



FCC TEST REPORT

FCC ID: 2AEDNA41

Product : 2.4GHz Wireless keyboard receiver

Trade Name : N/A

Model Number : SL-680008-BK BK

Prepared for

Winspeed Co., Ltd.

14 F-1, No. 2, Jian-Ba Rd., Chung-Ho District,
New Taipei City, Taiwan

Prepared by

Shenzhen POCE Technology Co., Ltd.

Room 502, Bldg. 1, Xinghua Garden, Baoan Road Xixiang,
Baoan District, Shenzhen, China

TEST RESULT CERTIFICATION

Applicant's name : Winspeed Co., Ltd.
Address : 14 F-1, No. 2, Jian-Ba Rd., Chung-Ho District, New Taipei City,
Taiwan
Manufacturer's Name : Winspeed Co., Ltd.
Address : 14 F-1, No. 2, Jian-Ba Rd., Chung-Ho District, New Taipei City,
Taiwan
Product description
Product name : 2.4GHz Wireless keyboard receiver
FCC Part15B
Standards : ANSI C63.4:2014

This device described above has been tested by POCE, and the test results show that the equipment under test (EUT) is in compliance with Part 15 of FCC Rules. And it is applicable only to the tested sample identified in the report.

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Date of Test :
Date (s) of performance of tests : 1 May 2017 ~7 May 2017
Date of Issue : 7 May 2017
Test Result : **Pass**

Testing Engineer :


(Ken Li)

Technical Manager :


(Jimmy Yao)

Authorized Signatory :


(Terry Yang)

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1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
FCC Part15B ANSI C63.4: 2014	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report
- (2) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen POCE Technology Co.,Ltd.

Add.: Room 502, Bldg. 1, Xinghua Garden, Baoan Road Xixiang, Baoan District, Shenzhen, China

FCC-Registration No.: 222278

1.2 MEASUREMENT UNCERTAINTY

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

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
POCE C01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U , (dB)	NOTE
POCE A01	ANSI	30MHz ~ 1000MHz	4.7	
		1GHz ~6GHz	5.0	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	2.4GHz Wireless keyboard receiver	
Model Name	SL-680008-BK BK	
Serial No	N/A	
Model Difference	N/A	
Product Description	The EUT is a 2.4GHz Wireless keyboard receiver.	
	Operating frequency:	OSC 16MHz
	Connecting I/O port:	USB
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	DC Voltage	
Power Rating	DC 5V from PC 120V/60Hz	

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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	Charging and data transmission

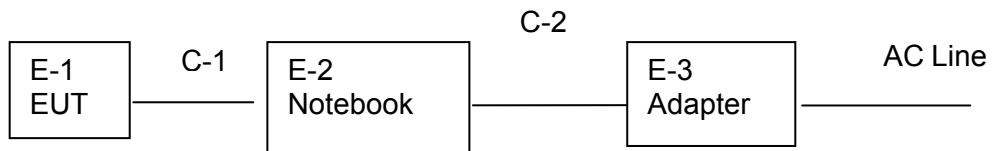
For Conducted Test	
Final Test Mode	Description
Mode 1	Charging and data transmission

For Radiated Test	
Final Test Mode	Description
Mode 1	Charging and data transmission

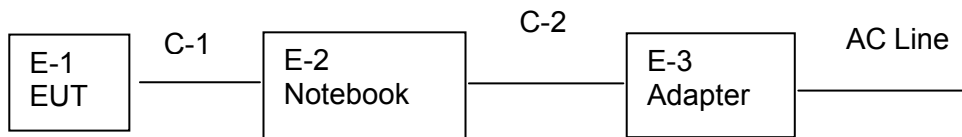
2.3 DESCRIPTION OF TEST SETUP

Mode 1:

CE:



RE:



2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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	2.4GHz Wireless keyboard receiver	N/A	SL-680008-BK BK	N/A	EUT
E-2	Notebook Computer	IBM	2366	N/A	
E-3	Adapter	IBM	08K8202	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	80cm	
C-2	NO	NO	80cm	

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.
- (3) “YES” means “shielded” “with core”; “NO” means “unshielded” “without core”.

2.5 MEASUREMENT INSTRUMENTS LIST

Radiation Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2016.07.06	2017.07.05	1 year
2	Test Receiver	R&S	ESPI	101318	2016.06.07	2017.06.06	1 year
3	Bilog Antenna	TESEQ	CBL6111D	31216	2016.07.06	2017.07.05	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2016.06.07	2017.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2016.06.07	2017.06.06	1 year
6	Horn Antenna	EM	EM-AH-10180	2011071402	2016.07.06	2017.07.05	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2016.07.06	2017.07.05	1 year
8	Amplifier	EM	EM-30180	060538	2016.12.22	2017.12.21	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2016.06.08	2017.06.07	1 year
10	Signal Analyzer	Agilent	N9020A	MY49100060	2016.07.06	2017.07.05	1 year

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2016.06.06	2017.06.05	1 year
2	LISN	R&S	ENV216	101313	2016.08.24	2017.08.23	1 year
3	LISN	EMCO	3816/2	00042990	2016.08.24	2017.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2016.06.07	2017.06.06	1 year
5	Passive Voltage Probe	R&S	ESH2-Z3	100196	2016.06.07	2017.06.06	1 year
6	Absorbing clamp	R&S	MOS-21	100423	2016.06.08	2017.06.07	1 year

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	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.

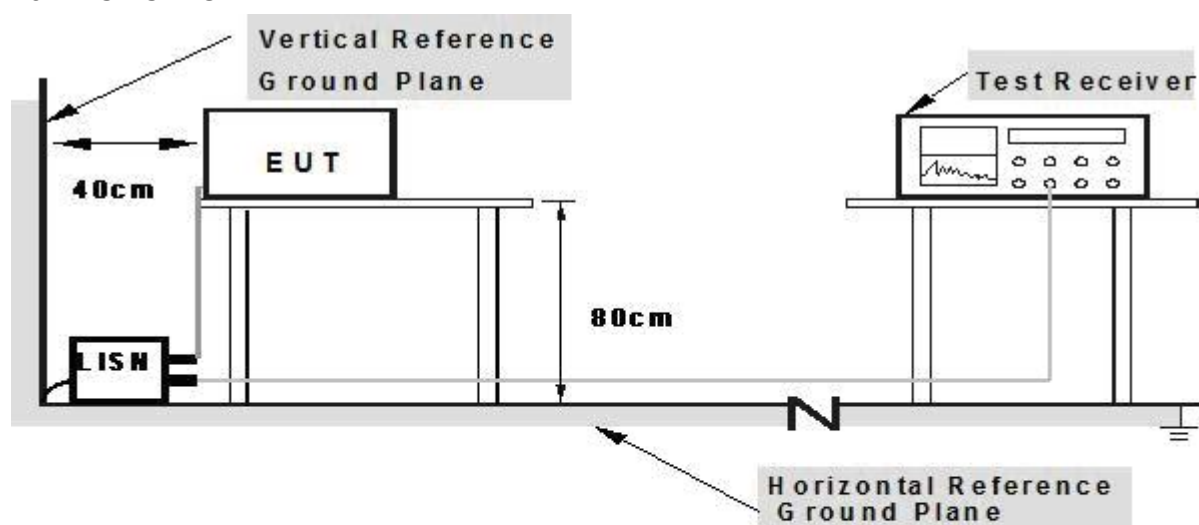
The following table is the setting of the receiver

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

3.1.2 TEST PROCEDURE

- 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.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 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

3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

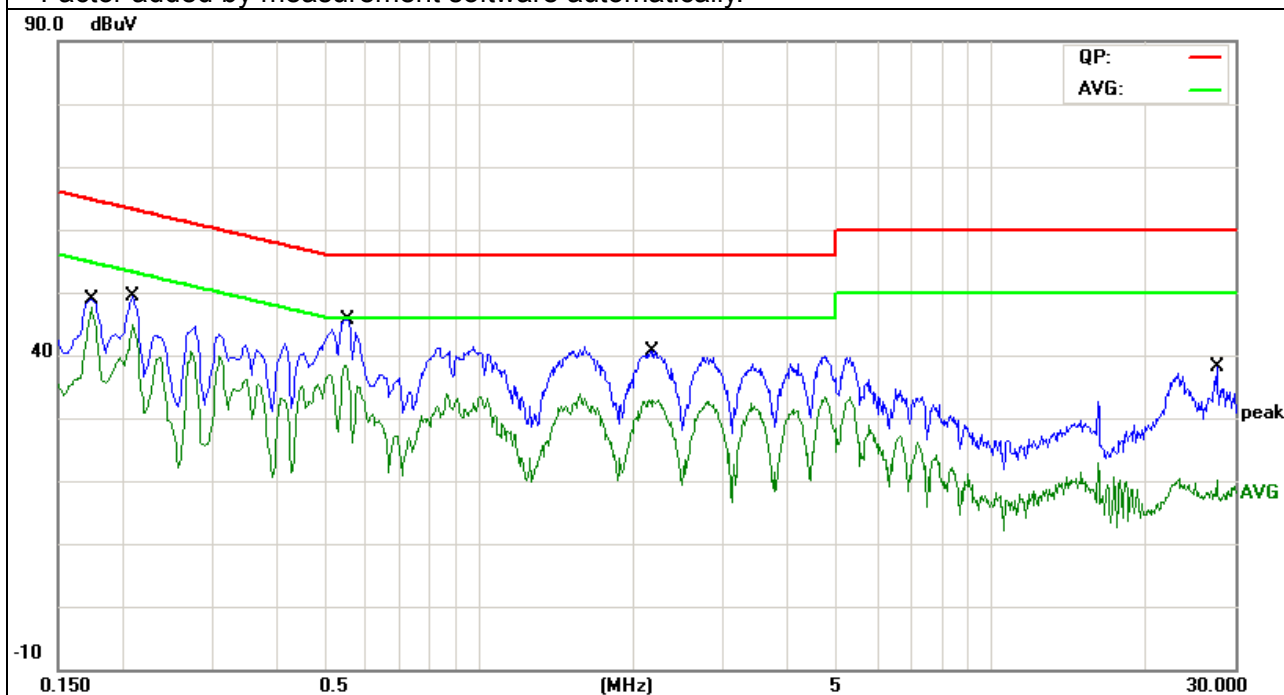
3.1.5 TEST RESULTS

EUT :	2.4GHz Wireless keyboard receiver	Model Name. :	SL-680008-BK BK
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2017-5-2
Test Mode :	Mode 1	Phase :	L
Test Voltage :	DC 5V from PC 120V/60Hz		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1740	38.18	9.97	48.15	64.76	-16.61	QP
0.1740	37.69	9.97	47.66	54.76	-7.10	AVG
0.2100	38.07	10.02	48.09	63.20	-15.11	QP
0.2100	34.74	10.02	44.76	53.20	-8.44	AVG
0.5540	35.29	10.05	45.34	56.00	-10.66	QP
0.5540	27.45	10.05	37.50	46.00	-8.50	AVG
2.1860	28.69	10.05	38.74	56.00	-17.26	QP
2.1860	22.87	10.05	32.92	46.00	-13.08	AVG
27.5860	12.32	10.21	22.53	60.00	-37.47	QP
27.5860	2.74	10.21	12.95	50.00	-37.05	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. lever = Read lever + factor (LISN Factor +cable loss)
Factor added by measurement software automatically.

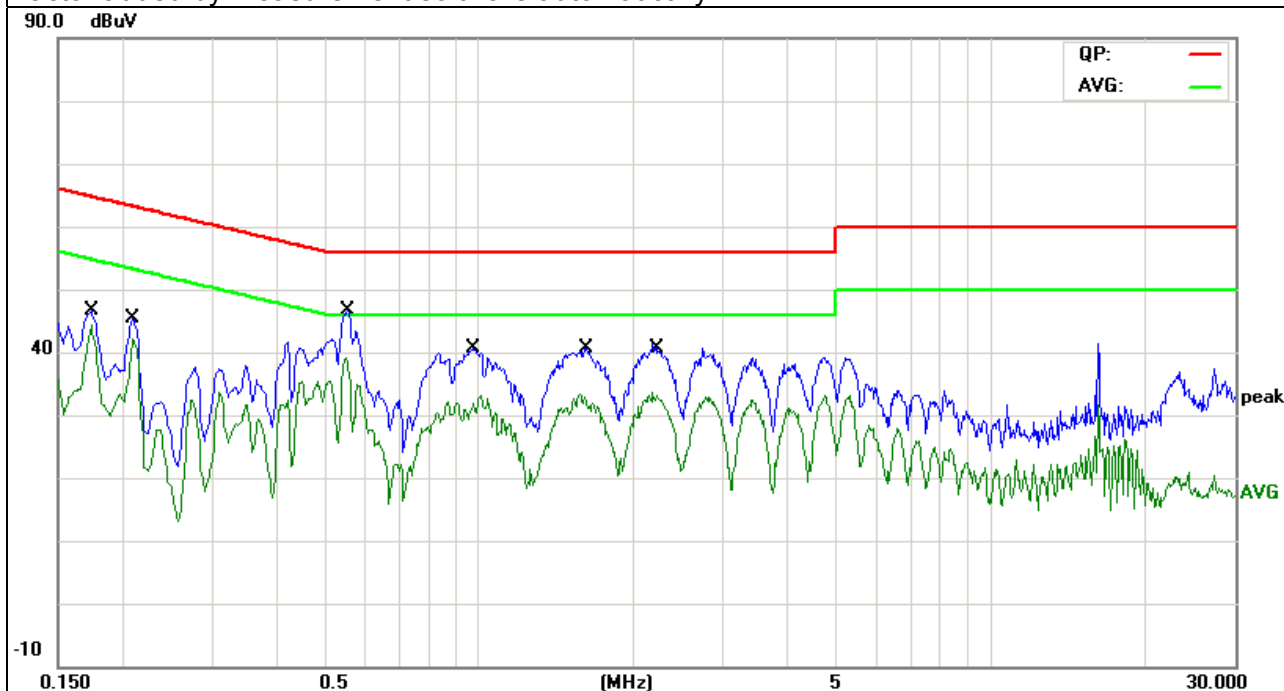


EUT :	2.4GHz Wireless keyboard receiver	Model Name. :	SL-680008-BK BK
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Test Date :	2017-5-2
Test Mode :	Mode 1	Phase :	N
Test Voltage :	DC 5V from PC 120V/60Hz		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1740	34.64	10.12	44.76	64.76	-20.00	QP
0.1740	34.04	10.12	44.16	54.76	-10.60	AVG
0.2100	34.18	10.12	44.30	63.20	-18.90	QP
0.2100	32.34	10.12	42.46	53.20	-10.74	AVG
0.5540	36.21	10.02	46.23	56.00	-9.77	QP
0.5540	28.24	10.02	38.26	46.00	-7.74	AVG
0.9700	28.87	10.15	39.02	56.00	-16.98	QP
0.9700	21.06	10.15	31.21	46.00	-14.79	AVG
1.6220	28.51	10.10	38.61	56.00	-17.39	QP
1.6220	21.66	10.10	31.76	46.00	-14.24	AVG
2.2260	27.44	10.06	37.50	56.00	-18.50	QP
2.2260	22.86	10.06	32.92	46.00	-13.08	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
 2. lever = Read lever + factor (LISN Factor +cable loss)
- Factor added by measurement software automatically.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 ~ 88	39.0	40.0
88 ~ 216	43.5	43.5
216 ~ 960	46.5	46.0
Above 960	49.5	54.0

Notes:

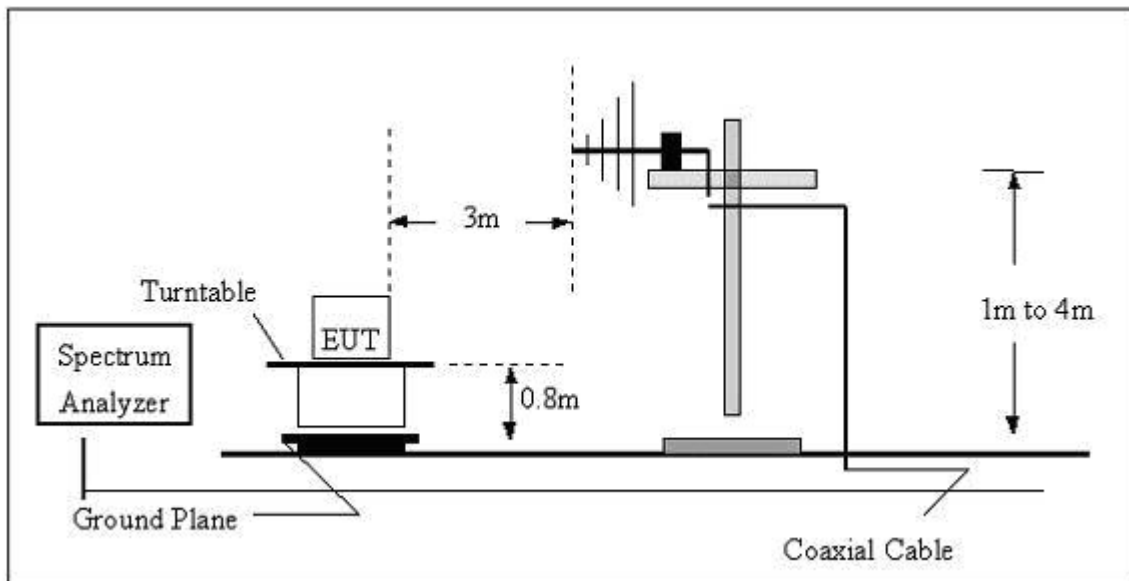
- (1) The limit for radiated test was performed according to as following:
FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 TEST PROCEDURE

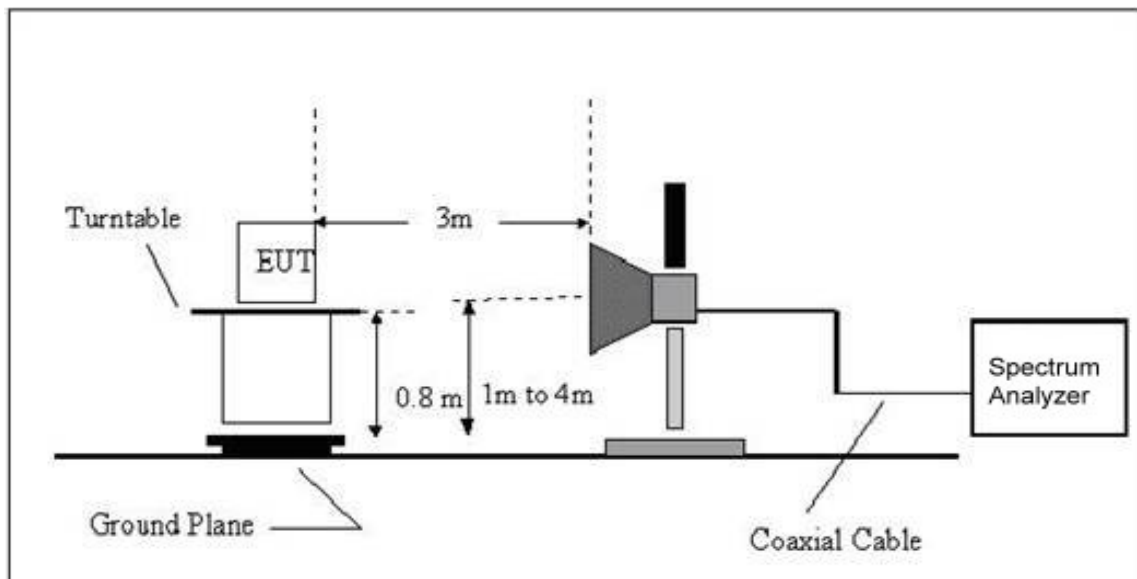
- a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 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. 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 Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz



3.2.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.3** Unless otherwise a special operating condition is specified in the follows during the testing.

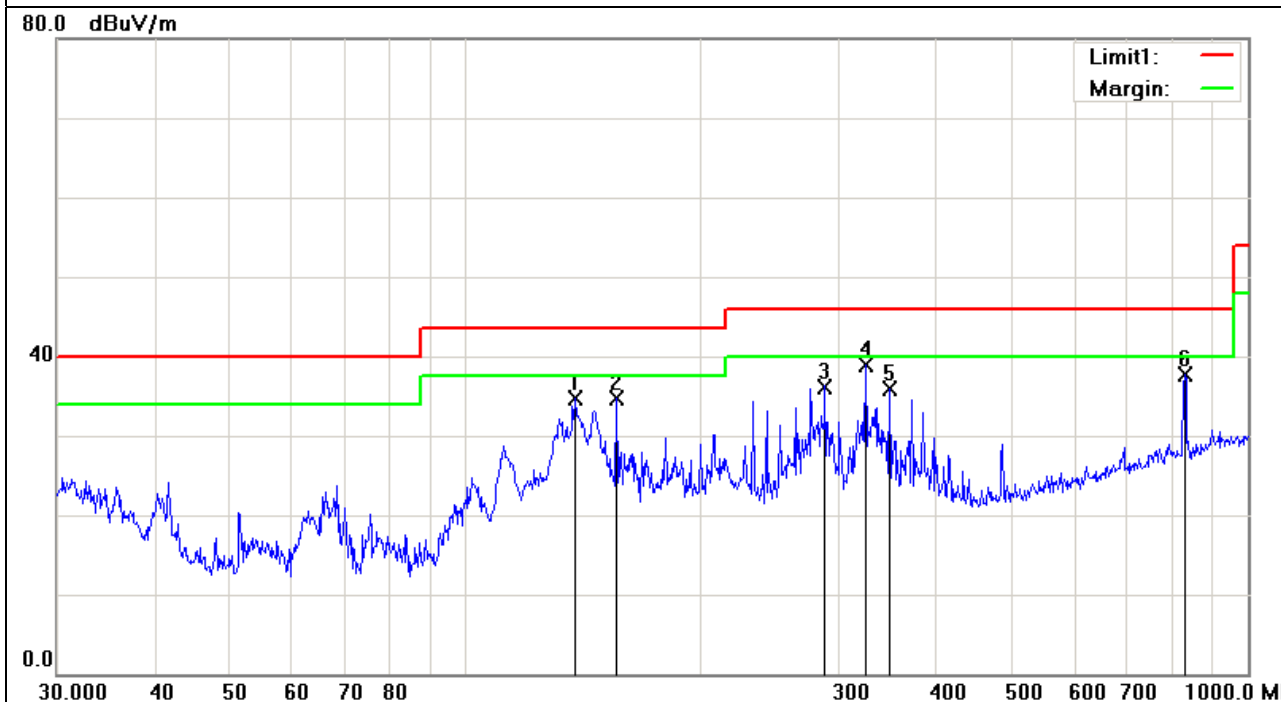
3.2.5 TEST RESULTS

EUT :	2.4GHz Wireless keyboard receiver	Model Name :	SL-680008-BKKB
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2017-05-2
Test Mode :	Charging and discharging	Polarization :	Horizontal
Test Power :	DC 5V from PC 120V/60Hz		

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	H	137.9029	43.19	QP	-8.40	34.79	43.50	-8.71	100	130
2	H	155.9101	43.12	QP	-8.33	34.79	43.50	-8.71	100	145
3	H	287.9904	43.65	QP	-7.45	36.20	46.00	-9.80	100	21
4	H	324.4561	45.07	QP	-6.20	38.87	46.00	-7.13	100	115
5	H	348.0274	41.41	QP	-5.52	35.89	46.00	-10.11	100	100
6	H	830.4002	34.10	QP	3.57	37.67	46.00	-8.33	100	66

Remark:

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



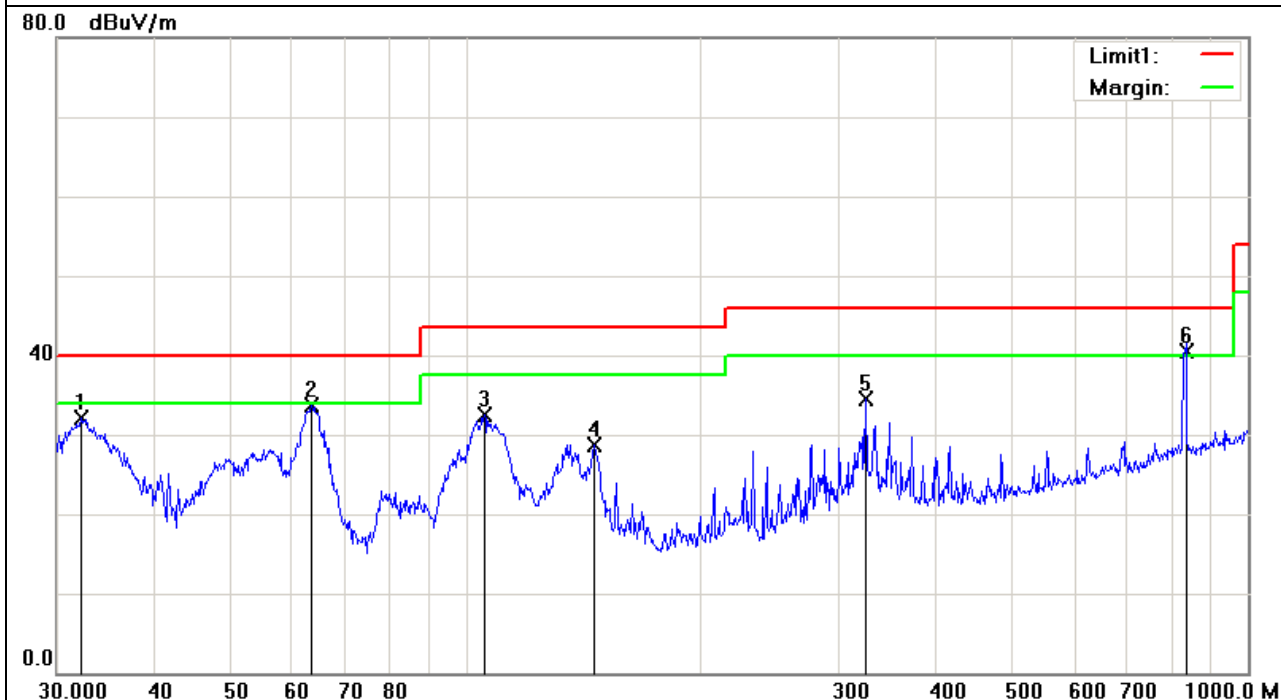
EUT :	2.4GHz Wireless keyboard receiver	Model Name :	SL-680008-BKKB
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2017-05-2
Test Mode :	Charging and discharging	Polarization :	Vertical
Test Power :	DC 5V from PC 120V/60Hz		

No.	P/L	Frequency	Reading	Detector	Corrected	Result	Limit	Margin	Height	Degree
		(MHz)	(dBuV/m)		(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	(cm)	(°)
1	V	32.2925	34.08	peak	-1.96	32.12	40.00	-7.88	100	86
2	V	63.5356	47.71	peak	-14.08	33.63	40.00	-6.37	100	98
3	V	105.6415	42.27	peak	-9.79	32.48	43.50	-11.02	100	255
4	V	145.8611	37.17	peak	-8.46	28.71	43.50	-14.79	100	199
5	V	324.4561	40.74	peak	-6.20	34.54	46.00	-11.46	100	359
6	V	833.3171	36.91	QP	3.61	40.52	46.00	-5.48	100	42

Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = Antenna Factor + Cable Loss.



3.2.6 TEST RESULTS(Above 1GHz)

EUT :	2.4GHz Wireless keyboard receiver	Model Name :	SL-680008-BKBK
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Test Date :	2017-05-2

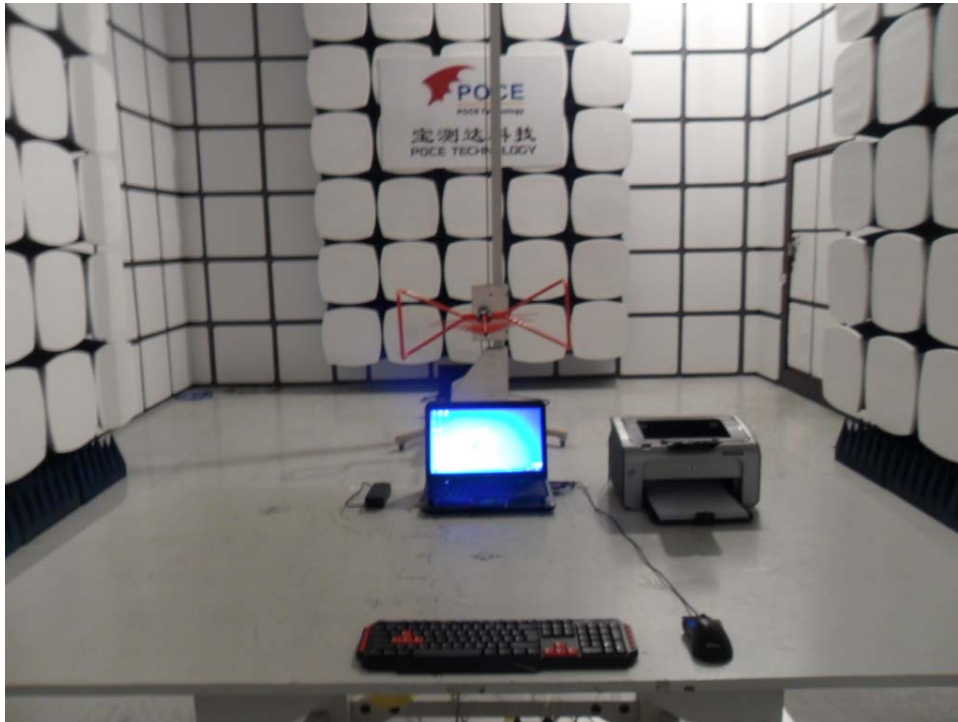
Freq.	Ant. Pol	Peak	Amplifier	Loss	Antenna Factor	Orrected Factor	Actual Fs	Peak	Peak
(MHz)	H/V	Reading (dBuV)	(dB)	(dB)	(dB/m)	(dB)	Peak (dBuV/m)	Limit (dBuV/m)	margin (dBuV/m)
2010.2	H	57.54	43.8	5.4	25.9	-12.5	45.04	74	-28.96
2506.2	H	52.09	44.4	6.0	27.6	-10.8	41.29	74	-32.71
3003.5	H	63.33	44.7	6.7	28.2	-9.8	53.53	74	-20.47
3503.6	H	52.76	44.4	7.1	28.5	-8.8	43.96	74	-30.04
N/A									
2010.2	V	52.56	43.8	5.4	25.9	-12.5	40.06	74	-33.94
2506.2	V	49.53	44.4	6.0	27.6	-10.8	38.73	74	-35.27
3003.5	V	63.98	44.7	6.7	28.2	-9.8	54.18	74	-19.82
3503.6	V	49.86	44.4	7.1	28.5	-8.8	41.06	74	-32.94
N/A									

Notes:

1. Measuring frequencies from 1 GHz to 13GHz.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode of the emission shown in Actual FS column.
3. The frequency that above 3GHz is mainly from the environment noise.

4. EUT TEST PHOTO

Radiated Measurement Photos



Conducted Measurement Photos

