



FCC RADIO TEST REPORT

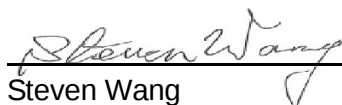
Applicant : TOSHIBA TEC CORPORATION
Address : 6-78,Minami-cho,Mishima,Shizuoka ,Japan
Equipment : Wireless LAN with Bluetooth USB Adapter
Model No. : GN-4020
Trade Name : TOSHIBA
FCC ID : BJI-GN4020

I HEREBY CERTIFY THAT :

The sample was received on Jul. 07, 2015 and the testing was carried out on Aug. 11, 2015 at CerpPASS Technology Corp. 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.

Approved by:

Tested by:


Steven Wang
Manager


Aiden Lu
Engineer

Laboratory Accreditation:

☒ CerpPASS Technology Corporation Test Laboratory



☐ CerpPASS Technology(SuZhou) Co., Ltd.





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History of this test report

☒ ORIGINAL.

☐ Additional attachment as following record:

Attachment No.	Issue Date	Description
TEFI1506153	Aug. 14, 2015	Original.



1. Summary of Test Procedure and Test Results

1.1 Applicable Standards

ANSI C63.4: 2009

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	. Spurious Emission(Radiated)	Pass
15.247(d)	. Spurious Emission(Conducted)	Pass
15.247(a)(2)	. 6dB Bandwidth	Pass
15.247(b)	. Maximum Peak 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

Frequency Range	802.11b/g/n: 2412-2462MHz Bluetooth: 2402-2480 MHz
Type of Modulation	OFDM, DSSS, FHSS, GFSK (Bluetooth low energy)
Channel Number	802.11b/g/n: 11 channels Bluetooth: 79 channels Bluetooth Low Energy: 39channels
Channel of Bandwidth	802.11b/g/n: 5MHz Bluetooth: 1MHz Bluetooth Low Energy: 2MHz
Data Rate	802.11b/g/n: up to 135Mbps Bluetooth: 1, 2, 3Mbps Bluetooth Low Energy: 1Mbps
Type of Antenna	PCB mounted antenna
Antenna Gain	1 dBi
Rating Input	DC 5V

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

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- The complete test system included Notebook and EUT for RF test.
- An executive program, "Realtek 11n 8723BU USB LAN" under WIN 7 was executed to transmit and receive data via WLAN.
- Pre-Scanned RF Power:

802.11b mode								
Data Rate	1M	2M	5.5M	11M	---	---	---	---
Avg. Power Output(dBm)	20.04	19.99	19.94	19.91	---	---	---	---
Peak. Power Output(dBm)	21.71	21.67	21.61	21.55	---	---	---	---

802.11g mode								
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M
Avg. Power Output(dBm)	17.02	17.11	16.99	17.54	17.49	17.41	17.26	17.02
Peak. Power Output(dBm)	24.32	24.22	24.52	24.32	24.58	24.76	24.66	24.47

802.11n HT20 mode								
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Avg. Power Output(dBm)	17.35	17.38	17.42	17.47	17.37	17.31	17.34	17.36
Peak. Power Output(dBm)	24.35	24.31	24.26	24.22	24.25	24.27	24.29	24.32

802.11n HT40 mode								
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Avg. Power Output(dBm)	16.89	16.85	16.81	16.75	16.87	16.98	17.07	17.13
Peak. Power Output(dBm)	24.32	24.37	24.42	24.45	24.41	24.38	24.25	24.18

*The highest powers were chosen for the full test.

- Test modes:

Mode 1: 802.11b (1Mbps)

Mode 2: 802.11g (12Mbps)

Mode 3: 802.11n HT20 (58.5Mbps)

Mode 4: 802.11n HT40 (54Mbps)

Only the worst case is shown in the test report (Mode 3: 802.11n HT20)

2.4 Description of Test System

Device	Manufacturer	Model No.	Description
Notebook	DELL	VOSTRO	Power Cable, Unshielding, 1.8m

Used cable

Cable	Quantity	Description
USB	1	Unshielding, 0.3m



2.5 General Information of Test

☒	Test Site	CerpPASS 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	4934B-1, 4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
☐	Test Site	CerpPASS Technology (Suzhou) Co.,Ltd Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666
	FCC	916572, 331395
	IC	7290A-1, 7290A-2
	VCCI	T-343 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:		Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 25,000MHz
Test Distance:		The test distance of radiated emission from antenna to EUT is 3 M.



3. Test Equipment and Ancillaries Used for Tests

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Spectrum Analyzer	R&S	FSP40	100047	2015/03/07	2016/03/06
PREAMPLIFIER	AGILENT	8449B	3008A01954	2015/03/05	2016/03/04
HORN ANTENNA	EMCO	3115	31589	2015/03/09	2016/03/08
HIGH PASS FILTER	HP	84300-80038	002	N/A	N/A
Bilog Antenna	SchwarzBeck	VULB 9168	275	2014/09/18	2015/09/17
SERIES POWER METER	ANRITSU	ML2495A	1224005	2015/03/05	2016/03/04
POWER SENSOR	ANRITSU	MA2411B	1207295	2015/03/05	2016/03/04
Bluetooth Tester	R&S	CBT	101133	2015/03/12	2016/03/11



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

No.	Antenna Type	Antenna Gain
1	PCB mounted antenna	1 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 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 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

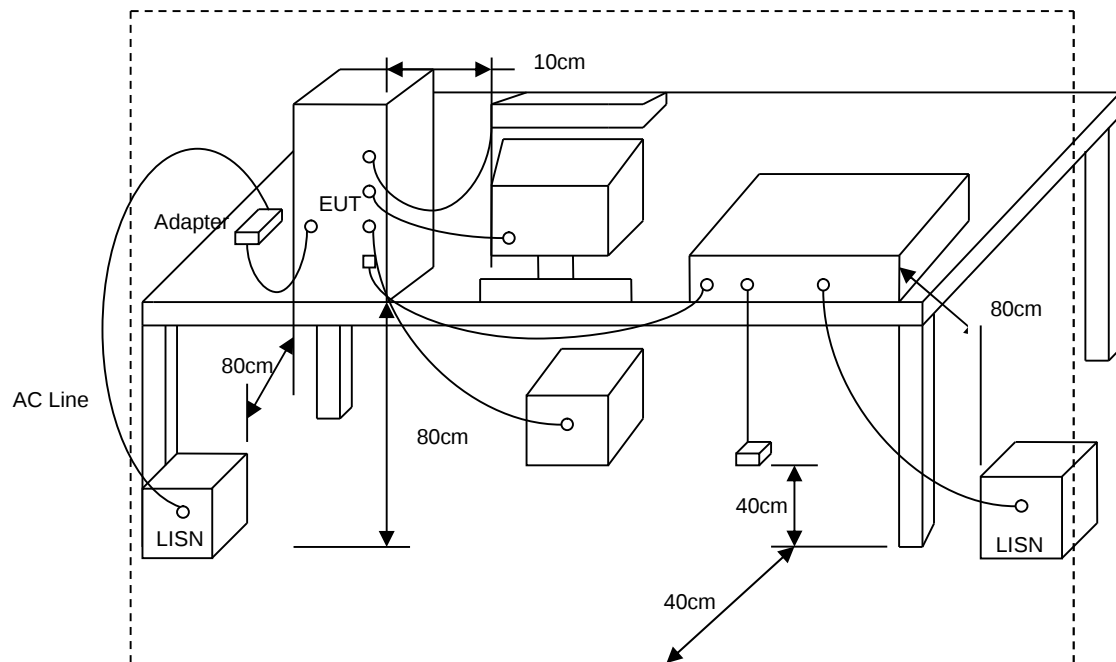
*Decreases with the logarithm of the frequency.

5.2 Test Procedures

- 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.



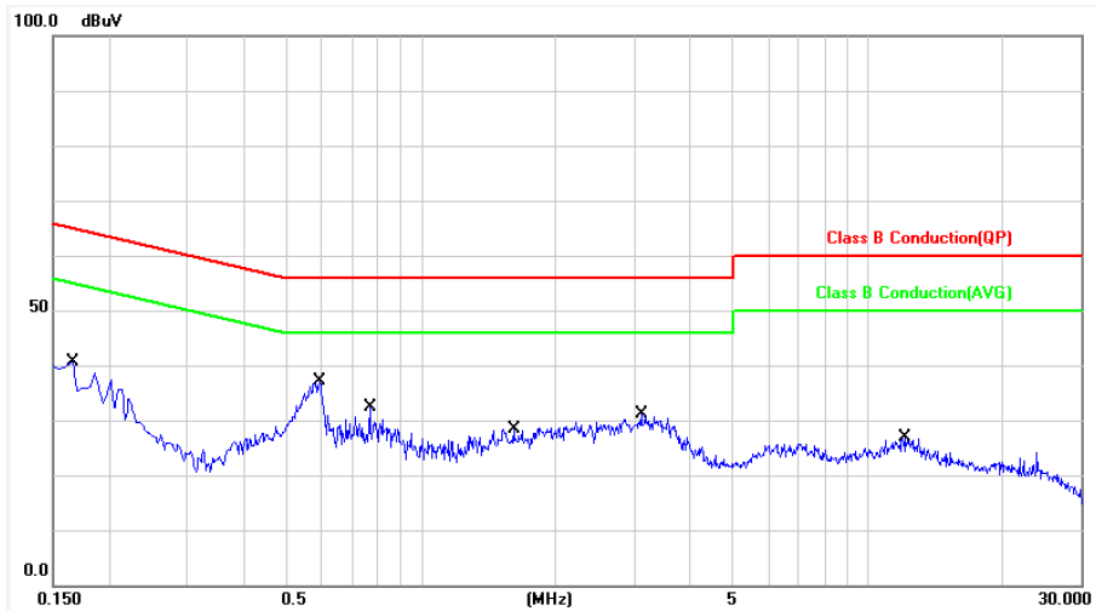
5.3 Typical Test Setup





5.4 Test Result and Data

Power	: DC 5V	Pol/Phase	: LINE
Test Mode	: Mode 3	Temperature	: 26 °C
Test date	: Jul. 13, 2015	Humidity	: 48 %
Memo	:	Atmospheric Pressure	: 1008 hpa

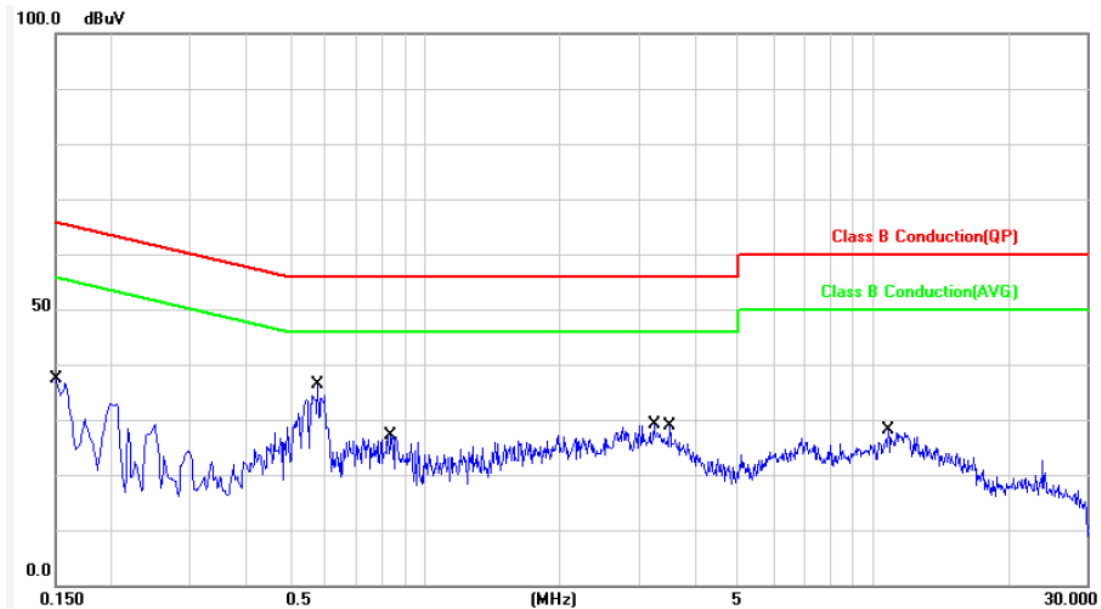


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1660	9.92	24.07	33.99	65.15	-31.16	QP	P
2	0.1660	9.92	10.79	20.71	55.15	-34.44	AVG	P
3	0.5940	9.90	22.23	32.13	56.00	-23.87	QP	P
4	0.5940	9.90	14.94	24.84	46.00	-21.16	AVG	P
5	0.7700	9.90	13.36	23.26	56.00	-32.74	QP	P
6	0.7700	9.90	7.56	17.46	46.00	-28.54	AVG	P
7	1.6180	9.90	11.43	21.33	56.00	-34.67	QP	P
8	1.6180	9.90	6.48	16.38	46.00	-29.62	AVG	P
9	3.1180	9.89	14.11	24.00	56.00	-32.00	QP	P
10	3.1180	9.89	8.82	18.71	46.00	-27.29	AVG	P
11	12.1780	10.01	9.44	19.45	60.00	-40.55	QP	P
12	12.1780	10.01	2.45	12.46	50.00	-37.54	AVG	P

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



Power	: DC 5V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3	Temperature	: 26 °C
Test date	: Jul. 13, 2015	Humidity	: 48 %
Memo	:	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1500	9.92	26.05	35.97	65.99	-30.02	QP	P
2	0.1500	9.92	15.98	25.90	55.99	-30.09	AVG	P
3	0.5780	9.89	23.15	33.04	56.00	-22.96	QP	P
4	0.5780	9.89	15.32	25.21	46.00	-20.79	AVG	P
5	0.8420	9.89	13.40	23.29	56.00	-32.71	QP	P
6	0.8420	9.89	6.98	16.87	46.00	-29.13	AVG	P
7	3.2420	9.88	14.15	24.03	56.00	-31.97	QP	P
8	3.2420	9.88	9.21	19.09	46.00	-26.91	AVG	P
9	3.5180	9.88	13.58	23.46	56.00	-32.54	QP	P
10	3.5180	9.88	8.53	18.41	46.00	-27.59	AVG	P
11	10.8060	10.00	11.39	21.39	60.00	-38.61	QP	P
12	10.8060	10.00	6.15	16.15	50.00	-33.85	AVG	P

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



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

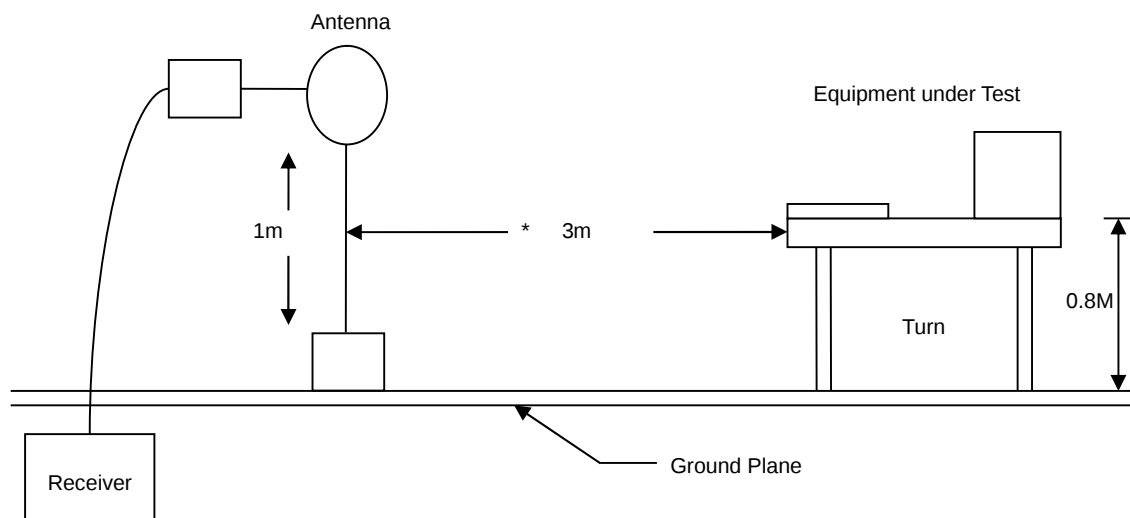
6.2 Test Procedures

- 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.

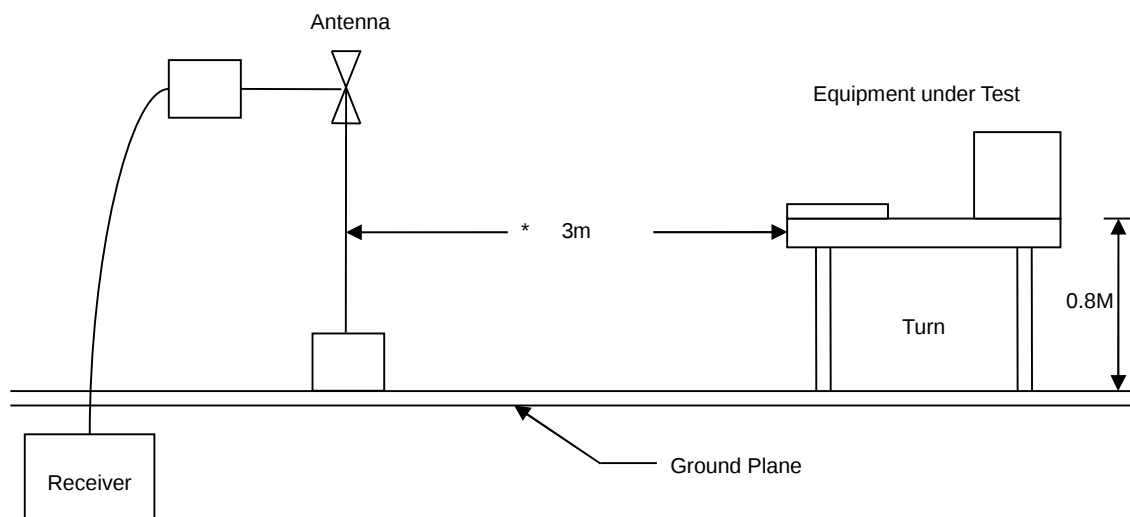


6.3 Typical Test Setup

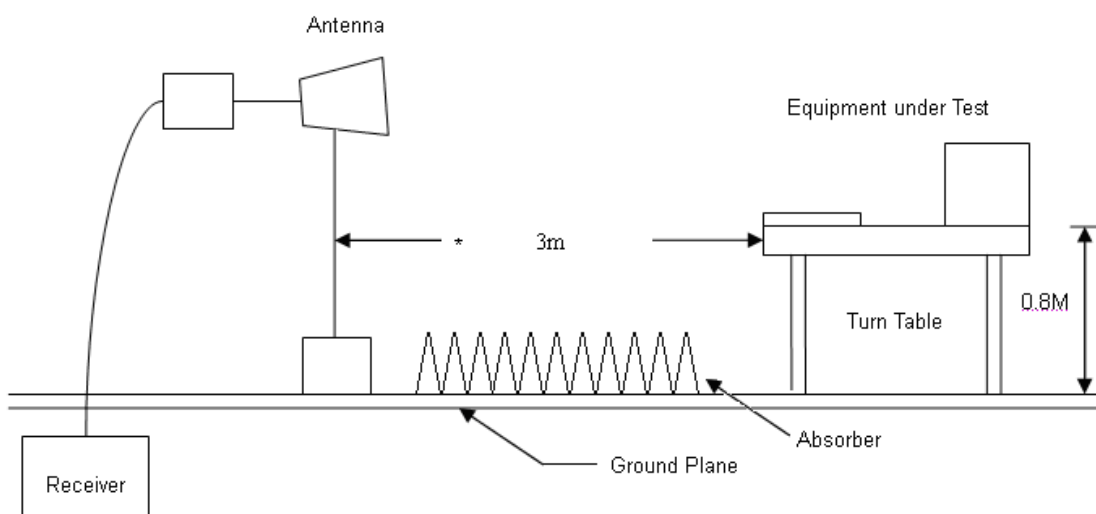
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



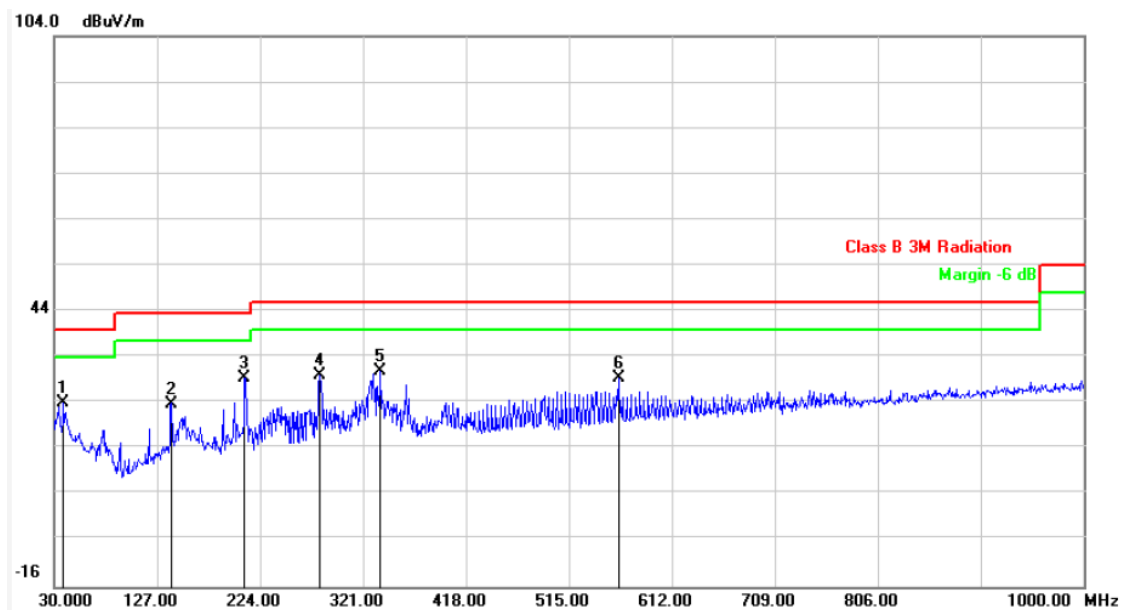


6.4 Test Result and Data (9KHz ~ 30MHz)

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

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

Power	: DC 5V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	:	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	38.7300	-18.50	42.44	23.94	40.00	-16.06	peak	105	188	P
2	140.5800	-19.23	43.13	23.90	43.50	-19.60	peak	105	188	P
3	209.4500	-20.68	50.24	29.56	43.50	-13.94	peak	105	188	P
4	280.2600	-18.17	48.15	29.98	46.00	-16.02	peak	105	188	P
5	337.4900	-16.71	47.75	31.04	46.00	-14.96	peak	105	188	P
6	561.5600	-11.34	40.70	29.36	46.00	-16.64	peak	105	188	P

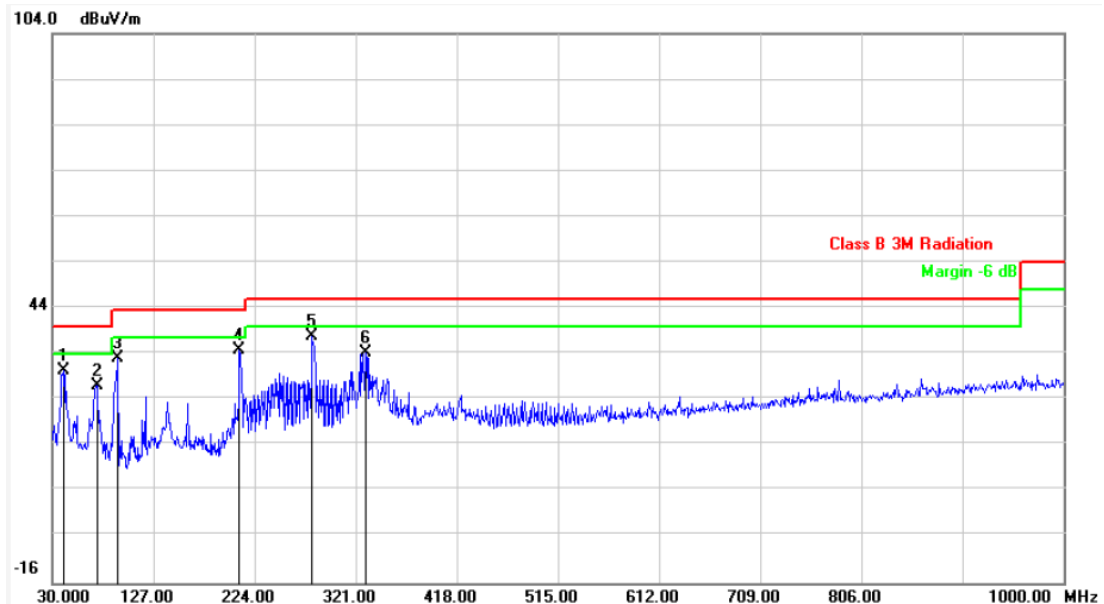
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 5V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	:	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	40.6699	-18.40	48.86	30.46	40.00	-9.54	peak	105	188	P
2	72.6800	-21.41	48.53	27.12	40.00	-12.88	peak	105	188	P
3	93.0500	-24.41	57.44	33.03	43.50	-10.47	peak	105	188	P
4	209.4500	-20.68	55.39	34.71	43.50	-8.79	peak	105	188	P
5	279.2900	-18.21	56.07	37.86	46.00	-8.14	peak	105	188	P
6	330.7000	-16.87	51.02	34.15	46.00	-11.85	peak	105	188	P

Note: Level = Reading + Factor

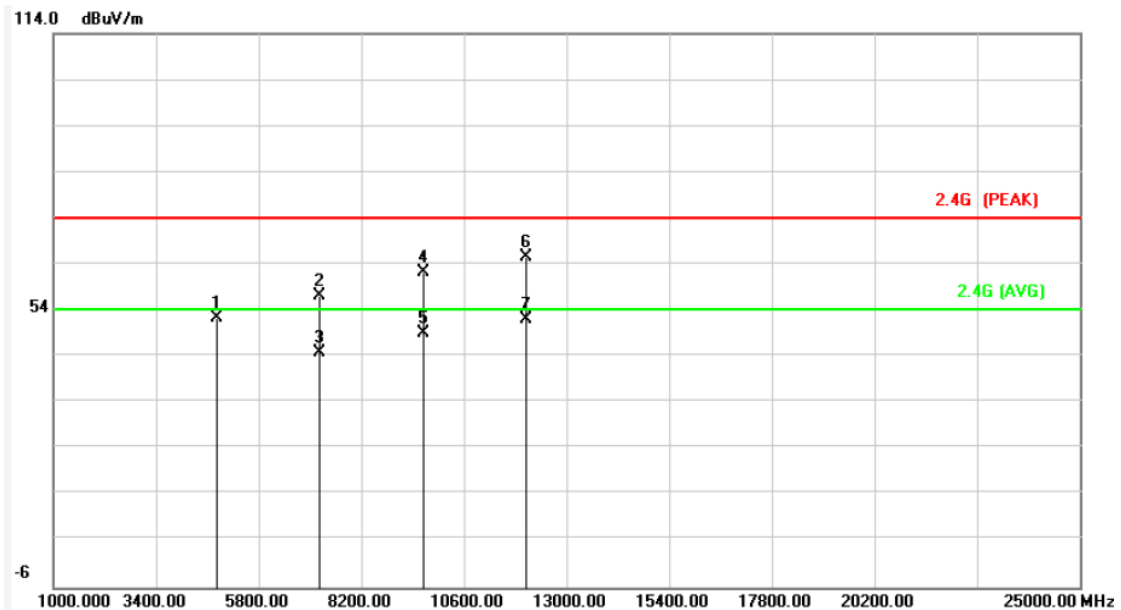
Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



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

Power	: DC 5V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	: CH01	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	4824.000	7.36	44.84	52.20	74.00	-21.80	peak	105	173	P
2	7236.000	12.42	44.65	57.07	74.00	-16.93	peak	105	173	P
3	7236.000	12.42	32.46	44.88	54.00	-9.12	AVG	105	173	P
4	9648.000	16.13	46.24	62.37	74.00	-11.63	peak	105	173	P
5	9648.000	16.13	32.86	48.99	54.00	-5.01	AVG	105	173	P
6	12060.000	19.77	45.64	65.41	74.00	-8.59	peak	105	173	P
7	12060.000	19.77	32.14	51.91	54.00	-2.09	AVG	105	173	P

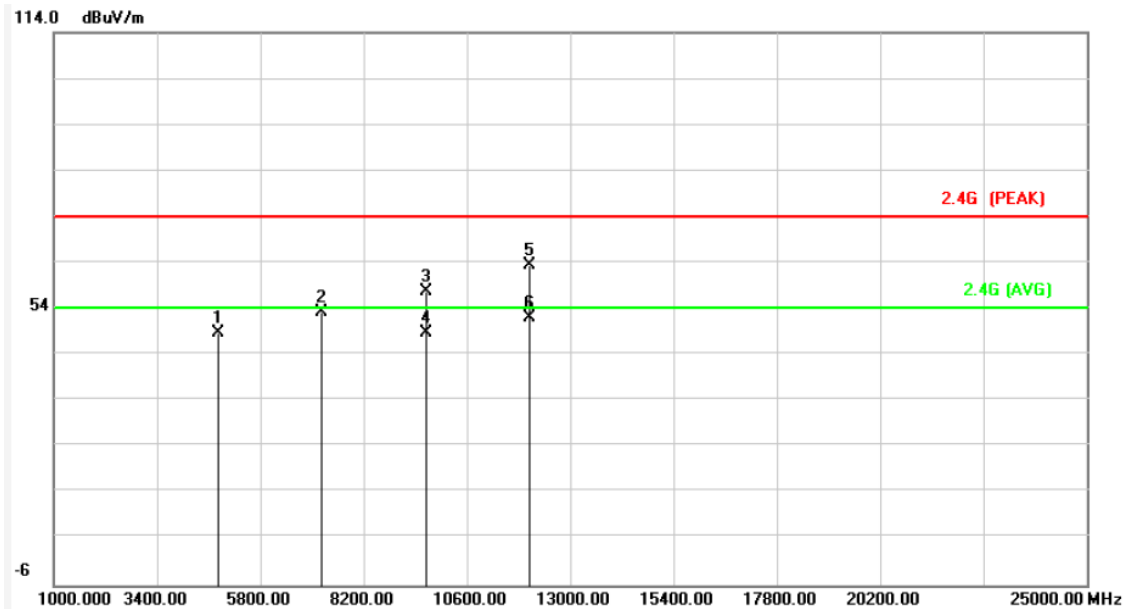
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 5V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	: CH01	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	4824.000	7.36	41.44	48.80	74.00	-25.20	peak	105	173	P
2	7236.000	12.42	40.79	53.21	74.00	-20.79	peak	105	173	P
3	9648.000	16.13	41.57	57.70	74.00	-16.30	peak	105	173	P
4	9648.000	16.13	32.69	48.82	54.00	-5.18	AVG	105	173	P
5	12060.000	19.77	43.54	63.31	74.00	-10.69	peak	105	173	P
6	12060.000	19.77	32.15	51.92	54.00	-2.08	AVG	105	173	P

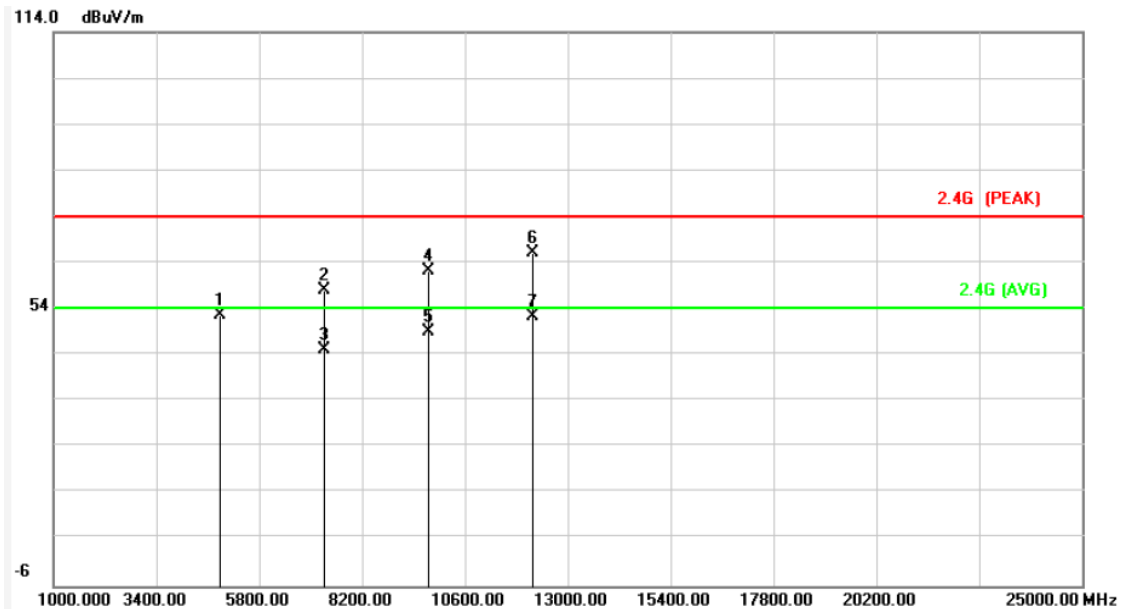
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor.



Power	: DC 5V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	: CH06	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	4874.000	7.51	45.10	52.61	74.00	-21.39	peak	104	177	P
2	7311.000	12.73	45.22	57.95	74.00	-16.05	peak	104	177	P
3	7311.000	12.73	32.50	45.23	54.00	-8.77	AVG	104	177	P
4	9748.000	16.24	46.00	62.24	74.00	-11.76	peak	104	177	P
5	9748.000	16.24	32.95	49.19	54.00	-4.81	AVG	104	177	P
6	12185.000	19.83	46.39	66.22	74.00	-7.78	peak	104	177	P
7	12185.000	19.83	32.55	52.38	54.00	-1.62	AVG	104	360	P

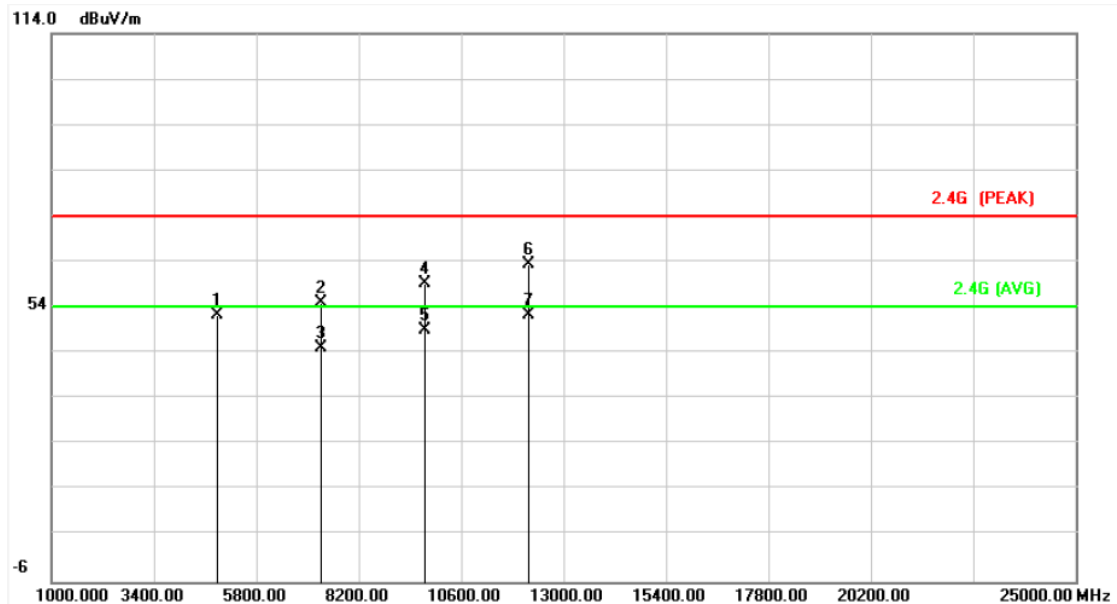
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 5V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	: CH06	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	4874.000	7.51	44.81	52.32	74.00	-21.68	peak	104	177	P
2	7311.000	12.73	42.45	55.18	74.00	-18.82	peak	104	177	P
3	7311.000	12.73	32.52	45.25	54.00	-8.75	AVG	104	177	P
4	9748.000	16.24	43.02	59.26	74.00	-14.74	peak	104	177	P
5	9748.000	16.24	32.86	49.10	54.00	-4.90	AVG	104	177	P
6	12185.000	19.83	43.74	63.57	74.00	-10.43	peak	104	177	P
7	12185.000	19.83	32.62	52.45	54.00	-1.55	AVG	104	177	P

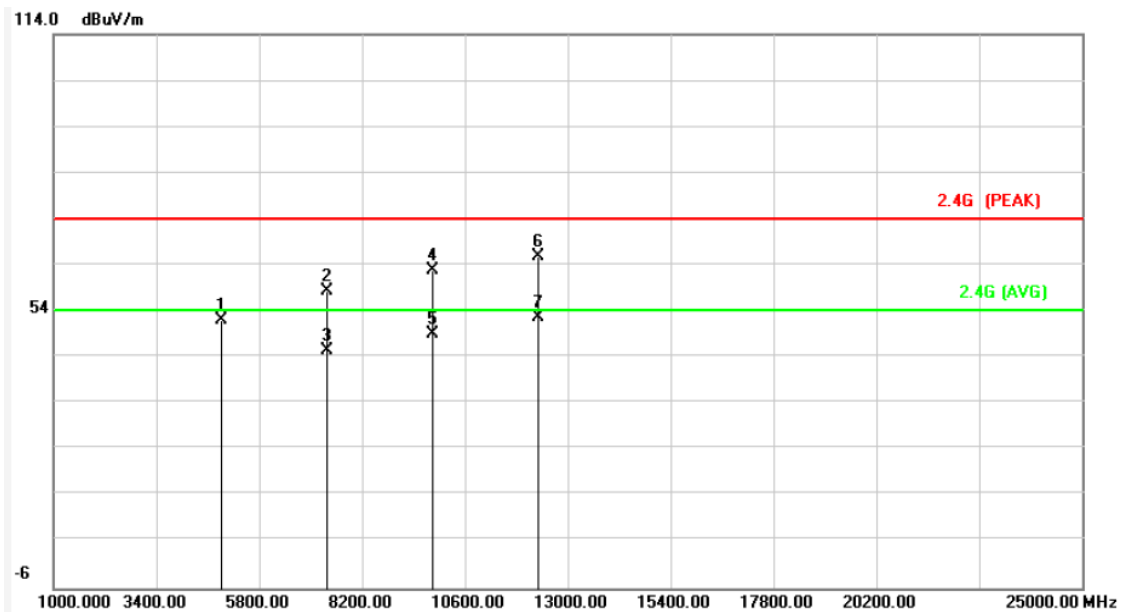
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor.



Power	: DC 5V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	: CH11	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	4924.000	7.67	44.34	52.01	74.00	-21.99	peak	102	185	P
2	7386.000	13.03	45.46	58.49	74.00	-15.51	peak	102	185	P
3	7386.000	13.03	32.43	45.46	54.00	-8.54	AVG	102	185	P
4	9848.000	16.34	46.60	62.94	74.00	-11.06	peak	102	185	P
5	9848.000	16.34	32.72	49.06	54.00	-4.94	AVG	102	185	P
6	12310.000	19.89	45.86	65.75	74.00	-8.25	peak	102	185	P
7	12310.000	19.89	32.91	52.80	54.00	-1.20	AVG	102	360	P

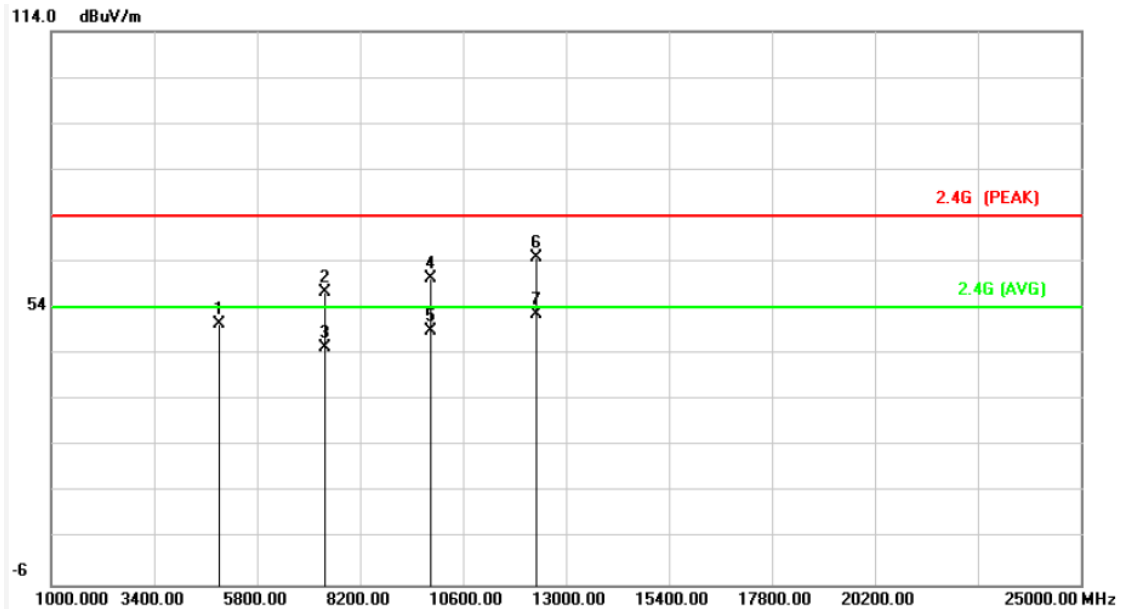
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: DC 5V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 18 °C
Test date	: Jul. 08, 2015	Humidity	: 49 %
Memo	: CH11	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	4924.000	7.67	42.93	50.60	74.00	-23.40	peak	102	185	P
2	7386.000	13.03	44.36	57.39	74.00	-16.61	peak	102	185	P
3	7386.000	13.03	32.42	45.45	54.00	-8.55	AVG	102	185	P
4	9848.000	16.34	44.14	60.48	74.00	-13.52	peak	102	185	P
5	9848.000	16.34	32.68	49.02	54.00	-4.98	AVG	102	185	P
6	12310.000	19.89	44.95	64.84	74.00	-9.16	peak	102	185	P
7	12310.000	19.89	32.89	52.78	54.00	-1.22	AVG	102	185	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



6.8 Restrict Band Emission Measurement Data

Test Date: Aug. 11, 2015

Temperature: 22 °C

Atmospheric pressure: 1092 hPa

Humidity: 52 %

Modulation Standard: IEEE 802.11b

Channel 1						Fundamental Frequency: 2412 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2375.688	V	60.01	7.21	67.22	Peak	74	54	-6.78	188	1.00
2375.688	V	42.04	7.21	49.25	Ave	74	54	-4.75	188	1.00
2388.438	H	59.47	7.28	66.75	Peak	74	54	-7.25	188	1.00
2388.438	H	41.39	7.28	48.67	Ave	74	54	-5.33	188	1.00
Channel 11						Fundamental Frequency: 2462 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2514.716	V	59.45	7.92	67.37	Peak	74	54	-6.63	178	1.02
2514.716	V	42.05	7.92	49.97	Ave	74	54	-4.03	178	1.02
2485.874	H	58.93	7.78	66.71	Peak	74	54	-7.29	221	1.04
2485.874	H	41.00	7.78	48.78	Ave	74	54	-5.22	221	1.04

Modulation Standard: IEEE 802.11g

Channel 1						Fundamental Frequency: 2412 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2357.838	V	59.97	7.12	67.09	Peak	74	54	-6.91	215	1.02
2357.838	V	42.73	7.12	49.85	Ave	74	54	-4.15	215	1.02
2386.092	H	59.02	7.26	66.28	Peak	74	54	-7.72	208	1.01
2386.092	H	40.66	7.26	47.92	Ave	74	54	-6.08	208	1.01
Channel 11						Fundamental Frequency: 2462 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2547.974	V	59.54	8.04	67.58	Peak	74	54	-6.42	225	1.01
2547.974	V	39.19	8.04	47.23	Ave	74	54	-6.77	225	1.01
2495.396	H	59.13	7.83	66.96	Peak	74	54	-7.04	207	1.03
2495.396	H	38.72	7.83	46.55	Ave	74	54	-7.45	207	1.03



Modulation Standard: IEEE 802.11n HT20

Channel 1						Fundamental Frequency: 2412 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2388.132	V	59.54	7.28	66.82	Peak	74	54	-7.18	226	1.03
2388.132	V	41.21	7.28	48.49	Ave	74	54	-5.51	226	1.03
2383.236	H	59.60	7.25	66.85	Peak	74	54	-7.15	203	1.05
2383.236	H	38.09	7.25	45.34	Ave	74	54	-8.66	203	1.05
Channel 11						Fundamental Frequency: 2462 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2521.202	V	59.29	7.94	67.23	Peak	74	54	-6.77	217	1.02
2521.202	V	40.09	7.94	48.03	Ave	74	54	-5.97	217	1.02
2504.918	H	59.95	7.89	67.84	Peak	74	54	-6.16	211	1.05
2504.918	H	39.29	7.89	47.18	Ave	74	54	-6.82	211	1.05

Modulation Standard: IEEE 802.11n HT40

Channel 3						Fundamental Frequency: 2422 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2384.592	V	59.50	7.26	66.76	Peak	74	54	-7.24	238	1.01
2384.592	V	40.90	7.26	48.16	Ave	74	54	-5.84	238	1.01
2381.232	H	59.67	7.24	66.91	Peak	74	54	-7.09	209	1.01
2381.232	H	39.99	7.24	47.23	Ave	74	54	-6.77	209	1.01
Channel 9						Fundamental Frequency: 2452 MHz				
Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result (dBuV/m)	Remark	Limit (dBuV/m)		Margin (dB)	Table Deg.	Ant High (m)
						Peak	Ave			
2491.812	V	59.54	7.82	67.36	Peak	74	54	-6.64	233	1.00
2491.812	V	39.21	7.82	47.03	Ave	74	54	-6.97	233	1.00
2485.892	H	60.87	7.78	68.65	Peak	74	54	-5.35	212	1.02
2485.892	H	38.08	7.78	45.86	Ave	74	54	-8.14	212	1.02

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector peak mode) for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3 MHz (detector sample mode) for Average detection at frequency above 1GHz.



7. Test of Spurious Emission (Conducted)

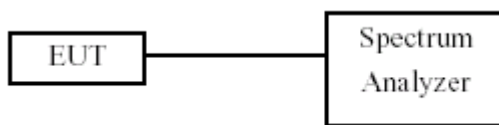
7.1 Test Limit

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

7.2 Test Procedure

- The transmitter output was connected to the spectrum analyzer via a low lose cable.
- 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.
- 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.
- The band edges was measured and recorded.

7.3 Test Setup Layout



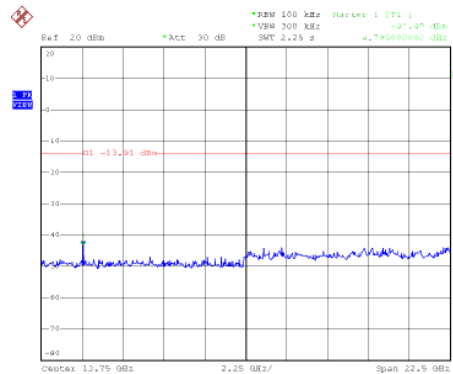
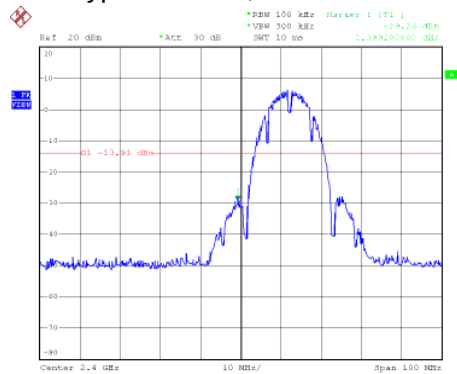
7.4 Test Result and Data

Test Date	: Jul. 07, 2015	Temperature	: 22°C
Atmospheric pressure	: 1078 hPa	Humidity	: 55%
Test Result	: PASS		

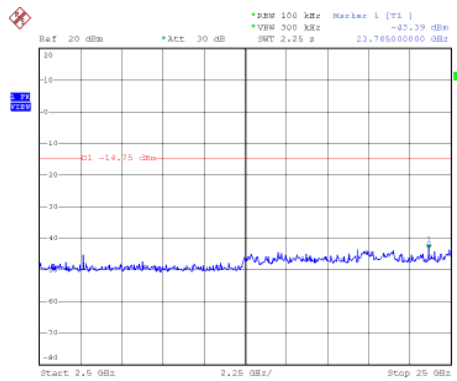
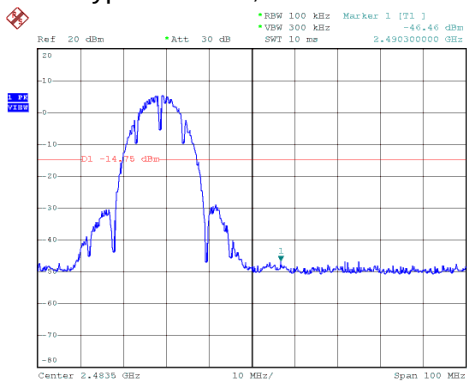
Note: Test plots refers to the following pages.



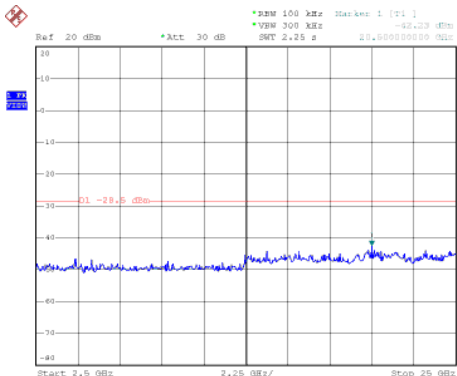
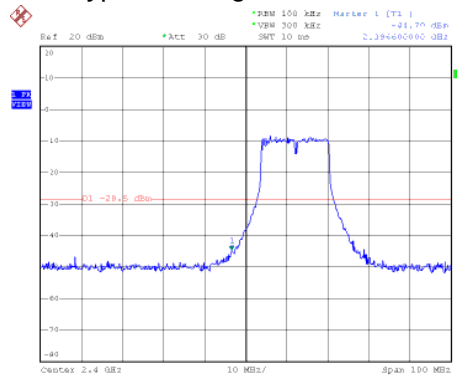
Modulation Type: 802.11b, CH01



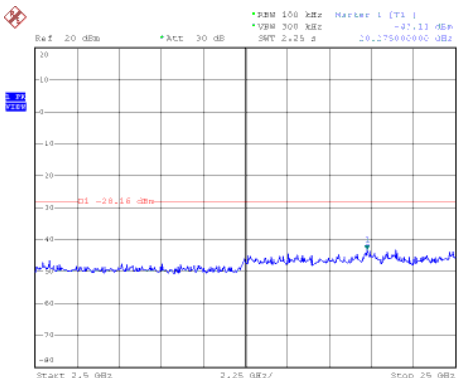
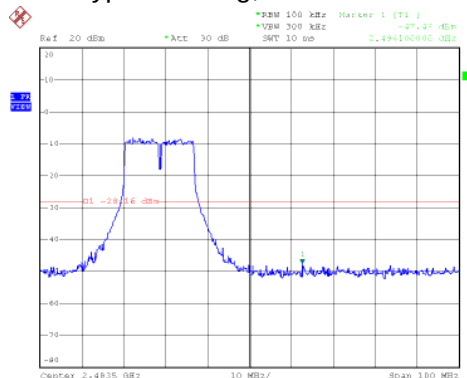
Modulation Type: 802.11b, CH11



Modulation Type: 802.11g, CH01

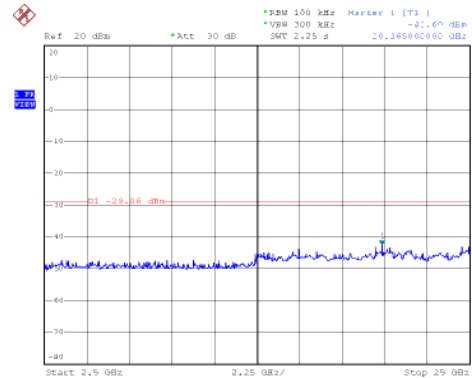
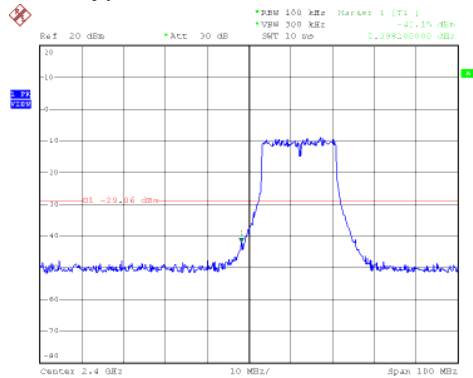


Modulation Type: 802.11g, CH11

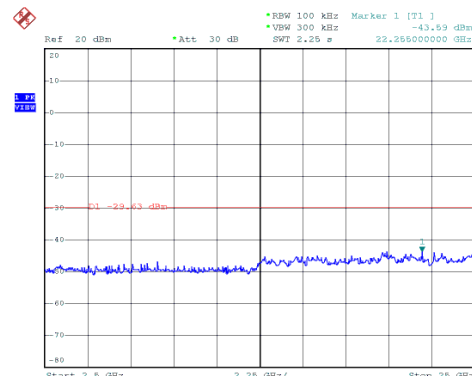
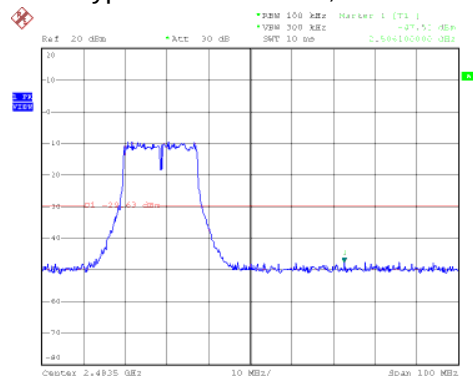




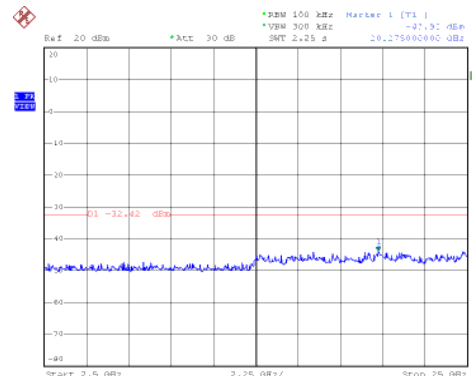
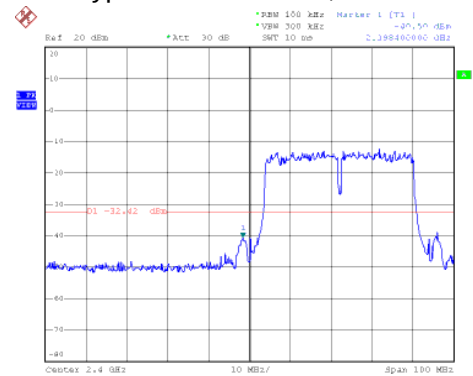
Modulation Type: 802.11n HT20, CH01



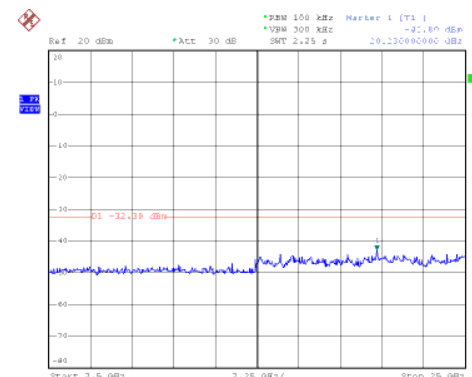
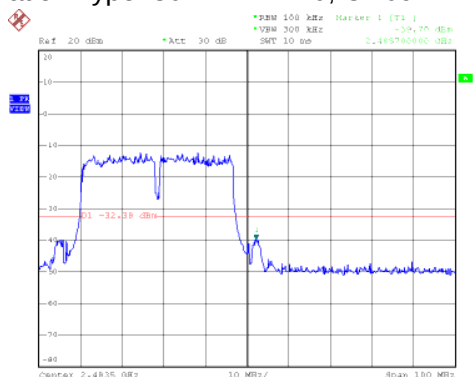
Modulation Type: 802.11n HT20, CH11



Modulation Type: 802.11n HT40, CH03



Modulation Type: 802.11n HT40, CH09





8. 6dB Bandwidth Measurement Data

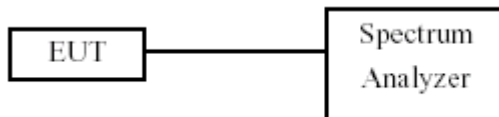
8.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

8.2 Test Procedures

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 1~5% of the emission bandwidth and $VBW \geq 3 \times RBW$.
- The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.
- The 6dB Bandwidth was measured and recorded.

8.3 Test Setup Layout

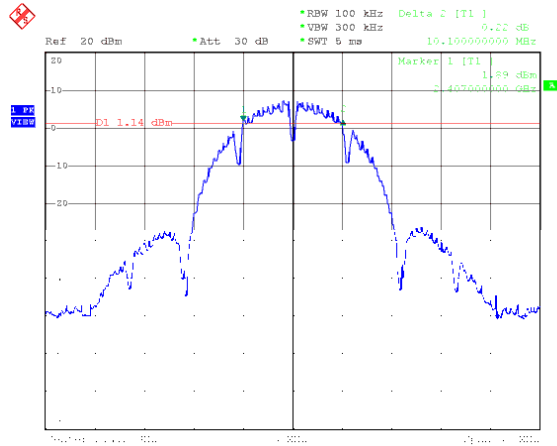
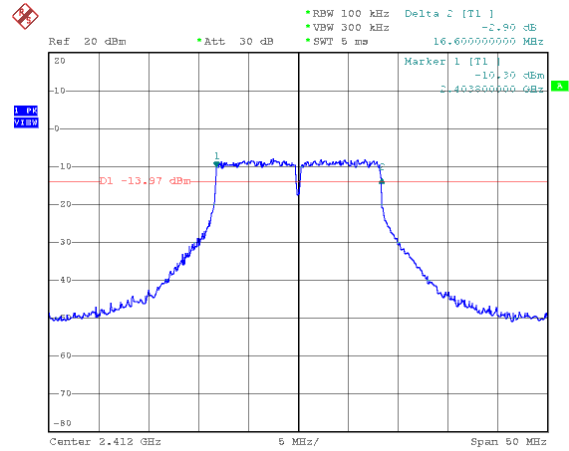




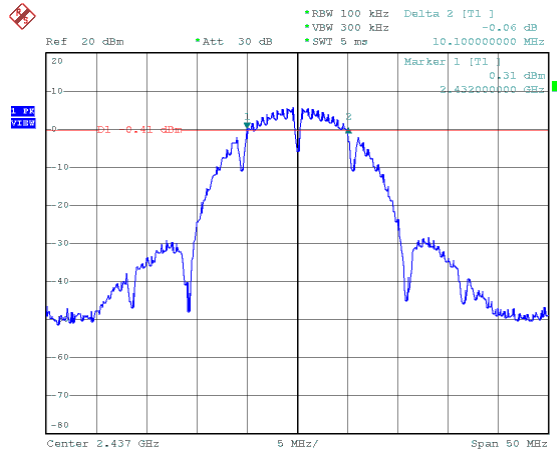
8.4 Test Result and Data

Test Date : Aug. 11, 2015 Temperature : 22°C
Atmospheric pressure : 1092 hPa Humidity : 52%

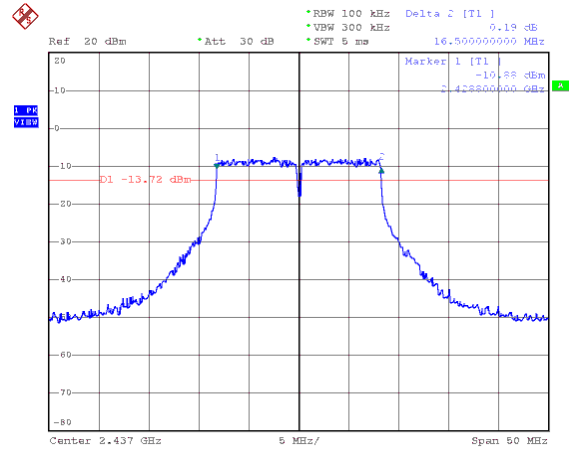
Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth (KHz)
IEEE 802.11b (1Mbps)	01	2412	101000
	06	2437	101000
	11	2462	101000
IEEE 802.11g (12Mbps)	01	2412	166000
	06	2437	165000
	11	2462	166000
IEEE 802.11n HT20 (58.5Mbps)	01	2412	179000
	06	2437	179000
	11	2462	177000
IEEE 802.11n HT40 (54Mbps)	03	2422	364000
	06	2437	364000
	09	2452	366000

Modulation Type: 802.11b
CH01Modulation Type: 802.11g
CH01

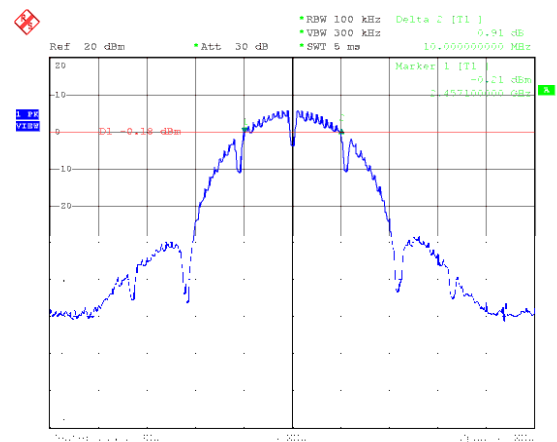
CH06



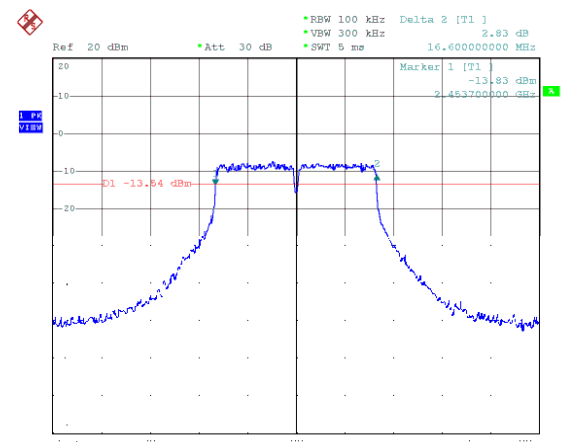
CH06

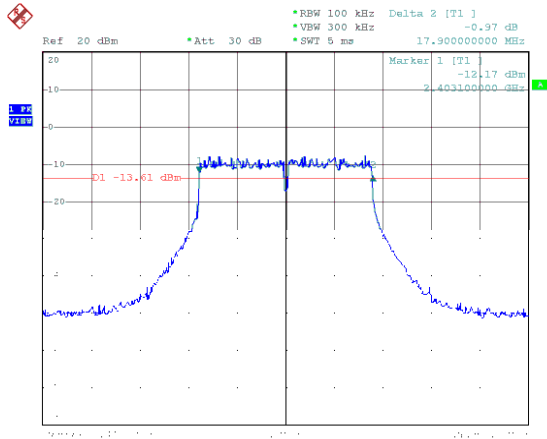
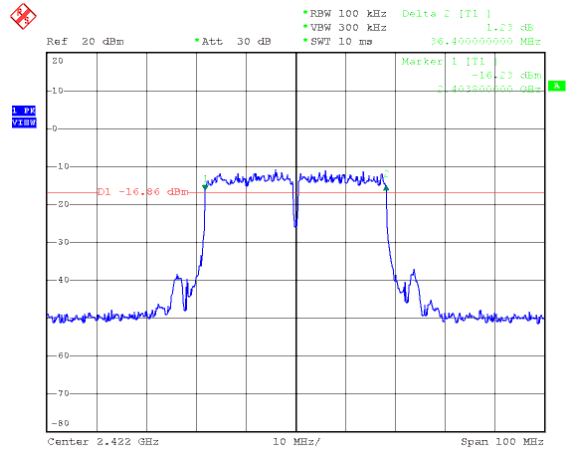


CH11

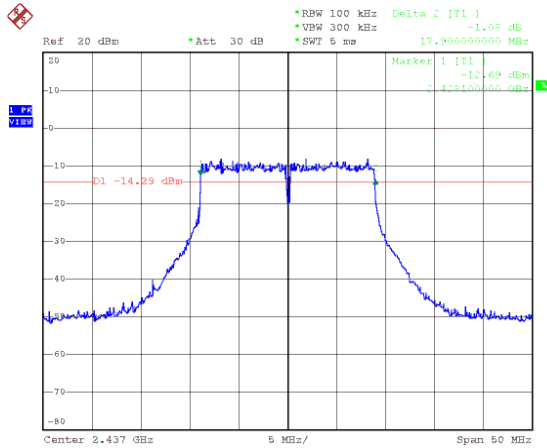


CH11

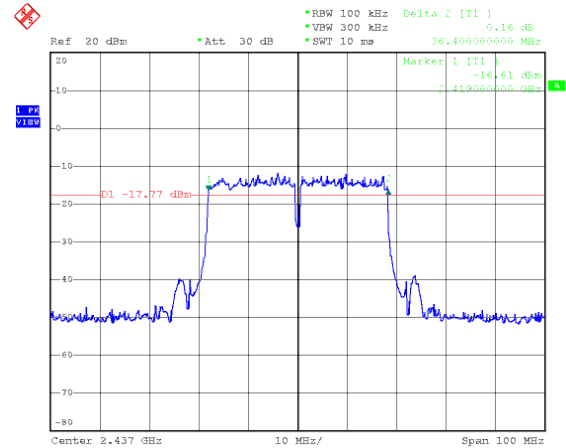


Modulation Type: 802.11n HT20
CH01Modulation Type: 802.11n HT40
CH03

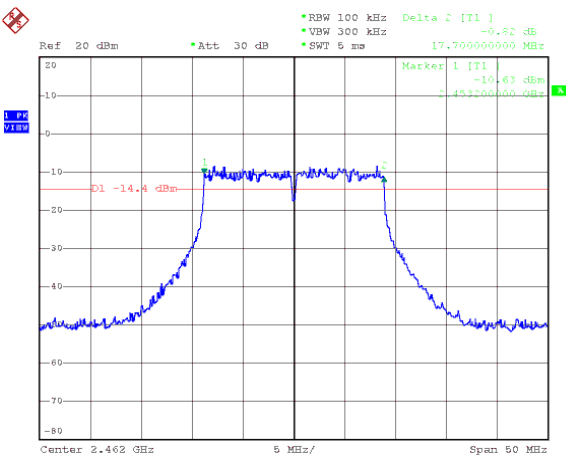
CH06



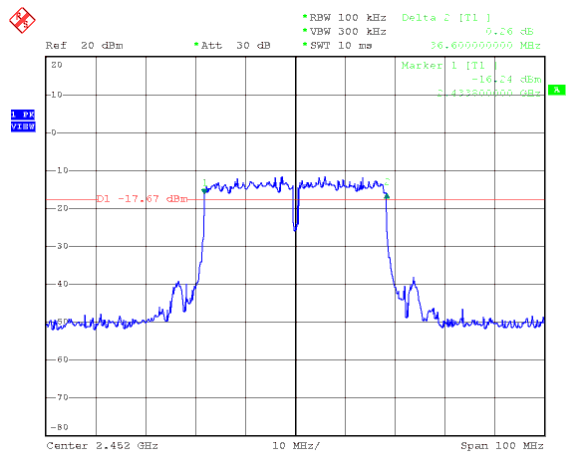
CH06



CH11



CH09





9. Maximum Peak and Average Output Power

9.1 Test Limit

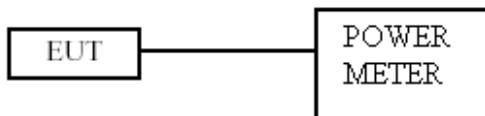
The Maximum Peak Output Power Measurement is 30dBm.

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 : Aug. 11, 2015 Temperature : 22°C
Atmospheric pressure : 1092 hPa Humidity : 52%

Modulation Type	Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
IEEE 802.11b (1Mbps)	01	2412	21.38	137.40
	06	2437	21.65	146.22
	11	2462	21.71	148.25
IEEE 802.11g (12Mbps)	01	2412	24.76	299.23
	06	2437	24.72	296.48
	11	2462	24.67	293.09
IEEE 802.11n HT20 (58.5Mbps)	01	2412	24.11	257.63
	06	2437	24.25	266.07
	11	2462	24.35	272.27
IEEE 802.11n HT40 (54Mbps)	03	2422	24.22	264.24
	06	2437	24.28	267.92
	09	2452	24.45	278.61

Modulation Type	Channel	Frequency (MHz)	Avg. Power Output (dBm)	Avg. Power Output (mW)
IEEE 802.11b (1Mbps)	01	2412	19.71	93.54
	06	2437	19.98	99.54
	11	2462	20.04	100.93
IEEE 802.11g (12Mbps)	01	2412	17.41	55.08
	06	2437	17.39	54.83
	11	2462	17.45	55.59
IEEE 802.11n HT20 (58.5Mbps)	01	2412	16.88	48.75
	06	2437	17.18	52.24
	11	2462	17.35	54.33
IEEE 802.11n HT40 (54Mbps)	03	2422	16.27	42.36
	06	2437	16.41	43.75
	09	2452	16.75	47.32



10. Power Spectral Density

10.1 Test Limit

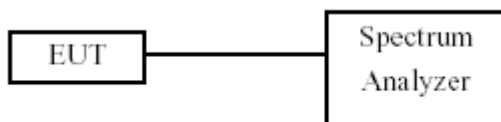
The Maximum of Power Spectral Density Measurement is 8dBm.

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

- The transmitter output was connected to spectrum analyzer.
- 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.
- The power spectral density was measured and recorded.

10.3 Test Setup Layout

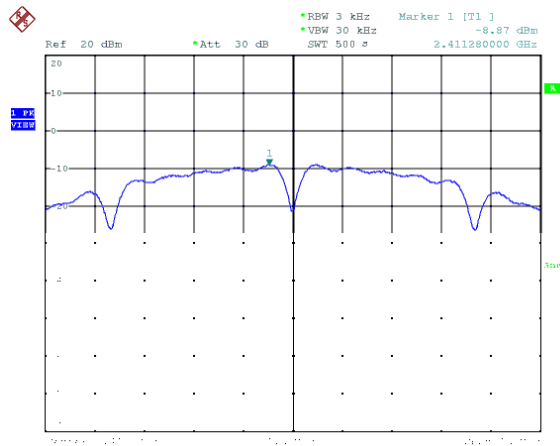
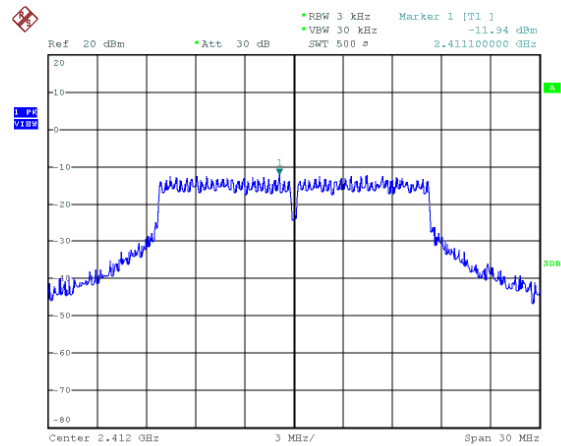




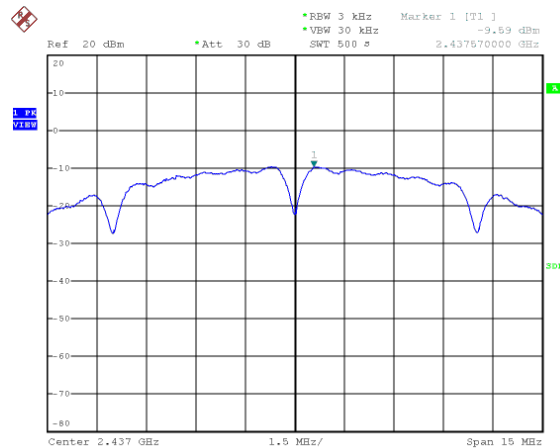
10.4 Test Result and Data

Test Date : Aug. 11, 2015 Temperature : 22°C
Atmospheric pressure : 1092 hPa Humidity : 52%

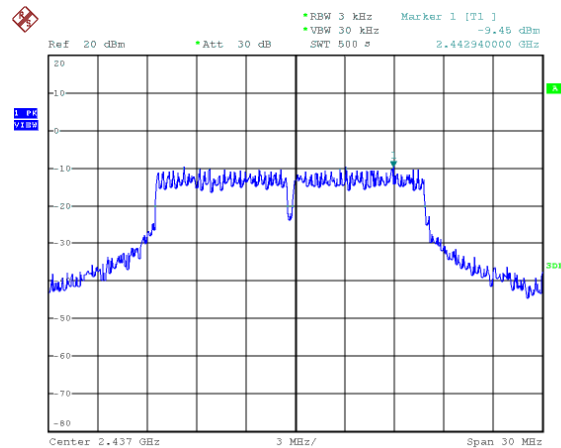
Modulation Type	Channel	Frequency (MHz)	Maximum Power Density of 3 kHz Bandwidth (dBm)
IEEE 802.11b (1Mbps)	01	2412	-8.87
	06	2437	-9.59
	11	2462	-10.45
IEEE 802.11g (12Mbps)	01	2412	-11.94
	06	2437	-9.45
	11	2462	-11.73
IEEE 802.11n HT20 (58.5Mbps)	01	2412	-12.04
	06	2437	-9.40
	11	2462	-10.02
IEEE 802.11n HT40 (54Mbps)	03	2422	-12.32
	06	2437	-11.50
	09	2452	-13.00

Modulation Type: 802.11b
CH01Modulation Type: 802.11g
CH01

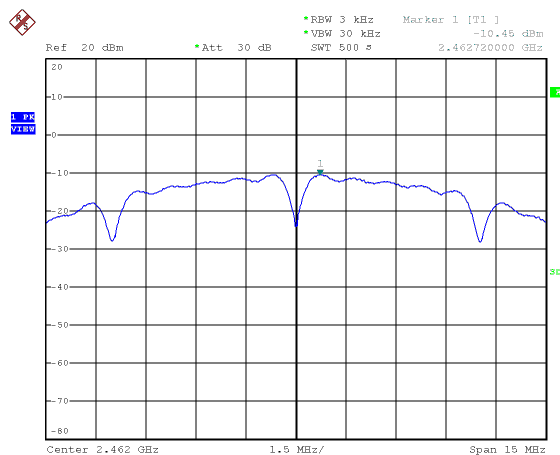
CH06



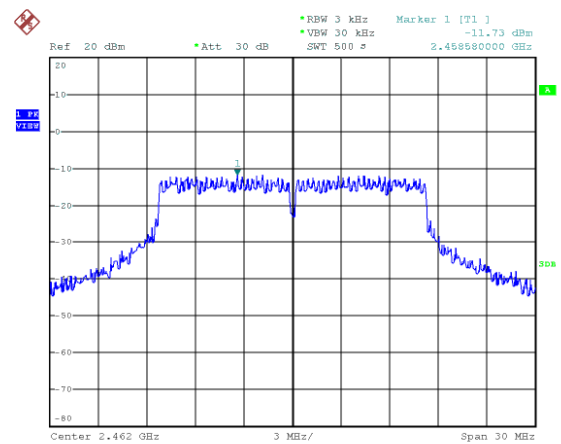
CH06

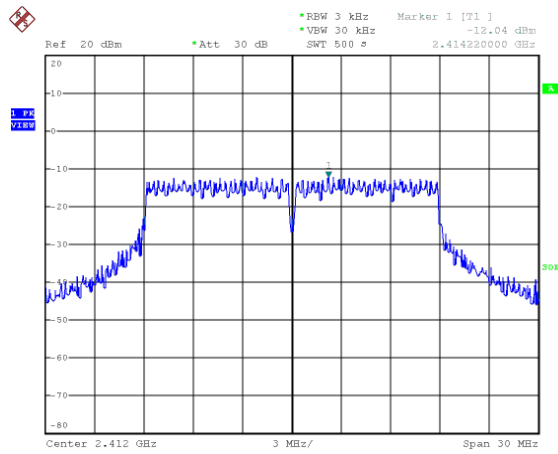
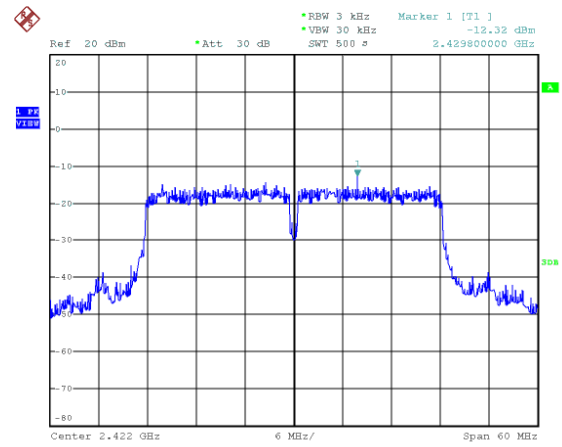


CH11

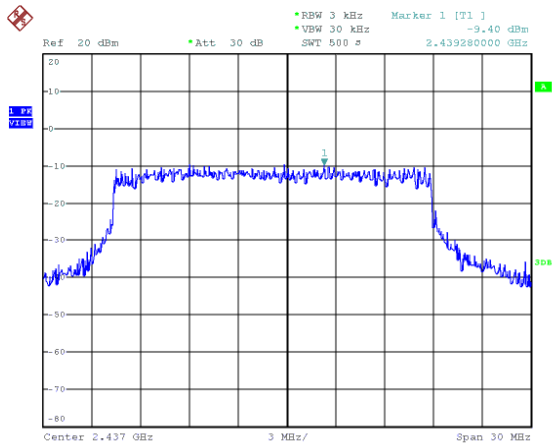


CH11

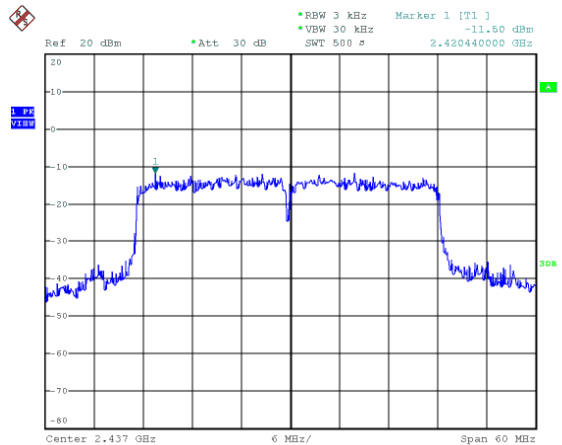


Modulation Type: 802.11n HT20
CH01Modulation Type: 802.11n HT40
CH03

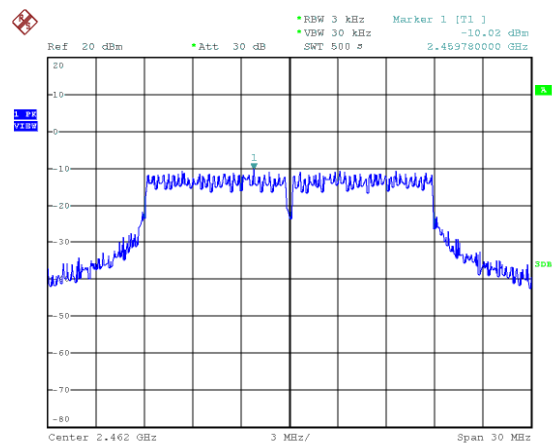
CH06



CH06



CH11



CH09

