



# FCC RADIO TEST REPORT

Applicant : Withings SA

Address : 2 Rue Maurice Hartmann, 92130  
              Issy-les-Moulineaux, France

Equipment : BPM Core

Model No. : WPM04

Trade Name : Withings

FCC ID. : XNAWPM04

## I HEREBY CERTIFY THAT :

The sample was received on Apr. 25, 2019 and the testing was completed on May. 27, 2019 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Mark Liao / Supervisor

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory





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## History of this test report

Report No.	Issue Date	Description
TEFI1903241	May. 27, 2019	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**

**KDB447498**

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
2.1091	. Radio Frequency Exposure	PASS

\*The principle of judgment is made according to the laboratory's reporting control and measurement uncertainty standard procedures.

\*This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report(TEFD1903241).



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment

Frequency Range	2400MHz -2483.5MHz
Modulation Type	BLE: GFSK 802.11b: CCK, DQPSK, DBPSK 802.11g/n: BPSK, QPSK, 16QAM,64QAM
MODULATION TECHNOLOGY	BLE: DTS 802.11b: DSSS 802.11g/n: OFDM
Data Rate	BLE: GFSK for 1Mbps 2.4GHz: 802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: MCS0 – MCS7, HT20
Antenna Type	PCB Antenna
Antenna Gain	2.8dBi

Note: for more details, please refer to the User's manual of the EUT



## 2.2 Carrier Frequency of Channels

802.11b, 802.11g, 802.11n HT20 (2412MHz~2462MHz)

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

802.11n HT40 (2422MHz~2452MHz)

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

Note: Channels remarked \* are selected to perform test.



### 2.3 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.10.
- b. The complete test system included Remote workstation and EUT for RF test. The Remote workstation included Notebook.
- c. An executive “TEAR TERM” program” type hci command” under WIN 7 was executed to transmit and receive data via WLAN.
- d. The following test modes were performed for the test:

Conducted Emissions from the AC mains power ports	
Test Mode	Operating Description
1	802.11b (1Mbps)
2	802.11g (6Mbps)
3	802.11n HT20 (6.5Mbps)

caused “Test Mode 2” generated the worst case, it was reported as the final data.

Radiation Emissions (30MHz ~ 1GHz)	
Test Mode	Operating Description
1	802.11b (1Mbps)
2	802.11g (6Mbps)
3	802.11n HT20 (6.5Mbps)

caused “Test Mode 2” generated the worst case, they were reported as the final data.

Radiation Emissions (1GHz ~ 25GHz)	
Test Mode	Operating Description
1	802.11b (1Mbps)
2	802.11g (6Mbps)
3	802.11n HT20 (6.5Mbps)

caused “Test Mode 1~3” generated the worst case, they were reported as the final data.

### 2.4 Description of Test System

RF Conducted				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
Radiated Emissions				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS
AC Power Line Conducted Emission				
Equipment	Brand	Model	Length/Type	Power cord/Length/Type
Notebook	ASUS	P2430U	N/A	Adapter / 1.8m / NS



## 2.5 General Information of Test

Test Site	<b>Cerpass Technology Corporation Test Laboratory</b> 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,TW1439
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication test C-4663 for Conducted emission test R-4399, R-4218 for Radiated emission test G-10812, G-10813 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.	

Test Item	Test Site	Tested Date	Environmental Conditions	Tested By
RF Conducted	RFCON01-NK	2019/05/27	21°C / 63%	Leon Huang
Radiated Emissions	3M02-NK	2019/05/17	25°C / 54%	Leon Huang
RF Conduction	CON02-NK	2019/05/27	25°C / 43%	Leon Huang



## 2.6 Measurement Uncertainty

Measurement Item	Uncertainty
Radiated Spurious Emission(9KHz~30MHz)	±3.405dB
Radiated Spurious Emission(30MHz~1GHz)	±5.326dB
Radiated Spurious Emission(1GHz~25GHz)	±5.918dB
Conducted Spurious Emission	±2.156dB
6dB Bandwidth	±4.401%
20dB Bandwidth	±4.40%
Occupied Bandwidth	±4.41%
Peak Output Power(Conducted Power Meter)	±1.31dB
Dwell Time	±0.11%
Power Spectral Density	±2.146dB
Duty Cycle	±0.17%



### 3. Test Equipment and Ancillaries Used for Tests

Test Item	Radiated Emissions				
Test Site	Semi Anechoic Room(3M02-NK)				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Bilog Antenna	Schwarzbeck	VULB9168	275	2018/09/17	2019/09/16
Active Loop Antenna	EMCO	6507	40855	2018/05/22	2019/05/21
Horn Antenna	EMCO	3115	31589	2019/04/01	2020/03/31
Horn Anrenna	EMCO	3116	31974	2018/09/07	2019/09/06
EMI Receiver	ROHDE & SCHWARZ	ESCI	101423	2018/06/11	2019/06/10
Spectrum Analyzer	ROHDE & SCHWARZ	FSP 40	100219	2018/07/03	2019/07/02
Preamplifier	EM Electronics corp.	EM330	60660	2019/03/11	2020/03/10
Preamplifier	EMC INSTRUMENTS	EMC051845SE	980333	2018/09/18	2019/09/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2019/04/07	2020/04/06
Cable-3in1(30M-1G)	HARBOUR INDUSTRIES	LL142	CCE1315	2018/04/20	2019/04/19
Cable-0.5m(1G-40G)	Rapidtek	40GHZ 50CM	38MS-38MS50314	2019/04/09	2020/04/08
Cable-3m(1G-40G)	Rapidtek	40GHZ 300CM	38MS-38MS300314	2019/04/09	2020/04/08
Cable-8m(1G-40G)	Rapidtek	40GHZ 800CM	38MS-38MS800314	2019/04/10	2020/04/09
E3	AUDIX	v8.2014-8-6	RK-000529	NA	NA

Test Item	RF Conducted				
Test Site	RFCON01-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
Spectrum Analyzer	ROHDE & SCHWARZ	FSP 40	100219	2018/07/03	2019/07/02
Bluetooth Tester	ROHDE & SCHWARZ	CBT	101133	2019/04/07	2020/04/06
Attenuator	KEYSIGHT	8491B	MY39250705	2018/09/04	2019/09/03
TEMP & HUMI CHAMBER	T-MACHINE	TMJ-9712	T-12-040111	2018/08/30	2019/08/29
Power Sensor	Anritsu	MA2411B	1207295	2019/04/11	2020/04/10

Test Item	AC Power Line Conducted Emission				
Test Site	CON01-NK				
Instrument	Manufacturer	Model No	Serial No	Calibration Date	Valid Date
EMI Receiver	ROHDE & SCHWARZ	ESCI	100821	2018/9/12	2019/09/11
Line Impedance Stabilization Network	Schwarzbeck	NSLK 8127	8127-740	2018/6/13	2019/06/12
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	101933	2018/9/4	2019/09/03
E3	AUDIX	v8.2014-8-6	RK-000531	NA	NA



## 4. Antenna Requirements

### 4.1 Antenna Construction and Directional Gain

Antenna Type	PCB Antenna
Antenna Gain	2.80 dBi

For Power directional gain =  $G_{ant} = 2.8 \text{ dBi}$

For PSD directional gain =  $G_{ant} = 2.8 \text{ dBi}$



## 5. Test of AC Power Line Conducted Emission

### 5.1 Test Limit

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

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

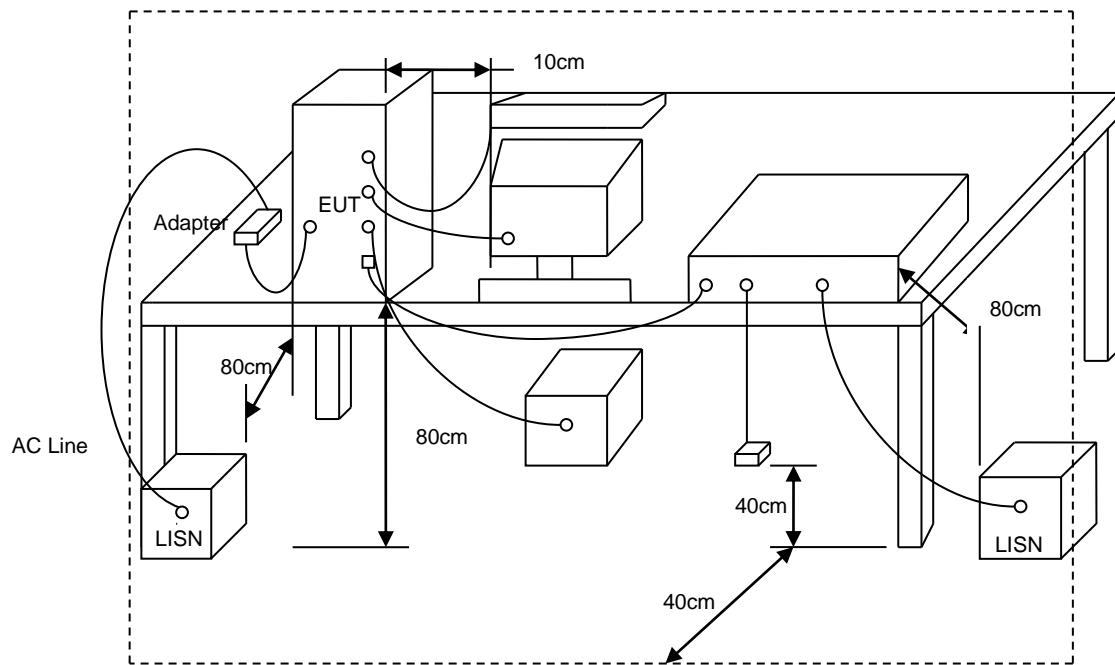
\*Decreases with the logarithm of the frequency.

### 5.2 Test Procedures

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



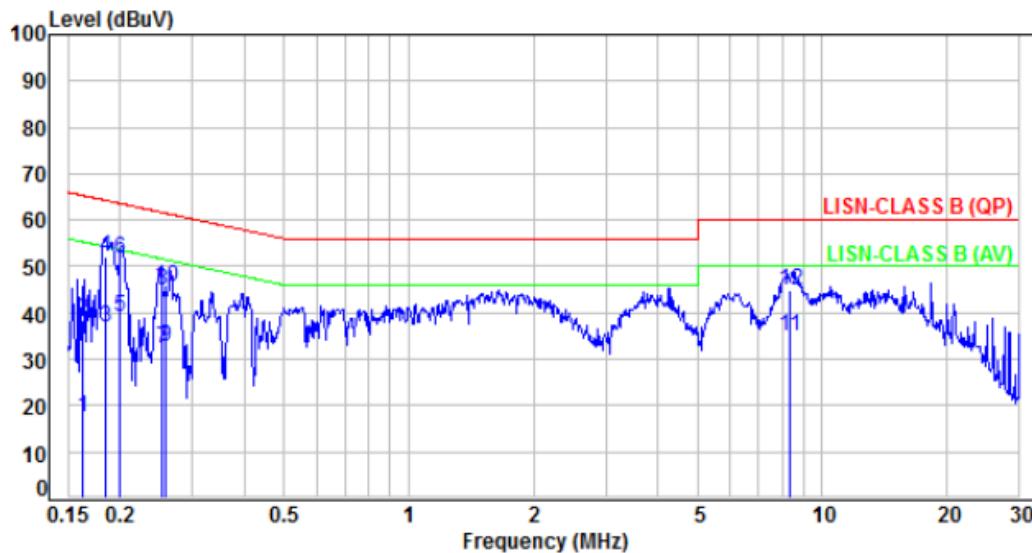
### 5.3 Typical Test Setup





## 5.4 Test Result and Data

Power :	DC 5V from system	Pol/Phase :	NEUTRAL
Test Mode :	Mode 2	:	

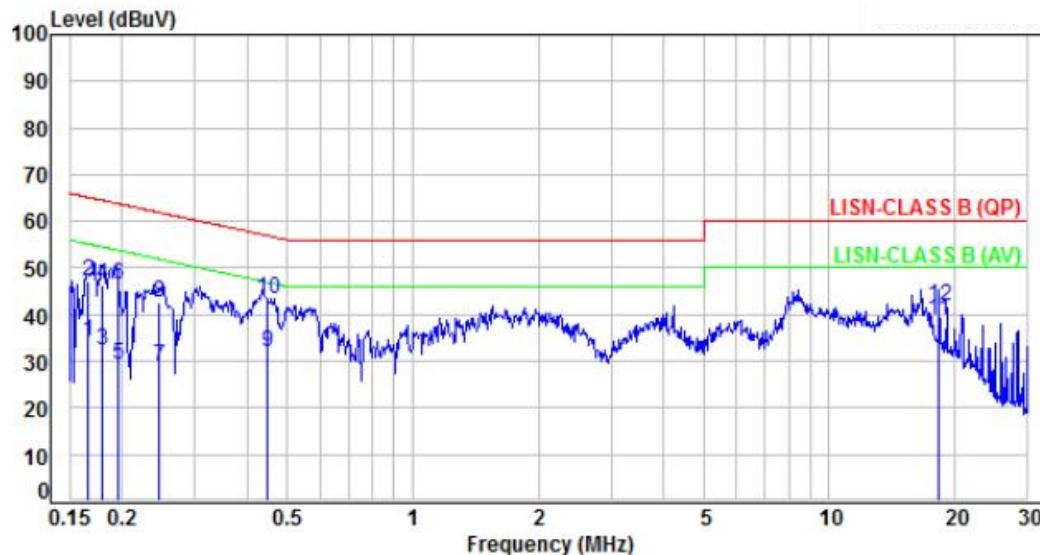


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.16	9.94	7.66	17.60	55.35	-37.75	Average	P
2	0.16	9.94	28.29	38.23	65.35	-27.12	QP	P
3	0.19	9.94	27.01	36.95	54.24	-17.29	Average	P
4	0.19	9.94	42.12	52.06	64.24	-12.18	QP	P
5	0.20	9.94	29.36	39.30	53.64	-14.34	Average	P
6	0.20	9.94	41.64	51.58	63.64	-12.06	QP	P
7	0.25	9.94	22.52	32.46	51.64	-19.18	Average	P
8	0.25	9.94	34.97	44.91	61.64	-16.73	QP	P
9	0.26	9.94	22.60	32.54	51.47	-18.93	Average	P
10	0.26	9.94	35.72	45.66	61.47	-15.81	QP	P
11	8.33	10.27	24.85	35.12	50.00	-14.88	Average	P
12	8.33	10.27	34.71	44.98	60.00	-15.02	QP	P

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



Power :	DC 5V from system	Pol/Phase :	LINE
Test Mode :	Mode 2	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.17	9.94	24.13	34.07	55.15	-21.08	Average	P
2	0.17	9.94	37.24	47.18	65.15	-17.97	QP	P
3	0.18	9.94	22.31	32.25	54.54	-22.29	Average	P
4	0.18	9.94	36.33	46.27	64.54	-18.27	QP	P
5	0.20	9.94	19.25	29.19	53.78	-24.59	Average	P
6	0.20	9.94	36.33	46.27	63.78	-17.51	QP	P
7	0.25	9.94	19.11	29.05	51.92	-22.87	Average	P
8	0.25	9.94	32.83	42.77	61.92	-19.15	QP	P
9	0.45	9.96	21.91	31.87	46.93	-15.06	Average	P
10	0.45	9.96	33.34	43.30	56.93	-13.63	QP	P
11	18.31	10.54	28.24	38.78	50.00	-11.22	Average	P
12	18.31	10.54	31.33	41.87	60.00	-18.13	QP	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=(LISN or ISN 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

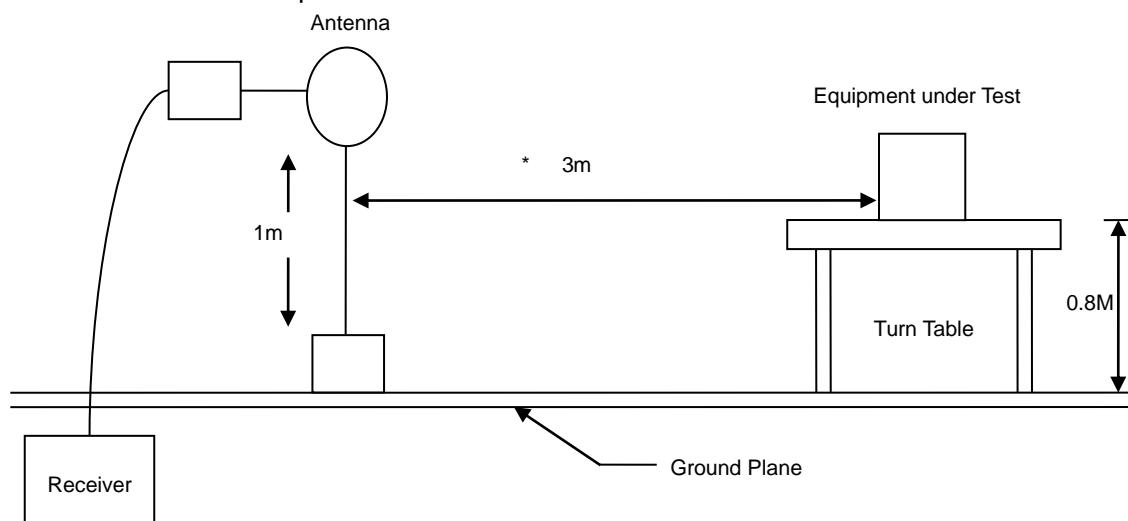
### 6.2 Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

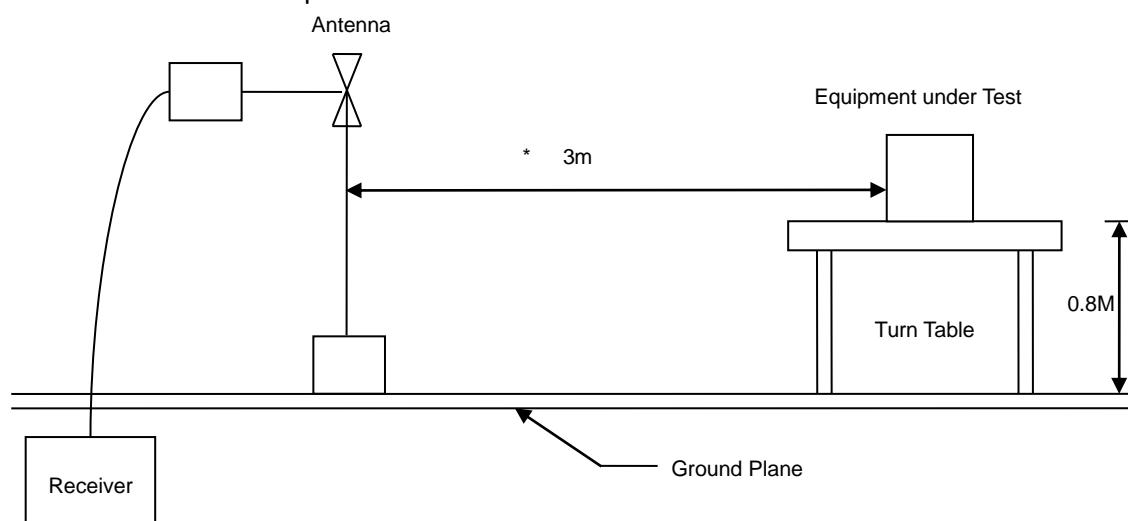


### 6.3 Typical Test Setup

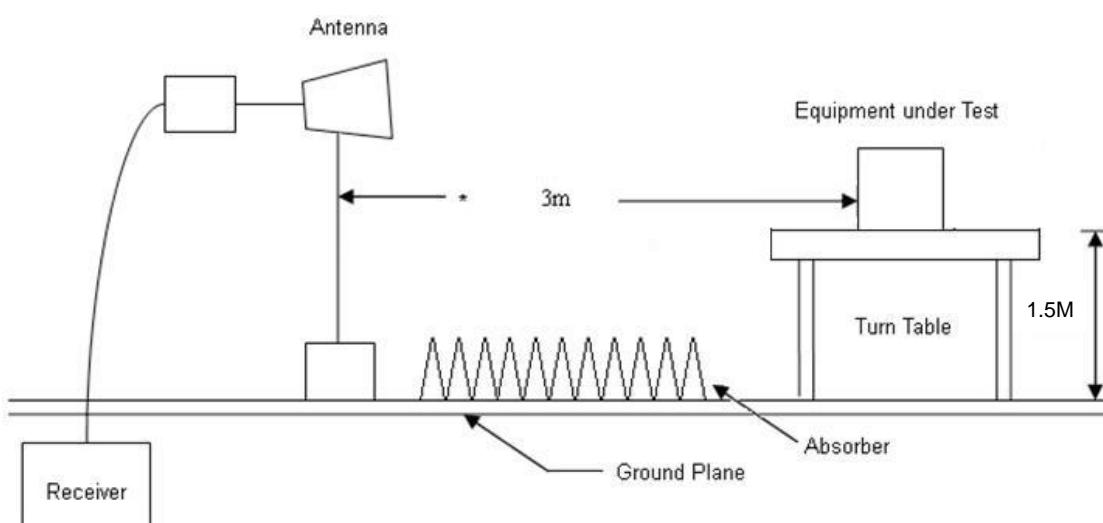
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



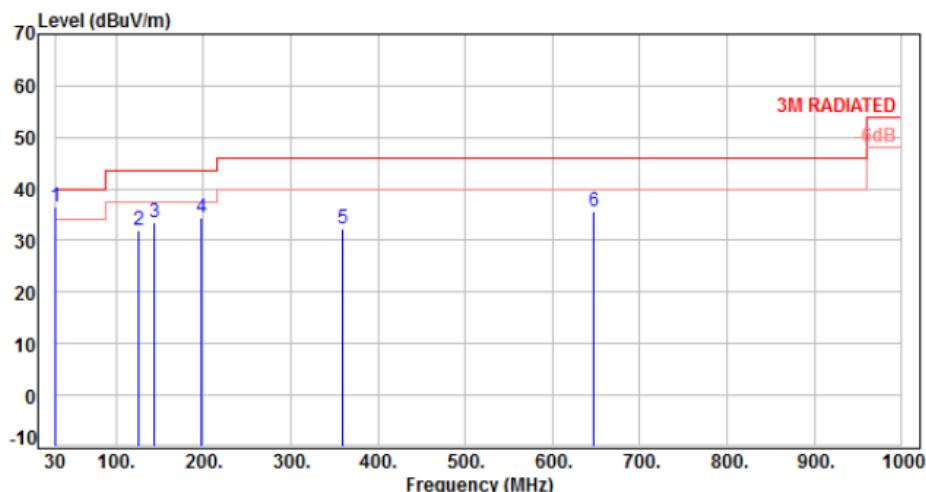


## 6.4 Test Result and Data (9KHz ~ 30MHz)

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

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

Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 2	:	

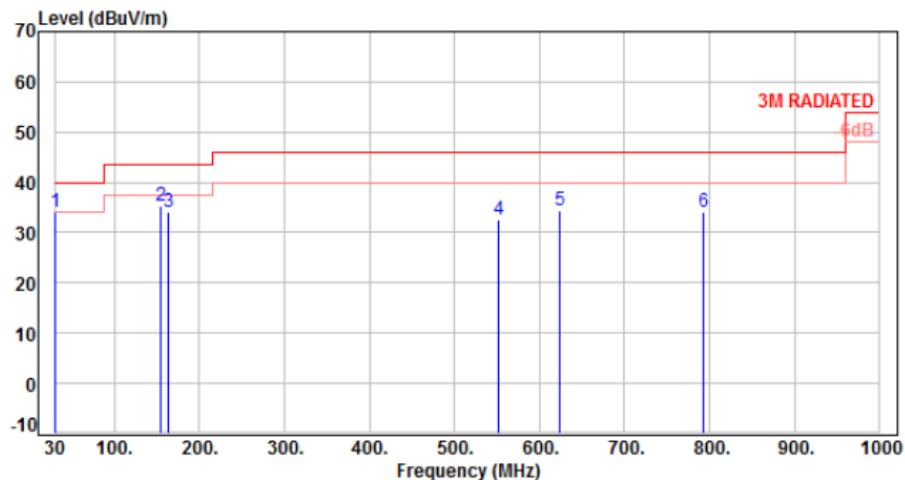


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.00	-10.51	47.20	36.69	40.00	-3.31	Peak	400	0	P
2	126.03	-11.25	43.37	32.12	43.50	-11.38	Peak	400	0	P
3	143.49	-9.71	43.08	33.37	43.50	-10.13	Peak	400	0	P
4	197.81	-12.21	46.55	34.34	43.50	-9.16	Peak	400	0	P
5	359.80	-7.05	39.37	32.32	46.00	-13.68	Peak	400	0	P
6	647.89	-1.13	36.74	35.61	46.00	-10.39	Peak	400	0	P

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 2	:	



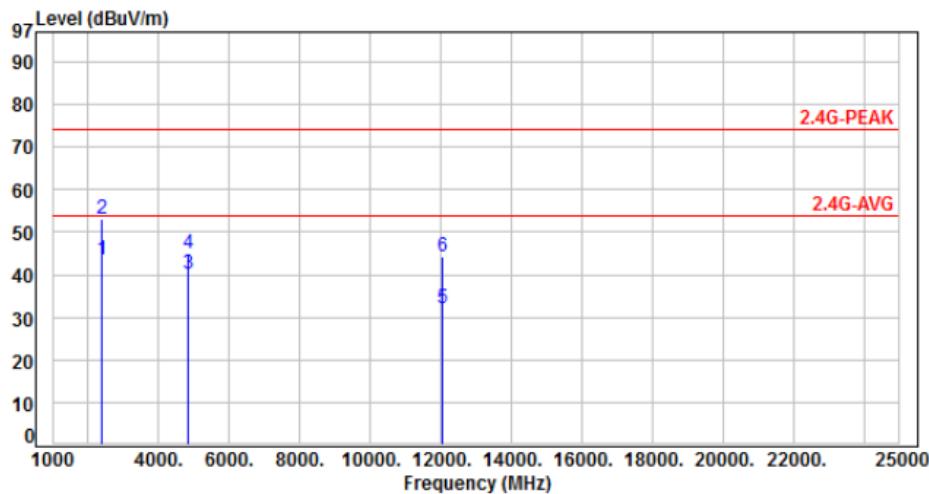
No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.00	-10.51	44.69	34.18	40.00	-5.82	Peak	100	0	P
2	155.13	-9.46	44.74	35.28	43.50	-8.22	Peak	100	0	P
3	163.86	-9.41	43.60	34.19	43.50	-9.31	Peak	100	0	P
4	551.86	-2.89	35.56	32.67	46.00	-13.33	Peak	100	0	P
5	623.64	-1.21	35.72	34.51	46.00	-11.49	Peak	100	0	P
6	792.42	1.25	32.94	34.19	46.00	-11.81	Peak	100	0	P

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



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

Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 1, CH01	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	58.05	43.44	54.00	-10.56	Average	190	213	P
2	2390.00	-14.61	67.78	53.17	74.00	-20.83	Peak	190	213	P
3	4824.00	-6.82	47.00	40.18	54.00	-13.82	Average	100	60	P
4	4824.00	-6.82	51.90	45.08	74.00	-28.92	Peak	100	60	P
5	12060.00	4.61	27.35	31.96	54.00	-22.04	Average	180	165	P
6	12060.00	4.61	39.47	44.08	74.00	-29.92	Peak	180	165	P

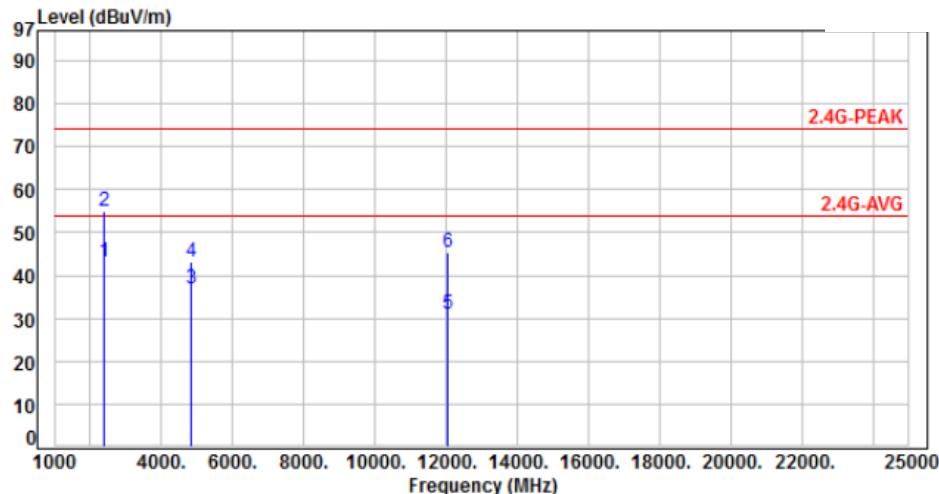
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 1, CH01	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	57.60	42.99	54.00	-11.01	Average	130	200	P
2	2390.00	-14.61	69.74	55.13	74.00	-18.87	Peak	130	200	P
3	4824.00	-6.82	43.59	36.77	54.00	-17.23	Average	100	260	P
4	4824.00	-6.82	50.15	43.33	74.00	-30.67	Peak	100	260	P
5	12060.00	4.61	26.26	30.87	54.00	-23.13	Average	100	170	P
6	12060.00	4.61	40.60	45.21	74.00	-28.79	Peak	100	170	P

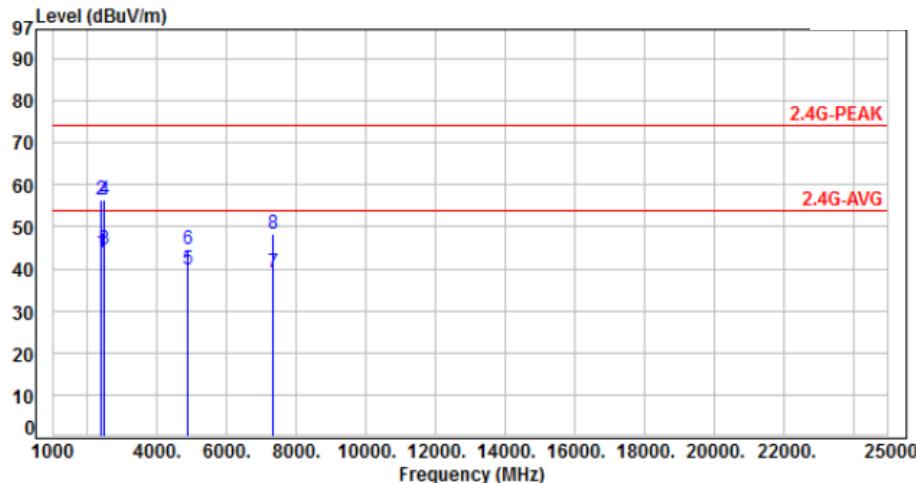
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 1, CH06	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	58.60	43.99	54.00	-10.01	Average	100	60	P
2	2390.00	-14.61	70.92	56.31	74.00	-17.69	Peak	100	60	P
3	2483.50	-14.22	58.75	44.53	54.00	-9.47	Average	100	60	P
4	2483.50	-14.22	70.71	56.49	74.00	-17.51	Peak	100	60	P
5	4874.00	-6.63	46.51	39.88	54.00	-14.12	Average	100	260	P
6	4874.00	-6.63	51.43	44.80	74.00	-29.20	Peak	100	260	P
7	7311.00	-1.28	40.55	39.27	54.00	-14.73	Average	100	265	P
8	7311.00	-1.28	49.71	48.43	74.00	-25.57	Peak	100	265	P

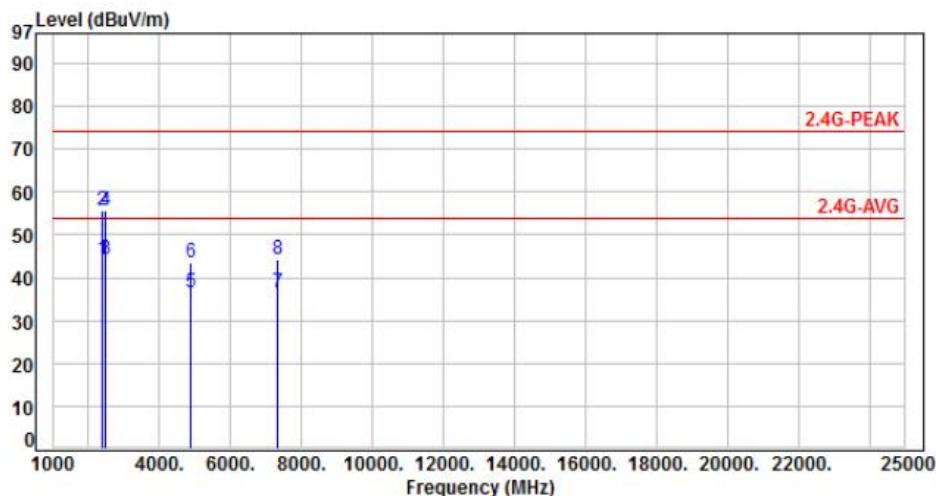
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 1, CH06	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	58.92	44.31	54.00	-9.69	Average	390	355	P
2	2390.00	-14.61	70.44	55.83	74.00	-18.17	Peak	390	355	P
3	2483.50	-14.22	58.54	44.32	54.00	-9.68	Average	390	355	P
4	2483.50	-14.22	69.87	55.65	74.00	-18.35	Peak	390	355	P
5	4874.00	-6.63	43.16	36.53	54.00	-17.47	Average	105	255	P
6	4874.00	-6.63	50.09	43.46	74.00	-30.54	Peak	105	255	P
7	7311.00	-1.28	37.65	36.37	54.00	-17.63	Average	100	349	P
8	7311.00	-1.28	45.71	44.43	74.00	-29.57	Peak	100	349	P

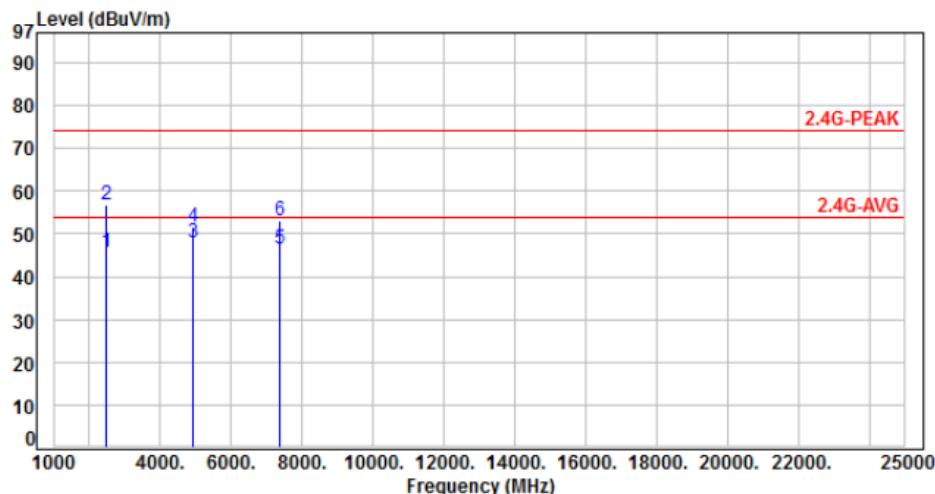
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 1, CH11	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-14.22	59.88	45.66	54.00	-8.34	Average	100	65	P
2	2483.50	-14.22	71.17	56.95	74.00	-17.05	Peak	100	65	P
3	4924.00	-6.50	54.33	47.83	54.00	-6.17	Average	100	258	P
4	4924.00	-6.50	58.24	51.74	74.00	-22.26	Peak	100	258	P
5	7386.00	-1.19	47.80	46.61	54.00	-7.39	Average	100	115	P
6	7386.00	-1.19	54.25	53.06	74.00	-20.94	Peak	100	115	P

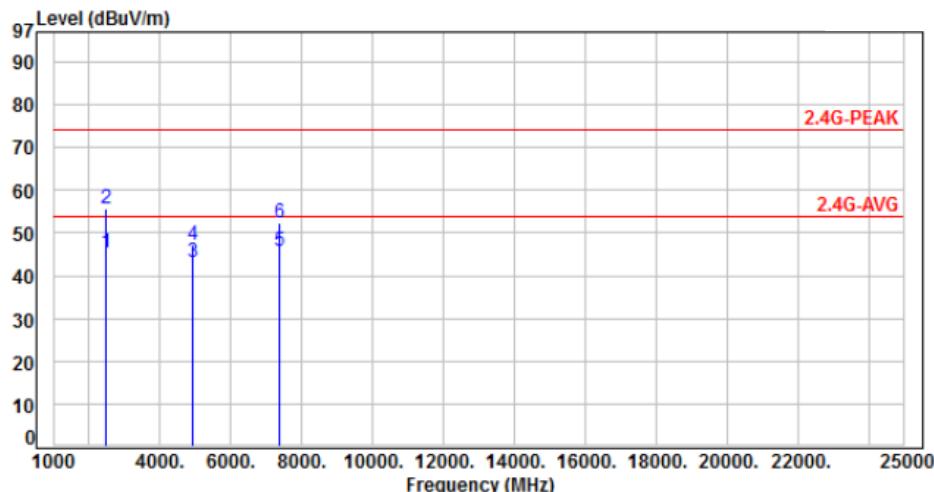
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 1, CH11	:	

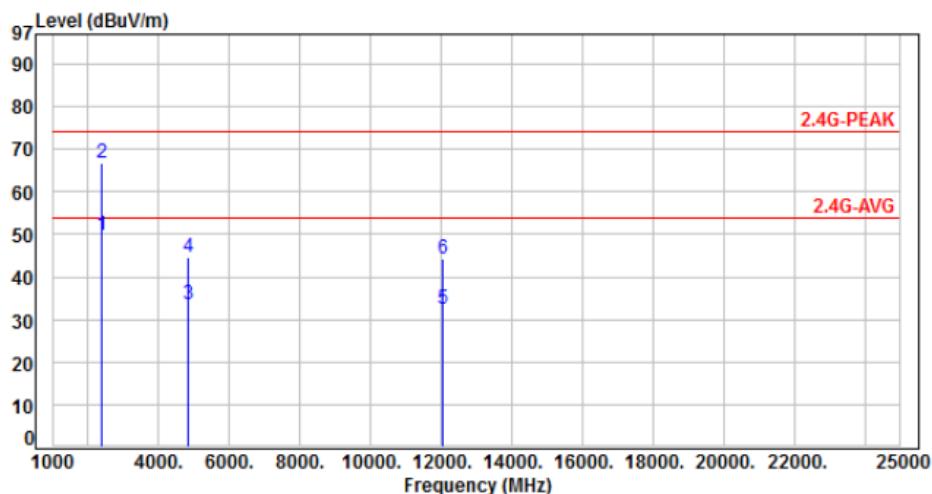


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-14.22	59.43	45.21	54.00	-8.79	Average	365	150	P
2	2483.50	-14.22	70.05	55.83	74.00	-18.17	Peak	365	150	P
3	4924.00	-6.50	49.81	43.31	54.00	-10.69	Average	100	290	P
4	4924.00	-6.50	53.53	47.03	74.00	-26.97	Peak	100	290	P
5	7386.00	-1.19	46.81	45.62	54.00	-8.38	Average	100	158	P
6	7386.00	-1.19	53.48	52.29	74.00	-21.71	Peak	100	158	P

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 2, CH01	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	64.24	49.63	54.00	-4.37	Average	100	103	P
2	2390.00	-14.61	81.39	66.78	74.00	-7.22	Peak	100	103	P
3	4824.00	-6.82	40.37	33.55	54.00	-20.45	Average	100	268	P
4	4824.00	-6.82	51.57	44.75	74.00	-29.25	Peak	100	268	P
5	12060.00	4.61	28.01	32.62	54.00	-21.38	Average	100	170	P
6	12060.00	4.61	39.71	44.32	74.00	-29.68	Peak	100	170	P

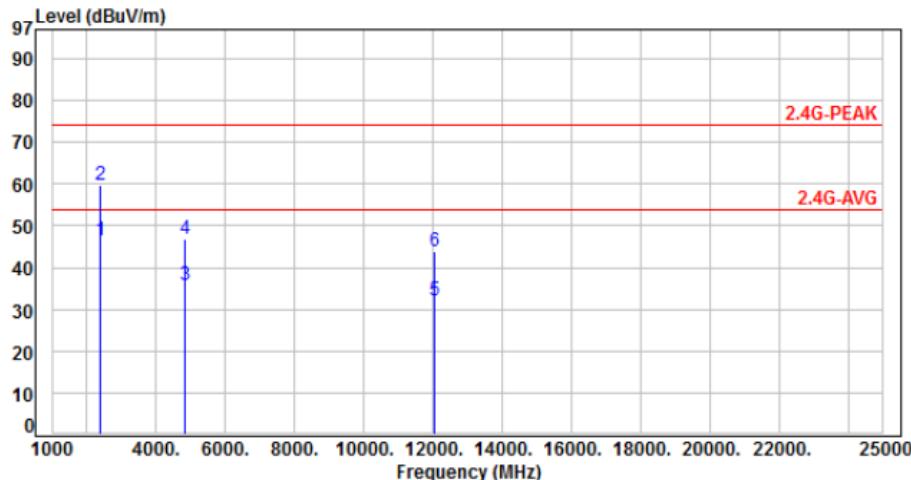
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 2, CH01	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	61.16	46.55	54.00	-7.45	Average	125	345	P
2	2390.00	-14.61	74.46	59.85	74.00	-14.15	Peak	125	345	P
3	4824.00	-6.82	42.62	35.80	54.00	-18.20	Average	100	260	P
4	4824.00	-6.82	53.65	46.83	74.00	-27.17	Peak	100	260	P
5	12060.00	4.61	27.39	32.00	54.00	-22.00	Average	100	285	P
6	12060.00	4.61	39.34	43.95	74.00	-30.05	Peak	100	285	P

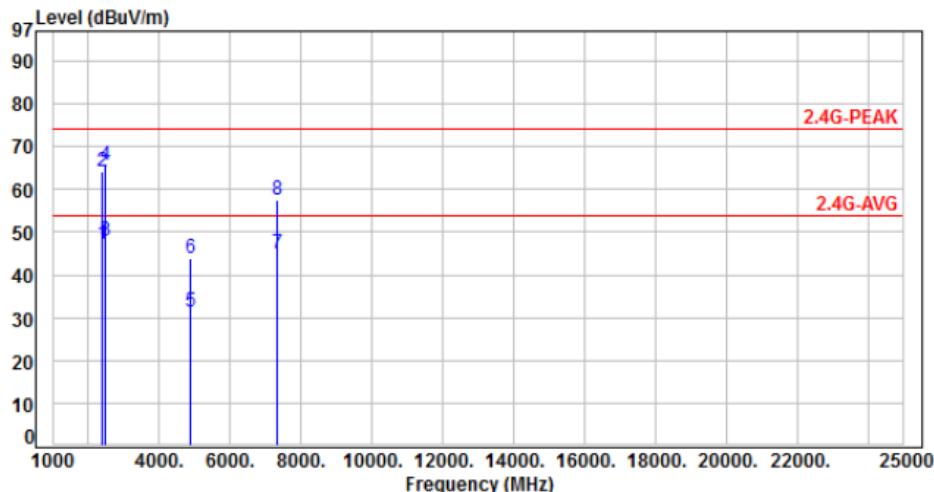
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 2, CH06		:



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth P/F (deg)	P/F
1	2390.00	-14.61	61.66	47.05	54.00	-6.95	Average	100	70	P
2	2390.00	-14.61	78.97	64.36	74.00	-9.64	Peak	100	70	P
3	2483.50	-14.22	62.22	48.00	54.00	-6.00	Average	100	70	P
4	2483.50	-14.22	79.87	65.65	74.00	-8.35	Peak	100	70	P
5	4874.00	-6.63	38.12	31.49	54.00	-22.51	Average	100	267	P
6	4874.00	-6.63	50.38	43.75	74.00	-30.25	Peak	100	267	P
7	7311.00	-1.28	46.24	44.96	54.00	-9.04	Average	140	152	P
8	7311.00	-1.28	58.95	57.67	74.00	-16.33	Peak	140	152	P

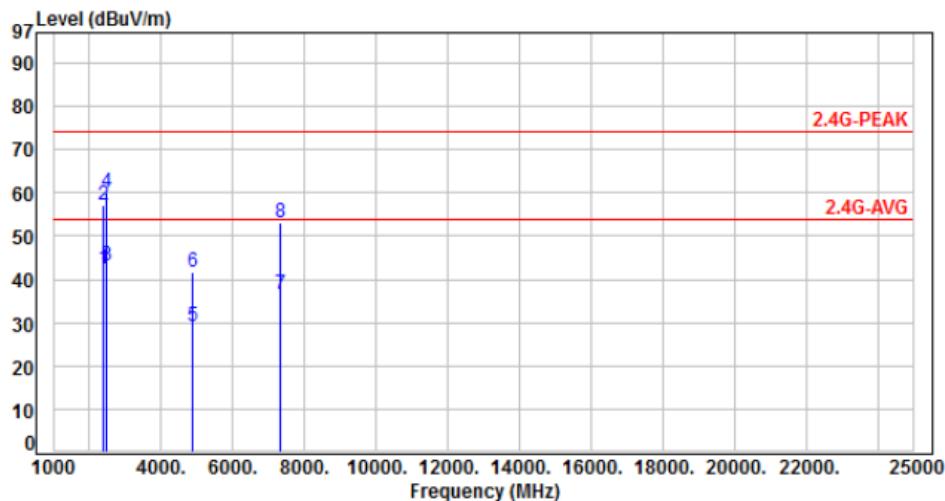
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 2, CH06	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	57.01	42.40	54.00	-11.60	Average	100	192	P
2	2390.00	-14.61	71.80	57.19	74.00	-16.81	Peak	100	192	P
3	2483.50	-14.22	57.24	43.02	54.00	-10.98	Average	100	192	P
4	2483.50	-14.22	74.50	60.28	74.00	-13.72	Peak	100	192	P
5	4874.00	-6.63	35.73	29.10	54.00	-24.90	Average	100	260	P
6	4874.00	-6.63	48.23	41.60	74.00	-32.40	Peak	100	260	P
7	7311.00	-1.28	37.95	36.67	54.00	-17.33	Average	367	350	P
8	7311.00	-1.28	54.24	52.96	74.00	-21.04	Peak	367	350	P

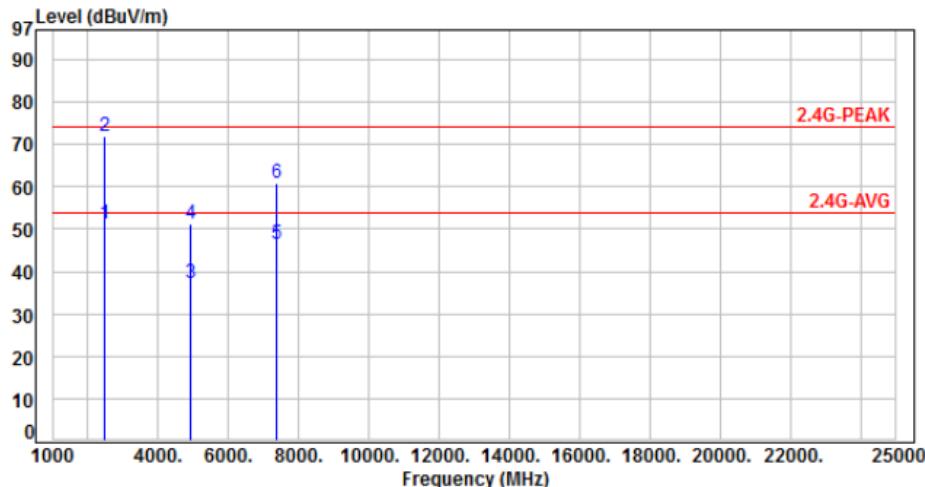
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 2, CH11	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-14.22	65.66	51.44	54.00	-2.56	Average	100	5	P
2	2483.50	-14.22	86.21	71.99	74.00	-2.01	Peak	100	5	P
3	4924.00	-6.50	43.86	37.36	54.00	-16.64	Average	100	65	P
4	4924.00	-6.50	57.67	51.17	74.00	-22.83	Peak	100	65	P
5	7386.00	-1.19	47.66	46.47	54.00	-7.53	Average	100	7	P
6	7386.00	-1.19	62.17	60.98	74.00	-13.02	Peak	100	7	P

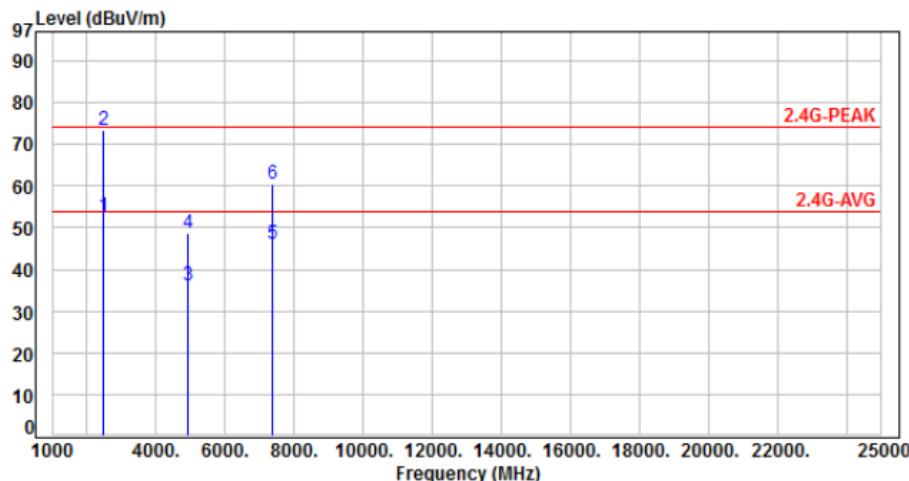
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 2, CH11	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-14.22	66.87	52.65	54.00	-1.35	Average	360	200	P
2	2483.50	-14.22	87.48	73.26	74.00	-0.74	Peak	360	200	P
3	4924.00	-6.50	42.63	36.13	54.00	-17.87	Average	100	270	P
4	4924.00	-6.50	55.01	48.51	74.00	-25.49	Peak	100	270	P
5	7386.00	-1.19	47.45	46.26	54.00	-7.74	Average	100	33	P
6	7386.00	-1.19	61.60	60.41	74.00	-13.59	Peak	100	33	P

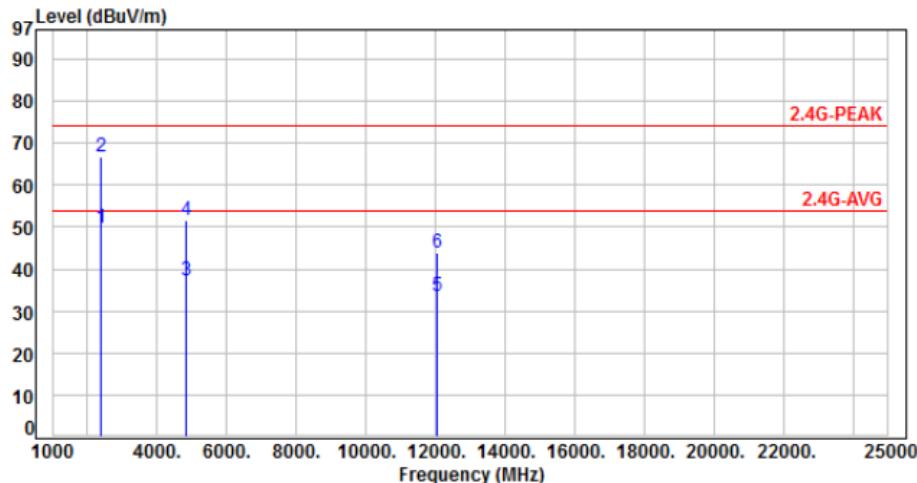
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 3, CH01	:	

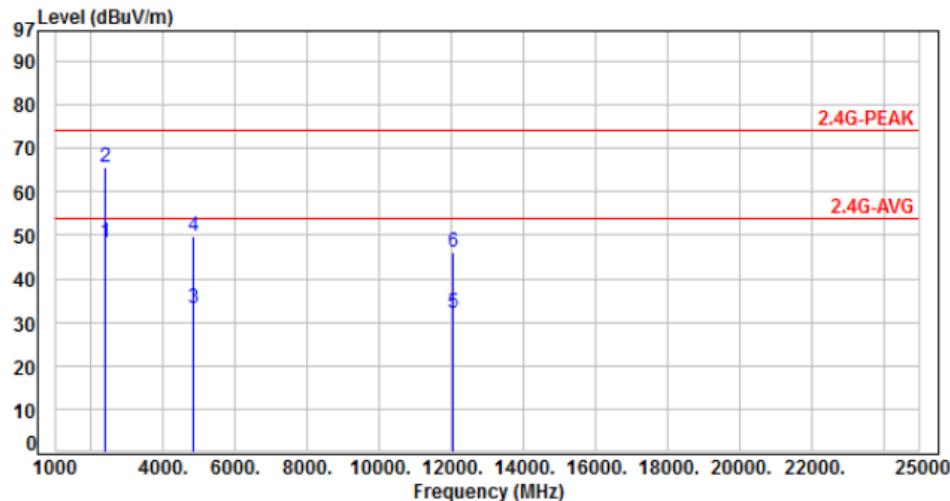


No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	64.24	49.63	54.00	-4.37	Average	100	360	P
2	2390.00	-14.61	81.26	66.65	74.00	-7.35	Peak	100	360	P
3	4824.00	-6.82	44.19	37.37	54.00	-16.63	Average	100	40	P
4	4824.00	-6.82	58.29	51.47	74.00	-22.53	Peak	100	40	P
5	12060.00	4.61	28.90	33.51	54.00	-20.49	Average	100	120	P
6	12060.00	4.61	39.34	43.95	74.00	-30.05	Peak	100	120	P

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 3, CH01	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	63.05	48.44	54.00	-5.56	Average	100	192	P
2	2390.00	-14.61	80.21	65.60	74.00	-8.40	Peak	100	192	P
3	4824.00	-6.82	40.05	33.23	54.00	-20.77	Average	100	287	P
4	4824.00	-6.82	56.46	49.64	74.00	-24.36	Peak	100	287	P
5	12060.00	4.61	27.40	32.01	54.00	-21.99	Average	100	135	P
6	12060.00	4.61	41.44	46.05	74.00	-27.95	Peak	100	135	P

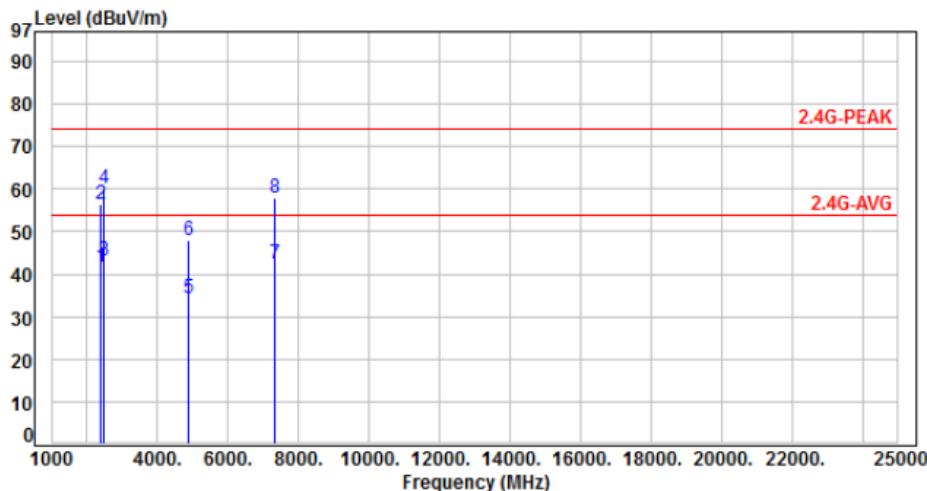
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 3, CH06	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	56.41	41.80	54.00	-12.20	Average	200	225	P
2	2390.00	-14.61	71.19	56.58	74.00	-17.42	Peak	200	225	P
3	2483.50	-14.22	57.48	43.26	54.00	-10.74	Average	200	225	P
4	2483.50	-14.22	74.17	59.95	74.00	-14.05	Peak	200	225	P
5	4874.00	-6.63	40.90	34.27	54.00	-19.73	Average	100	57	P
6	4874.00	-6.63	54.76	48.13	74.00	-25.87	Peak	100	57	P
7	7311.00	-1.28	43.87	42.59	54.00	-11.41	Average	100	0	P
8	7311.00	-1.28	59.17	57.89	74.00	-16.11	Peak	100	0	P

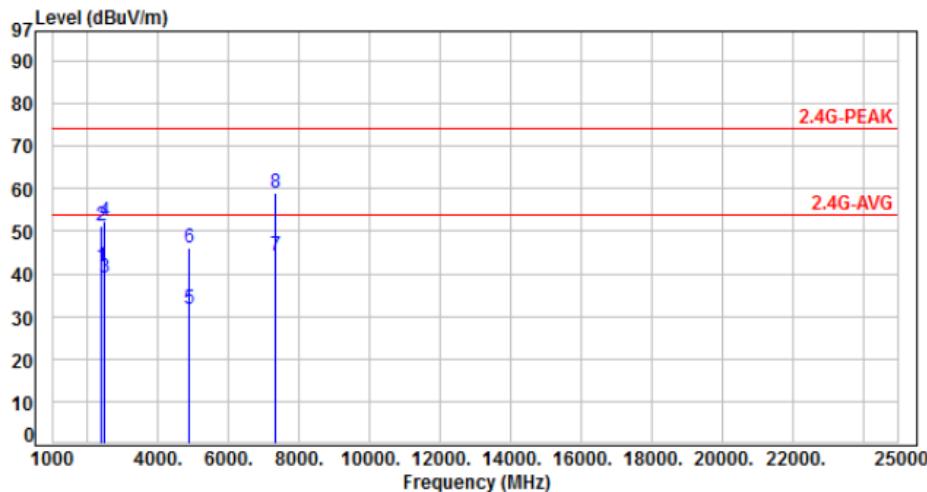
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 3, CH06	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2390.00	-14.61	56.44	41.83	54.00	-12.17	Average	100	186	P
2	2390.00	-14.61	65.76	51.15	74.00	-22.85	Peak	100	186	P
3	2483.50	-14.22	53.41	39.19	54.00	-14.81	Average	100	186	P
4	2483.50	-14.22	66.53	52.31	74.00	-21.69	Peak	100	186	P
5	4874.00	-6.63	38.42	31.79	54.00	-22.21	Average	100	283	P
6	4874.00	-6.63	52.64	46.01	74.00	-27.99	Peak	100	283	P
7	7311.00	-1.28	45.40	44.12	54.00	-9.88	Average	100	30	P
8	7311.00	-1.28	60.25	58.97	74.00	-15.03	Peak	100	30	P

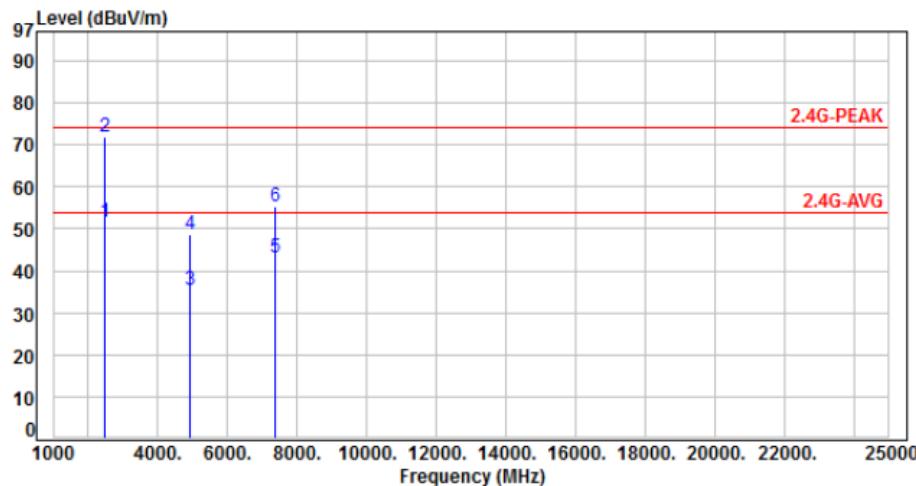
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	VERTICAL
Test Mode :	Mode 3, CH11	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-14.22	65.71	51.49	54.00	-2.51	Average	100	227	P
2	2483.50	-14.22	86.25	72.03	74.00	-1.97	Peak	100	227	P
3	4924.00	-6.50	41.86	35.36	54.00	-18.64	Average	100	50	P
4	4924.00	-6.50	55.01	48.51	74.00	-25.49	Peak	100	50	P
5	7386.00	-1.19	44.48	43.29	54.00	-10.71	Average	100	155	P
6	7386.00	-1.19	56.57	55.38	74.00	-18.62	Peak	100	155	P

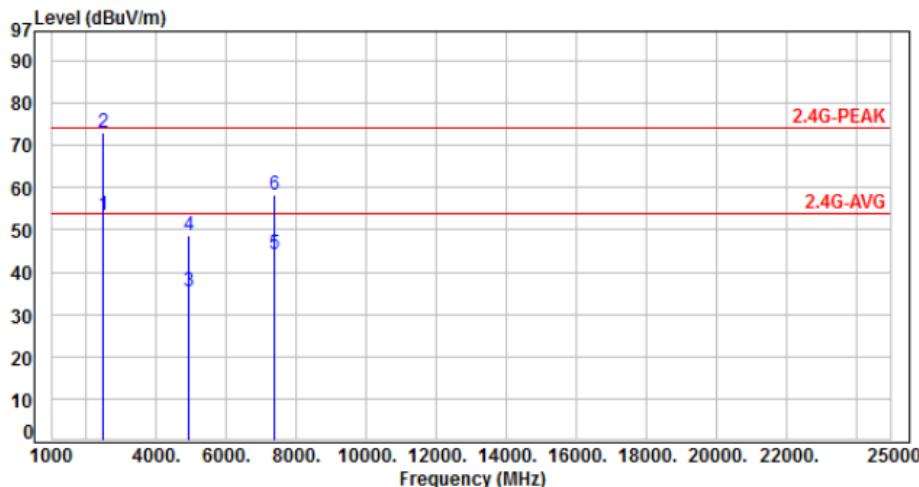
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power :	DC 5V from system	Pol/Phase :	HORIZONTAL
Test Mode :	Mode 3, CH11	:	



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	2483.50	-14.22	67.68	53.46	54.00	-0.54	Average	100	190	P
2	2483.50	-14.22	87.17	72.95	74.00	-1.05	Peak	100	190	P
3	4924.00	-6.50	41.80	35.30	54.00	-18.70	Average	100	283	P
4	4924.00	-6.50	55.21	48.71	74.00	-25.29	Peak	100	283	P
5	7386.00	-1.19	45.47	44.28	54.00	-9.72	Average	325	31	P
6	7386.00	-1.19	59.57	58.38	74.00	-15.62	Peak	325	31	P

Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



## 6.7 Restricted Bands of Operation

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

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

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



## 7. Test of Conducted Spurious Emission

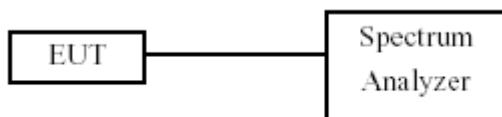
### 7.1 Test Limit

Below –30dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

### 7.2 Test Procedure

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

### 7.3 Test Setup Layout

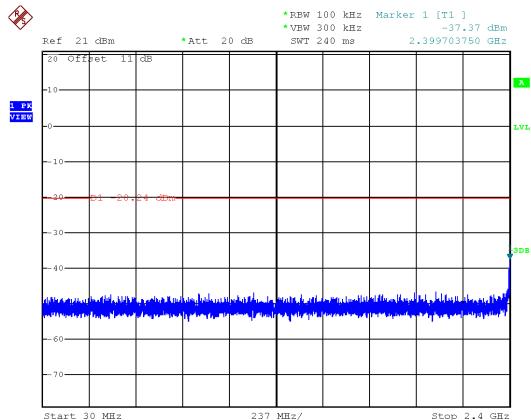


### 7.4 Test Result and Data

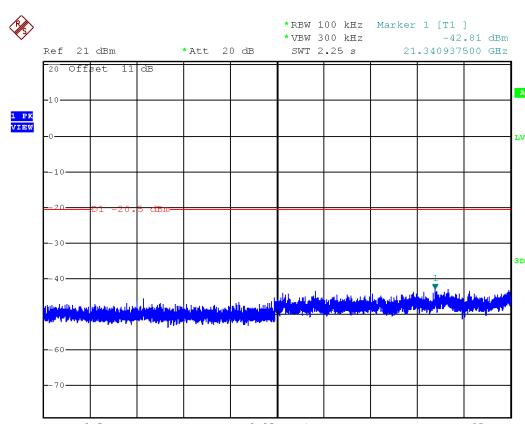
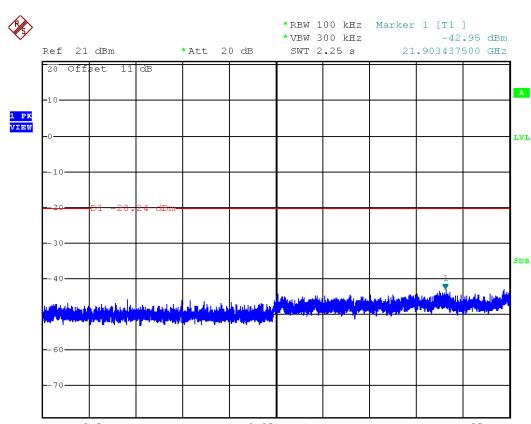
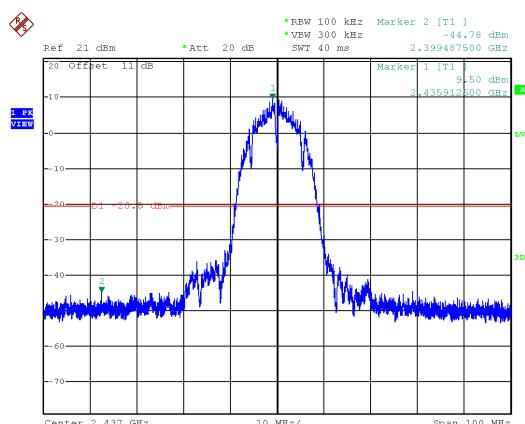
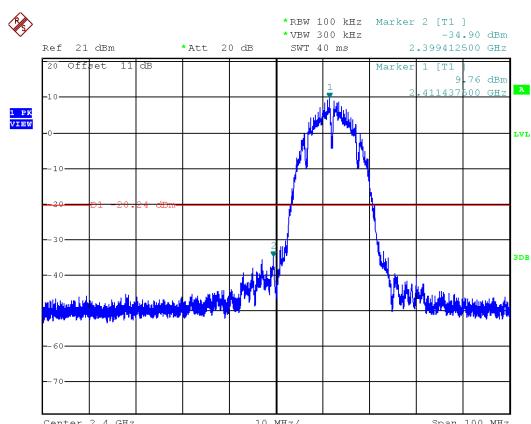
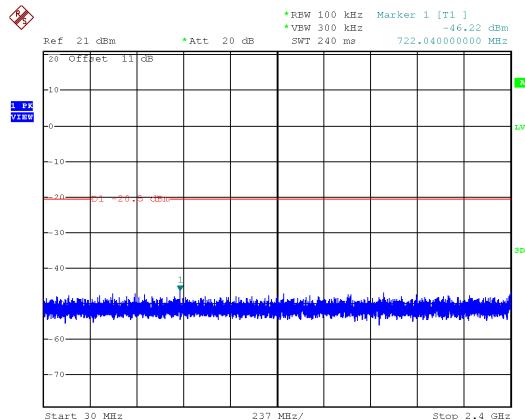
Note: Test plots refers to the following pages.



## Modulation Type: 802.11b, CH 01

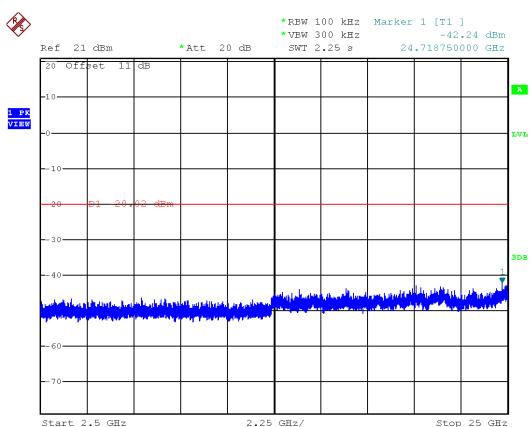
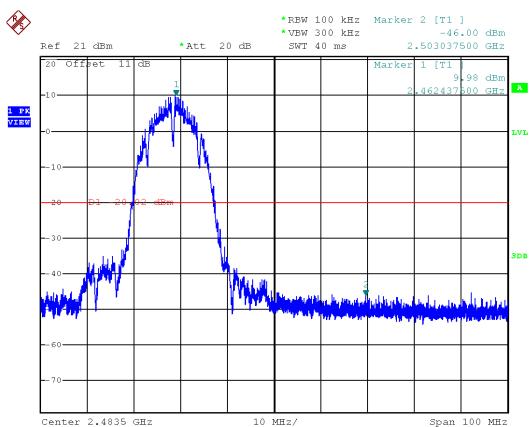
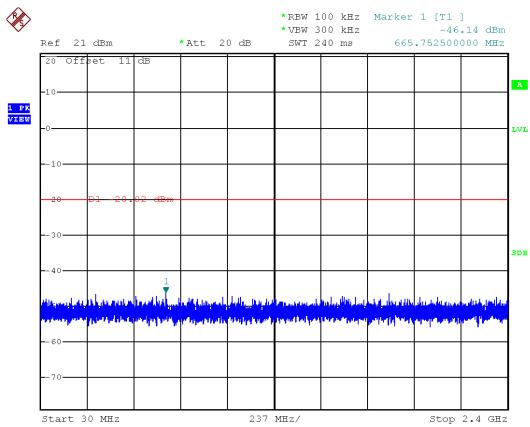


## Modulation Type: 802.11b, CH 06



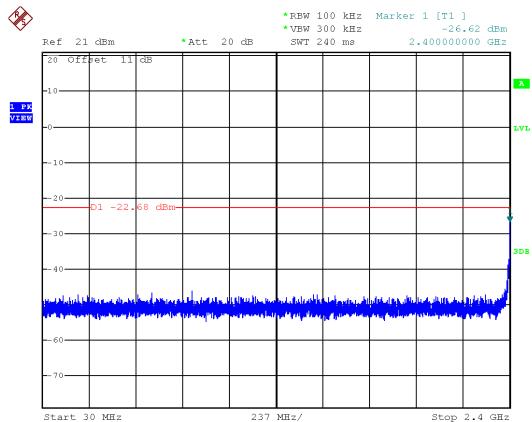


## Modulation Type: 802.11b, CH 11

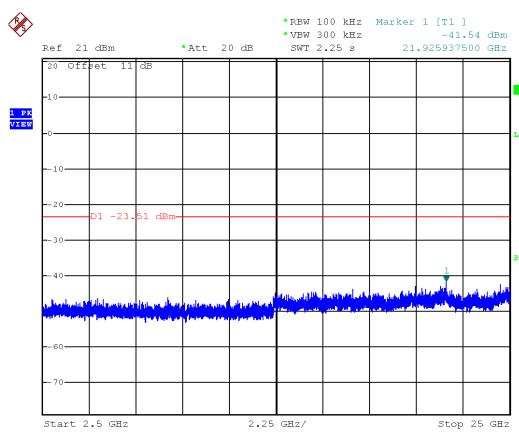
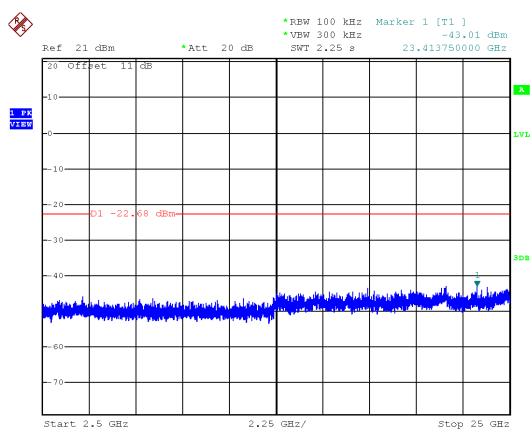
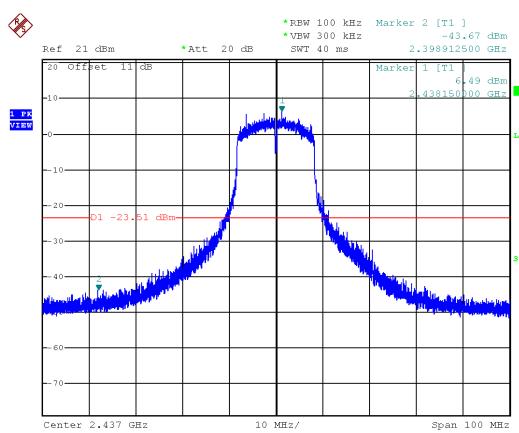
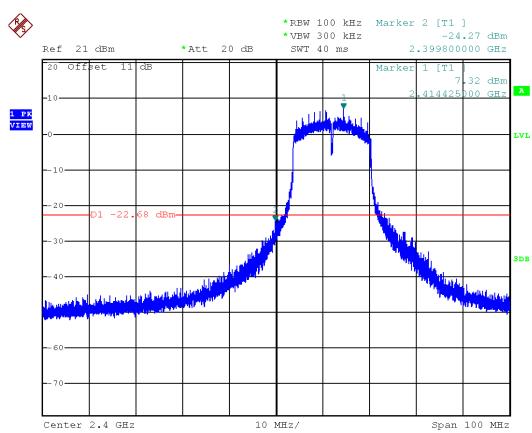
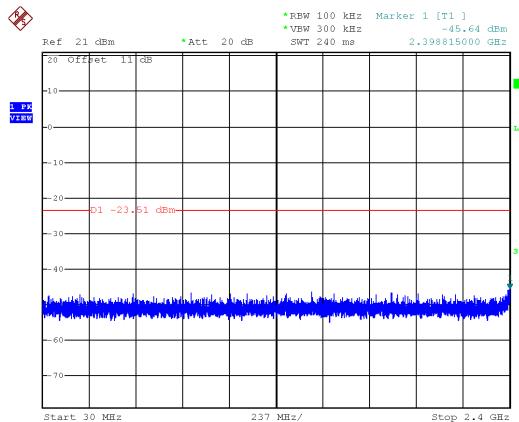




## Modulation Type: 802.11g, CH 01

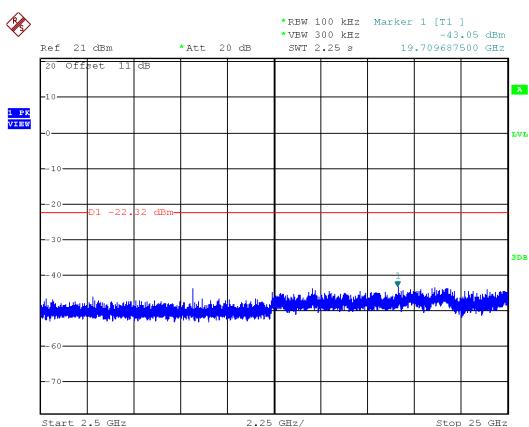
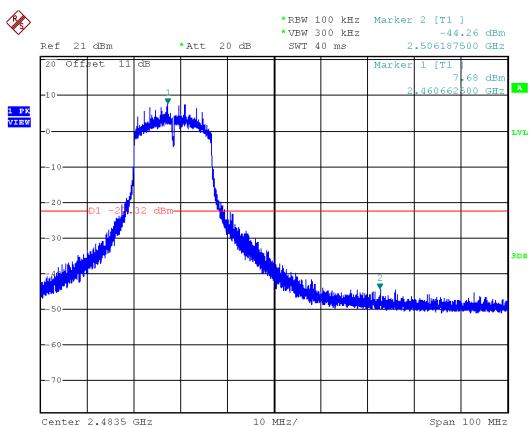
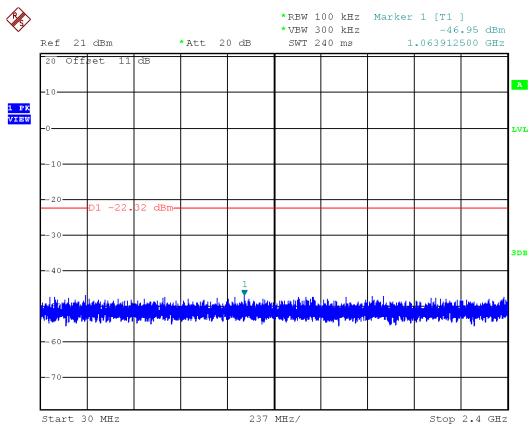


## Modulation Type: 802.11g, CH 06



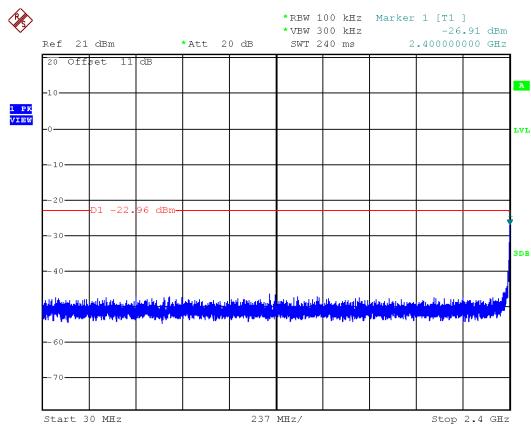


## Modulation Type: 802.11g, CH 11

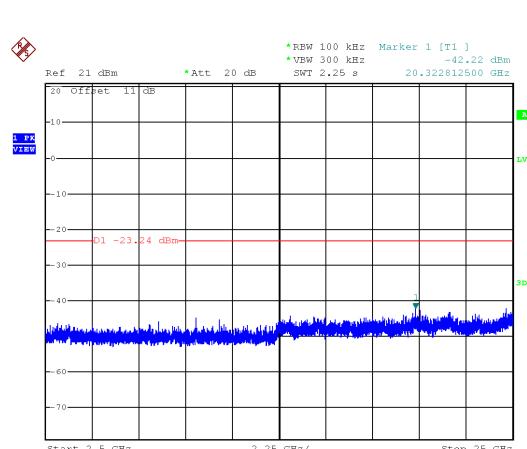
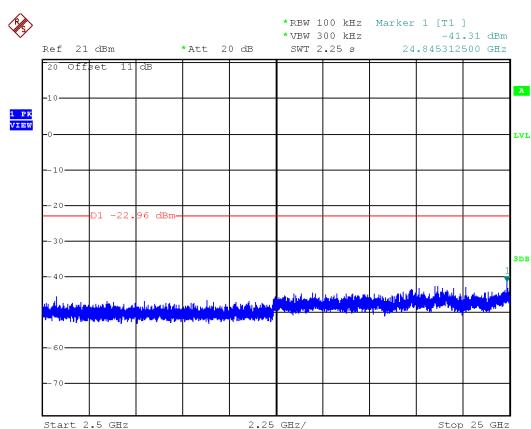
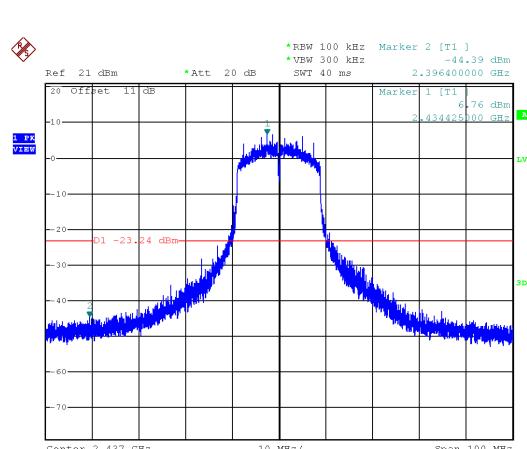
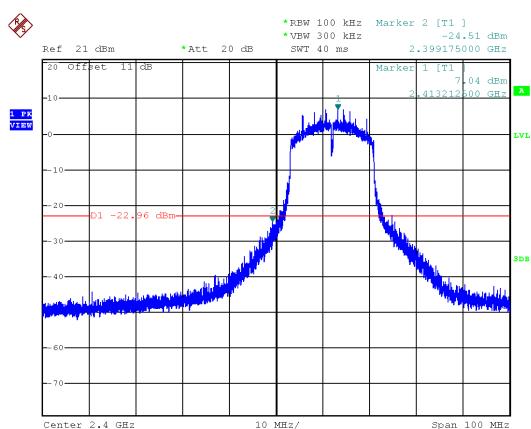
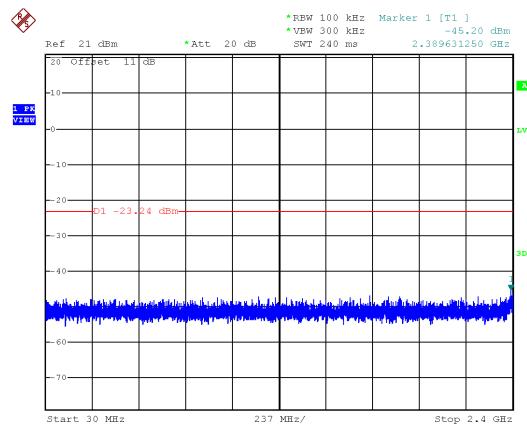




## Modulation Type: 802.11n HT20, CH01

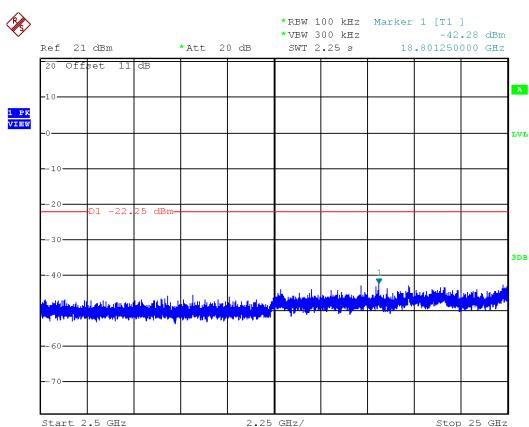
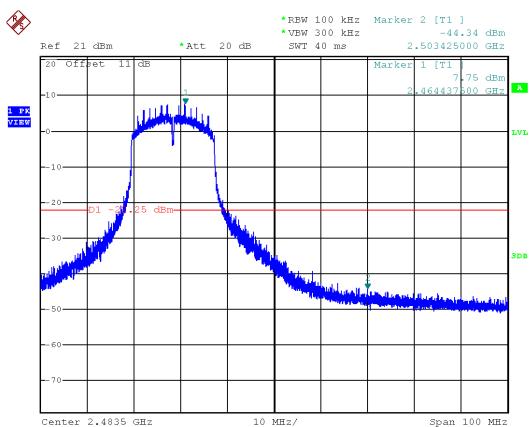
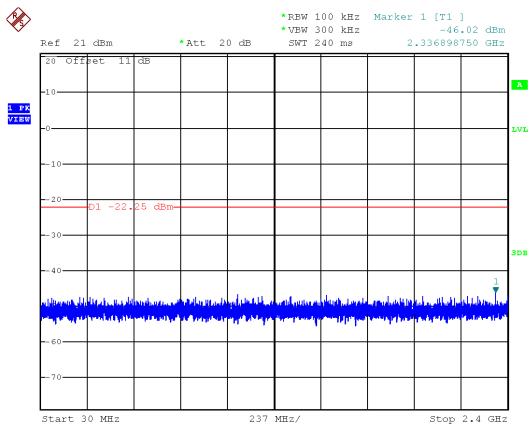


## Modulation Type: 802.11n HT20, CH06





Modulation Type: 802.11n HT20, CH11





## 8. On Time, Duty Cycle and Measurement methods

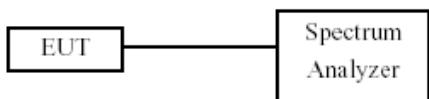
### 8.1 Test Limit

None; for reporting purposes only.

### 8.2 Test Procedure

KDB 558074 Zero-Span Spectrum Analyzer Method.

### 8.3 Test Setup Layout

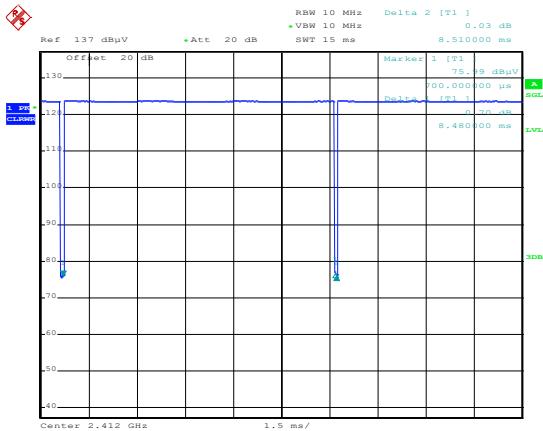


### 8.4 Test Result and Data

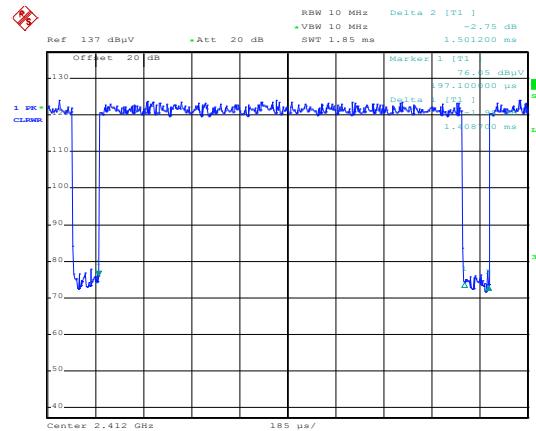
Modulation Mode	On Time (ms)	Period Time (ms)	Duty Cycle (%)
11b,1M	8.48	8.51	99.65%
11g,6M	1.41	1.50	93.84%
11n HT20	1.33	1.42	93.64%



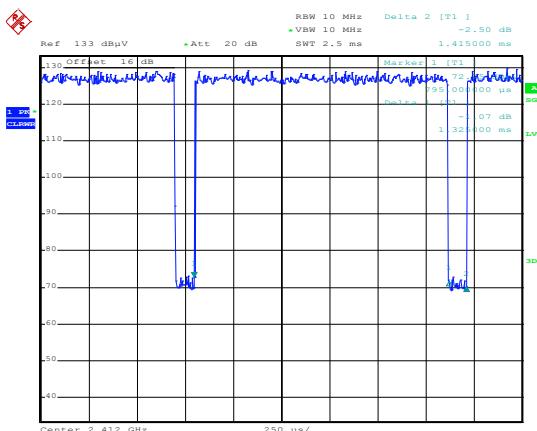
## Modulation Standard: 802.11b (1Mbps)



## Modulation Standard: 802.11g (6Mbps)



## Modulation Standard: 802.11n HT20 (6.5Mbps)





## 9. 6dB Bandwidth Measurement Data

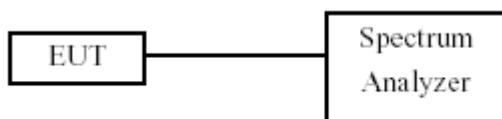
### 9.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

### 9.2 Test Procedures

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

### 9.3 Test Setup Layout

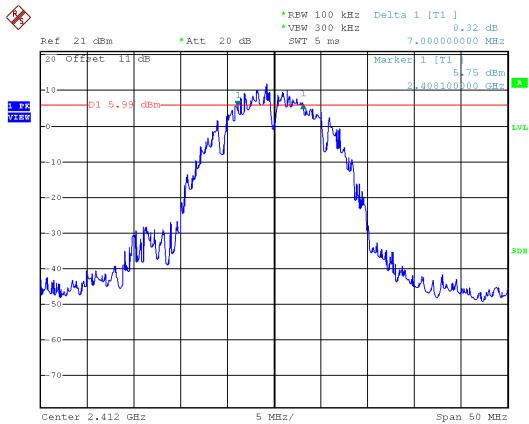


### 9.4 Test Result and Data

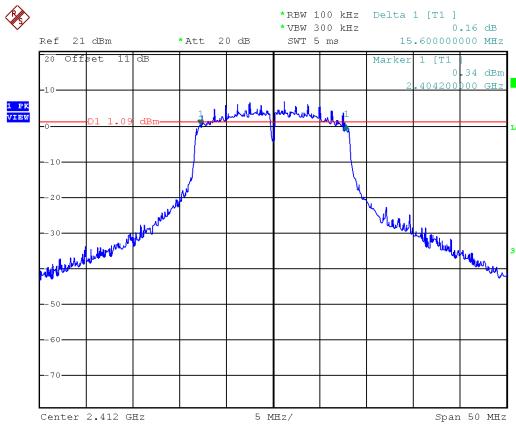
Modulation Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
			ANT A	
11b	1	2412	<b>7.00</b>	0.5
	6	2437	9.10	0.5
	11	2462	9.10	0.5
11g	1	2412	15.60	0.5
	6	2437	15.50	0.5
	11	2462	15.40	0.5
11n HT20	1	2412	15.10	0.5
	6	2437	15.50	0.5
	11	2462	15.60	0.5



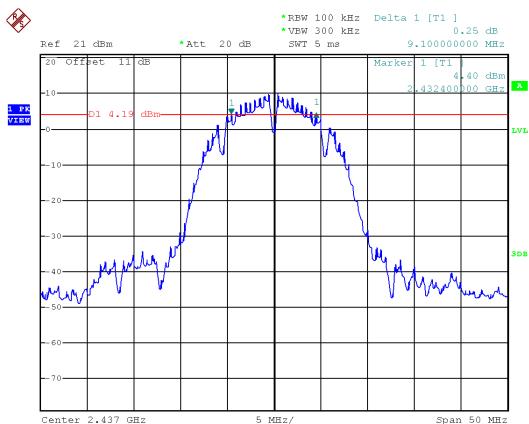
Modulation Type: 802.11b  
CH01



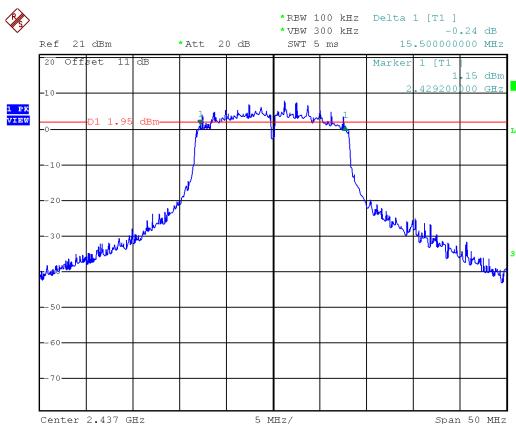
Modulation Type: 802.11g  
CH01



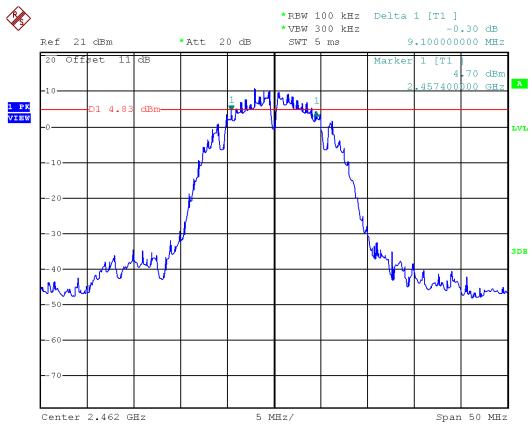
## CH06



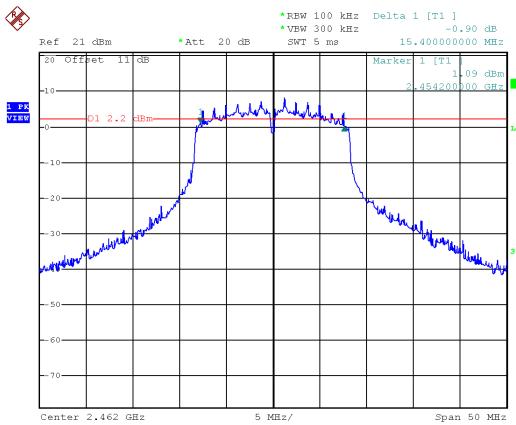
## CH06



## CH11

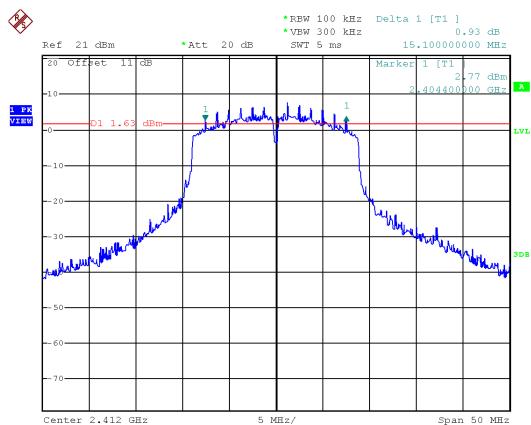


## CH11

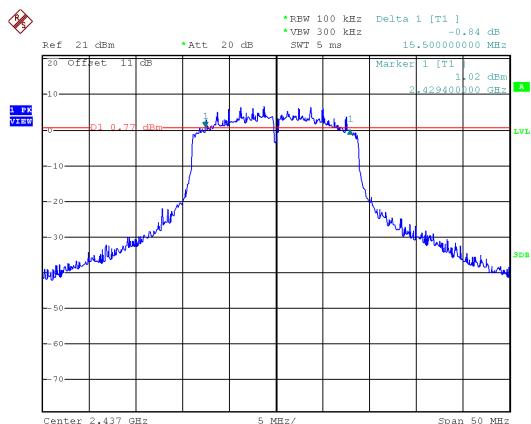




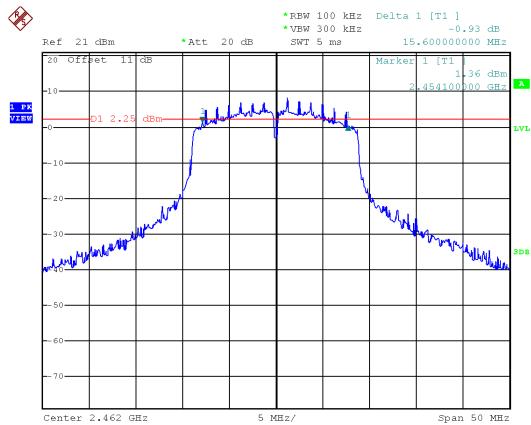
Modulation Type: 802.11n HT20  
CH01



CH06



CH11





## 10. Maximum Average Output Power

### 10.1 Test Limit

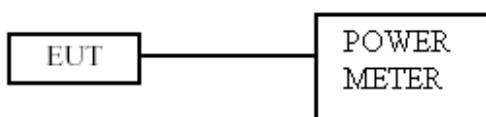
The Maximum Average Output Power Measurement is 30dBm.

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

### 10.2 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.

### 10.3 Test Setup Layout



### 10.4 Test Result and Data

Modulation Mode	Channel	Frequency (MHz)	Conducted(average) output power (dBm)	Total AV power (dBm)	Total AV power (mW)	Powe Limit (dBm)
11b	1	2412	2.97	2.97	1.982	30.00
	6	2437	3.22	3.22	2.099	30.00
	11	2462	3.38	<b>3.38</b>	2.178	30.00
11g	1	2412	2.70	2.70	1.862	30.00
	6	2437	3.68	3.68	2.333	30.00
	11	2462	4.00	<b>4.00</b>	2.512	30.00
11n HT20	1	2412	2.45	2.45	1.758	30.00
	6	2437	2.73	2.73	1.875	30.00
	11	2462	2.90	<b>2.90</b>	1.950	30.00



## 11. Power Spectral Density

### 11.1 Test Limit

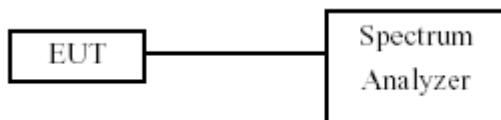
The Maximum of Power Spectral Density Measurement is 8dBm.

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

### 11.2 Test Procedures

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

### 11.3 Test Setup Layout



### 11.4 Test Result and Data

Modulation Mode	Channel	Frequency (MHz)	Maximum Power Density of 3KHz Bandwidth(dBm)	Sum chain (dBm)	Duty Cycle CF(dB)	Total PSD (dBm)	Limit (dBm)
11b	1	2412	-9.51	-9.51	0.00	-9.51	8.00
	6	2437	-9.41	-9.41	0.00	-9.41	8.00
	11	2462	-8.72	-8.72	0.00	<b>-8.72</b>	8.00
11g	1	2412	-11.29	-11.29	0.28	-11.01	8.00
	6	2437	-10.99	-10.99	0.28	-10.71	8.00
	11	2462	-10.46	-10.46	0.28	-10.18	8.00
11n HT20	1	2412	-11.45	-11.45	0.29	-11.16	8.00
	6	2437	-11.18	-11.18	0.29	-10.89	8.00
	11	2462	-10.82	-10.82	0.29	-10.53	8.00



Modulation Type: 802.11b  
CH01



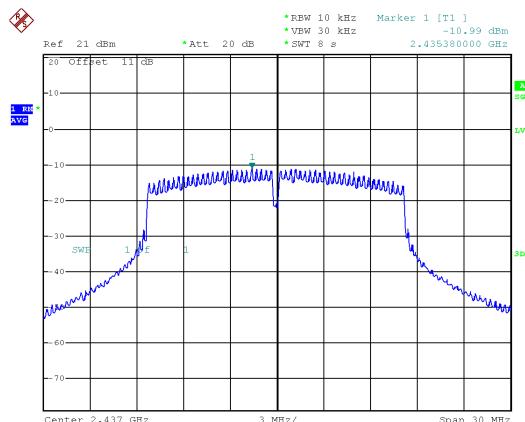
Modulation Type: 802.11g  
CH01



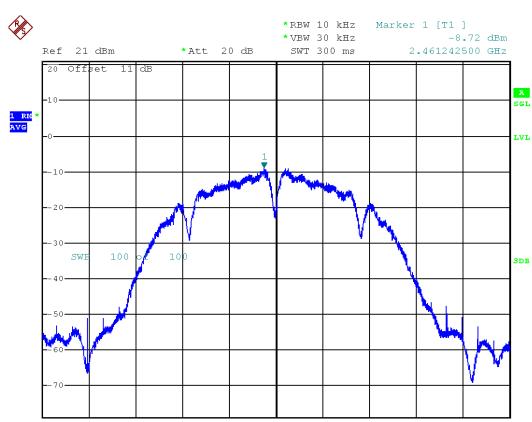
CH06



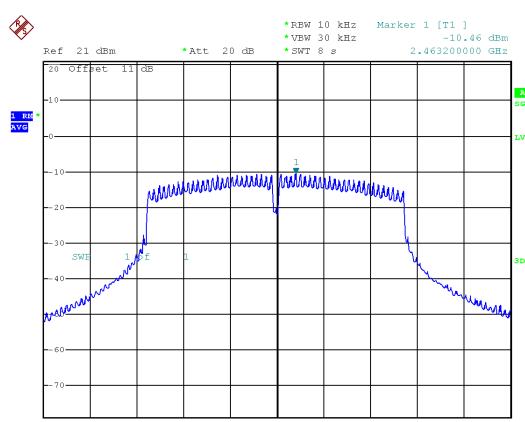
CH06



CH11

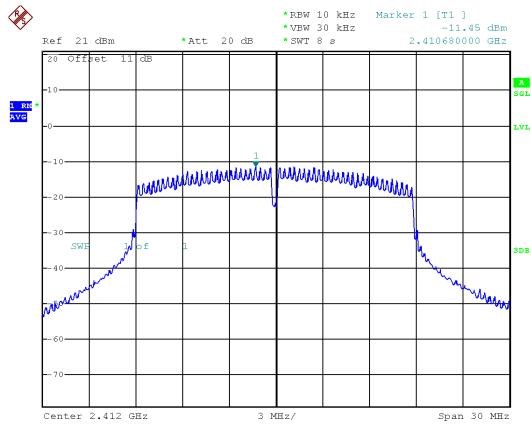


CH11

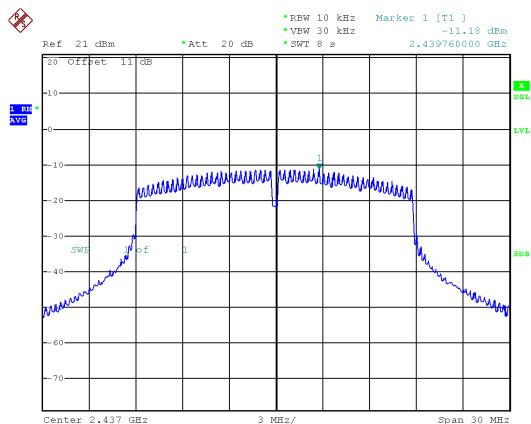




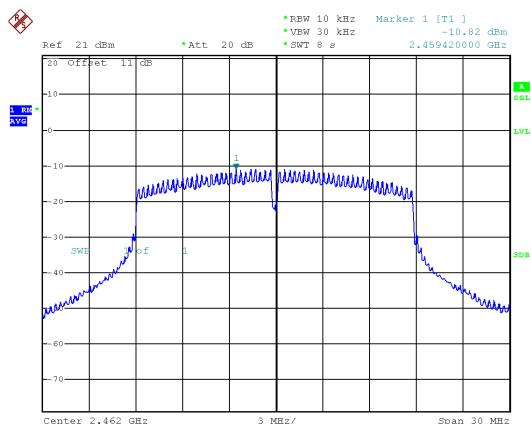
Modulation Type: 802.11n HT20  
CH01



CH06



CH11





## 12. Radio Frequency Exposure

### 12.1 Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in FCC Part 2 (Section 2.1093)

KDB 447498

IEEE C95.1:2005

#### LIMIT

KDB 447498 D01 § 4.3(a)

For 100 MHz to 6 GHz and test separation distances  $\leq$  50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR, and } \leq 7.5 \text{ for 10-g extremity SAR, where}$

\* $f(\text{GHz})$  is the RF channel transmit frequency in GHz

\* Power and distance are rounded to the nearest mW and mm before calculation

\*The result is rounded to one decimal place for comparison

\*The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is  $\leq$  50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $<$  5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion

### 12.2 EUT Specification

<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2412MHz ~ 2462MHz <input type="checkbox"/> Bluetooth: 2402MHz ~ 2480MHz
<b>Device category</b>	<input checked="" type="checkbox"/> Portable (<20cm separation) <input type="checkbox"/> Mobile (>20cm separation)
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure <input checked="" type="checkbox"/> General Population/Uncontrolled exposure
<b>Antenna diversity</b>	<input checked="" type="checkbox"/> Single antenna <input type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input type="checkbox"/> Tx/Rx diversity
<b>Evaluation applied</b>	<input type="checkbox"/> MPE Evaluation* <input checked="" type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

#### **Remark:**

1. The maximum conducted output power is 4dBm (2.512mW) at 2462MHz (with 2.8 dBi antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied.



## 12.3 Test Results

No non-compliance noted.

According to the KDB447498:

The SAR test exclusion thresholds Level:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * \sqrt{\text{freq. in GHz}} < 3$

Calculation

Channel Frequency (MHz)	Max. Conducted output power(dBm)	Max. Conducted output power(mW)	Distance (mm)	SAR test exclusion thresholds (mW)
2412-2462	4.00	2.51	5	10.00

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing