



No.:
FCCSZ2024-0027-EMC

TEST REPORT

FCC ID : 2ALG8BEENG500-2

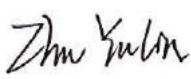
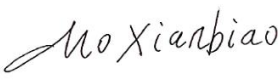
NAME OF SAMPLE : BEESENSE FLEX

APPLICANT : Roambee Corporation

CLASSIFICATION OF TEST : N/A

CVC Testing Technology (Shenzhen) Co., Ltd.



Applicant	Name: Roambee Corporation Address: 3120 De La Cruz Blvd Suite 210 Santa Clara CA 95054 United States		
Manufacturer	Name: AOVX WIRELESS SOLUTIONS CO. LTD Address: Room 501, BlockA1, ZhongAn Valley, 900 Wangjiang West Road, High-tech Zone, HeFei, China 230088		
Equipment Under Test	Product Name: BEESENSE FLEX Model/Type: BNG 500 Brand Name: Roambee Serial NO.: N/A Sample NO.:3-1		
Date of Receipt.	2024.03.22	Date of Testing	2024.03.22 ~ 2024.04.08
Test Specification		Test Result	
FCC Part 15, Subpart B, Class B		PASS	
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied. Seal of CVC Issue Date: 2024.04.10		
Tested by:  Zhu Yulin Name Signature	Reviewed by:  Mo Xianbiao Name Signature	Approved by:  Dong Sanbi Name Signature	
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.



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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCCSZ2024-0027-EMC	Original release	2024.04.10



1. SUMMARY OF TEST RESULTS

EMISSION			
Standard	Test Item	Result	Remarks
FCC Part 15, Subpart B, Class B	Conducted Test	PASS	Minimum passing margin is 15.3dB at 4.508MHz
	Radiated Test (30MHz~ 1GHz)	PASS	Minimum passing margin is 10.78dB at 336.648MHz
	Radiated Test (Above 1GHz)	PASS	Minimum passing margin is 17.00dB at 13124.312MHz

1.1 List of Test and Measurement Instruments

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
Conducted emission					
EMI Test Receiver	Rohde&Schwarz	ESR3	102694	1 year	2024.5.25
limiter (10 dB)	Rohde&Schwarz	ESH3-Z2	102824	1 year	2024.5.16
Voltage probe	Rohde&Schwarz	CVP9222C	28	1 year	2024.5.16
Current probe	Rohde&Schwarz	EZ-17	101442	1 year	2024.5.21
ISN network	Rohde&Schwarz	ENV 81	100401	1 year	2024.5.16
ISN network	Rohde&Schwarz	ENV 81 Cat6	101896	1 year	2024.5.16
LISN (single-phase)	Rohde&Schwarz	ENV216	102569	1 year	2024.4.11
#1Shielding room	MORI	854	N/A	3 year	2026.5.16
Radiation Spurious					
EMI Test Receiver	Rohde&Schwarz	ESR 26	101718	1 year	2024.5.25
Loop antenna (8.3k~30MHz)	Rohde&Schwarz	HFH2-Z2E	100951	1 year	2024.5.26
Antenna(30MHz~1000MHz)	SCHWARZBECK	VULB 9168	1132	1 year	2025.2.13
Horn antenna(1GHz-18GHz)	ETS	3117	227634	1 year	2025.3.24
Horn antenna(18GHz-40GHz)	SCHWARZBECK	BBHA 9170	01003	1 year	2025.3.24
3m anechoic chamber	MORI	966	CS0200019	3 year	2026.5.18
#1 control room	MORI	433	CS0300028	3 year	2026.5.16
Temperature and humidity meter	/	C193561473	CS0200071	1 year	2024.5.21



1.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	Measurement Uncertainty
1	Conductedemission test	+/- 2.7 dB
2	Radiated emission 30MHz-1GHz	+/- 4.6 dB
3	Radiated emission 1GHz-18GHz	+/- 4.4 dB
4	Volatage fluctuations and flicker	±1.4 %
Remark: 95% Confidence Levels, k=2.		

1.3 Test Location

The tests and measurements refer to this report were performed by EMC testing Lab of CVC Testing Technology (Shenzhen) Co., Ltd.

Lab Address: No. 1301, Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen City, Guangdong Province 518110 P.R.China

Post Code: 518110 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

FCC(Test firm designation number: CN1363)

IC(Test firm CAB identifier number: CN0137)

CNAS(Test firm designation number: L16091)



2. GENERAL INFORMATION

2.1 General Product Information

PRODUCT	BEESENSE FLEX
BRAND	Roambee
TEST MODEL	BNG 500
POWER SUPPLY	1. DC 3.6V from battery 2. 5V from USB host unit
HARDWARE VERSION:	1.1
SOFTWARE VERSION:	2.0.8V19
I/O PORTS	Refer to user' s manual
CABLE SUPPLIED	N/A
Remark: 1. For more detailed features description, please refer to the manufacturer's specifications or the User's Manual. 2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report. 3. EUT photo refer to the report (Report NO.: FCCSZ2024-0027-EUT).	

2.2 Description of Accessories

N/A



2.3 Independent Operation Modes

The EUT were tested under the following modes, the final worst mode was marked in boldface and recorded in this report.

EMISSION Test Modes		
For Conducted Emission Tests		
Test Mode		Test Voltage
1	Normal Working + LTE Link + GNSS IDLE	DC 3.6V from battery
2	Normal Working + LTE Link + GNSS IDLE + Charging	DC 5V from USB unit
For Radiated Emission Tests		
Test Mode		Test Voltage
1	Normal Working + LTE Link + GNSS IDLE	DC 3.6V from battery
2	Normal Working + LTE Link + GNSS IDLE + Charging	DC 5V from USB unit
Remark: The above test modes in boldface were the worst cases, only the test data of these modes were reported.		



2.4 General Description of Applied Standards

According to the specifications of the manufacturers, the EUT must comply with the requirements of the following standards:

FCC PART 15, SUBPART B, CLASS B

ANSI C63.4:2014

All test items have been performed and recorded as per the above standards.

2.5 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.

Support Equipment					
NO	Description	Brand	Model No.	Serial Number	Supplied by
1	Adapter	Apple	A1443	N/A	Lab

3. EMISSION

3.1 Conducted Emission

3.1.1 Limits Of Conducted Emission

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.107)

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.
 NOTE: 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
 NOTE: 3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

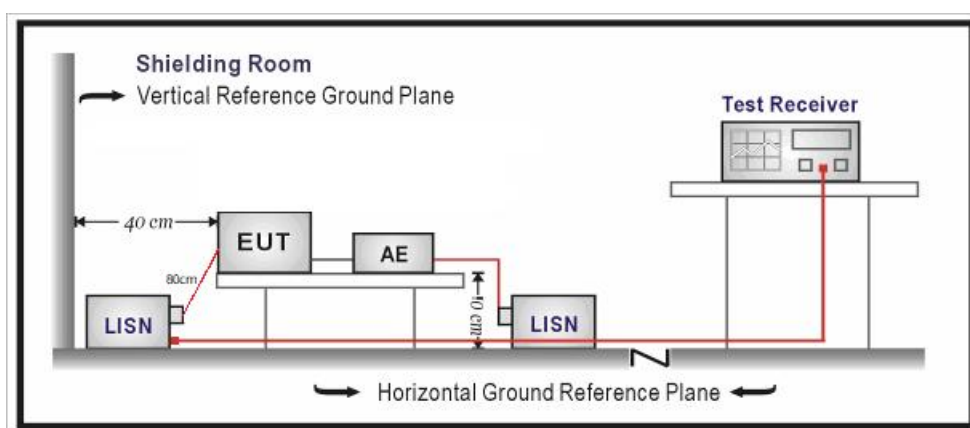
3.1.2 Test Procedures

The basic test procedure was in accordance with ANSI C63.4:2014 (section 7).

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

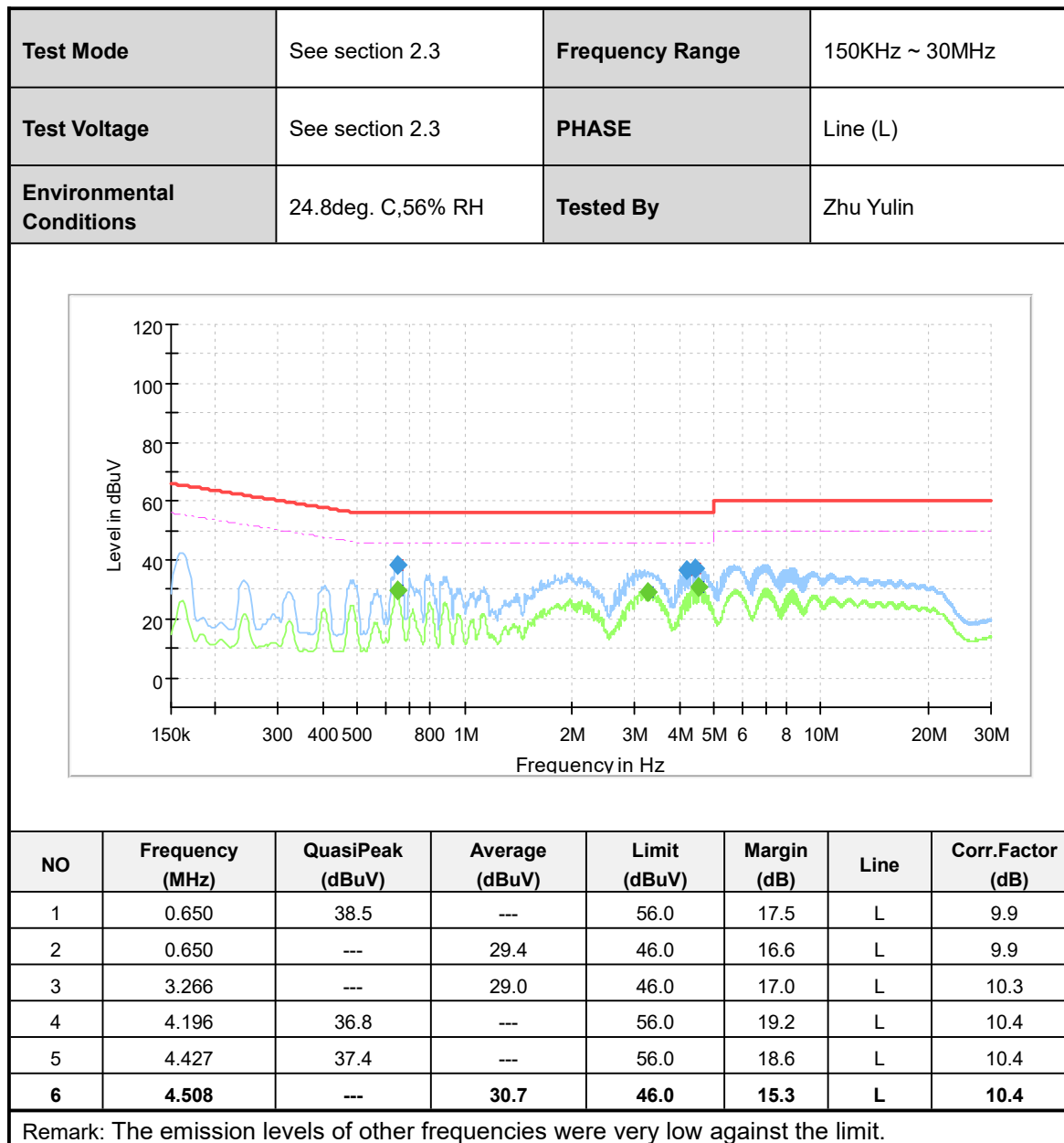
3.1.3 Test setup





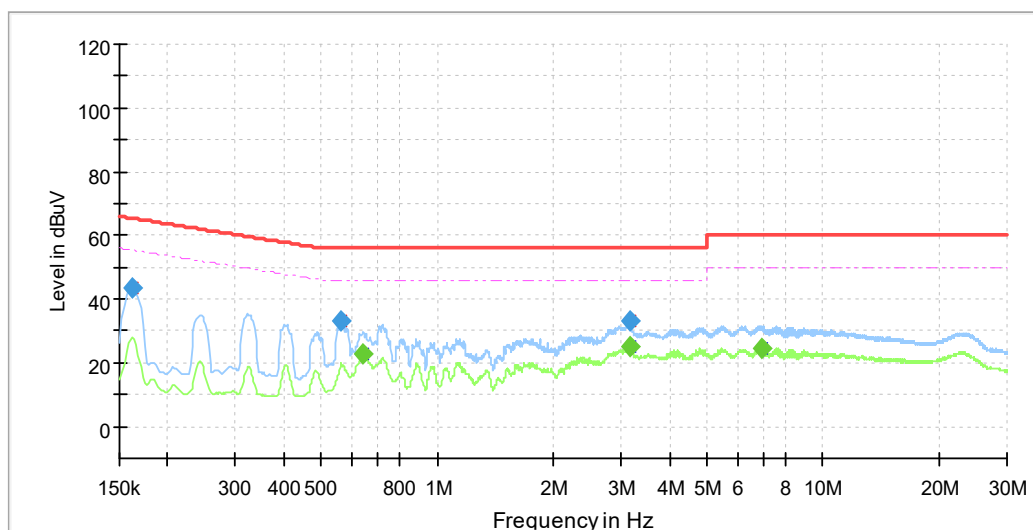
3.1.4 Test Results

CONDUCTED WORST-CASE DATA:





Test Mode	See section 2.3	Frequency Range	150KHz ~ 30MHz
Test Voltage	See section 2.3	PHASE	Line (N)
Environmental Conditions	24.8deg. C,56% RH	Tested By	Zhu Yulin



NO	Frequency (MHz)	QuasiPeak (dBuV)	Average (dBuV)	Limit (dBuV)	Margin (dB)	Line	Corr.Factor (dB)
1	0.161	43.3	---	65.4	22.1	N	10.0
2	0.562	33.0	---	56.0	23.0	N	9.9
3	0.643	---	22.8	46.0	23.2	N	9.9
4	3.145	33.0	---	56.0	23.0	N	10.3
5	3.149	---	25.0	46.0	21.0	N	10.3
6	6.923	---	24.5	50.0	25.5	N	10.8

Remark: The emission levels of other frequencies were very low against the limit.



3.2 Radiated emission

3.2.1 Limits Of Radiated

TEST STANDARD:

FCC Part 15, Subpart B (Section: 15.109), for above 1GHz(section 3.2.2 Table 4)

FCC Part 15, Subpart B

Frequency (MHz)	Distance (m)	Class A (dBuV)	Class B (dBuV)
30 - 88	3	QP: 49.5	QP: 40
88 - 216	3	QP: 54	QP: 43.5
216 - 960	3	QP: 56.9	QP: 46
960-1000	3	QP: 60	QP: 54
Above 1000	3	Avg: 60 Peak: 80	Avg: 54 Peak: 74

NOTE: 1. The lower limit shall apply at the transition frequencies.

NOTE: 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

NOTE: 3. All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



3.2.2 Test Procedures

The basic test procedure was in accordance with ANSI C63.4:2014 (section 12).

1. From 30 MHz to 1GHz test procedure as below:

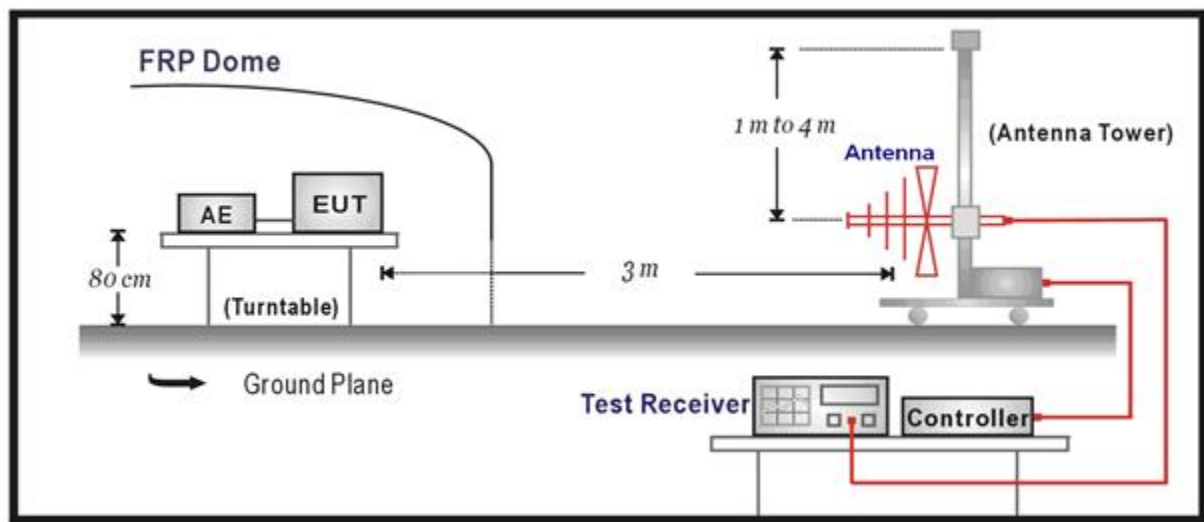
- 1) The radiated emissions were tested in a semi-anechoic chamber.
- 2) The Product was placed on the non-conductive turntable 0.1 m above the ground at a chamber.
- 3) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 120 kHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied between 1~4 m in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 4) For each frequency whose maximum record was higher or close to limit, measure its QP value: vary the antenna's height and rotate the turntable from 0 to 360 degrees to find the height and degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to QP Detector and specified bandwidth with Maximum Hold Mode, and record the maximum value.

2. Above 1GHz test procedure as below:

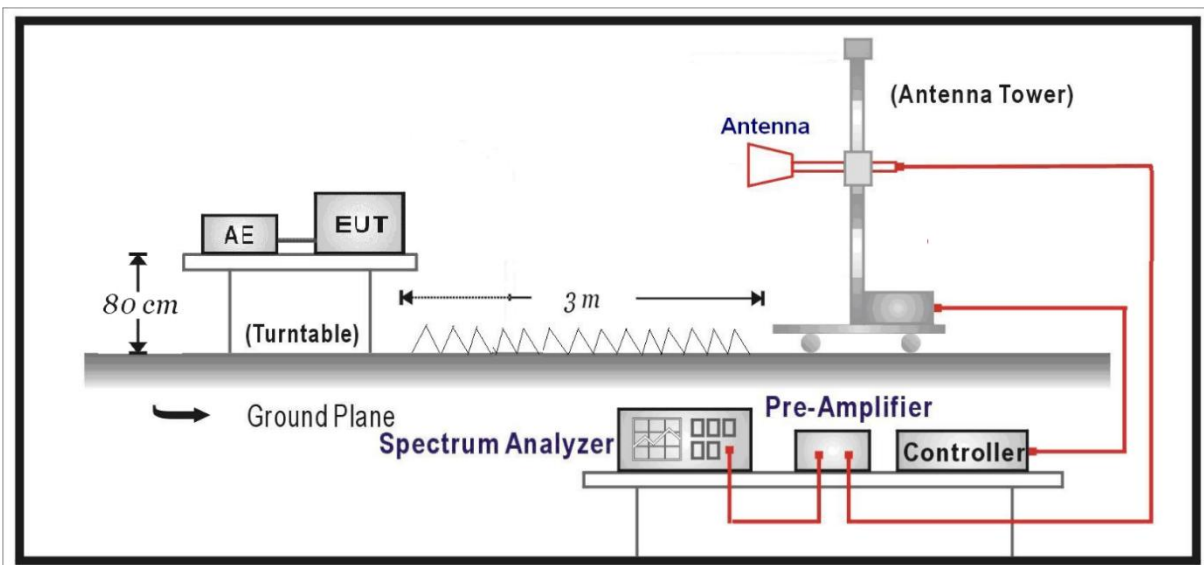
- 1) The radiated emissions were tested in a fully Anechoic Chamber.
- 2) Set the spectrum analyzer/receiver in Peak detector, Max Hold mode, and 1MHz RBW. Record the maximum field strength of all the pre-scan process in the full band when the antenna is varied in both horizontal and vertical, and the turntable is rotated from 0 to 360 degrees.
- 3) For each frequency whose maximum record was higher or close to limit, measure its AV value: rotate the turntable from 0 to 360 degrees to find the degree where Product radiated the maximum emission, then set the test frequency analyzer/receiver to AV value and specified bandwidth with Maximum Hold Mode, and record the maximum value.

3.2.3 Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:

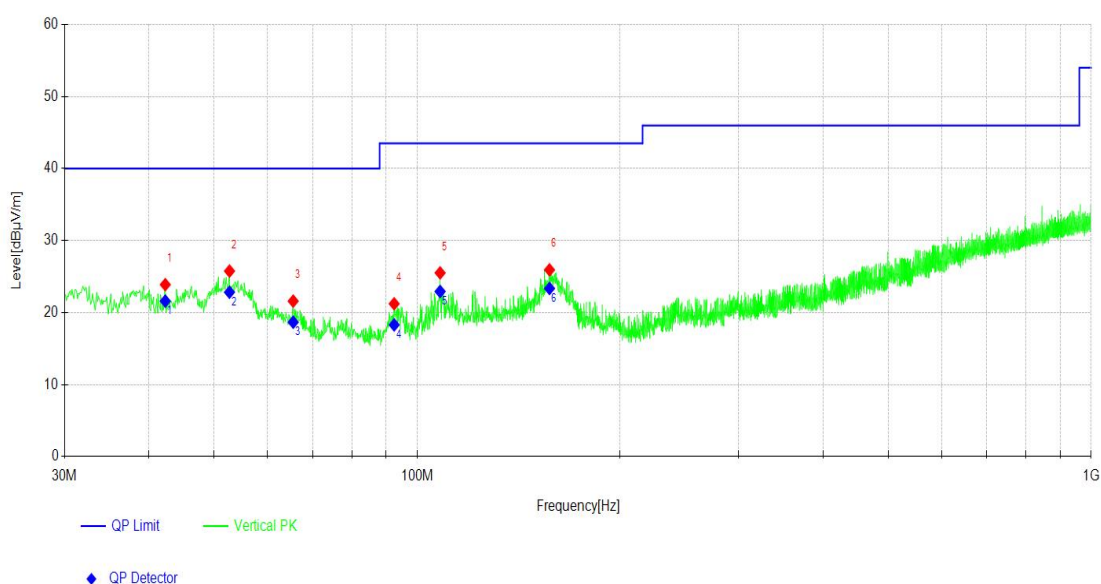




3.2.4 Test Results (Below 1GHz)

Test Mode	See section 2.3	Frequency Range	30-1000MHz
Test Voltage	See section 2.3	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25.7deg. C,52% RH	Tested By	Zhu Yulin

Horizontal



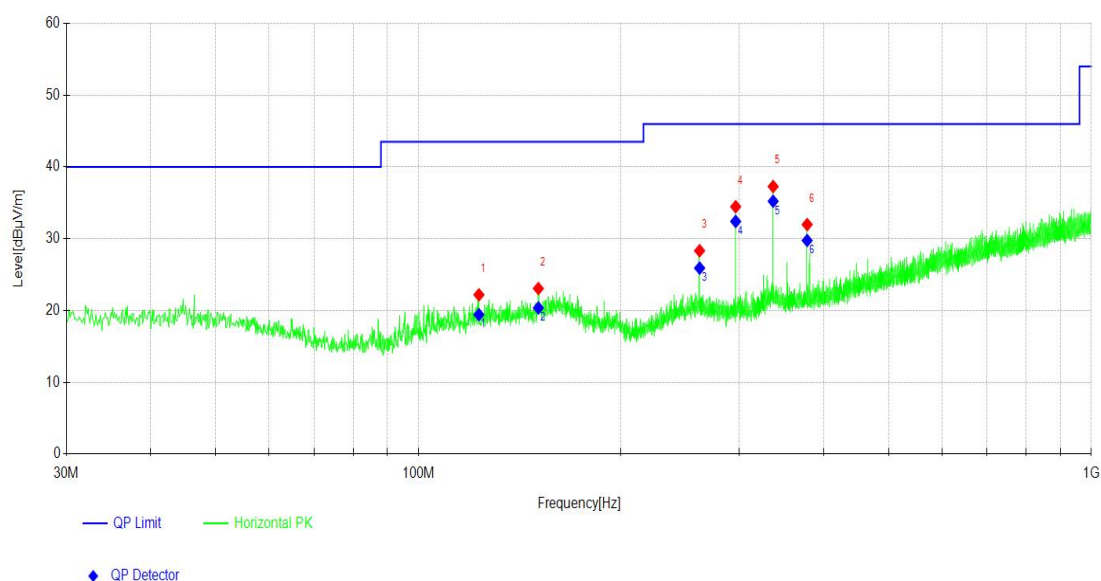
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]
1	42.320	1.73	19.86	21.59	40.00	18.41	200	212
2	52.700	3.53	19.30	22.83	40.00	17.17	100	209
3	65.506	1.08	17.58	18.66	40.00	21.34	100	163
4	92.474	2.16	16.13	18.29	43.50	25.21	100	216
5	108.190	5.39	17.54	22.93	43.50	20.57	300	230
6	157.180	2.64	20.71	23.35	43.50	20.15	100	116

Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]



Test Mode	See section 2.3	Frequency Range	30-1000MHz
Test Voltage	See section 2.3	Detector Function	Quasi-Peak(QP)
Environmental Conditions	25.7deg. C,52% RH	Tested By	Zhu Yulin

Vertical



NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]
1	123.032	0.43	18.99	19.42	43.50	24.08	100	201
2	150.777	-0.27	20.63	20.36	43.50	23.14	100	13
3	261.756	7.13	18.78	25.91	46.00	20.09	100	6
4	296.098	12.69	19.72	32.41	46.00	13.59	100	6
5	336.648	14.62	20.60	35.22	46.00	10.78	100	6
6	378.168	8.33	21.43	29.76	46.00	16.24	100	6

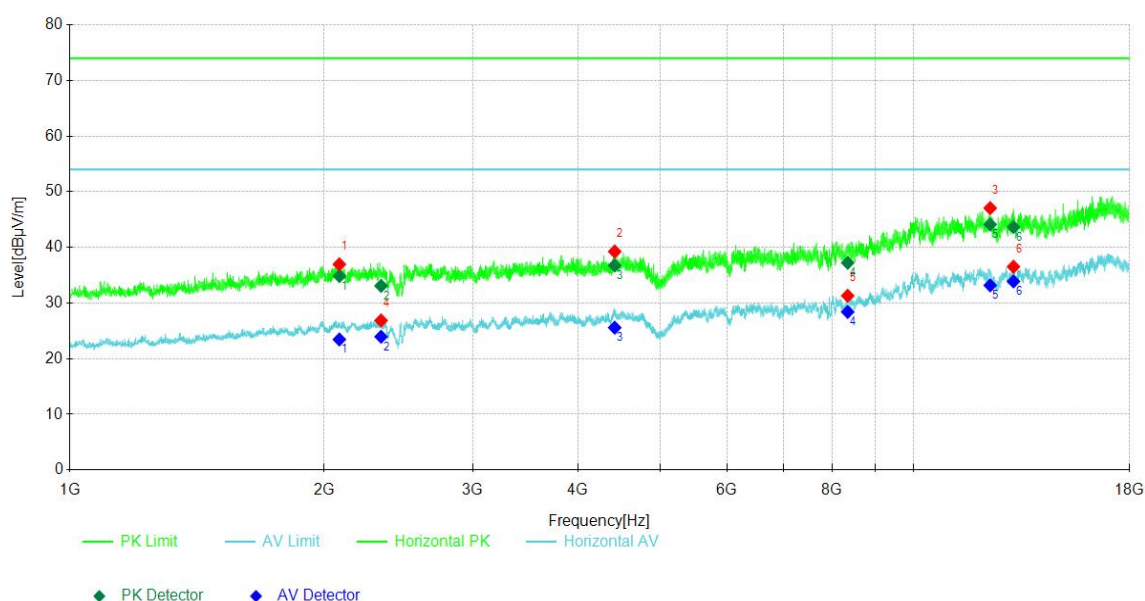
Remark: 1. The emission levels of other frequencies were greater than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBuV/m] - LH [dBuV/m]



3.2.5 Test Results (Above 1GHz)

Test Mode	See section 2.3	Frequency Range	Above 1GHz
Test Voltage	See section 2.3	Detector Function	PK/AV
Environmental Conditions	25.7deg. C,52% RH	Tested By	Zhu Yulin

Horizontal



NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB/m]	Level [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2086.109	52.32	-15.36	36.96	74.00	37.04	200	271	PK
2	4420.942	51.22	-11.96	39.26	74.00	34.74	100	240	PK
3	12313.531	46.21	0.85	47.06	74.00	26.94	200	339	PK
4	2337.534	42.64	-15.78	26.86	54.00	27.14	100	353	AV
5	8347.635	37.29	-5.98	31.31	54.00	22.69	200	242	AV
6	13121.012	34.83	1.70	36.53	54.00	17.47	100	162	AV

Remark: 1. Above 18GHz have been test and test data more than 20dB margin.

2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).

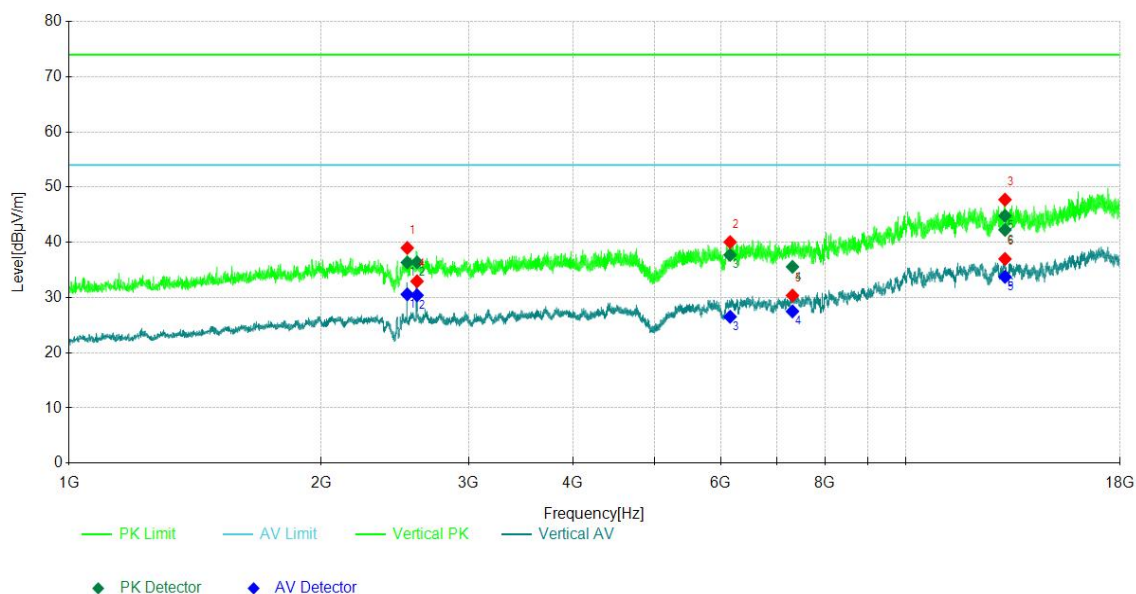
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).

4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]



Test Mode	See section 2.3	Frequency Range	Above 1GHz
Test Voltage	See section 2.3	Detector Function	PK/AV
Environmental Conditions	25.7deg. C,52% RH	Tested By	Zhu Yulin

Vertical



NO.	Freq. [MHz]	Reading [dBuV]	Factor [dB/m]	Level [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector
1	2535.554	54.53	-15.54	38.99	74.00	35.01	100	116	PK
2	6161.716	48.58	-8.53	40.05	74.00	33.95	200	53	PK
3	13123.212	46.03	1.70	47.73	74.00	26.27	100	219	PK
4	2604.560	48.36	-15.42	32.94	54.00	21.06	100	116	AV
5	7314.631	38.21	-7.84	30.37	54.00	23.63	100	248	AV
6	13124.312	35.30	1.70	37.00	54.00	17.00	100	236	AV

Remark: 1. Above 18GHz have been test and test data more than 20dB margin.
2. Level (dBuV/m) = Reading (dBuV/m) + Factor (dB).
3. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
4. Margin(dB) = Limit[dBuV/m] - Level [dBuV/m]



4. PHOTOGRAPHS OF TEST SETUP

Please refer to the attached file (Test Photos).



5. PHOTOGRAPHS OF THE EUT

Please refer to the attached file (External Photos and Internal Photos).

----- End of the Report -----



Important

- (1) The test report is invalid without the official stamp of CVC;
- (2) Any part photocopies of the test report are forbidden without the written permission from CVC;
- (3) The test report is invalid without the signatures of Approval and Reviewer;
- (4) The test report is invalid if altered;
- (5) Objections to the test report must be submitted to CVC within 15 days.
- (6) Generally, commission test is responsible for the tested samples only.
- (7) As for the test result “-” or “N” means “not applicable”, “/” means “not test”, “P” means “pass” and “F” means “fail”

The test data and test results given in this test report should only be used for purposes of scientific research, teaching and internal quality control when the CMA symbol is not presented.

Address: No. 1301, Guanguang Road, Xinlan Community, Guanlan Street,
Longhua District, Shenzhen, Guangdong, 518110, P. R. China

Post Code: 518110 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

<http://www.cvc.org.cn>