

FCC PART 15 SUBPART C TEST REPORT
for
DIGITAL PHOTO FRAME WITH WIRELESS SURVEILLANCE
Model No.: PFA-702
FCC ID: V94-PFA-702

of

Applicant: **ABEL INDUSTRIES INT'L Co., Ltd.**

Address: **318, SEC. 3, CHANG NAN RD, CHANG HUA,
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.: W6M20804-9054-P-15

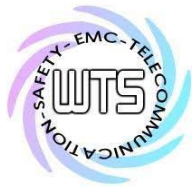
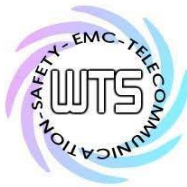


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1 General Information

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.

This report is related to FCC Part 15 C.

Tester:

September 9, 2008

Danny

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

September 9, 2008

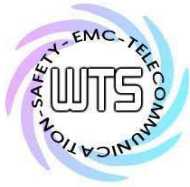
Chang Tse-Ming

Date

WTS

Name

Signature



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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

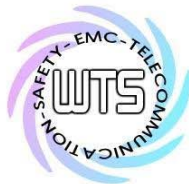
A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

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

1.3 Details of approval holder

Name:	ABEL INDUSTRIES INT'L Co., Ltd.
Street:	318, SEC. 3, CHANG NAN RD,
City:	CHANG HUA
Country:	Taiwan, R.O.C
Telephone:	+886-3-6583147
Fax:	+886-3-6585674
Teletex:	./.



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1.4 Application details

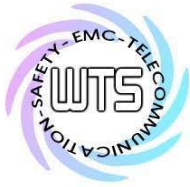
Date of receipt of test item: April 29, 2008
Date of test: from April 30, 2008 to September 9, 2008

1.5 General information of Test item

Type of test item: DIGITAL PHOTO FRAME WITH WIRELESS SURVEILLANCE
Model Number: PFA-702
Brand Name: ./.
Multi-listing model number: PFA-701 / PFA-701 AV / PFA-702T / PFA-702R
PFA-705T / PFA-705R
Photos: See Appendix

Technical data

Frequency band: 2.4 GHz – 2.4835 GHz
Testing frequency (ch 1 or A): 2.414 GHz
Testing frequency (ch 2 or B): 2.432 GHz
Testing frequency (ch 4 or C): 2.468 GHz
Number of Channels: 4
Ch1: 2.414 GHz
Ch2: 2.432 GHz
Ch3: 2.450 GHz
Ch4: 2.468 GHz
Operation modes: duplex
Modulation Type: FM
Fixed point-to-point operation: ☐ Yes / ☒ No
Type of Antenna: Soldered on PCB
Antenna gain: 1.5 dBi
Power supply: TX: Adaptor (I/P: AC 120 V / 60 Hz, O/P: 9 Vdc / 300 mA)
RX: Adaptor (I/P: AC 100-240 V / 50-60 Hz / 0.35 A,
O/P: 12 Vdc / 1 A)



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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 1 or A): Conducted: -2.79 dBm

Power (ch 2 or B): Conducted: -2.58 dBm

Power (ch 4 or C): Conducted: -2.25 dBm

Manufacturer: (if applicable)

Name: ./.

Street: ./.

Town: ./.

Country: ./.

Additional information: The sample is using FM modulation.
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 C § 15.247 (2007-10)



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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

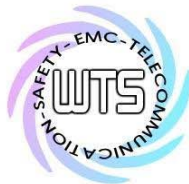
Temperature: 23 °C

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Power supply: TX: Adaptor (I/P: AC 120 V / 60 Hz, O/P: 9 Vdc / 300 mA)
RX: Adaptor (I/P: AC 100-240 V / 50-60 Hz / 0.35 A,
O/P: 12 Vdc / 1 A)

Extreme conditions parameters: ./.



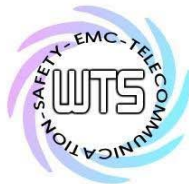
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2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2007/10/15	2008/10/14
ETSTW-CE 002	PREREULATOR MODE DC POWER SUPPLY	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	2007/10/15	2008/10/14
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2007/10/15	2008/10/14
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2008/5/10	2009/5/09
ETSTW-CE 008	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2007/10/23	2009/10/22
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2008/7/25	2009/7/24
ETSTW-CE 013	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T4-02	20242	FCC	2007/11/2	2009/11/1
ETSTW-CE 014	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T2-02	20241	FCC	2005/12/7	2008/12/6
ETSTW-CE 015	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T8-02	20307	FCC	2006/11/7	2008/11/6
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2007/10/29	2008/10/28
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	2007/12/3	2008/12/2
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2007/10/29	2008/10/28
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2007/10/11	2008/10/12
ETSTW-RE 010	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070181	MOTECH	Function Test	
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	2010/5/4
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2007/11/7	2010/11/6
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 021	SWEEP GENERATOR	SWM05	835130/010	R&S	2007/10/9	2008/10/8
ETSTW-RE 028	Log-Periodic DipoleArray Antenna	3148	34429	EMCO	2008/4/23	2010/4/22
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	2008/4/23	2010/4/22
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2008/3/26	2010/3/25
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2007/10/9	2008/10/8
ETSTW-RE 033	WaveRunner 6000A Serie Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2008/6/27	2009/6/26
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2007/10/16	2009/10/15
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2007/1/11	2009/1/10
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2008/5/2	2010/5/1
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2008/5/22	2010/5/21
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	2005/3/22	2009/3/21

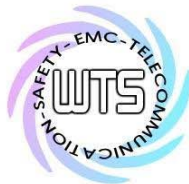


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ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2007/5/2	2009/5/1
ETSTW-RE 055	SPECTRUM ANALYZER	FSU-26	200074	R&S	2008/7/1	2009/6/30
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2007/7/2	2009/7/1



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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 μ 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 μ 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 μ V + 10.36 dB + 6 dB = 36.36 dB μ V/m @3m

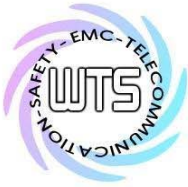
The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2003 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

- (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.

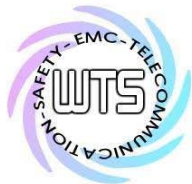
The formula is as follows:

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 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).

Test condition		Conducted Power		
		Channel A	Channel B	Channel C
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120\text{ V}$	[dBm]	[dBm]	[dBm]
		-2.79	-2.58	-2.25

Test condition $T_{nom} = \text{--}^{\circ}\text{C}$, $V_{nom} = \text{-- V}$	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 003 ETSTW-RE 004 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

EIRP = -2.25 dBm + 1 dBi

= -1.25 dBm

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

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 021
ETSTW-RE 028 ETSTW-RE 030 ETSTW-RE 043 ETSTW-RE 044

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.

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

S – Power Density

P – Output power ERP

R – Distance

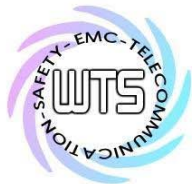
D – Cable Loss

AG – Antenna Gain

Item	Unit	Value	Remarks
P	mW	0.596	Peak value
D	dB		
AG	dBi	1.5	
G		1.42	Calculated Value
R	cm	20	Assumed value
S	mW/cm ²	0.000168	Calculated value

Limits:

Limit for General Population / Uncontrolled Exposure	
Frequency (MHz)	Power Density (mW/cm ²)
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:

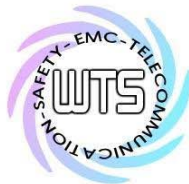
“If the emission is pulsed, modify the unit for continuous operation, use the setting shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.”

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:

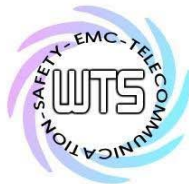
“If the emission is pulsed, modify the unit for continuous operation, use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.”

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

Test equipment used: ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028 ETSTW-RE 029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043 ETSTW-RE 044

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

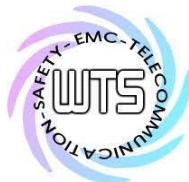
Model: PFA-702 Date: 2008/6/27
Mode: TX CH1 Temperature: 26 °C Engineer: Danny
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
114.409	14.81	peak	12.83	27.64	43.50	-15.86	110	150
612.826	4.97	peak	22.24	27.21	46.00	-18.79	125	150

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.			
4828.536	58.64	51.81	-1.30	57.34	50.51	74.00	54.00	-3.49	135	150
7246.493	47.58	---	1.85	49.43	---	74.00	54.00	-24.57	140	150
9656.000	20.52	---	25.01	39.53	---	74.00	54.00	-34.47	140	150
12070.000	20.34	---	29.47	43.81	---	74.00	54.00	-30.19	145	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
73.287	13.14	peak	11.39	24.53	40.00	-15.47	115	150
608.617	6.33	peak	22.22	28.55	46.00	-17.45	120	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.			
4828.508	64.21	53.58	-1.30	62.91	52.28	74.00	54.00	-1.72	135	150
7246.493	46.67	---	1.85	48.52	---	74.00	54.00	-25.48	140	150
9656.000	20.72	---	25.01	39.73	---	74.00	54.00	-34.27	140	150
12070.000	20.56	---	29.47	44.03	---	74.00	54.00	-29.97	145	150

Mode: TX CH2 Temperature: 26 °C Engineer: Danny
Polarization: Horizontal Humidity: 60 %

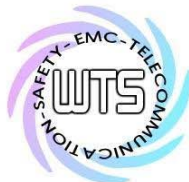
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
114.409	14.45	peak	12.83	27.28	43.50	-16.22	115	150
610.020	5.05	peak	22.22	27.27	46.00	-18.73	125	150

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.			
4864.493	61.63	53.37	-1.30	60.33	52.07	74.00	54.00	-1.93	140	150
7302.605	46.81	---	1.81	48.62	---	74.00	54.00	-25.38	145	150
9728.000	20.27	---	24.84	39.11	---	74.00	54.00	-34.89	140	150
12160.000	20.03	---	29.68	43.71	---	74.00	54.00	-30.29	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)
74.910	13.01	peak	11.03	24.04	40.00	-15.96	110	150
612.826	6.30	peak	22.24	28.54	46.00	-17.46	120	150

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.			
4864.703	64.06	53.62	-1.30	62.76	52.32	74.00	54.00	-1.68	135	150
7302.605	45.30	---	1.81	47.11	---	74.00	54.00	-26.89	135	150
9728.000	21.15	---	24.84	39.99	---	74.00	54.00	-34.01	140	150
12160.000	20.82	---	29.68	44.5	---	74.00	54.00	-29.50	145	150



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Mode: TX CH4 Temperature: 26 °C Engineer: Danny
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
114.409	14.52	peak	12.83	27.35	43.50	-16.15	115	150
610.020	4.58	peak	22.22	26.80	46.00	-19.20	120	150

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.			
4936.546	59.43	52.86	-1.15	58.28	51.71	74.00	54.00	-15.72	135	150
7406.814	45.12	---	1.97	47.09	---	74.00	54.00	-26.91	130	150
9872.000	20.46	---	25.63	40.09	---	74.00	54.00	-33.91	135	150
12340.000	19.95	---	30.12	44.07	---	74.00	54.00	-29.93	140	150

Polarization: Vertical

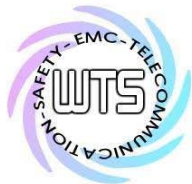
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
73.287	14.77	peak	11.39	26.16	40.00	-13.84	110	150
610.020	6.62	peak	22.22	28.84	46.00	-17.16	125	150

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.			
4936.542	62.67	53.53	-1.15	61.52	52.38	74.00	54.00	-12.48	130	150
7406.814	44.76	---	1.97	46.73	---	74.00	54.00	-27.27	140	150
9872.000	19.07	---	25.63	38.70	---	74.00	54.00	-35.30	140	150
12340.000	22.47	---	30.12	46.59	---	74.00	54.00	-27.41	145	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-RE003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028
ETSTW-RE029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043
ETSTW-RE044



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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
$T_{nom} = 23^{\circ}C$	$V_{nom} = 120\ V$	52.31 dB	66.94 dB

Limit:

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

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028
ETSTW-RE 030 ETSTW-RE 043 ETSTW-RE 044

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 2	Channel 4
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120\text{ V}$	5.7831 MHz	5.9955 MHz	5.8609 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 003 ETSTW-RE 004 ETSTW-RE 055

Explanation: See attached diagrams in Appendix.



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3.8 Peak Power Spectral Density

Peak Power Spectral density is a 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.

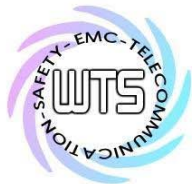
Test conditions		Peak Power Spectral Density (3 kHz)		
		Channel 1 [dBm]	Channel 6 [dBm]	Channel 11 [dBm]
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	-7.70	-9.03	-18.47

Limits:

Frequency Range MHz	dBm
902-928	8
2400-2483,5	8
5725-5850	8

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055

Explanation: See attached diagrams in Appendix.



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3.9 Radiated Emission from Digital Part

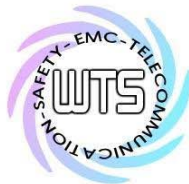
According to FCC part 15.109 (g), digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement".

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 (dBmicrovolts/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 ETSTW-RE 044

Explanation: The test results are listed in the separated test report no. W6M20804-9054-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.

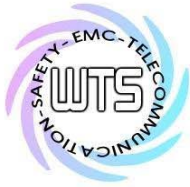
Frequency	Level (dB μ V)	
	quasi-peak	average
150 kHz	lower limit line	Lower limit line

Model: PFA-702 Date: 2008/8/25
Mode: Temperature: 26 °C Engineer: Danny
Polarization: N Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result (dBuV)		Limit (dBuV)		Margin (dB)
	QP	Ave.		QP	Ave.	QP	Ave.	
0.1512	30.56	--	10.10	40.66	--	65.93	--	-25.27
0.2383	28.98	--	10.10	39.08	--	62.16	--	-23.08
0.4720	20.73	--	10.10	30.83	--	56.48	--	-25.65
0.5400	19.03	--	10.10	29.13	--	56.00	--	-26.87
0.6000	16.67	--	10.10	26.77	--	56.00	--	-29.23
0.9100	11.69	--	10.10	21.79	--	56.00	--	-34.21

Polarization: L1

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result (dBuV)		Limit (dBuV)		Margin (dB)
	QP	Ave.		QP	Ave.	QP	Ave.	
0.1566	30.66	--	10.10	40.76	--	65.64	--	-24.88
0.2426	29.77	--	10.10	39.87	--	62.01	--	-22.14
0.3713	28.58	--	10.10	38.68	--	58.47	--	-19.79
0.6150	23.30	--	10.10	33.40	--	56.00	--	-22.60
0.9750	10.98	--	10.10	21.08	--	56.00	--	-34.92
1.1600	9.63	--	10.10	19.73	--	56.00	--	-36.27



Worldwide Testing Services(Taiwan) Co., Ltd.

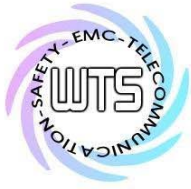
Registration number: W6M20804-9054-P-15
FCC ID: V94-PFA-702

- Note:**
1. The formula of measured value as: $\text{Test Result} = \text{Reading} + \text{Correction Factor}$
 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



Appendix

Measurement diagrams

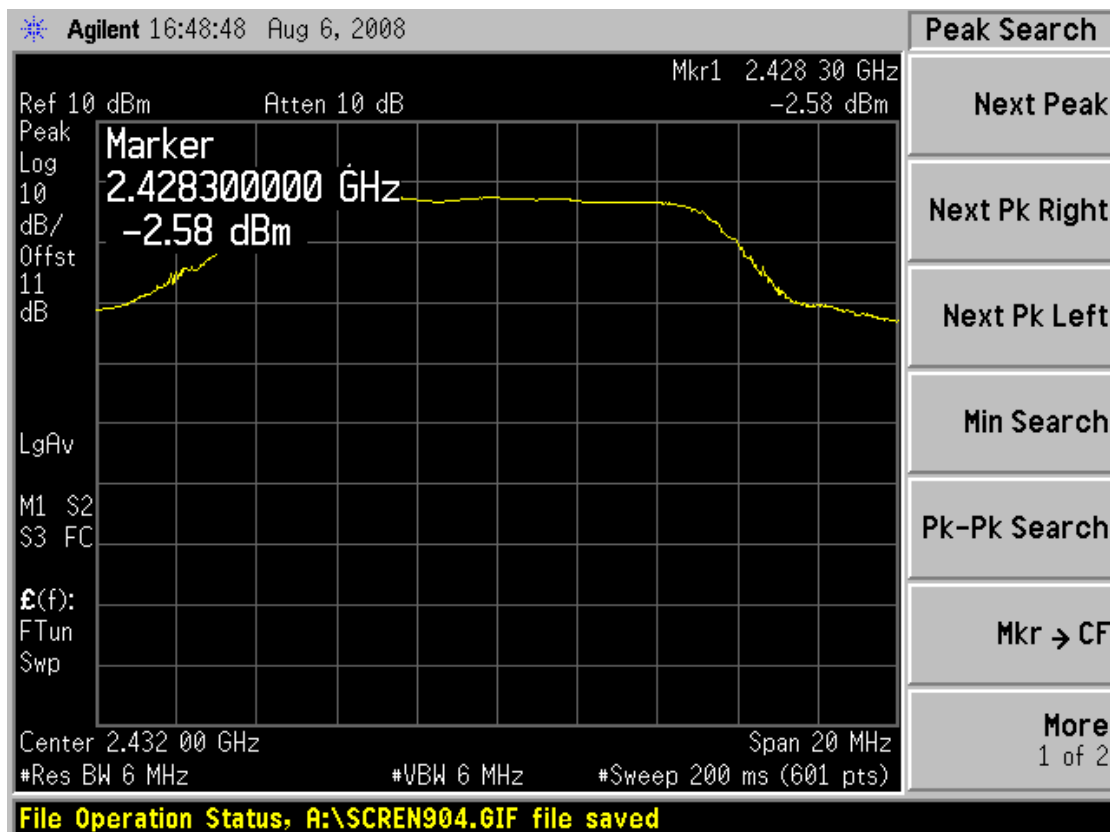
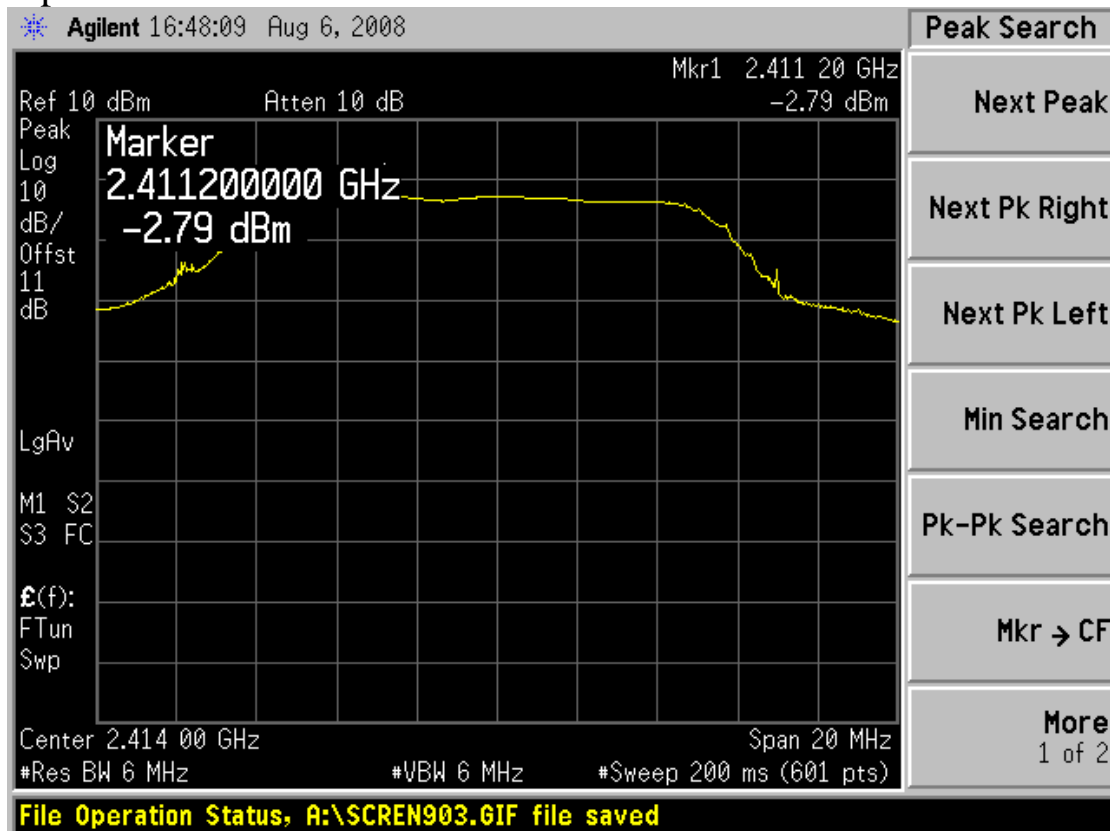
1. Peak Output Power
2. Spurious Emissions radiated – Transmitter operating
3. Band Edge Measurement
4. Minimum 6dB Bandwidth
5. Peak Power Spectral Density
6. Power Line Conducted Emission



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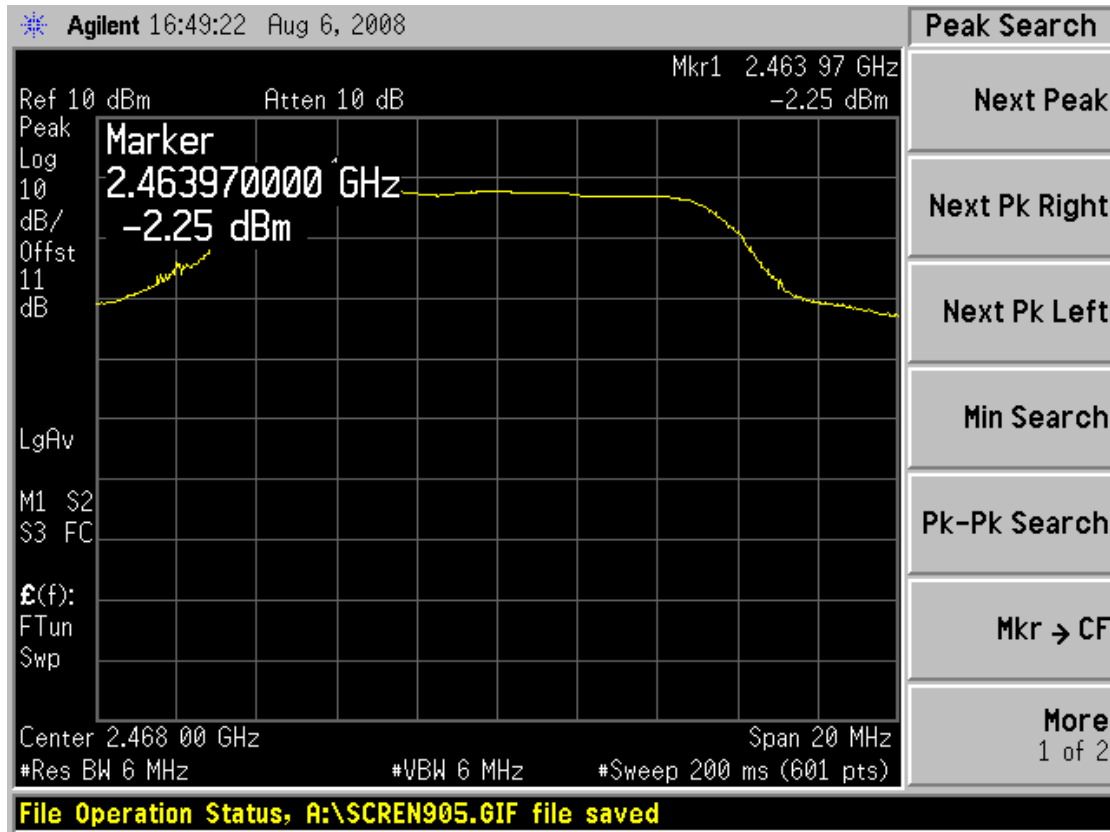
Peak Output Power





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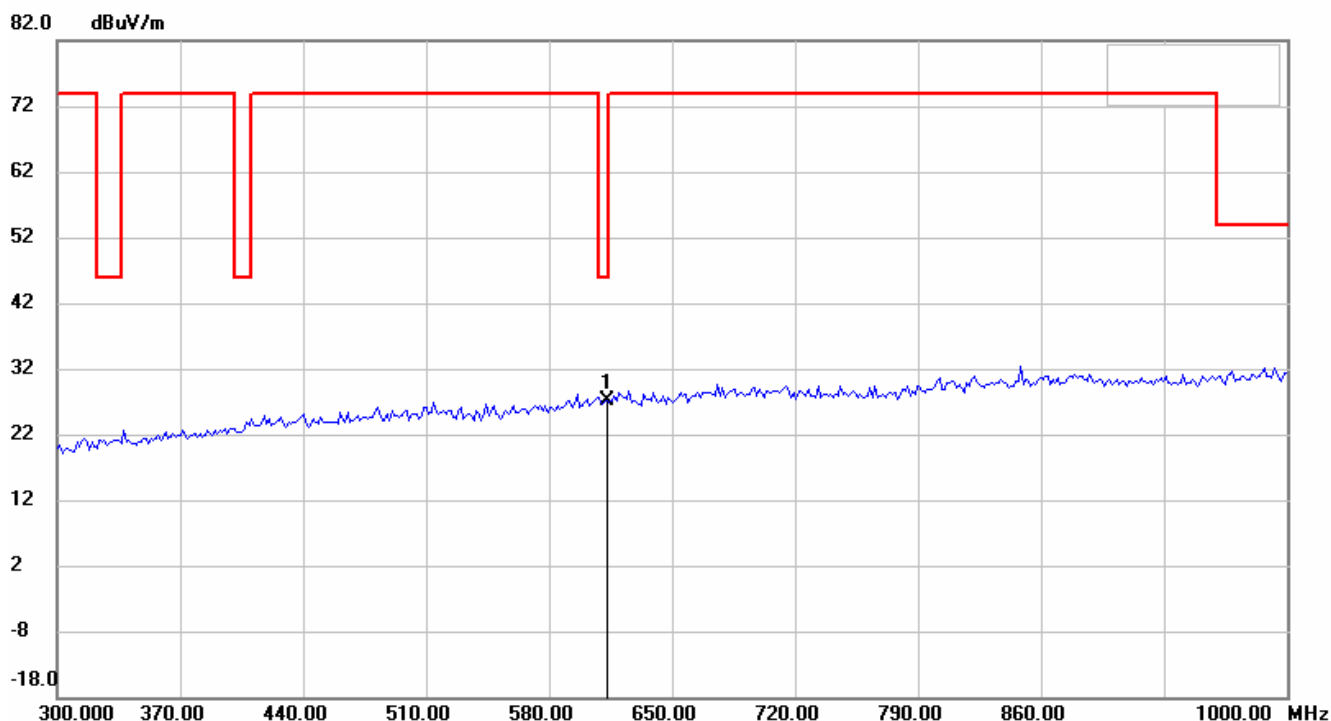
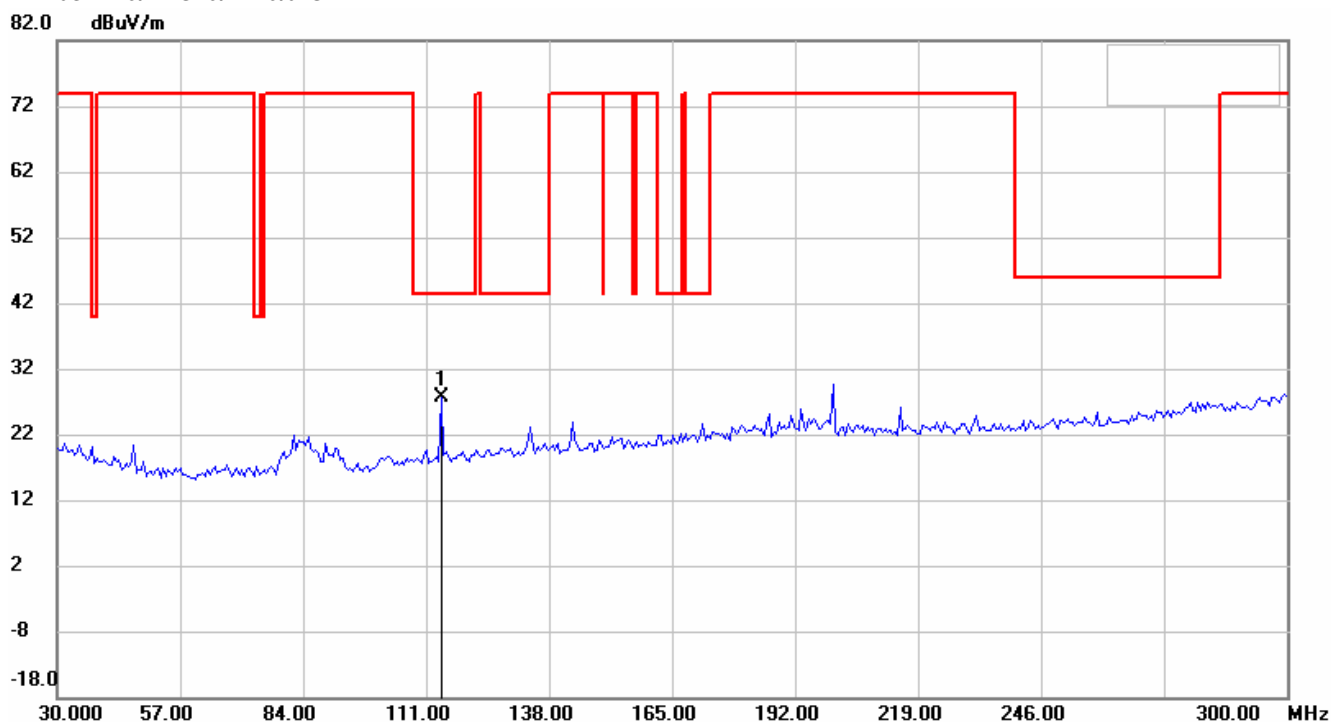
Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

Spurious Emissions radiated – Transmitter operating

CH 1

Antenna Polarization H



Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

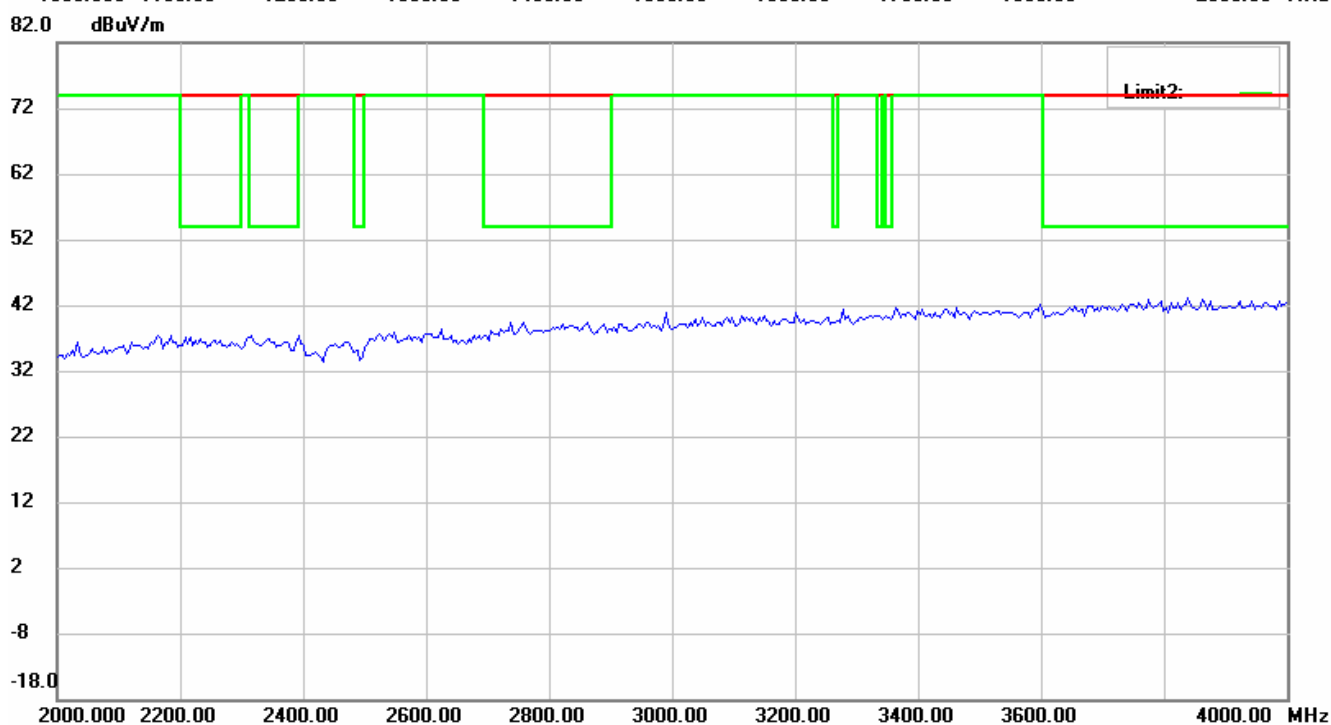
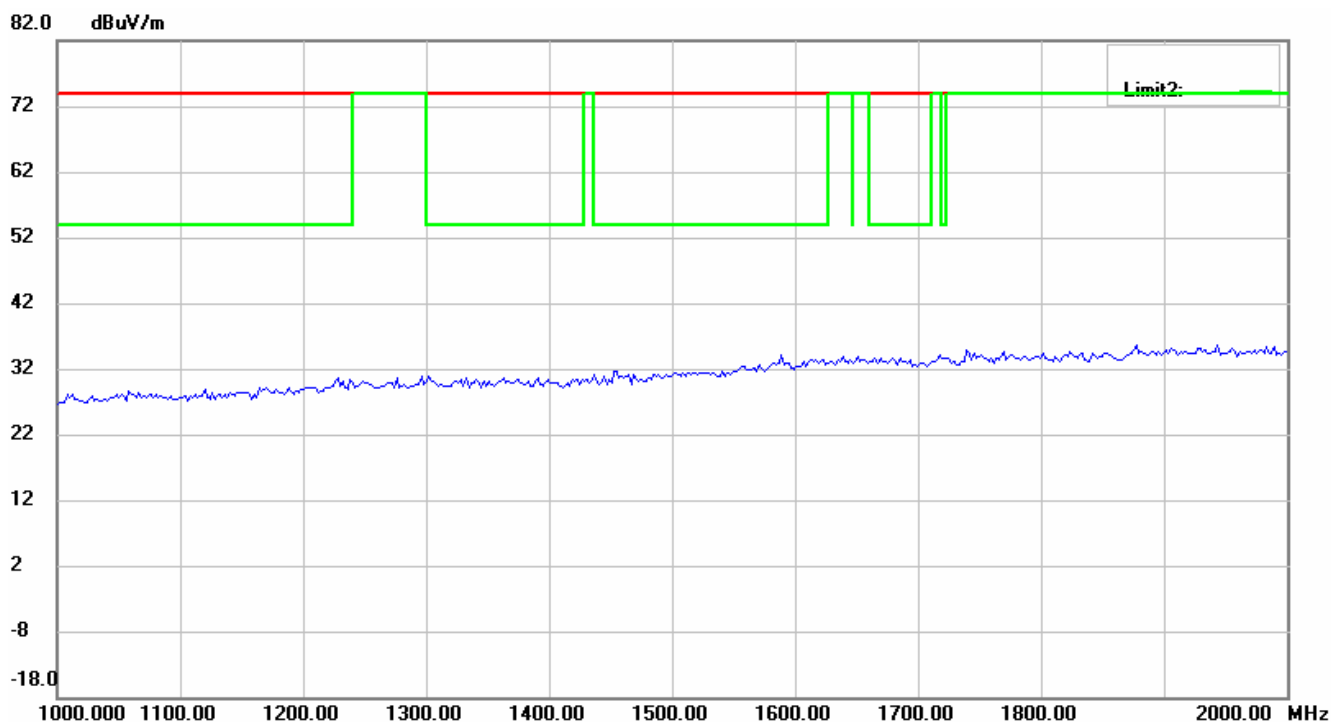
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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



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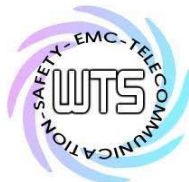


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

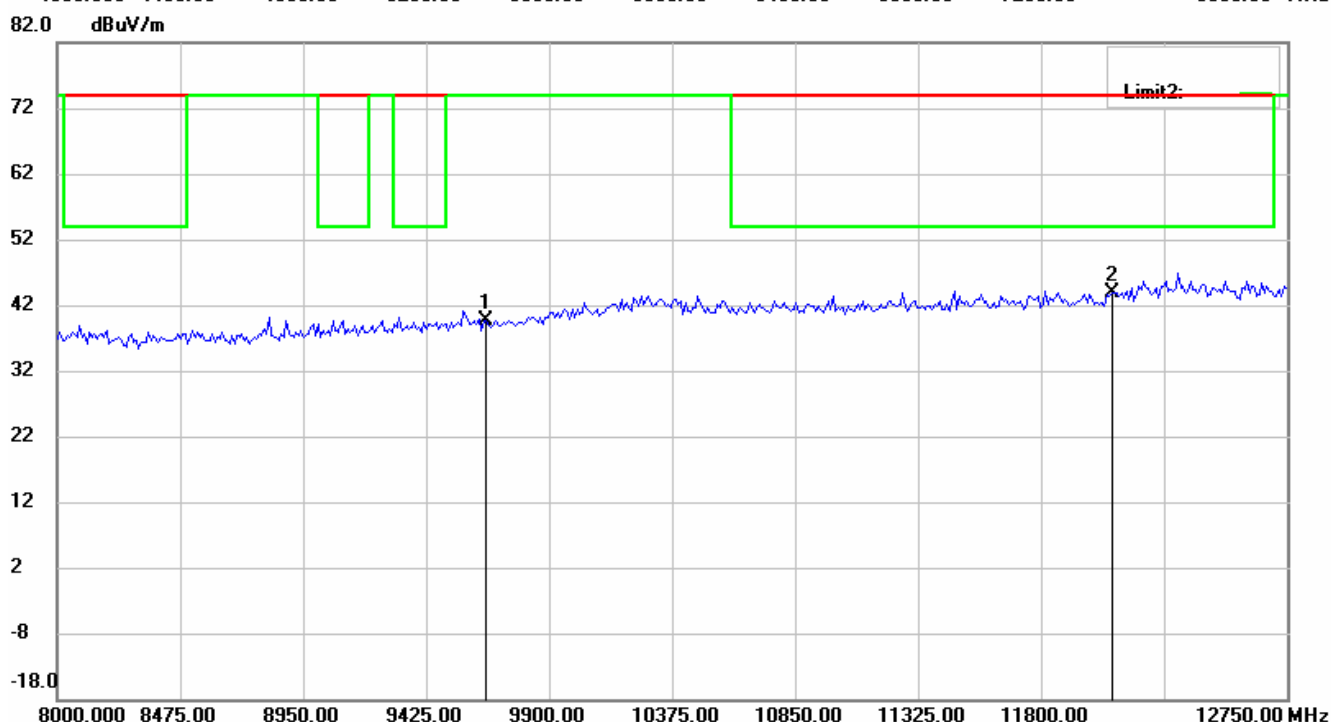
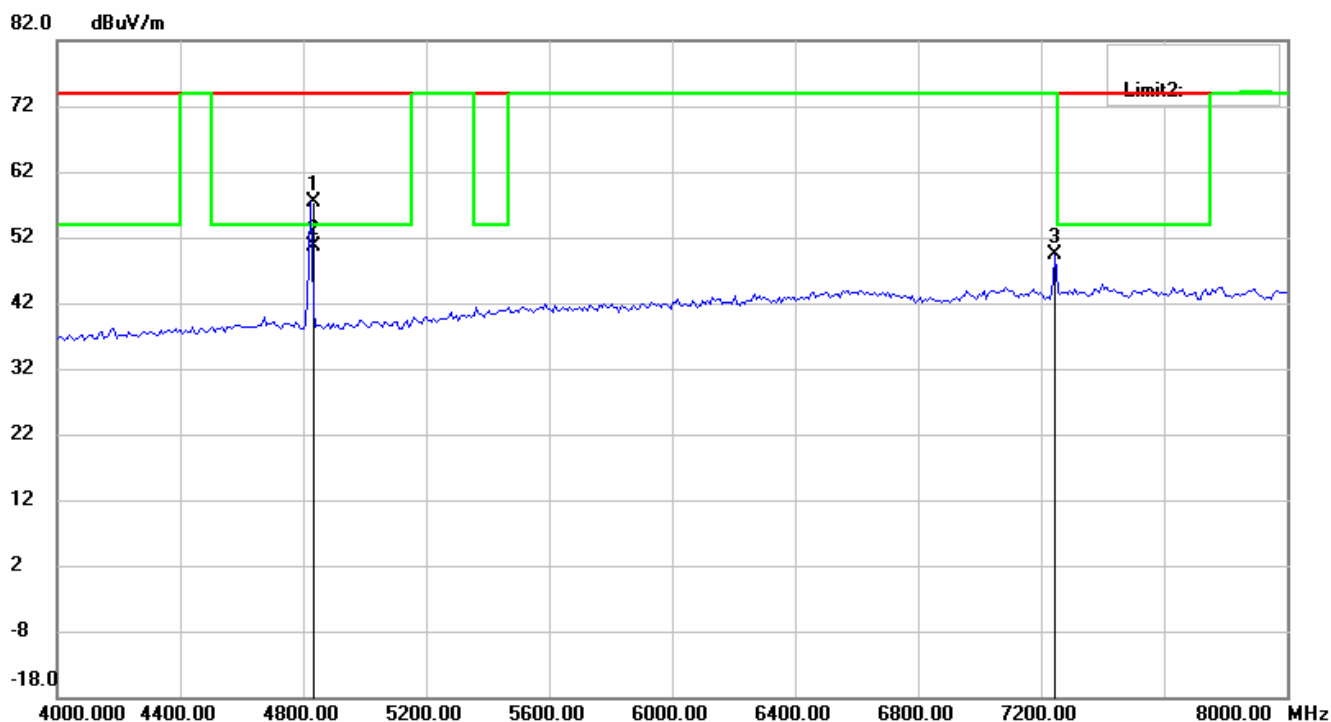
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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



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Registration number: W6M20804-9054-P-15

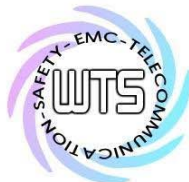
FCC ID: V94-PFA-702



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

Note:

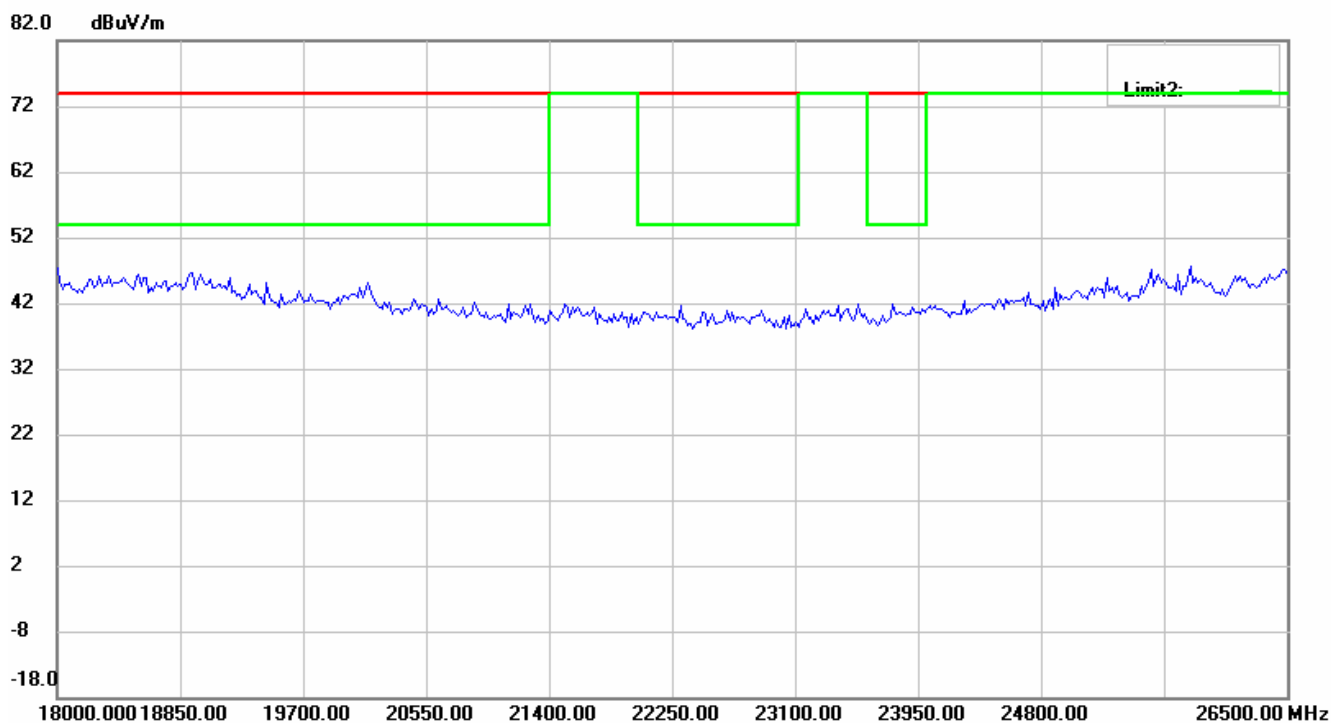
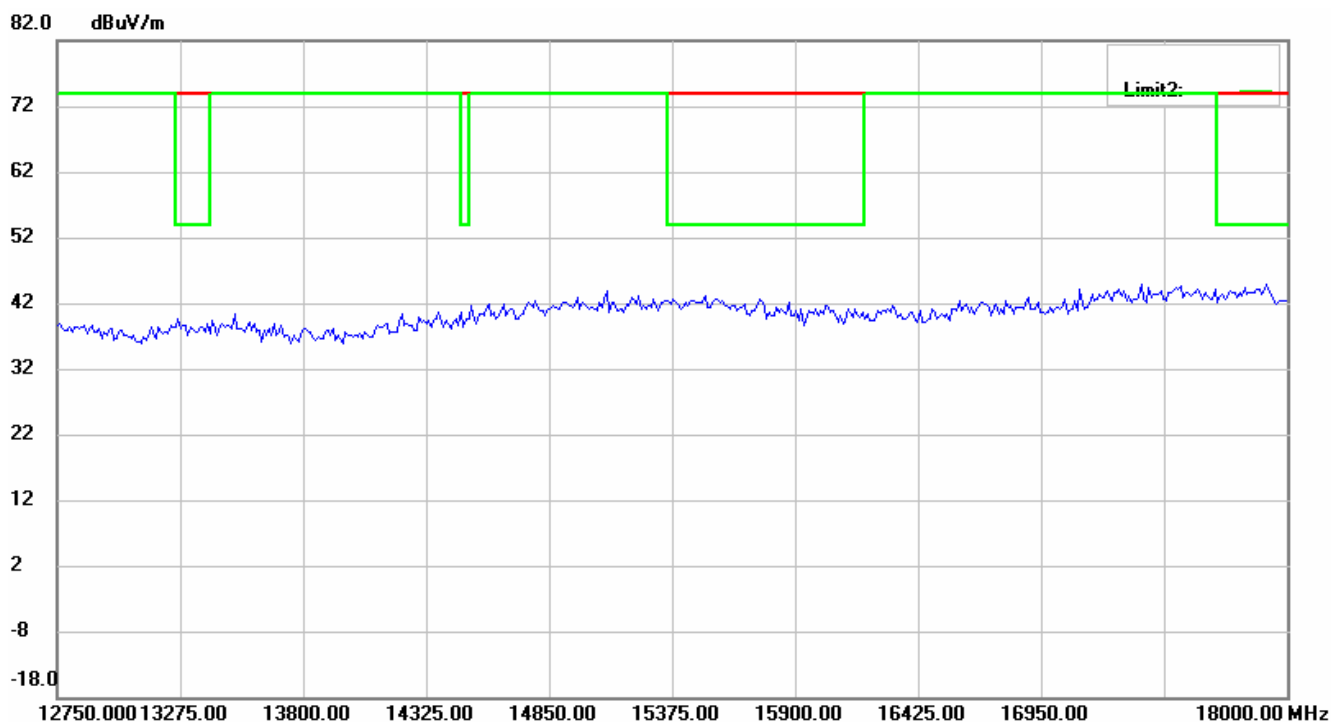
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification 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: W6M20804-9054-P-15

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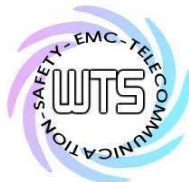


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

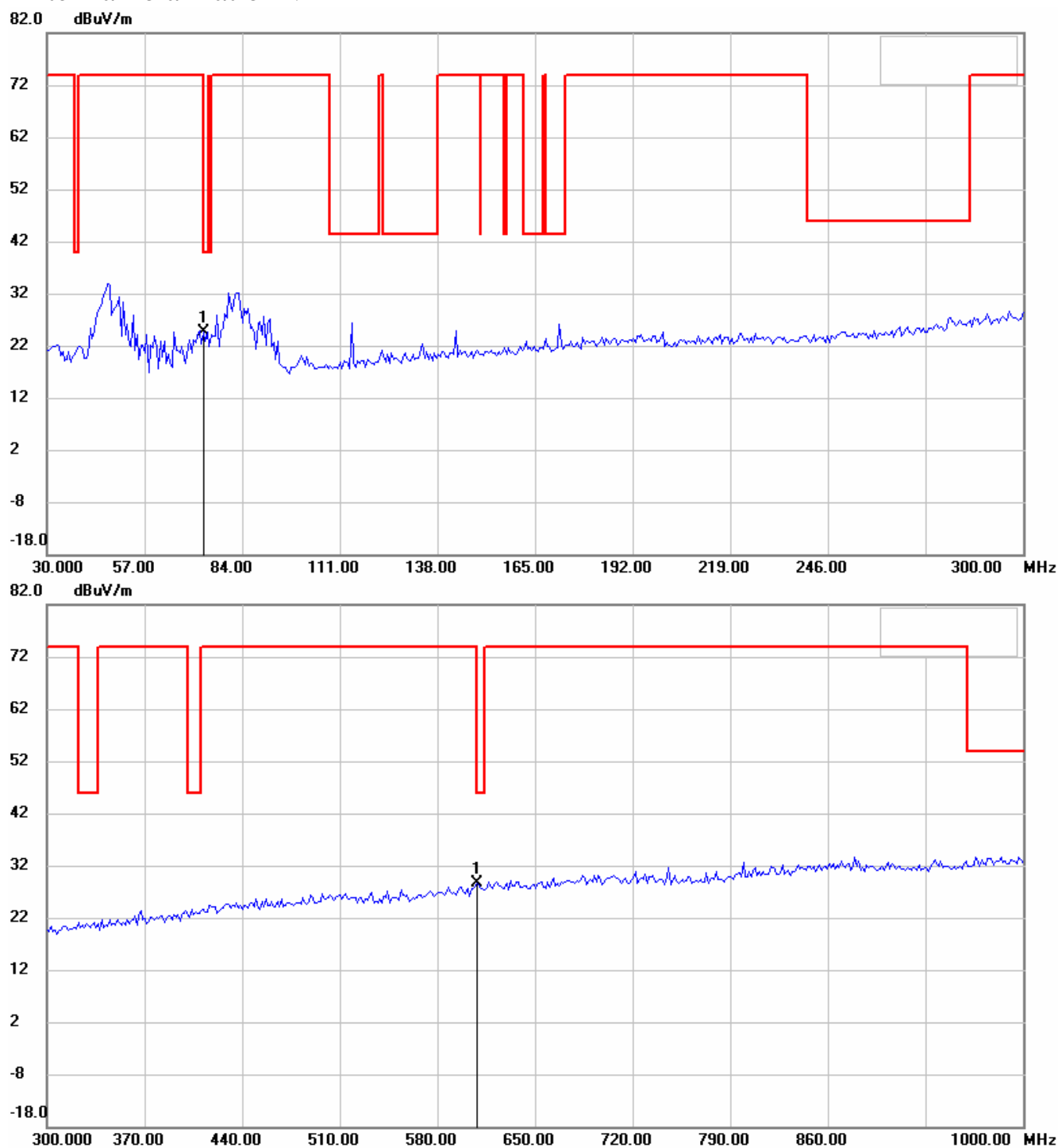
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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



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FCC ID: V94-PFA-702

Antenna Polarization V

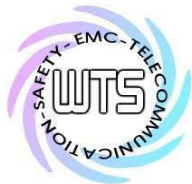


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

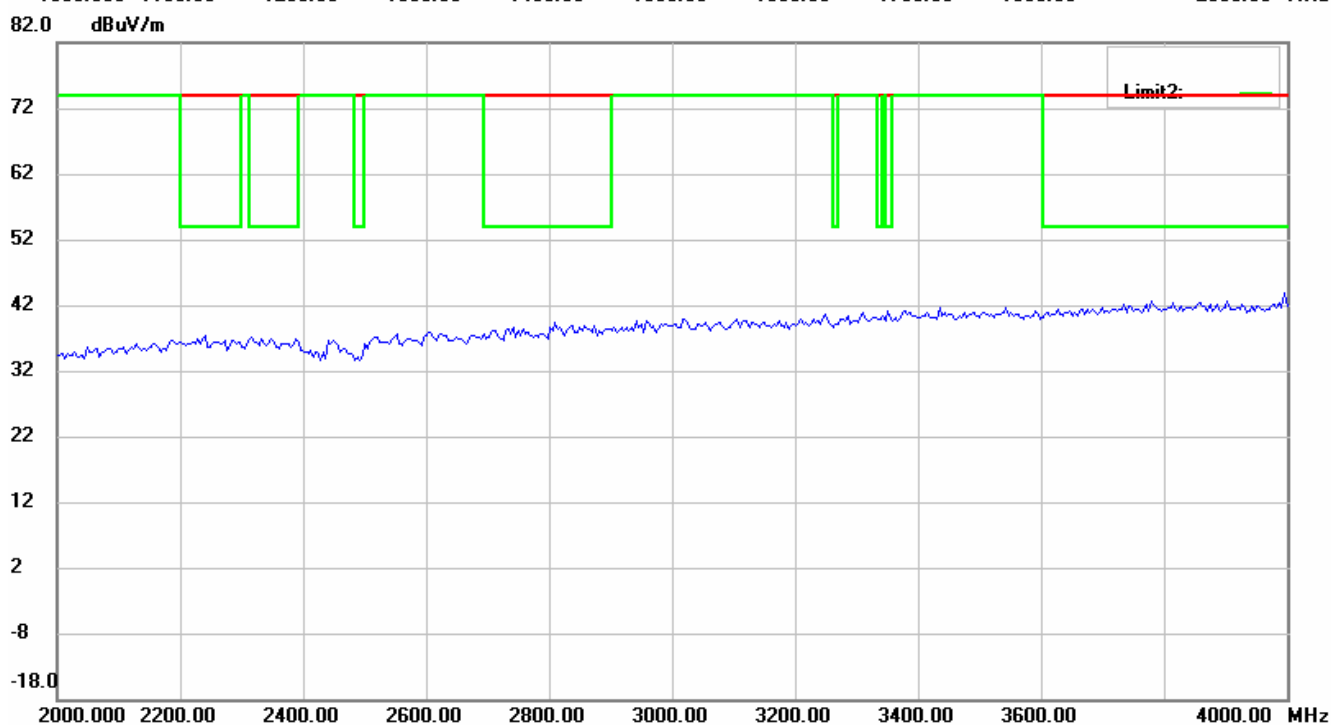
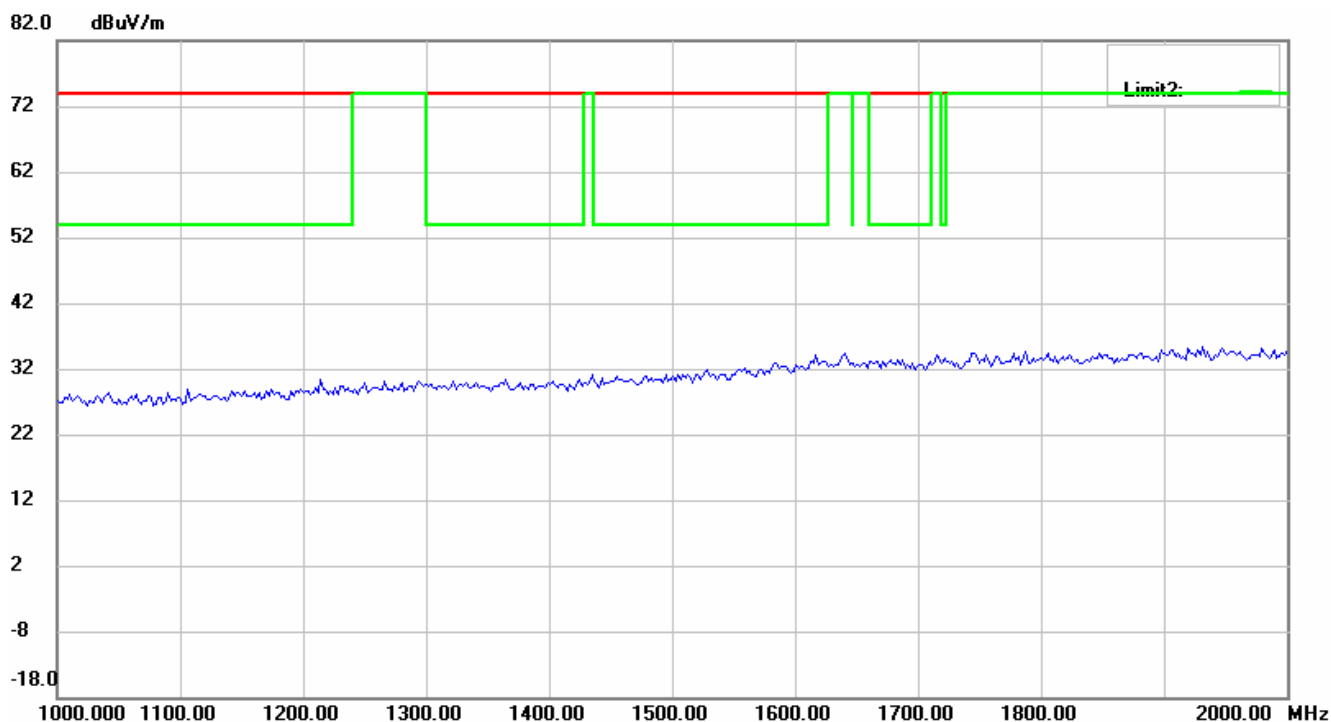
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

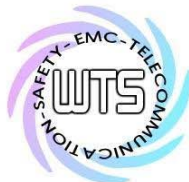


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

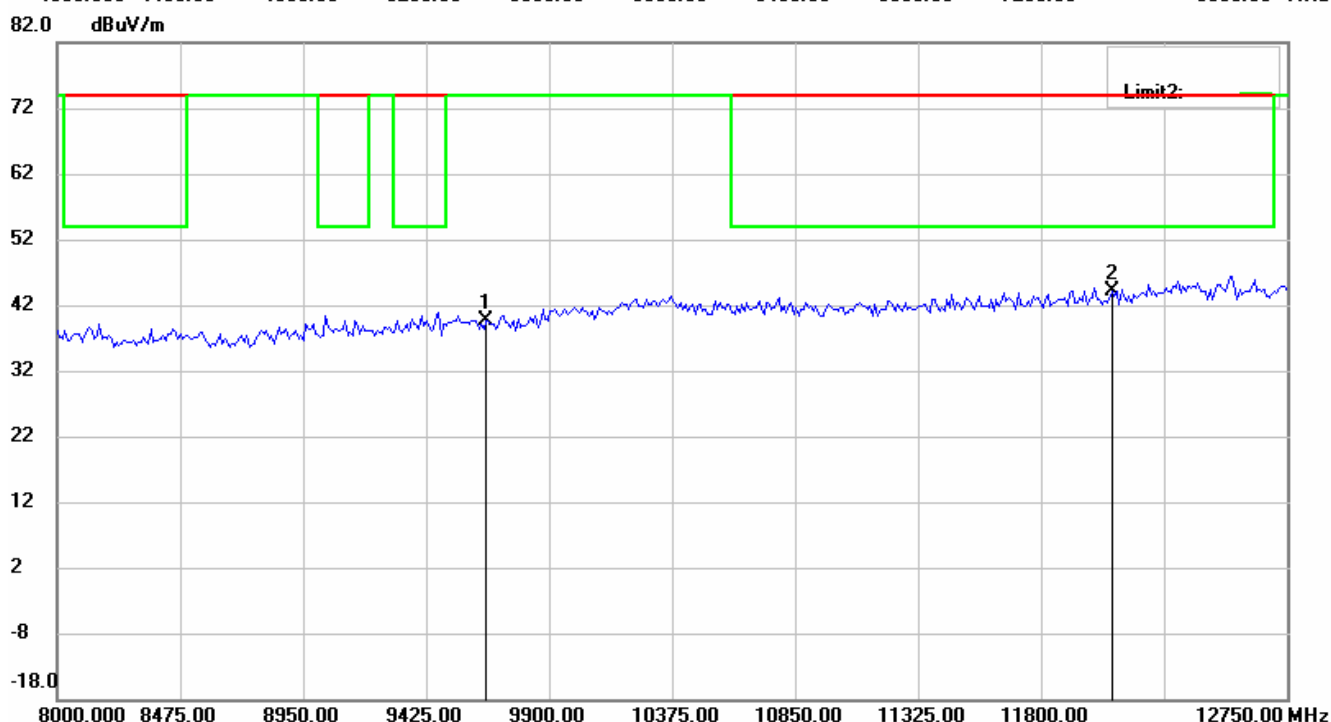
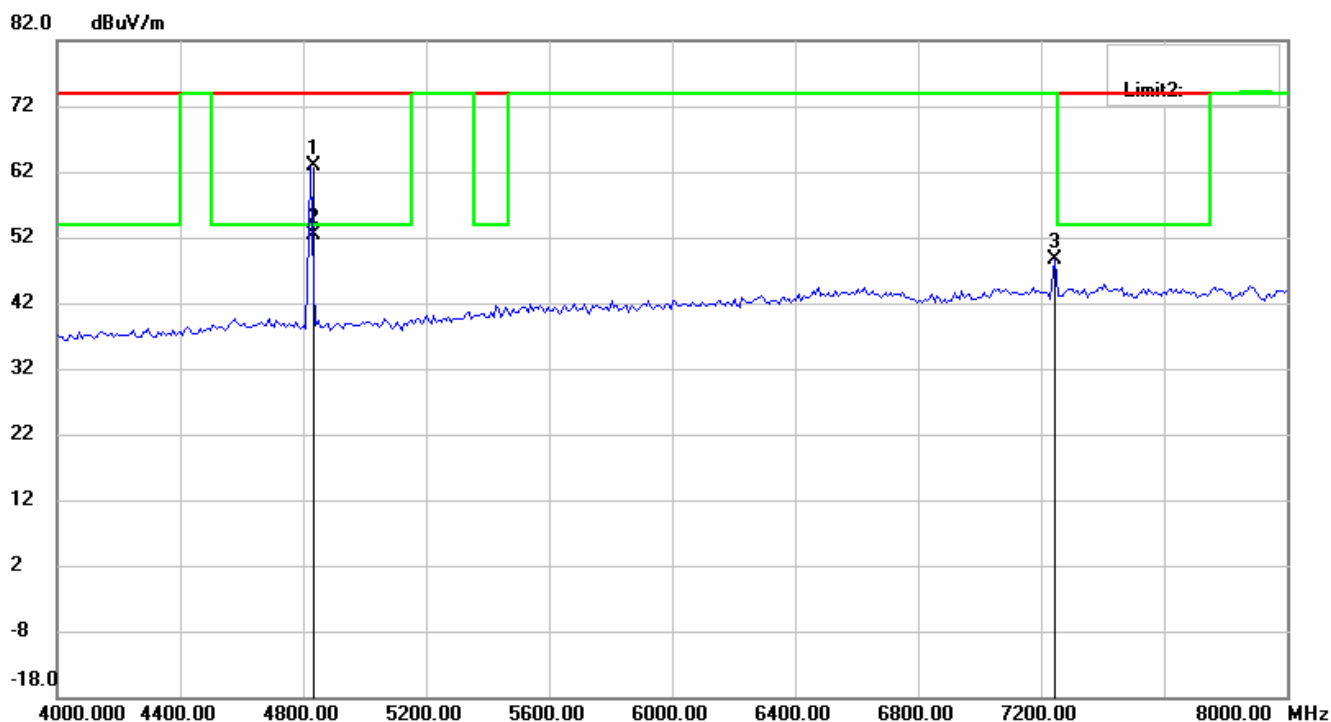
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification 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: W6M20804-9054-P-15

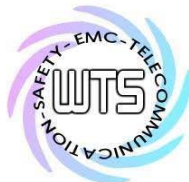
FCC ID: V94-PFA-702



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

Note:

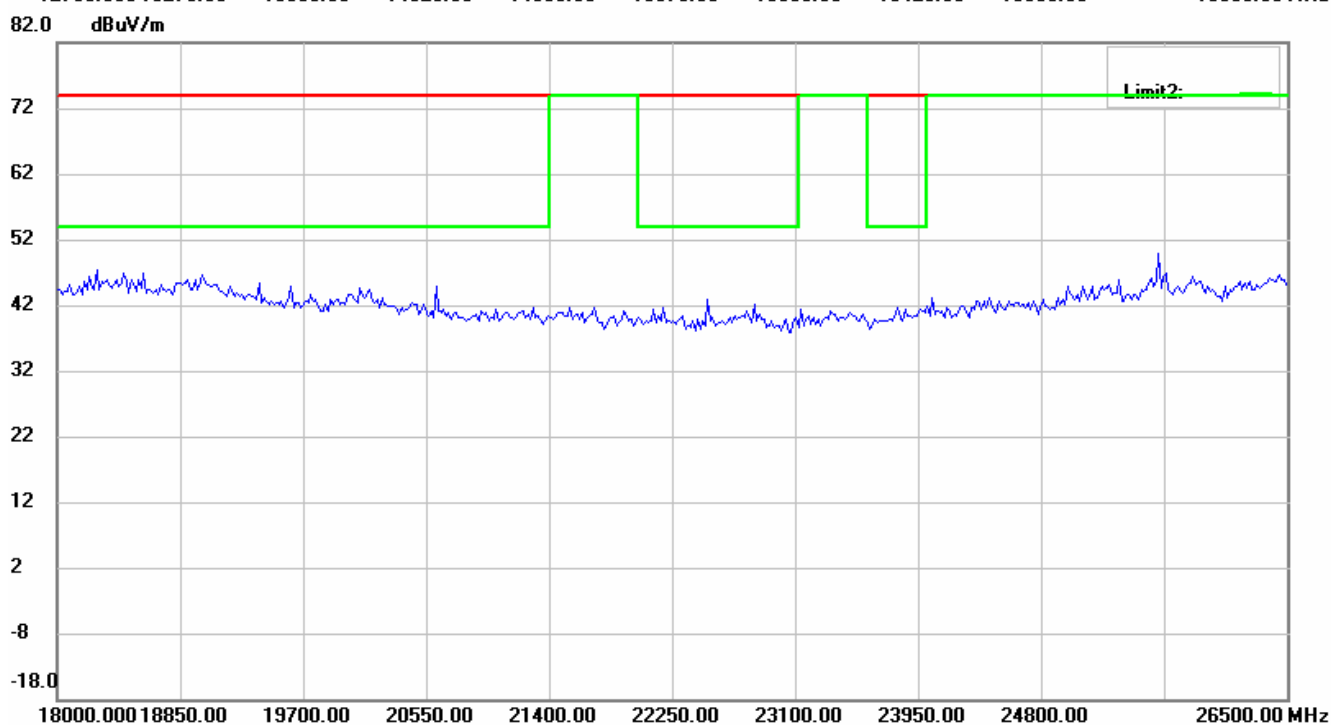
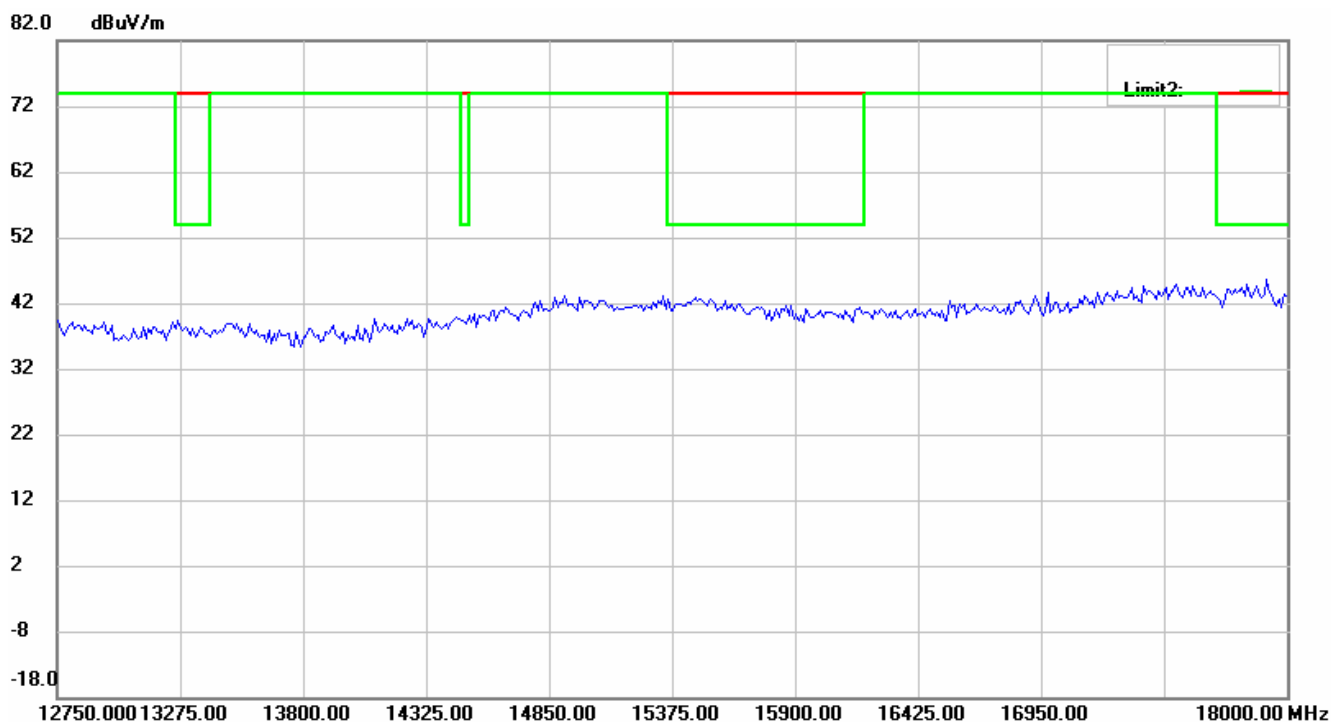
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702



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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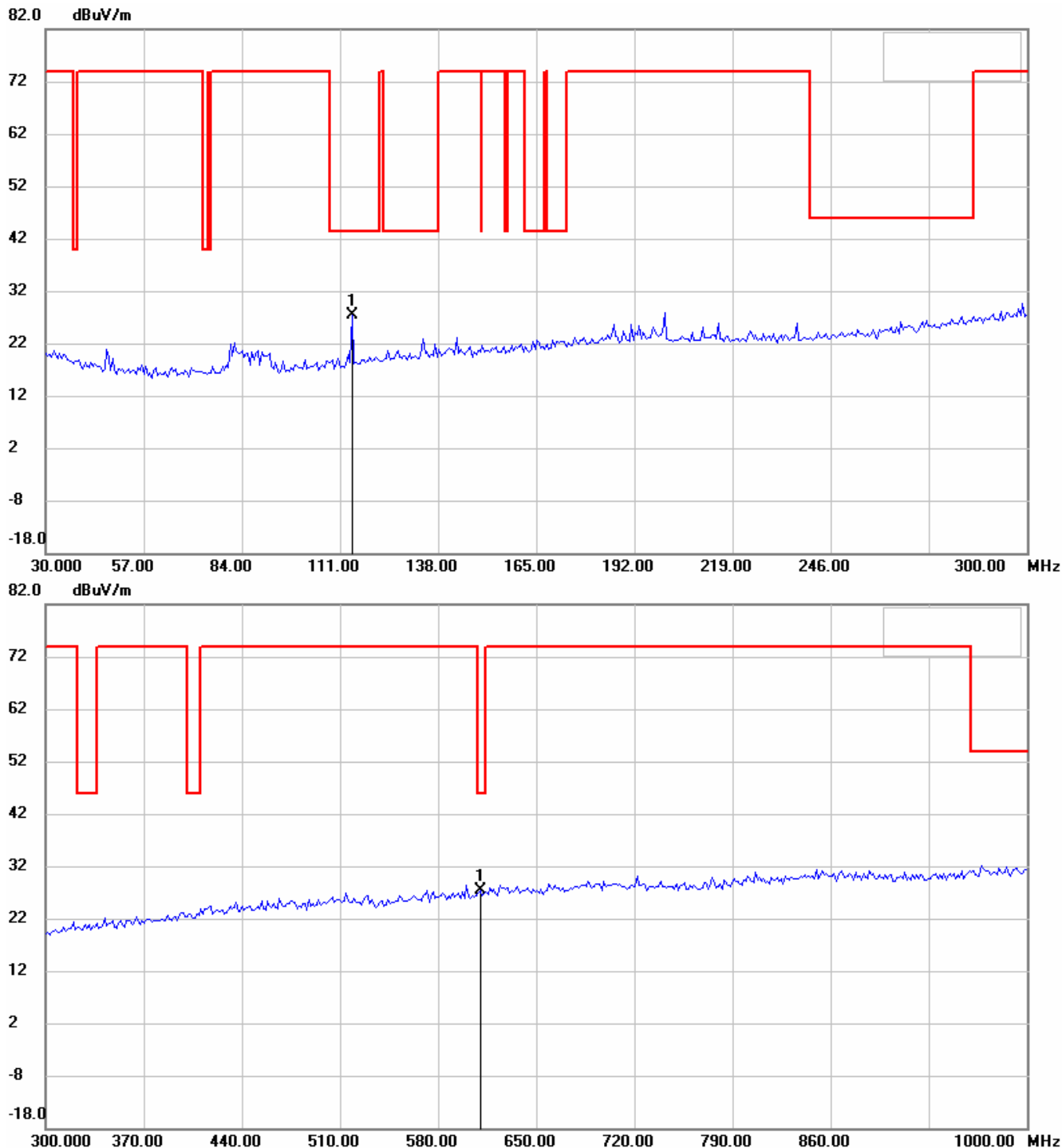


Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

CH 2

Antenna Polarization H



Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

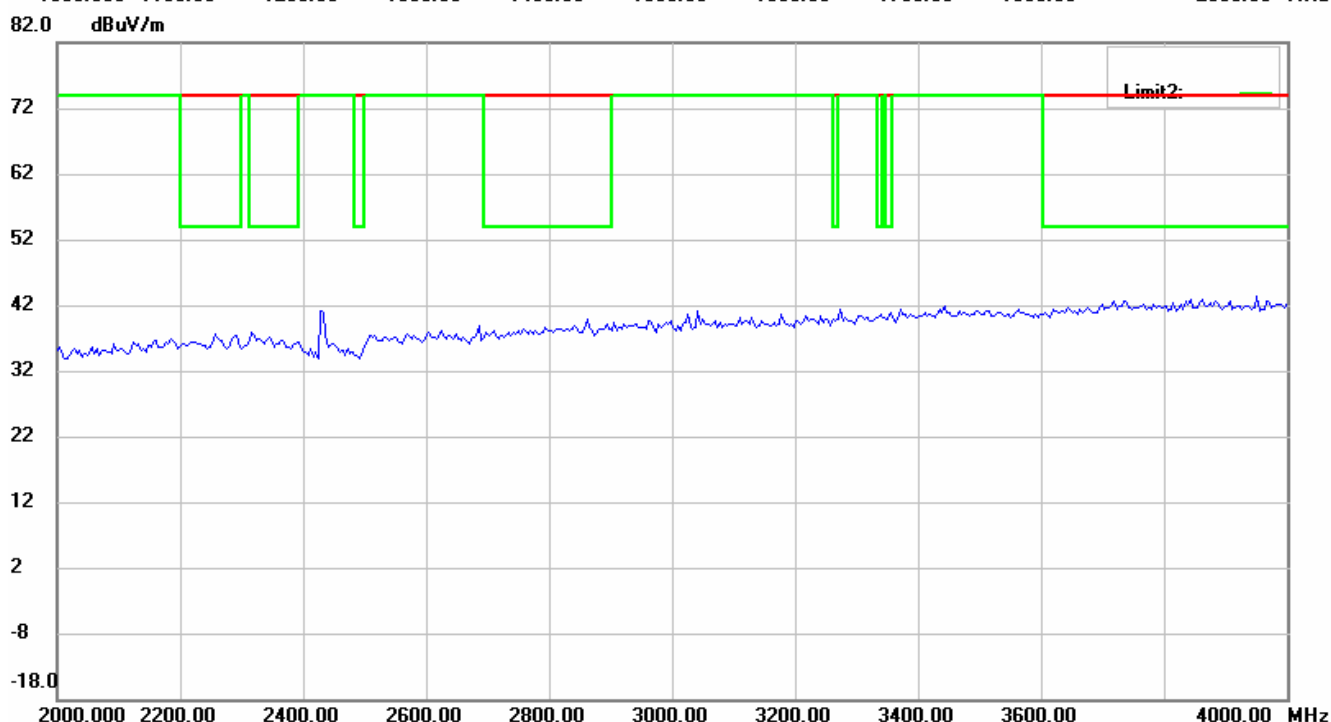
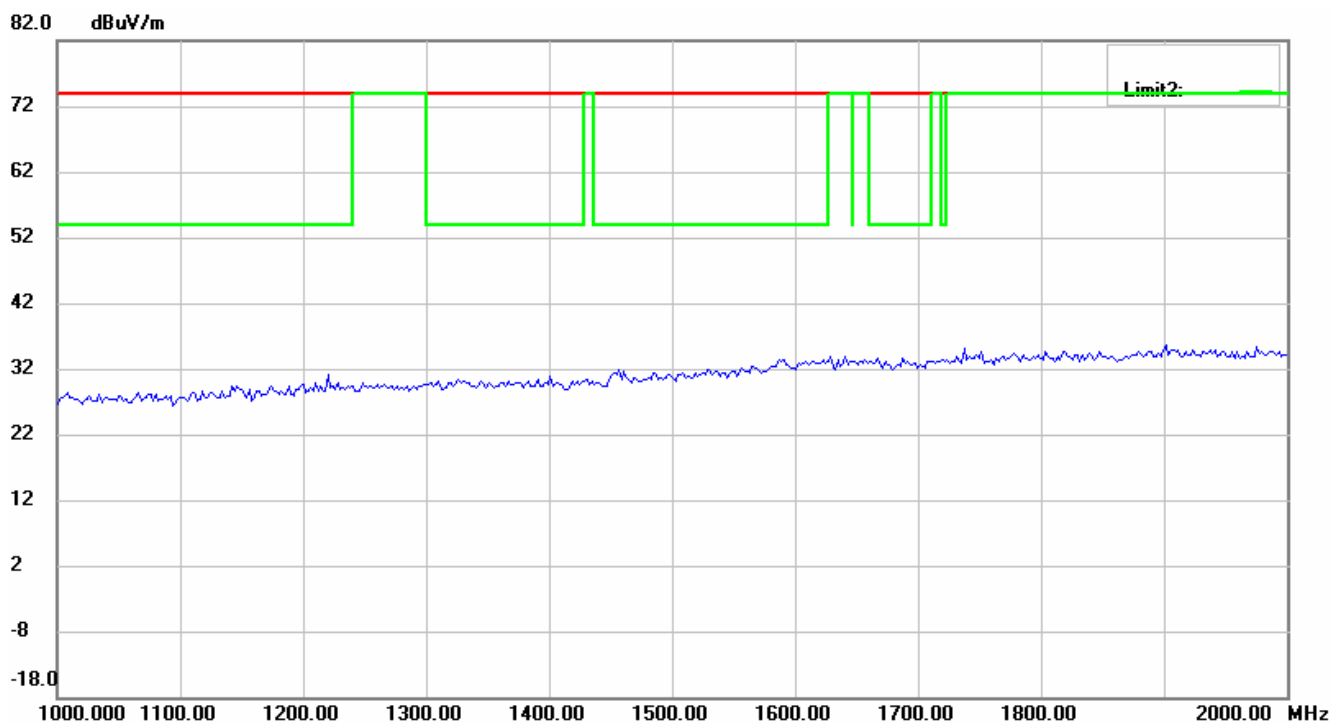
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

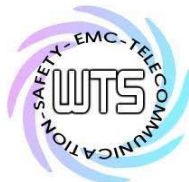


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

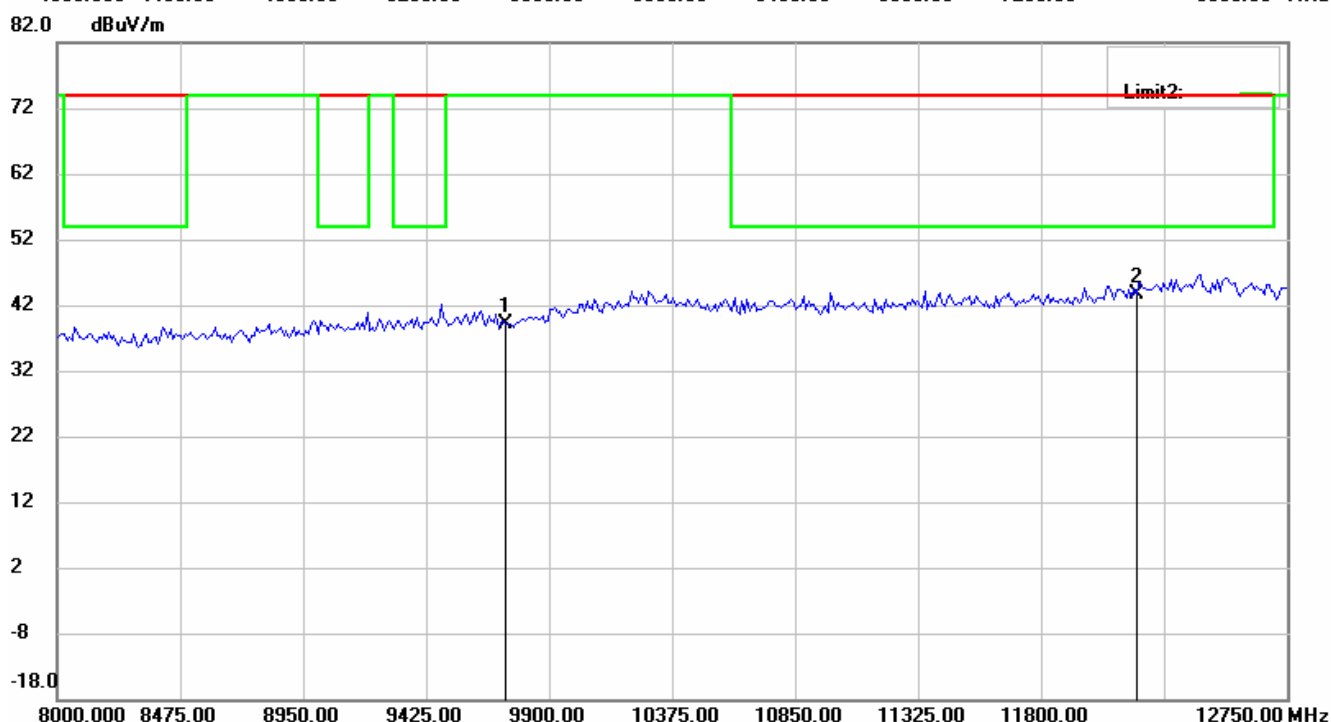
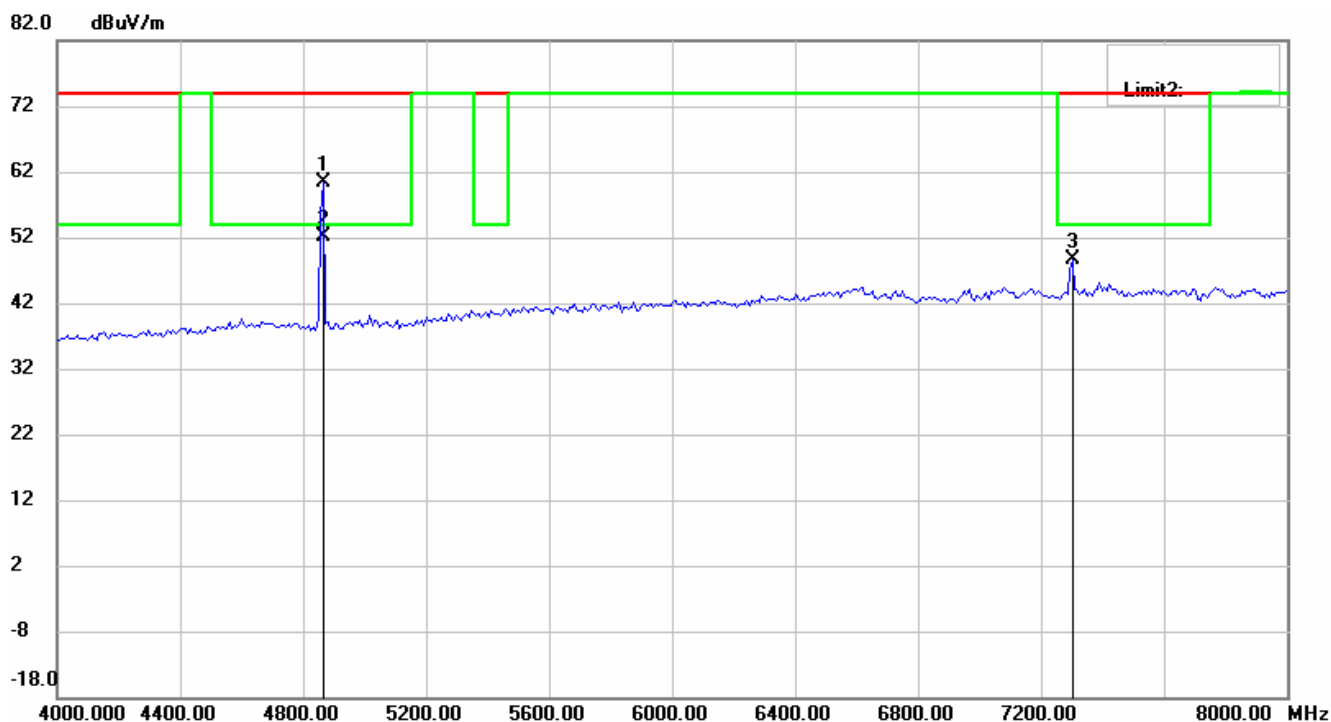
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

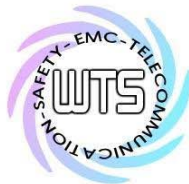
FCC ID: V94-PFA-702



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

Note:

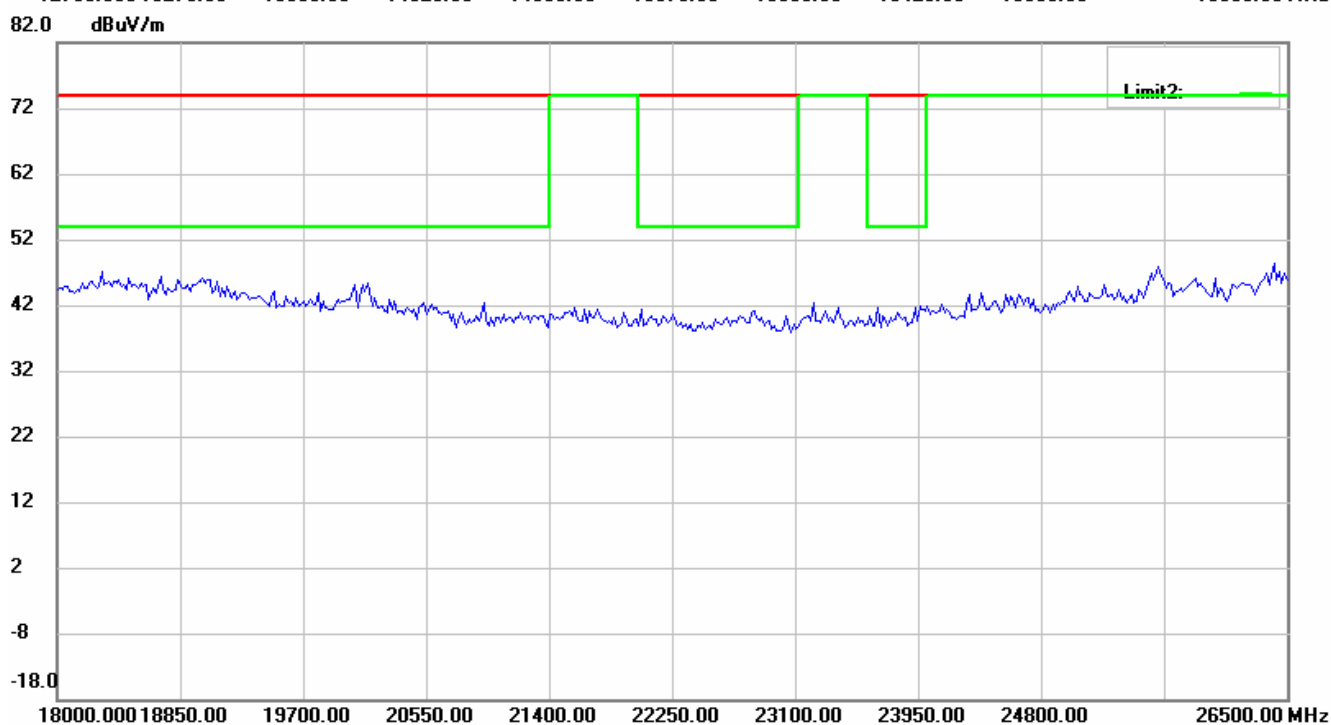
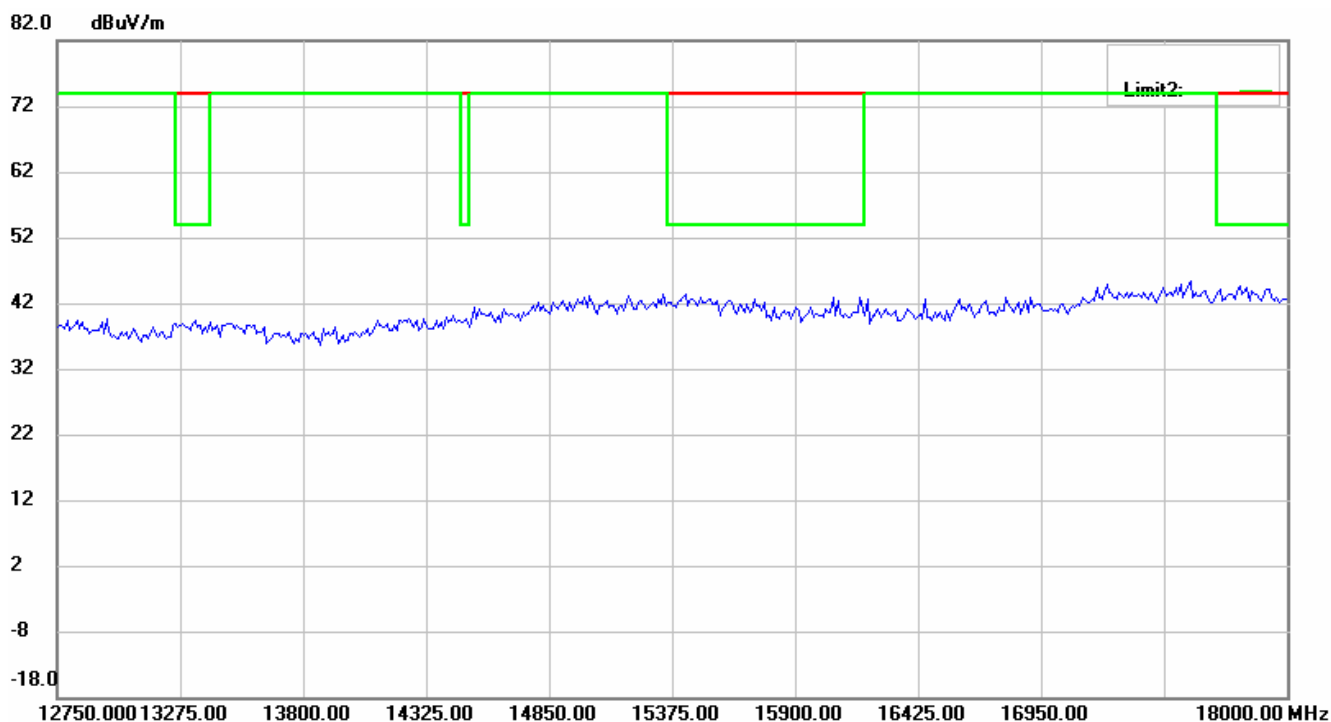
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

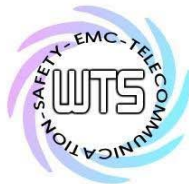


Up Line: Peak Limit Line

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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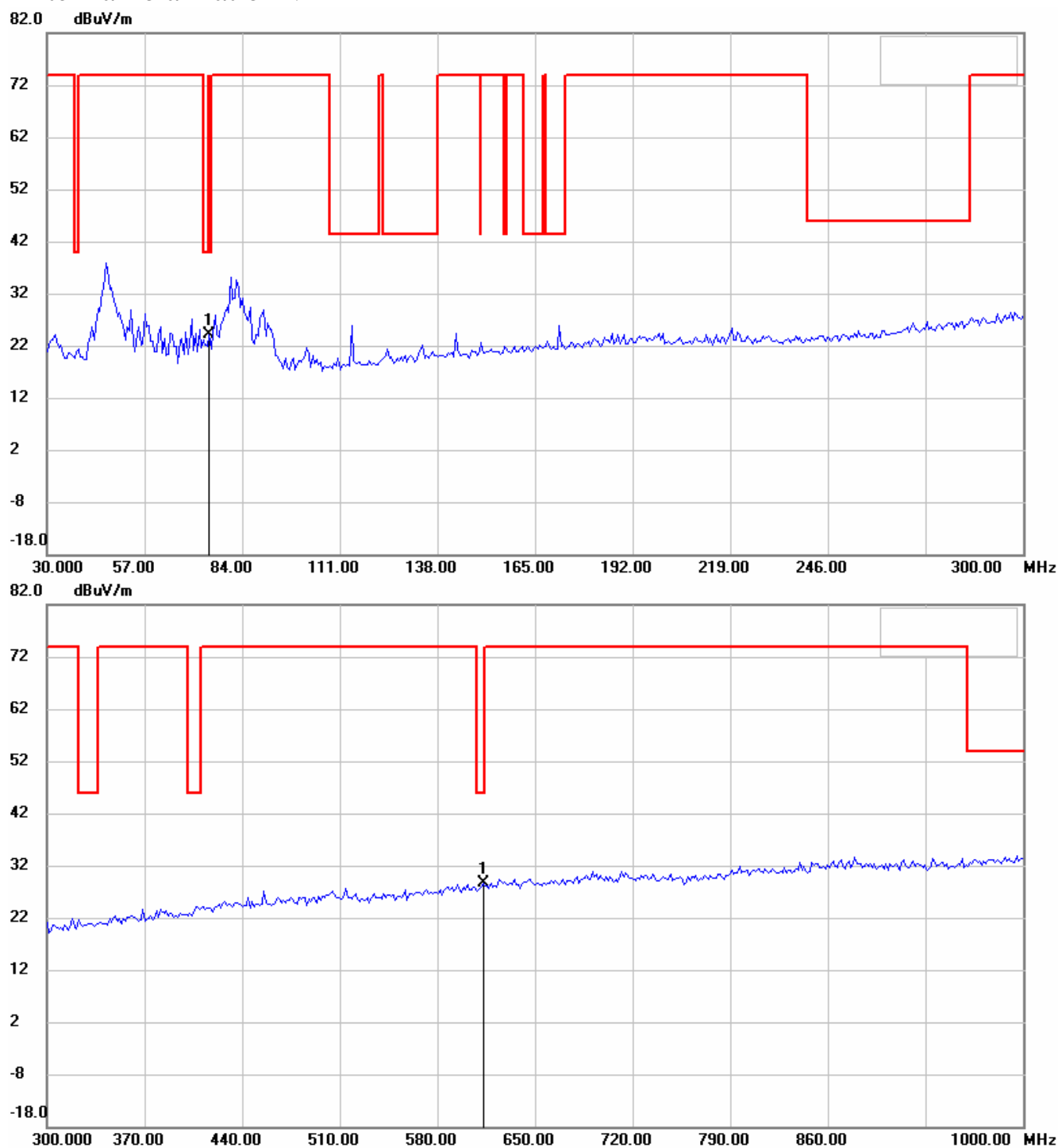


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

Antenna Polarization V

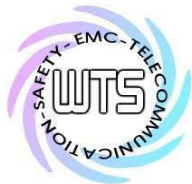


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

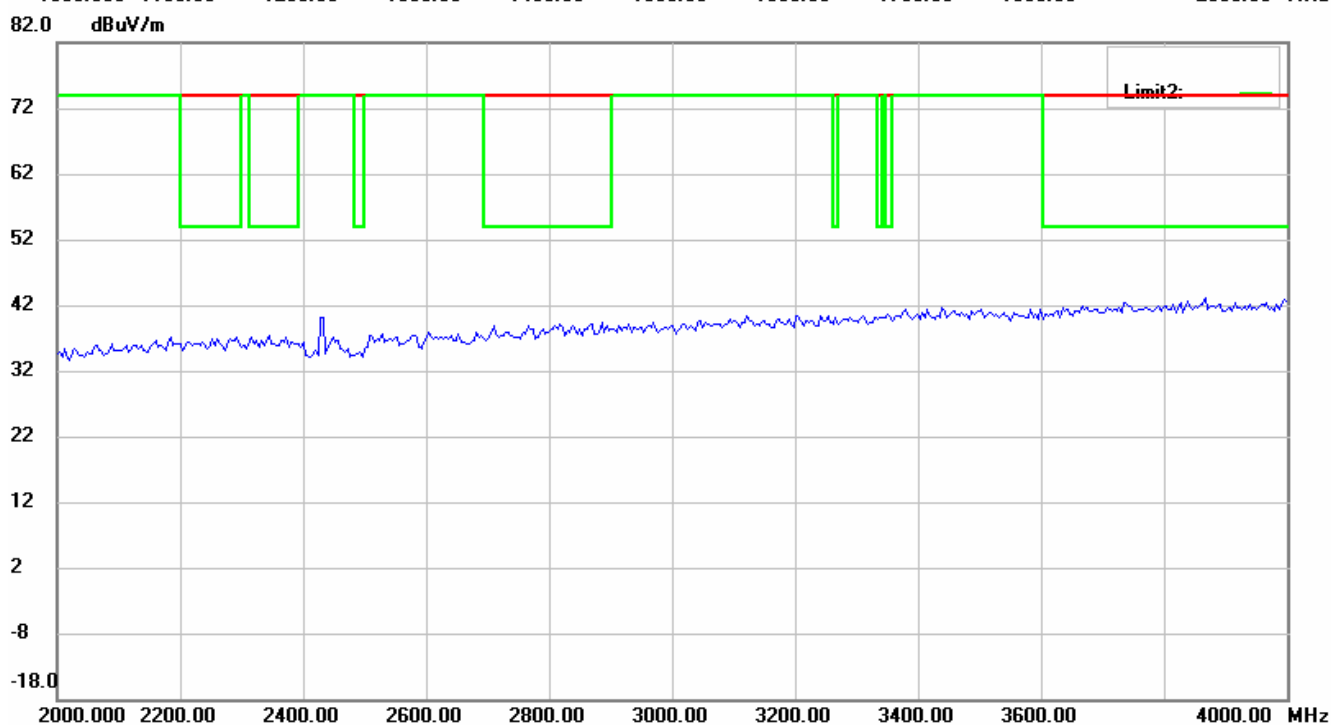
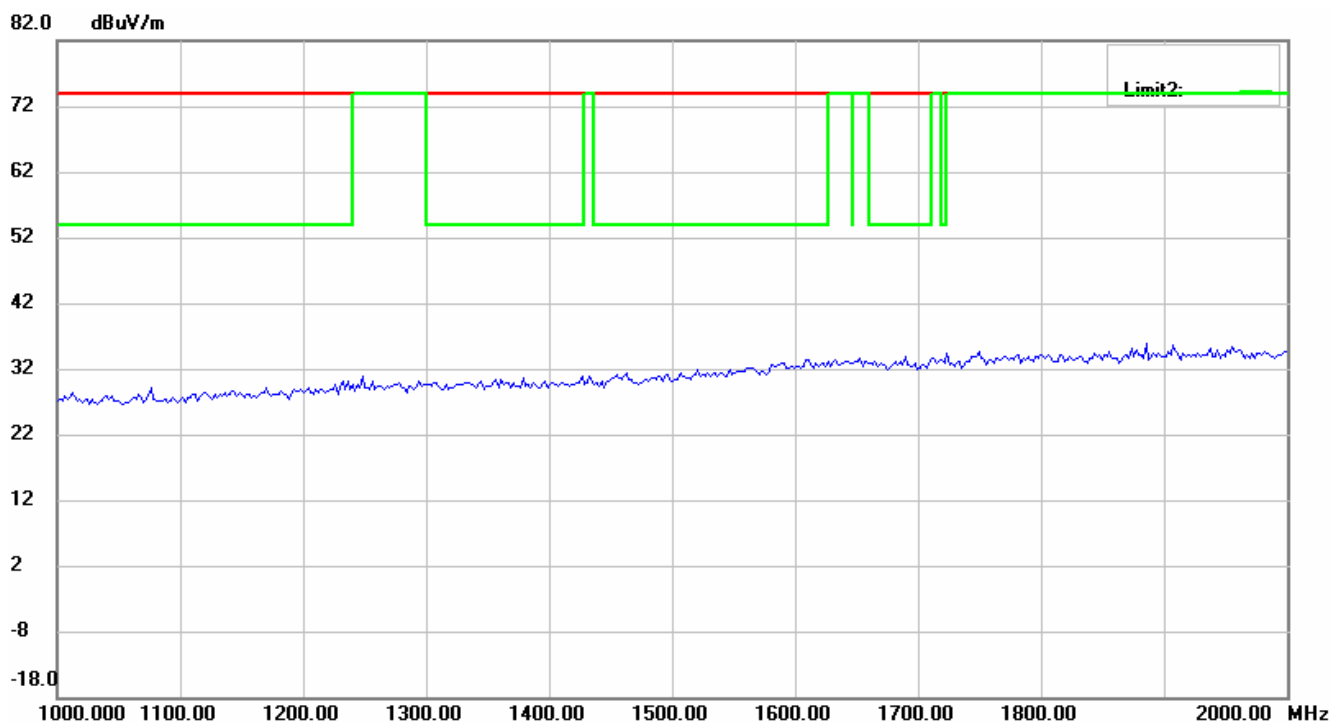
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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3. For corrected test results are listed in the relevant table of radiated test data of this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



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

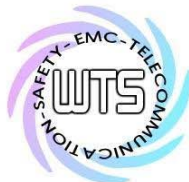


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

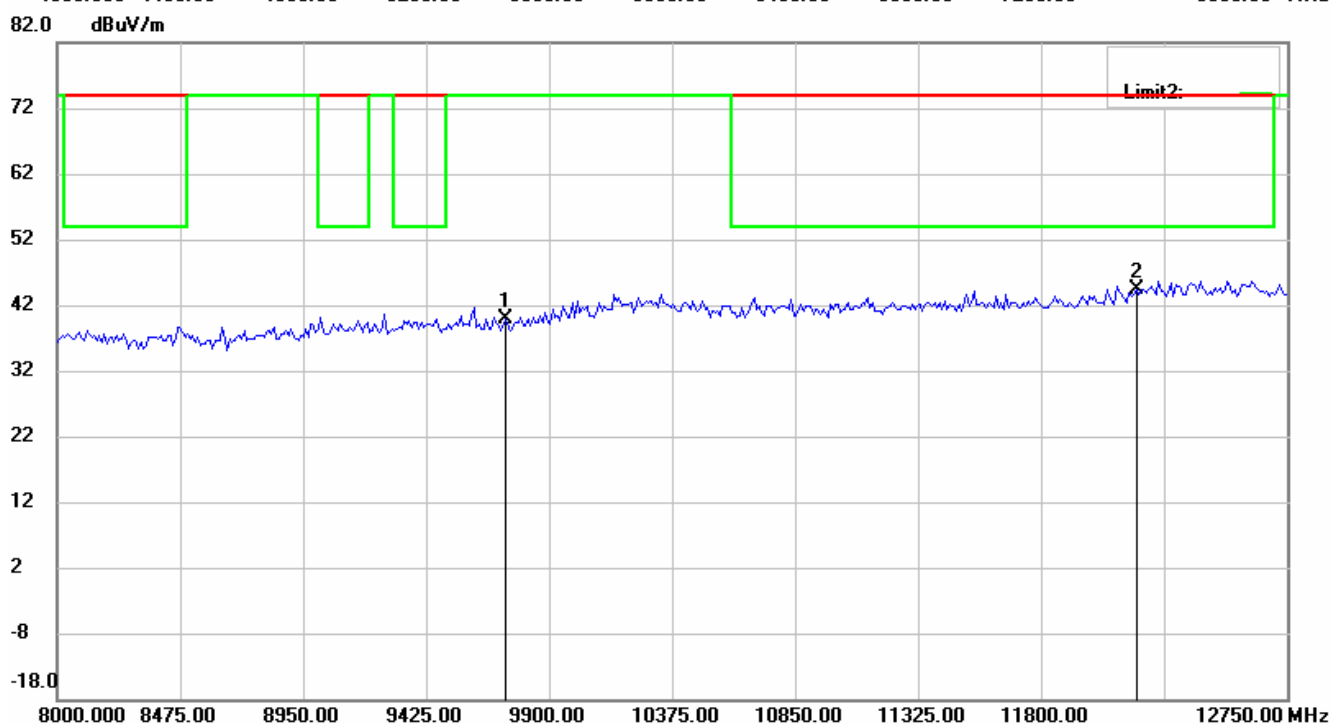
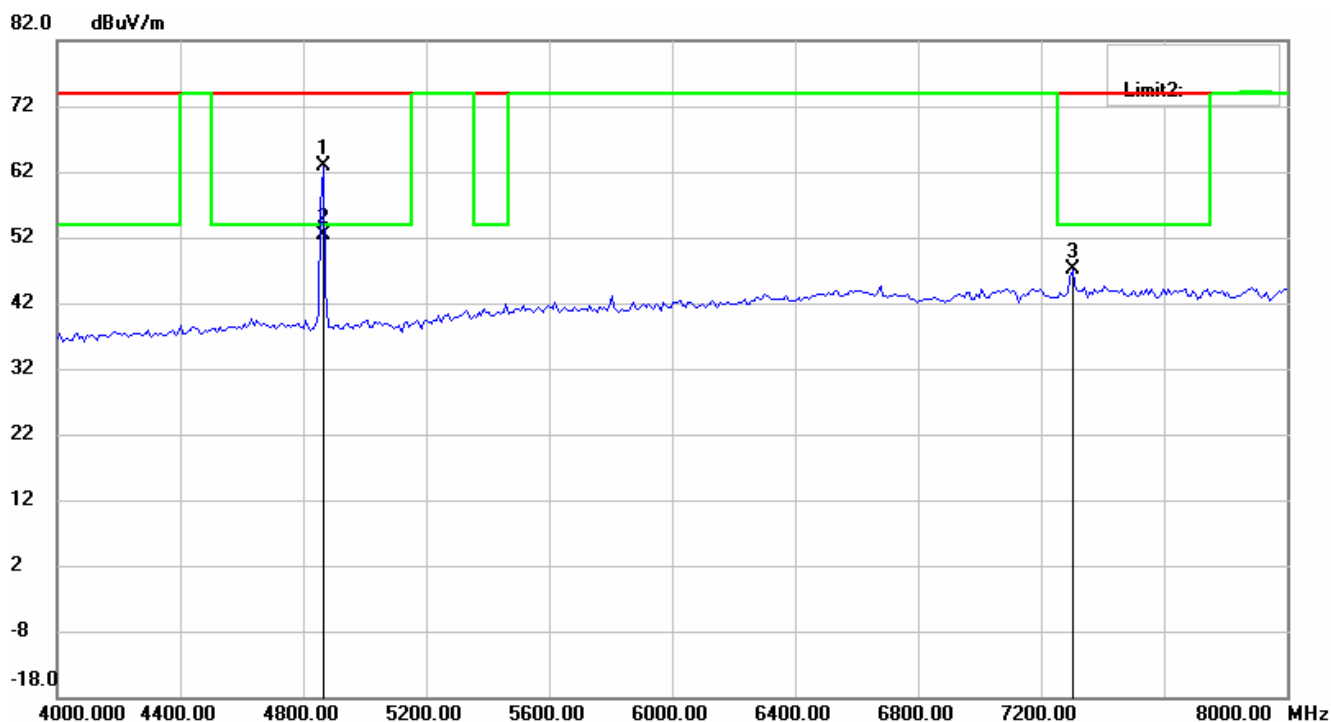
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M20804-9054-P-15

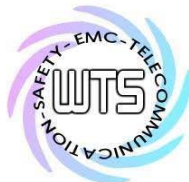
FCC ID: V94-PFA-702



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

Note:

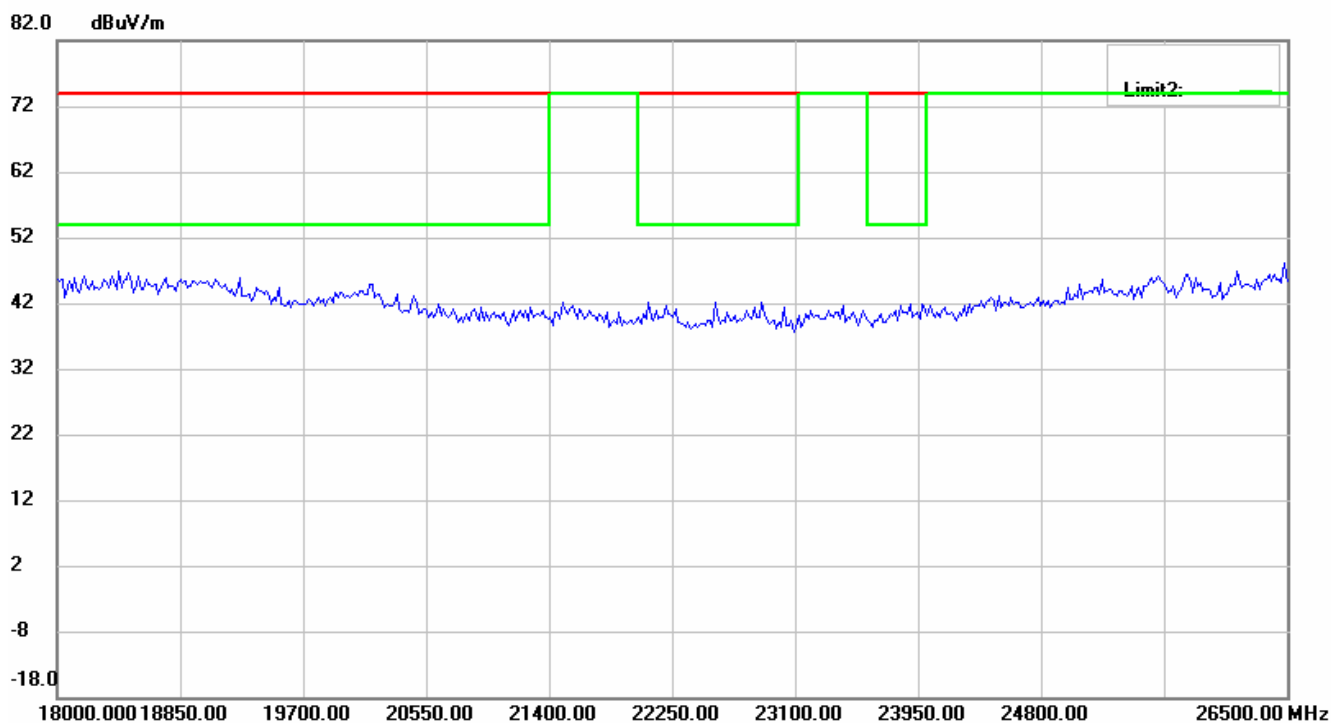
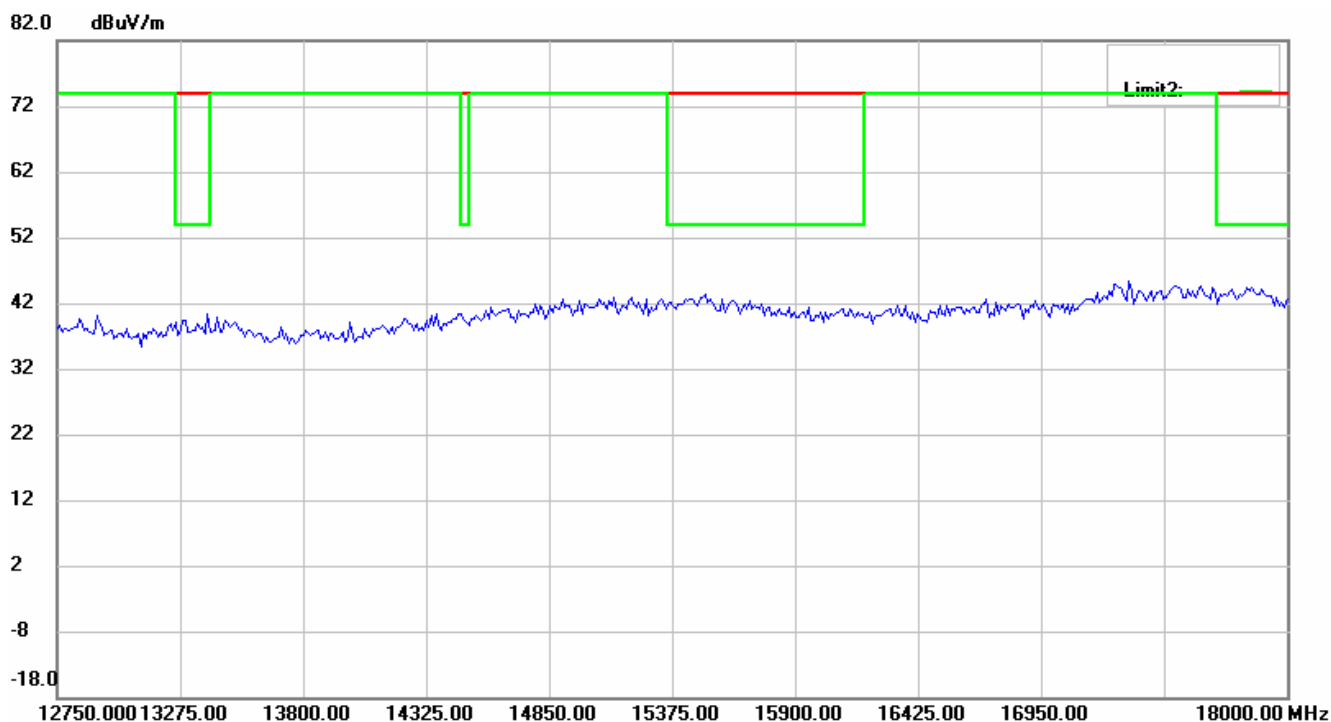
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702



Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

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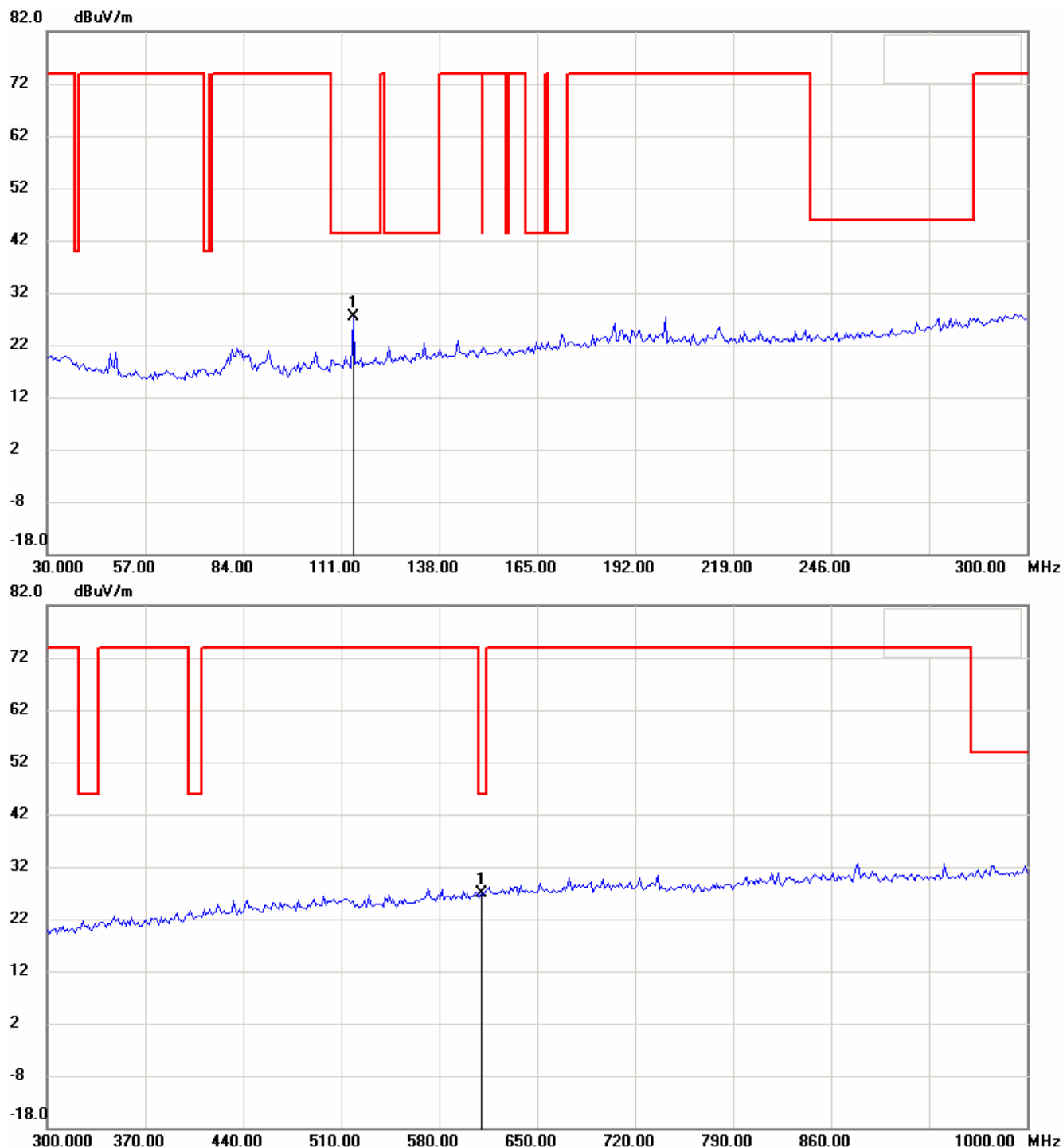


Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

CH 4

Antenna Polarization H

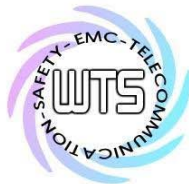


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

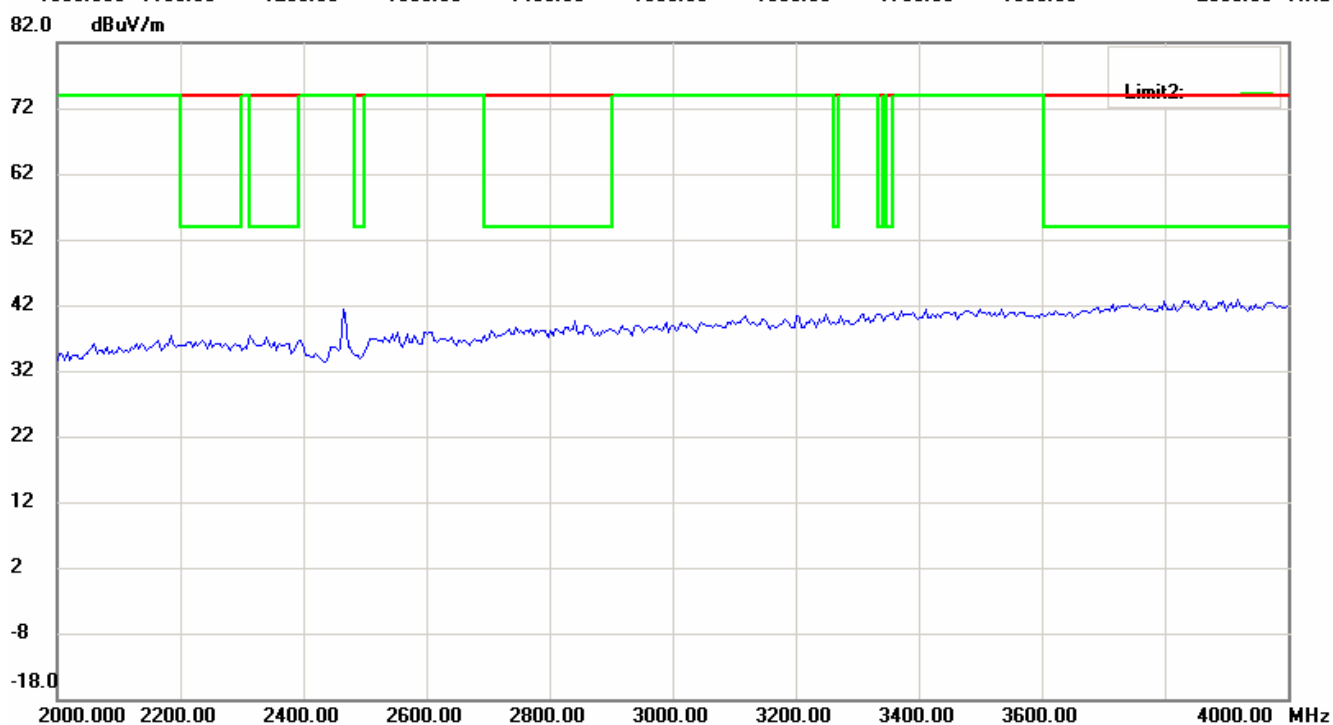
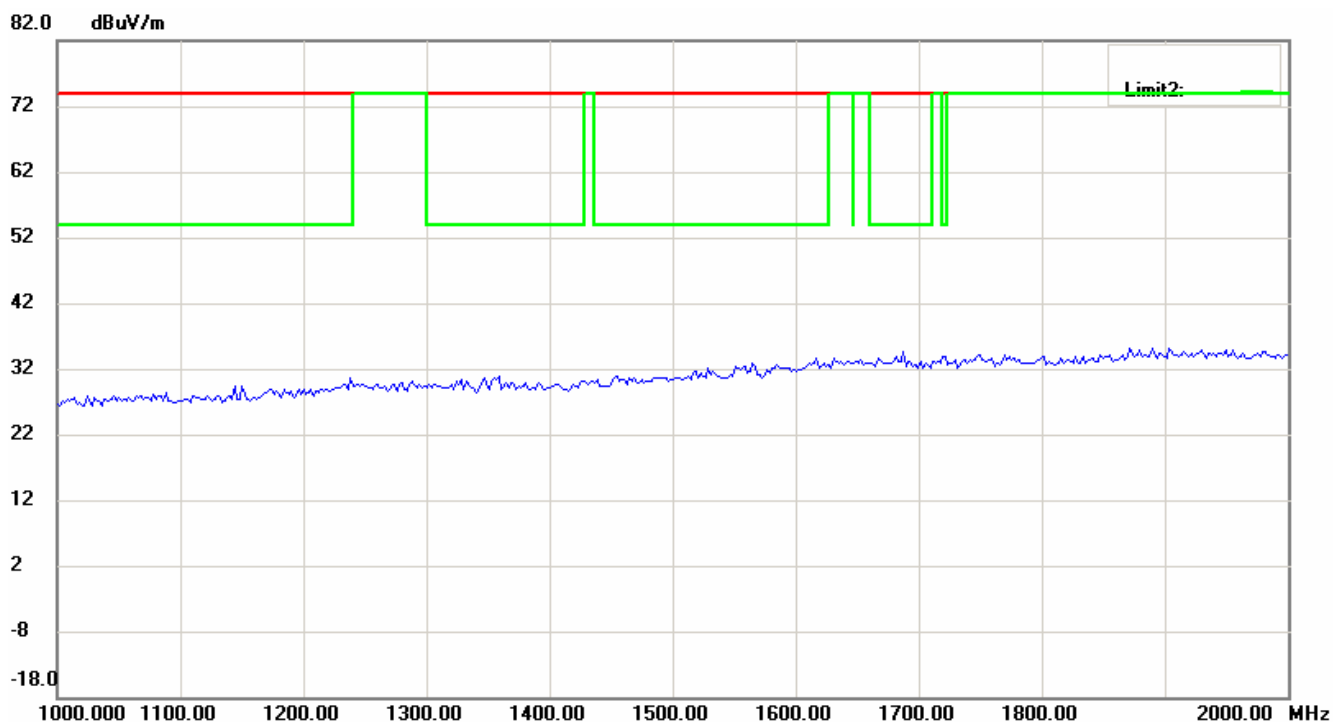
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

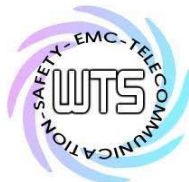


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

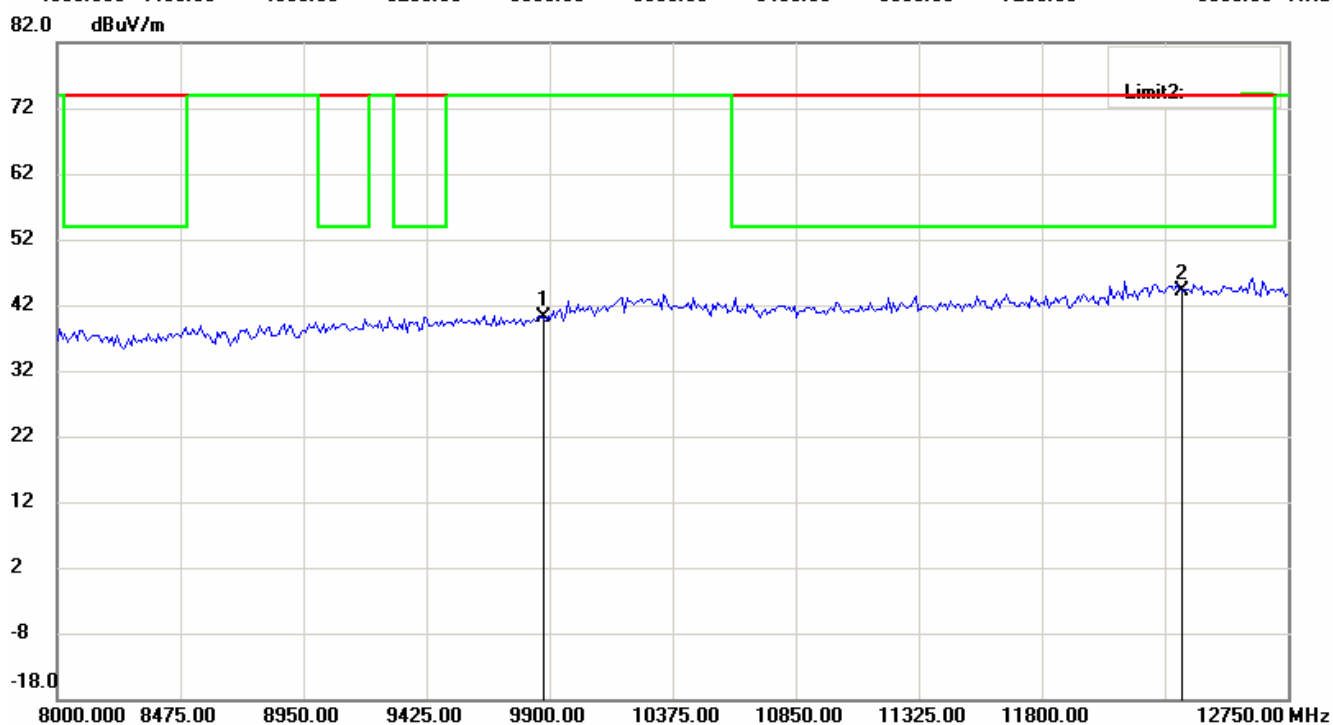
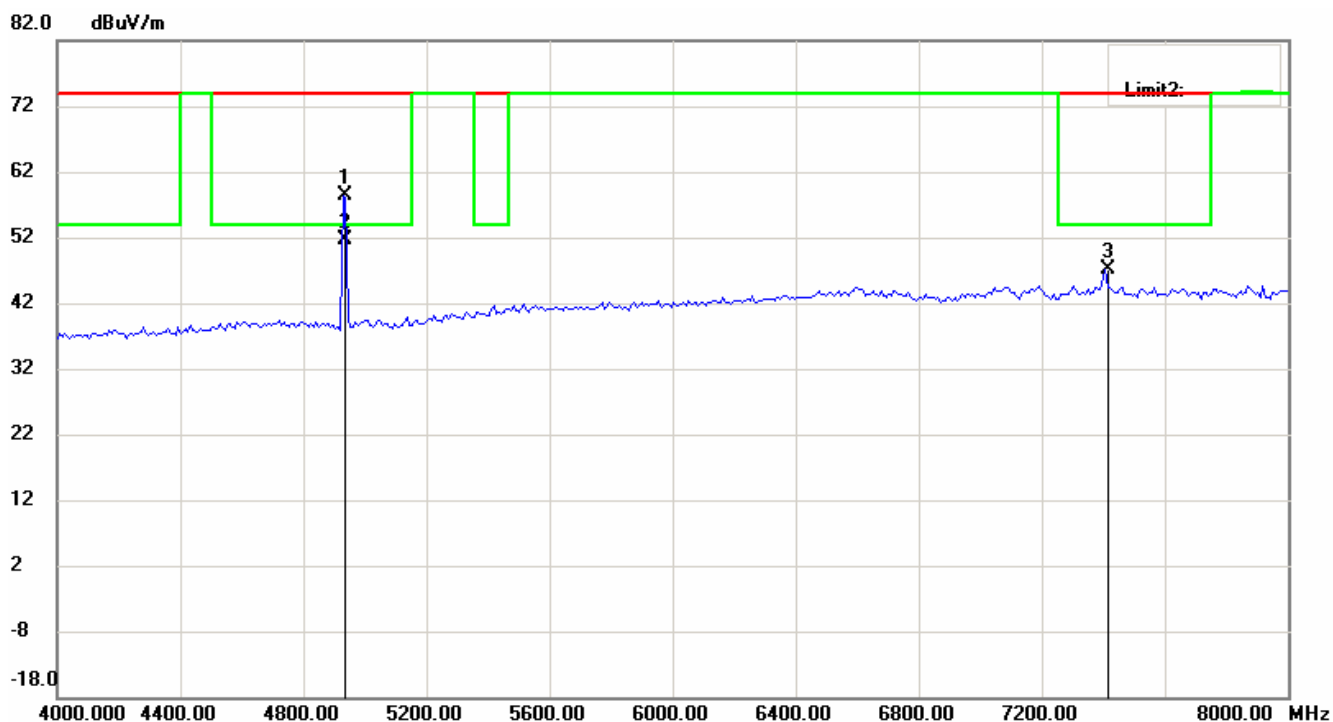
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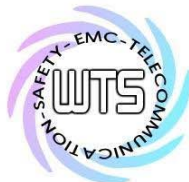


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

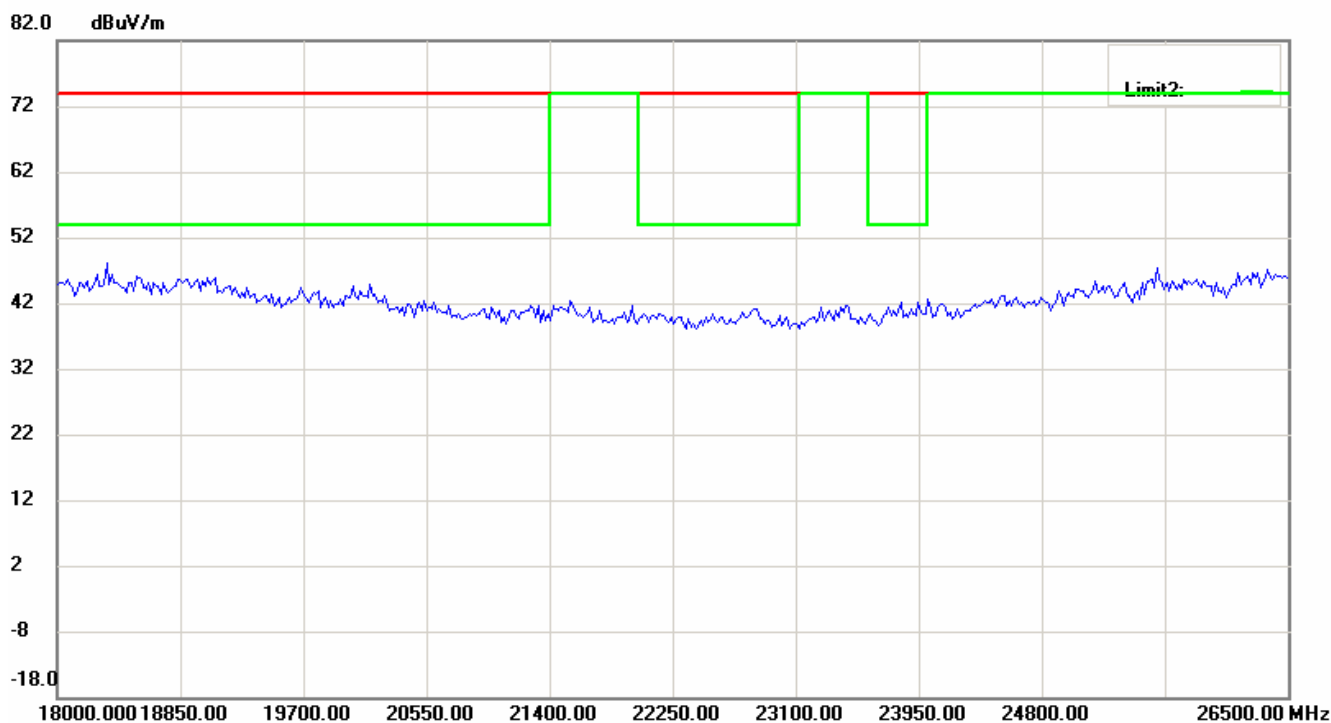
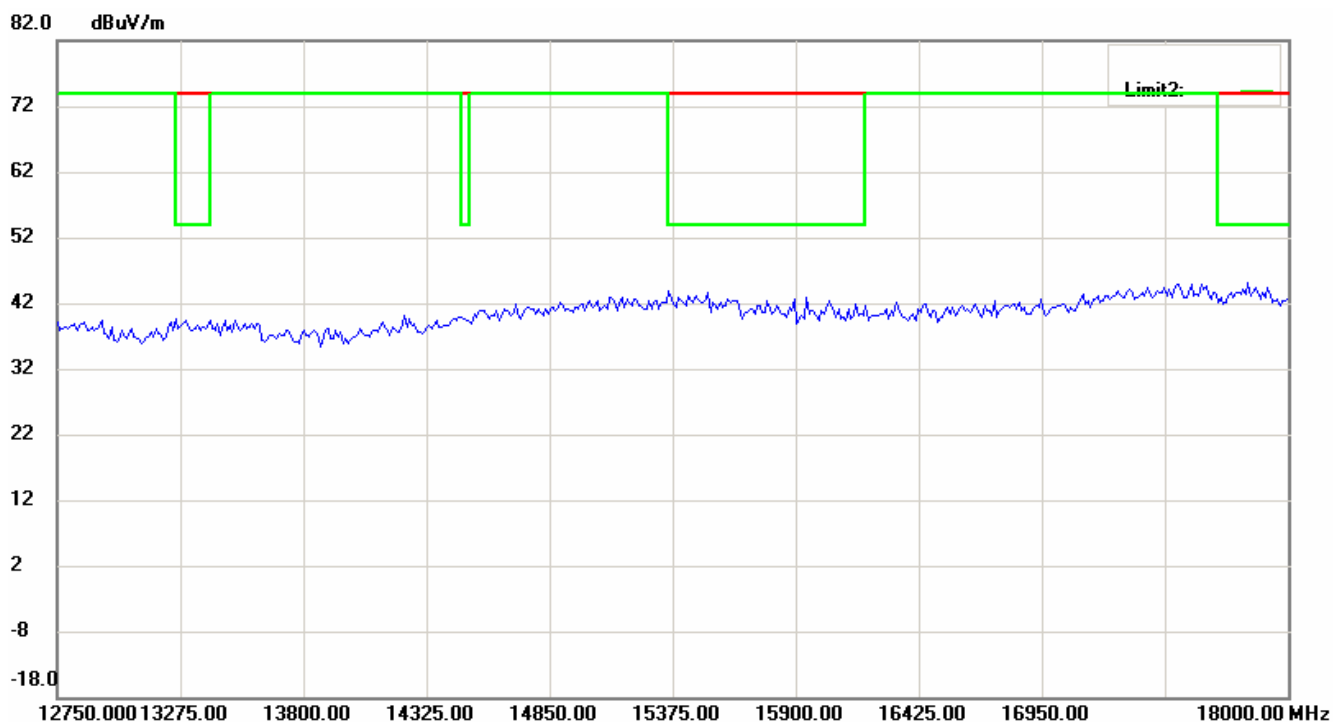
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FCC ID: V94-PFA-702

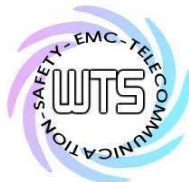


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

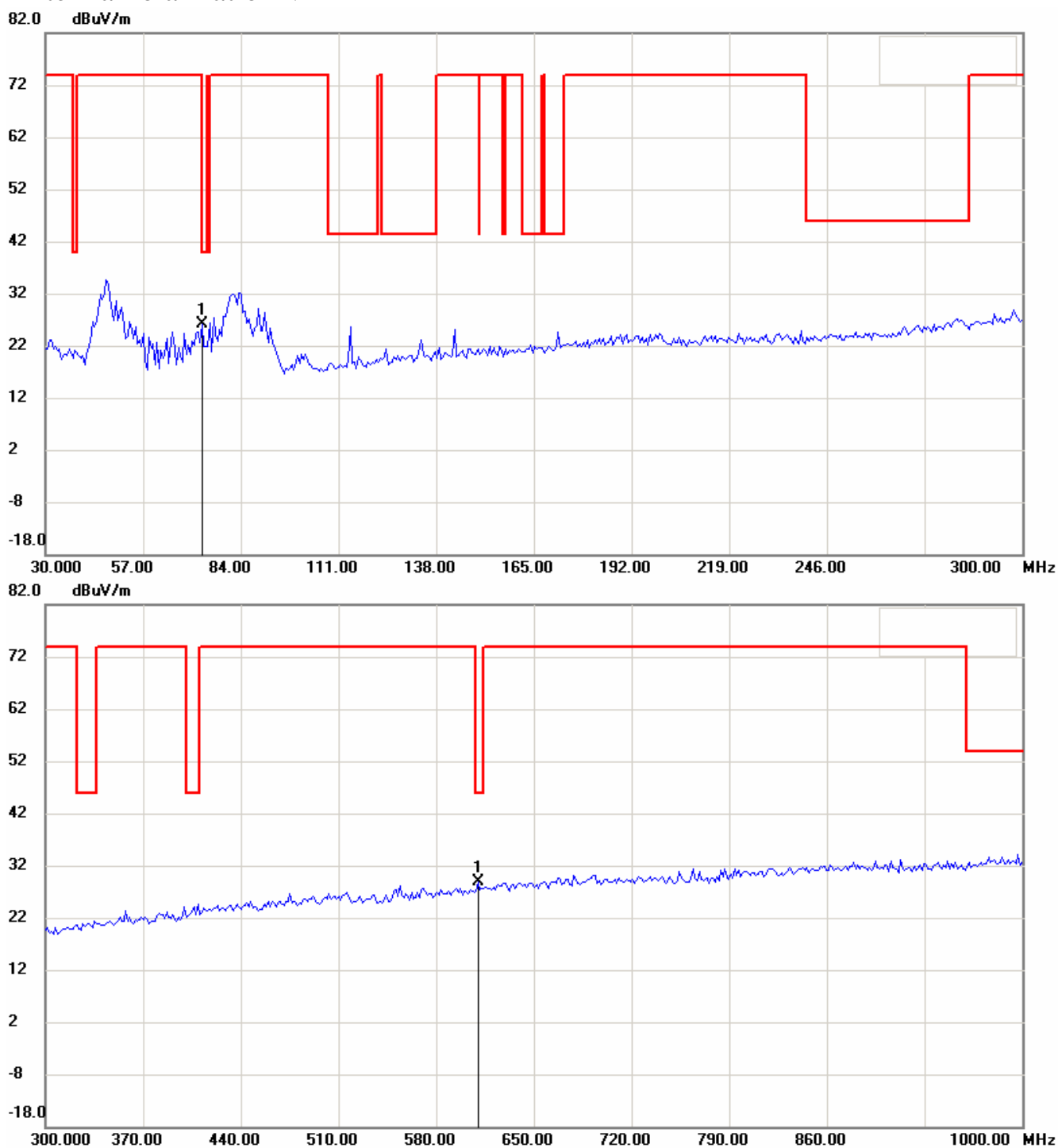
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Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

Antenna Polarization V

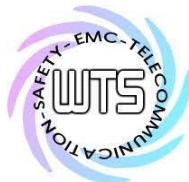


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

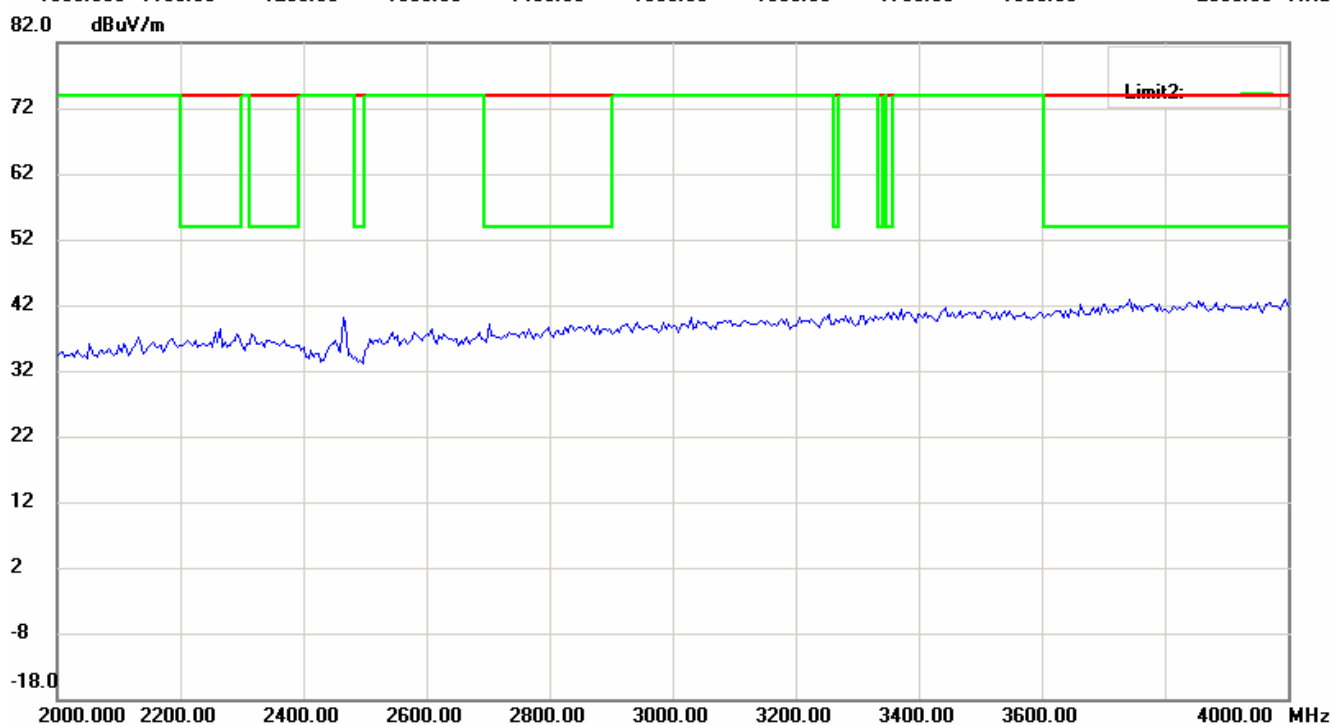
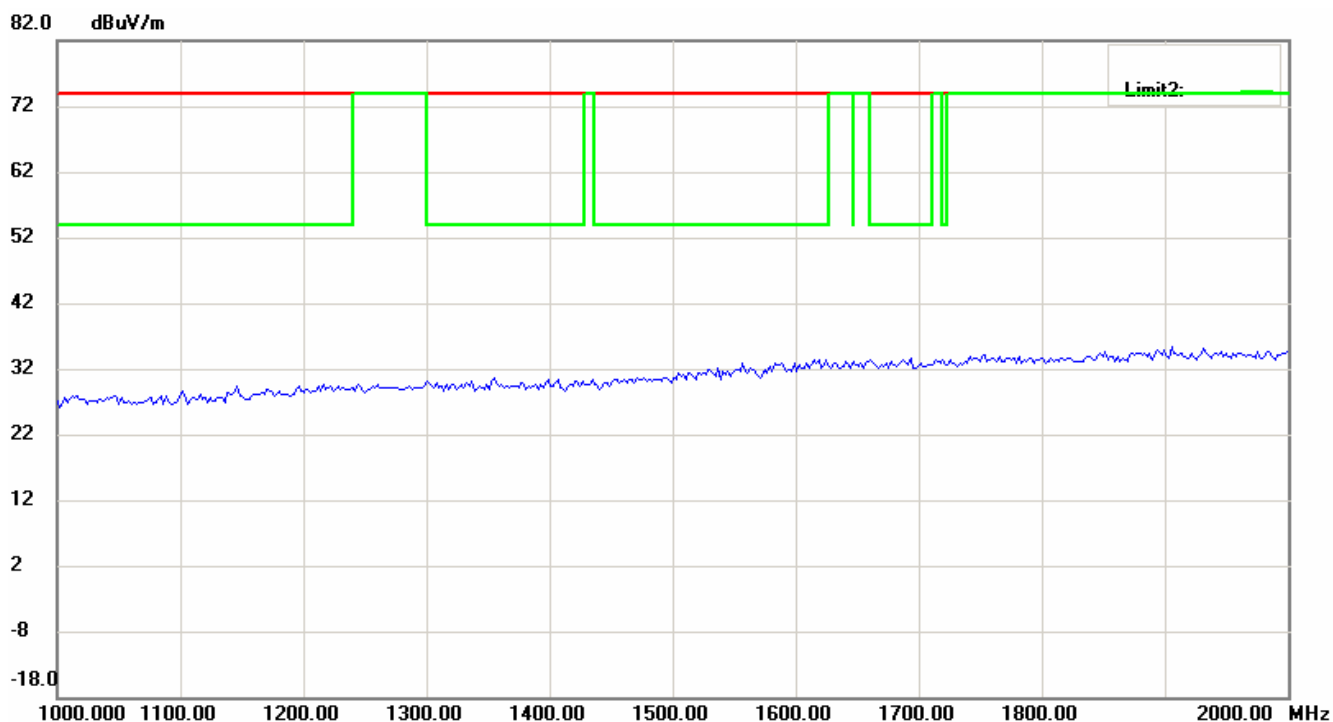
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Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

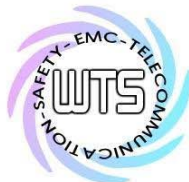


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

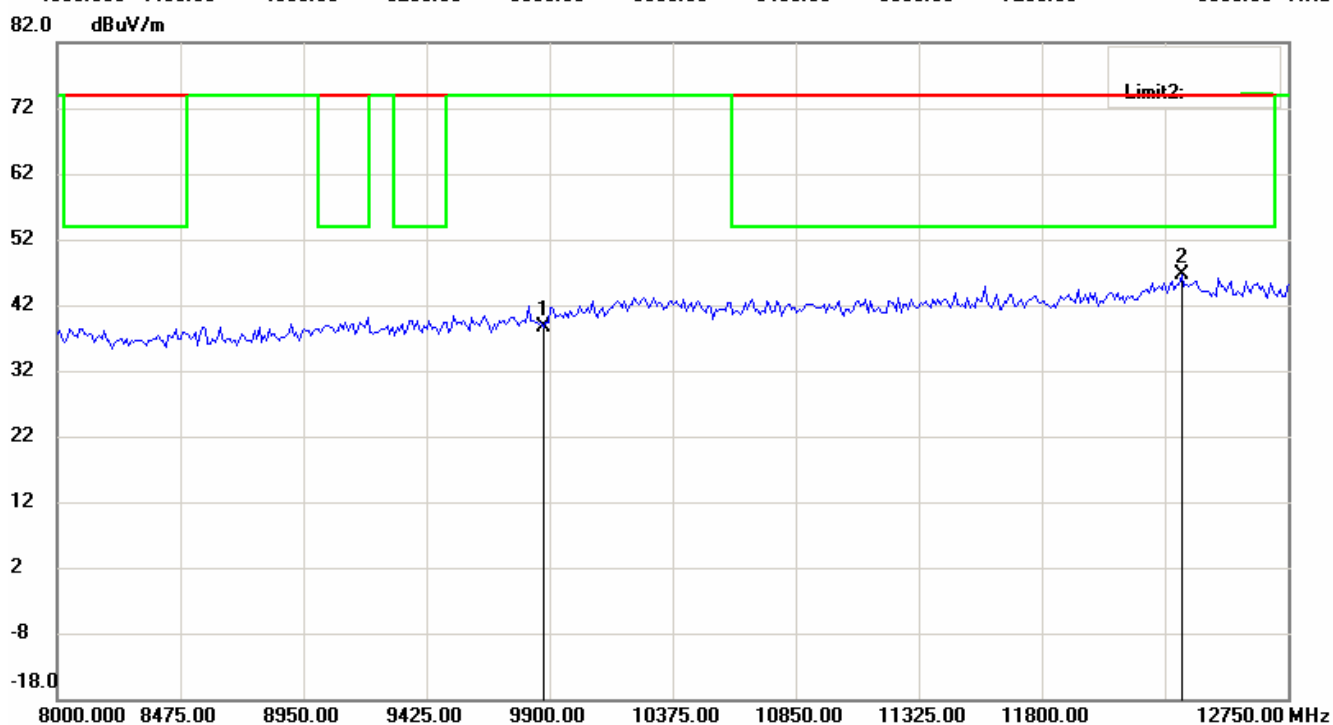
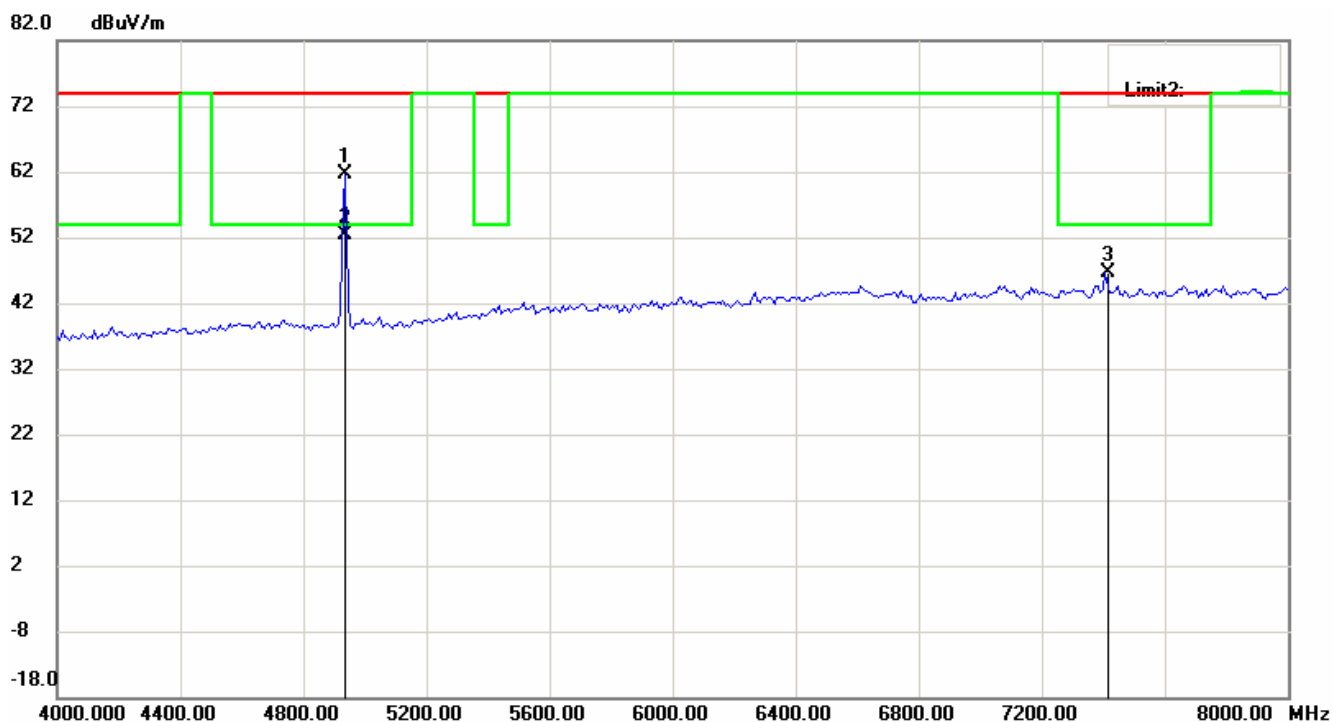
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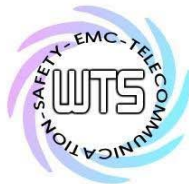


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

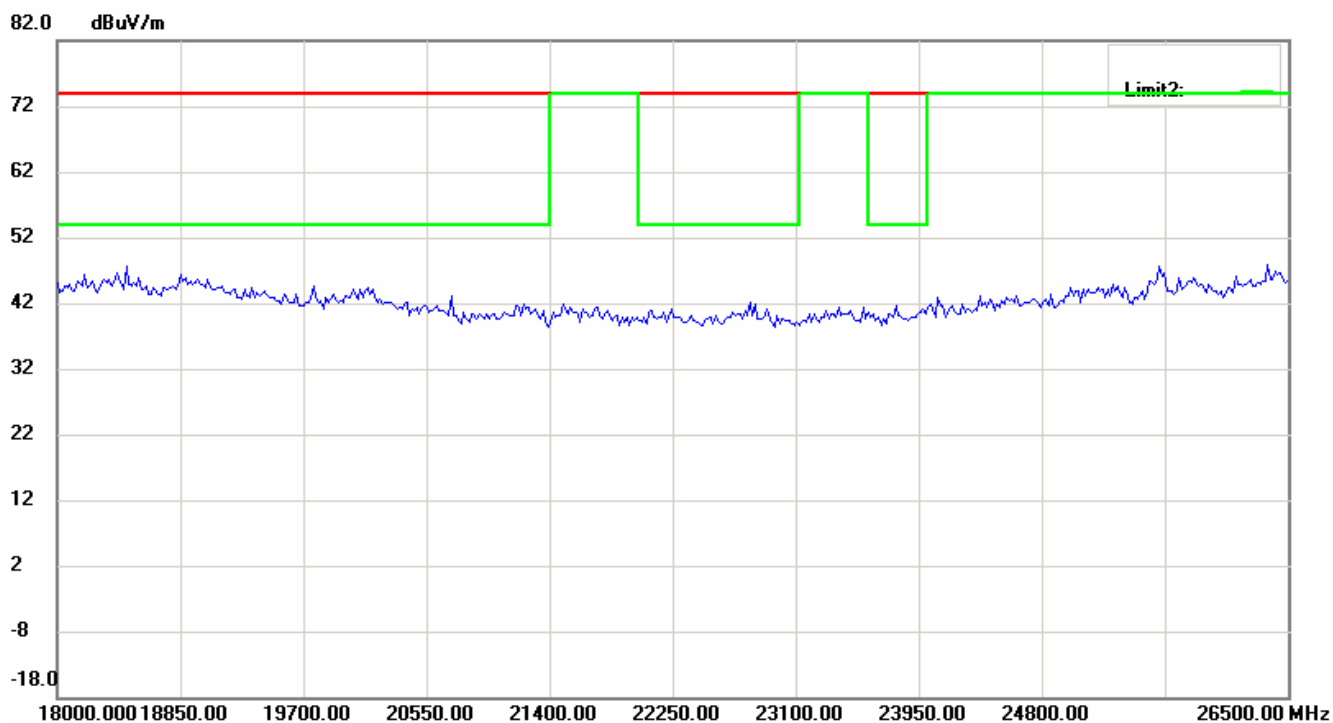
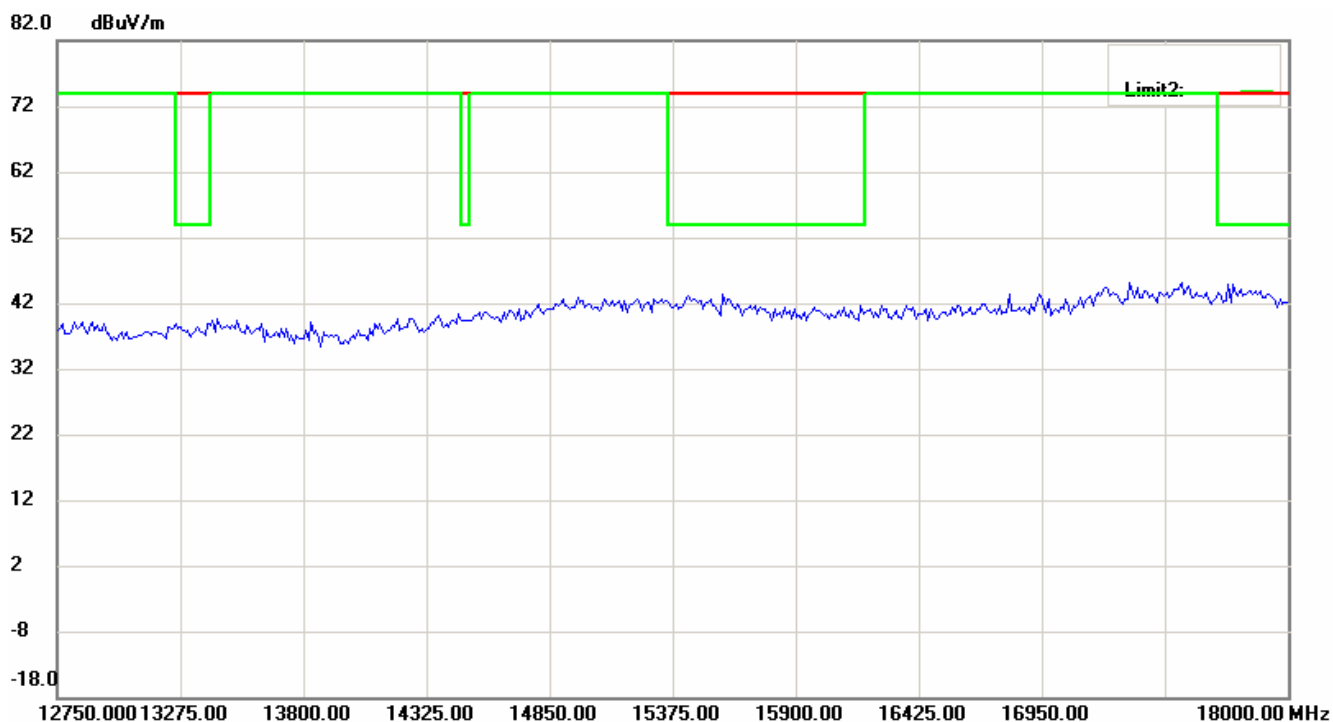
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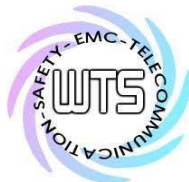


Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

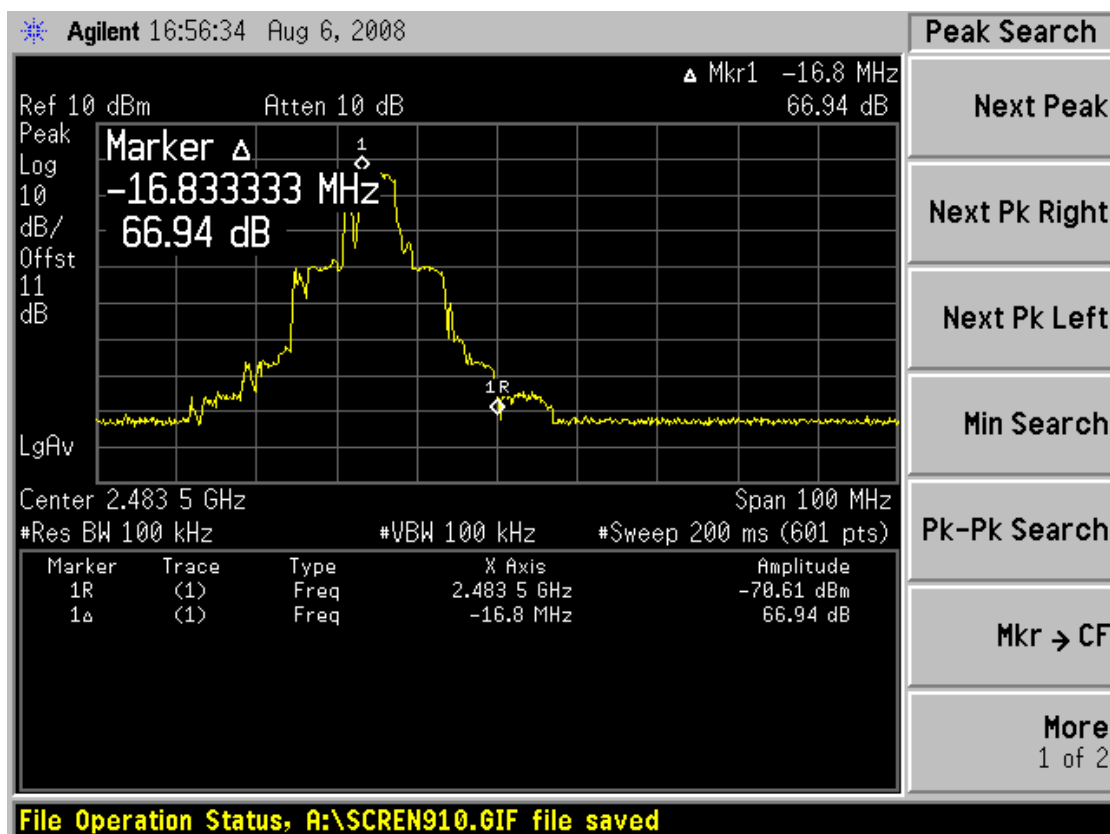
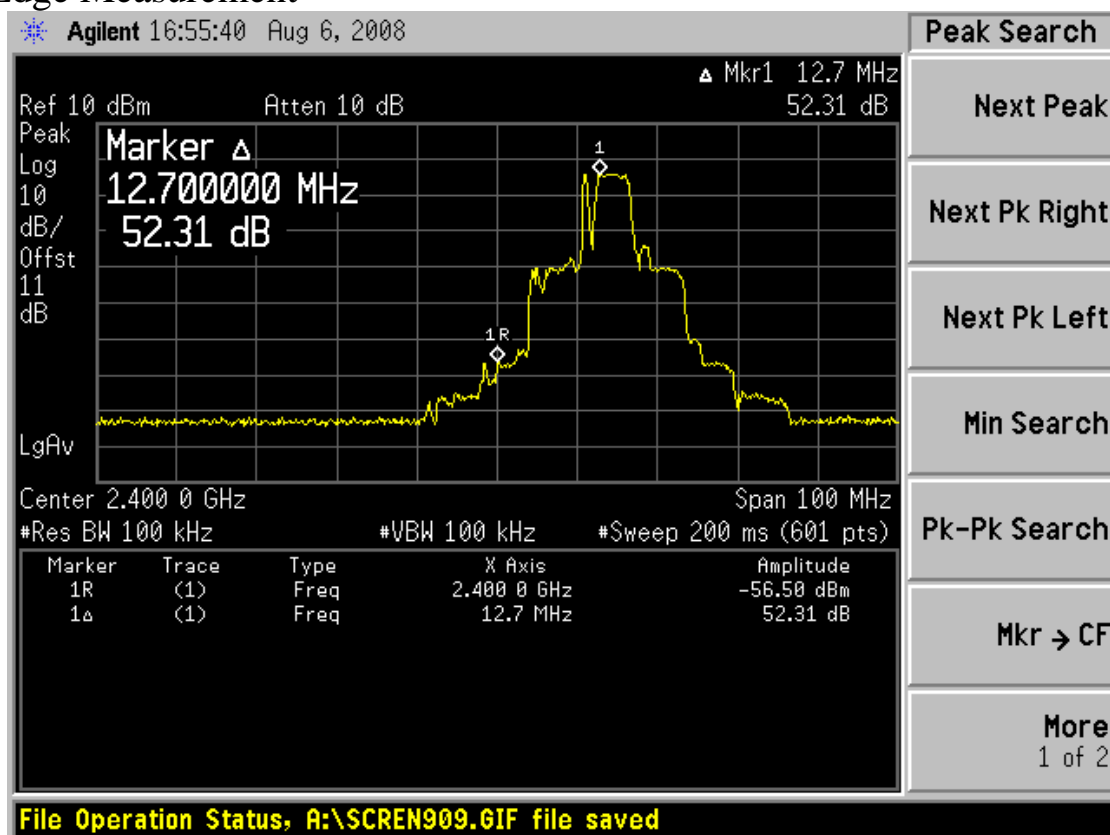
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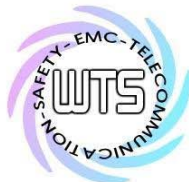


Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

Band Edge Measurement

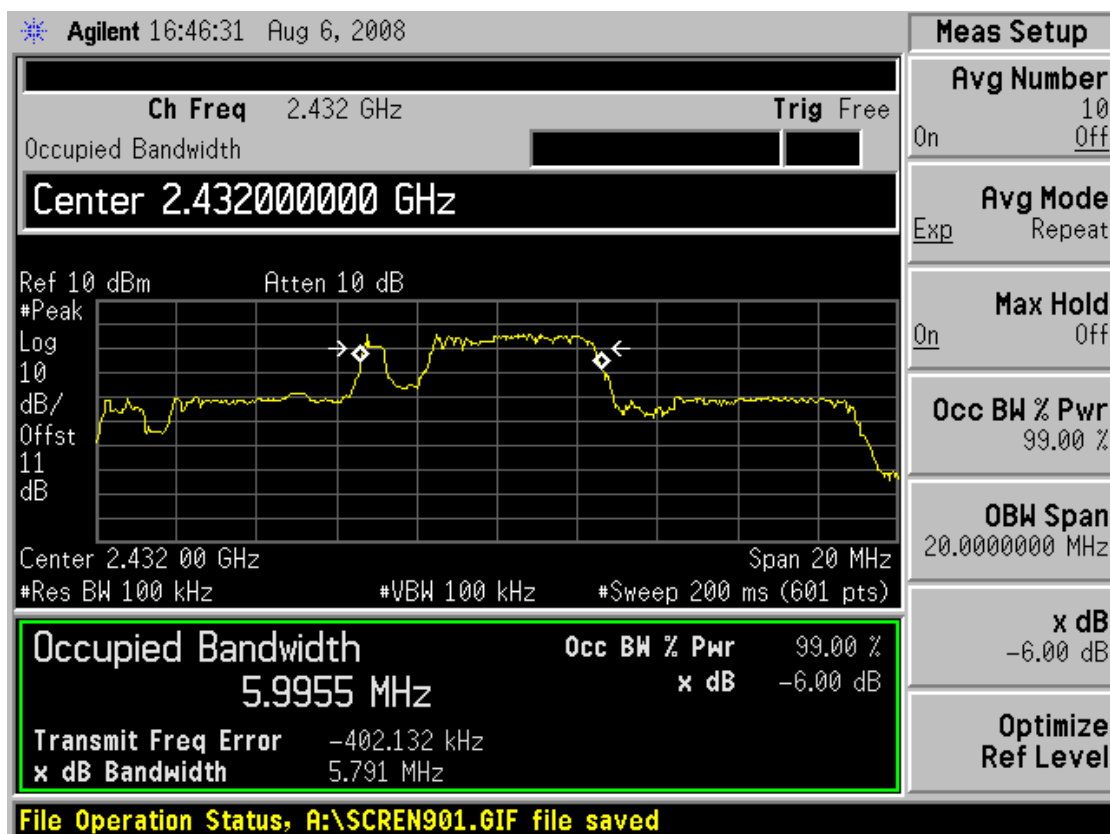
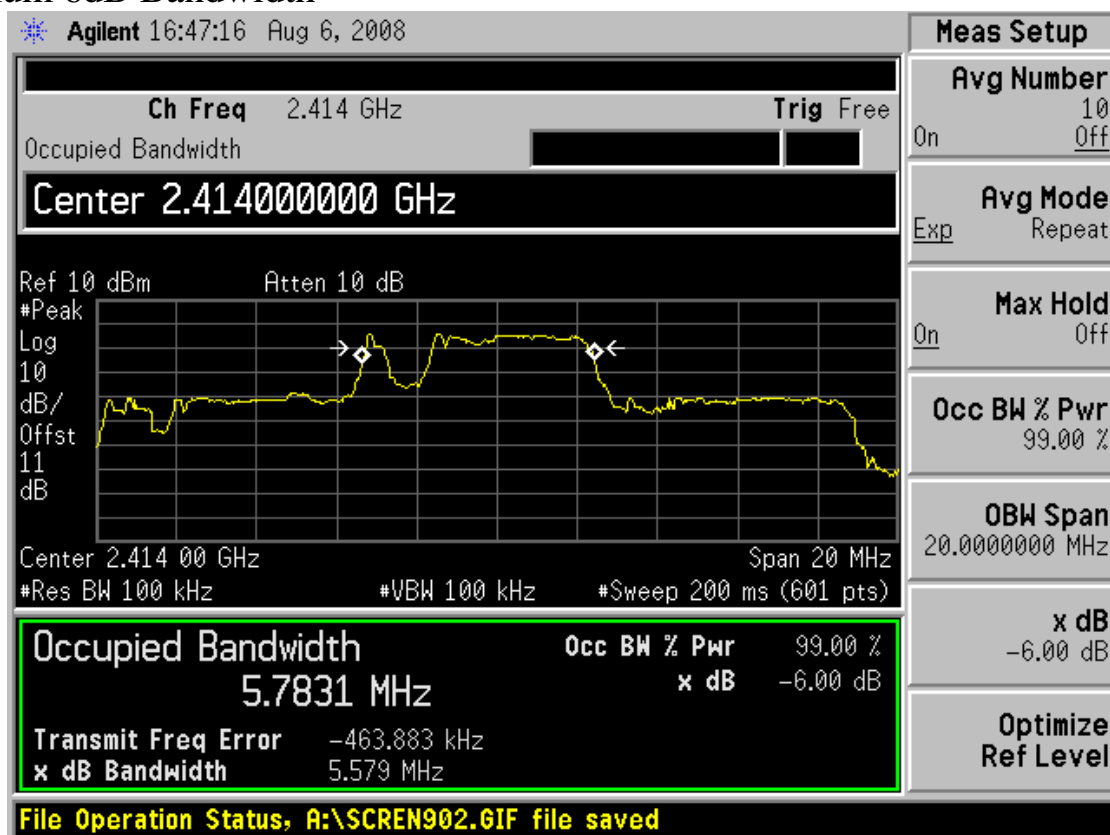


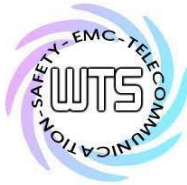


Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

Minimum 6dB Bandwidth

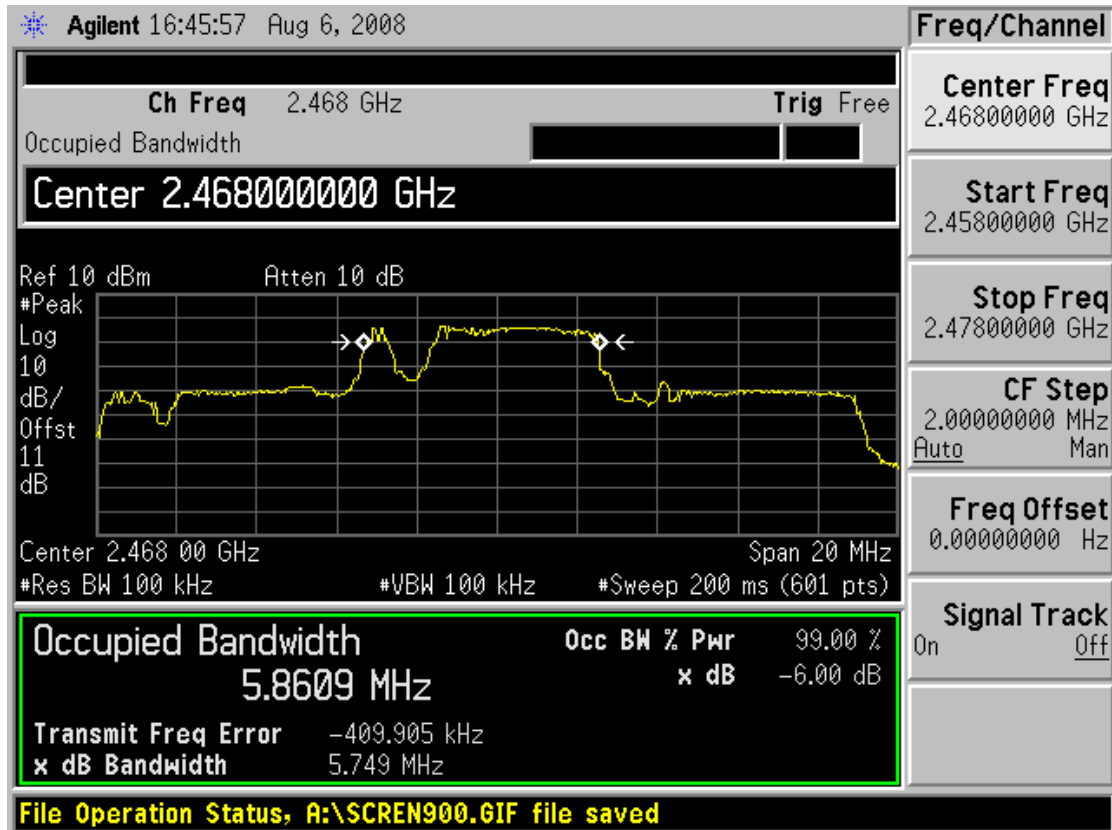




Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

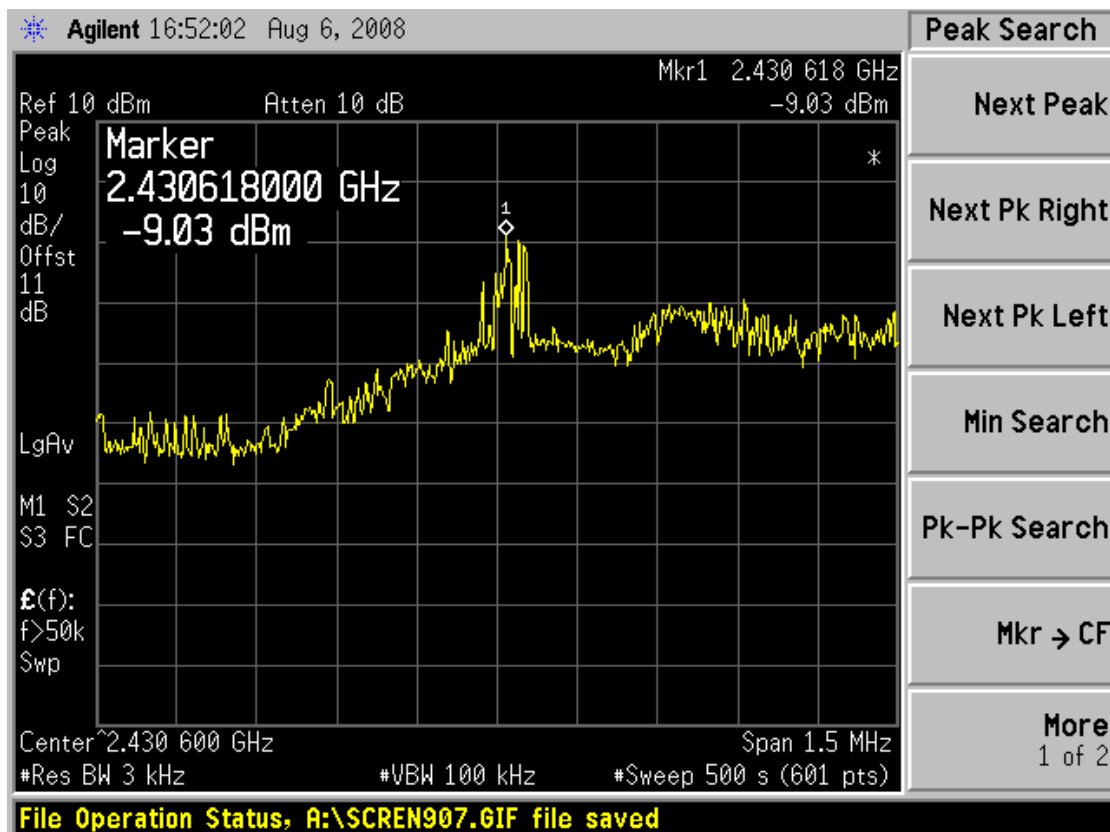
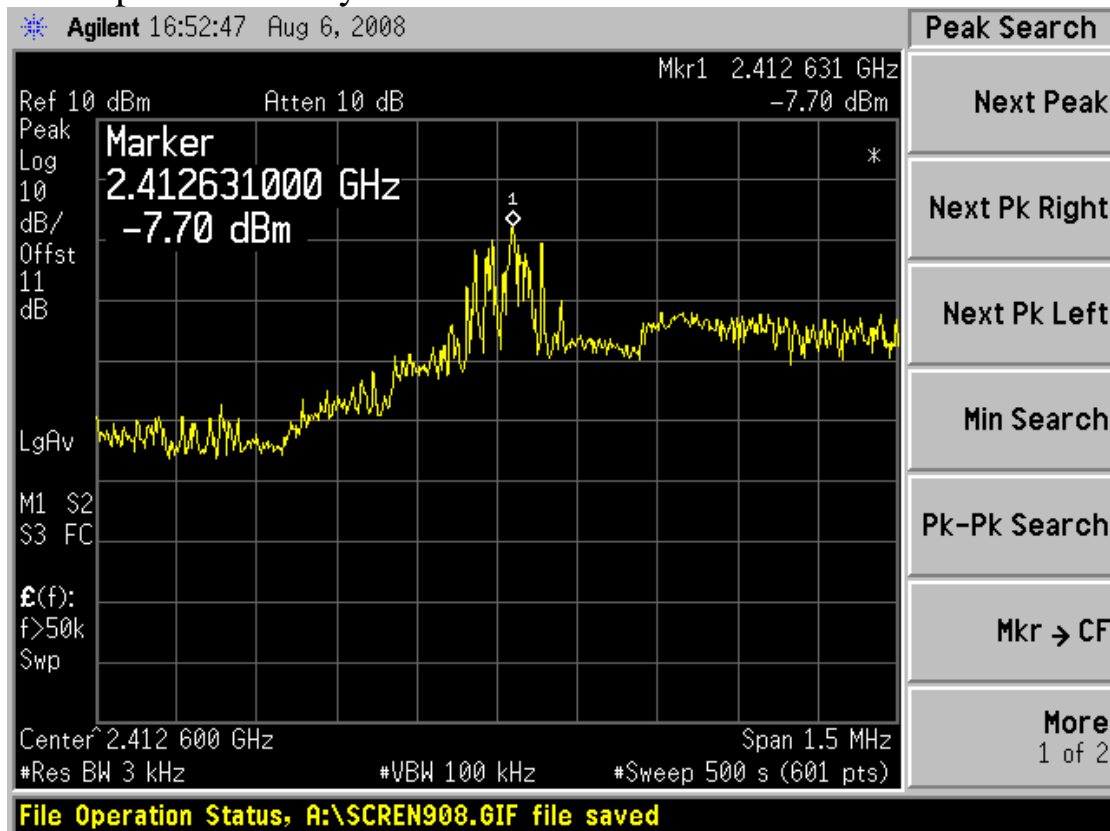




Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702

Peak Power Spectral Density

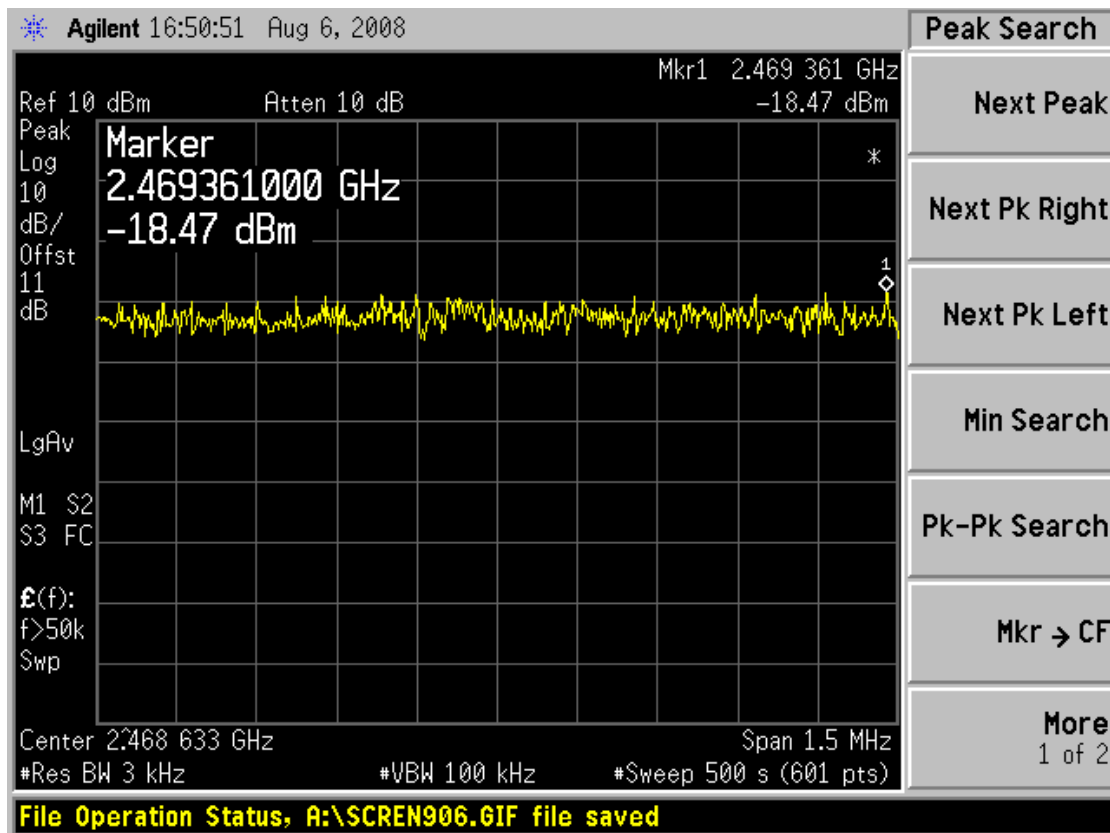


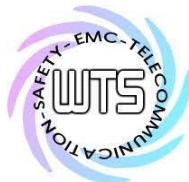


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M20804-9054-P-15

FCC ID: V94-PFA-702



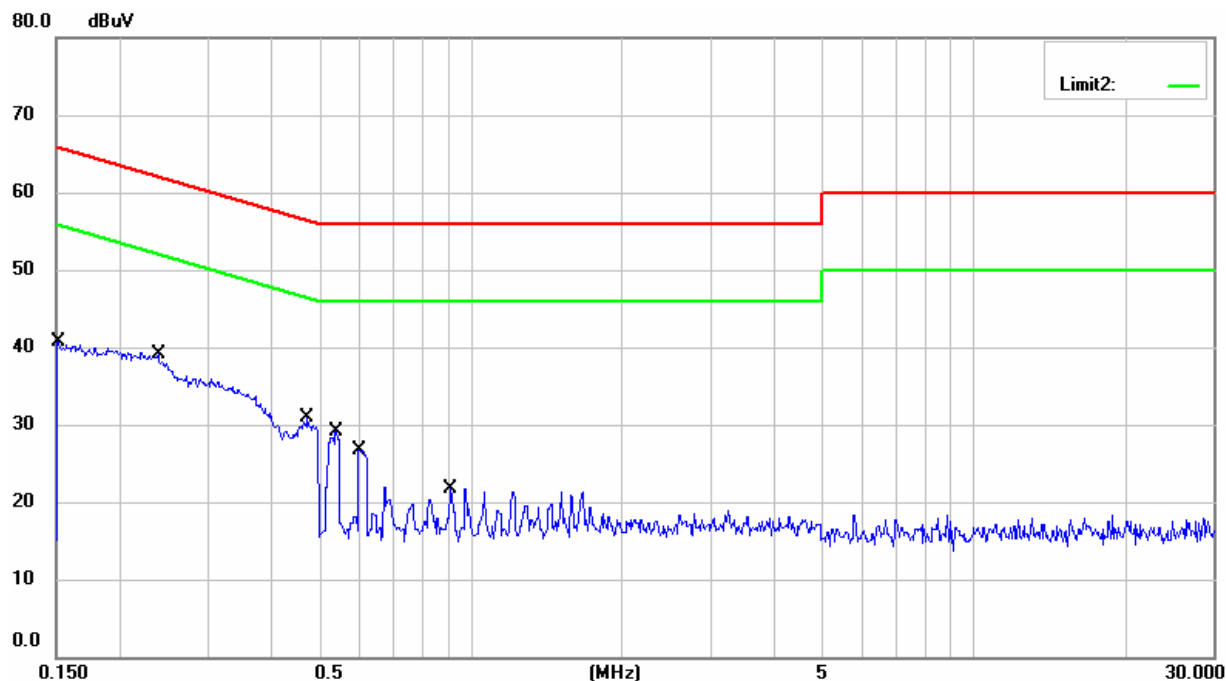


Registration number: W6M20804-9054-P-15

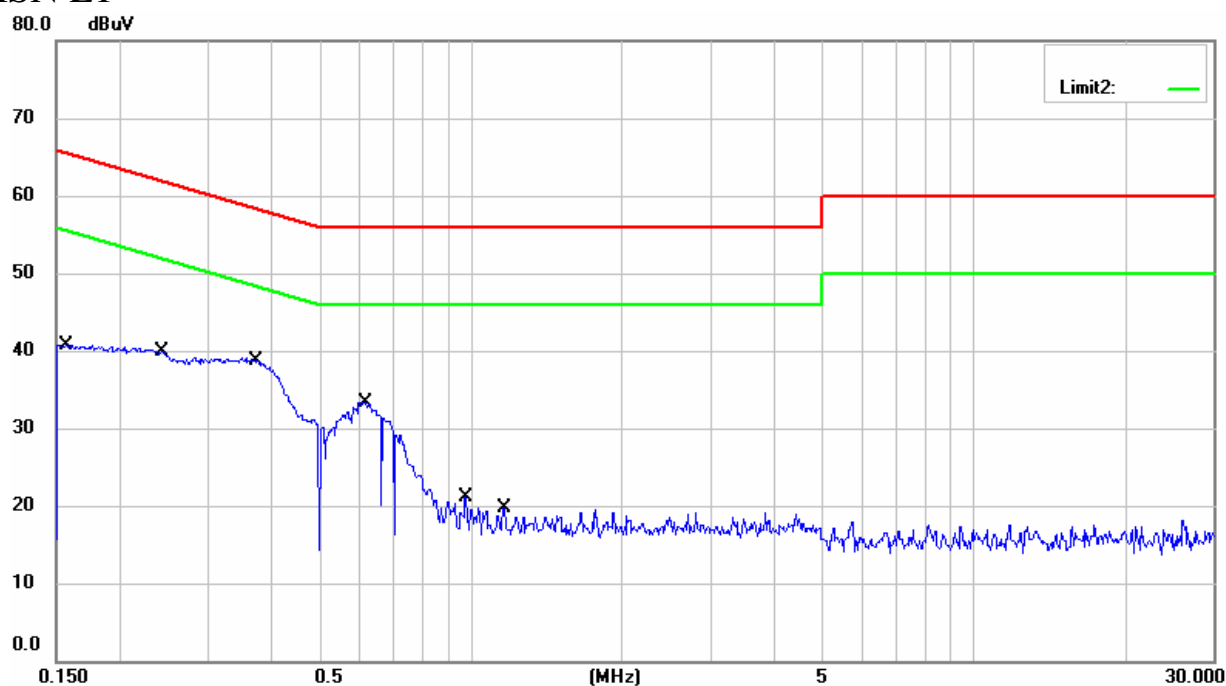
FCC ID: V94-PFA-702

Power Line Conducted Emission

LISN N



LISN L1



Up Line: QP Limit Line

Down Line: Ave Limit Line

Note:

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