# FCC TEST REPORT

**For**

**Wireless Big Optical Trackball Mouse**
**Model No.: GM-520**

of

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

Tested and Prepared
by

**ETS Product Service (Taiwan) CO., LTD**

**FCC Registration No.: 930600**

**Industry Canada filed test laboratory Reg. No. IC 5679**

**A2LA Accredited No.: 2300.01**

**PTCRB Accredited Type Certification Test House**

# FCC ID: OR7GM520

**Report No.: W6M20707-8372-P-15**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
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Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

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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.
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**Tester:**

| August 30, 2007 | | Jay Chaing | Jay Chaing |
|---|---|---|---|
| Date | ETS-Lab. | Name | Signature |

**Technical responsibility for area of testing:**

| August 30, 2007 | | Steven Chuang | Steven Chuang |
|---|---|---|---|
| Date | ETS | Name | Signature |

## 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
ETS Product Service ( 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: 2300.01**

**FCC filed test laboratory Reg. No. 930600**

**Industry Canada filed test laboratory Reg. No. IC 5679**

**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: | ./. |

## 1.4 Application details

Date of receipt of test item : August 06, 2007
Date of test : From August 07, 2007 to August 29, 2007

## 1.5 General information of Test item

Type of test item : Wireless Big Optical Trackball Mouse

Model Number : GM-520

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 : FHSS

Antenna type : Printed Antenna

Power supply : 3 VDC ( Battery )

Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

**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 : May 2007

**Special statement:**
**The standards applied to this test sample were under the demand of the applicant.**
**This device uses FHSS modulation and there are 8 channels. Any deviation from the applicable product standards is the responsibility of the applicant.**

# 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 "**Special statement"** 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 | : 3 VDC ( Battery ) |
| Extreme conditions parameters | : Not required |

## 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 | 2006/10/16 | 2007/10/15 |
| 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 | 2006/10/16 | 2007/10/15 |
| ETSTW-CE 005 | Line-Impedance Stabilisation Network | NNBM 8126D | 137 | Schwarzbeck | 2006/10/16 | 2007/10/15 |
| ETSTW-CE 006 | IMPULSBEGRENZER PULSE LIMITER | ESH3-Z2 | 100226 | R&S | In House Certificate | |
| ETSTW-CE 008 | ABSORBING CLAMP | MDS 21 | 3469 | Schwarzbeck | 2005/10/24 | 2007/10/23 |
| 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 | 2005/12/8 | 2007/12/7 |
| ETSTW-CE 014 | CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK | FCC-TLISN-T2-02 | 20241 | FCC | 2005/12/7 | 2007/12/6 |
| 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 | 2006/11/21 | 2007/11/20 |
| ETSTW-RE 002 | Function Generator | 33220A | MY43004982 | Agilent | 2005/10/14 | 2007/10/13 |
| ETSTW-RE 003 | EMI TEST RECEIVER | ESI 26 | 831438/001 | R&S | 2006/10/20 | 2007/10/19 |
| ETSTW-RE 004 | EMI TEST RECEIVER | ESI 40 | 832427/004 | R&S | 2006/10/30 | 2007/10/29 |
| ETSTW-RE 005 | EMI TEST RECEIVER | ESVS10 | 843207/020 | R&S | 2006/10/12 | 2007/10/11 |
| 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 | 2004/11/8 | 2007/11/7 |
| ETSTW-RE 020 | MICROWAVE HORN ANTENNA | AT4002A | 306915 | AR | Function Test | |
| ETSTW-RE 021 | SWEEP GENERATOR | SWM05 | 835130/010 | R&S | 2006/10/11 | 2007/10/10 |
| ETSTW-RE 027 | Passive Loop Antenna | 6512 | 00034563 | EMCO | In House Certificate | |
| 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 | 2006/10/11 | 2007/10/10 |
| ETSTW-RE 034 | Power Sensor | URV5-Z4 | 839313/006 | R&S | 2005/10/17 | 2007/10/16 |
| 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 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 |

## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.4-2003 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 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the EUT was 23°C with a humidity of 40 %.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of 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 + 6 dB = 36.36 dBµV/m @3m |

ANSI STANDARD C63.4-2003 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table). The EUT 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$^{th}$ harmonic of the fundamental.

Peak readings were taken in three (3) orthogonal planes and the highest readings.
Measurements were made by ETS Dr. Genz GmbH 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.

ANTENNA & GROUND:
**This unit uses Printed Antenna (see photo).**

## 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.

### 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.

Model: GM-520 Date: 2007/8/9
Mode: Tx Power Low Channel Temperature: 26 ˚C Engineer: Danny
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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2423.571 | 37.47 | --- | 35.73 | 75.2 | --- | 114 | 94 | -38.8 | 150 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2423.571 | 37.47 | --- | 35.73 | 75.2 | --- | 114 | 94 | -38.8 | 150 | 150 |

Mode: Tx Power 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2447.311 | 48.06 | --- | 35.81 | 85.87 | --- | 114 | 94 | -28.13 | 150 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2447.431 | 38.25 | --- | 35.78 | 76.03 | --- | 114 | 94 | -37.97 | 140 | 150 |

Mode: Tx Power 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2477.15 | 48.36 | --- | 35.88 | 86.24 | --- | 114 | 94 | -27.76 | 145 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) Peak | Reading (dBuV) Ave. | Factor (dB) Corr. | Result @3m (dBuV/m) Peak | Result @3m (dBuV/m) Ave. | Limit @3m (dBuV/m) Peak | Limit @3m (dBuV/m) Ave. | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2477.09 | 35.44 | --- | 35.85 | 73.29 | --- | 114 | 94 | -40.71 | 150 | 150 |

The power was measured with modulation (declared by the applicant).

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

Comments: Please see attached diagrams as appendix.

### 3.2 Equivalent isotropic radiated power

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

### 3.2.1 Transmitter

Integral Antenna:
At the transmitter the measurement was transacted with the modulation declared by the manufacturer and the maximum available output power of the EUT.
In this arrangement the EUT fulfils the requirements of the FCC rules § 15.249, subpart C, This unit uses permanent antenna. There is no provision for an external antenna (see photo).

### 3.3 RF Exposure Compliance Requirements

Not applicable for this **Wireless Big Optical Trackball 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 dBµV/m + 20 dB= 74dBµV/m
Or
Must be antenuatted 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
Comment: Please see attached diagrams as appendix.

### 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-520 Date: 2007/8/9
Mode: Tx Low Channel Temperature: 26 ˚C Engineer: Danny
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) |
|---|---|---|---|---|---|---|---|---|
| 38.116 | 13.74 | peak | 13.42 | 27.16 | 40 | -12.84 | 175 | 385 |
| 211.263 | 14.05 | peak | 12.36 | 26.41 | 43.5 | -17.09 | 175 | 300 |
| 502.004 | 9.14 | peak | 19.84 | 28.98 | 46 | -17.02 | 205 | 180 |
| 684.369 | 10.51 | peak | 23.13 | 33.64 | 46 | -12.36 | 210 | 155 |

| Frequency | Reading (dBuV) | | Factor (dB) | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin | Table Degree | Ant. High |
|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | (dB) | (Deg.) | (cm) |
| 2719.439 | 61.72 | 44.75 | -6.77 | 54.95 | 37.98 | 74 | 54 | -16.02 | 145 | 150 |
| 4841.683 | 62.94 | 46.95 | -2.33 | 60.61 | 44.62 | 74 | 54 | -9.38 | 140 | 150 |
| 7270.541 | 44.97 | --- | 2.15 | 47.12 | --- | 74 | 54 | -26.88 | 145 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 38.116 | 13.38 | peak | 13.42 | 26.80 | 40 | -13.20 | 170 | 110 |
| 211.263 | 16.97 | peak | 12.36 | 29.33 | 43.5 | -14.17 | 175 | 170 |
| 518.838 | 9.13 | peak | 20.08 | 29.21 | 46 | -16.79 | 210 | 275 |
| 831.663 | 6.96 | peak | 25.55 | 32.51 | 46 | -13.49 | 220 | 355 |

| Frequency | Reading (dBuV) | | Factor (dB) | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin | Table Degree | Ant. High |
|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | (dB) | (Deg.) | (cm) |
| 4841.683 | 55.77 | 38.44 | -2.33 | 53.44 | 36.11 | 74 | 54 | -17.89 | 145 | 150 |

Model: GM-520 Date: 2007/8/9
Mode: Tx Middle Channel Temperature: 26 ˚C Engineer: Danny
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) |
|---|---|---|---|---|---|---|---|---|
| 38.116 | 13.44 | peak | 13.42 | 26.86 | 40 | -13.14 | 180 | 390 |
| 212.345 | 15.97 | peak | 12.38 | 28.35 | 43.5 | -15.15 | 180 | 315 |
| 500.601 | 8.95 | peak | 19.82 | 28.77 | 46 | -17.23 | 205 | 165 |
| 855.511 | 8.12 | peak | 25.63 | 33.75 | 46 | -12.25 | 205 | 120 |

| Frequency | Reading (dBuV) | | Factor (dB) | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin | Table Degree | Ant. High |
|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | (dB) | (Deg.) | (cm) |
| 2575.15 | 58.47 | 41.26 | -7.12 | 51.35 | 34.14 | 74 | 54 | -19.86 | 145 | 150 |
| 2719.439 | 62.1 | 45.25 | -6.77 | 55.33 | 38.48 | 74 | 54 | -15.52 | 150 | 150 |
| 4893.874 | 61.29 | 40.26 | -2.09 | 59.20 | 38.17 | 74 | 54 | -15.83 | 145 | 150 |
| 7342.685 | 42.82 | --- | 2.32 | 45.14 | --- | 74 | 54 | -28.86 | 140 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 38.116 | 13.71 | peak | 13.42 | 27.13 | 40 | -12.87 | 175 | 100 |
| 211.804 | 16.52 | peak | 12.37 | 28.89 | 43.5 | -14.61 | 180 | 200 |
| 551.102 | 9.10 | peak | 20.81 | 29.91 | 46 | -16.09 | 205 | 320 |
| 942.485 | 8.23 | peak | 27.12 | 35.35 | 46 | -10.65 | 210 | 375 |

| Frequency | Reading (dBuV) | | Factor (dB) | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin | Table Degree | Ant. High |
|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | (dB) | (Deg.) | (cm) |
| 4889.78 | 55.41 | 38.23 | -2.11 | 53.3 | 36.12 | 74 | 54 | -17.88 | 150 | 150 |

Model: GM-520 Date: 2007/8/9
Mode: Tx High Channel Temperature: 26 ˚C Engineer: Danny
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) |
|---|---|---|---|---|---|---|---|---|
| 38.116 | 14.09 | peak | 13.42 | 27.51 | 40 | -12.49 | 170 | 390 |
| 125.231 | 10.66 | peak | 13.77 | 24.43 | 43.5 | -19.07 | 180 | 345 |
| 647.896 | 8.52 | peak | 22.74 | 31.26 | 46 | -14.74 | 205 | 160 |
| 809.218 | 9.05 | peak | 25.28 | 34.33 | 46 | -11.67 | 205 | 135 |

| Frequency | Reading (dBuV) | | Factor (dB) | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin | Table Degree | Ant. High |
|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | (dB) | (Deg.) | (cm) |
| 2575.15 | 58.05 | --- | -7.12 | 50.93 | --- | 74 | 54 | -23.07 | 140 | 150 |
| 2719.439 | 60.5 | 43.62 | -6.77 | 53.73 | 36.85 | 74 | 54 | -17.15 | 145 | 150 |
| 4953.81 | 57.74 | 40.09 | -1.81 | 55.93 | 38.28 | 74 | 54 | -15.72 | 135 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 37.575 | 13.55 | peak | 13.38 | 26.93 | 40 | -13.07 | 170 | 110 |
| 211.263 | 16.27 | peak | 12.36 | 28.63 | 43.5 | -14.87 | 170 | 175 |
| 525.852 | 8.90 | peak | 20.22 | 29.12 | 46 | -16.88 | 200 | 290 |
| 667.535 | 8.17 | peak | 22.90 | 31.07 | 46 | -14.93 | 210 | 315 |

| Frequency | Reading (dBuV) | | Factor (dB) | Result @3m (dBuV/m) | | Limit @3m (dBuV/m) | | Margin | Table Degree | Ant. High |
|---|---|---|---|---|---|---|---|---|---|---|
| (MHz) | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | (dB) | (Deg.) | (cm) |
| 4953.758 | 56.73 | 39.67 | -1.81 | 54.92 | 37.86 | 74 | 54 | -16.14 | 140 | 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. **Please see attached diagrams as appendix.**

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

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

### 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”.

**Digital Part**

**Summary table with radiated data of the test plots**

Model: GM-520 Date: 2007/8/14
Mode: Temperature: 26 ˚C Engineer: Eric
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) |
|---|---|---|---|---|---|---|---|---|
| 85.732 | 9.72 | peak | 9.99 | 19.71 | 30 | -10.29 | 66 | 300 |
| 184.208 | 11.30 | peak | 13.48 | 24.78 | 30 | -5.22 | 182 | 310 |
| 209.098 | 11.80 | peak | 12.32 | 24.12 | 30 | -5.88 | 236 | 320 |
| 332.265 | 11.63 | peak | 16.16 | 27.79 | 37 | -9.21 | 52 | 100 |
| 716.633 | 8.27 | peak | 23.89 | 32.16 | 37 | -4.84 | 218 | 115 |
| 913.026 | 2.96 | peak | 26.54 | 29.5 | 37 | -7.5 | 127 | 110 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 134.970 | 12.92 | QP | 14.45 | 27.37 | 30 | -2.63 | 85 | 100 |
| 159.860 | 8.57 | peak | 15.46 | 24.03 | 30 | -5.97 | 213 | 110 |
| 200.441 | 16.34 | QP | 12.15 | 28.49 | 30 | -1.51 | 119 | 100 |
| 499.198 | 9.30 | peak | 19.80 | 29.1 | 37 | -7.9 | 254 | 310 |
| 716.633 | 4.53 | peak | 23.89 | 28.42 | 37 | -8.58 | 153 | 300 |
| 913.026 | 5.93 | peak | 26.54 | 32.47 | 37 | -4.53 | 43 | 315 |

**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 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

### 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<br>Tnom = 26°C, Vnom = 3 V<br>Frequency [MHz] | Transmitter field strength of Radiated Emission<br>(Peak Detector)<br>[dBµV/m] | Transmitter field strength of Radiated Emission<br>(Average Detector)<br>[dBµV/m] |
|---|---|---|
| 2400.000 | 40.37 | -- |
| 2483.500 | 46.54 | -- |

Limit:

| Frequency Range (MHz) | Limit (dBµV/m) | |
|---|---|---|
| 902 – 928<br>2400 – 2483.5<br>5725 – 5875<br>24000 - 24250 | Peak | Average |
| | 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

Comment: Please see attached diagram as appendix.

### 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.

| Frequency | Level (dBμV) | |
|---|---|---|
| | quasi-peak | average |
| 150 kHz | lower limit line | Lower 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 003 ETSTW-CE 004 ETSTW-CE 006 ETSTW-CE 011

**Explanation: This test is not required because there is no AC power line for this EUT.**

# Appendix

## A Measurement diagrams

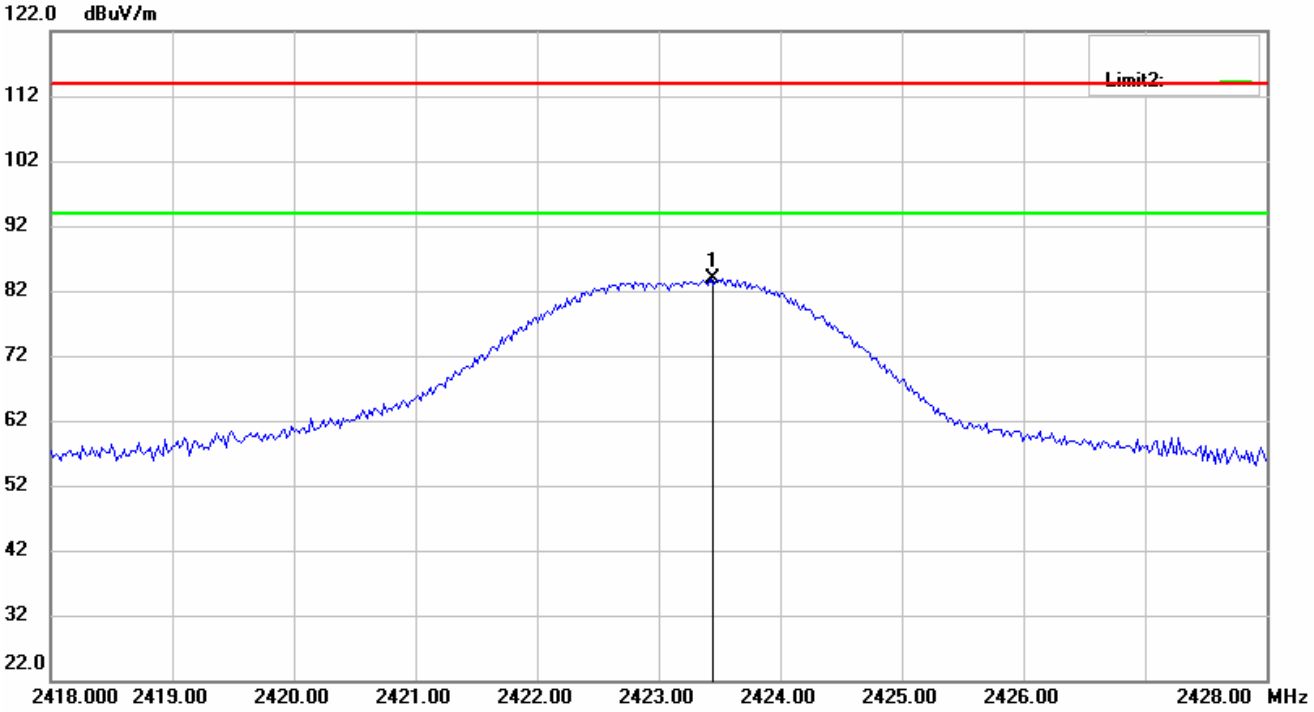
1. Peak Output Power (transmitter)
2. Spurious Emissions radiated
   (The measurement diagrams plots attached below are preliminary wideband scan with a peak detector for reference only. The final test results are listed on section 3.5)
3. Radiated Emissions from Digital Part
   (The measurement diagrams plots attached below are preliminary wideband scan with a peak detector for reference only. The final test results are listed on section 3.6)
4. Radiated Emission on the band edge

## B Photos

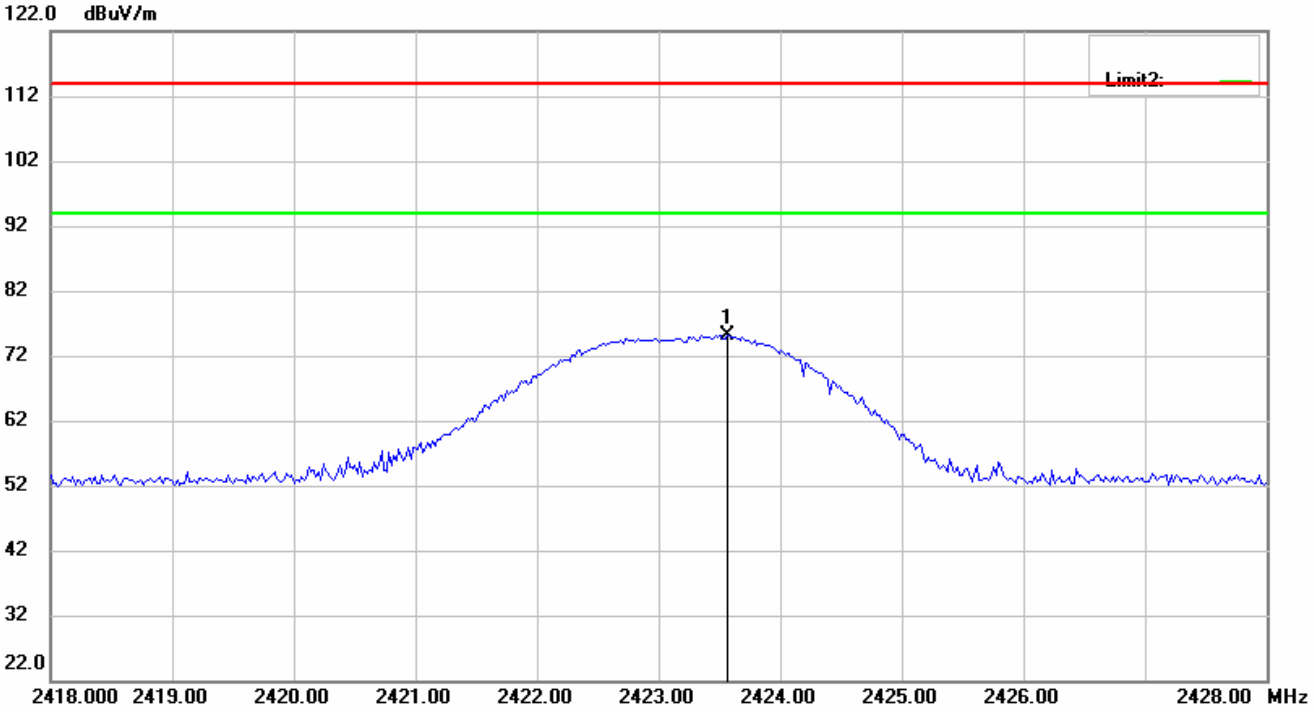
1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission

Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

# Peak Output Power (transmitter)
# Low Channel
# Antenna Polarization H

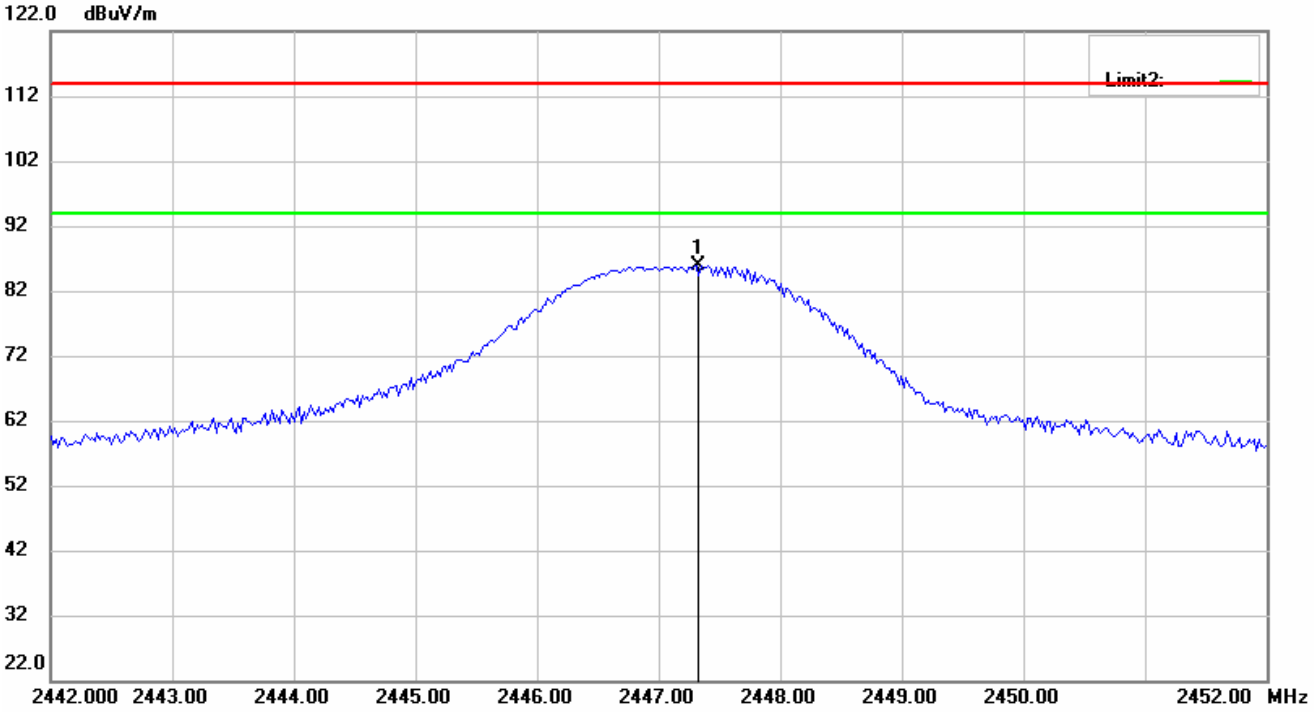



# Antenna Polarization V

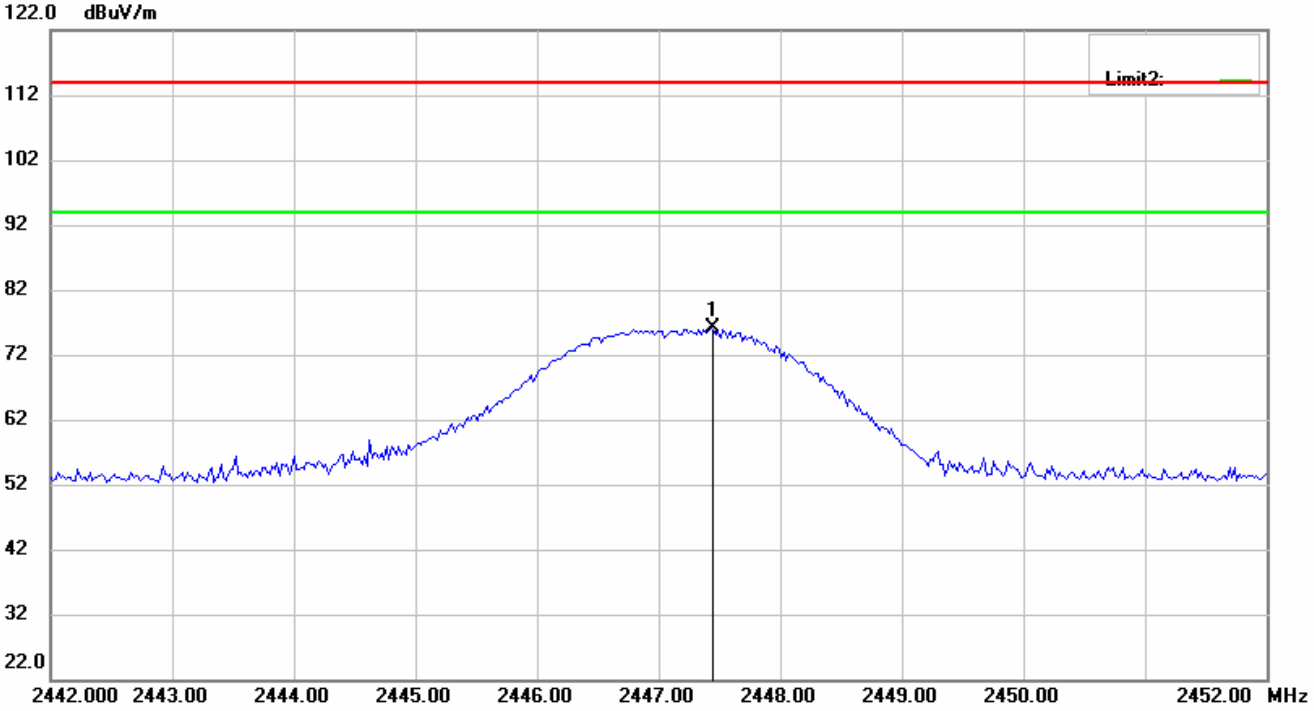


Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

## Middle Channel
## Antenna Polarization H



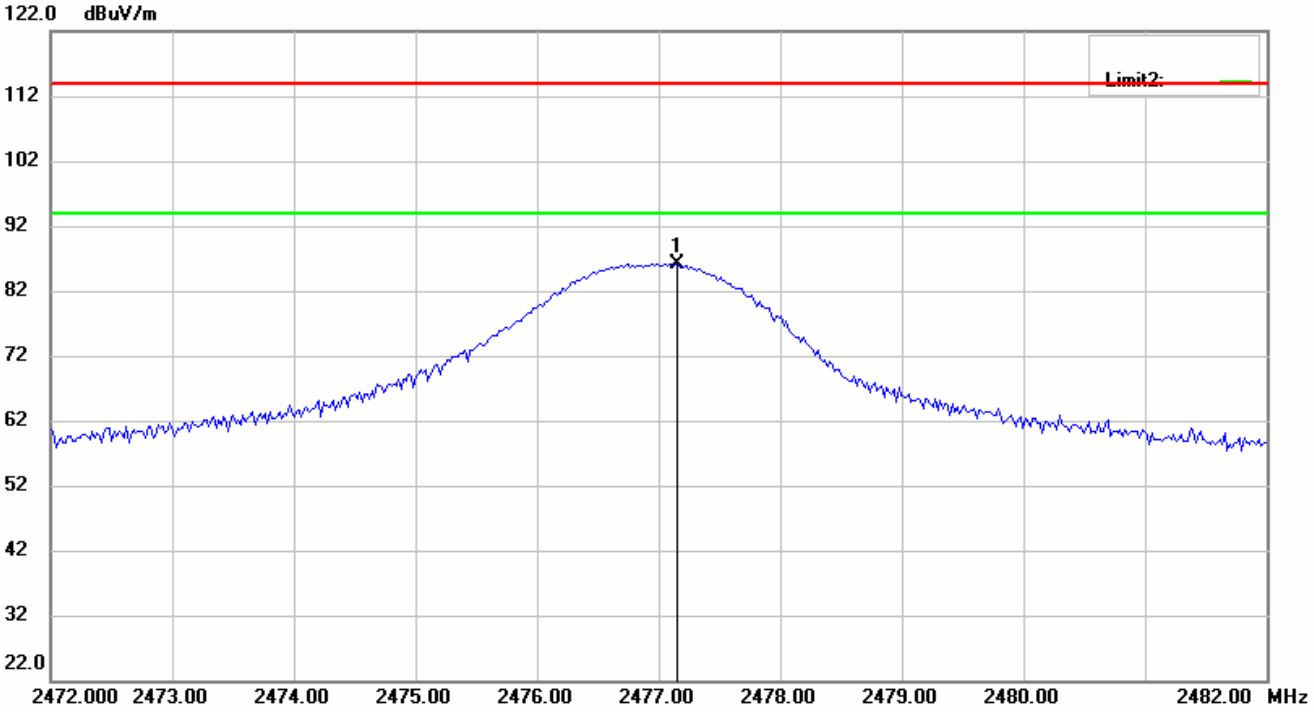

## Antenna Polarization V



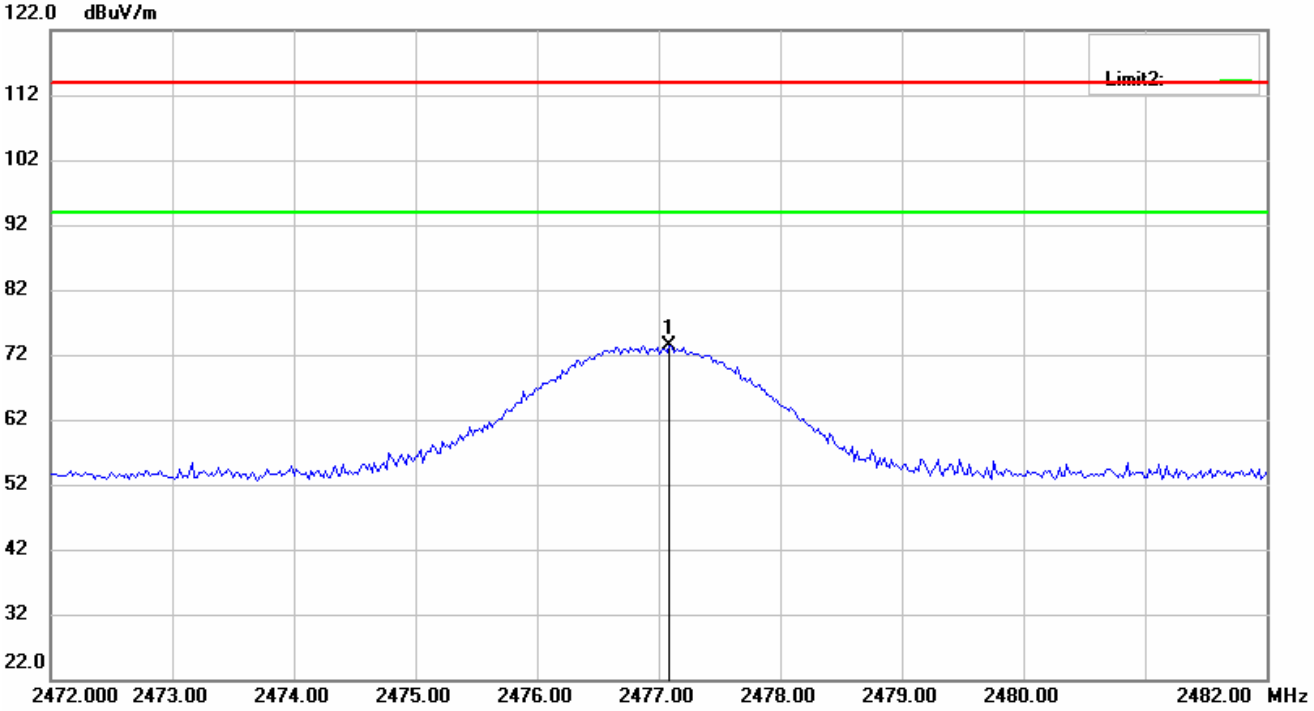
Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

# High Channel

## Antenna Polarization H

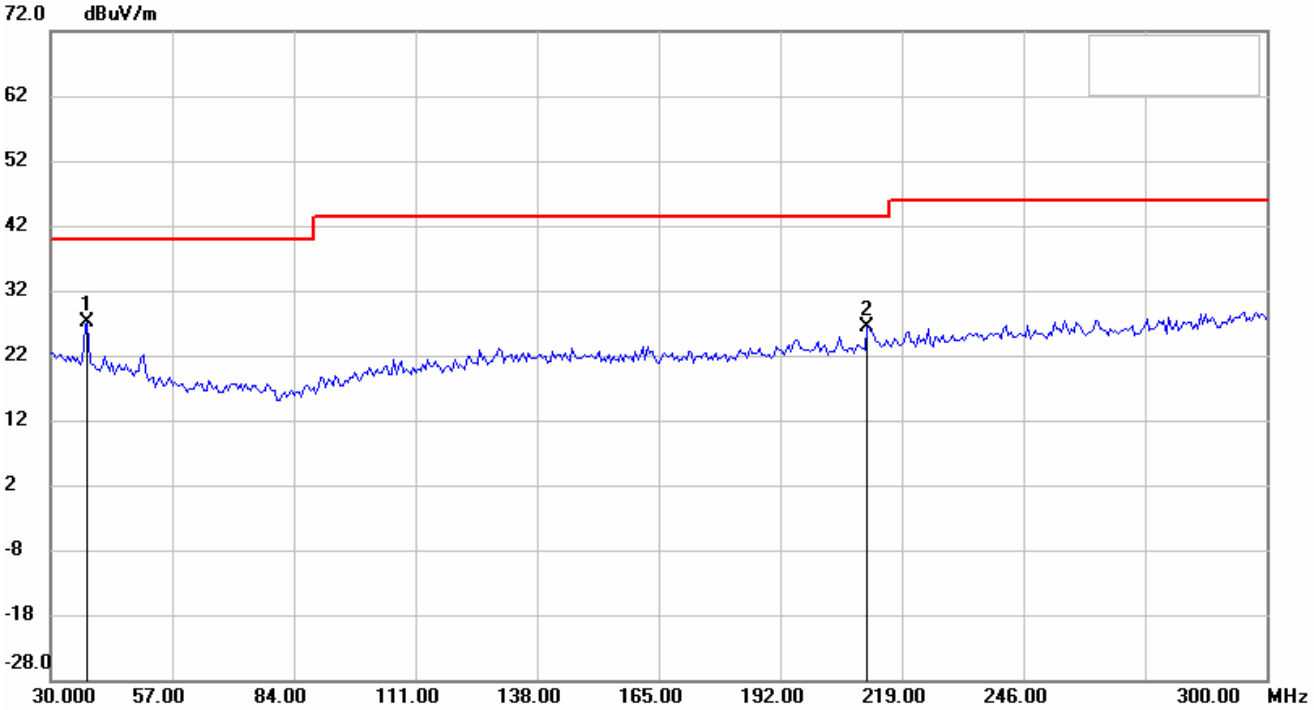


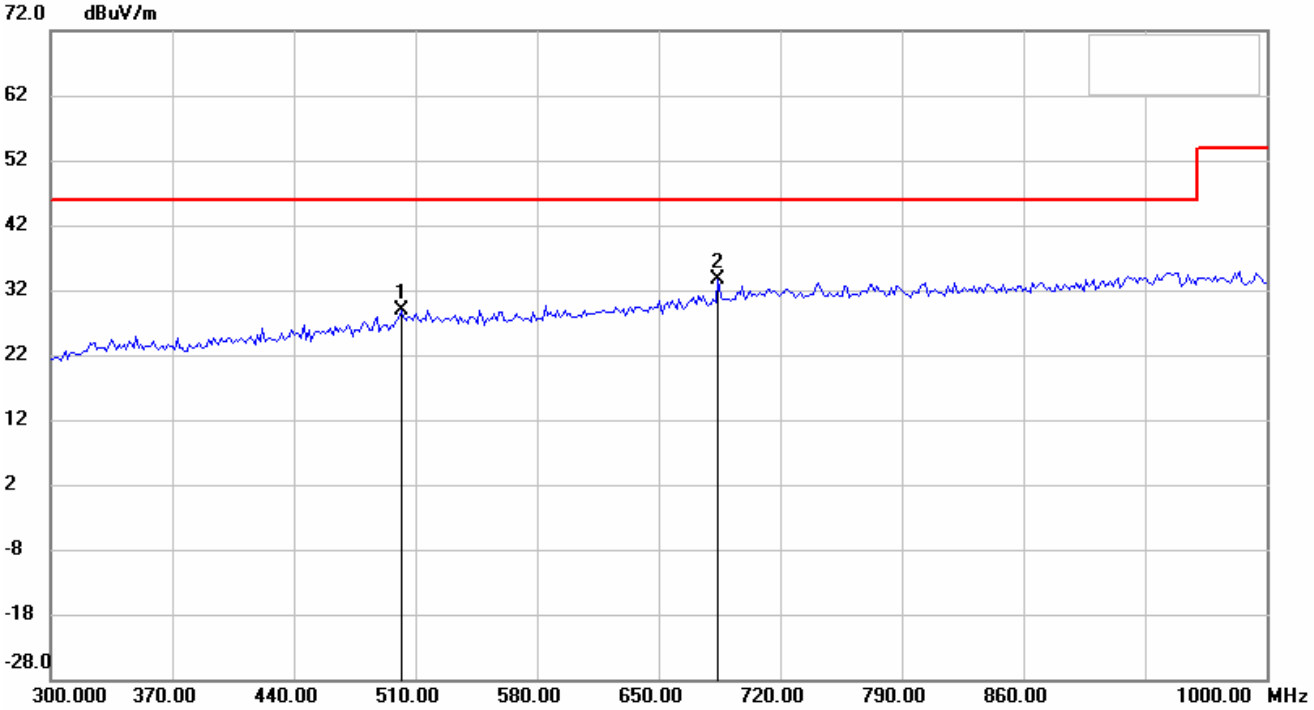

## Antenna Polarization V



Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

# Spurious Emissions radiated
# Low Channel
# Antenna Polarization H



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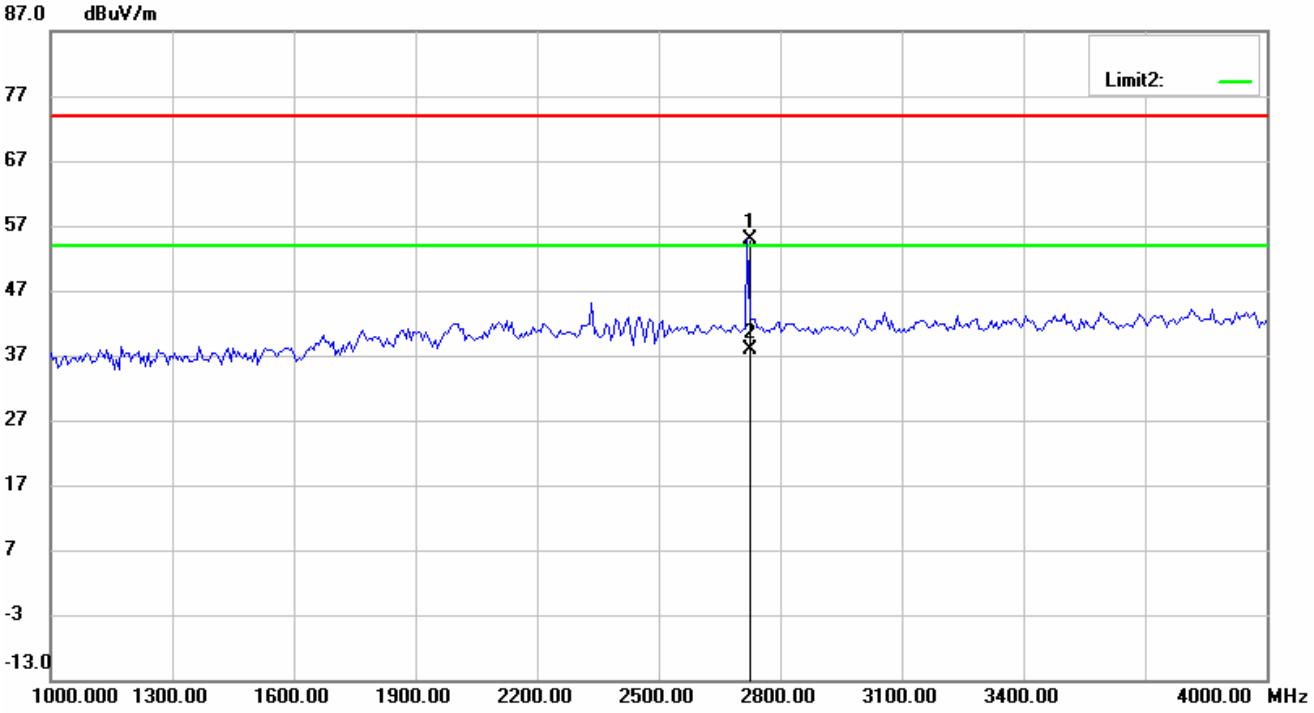
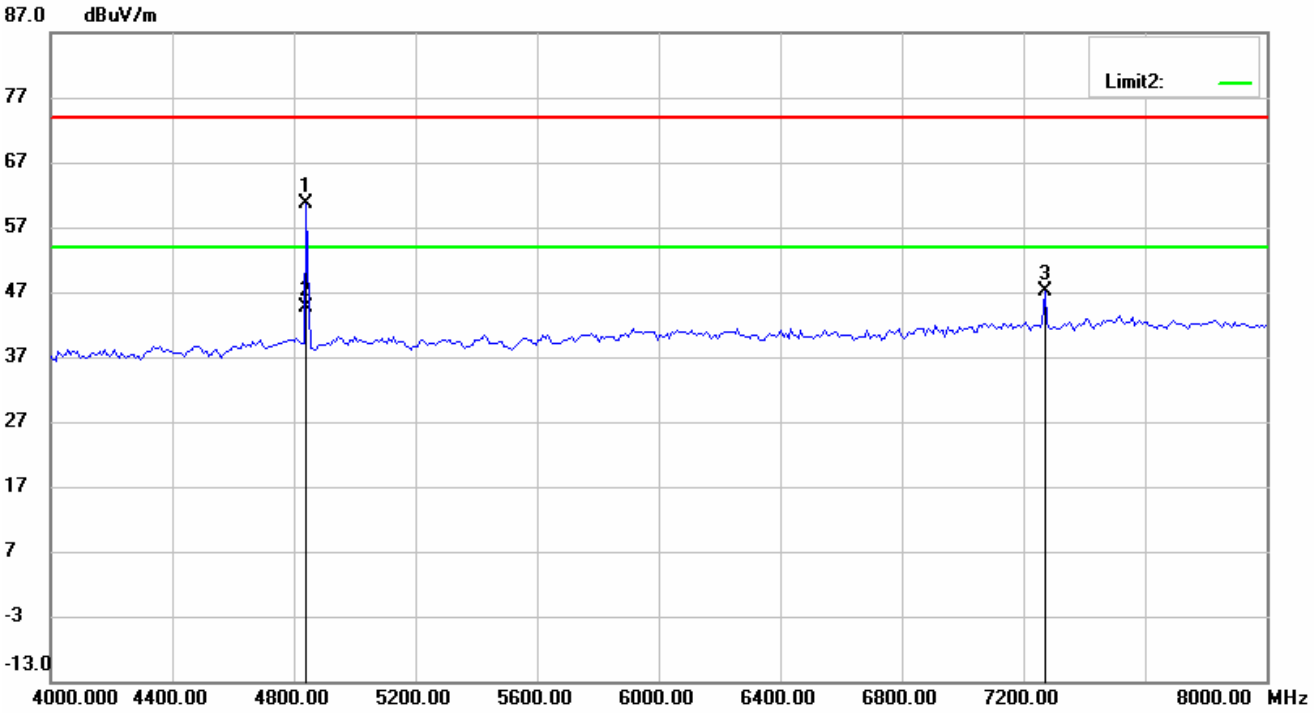
FCC ID: OR7GM520



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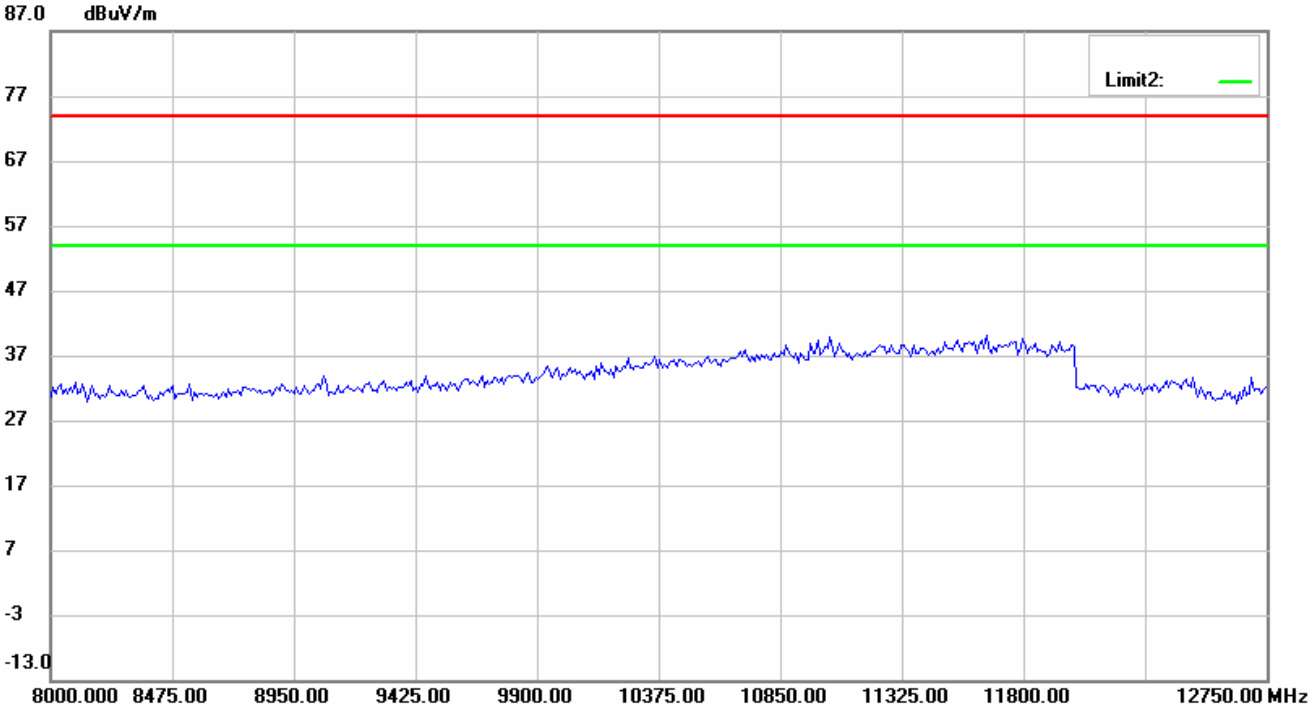
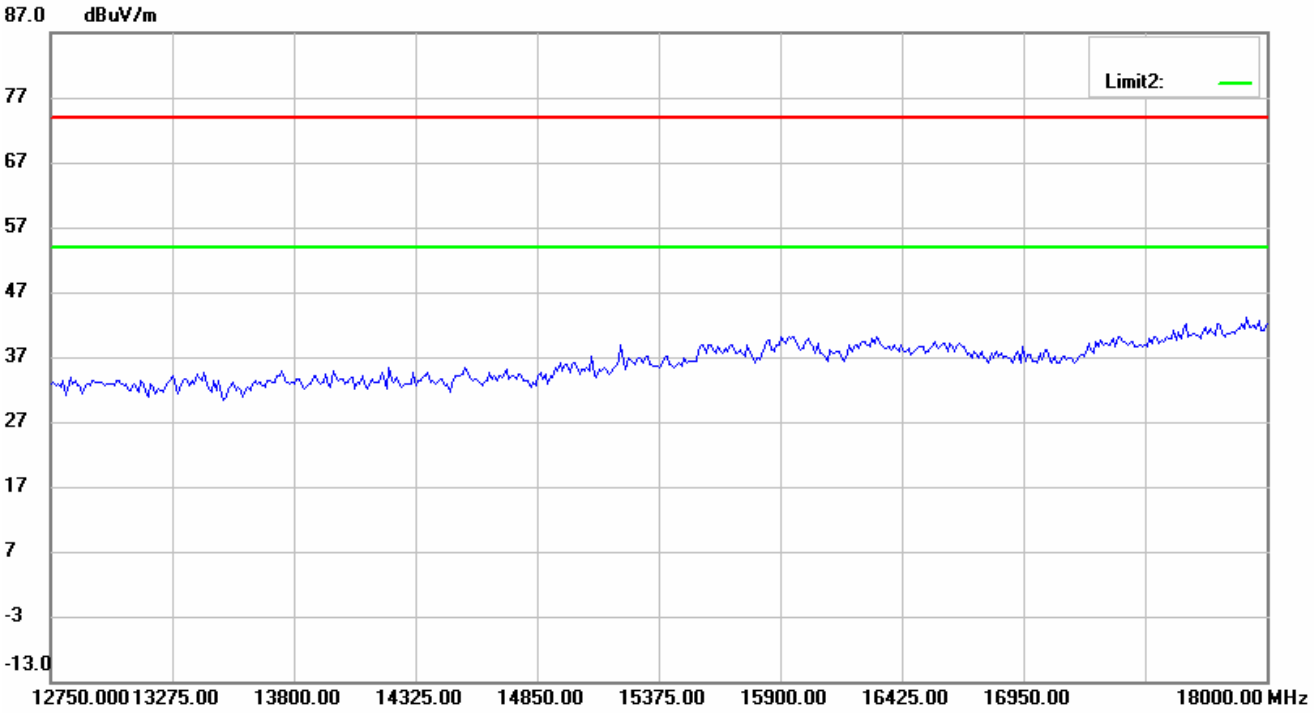
FCC ID: OR7GM520



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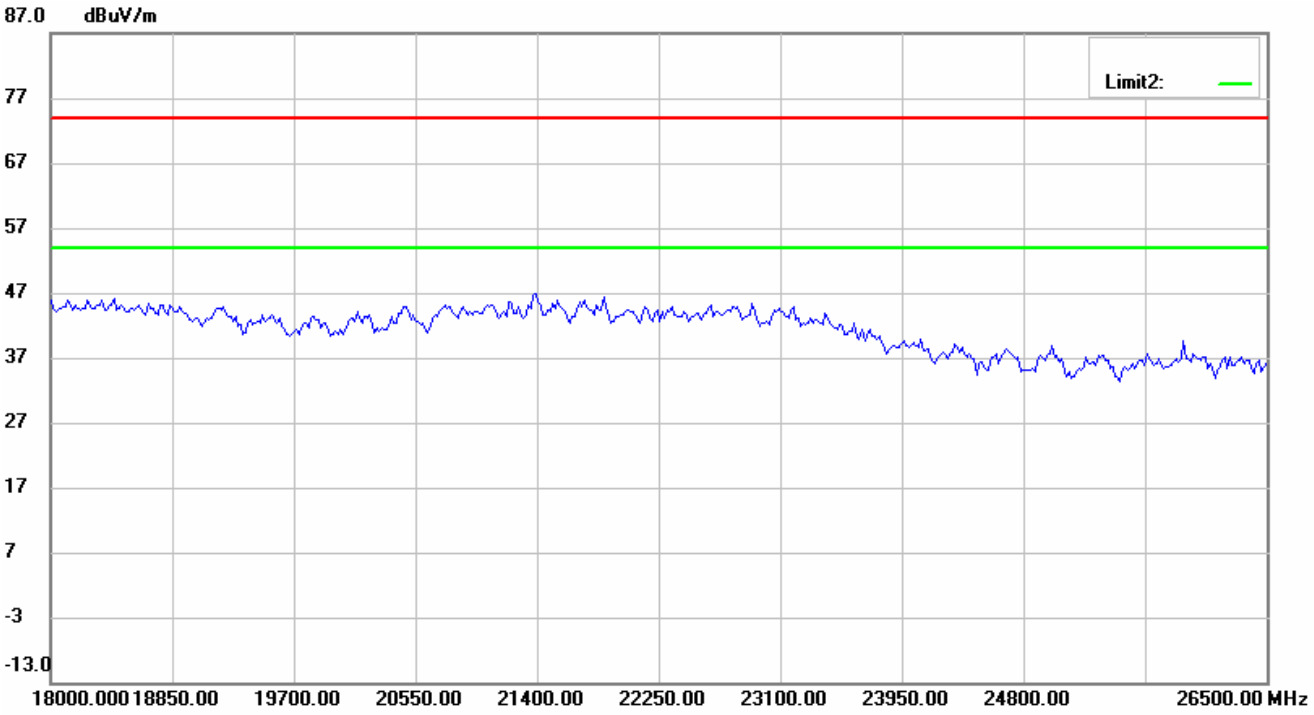
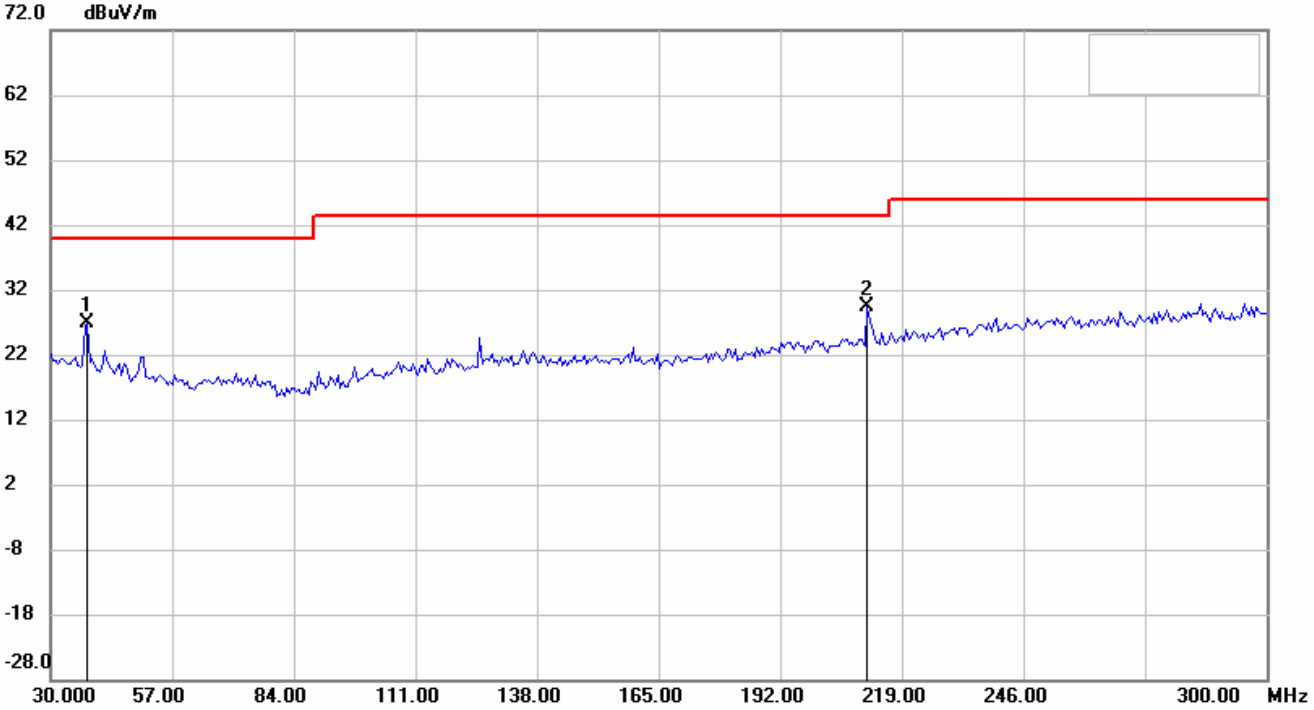
FCC ID: OR7GM520




Antenna Polarization V



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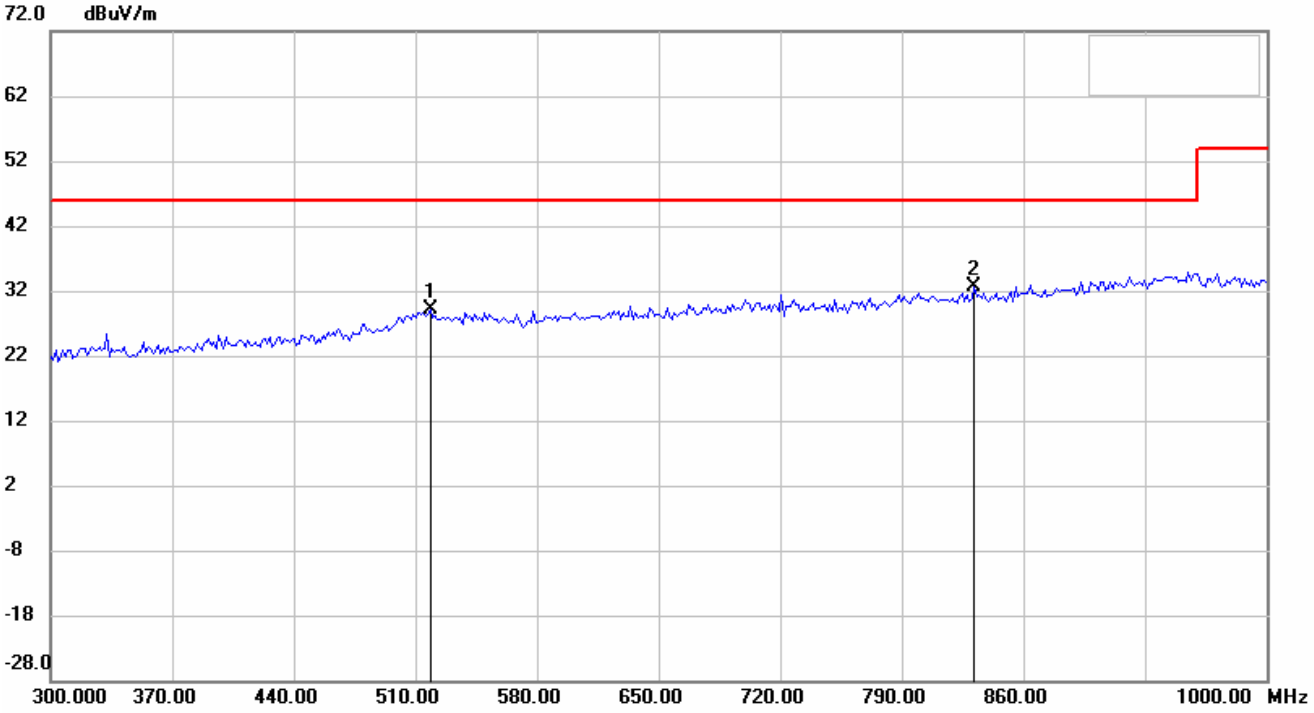


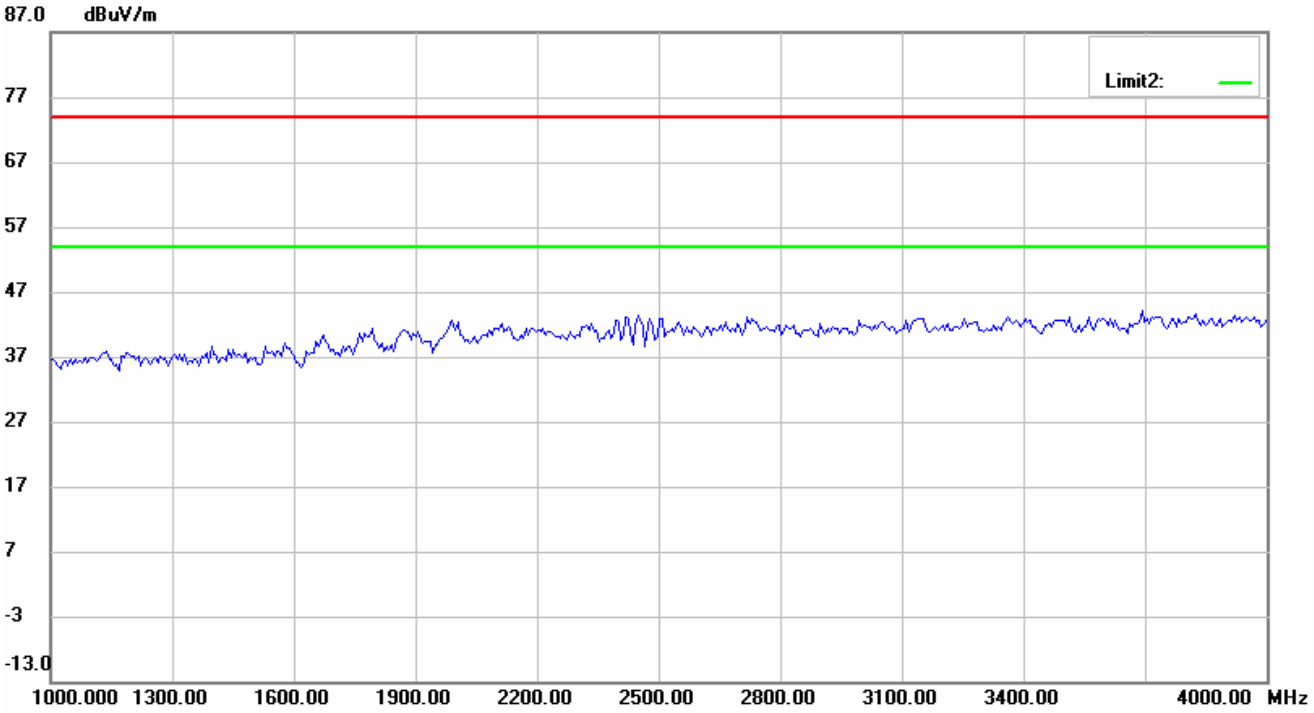

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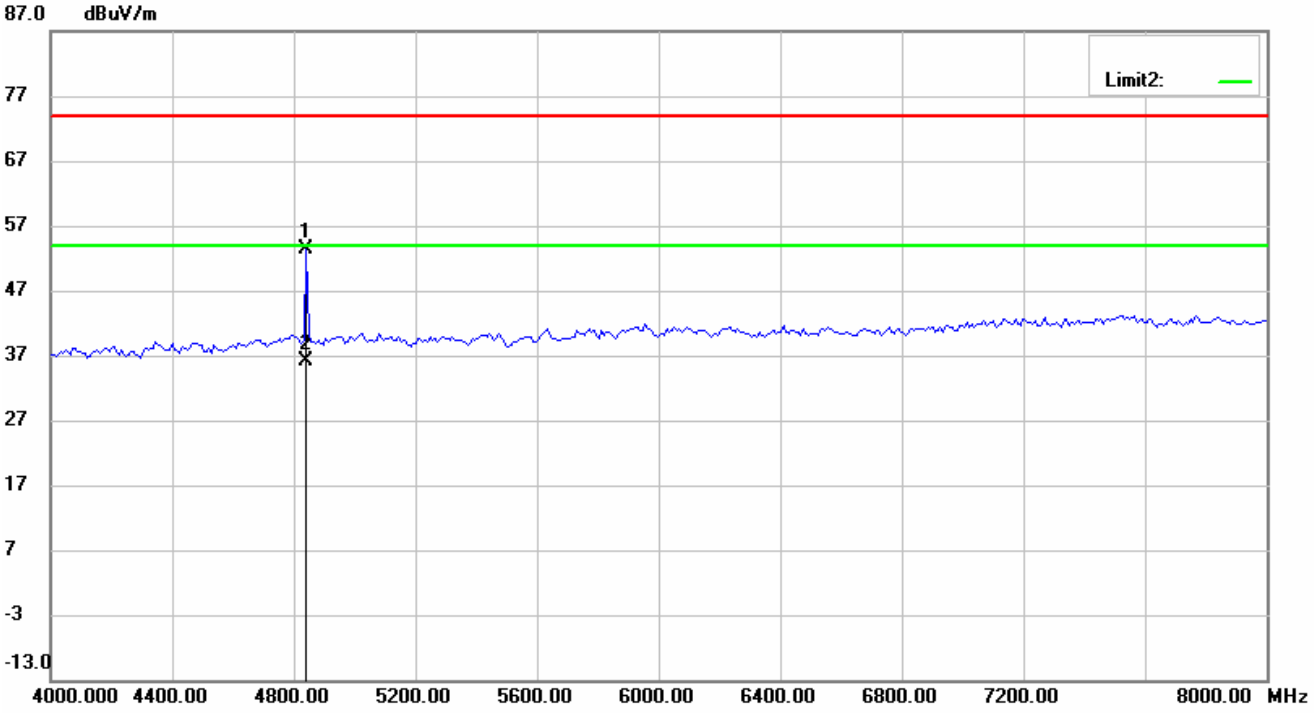


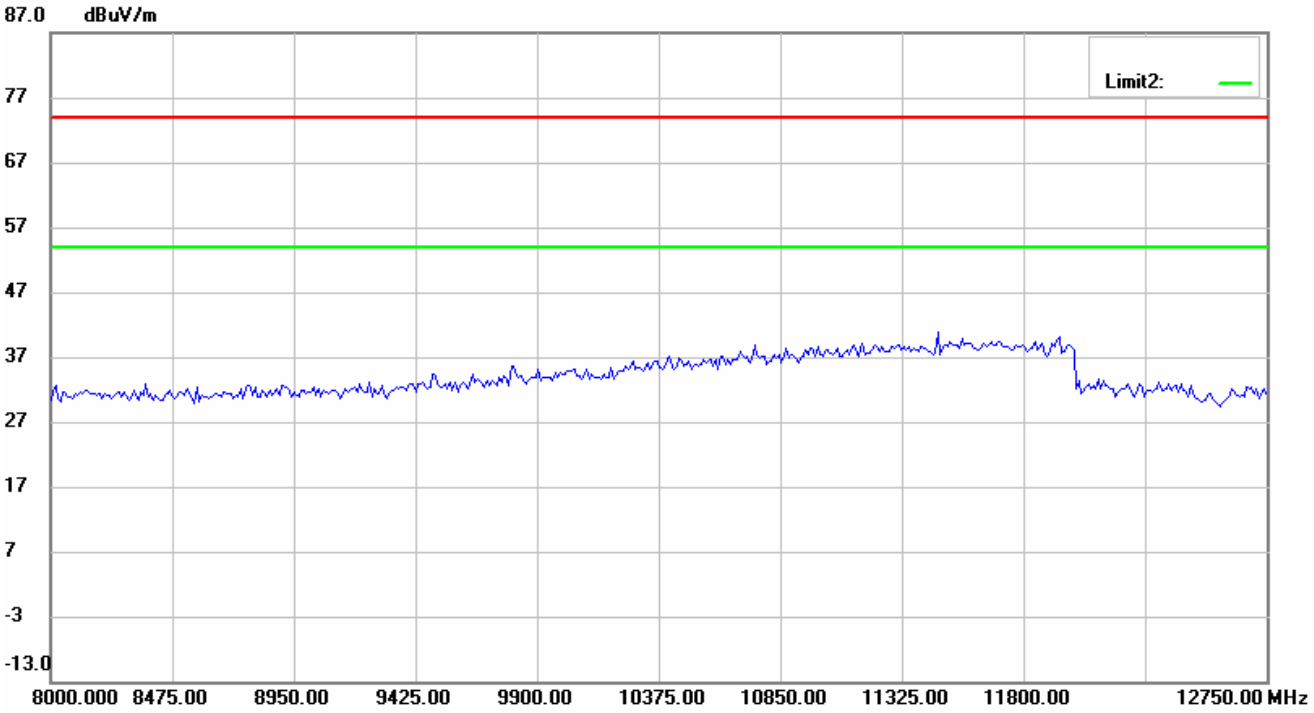

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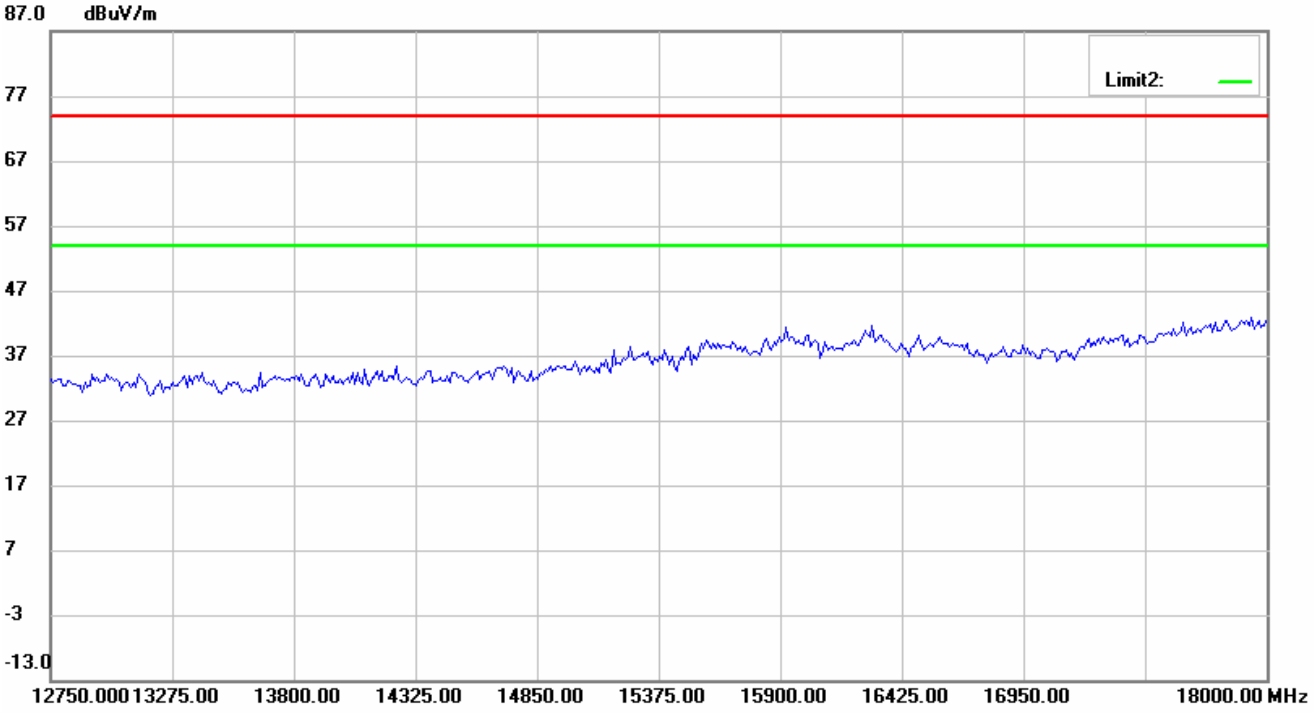
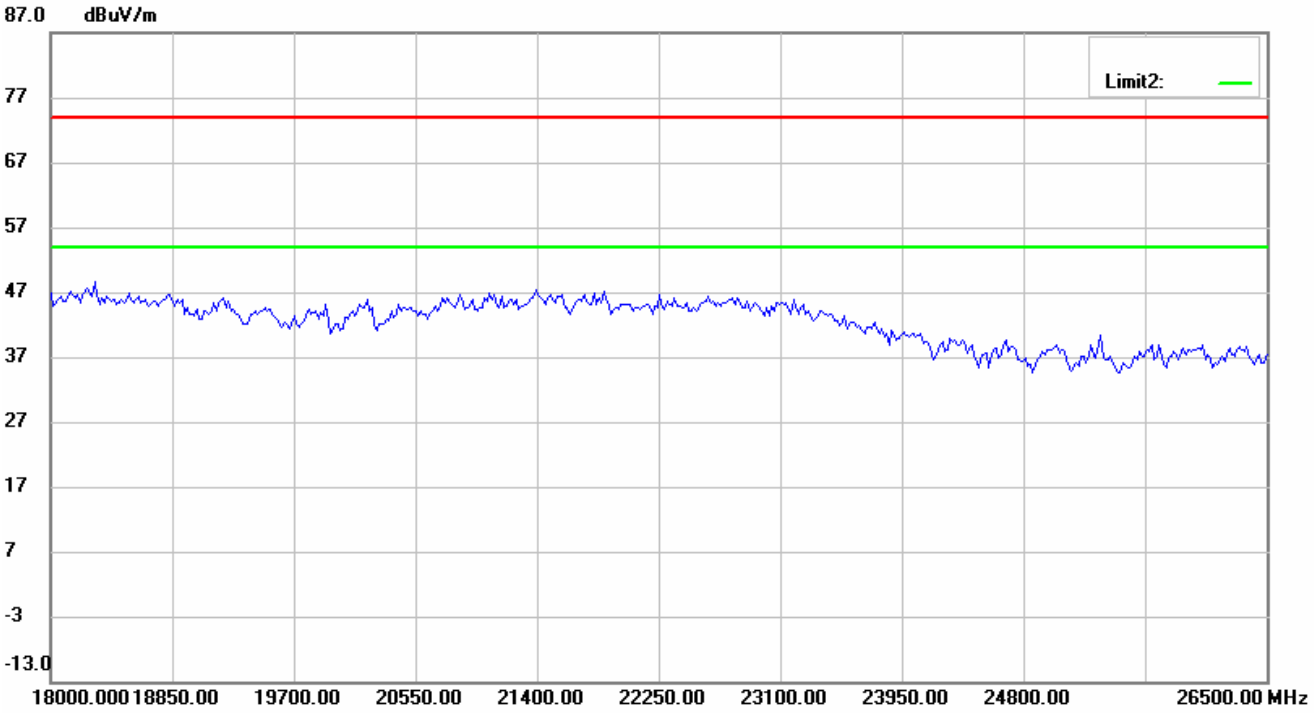
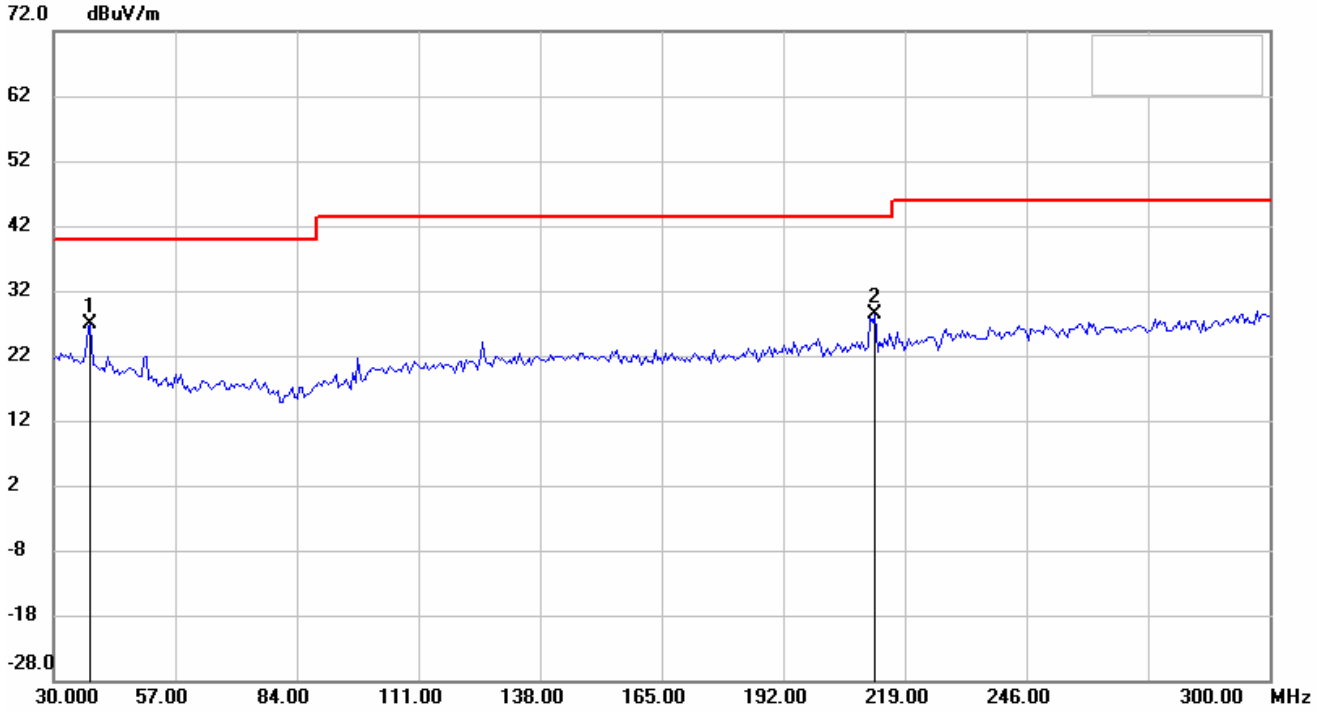
FCC ID: OR7GM520

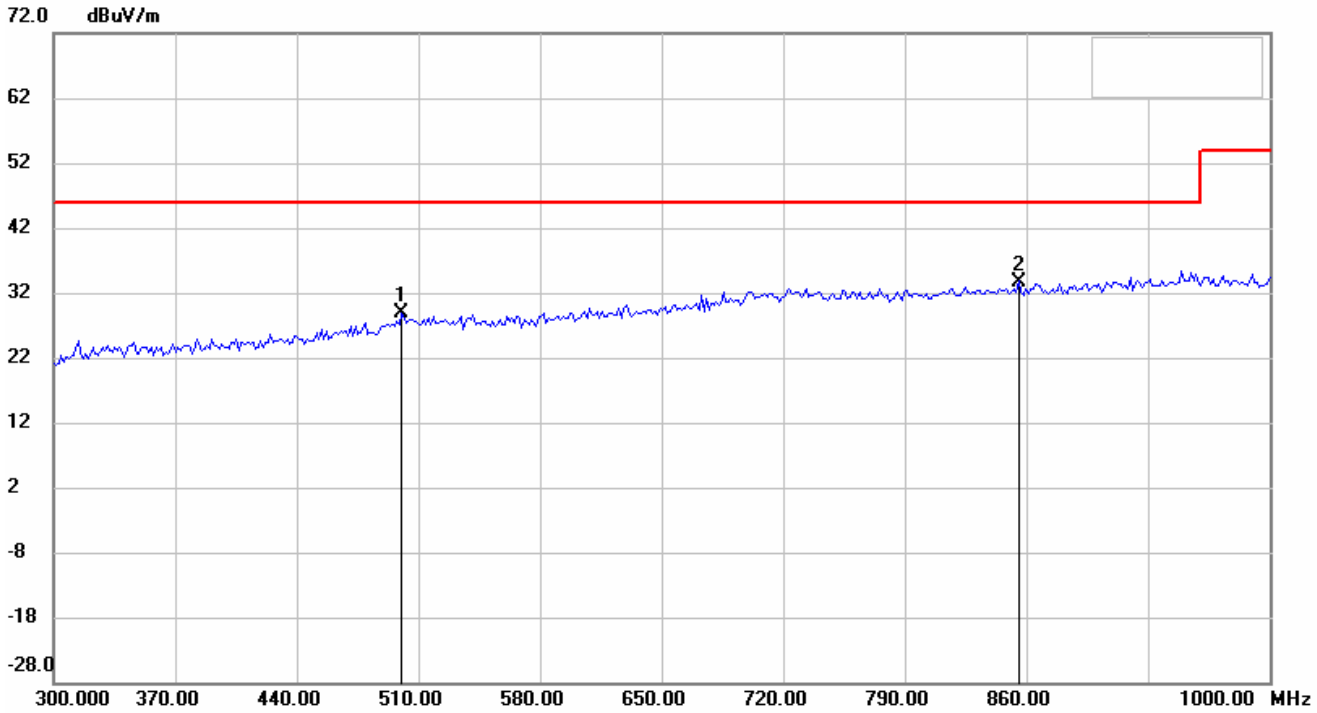


Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

# Middle Channel
# Antenna Polarization H



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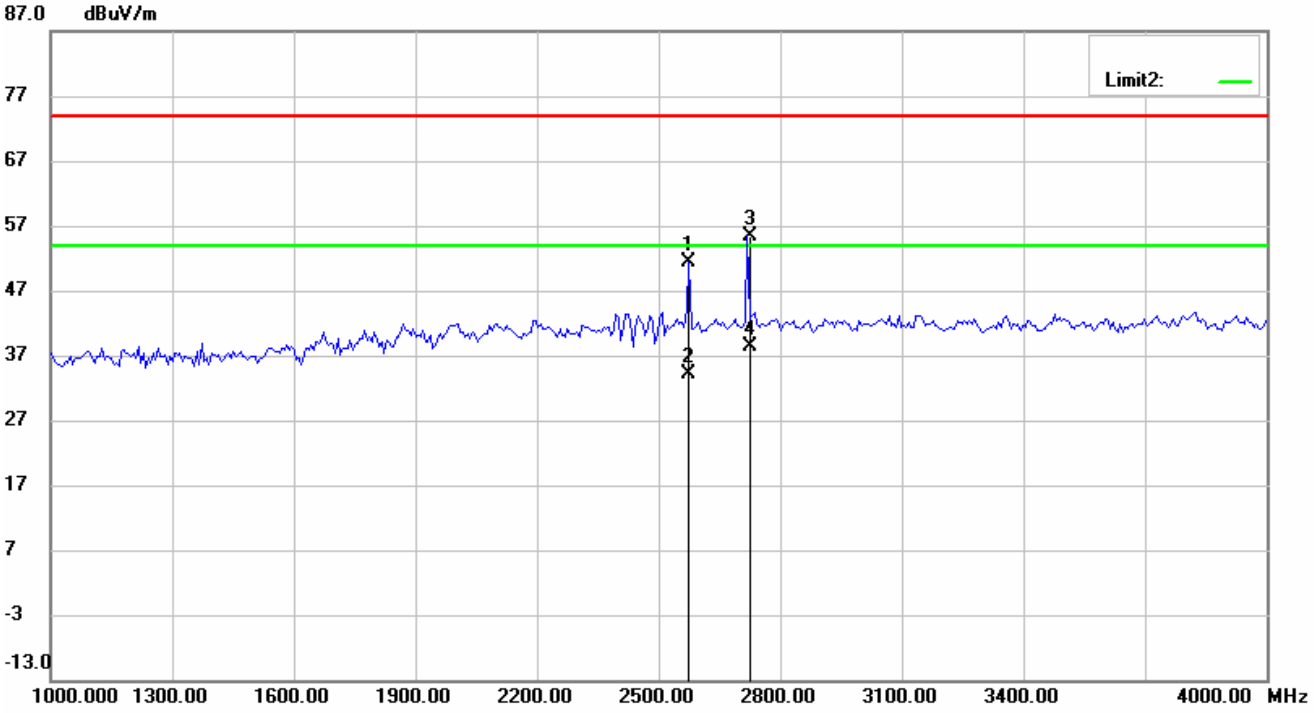


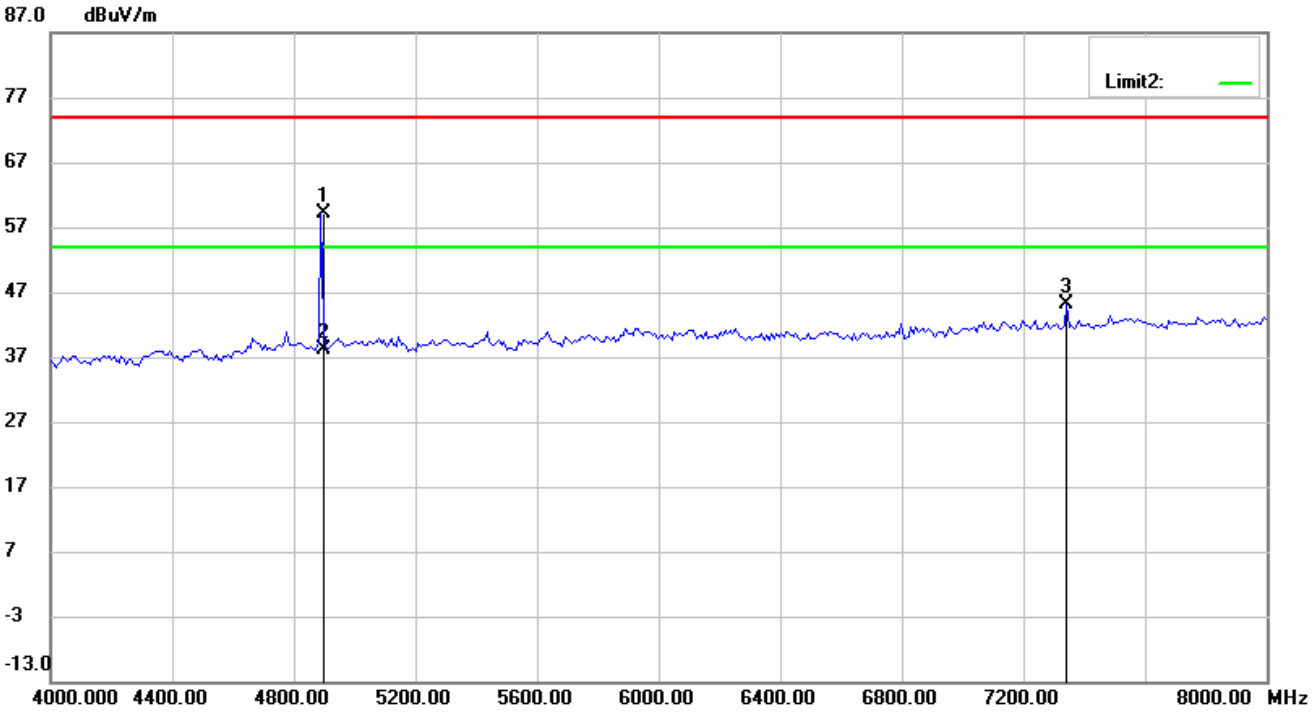

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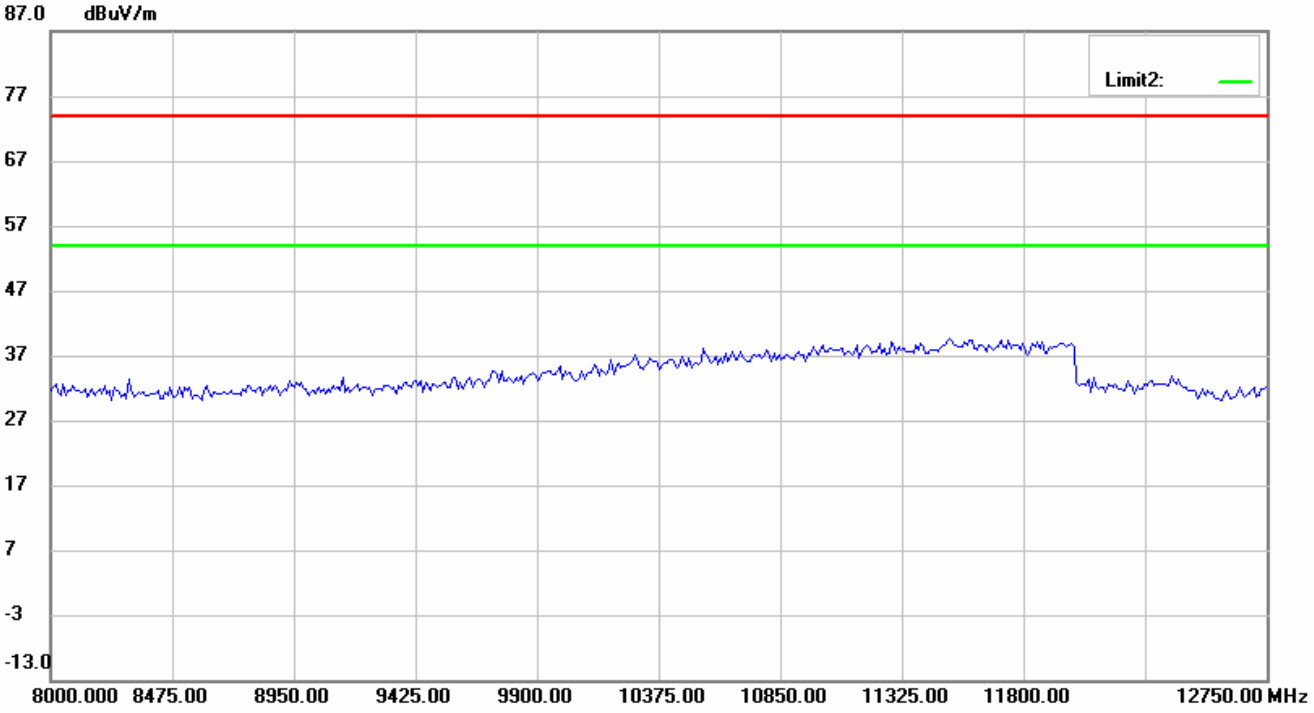


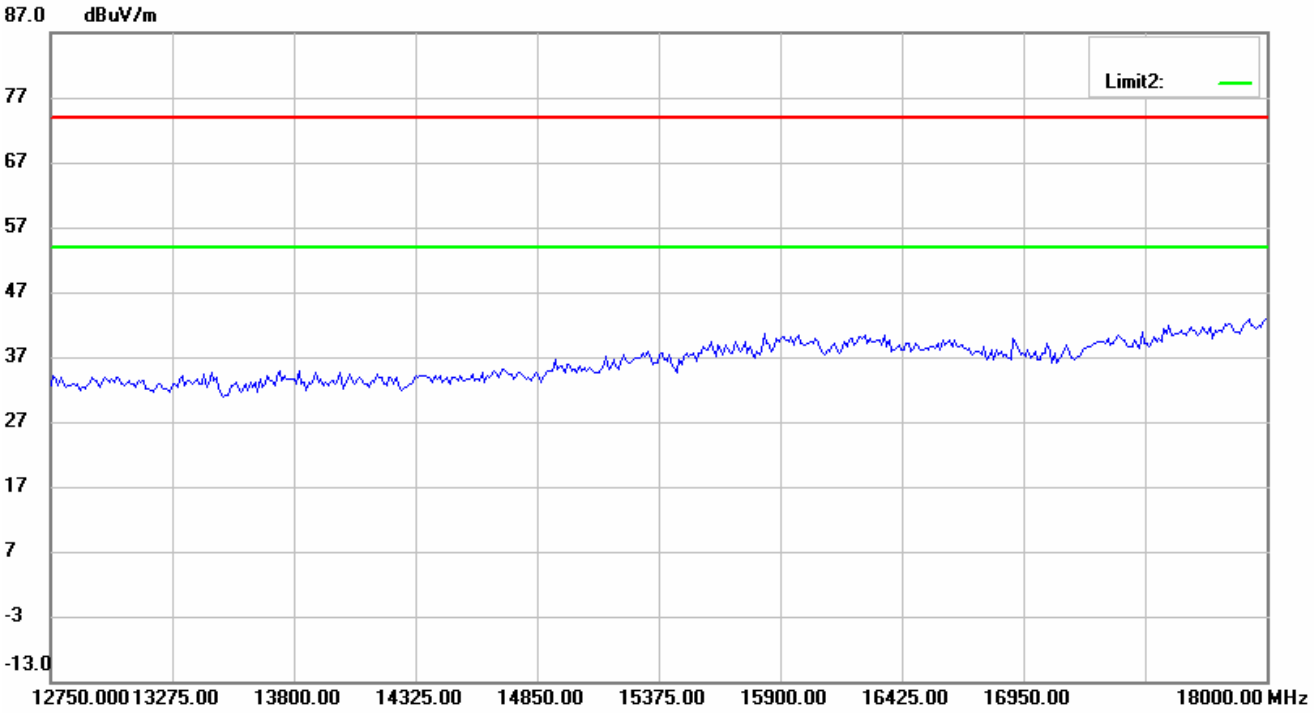

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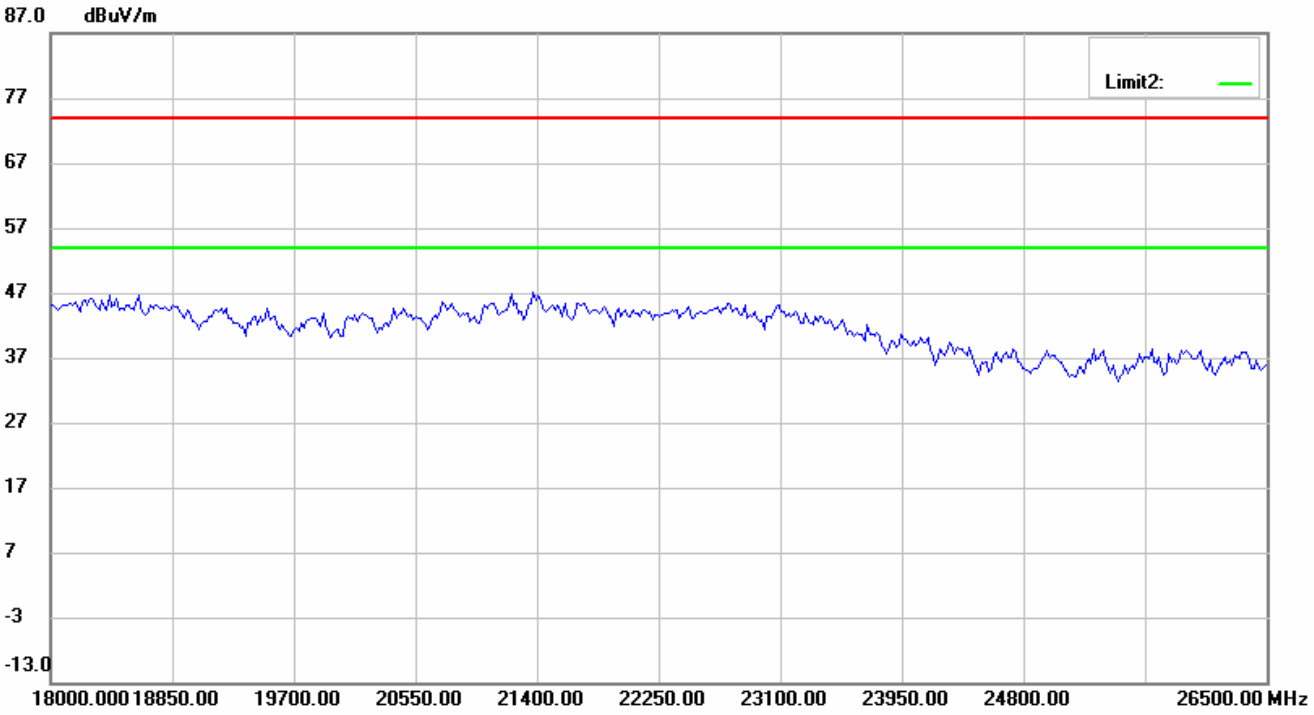
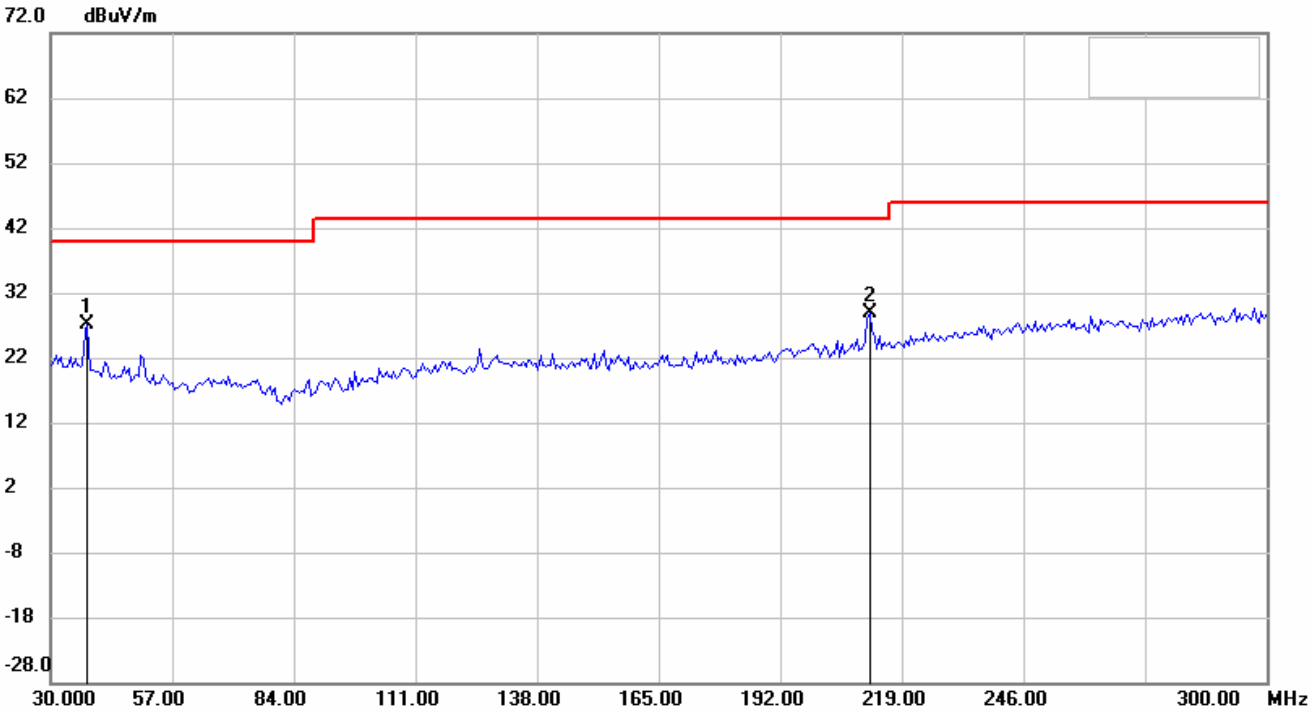



Antenna Polarization V



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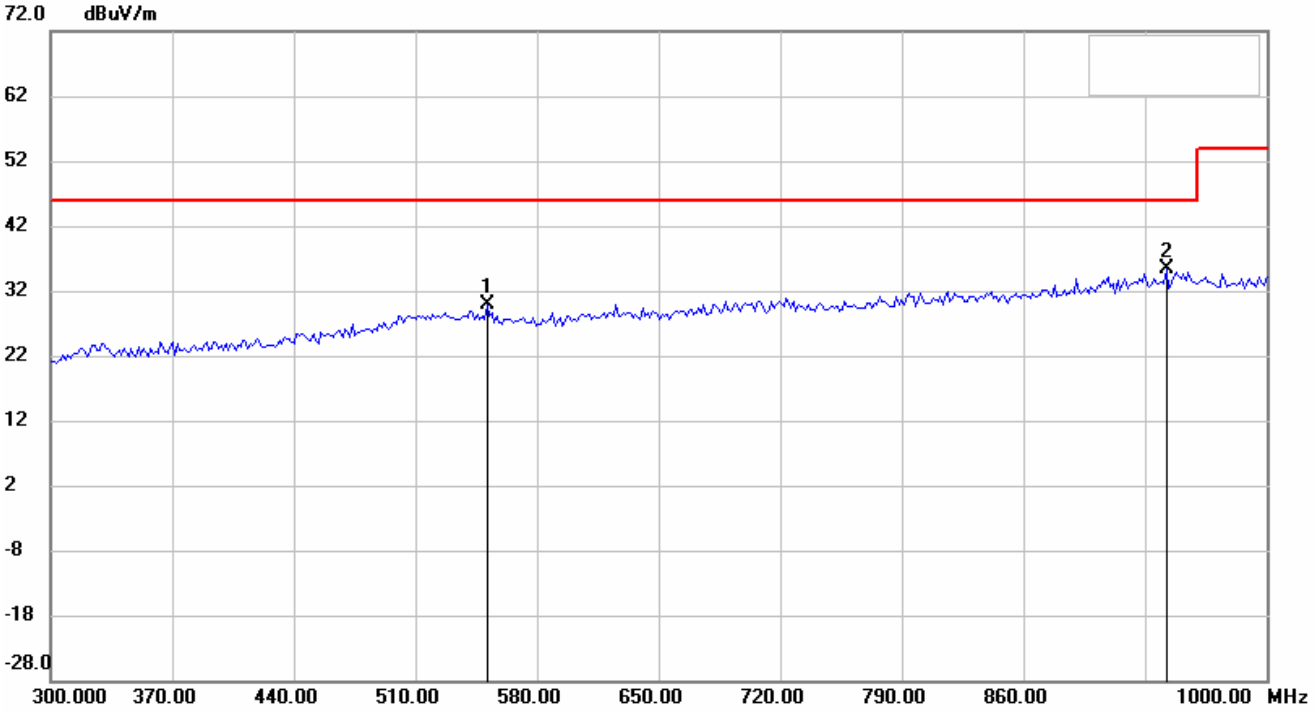


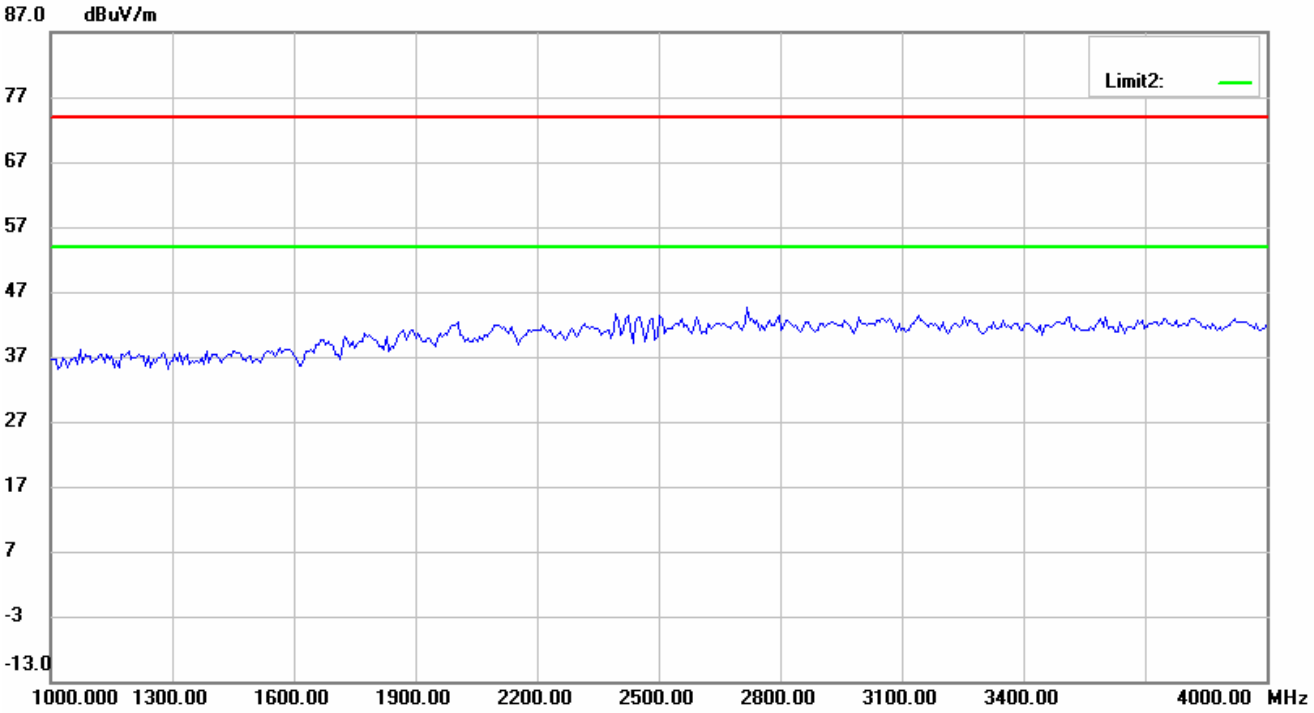

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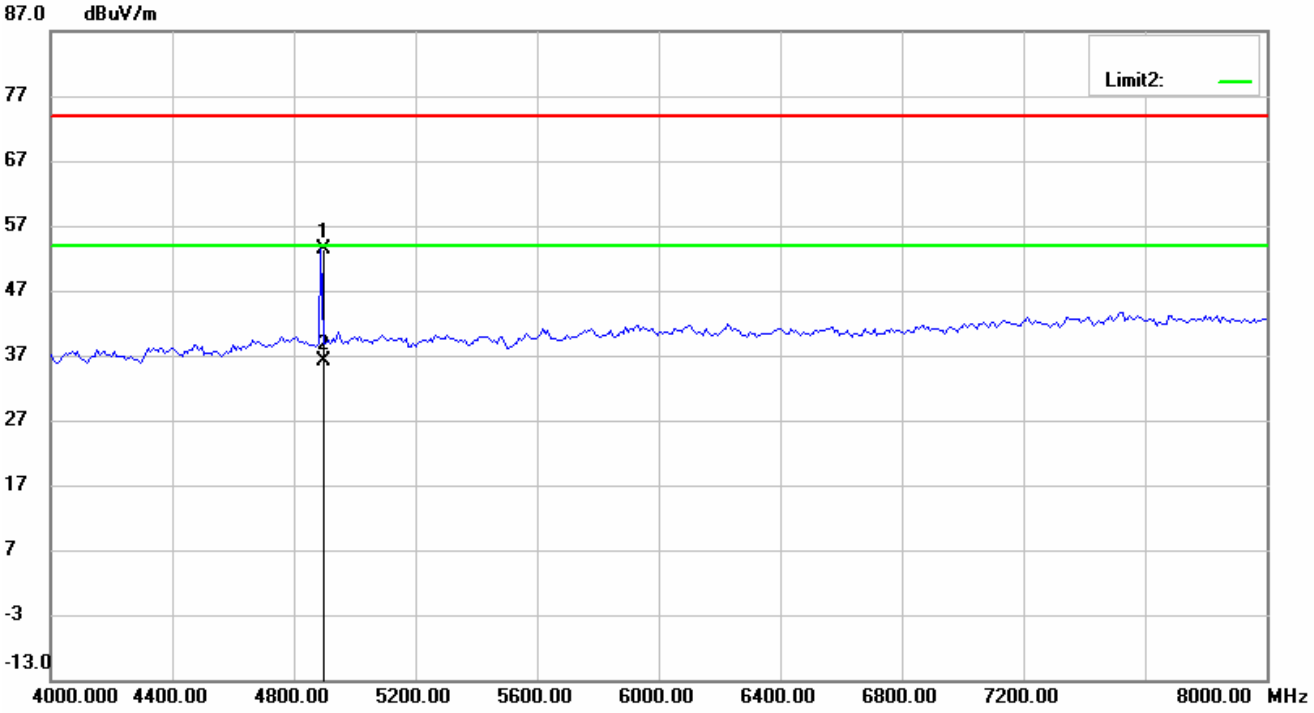


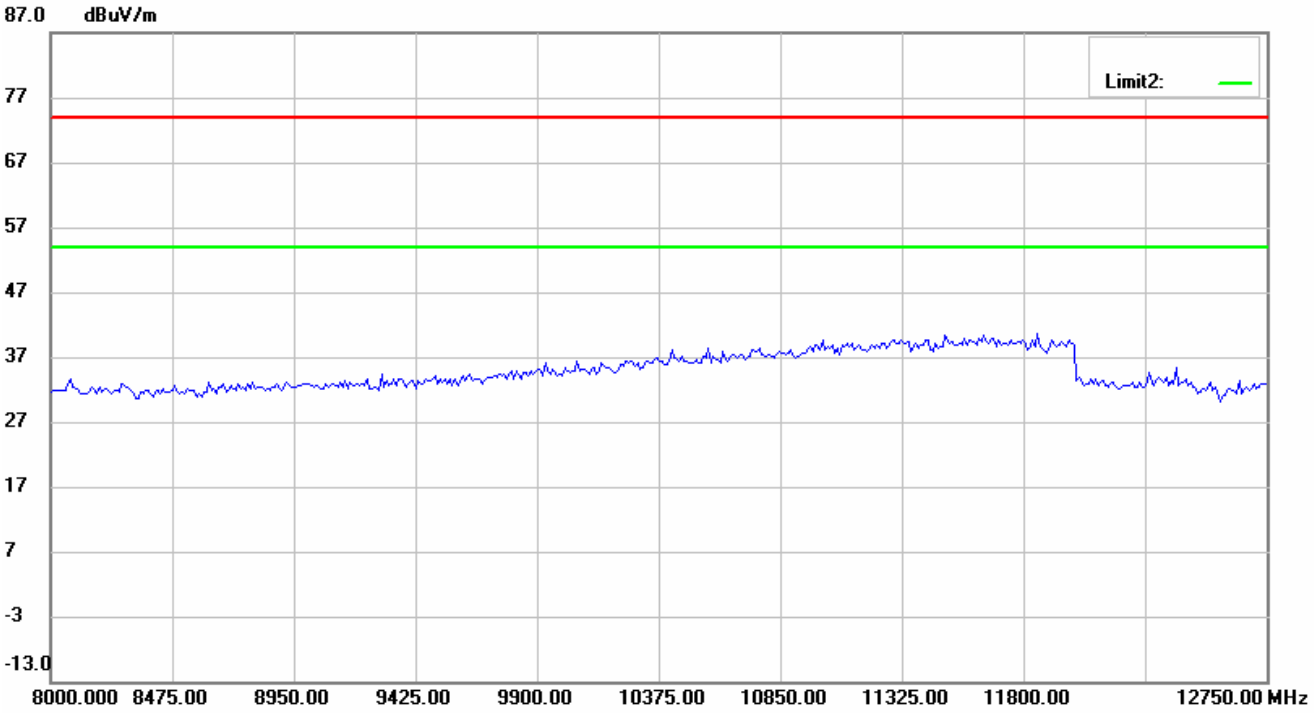

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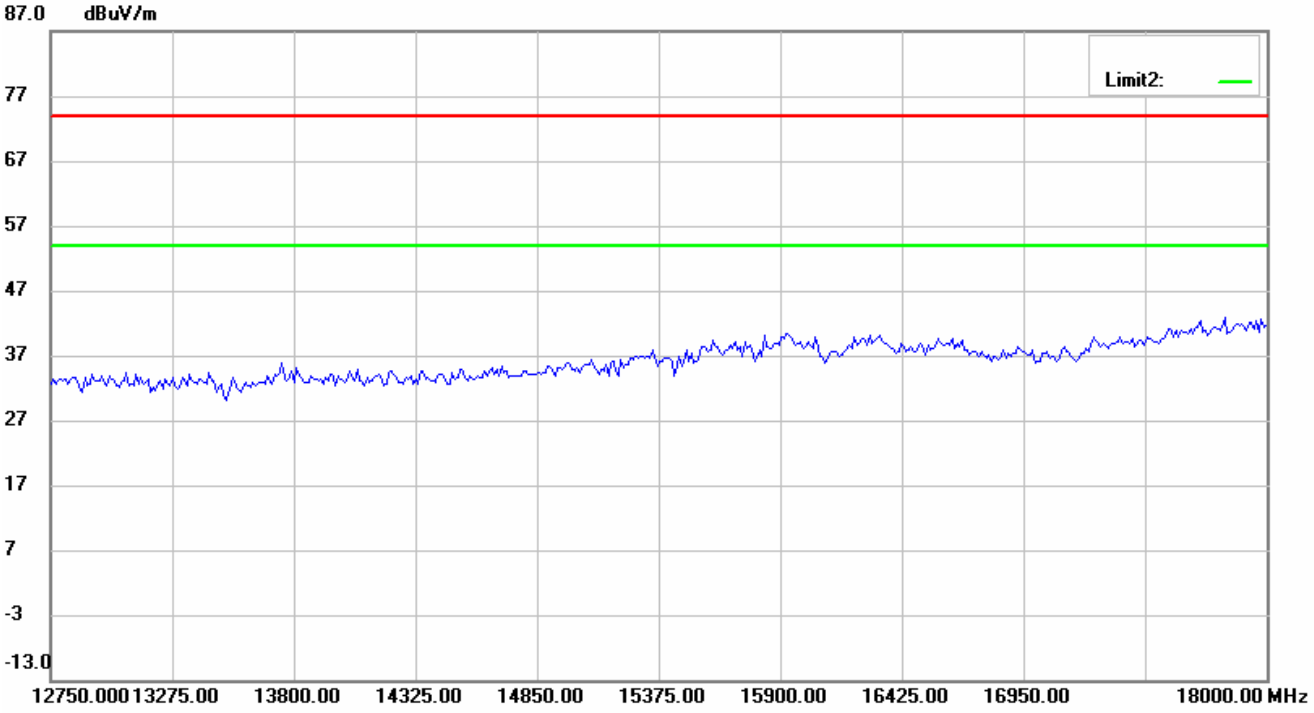
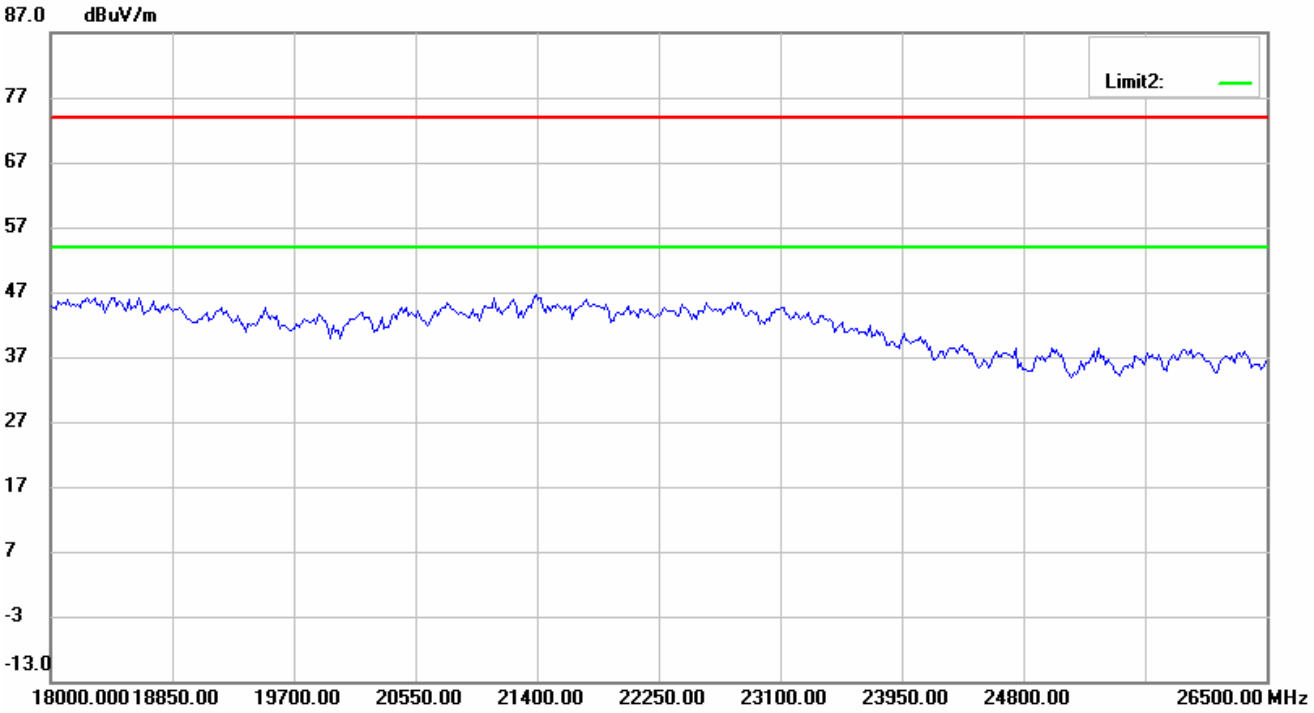
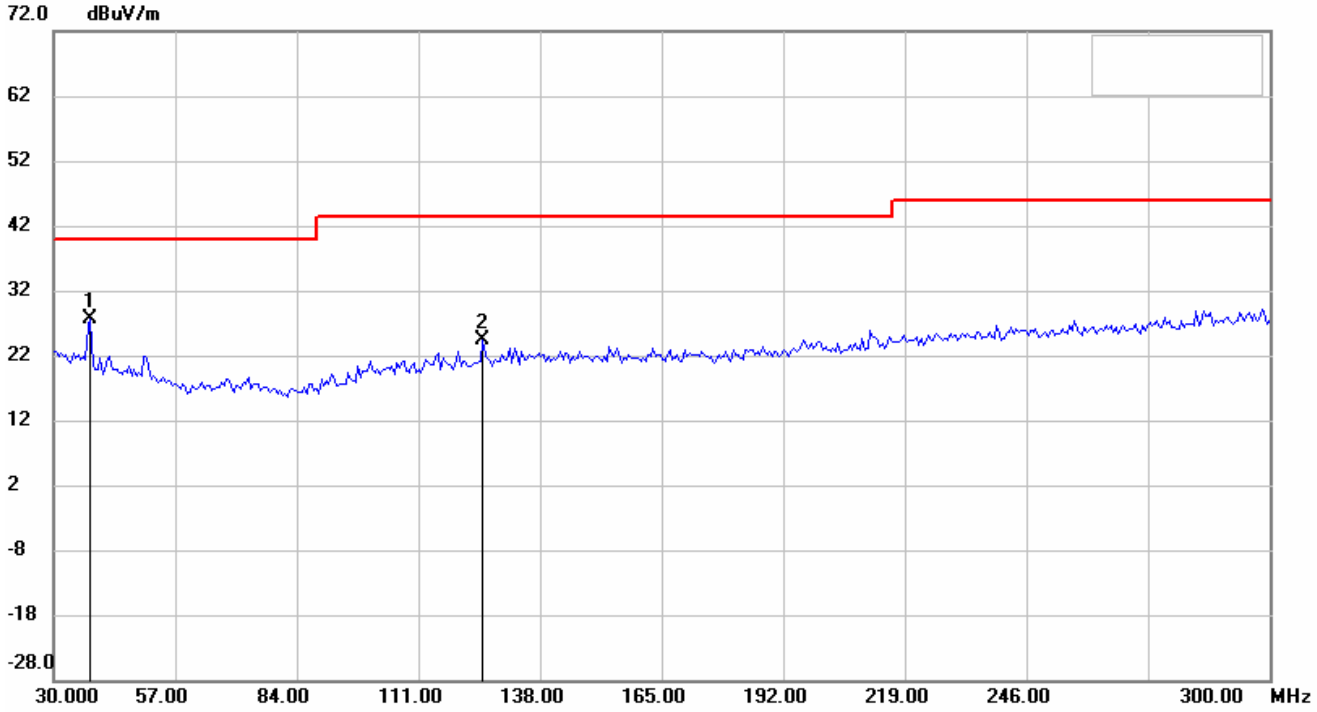
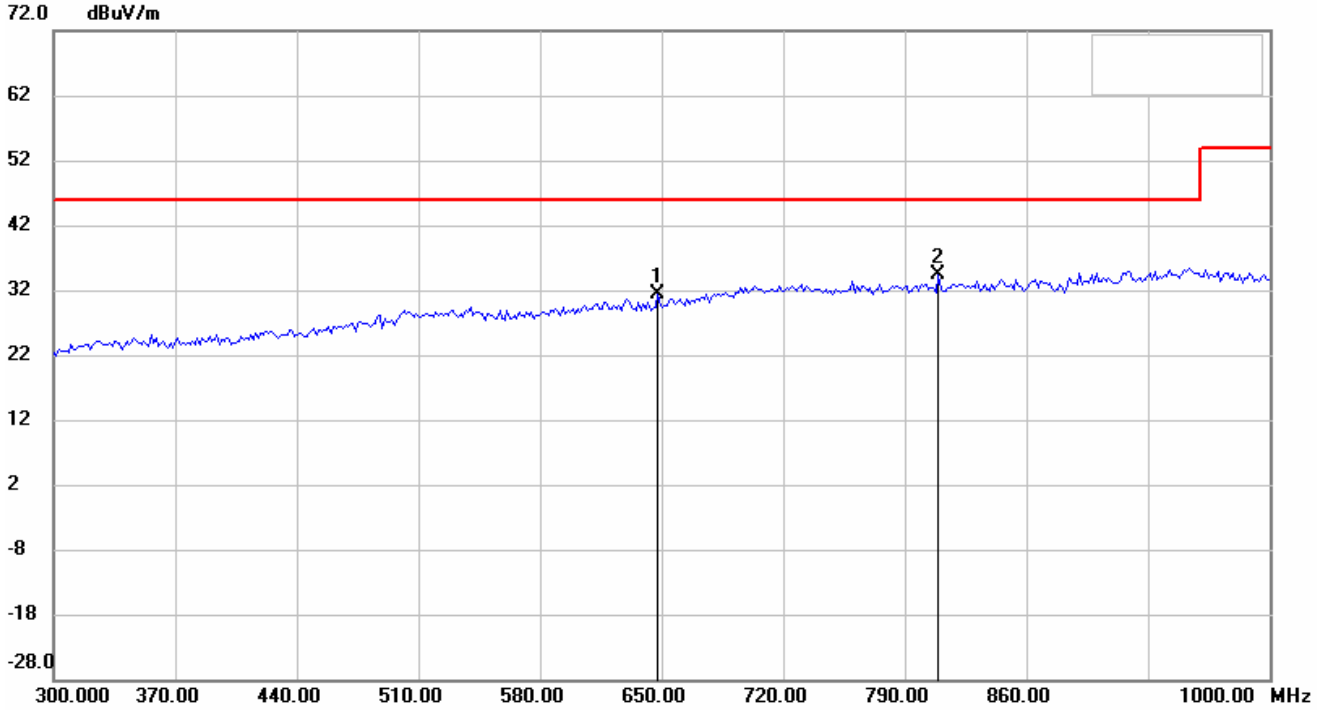


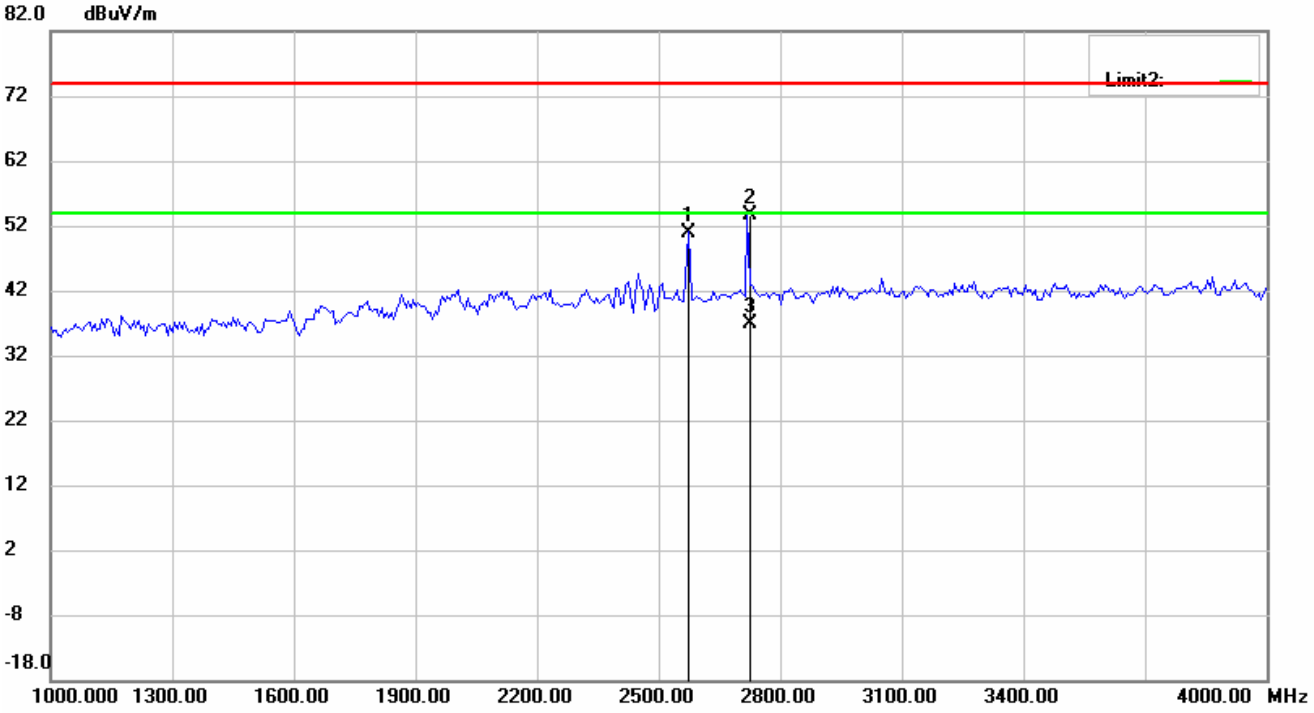
Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

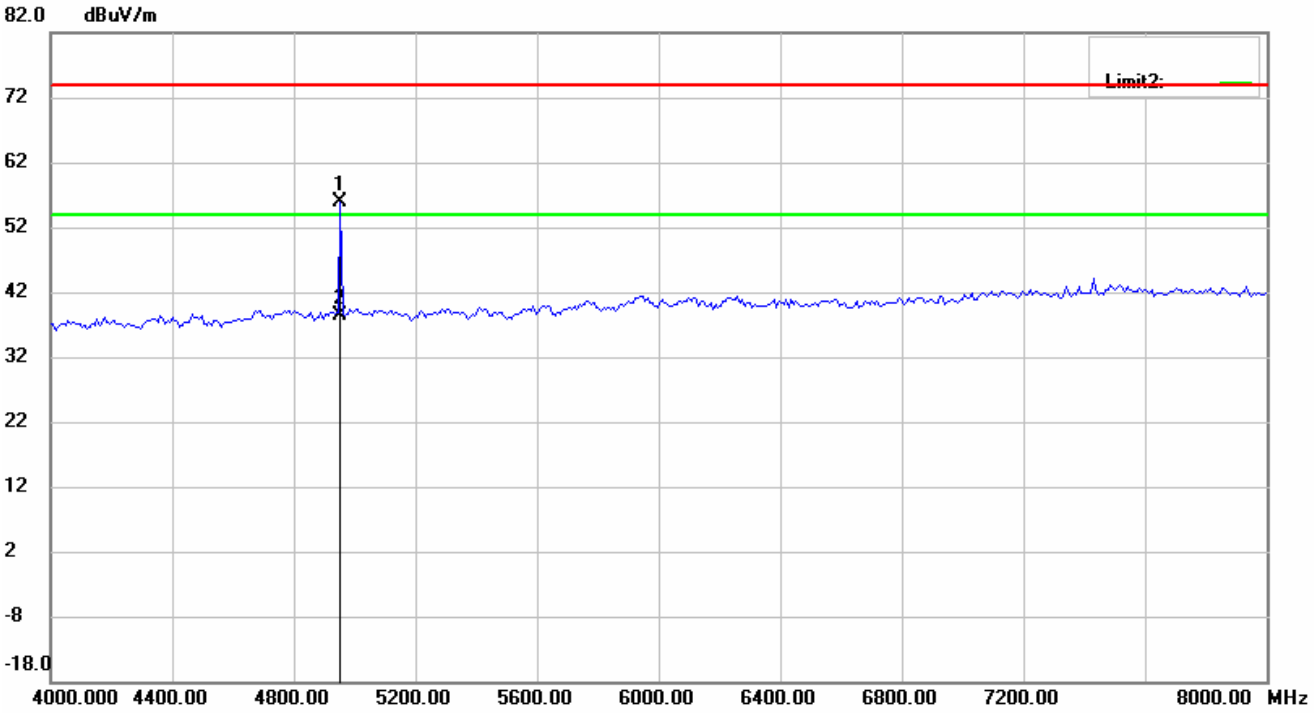
# High Channel
# Antenna Polarization H



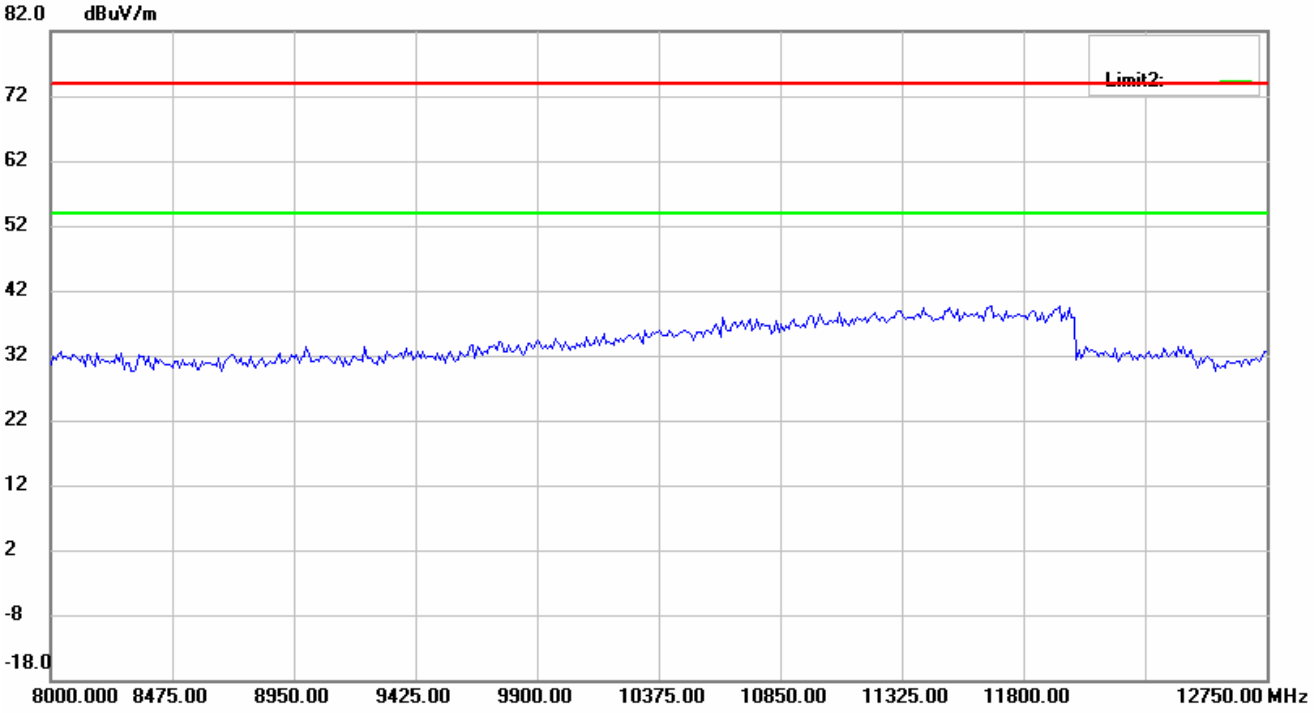



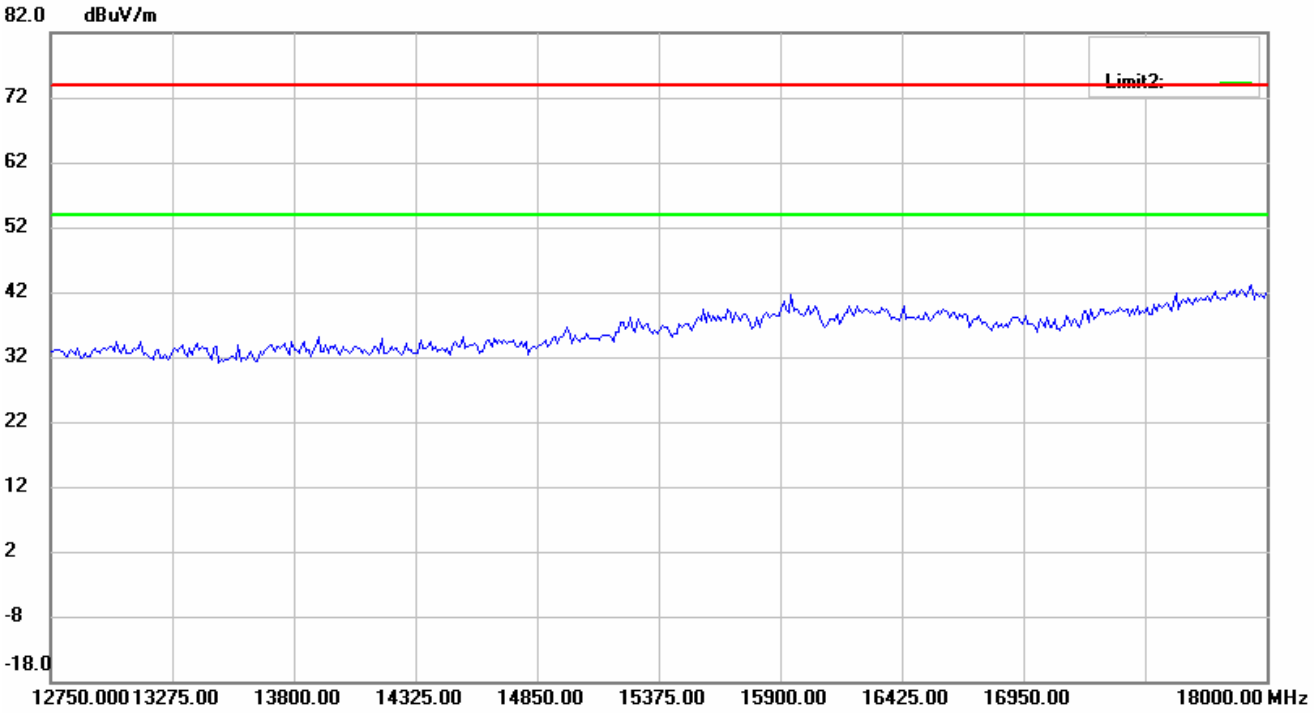
Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520



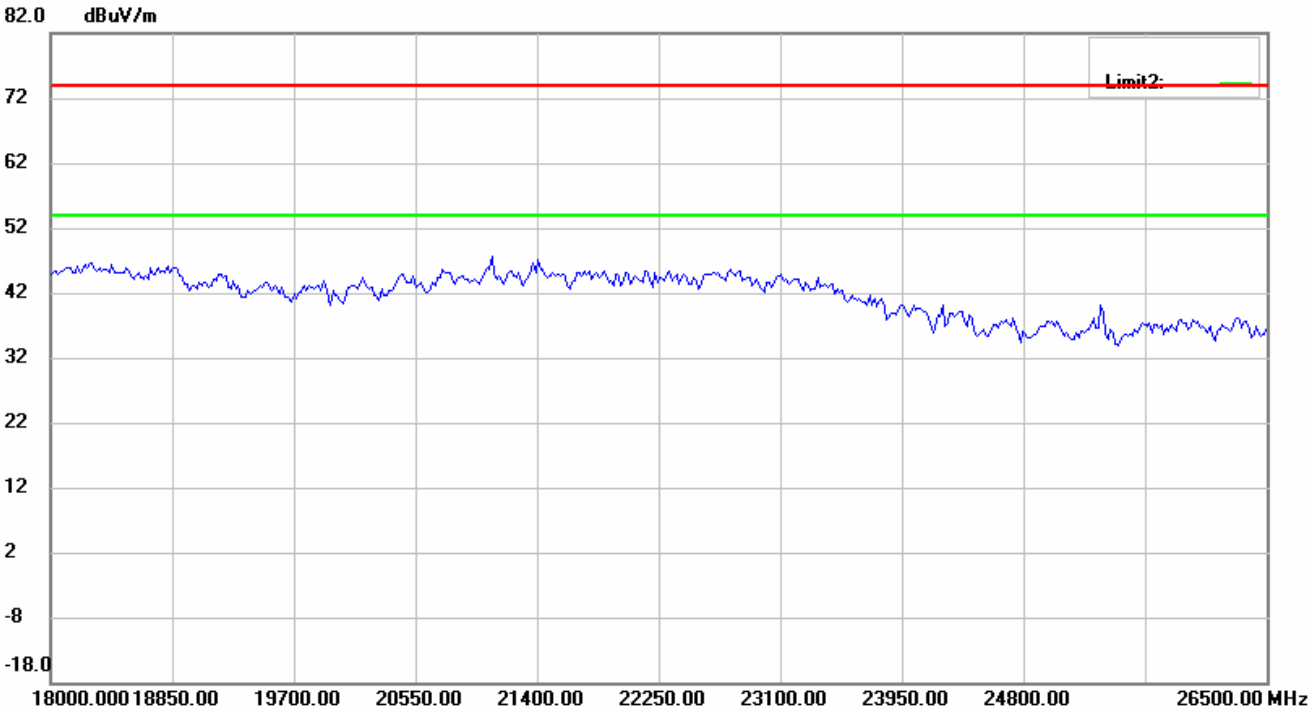



Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

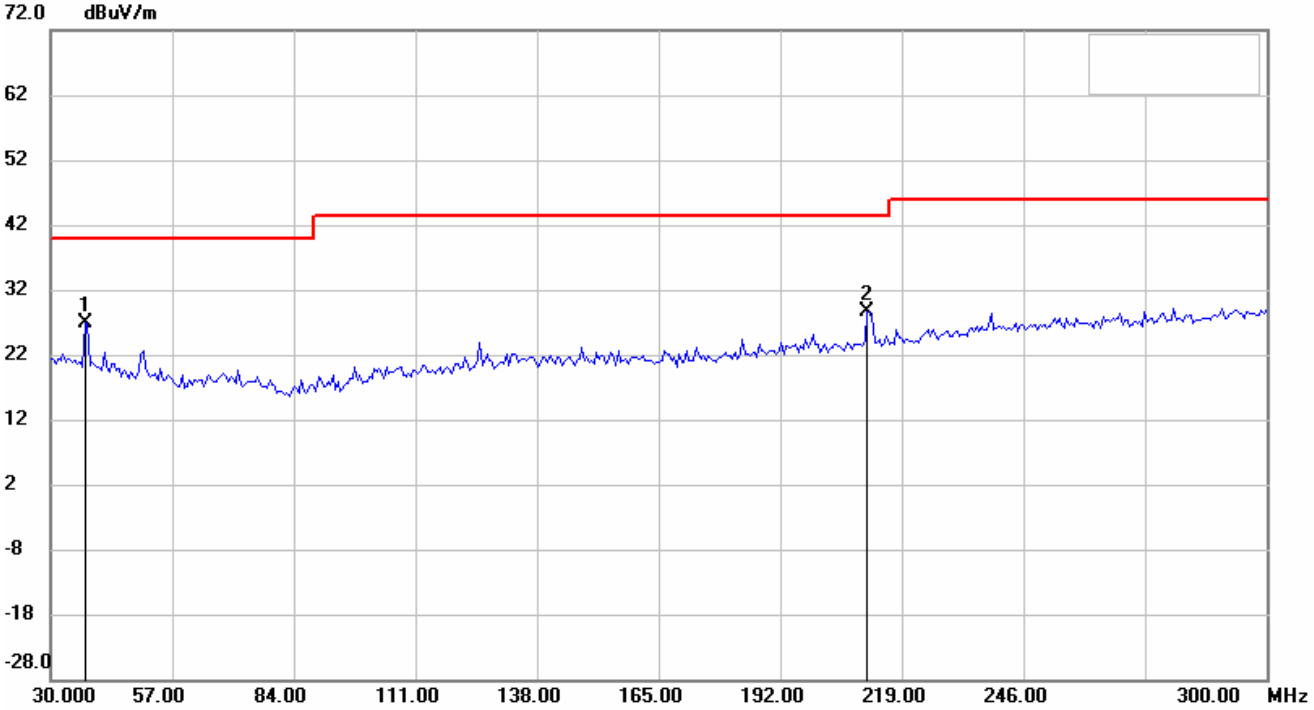


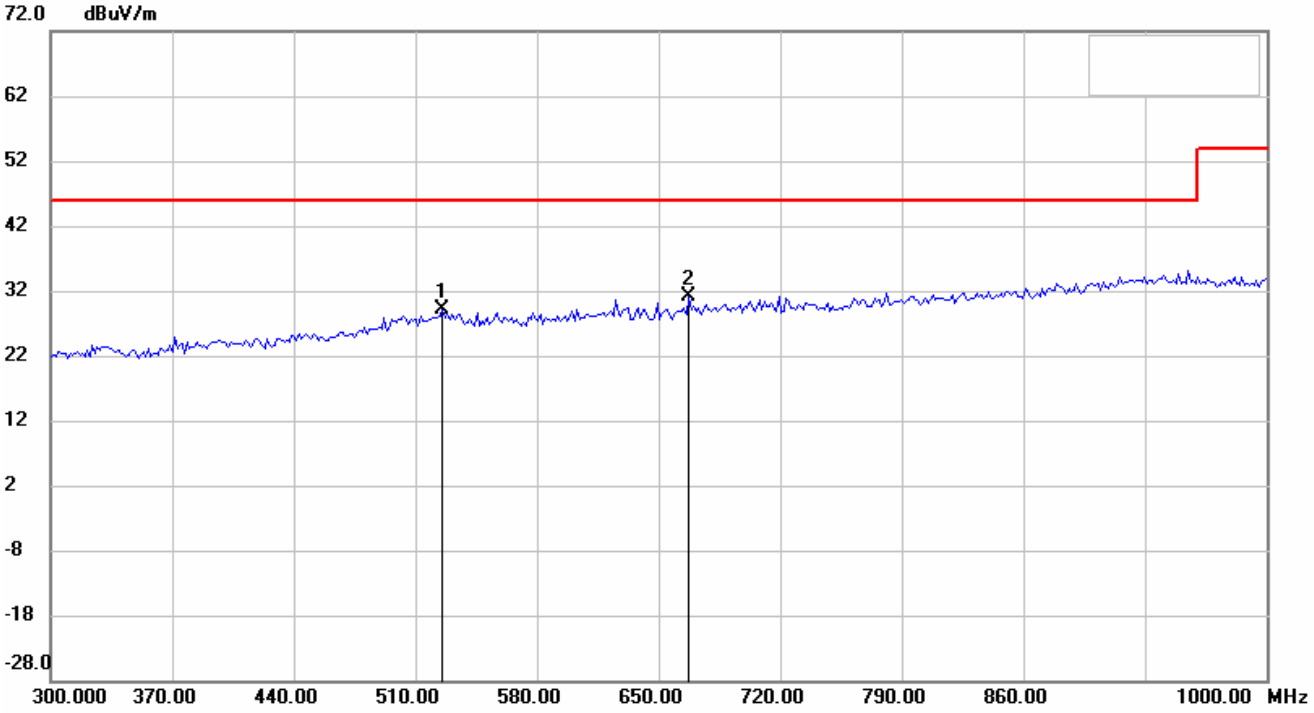
Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

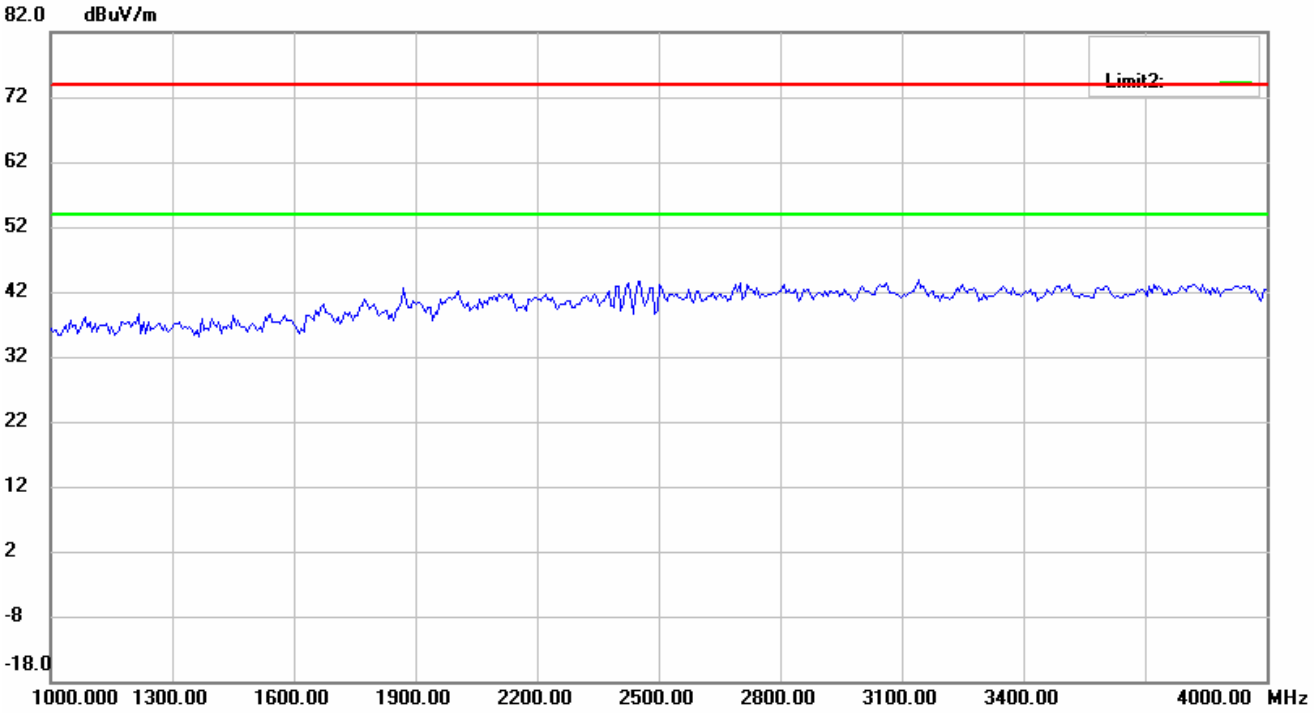



Antenna Polarization V



Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520



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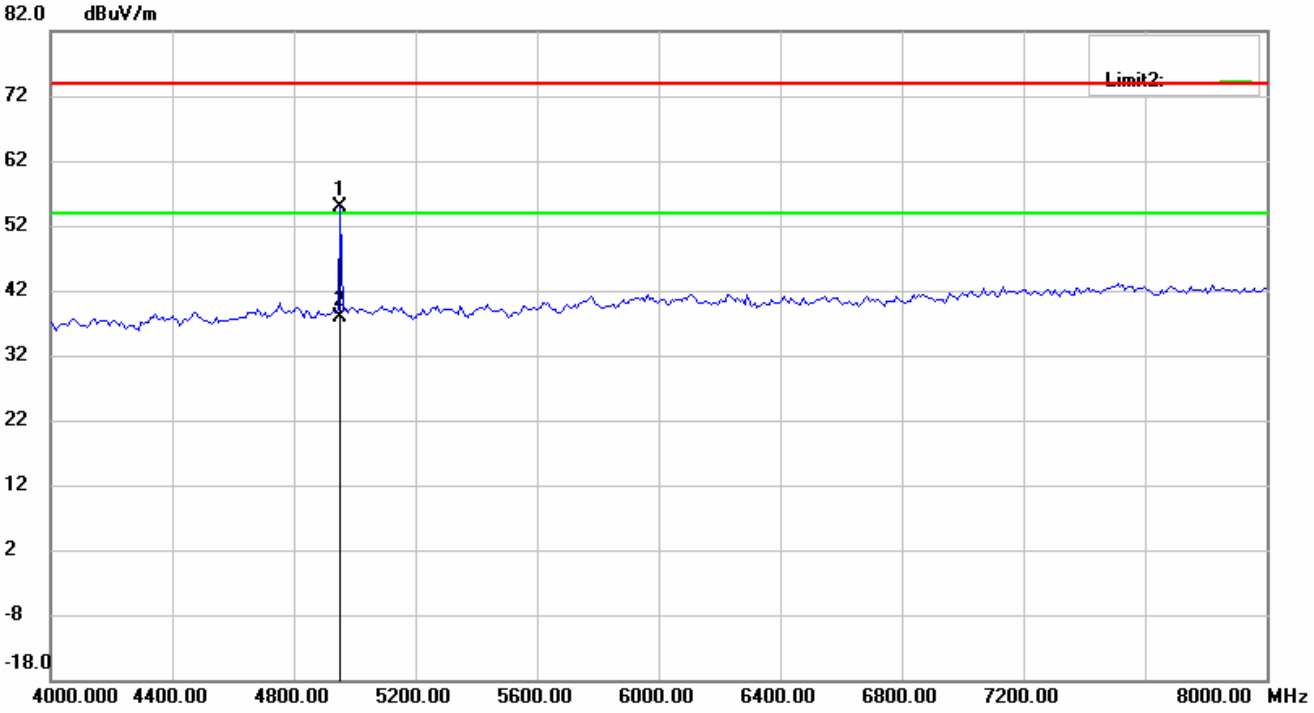


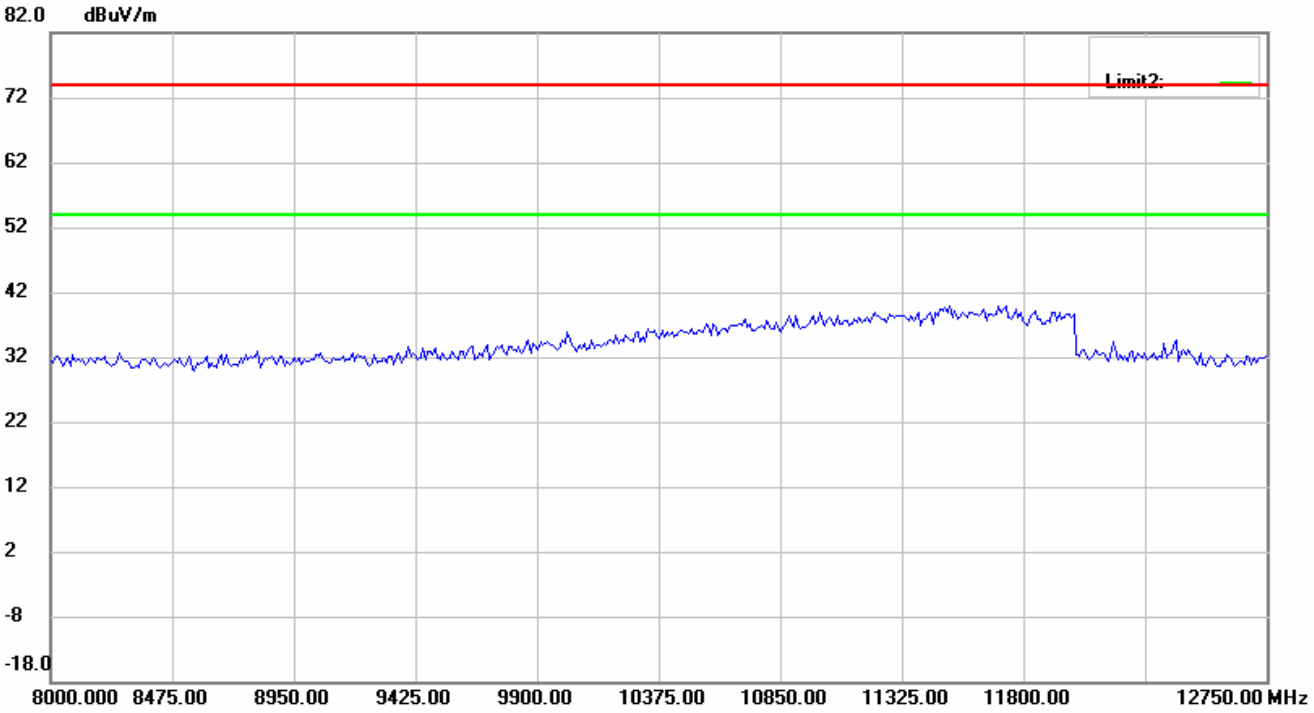

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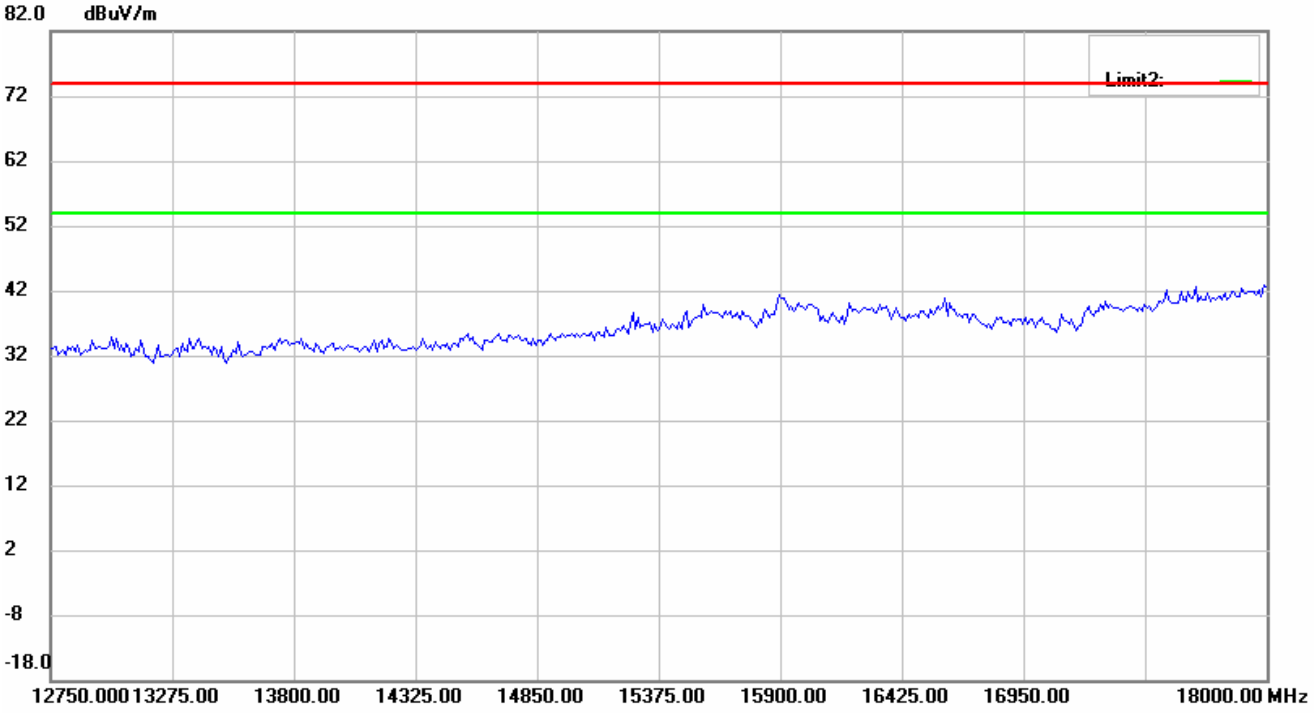
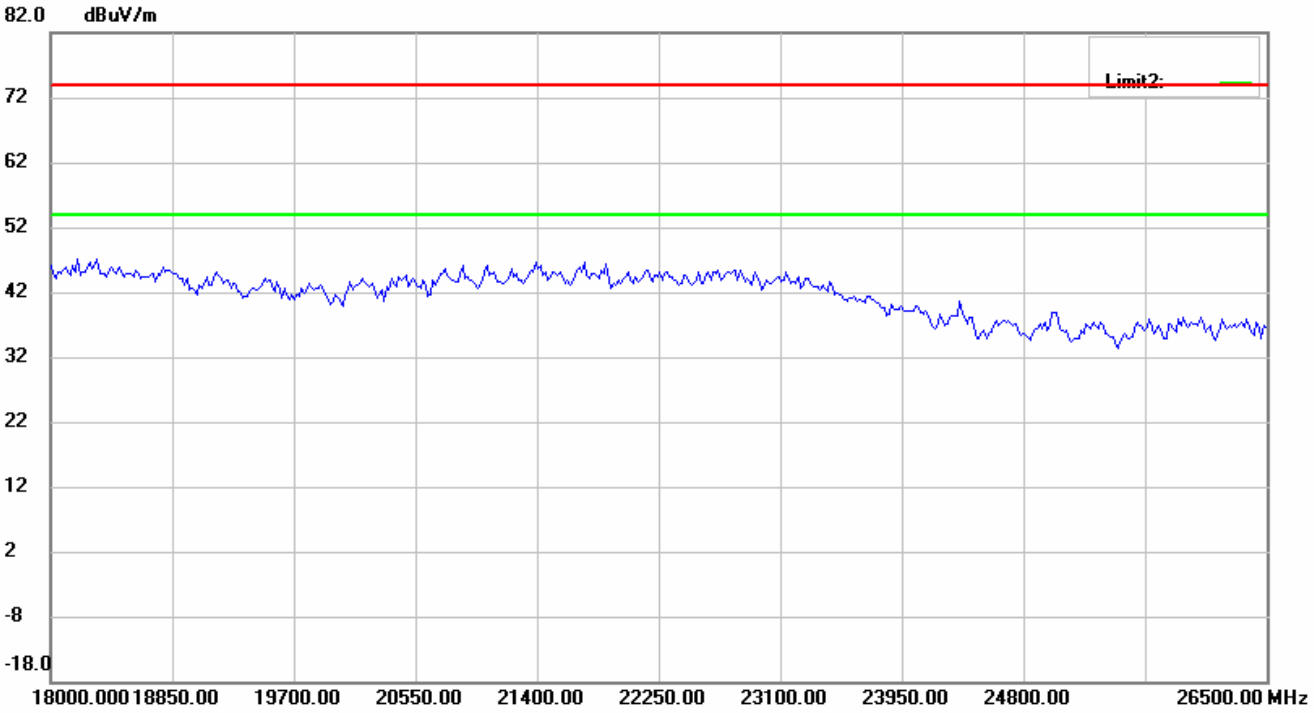
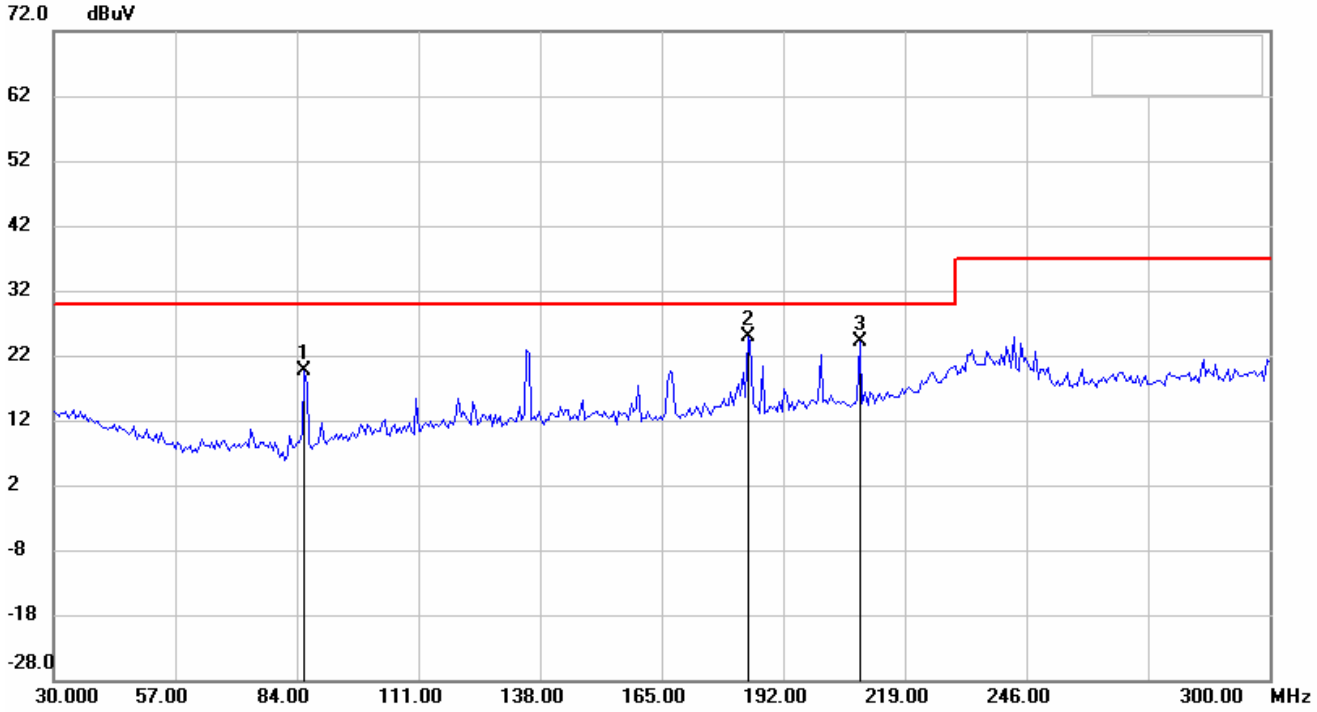
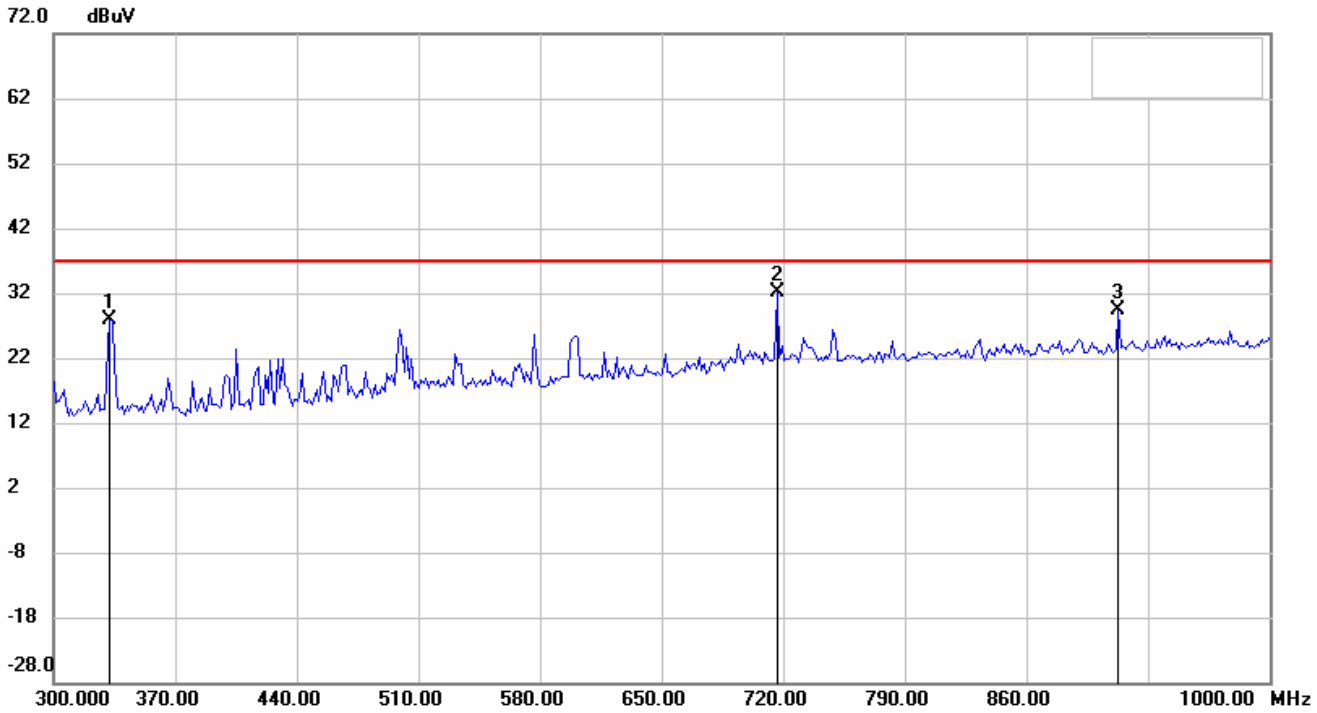


Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

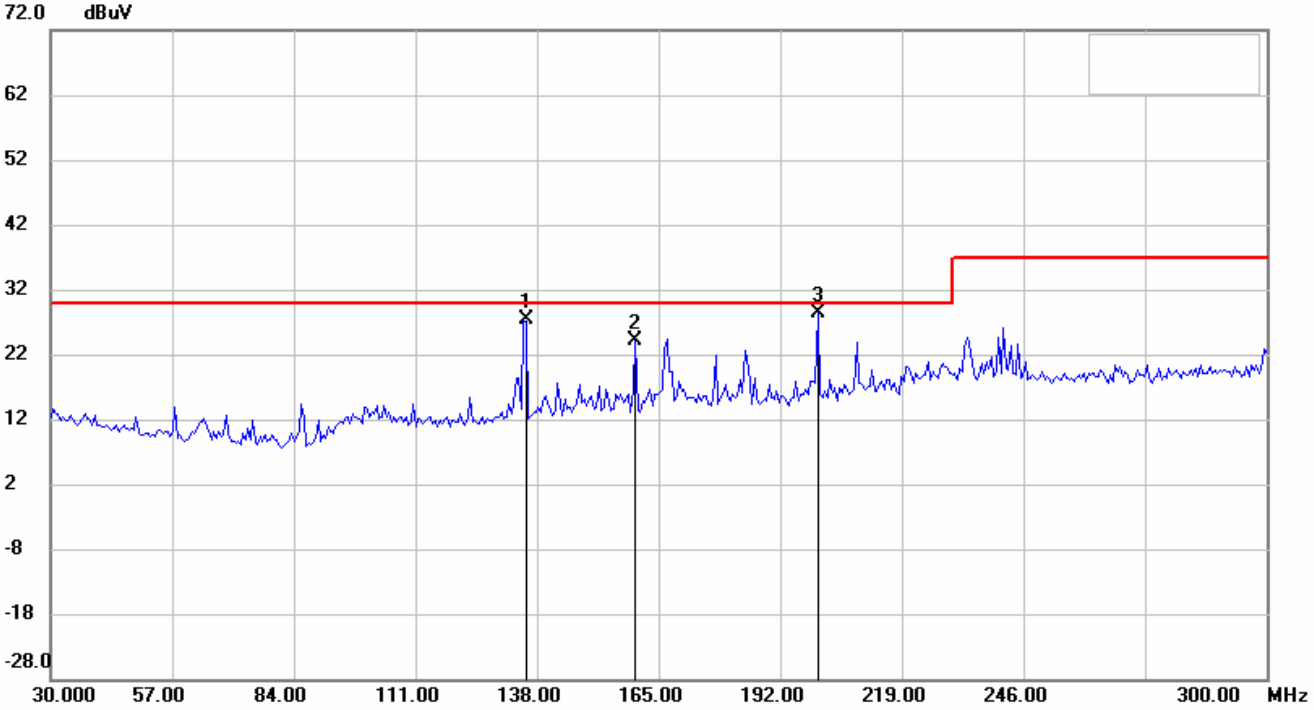
# Radiated Emissions from Digital Part
## Antenna Polarization H

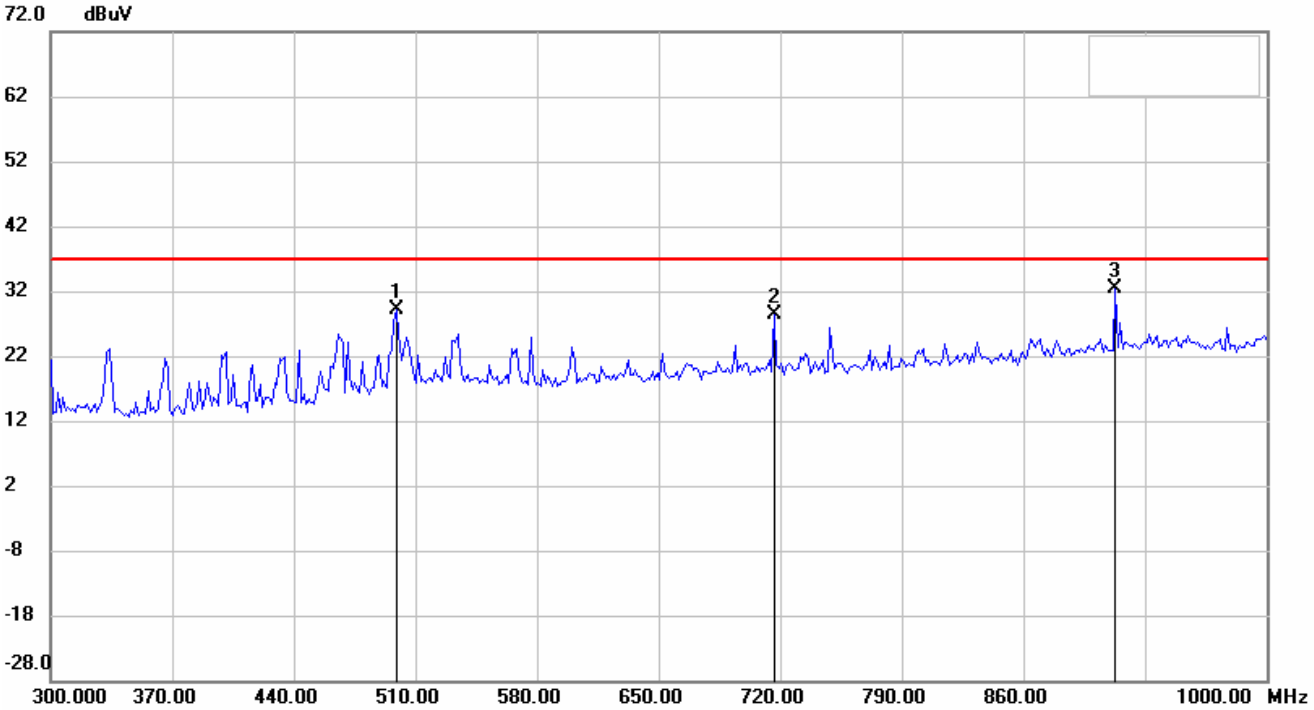


Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

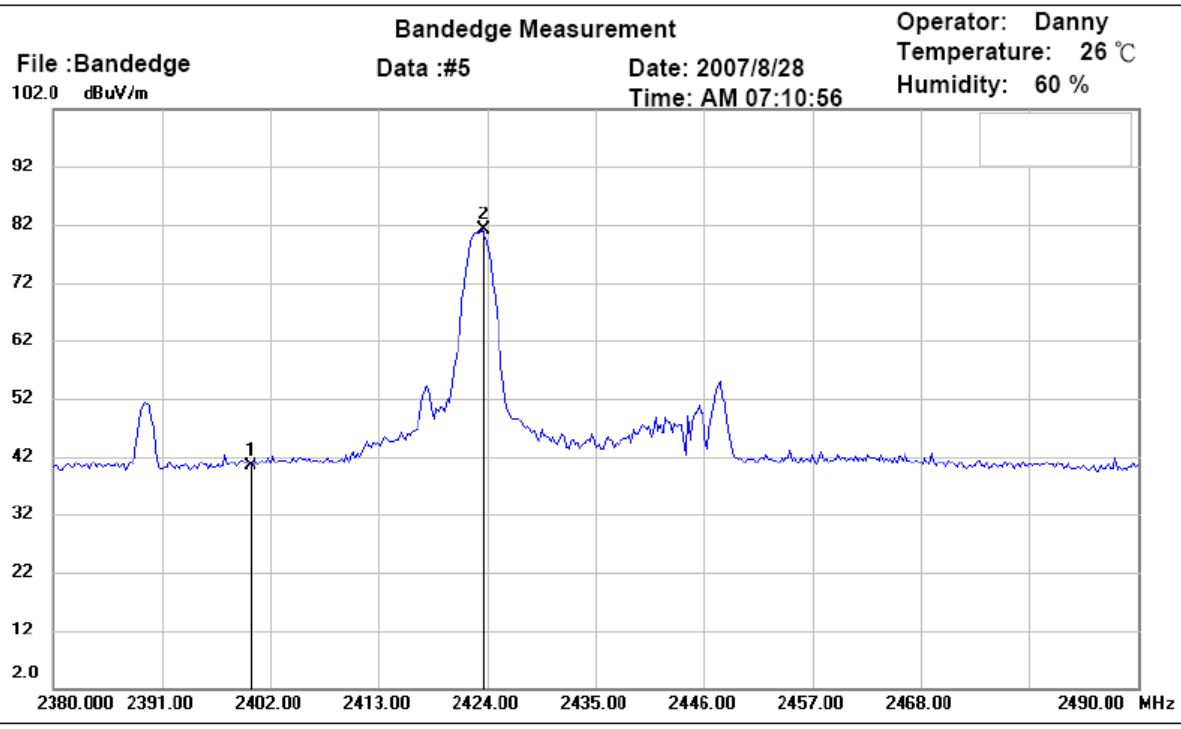
## Antenna Polarization V



Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520

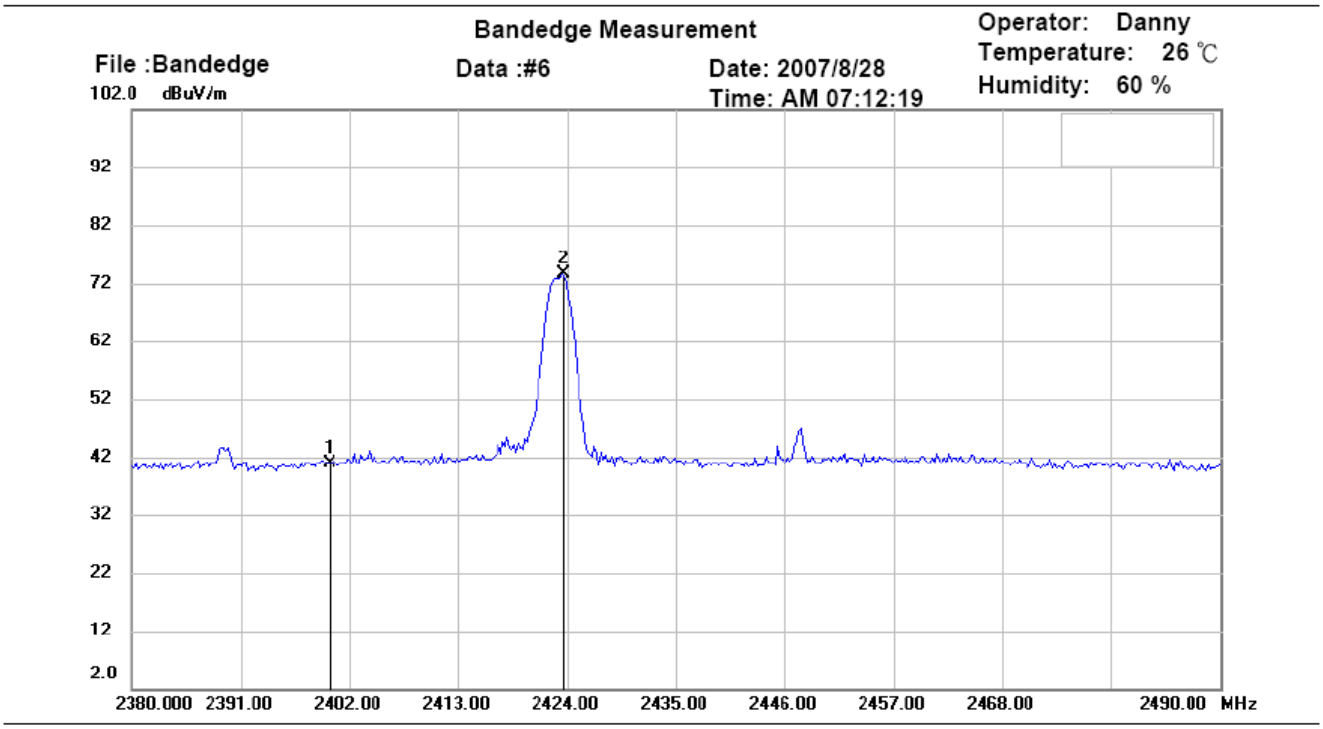
# Radiated Emission on the band edge




Site : site #1
Condition :
Company : W6M20707-8372
EUT Model: GM-520
Execute Program : Bandedge Low Channel

Polarization: *Horizontal*
Power :
Distance: 3m

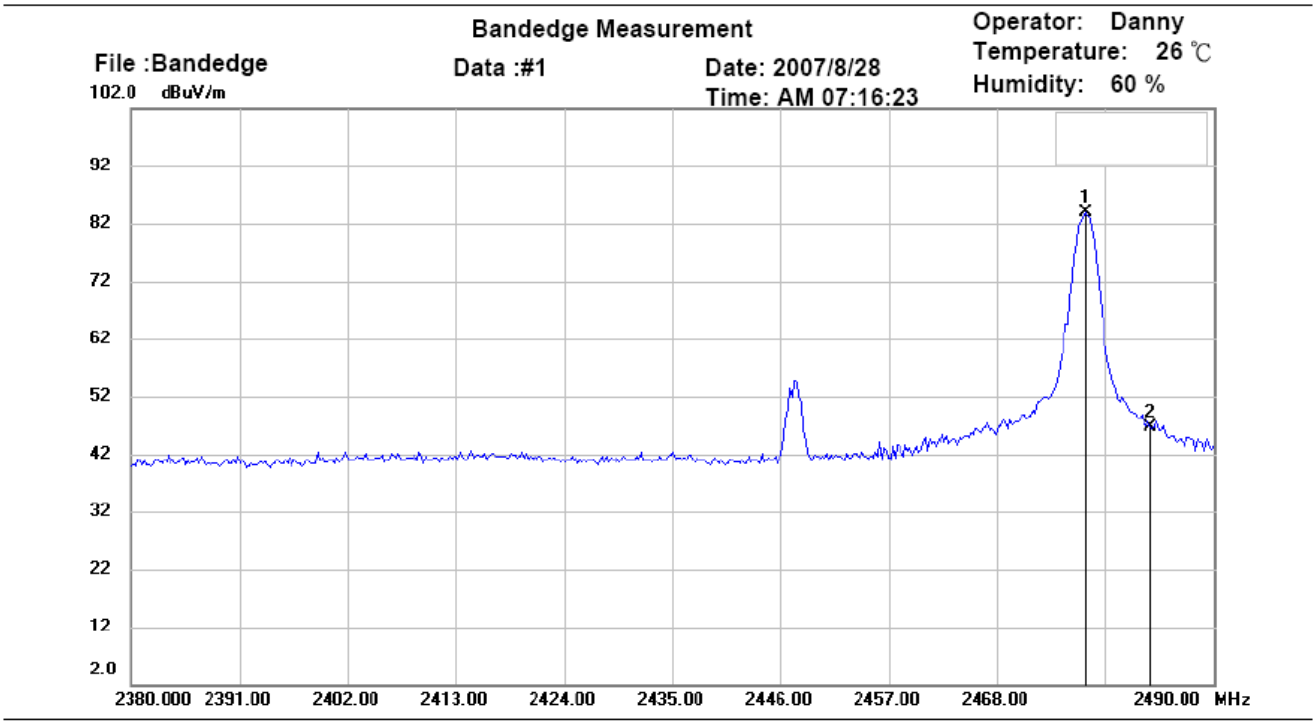
Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520




Site : site #1
Condition :
Company : W6M20707-8372
EUT Model: GM-520
Execute Program : Bandedge Low Channel

Polarization: *Vertical*
Power :
Distance: 3m

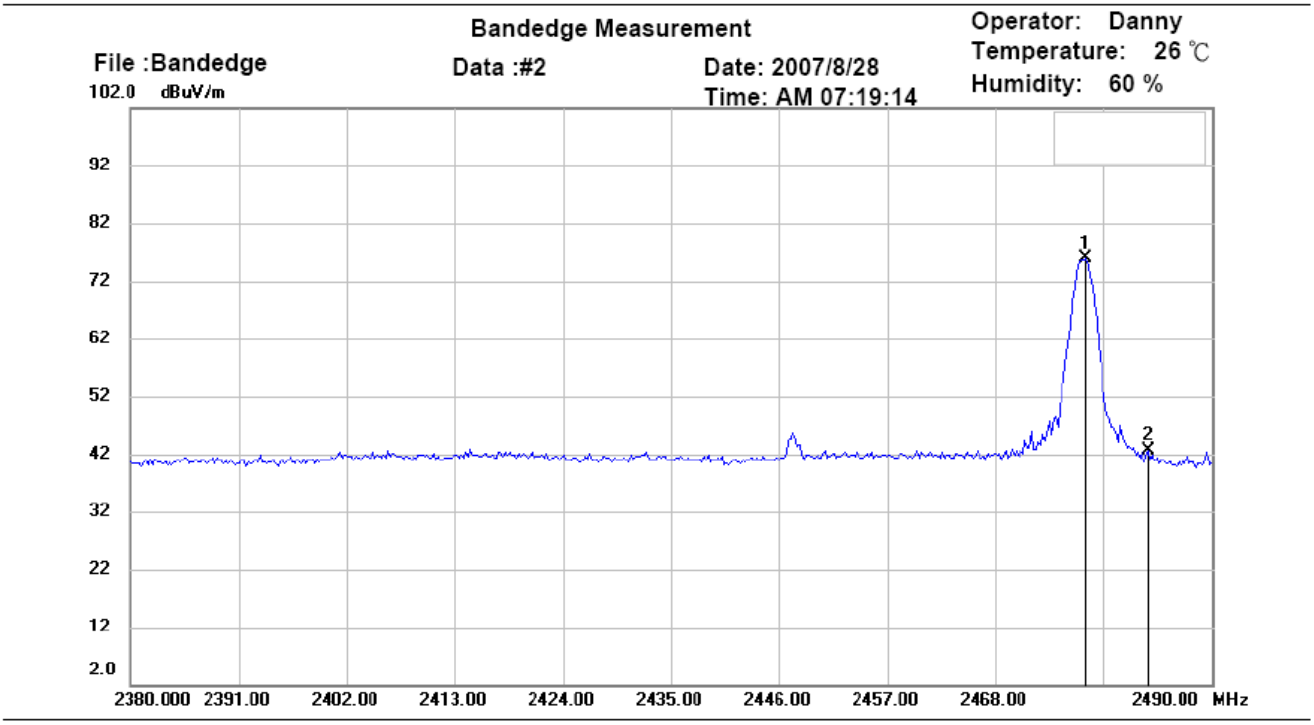
Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520




Site : site #1
Condition :
Company : W6M20707-8372
EUT Model: GM-520
Execute Program : Bandedge High Channel

Polarization: *Horizontal*
Power :
Distance: 3m

Registration number: W6M20707-8372-P-15
FCC ID: OR7GM520




Site : site #1
Condition :
Company : W6M20707-8372
EUT Model: GM-520
Execute Program : Bandedge High Channel

Polarization: *Vertical*
Power :
Distance: 3m