



# FCC TEST REPORT

According to

## FCC Rules and Regulations Part 15 Subpart C

Applicant	: Amped Wireless
Address	: 13089 Peyton Dr. #C307, Chino Hills CA 91709
Equipment	: High Power Wireless-N 600mW Dual Band Access Point
Model No.	: AP20000G
FCC ID	: ZTT-AP20000G-2
Trade Name	: Amped Wireless

- The test result refers exclusively to the test presented test model / sample.,
- Without written approval of **CerpPASS Technology Corp.**, the test report shall not be reproduced except in full.
- The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.



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## History of this test report

■ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description



# CERTIFICATE OF COMPLIANCE

According to

## FCC Rules and Regulations Part 15 Subpart C

Applicant	: Amped Wireless
Address	: 13089 Peyton Dr. #C307, Chino Hills CA 91709
Equipment	: High Power Wireless-N 600mW Dual Band Access Point
Model No.	: AP20000G
FCC ID	: ZTT-AP20000G-2
Trade Name	: Amped Wireless

### I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 2009, KDB558074 & KDB662911**. The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart C (2010)**. The test was carried out on Sep. 04, 2013 at CerpPASS Technology Corp.

Approved by:

Tested by:

Hill Chen  
EMC/RF B.U. Assistant Manager

Tom Tai  
Engineer



## 1. Report of Measurements and Examinations

### 1.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. Conducted Emission	Pass
15.209 15.247(d)	. Radiated Emission	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak Output Power	Pass
15.247(d)	. 100kHz Bandwidth of Frequency Band Edges	Pass
15.247(e)	. Power Spectral Density	Pass
1.1307 1.1310 2.1091 2.1093	. RF Exposure Compliance	Pass



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment under Test

- Wireless Standard: 802.11a/b/g/n
- Frequency Band: 2.4GHz, 5.0GHz
- Wireless Speed: 2.4GHz: 300Mbps (Tx/Rx)  
5.0GHz: 300Mbps (Tx/Rx)
- Amplifier: Dual 2.4GHz 600mW Amplifiers  
Dual 5.0GHz Amplifiers  
Dual Low Noise Amplifier
- Wireless Sensitivity: -94dBm
- Wireless Output Power: Up to 29dBm
- Wireless Security: WEP, WPA, WPA2, WPA Mixed, WPS
- Processor Clock Speed: 620MHz
- Wireless Coverage Control: 15% - 100% Output Power
- Data Rate:  
2.4GHz: 802.11b: 11Mbps, 802.11g: 54Mbps, 802.11n HT20: 130Mbps, 802.11n HT40: 270Mbps  
5.0GHz: 802.11a: 54Mbps, 802.11an HT20: 130Mbps, 802.11an HT40: 270Mbps
- Antenna:  
-2 x Detachable High Gain  
Dual Band 2dBi (for 2.4GHz), 4dBi (for 5GHz) Antennas  
-2 x Reverse SMA Connector
- Ports:  
-4 x RJ45 10/100/1000 LAN ports  
-1 x RJ45 10/100/1000 WAN ports  
-USB 2.0 Port for Storage Devices
- Mounting: Wall, Stand or Desktop
- Warranty: 1 Year



## 2.2 Carrier Frequency of Channels

802.11b, 802.11g, 802.11n HT 20 (2412MHz~2462MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
01	2412	07	2442
02	2417	08	2447
03	2422	09	2452
04	2427	10	2457
05	2432	11	2462
06	2437	---	---

802.11n, HT 40 (2422MHz~2452MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
03	2422	07	2442
04	2427	08	2447
05	2432	09	2452
06	2437	---	---

802.11a, 802.11an HT 20 (5725MHz~5850MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
149	5745	161	5805
153	5765	165	5825
157	5785	---	---

802.11an HT 40 (5755MHz~5795MHz)

Channel	Frequency(MHz)	Channel	Frequency(MHz)
151	5755	159	5795
155	5775	---	---





### 2.3 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included Notebook and EUT for RF test.
- c. An executive "MD TOOL" under XP was executed to keep transmitting and receiving data via Wireless.
- d. The following test modes were performed for test:
  - 802.11b/g/n HT20: CH01: 2412MHz, CH06: 2437MHz, CH11: 2462MHz
  - 802.11n HT40: CH03: 2422MHz, CH06: 2437MHz, CH09: 2452MHz
  - 802.11a/ an HT20: CH149: 5745MHz, CH157: 5785MHz, CH165: 5825MHz
  - 802.11an HT40: CH151: 5755MHz, CH155: 5775MHz, CH159: 5795MHz

\* Power output of data rate:

802.11b		802.11g		802.11n HT20		802.11n HT40	
Data Rate (Mbps)	Power output (dBm)	Data Rate (Mbps)	Power output (dBm)	Data Rate (Mbps)	Power output (dBm)	Data Rate (Mbps)	Power output (dBm)
11	24.32	54	26.39	130/15	27.31	270/15	27.34
5.5	24.21	48	26.37	117/14	27.30	243/14	27.27
2	24.17	36	26.33	104/13	27.24	216/13	27.31
1	24.14	24	26.30	78/12	27.28	162/12	27.32
---	---	18	26.30	52/11	27.22	108/11	27.30
---	---	12	26.31	39/10	27.22	81/10	27.33
---	---	9	26.34	26/9	27.14	54/9	27.26
---	---	6	26.27	13/8	27.15	27/8	27.29
---	---	---	---	65/7	27.28	135/7	27.24
---	---	---	---	58.5/6	27.27	121.5/6	27.17
---	---	---	---	52/5	27.21	108/5	27.21
---	---	---	---	39/4	27.25	81/4	27.22
---	---	---	---	26/3	27.19	54/3	27.20
---	---	---	---	19.5/2	27.19	40.5/2	27.23
---	---	---	---	13/1	27.11	27/1	27.26
---	---	---	---	6.5/0	27.12	13.5/0	27.19




802.11a		802.11an HT20		802.11an HT40	
Data Rate (Mbps)	Power output (dBm)	Data Rate (Mbps)	Power output (dBm)	Data Rate (Mbps)	Power output (dBm)
54	23.43	130/15	26.28	270/15	26.32
48	23.35	117/14	26.27	243/14	26.25
36	23.41	104/13	26.21	216/13	26.29
24	23.38	78/12	26.25	162/12	26.30
18	23.38	52/11	26.19	108/11	26.28
12	23.39	39/10	26.19	81/10	26.31
9	23.42	26/9	26.11	54/9	26.24
6	23.35	13/8	26.12	27/8	26.27
---	---	65/7	26.18	135/7	26.22
---	---	58.5/6	26.17	121.5/6	26.21
---	---	52/5	26.11	108/5	26.25
---	---	39/4	26.15	81/4	26.26
---	---	26/3	26.18	54/3	26.24
---	---	19.5/2	26.18	40.5/2	26.27
---	---	13/1	26.12	27/1	26.20
---	---	6.5/0	26.11	13.5/0	26.23

## 2.4 Description of Test System

Device	Manufacturer	Model No.	Description
Notebook	ASUS	A8J	Power Cable, Unshielding 1.8m



## 2.5 General Information of Test

Test Site :	CerpPASS Technology Corp. 2F-11, No. 3, Yuan Qu St., (Nankang Software Park), Taipei, Taiwan 115, R.O.C.
Test Site Location (OATS2-SD) :	No.68-1, Shihbachongsi, Shihding Township, Taipei City 223, Taiwan, R.O.C.
FCC Registration Number :	TW1049, TW1061, 488071, 390316
IC Registration Number :	4934B-1, 4934D-1
VCCI Registration Number :	T-1173 for Telecommunication Test C-4139 for Conducted emission test R-3428 for Radiated emission test G-97 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30MHz Radiation: from 30MHz to 40,000MHz
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.
Laboratory Accreditation	

## 2.6 Measurement Uncertainty

Measurement Item	Uncertainty
Radiated emission	$\pm 4.11\text{dB}$
Peak Output Power(conducted)	$\pm 1.38\text{dB}$
Peak Output Power(Radiated)	$\pm 1.70\text{dB}$
Power Spectral Density	$\pm 1.39\text{dB}$
Radiated emission(3m)	$\pm 4.11\text{dB}$
Radiated emission(10m)	$\pm 3.89\text{dB}$



### 3. Antenna Requirements

#### 3.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

#### 3.2 Antenna Construction and Directional Gain

##### **802.11b/g/n:**

ANT R, ANT L

Antenna Type: Dipole Antenna

Antenna Gain: 2 dBi

Note: Directional gain =  $G_{ANT} + 10 \log(N)$  dBi =  $2 + 10 \log(2) = 5.01$  (dBi)

##### **802.11a, an:**

ANT R, ANT L

Antenna Type: Dipole Antenna

Antenna Gain: 4 dBi

Note: Directional gain =  $G_{ANT} + 10 \log(N)$  dBi =  $4 + 10 \log(2) = 7.01$  (dBi)



## 4. Test of Conducted Emission

### 4.1 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 C63.4-2009 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.

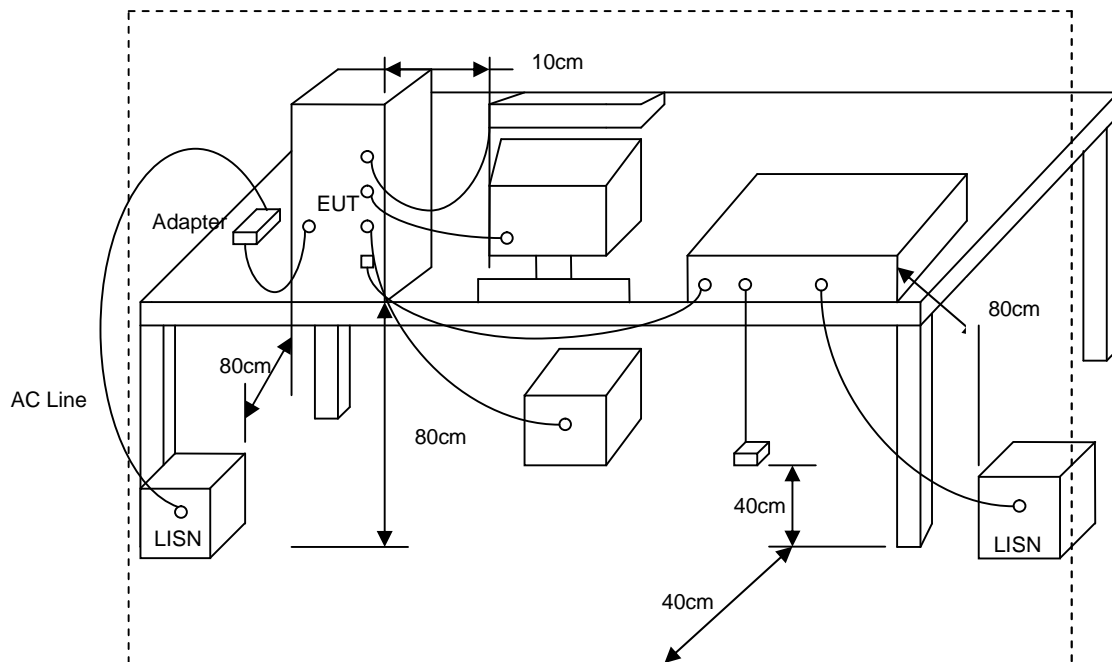
Frequency (MHz)	Quasi Peak (dB $\mu$ V)	Average (dB $\mu$ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

\*Decreases with the logarithm of the frequency.

### 4.2 Test Procedures

- 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.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

### 4.3 Typical Test Setup



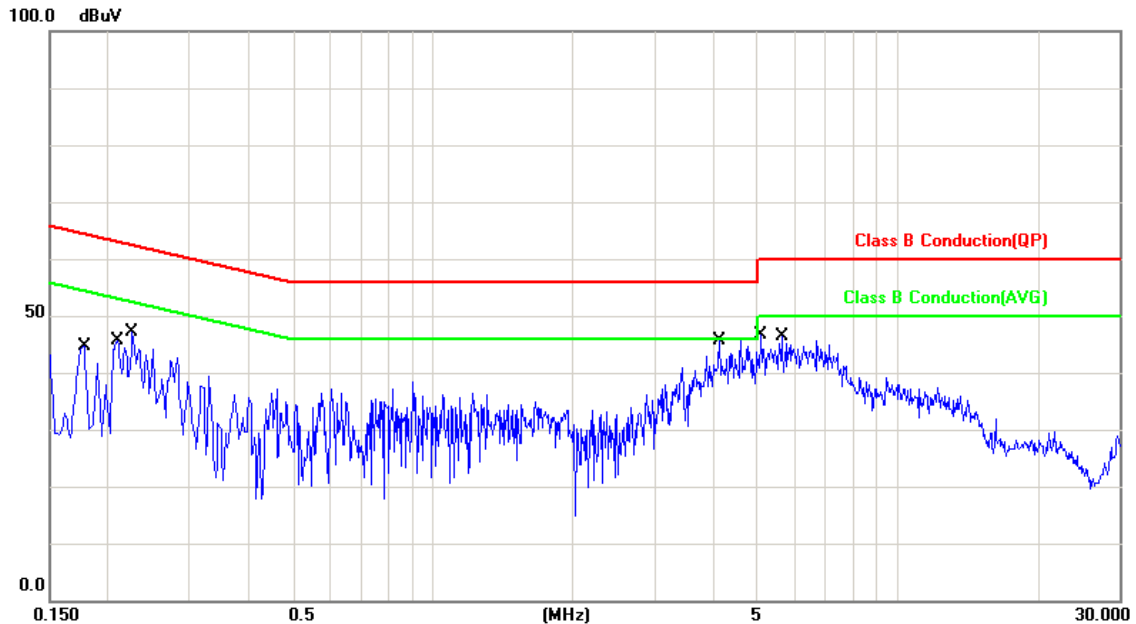
#### 4.4 Measurement Equipment

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100821	2012/12/24	2013/12/23
LISN	Schwarzbeck	NSLK 8127	8127-516	2013/03/08	2014/03/07
LISN	Schwarzbeck	NSLK 8127	8127-568	2013/08/26	2014/08/25
Attenuator	HAMEG	HZ560	-----	2013/03/07	2014/03/06



#### 4.5 Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode 1	: 802.11g, CH1	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %

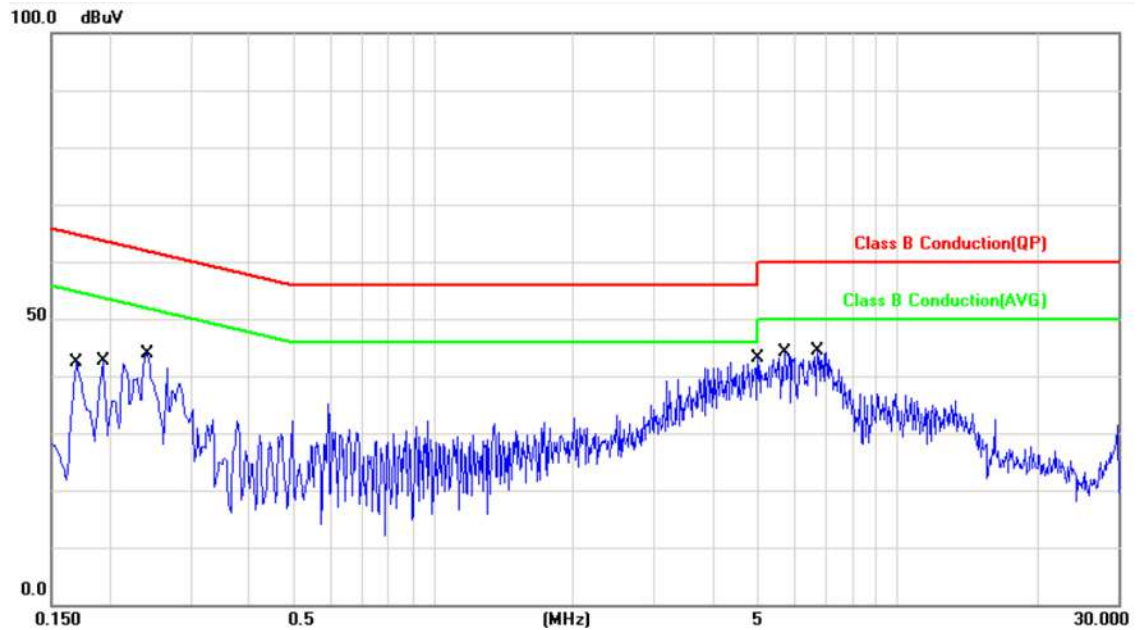


No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	10.45	31.26	41.71	64.57	-22.86	QP	P
2	0.1780	10.45	22.17	32.62	54.57	-21.95	AVG	P
3	0.2100	10.42	33.22	43.64	63.20	-19.56	QP	P
4	0.2100	10.42	25.30	35.72	53.20	-17.48	AVG	P
5	0.2260	10.41	34.41	44.82	62.59	-17.77	QP	P
6	0.2260	10.41	22.57	32.98	52.59	-19.61	AVG	P
7	4.1459	10.51	27.61	38.12	56.00	-17.88	QP	P
8	4.1459	10.51	18.53	29.04	46.00	-16.96	AVG	P
9	5.0858	10.57	29.27	39.84	60.00	-20.16	QP	P
10	5.0858	10.57	20.39	30.96	50.00	-19.04	AVG	P
11	5.6419	10.60	30.13	40.73	60.00	-19.27	QP	P
12	5.6419	10.60	20.24	30.84	50.00	-19.16	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode 1	: 802.11g, CH1	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



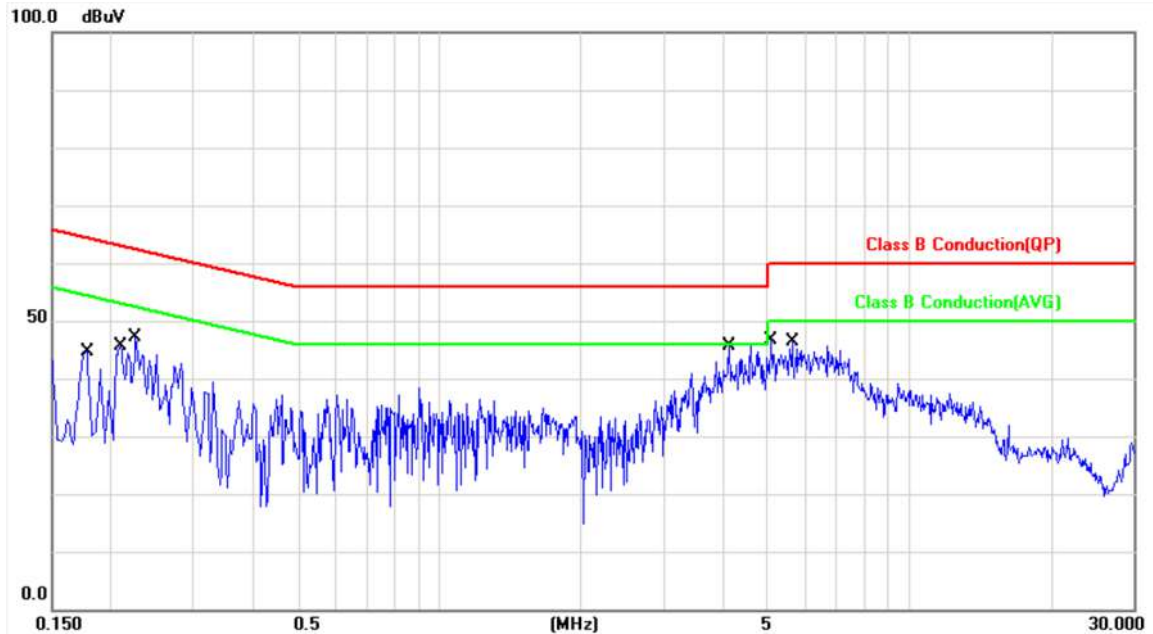
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	10.44	30.12	40.56	64.96	-24.40	QP	P
2	0.1700	10.44	17.74	28.18	54.96	-26.78	AVG	P
3	0.1940	10.41	24.25	34.66	63.86	-29.20	QP	P
4	0.1940	10.41	12.67	23.08	53.86	-30.78	AVG	P
5	0.2420	10.38	32.54	42.92	62.02	-19.10	QP	P
6	0.2420	10.38	24.22	34.60	52.02	-17.42	AVG	P
7	5.0139	10.52	26.45	36.97	60.00	-23.03	QP	P
8	5.0139	10.52	17.76	28.28	50.00	-21.72	AVG	P
9	5.7419	10.55	26.31	36.86	60.00	-23.14	QP	P
10	5.7419	10.55	17.56	28.11	50.00	-21.89	AVG	P
11	6.7379	10.60	26.28	36.88	60.00	-23.12	QP	P
12	6.7379	10.60	17.45	28.05	50.00	-21.95	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit





Power	: AC 120V	Pol/Phase	: LINE
Test Mode 2	: 802.11n HT20, CH1	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %

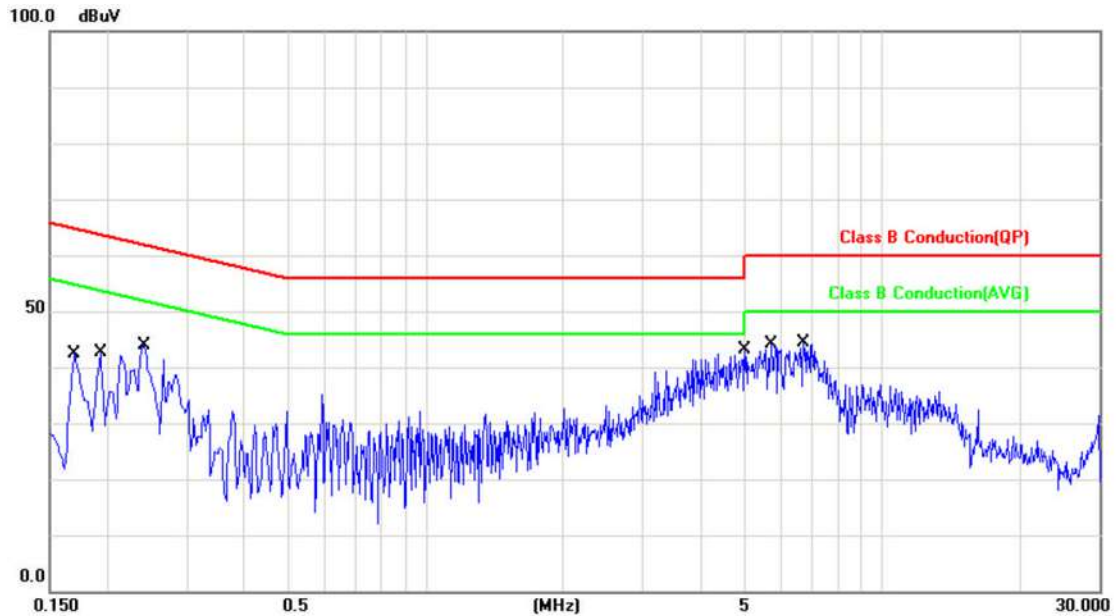


No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	10.45	31.22	41.67	64.57	-22.90	QP	P
2	0.1780	10.45	22.32	32.77	54.57	-21.80	AVG	P
3	0.2100	10.42	33.25	43.67	63.20	-19.53	QP	P
4	0.2100	10.42	25.43	35.85	53.20	-17.35	AVG	P
5	0.2260	10.41	34.61	45.02	62.59	-17.57	QP	P
6	0.2260	10.41	22.58	32.99	52.59	-19.60	AVG	P
7	4.1459	10.51	27.77	38.28	56.00	-17.72	QP	P
8	4.1459	10.51	18.56	29.07	46.00	-16.93	AVG	P
9	5.0858	10.57	29.41	39.98	60.00	-20.02	QP	P
10	5.0858	10.57	20.39	30.96	50.00	-19.04	AVG	P
11	5.6419	10.60	30.12	40.72	60.00	-19.28	QP	P
12	5.6419	10.60	20.34	30.94	50.00	-19.06	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode 2	: 802.11n HT20, CH1	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



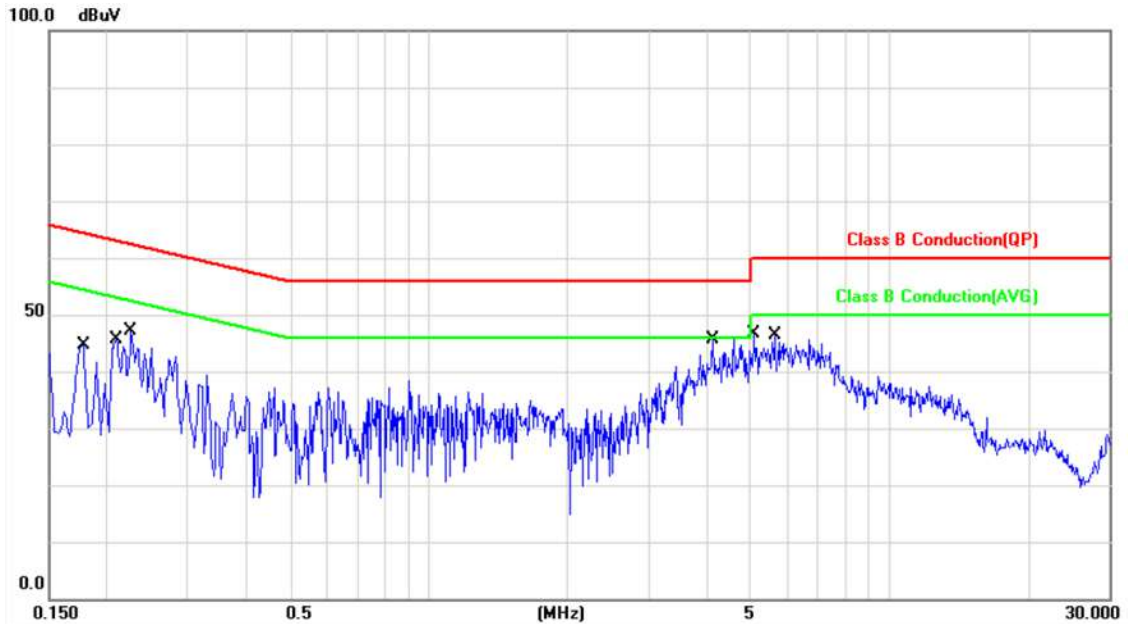
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	10.44	30.13	40.57	64.96	-24.39	QP	P
2	0.1700	10.44	17.75	28.19	54.96	-26.77	AVG	P
3	0.1940	10.41	24.36	34.77	63.86	-29.09	QP	P
4	0.1940	10.41	12.66	23.07	53.86	-30.79	AVG	P
5	0.2420	10.38	32.68	43.06	62.02	-18.96	QP	P
6	0.2420	10.38	24.23	34.61	52.02	-17.41	AVG	P
7	5.0139	10.52	26.37	36.89	60.00	-23.11	QP	P
8	5.0139	10.52	17.65	28.17	50.00	-21.83	AVG	P
9	5.7419	10.55	26.33	36.88	60.00	-23.12	QP	P
10	5.7419	10.55	17.49	28.04	50.00	-21.96	AVG	P
11	6.7379	10.60	26.22	36.82	60.00	-23.18	QP	P
12	6.7379	10.60	17.48	28.08	50.00	-21.92	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: LINE
Test Mode 3	: 802.11n HT40, CH3	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	10.45	31.26	41.71	64.57	-22.86	QP	P
2	0.1780	10.45	22.28	32.73	54.57	-21.84	AVG	P
3	0.2100	10.42	33.17	43.59	63.20	-19.61	QP	P
4	0.2100	10.42	25.42	35.84	53.20	-17.36	AVG	P
5	0.2260	10.41	34.62	45.03	62.59	-17.56	QP	P
6	0.2260	10.41	22.59	33.00	52.59	-19.59	AVG	P
7	4.1459	10.51	27.72	38.23	56.00	-17.77	QP	P
8	4.1459	10.51	18.56	29.07	46.00	-16.93	AVG	P
9	5.0858	10.57	29.32	39.89	60.00	-20.11	QP	P
10	5.0858	10.57	20.42	30.99	50.00	-19.01	AVG	P
11	5.6419	10.60	30.12	40.72	60.00	-19.28	QP	P
12	5.6419	10.60	20.36	30.96	50.00	-19.04	AVG	P

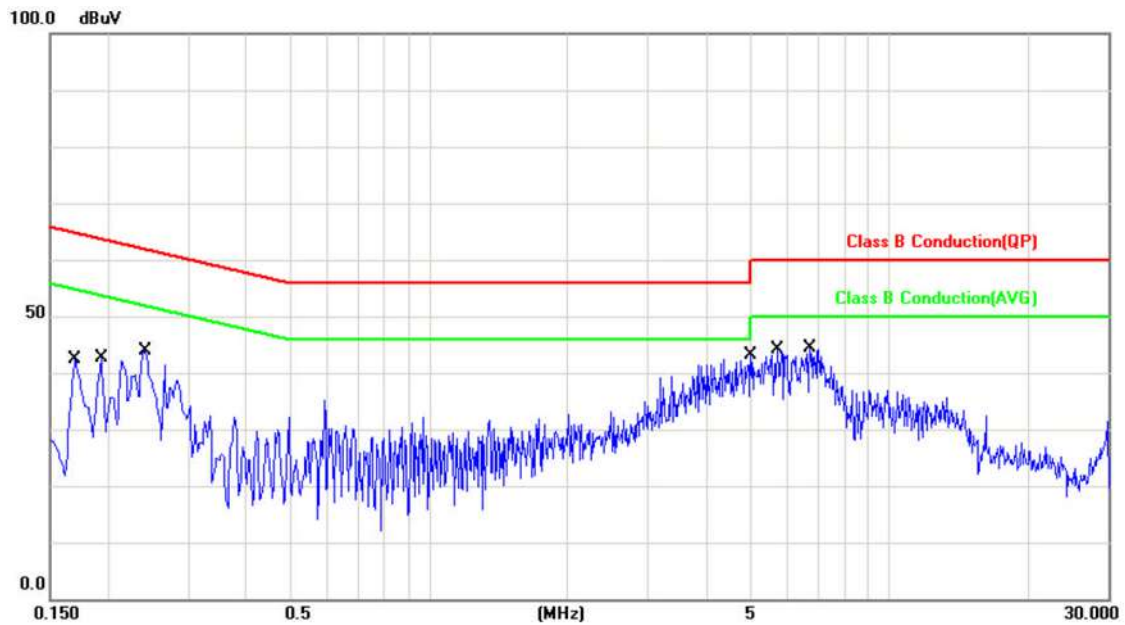
Note: Level = Reading + Factor

Margin = Level – Limit





Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode 3	: 802.11n HT40, CH3	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



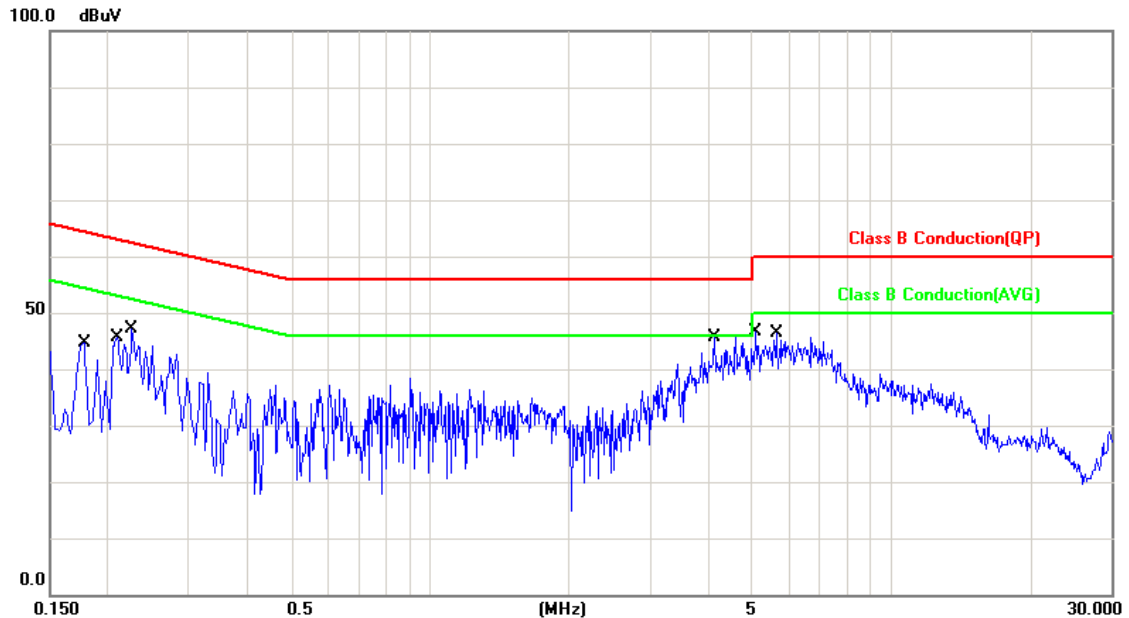
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	10.44	30.14	40.58	64.96	-24.38	QP	P
2	0.1700	10.44	17.74	28.18	54.96	-26.78	AVG	P
3	0.1940	10.41	24.32	34.73	63.86	-29.13	QP	P
4	0.1940	10.41	12.66	23.07	53.86	-30.79	AVG	P
5	0.2420	10.38	32.52	42.90	62.02	-19.12	QP	P
6	0.2420	10.38	24.24	34.62	52.02	-17.40	AVG	P
7	5.0139	10.52	26.26	36.78	60.00	-23.22	QP	P
8	5.0139	10.52	17.75	28.27	50.00	-21.73	AVG	P
9	5.7419	10.55	26.32	36.87	60.00	-23.13	QP	P
10	5.7419	10.55	17.37	27.92	50.00	-22.08	AVG	P
11	6.7379	10.60	26.23	36.83	60.00	-23.17	QP	P
12	6.7379	10.60	17.47	28.07	50.00	-21.93	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: LINE
Test Mode 4	: 802.11a, CH149	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



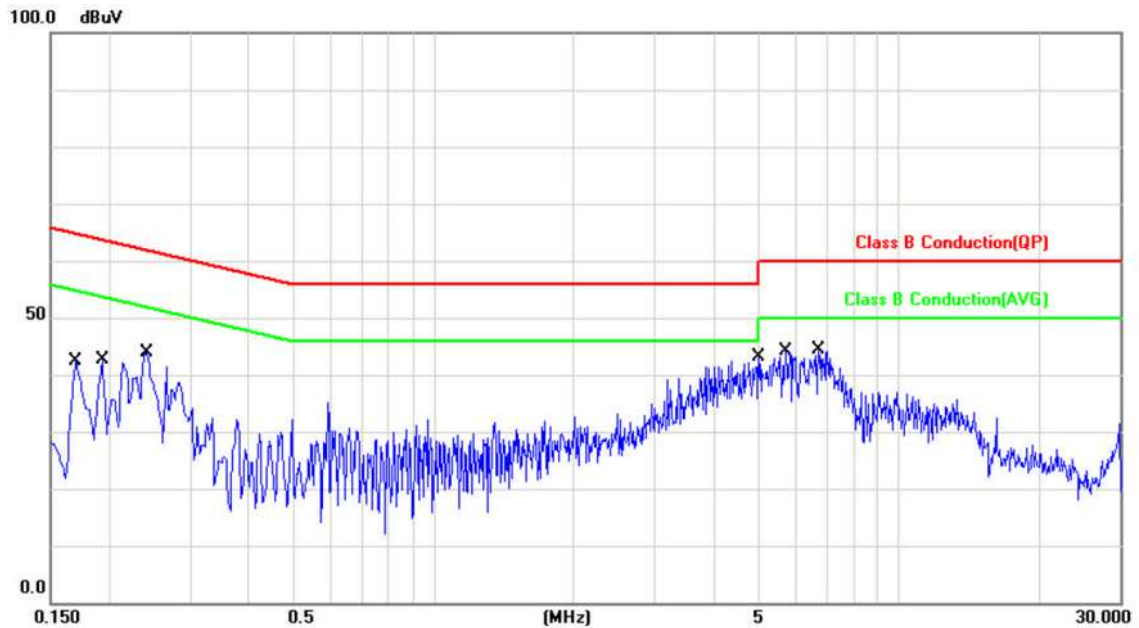
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	10.45	31.25	41.70	64.57	-22.87	QP	P
2	0.1780	10.45	22.16	32.61	54.57	-21.96	AVG	P
3	0.2100	10.42	33.23	43.65	63.20	-19.55	QP	P
4	0.2100	10.42	25.40	35.82	53.20	-17.38	AVG	P
5	0.2260	10.41	34.61	45.02	62.59	-17.57	QP	P
6	0.2260	10.41	22.52	32.93	52.59	-19.66	AVG	P
7	4.1459	10.51	27.77	38.28	56.00	-17.72	QP	P
8	4.1459	10.51	18.65	29.16	46.00	-16.84	AVG	P
9	5.0858	10.57	29.43	40.00	60.00	-20.00	QP	P
10	5.0858	10.57	20.16	30.73	50.00	-19.27	AVG	P
11	5.6419	10.60	30.18	40.78	60.00	-19.22	QP	P
12	5.6419	10.60	20.26	30.86	50.00	-19.14	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode 4	: 802.11a, CH149	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %

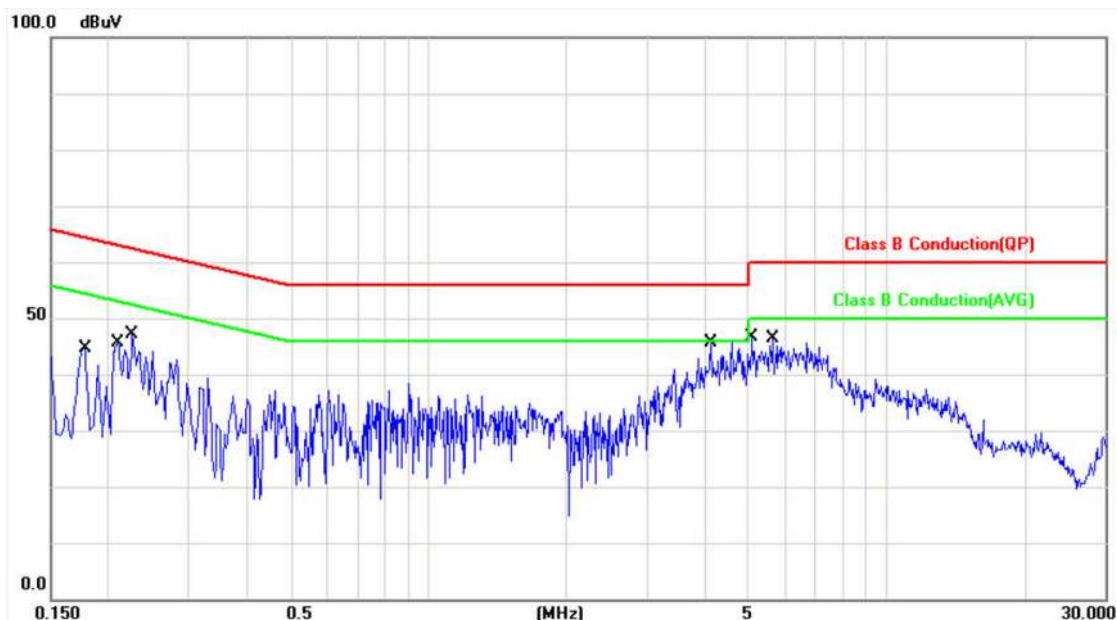


No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	10.44	30.12	40.56	64.96	-24.40	QP	P
2	0.1700	10.44	17.76	28.20	54.96	-26.76	AVG	P
3	0.1940	10.41	24.33	34.74	63.86	-29.12	QP	P
4	0.1940	10.41	12.61	23.02	53.86	-30.84	AVG	P
5	0.2420	10.38	32.52	42.90	62.02	-19.12	QP	P
6	0.2420	10.38	24.24	34.62	52.02	-17.40	AVG	P
7	5.0139	10.52	26.46	36.98	60.00	-23.02	QP	P
8	5.0139	10.52	17.73	28.25	50.00	-21.75	AVG	P
9	5.7419	10.55	26.29	36.84	60.00	-23.16	QP	P
10	5.7419	10.55	17.35	27.90	50.00	-22.10	AVG	P
11	6.7379	10.60	26.24	36.84	60.00	-23.16	QP	P
12	6.7379	10.60	17.45	28.05	50.00	-21.95	AVG	P

Note: Level = Reading + Factor  
Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: LINE
Test Mode 5	: 802.11an HT20, CH149	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	10.45	31.25	41.70	64.57	-22.87	QP	P
2	0.1780	10.45	22.36	32.81	54.57	-21.76	AVG	P
3	0.2100	10.42	33.27	43.69	63.20	-19.51	QP	P
4	0.2100	10.42	25.48	35.90	53.20	-17.30	AVG	P
5	0.2260	10.41	34.61	45.02	62.59	-17.57	QP	P
6	0.2260	10.41	22.59	33.00	52.59	-19.59	AVG	P
7	4.1459	10.51	27.77	38.28	56.00	-17.72	QP	P
8	4.1459	10.51	18.58	29.09	46.00	-16.91	AVG	P
9	5.0858	10.57	29.23	39.80	60.00	-20.20	QP	P
10	5.0858	10.57	20.25	30.82	50.00	-19.18	AVG	P
11	5.6419	10.60	30.22	40.82	60.00	-19.18	QP	P
12	5.6419	10.60	20.37	30.97	50.00	-19.03	AVG	P

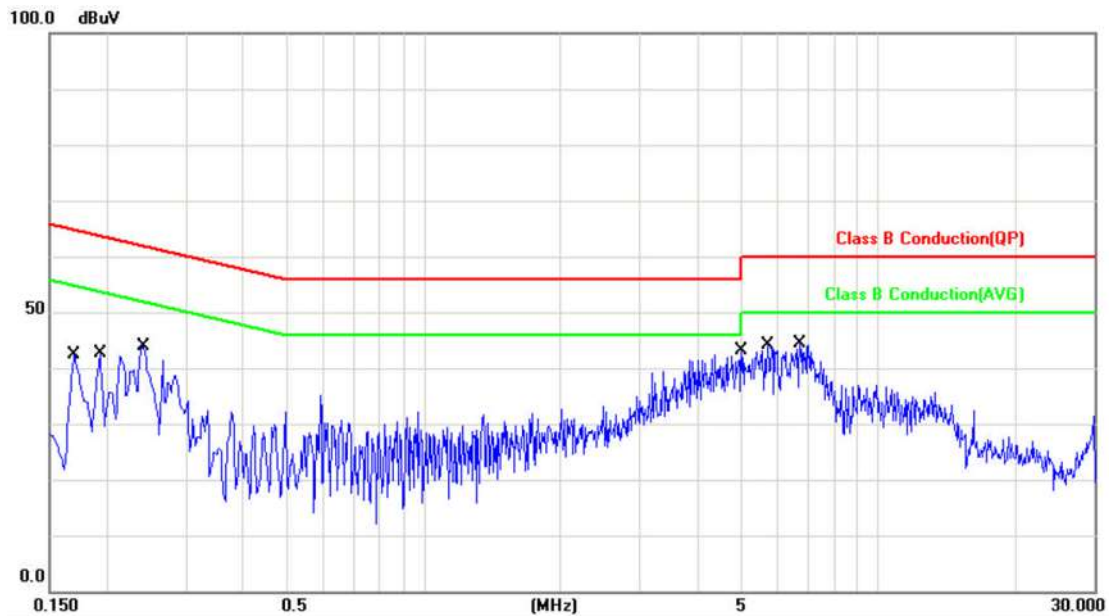
Note: Level = Reading + Factor

Margin = Level – Limit





Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode 5	: 802.11an HT20, CH149	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	10.44	30.12	40.56	64.96	-24.40	QP	P
2	0.1700	10.44	17.70	28.14	54.96	-26.82	AVG	P
3	0.1940	10.41	24.25	34.66	63.86	-29.20	QP	P
4	0.1940	10.41	12.68	23.09	53.86	-30.77	AVG	P
5	0.2420	10.38	32.47	42.85	62.02	-19.17	QP	P
6	0.2420	10.38	24.26	34.64	52.02	-17.38	AVG	P
7	5.0139	10.52	26.47	36.99	60.00	-23.01	QP	P
8	5.0139	10.52	17.85	28.37	50.00	-21.63	AVG	P
9	5.7419	10.55	26.36	36.91	60.00	-23.09	QP	P
10	5.7419	10.55	17.39	27.94	50.00	-22.06	AVG	P
11	6.7379	10.60	26.21	36.81	60.00	-23.19	QP	P
12	6.7379	10.60	17.38	27.98	50.00	-22.02	AVG	P

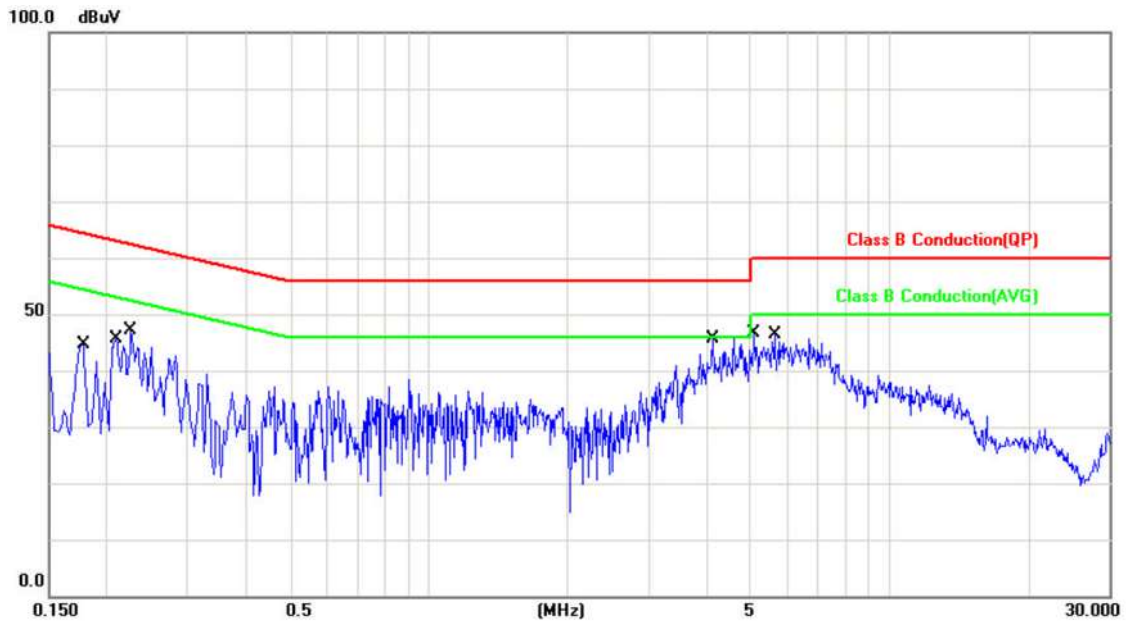
Note: Level = Reading + Factor

Margin = Level – Limit





Power	: AC 120V	Pol/Phase	: LINE
Test Mode 6	: 802.11an HT40, CH151	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



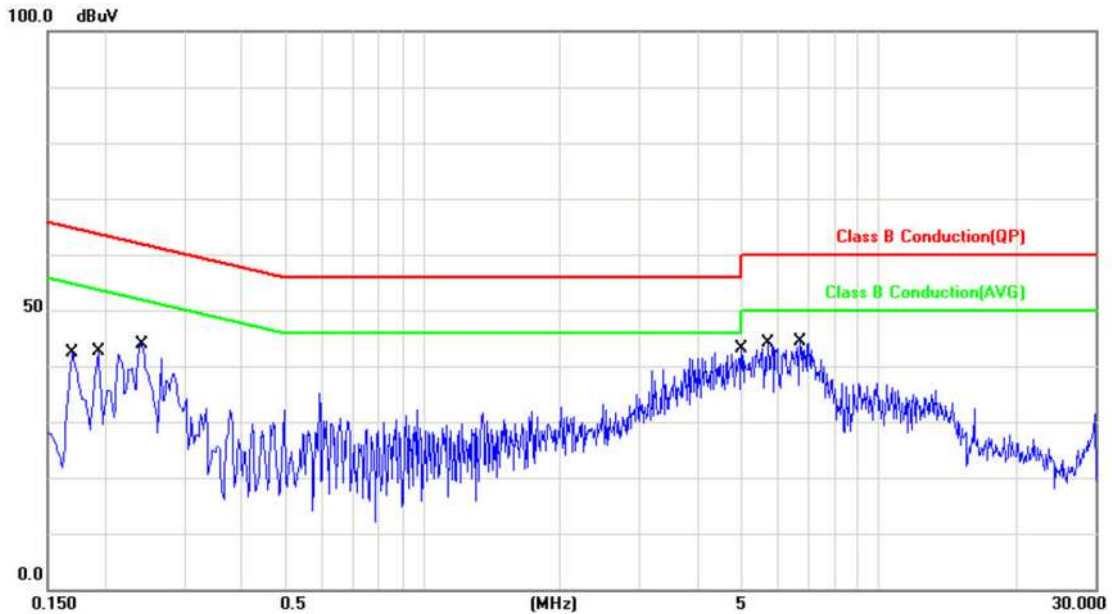
No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	10.45	31.26	41.71	64.57	-22.86	QP	P
2	0.1780	10.45	22.24	32.69	54.57	-21.88	AVG	P
3	0.2100	10.42	33.15	43.57	63.20	-19.63	QP	P
4	0.2100	10.42	25.34	35.76	53.20	-17.44	AVG	P
5	0.2260	10.41	34.66	45.07	62.59	-17.52	QP	P
6	0.2260	10.41	22.52	32.93	52.59	-19.66	AVG	P
7	4.1459	10.51	27.71	38.22	56.00	-17.78	QP	P
8	4.1459	10.51	18.80	29.31	46.00	-16.69	AVG	P
9	5.0858	10.57	29.24	39.81	60.00	-20.19	QP	P
10	5.0858	10.57	20.39	30.96	50.00	-19.04	AVG	P
11	5.6419	10.60	30.11	40.71	60.00	-19.29	QP	P
12	5.6419	10.60	20.32	30.92	50.00	-19.08	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode 6	: 802.11an HT40, CH151	Temperature	: 26 °C
Test Date	: Sep. 04, 2013	Humidity	: 48 %



No.	Frequency (MHz)	Factor (dBuV)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1700	10.44	30.15	40.59	64.96	-24.37	QP	P
2	0.1700	10.44	17.77	28.21	54.96	-26.75	AVG	P
3	0.1940	10.41	24.32	34.73	63.86	-29.13	QP	P
4	0.1940	10.41	12.66	23.07	53.86	-30.79	AVG	P
5	0.2420	10.38	32.58	42.96	62.02	-19.06	QP	P
6	0.2420	10.38	24.23	34.61	52.02	-17.41	AVG	P
7	5.0139	10.52	26.40	36.92	60.00	-23.08	QP	P
8	5.0139	10.52	17.73	28.25	50.00	-21.75	AVG	P
9	5.7419	10.55	26.25	36.80	60.00	-23.20	QP	P
10	5.7419	10.55	17.33	27.88	50.00	-22.12	AVG	P
11	6.7379	10.60	26.25	36.85	60.00	-23.15	QP	P
12	6.7379	10.60	17.34	27.94	50.00	-22.06	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit



## 5. Test of Radiated Emission

### 5.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequency (MHz)	Field Strength (microvolt/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

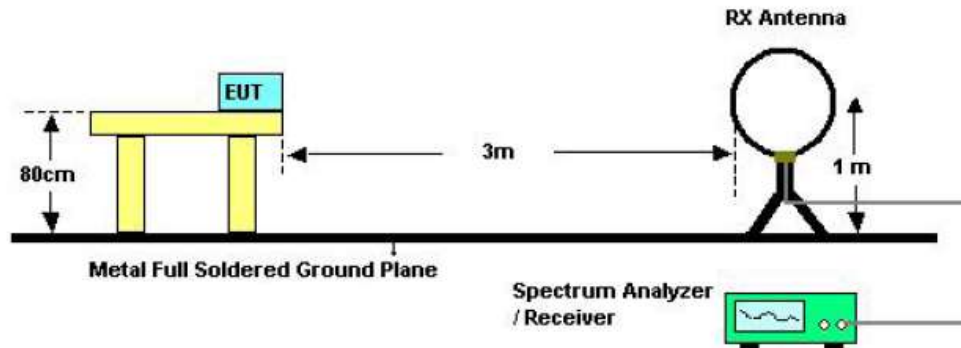
### 5.2 Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna 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.
- 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.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 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 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

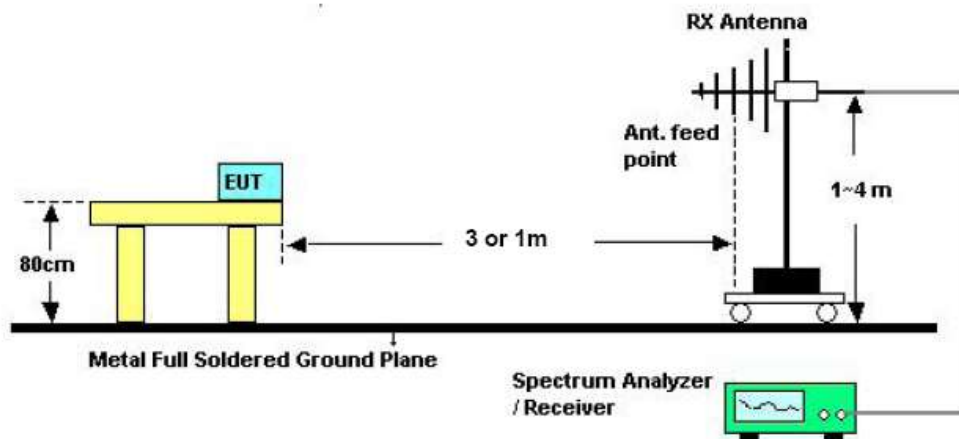


### 5.3 Typical Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.

Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$  (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

### 5.4 Measurement Equipment

Instrument/Ancillary	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI	100443	2013/01/15	2014/01/14
Bilog Antenna	Schwarzbeck	VULB 9168	369	2013/03/06	2014/03/05
Amplifier	QuieTek	AP/0100A	CHM0906075	2013/01/15	2014/01/14
SPECTRUM ANALYZER	R&S	FSP40	100219	2012/09/13	2013/09/12
HORN ANTENNA	EMCO	3115	31601	2012/09/13	2013/09/12
PREAMPLIFIER	EMC	EMC012635	980029	2012/09/12	2013/09/11



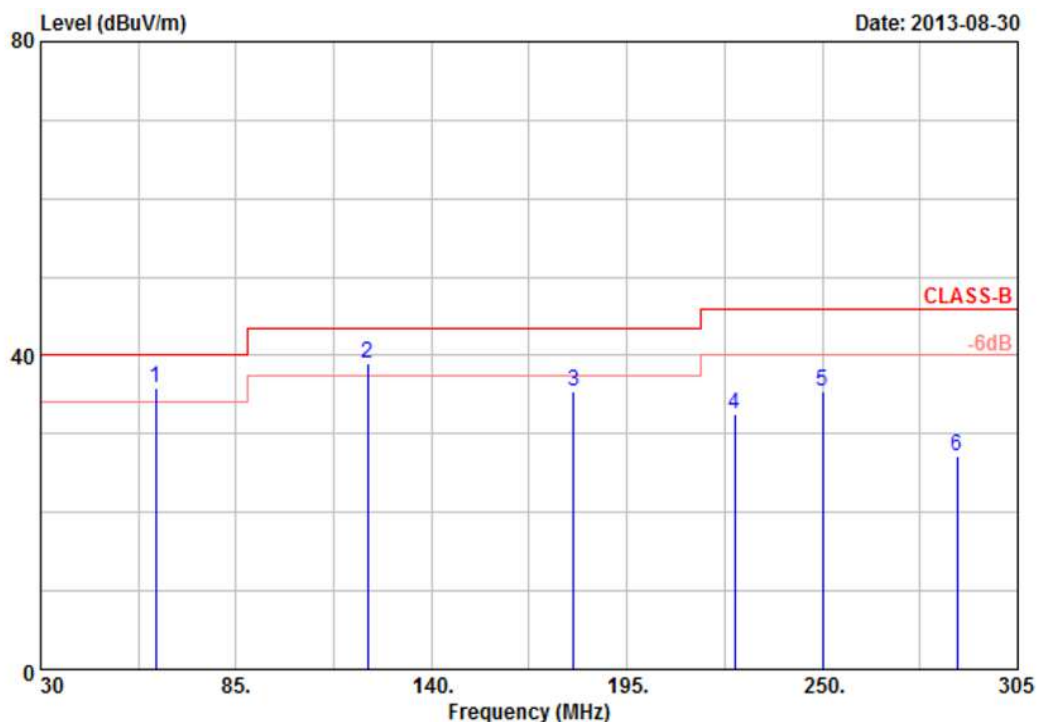


### 5.5 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

### 5.6 Test Result and Data (30MHz ~ 1GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 1	: 802.11g, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



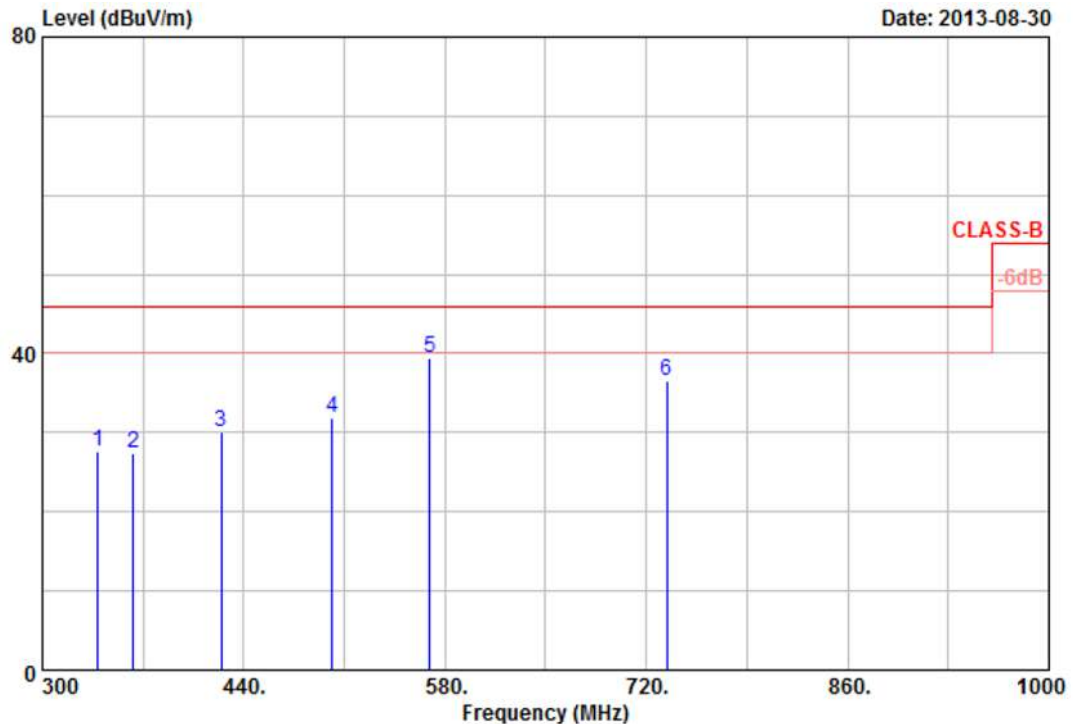
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	62.45	47.21	-11.33	35.88	40.00	-4.12	QP	101	0
2	122.13	43.84	-4.76	39.08	43.50	-4.42	QP	101	0
3	179.88	40.45	-5.06	35.39	43.50	-8.11	Peak	101	0
4	225.25	39.44	-6.86	32.58	46.00	-13.42	Peak	101	0
5	250.00	47.04	-11.52	35.52	46.00	-10.48	Peak	101	0
6	287.95	37.52	-10.30	27.22	46.00	-18.78	Peak	101	0

Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 1	: 802.11g, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



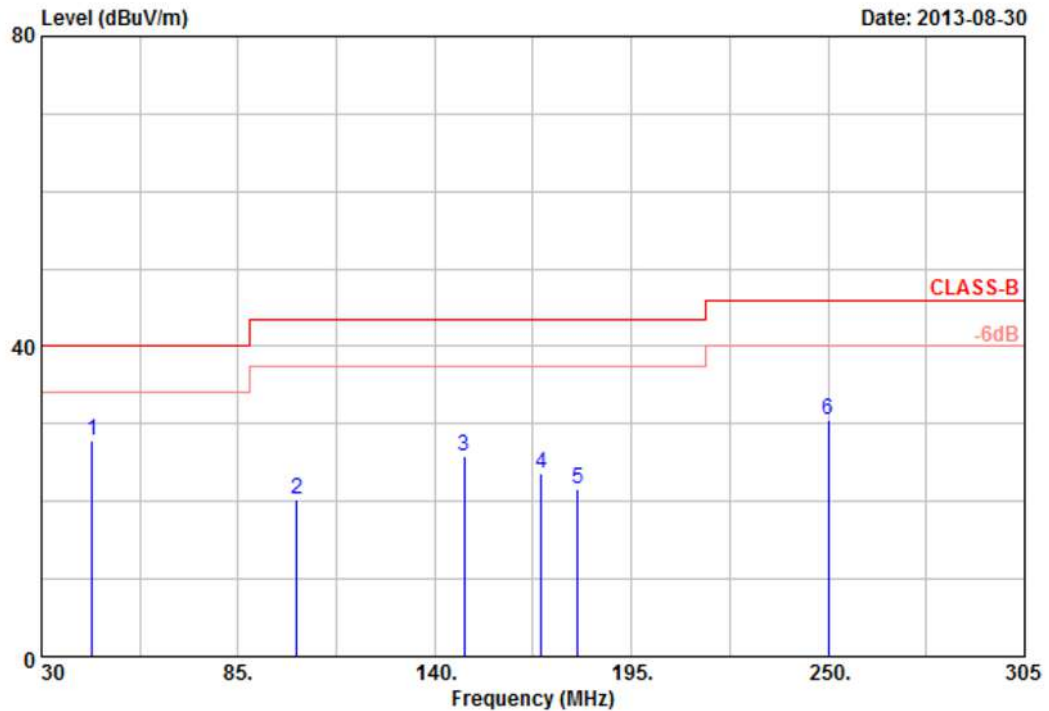
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	338.50	35.08	-7.46	27.62	46.00	-18.38	Peak	101	0
2	363.00	36.15	-8.72	27.43	46.00	-18.57	Peak	101	0
3	424.60	33.72	-3.57	30.15	46.00	-15.85	Peak	101	0
4	501.60	36.96	-4.99	31.97	46.00	-14.03	Peak	101	0
5	569.50	31.94	7.60	39.54	46.00	-6.46	Peak	101	0
6	734.00	29.62	6.92	36.54	46.00	-9.46	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode 1	: 802.11g, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



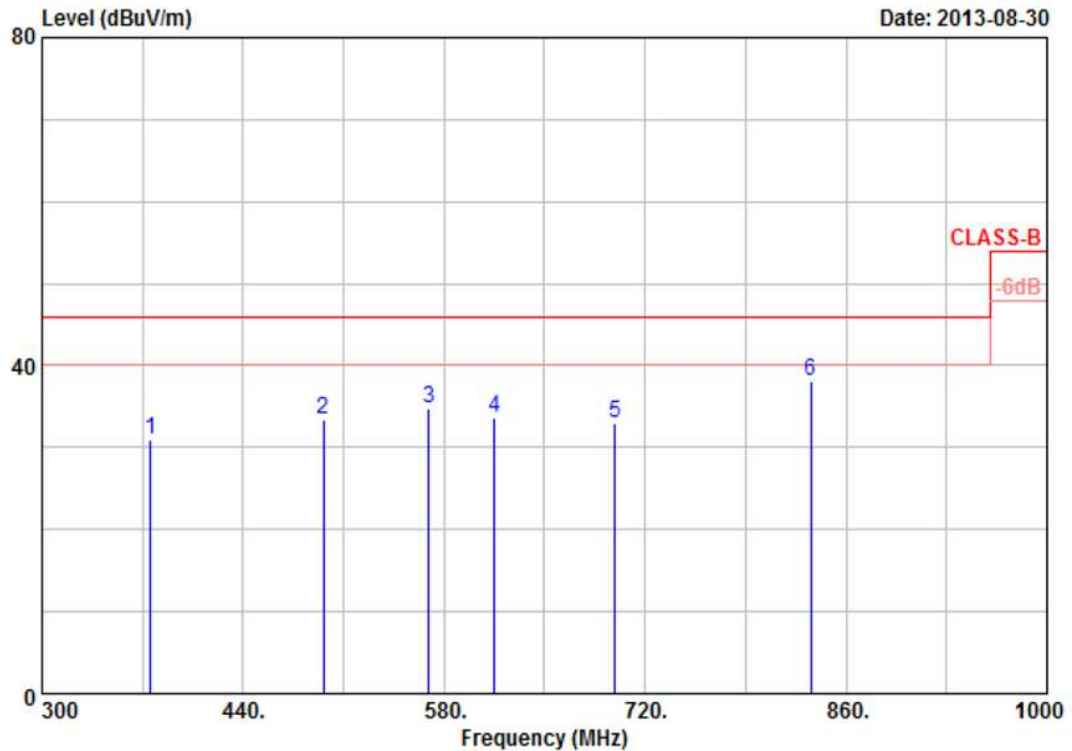
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	44.30	35.88	-8.12	27.76	40.00	-12.24	Peak	101	0
2	101.50	39.03	-18.72	20.31	43.50	-23.19	Peak	101	0
3	148.25	40.50	-14.69	25.81	43.50	-17.69	Peak	101	0
4	169.70	34.82	-11.27	23.55	43.50	-19.95	Peak	101	0
5	179.88	42.78	-21.10	21.68	43.50	-21.82	Peak	101	0
6	250.00	44.13	-13.52	30.61	46.00	-15.39	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode 1	: 802.11g, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



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	375.60	42.74	-11.68	31.06	46.00	-14.94	Peak	101	0
2	496.00	34.07	-0.74	33.33	46.00	-12.67	Peak	101	0
3	569.50	31.44	3.36	34.80	46.00	-11.20	Peak	101	0
4	615.00	29.80	3.76	33.56	46.00	-12.44	Peak	101	0
5	699.00	30.81	2.08	32.89	46.00	-13.11	Peak	101	0
6	835.50	29.25	8.89	38.14	46.00	-7.86	Peak	101	0

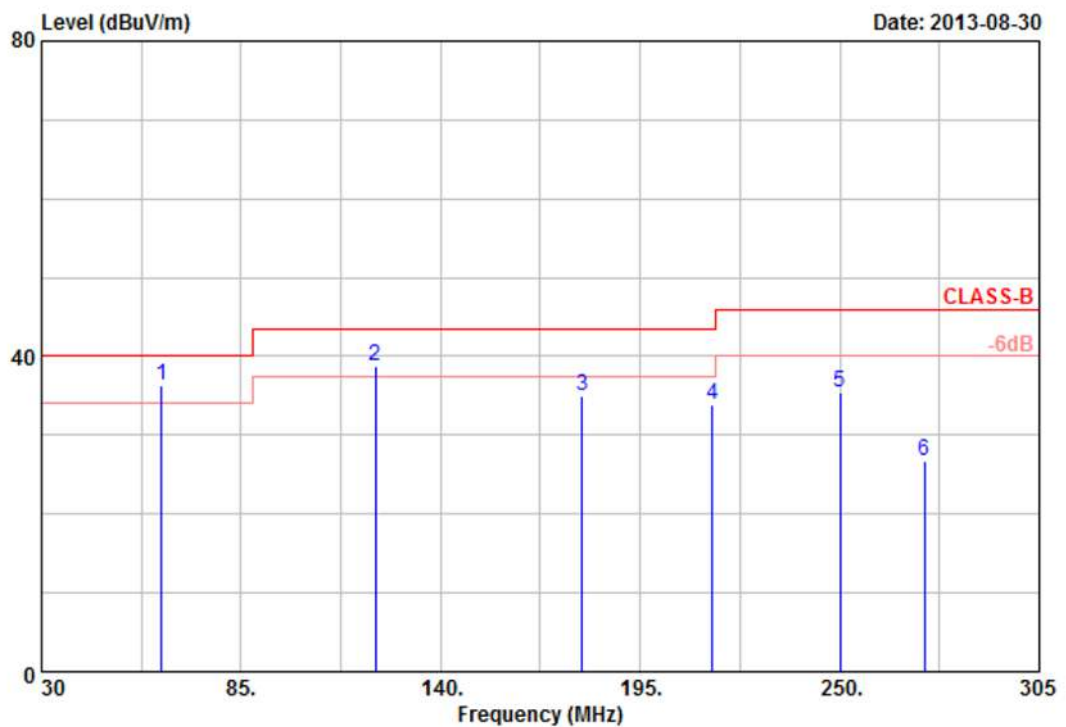
## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.





Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 2	: 802.11n HT20, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



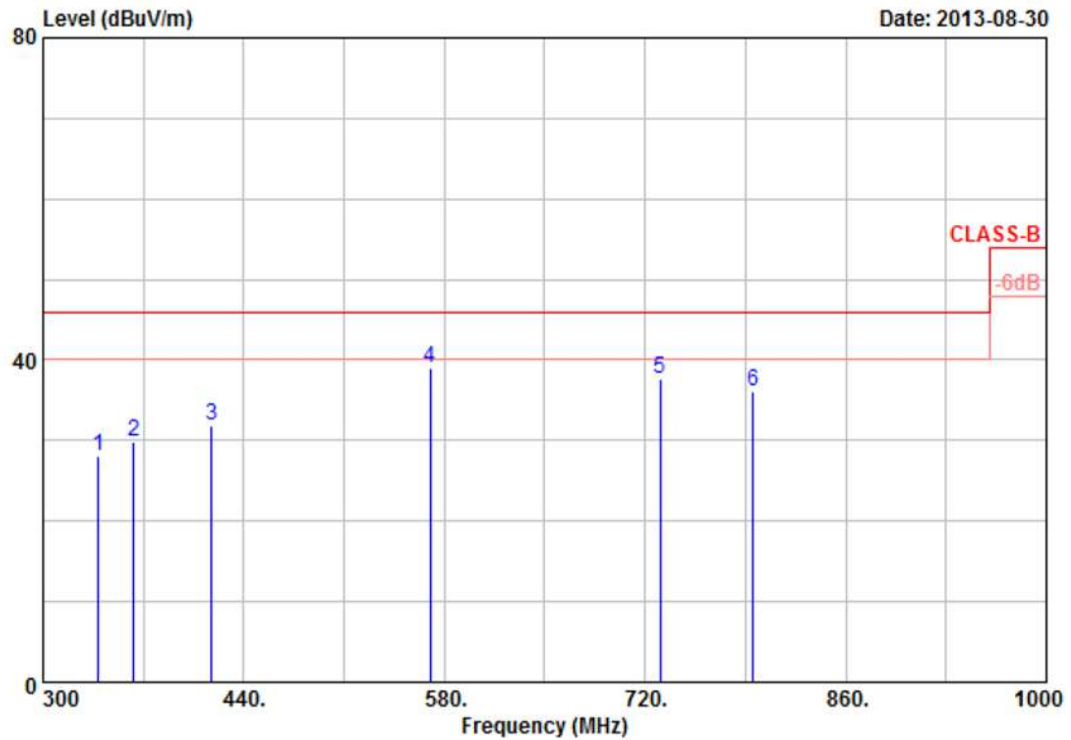
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	63.00	47.70	-11.45	36.25	40.00	-3.75	QP	101	0
2	122.13	43.57	-4.76	38.81	43.50	-4.69	QP	101	0
3	179.05	41.20	-6.31	34.89	43.50	-8.61	Peak	101	0
4	214.80	40.96	-6.99	33.97	43.50	-9.53	Peak	101	0
5	250.00	46.86	-11.52	35.34	46.00	-10.66	Peak	101	0
6	273.38	35.30	-8.59	26.71	46.00	-19.29	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 2	: 802.11n HT20, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



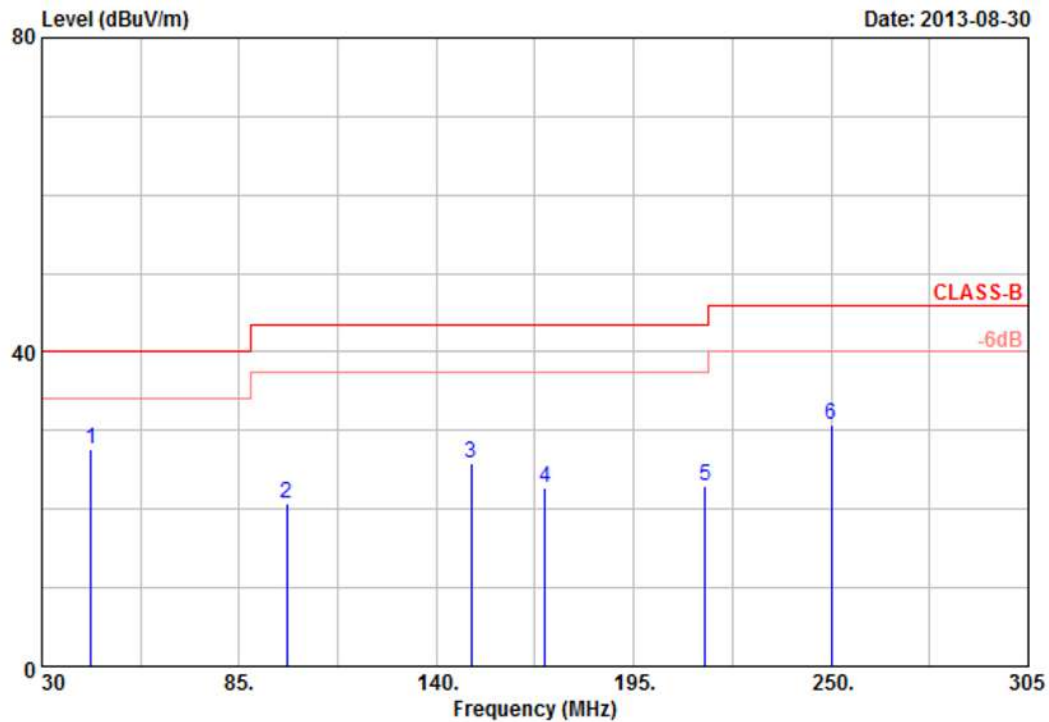
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	338.50	35.48	-7.46	28.02	46.00	-17.98	Peak	101	0
2	363.00	38.51	-8.72	29.79	46.00	-16.21	Peak	101	0
3	417.60	37.29	-5.41	31.88	46.00	-14.12	Peak	101	0
4	570.20	31.32	7.59	38.91	46.00	-7.09	Peak	101	0
5	730.50	30.41	7.18	37.59	46.00	-8.41	Peak	101	0
6	795.60	30.12	6.06	36.18	46.00	-9.82	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode 2	: 802.11n HT20, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



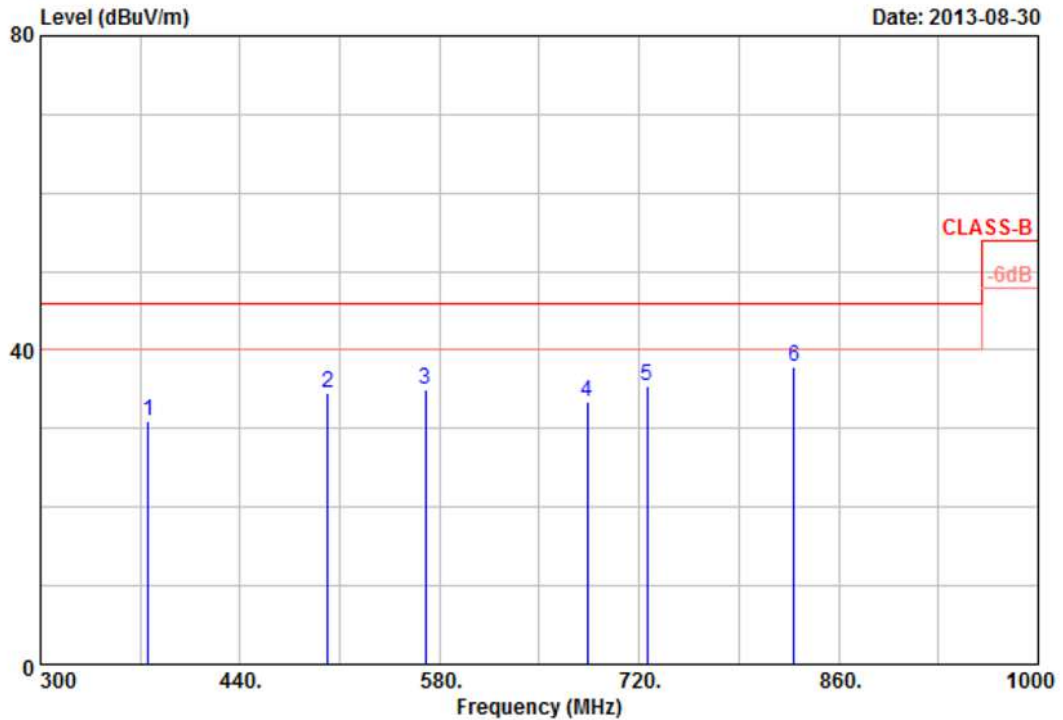
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	43.75	35.61	-8.03	27.58	40.00	-12.42	Peak	101	0
2	98.20	39.33	-18.63	20.70	43.50	-22.80	Peak	101	0
3	149.63	40.47	-14.70	25.77	43.50	-17.73	Peak	101	0
4	170.25	34.01	-11.29	22.72	43.50	-20.78	Peak	101	0
5	214.80	39.33	-16.46	22.87	43.50	-20.63	Peak	101	0
6	250.00	44.31	-13.52	30.79	46.00	-15.21	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode 2	: 802.11n HT20, CH1	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



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	375.60	42.73	-11.68	31.05	46.00	-14.95	Peak	101	0
2	501.60	34.49	0.10	34.59	46.00	-11.41	Peak	101	0
3	570.20	31.47	3.42	34.89	46.00	-11.11	Peak	101	0
4	683.60	30.92	2.57	33.49	46.00	-12.51	Peak	101	0
5	725.60	31.72	3.60	35.32	46.00	-10.68	Peak	101	0
6	828.50	29.58	8.34	37.92	46.00	-8.08	Peak	101	0

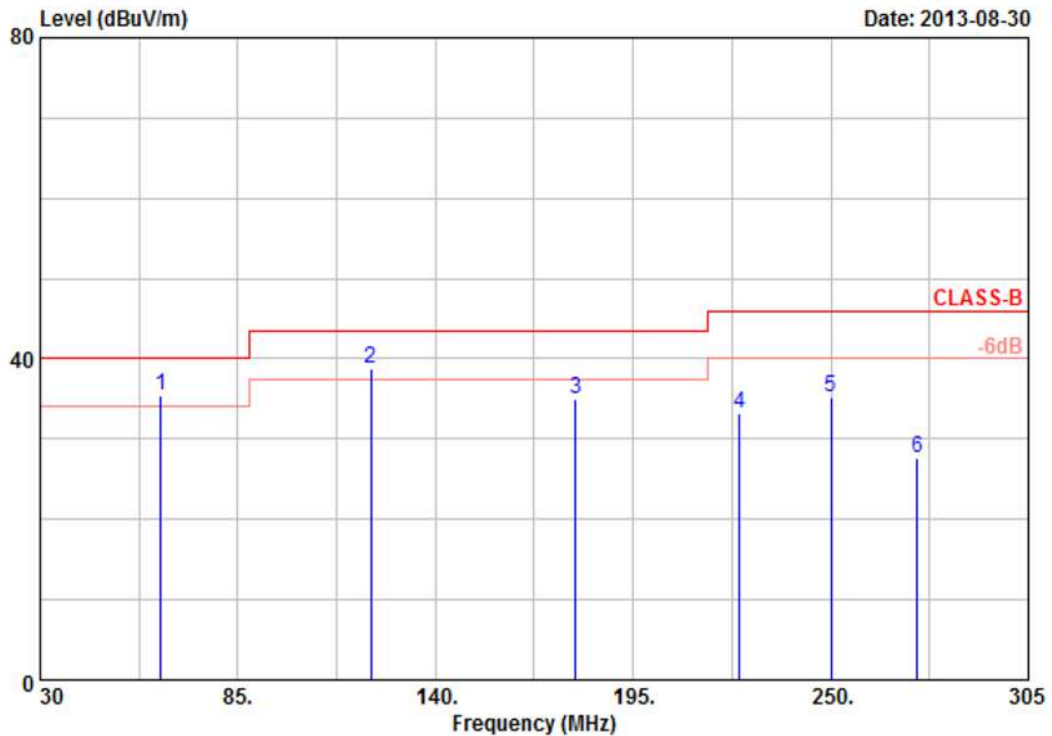
## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.





Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 3	: 802.11n HT40, CH3	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



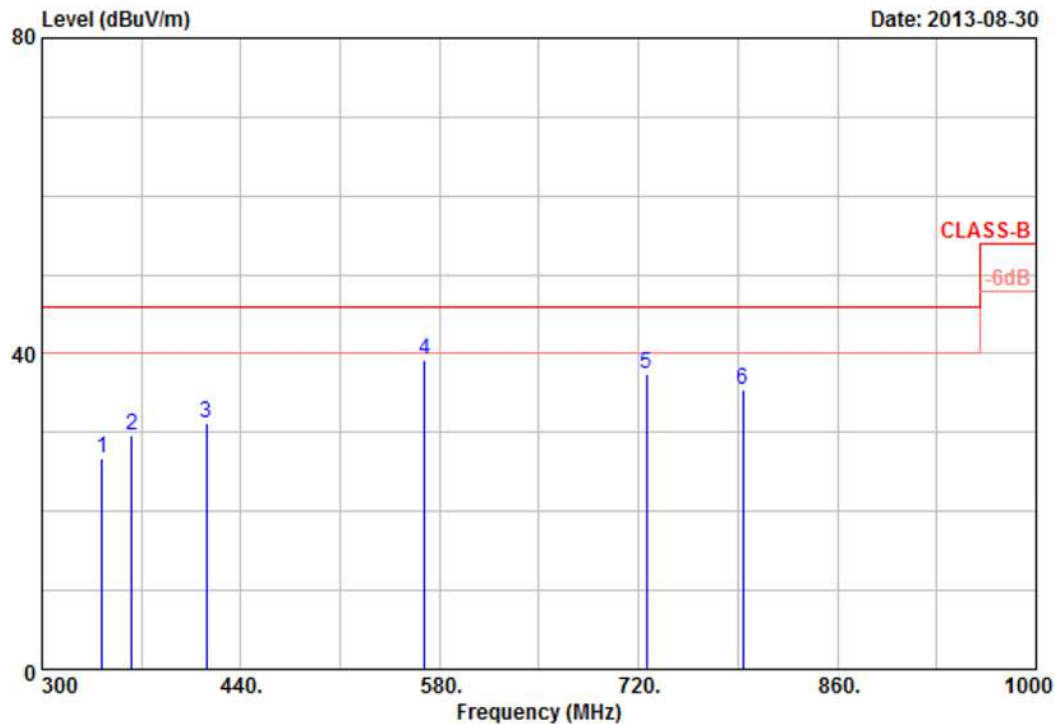
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	63.55	47.00	-11.57	35.43	40.00	-4.57	QP	101	0
2	122.13	43.58	-4.76	38.82	43.50	-4.68	QP	101	0
3	179.05	41.21	-6.31	34.90	43.50	-8.60	Peak	101	0
4	224.70	40.03	-6.76	33.27	46.00	-12.73	Peak	101	0
5	250.00	46.65	-11.52	35.13	46.00	-10.87	Peak	101	0
6	274.20	36.30	-8.66	27.64	46.00	-18.36	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode 3	: 802.11n HT40, CH3	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



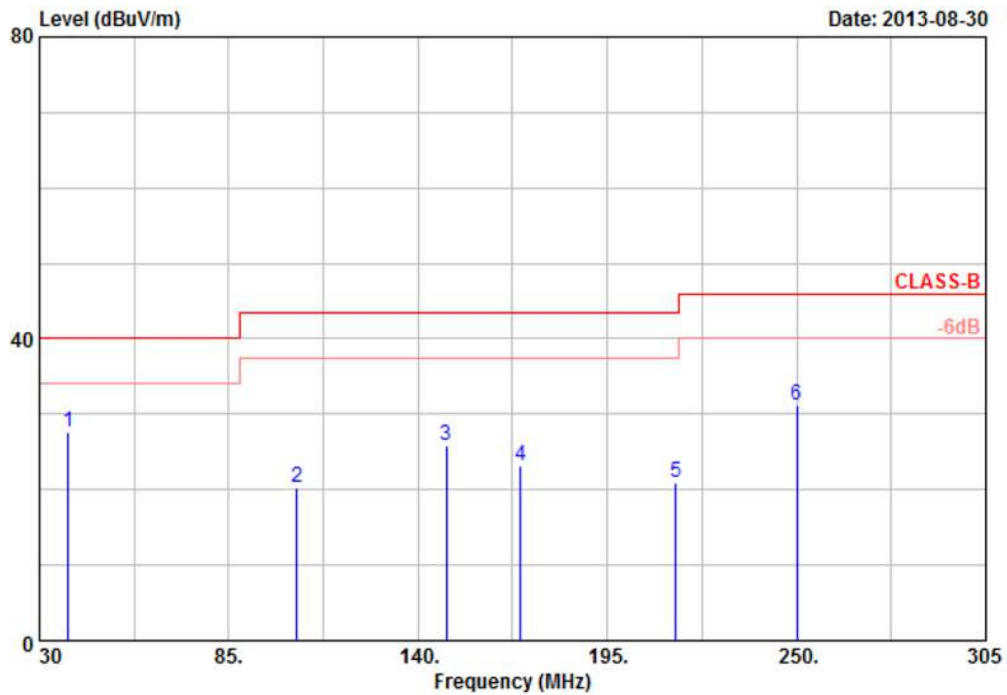
Item	Freq	Read Value	Factor	Result	Limit	Margin	Remark	Ant Pos	Tab Pos
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	Deg
1	342.00	34.12	-7.36	26.76	46.00	-19.24	Peak	101	0
2	363.00	38.32	-8.72	29.60	46.00	-16.40	Peak	101	0
3	415.50	36.29	-5.15	31.14	46.00	-14.86	Peak	101	0
4	569.50	31.65	7.60	39.25	46.00	-6.75	Peak	101	0
5	725.60	31.41	6.12	37.53	46.00	-8.47	Peak	101	0
6	793.50	29.58	5.82	35.40	46.00	-10.60	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode 3	: 802.11n HT40, CH3	Temperature	: 25 °C
Memo	:	Humidity	: 47 %



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	38.25	34.67	-7.14	27.53	40.00	-12.47	Peak	101	0
2	104.80	39.02	-18.80	20.22	43.50	-23.28	Peak	101	0
3	148.25	40.58	-14.69	25.89	43.50	-17.61	Peak	101	0
4	169.70	34.43	-11.27	23.16	43.50	-20.34	Peak	101	0
5	214.80	37.36	-16.46	20.90	43.50	-22.60	Peak	101	0
6	250.00	44.66	-13.52	31.14	46.00	-14.86	Peak	101	0

## Notes:

1. Result = Read Value + Factor
2. Factor = Antenna Factor + Cable Loss - Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 120KHz and video bandwidth is 300kHz for Peak detection and Quasi-peak detection at frequency below 1GHz.
4. All below 1GHz configurations are pretested among available 802.11b/g/n modes and found that the worst cases are on channel 1 of 802.11g & n20 mode and Channel 3 for n40 mode. Only worst case data concluded above were presented in this test report.
5. The data is worse case.