Shenzhen EMTEK Co.,Ltd.
Building 69, Majialong Industry Zone, Nanshan District, Shenzhen,Guangdong,China
www.emtek.com.cn Tel: +86-755-2695 4280 Fax: +86-755-2695 4282

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C AND CANADIAN RSS 210 ISSUE 8 REQUIREMENTS

OF

Control Box

MODEL No.: FLED-ISCNTR

FCC ID: 2ABMMISCNTR

IC:11655A-ISCNTR

Trademark: iStar

REPORT NO.: ES130803024E

ISSUE DATE: December 25, 2013

Prepared for
S.R. Smith LLC

1017 SW Berg Parkway, Canby OR, 97013

Prepared by
SHENZHEN EMTEK CO., LTD

Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China
TEL: 86-755-26954280
FAX: 86-755-26954282

VERIFICATION OF COMPLIANCE

Applicant:	S.R. Smith LLC 1017 SW Berg Parkway, Canby OR, 97013
Manufacturer:	HK Tairuie Electronics Co., Ltd. Block A5, Yulu Industrial Zone of Gongming Estate Development Company Guangming New District, Shenzhen, P.R. of China
Product Description:	Control Box
Model Number:	FLED-ISCNTR
Serial Number:	N/A
File Number:	ES130803024E
Date of Test:	December 5, 2013 to December 12, 2013

We hereby certify that:

The above equipment was tested by SHENZHEN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2009) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.249 and Canadian RSS 210 ISSUE 8 REQUIREMENTS
The test results of this report relate only to the tested sample identified in this report.

Date of Test : December 5, 2013 to December 12, 2013

Prepared by : Joe Xia
Joe Xia /Editor

Reviewer : June Xie
June xie/Supervisor

Approve & Authorized Signer :
Lisa Wang/Manager

Table of Contents

1. GENERAL INFORMATION

1.1 Product Description

A major technical descriptions of EUT is described as following:

A). Standards: FCC Rules Part 15.249 &15.247 and Canadian RSS 210 ISSUE 8
B). Operation Frequency: RF:915MHz; Bluetooth: 2402-2480MHz
C). Modulation: RF: GFSK; Bluetooth: GFSK, 1/4∏-DQPSK, 8DPSK
D). Number of Channel: RF: 1 channel; Bluetooth:79channels
E).Antenna Type: RF: Metal antenna; Bluetooth: External antenna
F). Antenna GAIN: RF:2.15dBi; Bluetooth: 5dBi
G). Power Supply: 90-260Vac, 110W

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ABMMISCNTR filing to comply with Section 15.249 of the FCC Part 15, Subpart C Rules and also intended for IC: 11655A-ISCNTR filing to comply with Canadian RSS 210 Issue 8.0.

1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (2009) and FCC Public Notice DA 00-705. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab. : Accredited by CNAS, 2013.10.29
The certificate is valid until 2016.10.28
The Laboratory has been assessed and proved to be in compliance with CNAS/CL01:2006(identical to ISO/IEC17025: 2005)
The Certificate Registration Number is L2291

Accredited by TUV Rheinland Shenzhen 2010.5.25
The Laboratory has been assessed according to the requirements ISO/IEC 17025

Accredited by FCC, October 28, 2010
The Certificate Registration Number is 406365.

Accredited by Industry Canada, March 5, 2010
The Certificate Registration Number is 4480A-2.

Name of Firm : SHENZHEN EMTEK CO., LTD

Site Location : Bldg 69, Majialong Industry Zone,
Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2009 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.4-2009.

2.4 Description of test modes

The EUT has been tested under normal operating condition.
Let EUT transmit with highest power, and the result was reported.

For Conducted Test	
Final Test Mode	Description
Mode	915MHz

For Radiated Test	
Mode	915MHz

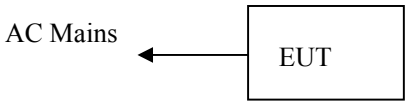
Note:
Only one channel for RF, and result recorded on this report.

3. Summary of Test Results

FCC Rule	IC Rule	Description Of Test	Result
15.207	RSS-GEN, Section 7.2.2	AC Power Conducted Emission	Pass
15.209 &15.249	RSS-210, A2.5, A8.5	Radiated Emission	Pass
15.249	RSS-210, A8.1(a)	20dB Bandwidth	Pass
15.203	RSS-GEN, Section 7.2.3	Antenna requirement	Pass

3.1 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System



3.2 DESCRIPTION OF SUPPORT UNITS

Equipment	Mfr/Brand	Model/Type No.	FCC ID / IC	Series No.	Note
Control Box	N/A	FLED-ISCNTR	FCC ID: 2ABMMISCNTR IC: 11655A-ISCNTR	N/A	EUT

4. CONDUCTED EMISSIONS TEST

4.1. Measurement Procedure:

1. The EUT was placed on a table which is 80mm above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

4.2. Test SET-UP (Block Diagram of Configuration)

4.3. Measurement Equipment Used:

Conducted Emission Test Site # 1					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2013	05/28/2014
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	05/29/2013	05/28/2014
L.I.S.N	Rohde & Schwarz	ENV216	834549/005	05/29/2013	05/28/2014
50ΩCoaxial Switch	Anritsu	MP59B	M20531	05/29/2013	05/28/2014

4.4. Conducted Emission Limit

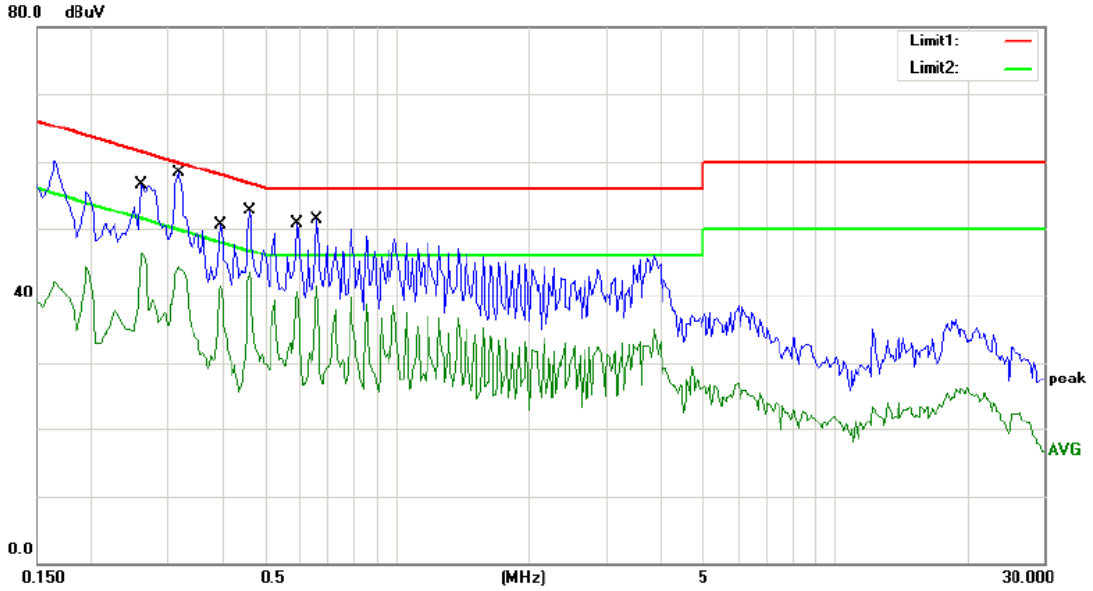
(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.5. Measurement Result:



Site Conduction #2 Phase: *L1* Temperature: 26

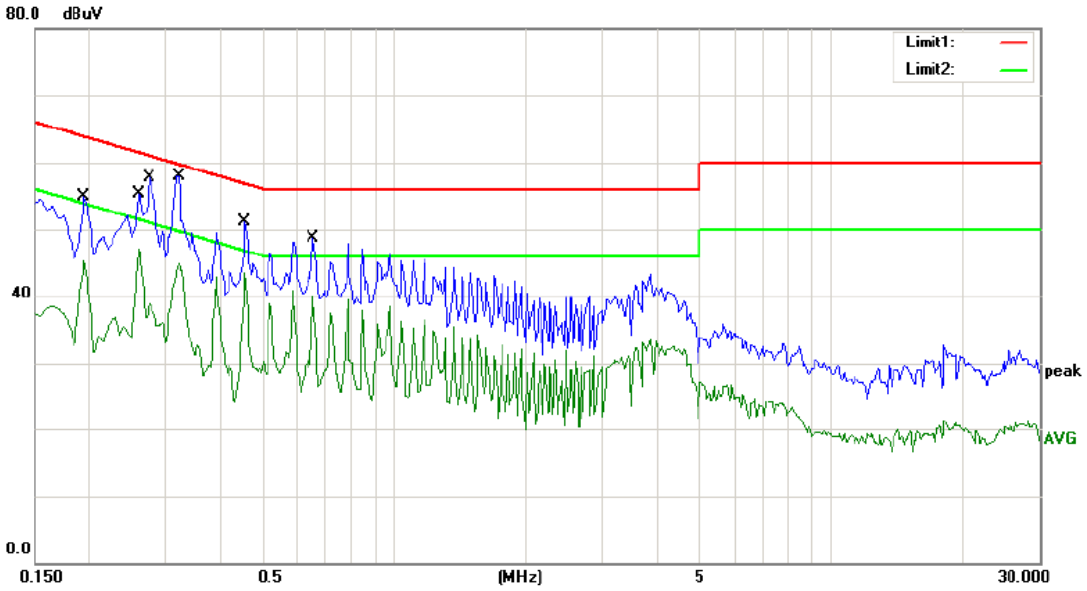
Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 60 %

Mode: ON

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2600	56.43	0.00	56.43	61.43	-5.00	QP	
2		0.2600	46.36	0.00	46.36	51.43	-5.07	AVG	
3		0.3150	55.30	0.00	55.30	59.84	-4.54	QP	
4		0.3150	44.26	0.00	44.26	49.84	-5.58	AVG	
5		0.3950	50.53	0.00	50.53	57.96	-7.43	QP	
6		0.3950	41.42	0.00	41.42	47.96	-6.54	AVG	
7		0.4600	52.78	0.00	52.78	56.69	-3.91	QP	
8	*	0.4600	43.47	0.00	43.47	46.69	-3.22	AVG	
9		0.5900	50.67	0.00	50.67	56.00	-5.33	QP	
10		0.5900	40.70	0.00	40.70	46.00	-5.30	AVG	
11		0.6550	51.29	0.00	51.29	56.00	-4.71	QP	
12		0.6550	41.44	0.00	41.44	46.00	-4.56	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: ZHL



Site Conduction #2 Phase: N Temperature: 26
Limit: (CE)FCC PART 15 class B_QP Power: AC 120V/60Hz Humidity: 60 %
Mode: ON
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1950	54.86	0.00	54.86	63.82	-8.96	QP	
2		0.1950	45.26	0.00	45.26	53.82	-8.56	AVG	
3		0.2600	55.26	0.00	55.26	61.43	-6.17	QP	
4		0.2600	47.05	0.00	47.05	51.43	-4.38	AVG	
5	*	0.2750	57.61	0.00	57.61	60.97	-3.36	QP	
6		0.2750	38.90	0.00	38.90	50.97	-12.07	AVG	
7		0.3200	53.30	0.00	53.30	59.71	-6.41	QP	
8		0.3200	44.84	0.00	44.84	49.71	-4.87	AVG	
9		0.4550	51.03	0.00	51.03	56.78	-5.75	QP	
10		0.4550	43.41	0.00	43.41	46.78	-3.37	AVG	
11		0.6500	48.68	0.00	48.68	56.00	-7.32	QP	
12		0.6500	40.16	0.00	40.16	46.00	-5.84	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: ZHL

5. Radiated Emission Test

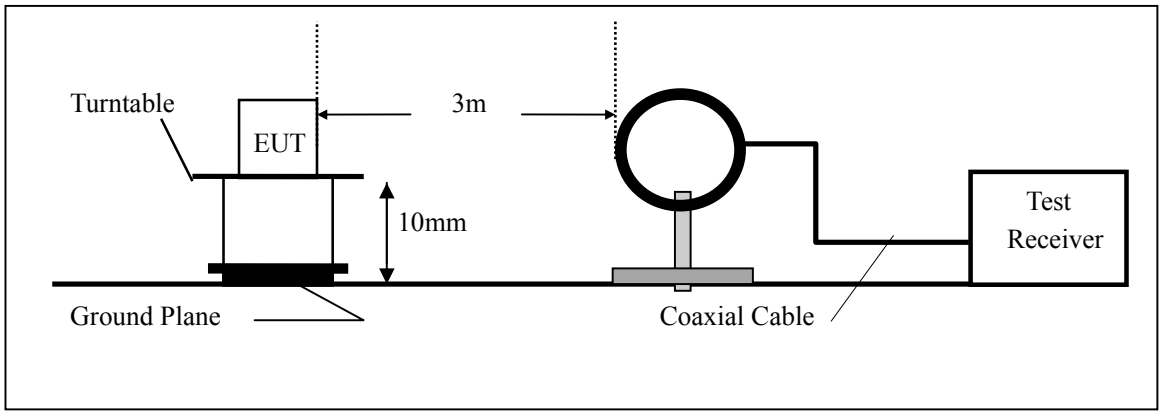
5.1 Measurement Procedure

a. The EUT was placed on the top of a rotating table 0.8m above the ground at a 3 meter Semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter Semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the
highest radiation.(above 1GHz)
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. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
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 AV 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.

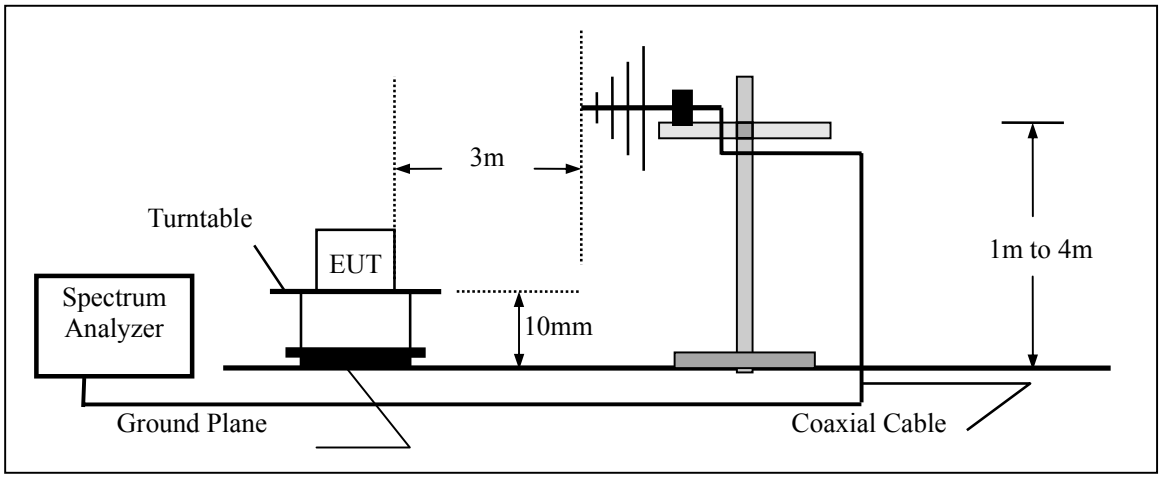
For emissions measurement set the bandwidth of the Spectrum's RBW at 1MHz 1GHz~25GHz and RBW 100 KHz below 1GHz.

5.2 Test SET-UP (Block Diagram of Configuration)

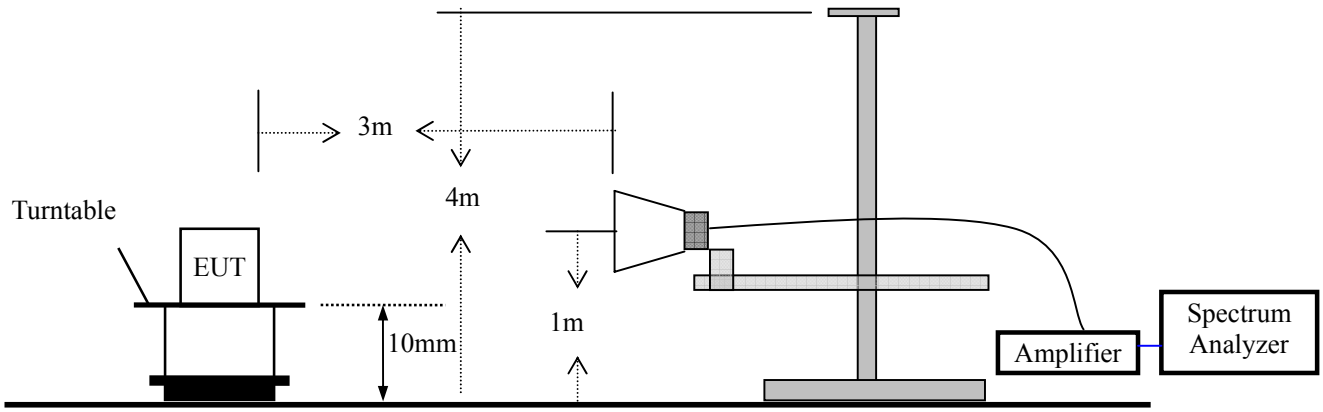
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



5.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSP7	839511/010	05/29/2013	05/28/2014
Spectrum Analyzer	HP	E4407B	839840481	05/29/2013	05/28/2014
EMI Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/29/2013	05/28/2014
Pre-Amplifier	HP	8447D	2944A07999	05/29/2013	05/28/2014
Bilog Antenna	Schwarzbeck	VULB9163	142	05/14/2013	05/13/2014
Loop Antenna	ARA	PLA-1030/B	1029	05/14/2013	05/13/2014
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/14/2013	05/13/2014
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/14/2013	05/13/2014

5.4 Radiated Emission Limit

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
960~1000	500	3

Harmonic emissions limits comply with below 54 dBuV/m at 3m. Other 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 comply with the radiated emissions limits specified in section 1 5.209(a) limit in the table below has to be followed.

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 15.209)

FREQUENCY (MHz)	(dBuV/m) (at 3m)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:
(1) The limit for radiated test was performed according to FCC PART 15C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m) =20log Emission level (uV/m).

Limits of radiated emission measurement (FCC 15.249)

FCC Part15 (15.249) , Subpart C	
Limit	Frequency Range (MHz)
Field strength of fundamental 50000uV/m (94 dBV/m) @ 3 m	915
Field strength of harmonics 500uV/m (54 dBV/m) @ 3 m	Above 960

5.5 Measurement Result

Transmitter Fundamental Field Strength

Operation Mode:	915MHz	Test Date :	December 5, 2013
FCC Part:	15.249(a)	Temperature :	28℃
Test Result:	PASS	Humidity :	60 %
Measured Distance:	3m	Test By:	WOLF
Test Method Used:	As detailed in ANSI C63.4 Section 8 and relevant annexes		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) PK	Emission Level(dBuV/m) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Over(dB) PK	Over(dB) AV
915	V	80.44	71.45	114.00	94.00	-33.56	-22.55
915	H	68.62	59.21	114.00	94.00	-45.38	-34.79

Operation Mode:	TX	Test Date :	August 5, 2013
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	60 %
Measured Distance:	3m	Test By:	WOLF

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Operation Mode:	915MHz	Test Date :	December 5, 2013
Frequency Range:	30~1000MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	60 %
Measured Distance:	3m	Test By:	WOLF
Test mode:	RF		

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
42.44	V	14.93	40.00	-25.07	PK
326.91	V	24.94	46.00	-21.06	PK
379.76	V	24.58	46.00	-21.42	PK
393.75	V	27.42	46.00	-18.58	PK
403.08	V	23.32	46.00	-22.68	PK
466.81	V	22.06	46.00	-23.94	PK
326.91	H	17.11	46.00	-28.89	PK
379.76	H	19.35	46.00	-26.65	PK
452.82	H	18.99	46.00	-27.01	PK
505.67	H	19.26	46.00	-26.74	PK
564.74	H	20.42	46.00	-25.58	PK
654.90	H	23.93	46.00	-22.07	PK

Note: (1) All Readings are Peak Value.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) EUT stood on the table position is the worst case result in the report.

Operation Mode:	915MHz	Test Date :	December 5, 2013
Frequency Range:	1-10GHz	Temperature :	28℃
Test Result:	PASS	Humidity :	60 %
Measured Distance:	3m	Test By:	WOLF
Test mode:	RF		

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m) PK	Emission Level(dBuV/m) AV	Limit 3m(dBuV/m) PK	Limit 3m(dBuV/m) AV	Margin(dB) PK	Margin(dB) AV
1843.29	V	52.36	35.78	74.00	54.00	-21.64	-18.22
2746.38	V	53.21	36.53	74.00	54.00	-20.79	-17.47
3679.11	V	51.19	34.92	74.00	54.00	-22.81	-19.08
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1844.25	H	52.85	36.05	74.00	54.00	-21.15	-17.95
2746.45	H	51.21	35.48	74.00	54.00	-22.79	-18.52
3675.59	H	52.31	35.75	74.00	54.00	-21.69	-18.25

No others harmonics emissions are higher than 20dB below the limits of 47 CFR Part 15.249.

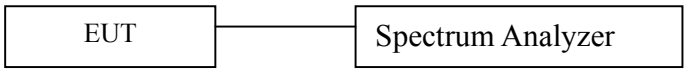
Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

6. Bandwidth test

6.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4407B	88156318	05/29/2013	05/28/2014

6.4 Measurement Results:

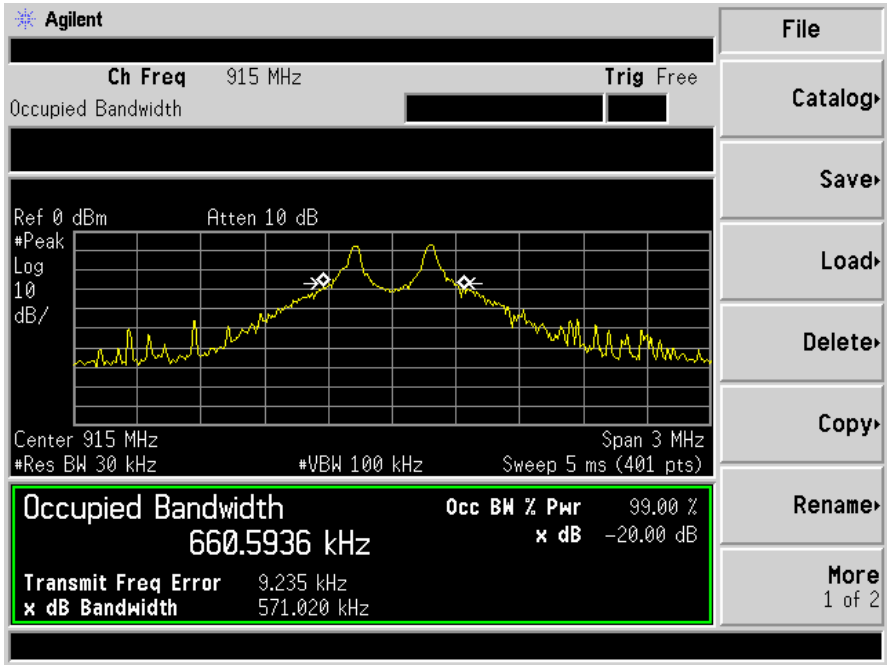
The following table is the setting of spectrum analyzer.

EMI Test Receiver	Setting
Attenuation	Auto
Span	3MHz
RB	30kHz
VB	100kHz
Detector	Peak
Trace	Max hold

20dB Bandwidth and 99% Bandwidth test data Chart:
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 26, 2013
Test By:	Joe	Temperature :	28℃
Test Result:	PASS	Humidity :	60 %
Modulation:	GFSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)	99% BW (kHz)
1	915	571.02	660.59



7. Antenna requirement

For intentional device, according to FCC 47 CFR 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.

7.1 Result

The EUT'S antenna is Metal Antenna for RF mode. The antenna's gain is 1.5dBi and meets the requirement.