FCC PART 15 SUBPART C TEST REPORT

for

Evoluent VerticalMouse Receiver

Model No.: VMR2

FCC ID: TUQVMR2

of

Applicant: K-WELL INTERNATIONAL CORP.

Address: 10F, NO. 57, SEC. 4, JHONGSIAO E. RD., DA-AN DIST.

TAIPEI CITY TAIWAN

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: 930600

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

A2LA Accredited No.: 2732.01





Report No.: W6M21108-11762-C-1

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



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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 is 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:

October 06, 2011 Rick Chen Rick Chen

Date WTS-Lab. Name Signature

Technical responsibility for area of testing:

October 06, 2011 Chang Tse-Ming

Date WTS Name Signature

Chang Tse-Ming

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: K-WELL INTERNATIONAL CORP.

Street: 10F, NO. 57, SEC. 4, JHONGSIAO E. RD., DA-AN DIST.

Town: TAIPEI CITY
Country: TAIWAN
Telephone: 02-27317775
Fax: 02-87735730

Teletex: ./.

1.4 Application details

Date of receipt of test item: August 25, 2011

Date of test: From August 26, 2011 to October 04, 2011

1.5 General information of Test item

Type of test item: Evoluent VerticalMouse Receiver

Model Number: VMR2

Multi-listing model number: ./.

Brand Name: Evoluent
Photos: see Annex

Technical data

Frequency band: 2.400-2.4835GHz Operation Frequency: 2.403-2.478 GHz

Frequency 1: 2.403 GHz
Frequency 2: 2.453 GHz
Frequency 3: 2.478 GHz

Operation modes: duplex Modulation Type: GFSK

Antenna type: Chip Antenna / gain: -5 dBi
Power supply: USB 5VDC (power on 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 (2010-10)

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2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.	×
or	
The deviations as specified in 2.5 were ascertained in the course of the tests performed.	

2.2 Test environment

Temperature: 23 °C

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Details Power supply: USB 5VDC (power on 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	2011/9/2	2012/9/1
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function	on Test
ETSTW-CE 004	ZWEILEITER-V- NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2011/3/10	2012/3/9
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2011/9/5	2012/9/4
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2011/3/8	2012/3/7
ETSTW-CE 007	SPECTRUM ANALYZER 5GHz	FSB	849670/001	R&S	Pre-test I	Use NCR
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function	on Test
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2011/7/13	2012/7/12
ETSTW-CE 013	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T4-02	20242	FCC	2011/9/6	2012/9/5
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2011/2/21	2012/2/20
ETSTW-CE 024	IMPEDANCE STABILIZATION NETWORK	ISN T800	29454	TESEQ	2011/1/10	2012/1/9
ETSTW-CS 004	COUPLING AND DECOUPLING NETWORK	CDN M016	20053	SCHAFFNER	2011/8/12	2012/8/11
ETSTW-CS 005	RF Power Amplifier	100A250A	306547	AR	Function Test	
ETSTW-CS 009	6 dB Attenuator	75-A-FFN-06	70998	BIRD	2011/5/20	2012/5/19
ETSTW-CS 010	6 dB Attenuator	SA3N1007-06	None	AISI	2011/7/29	2012/7/28
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2011/8/16	2012/8/15
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2011/9/5	2012/9/4
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2011/9/2	2012/9/1
ETSTW-RE 010	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2011/9/7	2012/9/6
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function	on Test
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function	on Test
ETSTW-RE 019	MICROWAVE HORN ANTENNA	22240-25	121074	FM	2011/4/25	2012/4/24
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function	on Test
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2011/7/19	2012/7/18
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2011/2/25	2012/2/24
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2011/10/3	2012/10/2
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P1450 8	LeCroy	Function	on Test
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2011/10/3	2012/10/2
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2011/1/14	2012/1/13
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2011/4/26	2012/4/25
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2011/4/25	2012/4/24
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test U	Use NCR



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ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2011/8/29	2012/8/28
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2011/4/8	2012/4/7
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2011/3/4	2012/3/3
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2011/3/4	2012/3/3
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2011/3/4	2012/3/3
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2011/5/30	2012/5/29
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2011/3/4	2012/3/3
ETSTW-RE 061	Amplifier Module	CHC 1	None	ETS	2011/5/18	2012/5/17
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2010/11/30	2011/11/29
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function	on Test
ETSTW-RE 065	Amplifier	AMF-6F-18002650- 25-10P	941608	MITEQ	2011/4/8	2012/4/7
ETSTW-RE 066	Highpass Filter	H1G013G1	206015	MICROWAVE CIRCUITS, INC.	2011/3/4	2012/3/3
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	НР	2011/10/3	2012/10/2
ETSTW-RE 073	Power Meter	N1911A	MY45100769	Agilent	2011/1/10	2012/1/9
ETSTW-RE 074	Power Sensor	N1921A	MY45241198	Agilent	2011/1/10	2012/1/9
ETSTW-RE 081	Highpass Filter	H03G13G1	4260-02 DC0428	MICROWAVE CIRCUITS, INC.	2011/3/4	2012/3/3
ETSTW-RE 096	SIGNAL GENERATOR	SMIQ 03B	102274	R&S	2011/5/31	2012/5/30
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2011/3/10	2012/3/9
ETSTW-RE 105	2.4GHz Notch Filter	NO124411	39555	MICROWAVE CIRCUITS, INC.	2011/3/11	2012/3/10
ETSTW-RE 106	Humidity Temperature Meter	TES-1366	091011113	TES	2011/3/24	2012/3/23
ETSTW-RE 111	Log-Periodic Dipole Array Antenna	VULB 9160	9160-3309	Schwarz beck	2010/12/17	2011/12/16
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	None	T-Power	Functi	on test
ETSTW-RE 114	2.4GHz Notch Filter	N0124411	473873	MICROWAVE CIRCUITS	2011/1/13	2012/1/12
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Functi	on test
ETSTW-RE 121	SPECTRUM ANALYZER	FSU43	100013	R&S	2011/6/23	2012/6/22
ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2011/7/4	2012/7/3
ETSTW-RE 125	5GHz Notch filter	5NSL11- 5200/E221.3-O/O	1	K&L Microwave	2011/8/19	2012/8/18
ETSTW-RE 126	5GHz Notch filter	5NSL11- 5800/E221.3-O/O	1	K&L Microwave	2011/8/19	2012/8/18
ETSTW-EMI 001	HARMONICS 1000	HAR1000-1P	093	EMC-PARTNER	2011/9/1	2012/8/31
ETSTW-EMS 001	BASELSTRASSE 160 CH- 4242 LAUFEN	CN-EFT1000	354	EMC-PARTNER	Function	on Test
ETSTW-EMS 002	Frequency Converter	YF-6020	0308014	None	Function	on Test
ETSTW-EMS 003	EMC Immunity Test System	TRA2000IN6	579	EMC-PARTNER	2010/11/3	2011/11/2
ETSTW-EMS 009	Magnetic Field Antenna	MF1000-1	104	EMC-PARTNER	Function	on Test
ETSTW-EMS 012	EM Injection Clamp	F-203I-23MM	476	FCC	2011/6/1	2012/5/31
ETSTW-EMS 015	HVAC Trms Power Clamp Meter	3079K	070800649	TES	2011/10/3	2012/10/2
ETSTW-EMS 016	EMF Tester	1390	071208732	TES	2011/10/3	2012/10/2
ETSTW-EMS 017	Multimeter	DM-1220	518614	HOLA	2011/8/11	2012/8/10
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ETSTW-EMS 019	Electrostatic Discharge Simulator	ESS-2002	ESS06Y6300	NoiseKen	2010/11/25	2011/11/24	
ETSTW-EMS 020	Humidity Temperature Meter	TES-1366	091011116	TES	2011/3/24	2012/3/23	
ETSTW-RS 003	STW-RS 003 RF Power Amplifier		306933	AR	Function	on Test	
ETSTW-RS 004	RF Power Amplifier	150W1000	307009	AR	Function Test		
ETSTW-RS 006	SIGNAL GENERATOR	SML03	101551	R&S	2011/3/7	2012/3/6	
ETSTW-RS 007	14" COLOR VIDEO MONITOR	HS-CM145A	0512011548	None	Function	on Test	
ETSTW-RS 009	SIGNAL GENERATOR	8648C	3642U01656	НР	2011/2/23	2012/2/22	
ETSTW-RS 010	Broadband Field Meter	NBM-520	C-0195	Narda	2011/9/8	2012/9/7	
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2011/10/3	2012/10/2	
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849- 822/851-40 /12+9SS	3	WI	2011/1/14	2012/1/13	
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748- 1743/1752-32/5SS	1	WI	2011/1/14	2012/1/13	
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5 -1875.5/1884.5- 32/5SS	3	WI	2011/1/14	2012/1/13	
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1- 904.25-50/8SS	1	WI	2011/1/14	2012/1/13	
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2011/9/19	2012/9/18	
ETSTW-Cable 002	Microwave Cable	SUCOFLEX 104 (S_Cable 7)	238093	HUBER+SUHNER	2011/5/18	2012/5/17	
ETSTW-Cable 003	Microwave Cable	SUCOFLEX 104 (S_Cable 11)	209953	HUBER+SUHNER	2011/5/18	2012/5/17	
ETSTW-Cable 010	BNC Cable	5 M BNC Cable	None	JYE BAO CO.,LTD.	2011/3/8	2012/3/7	
ETSTW-Cable 011	BNC Cable	BNC Cable 1	None	JYE BAO CO.,LTD.	Pre-test I	Use NCR	
ETSTW-Cable 012	BNC Cable	BNC Cable 2	None	JYE BAO CO.,LTD.	2011/3/8	2012/3/7	
ETSTW-Cable 013	Microwave Cable	SUCOFLEX 104 (S_Cable 5)	232345	HUBER+SUHNER	Function	on Test	
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2011/3/4	2012/3/3	
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2011/3/4	2012/3/3	
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2011/3/4	2012/3/3	
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2011/3/4	2012/3/3	
ETSTW-Cable 022	N TYPE Cable	OATS Cable 3	0002	JYE BAO CO.,LTD.	2011/3/4	2012/3/3	
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2011/3/10	2012/3/9	
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2011/3/10	2012/3/9	
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2011/4/26	2012/4/25	
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2011/4/26	2012/4/25	
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104 (S_Cable 9)	279067	SPECTRUM	2011/3/10	2012/3/9	
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104 (S_Cable 10)	238092	HUBER+SUHNER	2010/11/30	2011/11/29	
ETSTW-Cable 039	Microwave Cable	SUCOFLEX 104 (S_Cable 19)	316739	HUBER+SUHNER	2011/5/18	2012/5/17	
ETSTW-Cable 040	Microwave Cable	SUCOFLEX 104 (S_Cable 20)	316738	HUBER+SUHNER	Function	on Test	
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2010/11/30	2011/11/29	
ETSTW-Cable 047	Microwave Cable	SUCOFLEX 104	325518	HUBER+SUHNER	2010/11/30	2011/11/29	
ETSTW-Cable 051	BNC Cable	BNC Cable 6	None	JYE BAO CO.,LTD.	2011/3/31	2012/3/30	



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ETSTW-Cable 052	BNC Cable	Clamp Cable	None	Schwarz beck	2011/3/31	2012/3/30
ETSTW-Cable 053	N TYPE To SMA Cable	OATS Cable 4	None	JYE BAO CO.,LTD.	2011/3/4	2012/3/3
ETSTW-Cable 054	BNC To SMA Cable	OATS Cable 5	None	JYE BAO CO.,LTD.	2011/3/4	2012/3/3
ETSTW-Cable 055	Microwave Cable	SUCOFLEX 104	None	HUBER+SUHNER	Function	on Test
ETSTW-Cable 056	ETSTW-Cable 056 N TYPE Cable		20110621-1.0	JYE BAO CO.,LTD.	Function Test	
ETSTW-Cable 057	N TYPE Cable	N30N30-JBY240- 80CM	20110621-1.1	JYE BAO CO.,LTD.	Function	on Test
WTSTW-SW 001	EMI TEST SOFTWARE	Harmonics-1000	None	EMC PARTNER	HARCS V Firmware V	ersion 4.16 Version 2.18
WTSTW-SW 002	VTSTW-SW 002 EMI TEST SOFTWARE		None	Farad	Version ETS-03A1	
WTSTW-SW 003	EMS TEST SOFTWARE	i2	None	AUDIX	Version 3.2	2007-8-17b
WTSTW-SW 005	GSM Fading Level Correction	GSMFadLevCor	None	R&S	Version 1.66	

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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 50µH 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 $dB\mu V$) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz) METER READING + ACF + CABLE LOSS (to the receiver) = FS

 $20 \; dB\mu V + 10.36 \; dB + 6 \; dB = 36.36 \; dB\mu V/m \; @3m$

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)	×	×	
Spurious Emissions radiated – Transmitter operating	15.249 (e)	×	×	
Spurious Emissions conducted – Transmitter operating	15.249 (e)			
Radiated Emission from Digital Part	15.109			
Out of Band Spurious Emission, Band edge-Transmitter operating	15.249 (e)	×	×	
Power Line Conducted Emission	15.207	×	×	

The follows is intended to leave 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:	VIV	IR2	Date:	20)11/09/:	29				
Mode:	2403	SMHz	Tempera	iture: 24		°C			Engineer:	Kevin
Polarization:	Horiz	ontal	Humidi	ity:	60	%				
Frequency		ding uV)	Factor (dB)	Res (dBu)		Lin (dBu)		Margin	Table Degree	Ant. High
(MHz)	Peak	Äve.	Corr.	Peak	Äve.	Peak	Äve.	(dB)	(Deg.)	(m) o
2402.9800	47.90		38.44	86.34		114.00	94.00	-27.66	90	100

Polarization:	Ver	tical								
Frequency	Reading (dBuV)		Factor Result (dB) (dBuV/m			Limit n) (dBuV/m)		Margin	Table Degree	Ant. High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(m)
2477.9240	50.38		38.77	89.15		114.00	94.00	-24.85	170	100

Mode:	2453	BMHz	Tempera	iture:	24	°C		Engineer:		Kevin
Polarization:	Horiz	zontal	Humid	Humidity: 60		%				
Frequency	Reading Factor (dBuV) (dB)		Factor (dB)	Res (dBu)		Lin (dBu)		Margin	Table Degree	Ant. High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(m)
2452.9160	49.34		38.66	88.00		114.00	94.00	-26.00	140	100

Polarization:	Ver	tical								
Frequency		ding suV)	Factor (dB)	Result (dBuV/m)		Limit (dBuV/m)		Margin	Table Degree	Ant. High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(m)
2452.9400	53.06		38.66	91.72		114.00	94.00	-22.28	100	100



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2

Mode:	2478	BMHz	Tempera	iture:	24	°C			Engineer:	Kevin
Polarization:	Horiz	ontal	Humid	ity:	60	%				
Frequency		ding uV)	Factor (dB)	Res (dBu)		Lir (dBu'		Margin	Table Degree	Ant. High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(m)
2477.9080	49.64		38.77	88.41		114.00	94.00	-25.59	160	100

Polarization: Vertical

Frequency Reading Factor Result Limit Margin Table (dBuV) (dB) (dBuV/m) (dBuV/m) Degree

Degree Ant. High (dB) Peak Peak Peak Ave. (MHz) Ave. Corr. (Deg.) (m) 114.00 94.00 2477.9240 50.38 38.77 89.15 -24.85 170 100

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 062, ETSTW-RE 111

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

FCC ID: TUQVMR2

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.

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	Field strength	Field Strength
(MHz)	(microvolts/meter)	(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 fundament

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 062, ETSTW-RE 111

Explanation: Please see attached diagrams in appendix.

FCC ID: TUQVMR2

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: VMR2 Date: 2011/09/29

Mode: TX 2403MHz Temperature: 24 °C Engineer: Kevin

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)
168.0160	4.00	peak	14.68	18.68	43.50	-24.82	110	100
239.9400	11.22	peak	13.21	24.43	46.00	-21.57	210	100
335.1904	10.46	peak	15.77	26.23	46.00	-19.77	60	100
397.3948	6.38	peak	17.21	23.59	46.00	-22.41	50	100

Frequency	Rea	ding	Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
	(dB	uV)	(dB)	(dBuV/m)		(dBuV/m)			Degree	High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(cm)
4801.6030	56.87	39.96	4.56	61.43	44.52	74.00	54.00	-9.48	196	100
7209.0000	41.58		6.93	48.51		74.00	54.00	-25.49	210	100
9612.0000	34.84		9.48	44.32		74.00	54.00	-29.68	200	100
12015.0000	32.93		13.29	46.22		74.00	54.00	-27.78	50	100



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
166.0721	17.70	peak	14.78	32.48	43.50	-11.02	220	100
239.9400	11.24	peak	13.21	24.45	46.00	-21.55	310	100
397.3948	15.11	peak	17.21	32.32	46.00	-13.68	60	100
869.7595	5.96	peak	25.22	31.18	46.00	-14.82	140	100

Frequency	Rea	ding	Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
	(dB	uV)	(dB)	(dBu	(dBuV/m)		(dBuV/m)		Degree	High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(cm)
4801.6030	61.76	39.98	4.56	66.32	44.54	74.00	54.00	-9.46	190	100
7209.0000	40.67		6.93	47.60		74.00	54.00	-26.40	300	100
9612.0000	35.93		9.48	45.41		74.00	54.00	-28.59	200	100
12015.0000	32.46		13.29	45.75		74.00	54.00	-28.25	60	100

Mode: TX 2453MHz Temperature: 24 °C Engineer: Kevin Polarization: Horizontal Humidity: 60 %

 olarization.	Honzontai			riairiiaity.	00	70		
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
239.9400	10.57	peak	13.21	23.78	46.00	-22.22	210	100
335.1904	9.47	peak	15.77	25.24	46.00	-20.76	170	100
677.3146	5.72	peak	22.47	28.19	46.00	-17.81	60	100
852.2645	5.63	peak	25.00	30.63	46.00	-15.37	220	100

Frequency		ding uV)	Factor (dB)	Result (dBu	_	Limit (dBu	@3m V/m)	Margin	Table Degree	Ant. High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(cm)
4905.8120	55.31	39.27	4.62	59.93	43.89	74.00	54.00	-10.11	340	100
7359.0000	39.39		6.87	46.26		74.00	54.00	-27.74	40	100
9812.0000	34.17		9.76	43.93		74.00	54.00	-30.07	250	100
12265.0000	33.17		14.45	47.62		74.00	54.00	-26.38	110	100

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
142.7455	11.29	peak	14.65	25.94	43.50	-17.56	145	100
166.0721	17.92	peak	14.78	32.70	43.50	-10.80	110	100
239.9400	11.43	peak	13.21	24.64	46.00	-21.36	220	100
381.8437	16.19	peak	16.83	33.02	46.00	-12.98	60	100



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2

Frequency	Rea (dB	ding uV)	Factor (dB)			Limit (dBu		Margin	Table Degree	Ant. High
(MHz)	Peak	Áve.	Corr.	Peak	Äve.	Peak	Äve.	(dB)	(Deg.)	(cm)
4905.8120	57.86	39.22	4.62	62.48	43.84	74.00	54.00	-10.16	90	100
7359.0000	40.22		6.87	47.09		74.00	54.00	-26.91	30	100
9812.0000	34.29		9.76	44.05		74.00	54.00	-29.95	260	100
12265.0000	33.32		14.45	47.77		74.00	54.00	-26.23	170	100

Temperature: Humidity: Engineer: Kevin Mode: TX 2478MHz 24 °C

Polarization: Horizontal 60 %

i didiization.	Honzontai		Trainiaity. 00 7					
Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
166.0721	5.28	peak	14.78	20.06	43.50	-23.44	60	100
232.1643	10.48	peak	12.81	23.29	46.00	-22.71	220	100
335.1904	9.33	peak	15.77	25.10	46.00	-20.90	145	100
397.3948	5.95	peak	17.21	23.16	46.00	-22.84	280	100

Frequency		ding uV)	Factor	Result @3m (dBuV/m)				Margin	1	Ant.
	`	,	(dB)	` '		(dBuV/m)			Degree	High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(cm)
4953.9080	56.46	39.26	4.77	61.23	44.03	74.00	54.00	-9.97	190	100
7434.0000	40.42		6.71	47.13		74.00	54.00	-26.87	200	100
9912.0000	34.89		9.83	44.72		74.00	54.00	-29.28	220	100
12390.0000	33.39		14.34	47.73		74.00	54.00	-26.27	130	100

Polarization: Vertical

Freque (MH	,	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
166.0	721	16.58	peak	14.78	31.36	43.50	-12.14	40	100
239.9	400	11.39	peak	13.21	24.60	46.00	-21.40	110	100
397.3	948	15.43	peak	17.21	32.64	46.00	-13.36	90	100
558.7	375	5.53	peak	20.49	26.02	46.00	-19.98	230	100

Frequency	Rea	ding	Factor	Result	@3m	Limit	@3m	Margin	Table	Ant.
	(dB	uV)	(dB)	(dBu	V/m)	(dBu	V/m)		Degree	High
(MHz)	Peak	Ave.	Corr.	Peak	Ave.	Peak	Ave.	(dB)	(Deg.)	(cm)
4953.9080	56.97	39.58	4.77	61.74	44.35	74.00	54.00	-9.65	190	100
7434.0000	40.56		6.71	47.27		74.00	54.00	-26.73	60	100
9912.0000	34.86		9.83	44.69		74.00	54.00	-29.31	210	100
12390.0000	33.11		14.34	47.45		74.00	54.00	-26.55	170	100



FCC ID: TUQVMR2

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. Please 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 030, ETSTW-RE 044, ETSTW-RE 062, ETSTW-RE 111

FCC ID: TUQVMR2

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	Field Strength	Field Strength
(MHz)	(microvolts/meter)	(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.

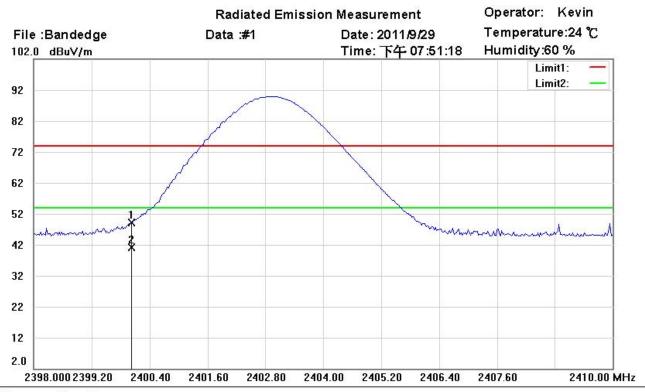
Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 062, ETSTW-RE 111

Explanation: The test results are listed in the separated test report no.: W6M21108-11762-P-15B.

FCC ID: TUQVMR2

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 hey 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

Condition: FCC 15.249 PK >1G

EUT: W6M21108-11762 Power: 110Vac M/N: VMR2 Distance: 3m

Test Mode: 2403MHz

Note:

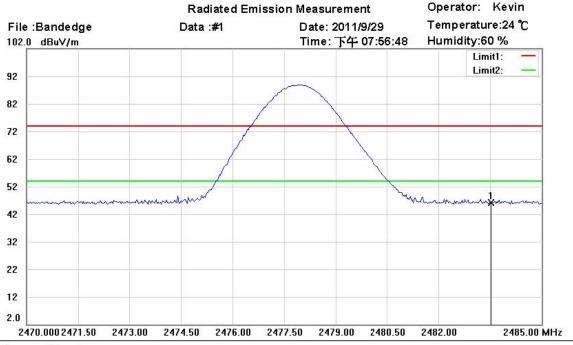
Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	2400.000	10.69	peak	38.43	49.12	74.00	100	196	-24.88	
*	2400.000	2.73	AVG	38.43	41.16	54.00	100	196	-12.84	

Polarization:



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2



Site: Chamber

Condition: FCC 15.249 PK >1G EUT: W6M21108-11762

VMR2

Test Mode: 2478MHz

Frequency

(MHz)

2483.500

Note:

Mk.

/	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
500	7.28	peak	38.80	46.08	74.00	100	120	-27.92	

Polarization:

Distance: 3m

110 Vac

Power:

Limit:

Frequency Range (MHz)	Limi	$t (dB\mu V/m)$
902 – 928	Peak	Average
2400 – 2483.5		
5725 – 5875	74	54
24000 - 24250		

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 062, ETSTW-RE 111



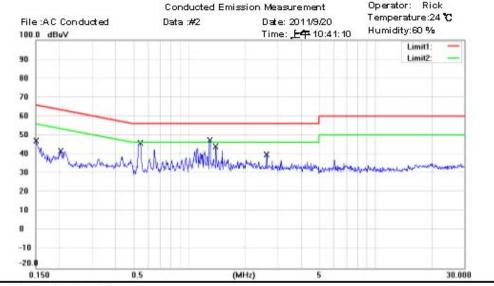
Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2

Power Line Conducted Emission 3.8

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.



Chamber_03

Condition: FCC Part 15 Class B Conduction (QP)

Phase: Power: 110VAC EUT: W6M21109-11762

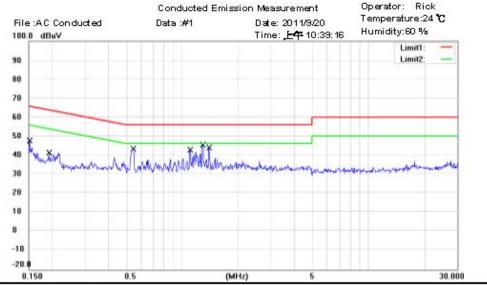
M/N: VMR2 Test Mode: Note:

М.	Prequency (MHz)	Reading (dBuV)	Detector	Corrected tector(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.1505	32.01	QP	9.94	41.95	65.97	-24.02	
	0.1505	21.64	AVG	9.94	31.58	55.97	-24.39	
	0.2030	28.57	QP	9.89	38.46	63.49	-25.03	
	0.2030	19.87	AVG	9.89	29.76	53.49	-23.73	
	0.5427	33.01	QP	9.93	42.94	56.00	-13.06	
9 15	0.5427	15.87	AVG	9.93	25.80	46.00	-20.20	
*	1.2920	37.44	QP	9.97	47.41	56.00	-8.59	
	1.2920	19.40	AVG	9.97	29.37	46.00	-16.63	
	1,3955	31.33	QP	9.98	41.31	56.00	-14.69	
	1.3955	18.39	AVG	9.98	28.37	46.00	-17.63	
	2,6060	26.40	QP	10.04	36.44	56.00	-19.56	
	2,6060	10.82	AVG	10.04	20.86	46.00	-25.14	



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2



Site: Chamber_03

Condition: FCC Part 15 Class B Conduction (QP)

EUT: W6M21109-11762

M/N: VMR2 Test Mode: Note:

	010 110 000 1220
Power:	110VAC
I OWEI .	

MH.	Frequency (MHz)	Reading (dBuV)	Detector	Corrected tector(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Comment
	0.1508	31.78	QP	10.00	41.78	65.96	-24.18	
	0.1508	21.37	AVG	10.00	31.37	55.96	-24.59	
	0.1922	24.14	QP	9.95	34.09	63.94	-29.85	
	0.1922	14.26	AVG	9.95	24.21	53.94	-29.73	
	0.5427	32.51	QP	10.00	42.51	56.00	-13.49	
	0.5427	16.23	AVG	10.00	26.23	46.00	-19.77	
	1.1097	32.87	QP	10.03	42.90	56.00	-13.10	
*	1.1097	28.08	AVG	10.03	38.11	46.00	-7.89	
	1.2920	37.55	QP	10.03	47.58	56.00	-8.42	
	1.2920	2025	AVG	10.03	30.28	46.00	-15.72	
	1,3977	33.70	QP	10.04	43.74	56.00	-12.26	
	1,3977	20.71	AVG	10.04	30.75	46.00	-15.25	

- 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 = Qusai Peak, AV = Average
 - 4. All not in the table noted test results are more than 20 dB below the relevant limits.
 - 5. 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

FCC ID: TUQVMR2

Appendix

A Measurement diagrams

- 1. Peak Output Power
- 2. Spurious Emissions radiated

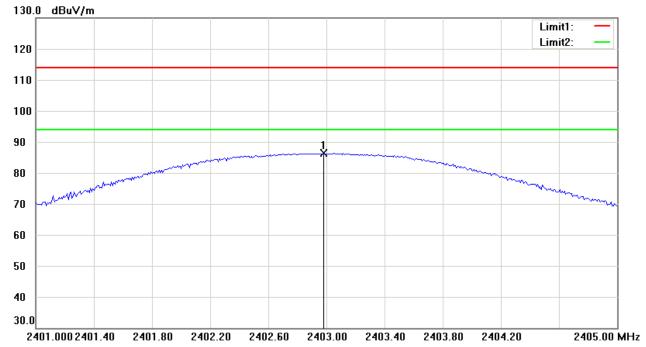


Registration number: W6M21108-11762-C-1

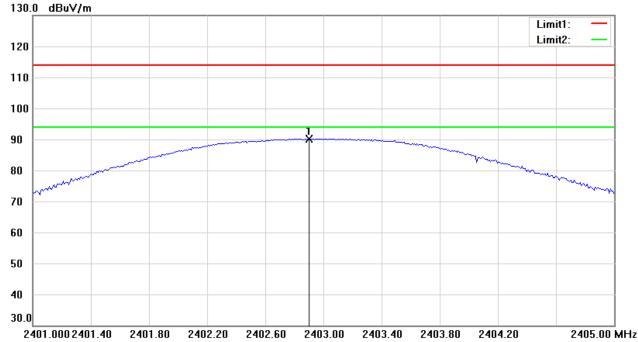
FCC ID: TUQVMR2
Peak Output Power

2403MHz

Antenna Polarization H



Antenna Polarization V



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

- 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.

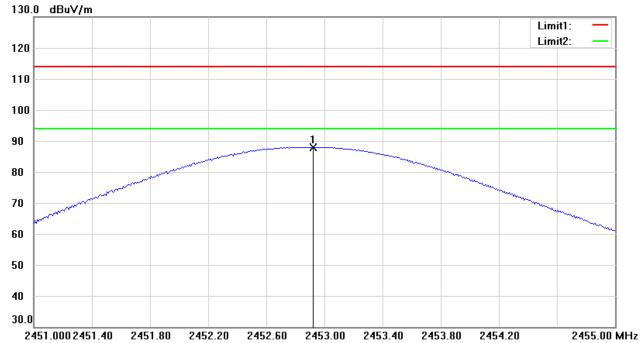


Registration number: W6M21108-11762-C-1

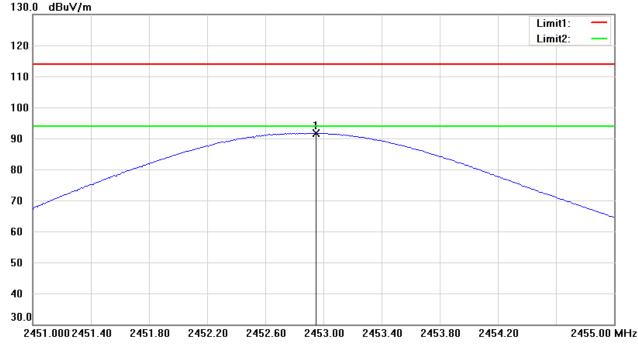
FCC ID: TUQVMR2

2453MHz

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.

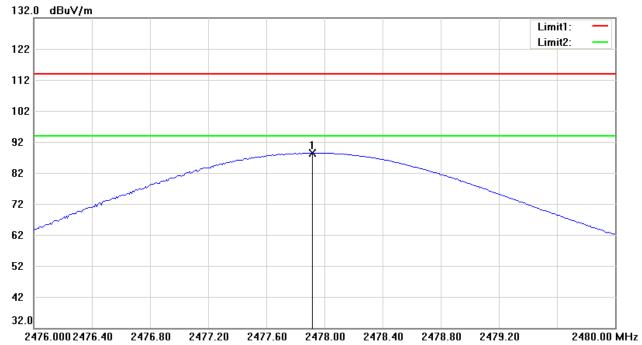


Registration number: W6M21108-11762-C-1

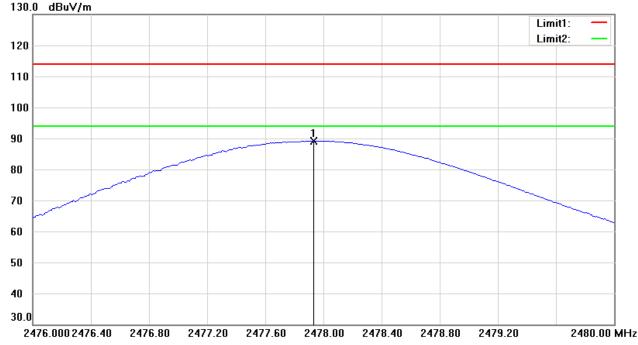
FCC ID: TUQVMR2

2478MHz

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.

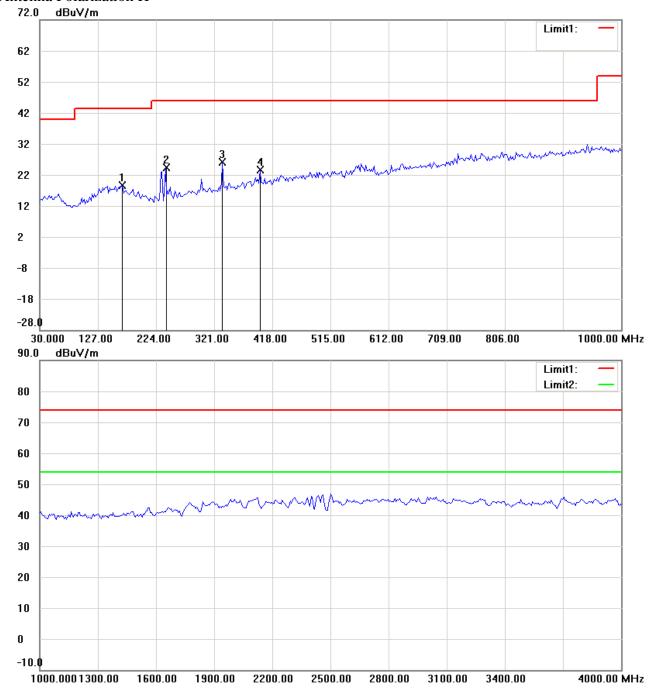


Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2

Spurious Emissions radiated

TX_2403MHz Antenna Polarization H



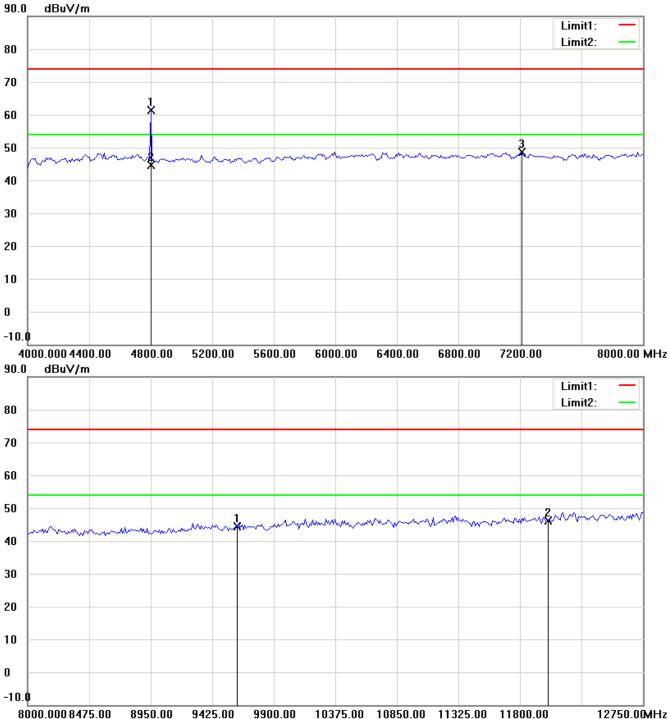
Up Line: Peak Limit Line, Down Line: Ave Limit Line.

- 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: W6M21108-11762-C-1

FCC ID: TUQVMR2



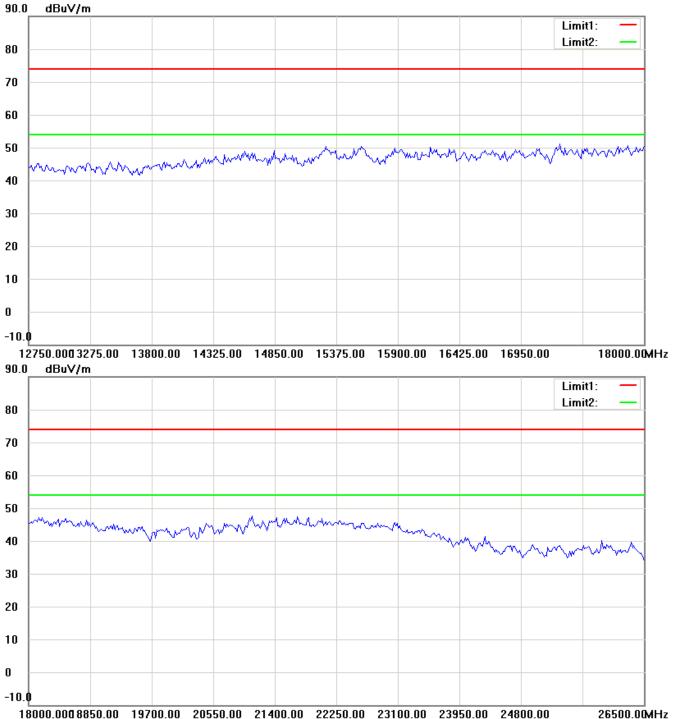
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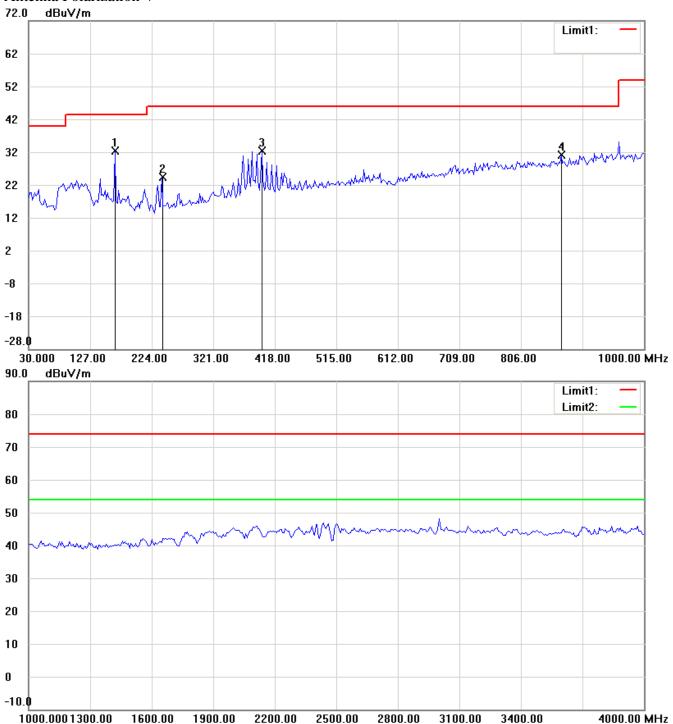
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Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2 Antenna Polarization V



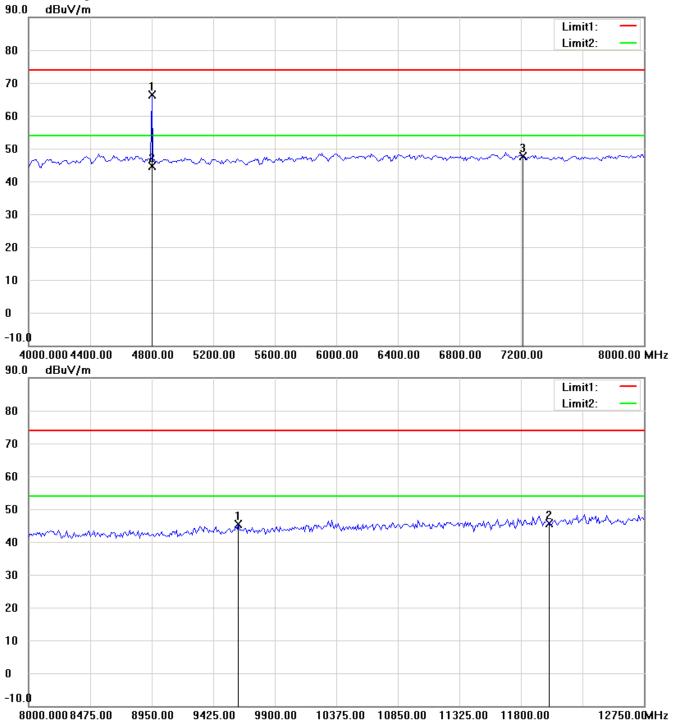
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FCC ID: TUQVMR2



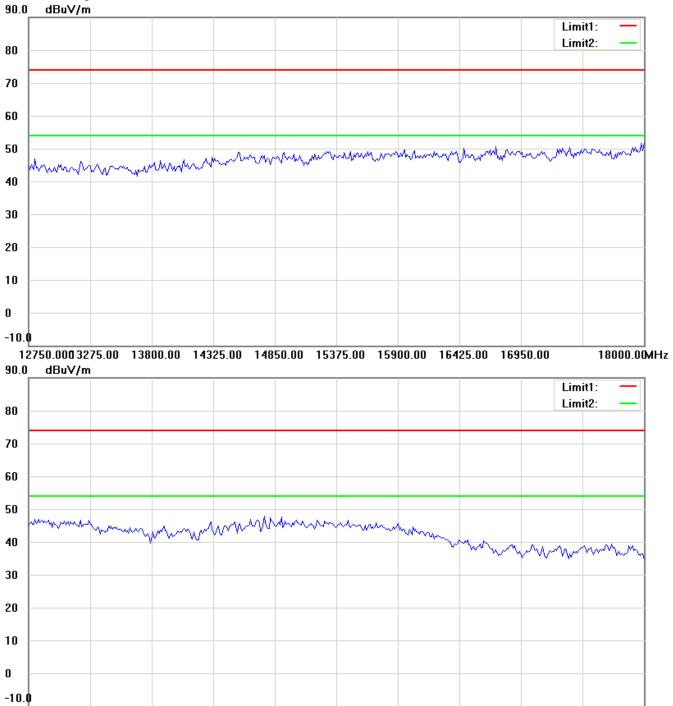
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Up Line: Peak Limit Line, Down Line: Ave Limit Line.

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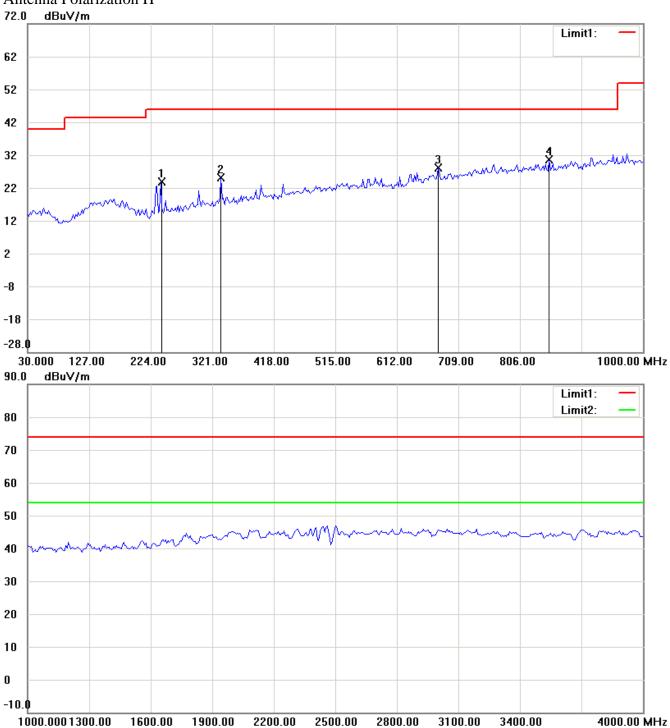
18000.0008850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00

26500.00MHz



Registration number: W6M21108-11762-C-1

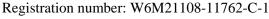
FCC ID: TUQVMR2
TX_2453MHz
Antenna Polarization H



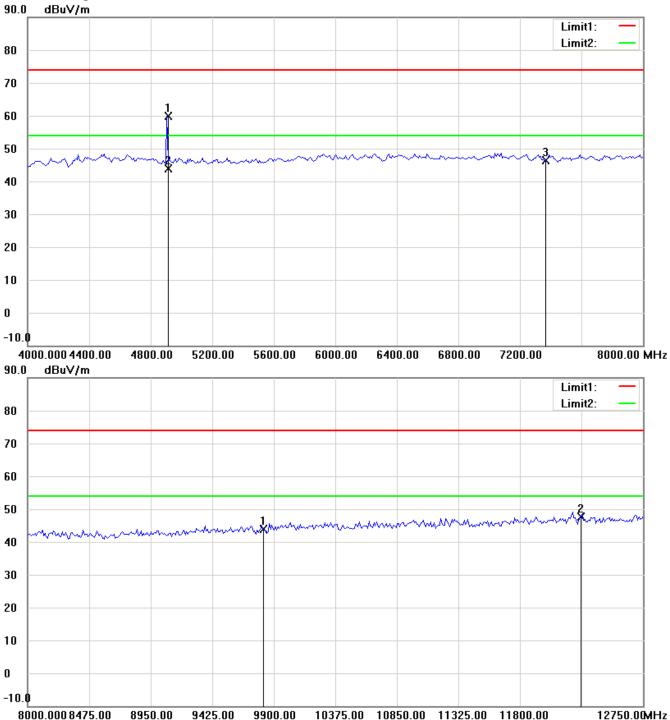
Up Line: Peak Limit Line, Down Line: Ave Limit Line.

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FCC ID: TUQVMR2



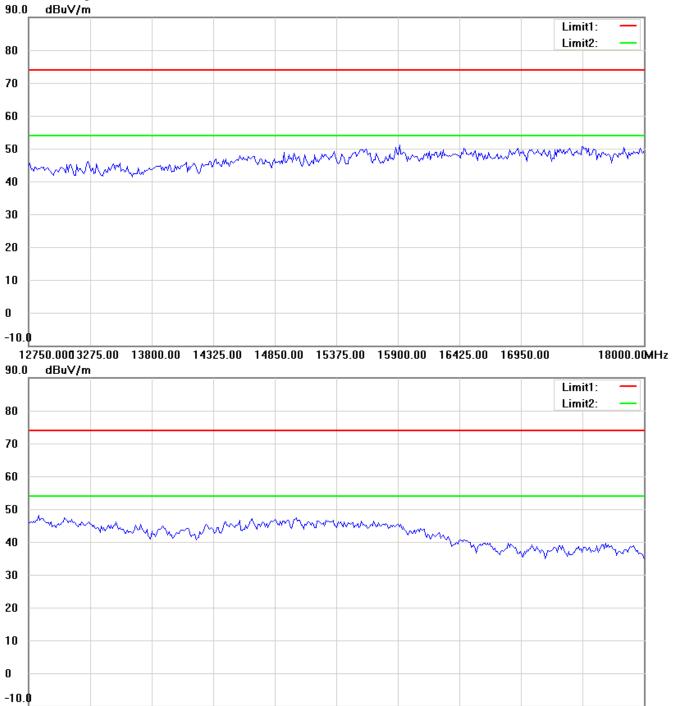
Up Line: Peak Limit Line, Down Line: Ave Limit Line.

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FCC ID: TUQVMR2



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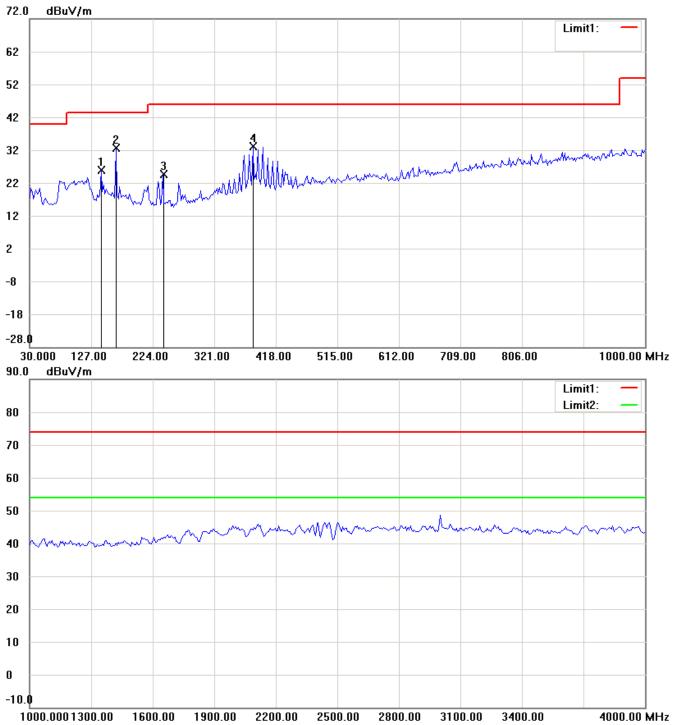
18000.0008850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00

26500.00MHz



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2 Antenna Polarization V



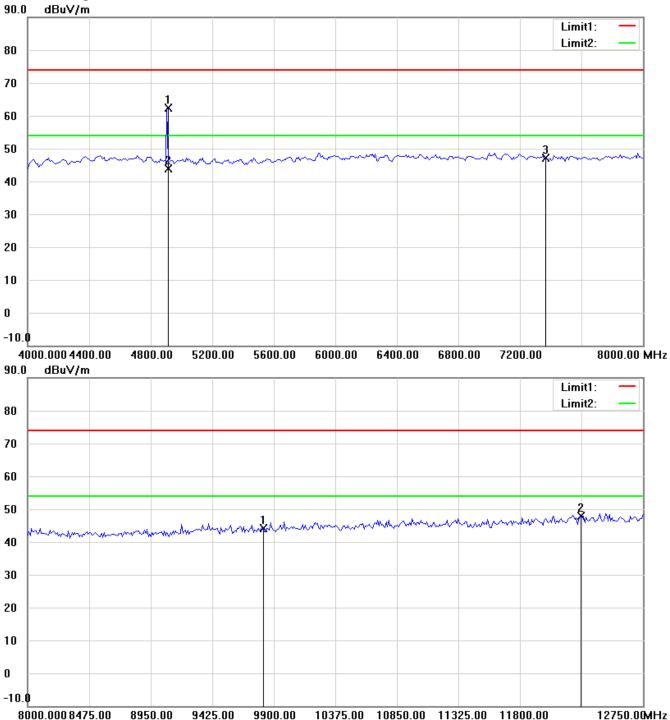
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FCC ID: TUQVMR2



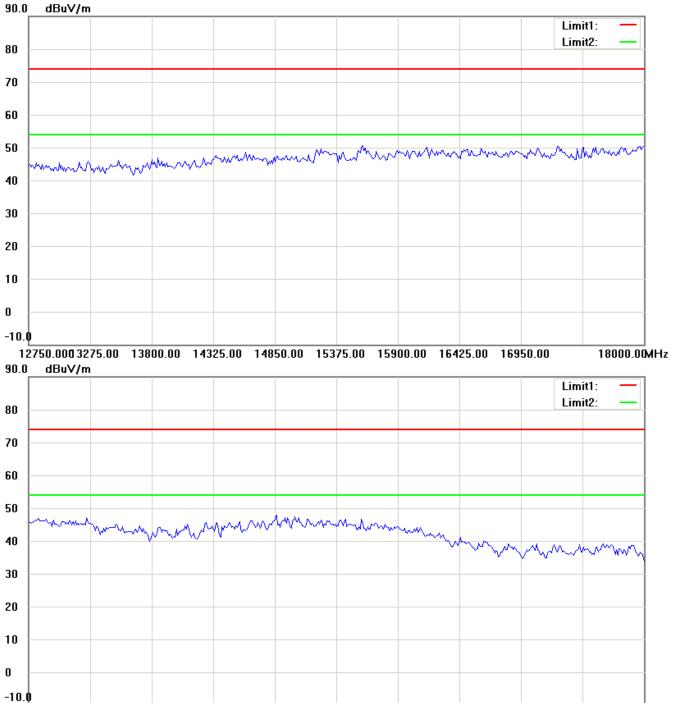
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FCC ID: TUQVMR2



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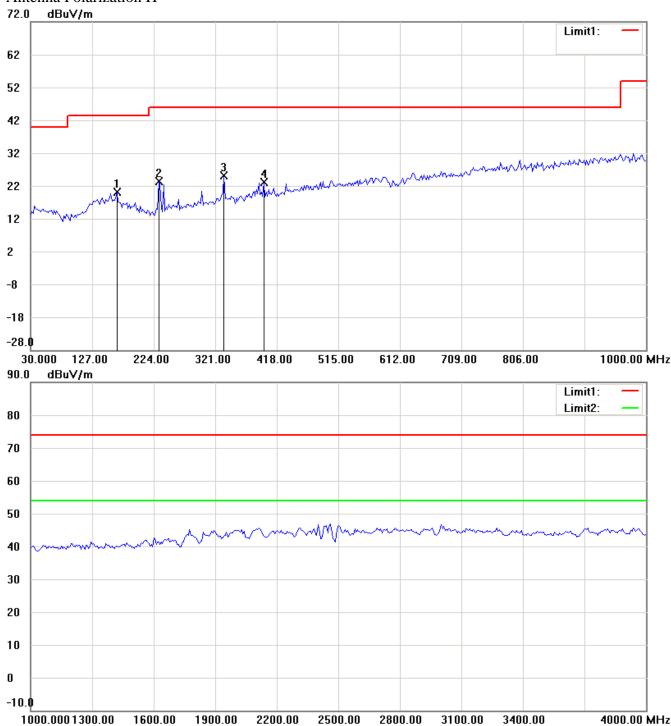
18000.0008850.00 19700.00 20550.00 21400.00 22250.00 23100.00 23950.00 24800.00

26500.00MHz



Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2
TX_2478MHz
Antenna Polarization H



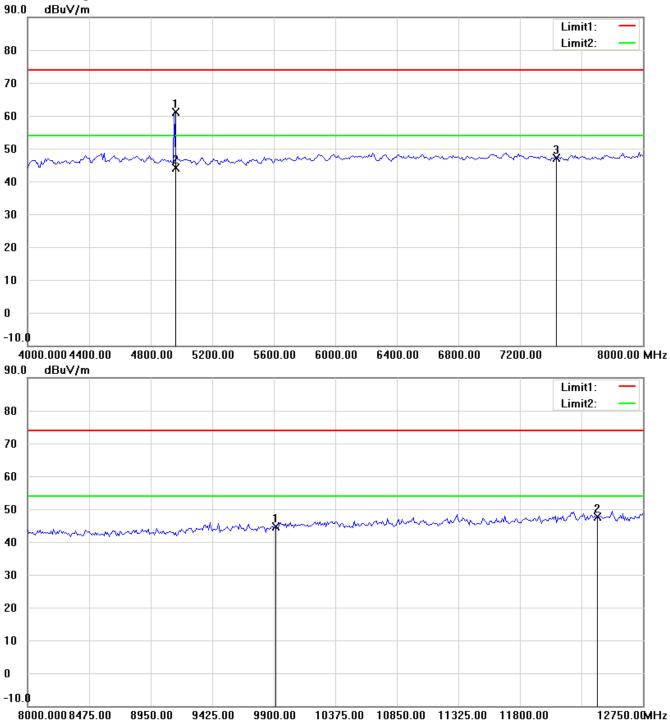
Up Line: Peak Limit Line, Down Line: Ave Limit Line.

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FCC ID: TUQVMR2



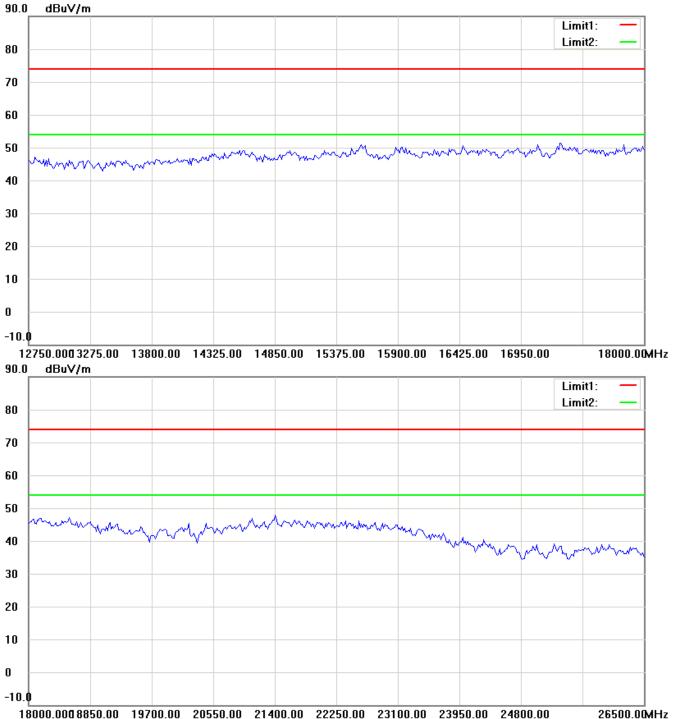
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FCC ID: TUQVMR2



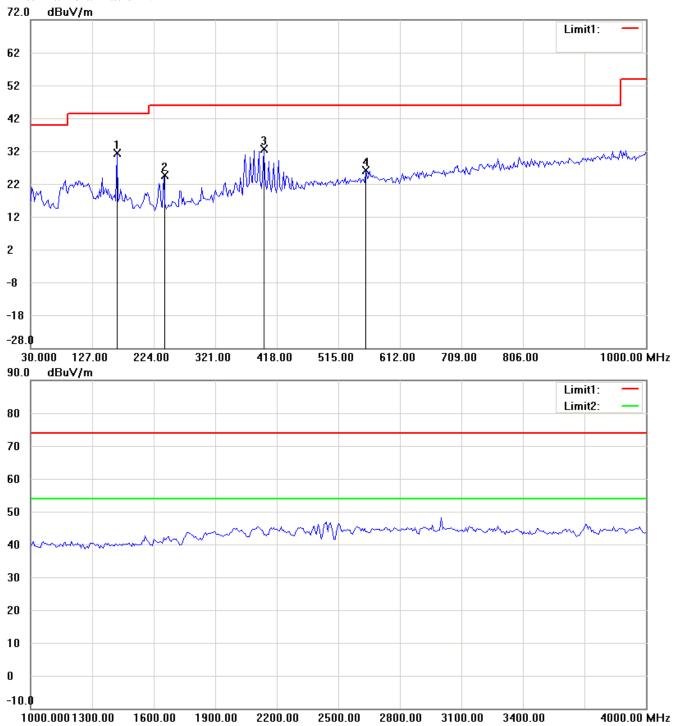
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Registration number: W6M21108-11762-C-1

FCC ID: TUQVMR2 Antenna Polarization V



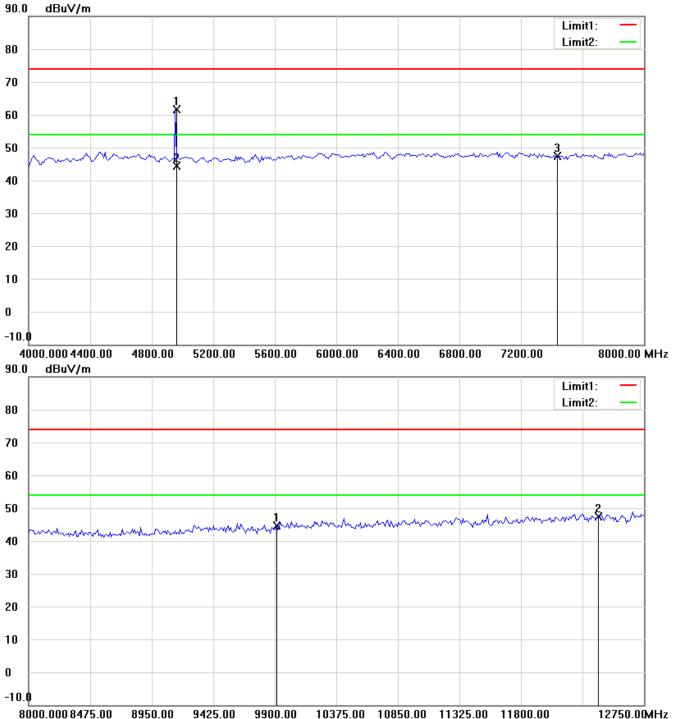
Up Line: Peak Limit Line, Down Line: Ave Limit Line.

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FCC ID: TUQVMR2



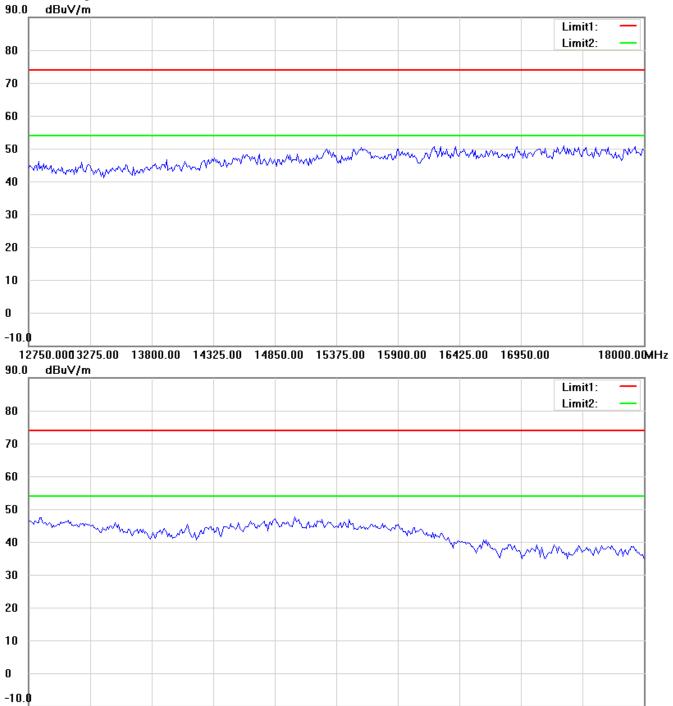
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