

**FCC PART 15 SUBPART C TEST REPORT**  
**for**  
**Wireless Speaker Amplifier**  
**Model No.: TVee Model 2c**  
**FCC ID: R48TVEE21C**

of  
Applicant: **MEILOON INDUSTRIAL CO., LTD.**  
Address: **No.77, Lane 1775, Chuen-Ryh Road,**  
**Taoyuan City, Taiwan**

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.: W6M20908-9997-C-1**

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

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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.

### **Tester:**

September 16, 2009

Danny Sung

---

Date

WTS-Lab.

Name

Signature

### **Technical responsibility for area of testing:**

September 16, 2009

Chang Tse-Ming

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Date

WTS

Name

Signature



# 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:	MEILOON INDUSTRIAL CO., LTD.
Street:	No.77, Lane 1775, Chuen-Ryh Road
Town:	Taoyuan City
Country:	Taiwan
Telephone:	+886-3-326-1611
Fax:	+886-3-326-3884



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

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## 1.4 Application details

Date of receipt of test item : August 24, 2009  
Date of test : from August 25, 2009 to September 15, 2009

## 1.5 General information of Test item

Type of test item : Wireless Speaker Amplifier  
Model Number : TVee Model 2c  
Multi-listing model number : ./  
Photos : see Appendix

### Technical data

Frequency band : 2404-2479 MHz  
Frequency ( ch 1 ) : 2404 MHz  
Frequency ( ch 9 ) : 2444 MHz  
Frequency ( ch 16 ) : 2479 MHz  
Number of Channels: 16  
Operation modes: duplex  
Modulation Type: DSSS / GFSK  
Fixed point-to-point operation:  Yes /  No  
Type of Antenna: Monopole Antenna  
Antenna gain: 3.14 dBi  
Power supply: Transmitter: Adaptor ( I/P: AC 100-240 V / 50-60 Hz / 1.8 A, O/P: 18-24 Vdc / 3.61-2.7 A )  
Receiver: 120 V, 60 Hz  
Emission designator: DSSS: 1M60G1D



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

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Host device: none

Classification:

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

## Transmitter

## Unom

Power ( ch A or ch 1) : Conducted: 11.07 dBm  
Power ( ch B or ch 9) : Conducted: 10.68 dBm  
Power ( ch C or ch 16) : Conducted: 10.78 dBm

## **Manufacturer:**

(if applicable)

Name : ./.  
Street : ./.  
Town : ./.  
Country : ./.

Additional information: : ./.

## **1.6 Test standards**

Technical standard : FCC RULES PART 15 SUBPART B / SUBPART C § 15.247 (2008-10)



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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:                            Transmitter: Adaptor ( I/P: AC 100-240 V / 50-60 Hz / 1.8 A,  
    O/P: 18-24 Vdc / 3.61-2.7 A )  
    Receiver: 120 V, 60 Hz

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	2009/9/10	2010/9/9
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	2009/9/9	2010/9/8
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2009/5/9	2010/5/8
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2009/7/21	2010/7/20
ETSTW-CE 015	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T8-02	20307	FCC	2009/9/12	2010/9/11
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2009/9/9	2010/9/8
ETSTW-RE 002	Function Generator	33220A	MY43004982	Agilent	Function Test	
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	2009/9/11	2010/9/10
ETSTW-RE 010	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2009/9/11	2010/9/10
ETSTW-RE 011	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070165	MOTECH	Function Test	
ETSTW-RE 017	Log-Periodic Antenna	HL025	352886/001	R&S	2009/5/4	2010/5/3
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	SWEEP GENERATOR	SWM05	835130/010	R&S	2009/8/19	2010/8/18
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	EMCO	2009/8/14	2011/8/13
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	2009/8/23	2010/8/22
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2009/6/15	2010/6/14
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2009/8/23	2010/8/22
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2009/1/8	2010/1/7
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2009/5/5	2010/5/4
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2009/5/21	2010/5/20
ETSTW-RE 047	PSA SERIES SPECTRUM ANALYZER	E4445A	MY46181369	Agilent	2009/6/15	2010/6/14
ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2009/8/31	2010/8/30
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2009/4/14	2010/4/13
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2009/6/10	2010/6/09
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	



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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	2009/1/13	2010/1/12
ETSTW-RE 074	Power Sensor	N1921A	MY45241198	Agilent	2009/1/13	2010/1/12
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-RE 096	SIGNAL GENERATOR	SMIQ 03B	102274	R&S	2009/6/5	2010/6/4
ETSTW-RE 097	GPS SIGNAL GENERATOR	GSG-L1	06-0507-0311	Naviva	Function Test	
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 (S_Cable 1)	238094	HUBER+SUHNER	2008/9/22	2009/9/21
ETSTW-Cable 002	Microwave Cable	SUCOFLEX 104 (S_Cable 7)	238093	HUBER+SUHNER	2008/9/22	2009/9/21
ETSTW-Cable 003	Microwave Cable	SUCOFLEX 104 (S_Cable 11)	209953	HUBER+SUHNER	2008/9/22	2009/9/21
ETSTW-Cable 006	Microwave Cable	SUCOFLEX 104 (S_Cable 8)	238095	HUBER+SUHNER	2009/3/6	2010/3/5
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2009/3/6	2010/3/5
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	2009/8/20	2010/8/19
ETSTW-Cable 012	BNC Cable	BNC Cable 2	None	JYE BAO CO.,LTD.	2009/8/20	2010/8/19
ETSTW-Cable 013	Microwave Cable	SUCOFLEX 104 (S_Cable 5)	232345	HUBER+SUHNER	2009/3/6	2010/3/5
ETSTW-Cable 022	N TYPE Cable	OATS Cable 3	0002	JYE BAO CO.,LTD.	2009/3/6	2010/3/5



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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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## **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 Receiver Part	15.109	<input checked="" type="checkbox"/>	<input checked="" 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).

Test condition		Conducted Power		
		Channel 1	Channel 9	Channel 16
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	[dBm]	[dBm]	[dBm]
		11.07	10.68	10.78

Test condition $T_{nom} = 23^{\circ}\text{C}$ , $V_{nom} = 120 \text{ V}$	Signal Field strength TX highest power mode 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

$$\text{EIRP} = 11.07 \text{ dBm} + 3.14 \text{ dBi}$$

$$= 14.21 \text{ dBm}$$

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	12.79381	Peak value
D	dB		
AG	dBi	3.14	
G		2.06	Calculated Value
R	cm	20	Assumed value
S	mW/cm <sup>2</sup>	0.005	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.



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

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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:	TVee Model 2c	Date:	2009/9/1
Mode:	Tx 2404 MHz	Temperature:	24 °C
Polarization:	Horizontal	Humidity:	51 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
282.685	28.80	peak	14.89	43.69	46.00	-2.31	110	150
330.862	22.67	peak	16.13	38.80	46.00	-7.20	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.						
1200.401	63.53	---	-11.62	51.91	---	74.00	54.00	-22.09	125	150
4809.619	58.37	---	-5.91	52.46	---	74.00	54.00	-21.54	145	150
7214.429	53.61	---	-0.73	52.88	---	74.00	54.00	-21.12	135	150
9618.237	35.89	---	20.93	50.82	---	74.00	54.00	-23.18	150	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
172.305	26.60	peak	14.75	41.35	43.50	-2.15	105	150
330.862	18.07	peak	16.13	34.20	46.00	-11.80	130	150



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Polarization: Vertical

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)
1200.401	55.06	---	-11.62	43.44	---	74.00	54.00	-30.56	130	150
4808.077	64.01	55.92	-5.92	58.09	50.00	74.00	54.00	-4.00	135	150
7214.429	56.35	47.36	-0.73	55.62	46.63	74.00	54.00	-18.38	130	150
9618.237	37.35	---	20.93	52.28	---	74.00	54.00	-21.72	140	150

Mode: Tx 2444 MHz Temperature: 24 °C Engineer: Danny  
Polarization: Horizontal Humidity: 51 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
172.305	26.46	peak	14.75	41.21	43.50	-2.29	105	150
405.210	24.52	peak	17.90	42.42	46.00	-3.58	125	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)
1220.441	57.95	---	-11.61	46.34	---	74.00	54.00	-27.66	140	150
4889.780	58.02	---	-5.52	52.50	---	74.00	54.00	-21.50	135	150
7334.669	50.60	---	-1.01	49.59	---	74.00	54.00	-24.41	145	150
9770.541	33.58	---	21.36	48.94	---	74.00	54.00	-25.06	140	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
172.305	26.73	peak	14.75	41.48	43.50	-2.02	105	150
330.862	19.66	peak	16.13	35.79	46.00	-10.21	125	150

Polarization: Vertical

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)
1220.441	52.90	---	-11.61	41.29	---	74.00	54.00	-32.71	145	150
4888.013	64.61	56.40	-5.53	59.08	50.87	74.00	54.00	-3.13	140	150
7334.669	52.05	---	-1.01	51.04	---	74.00	54.00	-22.96	145	150
9776	31.16	---	21.38	46.54	---	74.00	54.00	-27.46	135	150



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Mode: Tx 2479 MHz      Temperature: 24 °C      Engineer: Danny  
Polarization: Horizontal      Humidity: 51 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
282.685	28.70	peak	14.89	43.59	46.00	-2.41	120	150
405.210	24.81	peak	17.90	42.71	46.00	-3.29	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.			
1238.477	57.63	---	-11.60	46.03	---	74.00	130
4957.974	59.76	52.16	-5.40	54.36	46.76	74.00	150
7437.000	49.69	---	-1.02	48.67	---	74.00	145
9916.000	30.34	---	21.63	45.97	---	74.00	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
172.305	26.63	peak	14.75	41.38	43.50	-2.12	110	150
330.862	21.46	peak	16.13	37.59	46.00	-8.41	125	150

Polarization: Vertical

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.			
1238.477	50.86	---	-11.60	39.26	---	74.00	150
4958.220	64.83	56.78	-5.40	59.43	51.38	74.00	135
7438.878	50.42	---	-1.02	49.40	---	74.00	150
9916.000	30.29	---	21.63	45.92	---	74.00	140

**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



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## **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.

Test conditions	Attenuation at or outside band-edges	
	Lower Band-edge	Upper Band-edge
$T_{nom}=23^{\circ}\text{C}$	$V_{nom}=120\text{ V}$	44.46 dB
		46.27 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.



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## **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.

Test conditions	6 dB Bandwidth		
	Channel 1	Channel 9	Channel 16
T <sub>nom</sub> = 23°C    V <sub>nom</sub> = 120 V	839.743589744 kHz	852.564102564 kHz	846.153846154 kHz

## **Limits:**

Frequency Range MHz	<b>Limits</b>
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.

Test conditions		Peak Power Spectral Density (3 kHz)		
		Channel 1 [dBm]	Channel 9 [dBm]	Channel 16 [dBm]
T <sub>nom</sub> = 23°C	V <sub>nom</sub> = 120 V	5.69	3.75	4.09

## 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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## 3.9 Radiated Emission from Receiver 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".

Model: TVee Model 2c

Date: 2009/9/1

Mode: Rx 2404 MHz

Temperature: 24 °C

Engineer: Danny

Polarization: Horizontal

Humidity: 51 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
30.541	10.88	peak	13.03	23.91	40.00	-16.09	105	150
298.918	18.03	peak	15.22	33.25	46.00	-12.75	110	150
849.900	6.38	peak	25.60	31.98	46.00	-14.02	130	150
917.235	5.54	peak	26.64	32.18	46.00	-13.82	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.						
3837.675	45.12	---	-2.13	42.99	---	74.00	54.00	-31.01	135	150
7519.038	49.48	---	-0.90	48.58	---	74.00	54.00	-25.42	140	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
34.870	7.71	peak	13.25	20.96	40.00	-19.04	110	150
298.918	15.78	peak	15.22	31.00	46.00	-15.00	120	150
718.036	8.22	peak	23.93	32.15	46.00	-13.85	125	150
934.068	7.94	peak	26.98	34.92	46.00	-11.08	130	150

Polarization: Vertical

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.						
3951.904	45.02	---	-1.64	43.38	---	74.00	54.00	-30.62	135	150
7511.022	49.25	---	-0.93	48.32	---	74.00	54.00	-25.68	130	150



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

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Mode: Rx 2444 MHz      Temperature: 24 °C      Engineer: Danny  
Polarization: Horizontal      Humidity: 51 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
219.379	14.09	peak	12.52	26.61	46.00	-19.39	100	150
300.000	17.13	peak	15.24	32.37	46.00	-13.63	110	150
494.990	10.14	peak	19.75	29.89	46.00	-16.11	120	150
914.429	5.72	peak	26.57	32.29	46.00	-13.71	125	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.						
3645.291	46.78	---	-2.68	44.10	---	74.00	54.00	-29.90	145	150
7494.990	48.39	---	-0.97	47.42	---	74.00	54.00	-26.58	135	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
31.082	9.36	peak	13.03	22.39	40.00	-17.61	120	150
299.459	15.77	peak	15.23	31.00	46.00	-15.00	115	150
704.008	7.75	peak	23.54	31.29	46.00	-14.71	135	150
880.762	8.40	peak	25.85	34.25	46.00	-11.75	130	150

Polarization: Vertical

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.						
3897.796	44.73	---	-1.88	42.85	---	74.00	54.00	-31.15	140	150
7583.166	49.20	---	-0.68	48.52	---	74.00	54.00	-25.48	140	150

Mode: Rx 2479 MHz      Temperature: 24 °C      Engineer: Danny  
Polarization: Horizontal      Humidity: 51 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
31.082	9.78	peak	13.03	22.81	40.00	-17.19	115	150
298.918	16.04	peak	15.22	31.26	46.00	-14.74	110	150
496.393	10.37	peak	19.77	30.14	46.00	-15.86	120	150
904.609	5.96	peak	26.33	32.29	46.00	-13.71	125	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.						
3963.928	45.27	---	-1.59	43.68	---	74.00	54.00	-30.32	130	150
7655.311	47.86	---	-0.65	47.21	---	74.00	54.00	-26.79	140	150



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Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
33.788	8.69	peak	13.15	21.84	40.00	-18.16	105	150
299.459	15.76	peak	15.23	30.99	46.00	-15.01	115	150
761.523	7.70	peak	24.72	32.42	46.00	-13.58	115	150
924.249	7.99	peak	26.81	34.80	46.00	-11.20	125	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
3987.976	45.09	---	-1.48	43.61	---	74.00	54.00	-30.39	135	150
7767.535	49.41	---	-0.64	48.77	---	74.00	54.00	-25.23	145	150

**Note**

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

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 of digital part are listed in the separated test report no. W6M20908-9997-P-15B.



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## **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: TVee Model 2c Date: 2009/8/28  
Mode: Transmitter Temperature: 24 °C Engineer:  
Polarization: N Humidity: 51 % Rick

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.	
0.1893	40.26	--	10.10	50.36	--	64.07	--	-13.71
0.2503	33.58	--	10.06	43.64	--	61.75	--	-18.11
0.5631	15.34	--	10.16	25.50	--	56.00	--	-30.50
2.0059	13.39	--	10.07	23.46	--	56.00	--	-32.54
9.0080	16.85	--	10.47	27.32	--	60.00	--	-32.68
23.7375	13.92	--	10.57	24.49	--	60.00	--	-35.51

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.	
0.1879	40.46	--	10.18	50.64	--	64.13	--	-13.49
0.2503	33.58	--	10.14	43.72	--	61.75	--	-18.03
0.5540	16.55	--	10.25	26.80	--	56.00	--	-29.20
0.8788	13.84	--	10.22	24.06	--	56.00	--	-31.94
8.2565	18.60	--	10.84	29.44	--	60.00	--	-30.56
13.4669	15.12	--	11.14	26.26	--	60.00	--	-33.74



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Model: TVee Model 2c Date: 2009/8/28  
Mode: Receiver Temperature: 24 °C  
Polarization: N Humidity: 51 % Engineer: Rick

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV)		Limit (dBuV)		Margin (dB)
	QP	Ave.	Corr.	QP	Ave.	QP	Ave.	
0.1604	33.39	--	10.17	43.56	--	65.44	--	-21.88
0.2482	30.60	--	10.06	40.66	--	61.82	--	-21.16
1.0681	16.48	--	10.10	26.58	--	56.00	--	-29.42
1.4559	14.80	--	10.09	24.89	--	56.00	--	-31.11
6.9539	10.68	--	10.30	20.98	--	60.00	--	-39.02
28.7976	13.08	--	10.64	23.72	--	60.00	--	-36.28

Polarization: L1

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV)		Limit (dBuV)		Margin (dB)
	QP	Ave.	Corr.	QP	Ave.	QP	Ave.	
0.1500	33.99	--	10.27	44.26	--	66.00	--	-21.74
0.2973	28.90	--	10.08	38.98	--	60.32	--	-21.34
0.5451	12.33	--	10.26	22.59	--	56.00	--	-33.41
1.2124	13.91	--	10.21	24.12	--	56.00	--	-31.88
23.6373	11.24	--	11.70	22.94	--	60.00	--	-37.06
29.6493	11.71	--	11.84	23.55	--	60.00	--	-36.45

**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, AVG = Average  
4. All not in the table noted test results are more than 20 dB below the relevant limits.  
5. See attached diagrams in Appendix.

## 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



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Registration number: W6M20908-9997-C-1  
FCC ID: R48TVEE21C

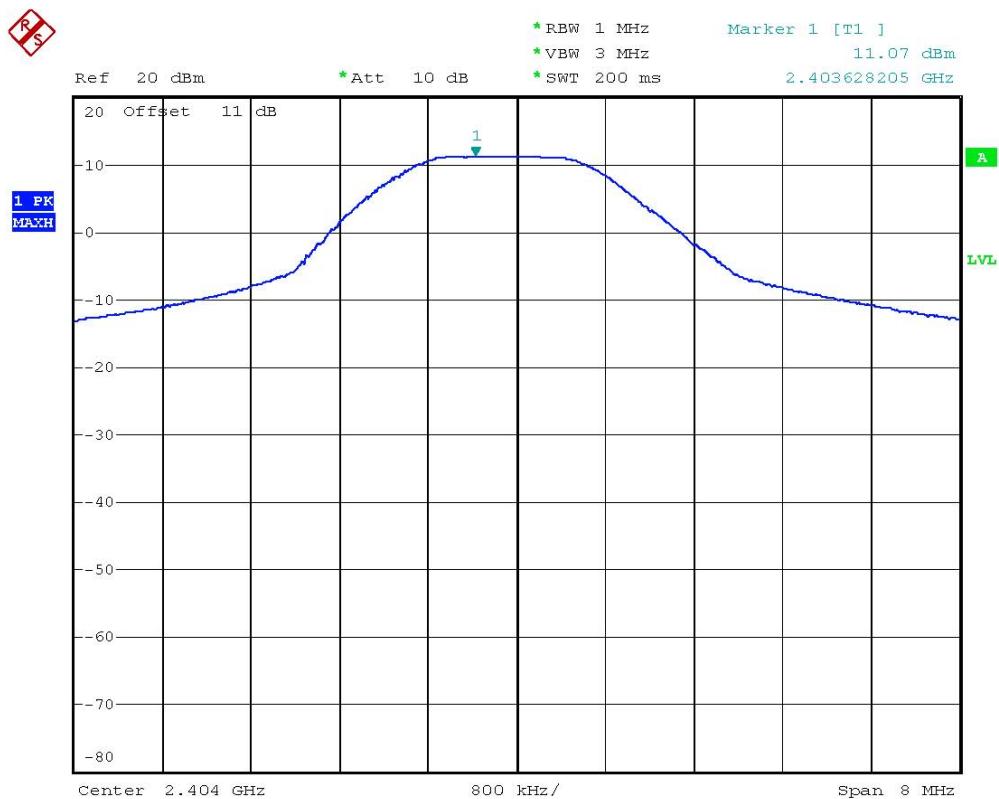
## **Appendix**

### **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: W6M20908-9997-C-1  
 FCC ID: R48TVEE21C

## Peak Output Power

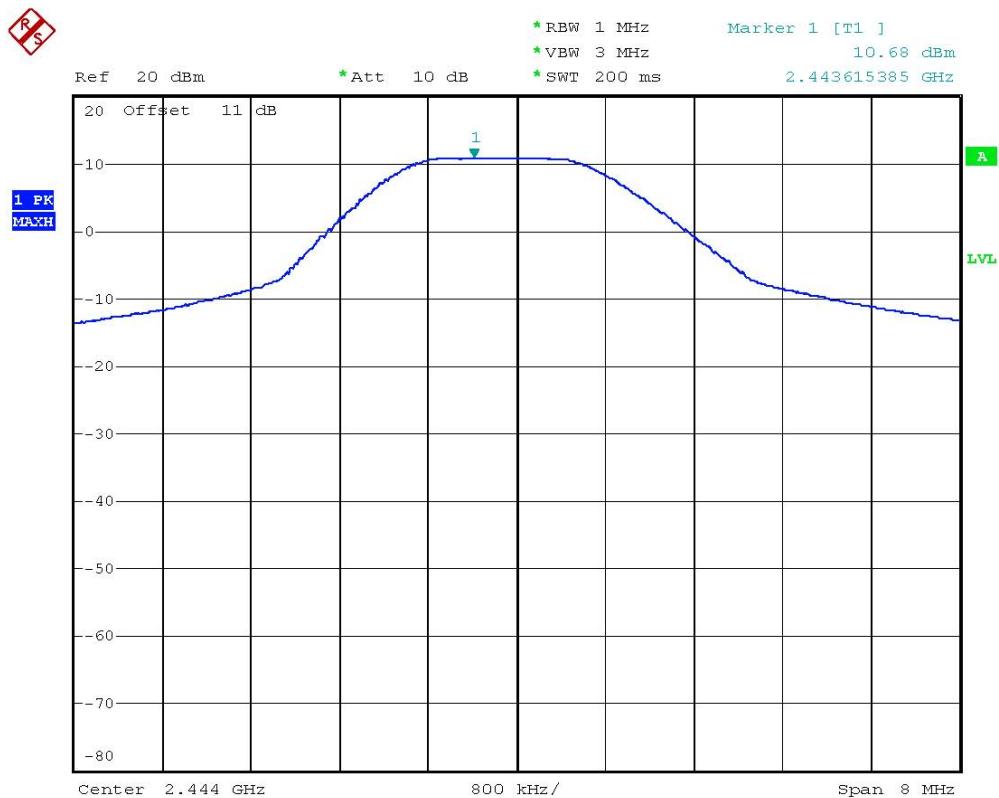


MAX OUTPUT POWER 2404MHz  
 Date: 9.SEP.2009 13:50:13



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

Registration number: W6M20908-9997-C-1  
FCC ID: R48TVEE21C

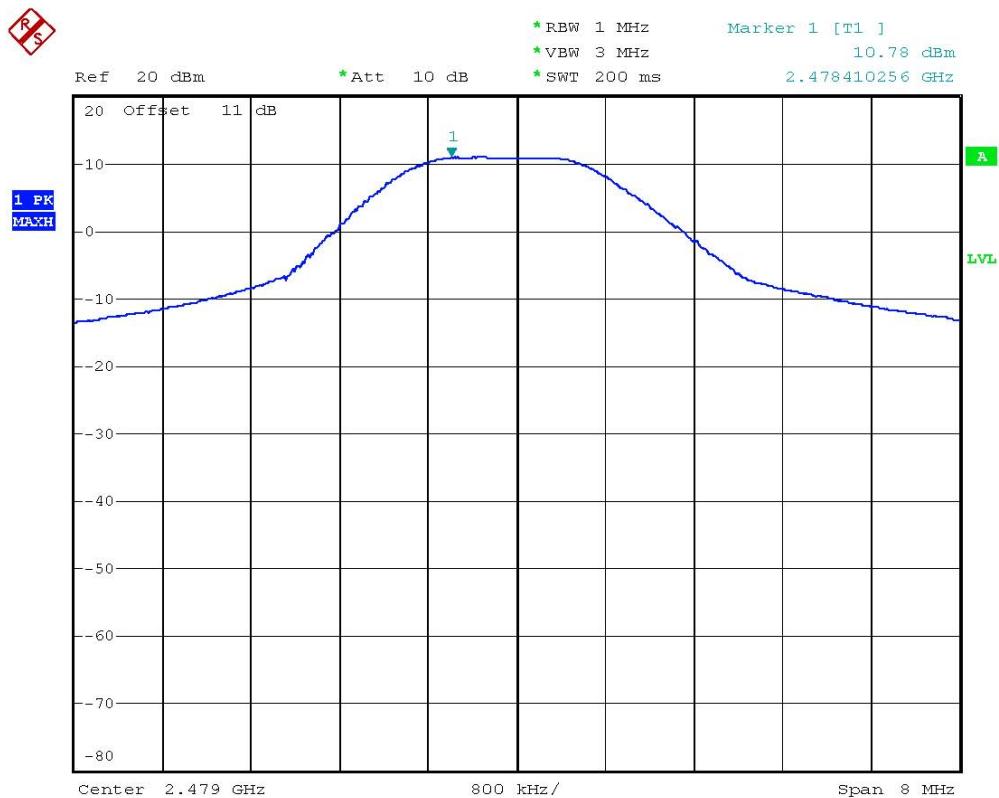


MAX OUTPUT POWER 2444MHz  
Date: 9.SEP.2009 13:51:57



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

Registration number: W6M20908-9997-C-1  
FCC ID: R48TVEE21C



MAX OUTPUT POWER 2479MHz  
Date: 9.SEP.2009 13:50:47

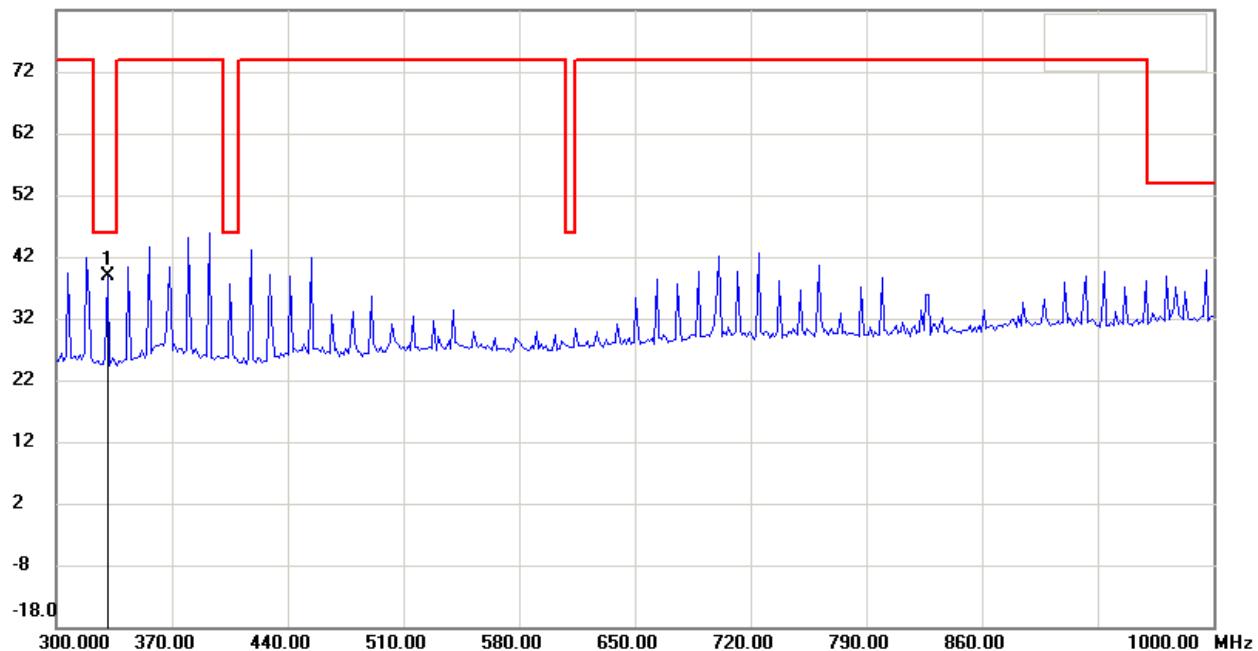
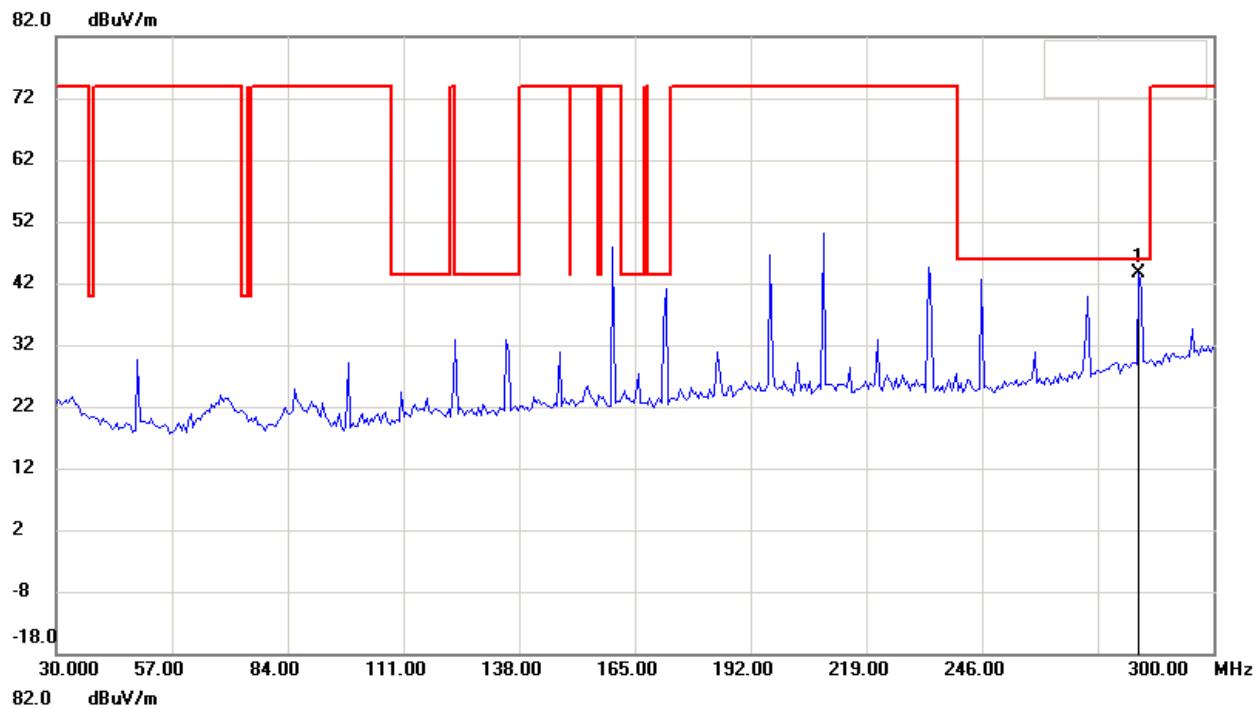
Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Spurious Emissions radiated

Transmitter\_ CH 1

Antenna Polarization H



Up Line: Peak Limit Line Down Line: Ave Limit Line

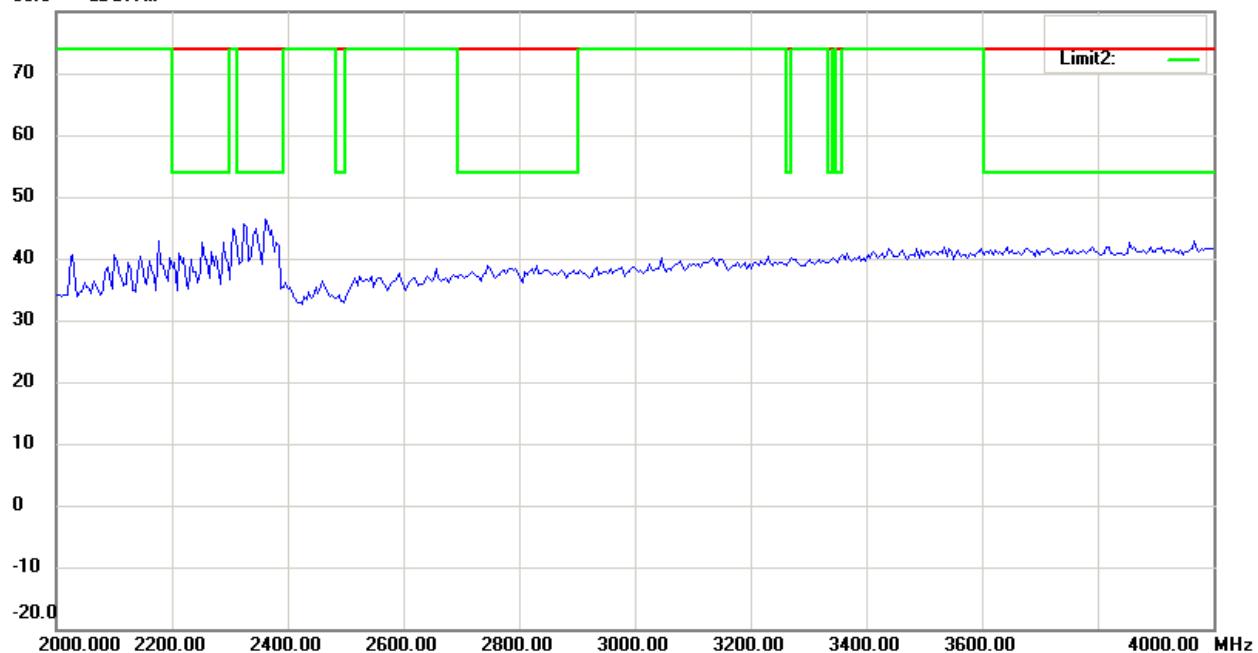
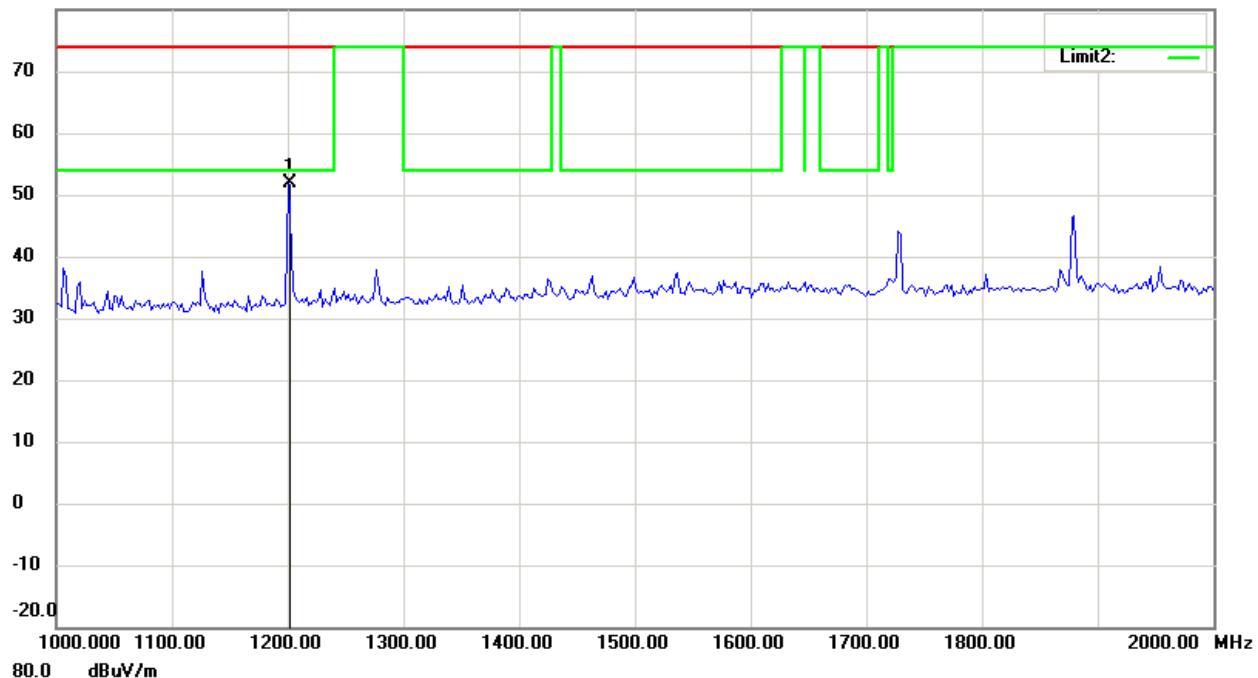
Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

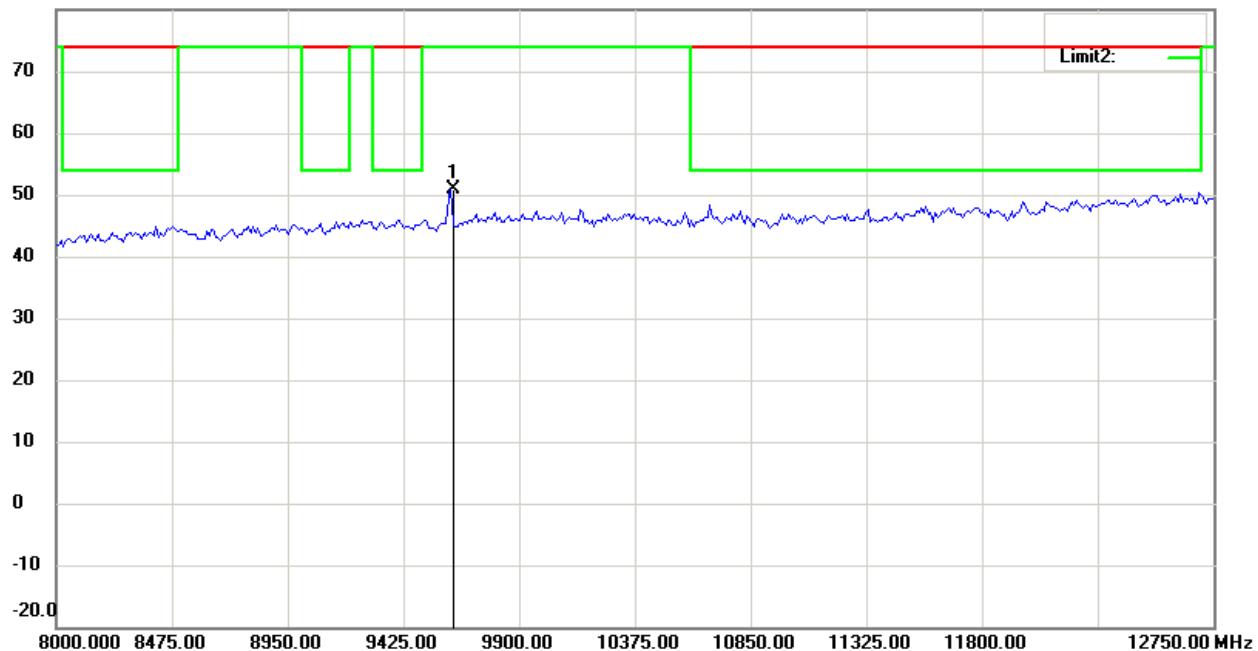
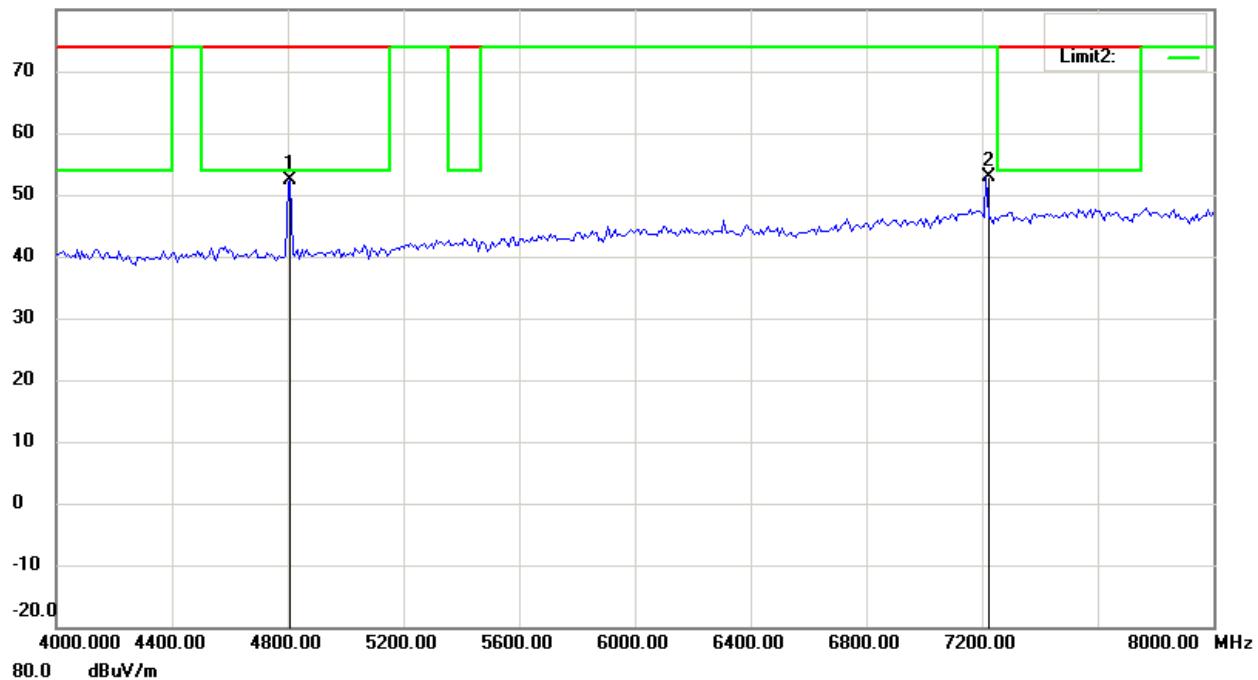
Note:

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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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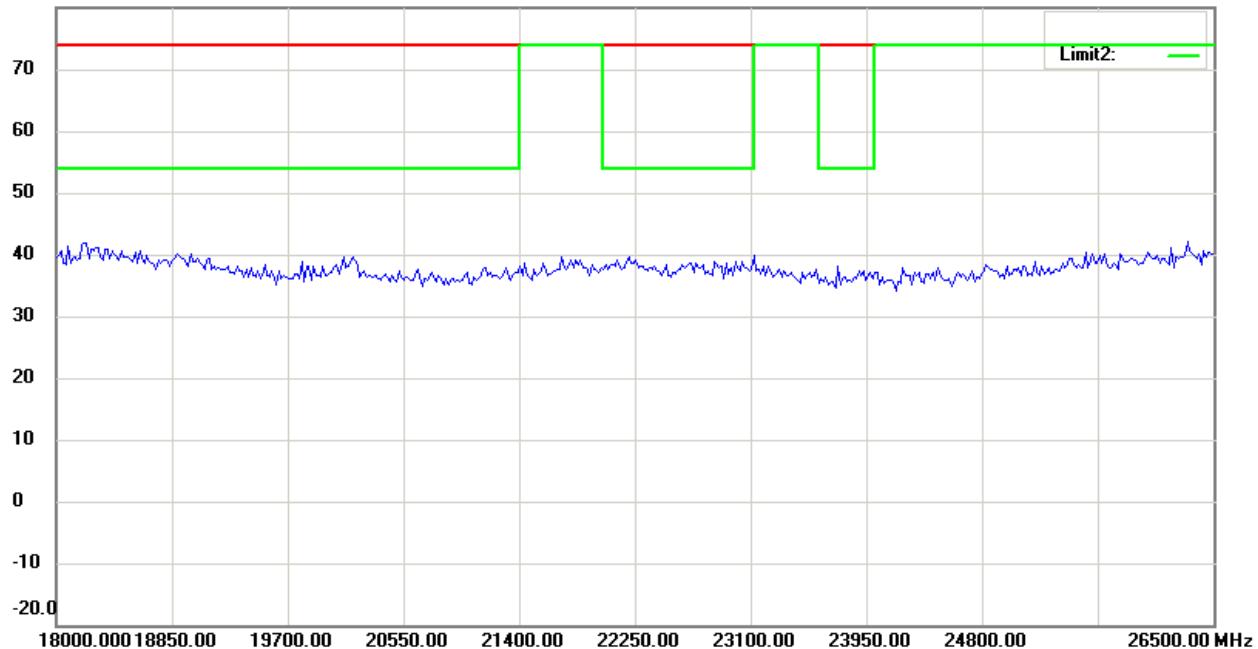
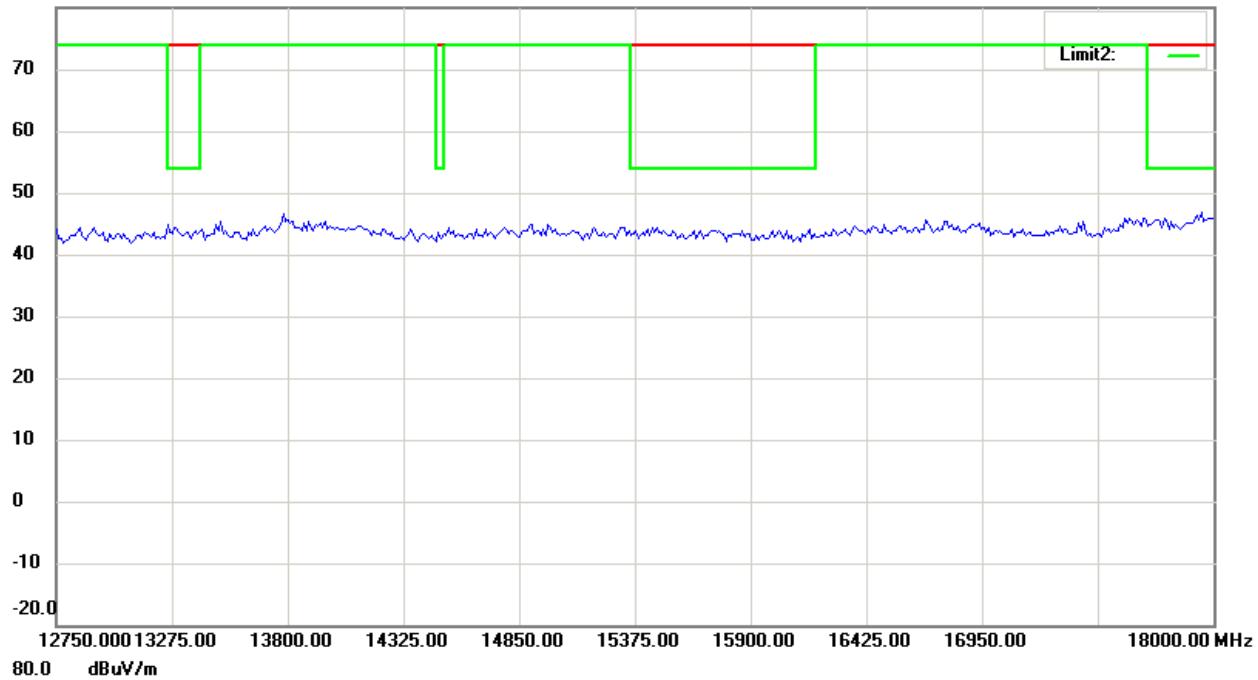


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

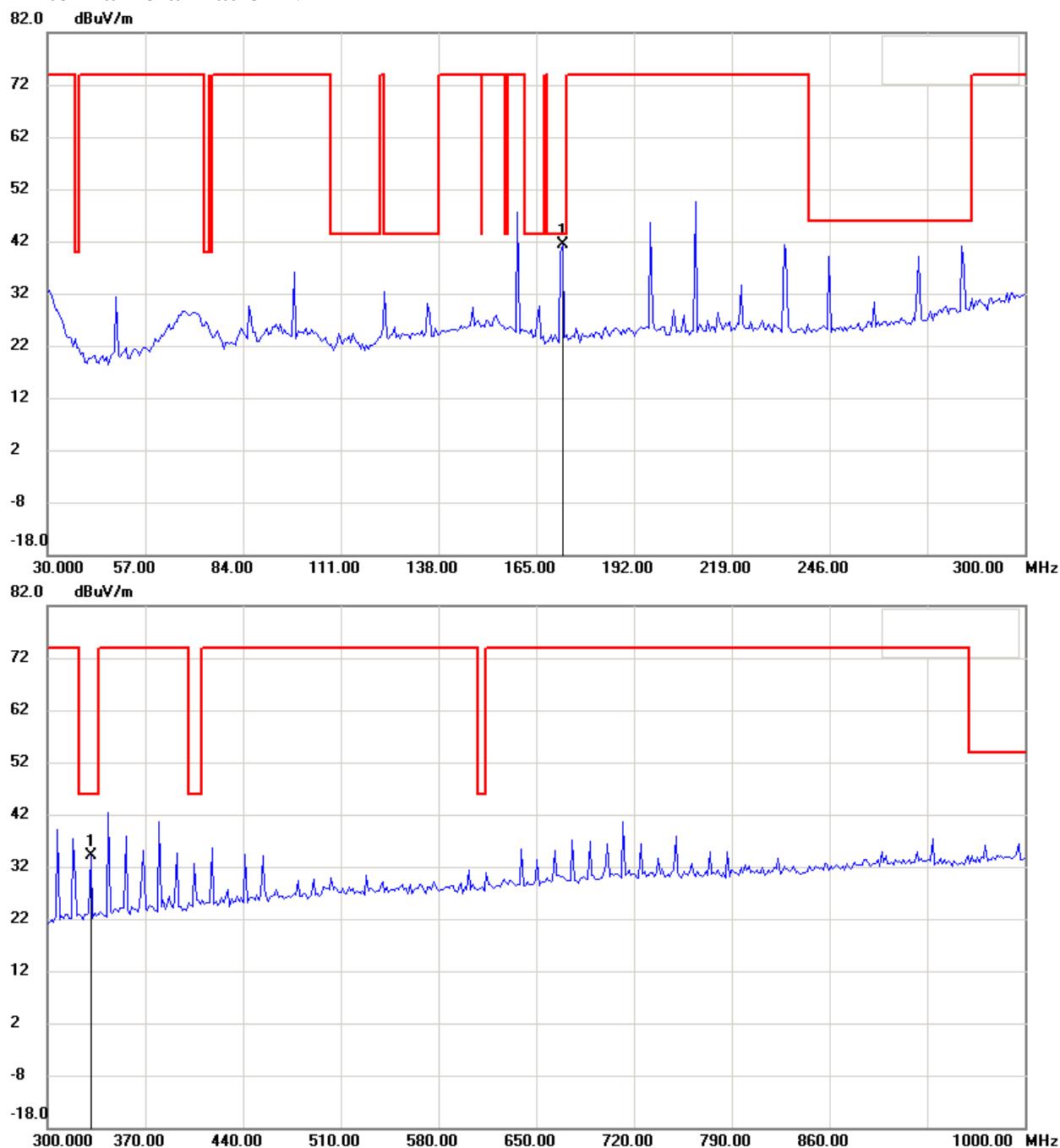
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1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Antenna Polarization V



Up Line: Peak Limit Line Down Line: Ave Limit Line

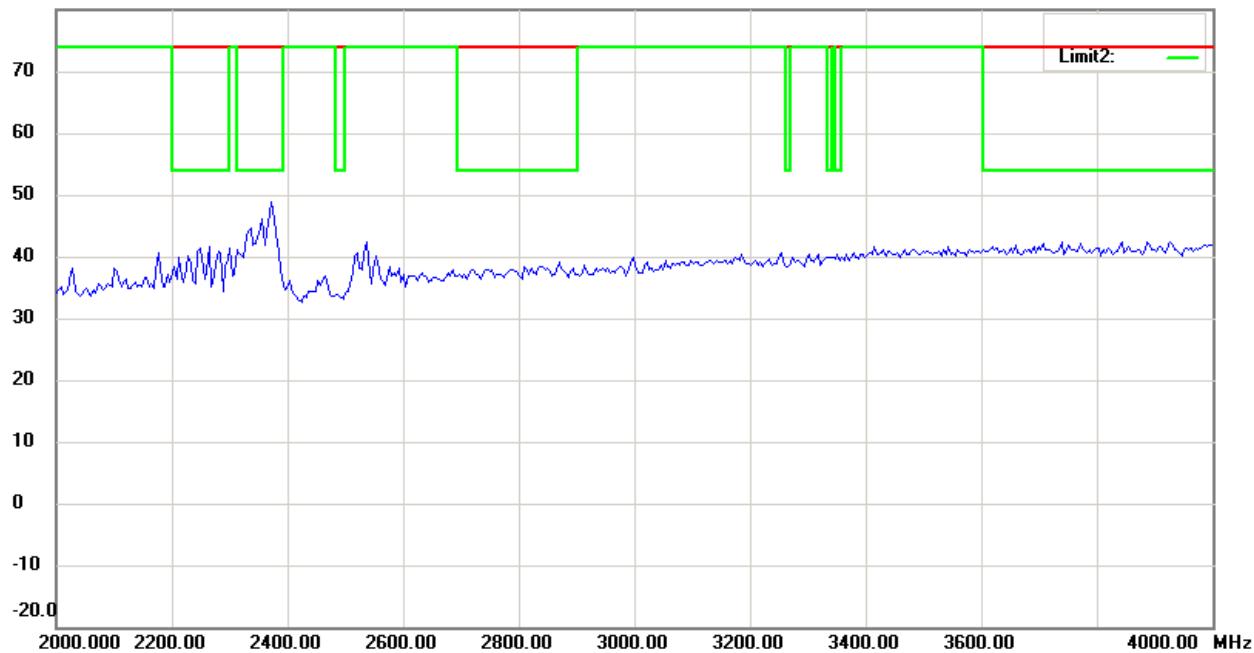
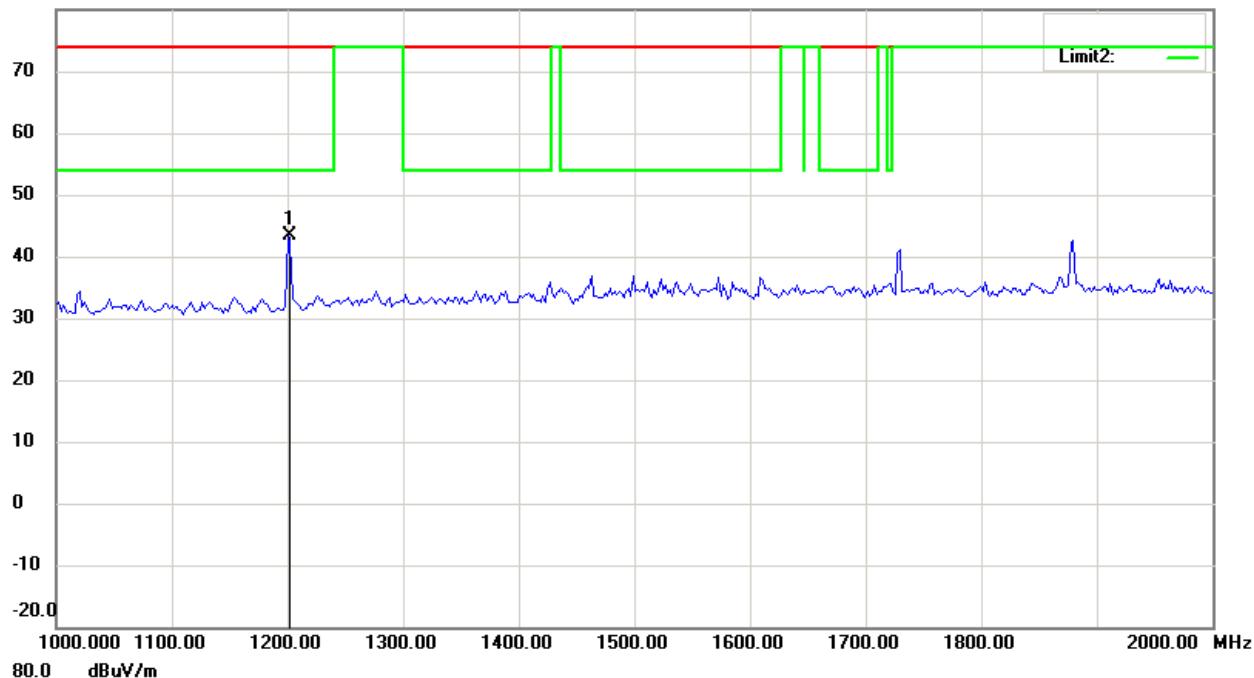
Note:

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: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

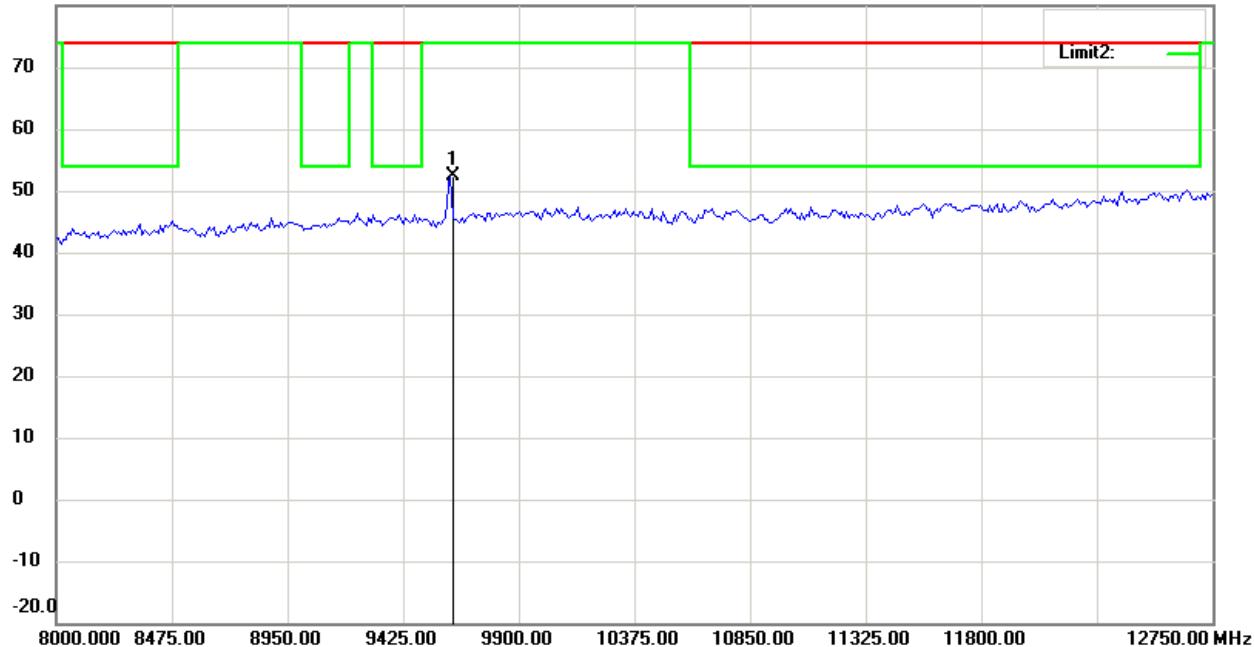
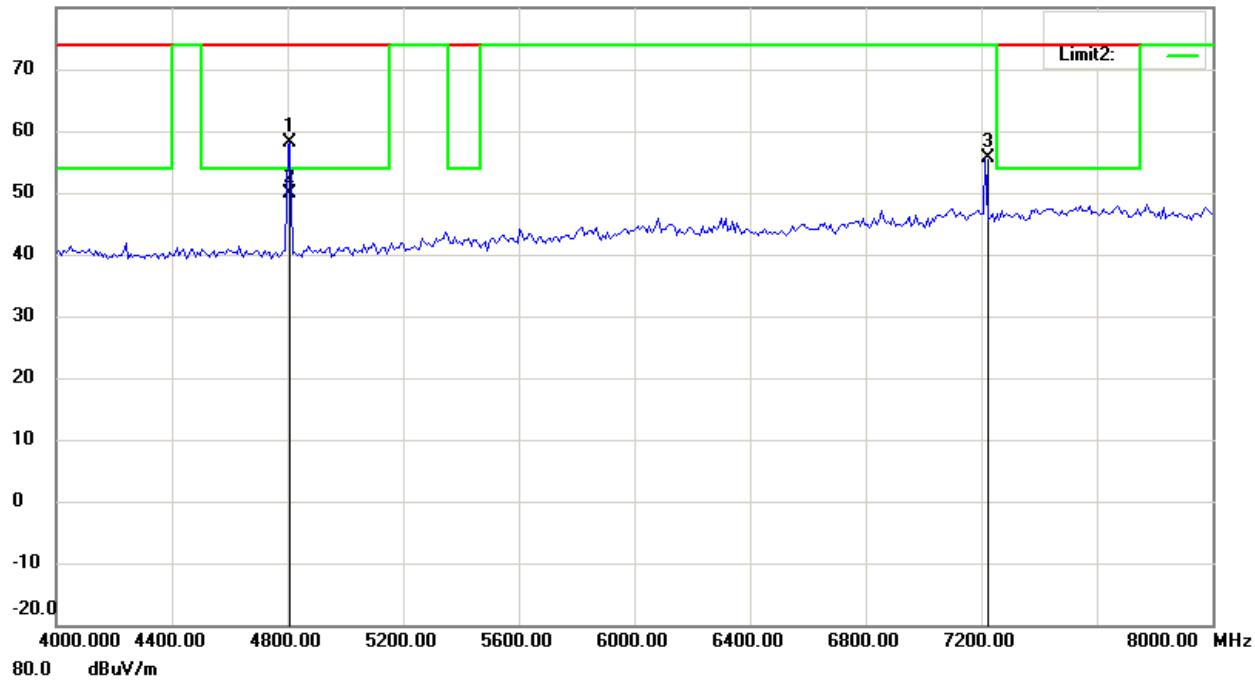
Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak 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.
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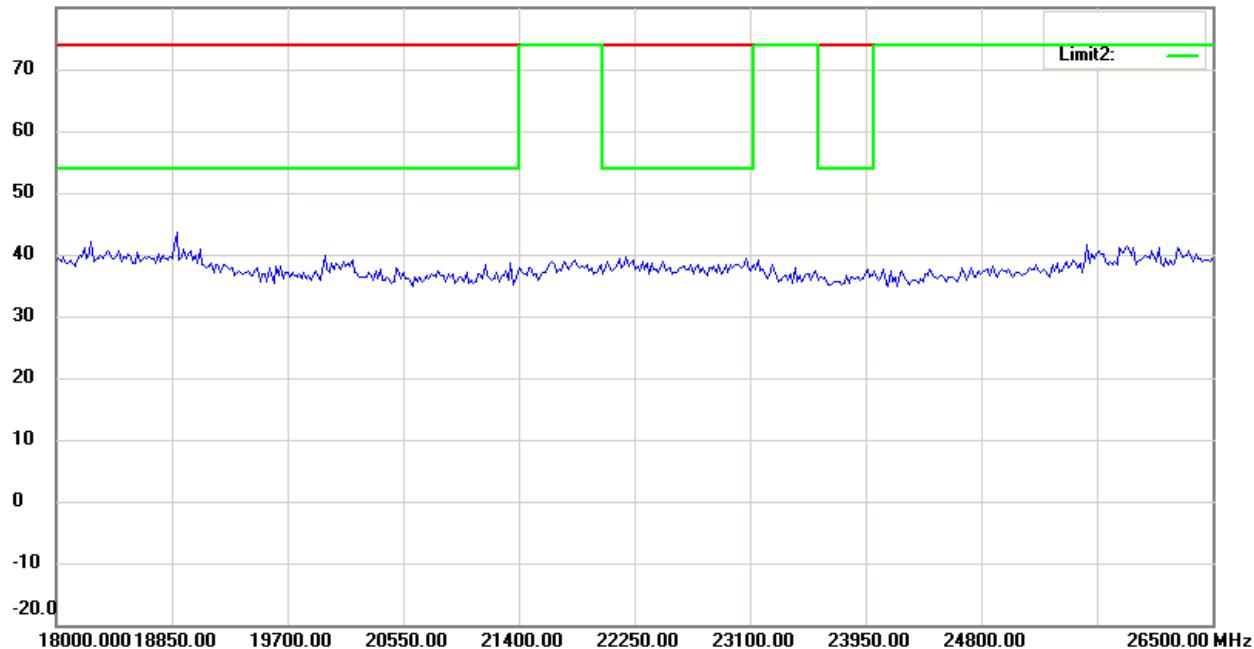
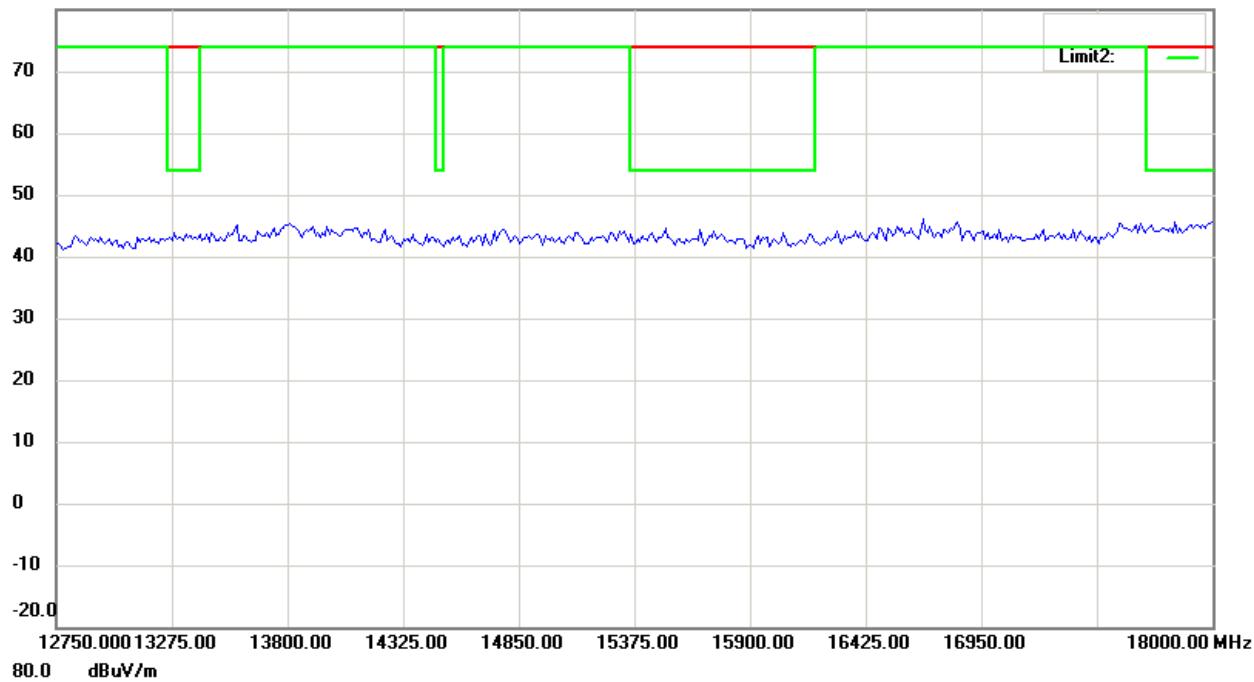


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

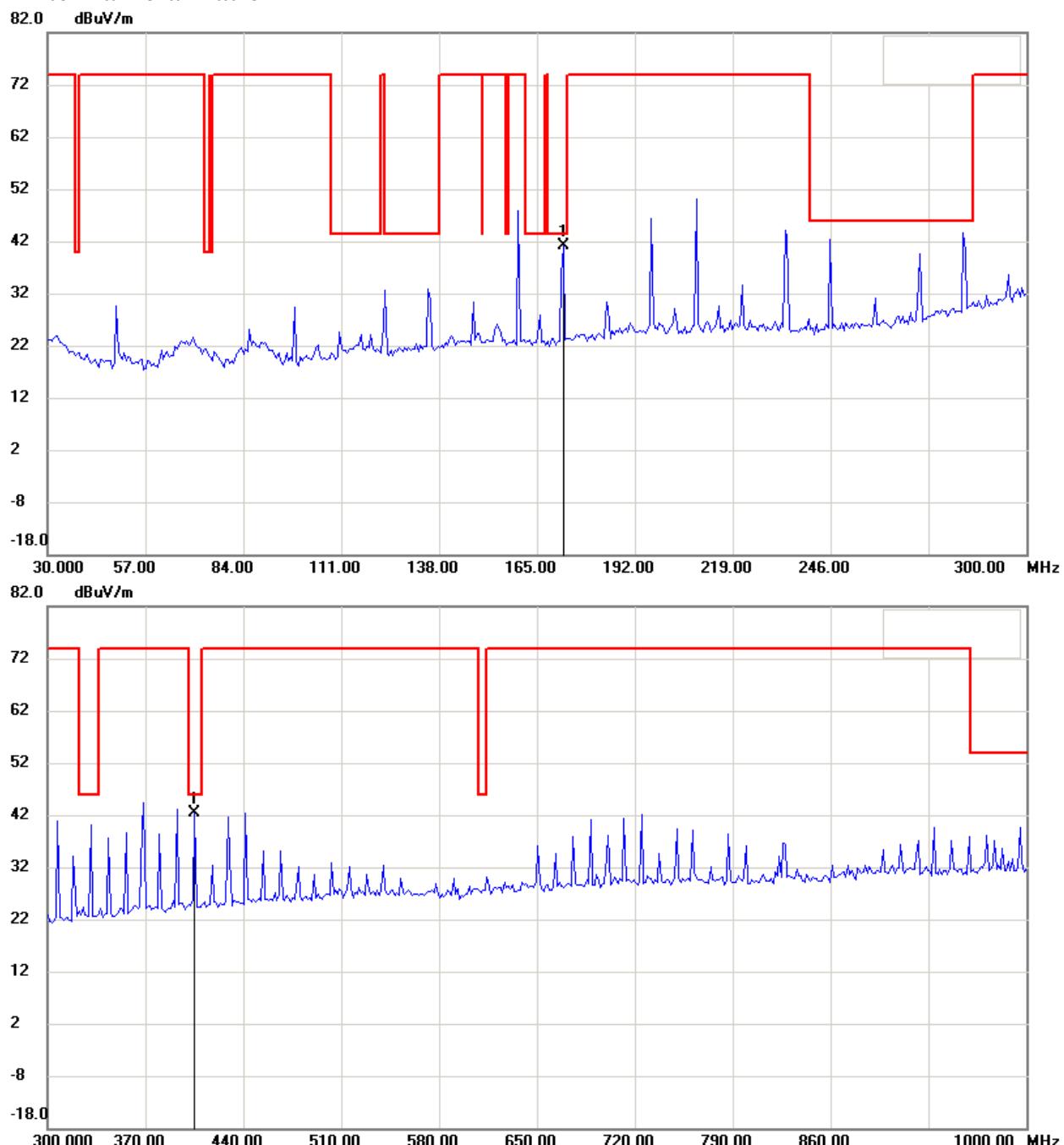
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Transmitter\_ CH 9

Antenna Polarization H



Up Line: Peak Limit Line Down Line: Ave Limit Line

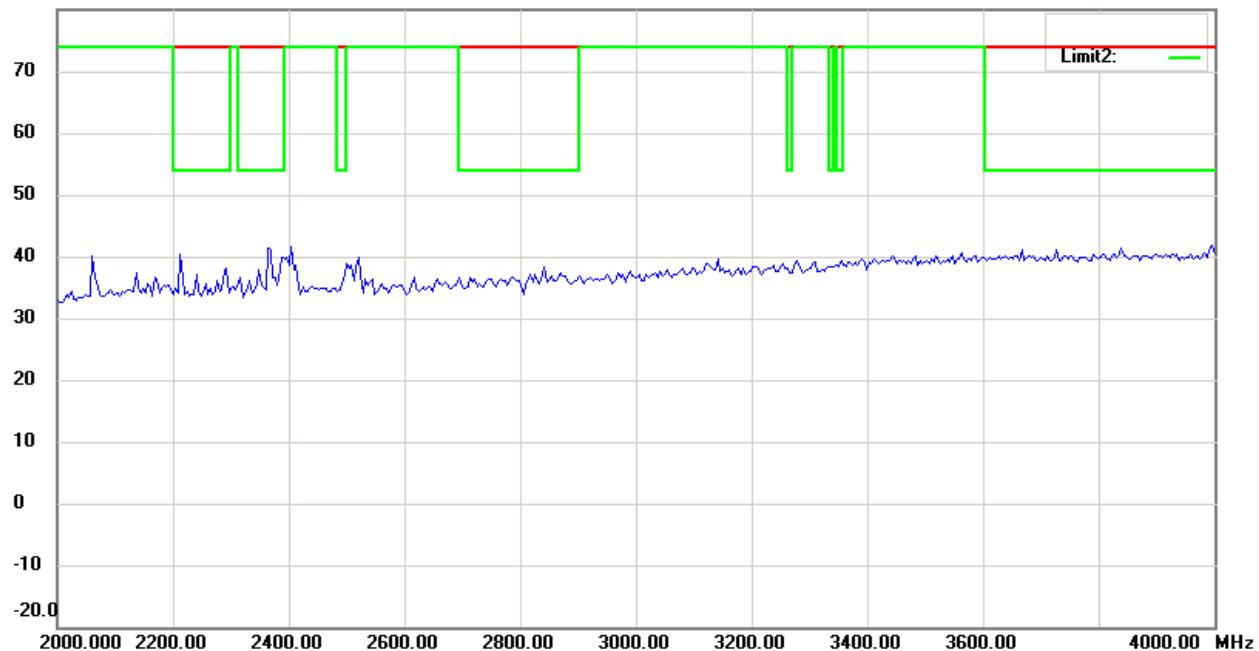
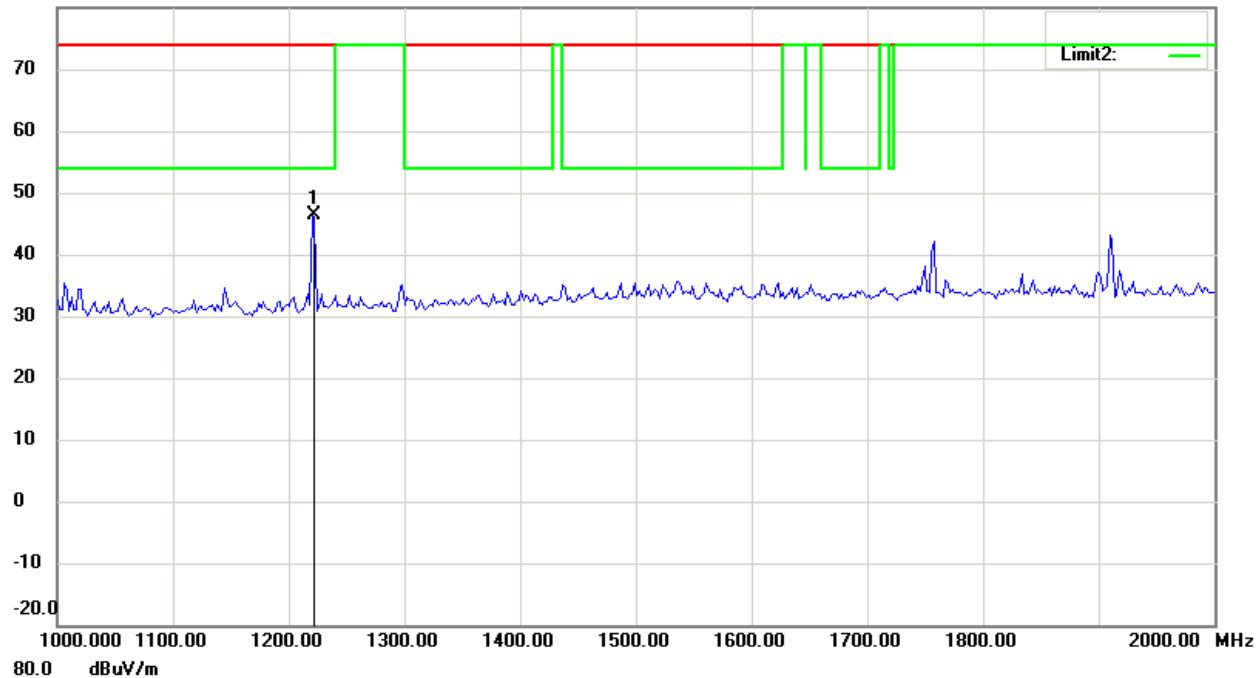
Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

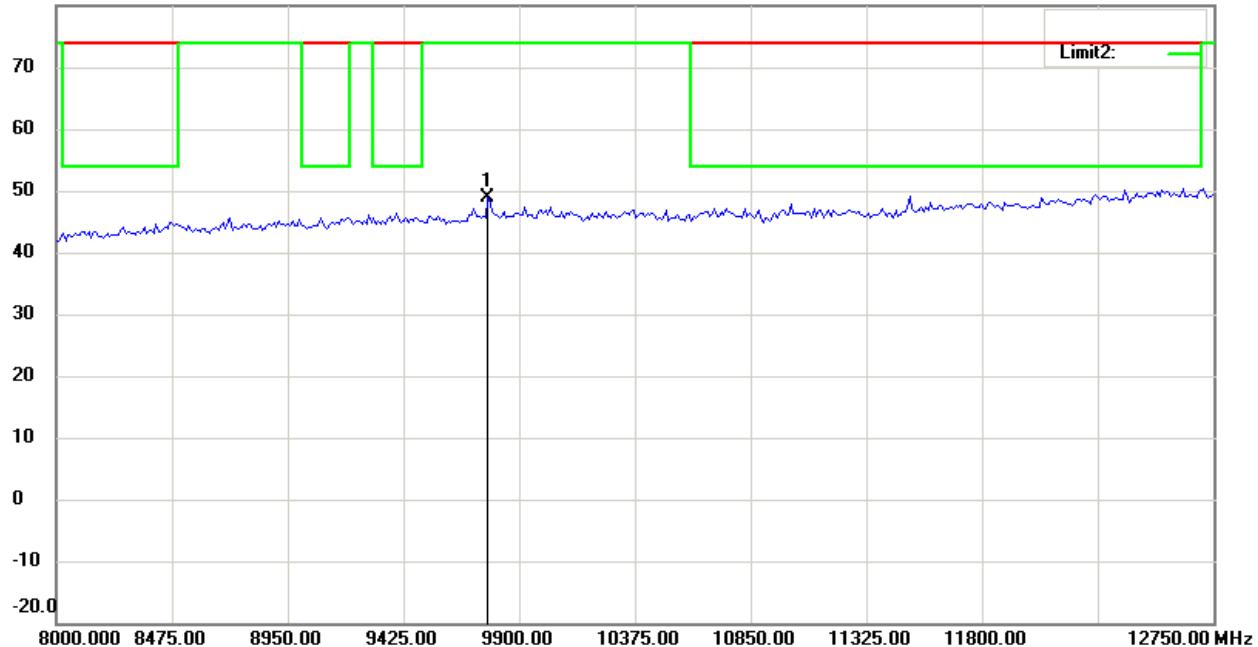
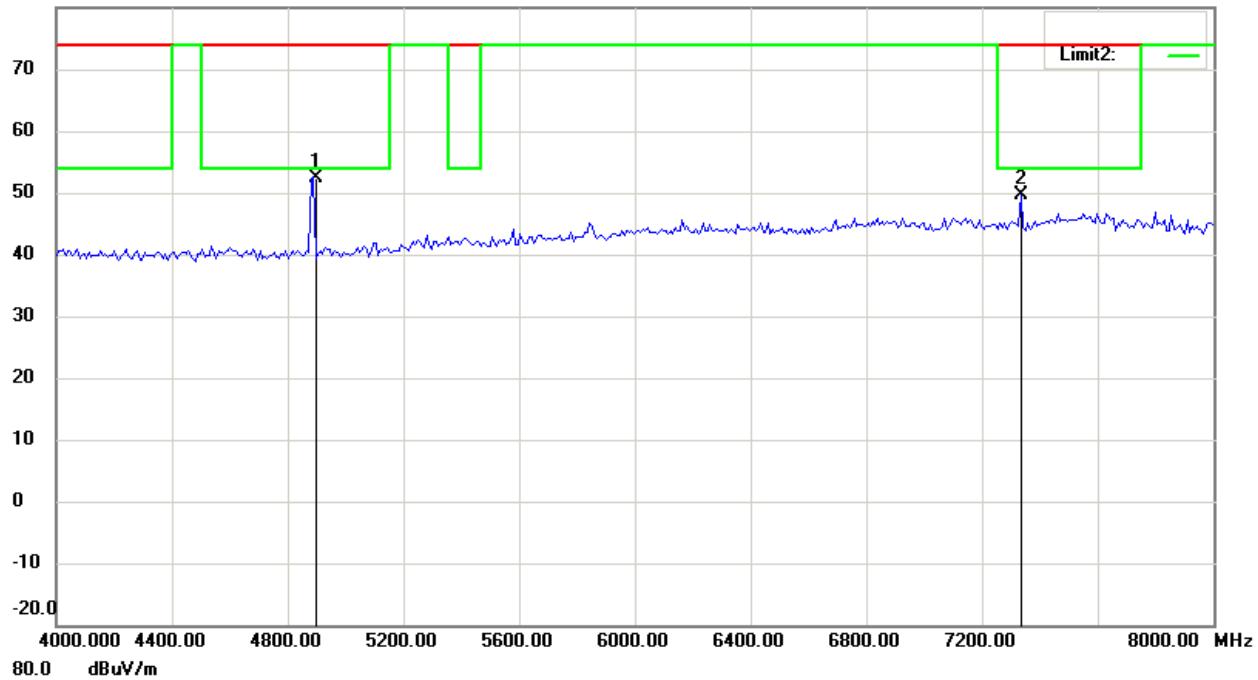
Note:

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.
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

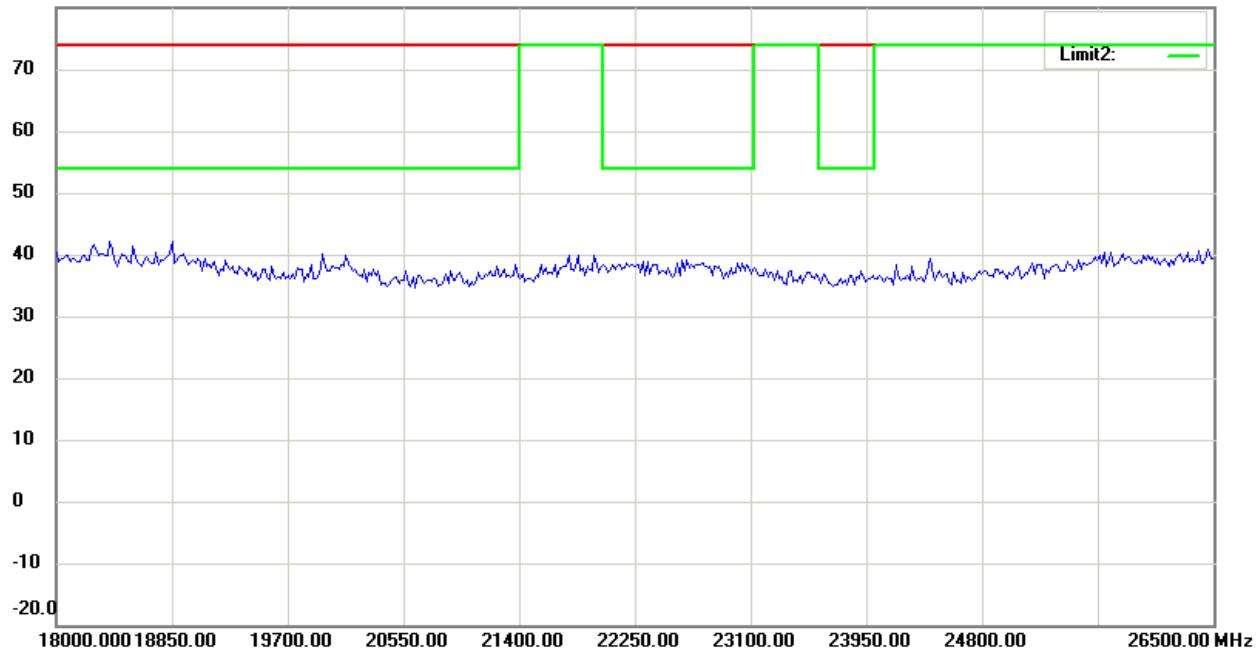
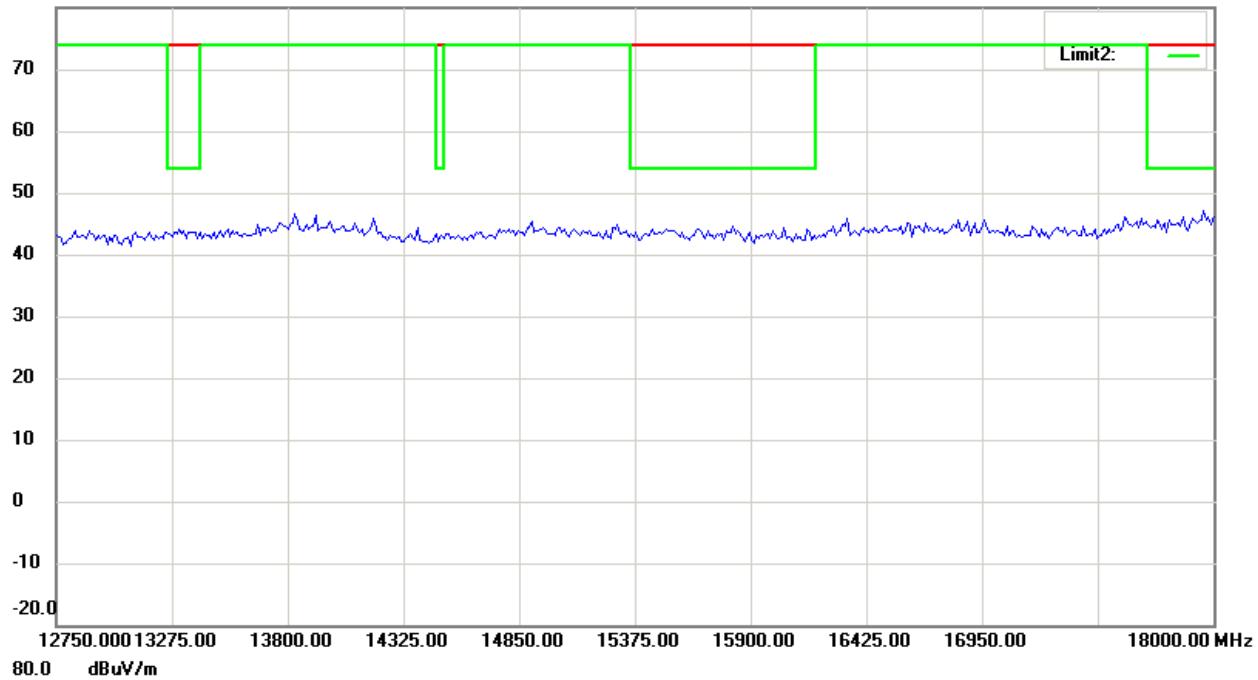
Note:

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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.
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

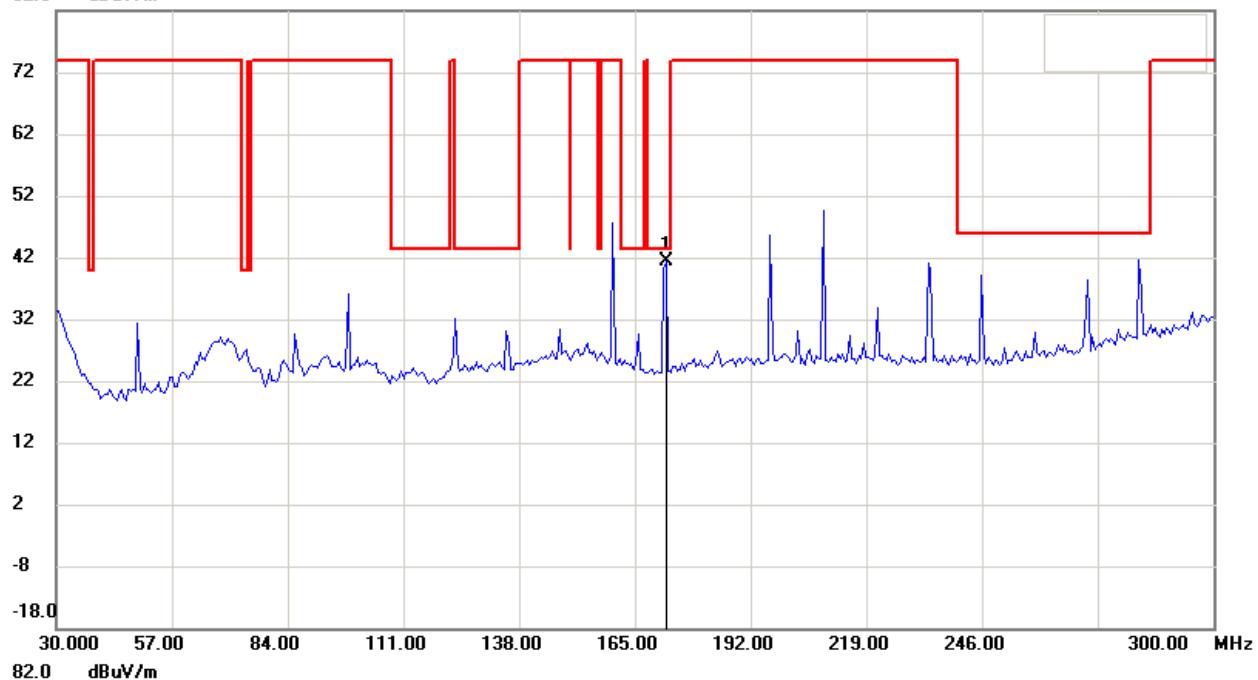
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Registration number: W6M20908-9997-C-1

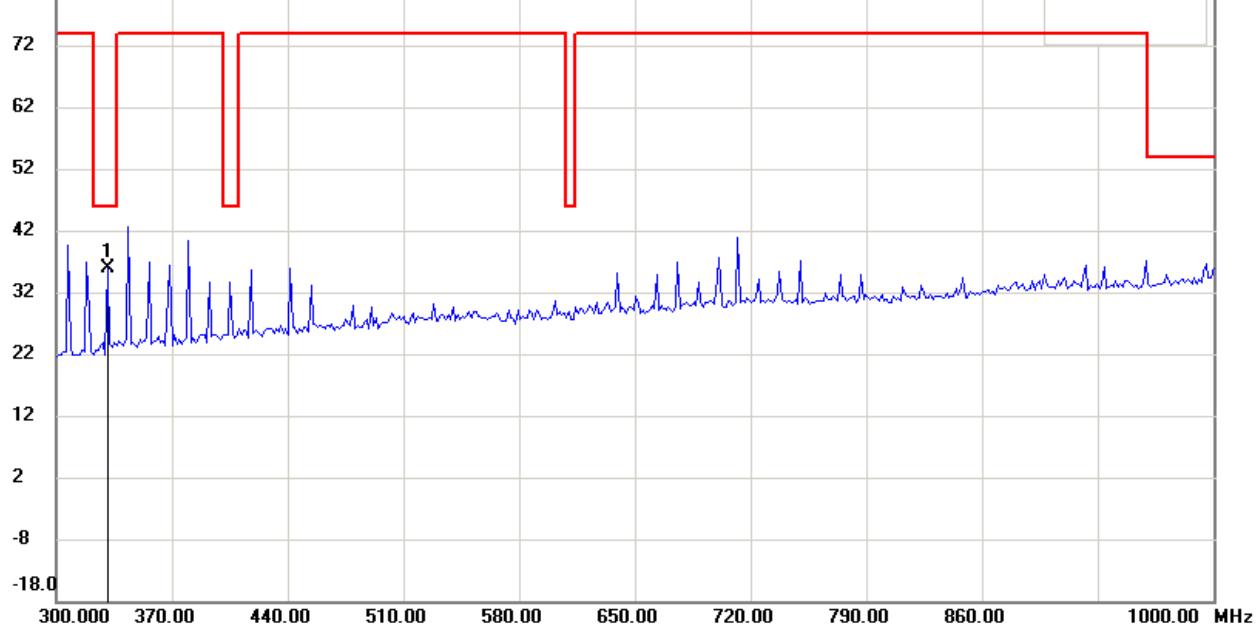
FCC ID: R48TVEE21C

Antenna Polarization V

82.0 dBuV/m



82.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

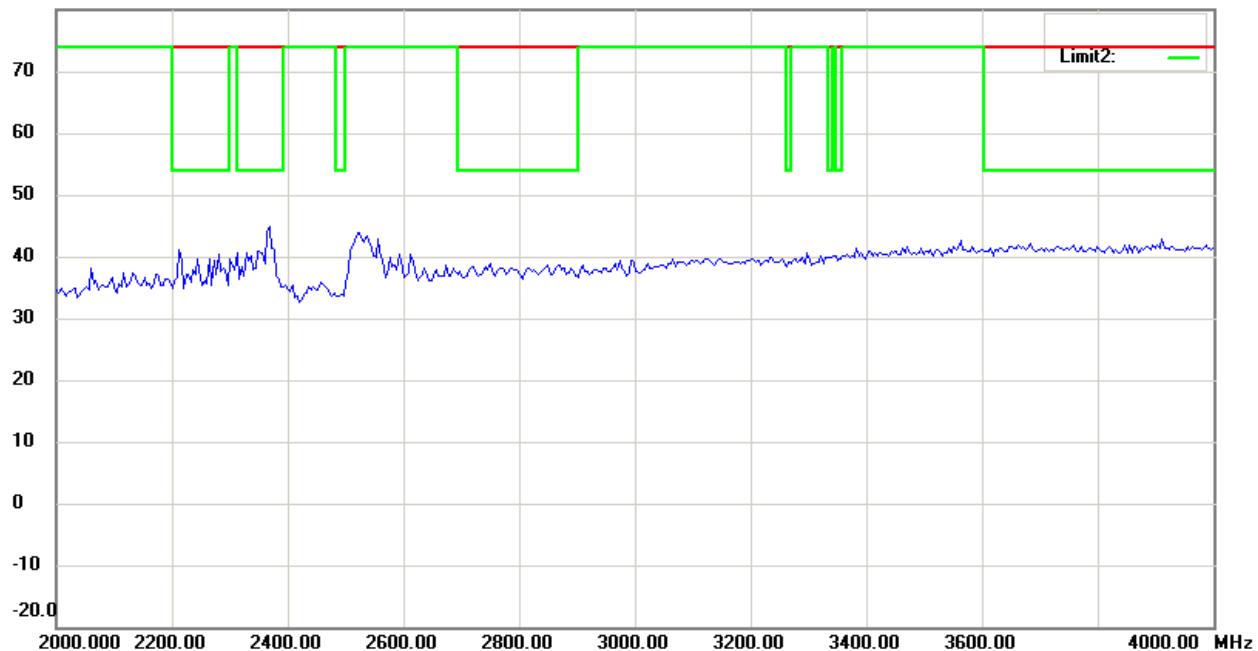
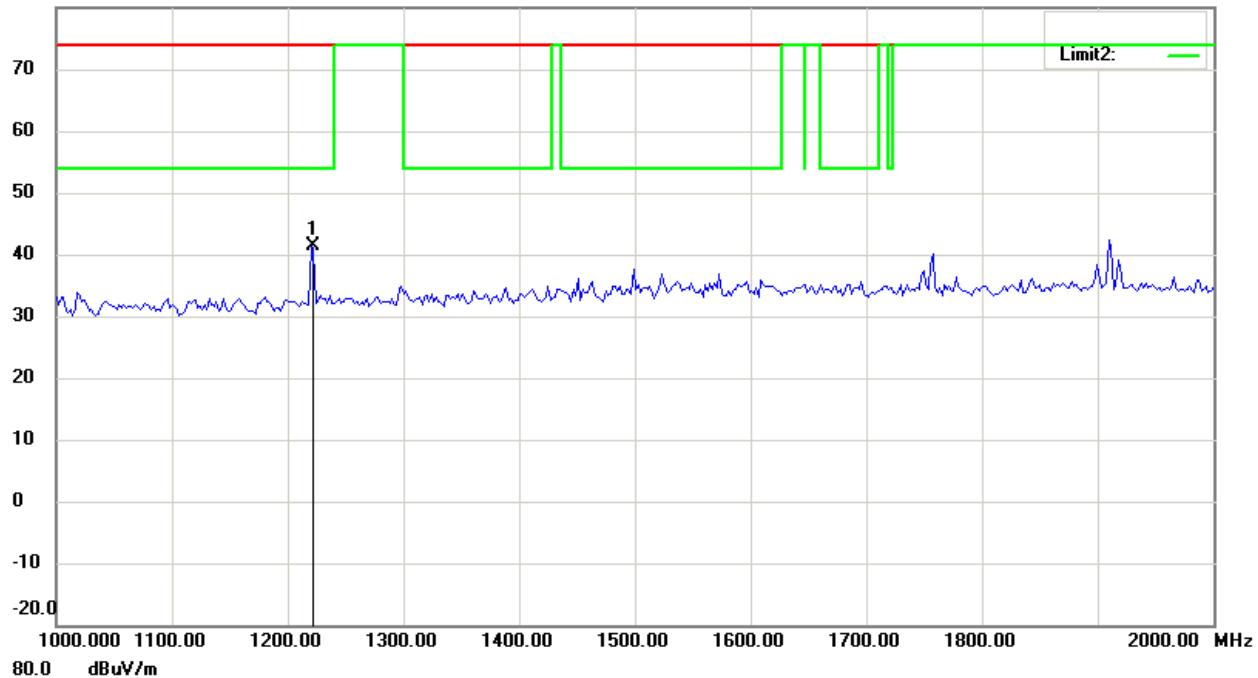
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

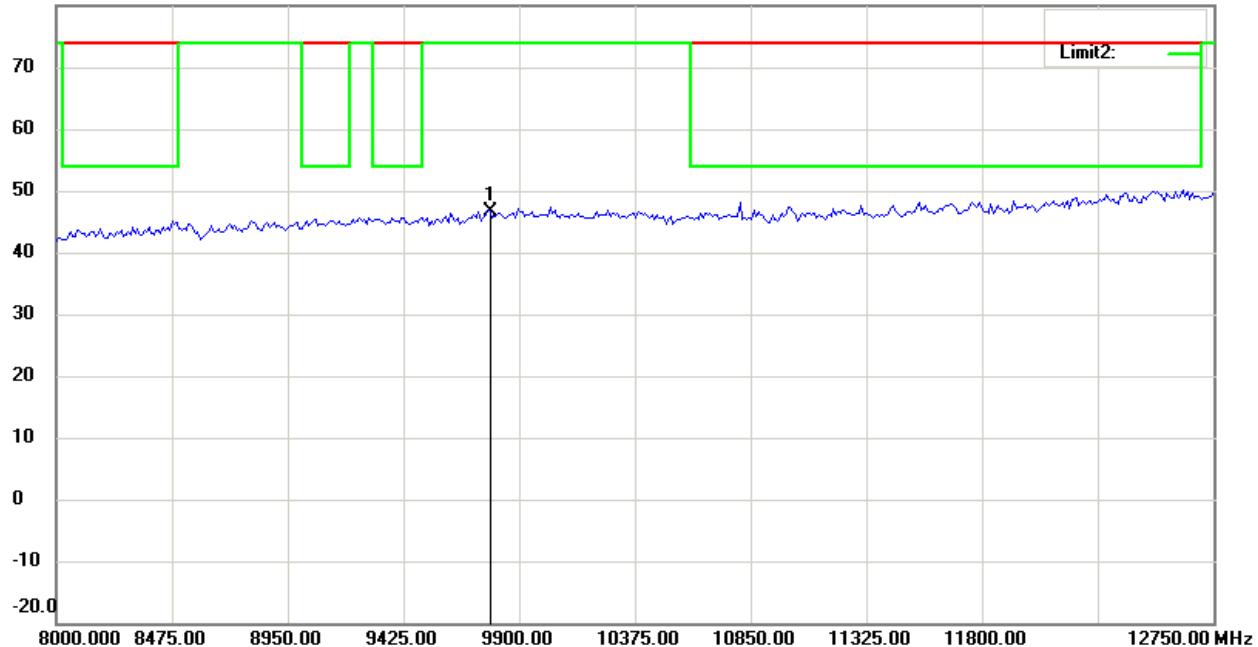
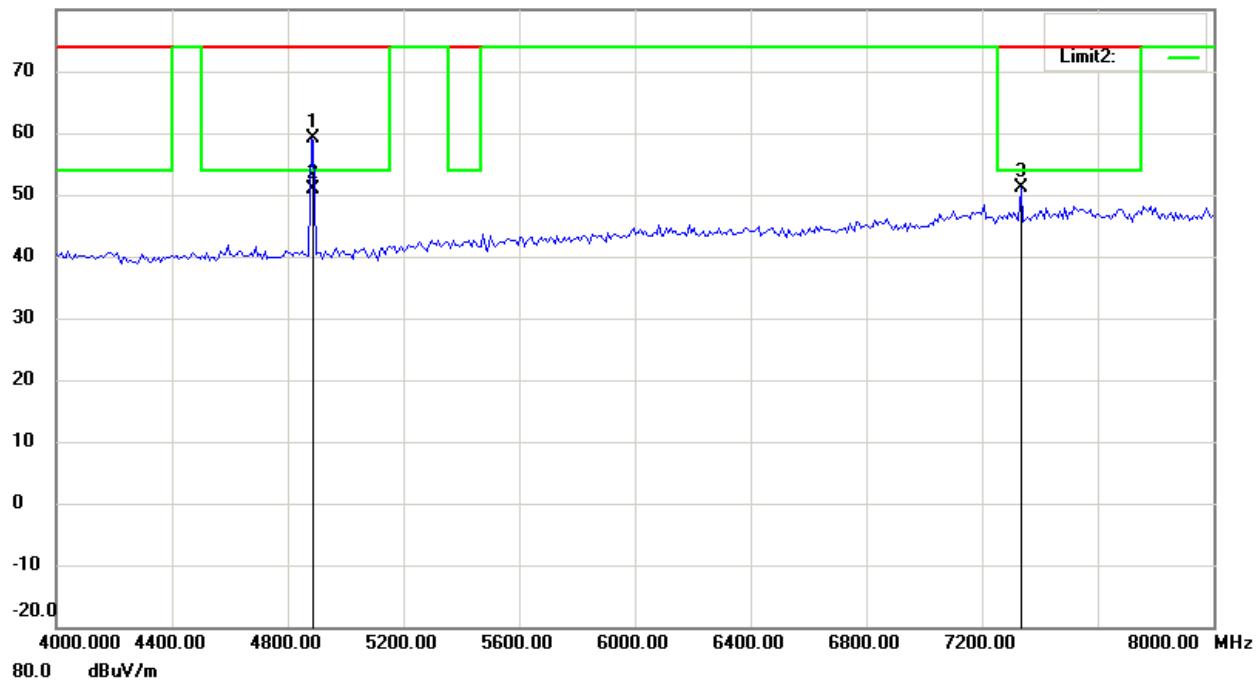
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

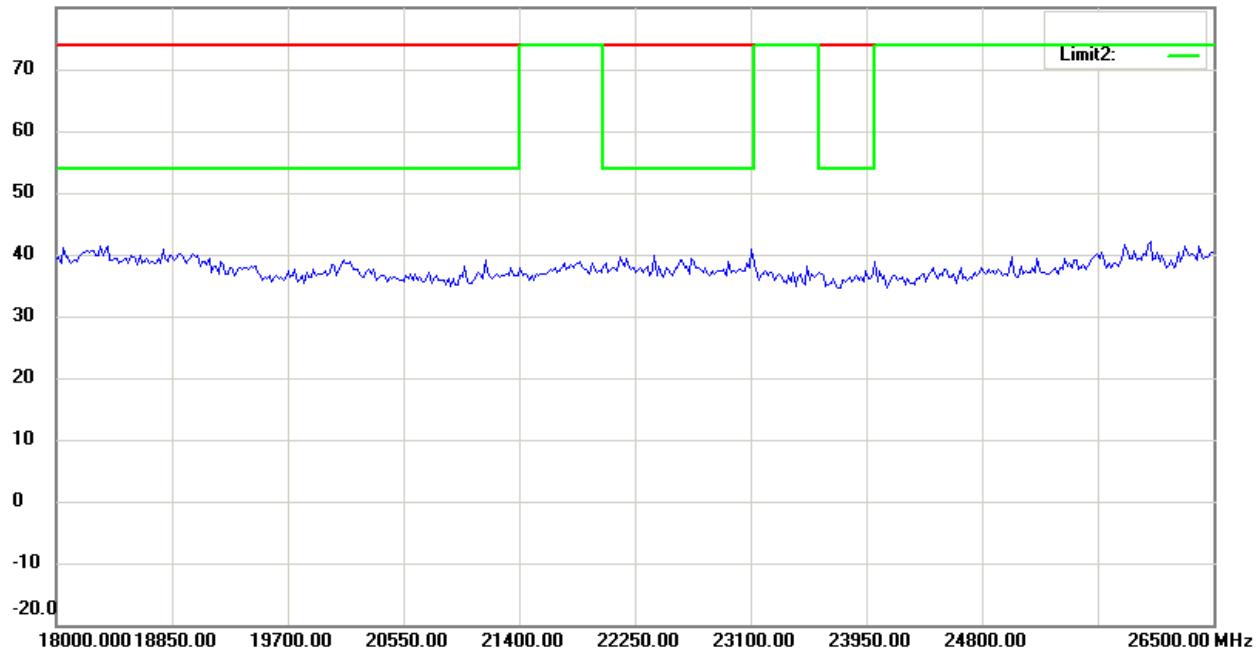
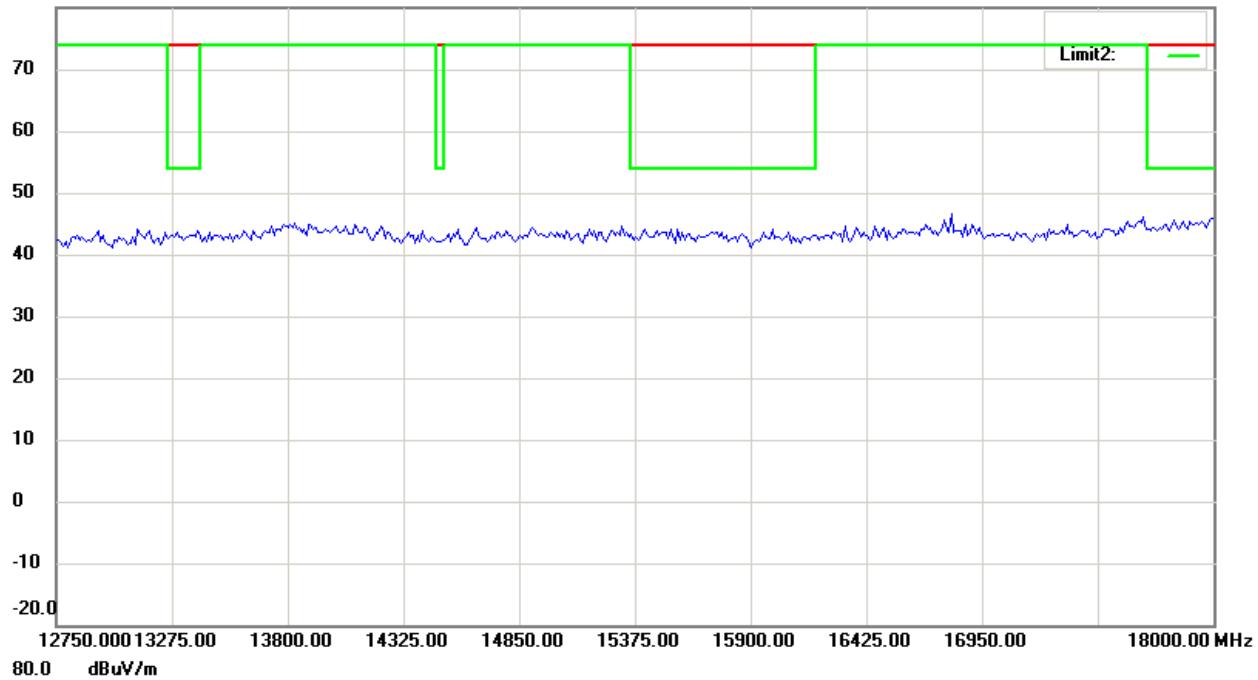
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

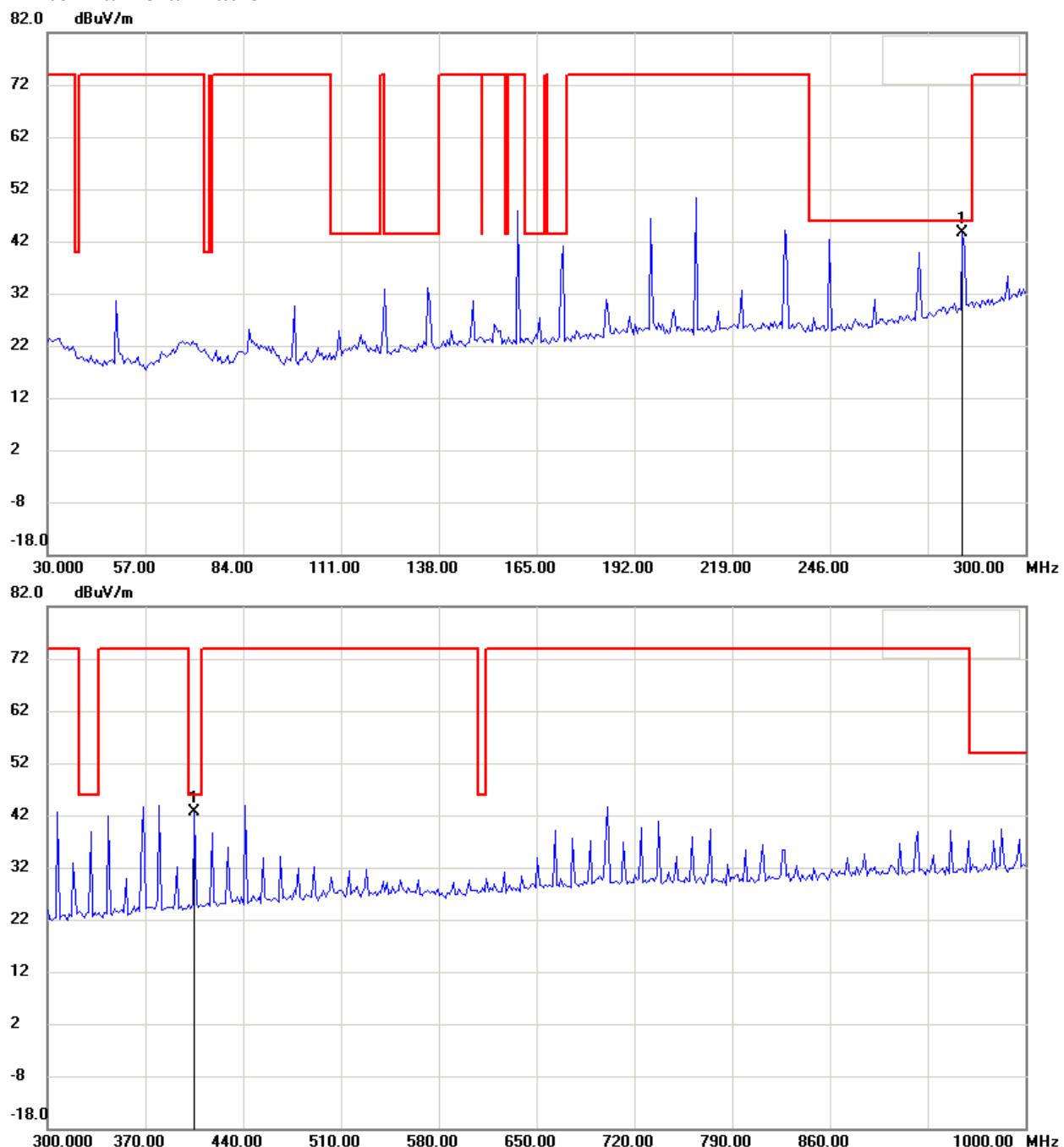
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Transmitter\_ CH 16

Antenna Polarization H



Up Line: Peak Limit Line Down Line: Ave Limit Line

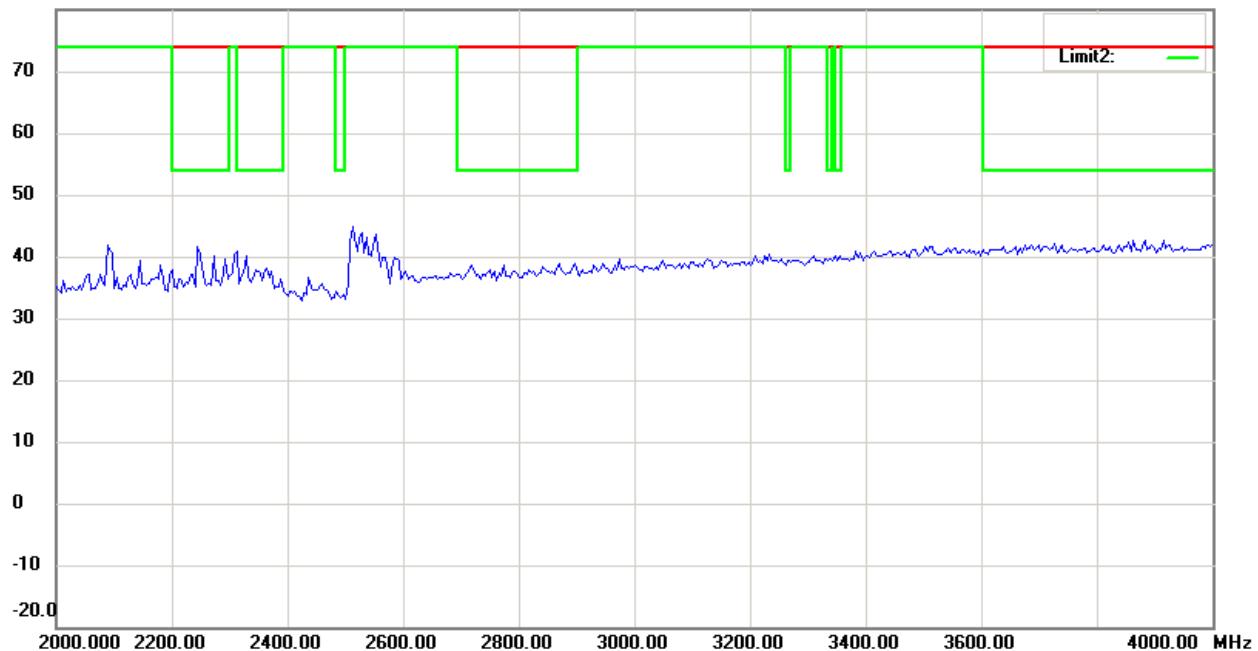
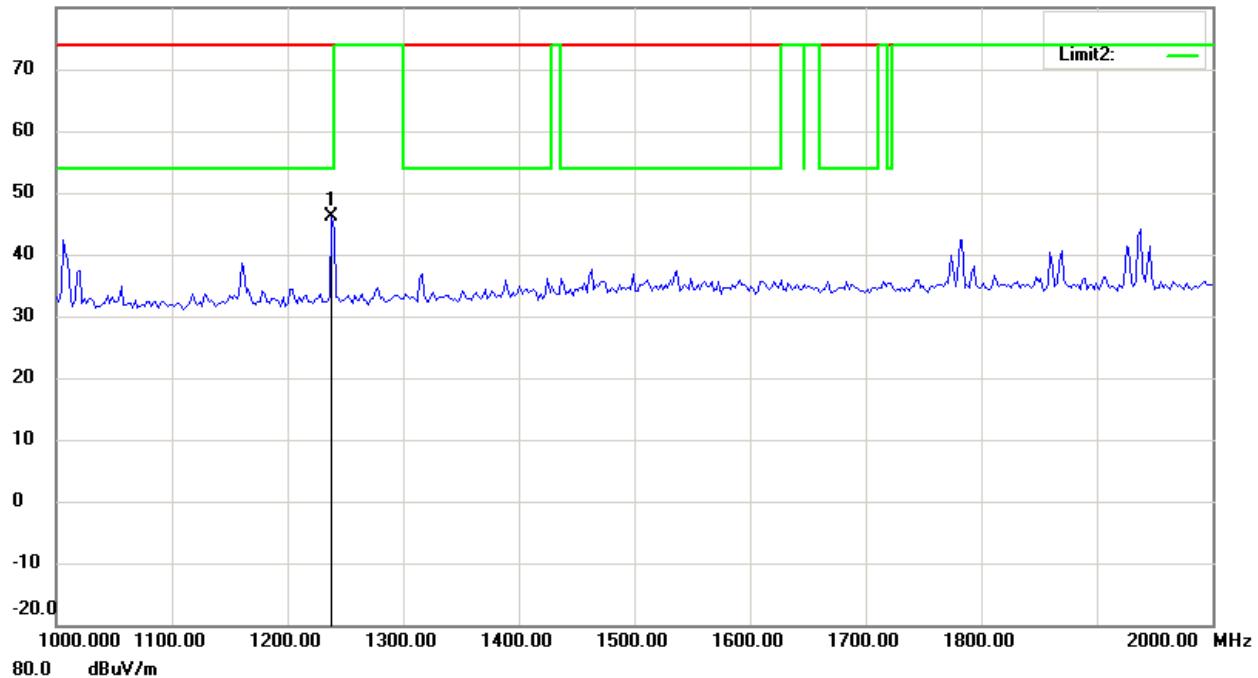
Note:

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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

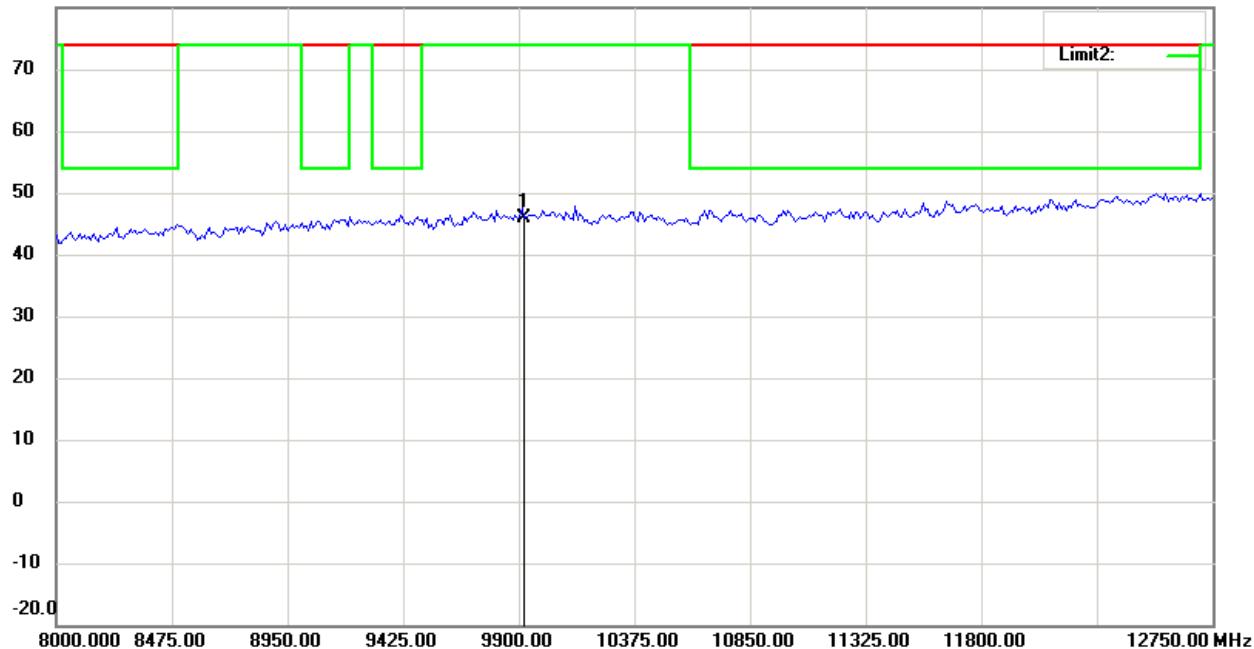
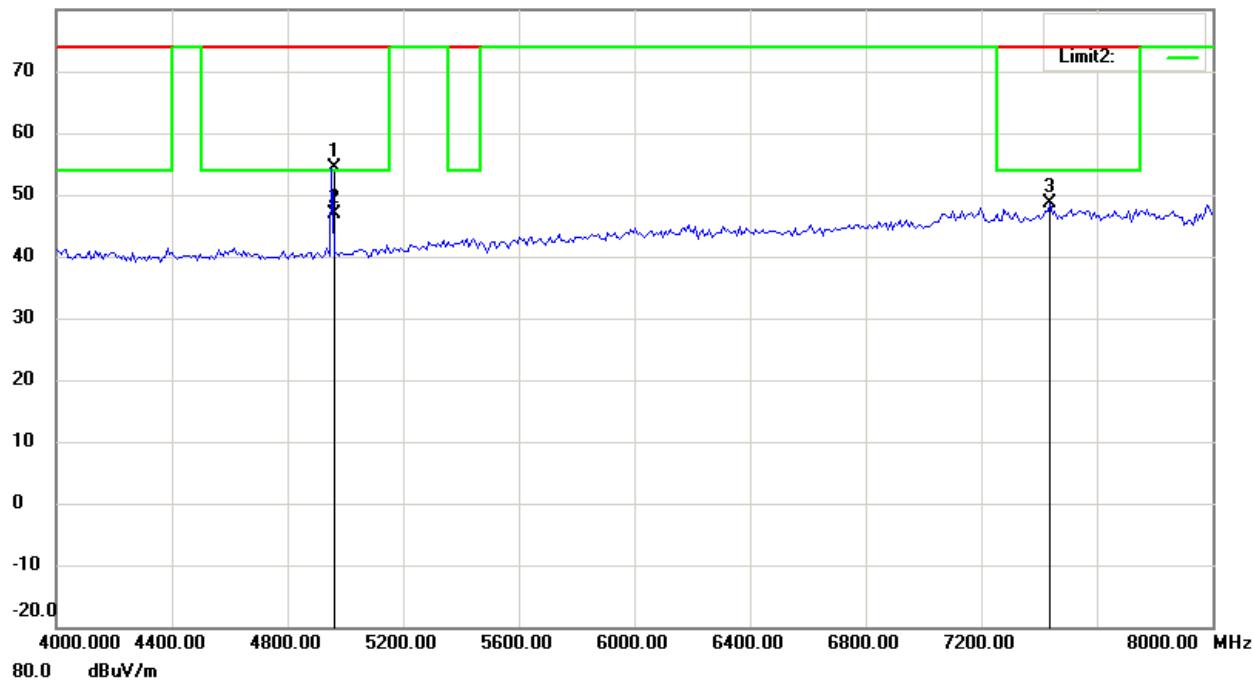
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak 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.
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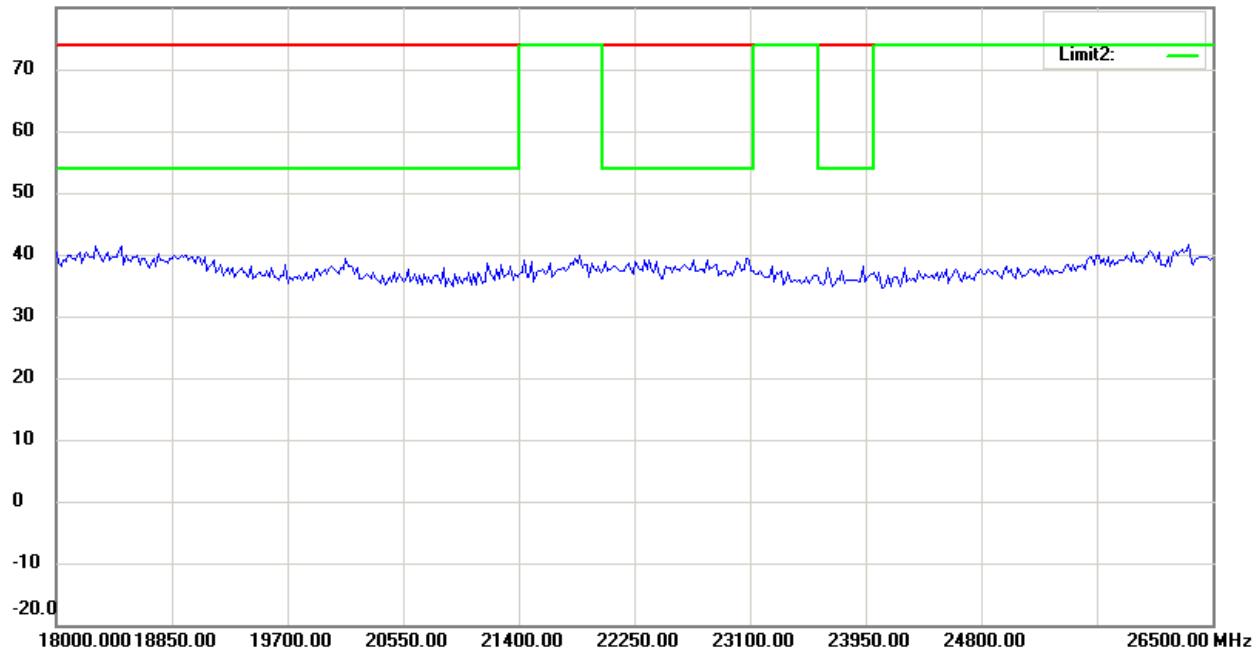
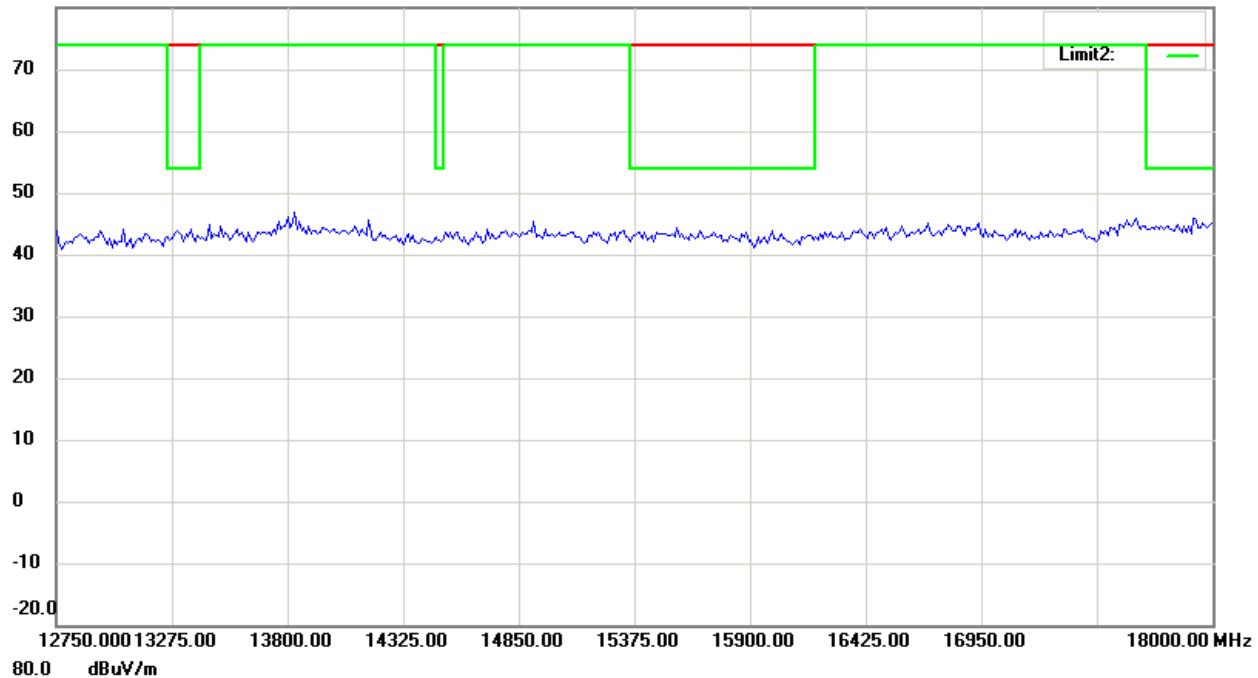


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

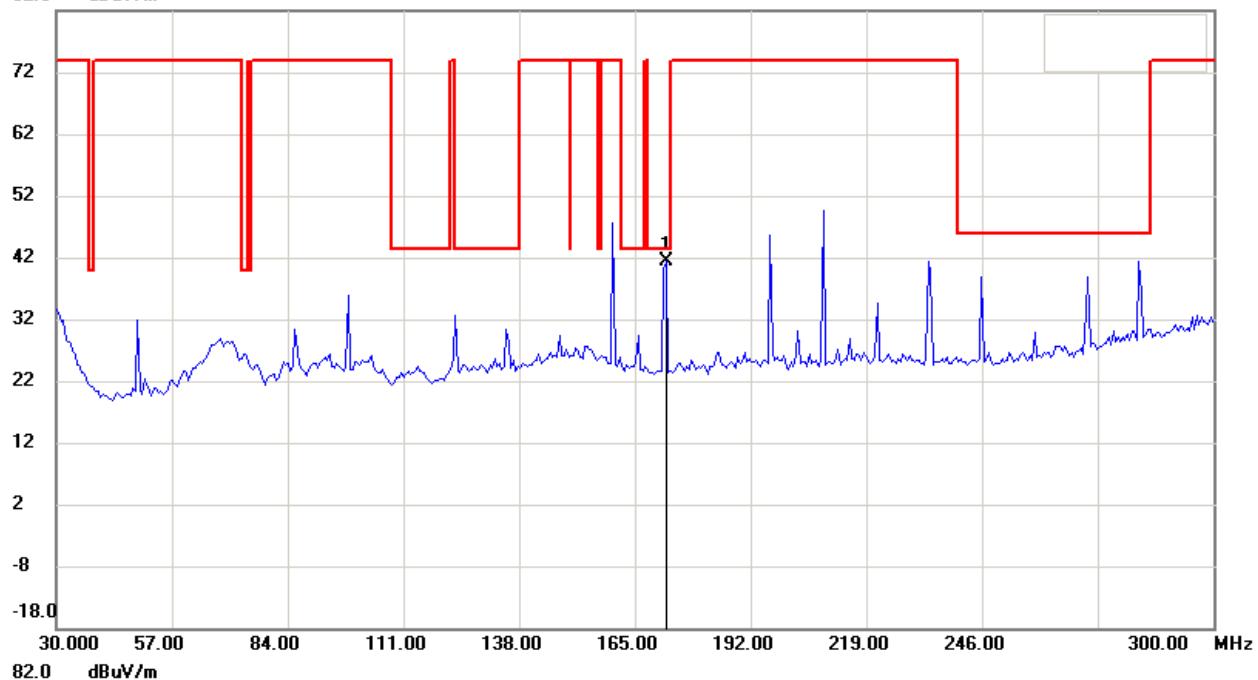
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Registration number: W6M20908-9997-C-1

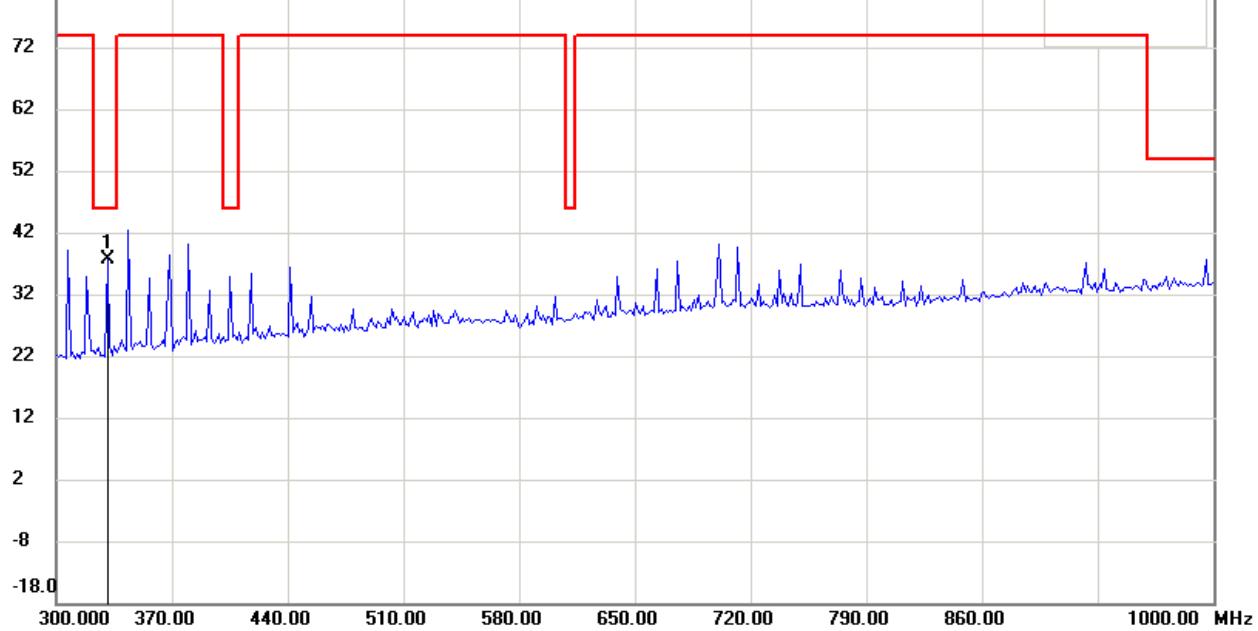
FCC ID: R48TVEE21C

Antenna Polarization V

82.0 dBuV/m



82.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

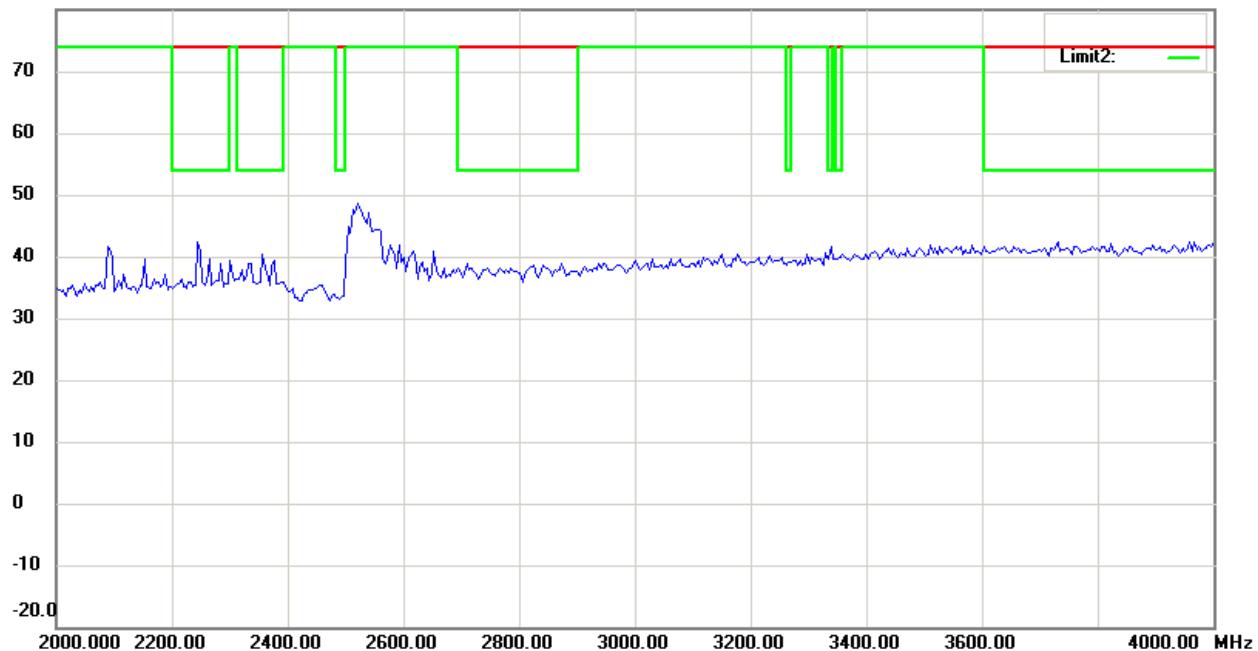
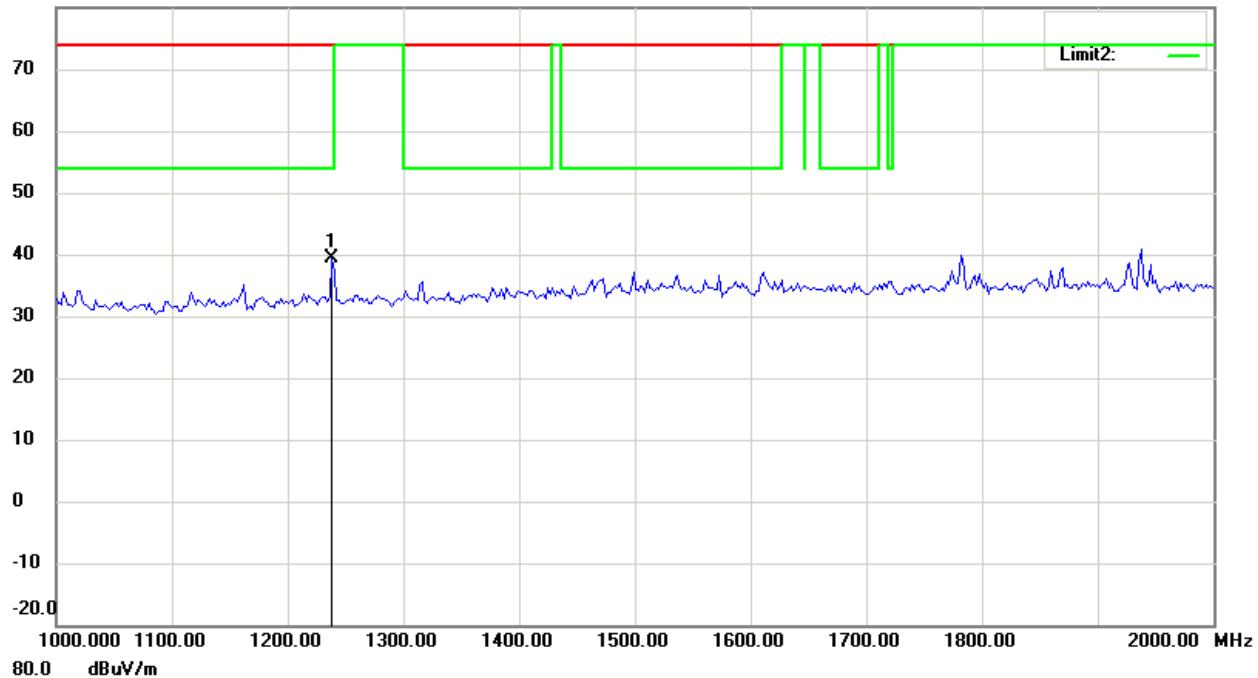
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

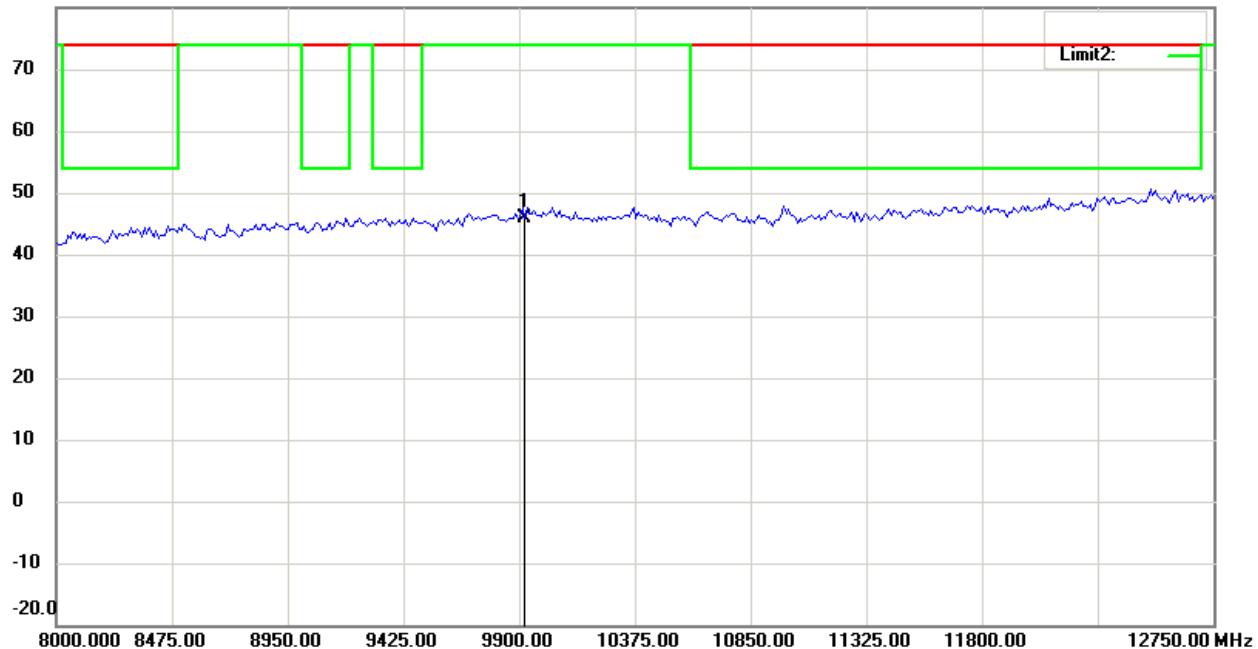
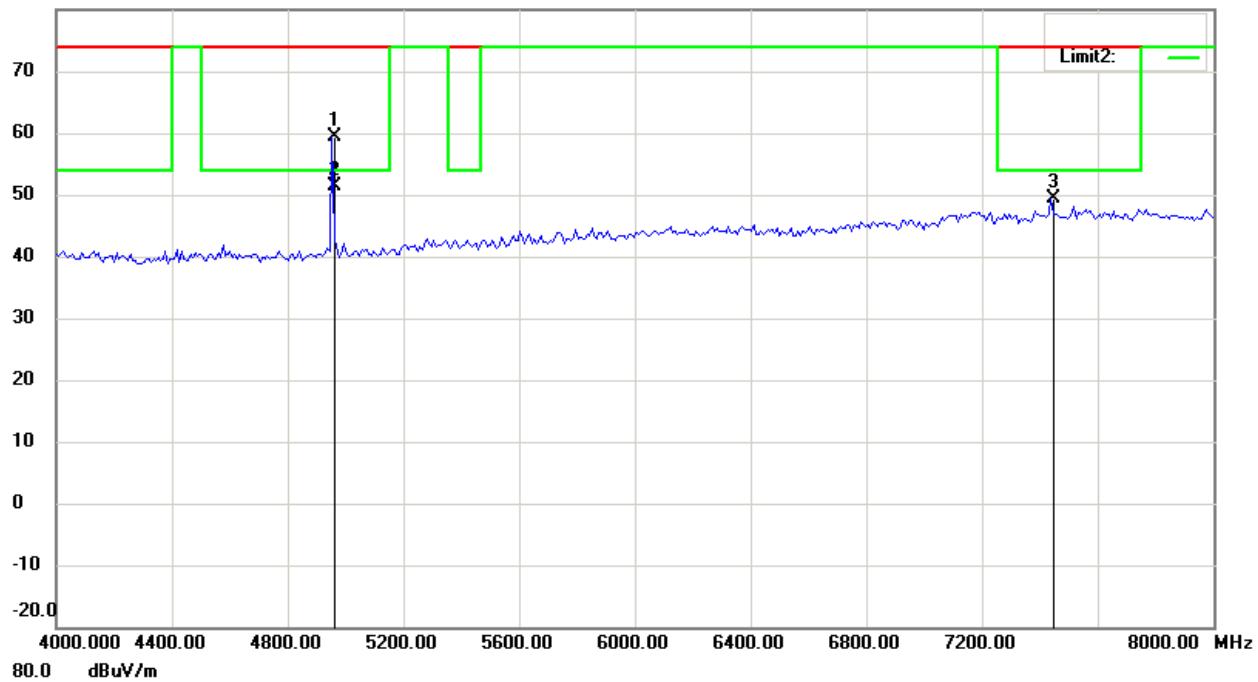
Note:

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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

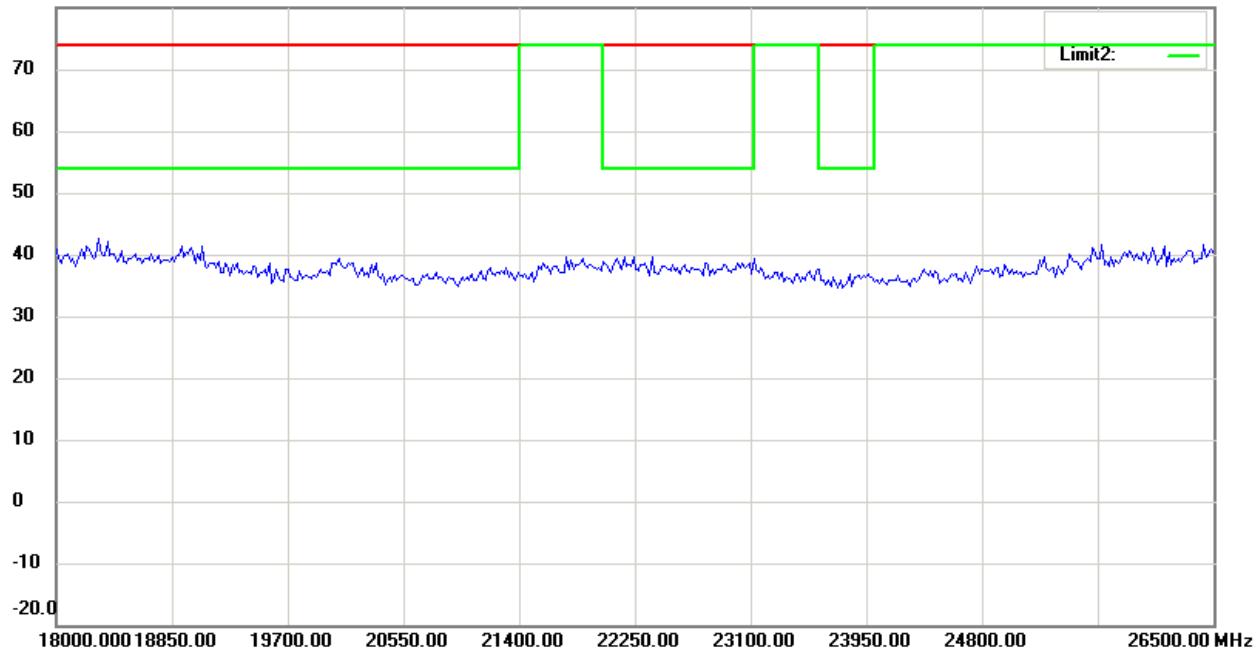
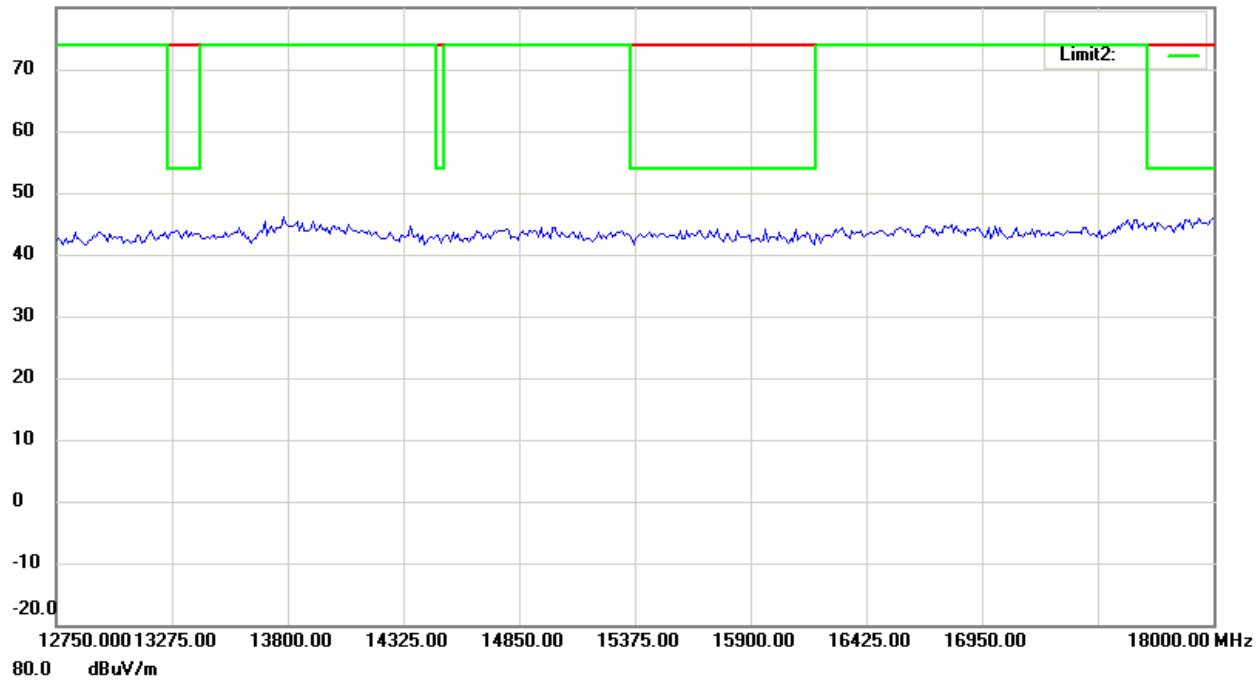
Note:

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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

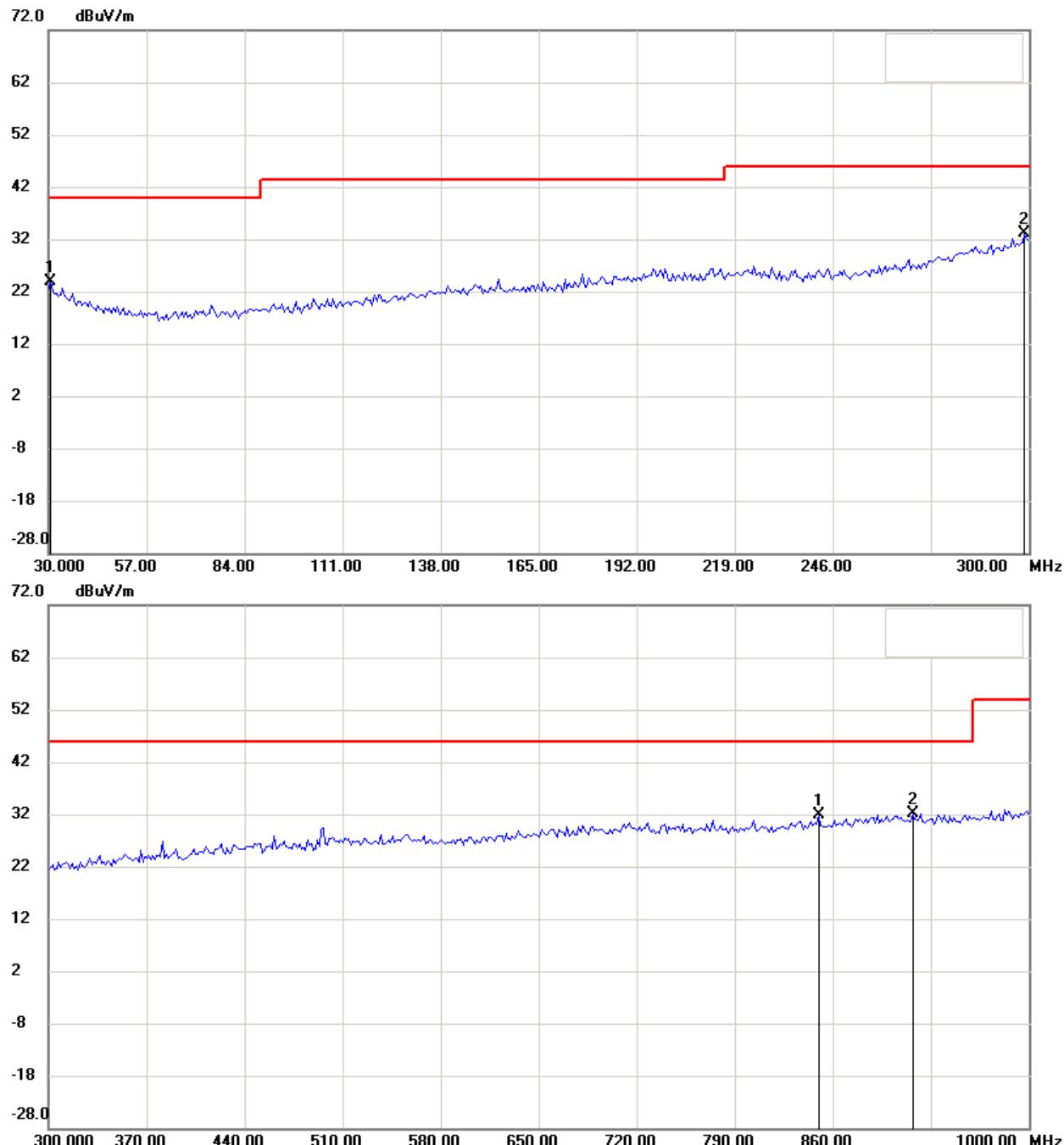
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Receiver \_ CH 1

Antenna Polarization H



Up Line: Peak 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 radiated test data of this test report.

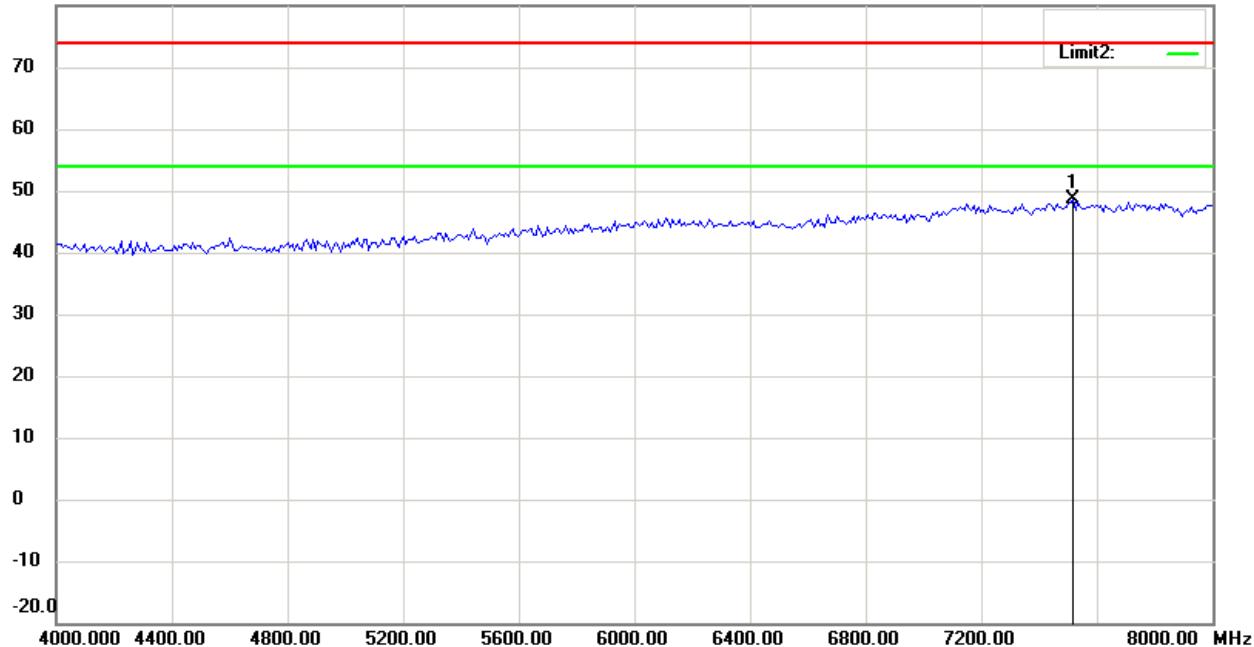
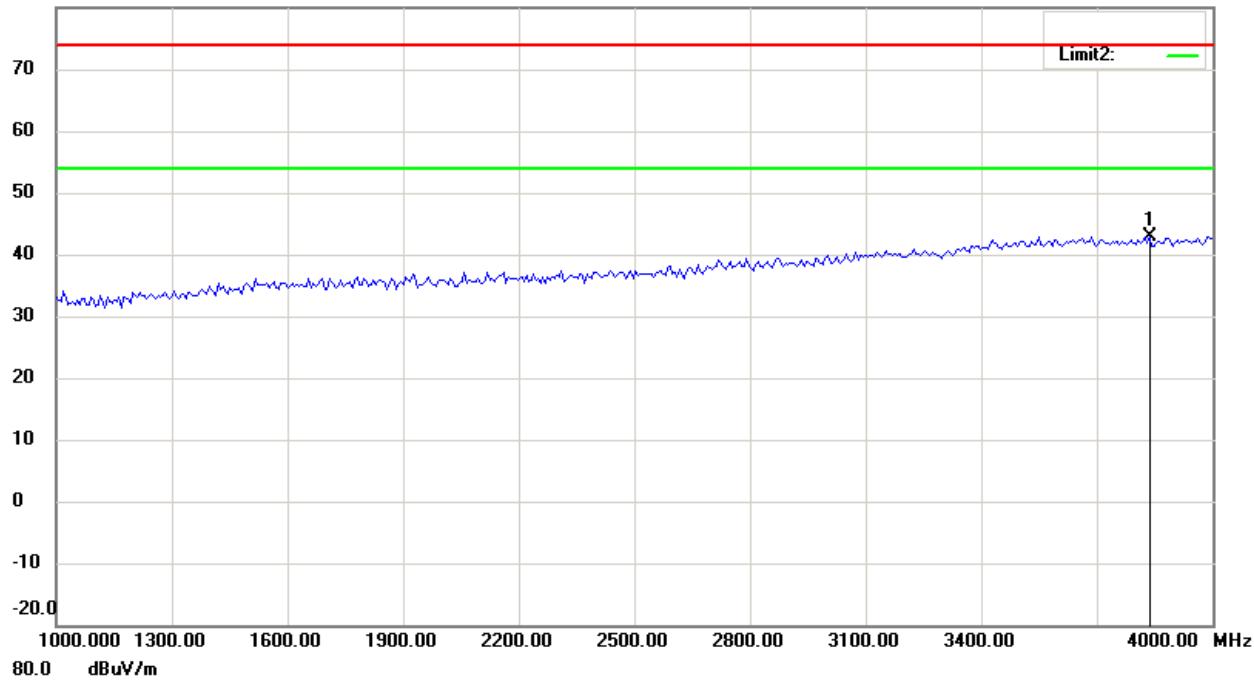


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



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.

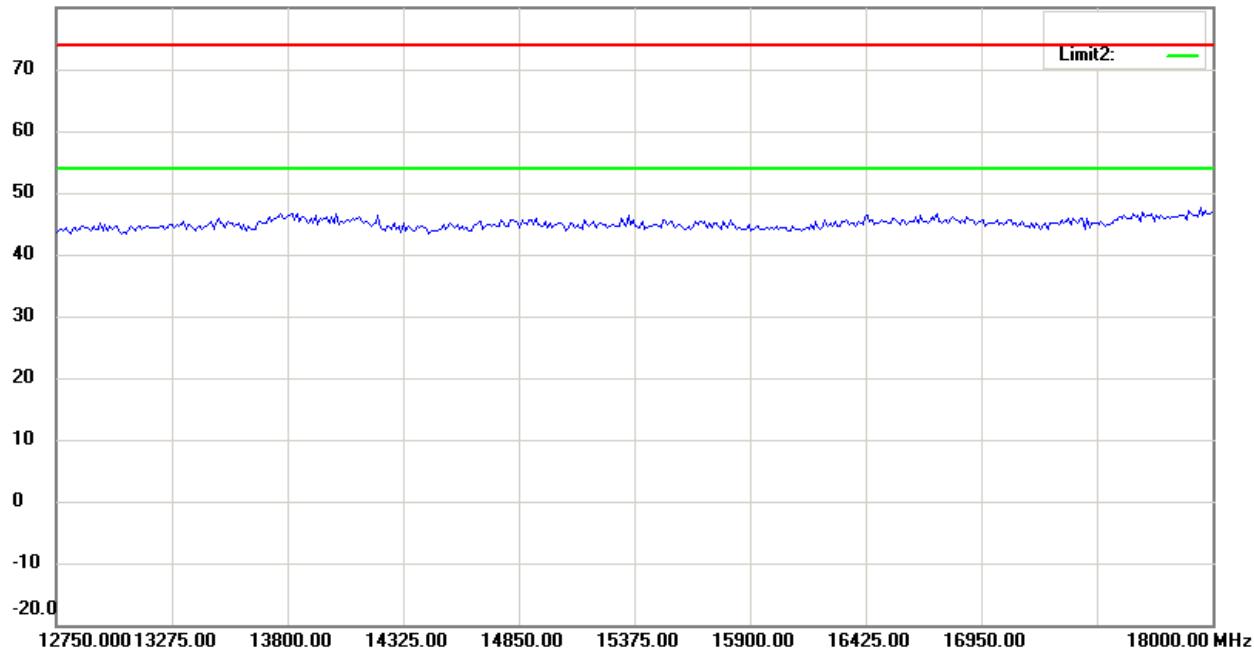
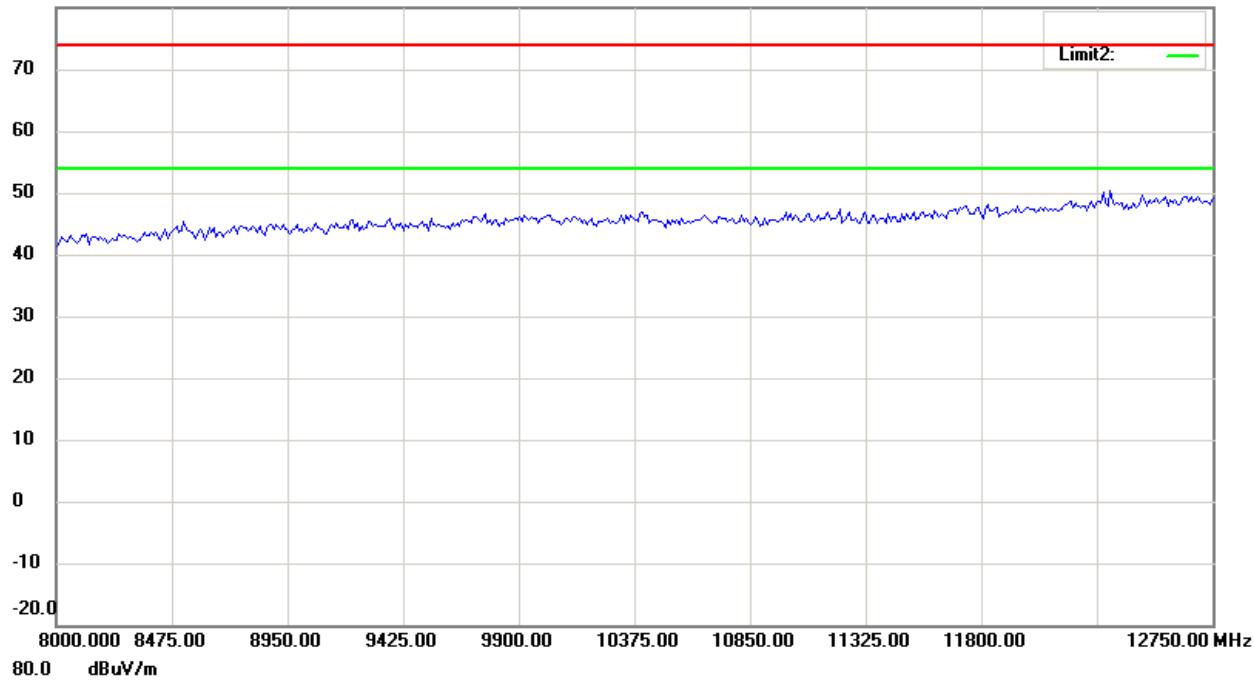


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

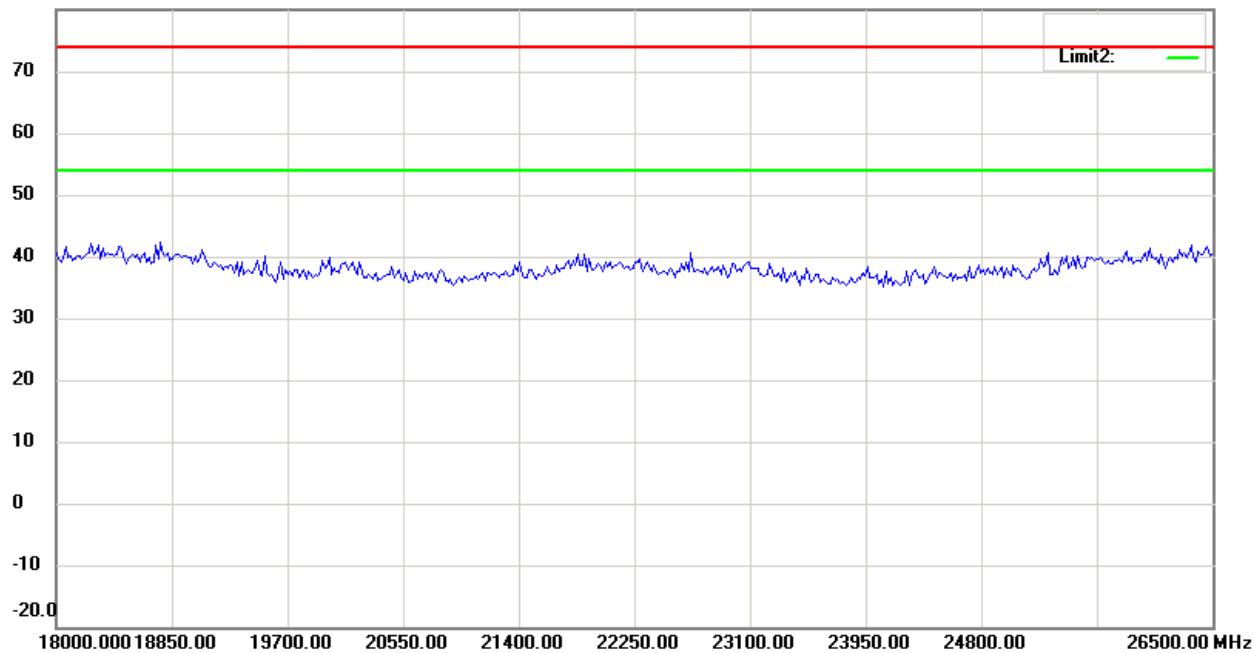


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

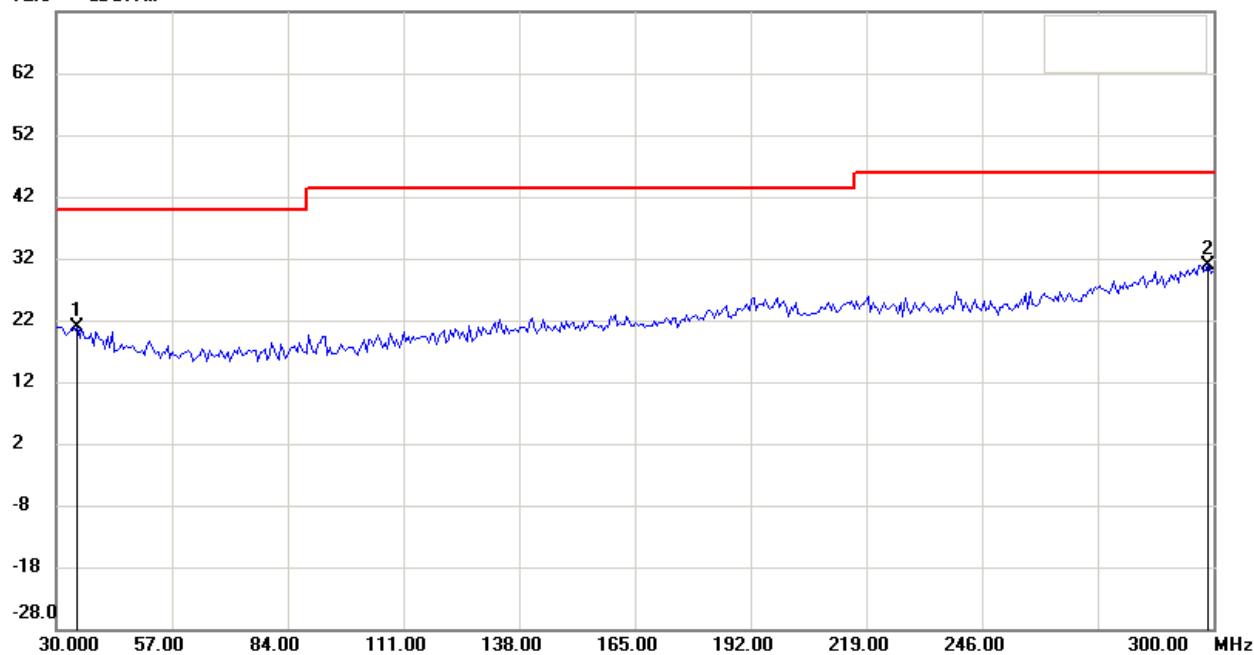
FCC ID: R48TVEE21C

80.0 dBuV/m



## Antenna Polarization V

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

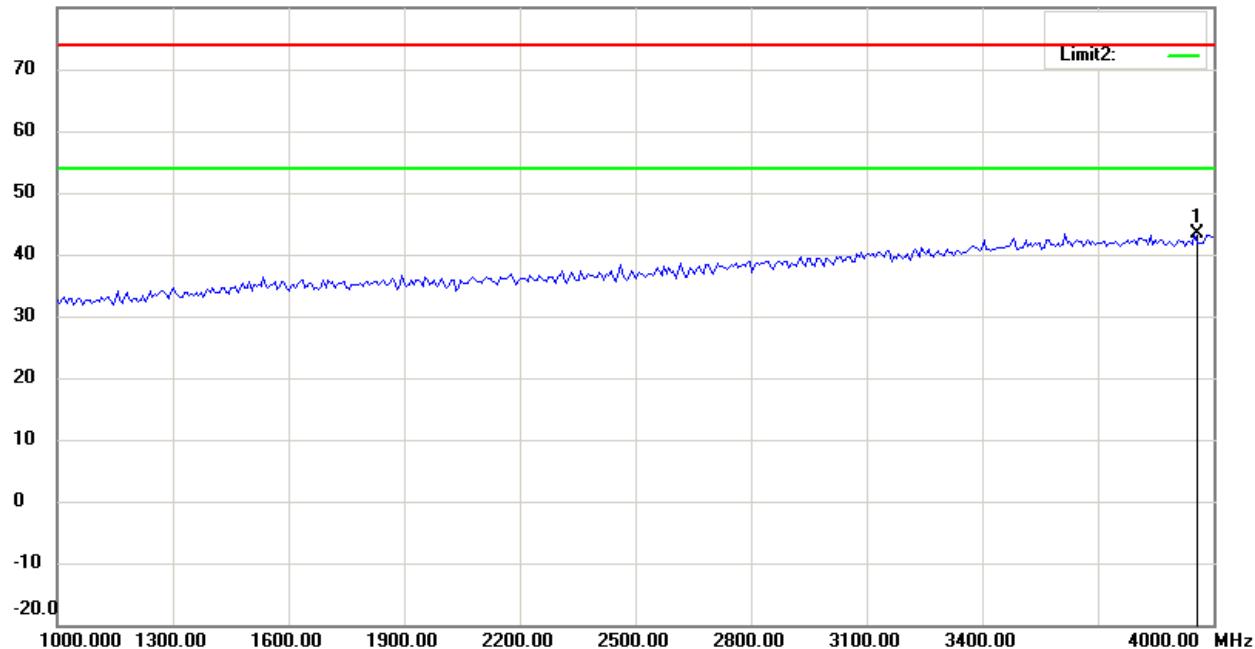
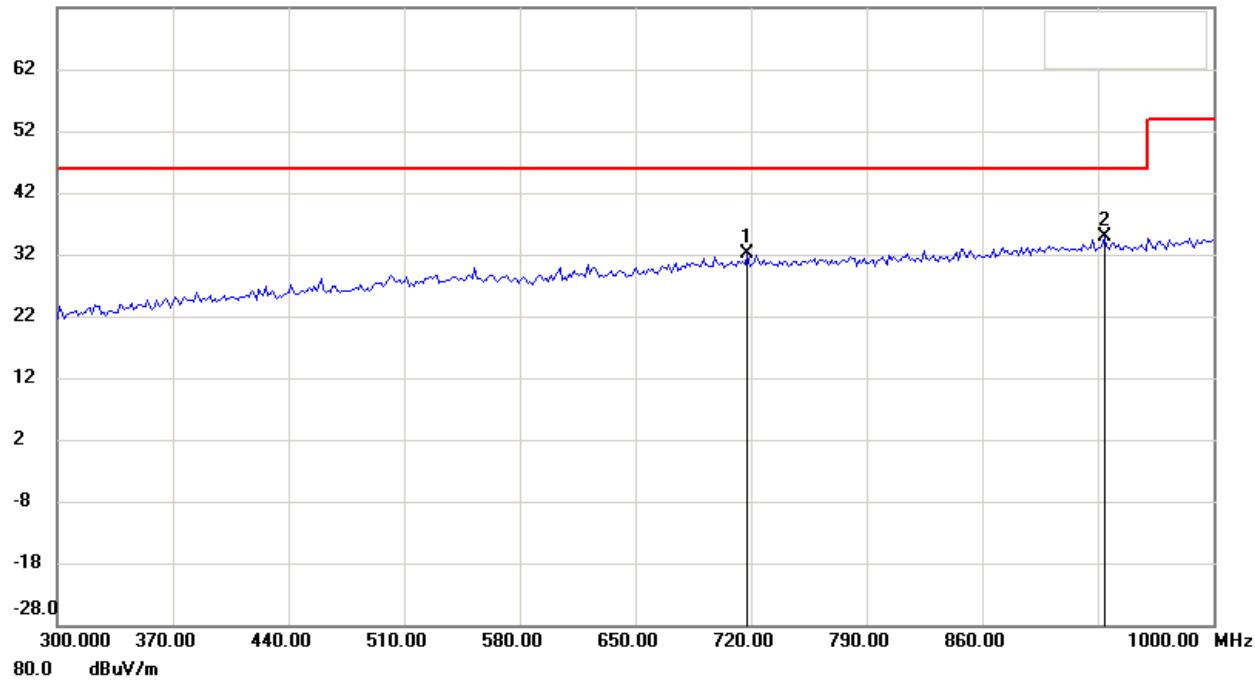
Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

72.0 dBuV/m



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.

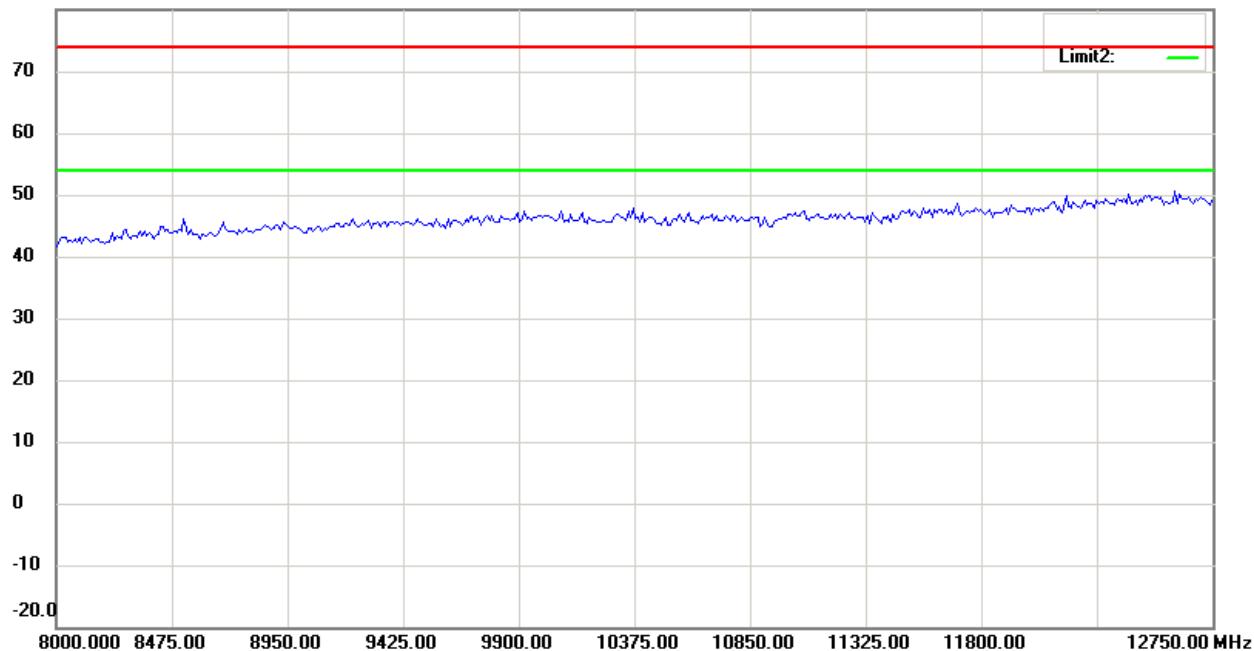
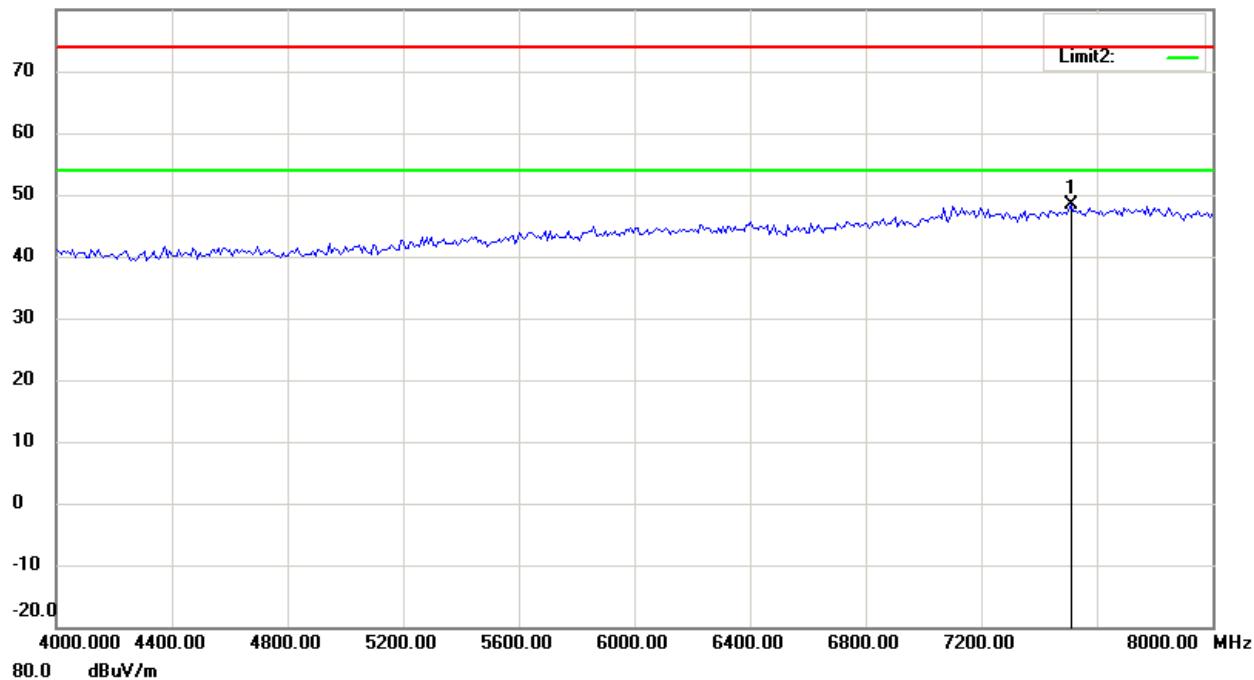


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



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.

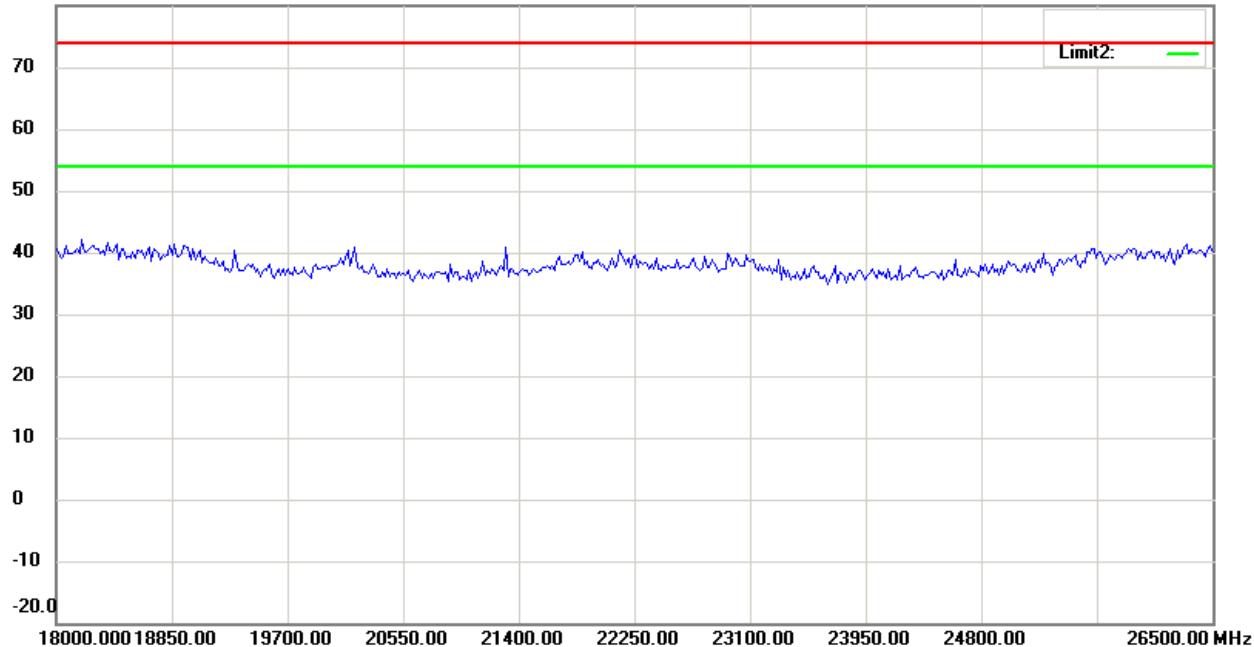
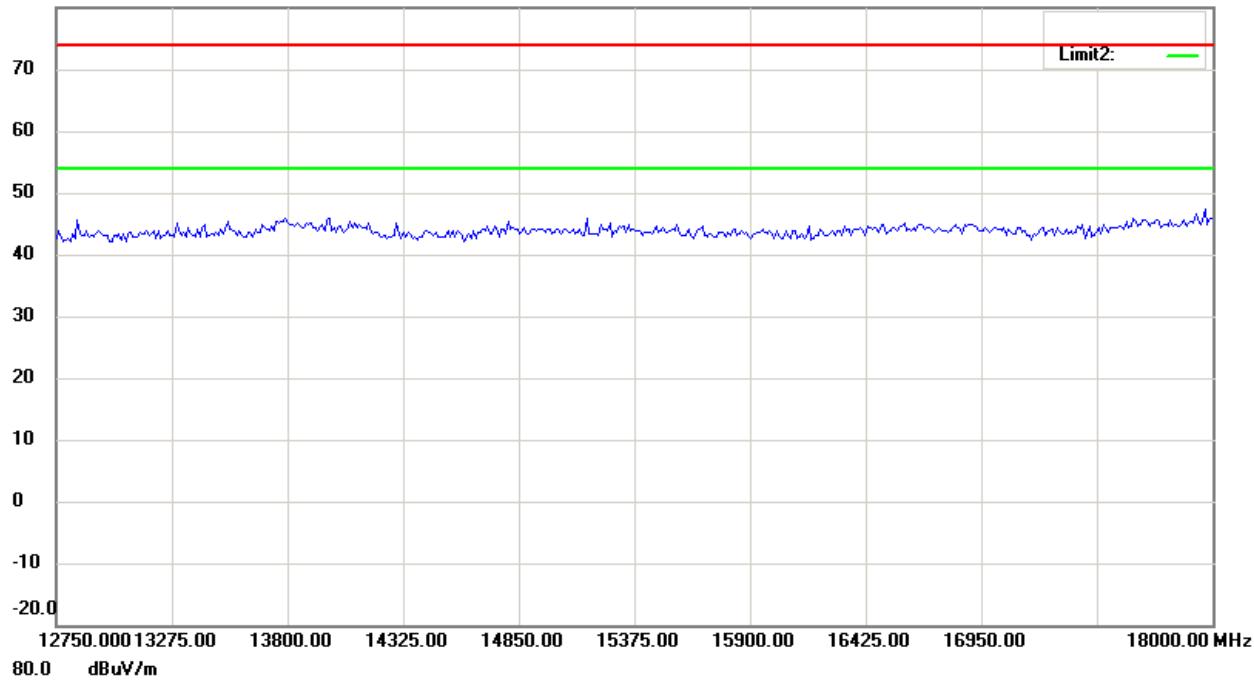


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

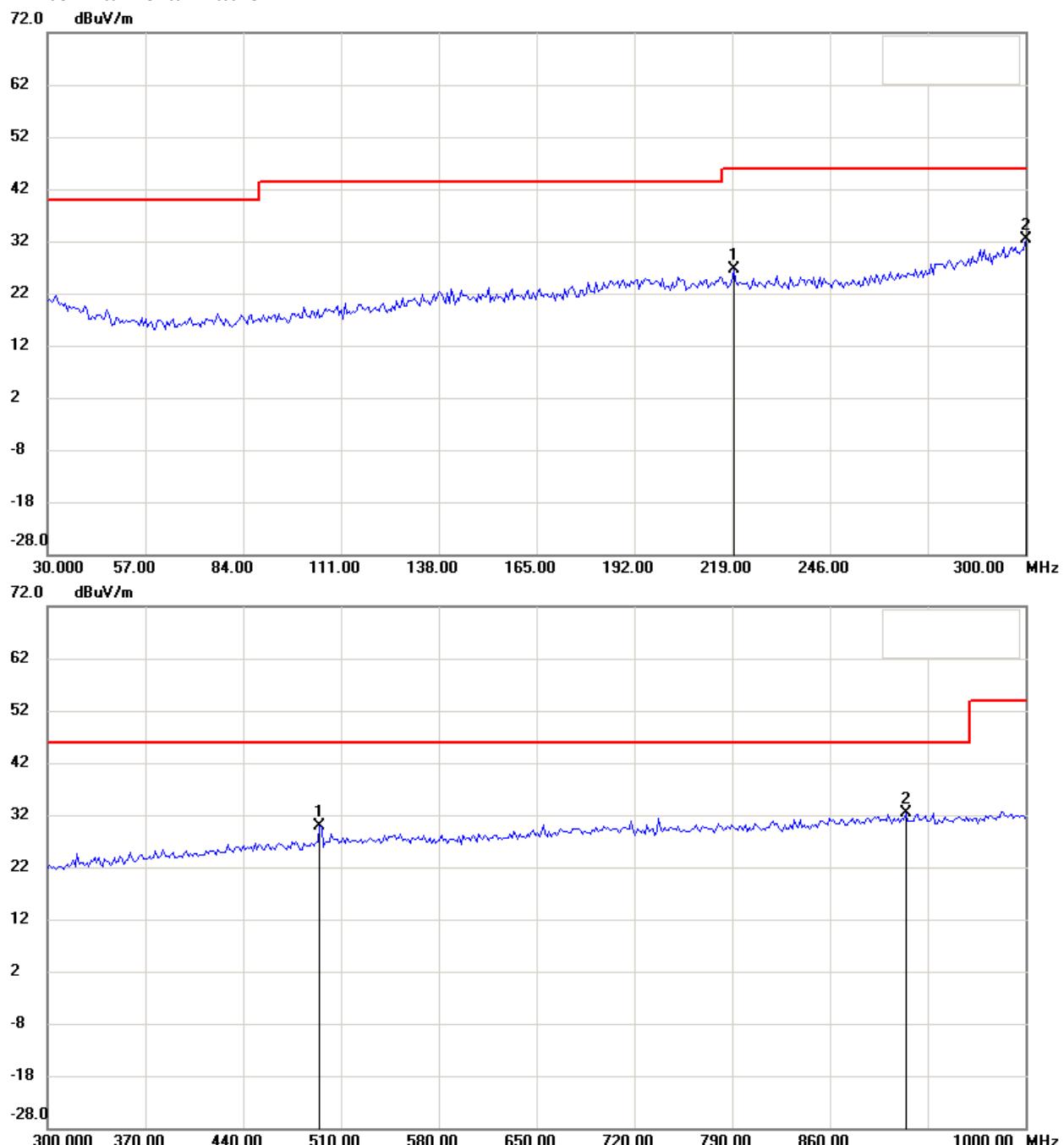
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Receiver \_ CH 9

Antenna Polarization H



Up Line: Peak 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 radiated test data of this test report.

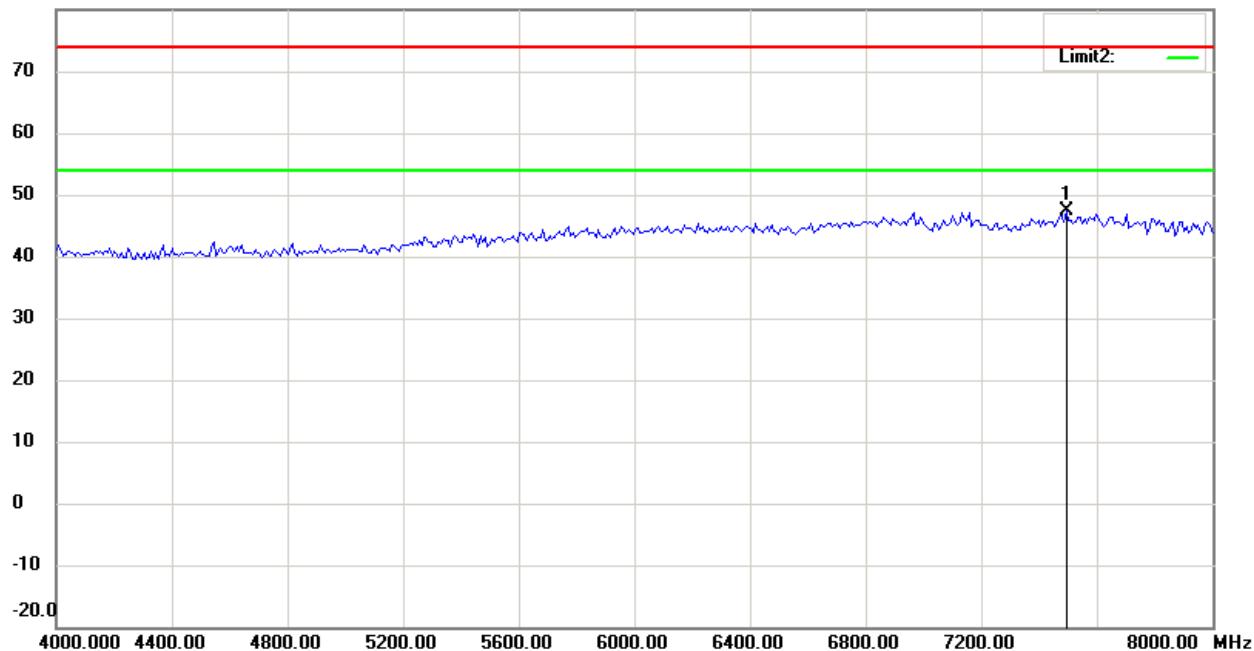
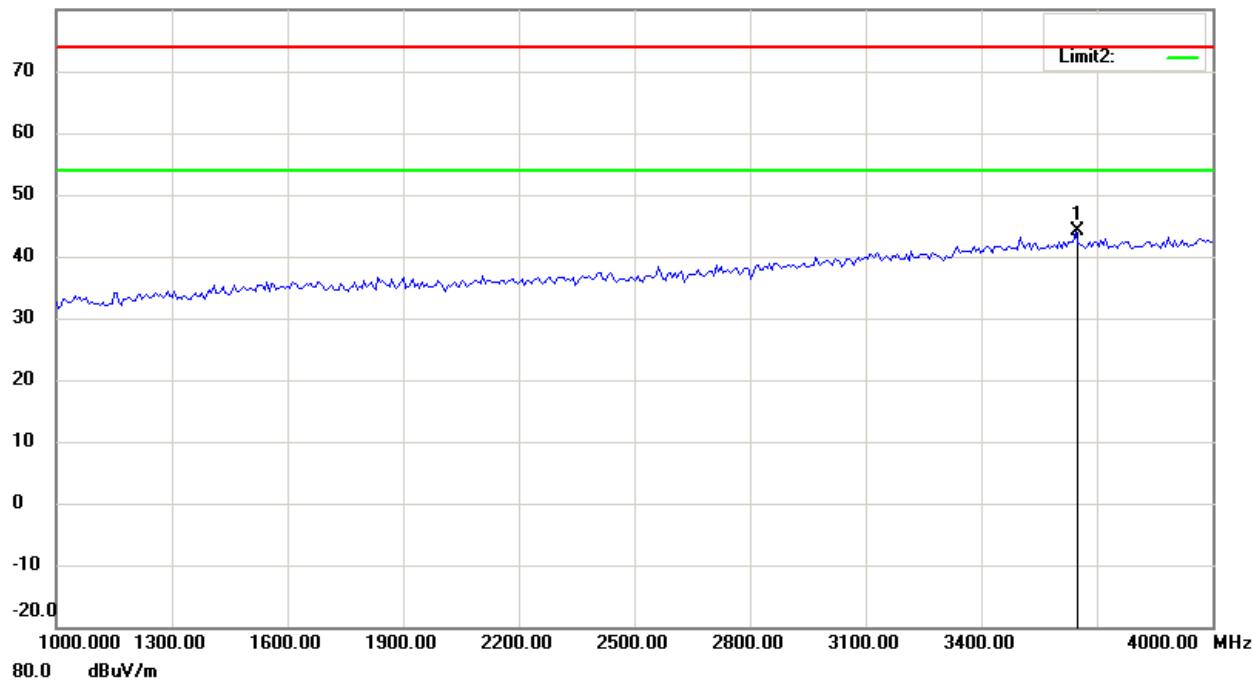


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dB $\mu$ V/m



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.

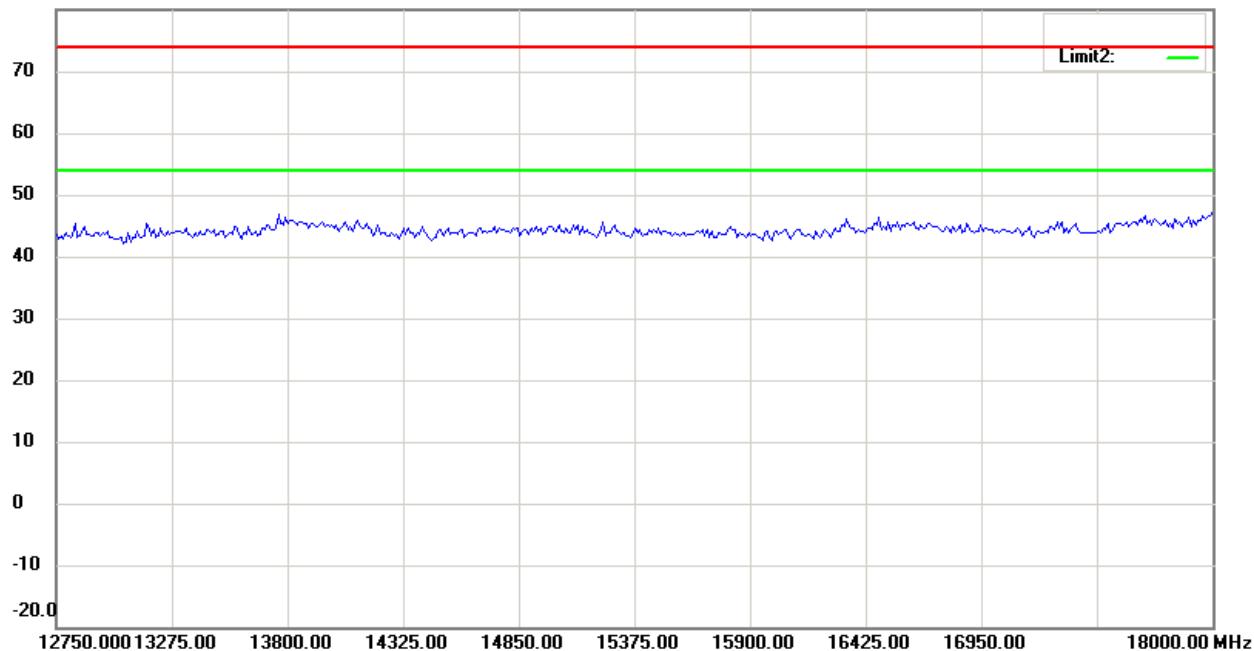
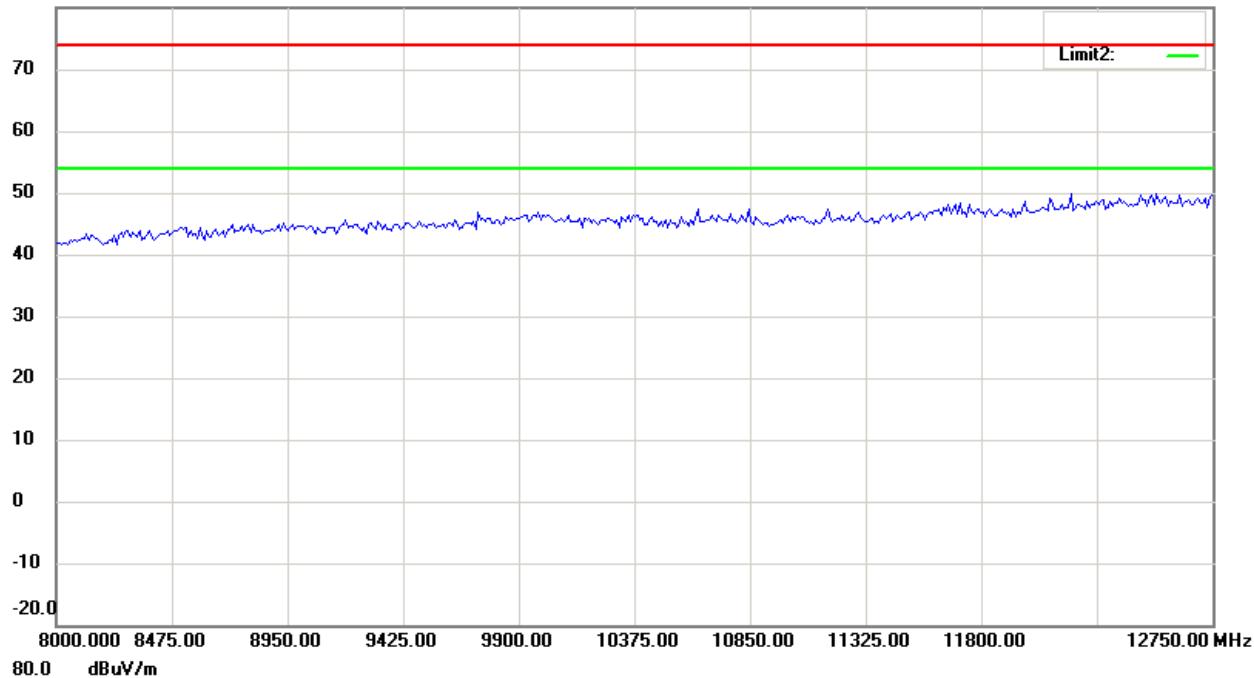


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

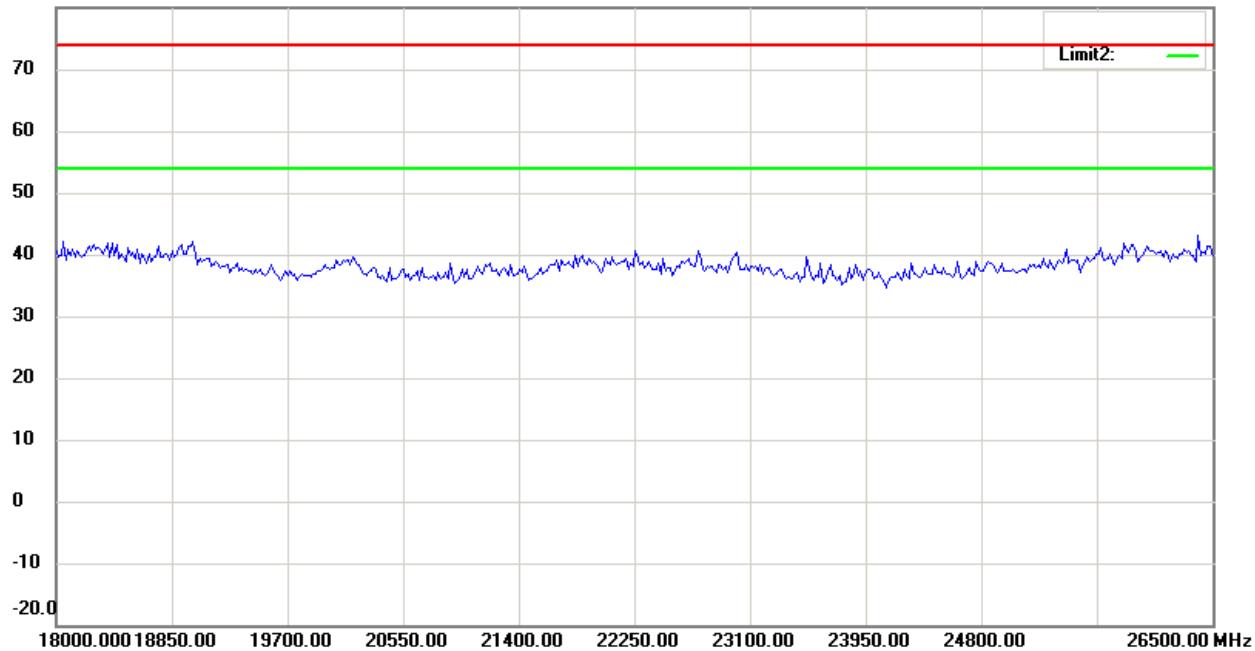
Note:

1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M20908-9997-C-1

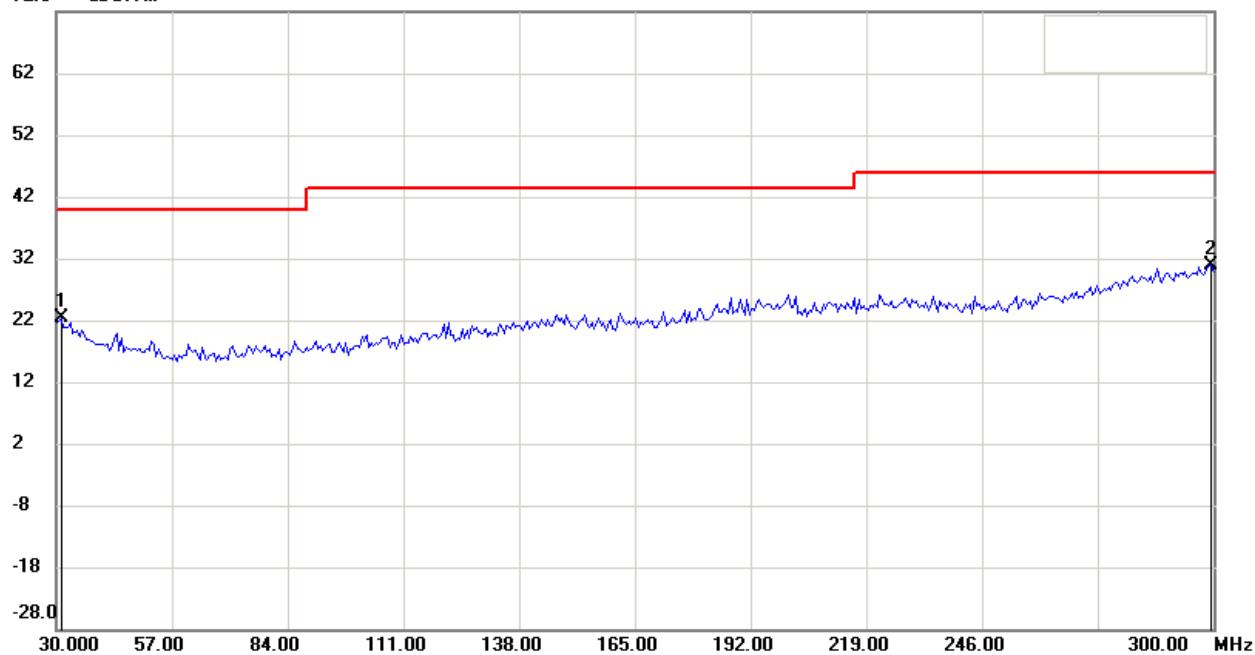
FCC ID: R48TVEE21C

80.0 dBuV/m



## Antenna Polarization V

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

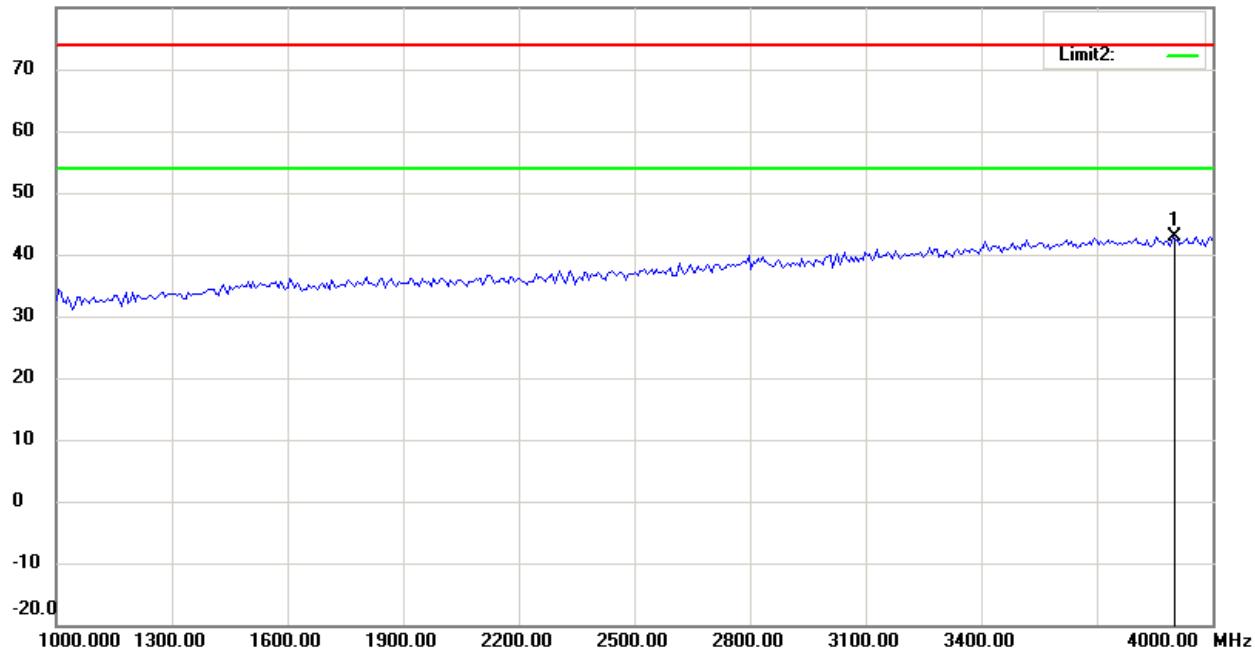
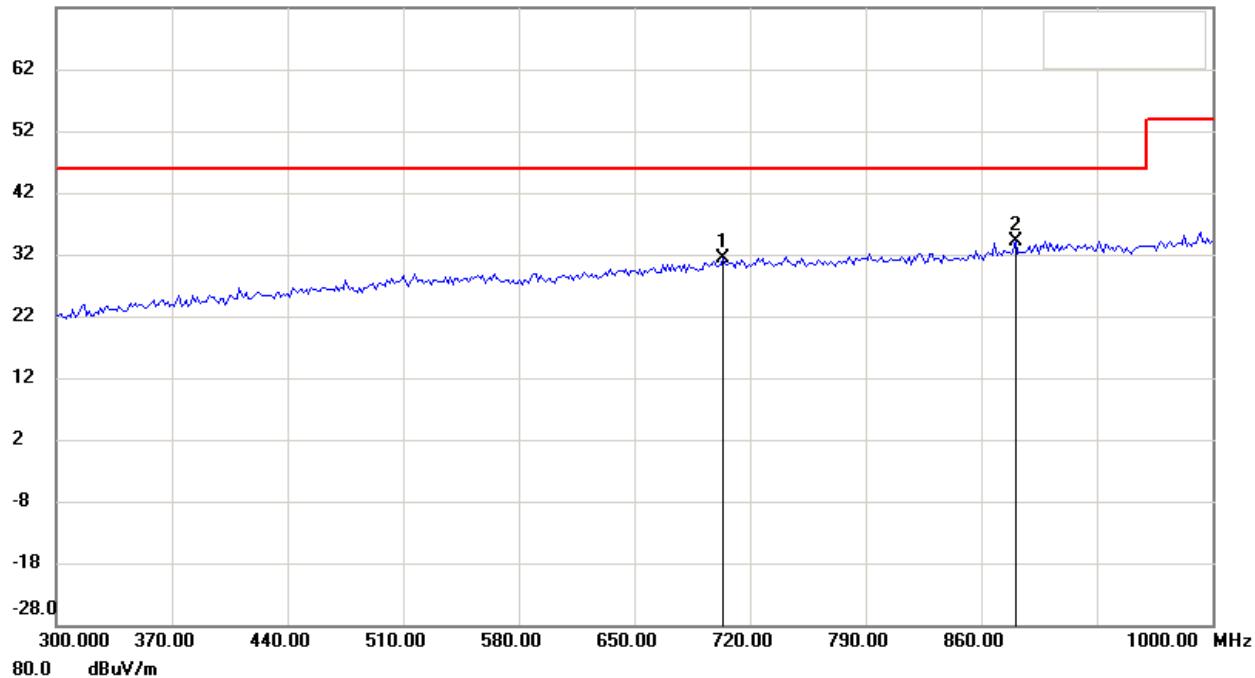


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

72.0 dB $\mu$ V/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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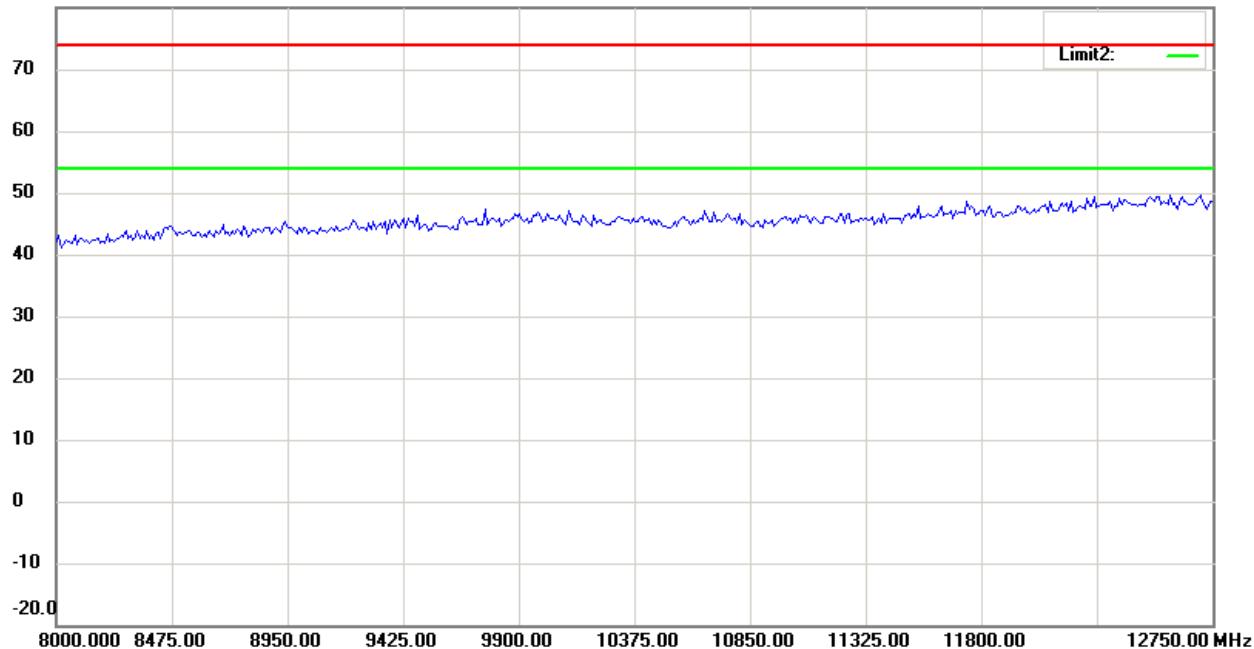
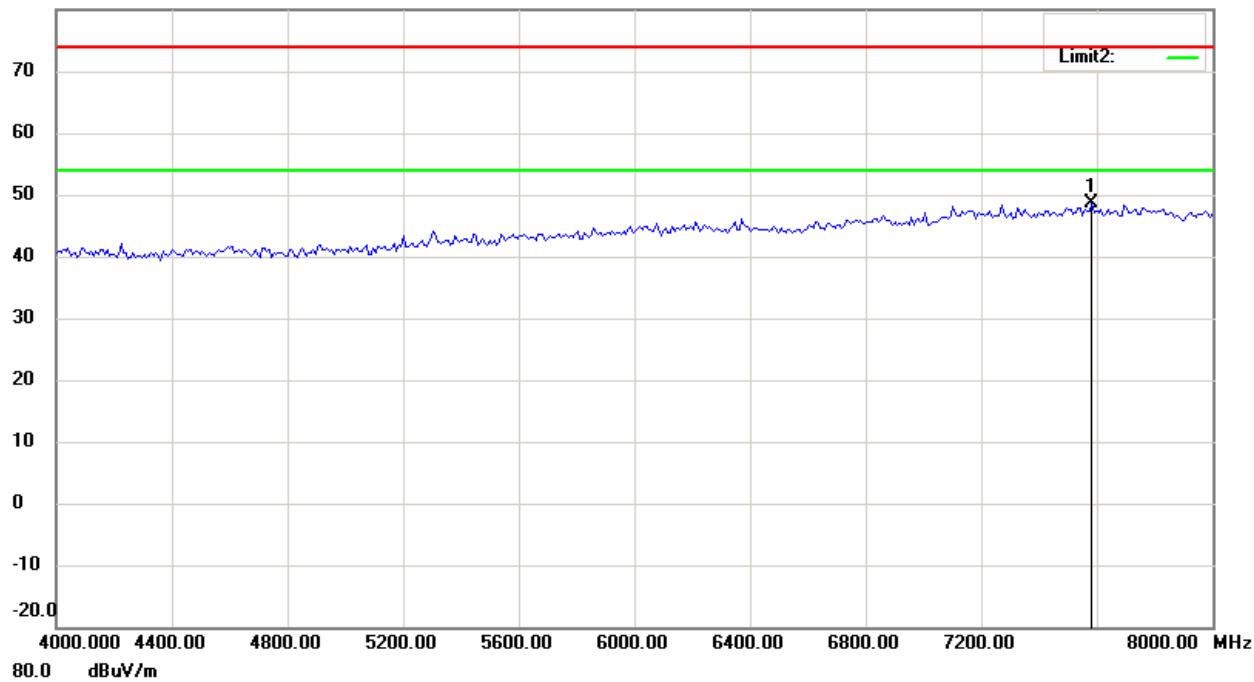


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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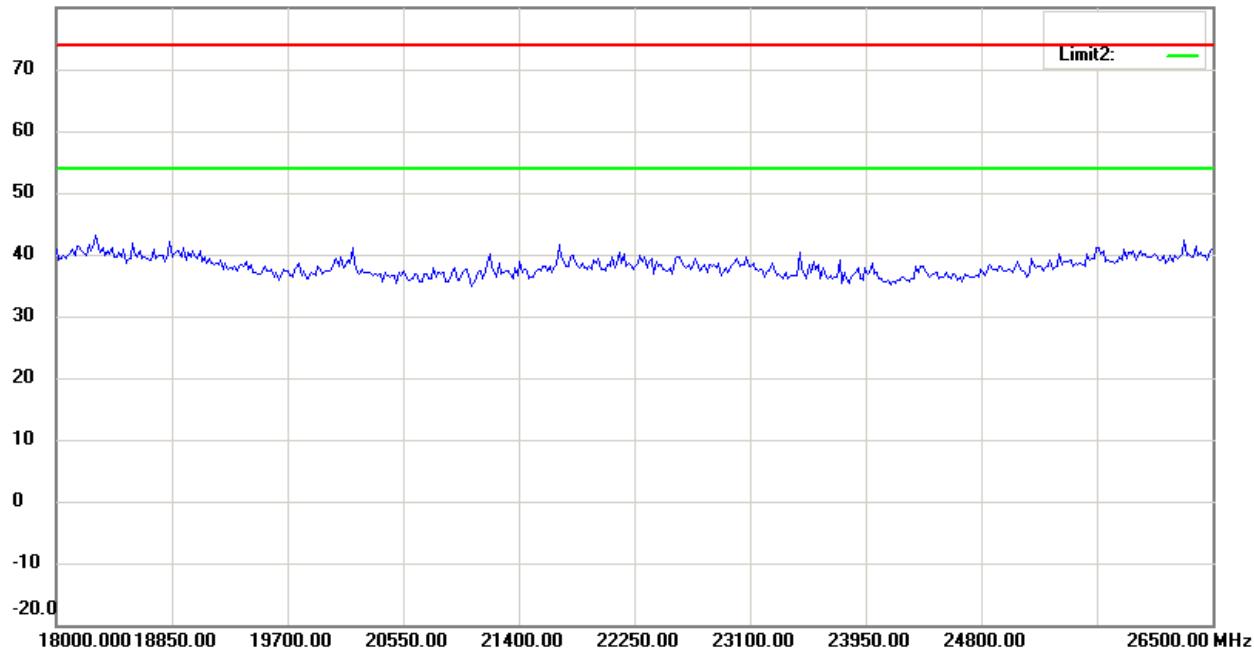
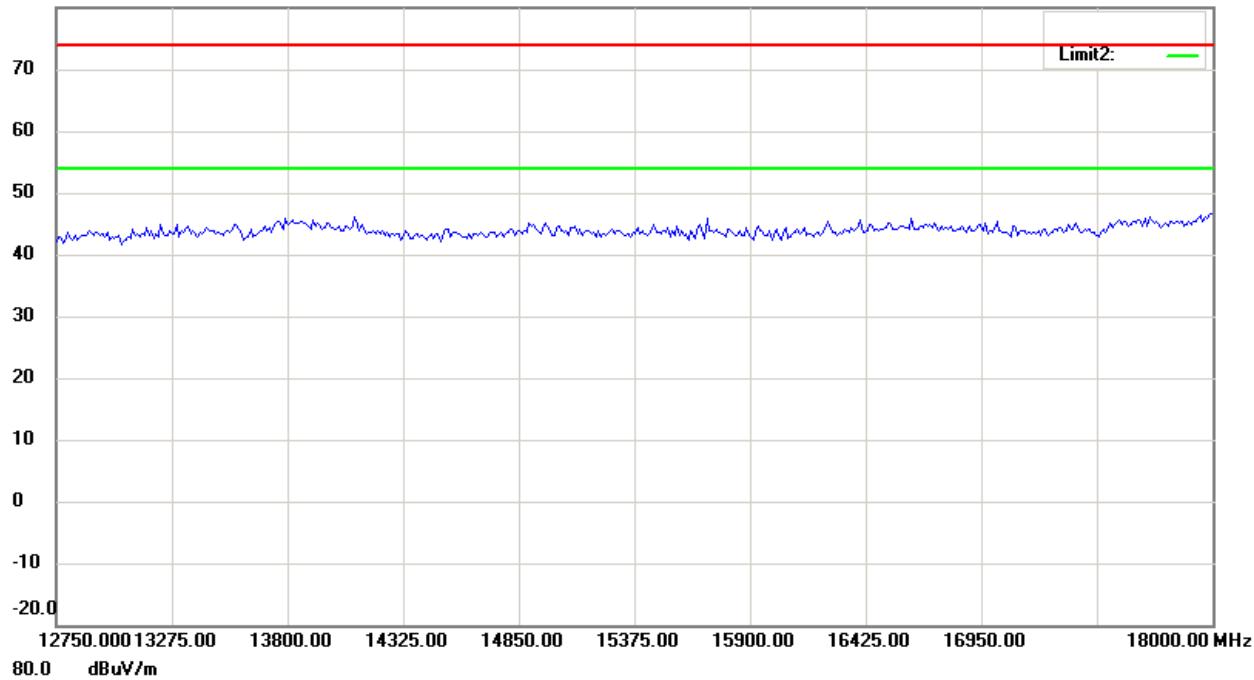


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

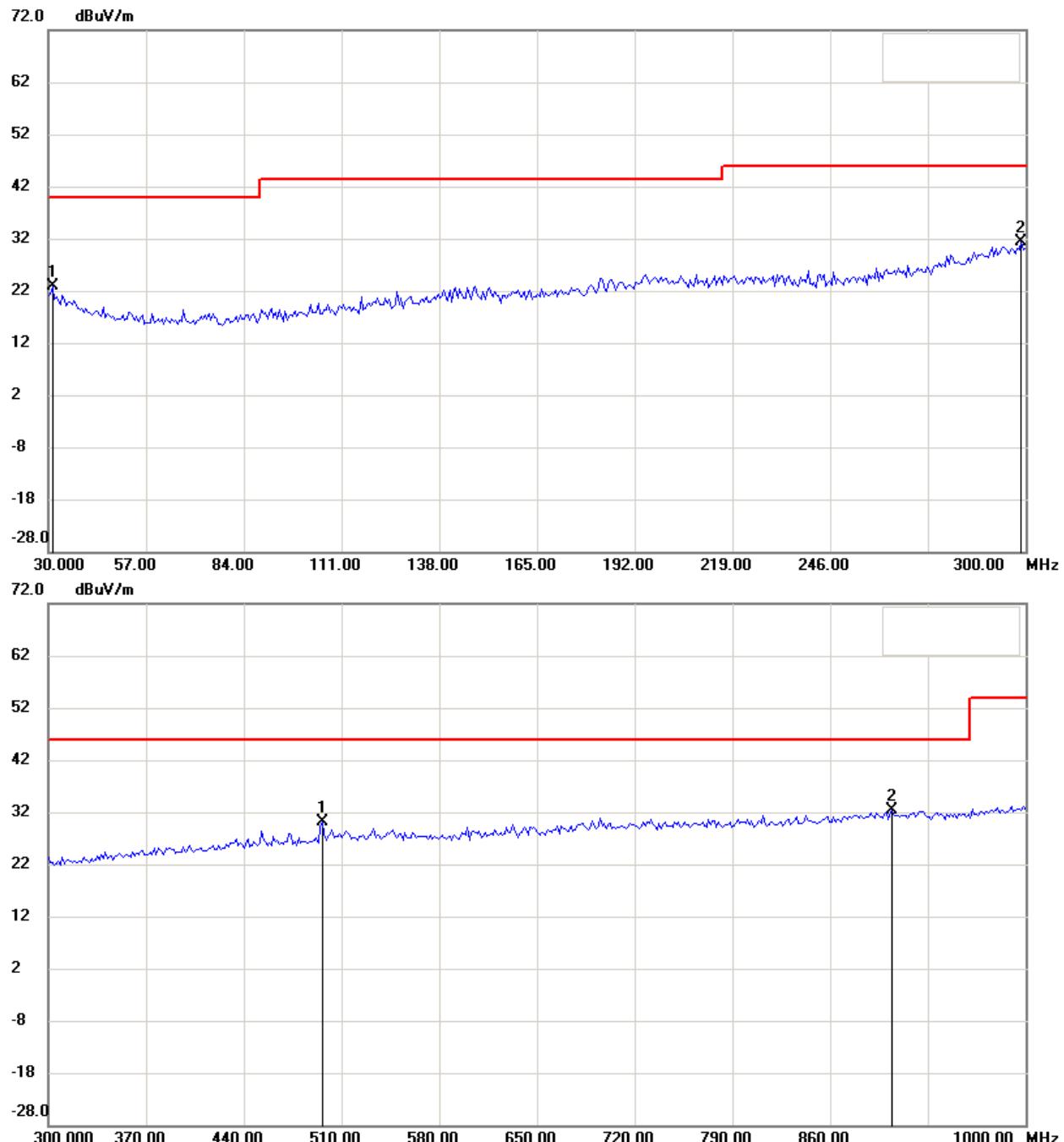
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

Receiver \_ CH 16

Antenna Polarization H



Up Line: Peak 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.
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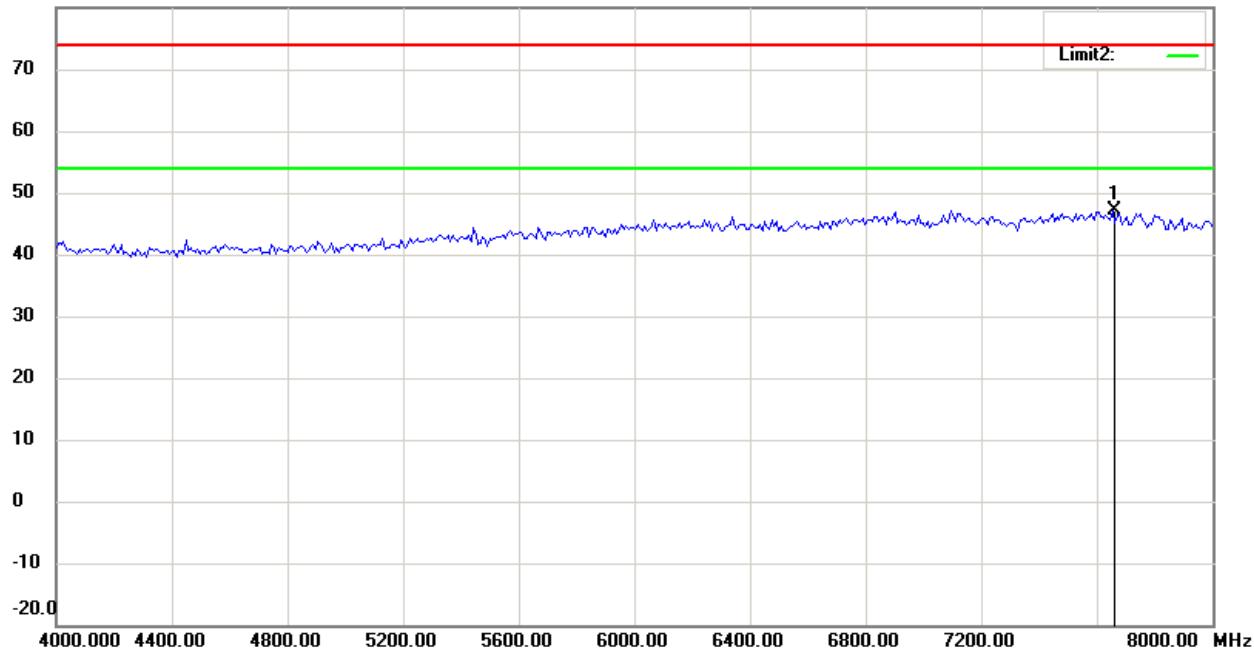
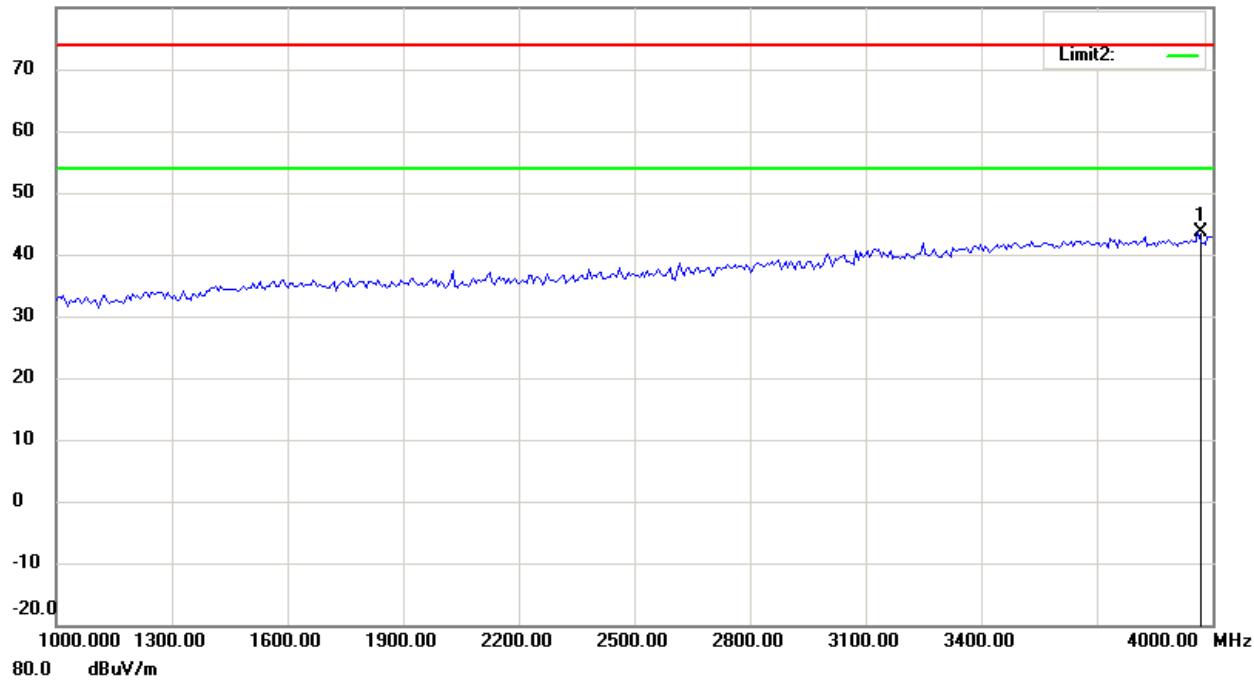


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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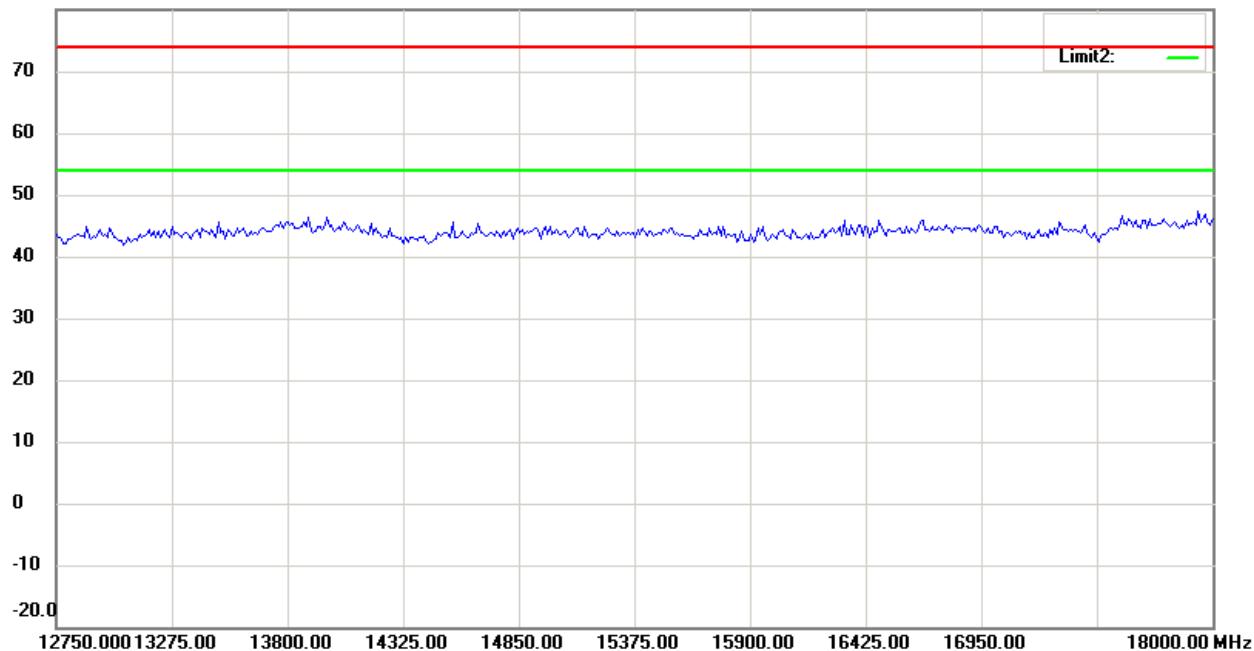
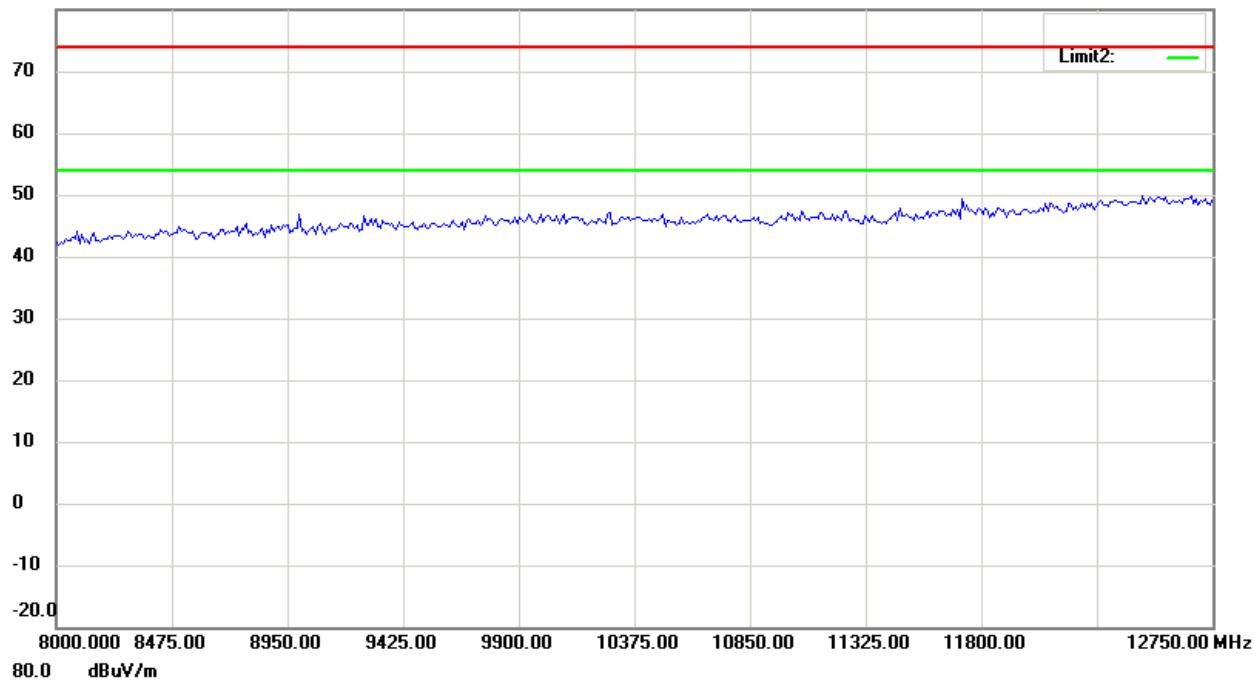


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

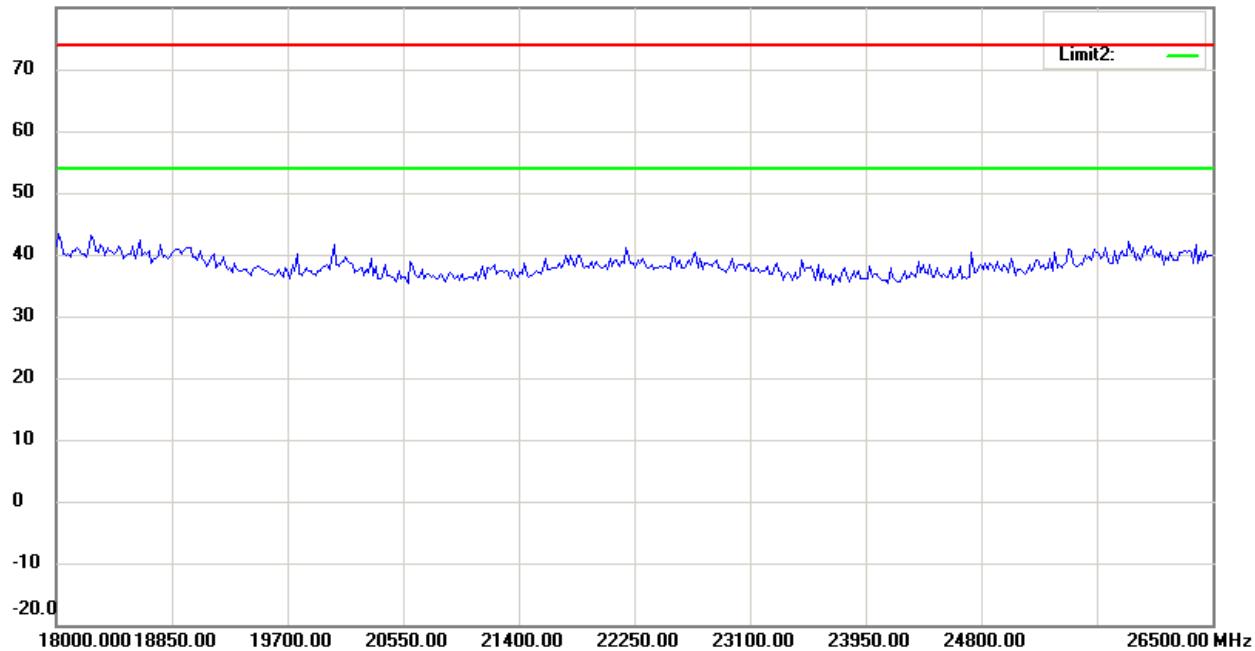
Note:

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Registration number: W6M20908-9997-C-1

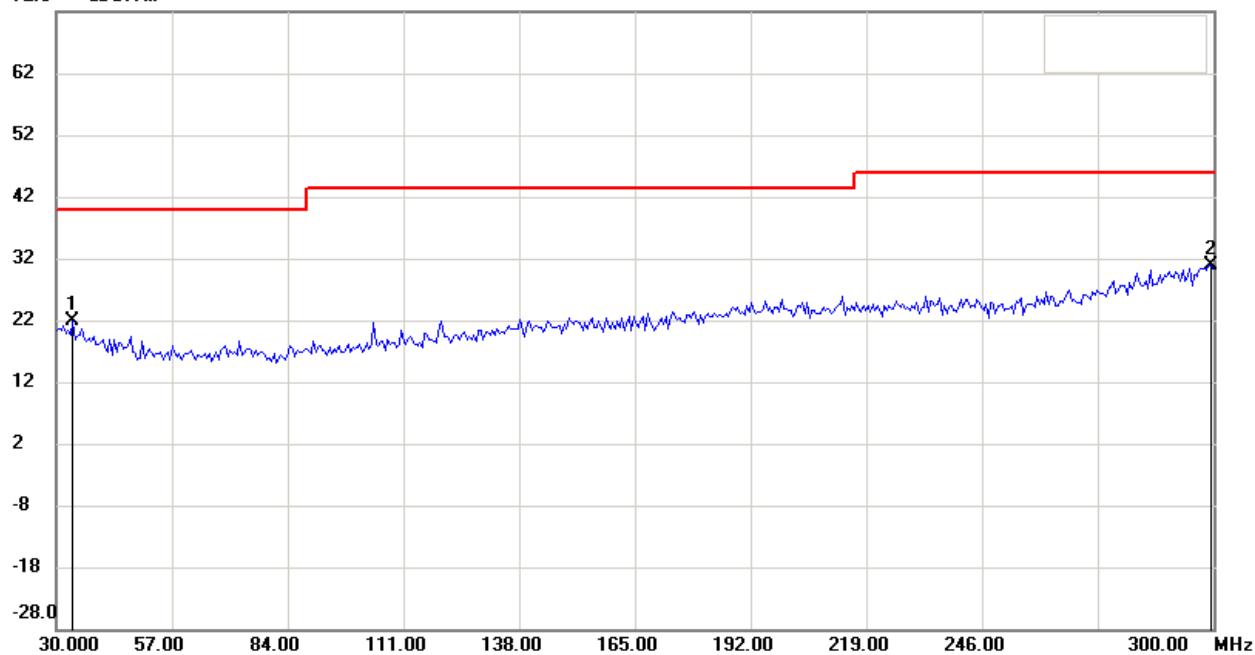
FCC ID: R48TVEE21C

80.0 dBuV/m



Antenna Polarization V

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

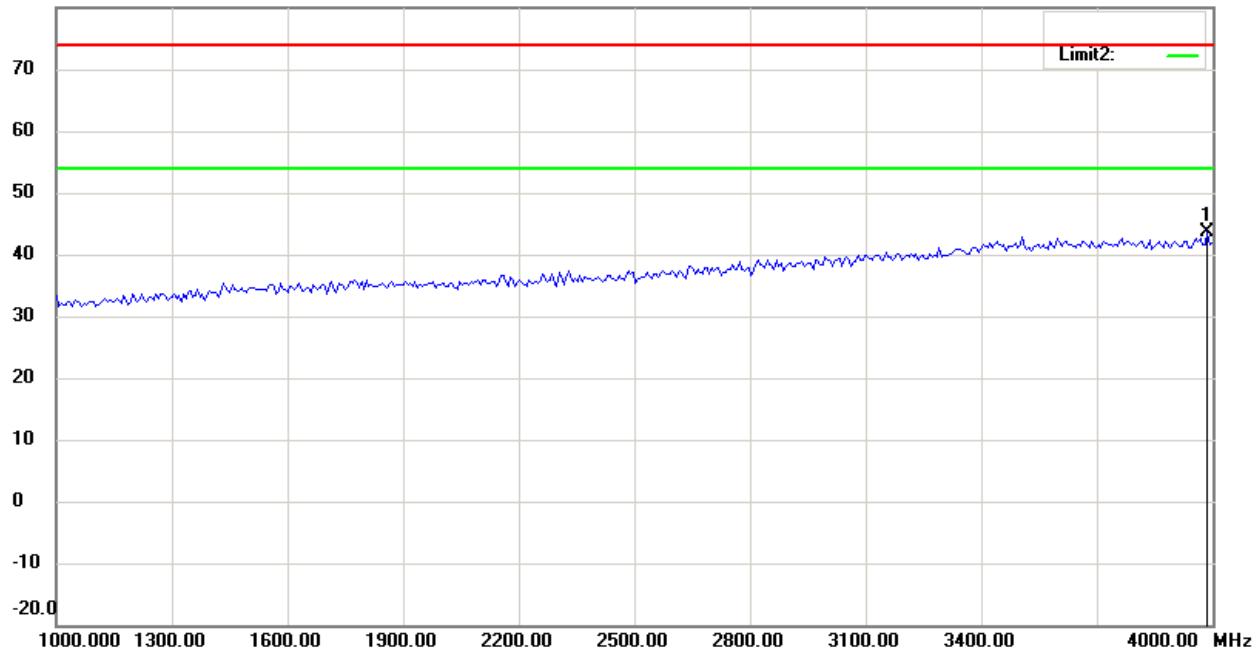
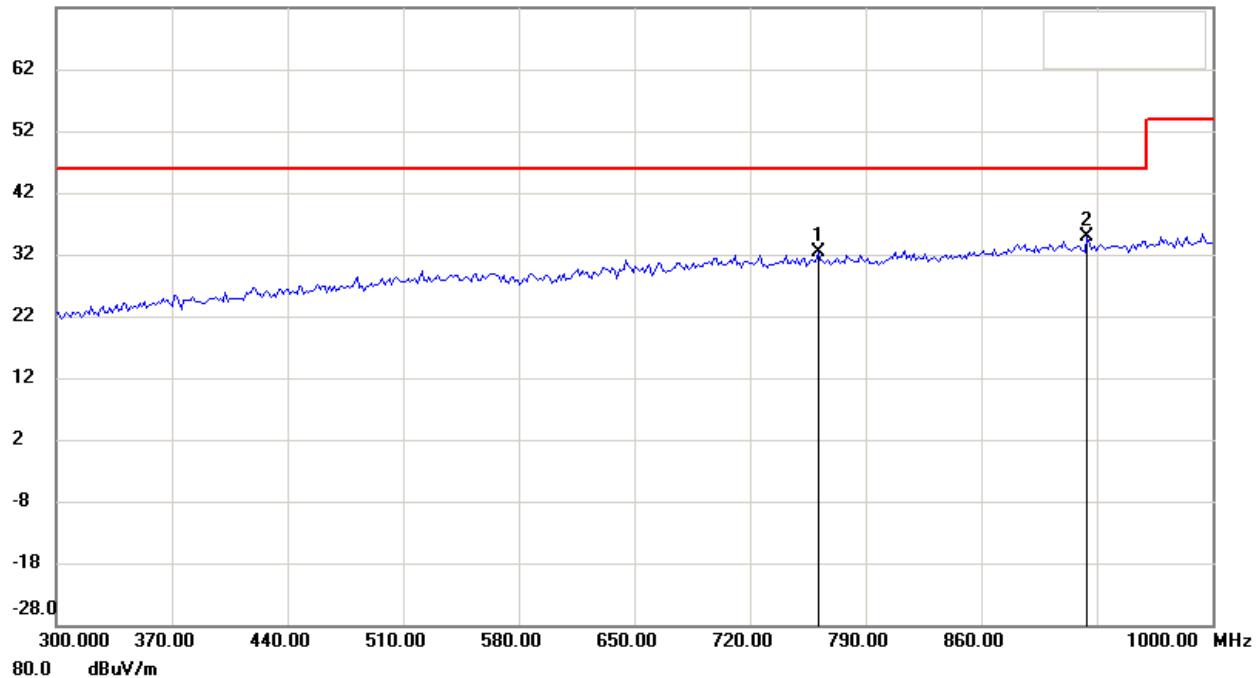
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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

72.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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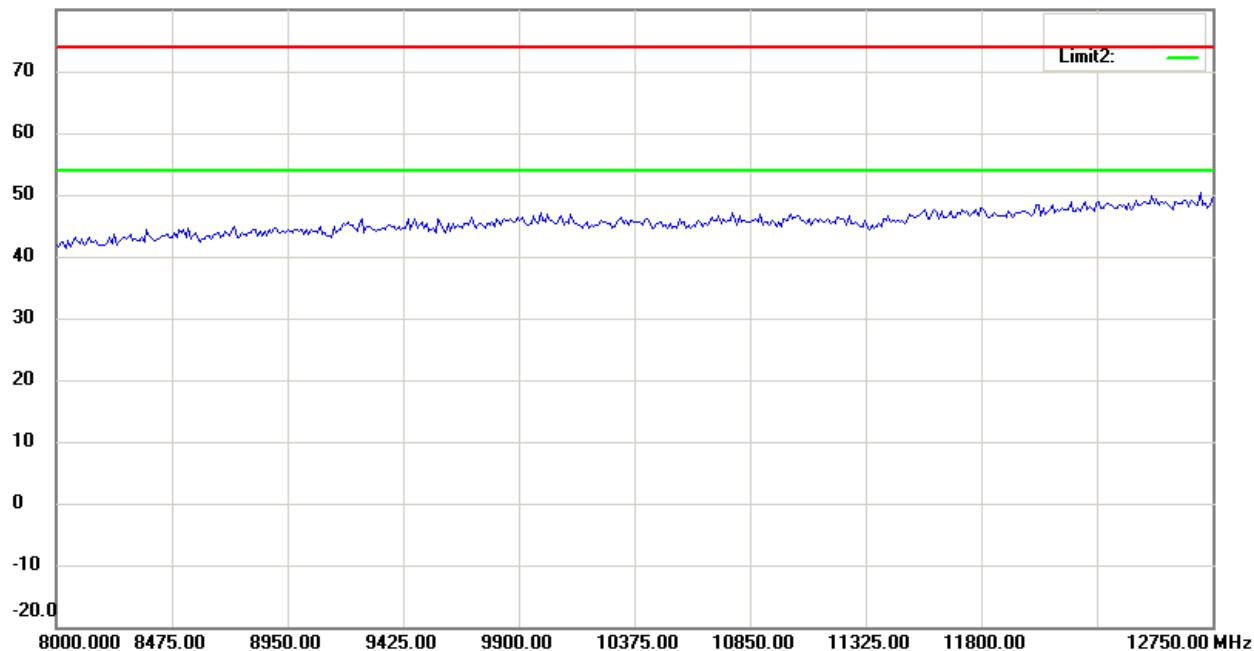
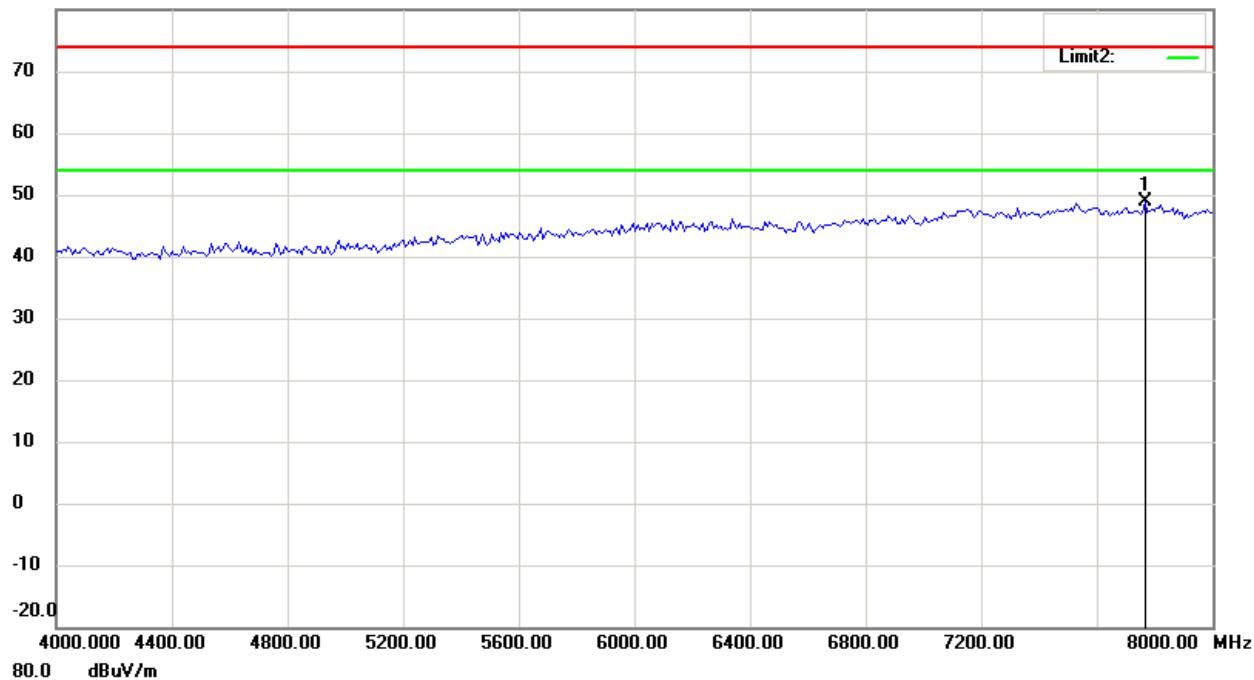


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

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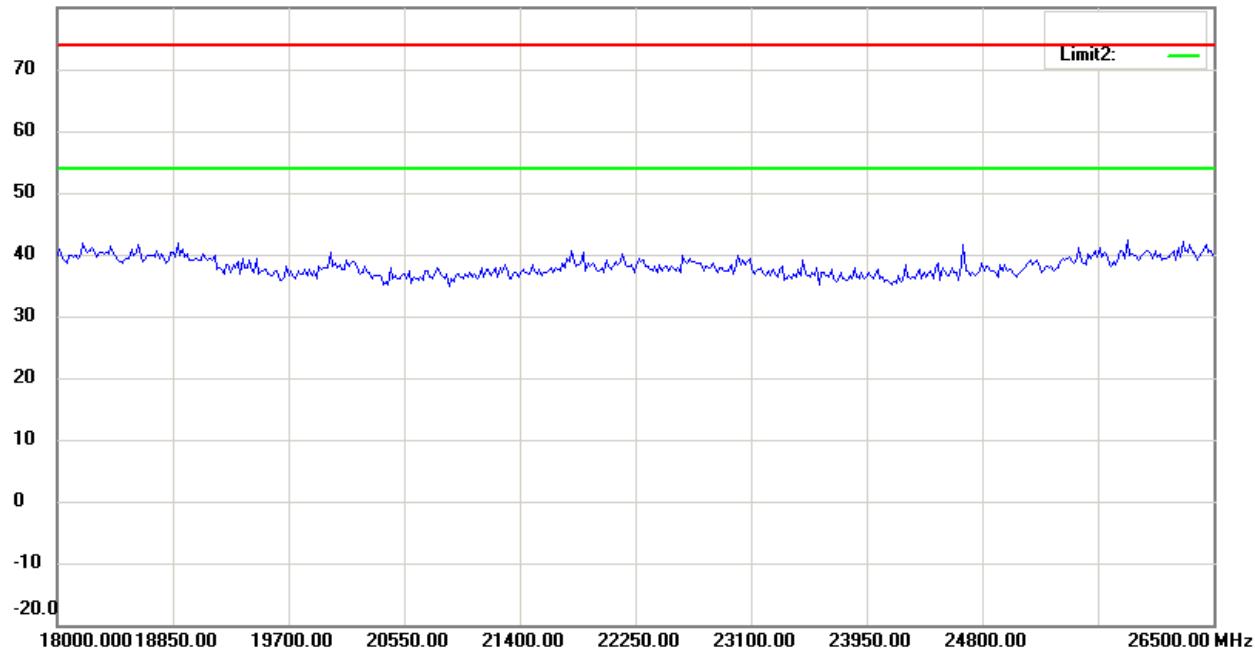
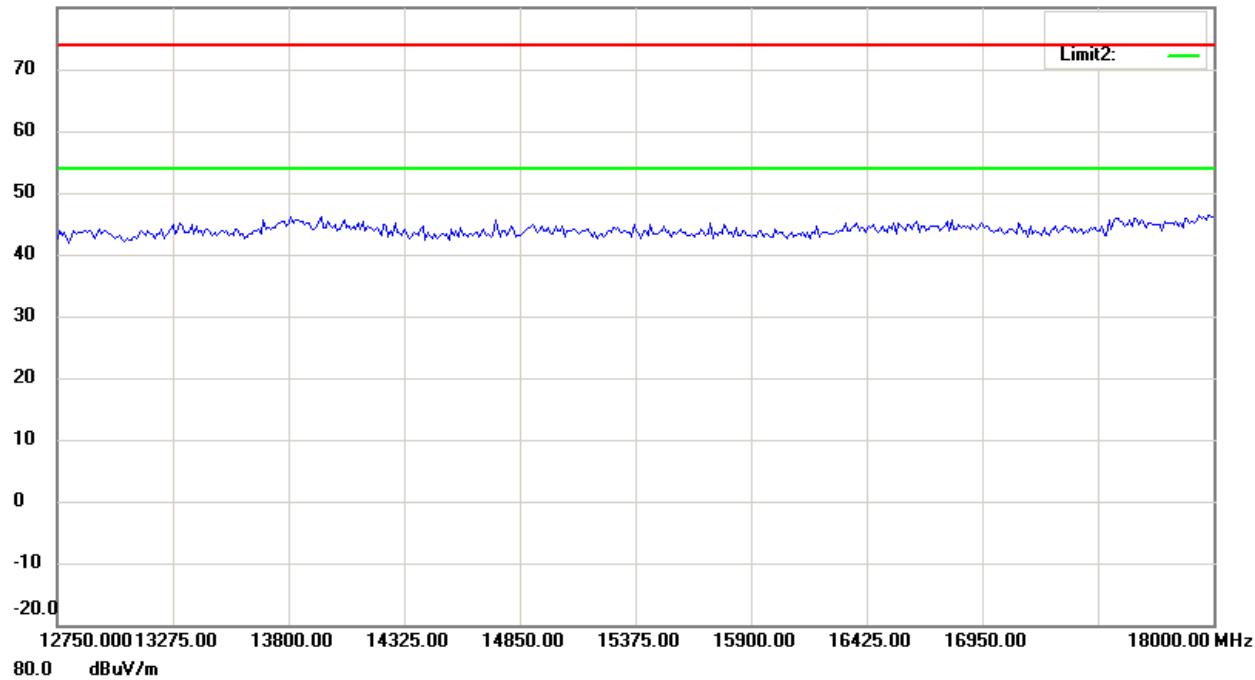


# Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

80.0 dBuV/m



Up Line: Peak Limit Line Down Line: Ave Limit Line

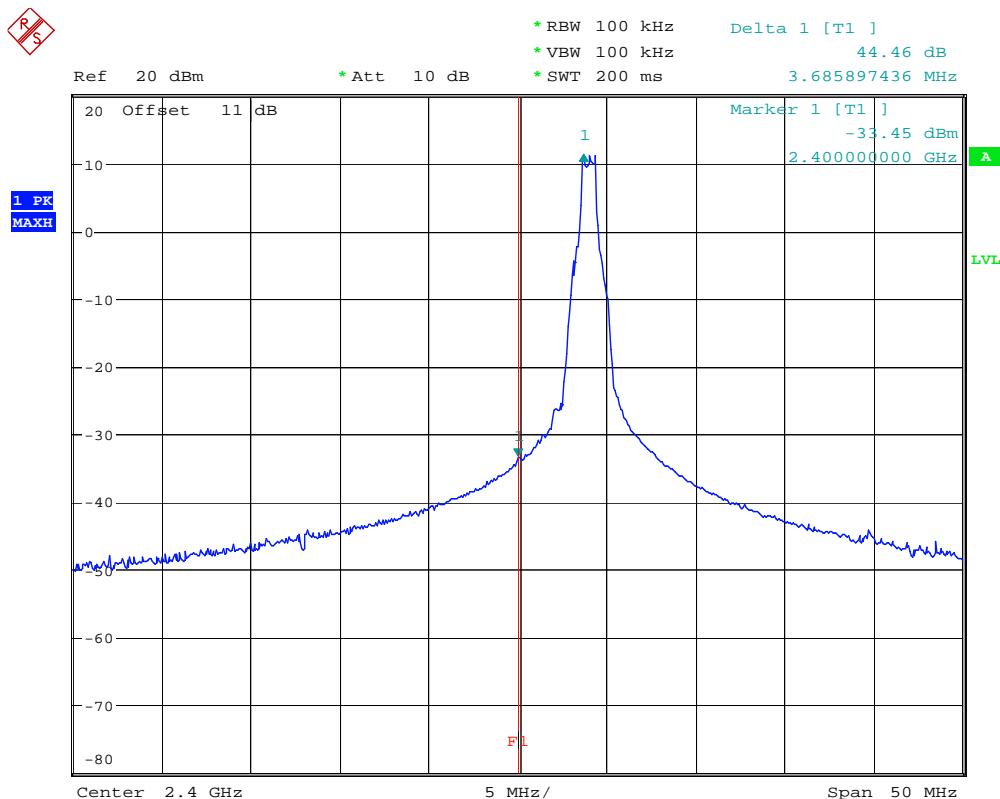
Note:

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Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

## Band Edge Measurement

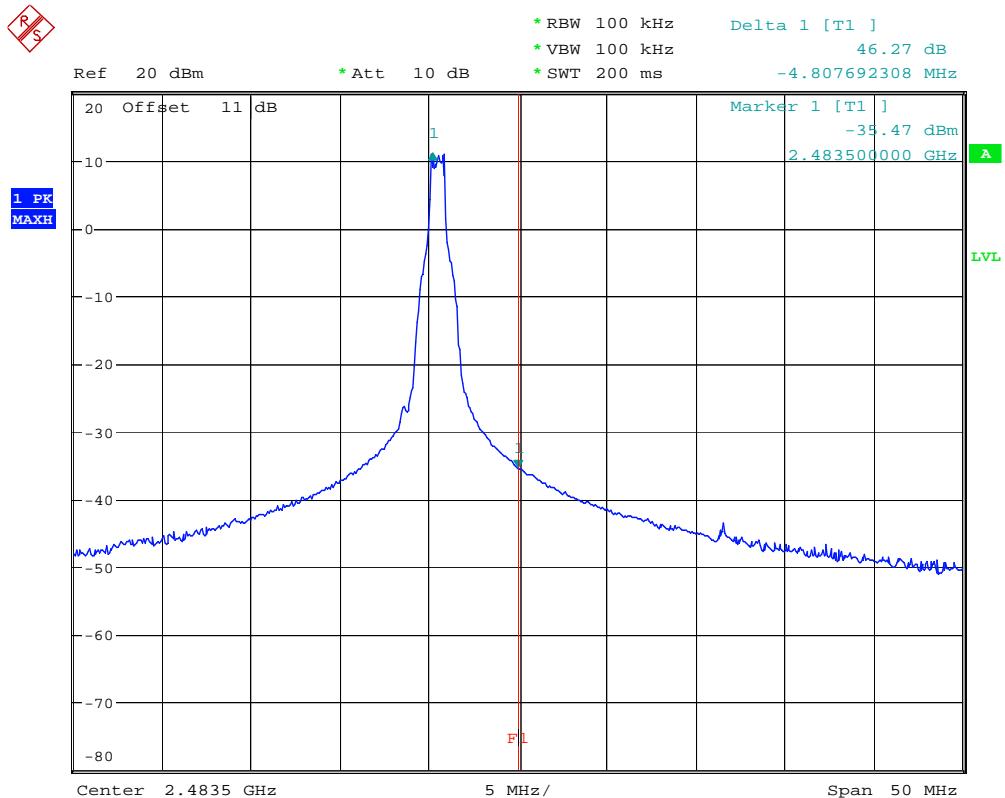


BAND EDGE 2404MHz

Date: 9.SEP.2009 13:54:07

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C



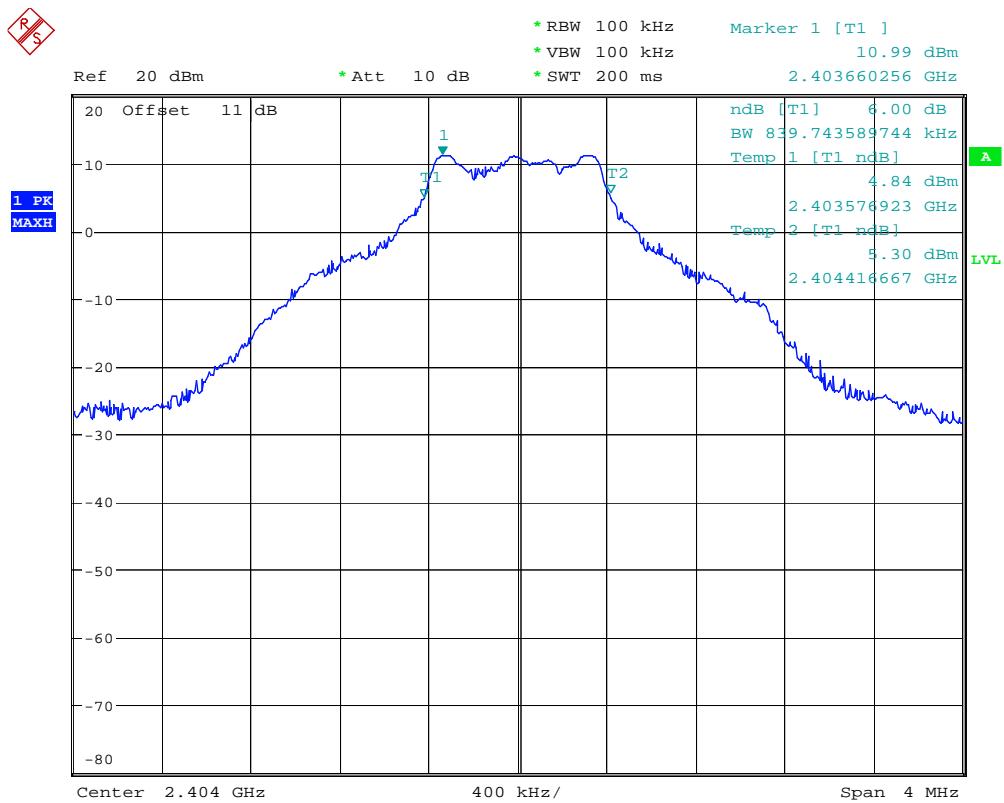
BAND EDGE 2479MHz

Date: 9.SEP.2009 14:18:59

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

## Minimum 6dB Bandwidth

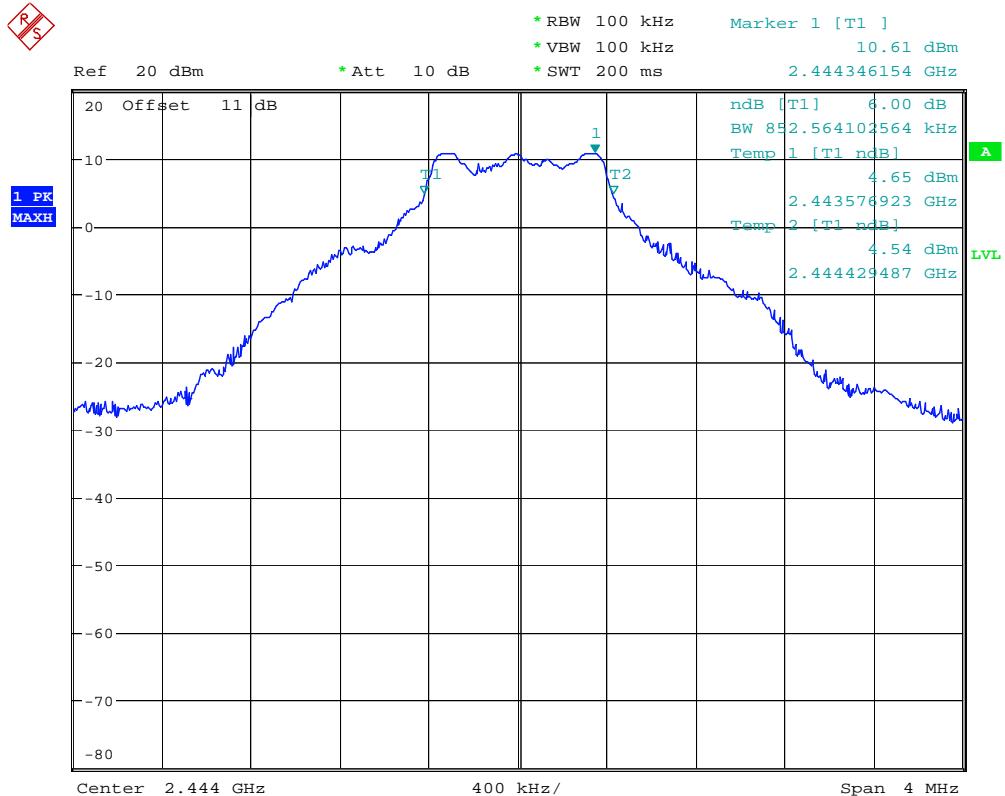


6DB BANDWIDTH 2404MHz

Date: 9.SEP.2009 13:49:39

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

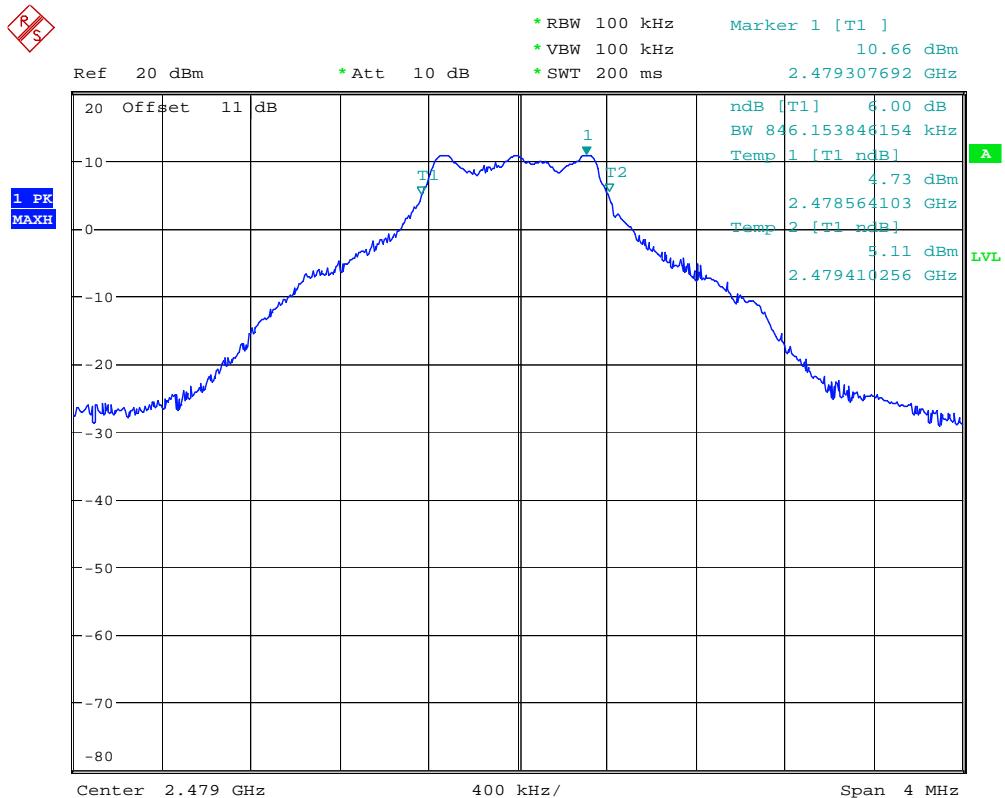


6DB BANDWIDTH 2444MHz

Date: 9.SEP.2009 13:49:16

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C



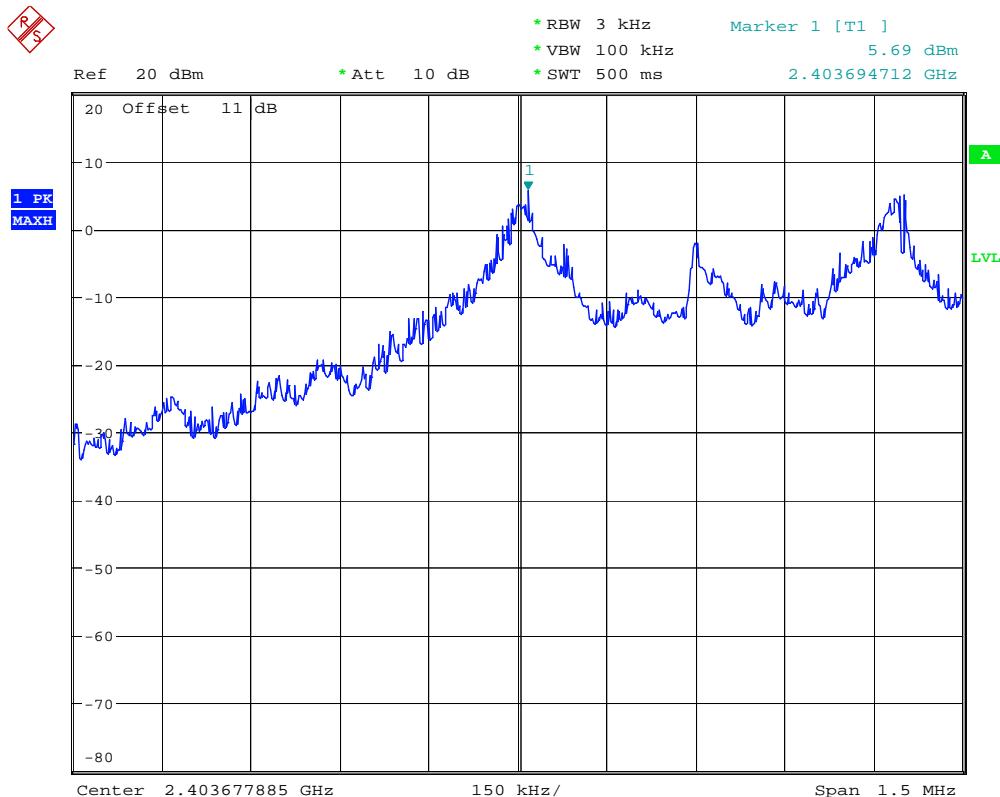
6DB BANDWIDTH 2479MHz

Date: 9.SEP.2009 13:48:45

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

## Peak Power Spectral Density

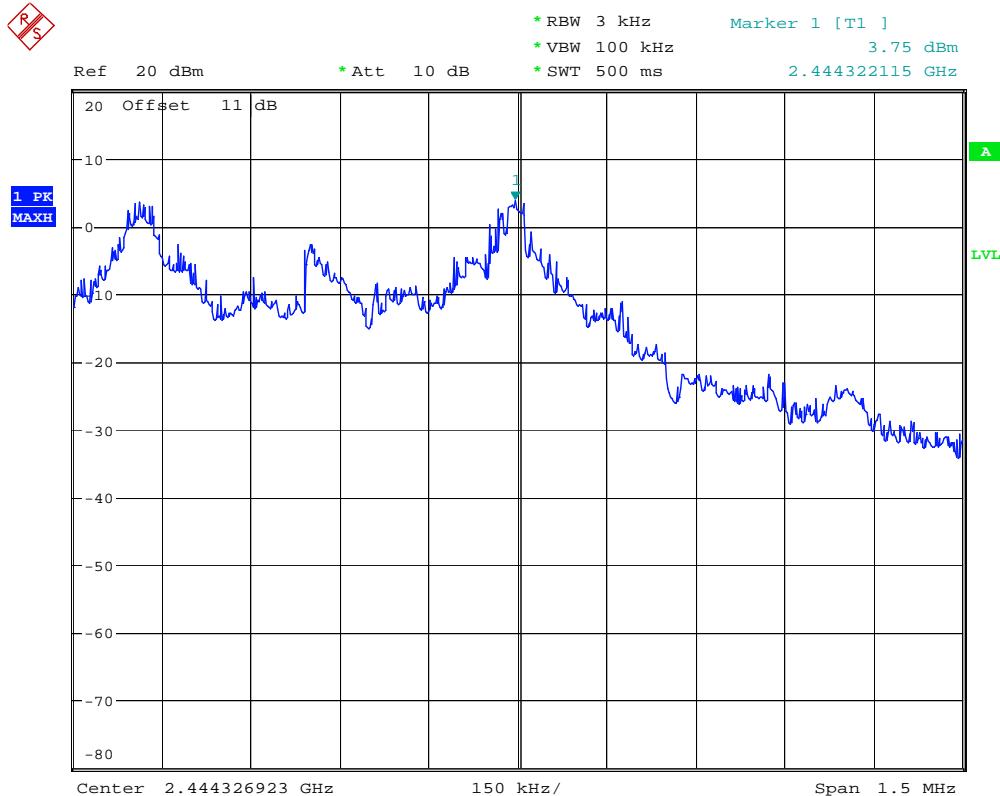


POWER DENSITY 2404MHz

Date: 9.SEP.2009 14:00:00

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

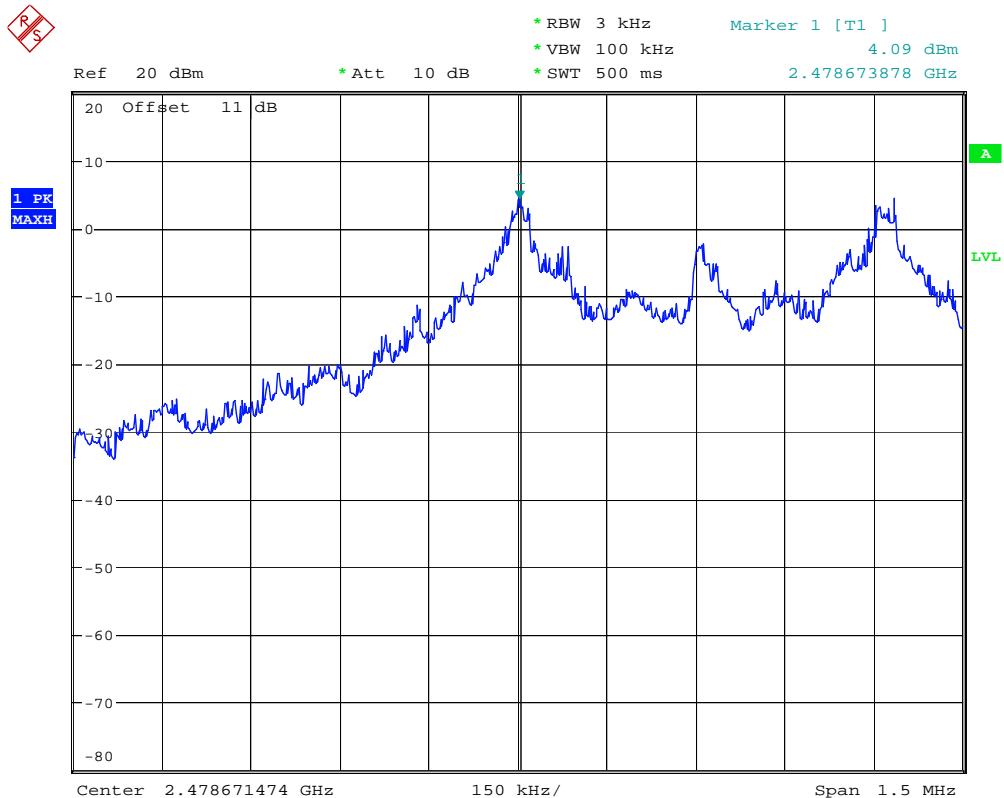


POWER DENSITY 2444MHz

Date: 9.SEP.2009 13:59:32

Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C



POWER DENSITY 2479MHz  
Date: 9.SEP.2009 13:58:56

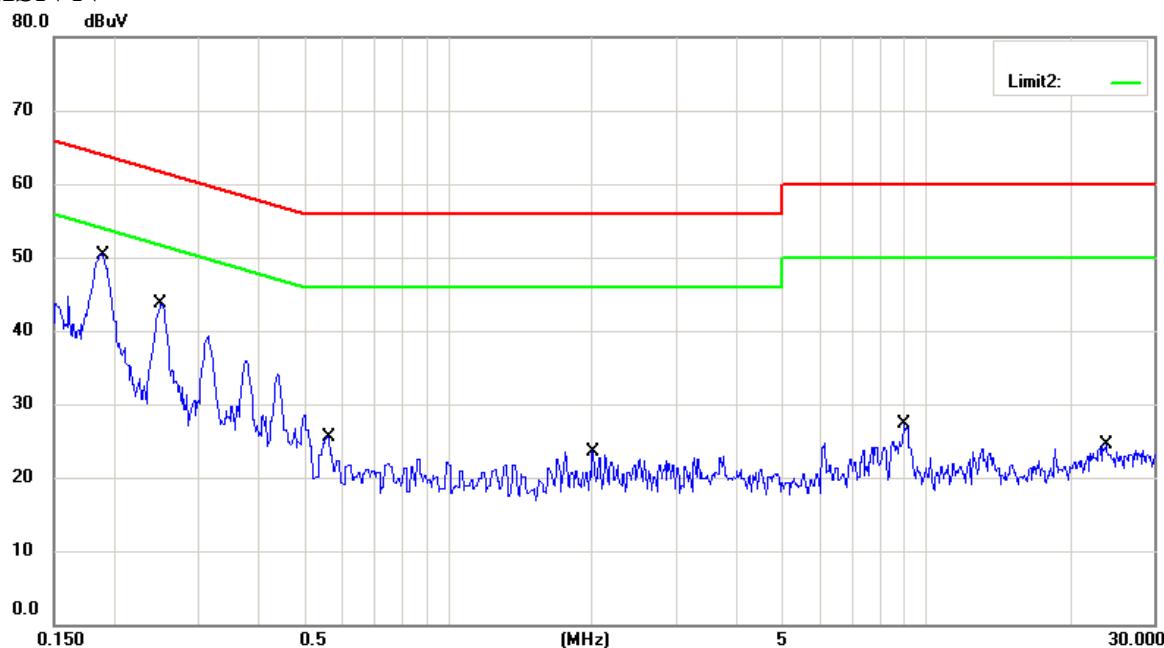
Registration number: W6M20908-9997-C-1

FCC ID: R48TVEE21C

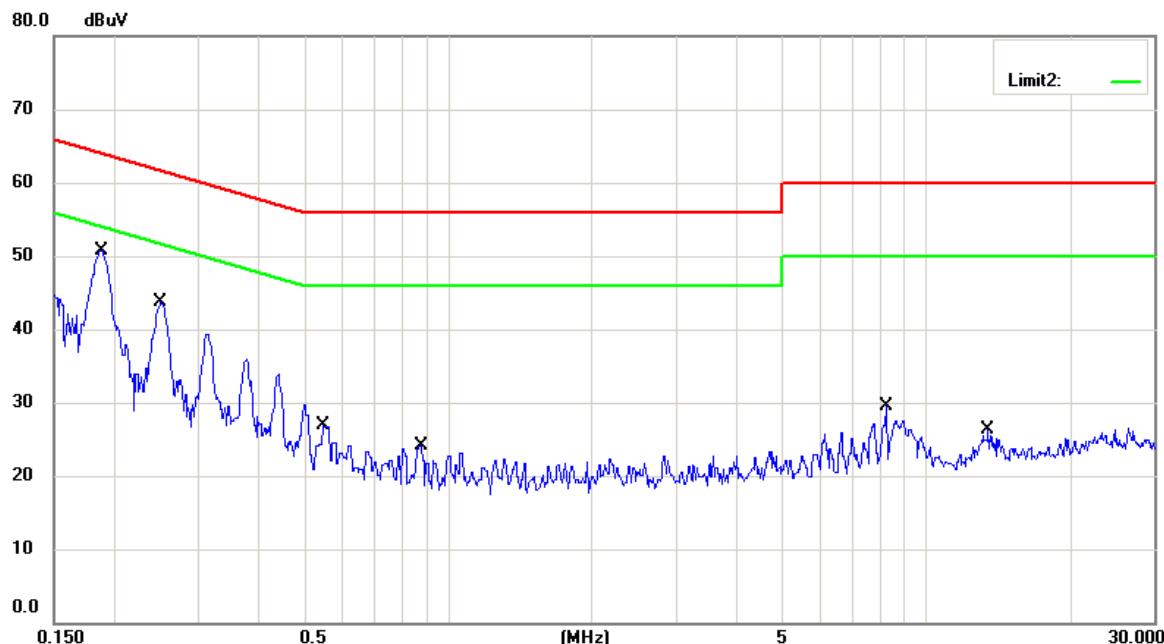
Power Line Conducted Emission

Transmitter

LISN N



LISN L1



Up Line: QP Limit Line

Down Line: Ave Limit Line

Note:

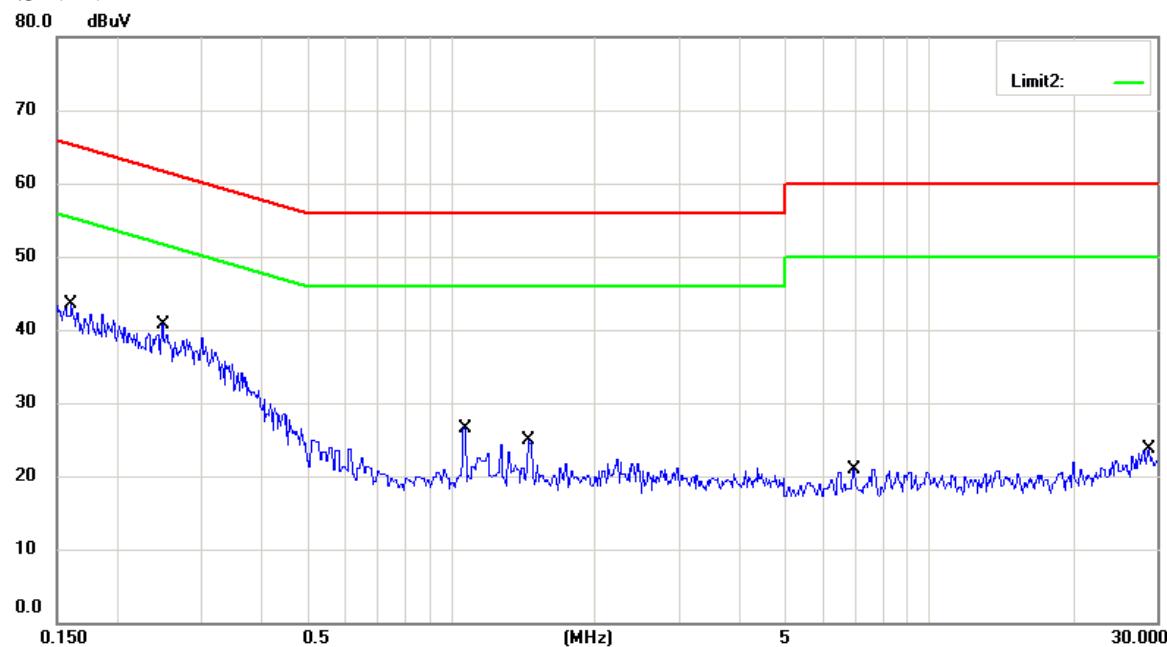
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Registration number: W6M20908-9997-C-1

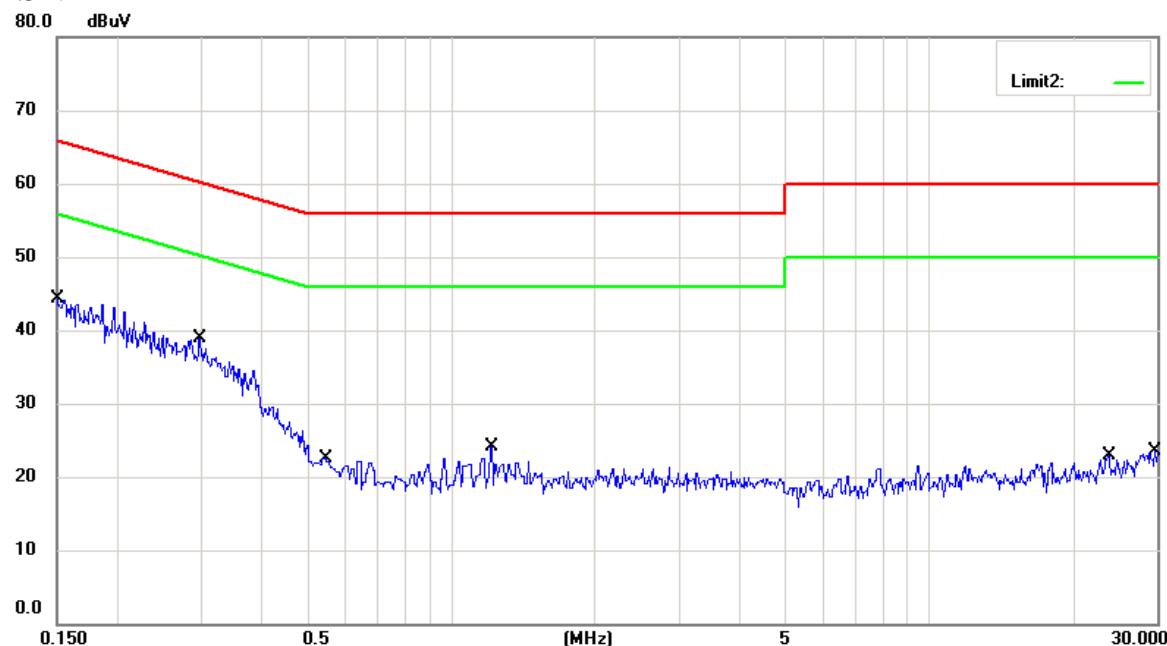
FCC ID: R48TVEE21C

Receiver

LISN N



LISN L1



Up Line: QP Limit Line

Down Line: Ave Limit Line

Note:

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