



EMC TEST REPORT

DRAFT ETSI EN 301 489-1/-5

For

Applicant : Fujian Baofeng Electronics Co., Ltd.

Address : Changfu Industrial Zone, Xiamei, Nan'an, Quanzhou, Fujian, China

Product Name : DUAL BAND/DUAL DISPLAY RADIO

Model Name : UV-5R, UV-5RA, UV-5RC, UV-5RE, UV-5R+plus, GT-3, UV-5RE plus, Proxel BF-UV9R + HP

Trade Name : ***BAOFENG***

Report No. : MTE/AVJ/E18050863

Date of Issue : May 22, 2018

Issued by: Shenzhen Most Technology Service Co., Ltd.

Address : No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China

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1. TEST REPORT CERTIFICATION

Product Name:	DUAL BAND/DUAL DISPLAY RADIO
Band Name:	BAOFENG
Model Name:	UV-5R
Series Model Name:	UV-5RA,UV-5RC, UV-5RE,UV-5R+plus, GT-3,UV-5RE plus, Proxel BF-UV9R + HP
Difference description:	Only the model name is different
Applicant:	Fujian Baofeng Electronics Co., Ltd.
Applicant Address:	Changfu Industrial Zone, Xiamei, Nan'an,Quanzhou,Fujian,China
Manufacturer:	Fujian Baofeng Electronics Co., Ltd.
Manufacturer Address:	Changfu Industrial Zone, Xiamei, Nan'an,Quanzhou,Fujian,China
Date of Test:	May10-21, 2018
Test Standards:	Draft ETSI EN 301 489-1 V2.2.0 (2017-03) Draft ETSI EN 301 489-5 V2.2.0 (2017-03)
Test Result:	PASS


We, MOST, hereby certify that the submitted samples of the above item, as detailed in chapter 2.1 of this report, has been tested in our facility. The test record, data evaluation and test configuration represented herein are true and accurate accounts of measurements of the sample's EMC characteristics under the conditions herein specified.

Tested by (+ signature):



 Ava jiang May10-21, 2018

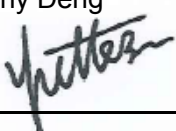
Review by (+ signature):



 Sunny Deng May 22, 2018



Approved by (+ signature):



 Yvette Zhou(Manager) May 22, 2018

2. GENERAL INFORMATON

2.1 DESCRIPTION OF EUT

Product Name:	DUAL BAND/DUAL DISPLAY RADIO
Trade Name:	<i>BAOFENG</i>
Model Number:	UV-5R
Power Supply:	1、DC 7.4V by Battery 2、DC 10V by Adapter
Frequency Range:	136-174MHz; 400-470MHz
Output Power:	4/1W
Test Frequencies:	1: 136.05 MHz 2: 155.00 MHz 3: 173.95 MHz 4: 400.05MHz 5: 417.00MHz 6: 435.00MHz 7: 452.05MHz 8: 469.95MHz
Hardware and software version number	5R-VER22 / Bfb297

NOTE:

1. For a more detailed features description about the EUT, please refer to User's Manual.

2.2 OBJECTIVE

Perform Electro Magnetic Interference (EMI) and Electro Magnetic Susceptibility (EMS) tests for CE Marking.

2.3 TEST STANDARDS AND RESULTS

The EUT has been tested according to Draft ETSI EN 301 489-1V2.2.0 (2017-03), together with Draft ETSI EN 301 489-5V2.2.0 (2017-03).

Draft ETSI EN 301 489-1 V2.2.0 (2017-03)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
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Draft ETSI EN 301 489-5 V2.2.0 (2017-03)	Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 5: Specific conditions for Private Shoulder Radio (PMR) and ancillary equipment (speech and non-speech)
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Test items and the results are as bellow:

No	Basic Standard	Test Type	Result
EMISSION (EN 301 489-1 §7.1)			
1	EN 55032	Radiated emission	PASS
2	EN 55032	Conducted emission, AC ports	PASS
3	EN 55032	Conducted emission, DC ports	N/A
4	EN 55032	Conducted emission, Telecom ports	N/A
5	EN 61000-3-2	Harmonic current emissions	N/A
6	EN 61000-3-3	Voltage fluctuations & flicker	PASS
IMMUNITY (EN 301 489-1 §7.2)			
7	EN 61000-4-2	Electrostatic discharge immunity	PASS
8	EN 61000-4-3	Radiated RF electromagnetic field immunity (80MHz to 6000MHz)	PASS
9	EN 61000-4-4	Electrical fast transient/burst immunity	PASS
10	EN 61000-4-5	Surge immunity, AC ports, Telecom ports	PASS
11	EN 61000-4-6	Radio frequency common mode	PASS
13	EN 61000-4-11	Voltage dips and short interruptions immunity	PASS

NOTE:

1. N/A- Not Applicable.
2. The latest versions of basic standards are applied

2.4 IDENTIFICATION OF THE RESPONSIBLE TESTING LOCATION

Test Site:	Shenzhen Most Technology Service Co., Ltd.
Address:	No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China
Description:	<p>There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4 and CISPR 16 requirements.</p> <p>The FCC Registration Number is 490827.</p> <p>The CNAS Registration Number is CNAS L3573.</p>

2.5 LIST OF EQUIPMENTS USED

No.	Equipment	Manufacturer	Model No.	S/N	Calculator date	Cal. Interval
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2018/03/10	1 Year
2	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2018/03/10	1 Year
3	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2018/03/10	1 Year
4	Terminator	Hubersuhner	50Ω	No.1	2018/03/10	1 Year
5	RF Cable	SchwarzBeck	N/A	No.1	2018/03/10	1 Year
6	Test Receiver	Rohde & Schwarz	ESPI	101202	2018/03/10	1 Year
7	Bilog Antenna	Sunol	JB3	A121206	2018/03/10	1 Year
8	Cable	Resenberger	N/A	NO.1	2018/03/10	1 Year
9	Cable	SchwarzBeck	N/A	NO.2	2018/03/10	1 Year
10	Cable	SchwarzBeck	N/A	NO.3	2018/03/10	1 Year
11	DC Power Filter	DuoJi	DL2×30B	N/A	2018/03/10	1 Year
12	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2018/03/10	1 Year
13	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2018/03/10	1 Year
14	Test Receiver	Rohde & Schwarz	ESCI	100492	2018/03/10	1 Year
15	Absorbing Clamp	Luthi	MDS21	3635	2018/03/10	1 Year
16	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2018/03/10	1 Year
17	AC Power Source	Kikusui	AC40MA	LM003232	2018/03/10	1 Year
18	Test Analyzer	Kikusui	KHA1000	LM003720	2018/03/10	1 Year
19	Line Impedance Network	Kikusui	LIN40MA-PCR-L	LM002352	2018/03/10	1 Year
20	ESD Tester	Kikusui	KES4021	LM003537	2018/03/10	1 Year
21	EMC PRO System	EM Test	UCS-500-M4	V0648102026	2018/03/10	1 Year
22	Signal Generator	IFR	2032	203002/100	2018/03/10	1 Year
23	Amplifier	A&R	150W1000	301584	2018/03/10	1 Year
24	CDN	FCC	FCC-801-M2-25	47	2018/03/10	1 Year
25	CDN	FCC	FCC-801-M3-25	107	2018/03/10	1 Year
26	EM Injection Clamp	FCC	F-203I-23mm	403	2018/03/10	1 Year
27	RF Cable	MIYAZAKI	N/A	No.1/No.2	2018/03/10	1 Year
28	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2018/03/10	1 Year
29	RF communication tester	HP	8920A	3813A10205	2018/03/10	1 Year
30	Audio Analyzer	Rohde & Schwarz	UPL	100855	2018/03/10	1 Year
31	50 ohm impedance	Maikairui	RELM T44004	58B83464R01	2018/03/10	1 Year

NOTE: Equipments listed above have been calibrated and are in the period of validation.

2.6 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35°C
- Humidity: 30-60 %
- Atmospheric pressure: 86-106 kPa

2.7 MEASUREMENT UNCERTAINTY

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in Measurement” (GUM) published by ISO.

- Uncertainty of Conducted Emission, $U_c = \pm 1.8\text{dB}$
- Uncertainty of Radiated Emission, $U_c = \pm 3.2\text{dB}$

3. EMISSION TEST

3.1 EUT SETUP AND OPERATING CONDITIONS

The EUT has been tested under normal operating condition.

The field strength of radiation emission was measured in the following position: EUT stand-up position (X,axis).

The following data show only with the worst case setup.

The worst case of X axis was reported.

Based on client request, all modes of the Transmitter were tested but only the worst test data of the worst mode is reported by this report.

Mode 1: TX operating Mode

During the measurement, the EUT was Transmitting mode continuously.

The EUT configuration of the emission test was **EUT+ Battery** .

Mode 2: Charging Mode

During the test, the EUT was Standby mode continuously.

The EUT configuration of the emission test was **EUT + Battery + charger**

3.2 MAINS TERMINAL DISTURBANCE VOLTAGE MEASUREMENT

3.2.1 LIMITS OF MAINS TERMINAL DISTURBANCE VOLTAGE

Frequency range (MHz)	Limits (dB μ V), Class B ITE	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

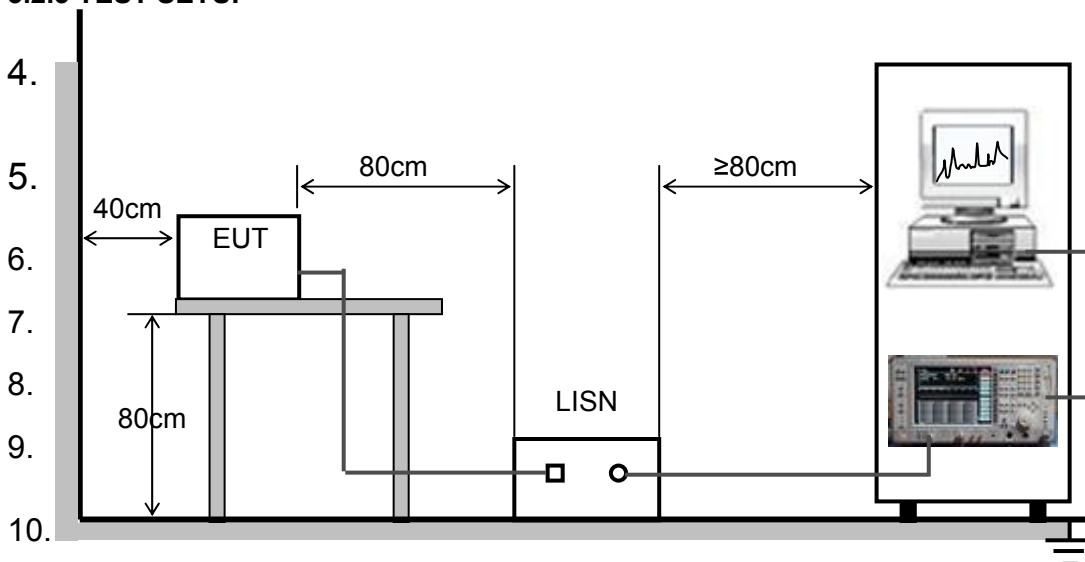
NOTE:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.2.2 TEST PROCEDURE

1. The EUT was placed 0.4 meters from the conducting wall of shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). The LISN provide 50 Ω /50 μ H of coupling impedance for the measuring instrument.
2. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
3. The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 20dB under the prescribed limits are not reported.

3.2.3 TEST SETUP



11. For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.

12. 3.2.4 TEST RESULT

13. N/A

3.3 DC POWER INPUT/OUTPUT PORTS CONDUCTED EMISSIONS

3.3.1 LIMITS OF DC POWER INPUT/OUTPUT PORTS CONDUCTED EMISSIONS

Frequency range (MHz)	Limits (dB μ V), Class B ITE	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

NOTE:

14. The lower limit shall apply at the transition frequencies.
15. The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.3.2 TEST PROCEDURE

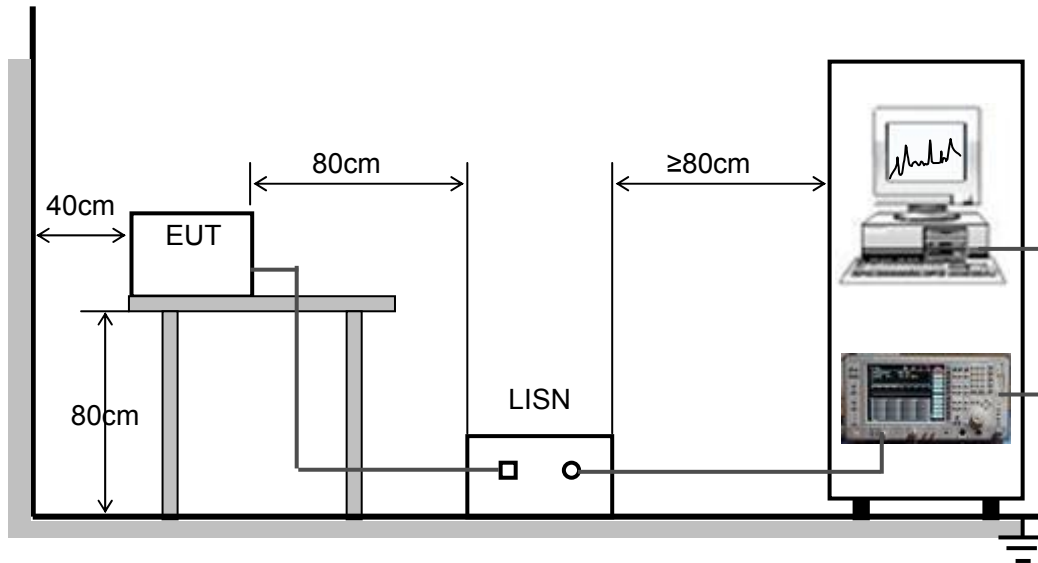
The test method shall be in accordance with EN 55022[1], For radio and ancillary equipment for fixed use, the artificial mains networks as specified in EN 55022[1] shall be used and be connected to a DC power source.

For mobile radio and ancillary equipment intended to be connected to the vehicle's onboard DC mains, an artificial network as specified in CISPR25[10] shall be used and be connected to a DC power source.

The measurement frequency range extends from 150kHz to 30MHz, when the EUT is a transmitter operating at frequencies below 30MHz, then the exclusion band for transmitters applies(see clause4.3) for measurements in the transmitter mode of operation.

For emission measurements on DC output ports the relevant port shall be connected via an AMN/AN to a load drawing the rated current of the source.

3.3.3 TEST SETUP

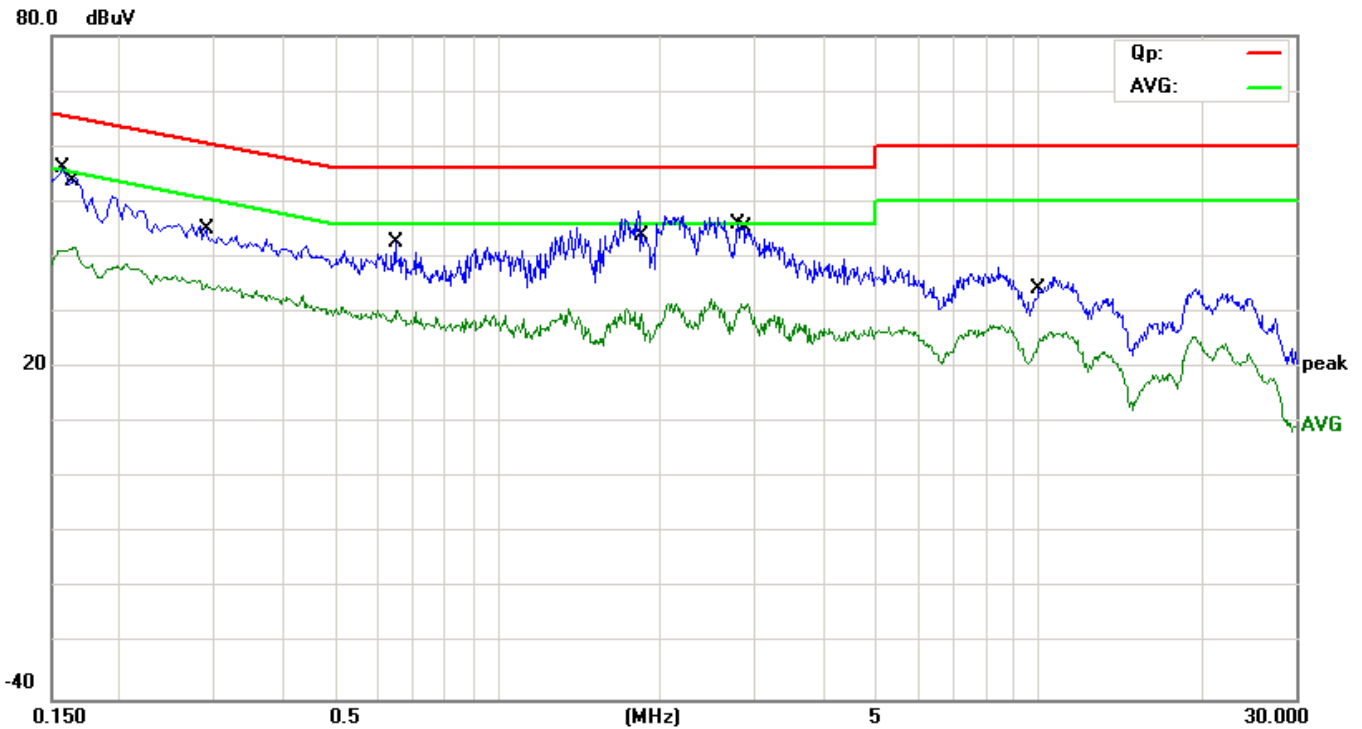


For the actual test configuration, please refer to the related item - Photographs of the Test Configuration.

3.3.4 TEST RESULT

The test modes were carried out for all operation modes of 3.1, and its worse test data was showed as the follow:.

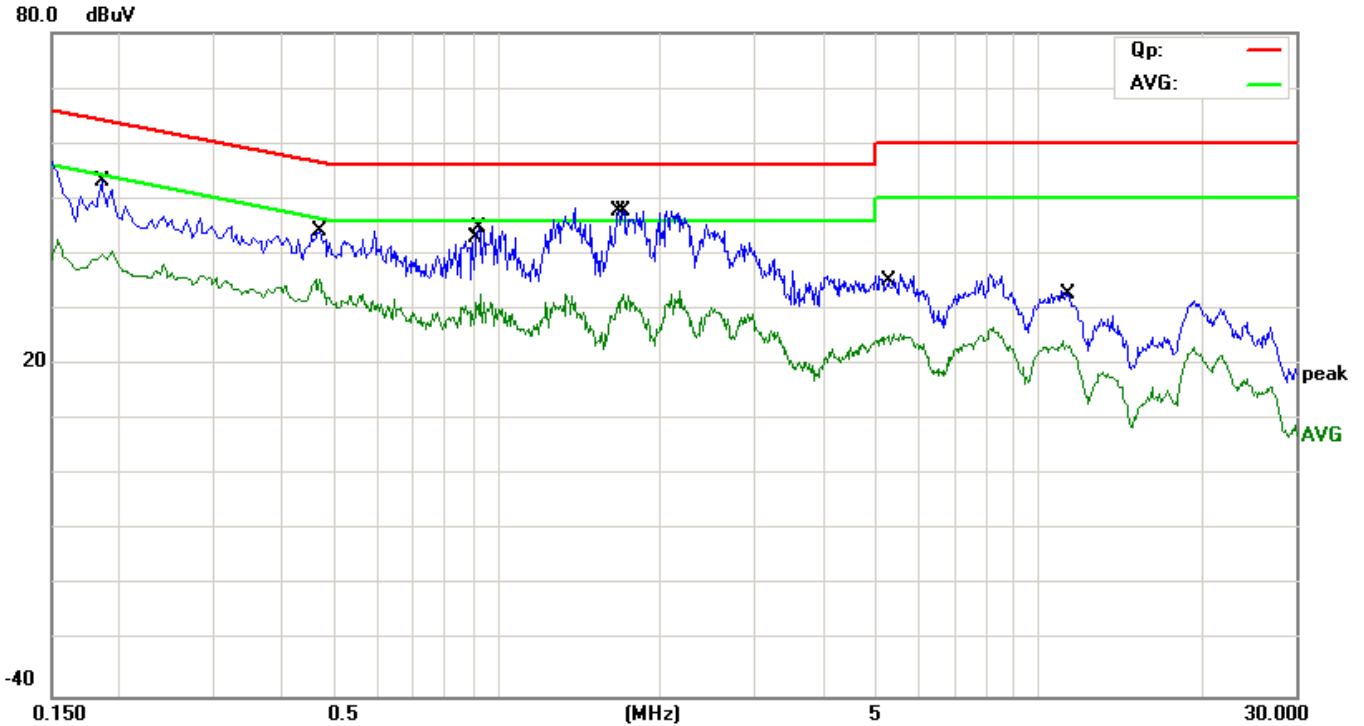
EUT:	DUAL BAND/DUAL DISPLAY RADIO	M/N:	UV-5R
Mode:	TX operating+Charging	Phase:	N
Test by:	Temo	Power:	DC 10V by Adapter
Temperature: / Humidity	23.4°C / 52.7%	Test date:	2018-05-21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1582	45.81	9.60	55.41	65.56	-10.15	QP	
2		0.1620	31.76	9.61	41.37	55.36	-13.99	AVG	
3		0.2908	34.70	9.59	44.29	60.50	-16.21	QP	
4		0.2908	25.30	9.59	34.89	50.50	-15.61	AVG	
5		0.6500	33.02	9.60	42.62	56.00	-13.38	QP	
6		0.6540	20.65	9.60	30.25	46.00	-15.75	AVG	
7		1.8540	34.16	9.60	43.76	56.00	-12.24	QP	
8		1.8540	20.06	9.60	29.66	46.00	-16.34	AVG	
9		2.7900	36.20	9.61	45.81	56.00	-10.19	QP	
10		2.8340	21.79	9.61	31.40	46.00	-14.60	AVG	
11		9.9060	22.70	9.69	32.39	60.00	-27.61	QP	
12		9.9060	13.17	9.69	22.86	50.00	-27.14	AVG	

*:Maximum data x:Over limit !:over margin

EUT:	DUAL BAND/DUAL DISPLAY RADIO	M/N:	UV-5R
Mode:	TX operating+Charging	Phase:	L
Test by:	Temo	Power:	DC 10V by Adapter
Temperature: / Humidity	23.4°C / 52.7%	Test date:	2018-05-21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1844	29.94	9.61	39.55	54.29	-14.74	AVG	
2		0.1860	43.41	9.60	53.01	64.21	-11.20	QP	
3		0.4700	34.46	9.59	44.05	56.51	-12.46	QP	
4		0.4700	25.76	9.59	35.35	46.51	-11.16	AVG	
5		0.9020	32.42	9.60	42.02	56.00	-13.98	QP	
6		0.9180	21.77	9.60	31.37	46.00	-14.63	AVG	
7	*	1.6740	38.05	9.60	47.65	56.00	-8.35	QP	
8		1.6980	21.97	9.60	31.57	46.00	-14.43	AVG	
9		5.3020	25.52	9.63	35.15	60.00	-24.85	QP	
10		5.3020	15.56	9.63	25.19	50.00	-24.81	AVG	
11		11.4180	23.01	9.69	32.70	60.00	-27.30	QP	
12		11.4420	13.67	9.69	23.36	50.00	-26.64	AVG	

*:Maximum data x:Over limit !:over margin

3.4 RADIATED DISTURBANCE MEASUREMENT

3.4.1 LIMITS OF RADIATED DISTURBANCE

Frequency range (MHz)	Quasi peak limits(dB μ V/m), for Class B ITE, at 3m measurement distance
30 - 230	40
230 - 1000	47

Notes:

1. The lower limit shall apply at the transition frequency.
2. Additional provisions may be required for cases where interference occurs.

3.4.2 LIMITS OF RADIATED DISTURBANCE (ABOVE 1000MHZ)

Frequency range (MHz)	limits(dBuV/m), for Class B ITE, at 3m measurement distance	
	Peak	AV
1000-3000	70	50
3000-6000	74	54

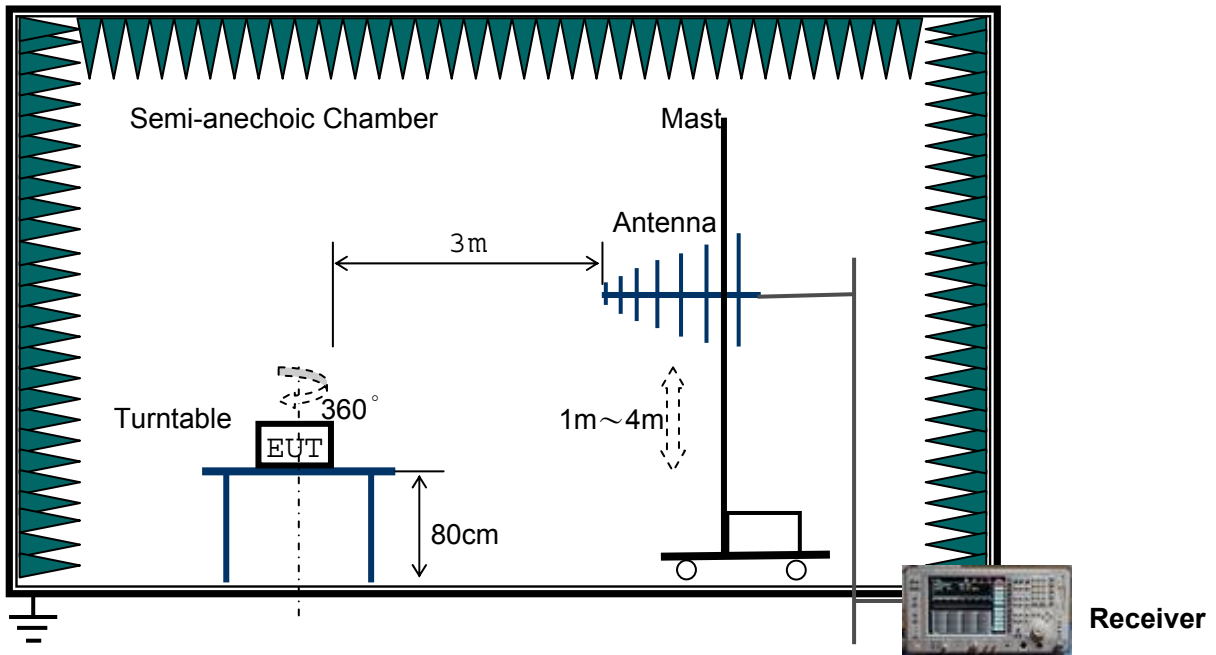
Notes:

- 1 The lower limit shall apply at the transition frequency.

3.4.3 TEST PROCEDURE

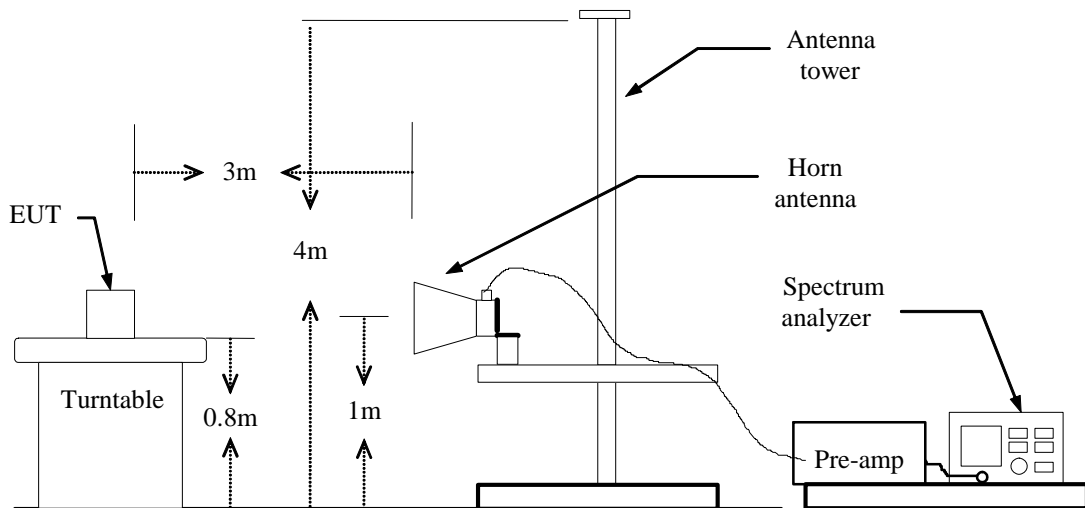
1. The EUT was placed on the top of an insulating table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna is a broadband antenna, and its height is varied from 1 to 4 meter 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.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to the heights from 1 to 4 meters and the ratable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detector Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 20dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emission that did not have 10dB margin would be retested one by one using the quasi-peak method.

3.4.4 TEST SETUP



For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

Above 1GHz:

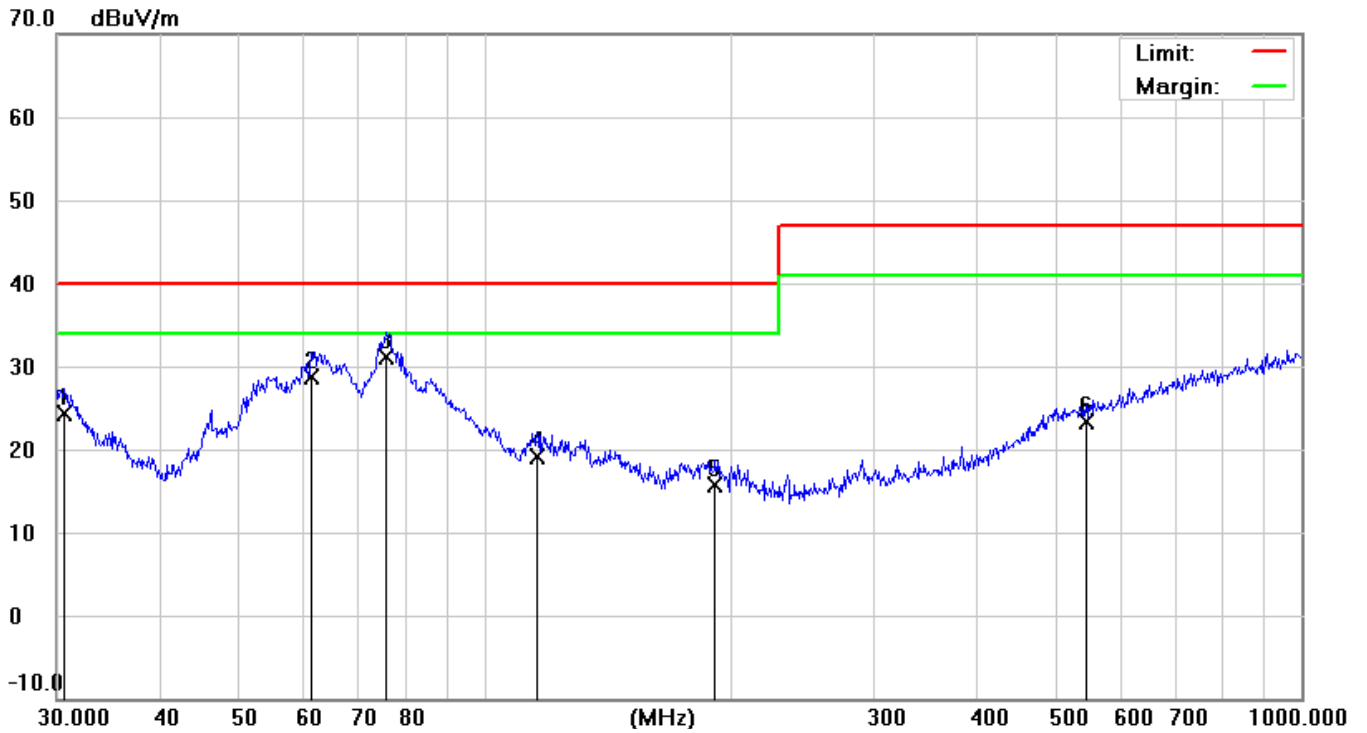


For the actual test configuration, please refer to the related item-Photographs of the Test Configuration.

3.4.5 TEST RESULT

The digital and analog transmitting (Low, Middle & High) and standby mode were carried out, and digital transmitting at low channel (worse case) test data was showed as the follow:.

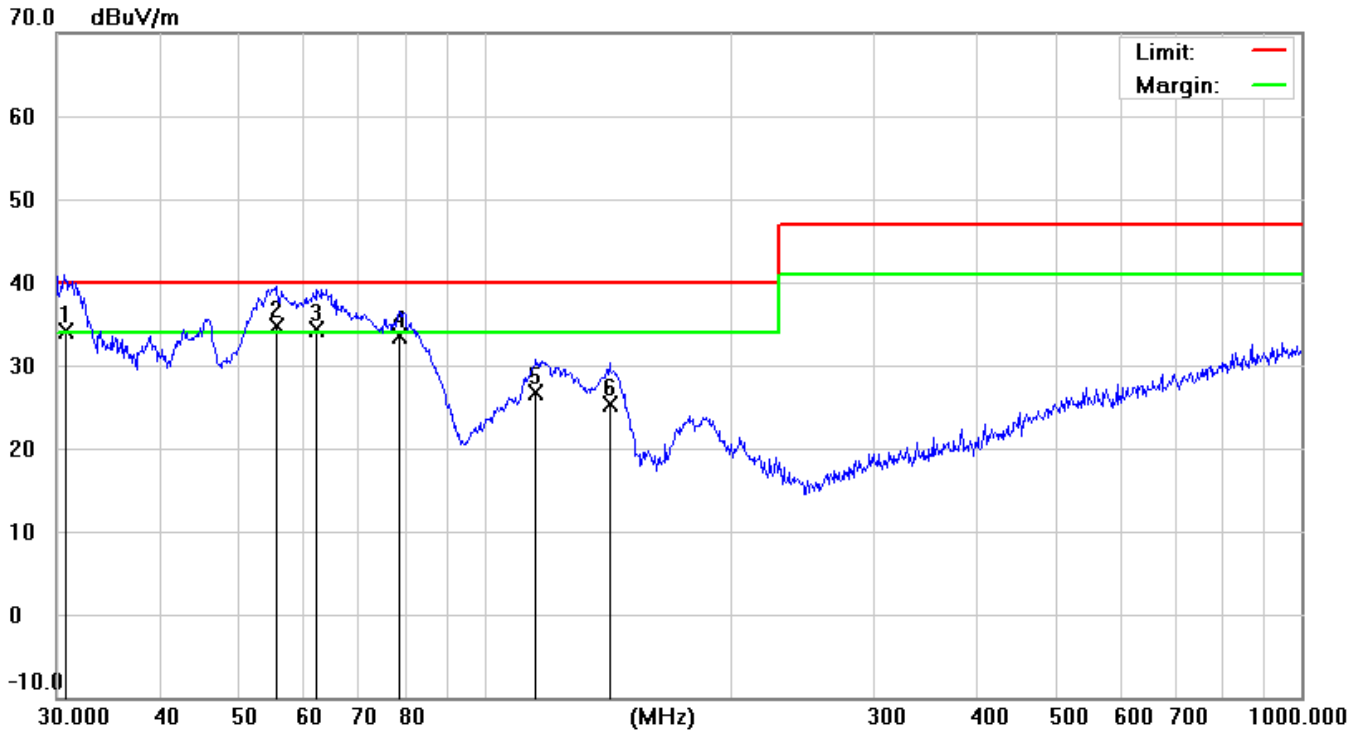
EUT:	DUAL BAND/DUAL DISPLAY RADIO	M/N:	UV-5R
Mode:	TX operating+ charging	Polarization:	Horizontal
Test by:	Temo	Power:	DC 10V by Adapter
Temperature: / Humidity	24°C / 50.5%	Test date:	2018-05-21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		30.6378	3.83	20.47	24.30	40.00	-15.70	QP		
2		61.3462	21.11	7.69	28.80	40.00	-11.20	QP		
3	*	75.9772	22.96	8.18	31.14	40.00	-8.86	QP		
4		116.1321	6.05	12.99	19.04	40.00	-20.96	QP		
5		191.7450	3.74	11.95	15.69	40.00	-24.31	QP		
6		545.1825	2.18	21.20	23.38	47.00	-23.62	QP		

*:Maximum data x:Over limit !:over margin

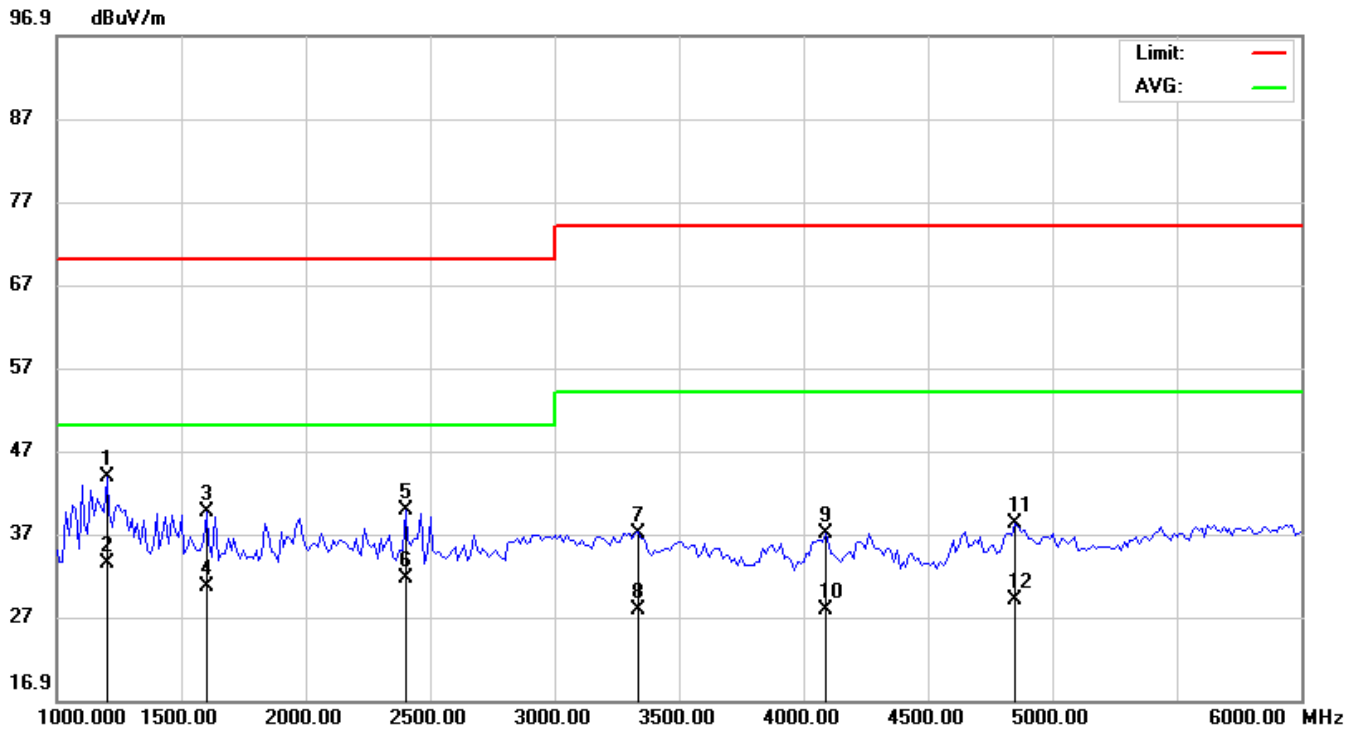
EUT:	DUAL BAND/DUAL DISPLAY RADIO	M/N:	UV-5R
Mode:	TX operating+ charging	Polarization:	Vertical
Test by:	Temo	Power:	DC 10V by Adapter
Temperature: / Humidity	24°C / 50.5%	Test date:	2018-05-21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	!	30.6379	13.60	20.47	34.07	40.00	-5.93	QP			
2	*	55.6094	26.80	7.82	34.62	40.00	-5.38	QP			
3	!	62.4313	26.60	7.77	34.37	40.00	-5.63	QP			
4		78.6885	25.44	8.13	33.57	40.00	-6.43	QP			
5		115.7256	13.74	12.90	26.64	40.00	-13.36	QP			
6		142.3243	12.06	13.24	25.30	40.00	-14.70	QP			

*:Maximum data x:Over limit !:over margin

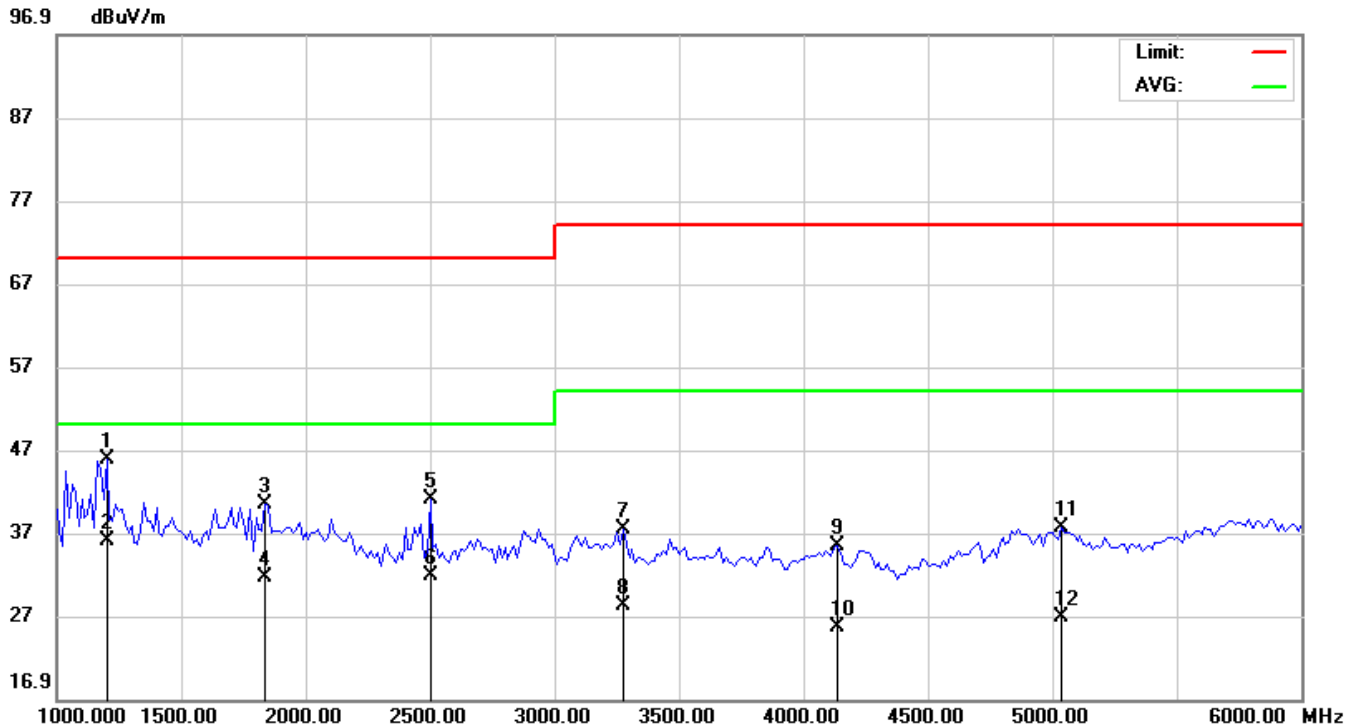
EUT:	DUAL BAND/DUAL DISPLAY RADIO	M/N:	UV-5R
Mode:	TX operating+ charging	Polarization:	Horizontal
Test by:	Temo	Power:	DC 10V by Adapter
Temperature: / Humidity	24°C / 50.5%	Test date:	2018-05-21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		1200.000	52.44	-8.70	43.74	70.00	-26.26			peak
2	*	1200.000	42.06	-8.70	33.36	50.00	-16.64			AVG
3		1600.000	47.63	-8.08	39.55	70.00	-30.45			peak
4		1600.000	38.62	-8.08	30.54	50.00	-19.46			AVG
5		2400.000	48.30	-8.43	39.87	70.00	-30.13			peak
6		2400.000	40.01	-8.43	31.58	50.00	-18.42			AVG
7		3337.500	44.96	-7.86	37.10	74.00	-36.90			peak
8		3337.500	35.61	-7.86	27.75	54.00	-26.25			AVG
9		4087.500	44.56	-7.58	36.98	74.00	-37.02			peak
10		4087.500	35.43	-7.58	27.85	54.00	-26.15			AVG
11		4850.000	43.75	-5.60	38.15	74.00	-35.85			peak
12		4850.000	34.62	-5.60	29.02	54.00	-24.98			AVG

*:Maximum data x:Over limit !:over margin

EUT:	DUAL BAND/DUAL DISPLAY RADIO	M/N:	UV-5R
Mode:	TX operating+ charging	Polarization:	Vertical
Test by:	Temo	Power:	DC 10V by Adapter
Temperature: / Humidity	24°C / 50.5%	Test date:	2018-05-21



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		1200.000	54.49	-8.70	45.79	70.00	-24.21			peak
2	*	1200.000	44.68	-8.70	35.98	50.00	-14.02			AVG
3		1837.500	47.62	-7.31	40.31	70.00	-29.69			peak
4		1837.500	38.94	-7.31	31.63	50.00	-18.37			AVG
5		2500.000	49.32	-8.26	41.06	70.00	-28.94			peak
6		2500.000	40.01	-8.26	31.75	50.00	-18.25			AVG
7		3275.000	45.09	-7.72	37.37	74.00	-36.63			peak
8		3275.000	35.86	-7.72	28.14	54.00	-25.86			AVG
9		4137.500	42.40	-7.07	35.33	74.00	-38.67			peak
10		4137.500	32.61	-7.07	25.54	54.00	-28.46			AVG
11		5037.500	41.45	-3.92	37.53	74.00	-36.47			peak
12		5037.500	30.68	-3.92	26.76	54.00	-27.24			AVG

*:Maximum data x:Over limit !:over margin

Notes:

1. *Measuring frequencies from 1 GHz to 6GHz.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.*
3. *The frequency that above 1GHz, the emission measurements of basic frequency and harmonic frequency is not suitable, and is mainly from the environment noise.*

3.5 HARMONIC CURRENT MEASUREMENT

3.5.1 LIMITS OF HARMONIC CURRENT

Limits for Class A Equipment	
Harmonics Order n	Max. permissible harmonic current (A)
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \times 15/n$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \times 8/n$

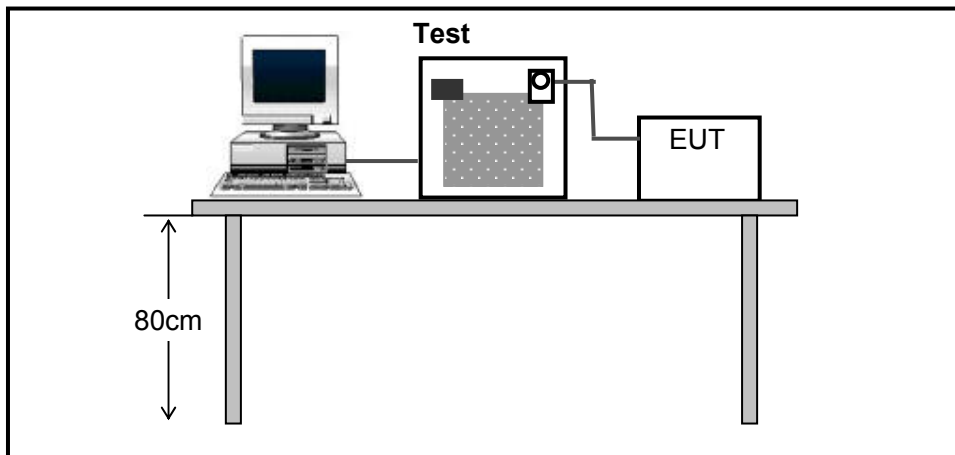
NOTE:

1. According to section 5 of EN61000-3-2: 2006+A1: 2009+A2: 2009, the EUT is Class A equipment.
2. The above limits are for all applications having an active input power >75W. No limits apply for equipment with an active input power up to and including 75W.

3.5.2 TEST PROCEDURE

1. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
2. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the necessary for the EUT to be exercised.

3.5.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

3.5.4 TEST RESULT:

No limit apply for equipment with an active input power less than or equal to 75W.

3.6 VOLTAGE FLUCTUATIONS AND FLICK MEASUREMENT

3.6.1 LIMITS OF VOLTAGE FLUCTUATIONS AND FLICK

Test Item	Limit	Note
P_{st}	1.0	P_{st} means Short-term flicker indicator
P_{lt}	0.65	P_{lt} means long-term flicker indicator
T_{dt}	0.2	T_{dt} means maximum time that d_t exceeds 3%
$d_{max}(\%)$	4%	d_{max} means maximum relative voltage change.
$d_c(\%)$	3%	d_c means relative steady-state voltage change.

3.6.2 TEST PROCEDURE

1. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal conditions
2. During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

3.6.3 TEST SETUP

Same as 3.4.3

3.6.4 TEST RESULT:

N/A

4. IMMUNITY TEST

4.1 EUT SETUP AND OPERATING CONDITIONS

Mode 1: TX operating Mode

During the measurement, the EUT was Transmitting mode continuously.

The EUT configuration of the emission test was **EUT+ Battery+ charger** .

Mode 2: Charging Mode

During the test, the EUT was Standby mode continuously.

The EUT configuration of the emission test was **EUT + Battery + charger**

4.2 PERFORMANCE CRITERIA

The equipment shall meet the minimum performance criteria as specified in clauses 6.1, 6.2, 6.3 and 6.4.

The establishment of the communication link at the start of the test, its maintenance and the assessment of the recovered signal are used as the performance criteria for the evaluation of the essential functions of the equipment during and after the test.

If an equipment is of a specialized nature and the performance criteria specified in the table are not appropriate the manufacturer shall declare a substituted specification for an acceptable performance level or performance degradation as required by the present document. The performance specification shall be included in the test report and the product description and documentation.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in the following clauses.

4.2.1 GENERAL PERFORMANCE CRITERIA TO CT

For speech equipment, the distortion of the audio signal shall be measured during each individual exposure in the test sequence and shall not exceed 25 % measured in a post detection bandwidth determined by a first order band pass filter with a 3 Db bandwidth of 300 Hz to 3 kHz, without the use of psophometric weighting filter.

For equipment which can be measured using continuous bit streams, a bit error shall not exceed 1×10^{-2} .

For other non-speech equipment four messages out of five or 90 % of the transmitted symbols shall be received correctly.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transmitter only and can be operated in standby mode, tests shall be repeated with the EUT in this mode to ensure that unintentional transmission does not occur.

4.2.2 GENERAL PERFORMANCE CRITERIA TO CR

For speech equipment, the distortion of the audio signal shall be measured during each individual exposure in the test sequence and shall not exceed 25 % measured in a post detection bandwidth determined by a first order band pass filter with a 3 Db bandwidth of 300 Hz to 3 kHz, without the use of psophometric weighting filter.

For equipment which can be measured using continuous bit streams, the bit error rate shall not exceed 10^{-2} .

For other non-speech equipment four messages out of five or 90 % of the transmitted symbols shall be received correctly.

At the conclusion of the test the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained during the test.

Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.2.3 PERFORMANCE CRITERIA FOR ANCILLARY EQUIPMENT TESTED ON A STAND ALONE BASIS

The provision of EN 301 489-1 [1], clause 6.4 shall apply.

4.3 ELECTROSTATIC DISCHARGE IMMUNITY TEST

4.3.1 TEST SPECIFICATION

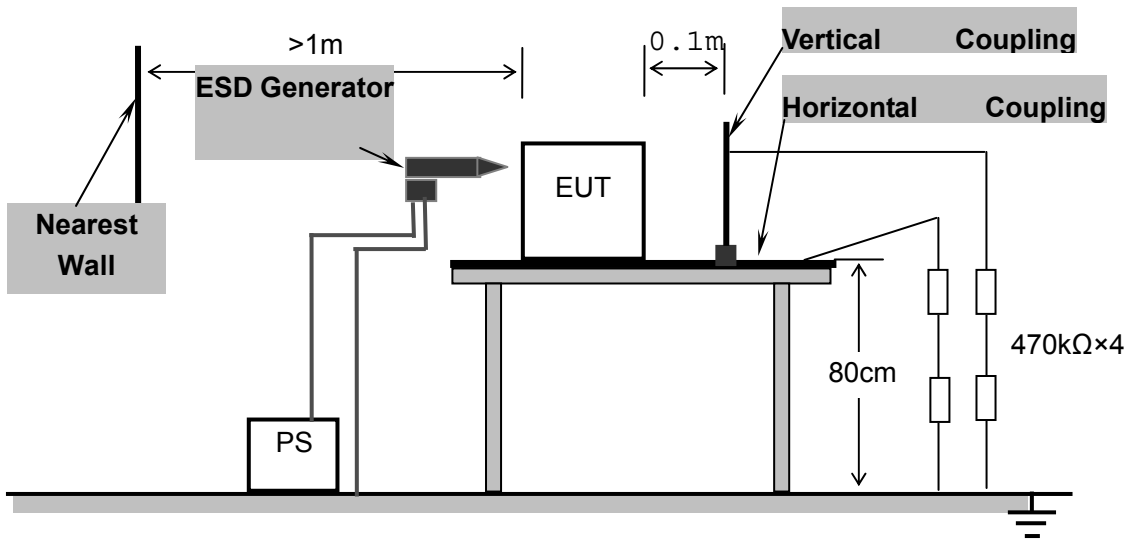
Basic Standard:	EN 61000-4-2
Discharge Impedance	330Ω / 150 Pf
Discharge Voltage:	Air Discharge +/-8Kv Contact Discharge +/-4Kv
Polarity:	Positive / Negative
Number of Discharge:	Minimum 20 times at each test point
Discharge Mode:	Single discharge
Discharge Period:	1-second minimum

4.3.2 TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-2:2008

1. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
2. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
3. The time interval between two successive single discharges was at least 1 second.
4. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
5. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
6. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were completed.
7. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
8. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that the four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m×0.5m) was placed vertically to and 0.1 meters from the EUT.

4.3.3 TEST SETUP



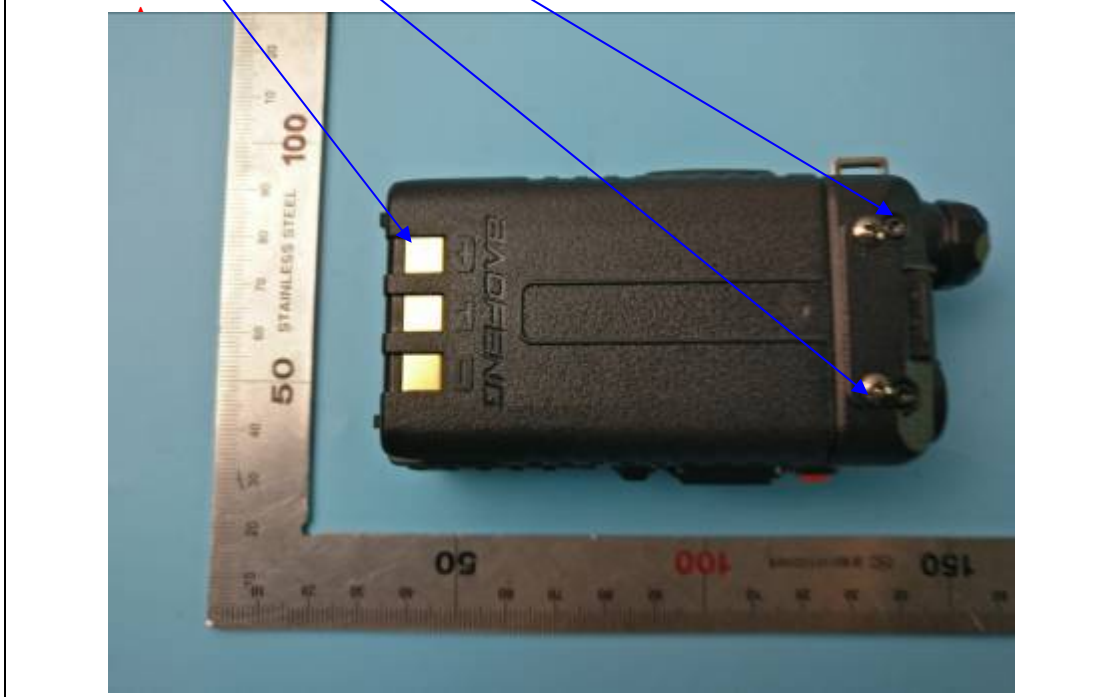
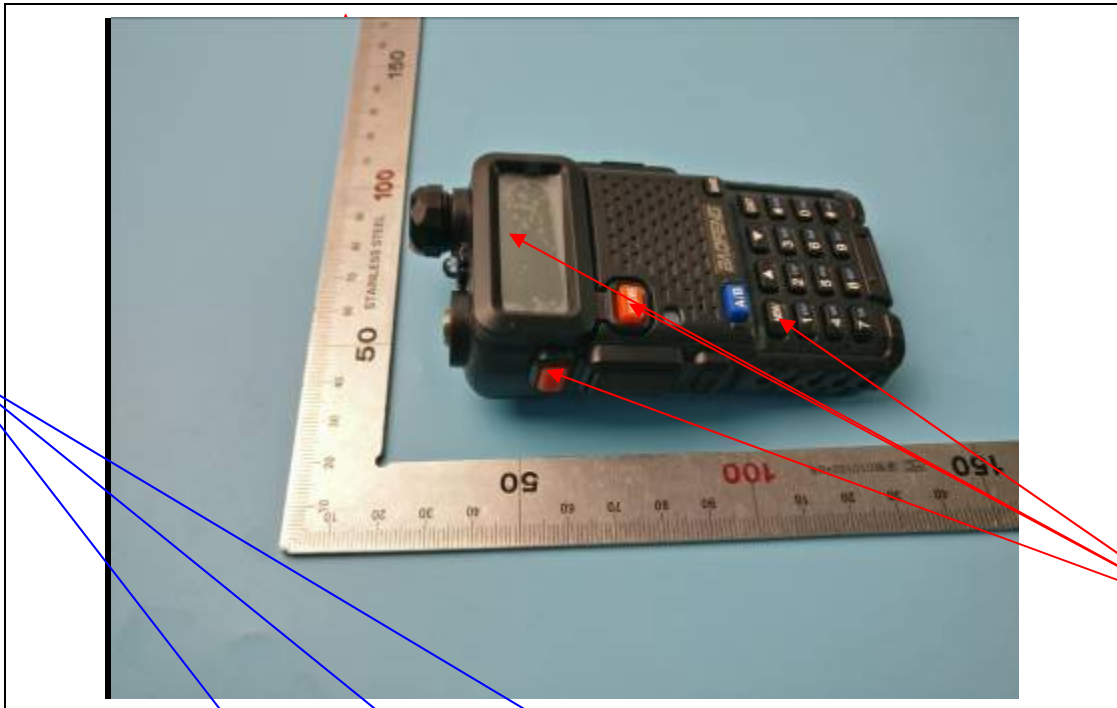
For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

4.3.4 TEST RESULT

Test Points	Discharge Level (Kv)	Discharge Mode	Observation	Conclusion
HCP	±4	Contact	Note	PASS
VCP	±4	Contact	Note	PASS
Screw	±4	Contact	Note	PASS
port	±2, ±4, ±8	Air	Note	PASS
screen	±2, ±4, ±8	Air	Note	PASS
Metal case	±4	Contact	Note	PASS
keys	±2, ±4, ±8	Air	Note	PASS
gap	±2, ±4, ±8	Air	Note	PASS
Rotary Switch	±2, ±4, ±8	Air	Note	PASS
Side port for the EUT	±2, ±4, ±8	Air	Note	PASS

NOTE: All test mode of section 4.1 were tested and the EUT performance complied with the performance criteria for TT and TR.

4.3.5 TEST POINT:



C – Contact Discharge

A – Air Discharge

4.4 RADIATED, RADIO FREQUENCY ELECTROMAGNETIC FIELD IMMUNITY TEST

4.4.1 TEST SPECIFICATION

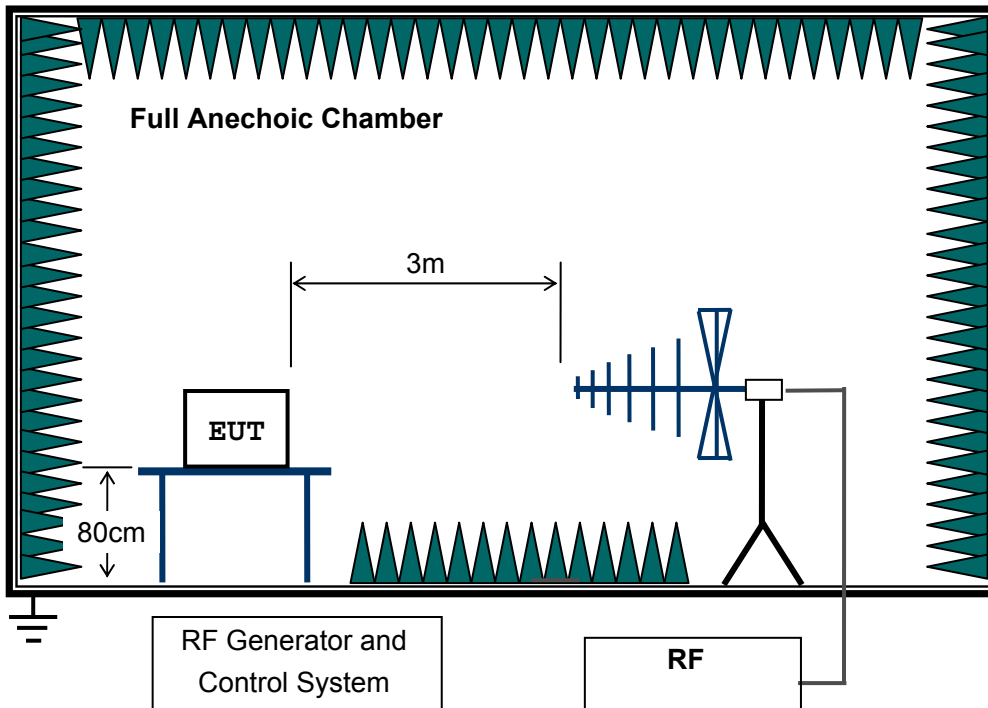
Basic Standard:	EN 61000-4-3
Frequency Range:	80 MHz – 6000MHz
Field Strength:	3V/m
Modulation:	400Hz sine wave, 80%, AM modulation
Wanted signal	1KHz
Frequency Step:	1% of fundamental
Polarity of Antenna	Horizontal and Vertical
Test Distance:	3m
Antenna Height:	1.5m
Dwell Time:	3 seconds

4.4.2 TEST PROCEDURE

The test procedure was in accordance with EN 61000-4-3.

1. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
2. The test signal was 80% amplitude modulated with a 400Hz sine wave.
3. The frequency range was swept from 80 MHz to 6000MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
4. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
5. The field strength level was 3V/m.
6. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.4.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

4.4.4 TEST RESULT

EUT Operating Mode	Antenna Polarity	Frequency (MHz)	Field Strength (V/m)	Observation	Conclusion
TX operating Mode	Vertical	80-6000	3	Note	Pass
	Horizontal	80-6000	3	Note	Pass
Charging Mode	Vertical	80-6000	3	Note	Pass
	Horizontal	80-6000	3	Note	Pass

NOTE: 1. The worst case of distortion of the audio signal is 18%.

2. All test mode of section 4.1 were tested and the EUT performance complied with the performance criteria for CT and CR.

4.5 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

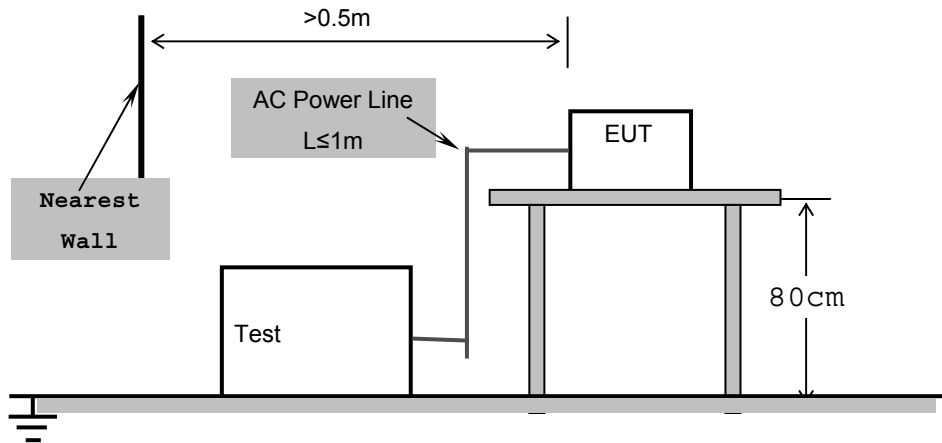
4.5.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-4
Test Voltage:	a.c. power port +/-1 kV
Polarity:	Positive/Negative
Impulse Frequency:	5kHz
Impulse wave shape:	5/50ns
Burst Duration:	15ms
Burst Period:	300ms
Test Duration:	Not less than 1 min.

4.5.2 TEST PROCEDURE

1. The EUT was tested with 1000 volt discharges to the AC power input leads.
2. Both positive and negative polarity discharges were applied.
3. The length of the “hot wire” from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
4. The duration time of each test sequential was 1 minute.
5. The transient/burst waveform was in accordance with EN 61000-4-4, 5/50ns.

4.5.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

4.5.4 TEST RESULT

Test Point	Polarity	Test Level (kV)	Observation	Conclusion
d.c. port, L	+/-	1	Note (1)	Pass
d.c. port, N	+/-	1	Note (1)	Pass
d.c. port, L-N	+/-	1	Note (1)	Pass

NOTE: (1) All test mode of section 4.1 were tested and the EUT performance complied with the performance criteria for TT and TR. And the test result criterion is A

4.6 SURGE IMMUNITY TEST

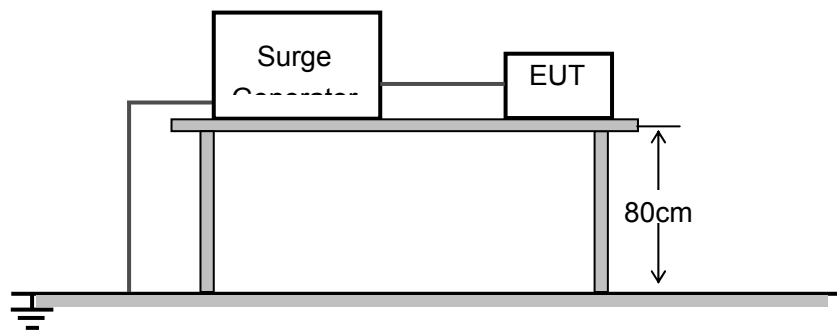
4.6.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-5
Waveform:	Voltage 1.2/50 μ s; Current 8/20 μ s
Test Voltage:	a.c. power port, line to ground 2 kV, line to line 1kV
Polarity:	Positive/Negative
Phase Angle:	0°, 90°, 180°, 270°
Repetition Rate:	60sec
Times:	5 time/each condition.

4.6.2 TEST PROCEDURE

1. The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT was less than 2 meters (provided by the manufacturer).
2. The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).
3. The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

4.6.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

4.6.4 TEST RESULT

Coupling Line	Polarity	Voltage (kV)	Observation	Conclusion
a.c. power, L-N	+/-	1	Note (1)	Pass

4.7 TRANSIENTS AND SURGES IN THE VEHICULAR ENVIRONMENT

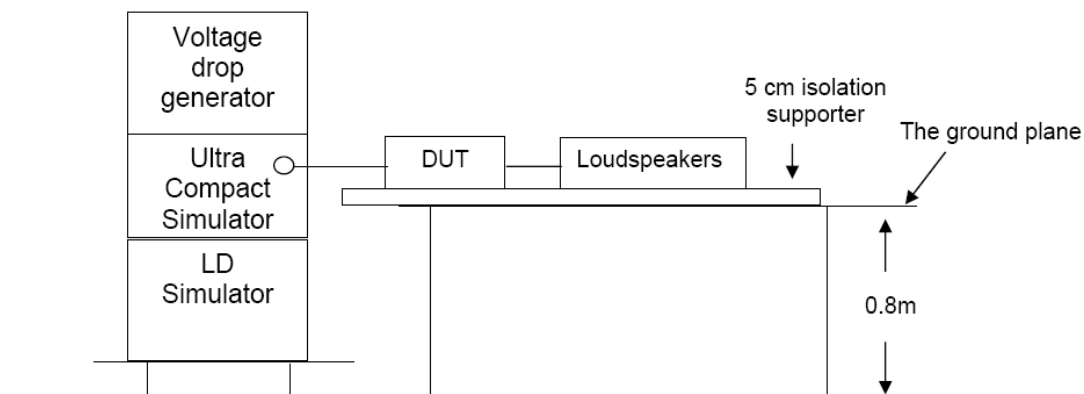
4.7.1 TEST SPECIFICATION

Basic Standard:	ISO 7637-2
Test pulse number	Immunity test level
1	III
2a	III
2b	III
3a	III
3b	III
4	III

4.7.2 TEST PROCEDURE

1. Connect the DUT to the test pulse generator and let the DUT works in the test mode.
2. Set the pulse polarity, amplitude, duration and resistance and test number in the test program according to the standard.
3. Start the test.
4. During and after the immunity test, the functional status of the DUT should be written down, evaluating the performance of the DUT and giving the actual immunity level in the test report.

4.7.3 TEST SETUP



4.7.4 TEST RESULT

N/A

4.8 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS

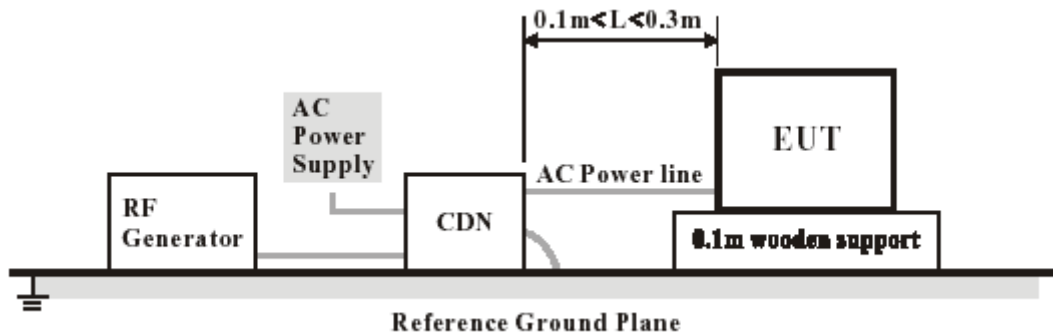
4.8.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-6
Frequency Range:	0.15 MHz – 80 MHz
Field Strength:	3Vrms
Modulation:	400Hz Sine Wave, 80% AM
Wanted signal	1KHz
Frequency Step:	1% of fundamental
Coupled Cable:	a.c. power
Coupling Device:	CDN-M2

4.8.2 TEST PROCEDURE

1. The EUT shall be tested within its intended operating and climatic conditions.
2. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
3. The test signal was 80% amplitude modulated with a 400Hz sine wave
4. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80% amplitude. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value where the frequency is swept incrementally.
5. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.
6. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

4.8.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

4.8.4 TEST RESULT

EUT Operating Mode	Test Point	Frequency (MHz)	Field Strength (Vrms)	Observation	Conclusion
TX operating Mode	d.c. port	0.15 – 80	3	Note	Pass
Charging Mode	d.c. port	0.15 – 80	3	Note	Pass

NOTE: 1. The worst case of distortion of the audio signal is 18%.

2. All test mode of section 4.1 were tested and the EUT performance complied with the performance criteria for CT and CR.

4.9 VOLTAGE DIPS AND SHORT INTERRUPTIONS IMMUNITY TEST

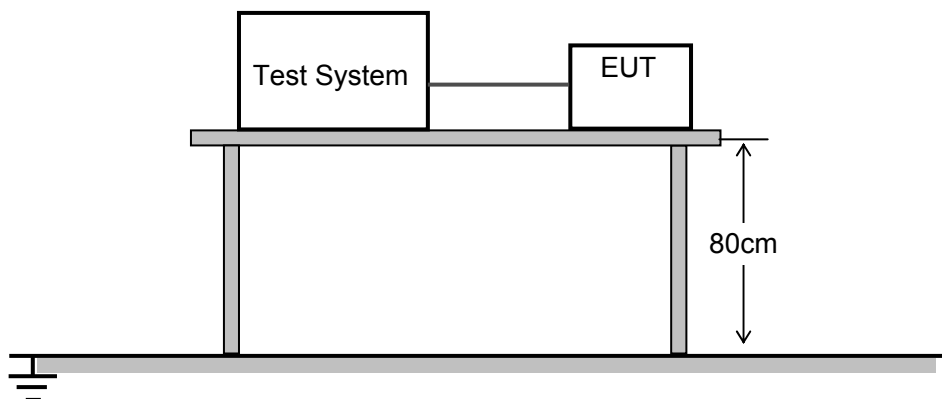
4.9.1 TEST SPECIFICATION

Basic Standard:	EN 61000-4-11
Voltage Dips:	0% residual voltage for 0.5 cycle 0% residual voltage for 1 cycle 70% residual voltage for 25 cycles (at 50Hz)
Voltage Interruptions:	0% residual voltage for 250 cycles (at 50Hz)
Voltage Phase Angle:	0°

4.9.2 TEST PROCEDURE

1. The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.
2. The EUT was tested for (I) 0% residual voltage dip of supplied voltage with duration of 0.5 cycle, (II) 0% residual voltage dip of supplied voltage and duration 1 cycle and (III) 70% residual voltage dip of supplied voltage and duration 25 cycles (at 50Hz). Both of the dip tests were carried out for a sequence of three voltage dips with intervals of 10 seconds (at 50Hz).
3. 0% residual voltage interruption of supplied voltage with duration of 250 cycles (at 50Hz) was followed, which was a sequence of three voltage interruptions with intervals of 10 seconds.
4. Voltage reductions occur at 0 degree crossover point of the voltage waveform. The performance of the EUT was checked after the voltage dip or interruption.

4.9.3 TEST SETUP



For the actual test configuration, please refer to Appendix I : Photographs of the Test Configuration.

4.9.4 TEST RESULT

Test Mode	Voltage Reduction	Duration (cycle)	Times	Interval (Sec)	Observation	Conclusion
Voltage dips	0%	0.5	3	10	Note (1)	Pass
	0%	1	3	10	Note (1)	Pass
	70%	25	3	10	Note (1)	Pass
Voltage interruptions	0%	250	3	10	Note (1)	Pass

APPENDIX I

PHOTOGRAPHS OF THE TEST SETUP

CE TEST SETUP



RE TEST SETUP





EFT TEST SETUP



ESD TEST SETUP



RS TEST SETUP



----END OF REPORT----