

# FCC RADIO TEST REPORT

## FCC ID: 2ALMJEN-C0012W

**Product :** Central Controller

**Trade Name :** ENZD

**Model Name :** EN-C0012W

EN-C0012P, EN-C00182W,

**Serial Model :** EN-C0022W, EN-C1012W, EN-C2012W,  
EN-C3012W, EN-C4012W, EN-C5012W,  
EN-C6012W

**Report No. :** BZT-20170309214F

### **Prepared for**

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Suite 1409 Digital Building, Huizhan East Road 16 , Torch Development Zone,  
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### **Prepared by**

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## VERIFICATION OF COMPLIANCE

**Applicant's name** ..... : iTsEasy Electronics Co., Ltd.

Address ..... : Suite 1409 Digital Building, Huizhan East Road 16 , Torch Development Zone,Zhongshan,Guangdong,China

**Manufacture's Name** ..... : iTsEasy Electronics Co., Ltd.

Address ..... : Suite 1409 Digital Building, Huizhan East Road 16 , Torch Development Zone,Zhongshan,Guangdong,China

### Product description

Product name ..... : Central Controller

Trademark: ENZD

Test procedure FCC Part15.249

Standards ANSI C63.10: 2013

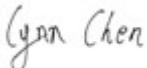
This device described above has been tested by BZT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Result.....: **Pass**

Date (s) of performance of tests .....: 10 Mar. 2017 ~20 Mar. 2017

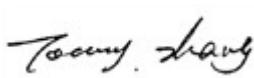
Date of Issue.....: 20 Mar. 2017

Testing Engineer : 

(Lynn Chen)

Technical Manager : 

(Carlen Liu)

Authorized Signatory : 

(Tommy Zhang)

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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

<b>FCC Part15, Subpart C (15.249)</b>			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.203	Antenna Requirement	Pass	
15.249	Radiated Spurious Emission	Pass	
15.205	Band Edge Emission	Pass	
15.249	Occupied Bandwidth	Pass	

NOTE: (1)" N/A" denotes test is not applicable in this Test Report

## 1.1 TEST FACILITY

BZT Testing Technology Co., Ltd.

Add. : Building 17, Xinghua Road Xingwei industrial Park Fuyong, Baoan District, Shenzhen, Guangdong, China  
FCC Registration No.: 701733

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %** .

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$

## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Central Controller												
Trade Name	ENZD												
Model Name	EN-C0012W												
Serial Model	EN-C0012P, EN-C00182W, EN-C0022W, EN-C1012W, EN-C2012W, EN-C3012W, EN-C4012W, EN-C5012W, EN-C6012W												
Model Difference	All the model are the same circuit and RF module, except the model name.												
Product Description	<p>The EUT is a 2.4G wireless switch</p> <table border="1"><tr><td>Operation Frequency:</td><td>2480MHz</td></tr><tr><td>Modulation Type:</td><td>GFSK</td></tr><tr><td>Channel number</td><td>1</td></tr><tr><td>Antenna Designation:</td><td>Integrated antenna</td></tr><tr><td>Antenna Gain(Peak)</td><td>0.7dBi</td></tr><tr><td>EIRP</td><td>80.4dbuv/m@3m(Peak)</td></tr></table> <p>Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.</p>	Operation Frequency:	2480MHz	Modulation Type:	GFSK	Channel number	1	Antenna Designation:	Integrated antenna	Antenna Gain(Peak)	0.7dBi	EIRP	80.4dbuv/m@3m(Peak)
Operation Frequency:	2480MHz												
Modulation Type:	GFSK												
Channel number	1												
Antenna Designation:	Integrated antenna												
Antenna Gain(Peak)	0.7dBi												
EIRP	80.4dbuv/m@3m(Peak)												
Adapter	Model:HS36-1200500CH INPUT:100-240V~,50-60Hz OUTPUT:DC 12V,0.5A												
Battery	N/A												

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.

Table for Filed Antenna

Ant .	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	Integrated antenna	NA	0.7	Antenna

## 2.2 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.

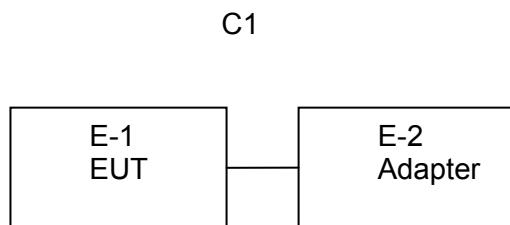
Pretest Mode	Description
Mode 1	TX

<b>For Conducted Emission</b>	
Final Test Mode	Description
Mode 1	TX

<b>For Radiated Emission</b>	
Final Test Mode	Description
Mode 1	TX

Note:

- (1) The EUT use new battery.

**2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED**

## 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Central Controller	ENZD	EN-C0012W	N/A	EUT
E-2	Adapter	ENZD	HS36-1200500CH	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	N/A	N/A	0.6	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

### Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	EMI Test Receiver	R&S	ESU8	100316	2016/10/25	2017/10/24
2	Double Ridged Horn Antenna (0.8GHz-18GHz)	R&S	HF907	100276	2016/11/01	2017/10/31
3	Log-periodic Dipole Antenna (30MHz-1GHz)	R&S	HL223	100435	2016/11/01	2017/10/31
4	Biconical Antenna (9K-30MHz)	R&S	HK116	100431	2016/10/25	2017/10/24
5	Pre-amplifier	Schwarzbeck	VULB 9163	9163-462	2016/04/12	2017/04/11
6	Signal Conditioning Unit	R&S	SCU-08	10008	2016/10/25	2017/10/24
7	Rod Antenna (9K-30MHz)	R&S	HFH2-Z6	100386	2016/11/01	2017/10/31
8	Pre-amplifier	R&S	SCU-01	10049	2016/10/25	2017/10/24
9	Active loop antenna (9K-30MHz)	Schwarzbeck	FMZB1519	1519-038	2016/11/01	2017/10/31
10	Spectrum Analyzer	Agilent	E4407B	MY45109572	2016/11/01	2017/10/31

### Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESU8	100316	2016/10/25	2017/10/24
	Current Probe	R&S	EZ-17	100532	2016/10/25	2017/10/24
3	Two Line V-Network	R&S	ENV216	101109	2016/10/25	2017/10/24
4	Passive Voltage Probe	R&S	ESH2-Z3	100169	2016/10/25	2017/10/24
5	V-Network	R&S	ESH3-Z6	100694	2016/10/25	2017/10/24
6	V-Network	R&S	ESH3-Z6	100690	2016/10/25	2017/10/24
7	Artificial mains	R&S	ESH2-Z5	100309	2016/10/25	2017/10/24
8	Pulse Limiter	R&S	ESH3-Z2	101242	2016/10/25	2017/10/24

### **3. ANTENNA REQUIREMENT**

#### **3.1 STANDARD REQUIREMENT**

15.203 requirement: For intentional device, according to 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.

#### **3.2 EUT ANTENNA**

The EUT antenna is a Integrated antenna. It comply with the standard requirement.

### 3.3 CONDUCTED EMISSION MEASUREMENT

#### 3.3.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

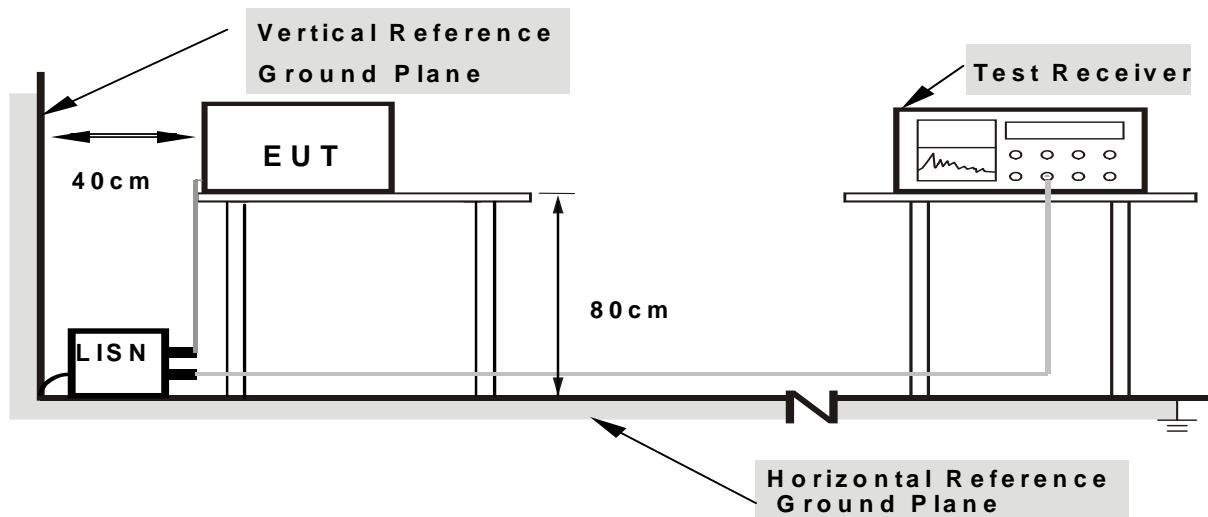
### 3.3.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.3.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.3.4 TEST SETUP



**Note: 1. Support units were connected to second LISN.**

**2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes**

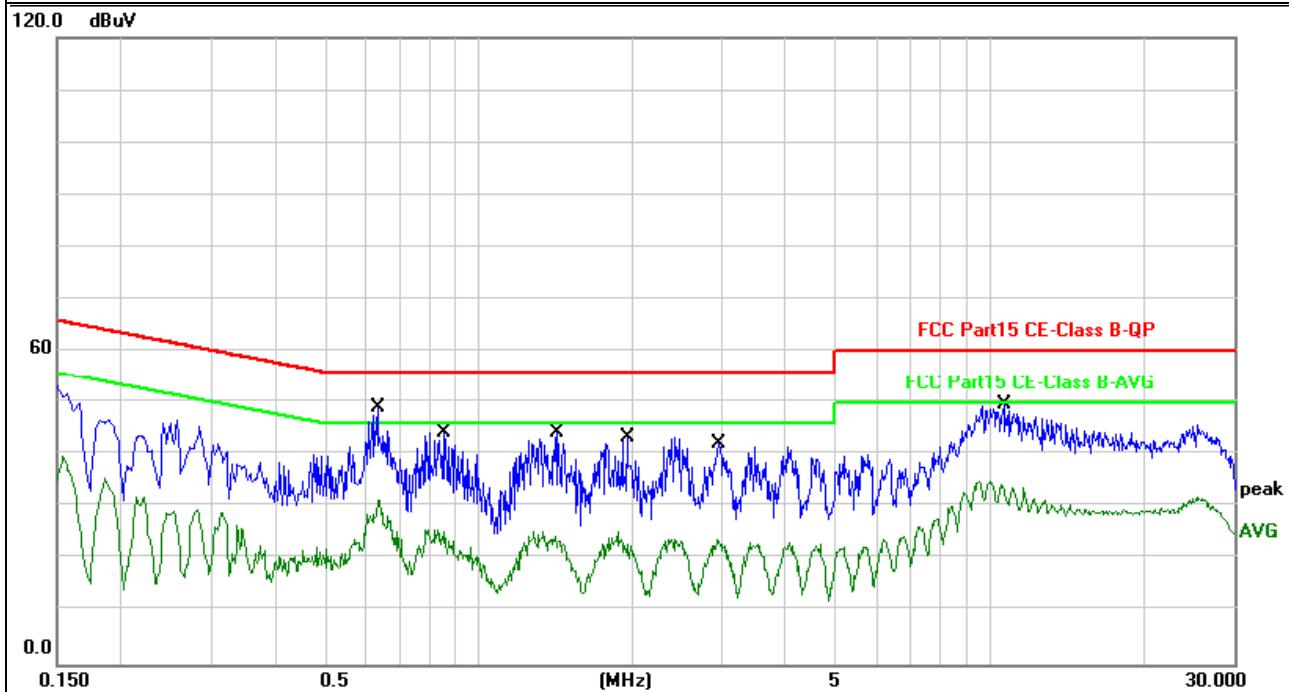
### 3.2.5 TEST RESULT

EUT :	Central Controller	Model Name. :	EN-C0012W
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	AC120V	Test Mode :	TX

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Margin (dB)	Detector Type
0.634	38.91	10.13	49.04	56	-6.96	QP
0.634	21.32	10.13	31.45	46	-14.55	AVG
0.854	34.19	10.15	44.34	56	-11.66	QP
0.854	15.29	10.15	25.44	46	-20.56	AVG
1.414	34.07	10.17	44.24	56	-11.76	QP
1.414	14.31	10.17	24.48	46	-21.52	AVG
1.954	33.29	10.18	43.47	56	-12.53	QP
1.954	12.67	10.18	22.85	46	-23.15	AVG
2.946	13.67	10.19	23.86	46	-22.14	AVG
2.9539	31.82	10.19	42.01	56	-13.99	QP
10.626	39.5	10.13	49.63	60	-10.37	QP

#### Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

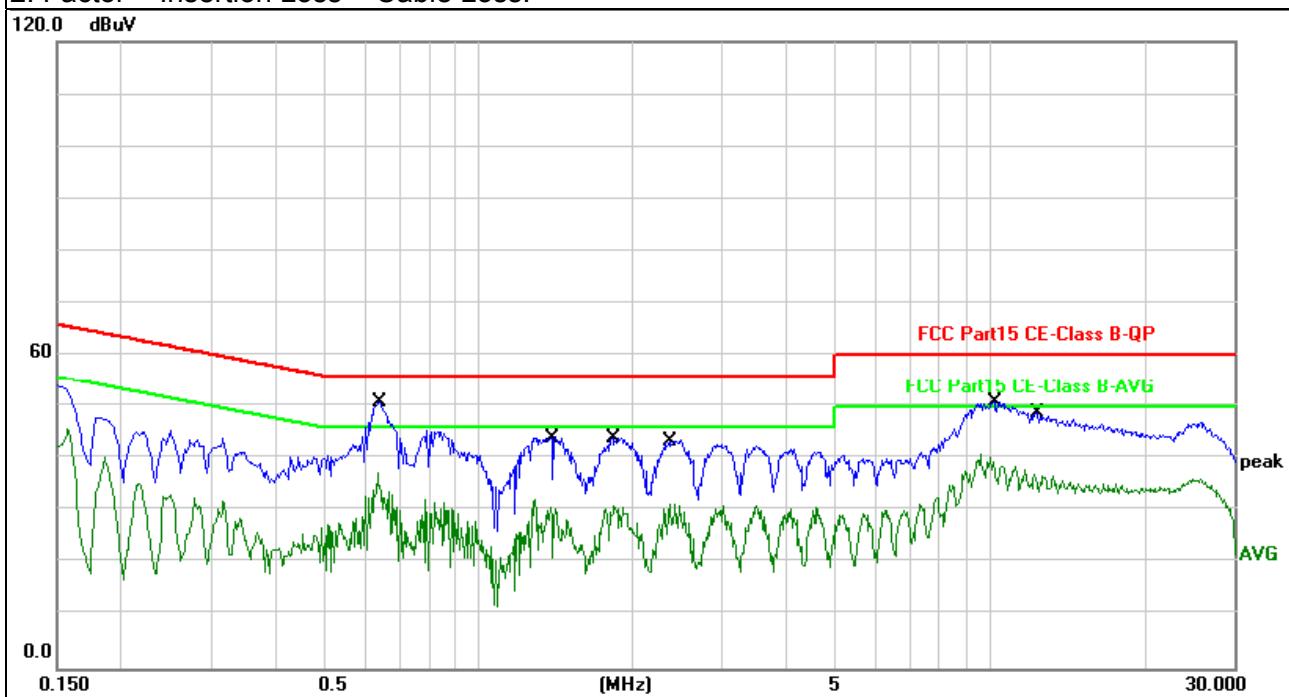


EUT :	Central Controller	Model Name. :	EN-C0012W
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	AC120V	Test Mode :	TX

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V)	Limits (dB $\mu$ V)	Margin (dB)	Detector Type
0.634	40.77	10.13	50.9	56	-5.1	QP
0.634	27.31	10.13	37.44	46	-8.56	AVG
1.386	34.13	10.17	44.3	56	-11.7	QP
1.386	20.69	10.17	30.86	46	-15.14	AVG
1.842	33.83	10.18	44.01	56	-11.99	QP
1.842	21.01	10.18	31.19	46	-14.81	AVG
2.366	33.44	10.18	43.62	56	-12.38	QP
2.366	21.26	10.18	31.44	46	-14.56	AVG
10.162	40.7	10.12	50.82	60	-9.18	QP
10.162	29.22	10.12	39.34	50	-10.66	AVG
12.226	38.04	10.13	48.17	60	-11.83	QP
12.226	26.84	10.13	36.97	50	-13.03	AVG

## Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



### 3.4 RADIATED EMISSION MEASUREMENT

#### 3.4.1 Radiated Emission Limits ( FCC 15.209 )

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

#### LIMITS OF RADIATED EMISSION MEASUREMENT ( FCC 15.249 )

Frequency of Emission (MHz)	Field Strength of fundamental ((millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
2400 - 2483.5	50	500

Notes:

- (1) 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 Section 15.209, whichever is the lesser attenuation.

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

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

### 3.4.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

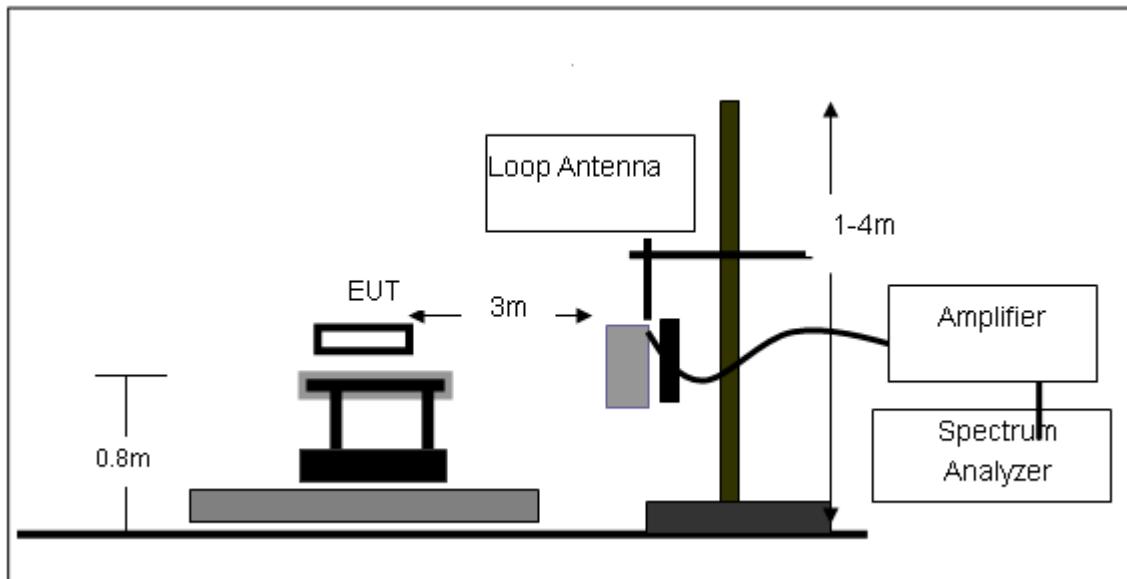
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.4.3 DEVIATION FROM TEST STANDARD

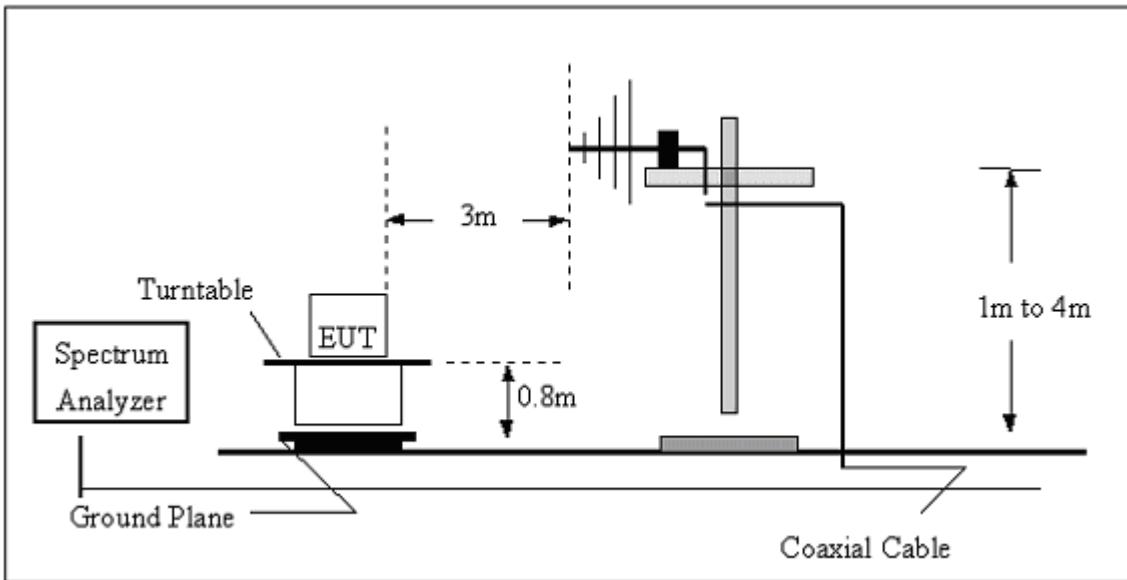
No deviation

### 3.4.4 TEST SETUP

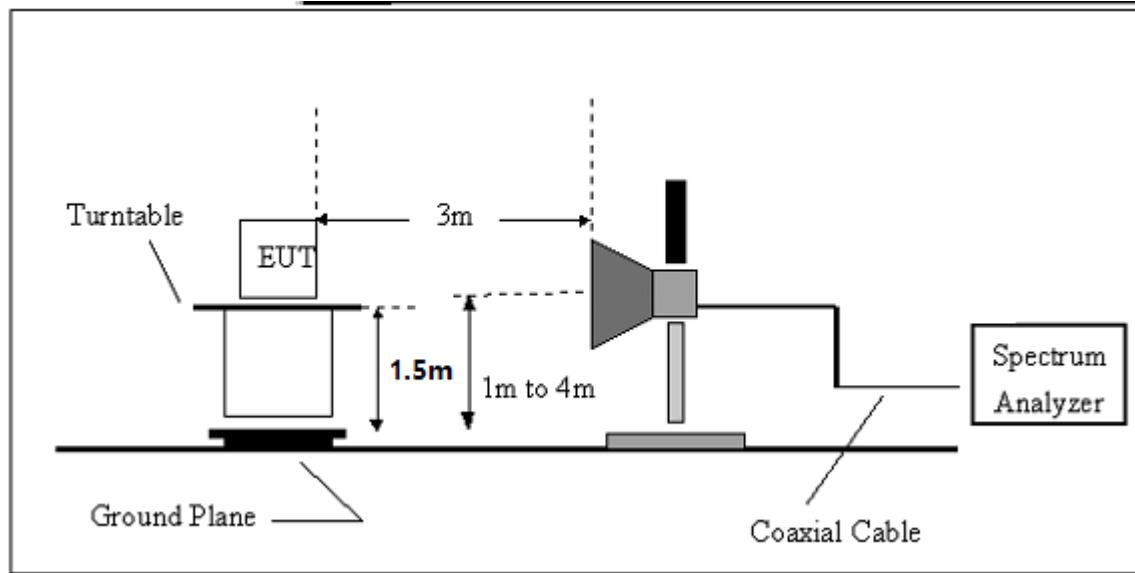
#### (A) Radiated Emission Test-Up Frequency Below 30MHz



#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz



## (C) Radiated Emission Test-Up Frequency Above 1GHz



### 3.4.5 TEST RESULTS (BLOW 30MHz)

EUT :	Central Controller	Model Name. :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

**NOTE:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =  $40 \log (\text{specific distance}/\text{test distance})$  (dB);  
Limit line = specific limits(dBuV) + distance extrapolation factor.

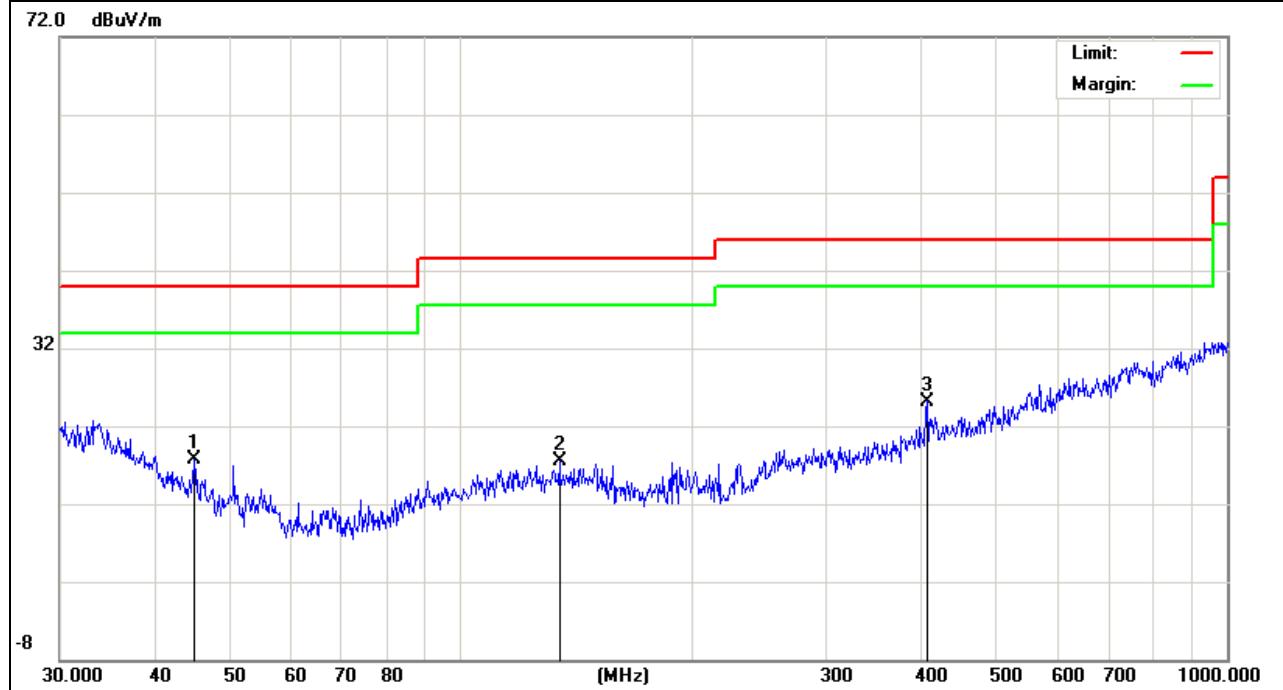
### 3.4.6 TEST RESULTS (BETWEEN 30 – 1000 MHZ)

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX	Polarization :	Vertical

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
44.9004	7.02	10.66	17.68	40	-22.32	QP
134.5592	5.45	11.98	17.43	43.5	-26.07	QP
406.088	7.72	17.48	25.2	46	-20.8	QP

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

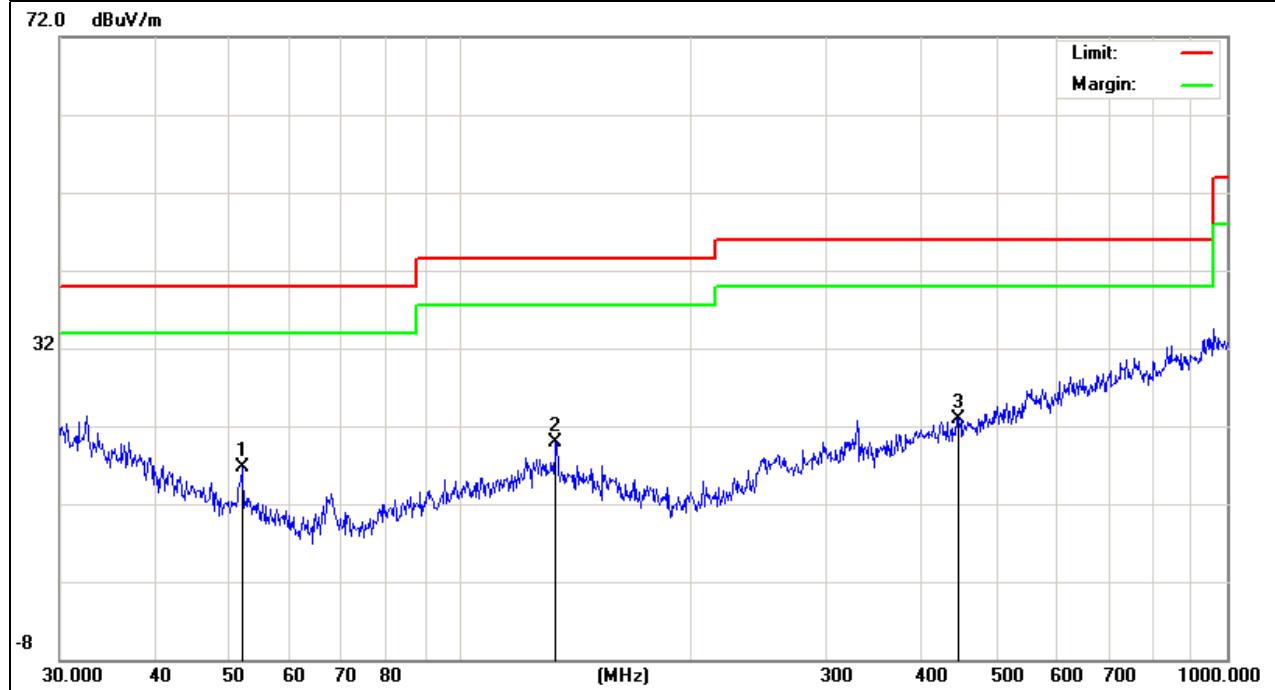


EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
51.843	9.43	7.31	16.74	40	-23.26	QP
133.1511	7.94	11.96	19.9	43.5	-23.6	QP
446.4141	4.87	18.13	23	46	-23	QP

## Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



**3.4.7 TEST RESULTS (ABOVE 1000 MHZ)**

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX /2480MHz	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2480	85.61	-12.79	72.82	114.0 0	-41.18	peak
4960	50.63	-3.59	47.04	74	-26.96	peak

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX /2480MHz	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2480	90.76	-12.79	77.97	114.0 0	-36.03	peak
4960	52.72	-3.59	49.13	74	-24.87	peak

Note:

1. The testing has been conformed to 25GHz
2. If the PK measured value is less than AV limit already, the AV measurement is not required.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported.

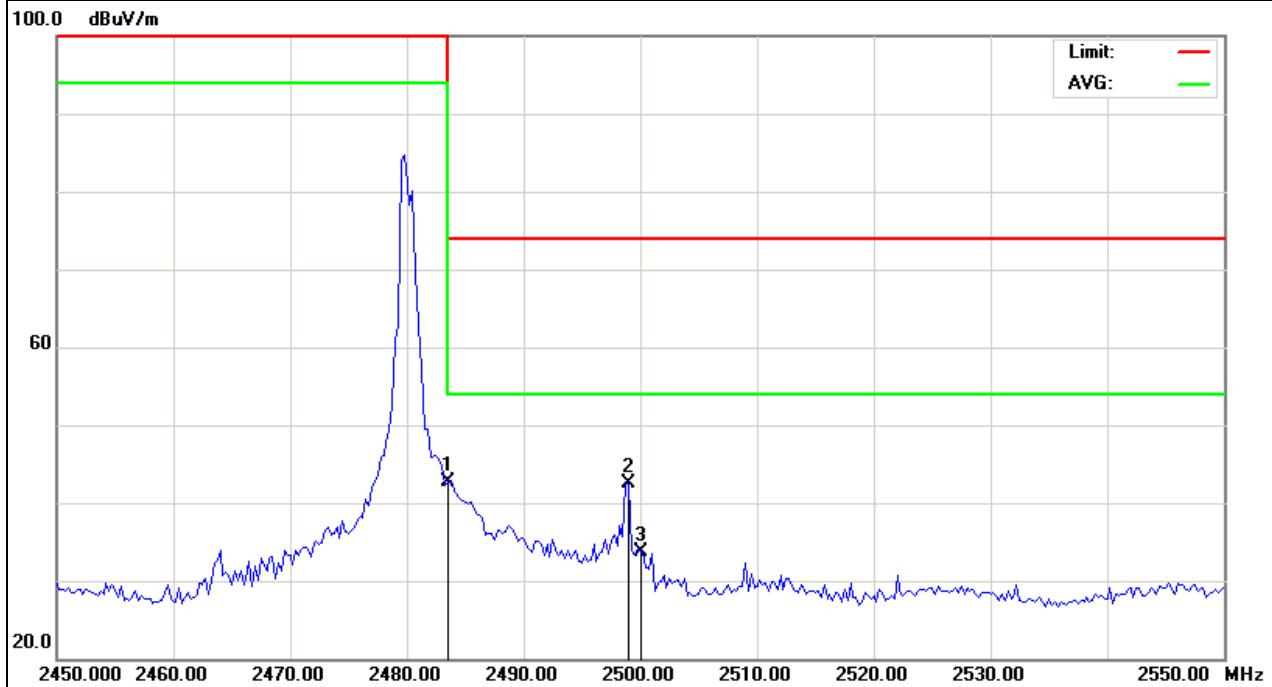
### 3.4.8 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT :	Central Controller	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX /2480MHz	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dB $\mu$ V)	(dB)	(dB $\mu$ V/m)	(dB $\mu$ V/m)	(dB)	
2483.5	55.46	-12.78	42.68	74	-31.32	peak
2499	55.32	-12.72	42.6	74	-31.4	peak
2500	46.52	-12.72	33.8	74	-40.2	peak

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

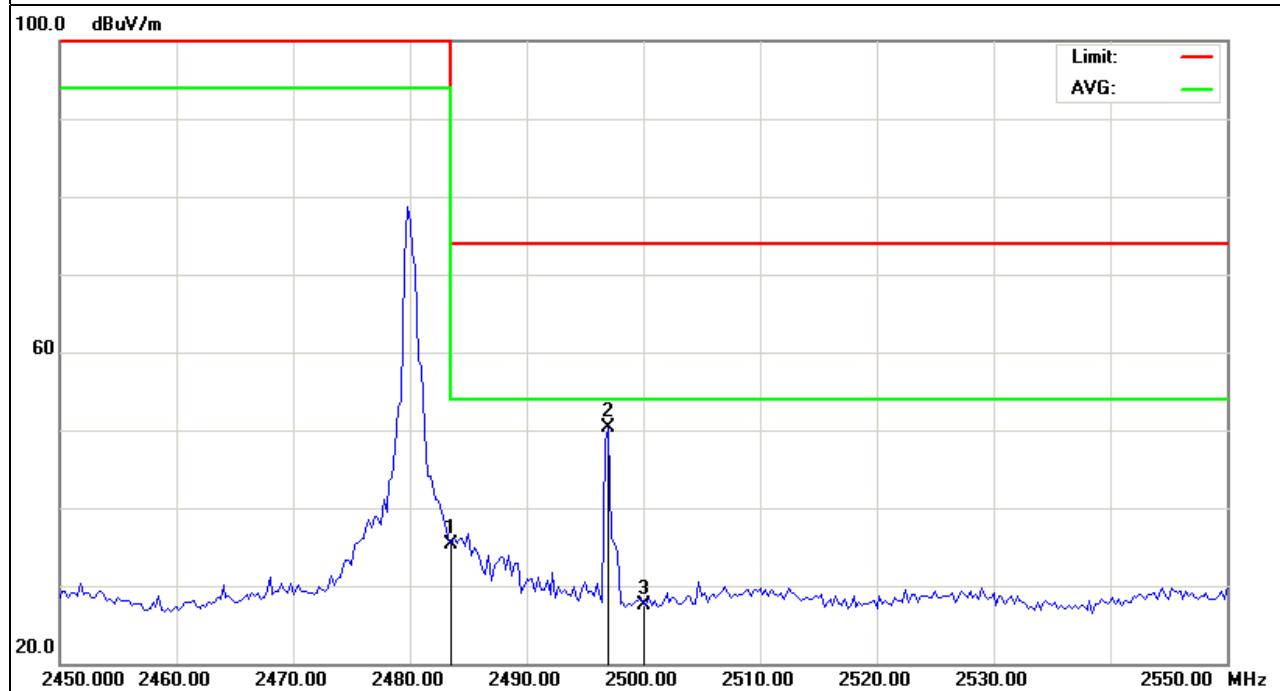


EUT :	2.4G wireless switch	Model Name :	EN-C0012W
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Voltage :	AC 120V
Test Mode :	TX /2480MHz	Polarization :	Horizontal

Frequency (MHz)	Meter Reading (dB $\mu$ V)	Factor (dB)	Emission Level (dB $\mu$ V/m)	Limits (dB $\mu$ V/m)	Margin (dB)	Detector Type
2483.5	48.15	-12.78	35.37	74	-38.63	peak
2497	63.03	-12.73	50.3	74	-23.7	peak
2500	40.32	-12.72	27.6	74	-46.4	peak

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



## 4. BANDWIDTH TEST

### 4.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting :  $RBW = 100\text{KHz}$ ,  $VBW \geq RBW$ , Sweep time = Auto.

### 4.2 DEVIATION FROM STANDARD

No deviation.

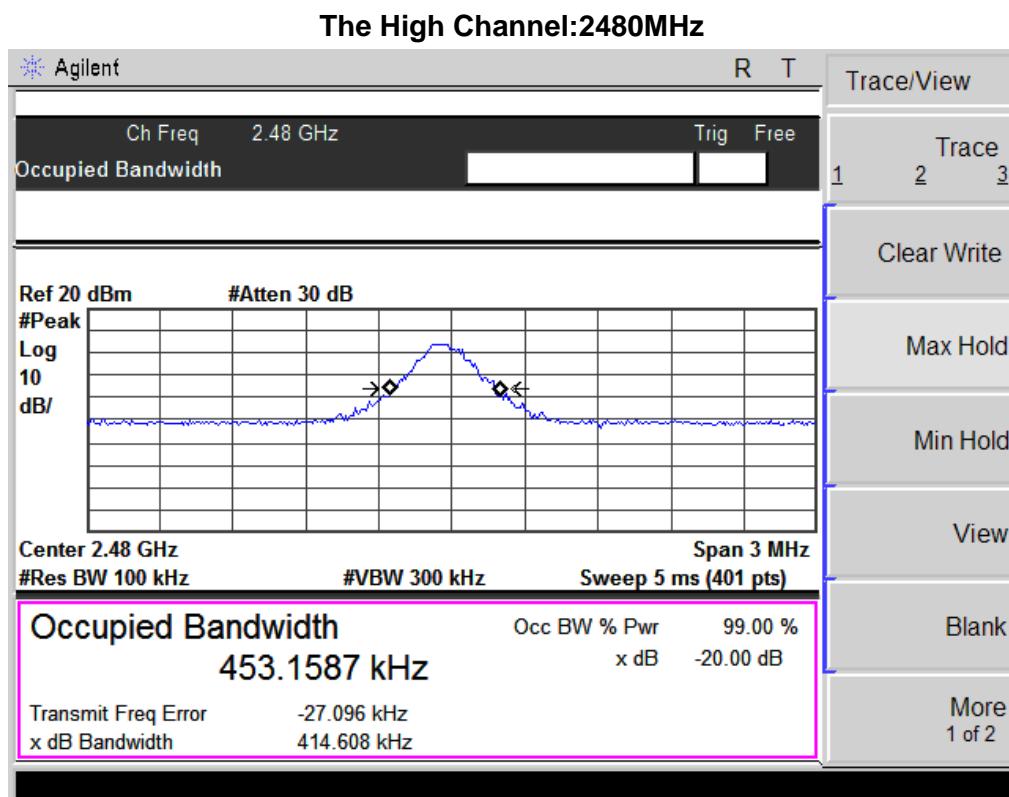
### 4.3 TEST SETUP

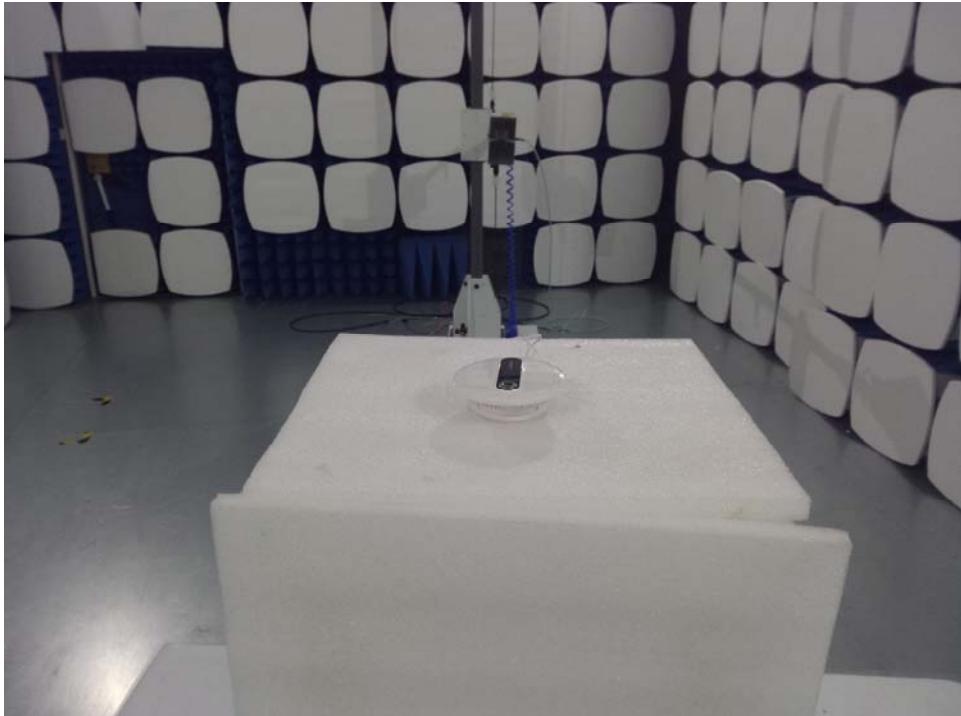
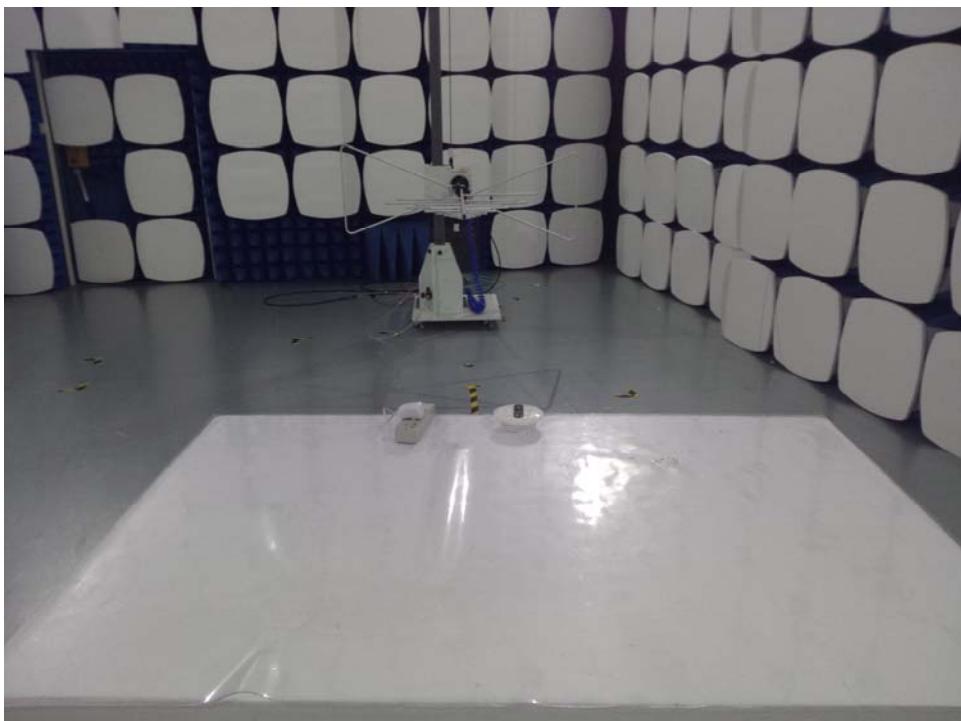


#### 4.4 TEST RESULTS

EUT :	2.4G wireless switch	Model Name :	EN-C0012W
Temperature :	26 °C	Relative Humidity :	53%
Pressure :	1020 hPa	Test Power :	AC 120V
Test Mode :	TX CH		

Frequency (MHz)	20 dBc Bandwidth (MHz)	99% Bandwidth (MHz)
2480	0.415	0.453



**5. EUT TEST PHOTO****Radiated Measurement Photos**

Conducted Emission Photo

