# FCC PART 15 SUBPART C TEST REPORT

# for

# 2.4GHz Digital Wireless NVR USB Dongle

# Model No.: ALM-2811

# FCC ID: YS8-ALM-A811

of

Applicant: **Almacro Technology Inc.**
Address: **12-3F,NO.888,JING KUO ROAD, TAOYUAN CITY 330, TAIWAN.R.O.C**

Tested and Prepared

by

**Worldwide Testing Services (Taiwan) Co., Ltd.**

**FCC Registration No.: 930600**

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

**A2LA Accredited No.: 2732.01**

**Report No.: W6M21009-10899-C-1-R**

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

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# 1 General Information

## 1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.
The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.
Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.
Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.
The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that is performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.
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**Tester:**

| Date | WTS-Lab. | Name | Signature |
|---|---|---|---|
| February 25, 2011 | | Rick Chen | Rick Chen. |

**Technical responsibility for area of testing:**

| Date | WTS | Name | Signature |
|---|---|---|---|
| February 25, 2011 | | Chang Tse-Ming | Chang Tse-Ming |

## 1.2 Testing laboratory

### 1.2.1 Location

OATS
No.5-1, Shuang Sing Village,
LiShuei Rd., Wanli Township,
Taipei County 207, Taiwan (R.O.C.)
Company
Worldwide Testing Services(Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

### 1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA accredited number: 2732.01

FCC filed test laboratory Reg. No. 930600

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

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

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

## 1.3 Details of approval holder

| | |
|---|---|
| Name: | Almacro Technology Inc. |
| Street: | 12-3F,NO.888,JING KUO ROAD, |
| Town: | TAOYUAN CITY 330, |
| Country: | TAIWAN.R.O.C |
| Telephone: | 03-3162188 |
| Fax: | 03-3466488 |

## 1.4 Application details

Date of receipt of test item: September 16, 2010
Date of test: from September 17, 2010 to February 24, 2011

## 1.5 General information of Test item

Type of test item: 2.4GHz Digital Wireless NVR USB Dongle

Model Number: ALM-2811

Multi-listing model number: ./.

Brand Name: LMACRO

Photos: see Annex

**Technical data**

Frequency band: 2402 - 2480 MHz
Frequency ( ch A): 2.402 GHz
Frequency ( ch B): 2.440 GHz
Frequency ( ch C): 2.480 GHz

**Transmitter** **Unom**

Power ( ch A or ch 1): Conducted: 10.93 dBm
Power ( ch B or ch 20): Conducted: 11.15 dBm
Power ( ch C or ch 40): Conducted: 11.24 dBm

Power supply: 5 Vdc from PC

Operation modes: duplex

Modulation Type: GFSK

Antenna Type: Dipole antenna

Antenna gain: 1.5 dBi

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811
Host device: none

Classification:

| | |
|---|---|
| Fixed Device | ☐ |
| Mobile Device (Human Body distance ＞ 20cm) | ☒ |
| Portable Device (Human Body distance ＜ 20cm) | ☐ |
| Modular Radio Device | ☐ |

**Manufacturer: (if applicable)**

Name: Almacro Technology Inc.
Street: 12-3F,NO.888,JING KUO ROAD,
Town: TAOYUAN CITY 330,
Country: TAIWAN.R.O.C

Additional information: ./.

## 1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART C § 15.247 (2009-10)

# 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-35°C |
| Relative humidity content: | 20 ... 75 % |
| Air pressure: | 86 ... 103 kPa |
| Details of power supply | 5 Vdc from PC |
| Extreme conditions parameters: | test voltage : -- extreme<br>min : -- V<br>max : -- V |

## 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 | 2010/9/2 | 2011/9/1 |
| ETSTW-CE 004 | ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK | ESH3-Z5 | 840731/011 | R&S | 2010/3/2 | 2011/3/1 |
| ETSTW-CE 005 | Line-Impedance Stabilisation Network | NNBM 8126D | 137 | Schwarzbeck | 2010/9/8 | 2011/9/7 |
| ETSTW-CE 006 | IMPULSBEGRENZER PULSE LIMITER | ESH3-Z2 | 100226 | R&S | 2010/5/8 | 2011/5/7 |
| ETSTW-CE 007 | SPECTRUM ANALYZER 5GHz | FSB | 849670/001 | R&S | Pre-test Use NCR | |
| ETSTW-CE 008 | HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP | 334.6010.02 | 844581/024 | R&S | Function Test | |
| ETSTW-CE 009 | TEMP.&HUMIDITY CHAMBER | GTH-225-40-1P-U | MAA0305-009 | GIANT FORCE | 2010/7/21 | 2011/7/20 |
| ETSTW-CE 013 | CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK | FCC-TLISN-T4-02 | 20242 | FCC | 2010/10/21 | 2011/10/20 |
| ETSTW-CE 015 | CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK | FCC-TLISN-T8-02 | 20307 | FCC | 2010/9/6 | 2011/9/5 |
| ETSTW-RE 002 | Function Generator | 33220A | MY43004982 | Agilent | Function Test | |
| ETSTW-RE 003 | EMI TEST RECEIVER | ESI 26 | 831438/001 | R&S | 2010/8/10 | 2011/8/9 |
| ETSTW-RE 004 | EMI TEST RECEIVER | ESI 40 | 832427/004 | R&S | 2010/9/14 | 2011/9/13 |
| ETSTW-RE 005 | EMI TEST RECEIVER | ESVS10 | 843207/020 | R&S | 2010/9/2 | 2011/9/1 |
| ETSTW-RE 006 | Attenuator 10dB | 50HF-010-5N-1 | None | STEP | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 010 | ABSORBING CLAMP | MDS 21 | 3469 | Schwarzbeck | 2010/9/6 | 2011/9/5 |
| ETSTW-RE 012 | TUNABLE BANDREJECT FILTER | D.C 0309 | 146 | K&L | Function Test | |
| ETSTW-RE 013 | TUNABLE BANDREJECT FILTER | D.C 0336 | 397 | K&L | Function Test | |
| ETSTW-RE 018 | MICROWAVE HORN ANTENNA | AT4560 | 27212 | AR | 2010/10/4 | 2011/10/3 |
| ETSTW-RE 020 | MICROWAVE HORN ANTENNA | AT4002A | 306915 | AR | Function Test | |
| ETSTW-RE 021 | SWEEP GENERATOR | SWM05 | 835130/010 | R&S | 2010/8/20 | 2011/8/19 |
| ETSTW-RE 027 | Passive Loop Antenna | 6512 | 00034563 | EMCO | 2010/7/22 | 2011/7/21 |
| ETSTW-RE 028 | Log-Periodic Dipole Array Antenna | 3148 | 34429 | EMCO | 2010/4/14 | 2011/4/13 |
| ETSTW-RE 029 | Biconical Antenna | 3109 | 33524 | EMCO | 2010/4/14 | 2011/4/13 |
| ETSTW-RE 030 | Double-Ridged Guide Horn Antenna | 3117 | 00035224 | EMCO | 2010/3/2 | 2011/3/1 |
| ETSTW-RE 032 | Millivoltmeter | URV 55 | 849086/013 | R&S | 2010/10/4 | 2011/10/3 |
| ETSTW-RE 033 | WaveRunner 6000A Serise Oscilloscope | WAVERUNNER 6100A | LCRY0604P14508 | LeCroy | Function Test | |
| ETSTW-RE 034 | Power Sensor | URV5-Z4 | 839313/006 | R&S | 2010/10/4 | 2011/10/3 |
| ETSTW-RE 042 | Biconical Antenna | HK116 | 100172 | R&S | 2011/1/14 | 2012/1/13 |
| ETSTW-RE 044 | Log-Periodic Antenna | HL050 | 100094 | R&S | 2010/5/11 | 2011/5/10 |
| ETSTW-RE 047 | PSA SERIES SPECTRUM ANALYZER | E4445A | MY46181369 | Agilent | Pre-test Use NCR | |
| ETSTW-RE 048 | Triple Loop Antenna | HXYZ 9170 | HXYZ 9170-134 | Schwarzbeck | 2010/8/30 | 2011/8/29 |
| ETSTW-RE 049 | TRILOG Super Broadband test Antenna | VULB 9160 | 9160-3185 | Schwarzbeck | 2010/4/13 | 2011/4/12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ETSTW-RE 050 | Attenuator 10dB | 50HF-010-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 051 | Attenuator 6dB | 50HF-006-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 053 | Attenuator 3dB | 50HF-003-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 055 | SPECTRUM ANALYZER | FSU 26 | 200074 | R&S | 2010/6/3 | 2011/6/2 |
| ETSTW-RE 060 | Attenuator 30dB | 5015-30 | F651012z-01 | ATM | 2009/3/6 | 2011/3/6 |
| ETSTW-RE 061 | Amplifier Module | CHC 1 | None | ETS | 2010/9/27 | 2011/9/26 |
| ETSTW-RE 062 | Amplifier Module | CHC 2 | None | KMIC | 2010/11/30 | 2011/11/29 |
| ETSTW-RE 064 | Bluetooth Test Set | MT8852B-042 | 6K00005709 | Anritsu | Function Test | |
| ETSTW-RE 065 | Amplifier | AMF-6F-18002650-25-10P | 941608 | MITEQ | 2010/4/13 | 2011/4/12 |
| ETSTW-RE 066 | Highpass Filter | H1G013G1 | 206015 | MICROWAVE CIRCUITS, INC. | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 072 | CELL SITE TEST SET | 8921A | 3339A00375 | HP | 2010/10/7 | 2011/10/6 |
| ETSTW-RE 073 | Power Meter | N1911A | MY45100769 | Agilent | 2011/1/10 | 2012/1/9 |
| ETSTW-RE 074 | Power Sensor | N1921A | MY45241198 | Agilent | 2011/1/10 | 2012/1/9 |
| ETSTW-RE 081 | Highpass Filter | H03G13G1 | 4260-02 DC0428 | MICROWAVE CIRCUITS, INC. | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 096 | SIGNAL GENERATOR | SMIQ 03B | 102274 | R&S | 2010/5/31 | 2011/5/30 |
| ETSTW-RE 099 | DC Block | 50DB-007-1 | None | JFW | 2010/3/5 | 2011/3/4 |
| ETSTW-RE 105 | 2.4GHz Notch Filter | NO124411 | 39555 | MICROWAVE CIRCUITS, INC. | 2010/3/25 | 2011/3/24 |
| ETSTW-RE 106 | Humidity Temperature Meter | TES-1366 | 091011113 | TES | 2010/3/25 | 2011/3/24 |
| ETSTW-RE 111 | Log-Periodic Dipole Array Antenna | VULB 9160 | 9160-3309 | Schwarz beck | 2010/12/17 | 2011/12/16 |
| ETSTW-RE 114 | 2.4GHz Notch Filter | N0124411 | 473873 | MICROWAVE CIRCUITS | 2011/1/13 | 2012/1/12 |
| ETSTW-GSM 002 | Universal Radio Communication Tester | CMU 200 | 109439 | R&S | 2010/10/7 | 2011/10/6 |
| ETSTW-GSM 019 | Band Reject Filter | WRCTF824/849-822/851-40/12+9SS | 3 | WI | 2011/1/14 | 2012/1/13 |
| ETSTW-GSM 020 | Band Reject Filter | WRCD1747/1748-1743/1752-32/5SS | 1 | WI | 2011/1/14 | 2012/1/13 |
| ETSTW-GSM 021 | Band Reject Filter | WRCD1879.5/1880.5-1875.5/1884.5-32/5SS | 3 | WI | 2011/1/14 | 2012/1/13 |
| ETSTW-GSM 022 | Band Reject Filter | WRCT901.9/903.1-904.25-50/8SS | 1 | WI | 2011/1/14 | 2012/1/13 |
| ETSTW-GSM 023 | Power Divider | 4901.19.A | None | SUHNER | 2010/9/20 | 2011/9/19 |
| ETSTW-Cable 002 | Microwave Cable | SUCOFLEX 104（S_Cable 7） | 238093 | HUBER+SUHNER | 2010/9/27 | 2011/9/26 |
| ETSTW-Cable 003 | Microwave Cable | SUCOFLEX 104（S_Cable 11） | 209953 | HUBER+SUHNER | 2010/9/27 | 2011/9/26 |
| ETSTW-Cable 010 | BNC Cable | 5 M BNC Cable | None | JYE BAO CO.,LTD. | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 011 | BNC Cable | BNC Cable 1 | None | JYE BAO CO.,LTD. | 2010/8/19 | 2011/8/18 |
| ETSTW-Cable 012 | BNC Cable | BNC Cable 2 | None | JYE BAO CO.,LTD. | 2010/8/19 | 2011/8/18 |
| ETSTW-Cable 013 | Microwave Cable | SUCOFLEX 104（S_Cable 5） | 232345 | HUBER+SUHNER | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 022 | N TYPE Cable | OATS Cable 3 | 0002 | JYE BAO CO.,LTD. | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 028 | Microwave Cable | FA147A0015M2020 | 30064-2 | UTIFLEX | 2010/9/13 | 2011/9/12 |
| ETSTW-Cable 029 | Microwave Cable | FA147A0015M2020 | 30064-3 | UTIFLEX | 2010/9/13 | 2011/9/12 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ETSTW-Cable 030 | Microwave Cable | SUCOFLEX 104 （S_Cable 9） | 279067 | HUBER+SUHNER | 2011/1/28 | 2012/1/27 |
| ETSTW-Cable 031 | Microwave Cable | SUCOFLEX 104 （S_Cable 10） | 238092 | HUBER+SUHNER | 2010/11/30 | 2011/11/29 |
| ETSTW-Cable 039 | Microwave Cable | SUCOFLEX 104 （S_Cable 19） | 316739 | HUBER+SUHNER | 2010/3/5 | 2011/3/4 |
| ETSTW-Cable 043 | Microwave Cable | SUCOFLEX 104 | 317576 | HUBER+SUHNER | 2010/11/30 | 2011/11/29 |
| ETSTW-Cable 047 | Microwave Cable | SUCOFLEX 104 | 325518 | HUBER+SUHNER | 2010/11/30 | 2011/11/29 |
| WTSTW-SW 001 | EMI TEST SOFTWARE | Harmonics-1000 | None | EMC PARTNER | HARCS Version 4.16<br>Firmware Version 2.18 | |
| WTSTW-SW 002 | EMI TEST SOFTWARE | EZ_EMC | None | Farad | Version ETS-03A1 | |
| WTSTW-SW 003 | EMS TEST SOFTWARE | i2 | None | AUDIX | Version 3.2007-8-17b | |
| WTSTW-SW 005 | GSM Fading Level Correction | GSMFadLevCor | None | R&S | Version 1.66 | |

## 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 UUT was 23°C with a humidity of 40 %.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of 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 |

The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2003 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
(4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.
Measurements were made by Worldwide Testing Services(Taiwan) Co., Ltd. at the registered open field test site located No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.). The Registration Number: **930600**.

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

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

The formula is as follows:
Average = Peak + Duty Factor
Duty Factor = 20 log (dwell time/T)
T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

## 3 Test results (enclosure)

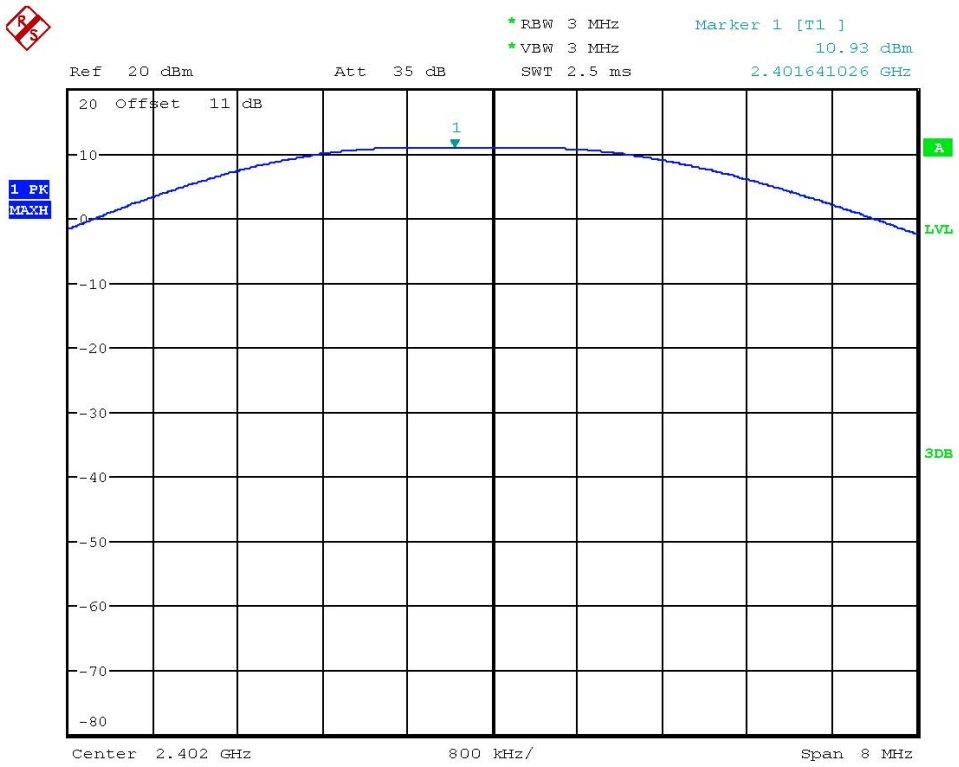
| TEST CASE | Para. Number | Required | Test passed | Test failed |
|---|---|---|---|---|
| Peak Output Power | 15.247(b) | ☒ | ☒ | ☐ |
| Equivalent radiated Power | 15.247(b) | ☒ | ☒ | ☐ |
| Spurious Emissions radiated – Transmitter operating | 15.247(c) | ☒ | ☒ | ☐ |
| Spurious Emissions conducted – Transmitter operating | 15.247 | ☐ | ☐ | ☐ |
| Carrier Frequency Separation | 15.247(a) (1) | ☒ | ☒ | ☐ |
| Number of Hopping Frequencies | 15.247(a) (1)(i) | ☒ | ☒ | ☐ |
| Time of Occupancy (Dwell Time) | 15.247(a) (1)(i) | ☒ | ☒ | ☐ |
| 20 dB Bandwidth | 15.247(a) (1)(i) | ☒ | ☒ | ☐ |
| Band-edge Compliance of RF Emission | 15.247(c) | ☒ | ☒ | ☐ |
| Radiated Emission from Digital Part | 15.109 | ☐ | ☐ | ☐ |
| Power Line Conducted Emission | 15.207(a) | ☒ | ☒ | ☐ |

The follows is intended to leave blank.

## 3.1 Peak Output Power (transmitter)

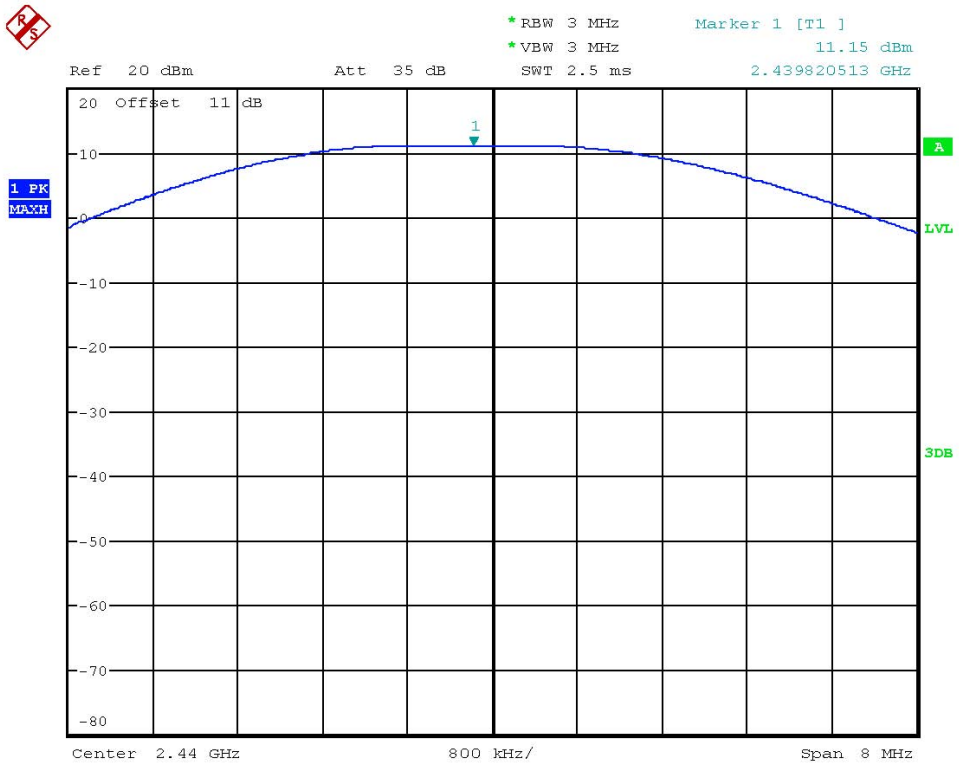
FCC Rule: 15.247

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.
The power was measured with modulation (declared by the applicant).



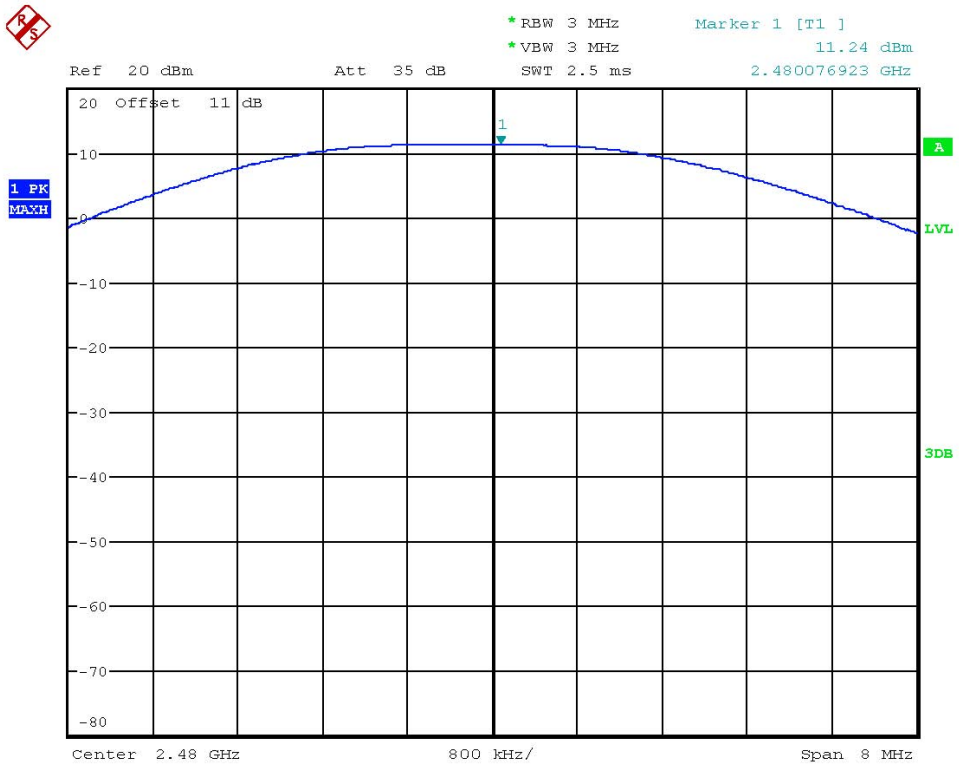

MAX OUTPUT POWER 2402MHz
Date: 21.FEB.2011 09:06:34

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811




MAX OUTPUT POWER 2440MHz
Date: 21.FEB.2011 09:07:40

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811




| Test conditions<br>$T_{nom}$= 23°C, $V_{nom}$= 5 V<br>Frequency[MHz] | Signal Field strength TX highest power mode<br>dBµV/m |
|---|---|
| -- | -- |
| Measurement uncertainty | < 3 dB |

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

# Maximum Peak Output Power

Limits:

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

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

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

## 3.2 RF Exposure Compliance Requirements

According to Supplement C, Edition 01-01 to OET Bulletin 65, Edition 97-01 this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.
The antenna used for this Bluetooth transceiver module must not be co-located or operating in conjunction with any other antenna or transmitter.

## 3.3 Out of Band Radiated Emissions

FCC Rule: 15.247(c) , 15.35
For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.
Limits:
For frequencies below 1GHz :
Max. reading – 20 dB

Guidance on Measurement of FHSS Systems:
"If the emission is pulsed, modify the unit for continuous operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation." Here the correction was added to the limit instead subtracted from the reading.

Duty Cycle correction = 20 log (dwell time/100ms)
For frequencies above 1GHz (Peak measurements).
Limit = max. aver. reading-20dB +20dB(because Peak detector is used)

For frequencies above 1GHz (Average measurements).
Max. reading – 20 dB - duty cycle correction:

No duty cycle correction was added to the reading

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 018, ETSTW-RE 021, ETSTW-RE 028, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 064

Explanation: See attached diagrams in appendix.

## 3.4 Transmitter Radiated Emissions in restricted Bands

FCC Rules: 15.247 (c), 15.205, 15.209, 15.35
Radiated emission measurements were performed from 30 MHz to 26000 MHz.
For radiated emission tests, the analyzer setting was as followings:
RES BW VID BW
Frequency <1 GHz 100 kHz 100 kHz (Peak measurements)
Frequency >1 GHz 1 MHz 1 MHz (Peak measurements)
1 MHz 1 MHz (Average measurements)
Limits:

For frequencies below 1GHz :

| Frequency of Emission (MHz) | Field strength (microvolts/meter) | Field Strength (dB microvolts/meter) |
|---|---|---|
| 30 – 88 | 100 | 40.0 |
| 88 – 216 | 150 | 43.5 |
| 216 – 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

For frequencies above 1GHz (Average measurements).
Guidance on Measurement of FHSS Systems:
"If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation." Here the correction was added to the limit instead subtracted from the reading.

Duty cycle correction = 20 log (dwell time/100ms)

For frequencies above 1GHz (Average measurements).

Limit – duty cycle correction

No duty cycle correction was added to the reading.

54.0dBμV/m

For frequencies above 1GHz (Peak measurements).

Limit + 20dB

54.0dBμV/m + 20 dB= 74 dBμV/m

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 064

Explanation: See attached diagrams in appendix.

## 3.5 Spurious emissions (tx)

Spurious emission was measured with modulation (declared by manufacturer).
In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c))

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance to point 2.3.
Calculation of test results:
Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.
In the Table being listed the critical peak and average value an exhibit the compliance with the above calculated Limits.

If in the column‘s correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the “Marker-Delta-Method“ or the „Duty-Cycle Correction Factor“.

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

| | | | | | |
|---|---|---|---|---|---|
| Model: | ALM-2811 | Date: | 2010/9/21 | | |
| Mode: | TX mode ( 2402 MHz) | Temperature: | 33.4 | °C | Engineer: Rick |
| Polarization: | Horizontal | Humidity: | 56 | % | |

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 169.0580 | 20.98 | peak | 14.94 | 35.92 | 43.50 | -7.58 | 160 | 150 |
| 335.0701 | 18.10 | peak | 17.04 | 35.14 | 46.00 | -10.86 | 170 | 150 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4804.0080 | 59.91 | 56.71 | -4.21 | 55.70 | 52.50 | 74.00 | 54.00 | -1.50 | 230 | 150 |
| 7205.1280 | 52.12 | --- | -1.20 | 50.92 | --- | 74.00 | 54.00 | -23.08 | 140 | 150 |
| 9606.1700 | 28.28 | --- | 19.60 | 47.88 | --- | 74.00 | 54.00 | -26.12 | 240 | 150 |
| 12010.0000 | 23.45 | --- | 21.90 | 45.35 | --- | 74.00 | 54.00 | -28.65 | 180 | 150 |

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 74.3687 | 21.15 | peak | 11.10 | 32.25 | 40.00 | -7.75 | 210 | 150 |
| 335.0701 | 14.73 | peak | 17.04 | 31.77 | 46.00 | -14.23 | 80 | 150 |

| Frequency (MHz) | Reading (dBuV) Peak | Ave. | Factor (dB) Corr. | Result @3m (dBuV/m) Peak | Ave. | Limit @3m (dBuV/m) Peak | Ave. | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2323.7180 | 62.55 | 59.97 | -7.27 | 55.28 | 52.70 | 74.00 | 54.00 | -1.30 | 220 | 150 |
| 4801.2820 | 56.10 | --- | -4.22 | 51.88 | --- | 74.00 | 54.00 | -22.12 | 250 | 150 |
| 7205.1280 | 48.50 | --- | -1.20 | 47.30 | --- | 74.00 | 54.00 | -26.70 | 170 | 150 |
| 9606.1700 | 26.53 | --- | 19.60 | 46.13 | --- | 74.00 | 54.00 | -27.87 | 260 | 150 |
| 12010.0000 | 24.38 | --- | 21.90 | 46.28 | --- | 74.00 | 54.00 | -27.72 | 140 | 150 |

Mode: TX mode ( 2440 MHz)
Polarization: Horizontal

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 167.9760 | 20.64 | peak | 15.64 | 36.28 | 43.50 | -7.22 | 200 | 150 |
| 335.0701 | 18.30 | peak | 16.85 | 35.15 | 46.00 | -10.85 | 300 | 150 |

| Frequency (MHz) | Reading (dBuV) Peak | Ave. | Factor (dB) Corr. | Result @3m (dBuV/m) Peak | Ave. | Limit @3m (dBuV/m) Peak | Ave. | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4878.2050 | 50.76 | --- | -3.99 | 46.77 | --- | 74.00 | 54.00 | -27.23 | 190 | 150 |
| 7320.0000 | 48.44 | --- | -1.91 | 46.53 | --- | 74.00 | 54.00 | -27.47 | 210 | 150 |
| 9760.0000 | 24.14 | --- | 19.43 | 43.57 | --- | 74.00 | 54.00 | -30.43 | 140 | 150 |
| 12200.0000 | 22.41 | --- | 22.32 | 44.73 | --- | 74.00 | 54.00 | -29.27 | 210 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 168.5170 | 16.91 | peak | 15.62 | 32.53 | 43.50 | -10.97 | 220 | 150 |
| 401.0020 | 12.29 | peak | 18.40 | 30.69 | 46.00 | -15.31 | 270 | 150 |

| Frequency (MHz) | Reading (dBuV) Peak | Ave. | Factor (dB) Corr. | Result @3m (dBuV/m) Peak | Ave. | Limit @3m (dBuV/m) Peak | Ave. | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4878.2050 | 50.09 | --- | -3.99 | 46.10 | --- | 74.00 | 54.00 | -27.90 | 280 | 150 |
| 7320.0000 | 48.55 | --- | -1.91 | 46.64 | --- | 74.00 | 54.00 | -27.36 | 210 | 150 |
| 9760.0000 | 23.14 | --- | 19.43 | 42.57 | --- | 74.00 | 54.00 | -31.43 | 140 | 150 |
| 12200.0000 | 21.72 | --- | 22.32 | 44.04 | --- | 74.00 | 54.00 | -29.96 | 210 | 150 |

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Mode: TX mode ( 2480 MHz )
Polarization: Horizontal

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 165.8117 | 23.16 | peak | 15.15 | 38.31 | 43.50 | -5.19 | 200 | 150 |
| 335.0701 | 18.31 | peak | 17.04 | 35.35 | 46.00 | -10.65 | 140 | 150 |

| Frequency (MHz) | Reading (dBuV) Peak | Ave. | Factor (dB) Corr. | Result @3m (dBuV/m) Peak | Ave. | Limit @3m (dBuV/m) Peak | Ave. | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4961.5390 | 48.22 | --- | -3.90 | 44.32 | --- | 74.00 | 54.00 | -29.68 | 150 | 150 |
| 7440.0000 | 49.81 | --- | -2.15 | 47.66 | --- | 74.00 | 54.00 | -26.34 | 250 | 150 |
| 9920.0000 | 23.88 | --- | 19.81 | 43.69 | --- | 74.00 | 54.00 | -30.31 | 254 | 150 |
| 12400.0000 | 22.48 | --- | 22.37 | 44.85 | --- | 74.00 | 54.00 | -29.15 | 210 | 150 |

Polarization: Vertical

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| 167.9760 | 19.21 | peak | 15.01 | 34.22 | 43.50 | -9.28 | 110 | 150 |
| 335.0701 | 13.28 | peak | 17.04 | 30.32 | 46.00 | -15.68 | 130 | 150 |

| Frequency (MHz) | Reading (dBuV) Peak | Ave. | Factor (dB) Corr. | Result @3m (dBuV/m) Peak | Ave. | Limit @3m (dBuV/m) Peak | Ave. | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4961.5390 | 48.48 | --- | -3.90 | 44.58 | --- | 74.00 | 54.00 | -29.42 | 140 | 150 |
| 7442.3080 | 49.93 | --- | -2.15 | 47.78 | --- | 74.00 | 54.00 | -26.22 | 170 | 150 |
| 9920.0000 | 23.28 | --- | 19.81 | 43.09 | --- | 74.00 | 54.00 | -30.91 | 240 | 150 |
| 12400.0000 | 23.05 | --- | 22.37 | 45.42 | --- | 74.00 | 54.00 | -28.58 | 170 | 150 |

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

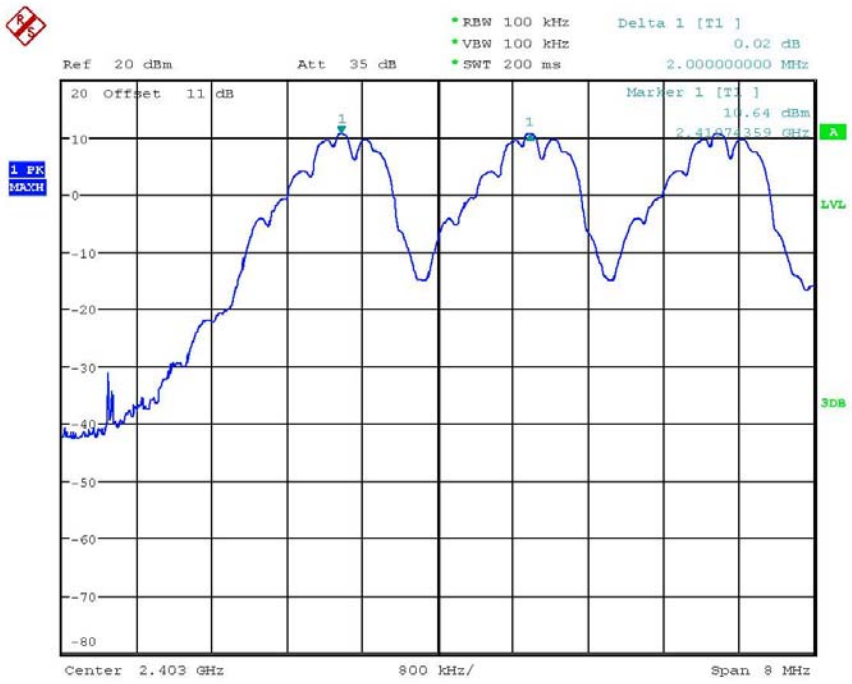
All other not noted test plots do not contain significant test results in relation to the limits.

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

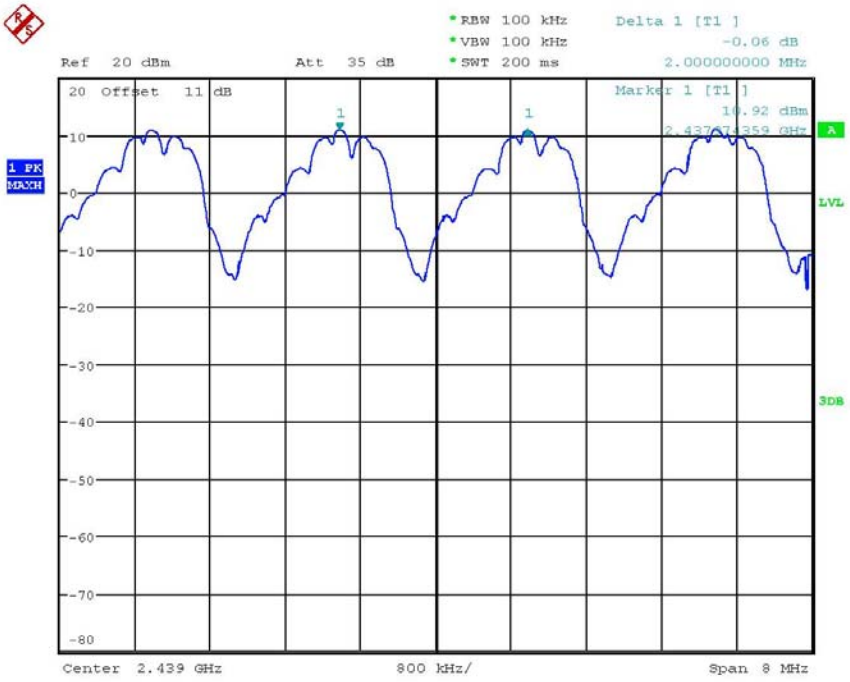
Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 064

## 3.6 Carrier Frequency Separation

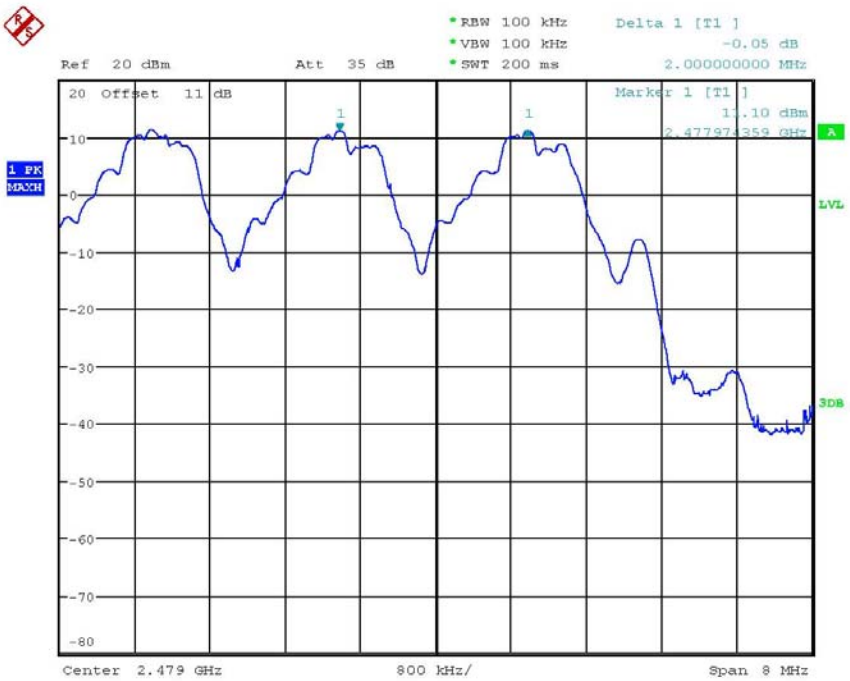
Carrier Frequency Separation was measured with modulation (declared by manufacturer).
According to FCC rules part 15 subpart C §15.247 frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater.




FREQUENCY SEPARTION 2402MHz
Date: 21.FEB.2011 09:29:59




FREQUENCY SEPARTION 2440MHz
Date: 21.FEB.2011 09:28:07




FREQUENCY SEPARTION 2480MHz
Date: 21.FEB.2011 09:26:47

**Limits:**

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

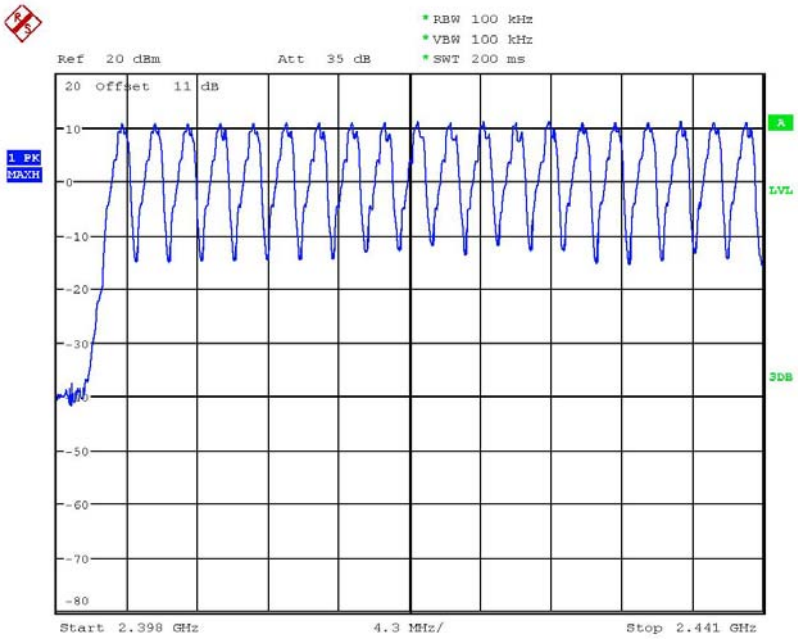
Test equipment used: ETSTW-RE 055, ETSTW-RE 064

## 3.7 Number of Hopping Frequencies

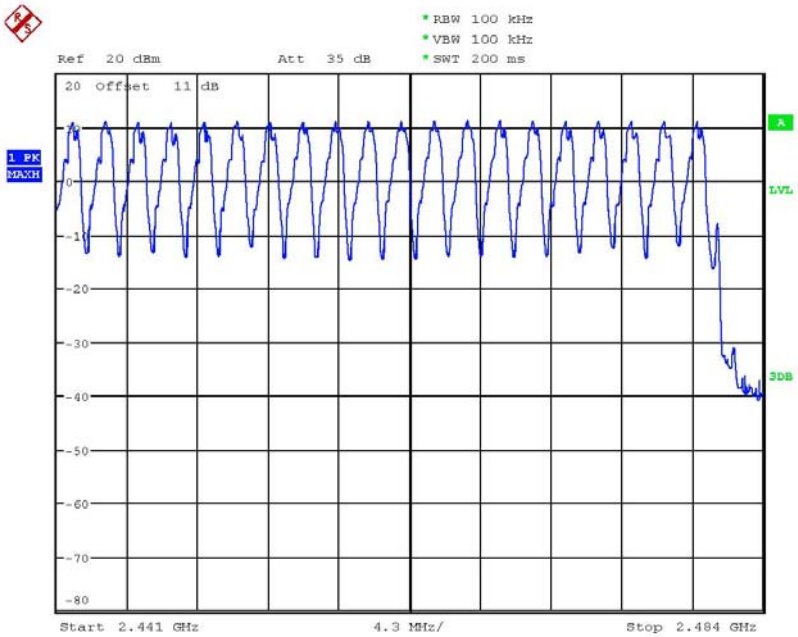
According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies. Frequency hopping systems in 5725-5850 MHz bands shall use least 75 hopping frequencies.

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

| Test conditions | | Operating Mode | Number of Channels |
|---|---|---|---|
| $T_{nom}$= 23°C | $V_{nom}$= 5 V | normal transmitting | 40 |



Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811




**Limits:**

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

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

### 3.7.1 Pseudorandom Frequency Hopping Sequence

The RF module can synthesize a total of 40 channels.

| Channels list | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | MHz | | | | | | |
| CH01 | 2402 | CH11 | 2422 | CH21 | 2442 | CH31 | 2462 |
| CH02 | 2404 | CH12 | 2424 | CH22 | 2444 | CH32 | 2464 |
| CH03 | 2406 | CH13 | 2426 | CH23 | 2446 | CH33 | 2466 |
| CH04 | 2408 | CH14 | 2428 | CH24 | 2448 | CH34 | 2468 |
| CH05 | 2410 | CH15 | 2430 | CH25 | 2450 | CH35 | 2470 |
| CH06 | 2412 | CH16 | 2432 | CH26 | 2452 | CH36 | 2472 |
| CH07 | 2414 | CH17 | 2434 | CH27 | 2454 | CH37 | 2474 |
| CH08 | 2416 | CH18 | 2436 | CH28 | 2456 | CH38 | 2476 |
| CH09 | 2418 | CH19 | 2438 | CH29 | 2458 | CH39 | 2478 |
| CH10 | 2420 | CH20 | 2440 | CH30 | 2460 | CH40 | 2480 |

### 3.7.2 Coordination of hopping sequences to other transmitters

This Dongle does not have the ability of being coordinated with other FHSS system for as soon as the Dongle is in operation, the hopping frequency will follow the selected hopping sequence to transmit independently and no coordination is possible. Especially, this transmitter is used as a Digital Wireless 2.4GHz MVR Camera System, so no coordination of hopping frequency is required.

### 3.7.3 System Receiver Hopping Capability

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

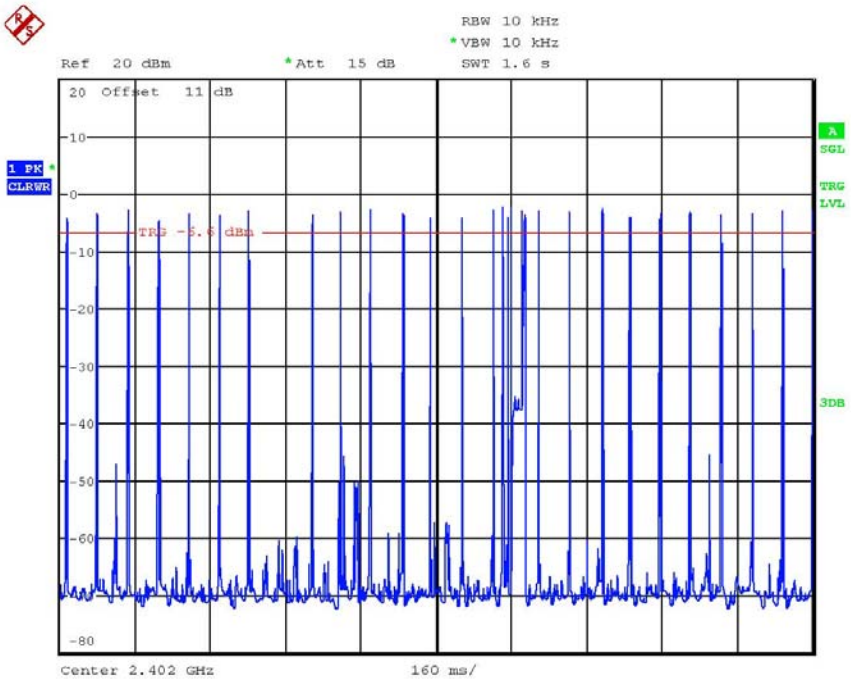
First, the Dongle will emit a preamble signal of 22.5 ms and the Camera will scan this signal by 7.5 ms sweeping until the preamble signal is caught. Second, the preamble signal is coded with the information of hopping sequence and the next transmitting frequency, so the Camera will be able to shift the receiving frequencies in synchronization with the transmitted signals.

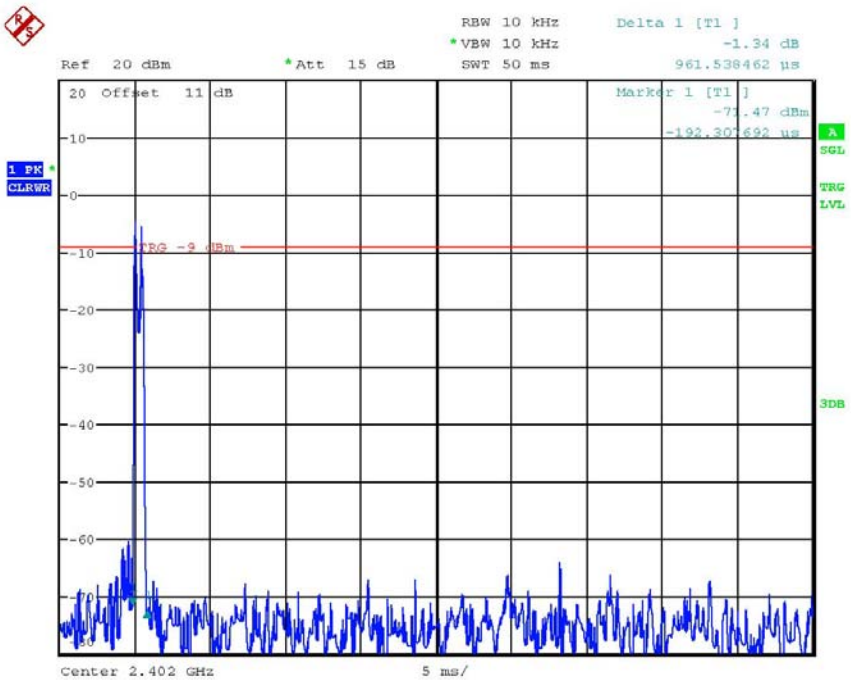
## 3.8 Time of Occupancy (Dwell Time)

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

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

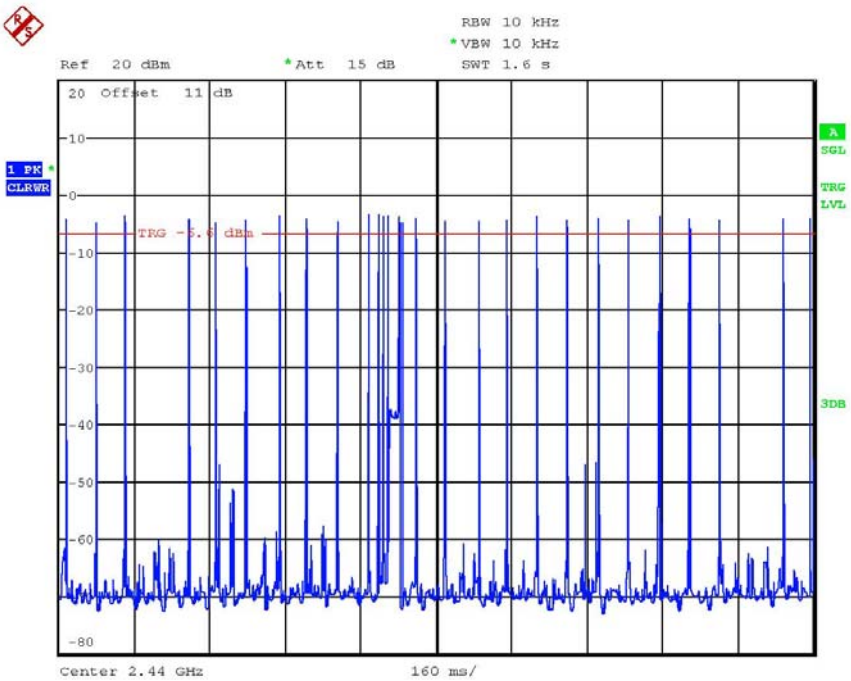
For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not greater than 0.4 seconds within a 20 second period; if the 20dB bandwidth of the hopping channel is 250 kHz or greater,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





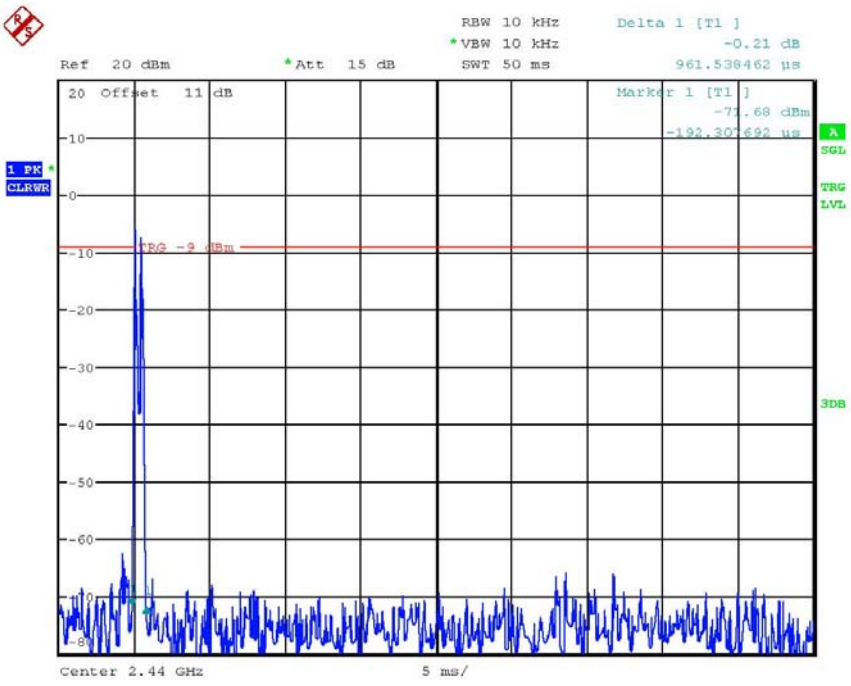

DEWLL TIME 2402MHz

Date: 22.FEB.2011 10:03:54

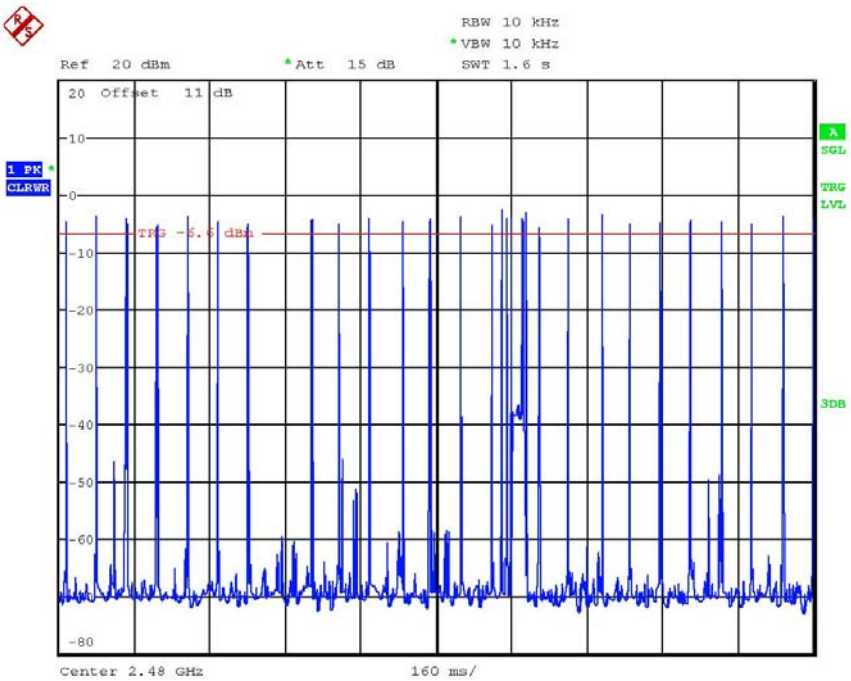



DEWLL TIME 2440MHz(0.961ms*29*10=278.69ms)

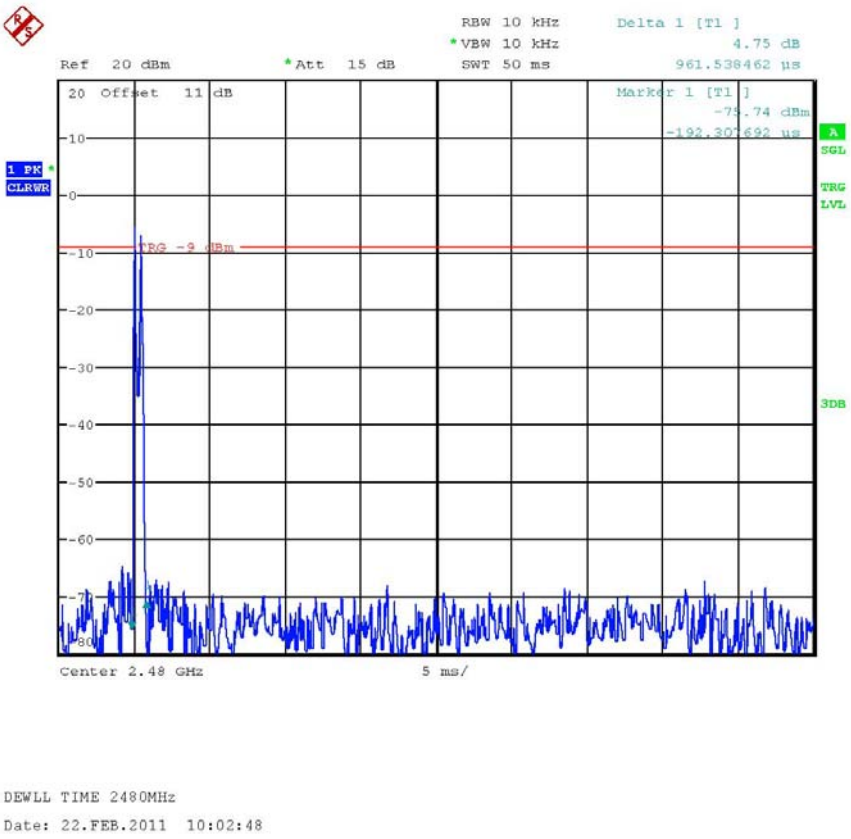
Date: 22.FEB.2011 09:57:15




DEWLL TIME 2440MHz
Date: 22.FEB.2011 10:03:17




DEWLL TIME 2480MHz(0.961ms*29*10=278.69ms)
Date: 22.FEB.2011 09:58:53




**Limits and measurement periods:**

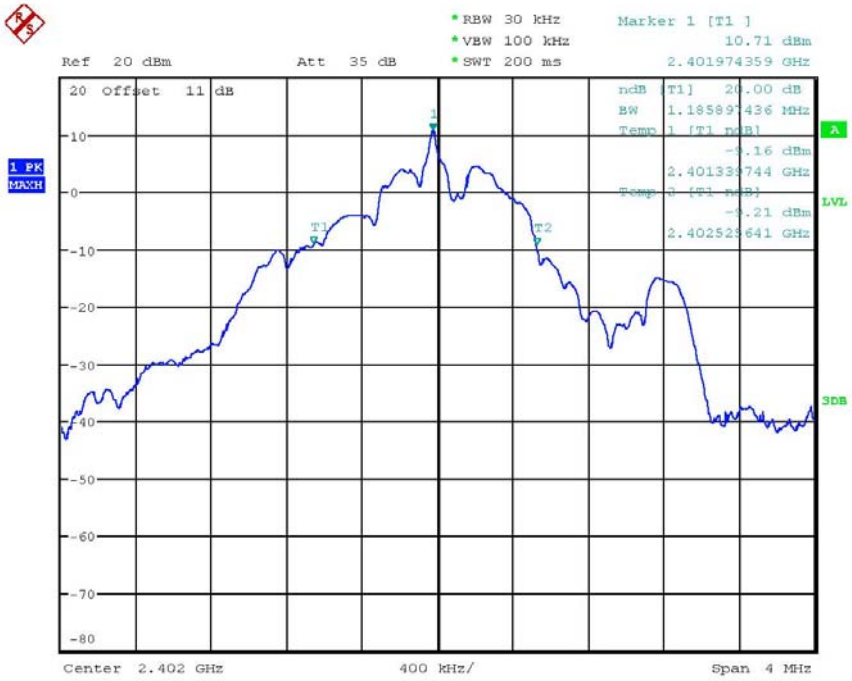
| Frequency MHz | Number of channels | Measurement Periode | Limit |
|---|---|---|---|
| 902 – 928 | ≥50 | 20 s | 0.4 s |
| | 49 ≥ 25 | 10 s | 0.4 s |
| 2400 – 2483.5 | ≥ 15 | 0.4 s * number of used channels | 0.4 s |
| 5725- 5850 | ≥ 75 | 30 s | 0.4s |

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

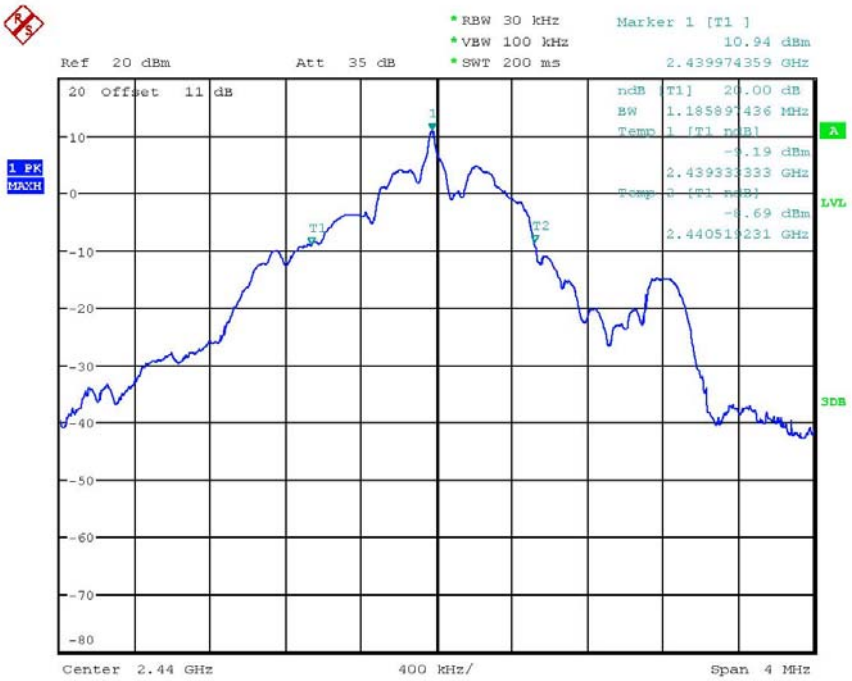
## 3.9 20dB Bandwidth

Frequency hopping systems operating in the 5725-5850 MHz bands shall use a maximum 20dB bandwidth of 1 MHz.
The 20dB bandwidth is measured on the lowest, middle and highest hopping channel.

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

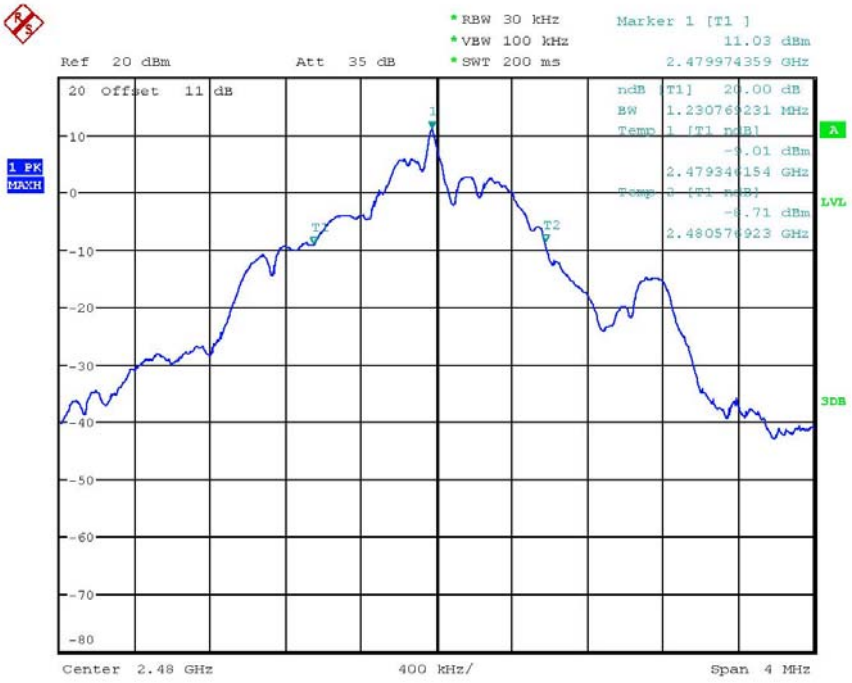



20DB BANDWIDTH 2402MHz
Date: 21.FEB.2011 09:12:36




20DB BANDWIDTH 2440MHz

Date: 21.FEB.2011 09:11:53




20DB BANDWIDTH 2480MHz

Date: 21.FEB.2011 09:11:15

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

**Limits:**

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

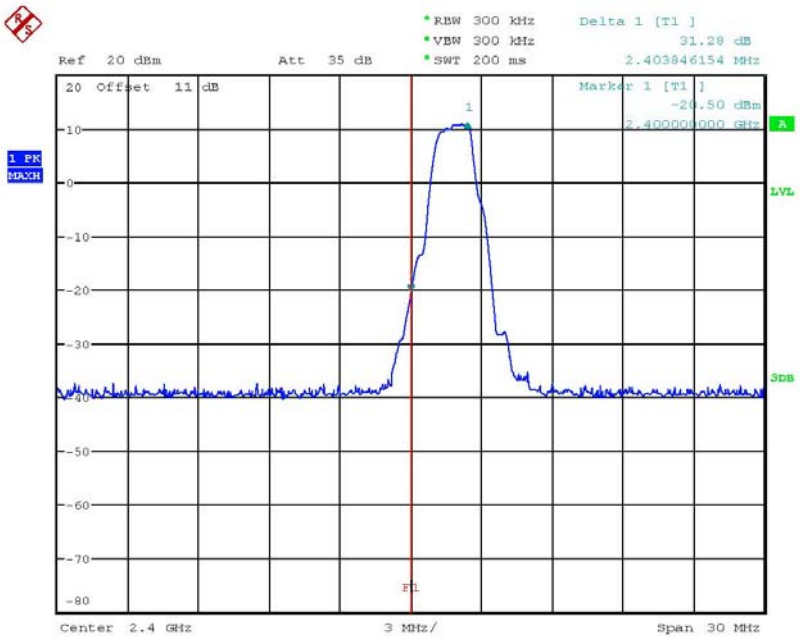
Test equipment used: ETSTW-RE 055, ETSTW-RE 064

## 3.10 Band-edge Compliance of RF Emissions

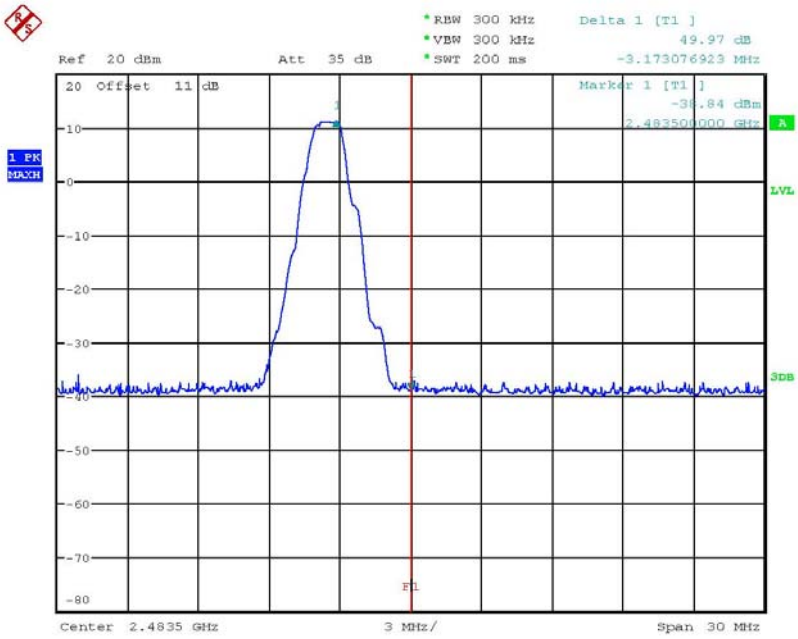
According to FCC rules part 15 subpart C §15.247(c) in any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required.

In addition radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also with the radiated emission limits.

**Single Frequency**

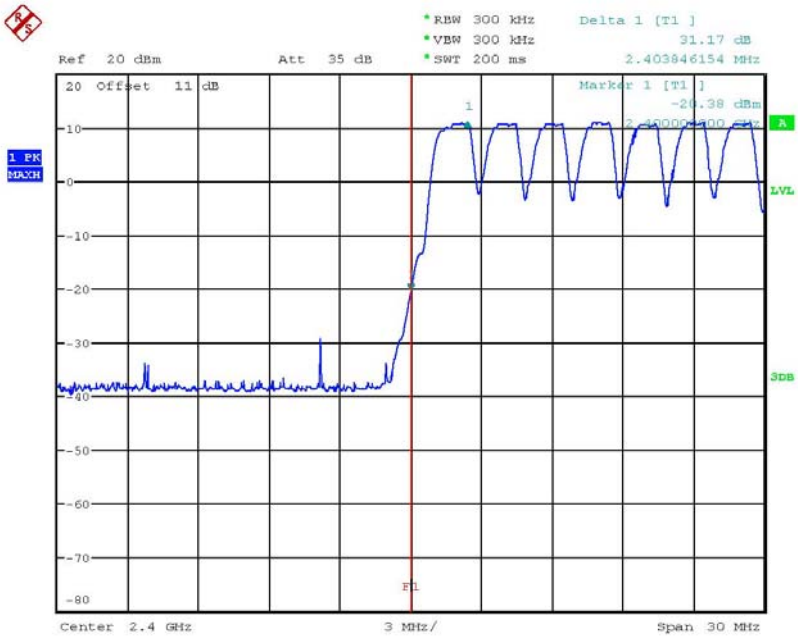



BANDEDGE 2402MHz
Date: 21.FEB.2011 09:17:26

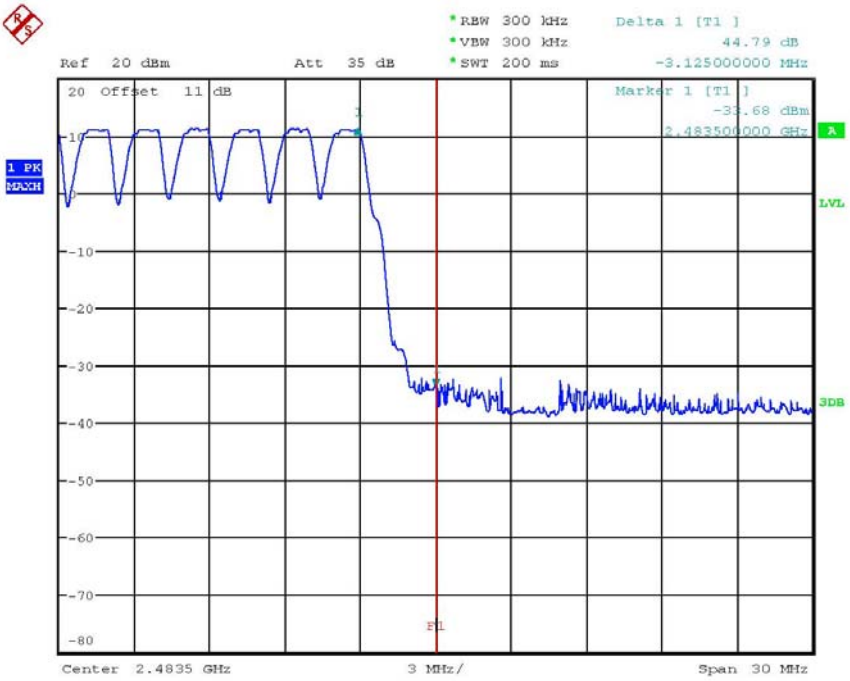



BANDEDGE 2480MHz
Date: 21.FEB.2011 09:23:49

**Hopping Frequency**




BANDEDGE 2402MHz
Date: 21.FEB.2011 09:20:23




**Limits:**

| Frequency Range / MHz | Limit |
|---|---|
| 902 –928<br>2400 – 2483.5<br>5725 - 5850 | - 20 dB |

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

### 3.11 Radiated Emissions from Digital Part

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| Frequency of Emission (MHz) | Field Strength (microvolts/meter) | Field Strength (dBmicrovolts/meter) |
|---|---|---|
| 30 – 88 | 100 | 40.0 |
| 88 – 216 | 150 | 43.5 |
| 216 – 960 | 200 | 46.0 |
| Above 960 | 500 | 54.0 |

Test equipment used: ETSTW-RE 003, ETSTW-RE 004, ETSTW-RE 028, ETSTW-RE 029, ETSTW-RE 030, ETSTW-RE 044, ETSTW-RE 064

Explanation: The test results are listed in the separated test report no. W6M21009-10899-P-15B-R.

## 3.12 Power Line Conducted Emission

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

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

| Frequency | Level (dBμV) | |
|---|---|---|
| | quasi-peak | average |
| 150 kHz | lower limit line | Lower limit line |

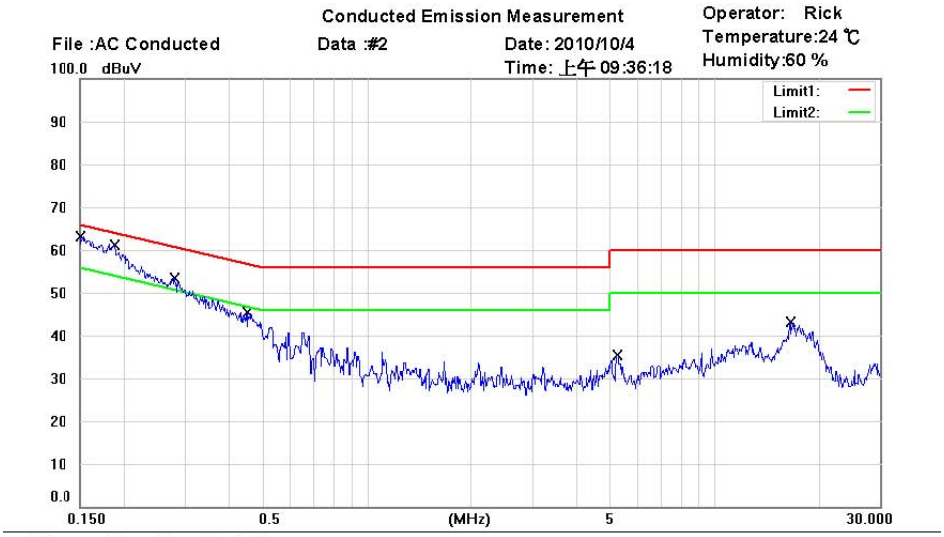
**Limits:**

| 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 |


Site : Open Area Test Site
Condition : FCC Part 15 Class B Conduction (QP)
Phase: N
EUT : W6M21009-10899
Power : 110V
M/N: ALM-2811
Test Mode : Dongle
Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corrected factor(dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|
| * | 0.1508 | 42.95 | QP | 10.74 | 53.69 | 65.96 | -12.27 | |
| | 0.1508 | 18.19 | AVG | 10.74 | 28.93 | 55.96 | -27.03 | |
| | 0.1811 | 41.12 | QP | 10.76 | 51.88 | 64.44 | -12.56 | |
| | 0.1811 | 22.69 | AVG | 10.76 | 33.45 | 54.44 | -20.99 | |
| | 0.2601 | 31.91 | QP | 10.72 | 42.63 | 61.43 | -18.80 | |
| | 0.2601 | 15.21 | AVG | 10.72 | 25.93 | 51.43 | -25.50 | |
| | 0.4778 | 23.39 | QP | 10.65 | 34.04 | 56.38 | -22.34 | |
| | 0.4778 | 10.67 | AVG | 10.65 | 21.32 | 46.38 | -25.06 | |
| | 1.1200 | 17.11 | QP | 10.34 | 27.45 | 56.00 | -28.55 | |
| | 1.1200 | 6.15 | AVG | 10.34 | 16.49 | 46.00 | -29.51 | |
| | 17.0278 | 24.39 | QP | 10.73 | 35.12 | 60.00 | -24.88 | |
| | 17.0278 | 17.63 | AVG | 10.73 | 28.36 | 50.00 | -21.64 | |

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811




Site : Open Area Test Site
Condition : FCC Part 15 Class B Conduction (QP) Phase: L1
EUT : W6M21009-10899 Power : 110V
M/N: ALM-2811
Test Mode : Dongle
Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corrected factor(dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|
| | 0.1508 | 42.73 | QP | 10.75 | 53.48 | 65.96 | -12.48 | |
| | 0.1508 | 18.43 | AVG | 10.75 | 29.18 | 55.96 | -26.78 | |
| * | 0.1877 | 44.36 | QP | 10.77 | 55.13 | 64.14 | -9.01 | |
| | 0.1877 | 25.90 | AVG | 10.77 | 36.67 | 54.14 | -17.47 | |
| | 0.2795 | 33.14 | QP | 10.72 | 43.86 | 60.83 | -16.97 | |
| | 0.2795 | 17.15 | AVG | 10.72 | 27.87 | 50.83 | -22.96 | |
| | 0.4526 | 25.30 | QP | 10.62 | 35.92 | 56.83 | -20.91 | |
| | 0.4526 | 10.31 | AVG | 10.62 | 20.93 | 46.83 | -25.90 | |
| | 5.2222 | 15.47 | QP | 10.23 | 25.70 | 60.00 | -34.30 | |
| | 5.2222 | 8.10 | AVG | 10.23 | 18.33 | 50.00 | -31.67 | |
| | 16.5000 | 23.86 | QP | 10.90 | 34.76 | 60.00 | -25.24 | |
| | 16.5000 | 17.16 | AVG | 10.90 | 28.06 | 50.00 | -21.94 | |

**Note: 1. The formula of measured value as: Test Result = Reading + Correction Factor**
**2. The Correction Factor = Cable Loss + LISN Insertion Loss + Pulse Limit Loss**
**3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average**
**4. All not in the table noted test results are more than 20 dB below the relevant limits.**
**5. Up Line: QP Limit Line, Down Line: Ave Limit Line.**

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

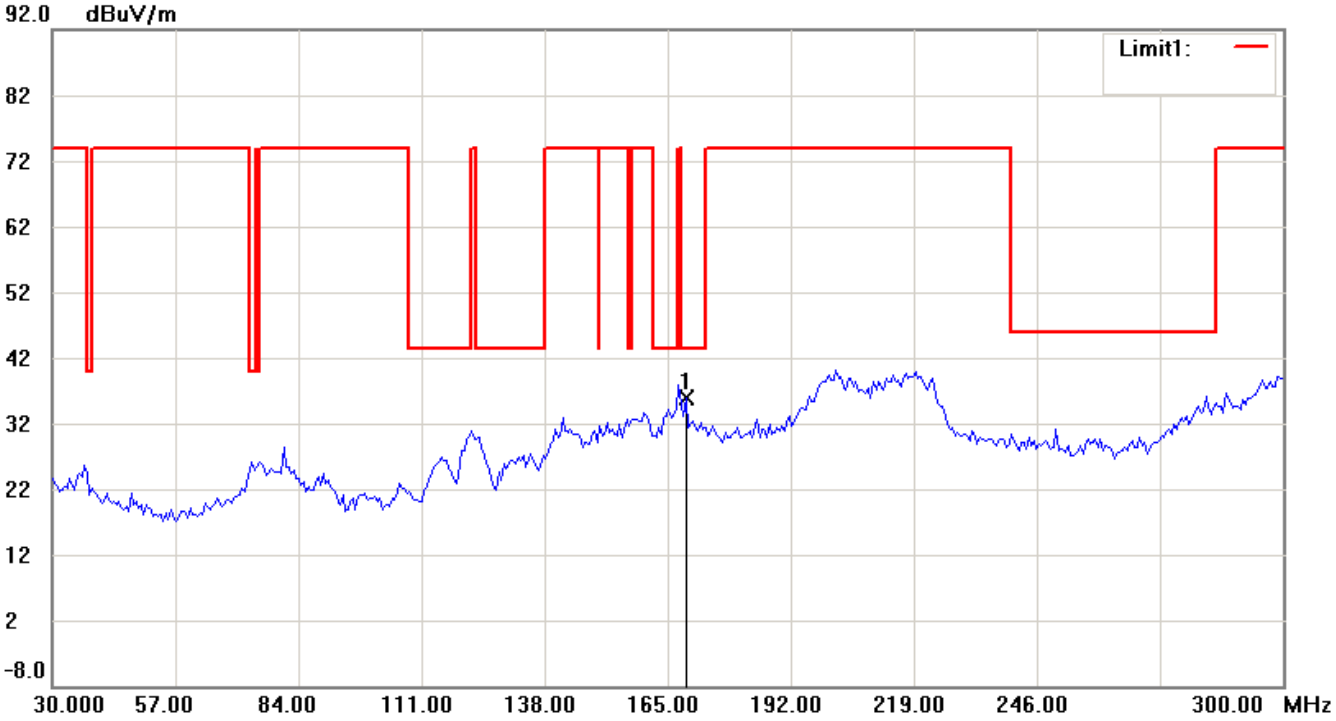
# Appendix

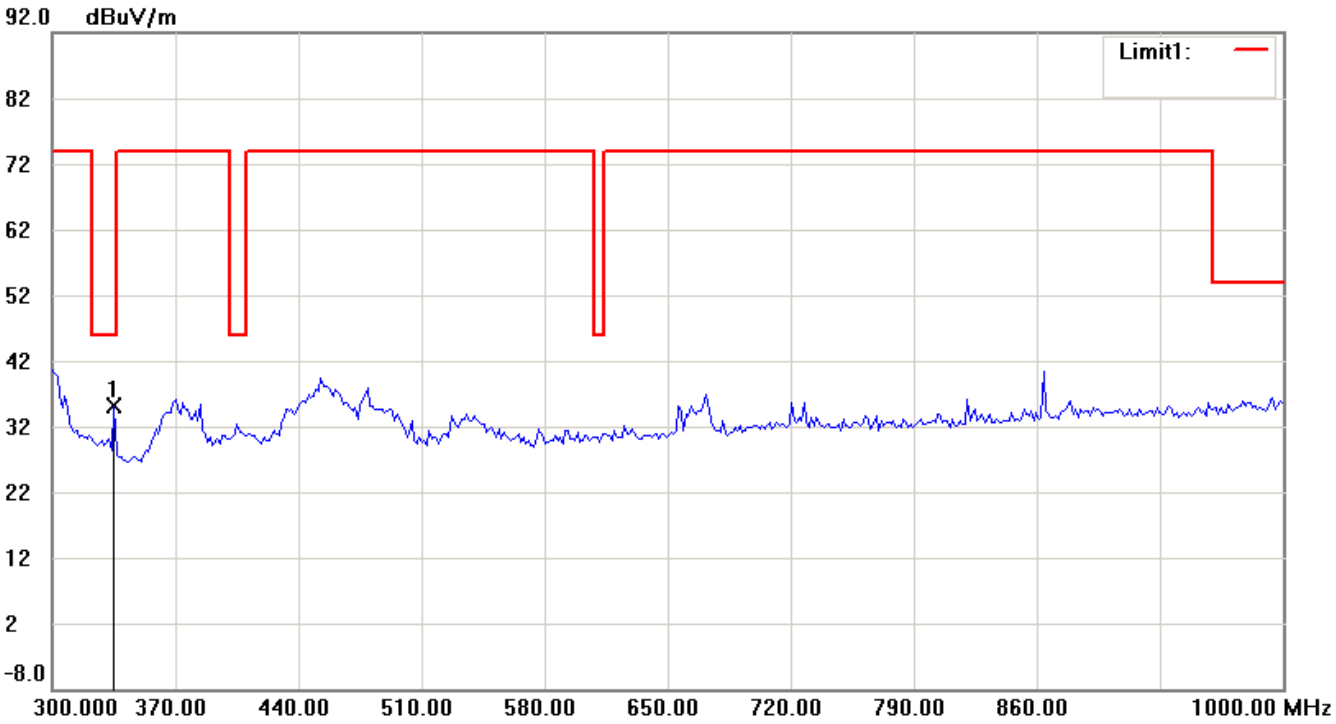
## Measurement diagrams

Spurious Emissions radiated

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

Spurious Emissions radiated
2402MHz
Antenna Polarization H

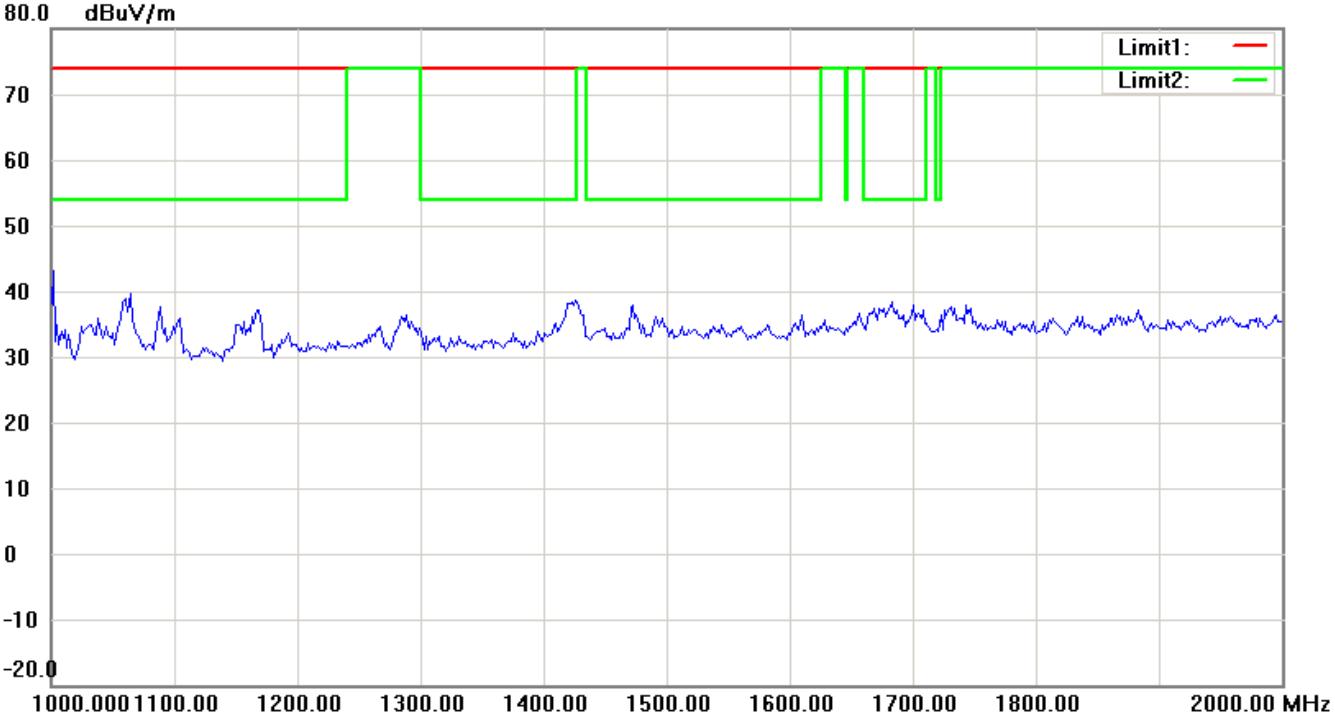


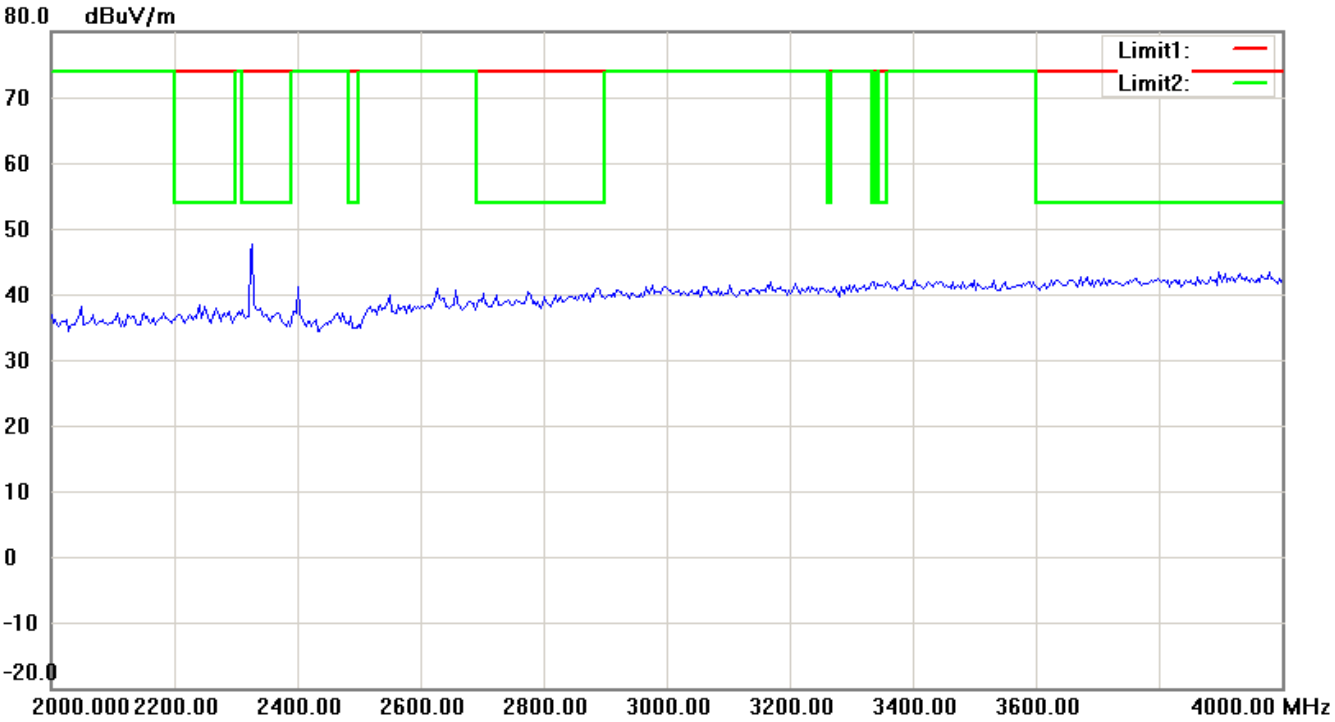




**Note:**
**Up Line: Peak Limit Line, Down Line Ave Limit Line**

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

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

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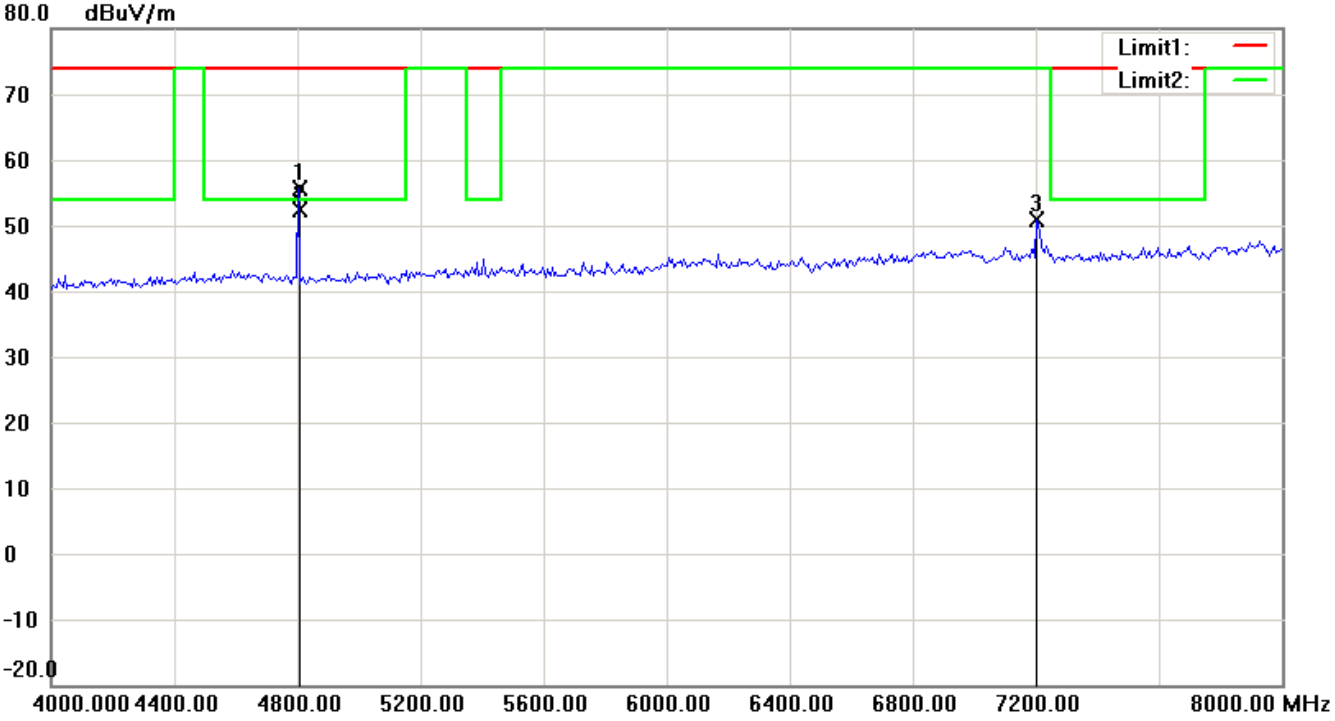
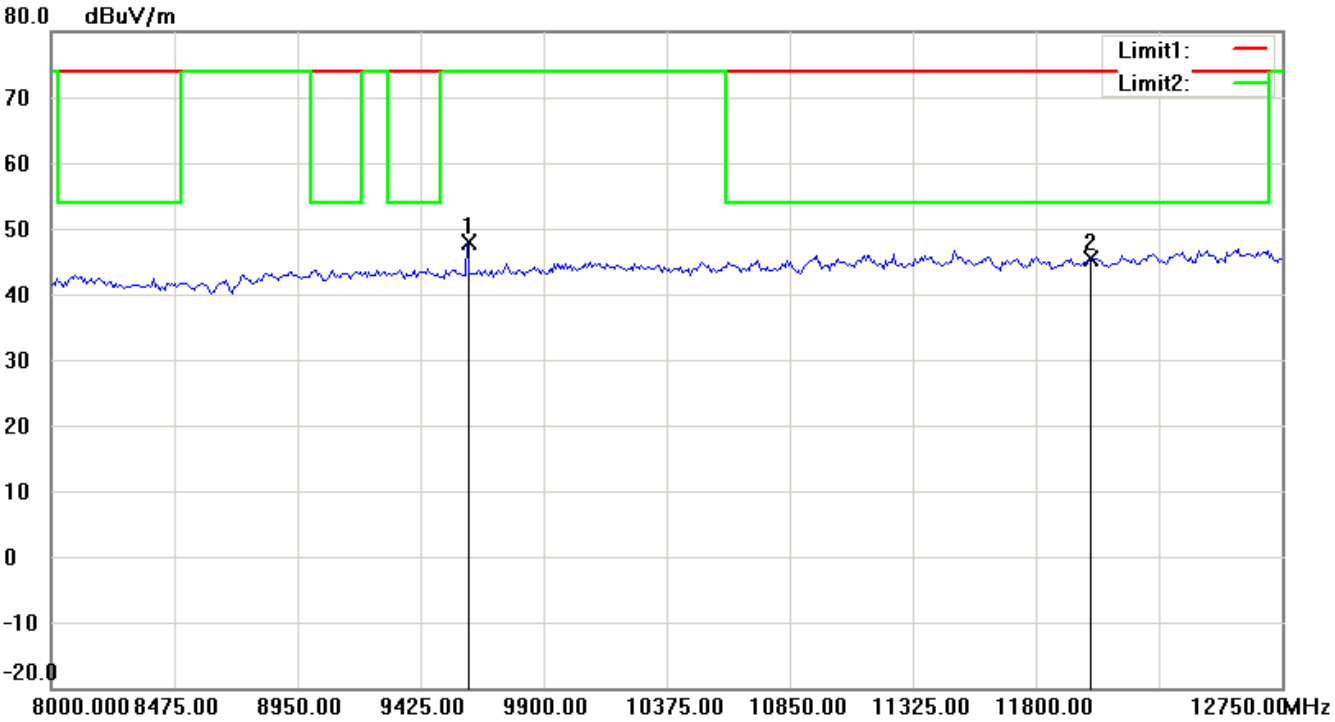
FCC ID :YS8-ALM-A811

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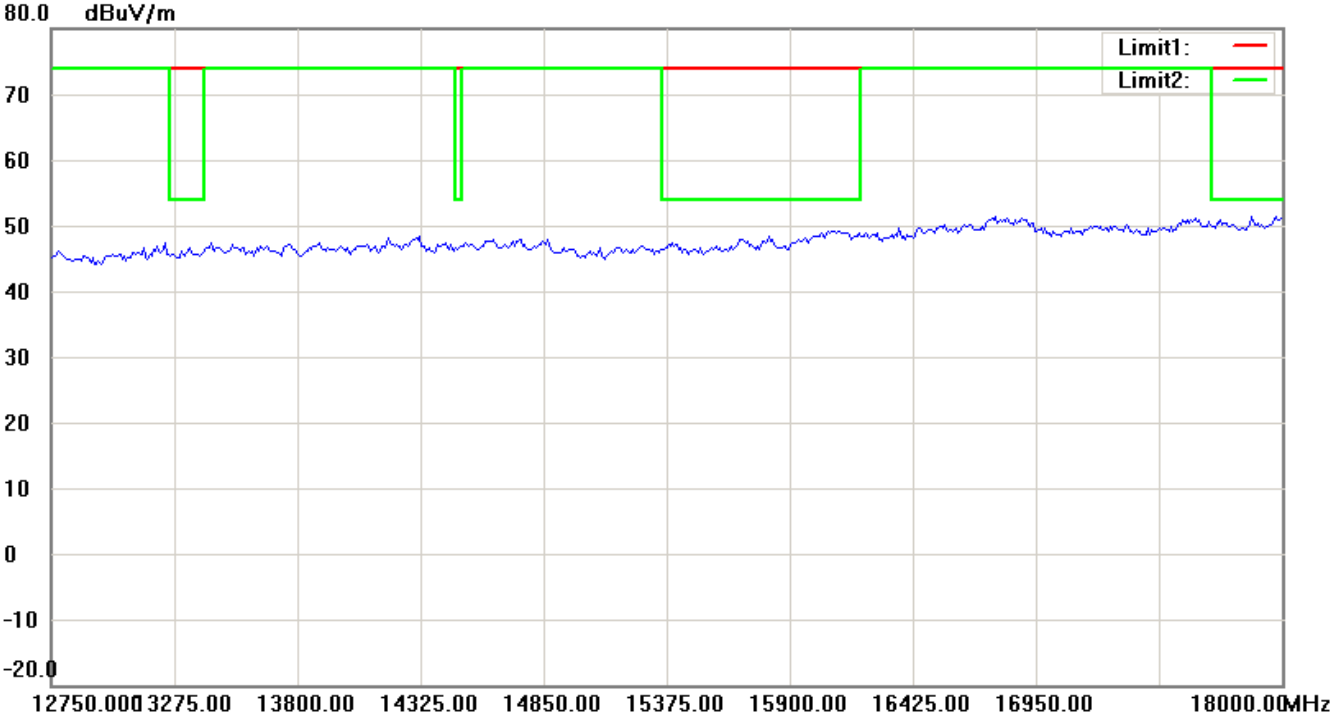


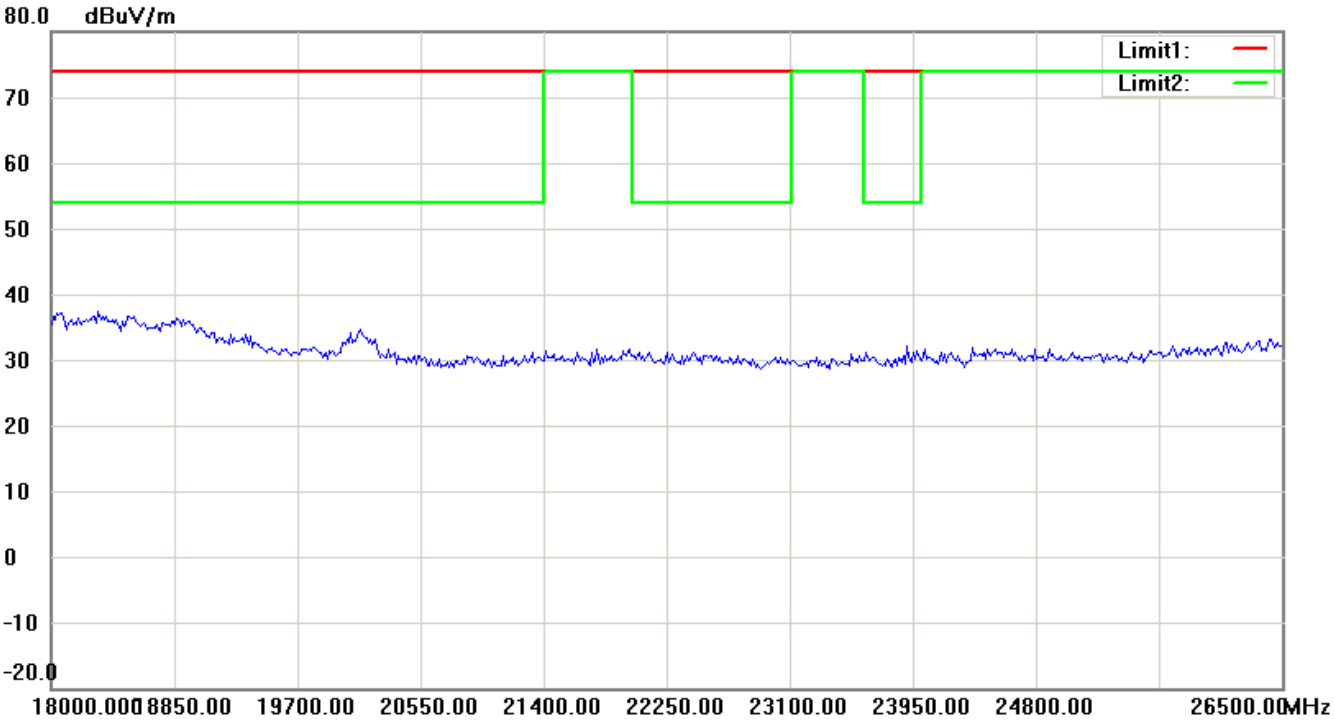


**Note:**
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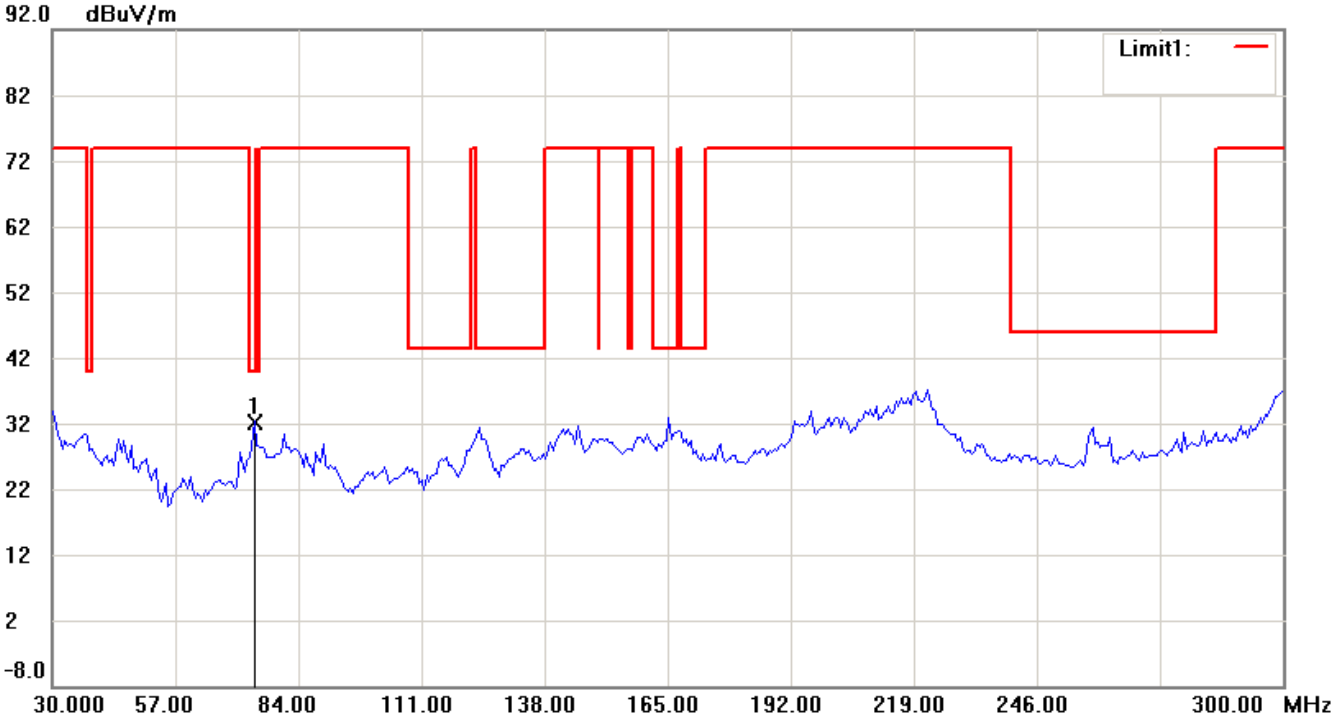
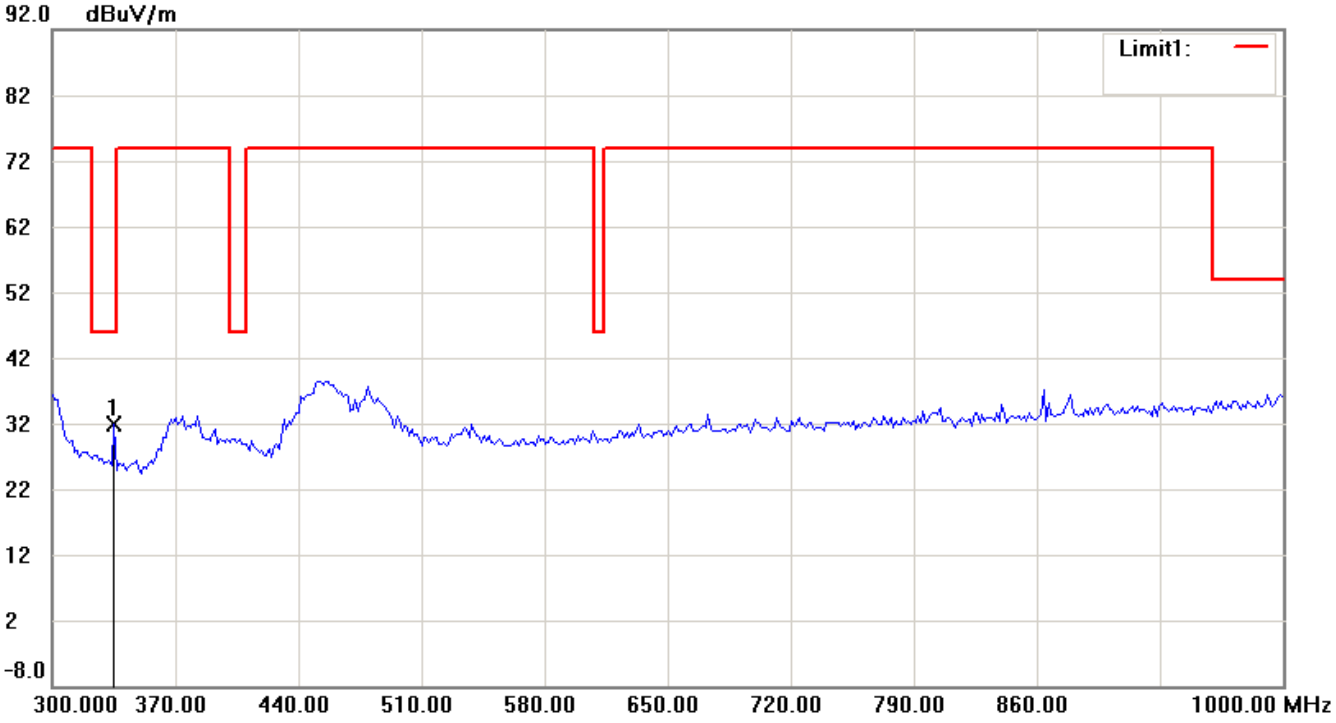
Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

Antenna Polarization V




**Note:**
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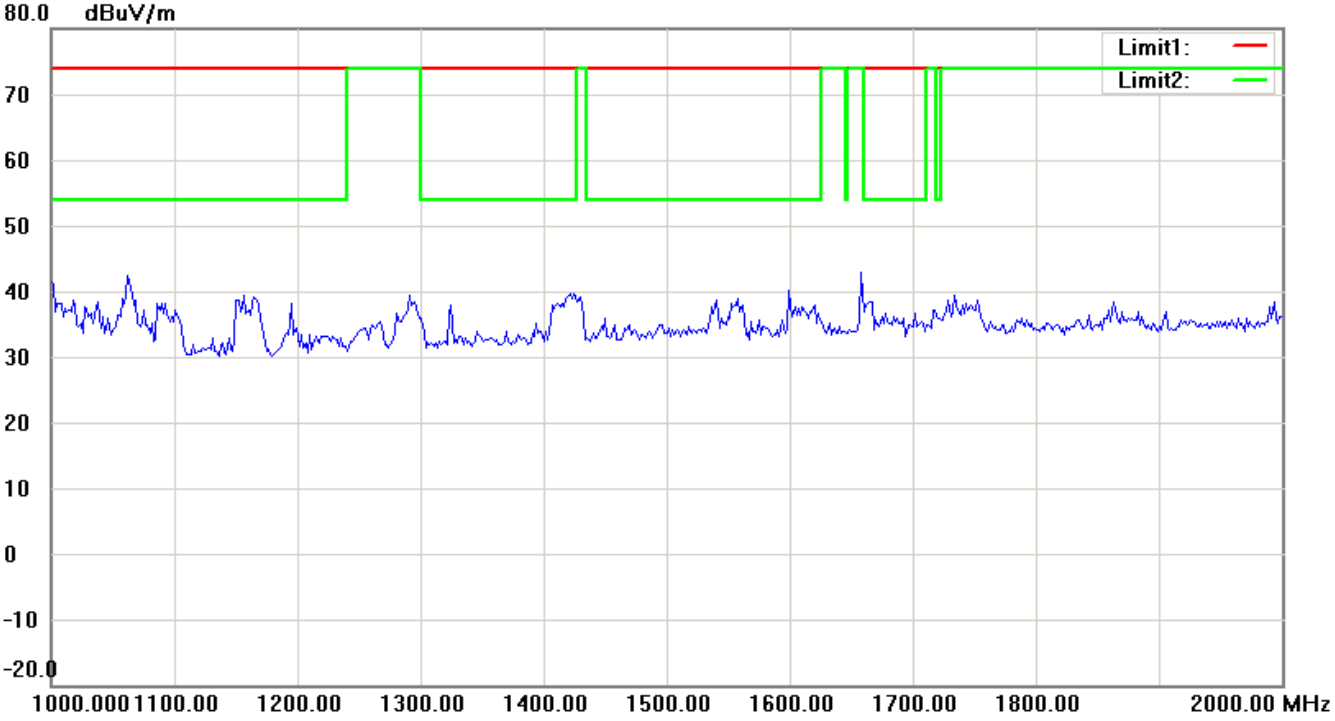


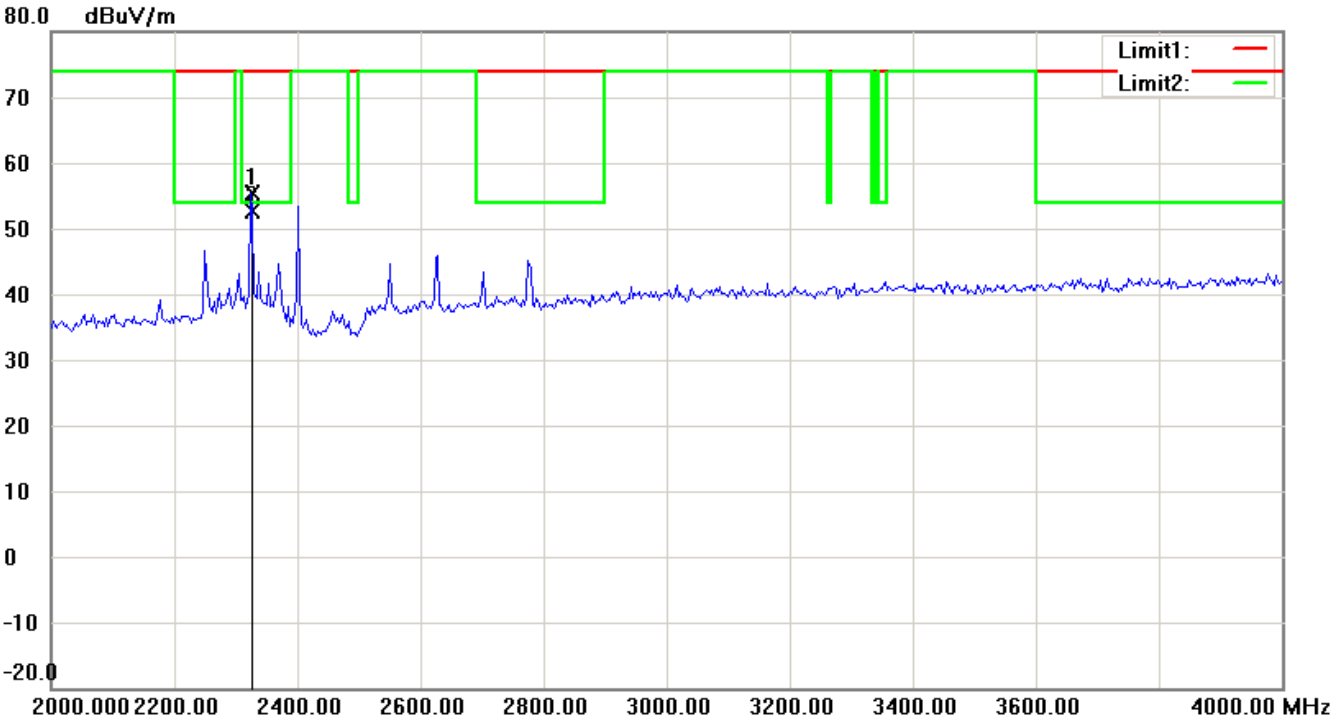


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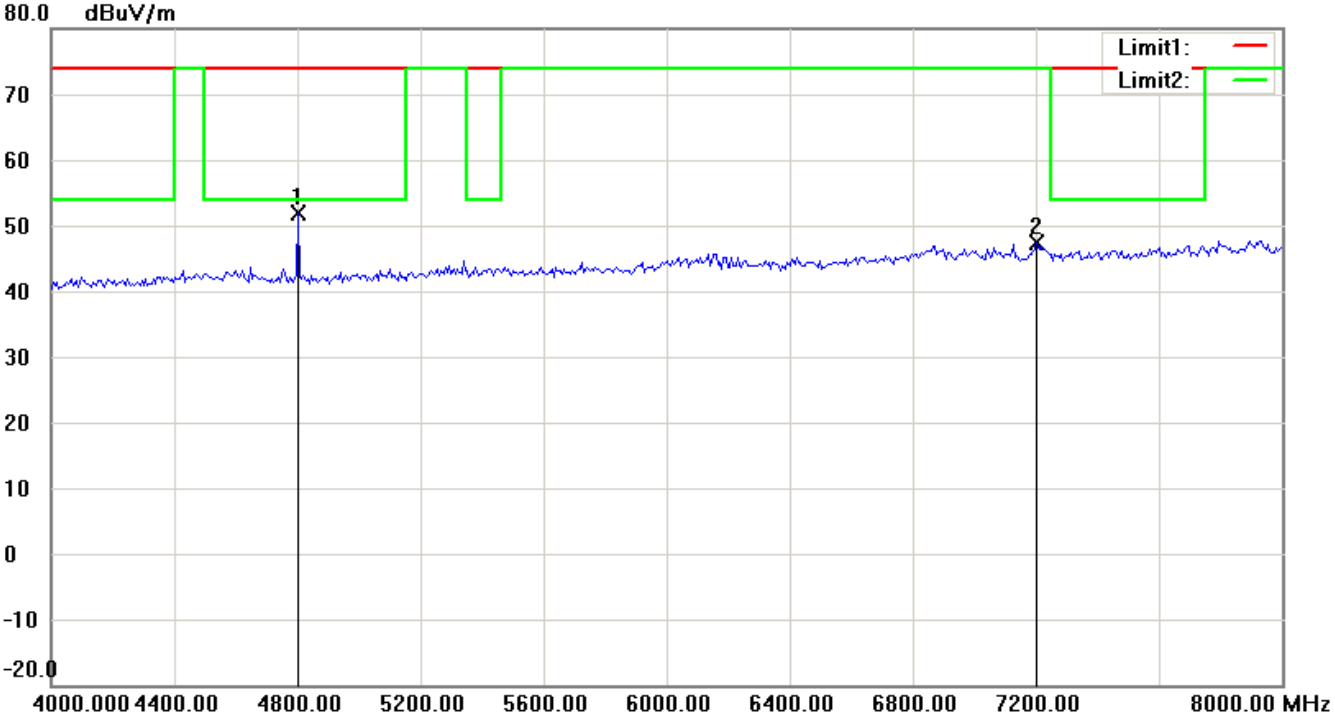


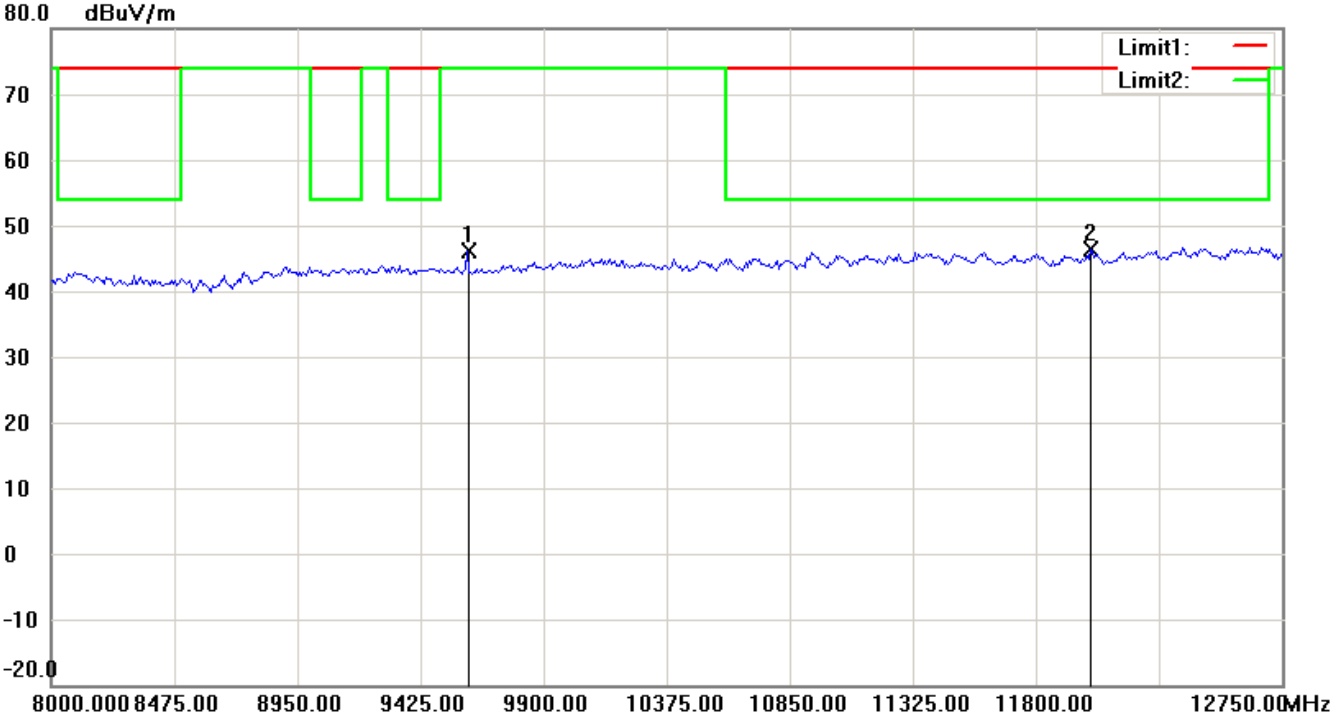


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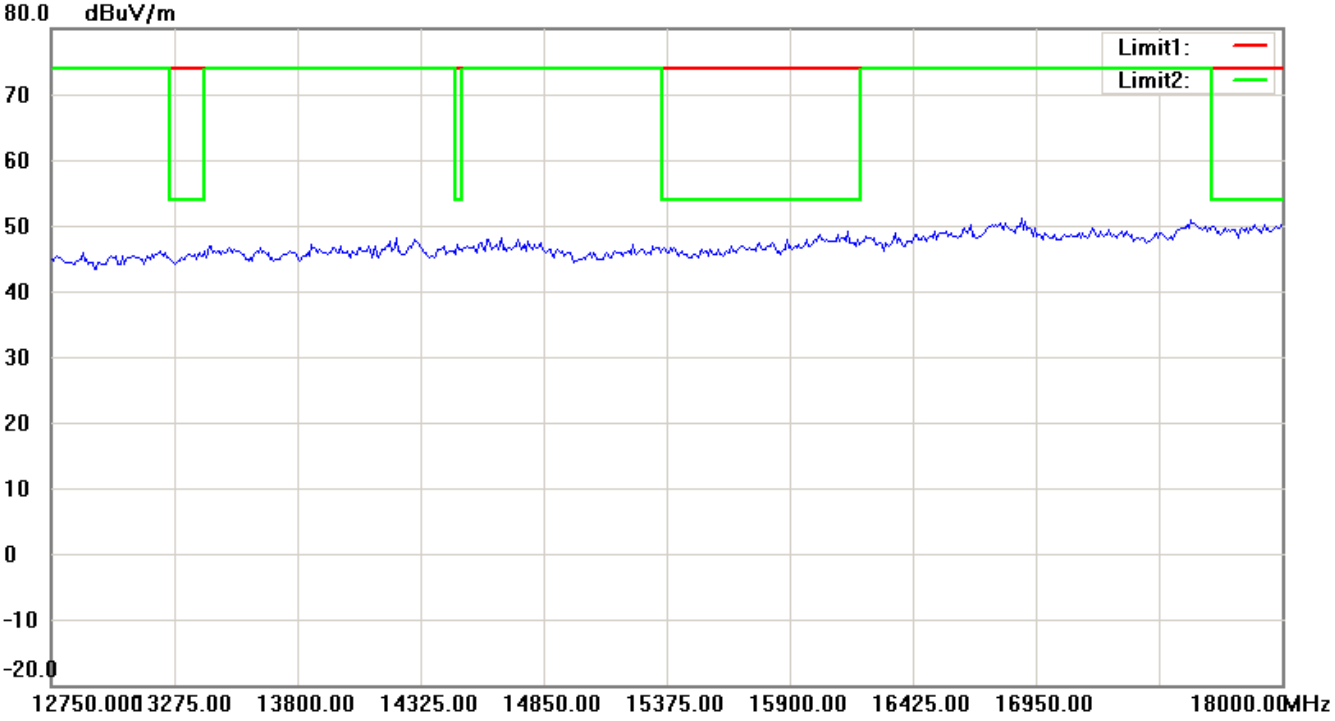


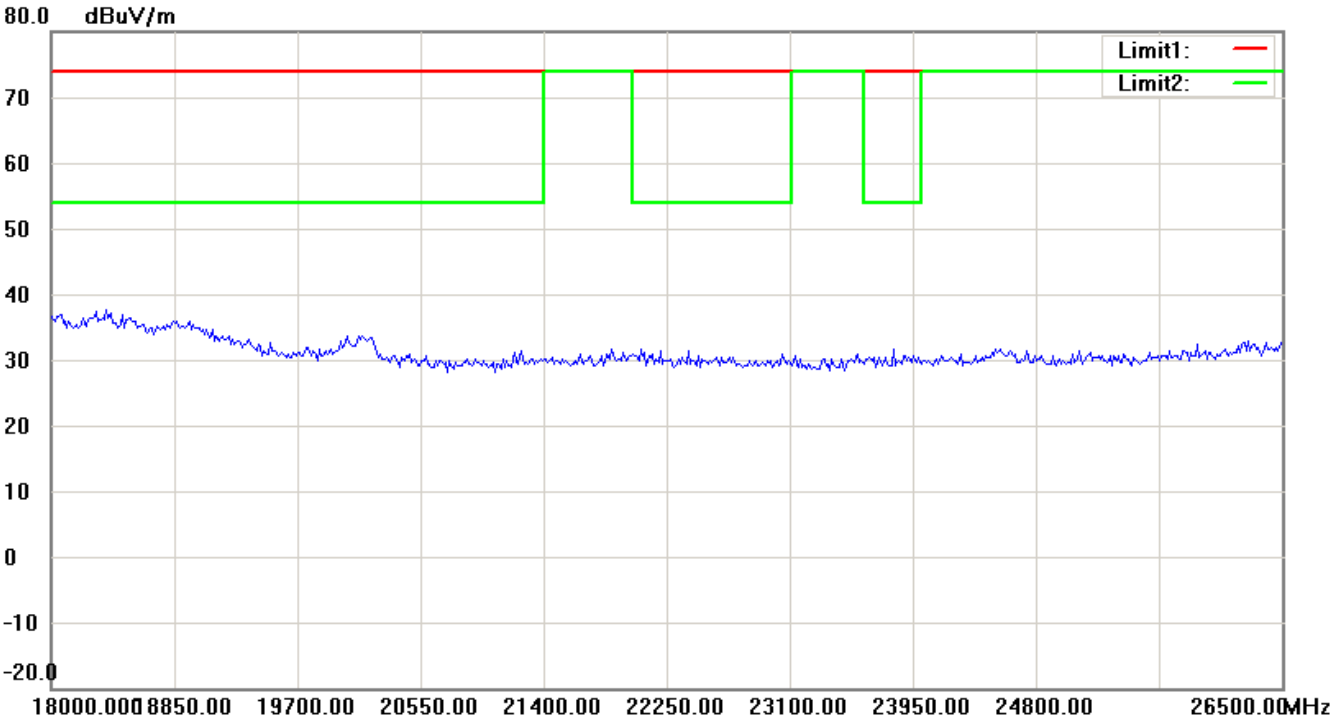


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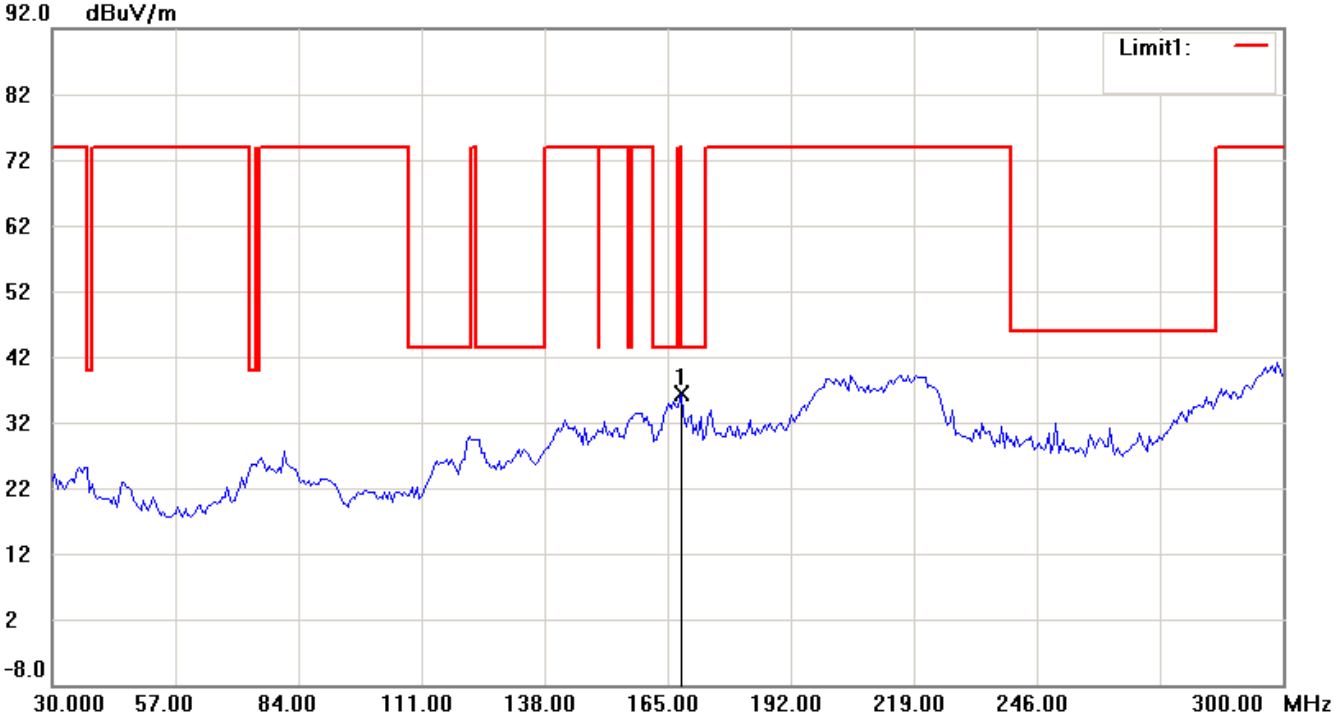
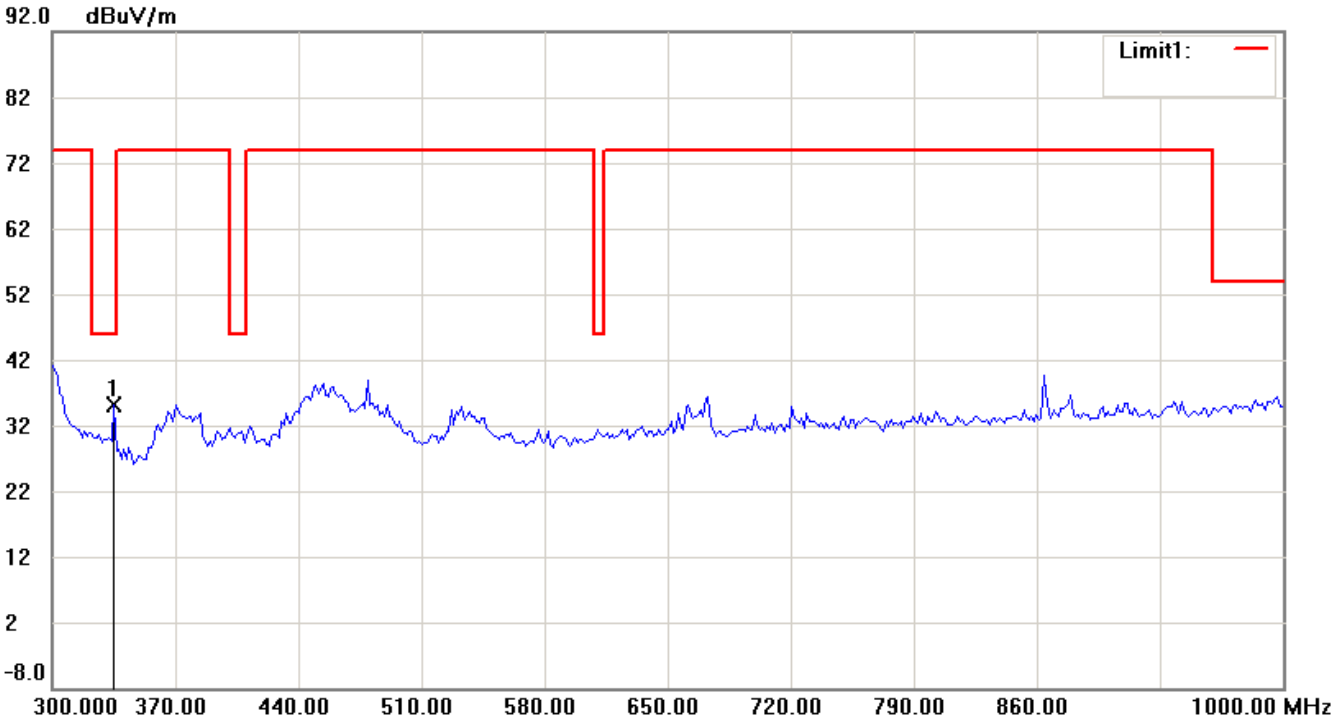
Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

2440MHz

Antenna Polarization H

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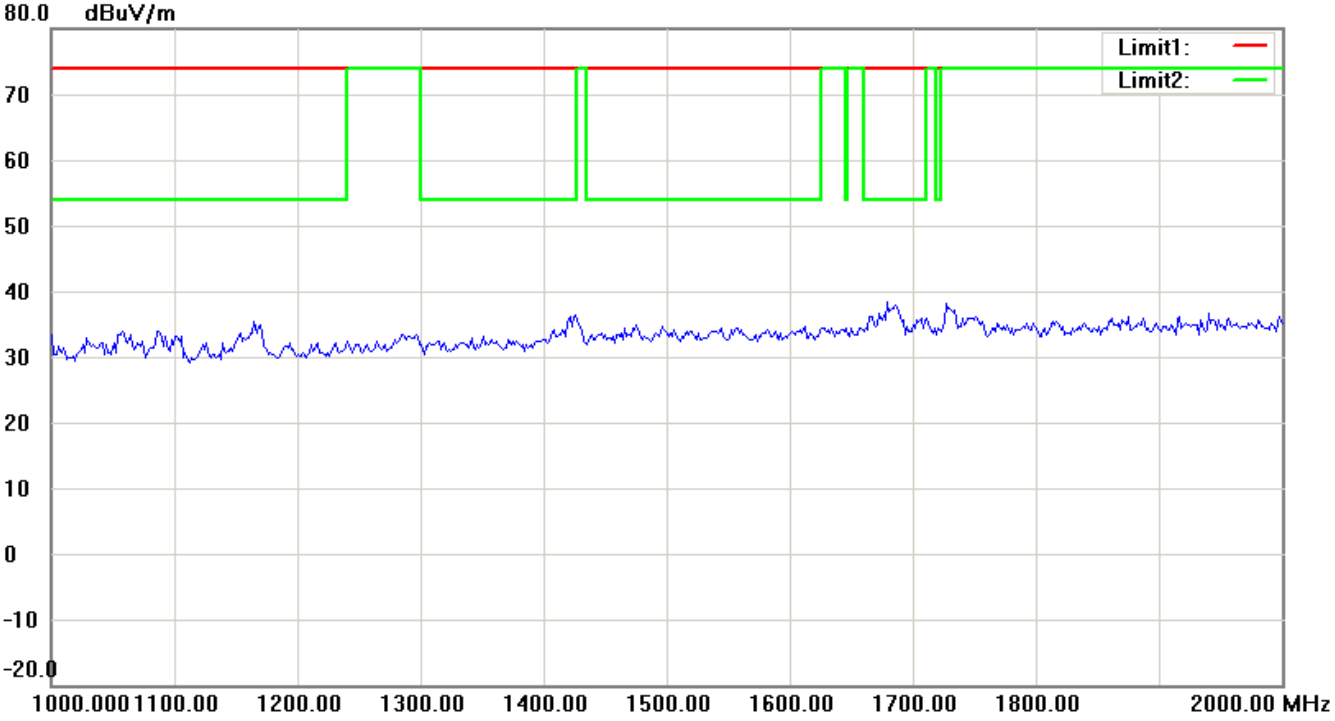


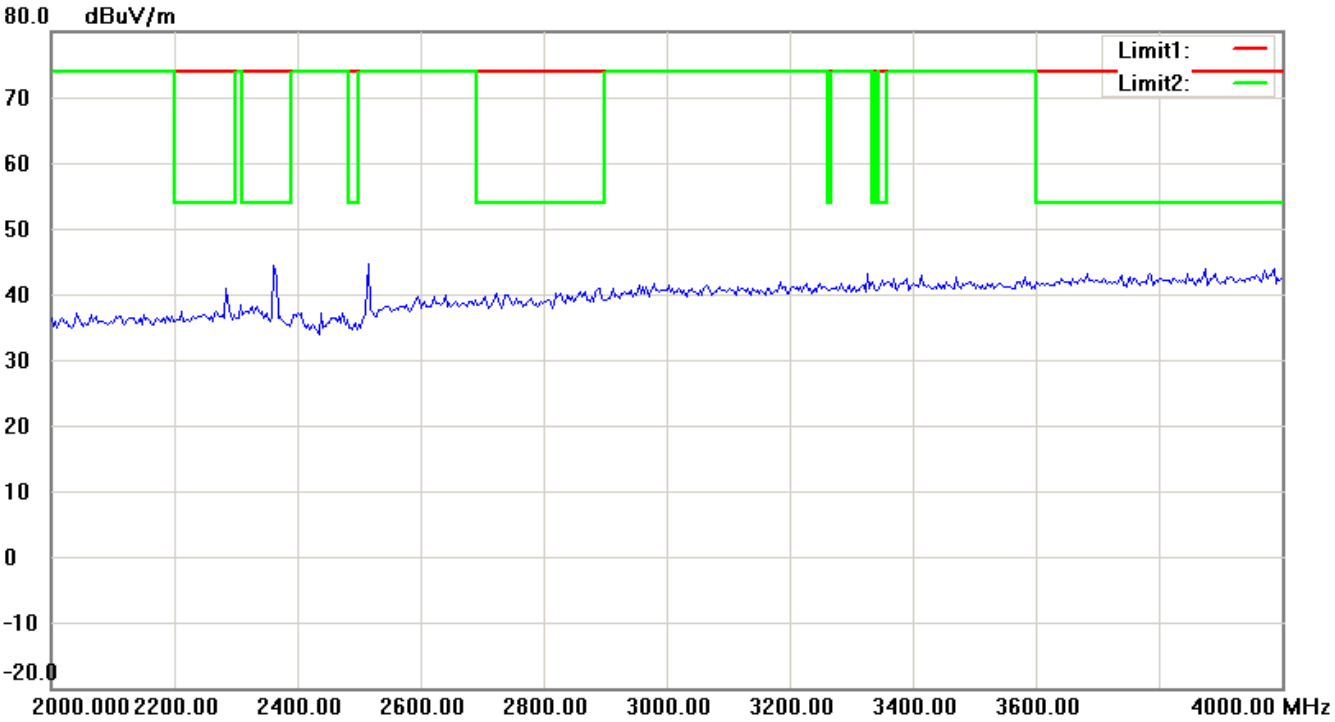


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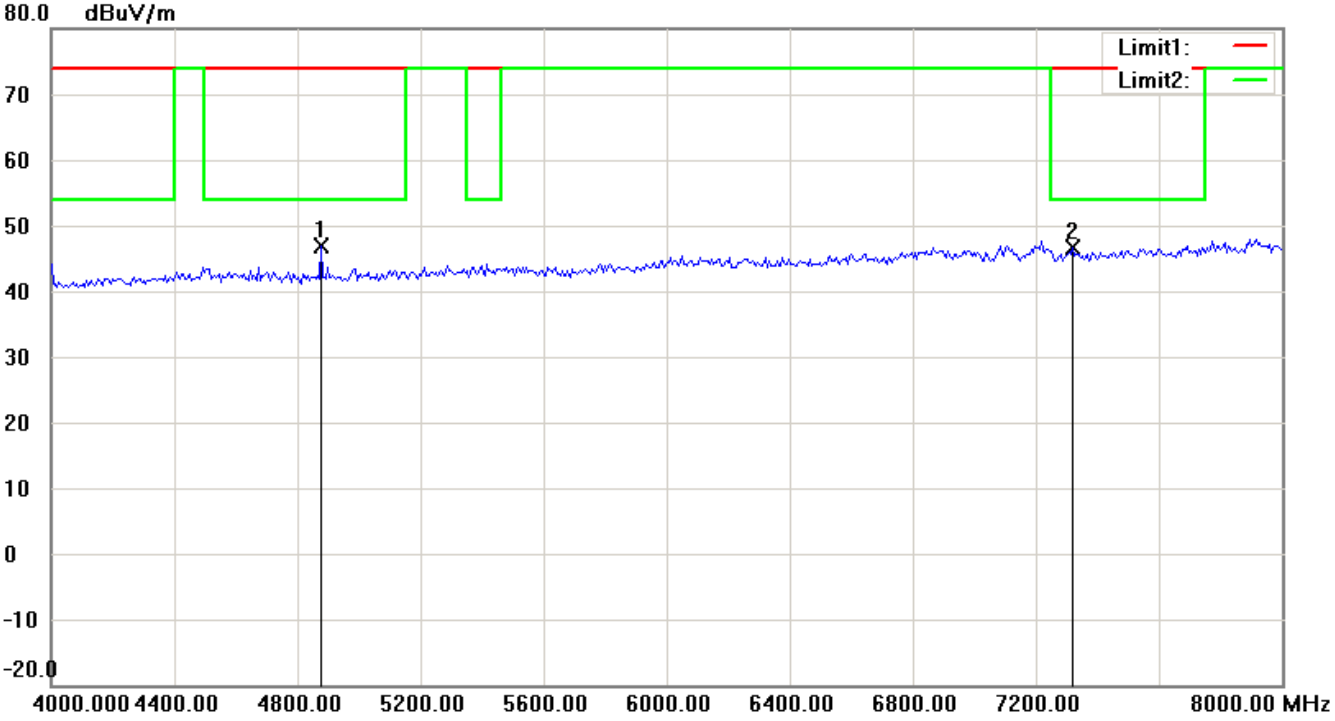


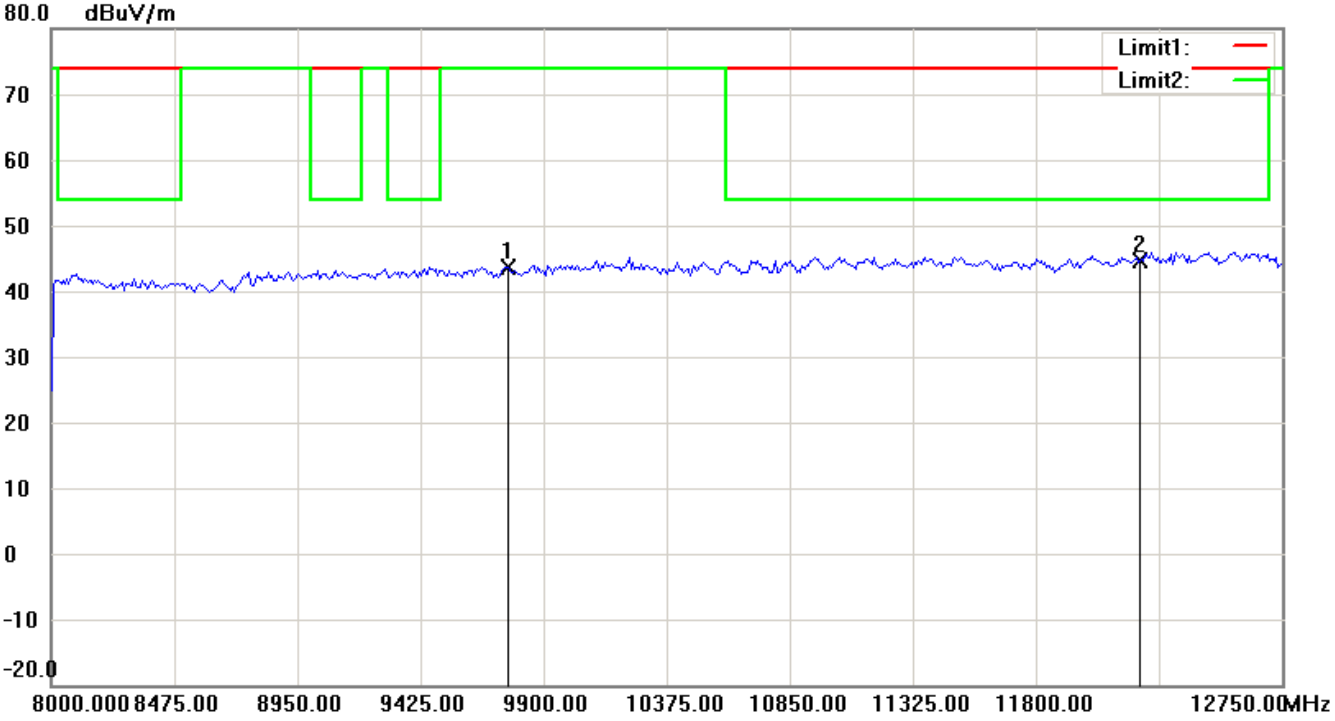


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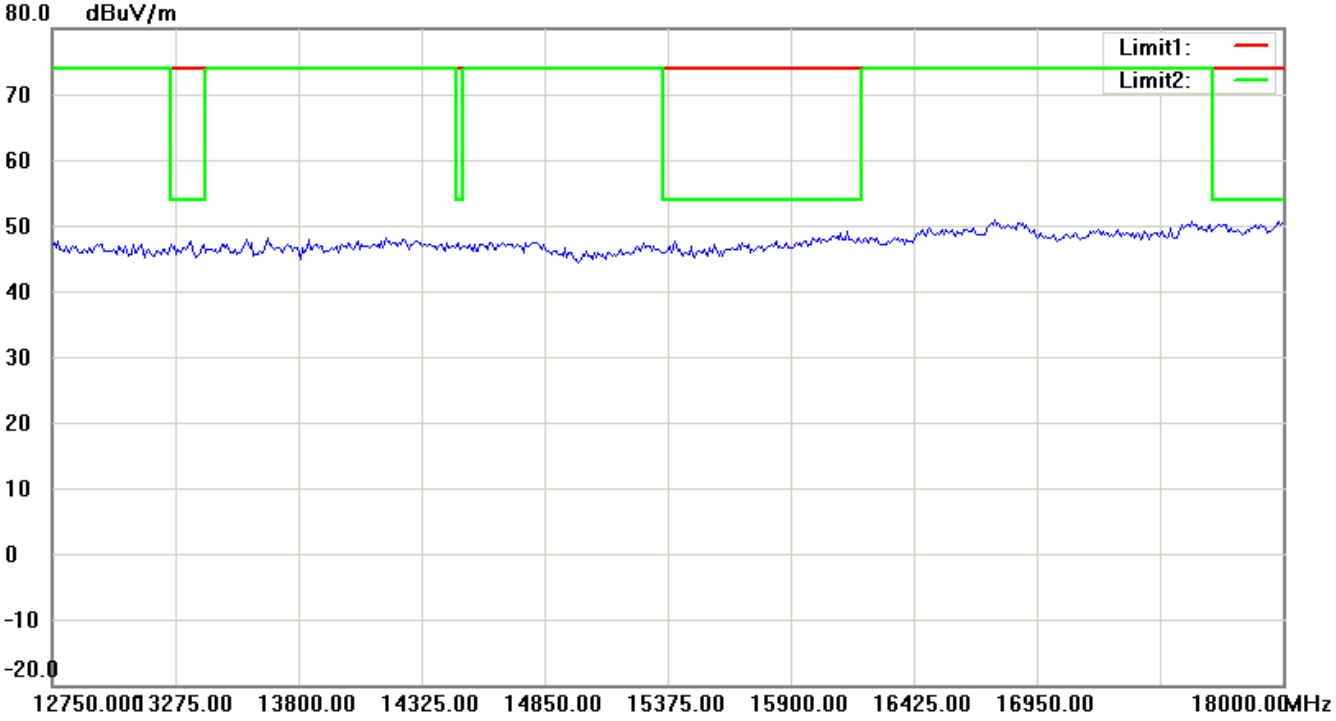


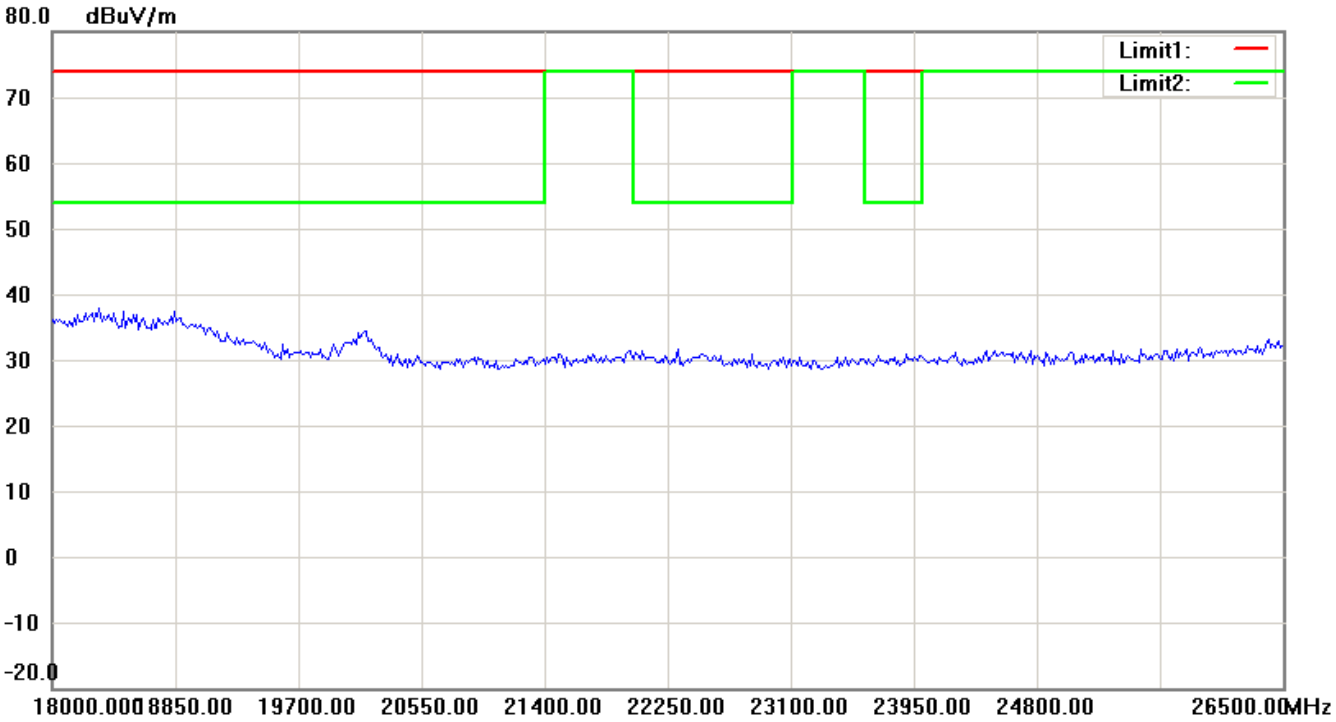


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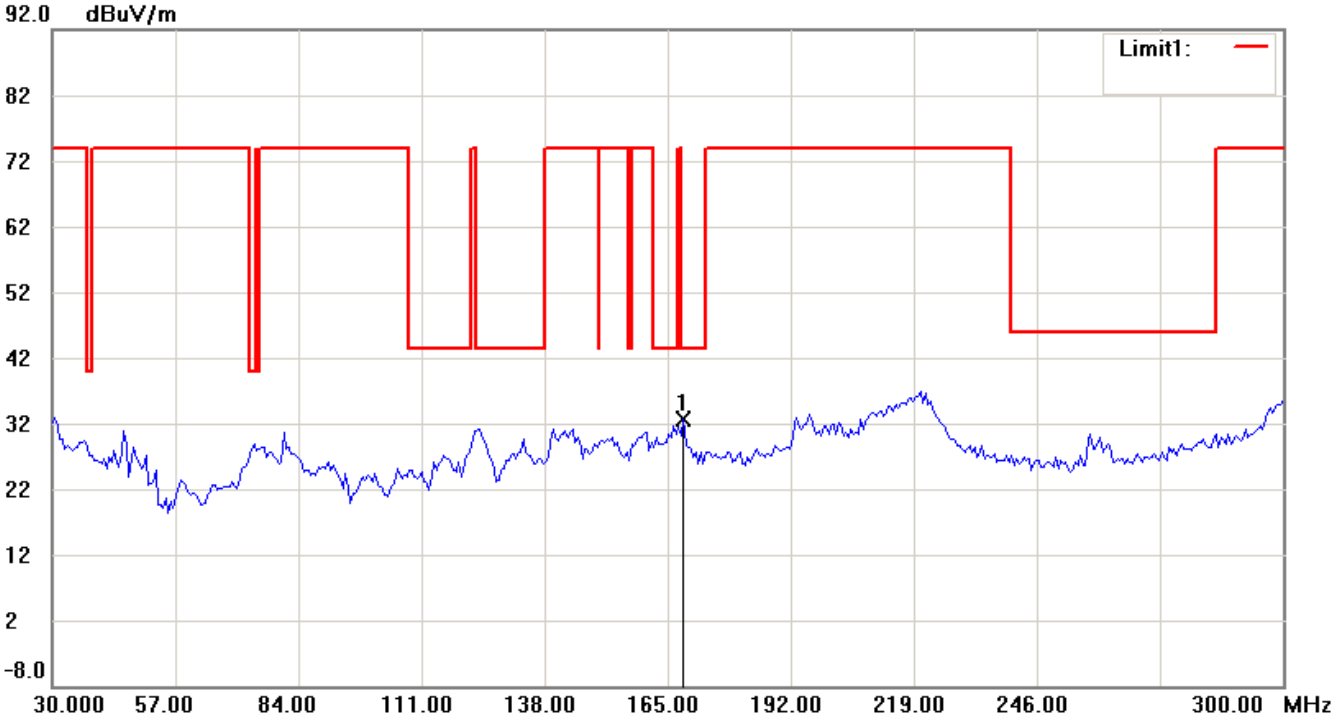
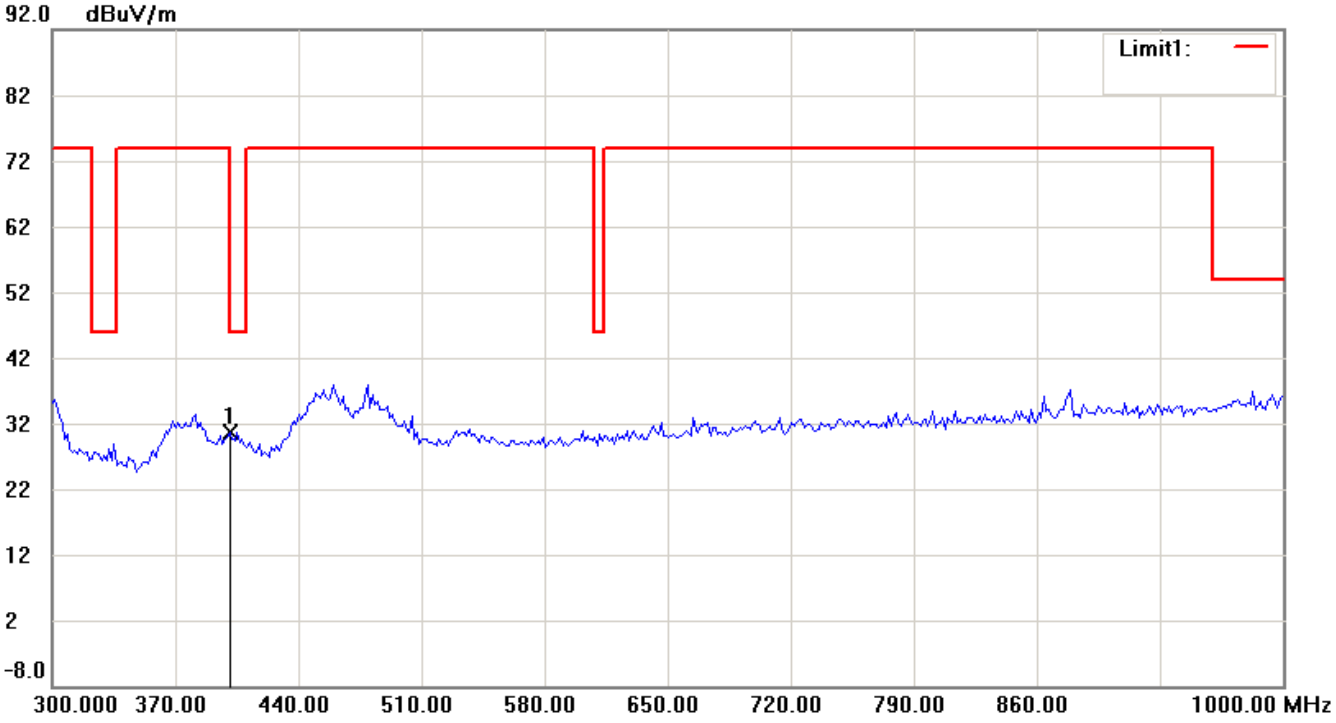
Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

Antenna Polarization V

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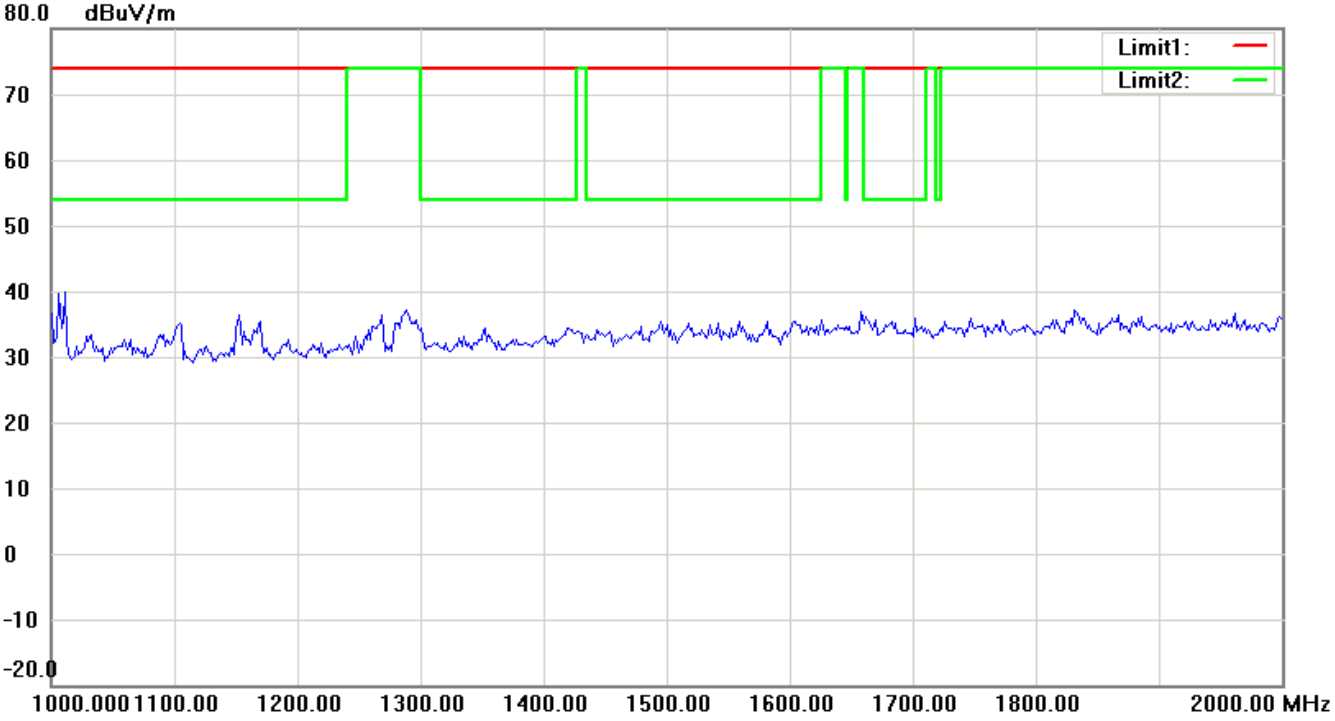


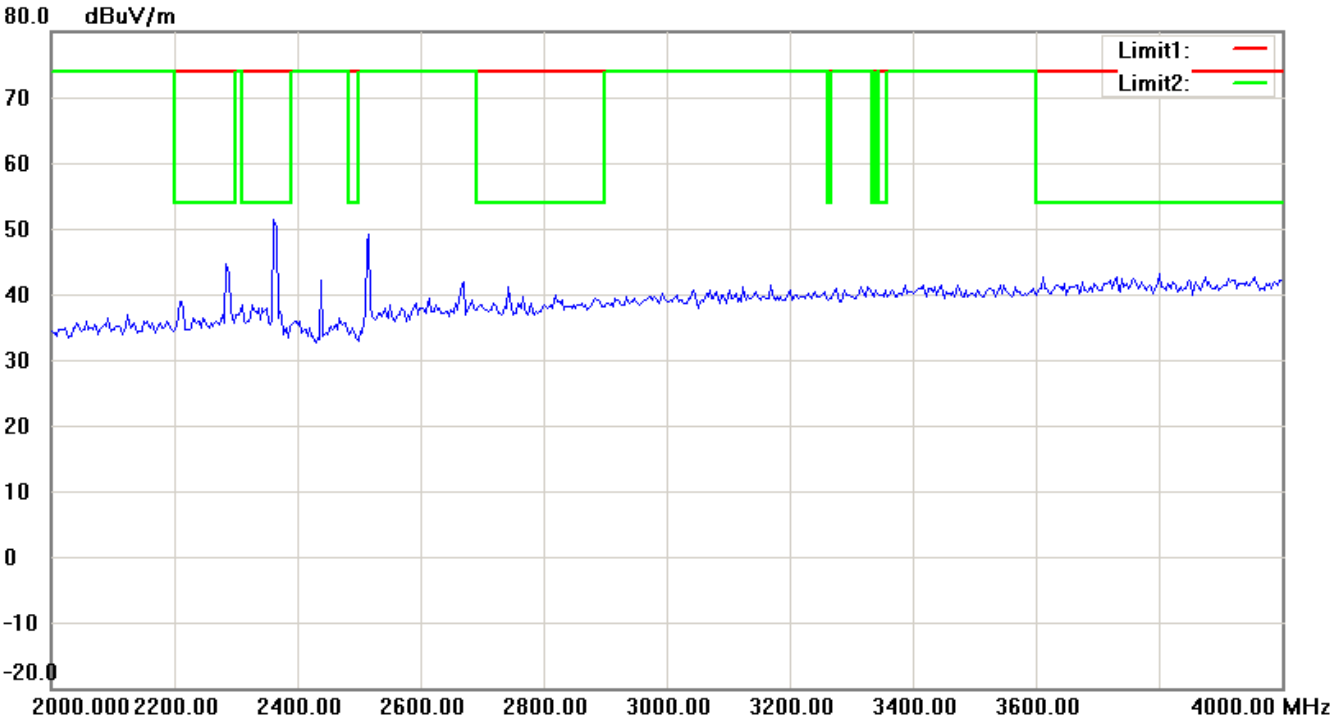


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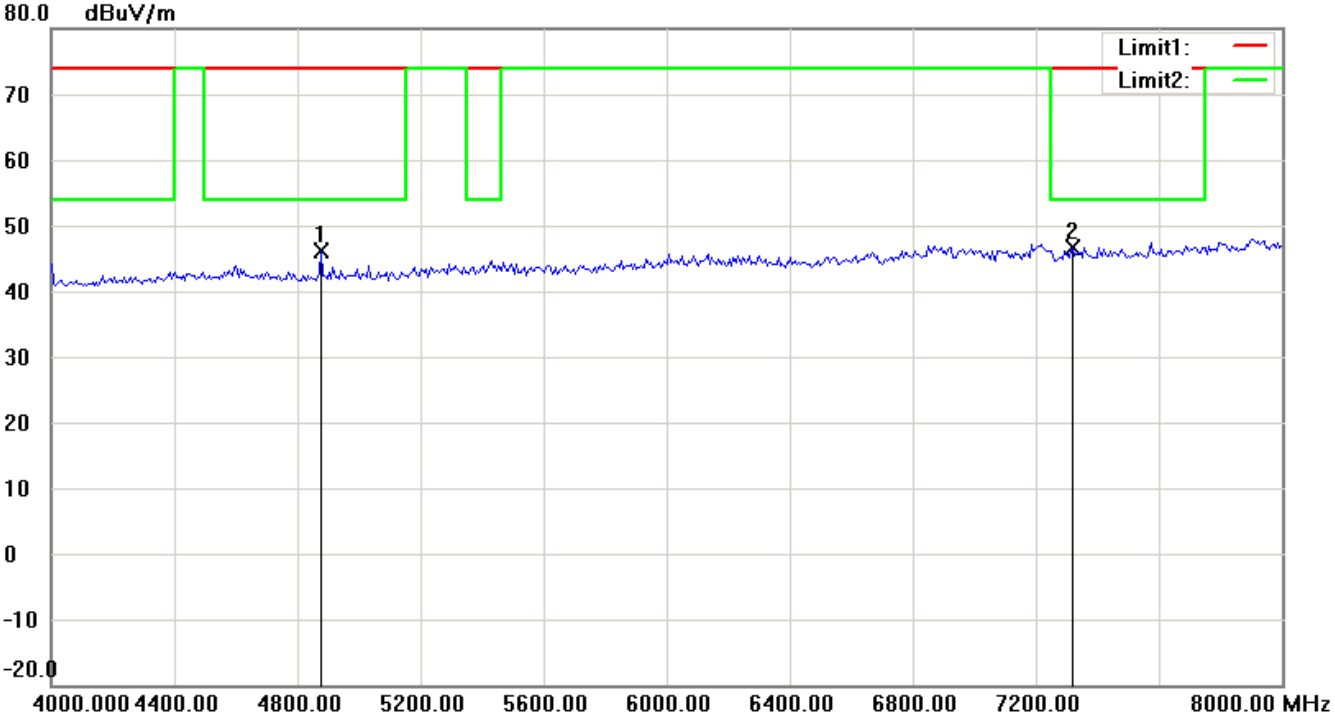


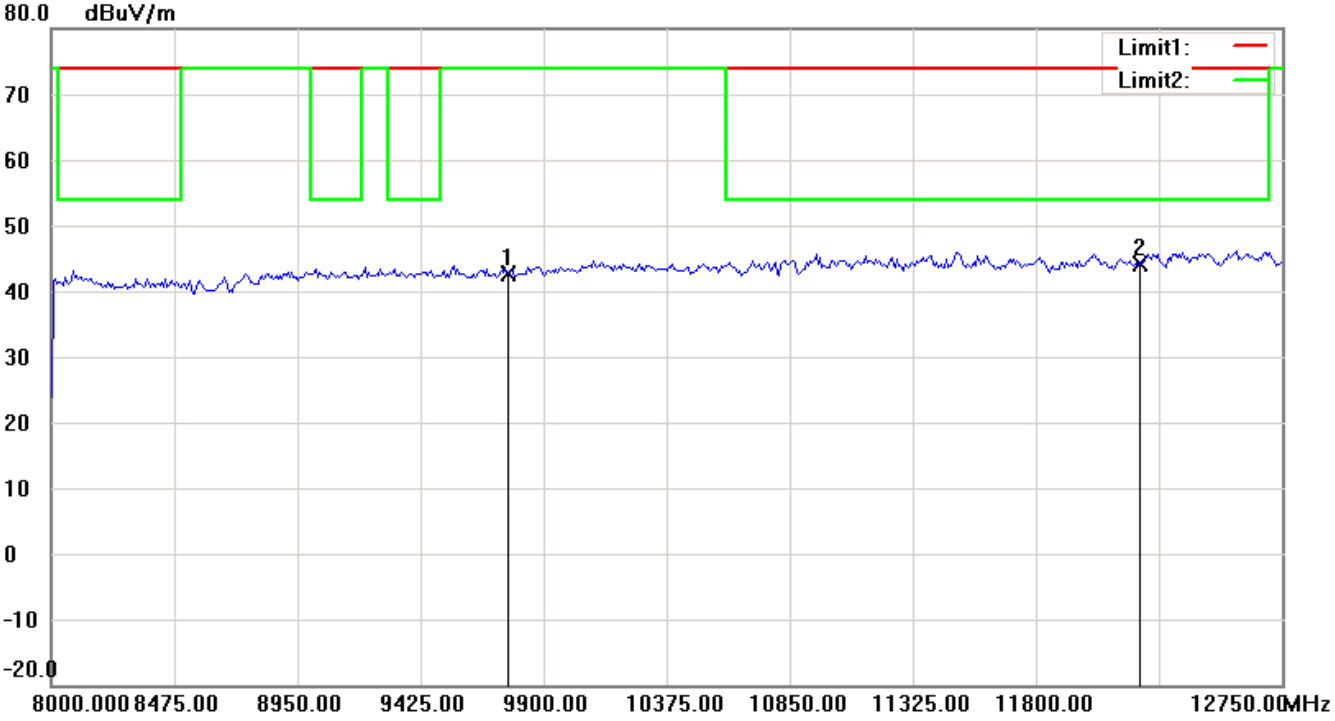


**Note:**
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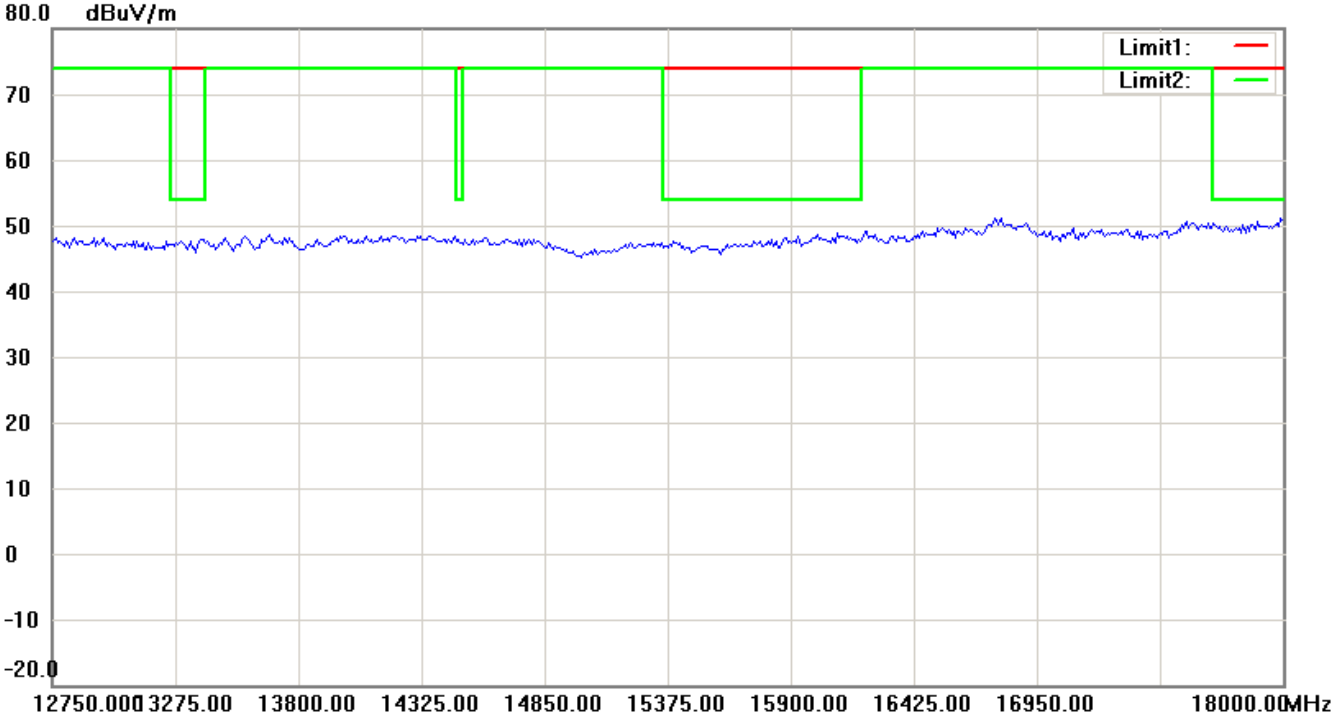


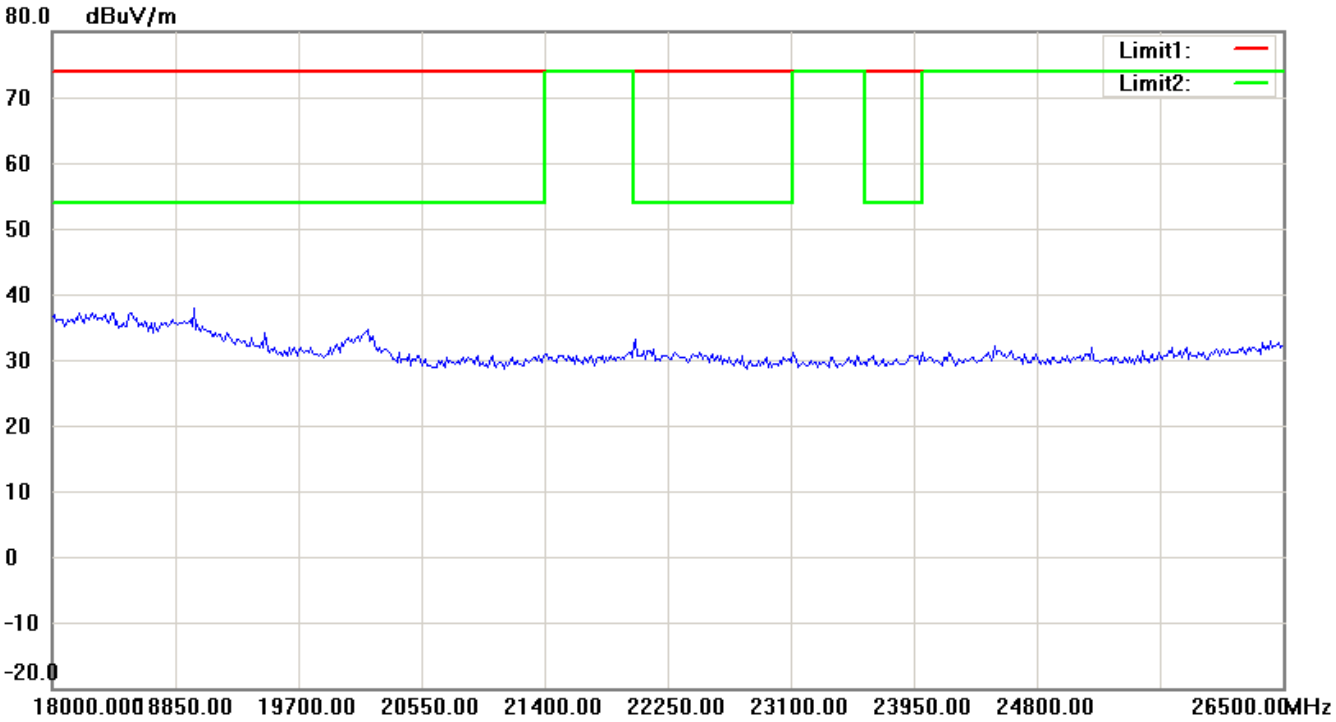


**Note:**
**Up Line: Peak Limit Line, Down Line Ave Limit Line**

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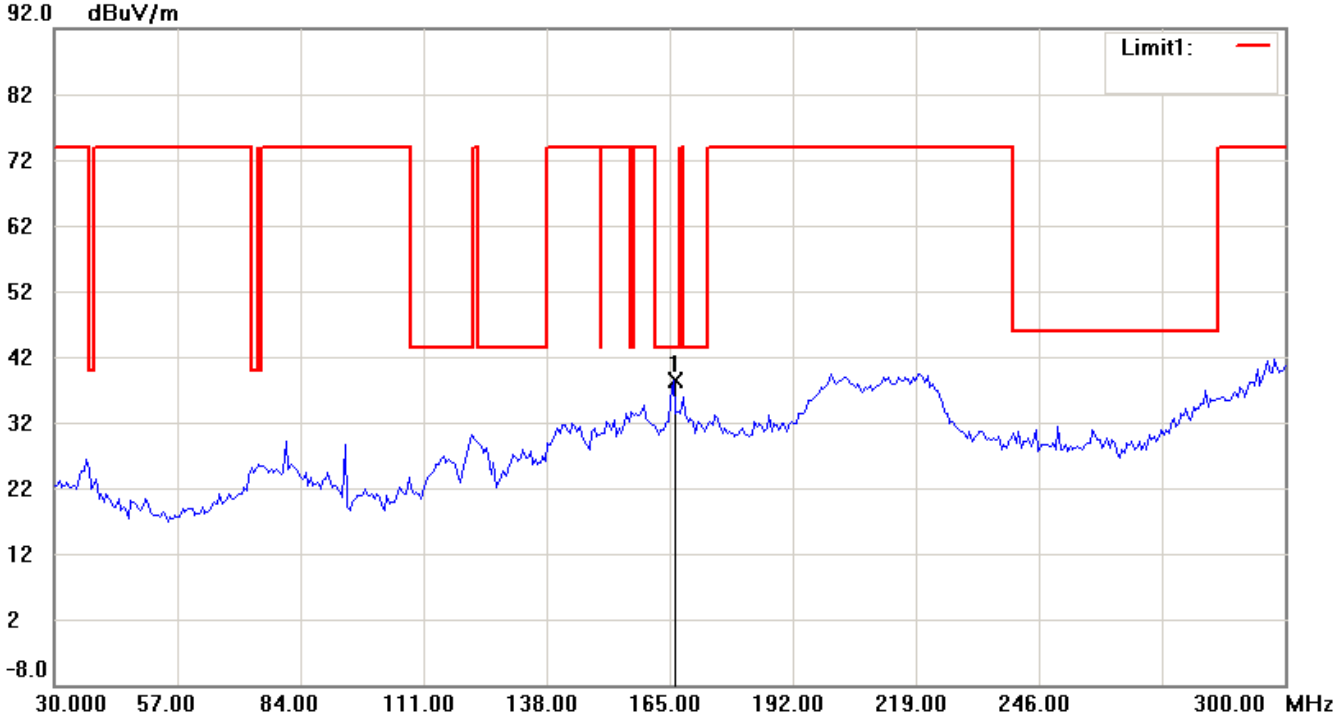
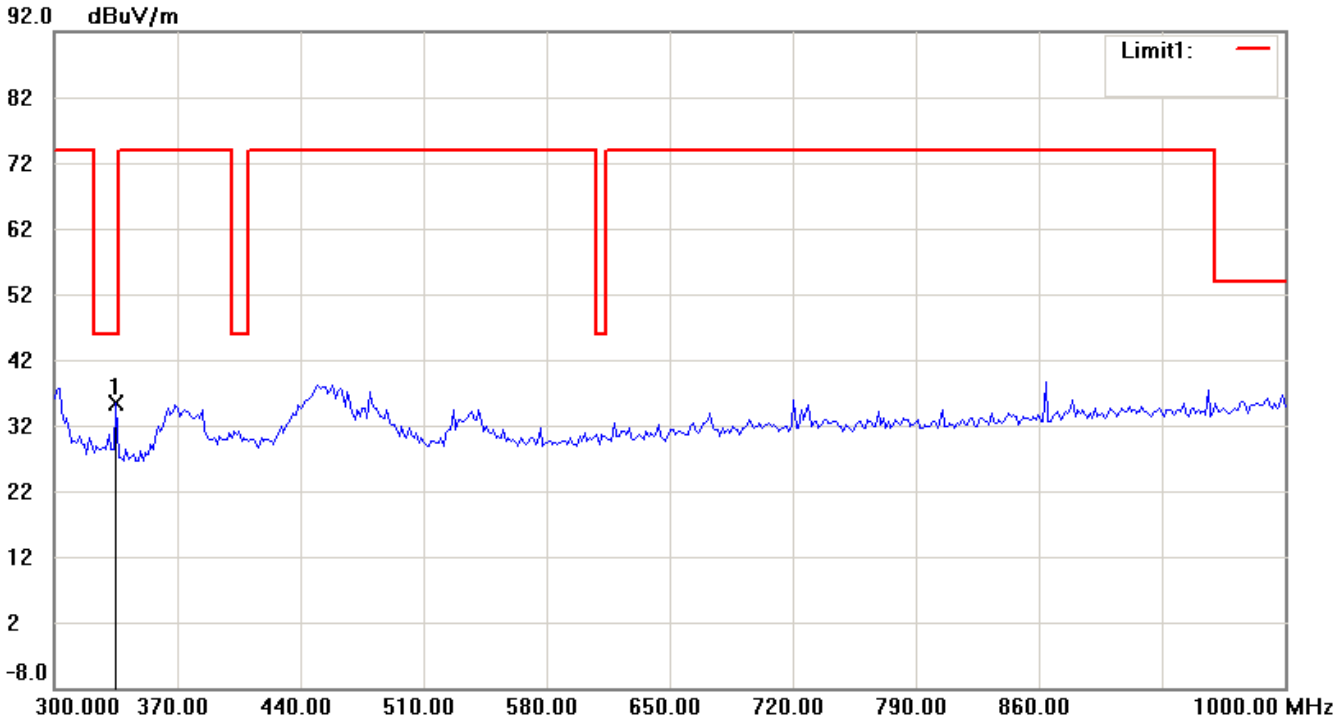
Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811

2480MHz

Antenna Polarization H

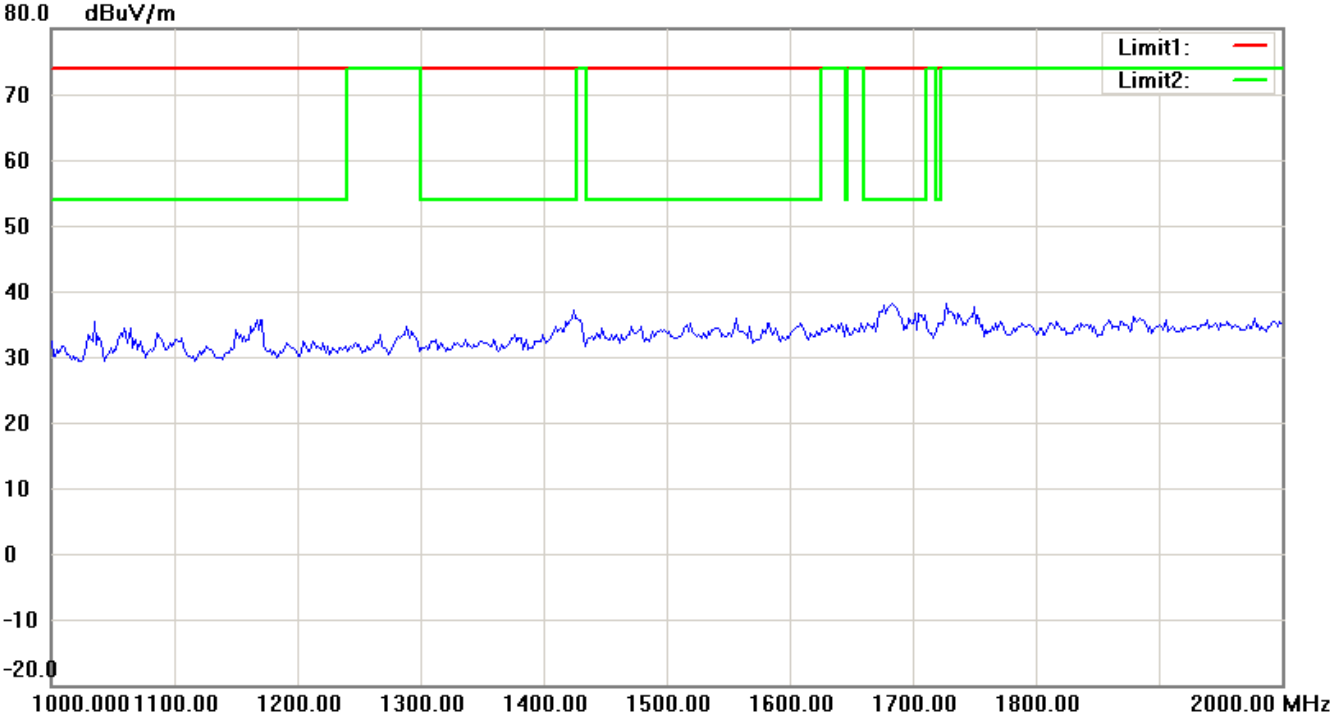


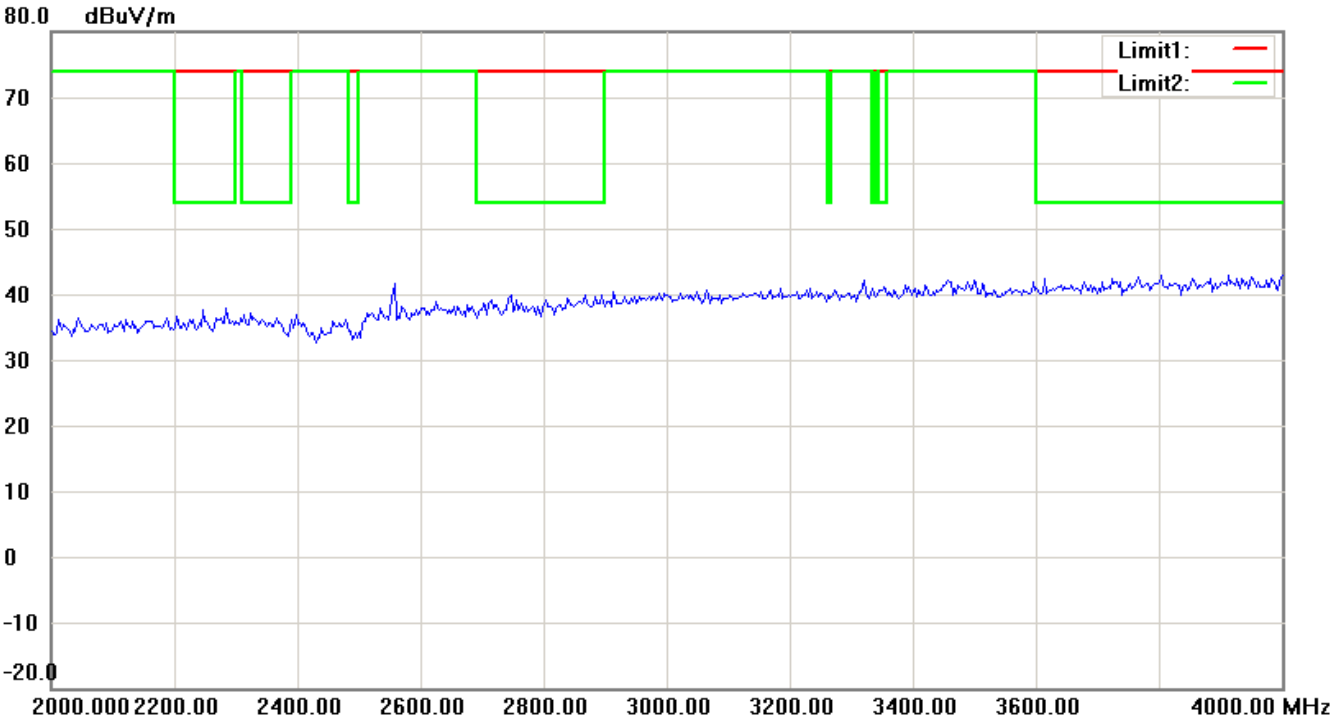




**Note:**
**Up Line: Peak Limit Line, Down Line Ave Limit Line**

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

Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811




**Note:**
**Up Line: Peak Limit Line, Down Line Ave Limit Line**

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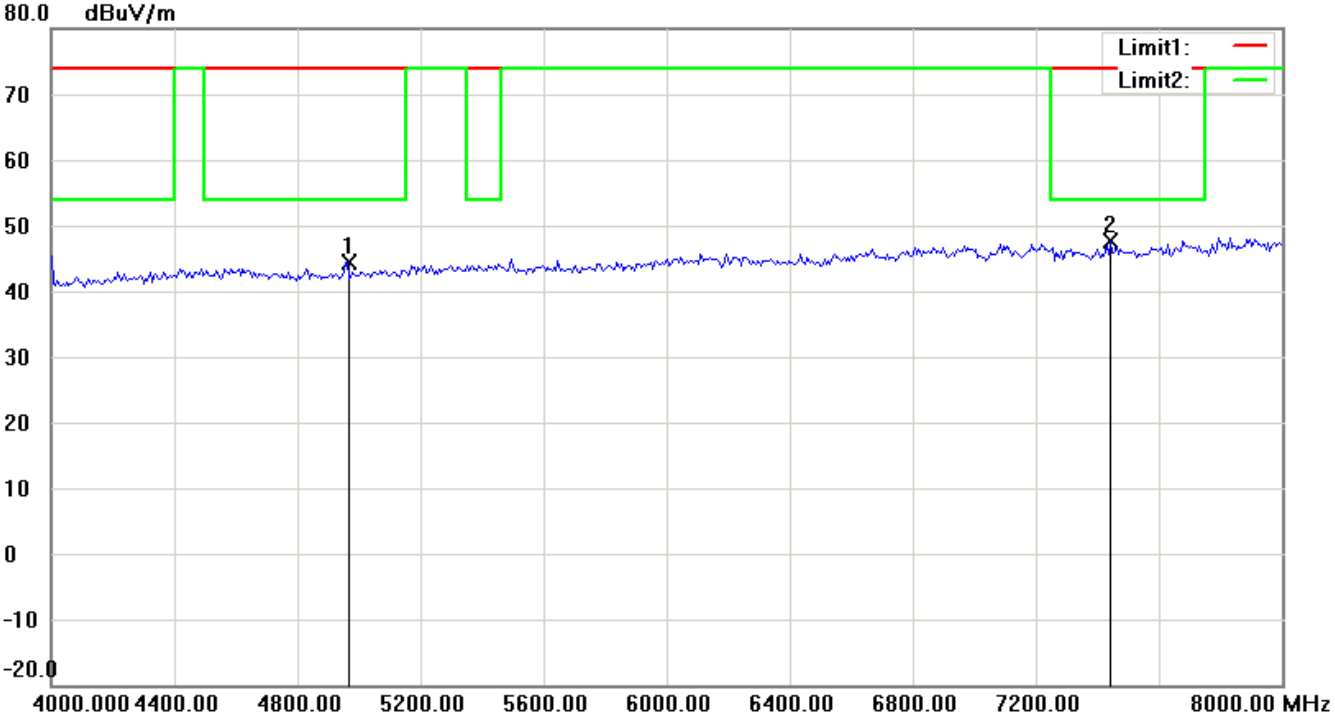
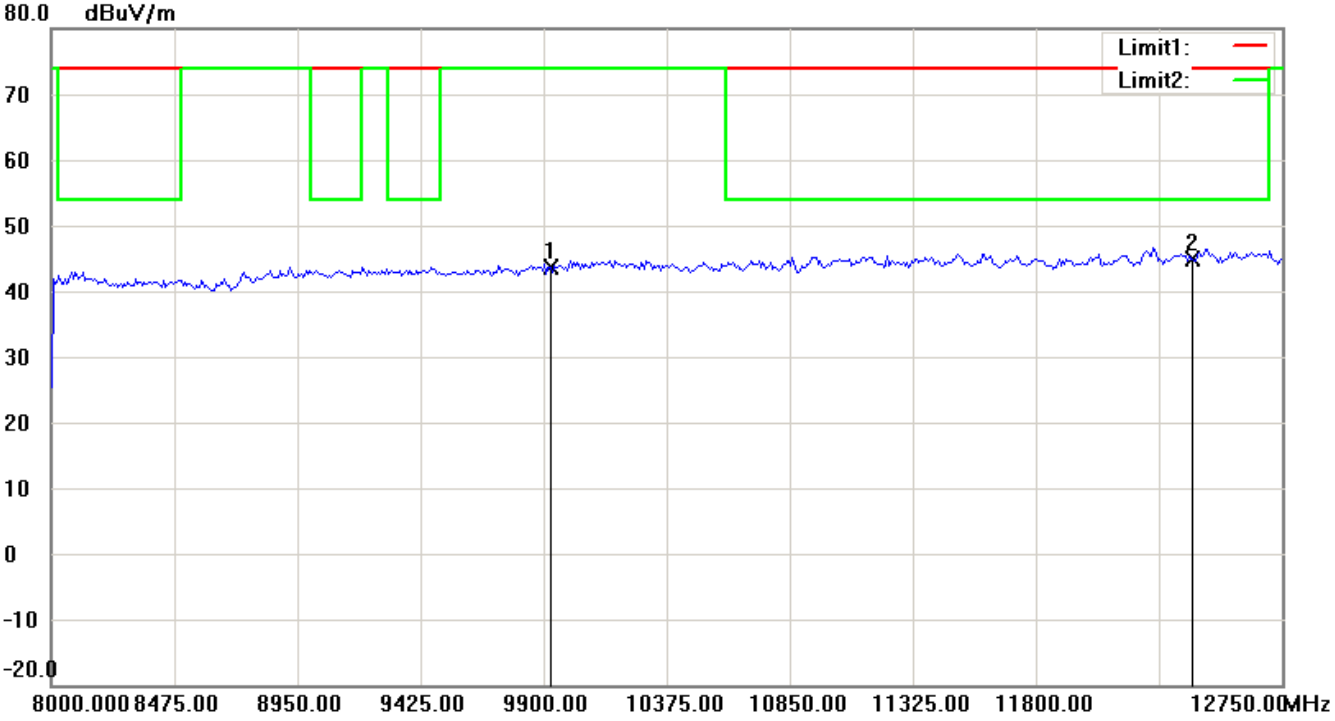
FCC ID :YS8-ALM-A811

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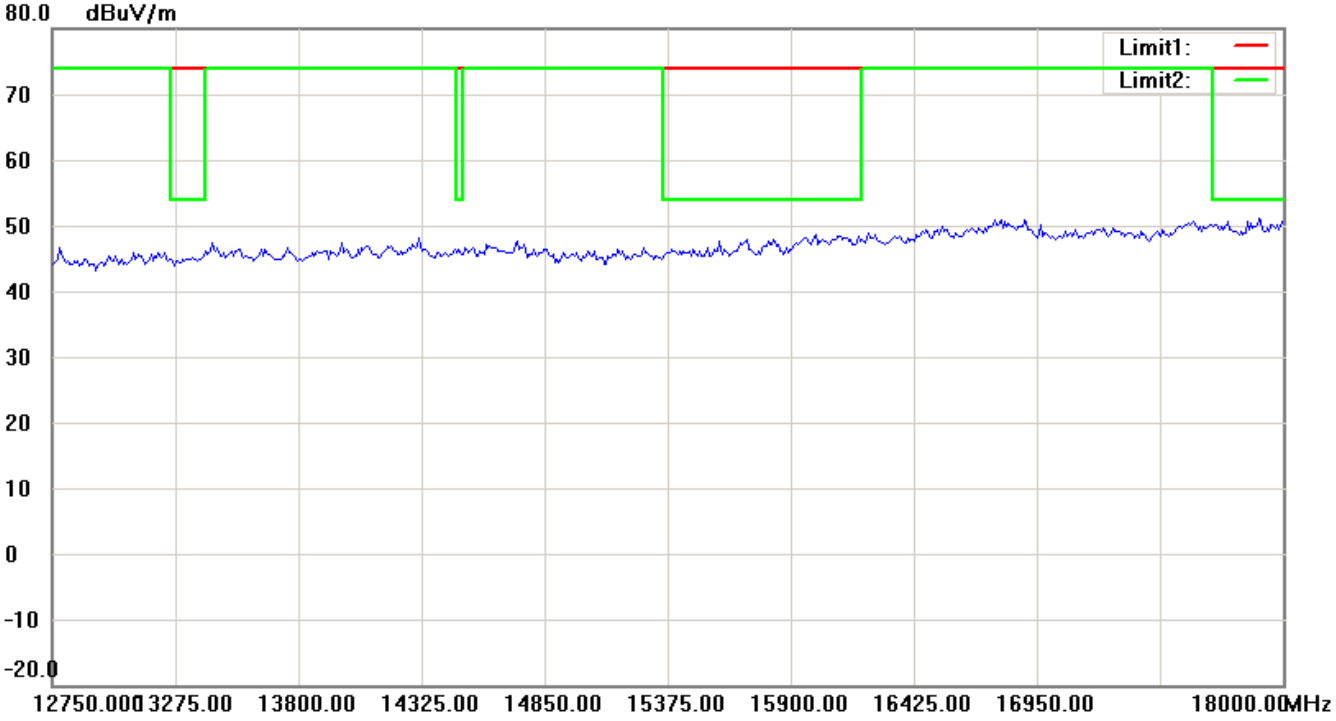


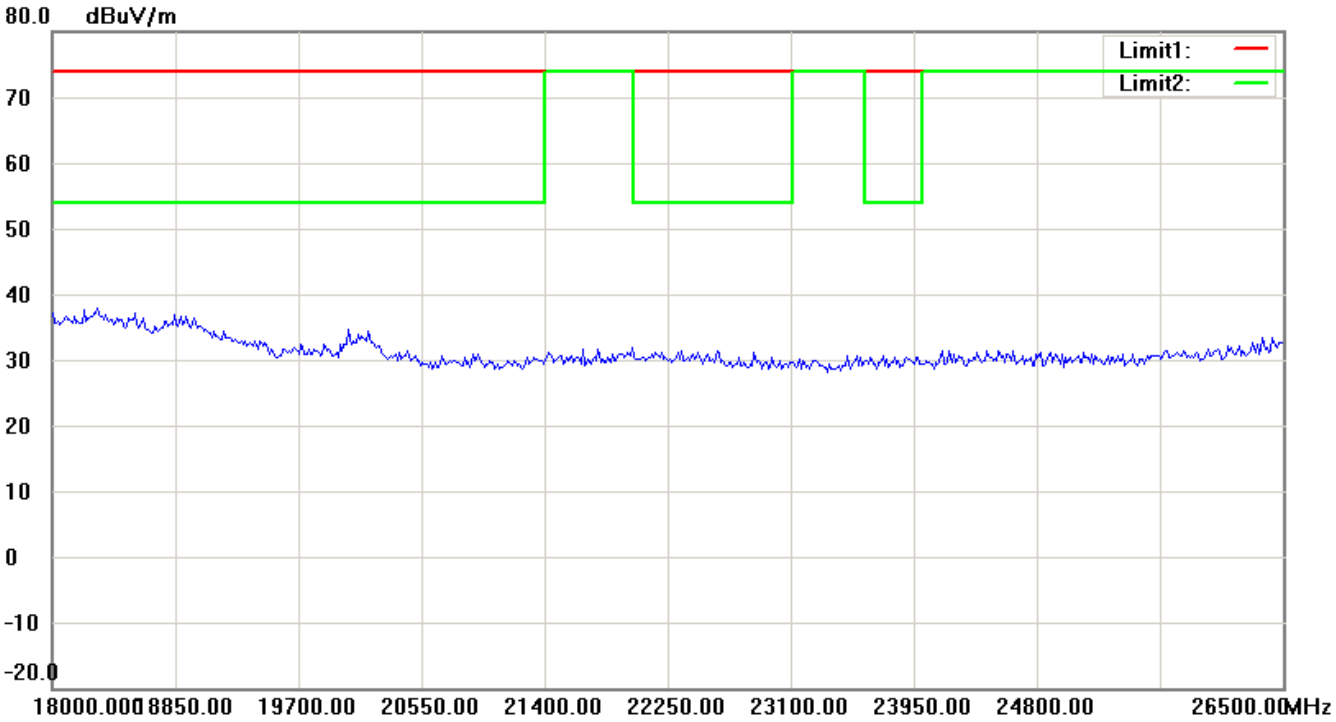


**Note:**
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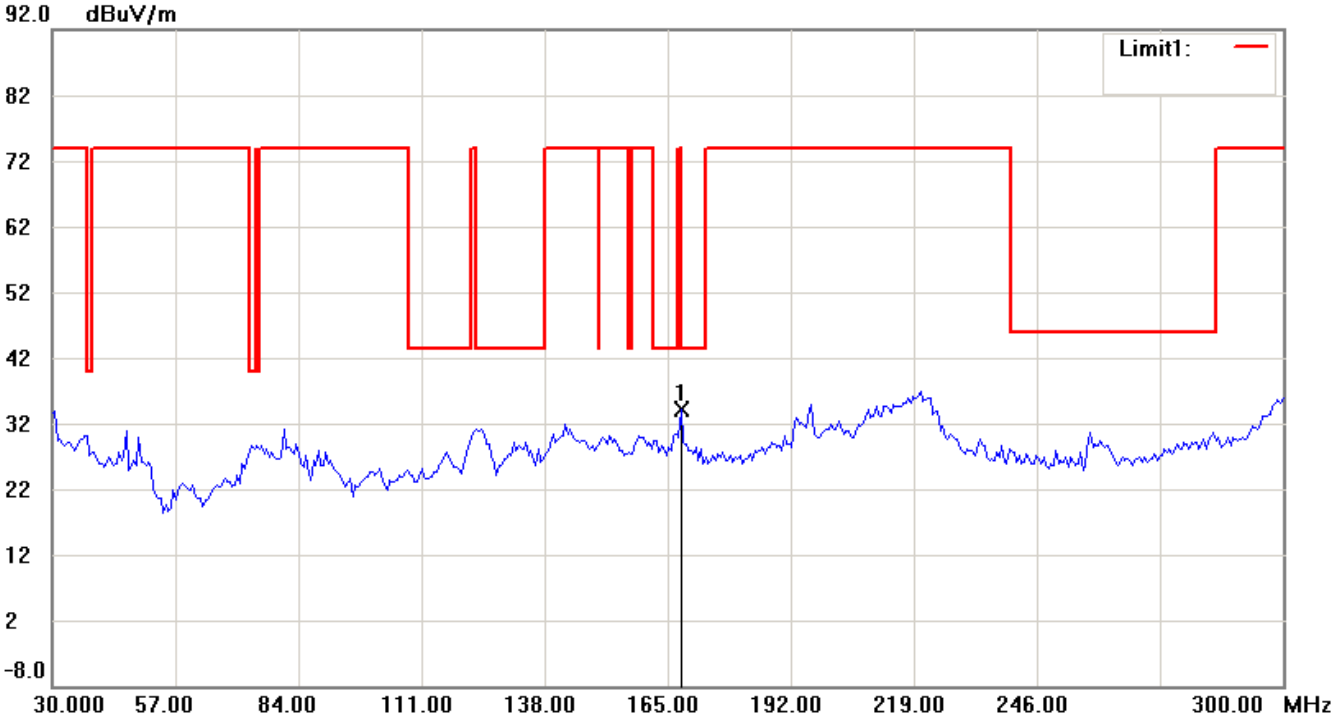
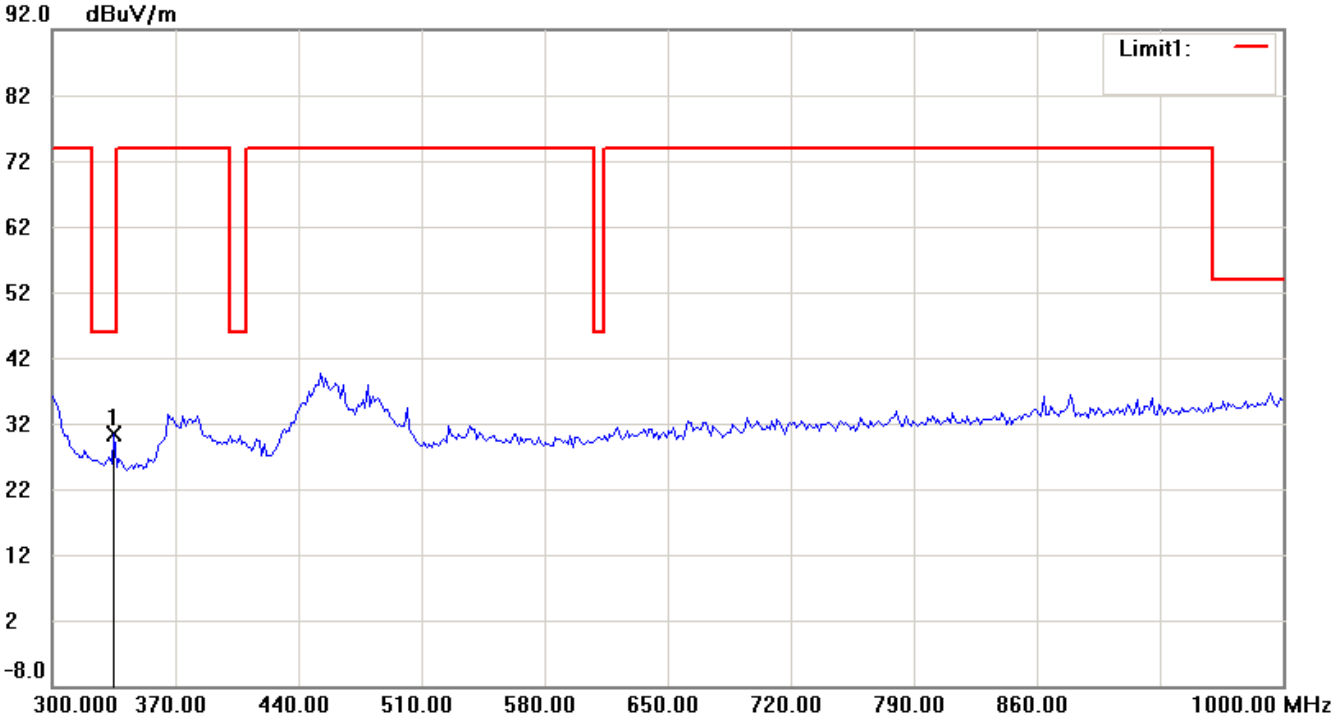
FCC ID :YS8-ALM-A811

Antenna Polarization V




**Note:**
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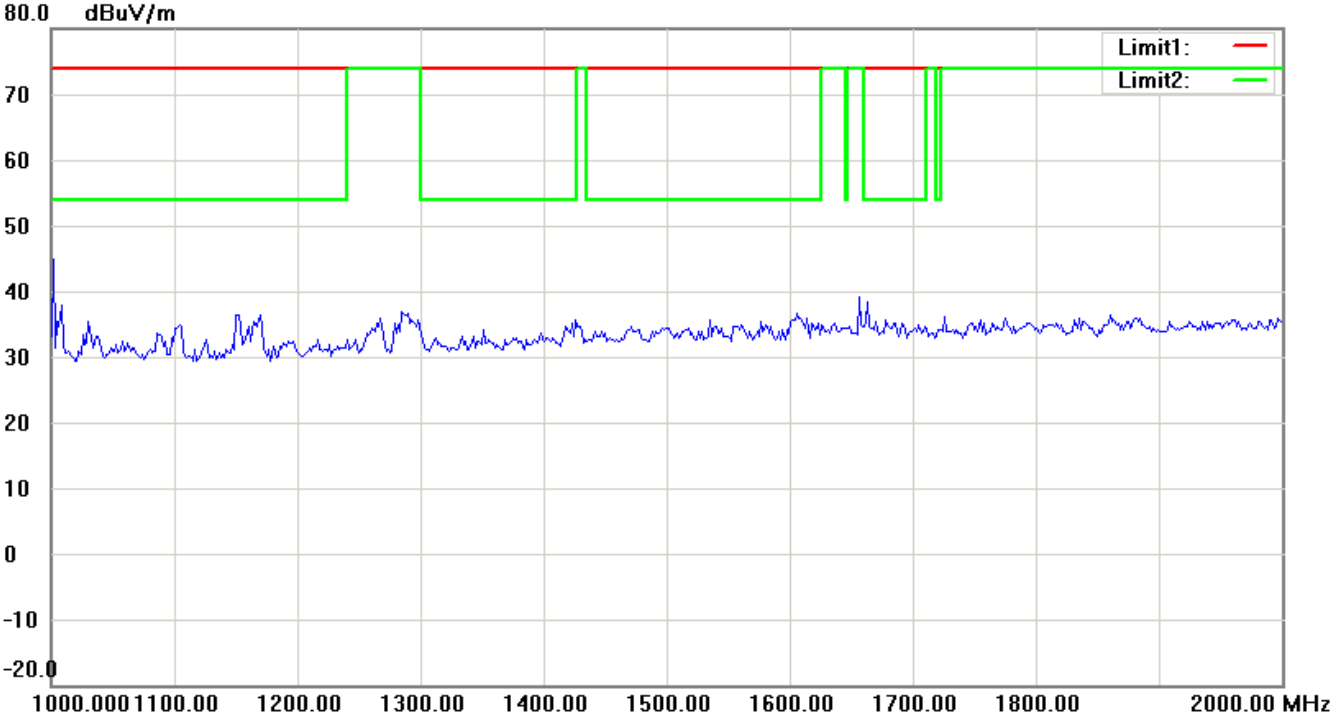
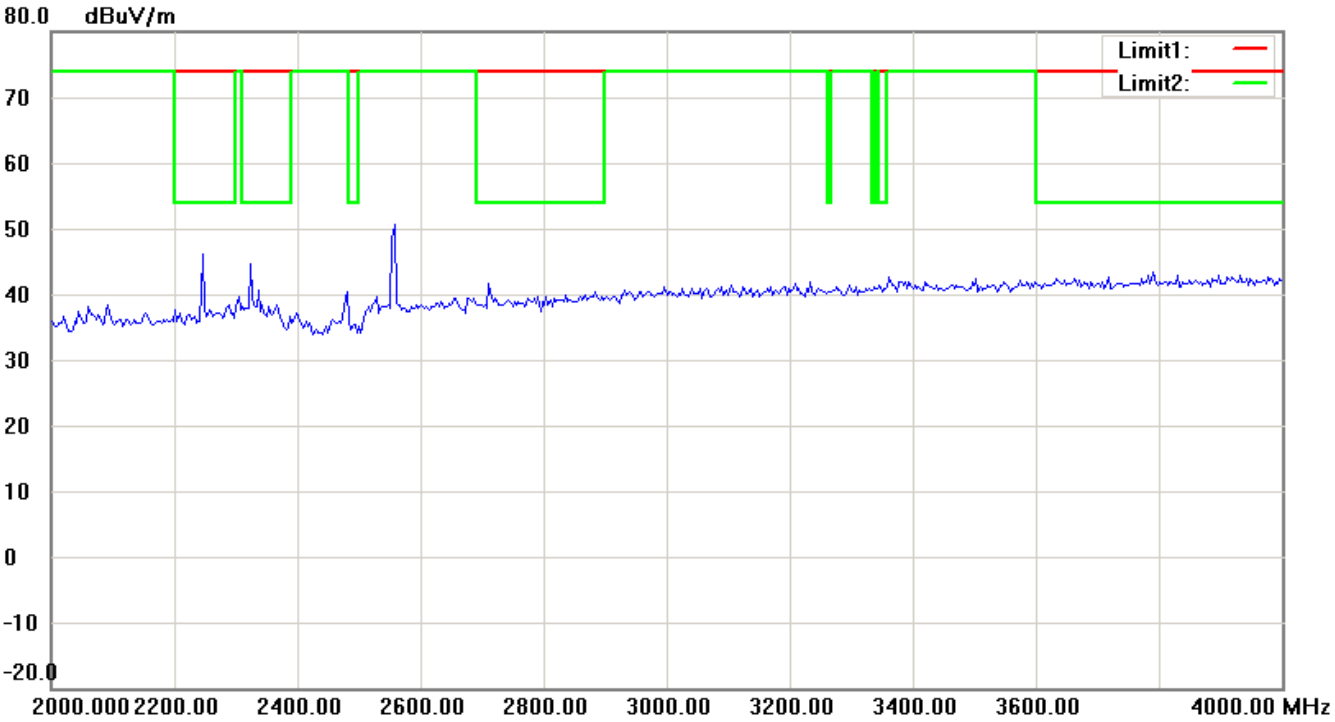
Registration number: W6M21009-10899-C-1-R
FCC ID :YS8-ALM-A811




**Note:**
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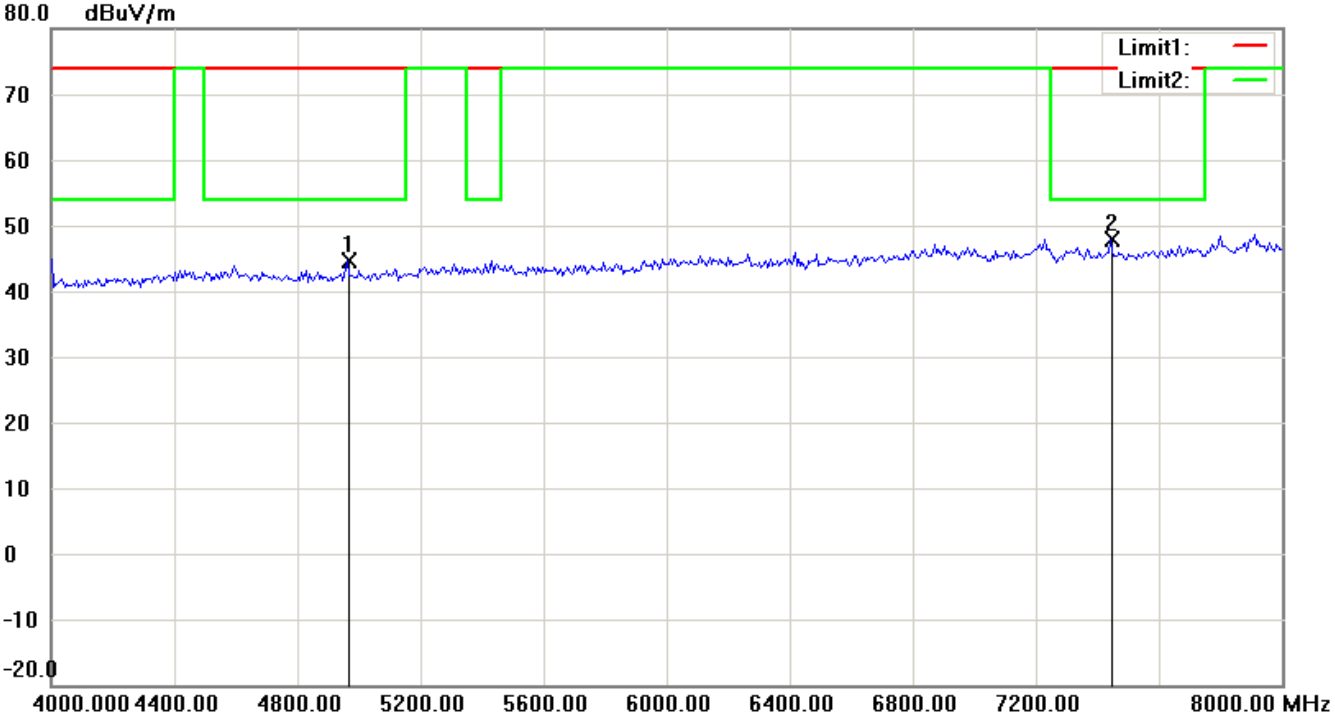


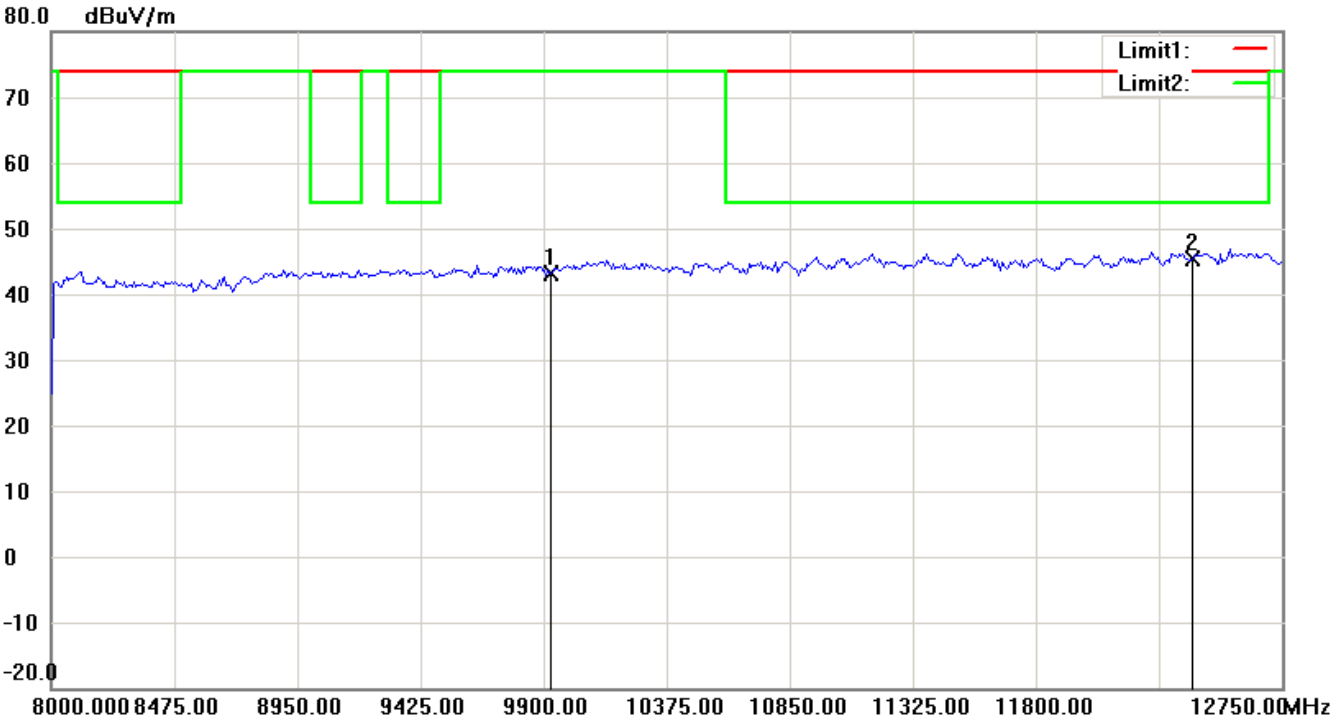


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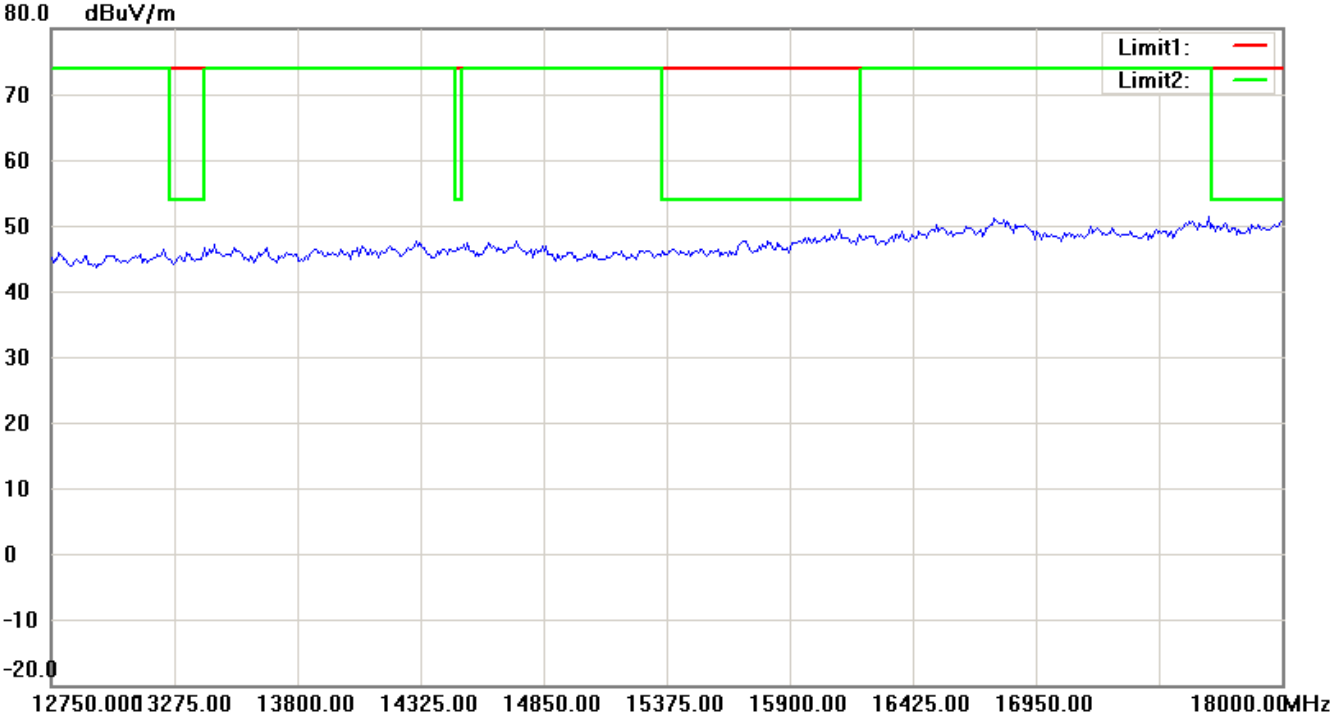


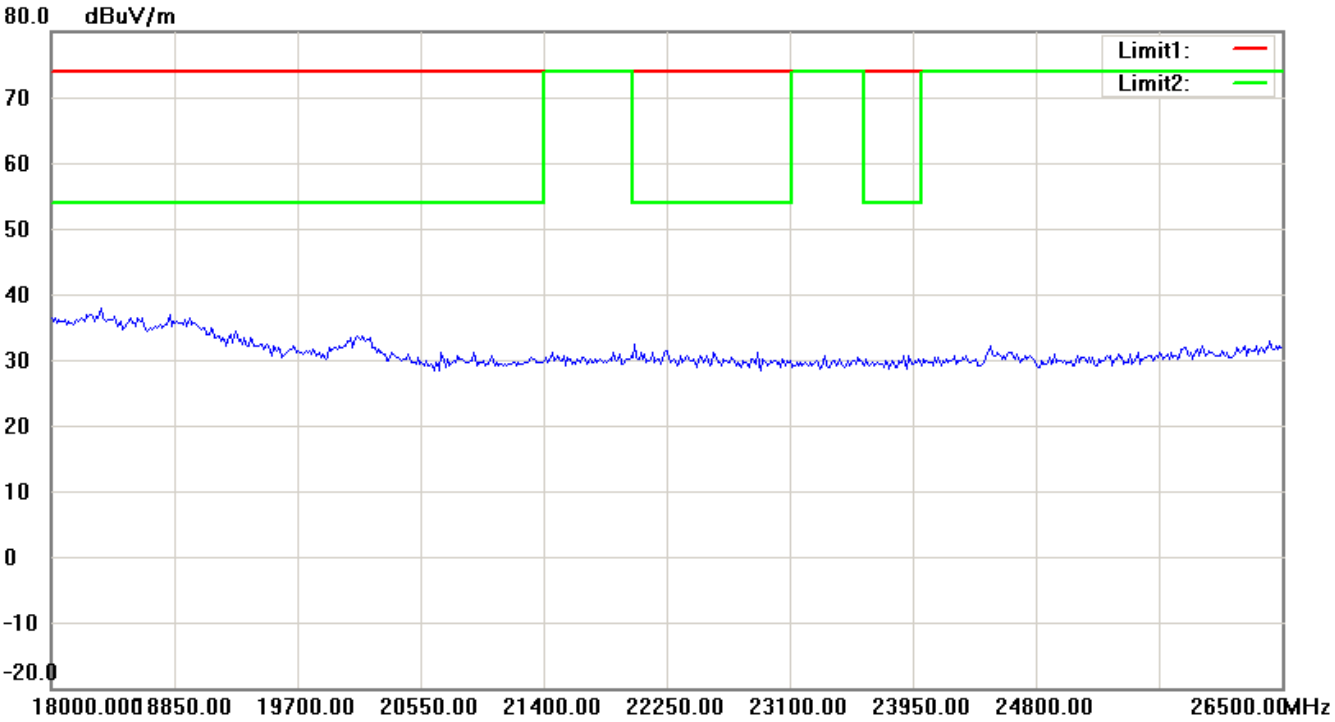


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