



BUREAU
VERITAS

Test Report No.: FC131122N006



Test Lab
Cert 2951.01

TEST REPORT



Applicant	CAD Audio, LLC
Address	6573 Cochran Rd., Bldg I Solon, OH 44139

Manufacturer or Supplier	CAD Audio, LLC
Address	6573 Cochran Rd., Bldg I Solon, OH 44139
Product	wireless microphone receiver
Brand Name	CAD
Model	RX1600
Additional Model & Model Difference	N/A
Date of tests	Nov. 22 ~ Dec. 11, 2013

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

FCC Part 15, Subpart B, Class B: 2012

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Venless Long Project Engineer / EMC Department	Approved by Glyn He Supervisor / EMC Department
	 Date: Dec. 11, 2013

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



TABLE OF CONTENTS

RELEASE CONTROL RECORD	3
1 SUMMARY OF TEST RESULTS	4
1.1 MEASUREMENT UNCERTAINTY	4
2 GENERAL INFORMATION.....	5
2.1 GENERAL DESCRIPTION OF EUT	5
2.2 DESCRIPTION OF TEST MODES	6
2.3 DESCRIPTION OF SUPPORT UNITS	6
3 EMISSION TEST.....	7
3.1 CONDUCTED EMISSION MEASUREMENT	7
3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	7
3.1.2 TEST INSTRUMENTS.....	7
3.1.3 TEST PROCEDURE.....	8
3.1.4 DEVIATION FROM TEST STANDARD	8
3.1.5 TEST SETUP.....	9
3.1.6 EUT OPERATING CONDITIONS	9
3.1.7 TEST RESULTS	10
3.2 RADIATED EMISSION MEASUREMENT	12
3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT	12
3.2.2 TEST INSTRUMENTS.....	13
3.2.3 TEST PROCEDURE.....	14
3.2.4 DEVIATION FROM TEST STANDARD	14
3.2.5 TEST SETUP.....	15
3.2.6 EUT OPERATING CONDITIONS	15
3.2.7 TEST RESULTS	16
4 PHOTOGRAPHS OF THE TEST CONFIGURATION	19
5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	19



BUREAU
VERITAS

Test Report No.: FC131122N006

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FC131122N006	Original release	Dec. 11, 2013

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

No. 34, Chenwulu Section, Guantai Rd., Houjie
Town, Dongguan City,
Guangdong 523942, China

Tel.: +86 769 8593 5656
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com



1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD			
Standard Section	Test Item	Result	Remark
FCC Part 15, Subpart B, Class B	Conducted Emission Test	PASS	Meets Class B Limit Minimum passing margin is -12.84dB at 0.38218 MHz
	Radiated Emission Test (30MHz ~ 1GHz)	PASS	Meets Class B Limit Minimum passing margin is -10.44 dB at 866.14 MHz
	Radiated Emission Test (1GHz ~ 5GHz)	PASS	Meets Class B Limit Minimum passing margin is -12.7 dB at 3575 MHz

1.1 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:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	+/-2.67 dB
Radiated emissions	30MHz ~ 1000MHz	+/-4.12 dB
	Above 1GHz	+/-4.30 dB



2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	wireless microphone receiver
MODEL NO.	RX1600
FCC ID	OQ5RX1600
POWER SUPPLY	DC15V From Adapter
DATA CABLE SUPPLIED	Refer to user's manual
OPERATING FREQUENCY	542.125 - 564.400MHz 638.125 - 660.400MHz

NOTE:

1. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	KTEC
MODEL:	KSAS0121500080D5
INPUT:	100-240V~ 50/60Hz 0.4A
OUTPUT:	15VDC, 0.8A
DC LINE:	Unshielded,Undetachable 1.80m,with one core

2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.



2.2 DESCRIPTION OF TEST MODES

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

◆ FOR Conducted Emission Test:

Test Mode
1kHz Signal Playing

◆ FOR Radiated Emission Test:

Test Mode
1kHz Signal Playing

2.3 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.

For All Test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	iPhone 4	APPLE	A1332	81124KCJA4S	N/A
2	Speaker	lenovo	C3630	N/A	N/A
3	wireless microphone	CAD	TX1600	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	Audio Line :Unshielded, Detachable 1.0 m
2	Audio Line :Unshielded, Detachable 1.7m

NOTE:

1. All power cords of the above support units are non-shielded (1.5 m).



3 EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTES:**
- (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 0.50 MHz.
 - (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 INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU 26	100005	May 14,13	May 13,14
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	May 14,13	May 13,14
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	May 14,13	May 13,14
Test software	ADT	ADT_Con _V7.3.7	N/A	N/A	N/A

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
 2. The test was performed in Shielded Room 553.



3.1.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2009 (section 7).

- a. 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.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE:

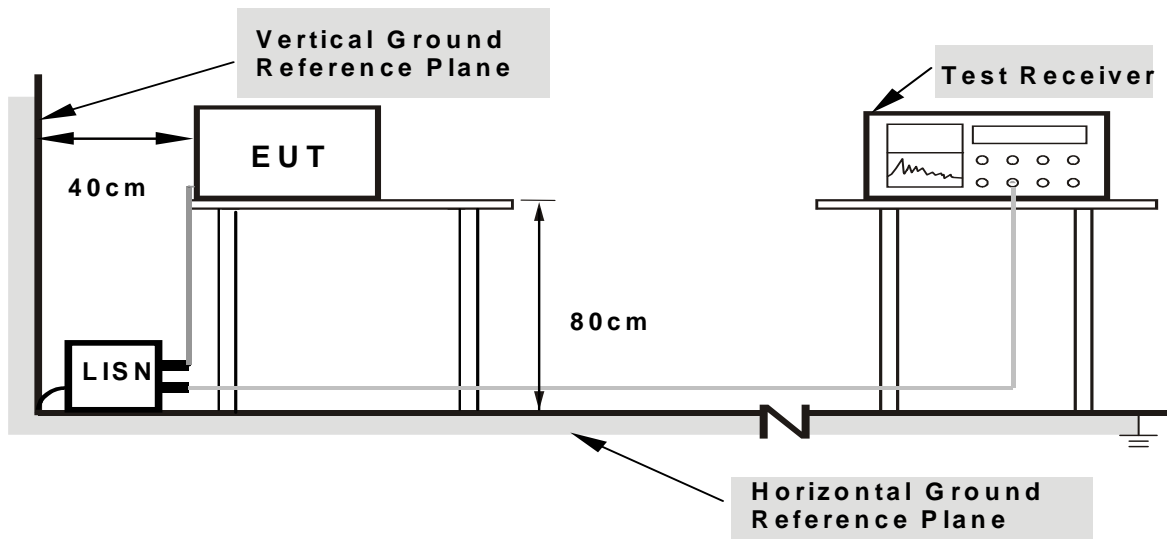
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation



3.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

3.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type described in manufacturer's specifications or the User's Manual.

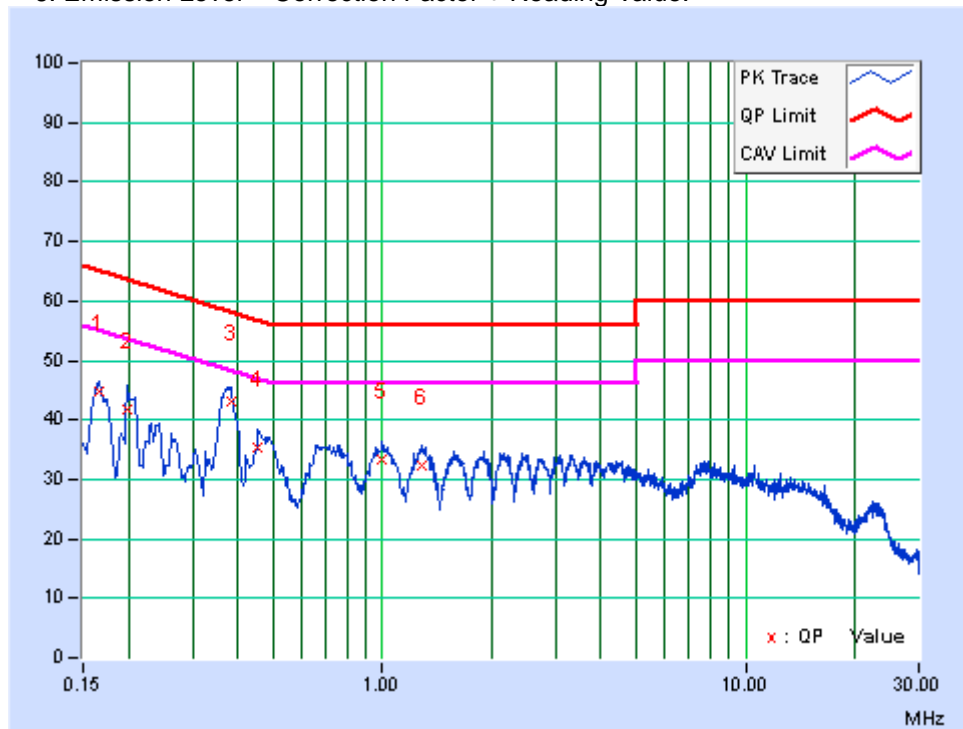


3.1.7 TEST RESULTS

TEST MODE	1kHz Signal Playing	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	AC 120V/60Hz	PHASE	Line (L)
ENVIRONMENTAL CONDITIONS	25deg. C, 57% RH	TESTED BY	Bin

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16579	10.61	34.1	21.56	44.71	32.17	65.17	55.17	-20.46	-23
2	0.198	10.54	31.2	21.48	41.74	32.02	63.69	53.69	-21.95	-21.67
3	0.38218	10.38	32.67	25.02	43.05	35.4	58.23	48.23	-15.19	-12.84
4	0.45476	10.34	25	18.63	35.34	28.97	56.79	46.79	-21.45	-17.82
5	1.002	10	23.17	17.85	33.17	27.85	56	46	-22.83	-18.15
6	1.29	9.97	22.31	17.28	32.28	27.25	56	46	-23.72	-18.75

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

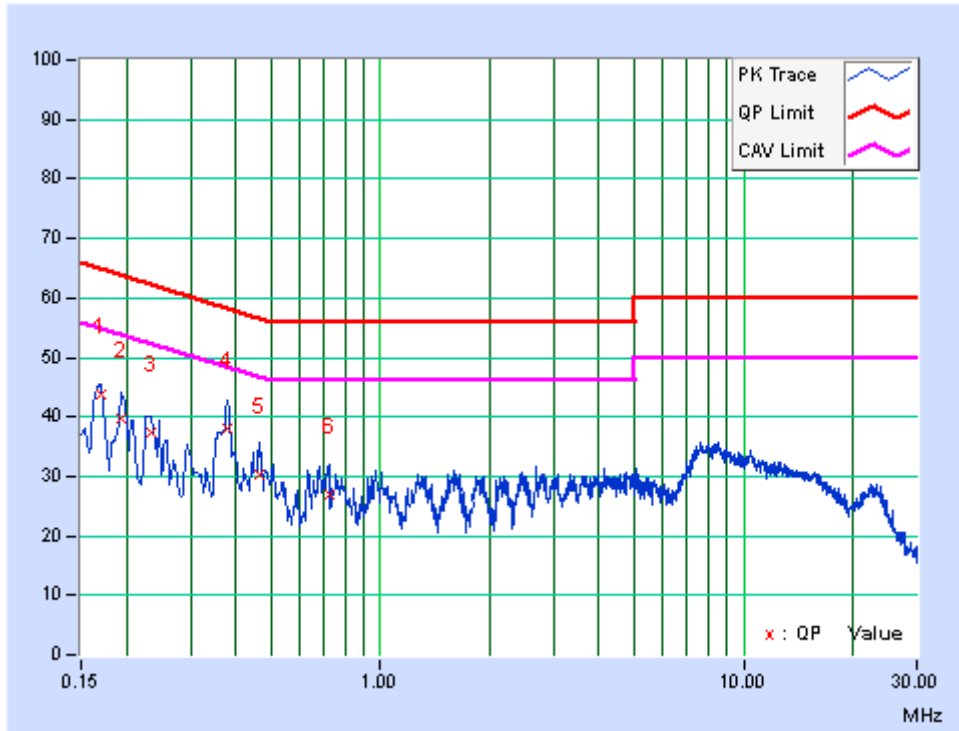




TEST MODE	1kHz Signal Playing	6DB BANDWIDTH	9 kHz
TEST VOLTAGE	AC 120V/60Hz	PHASE	Neutral (N)
ENVIRONMENTAL CONDITIONS	25deg. C, 57% RH	TESTED BY	Bin

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16932	10.5	33.3	21.6	43.8	32.1	64.99	54.99	-21.2	-22.9
2	0.194	10.44	29.38	16.8	39.82	27.24	63.86	53.86	-24.04	-26.62
3	0.234	10.38	26.91	17.15	37.29	27.53	62.31	52.31	-25.01	-24.77
4	0.378	10.47	27.43	19.08	37.9	29.55	58.32	48.32	-20.43	-18.78
5	0.466	10.52	19.63	11.31	30.15	21.83	56.58	46.58	-26.43	-24.75
6	0.72113	10.07	17	8.58	27.07	18.65	56	46	-28.93	-27.35

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart B (Section: 15.109)

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
30 – 88	90	39.1	100	40.0
88 – 216	150	43.5	150	43.5
216 – 960	210	46.4	200	46.0
960 – 1000	300	49.5	500	54.0

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

- Note: (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).
(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 INSTRUMENTS

FOR FREQUENCY BELOW 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESVS10	841431/004	May 19,13	May 18,14
Bilog Antenna	Teseq	CBL 6111D	27089	Jul. 27, 13	Jul. 26, 14
EMI Test Receiver	Rohde&Schwarz	ESPI	100302	May 19,13	May 18,14
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 24,13	Mar. 23,14
Signal Amplifier	Agilent	8447D	2944A10488	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.5.14	N/A	N/A	N/A

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in Chamber 966.
3. The FCC Site Registration No. is 494399

FOR FREQUENCY ABOVE 1GHz

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	EMCO	3117	00062558	Oct. 18, 12	Oct. 17, 14
Spectrum Analyzer	Agilent	E4446A	MY46180622	April 24,13	April 23,14
Pre-Amplifier (100MHz-26.5GHz)	Agilent	8449B	3008A00409	May 14,13	May 13,14
10m Semi-anechoic Chamber	CHANGLING	21.4m*12.1m*8.8m	NSEMC006	Mar. 24,13	Mar. 23,14
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A

- NOTE:** 1. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 10m Chamber.
3. The FCC Site Registration No. is 502831.



3.2.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2009 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters (below 1GHz) and 3 meters (above 1GHz) away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
3. For measurement of frequency above 1000 MHz, the EUT was set 3 meters away from the receiver antenna.
4. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
5. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
6. Margin value = Emission level – Limit value.

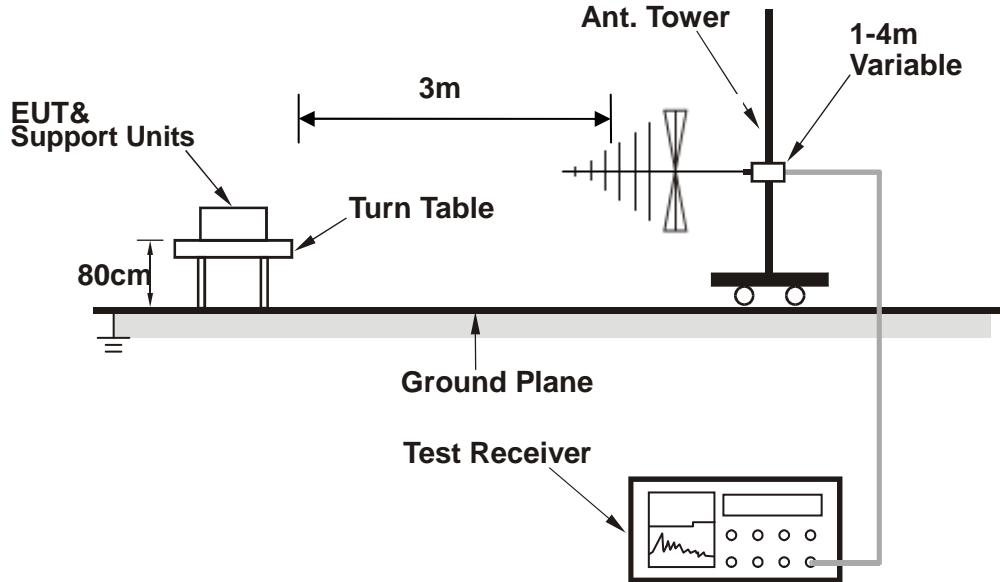
3.2.4 DEVIATION FROM TEST STANDARD

No deviation

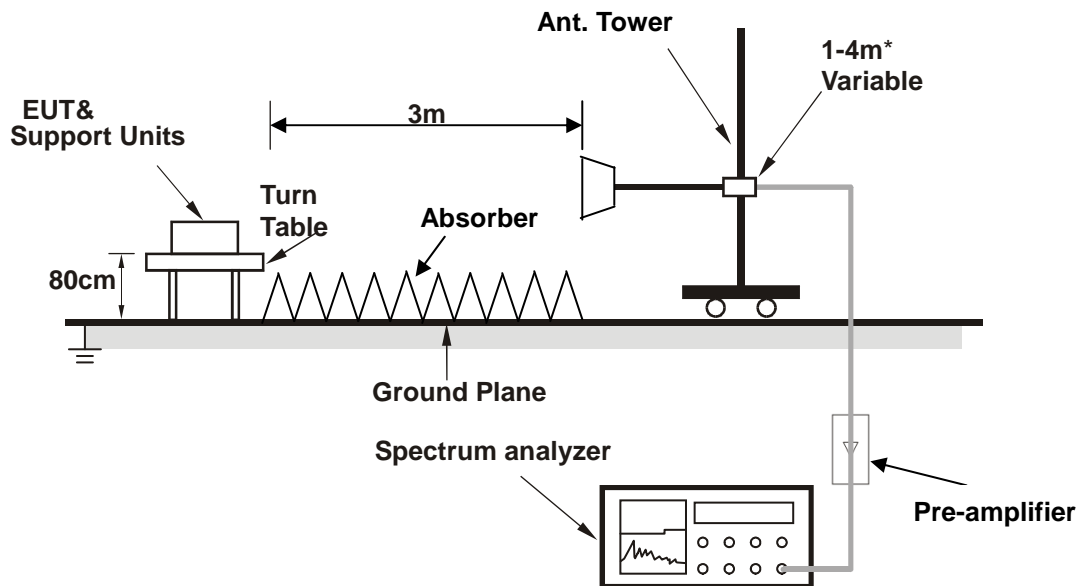


3.2.5 TEST SETUP

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



* : depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

3.2.6 EUT OPERATING CONDITIONS

Same as item 3.1.6.

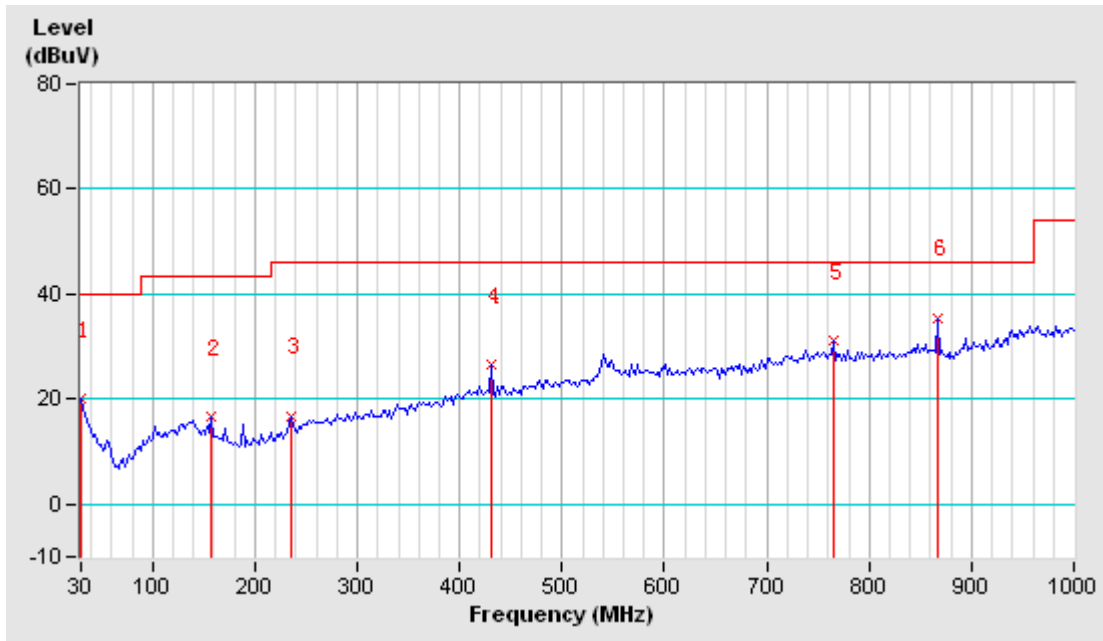


3.2.7 TEST RESULTS

TEST MODE	1kHz Signal Playing	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 53% RH	TESTED BY: Robert	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	30	19.58	0.5	20.08	40	-19.92	100	0
2	158.04	12.58	4.07	16.64	43.5	-26.86	106	36
3	235.64	12.87	4	16.88	46	-29.12	215	198
4	431.58	19.95	6.57	26.52	46	-19.48	100	0
5	765.26	27.8	3.43	31.23	46	-14.77	180	146
6	866.14	28.84	6.73	35.56	46	-10.44	149	99

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

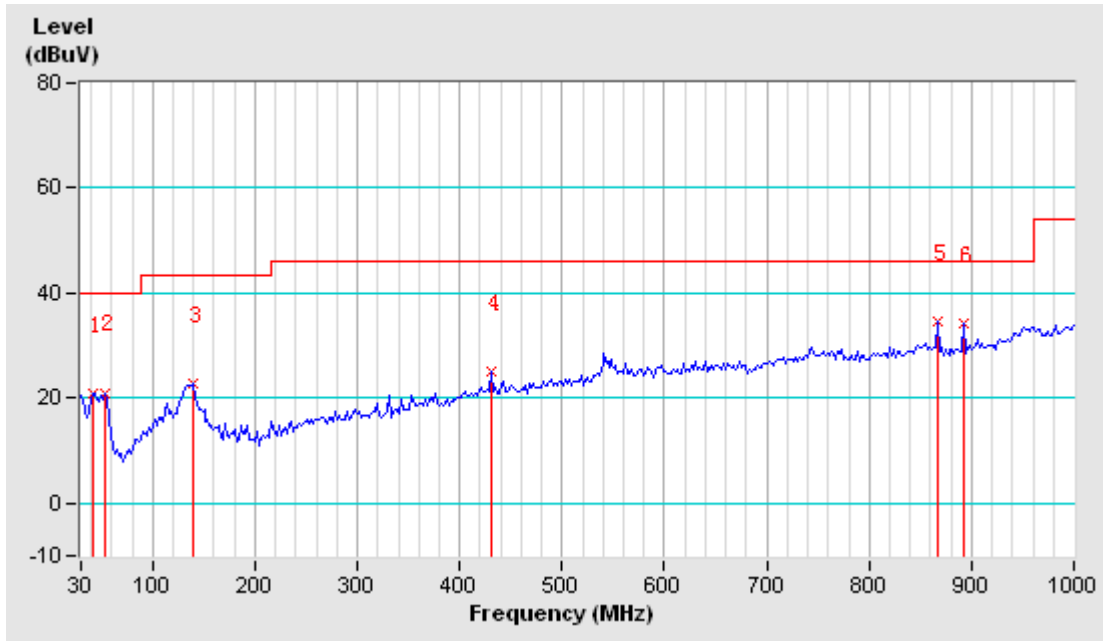




TEST MODE	1kHz Signal Playing	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 53% RH	TESTED BY: Robert	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	41.64	13.9	7.08	20.98	40	-19.02	100	220
2	53.28	8.3	12.74	21.04	40	-18.96	100	148
3	138.64	12.93	9.78	22.71	43.5	-20.79	100	93
4	431.58	19.95	5.15	25.1	46	-20.9	100	0
5	866.14	28.84	5.59	34.43	46	-11.57	100	303
6	893.3	28.55	5.8	34.35	46	-11.65	100	346

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





TEST MODE	1kHz Signal Playing	FREQUENCY RANGE	1-5GHz
TEST VOLTAGE	AC 120V/60Hz	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Peak/Average, 1MHz
ENVIRONMENTAL CONDITIONS	25deg. C, 61% RH	TESTED BY: Endy Xie	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2965 PK	49.5	74	-24.5	100	140	43.94	5.56
2	2965 AV	38.8	54	-15.2	100	140	33.24	5.56
3	3535 PK	52.1	74	-21.9	100	200	44.92	7.18
4	3535 AV	41.3	54	-12.7	100	200	34.12	7.18
5	4140 PK	48.2	74	-25.8	100	145	37.67	10.53
6	4140 AV	37.11	54	-16.89	100	145	26.58	10.53

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2020 PK	47.2	74	-26.8	100	250	43.94	3.26
2	2020 AV	36.2	54	-17.8	100	250	32.94	3.26
3	3565 PK	52.1	74	-21.9	110	214	44.83	7.27
4	3565 AV	41.2	54	-12.8	110	214	33.93	7.27
5	4345 PK	52.7	74	-21.3	100	200	43.42	9.28
6	4345 AV	40.8	54	-13.2	100	200	31.52	9.28

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



**BUREAU
VERITAS**

Test Report No.: FC131122N006

4 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to attached file (Test Setup Photo).

5 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

Some modifications were made to the EUT by the lab during the test. And more details to see the modification letter.

---END---