



FCC RADIO TEST REPORT

Applicant : Ubiquiti Networks, Inc.
Address : 2580 Orchard Parkway, San Jose,
California 95131, United States
Equipment : AmpliFi Router
Model No. : AFi-R-LP, AFi-R
Trade Name : ULABS
FCC ID : SWX-AFR

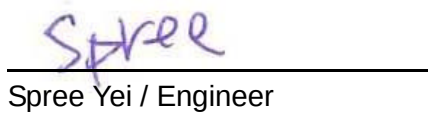
I HEREBY CERTIFY THAT :

The sample was received on Mar. 22, 2016 and the testing was carried out on May 11, 2016 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:


Ray Chou / Assistant Manager

Tested by:


Spree Yei / Engineer

Laboratory Accreditation:

CerpPASS Technology Corporation Test
Laboratory





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History of this test report

Report No.	Issue Date	Description
TEFI1511044	May 16, 2016	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

Modulation Type	DSSS, OFDM, FHSS, GFSK (Bluetooth low energy)
Frequency Range	802.11b/g/n: 2400-2483.5MHz 802.11a/an/ac: 5150-5250MHz, 5725-5850MHz Bluetooth: 2400-2483.5MHz
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: 6.5Mbps to 450Mbps (MCS0 – MCS23, HT20/40) 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11ac: 13Mbps to 1300Mbps (MCS0 – MCS9, VHT 20/40/80) Bluetooth: 1MHz
Antenna Type	PIFA Antenna
Antenna Gain	802.11b/g/n/a/an/ac: Antenna 0: 4.0 dBi Antenna 1: 4.0 dBi Antenna 2: 4.0 dBi Bluetooth: 1.0 dBi
Adapter	GP-L015-QC Input: 100-240V~ 50/60Hz MAX. 0.5A Output: 5V / 2A or 9V /1.7A or 12V / 1.25A

2.2 The difference of Model No.

Model No.	Difference
AFi-R-LP	Marketing differentiation
AFi-R	

2.3 Carrier Frequency of Channels

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

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

802.11n HT40 (2422MHz~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.



2.4 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 remote workstation and EUT for RF test. The remote workstation included Notebook.
- An executive program, "Art2_ver_4_9_815" under WIN 7 was executed to transmit and receive data via WLAN.
- Pre-Scanned RF Power:

802.11b mode								
Antenna A								
Data Rate	1	2	5.5	11	---	---	---	---
Avg. Power Output(dBm)	20.56	20.51	20.47	20.44	---	---	---	---
Peak. Power Output(dBm)	23.34	23.42	23.55	23.63	---	---	---	---
Antenna B								
Data Rate	1	2	5.5	11	---	---	---	---
Avg. Power Output(dBm)	17.57	17.49	17.52	17.53	---	---	---	---
Peak. Power Output(dBm)	20.79	20.69	20.56	20.88	---	---	---	---
Antenna C								
Data Rate	1	2	5.5	11	---	---	---	---
Avg. Power Output(dBm)	17.82	17.69	17.25	17.79	---	---	---	---
Peak. Power Output(dBm)	21.03	21.11	21.06	21.14	---	---	---	---

802.11g mode								
Antenna A								
Data Rate	6	9	12	18	24	36	48	54
Avg. Power Output(dBm)	13.04	13.1	13.22	13.01	13.17	13.2	13.25	13.28
Peak. Power Output(dBm)	22.48	22.79	23.17	23.56	23.88	24.02	24.21	24.33
Antenna B								
Data Rate	6	9	12	18	24	36	48	54
Avg. Power Output(dBm)	10.22	10.24	10.48	10.38	10.24	10.69	10.32	10.39
Peak. Power Output(dBm)	19.17	19.46	20.01	19.72	19.86	21.03	20.69	21.39
Antenna C								
Data Rate	6	9	12	18	24	36	48	54
Avg. Power Output(dBm)	10.19	10.11	10.17	10.28	10.11	10.58	10.25	10.36
Peak. Power Output(dBm)	19.9	20.79	20.44	19.96	19.84	21.17	21.05	21.72



802.11n HT20 mode								
Antenna A								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	10.13	10.06	9.89	9.78	9.69	6.24	9.68	9.78
Peak. Power Output(dBm)	20.54	20.33	20.96	20.44	20.87	20.69	21.03	21.12
Antenna B								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	10.06	10.01	9.78	9.58	9.68	9.14	9.33	9.22
Peak. Power Output(dBm)	20.68	20.46	20.69	20.77	21.01	20.91	20.89	21.04
Antenna C								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	10.11	9.98	10.02	10.03	9.78	9.69	9.58	9.49
Peak. Power Output(dBm)	20.17	20.13	20.08	20	20.94	20.78	20.69	21.08

802.11n HT40 mode								
Antenna A								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	9.81	9.88	9.75	9.47	9.65	9.86	9.77	9.72
Peak. Power Output(dBm)	21.06	21.01	21.63	21.59	21.48	21.08	21.69	21.76
Antenna B								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	9.72	9.71	9.66	9.52	9.58	9.46	9.68	9.45
Peak. Power Output(dBm)	20.65	20.47	20.35	20.69	20.58	20.77	21.02	21.06
Antenna C								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	9.12	8.93	8.97	9.21	9.01	8.94	8.69	8.93
Peak. Power Output(dBm)	20.15	20.08	20.67	20.54	20.39	20.16	20.55	20.72

*The highest powers were chosen for the full test.



e. The following test modes were performed for the test:

Mode 1: 802.11b (11Mbps)

Mode 2: 802.11g (54Mbps)

Mode 3: 802.11n HT20 (195Mbps)

Mode 4: 802.11n HT40 (405Mbps)

caused "Test Mode 3" generated the worst case, it was reported as the final data.

2.5 Description of Test System

Device	Manufacturer	Model No.	Description
Remote Workstation			
Notebook	DELL	Vostro 3560	Power Cable, Unshielding, 1.8m

Used cable

Cable	Quantity	Description
RJ45	1	Unshielding, 3.0m



2.6 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-3428, R-4218 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 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
Bilog Antenna	Schwarzbeck	VULB9168	275	2015/09/03	2016/09/02
Active Loop Antenna	EMCO	6507	40855	2016/03/11	2017/03/10
Horn Antenna	EMCO	3115	31601	2015/09/02	2016/09/01
Horn Antenna	EMCO	3116	31974	2015/09/07	2016/09/06
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2016/03/16	2017/03/15
Preamplifier	EM	EM330	060660	2016/03/16	2017/03/15
Preamplifier	Agilent	8449B	3008A01954	2016/03/04	2017/03/03
Preamplifier	MITEQ	AMF-7D-001 0100-30-10P	1860212	2016/03/16	2017/03/15
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2015/11/04	2016/11/03
Signal Generator	KEYSIGHT	83640A	2927A00107	2015/09/01	2016/08/31
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2016/03/18	2017/03/17
MXG-B RF Vector Signal Generator	KEYSIGHT	N5182B	MY53051383	2016/03/18	2017/03/17
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	2015/09/08	2016/09/07
Series Power Meter	Anritsu	ML2495A	1224005	2016/03/03	2017/03/02
Power Sensor	Anritsu	MA2411B	1207295	2016/03/03	2017/03/02
USB Average Power Sensor	Theda	4PS6A	TW5451013~16	2014/11/08	2016/11/07



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	Antenna Gain
PIFA Antenna	Antenna 0: 4.0 dBi
	Antenna 1: 4.0 dBi
	Antenna 2: 4.0 dBi

$$\begin{aligned}\text{Directional gain} &= G_{\text{ant}} + 10\log(N) \text{ dBi} \\ &= 4 + 10\log(3) \\ &= 8.77 \text{ (dBi)}\end{aligned}$$



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

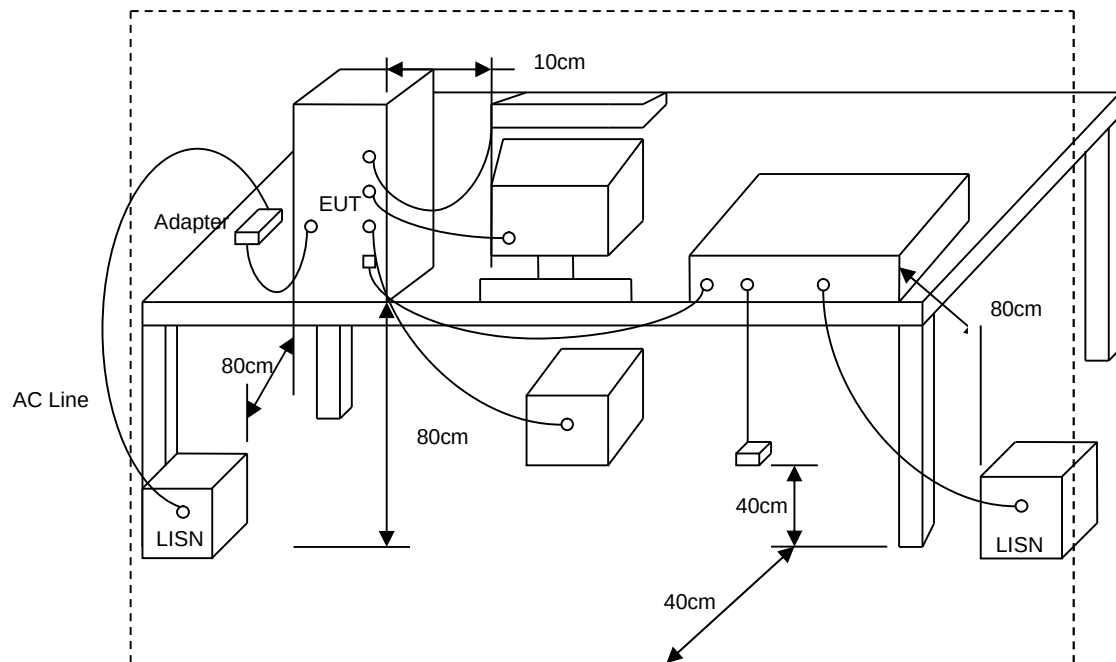
*Decreases with the logarithm of the frequency.

5.2 Test Procedures

- 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.



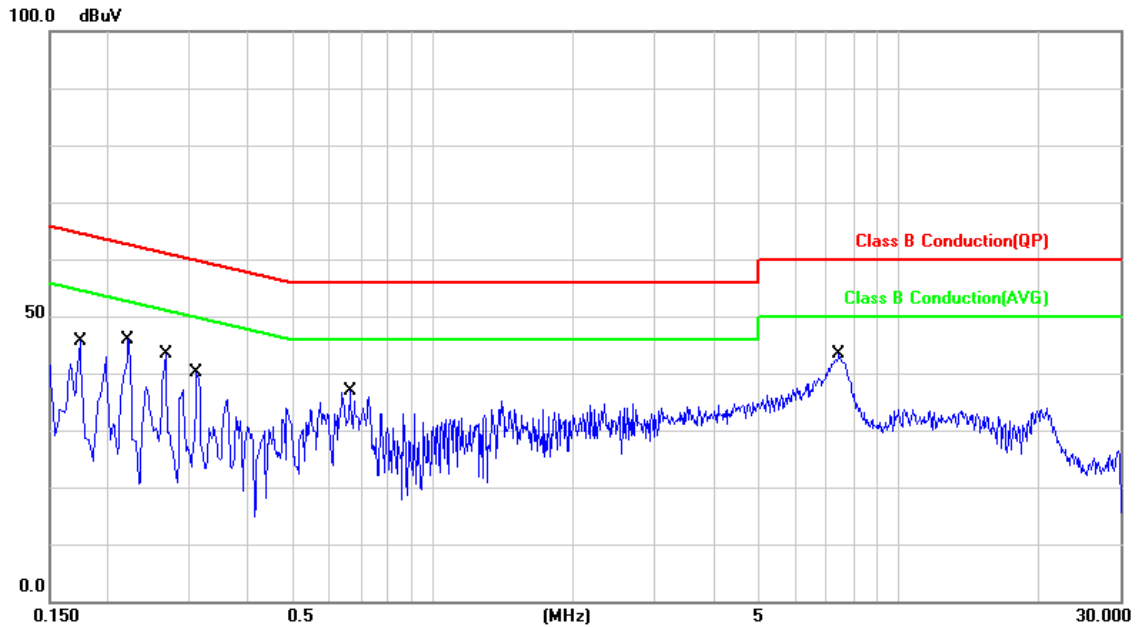
5.3 Typical Test Setup





5.4 Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 3	Temperature	: 21 °C
Test date	: Mar. 31, 2016	Humidity	: 52 %
Memo	: CH01	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1740	9.99	31.34	41.33	64.76	-23.43	QP	P
2	0.1740	9.99	15.69	25.68	54.76	-29.08	AVG	P
3	0.2220	10.00	32.83	42.83	62.74	-19.91	QP	P
4	0.2220	10.00	19.32	29.32	52.74	-23.42	AVG	P
5	0.2660	10.01	29.38	39.39	61.24	-21.85	QP	P
6	0.2660	10.01	16.82	26.83	51.24	-24.41	AVG	P
7	0.3100	10.02	25.63	35.65	59.97	-24.32	QP	P
8	0.3100	10.02	13.35	23.37	49.97	-26.60	AVG	P
9	0.6620	10.04	25.66	35.70	56.00	-20.30	QP	P
10	0.6620	10.04	21.29	31.33	46.00	-14.67	AVG	P
11	7.4700	10.32	31.38	41.70	60.00	-18.30	QP	P
12	7.4700	10.32	28.97	39.29	50.00	-10.71	AVG	P

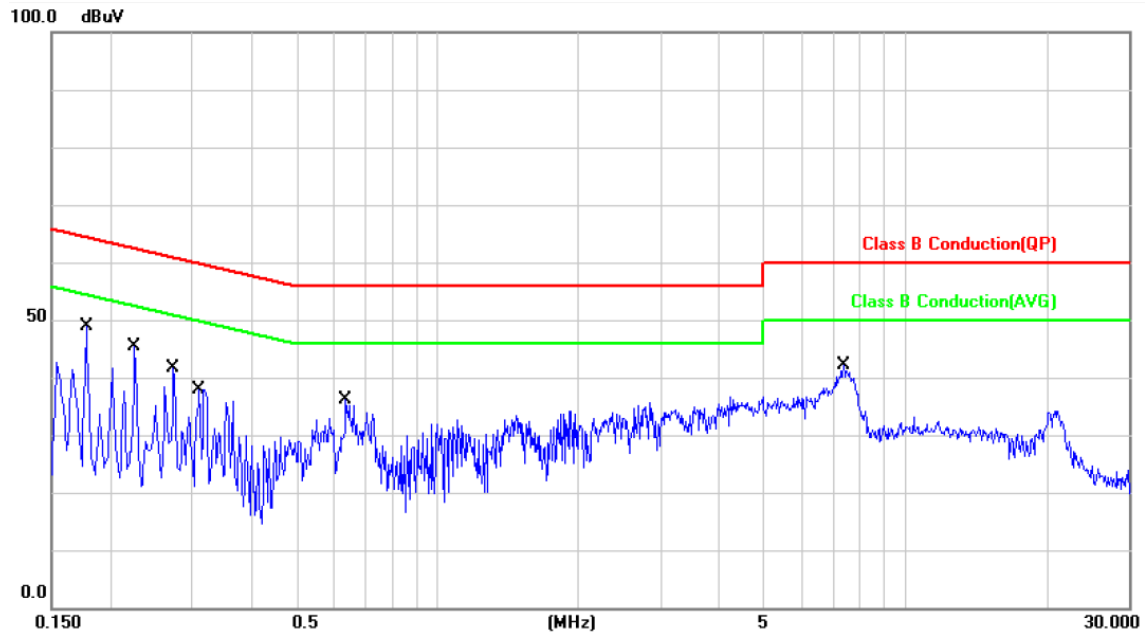
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3	Temperature	: 21 °C
Test date	: Mar. 31, 2016	Humidity	: 52 %
Memo	: CH01	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1780	9.98	36.25	46.23	64.57	-18.34	QP	P
2	0.1780	9.98	20.50	30.48	54.57	-24.09	AVG	P
3	0.2260	9.97	33.11	43.08	62.59	-19.51	QP	P
4	0.2260	9.97	18.54	28.51	52.59	-24.08	AVG	P
5	0.2740	9.97	28.20	38.17	60.99	-22.82	QP	P
6	0.2740	9.97	13.48	23.45	50.99	-27.54	AVG	P
7	0.3100	9.98	24.86	34.84	59.97	-25.13	QP	P
8	0.3100	9.98	10.84	20.82	49.97	-29.15	AVG	P
9	0.6380	10.00	23.14	33.14	56.00	-22.86	QP	P
10	0.6380	10.00	17.69	27.69	46.00	-18.31	AVG	P
11	7.3780	10.34	29.23	39.57	60.00	-20.43	QP	P
12	7.3780	10.34	26.95	37.29	50.00	-12.71	AVG	P

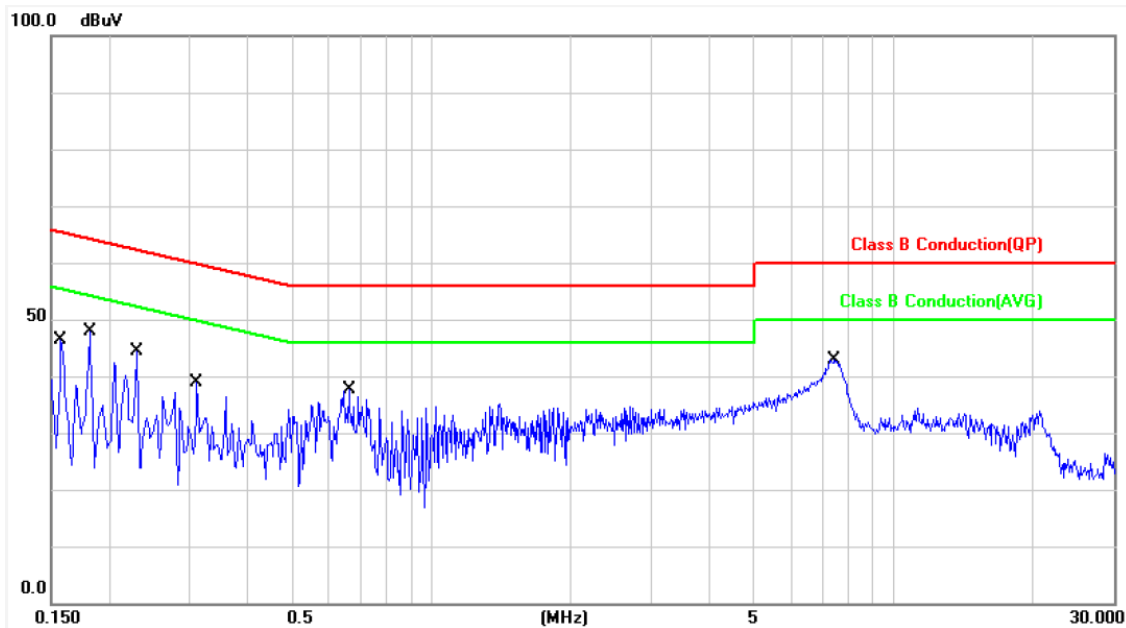
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 3	Temperature	: 21 °C
Test date	: Mar. 31, 2016	Humidity	: 52 %
Memo	: CH06	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1580	9.99	38.04	48.03	65.56	-17.53	QP	P
2	0.1580	9.99	23.53	33.52	55.56	-22.04	AVG	P
3	0.1819	10.00	35.16	45.16	64.39	-19.23	QP	P
4	0.1819	10.00	21.19	31.19	54.39	-23.20	AVG	P
5	0.2300	10.00	29.17	39.17	62.45	-23.28	QP	P
6	0.2300	10.00	14.89	24.89	52.45	-27.56	AVG	P
7	0.3100	10.02	25.13	35.15	59.97	-24.82	QP	P
8	0.3100	10.02	13.25	23.27	49.97	-26.70	AVG	P
9	0.6620	10.04	25.79	35.83	56.00	-20.17	QP	P
10	0.6620	10.04	21.34	31.38	46.00	-14.62	AVG	P
11	7.4660	10.32	31.14	41.46	60.00	-18.54	QP	P
12	7.4660	10.32	28.08	38.40	50.00	-11.60	AVG	P

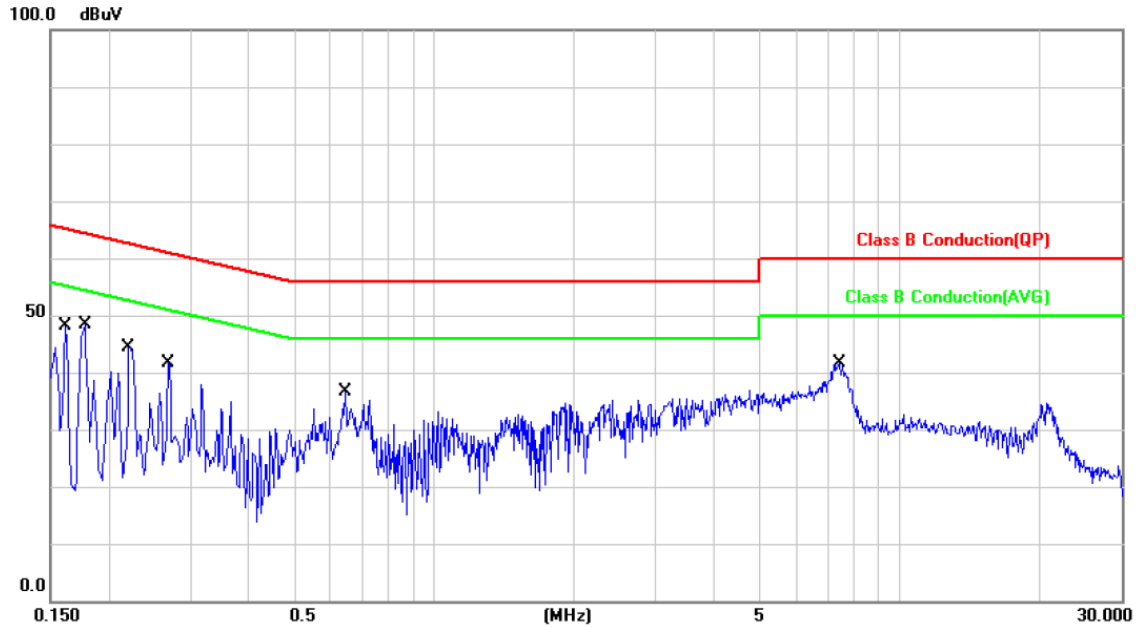
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3	Temperature	: 21 °C
Test date	: Mar. 31, 2016	Humidity	: 52 %
Memo	: CH06	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1620	9.99	33.53	43.52	65.36	-21.84	QP	P
2	0.1620	9.99	16.67	26.66	55.36	-28.70	AVG	P
3	0.1780	9.98	35.81	45.79	64.57	-18.78	QP	P
4	0.1780	9.98	20.15	30.13	54.57	-24.44	AVG	P
5	0.2220	9.97	32.05	42.02	62.74	-20.72	QP	P
6	0.2220	9.97	17.20	27.17	52.74	-25.57	AVG	P
7	0.2700	9.97	29.84	39.81	61.12	-21.31	QP	P
8	0.2700	9.97	16.96	26.93	51.12	-24.19	AVG	P
9	0.6460	10.00	21.41	31.41	56.00	-24.59	QP	P
10	0.6460	10.00	15.12	25.12	46.00	-20.88	AVG	P
11	7.4220	10.34	29.07	39.41	60.00	-20.59	QP	P
12	7.4220	10.34	26.35	36.69	50.00	-13.31	AVG	P

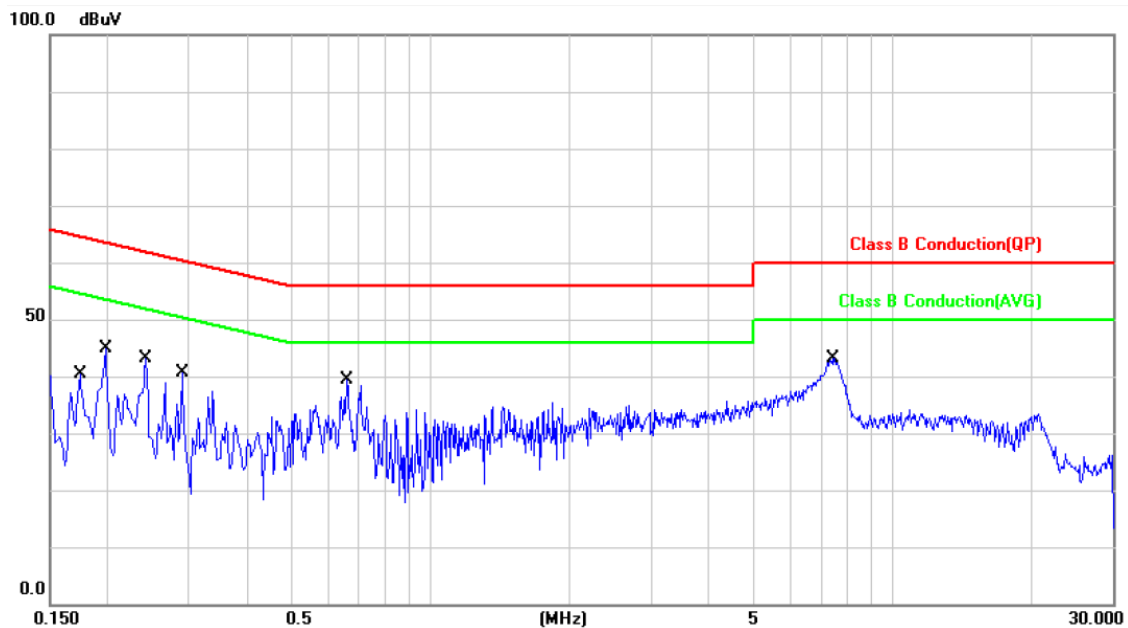
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 3	Temperature	: 21 °C
Test date	: Mar. 31, 2016	Humidity	: 52 %
Memo	: CH11	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1740	9.99	30.71	40.70	64.76	-24.06	QP	P
2	0.1740	9.99	15.39	25.38	54.76	-29.38	AVG	P
3	0.1980	10.00	31.67	41.67	63.69	-22.02	QP	P
4	0.1980	10.00	17.03	27.03	53.69	-26.66	AVG	P
5	0.2420	10.01	28.84	38.85	62.02	-23.17	QP	P
6	0.2420	10.01	15.44	25.45	52.02	-26.57	AVG	P
7	0.2900	10.01	27.17	37.18	60.52	-23.34	QP	P
8	0.2900	10.01	16.24	26.25	50.52	-24.27	AVG	P
9	0.6580	10.04	24.73	34.77	56.00	-21.23	QP	P
10	0.6580	10.04	18.66	28.70	46.00	-17.30	AVG	P
11	7.4460	10.32	31.38	41.70	60.00	-18.30	QP	P
12	7.4460	10.32	28.94	39.26	50.00	-10.74	AVG	P

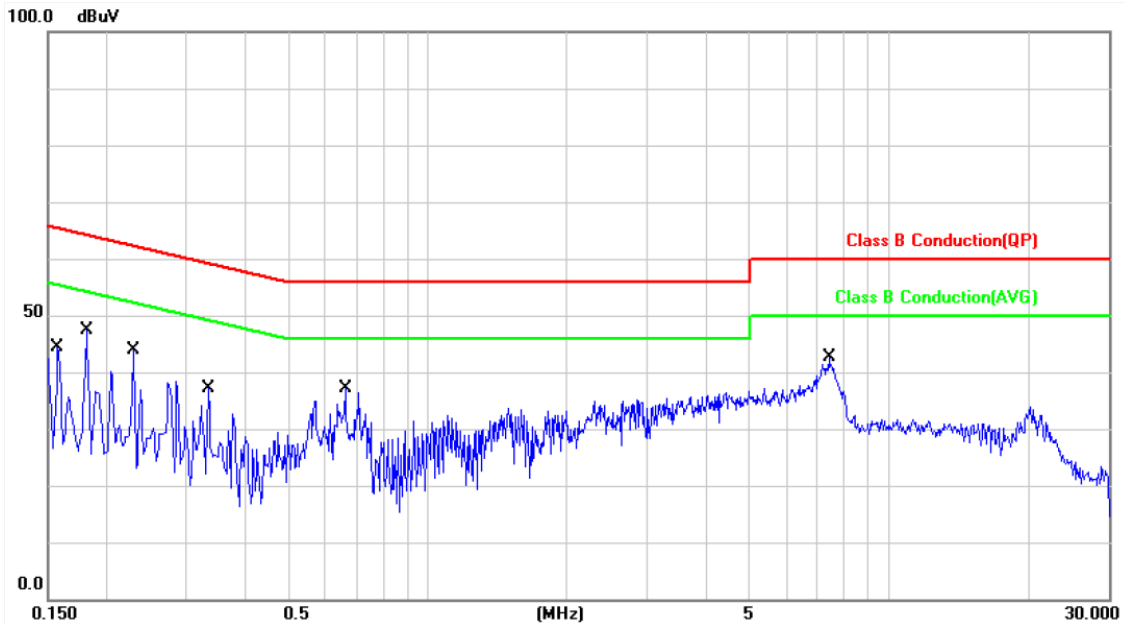
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 3	Temperature	: 21 °C
Test date	: Mar. 31, 2016	Humidity	: 52 %
Memo	: CH11	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1580	9.99	37.81	47.80	65.56	-17.76	QP	P
2	0.1580	9.99	21.74	31.73	55.56	-23.83	AVG	P
3	0.1819	9.98	34.99	44.97	64.39	-19.42	QP	P
4	0.1819	9.98	19.35	29.33	54.39	-25.06	AVG	P
5	0.2300	9.97	28.80	38.77	62.45	-23.68	QP	P
6	0.2300	9.97	12.82	22.79	52.45	-29.66	AVG	P
7	0.3339	9.98	24.04	34.02	59.35	-25.33	QP	P
8	0.3339	9.98	12.00	21.98	49.35	-27.37	AVG	P
9	0.6620	10.00	24.55	34.55	56.00	-21.45	QP	P
10	0.6620	10.00	19.26	29.26	46.00	-16.74	AVG	P
11	7.4260	10.34	28.66	39.00	60.00	-21.00	QP	P
12	7.4260	10.34	25.09	35.43	50.00	-14.57	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss



6. Test of Radiated Spurious Emission

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

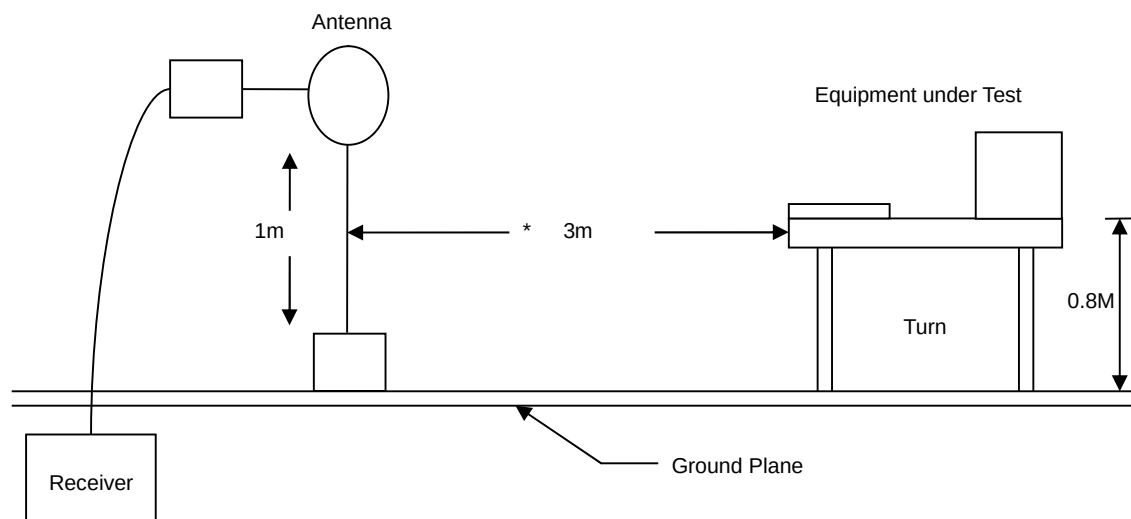
6.2 Test Procedures

- 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.

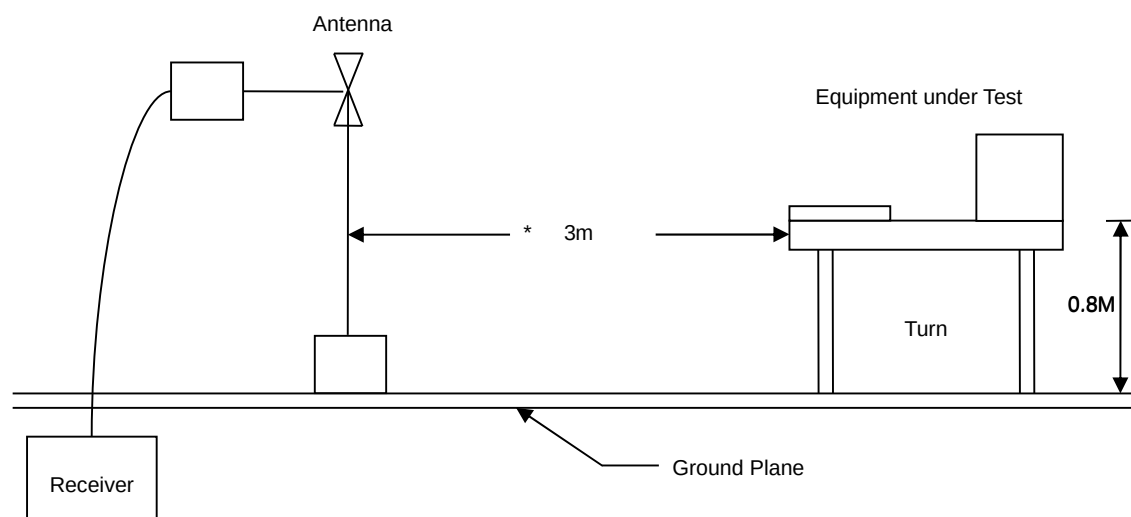


6.3 Typical Test Setup

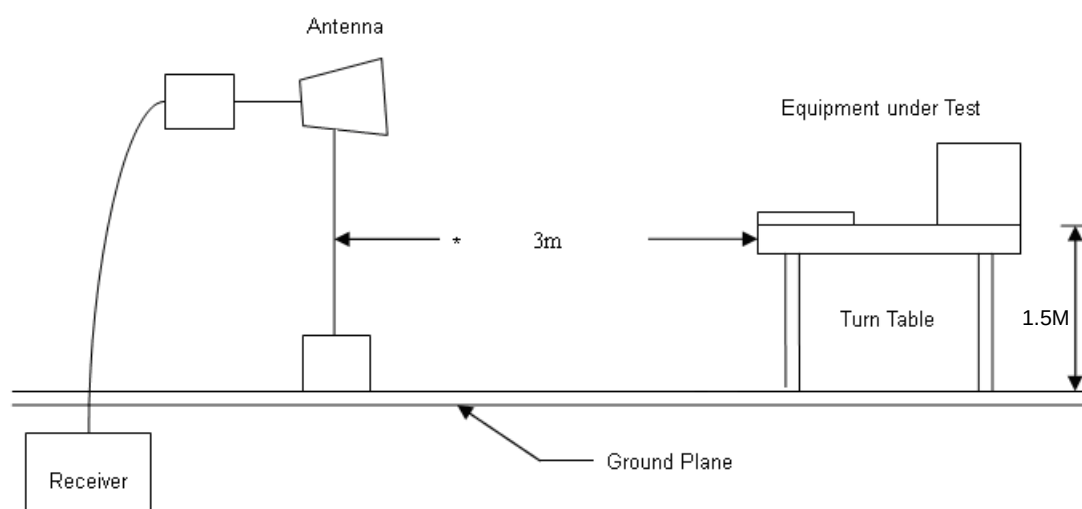
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



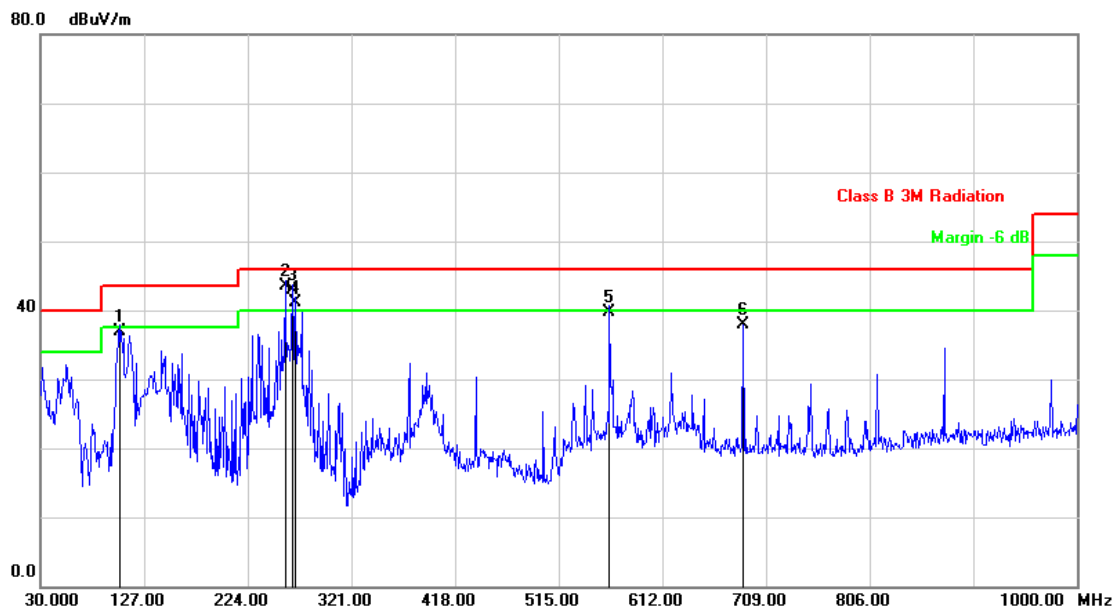


6.4 Test Result and Data (9KHz ~ 30MHz)

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

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

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 01	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	103.7200	-20.45	57.43	36.98	43.50	-6.52	QP	100	201	P
2	258.9200	-16.52	60.06	43.54	46.00	-2.46	QP	100	122	P
3	265.7099	-16.20	59.08	42.88	46.00	-3.12	QP	100	175	P
4	268.6200	-16.06	57.09	41.03	46.00	-4.97	QP	100	169	P
5	562.5300	-8.83	48.49	39.66	46.00	-6.34	QP	100	147	P
6	687.6599	-6.67	44.53	37.86	46.00	-8.14	peak	100	0	P

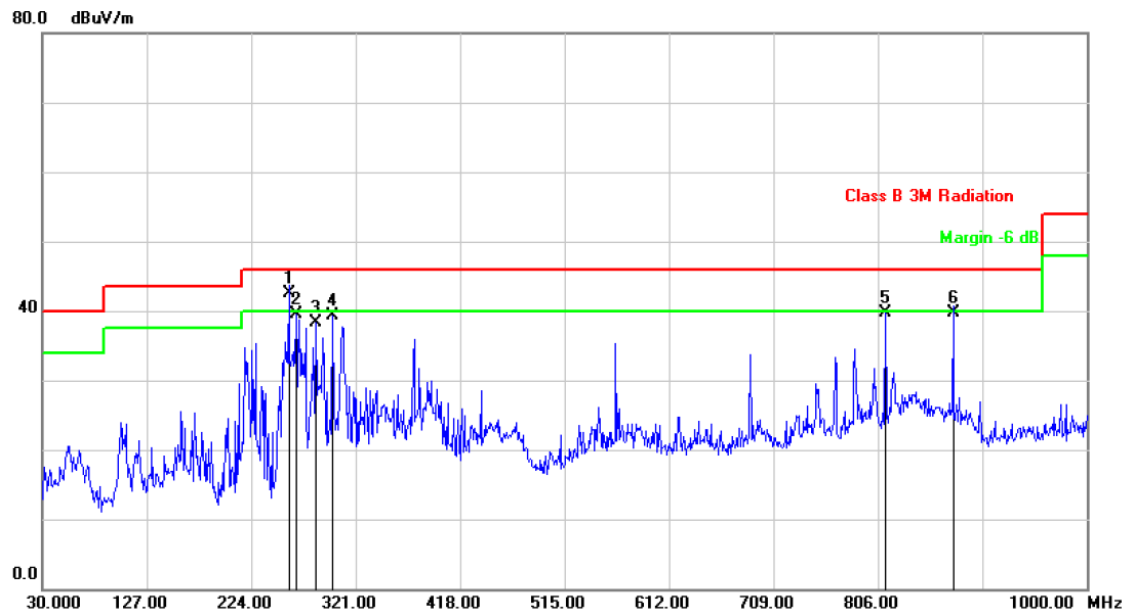
Note: Level = Reading + Factor

Margin = Level - Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 01	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	258.9200	-16.52	59.05	42.53	46.00	-3.47	QP	100	152	P
2	265.7099	-16.20	55.64	39.44	46.00	-6.56	peak	200	0	P
3	284.1399	-15.51	53.74	38.23	46.00	-7.77	peak	200	0	P
4	299.6600	-15.05	54.38	39.33	46.00	-6.67	peak	200	0	P
5	812.7898	-4.86	44.52	39.66	46.00	-6.34	peak	200	0	P
6	875.8400	-3.80	43.52	39.72	46.00	-6.28	QP	100	182	P

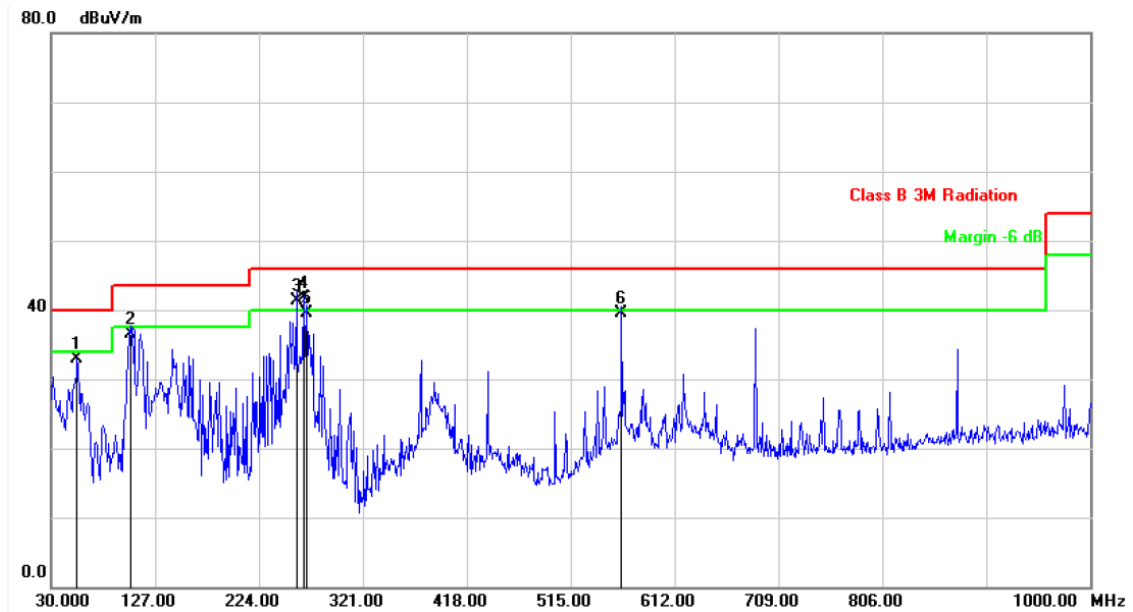
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 06	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	54.2500	-16.17	49.12	32.95	40.00	-7.05	peak	100	0	P
2	103.7200	-20.45	57.03	36.58	43.50	-6.92	QP	100	127	P
3	258.9200	-16.52	57.77	41.25	46.00	-4.75	QP	100	158	P
4	265.7100	-16.20	57.85	41.65	46.00	-4.35	QP	100	164	P
5	268.6200	-16.06	55.63	39.57	46.00	-6.43	QP	100	187	P
6	562.5300	-8.83	48.28	39.45	46.00	-6.55	QP	100	147	P

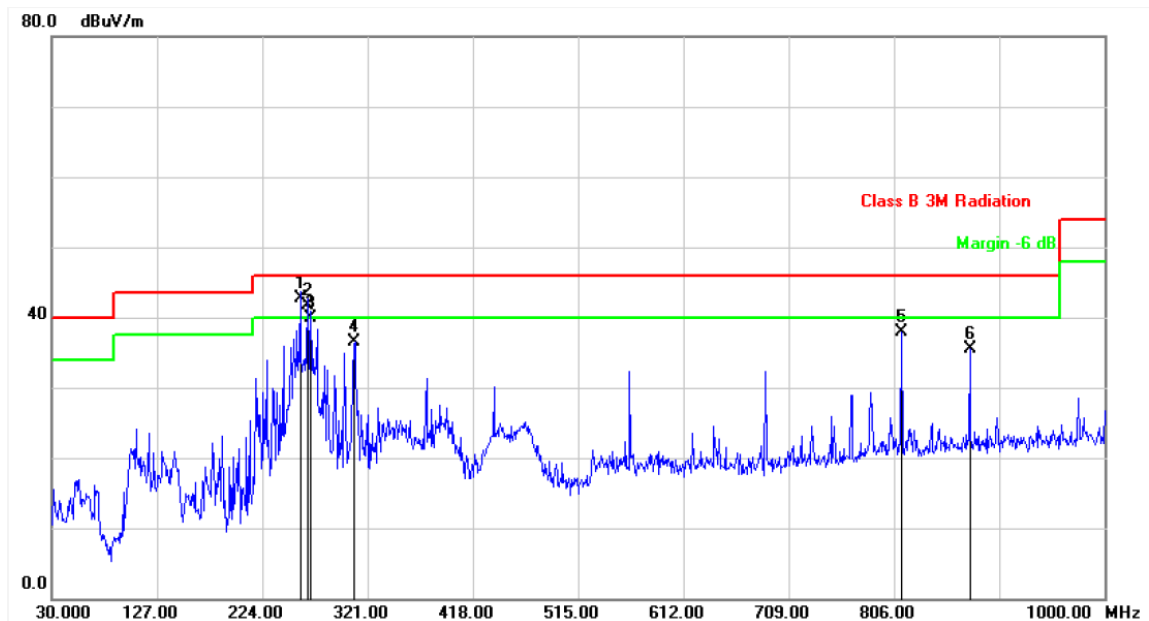
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 06	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	258.9200	-16.52	59.30	42.78	46.00	-3.22	QP	100	176	P
2	265.7099	-16.20	57.89	41.69	46.00	-4.31	QP	100	193	P
3	268.6200	-16.06	55.92	39.86	46.00	-6.14	QP	100	154	P
4	309.3599	-14.81	51.24	36.43	46.00	-9.57	peak	200	0	P
5	812.7899	-4.86	42.70	37.84	46.00	-8.16	peak	200	0	P
6	875.8400	-3.80	39.22	35.42	46.00	-10.58	peak	200	0	P

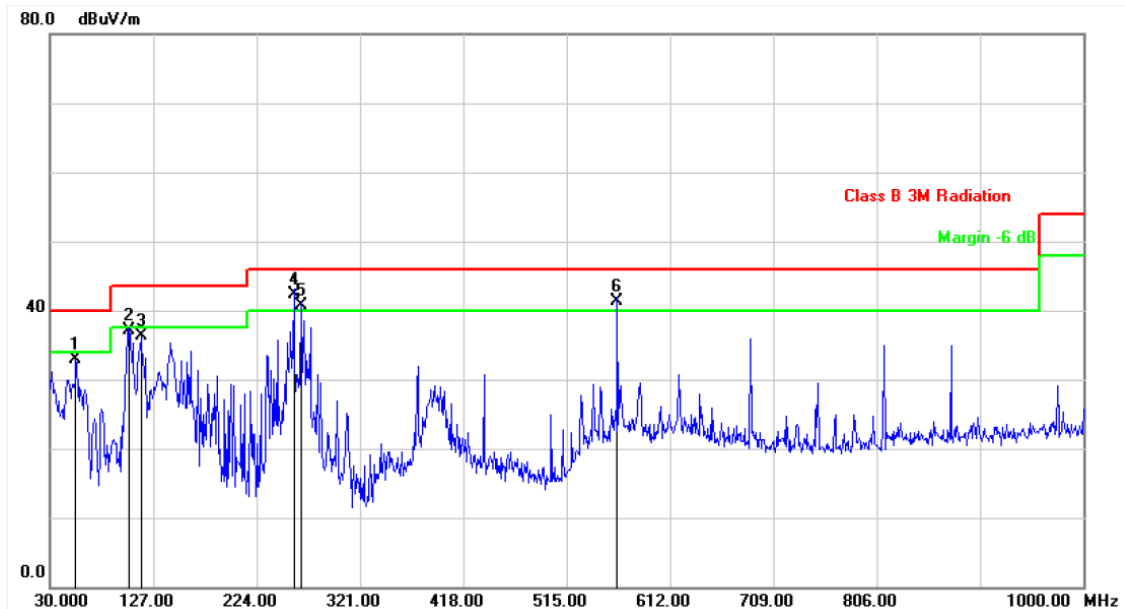
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 11	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	54.2500	-16.17	49.13	32.96	40.00	-7.04	peak	100	0	P
2	104.6900	-20.28	57.30	37.02	43.50	-6.48	QP	100	172	P
3	115.3600	-18.75	55.02	36.27	43.50	-7.23	peak	100	0	P
4	258.9200	-16.52	58.88	42.36	46.00	-3.64	QP	100	144	P
5	265.7100	-16.20	56.89	40.69	46.00	-5.31	QP	100	178	P
6	562.5300	-8.83	50.05	41.22	46.00	-4.78	QP	100	193	P

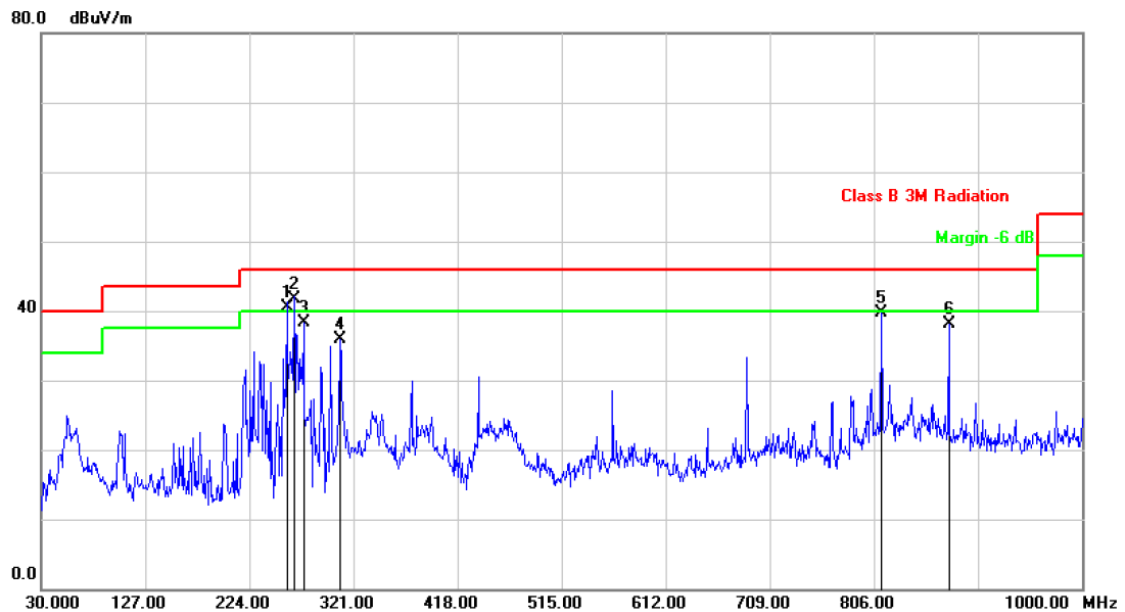
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 11	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	258.9200	-16.52	57.10	40.58	46.00	-5.42	QP	100	155	P
2	265.7100	-16.20	57.85	41.65	46.00	-4.35	QP	100	178	P
3	274.4400	-15.85	54.09	38.24	46.00	-7.76	peak	200	0	P
4	308.3900	-14.84	50.82	35.98	46.00	-10.02	peak	200	0	P
5	812.7900	-4.86	44.64	39.78	46.00	-6.22	peak	200	0	P
6	875.8400	-3.80	41.99	38.19	46.00	-7.81	peak	200	0	P

Note: Level = Reading + Factor

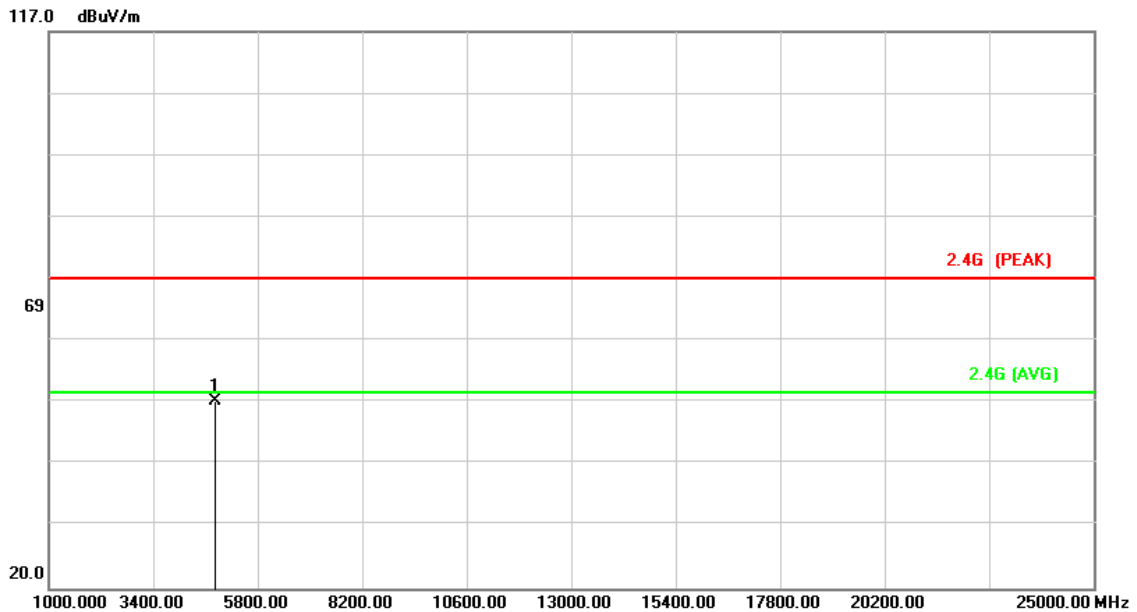
Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



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

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 22, 2016	Humidity	: 49 %
Memo	: CH 01	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	7.87	44.75	52.62	74.00	-21.38	peak	100	0	P

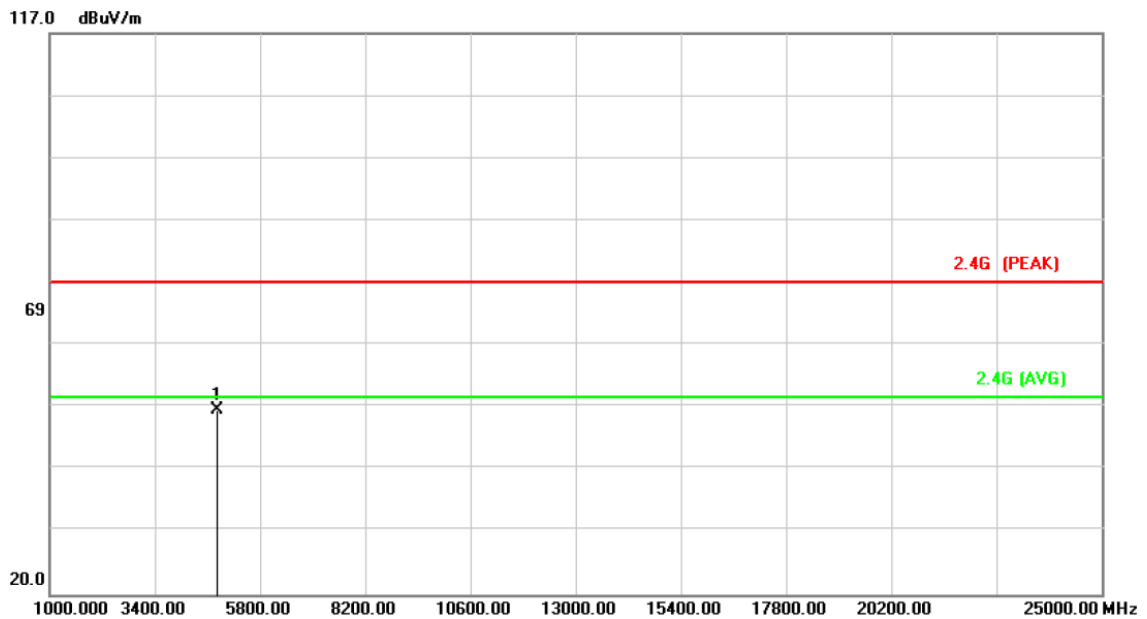
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 22, 2016	Humidity	: 49 %
Memo	: CH 01	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	7.87	44.11	51.98	74.00	-22.02	peak	200	0	P

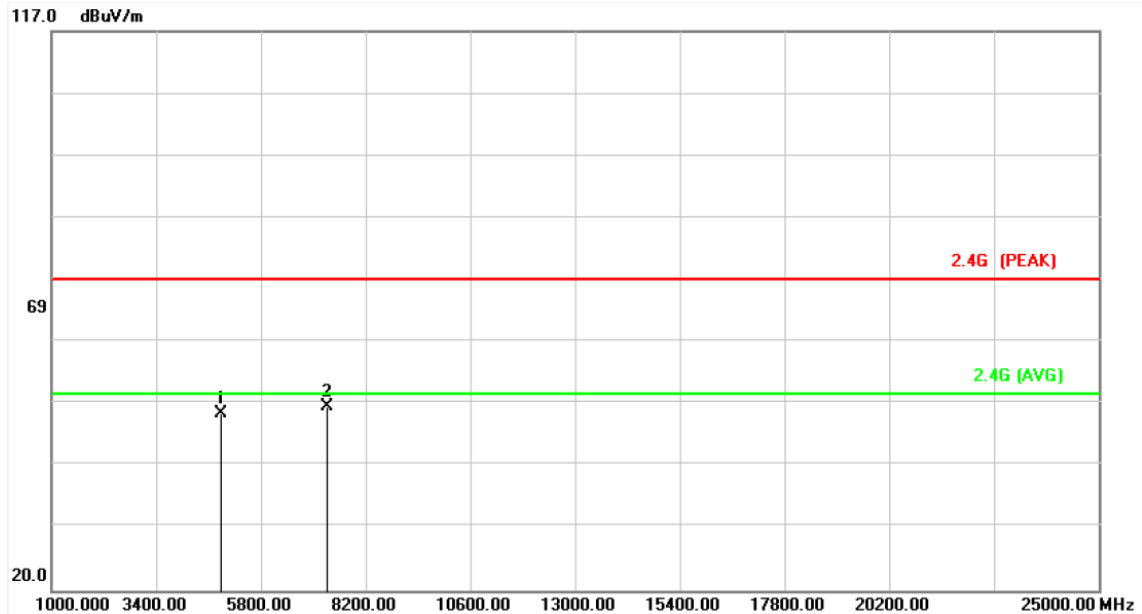
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 22, 2016	Humidity	: 49 %
Memo	: CH 06	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	8.07	42.57	50.64	74.00	-23.36	peak	100	0	P
2	7311.000	13.19	38.58	51.77	74.00	-22.23	peak	100	0	P

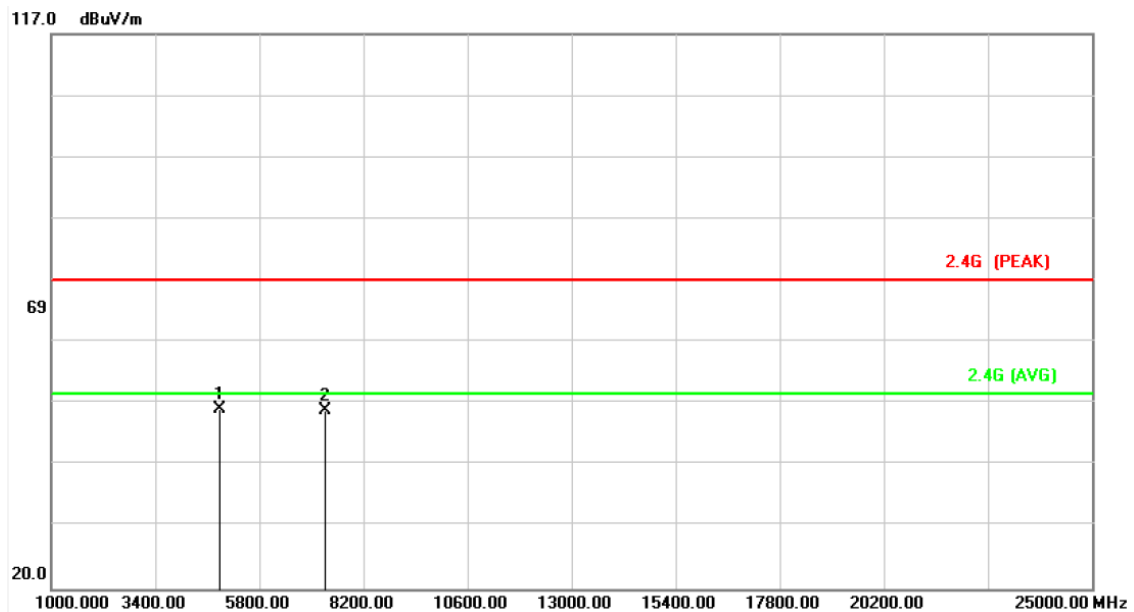
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 22, 2016	Humidity	: 49 %
Memo	: CH 06	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	8.07	43.29	51.36	74.00	-22.64	peak	200	0	P
2	7311.000	13.19	37.89	51.08	74.00	-22.92	peak	200	0	P

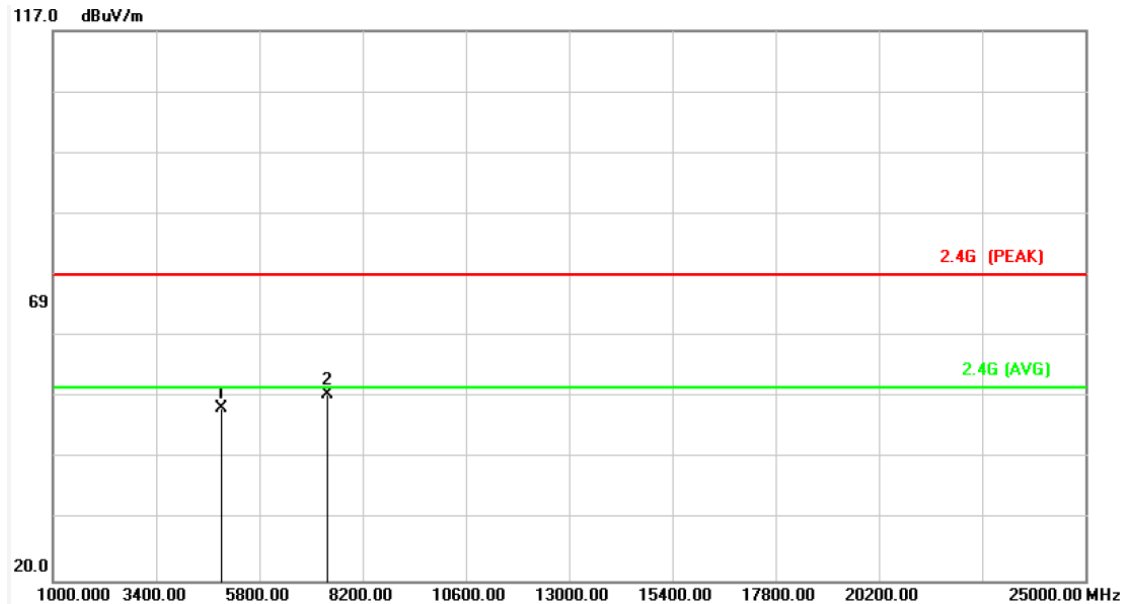
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 22, 2016	Humidity	: 49 %
Memo	: CH 11	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	8.27	42.08	50.35	74.00	-23.65	peak	100	0	P
2	7386.000	13.45	39.43	52.88	74.00	-21.12	peak	100	0	P

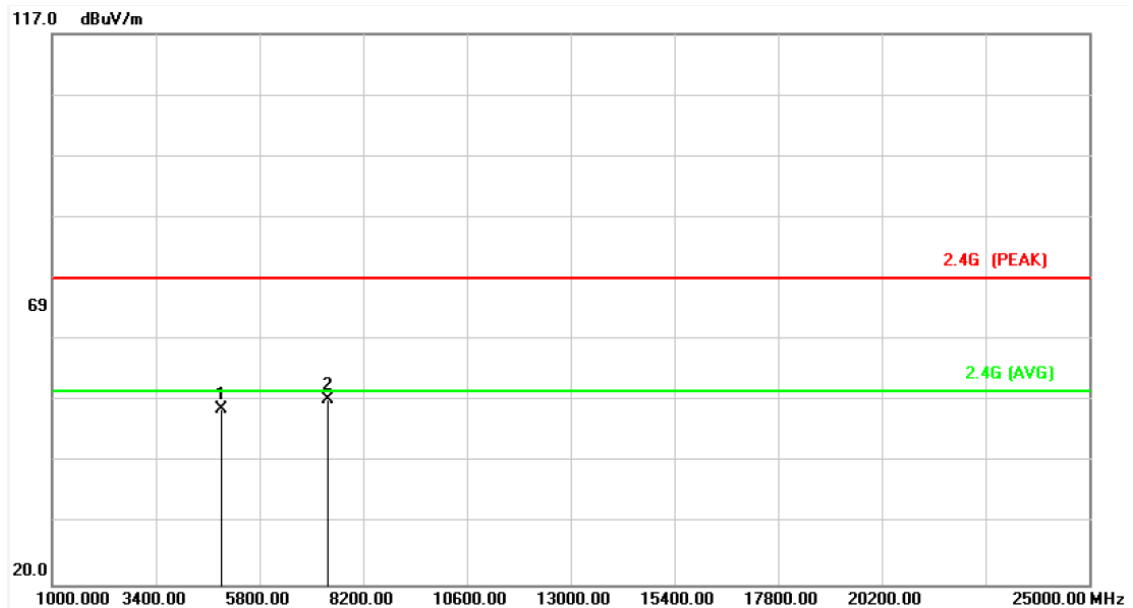
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3	Temperature	: 22.3 °C
Test Date	: Mar. 22, 2016	Humidity	: 49 %
Memo	: CH 11	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	8.27	42.63	50.90	74.00	-23.10	peak	200	0	P
2	7386.000	13.45	39.24	52.69	74.00	-21.31	peak	200	0	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: May 11, 2016

Temperature: 24 °C

Atmospheric pressure: 1015 hPa

Humidity: 55 %

Modulation Standard: IEEE 802.11b

Antenna: 0+1+2

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			
2374.158	V	69.63	-0.99	68.64	Peak	74	54	-5.36	164	159
2374.158	V	54.36	-0.99	53.47	Ave	74	54	-0.53	164	159
2372.934	H	65.28	-0.99	64.29	Peak	74	54	-9.71	187	156
2372.934	H	50.82	-0.99	49.93	Ave	74	54	-4.07	187	156
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			
2484.686	V	67.86	-0.64	67.22	Peak	74	54	-6.78	162	156
2484.686	V	51.47	-0.64	50.93	Ave	74	54	-3.07	162	156
2499.620	V	69.72	-0.59	69.13	Peak	74	54	-4.87	162	156
2499.620	V	53.91	-0.59	53.42	Ave	74	54	-0.58	162	156
2486.130	H	65.97	-0.64	65.33	Peak	74	54	-8.67	183	211
2486.130	H	49.19	-0.64	48.65	Ave	74	54	-5.35	183	211
2498.556	H	66.14	-0.59	65.55	Peak	74	54	-8.45	183	211
2498.556	H	50.51	-0.59	50.02	Ave	74	54	-3.98	183	211

Duty cycle: 0.9760

$$\text{AVG Compensate} = 10\log(1/\text{duty cycle})$$
$$= 0.10$$

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.



Modulation Standard: IEEE 802.11g

Antenna: 0+1+2

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			
2369.262	V	66.22	-1.01	65.21	Peak	74	54	-8.79	168	175
2369.262	V	49.05	-1.01	48.77	Ave	74	54	-5.23	168	175
2390.000	V	66.69	-0.94	65.75	Peak	74	54	-8.25	168	175
2390.000	V	47.81	-0.94	47.60	Ave	74	54	-6.40	168	175
2350.800	H	56.13	-1.07	55.06	Peak	74	54	-18.94	148	158
2350.800	H	42.08	-1.07	41.74	Ave	74	54	-12.26	148	158
2375.178	H	63.64	-0.99	62.65	Peak	74	54	-11.35	148	158
2375.175	H	48.70	-0.99	48.44	Ave	74	54	-5.56	148	158
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			
2483.546	V	61.91	-0.64	61.27	Peak	74	54	-12.73	182	166
2483.546	V	45.01	-0.64	45.10	Ave	74	54	-8.90	182	166
2498.176	V	61.79	-0.59	61.20	Peak	74	54	-12.80	182	166
2498.176	V	45.99	-0.59	46.13	Ave	74	54	-7.87	182	166
2483.850	H	55.24	-0.64	54.60	Peak	74	54	-19.40	194	189
2483.850	H	41.15	-0.64	41.24	Ave	74	54	-12.76	194	189
2498.974	H	55.33	-0.59	54.74	Peak	74	54	-19.26	194	189
2498.974	H	42.57	-0.59	42.71	Ave	74	54	-11.29	194	189

Duty cycle: 0.8440

$$\text{AVG Compensate} = 10\log(1/\text{duty cycle})$$
$$= 0.73$$

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.



Modulation Standard: IEEE 802.11n HT20

Antenna: 0+1+2

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			
2374.056	V	54.52	-0.97	56.55	Peak	74	54	-17.45	201	144
2374.056	V	42.29	-0.97	42.81	Ave	74	54	-11.19	201	144
2371.302	H	52.88	-0.98	51.90	Peak	74	54	-22.10	0	200
---	H	---	---	---	---	---	---	---	---	---
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			
2483.500	V	64.16	-0.60	63.56	Peak	74	54	-10.44	212	124
2483.500	V	41.34	-0.60	42.23	Ave	74	54	-11.77	212	124
2500.000	V	61.87	-0.55	61.32	Peak	74	54	-12.68	212	124
2500.000	V	43.55	-0.55	44.49	Ave	74	54	-9.50	212	124
2483.500	H	56.62	-0.60	56.02	Peak	74	54	-17.98	264	121
2483.500	H	35.90	-0.60	36.79	Ave	74	54	-17.21	264	121

Duty cycle: 0.7084

$$\text{AVG Compensate} = 10\log(1/\text{duty cycle})$$

$$= 1.49$$

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.



Modulation Standard: IEEE 802.11n HT40

Antenna: 0+1+2

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			
2390.000	V	63.89	-0.91	62.98	Peak	74	54	-11.02	177	100
2390.000	V	43.34	-0.91	44.00	Ave	74	54	-10.00	177	100
2389.296	H	60.89	-0.92	59.97	Peak	74	54	-14.03	201	163
2389.296	H	40.45	-0.92	41.10	Ave	74	54	-12.90	201	163
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			
2484.592	V	68.09	-0.60	67.49	Peak	74	54	-6.51	208	149
2484.592	V	46.32	-0.60	47.29	Ave	74	54	-6.71	208	149
2489.248	V	66.03	-0.59	65.44	Peak	74	54	-8.56	208	149
2489.248	V	45.29	-0.59	46.27	Ave	74	54	-7.73	208	149
2483.584	H	65.59	-0.60	64.99	Peak	74	54	-9.01	237	146
2483.584	H	42.22	-0.60	43.19	Ave	74	54	-10.81	237	146

Duty cycle: 0.6959

$$\text{AVG Compensate} = 10\log(1/\text{duty cycle})$$
$$= 1.57$$

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 Conducted Spurious Emission

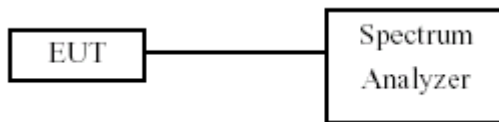
7.1 Test Limit

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

7.2 Test Procedure

- 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

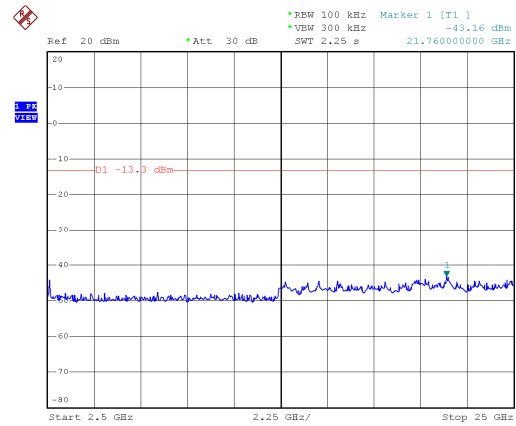
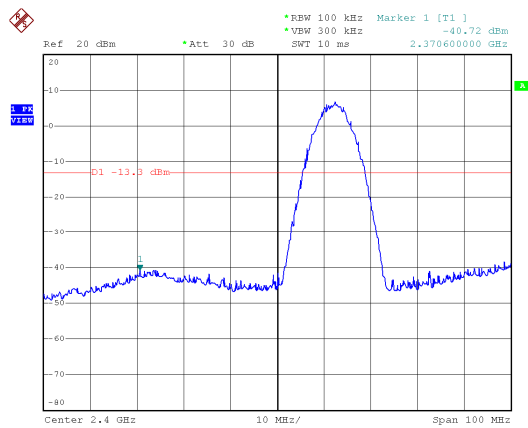
Test Date	: May 10, 2016	Temperature	: 24°C
Atmospheric pressure	: 1015 hPa	Humidity	: 55%
Test Result	: PASS		

Note: Test plots refers to the following pages.

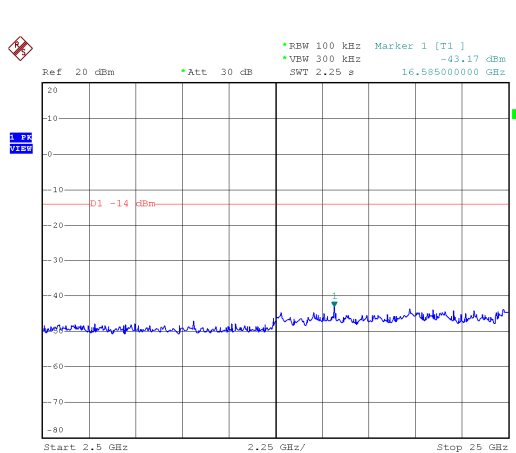
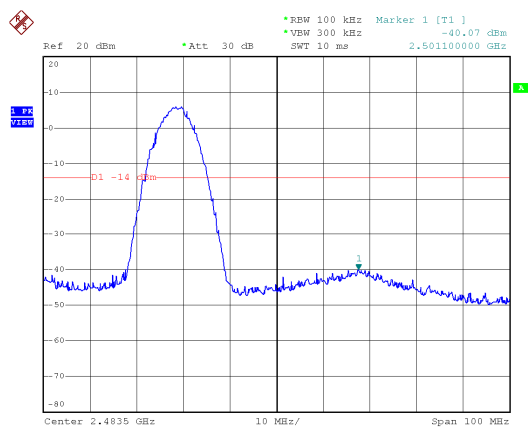


Antenna 0

Modulation Type: 802.11b, CH01



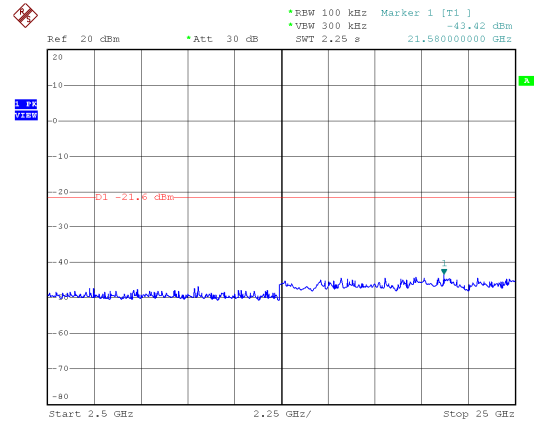
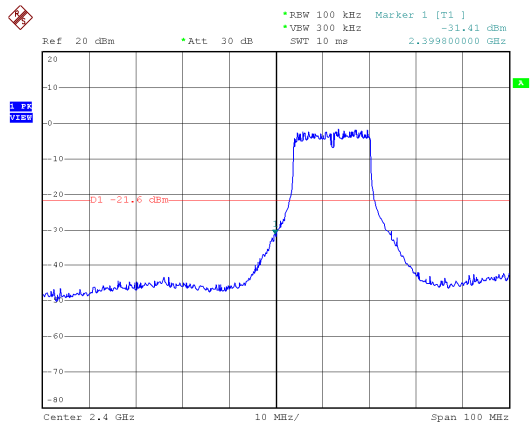
Modulation Type: 802.11b, CH11



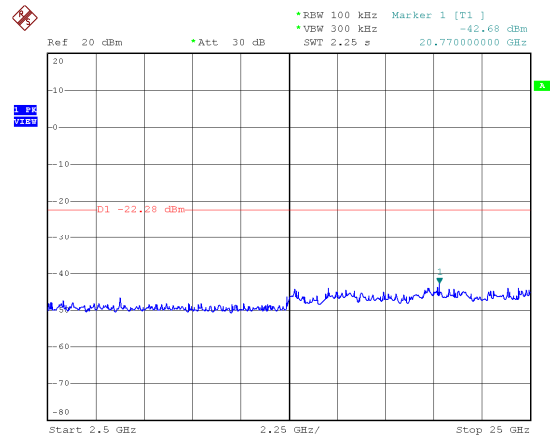
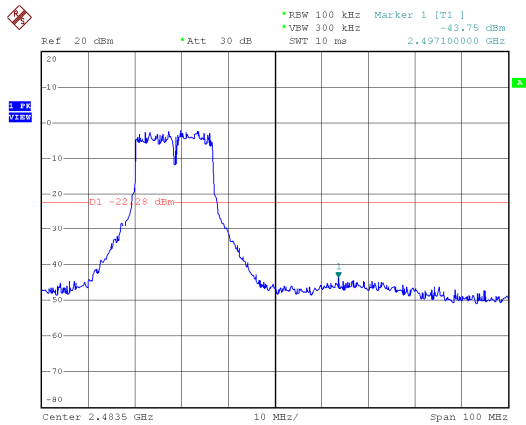


Antenna 0

Modulation Type: 802.11g, CH01



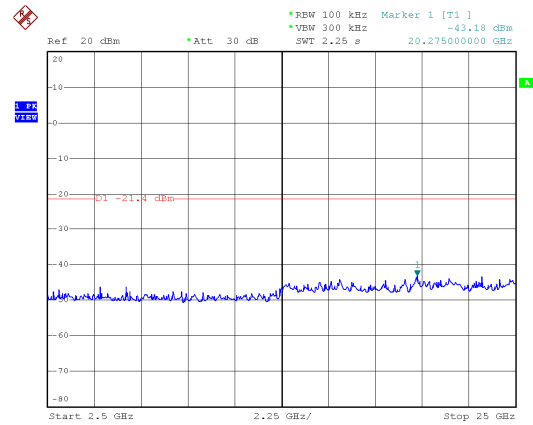
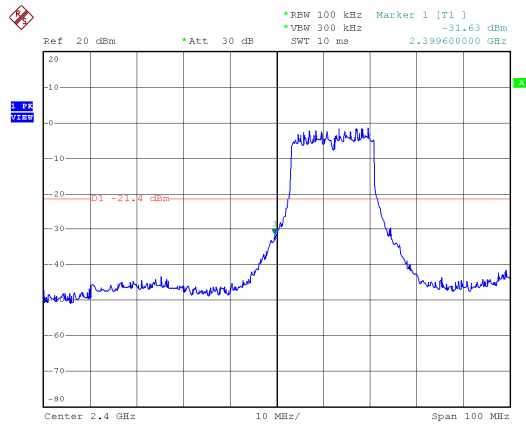
Modulation Type: 802.11g, CH11



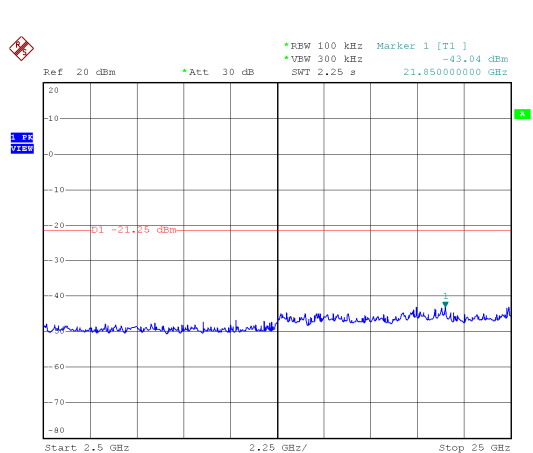
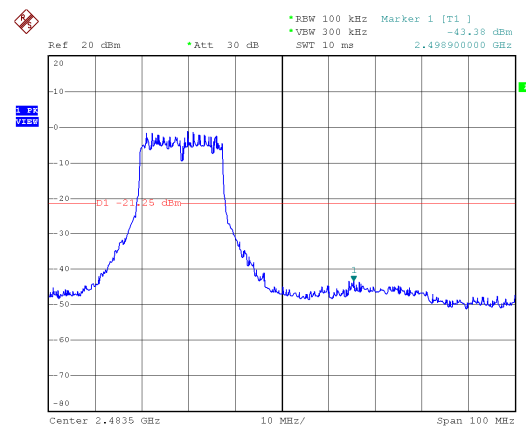


Antenna 0

Modulation Type: 802.11n HT20, CH01



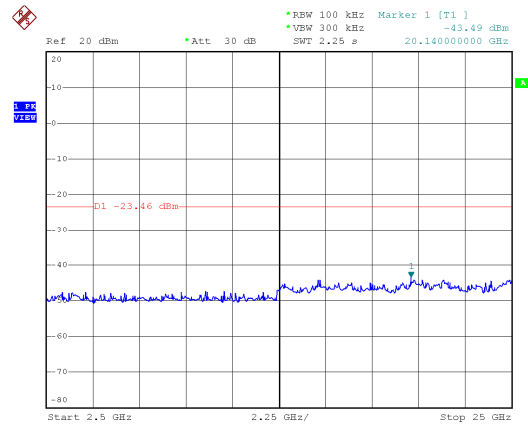
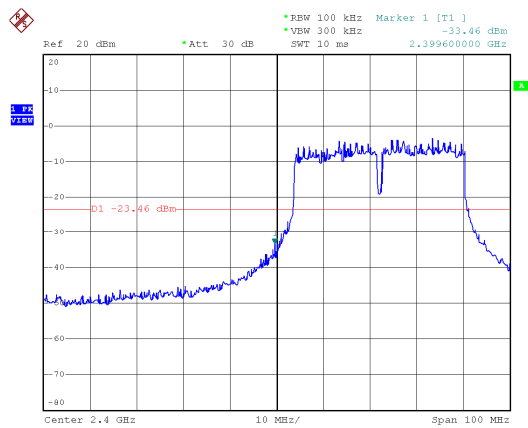
Modulation Type: 802.11n HT20, CH11



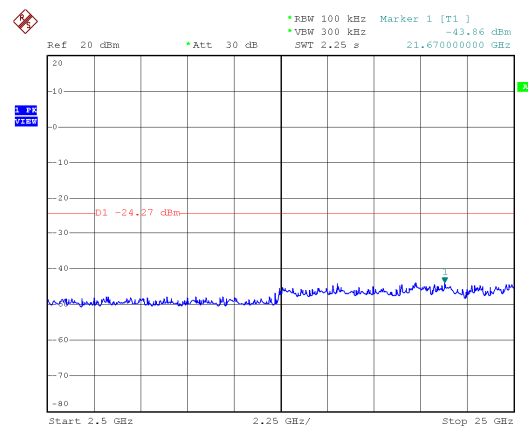
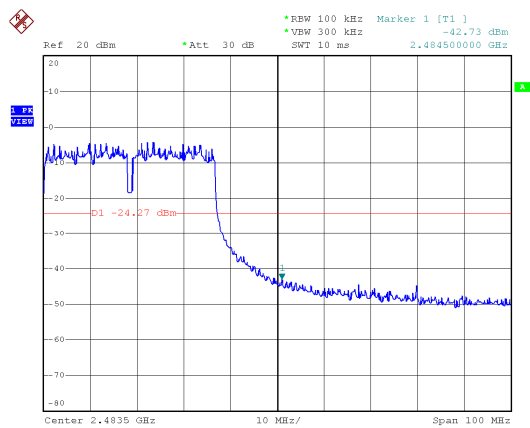


Antenna 0

Modulation Type: 802.11n HT40, CH03



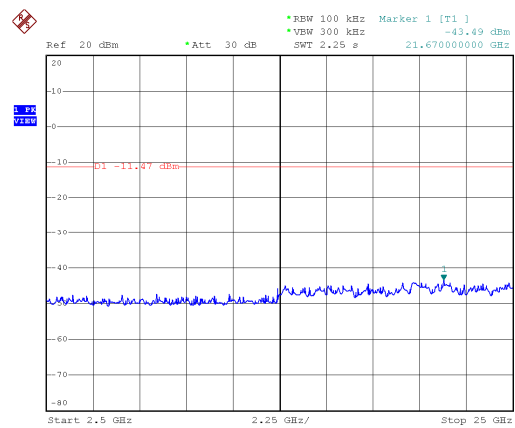
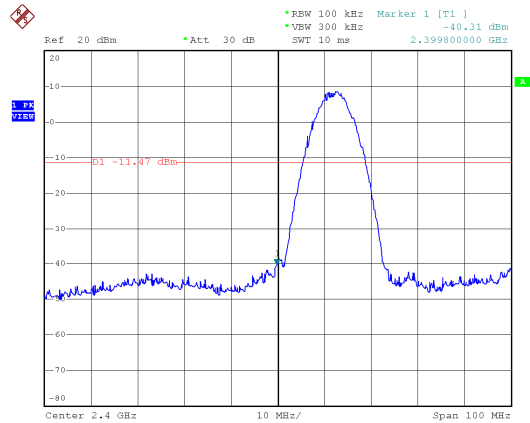
Modulation Type: 802.11n HT40, CH09



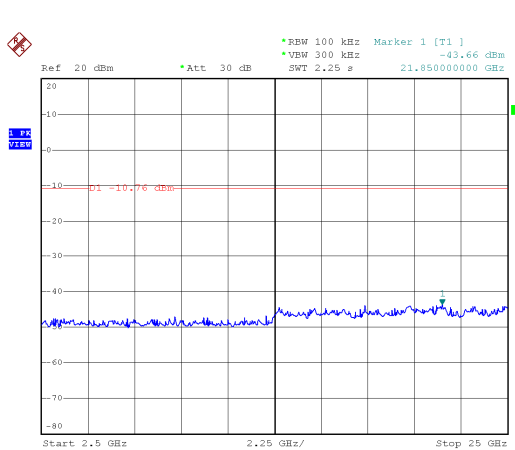
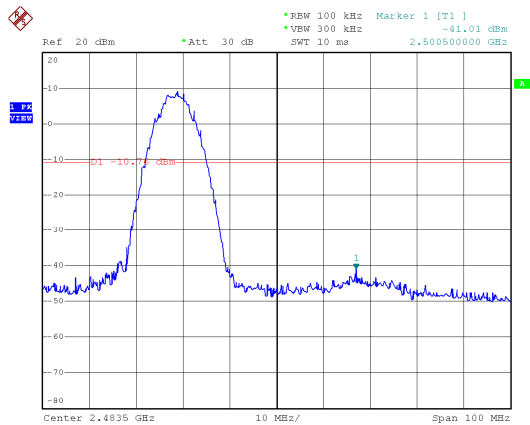


Antenna 1

Modulation Type: 802.11b, CH01

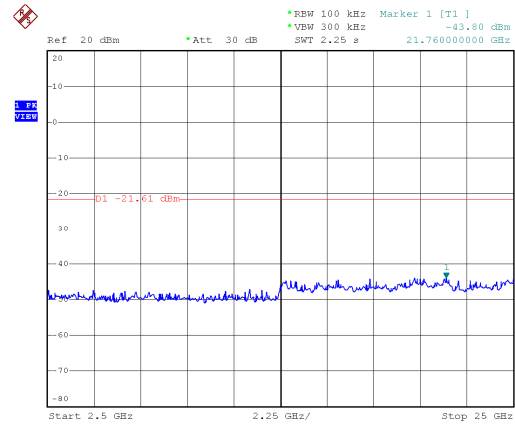
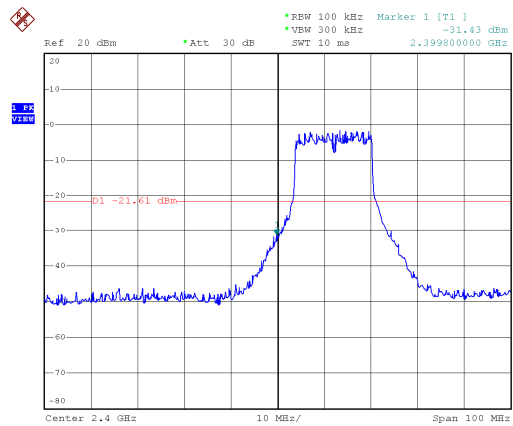


Modulation Type: 802.11b, CH11

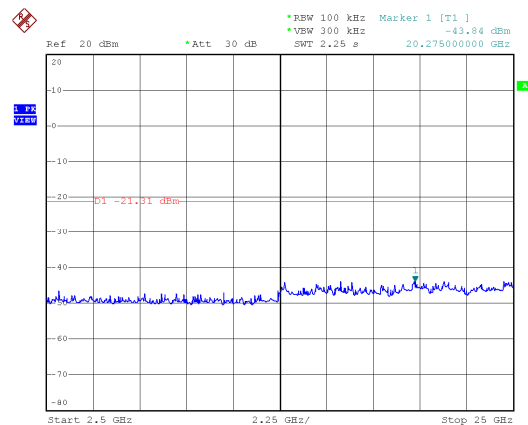
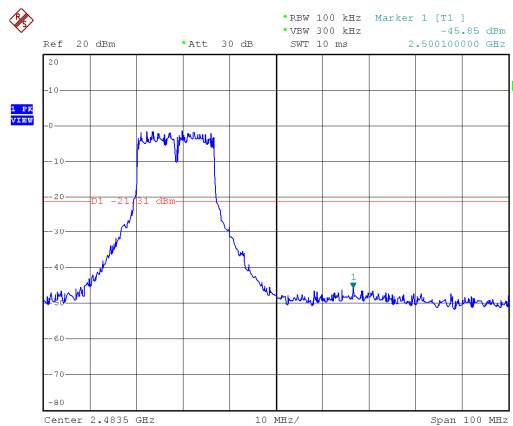




Antenna 1
Modulation Type: 802.11g, CH01



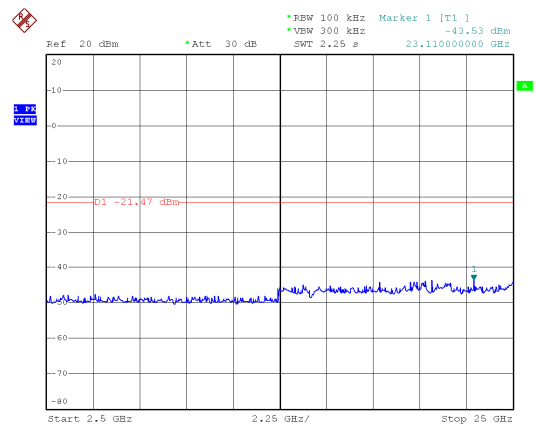
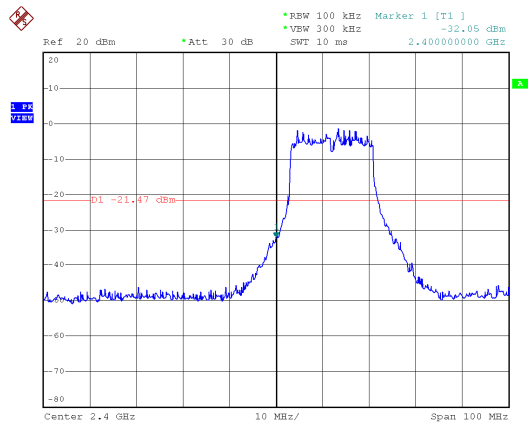
Modulation Type: 802.11g, CH11



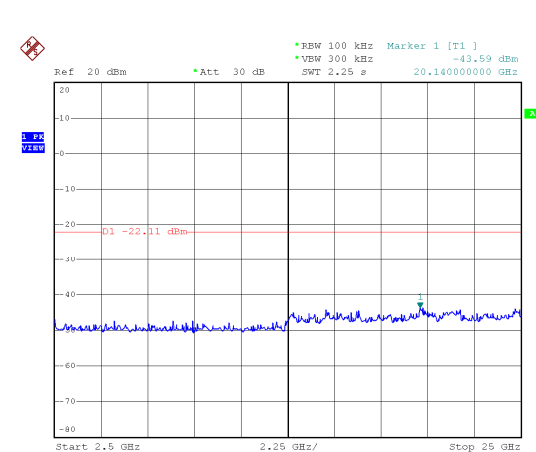
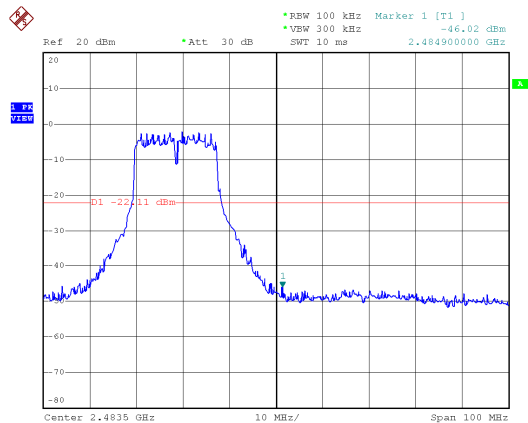


Antenna 1

Modulation Type: 802.11n HT20, CH01



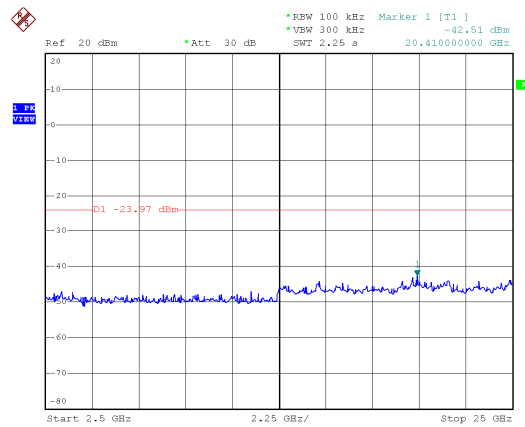
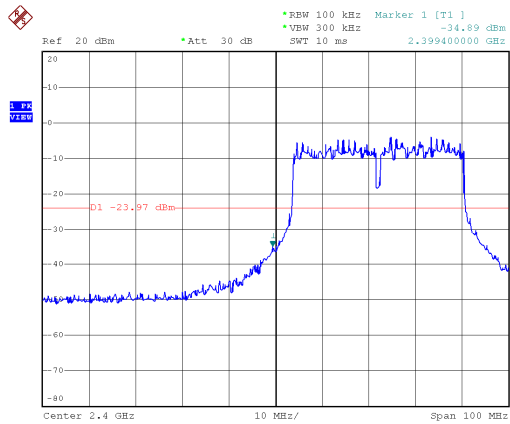
Modulation Type: 802.11n HT20, CH11



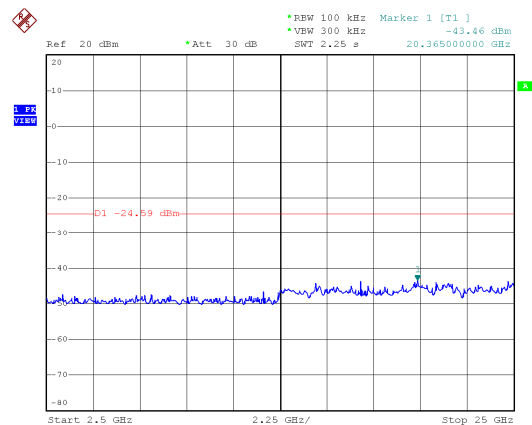
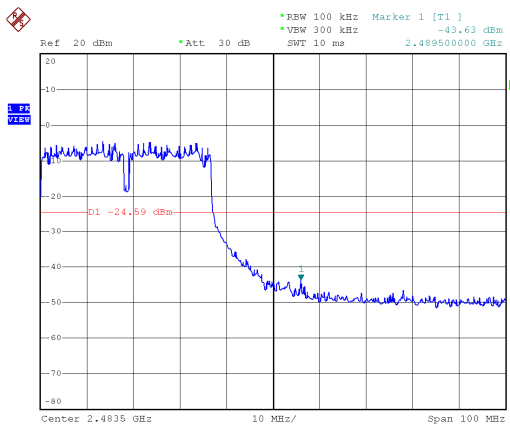


Antenna 1

Modulation Type: 802.11n HT40, CH03



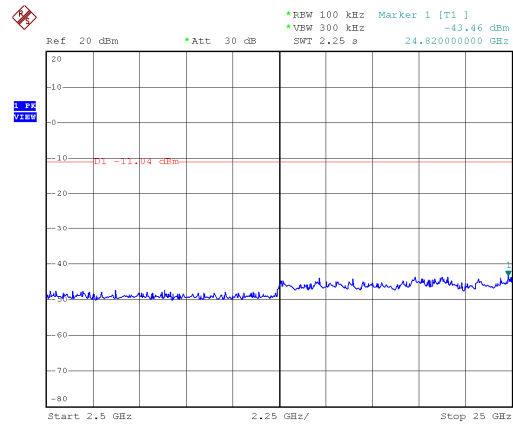
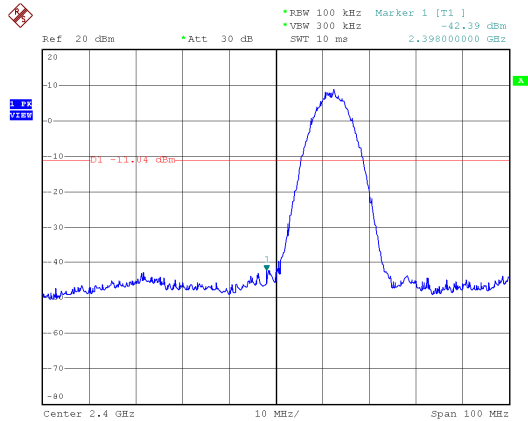
Modulation Type: 802.11n HT40, CH09



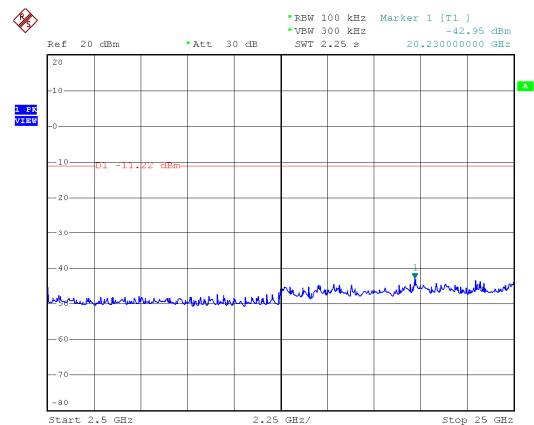
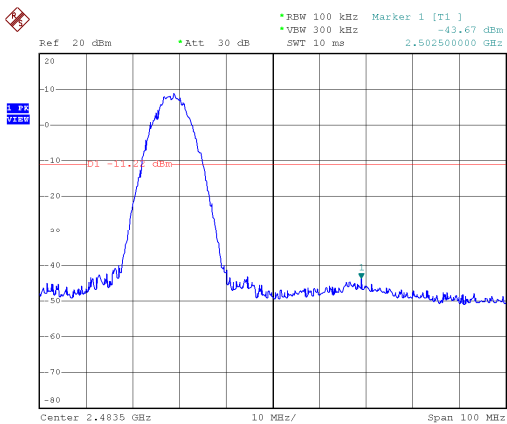


Antenna 2

Modulation Type: 802.11b, CH01

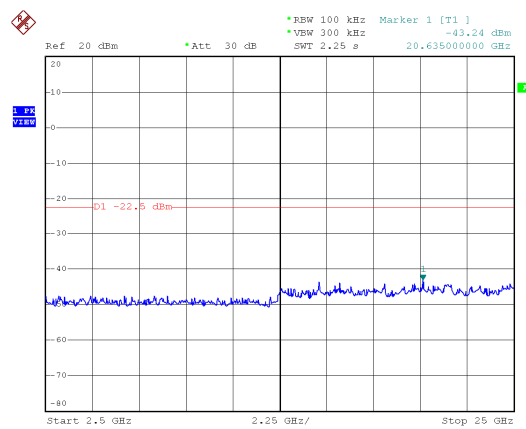
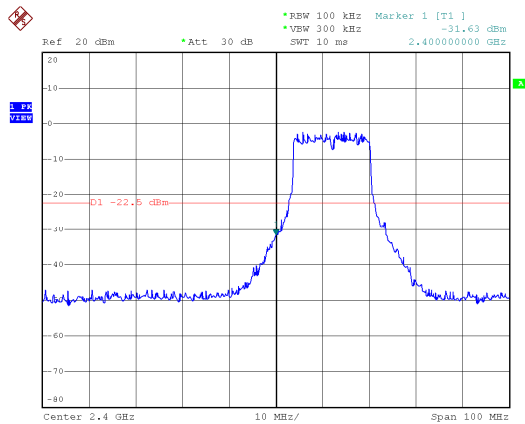


Modulation Type: 802.11b, CH11

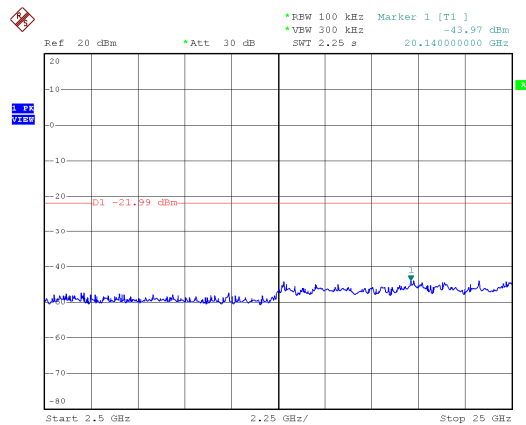
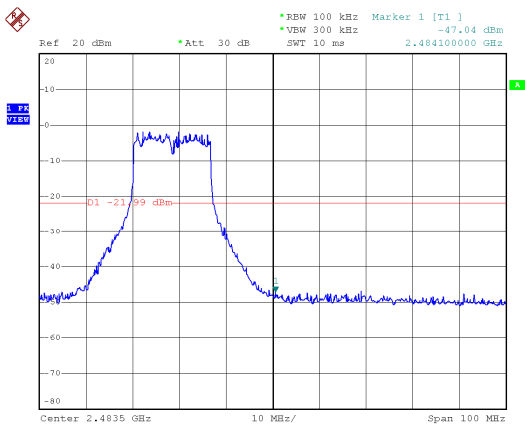




Antenna 2
Modulation Type: 802.11g, CH01



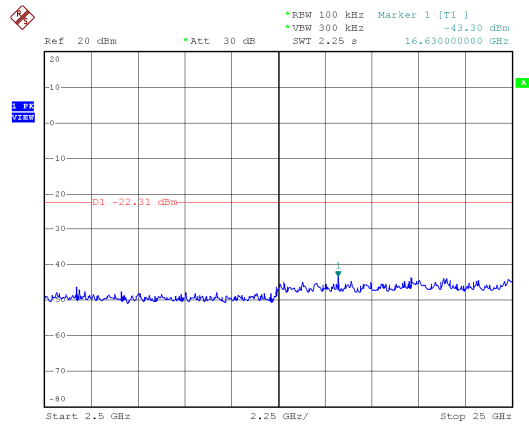
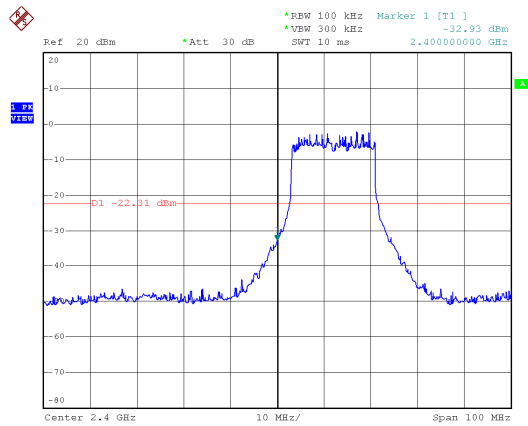
Modulation Type: 802.11g, CH11



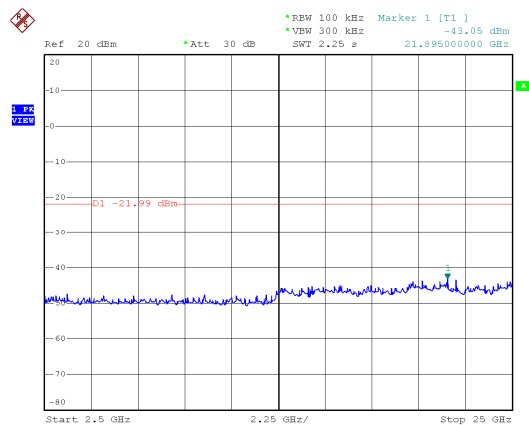
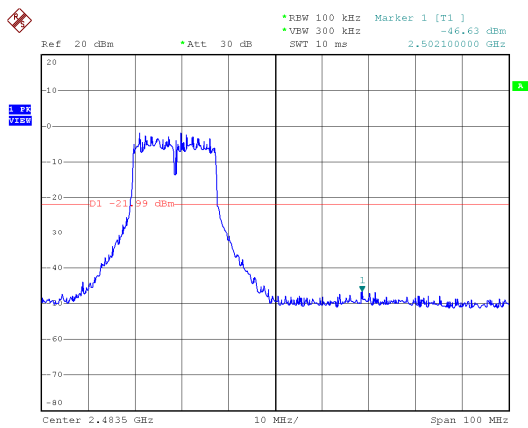


Antenna 2

Modulation Type: 802.11n HT20, CH01



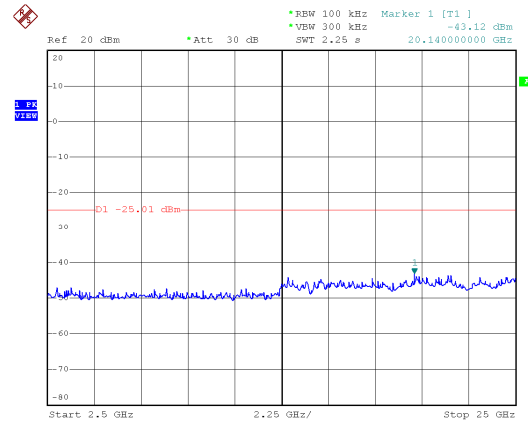
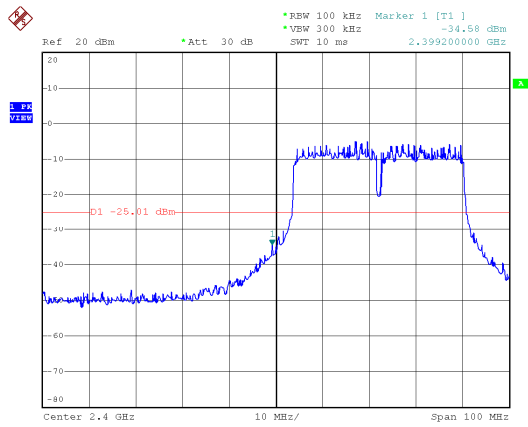
Modulation Type: 802.11n HT20, CH11



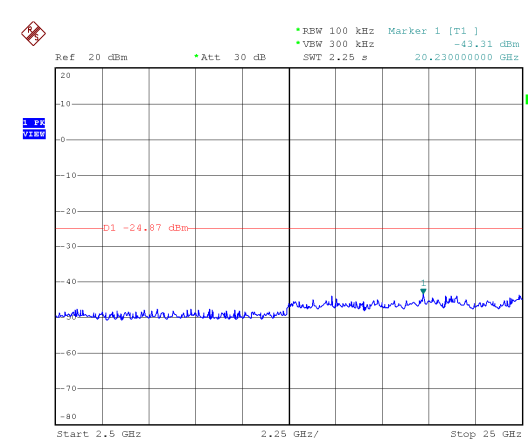
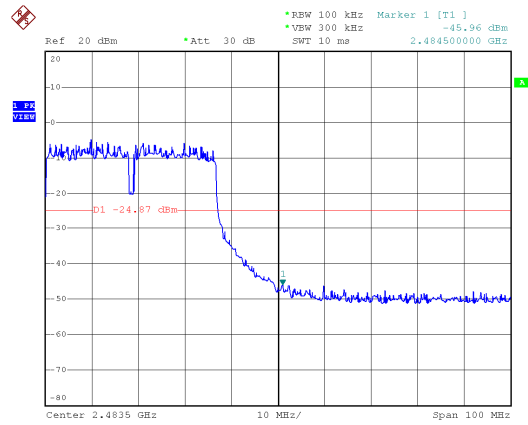


Antenna 2

Modulation Type: 802.11n HT40, CH03



Modulation Type: 802.11n HT40, CH09





8. 6dB Bandwidth Measurement Data

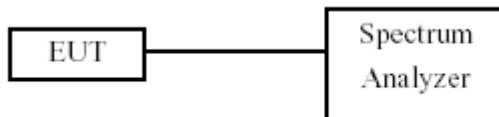
8.1 Test Limit

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 : May 10, 2016 Temperature : 24°C
Atmospheric pressure : 1015 hPa Humidity : 55%

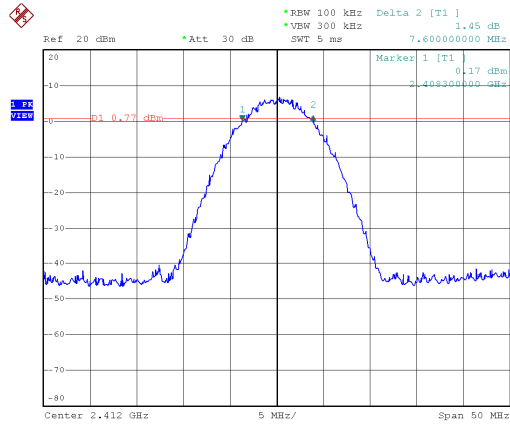
Modulation Type	Channel	Frequency (MHz)	6dB Bandwidth (MHz)		
			ANT A	ANT B	ANT C
IEEE 802.11b (11Mbps)	01	2412	7.60	7.40	7.70
	06	2437	7.50	7.60	7.70
	11	2462	7.80	7.60	7.90
IEEE 802.11g (54Mbps)	01	2412	16.50	16.50	16.50
	06	2437	16.50	16.50	16.50
	11	2462	16.60	16.50	16.60
IEEE 802.11n HT20 (195Mbps)	01	2412	17.80	17.70	17.80
	06	2437	17.80	17.80	17.80
	11	2462	17.70	17.70	17.60
IEEE 802.11n HT40 (405Mbps)	03	2422	36.40	36.20	36.40
	06	2437	36.60	36.40	36.40
	09	2452	36.40	36.40	36.20



Antenna 0

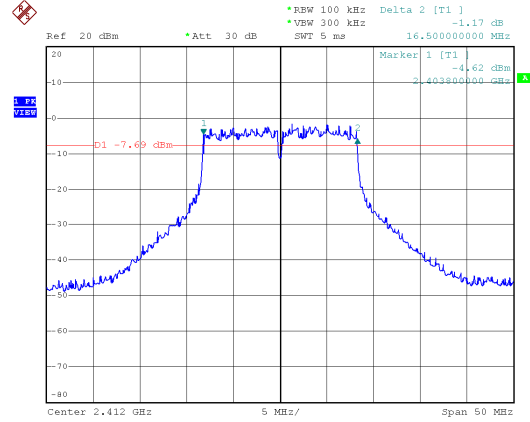
Modulation Type: 802.11b

CH01

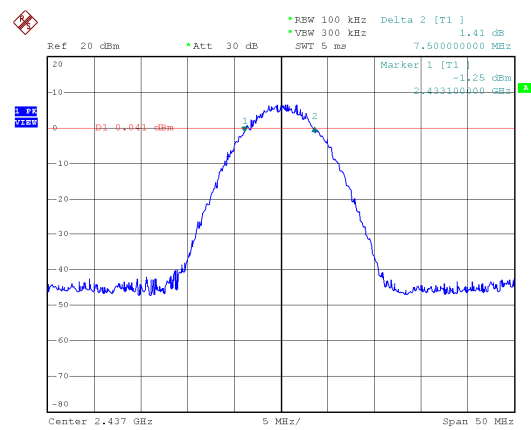


Modulation Type: 802.11g

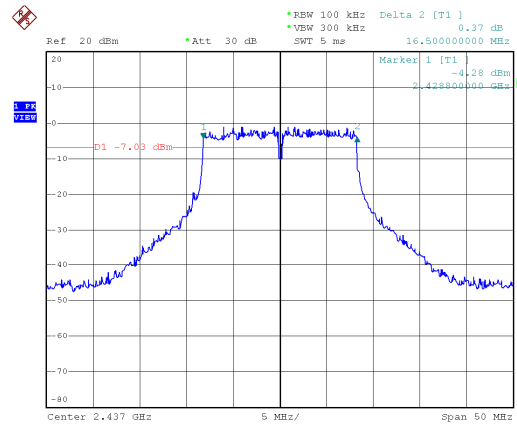
CH01



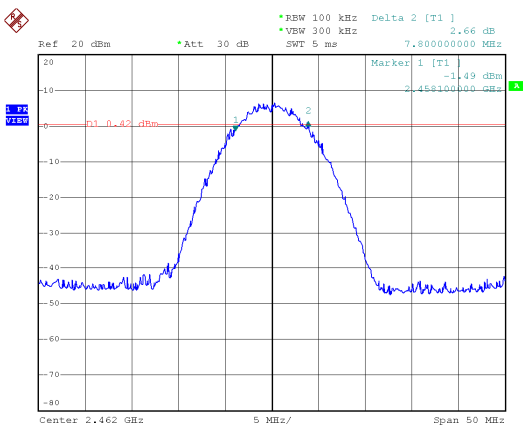
CH06



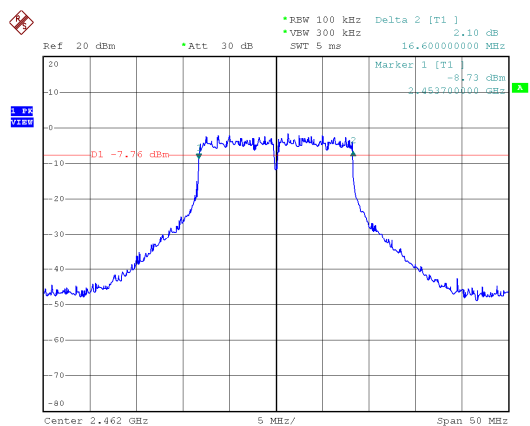
CH06



CH11

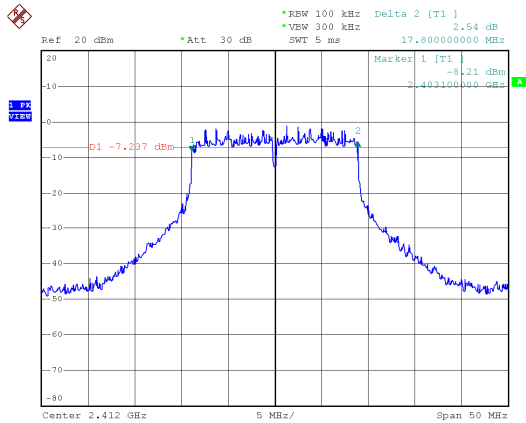


CH11

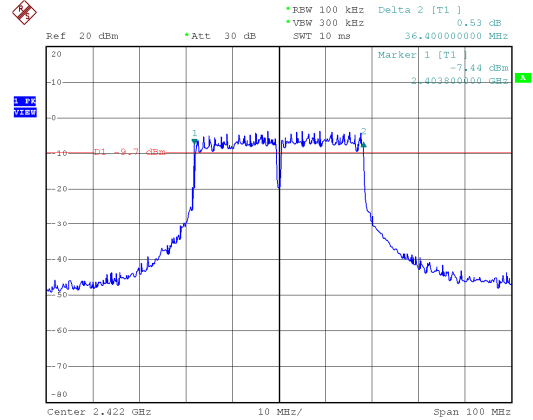




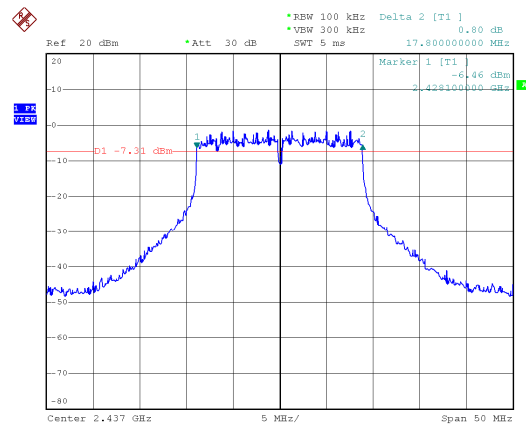
Antenna 0
Modulation Type: 802.11n HT20
CH01



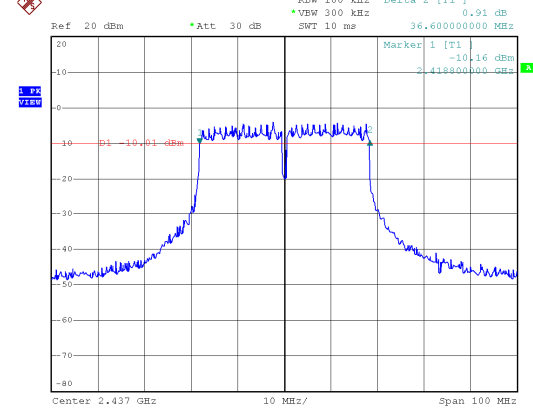
Modulation Type: 802.11n HT40
CH03



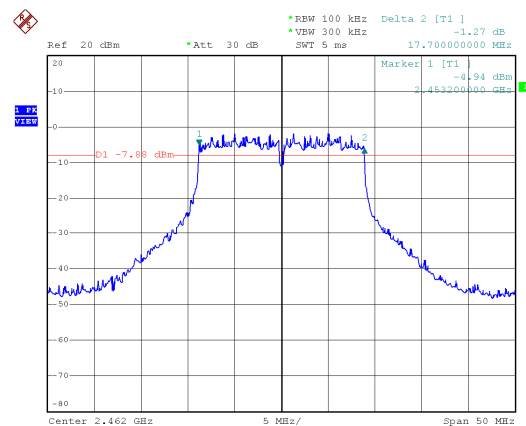
CH06



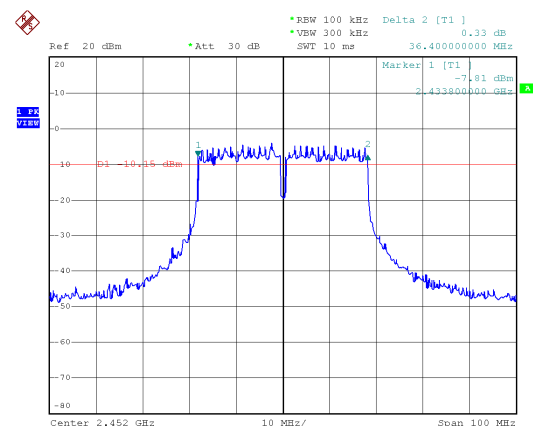
CH06



CH11



CH09

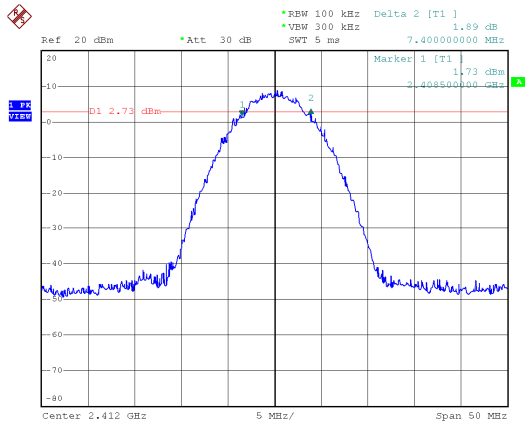




Antenna 1

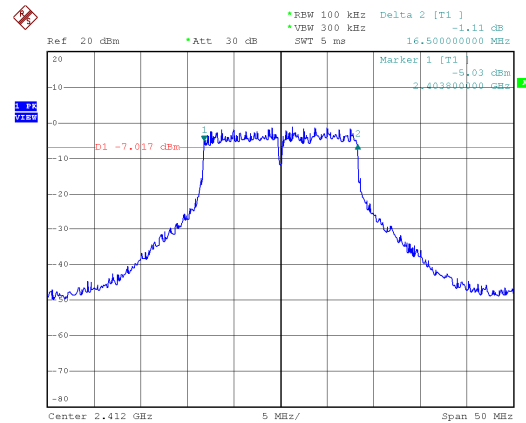
Modulation Type: 802.11b

CH01

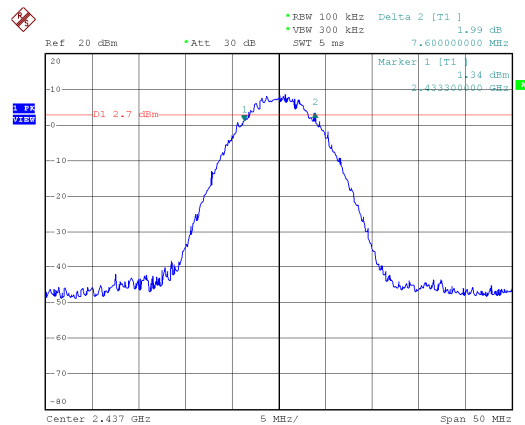


Modulation Type: 802.11g

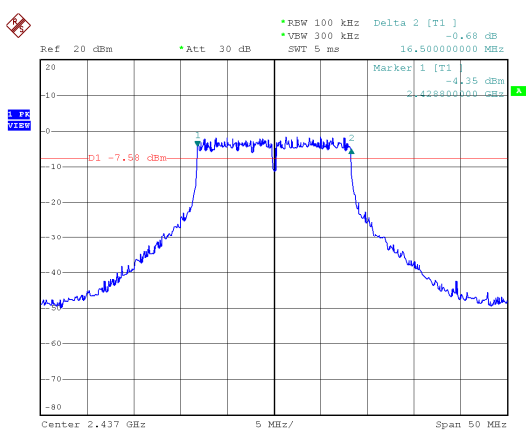
CH01



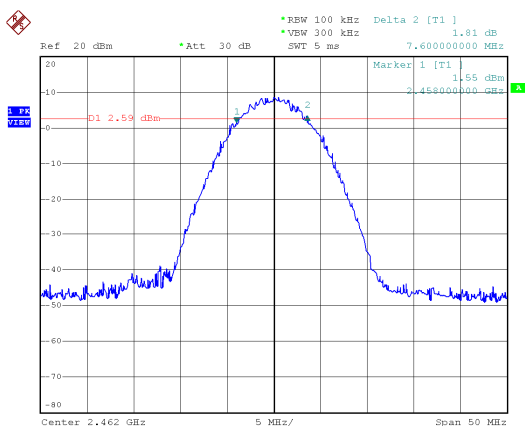
CH06



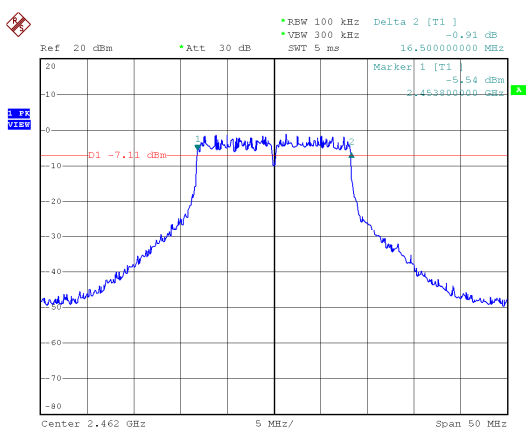
CH06



CH11

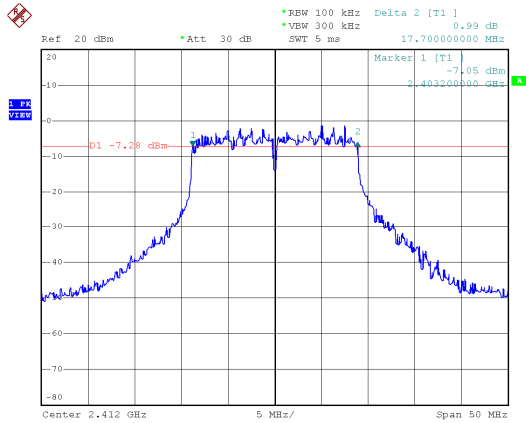


CH11

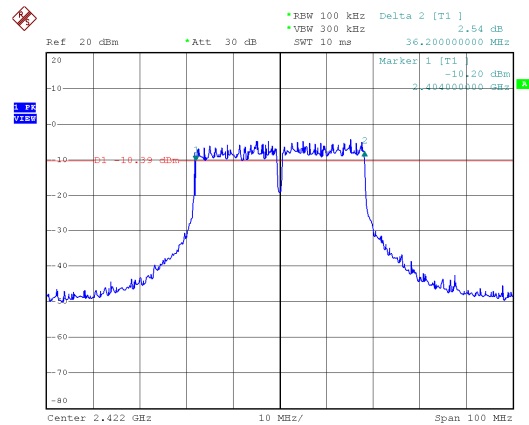




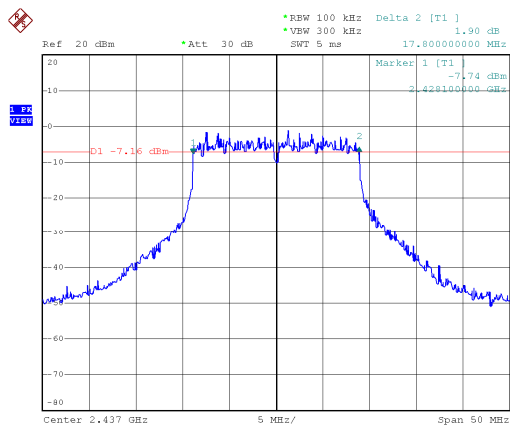
Antenna 1
Modulation Type: 802.11n HT20
CH01



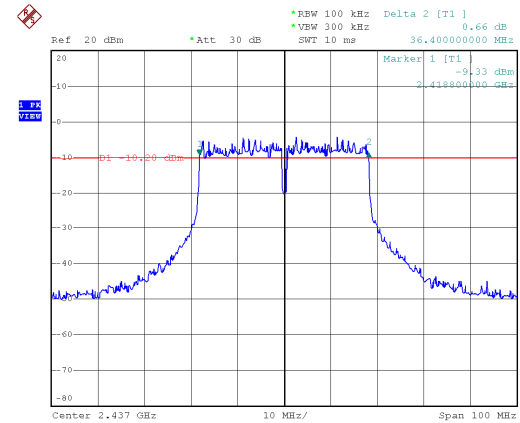
Modulation Type: 802.11n HT40
CH03



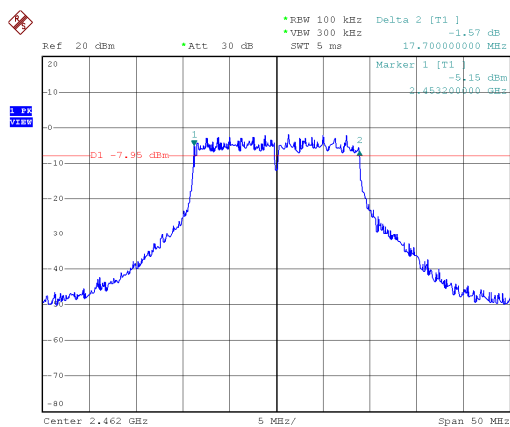
CH06



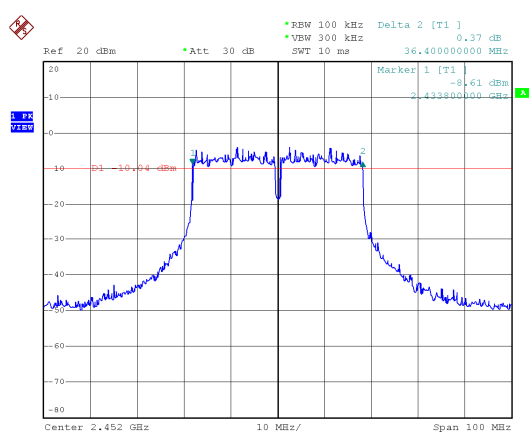
CH06



CH11

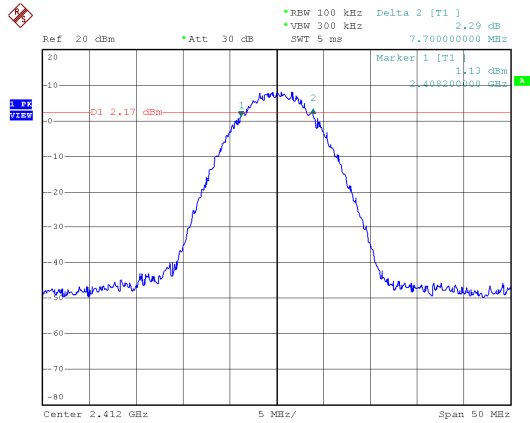


CH09

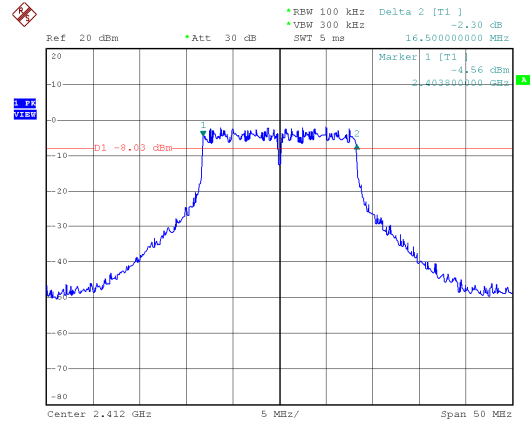




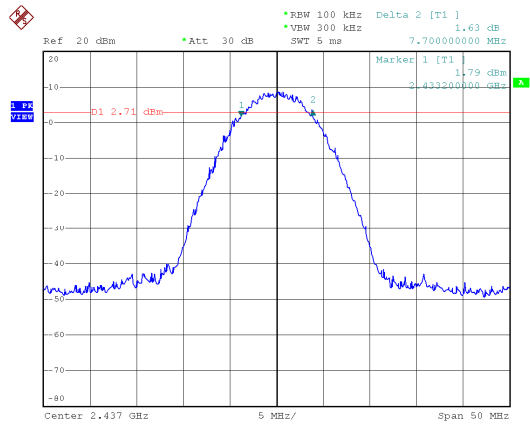
Antenna 2
Modulation Type: 802.11b
CH01



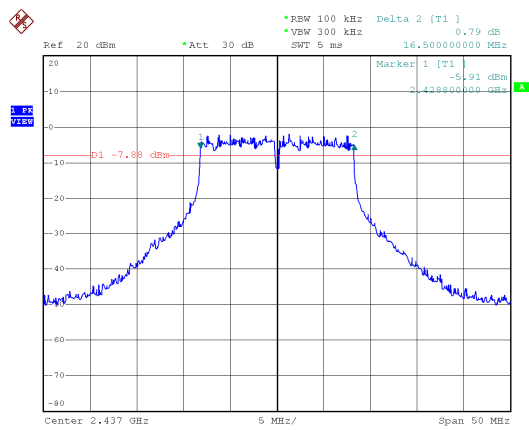
Modulation Type: 802.11g
CH01



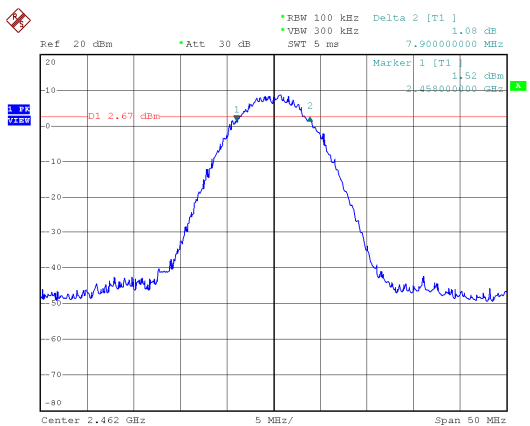
CH06



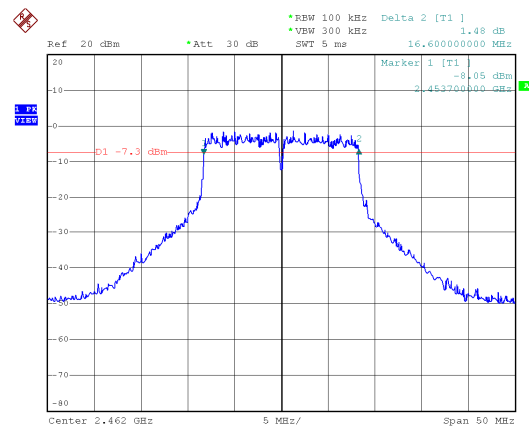
CH06



CH11

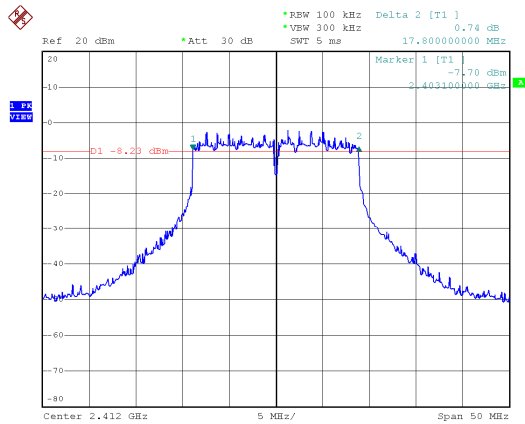


CH11

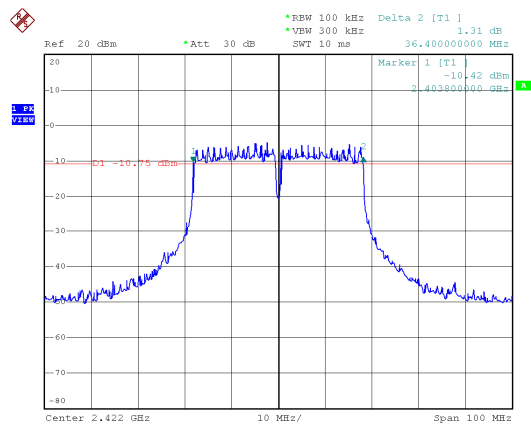




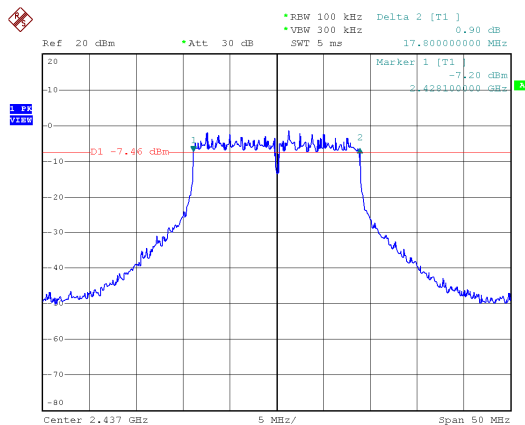
Antenna 2
Modulation Type: 802.11n HT20
CH01



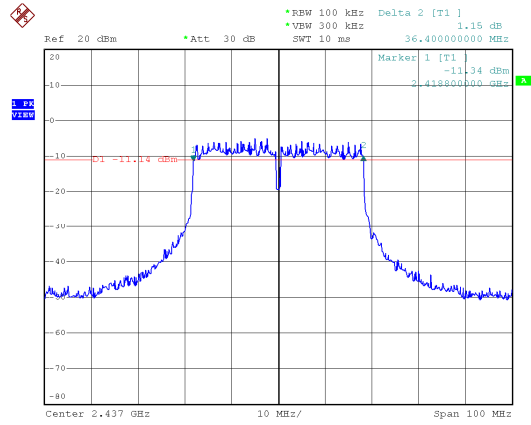
Modulation Type: 802.11n HT40
CH03



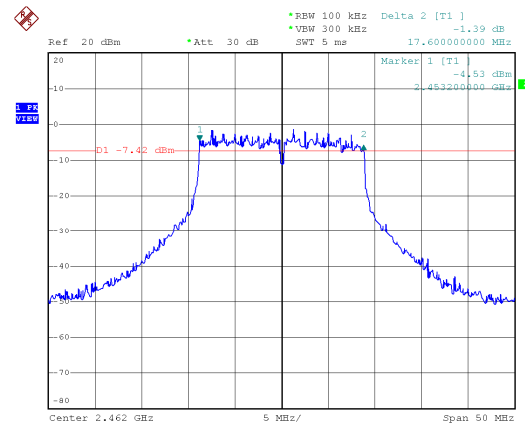
CH06



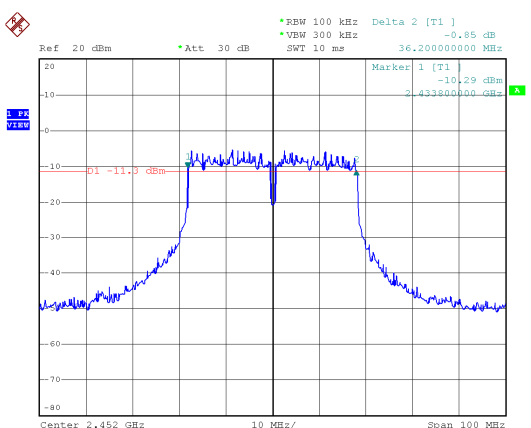
CH06



CH11



CH09





9. Maximum Peak and Average Output Power

9.1 Test Limit

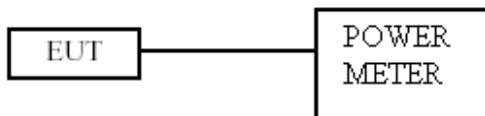
The Maximum Peak Output Power Measurement is 30dBm.

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 : May 10, 2016 Temperature : 24°C
 Atmospheric pressure : 1015 hPa Humidity : 55%

Modulation Type	Channel	Frequency (MHz)	Peak Power Output (dBm)				Peak Power Output (mW)			
			ANT 0	ANT 1	ANT 2	0+1+2	ANT 0	ANT 1	ANT 2	0+1+2
IEEE 802.11b (11Mbps)	01	2412	23.63	20.88	21.14	26.84	230.67	122.46	130.02	483.15
	06	2437	23.55	20.79	21.08	26.76	226.46	119.95	128.23	474.65
	11	2462	23.47	20.84	21.32	26.81	222.33	121.34	135.52	479.19
IEEE 802.11g (54Mbps)	01	2412	24.33	21.39	21.72	27.46	271.02	137.72	148.59	557.33
	06	2437	24.25	21.69	21.59	27.47	266.07	147.57	144.21	557.85
	11	2462	24.28	21.35	21.71	27.42	267.92	136.46	148.25	552.63
IEEE 802.11n HT20 (195Mbps)	01	2412	21.12	21.04	21.08	25.85	129.42	127.06	128.23	384.71
	06	2437	21.36	21.01	21.12	25.94	136.77	126.18	129.42	392.38
	11	2462	21.42	20.99	21.02	25.92	138.68	125.60	126.47	390.75
IEEE 802.11n HT40 (405Mbps)	03	2422	21.76	21.06	20.72	25.97	149.97	127.64	118.03	395.64
	06	2437	21.56	21.12	20.96	25.99	143.22	129.42	124.74	397.38
	09	2452	21.78	21.3	20.88	26.11	150.66	134.90	122.46	408.02

Modulation Type	Channel	Frequency (MHz)	Avg. Power Output (dBm)				Avg. Power Output (mW)			
			ANT 0	ANT 1	ANT 2	0+1+2	ANT 0	ANT 1	ANT 2	0+1+2
IEEE 802.11b (11Mbps)	01	2412	20.44	17.53	17.79	23.57	110.66	56.62	60.12	227.40
	06	2437	20.25	17.69	17.56	23.46	105.93	58.75	57.02	221.69
	11	2462	20.14	17.54	17.92	23.46	103.28	56.75	61.94	221.97
IEEE 802.11g (54Mbps)	01	2412	13.28	10.39	10.36	16.34	21.28	10.94	10.86	43.09
	06	2437	13.19	10.36	10.42	16.31	20.84	10.86	11.02	42.72
	11	2462	13.31	10.58	10.29	16.39	21.43	11.43	10.69	43.55
IEEE 802.11n HT20 (195Mbps)	01	2412	9.78	9.22	9.49	14.27	9.51	8.36	8.89	26.75
	06	2437	9.77	9.36	9.56	14.34	9.48	8.63	9.04	27.15
	11	2462	9.68	9.42	9.33	14.25	9.29	8.75	8.57	26.61
IEEE 802.11n HT40 (405Mbps)	03	2422	9.72	9.45	8.93	14.15	9.38	8.81	7.82	26.00
	06	2437	9.58	9.55	8.96	14.14	9.08	9.02	7.87	25.96
	09	2452	9.45	9.43	8.84	14.02	8.81	8.77	7.66	25.24



10. Power Spectral Density

10.1 Test Limit

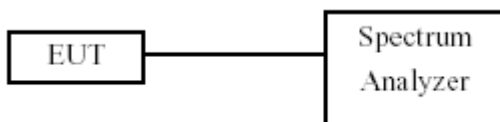
The Maximum of Power Spectral Density Measurement is 8dBm.

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



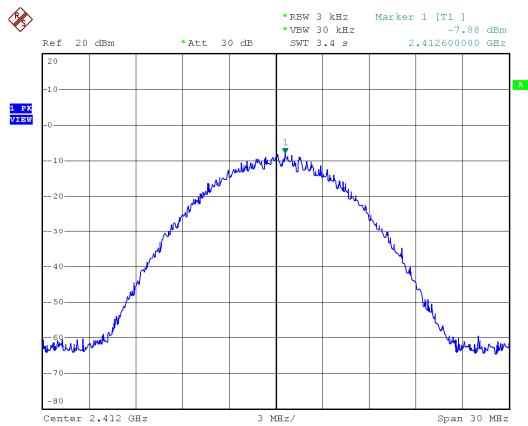
10.4 Test Result and Data

Test Date : May 10, 2016 Temperature : 24°C
Atmospheric pressure : 1015 hPa Humidity : 55%

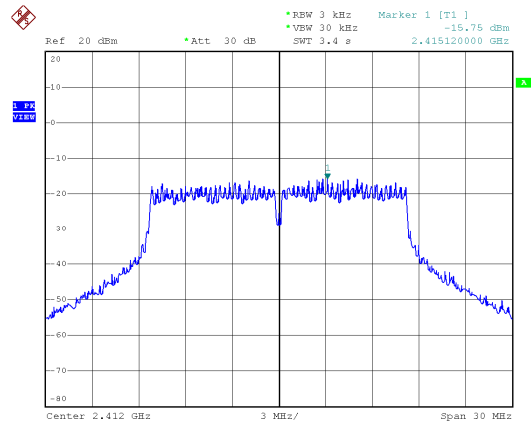
Modulation Type	Channel	Frequency (MHz)	Maximum Power Density of 3 kHz Bandwidth (dBm)			
			ANT 0	ANT 1	ANT 2	0+1+2
IEEE 802.11b (11Mbps)	01	2412	-7.88	-5.32	-6.49	-1.67
	06	2437	-7.59	-5.24	-6.05	-1.42
	11	2462	-7.74	-4.90	-5.57	-1.14
IEEE 802.11g (54Mbps)	01	2412	-15.75	-15.79	-15.93	-11.05
	06	2437	-16.30	-15.93	-14.85	-10.88
	11	2462	-16.35	-15.02	-15.64	-10.86
IEEE 802.11n HT20 (195Mbps)	01	2412	-16.65	-16.10	-16.59	-11.67
	06	2437	-16.36	-15.78	-15.68	-11.16
	11	2462	-16.81	-16.43	-16.79	-11.90
IEEE 802.11n HT40 (405Mbps)	03	2422	-17.48	-15.96	-17.89	-12.26
	06	2437	-18.10	-18.33	-17.56	-13.21
	09	2452	-18.29	-18.53	-18.07	-13.52



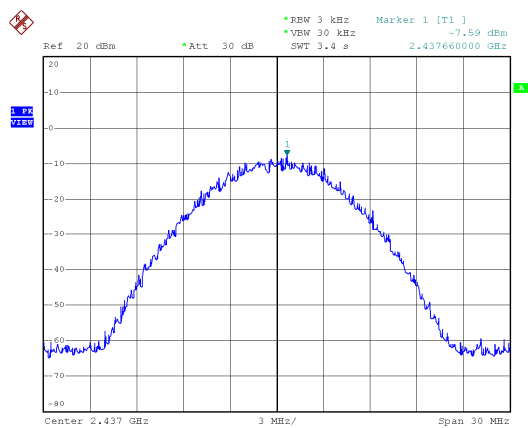
Antenna 0
Modulation Type: 802.11b
CH01



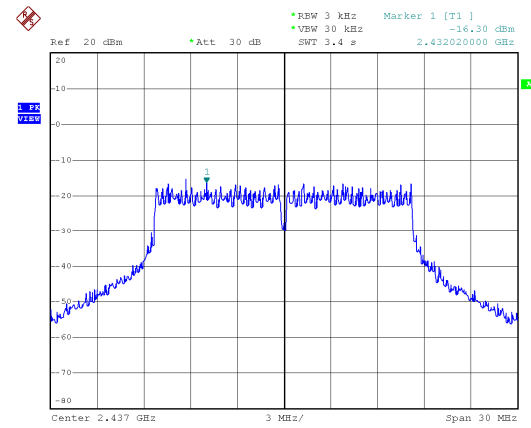
Modulation Type: 802.11g
CH01



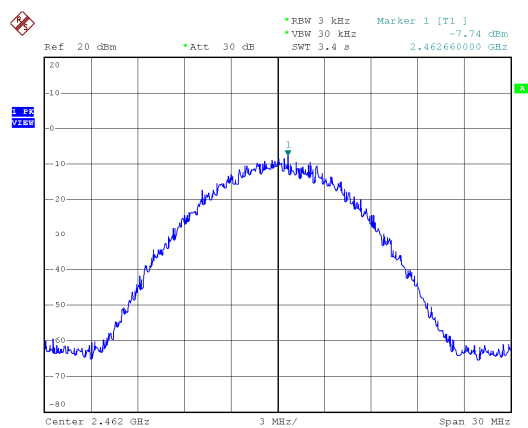
CH06



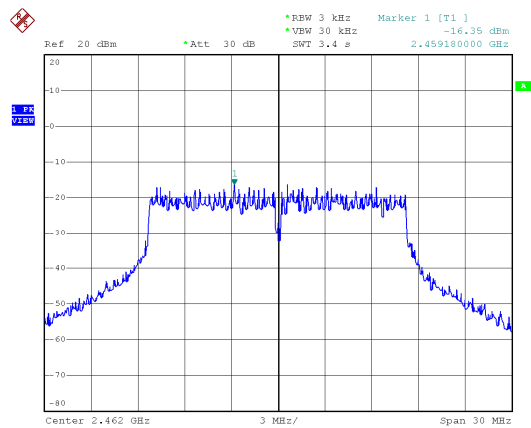
CH06



CH11

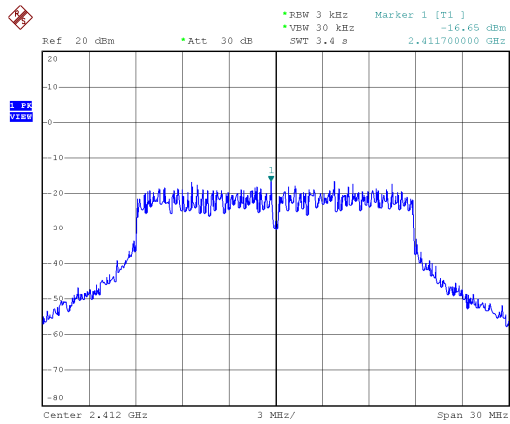


CH11

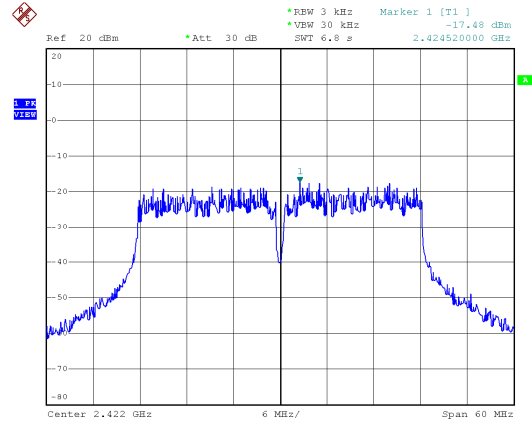




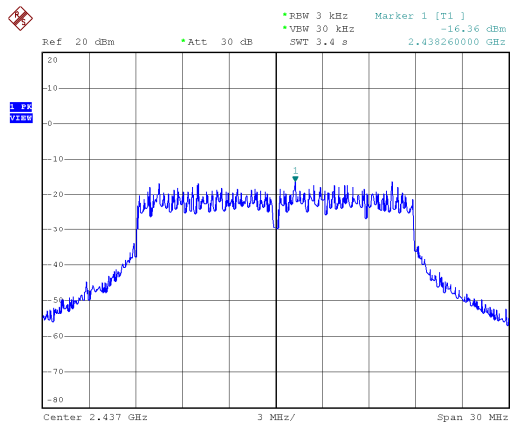
Antenna 0
Modulation Type: 802.11n HT20
CH01



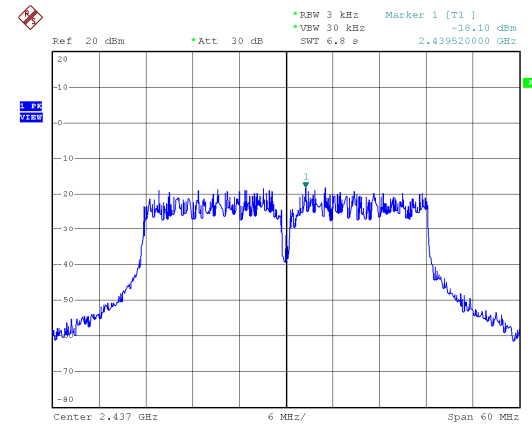
Modulation Type: 802.11n HT40
CH03



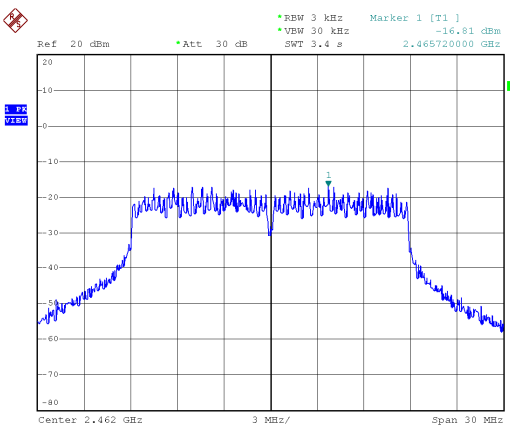
CH06



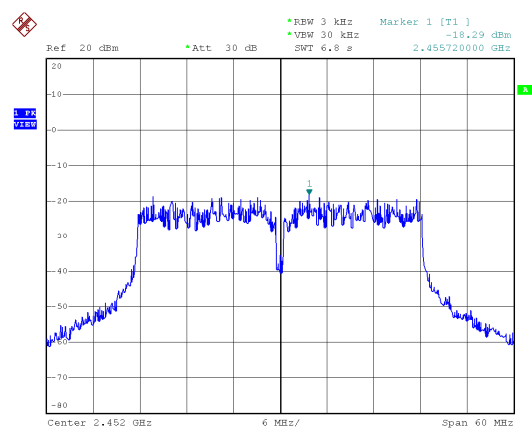
CH06



CH11

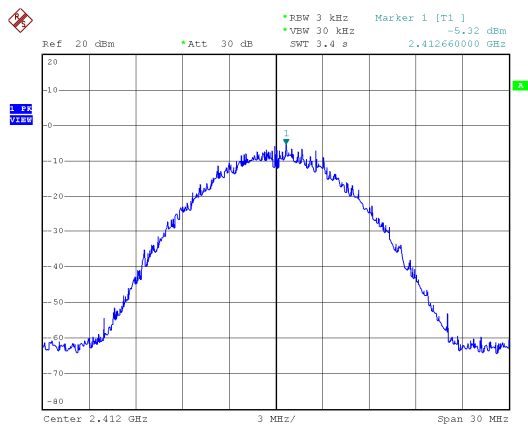


CH09

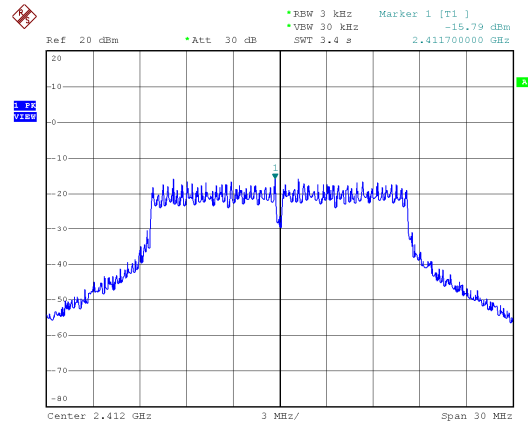




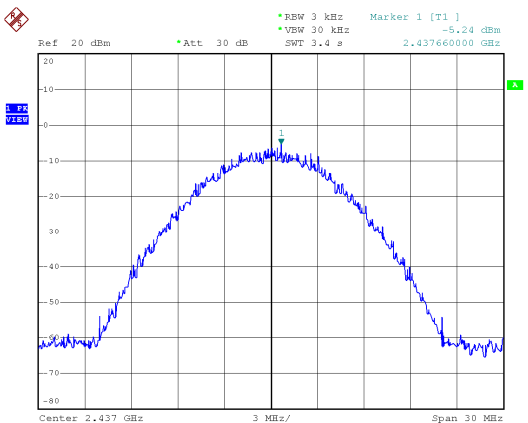
Antenna 1
Modulation Type: 802.11b
CH01



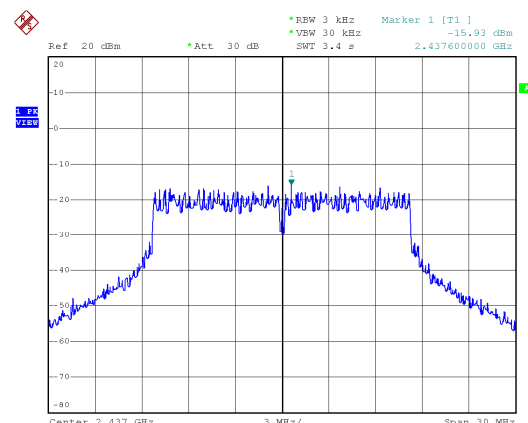
Modulation Type: 802.11g
CH01



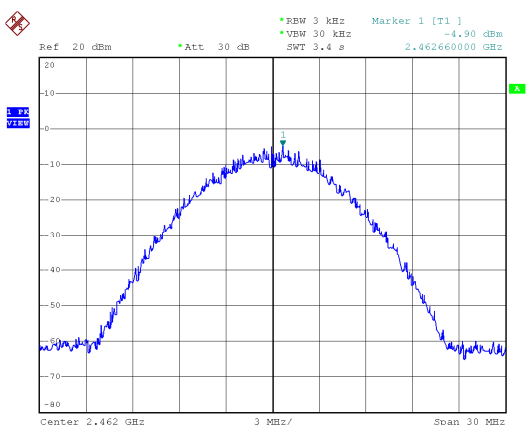
CH06



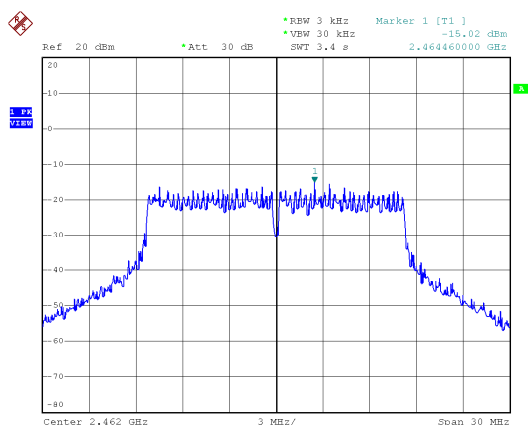
CH06



CH11

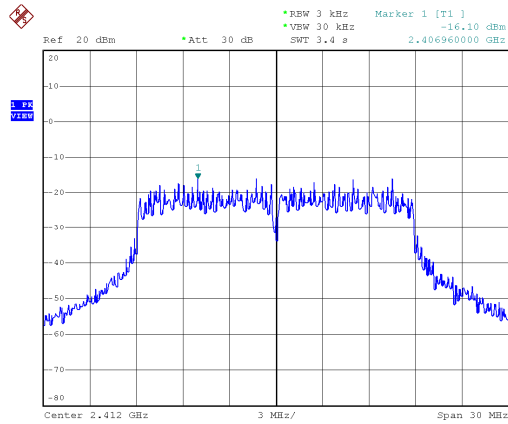


CH11

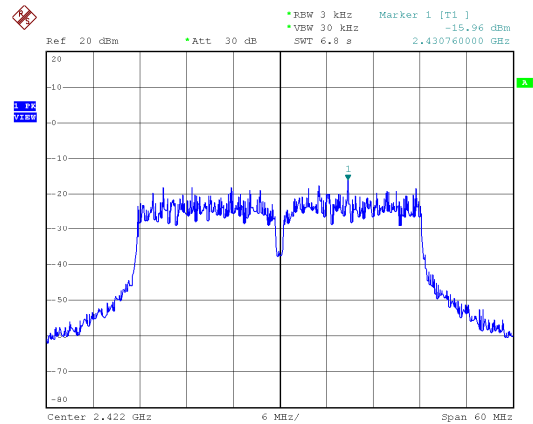




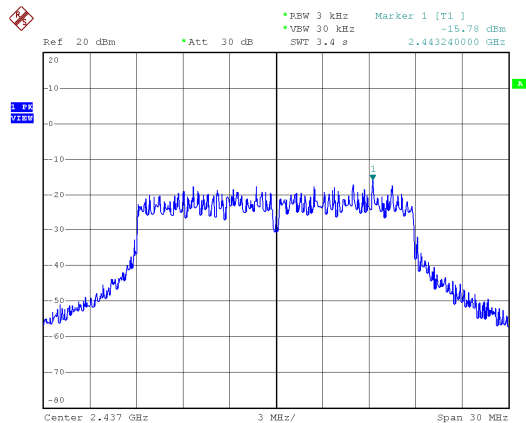
Antenna 1
Modulation Type: 802.11n HT20
CH01



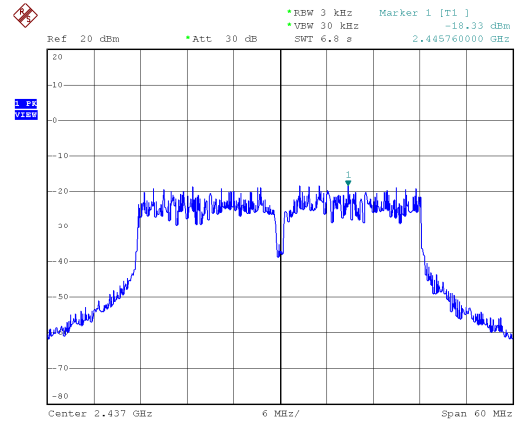
Modulation Type: 802.11n HT40
CH03



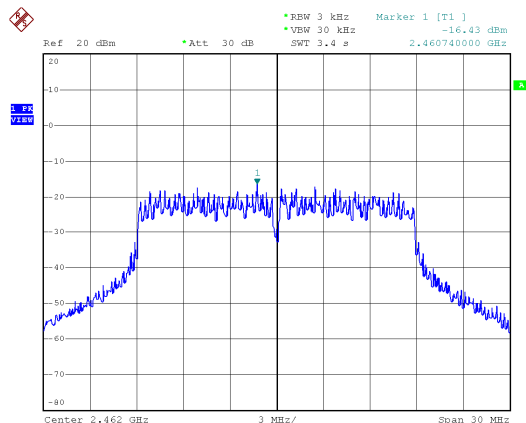
CH06



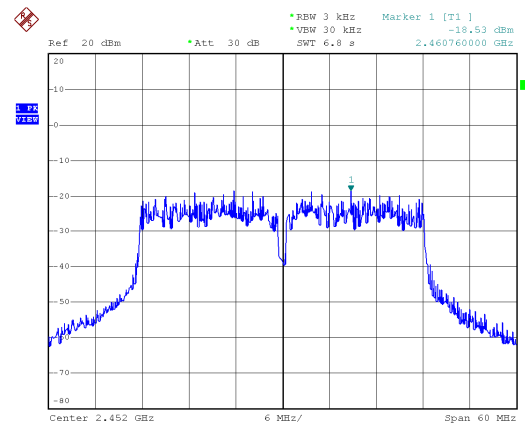
CH06



CH11

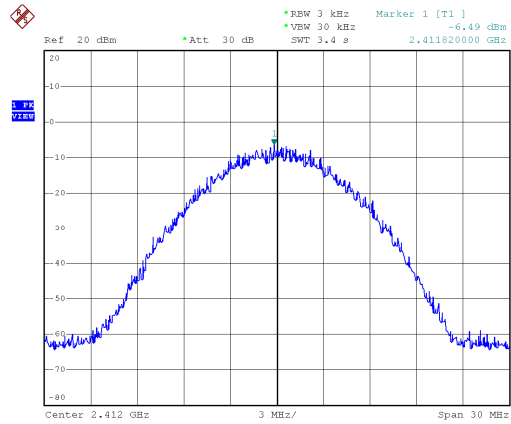


CH09

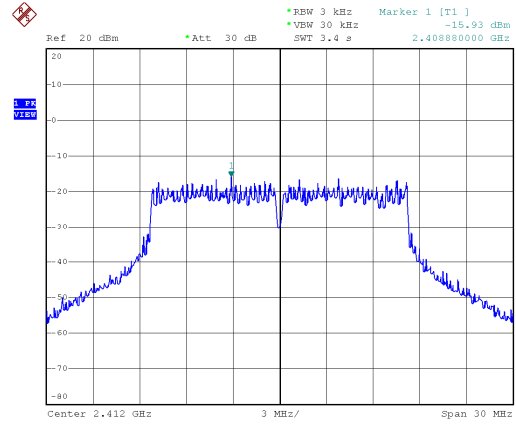




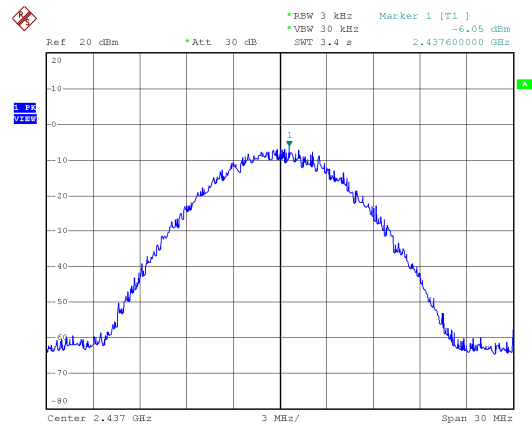
Antenna 2
Modulation Type: 802.11b
CH01



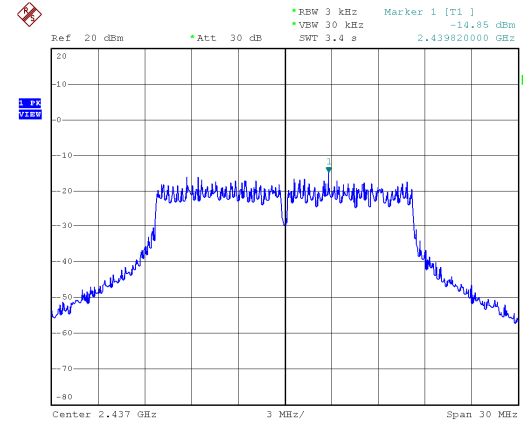
Modulation Type: 802.11g
CH01



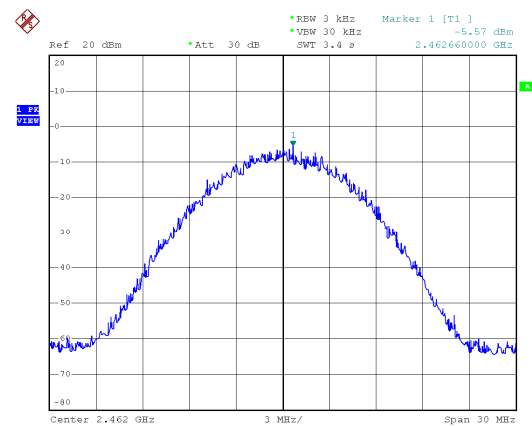
CH06



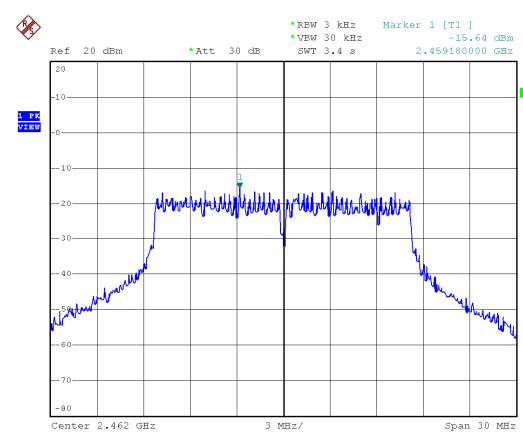
CH06



CH11

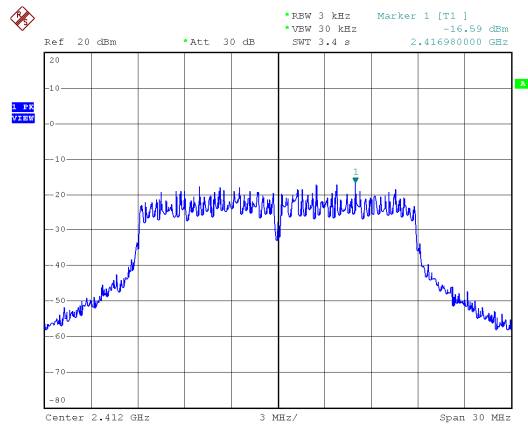


CH11

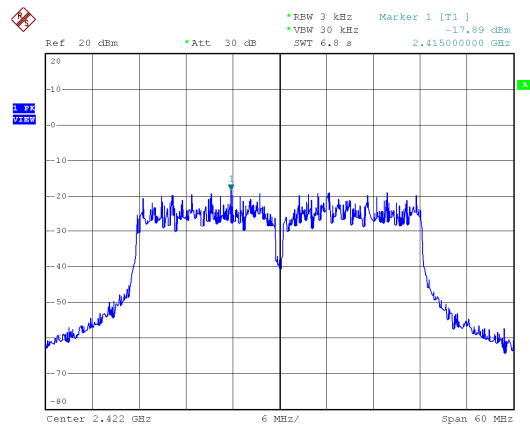




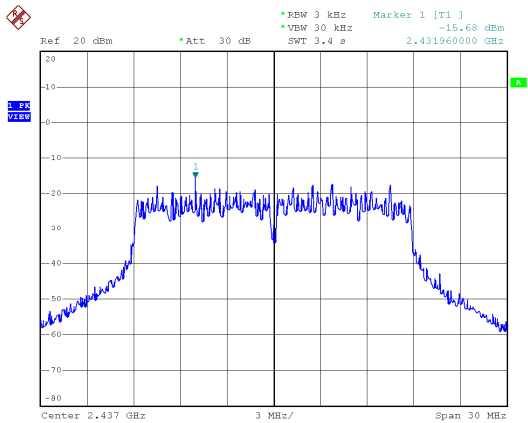
Antenna 2
Modulation Type: 802.11n HT20
CH01



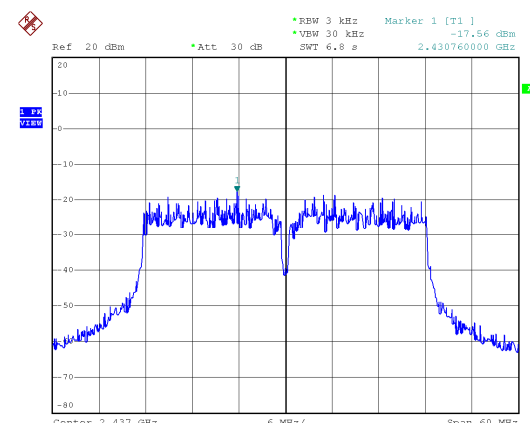
Modulation Type: 802.11n HT40
CH03



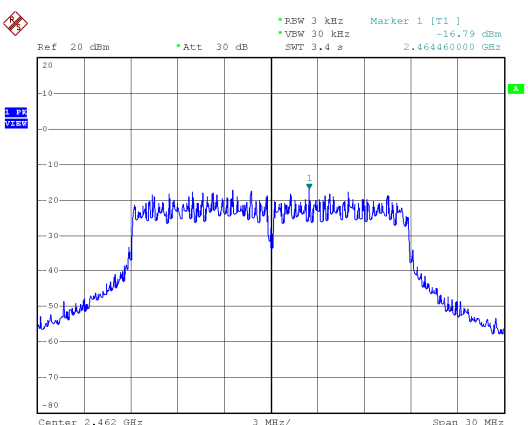
CH06



CH06



CH11



CH09

