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FCC PART 15B REPORT

Report No: STS1502032E01

Issued for

Tianjin RoamWiFi Technology Co., Ltd.
2018 Zhong Tian Road , Block 16 Unit 429, Ready built
office, Tianjin Eco-city, Tianjin

Product Name:	3G Wireless Router
Brand Name:	Roam WiFi
Model No.:	RW-801
FCC ID:	2ADUB-ROAMWIFI
Test Standard:	FCC Part 15B

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Shenzhen STS Test Services Co., Ltd.

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TEST RESULT CERTIFICATION

Applicant's name..... Tianjin RoamWiFi Technology Co., Ltd.
Address 2018 Zhong Tian Road , Block 16 Unit 429, Ready built office, Tianjin
Eco-city, Tianjin
Manufacture's Name Tianjin RoamWiFi Technology Co., Ltd.
Address 2018 Zhong Tian Road , Block 16 Unit 429, Ready built office, Tianjin
Eco-city, Tianjin
Product description
Product name 3G Wireless Router
Band name Roam WiFi
Model and/or type reference..... RW-801
Standards FCC Part 15B
Test procedure..... ANSI C63.4-2009
This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test
Date of performance of tests 02 Feb. 2015 ~10 Feb. 2015
Date of Issue 11 Feb. 2015
Test Result..... Pass

Testing Engineer :

(Hakim Hou)

Report writing :

(Sunny zheng)

Authorized
Signatory :

(Bovey Yang)





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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

EMISSION			
Standard	Item	Result	Remarks
FCC 47 CFR Part 15 Subpart B (10-1-05 Edition)	Conducted Emission	PASS	Meet Class B limit
	Radiated Emission	PASS	Meet Class B limit

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.

Add.: 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Bao'an District, Shenzhen, China.

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	3G Wireless Router
Trade Name	Roam WiFi
Model Name	RW-801
Channel List	Please refer to the Note 2.
Battery	Rated Voltage: 3.7V Charge Limit: 4.2V capacity :5200mAh
Hardware version number	SP918
Software versioning number	RoamWiFi_1.00.001
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	USB Model

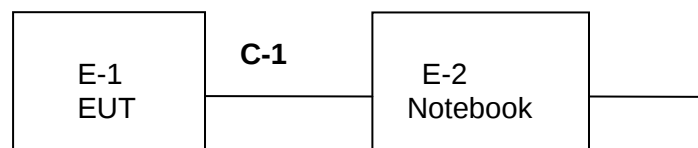
For Conducted Emission	
Final Test Mode	Description
Mode1	USB Model

For Radiated Emission	
Final Test Mode	Description
Mode 1	USB Model

Note:

- (1) Due to the different configuration and test, in this list only some worse mode. The worst test data of the worse modeis reported by this report.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED





2.4 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.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	3G Wireless Router	Roam WiFi	RW-801	N/A	EUT
E-2	Notebook	Lenovo	B460	WB03928113	
E-3	Adapter	Rivo	RM003	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.5m	
C-2	NO	NO	1.2m	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.
- (4) The Adapter was provided by Lab.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

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.

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
Universal Radio Communication Tester	R&S	CMU200	112012	2014.10.25	2015.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2014.10.25	2015.10.24
RF Cable	MURATA	R-03	130627	2014.10.25	2015.10.24
High frequency Cable	HARBOUR	R-02	FL0000175	2014.10.25	2015.10.24
EMI Test Receiver	R&S	ESCI	101427	2014.10.25	2015.10.24
Antenna Mast	EM	SC100_1	N/A	N/A	N/A
Turn Table	EM	SC100	060531	N/A	N/A
50Ω Switch	Anritsu Corp	MP59B	6200983705	2014.07.06	2015.07.05
Spectrum Analyzer	Aglient	E4407B	MY50140340	2014.10.25	2015.10.24
Horn Antenna	Schwarbeck	BBHA 9120D	9120D-963	2014.10.25	2015.10.24
Pre-Amplifier	EM	EM30180	060552	2014.10.25	2015.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibration	Calibrated Until
EMI Test Receiver	R&S	ESPI	102086	2014.10.25	2015.10.24
LISN	R&S	ENV216	101242	2014.10.25	2015.10.24
LISN	EMCO	3810/2NM	000-23625	2014.10.25	2015.10.24
Absorbing clamp	R&S	MDS-21	100668	2014.10.27	2015.10.26
Temperature & Humidity Chamber	Mieo	HH660	N/A	2014.10.27	2015.10.26
Conduction Cable	EM	C01	N/A	2014.10.25	2015.10.24
Clamp Cable	EM	C02	N/A	2014.10.25	2015.10.24



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

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

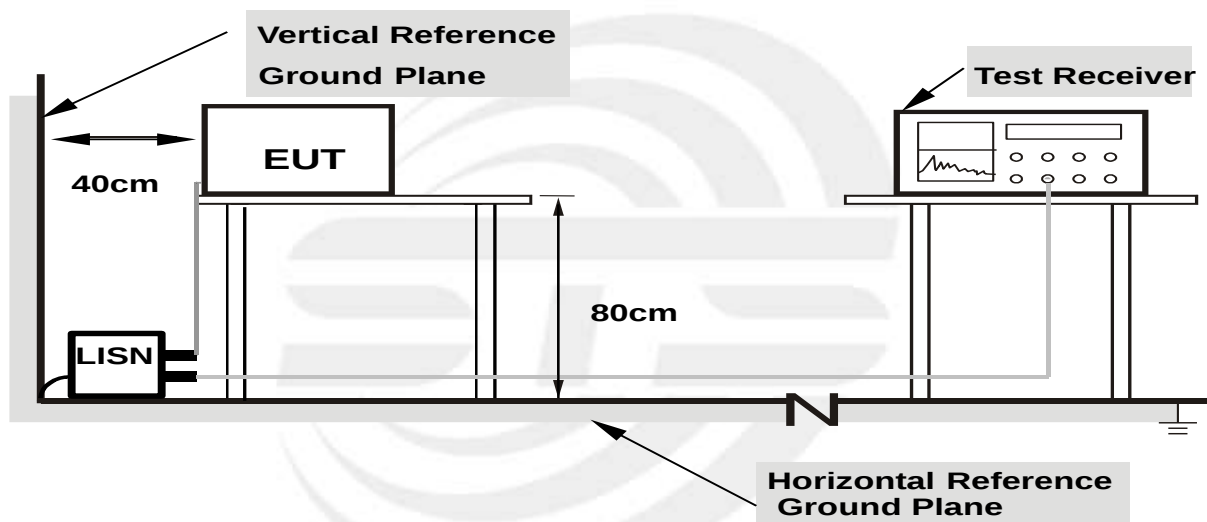
3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



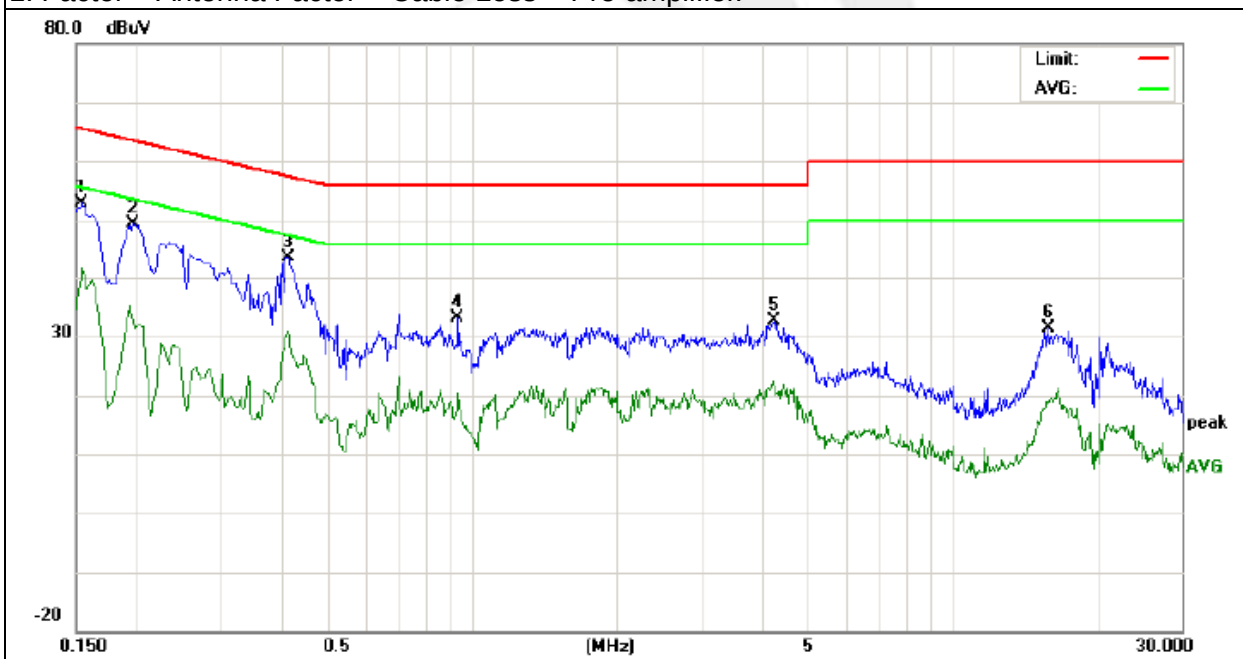
3.1.6 TEST RESULTS

EUT :	3G Wireless Router	Model Name. :	RW-801
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from Adapter with AC 120V/60Hz	Test Mode :	1

No.	Freq. (MHz)	Reading_Level (dBuV)			Correct Factor (dB)	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1539	42.62		31.48	10.16	52.78		41.64	65.78	55.78	-13.00	-14.14	P	
2	0.1965	41.12		24.43	10.21	51.33		34.64	63.75	53.75	-12.42	-19.11	P	
3	0.4140	33.35		20.44	10.34	43.69		30.78	57.57	47.57	-13.88	-16.79	P	
4	0.9340	22.69		9.90	10.40	33.09		20.30	56.00	46.00	-22.91	-25.70	P	
5	4.2500	22.20		10.92	10.32	32.52		21.24	56.00	46.00	-23.48	-24.76	P	
6	15.8460	21.19		8.43	10.11	31.30		18.54	60.00	50.00	-28.70	-31.46	P	

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



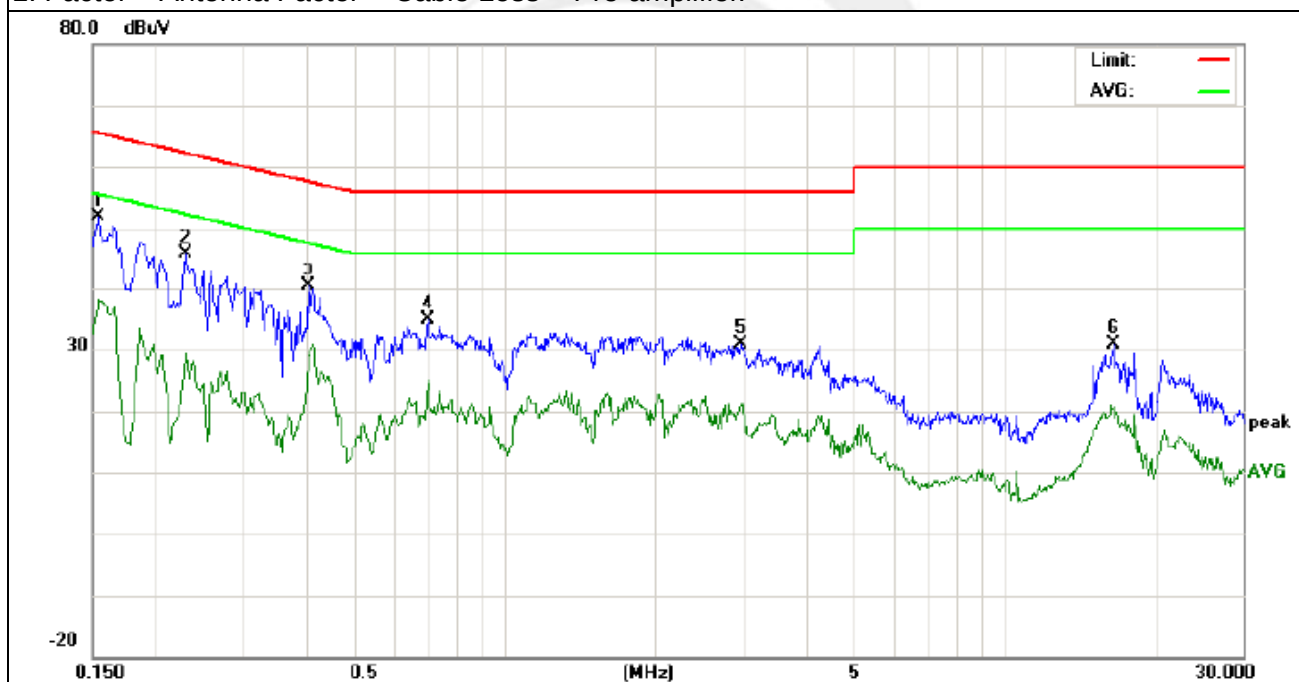


EUT :	3G Wireless Router	Model Name. :	RW-801
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from Adapter with AC 120V/60Hz	Test Mode :	1

No.	Freq. (MHz)	Reading Level (dBuV)			Correct Factor dB	Measurement (dBuV)			Limit (dBuV)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		Peak	QP	AVG	QP	AVG	QP	AVG		
1	0.1539	41.83		27.90	10.16	51.99		38.06	65.78	55.78	-13.79	-17.72	P	
2	0.2300	35.54		19.17	10.25	45.79		29.42	62.45	52.45	-16.66	-23.03	P	
3	0.4060	30.12		18.83	10.33	40.45		29.16	57.73	47.73	-17.28	-18.57	P	
4	0.7019	24.49		14.81	10.35	34.84		25.16	56.00	46.00	-21.16	-20.84	P	
5	2.9660	20.36		10.55	10.54	30.90		21.09	56.00	46.00	-25.10	-24.91	P	
6	16.4900	20.74		10.60	10.12	30.86		20.72	60.00	50.00	-29.14	-29.28	P	

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.





3.2 RADIATED EMISSION MEASUREMENT

3.2.1 Radiated Emission Limits

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

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (dBuV/m) (at 3M)		Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80	60	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

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	5 th harmonic of the highest frequency or 40 GHz, whichever is lower



Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz / 10Hz

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz/RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz/RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz/RB 120kHz for QP

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 1 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment shall be 1 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

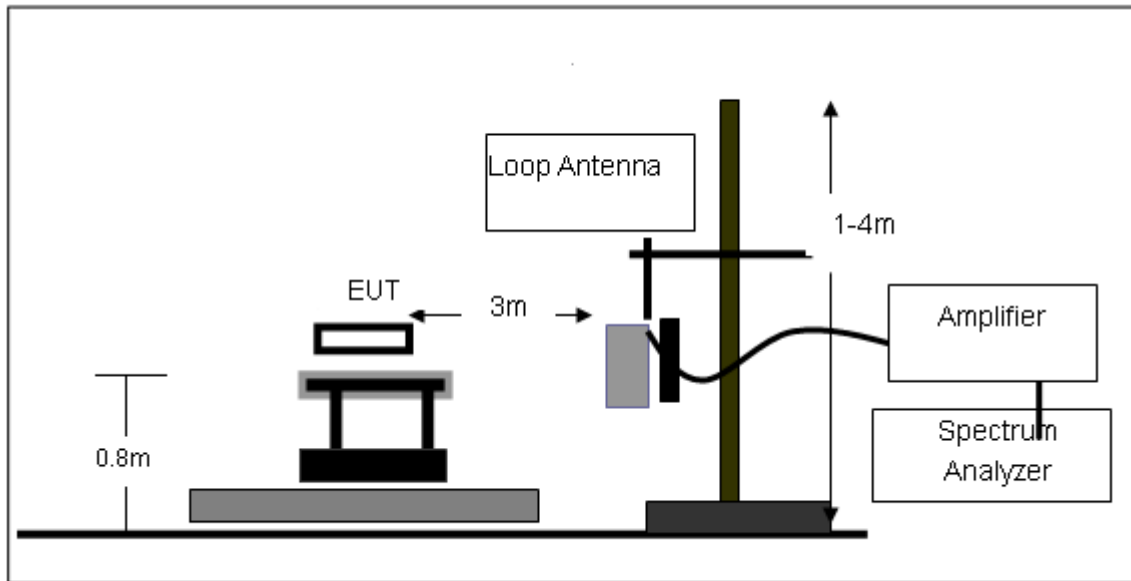
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

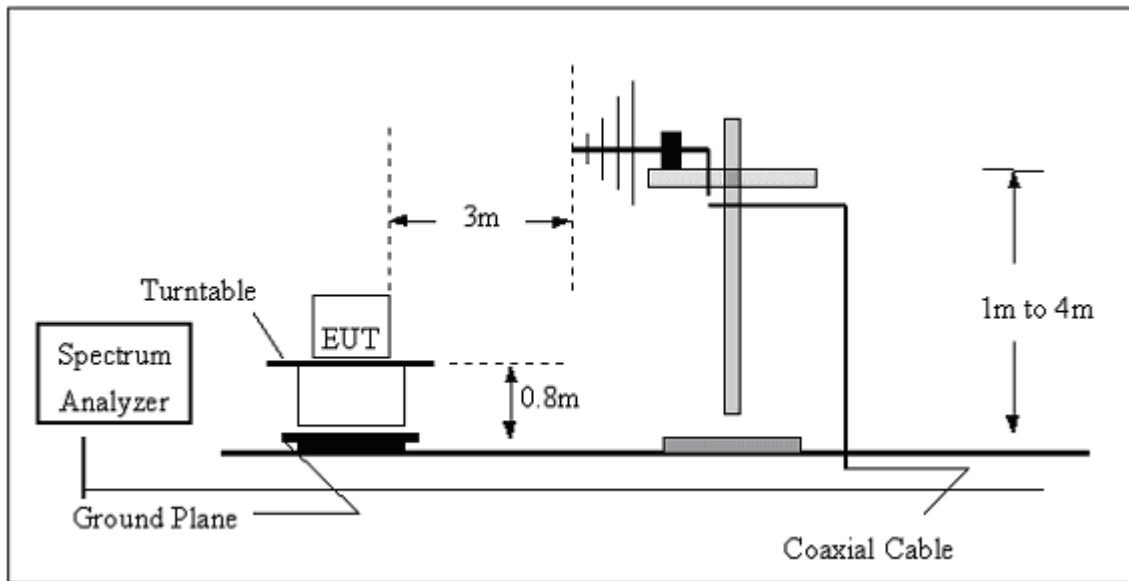
No deviation

3.2.4 TEST SETUP

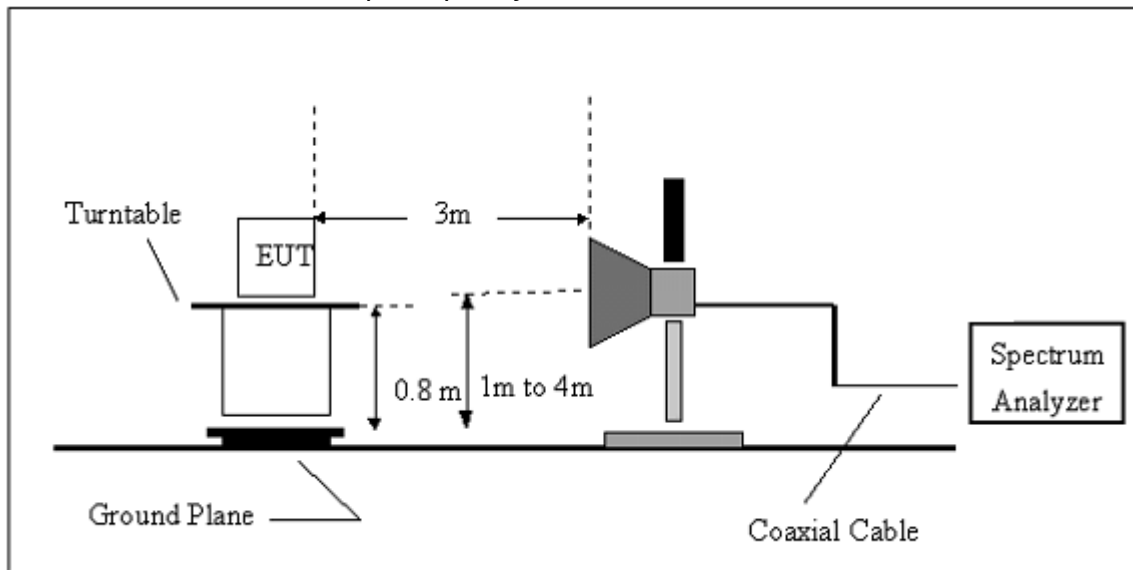
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



3.2.6 TEST RESULTS

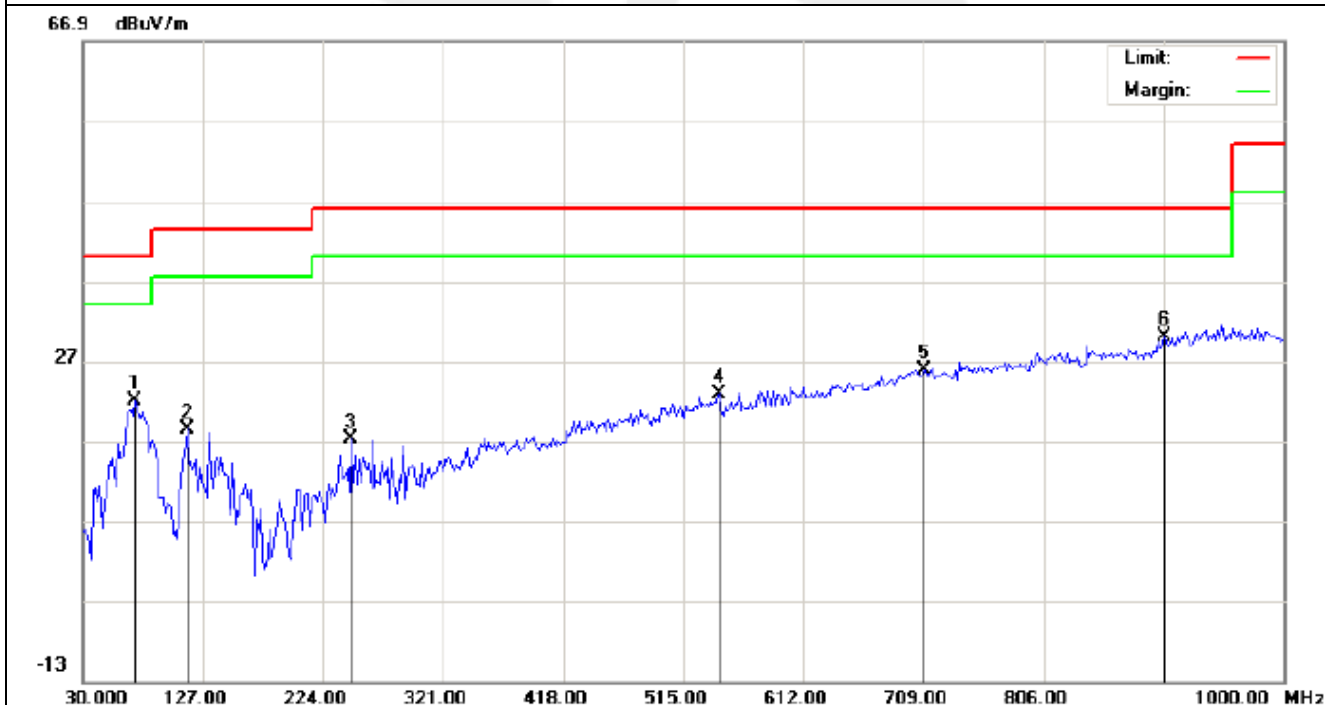
Between 30MHz – 1000 MHz

EUT :	3G Wireless Router	Model Name. :	RW-801
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 5V from Adapter AC 120V/60Hz		
Test Mode :	Mode 1		

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		72.0333	11.75	10.17	21.92	40.00	-18.08	peak			
2		114.0667	7.05	11.45	18.50	43.50	-25.00	peak			
3		246.6333	3.43	13.77	17.20	46.00	-28.80	peak			
4		544.1000	0.58	22.32	22.90	46.00	-23.10	peak			
5		709.0000	0.30	25.45	25.75	46.00	-20.25	peak			
6	*	903.0000	1.22	28.69	29.91	46.00	-16.09	peak			

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.



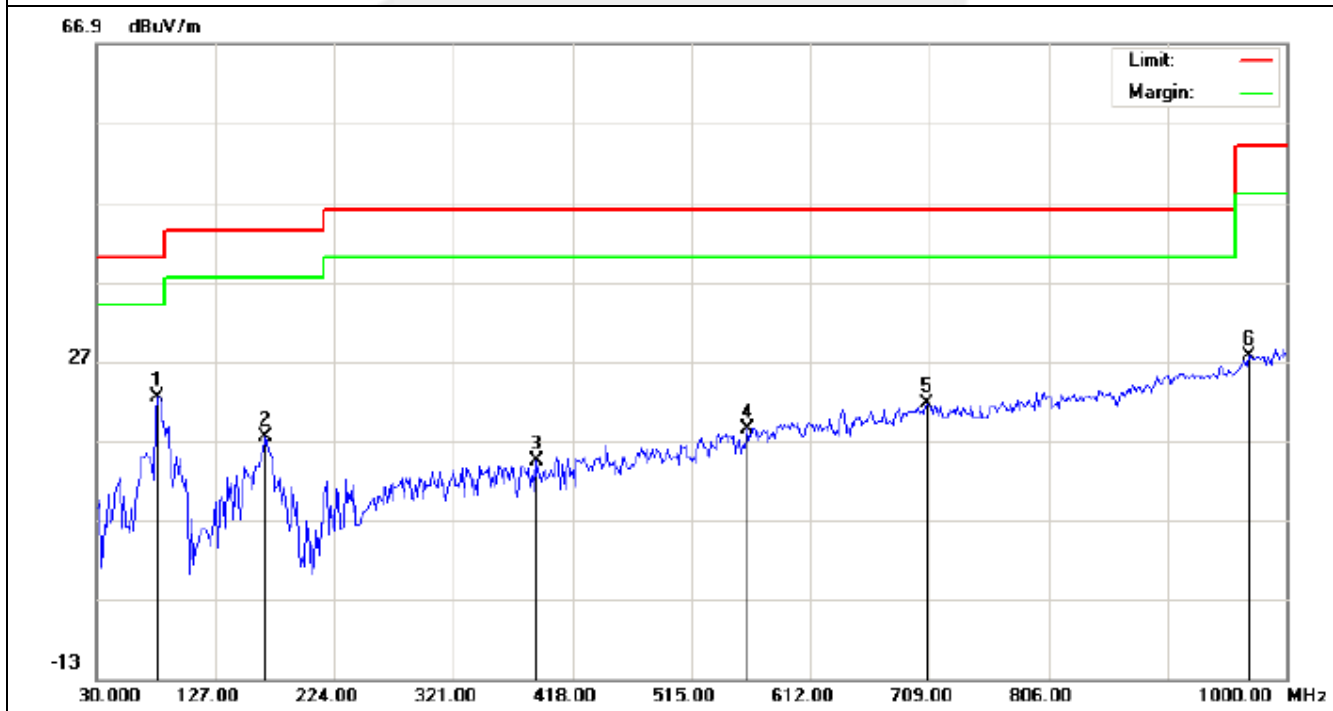


EUT :	3G Wireless Router	Model Name. :	RW-801
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 5V from Adapter AC 120V/60Hz		
Test Mode :	Mode 1		

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	80.1167	20.66	1.84	22.50	40.00	-17.50	peak			
2		167.4167	2.62	14.86	17.48	43.50	-26.02	peak			
3		388.9000	-4.60	19.00	14.40	46.00	-31.60	peak			
4		560.2667	-4.10	22.53	18.43	46.00	-27.57	peak			
5		707.3832	-3.84	25.40	21.56	46.00	-24.44	peak			
6		969.2833	-2.20	29.81	27.61	54.00	-26.39	peak			

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.





Above 1GHz

The worst test data above 1 GHz was showed as thefollow:

EUT :	3G Wireless Router	Model Name. :	RW-801
Temperature :	20 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Test Mode :	Mode 1
Test Voltage :	DC 5V from Adapter AC 120V/60Hz		

Freq.	Ant. Pol	Peak	AV	Ant./CL	Actual Fs		Peak	AV	Peak	AV
(MHz)	H/V	Reading	Reading	CF			Limit	Limit	margin	margin
		(dBuV)	(dBuV)	(dB)	Peak	AV	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)
					(dBuV/m)	(dBuV/m)				
1097.22	H	57.26	41.37	5.15	62.41	46.52	74	54	-11.59	-7.48
2866.4	H	52.43	38.52	9.45	61.88	47.97	74	54	-12.12	-6.03
N/A										
1069.22	V	52.68	37.41	5.15	57.83	42.56	74	54	-16.17	-11.44
2896.40	V	49.92	32.28	9.45	59.37	41.73	74	54	-14.63	-12.27
N/A										

Notes:

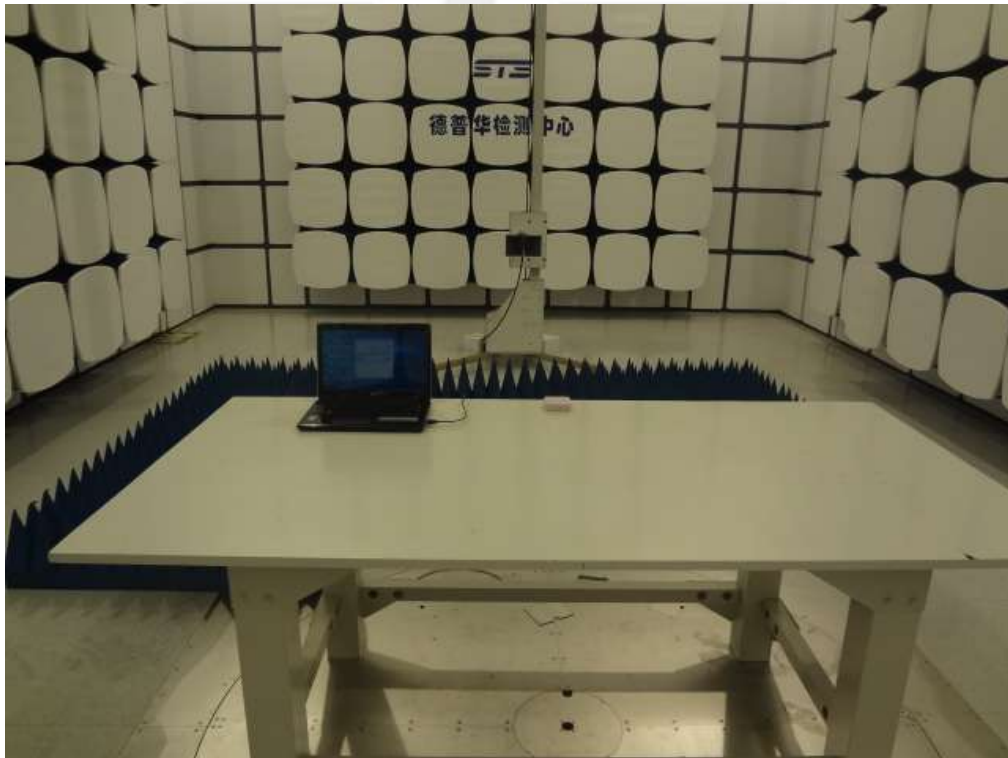
1. Measuring frequencies from 1 GHz to 6GHz.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak&AV detector mode of the emission shown in Actual FS column.
3. The frequency that above 3GHz is mainly from the environment noise.

4. PHOTOS OF TEST SETUP

Radiated Measurement Photos 30MHz- 1GHz



Above 1GHz





Conducted Measurement Photos

