TEST REPORT

FCC ID: QTG-ZKPIB

Product Name:	Bluetooth Keyboard
Trademark:	ZAGG
Model Number:	ZKB102FCB17 (Slim Book Go 10.2) ZKB102RMB17(Rugged Messenger 10.2)
Prepared For:	ZAGG Inc.
Address:	910 West Legacy Center Way, Midvale Utah United States, 84047
Manufacturer:	ZAGG Inc.
Address:	910 West Legacy Center Way, Midvale Utah United States, 84047
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Sample Received Date:	Nov. 29, 2019
Sample tested Date:	Nov. 29, 2019 to Dec. 09, 2019
Issue Date:	Dec. 09, 2019
Report No.:	BCTC1912000006E
Test Standards	FCC Part15.247 ANSI C63.10-2013
Test Results	PASS
Remark:	This is Bluetooth BLE radio test report.

Compiled by:	Reviewed by:	Approved by:
Willem Wang	Eric Yang	Zero Zhou/Manager

The test report is effective only with both signature and specialized stamp.This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full.The tested sample(s) and the sample information are provided by the client.

TABLE OF CONTENT

(Note: N/A means not applicable)

1. VERSION

Report No.	Issue Date	Description	Approved
BCTC1912000006E	Dec. 09, 2019	Original	Valid

2. TEST SUMMARY

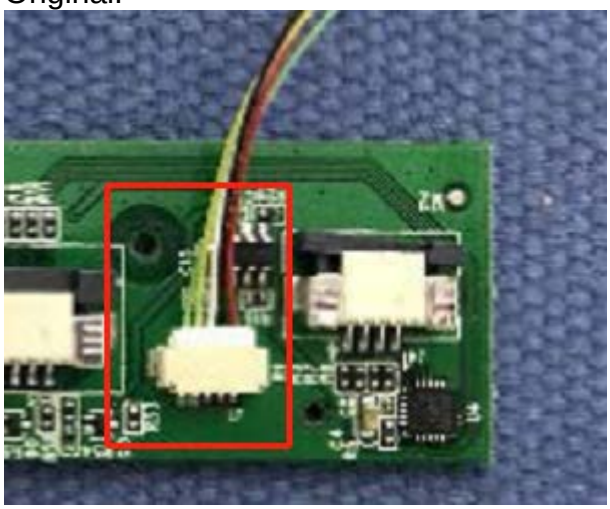
The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No	Results
1	Radiated Emissions	15.209	PASS
2	Conducted emissions	15.207	PASS

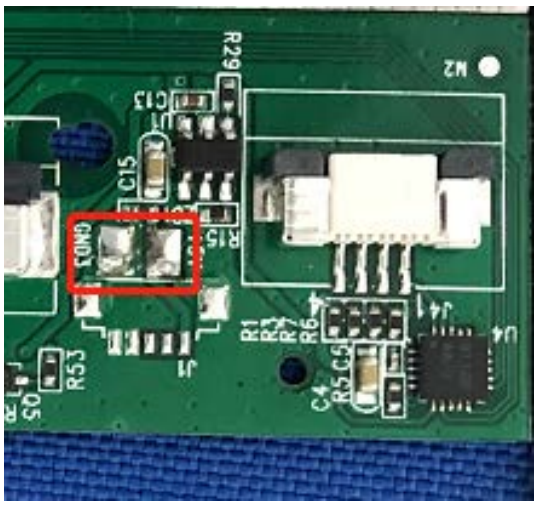
Remark: Based on the following changes in the product, the RF chip remains unchanged. So the report is only updated Conducted emissions and Radiated Emissions for the original report（CQASZ20190400219E-01）。

Changes ： 1. Appearance changes, material is unchanged.
2.The USB interface Change：The original product is 4 pin interface, The new product is 2 pin interface.

Original:



new



3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	humidity uncertainty	U=5.3%
2	Temperature uncertainty	U=0.59℃
3	Conducted Emission (150kHz-30MHz)	U=3.2dB
4	Radiated disturbance(30MHz-1000MHz)	U=4.8dB
5	Radiated disturbance(1GHz-6GHz)	U=4.9dB
6	Radiated disturbance(1GHz-18GHz)	U=5.0dB

4. PRODUCT INFORMATION AND TEST SETUP

4.1 Product Information

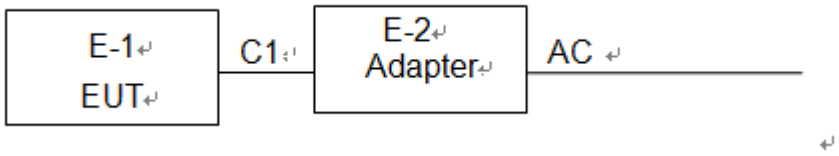
Model(s):	ZKB102FCB17 (Slim Book Go 10.2) ZKB102RMB17(Rugged Messenger 10.2)
Model Description:	All the model are the same circuit and RF module, except model names and appearance. See the Note 1.
Bluetooth Version:	BT 5.0
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	Bluetooth: 2402-2480MHz
Max. RF output power:	Bluetooth :5.57dBm
Type of Modulation:	Bluetooth: GFSK
Antenna installation:	Bluetooth: PCB antenna
Antenna Gain:	Bluetooth:1.87dBi
Ratings:	DC 5V from Adapter DC 3.7V from Battery

Note 1:
Model: ZKB102RMB17(Rugged Messenger 10.2)

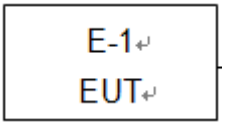
4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:



Radiated Spurious Emission



4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Data Cable	Power Cord
E-1	Bluetooth		ZKB102FC	N/A	EUT	E-1
E-2	Adapter	N/A	BCTC001	N/A	Auxiliary	E-2

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.3M	DC cable unshielded

Notes:

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.

4.4 Channel List

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	11	2422	21	2442
02	2404	12	2424	22	2444
03	2406	13	2426	23	2446
~	~	~	~	~	~
09	2418	19	2438	39	2478
10	2420	20	2440	40	2480

4.5 Test Mode

Test mode	Test mode	Low channel	Middle channel	High channel
1	Link mode(conducted emission and Radiated emission)			

5. TEST FACILITY AND TEST INSTRUMENT USED

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

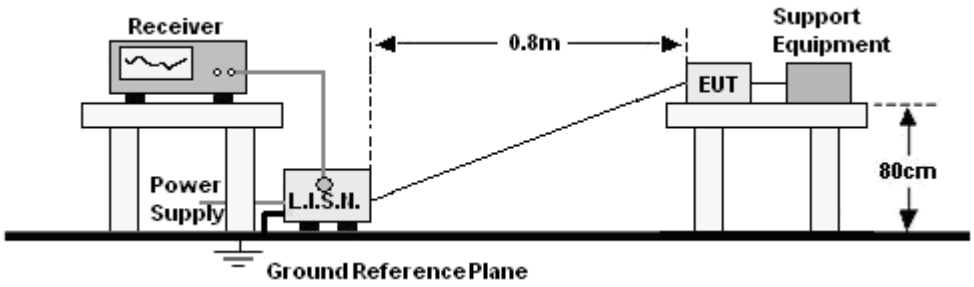
5.2 Test Instrument Used

Conducted emissions Test					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
Receiver	R&S	ESR3	102075	Jun. 13, 2019	Jun.12, 2020
LISN	R&S	ENV216	101375	Jun. 13, 2019	Jun.12, 2020
ISN	HPX	ISN T800	S1509001	Jun. 13, 2019	Jun.12, 2020
Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

Radiated emissions Test (966 chamber)					
Equipment	**Manufacturer**	**Model#**	**Serial#**	**Last Cal.**	**Next Cal.**
966 chamber	ChengYu	966 Room	966	Jun. 19, 2018	Jun. 18, 2021
Receiver	R&S	ESR3	102075	Jun. 13, 2019	Jun. 12, 2020
Receiver	R&S	ESRP	101154	Jun. 13, 2019	Jun. 12, 2020
Amplifier	Schwarzbeck	BBV9718	9718-309	Jun. 25, 2019	Jun. 24, 2020
Amplifier	Schwarzbeck	BBV9744	9744-0037	Jun. 25, 2019	Jun. 24, 2020
TRILOG Broadband Antenna	schwarzbeck	VULB 9163	VULB9163-942	Jun. 22, 2019	Jun. 21, 2020
Horn Antenna	SCHWARZBECK	BBHA9120D	1201	Jun. 22, 2019	Jun. 21, 2020
Software	Frad	EZ-EMC	FA-03A2 RE	\	\

6. CONDUCTED EMISSIONS

6.1 Block Diagram Of Test Setup



6.2 Limit

FREQUENCY (MHz)	Limit (dBuV)	
	Quas-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
Notes: 1. *Decreasing linearly with logarithm of frequency. 2. The lower limit shall apply at the transition frequencies.		

6.3 Test procedure

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

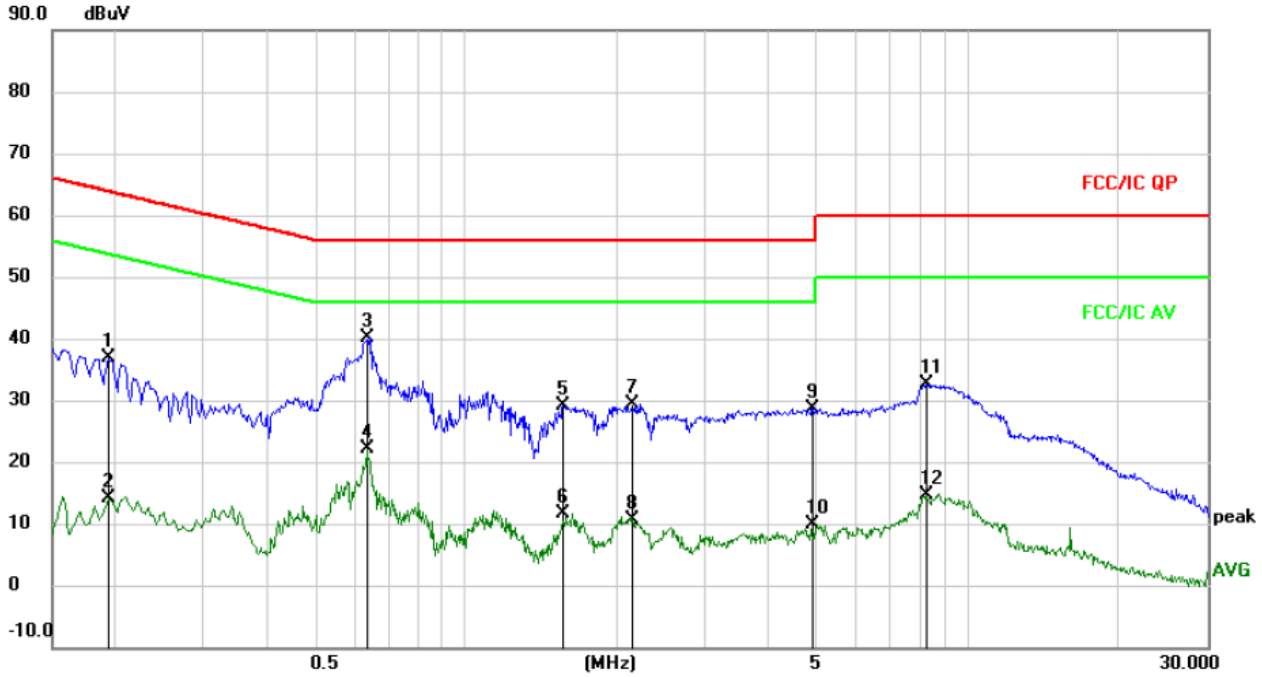
a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

6.4 Test Result

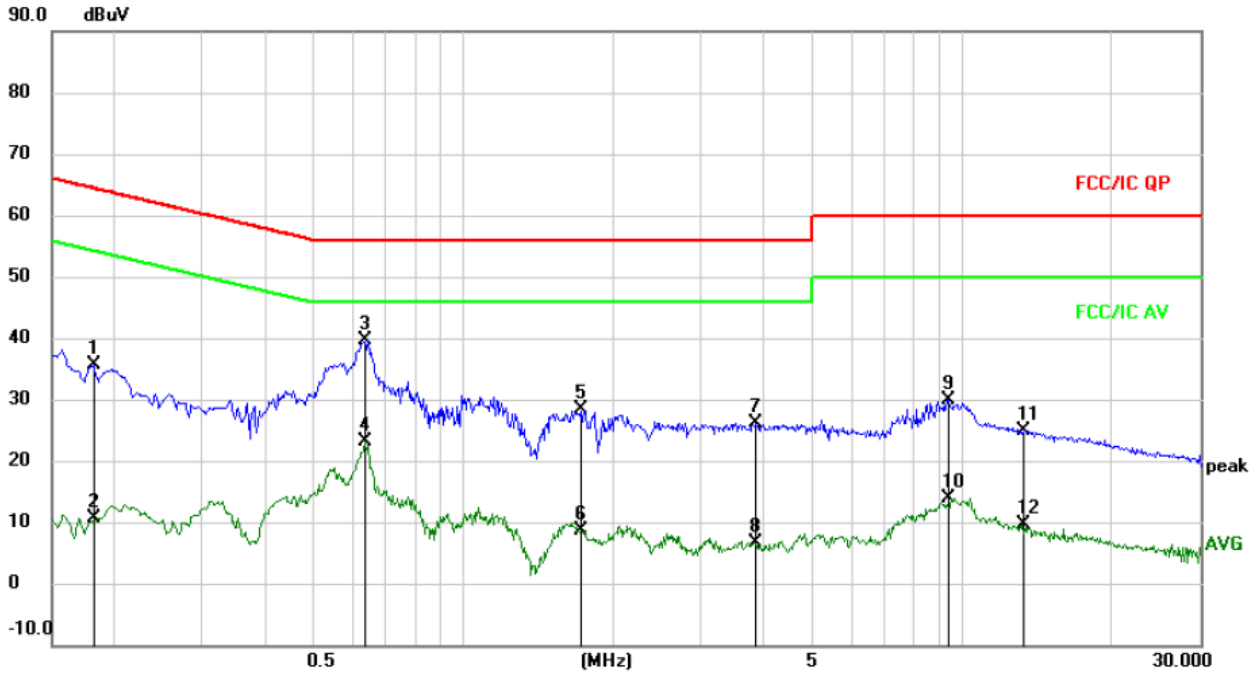
Temperature：	25 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 5V From Adapter Input AC 120V/60Hz	Test Mode：	Mode 1



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV		dBuV	dBuV	dB	Detector	Comment
1		0.1940	27.38	9.47	36.85	63.86	-27.01	QP	
2		0.1940	4.66	9.47	14.13	53.86	-39.73	AVG	
3	*	0.6340	30.30	9.88	40.18	56.00	-15.82	QP	
4		0.6340	12.23	9.88	22.11	46.00	-23.89	AVG	
5		1.5660	19.44	9.58	29.02	56.00	-26.98	QP	
6		1.5660	2.06	9.58	11.64	46.00	-34.36	AVG	
7		2.1500	19.88	9.60	29.48	56.00	-26.52	QP	
8		2.1500	0.92	9.60	10.52	46.00	-35.48	AVG	
9		4.9139	18.95	9.79	28.74	56.00	-27.26	QP	
10		4.9139	0.12	9.79	9.91	46.00	-36.09	AVG	
11		8.2659	23.03	9.71	32.74	60.00	-27.26	QP	
12		8.2659	4.89	9.71	14.60	50.00	-35.40	AVG	

Temperature：	25 ℃	Relative Humidity：	54%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 5V From Adapter Input AC 120V/60Hz	Test Mode：	Mode 1



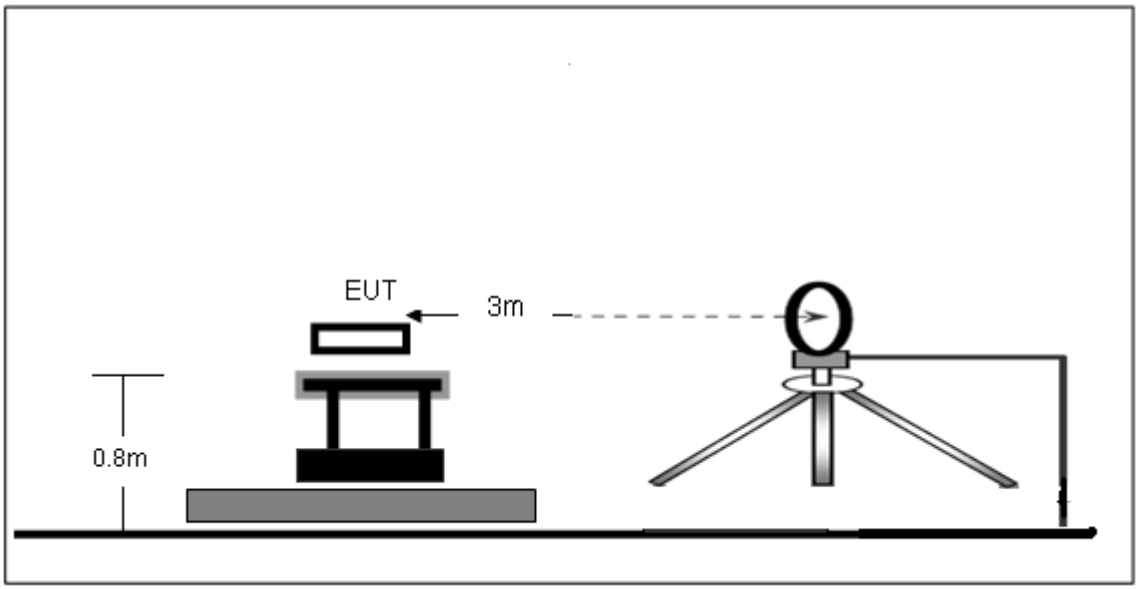
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV		dBuV	dBuV	dB	Detector	Comment
1		0.1819	26.05	9.48	35.53	64.40	-28.87	QP	
2		0.1819	1.22	9.48	10.70	54.40	-43.70	AVG	
3	*	0.6340	29.82	9.88	39.70	56.00	-16.30	QP	
4		0.6340	13.29	9.88	23.17	46.00	-22.83	AVG	
5		1.7300	18.76	9.58	28.34	56.00	-27.66	QP	
6		1.7300	-0.84	9.58	8.74	46.00	-37.26	AVG	
7		3.8460	16.47	9.72	26.19	56.00	-29.81	QP	
8		3.8460	-2.98	9.72	6.74	46.00	-39.26	AVG	
9		9.3779	20.28	9.70	29.98	60.00	-30.02	QP	
10		9.3779	4.28	9.70	13.98	50.00	-36.02	AVG	
11		13.2259	15.22	9.70	24.92	60.00	-35.08	QP	
12		13.2259	-0.19	9.70	9.51	50.00	-40.49	AVG	

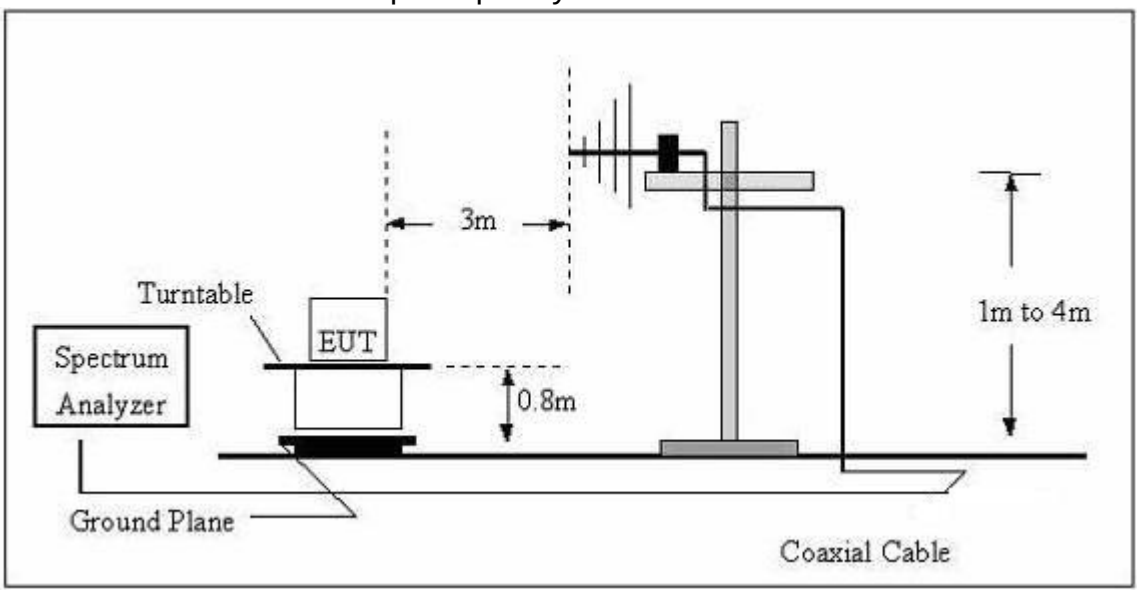
7. RADIATED EMISSIONS

7.1 Block Diagram Of Test Setup

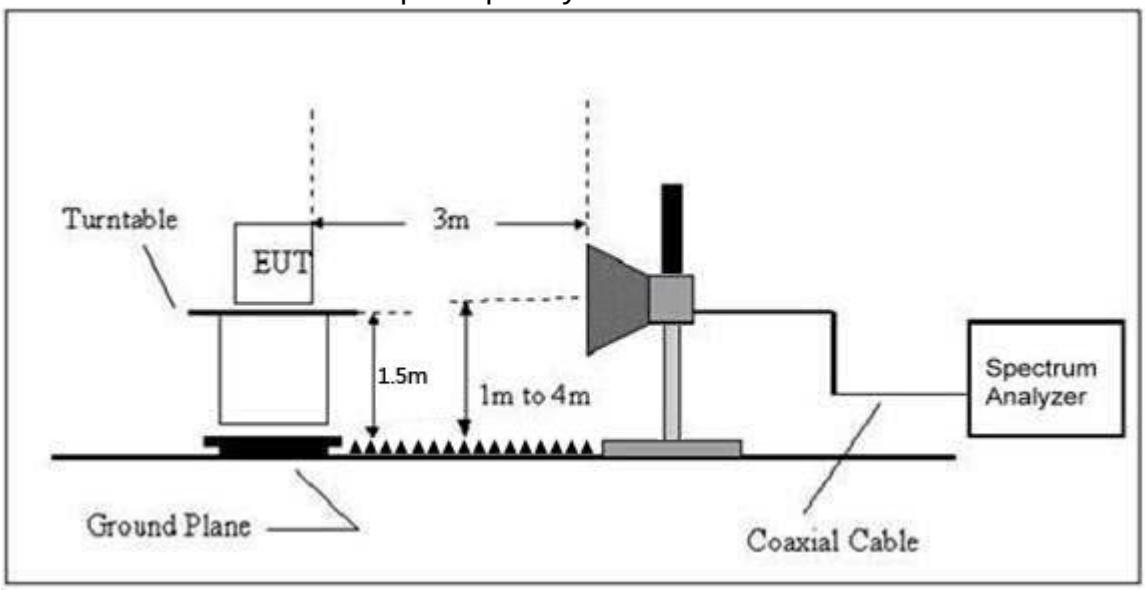
（A）Radiated Emission Test-Up Frequency Below 30MHz



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



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



7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance	
(MHz)	uV/m	(m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))}$ + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))}$ + 40
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)}$ + 40
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.3 Test procedure

Receiver Parameter	Setting
Attenuation	Auto
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Spectrum Parameter	Setting
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).

h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel.

Note:

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

Above 1GHz test procedure as below:

a.The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

b.The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g.Test the EUT in the lowest channel,the Highest channel.

Note:

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

7.4 Test Result

Below 30MHz

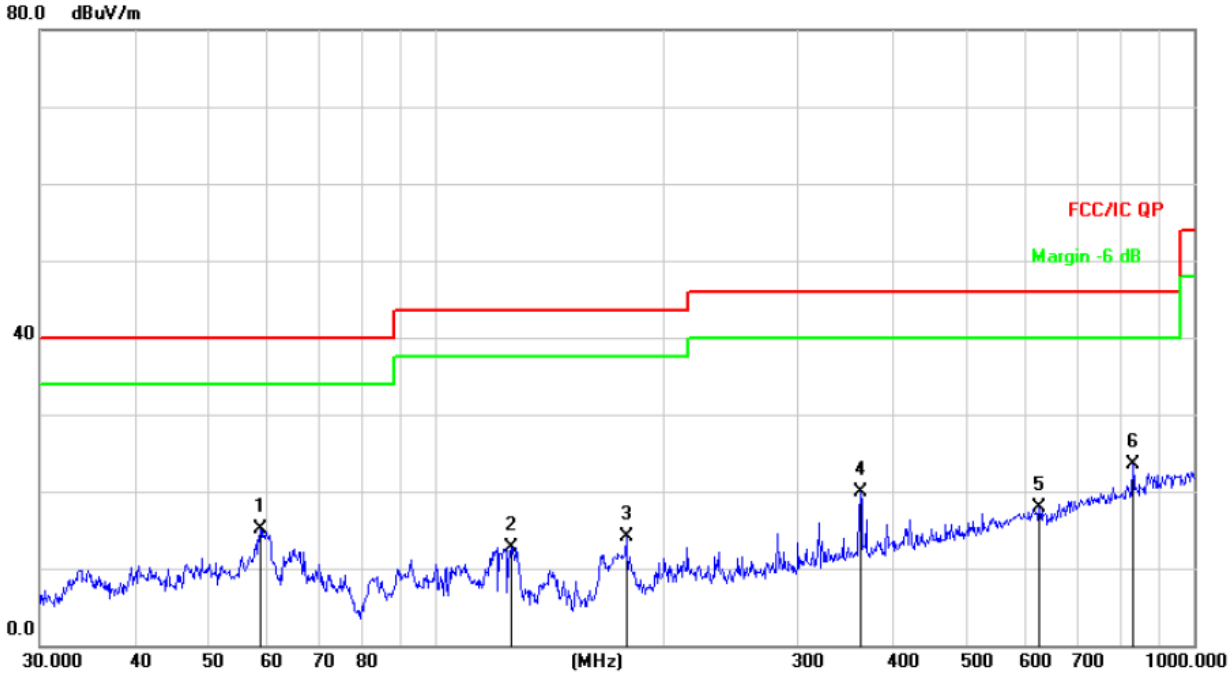
Temperature：	26℃	Relative Humidtity：	24%
Pressure：	101 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	Mode 1	Polarization :	--

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.

Between 30MHz – 1GHz

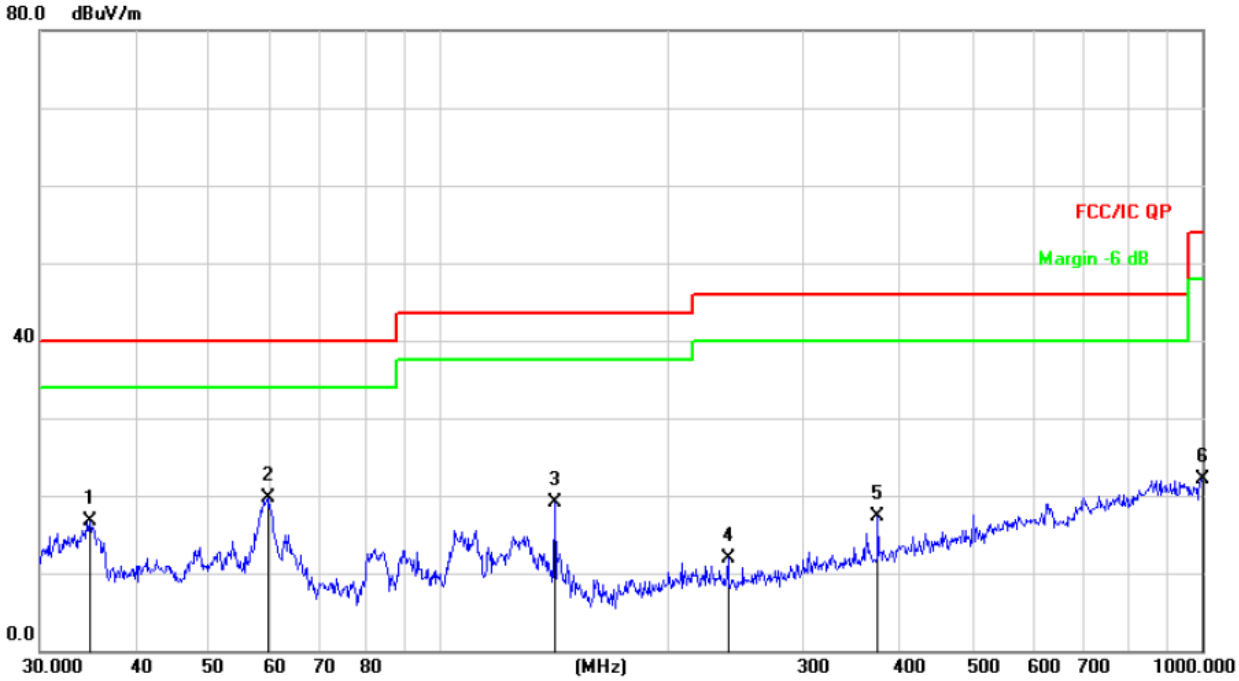
Temperature：	26℃	Relative Humidtity：	54%
Pressure：	101 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	Mode 1	Polarization :	Horizontal



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		58.6126	30.87	-15.76	15.11	40.00	-24.89	QP
2		125.4457	30.70	-17.92	12.78	43.50	-30.72	QP
3		178.1327	31.80	-17.70	14.10	43.50	-29.40	QP
4		362.9844	31.81	-11.93	19.88	46.00	-26.12	QP
5		625.0780	24.48	-6.67	17.81	46.00	-28.19	QP
6	*	830.4002	26.41	-2.96	23.45	46.00	-22.55	QP

Temperature：	26℃	Relative Humidtity：	54%
Pressure：	101 hPa	Test Voltage ：	DC 3.7V
Test Mode ：	Mode 1	Polarization :	Vertical



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		34.8823	33.00	-16.37	16.63	40.00	-23.37	QP
2	*	59.6493	35.49	-15.87	19.62	40.00	-20.38	QP
3		141.8262	38.15	-18.97	19.18	43.50	-24.32	QP
4		239.1473	27.26	-15.40	11.86	46.00	-34.14	QP
5		375.9385	28.95	-11.64	17.31	46.00	-28.69	QP
6		1000.000	22.87	-0.81	22.06	54.00	-31.94	QP

8. EUT PHOTOGRAPHS

EUT Photo 1

EUT Photo 2

EUT Photo 3

EUT Photo 4

9. EUT TEST SETUP PHOTOGRAPHS

Conducted emissions

Radiated emission

※※※※※ END OF REPORT ※※※※※