

## FCC PART 15 SUBPART C TEST REPORT

for

**Wireless USB Dongle**

**Model No.: WA-54U Pro**

**FCC ID: W8ONW06-WA54UP**

of

Applicant: KAIOMY TECHNOLOGY CO., LTD.

Address: 2F-1, No.582, Ruiguang RD., Neihu District, Taipei,  
Taiwan.(R.O.C.)

Tested and Prepared

by

**Worldwide Testing Services (Taiwan) Co., Ltd.**

**FCC Registration No.: 930600**

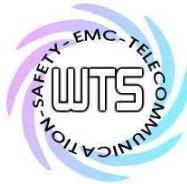
**Industry Canada filed test laboratory Reg. No. IC 5679A-1**

**A2LA Accredited No.: 2732.01**



**Report No.: W6M20903-9663-C-1**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.  
TEL: 886-2-66068877      FAX: 886-2-66068879      E-mail: [wts@wts-lab.com](mailto:wts@wts-lab.com)

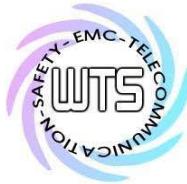


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1  
FCC ID: W8ONW06-WA54UP

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## 1 General Information

### 1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems. The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

The test report may only be reproduced or published in full.

Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.

Specific Conditions:

Usage of the hereunder tested device in combination with other integrated or external antennas requires at least additional output power measurements, spurious emission measurements, conducted emission measurements (AC supply lines) and radio frequency exposure evaluations for each individual configuration performed, for certification by FCC.

The test sample is able to work according IEEE 802.11 b/g.

This report is related to FCC Part 15 C (DSSS and OFDM device).

### Tester:

April 28, 2009

Danny

*Danny*

---

Date

WTS-Lab.

Name

Signature

### Technical responsibility for area of testing:

April 28, 2009

Chang Tse-Ming

*Chang Tse-ming*

---

Date

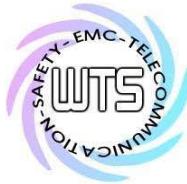
WTS

Name

Signature

Note:

1. This test report is valid in connection to the model has been tested, any modification to the product which is different from the test model will avoid the certification of the test report.
2. This test report shall always be duplicated in full pages unless the written approval of the testing laboratory is obtained.
3. The X in multi-listing model number is representing different housing, color and accessories.



# Worldwide Testing Services(Taiwan) Co., Ltd.

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## **1.2 Testing laboratory**

### **1.2.1 Location**

OATS

No.5-1, Shuang Sing Village,  
LiShuei Rd., Wanli Township,  
Taipei County 207, Taiwan (R.O.C.)

Company

Worldwide Testing Services(Taiwan) Co., Ltd.  
6F, NO. 58, LANE 188, RUEY-KUANG RD.  
NEIHU, TAIPEI 114, TAIWAN R.O.C.

Tel : 886-2-66068877

Fax : 886-2-66068879

### **1.2.2 Details of accreditation status**

Accredited testing laboratory

A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679A-1



### **Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd. :**

Name: ./

Accredited number: ./

Street: ./

Town: ./

Country: ./

Telephone: ./

Fax: ./

## **1.3 Details of approval holder**

Name:	KAIOMY TECHNOLOGY CO., LTD.
Street:	2F-1, No.582, Ruiguang RD., Neihu District,
Town:	Taipei,
Country:	Taiwan.(R.O.C.)
Telephone:	+886-2-6600-3268
Fax:	+886-2-6600-3269



# Worldwide Testing Services(Taiwan) Co., Ltd.

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## **1.4 Application details**

Date of receipt of test item: April 14, 2009  
Date of test: from April 15, 2009 to April 28, 2009

## **1.5 General information of Test item**

Type of test item: Wireless USB Dongle  
Model Number: WA-54U Pro  
Brand Name: KAIOMY  
Multi-listing model number: WA-54UX Pro, WA-54UX XXXXXXX (X can be A-Z, a-z, 0-9 or blank)  
Photos: See Appendix

### **Technical data**

Frequency band: 2.4 GHz – 2.4835 GHz  
Frequency ( ch 1 or A): 2.412 GHz  
Frequency ( ch 6 or B): 2.437 GHZ  
Frequency ( ch 11 or C): 2.462 GHz  
Number of Channels: 11  
Operation modes: duplex  
Modulation Type: DSSS / OFDM  
Fixed point-to-point operation:  Yes /  No  
Type of Antenna: PCB Antenna  
Antenna gain: 2 dBi  
Power supply: 5 Vdc from PC  
Emission designator: DSSS: 16M6G1D  
OFDM: 17M0W7D



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1  
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Host device: none

Classification:

Fixed Device	<input type="checkbox"/>
Mobile Device (Human Body distance > 20cm)	<input checked="" type="checkbox"/>
Portable Device (Human Body distance < 20cm)	<input type="checkbox"/>

## Transmitter

## Unom

### **Mode A (DSSS)**

Power ( ch 1 or A): Conducted: 10.34 dBm

Power ( ch 6 or B): Conducted: 10.38 dBm

Power ( ch 11 or C): Conducted: 11.80 dBm

### **Mode B (OFDM)**

Power ( ch 1 or A): Conducted: 10.65 dBm

Power ( ch 6 or B): Conducted: 9.70 dBm

Power ( ch 11 or C): Conducted: 10.26 dBm

**Manufacturer:** (if different from approval holder)

Name: ./

Street: ./

Town: ./

Country: ./

Additional information: The sample is using WLAN technology according IEEE 802.11 b/g.

There are two testing modes in the test report.

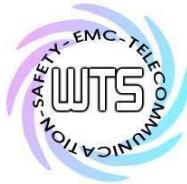
Mode A: IEEE 802.11b

Mode B: IEEE 802.11g

The scheme for frequency generation, spectrum spreading, receiver parameters, synchronization procedure, and other parameters are determined by the mentioned standard above.

## **1.6 Test standards**

Technical standard : FCC RULES PART 15 SUBPART B / SUBPART C § 15.247 (2008-07)



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## **2 Technical test**

### **2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

or

The deviations as specified in 2.5 were ascertained in the course of the tests performed.

### **2.2 Test environment**

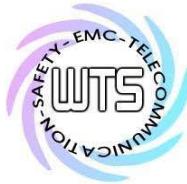
Temperature: 23 °C

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Power supply: 5 Vdc from PC

Extreme conditions parameters: ./.



# Worldwide Testing Services(Taiwan) Co., Ltd.

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## 2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2008/9/18	2009/9/17
ETSTW-CE 002	PREREULATOR MODE DC POWER SUPPLY	None	None	None	Function Test	
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2009/3/27	2010/3/26
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2008/9/15	2009/9/14
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2008/5/10	2009/5/9
ETSTW-CE 008	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2008/9/18	2009/9/17
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2008/7/25	2009/7/24
ETSTW-CE 015	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T8-02	20307	FCC	2008/9/22	2009/9/21
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2008/9/24	2009/9/23
ETSTW-RE 002	Function Generator	33220A	MY43004982	Agilent	2007/10/12	2009/10/11
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2008/10/8	2009/10/7
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2008/9/22	2009/9/21
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2008/9/18	2009/9/17
ETSTW-RE 011	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070165	MOTECH	Function Test	
ETSTW-RE 017	Log-Periodic Antenna	HL025	352886/001	R&S	2008/5/5	2009/5/4
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2008/10/27	2009/10/26
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 021	SWEET GENERATOR	SWM05	835130/010	R&S	2008/8/27	2009/8/26
ETSTW-RE 028	Log-Periodic Dipole Array Antenna	3148	34429	EMCO	2009/4/15	2010/4/14
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	2009/4/15	2010/4/14
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2009/3/23	2010/3/22
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2008/9/1	2009/8/31
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2008/6/27	2009/6/26
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2008/9/1	2009/8/31
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2009/1/8	2011/1/7
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2008/5/2	2009/5/1
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2008/5/22	2009/5/21
ETSTW-RE 047	ESA-E SERIES SPECTRUM ANALYZER	E4445A	MY46181369	Agilent	2008/6/26	2009/6/25
ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2008/9/1	2009/8/31
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2009/4/14	2011/4/13
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2008/7/1	2009/6/30
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	2008/9/1	2009/8/31



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ETSTW-RE 065	Amplifier	AMF-6F-18002650-25-10P	941608	MITEQ	2009/4/21	2010/4/20
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2008/10/28	2009/10/27
ETSTW-RE 073	Power Meter	N1911A	MY45100769	Agilent	2009/1/9	2011/1/8
ETSTW-RE 074	Power Sensor	N1921A	MY45241198	Agilent	2009/1/9	2011/1/8
ETSTW-RE 091	Match Pad	MDCS1500	None	WOKEN	2008/10/9	2009/10/8
ETSTW-RE 092	Match Pad	MDCS1510	None	WOKEN	2008/10/9	2009/10/8
ETSTW-RE 093	LUMPED ELEMENT POWER DIVIDER	PL2-10	146	MCLI	2009/3/6	2010/3/5
ETSTW-RE 094	Precision Coaxial Termination	HP 909F	03941	Agilent	2008/12/19	2009/12/18
ETSTW-RE 095	Digital Thermo-Hygro Meter	0410	01	WISEWIND	2009/3/24	2010/3/23
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2008/9/23	2009/9/22
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2008/9/22	2009/9/21
ETSTW-Cable 001	Microwave Cable	SUCOFLEX 104	238094	HUBER+SUHNER	2008/9/22	2009/9/21
ETSTW-Cable 002	Microwave Cable	SUCOFLEX 104	238093	HUBER+SUHNER	2008/9/22	2009/9/21
ETSTW-Cable 003	Microwave Cable	SUCOFLEX 104	209953	HUBER+SUHNER	2008/9/22	2009/9/21
WTSTW-SW 001	EMI TEST SOFTWARE	Harmonics-1000	None	EMC PARTNER	HARCS Version 4.16 Firmware Version 2.18	
WTSTW-SW 002	EMI TEST SOFTWARE	EZ_EMCA	None	Farad	Version ETS-03A1	
WTSTW-SW 003	EMI TEST SOFTWARE	i2	None	AUDIX	Version 3.2007-8-17b	



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## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 using a 50 $\mu$ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was according to ANSI STANDARD C63.4-2003 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB $\mu$ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dB $\mu$ V + 10.36 dB + 6 dB = 36.36 dB $\mu$ V/m @3m

The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2003 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

Measurements were made by Worldwide Testing Services(Taiwan) Co., Ltd. at the registered open field test site located at No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.) The Registration Number: 930600.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.



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When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

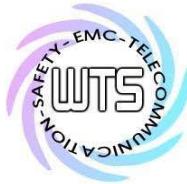
The formula is as follows:

Average = Peak + Duty Factor

Duty Factor =  $20 \log (\text{dwell time}/T)$

T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB



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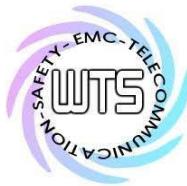
Registration number: W6M20903-9663-C-1

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## **3 Test results (enclosure)**

TEST CASE	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.247(b)(3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Equivalent radiated Power	15.247(b)(3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Transmitter operating	15.247(c): 15.209	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Band Edge Measurement	15.247(c)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Minimum 6 dB Bandwidth	15.247(a)(2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Peak Power Spectral Density	15.247(d)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emission from Digital Part	15.109	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Line Conducted Emission	15.207	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The follows is intended to leave blank.



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## 3.1 Peak Output Power (transmitter)

FCC Rule: 15.247(b)(3)

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

### Mode A

Test condition		Conducted Power		
		Channel A	Channel B	Channel C
$T_{nom}= 23^{\circ}C$	$V_{nom} = 120 \text{ V}$	[dBm]	[dBm]	[dBm]
		10.34	10.38	11.80

### Mode B

Test condition		Conducted Power		
		Channel A	Channel B	Channel C
$T_{nom}= 23^{\circ}C$	$V_{nom} = 120 \text{ V}$	[dBm]	[dBm]	[dBm]
		10.65	9.70	10.26

### Mode A

Test condition $T_{nom}= \text{-- }^{\circ}C, V_{nom} = \text{-- } \text{V}$	Signal Field strength TX highest power mode $\text{dB } \mu \text{V/m}$
Frequency [MHz]	--
--	--

### Mode B

Test condition $T_{nom}= \text{-- }^{\circ}C, V_{nom} = \text{-- } \text{V}$	Signal Field strength TX highest power mode $\text{dB } \mu \text{V/m}$
Frequency [MHz]	--
--	--

Limits:

Frequency MHz	Power dBm
902 - 928	30
2400 - 2483.5	30
5725 - 5850	30

In case of employing transmitter antennas having antenna gain  $> 6 \text{ dBi}$  and using fixed point-to point operation consider §15.247 (b)(4)

Test equipment used: ETSTW-RE 055

Explanation: The diagrams for the peak output power measurements are included in Appendix.



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## 3.2 Equivalent isotropic radiated power

FCC Rule: 15.247(b)(3)

EIRP = max. conducted output power + antenna gain

$$\begin{aligned} \text{EIRP} &= 11.80 \text{ dBm} + 2 \text{ dBi} \\ &= 13.80 \text{ dBm} \end{aligned}$$

Limit: EIRP = +36 dBm for Antenna gain <6dBi

Test equipment used: ETSTW-RE 055

## 3.3 RF Exposure Compliance Requirements

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.

The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case” or conservative prediction.

$$S = \frac{P G}{4 \pi R^2}$$

S – Power Density

P – Output power ERP

R – Distance

D – Cable Loss

AG – Antenna Gain

Item	Unit	Value	Remarks
P	mW	15.14	Peak value
D	dB		
AG	dBi	2	
G		1.6	Calculated Value
R	cm	20	Assumed value
S	mW/cm <sup>2</sup>	0.00482	Calculated value

Limits:

Limit for General Population / Uncontrolled Exposure	
Frequency (MHz)	Power Density (mW/cm <sup>2</sup> )
1500 – 100.000	1.0



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## **3.4 Transmitter Radiated Emissions in Restricted Bands**

FCC Rules: 15.247 (c), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 26500 MHz.

For radiated emission tests, the analyzer setting was as followings:

Frequency  $\leq$  1 GHz, RBW:100 kHz, VBW: 100 kHz (Peak measurements)

Frequency > 1 GHz, RBW: 1 MHz, VBW: 1 MHz (Peak measurements)

Frequency > 1 GHz , RBW:1 MHz , VBW: 10 Hz (Average measurements)

Limits.

For frequencies below 1GHz:

Frequency of Emission (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above	500	54.0

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of Digit Transmission Systems:

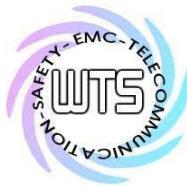
"If the emission is pulsed, modify the unit for continuous operation, use the setting shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation."

The correction factor, based on the total channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

Duty cycle correction =  $20 \log (\text{dwell time} / 100\text{ms})$

Note: No duty cycle correction was added to the reading of this EUT.

Explanation: See attached diagrams in Appendix.



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## **3.5 Spurious Emissions (tx)**

Spurious emission was measured with modulation (declared by manufacturer).

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c))

FCC Rule: 15.247(c), 15.35

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Limits:

For frequencies above 1GHz (Peak measurements).

Modified Limit for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

For frequencies above 1GHz (Average measurements).

Max. reading – 20dB

Max. reading – 20 dB

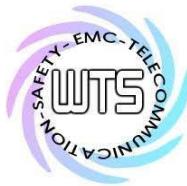
Guidance on Measurement of Digit Transmission Systems:

“If the emission is pulsed, modify the unit for continuous operation, use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.”

The correction factor, based on the total channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

Duty Cycle correction =  $20 \log (\text{dwell time}/100\text{ms})$

Note: No duty cycle correction was added to the reading of EUT.



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**SAMPLE CALCULATION OF LIMIT.** All results will be updated by an automatic measuring system in accordance with point 2.3.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value and exhibit the compliance with the above calculated Limits.

If in the column's correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the "Correction Factor".

## **Summary table with radiated data of the test plots**

Model:	WA-54U Pro		Date:	2009/4/25				
Mode:	Mode A CH1		Temperature:	26	°C	Engineer:	Kevin	
Polarization:	Horizontal		Humidity:	52	%			
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
200.441	20.29	peak	12.15	32.44	43.50	-11.06	210	150
960.721	11.94	peak	27.24	39.18	54.00	-14.82	120	150

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.			
3218.437	53.33	---	-5.75	47.58	---	74.00	54.00	-26.42	210	150
4824.000	41.15	---	-2.41	38.74	---	74.00	54.00	-35.26	120	150
6436.874	59.48	---	0.11	59.59	---	74.00	54.00	-14.41	120	150
7326.000	40.55	---	2.28	42.83	---	74.00	54.00	-31.17	100	150
9648.000	34.14	---	4.96	33.10	---	74.00	54.00	-40.90	210	150
12060.000	33.28	---	11.60	38.88	---	74.00	54.00	-35.12	250	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
196.653	28.94	peak	12.35	41.29	43.50	-2.21	120	150
816.232	7.79	peak	25.39	33.18	46.00	-12.82	200	150



# Worldwide Testing Services(Taiwan) Co., Ltd.

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Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
4824.000	40.90	---	-2.41	38.49	---	74.00	54.00	-35.51	250	150
6436.874	59.49	---	0.11	59.60	---	74.00	54.00	-14.40	210	150
7326.000	39.74	---	2.28	42.02	---	74.00	54.00	-31.98	80	150
9648.000	33.70	---	4.96	32.66	---	74.00	54.00	-41.34	120	150
12060.000	32.82	---	11.60	38.42	---	74.00	54.00	-35.58	100	150

Mode: Mode A CH6

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
203.146	20.37	peak	12.20	32.57	46.00	-13.43	210	150
960.721	11.85	peak	27.24	39.09	54.00	-14.91	155	150

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
4874.000	40.47	---	-2.18	38.29	---	74.00	54.00	-35.71	120	150
6501.002	60.16	---	0.10	60.26	---	74.00	54.00	-13.74	20	150
7311.000	40.86	---	2.25	43.11	---	74.00	54.00	-30.89	80	510
9748.000	34.25	---	5.34	33.59	---	74.00	54.00	-40.41	120	150
12185.000	31.03	---	11.60	36.63	---	74.00	54.00	-37.37	215	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
193.407	29.86	peak	12.55	42.41	43.50	-1.09	210	150
664.730	10.38	peak	22.88	33.26	46.00	-12.74	100	150

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
4874.000	41.12	---	-2.18	38.94	---	74.00	54.00	-35.06	80	150
6501.002	61.82	---	0.10	61.92	---	74.00	54.00	-12.08	100	150
7311.000	39.98	---	2.25	42.23	---	74.00	54.00	-31.77	150	150
9748.000	33.23	---	5.34	32.57	---	74.00	54.00	-41.43	20	150
12185.000	32.29	---	11.60	37.89	---	74.00	54.00	-36.11	120	150



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

Mode: Mode A CH11

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
203.146	19.51	peak	12.20	31.71	74.00	-42.29	200	150

Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)	
	Peak Ave.	Corr.	Peak Ave.	Peak Ave.				
4924.000	41.31	---	-1.95	39.36	74.00	-34.64	250	150
6565.130	58.26	---	0.28	58.54	74.00	-15.46	200	150
7386.000	40.05	---	2.43	42.48	74.00	-31.52	255	150
9848.000	33.71	---	5.72	33.43	74.00	-40.57	210	150
12310.000	32.49	---	11.60	38.09	74.00	-35.91	240	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
196.653	28.45	peak	12.35	40.80	43.50	-2.70	120	150
834.469	7.75	peak	25.56	33.31	46.00	-12.69	120	150

Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)	
	Peak Ave.	Corr.	Peak Ave.	Peak Ave.				
4924.000	40.87	---	-1.95	38.92	74.00	-35.08	200	150
6565.130	60.59	---	0.28	60.87	74.00	-13.13	210	150
7386.000	39.72	---	2.43	42.15	74.00	-31.85	280	150
9848.000	32.89	---	5.72	32.61	74.00	-41.39	120	150
12310.000	32.38	---	11.60	37.98	74.00	-36.02	100	150

Mode: Mode B CH1

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
202.064	20.72	peak	12.18	32.90	43.50	-10.60	100	150
960.721	10.63	peak	27.24	37.87	54.00	-16.13	200	150



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Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
4824.000	40.79	---	-2.41	38.38	---	74.00	54.00	-35.62	280	150
6428.858	59.62	---	0.11	59.73	---	74.00	54.00	-14.27	200	150
7326.000	39.81	---	2.28	42.09	---	74.00	54.00	-31.91	25	150
9648.000	34.62	---	4.96	33.58	---	74.00	54.00	-40.42	120	150
12060.000	33.35	---	11.60	38.95	---	74.00	54.00	-35.05	320	150

Polarization: Vertical

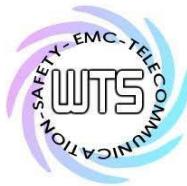
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
195.571	27.53	peak	12.41	39.94	43.50	-3.56	120	150
666.132	11.40	peak	22.89	34.29	46.00	-11.71	210	150

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
4824.000	41.66	---	-2.41	39.25	---	74.00	54.00	-34.75	300	150
6436.874	62.30	---	0.11	62.41	---	74.00	54.00	-11.59	250	150
7326.000	39.55	---	2.28	41.83	---	74.00	54.00	-32.17	200	150
9748.000	34.11	---	5.34	33.45	---	74.00	54.00	-40.55	72	150
12185.000	31.78	---	11.60	37.38	---	74.00	54.00	-36.62	82	150

Mode: Mode B CH6  
Polarization: Horizontal  
Temperature: 26 °C  
Humidity: 52 %  
Engineer: Kevin

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
199.359	20.18	peak	12.18	32.36	43.50	-11.14	280	150
960.721	11.12	peak	27.24	38.36	54.00	-15.64	40	150

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
4874.000	40.35	---	-2.18	38.17	---	74.00	54.00	-35.83	120	150
6501.002	59.42	---	0.10	59.52	---	74.00	54.00	-14.48	120	150
7311.000	40.17	---	2.25	42.42	---	74.00	54.00	-31.58	250	150
9748.000	33.34	---	5.34	32.68	---	74.00	54.00	-41.32	200	150
12185.000	31.70	---	11.60	37.30	---	74.00	54.00	-36.70	210	150



# Worldwide Testing Services(Taiwan) Co., Ltd.

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FCC ID: W8ONW06-WA54UP

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
196.653	29.30	peak	12.35	41.65	43.50	-1.85	20	150
816.232	6.75	peak	25.39	32.14	46.00	-13.86	240	150

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	
4874.000	40.68	---	-2.18	38.50	---	74.00	54.00	-35.50
6501.002	62.28	---	0.10	62.38	---	74.00	54.00	-11.62
7311.000	39.49	---	2.25	41.74	---	74.00	54.00	-32.26
9748.000	34.11	---	5.34	33.45	---	74.00	54.00	-40.55
12185.000	31.62	---	11.60	37.22	---	74.00	54.00	-36.78

Mode: Mode B CH11

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
202.605	20.29	peak	12.19	32.48	43.50	-11.02	40	150
960.721	10.30	peak	27.24	37.54	54.00	-16.46	120	150

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	
4924.000	41.40	---	-1.95	39.45	---	74.00	54.00	-34.55
6565.130	58.38	---	0.28	58.66	---	74.00	54.00	-15.34
7386.000	39.66	---	2.43	42.09	---	74.00	54.00	-31.91
9848.000	33.77	---	5.72	33.49	---	74.00	54.00	-40.51
12310.000	33.20	---	11.60	38.80	---	74.00	54.00	-35.20

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
196.653	26.33	peak	12.35	38.68	43.50	-4.82	215	150
914.429	6.70	peak	26.57	33.27	46.00	-12.73	210	150



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Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4924.000	41.65	---	-1.95	39.70	---	74.00	54.00	-34.30	200	150
6565.130	60.20	---	0.28	60.48	---	74.00	54.00	-13.52	120	150
7386.000	40.05	---	2.43	42.48	---	74.00	54.00	-31.52	280	150
9848.000	33.27	---	5.72	32.99	---	74.00	54.00	-41.01	82	150
12310.000	32.96	---	11.60	38.56	---	74.00	54.00	-35.44	55	150

**Note**

1. Correction Factor = Antenna factor + Cable loss - Preamplifier
2. The formula of measured value as: Test Result = Reading + Correction Factor
3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.
5. See the attached diagram as appendix.

**TEST RESULT (Transmitter):** The unit DOES meet the FCC requirements.

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 017, ETSTW-RE 018, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 042, ETSTW-RE 043



# Worldwide Testing Services(Taiwan) Co., Ltd.

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FCC ID: W8ONW06-WA54UP

## 3.6 Radiated Emission on the band edge

According to FCC rules part 15 subpart C §15.247(c) in any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required.

In addition radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also with the radiated emission limits.

### Mode A

Test conditions		Attenuation at or outside band-edges	
		Lower Band-edge	Upper Band-edge
$T_{nom}= 23^{\circ}C$	$V_{nom} = 120 \text{ V}$	38.96 dB	45.15 dB

### Mode B

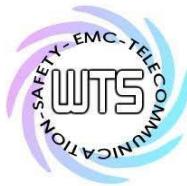
Test conditions		Attenuation at or outside band-edges	
		Lower Band-edge	Upper Band-edge
$T_{nom}= 23^{\circ}C$	$V_{nom} = 120 \text{ V}$	38.92 dB	44.18 dB

Limit:

Frequency Range / MHz	Limit
902 – 928	
2400 – 2483.5	- 20 dB
5725 - 5850	

Test equipment used: ETSTW-RE 055

Explanation: Please see attached diagram as appendix.



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

## 3.7 Minimum 6 dB Bandwidth

The analyzer ResBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK reading was taken, two markers were set 6 dB below the maximum level on the right and the left side of the emission.

The 6 dB bandwidth is the frequency difference between the two markers.

### Mode A

Test conditions	6 dB Bandwidth		
	Channel 1	Channel 6	Channel 11
T <sub>nom</sub> = 23°C    V <sub>nom</sub> = 120 V	11.826923077 MHz	11.987179487 MHz	11.987179487 MHz

### Mode B

Test conditions	6 dB Bandwidth		
	Channel 1	Channel 6	Channel 11
T <sub>nom</sub> = 23°C    V <sub>nom</sub> = 120 V	16.570512821 MHz	16.602564103 MHz	16.602564103 MHz

### Limits:

Frequency Range MHz	Limits
902-928	min 500 kHz
2400-2483.5	min 500 kHz
5725-5850	min 500 kHz

Test equipment used: ETSTW-RE 055

Explanation: See attached diagrams in Appendix.



# Worldwide Testing Services(Taiwan) Co., Ltd.

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## 3.8 Peak Power Spectral Density

Peak Power Spectral density is measured at low, middle and high channel.

The peak output power is measured with a measurement bandwidth of 10 MHz and displayed on diagram together with Peak Power Spectral Density result which was measured with a bandwidth of 3 kHz, appreciate frequency span and sweep time.

### Mode A

Test conditions		Peak Power Spectral Density (3 kHz)		
		Channel 1 [dBm]	Channel 6 [dBm]	Channel 11 [dBm]
T <sub>nom</sub> = 23°C	V <sub>nom</sub> = 120 V	-21.18	-21.09	-19.57

### Mode B

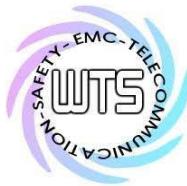
Test conditions		Peak Power Spectral Density (3 kHz)		
		Channel 1 [dBm]	Channel 6 [dBm]	Channel 11 [dBm]
T <sub>nom</sub> = 23°C	V <sub>nom</sub> = 120 V	-23.07	-24.10	-23.68

### Limits:

Frequency Range MHz	dBm
902-928	8
2400-2483.5	8
5725-5850	8

Test equipment used: ETSTW-RE 055

Explanation: See attached diagrams in Appendix.



# Worldwide Testing Services(Taiwan) Co., Ltd.

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FCC ID: W8ONW06-WA54UP

## **3.9 Radiated Emission from Digital Part**

According to FCC part 15.109 (g), digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement".

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 017, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 042, ETSTW-RE 043

Explanation: The test results are listed in the separated test report no. W6M20903-9663-P-15B.



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

## **3.10 Power Line Conducted Emission**

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Frequency	Level (dB $\mu$ V)	
	quasi-peak	average
150 kHz	lower limit line	Lower limit line

Model: WA-54U Pro Date: 2009/4/25  
Mode: Temperature: 24 °C Engineer: Kevin  
Polarization: N Humidity: 51 %

Frequency (MHz)	Reading (dB $\mu$ V)		Factor (dB) Corr.	Result (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)
	QP	Ave.		QP	Ave.	QP	Ave.	
0.1850	30.56	12.93	19.69	50.25	32.62	64.26	54.26	-14.01
0.4860	6.12	-2.13	19.75	25.87	17.62	56.24	46.24	-28.62
0.7250	17.02	13.76	19.72	36.74	33.48	56.00	46.00	-12.52
1.8475	7.60	0.55	19.67	27.27	20.22	56.00	46.00	-25.78
3.8200	6.39	0.24	19.76	26.15	20.00	56.00	46.00	-26.00
17.0000	14.00	5.89	20.26	34.26	26.15	60.00	50.00	-23.85

Polarization: L1

Frequency (MHz)	Reading (dB $\mu$ V)		Factor (dB) Corr.	Result (dB $\mu$ V)		Limit (dB $\mu$ V)		Margin (dB)
	QP	Ave.		QP	Ave.	QP	Ave.	
0.1884	30.50	14.66	19.69	50.19	34.35	64.11	54.11	-13.92
0.2744	18.79	5.95	19.62	38.41	25.57	60.98	50.98	-22.57
0.5365	14.19	0.09	19.76	33.95	19.85	56.00	46.00	-22.05
0.7300	12.26	3.12	19.73	31.99	22.85	56.00	46.00	-23.15
4.8500	8.32	2.96	19.74	28.06	22.70	56.00	46.00	-23.30
17.4027	15.06	6.39	20.15	35.21	26.54	60.00	50.00	-23.46

**Note**

- 1. The formula of measured value as: Test Result = Reading + Correction Factor**
- 2. The Correction Factor = Cable Loss + LISN Insertion Loss + Pulse Limit Loss**
- 3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average**
- 4. All not in the table noted test results are more than 20 dB below the relevant limits.**
- 5. See attached diagrams as appendix.**



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

## **Limits:**

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test equipment used:ETSTW-CE 001, ETSTW-CE 003, ETSTW-CE 004, ETSTW-CE 006

Explanation: See attached diagrams in Appendix.



# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20903-9663-C-1  
FCC ID: W8ONW06-WA54UP

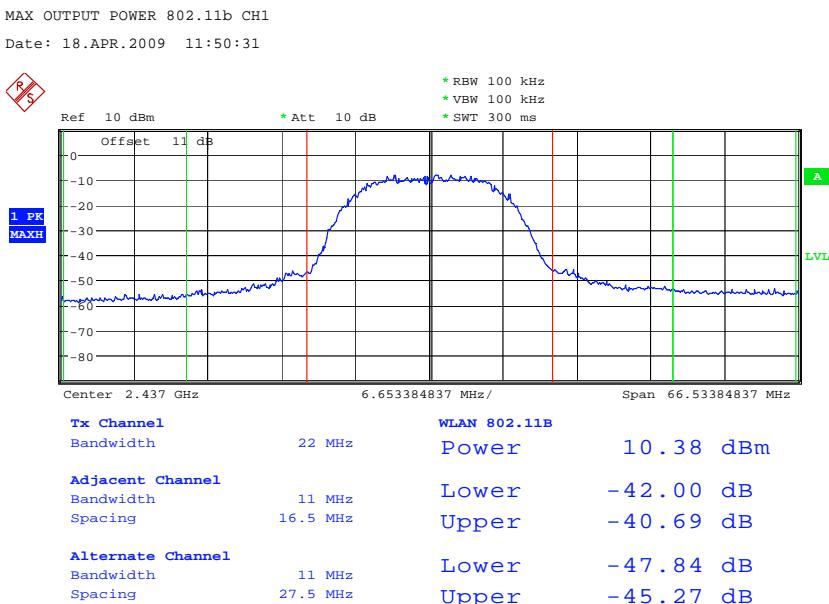
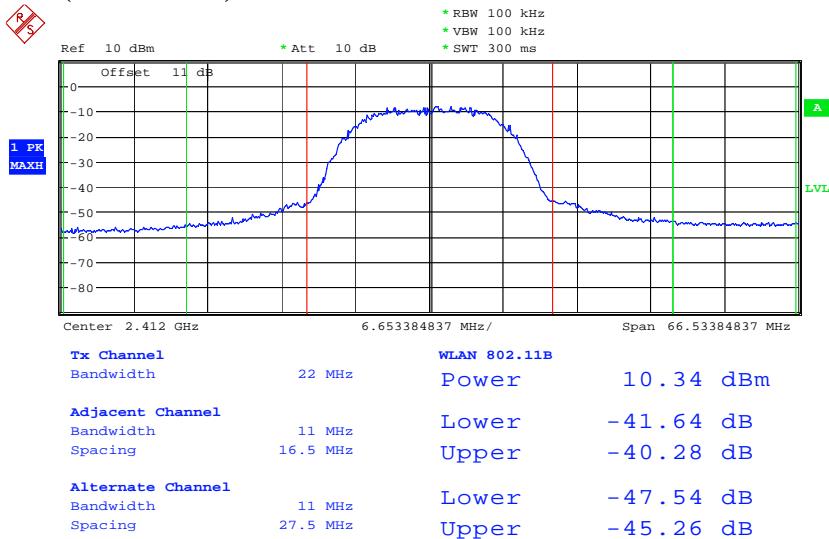
## Appendix

### **Measurement diagrams**

1. Peak Output Power
2. Spurious Emissions Radiated
3. Band Edge Measurement
4. Minimum 6dB Bandwidth
5. Peak Power Spectral Density
6. Power Line Conducted Emission

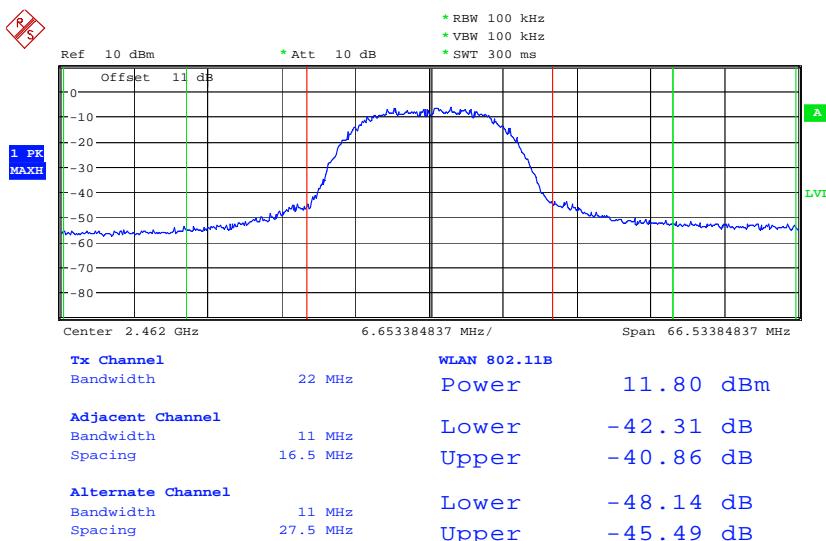
Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP

## Peak Output Power 802.11B Mode ( Mode A )



Registration number: W6M20903-9663-C-1

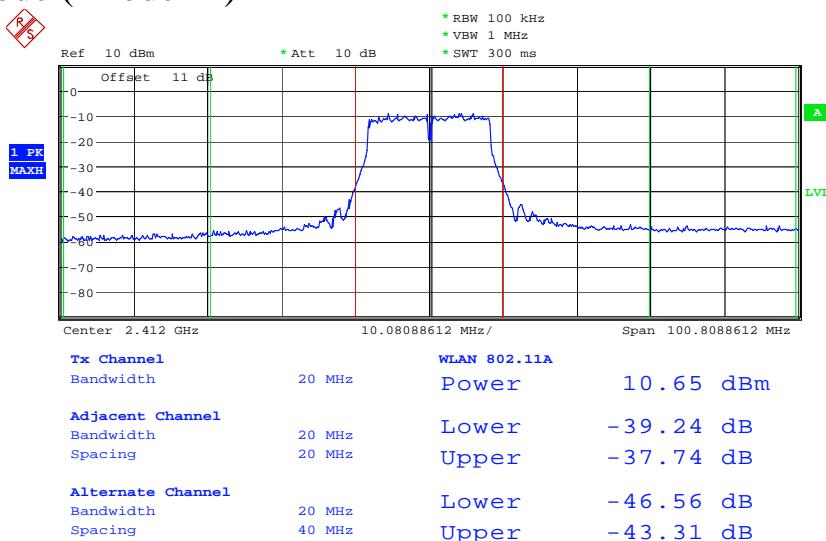
FCC ID: W8ONW06-WA54UP



MAX OUTPUT POWER 802.11b CH11

Date: 18.APR.2009 11:56:32

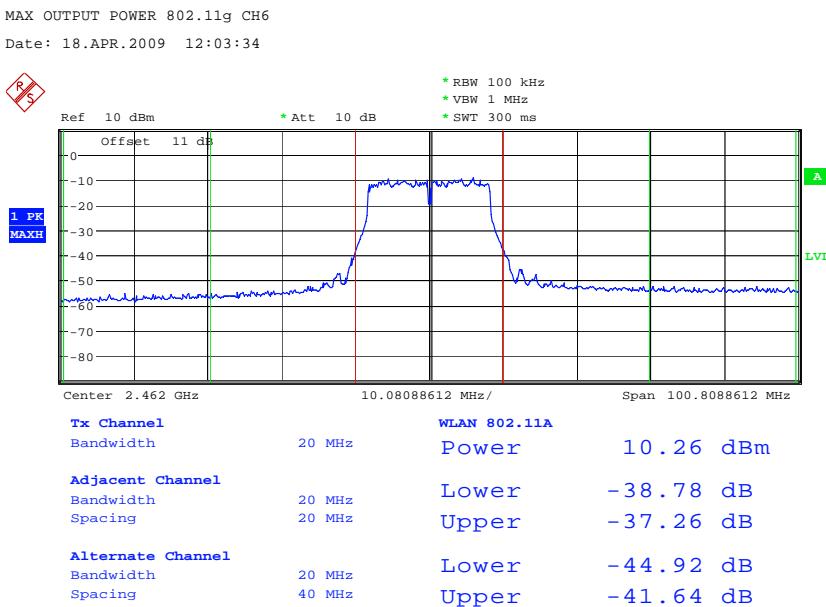
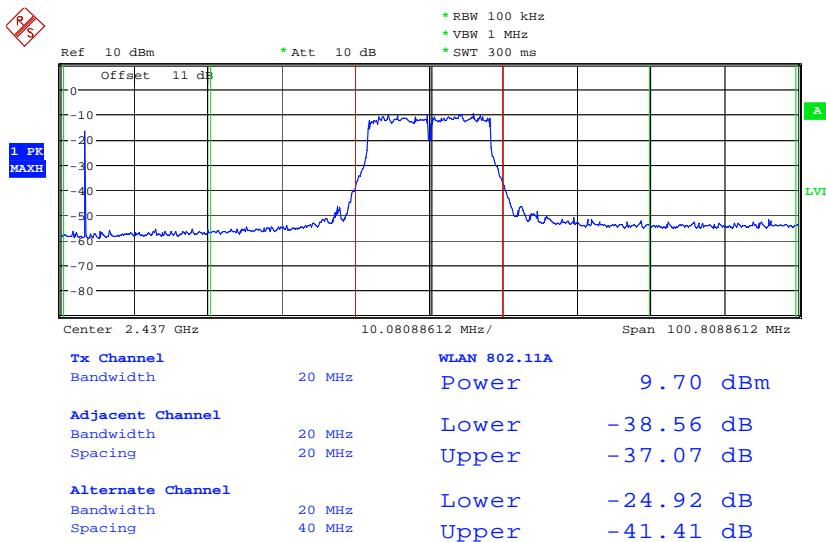
## 802.11G Mode ( Mode B )



MAX OUTPUT POWER 803 11g CH1

Date: 18 ABR 2009 12:01:36

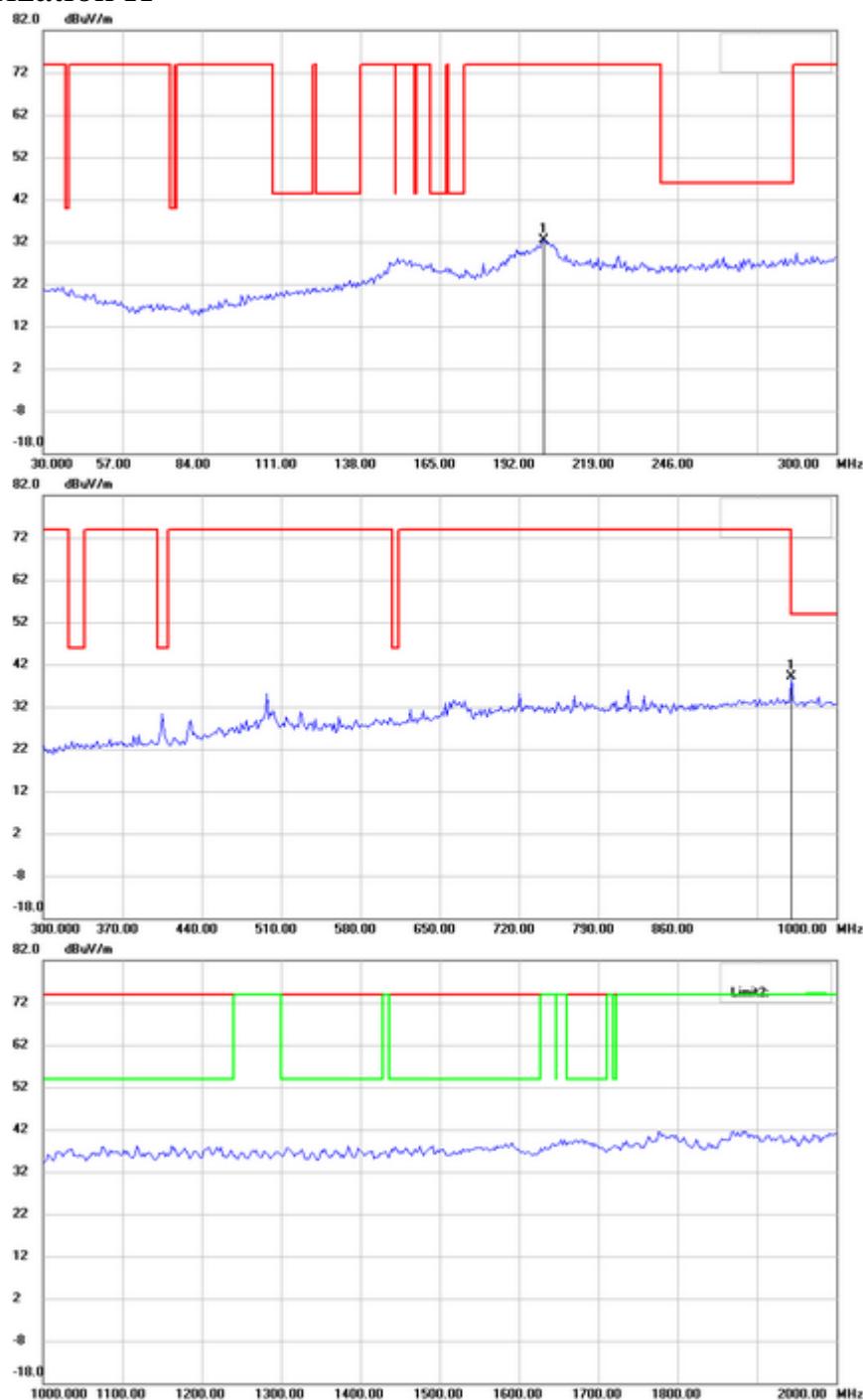
Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP



Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

**Spurious Emissions Radiated  
802.11B Mode ( Mode A )\_CH1  
Antenna Polarization H**



**Up Line: Peak Limit Line**

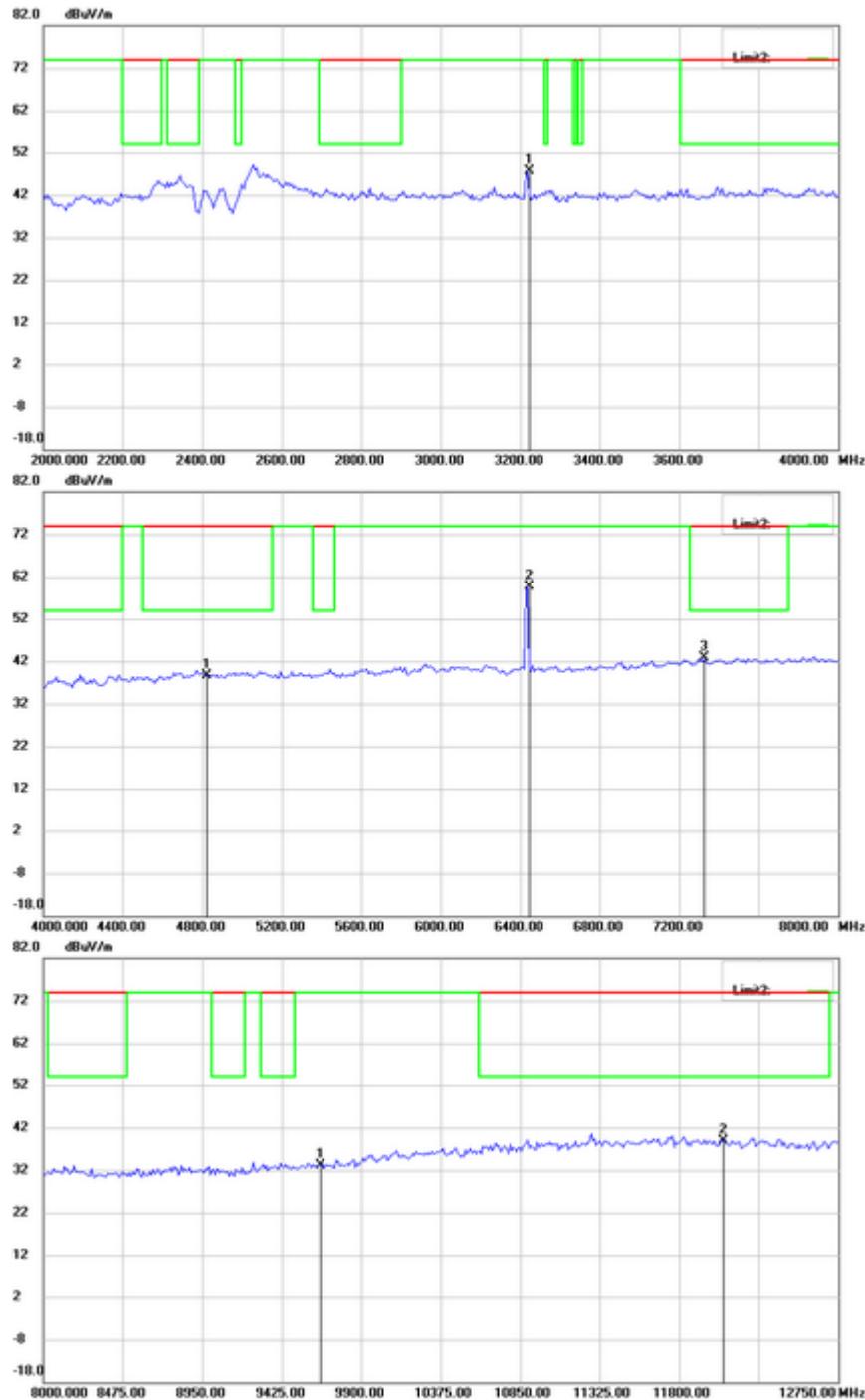
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

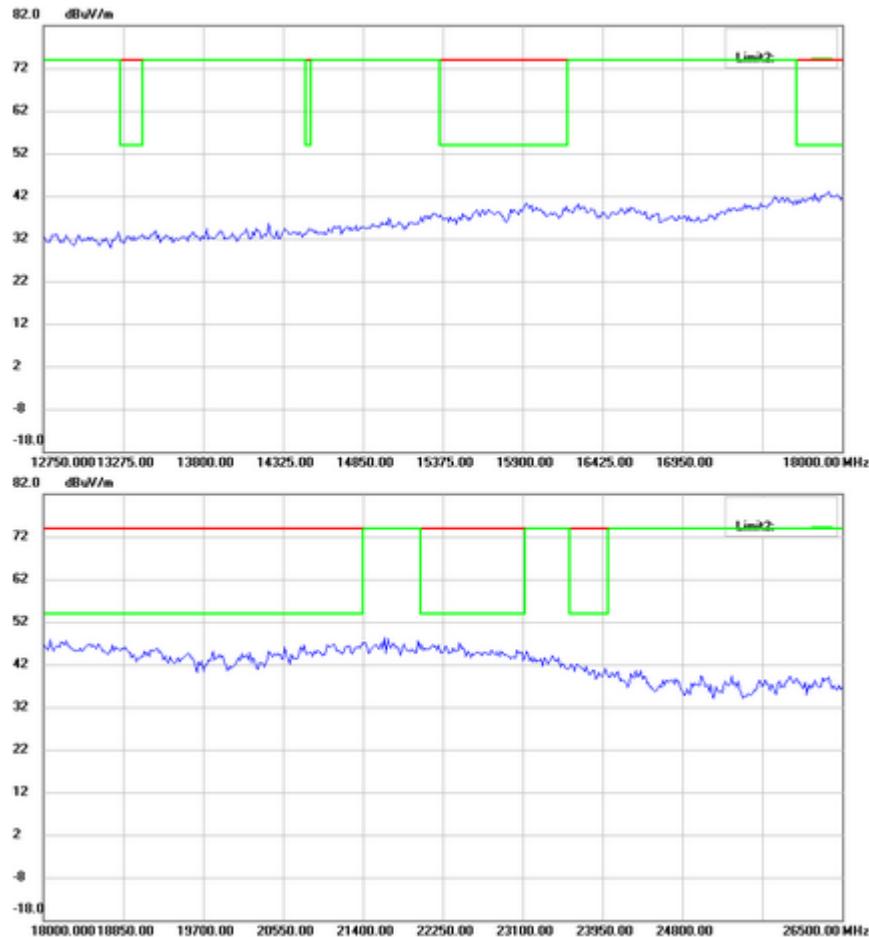
**Down Line: Ave Limit Line**

**Note:**

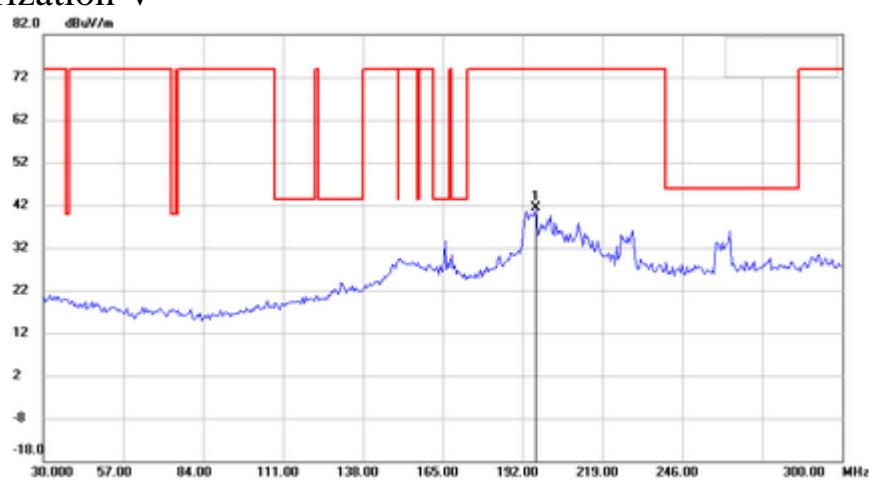
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



Antenna Polarization V



**Up Line: Peak Limit Line**

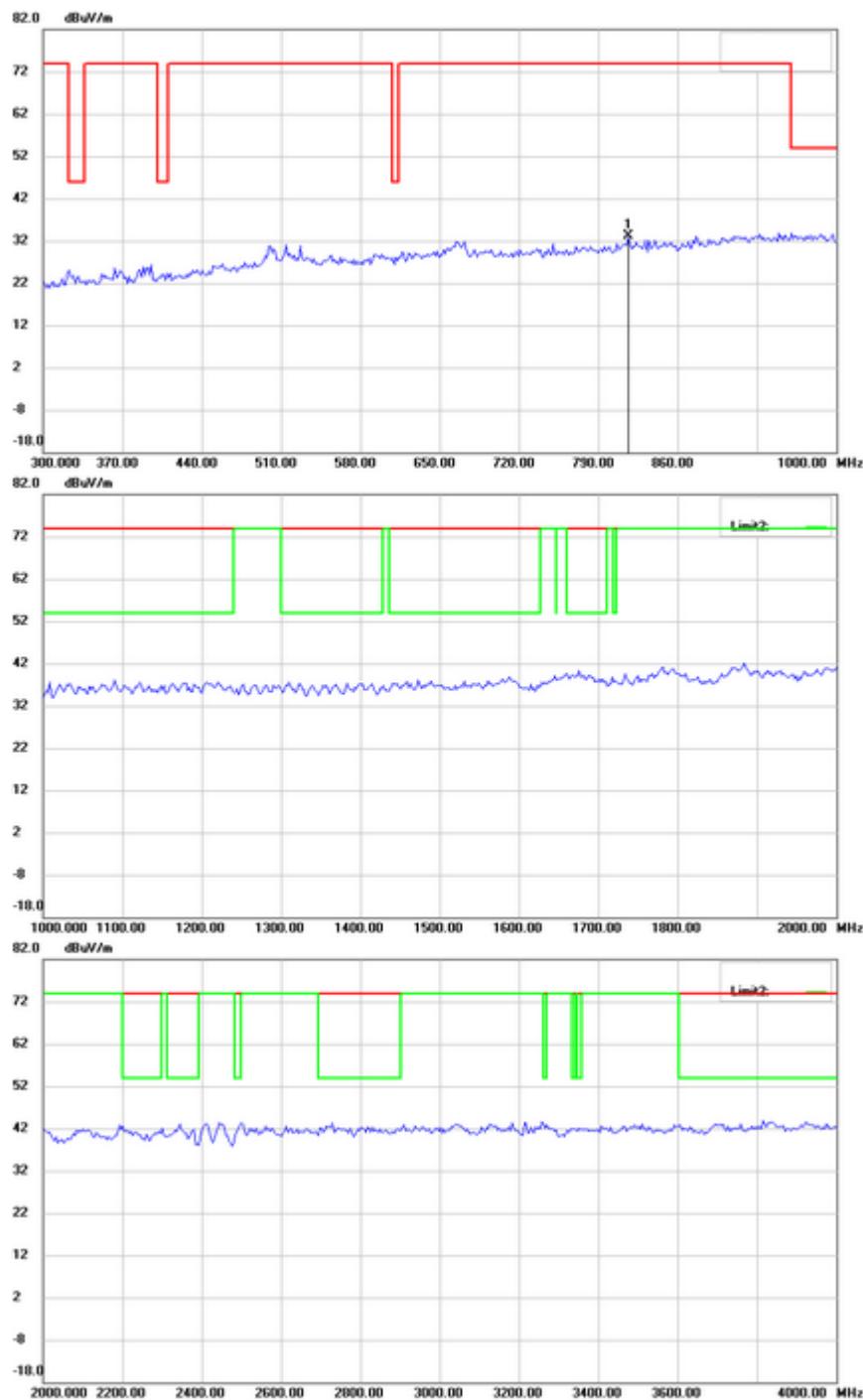
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

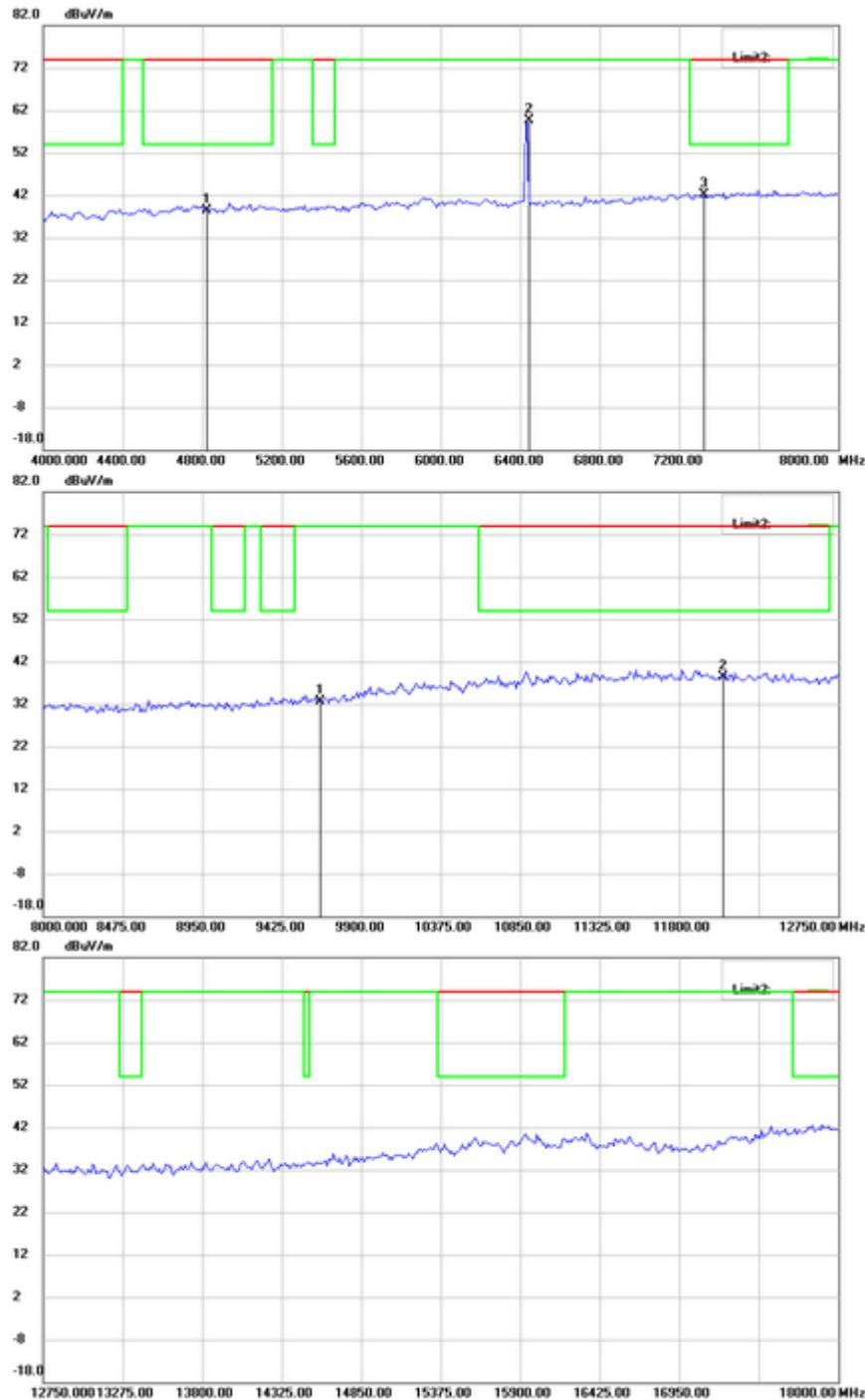
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

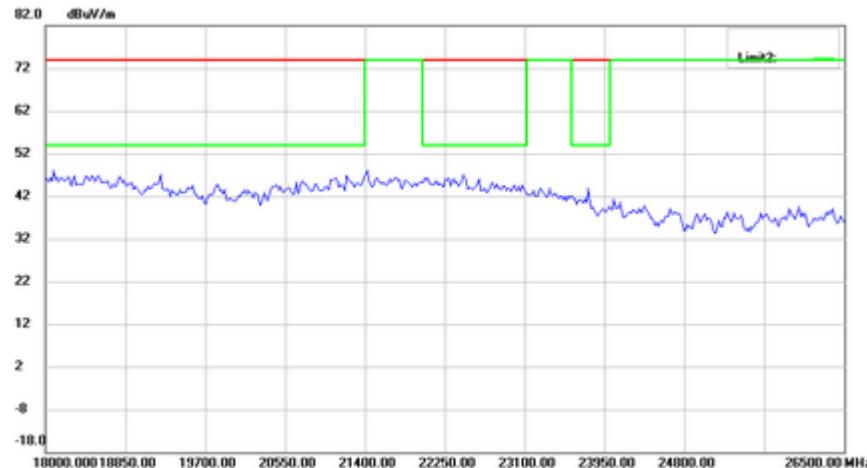
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

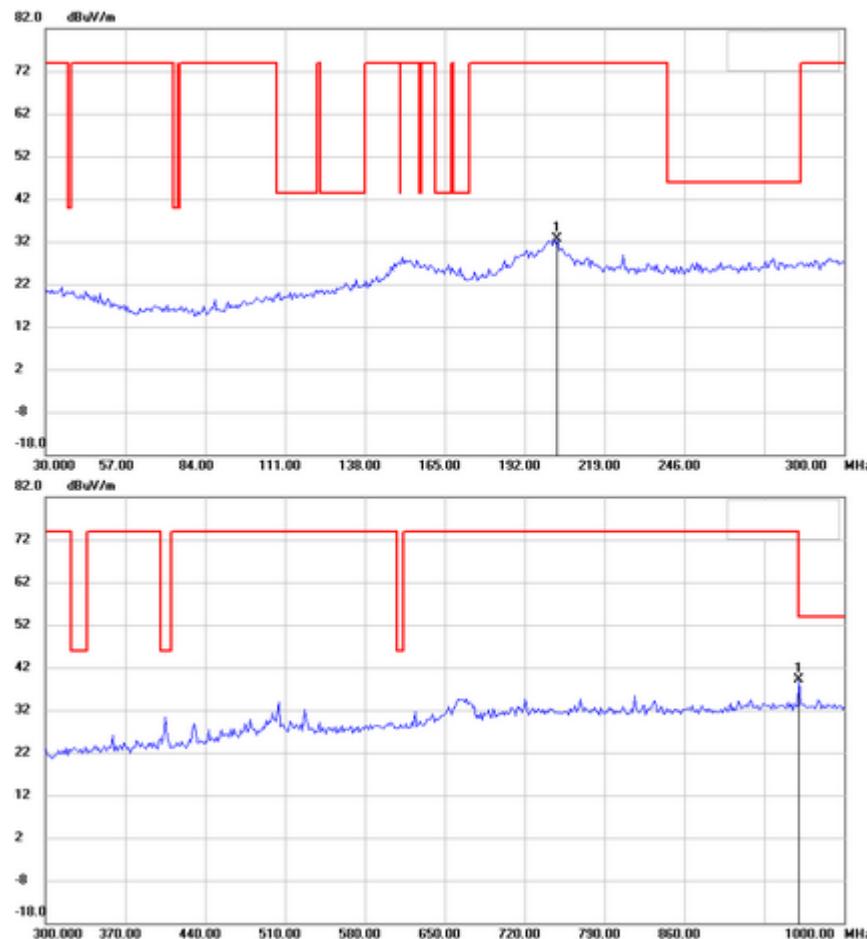
Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



802.11B Mode ( Mode A )\_CH6

Antenna Polarization H



Up Line: Peak Limit Line

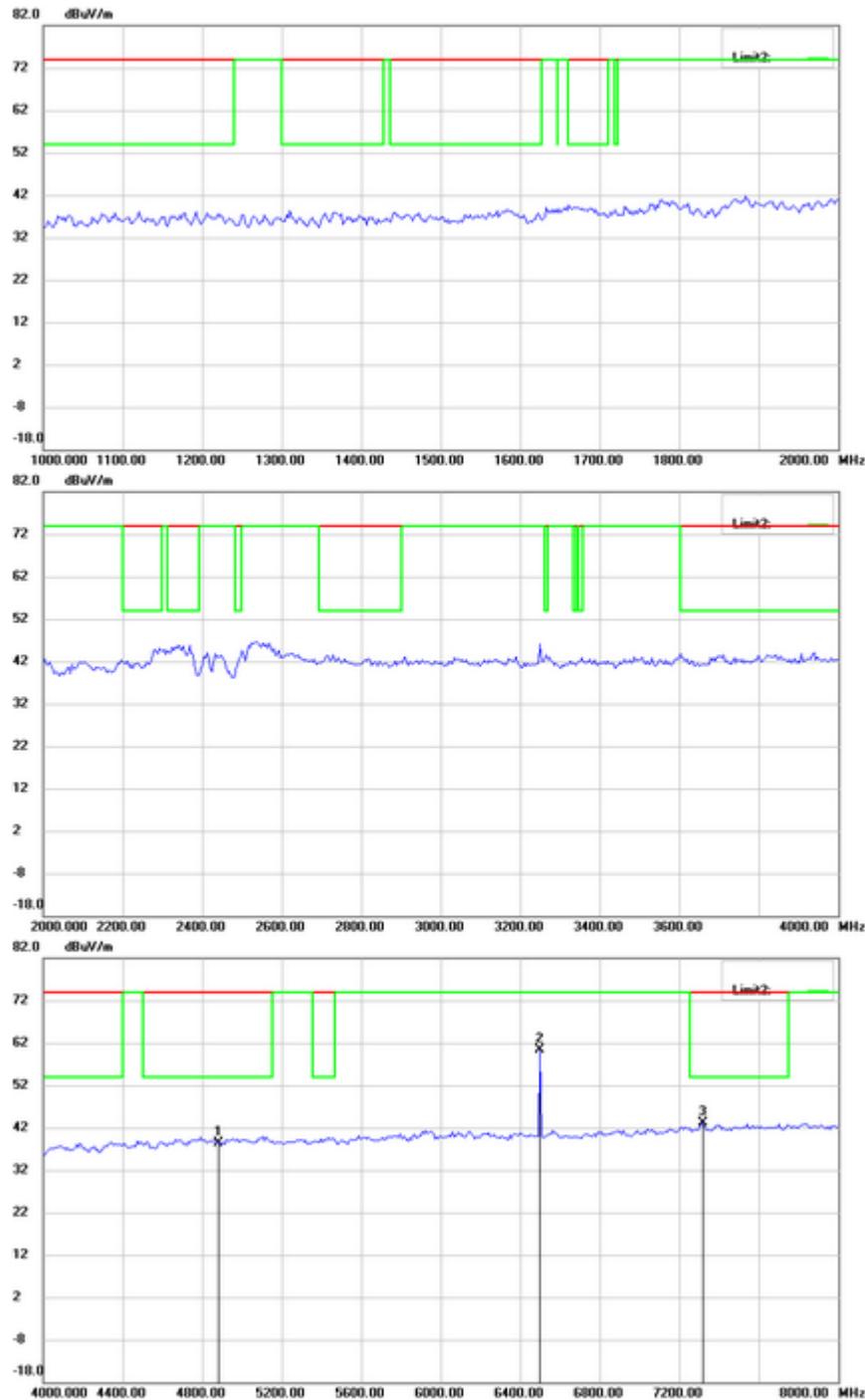
Down Line: Ave Limit Line

Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

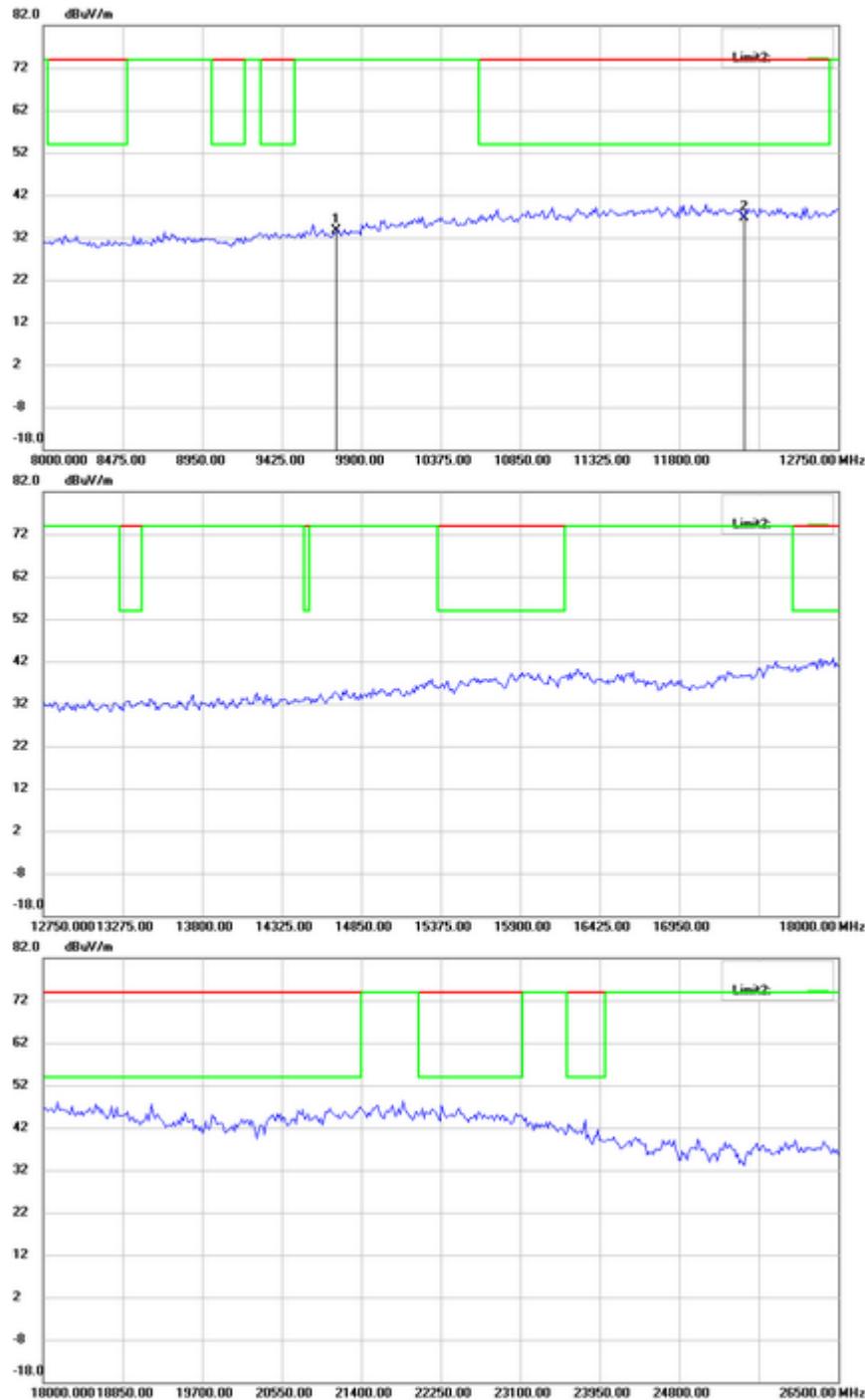
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

**Down Line: Ave Limit Line**

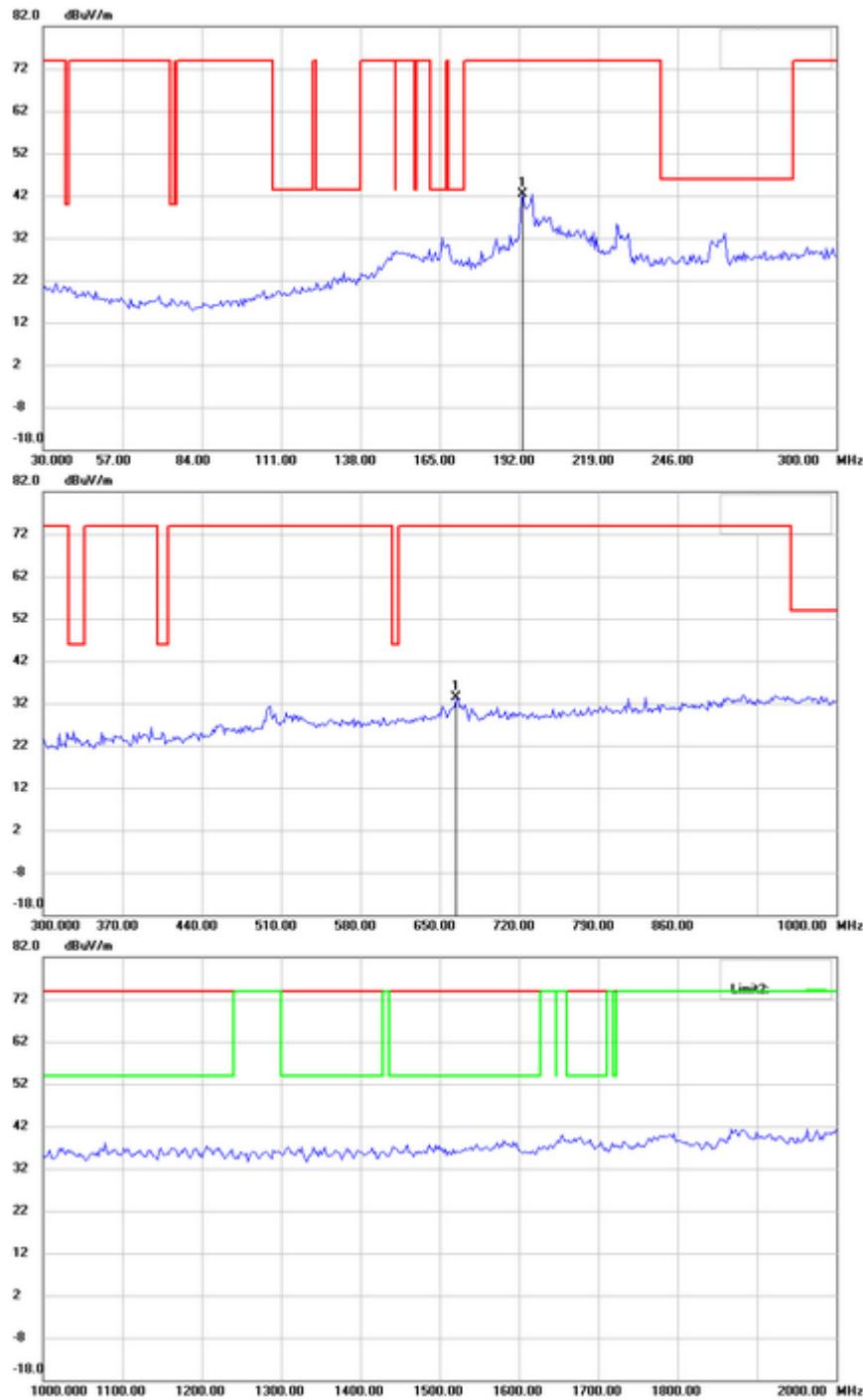
**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

## Antenna Polarization V



**Up Line: Peak Limit Line**

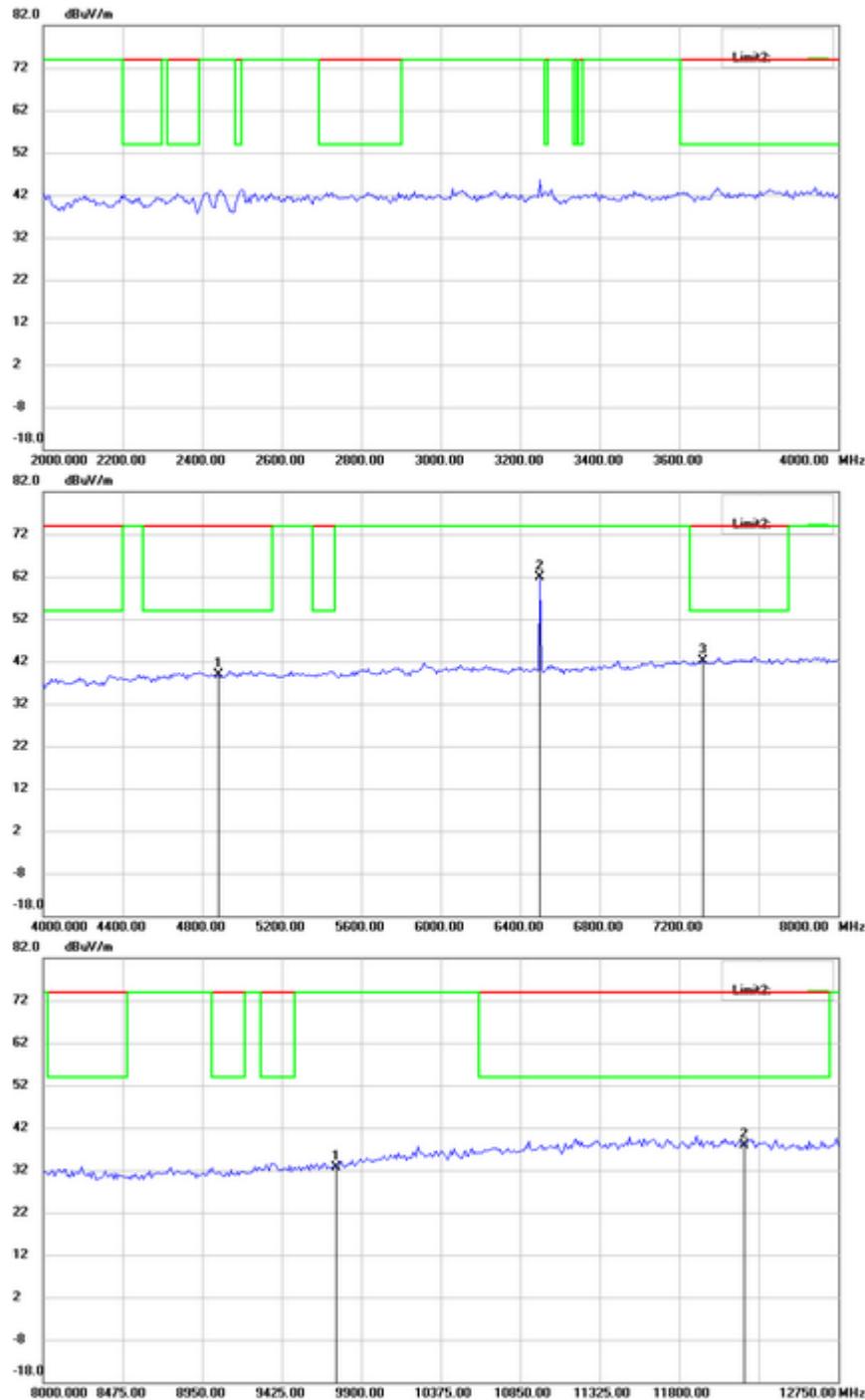
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

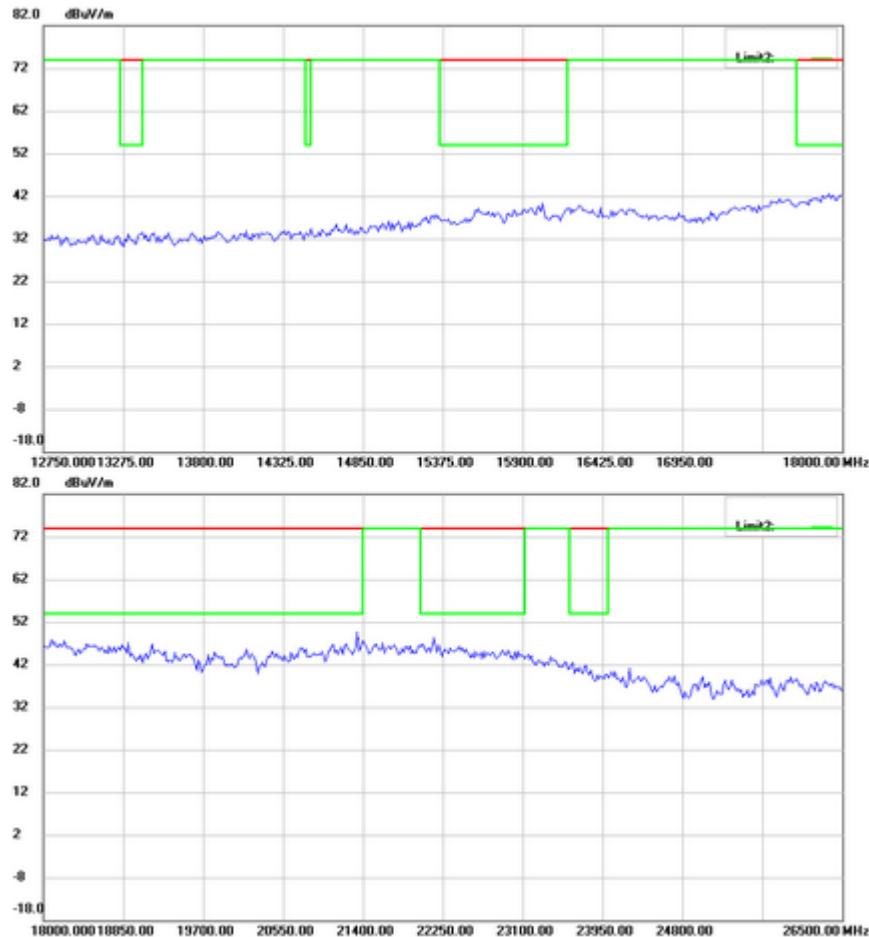
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

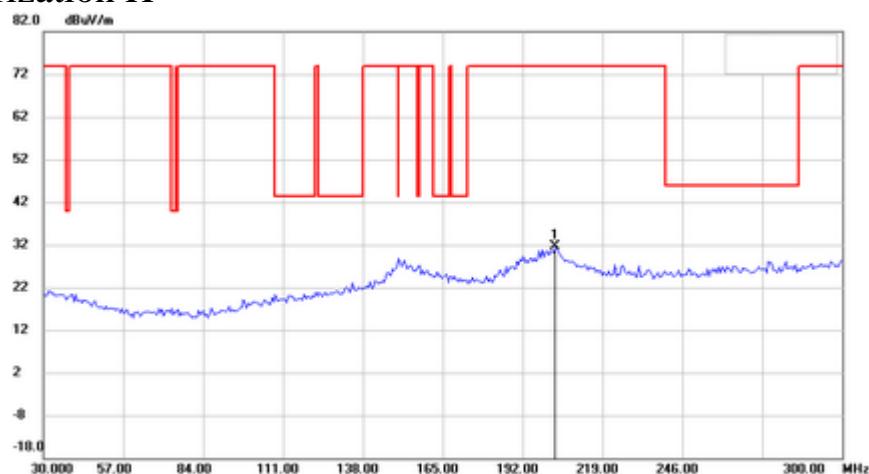
Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



802.11B Mode ( Mode A )\_CH11

Antenna Polarization H



**Up Line: Peak Limit Line**

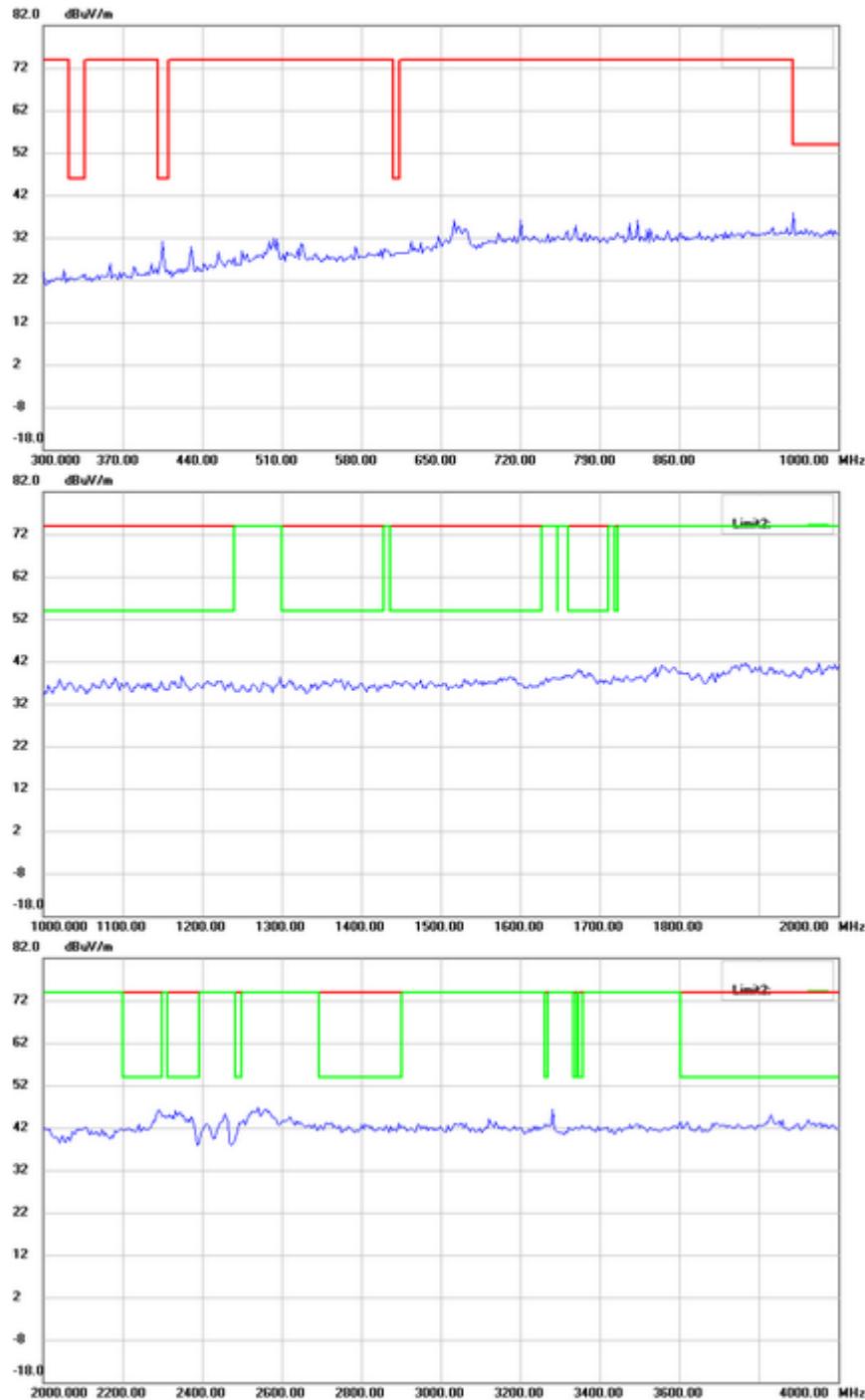
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

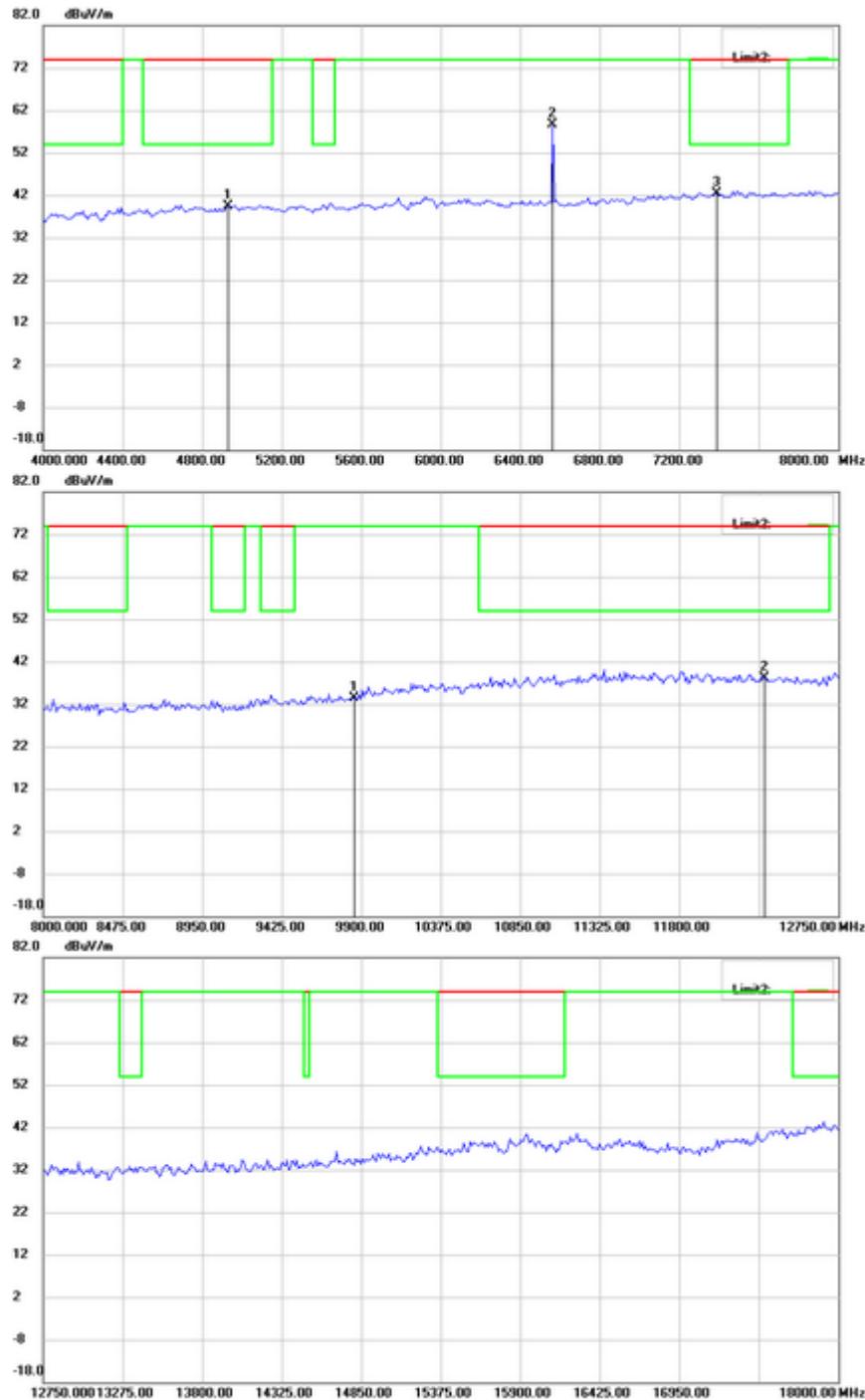
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

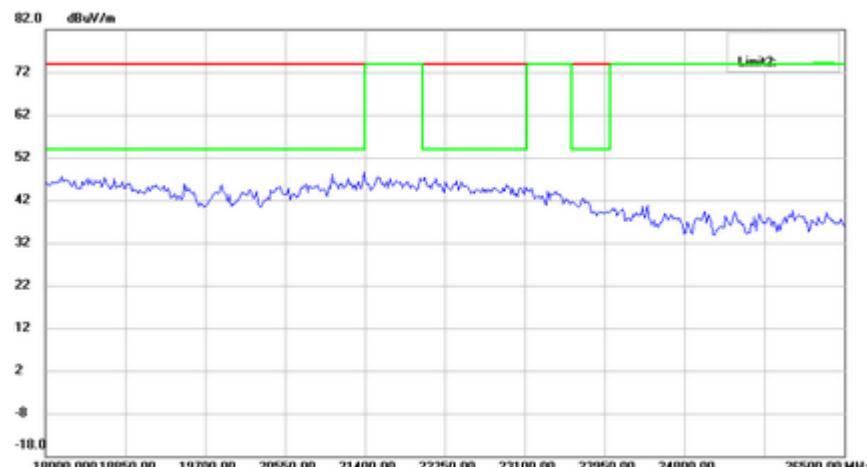
**Down Line: Ave Limit Line**

**Note:**

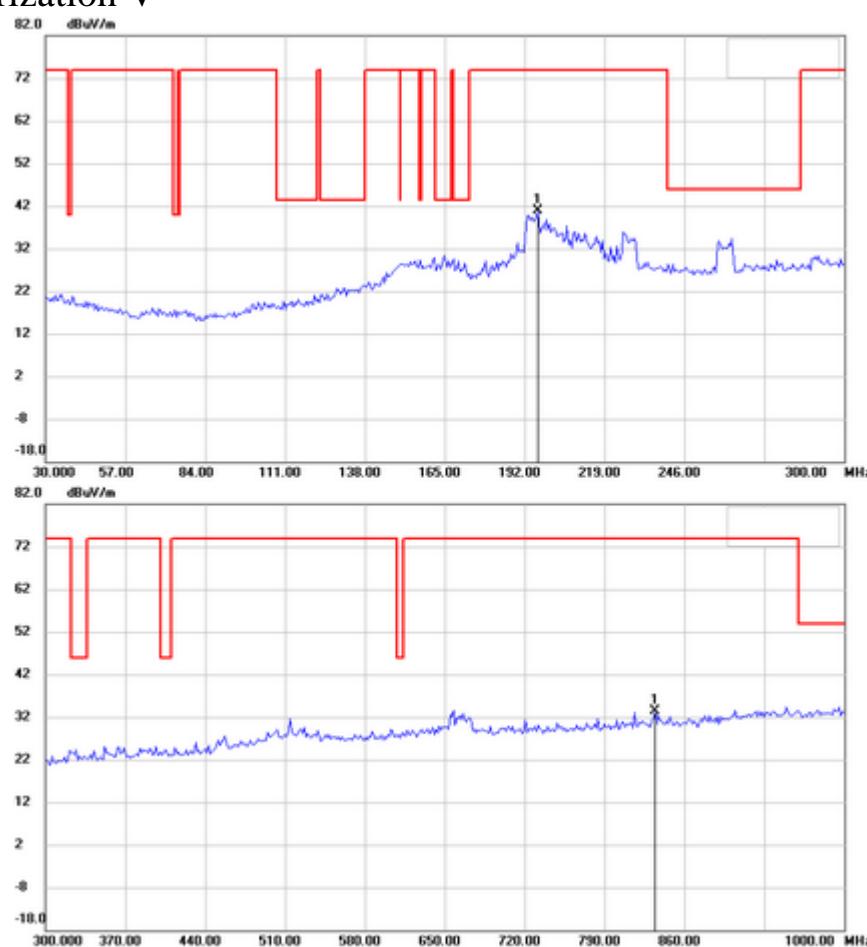
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



## Antenna Polarization V



**Up Line: Peak Limit Line**

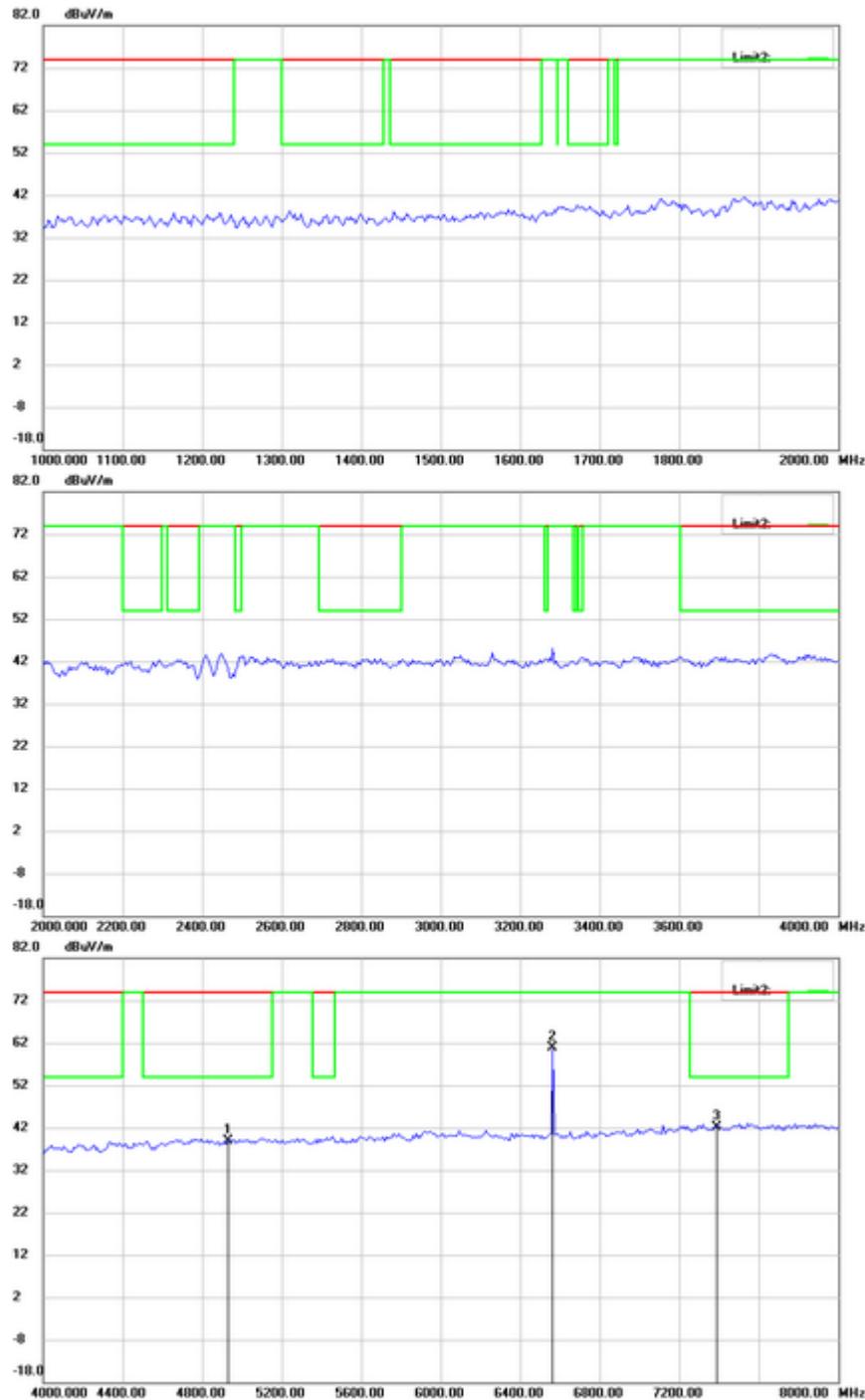
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

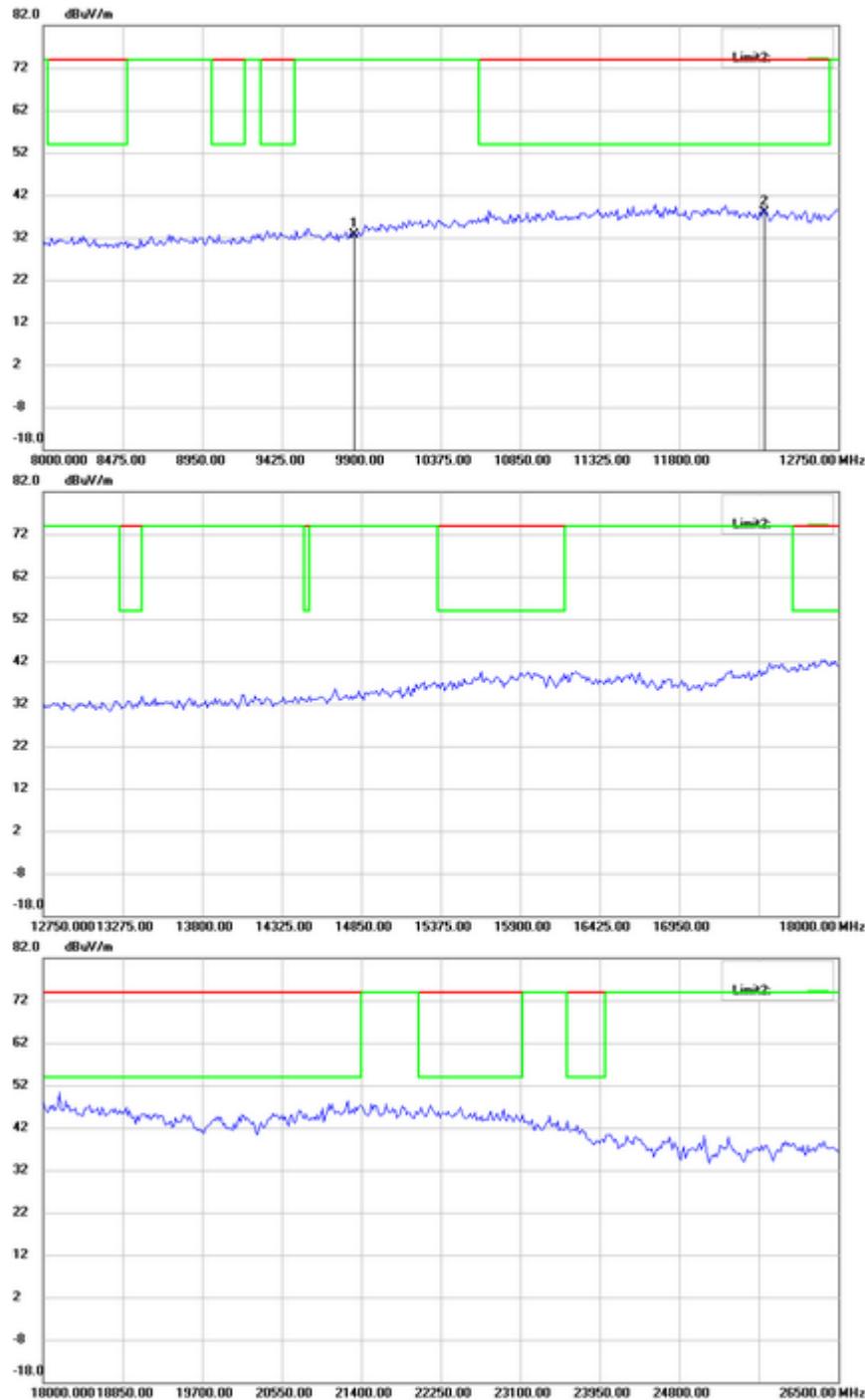
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

**Down Line: Ave Limit Line**

**Note:**

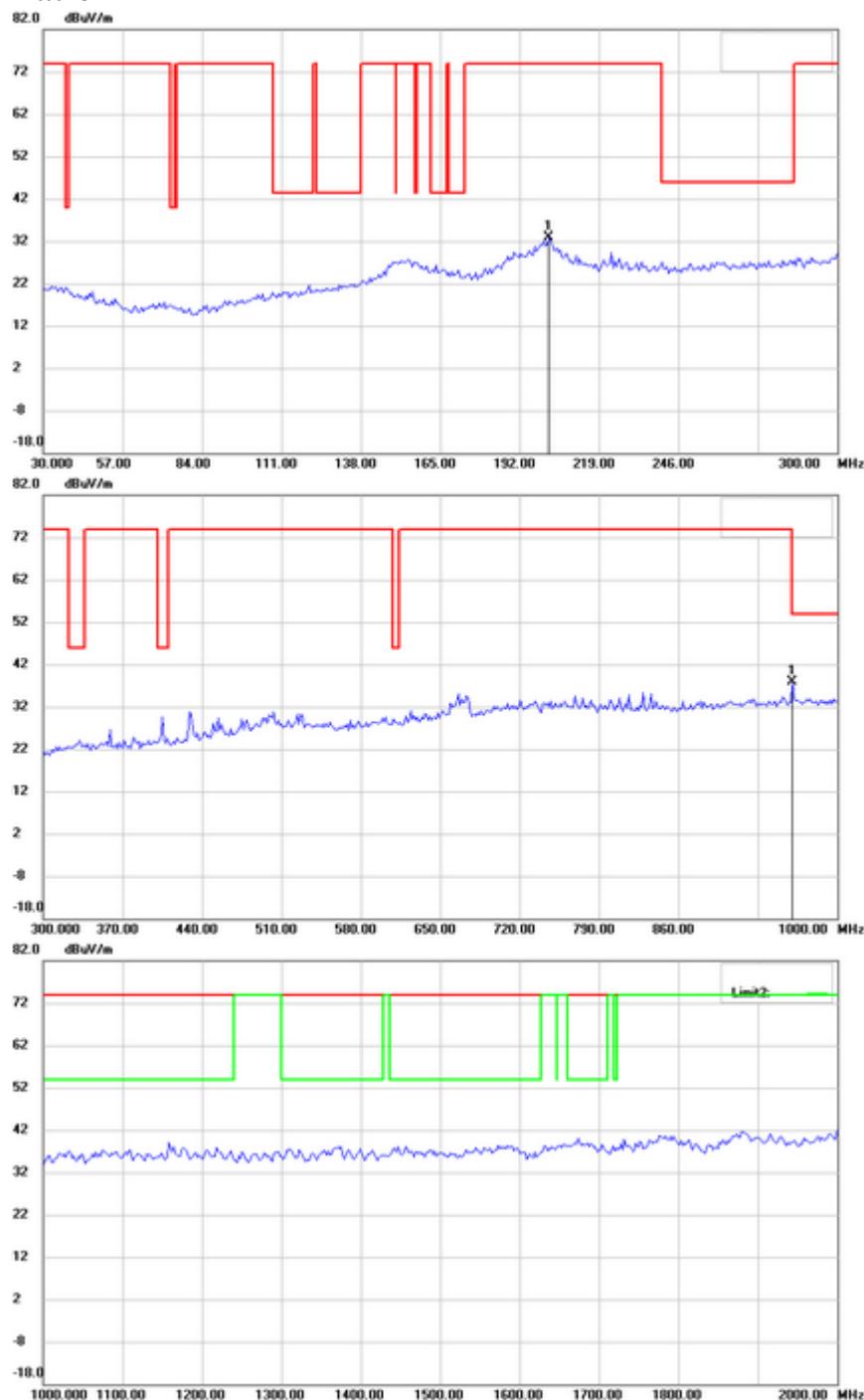
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

802.11G Mode ( Mode B )\_CH1

Antenna Polarization H



**Up Line: Peak Limit Line**

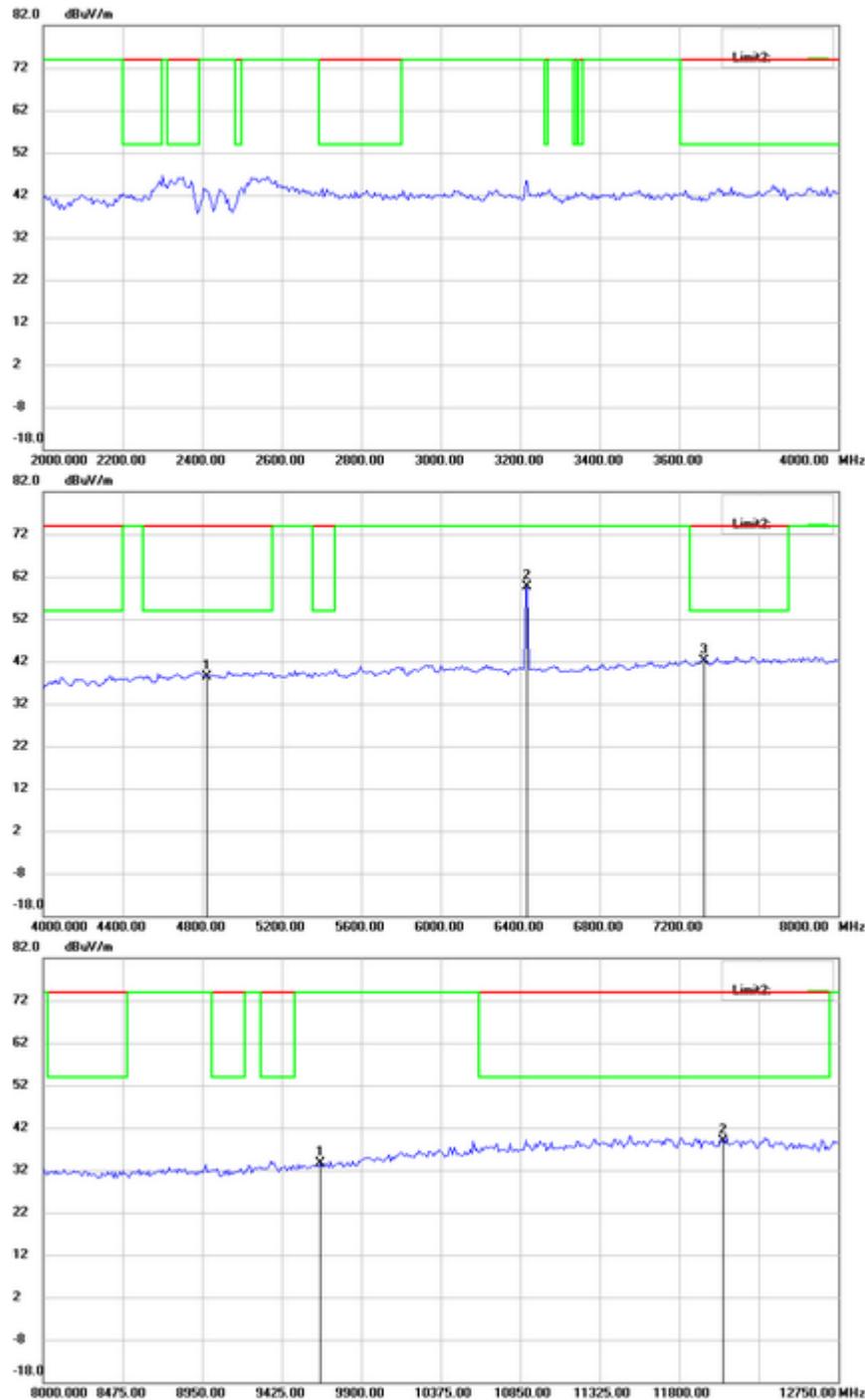
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

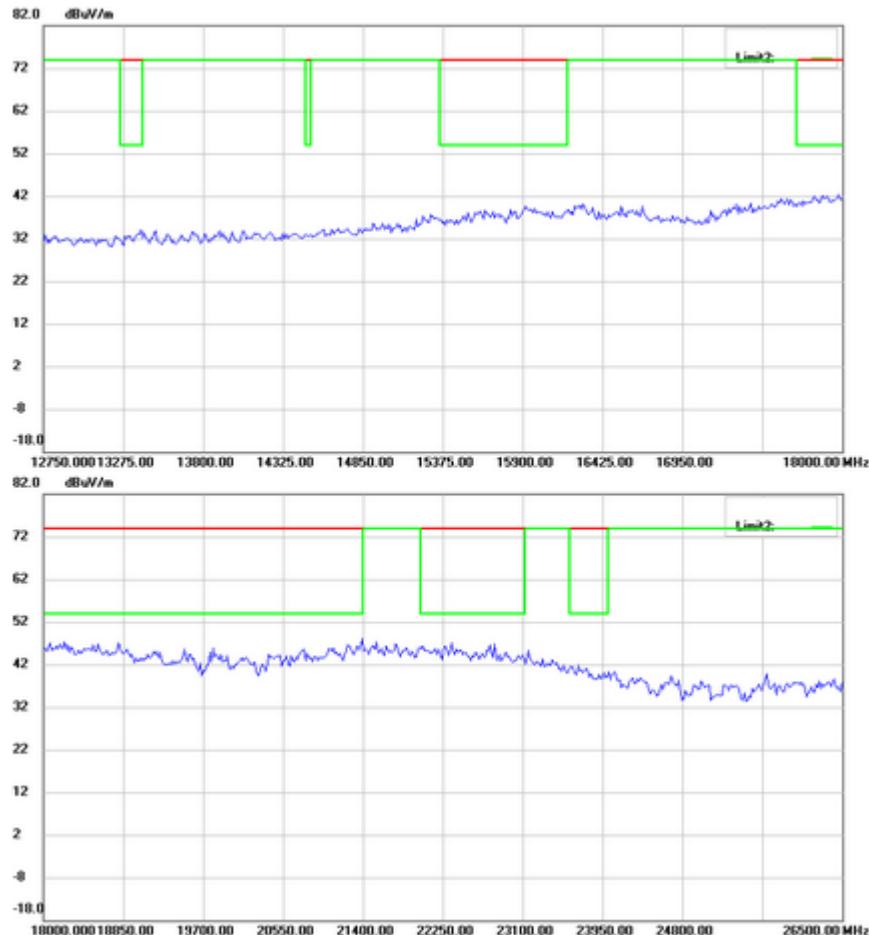
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



Antenna Polarization V



**Up Line: Peak Limit Line**

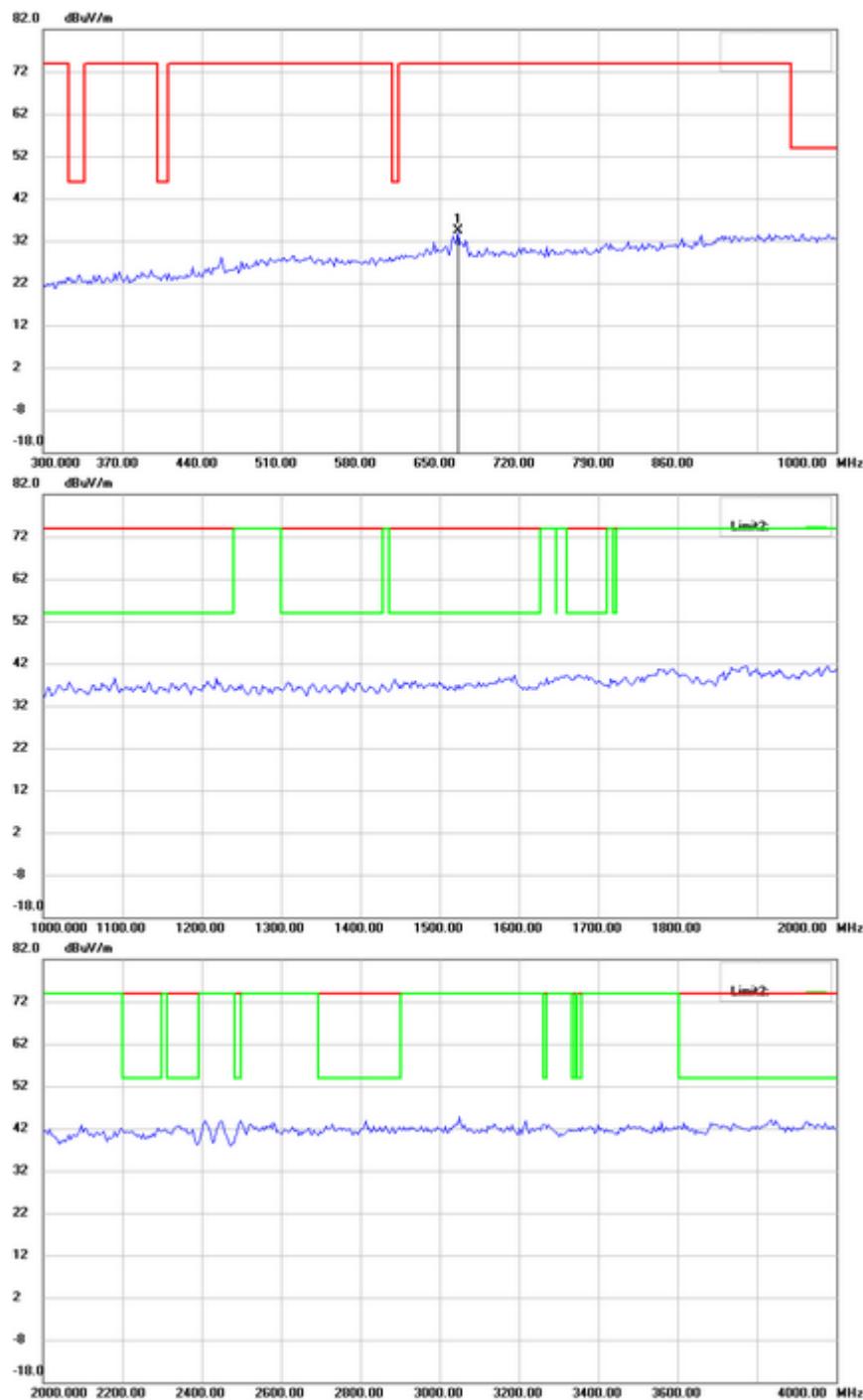
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

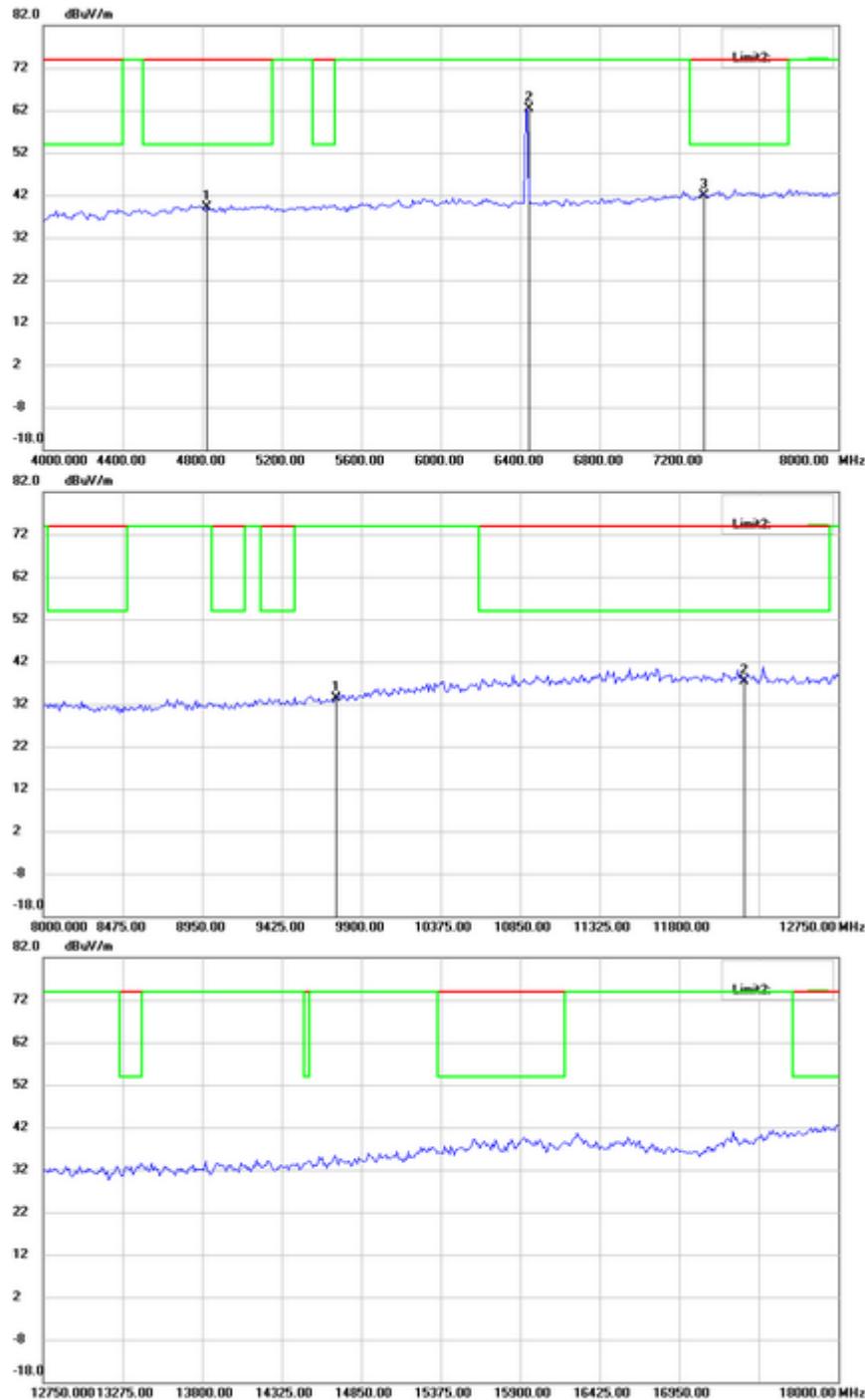
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

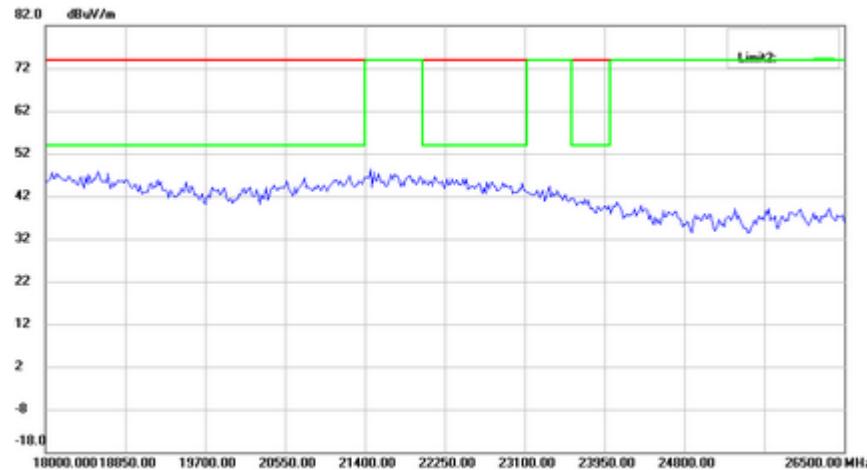
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

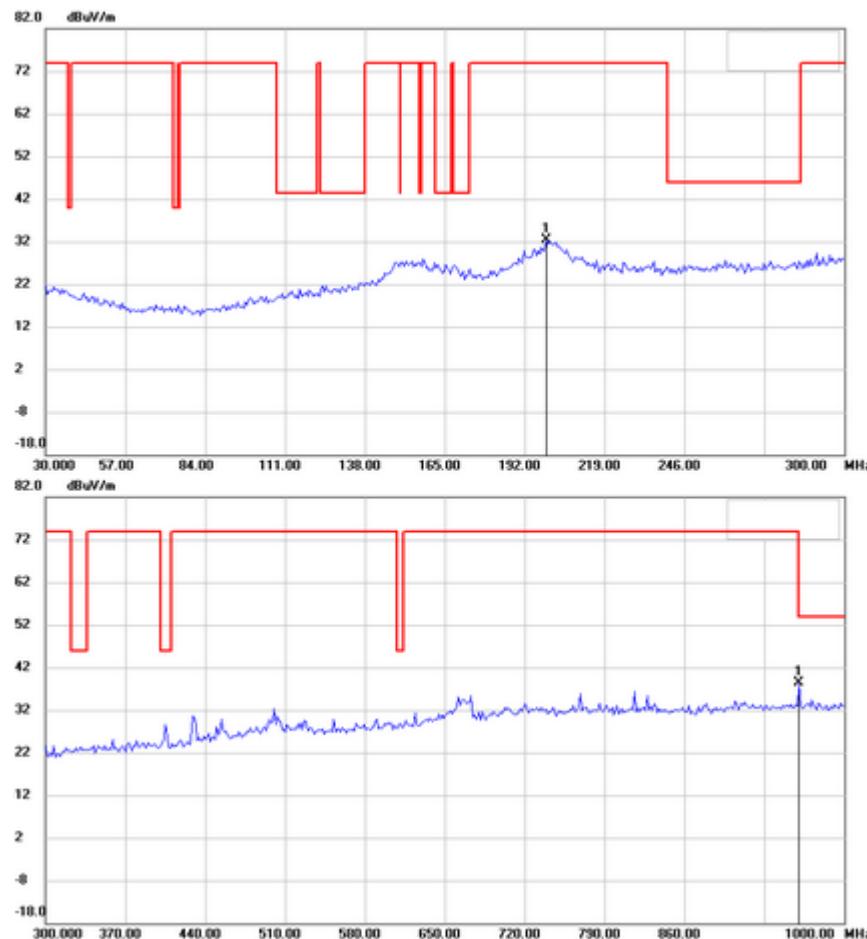
Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



802.11G Mode ( Mode B )\_CH6

Antenna Polarization H



**Up Line: Peak Limit Line**

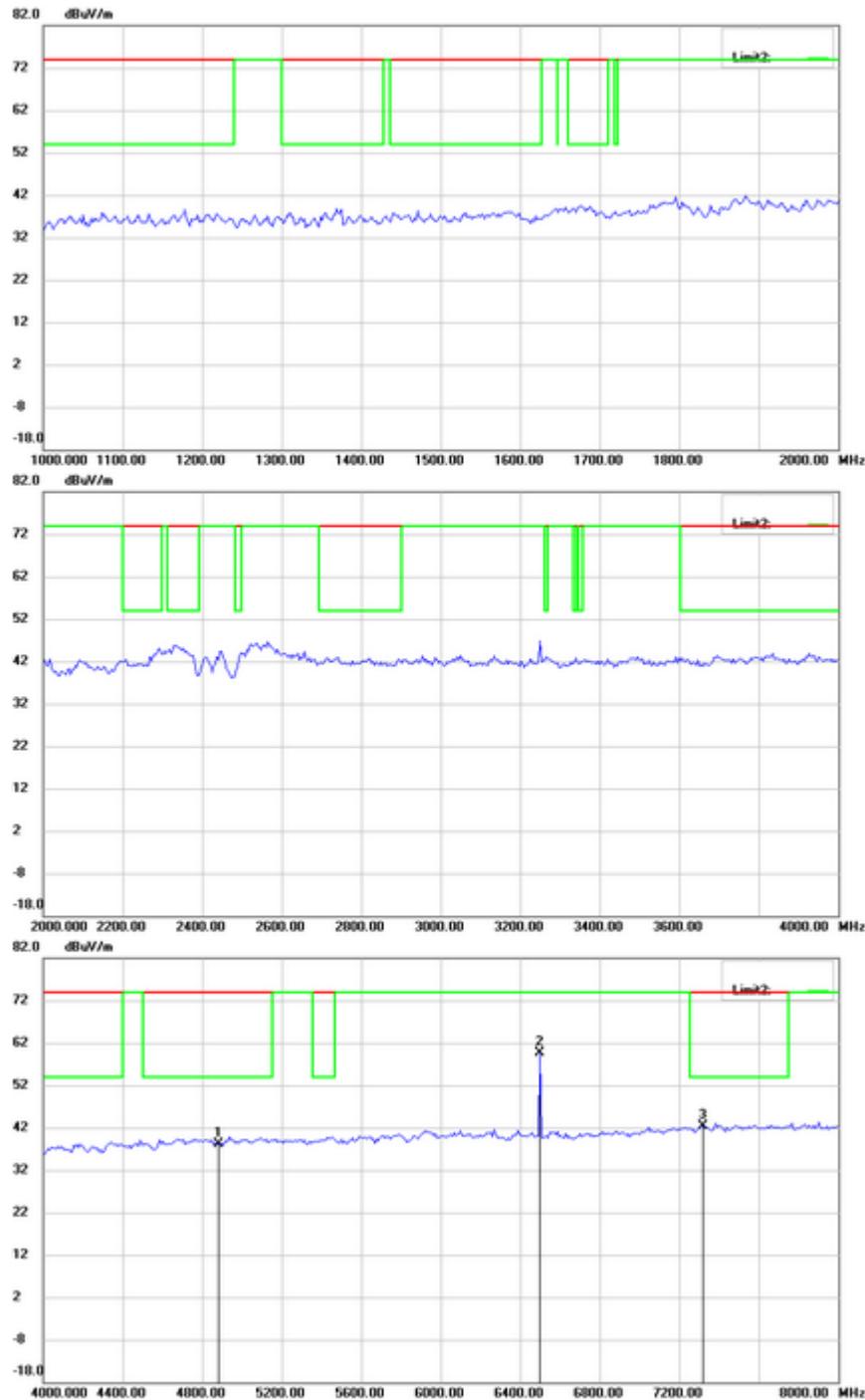
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

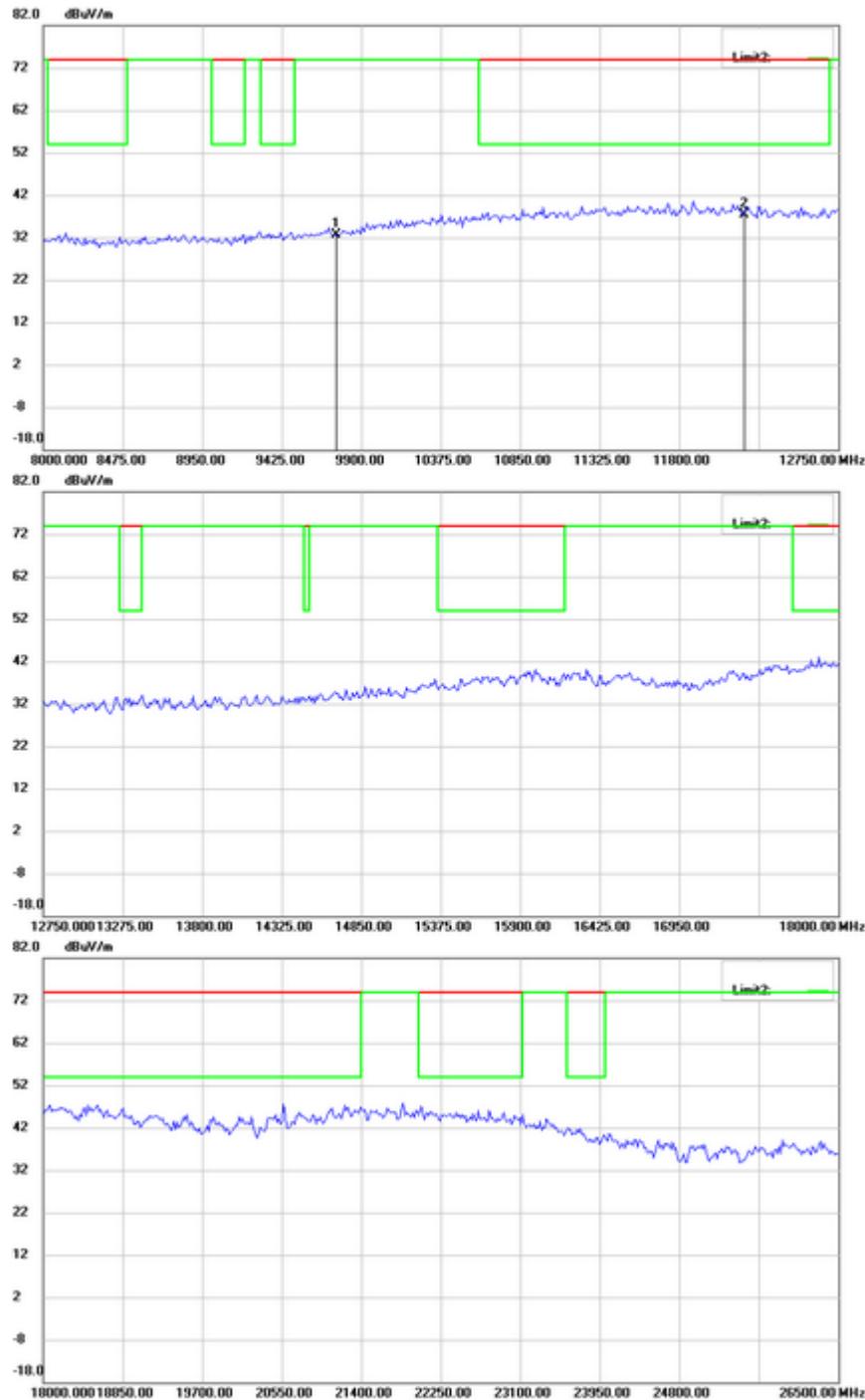
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

**Down Line: Ave Limit Line**

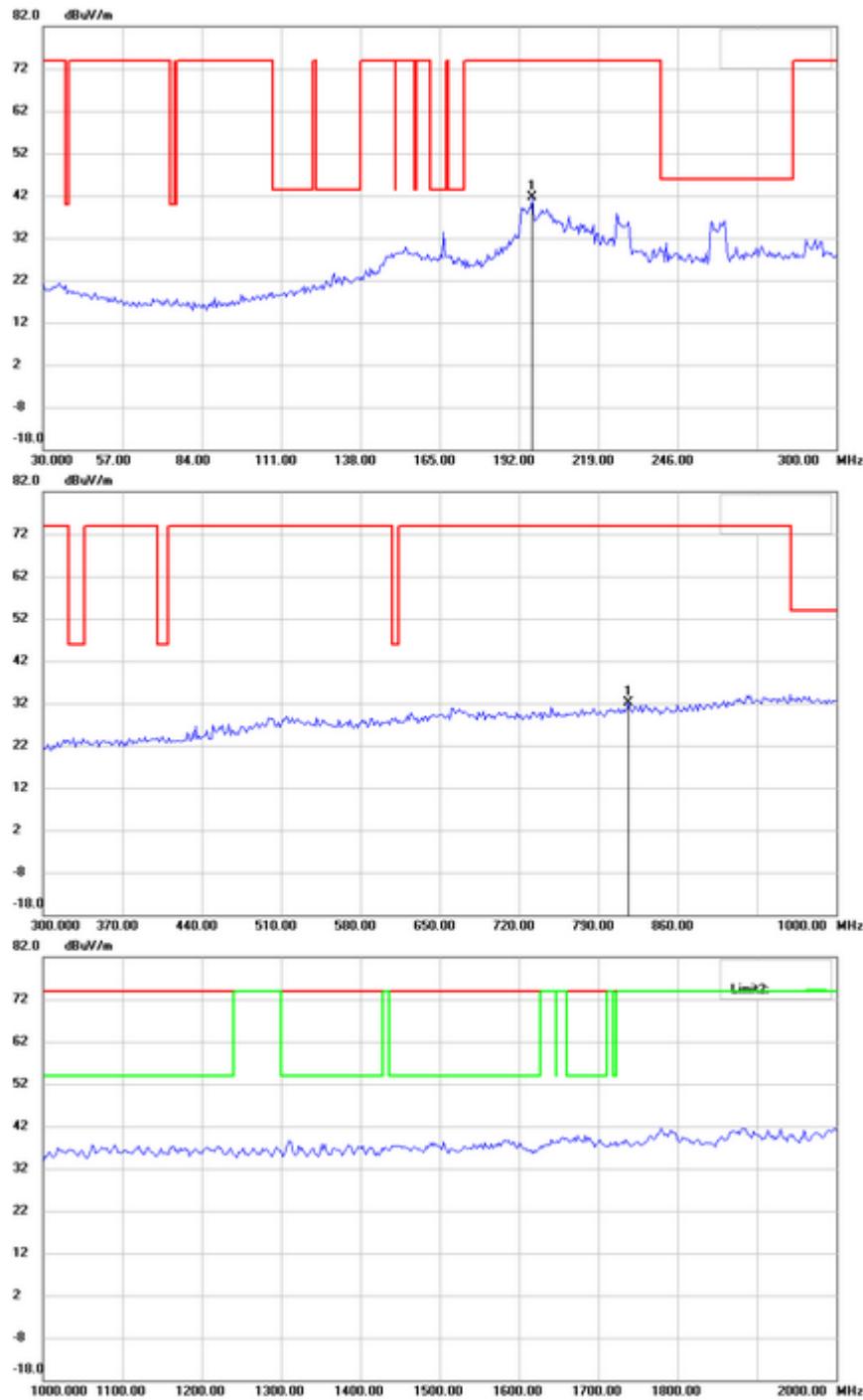
**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

## Antenna Polarization V



**Up Line: Peak Limit Line**

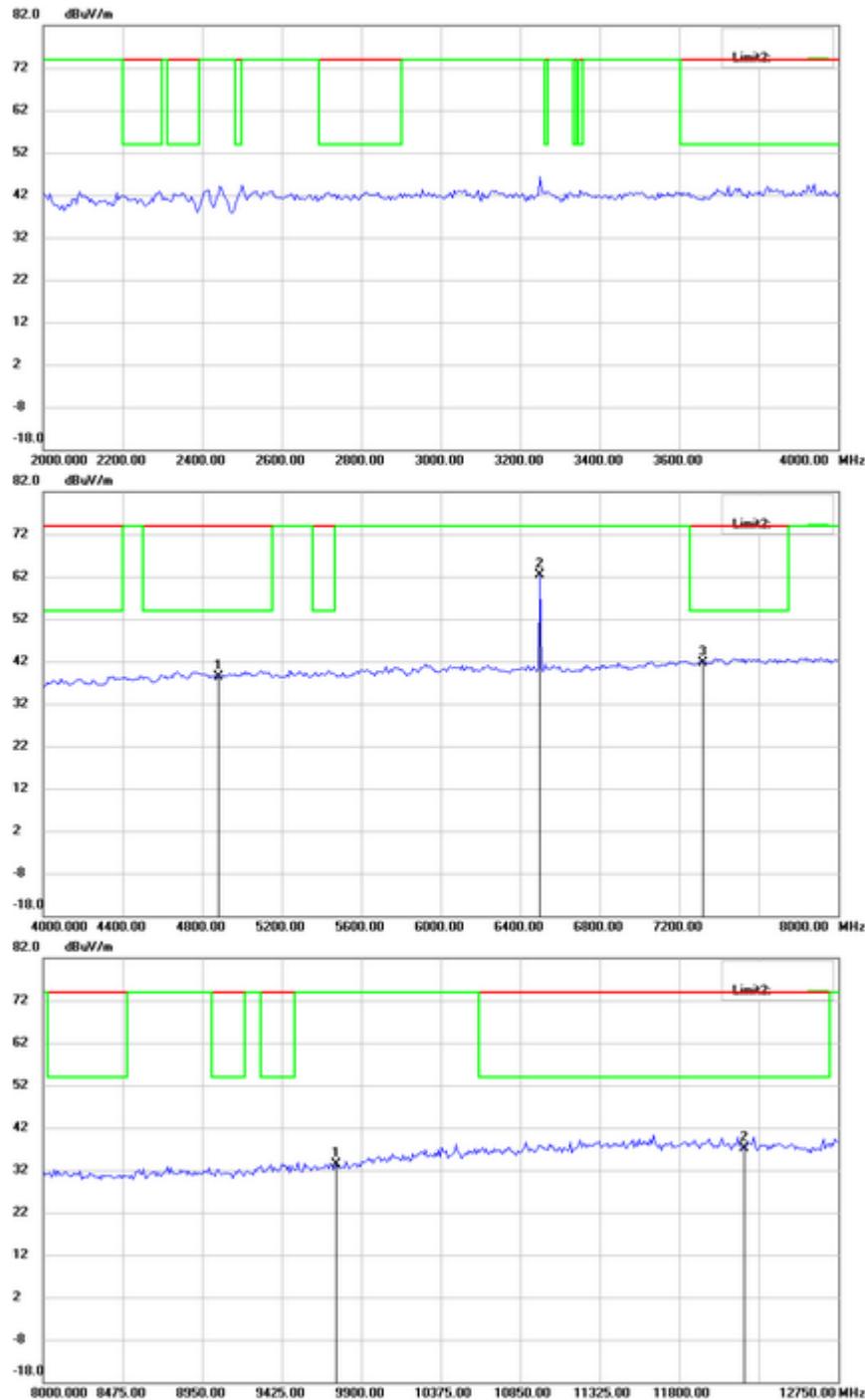
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

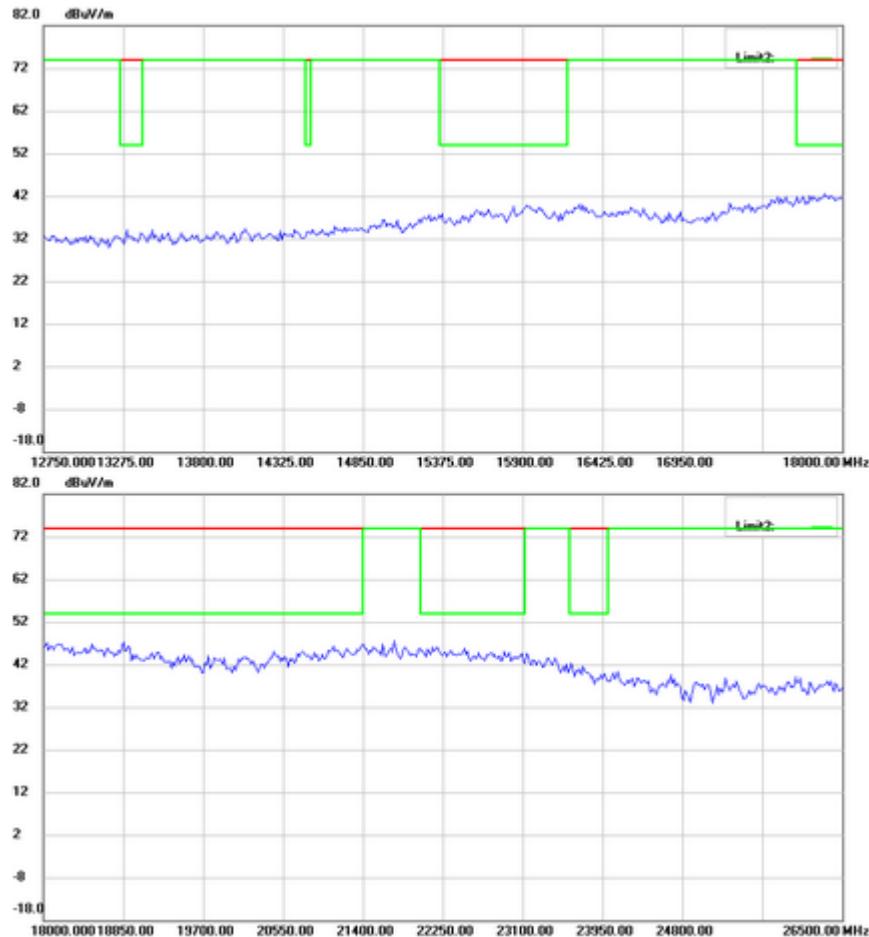
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

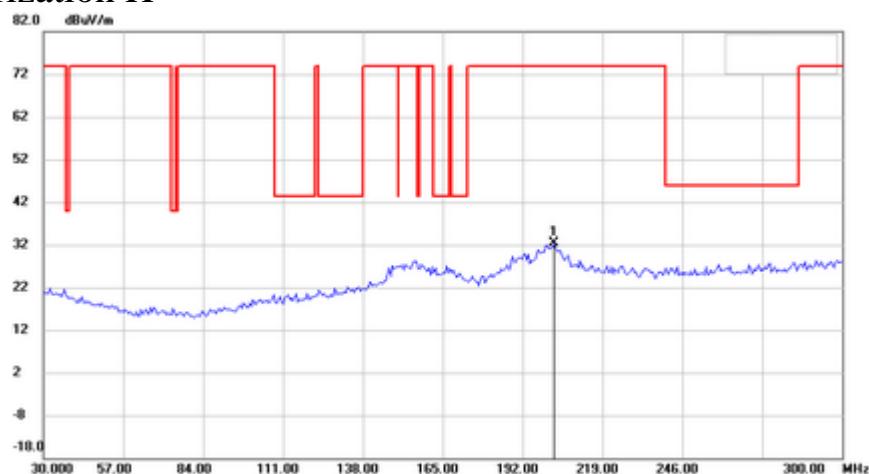
Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



802.11G Mode ( Mode B )\_CH11

Antenna Polarization H



**Up Line: Peak Limit Line**

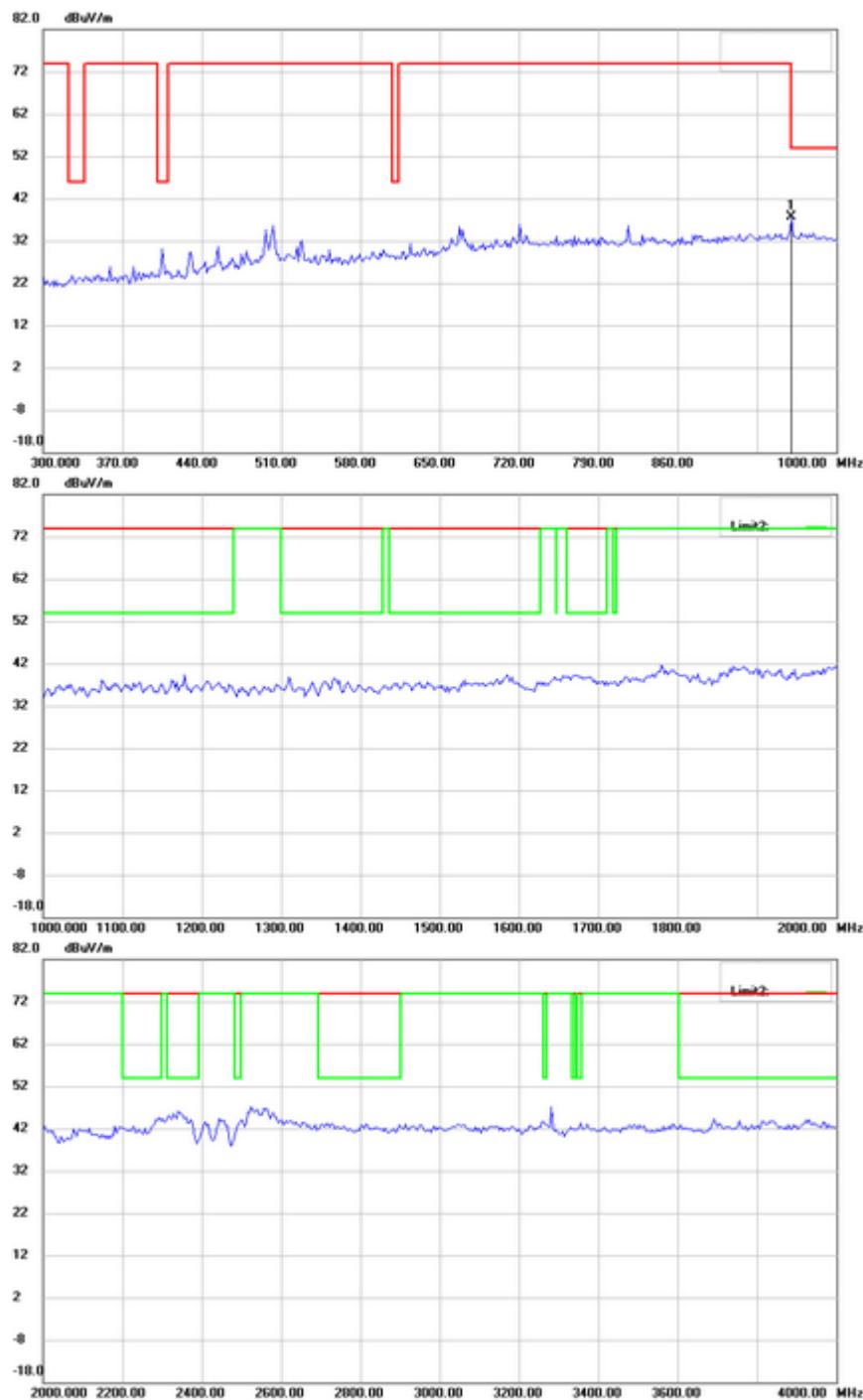
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

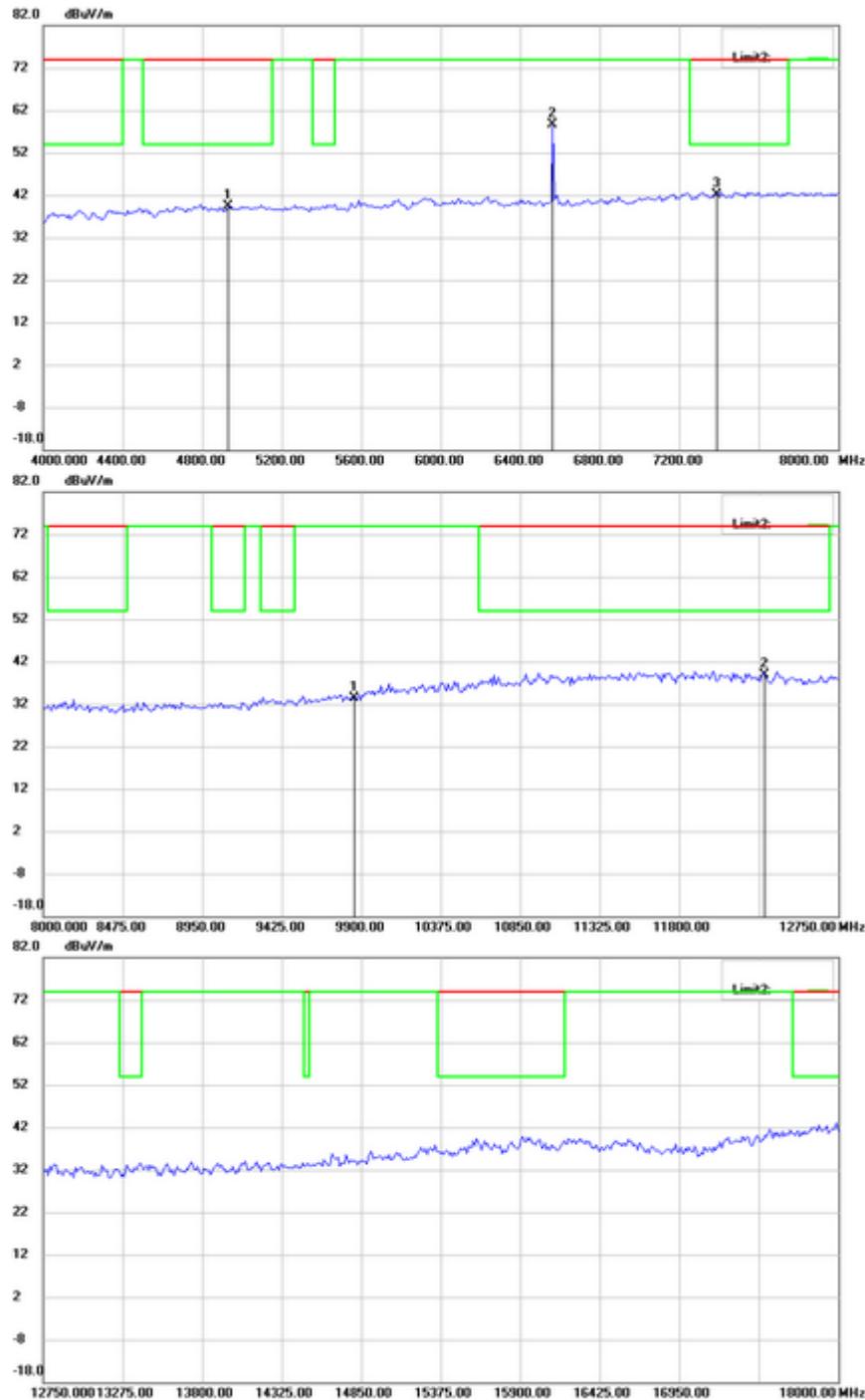
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

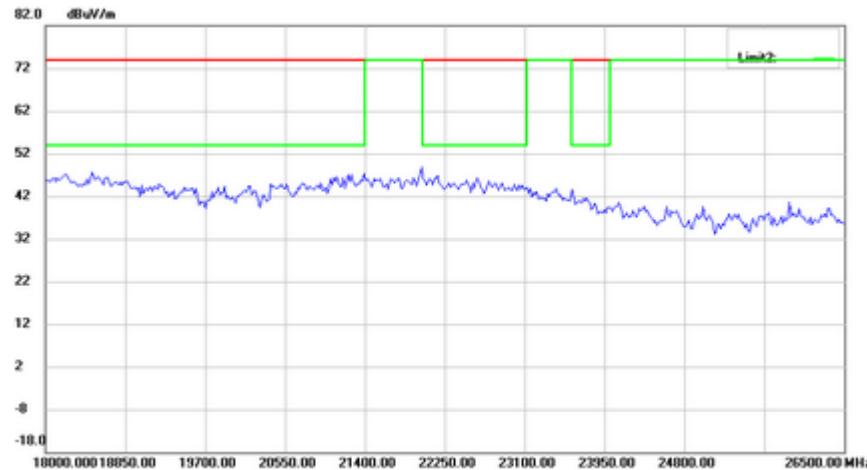
**Down Line: Ave Limit Line**

**Note:**

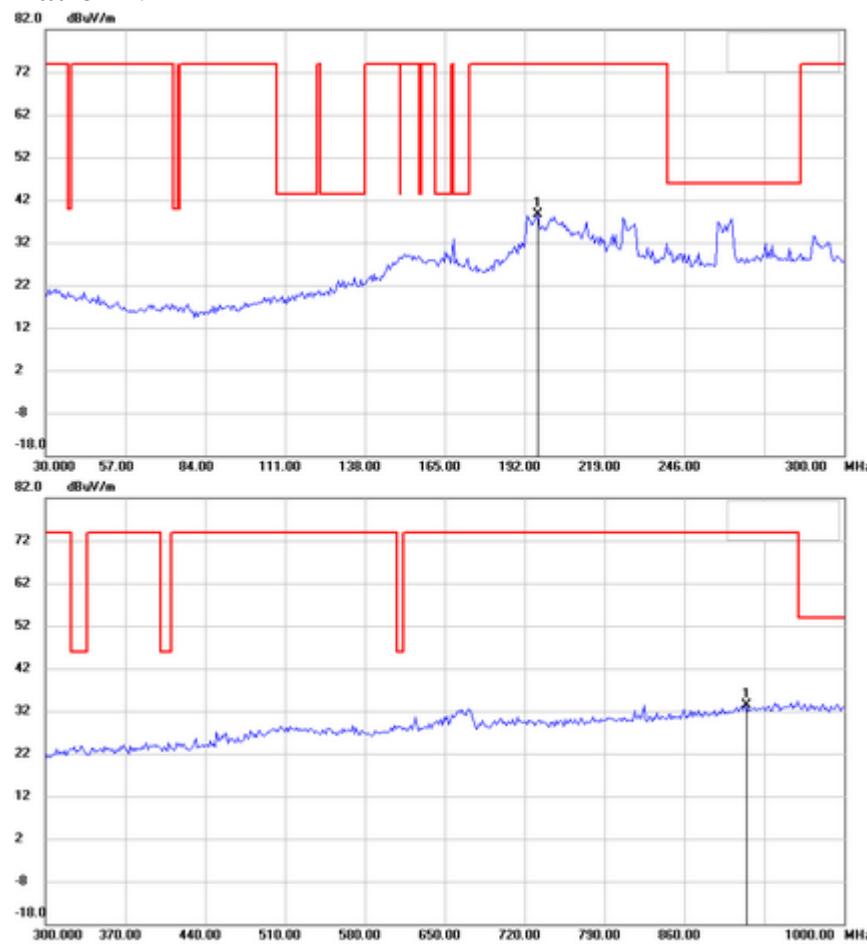
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



## Antenna Polarization V



**Up Line: Peak Limit Line**

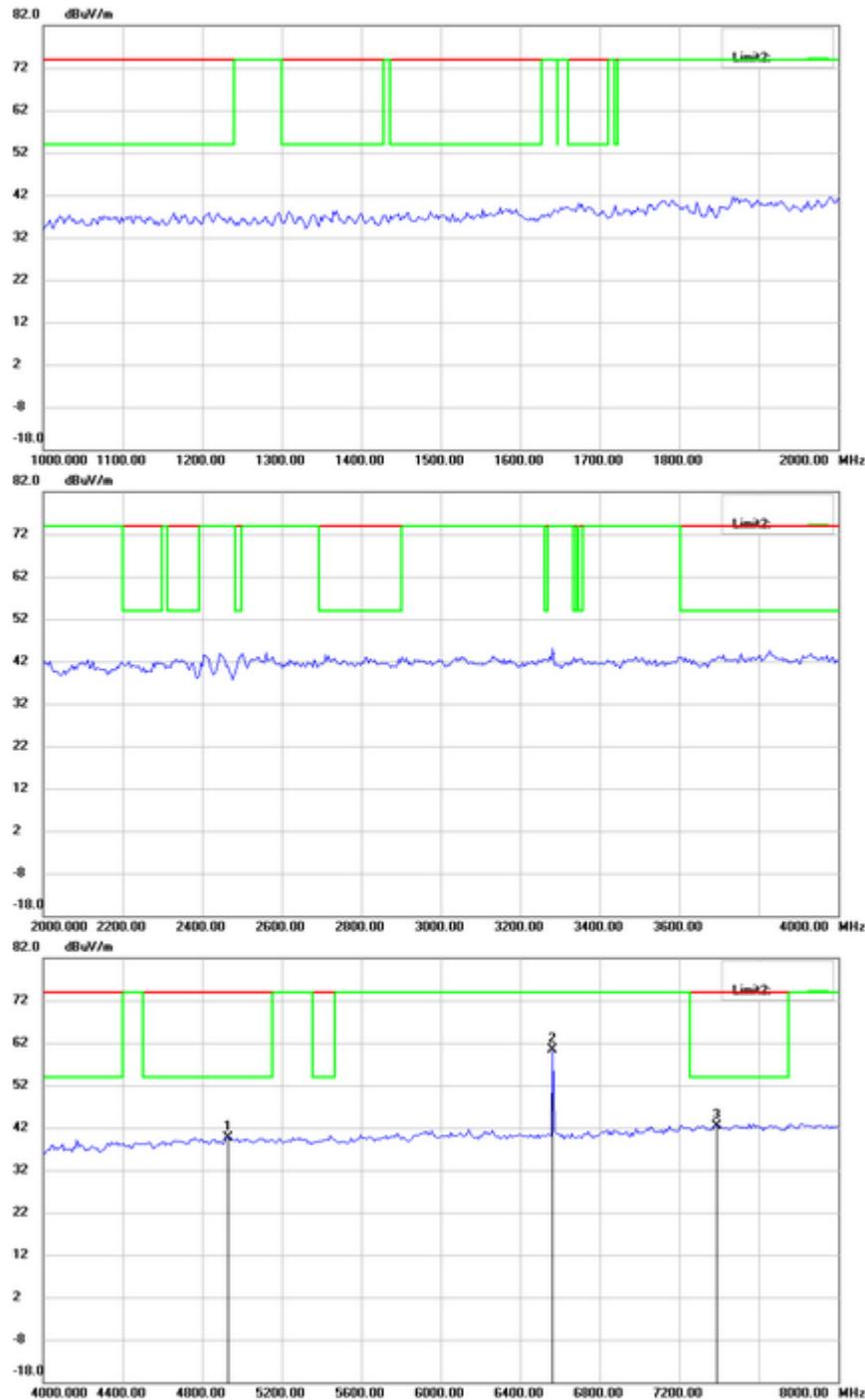
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

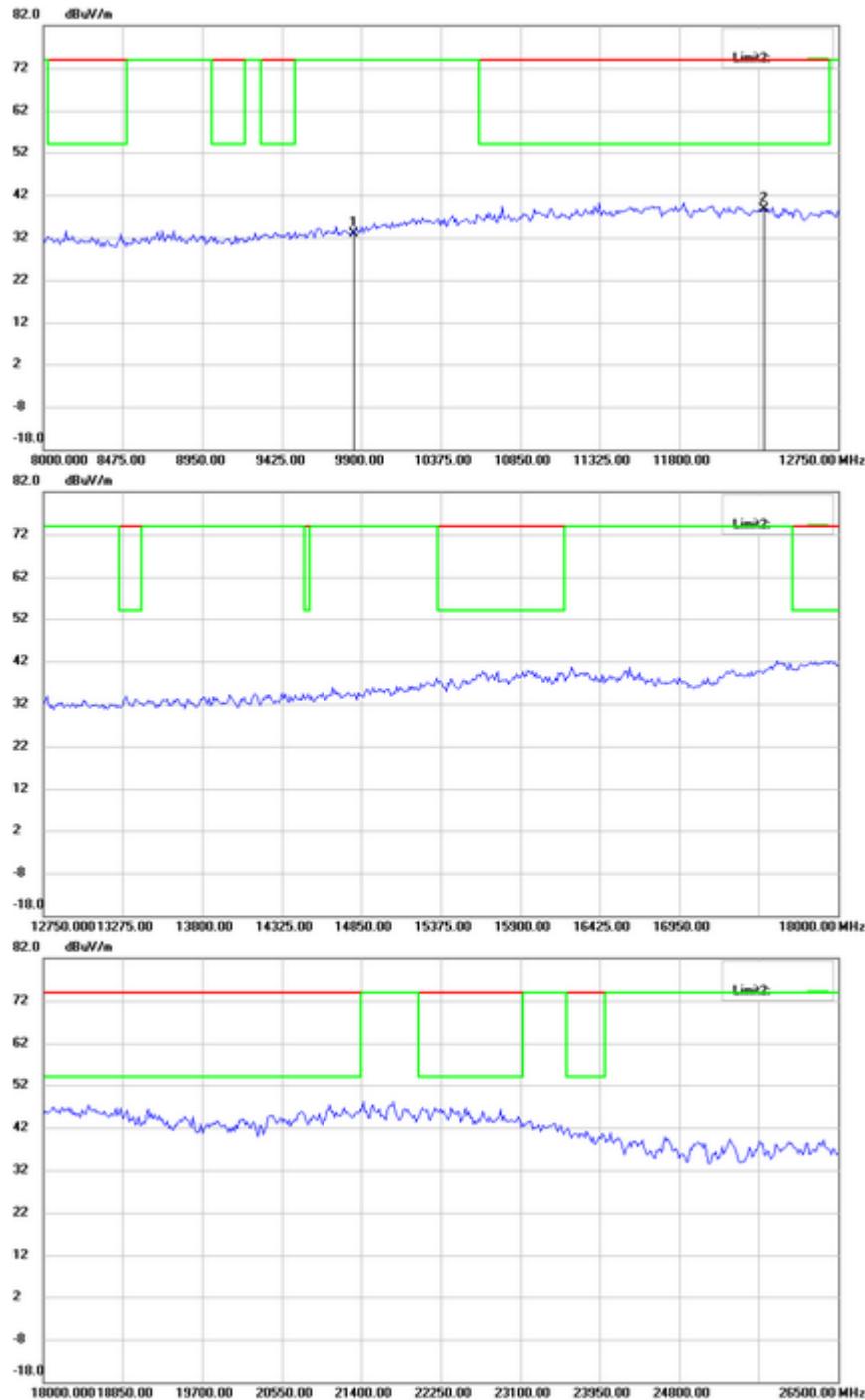
**Down Line: Ave Limit Line**

**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP



**Up Line: Peak Limit Line**

**Down Line: Ave Limit Line**

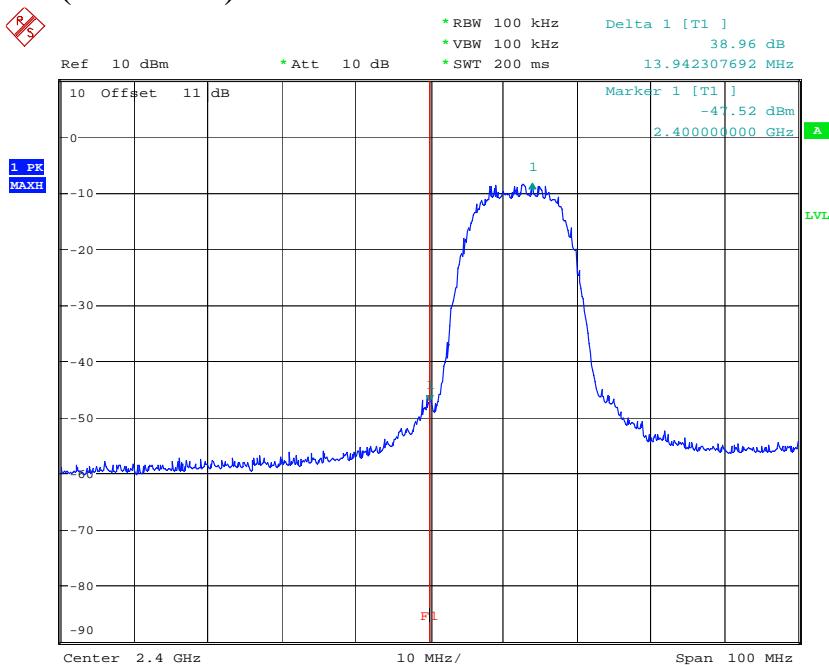
**Note:**

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20903-9663-C-1

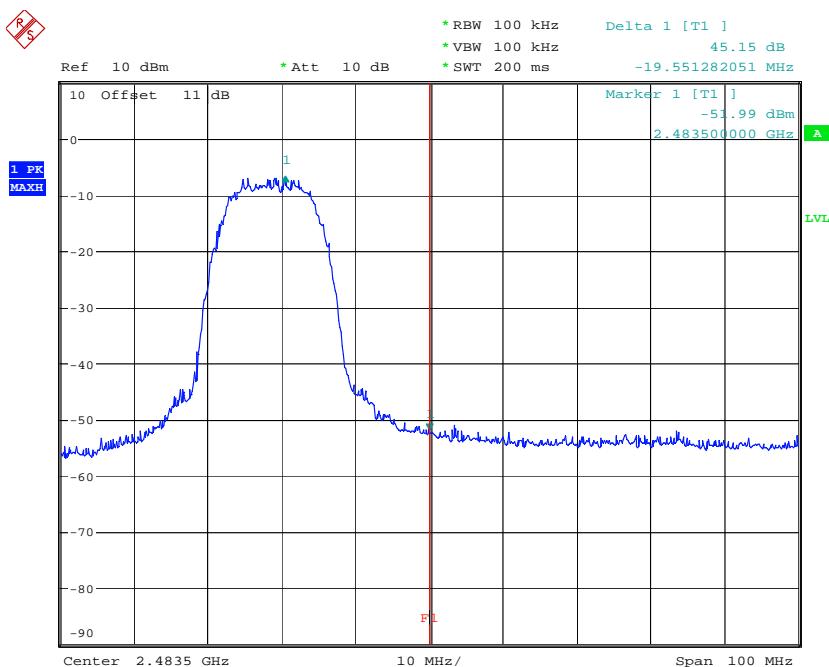
FCC ID: W8ONW06-WA54UP

## Band Edge Measurement 802.11B Mode ( Mode A )



FREQUENCY RANGE 802.11b CH1

Date: 18.APR.2009 12:39:03

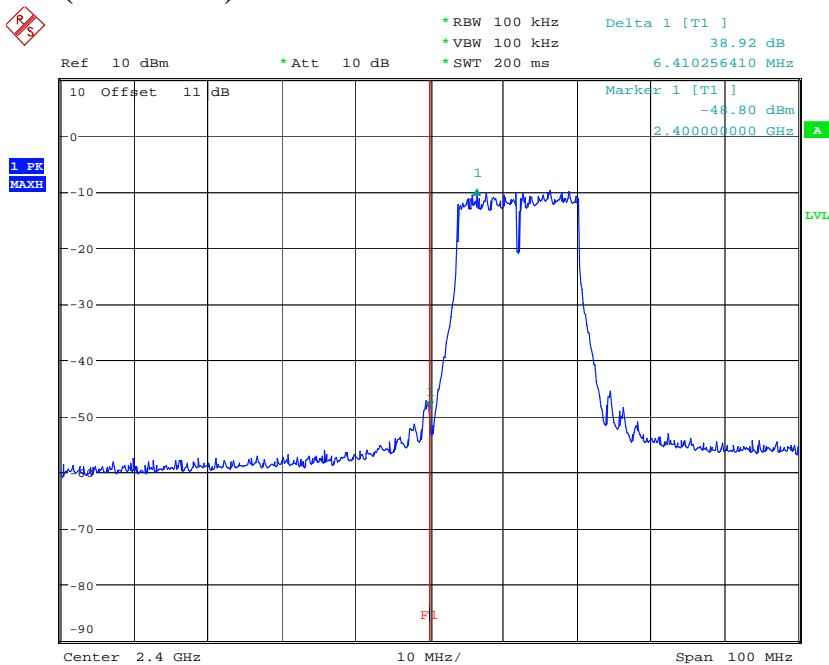


FREQUENCY RANGE 802.11b CH11

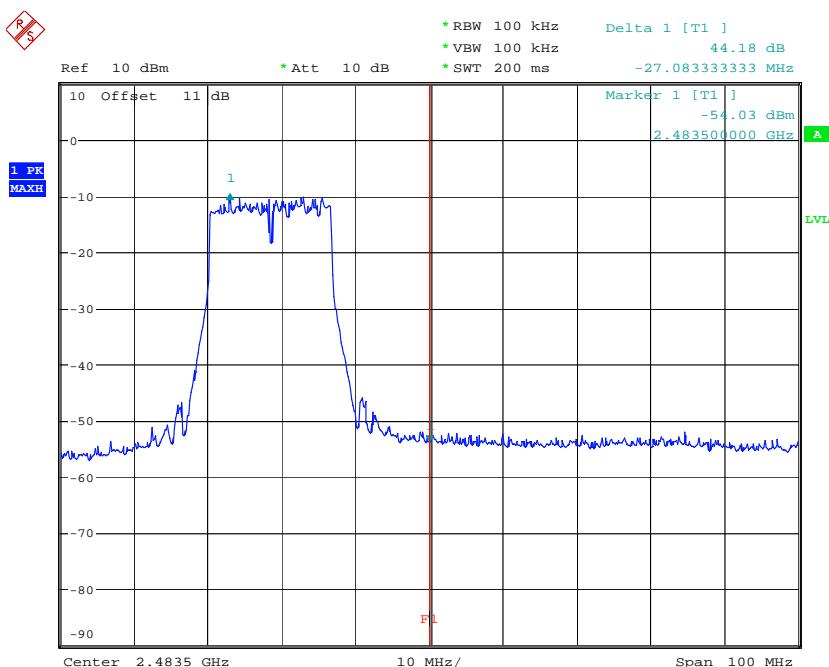
Date: 18.APR.2009 12:41:03

Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP

## 802.11G Mode ( Mode B )



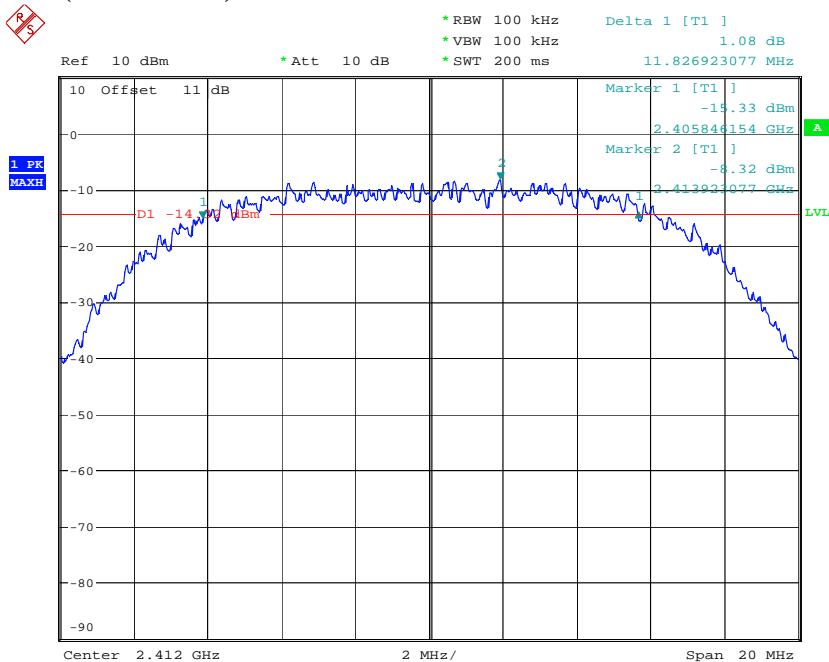
FREQUENCY RANGE 802.11g CH1  
 Date: 18.APR.2009 12:42:32



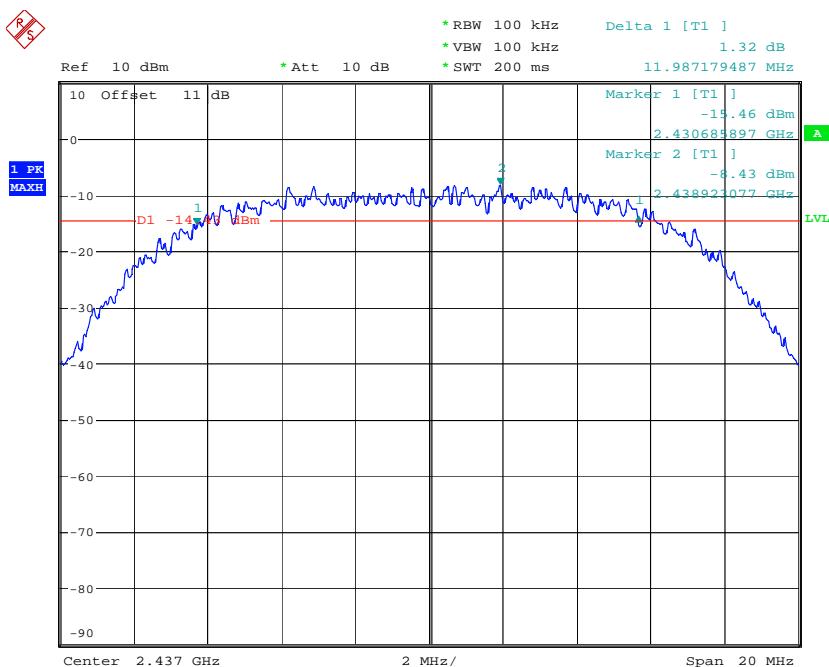
FREQUENCY RANGE 802.11g CH11  
 Date: 18.APR.2009 12:43:52

Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP

## Minimum 6dB Bandwidth 802.11B Mode ( Mode A )

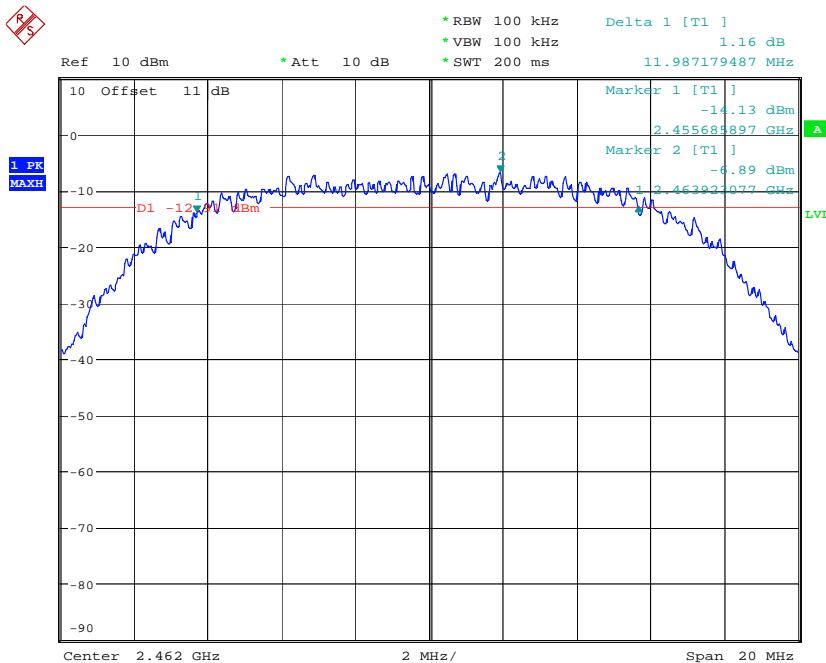


6DB BANDWIDTH 802.11b CH1  
 Date: 18.APR.2009 12:15:08



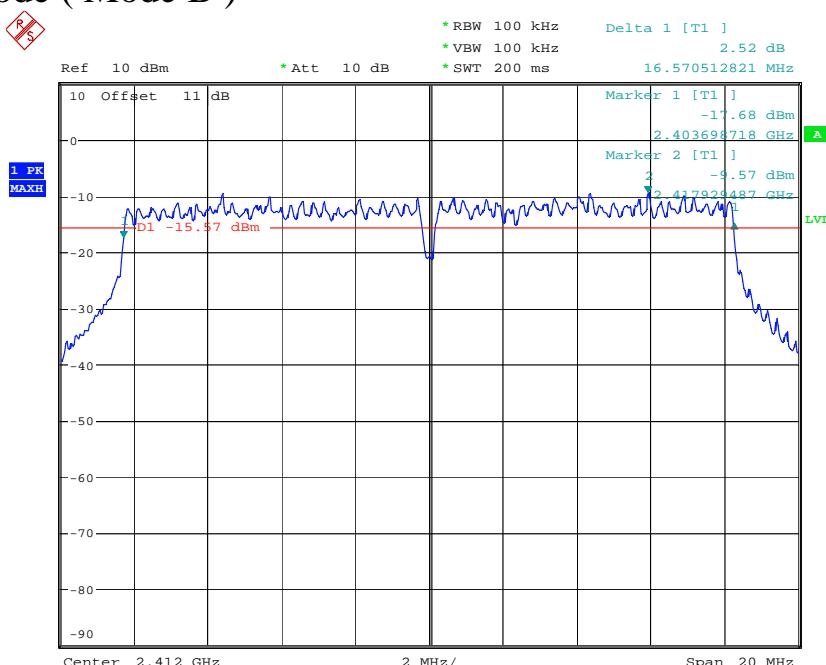
6DB BANDWIDTH 802.11b CH6  
 Date: 18.APR.2009 12:12:48

Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP



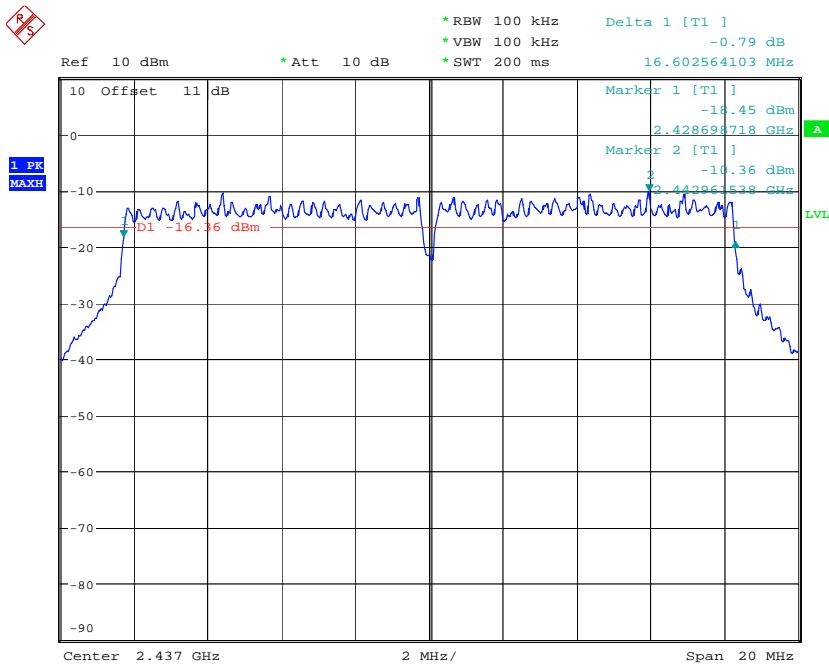
6DB BANDWIDTH 802.11b CH11  
 Date: 18.APR.2009 12:16:47

## 802.11G Mode ( Mode B )

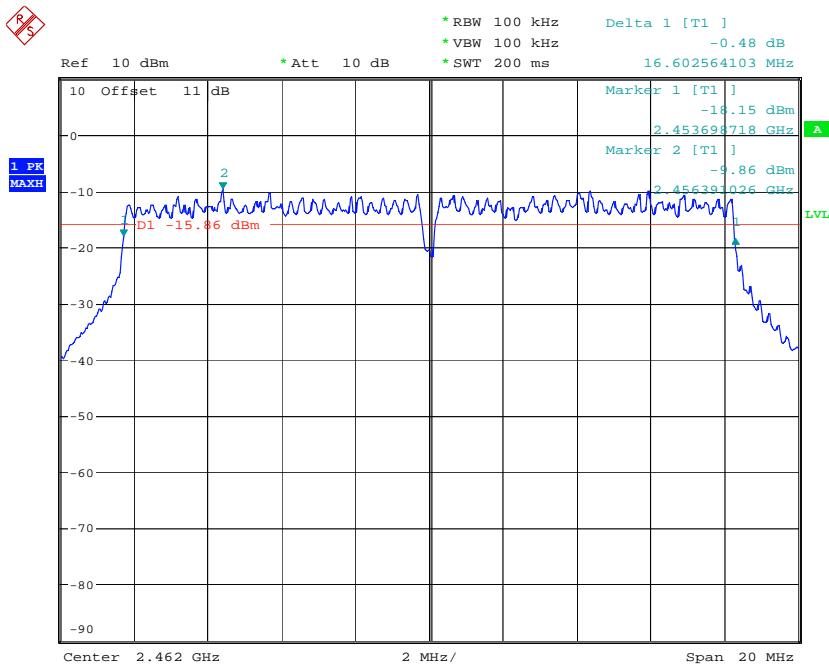


6DB BANDWIDTH 802.11g CH1  
 Date: 18.APR.2009 12:19:20

Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP



6DB BANDWIDTH 802.11g CH6  
 Date: 18.APR.2009 12:20:31

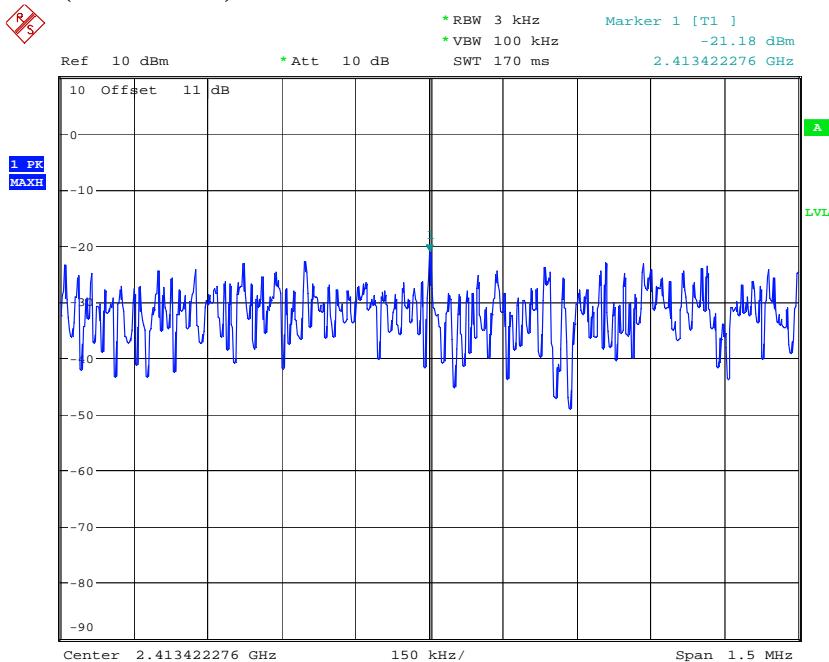


6DB BANDWIDTH 802.11g CH11  
 Date: 18.APR.2009 12:21:39

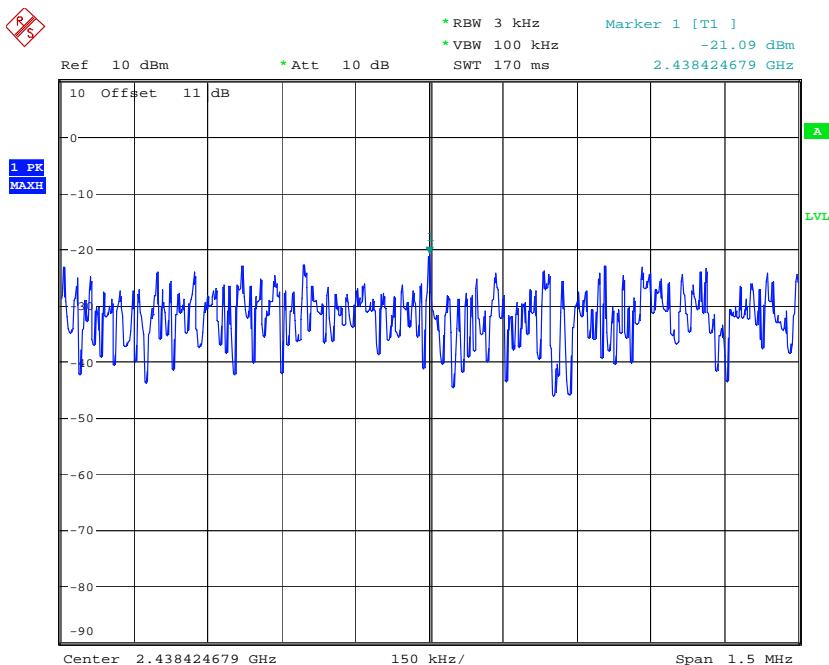
Registration number: W6M20903-9663-C-1

FCC ID: W8ONW06-WA54UP

## Peak Power Spectral Density 802.11B Mode ( Mode A )

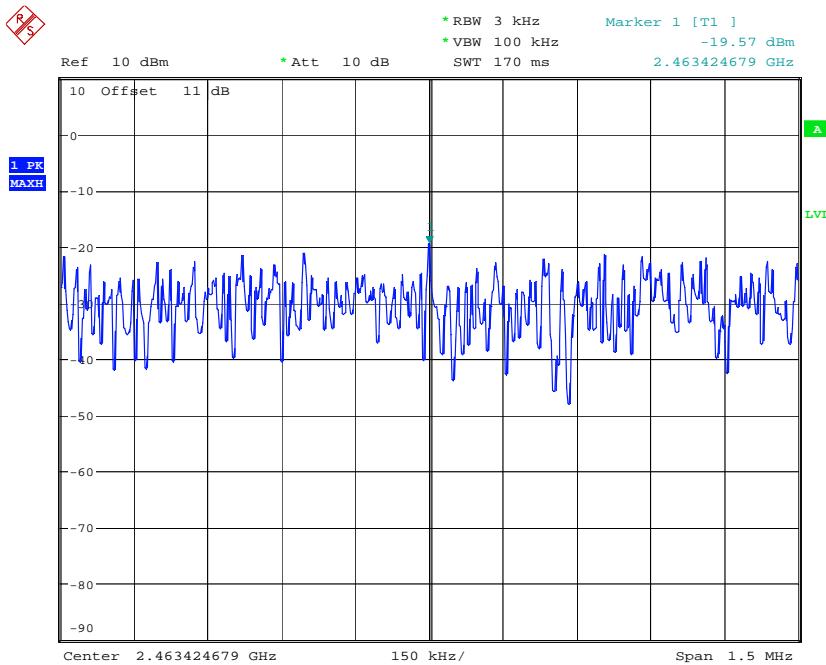


POWER DENSITY 802.11b CH1  
Date: 18.APR.2009 12:28:08



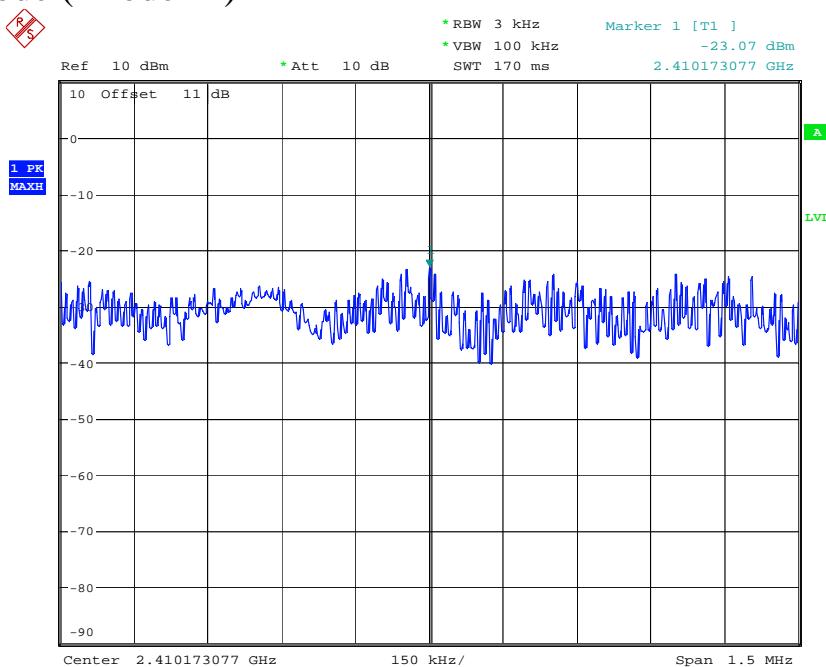
POWER DENSITY 802.11b CH6  
Date: 18.APR.2009 12:29:30

Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP



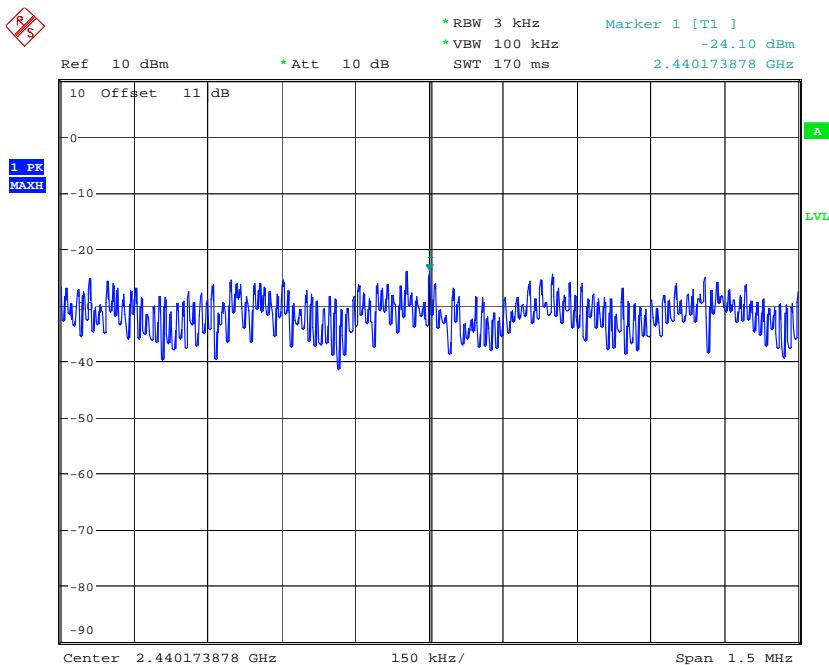
POWER DENSITY 802.11b CH11  
 Date: 18.APR.2009 12:30:53

## 802.11G Mode ( Mode B )

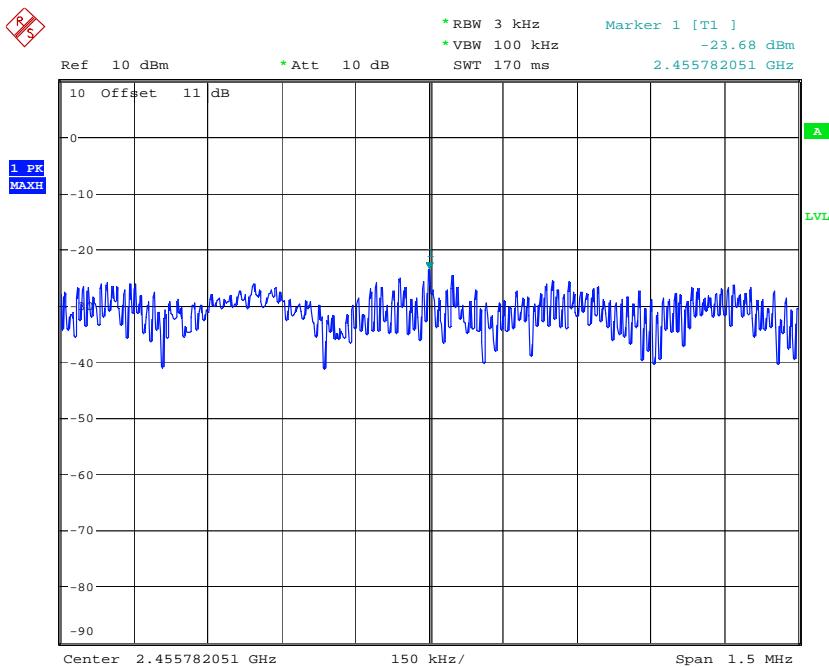


POWER DENSITY 802.11g CH1  
 Date: 18.APR.2009 12:33:26

Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP



POWER DENSITY 802.11g CH6  
 Date: 18.APR.2009 12:35:13

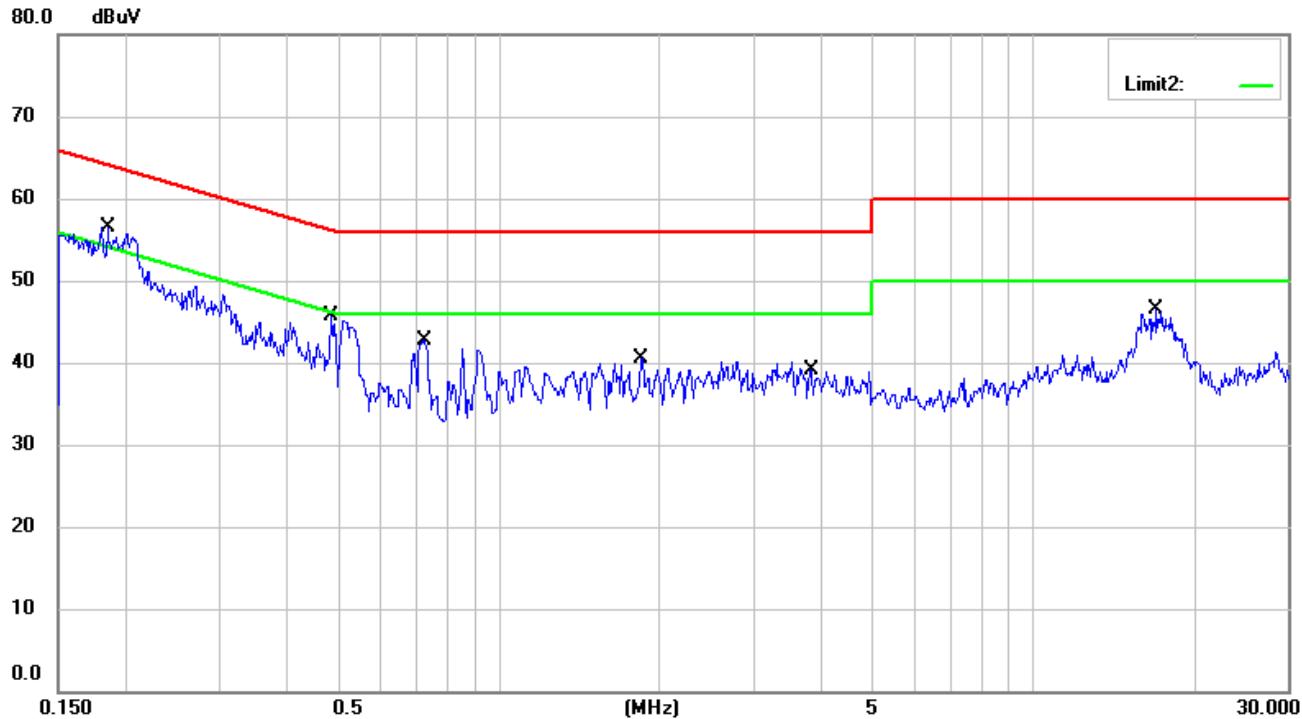


POWER DENSITY 802.11g CH11  
 Date: 18.APR.2009 12:36:08

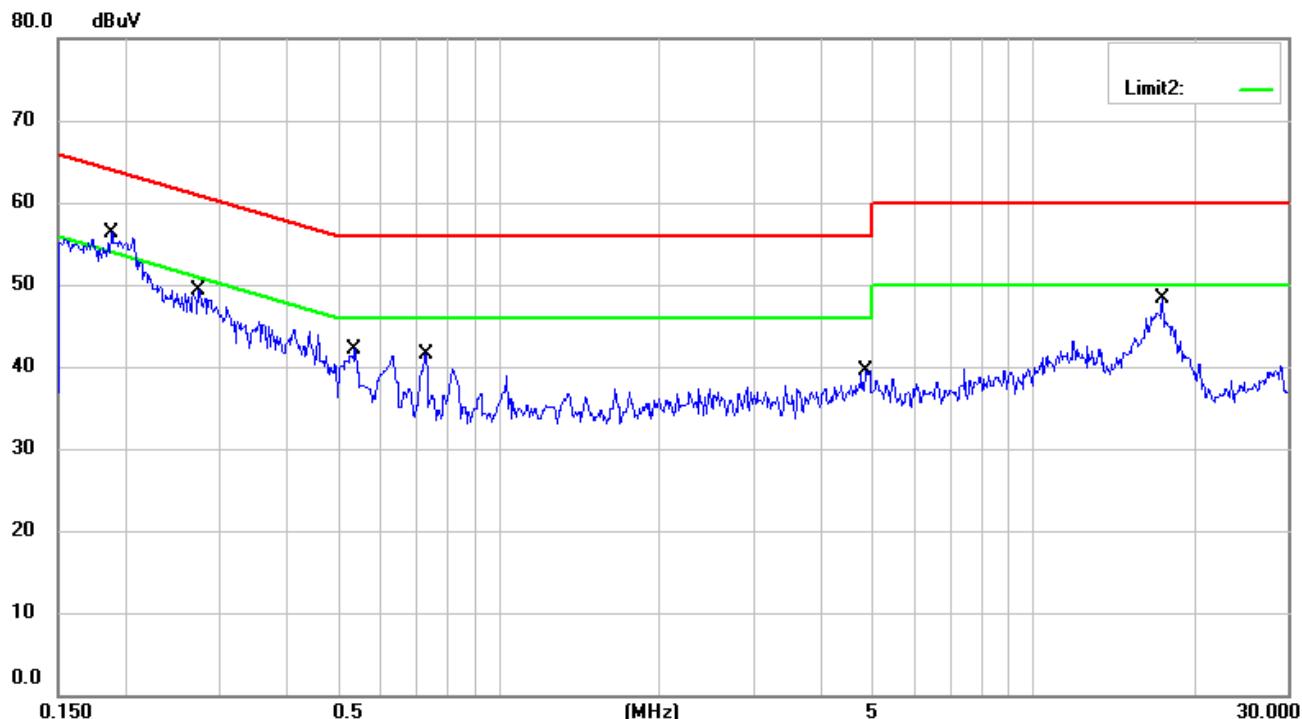
Registration number: W6M20903-9663-C-1  
 FCC ID: W8ONW06-WA54UP

## Power Line Conducted Emission

### LISN N



### LISN L1



Up Line: QP Limit Line

Down Line: Ave Limit Line

Note:

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2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
3. For corrected test results are listed in the relevant table of AC conducted test data of this test report.