

EN301489-1V1.9.2/EN301489-5V1.3.1 TEST REPORT

On Behalf of

Zhengzhou Eshow Import and Export Trade Co., Ltd.

Two way radio

Model No.: RT5

Prepared for : Zhengzhou Eshow Import and Export Trade Co., Ltd.

Address : Room 722, Sanjiang Building, No. 170,
Nanyang Road, Huiji District, Zhengzhou City, Henan, China

Prepared By : Beide (UK) Product Service limited

Address : 6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China

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RADIO TEST REPORT
EN301489-1V1.9.2/EN301489-5V1.3.1**Report Reference No. : B-E16049604****Date of Issue : Apr. 27, 2016****Testing Laboratory Name : Beide (UK) Product Service Limited****Address : 6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist,
Shenzhen, China****Testing Location/ Procedure : Full application of Harmonised standards ☒**
Partial application of Harmonised standards ☐
Other standard testing method ☐**Applicant's Name : Zhengzhou Eshow Import and Export Trade Co., Ltd. ☐ ☐****Address : Room 722, Sanjiang Building, No. 170, Nanyang Road, Huiji
District, Zhengzhou City, Henan, China.****Test Specification****Standard : EN301489-1V1.9.2/EN301489-5V1.3.1****Test Report Form No. : B-E16049604****TRF Originator : Beide (UK) Product Service Limited****Beide (UK) Product Service Limited. All rights reserved.**

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Test Item Description. : Two way radio**Trade Mark : N/A****Test Model : RT5****Ratings : DC 7.4V****Result : Positive****Compiled by:**

Jacky Li/ File administrators

Supervised by:

Glin Lu/ Technique principal

Approved by:

Gavin Liang/ Manager

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	Two way radio
Model No.	:	RT5
DIFF	:	Only differ in model number.
Trademark	:	N/A
Power supply	:	DC 7.4V from battery, DC 10V from adapter for charging
Radio Technology	:	PMR
Operation frequency	:	136MHz-174MHz 400MHz-480MHz
Modulation	:	FM
Antenna Type	:	Integrated Antenna, Maximum Gain is 3dBi
Intend use environment	:	Residential, commercial and light industrial environment
Applicant	:	Zhengzhou Eshow Import and Export Trade Co., Ltd.
Address	:	Room 722, Sanjiang Building, No. 170, Nanyang Road, Huiji District, Zhengzhou City, Henan, China
manufacture	:	Shenzhen Retevis Technology Co.,Ltd
Address	:	Room 700, 7/F., 13-C, Zhonghaixin Science &Technology Park, No.12 Ganli 6th Road, Buji Street, Longgang District, Shenzhen, China

1.2. Accessories of device (EUT)

Accessories 1 : Adapter
M/N : 480-10050-E.S
Rang : Input: AC 100-240V, 50/60Hz
Output: DC 10V, 0.5A

1.3. Test Lab information

Testing Laboratory Name: Beide (UK) Product Service Limited

Address: 6F, Bldg E, Hourui 3rd Ind Zone, Xixiang, Bao'an Dist, Shenzhen, China

2. Summary of test

2.1. Test Standard description:

ETSI EN 301 489-1 V1.9.2: Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.

ETSI EN 301 489-5 V1.3.1: Electromagnetic compatibility and Radio spectrum Matters (ERM); Electro-Magnetic Compatibility (EMC) standard for radio equipment and services; Part 5: Specific conditions for Private land Mobile Radio (PMR) and ancillary equipment (speech and non-speech)

EN55022:2010: Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement.

EN55024:2010 : Information technology equipment- Immunity characteristics- Limits and methods of measurement.

2.2. Summary of test result

NO	TEST PARAMETER	APPLICATION	RESULTS
EMC emission			
1	Radiated emission	Enclosure of ancillary equipment and non wireless function	PASS
2	Conducted emission	DC power input/output port	N/A
3	Conducted emission	AC mains input/output port	PASS
4	Harmonic Current Emissions	AC mains input port	PASS
5	Voltage Fluctuation & Flicker	AC mains input port	PASS
6	Conducted emission	Telecommunication port	PASS
Immunity			
7	RF electromagnetic field	Enclosure	PASS
8	Electrostatic Discharge	Enclosure	PASS
9	Fast transients common mode	Signal,telecommunication and control ports, and AC power ports	PASS
10	RF Common mode	Signal,telecommunication and control ports, and AC power ports	PASS
11	Transients and Surges	DC power input ports for vehicular use	N/A
12	Voltage dips and interruptions	AC mains power input ports	PASS
13	Surges ,line to line and line to ground	AC mains power input ports, telecommunication ports	PASS

Note: N/A means this test item is not applicable for this device.

Note: This device also belong to information technology equipment, and most of EN55022 and EN55024's test intems are same with ETSI EN301 489's.so most of EN55022 and EN55024's tests were performed together with EN301 489's test.

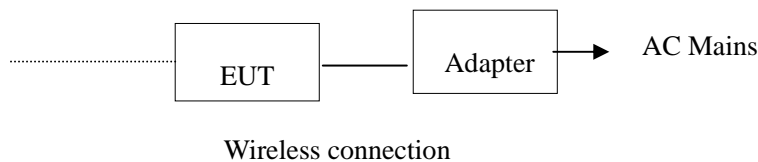
Note: All test were performed on EUT with different antennas, and only worst data listed in this report.

2.3. Assistant equipment used for test

Description	:	N/A
Manufacturer	:	N/A
Model No.	:	N/A

2.4. Block Diagram and Mode of EMC test

PMR Mode



EUT transmit data with PC though EUT and wireless router

Remark: All tests were performed with two adapters and only worst test data listed in this report.

2.5. Immunity performance assessment criteria

General performance criteria

During test	After test	Criteria
Operate as intended; Degradation of performance (see note 1); No loss of function.	Operate as intended; No degradation of performance (see note 2); No loss of function.	A
Loss of function (one or more).	Operate as intended; No degradation of performance (see note 2); Functions self-recoverable.	B
Loss of function (one or more).	Operate as intended; No degradation of performance (see note 2); Functions recoverable by the operator.	C
<p>NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the permissible degradation of performance is not specified by the manufacturer, then this may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p> <p>NOTE 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible degradation of performance is not specified by the manufacturer, then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>		

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions and voltage dips exceeding a certain period of time.

2.6. Test Conditions

All test were performed under the following environmental conditions

Temperature range	:	21-25°C
Humidity range	:	40-75%
Pressure range	:	86-106kPa
Power supply	:	DC 7.4V From battery or DC 10V from adapter

2.7. Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	MU	Remark
1	Uncertainty for Conducted Emission Test	2.50dB	
2	Uncertainty for Radiation Emissions	3.04 dB	Polarize: V
		3.02 dB	Polarize: H

2.8. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last cal.	Cal. Interval
Test Receiver	Rohde&Schwarz	ESCI	101165	2016.01.19	1 Year
Amplifier	Schwarzbeck	BBV9743	9743-019	2016.01.19	1 Year
Bilog Antenna	Schwarzbeck	VULB 9168	9168-438	2016.01.21	2 Year
Spectrum Analyzer	Agilent	E4407B	MY49510055	2016.01.19	1 Year
Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2016.01.21	2 Year
Amplifier	Quietek	AP-180C	CHM-0602012	2016.01.19	1 Year
Test Receiver	Rohde & Schwarz	ESCI	101165	2016.01.19	1 Year
L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2016.01.19	1 Year
L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	101043	2016.01.19	1 Year
Pulse Limiter	Schwarzbeck	9516F	9618	2016.01.19	1 Year
Harmonics Flicker Analyser	Voltech	PM6000	200006700495	2016.01.19	1 Year
ESD Tester	HAEFLY	PESD1610	H310546	2016.01.21	1 Year
Signal Generator	Marconi	2031B	11606/058	2016.01.20	1 Year
Amplifier	A&R	100W/1000M1	17028	NCR	NCR
Isotropic Field Monitor	A&R	FM7004	0325983	NCR	NCR
Isotropic Field Probe	A&R	FL7006	0325736	2016.01.20	1 Year
Laser Probe Interface	A&R	FL7000	325430	NCR	NCR
Power Meter	Anritsu	ML2487A	6k00003262	2016.01.20	1 Year
Power Sensor	Anritsu	MA2491A	33005	2016.01.20	1 Year
Log-periodic Antenna	A&R	AT1080	16512	NCR	NCR
CONDUCTED IMMUNITY TEST SYSTEM (RF-Generator)	Frankonia	CIT-10/75	12681247/2013	2016.01.19	1 Year
Fixed Coaxial Attenuator (6dB Attenuation)	CD	ATT-0675	120540086	2016.01.19	1 Year
Coupling-Decoupling Network	CD	CDN M2/50 050 0517	2302	2016.01.19	1 Year

(CDN)					
Electromagnetic Injection Clamp (EMC-Clamp)	CD	EM-Clamp	0513A031201	2016.01.19	1 Year
Main Interference Simulator	3ctest	VDG-1105G	EC0171002	2016.01.19	1 Year
Burst Tester	3ctest	EFT-4001G	EC0461015	2016.01.19	1 Year
Capacitive Coupling	3ctest	EFTC	EC0441049	2016.01.19	1 Year
Surge CDN	3ctest	SGN-5010G	EC5591004	2016.01.19	1 Year
Surge Generator	3ctest	SG-5006G	EC5581006	2016.01.19	1 Year
Base station	Agilent	E4438C	US44271917	2016.01.19	1 Year
Universal Radio Communication Tester	ROHDE&SCHWARZ	CMU200	116785	2016.05.11	1 Year
Audio analyze	ROHDE&SCHWARZ	UPV	113258	2016.01.19	1 Year
Signal Generator	Agilent	N5182A	MY49060042	2016.01.19	1 Year

3. Conducted emission

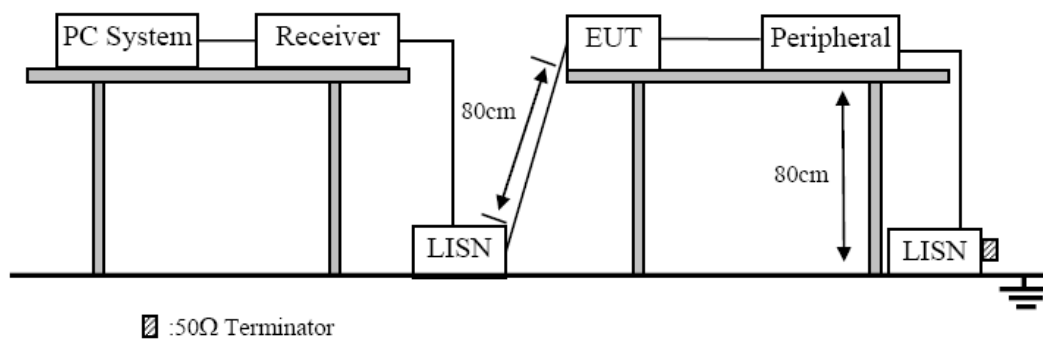
3.1. Limit for AC mains port

Frequency	Quasi-Peak Level dB (μ V)	Average Level dB (μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.2. Test Setup



3.3. Test Procedure

Placed the EUT on a non-metallic table, 80cm above the ground plane, and configure EUT follow clause 2.4 block diagram in data transmitting mode and power charging mode.

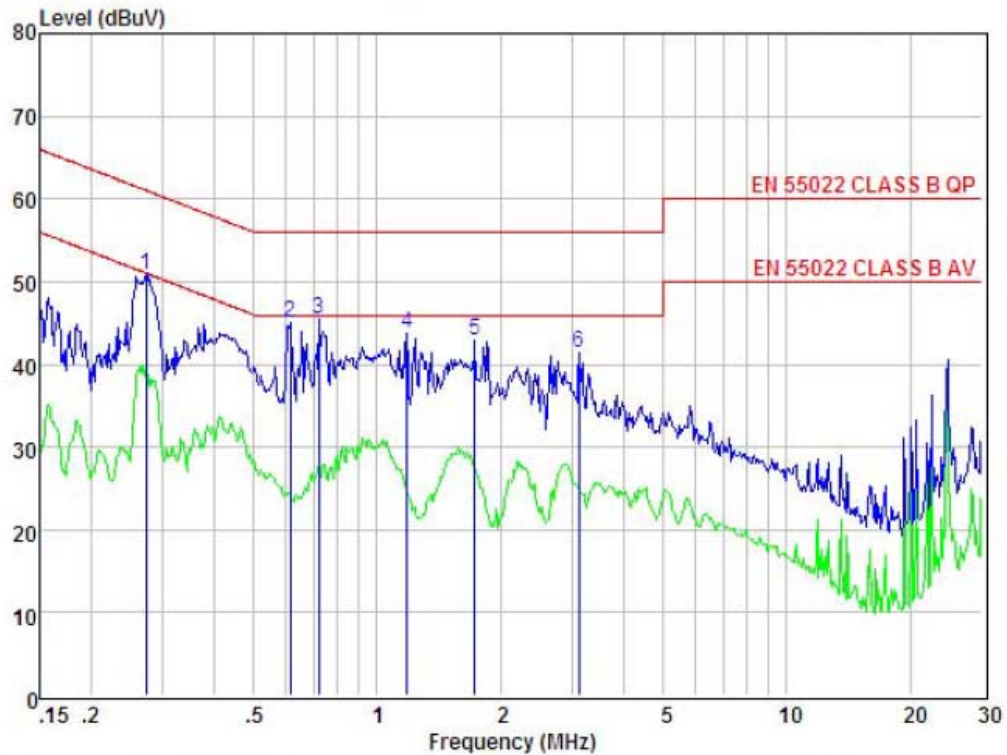
The power of notebook or power adapter was powered from power mains through a line impedance stabilization network (L.I.S.N. 1#).

The maximum of emissions for each power line and work mode were measured follow EN55022 test standard.

The bandwidth of the test receiver is set at 9 kHz. And the frequency range from 150 kHz to 30MHz was checked.

3.4. Test Result

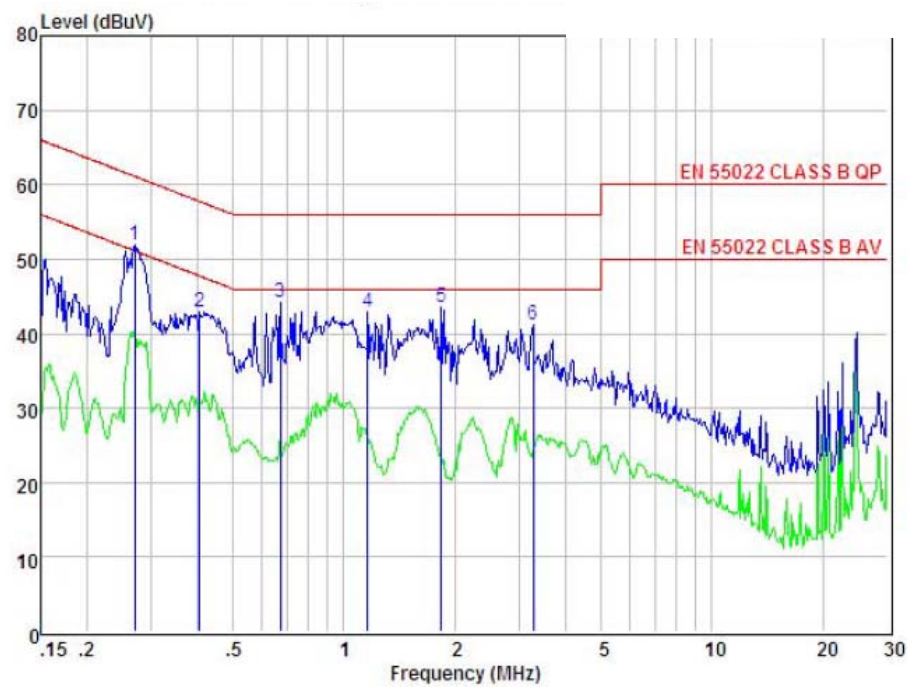
PASS



Condition : EN 55022 CLASS B QP POL: LINE Temp:24 °C Hum:56 %
 EUI :
 Model No : LigoDLB2
 Test Mode :
 Power : AC 230V/50Hz
 Test Engineer:
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.273	40.94	0.03	-9.72	0.10	50.79	61.03	-10.24	Peak
2	0.614	35.18	0.03	-9.72	0.10	45.03	56.00	-10.97	Peak
3	0.720	35.51	0.04	-9.72	0.10	45.37	56.00	-10.63	Peak
4	1.184	34.01	0.04	-9.71	0.10	43.86	56.00	-12.14	Peak
5	1.734	33.10	0.05	-9.70	0.10	42.95	56.00	-13.05	Peak
6	3.107	31.48	0.07	-9.69	0.12	41.36	56.00	-14.64	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss



Condition : EN 55022 CLASS B QP POL: NEUTRAL Temp:24 °C Hum:56 %
 EUT :
 Model No : LigoDLB2
 Test Mode :
 Power : AC 230V/50Hz
 Test Engineer:
 Remark :

Item	Freq MHz	Read dBuV	LISN Factor dB	Preamp Factor dB	Cable Loss dB	Level dBuV	Limit dBuV	Margin dBuV	Remark
1	0.270	42.03	0.03	-9.72	0.10	51.88	61.12	-9.24	Peak
2	0.406	33.04	0.03	-9.72	0.10	42.89	57.73	-14.84	Peak
3	0.672	34.34	0.04	-9.72	0.10	44.20	56.00	-11.80	Peak
4	1.160	33.00	0.04	-9.71	0.10	42.85	56.00	-13.15	Peak
5	1.839	33.67	0.05	-9.70	0.10	43.52	56.00	-12.48	Peak
6	3.276	31.31	0.07	-9.69	0.12	41.19	56.00	-14.81	Peak

Remarks: Level = Read + LISN Factor - Preamp Factor + Cable loss

4. Radiated emission

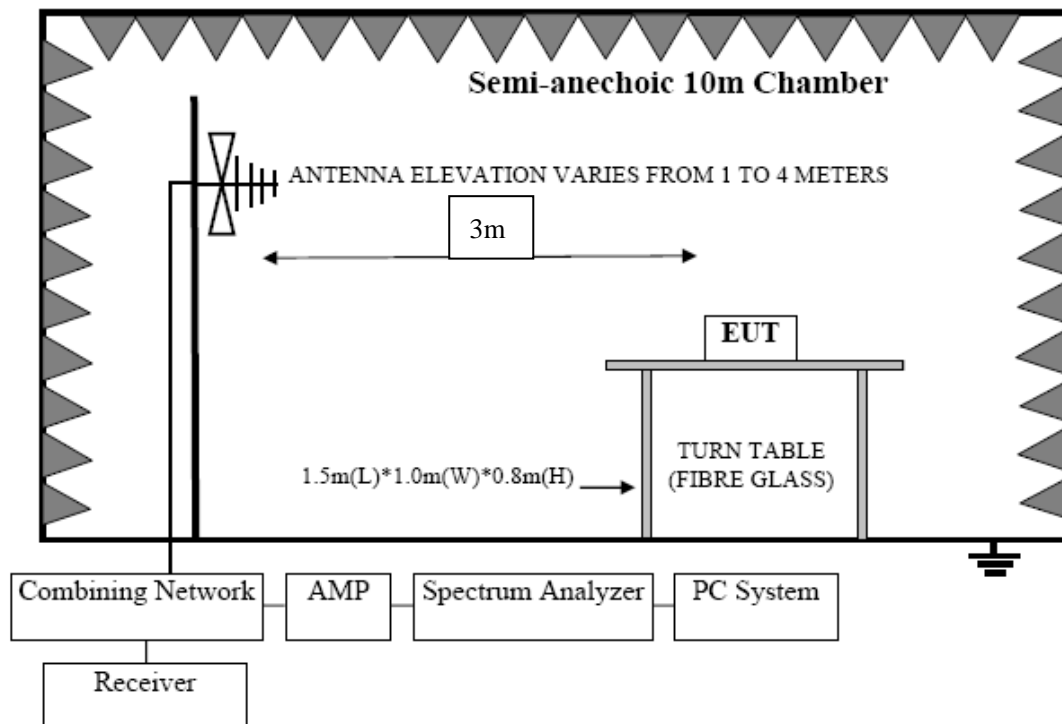
4.1. Limit

FREQUENCY (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMITS (dB μ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47
1000-3000	3	Average limit:50 Peak limit:70
3000-6000	3	Average limit:54 Peak limit:74

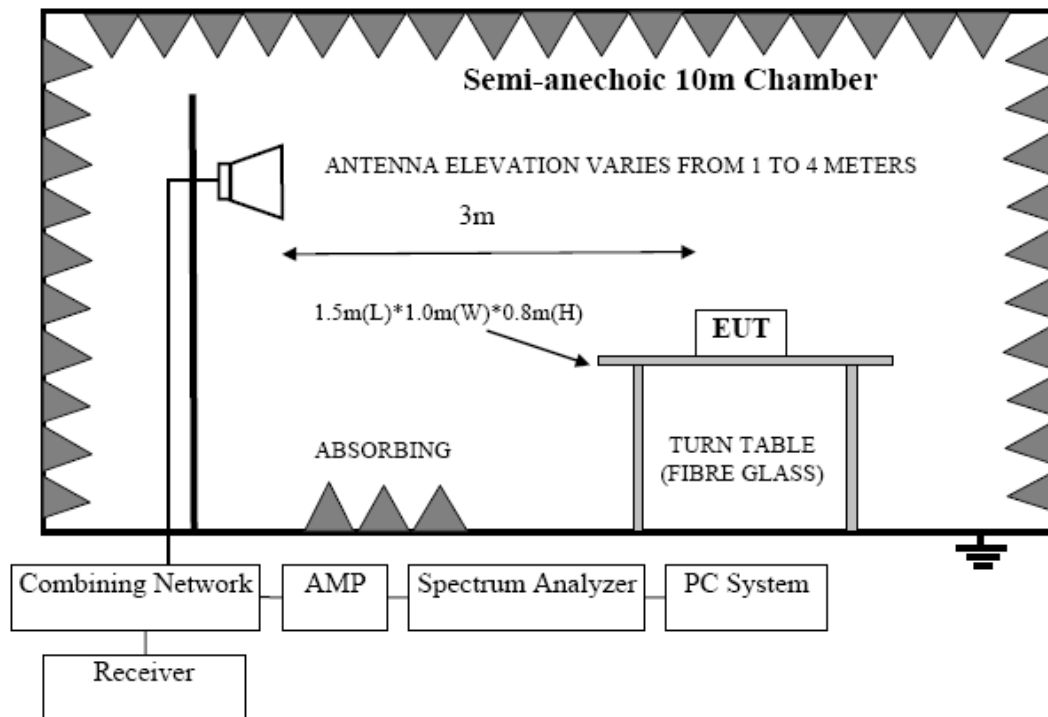
Note: (1) The lower limit shall apply at the transition frequencies.

4.2. Test setup

5.2.1. In Anechoic Chamber Test Setup Diagram for 30MHz~1000MHz



5.2.2. In Anechoic (10m) Chamber Test Setup Diagram for 1-6GHz



4.3. Test Procedure

Placed the EUT on a non-metallic table, 80cm above the ground plane, and configure EUT follow clause 2.4 block diagram in data transmitting mode and power charging mode.

An antenna was located 10m from the EUT for below 1GHz test and 3m for above 1GHz test on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to EN 55022 Class B on Radiated Disturbance test.

The bandwidth setting on the test receiver (R&S TEST RECEIVER ESVS10) is 120 kHz for below 1GHz test. For emission above 1GHz, The Spectrum's RWB is set 1MHz and VBW 1MHz to measure Peak Level.

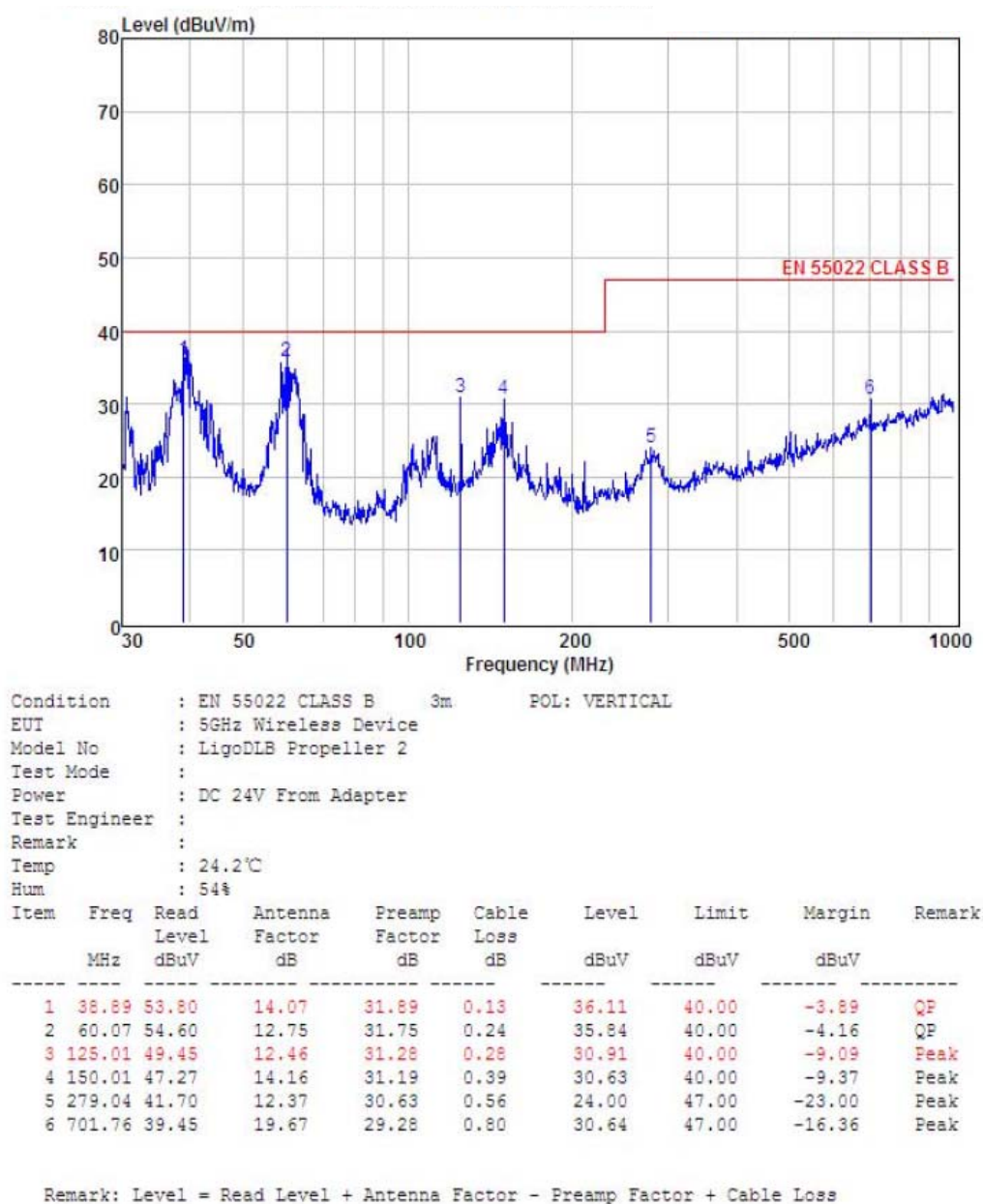
Note: Radiated emission test is only applicable to ancillary equipment not incorporated in the radio equipment and intended to be measured on a stand-alone basis, so the wireless function of EUT was closed in this test.

4.4. Test result

PASS

See below original test data





Note: There is no data detected above 1GHz, so, no data shown in this report.

5. Harmonic current emissions

5.1. Test Procedure

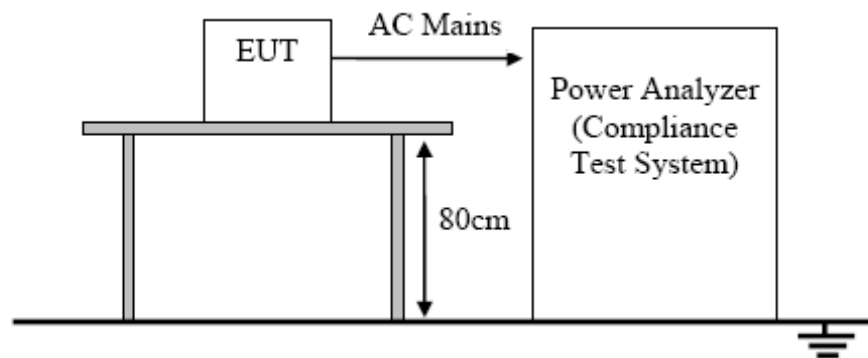
The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was powered from notebook which's power was connected to the power mains through a power Analyzer, let EUT worked in test mode then measure Harmonic current emissions by power analyzer and recorded data.

5.2. Limit

Limits for Class A equipment	
Harmonic order n	Maximum permissible Harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \leq n \leq 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \leq n \leq 40$	$0,23 \frac{8}{n}$

Remark: if the EUT Power level is below 75 Watts and therefore has no defined limits.

5.3. Test setup



5.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.
- 3, Run EUT work in data transmitting mode and charging mode.

5.5. Test Result

Not apply to EUT with power less than 75W

6. Voltage fluctuations and flicker

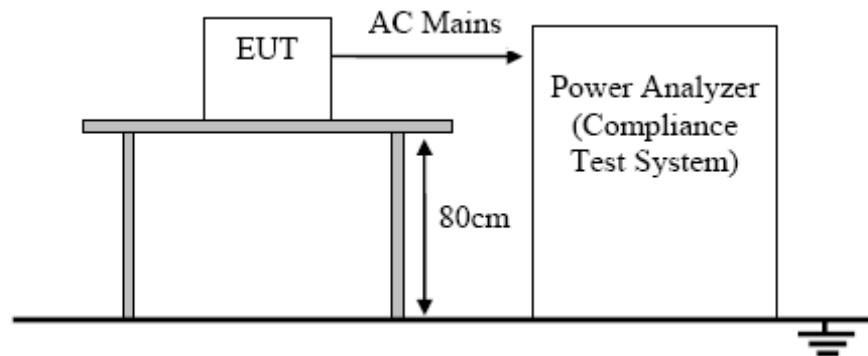
6.1. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was powered from notebook which's power through a power Analyzer, let EUT worked in test mode then measure voltage fluctuations and flicker by power analyzer and recorded data.

6.2. Limit

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 dt exceeds 3%
$d_{max}(\%)$	4%	d_{max} means maximum relative voltage change.
$d_c(\%)$	3%	d_c means relative steady-state voltage change.

6.3. Test setup



6.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.
- 3, Run EUT work in data transmitting mode and charging mode.

6.5. Test Result

PASS

See below original test data.

7. RF electromagnetic field

7.1. Test levels and Performance Criteria

Test Level		Performance Criteria
Frequency	80MHz-1000MHz 1.4GHz-2.7GHz (Note)	A
Field Strength	3V/m measured unmodulated	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of 1KHz(Note)	
Step Size	1% increments	
Dwell time	3 Sec.	

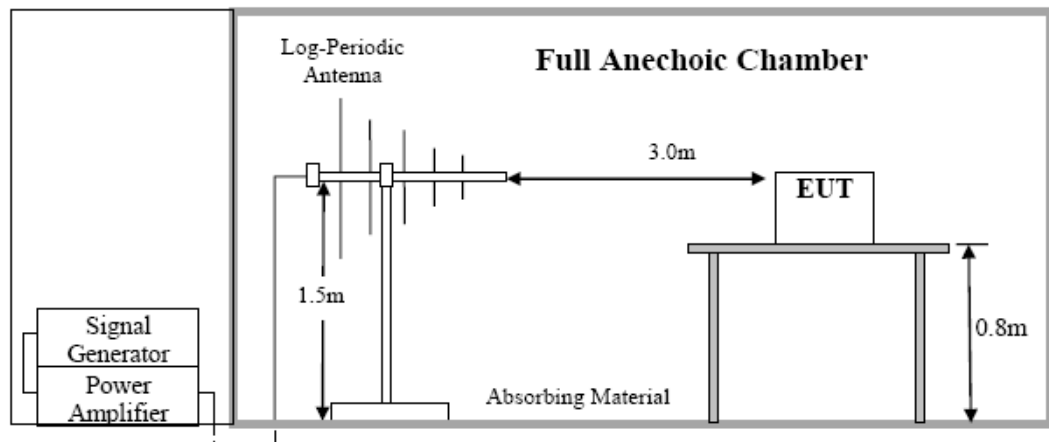
7.2. Test Procedure

The field sensor is placed on the EUT table (0.8 meter above the ground) which is 3 meters away from the transmitting antenna. Through the signal generator, power amplifier and transmitting antenna to produce a uniformity field strength (3V/m measured by field sensor) around the EUT table from frequency range specified and records the signal generator's output level at the same time for whole measured frequency range. Then, put EUT and its simulators on the EUT turn table and keep them 3 meters away from the transmitting antenna which is mounted on an antenna tower and fixes at 1 meter height above the ground. Using the recorded signal generator's output level to measure the EUT from frequency range specified and both horizontal & vertical polarization of antenna must be set and measured. Each of the four sides of EUT must be faced this transmitting antenna and measures individually.

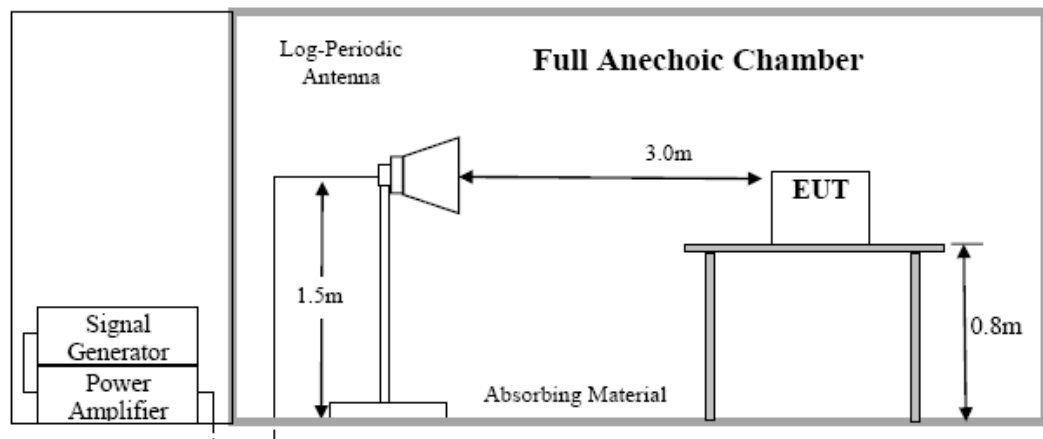
Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

7.3. Test setup

For frequency from 80MHz to 1GHz



Frequency For 1.4-2.7GHz



7.4. Operation condition of EUT

- 1, Setup the EUT and the simulators as shown on Section 2.4
- 2, Turned on the power of all equipments.
- 3, EUT transmit data with PC 4# though EUT and wireless router

7.5. Test Result

EUT: Two way radio M/N: RT5				
Test mode: Link Mode				
Power: DC 10V from adapter for charging				
Test conditions: Temperature 24°C Humidity: 52% Pressure 100.6kPa				
Test date: 2016-1-25				
Tested by: Peter Chu				
EUT Position	Antenna	Observation	Required	Conclusion
Front	H	A	A	PASS
	V	A	A	PASS
Right	H	A	A	PASS
	V	A	A	PASS
Rear	H	A	A	PASS
	V	A	A	PASS
Left	H	A	A	PASS
	V	A	A	PASS
Operation as intend, no loss of function during test and after test; No unintentional transmissions happened in idle mode.				

8. Electrostatic discharge

8.1. Test level and Performance Criteria

Test Level		Performance Criteria
Air Discharge	$\pm 2\text{kV}$, $\pm 4\text{kV}$ and $\pm 8\text{kV}$	B
Contact Discharge	$\pm 2\text{kV}$ and $\pm 4\text{kV}$	

8.2. Test Procedure

Air discharge:

The test was applied on non-conductive surfaces of EUT. The round discharge tip of the discharge electrode was approached as fast as possible to touch the EUT. After each discharge, the discharge electrode was removed from the EUT. The generator was re-triggered for a new single discharge and repeated 20 times for each pre-selected test point. This procedure was repeated until all the air discharge completed

Contact Discharge:

All the procedure was same as air discharge. except that the generator was re-triggered for a new single discharge and repeated 50 times for each pre-selected test point. The tip of the discharge electrode was touching the EUT before the discharge switch was operated.

Indirect discharge for horizontal coupling plane

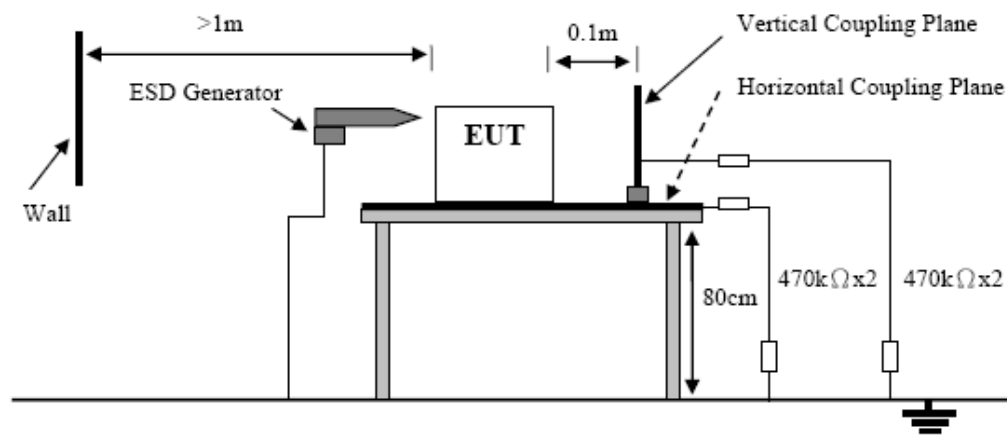
At least 20 single discharges were applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane

At least 20 single discharges were applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, was placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges were applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

8.3. Test setup



8.4. Test Result

PASS

See below original test data.

EUT: Two way radio M/N:RT5					
Test mode: Link Mode					
Power: DC 10V from adapter for charging					
Test conditions: Temperature 23°C Humidity: 51% Pressure 100.2kPa					
Test date: 2016-1-25					
Tested by: Peter					
Discharge Voltage (kV)	Type of discharge	Dischargeable Points	Observation	Require	Conclusion
± 2	Contact	1,2	A	B	PASS
± 4	Contact	1,2	A	B	PASS
± 2	Air	3,4,5	A	B	PASS
± 4	Air	3,4,5	A	B	PASS
± 8	Air	3,4,5	A	B	PASS
± 2	HCP-Bottom	Edge of the HCP	A	B	PASS
± 2	VCP-Front	Center of the VCP	A	B	PASS
± 2	VCP-Left	Center of the VCP	A	B	PASS
± 2	VCP-Back	Center of the VCP	A	B	PASS
± 2	VCP-Right	Center of the VCP	A	B	PASS
± 4	HCP-Bottom	Edge of the HCP	A	B	PASS
± 4	VCP-Front	Center of the VCP	A	B	PASS
± 4	VCP-Left	Center of the VCP	A	B	PASS
± 4	VCP-Back	Center of the VCP	A	B	PASS
± 4	VCP-Right	Center of the VCP	A	B	PASS
Operation as intend, no loss of function during test and after test No unintentional transmissions happened in idle mode					
Discharge Points Description					
1	Metal surface	4	LED light		
2	Screw	5	Button		
3	Slot	6			

9. Fast transients test

9.1. Test levels and Performance Criteria

Test Level		Performance Criteria
Test voltage	1KV For AC mains Port	A
	0.5KV for telecommunication ports	
Repetition Frequency	5KHz	
Burst Duration	15ms	
Burst Period	300ms	
Inject Time(s)	120s	
Inject Method	Direct For AC mains port	
	Couple for telecommunication ports	
Inject Line	AC Mains of adapter	

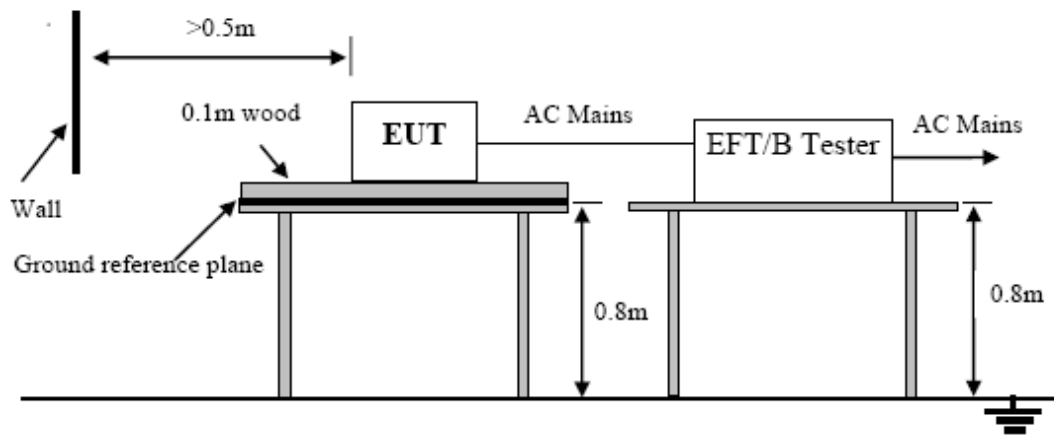
9.2. Test Procedure

The EUT and its simulators were placed on the ground reference plane and were insulated from it by a wood support $0.1\text{m} \pm 0.01\text{m}$ thick. The ground reference plane was $1\text{m} \times 1\text{m}$ metallic sheet with 0.65mm minimum thickness. This reference ground plane was project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane was more than 0.5m. All cables to the EUT was placed on the wood support, cables not subject to EFT/B was routed as far as possible from the cable under test to minimize the coupling between the cables.

The EUT was powered from notebook which powered from power mains by using a coupling device that couples the EFT interference signal to AC power lines. Both positive transients and negative transients of test voltage were applied during compliance test and the duration of the test can't less than 1min.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

9.3. Test setup



9.4. Test Result

EUT: Two way radio M/N:RT5					
Test mode : Link Mode					
Power: DC 10V from adapter for charging					
Test conditions: Temperature 24°C Humidity: 52% Pressure 100.1kPa					
Test date: 2016-1-25					
Tested by: Peter					
Line	Test Voltage	Observation (+)	Observation (-)	Require	Conclusion
L	1KV	A	A	B	PASS
N	1KV	A	A	B	PASS
L N	1KV	A	A	B	PASS
LAN Port	1KV	A	A	B	PASS
Operation as intend, no loss of function during test and after test No unintentional transmissions happened in idle mode					

10. Injection current test

10.1. Test level and Performance Criteria

Test Level		Performance Criteria
Frequency	0.15MHz to 80MHz	A
Field Strength	3V/m measured unmodulated	
Modulation	AM modulated to a depth of 80% by a sinusoidal audio signal of 1KHz(Note)	
Step Size	1% increments	
Dwell time	3 Sec.	

10.2. Test Procedure

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).

The disturbance signal described below is injected to EUT through CDN.

The EUT operates within its operational mode(s) under intended climatic conditions after power on.

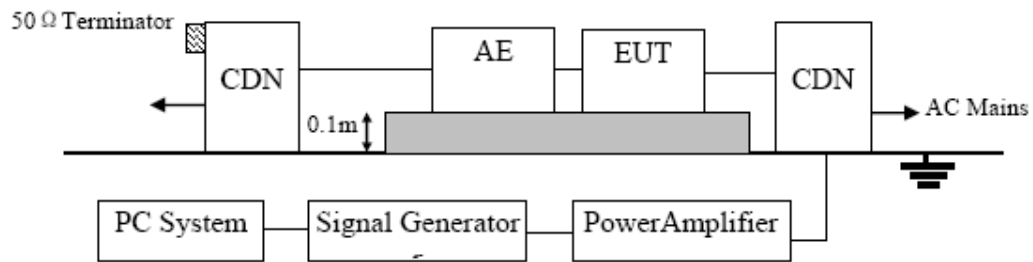
The frequency range is swept from 0.150MHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 400Hz sine wave.

The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally; the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

10.3. Test setup



10.4. Test result

EUT: Two way radio M/N:RT5				
Test mode : Link Mode				
Power: DC 10V from adapter for charging				
Test conditions: Temperature 24°C Humidity: 52% Pressure 100.1kPa				
Test date: 2016-1-25				
Tested by: Peter				
Injected Position	Strength (Unmodulated)	Observation	Required	Conclusion
AC mains	3V	A	A	PASS
LAN port	3V	A	A	PASS
Operation as intend, no loss of function during test and after test; No unintentional transmissions happened in idle mode.				

11. Voltage dips and interruptions

11.1. Test level and Performance Criteria

For EN301 489 Standard		
Test Level %U _T	Duration (in period)	Performance Criterion
0	0.5P	B
0	1P	B
70	25P	B
0	250P	C

11.2. Test Procedure

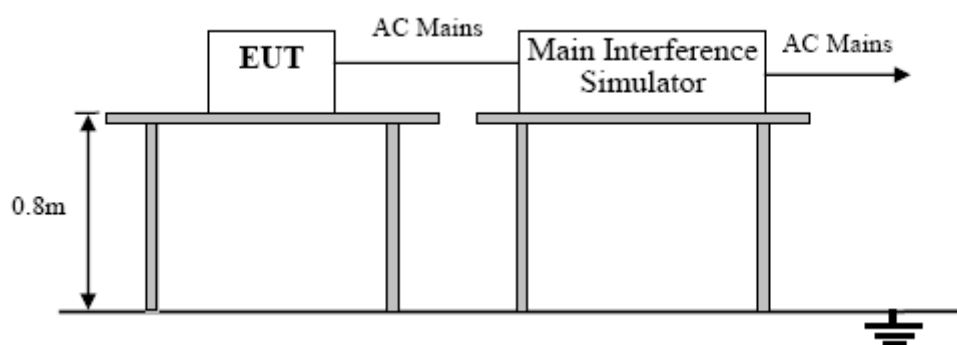
The EUT and test generator were setup as shown on Section 11.3

The interruptions are introduced at selected phase angles with specified duration.

Record any degradation of performance.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

11.3. Test setup



11.4. Test Result

EUT: Two way radio M/N:RT5					
Test mode: Link Mode					
Power: DC 10V from adapter for charging					
Test conditions: Temperature 23℃ Humidity: 56% Pressure 100.6kPa					
Test date: 2016-1-25					
Tested by: Peter					
Test Level % UT	Duration (in period)	Phase Angle	Observation	Require	Conclusion
0	0.5P	0-360	B	B	PASS
0	1P	0-360	B	B	PASS
70	25P	0-360	B	B	PASS
0	250P	0-360	B	C	PASS
Operation as intend, no loss of function during test and after test;					

12.Surge Test

12.1.Test level and Performance Criteria

Test level for AC mains ports		Performance Criterion
Line to Line	1KV	B
Line to ground	2KV	B
Test level for telecommunication ports		Performance Criterion
Line to ground	0.5KV	B

12.2.Test Procedure

Set up the EUT and test generator as shown on Section 12.3

For line-to-line coupling mode, provide a 1kV 1.2/50us voltage surge (at pen-circuit condition) and 8/20us current surge to EUT selected points, and for active line / neutral lines to ground are same except test level is 2kV.

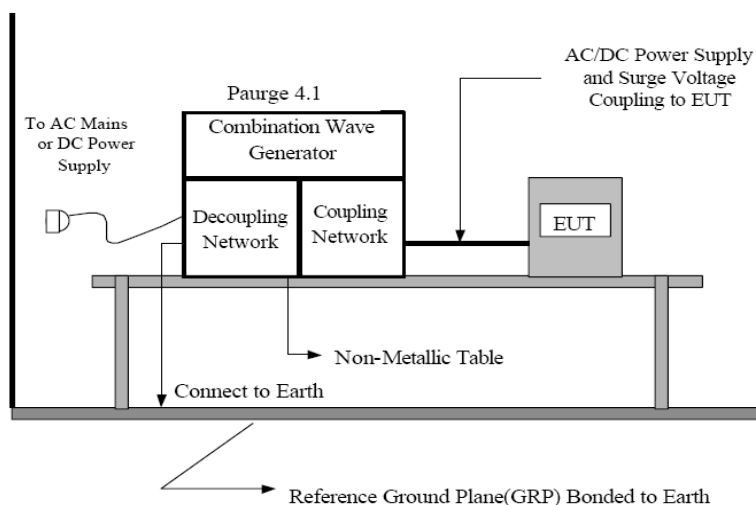
At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are applied during test.

Different phase angles are done individually.

Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Set EUT in idle mode and repeated test with a receive antenna connected to a spectrum analyzer to see if there was unintentional transmissions happened.

12.3.Test setup



12.4.Test Result

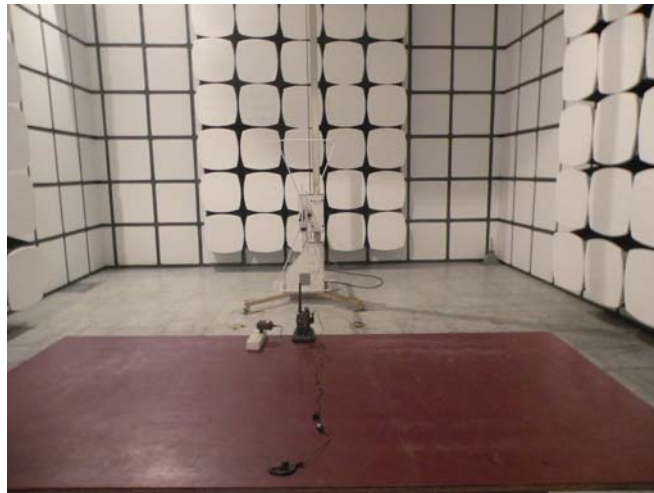
EUT: Two way radio M/N:RT5					
Test mode: Link Mode					
Power: DC 10V from adapter for charging					
Test conditions: Temperature 23℃ Humidity: 56% Pressure 100.6kPa					
Test date: 2016-1-25					
Tested by: Peter Chu					
Location	Phase	Level 1KV		Require	Conclusion
		+	-		
L-N	0	A	A	B	PASS
	90	A	A	B	PASS
	180	A	A	B	PASS
	270	A	A	B	PASS
Location	Phase	Level 0.5KV		Require	Conclusion
		+	-		
LAN port	0	A	A	B	PASS
	90	A	A	B	PASS
	180	A	A	B	PASS
	270	A	A	B	PASS
Operation as intend, no loss of function during test and after test; No unintentional transmissions happened in idle mode					

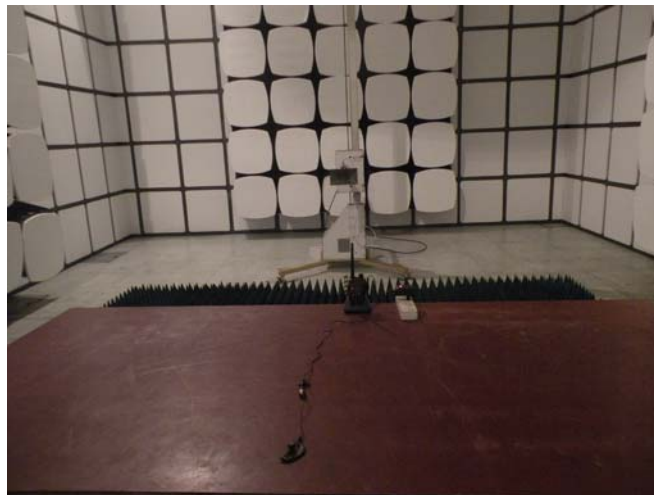
13. Photos of test setup

13.1. Photos of conducted emission



13.2. Photos of Radiated emission

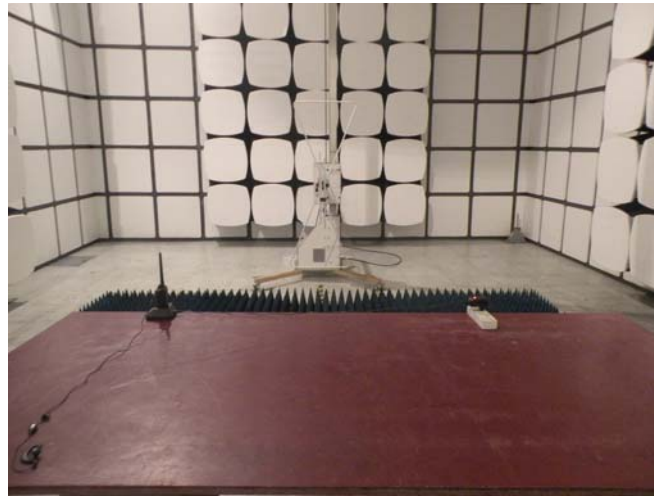




13.3.Photos Harmonic current and voltage fluctuation and flicker



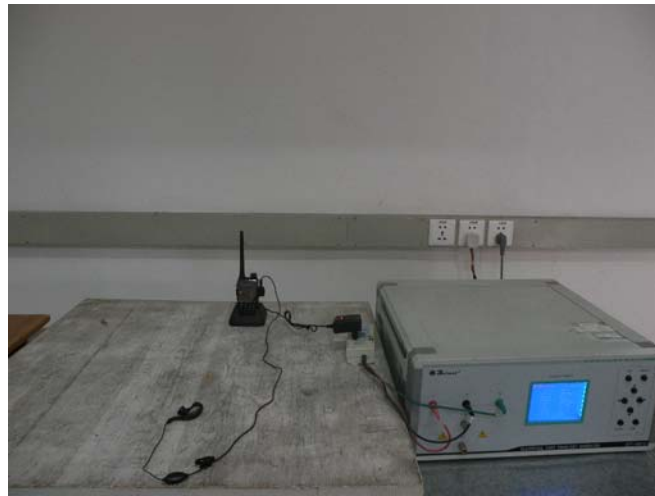
13.4.Photos of RF electromagnetic field



13.5.Photos of electrostatic discharge



13.6.Photos of fast transients common mode



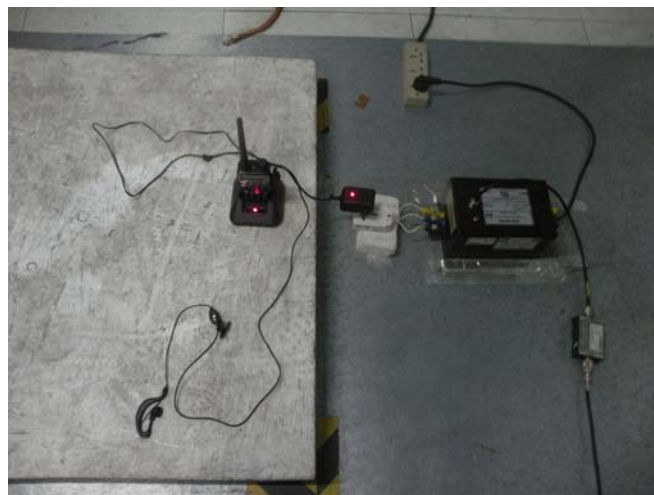
13.7.Photos of voltage dips and interruptions



13.8..Photos of surge



13.9.Injection current test



14. Photos of EUT





