

**FCC PART 15 SUBPART C TEST REPORT**  
**for**  
**Tire Pressure Monitoring System (TPMS)**  
**Model No.: AVE-T100**  
**FCC ID: VMUAVE-TPMS-T100**

of

**Applicant: Advanced Vehicle Electronic Technology Co., Ltd.**  
**Address: B-2, 23F-2, No.29, Haibian Road, Lingya District, Kaohsiung**  
**802, 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.: W6M20708-8446-C-1**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.  
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# **Taiwan ETS Product Service Co., Ltd.**

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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 Taiwan ETS Product Service Co., Ltd.

### **Tester:**

January 17, 2008

Jay Chaing

Date

ETS-Lab.

Name

Signature

### **Technical responsibility for area of testing:**

January 17, 2008

Steven Chuang

Date

ETS

Name

Signature



# **Taiwan ETS Product Service Co., Ltd.**

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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**

Town: ./.

Country: ./.

Telephone: ./.

Fax: ./.

## **1.3 Details of approval holder**

Name: Advanced Vehicle Electronic Technology Co., Ltd.

Street: B-2, 23F-2, No.29, Haibian Road,

Town: Lingya District, Kaohsiung 802,

Country: Taiwan

Telephone: 07-3310885

Fax: 07-3311351



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## **1.4 Application details**

Date of receipt of test item: August 22, 2007  
Date of test: from August 22, 2007 to January 17, 2008

## **1.5 Test item**

Description of test item: Tire Pressure Monitoring System (TPMS)

Type identification: AVE-T100

Brand name: AVE

Multi-listing model number: ./.

Transmitting frequency: 433.92 MHz

Operation mode: simplex

Voltage supply: Battery 3.6V

(The device is tested under fresh battery condition.)

Highest clock frequency: 433.92 MHz

Antenna type: PCB antenna

Photos: see Annex

### **Manufacturer (if applicable)**

Name: Heng Shan Electronics Co.,Ltd  
Street: No.115 Cueihua rd., Gushan district,  
Town: Kaohsiung city 80456  
Country: Taiwan R.O.C.

Additional information: ./.



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## **1.6 Test standards**

Technical standard : FCC RULES PART 15 SUBPART C § 15.231 (e) (2007-9)

## **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:	Battery 3.6V

Note: This test report contains only transmitter part. The test result and relevant diagrams of receiver part are listed in the test report number W6M20708-8446-P-15B.

### **2.3 Test Mode**

This EUT is the portable device. So the EUT was tested on three different axes. Please see assessment test results as section 3 of this test report.



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## 2.4 Test equipment utilized

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



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ETSTW-RE 047	ESA-E SERIES SPECTRUM ANALYZER	E4445A	MY46181369	Agilent	2007/7/19	2008/7/18
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





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## **2.5 General Test Procedure**

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 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 C63.4-2003 6.4 using a spectrum analyzer. The bandwidth of the spectrum analyzer was 100 kHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was the 100 kHz and the video bandwidth was 300 kHz.

**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 dBμV) 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 dBμV + 10.36 dB/m + 6 dB = 36.36 dBμV/m @3m

**ANSI STANDARD C63.4-2003 6.2.1 MEASUREMENT PROCEDURES:** The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table). The UUT was placed in the center of the table. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to 10<sup>th</sup> 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. 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)**

☐ 1st test

☒ test after modification

☐ production test

TEST CASE	Para. Number	Required	Test passed	Test failed
Transmission Requirements	FCC 15.231(e)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emission	FCC 15.231(e)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Bandwidth of Emission	FCC 15.231(c)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Frequency Tolerance	FCC 15.231(d)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Period Alternate Field Strength Requirements	FCC 15.231(e)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Antenna Requirement	FCC 15.203	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conducted Measurement at (AC) Power Line	FCC 15.207	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The follows is intended to leave blank.



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### **3.1 Transmission Requirements**

FCC 15.231(e)

#### **3.1.1 Limit of Transmission Time**

Devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

#### **3.1.2 Results for the duration and silent period measurement**

☐ This manually operated transmitter employs software to control the duration of each transmission and silent period between transmissions. The real measured result for the duration of each transmission is \_\_\_\_\_ ms, and the result for silent period between transmissions is \_\_\_\_\_ second.

☒ This transmitter is operated by automatic activation, and the duration of each transmission and silent period between transmissions will be controlled by software. The real measured result for the duration of each transmission is 320.512821ms, and the result for silent period between transmissions is 10.985577 second.

Explanation: See attached diagrams in appendix.

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



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## **3.2 Output Power (Field Strength)**

Model: AVE-T100

Date: 2008/1/7

Mode: TX mode

Temperature: 26 °C

Engineer: Michael

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)
433.932	25.99	---	18.54	44.53	---	92.87	72.87	-28.34	230	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)
433.937	17.50	---	18.54	36.04	---	92.87	72.87	-36.83	208	330

Limit 15.231(e)

Fundamental Frequency (MHz)	Field strength of fundamental, limit $\mu\text{V/m}$
40.66 – 40.70	1000
70 – 130	500
130 – 174	500 to 1000**
174 – 260	1500
260 – 470	1500 to 5000** (433.92 MHz: 72.87 dB $\mu\text{V/m}$ = 4398.68 $\mu\text{V/m}$ )
Above 470	5000

\*\* linear interpolation

Explanation: See attached diagrams in appendix.

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



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## **3.3 Out of Band Radiated Emissions**

FCC Rule: 15.231(e) , 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.

Guidance on Measurement of pulsed emission: 15.35(c)

“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.”

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

Limits:

For frequencies (Average measurements)

Correction factor conform 15.35 (c) (Average measurements)

Duty cycle correction :

Max. Peak reading – duty cycle correction

Max permitted average Limits = Max permitted Fundamental limit – 20 dB

For example for 433.92 fundamental carrier:

Max permitted average Limit:  $72.87 \text{ dB}\mu\text{V/m} - 20 \text{ dB} = 52.87 \text{ dB}\mu\text{V/m}$

For frequencies above 1GHz (Peak measurements).

Modified Limits for peak conform 15.35 (b) = Max Permitted average Limits + 20dB (because Peak detector is used)

Explanation: See attached diagrams.

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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## **3.4 Transmitter Radiated Emissions in restricted Bands**

FCC Rules: 15.231 (b), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 8000 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 pulsed emission:

“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.

For frequencies above 1GHz (Average measurements).

The correction factor, based on the channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

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

No duty cycle correction was added to the reading

Modified Limits for peak conform 15.35 (b) = Max Permitted average Limits + 20dB (because Peak detector is used)

Above 960 MHz

For mode DSSS CW:  $54 \text{ dB}\mu\text{V/m} + 20 \text{ dB} = 74 \text{ dB}\mu\text{V/m}$

Explanation: See attached diagrams.



## 3.5 Spurious Emission radiated, Transmitter

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

The limits on the field strength of the spurious emission in the table § 15.231(e) are based on the fundamental frequency of the intentional radiator. Spurious emission shall be attenuated to the average (or alternatively, CISPR quasi-peak) limits shown in this table or to the general limits shown in § 15.209, whichever limit permits a higher field strength.

In addition, radiated emission 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.

Summary table with radiated data of the test plots

Model: AVE-T100 Date: 2008/1/7  
Mode: TX mode Temperature: 26 °C Engineer: Michael  
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)
868.136	24.04	peak	25.70	49.74	72.87	-23.13	229	150

Polarization: Horizontal

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.			
1300.601	53.04	---	-12.30	40.74	---	74.00	54.00	-13.26	210	150
1735.680	44.29	---	-8.82	35.47	---	74.00	54.00	-18.53	205	150
2169.600	42.32	---	-6.17	36.15	---	74.00	54.00	-17.85	182	150
2603.520	42.46	---	-4.39	38.07	---	74.00	54.00	-15.93	211	150
3037.440	41.96	---	-2.53	39.43	---	74.00	54.00	-14.57	232	150
3471.360	41.80	---	-0.76	41.04	---	74.00	54.00	-12.96	220	150
3905.280	41.59	---	0.92	42.51	---	74.00	54.00	-11.49	241	150



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Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
868.136	17.96	peak	25.70	43.66	72.87	-29.21	202	330

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.			
1300.601	43.94	---	-12.30	31.64	---	74.00	54.00	-22.36	230	150
1735.680	42.62	---	-8.82	33.80	---	74.00	54.00	-20.20	211	150
2169.600	42.50	---	-6.17	36.33	---	74.00	54.00	-17.67	225	150
2603.520	42.70	---	-4.39	38.31	---	74.00	54.00	-15.69	233	150
3037.440	42.09	---	-2.53	39.56	---	74.00	54.00	-14.44	195	150
3471.360	41.61	---	-0.76	40.85	---	74.00	54.00	-13.15	208	150
3905.280	41.04	---	0.92	41.96	---	74.00	54.00	-12.04	219	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 attached diagrams.**

All other not noted test plots do not contain significant test results in relation to the limits  
Test results: The unit meet the FCC requirements.

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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## **3.6 Channel Bandwidth**

Measurement of Necessary Bandwidth (BN)

Used frequency	Bandwidth	Limit
433.92 MHz	242.788461538 kHz	1.0848 MHz

Explanation: The bandwidth fulfills the requirements of FCC § 15.231, see attached diagrams.

Limits:

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 028, ETSTW-RE 029  
ETSTW-RE 042 ETSTW-RE 043



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## **3.7 Antenna requirement**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

Explanation: This PCB antenna is integral antenna which passes antenna requirement.

The equipment meets the requirements	yes <input checked="" type="checkbox"/>	no <input type="checkbox"/>
--------------------------------------	--	--------------------------------



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## **3.8 Duty Cycle**

The correction factor, based on the channel dwell time in a 100ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the measured value.

Average Reading = Peak Reading (dBuV/m) + Duty Cycle Correction

Duty Cycle Correction =  $20 \log (\text{Cycle})$

In order to determine the Duty Cycle, the EUT is measured as:

Testing Mode	T period (ms)	T on (ms)	Duty Cycle	Duty Cycle Correction $20*\log(\text{Duty Cycle})$
Transmitting mode	--	--	--	--

Explanation: This test is not required because the EUT does not belong to phase modulation device.

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



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## **3.9 Conducted Measurement at (AC) Power Line**

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	
	quasi-peak (dB $\mu$ V/m)	average (dB $\mu$ V/m)
-- kHz	--	--

### **Limits:**

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Explanation: Test is not required because the sample is battery-used.

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



## **Taiwan ETS Product Service Co., Ltd.**

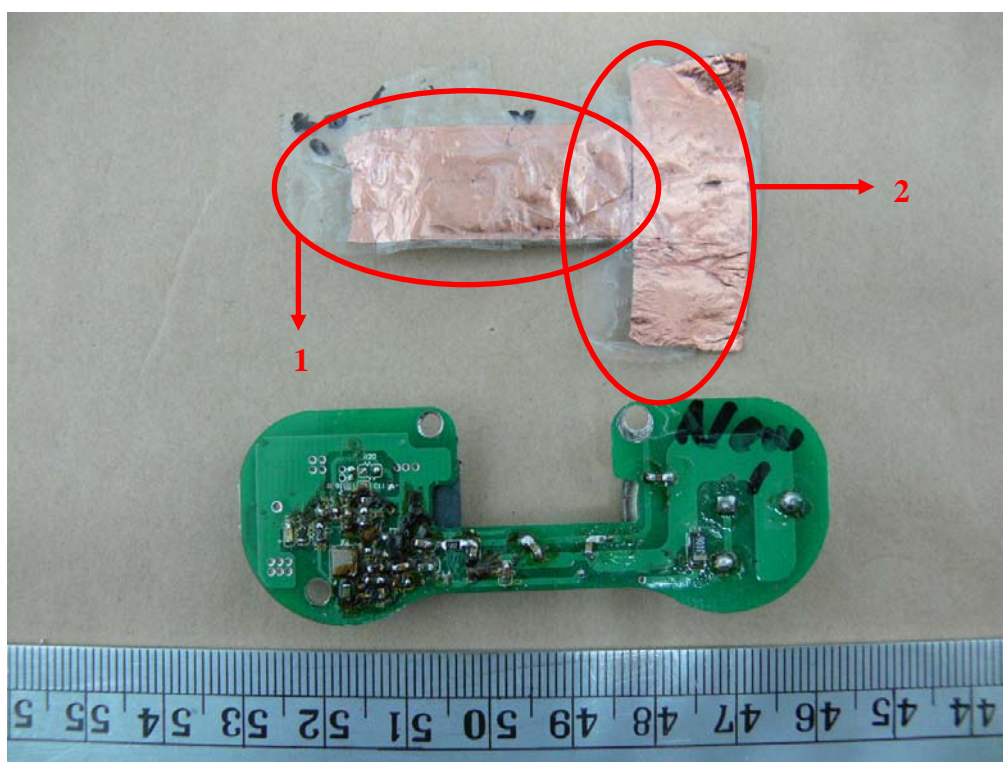
Registration number: W6M20708-8446-C-1  
FCC ID: VMUAVE-TPMS-T100

### **3.10 Equipment Modification**

The testing was passed only under the specific modification condition as below:

Item	Component	Quantity	Model No.	Specification	Manufacturer
1	Copper Foil	1	NA	15*38*0.5(mm)	DINYI PRINTING CO.,LTD
2	Copper Foil	1	NA	35*15*0.5(mm)	DINYI PRINTING CO.,LTD

The detail position information of the modified components is referred to below picture.



Any modification made previous to test by **Advanced Vehicle Electronic Technology Co., Ltd.** will be incorporated in each product sold in USA.

No modification was made by Taiwan ETS Product Service Co., Ltd.



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## **Appendix**

### **A Measurement diagrams**

1. Active Time
2. Output Power
3. Spurious Emissions radiated
4. Bandwidth

### **B Photos**

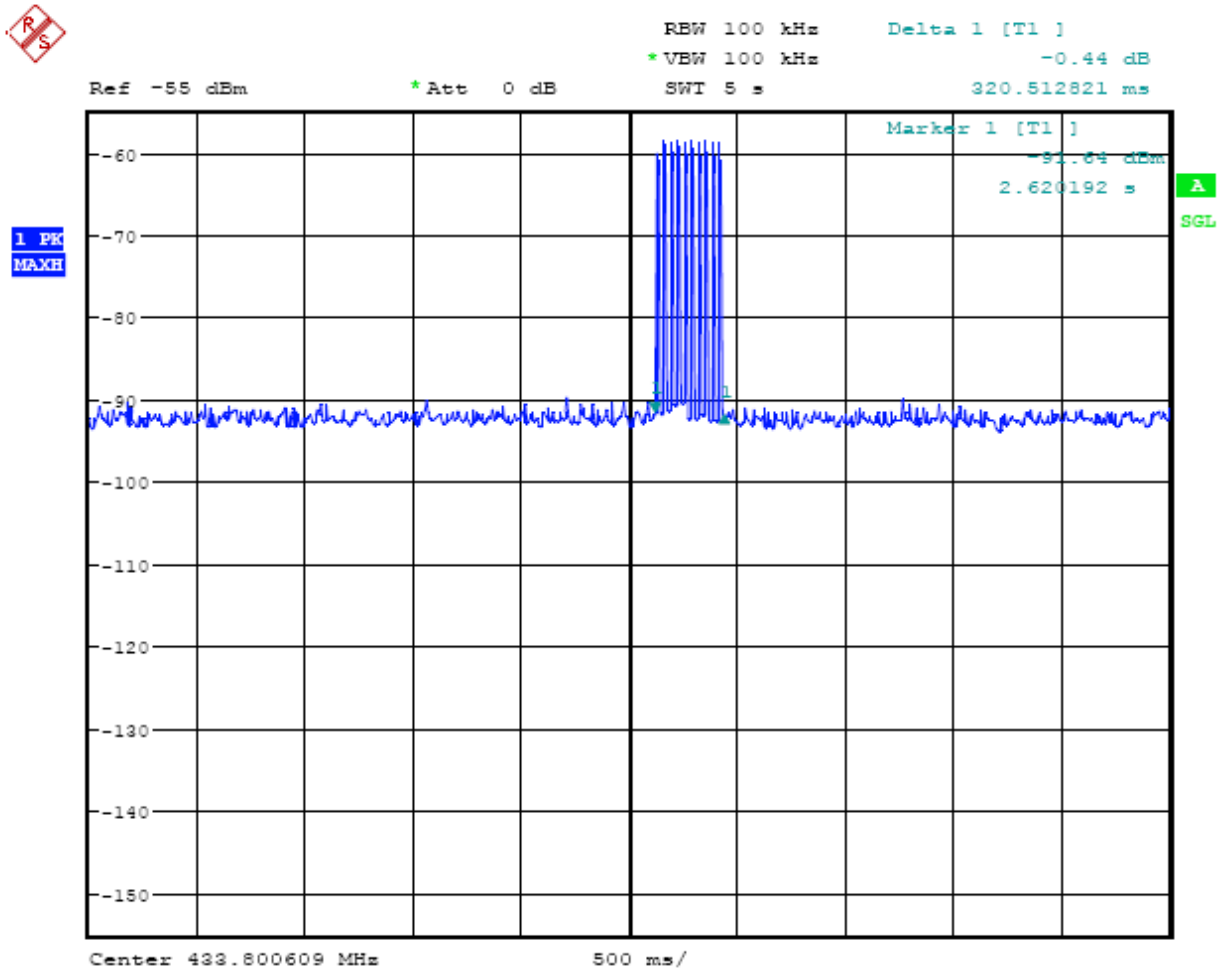
1. External Photos
2. Internal Photos
3. Set Up Photos



# Taiwan ETS Product Service Co., Ltd.

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## Active Time



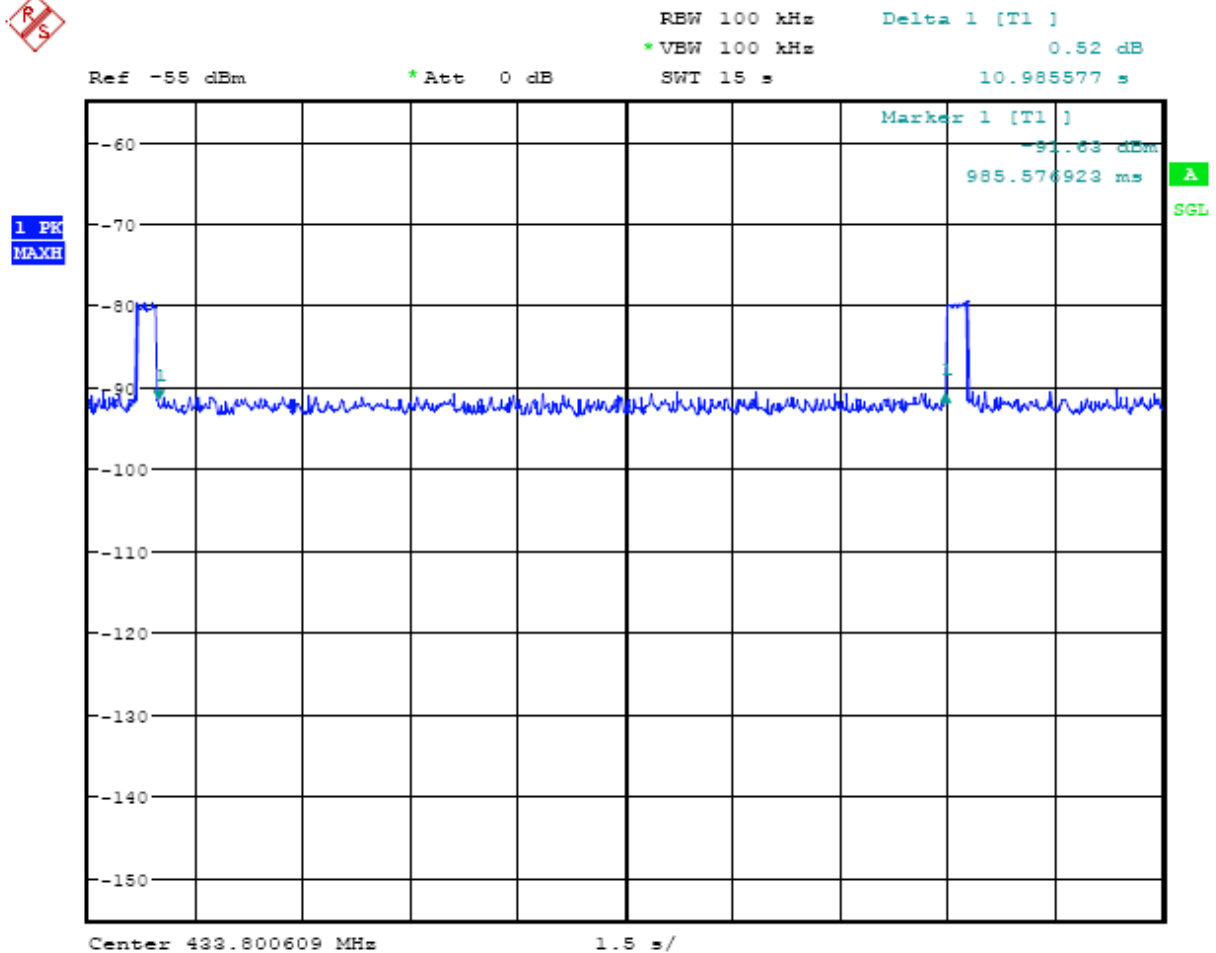
Duration Time

Date: 7.JAN.2008 12:31:03



# Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20708-8446-C-1  
FCC ID: VMUAVE-TPMS-T100



Duration Time

Date: 17.JAN.2008 12:51:04



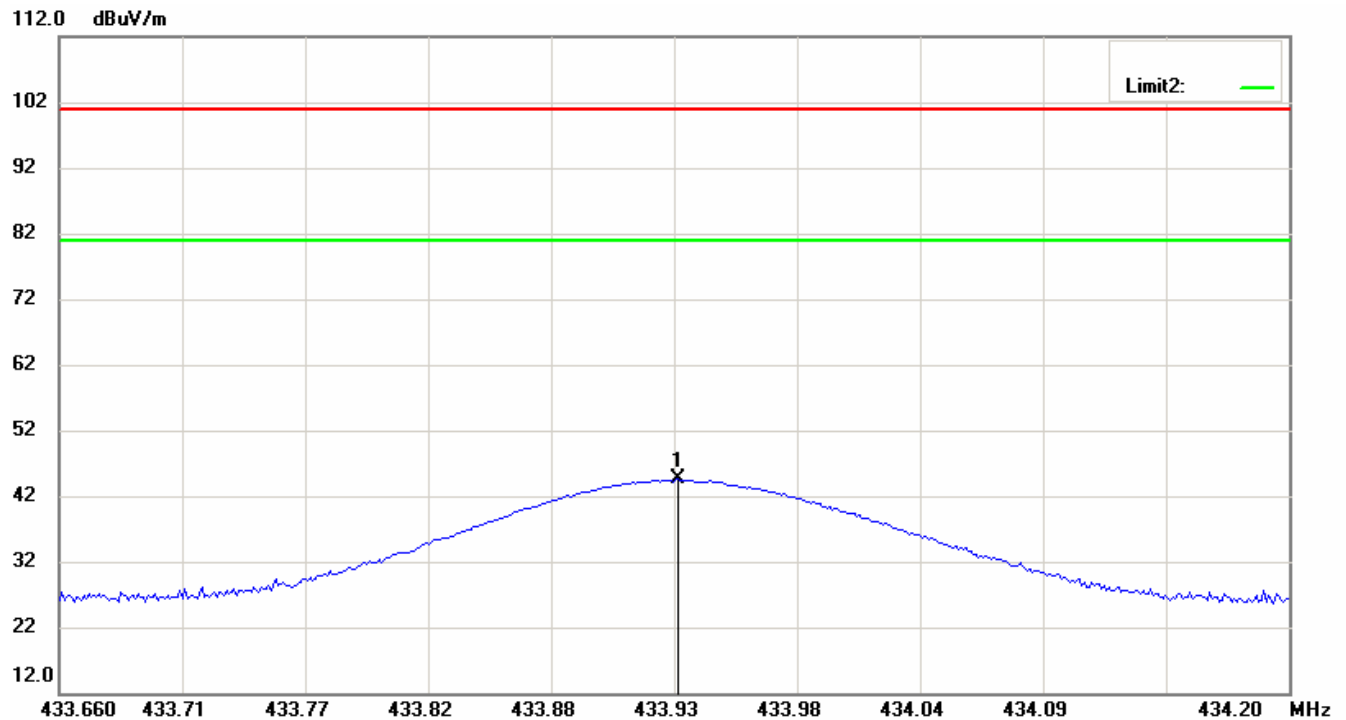


# **Taiwan ETS Product Service Co., Ltd.**

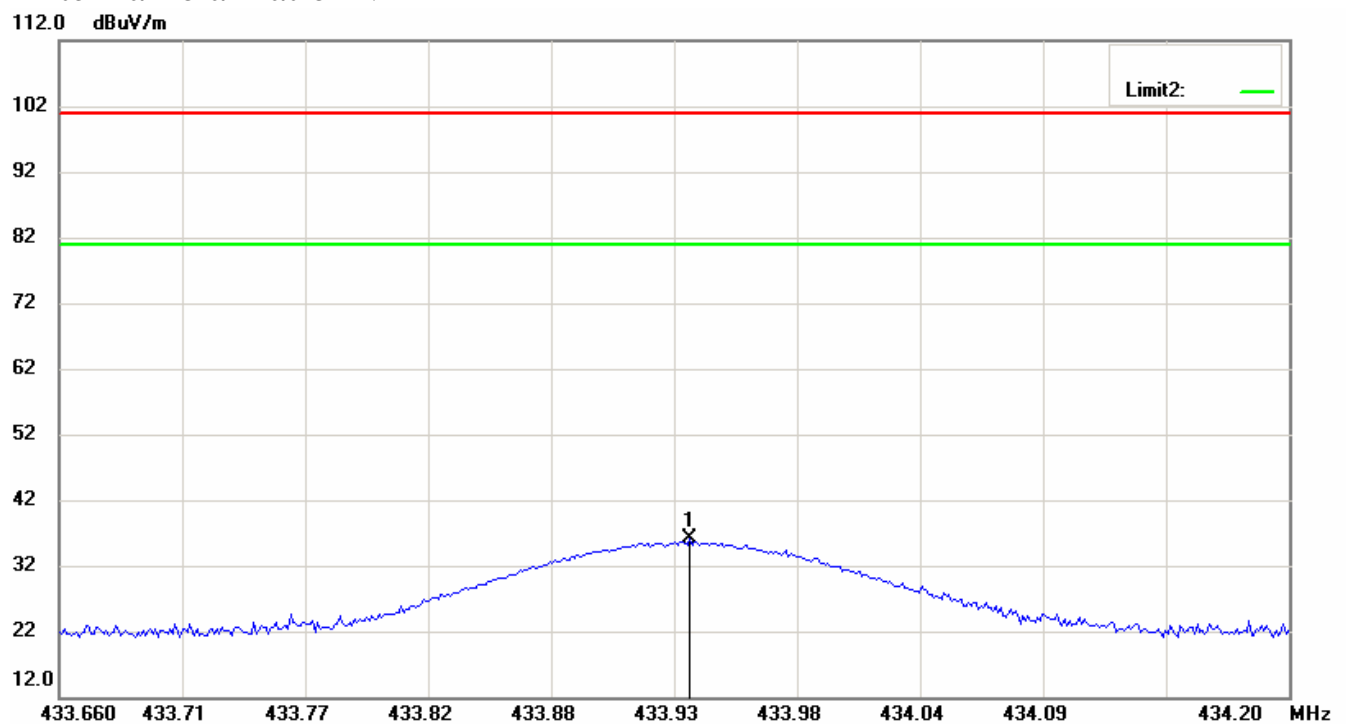
Registration number: W6M20708-8446-C-1  
FCC ID: VMUAVE-TPMS-T100

## Output Power

### Antenna Polarization H



### Antenna Polarization V



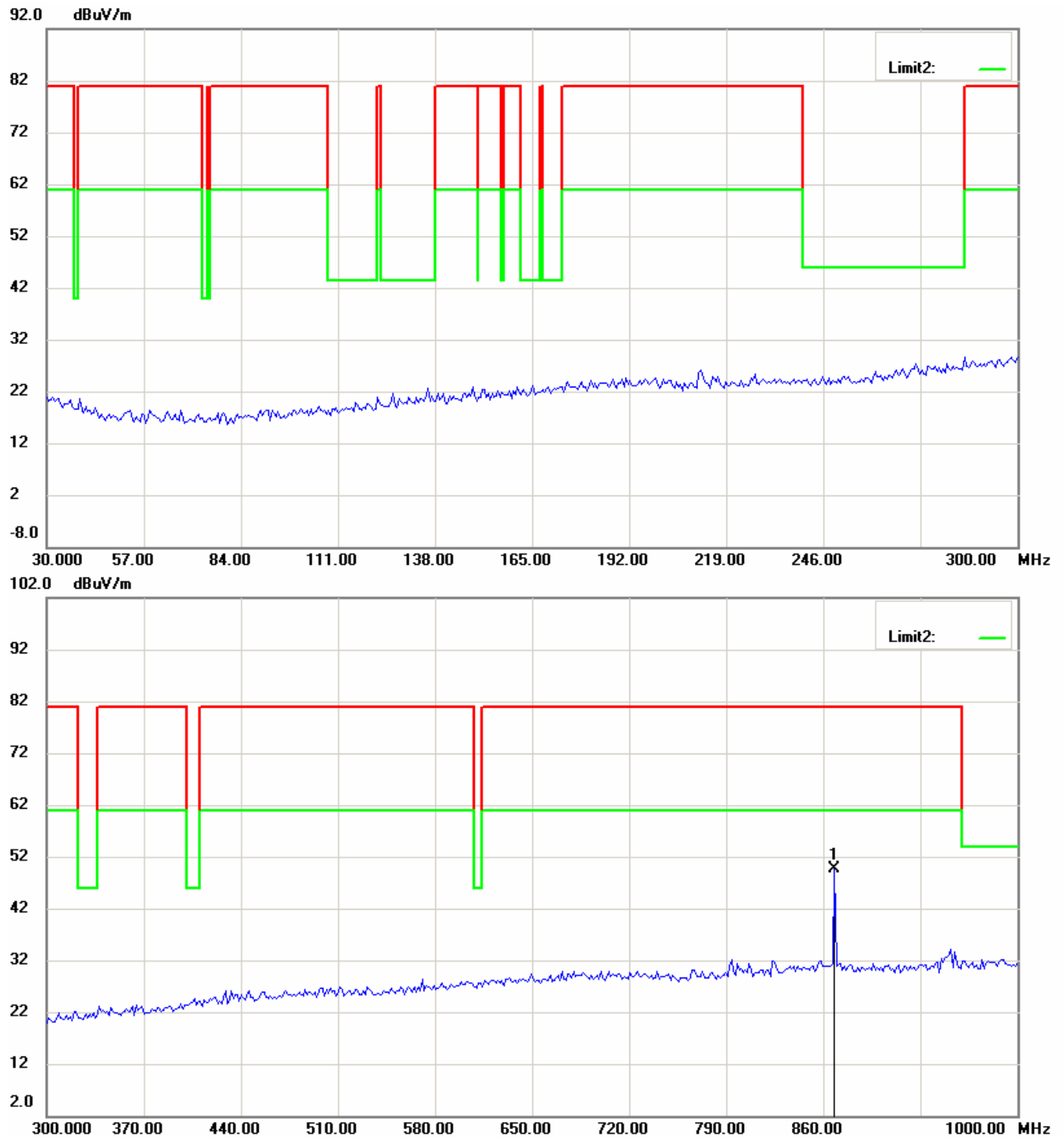


# ***Taiwan ETS Product Service Co., Ltd.***

Registration number: W6M20708-8446-C-1  
FCC ID: VMUAVE-TPMS-T100

## Spurious Emissions radiated

### Antenna Polarization H

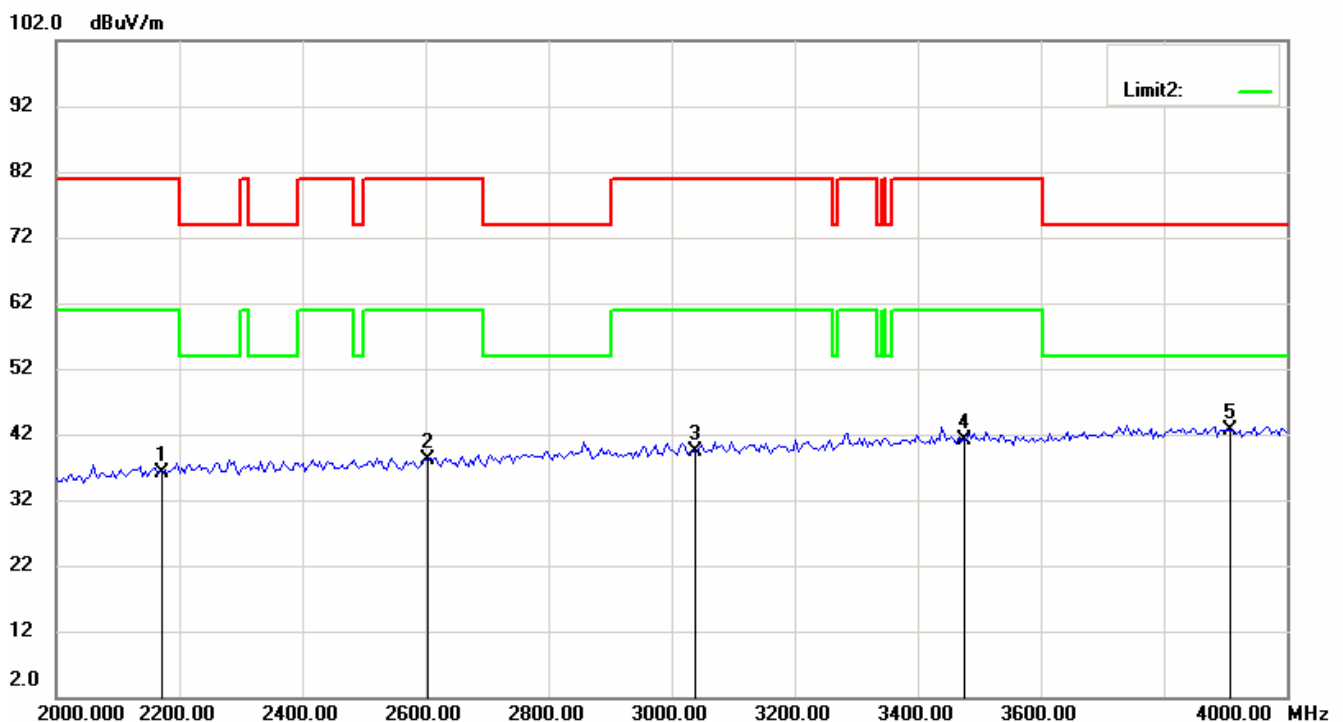
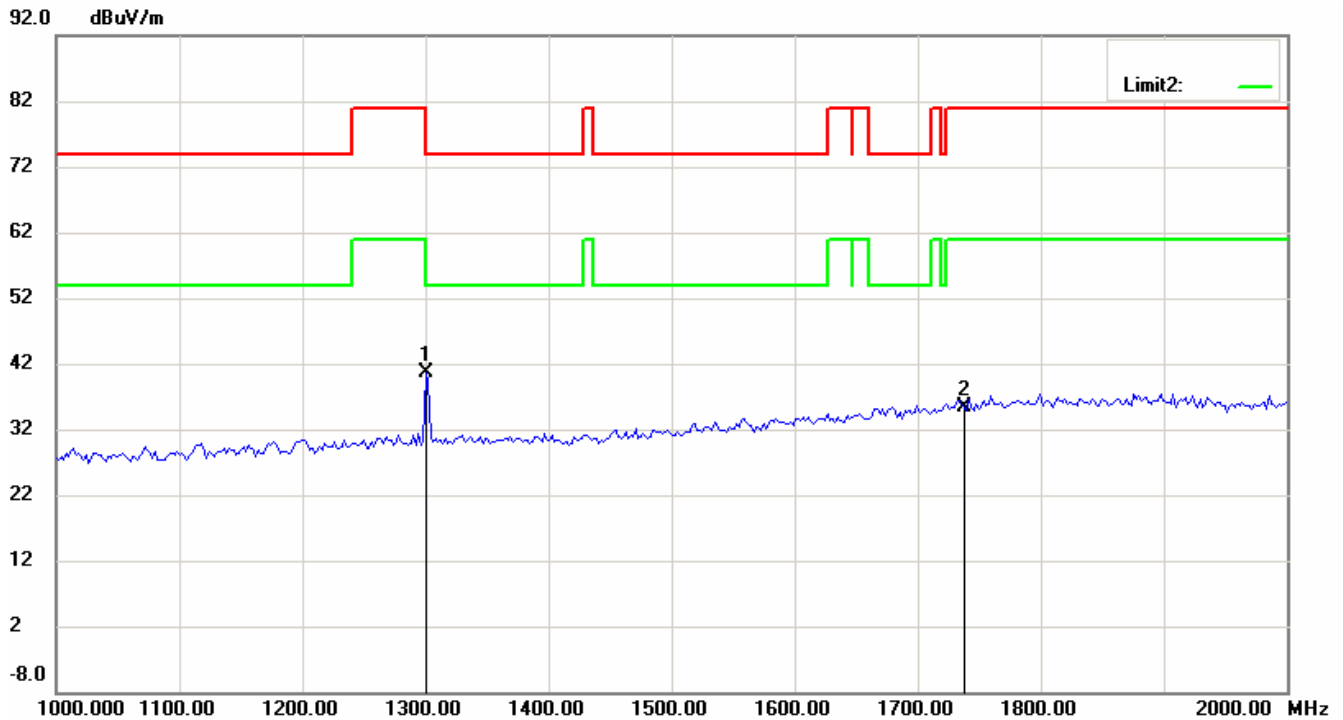




# **Taiwan ETS Product Service Co., Ltd.**

Registration number: W6M20708-8446-C-1

FCC ID: VMUAVE-TPMS-T100

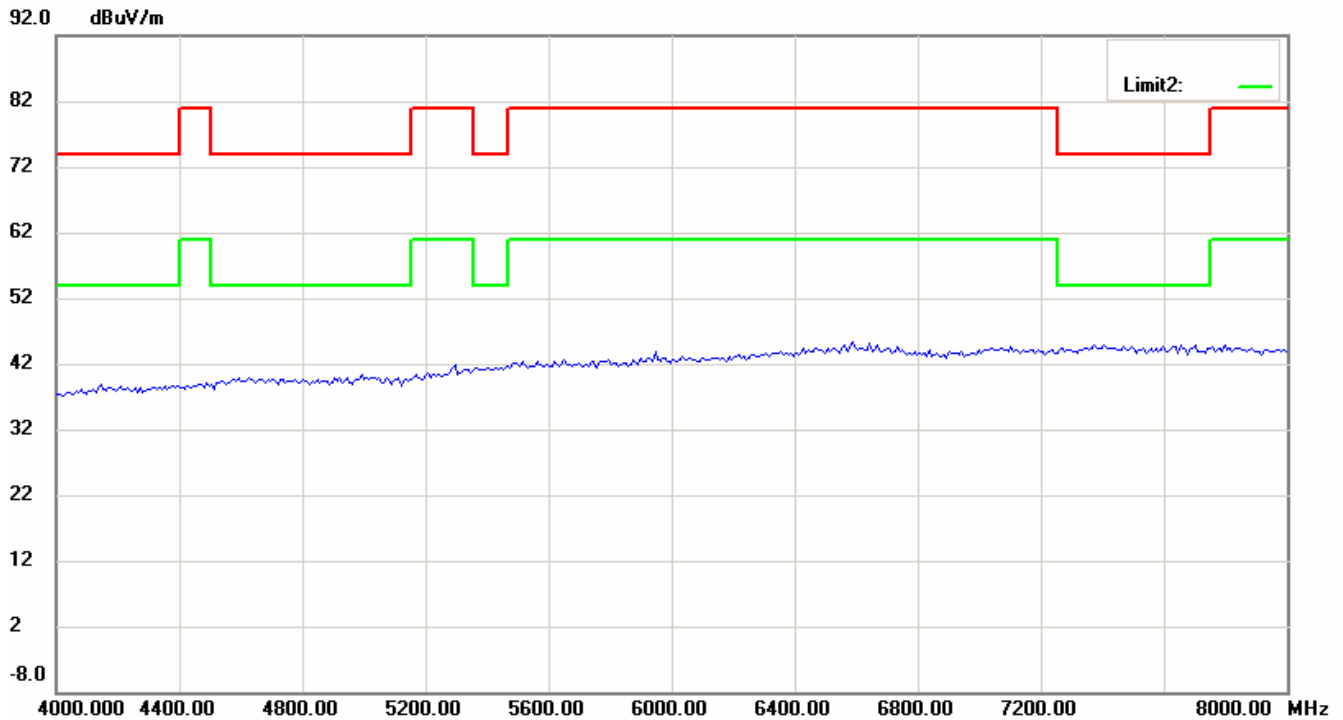




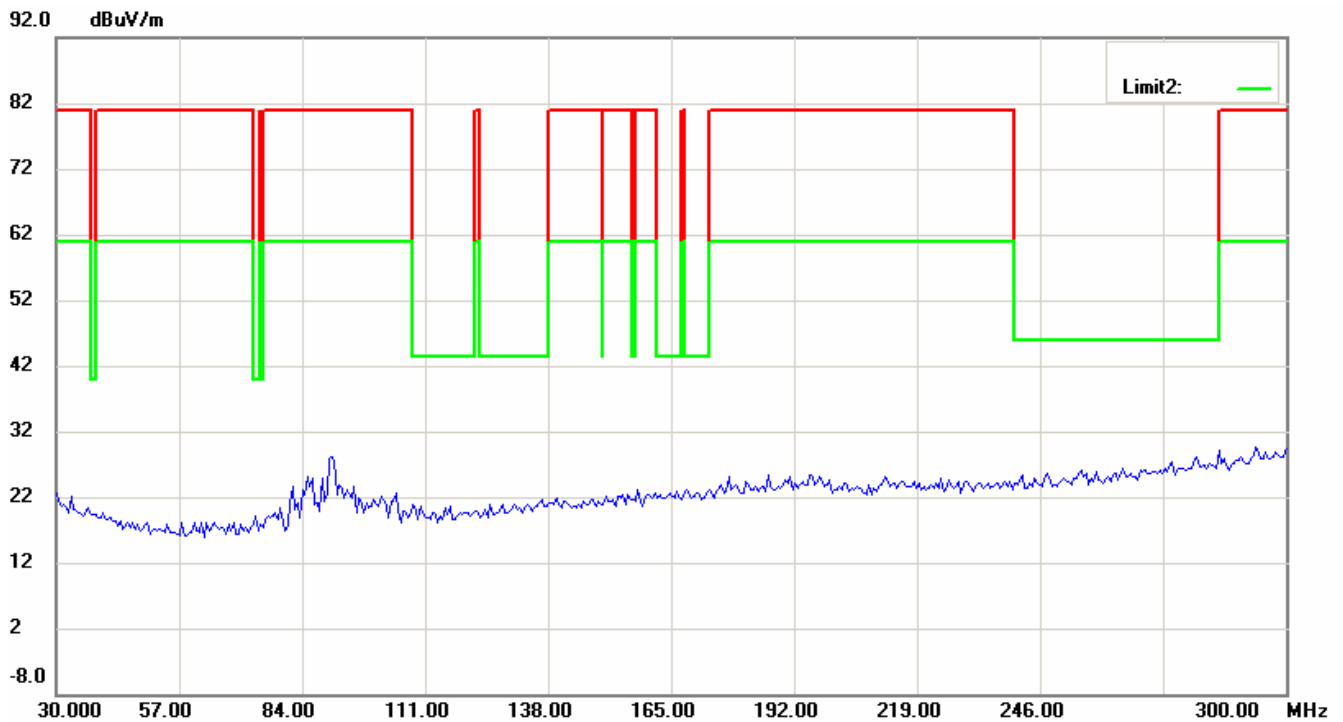
# **Taiwan ETS Product Service Co., Ltd.**

Registration number: W6M20708-8446-C-1

FCC ID: VMUAVE-TPMS-T100



## Antenna Polarization V

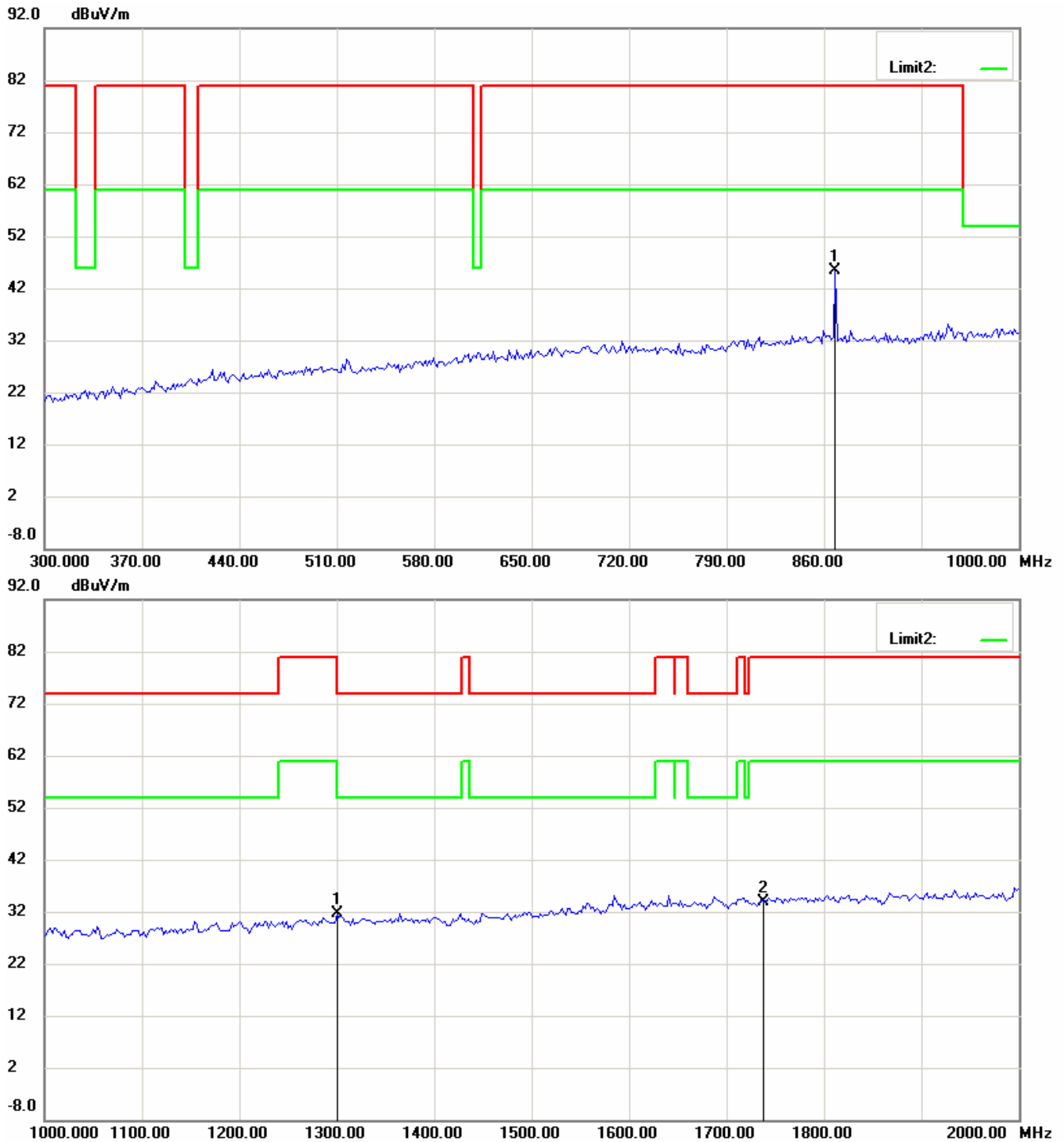




# ***Taiwan ETS Product Service Co., Ltd.***

Registration number: W6M20708-8446-C-1

FCC ID: VMUAVE-TPMS-T100



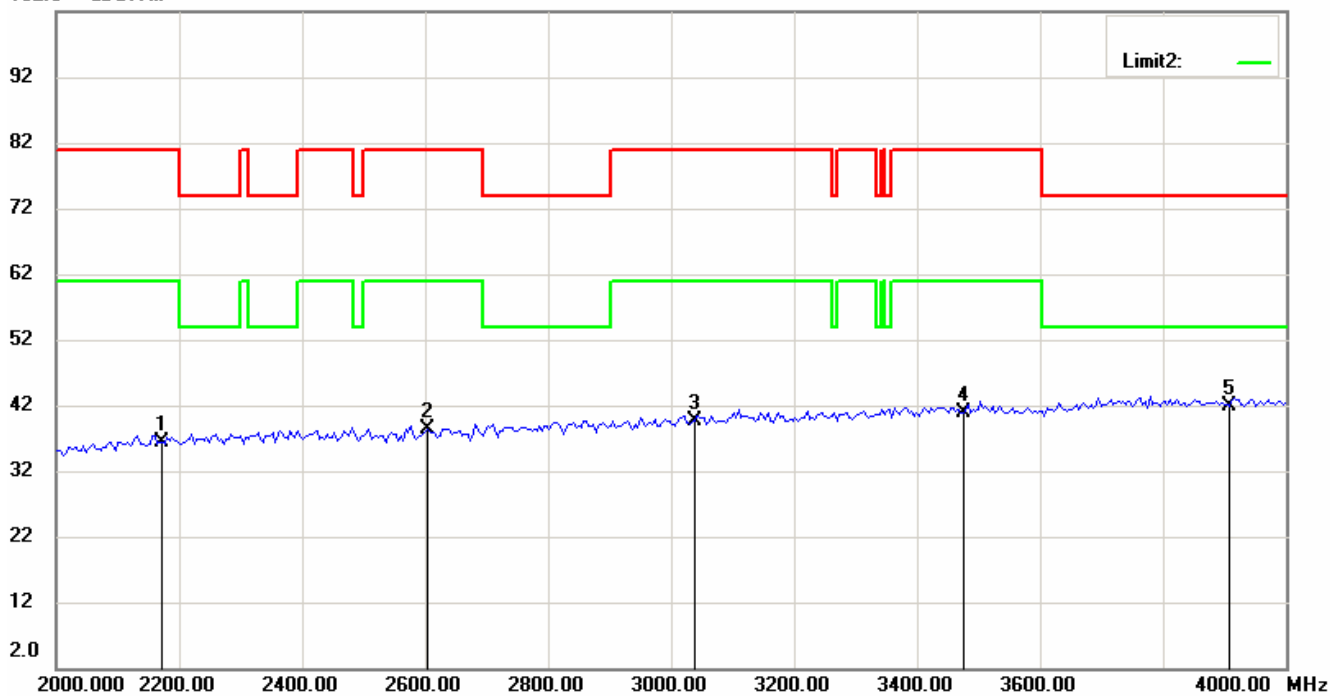


# ***Taiwan ETS Product Service Co., Ltd.***

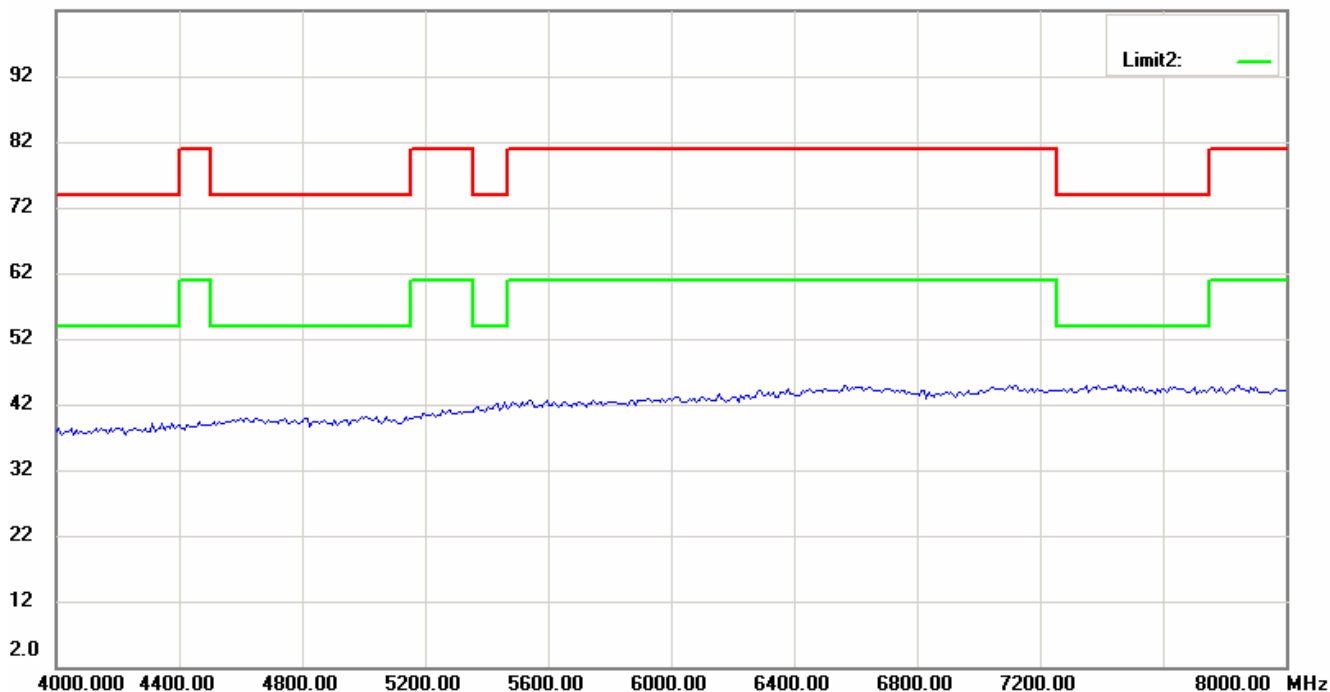
Registration number: W6M20708-8446-C-1

FCC ID: VMUAVE-TPMS-T100

102.0 dBuV/m



102.0 dBuV/m



**Up Line: Peak Limit Line**

**Down Line: Ave Limit Line**

**Note:**

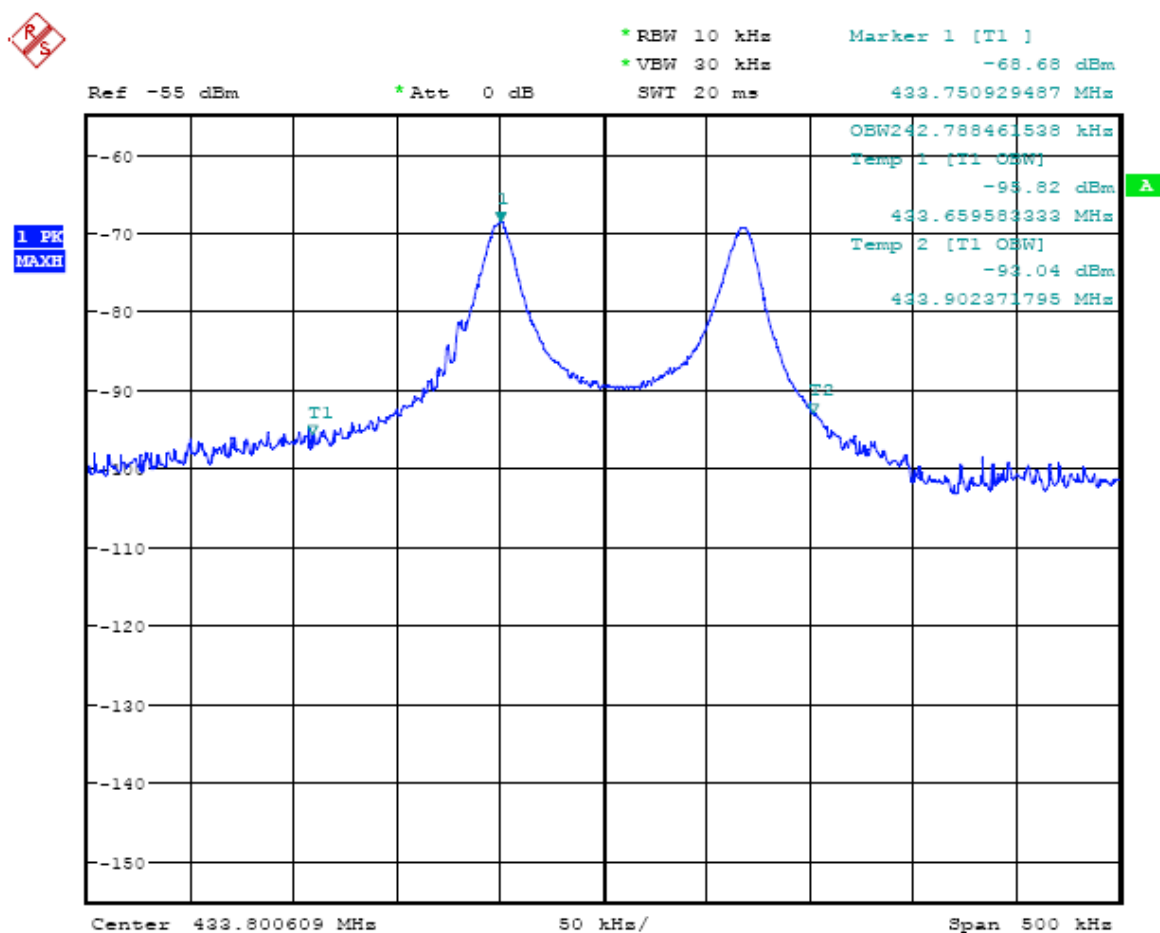
1. The plots are pre-scanned data for determining the tested points and for reference only.
2. The exact test result is shown in the data table of Radiated emission test of this test report.



# Taiwan ETS Product Service Co., Ltd.

Registration number: W6M20708-8446-C-1  
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## Bandwidth



Occupied Bandwidth

Date: 7.JAN.2008 12:16:53