FCC RADIO TEST REPORT

Applicant	:	StarTech.com Ltd
Address	:	45 Artisans Crescent London, Ontario CANADA N5V 5E9
Equipment	:	Wireless N USB 2.0 Network print server
Model No.	:	PM1115UWB
Trade Name	:	StarTech.com
FCC ID.	:	2AA3I-PM1115UWB

I HEREBY CERTIFY THAT :

The sample was received on Feb. 22, 2017 and the testing was carried out on Feb. 24, 2017 at Cerpass Technology Corp. 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.

Approved by:

Mark Liao / Assistant Manager

Tested by:

Spree Yei / Engineer

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory

Contents

History of this test report

Report No.	Issue Date	Description
TEFI1612038	Mar. 15, 2017	Original

1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.4:2014

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

KDB558074

KDB662911

FCC Rule	. Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207	. AC Power Line Conducted Emission	Pass
15.209 15.205	. Radiated Spurious Emission	Pass
15.247(d)	. Conducted Spurious Emission	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak and Average Output Power	Pass
15.247(e)	. Power Spectral Density	Pass

This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report.

2. Test Configuration of Equipment under Test

2.1 Feature of Equipment under Test

Standard	Complies with IEEE 802.11b/g/n standard
Radio Frequency	2.4GHz ISM Band
Media Access Control Method	Carrier Sense Multiple Access / Collision Avoidance (CSMA/CA) with ACK
Modes	Ad-Hoc and Infrastructure (User definable)
Data Transfer Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS7, HT20/40 Up to 135Mbps/150Mbps
Antenna Gain	3.0dBi
Output Power	23.24dBm
Wireless Security	WEP (64bit/128bit) and WPA/WPA2
I/O Port	USB 2.0 Port x 1 Fast Ethernet network port: RJ45 for 10Base-T or 100Base-TX x 1 1 LED to indicate status: Orange 1 LED to indicate USB port: Green 1 LED to indicate WLAN status: Orange External AC Power Adapter x 1
Others	Built-in WPS Button Built-in Reset Button

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**	---	---

802.11an HT40 (2422-2452MHz)

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

Note: Channels remarked * are selected to perform test.

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 Remote workstation, Notebook and EUT for RF test. The Remote workstation included AP.
c. An executive program, ”IE” under WIN 7 was executed to transmit and receive data via WLAN.
d. The following test modes were performed for the test:
   Test Mode 1: 802.11b (1Mbps)
   Test Mode 2: 802.11g (6Mbps)
   Test Mode 3: 802.11n HT20 (6.5Mbps)
   Test Mode 4: 802.11n HT40 (13.5Mbps)
   For conducted test, “Test Mode 4“ generated the worst case, it was reported as the final data.
   For radiated test (below 1GHz), “Test Mode 4“ generated the worst case, it was reported as the final data.
   For radiated test (above 1GHz), “Test Mode 1~4“ were reported as the final data.

2.4 Description of Test System

Device	Manufacturer	Model No.	Description
Notebook	DELL	LatitudeE5450	Power Cable, Unshielding, 1.8m
Remote workstation			
AP	Trendnet	TEW-8210DAP	Power Cable, Unshielding, 1.5m

Use Cable:

Cable	Quantity	Description
Network	1	Unshielding, 1.2m

2.5 General Information of Test

☒	Test Site	**Cerpass Technology Corporation Test Laboratory** Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582
	FCC	TW1079, TW1061,390316, 228391, 641184
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-4218, R-4399 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25000MHz
Test Distance:		The test distance of radiated emission from antenna to EUT is 3 M.

2.6 Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	Line / Neutral	±2.9076 dB
Radiated Emission	9 kHz ~ 25,000 MHz	Vertical / Horizontal	±0.948 dB
Spurious Emission (Conducted)	-	-	±4.011 dB
Maximum Peak and Average Output Power	-	-	±0.322 dB
Power Spectral Density	-	-	±0.322 dB
Bandwidth	-	-	74.224Hz

3. Test Equipment and Ancillaries Used for Tests

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
EMI Receiver	R&S	ESCI3	100443	2016/03/28	2017/03/27
LISN	Schwarzbeck	NSLK 8127	8127-740	2016/08/30	2017/08/29
LISN	Schwarzbeck	NSLK 8127	8127-516	2016/09/06	2017/09/05
Pulse Limiter	R&S	ESH3-Z2	101934	2016/03/09	2017/03/08
Bilog Antenna	Schwarzbeck	VULB9168	369	2016/03/22	2017/03/21
Active Loop Antenna	EMCO	6507	40855	2016/05/11	2017/05/10
Horn Antenna	EMCO	3115	31601	2016/09/05	2017/09/04
Horn Antenna	EMCO	3116	31970	2016/03/18	2017/03/17
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2016/03/16	2017/03/15
Preamplifier	EM	EM330	60660	2016/03/16	2017/03/15
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2016/09/13	2017/09/12
Preamplifier	Agilent	8449B	3008A01954	2017/02/09	2018/02/08
Preamplifier	MITEQ	AMF-7D-001010 0-30-10P	1860212	2016/03/16	2017/03/15
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2016/11/04	2017/11/03
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2016/03/18	2017/03/17
Spectrum Analyzer	R&S	FSP40	100219	2016/09/01	2017/08/31
Bluetooth Tester	R&S	CBT	101133	2016/03/18	2017/03/17
Attenuator	KEYSIGHT	8491B	MY39250703	2016/03/07	2017/03/06
Rotary Attenuator	Agilent	8494B	MY42154466	2016/03/08	2017/03/07
Rotary Attenuator	Agilent	8495B	MY42146680	2016/03/08	2017/03/07
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2016/09/05	2017/09/04
Series Power Meter	Anritsu	ML2495A	1224005	2016/03/03	2017/03/02
Power Sensor	Anritsu	MA2411B	1207295	2016/03/03	2017/03/02
Cable	HUBER SUHNER	SUCOFLEX 102	28422/2	2016/03/15	2017/03/14
Cable	HUBER SUHNER	SUCOFLEX 102	28418/2	2016/03/16	2017/03/15
Cable	HUBER SUHNER	SUCOFLEX 102	28417/2	2016/03/04	2017/03/03
Software	Farad	Ez-EMC	ver.ct3a1	N/A	N/A
Software	AUDIX	E3	V8.2014-8-6	N/A	N/A
Software	Keysight	N7607B Signal Studio	v2.0.0.1	N/A	N/A
Software	Keysight	Inservice MonitorUtility	N/A	N/A	N/A

4. Antenna Requirements

4.1 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.

4.2 Antenna Construction and Directional Gain

Antenna Type: FPC
Antenna Gain: 3.0dBi
For Power directional gain= Gant= 3.0 dBi
For PSD directional gain = 3.0 (dBi)

5. Test of AC Power Line Conducted Emission

5.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

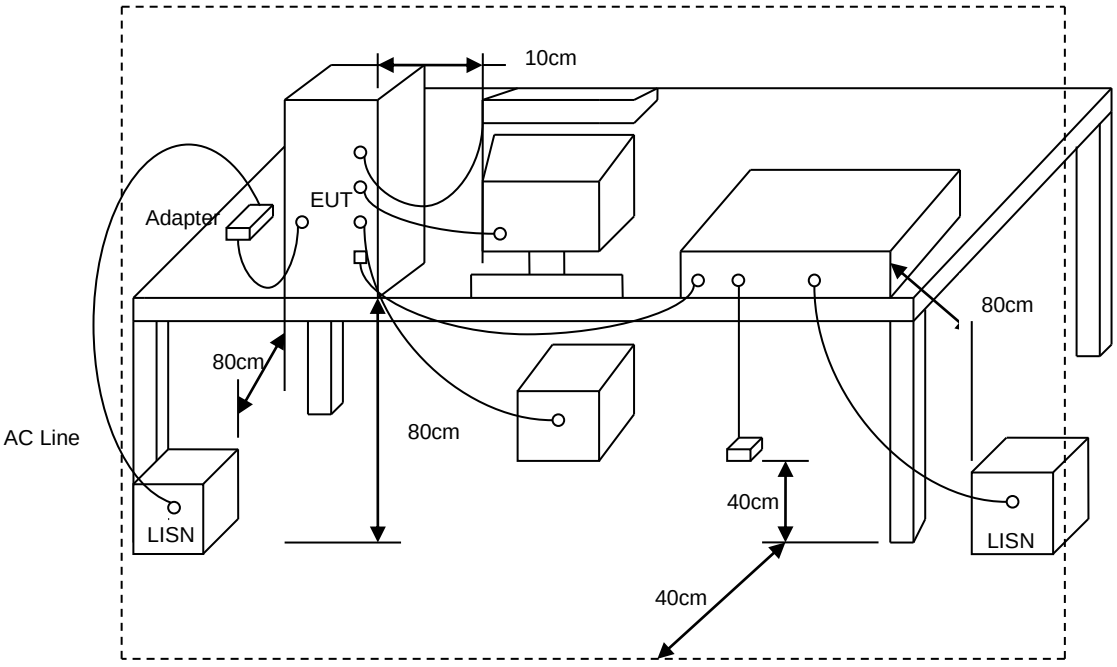
Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

*Decreases with the logarithm of the frequency.

5.2 Test Procedures

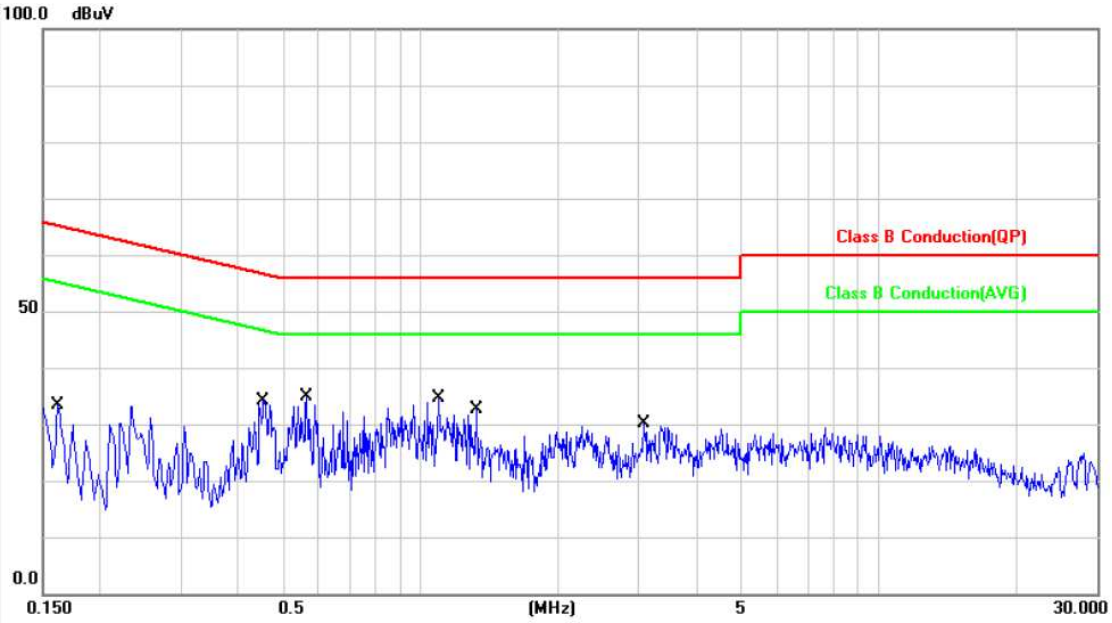
a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
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.

5.3 Typical Test Setup



5.4 Test Result and Data

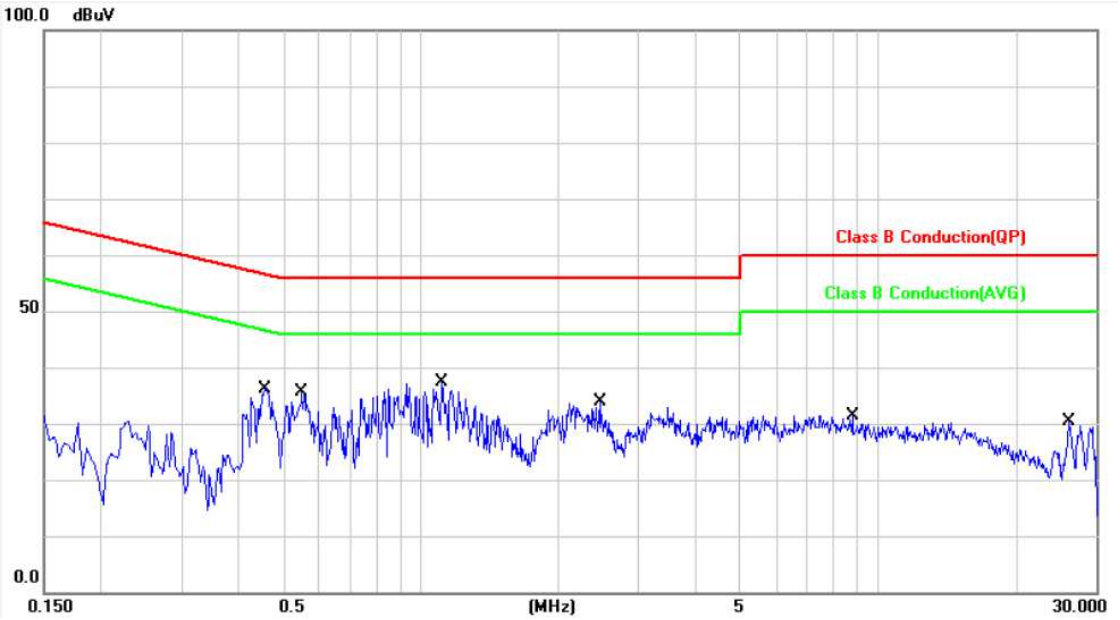
Power	:	AC 120V	Pol/Phase	:	LINE
Test Mode	:	Mode 4	Temperature	:	21 °C
Test date	:	Feb. 23, 2017	Humidity	:	54 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1620	9.98	16.74	26.72	65.36	-38.64	QP	P
2	0.1620	9.98	4.33	14.31	55.36	-41.05	AVG	P
3	0.4540	9.97	20.99	30.96	56.80	-25.84	QP	P
4	0.4540	9.97	12.37	22.34	46.80	-24.46	AVG	P
5	0.5660	9.98	16.55	26.53	56.00	-29.47	QP	P
6	0.5660	9.98	7.62	17.60	46.00	-28.40	AVG	P
7	1.0940	10.03	15.45	25.48	56.00	-30.52	QP	P
8	1.0940	10.03	7.37	17.40	46.00	-28.60	AVG	P
9	1.3300	10.04	13.66	23.70	56.00	-32.30	QP	P
10	1.3300	10.04	4.74	14.78	46.00	-31.22	AVG	P
11	3.0900	10.11	11.85	21.96	56.00	-34.04	QP	P
12	3.0900	10.11	4.18	14.29	46.00	-31.71	AVG	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator

Power	:	AC 120V	Pol/Phase	:	NEUTRAL
Test Mode	:	Mode 4	Temperature	:	21 °C
Test date	:	Feb. 23, 2017	Humidity	:	54 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.4580	9.94	23.69	33.63	56.73	-23.10	QP	P
2	0.4580	9.94	13.31	23.25	46.73	-23.48	AVG	P
3	0.5500	9.95	21.28	31.23	56.00	-24.77	QP	P
4	0.5500	9.95	10.10	20.05	46.00	-25.95	AVG	P
5	1.1140	9.99	22.02	32.01	56.00	-23.99	QP	P
6	1.1140	9.99	10.96	20.95	46.00	-25.05	AVG	P
7	2.4620	10.06	17.08	27.14	56.00	-28.86	QP	P
8	2.4620	10.06	6.65	16.71	46.00	-29.29	AVG	P
9	8.7900	10.29	14.71	25.00	60.00	-35.00	QP	P
10	8.7900	10.29	5.60	15.89	50.00	-34.11	AVG	P
11	26.2060	10.65	11.95	22.60	60.00	-37.40	QP	P
12	26.2060	10.65	2.13	12.78	50.00	-37.22	AVG	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss+ Attenuator

6. Test of Spurious Emission (Radiated)

6.1 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

6.2 Test Procedures

a. The EUT was placed on a rotatable table top 0.8 meter above ground.

b. The EUT was set 3 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 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.

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 or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.

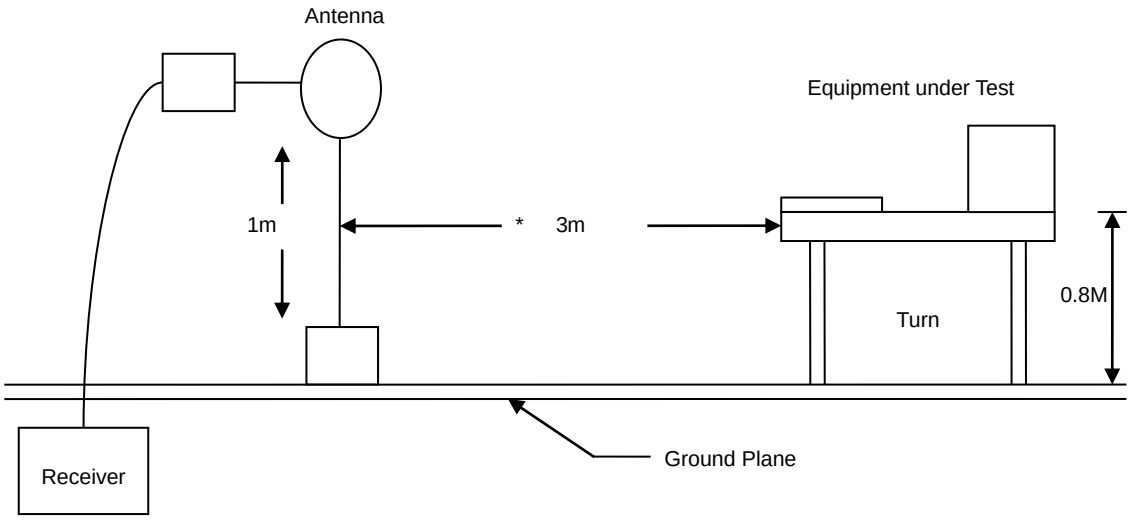
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

h. 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.

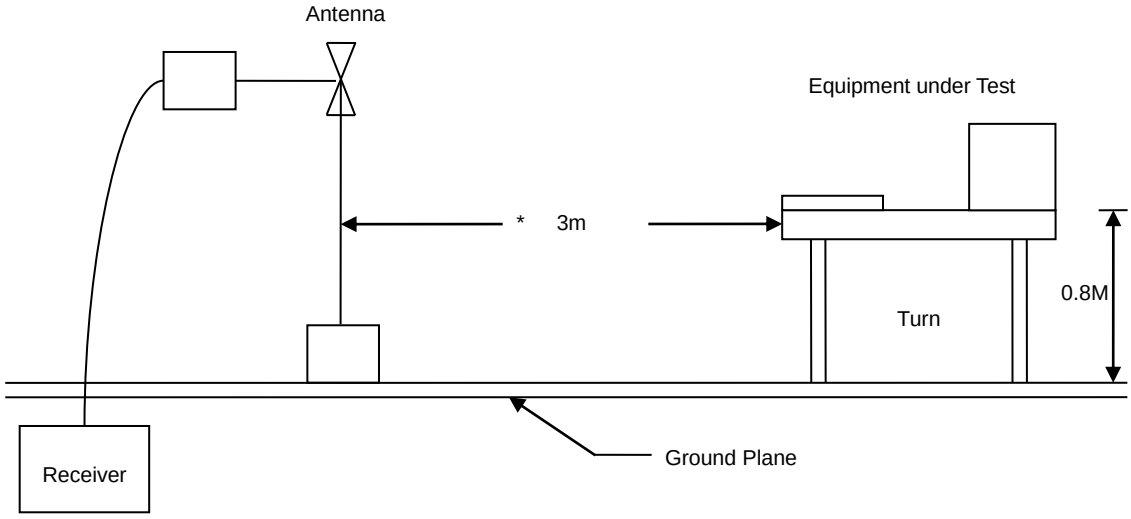
i. “Cone of radiation” has been considered to be 3dB bandwidth of the measurement antenna.

6.3 Typical Test Setup

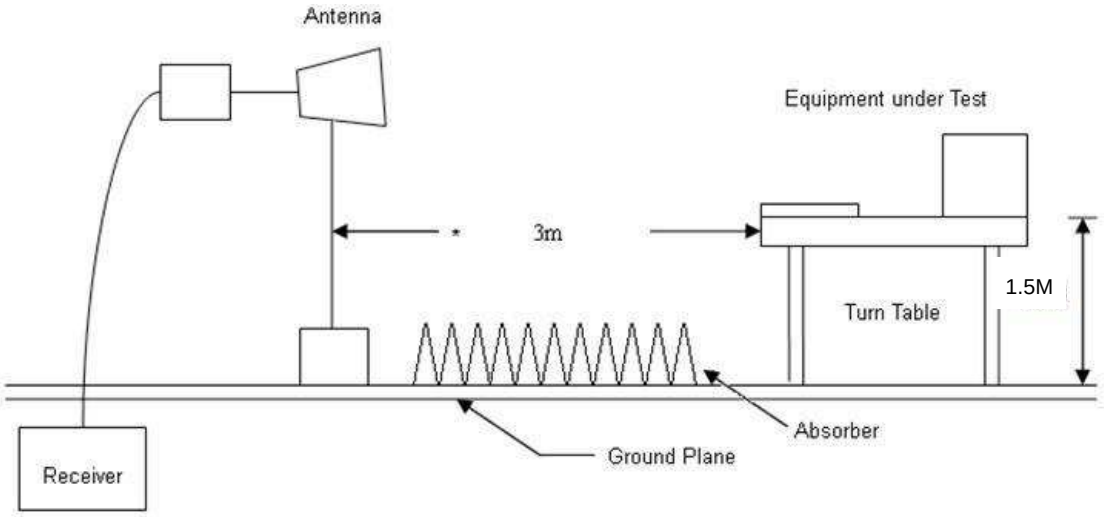
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup

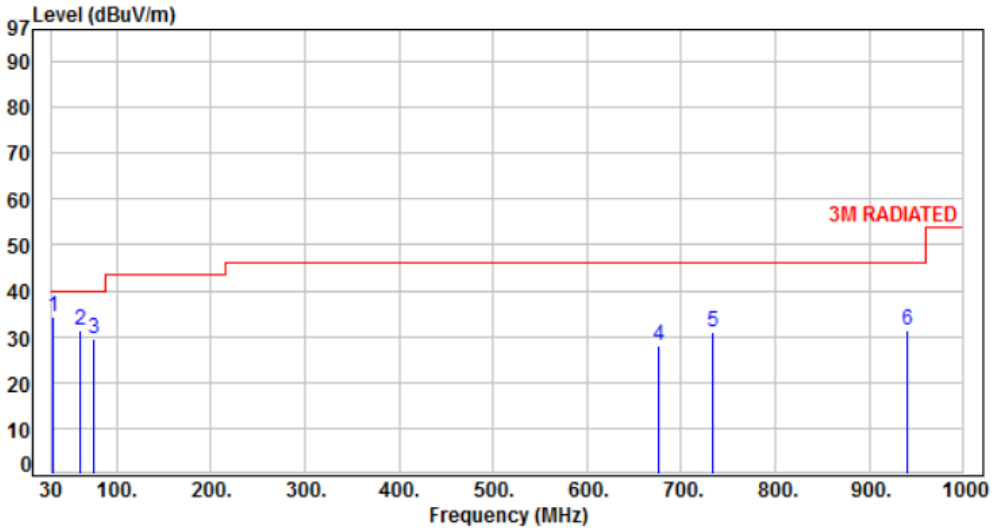


6.4 Test Result and Data (9KHz ~ 30MHz)

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

6.5 Test Result and Data (30MHz ~ 1GHz)

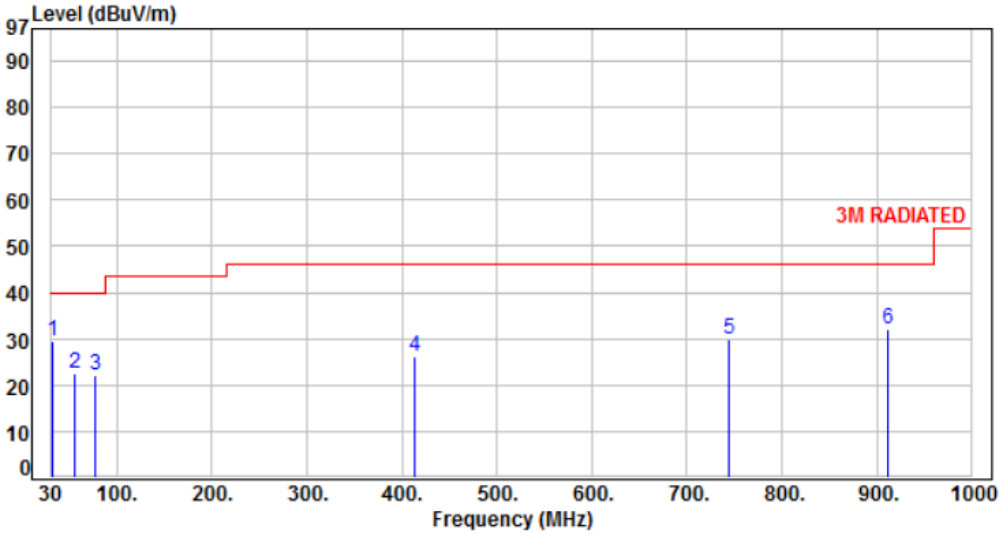
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4	Temperature	:	25 °C
Test Date	:	Feb. 23, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	31.94	-10.68	45.13	34.45	40.00	-5.55	Peak	199	0	P
2	61.04	-10.62	41.89	31.27	40.00	-8.73	Peak	199	0	P
3	74.62	-12.85	42.29	29.44	40.00	-10.56	Peak	199	0	P
4	676.02	-0.67	28.64	27.97	46.00	-18.03	Peak	199	0	P
5	734.22	0.35	30.73	31.08	46.00	-14.92	Peak	199	0	P
6	939.86	3.22	28.15	31.37	46.00	-14.63	Peak	199	0	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4	Temperature	:	25 °C
Test Date	:	Feb. 23, 2017	Humidity	:	63 %

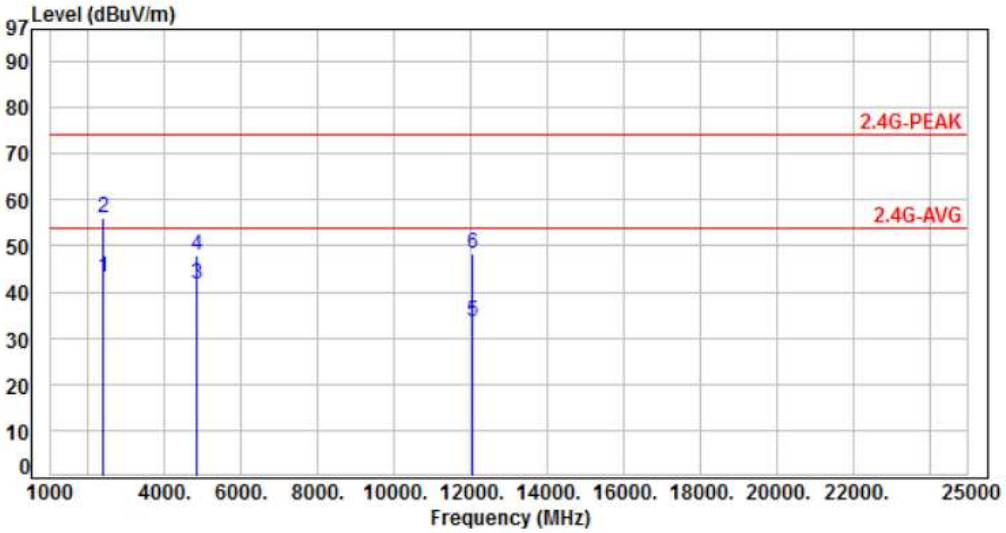


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	31.94	-10.68	40.13	29.45	40.00	-10.55	Peak	100	0	P
2	55.22	-10.01	32.39	22.38	40.00	-17.62	Peak	100	0	P
3	76.56	-13.23	35.43	22.20	40.00	-17.80	Peak	100	0	P
4	414.12	-5.71	31.93	26.22	46.00	-19.78	Peak	100	0	P
5	743.92	0.50	29.40	29.90	46.00	-16.10	Peak	100	0	P
6	910.76	2.64	29.38	32.02	46.00	-13.98	Peak	100	0	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

6.6 Test Result and Data (1GHz ~ 25GHz)

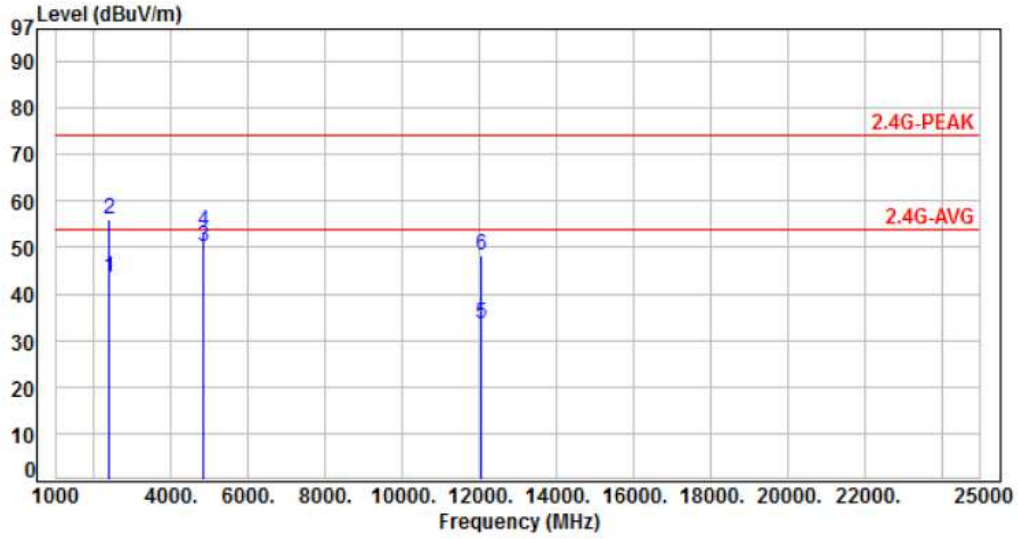
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH01	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	58.90	43.29	54.00	-10.71	Average	103	190	P
2	2390.00	-15.61	71.75	56.14	74.00	-17.86	Peak	103	190	P
3	4824.00	-7.51	49.28	41.77	54.00	-12.23	Average	100	242	P
4	4824.00	-7.51	55.35	47.84	74.00	-26.16	Peak	100	242	P
5	12060.00	2.66	30.74	33.40	54.00	-20.60	Average	112	253	P
6	12060.00	2.66	45.48	48.14	74.00	-25.86	Peak	112	253	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

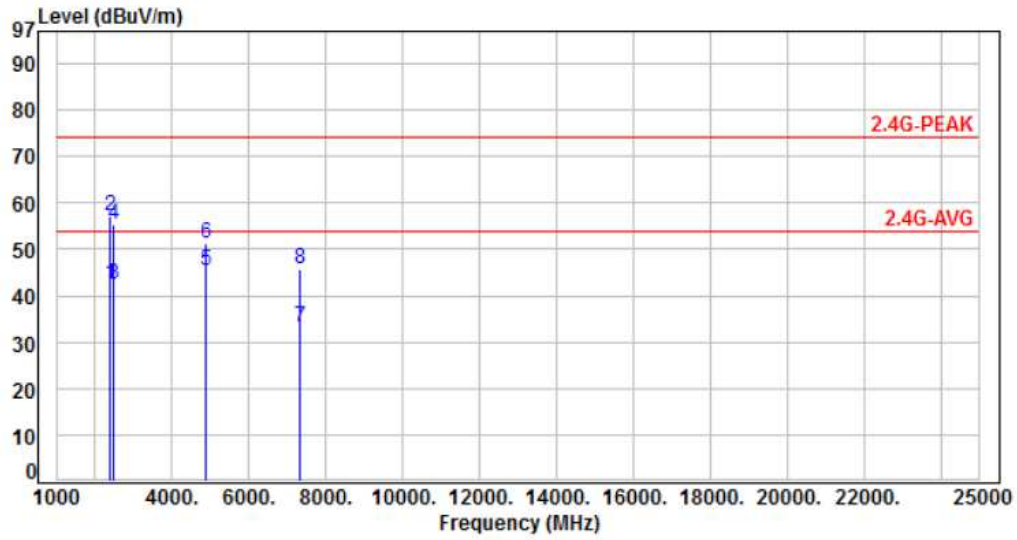
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH 01	Temperature	:	23 °C
Test Date	:	Feb. 22, 2017	Humidity	:	57 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	59.16	43.55	54.00	-10.45	Average	290	148	P
2	2390.00	-15.61	71.76	56.15	74.00	-17.85	Peak	290	148	P
3	4824.00	-7.51	57.62	50.11	54.00	-3.89	Average	103	274	P
4	4824.00	-7.51	60.82	53.31	74.00	-20.69	Peak	103	274	P
5	12060.00	2.66	30.79	33.45	54.00	-20.55	Average	106	282	P
6	12060.00	2.66	45.51	48.17	74.00	-25.83	Peak	106	282	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

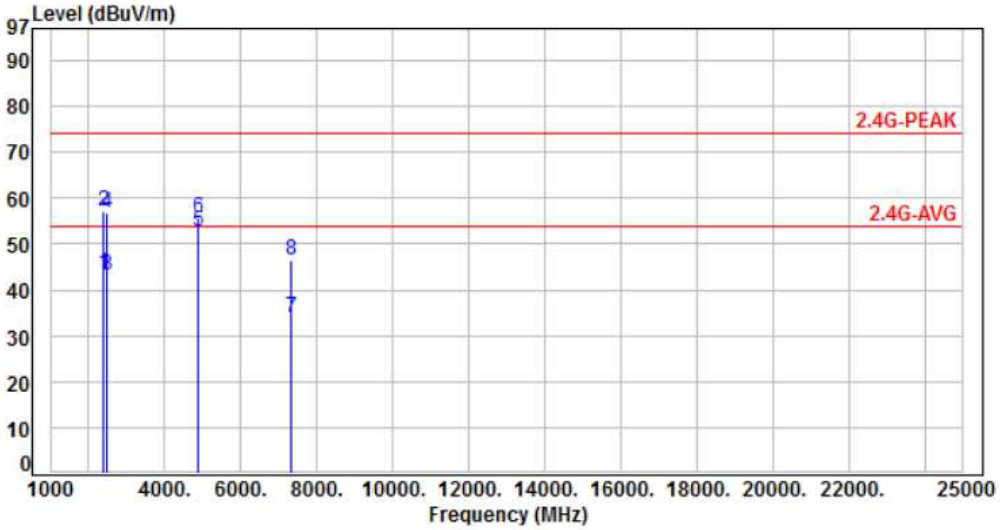
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	58.03	42.42	54.00	-11.58	Average	188	234	P
2	2390.00	-15.61	72.65	57.04	74.00	-16.96	Peak	188	234	P
3	2483.50	-15.29	57.53	42.24	54.00	-11.76	Average	188	234	P
4	2483.50	-15.29	70.46	55.17	74.00	-18.83	Peak	188	234	P
5	4874.00	-7.31	52.65	45.34	54.00	-8.66	Average	120	332	P
6	4874.00	-7.31	58.43	51.12	74.00	-22.88	Peak	120	332	P
7	7311.00	-3.18	36.45	33.27	54.00	-20.73	Average	188	143	P
8	7311.00	-3.18	48.83	45.65	74.00	-28.35	Peak	188	143	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

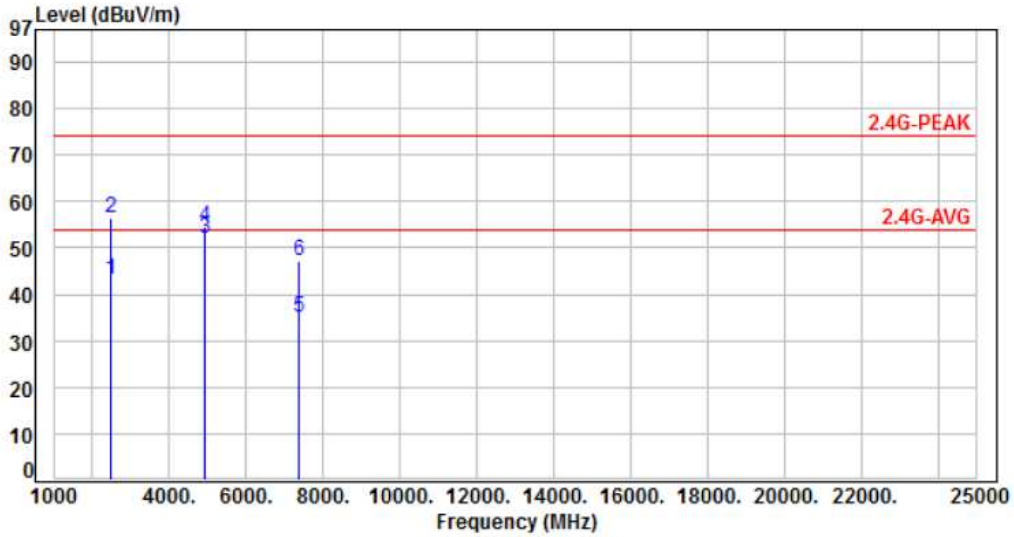
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	59.25	43.64	54.00	-10.36	Average	273	208	P
2	2390.00	-15.61	72.65	57.04	74.00	-16.96	Peak	273	208	P
3	2483.50	-15.29	58.45	43.16	54.00	-10.84	Average	273	208	P
4	2483.50	-15.29	71.92	56.63	74.00	-17.37	Peak	273	208	P
5	4874.00	-7.31	60.12	52.81	54.00	-1.19	Average	104	278	P
6	4874.00	-7.31	62.97	55.66	74.00	-18.34	Peak	104	278	P
7	7311.00	-3.18	37.29	34.11	54.00	-19.89	Average	350	219	P
8	7311.00	-3.18	49.57	46.39	74.00	-27.61	Peak	350	219	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

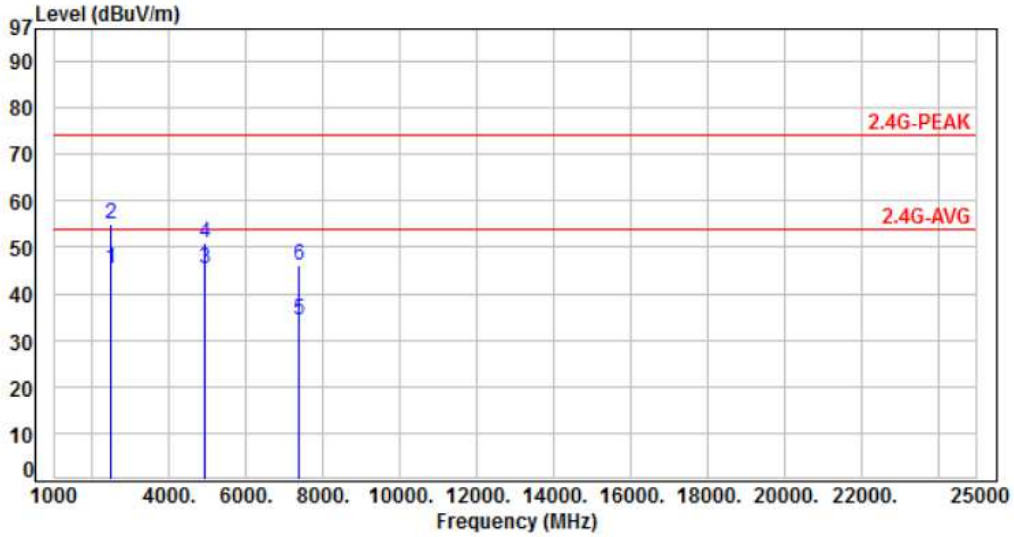
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 1, CH 11	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	58.53	43.24	54.00	-10.76	Average	289	202	P
2	2483.50	-15.29	71.74	56.45	74.00	-17.55	Peak	289	202	P
3	4924.00	-7.10	59.11	52.01	54.00	-1.99	Average	100	290	P
4	4924.00	-7.10	61.87	54.77	74.00	-19.23	Peak	100	290	P
5	7386.00	-3.03	38.14	35.11	54.00	-18.89	Average	218	325	P
6	7386.00	-3.03	50.32	47.29	74.00	-26.71	Peak	218	325	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

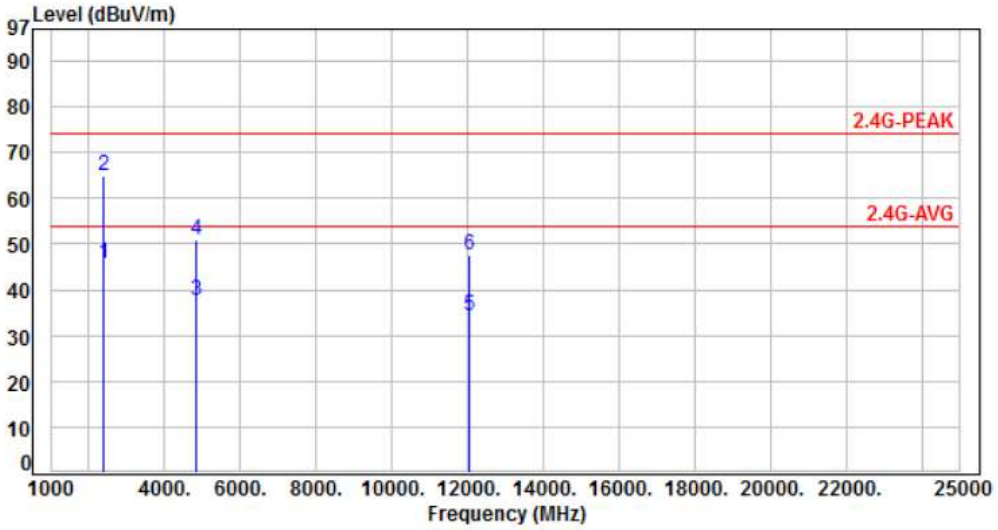
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 1, CH 11	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	60.76	45.47	54.00	-8.53	Average	163	251	P
2	2483.50	-15.29	70.42	55.13	74.00	-18.87	Peak	163	251	P
3	4924.00	-7.10	52.38	45.28	54.00	-8.72	Average	144	108	P
4	4924.00	-7.10	58.00	50.90	74.00	-23.10	Peak	144	108	P
5	7386.00	-3.03	37.35	34.32	54.00	-19.68	Average	173	166	P
6	7386.00	-3.03	49.16	46.13	74.00	-27.87	Peak	173	166	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

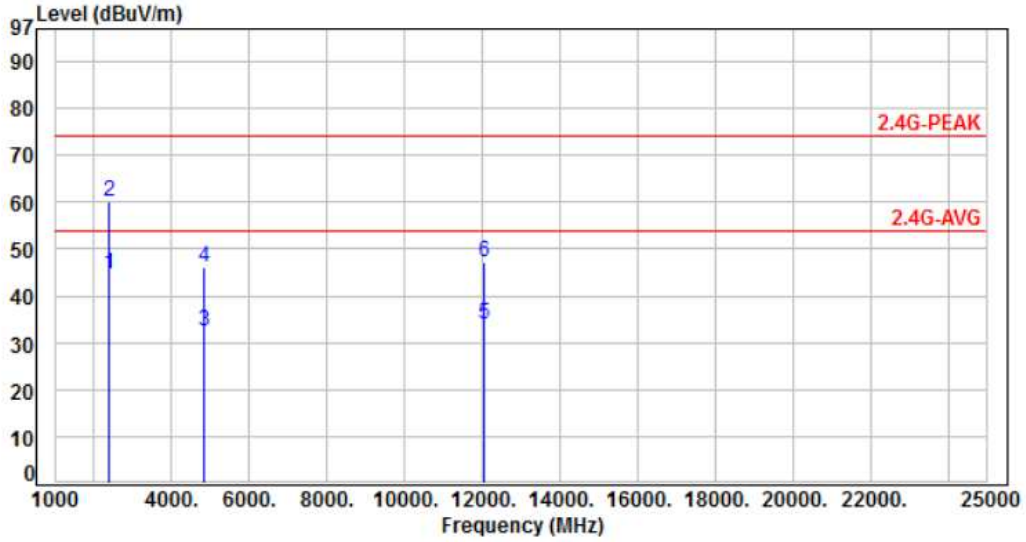
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH 01	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	61.32	45.71	54.00	-8.29	Average	234	210	P
2	2390.00	-15.61	80.63	65.02	74.00	-8.98	Peak	234	210	P
3	4824.00	-7.51	44.98	37.47	54.00	-16.53	Average	100	278	P
4	4824.00	-7.51	58.35	50.84	74.00	-23.16	Peak	100	278	P
5	12060.00	2.66	31.54	34.20	54.00	-19.80	Average	103	285	P
6	12060.00	2.66	44.98	47.64	74.00	-26.36	Peak	103	285	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

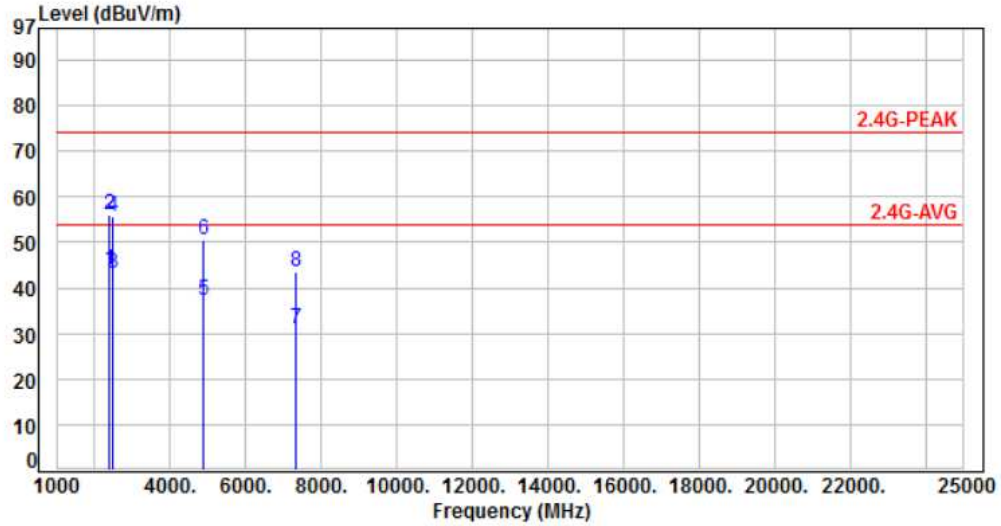
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH 01	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	60.08	44.47	54.00	-9.53	Average	101	129	P
2	2390.00	-15.61	75.81	60.20	74.00	-13.80	Peak	101	129	P
3	4824.00	-7.51	40.01	32.50	54.00	-21.50	Average	133	227	P
4	4824.00	-7.51	53.72	46.21	74.00	-27.79	Peak	133	227	P
5	12060.00	2.66	31.12	33.78	54.00	-20.22	Average	148	252	P
6	12060.00	2.66	44.67	47.33	74.00	-26.67	Peak	148	252	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

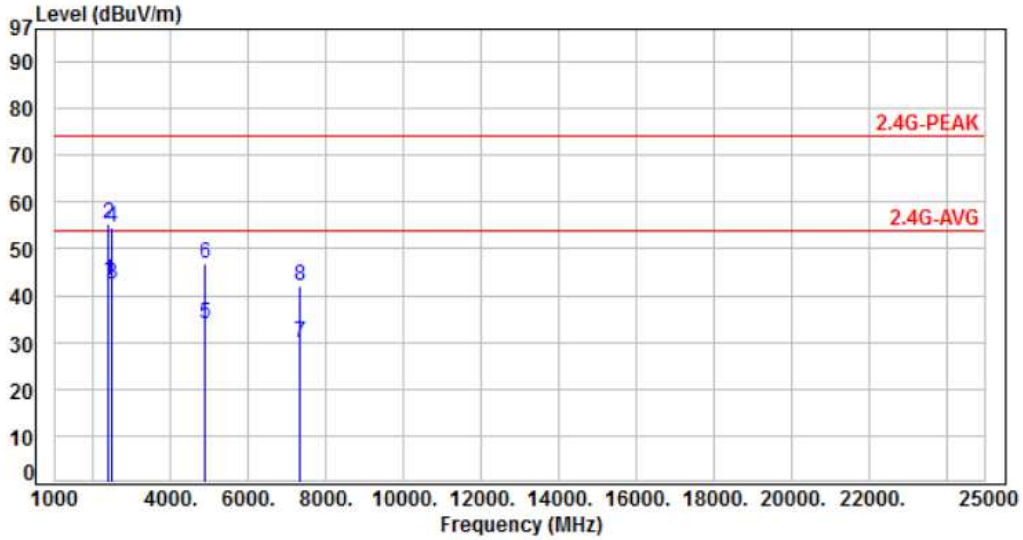
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	59.64	44.03	54.00	-9.97	Average	269	206	P
2	2390.00	-15.61	71.73	56.12	74.00	-17.88	Peak	269	206	P
3	2483.50	-15.29	58.32	43.03	54.00	-10.97	Average	269	206	P
4	2483.50	-15.29	71.15	55.86	74.00	-18.14	Peak	269	206	P
5	4874.00	-7.31	44.64	37.33	54.00	-16.67	Average	100	269	P
6	4874.00	-7.31	57.76	50.45	74.00	-23.55	Peak	100	269	P
7	7311.00	-3.18	34.14	30.96	54.00	-23.04	Average	348	221	P
8	7311.00	-3.18	46.61	43.43	74.00	-30.57	Peak	348	221	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

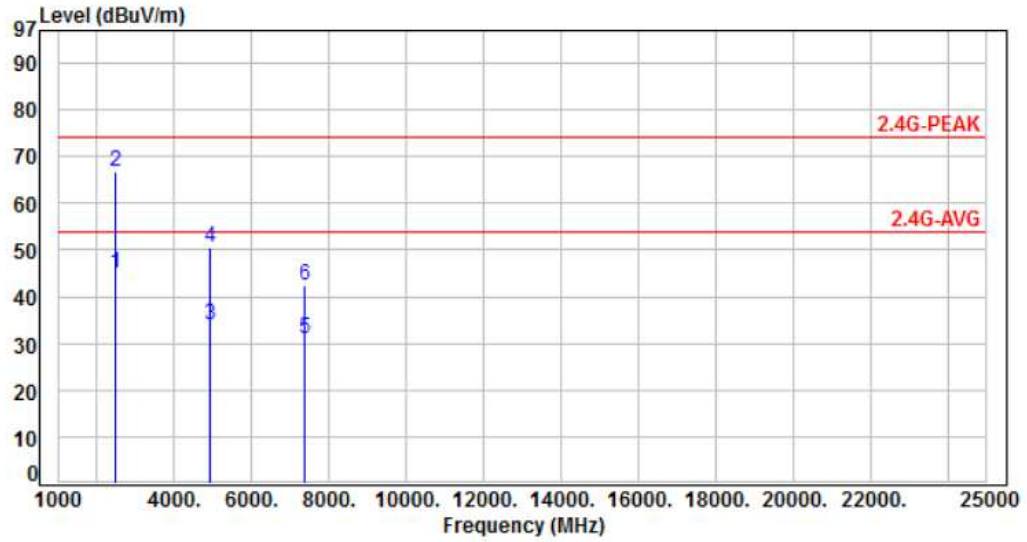
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	58.93	43.32	54.00	-10.68	Average	158	93	P
2	2390.00	-15.61	70.92	55.31	74.00	-18.69	Peak	158	93	P
3	2483.50	-15.29	57.52	42.23	54.00	-11.77	Average	158	93	P
4	2483.50	-15.29	69.86	54.57	74.00	-19.43	Peak	158	93	P
5	4874.00	-7.31	41.12	33.81	54.00	-20.19	Average	124	291	P
6	4874.00	-7.31	54.15	46.84	74.00	-27.16	Peak	124	291	P
7	7311.00	-3.18	32.94	29.76	54.00	-24.24	Average	211	308	P
8	7311.00	-3.18	45.30	42.12	74.00	-31.88	Peak	211	308	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

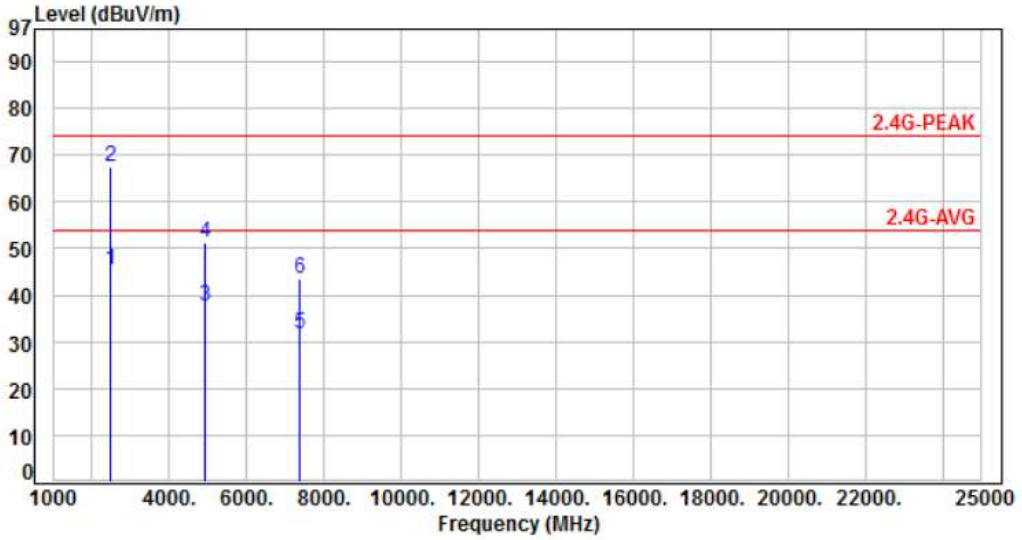
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 2, CH 11	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	60.12	44.83	54.00	-9.17	Average	142	153	P
2	2483.50	-15.29	82.02	66.73	74.00	-7.27	Peak	142	153	P
3	4924.00	-7.10	41.05	33.95	54.00	-20.05	Average	109	288	P
4	4924.00	-7.10	57.53	50.43	74.00	-23.57	Peak	109	288	P
5	7386.00	-3.03	33.87	30.84	54.00	-23.16	Average	281	203	P
6	7386.00	-3.03	45.46	42.43	74.00	-31.57	Peak	281	203	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

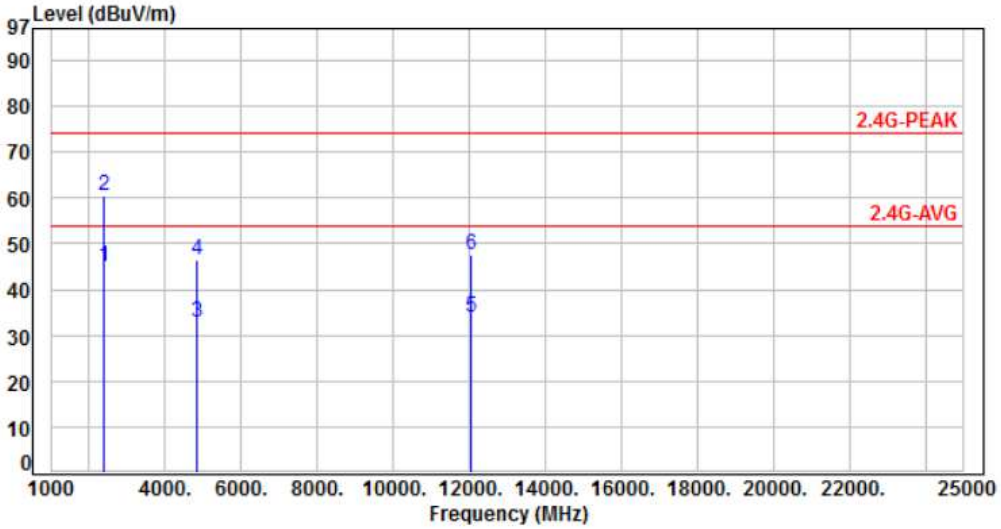
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 2, CH 11	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	60.80	45.51	54.00	-8.49	Average	170	186	P
2	2483.50	-15.29	82.80	67.51	74.00	-6.49	Peak	170	186	P
3	4924.00	-7.10	44.61	37.51	54.00	-16.49	Average	100	278	P
4	4924.00	-7.10	58.32	51.22	74.00	-22.78	Peak	100	278	P
5	7386.00	-3.03	34.61	31.58	54.00	-22.42	Average	341	213	P
6	7386.00	-3.03	46.37	43.34	74.00	-30.66	Peak	341	213	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

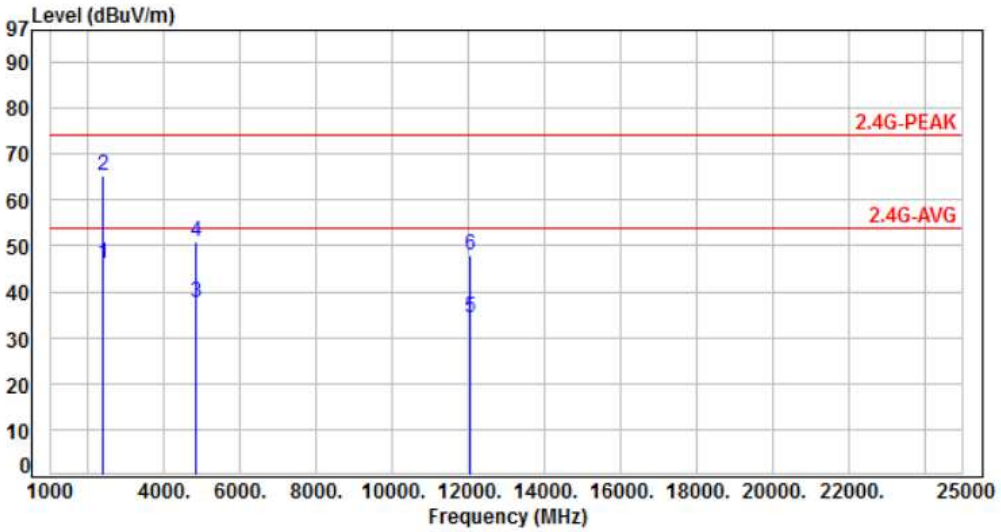
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 3, CH 01	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	60.49	44.88	54.00	-9.12	Average	106	134	P
2	2390.00	-15.61	75.94	60.33	74.00	-13.67	Peak	106	134	P
3	4824.00	-7.51	40.25	32.74	54.00	-21.26	Average	128	225	P
4	4824.00	-7.51	53.84	46.33	74.00	-27.67	Peak	128	225	P
5	12060.00	2.66	31.33	33.99	54.00	-20.01	Average	151	260	P
6	12060.00	2.66	44.81	47.47	74.00	-26.53	Peak	151	260	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

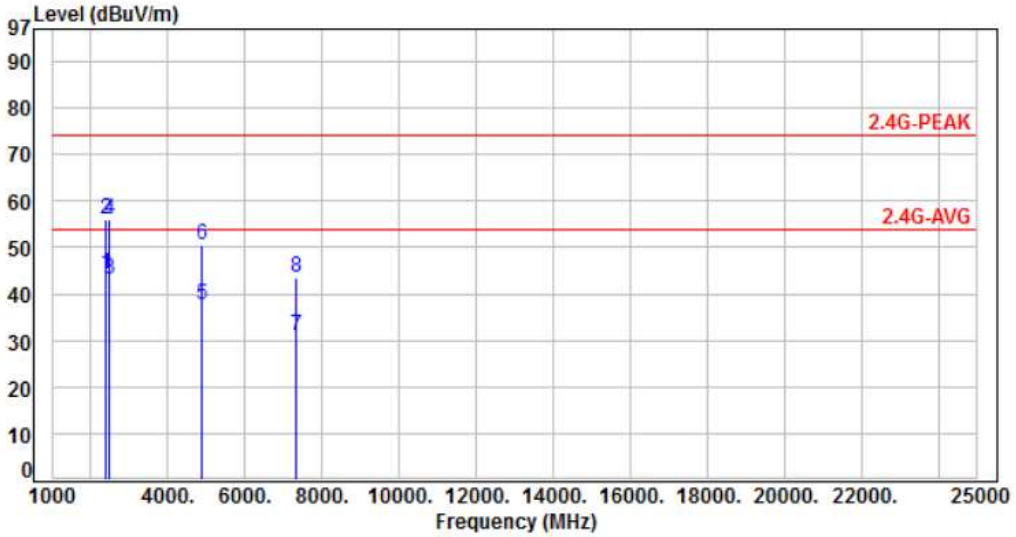
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 3, CH 01	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	61.59	45.98	54.00	-8.02	Average	227	208	P
2	2390.00	-15.61	80.87	65.26	74.00	-8.74	Peak	227	208	P
3	4824.00	-7.51	45.11	37.60	54.00	-16.40	Average	100	274	P
4	4824.00	-7.51	58.50	50.99	74.00	-23.01	Peak	100	274	P
5	12060.00	2.66	31.68	34.34	54.00	-19.66	Average	102	283	P
6	12060.00	2.66	45.24	47.90	74.00	-26.10	Peak	102	283	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

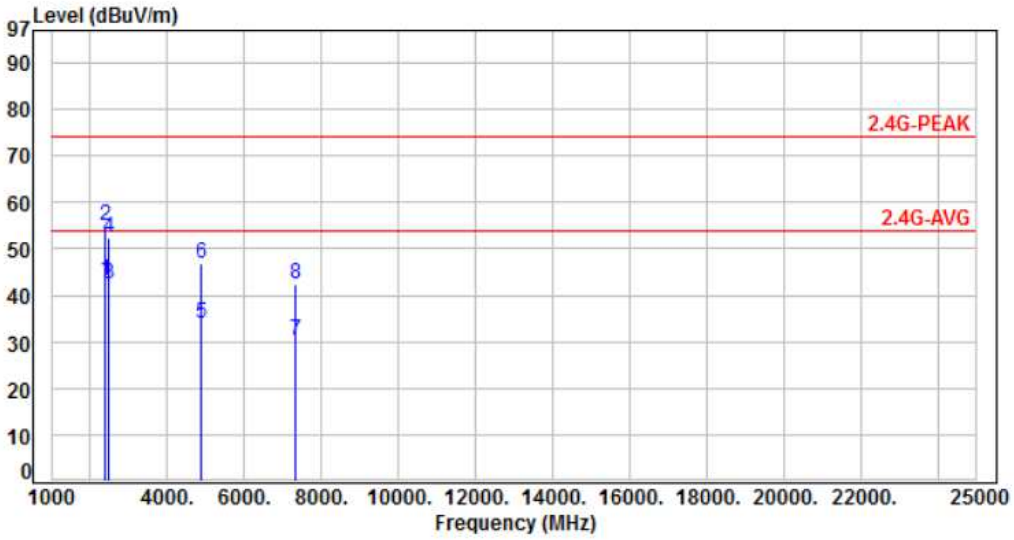
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 3, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	59.72	44.11	54.00	-9.89	Average	267	202	P
2	2390.00	-15.61	71.85	56.24	74.00	-17.76	Peak	267	202	P
3	2483.50	-15.29	58.51	43.22	54.00	-10.78	Average	267	202	P
4	2483.50	-15.29	71.34	56.05	74.00	-17.95	Peak	267	202	P
5	4874.00	-7.31	44.88	37.57	54.00	-16.43	Average	102	267	P
6	4874.00	-7.31	57.91	50.60	74.00	-23.40	Peak	102	267	P
7	7311.00	-3.18	34.31	31.13	54.00	-22.87	Average	337	216	P
8	7311.00	-3.18	46.78	43.60	74.00	-30.40	Peak	337	216	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

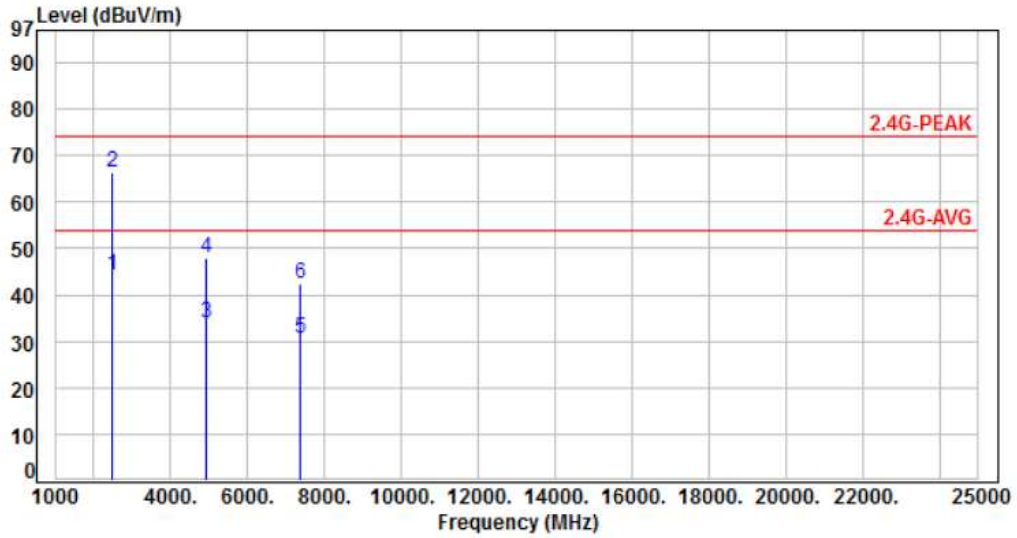
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 3, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	58.93	43.32	54.00	-10.68	Average	193	266	P
2	2390.00	-15.61	70.73	55.12	74.00	-18.88	Peak	193	266	P
3	2483.50	-15.29	57.77	42.48	54.00	-11.52	Average	193	266	P
4	2483.50	-15.29	67.49	52.20	74.00	-21.80	Peak	193	266	P
5	4874.00	-7.31	41.20	33.89	54.00	-20.11	Average	125	338	P
6	4874.00	-7.31	54.20	46.89	74.00	-27.11	Peak	125	338	P
7	7311.00	-3.18	33.49	30.31	54.00	-23.69	Average	221	150	P
8	7311.00	-3.18	45.60	42.42	74.00	-31.58	Peak	221	150	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

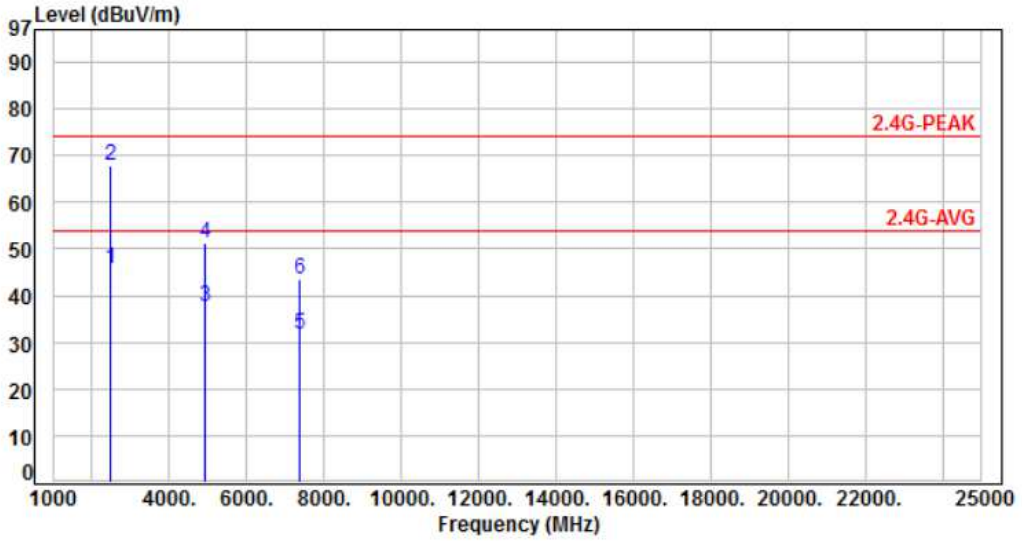
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 3, CH 11	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	59.67	44.38	54.00	-9.62	Average	146	204	P
2	2483.50	-15.29	81.72	66.43	74.00	-7.57	Peak	146	204	P
3	4924.00	-7.10	41.02	33.92	54.00	-20.08	Average	133	83	P
4	4924.00	-7.10	54.97	47.87	74.00	-26.13	Peak	133	83	P
5	7386.00	-3.03	33.65	30.62	54.00	-23.38	Average	251	144	P
6	7386.00	-3.03	45.37	42.34	74.00	-31.66	Peak	251	144	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

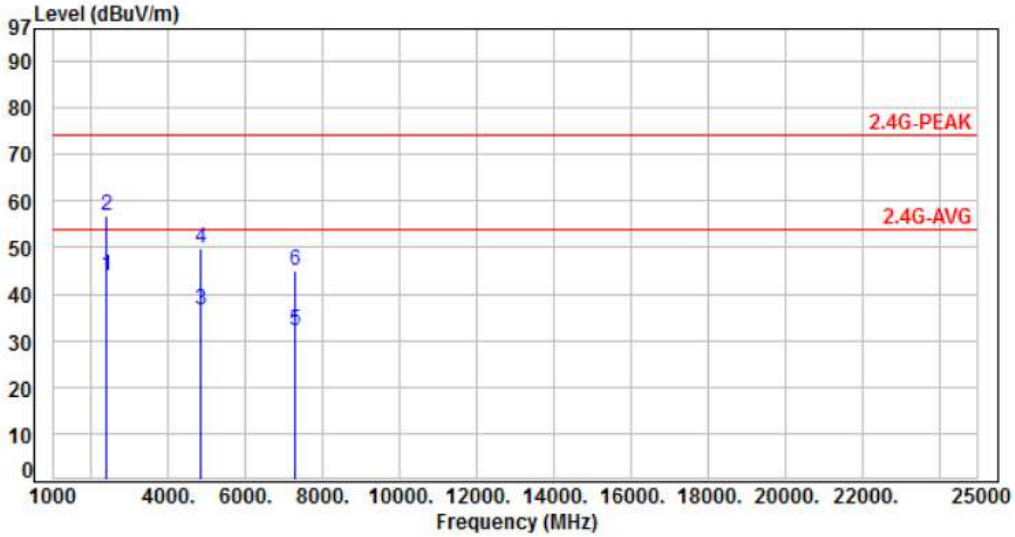
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 3, CH 11	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	60.91	45.62	54.00	-8.38	Average	172	194	P
2	2483.50	-15.29	83.15	67.86	74.00	-6.14	Peak	172	194	P
3	4924.00	-7.10	44.74	37.64	54.00	-16.36	Average	100	274	P
4	4924.00	-7.10	58.48	51.38	74.00	-22.62	Peak	100	274	P
5	7386.00	-3.03	34.85	31.82	54.00	-22.18	Average	333	215	P
6	7386.00	-3.03	46.52	43.49	74.00	-30.51	Peak	333	215	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

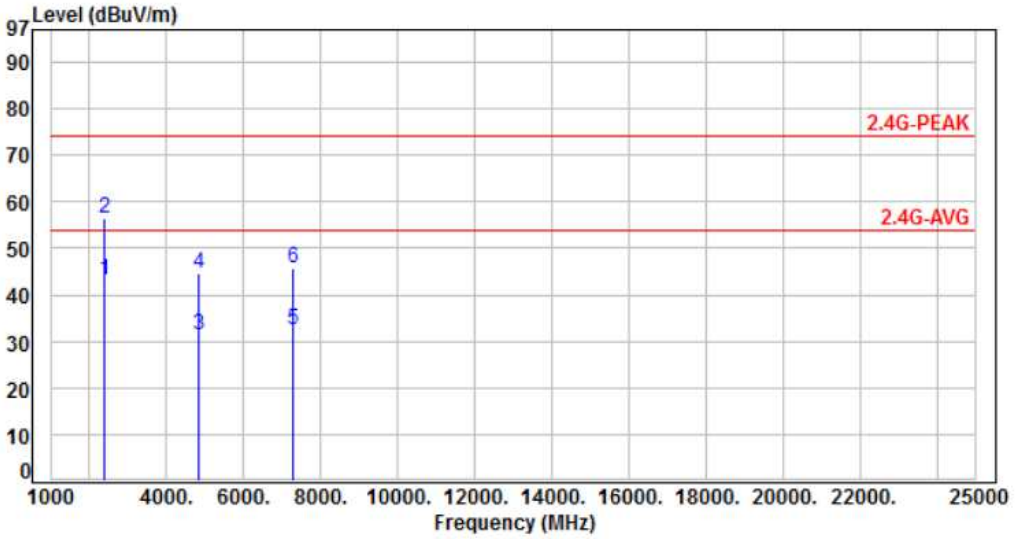
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4, CH 03	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	59.64	44.03	54.00	-9.97	Average	100	198	P
2	2390.00	-15.61	72.30	56.69	74.00	-17.31	Peak	100	198	P
3	4844.00	-7.43	43.78	36.35	54.00	-17.65	Average	146	262	P
4	4844.00	-7.43	57.28	49.85	74.00	-24.15	Peak	146	262	P
5	7266.00	-3.26	35.44	32.18	54.00	-21.82	Average	100	271	P
6	7266.00	-3.26	48.22	44.96	74.00	-29.04	Peak	100	271	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

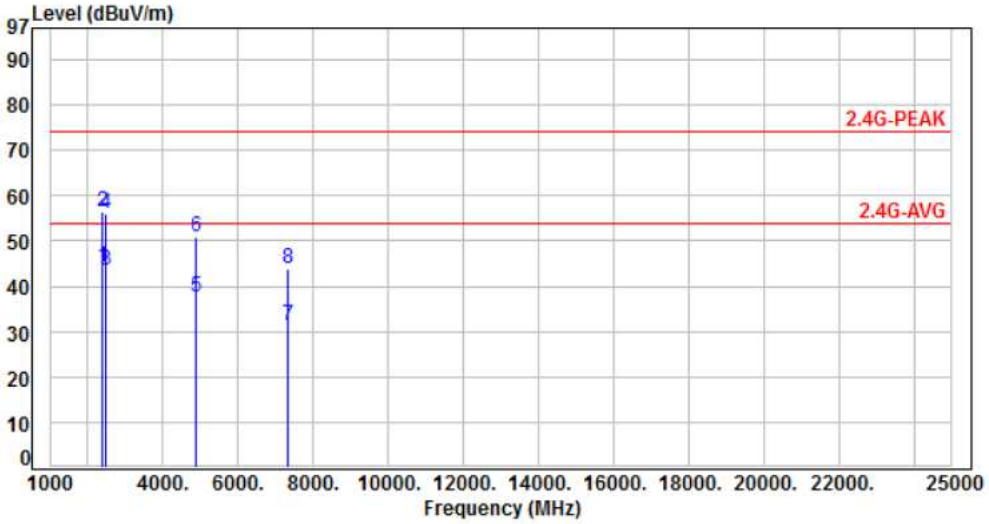
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, CH 03	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	58.77	43.16	54.00	-10.84	Average	137	168	P
2	2390.00	-15.61	71.93	56.32	74.00	-17.68	Peak	137	168	P
3	4844.00	-7.43	38.96	31.53	54.00	-22.47	Average	149	210	P
4	4844.00	-7.43	51.94	44.51	74.00	-29.49	Peak	149	210	P
5	7266.00	-3.26	35.80	32.54	54.00	-21.46	Average	148	253	P
6	7266.00	-3.26	48.94	45.68	74.00	-28.32	Peak	148	253	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

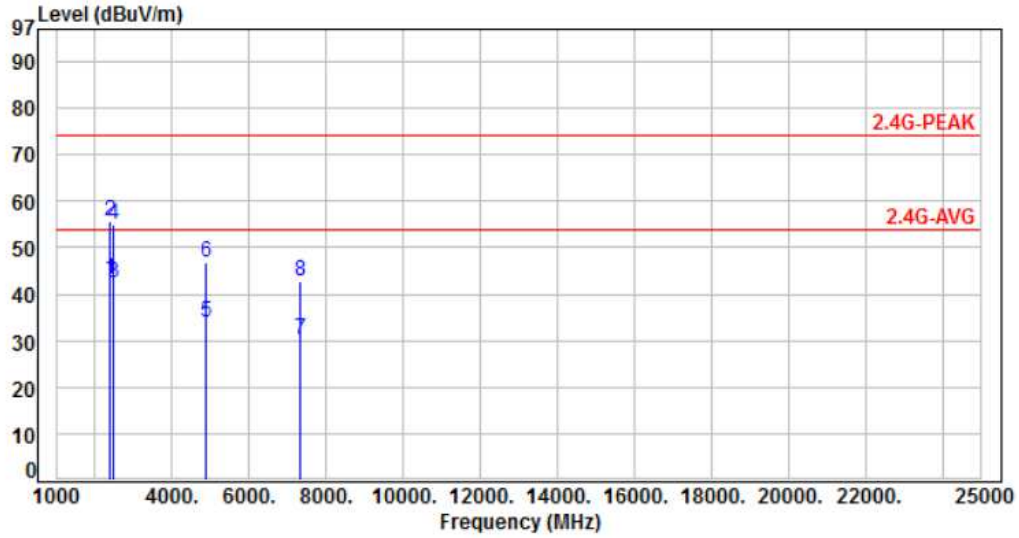
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	59.87	44.26	54.00	-9.74	Average	258	214	P
2	2390.00	-15.61	71.95	56.34	74.00	-17.66	Peak	258	214	P
3	2483.50	-15.29	58.69	43.40	54.00	-10.60	Average	258	214	P
4	2483.50	-15.29	71.52	56.23	74.00	-17.77	Peak	258	214	P
5	4874.00	-7.31	44.97	37.66	54.00	-16.34	Average	113	276	P
6	4874.00	-7.31	58.19	50.88	74.00	-23.12	Peak	113	276	P
7	7311.00	-3.18	34.45	31.27	54.00	-22.73	Average	331	212	P
8	7311.00	-3.18	46.92	43.74	74.00	-30.26	Peak	331	212	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

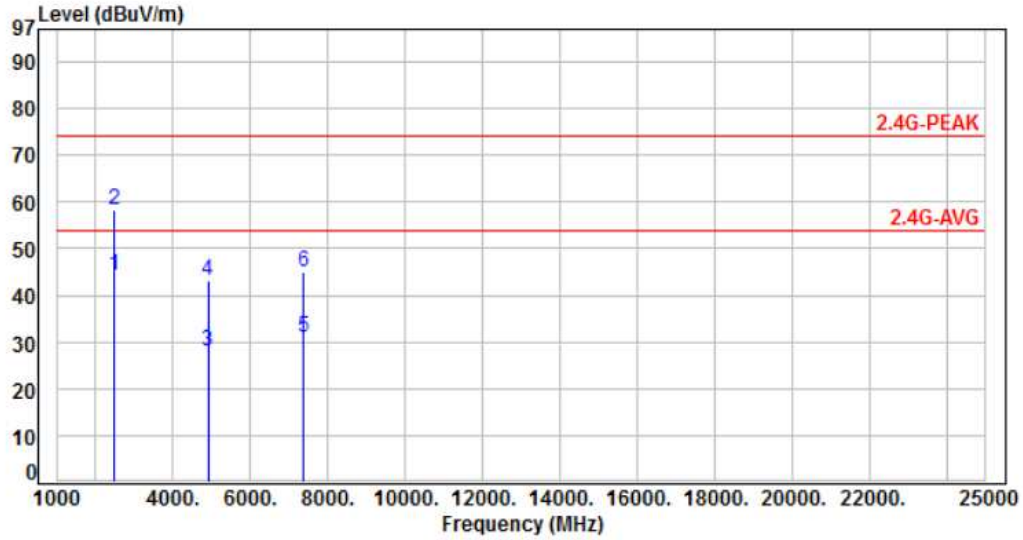
Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, CH 06	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-15.61	58.74	43.13	54.00	-10.87	Average	163	255	P
2	2390.00	-15.61	71.13	55.52	74.00	-18.48	Peak	163	255	P
3	2483.50	-15.29	57.52	42.23	54.00	-11.77	Average	163	255	P
4	2483.50	-15.29	70.40	55.11	74.00	-18.89	Peak	163	255	P
5	4874.00	-7.31	41.20	33.89	54.00	-20.11	Average	128	301	P
6	4874.00	-7.31	54.26	46.95	74.00	-27.05	Peak	128	301	P
7	7311.00	-3.18	33.30	30.12	54.00	-23.88	Average	231	151	P
8	7311.00	-3.18	45.99	42.81	74.00	-31.19	Peak	231	151	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

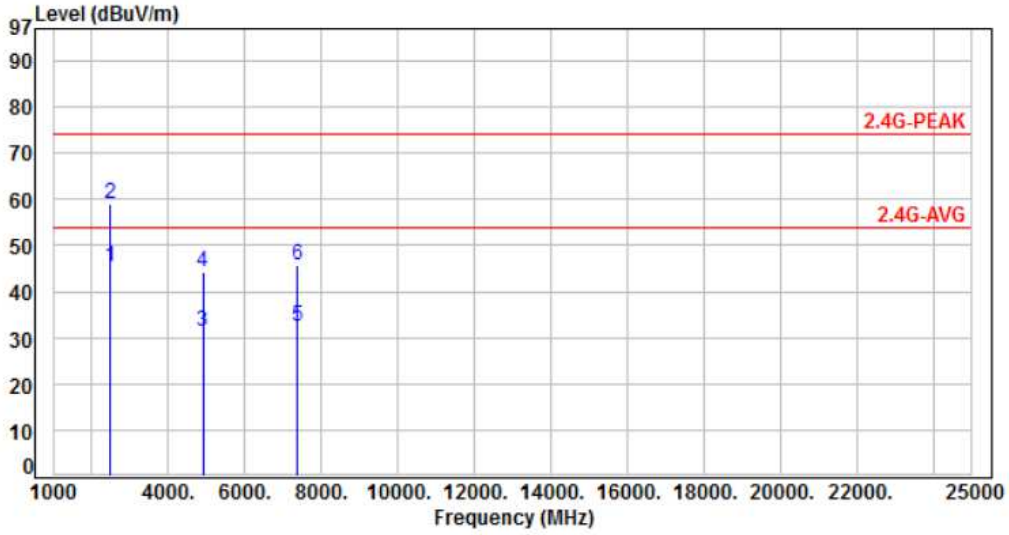
Power	:	AC 120V	Pol/Phase	:	VERTICAL
Test Mode	:	Mode 4, CH 09	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	59.41	44.12	54.00	-9.88	Average	137	337	P
2	2483.50	-15.29	73.55	58.26	74.00	-15.74	Peak	137	337	P
3	4904.00	-7.18	35.07	27.89	54.00	-26.11	Average	118	237	P
4	4904.00	-7.18	50.45	43.27	74.00	-30.73	Peak	118	237	P
5	7356.00	-3.08	34.21	31.13	54.00	-22.87	Average	201	155	P
6	7356.00	-3.08	48.21	45.13	74.00	-28.87	Peak	201	155	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

Power	:	AC 120V	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, CH 09	Temperature	:	25 °C
Test Date	:	Feb. 22, 2017	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-15.29	60.72	45.43	54.00	-8.57	Average	100	185	P
2	2483.50	-15.29	74.43	59.14	74.00	-14.86	Peak	100	185	P
3	4904.00	-7.18	38.52	31.34	54.00	-22.66	Average	162	268	P
4	4904.00	-7.18	51.55	44.37	74.00	-29.63	Peak	162	268	P
5	7356.00	-3.08	35.41	32.33	54.00	-21.67	Average	292	204	P
6	7356.00	-3.08	48.97	45.89	74.00	-28.11	Peak	292	204	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor

6.7 Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

7. Test of Conducted Spurious Emission

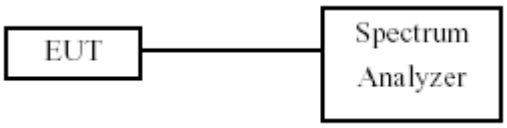
7.1 Test Limit

Below –20dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

7.2 Test Procedure

a. The transmitter output was connected to the spectrum analyzer via a low lose cable.
b. Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
c. Peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20dB relative to the maximum measured in-band peak PSD level.
d. The band edges was measured and recorded.

7.3 Test Setup Layout

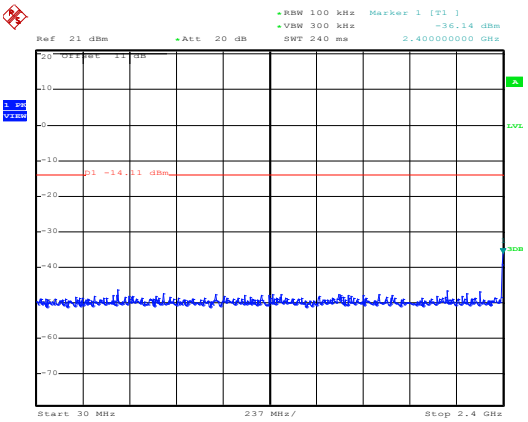


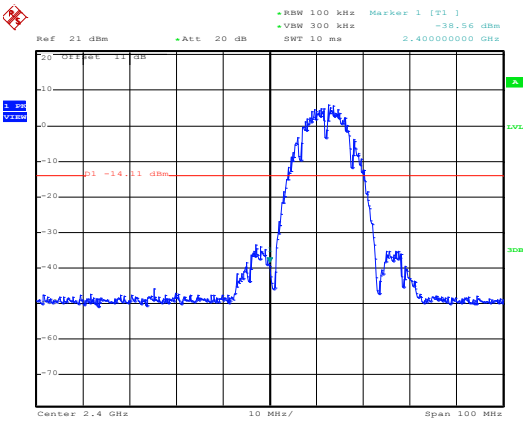
7.4 Test Result and Data

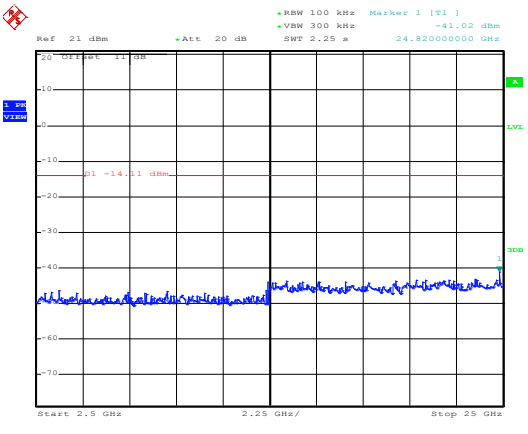
Test Result	:	PASS	Temperature	:	23°C
Test Date	:	Feb. 24, 2017	Humidity	:	64%

Note: Test plots refers to the following pages.

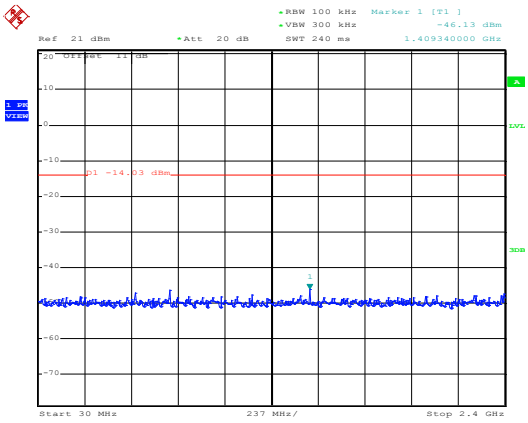
Modulation Type: 802.11b, CH 01

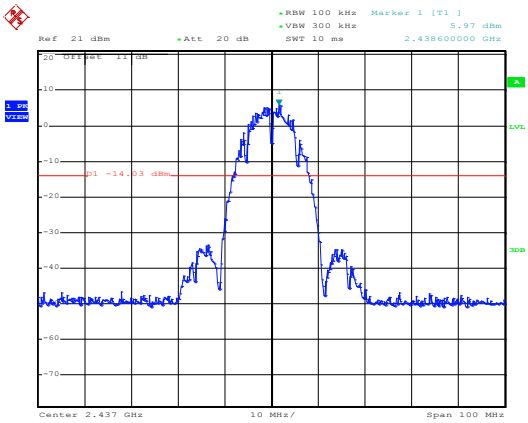


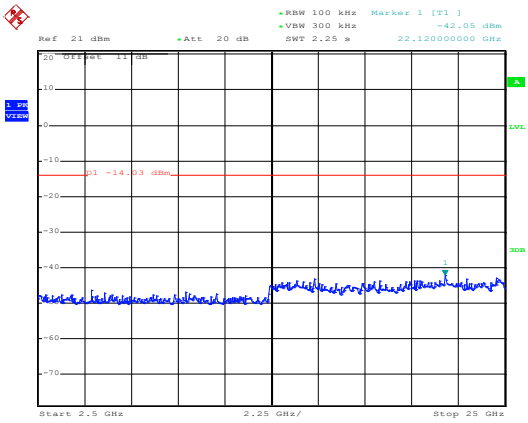




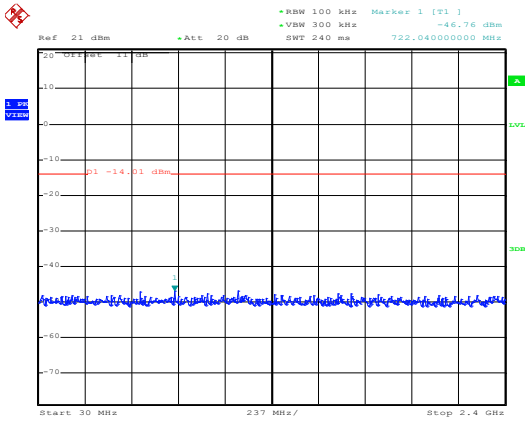
Modulation Type: 802.11b, CH 06

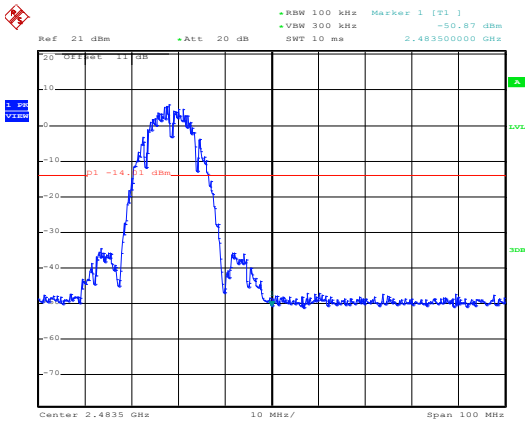


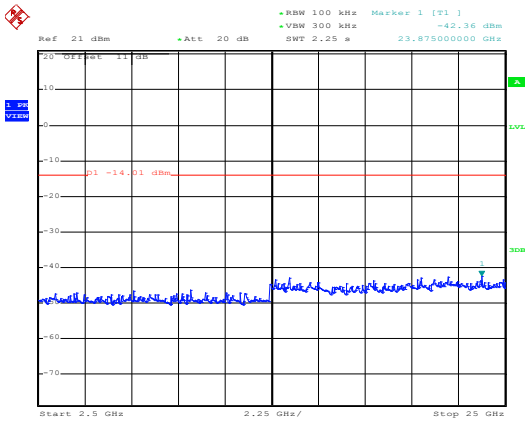




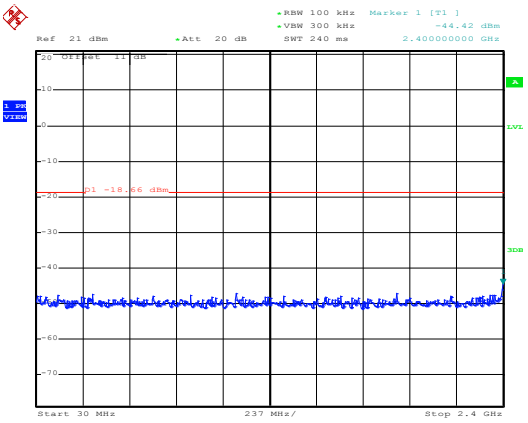
Modulation Type: 802.11b, CH 11



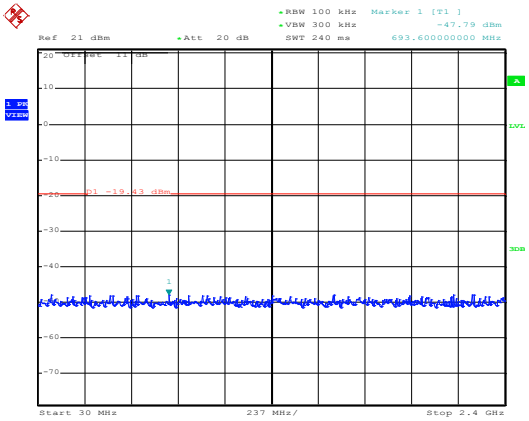


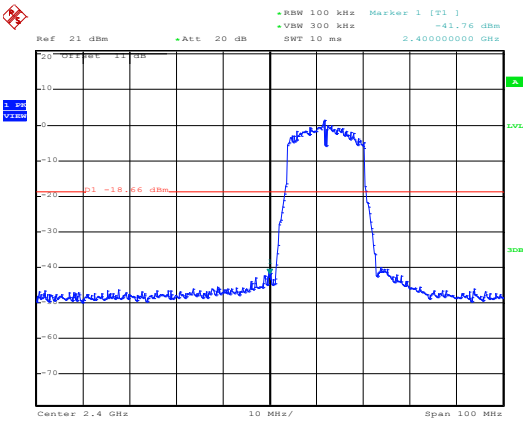


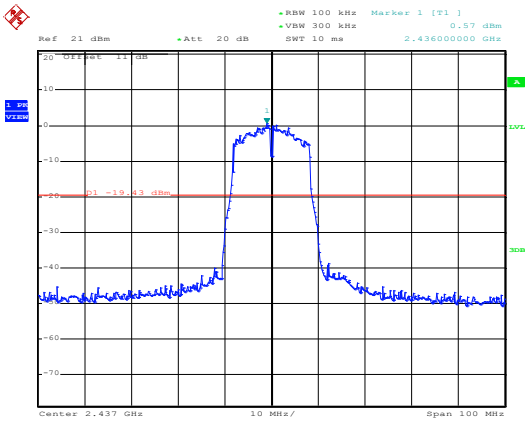
Modulation Type: 802.11g, CH 01

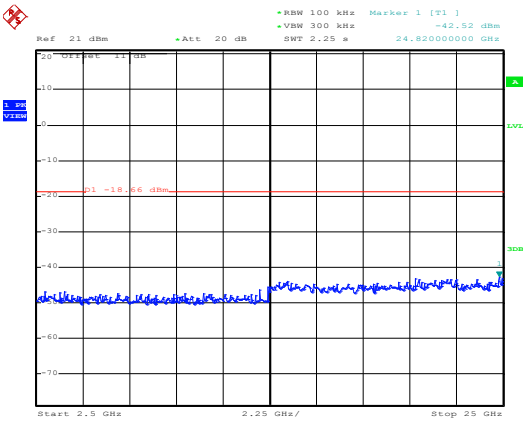


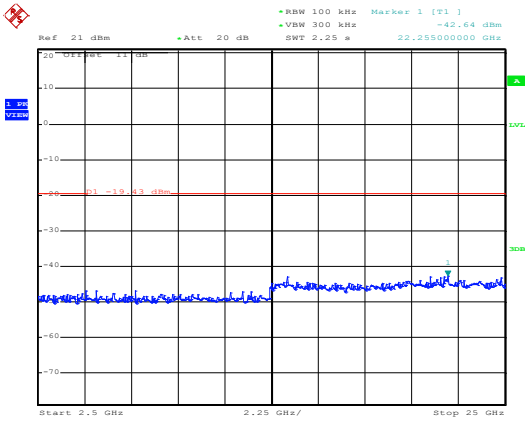
Modulation Type: 802.11g, CH 06



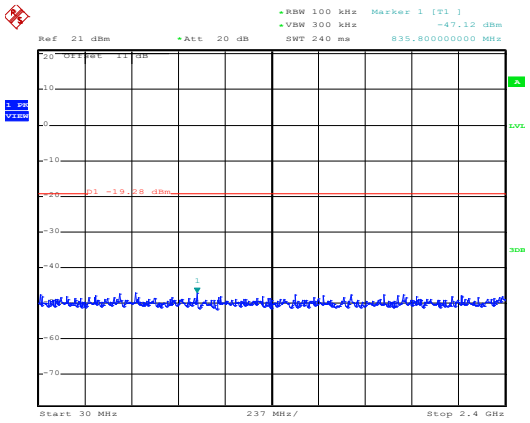


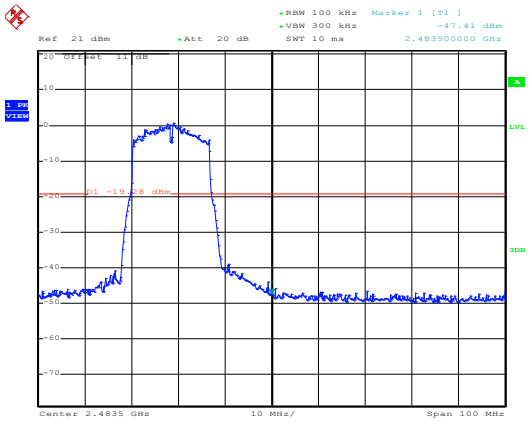


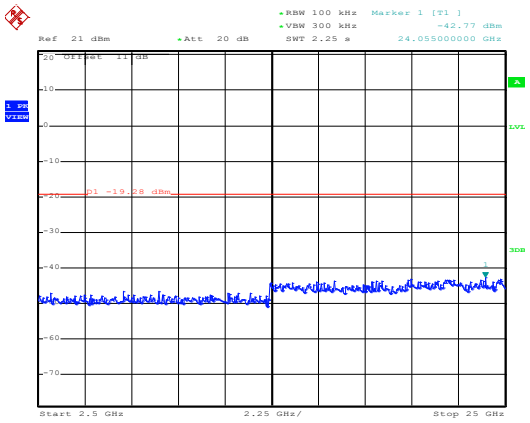




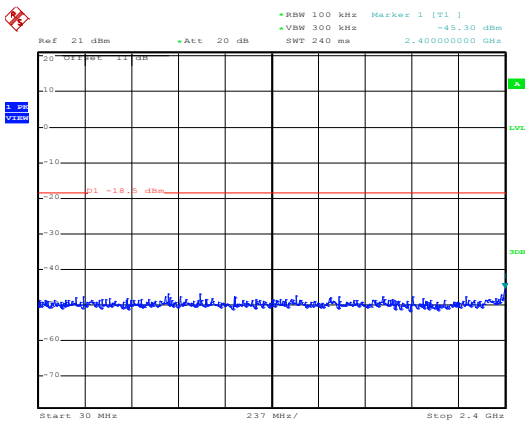
Modulation Type: 802.11g, CH 11

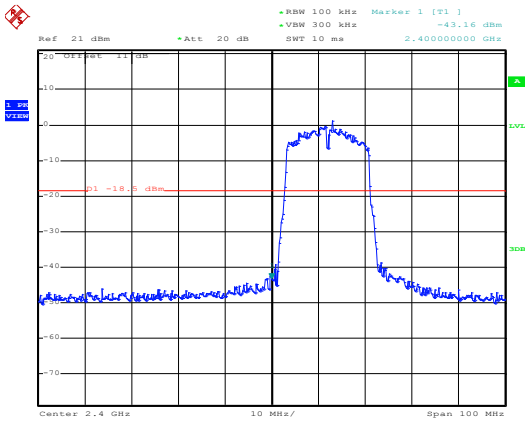


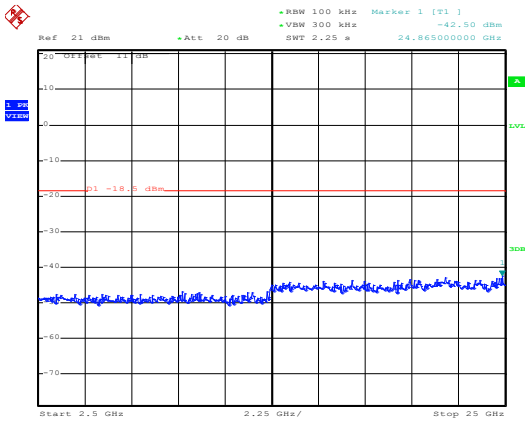




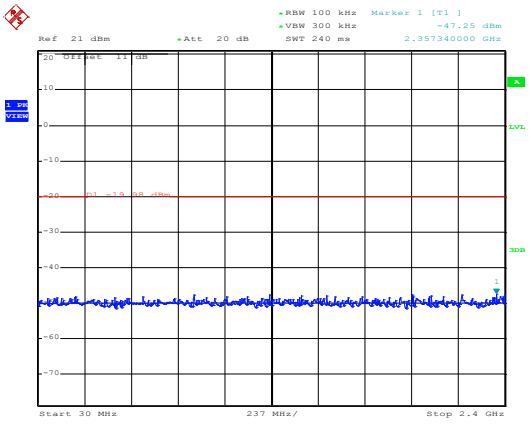
Modulation Type: 802.11n HT20, CH 01

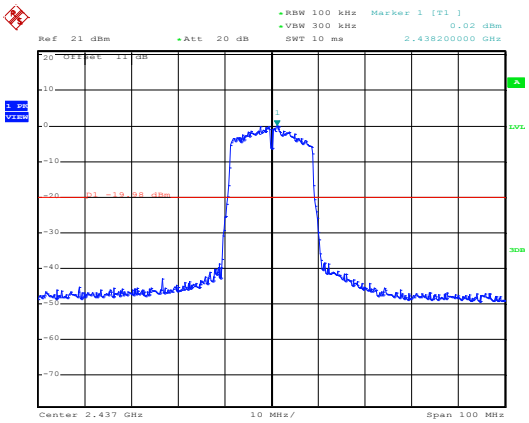


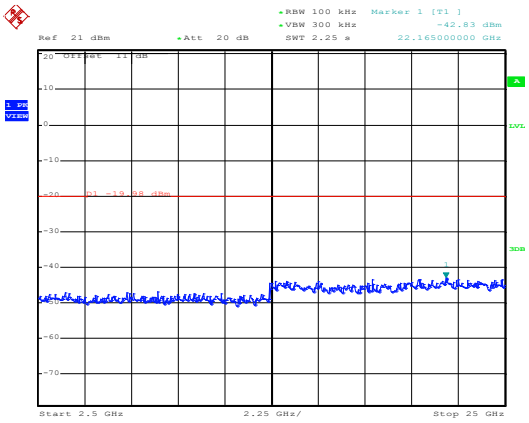




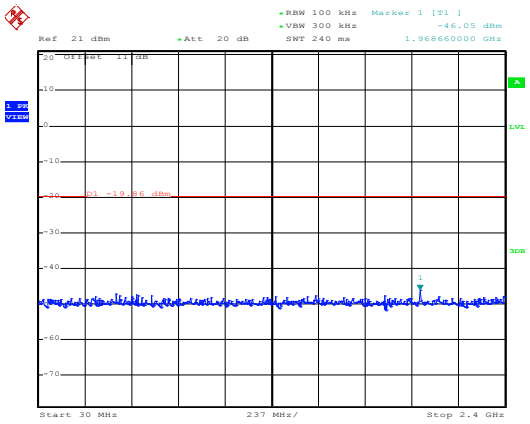
Modulation Type: 802.11n HT20, CH 06

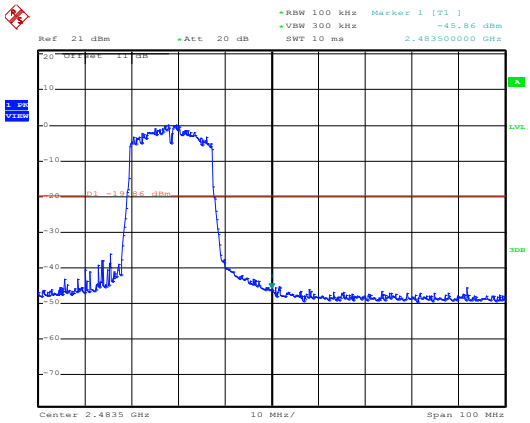


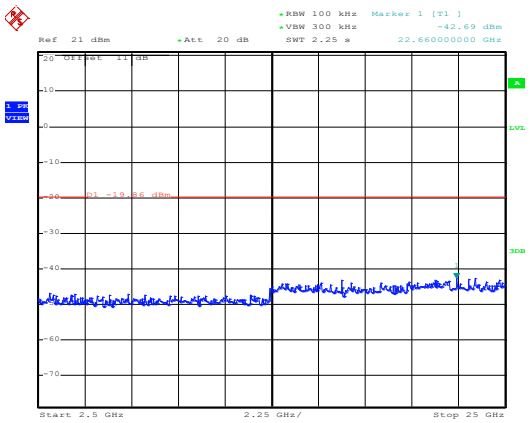




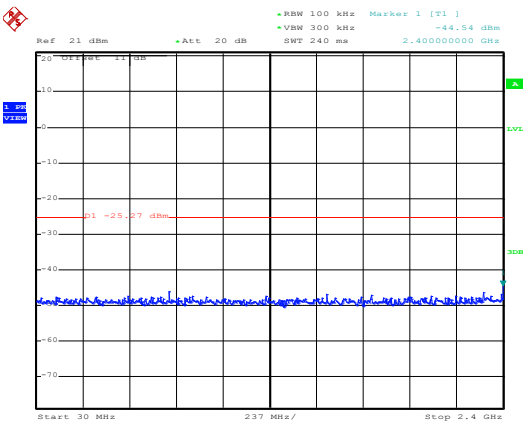
Modulation Type: 802.11n HT20, CH 11



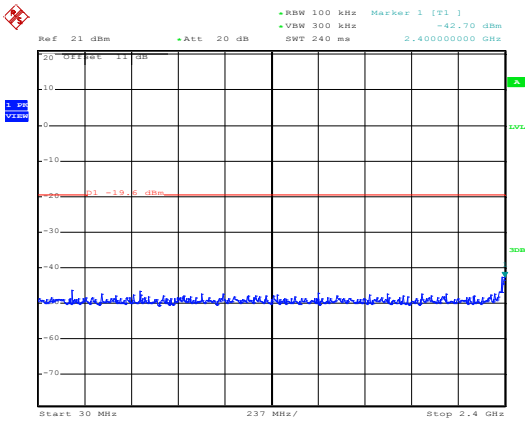


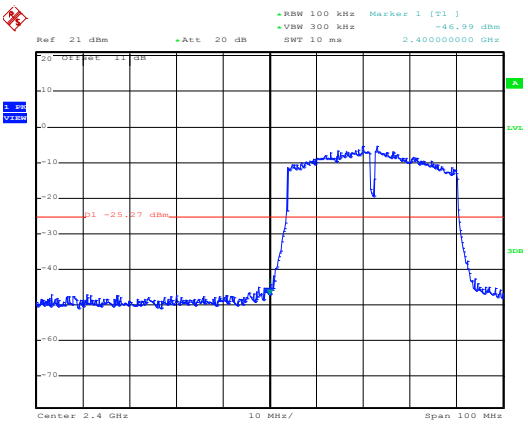


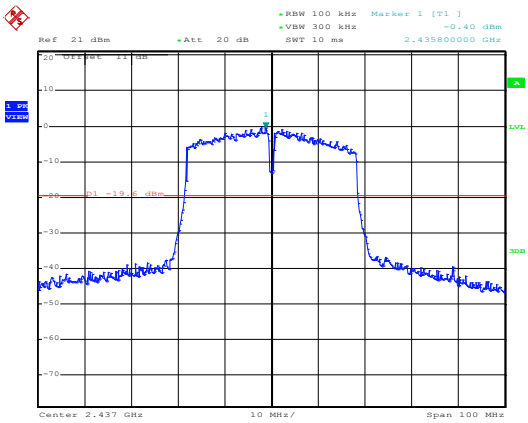
Modulation Type: 802.11n HT40, CH 03

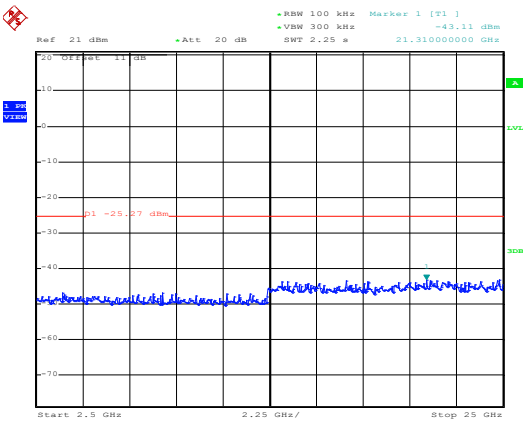


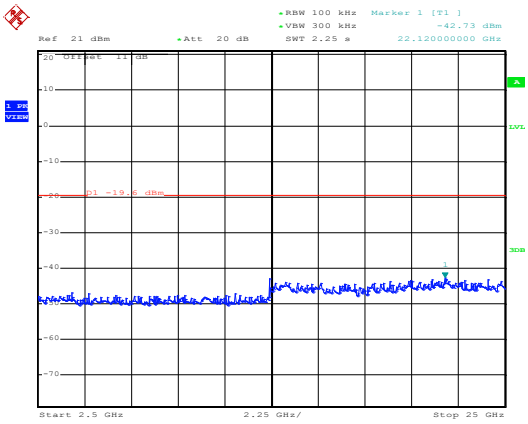
Modulation Type: 802.11n HT40, CH 06



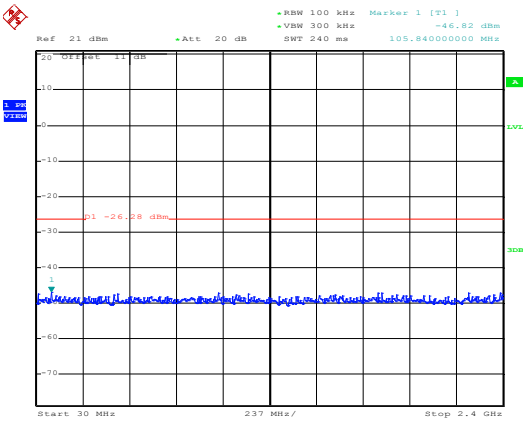


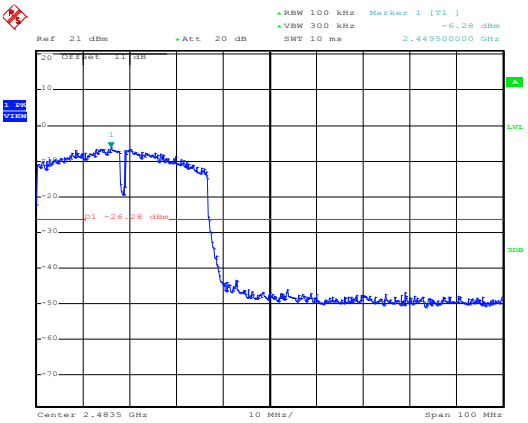


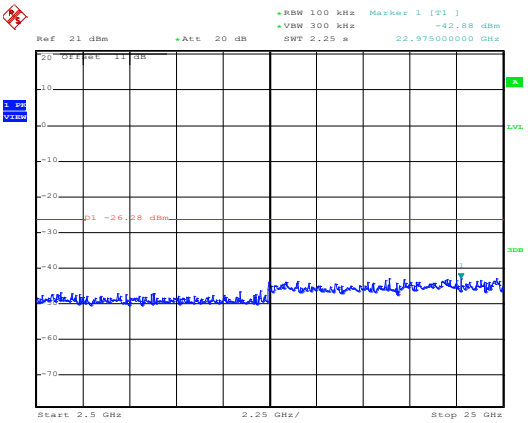




Modulation Type: 802.11n HT40, CH 09







8. 6dB Bandwidth Measurement Data

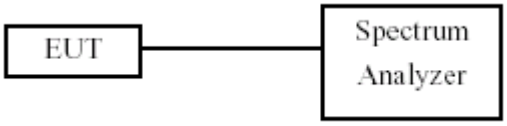
8.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

8.2 Test Procedures

a. The transmitter output was connected to the spectrum analyzer.
b. Set RBW of spectrum analyzer to 1~5% of the emission bandwidth and VBW ≥ 3x RBW.
c. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.
d. The 6dB Bandwidth was measured and recorded.

8.3 Test Setup Layout

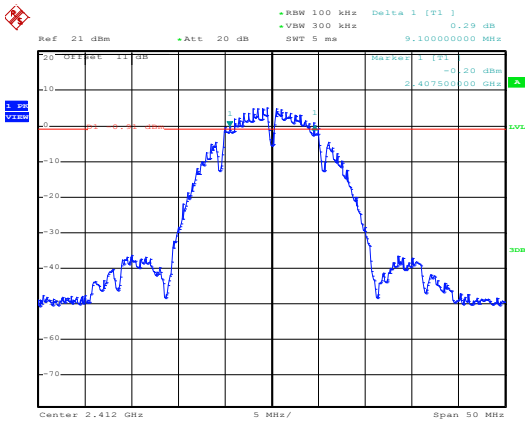


8.4 Test Result and Data

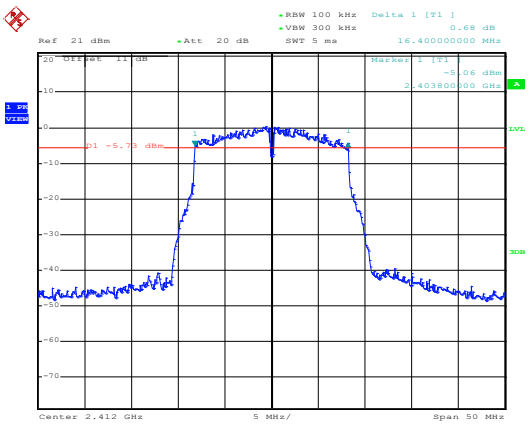
Test Date : Feb. 24, 2017
Temperature : 23°C
Humidity : 64%

Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limits (MHz)
IEEE 802.11b (1Mbps)	01	2412	9.10	0.5
	06	2437	8.70	0.5
	11	2462	8.70	0.5
IEEE 802.11g (6Mbps)	01	2412	16.40	0.5
	06	2437	16.30	0.5
	11	2462	16.40	0.5
IEEE 802.11n HT20 (6.5Mbps)	01	2412	17.70	0.5
	06	2437	17.30	0.5
	11	2462	17.60	0.5
IEEE 802.11n HT40 (13.5Mbps)	03	2422	35.40	0.5
	06	2437	34.20	0.5
	09	2452	35.80	0.5

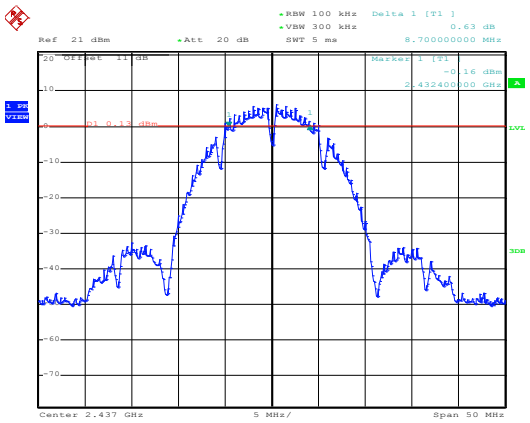
Modulation Type: 802.11b
CH01



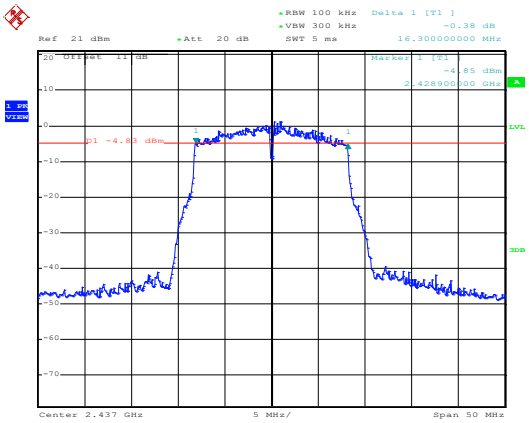
Modulation Type: 802.11g
CH01



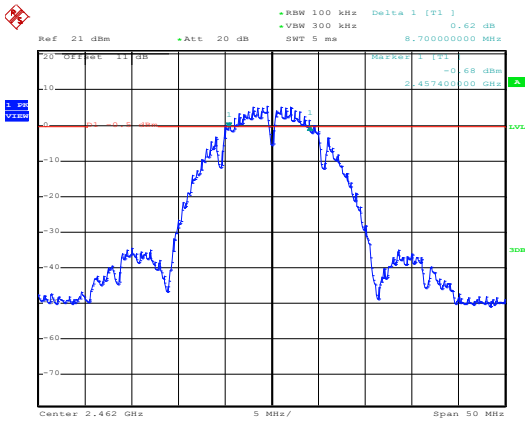
CH06



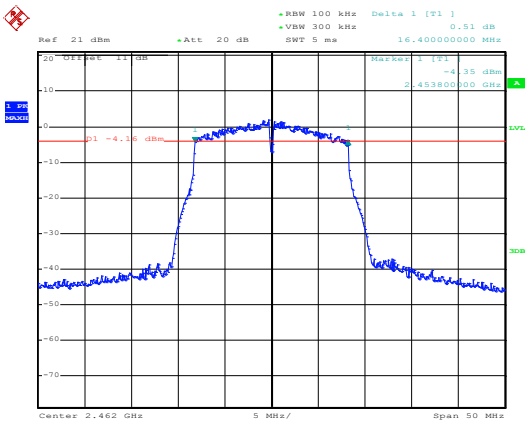
CH06



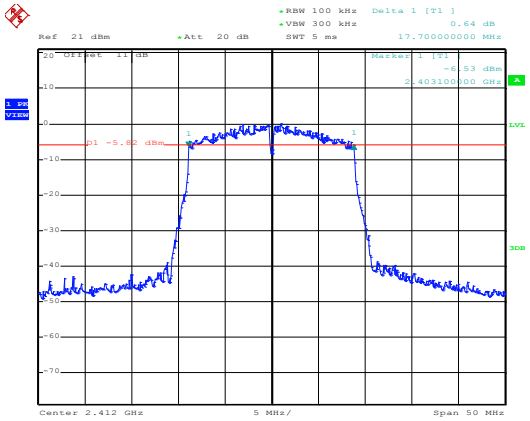
CH11



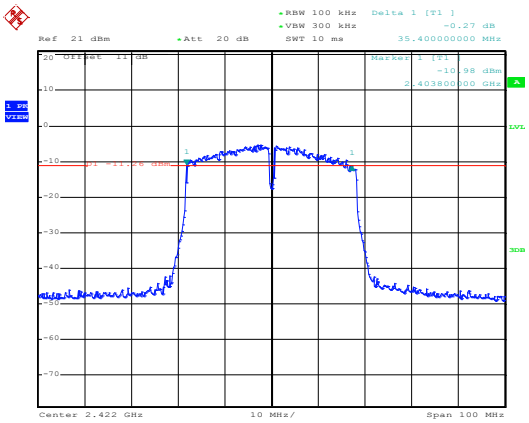
CH11



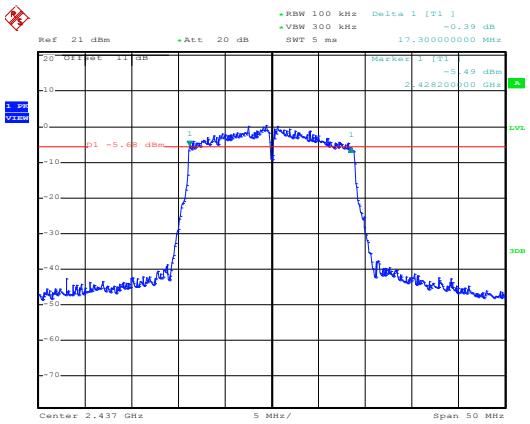
Modulation Type: 802.11n HT20
CH01



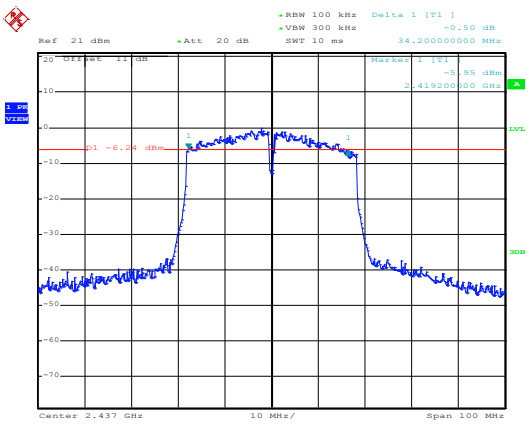
Modulation Type: 802.11n HT40
CH03



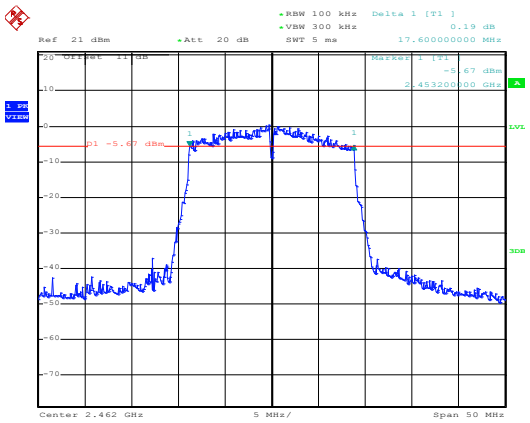
CH06



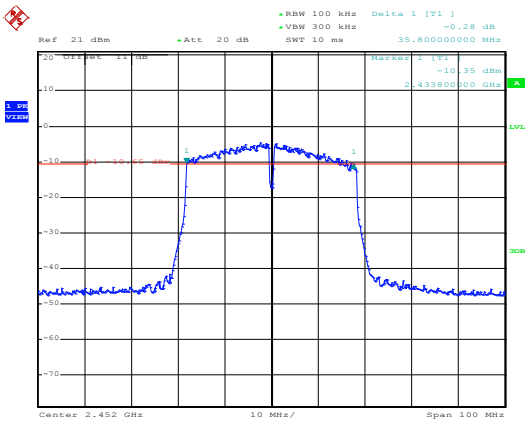
CH06



CH11



CH09



9. Maximum Peak and Average Output Power

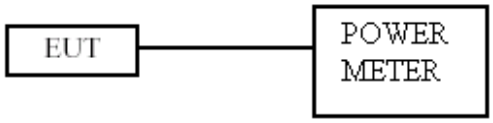
9.1 Test Limit

The Maximum Peak Output Power Measurement is 30dBm.
If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

9.2 Test Procedures

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

9.3 Test Setup Layout



9.4 Test Result and Data

Test Date : Feb. 24, 2017
Temperature : 23°C
Humidity : 64%

Modulation Standard	Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)	Power Limit (dBm)
802.11b (1Mbps)	01	2412	16.58	45.50	30.00
	06	2437	16.55	45.19	30.00
	11	2462	16.63	46.03	30.00
802.11g (6Mbps)	01	2412	22.33	171.00	30.00
	06	2437	22.67	184.93	30.00
	11	2462	22.21	166.34	30.00
802.11n HT20 (6.5Mbps)	01	2412	22.24	167.49	30.00
	06	2437	23.05	201.84	30.00
	11	2462	22.56	180.30	30.00
802.11n HT40 (13.5Mbps)	03	2422	18.43	69.66	30.00
	06	2437	23.24	210.86	30.00
	09	2452	18.53	71.29	30.00

Modulation Standard	Channel	Frequency (MHz)	Avg. Power Output (dBm)	Avg. Power Output (mW)	Power Limit (dBm)
802.11b (1Mbps)	01	2412	14.76	29.92	30.00
	06	2437	14.74	29.79	30.00
	11	2462	14.84	30.48	30.00
802.11g (6Mbps)	01	2412	12.11	16.26	30.00
	06	2437	11.86	15.35	30.00
	11	2462	11.78	15.07	30.00
802.11n HT20 (6.5Mbps)	01	2412	11.68	14.72	30.00
	06	2437	11.74	14.93	30.00
	11	2462	11.95	15.67	30.00
802.11n HT40 (13.5Mbps)	03	2422	8.99	7.93	30.00
	06	2437	13.88	24.43	30.00
	09	2452	8.98	7.91	30.00

Note: Average power is for reference only.

10. Power Spectral Density

10.1 Test Limit

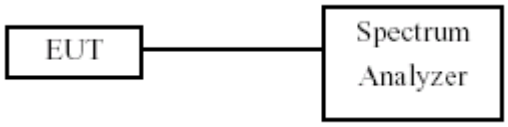
The Maximum of Power Spectral Density Measurement is 8dBm.

If transmitting antennas of directional gain greater than 6 dBi are used, the power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

10.2 Test Procedures

a. The transmitter output was connected to spectrum analyzer.
b. The spectrum analyzer's resolution bandwidth were set at 3KHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=auto couple.
c. The power spectral density was measured and recorded.

10.3 Test Setup Layout

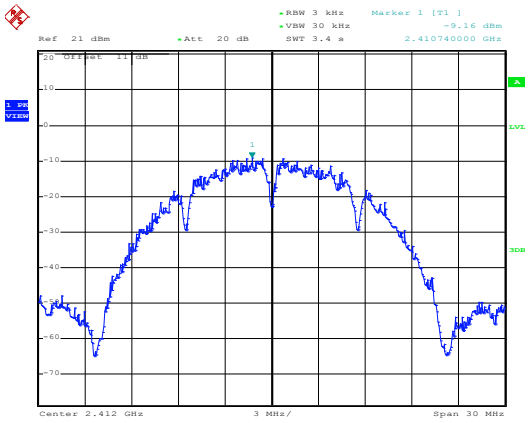


10.4 Test Result and Data

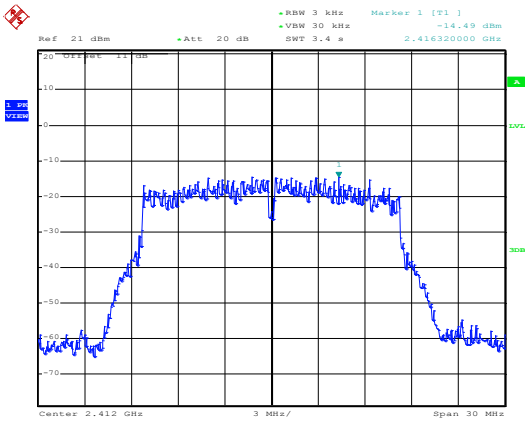
Test Date : Feb. 24, 2017
Temperature : 23°C
Humidity : 64%

Modulation Type	Channel	Frequency (MHz)	Maximum Power Density of 3 kHz Bandwidth (dBm)	Sum chain (dBm)	Duty Cycle CF(dB)	Total PSD (dBm)	Limit (dBm)
IEEE 802.11b (1Mbps)	01	2412	-9.16	-9.16	0.00	-9.16	8.00
	06	2437	-8.39	-8.39	0.00	-8.39	8.00
	11	2462	-9.94	-9.94	0.00	-9.94	8.00
IEEE 802.11g (6Mbps)	01	2412	-14.49	-14.49	0.00	-14.49	8.00
	06	2437	-12.75	-12.75	0.00	-12.75	8.00
	11	2462	-13.04	-13.04	0.00	-13.04	8.00
IEEE 802.11n HT20 (6.5Mbps)	01	2412	-12.98	-12.98	0.00	-12.98	8.00
	06	2437	-13.28	-13.28	0.00	-13.28	8.00
	11	2462	-13.15	-13.15	0.00	-13.15	8.00
IEEE 802.11n HT40 (13.5Mbps)	03	2422	-18.67	-18.67	0.00	-18.67	8.00
	06	2437	-14.09	-14.09	0.00	-14.09	8.00
	09	2452	-19	-19.00	0.00	-19.00	8.00

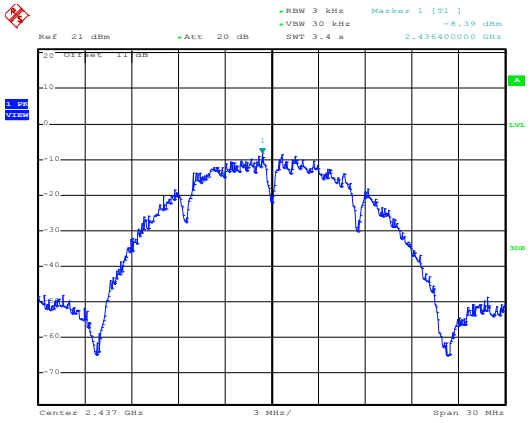
Modulation Type: 802.11b
CH01



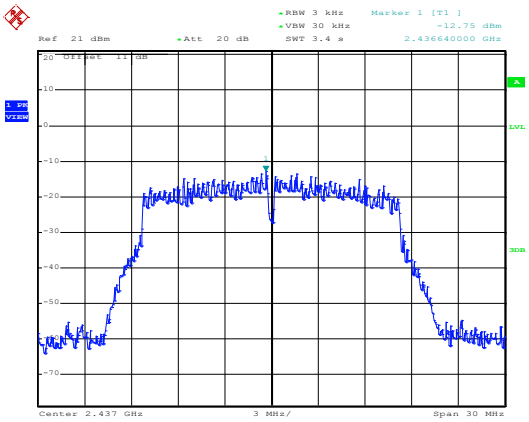
Modulation Type: 802.11g
CH01



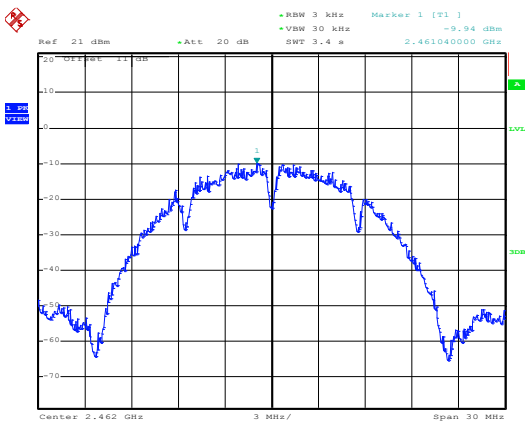
CH06



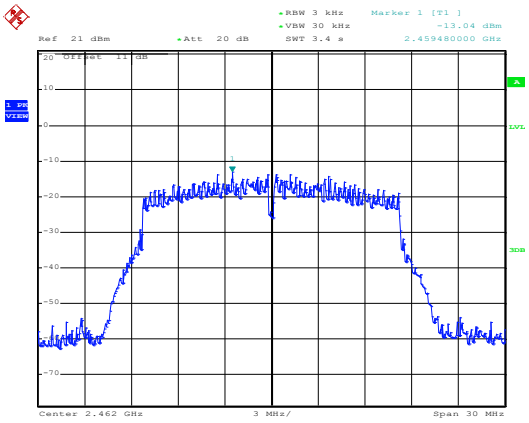
CH06



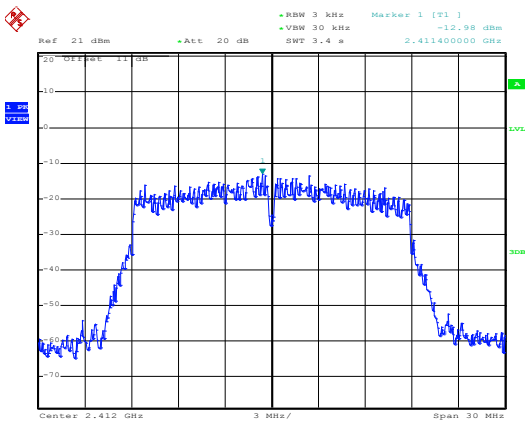
CH11



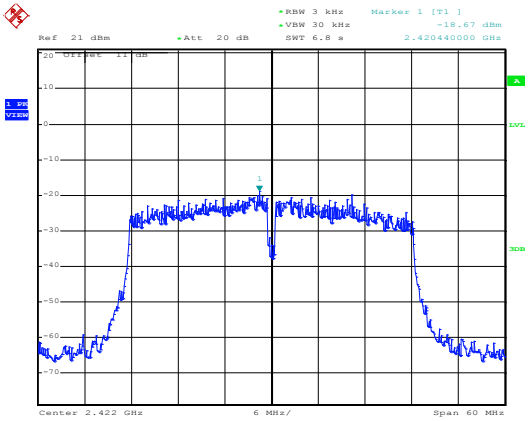
CH11



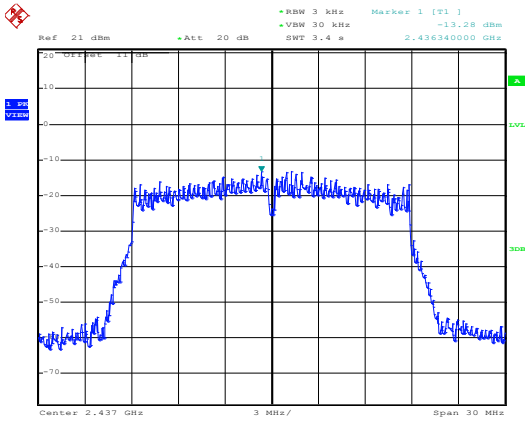
Modulation Type: 802.11n HT20
CH01



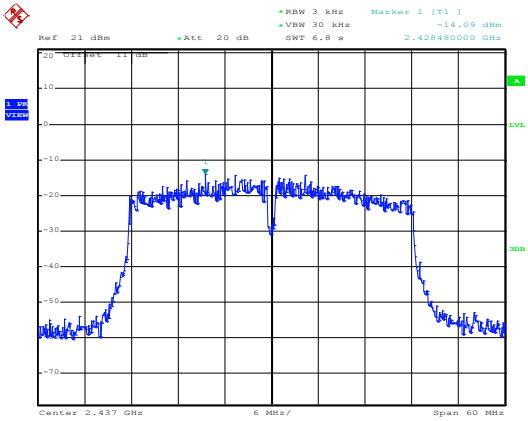
Modulation Type: 802.11n HT40
CH03



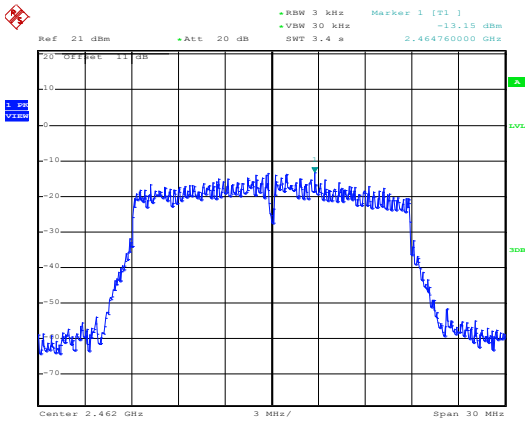
CH06



CH06



CH11



CH09