FCC RADIO TEST REPORT
FCC ID: 2ALMJEN-K1012W

Product：	2.4G wireless switch
Trade Name：	ENZD
Model Name：	EN-K1012W
Serial Model：	EN-K0012W, EN-K2012W，EN-K3012W，EN-K4012W，EN-K5012W，EN-K6012W，EN-K7012W，EN-K8012W
Report No.：	BZT-20170309213F

Prepared for

iTsEasy Electronics Co., Ltd.

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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 ..... :	2.4G wireless switch
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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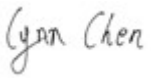
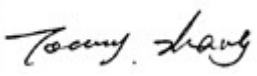
Test Result.....:	**Pass**
Date (s) of performance of tests .....:	10Mar. 2017 ~20 Mar. 2017
Date of Issue.....:	20 Mar. 2017

Testing Engineer **:** 

(Lynn Chen)

Technical Manager **:** 

(Carlen Liu)

Authorized Signatory **:** 

(Tommy zhang)

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Table of Contents **Page**

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15, Subpart C (15.249)			
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	

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1.1 TEST FACILITY

BZT Testing Technology Co., Ltd.
Add. : Buliding 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 ± 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	±1.38dB
2	RF power,conducted	±0.16dB
3	Spurious emissions,conducted	±0.21dB
4	All emissions,radiated(<1G)	±4.68dB
5	All emissions,radiated(>1G)	±4.89dB
6	Temperature	±0.5°C
7	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	2.4G wireless switch
Trade Name	ENZD
Model Name	EN-K1012W
Serial Model	EN-K0012W,EN-K2012W,EN-K3012W, EN-K4012W,EN-K5012W,EN-K6012W, EN-K7012W,EN-K8012W
Model Difference	All the model are the same circuit and RF module, except the model name.
Product Description	The EUT is a 2.4G wireless switch Operation Frequency: 2480MHz Modulation Type: GFSK Channel number 1 Antenna Designation: Integrated antenna Antenna Gain(Peak) 0.5 dBi Field strength 84.32dbuv/m@3m(Peak) 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.
Adapter	N/A
Battery	DC 3V(CR2450)

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	N/A	0.5	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

For Conducted Emission	
Final Test Mode	Description
N/A	N/A

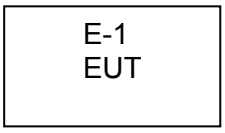
For Radiated Emission	
Final Test Mode	Description
Mode 1	TX

Note:

(1) The EUT use new battery.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



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	2.4G wireless switch	ENZD	EN-K1012W	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

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-amplifer	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-amplifer	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

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

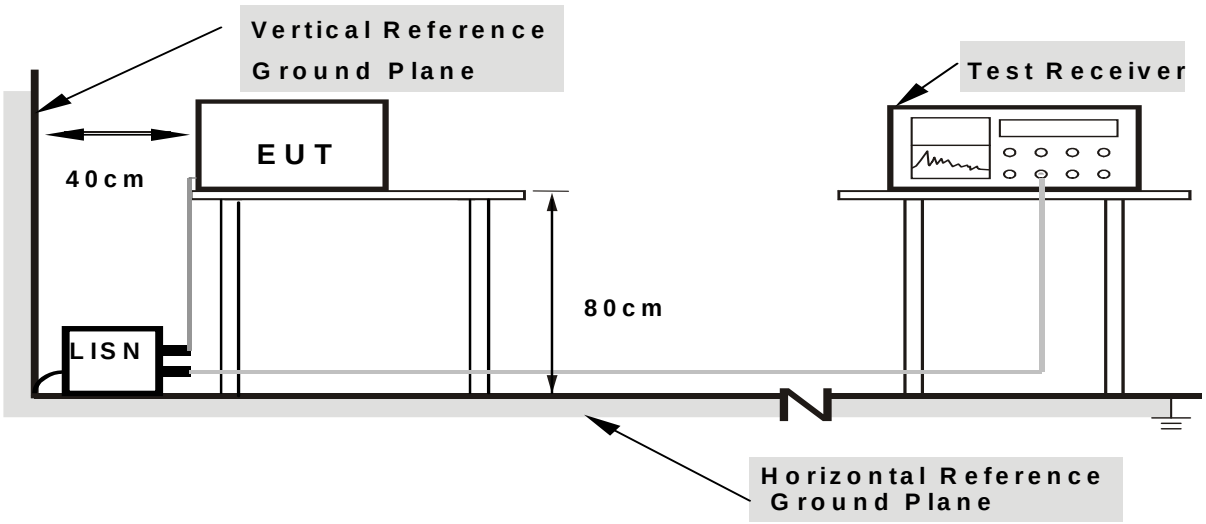
3.3.2 TEST PROCEDURE

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 from other units and other metal planes

3.2.5 TEST RESULT

EUT：	2.4G wireless switch	Model Name. ：	EN-K1012W
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	N/A	Test Mode：	N/A

Note: It is powered by the battery, Conducted emission test is not applicable.

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

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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:

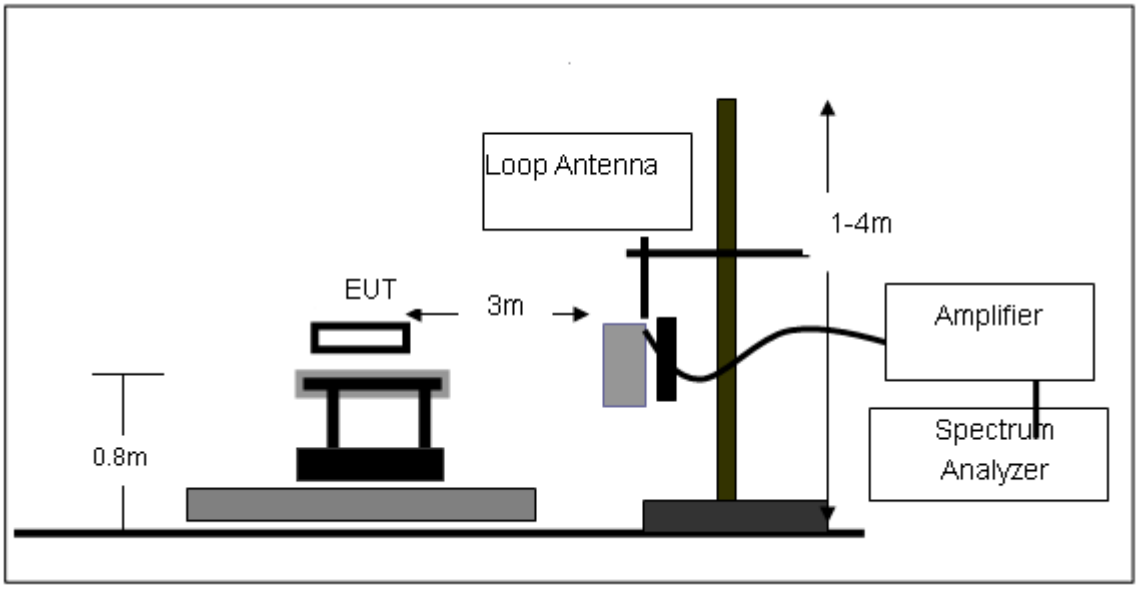
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

3.4.3 DEVIATION FROM TEST STANDARD

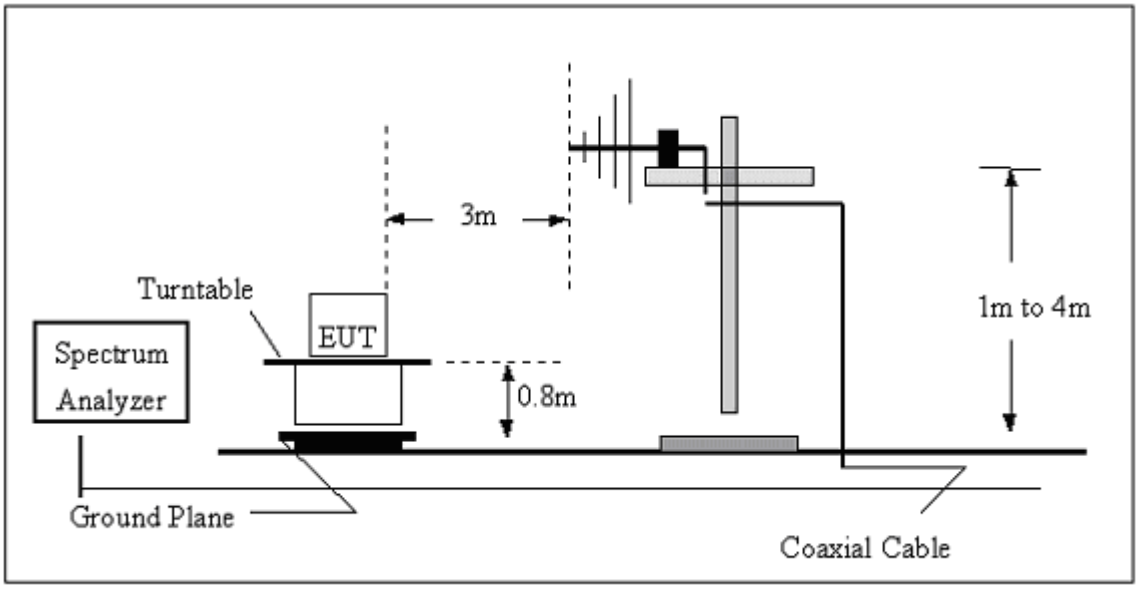
No deviation

3.4.4 TEST SETUP

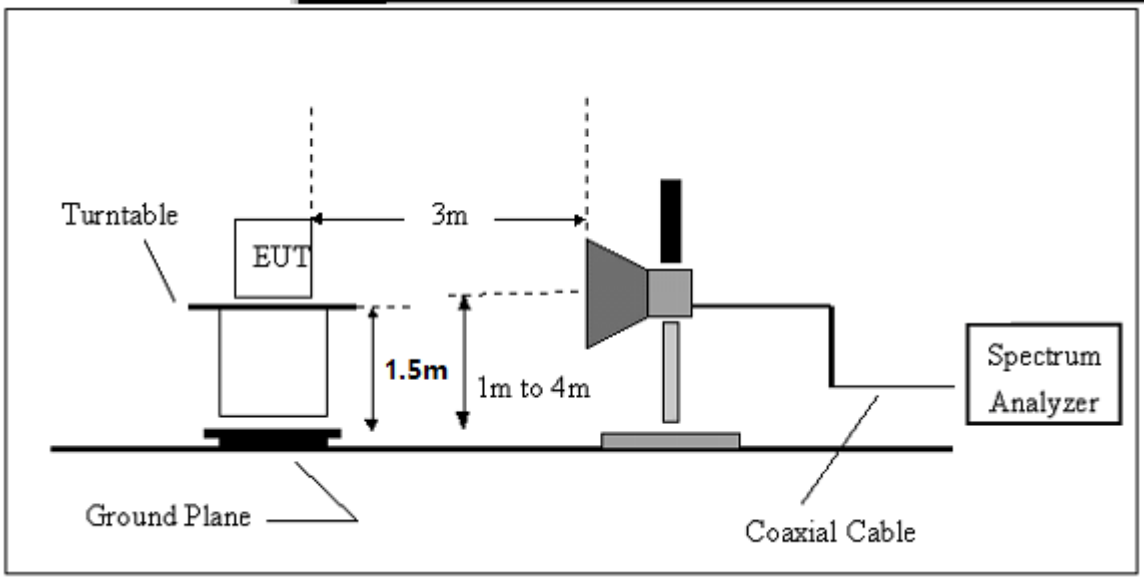
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.4.5 TEST RESULTS (BLOW 30MHz)

EUT：	2.4G wireless switch	Model Name. ：	EN-K1012W
Temperature：	20 ℃	Relative Humidtity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
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 (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

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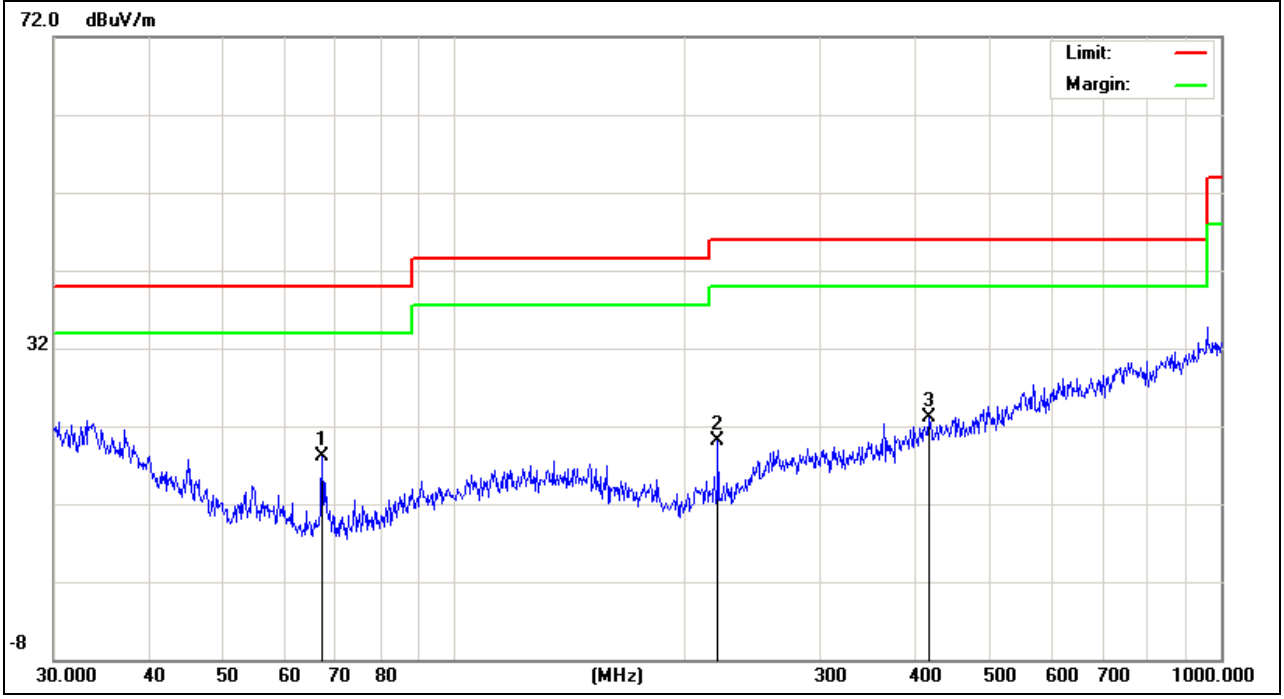
3.4.6 TEST RESULTS (BETWEEN 30 – 1000 MHZ)

EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	TX	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
67.2022	12.56	5.54	18.1	40	-21.9	QP
220.6168	10.29	9.91	20.2	46	-25.8	QP
416.1791	5.19	17.82	23.01	46	-22.99	QP

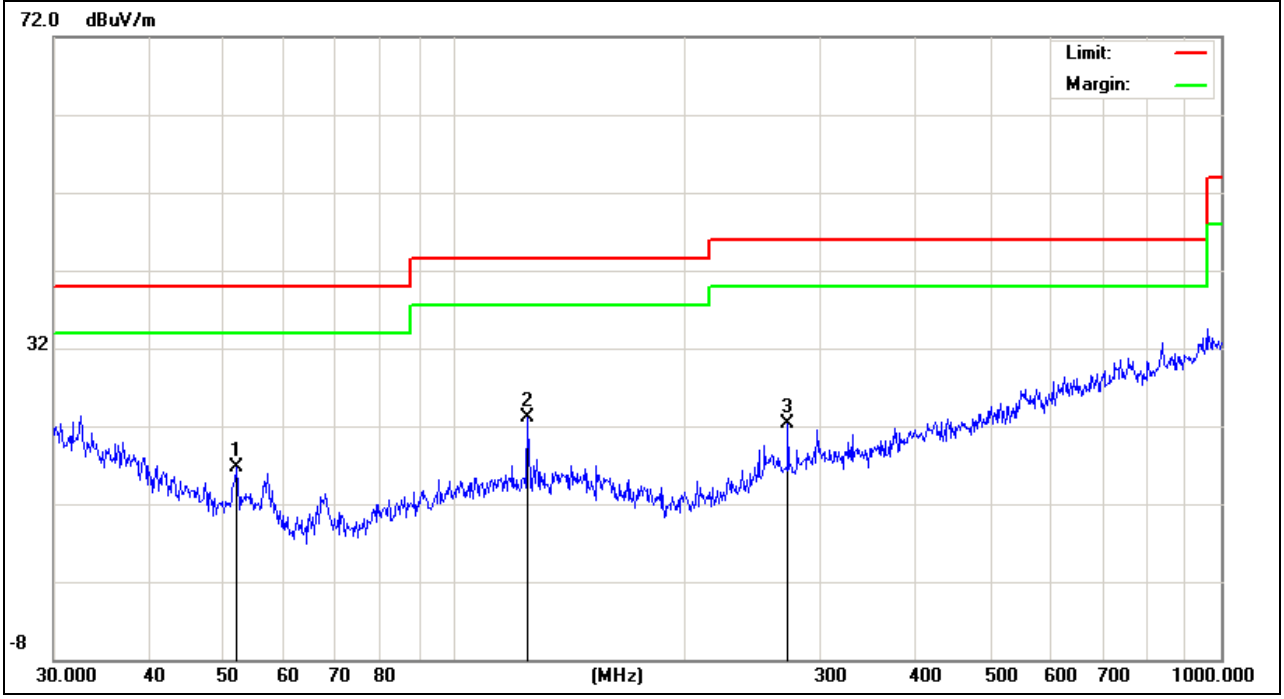
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	TX	Polarization：	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
51.843	9.43	7.31	16.74	40	-23.26	QP
124.569	11.31	11.89	23.2	43.5	-20.3	QP
272.2776	8.98	13.42	22.4	46	-23.6	QP

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



3.4.7 TEST RESULTS (ABOVE 1000 MHZ)

EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	TX	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2480	94.16	-12.79	81.37	114.0 0	-32.63	peak
4960	52.54	-3.59	48.95	74	-25.05	peak

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.
No emission detected in 18GHz~25GHz.

EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	TX	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2480	97.09	-12.77	84.32	114.0 0	-29.68	peak
4960	56.05	-3.59	52.46	74	-21.54	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.

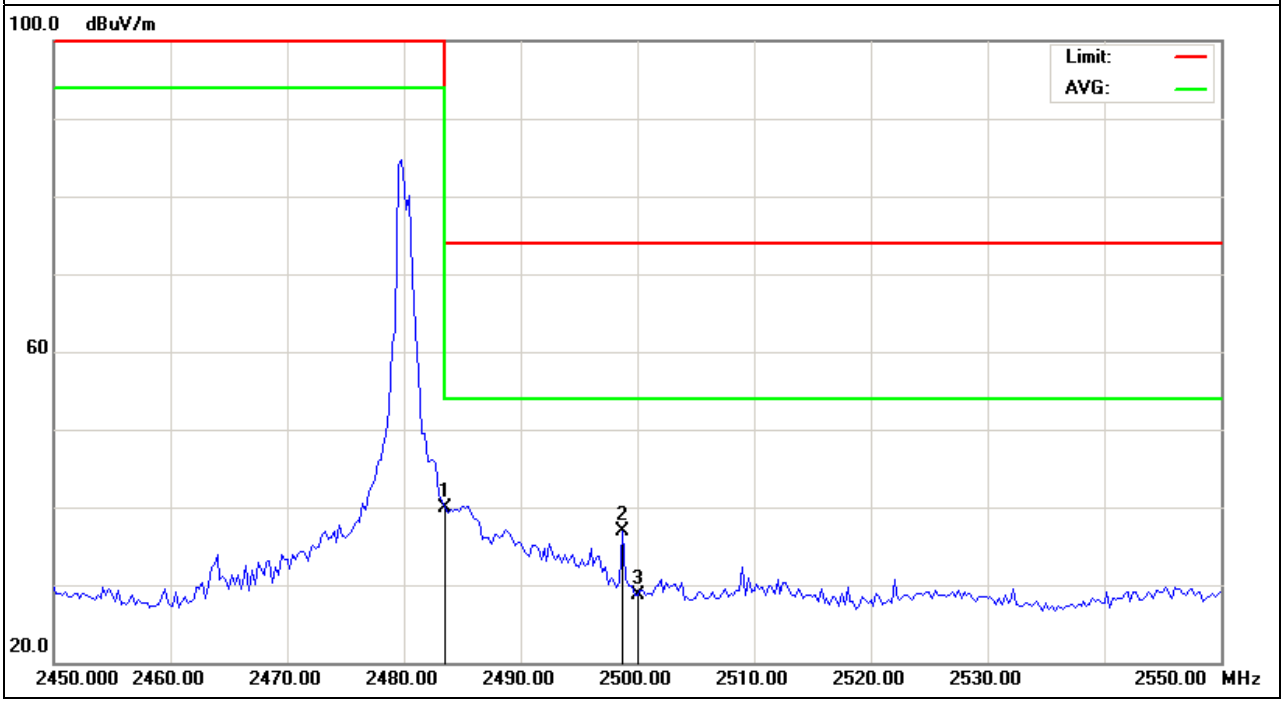
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported.

3.4.8 TEST RESULTS (RESTRICTED BANDS REQUIREMENTS)

EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	TX	Polarization：	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	52.68	-12.78	39.9	74	-34.1	peak
2498.75	49.62	-12.72	36.9	74	-37.1	peak
2500	41.42	-12.72	28.7	74	-45.3	peak

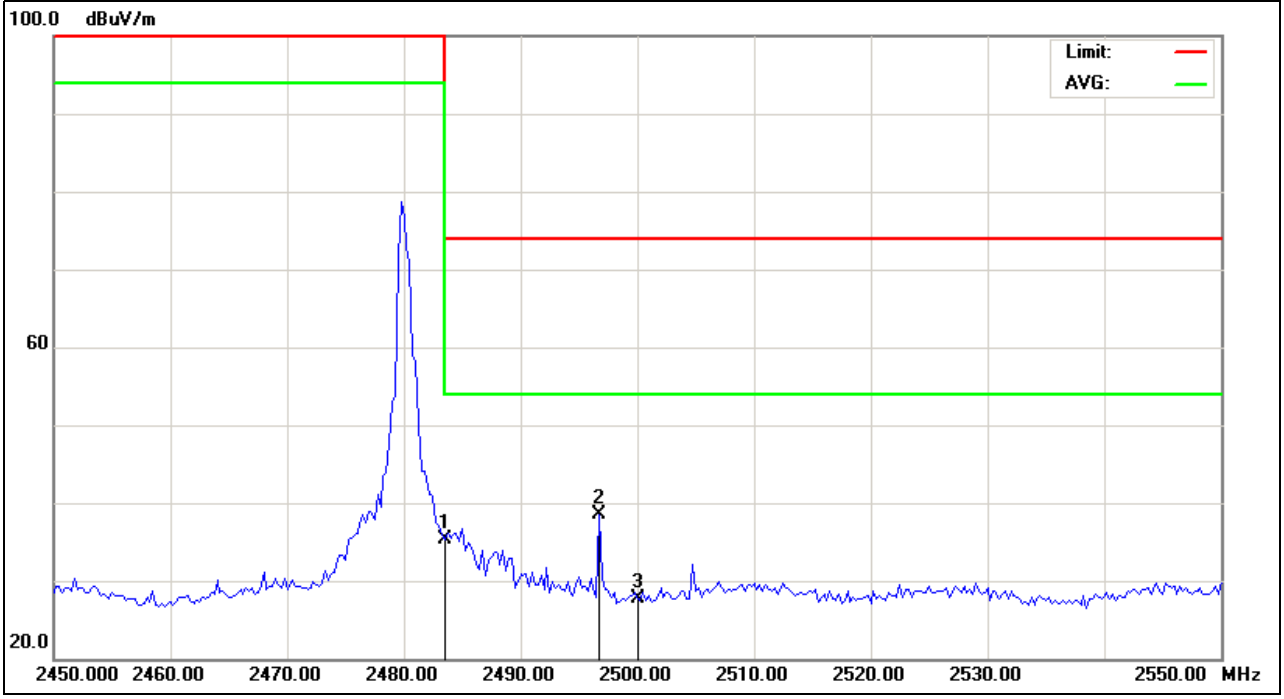
Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.



EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 3.0V
Test Mode ：	TX	Polarization：	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
2483.5	48.15	-12.78	35.37	74	-38.63	peak
2496.75	51.33	-12.73	38.6	74	-35.4	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= 100KHz, VBW≧RBW, Sweep time = Auto.

4.2 DEVIATION FROM STANDARD

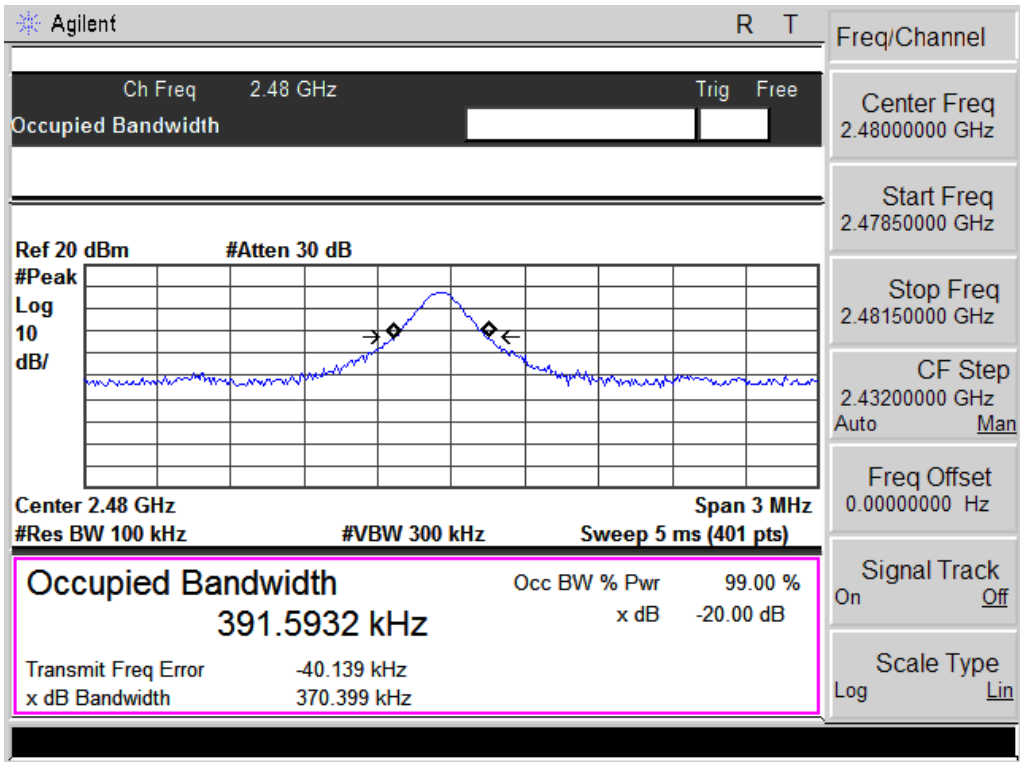
No deviation.

4.3 TEST SETUP

4.4 TEST RESULTS

EUT：	2.4G wireless switch	Model Name ：	EN-K1012W
Temperature：	26 ℃	Relative Humidity：	53%
Pressure：	1020 hPa	Test Power ：	DC 3.0V
Test Mode ：	TX		

Frequency (MHz)	20 dBc Bandwidth (MHz)	99% Bandwidth (MHz)
2480	0.370	0.392



5. EUT TEST PHOTO

Radiated Measurement Photos