-11.01	AV
9884.000	---	---	---	---	---	---	---	---
12355.00	---	---	---	---	---	---	---	---
14826.00	---	---	---	---	---	---	---	---
17297.00	---	---	---	---	---	---	---	---

Vertical CH High (2471MHz)								
Frequency MHz	Cable Loss dB	Ant Factor dB/m	Preamp Factor dB	Read Level dBμV	Level dBμV/m	Limit dBμV/m	Over Limit dB	Remark
2471.000	2.20	31.65	36.00	94.25	92.10	114.0	-21.90	Peak
2471.000	2.20	31.65	36.00	84.74	82.59	94.0	-11.41	AV
4942.350	2.58	35.06	34.79	49.61	52.46	74.0	-21.54	Peak
4942.350	2.58	35.06	34.79	39.56	42.41	54.0	-11.59	AV
7413.890	3.02	36.19	34.90	50.02	54.33	74.0	-19.67	Peak
7413.890	3.02	36.20	35.20	41.03	45.05	54.0	-8.95	AV
9884.000	---	---	---	---	---	---	---	---
12355.00	---	---	---	---	---	---	---	---
14826.00	---	---	---	---	---	---	---	---
17297.00	---	---	---	---	---	---	---	---

NOTE: “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured. The results of different modulations are the same.

5. Bandedge

5.1. Requirements (15.249):

The field strength of any emissions appearing outside the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 50 dB below the level of the carrier or to the general limits of 15.249.

5.2. Test Procedure

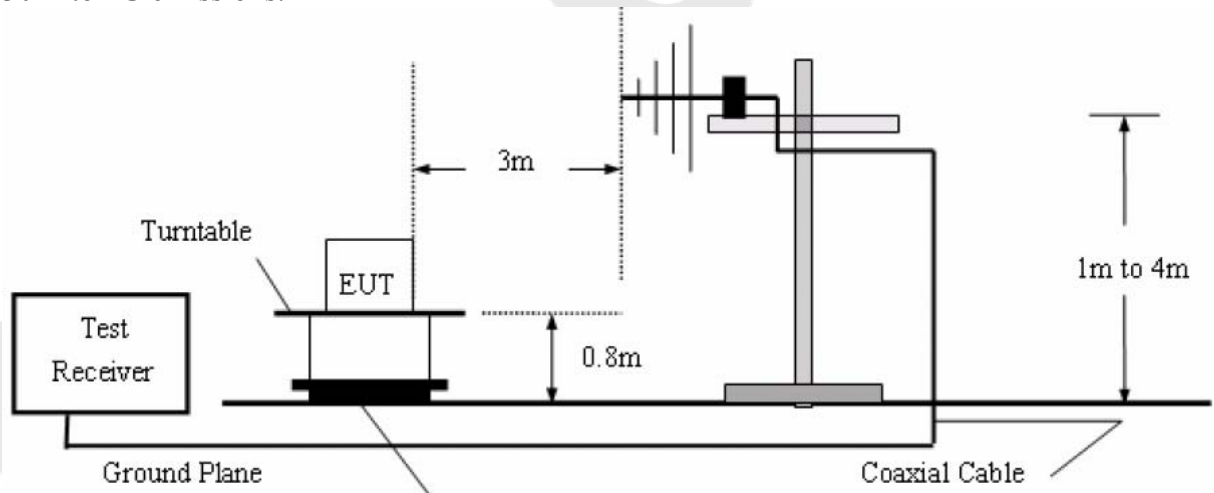
The EUT is placed on a turn table which is 1.5 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test. The device is evaluated in xyz orientation.

Test Equipment

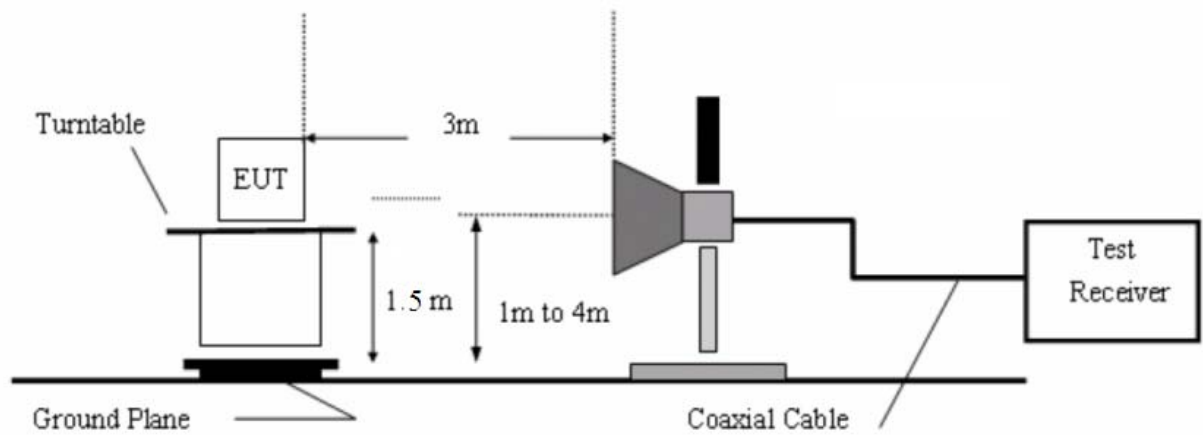
Same as the equipment listed in 4.3.

5.3. Test Configuration:

30M to 1G emissions:



1G to 40G emissions:



5.4. Test Results

Pass.

Please refer the following plot. Only the worst case (x orientation).

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	45.16	29.15	3.41	34.01	43.71	74.00	-30.29	H
2400.00	62.27	29.16	3.43	34.01	60.85	74.00	-13.15	H
2390.00	45.92	29.15	3.41	34.01	44.47	74.00	-29.53	V
2400.00	64.55	29.16	3.43	34.01	63.13	74.00	-10.87	V
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	35.19	29.15	3.41	34.01	33.74	54.00	-20.26	H
2400.00	46.57	29.16	3.43	34.01	45.15	54.00	-8.85	H
2390.00	35.30	29.15	3.41	34.01	33.85	54.00	-20.15	V
2400.00	48.43	29.16	3.43	34.01	47.01	54.00	-6.99	V

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	47.53	29.28	3.53	34.03	46.31	74.00	-27.69	H
2500.00	46.27	29.30	3.56	34.03	45.10	74.00	-28.90	H
2483.50	48.76	29.28	3.53	34.03	47.54	74.00	-26.46	V
2500.00	47.49	29.30	3.56	34.03	46.32	74.00	-27.68	V
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	38.05	29.28	3.53	34.03	36.83	54.00	-17.17	H
2500.00	35.72	29.30	3.56	34.03	34.55	54.00	-19.45	H
2483.50	39.45	29.28	3.53	34.03	38.23	54.00	-15.77	V
2500.00	35.83	29.30	3.56	34.03	34.66	54.00	-19.34	V

Remark:

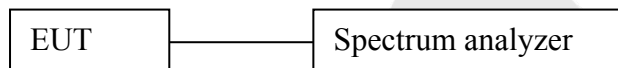
1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

6. Occupied Bandwidth

6.1. Requirements :

According to 15.215 (c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

6.2. Test SET-UP



6.3 Test Equipment

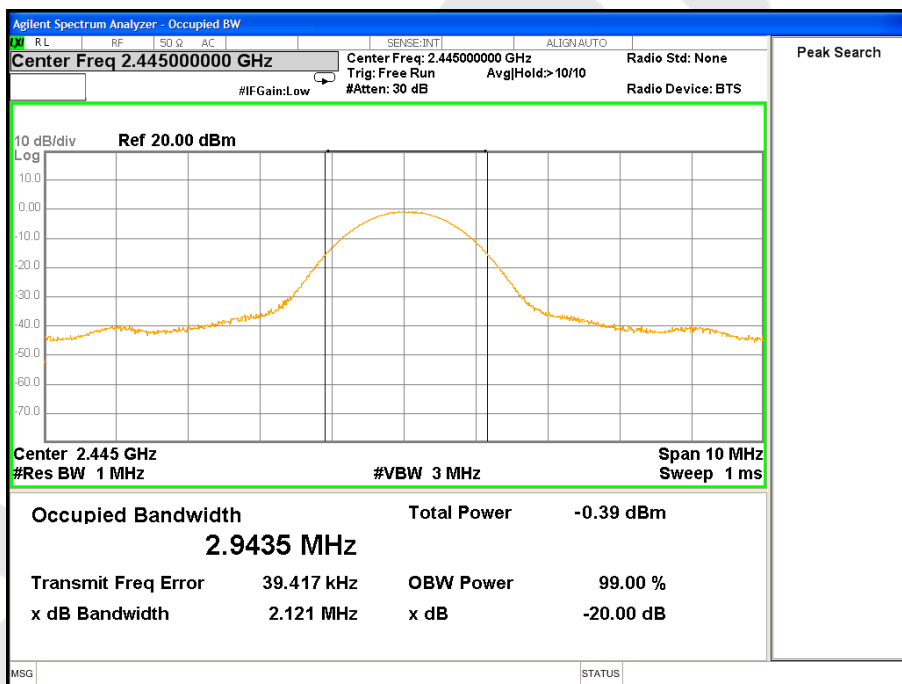
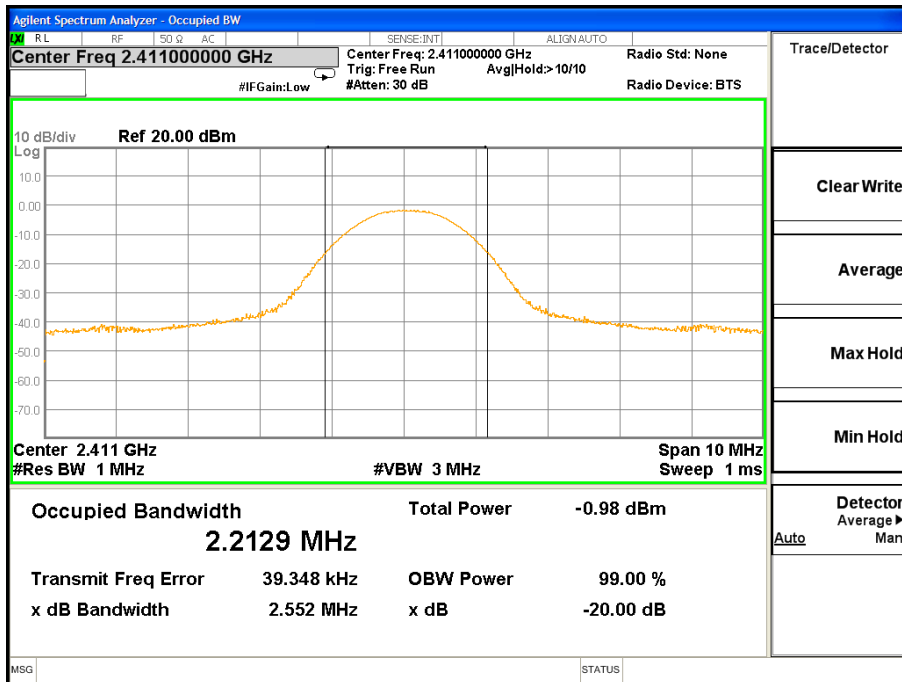
Same as the equipment listed in 4.3.

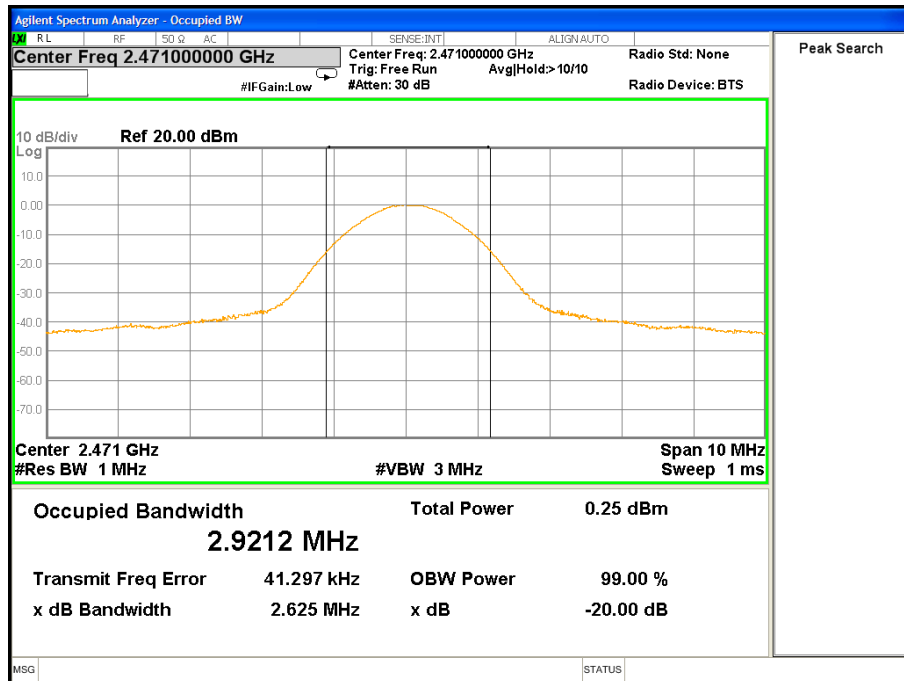
6.4. Test Results

Pass.

Please refer the following plot.

20dB Down:





7. ANTENNA APPLICATION

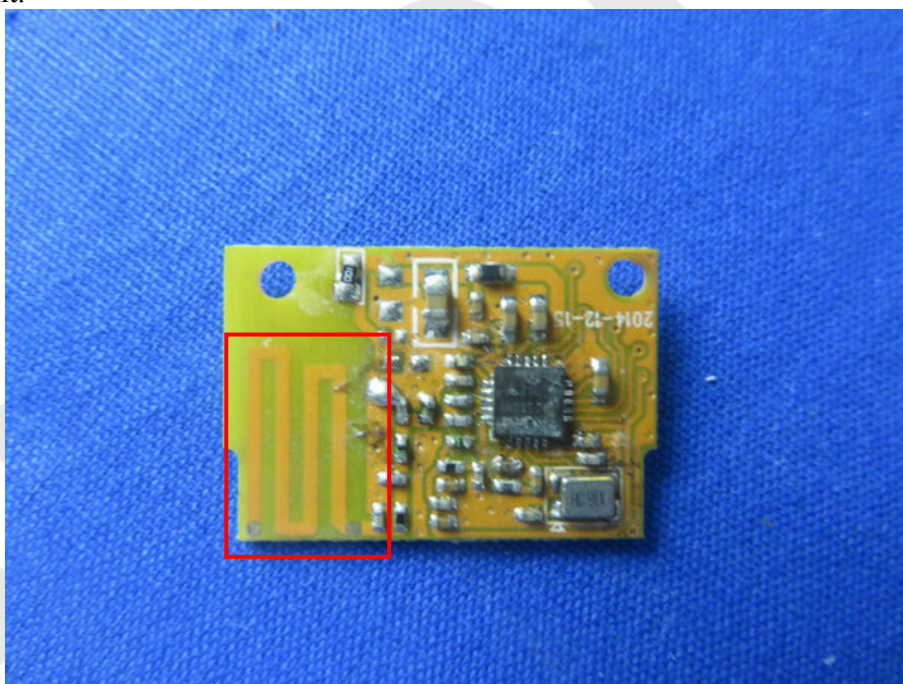
7.1. Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

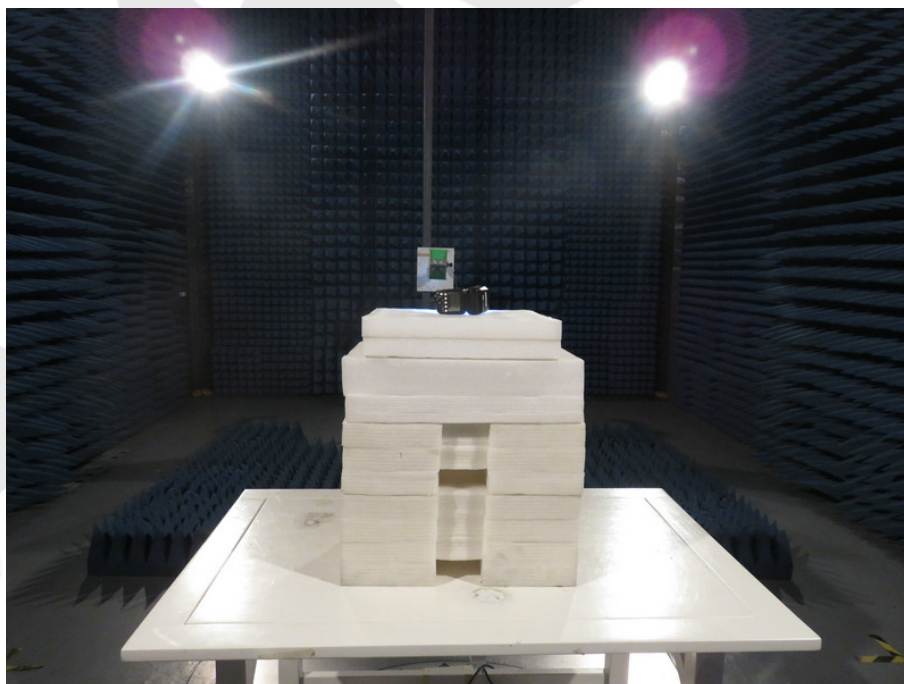
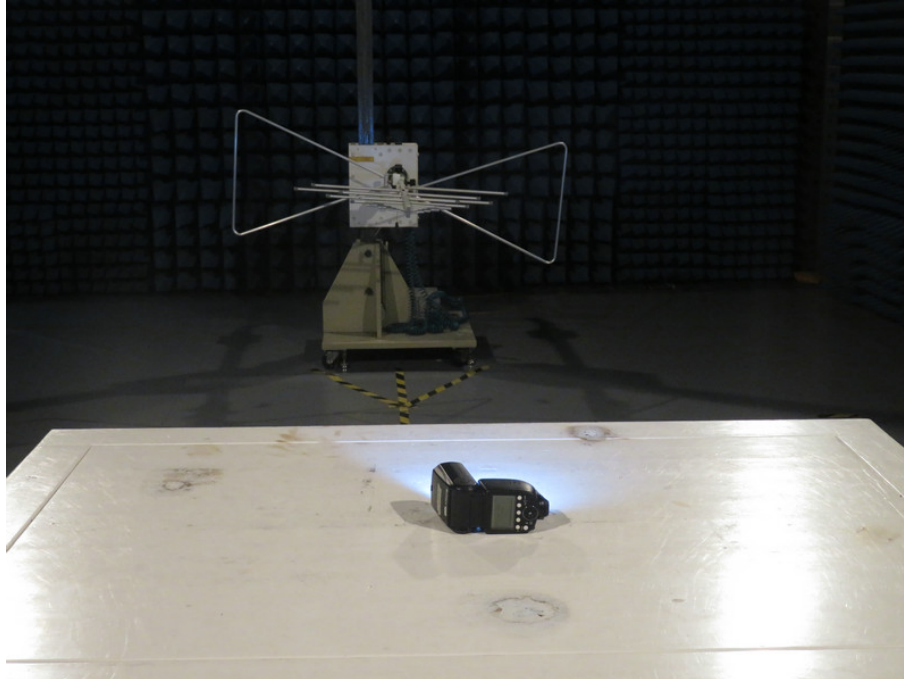
7.2. Result

The EUT's antenna used a PCB antenna which is permanently attached, The antenna's gain is 0dBi and meets the requirement.



8. PHOTOGRAPH

8.1. Photo of Radiation Emission Test



APPENDIX I (External Photos)







APPENDIX II (Internal Photos)

