

FCC PART 15 SUBPART C TEST REPORT

for

SonicAir and Airflex (Wireless amplifier System)

Model No.: SA 2.1

FCC ID: V7W-WRX

of

Applicant: SpeakerCraft Inc.

Address: 940 Columbia Ave. Riverside, CA 92507, United States

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.: W6M21002-10415-P-15-R

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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R
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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:

March 19, 2010

Danny Sung

Danny

Date

WTS-Lab.

Name

Signature

Technical responsibility for area of testing:

March 19, 2010

Chang Tse-Ming

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



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

Name: /.
Accredited number: /.
Street: /.
Town: /.
Country: /.
Telephone: /.
Fax: /.

1.3 Details of approval holder

Name: SpeakerCraft Inc.
Street: 940 Columbia Ave. Riverside, CA 92507,
City: /.
Country: United States
Telephone: /.
Fax: /.



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1.4 Application details

Date of receipt of test item: February 5, 2010
Date of test: from February 6, 2010 to March 18, 2010

1.5 General information of Test item

Type of test item: SonicAir and Airflex (Wireless amplifier System)
Model Number: SA 2.1
Brand name: SpeakerCraft
Multi-listing model number: AirFlex
Brand name of Multi-listing model number: PROFICIENT
Photos: See appendix

Technical data

Frequency band: 2403.3-2479.1 MHz
Frequency (ch A): 2403.3 MHz
Frequency (ch B): 2442.2 MHz
Frequency (ch C): 2479.1 MHz

Transmitter Unom

Power (ch A or ch L) : Conducted: 11.51 dBm
Power (ch B or ch M) : Conducted: 12.03 dBm
Power (ch C or ch H) : Conducted: 12.23 dBm

Power supply : Adaptor (I/P: AC 100-240 V / 50-60 Hz / 2.5 A, O/P: 18-24Vdc / 4.75 A)
Operation modes : duplex
Modulation Type : FSK
Antenna Type : 1/2 λ Dipole antenna
Antenna gain : 1.53 dBi



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R
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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"/>
Modular Radio Device	<input type="checkbox"/>

Manufacturer: (if applicable)

Name: DONGGUAN MEILOON ACOUSTIC EQUIPMENTS CO., LTD.
Street: FENG HUANG GANG INDUSTRIAL, ESTATE, NO.77 YUANLIN RD,
Town: TANGXIA, DONGGUAN, GUANDONG PROVINCE,
Country: CHINA.

Additional information: ./.

1.6 Test standards

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



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2 Technical test

2.1 Summary of test results

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

or

The deviations as specified in 3 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 of power supply Adaptor (I/P: AC 100-240 V / 50-60 Hz / 2.5 A, O/P: 18-24Vdc / 4.75 A)

Extreme conditions parameters: test voltage : -- extreme
min : -- V
max : -- V



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2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2009/9/10	2010/9/9
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V- NETZNACHBILDUNG TWO- LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2009/3/27	2010/3/26
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2009/9/9	2010/9/8
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2009/5/9	2010/5/8
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2009/7/21	2010/7/20
ETSTW-CE 015	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T8-02	20307	FCC	2009/9/12	2010/9/11
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2009/9/9	2010/9/8
ETSTW-RE 002	Function Generator	33220A	MY43004982	Agilent	Function Test	
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2009/10/1	2010/9/30
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2009/9/18	2010/9/17
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2009/9/11	2010/9/10
ETSTW-RE 010	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2009/9/11	2010/9/10
ETSTW-RE 011	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070165	MOTECH	Function Test	
ETSTW-RE 017	Log-Periodic Antenna	HL025	352886/001	R&S	2009/5/4	2010/5/3
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2009/10/1	2010/9/30
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 021	SWEEP GENERATOR	SWM05	835130/010	R&S	2009/8/19	2010/8/18
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	EMCO	2009/8/14	2011/8/13
ETSTW-RE 028	Log-Periodic Dipole Array Antenna	3148	34429	EMCO	2009/4/15	2010/4/14
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	2009/4/15	2010/4/14
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2009/3/23	2010/3/22
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2009/8/23	2010/8/22
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2009/6/15	2010/6/14
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2009/8/23	2010/8/22
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2010/1/13	2011/1/12
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2009/5/5	2010/5/4
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2009/5/21	2010/5/20
ETSTW-RE 047	PSA SERIES SPECTRUM ANALYZER	E4445A	MY46181369	Agilent	2009/6/15	2010/6/14
ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2009/8/31	2010/8/30
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2009/4/14	2010/4/13
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2009/6/10	2010/6/09
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	



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ETSTW-RE 065	Amplifier	AMF-6F-18002650-25-10P	941608	MITEQ	2009/4/21	2010/4/20
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2009/10/2	2010/10/1
ETSTW-RE 073	Power Meter	N1911A	MY45100769	Agilent	2010/1/7	2011/1/6
ETSTW-RE 074	Power Sensor	N1921A	MY45241198	Agilent	2010/1/7	2011/1/6
ETSTW-RE 091	Match Pad	MDCS1500	None	WOKEN	Function Test	
ETSTW-RE 092	Match Pad	MDCS1510	None	WOKEN	Function Test	
ETSTW-RE 093	LUMPED ELEMENT POWER DIVIDER	PL2-10	146	MCLI	2010/3/5	2011/3/4
ETSTW-RE 095	Digital Thermo-Hygro Meter	0410	01	WISEWIND	2009/3/24	2010/3/23
ETSTW-RE 096	SIGNAL GENERATOR	SMIQ 03B	102274	R&S	2009/6/5	2010/6/4
ETSTW-RE 097	GPS SIGNAL GENERATOR	GSG-L1	06-0507-0311	Naviva	Function Test	
ETSTW-RS 010	Broadband Field Meter	NBM-520	C-0195	Narda	2009/09/29	2010/09/28
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2009/9/22	2010/9/21
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2009/9/21	2010/9/20
ETSTW-Cable 001	Microwave Cable	SUCOFLEX 104 (S Cable 1)	238094	HUBER+SUHNER	2009/9/16	2010/9/15
ETSTW-Cable 002	Microwave Cable	SUCOFLEX 104 (S Cable 7)	238093	HUBER+SUHNER	2009/9/16	2010/9/15
ETSTW-Cable 003	Microwave Cable	SUCOFLEX 104 (S Cable 11)	209953	HUBER+SUHNER	2009/9/16	2010/9/15
ETSTW-Cable 006	Microwave Cable	SUCOFLEX 104 (S Cable 8)	238095	HUBER+SUHNER	2010/3/5	2011/3/4
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2010/3/5	2011/3/4
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	2009/8/20	2010/8/19
ETSTW-Cable 012	BNC Cable	BNC Cable 2	None	JYE BAO CO.,LTD.	2009/8/20	2010/8/19
ETSTW-Cable 013	Microwave Cable	SUCOFLEX 104 (S Cable 5)	232345	HUBER+SUHNER	2010/3/5	2011/3/4
ETSTW-Cable 022	N TYPE Cable	OATS Cable 3	0002	JYE BAO CO.,LTD.	2010/3/5	2011/3/4



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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. The ambient. temperature of the UUT was 23°C with a humidity of 40 %.

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 No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.). The Registration Number: **930600**.



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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.

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)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Equivalent radiated Power	15.247(b)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Transmitter operating	15.247(c)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions conducted – Transmitter operating	15.247	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carrier Frequency Separation	15.247(a) (1)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Number of Hopping Frequencies	15.247(a) (1)(i)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Time of Occupancy (Dwell Time)	15.247(a) (1)(i)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20 dB Bandwidth	15.247(a) (1)(i)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Band-edge Compliance of RF Emission	15.247(c)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emissions from Receiver Section of Transceiver	15.109	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Power Line Conducted Emission	15.207(a)	<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

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 conditions	Conducted Power		
	Channel A	Channel B	Channel C
	[dBm]	[dBm]	[dBm]
T _{nom} = 23°C V _{nom} = 120 V	11.51	12.03	12.23

Test conditions	Radiated Power		
	Channel A	Channel B	Channel C
	[dBm]	[dBm]	[dBm]
T _{nom} = 23°C V _{nom} = -- V	--	--	--

Test conditions T _{nom} = 23°C, V _{nom} = -- V Frequency[MHz]	Signal Field strength TX highest power mode dB μ V/m
--	--
Measurement uncertainty	< 3 dB

The diagrams for the field strength measurements are included in Appendix.



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Maximum Peak Output Power

Limits:

Frequency MHz	Number of hopping channels			
	≥ 75	≥ 50	$49 \geq 25$	$74 \geq 15$
902-928		30 dBm	24 dBm	
2400-2483.5 MHz	30 dBm	-		21 dBm
5725-5850 MHz	30 dBm	-		

In case of employing transmitter antennas having antenna gain >dB_i and using fixed point-to point operation consider §15.247 (b)(4).

Test equipment used: ETSTW-RE 055, ETSTW-RE 064

Explanation: See attached diagrams in appendix.



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3.2 RF Exposure Compliance Requirements

According to Supplement C, Edition 01-01 to OET Bulletin 65, Edition 97-01 this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.

The antenna used for this Bluetooth transceiver module must not be co-located or operating in conjunction with any other antenna or transmitter.

3.3 Out of Band Radiated Emissions

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 below 1GHz :

Max. reading – 20 dB

Guidance on Measurement of FHSS 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.” Here the correction was added to the limit instead subtracted from the reading.

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

For frequencies above 1GHz (Peak measurements).

Limit = max. aver. reading-20dB +20dB(because Peak detector is used)

For frequencies above 1GHz (Average measurements).

Max. reading – 20 dB - duty cycle correction:

No duty cycle correction was added to the reading

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 017, ETSTW-RE 018, ETSTW-RE 021, ETSTW-RE 028, ETSTW-RE 030, ETSTW-RE 043, ETSTW-RE 064

Explanation: See attached diagrams in appendix.



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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 26000 MHz.

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

RES BW VID BW

Frequency <1 GHz 100 kHz 100 kHz (Peak measurements)

Frequency >1 GHz 1 MHz 1 MHz (Peak measurements)

1 MHz 1 MHz (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 960	500	54.0

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of FHSS Systems:

“If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.” Here the correction was added to the limit instead subtracted from the reading.

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

For frequencies above 1GHz (Average measurements).

Limit – duty cycle correction

No duty cycle correction was added to the reading.

54.0dB μ V/m

For frequencies above 1GHz (Peak measurements).

Limit + 20dB

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

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 064

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))

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance to 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 an 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 "Marker-Delta-Method" or the „Duty-Cycle Correction Factor“.

Summary table with radiated data of the test plots

Model: SA 2.1	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
Mode: 2403.3 MHz				Temperature: 23.9 °C		Engineer: Rick		
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)
282.6854	15.12	peak	15.80	30.92	46.00	-15.08	280	150
971.9440	8.19	peak	28.86	37.05	54.00	-16.95	330	150

Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)			
	Peak Ave.	Corr.	Peak Ave.	Peak Ave.						
1601.2020	54.51	---	-10.03	44.48	---	74.00	54.00	-29.52	110	150
3206.4130	53.85	---	-3.33	50.52	---	74.00	54.00	-23.48	130	150
4806.0000	45.24	---	-4.32	40.92	---	74.00	54.00	-33.08	190	150
7209.0000	47.90	---	-0.70	47.20	---	74.00	54.00	-26.80	210	150
9612.0000	29.92	---	14.46	44.38	---	74.00	54.00	-29.62	160	150
12015.0000	30.6	---	16.83	47.43	---	74.00	54.00	-26.57	270	150



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R
FCC ID: V7W-WRX

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
74.3687	13.50	peak	11.10	24.60	40.00	-15.40	130	150
983.1663	11.59	peak	29.00	40.59	54.00	-13.41	290	150

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1603.2070	57.47	---	-10.02	47.45	---	74.00	54.00	-26.55	140	150
3202.4050	57.88	52.00	-3.36	54.52	48.64	74.00	54.00	-5.36	270	150
4801.6030	48.65	---	-4.33	44.32	---	74.00	54.00	-29.68	150	150
7206.4130	51.20	---	-0.69	50.51	---	74.00	54.00	-23.49	190	150
9612.0000	29.92	---	14.46	44.38	---	74.00	54.00	-29.62	130	150
12015.000	29.72	---	16.83	46.55	---	74.00	54.00	-27.45	190	150

Mode: 2442.2MHz

Temperature: 23.9

°C

Engineer: Rick

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)
74.3687	14.40	peak	11.10	25.50	40.00	-14.50	160	150
983.1663	12.16	peak	29.00	41.16	54.00	-12.84	290	150

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
1627.2550	55.42	---	-9.98	45.44	---	74.00	54.00	-28.56	280	150
3254.5090	47.80	---	-3.05	44.75	---	74.00	54.00	-29.25	110	150
4884.0000	45.51	---	-4.05	41.46	---	74.00	54.00	-32.54	110	150
7326.0000	46.76	---	-0.95	45.81	---	74.00	54.00	-28.19	170	150
9768.0000	29.41	---	14.72	44.13	---	74.00	54.00	-29.87	90	150
12210.000	31.56	---	17.38	48.94	---	74.00	54.00	-25.06	240	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
73.8276	14.64	peak	11.21	25.85	40.00	-14.15	200	150
983.1663	12.18	peak	29.00	41.18	54.00	-12.82	110	150



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Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
1629.2590	59.29	---	-9.98	49.31	---	74.00	54.00	-24.69	80	150
3254.5090	55.67	51.26	-3.05	52.62	48.21	74.00	54.00	-5.79	330	150
4881.7640	52.52	---	-4.06	48.46	---	74.00	54.00	-25.54	130	150
7326.0000	48.43	---	-0.95	47.48	---	74.00	54.00	-26.52	240	150
9768.0000	30.55	---	14.72	45.27	---	74.00	54.00	-28.73	40	150
12210.000	30.94	---	17.38	48.32	---	74.00	54.00	-25.68	210	150

Mode: 2479.1MHz Temperature: 23.9 °C Engineer: Rick
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)
282.6854	15.98	peak	15.80	31.78	46.00	-14.22	220	150
971.9440	12.96	peak	28.86	41.82	54.00	-12.18	120	150

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
1653.3070	53.53	---	-9.94	43.59	---	74.00	54.00	-30.41	260	150
3306.6130	46.22	---	-2.74	43.48	---	74.00	54.00	-30.52	210	150
4958.0000	45.57	---	-4.07	41.50	---	74.00	54.00	-32.50	260	150
7437.0000	48.43	---	-0.98	47.45	---	74.00	54.00	-26.55	140	150
9916.0000	30.62	---	15.43	46.05	---	74.00	54.00	-27.95	200	150
12395.000	29.98	---	17.35	47.33	---	74.00	54.00	-26.67	100	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
38.1163	10.84	peak	13.62	24.46	40.00	-15.54	110	150
983.1663	11.79	peak	29.00	40.79	54.00	-13.21	130	150



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Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
1653.3060	57.75	---	-9.94	47.81	---	74.00	54.00	-26.19	220	150
3306.6130	54.84	48.16	-2.74	52.10	45.42	74.00	54.00	-8.58	130	150
4953.9080	50.11	---	-4.06	46.05	---	74.00	54.00	-27.95	240	150
7437.0000	48.30	---	-0.98	47.32	---	74.00	54.00	-26.68	110	150
9916.0000	30.15	---	15.43	45.58	---	74.00	54.00	-28.42	170	150
12395.000	30.49	---	17.35	47.84	---	74.00	54.00	-26.16	260	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.

All other not noted test plots do not contain significant test results in relation to the limits.

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

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 017, ETSTW-RE 018, ETSTW-RE 021, ETSTW-RE 028, ETSTW-RE 030, ETSTW-RE 043, ETSTW-RE 064



Worldwide Testing Services(Taiwan) Co., Ltd.

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3.6 Carrier Frequency Separation

Carrier Frequency Separation was measured with modulation (declared by manufacturer).

According to FCC rules part 15 subpart C §15.247 frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater.

Test conditions	Channel Separation	
	Channel A	Channel A+1
T _{nom} = 23°C V _{nom} = 120 V		4.00 MHz

Test conditions	Channel Separation	
	Channel B	Channel B+1
T _{nom} = 23°C V _{nom} = 120 V		6.00 MHz

Test conditions	Channel Separation	
	Channel C	Channel C+1
T _{nom} = 23°C V _{nom} = 120 V		4.00 MHz

Limits:

Frequency Range MHz	Limits	
	20 dB bandwidth < 25 kHz	20 dB bandwidth > 25 kHz
902-928	25 kHz	20 dB bandwidth
2400-2483.5 5725-5850.0	25 kHz	20 dB bandwidth

Test equipment used: ETSTW-RE 055, ETSTW-RE 064

Explanation: See attached diagrams in appendix.



Worldwide Testing Services(Taiwan) Co., Ltd.

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3.7 Number of Hopping Frequencies

According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies. Frequency hopping systems in 5725-5850 MHz bands shall use least 75 hopping frequencies.

For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20dB bandwidth of the hopping channel 250 kHz or greater, the system shall use at least 25 hopping frequencies.

Test conditions	Operating Mode	Number of Channels
$T_{nom} = 23^{\circ}C$	$V_{nom} = 120 V$	normal transmitting

Limits:

Frequency Range MHz	Limit	
	20dB Bandwidth	Number of Channels
902-928 MHz	Bandwidth < 250 kHz	≥ 50
	Bandwidth ≥ 250 kHz	≥ 25
2400-2483.5	not defined	15
5725-5850.0 MHz	1 MHz	75

Test equipment used: ETSTW-RE 055, ETSTW-RE 064

Explanation: See attached diagrams in appendix.



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3.7.1 Pseudorandom Frequency Hopping Sequence

The RF module can synthesize a total of 38 channels. At any given point in time, it only hops on a subset of 20 of these channels. If one of the 20 channels it is using is deemed to be bad, it stops using it and replaces it with one of the other 18 unused channels.

Channel	Frequency GHz	Channel	Frequency GHz	Channel	Frequency GHz	Channel	Frequency GHz
0	2.403328	11	2.425856	22	2.448384	33	2.470912
1	2.405376	12	2.427904	23	2.450432	34	2.472960
2	2.407424	13	2.429952	24	2.452480	35	2.475008
3	2.409472	14	2.432000	25	2.454528	36	2.477056
4	2.411520	15	2.434048	26	2.456576	37	2.479104
5	2.413568	16	2.436096	27	2.458624		
6	2.415616	17	2.438144	28	2.460672		
7	2.417664	18	2.440192	29	2.462720		
8	2.419712	19	2.442240	30	2.464768		
9	2.421760	20	2.444288	31	2.466816		
10	2.423808	21	2.446336	32	2.468864		

3.7.2 Coordination of hopping sequences to other transmitters

This transmitter does not have the ability of being coordinated with other FHSS system for as soon as the transmitter is in operation, the hopping frequency will follow the selected hopping sequence to transmit independently and no coordination is possible. Especially, this transmitter is used as a duplex Wireless speaker system, so no coordination of hopping frequency is required.

3.7.3 System Receiver Hopping Capability

There are two steps to make the receiver to shift the frequencies in synchronization with the transmitted signals:

First, the Transmitter will emit a preamble signal of 5 ms and the receiver will scan this signal by 0.2 ms sweeping until the preamble signal is caught. Second, the preamble signal is coded with the information of hopping sequence and the next transmitting frequency, so the receiver will be able to shift the receiving frequencies in synchronization with the transmitted signals.

3.7.4 Equal Hopping Frequency Use

Due to each hopping frequency will be transmitted in accordance to the frequency tables described above, there is no any frequency will be able to hop more times than others. Therefore each frequency will be used equally.



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3.8 Time of Occupancy (Dwell Time)

Frequency hopping systems operating in the 5725-5850 MHz band shall use an average time of occupancy on any frequency not greater than 0.4 seconds within a 30 second period.

In 2400-2483.5 MHz band the average time of occupancy on any channel shall not be greater than 0.4 seconds multiplied by the number of hopping channels employed.

For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not greater than 0.4 seconds within a 20 second period; if the 20dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test conditions	Operating mode	Measurement period	Time of Occupancy
$T_{nom} = 23^{\circ}\text{C}$ $V_{nom} = 120 \text{ V}$	Channel A	8	14.1024 ms
	Channel B	8	14.1024 ms
	Channel C	8	14.1024 ms

Limits and measurement periods:

Frequency MHz	Number of channels	Measurement Period	Limit
902 – 928	≥ 50	20 s	0.4 s
	$49 \geq 25$	10 s	0.4 s
2400 – 2483.5	≥ 15	0.4 s * number of used channels	0.4 s
5725- 5850	≥ 75	30 s	0.4s

Test equipment used: ETSTW-RE 055, ETSTW-RE 064

Explanation: See attached diagrams in appendix, which show the On-time and the number of counted events during the measurement period



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3.9 20dB Bandwidth

Frequency hopping systems operating in the 5725-5850 MHz bands shall use a maximum 20dB bandwidth of 1 MHz.

The 20dB bandwidth is measured on the lowest, middle and highest hopping channel.

For frequency hopping systems operating in the 902-928 MHz band the maximum 20dB bandwidth of the hopping channel is 500 kHz.

Test conditions	20 dB Bandwidth		
	Channel A	Channel B	Channel C
T _{nom} = 23°C V _{nom} = 120 V	1.923076923 MHz	1.923076923 MHz	1.858974359 MHz

Limits:

Frequency Range / MHz	Limit
902-928	≤ 500 kHz
2400-2483.5	not defined
5725-5850	≤ 1 MHz

Test equipment used: ETSTW-RE 055, ETSTW-RE 064

Explanation: See attached diagrams in appendix.



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3.10 Band-edge Compliance of RF Emissions

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	
		Single Frequency	
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	Lower Band-edge	Upper Band-edge
		49.00 dB	54.32 dB

Test conditions		Attenuation at or outside band-edges	
		Hopping Frequency	
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	Lower Band-edge	Upper Band-edge
		39.51 dB	46.12 dB

Limits:

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

Test equipment used: ETSTW-RE 055, ETSTW-RE 064

Explanation: See attached diagrams in appendix.



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3.11 Radiated Emissions from Receiver Section of Transceiver

FCC Rule: 15.109

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 064

Explanation: The test results of digital part and receiver part are listed in the separated test report no. W6M21002-10415-P-15B.



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3.12 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: SA 2.1 Date: 2010/2/6
Mode: Wireless Temperature: 24 °C Engineer:
Polarization: N Humidity: 60 % Rick

Frequency (MHz)	Reading (dB μ V)		Factor (dB)	Result (dB μ V)		Limit (dB μ V)		Margin (dB)
	QP	Ave.	Corr.	QP	Ave.	QP	Ave.	
0.1613	39.59	24.51	10.75	50.34	35.26	65.40	55.40	-15.06
0.3850	28.67	26.67	10.66	39.33	37.33	58.17	48.17	-10.84
0.7700	28.61	27.60	10.51	39.12	38.11	56.00	46.00	-7.89
1.4550	14.91	3.52	10.24	25.15	13.76	56.00	46.00	-30.85
3.5150	15.69	3.68	10.16	25.85	13.84	56.00	46.00	-30.15
11.0833	25.01	21.37	10.42	35.43	31.79	60.00	50.00	-18.21

Polarization: L1

Frequency (MHz)	Reading (dB μ V)		Factor (dB)	Result (dB μ V)		Limit (dB μ V)		Margin (dB)
	QP	Ave.	Corr.	QP	Ave.	QP	Ave.	
0.1535	40.67	23.36	10.75	51.42	34.11	65.81	55.81	-14.39
0.1978	36.22	27.89	10.78	47.00	38.67	63.70	53.70	-15.03
0.7650	26.49	25.33	10.52	37.01	35.85	56.00	46.00	-10.15
2.1600	15.41	2.83	10.10	25.51	12.93	56.00	46.00	-30.49
3.6450	16.60	4.23	10.19	26.79	14.42	56.00	46.00	-29.21
8.8890	18.63	9.46	10.27	28.90	19.73	60.00	50.00	-30.27



Worldwide Testing Services(Taiwan) Co., Ltd.

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Mode: Polarization:	AUX IN		Temperature: Humidity:		24	°C	Engineer:
	N			60	%		Rick
Frequency (MHz)	Reading QP	Reading Ave.	Factor Corr.	Result QP	Result Ave.	Limit QP	Margin (dB)
0.1554	41.57	22.97	10.74	52.31	33.71	65.71	55.71
0.2161	35.19	25.46	10.75	45.94	36.21	62.97	52.97
0.2946	28.54	12.11	10.72	39.26	22.83	60.39	50.39
0.7150	15.87	5.00	10.55	26.42	15.55	56.00	46.00
1.1400	18.79	6.32	10.34	29.13	16.66	56.00	46.00
8.8890	21.22	12.00	10.19	31.41	22.19	60.00	50.00
							-27.81

Polarization: L1

Frequency (MHz)	Reading QP	Reading Ave.	Factor Corr.	Result QP	Result Ave.	Limit QP	Margin (dB)
0.1617	40.68	23.63	10.76	51.44	34.39	65.38	55.38
0.2690	30.52	18.92	10.73	41.25	29.65	61.15	51.15
0.3550	24.82	8.46	10.71	35.53	19.17	58.84	48.84
0.7700	27.76	26.86	10.52	38.28	37.38	56.00	46.00
3.7450	17.43	6.60	10.19	27.62	16.79	56.00	46.00
8.9444	28.56	26.70	10.26	38.82	36.96	60.00	50.00
							-13.04

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

Note: 1.The formula of measured value as: Test Result = Reading + Correction Factor

2.The Correction Factor = Cable Loss + LISN Insertion Loss + Pulse Limit Loss

3.Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average

4.All not in the table noted test results are more than 20 dB below the relevant limits.

5.See attached diagrams in Appendix.

Test equipment used: ETSTW-CE 001, ETSTW-CE 003, ETSTW-CE 004, ETSTW-CE 006, ETSTW-RE 064



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Appendix

A Measurement diagrams

1. Peak Output Power
2. Spurious Emissions radiated
3. Carrier Frequency Separation
4. Number of Hopping Frequencies
5. Time of Occupancy (Dwell Time)
6. 20dB Bandwidth
7. Band-edge Compliance of RF Conducted Emissions
8. Power Line Conducted Emission

B Photos

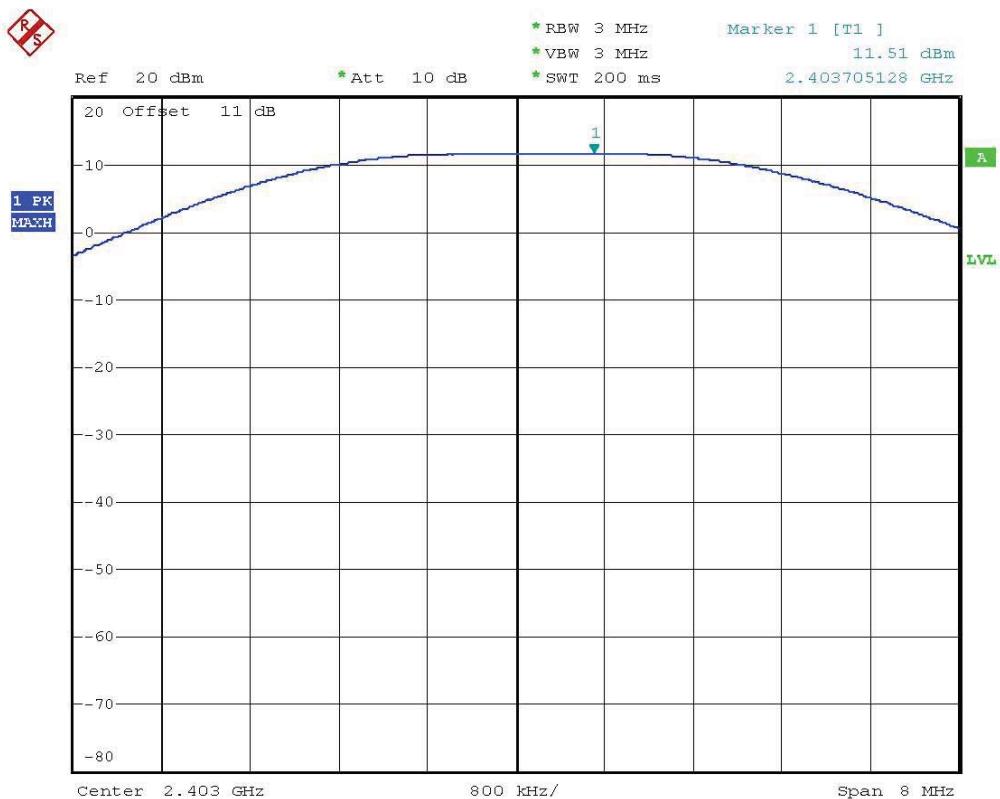
1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission
4. Set Up Photo of Conducted Emission



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FCC ID: V7W-WRX

Peak Output Power



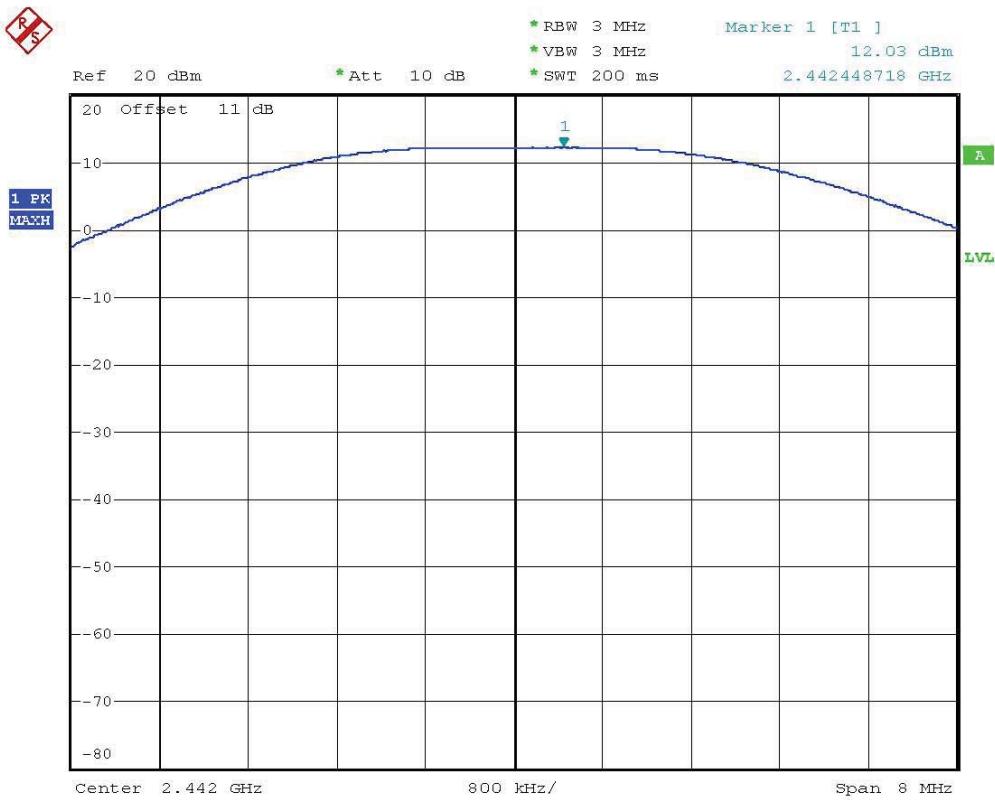
MAX OUTPUT POWER 2403.3 MHz
Date: 16.MAR.2010 15:19:12



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



MAX OUTPUT POWER 2442.2 MHz

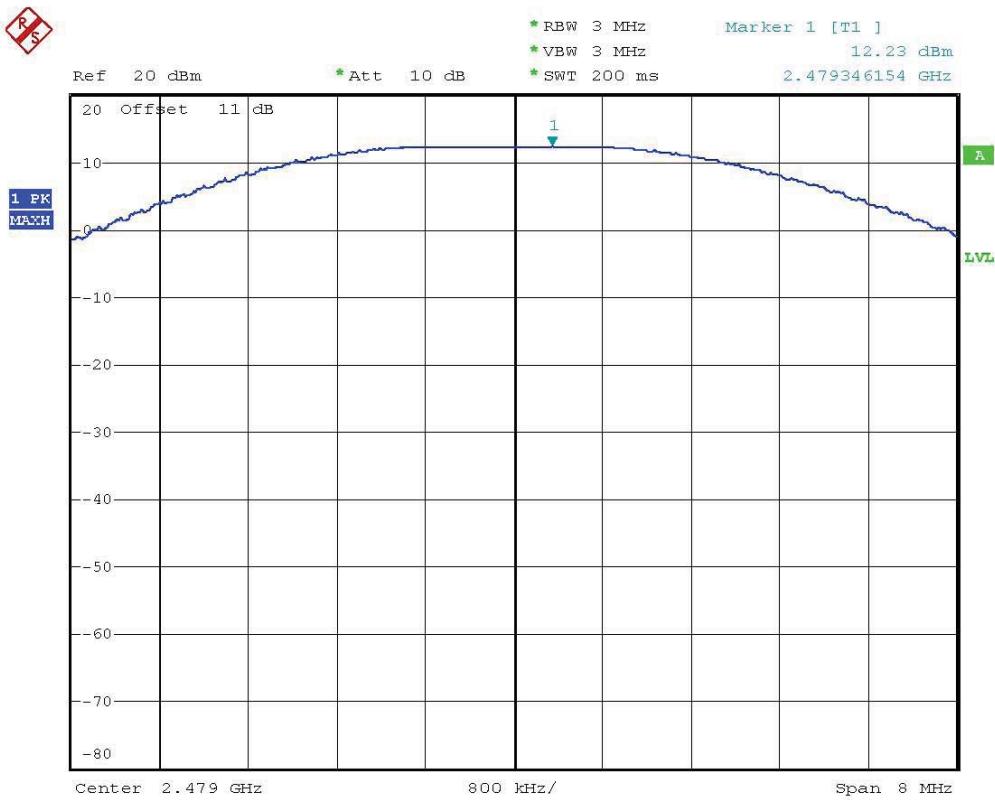
Date: 16.MAR.2010 15:20:00



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



MAX OUTPUT POWER 2479.1 MHz

Date: 16.MAR.2010 15:20:43

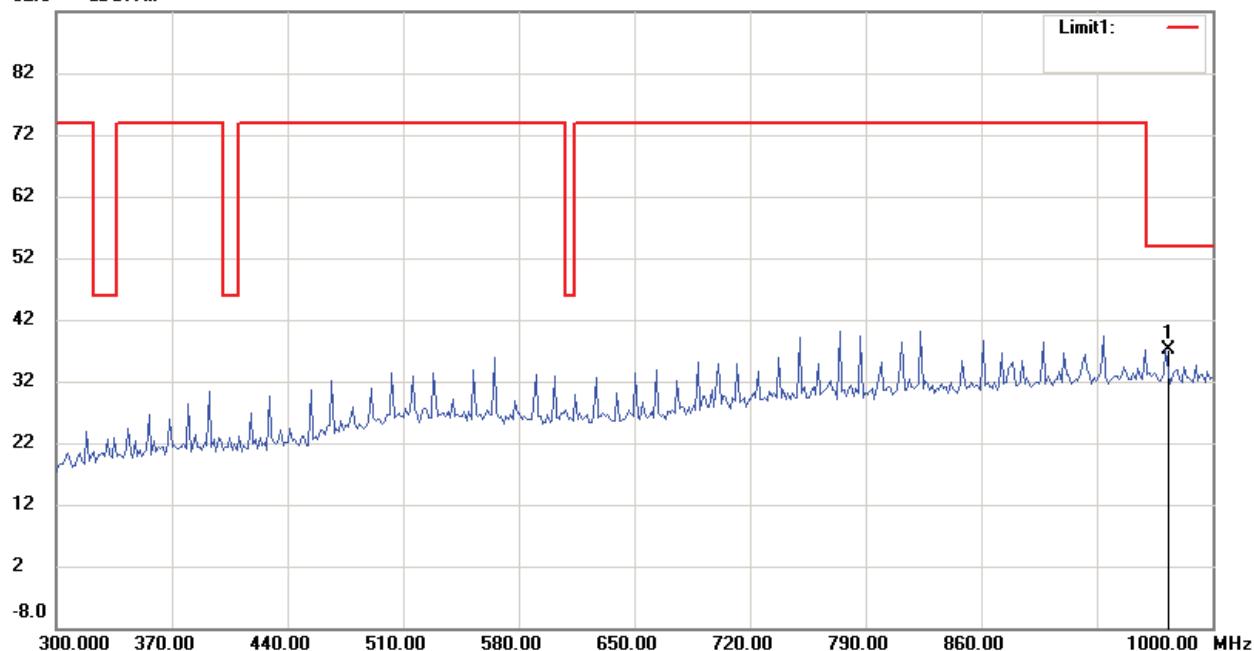
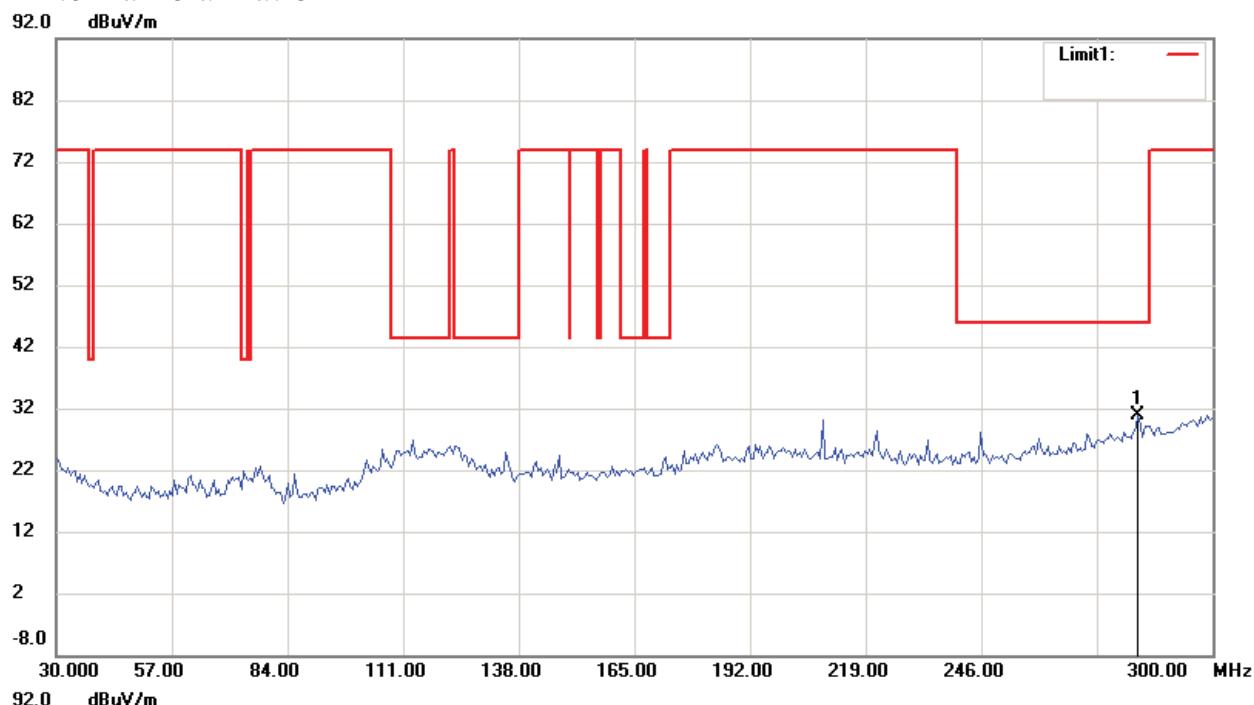
Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Spurious Emissions radiated

Transmitter_ 2403.3 MHz

Antenna Polarization H



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

Note:

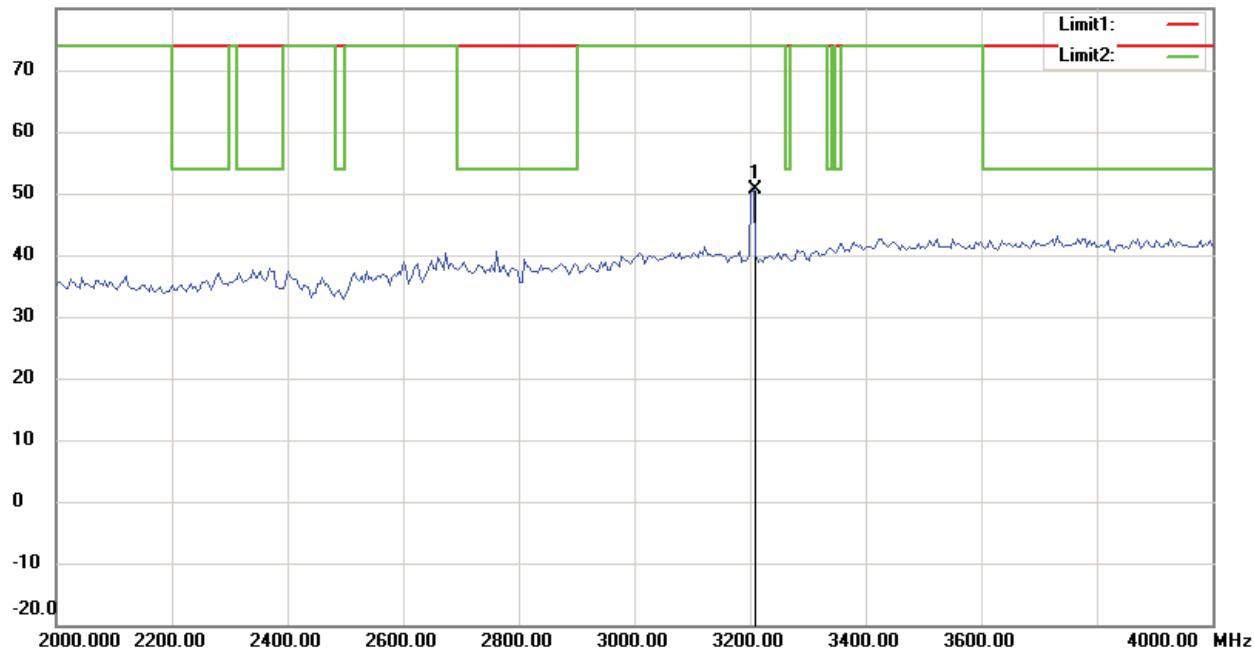
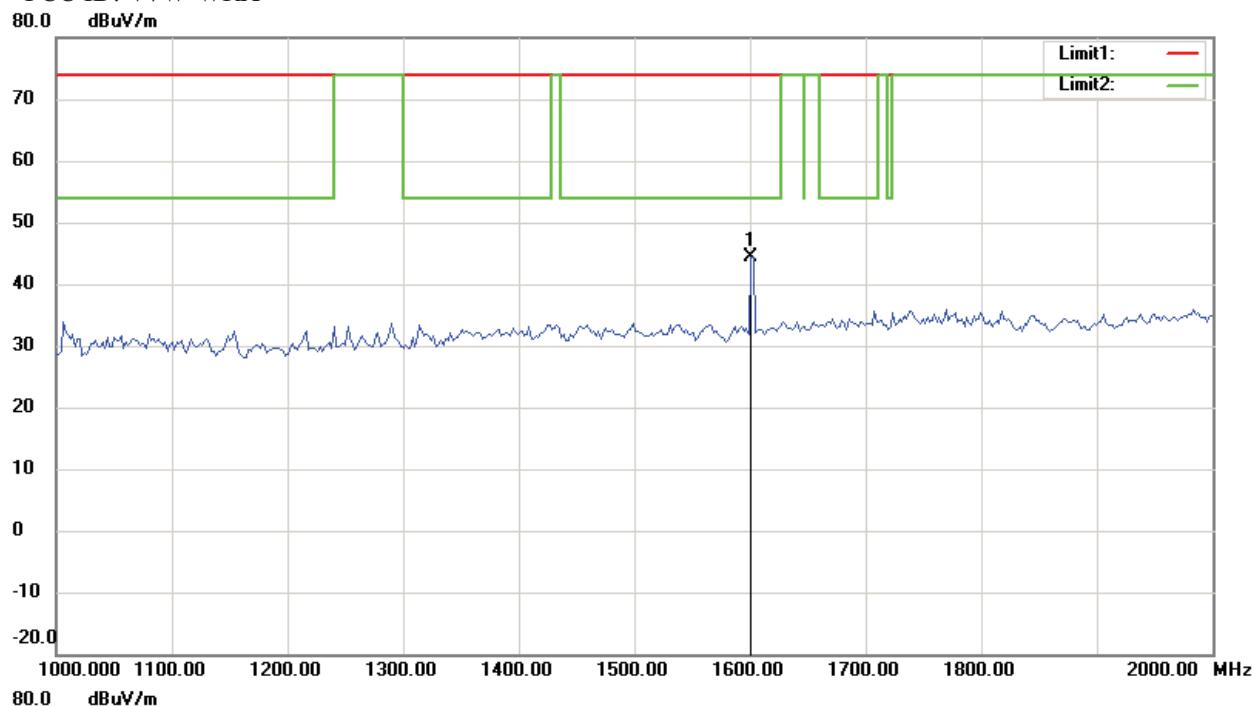
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

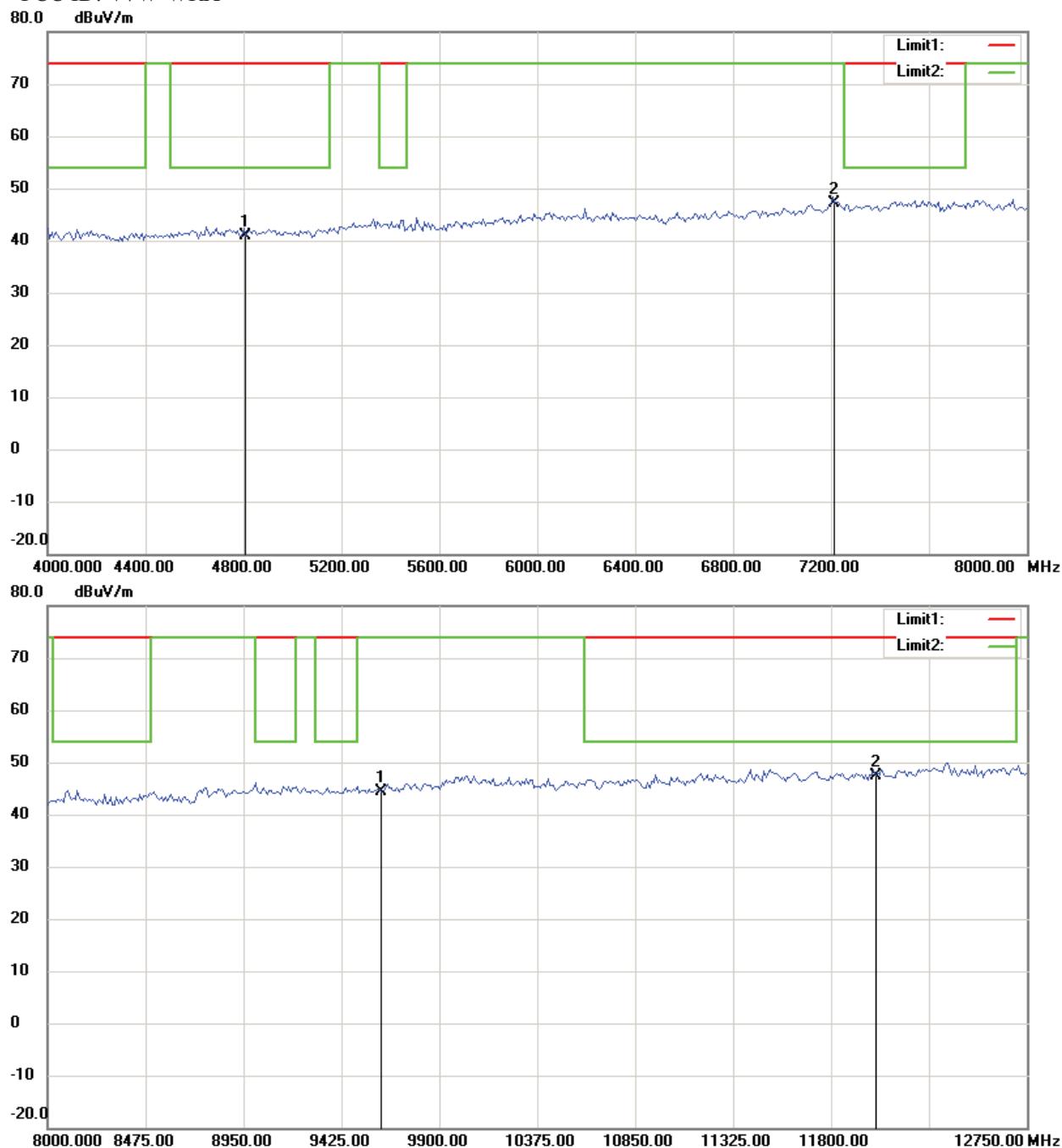
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

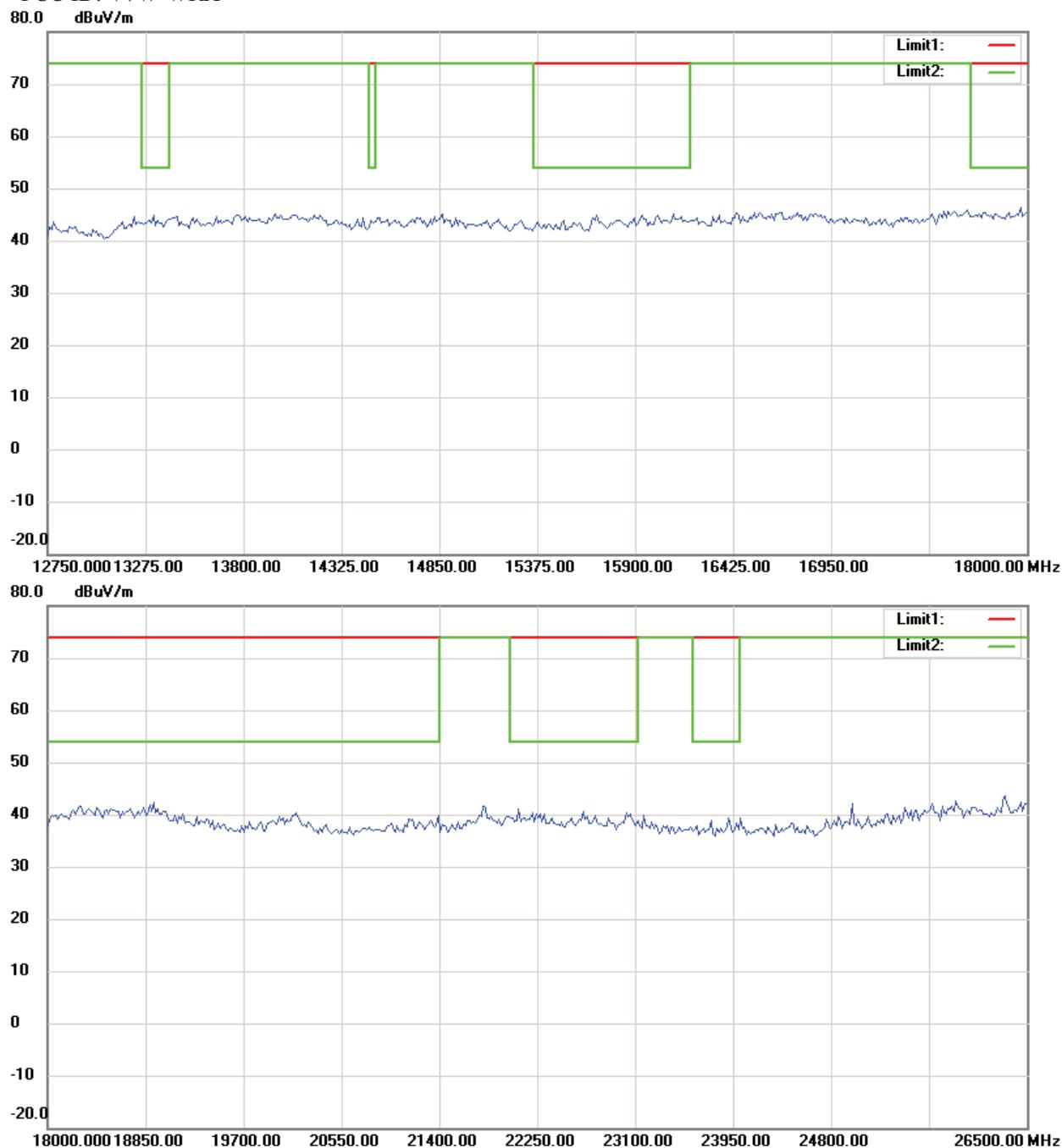
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

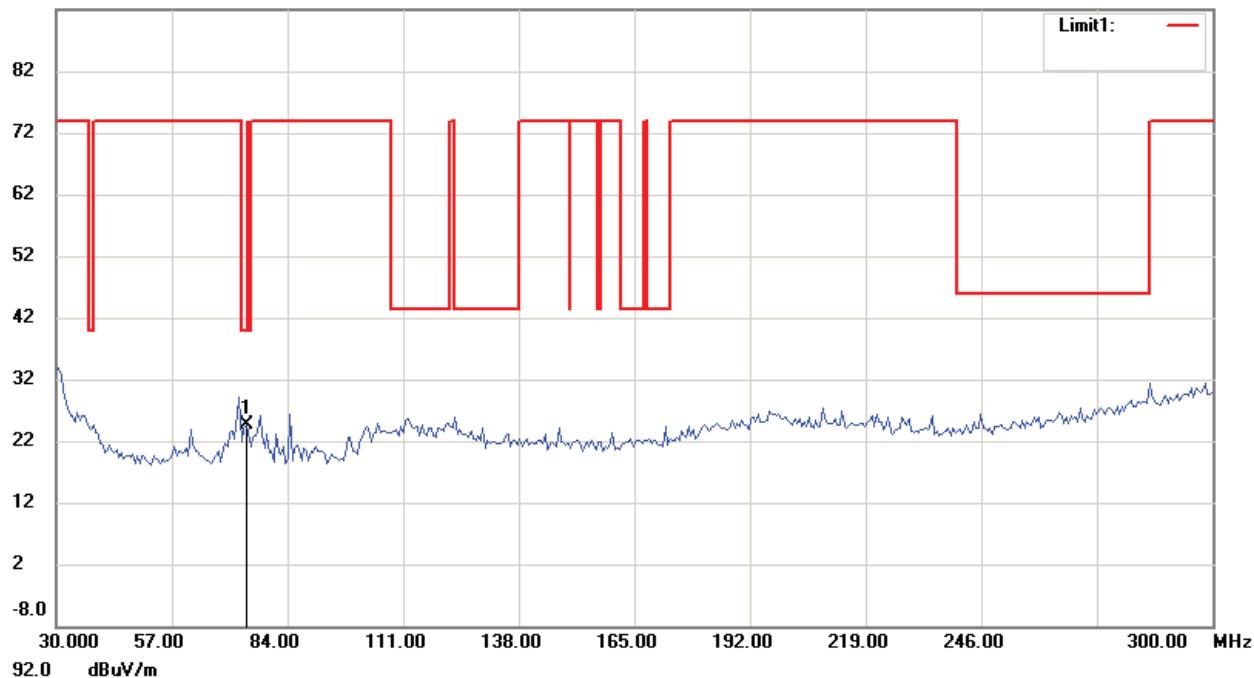
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification of test standard.
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Registration number: W6M21002-10415-P-15-R

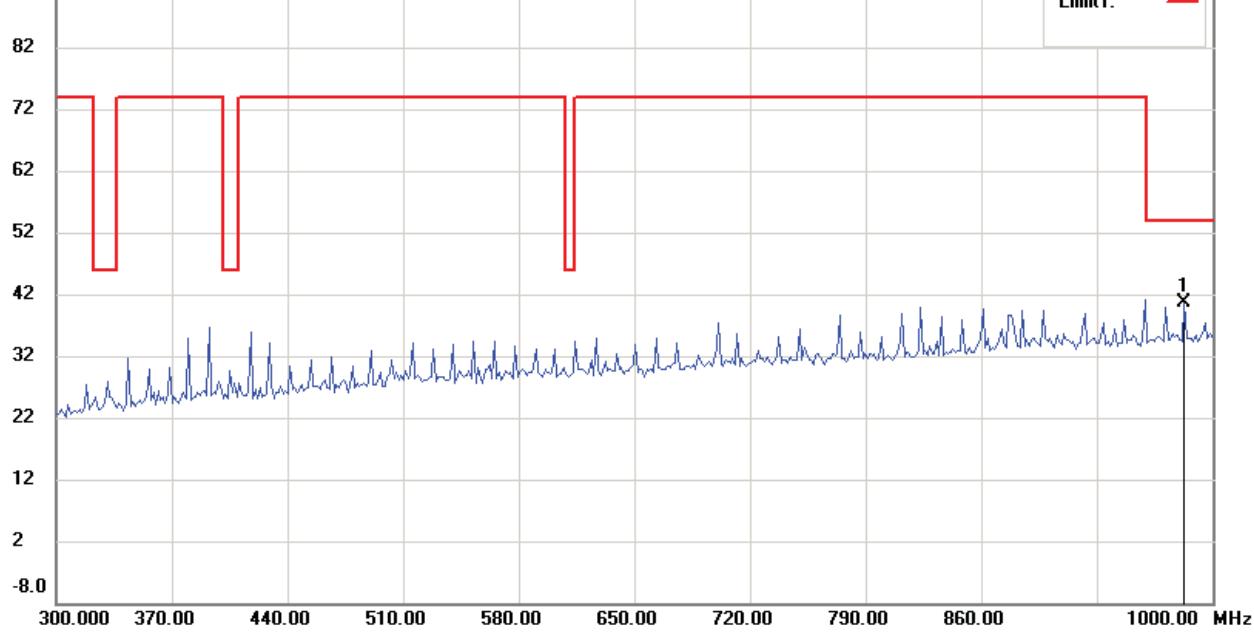
FCC ID: V7W-WRX

Antenna Polarization V

92.0 dBuV/m



92.0 dBuV/m



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

Note:

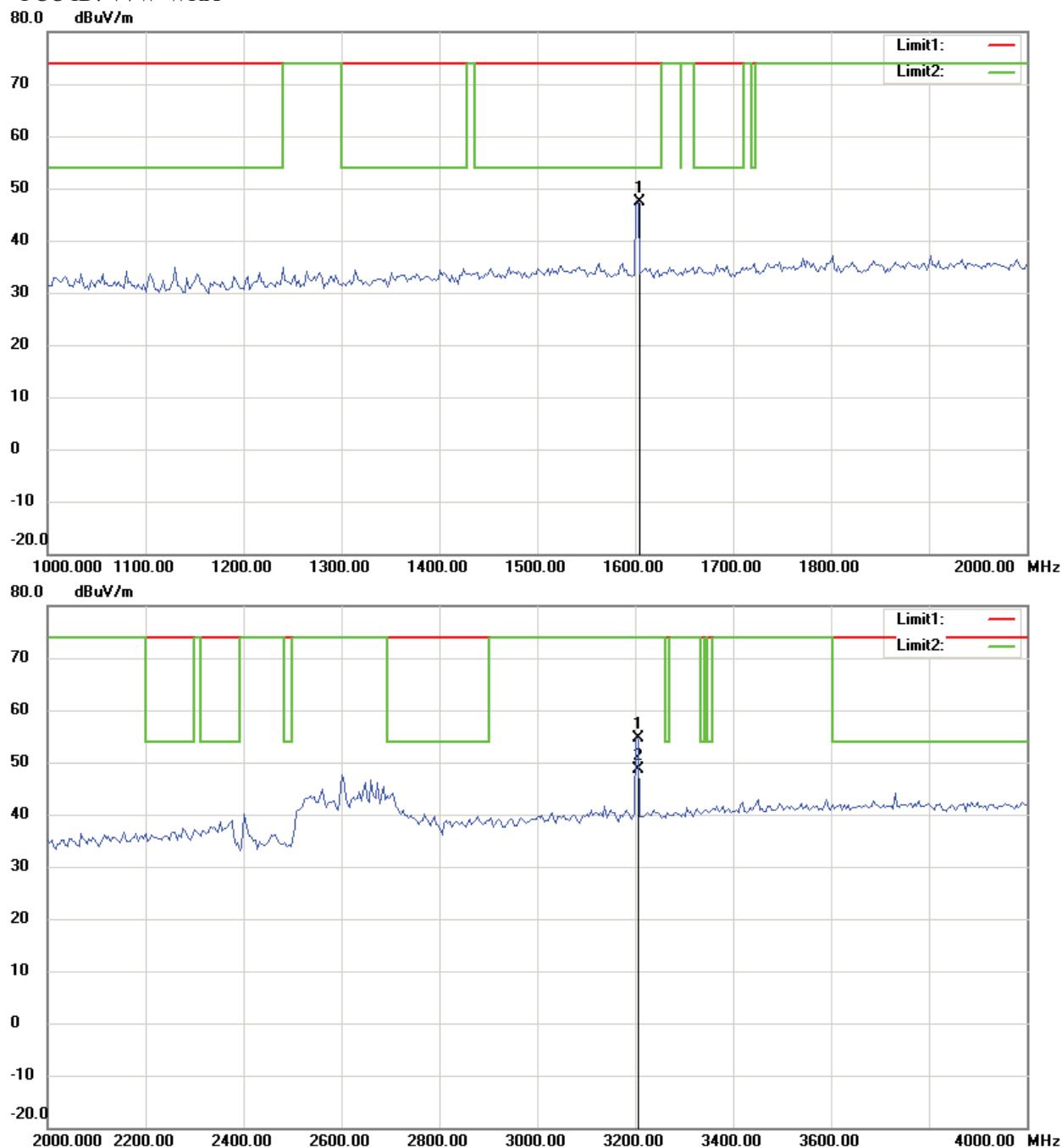
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



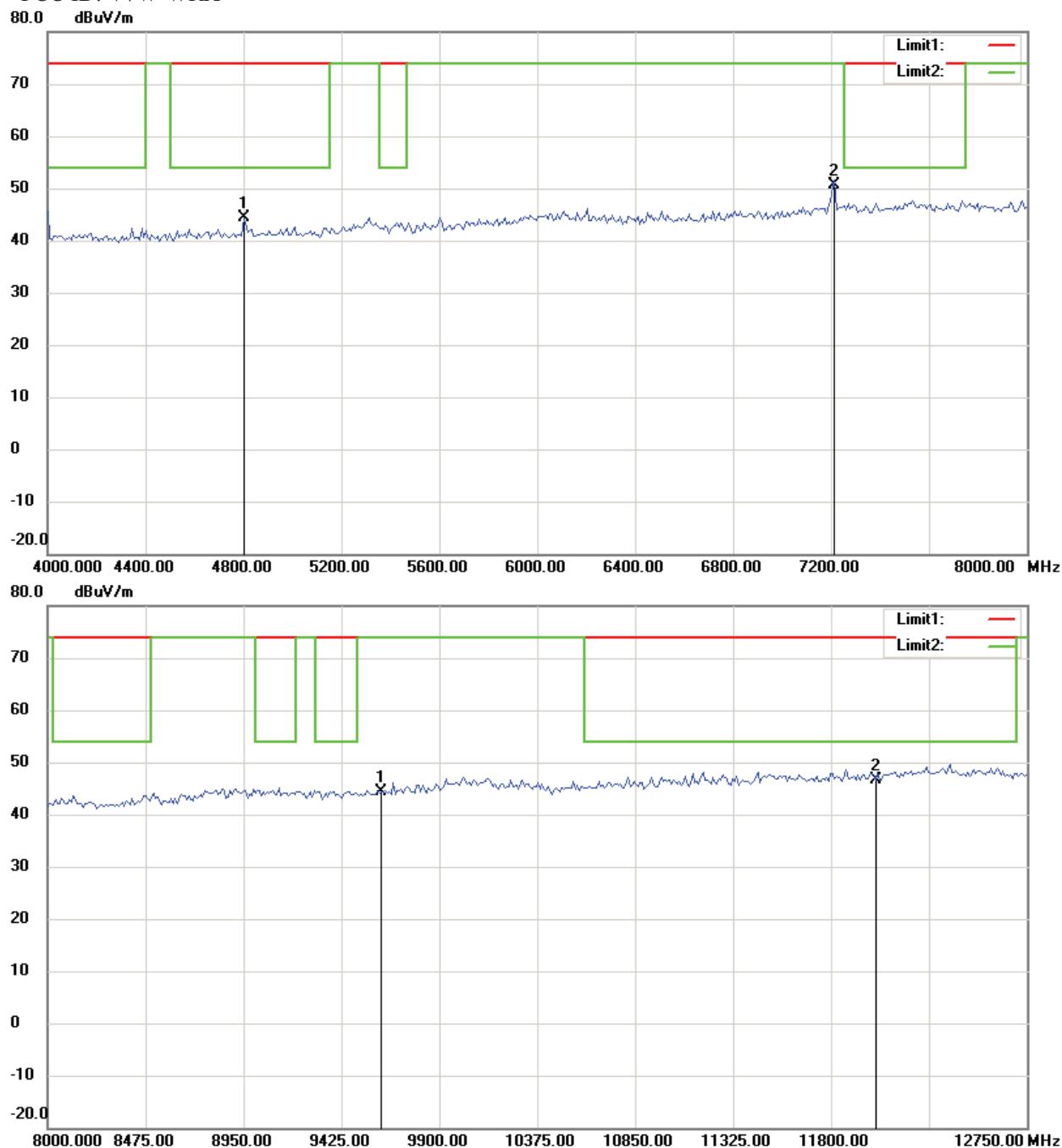
Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

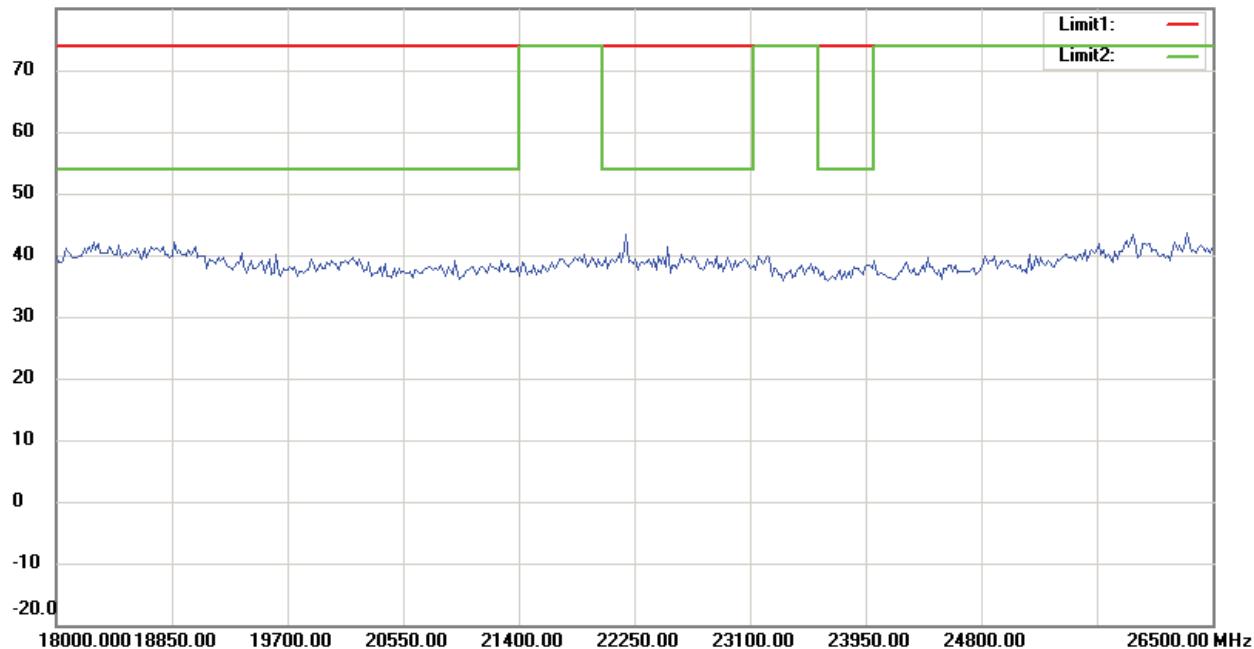
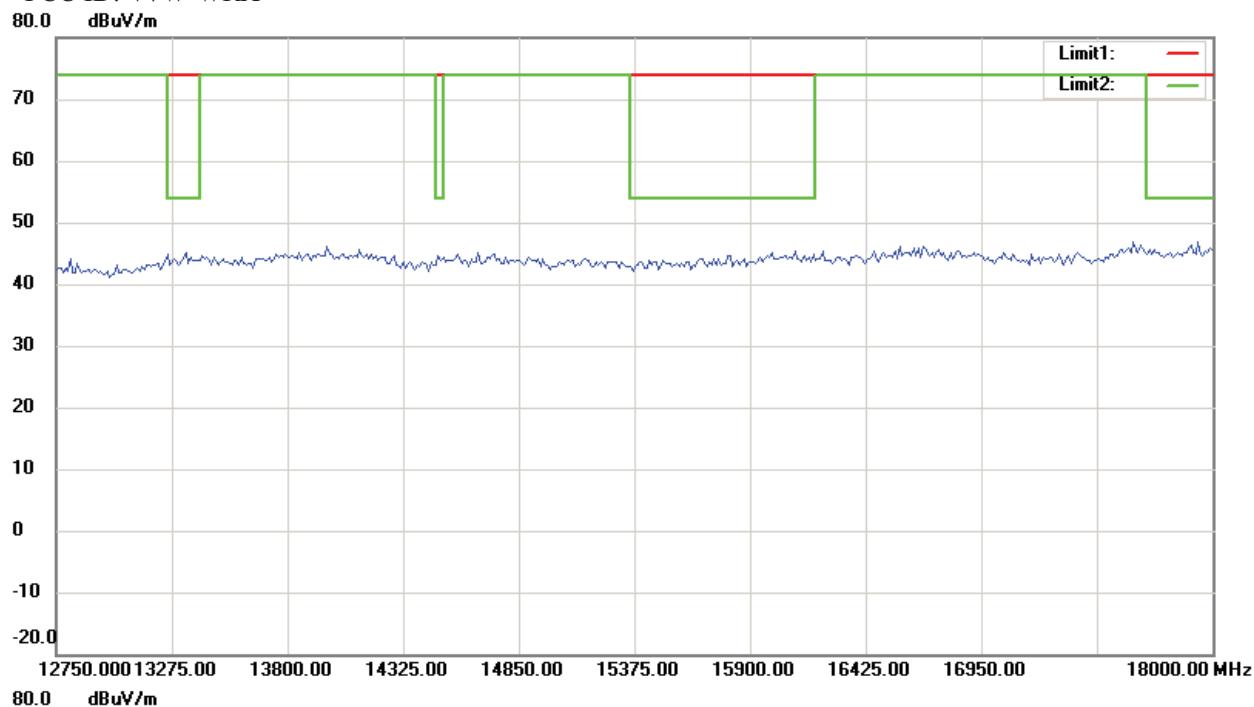
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

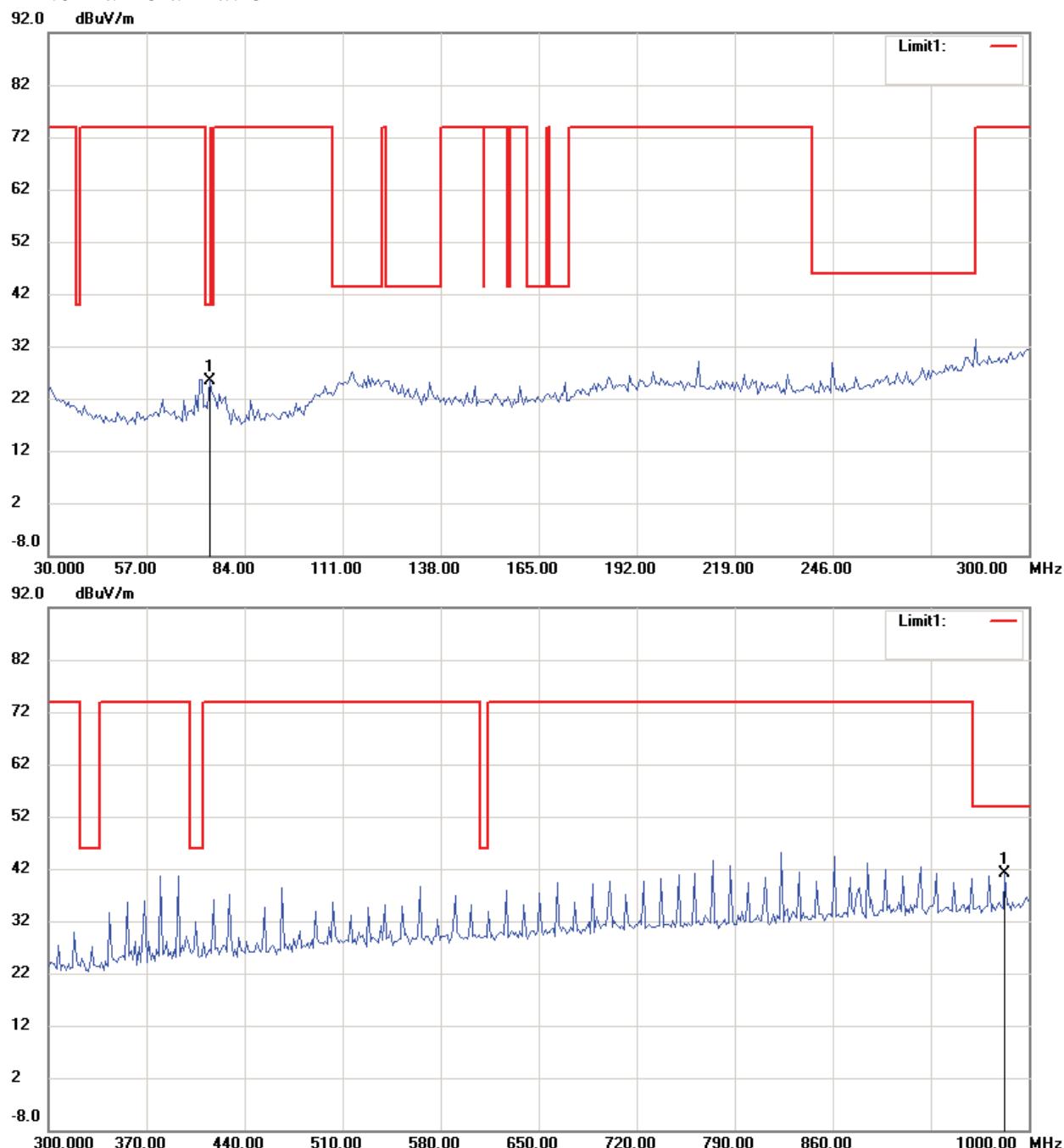
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Transmitter_ 2442.2 MHz

Antenna Polarization H



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

Note:

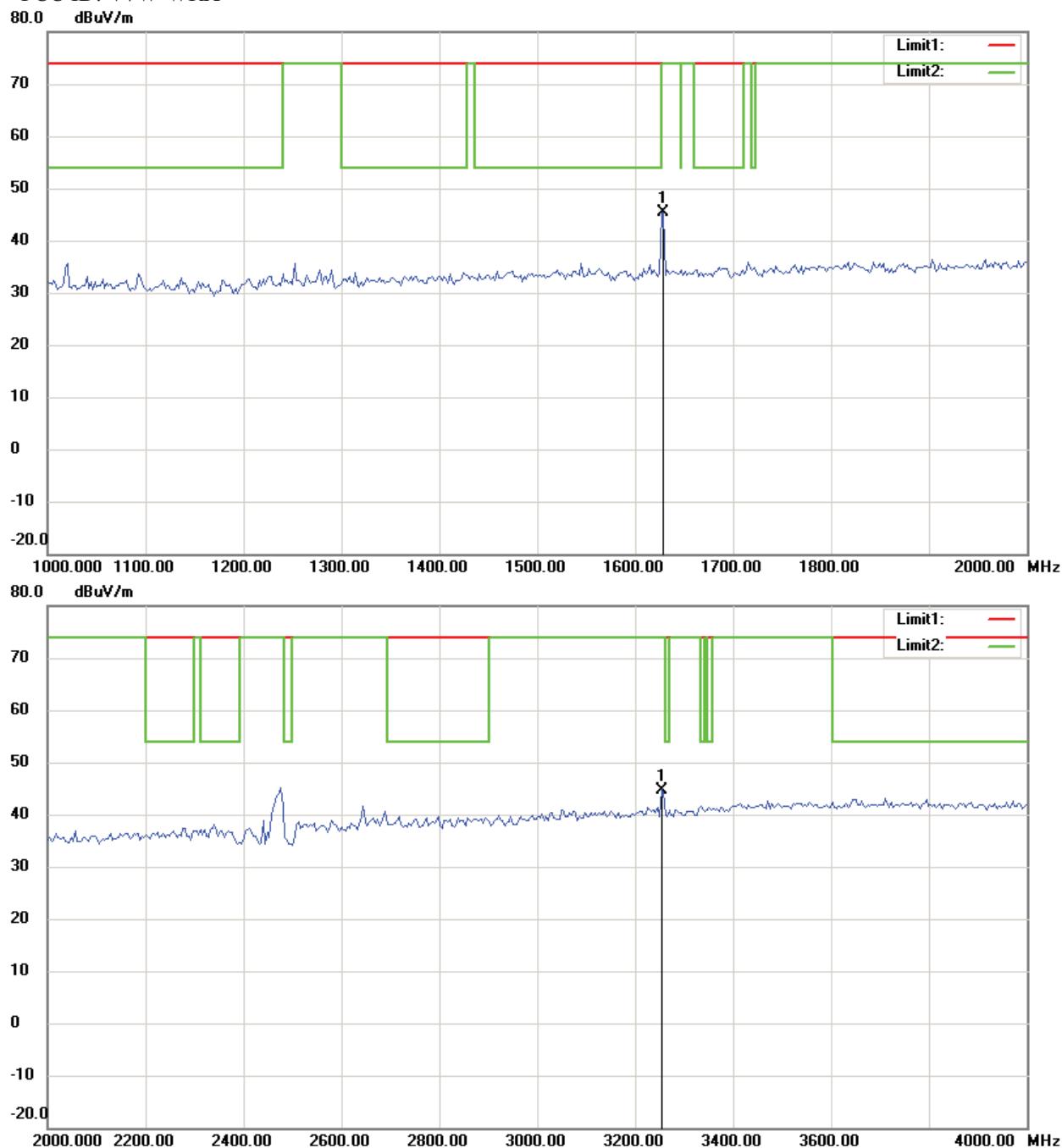
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

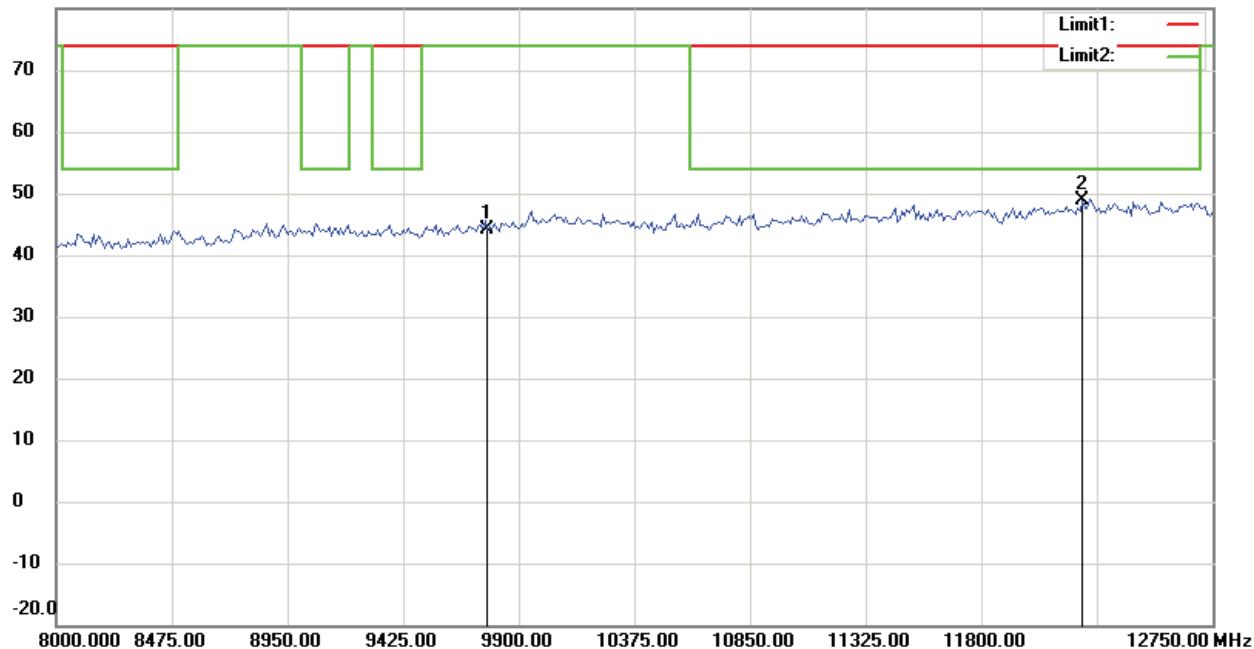
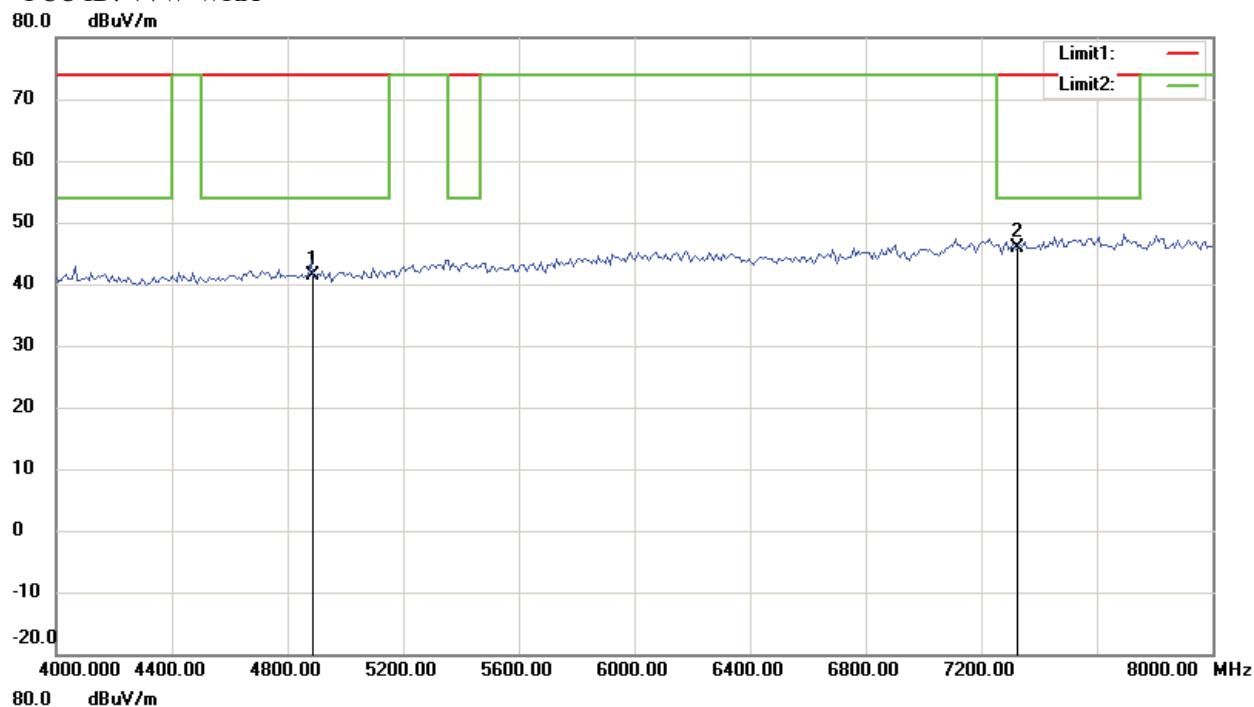
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

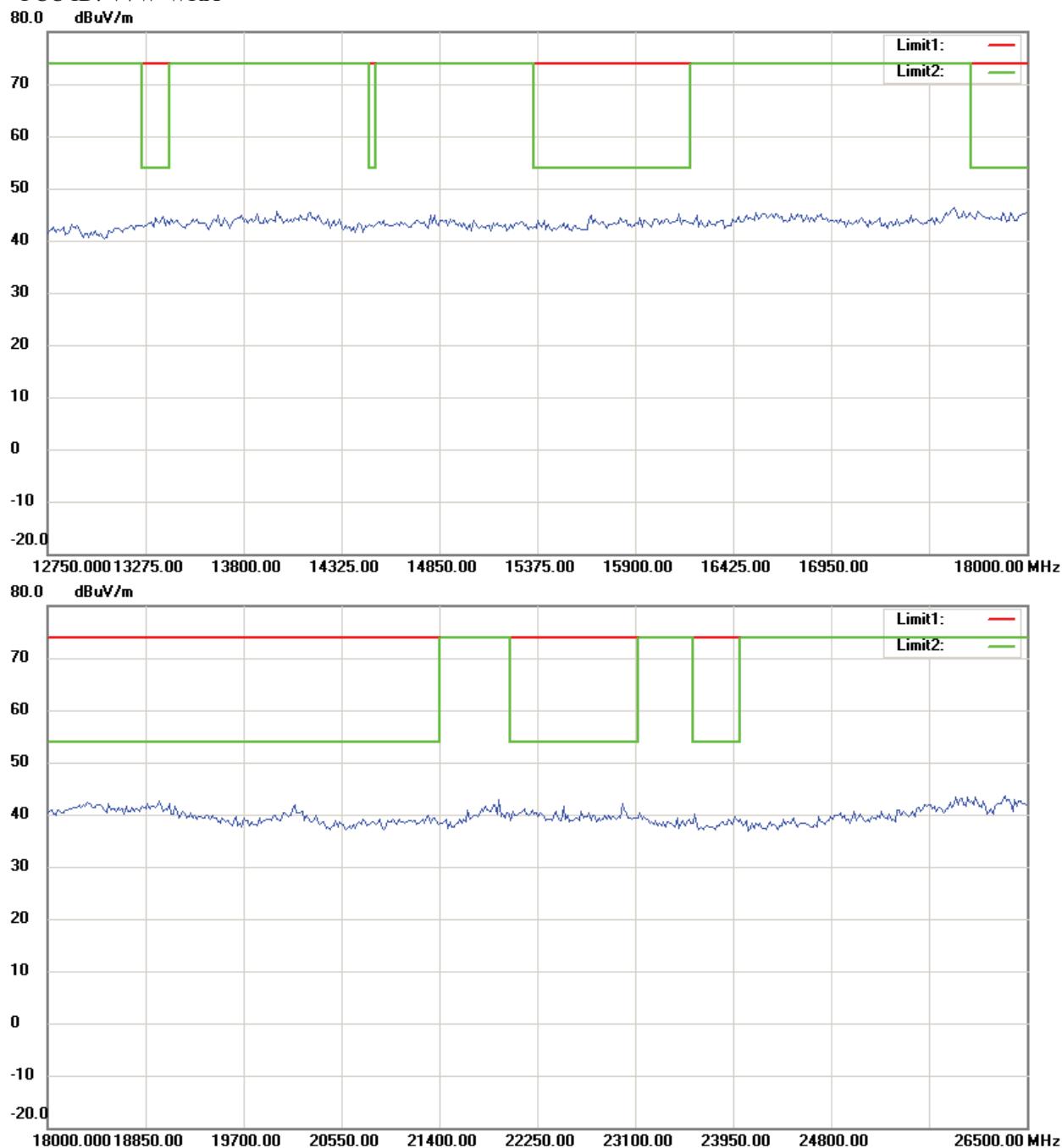
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

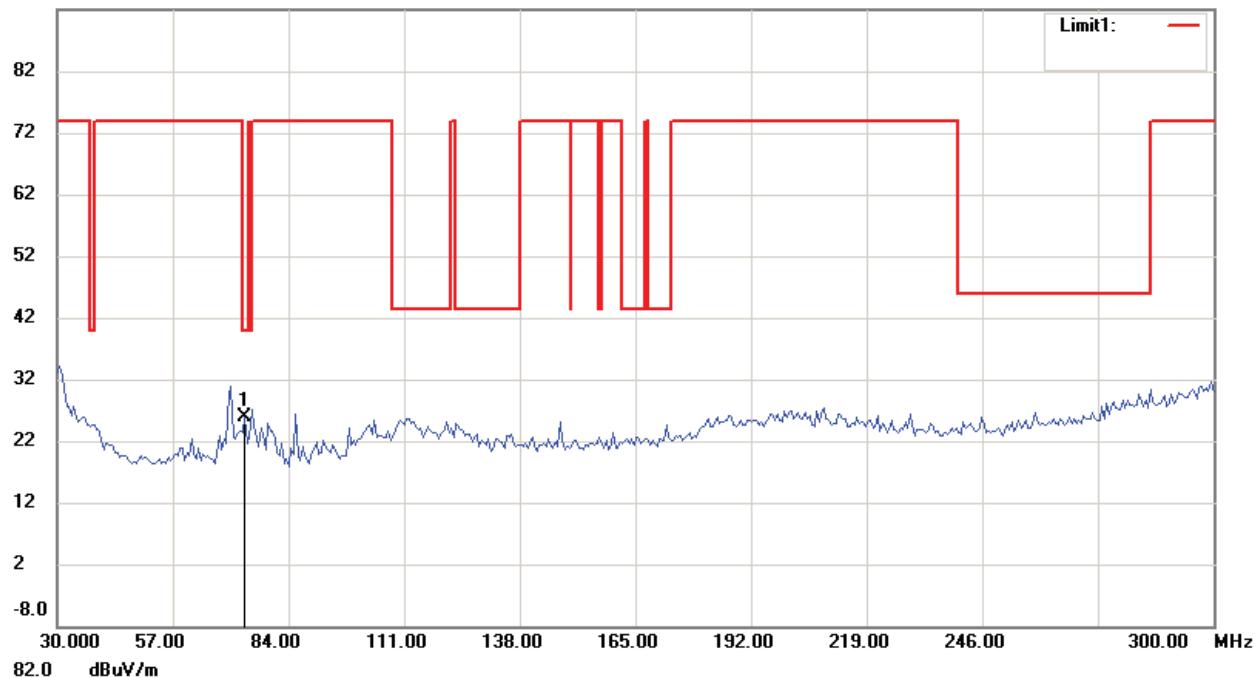
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Antenna Polarization V

92.0 dBuV/m



Limit1:

—

Limit1:

—

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

Note:

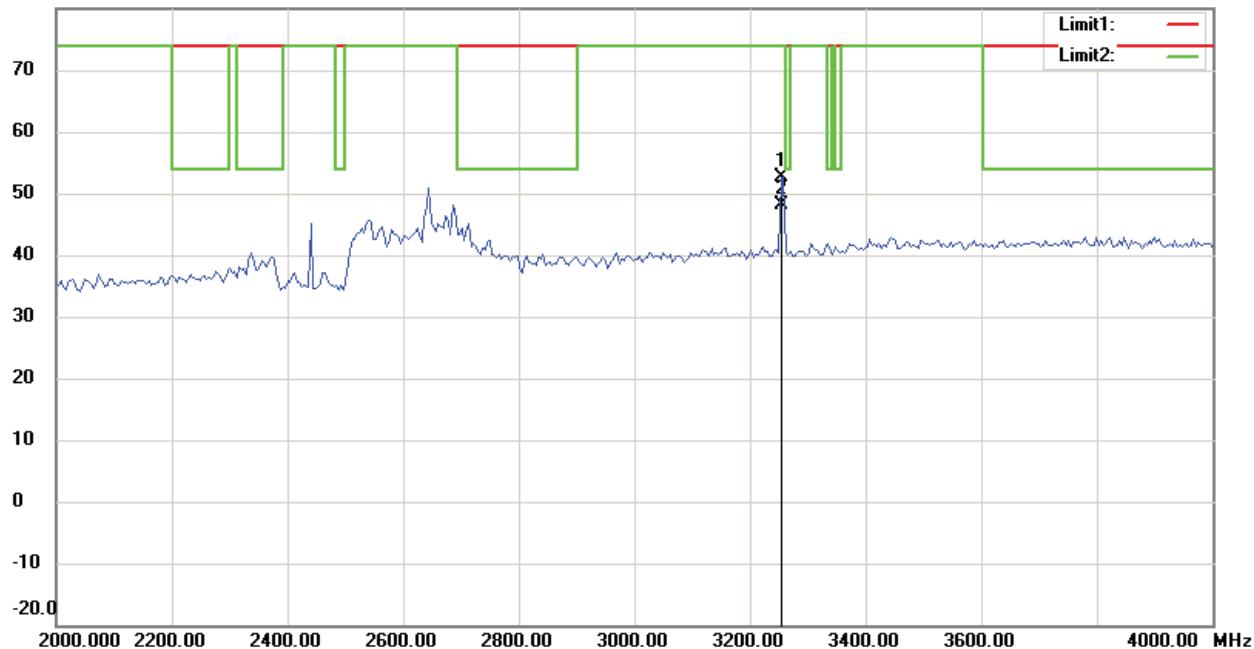
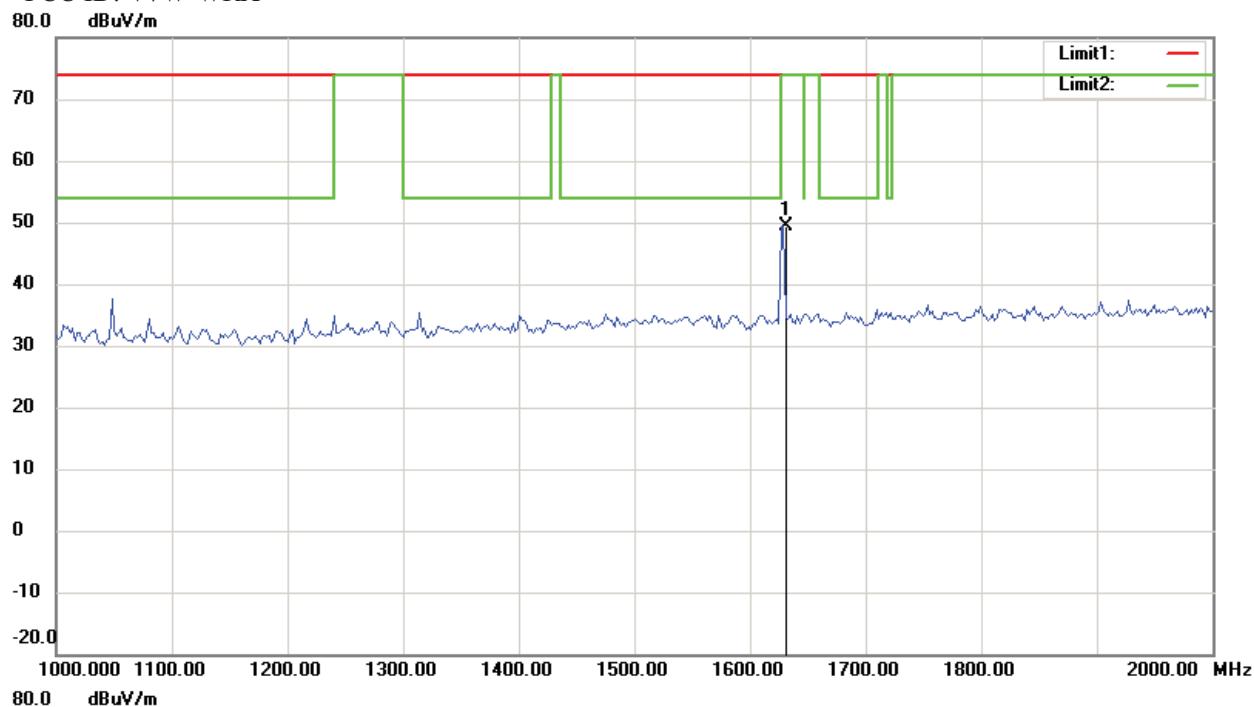
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

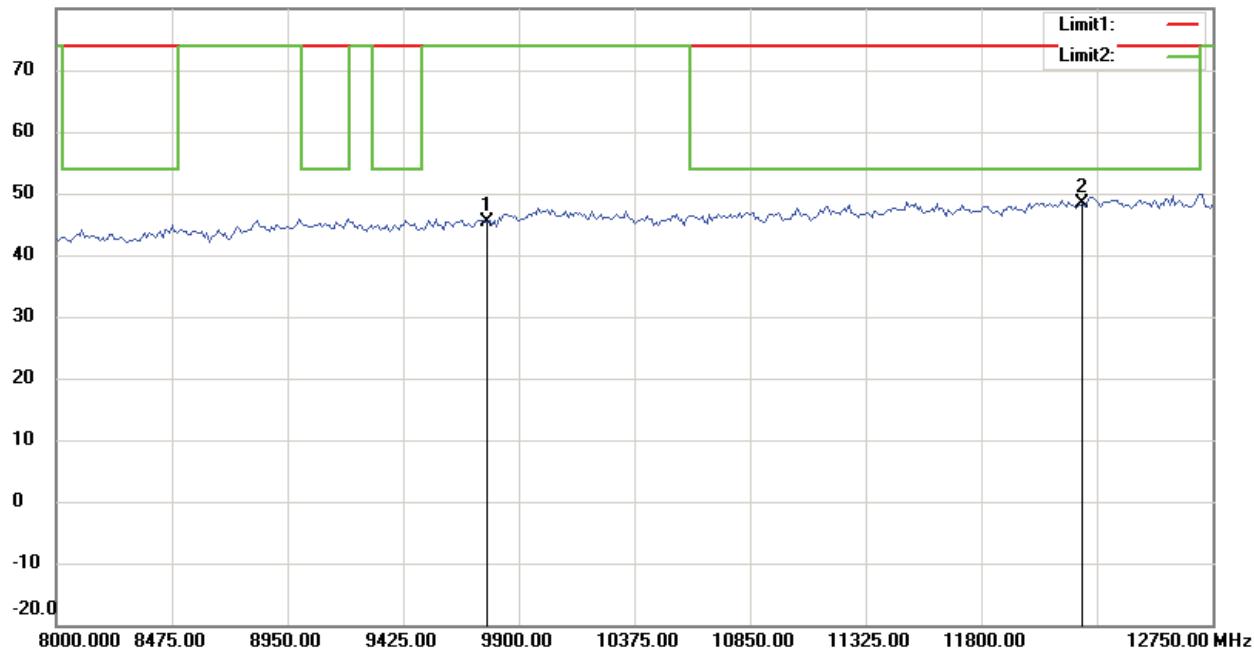
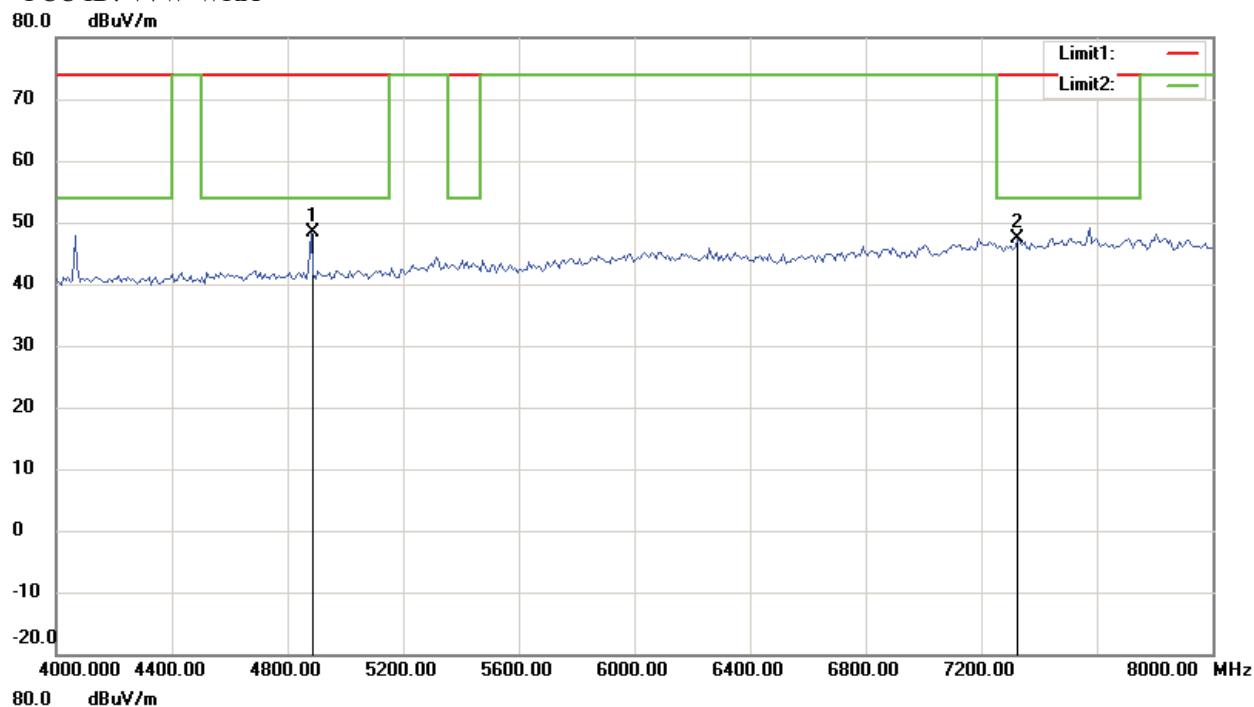
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

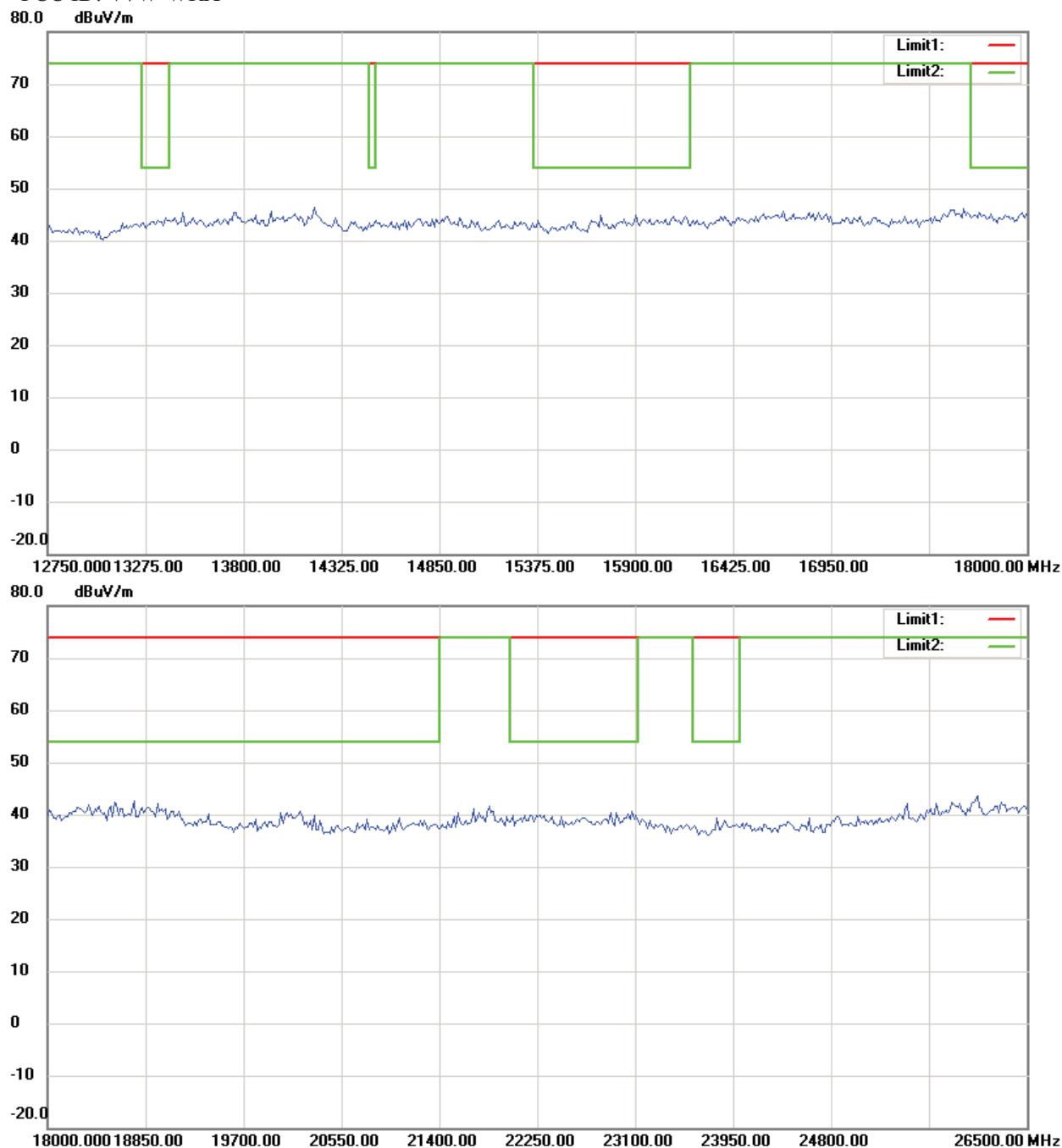
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

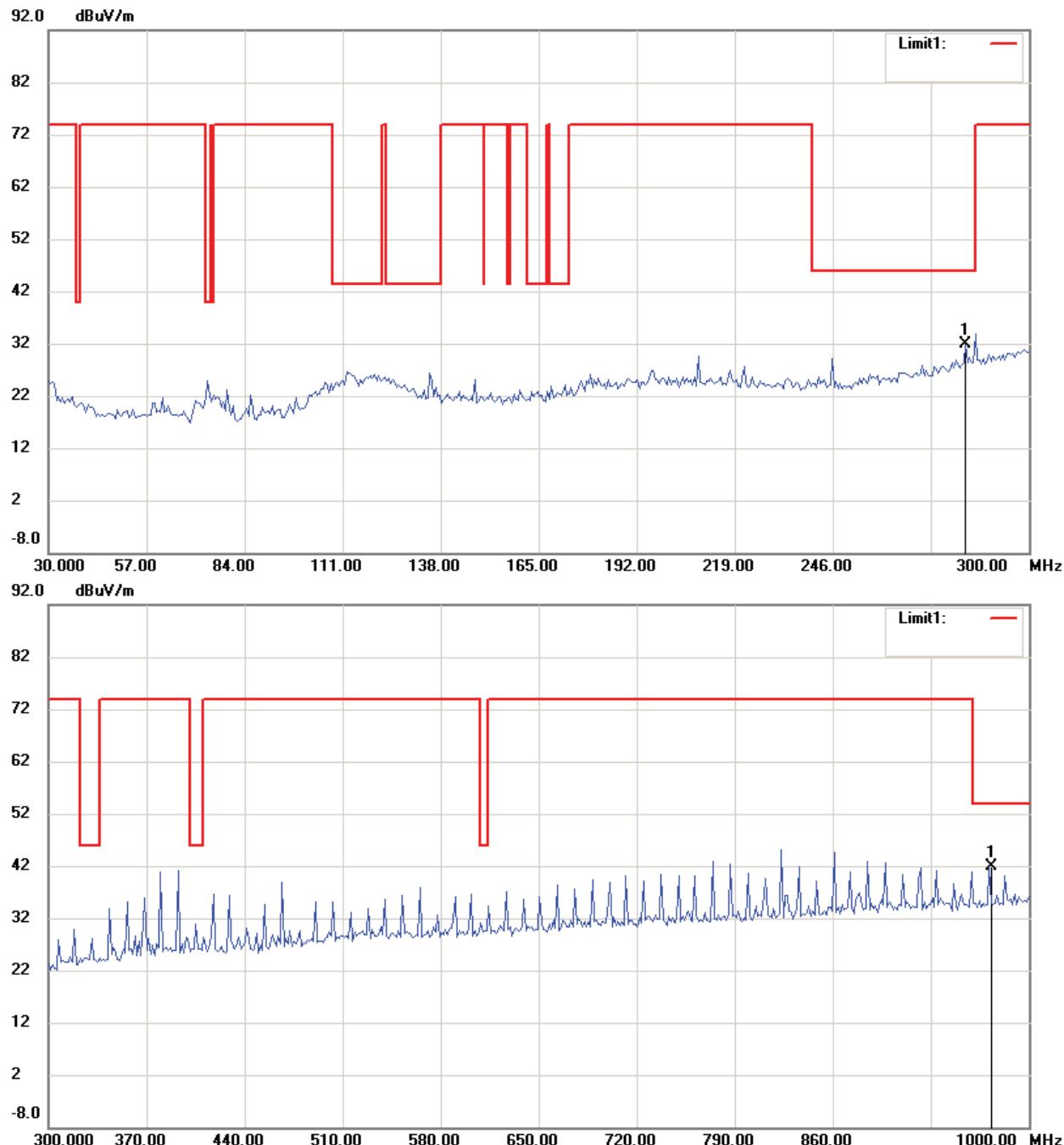
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3. For corrected test results are listed in the relevant table of radiated test data of this test report.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Transmitter_ 2479.1 MHz

Antenna Polarization H



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

Note:

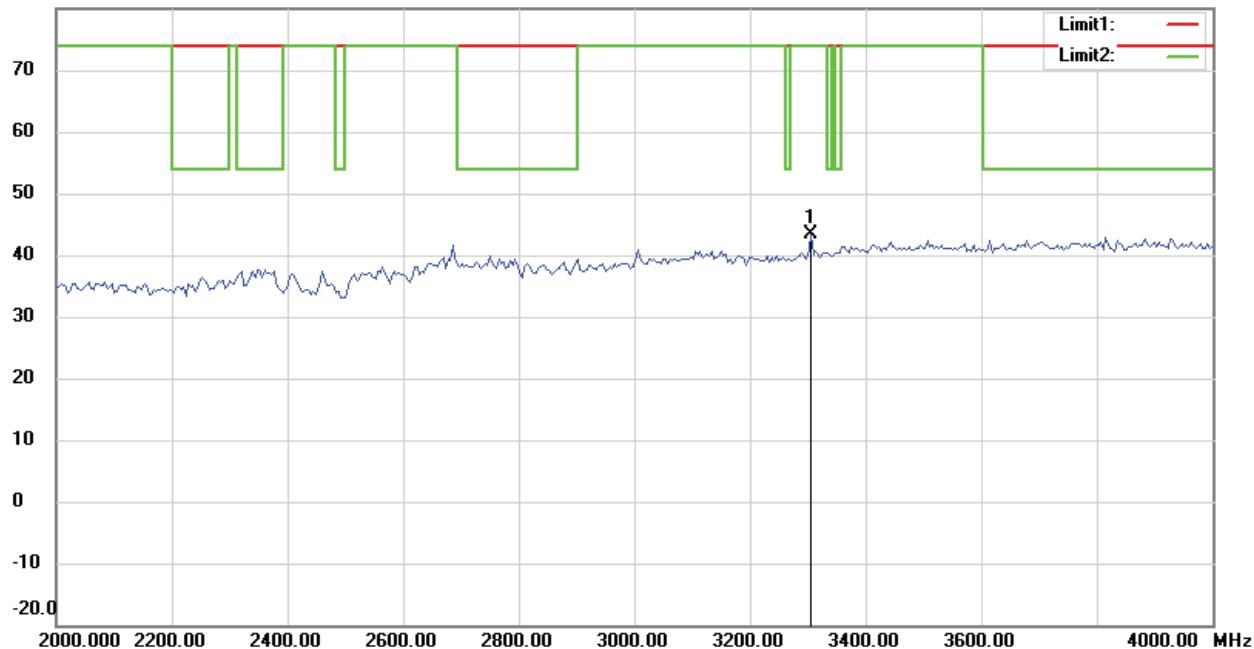
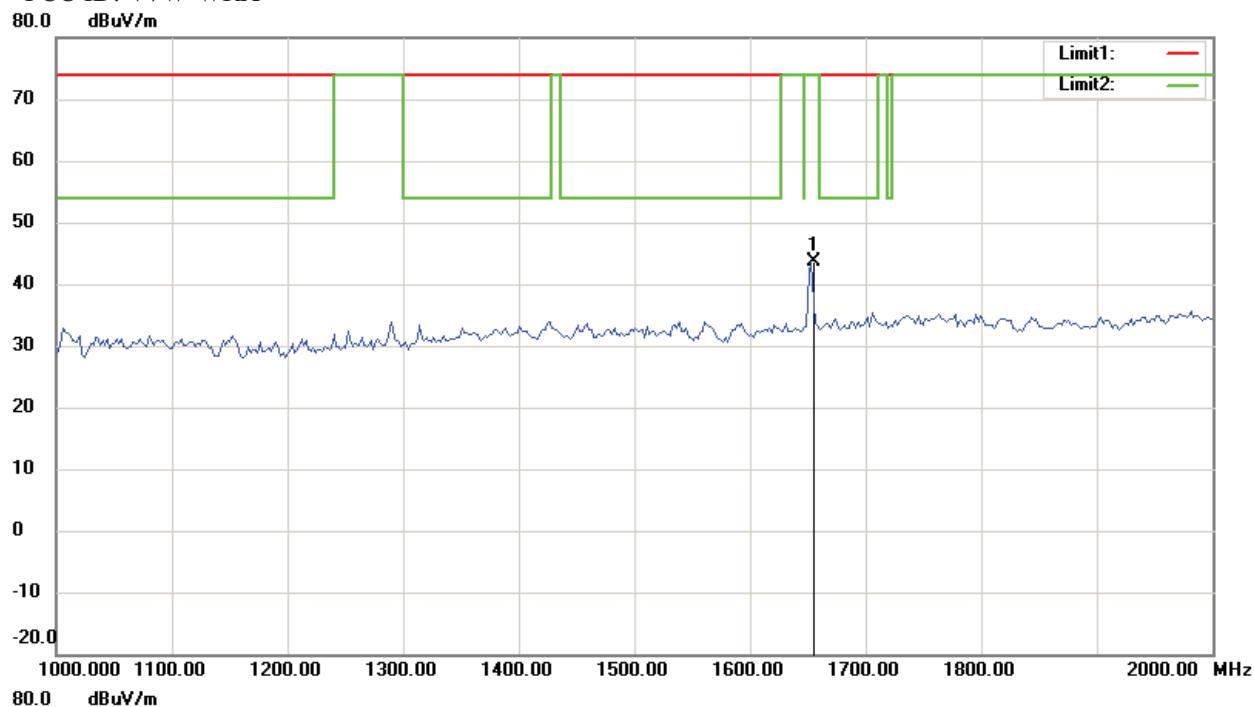
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

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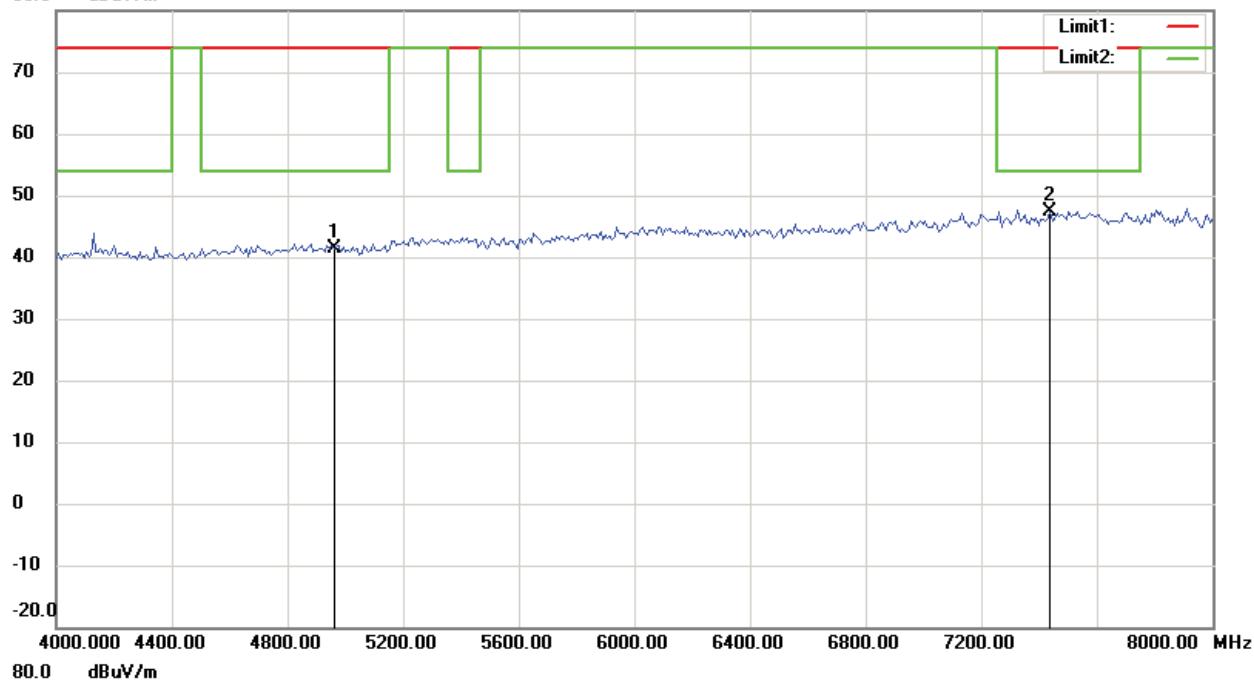


Worldwide Testing Services(Taiwan) Co., Ltd.

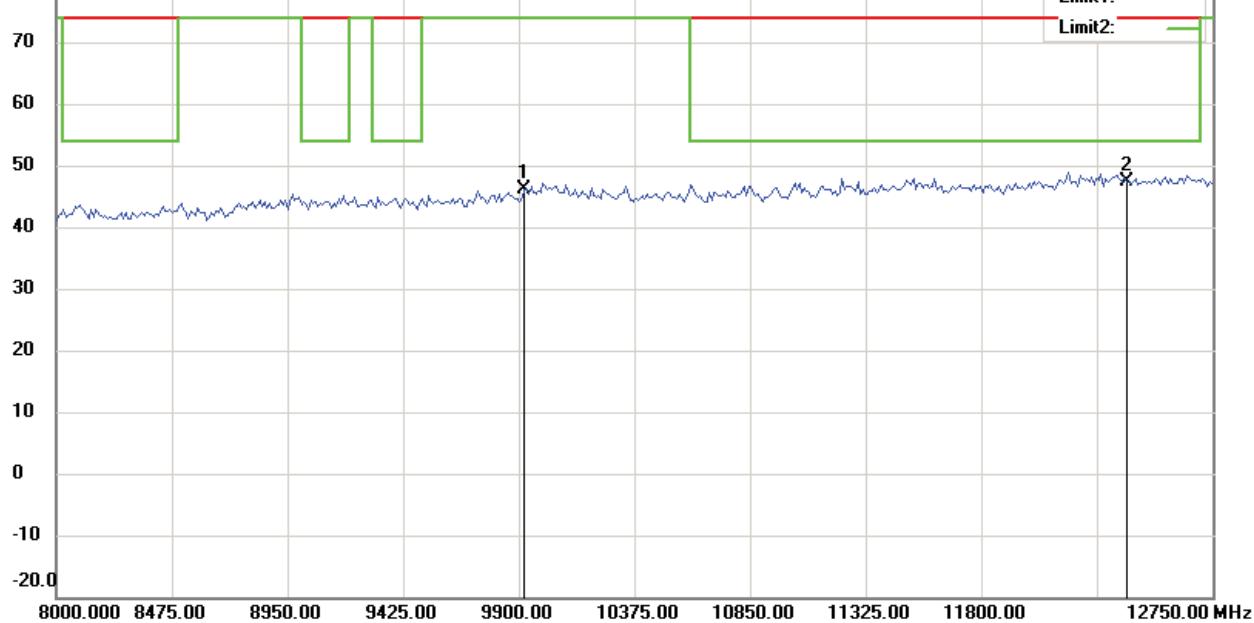
Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

80.0 dBuV/m



80.0 dBuV/m



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

Note:

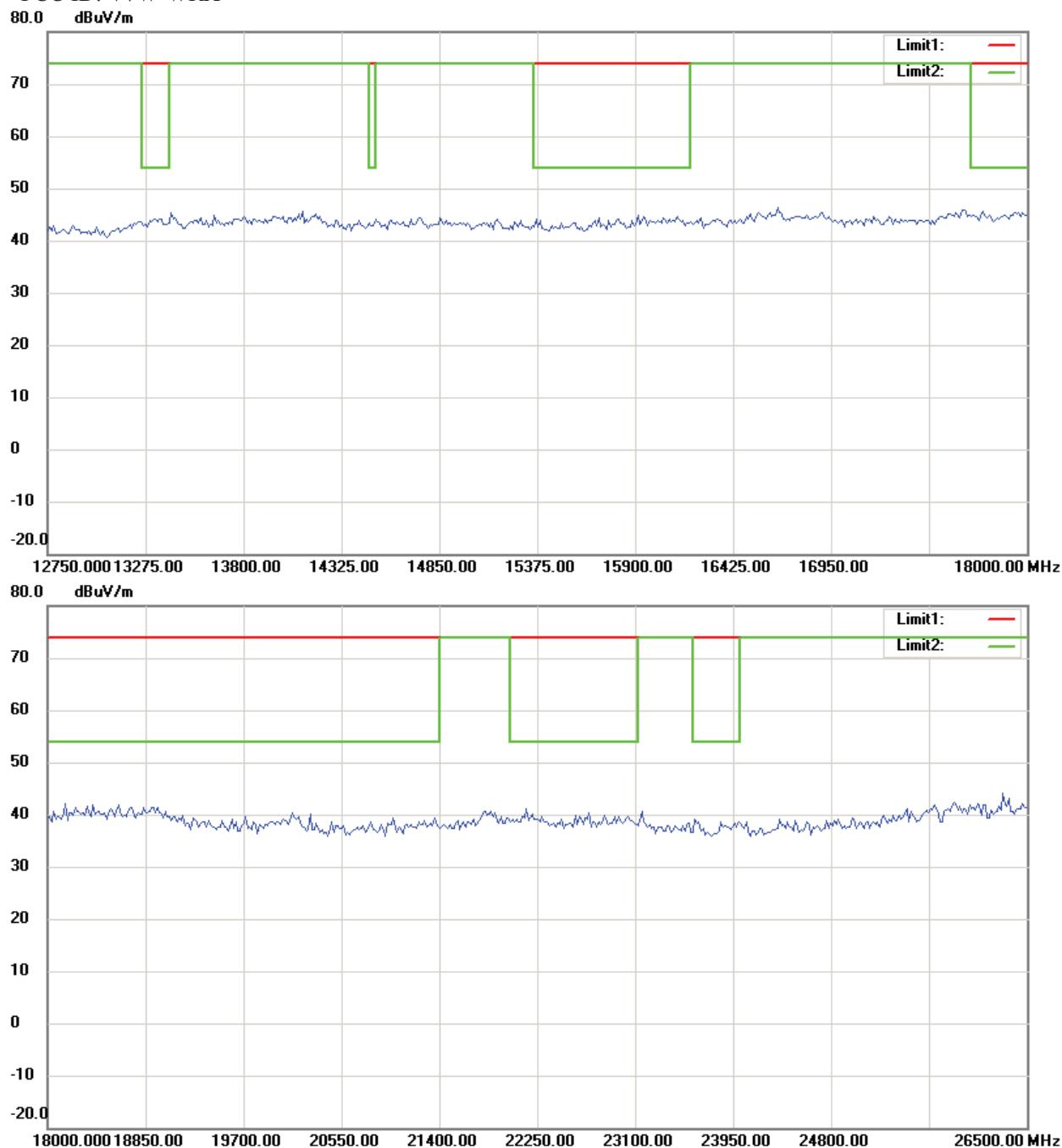
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

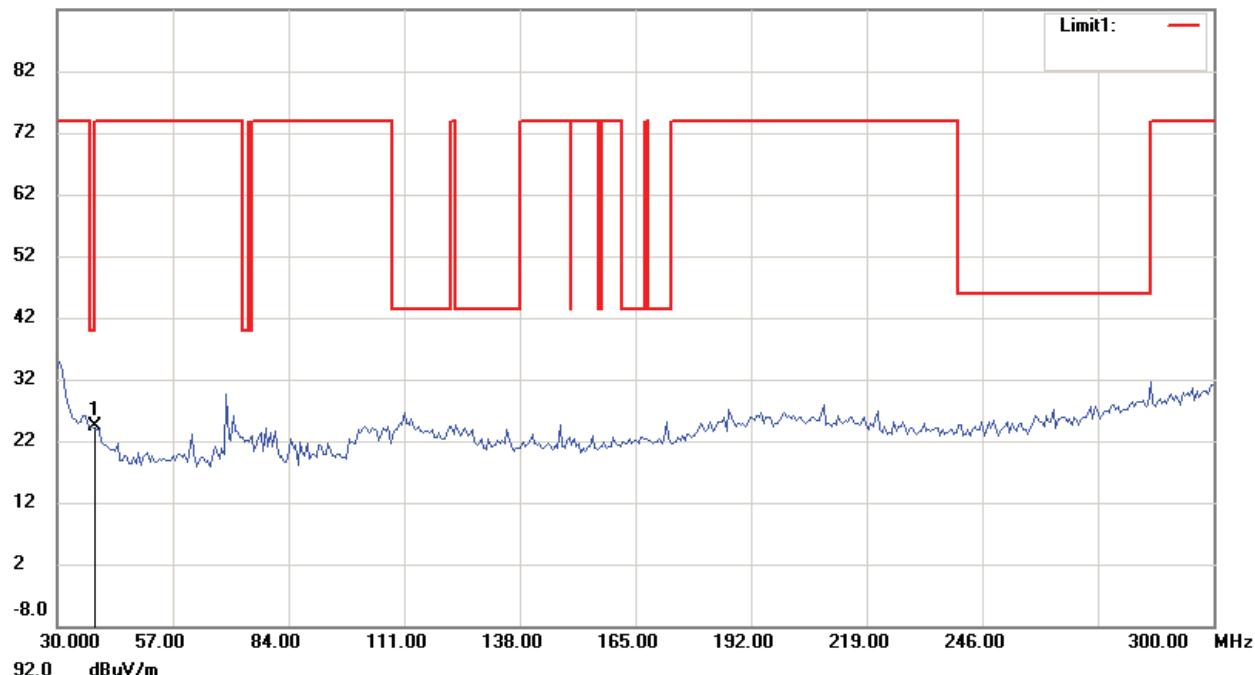
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Registration number: W6M21002-10415-P-15-R

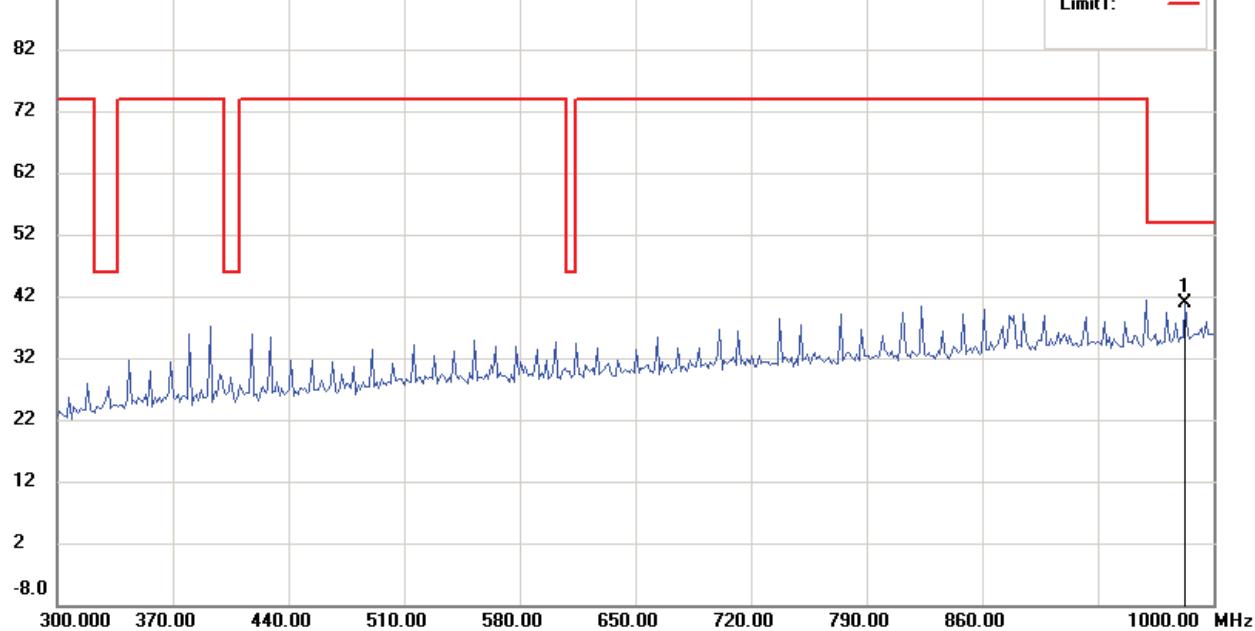
FCC ID: V7W-WRX

Antenna Polarization V

92.0 dBuV/m



92.0 dBuV/m



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

Note:

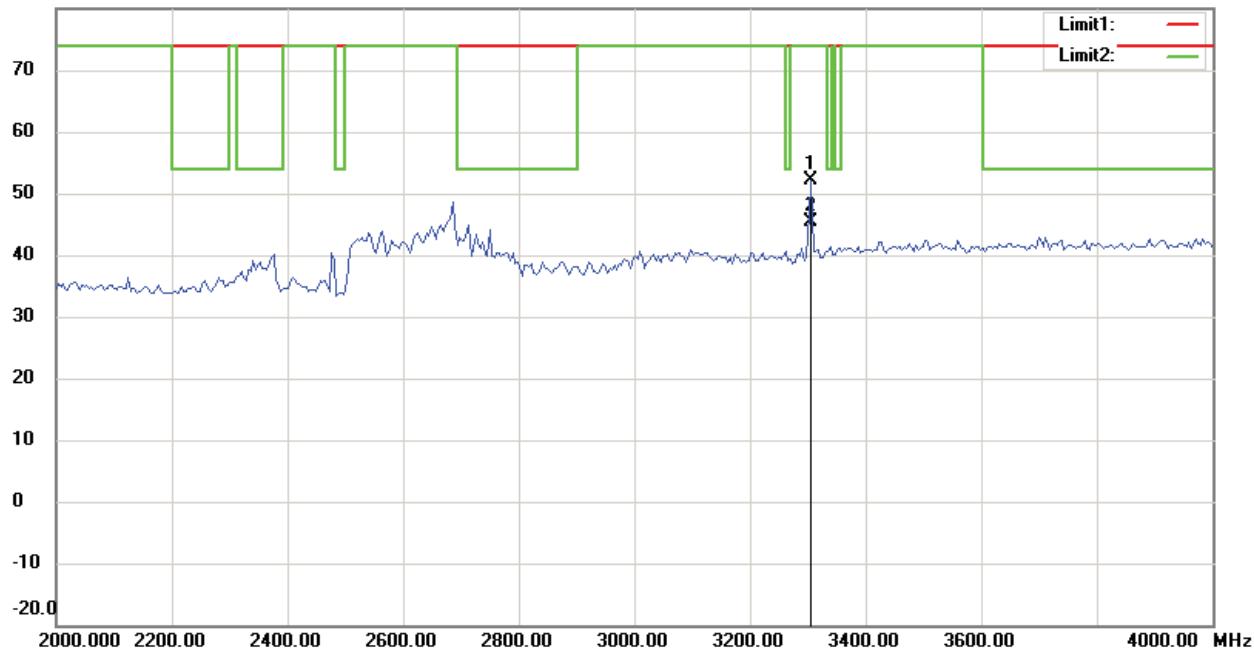
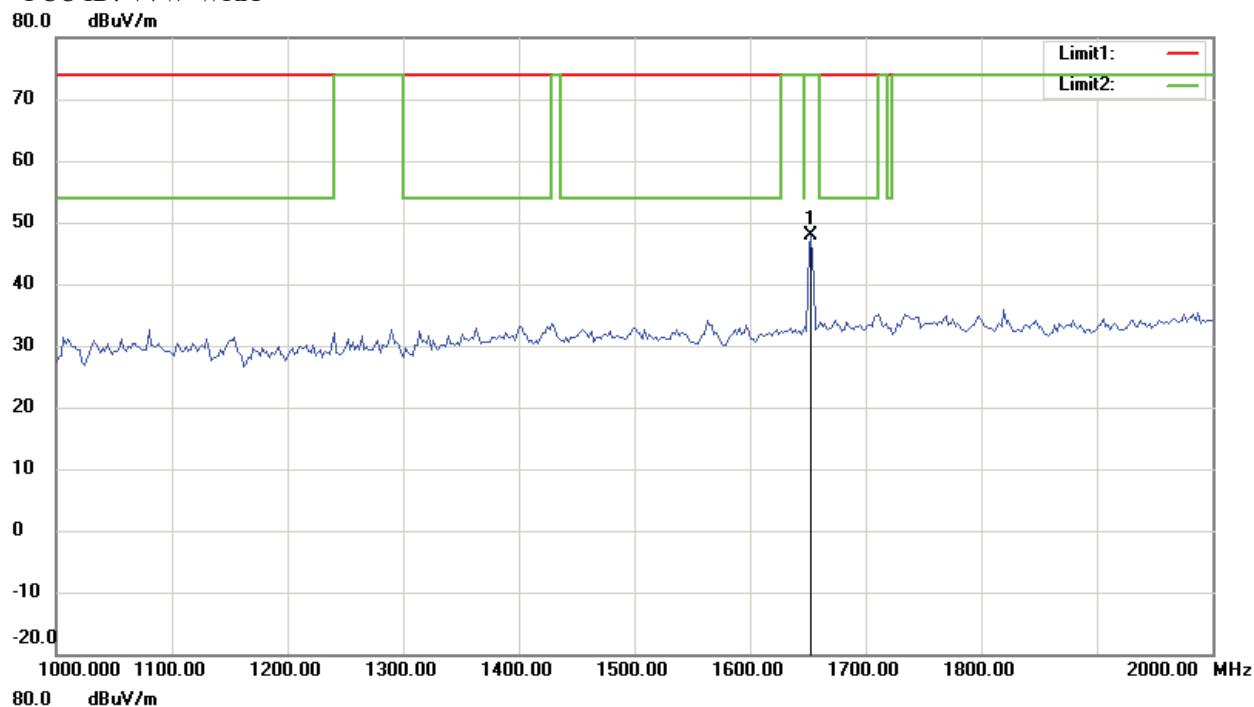
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



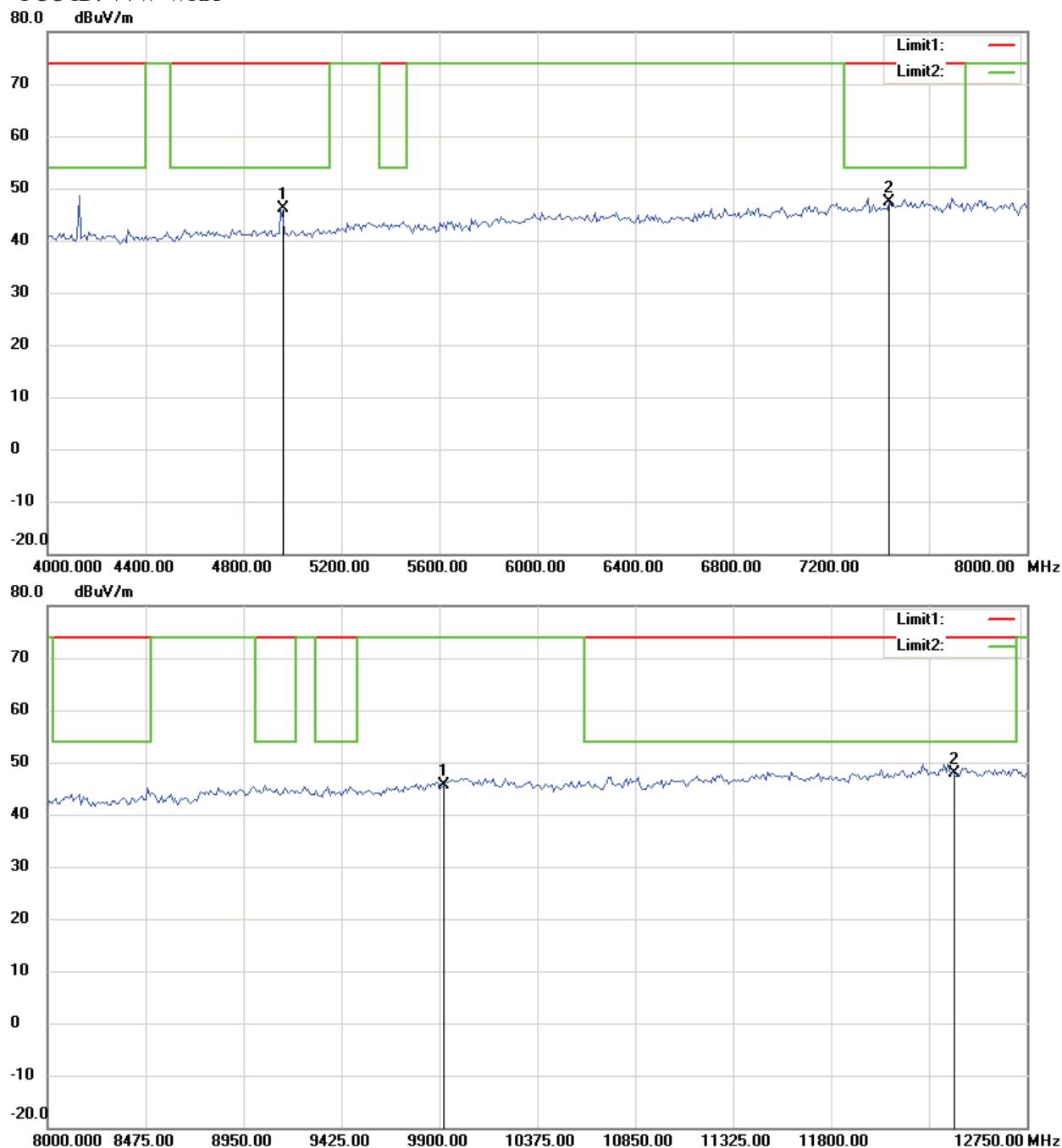
Up Line: Peak Limit Line Down Line: Ave Limit Line

Note:

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Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

Note:

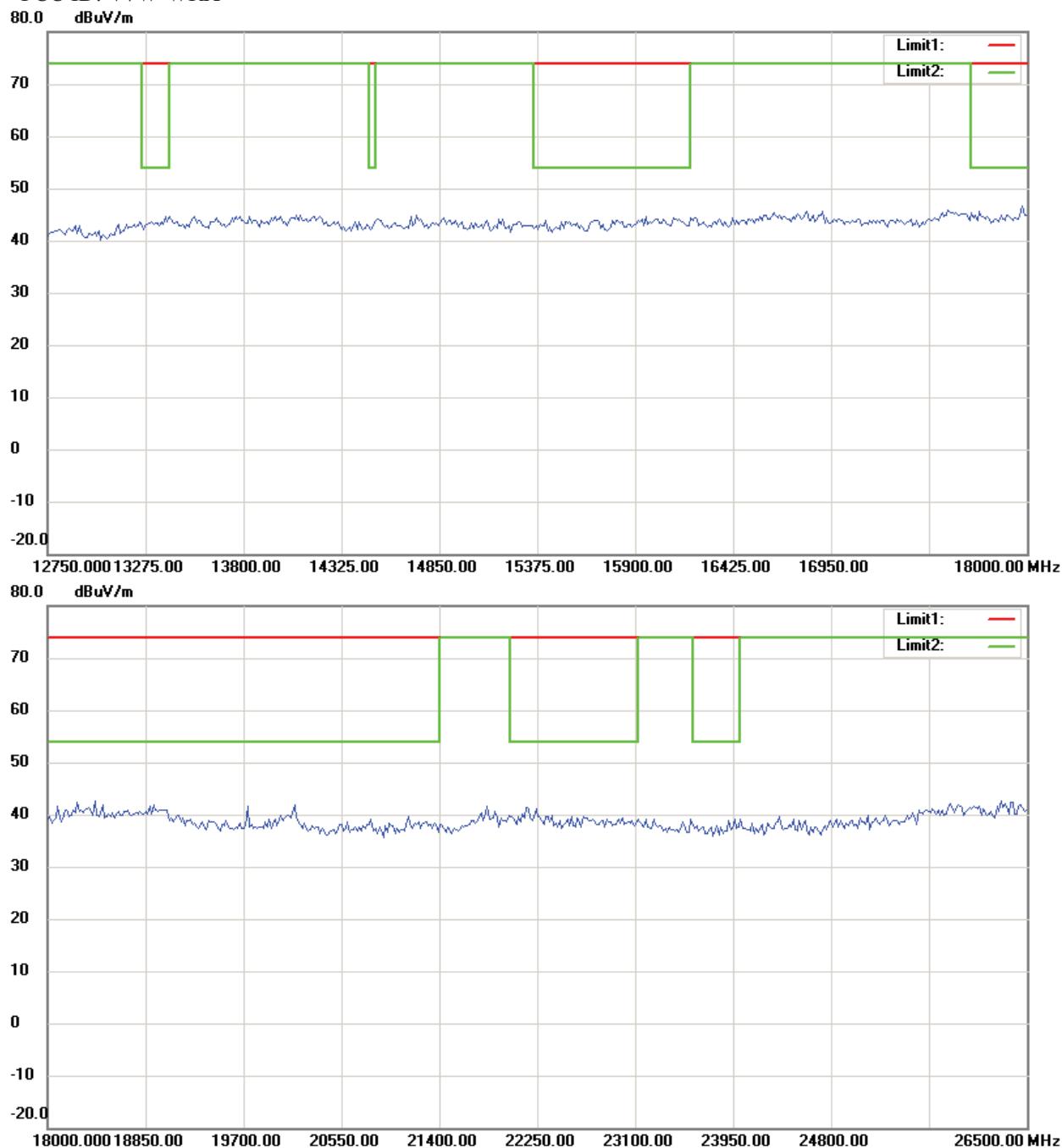
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



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

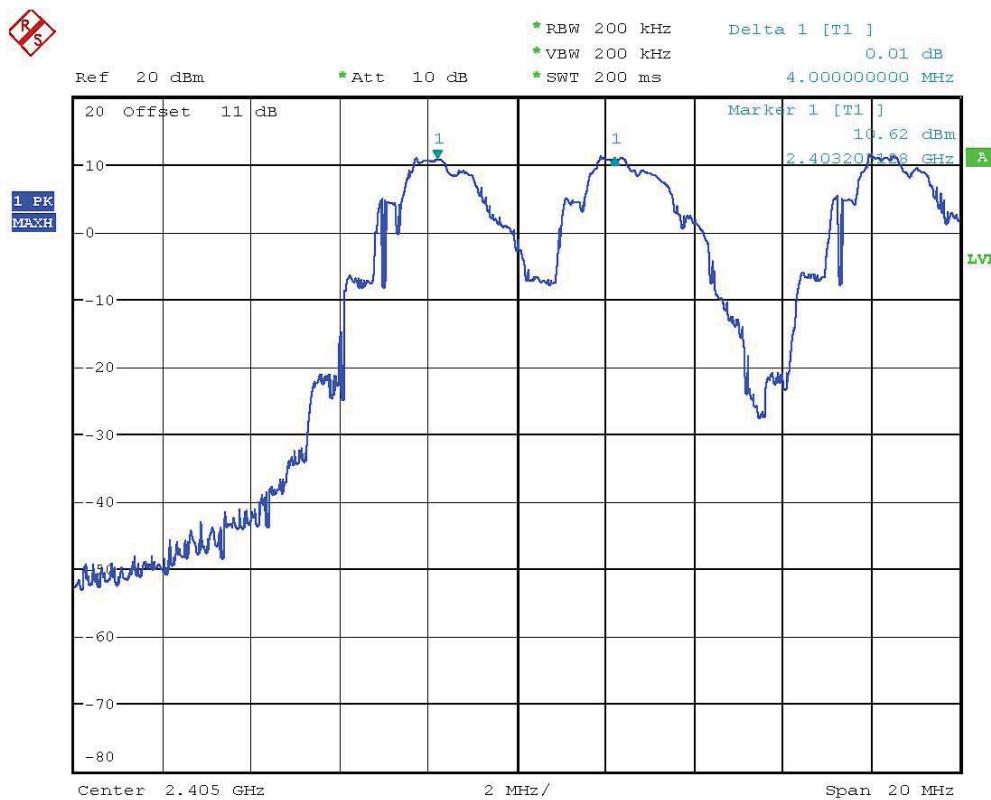
Note:

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Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Carrier Frequency Separation



FREQUENCY SEPARATION 2403.3 MHz

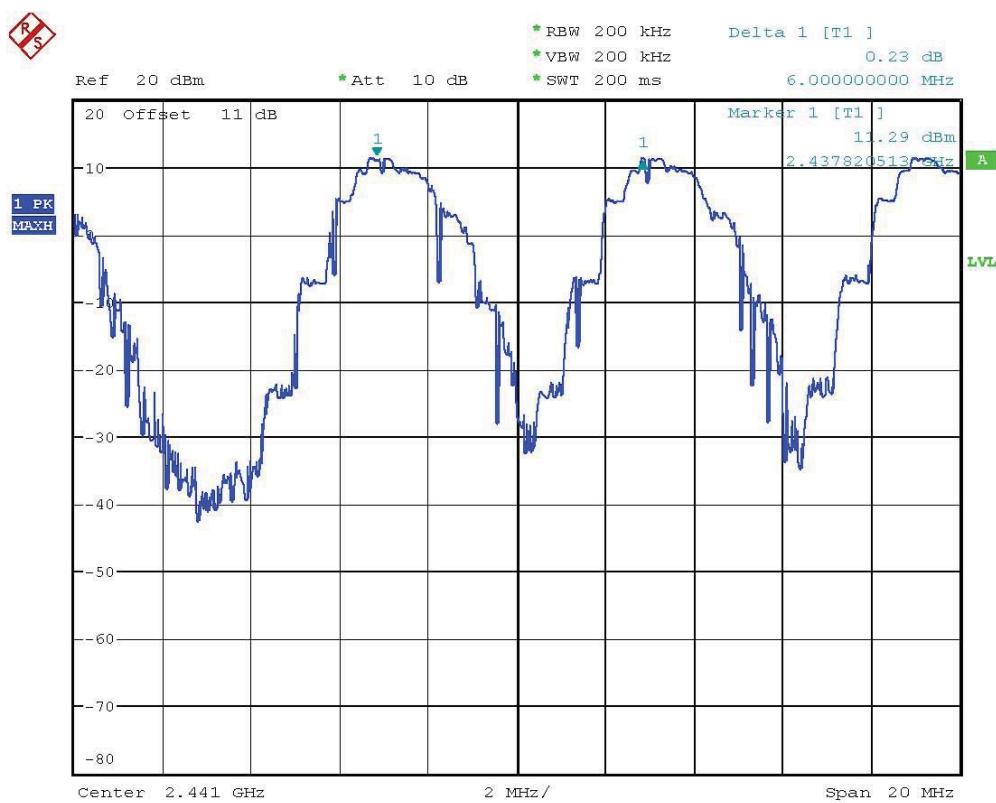
Date: 17.MAR.2010 09:26:19



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



FREQUENCY SEPARATION 2442.2 MHz

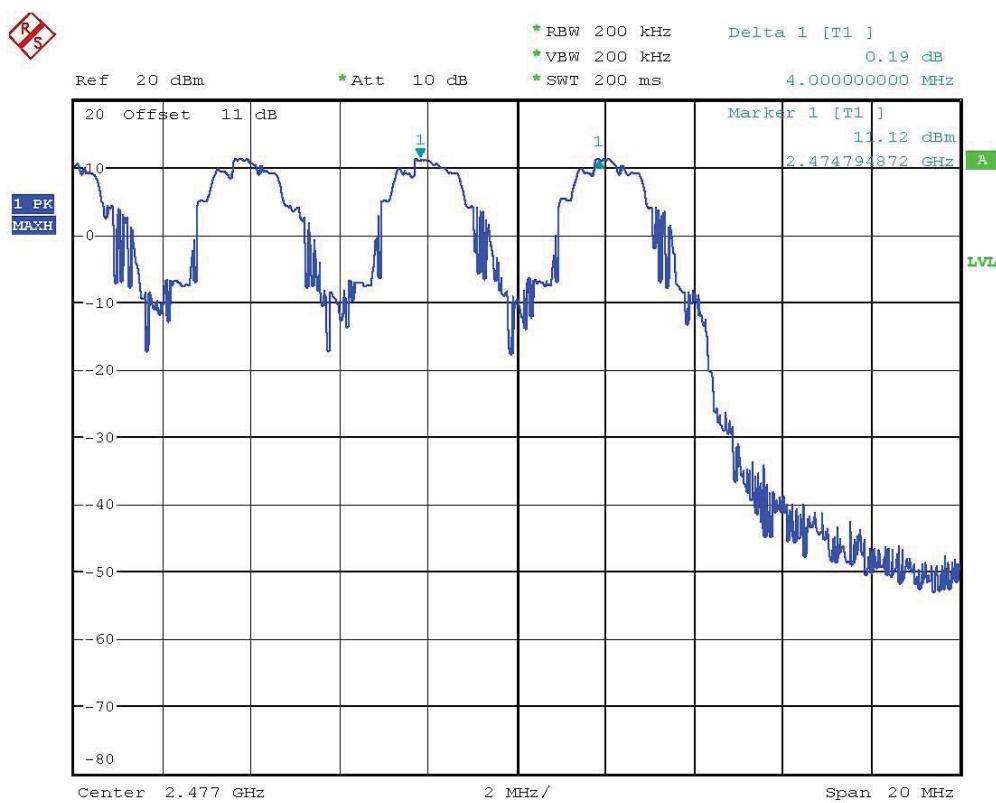
Date: 17.MAR.2010 09:29:47



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

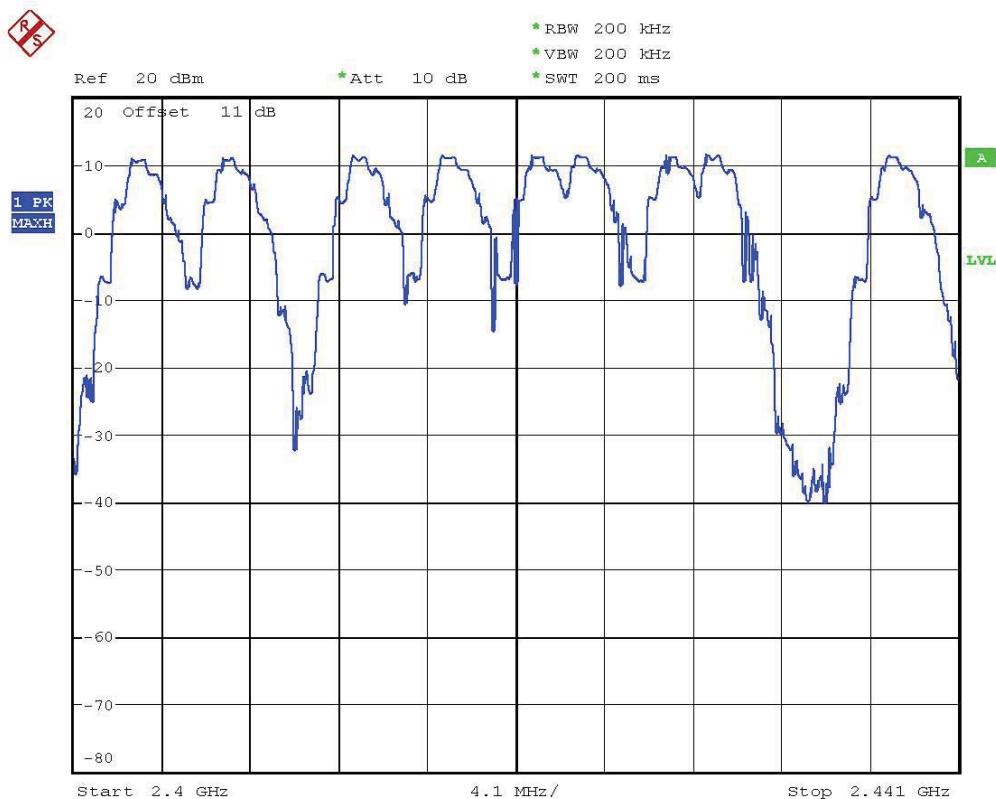


FREQUENCY SEPARATION 2479.1 MHz

Date: 17.MAR.2010 09:32:42

Registration number: W6M21002-10415-P-15-R
 FCC ID: V7W-WRX

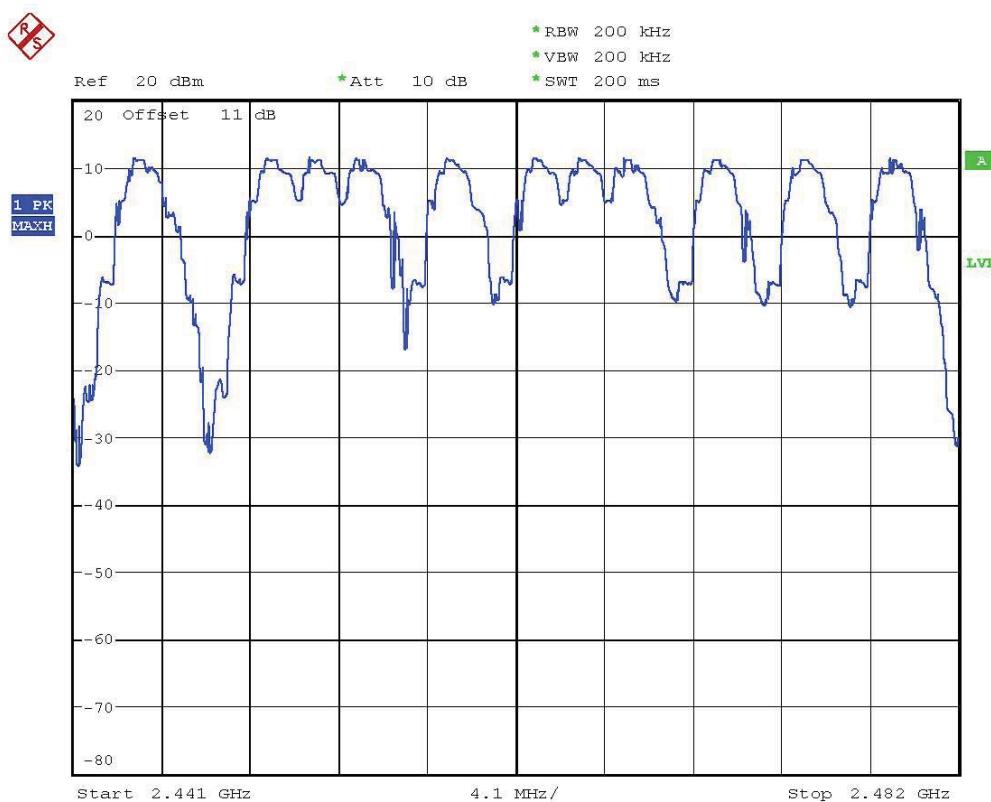
Number of Hopping Frequencies



NUMBER OF HOPPING LOW
 Date: 17.MAR.2010 09:39:00

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

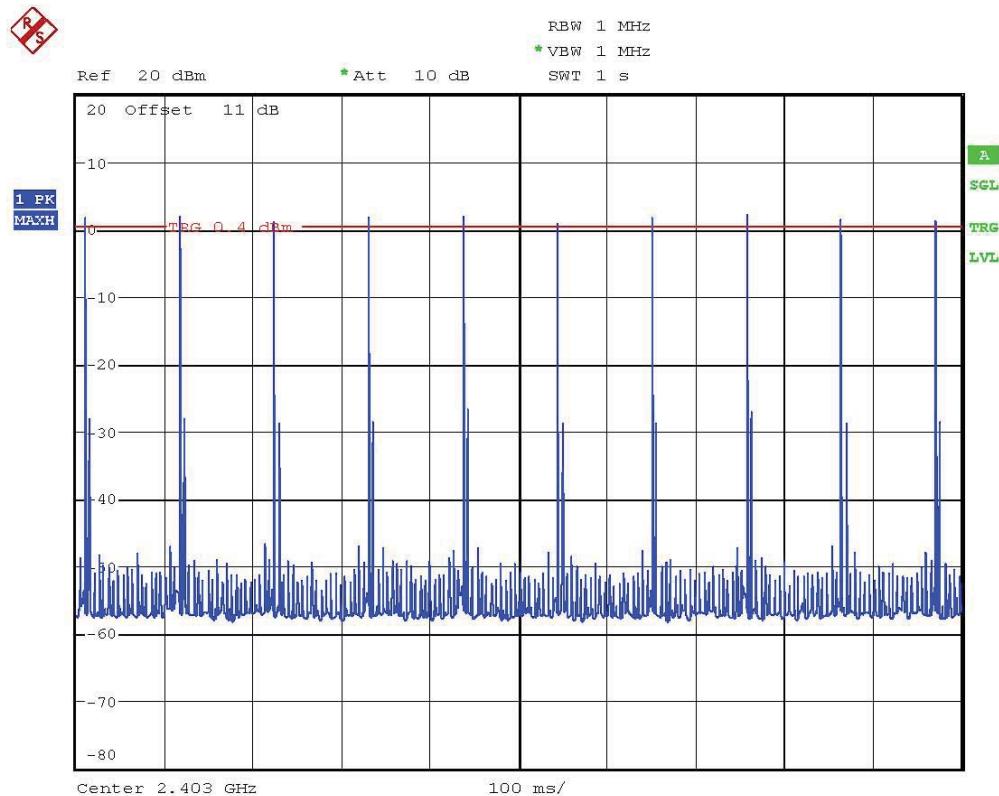


NUMBER OF HOPPING HIGH

Date: 17.MAR.2010 09:42:34

Registration number: W6M21002-10415-P-15-R
 FCC ID: V7W-WRX

Time of Occupancy (Dwell Time)



DELL TIME 2403.3 MHz (0.17628ms*80=14.1024ms)

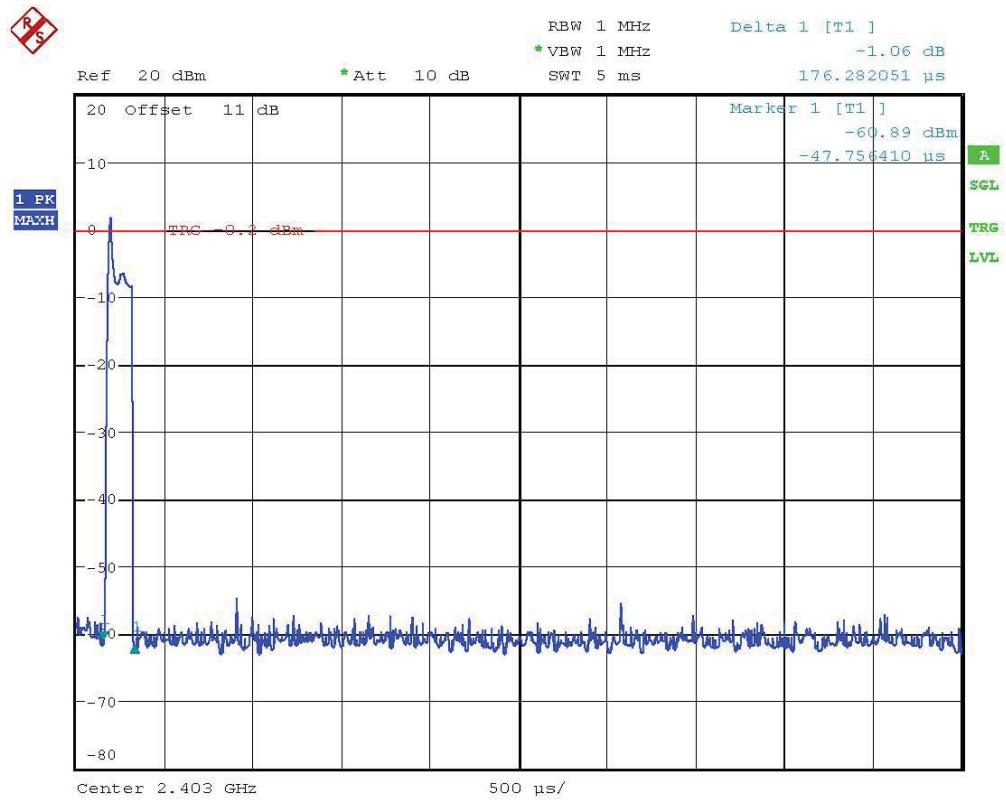
Date: 16.MAR.2010 15:04:31



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



DELL TIME 2403.3 MHz

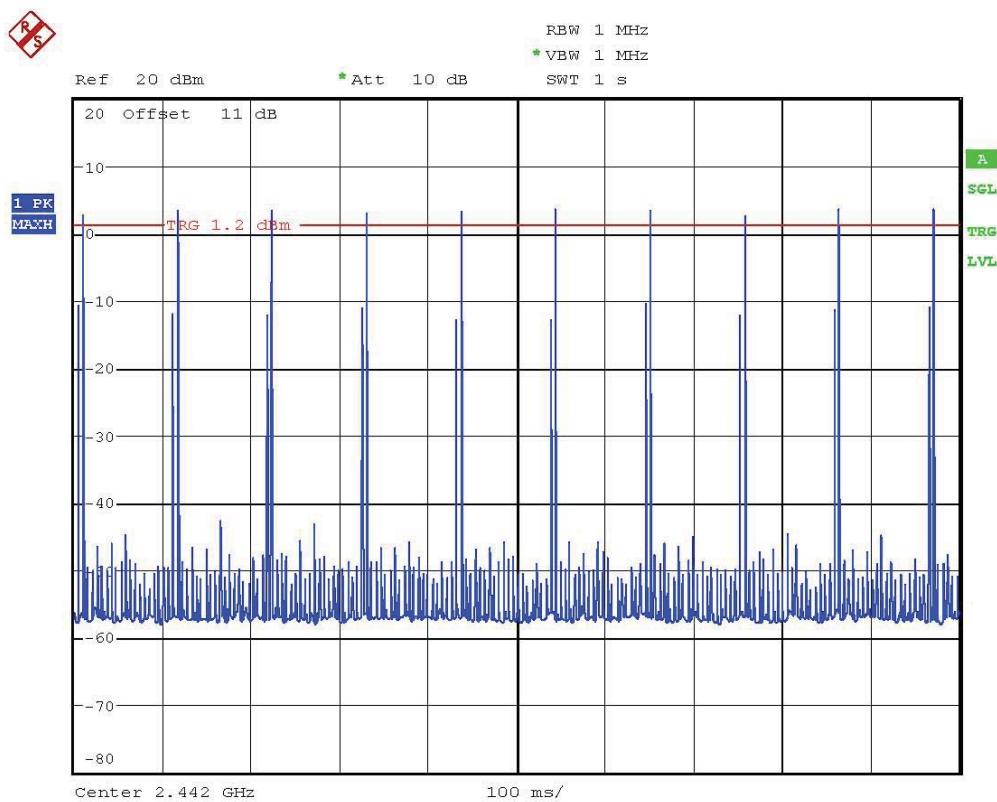
Date: 16.MAR.2010 15:07:53



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



DELL TIME 2442.2 MHz (0.17628ms*80=14.1024ms)

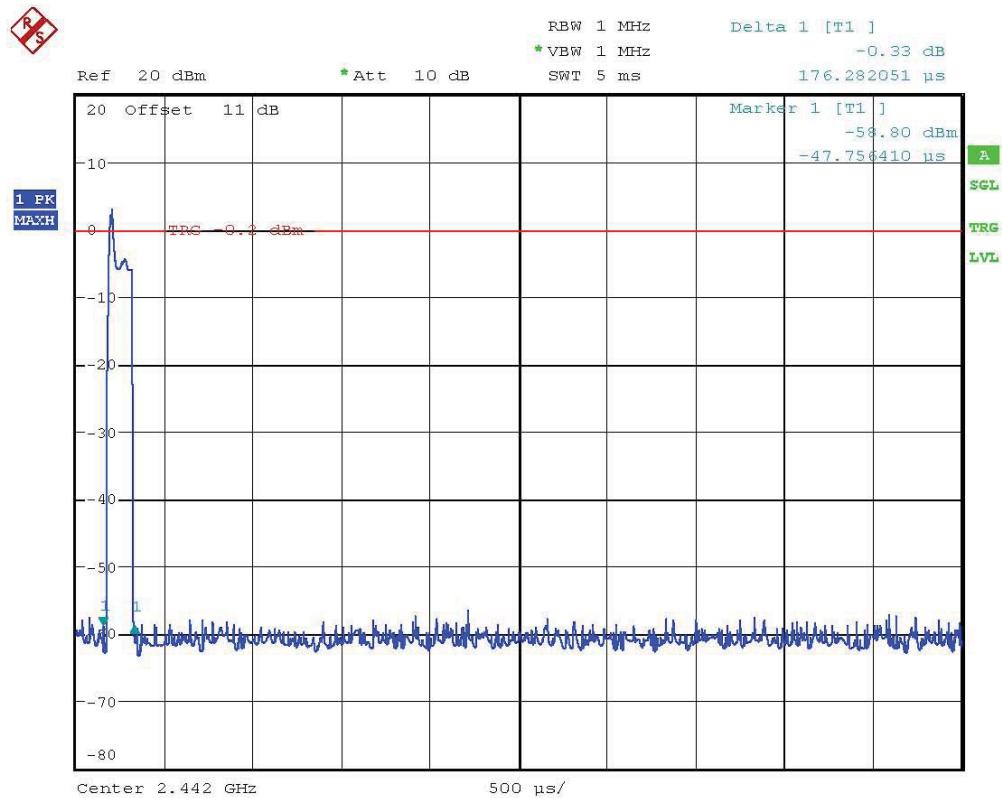
Date: 16.MAR.2010 15:03:58



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



DELL TIME 2442.2 MHz

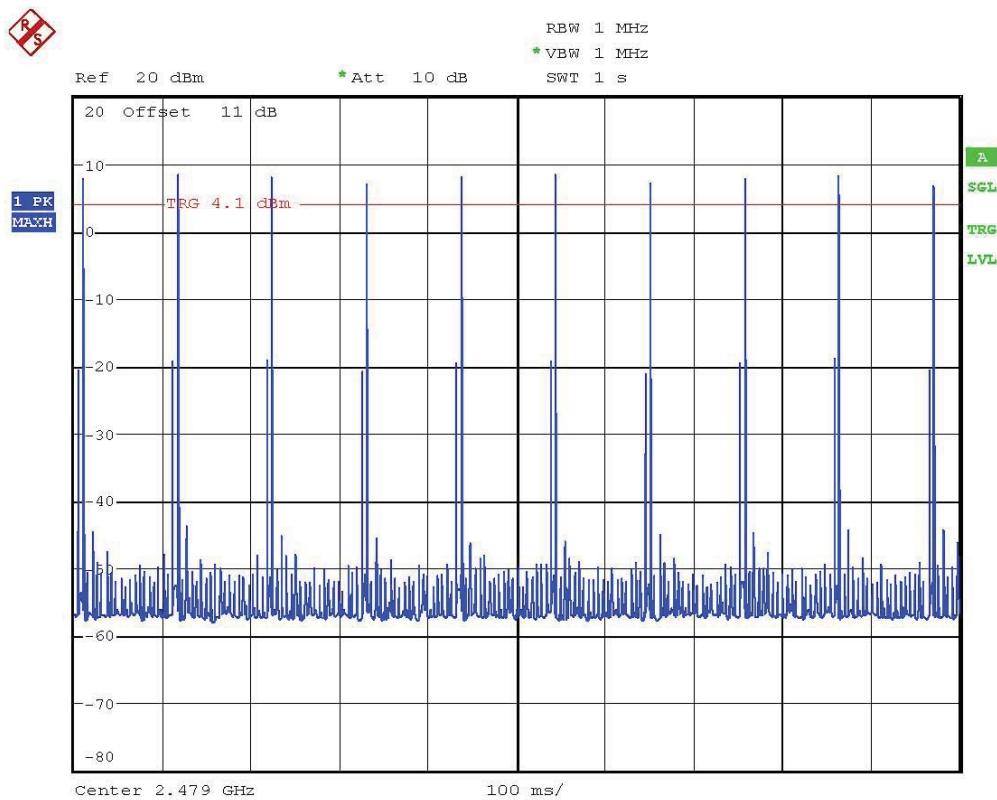
Date: 16.MAR.2010 15:08:22



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

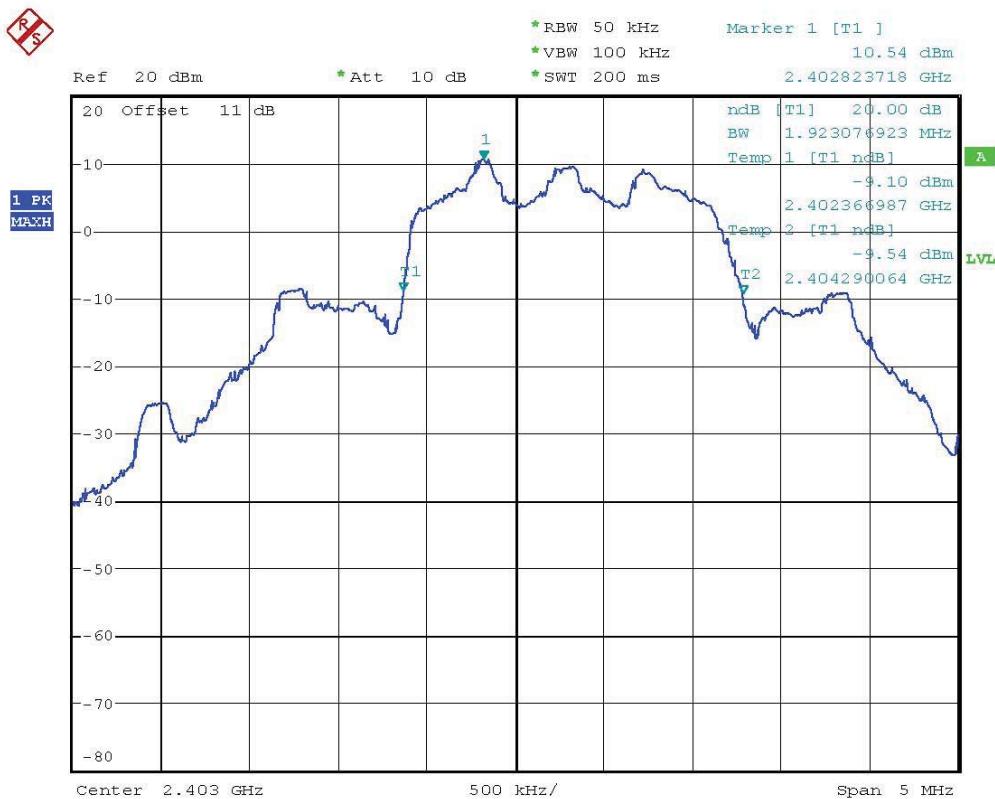


DELL TIME 2479.1 MHz (0.17628ms*80=14.1024ms)

Date: 16.MAR.2010 15:03:06

Registration number: W6M21002-10415-P-15-R
 FCC ID: V7W-WRX

20dB Bandwidth



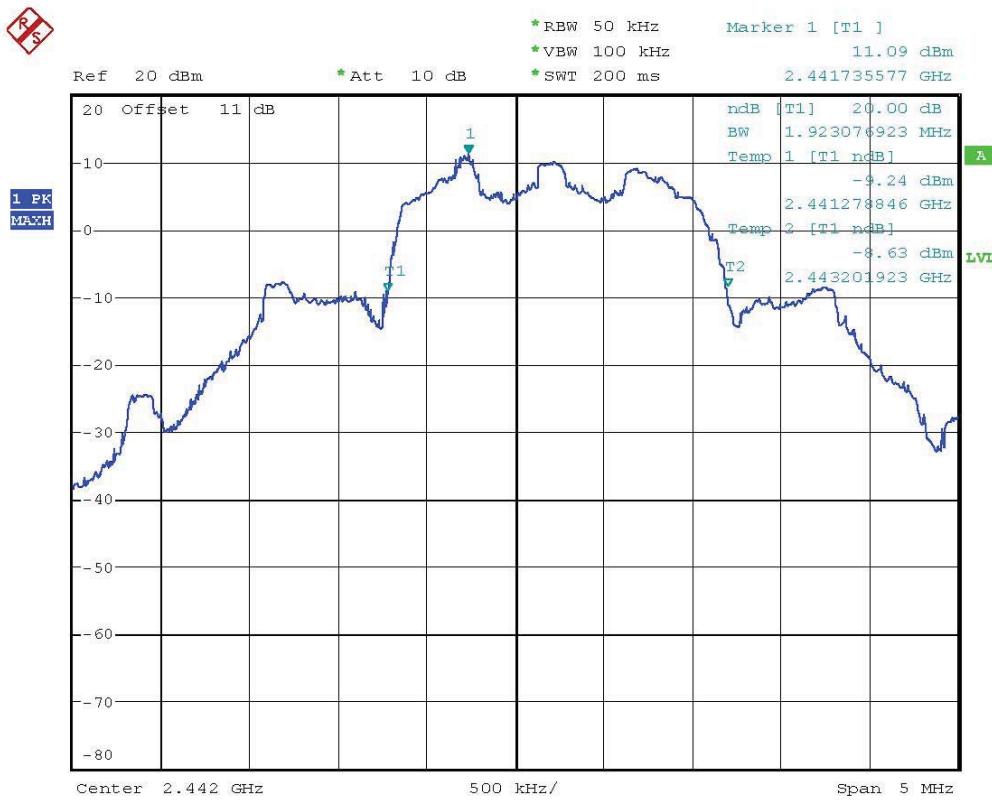
20DB BANDWIDTH 2403.3 MHz
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



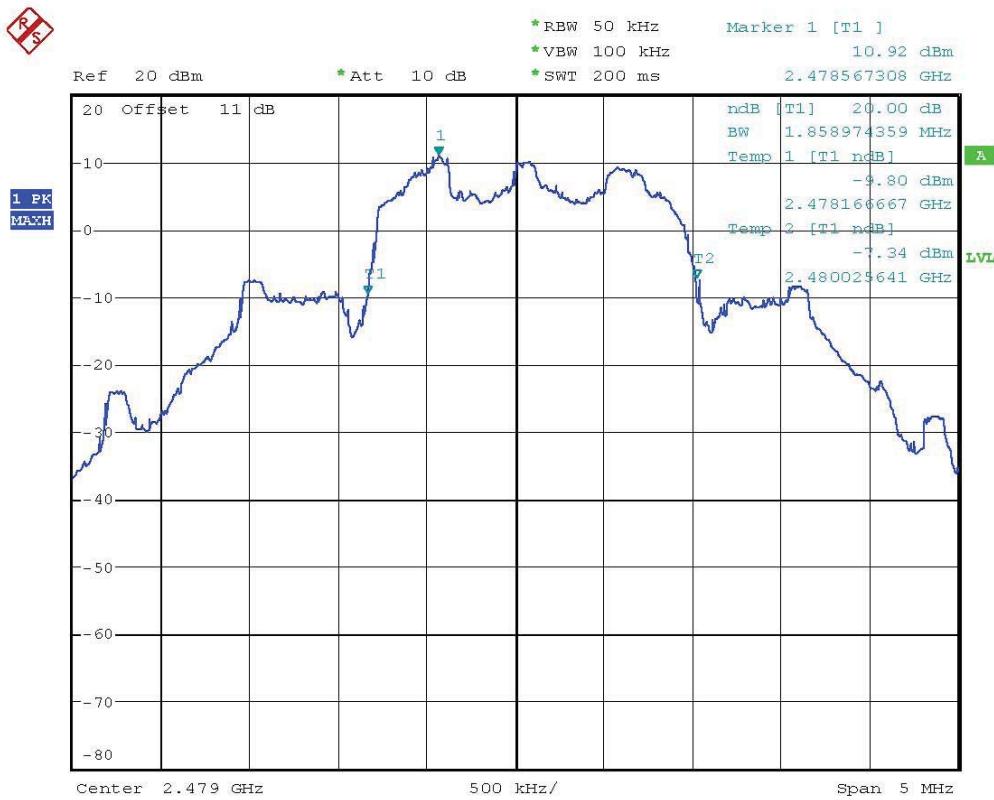
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Date: 16.MAR.2010 15:26:20



Worldwide Testing Services(Taiwan) Co., Ltd.

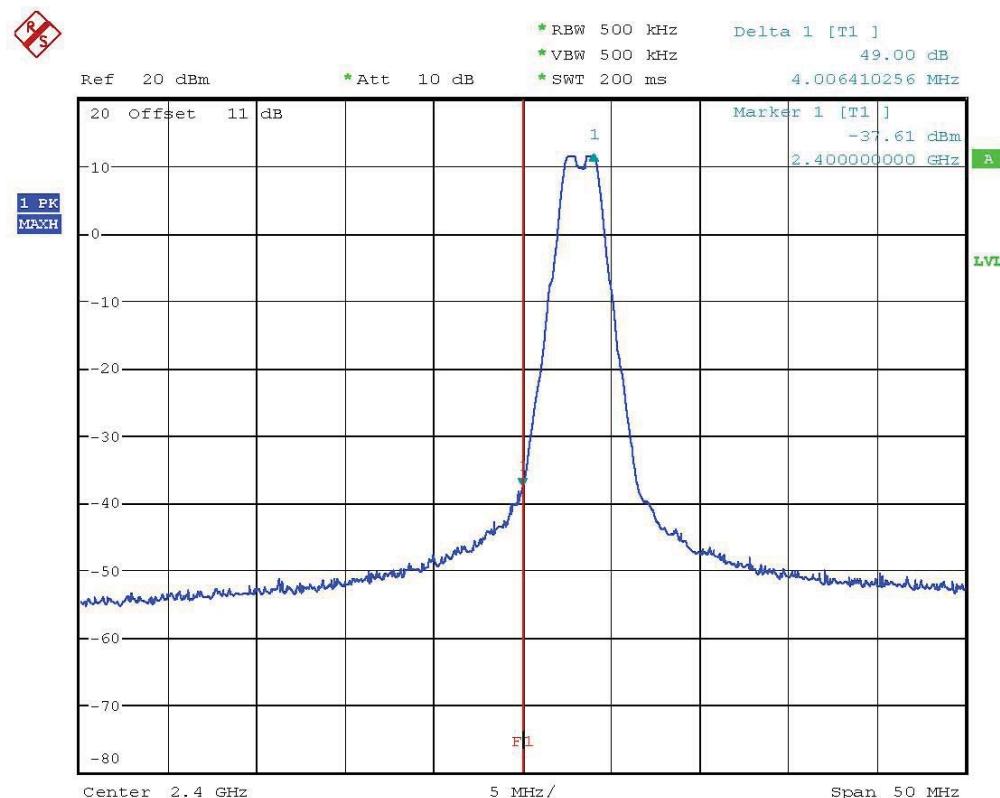
Registration number: W6M21002-10415-P-15-R
FCC ID: V7W-WRX



20DB BANDWIDTH 2479.1 MHz
Date: 16.MAR.2010 15:27:11

Registration number: W6M21002-10415-P-15-R
 FCC ID: V7W-WRX

Band-edge Compliance of RF Conducted Emissions



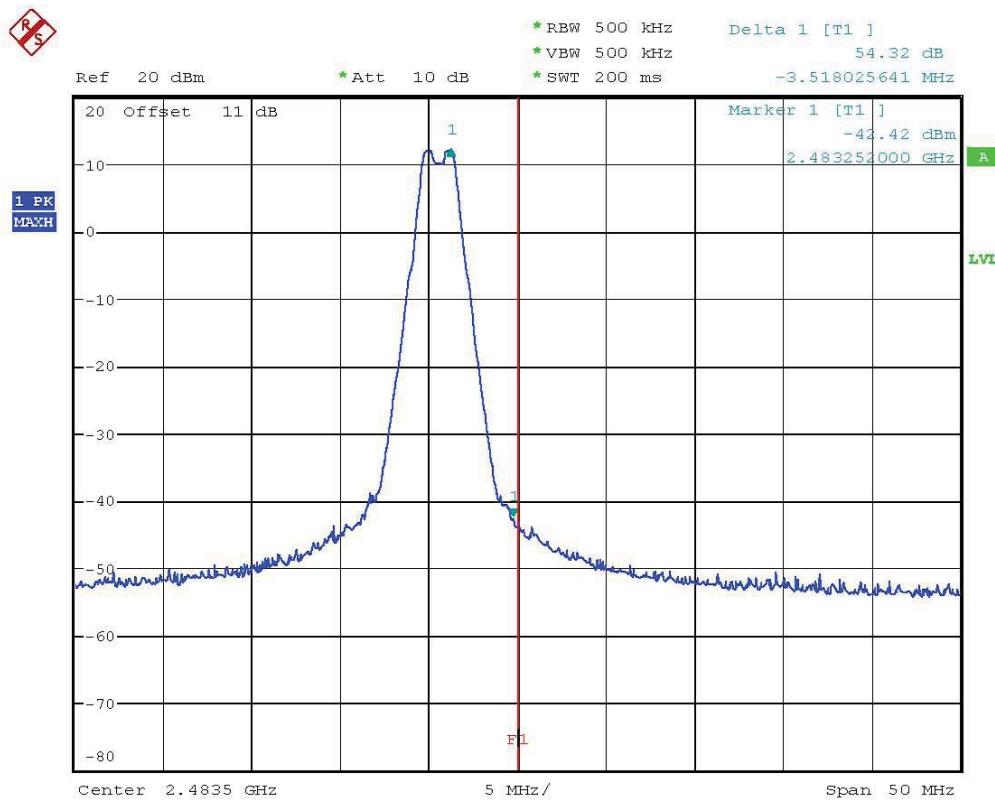
BANDEdge 2403.3 MHz
 Date: 16.MAR.2010 15:30:50



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



BANDEDGE 2479.1 MHz

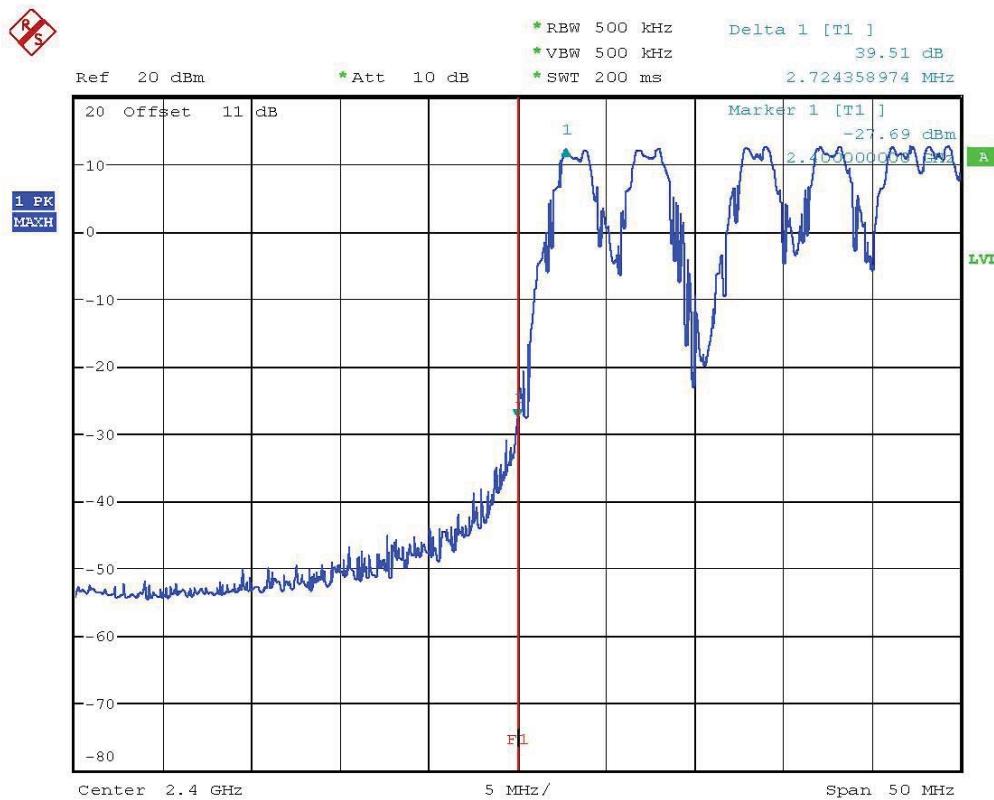
Date: 17.MAR.2010 09:16:44



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



BANDEDGE 2403.3 MHz

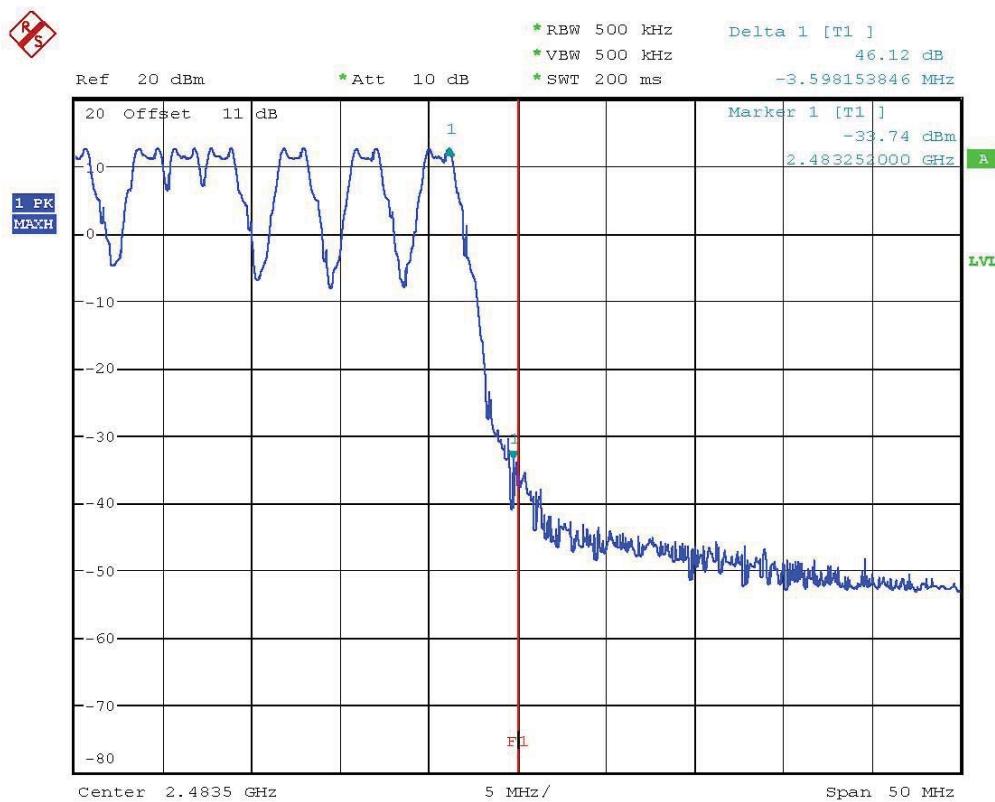
Date: 17.MAR.2010 09:19:52



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



BANDEdge 2479.1 MHz

Date: 17.MAR.2010 09:16:03

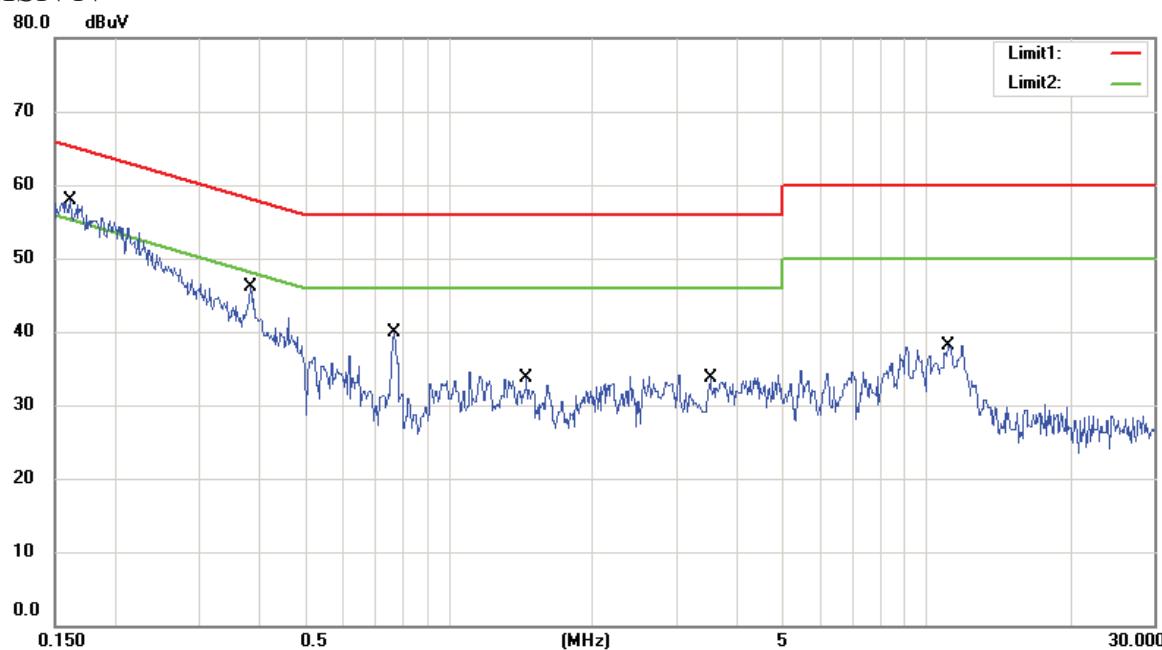
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FCC ID: V7W-WRX

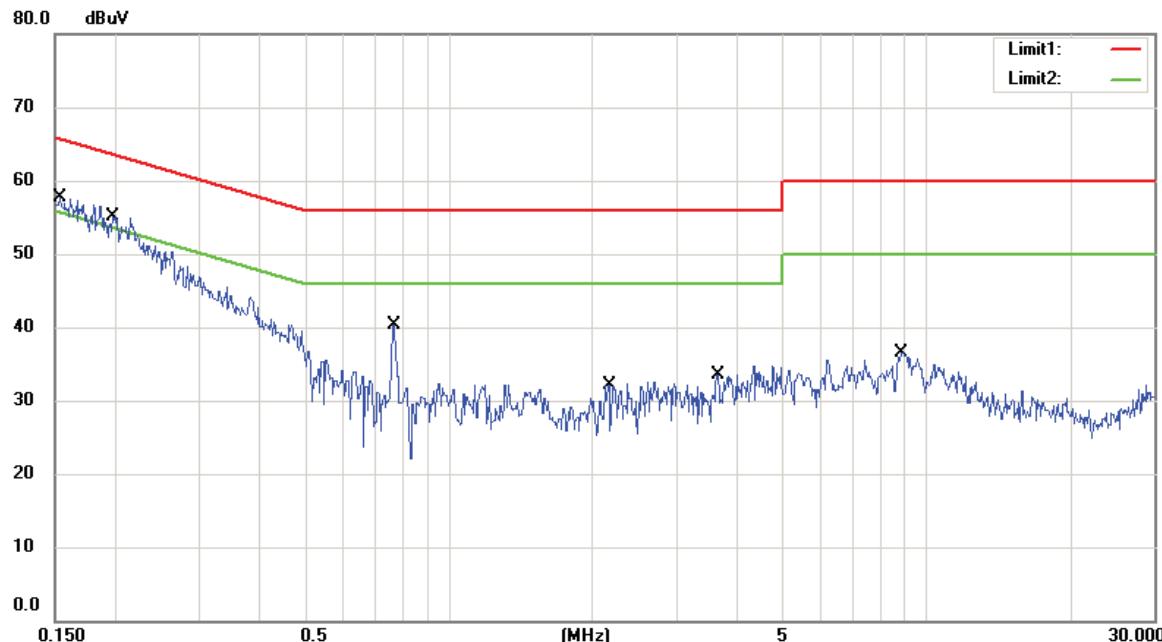
Conducted Emission

Wireless

LISN N



LISN L1



Up Line: QP Limit Line Down Line: Ave Limit Line

Note:

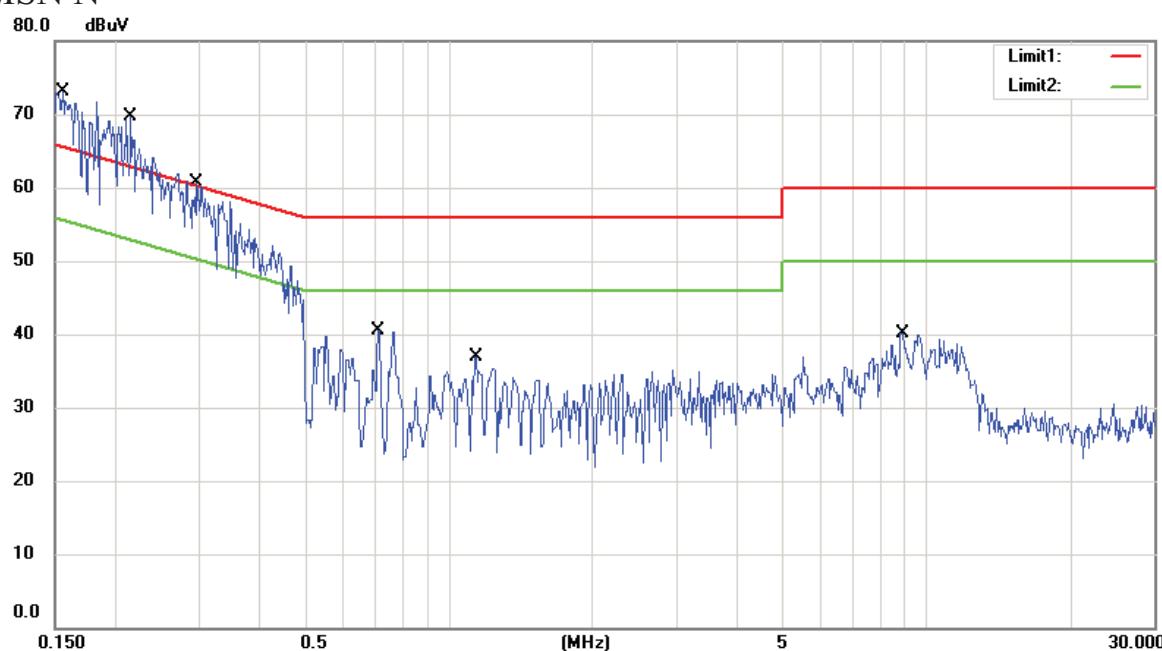
1. The attached measurement plots are preliminarily pre-scanned with peak detector for determining the final checking frequencies and are for reference only.
2. The some frequencies may exceed the limit line without the specified detectors, but that cannot present the results are failed to the specification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

Registration number: W6M21002-10415-P-15-R

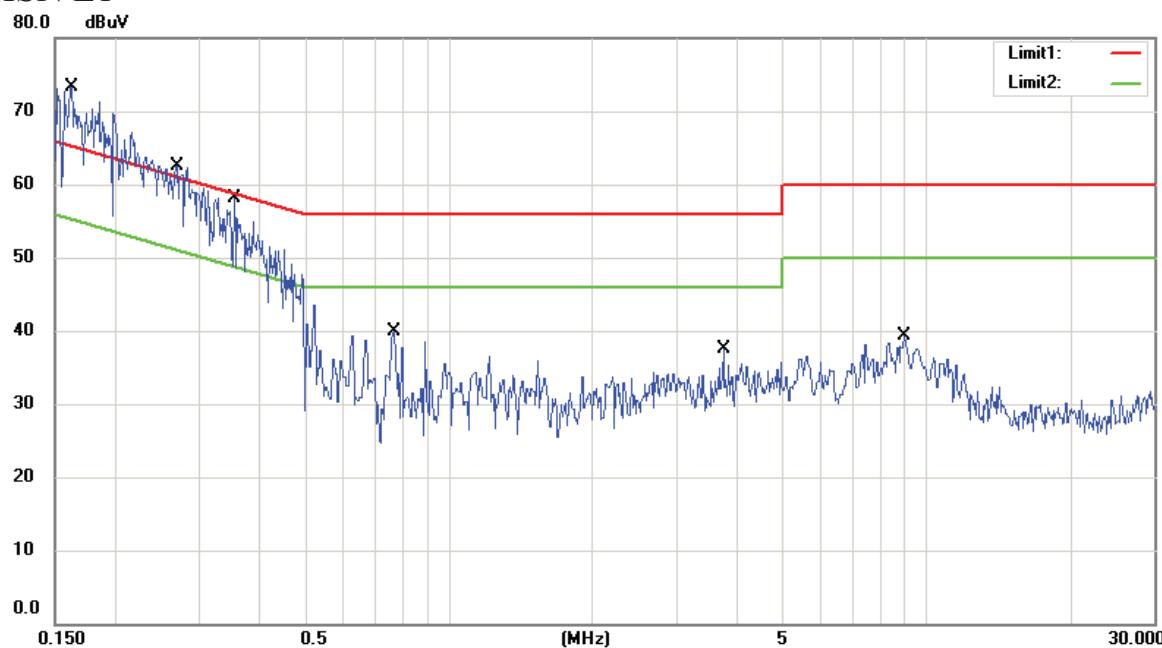
FCC ID: V7W-WRX

AUX IN

LISN N



LISN L1



Up Line: QP 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 AC conducted test data of this test report.



Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

External Photos





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R
FCC ID: V7W-WRX





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FCC ID: V7W-WRX





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Internal photos

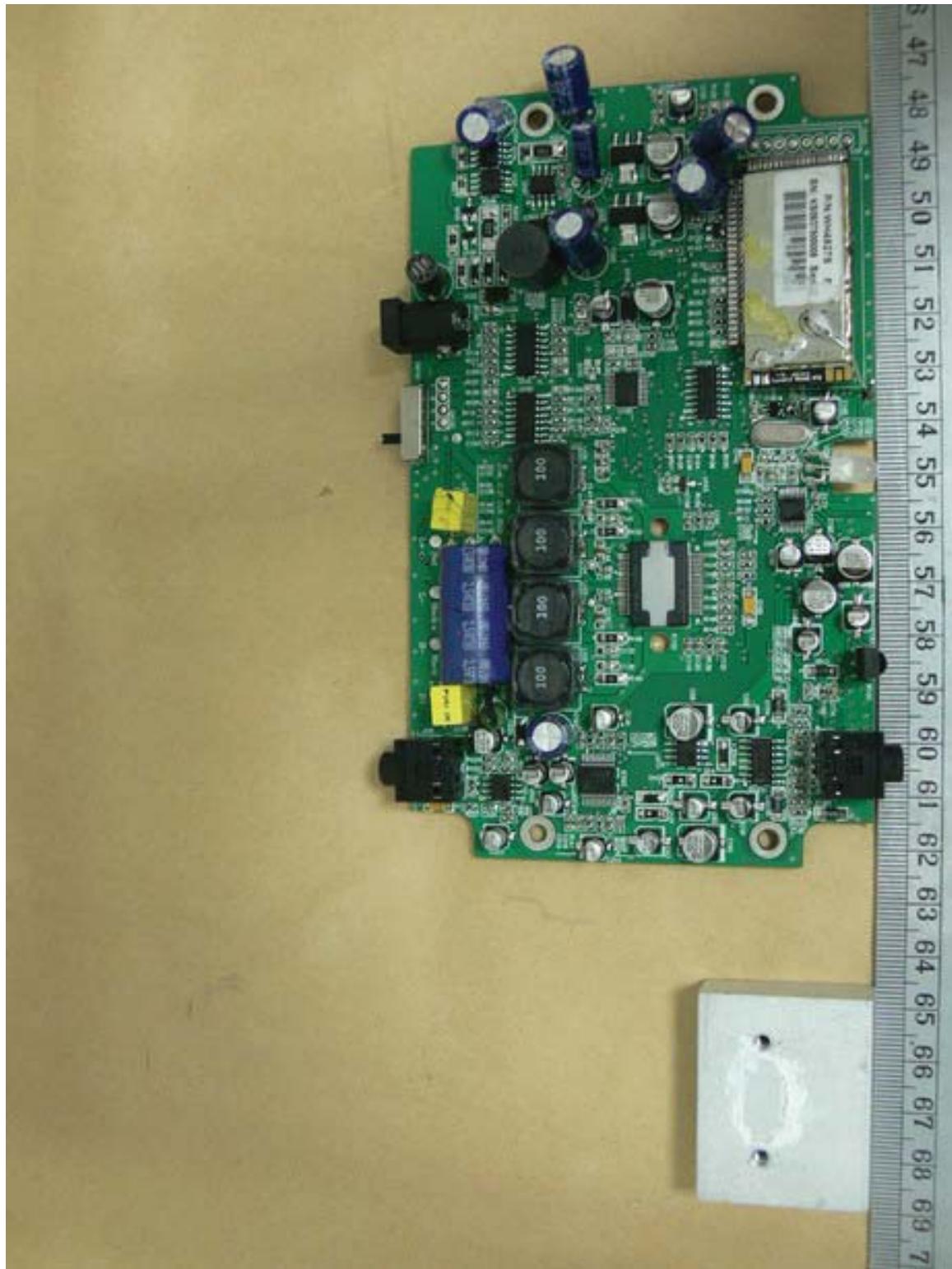




Worldwide Testing Services(Taiwan) Co., Ltd.

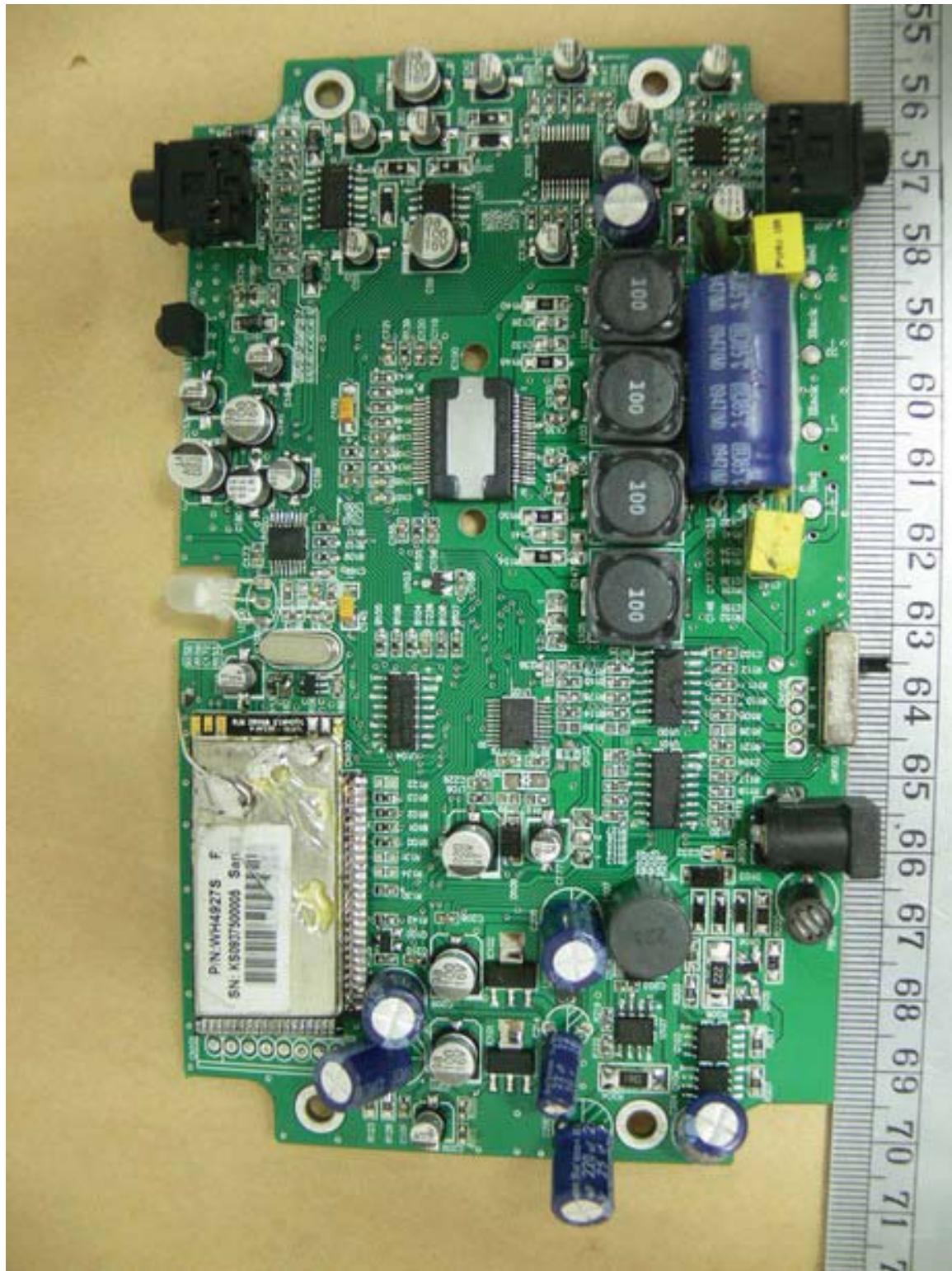
Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX



Registration number: W6M21002-10415-P-15-R

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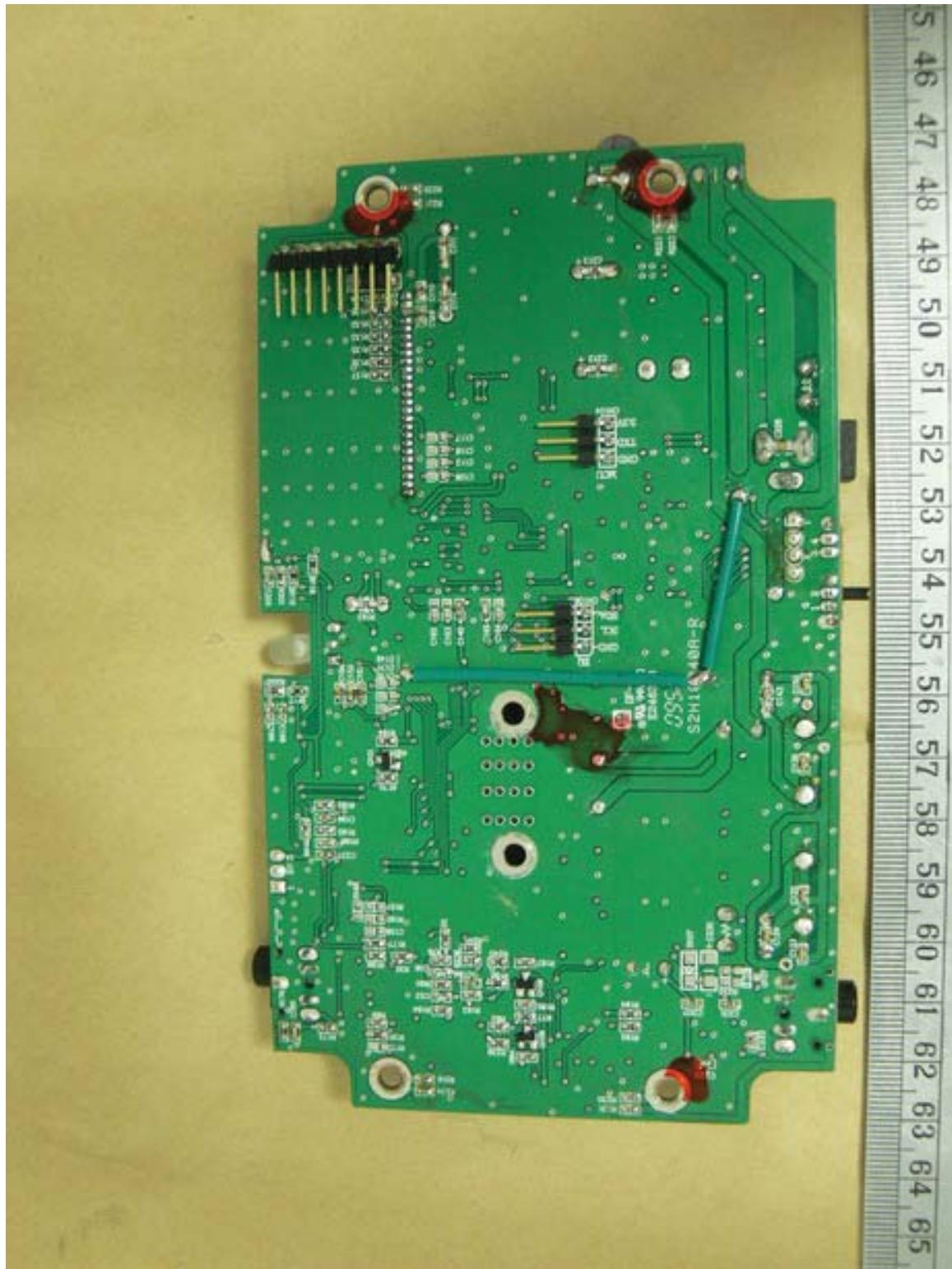




Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

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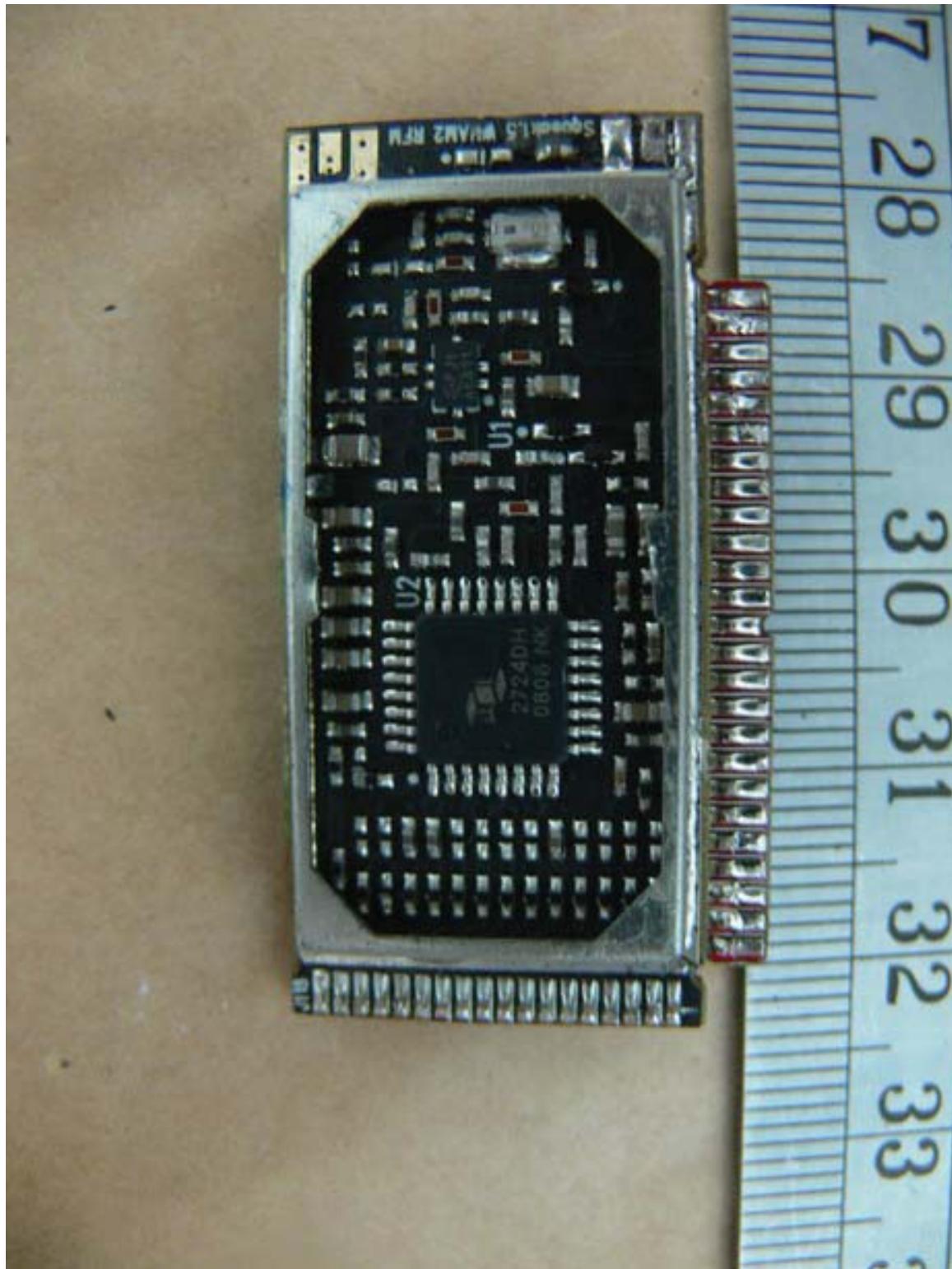




Worldwide Testing Services(Taiwan) Co., Ltd.

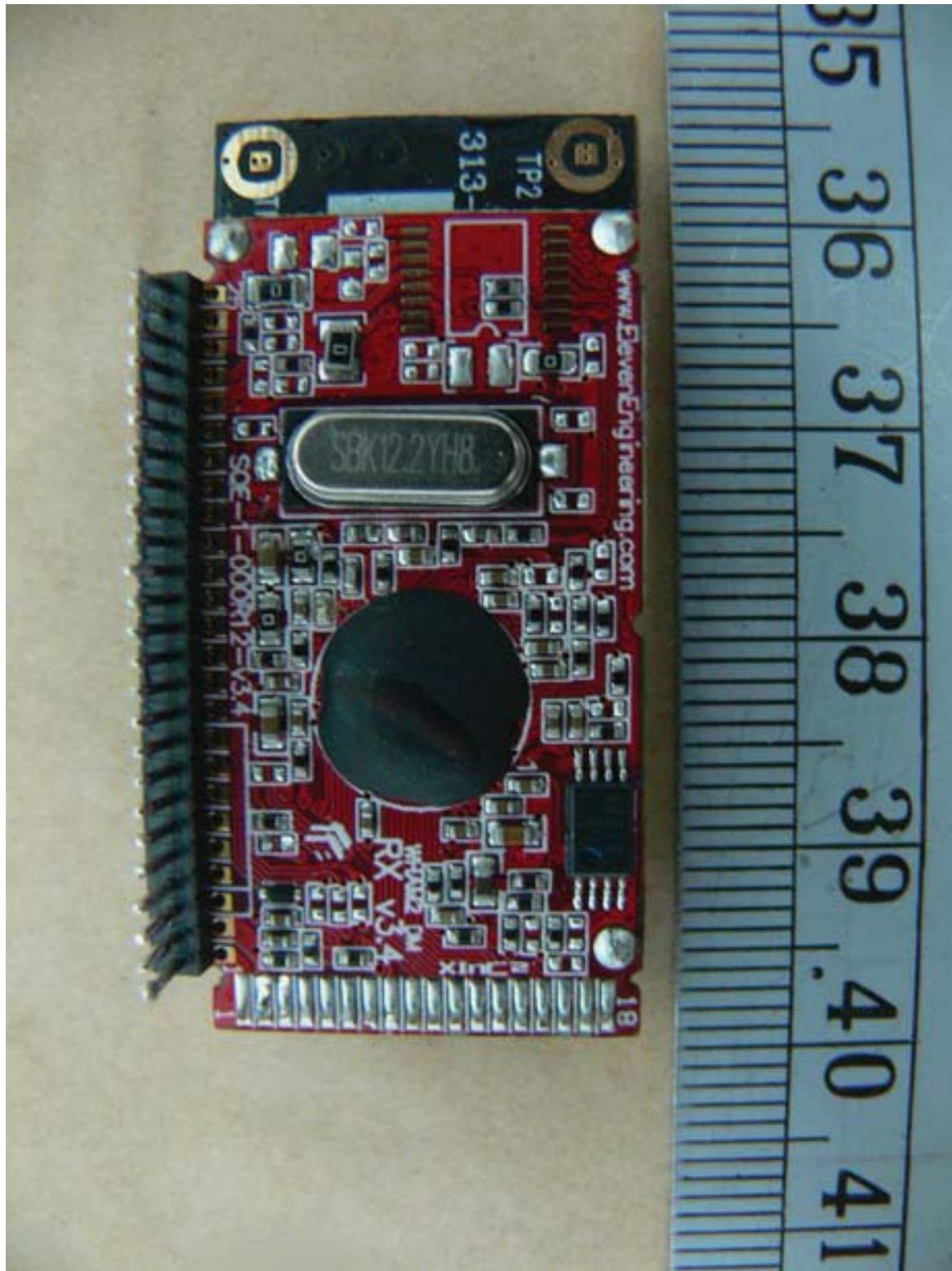
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FCC ID: V7W-WRX



Registration number: W6M21002-10415-P-15-R

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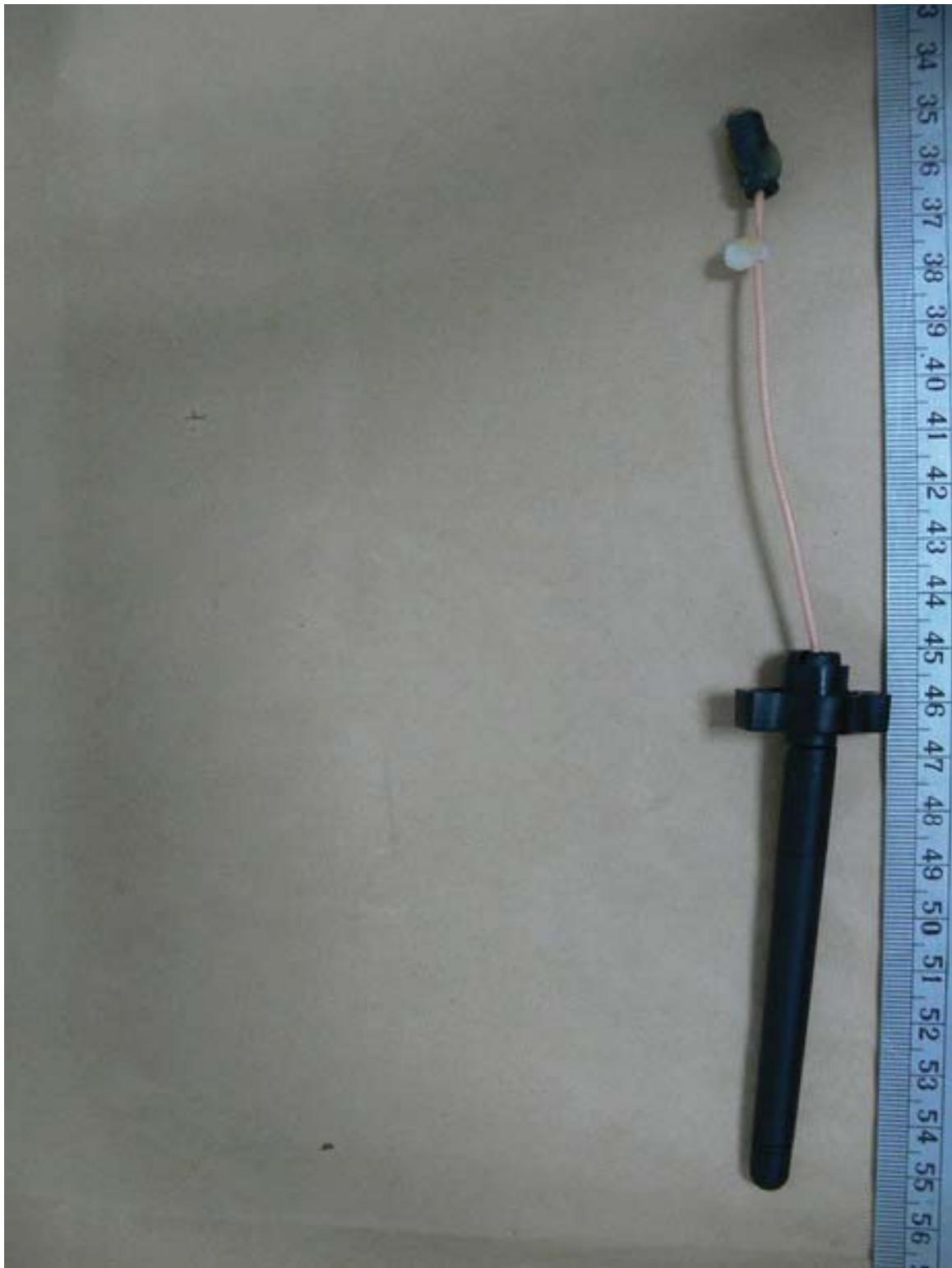




Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Multi-listing model no.: AirFlex

External Photos





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX





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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Internal Photos

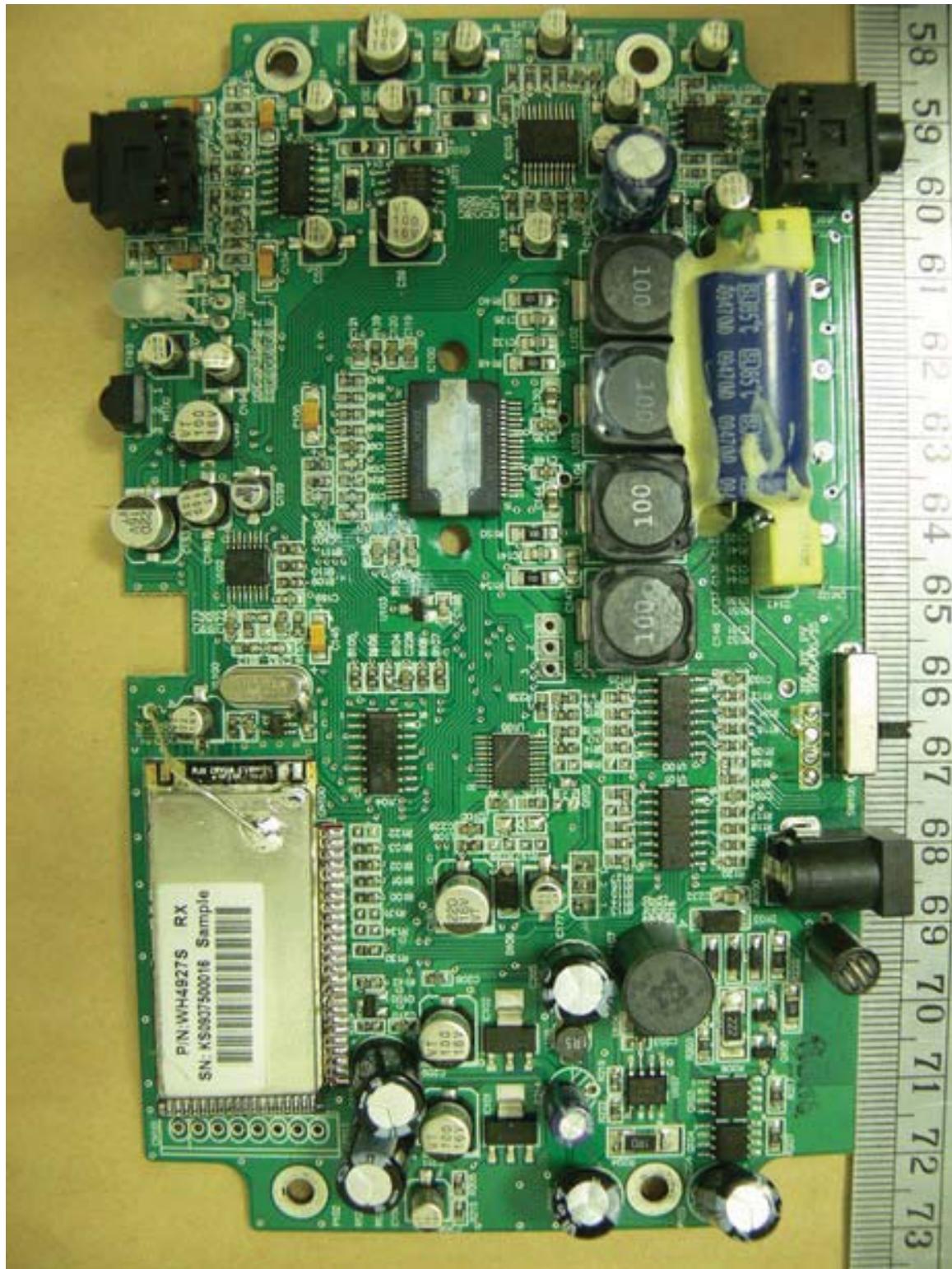




Worldwide Testing Services(Taiwan) Co., Ltd.

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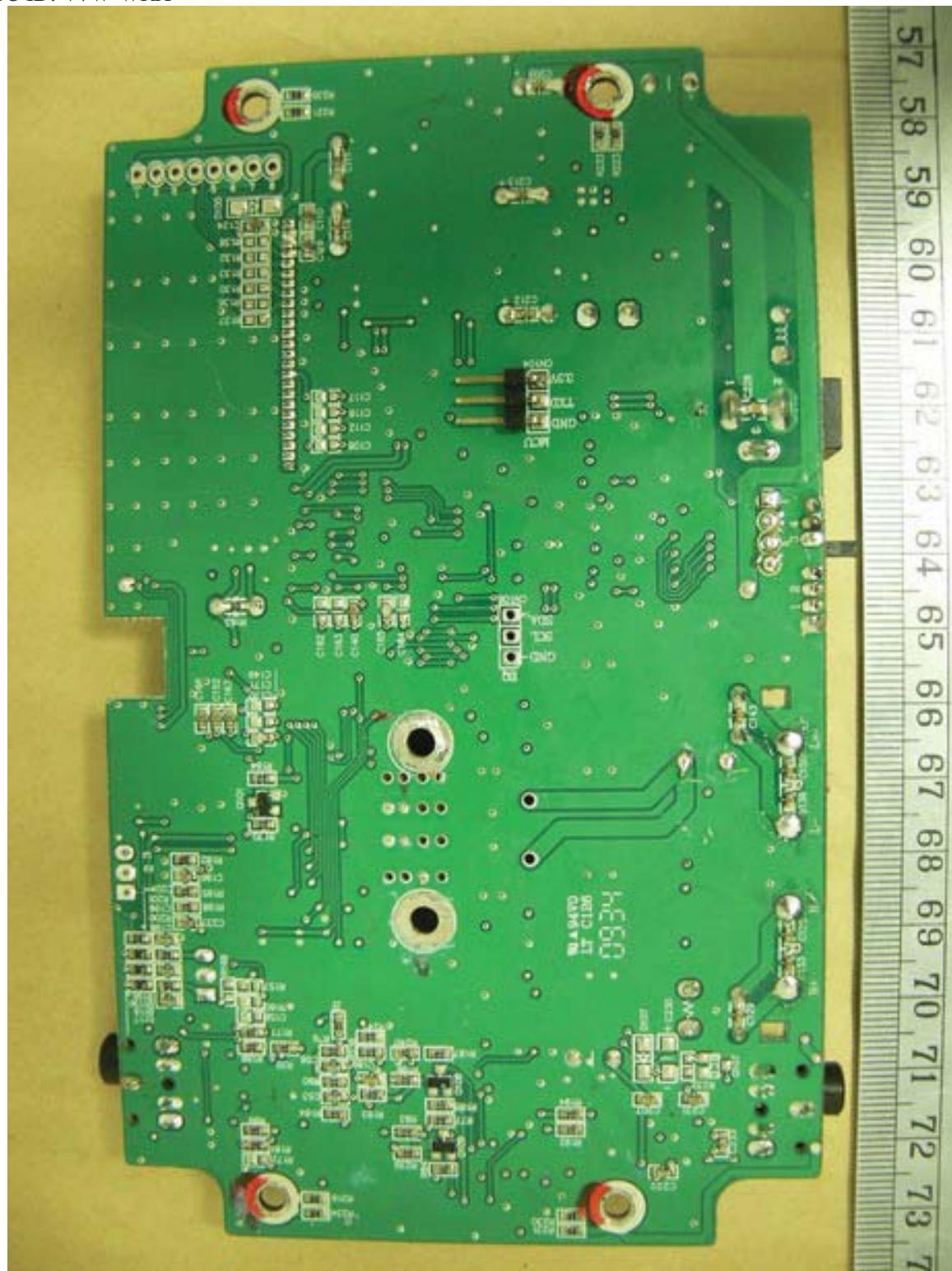
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Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R
FCC ID: V7W-WRX





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Set Up Photo of Radiated Emission



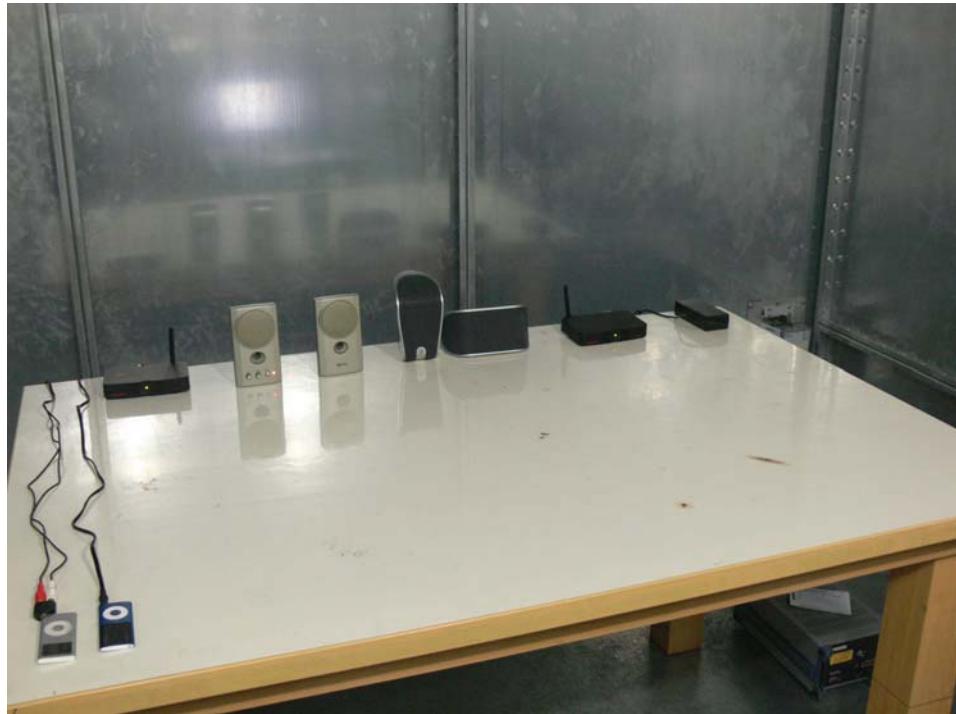


Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

Set Up Photo of Conducted Emission Wireless





Worldwide Testing Services(Taiwan) Co., Ltd.

Registration number: W6M21002-10415-P-15-R

FCC ID: V7W-WRX

AUX IN

