

FCC PART 15 SUBPART C TEST REPORT

for

WIRELESS CYCLE COMPUTER

Model No.: LV-2000A

FCC ID: 2AAQQ4C563230303041

of

Applicant: Taiwan Biotronic Technology Inc.

Address: 20 Lane 53 Hua Cheng Street, Da Li Dist.,
Taichung Hsien 41247 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.: W6M21307-13369-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.

Registration number: W6M21307-13369-C-1
FCC ID: 2AAQQ4C563230303041

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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.

Tester:

August 23, 2013

Rick Chen

Rick Chen.

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

August 23, 2013

Kevin Wang

Kevin Wang

Date

WTS

Name

Signature



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1.2 Testing laboratory

1.2.1 Location

OATS

No.5-1, Lishui, Shuang Sing Village,
Wanli Dist., New Taipei City 207,
Taiwan (R.O.C.)

3 meter semi-anechoic chamber

No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

TEL:886-2-6613-0228

FAX:886-2-2791-5046

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: 2730.01

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: ./.



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1.3 Details of approval holder

Name:	Taiwan Biotronic Technology Inc.
Street:	20 Lane 53 Hua Cheng Street, Da Li Dist.,
Town:	Taichung Hsien 41247
Country:	Taiwan
Telephone:	886-4-22750988
Fax:	886-4-22766449
Teletex:	./.

1.4 Application details

Date of receipt of test item:	July 31, 2013
Date of test:	from August 01, 2013 to August 22, 2013

1.5 General information of Test item

Type of test item:	WIRELESS CYCLE COMPUTER
Model Number:	LV-2000A
Multi-listing model number:	./.
Photos:	see Annex

Technical data

Frequency band:	2.400-2.4835 GHz
Operation Frequency:	2.402-2.466 GHz
Frequency 1:	2.402 GHz
Frequency 2:	2.418 GHz
Frequency 3:	2.466 GHz
Operation modes:	Duplex
Modulation Type:	GFSK
Antenna type:	Chip Antenna
Antenna gain:	3 dBi
Power supply:	Battery: 1.5Vdc*3 USB: 5Vdc(Power from PC)

Manufacturer: (if different from applicant)

Name:	./.
Street:	./.
Town:	./.
Country:	./.
Additional information:	./.

1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART C § 15.249 (2011-10)



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

Details Power supply: Battery: 1.5Vdc*3
USB: 5Vdc(Power from PC)

Extreme conditions parameters: Not required



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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	2012/9/5	2013/9/4
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	2012/12/21	2013/12/20
ETSTW-CE 006	IMPULSBEGRÄNZER PULSE LIMITER	ESH3-Z2	100226	R&S	2013/3/4	2014/3/3
ETSTW-CE 007	SPECTRUM ANALYZER 5GHz	FSB	849670/001	R&S	Pre-test Use	
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function Test	
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2013/7/10	2014/7/9
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2012/9/5	2013/9/4
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2012/9/5	2013/9/4
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function Test	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function Test	
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2012/10/12	2013/10/11
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2013/7/3	2014/7/2
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2013/3/4	2014/3/3
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2013/3/21	2014/3/20
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2013/5/31	2014/5/30
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2013/3/4	2014/3/3
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2012/11/28	2013/11/27
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	EMCO	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2012/10/5	2013/10/4
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2012/10/12	2013/10/11
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2013/3/4	2014/3/3
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2012/12/4	2013/12/3
ETSTW-RE 111	TRILOG Super Broadband test Antenna	VULB 9160	9160-3309	Schwarzbeck	2012/12/13	2013/12/12
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2013/1/11	2014/1/10
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	



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ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2013/6/28	2014/6/27
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2013/8/16	2014/8/15
ETSTW-RE 126	5GHz Notch filter	5NSL11-5800/E221.3-O/O	1	K&L Microwave	2013/8/16	2014/8/15
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2013/3/4	2014/3/3
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2012/10/5	2013/10/4
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40/12+9SS	3	WI	2013/1/11	2014/1/10
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2013/1/11	2014/1/10
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2013/1/11	2014/1/10
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2013/1/11	2014/1/10
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2012/9/18	2013/9/17
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2013/3/4	2014/3/3
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test Use NCR	
ETSTW-Cable 012	N TYPE To SMA Cable	Cable 012	None	JYE BAO CO.,LTD.	2013/3/4	2014/3/3
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2013/3/4	2014/3/3
ETSTW-Cable 022	N TYPE Cable	5006	0002	JYE BAO CO.,LTD.	2013/3/26	2014/3/25
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2013/3/4	2014/3/3
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2013/3/4	2014/3/3
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2012/10/12	2013/10/11
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2012/10/12	2013/10/11
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	HUBER+SUHNER	2013/3/4	2014/3/3
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104 (S_Cable 10)	238092	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2012/11/28	2013/11/27
ETSTW-Cable 053	N TYPE To SMA Cable	RG142	None	JYE BAO CO.,LTD.	2013/3/26	2014/3/25
ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2013/6/20	2014/6/19
WTSTW-SW 002	EMI TEST SOFTWARE	EZ_EMCA	None	Farad	Version ETS-03A1	



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2.4 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2009 5.2 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 C63.4-2009 6.4 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

ANSI STANDARD C63.4-2009 6.3.1 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm height and with dimensions of 1m by 1.5m (non metallic table). The EUT was placed in the centre of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10th harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.

Measurements were made by Worldwide Testing Services(Taiwan) Co., Ltd. at the registered open field test site located at No.5-1, Lishui, Shuang Sing Village, Wanli Dist., New Taipei City 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.

ANSI STANDARD C63.4-2009 10.2.7: Any measurements that utilize special test software shall be indicated and referenced in the test report. During testing, test software 'EZ EMC' was used for setting up different operation modes.



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3 Test results (enclosure)

Test case	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.249 (a)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Transmitter operating	15.249 (e)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions conducted – Transmitter operating	15.249 (e)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiated Emission from Digital Part	15.109	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Out of Band Spurious Emission, Band edge-Transmitter operating	15.249 (e)	<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 following is intentionally left blank.



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3.1 Peak Output Power (transmitter)

FCC Rule: 15.249 (b)

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).

Model: LV-2000A Date: 2013/08/15

Mode: TX_2402 MHz Temperature: 24 °C Engineer: Roy

Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.			
2401.9360	53.28	---	37.51	90.79	---	114.00	94.00	-23.21	45	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.			
2401.8960	47.23	---	37.51	84.74	---	114.00	94.00	-29.26	175	100

Mode: TX_2418 MHz

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.			
2417.7840	51.84	---	37.57	89.41	---	114.00	94.00	-24.59	195	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.			
2417.8960	47.95	---	37.57	85.52	---	114.00	94.00	-28.48	215	100

Mode: TX_2466 MHz

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.			
2466.0240	53.58	---	37.75	91.33	---	114.00	94.00	-22.67	230	100



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Polarization: Vertical

Frequency (MHz)	Reading (dBuV) Peak	Factor (dB) Ave.	Result (dBuV/m) Peak Ave.		Limit (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)	
2466.0080	47.64	---	37.75	85.39	---	114.00	94.00	-28.61	170	100

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044

Explanation: The diagrams for the field strength measurements are included in appendix.

3.2 Equivalent isotropic radiated power

Because using an permanent antenna there are no deviations from the radiated test results according 3.1.

3.3 RF Exposure Compliance Requirements

Not applicable for this EUT for the low power level.



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3.4 Out of Band Radiated Emissions

FCC Rule: 15.249 (d)(e), 15.35(b)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For frequency above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

Limits:

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	46.5
Above 960	500	54.0

For frequencies above 1 GHz (Peak measurements).

Limit + 20 dB $54.0 \text{ dB}\mu\text{V/m} + 20 \text{ dB} = 74 \text{ dB}\mu\text{V/m}$

Or

Must be attenuated at least 50dB below the level of fundamental

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 111, ETSTW-RE 030,
ETSTW-RE 044

Explanation: Please see attached diagram as appendix.



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3.5 Spurious emission (tx)

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

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

For frequencies above 1000 MHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

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

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

The critical peak value listed in the table agree with the above calculated limits.

Summary table with radiated data of the test plots

Model:	LV-2000A	Date:	2013/08/14~2013/08/15
Mode:	TX_2402 MHz	Temperature:	24 °C
Polarization:	Horizontal	Humidity:	60 %
Engineer:	Roy		

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
239.9400	22.57	peak	13.92	36.49	46.00	-9.51	30	100
335.1904	16.86	peak	16.77	33.63	46.00	-12.37	220	100

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.			
4801.6030	54.99	36.76	0.44	55.43	37.20	74.00	54.00	-16.80	160	100
7206.0000	40.84	---	4.01	44.85	---	74.00	54.00	-29.15	255	100
9608.0000	34.46	---	9.14	43.60	---	74.00	54.00	-30.40	120	100
12010.0000	33.12	---	13.41	46.53	---	74.00	54.00	-27.47	325	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
175.7916	19.35	peak	14.14	33.49	43.50	-10.01	265	100
239.9400	15.83	peak	13.92	29.75	46.00	-16.25	340	100



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FCC ID: 2AAQQ4C563230303041

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.			
4801.6030	58.00	35.44	0.44	58.44	35.88	74.00	54.00	-18.12	155	100
7206.0000	41.57	---	4.01	45.58	---	74.00	54.00	-28.42	40	100
9608.0000	34.09	---	9.14	43.23	---	74.00	54.00	-30.77	220	100
12010.0000	34.35	---	13.41	47.76	---	74.00	54.00	-26.24	275	100

Mode: TX_2418 MHz

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
177.7355	19.02	peak	13.89	32.91	43.50	-10.59	250	100
239.9400	22.40	peak	13.92	36.32	46.00	-9.68	125	100

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.			
4833.6670	55.50	36.88	0.52	56.02	37.40	74.00	54.00	-16.60	245	100
7254.0000	40.34	---	4.09	44.43	---	74.00	54.00	-29.57	80	100
9672.0000	35.70	---	9.18	44.88	---	74.00	54.00	-29.12	175	100
12090.0000	33.27	---	14.17	47.44	---	74.00	54.00	-26.56	330	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
179.6794	19.03	peak	13.64	32.67	43.50	-10.83	230	100
566.5130	8.24	peak	21.94	30.18	46.00	-15.82	50	100

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.			
4833.6670	56.65	36.19	0.52	57.17	36.71	74.00	54.00	-17.29	50	100
7254.0000	40.95	---	4.09	45.04	---	74.00	54.00	-28.96	260	100
9672.0000	34.61	---	9.18	43.79	---	74.00	54.00	-30.21	125	100
12090.0000	32.69	---	14.17	46.86	---	74.00	54.00	-27.14	300	100

Mode: TX_2466 MHz

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
239.9400	22.90	peak	13.92	36.82	46.00	-9.18	165	100
319.6393	17.38	peak	16.43	33.81	46.00	-12.19	270	100



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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.			
4929.8590	56.32	37.05	0.88	57.20	37.93	74.00	54.00	-16.07	150	100
7398.0000	39.89	---	4.46	44.35	---	74.00	54.00	-29.65	340	100
9864.0000	34.62	---	9.73	44.35	---	74.00	54.00	-29.65	140	100
12330.0000	33.87	---	14.38	48.25	---	74.00	54.00	-25.75	225	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
169.9600	18.62	peak	14.88	33.50	43.50	-10.00	235	100
179.6794	18.83	peak	13.64	32.47	43.50	-11.03	85	100

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.			
4929.8590	58.65	37.67	0.88	59.53	38.55	74.00	54.00	-15.45	140	100
7398.0000	40.02	---	4.46	44.48	---	74.00	54.00	-29.52	50	100
9864.0000	34.18	---	9.73	43.91	---	74.00	54.00	-30.09	135	100
12330.0000	33.25	---	14.38	47.63	---	74.00	54.00	-26.37	200	100

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. Measurement uncertainty for 3m measurement: 30-1000 MHz = ± 3.72 dB, 1-18 GHz = ± 5.33 dB, 18-40 GHz = ± 3.43 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.
6. See attached diagrams in appendix.

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

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 111, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 088, ETSTW-RE 018



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C5632303041

3.6 Radiated Emissions from Digital Part

Summary table with radiated data of the test plots

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

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. Measurement uncertainty for 3m measurement : 30-1000 MHz = ± 3.72 dB, 1-18 GHz = ± 5.33 dB, 18-40 GHz = ± 3.43 dB ; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.**
- 6. This test is not required.**

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 111, ETSTW-RE 030, ETSTW-RE 044

Explanation: The test results are listed in the separated test report no.: W6M21307-13369-P-15B.

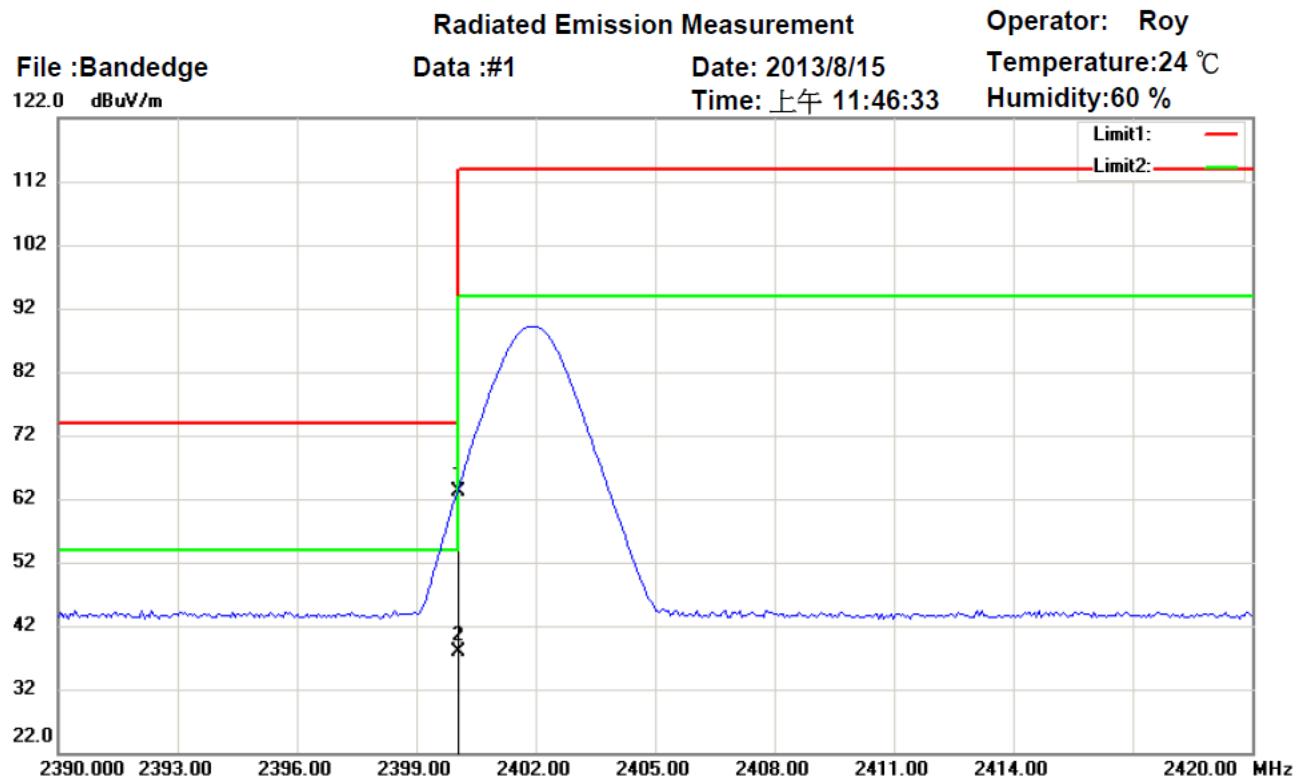


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1
FCC ID: 2AAQQ4C563230303041

3.7 Radiated Emission on the band edge

From the following plots, they show that the fundamental emissions are confined in the specified band and are at least 50 dB below the carrier level at band edge (2400 and 2483.5 MHz). It meets the requirement of section 15.249(d).



Site : Chamber_01

Condition : FCC 15.249 PK (Bandedge)

Polarization: *Horizontal*

EUT : W6M21307-13369

Power : 4.5VDC

M/N: LV-2000A

Distance: 3m

Test Mode : 2402MHz

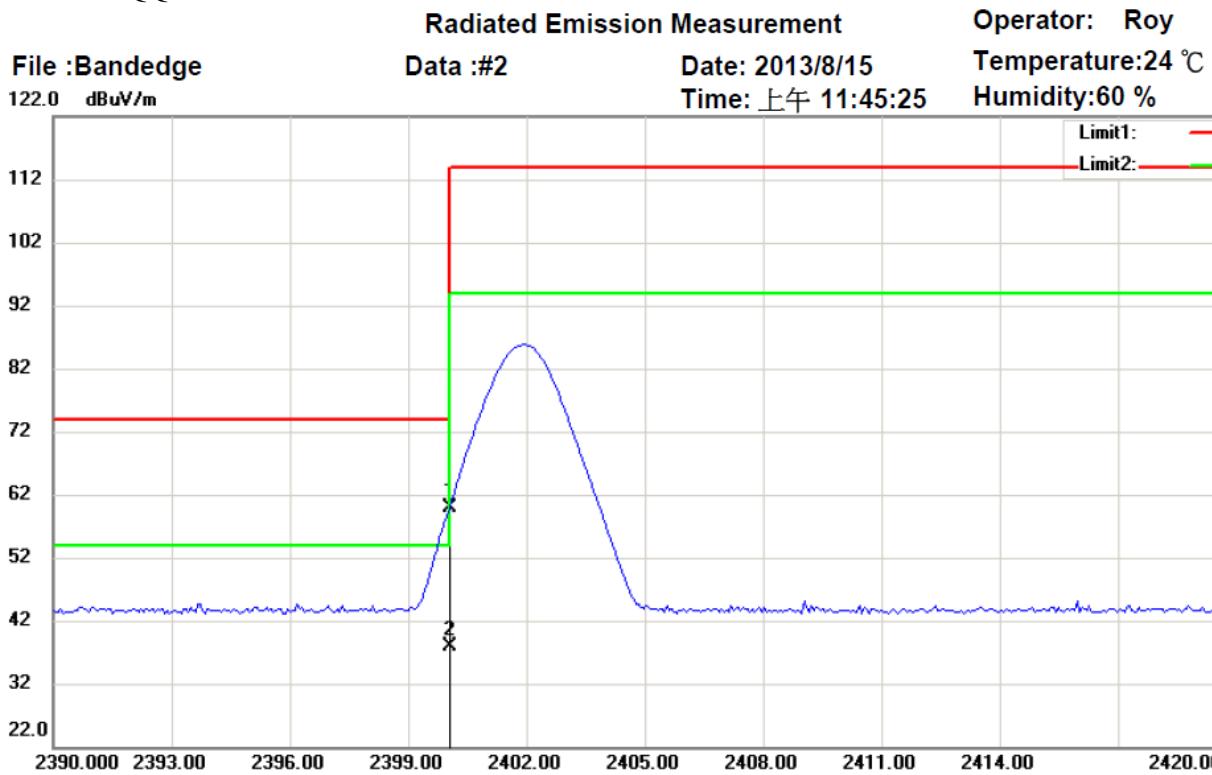
Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2400.000	25.70	peak	37.50	63.20	74.00	100	305	-10.80	
	2400.000	0.47	AVG	37.50	37.97	54.00	100	305	-16.03	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1
FCC ID: 2AAQQ4C563230303041



Site : Chamber_01

Condition : FCC 15.249 PK (Bandedge)

Polarization: *Vertical*

EUT : W6M21307-13369

Power : 4.5VDC

M/N: LV-2000A

Distance: 3m

Test Mode : 2402MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2400.000	22.43	peak	37.50	59.93	74.00	100	145	-14.07	
	2400.000	0.31	AVG	37.50	37.81	54.00	100	145	-16.19	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

Radiated Emission Measurement

Operator: Roy

File :Bandedge

Data :#1

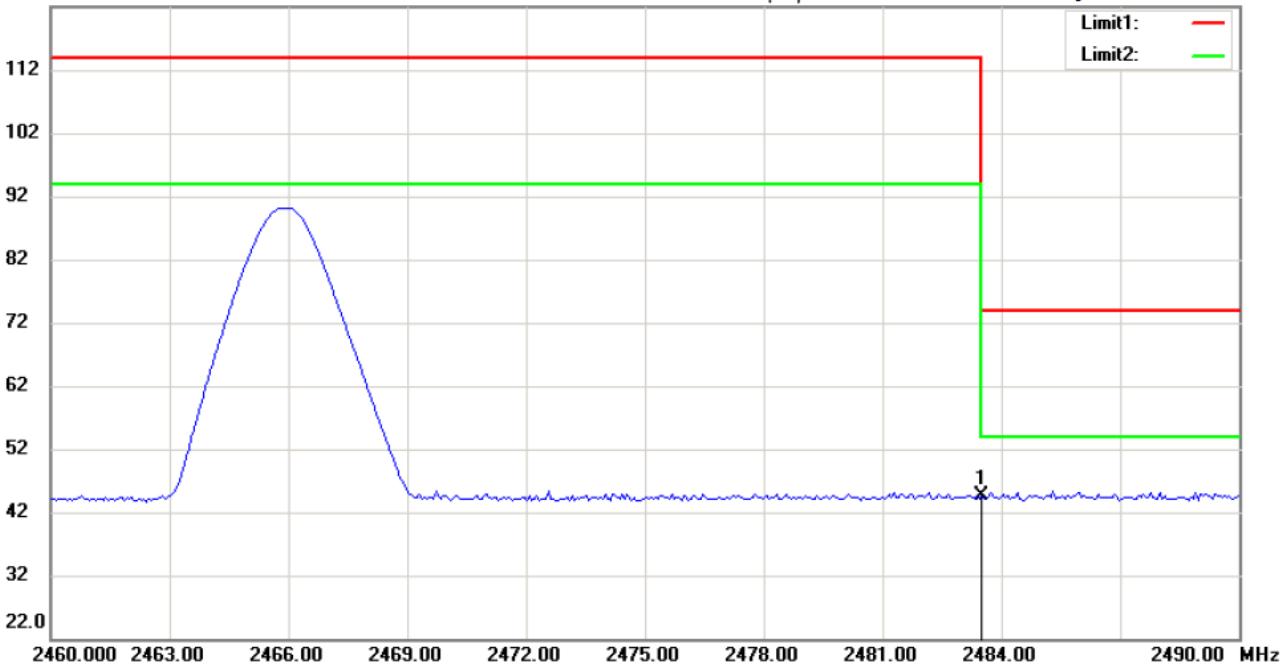
Date: 2013/8/15

Temperature:24 °C

122.0 dBuV/m

Time: 下午 01:56:25

Humidity:60 %



Site : Chamber_01

Condition : FCC 15.249 PK (Bandedge)

Polarization: *Horizontal*

EUT : W6M21307-13369

Power : 4.5VDC

M/N: LV-2000A

Distance: 3m

Test Mode : 2466MHz

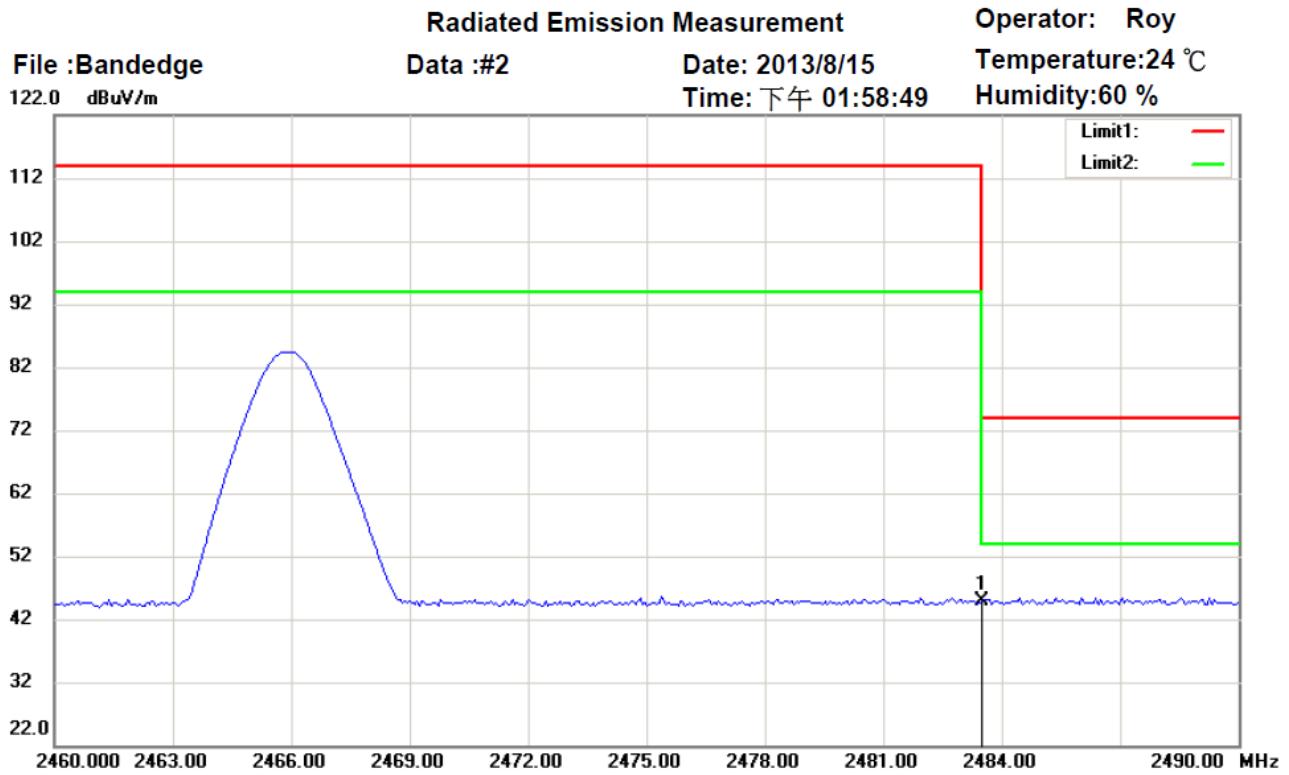
Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2483.500	6.81	peak	37.82	44.63	74.00	100	190	-29.37	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1
FCC ID: 2AAQQ4C563230303041



Site : Chamber_01

Condition : FCC 15.249 PK (Bandedge)

Polarization: *Vertical*

EUT : W6M21307-13369

Power : 4.5VDC

M/N: LV-2000A

Distance: 3m

Test Mode : 2466MHz

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corr. factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2483.500	7.13	peak	37.82	44.95	74.00	100	45	-29.05	

Limit:

Frequency Range (MHz)	Limit (dB μ V/m)	
	Peak	Average
902 – 928	114	94
2400 – 2483.5	74	54
5725 – 5875	74	54

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044



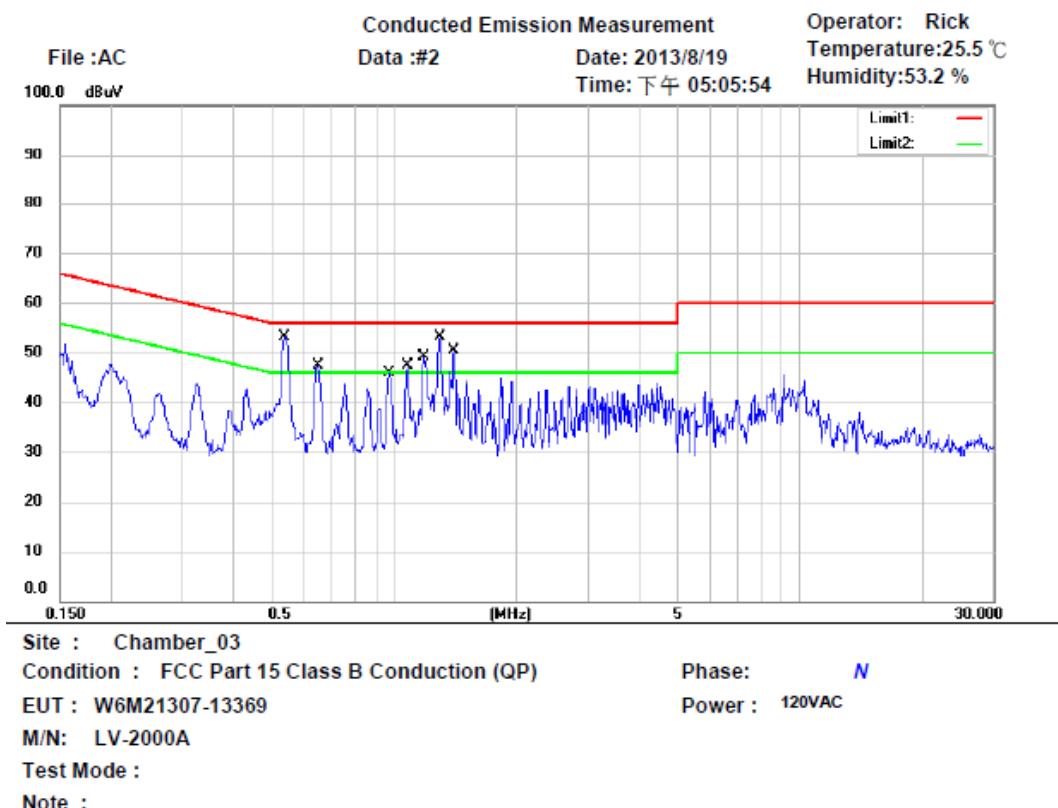
Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C5632303041

3.8 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.

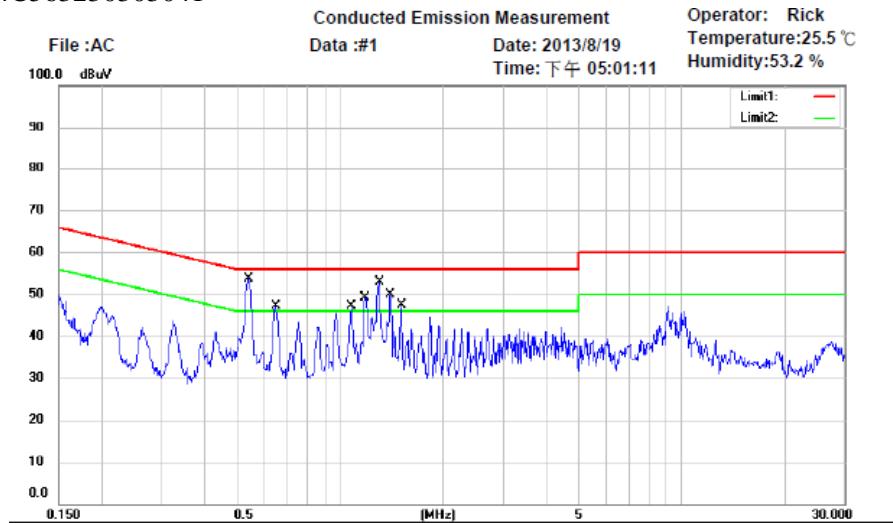


Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
*	0.5360	39.87	QP	10.12	49.99	56.00	-6.01	
	0.5360	24.07	AVG	10.12	34.19	46.00	-11.81	
	0.6485	34.69	QP	10.13	44.82	56.00	-11.18	
	0.6485	19.70	AVG	10.13	29.83	46.00	-16.17	
	0.9680	32.73	QP	10.14	42.87	56.00	-13.13	
	0.9680	19.75	AVG	10.14	29.89	46.00	-16.11	
	1.0760	34.76	QP	10.14	44.90	56.00	-11.10	
	1.0760	22.06	AVG	10.14	32.20	46.00	-13.80	
	1.1840	33.54	QP	10.15	43.69	56.00	-12.31	
	1.1840	19.77	AVG	10.15	29.92	46.00	-16.08	
	1.2920	37.65	QP	10.15	47.80	56.00	-8.20	
	1.2920	20.71	AVG	10.15	30.86	46.00	-15.14	
	1.4000	37.58	QP	10.16	47.74	56.00	-8.26	
	1.4000	23.40	AVG	10.16	33.56	46.00	-12.44	



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1
FCC ID: 2AAQQ4C563230303041



Site : Chamber_03

Condition : FCC Part 15 Class B Conduction (QP)

Phase: L1

EUT : W6M21307-13369

Power : 120VAC

M/N: LV-2000A

Test Mode :

Note :

Mk.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
*	0.5382	41.40	QP	10.12	51.52	56.00	-4.48	
	0.5382	25.06	AVG	10.12	35.18	46.00	-10.82	
	0.6462	35.33	QP	10.13	45.46	56.00	-10.54	
	0.6462	18.23	AVG	10.13	28.36	46.00	-17.64	
	1.0760	33.85	QP	10.14	43.99	56.00	-12.01	
	1.0760	18.64	AVG	10.14	28.78	46.00	-17.22	
	1.1818	32.13	QP	10.15	42.28	56.00	-13.72	
	1.1818	18.33	AVG	10.15	28.48	46.00	-17.52	
	1.2965	34.76	QP	10.15	44.91	56.00	-11.09	
	1.2965	15.79	AVG	10.15	25.94	46.00	-20.06	
	1.4000	37.30	QP	10.16	47.46	56.00	-8.54	
	1.4000	22.04	AVG	10.16	32.20	46.00	-13.80	
	1.5080	34.10	QP	10.17	44.27	56.00	-11.73	
	1.5080	19.68	AVG	10.17	29.85	46.00	-16.15	

Note:

1. The formula of measured value as: Test Result = Reading + Correction Factor
2. The Correction Factor = Cable Loss + LISN Insertion Loss
3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.
5. Measurement uncertainty = ± 1.60 dB; Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.
6. Up Line: PK Limit Line, Down Line: Ave Limit Line.

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 004, ETSTW-CE 006, ETSTW-RE045



Worldwide Testing Services(Taiwan) Co., Ltd.

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FCC ID: 2AAQQ4C563230303041

Appendix

Measurement diagrams

1. Fundamental Field Strength
2. Spurious Emissions radiated

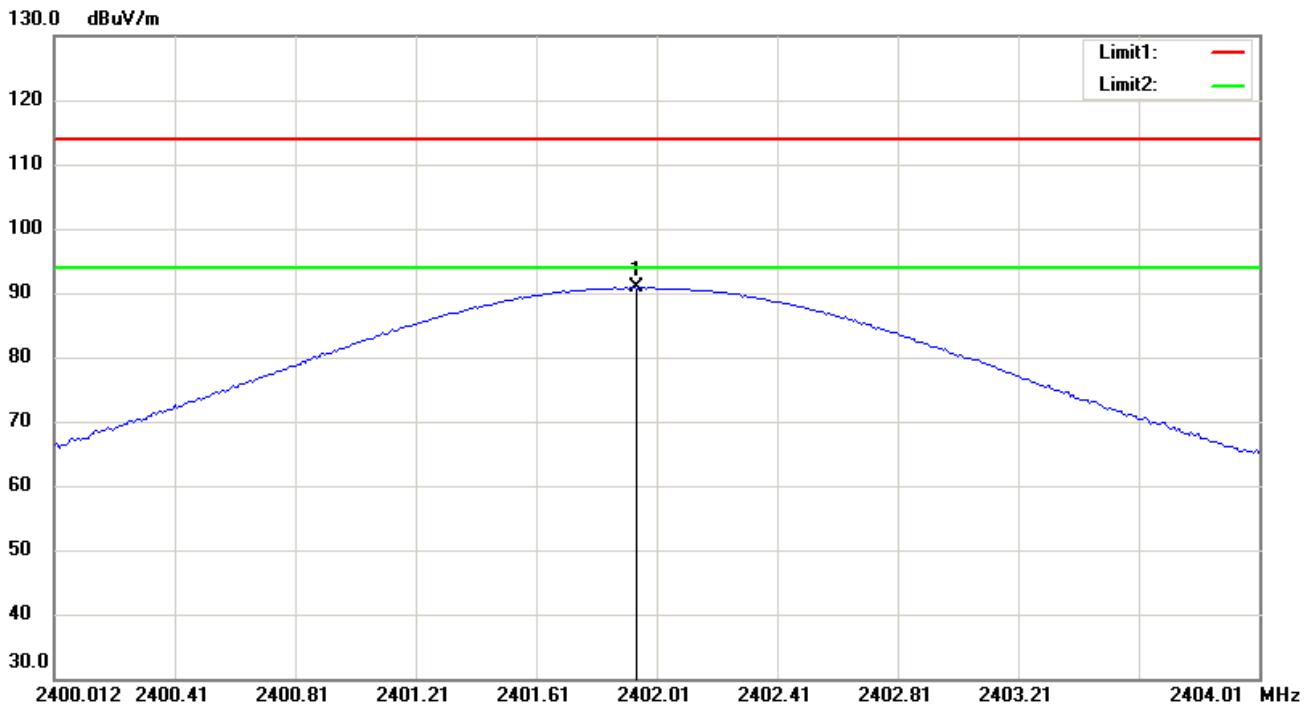
Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

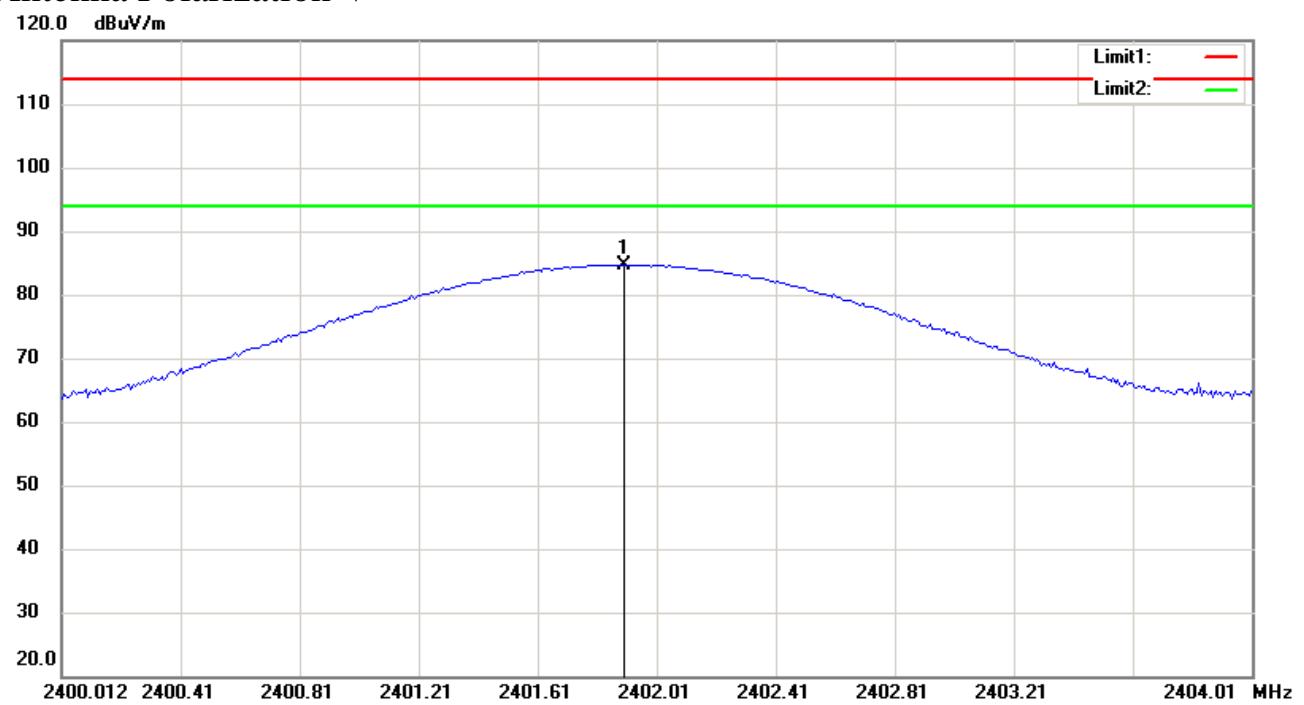
Fundamental Field Strength

TX_2402 MHz

Antenna Polarization H



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 fundamental field strength test data of this test report.



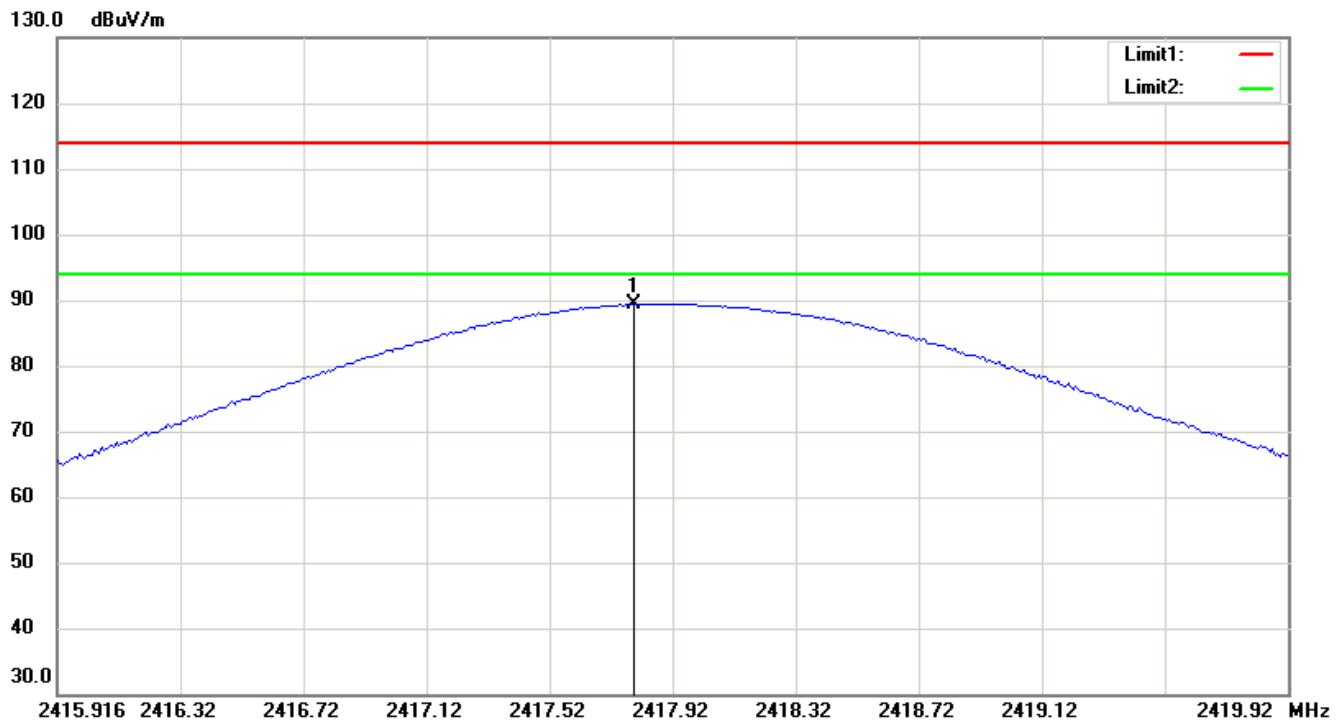
Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

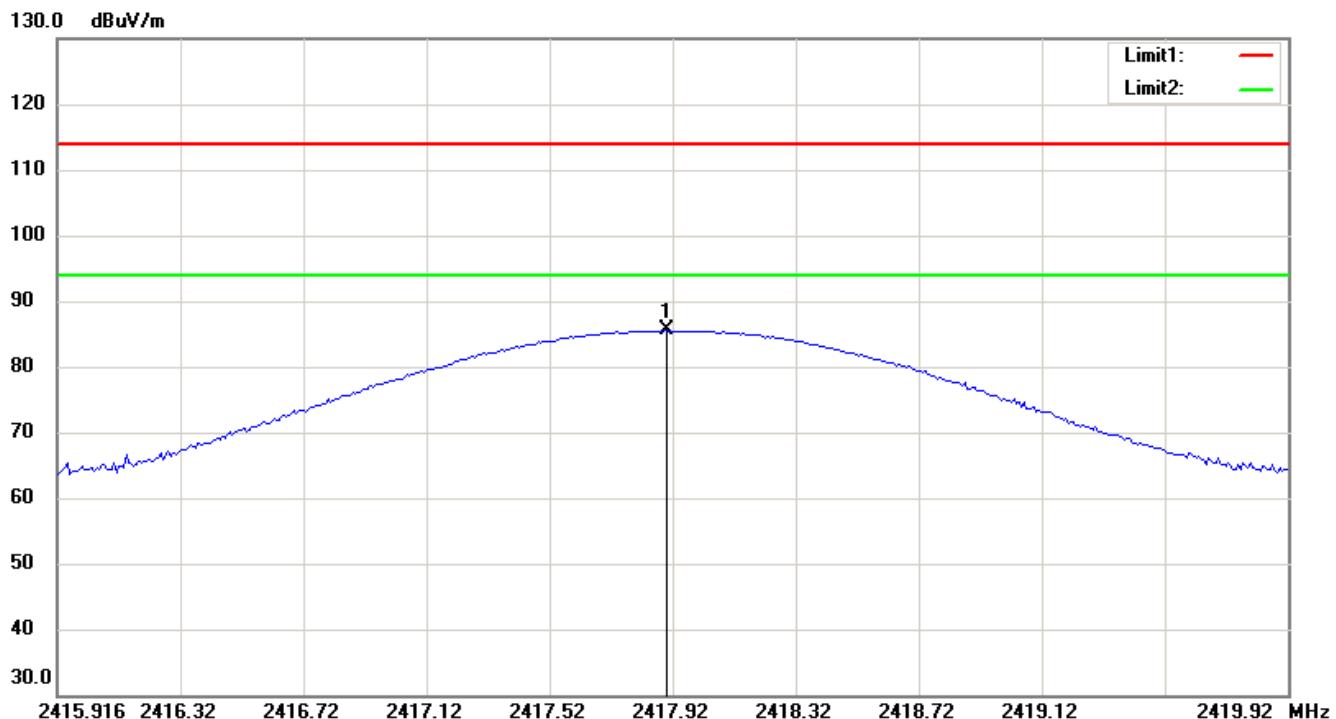
FCC ID: 2AAQQ4C563230303041

TX_2418 MHz

Antenna Polarization H



Antenna Polarization V



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

Note:

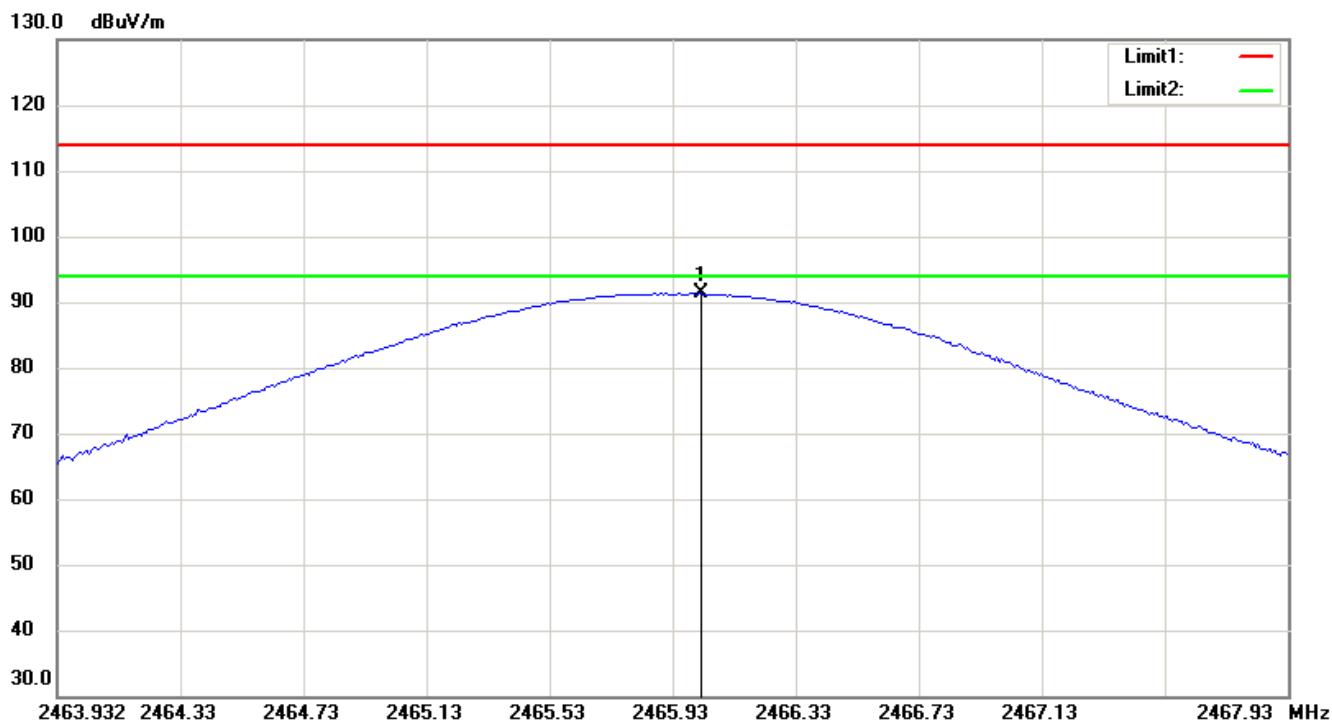
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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

Registration number: W6M21307-13369-C-1

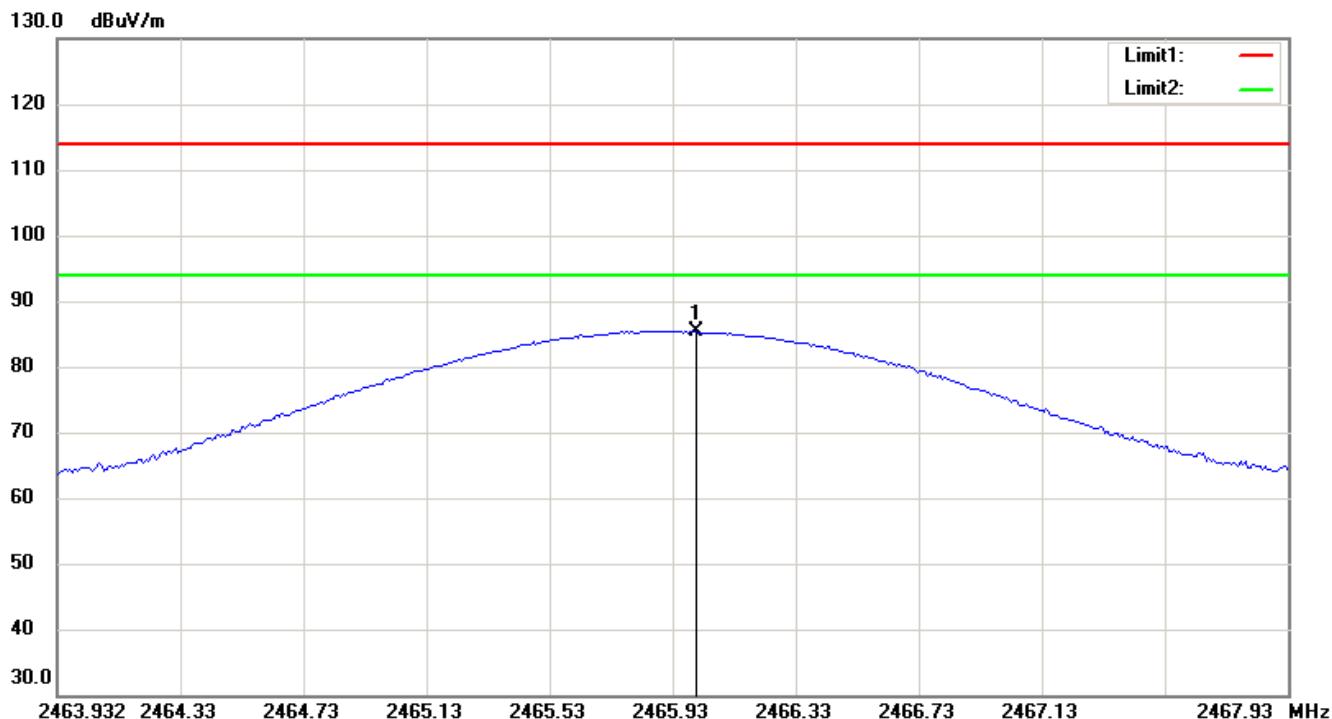
FCC ID: 2AAQQ4C563230303041

TX_2466 MHz

Antenna Polarization H



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 fundamental field strength test data of this test report.

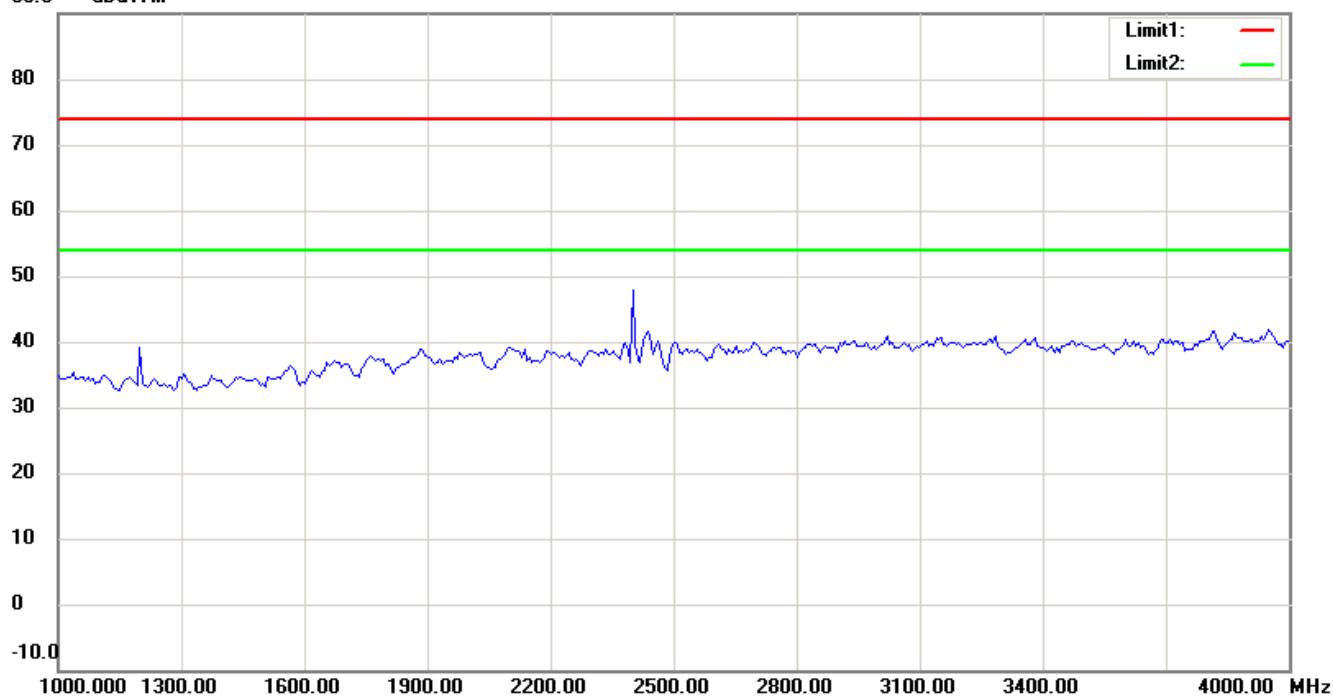
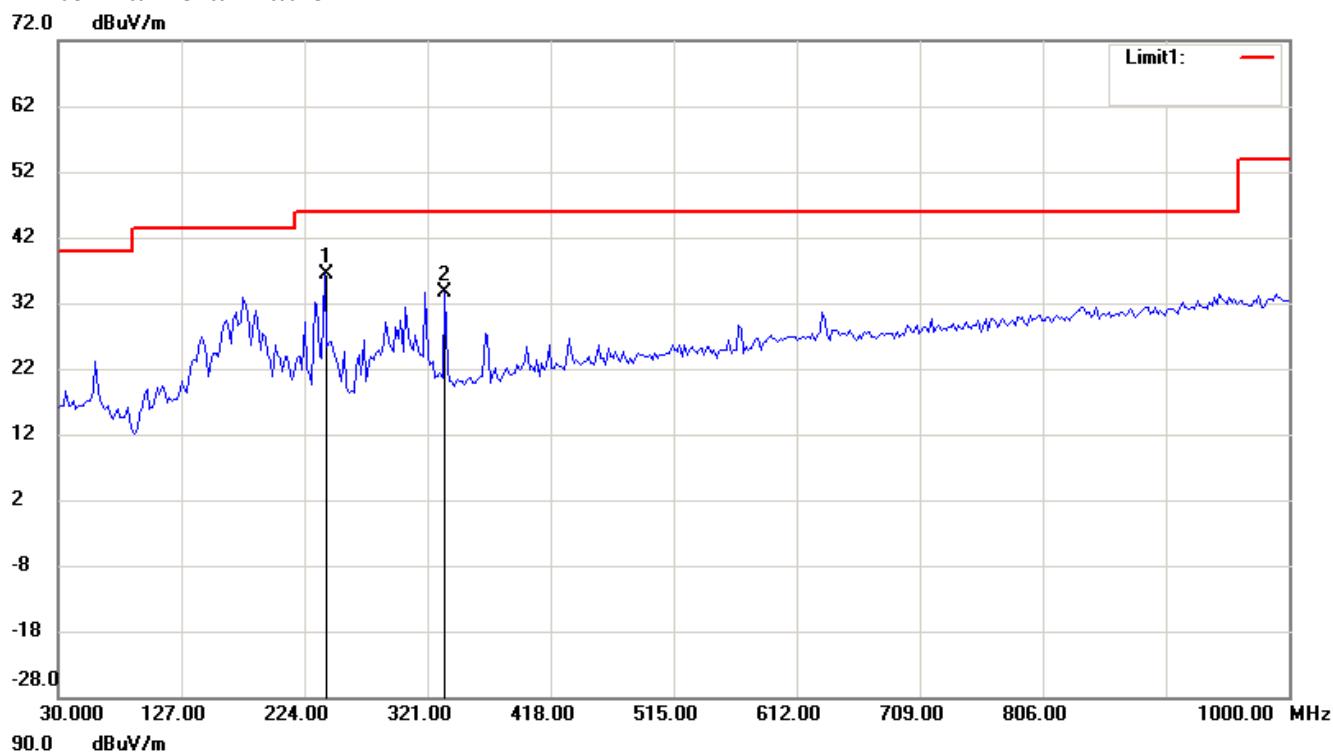
Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

Spurious Emissions radiated_ Transmitter

2402 MHz

Antenna Polarization H



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

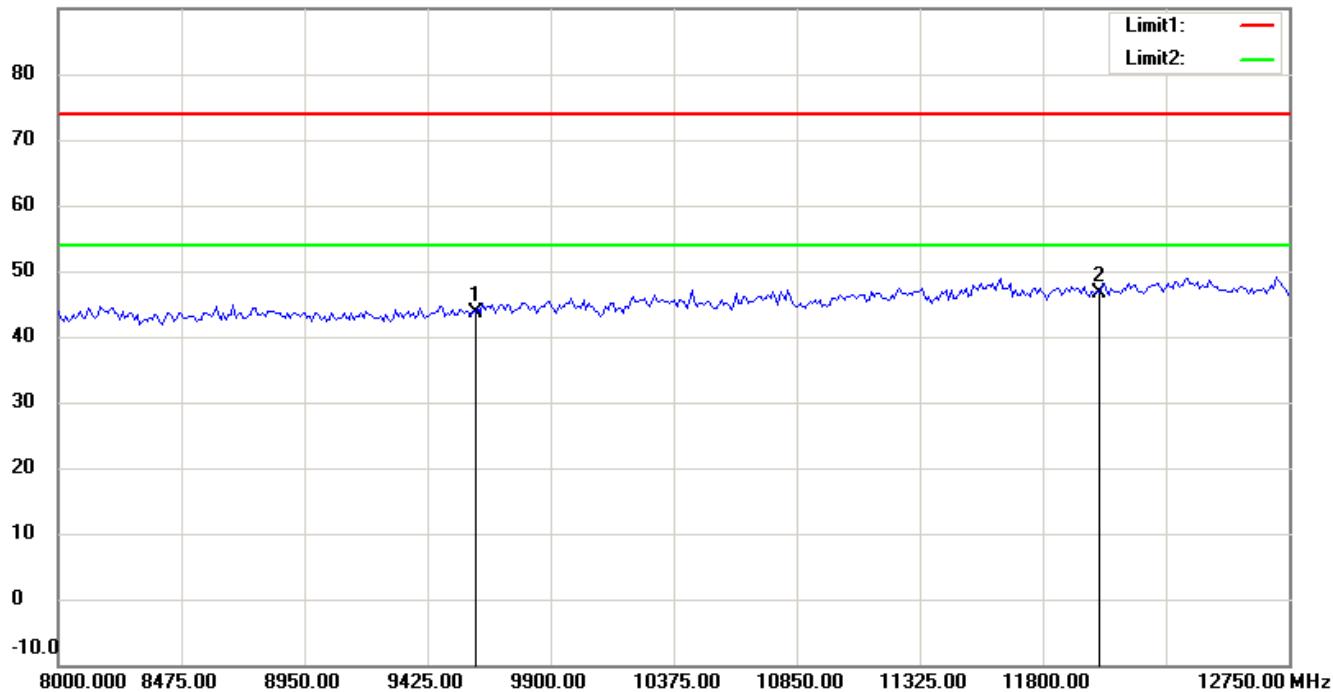
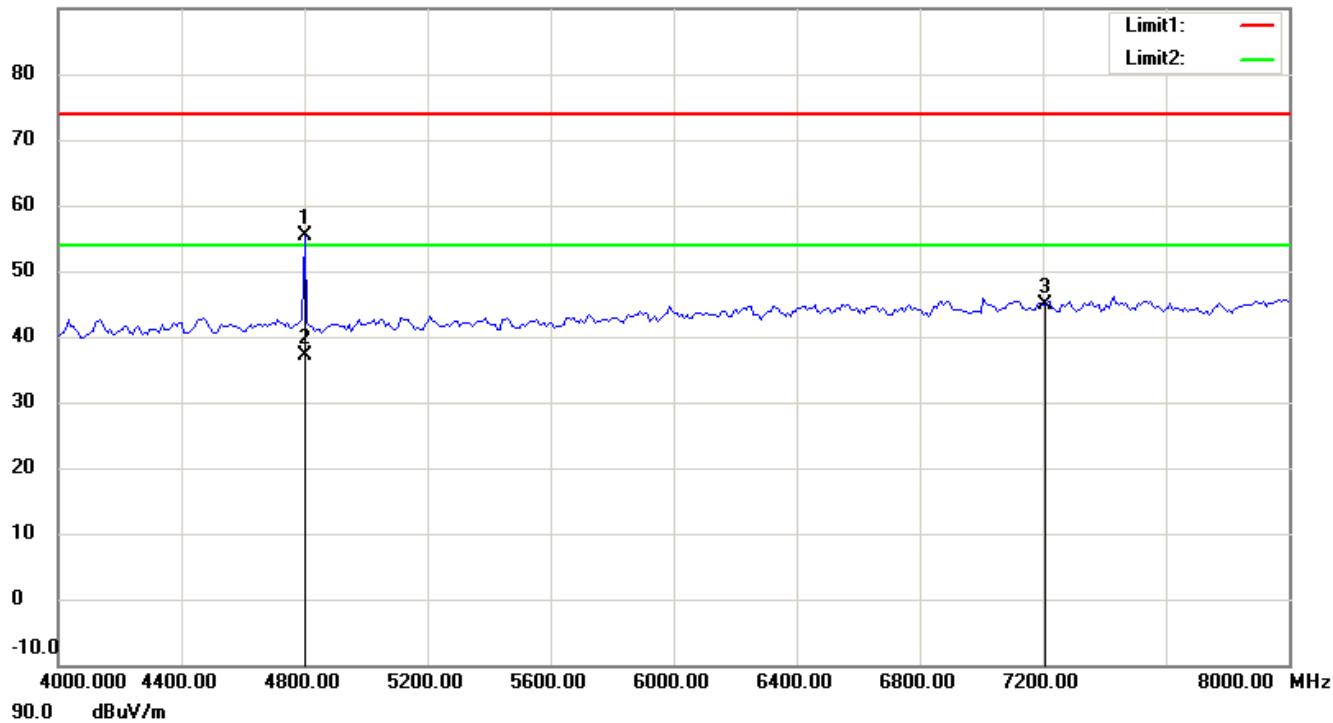
Note:

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

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 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.

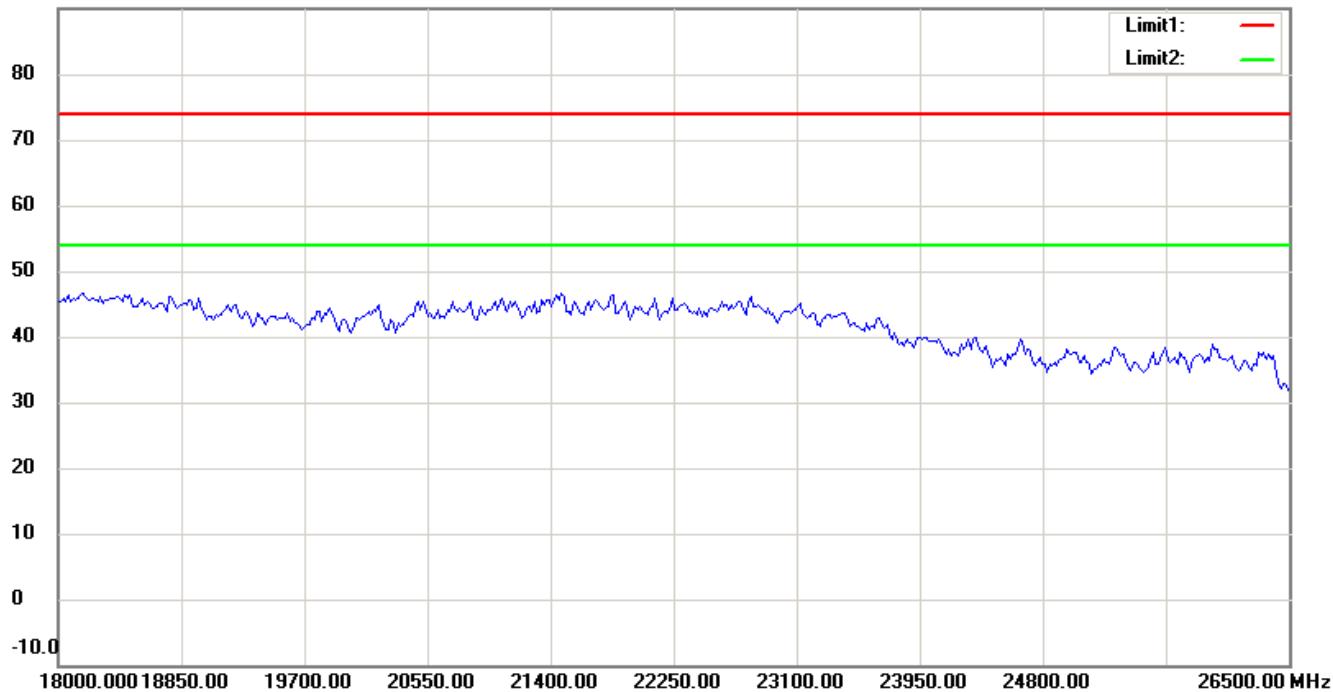
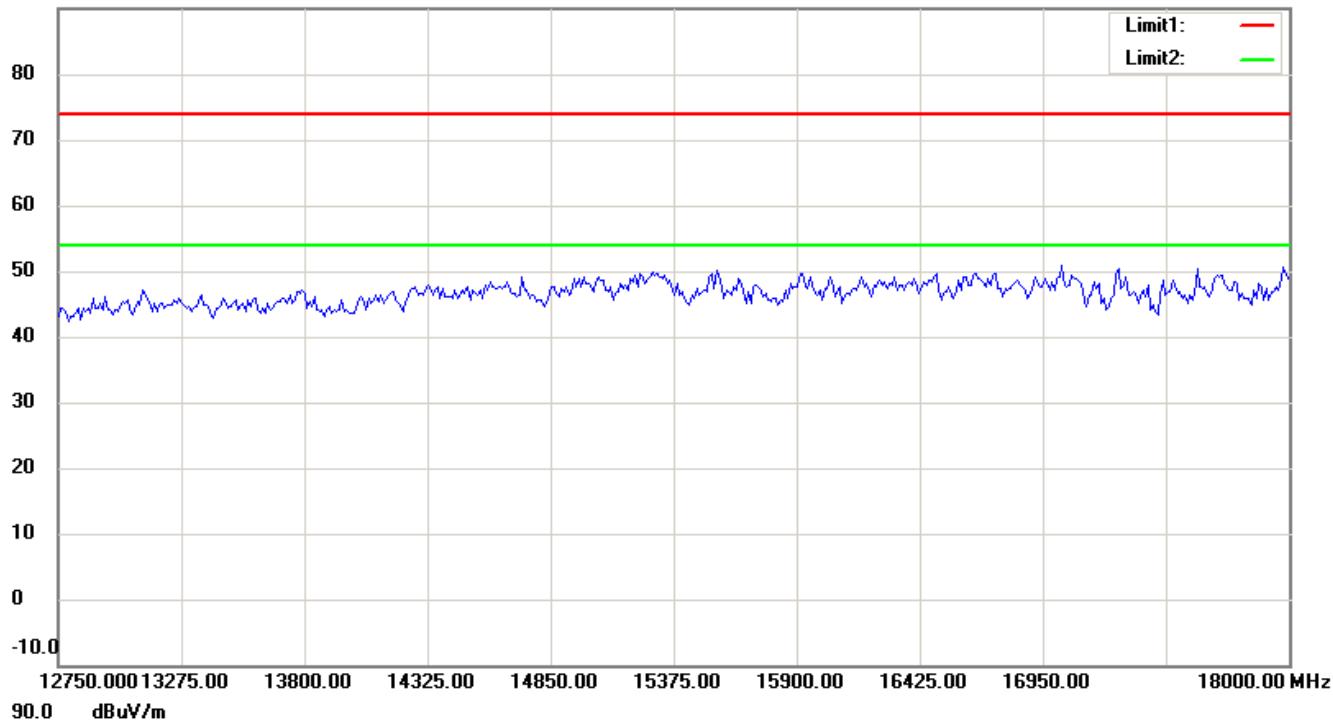


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 dBuV/m



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

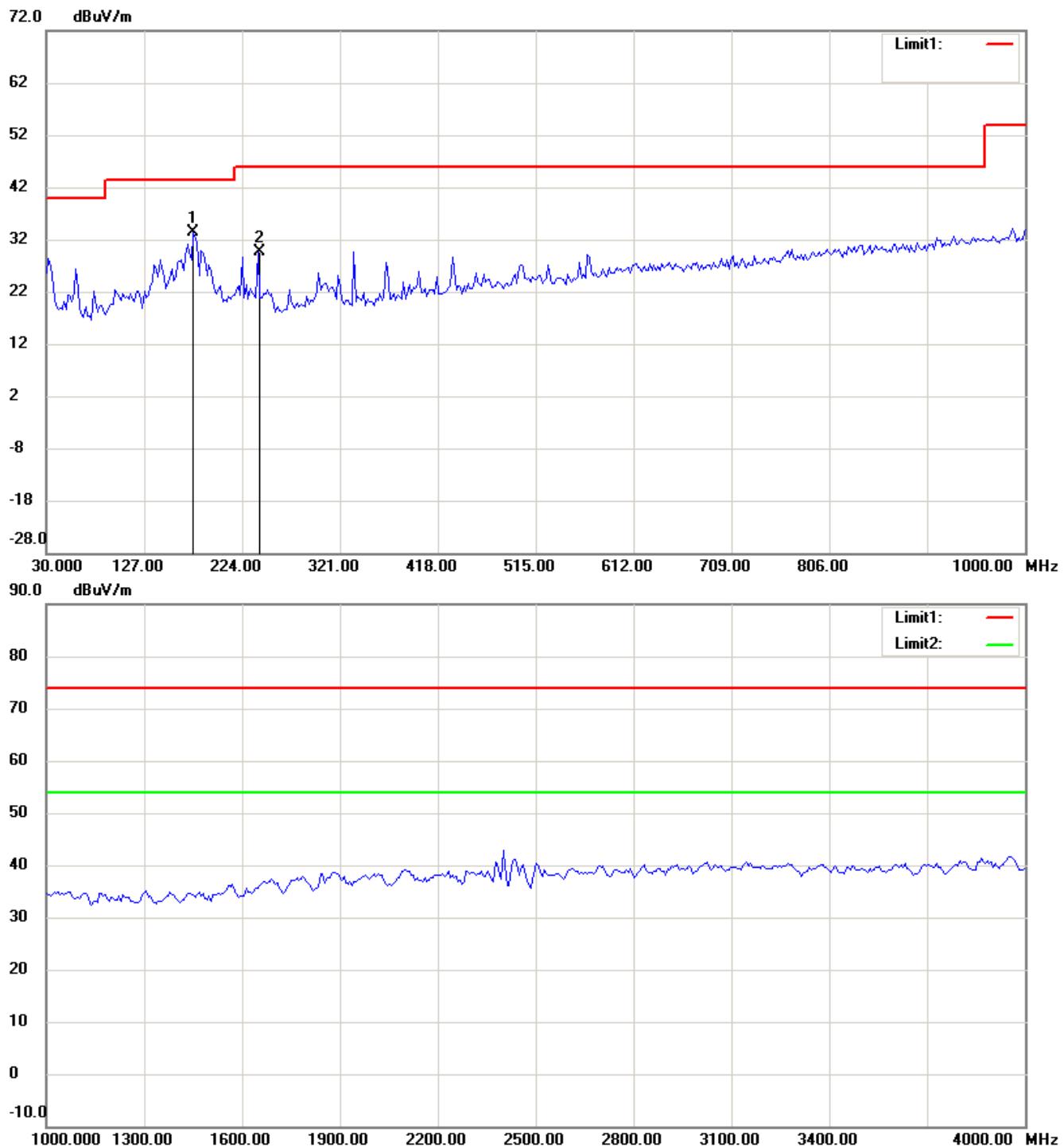
Note:

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.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

Antenna Polarization V



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

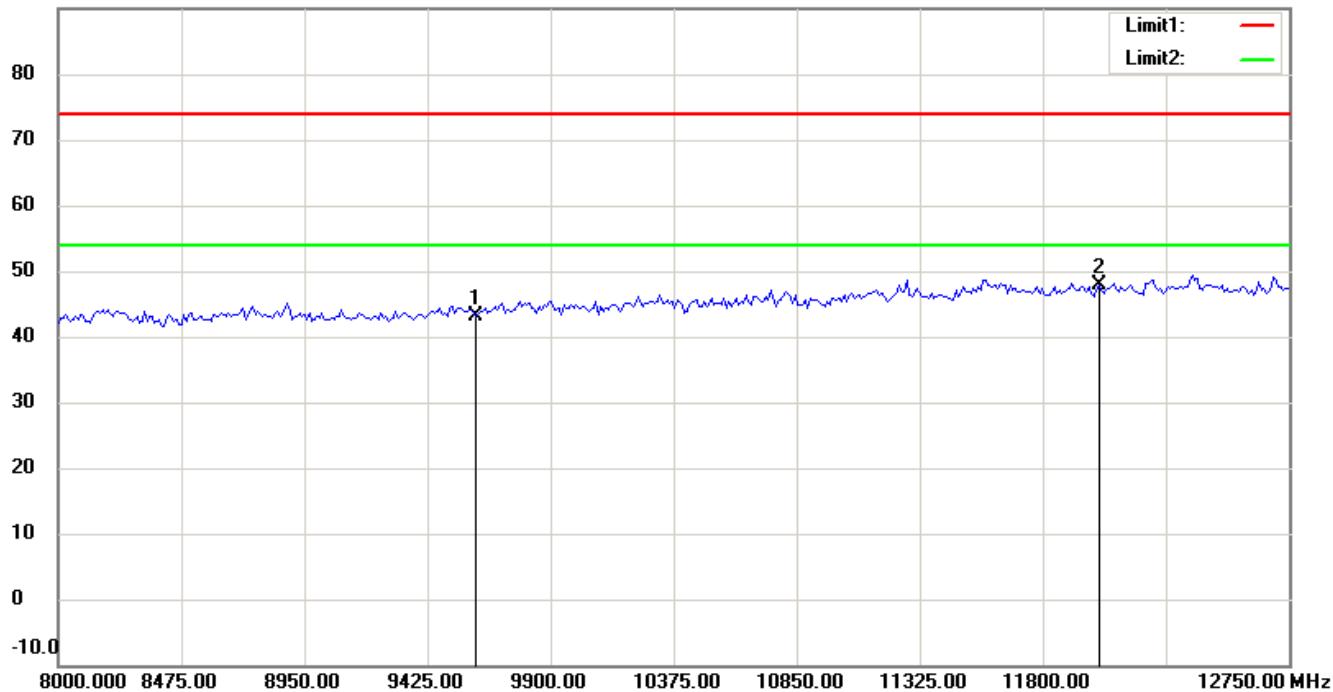
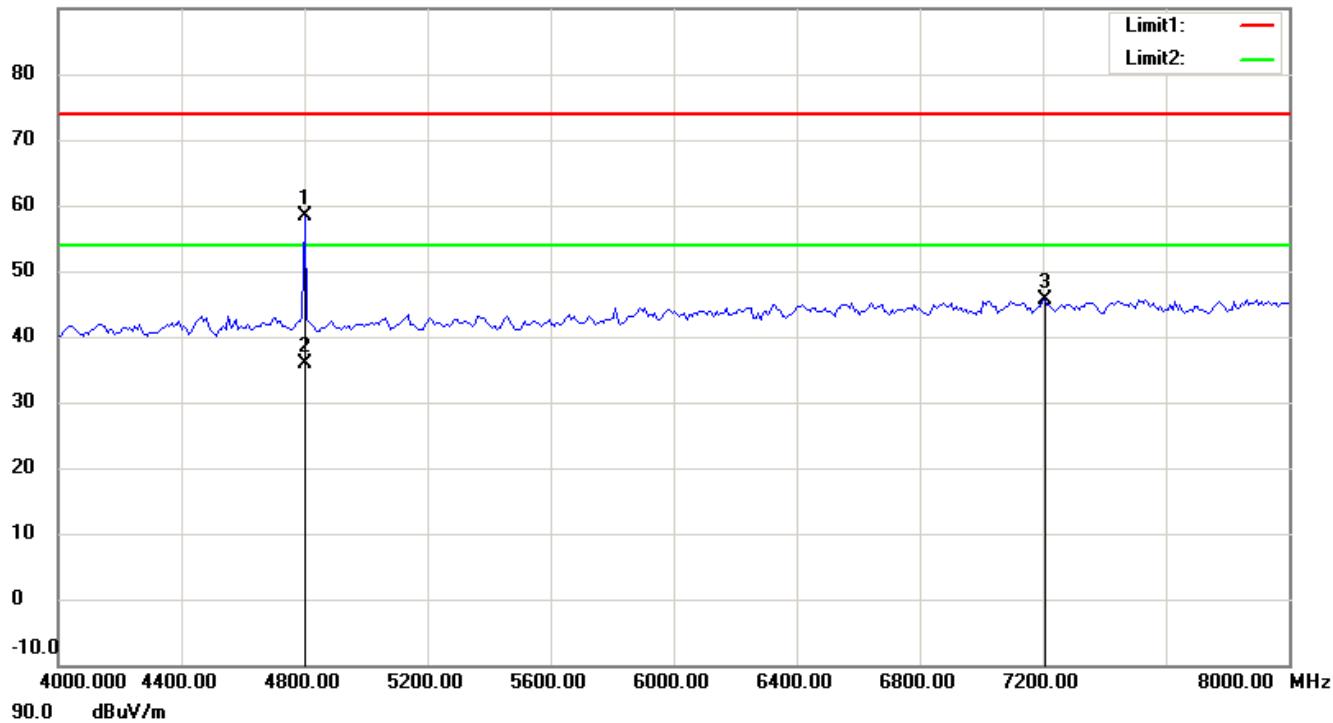
Note:

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: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 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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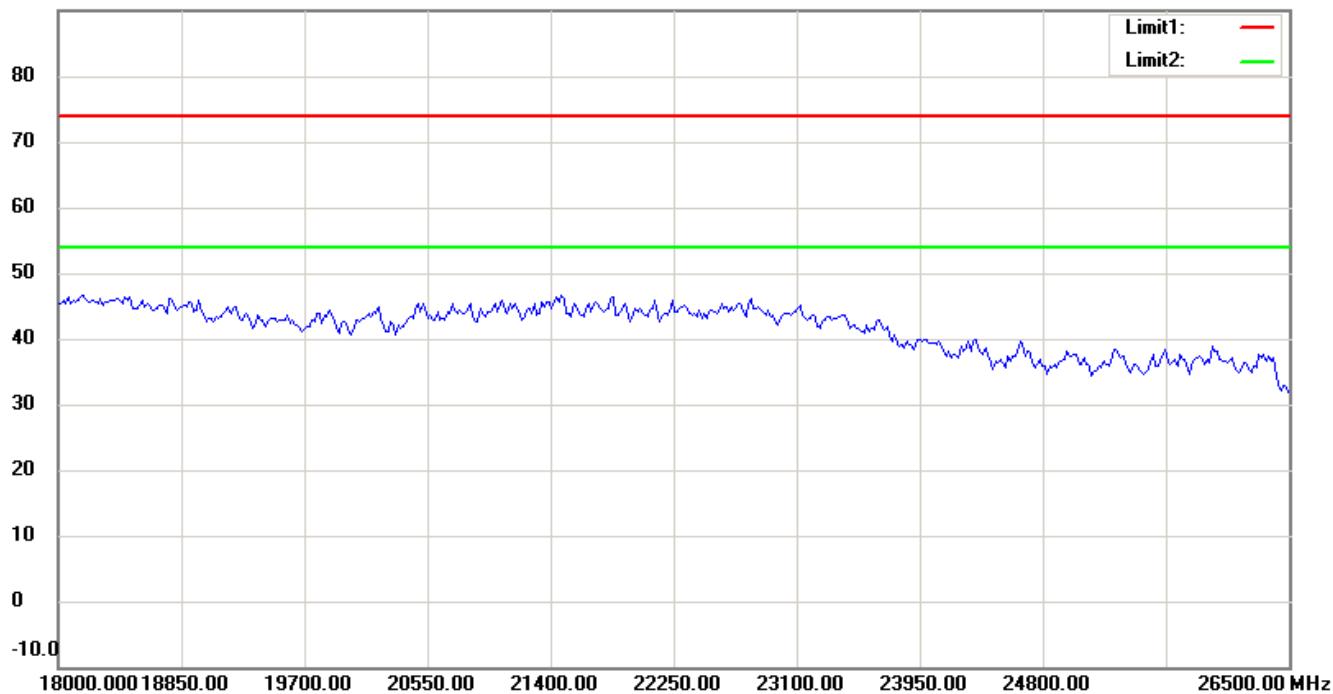
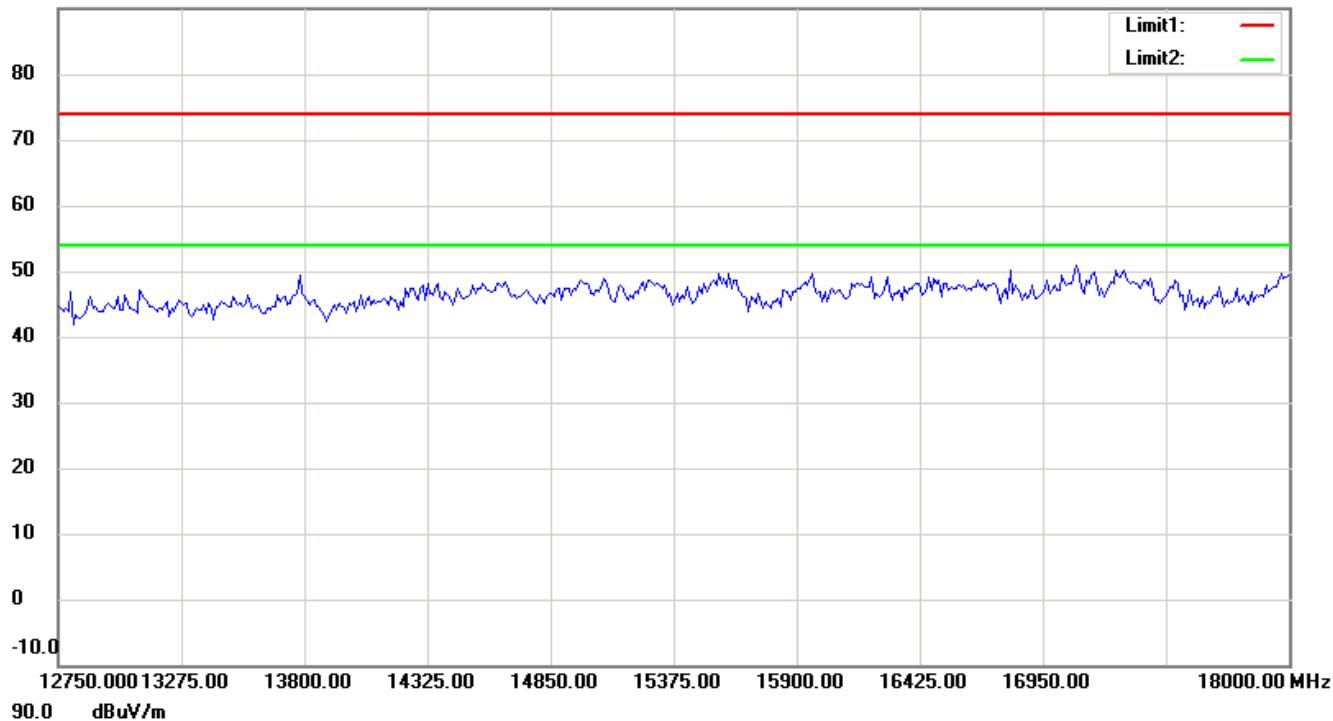


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 dBuV/m



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

Note:

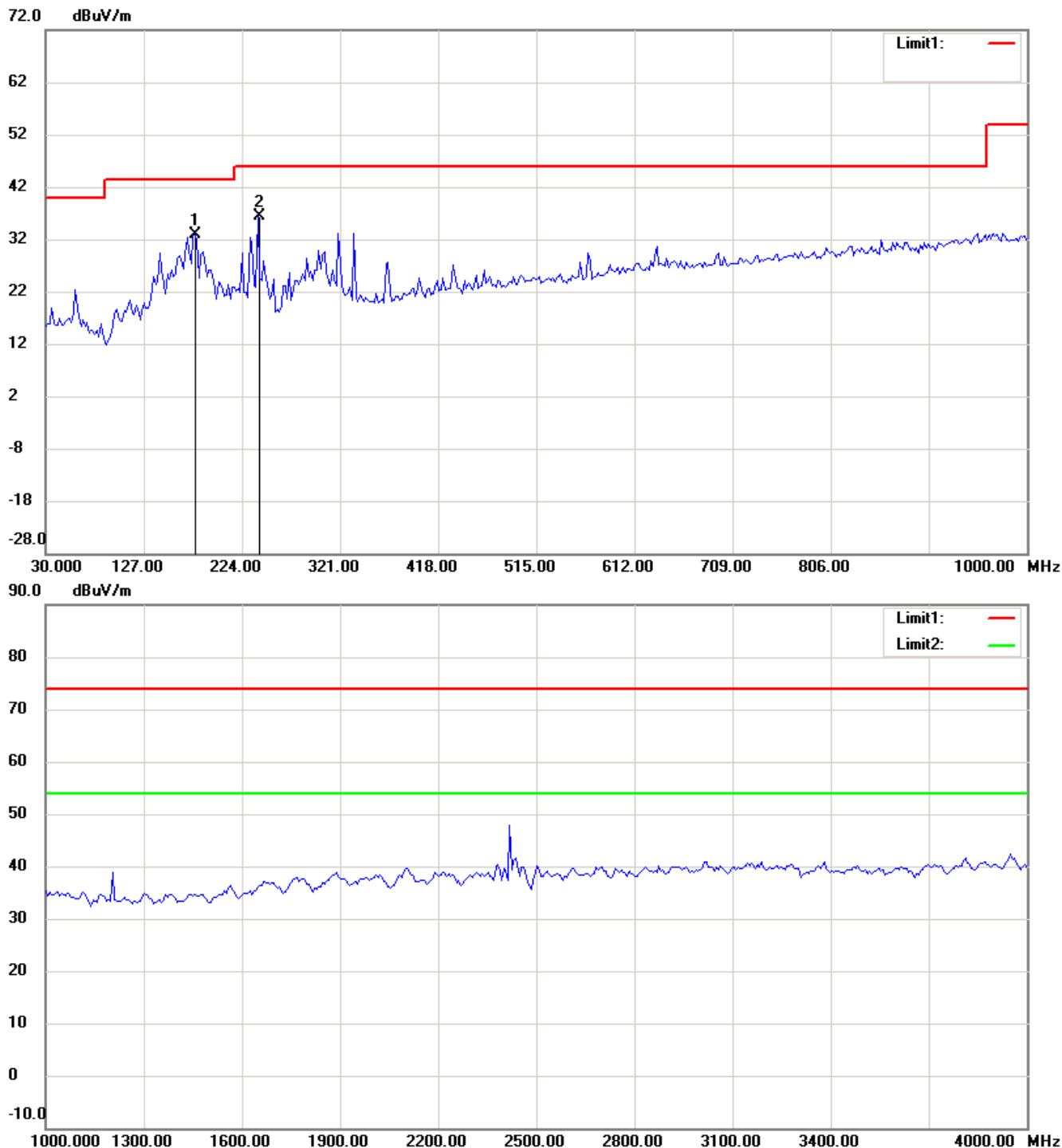
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
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Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

2418 MHz

Antenna Polarization H



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

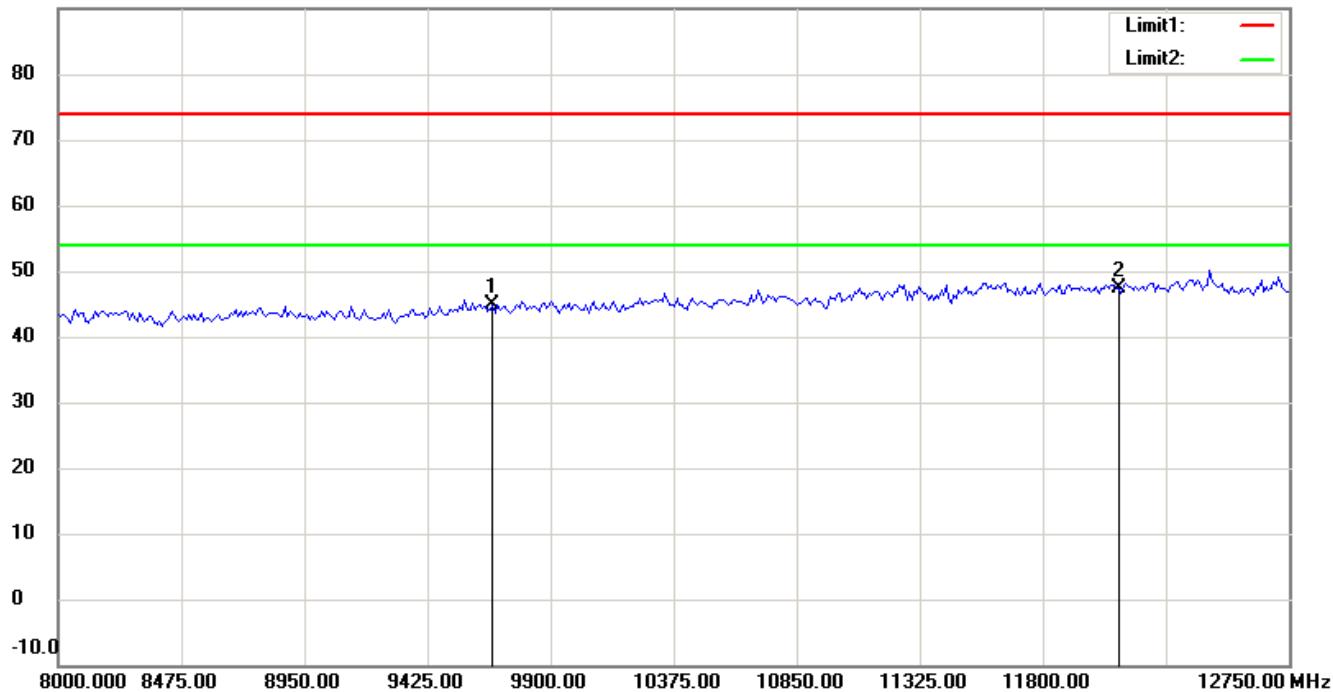
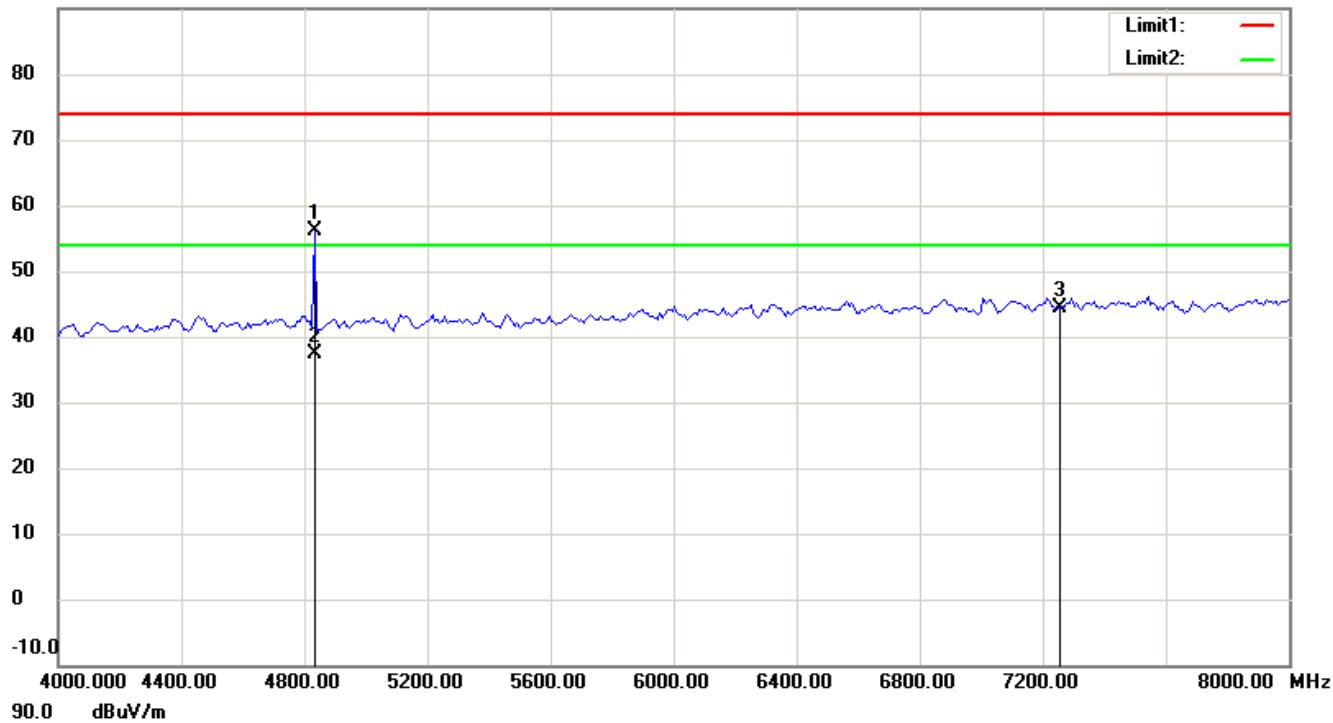
Note:

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

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 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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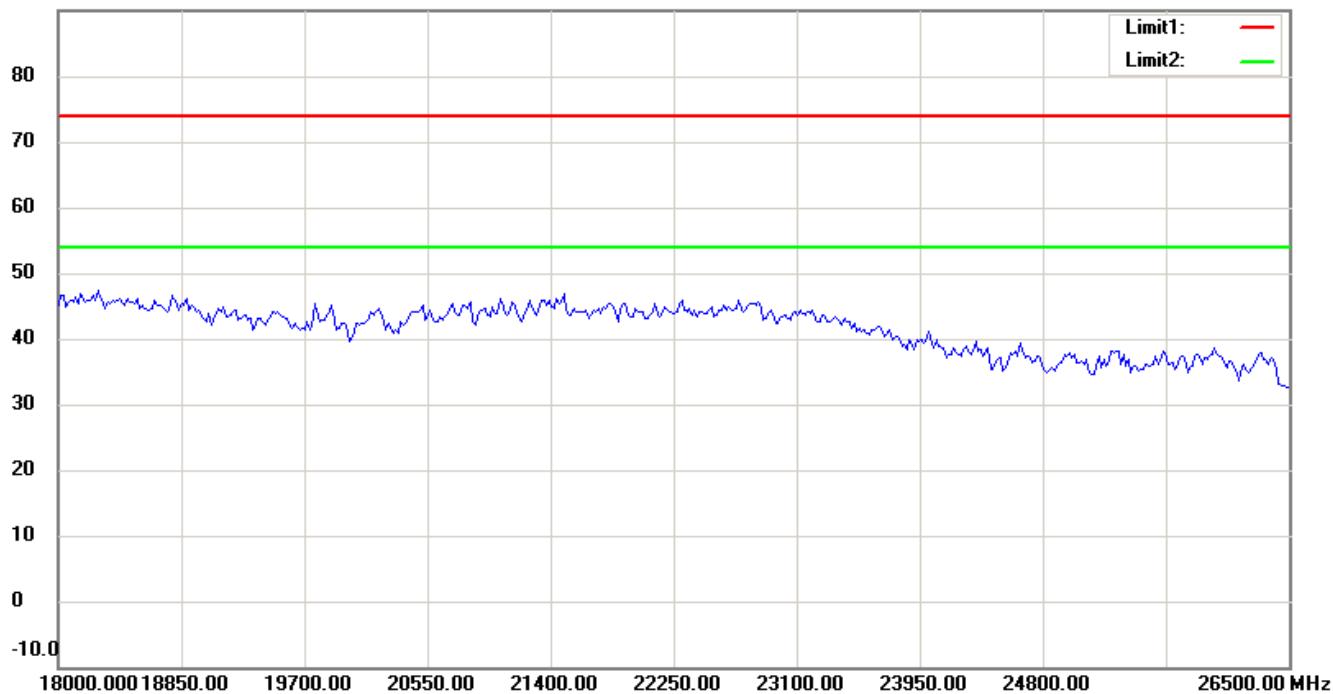
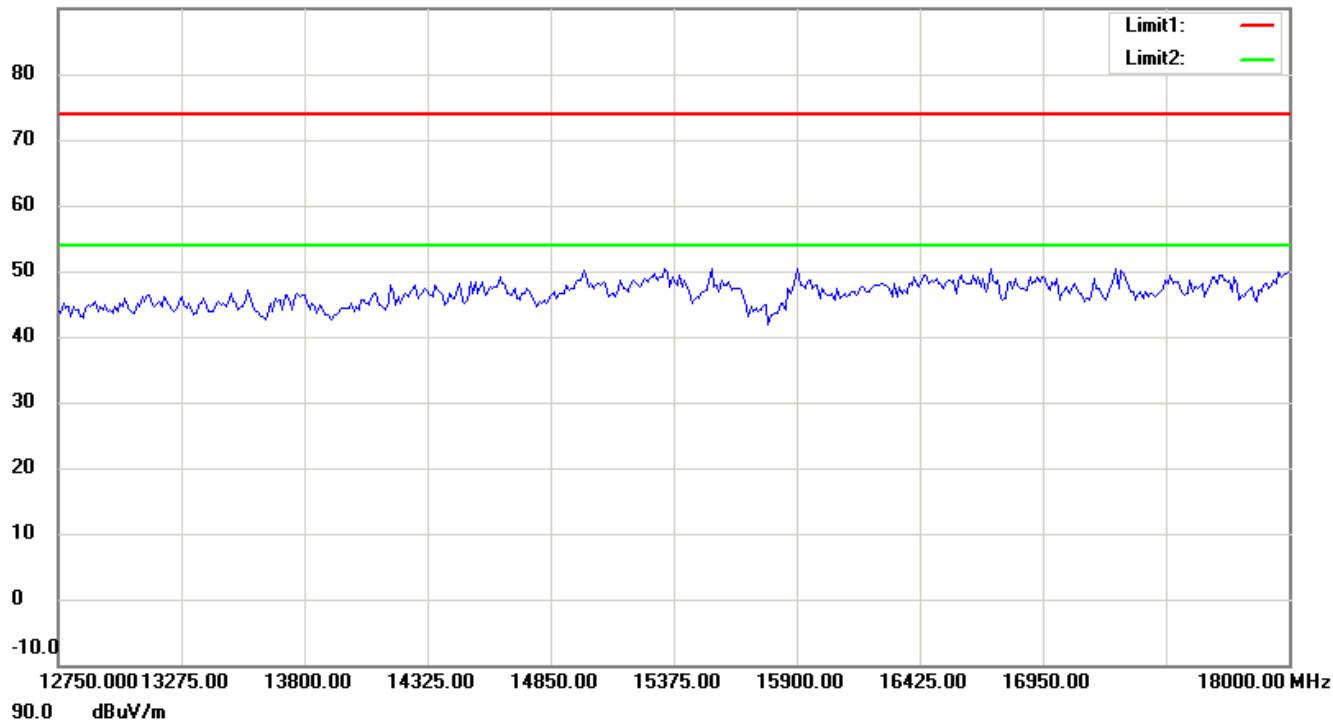


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 dBuV/m



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

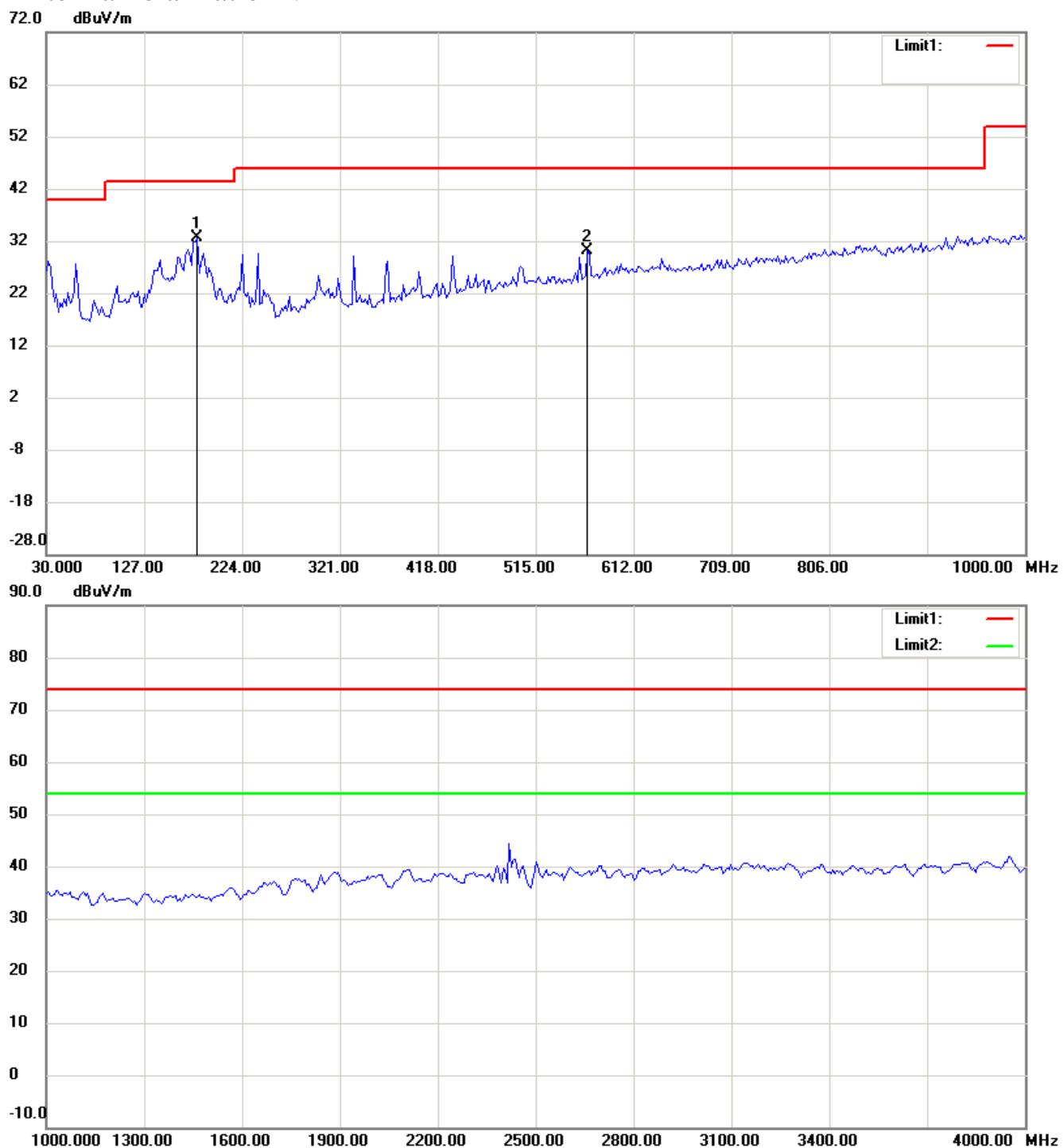
Note:

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: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

Antenna Polarization V



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

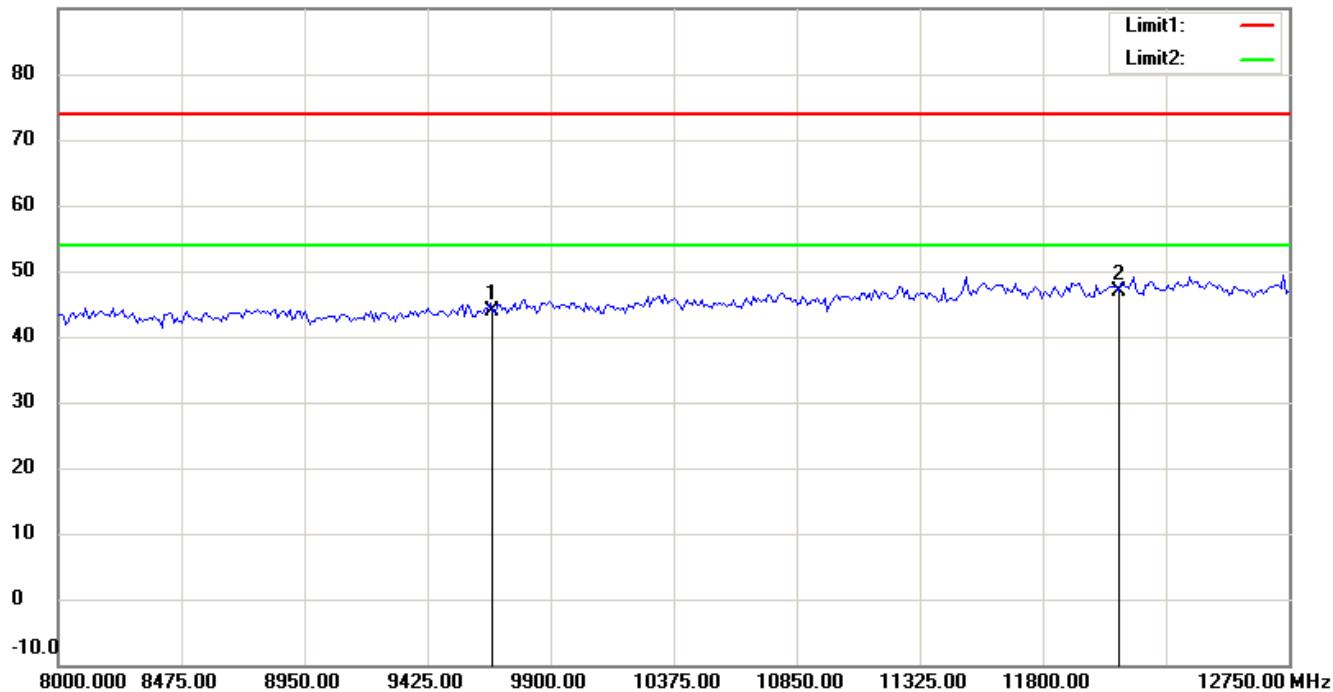
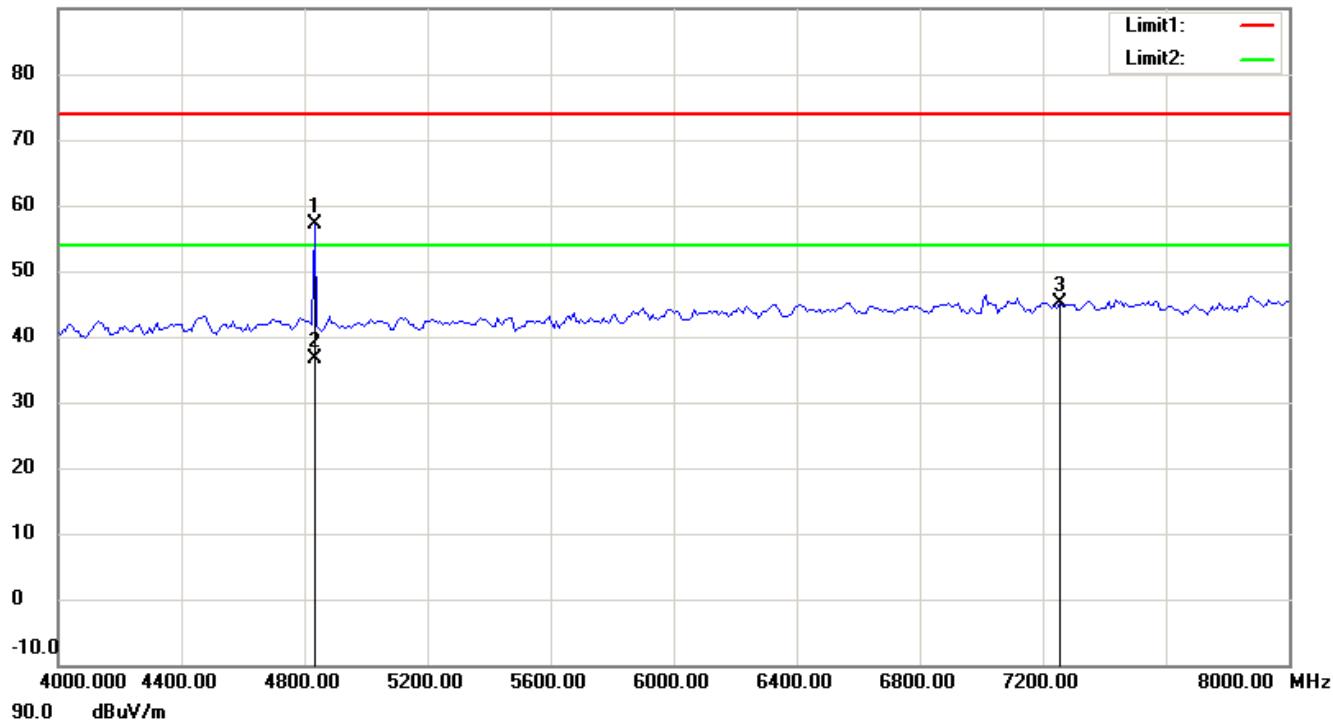
Note:

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Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 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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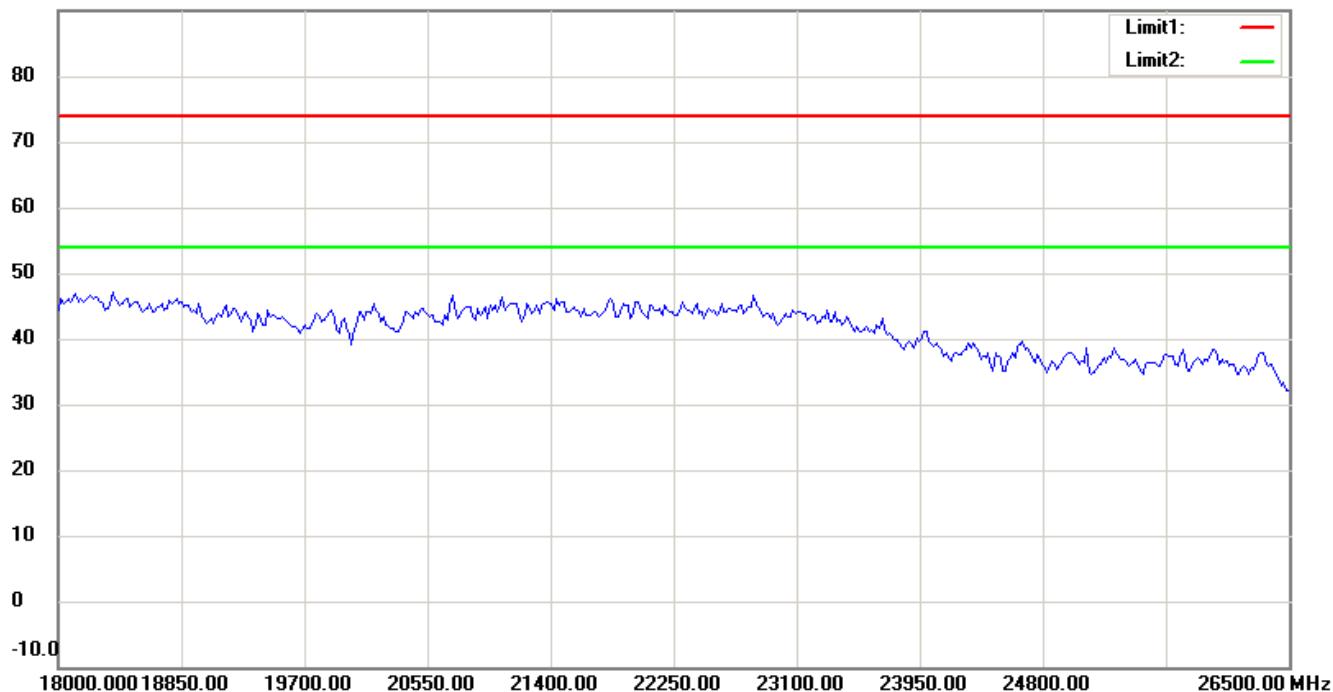
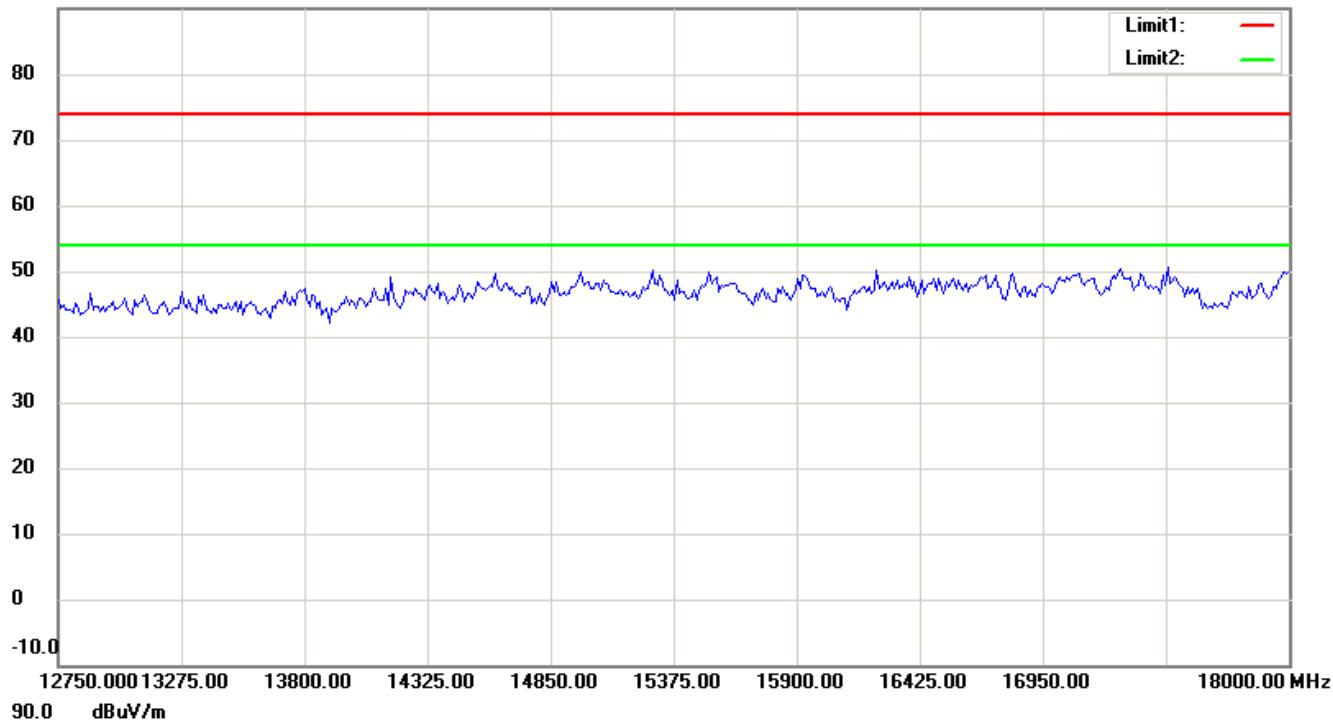


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 dBuV/m



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

Note:

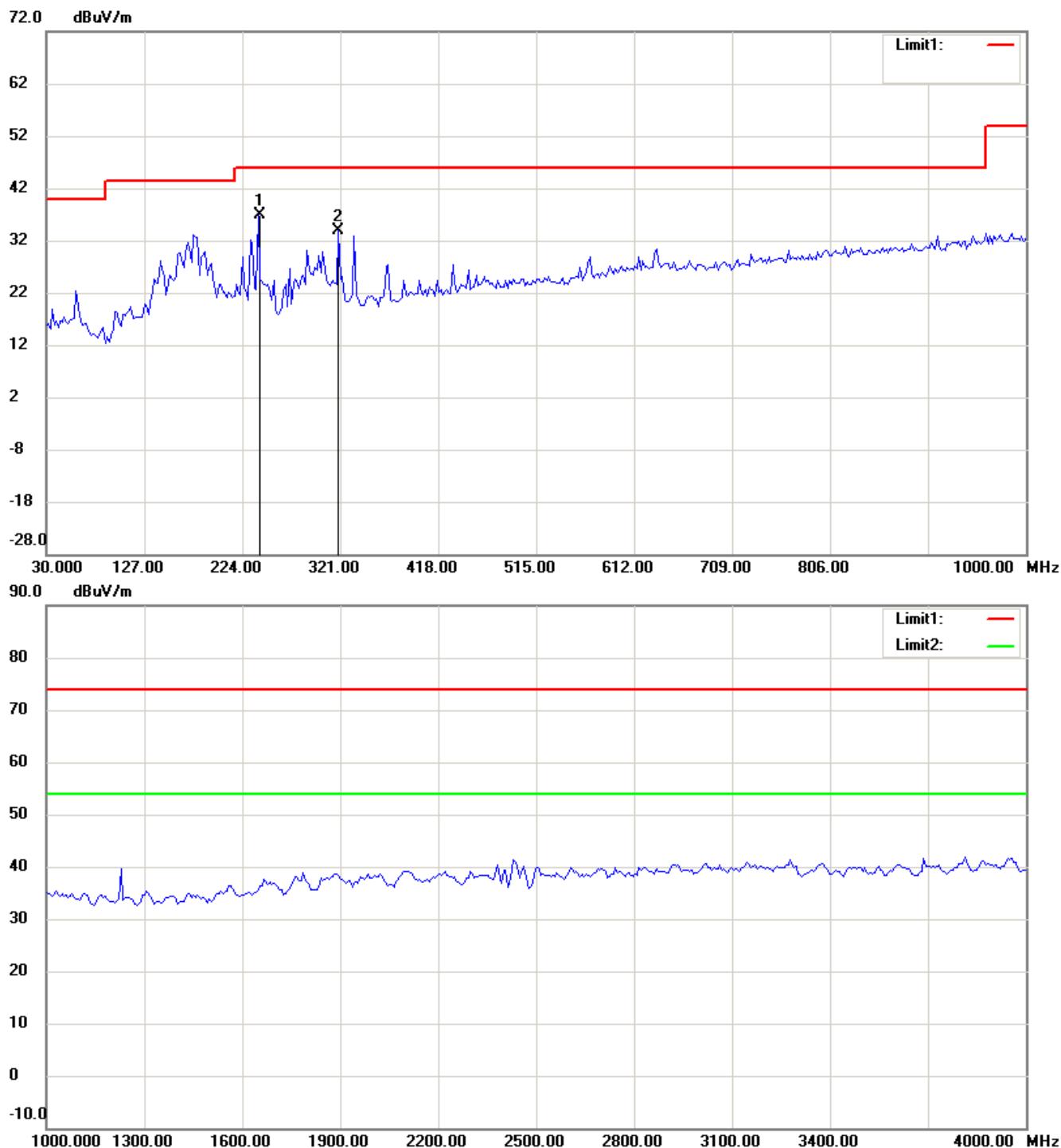
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

2466 MHz

Antenna Polarization H



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

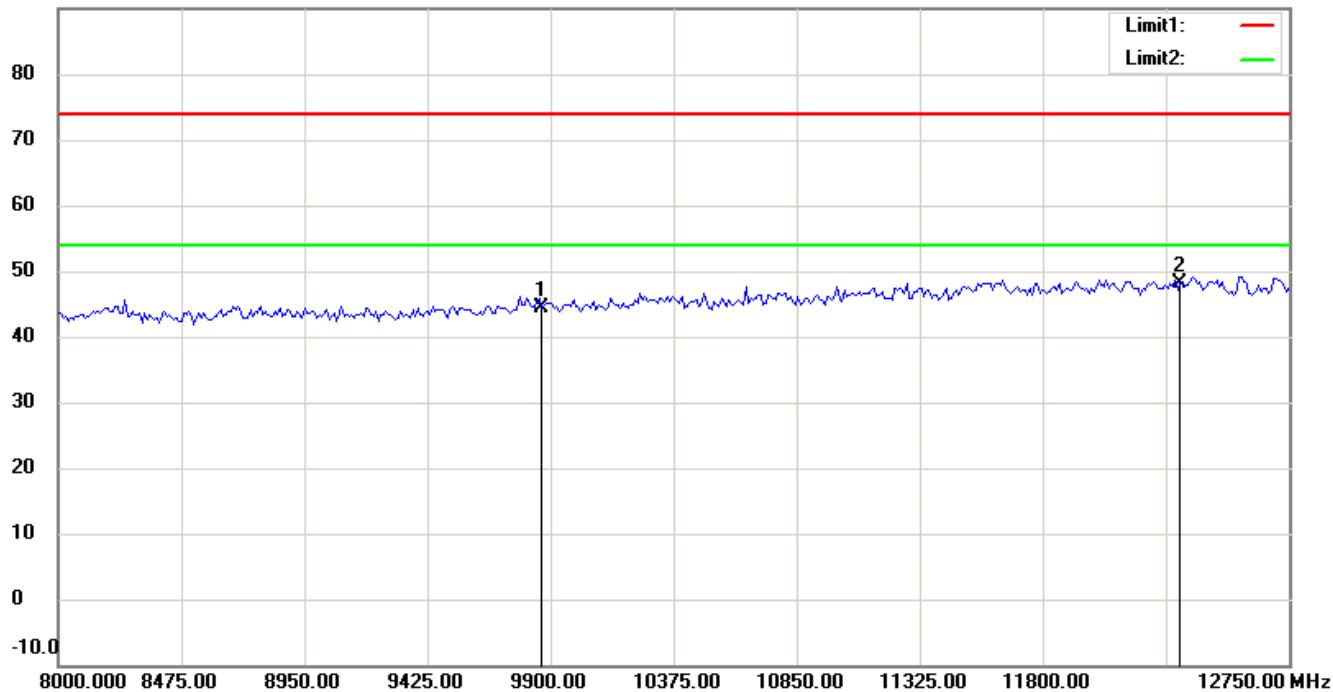
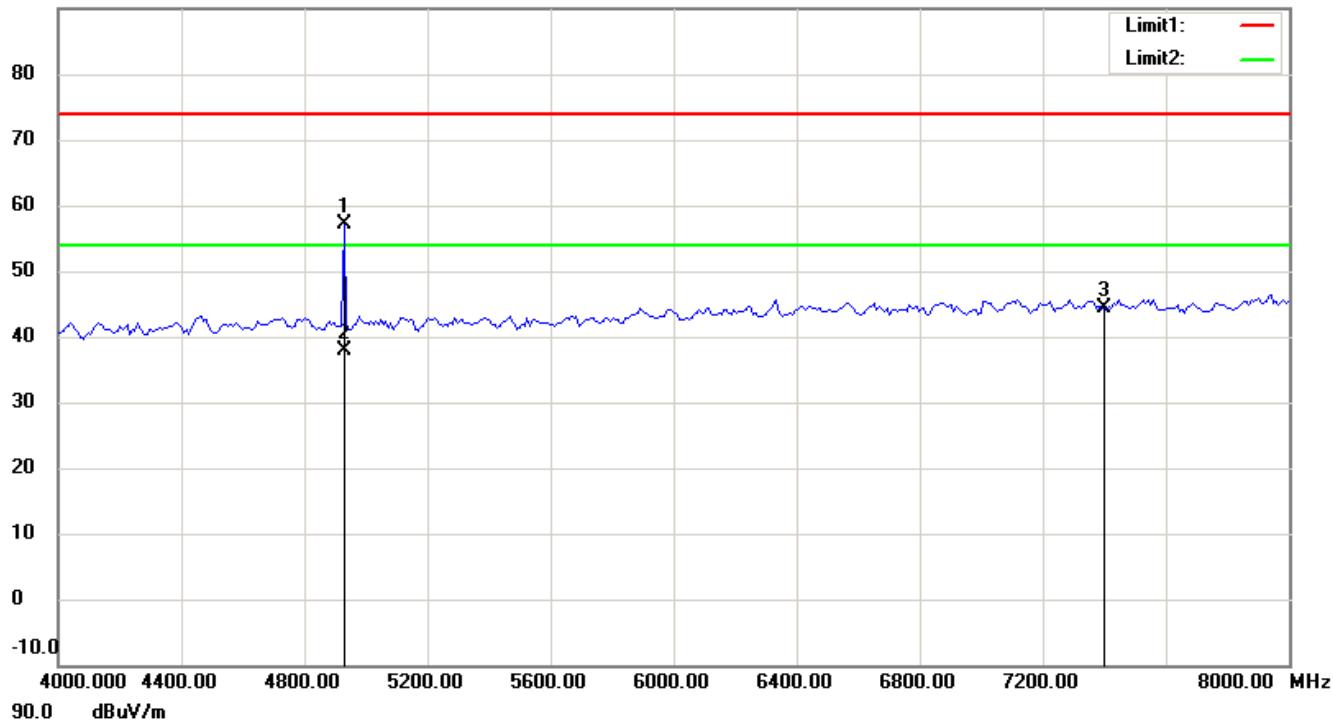
Note:

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Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

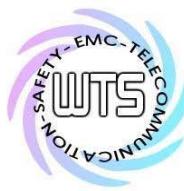
90.0 dBuV/m



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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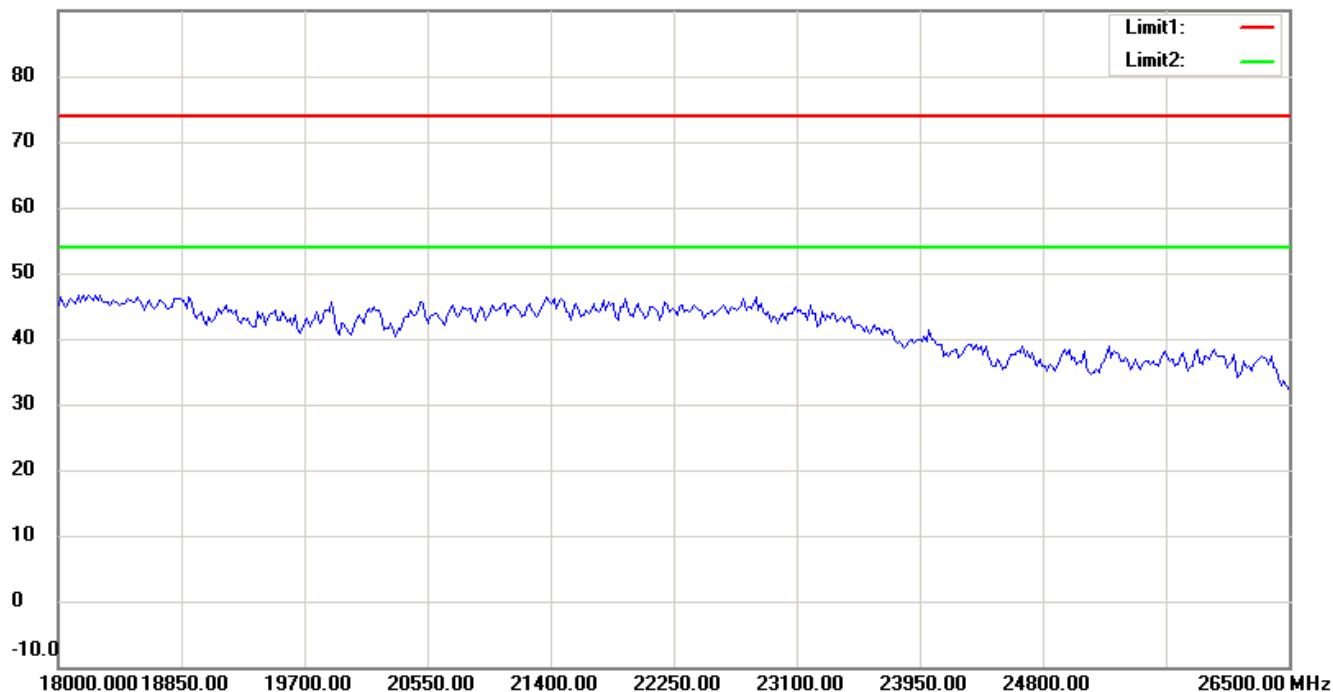
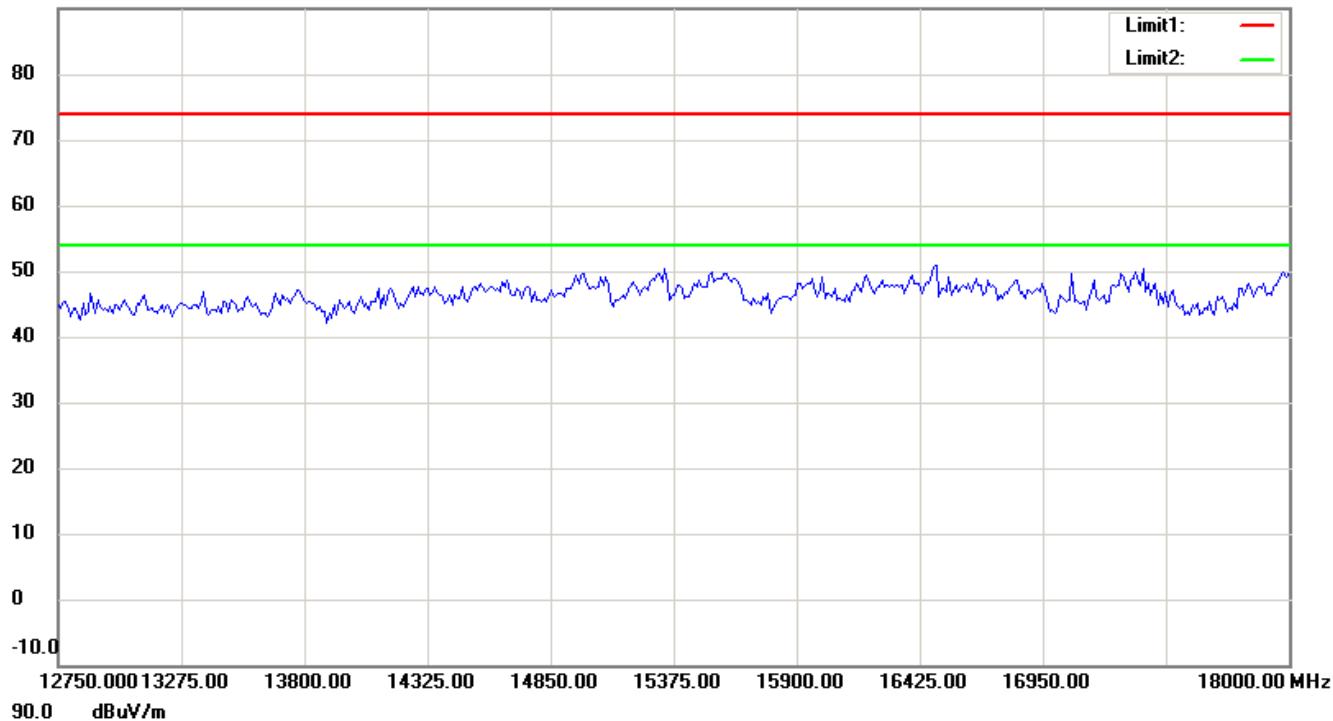


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 dBuV/m



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

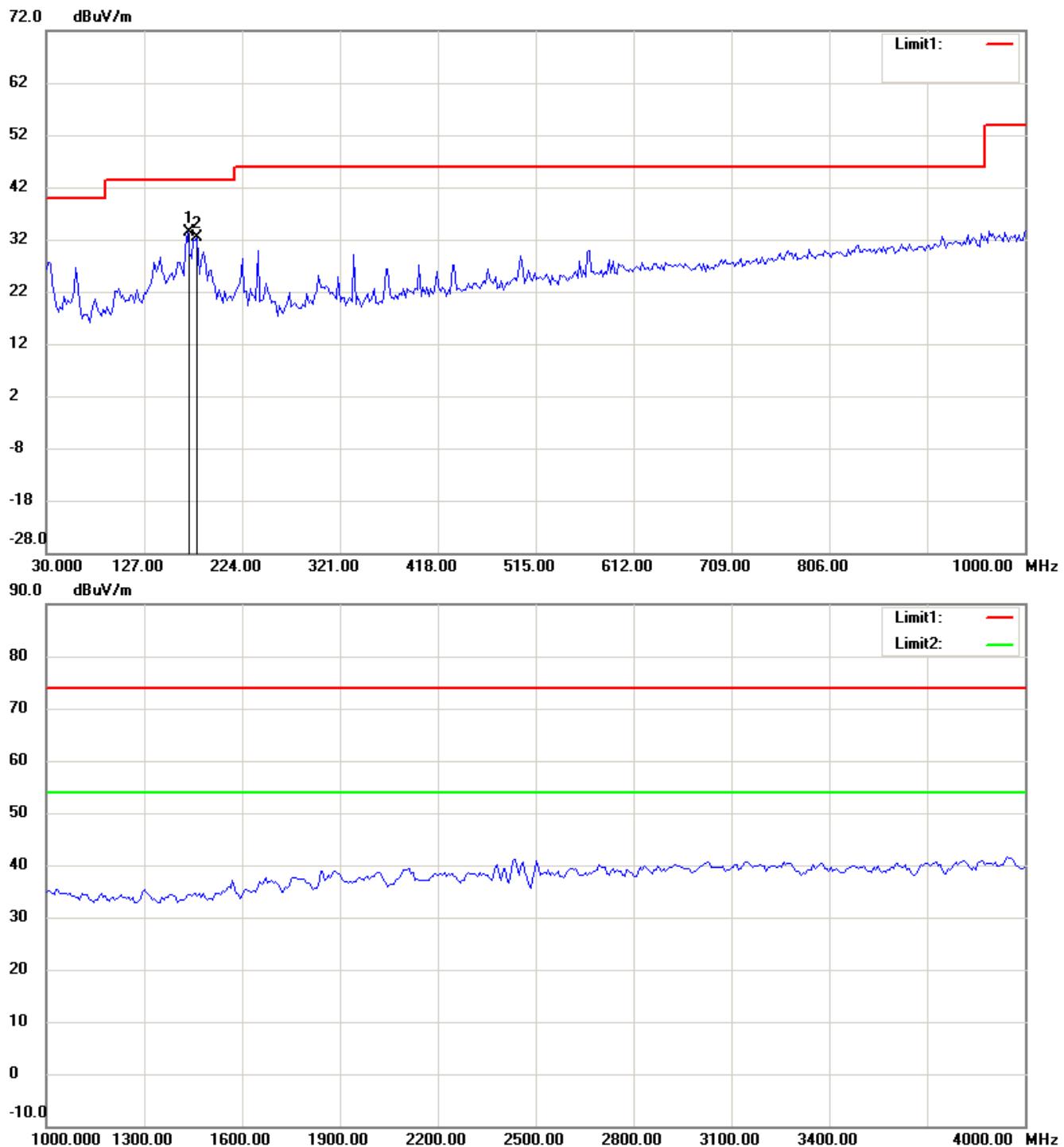
Note:

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Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

Antenna Polarization V



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

Note:

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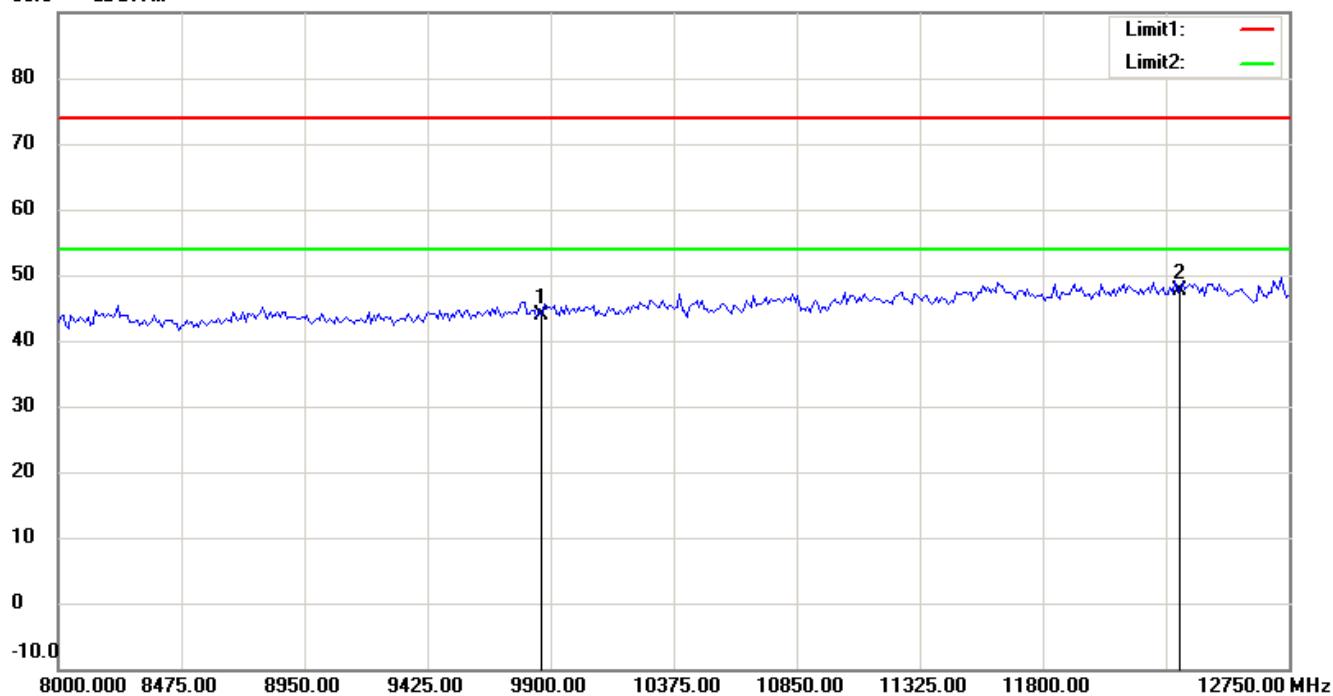
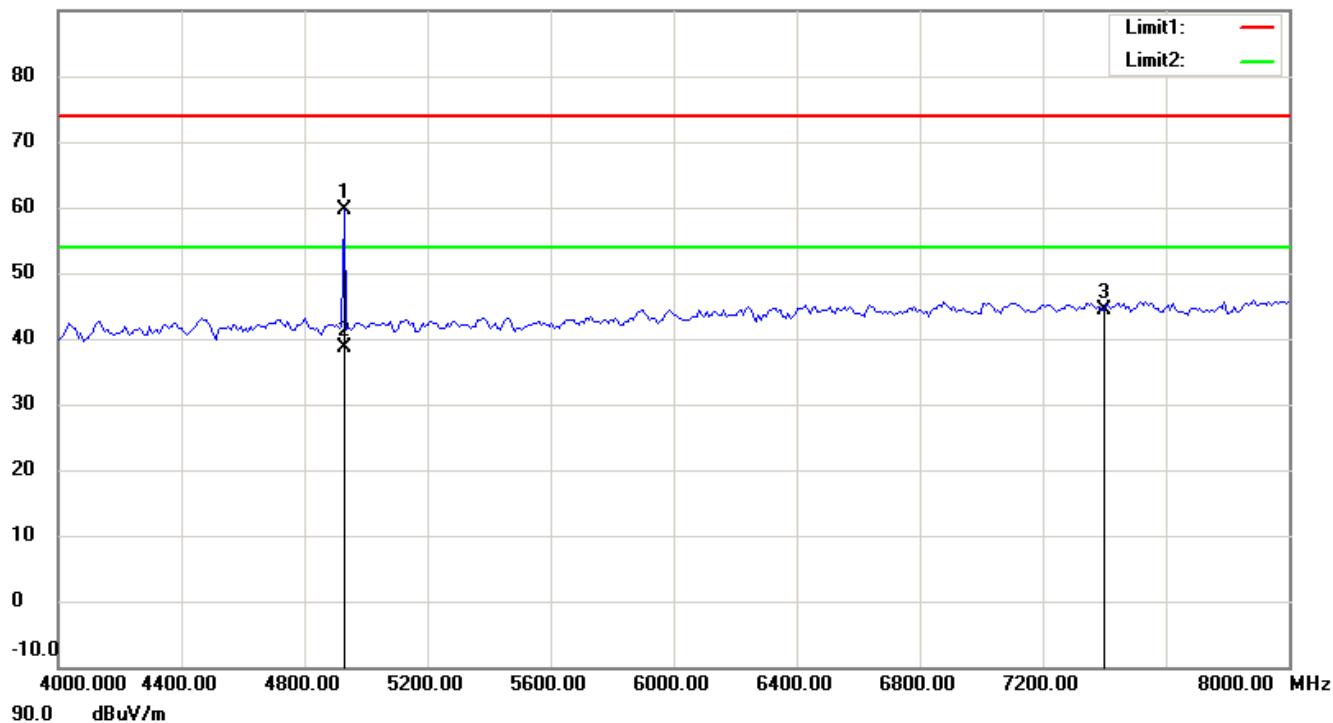


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

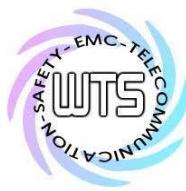
90.0 dBuV/m



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

Note:

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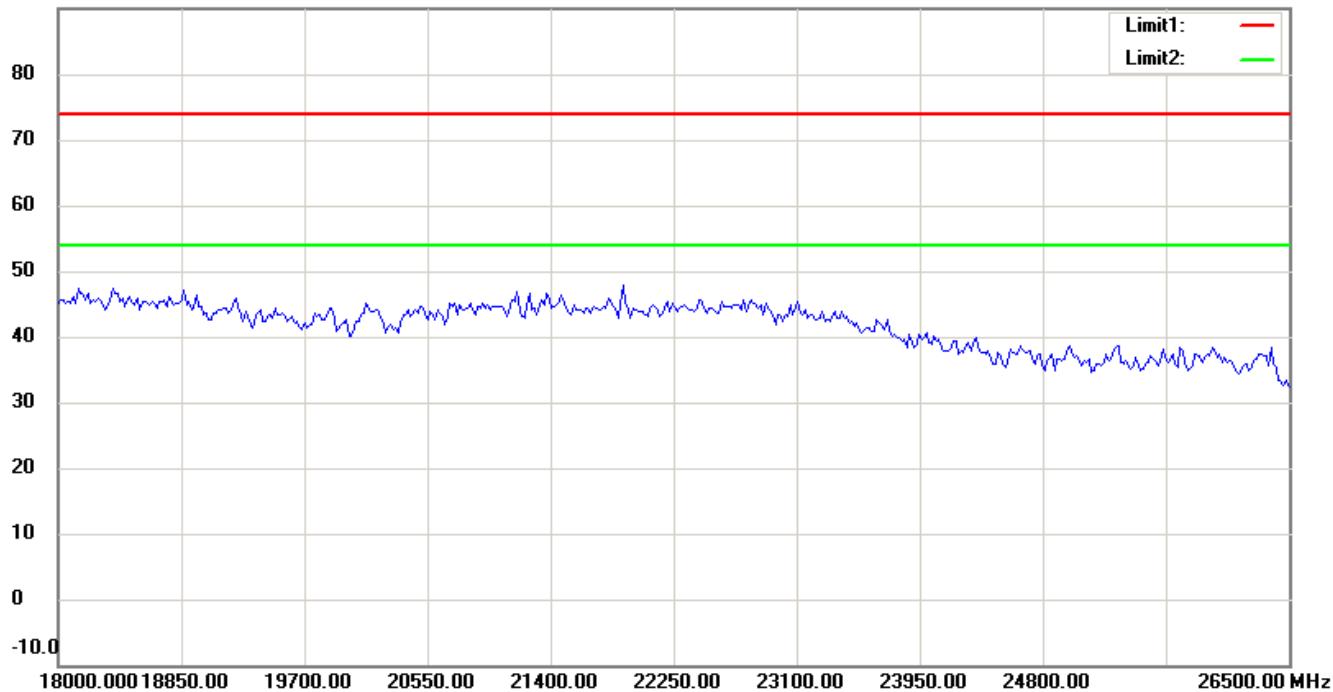
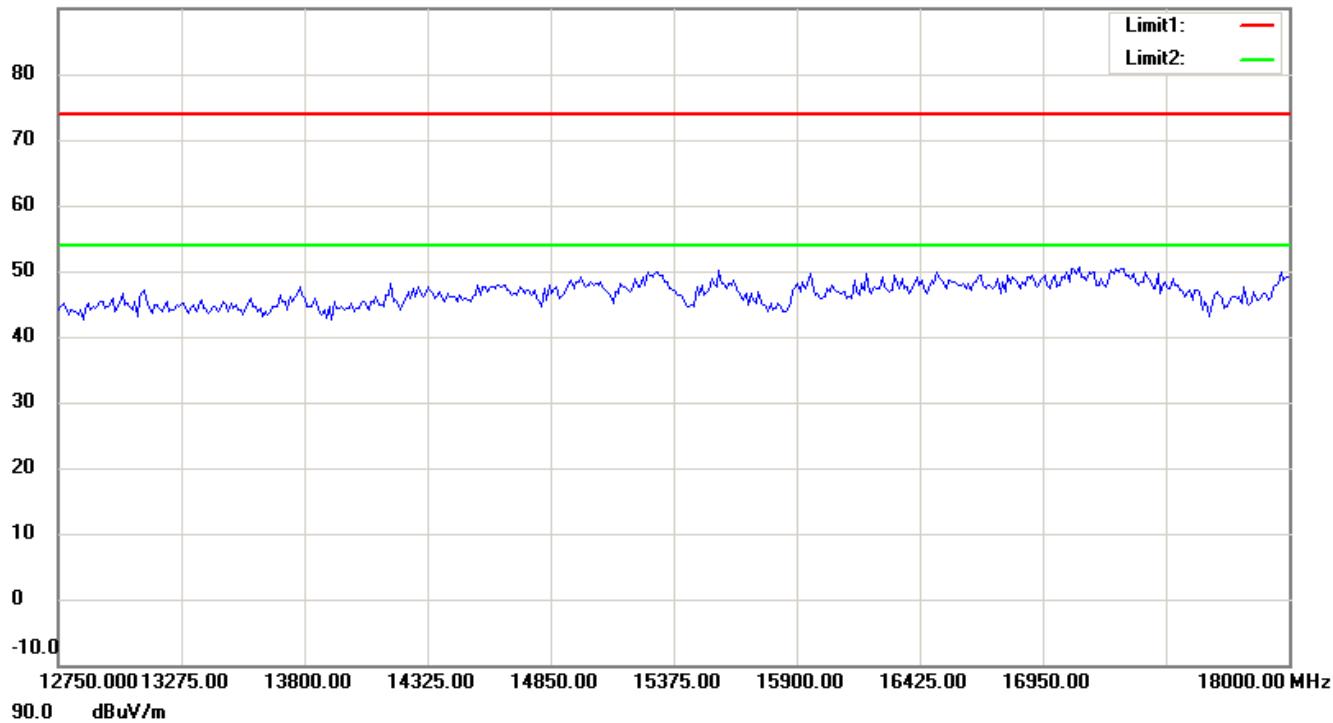


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Registration number: W6M21307-13369-C-1

FCC ID: 2AAQQ4C563230303041

90.0 dBuV/m



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

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