

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT  
INTENTIONAL RADIATOR CERTIFICATION TO  
FCC PART 15 SUBPART C REQUIREMENT**

*OF*

**WIRELESS SUB BASS SYSTEM**

**MODEL No.: HABITAT1**

**BRAND NAME:**



**FCC ID: 2AATQ-H1LONGBOW**

**REPORT NO: KAD130507025E**

**ISSUE DATE: September 05, 2013**

**Prepared for**

**REL ACOUSTICS LTD**

**North Road, Bridgend Industrial Estate, Bridgend CF31 3TP, United  
Kingdom**

*Prepared by*

**DONGGUAN EMTEK CO., LTD.**

**No.281, Guantai Road, Nancheng District,  
Dongguan, Guangdong, China**

**TEL: 86-769-22807078**

**FAX: 86-769-22807079**

## VERIFICATION OF COMPLIANCE

Applicant:	REL ACOUSTICS LTD North Road, Bridgend Industrial Estate, Bridgend CF31 3TP, United Kingdom
Manufacturer:	DONGGUAN TRISTAR ELECTRONIC CO., LTD. No. 24A Dongxing Ave South, Zhenxingwei, Tangxia Town, Dongguan City, China
Product Description:	WIRELESS SUB BASS SYSTEM
Brand Name:	
Model Number:	HABITAT1
Serial Number:	N/A
File Number:	KAD130507025E
Date of Test:	May 07, 2013 to July 24, 2013

### We hereby certify that:

The above equipment was tested by DONGGUAN 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 15.247.

The test results of this report relate only to the tested sample identified in this report.

**Approved By**



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**Sam.Lv / Q.A. Manager**  
**DONGGUAN EMTEK CO., LTD.**

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## 1. GENERAL INFORMATION

### 1.1 Product Description

The REL ACOUSTICS LTD Model: HABITAT1 (referred to as the EUT in this report)  
The EUT is an short range, lower power transmitter as an Input Device. It is designed by way of utilizing the following modulation achieves the system operating.

- A). Operation Frequency: 2406-2478MHz
- B). Modulation:2FSK
- C). Number of Channel: 18
- D). Channel space: 4MHz
- E). Rated RF Output Power: 8.17dBm
- F). Antenna Type: Internal PCB antenna
- G). Antenna GAIN: 0dBi
- H). Input Rating: DC 9.0V, 300mA come from adapter
- I). Information for adapter:
  - Model No.:GQ07-090030-AU
  - Input: AC 100-240V, 50-60Hz, 0.3A Max
  - Output: DC 9.0V, 300mA

## Declaration for FHSS Devices

Additional declaration part according to FCC 15.247(a) for a 2406 MHz to 2478 MHz FHSS devices.

### 1. Frequency range

The frequency range of this device is 2406-2478MHz as declared by the applicant.

### 2. hopping sequences

Example of a 18 hopping sequences:

2, 18, 5, 9, 1, 10, 15, 12, 14, 17, 3, 4, 8, 11, 13, 6, 7, 16

### 3. Equally average use of frequencies in data mode

The use of frequencies will be pseudo randomly generated by the use of different channel sequence tables.

So the used hopping sequence will be always different from the one before and an equally average use of the frequencies is guaranteed.

### 4. The receiver input bandwidth

The input bandwidth of the receiver is 2226 kHz. This will be part of the device manufacturing test.

## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2AATQ-H1LONGBOW filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and FCC Public Notice DA 00-705.

## 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2009). Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03 (April 2013) for compliance to FCC 47CFR 15.247 requirements.

## 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	:	Accredited by Industry Canada, January 13, 2011
EMC Lab.	:	The Certificate Registration Number. is 9444A
Name of Firm	:	DONGGUAN EMTEK CO., LTD
Site Location	:	No.281, Guantai Road, Nancheng District, Dongguan, 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**

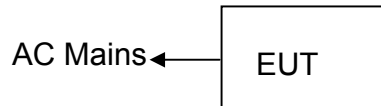
The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

#### **2.3.2 Radiated Emissions**


The EUT is placed on a turn table which is 0.8 m 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 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	WIRELESS SUB BASS SYSTEM		HABITAT1	2AATQ-H1LONGBOW	N/A	<b>EUT</b>

**Note:**

- (1) Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.



### 3. Description of test modes

The EUT is battery powered and only for charging connected to the AC lines via AC Adaptor. This is Digital Transmission System(DTS) and have one type of modulation 2FSK.

The 3 channels of lower, medium and higher were chosen for test.

1. For lowest channel : 2406MHz(Channel 00)
2. For middle channel : 2442MHz(Channel 09)
3. For highest channel: 2478MHz(Channel 18)

Channel Lists:

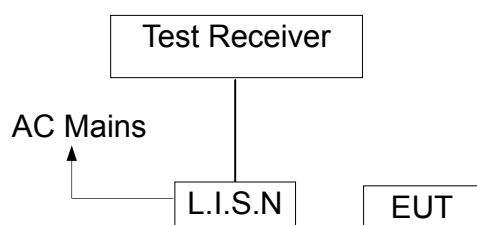
Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2406	14	2462
01	2410	15	2466
02	2414	16	2470
03	2418	17	2474
04	2422	18	2478
05	2426		
06	2430		
07	2434		
08	2438		
09	2442		
10	2446		
11	2450		
12	2454		
13	2458		

## 4. Conducted Emissions Test

### 4.1 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m 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 # 4					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	May 18, 2013	May 18, 2014
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	May 18, 2013	May 18, 2014
L.I.S.N	Rohde & Schwarz	ESH2-Z5	834549/005	May 18, 2013	May 18, 2014
50ΩCoaxial Switch	Anritsu	MP59B	M20531	May 18, 2013	May 18, 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

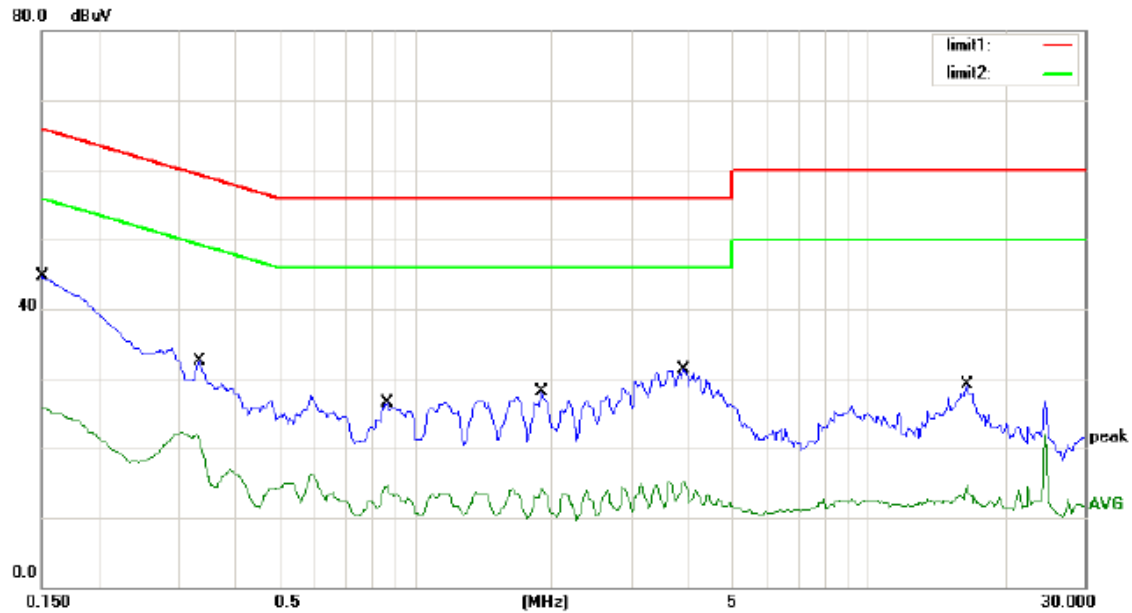
**Note:**

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:

**PASS.**

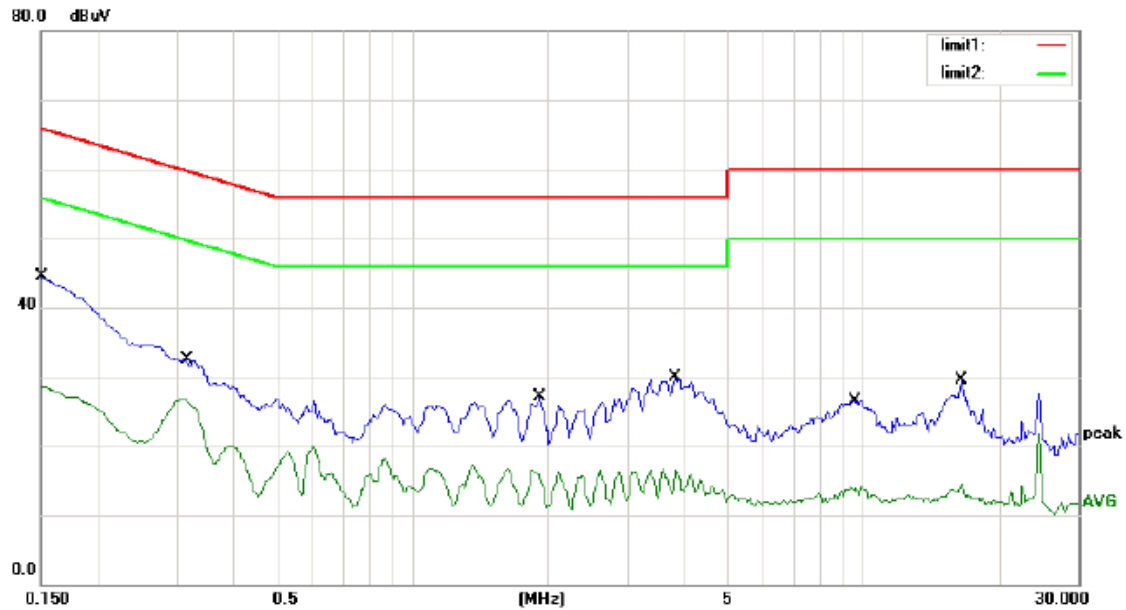
Please refer to the attached data.



Site site #1 Phase: **L1** Temperature: 26  
Limit: (CE)FCC PART 15 class C\_QP Power: AC 120V/60Hz Humidity: 60 %  
Mode: TX  
Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1500	44.61	0.00	44.61	66.00	-21.39	QP	
2		0.1500	25.96	0.00	25.96	56.00	-30.04	AVG	
3		0.3350	32.56	0.00	32.56	59.33	-26.77	QP	
4		0.3350	22.32	0.00	22.32	49.33	-27.01	AVG	
5		0.8700	26.55	0.00	26.55	56.00	-29.45	QP	
6		0.8700	16.21	0.00	16.21	46.00	-29.79	AVG	
7		1.9000	28.02	0.00	28.02	56.00	-27.98	QP	
8		1.9000	14.30	0.00	14.30	46.00	-31.70	AVG	
9		3.9100	31.34	0.00	31.34	56.00	-24.66	QP	
10		3.9100	15.18	0.00	15.18	46.00	-30.82	AVG	
11		16.5000	29.08	0.00	29.08	60.00	-30.92	QP	
12		16.5000	14.76	0.00	14.76	50.00	-35.24	AVG	

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

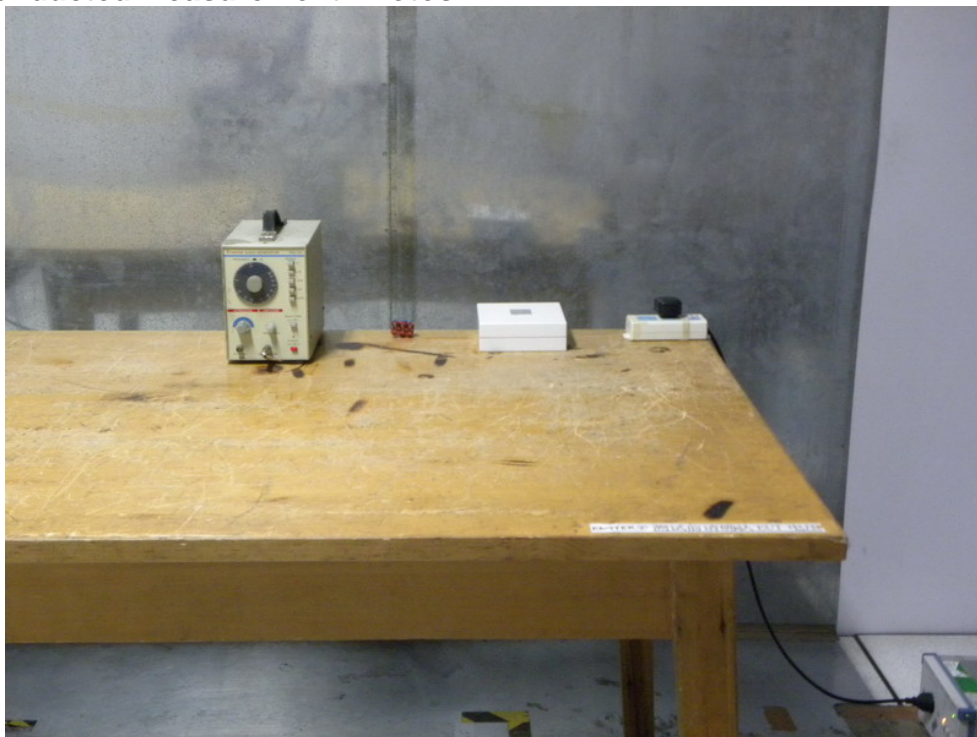


Site site #1 Phase: **N** Temperature: 26  
Limit: (CE)FCC PART 15 class C\_QP Power: AC 120V/60Hz Humidity: 60 %  
Mode: TX  
Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1500	44.43	0.00	44.43	66.00	-21.57	QP	
2		0.1500	28.59	0.00	28.59	56.00	-27.41	AVG	
3		0.3150	32.56	0.00	32.56	59.84	-27.28	QP	
4		0.3150	26.65	0.00	26.65	49.84	-23.19	AVG	
5		1.9200	27.02	0.00	27.02	56.00	-28.98	QP	
6		1.9200	17.25	0.00	17.25	46.00	-28.75	AVG	
7		3.8200	29.86	0.00	29.86	56.00	-26.14	QP	
8		3.8200	16.60	0.00	16.60	46.00	-29.40	AVG	
9		9.5800	26.54	0.00	26.54	60.00	-33.46	QP	
10		9.5800	14.07	0.00	14.07	50.00	-35.93	AVG	
11		16.5500	29.42	0.00	29.42	60.00	-30.58	QP	
12		16.5500	14.55	0.00	14.55	50.00	-35.45	AVG	

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

#### 4.6 Conducted Measurement Photos:



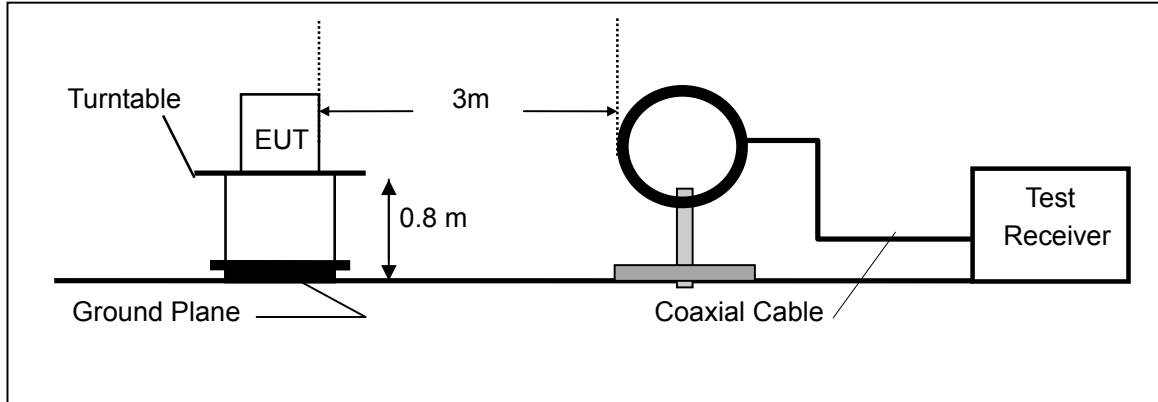
## **5. Radiated Emission Test**

### **5.1 Measurement Procedure**

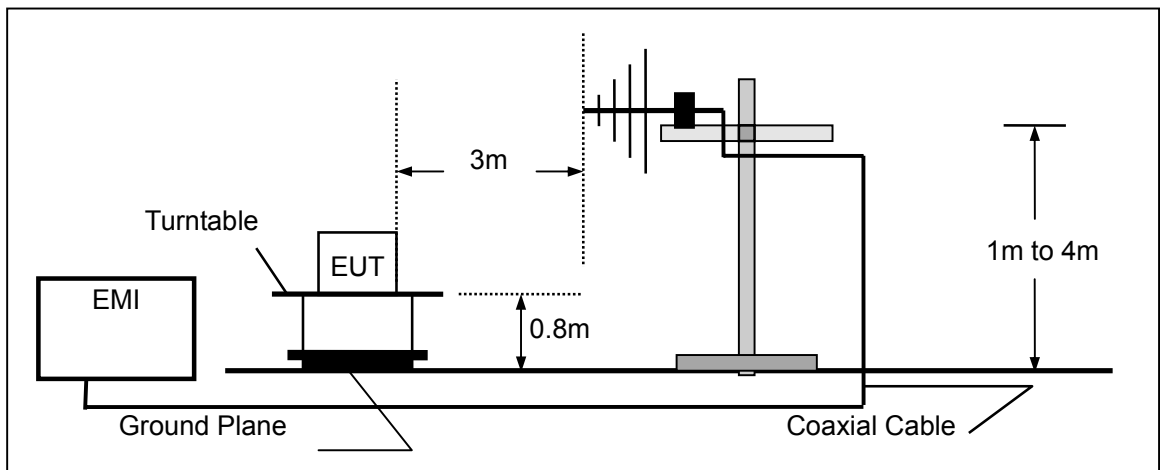
- 1 The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

## 5.2 Test SET-UP (Block Diagram of Configuration)

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

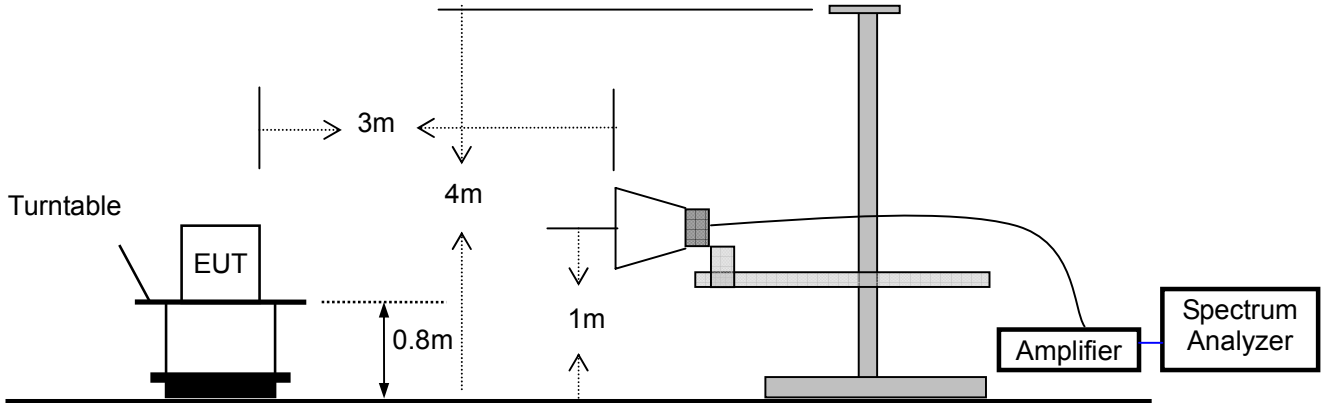


### (B) Radiated Emission Test Set-Up, Frequency Below 1000MHz





(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.
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	May 18, 2013	May 18, 2014
Pre-Amplifier	HP	8447D	2944A07999	May 11, 2013	May 11, 2014
Bilog Antenna	Schwarzbeck	VULB9163	142	May 28, 2013	May 28, 2014
Loop Antenna	Schwarzbeck	FMZB 1519	012	May 28, 2013	May 28, 2014
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	May 18, 2013	May 18, 2014
Horn Antenna	Schwarzbeck	BBHA 9120	D143	May 29, 2013	May 29, 2014
Cable	Schwarzbeck	AK9513	ACRX1	May 29, 2013	May 29, 2014
Cable	Rosenberger	N/A	FP2RX2	May 29, 2013	May 29, 2014
Cable	Schwarzbeck	AK9513	CRPX1	May 29, 2013	May 29, 2014
Cable	Schwarzbeck	AK9513	CRRX2	May 18, 2013	May 18, 2014
Pre-Amplifier	A.H.	PAM-0126	1415261	May 29, 2013	May 29, 2014

#### 5.4 Radiated emission limit

Frequency MHz	Distance Meter	Field Strength	
		uV/m	dBuV/m
0.009 – 0.490	300	10000 *	20log 2400/F(KHz) + 80
		2400/F(KHz)	
0.490 – 1.705	30	100 *	20log 24000/F(KHz) +
		24000/F(KHz)	40
1.705 – 30.00	30	100* 30	20log 30 + 40
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
Above 960	3	500	54.0

Note: The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above maximum permitted average limit.

## 5.5 Measurement Result

Operation Mode: TX Test Date : June 05, 2013  
Frequency Range: 9KHz~30MHz Temperature : 28℃  
Test Result: PASS Humidity : 65 %  
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: TX Mode(Channel 00) Test Date : July 04, 2013  
Frequency Range: 30~1000MHz Temperature : 25℃  
Test Result: PASS Humidity : 50%  
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
36.7900	V	31.15	40.00	-8.85	PK
110.5100	V	34.94	43.50	-8.56	PK
134.7600	V	35.51	43.50	-7.99	PK
159.0100	V	36.14	43.50	-7.36	PK
552.8300	V	36.91	46.00	-9.09	PK
811.8200	V	35.88	46.00	-10.12	PK
134.7600	H	34.93	43.50	-8.57	PK
184.2300	H	28.11	43.50	-15.39	PK
504.3300	H	35.19	46.00	-10.81	PK
552.8300	H	42.17	46.00	-3.83	PK
786.6000	H	38.61	46.00	-7.39	PK
959.2600	H	41.32	46.00	-4.68	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.

Operation Mode: TX Mode(Channel 09) Test Date : July 04, 2013  
Frequency Range: 30~1000MHz Temperature : 25 °C  
Test Result: PASS Humidity : 50 %  
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
36.4500	V	33.34	40.00	-6.66	PK
110.5700	V	34.23	43.50	-9.27	PK
124.7600	V	35.54	43.50	-7.96	PK
159.2100	V	36.54	43.50	-6.96	PK
552.5300	V	36.96	46.00	-9.04	PK
801.2300	V	33.24	46.00	-12.76	PK
134.3400	H	34.23	43.50	-9.27	PK
183.4600	H	28.45	43.50	-15.05	PK
502.3300	H	35.17	46.00	-10.83	PK
552.8400	H	42.23	46.00	-3.77	PK
786.5600	H	31.21	46.00	-14.79	PK
932.3400	H	40.56	46.00	-5.44	PK

**Note:** (1) All Readings are Peak Value and AV.  
(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.

Operation Mode: TX Mode(Channel 18) Test Date : July 04, 2013  
Frequency Range: 30~1000MHz Temperature : 25 °C  
Test Result: PASS Humidity : 50 %  
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Margin (dB)	Note
31.2300	V	31.15	40.00	-8.85	PK
114.3400	V	34.46	43.50	-9.04	PK
134.7200	V	29.51	43.50	-13.99	PK
152.2300	V	36.56	43.50	-6.94	PK
552.8400	V	31.23	46.00	-14.77	PK
811.3400	V	33.34	46.00	-12.66	PK
134.4500	H	34.93	43.50	-8.57	PK
184.5600	H	23.34	43.50	-20.16	PK
503.2300	H	35.34	46.00	-10.66	PK
552.3400	H	42.13	46.00	-3.87	PK
756.4500	H	38.34	46.00	-7.66	PK
952.5400	H	35.45	46.00	-10.55	PK

**Note:** (1) All Readings are Peak Value and AV.  
(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.

Operation Mode: TX Mode (Channel 00) Test Date : September 07, 2013  
Frequency Range: 1-25GHz Temperature : 25 °C  
Test Result: PASS Humidity : 50 %  
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2406	V	63.23	49.16	74	54	-10.77	-4.84
4812	V	62.56	48.08	74	54	-11.44	-5.92
7218	V	60.45	47.16	74	54	-13.55	-6.84
9624	V	59.23	46.75	74	54	-14.77	-7.25
12030	V	56.34	45.13	74	54	-17.66	-8.87
2406	H	65.46	50.34	74	54	-8.54	-3.66
4812	H	63.45	48.89	74	54	-10.55	-5.11
7218	H	61.24	48.45	74	54	-12.76	-5.55
9624	H	60.32	47.41	74	54	-13.68	-6.59
12030	H	57.57	46.23	74	54	-16.43	-7.77

**Other harmonics emissions are lower than 20dB below the allowable limit.**

**Note:** (1) All Readings are Peak Value and AV.  
(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.

Operation Mode: TX Mode (Channel 09)      Test Date : September 07, 2013  
Frequency Range: 1-25GHz      Temperature : 25 °C  
Test Result: PASS      Humidity : 50 %  
Measured Distance: 3m      Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2442	V	64.86	50.08	74	54	-9.14	-3.92
4884	V	62.25	49.05	74	54	-11.75	-4.95
7326	V	60.34	48.12	74	54	-13.66	-5.88
9468	V	59.56	47.73	74	54	-14.44	-6.27
12210	V	57.15	46.23	74	54	-16.85	-7.77
2442	H	62.44	49.67	74	54	-11.56	-4.33
4884	H	61.29	49.23	74	54	-12.71	-4.77
7326	H	60.52	48.31	74	54	-13.48	-5.69
9468	H	59.19	47.24	74	54	-14.81	-6.76
12210	H	58.12	46.83	74	54	-15.88	-7.17

Other harmonics emissions are lower than 20dB below the allowable limit.

**Note:** (1) All Readings are Peak Value and AV.  
(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.

Operation Mode: TX Mode (Channel 18)      Test Date : September 07, 2013  
Frequency Range: 1-25GHz      Temperature : 25 °C  
Test Result: PASS      Humidity : 50 %  
Measured Distance: 3m      Test By: Andy

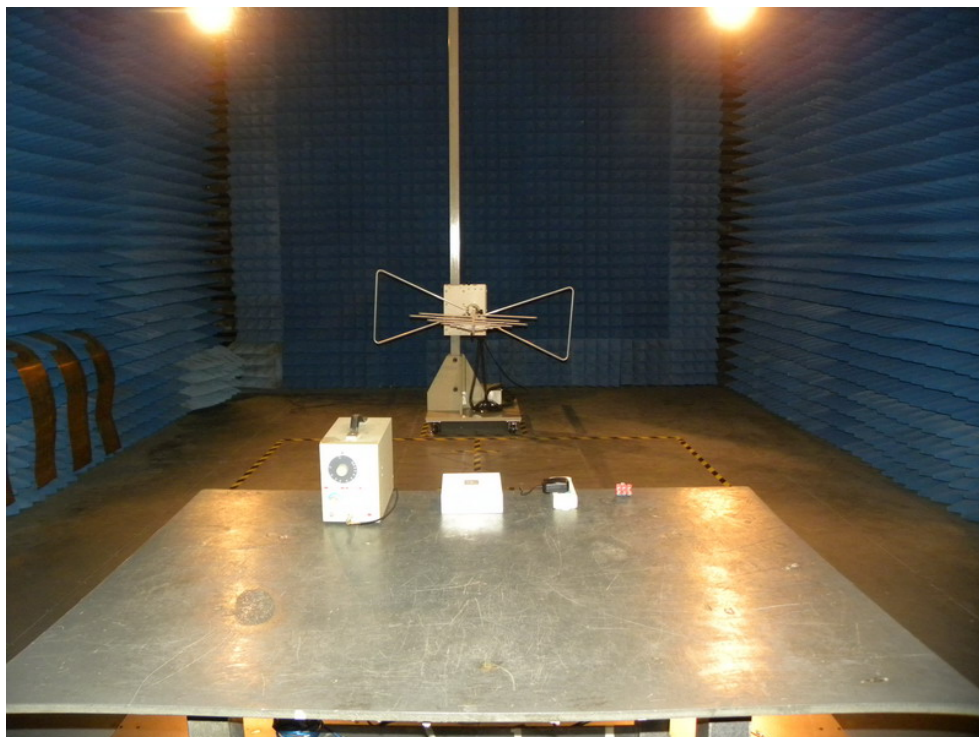
Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
2478	V	64.62	49.13	74	54	-9.38	-4.87
4956	V	63.23	48.56	74	54	-10.77	-5.44
7434	V	62.35	48.15	74	54	-11.65	-5.85
9912	V	61.28	47.23	74	54	-12.72	-6.77
12390	V	60.12	46.34	74	54	-13.88	-7.66
2478	H	66.23	49.25	74	54	-7.77	-4.75
4956	H	65.23	48.57	74	54	-8.77	-5.43
7434	H	64.25	47.12	74	54	-9.75	-6.88
9912	H	63.31	46.23	74	54	-10.69	-7.77
12390	H	61.57	45.47	74	54	-12.43	-8.53

**Other harmonics emissions are lower than 20dB below the allowable limit.**

**Note:** (1) All Readings are Peak Value and AV.  
(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.



## 5.6 Radiated Measurement Photos:

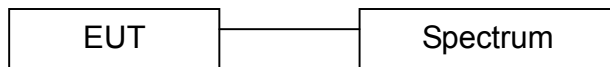


## 6. 6dB Bandwidth Measurement

### 6.1 Measurement Procedure

The EUT was operating in Wireless 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	05/29/2014

### 6.4 Limit

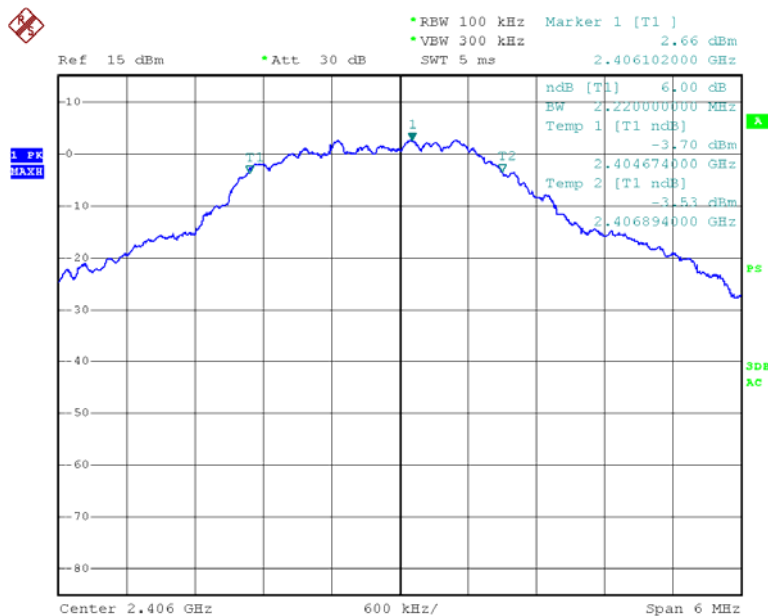
The minimum 6dB bandwidth shall be at least 500kHz.

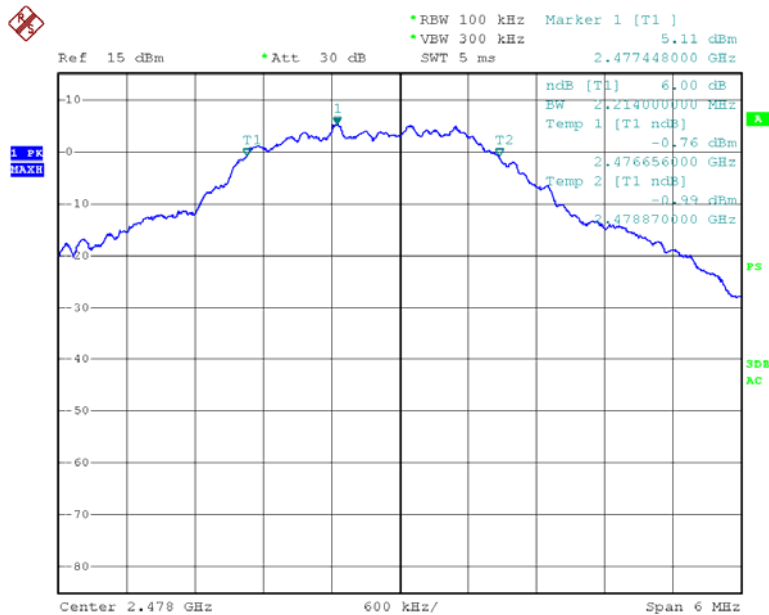
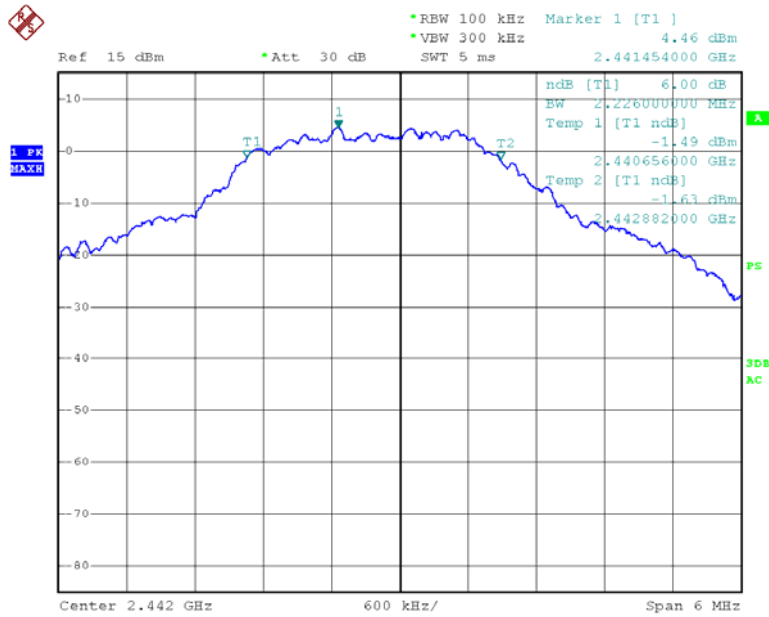
## 6.5 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	July 04, 2013
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

Channel number	Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)
00	2406	2220	>500
09	2442	2226	>500
18	2478	2214	>500



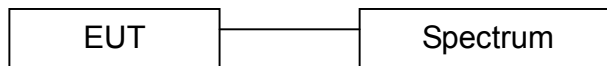


## 7. MAXIMUM PEAK OUTPUT POWER TEST

### 7.1 Measurement Procedure

- The Transmitter output (antenna port) was connected to the spectrum Analyzer.
- Turn on the EUT and then record the peak power value.
- Repeat above procedures on all channels needed to be tested.

### 7.2 Test SET-UP (Block Diagram of Configuration)



### 7.3 Measurement Equipment Used:

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

### 7.4 Peak Power output limit

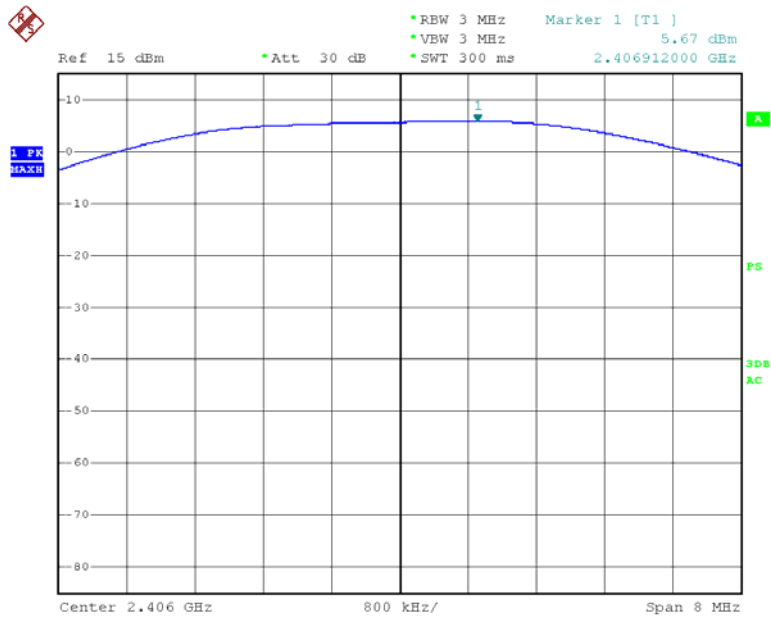
The maximum peak power shall be less 1Watt.

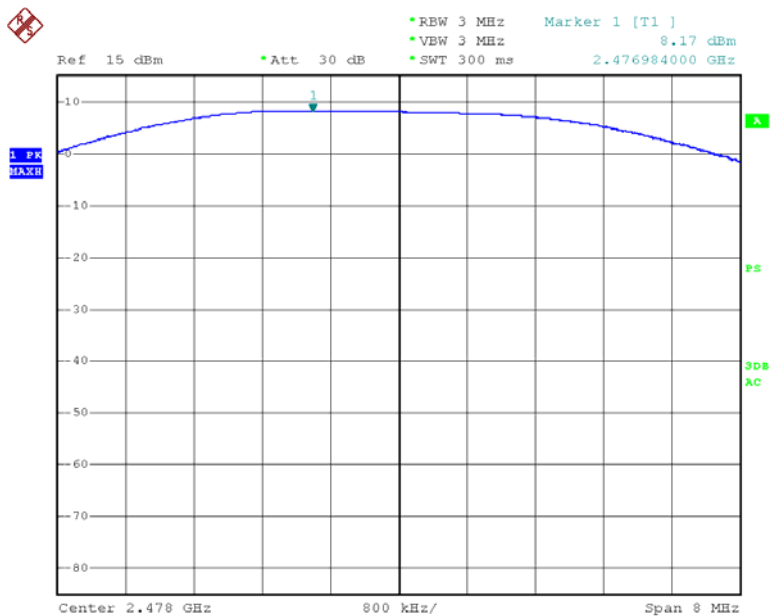
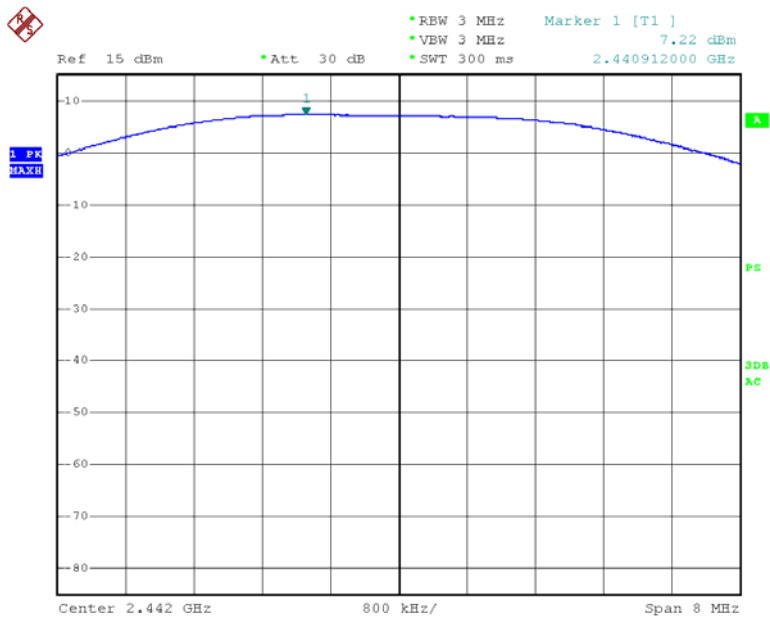
## 7.5 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	July 04, 2013
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power Limit(W)	Pass/Fail
00	2406	5.67	1W(30dBm)	PASS
09	2442	7.22	1W(30dBm)	PASS
18	2478	<b>8.17</b>	1W(30dBm)	PASS



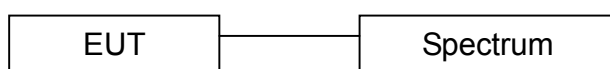


## 8. Power Spectral Density Measurement

### 8.1 Measurement Procedure

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

### 8.2 Test SET-UP (Block Diagram of Configuration)



### 8.3 Measurement Equipment Used:

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

### 8.4 Measurement Procedure

8.4.1 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

8.4.2. Set to the maximum power setting and enable the EUT transmit continuously.

8.4.3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

8.4.4. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.

8.4.5. Measure and record the results in the test report.

8.4.6. The Measured power density (dBm)/ 100KHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.



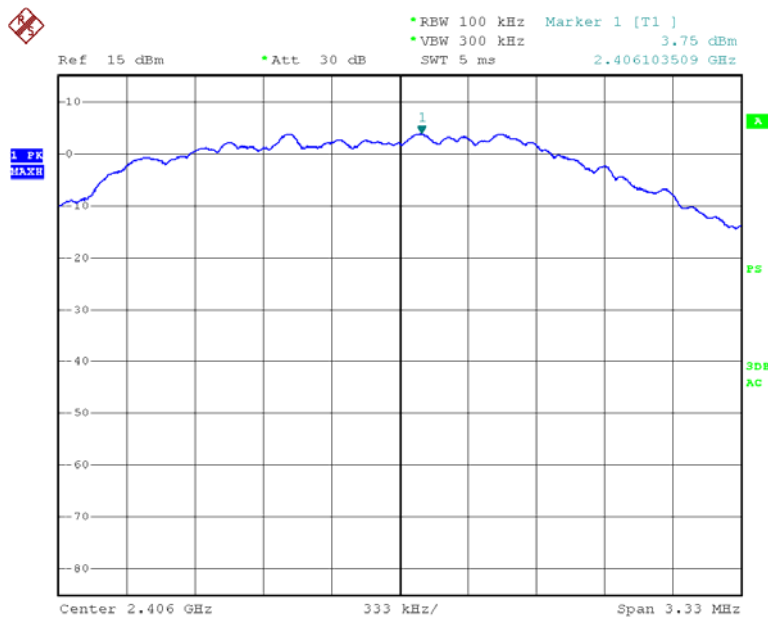
## 8.5 Measurement Results:

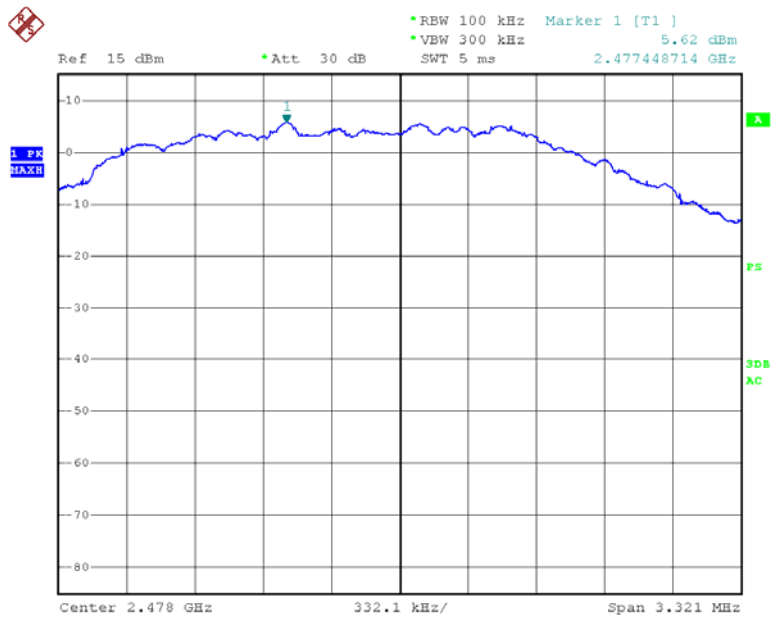
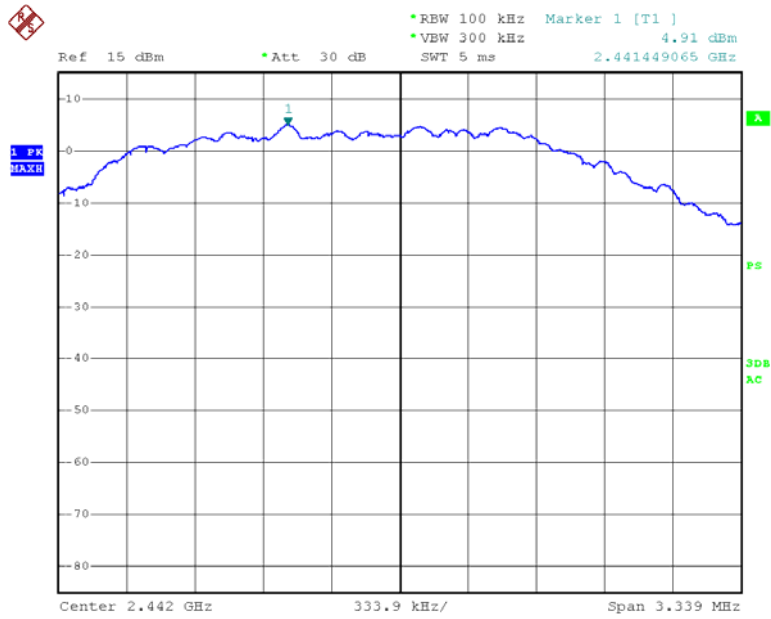
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	July 04, 2013
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

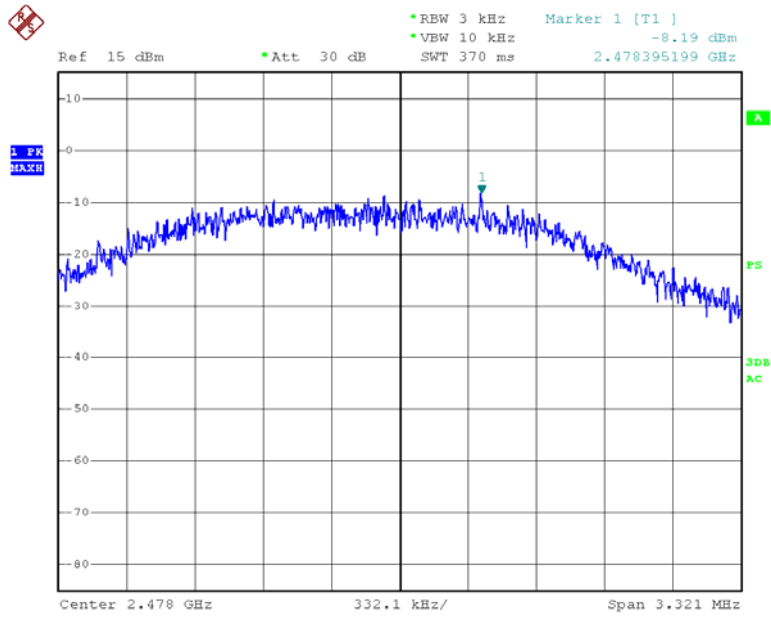
Channel number	Channel frequency (MHz)	Measurement level (dBm)		Required Limit (dBm)	Pass/Fail
00	2406	3.75	-10.32	8	PASS
09	2442	4.91	-9.34	8	PASS
18	2478	5.62	-8.19	8	PASS

PSD 100kHz Plot:







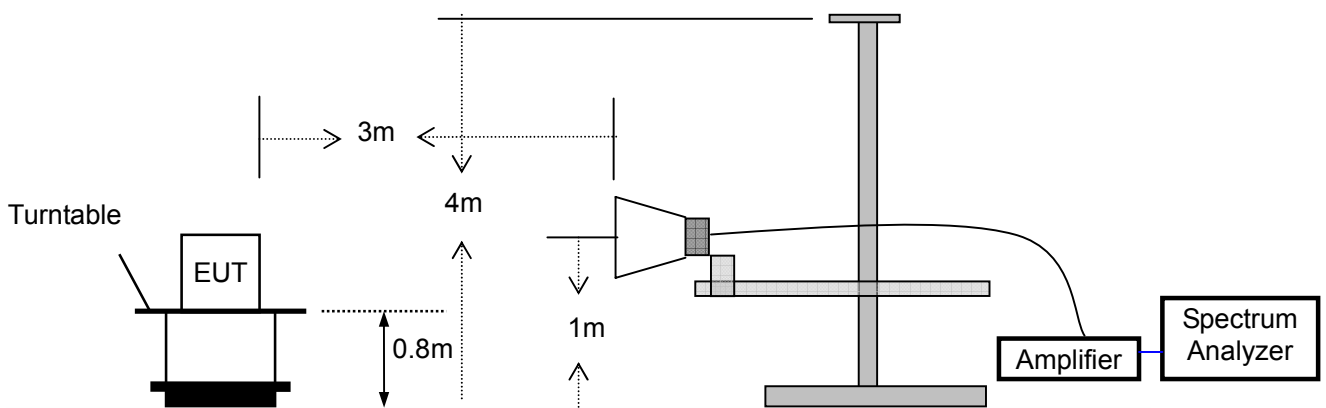


## 9. Band EDGE test

### 9.1 Measurement Procedure

1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

### 9.2 Test SET-UP (Block Diagram of Configuration)



### 9.3 Measurement Equipment Used:

Same as 5.3 Radiated Emission Measurement.

#### 9.4 Measurement Results:

Refer to attached data chart.

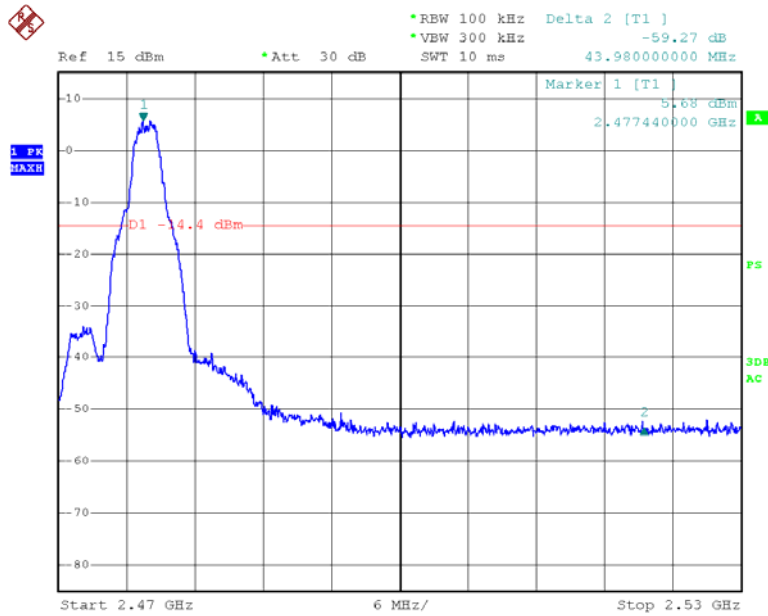
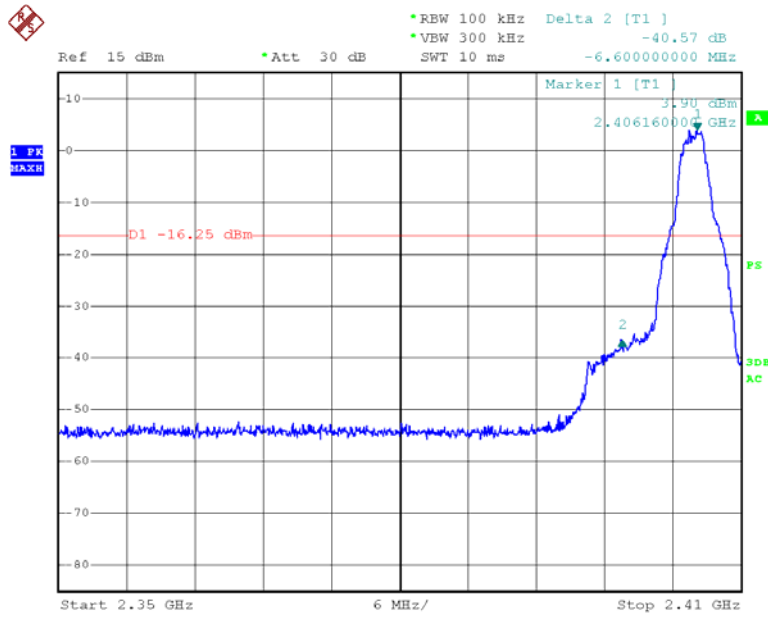
Spectrum Detector: PK                      Test Date : July 04, 2013  
Test By: Andy                      Temperature : 25 °C  
Test Result: PASS                      Humidity : 50 %

##### 1. Conducted Test

Frequency (MHz)	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
<2400	3.90	-40.57	44.47	>20dBc
>2483.5	5.68	-59.27	64.95	>20dBc

##### 2. Radiated emission Test

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	V	51.19	38.33	74.00	54.00
	V	52.33	39.63	74.00	54.00
	V	48.53	37.22	74.00	54.00
>2483.5	V	49.44	38.42	74.00	54.00
	V	41.33	36.43	74.00	54.00
	V	49.84	33.12	74.00	54.00



## **10 Antenna Application**

### **10.1 Antenna requirement**

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### **10.2 Result**

The EUT's antenna is an internal PCB antenna and integrated on PCB, The antenna's gain is 0dBi and meets the requirement.



# APPENDIX I (Photos of EUT)

## General Appearance of the EUT

