



TEST REPORT

Report No.:	EM201100506-5	Application No.:	ZJ00012332
Client:	AirTies Wireless Networks		
Address:	Gulbahar Mah. Avni Dilligil sk. No:5 Celik Is Merkezi Mecidiyekoy Istanbul Turkey		
Sample Description:	300 Mbps 802.11n Wireless USB Adapter		
Model:	Air 2411		
Test Location:	Guangzhou GRG Metrology and Test Co., Ltd.		
Test Specification:	FCC PART 15 SUBPART B:2010		
Issue Date:	2012-01-17		
Test Result:	Pass.		
Prepared By:	Reviewed By:	Approved By:	
Shi Gang / Test Engineer	Angel Liu / Technical Assistance	Gavin Wu / Manager	
 Date:	 Date:	 Date:	
Other Aspects:			
None			
Abbreviations: ok / P = passed; fail / F = failed; n.a. / N = not applicable			
The test result in this test report refers exclusively to the presented test sample. This report shall not be reproduced except in full, without the written approval of GRGT.			

GRG Metrology and Test Co., Ltd.

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Ver.:2.0/ 01. Jan. 2011

DIRECTIONS OF TEST

- 1. This station carries out test task according to the national regulation of verifications which can be traced to National Primary Standards and BIPM.**
- 2. The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test result without the written permission of the test laboratory.**
- 3. If there is any objection concerning the test, the client should inform the laboratory within 15 days from the date of receiving the test report.**

TABLE OF CONTENTS

1. TEST RESULT SUMMARY	4
2. GENERAL DESCRIPTION OF EUT.....	5
2.1 APPLICANT	5
2.2 MANUFACTURER.....	5
2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST.....	5
2.4 TEST OPERATION MODES	5
2.5 LOCAL SUPPORTIVE INSTRUMENTS	5
3. LABORATORY AND ACCREDITATIONS.....	6
3.1 LABORATORY.....	6
3.2 ACCREDITATIONS	6
3.3 MEASUREMENT UNCERTAINTY	6
3.4 LIST OF USED TEST EQUIPMENT AT GRGT.....	7
4. EMISSION TEST	8
4.1 RADIATED ELECTROMAGNETIC DISTURBANCE MEASUREMENT	8
4.1.1 LIMITS.....	8
4.1.2 TEST PROCEDURE.....	8
4.1.3 TEST SETUP	9
4.1.4 TEST RESULTS	11
4.2 CONDUCTED EMISSION MEASUREMENT.....	13
4.2.1 LIMITS.....	13
4.2.2 TEST PROCEDURES.....	13
4.2.3 TEST SETUP	14
4.2.4 TEST RESULTS	15
APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT.....	17
APPENDIX B: PHOTOGRAPH OF THE EUT	19

1. TEST RESULT SUMMARY

FCC PART 15 SUBPART B:2010			
Standard	Item	Limit / Severity	Result
FCC PART 15 SUBPART B:2010	Conducted Disturbance	Class B	PASS
	Radiated Electromagnetic Disturbance	Class B	PASS

2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name: AirTies Wireless Networks
Address: Gulbahar Mah. Avni Dilligil sk. No:5 Celik Is Merkezi Mecidiyekoy
Istanbul, Turkey

2.2 MANUFACTURER

Name: Shenzhen Gongjin Electronics Co., Ltd.
Address: B116,B118;A211-A213,B201-B213;A311-313;B411-413, Nanshan
Medical Instrument Industry Park, 1019# Nanhai RD,Shenzhen,
P.R.China

2.3 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	300 Mbps 802.11n Wireless USB Adapter
Model No.:	Air 2411
Adding Model	/
Trade Name:	AirTies
Power Supply:	DC 5V(USB port)
Frequency Range	2412MHz~2472MHz:802.11b;802.11g;802.11n(HT20) 2422MHz~2462 MHz: 802.11n(HT40) (Channel with 5MHz step) 5745MHz~5825MHz: 802.11n (5 for 20MHz bandwidth; 2 for 40MHz bandwidth)
Type of emission	WIFI
Note:	/

2.4 TEST OPERATION MODES

Emission: CE : Test the EUT in WIFI function on.
RE : Test the EUT in receiving mode.

2.5 LOCAL SUPPORTIVE INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number
PC	Lenovo	E46L	EB22867264

3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests and measurements refer to this report were performed by Guangzhou GRG Metrology and Test Technology Co., Ltd.

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3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

USA	FCC Listed Lab No. 688188
China	CNAS NO.L0446
China	DILAC No.DL175
Canada	Registration No.:8355A-1

3.3 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:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	30MHz~1000MHz	4.2dB
	Vertical	30MHz~1000MHz	4.4dB
Conducted Emission		9kHz~30MHz	3.1 dB

This uncertainty represents an expanded uncertainty factor of $k=2$.

3.4 LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Radiated Emission				
Bi-Log Antenna	ETS-LINDGRE N	3142C	75971	2012-07-31
EMI Receiver	R&S	ESU40	100106	2012-09-26
Loop Antenna	ROHDE & SCHWARZ	HFH2-Z2	881058/28	2012-7-7
Conducted Emission				
EMI Receiver	R&S	ESU40	100106	2012-09-26
L.I.S.N	SCHWARZBECK	NSLK 8127	8127450	2012-08-21

4. EMISSION TEST

4.1 RADIATED ELECTROMAGNETIC DISTURBANCE MEASUREMENT

4.1.1 LIMITS

Frequency (MHz)	Quasi-peak(dB μ V/m)
30 ~ 88	40
88~216	43.5
216 ~ 960	46
Above 960	54

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

4.1.2 TEST PROCEDURE

Procedure of Preliminary Test

Radiated emission tests shall be made with the receive or transmit antenna located at a horizontal distance of 3 m plus half of the maximum width of the EUT being tested, measured from the centre of the EUT. The tests shall be performed with the equipment configured as closely as possible to its typical, practical operation. Unless stated otherwise, cables and wiring shall be as specified by the manufacturer and the equipment shall be in its housing (or cabinet) with all covers and access panels in place. Any deviation from normal EUT operating conditions shall be included in the test report.

The EUT (on a non-conductive support structure, where applicable) shall be placed on a remotely operated turntable, to allow the EUT to be rotated. The height of the EUT above the ground plane shall be according to the following requirements.

- Table-top equipment is placed on a non-conductive set-up table with height $0,8\text{ m} \pm 0,01\text{ m}$, ANSI C63.4 specifies the method to determine the impact of the non-conductive set-up table on test results.
- Floor-standing equipment is placed on a non-conductive support, as specified in the applicable product standard. If there are no EUT height placement requirements in the product standard, the EUT shall be placed on a non-conductive support at a height of 5 cm to 15 cm above the ground plane.

Interface cables, loads, and devices should be connected to at least one of each type of the interface ports of the EUT and, where practical, each cable shall be terminated in a device typical for its actual use. Where there are multiple interface ports of the same type, a typical number of these devices shall be connected to devices or loads. It is sufficient to connect only one of the loads, provided that it can be shown, for example by preliminary testing, that the connection of further ports would not significantly increase the level of disturbance (that is, more than 2 dB) or significantly degrade the immunity level.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

Procedure of Final Test

EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test. The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level. Record at least six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only QP reading is presented. The test data of the worst-case condition(s) was recorded.

4.1.3 TEST SETUP

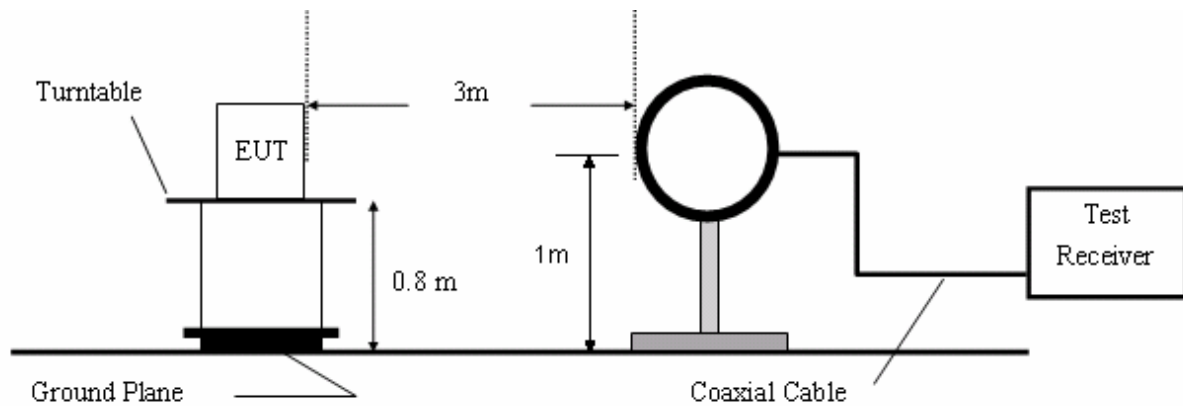


Figure 1. 9KHz to 30MHz radiated emissions test configuration

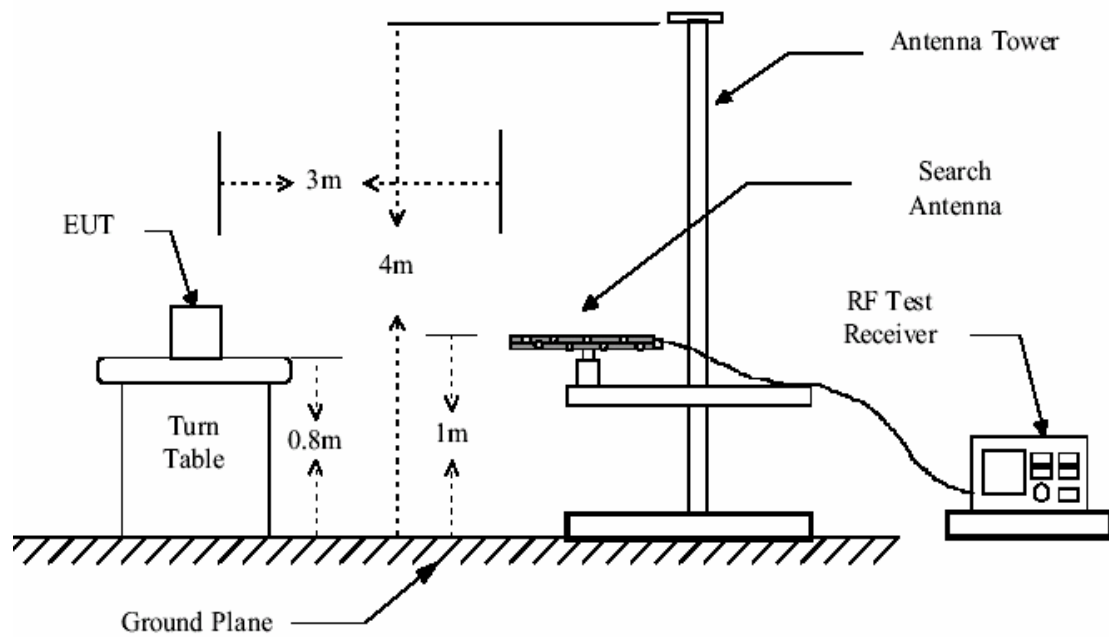


Figure 2. 30MHz to 1GHz radiated emissions test configuration

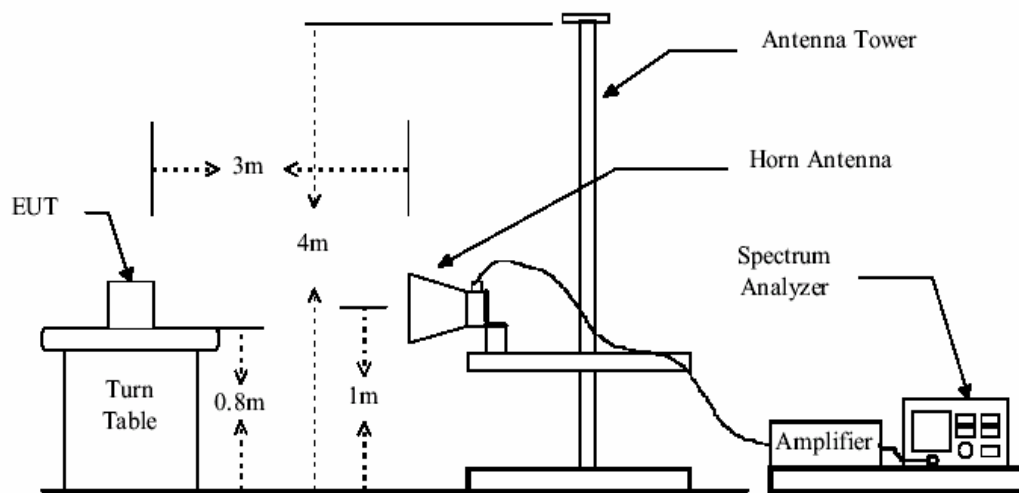
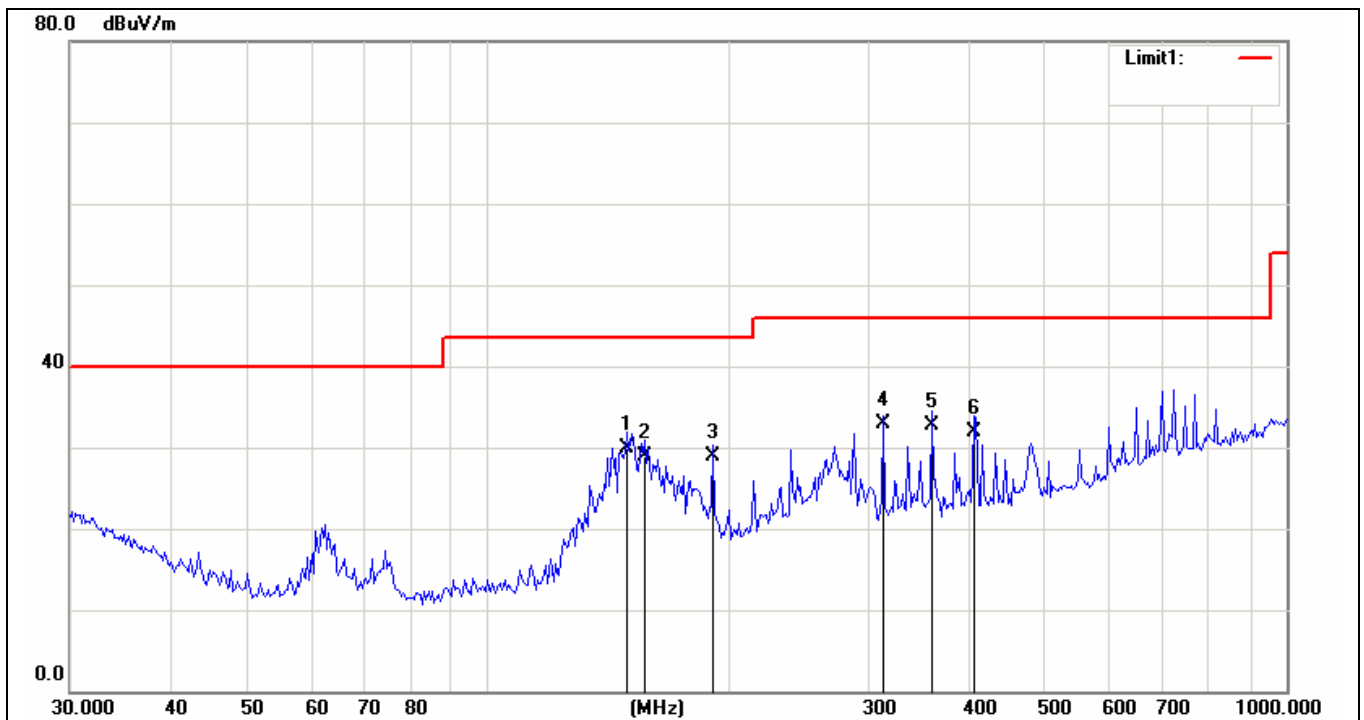


Figure 3. Above 1GHz radiated emissions test configuration

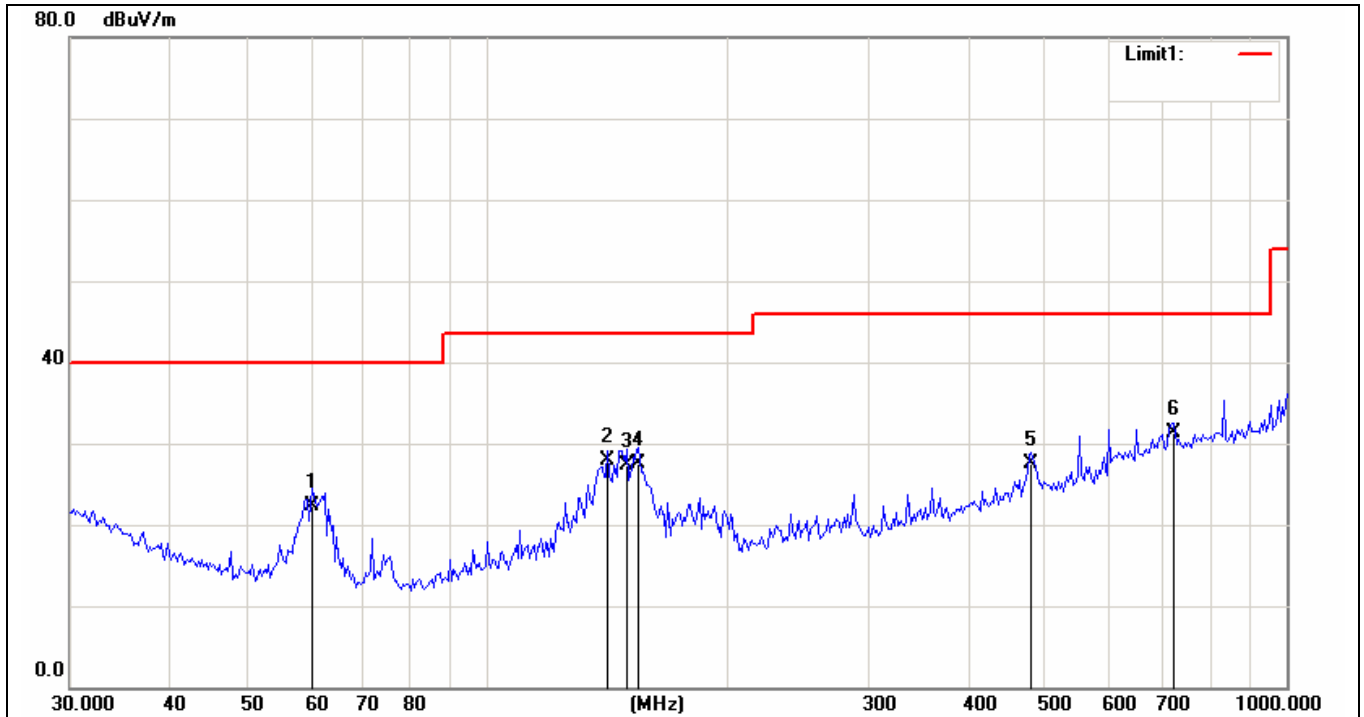
4.1.4 TEST RESULTS

Test Result:	Pass	Probe:	Horizontal
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2011-12-15
Temp./Hum.(%RH):	26/60%RH	Model:	AIR 2411
EUT:	300 MBPS 802.11N WIRELESS USB ADAPTER		
Note:	Test the EUT in receiving mode.		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	149.6606	19.75	10.10	29.85	43.50	-13.65	QP
2	157.4244	18.26	10.56	28.82	43.50	-14.68	QP
3	191.6416	17.50	11.45	28.95	43.50	-14.55	QP
4	312.4743	17.20	15.78	32.98	46.00	-13.02	QP
5	359.6061	15.20	17.44	32.64	46.00	-13.36	QP
6	406.9287	13.67	18.24	31.91	46.00	-14.09	QP

Test Result:	Pass	Probe:	Vertical
Standard:	(RE)FCC PART 15 class B 3m	Power Source:	AC 120V/60Hz
Test item:	Radiation Test	Date:	2011-12-15
Temp./Hum.(%RH):	26/60%RH	Model:	AIR 2411
EUT:	300 MBPS 802.11N WIRELESS USB ADAPTER		
Note:	Test the EUT in receiving mode.		



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	60.2205	14.20	8.01	22.21	40.00	-17.79	QP
2	141.4823	18.60	9.32	27.92	43.50	-15.58	QP
3	149.6606	17.20	10.10	27.30	43.50	-16.20	QP
4	154.7927	17.11	10.40	27.51	43.50	-15.99	QP
5	478.9532	7.50	20.00	27.50	46.00	-18.50	QP
6	721.8557	7.10	24.24	31.34	46.00	-14.66	QP

Note: Below 30MHz, since the radiated emission of the EUT is too weak to be detected.

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS

Frequency range	Limits (dB μ V)	
	Quasi-peak	Average
150kHz ~ 0.5MHz	66~56	56~46
0.5 MHz ~ 5 MHz	56	46
5 MHz ~ 30 MHz	60	50

NOTE: (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 150kHz to 0.5MHz.

4.2.2 TEST PROCEDURES

Procedure of Preliminary Test

For measurement of the disturbance voltage the equipment under test (EUT) is connected to the power supply mains and any other extended network via one or more artificial network(s). An EUT, whether intended to be grounded or not, and which is to be used on a table is configured as follows:

- Either the bottom or the rear of the EUT shall be at a controlled distance of 40 cm from a reference ground plane. This ground plane is normally the wall or floor of a shielded room. It may also be a grounded metal plane of at least 2 m by 2 m. This is physically accomplished as follows:

- 1) place the EUT on a table of non-conducting material which is at least 80 cm high. Place the EUT so that it is 40 cm from the wall of the shielded room, or

- 2) place the EUT on a table of non-conducting material which is 40 cm high so that the bottom of the EUT is 40 cm above the ground plane;

- All other conductive surfaces of the EUT shall be at least 80 cm from the reference ground plane;

- The EUT are placed on the floor that one side of the housings is 40 cm from the vertical reference ground plane and other metallic parts;

- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 cm to 40 cm long, hanging approximately in the middle between the ground plane and the table.

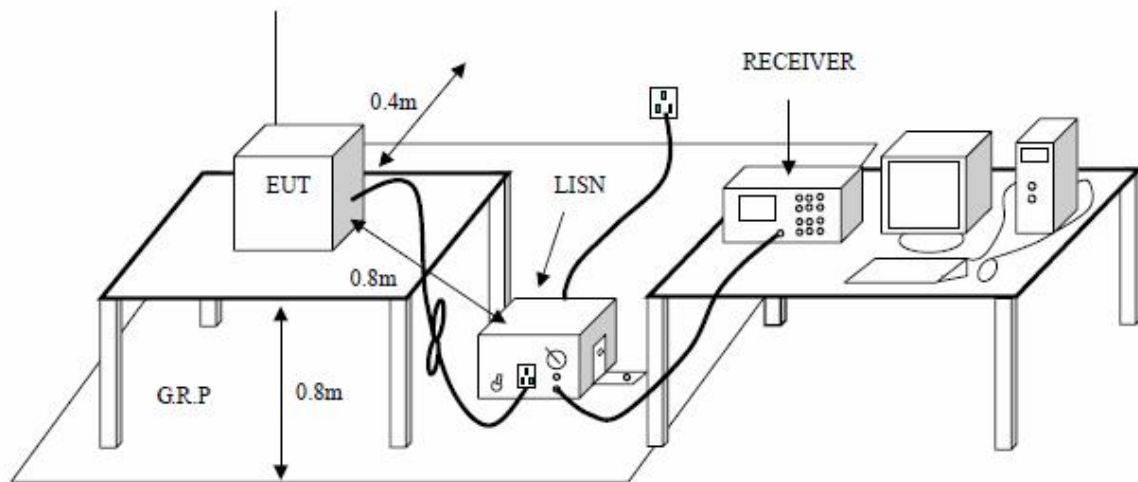
- I/O cables that are connected to a peripheral shall be bundled in the centre. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.

The test mode(s) described in Item 2.4 were scanned during the preliminary test. After the preliminary scan, we found the test mode described in Item 2.4 producing the highest emission level. The EUT configuration and cable configuration of the above highest emission levels were recorded for reference of the final test.

Procedure of Final Test

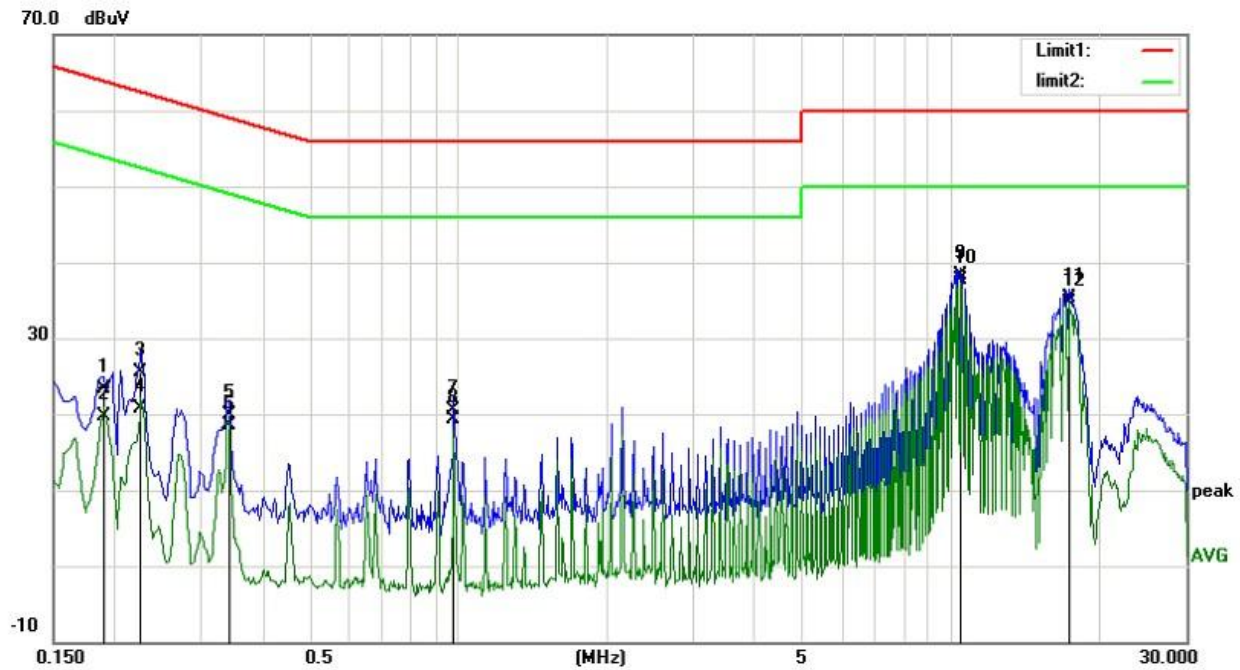
EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test. A scan was taken on both power lines, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. The test data of the worst-case condition(s) was recorded.

4.2.3 TEST SETUP



4.2.4 TEST RESULTS

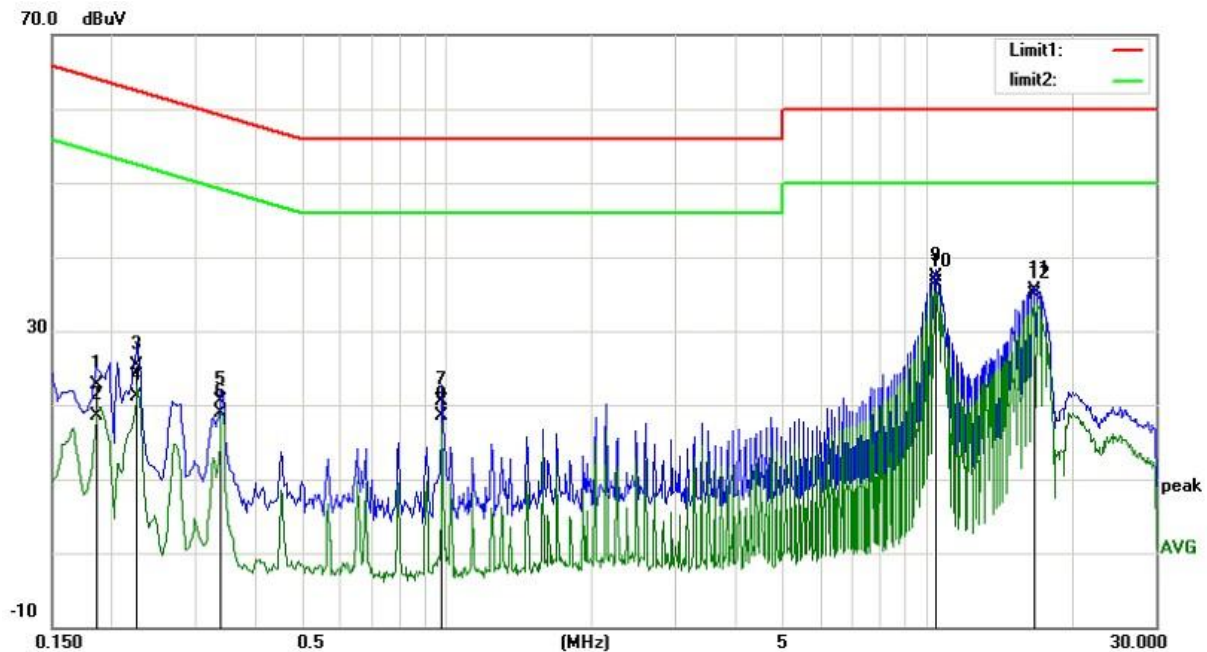
Test Result:	Pass	Probe:	L1
Standard:	(CE)FCC PART 15 class B_QP	Power Source:	AC 120V/60Hz
Test item:	Conduction Test	Date:	2012-1-9
Temp./Hum.(%RH):	25/57%RH	Time:	14:35:32
EUT:	300 Mbps 802.11n Wireless USB Adapter	Model:	Air 2411
Note:	Test the EUT in WIFI function on.		



QP and Average measure:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1900	22.12	1.28	23.40	64.03	-40.63	QP	
2		0.1900	18.52	1.28	19.80	54.03	-34.23	AVG	
3		0.2260	24.63	0.97	25.60	62.59	-36.99	QP	
4		0.2260	19.83	0.97	20.80	52.59	-31.79	AVG	
5		0.3420	19.07	0.83	19.90	59.15	-39.25	QP	
6		0.3420	17.77	0.83	18.60	49.15	-30.55	AVG	
7		0.9778	20.09	0.41	20.50	56.00	-35.50	QP	
8		0.9778	18.89	0.41	19.30	46.00	-26.70	AVG	
9		10.4098	37.51	0.79	38.30	60.00	-21.70	QP	
10	*	10.4098	37.01	0.79	37.80	50.00	-12.20	AVG	
11		17.3059	34.23	1.07	35.30	60.00	-24.70	QP	
12		17.3059	33.73	1.07	34.80	50.00	-15.20	AVG	

Test Result:	Pass	Probe:	N
Standard:	(CE)FCC PART 15 class B_QP	Power Source:	AC 120V/60Hz
Test item:	Conduction Test	Date:	2012-1-9
Temp./Hum.(%RH):	25/57%RH	Time:	14:40:38
EUT:	300 Mbps 802.11n Wireless USB Adapter	Model:	Air 2411
Note:	Test the EUT in WIFI function on.		



QP and Average measure:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1859	21.45	1.35	22.80	64.21	-41.41	QP	
2	0.1859	17.25	1.35	18.60	54.21	-35.61	AVG	
3	0.2260	24.33	0.97	25.30	62.59	-37.29	QP	
4	0.2260	20.13	0.97	21.10	52.59	-31.49	AVG	
5	0.3379	19.66	0.84	20.50	59.25	-38.75	QP	
6	0.3379	18.16	0.84	19.00	49.25	-30.25	AVG	
7	0.9779	20.19	0.41	20.60	56.00	-35.40	QP	
8	0.9779	18.19	0.41	18.60	46.00	-27.40	AVG	
9	10.3978	36.51	0.79	37.30	60.00	-22.70	QP	
10 *	10.3978	35.71	0.79	36.50	50.00	-13.50	AVG	
11	16.8338	34.65	0.95	35.60	60.00	-24.40	QP	
12	16.8338	34.05	0.95	35.00	50.00	-15.00	AVG	

APPENDIX A: PHOTOGRAPH OF THE TEST ARRANGEMENT

Radiated Emission (Below 30MHz)

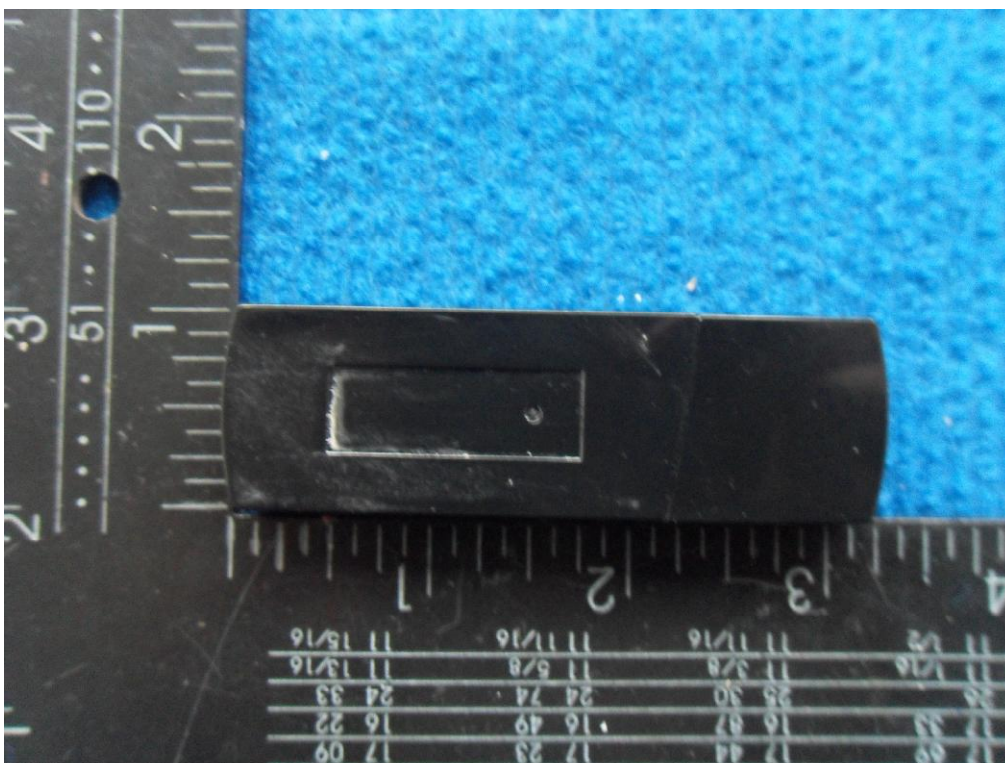


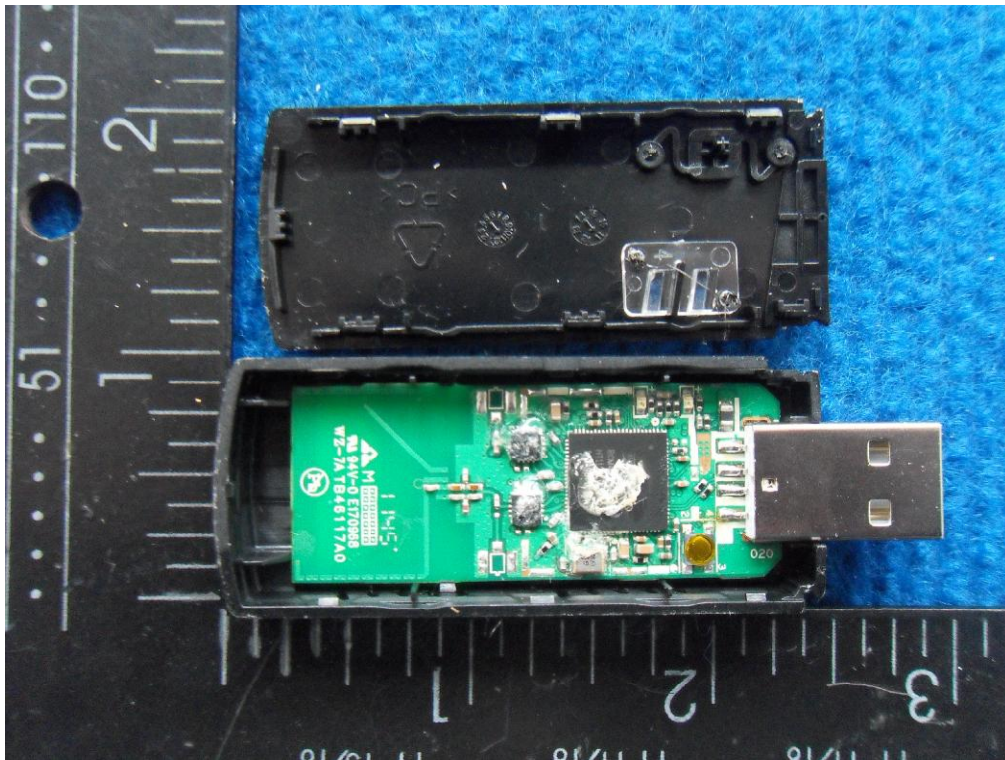
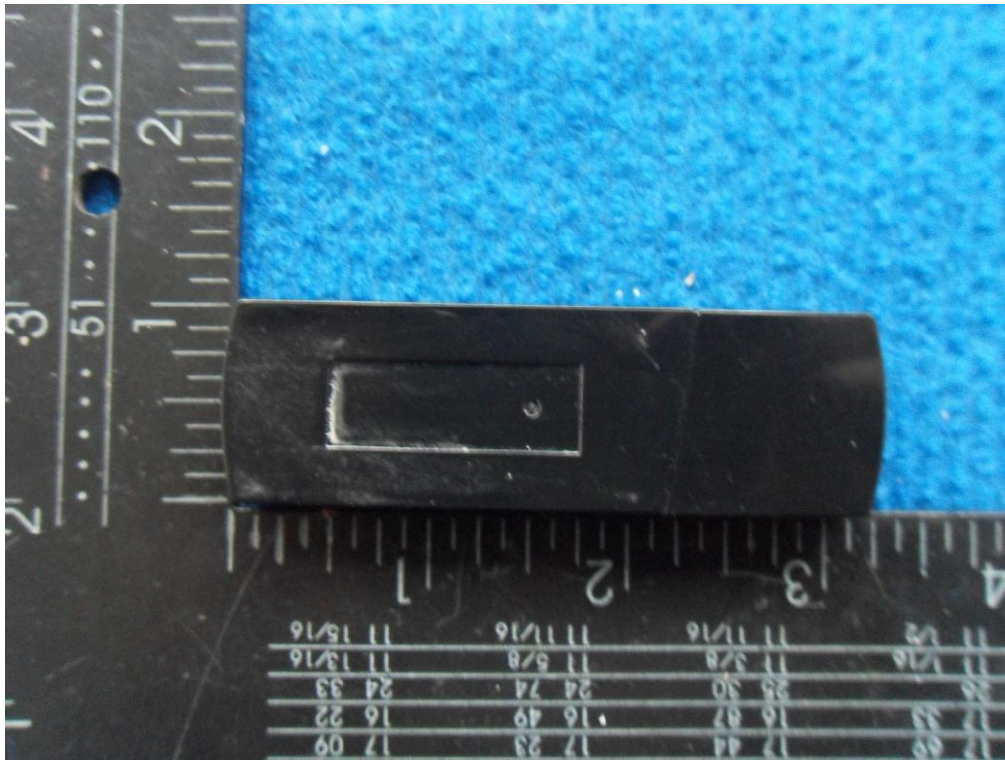
Radiated Emission (30MHz- 1GHz)

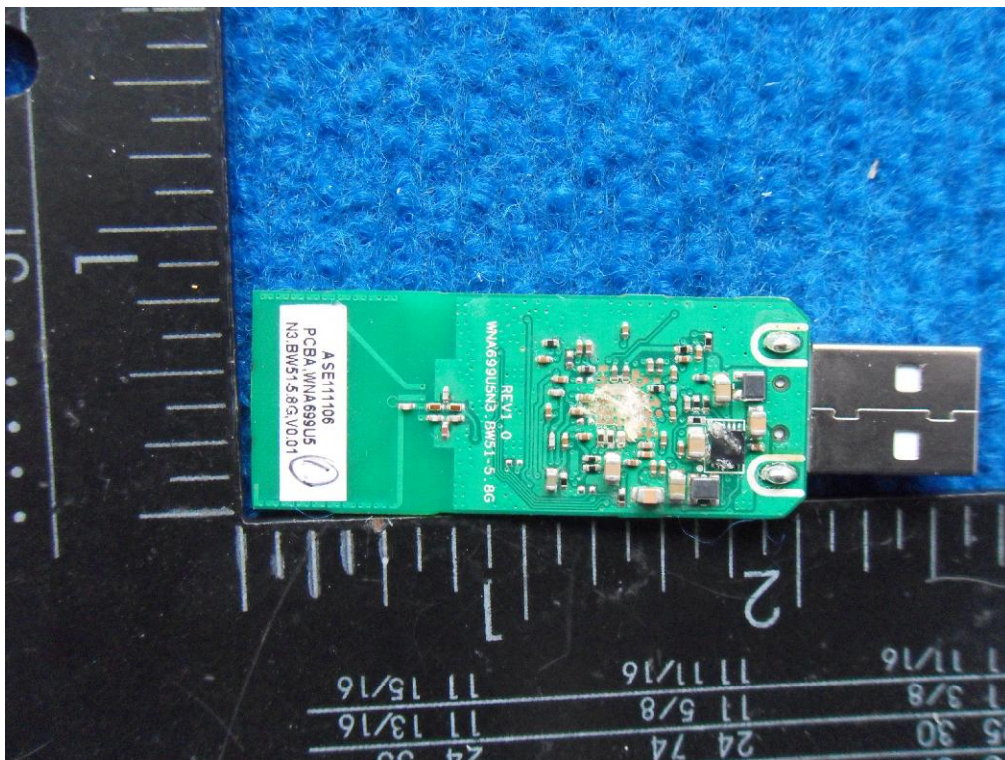
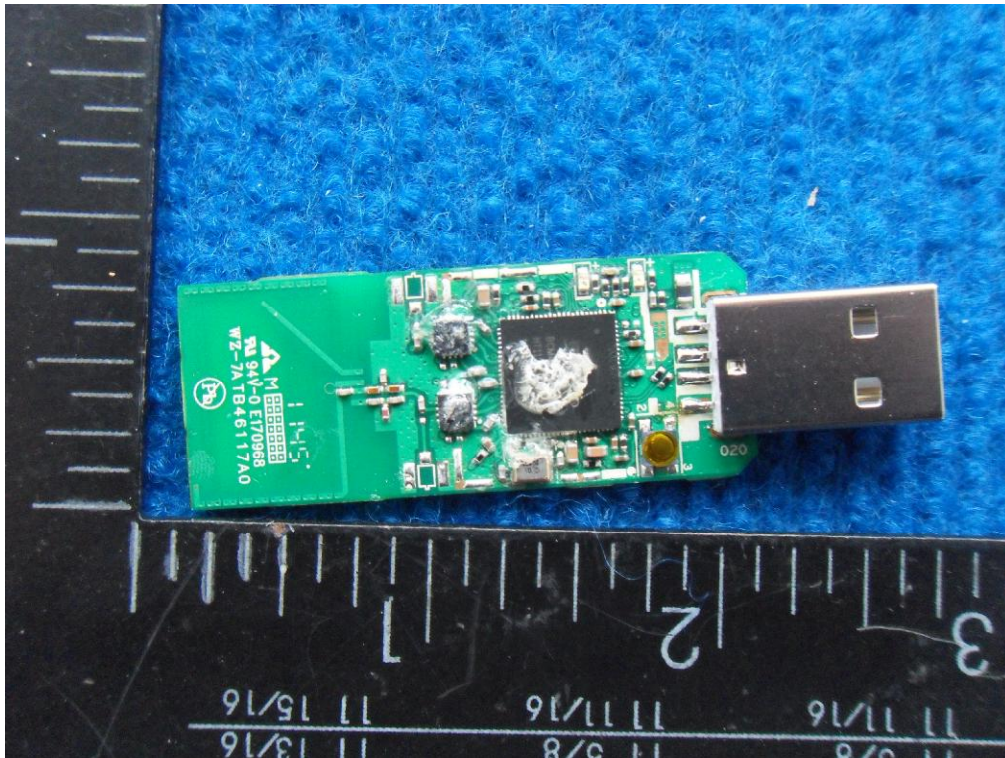


Conducted Emission



APPENDIX B: PHOTOGRAPH OF THE EUT





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