

FCC PART 15 SUBPART C TEST REPORT

for

Wireless Ring Mouse

Model No.: GM-521

FCC ID: OR7GM521

of

Applicant: Globlink Technology Inc.

Address: 2F, No.101, Rui-Hu St, Nei-Hu 114 Taipei Taiwan

Tested and Prepared

by

Taiwan ETS Product Service Co., Ltd.

FCC Registration No.: 930600

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

A2LA Accredited No.: 1983.02

PTCRB Accredited Type Certification Test House

Report No.: W6M20801-8832-P-15

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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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.

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Tester:

February 19, 2008

Jay Chaing

Date

ETS-Lab.

Name

Signature

Technical responsibility for area of testing:

February 19, 2008

Steven Chuang

Date

ETS

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
Taiwan ETS Product Service 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: 1983.02

FCC filed test laboratory Reg. No. 930600

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

PTCRB Accredited Type Certification Test House

1.3 Details of approval holder

Name:	Globlink Technology Inc.
Street:	2F,No.101,Rui-Hu St, Nei-Hu 114
Town:	Taipei
Country:	Taiwan
Telephone:	+886-2-87972919
Fax:	+886-2-87972918
Teletex:	./.



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1.4 Application details

Date of receipt of test item: February 4, 2008

Date of test: From February 5, 2008 to February 18, 2008

1.5 General information of Test item

Type of test item: Wireless Ring Mouse

Model Number: GM-521

Multi-listing model number: ./.

Photos: see Appendix

Technical data

Frequency band: 2.400-2.4835 GHz

Operation Frequency: 2.423-2.477 GHz

Frequency 1: 2.423 GHz

Frequency 2: 2.447 GHz

Frequency 3: 2.477 GHz

Operation modes: duplex

Modulation Type: GFSK

Antenna type: PCB antenna

Power supply: Battery (4 Vdc)



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Manufacturer: (if different from applicant)

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

Additional information: ./.

1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART B / SUBPART C § 15.249 (2007-10)



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2 Technical test

2.1 Summary of test results

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



or

The deviations as specified in 2.5 were ascertained in the course of the tests performed.



2.2 Test environment

Temperature:	23 °C
Relative humidity content:	20 ... 75 %
Air pressure:	86 ... 103 kPa
Details Power supply:	Battery (4 Vdc)
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	2007/10/15	2008/10/14
ETSTW-CE 002	PREREULATOR MODE DC POWER SUPPLY	None	None		Function Test	
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2007/10/15	2008/10/14
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2007/10/15	2008/10/14
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2007/5/11	2008/5/10
ETSTW-CE 008	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2007/10/23	2009/10/22
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2007/8/2	2008/8/1
ETSTW-CE 013	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T4-02	20242	FCC	2007/11/2	2009/11/1
ETSTW-CE 014	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T2-02	20241	FCC	2005/12/7	2008/12/6
ETSTW-CE 015	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T8-02	20307	FCC	2006/11/7	2008/11/6
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2007/10/29	2008/10/28
ETSTW-RE 002	Function Generator	33220A	MY43004982	Agilent	2007/10/12	2009/10/11
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2007/12/3	2008/12/2
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2007/10/29	2008/10/28
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2007/10/11	2008/10/12
ETSTW-RE 010	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070181	MOTECH	Function Test	
ETSTW-RE 011	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070165	MOTECH	Function Test	
ETSTW-RE 017	Log-Periodic Antenna	HL025	352886/001	R&S	2006/5/4	2008/5/3
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2007/11/7	2010/11/6
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 021	SWEEP GENERATOR	SWM05	835130/010	R&S	2007/10/9	2008/10/8
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	EMCO	2007/6/29	2008/6/28
ETSTW-RE 028	Log-Periodic DipoleArray Antenna	3148	34429	EMCO	2006/5/26	2008/5/25
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	2006/5/26	2008/5/25
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2006/5/3	2008/5/2
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2007/10/9	2008/10/8
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2007/7/9	2008/7/8
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2007/10/16	2009/10/15
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2007/1/11	2009/1/10
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2006/5/8	2008/5/7
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2006/5/29	2008/5/28
ETSTW-RE 047	ESA-E SERIES SPECTRUM ANALYZER	E4445A	MY46181369	Agilent	2007/7/19	2008/7/18



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ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2005/3/22	2008/3/21
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2007/5/2	2009/5/1
ETSTW-RE 055	SPECTRUM ANALYZER	FSU-26	200074	R&S	2007/7/16	2008/7/15
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2007/7/2	2009/7/1
ETSTW-GSM 01	SIM Simulator	IT3	B2004-50106	COMPRION	2007/7/23	2008/7/22
ETSTW-GSM 02	Universal Radio Communication Tester	CMU 200	109439	R&S	2007/10/17	2008/10/16
ETSTW-GSM 03	Agilent 8960 Test Set 1	E5515C	GB44052675	Agilent	2006/6/26	2008/6/25
ETSTW-GSM 04	Agilent 8960 Test Set 2	E5515C	GB44052665	Agilent	2006/6/29	2008/6/28
ETSTW-GSM 05	Agilent 8960 Test Set 3	E5515C	GB44052652	Agilent	2006/7/11	2008/7/10
ETSTW-GSM 06	Agilent 8960 Test Set 4	E5515C	GB44052684	Agilent	2006/7/4	2008/6/3
ETSTW-GSM 07	Agilent 8960 Test Set 5	E5515C	GB44052658	Agilent	2006/7/12	2008/7/11
ETSTW-GSM 08	Agilent 8960 Test Set 6	E5515C	GB44052666	Agilent	2006/7/6	2008/7/5
ETSTW-GSM 09	Controller PC	Dell GX 270	700F61J	Dell	Function Test	
ETSTW-GSM 10	Anite Combiner	B4605/100	0053	Wessex / Anite	2006/9/22	2008/9/21
ETSTW-GSM 11	GSM 850,900,1800,1900 Test system	TS8950G	100039	R&S	2008/1/18	2010/1/17
ETSTW-GSM 12	Acoustical Calibrator	4231	2463874	Brüel&Kjær	2007/8/2	2008/8/1
ETSTW-GSM 13	Conditioning Amplifier	2690--0S2	2437856	Brüel&Kjær	2007/8/2	2008/8/1
ETSTW-GSM 14	Telephone Test Head	4602B	2465324	Brüel&Kjær	Function Test	
ETSTW-GSM 15	Mouth Simulator	4227	2462516	Brüel&Kjær	2007/8/2	2008/8/1
ETSTW-GSM 16	TEMP.&HUMIDITY CHAMBER	GTH-120-40-1P-U	MAA0501002	GIANT FORCE	2007/12/28	2008/12/27
ETSTW-GSM 17	ANTENNT COPLER	CMU-Z10	100988	R&S	Function Test	
ETSTW-GSM 18	AUDIO ANALYZER	UPL16	100173	R&S	2007/10/25	2008/10/24
ETSTW-GSM 23	SPLITTER	4901.19.A	None	SUHNER	Function Test	
ETSTW-GSM 24	Vibration Testing System	VS-100V	5494	Vibration	2007/12/11	2008/12/10
ETSTW-GSM 29	Microphone	4185	2463004	Brüel&Kjær	2007/8/2	2008/8/1
ETSTW-GSM 30	Ear Simulator	4195	2457416	Brüel&Kjær	2007/8/2	2008/8/1



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2.4 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50 μ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was according to ANSI STANDARD C63.4-2003 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dB μ V + 10.36 dB + 6 dB = 36.36 dB μ V/m @3m

ANSI STANDARD C63.4-2003 10.1.7 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 Taiwan ETS Product Service Co., Ltd. at the registered open field test site located at No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.) The Registration Number: 930600.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.



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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: GM-521 Date: 2008/1/31
Mode: low channel Temperature: 26 °C Engineer: Derek
Polarization: Horizontal Humidity: 60 %

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)
2422.429	50.79	---	33.32	84.11	---	114.00	94.00	-29.89	205	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
2423.070	40.48	---	33.32	73.80	---	114.00	94.00	-40.20	200	150

Mode: middle channel
Polarization: Horizontal

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)
2446.790	50.78	---	33.35	84.13	---	114.00	94.00	-29.87	200	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV) Peak Ave.		Factor (dB) Corr.	Result @3m (dBuV/m) Peak Ave.		Limit @3m (dBuV/m) Peak Ave.		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
2446.910	36.09	---	33.35	69.44	---	114.00	94.00	-44.56	205	150

Mode: high channel
Polarization: Horizontal

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)
2476.810	49.44	---	33.38	82.82	---	114.00	94.00	-31.18	200	150



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Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
2477.130	39.23	---	33.38	72.61	---	114.00	94.00	-41.39	200	150

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

Explanation: Please see attached diagram as appendix.



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3.2 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 Wireless Ring Mouse 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 (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 - 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.5
Above 960	500	54.0

For frequencies above 1 GHz (Peak measurements).

Limit + 20 dB 54.0 dB μ V/m + 20 dB= 74dB μ 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 017 ETSTW-RE 028
ETSTW-RE 029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043
ETSTW-RE 044

Explanation: Please see attached diagram as appendix.



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3.5 Spurious emission (tx)

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

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

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

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

The peak and average spurious emission plots was measured with the average limits.
The critical peak value listed in the table agree with the above calculated limits.

Summary table with radiated data of the test plots

Model: GM-521 Date: 2008/2/1
Mode: low channel Tx Mode Temperature: 26 °C Engineer: Derek
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)
294.048	12.87	peak	15.12	27.99	46.00	-18.01	185	150
942.485	4.55	peak	27.12	31.67	46.00	-14.33	220	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.			
2328.657	57.66	---	-5.46	52.20	---	74.00	54.00	-21.80	205	150
4841.683	55.80	44.09	-1.30	54.50	42.79	74.00	54.00	-11.21	200	150
7270.541	45.20	---	1.83	47.03	---	74.00	54.00	-26.97	205	150
9692.000	25.50	---	24.76	44.26	---	74.00	54.00	-29.74	205	150
12115.000	24.16	---	29.58	47.74	---	74.00	54.00	-26.26	215	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
86.272	15.58	peak	10.06	25.64	40.00	-14.36	205	150
942.485	6.14	peak	27.12	33.26	46.00	-12.74	260	150



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Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
2328.657	49.16	---	-5.46	43.70	---	74.00	54.00	-30.30	215	150
4841.683	51.28	---	-1.30	49.98	---	74.00	54.00	-24.02	210	150
7269.000	42.78	---	1.83	44.61	---	74.00	54.00	-29.39	210	150
9692.000	24.44	---	24.76	43.20	---	74.00	54.00	-30.80	200	150
12115.000	23.97	---	29.58	47.55	---	74.00	54.00	-26.45	210	150

Mode: middle channel Tx Mode

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
298.377	12.55	peak	15.21	27.76	46.00	-18.24	150	150
882.164	6.43	peak	25.88	32.31	46.00	-13.69	270	150

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
2569.138	54.24	---	-4.62	49.62	---	74.00	54.00	-24.38	200	150
4889.780	56.03	40.89	-1.30	54.73	39.59	74.00	54.00	-14.41	200	150
7342.685	46.67	---	1.89	48.56	---	74.00	54.00	-25.44	220	150
9788.000	24.86	---	25.14	44.00	---	74.00	54.00	-30.00	200	150
12235.000	24.51	---	29.86	48.37	---	74.00	54.00	-25.63	205	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
90.601	16.63	peak	10.62	27.25	43.50	-16.25	140	150
945.291	6.37	peak	27.17	33.54	46.00	-12.46	200	150

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
2328.657	45.79	---	-5.46	40.33	---	74.00	54.00	-33.67	210	150
4889.780	50.83	---	-1.30	49.53	---	74.00	54.00	-24.47	200	150
7341.000	42.28	---	1.88	44.16	---	74.00	54.00	-29.84	200	150
9788.000	24.31	---	25.14	43.45	---	74.00	54.00	-30.55	205	150
12235.000	23.37	---	29.86	47.23	---	74.00	54.00	-26.77	220	150



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Mode: high channel Tx Mode

Polarization: Horizontal

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
298.377	13.20	peak	15.21	28.41	46.00	-17.59	145	150
879.359	6.11	peak	25.82	31.93	46.00	-14.07	160	150

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
2713.427	51.64	---	-4.03	47.61	---	74.00	54.00	-26.39	200	150
4953.908	56.11	41.41	-1.08	55.03	40.33	74.00	54.00	-13.67	200	150
7431.000	42.63	---	1.84	44.47	---	74.00	54.00	-29.53	200	150
9908.000	24.14	---	25.90	44.04	---	74.00	54.00	-29.96	200	150
12385.000	25.07	---	30.22	49.29	---	74.00	54.00	-24.71	215	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
83.567	15.12	peak	9.91	25.03	40.00	-14.97	150	150
952.305	6.63	peak	27.25	33.88	46.00	-12.12	300	150

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
2713.427	45.54	---	-4.03	41.51	---	74.00	54.00	-32.49	215	150
4953.908	50.55	---	-1.08	49.47	---	74.00	54.00	-24.53	210	150
7431.000	43.07	---	1.84	44.91	---	74.00	54.00	-29.09	200	150
9908.000	23.83	---	25.90	43.73	---	74.00	54.00	-30.27	200	150
12385.000	23.92	---	30.22	48.14	---	74.00	54.00	-25.86	205	150

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

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

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



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3.6 Radiated Emissions from Digital Part

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

Summary table with radiated data of the test plots

Model: GM-521 Date: 2008/2/1
Mode: Temperature: 26 °C Engineer: Derek
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)
73.828	2.90	peak	11.27	14.17	30.00	-15.83	50	305
166.894	6.47	peak	15.12	21.59	30.00	-8.41	150	300
200.441	11.58	peak	12.15	23.73	30.00	-6.27	220	315
500.601	4.79	peak	19.82	24.61	37.00	-12.39	140	320
601.603	2.23	peak	22.19	24.42	37.00	-12.58	250	350
748.898	0.29	peak	24.66	24.95	37.00	-12.05	290	310

Polarization:

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
91.142	11.63	peak	10.67	22.30	30.00	-7.70	145	100
166.353	11.15	peak	15.15	26.30	30.00	-3.70	300	145
200.441	14.10	peak	12.15	26.25	30.00	-3.75	260	120
465.531	5.63	peak	19.24	24.87	37.00	-12.13	225	150
716.633	3.93	peak	23.89	27.82	37.00	-9.18	100	110
913.026	3.07	peak	26.54	29.61	37.00	-7.39	185	140

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

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028 ETSTW-RE 029
ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043 ETSTW-RE 044



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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).

Test conditions Tnom = 23°C, Vnom = 4V Frequency [MHz]	Transmitter field strength of Radiated Emission (Peak Detector)	Transmitter field strength of Radiated Emission (Average Detector)
	[dBμV/m]	
2390.000	46.07	--
2483.500	48.25	--

Limit:

Frequency Range (MHz)	Limit (dBμV/m)	
	Peak	Average
902 – 928 2400 – 2483.5 5725 – 5875 24000 - 24250	74	54

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

Explanation: Please see attached diagram as appendix.



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3.8 Power Line Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Model:	GM-521	Date:	2008/2/15					
Mode:		Temperature:	26 °C	Engineer:	Derek			
Polarization:	N	Humidity:	60 %					
Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV)		Limit (dBuV)		Margin
	QP	Ave.	Corr.	QP	Ave.	QP	Ave.	(dB)
0.1516	36.33	10.59	10.10	46.43	20.69	65.91	55.91	-19.48
0.2017	43.53	34.28	10.10	53.63	44.38	63.54	53.54	-9.16
0.2678	37.57	31.42	10.10	47.67	41.52	61.19	51.19	-9.67
0.5350	25.23	---	10.10	35.33	---	56.00	---	-20.67
5.5556	23.88	---	10.10	33.98	---	60.00	---	-26.02
14.2222	24.11	---	10.10	34.21	---	60.00	---	-25.79

Polarization: L1

Frequency (MHz)	Reading (dBuV)		Factor (dB)	Result (dBuV)		Limit (dBuV)		Margin
	QP	Ave.	Corr.	QP	Ave.	QP	Ave.	(dB)
0.1516	33.60	9.20	10.10	43.70	19.30	65.91	55.91	-22.21
0.2017	42.32	32.63	10.10	52.42	42.73	63.54	53.54	-10.81
0.2659	36.65	29.39	10.10	46.75	39.49	61.25	51.25	-11.76
0.5350	27.28	---	10.10	37.38	---	56.00	---	-18.62
5.4167	24.13	---	10.10	34.23	---	60.00	---	-25.77
14.7778	25.86	---	10.10	35.96	---	60.00	---	-24.04

- 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. See the attached diagram as appendix.



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Limits:

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi Peak	Average
0.15-0.5 0.5-5 5-30	66 to 56	56 to 46
	56	46
	60	50

Test equipment used: ETSTW-CE 001 ETSTW-CE 003 ETSTW-CE 004 ETSTW-CE 006 ETSTW-CE 011



Appendix

A Measurement diagrams

1. Peak Output Power
2. Spurious emission (tx)
3. Radiated Emissions from Digital Part
4. Radiated Emission on the band edge
5. 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

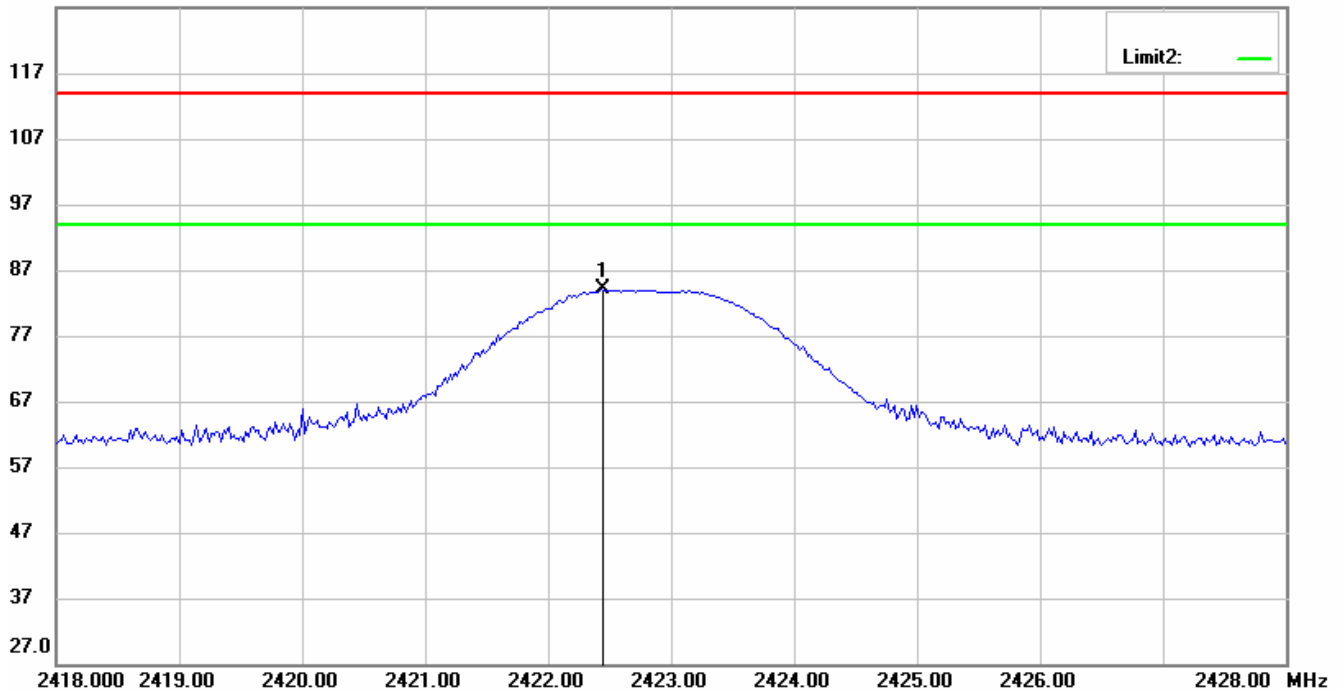


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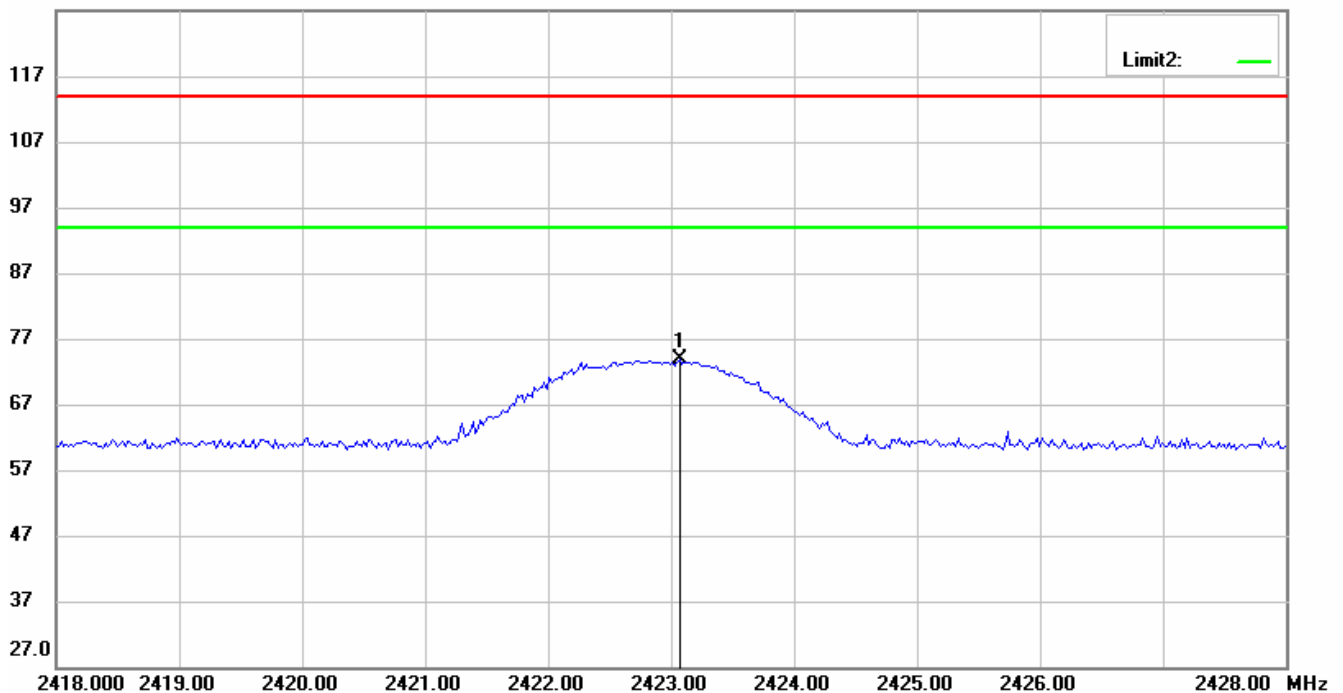
Peak Output Power
Low Channel
Antenna Polarization H

127.0 dBuV/m



Antenna Polarization V

127.0 dBuV/m



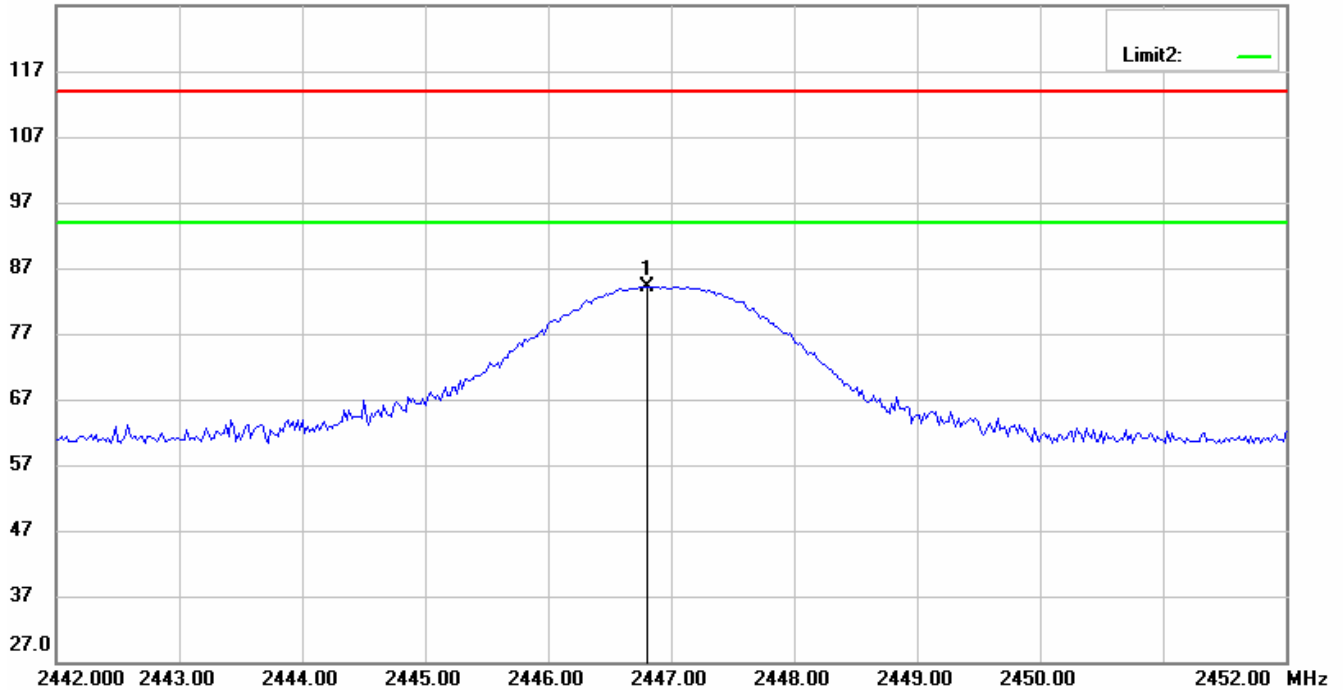


Taiwan ETS Product Service Co., Ltd.

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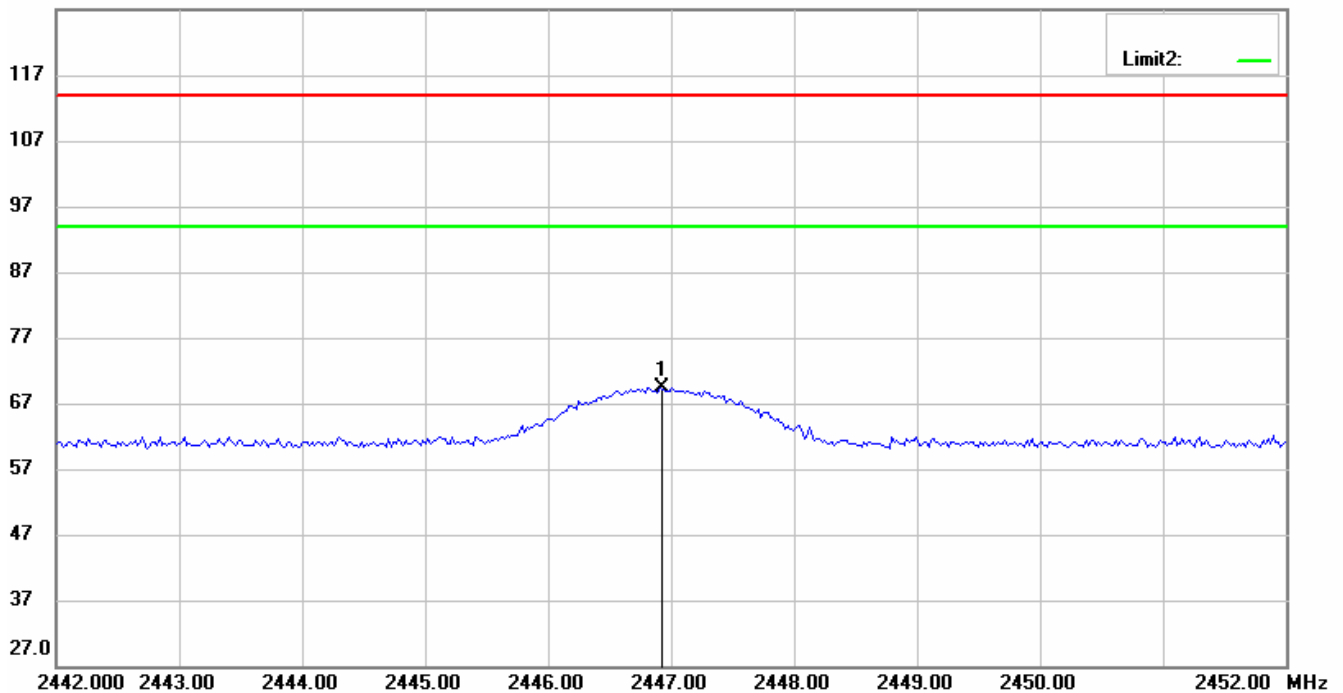
Middle Channel Antenna Polarization H

127.0 dBuV/m



Antenna Polarization V

127.0 dBuV/m





Taiwan ETS Product Service Co., Ltd.

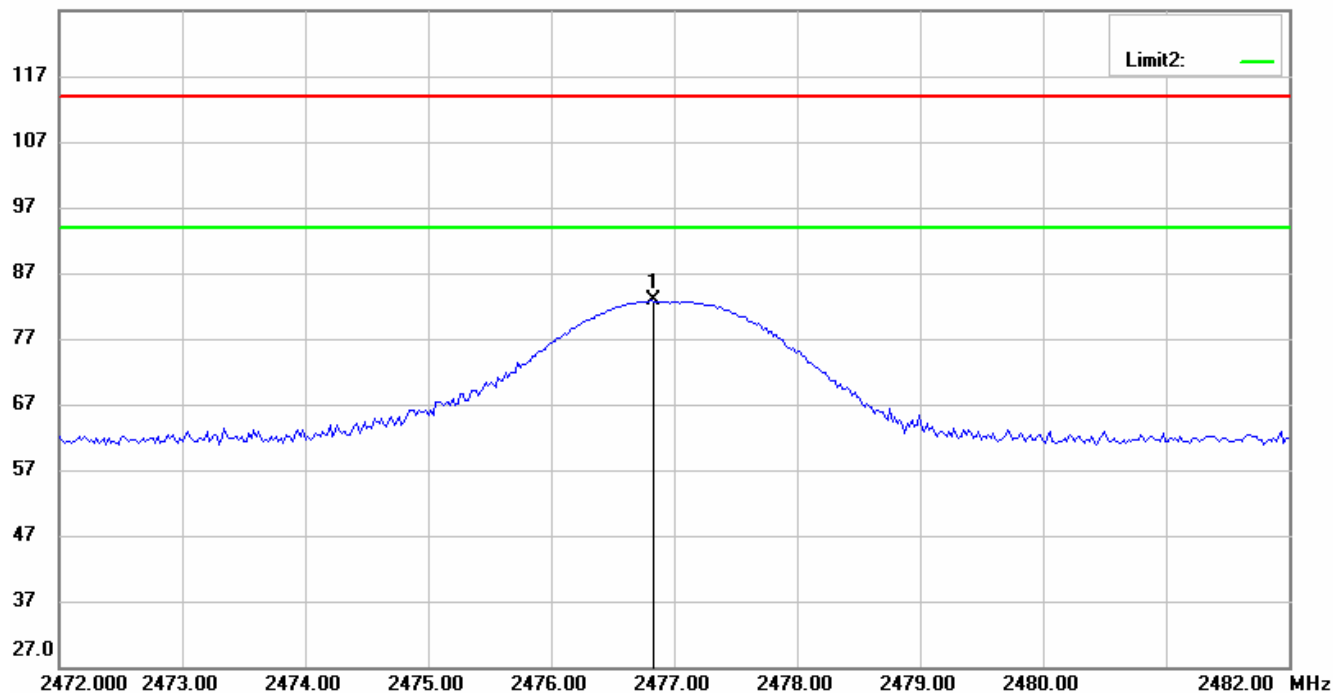
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FCC ID: OR7GM521

High Channel

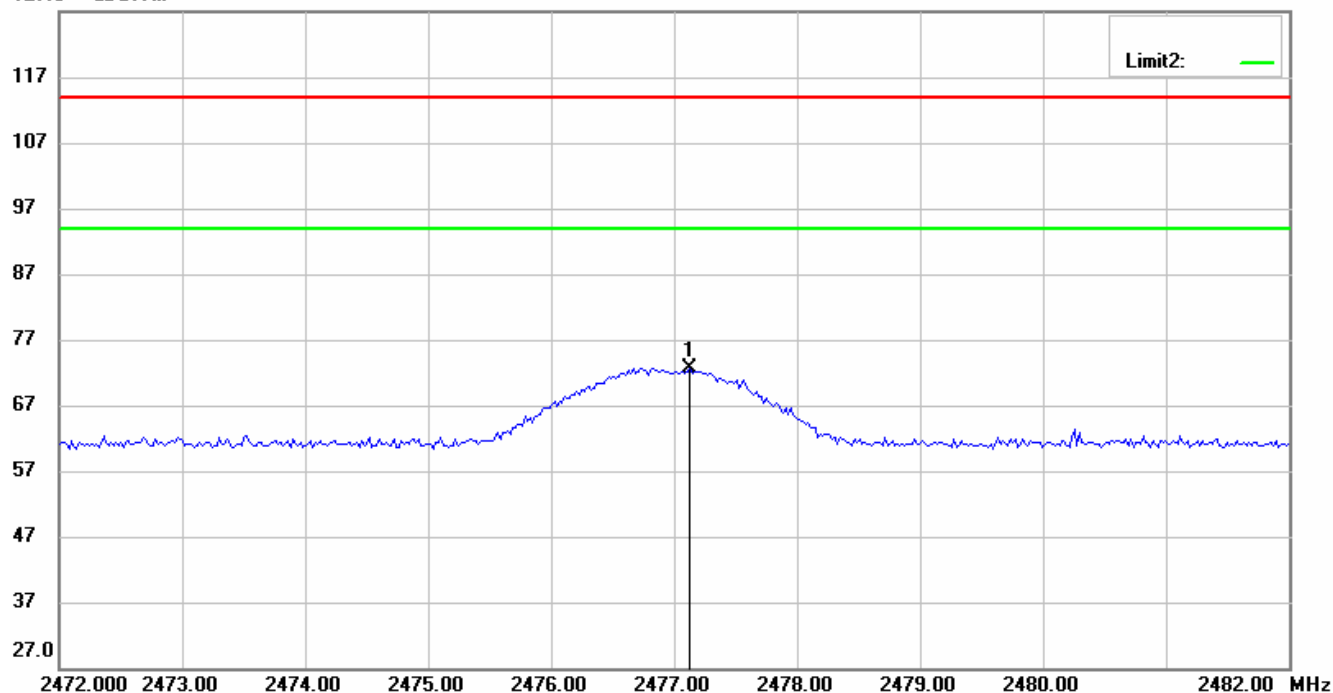
Antenna Polarization H

127.0 dBuV/m



Antenna Polarization V

127.0 dBuV/m



Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

1. The plots are pre-scanned data for determining the tested points and for reference only.
2. The exact test result is shown in the data table of Peak Output Power test of this test report.



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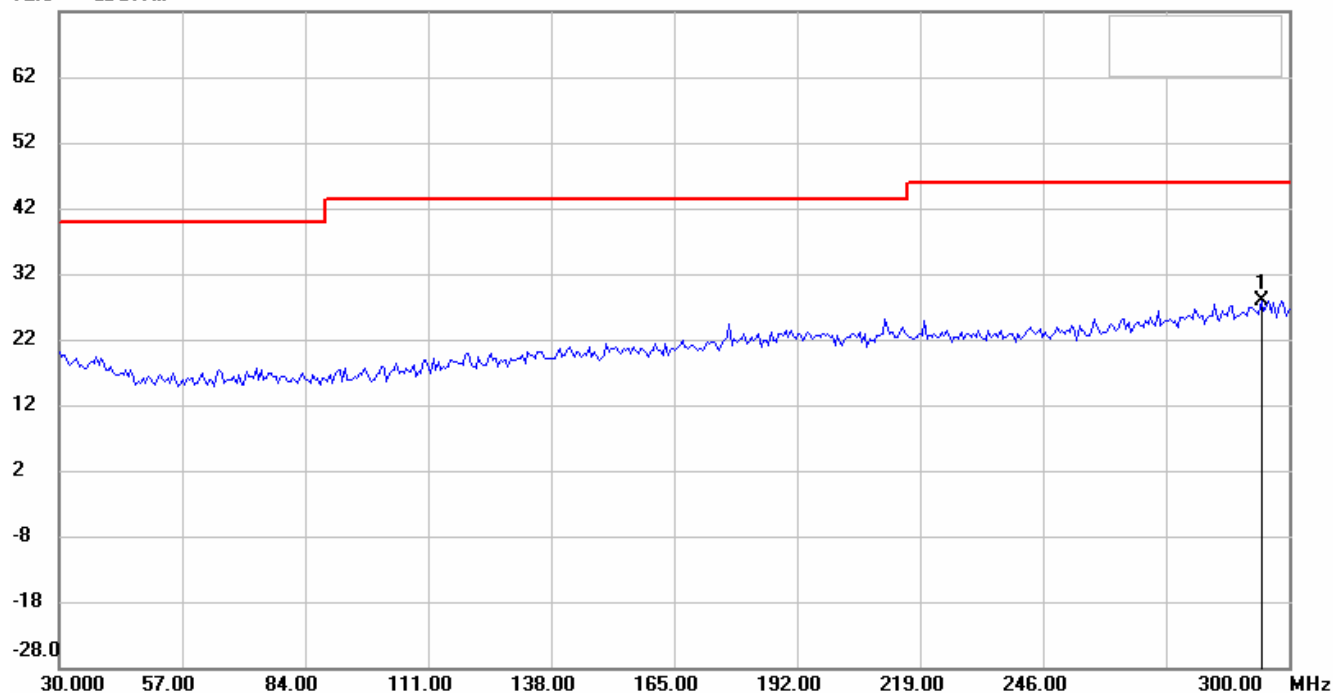
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Spurious emission (tx)

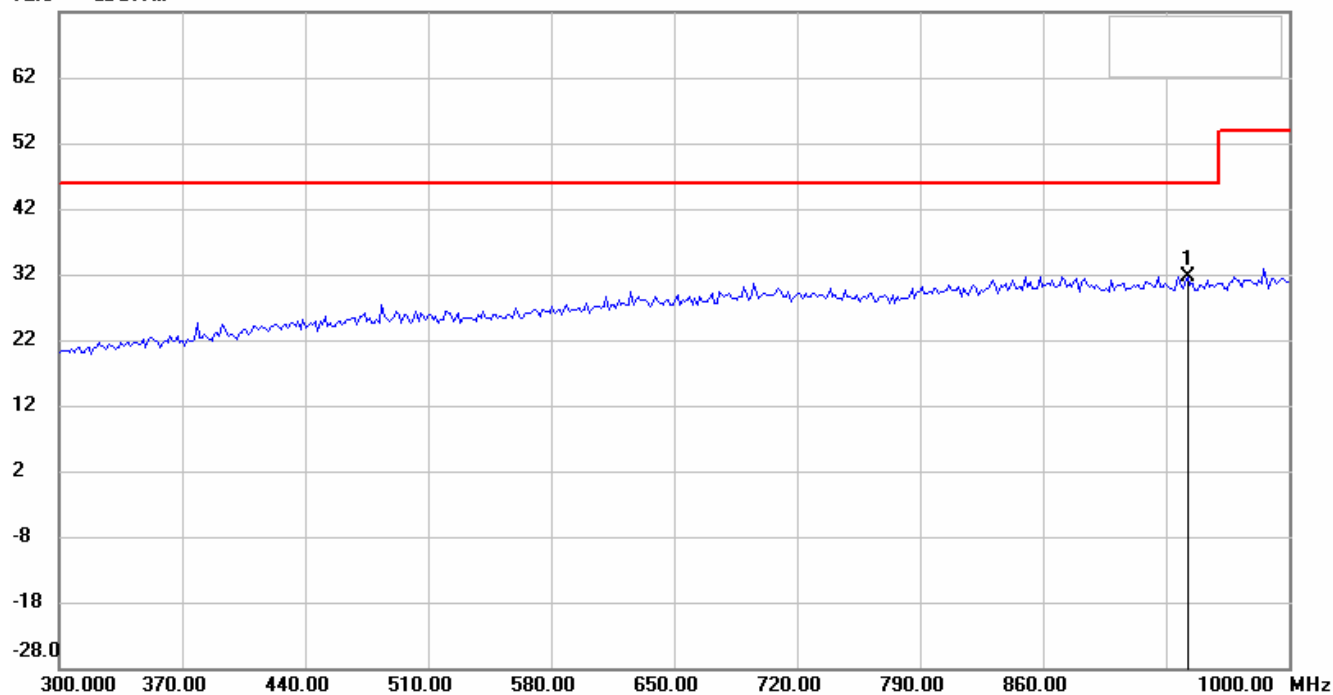
Low Channel

Antenna Polarization H

72.0 dBuV/m



72.0 dBuV/m

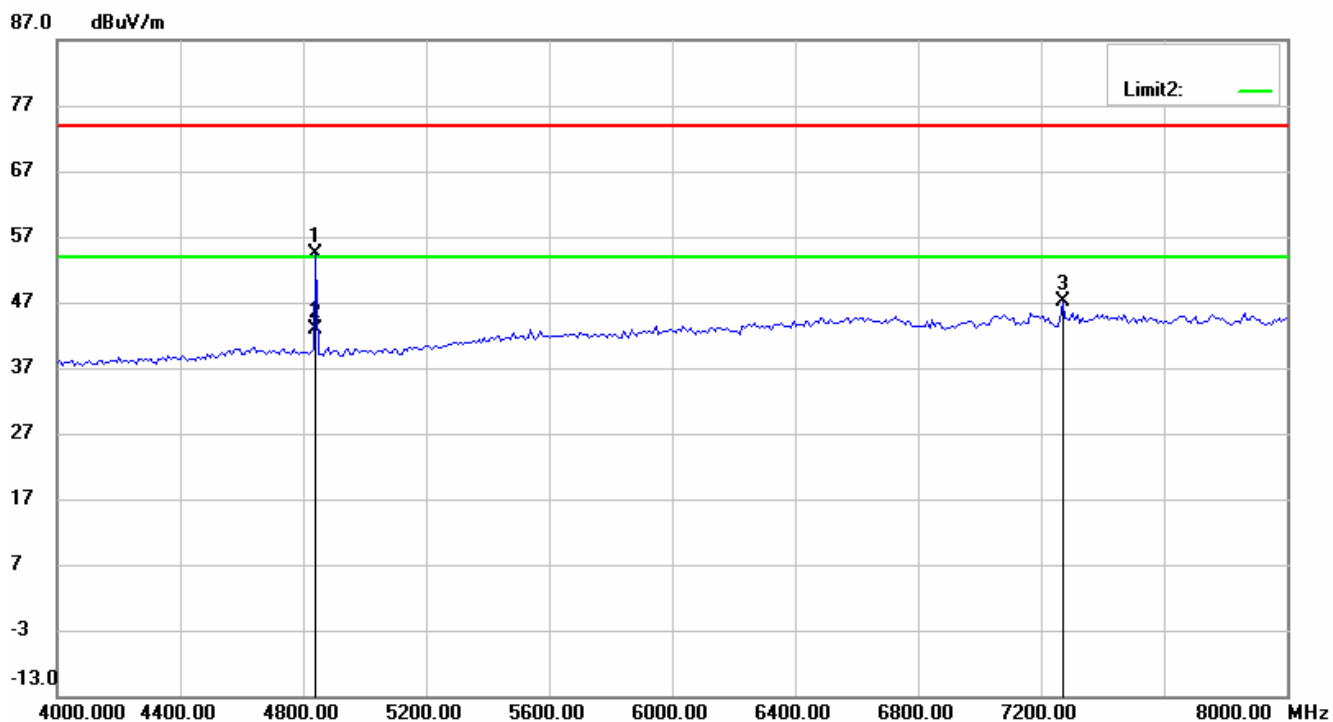
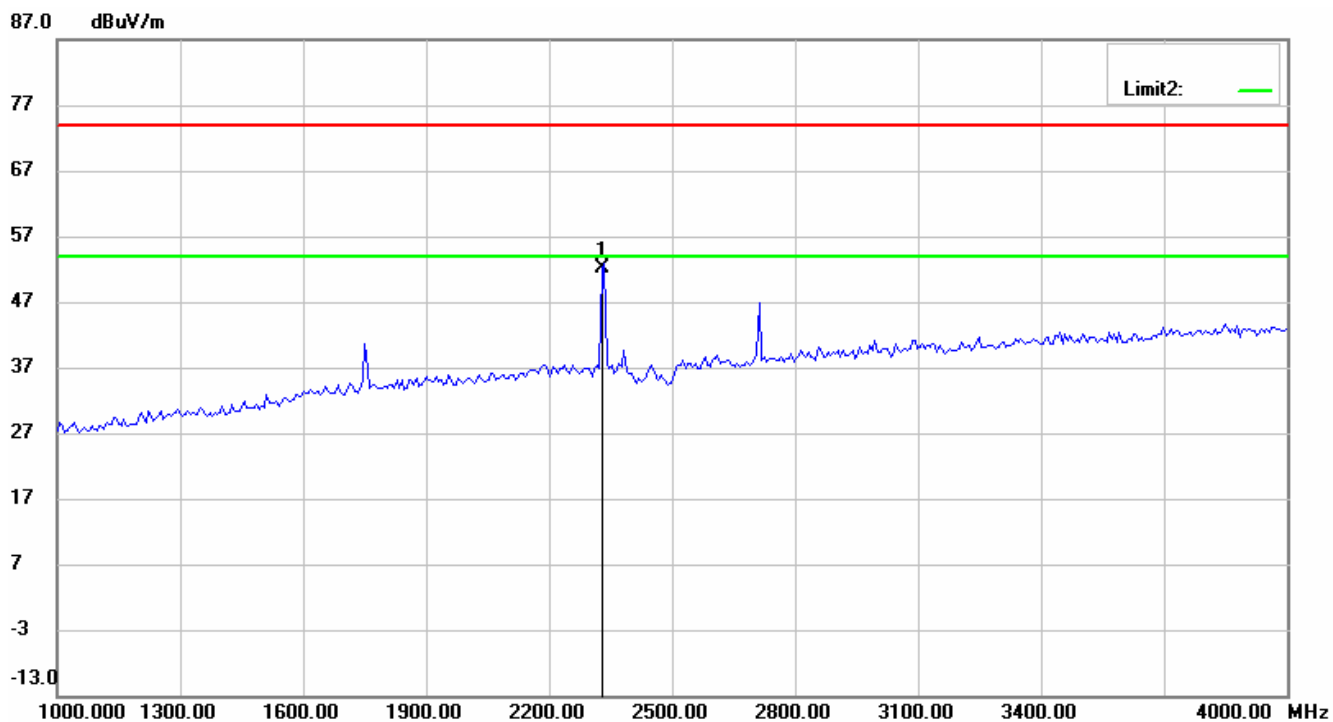




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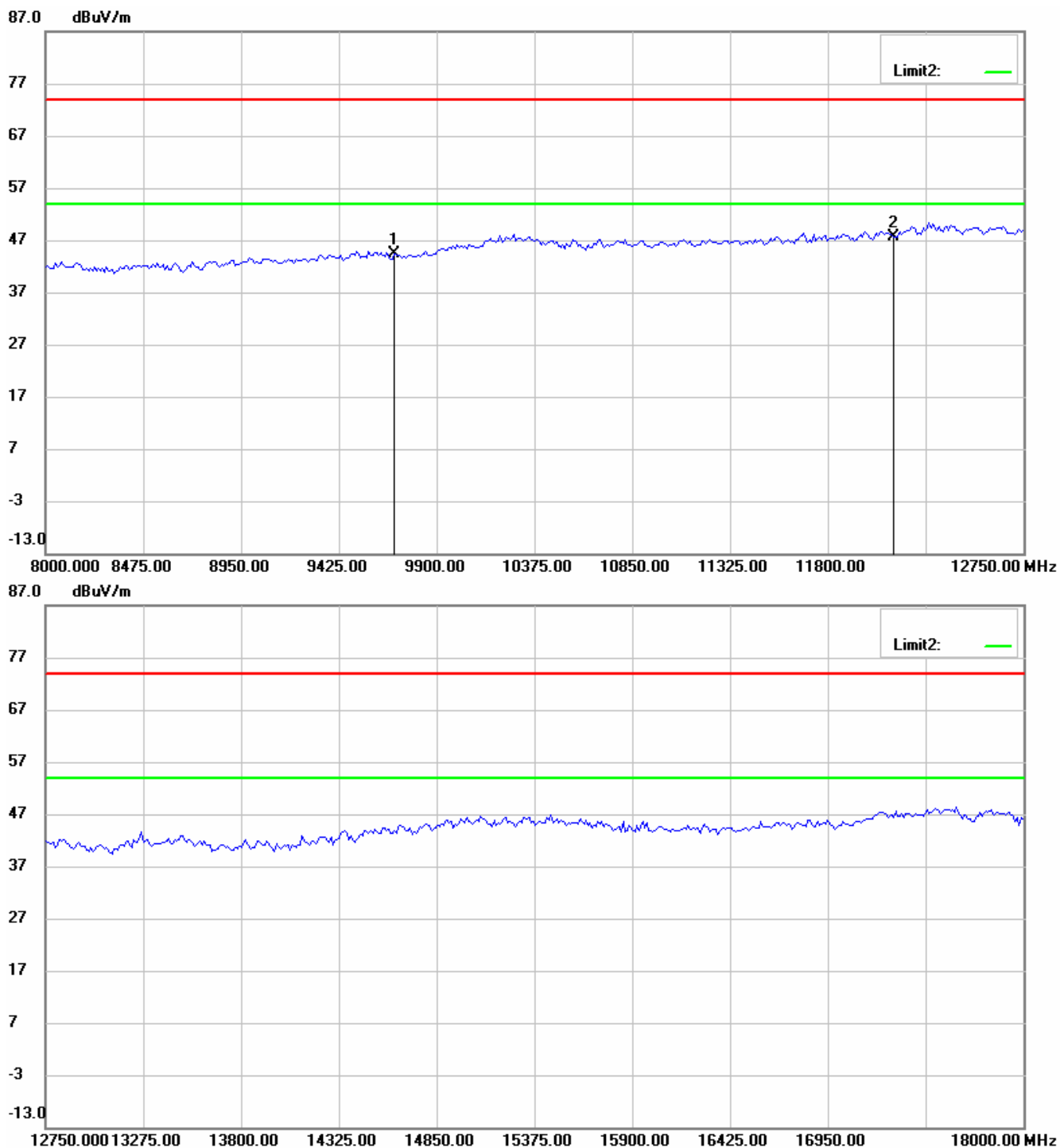




Taiwan ETS Product Service Co., Ltd.

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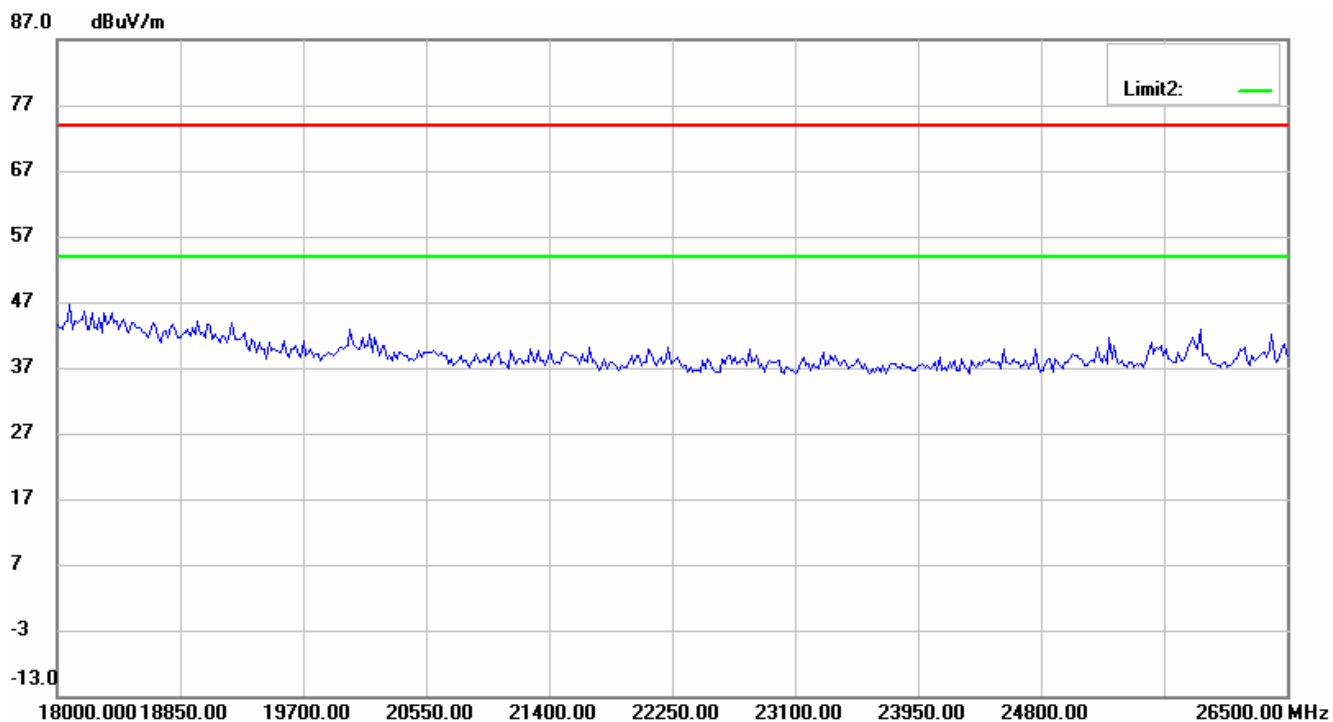




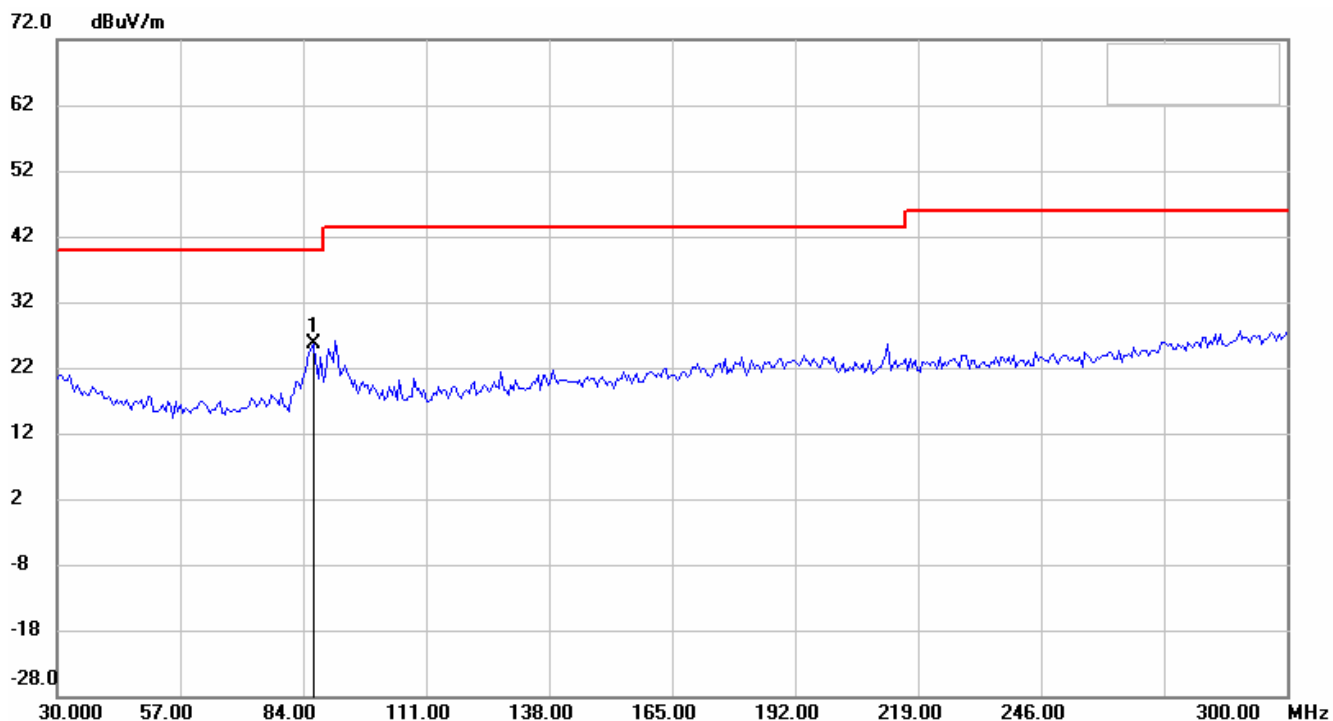
Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521



Antenna Polarization V

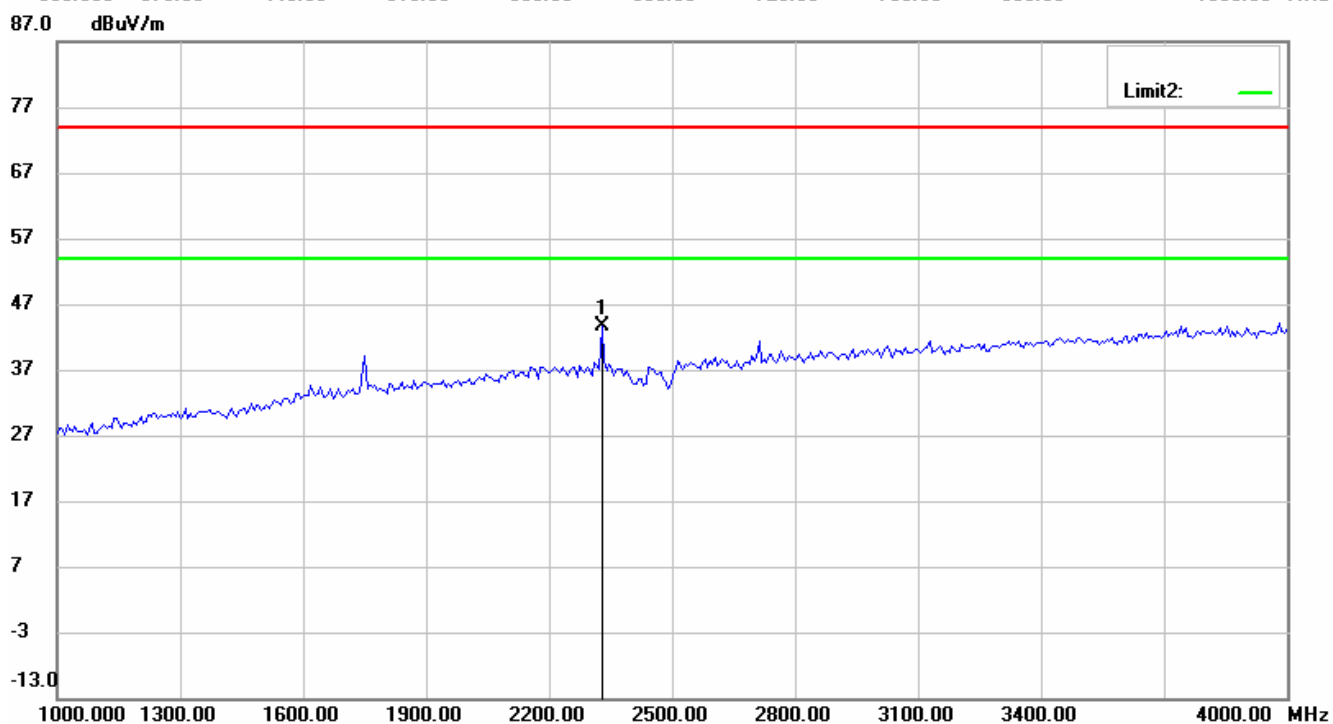
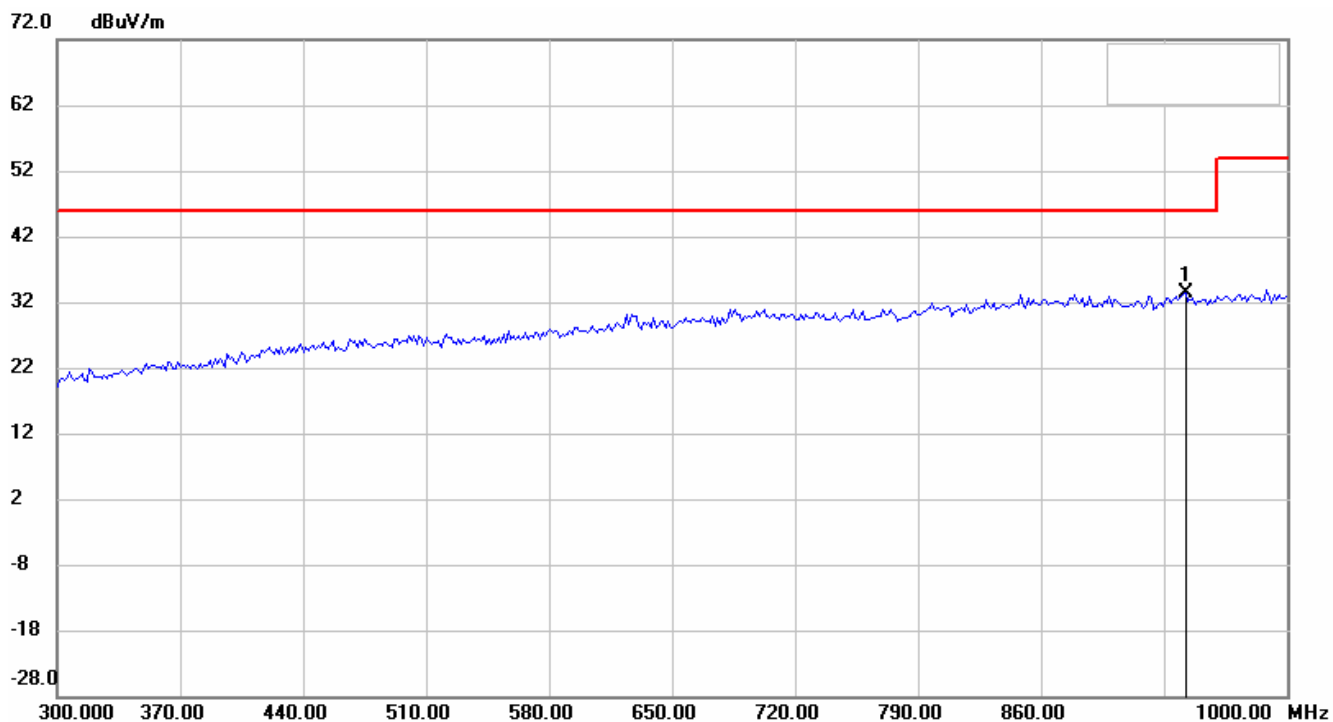




Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

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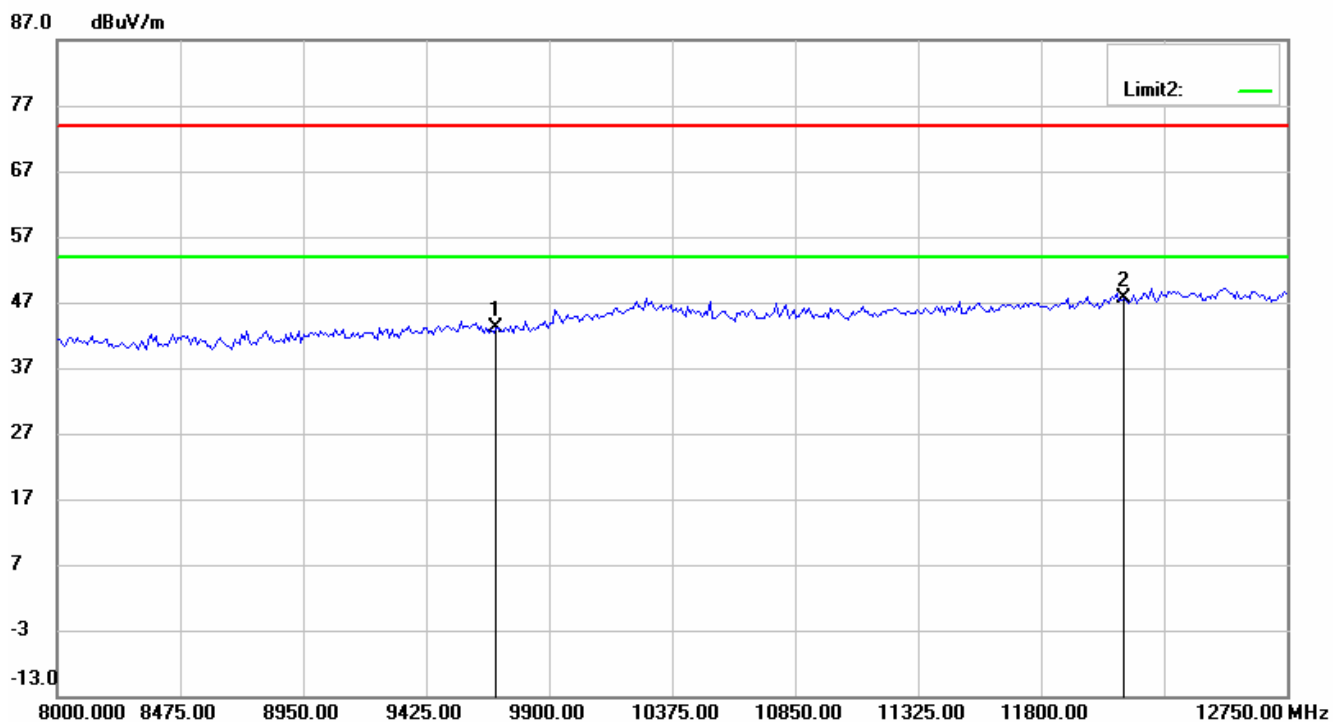
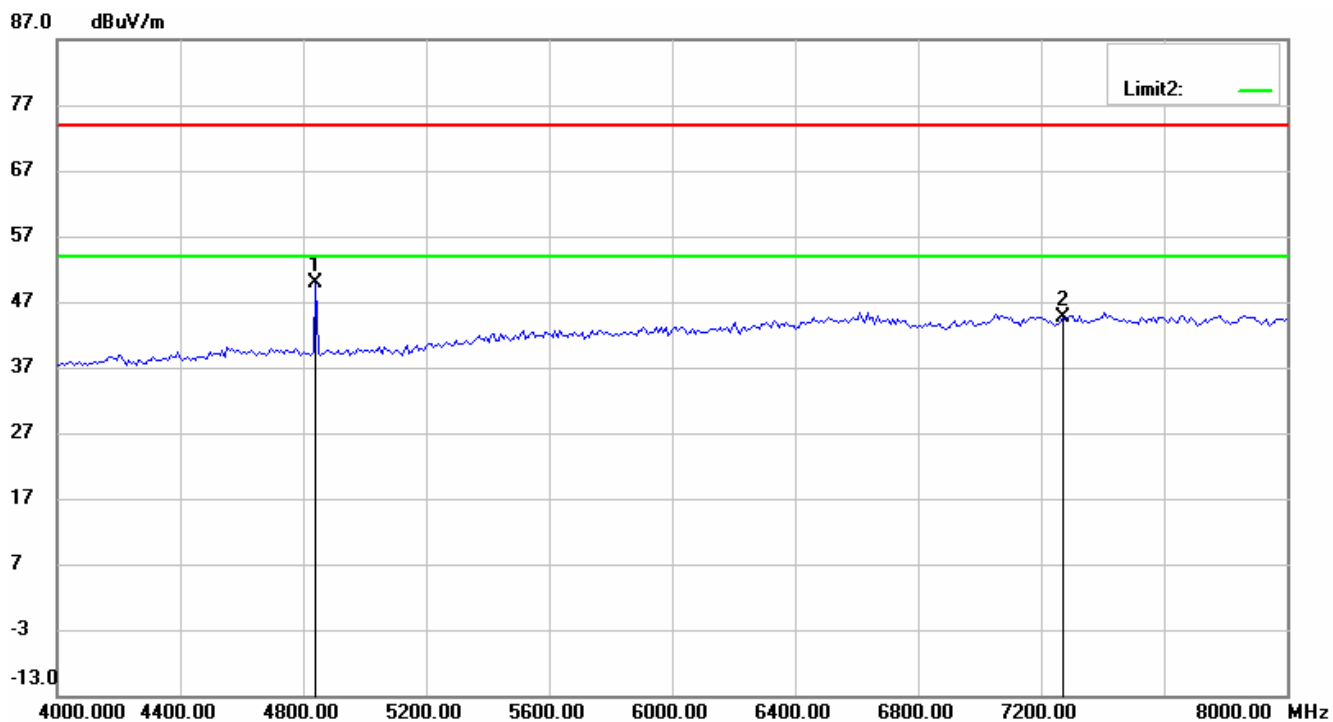




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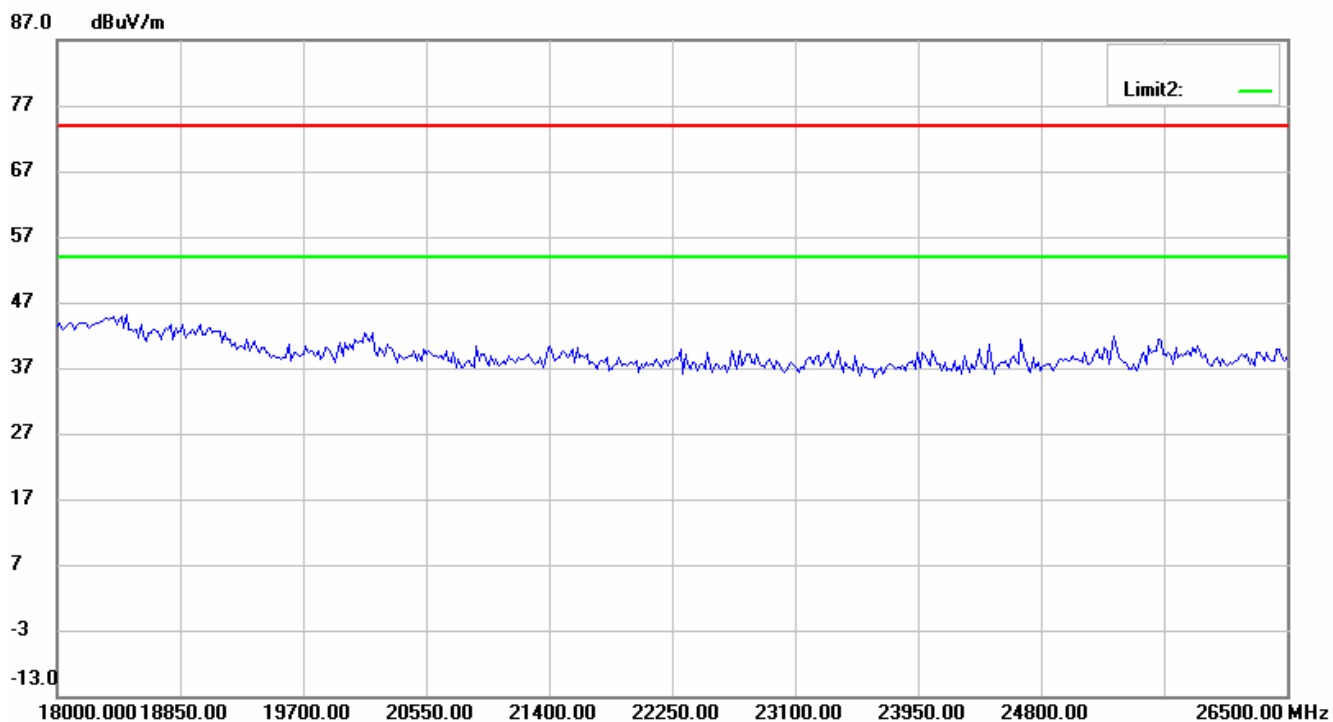
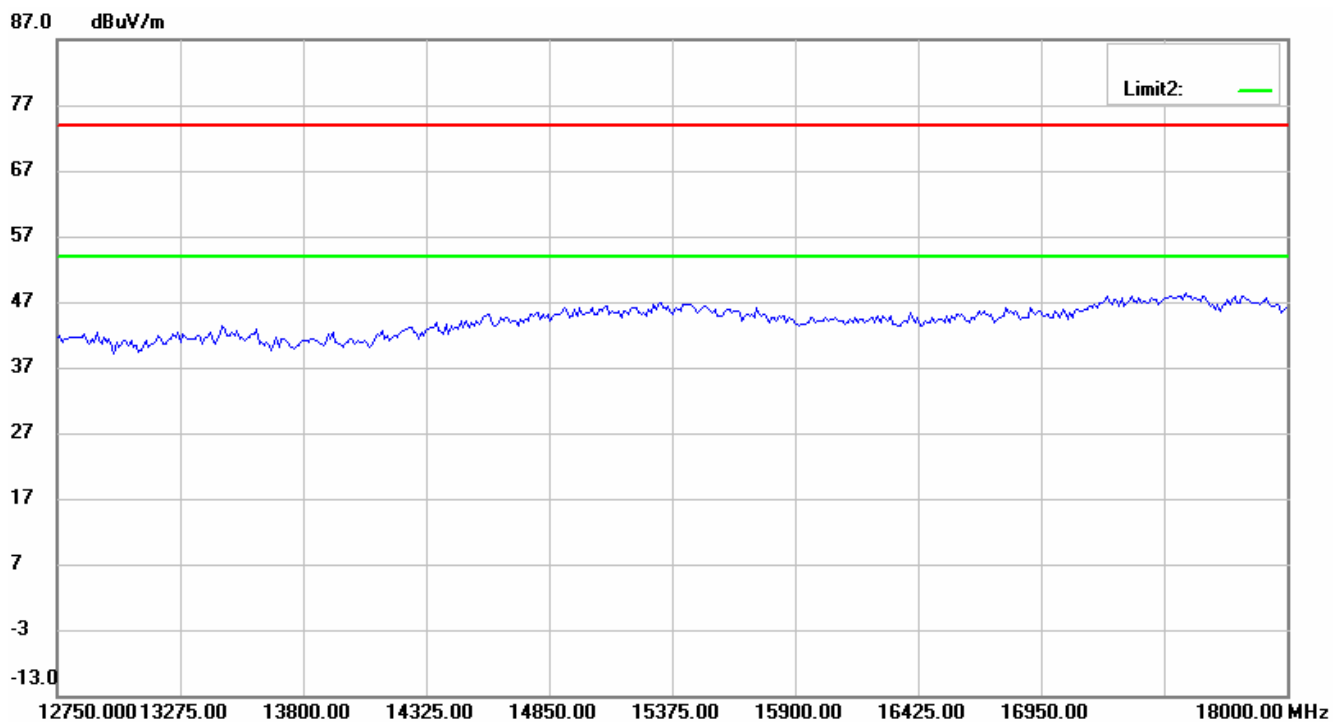




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Registration number: W6M20801-8832-P-15

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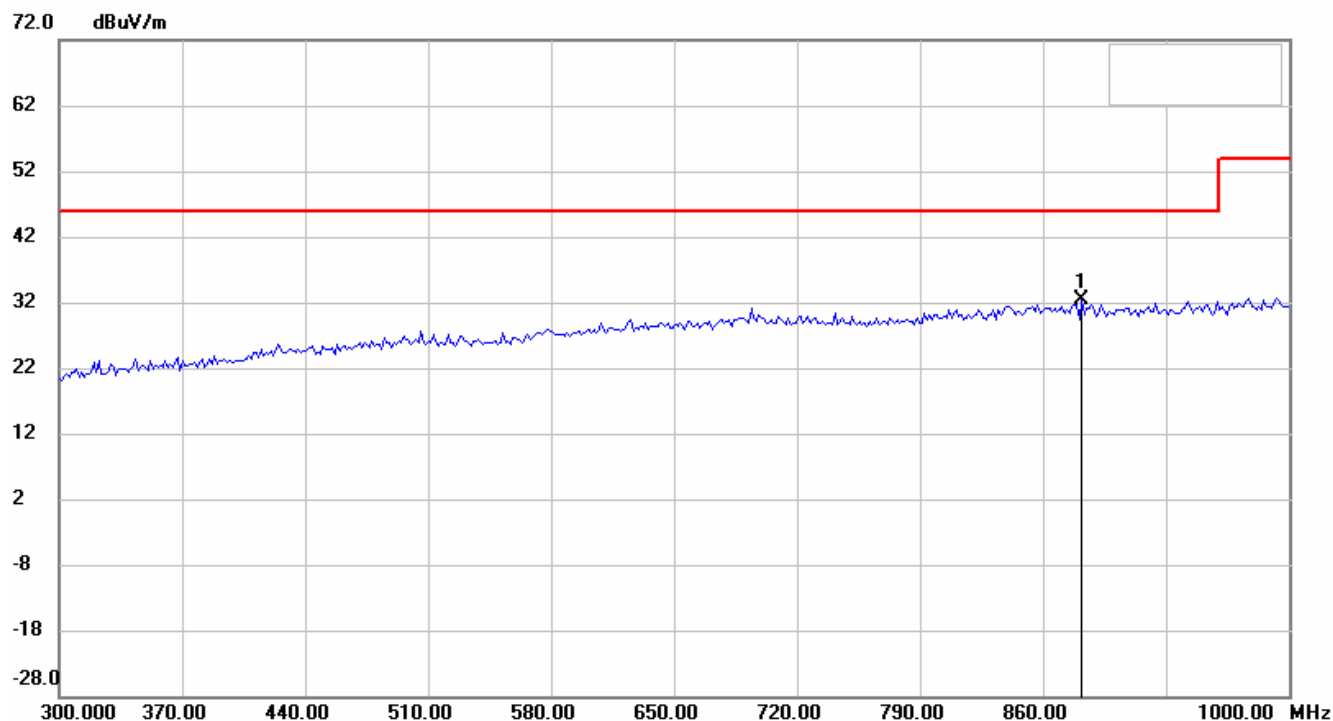
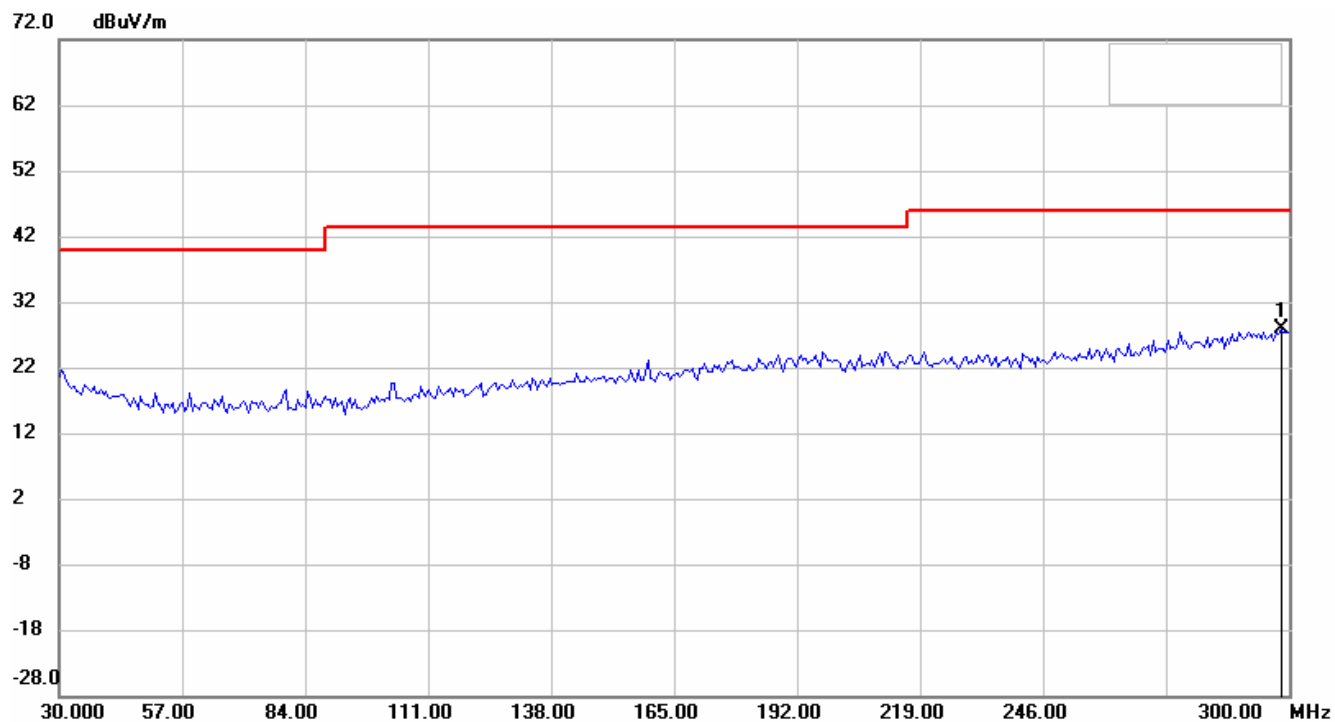
Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521

Middle Channel

Antenna Polarization H

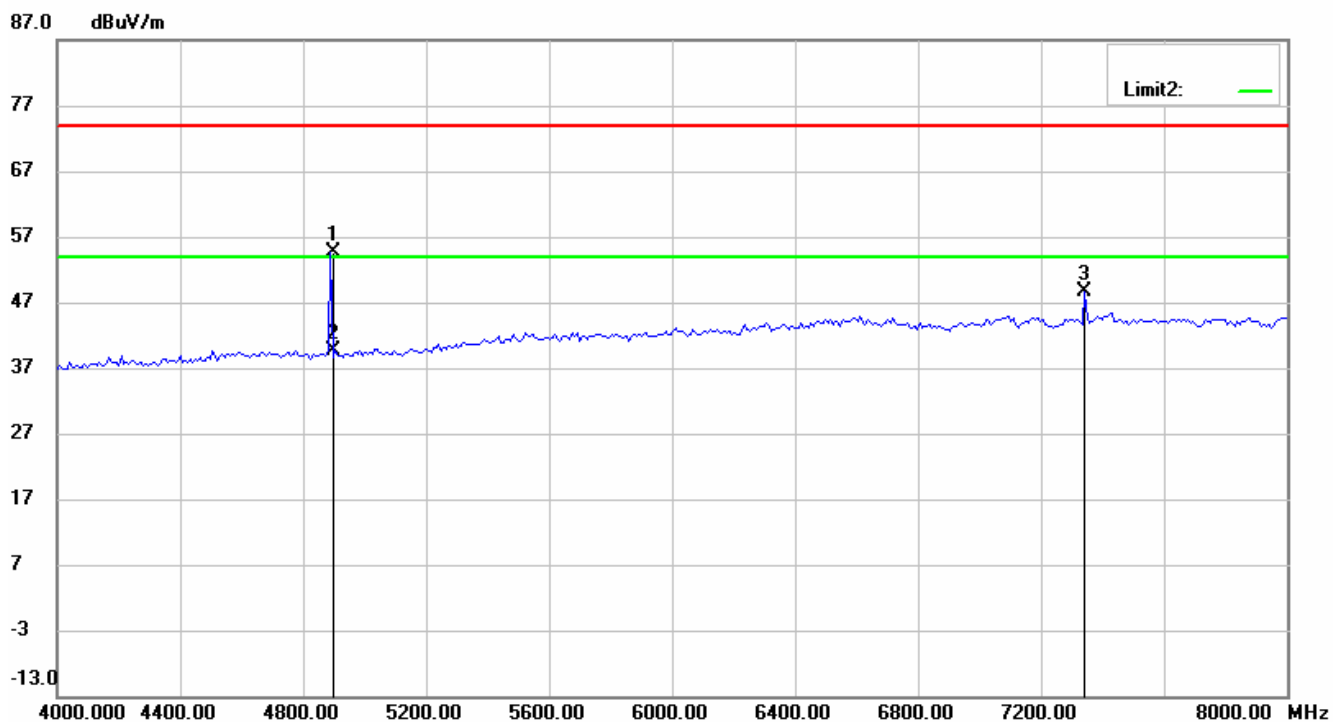
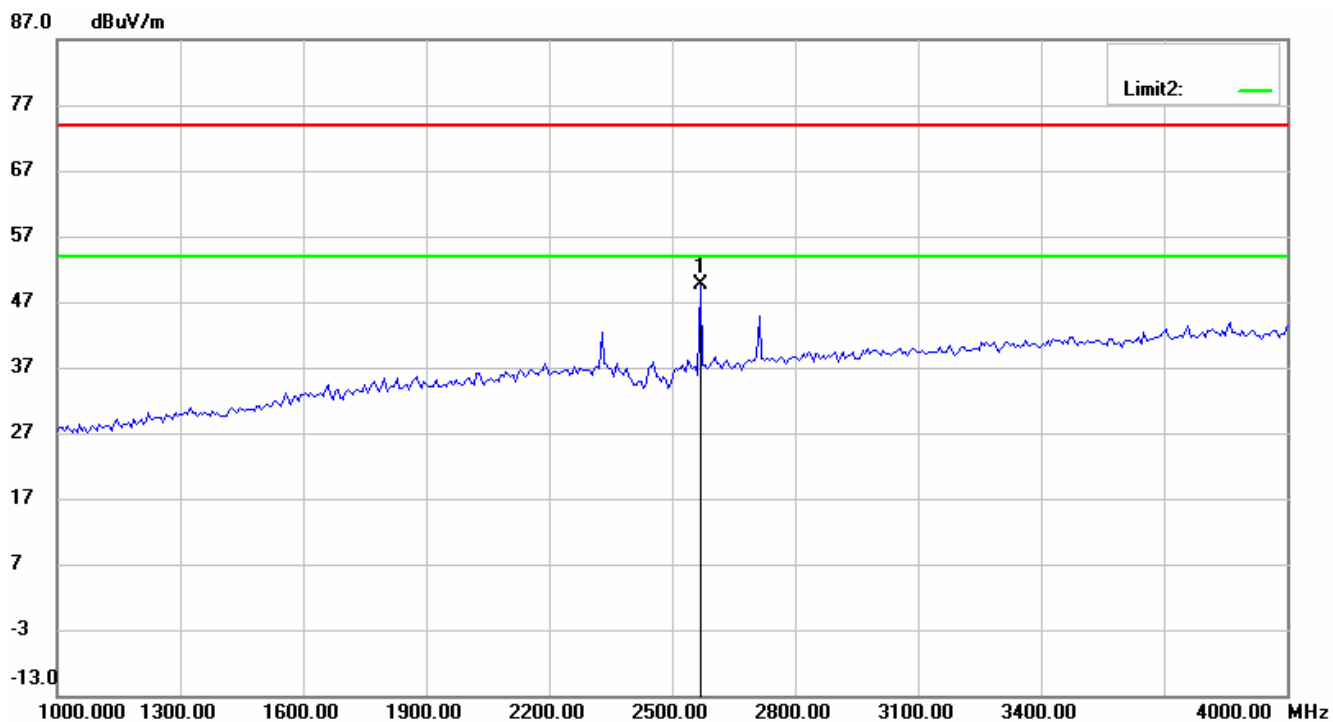




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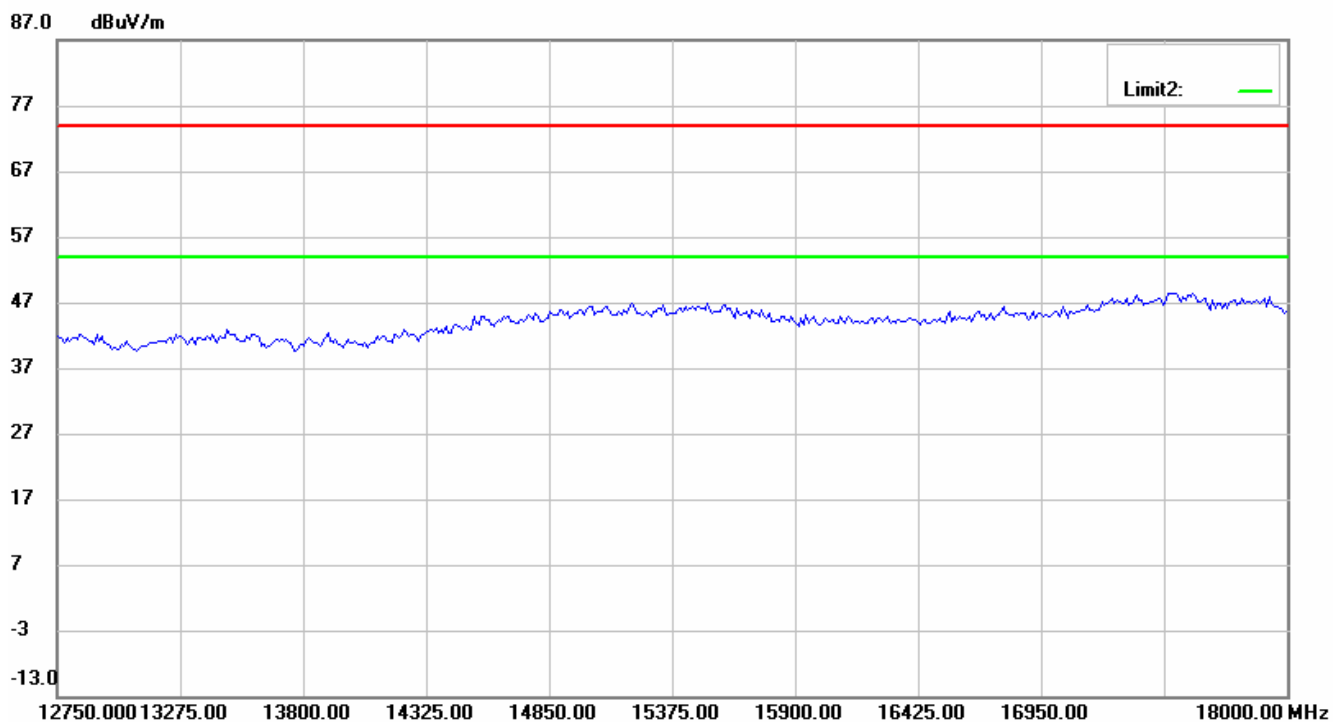
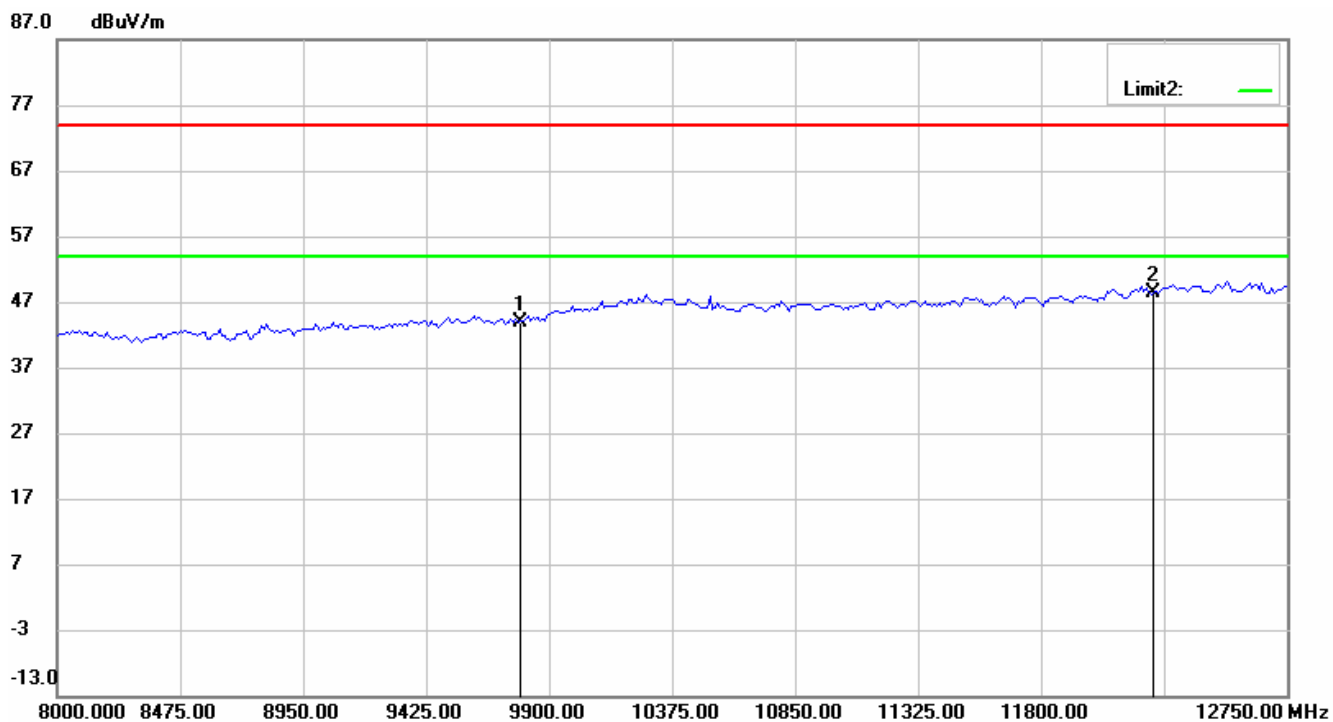




Taiwan ETS Product Service Co., Ltd.

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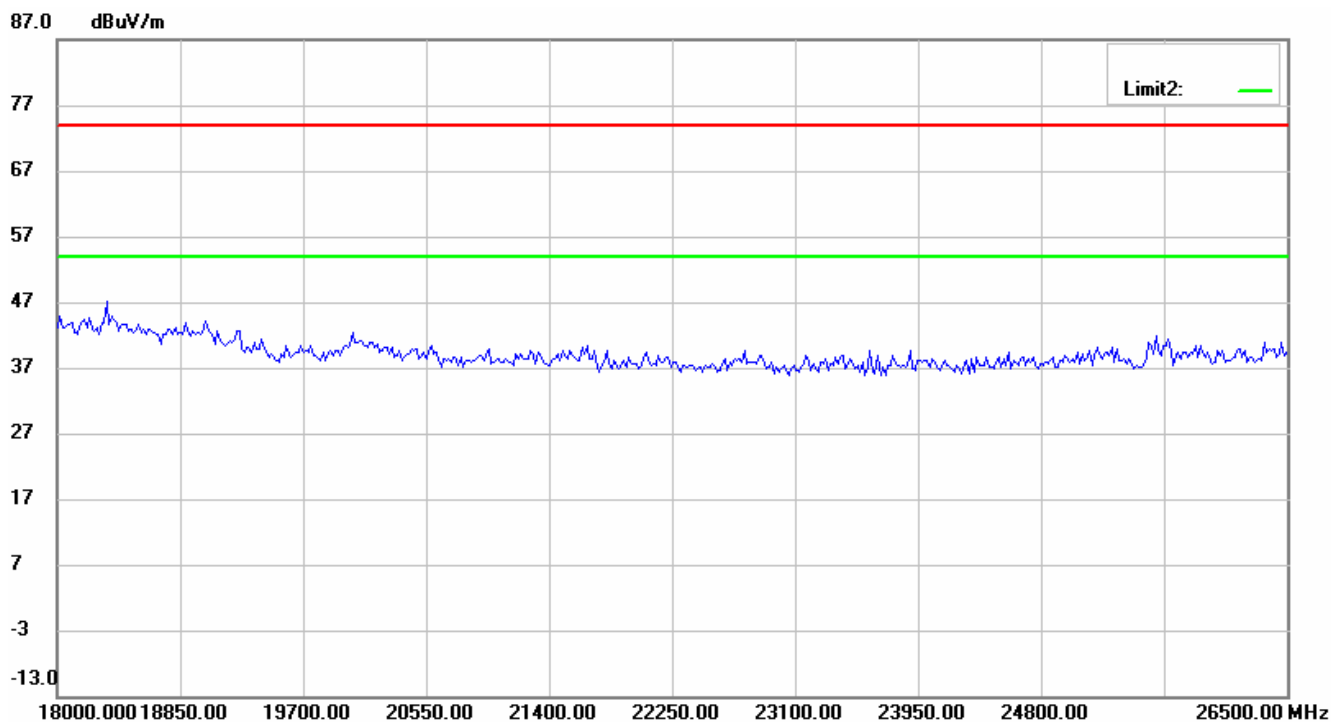




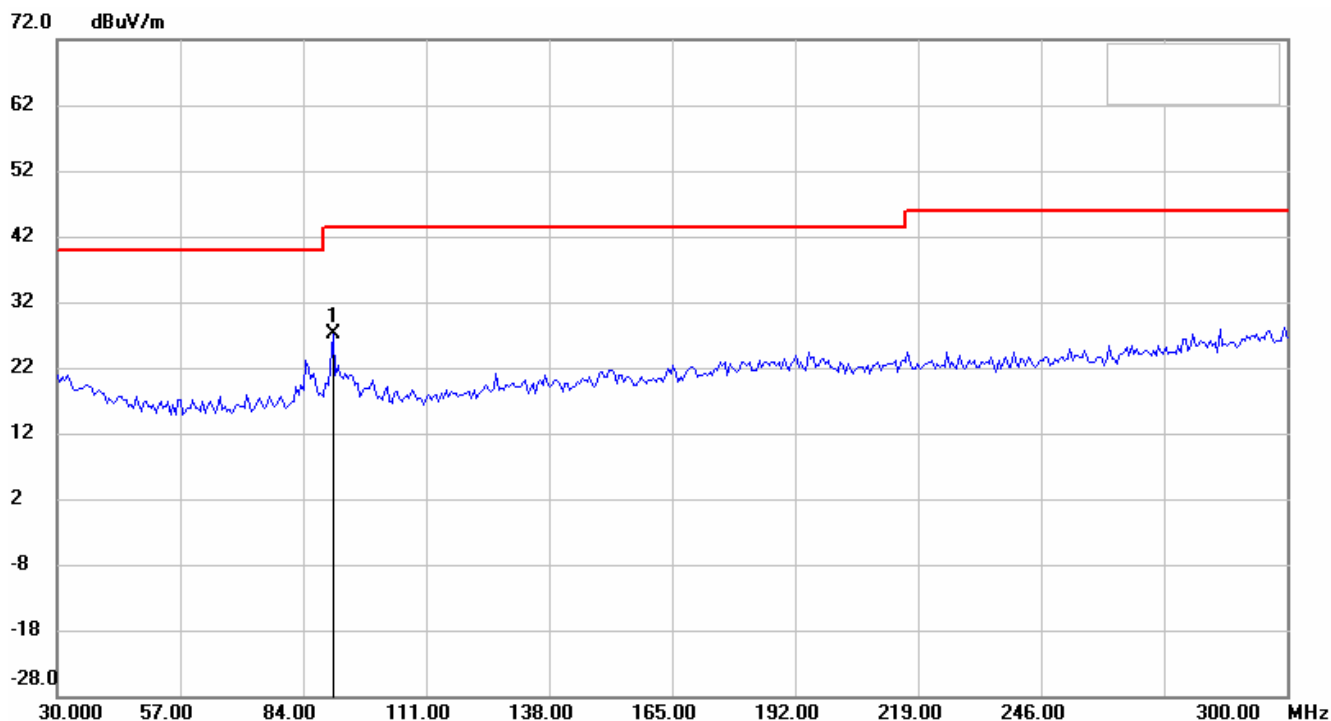
Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521



Antenna Polarization V

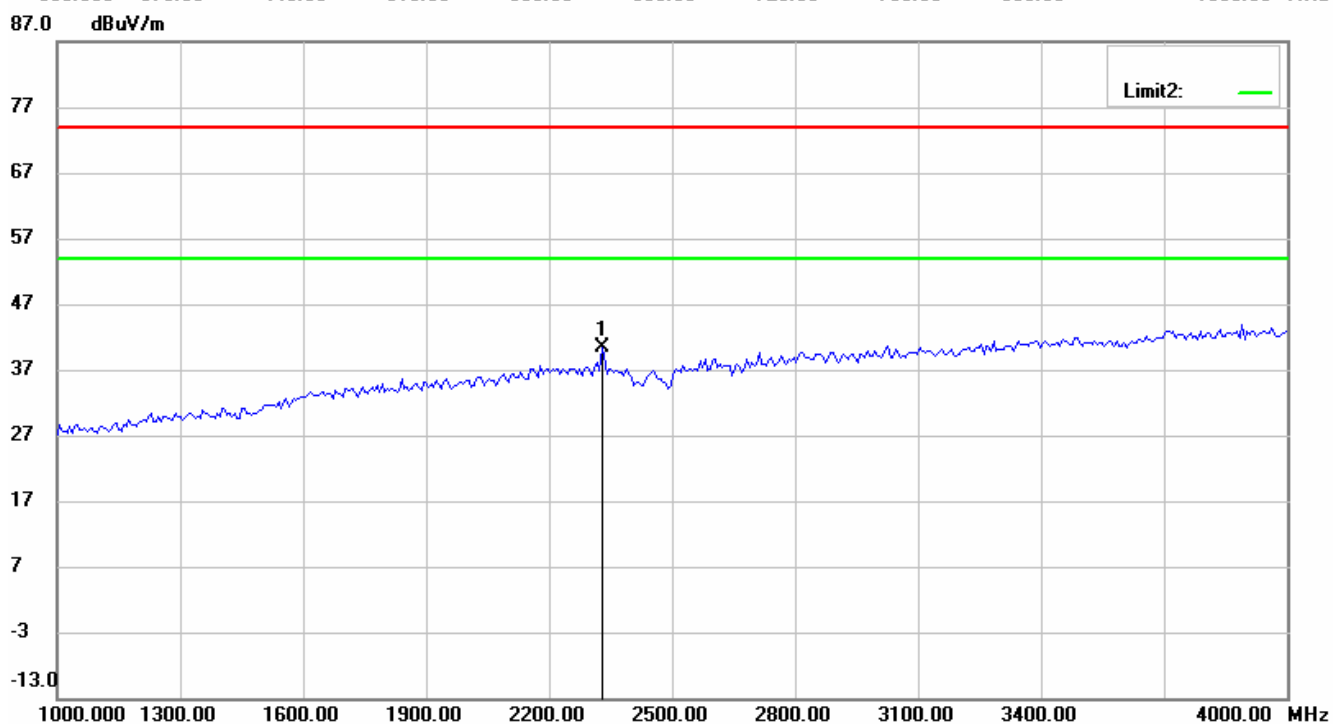
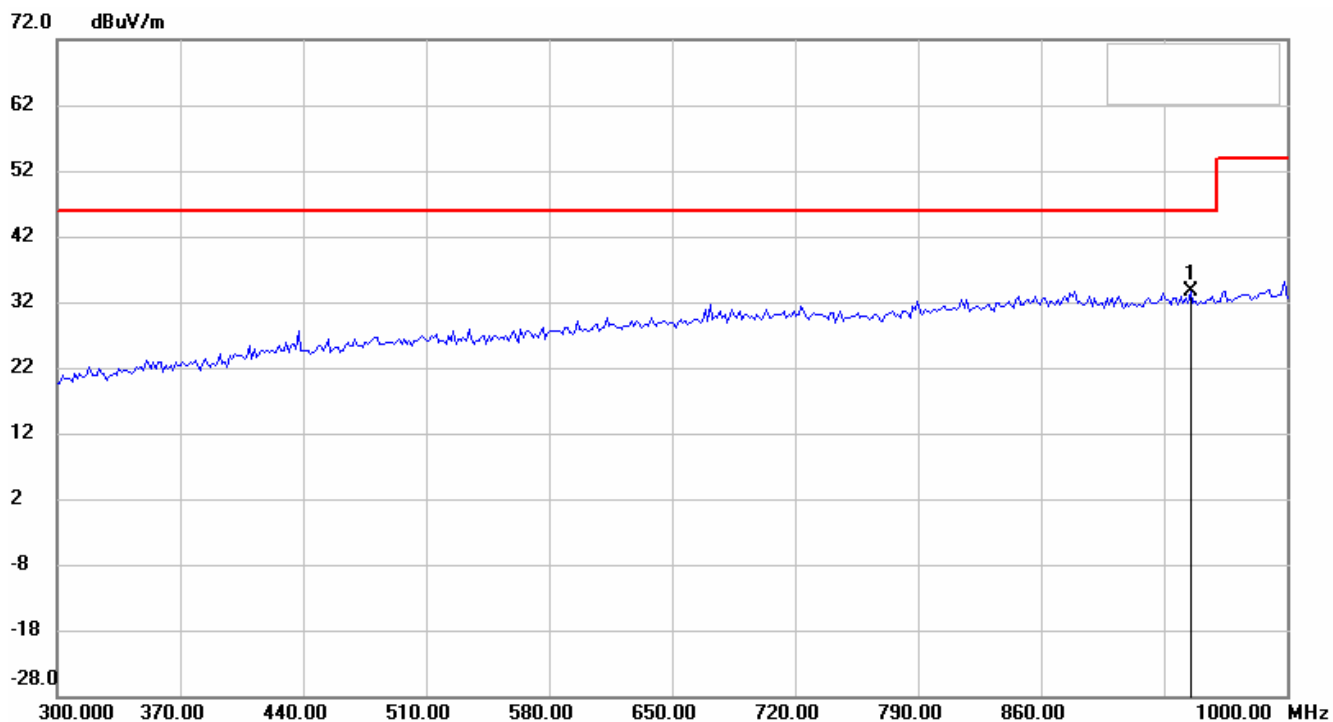




Taiwan ETS Product Service Co., Ltd.

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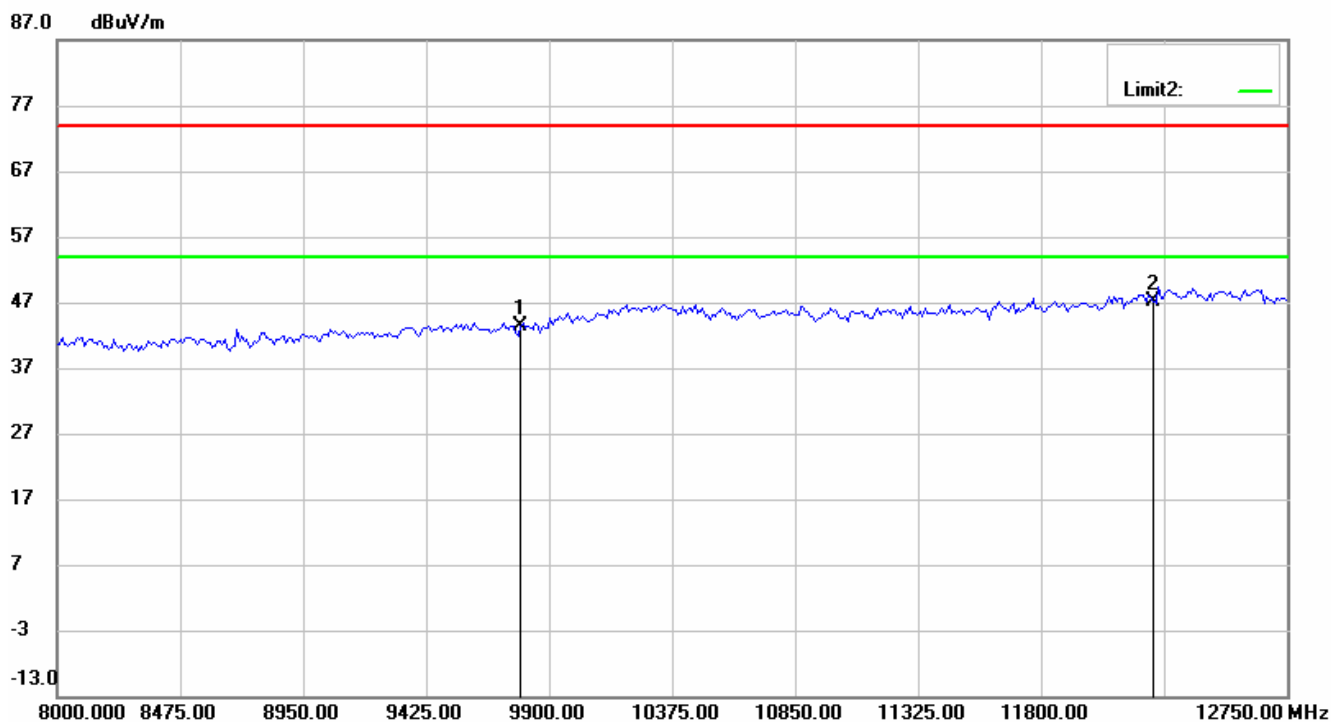
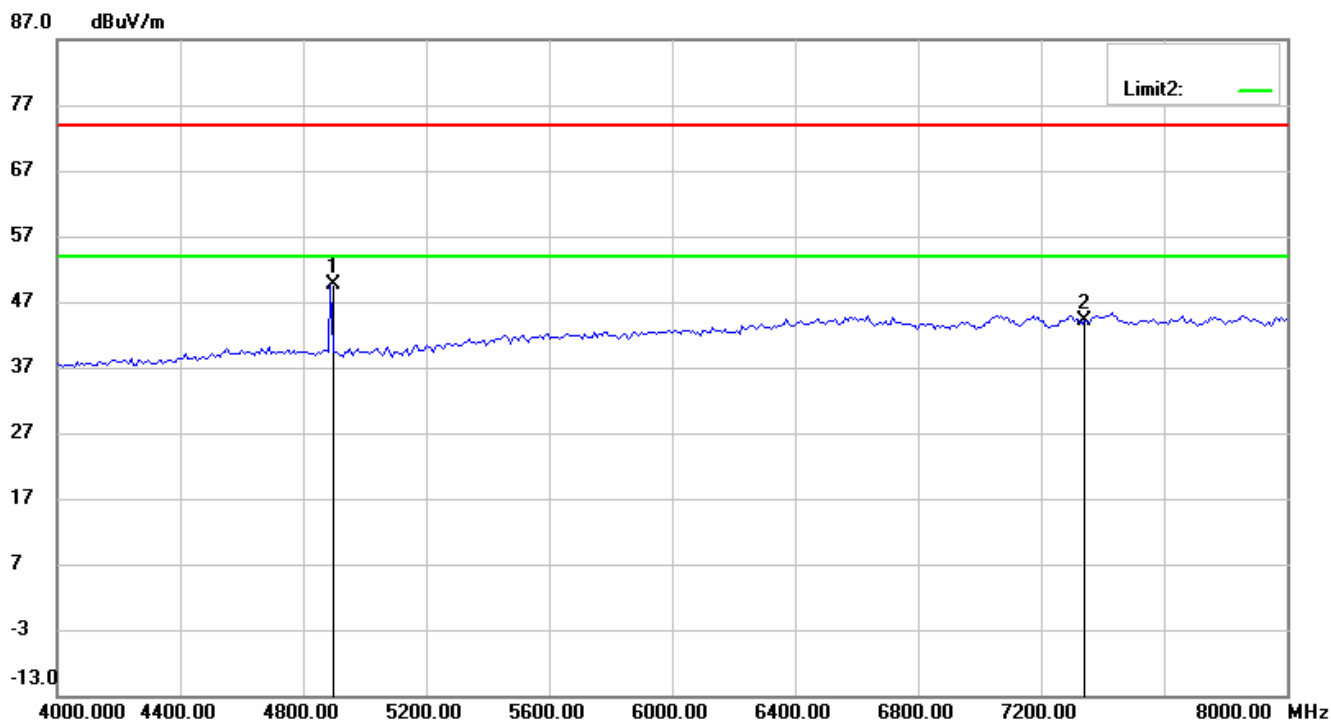




Taiwan ETS Product Service Co., Ltd.

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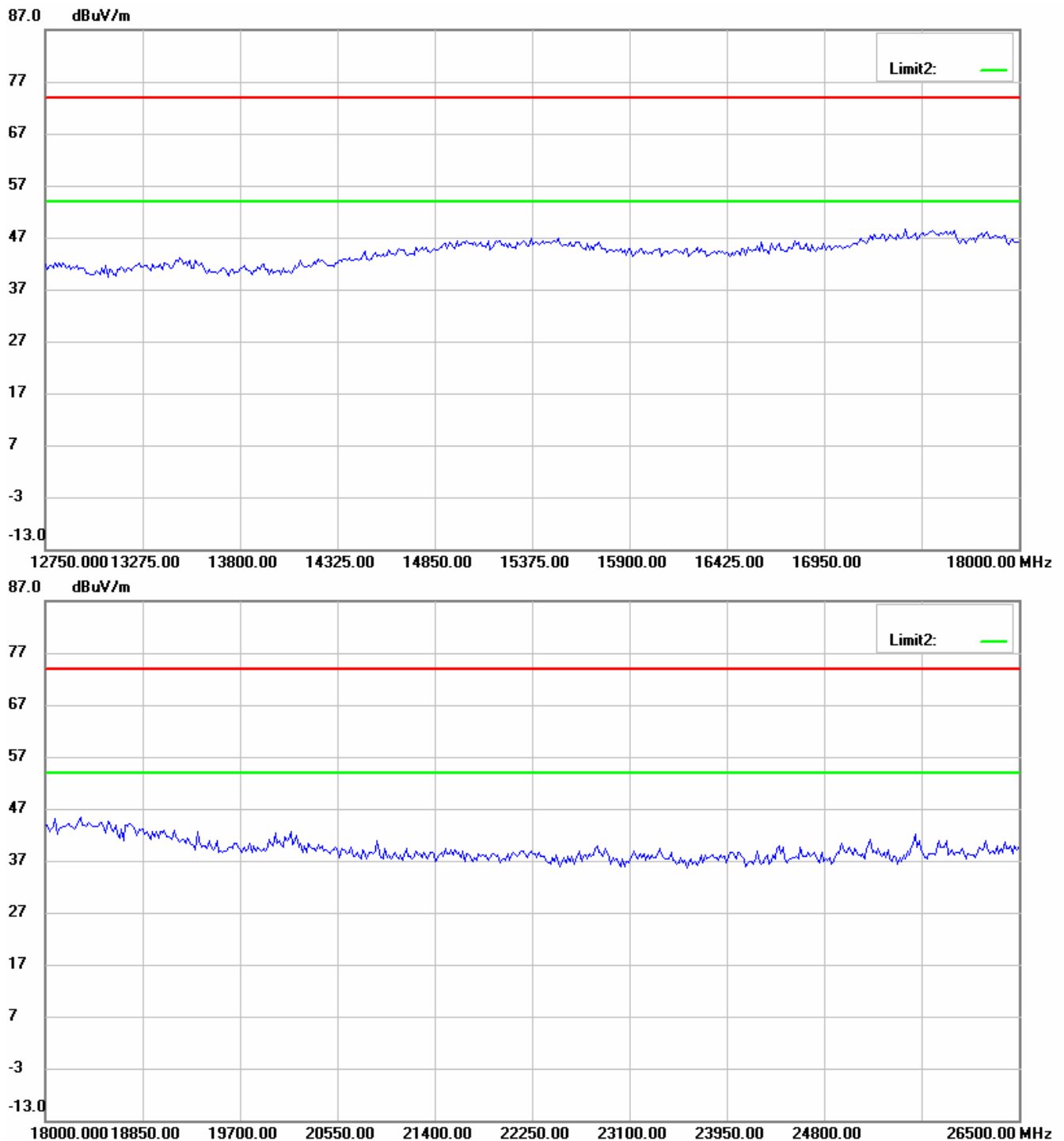




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Taiwan ETS Product Service Co., Ltd.

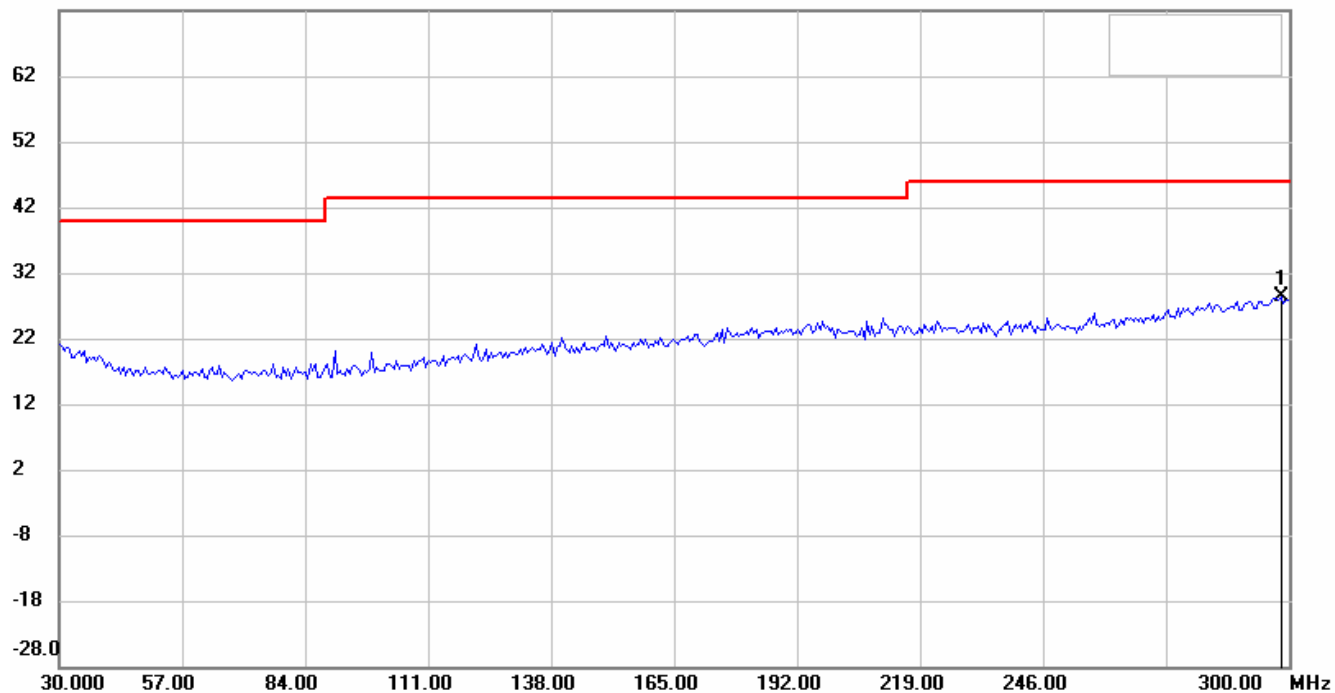
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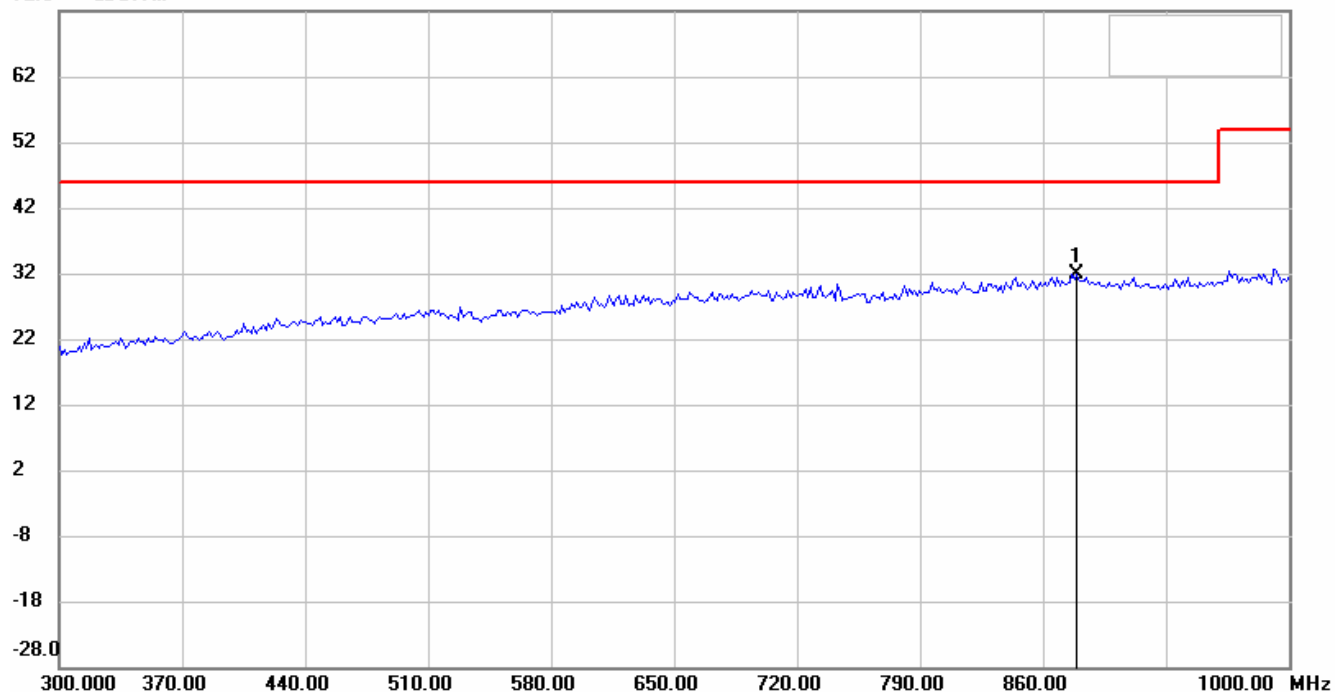
High Channel

Antenna Polarization H

72.0 dBuV/m



72.0 dBuV/m

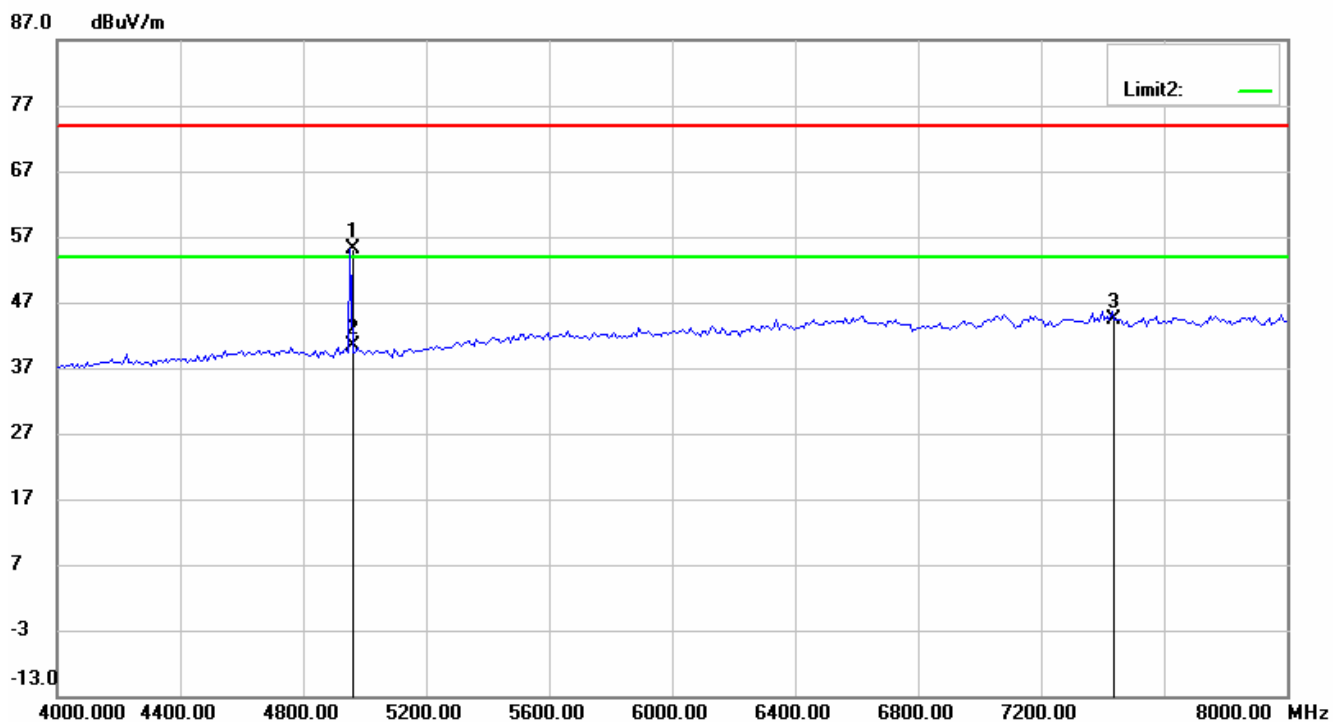
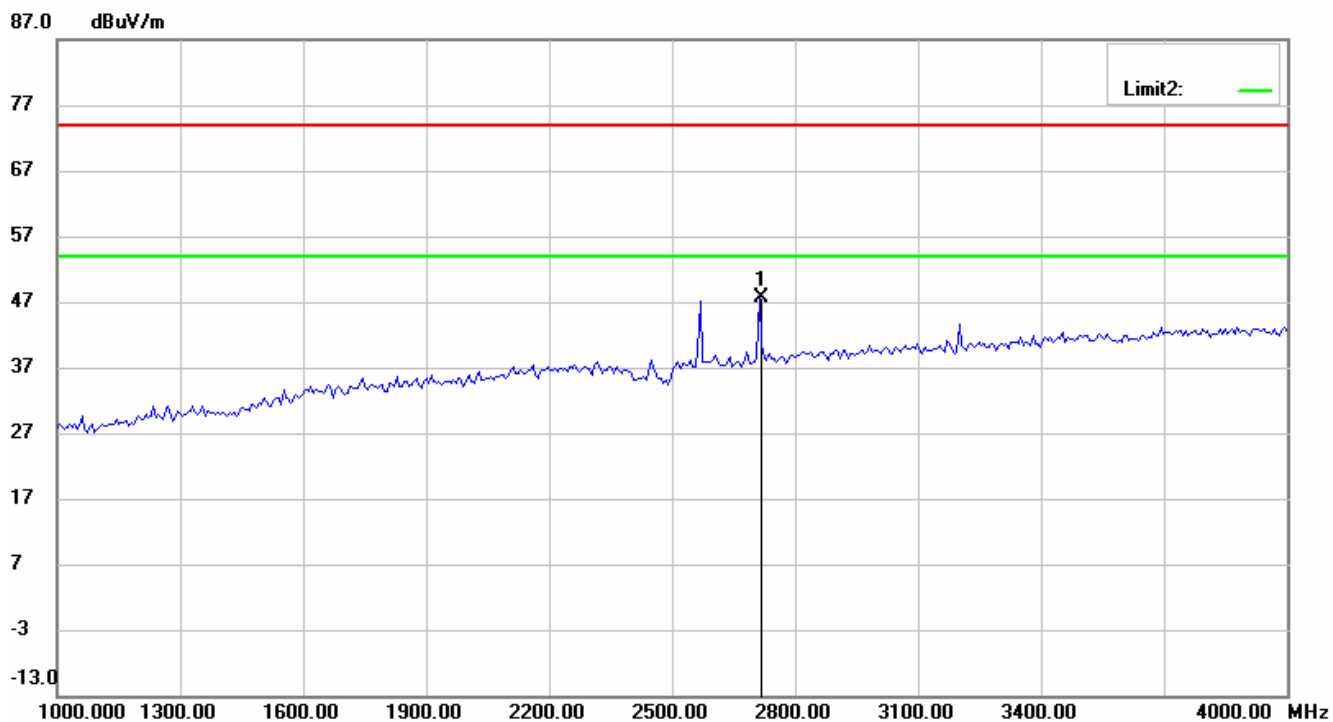




Taiwan ETS Product Service Co., Ltd.

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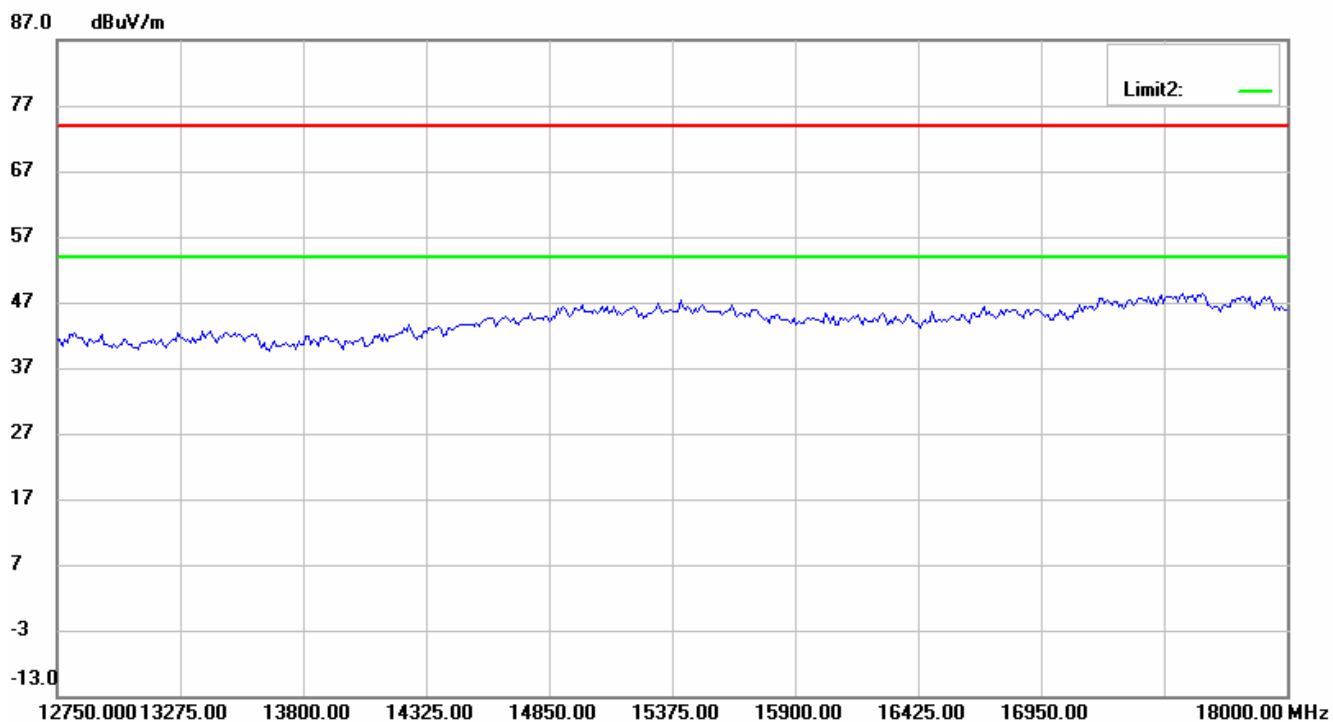
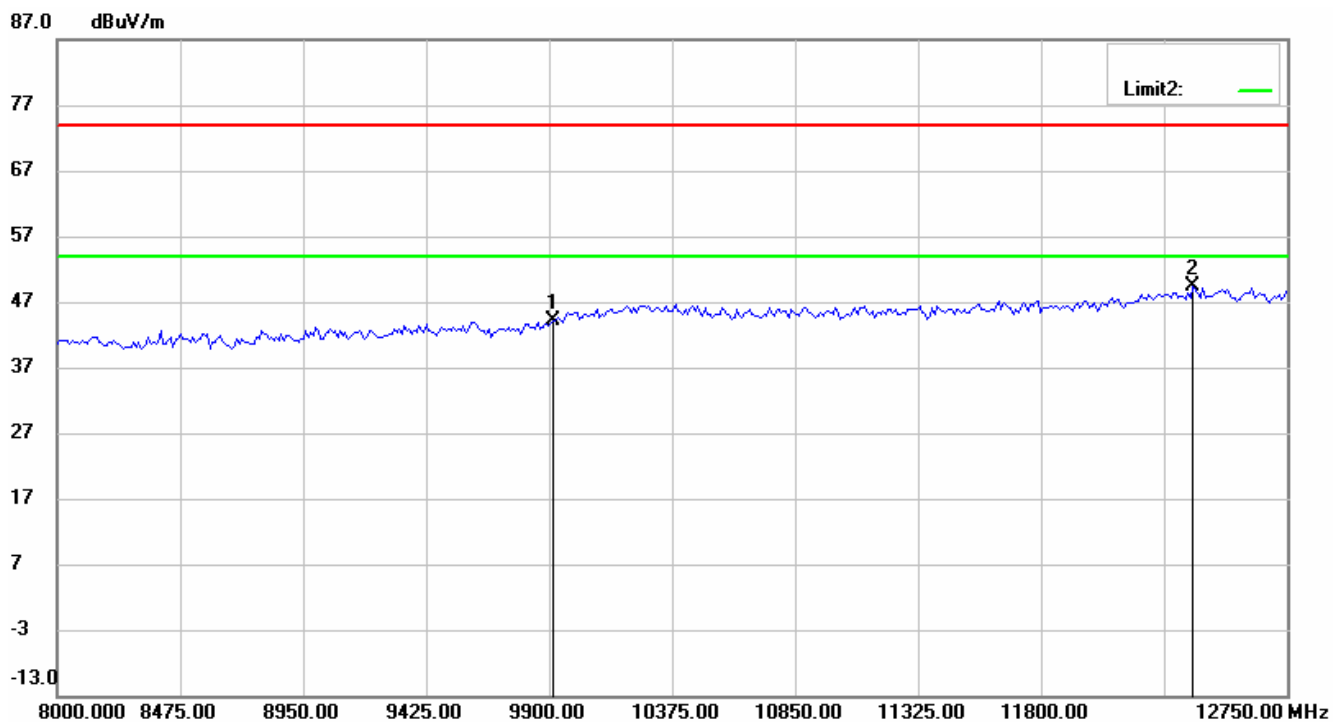




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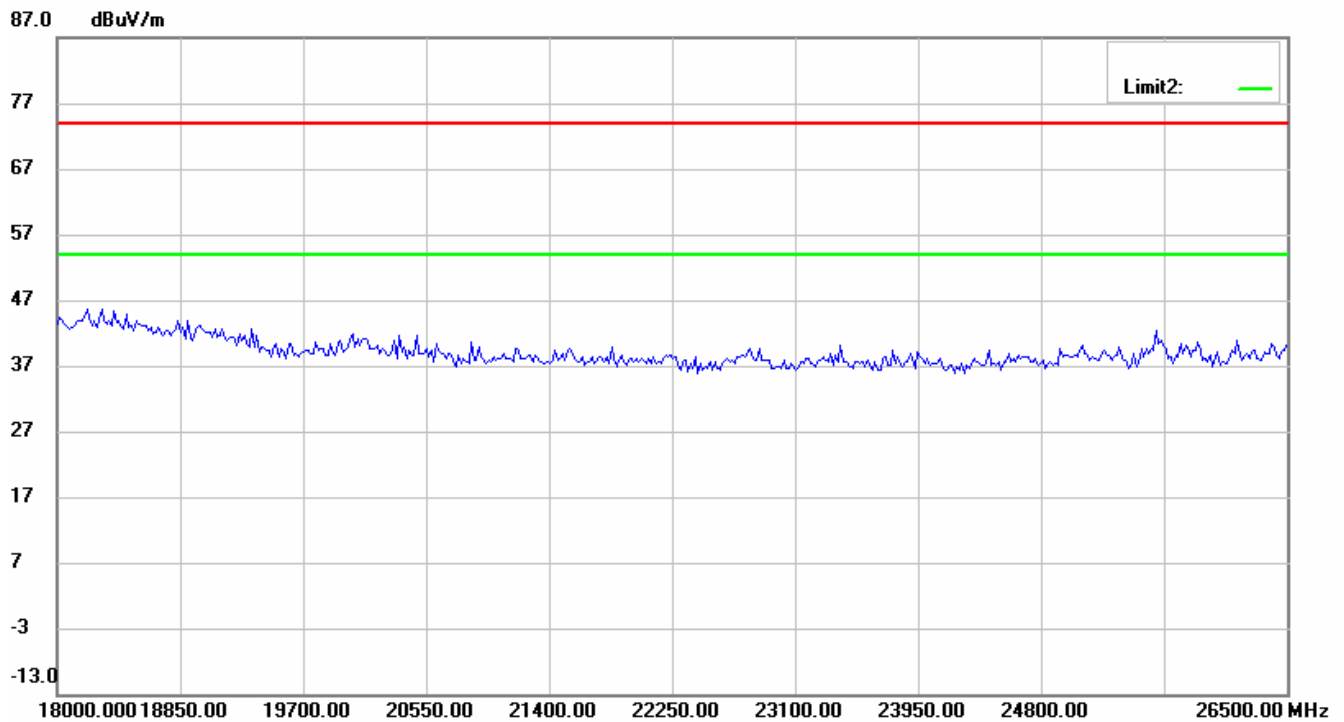




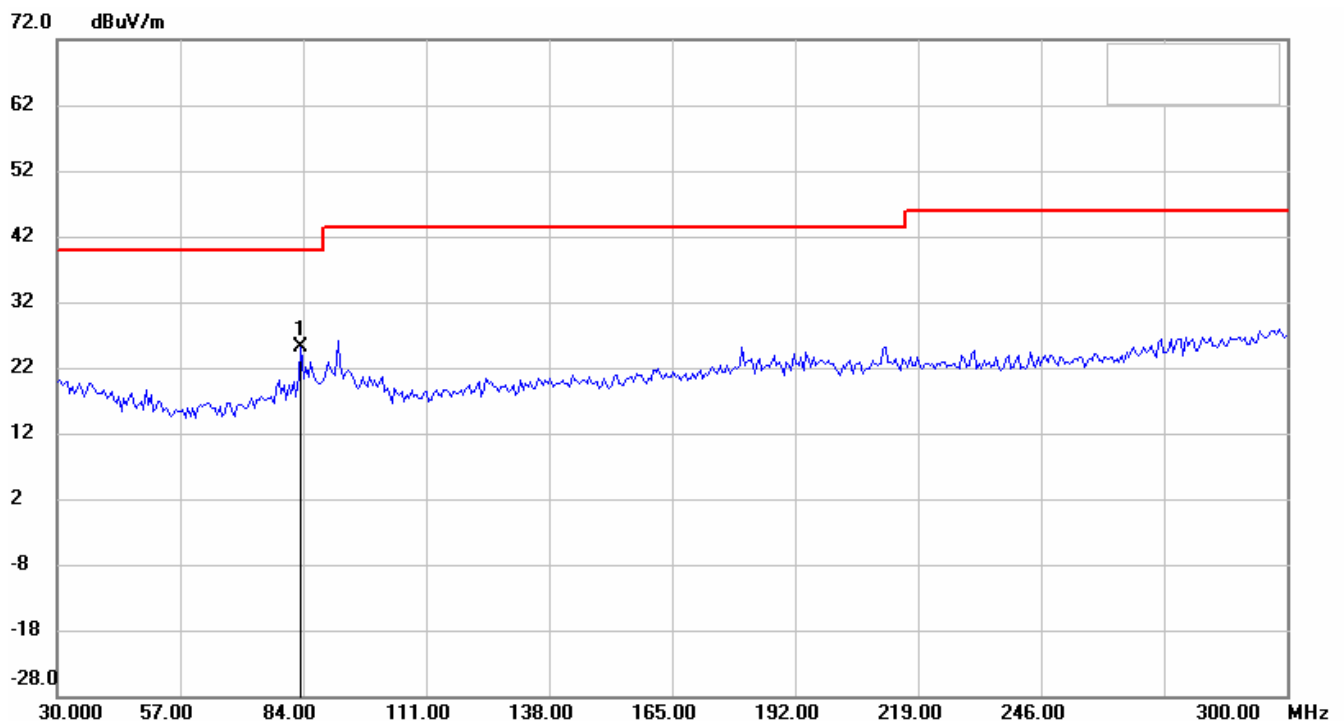
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Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521



Antenna Polarization V

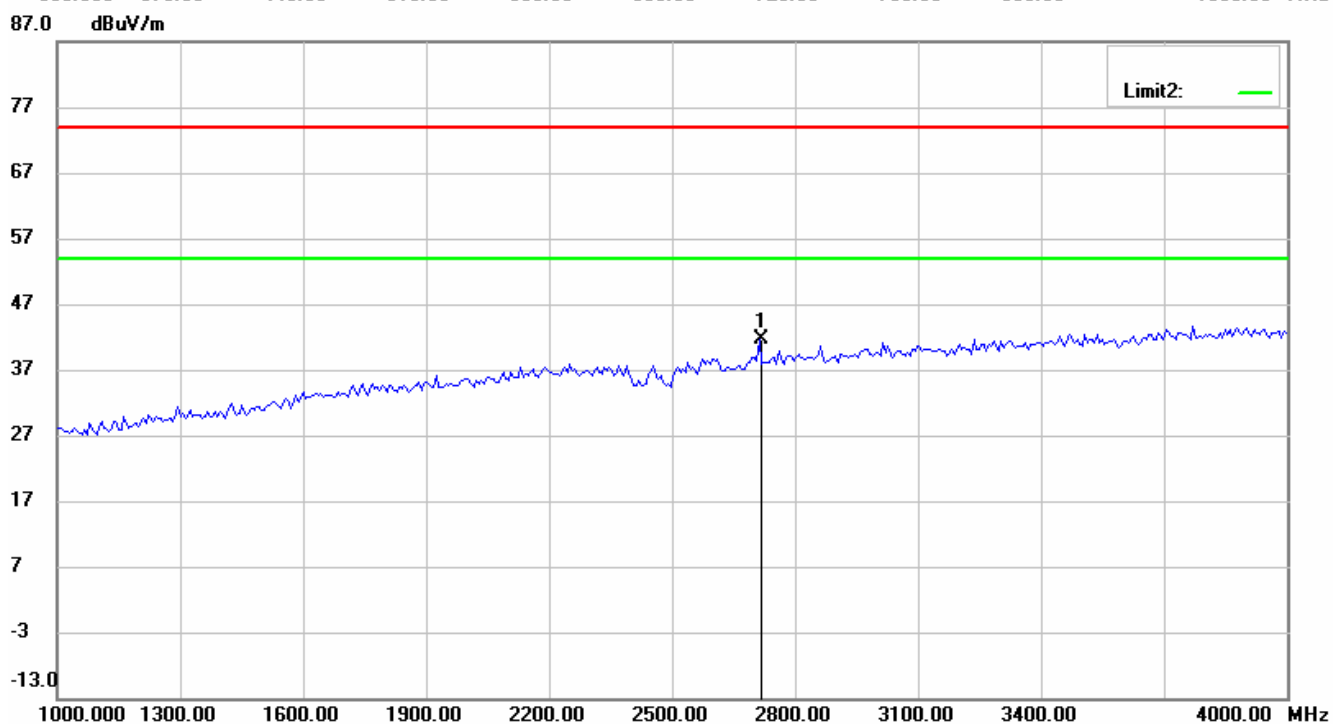
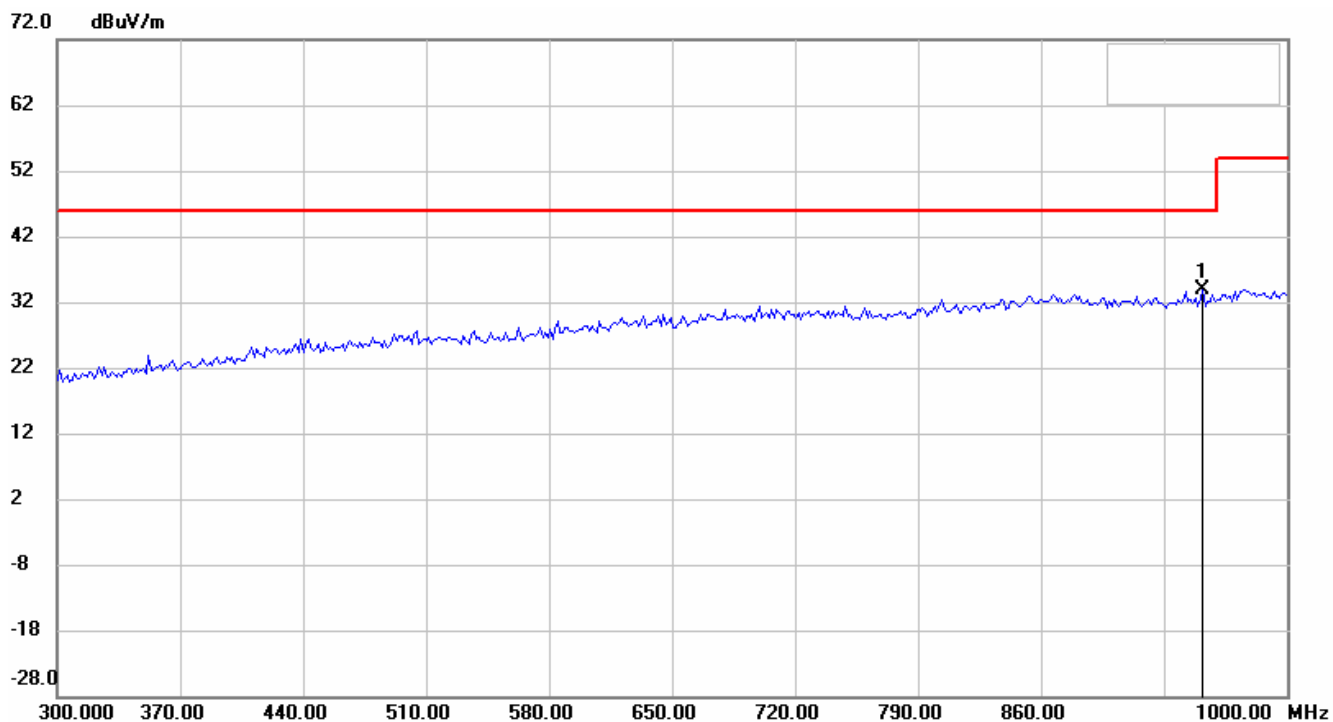




Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521

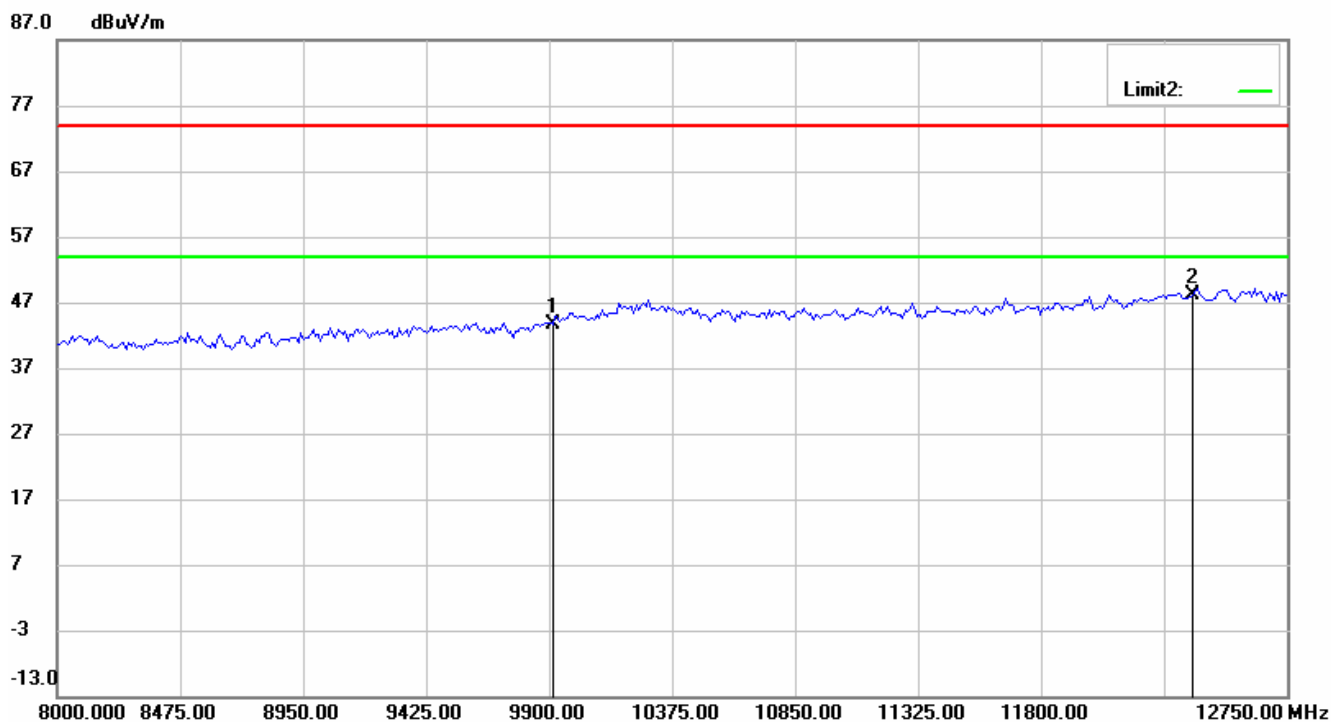
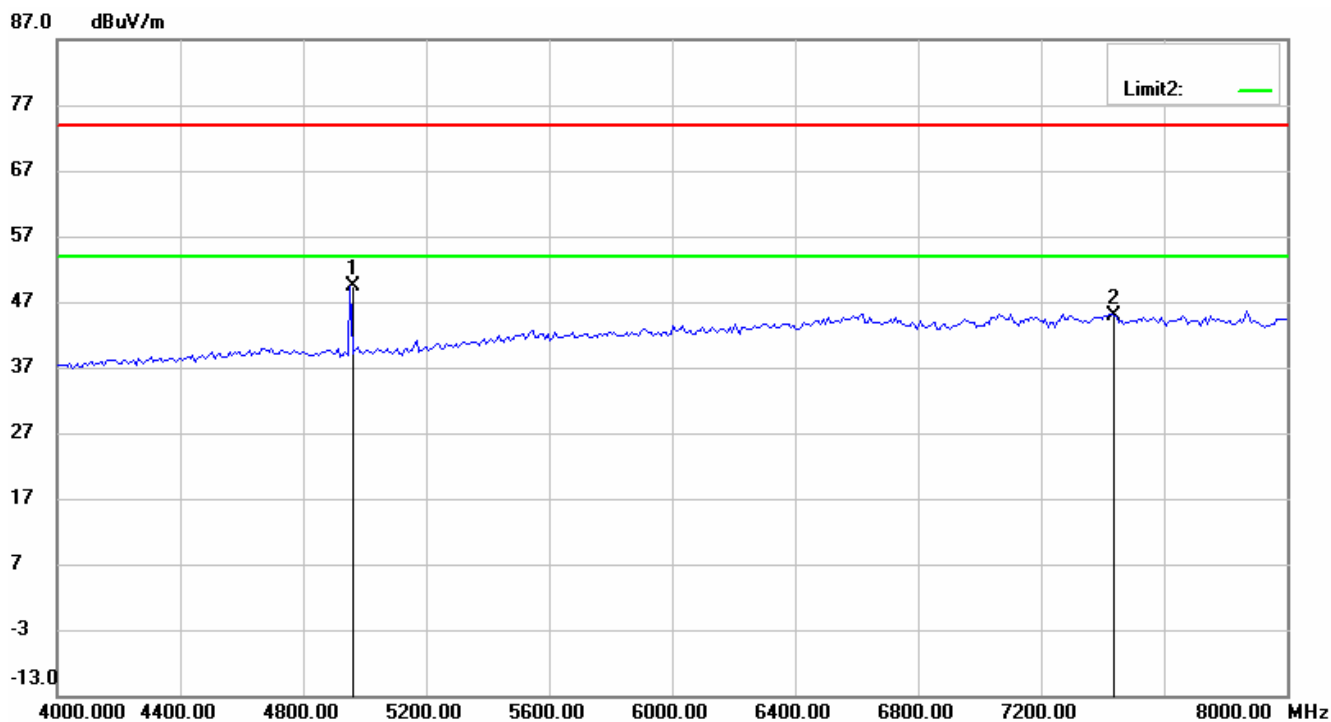




Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521

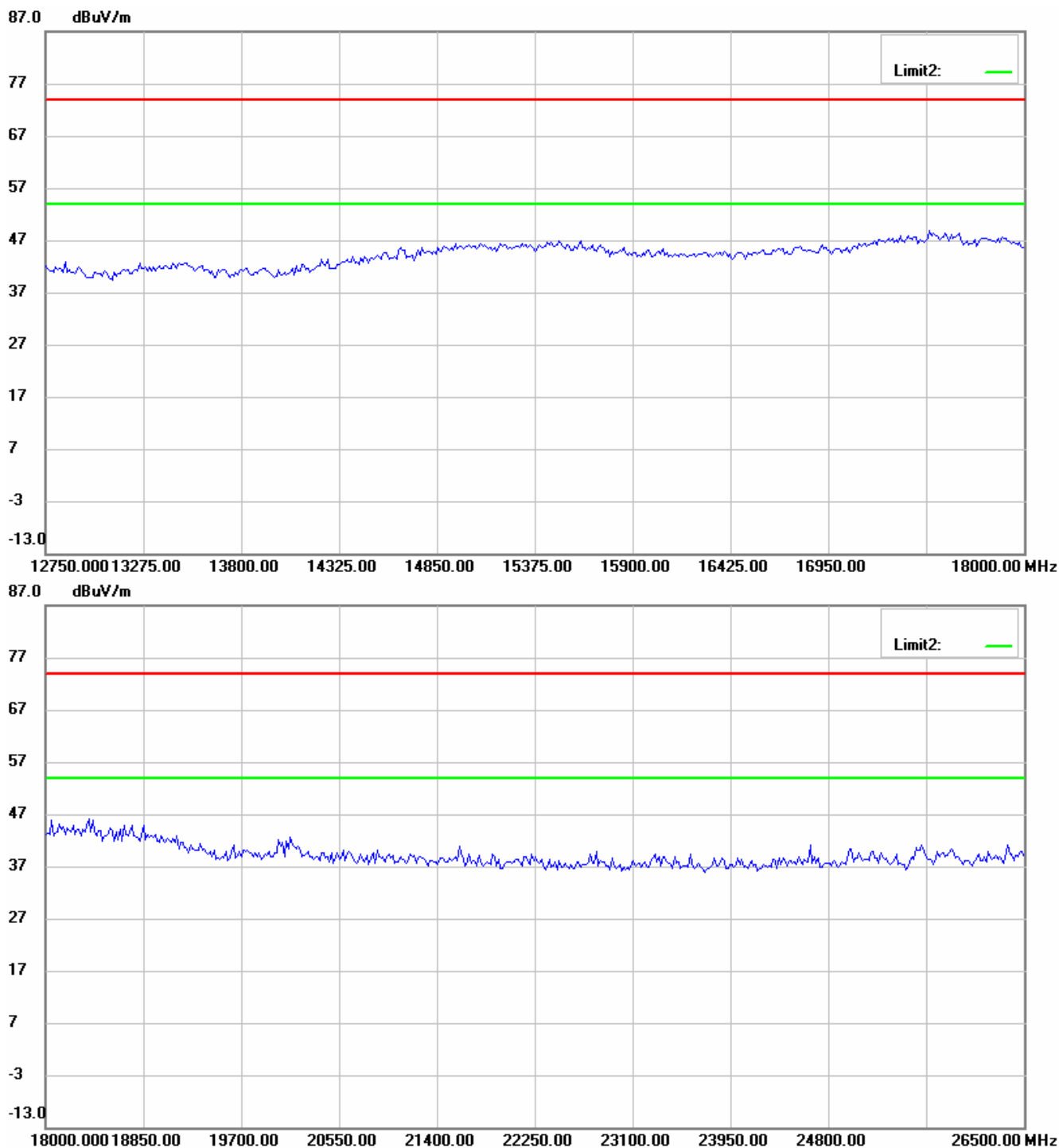




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FCC ID: OR7GM521



Up Line: Peak Limit Line

Down Line: Ave Limit Line

Note:

1. The plots are pre-scanned data for determining the tested points and for reference only.
2. The exact test result is shown in the data table of Spurious emission (tx) test of this test report.



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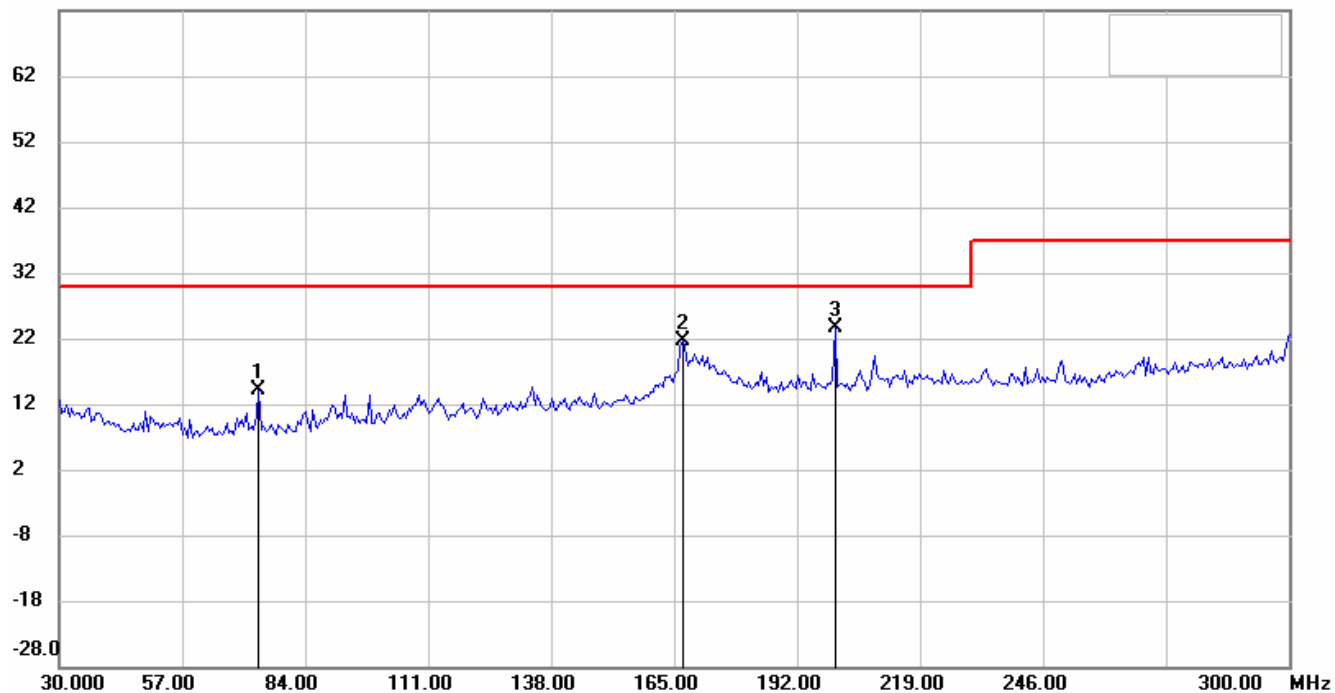
Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521

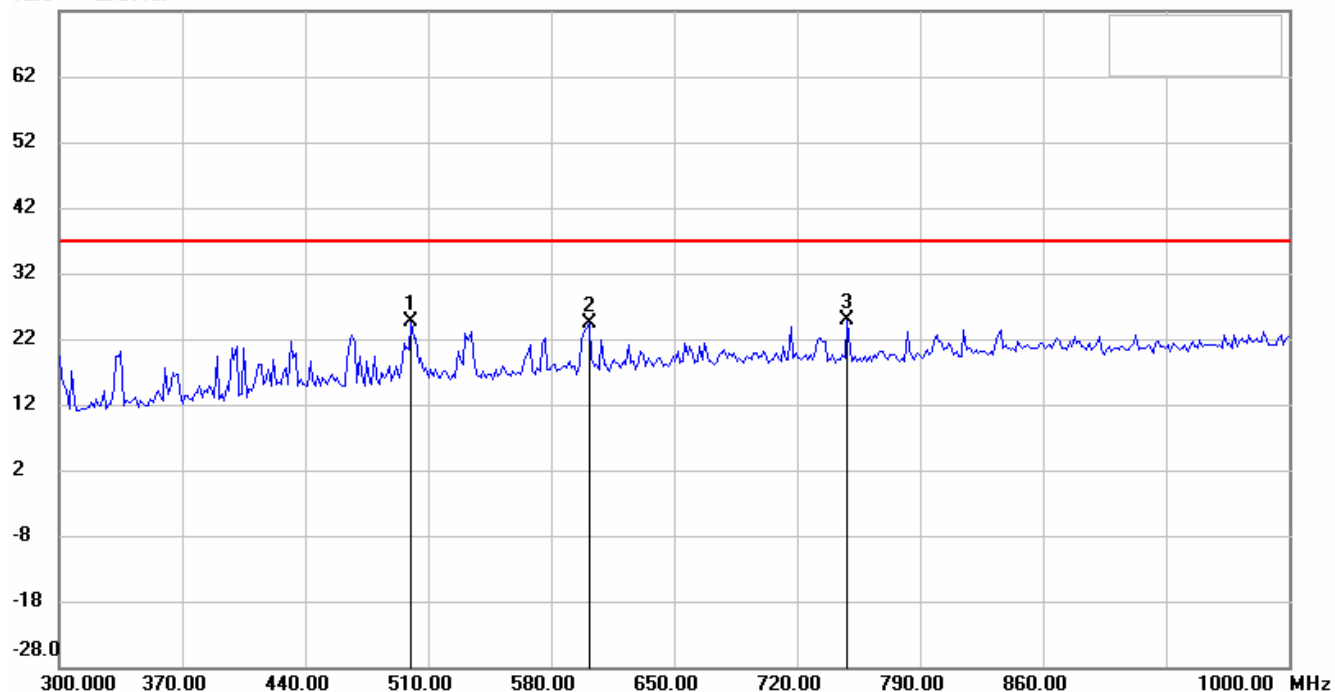
Radiated Emissions from Digital Part

Antenna Polarization H

72.0 dBuV/m



72.0 dBuV/m

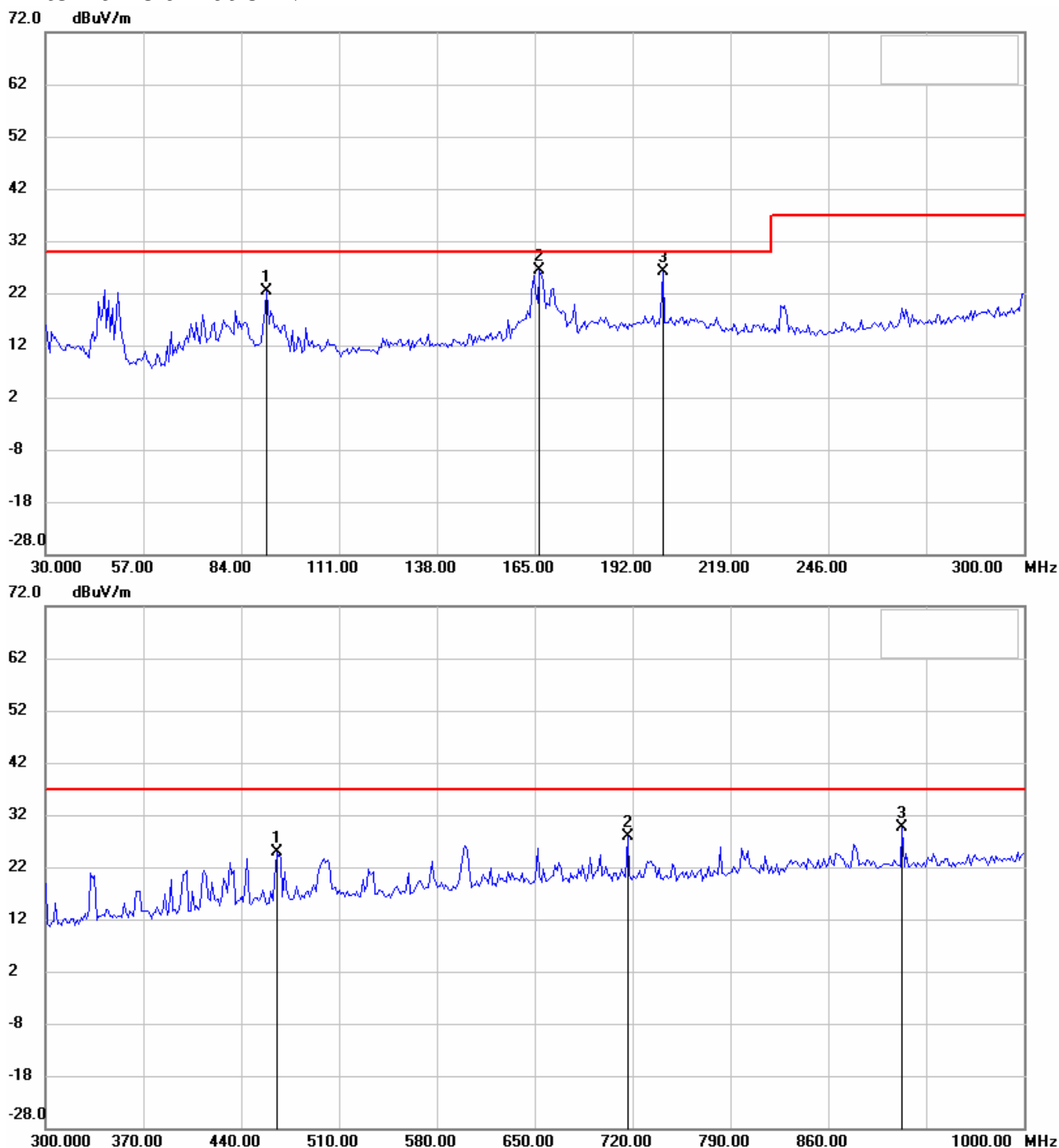




Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521

Antenna Polarization V



Note:

1. The plots are pre-scanned data for determining the tested points and for reference only.
2. The exact test result is shown in the data table of Radiated Emissions from Digital Part test of this test report.



Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15

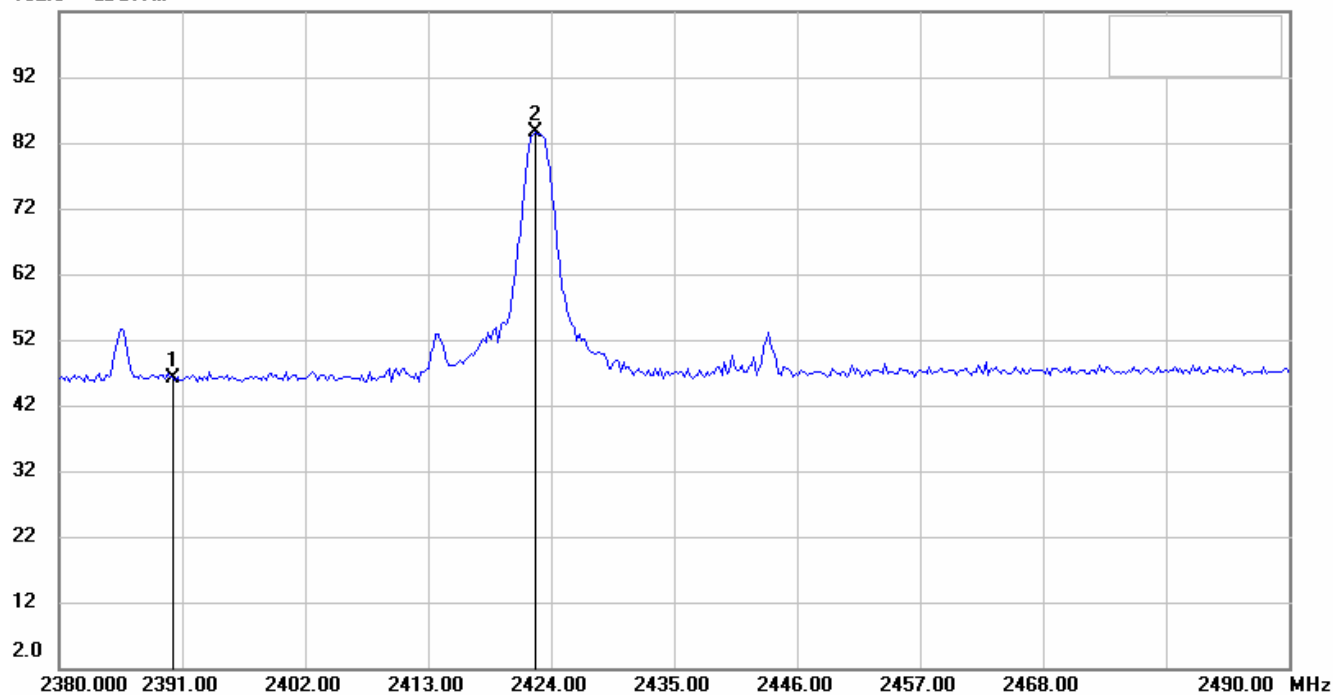
FCC ID: OR7GM521

Radiated Emission on the band edge

Low Channel

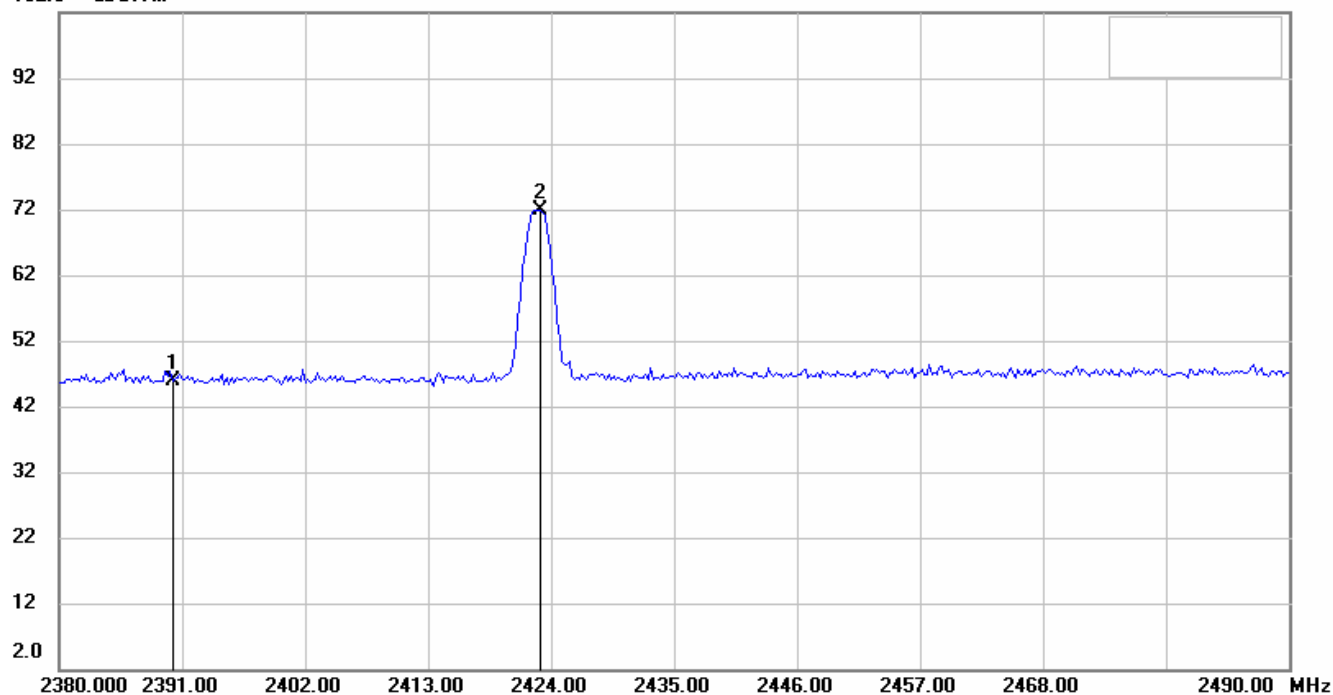
Antenna Polarization H

102.0 dBuV/m



Antenna Polarization V

102.0 dBuV/m



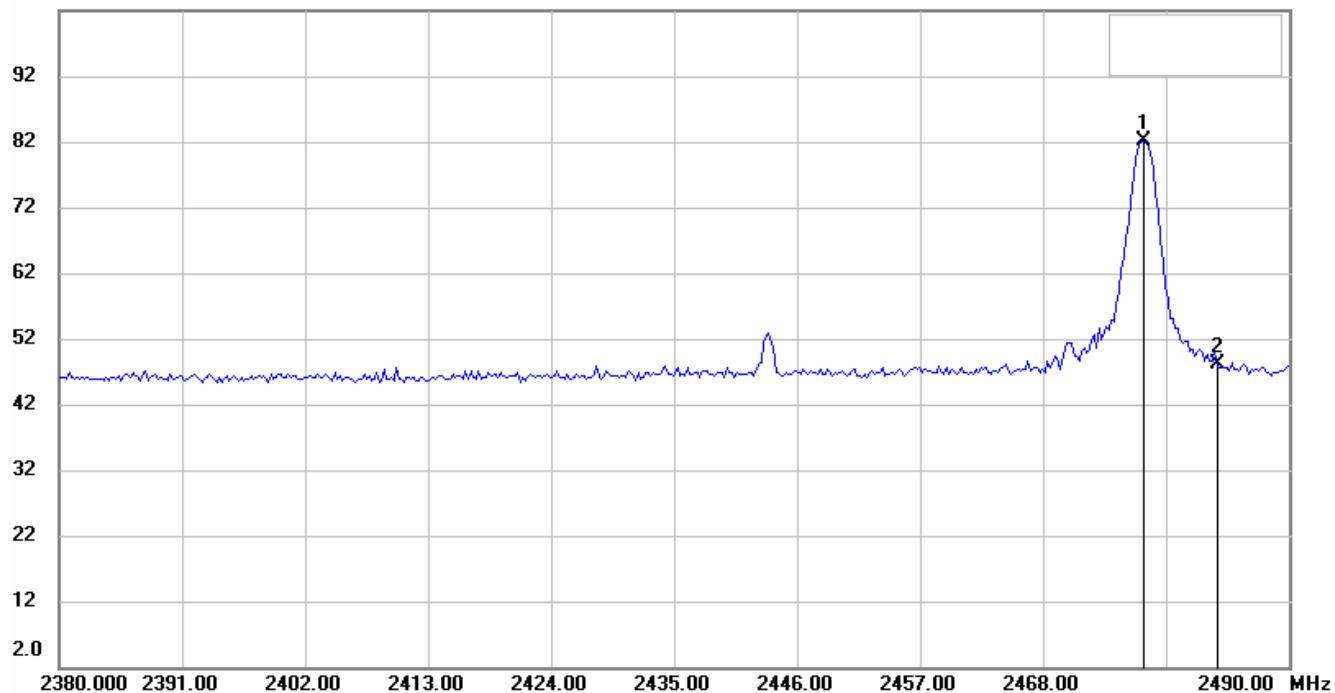


Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20801-8832-P-15
FCC ID: OR7GM521

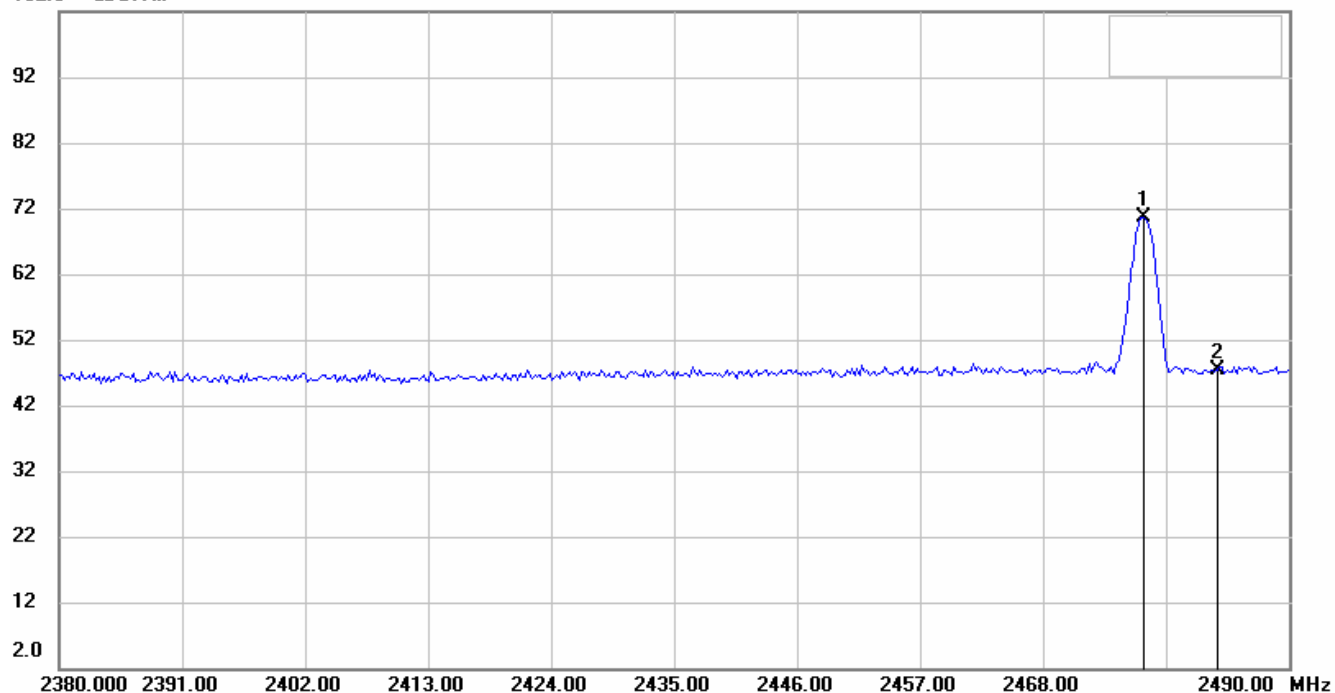
High Channel Antenna Polarization H

102.0 dBuV/m



Antenna Polarization V

102.0 dBuV/m





Taiwan ETS Product Service Co., Ltd.

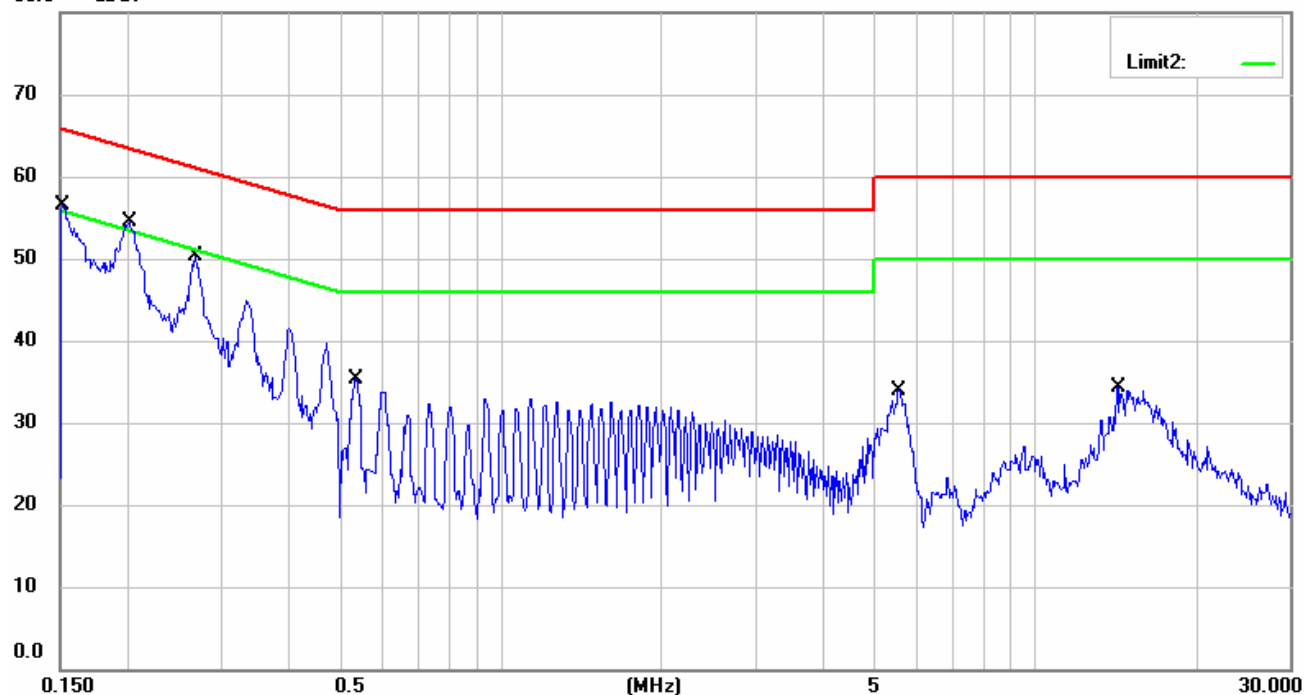
Registration number: W6M20801-8832-P-15

FCC ID: OR7GM521

Power Line Conducted Emission

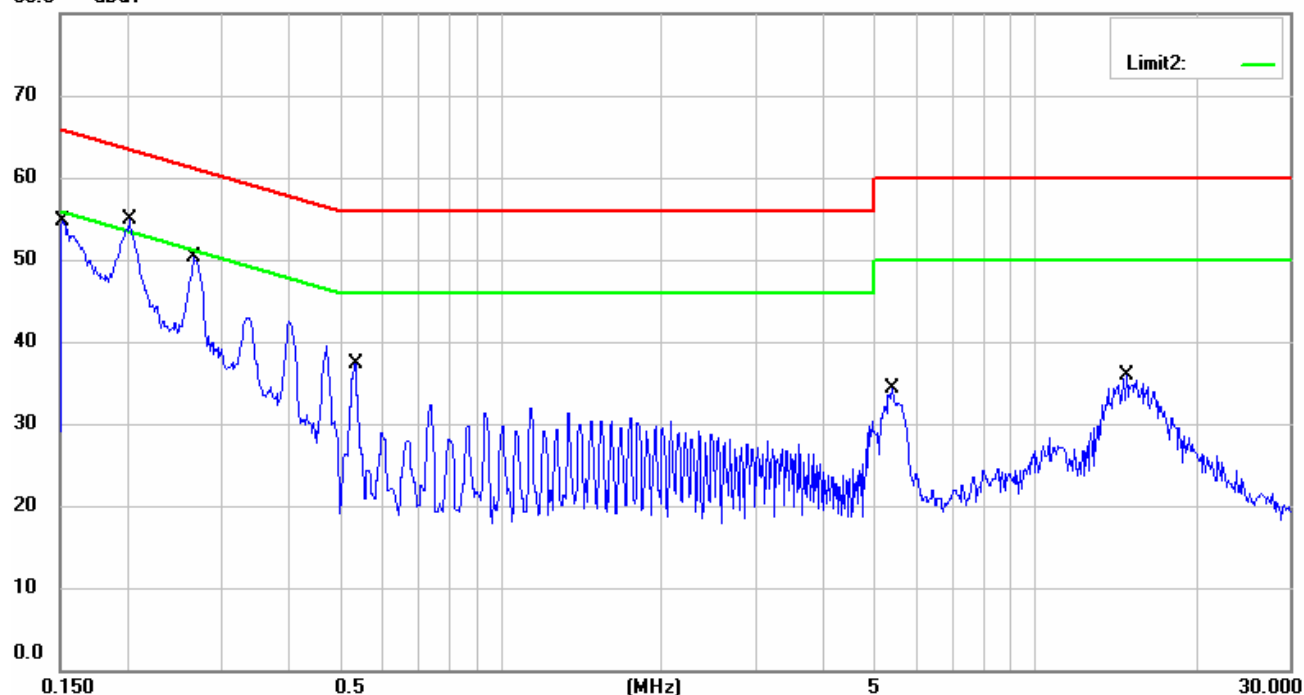
LISN N

80.0 dBuV



LISN L1

80.0 dBuV



Up Line: QP Limit Line

Down Line: Ave Limit Line

Note:

1. The plots are pre-scanned data for determining the tested points and for reference only.
2. The exact test result is shown in the data table of Power Line Conducted Emission test of this test report.