FCC DOC TEST REPORT

Declaration **o**f **C**onformity

according to

47 CFR, Part 2, Part 15, CISPR PUB. 22

Applicant	:	Motorola, Inc.
Address	:	46653 Frenont Blvd, Fremont, CA 94538
Equipment	:	Motorola 802.11n USB Adapter
Model No.	:	TER-NUSB1
Trade Name	:	Motorola

Laboratory accreditation

Testing Laboratory
1332

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of ***Cerpass Technology Corp.*** the test report shall not be reproduced except in full.

Contents

CERTIFICATE OF COMPLIANCE

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Address	:	46653 Frenont Blvd, Fremont, CA 94538
Equipment	:	Motorola 802.11n USB Adapter
Model No.	:	TER-NUSB1

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 – 2003** and the energy emitted by this equipment was ***passed*** **CISPR PUB. 22, FCC Part 15 i**n both radiated and conducted emission class B limits. Testing was carried out on Aug. 03, 2009 at **Cerpass Technology Corp**.

Signature

Anson Chou
EMC/RF B.U. Vice General Manager

1. Test Configuration of Equipment under Test

1.1. Feature of Equipment under Test

Standards:	IEEE802.11a, IEEE 802.11b, IEEE 802.11g, Draft 802.11n compliant
Computer Slot Type:	USB
Chipset:	Ralink RT2770(MAC/BB), RT2750(RF)
Tx:	1
Rx:	2
Operating Frequency:	2.4 ~ 2.4835 GHz 5.150~5.250GHz, 5.725~5.825GHz
Modulation Technique:	
Draft 802.11n:	BPSK, QPSK, 16-QAM, 64-QAM
802.11a/g:	OFDM
802.11b:	CCK,QPSK,BPSK
Media Access Protocol:	CSMA/CA
Operating Voltage:	5V +/- 5%
Transmit Power:	802.11n: 13.5 +/- 1 dBm 802.11a/g: 13.5 +/- 1 dBm 802.11b: 17 +/- 1 dBm
Security:	WPA/WPA2; 128-bit TKIP/AES encryption, 40/64-, 128-bit WEP shared-key encryption 802.1x, and EAP-TLS, and PEAP authentication
OS Requirements:	Windows Vista/XP
Antenna Type / Gain:	PCB Antenna / 3.89dBi PCB Antenna/ 1.73dBi

1.2. Test Manner

a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.

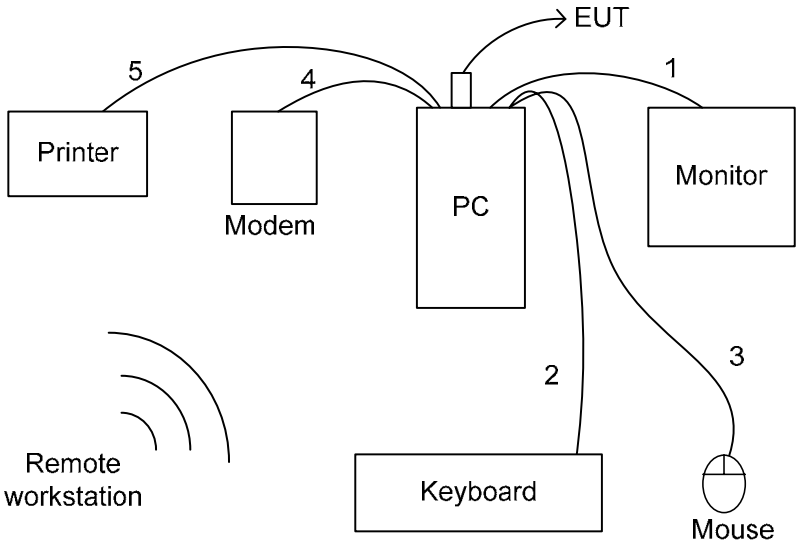
b. The complete test system included remote workstation, PC, Monitor, Keyboard, Mouse, Modem, Printer and EUT for EMI test. The remote workstation includes Notebook.

c. An executive program, “Ping.exe” under WIN XP, which transmits and receives data to the remote workstation through Wireless.

1.3. Description of Test System

Device	Manufacturer	Model No.	Description
PC	IBM	IGV	Power Cable, Unshielding 1.8 m
Monitor	ViewSonic	G90fB	Power Cable, Adapter Unshielding 1.8 m Data Cable, VGA Shielding 1.35 m
Keyboard	IBM	KB-0225	Data Cable, PS2 Shielding 1.85 m
Mouse	IBM	MU29J	Data Cable, PS2 Shielding 1.85 m
Modem	ACEXX	DM-1414	Power Cable, Adapter Unshielding 1.8 m Data Cable, RS232 Shielding 1.35 m
Printer	HP	Desk Jet 400	Power Cable, Adapter Unshielding 1.8 m Data Cable, Print Shielding 1.6 m
Remote Workstation			
Notebook	Toshiba	PSA50T-05M00C	Power Cable, Adapter Unshielding 1.8m

1.4. Connection Diagram of Test System



1. The VGA cable is connected from PC to the Monitor.
2. The PS2 cable is connected from PC to the PS2 Keyboard.
3. The PS2 cable is connected from PC to the PS2 Mouse.
4. The RS232 cable is connected from PC to the Modem.
5. The Print cable is connected from PC to the Printer.

＊ The EUT keeps to transmit and receive data to remote workstation by Wireless.

1.5. General Information of Test

Test Site :	Cerpass Technology Corp. 2F-11, No. 3, Yuan Qu St., (Nankang Software Park), Taipei, Taiwan 115, R.O.C.
Test Site Location (OATS1-SD):	No. 7-2, Moshihkeng, Fongtian Village, Shihding Township, Taipei County, Taiwan, R.O.C.
FCC Registration Number :	TW1049, 488071, 982971
IC Registration Number :	4934C-1, 4934D-1
VCCI Registration Number :	T-543 for Telecommunication Test C-3328 for Conducted emission test R-3013 for Radiated emission test
Test Voltage:	AC 120V / 60Hz
Test in Compliance with:	ANSI C63.4-2003 FCC Part 15 Subpart B
Frequency Range Investigated :	Conducted Emission Test: from 150kHz to 30 MHz Radiated Emission Test: from 30 MHz to 6,000 MHz
Test Distance :	The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.

1.6. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE/NEUTRAL	2.71 dB
Radiated Emission	30 MHz ~ 6GHz	Vertical	3.89 dB
		Horizontal	3.59 dB

1.7. History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description

2. Test of Conducted Emission

2.1. Test Limit

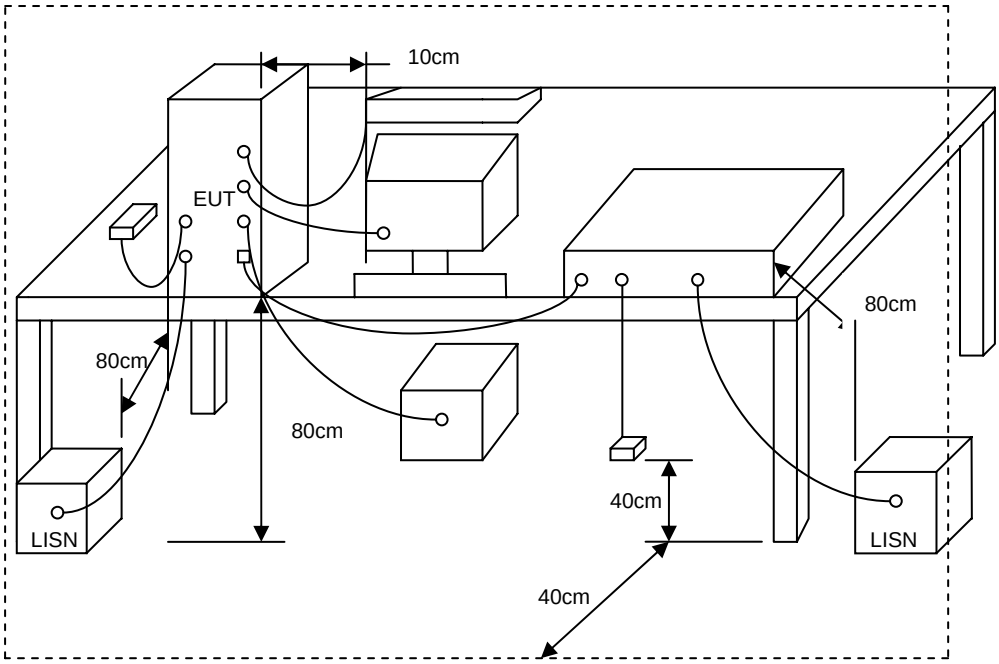
Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2003 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

2.2. Test Procedures

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

2.3. Typical test Setup

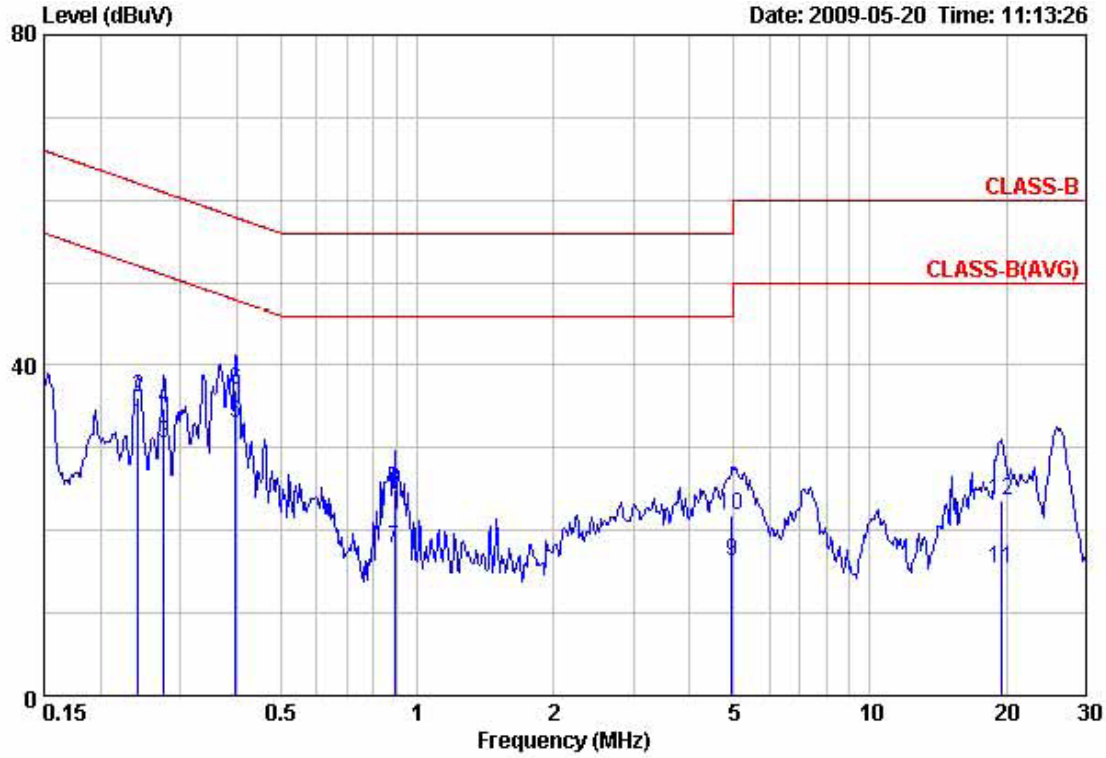


2.4. Measurement equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100443	2008/09/27	2009/09/26
LISN	NSLK 8127	Schwarzbeck	8127-516	2009/05/15	2010/05/14
LISN	Rolf Heine	NNB-2/16Z	03/10058	2009/04/18	2010/04/17

2.5. Test Result and Data

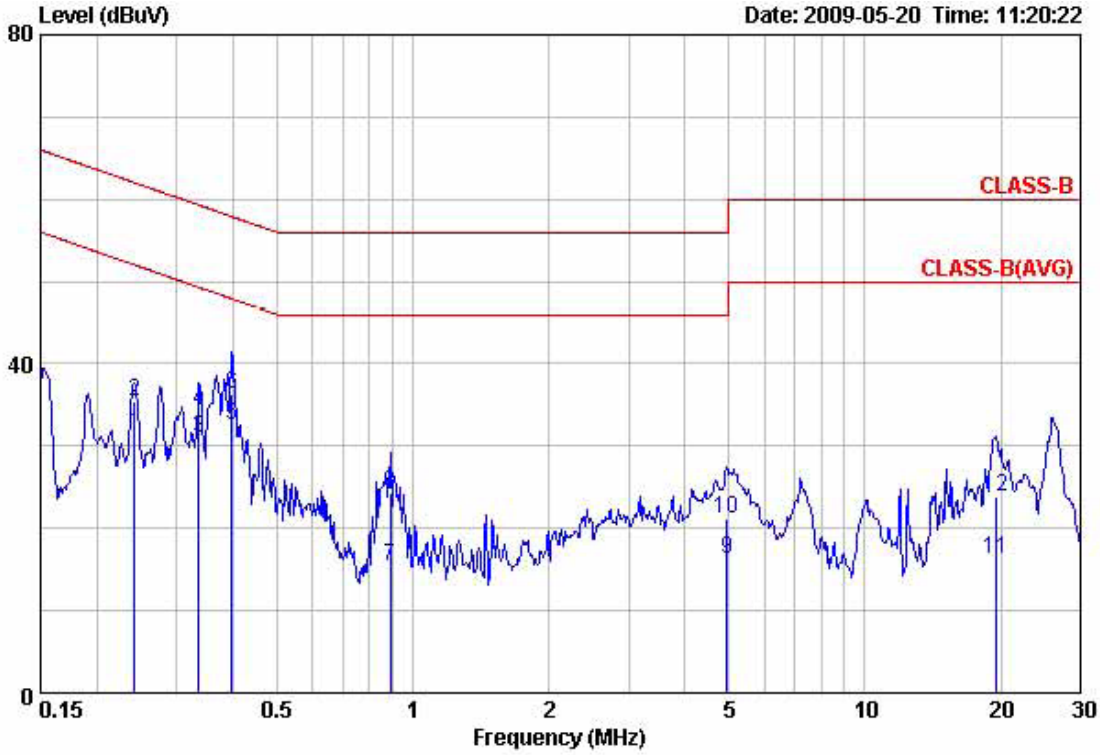
Power	:	AC 120V	Pol/Phase	:	LINE
Test Mode	:	LINK WIRELESS	Temperature	:	25 °C
Memo	:		Humidity	:	56 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV/m	dB	dBuV	dBuV	dBuV	
1	0.242	32.649	0.090	32.739	52.039	-19.300	Average
2	0.242	36.039	0.090	36.129	62.039	-25.910	QP
3	0.276	30.462	0.090	30.552	50.939	-20.387	Average
4	0.276	34.587	0.090	34.677	60.939	-26.262	QP
5	0.398	32.866	0.080	32.946	47.903	-14.957	Average
6	0.398	36.971	0.080	37.051	57.903	-20.852	QP
7	0.890	17.762	0.106	17.868	46.000	-28.132	Average
8	0.890	24.753	0.106	24.859	56.000	-31.141	QP
9	4.952	15.976	0.208	16.184	46.000	-29.816	Average
10	4.952	21.602	0.208	21.810	56.000	-34.190	QP
11	19.428	15.100	0.233	15.333	50.000	-34.667	Average
12	19.428	23.473	0.233	23.706	60.000	-36.294	QP

Remarks: 1. Result = Read Value + Factor
2. Factor = LISN(ISN) Factor + Cable Loss

Power	:	AC 120V	Pol/Phase	:	NEUTRAL
Test Mode	:	LINK WIRELESS	Temperature	:	25 °C
Memo	:		Humidity	:	56 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark
	MHz	dBuV/m	dB	dBuV	dBuV	dBuV	
1	0.242	31.294	0.113	31.407	52.039	-20.632	Average
2	0.242	35.421	0.113	35.534	62.039	-26.505	QP
3	0.336	30.803	0.110	30.913	49.311	-18.398	Average
4	0.336	34.099	0.110	34.209	59.311	-25.102	QP
5	0.398	32.423	0.110	32.533	47.903	-15.370	Average
6	0.398	36.169	0.110	36.279	57.903	-21.624	QP
7	0.890	15.195	0.127	15.322	46.000	-30.678	Average
8	0.890	24.091	0.127	24.218	56.000	-31.782	QP
9	4.952	16.042	0.202	16.244	46.000	-29.756	Average
10	4.952	21.035	0.202	21.237	56.000	-34.763	QP
11	19.428	15.836	0.388	16.224	50.000	-33.776	Average
12	19.428	23.524	0.388	23.912	60.000	-36.088	QP

Remarks: 1. Result = Read Value + Factor
2. Factor = LISN(ISN) Factor + Cable Loss

Test engineer: Tom

2.6. Test Photographs

Front View

Rear View

3. Test of Radiated Emission

3.1. Test Limit

Radiated emissions from 30 MHz to 2,000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-2003. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 3.2. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions. For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance Meters	Radiated (μ V / M)	Radiated (dB μ V/ M)
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
Above 960	3	500	54.0

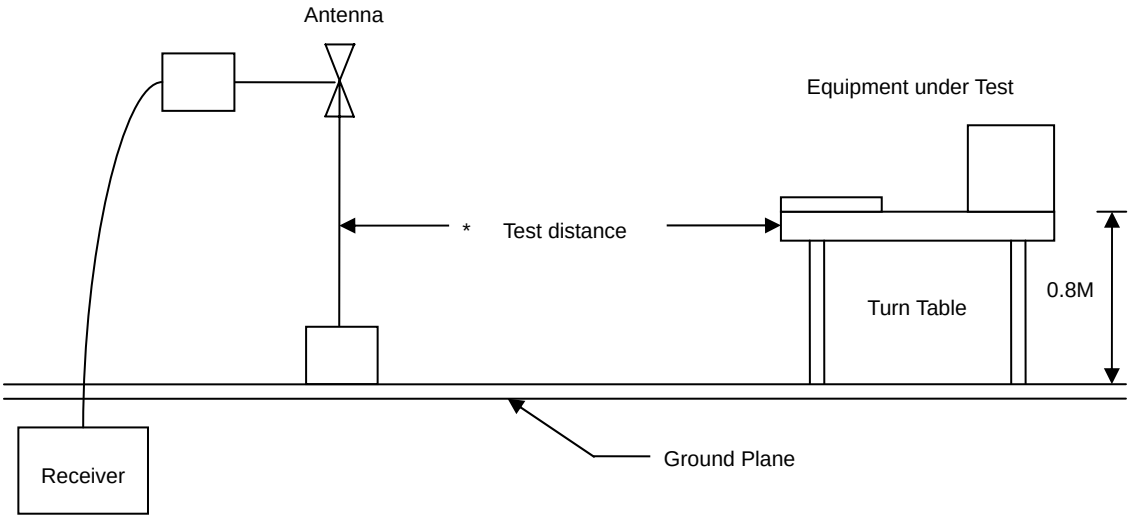
For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

Frequency (MHz)	Distance Meters	Radiated (dB μ V/ M)
30-230	10	30
230-1000	10	37

3.2. Test Procedures

a. The EUT was placed on a Rota table top 0.8 meter above ground.
b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

3.3. Typical test Setup

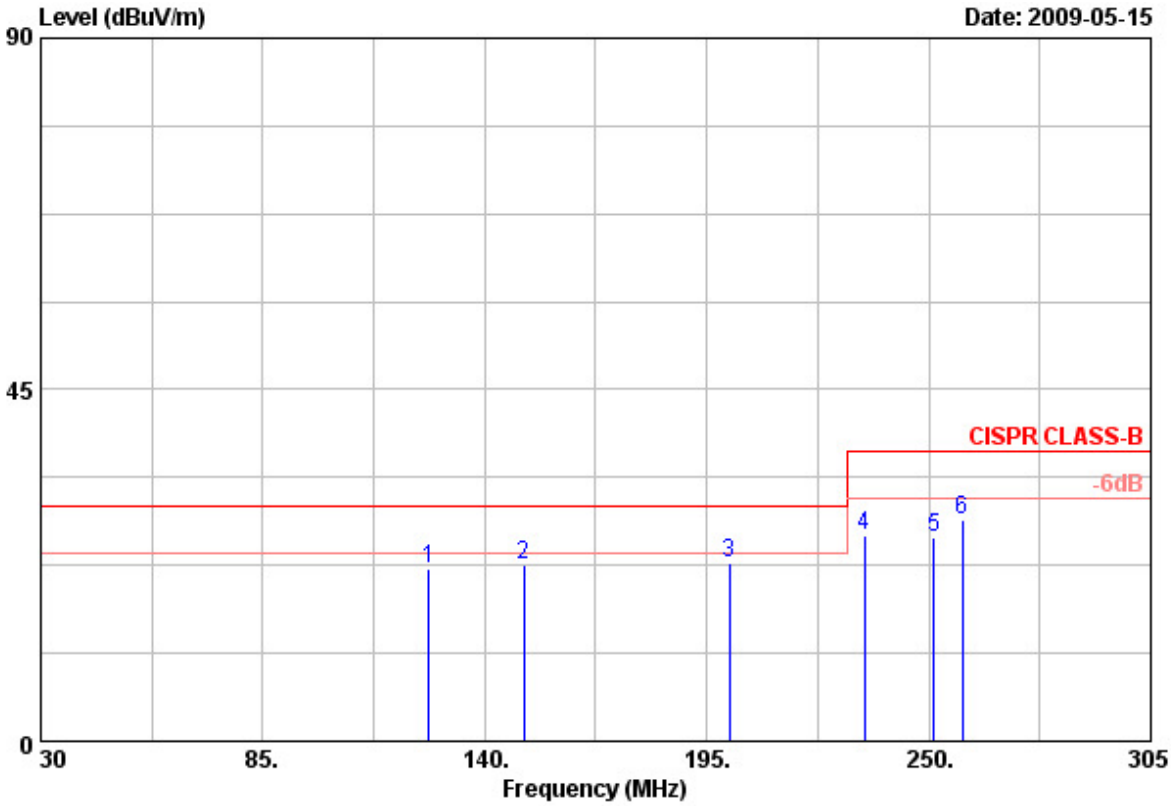


3.4. Measurement equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Bilog Antenna	CBL6112B	Schaffner	2840	2009/05/14	2010/05/13
Signal Generator	8648B	HP	3629U00612	2008/10/08	2009/10/07
Amplifier	8447D	Agilent	2944A10593	2009/05/21	2010/05/20
EMI Receiver	8546A	HP	3807A00454	2008/08/07	2009/08/06
RF Filter Section	85460A	HP	3704A00386	2008/08/07	2009/08/06
AC Power Converter	AFC-11005	APC	F103120008	N/A	N/A

3.5. Test Result and Data

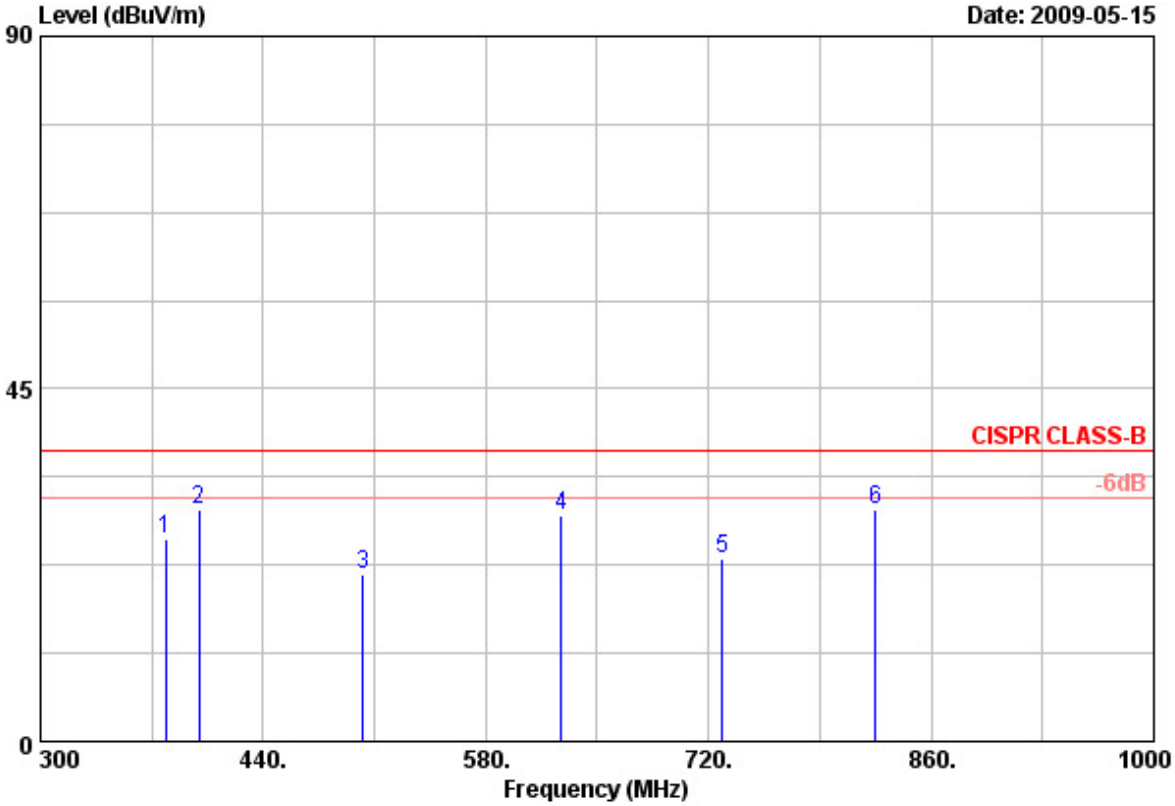
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	LINK WIRELESS	Temperature	:	30 °C
Memo	:		Humidity	:	55 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	126.250	36.100	-13.940	22.160	30.000	-7.840	Peak	100	360
2	149.625	36.330	-13.704	22.626	30.000	-7.374	Peak	100	360
3	200.500	39.369	-16.464	22.905	30.000	-7.095	Peak	100	360
4	234.050	41.379	-15.162	26.217	37.000	-10.783	Peak	100	360
5	251.375	39.980	-14.029	25.951	37.000	-11.049	Peak	100	360
6	258.250	41.819	-13.500	28.319	37.000	-8.681	Peak	100	360

Remarks: 1. Result = Read Value + Factor
2. Factor = Antenna factor + Cable loss - Amplifier factor

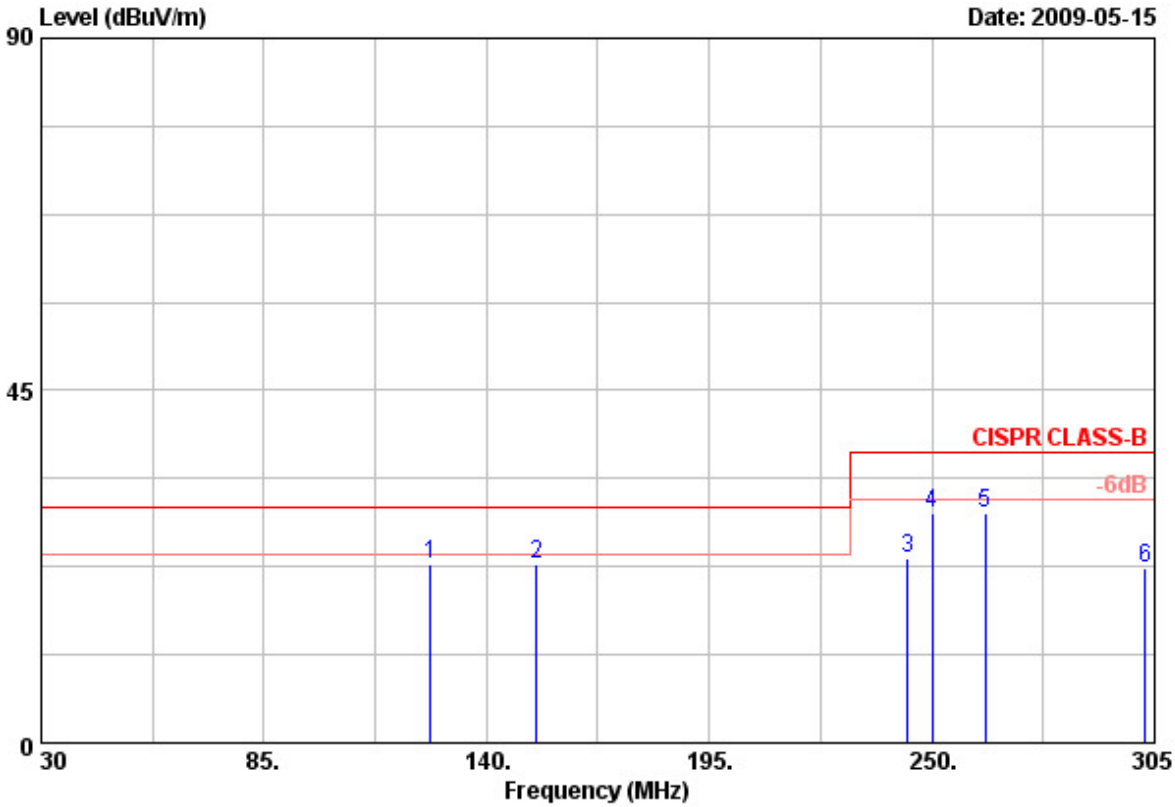
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	LINK WIRELESS	Temperature	:	30 °C
Memo	:		Humidity	:	55 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	378.400	34.239	-8.357	25.882	37.000	-11.118	Peak	100	360
2	399.400	37.140	-7.679	29.461	37.000	-7.539	Peak	100	360
3	503.000	28.071	-6.685	21.386	37.000	-15.614	Peak	100	360
4	627.600	33.711	-4.878	28.833	37.000	-8.167	Peak	100	360
5	728.400	26.751	-3.349	23.402	37.000	-13.598	Peak	100	360
6	825.000	30.300	-0.738	29.562	37.000	-7.438	Peak	100	360

Remarks: 1. Result = Read Value + Factor
2. Factor = Antenna factor + Cable loss - Amplifier factor

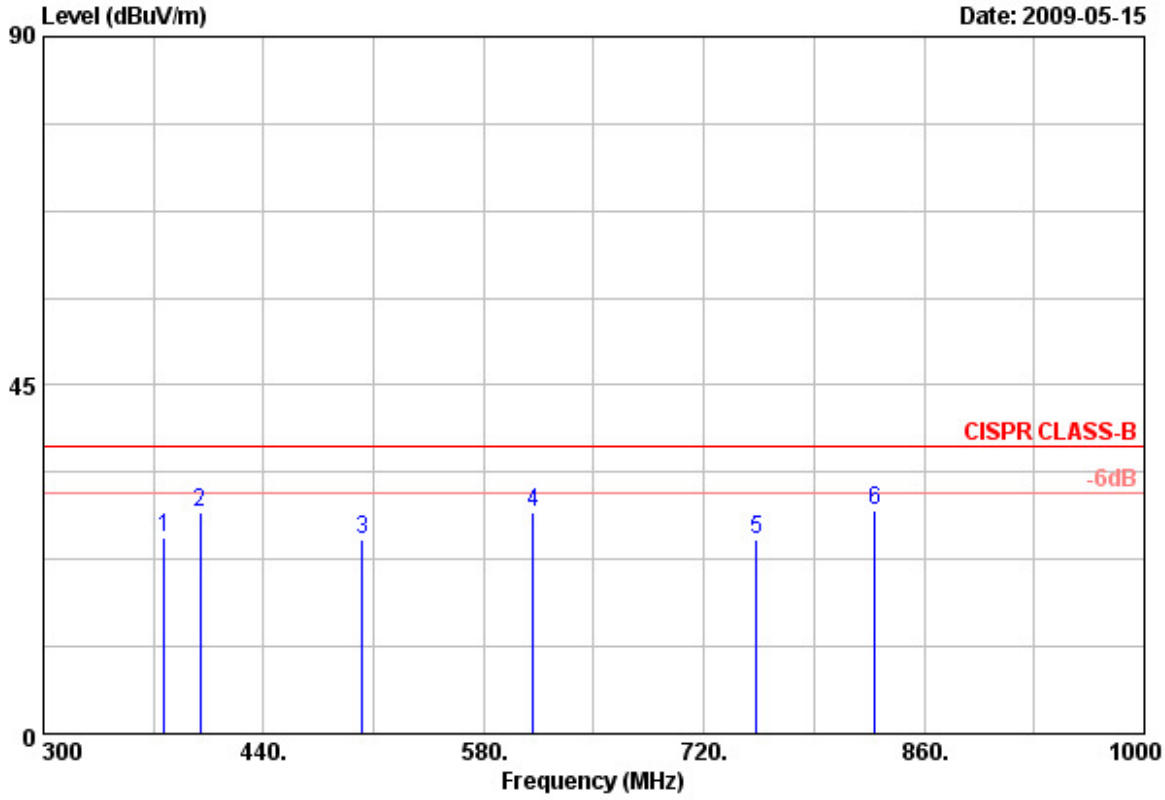
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	LINK WIRELESS	Temperature	:	30 °C
Memo	:		Humidity	:	55 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	126.250	36.780	-13.940	22.840	30.000	-7.160	Peak	400	0
2	152.375	36.049	-13.198	22.851	30.000	-7.149	Peak	400	0
3	243.950	38.120	-14.502	23.618	37.000	-13.382	Peak	400	0
4	250.000	43.390	-14.135	29.255	37.000	-7.745	Peak	400	0
5	263.200	42.530	-13.168	29.362	37.000	-7.638	Peak	400	0
6	302.800	33.400	-11.083	22.317	37.000	-14.683	Peak	400	0

Remarks: 1. Result = Read Value + Factor
2. Factor = Antenna factor + Cable loss - Amplifier factor

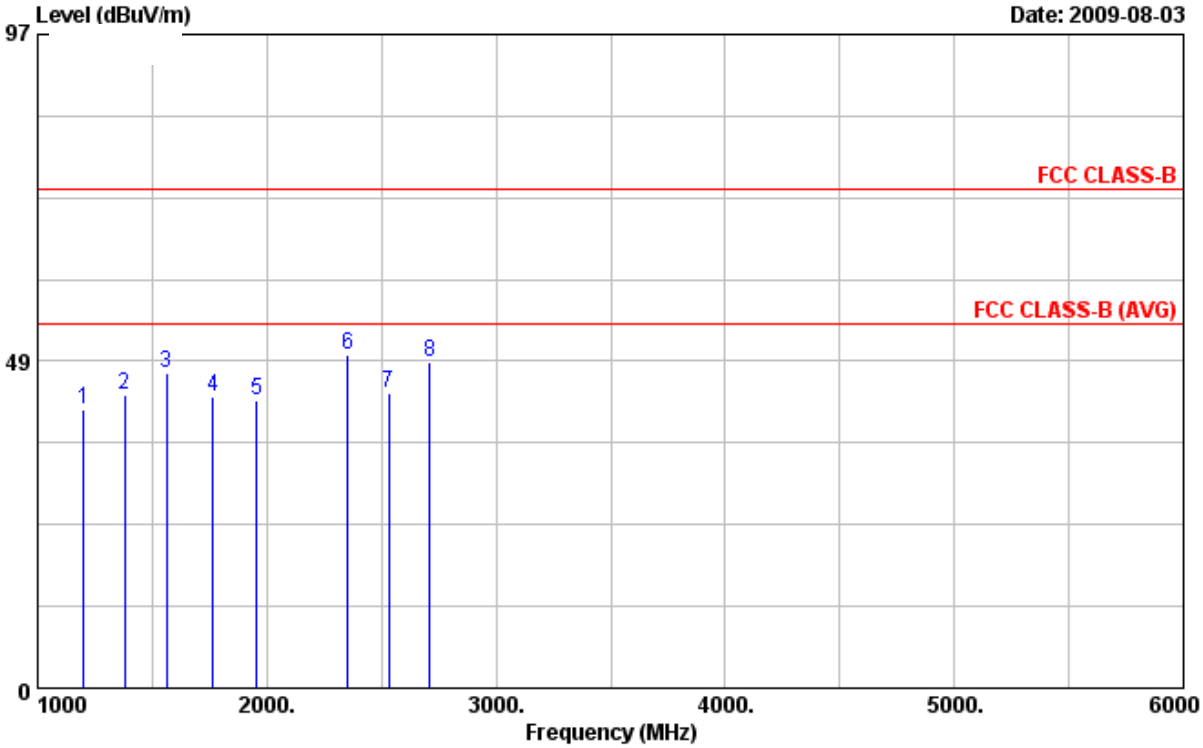
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	LINK WIRELESS	Temperature	:	30 °C
Memo	:		Humidity	:	55 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV/m	dB		cm	Deg
1	377.000	33.630	-8.403	25.227	37.000	-11.773	Peak	100	0
2	399.400	36.330	-7.679	28.651	37.000	-8.349	Peak	100	0
3	503.000	31.681	-6.685	24.996	37.000	-12.004	Peak	100	0
4	611.500	33.580	-5.112	28.468	37.000	-8.532	Peak	100	0
5	753.600	27.640	-2.603	25.037	37.000	-11.963	Peak	100	0
6	828.500	29.510	-0.624	28.886	37.000	-8.114	Peak	100	0

Remarks: 1. Result = Read Value + Factor
2. Factor = Antenna factor + Cable loss - Amplifier factor

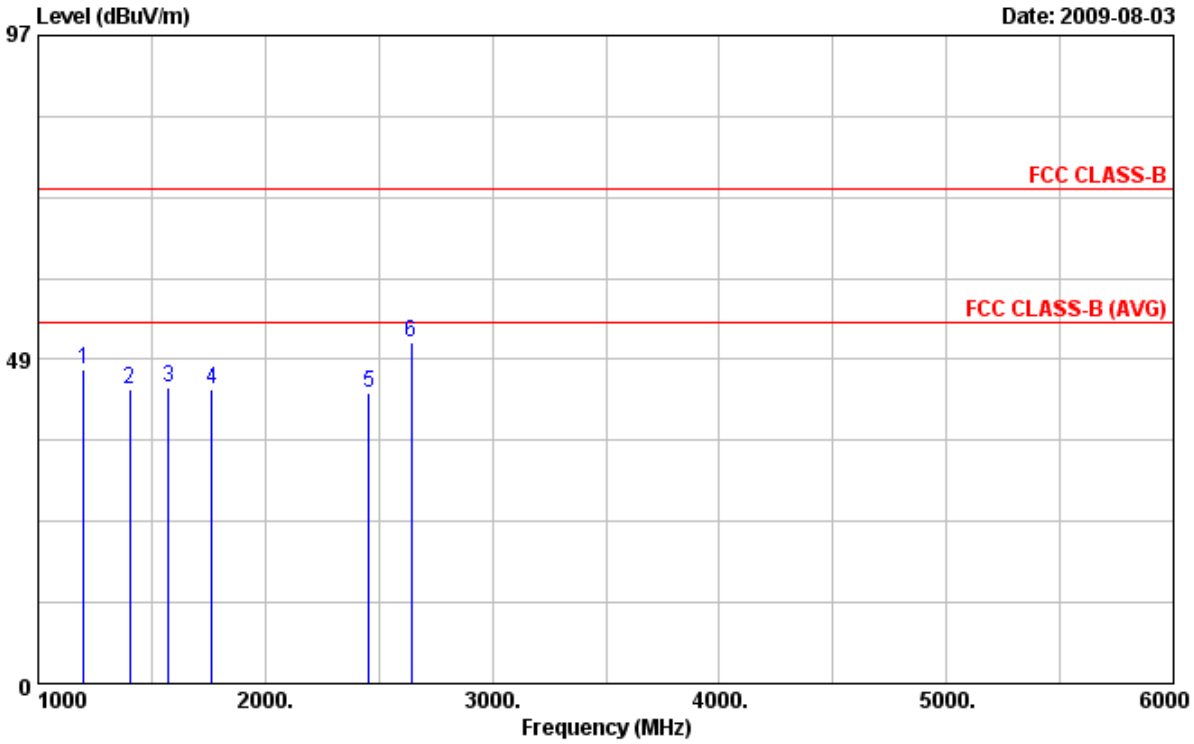
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	LINK WIRELESS	Temperature	:	30 °C
Memo	:		Humidity	:	55 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	1202.000	14.223	27.157	41.380	74.000	-32.620	Peak	100	162
2	1378.000	15.714	27.809	43.523	74.000	-30.477	Peak	100	162
3	1562.000	18.209	28.539	46.748	74.000	-27.252	Peak	100	162
4	1764.000	13.751	29.448	43.199	74.000	-30.801	Peak	100	162
5	1954.000	12.454	30.263	42.717	74.000	-31.283	Peak	100	162
6	2352.000	17.660	31.662	49.322	74.000	-24.678	Peak	100	162
7	2534.000	11.345	32.318	43.663	74.000	-30.337	Peak	100	162
8	2710.000	15.395	33.097	48.492	74.000	-25.508	Peak	100	162

Remarks: 1. Result = Read Value + Factor
2. Factor = Antenna factor + Cable loss - Amplifier factor

Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	LINK WIRELESS	Temperature	:	30 °C
Memo	:		Humidity	:	55 %



Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	1202.000	19.990	27.157	47.147	74.000	-26.853	Peak	100	185
2	1404.000	16.144	27.904	44.048	74.000	-29.952	Peak	100	185
3	1574.000	15.717	28.593	44.310	74.000	-29.690	Peak	100	185
4	1764.000	14.729	29.448	44.177	74.000	-29.823	Peak	100	185
5	2456.000	11.582	32.018	43.600	74.000	-30.400	Peak	100	185
6	2644.000	18.219	32.805	51.024	74.000	-22.976	Peak	100	185

Remarks: 1. Result = Read Value + Factor
2. Factor = Antenna factor + Cable loss - Amplifier factor

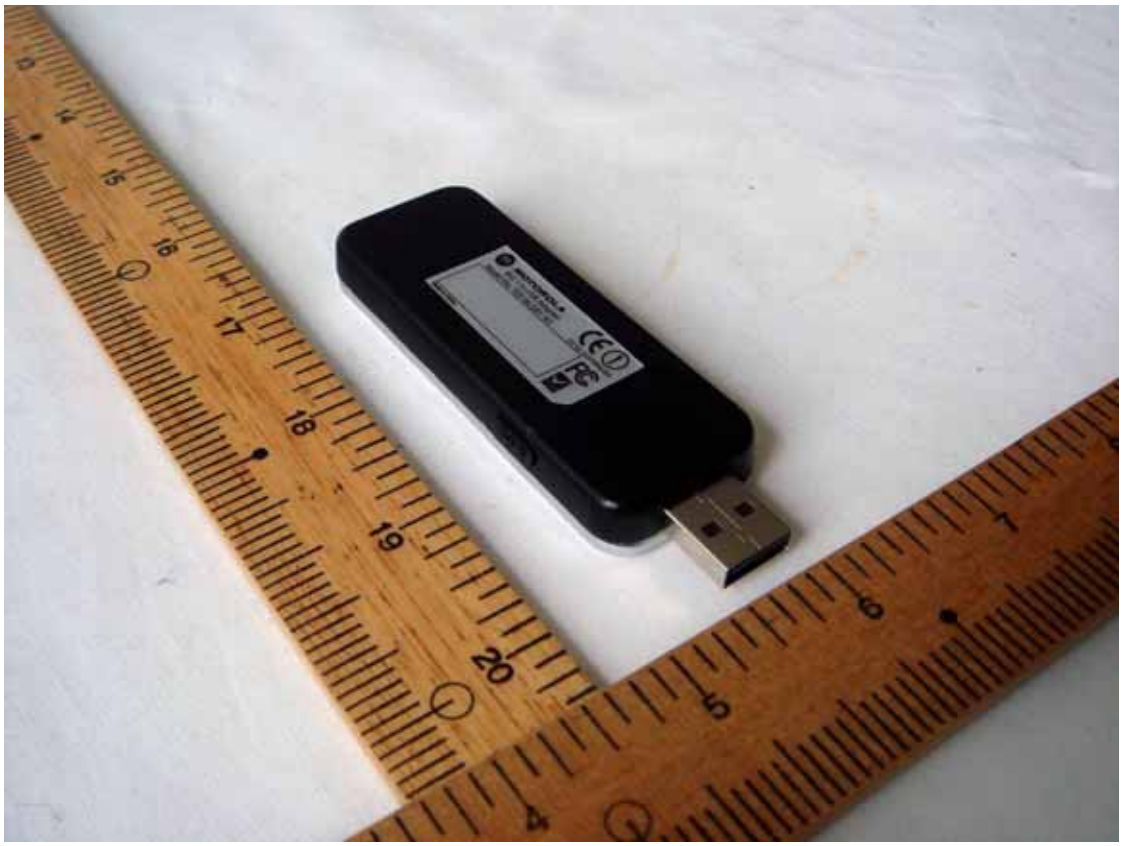
Test engineer: Ray

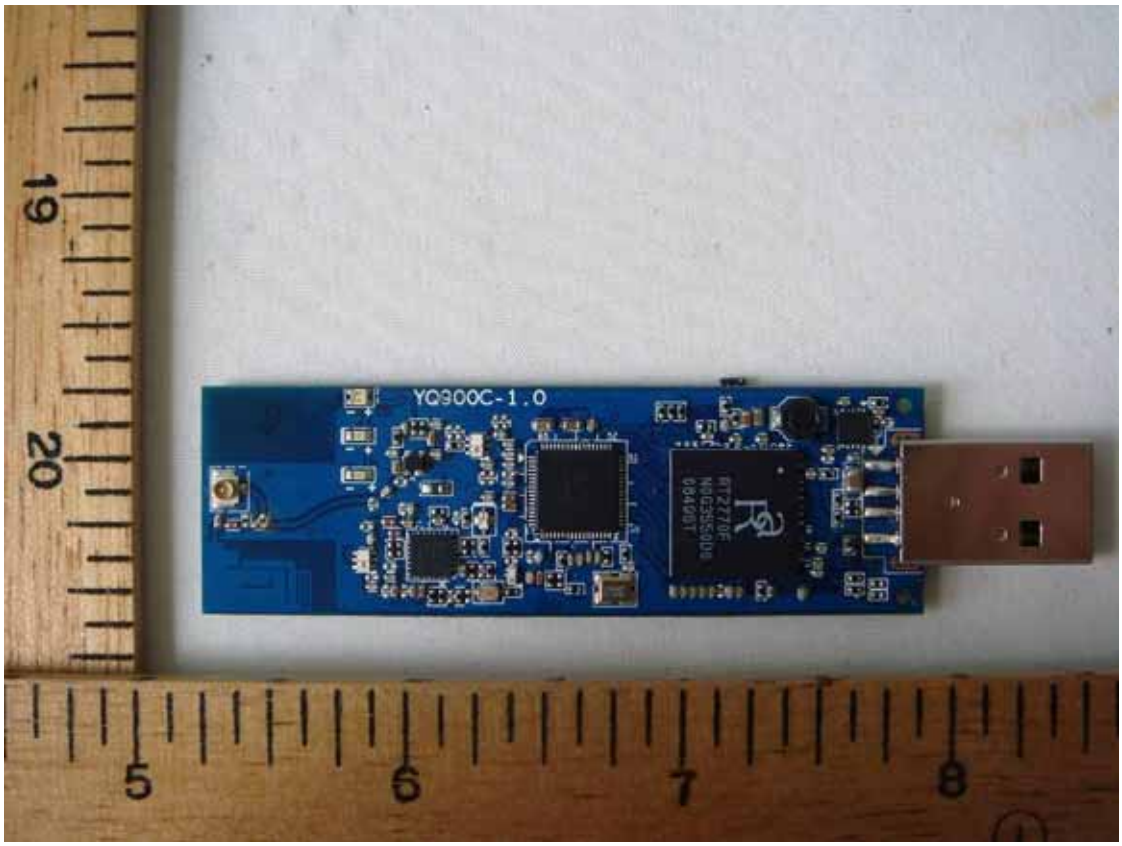
3.6. Test Photographs

Front View

Rear View

Appendix A. Photographs of EUT

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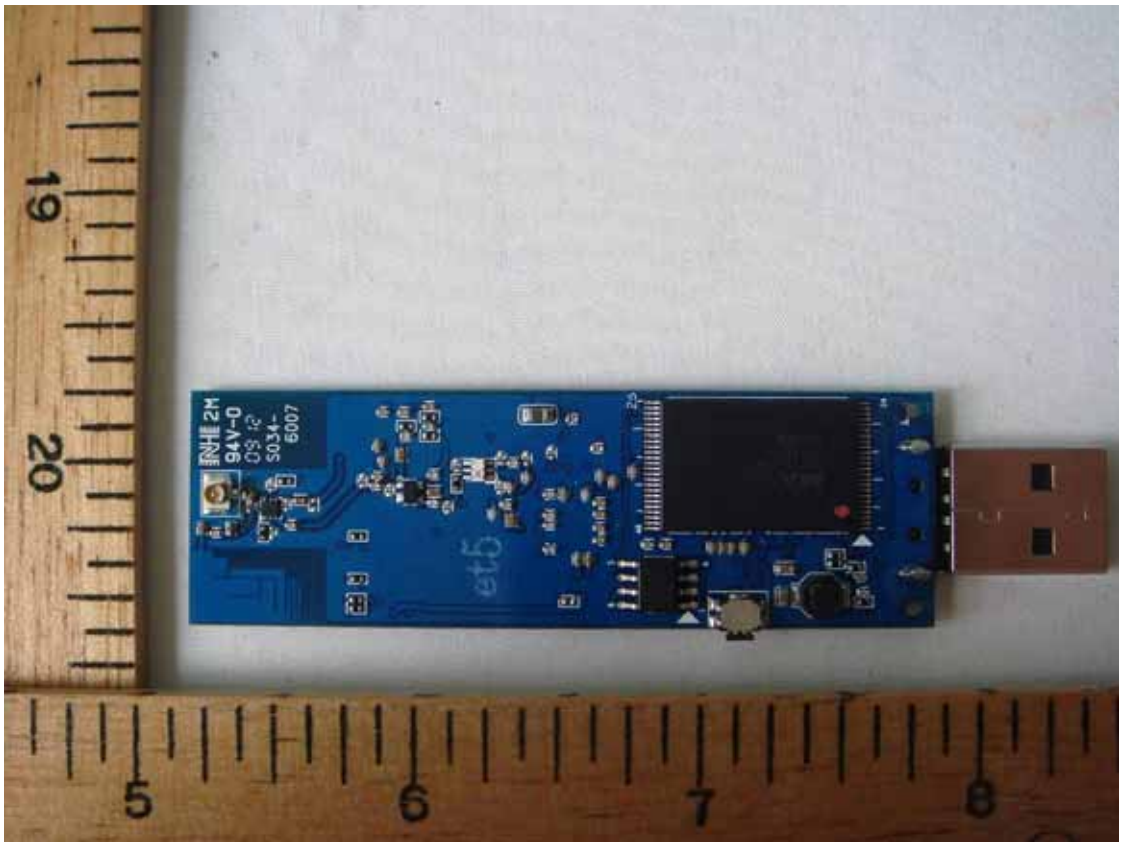
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