



# **R&TTE TEST REPORT**

for

**Bluetooth keyboard**

**MODEL:**

**(DR)KB-BT-001,KB-P6-BT,KB-3-BT,KB-BTF1/F2/F3-B/W,KB-BT3/BT4**

**Trade Mark: N/A**

**Test Report Number: BCTC-13041198**

**Issued Date: Nov. 15, 2013**

**Issued for**

**Gembird Europe B.V.**

**Wittevrouwen, 56, 1358CD, Almere Haven, The Netherlands**

**Issued By**

**Shenzhen BCTC Technology Co., Ltd.**

**A.Floor 3, 44 Building, Tanglang Industrial Park B, Taoyuan Street,  
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## TABLE OF CONTENTS

<b>1 TEST CERTIFICATION .....</b>	<b>3</b>
<b>2 TEST RESULT SUMMARY .....</b>	<b>4</b>
<b>3 EUT DESCRIPTION .....</b>	<b>5</b>
<b>4 TEST METHODOLOGY.....</b>	<b>6</b>
4.1. DECISION OF FINAL TEST MODE .....	6
4.2. EUT SYSTEM OPERATION .....	6
<b>5 SETUP OF EQUIPMENT UNDER TEST .....</b>	<b>7</b>
5.1. DESCRIPTION OF SUPPORT UNITS.....	7
5.2. CONFIGURATION OF SYSTEM UNDER TEST .....	7
<b>6 FACILITIES AND ACCREDITATIONS .....</b>	<b>8</b>
6.1. FACILITIES.....	8
6.2. ACCREDITATIONS .....	8
<b>7 ETSI EN 300 328 REQUIREMENTS .....</b>	<b>9</b>
7.1. TRANSMITTER REQUIREMENTS .....	9
7.1.1 Maximum transmit Power.....	9
7.1.2 Frequency range.....	12
7.1.3 Frequency hopping requirement .....	14
7.1.4 Transmitter spurious emission .....	22
7.1.5 Receiver Spurious Emissions.....	26
<b>8 PHOTOGRAPHS OF THE TEST CONFIGURATION.....</b>	<b>30</b>
<b>9 PHOTOGRAPHS OF EUT .....</b>	<b>31</b>



## 1 TEST CERTIFICATION

**Product:** Bluetooth keyboard

**Model:** (DR)KB-BT-001,KB-P6-BT,KB-3-BT,KB-BTF1/F2/F3-B/W,KB-BT3/BT4

**Trade Mark:** N/A

**Applicant:** Gembird Europe B.V.

Wittevrouwen, 56, 1358CD, Almere Haven, The Netherlands

**Factory:** Gembird Electronics Ltd.

5/F, Building B, Shifeng Industry District, Huaning Road, Dalang St.,  
Longhua, Bao'an, Shenzhen, Guangdong, China

**Tested:** Nov. 15, 2013

**Test Voltage:** DC1.5V from battery

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
ETSI EN 300 328 V1.8.1 (2012-06)	No non-compliance noted

The above equipment has been tested by Shenzhen BCTC Technology Co., Ltd., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

**Tested By:**

Jeff Fu

**Date:** Nov. 15, 2013

**Check By:**

Sophie Lee

**Date:** Nov. 15, 2013

**Approved By:**

Casey Wang



**Date:** Nov. 15, 2013



## 2 TEST RESULT SUMMARY

Test Items	Test Results
Equivalent Isotropic Radiated Power	Pass
Maximum spectral power density	N.A*
Frequency Range	Pass
Frequency hopping requirements	Pass
Medium access protocol	Pass *
Transmitter Spurious Emissions	Pass
Receiver spurious emissions	Pass

Note:

N.A\*- This item has no requirement for FHSS equipment.

Pass \*- The manufacturer has verified that medium access protocol has been implemented by the EUT.



### 3 EUT DESCRIPTION

<b>Product</b>	<b>Bluetooth keyboard</b>
<b>Model</b>	<b>(DR)KB-BT-001,KB-P6-BT,KB-3-BT,KB-BTF1/F2/F3-B/W KB-BT3/BT4</b>
<b>Trade Mark</b>	<b>N/A</b>
<b>Applicant</b>	<b>Gembird Europe B.V.</b>
<b>Antenna Type</b>	Integral Antenna
<b>EUT Power Rating</b>	DC1.5V from battery
<b>Temperature Range(Operating)</b>	0 ~ 30℃
<b>Operating Frequency</b>	2.4GHz
<b>Modulation type</b>	FHSS

Note: N/A. stand for no applicable.



## 4 TEST METHODOLOGY

### 4.1. DECISION OF FINAL TEST MODE

The EUT was tested together with the below additional components, and configuration, which produced the worst emission levels, was selected and recorded in this report.

The measurement was performed at 3 axis for lie orientation, side orientation and stand orientation. The lie orientation is the worst mode, so only the worst mode test data was reported.

The following test mode was recorder in this report.

Items	Test Content	Test mode
1	Maximum transmit power	Operating
2	Frequency range	Operating
3	Dwell time	Operating
4	Channel separation	Operating
5	Channel number	Operating
6	Transmitter spurious emission	Operating & Standby
7	Receiver spurious emissions	Operating

### 4.2. EUT SYSTEM OPERATION

1. Set up EUT with the support equipments.
2. Make sure the EUT work normally during the test.



## 5 SETUP OF EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF SUPPORT UNITS

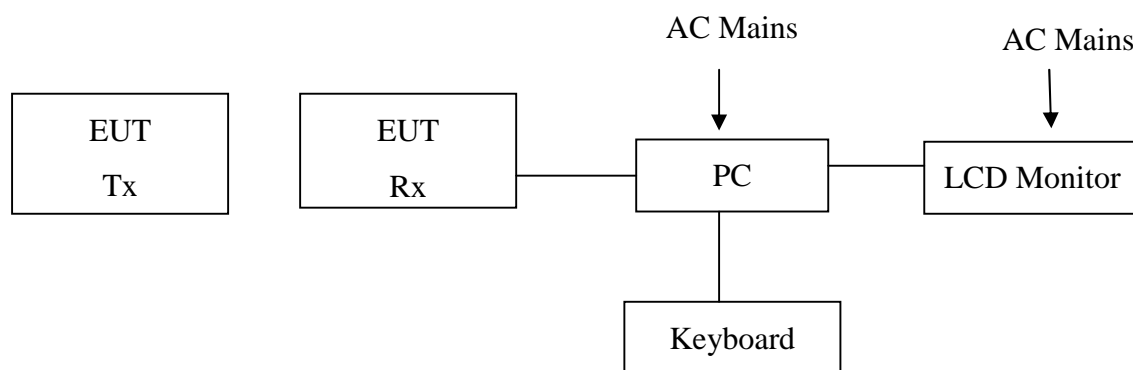
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	PC	DX2700	CNG714077P	N/A	HP	shielded 1.5m	Unshielded 1.8m
2.	LCD Monitor	L1706V	CON74535YZ	N/A	HP	Shielded 1.8m	Unshielded 1.8m
3.	Keyboard	SK-2800	435302-AA1	N/A	HP	Unshielded 1.5m	N/A

**Note:**

- 1) All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2) Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

### 5.2. CONFIGURATION OF SYSTEM UNDER TEST



(EUT: Bluetooth keyboard )



## 6 FACILITIES AND ACCREDITATIONS

### 6.1. FACILITIES

All measurement facilities used to collect the measurement data are located at  
A.Floor 3, 44 Building, Tanglang Industrial Park B, Taoyuan Street, Nanshan District, Shenzhen,  
China

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 6.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

<b>USA</b>	FCC (certificate registration number is 131636) TIMCO (certificate registration number is Q2004)
<b>Germany</b>	TUV Rheinland
<b>Canada</b>	INDUSTRY CANADA (certificated registration number is 46403-7712)





## 7 ETSI EN 300 328 REQUIREMENTS

### 7.1. TRANSMITTER REQUIREMENTS

#### 7.1.1 Maximum transmit Power

##### LIMIT

##### ETSI EN 300 328 (V1.8.1) clause 4.3.1.2

The maximum transmit power is defined as the maximum isotropic radiated power of the equipment. The equivalent isotropic radiated power (e.i.r.p) shall be equal to or less than -10dBW(100mW).

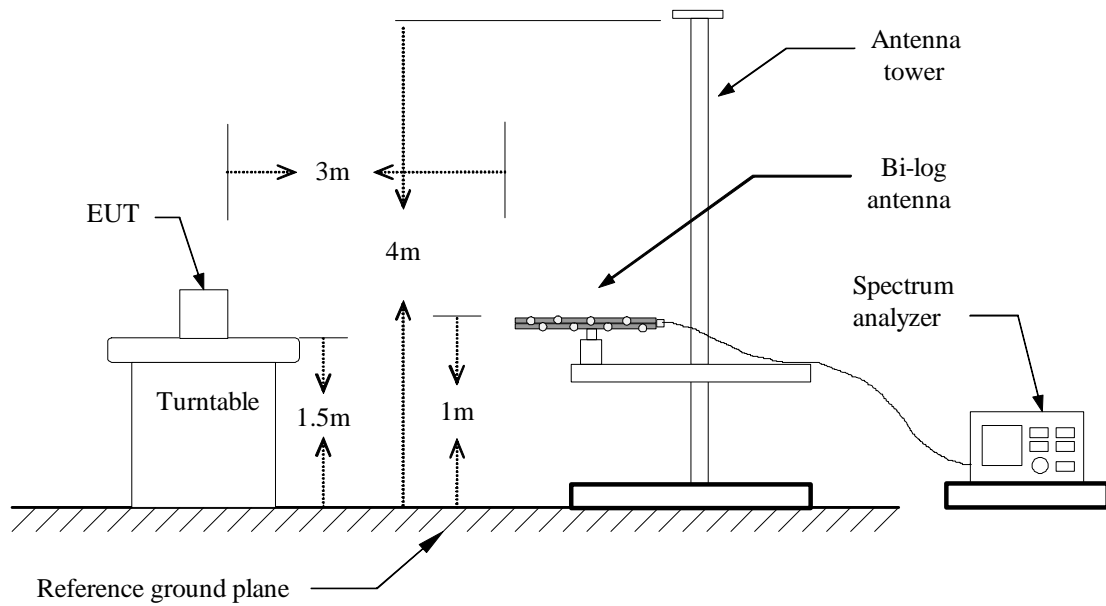
##### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013
Pre Amplifier	H.P.	HP8447E	2945A02715	06/24/2013
Pre-Amplifier	Compliance	PAM0118	1360976	06/24/2013
Bilog Antenna	SUNOL Sciences	JB3	A021907	06/24/2013
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/24/2013
Horn Antenna	Compliance	CE18000	001	06/24/2013

**Remark:** Each piece of equipment is scheduled for calibration once a year.

## **Test Configuration**

### **Below 1GHz**



## **TEST PROCEDURE**

1. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.7.2 for the measurement method.



## TEST RESULTS

*No non-compliance noted*

EUT	: Bluetooth keyboard	Temperature	: 25°C
Model No.	: KB-BT-001	Humidity	: 55%
Test Mode	: Operating	Test Engineer	: Daisy Zheng

Test condition	CH	EIRP (dBm)	Limit (dBm)	Margin (dB)	Conclusion
DC 1.5V 25°C	2402MHz	0.43	20	-19.57	PASS
	2441MHz	0.38	20	-19.62	PASS
	2480MHz	0.15	20	-19.85	PASS
DC 1.5V -20°C	2402MHz	0.40	20	-19.60	PASS
	2441MHz	0.08	20	-19.92	PASS
	2480MHz	0.27	20	-19.73	PASS
DC 1.5V 55°C	2402MHz	0.11	20	-19.89	PASS
	2441MHz	0.20	20	-19.80	PASS
	2480MHz	0.26	20	-19.74	PASS
Measurement uncertainty		±6dB			

Note: 1. EIRP = Reading -cable loss + antenna gain

2. Cable Loss: 2 dB, Antenna Gain: 1 dBi



## 7.1.2 Frequency range

### LIMIT

#### ETSI EN 300 328 (V1.8.1) clause 4.3.1.2

The frequency range shall lie with the band 2.4GHz to 2.47835GHz( $f_L > 2.4\text{GHz}$  and  $f_H < 2.4835\text{GHz}$ )

### MEASUREMENT EQUIPMENT USED

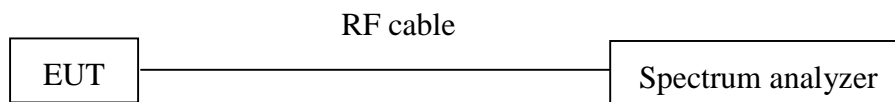
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013

**Remark:** Each piece of equipment is scheduled for calibration once a year.

### TEST PROCEDURE

1. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.7.4 for the measurement method.

### Test Configuration





## TEST RESULTS

EUT : Bluetooth keyboard      Temperature : 25°C  
Model No. : KB-BT-001      Humidity : 55%  
Test Mode : Operating      Test Engineer : Daisy Zheng

Test Conditions		CH	Result(GHz)	Limit(GHz)	Conclusion
Volt	Temp				
DC 1.5V	25℃	2402MHz	2.40226	>2.4000	PASS
		2480MHz	2.48232	<2.4835	PASS
Note1: Volt=Voltage Temp=Temperature					



## 7.1.3 Frequency hopping requirement

### 7.1.3.1 Dwell time

#### LIMIT

#### ETSI EN 300 328 (V1.8.1) Sub-clause 4.3.4.1.2

The maximum dwell time shall be 0.4s

#### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### Test Configuration

Same as frequency range.

#### TEST PROCEDURE

- 1.The EUT was placed on a turntable which is 0.8m above ground plane.
- 2.Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT work on the CH1
4. Set SPA Center Frequency = Operation frequency, RBW=1MHz,VBW=3MHz,Span:0Hz.
5. Set SPA trace max hold, then view.

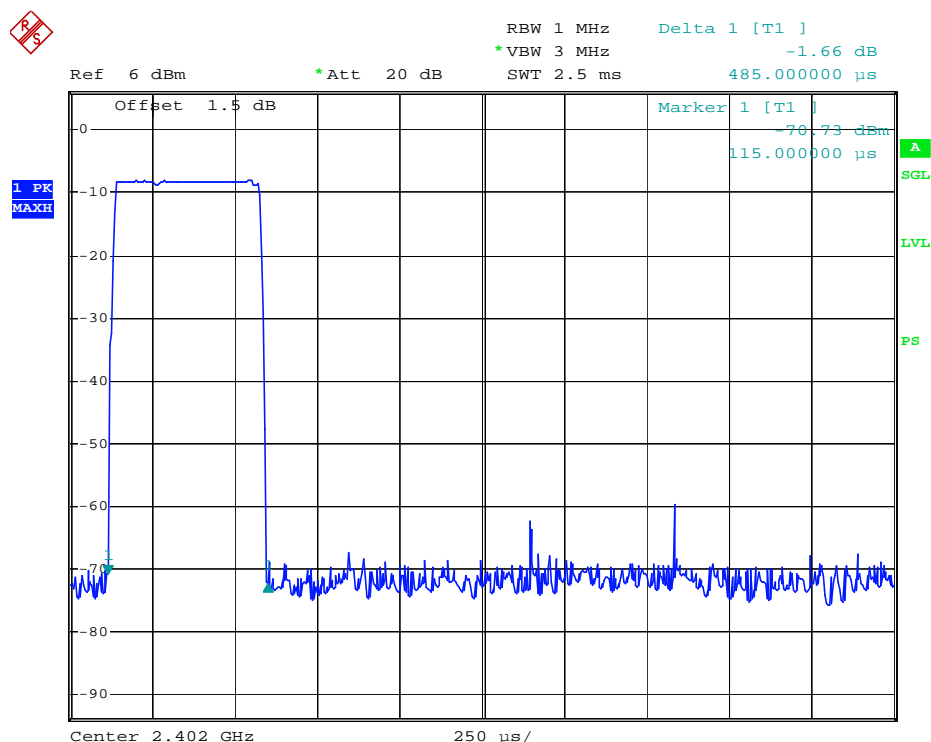
**TEST RESULTS**

EUT	: Bluetooth keyboard	Temperature	: 25°C
Model No.	: KB-BT-001	Humidity	: 55%
Test Mode	: Operating	Test Engineer	: Daisy Zheng

Channel	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
Low	0.485	0.1552	0.4	Pass
Mid	0.490	0.1568	0.4	Pass
High	0.490	0.1568	0.4	Pass

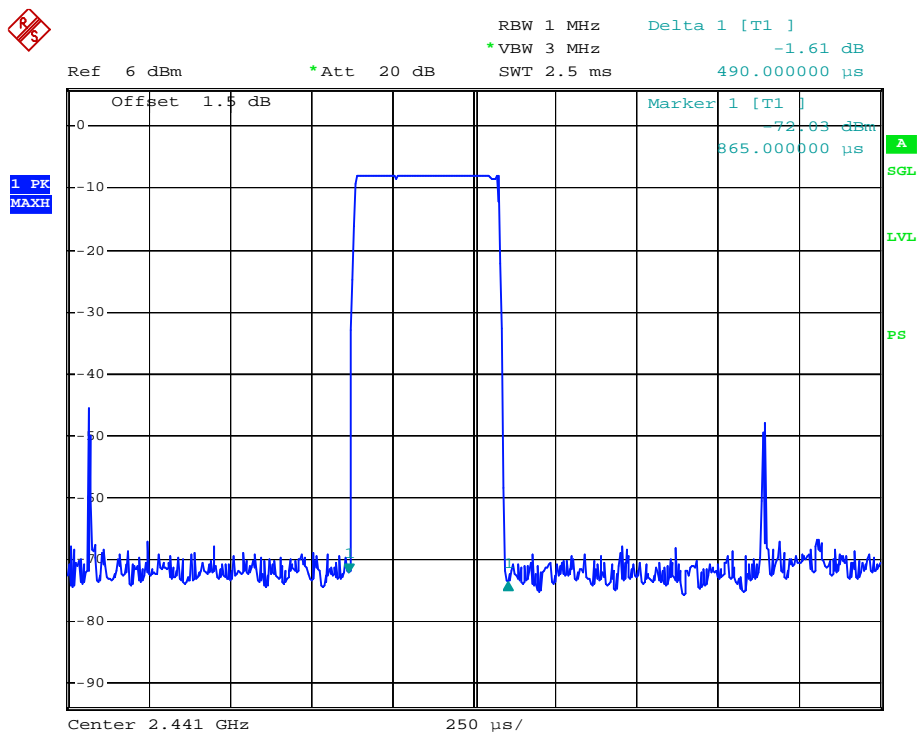
NOTE: Dwell time = Pulse time\*(1600/2/79)\*31.6S

Please refer to the following plots.

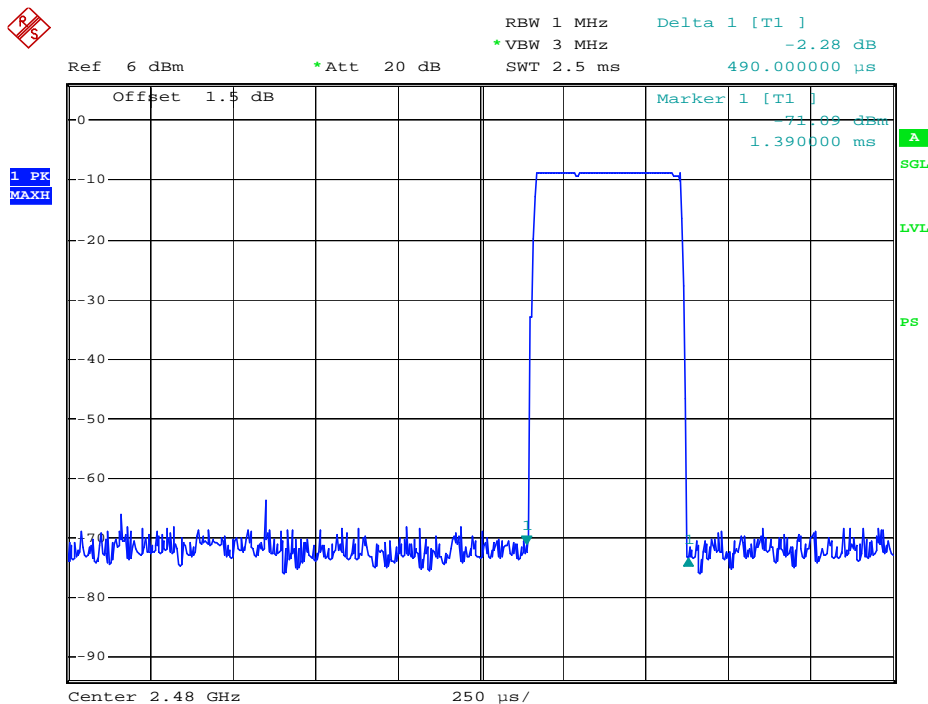
**Low Channel**



### Middle Channel



### High Channel







### 7.1.3.2 Channel Separation

#### **LIMIT**

##### **ETSI EN 300 328 (V1.8.1) Sub-clause 4.3.4.2.2**

Non-adaptive Frequency Hopping systems shall make use of non-overlapping hopping channels separated by the channel bandwidth as measured at 20dB below peak power

#### **MEASUREMENT EQUIPMENT USED**

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### **Test Configuration**

Same as frequency range.

#### **TEST PROCEDURE**

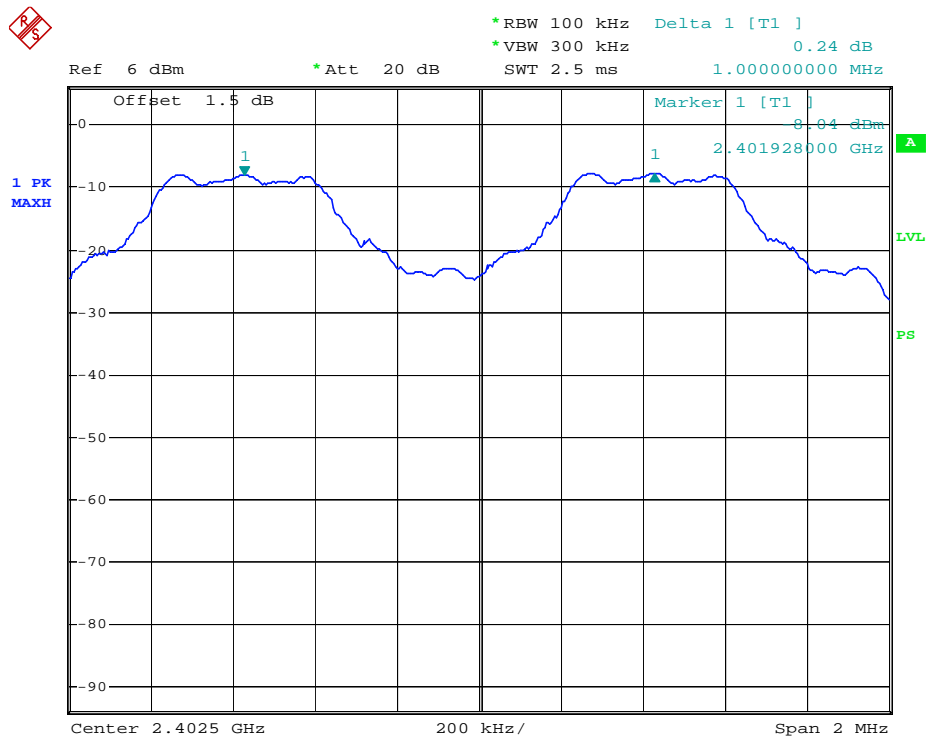
- 1.The EUT was placed on a turntable which is 0.8m above ground plane.
- 2.Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT work on the hopping mode.
4. Set SPA Center Frequency = Operation frequency, RBW=30kHz,VBW=100kHz,
5. Set SPA trace max hold, then view.

**TEST RESULTS**

EUT : Bluetooth keyboard Temperature : 25°C  
Model No. : KB-BT-001 Humidity : 55%  
Test Mode : Operating Test Engineer : Daisy Zheng

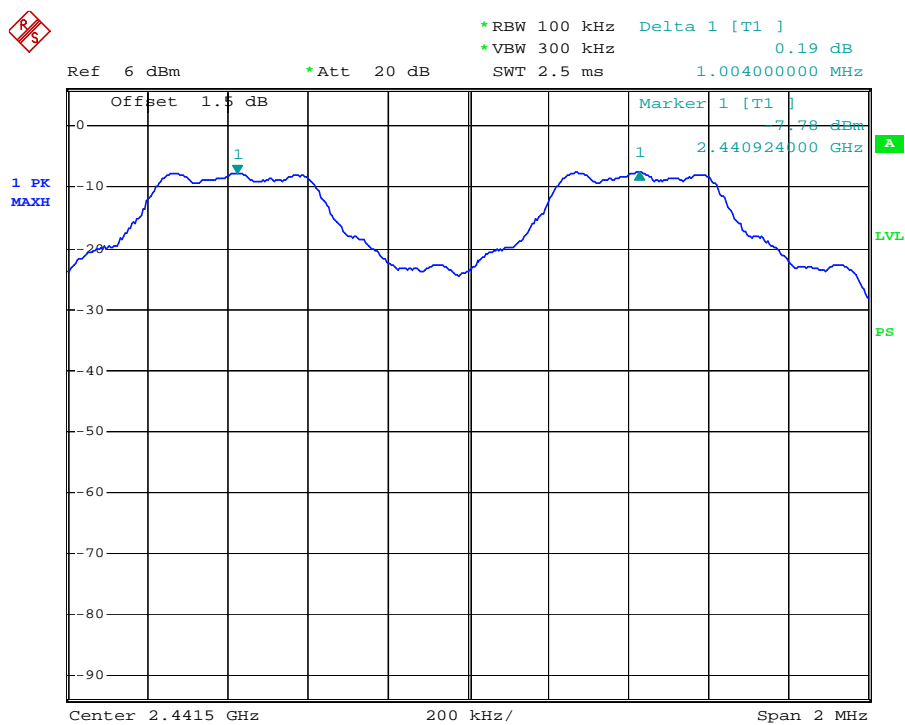
Channel	Channel Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
Low Channel	2402	1.000	1	Pass
Adjacent Channel	2403			
Middle Channel	2441	1.004	1	Pass
Adjacent Channel	2442			
High Channel	2480	1.000	1	Pass
Adjacent Channel	2479			

Please refer to following plots:

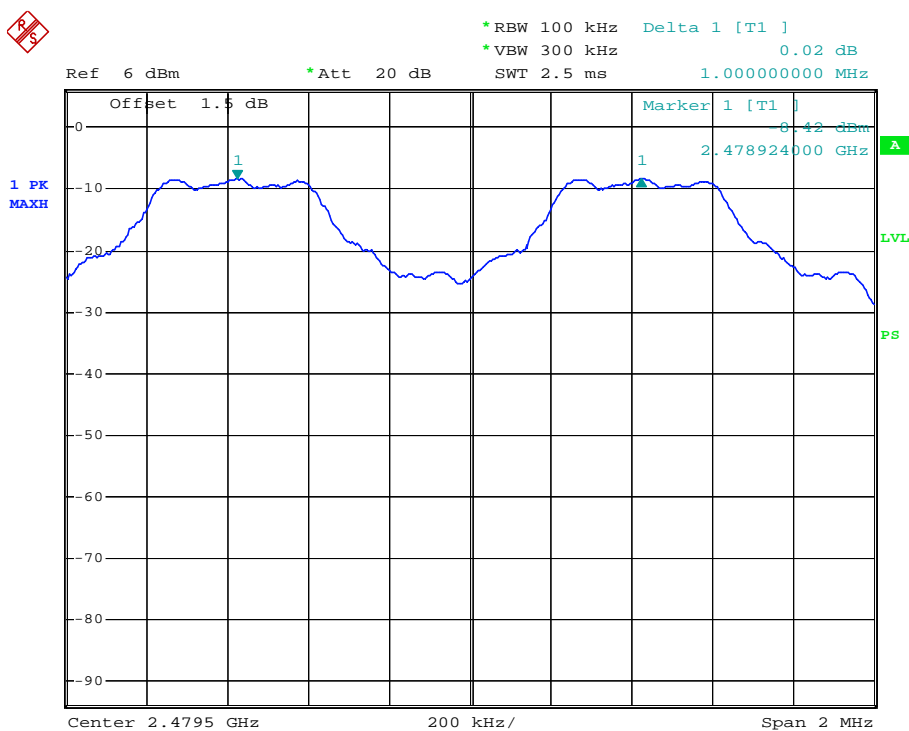
**Low channel**



### Middle channel



### High channel





### 7.1.3.3 Channel number

#### **LIMIT**

#### **ETSI EN 300 328 (V1.8.1) Sub-clause 4.3.4.2.2**

Non-adaptive Frequency Hopping systems shall make use of a hopping sequence(s) that contains at least 15 hopping channels

#### **MEASUREMENT EQUIPMENT USED**

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013

**Remark:** Each piece of equipment is scheduled for calibration once a year.

#### **Test Configuration**

Same as frequency range.

#### **TEST PROCEDURE**

- 1.The EUT was placed on a turntable which is 0.8m above ground plane.
- 2.Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
3. Set the EUT work on the hopping mode.
4. Set SPA Center Frequency = Operation frequency, RBW=300kHz,VBW=1MHz,.
5. Set SPA trace max hold, then view.

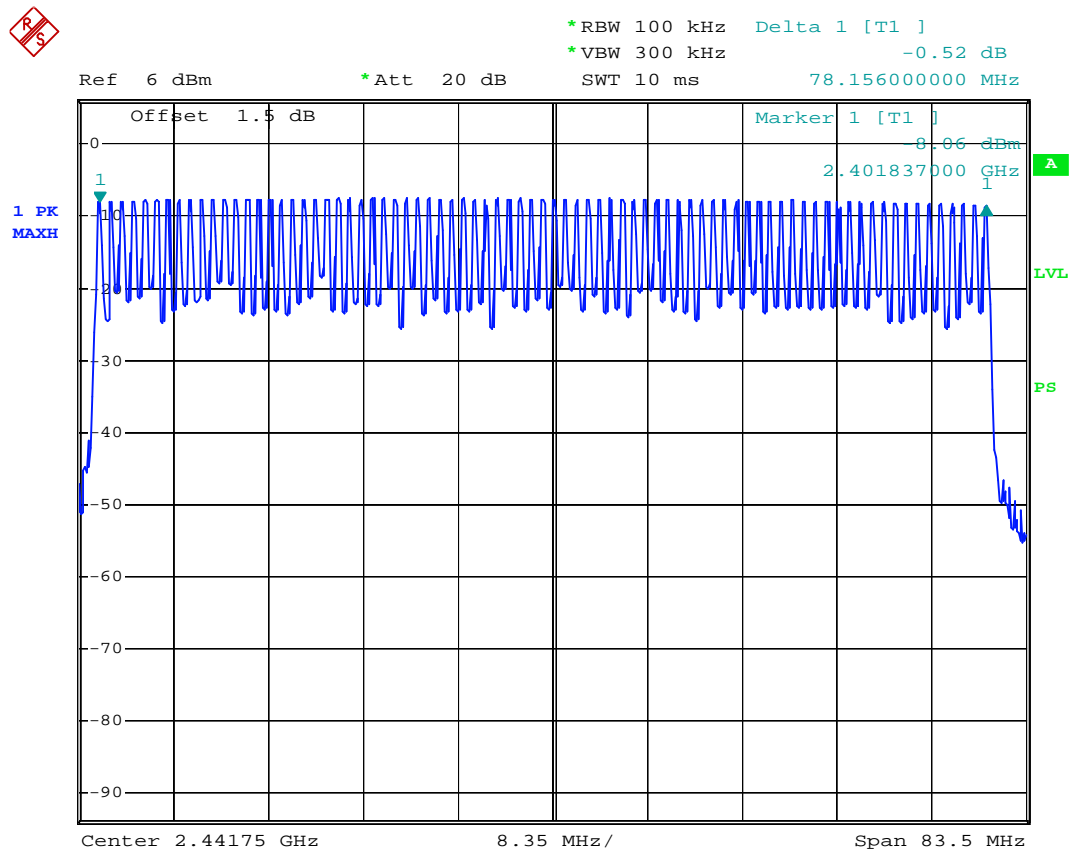


## TEST RESULTS

Compliance standard requirement.

Details see following test plots.

EUT	: Bluetooth keyboard	Temperature	: 25°C
Model No.	: KB-BT-001	Humidity	: 55%
Test Mode	: Operating	Test Engineer	: Daisy Zheng





## 7.1.4 Transmitter spurious emission

### LIMIT

#### ETSI EN 300 328 (V1.8.1) clause 4.3.6.2

The spurious emissions of the transmitter shall not exceed the values of following table in the indicated bands.

Frequency range	Limit when operating	Limit when in standby
30MHz to 1GHz	-36 dBm	-57dBm
Above 1 GHz to 12.75GHz	-30 dBm	-47dBm
1.8 GHz to 1.9 GHz 5.15 GHz to 5.3 GHz	-47 dBm	-47 dBm

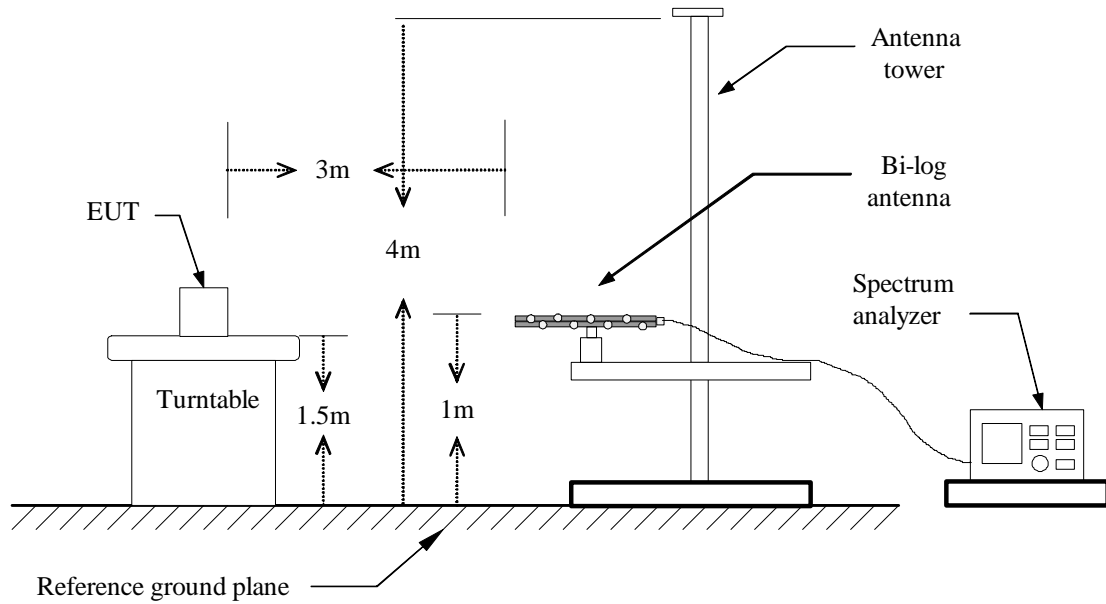
### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013
Pre Amplifier	H.P.	HP8447E	2945A02715	06/24/2013
Pre-Amplifier	Compliance	PAM0118	1360976	06/24/2013
Bilog Antenna	SUNOL Sciences	JB3	A021907	06/24/2013
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/24/2013
Horn Antenna	Compliance	CE18000	001	06/24/2013

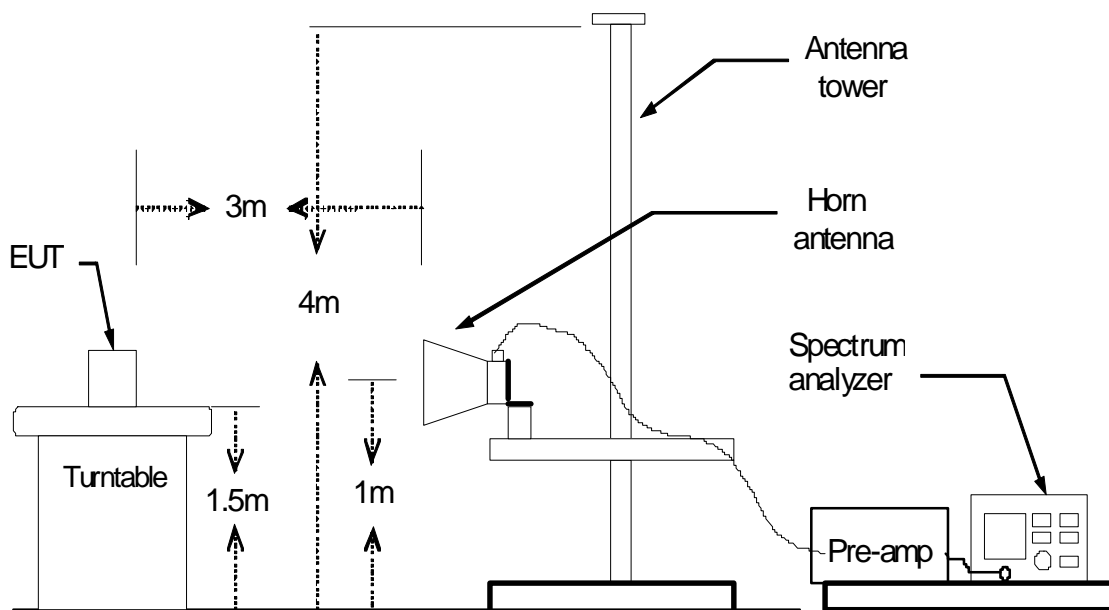
**Remark:** Each piece of equipment is scheduled for calibration once a year.

## Test Configuration

### Below 1GHz



### Above 1GHz





## **TEST PROCEDURE**

1. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.7.5 for the measurement method.





## TEST RESULTS

EUT	:	Bluetooth keyboard	Temperature	:	25°C
Model No.	:	KB-BT-001	Humidity	:	55%
Test Mode	:	Operating & Standby	Test Engineer	:	Daisy Zheng

Fre. (MHz)	ANT. Pol.	Result (dBm)	Limit	Margin	Conclusion
Test Mode: Lowest frequency					
434.0	H	-68.3	-36	-32.3	PASS
434.0	V	-78.5	-36	-42.5	PASS
2412.0	H	-65.6	-30	-35.6	PASS
2412.0	V	-70.4	-30	-40.4	PASS
2968.0	H	-68.2	-30	-38.2	PASS
2968.0	V	-73.6	-30	-43.6	PASS
4824.0	H	-69.8	-30	-39.8	PASS
4824.0	V	-70.5	-30	-40.5	PASS
Test Mode: Highest frequency					
434.0	H	-63.2	-36	-27.2	PASS
434.0	V	-76.6	-36	-40.6	PASS
2412.0	H	-65.4	-30	-35.4	PASS
2412.0	V	-70.3	-30	-40.3	PASS
4960.0	H	-68.7	-30	-38.7	PASS
4960.0	V	-74.5	-30	-44.5	PASS
8433.0	H	-69.6	-30	-39.6	PASS
8433.0	V	-74.1	-30	-44.1	PASS
Test Mode: Standby					
434.0	H	-65.3	-57	-8.3	PASS
434.0	V	-74.6	-57	-17.6	PASS
2412.0	H	-66.5	-47	-19.5	PASS
2412.0	V	-70.2	-47	-23.2	PASS
2968.0	H	-69.6	-47	-22.6	PASS
2968.0	V	-73.1	-47	-26.1	PASS
8433.0	H	-70.5	-47	-23.5	PASS
8433.0	V	-75.2	-47	-28.2	PASS

Note: 1. ERP = Reading -cable loss + antenna gain



## 7.1.5 Receiver Spurious Emissions

### LIMIT

#### ETSI EN 300 328 (V1.8.1)

The spurious emissions of the transmitter shall not exceed the values of following table in the indicated bands.

Frequency Range	Limit when in standby
30MHz to 1GHz	-57dBm
Above 1GHz to 12.75GHz	-47dBm

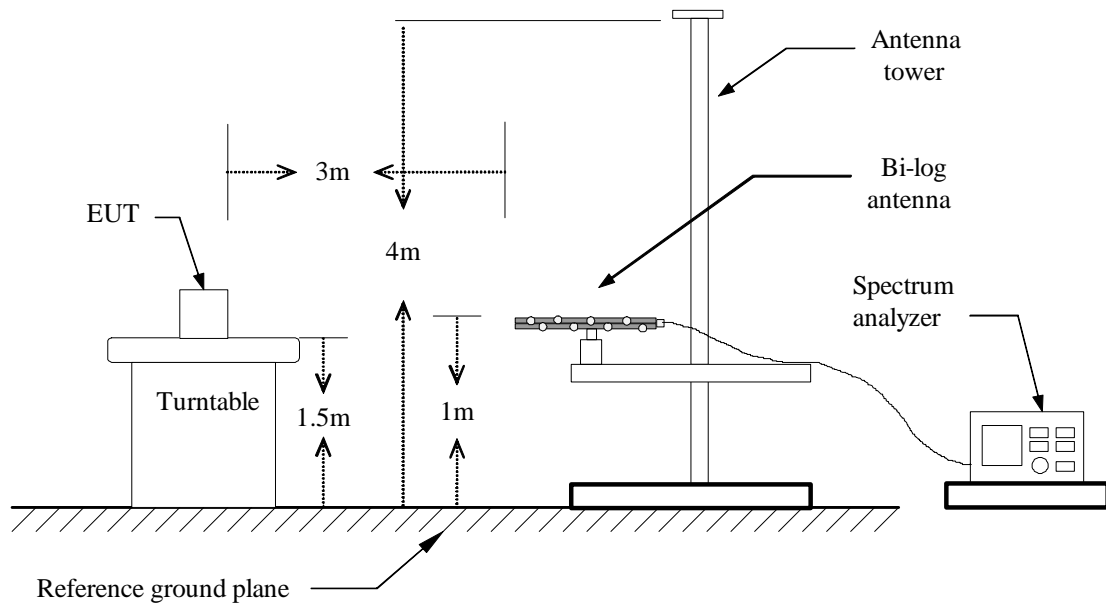
### MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	R&S	FSU	100114	06/24/2013
EMI Test Receiver	R&S	ESCI	100005	06/24/2013
Pre Amplifier	H.P.	HP8447E	2945A02715	06/24/2013
Pre-Amplifier	Compliance	PAM0118	1360976	06/24/2013
Bilog Antenna	SUNOL Sciences	JB3	A021907	06/24/2013
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	CT	N/A	N/A	N.C.R
Controller	CT	N/A	N/A	N.C.R
RF Comm. Test set	HP	8920B	US36142090	N.C.R
Site NSA	C&C	N/A	N/A	06/24/2013
Horn Antenna	Compliance	CE18000	001	06/24/2013

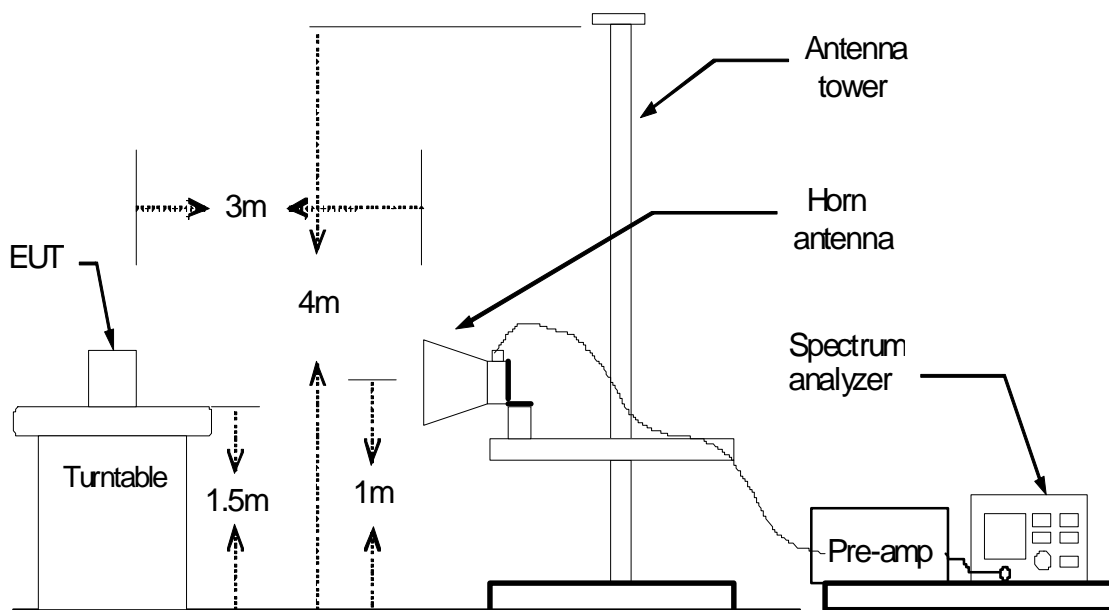
**Remark:** Each piece of equipment is scheduled for calibration once a year.

## Test Configuration

### Below 1GHz



### Above 1GHz





## **TEST PROCEDURE**

1. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.3 for the test conditions.
2. Please refer to ETSI EN 300 328 (V1.8.1) Sub-clause 5.7.5 for the measurement method.

**TEST RESULTS**

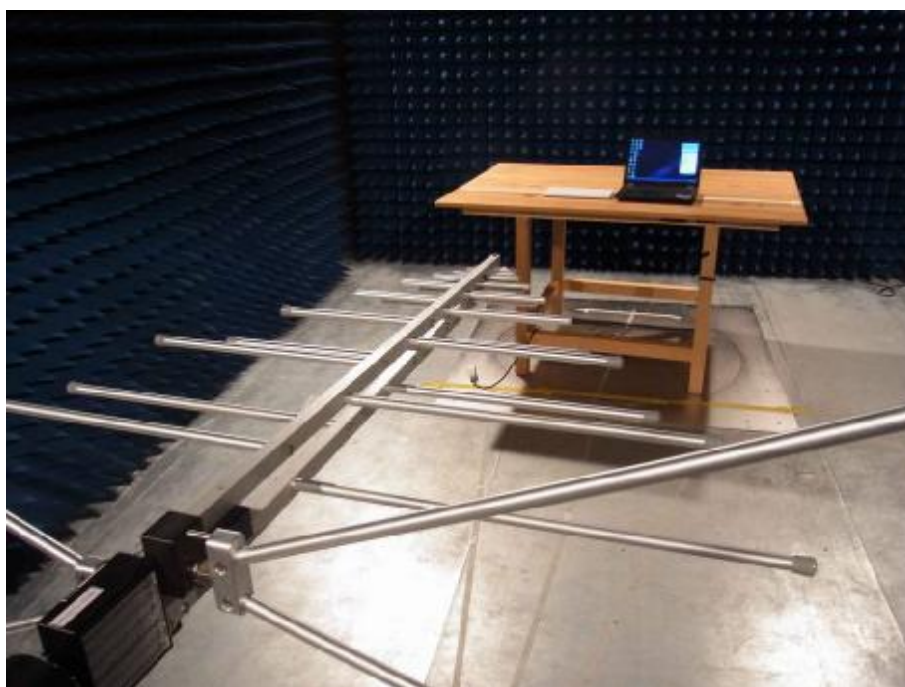
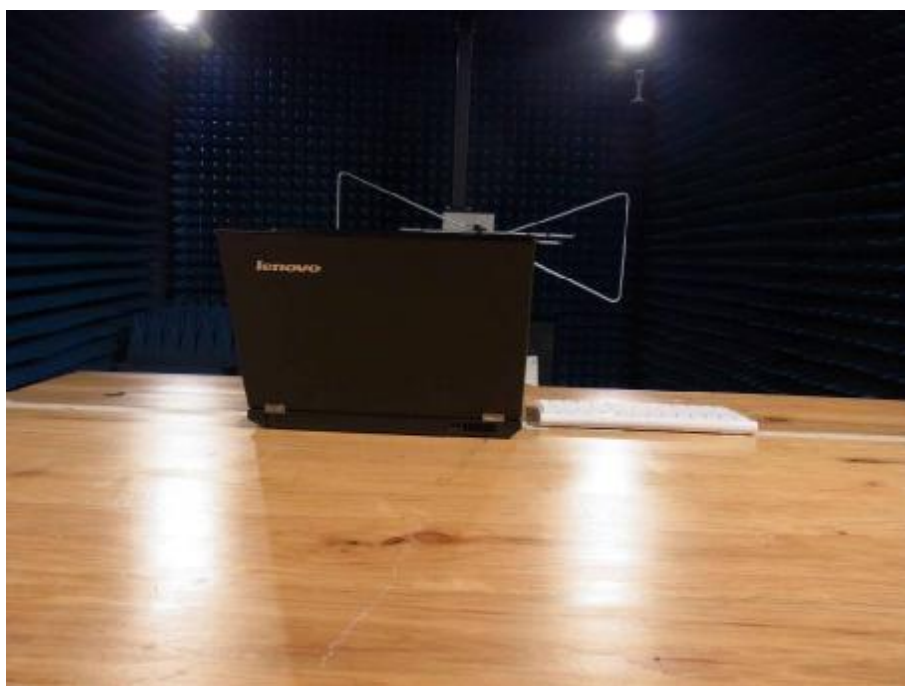
EUT	:	Bluetooth keyboard	Temperature	:	25°C
Model No.	:	KB-BT-001	Humidity	:	55%
Test Mode	:	Operating	Test Engineer	:	Daisy Zheng

Fre. (MHz)	ANT. Pol.	ERP (dBm)	Limit	Margin	Conclusion
Test Mode: Lowest frequency					
434.0	H	-75.23	-57	-18.23	<b>PASS</b>
434.0	V	-72.16	-57	-15.16	<b>PASS</b>
2412.0	H	-60.76	-47	-13.76	<b>PASS</b>
2412.0	V	-58.92	-47	-11.92	<b>PASS</b>
2968.0	H	-67.23	-47	-20.23	<b>PASS</b>
2968.0	V	-66.85	-47	-19.85	<b>PASS</b>
4824.0	H	-56.34	-47	-9.34	<b>PASS</b>
4824.0	V	-57.92	-47	-10.92	<b>PASS</b>
Test Mode: Highest frequency					
434.0	H	-72.61	-57	-15.61	<b>PASS</b>
434.0	V	-74.82	-57	-17.82	<b>PASS</b>
2412.0	H	-58.43	-47	-11.43	<b>PASS</b>
2412.0	V	-57.56	-47	-10.56	<b>PASS</b>
2968.0	H	-68.37	-47	-21.37	<b>PASS</b>
2968.0	V	-69.40	-47	-22.40	<b>PASS</b>
4824.0	H	-58.52	-47	-11.52	<b>PASS</b>
4824.0	V	-57.69	-47	-10.69	<b>PASS</b>

Note: 1. ERP = Reading -cable loss + antenna gain



## 8 PHOTOGRAPHS OF THE TEST CONFIGURATION



## 9 PHOTOGRAPHS OF EUT

**Photo 1**

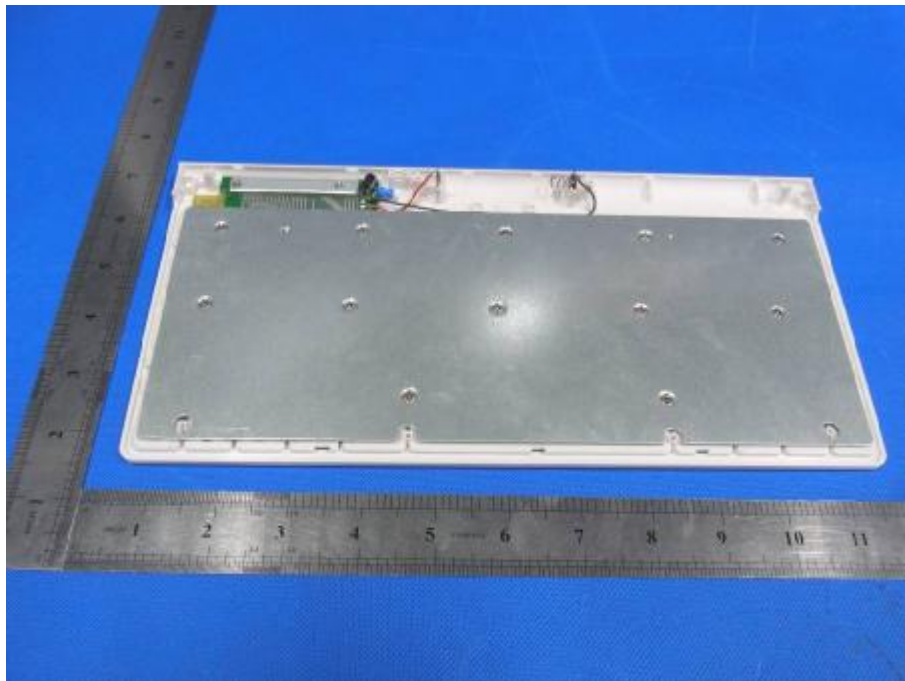


**Photo 2**





**Photo 3**



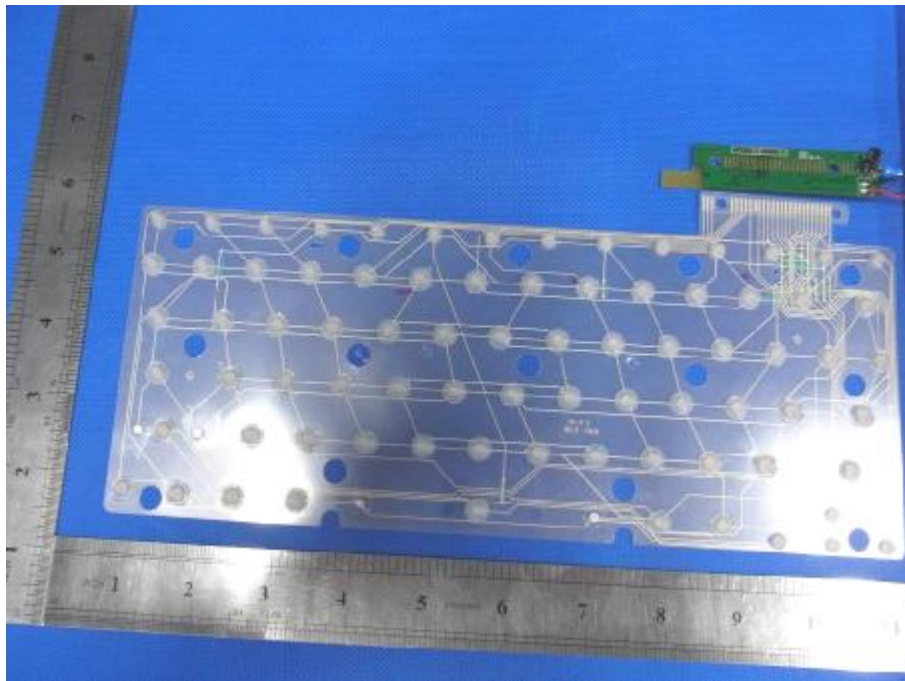
**Photo 4**



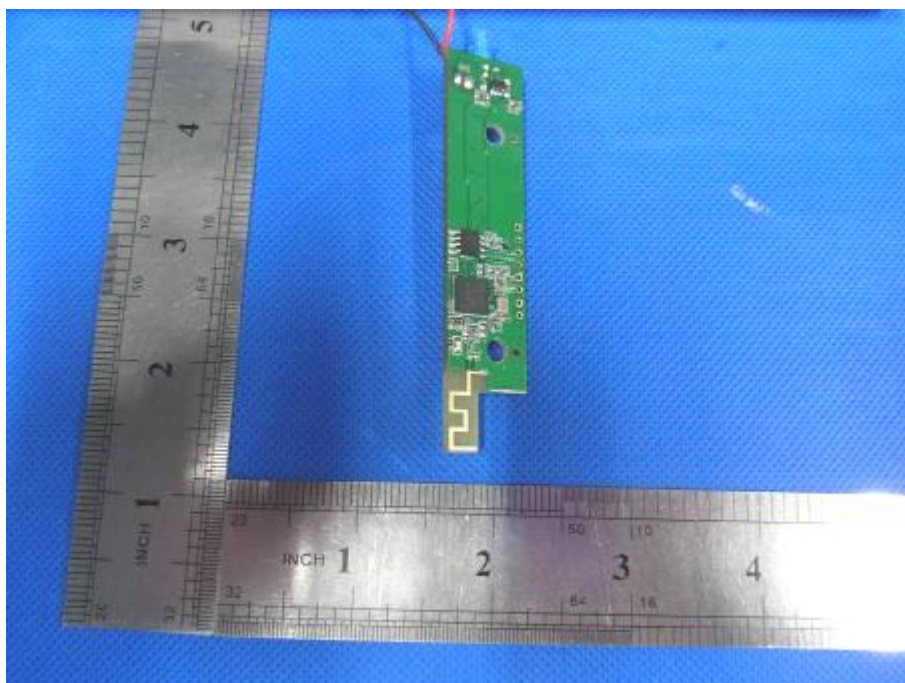




**Photo 5**



**Photo 6**



**\*\*\*\*\* END OF REPORT \*\*\*\*\***