# FCC PART 15 SUBPART C TEST REPORT

# for

# Dual band 4X4:4 0utdoor Access Point (AP) with integrated/external antenna

# Model No.: ion8/ion8e

# FCC ID: 2AUISION8ION8E

of

Applicant: HFCL Limited
Address: 8, Commercial Complex, Masjid Moth, Greater Kailash - 2, New Delhi-110048, India

Tested and Prepared

by

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

**FCC Registration No.: TW1477, TW0020, TW1072**

**Industry Canada filed test laboratory Reg. No. 20037**

**A2LA Accredited No.: 2732.01**

**Report No.: W6M21903-18922-C-1**

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

## 1.1 Notes

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

The test results of this test report relate exclusively to the item tested as specified in 1.5.
The test report may only be reproduced or published in full.
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Specific Conditions:
Usage of the hereunder tested device in combination with other integrated or external antennas requires at least additional output power measurements, spurious emission measurements, conducted emission measurements (AC supply lines) and radio frequency exposure evaluations for each individual configuration performed, for certification by FCC.
The test sample is able to work according IEEE 802.11 b/g/n.
This report is related to FCC Part 15 C (DSSS and OFDM device).

**Tester:**

| Date | WTS-Lab. | Name | Signature |
|---|---|---|---|
| December 27, 2019 | | Rick Chen | Rick Chen. |

**Technical responsibility for area of testing:**

| Date | WTS | Name | Signature |
|---|---|---|---|
| December 27, 2019 | | Kevin Wang | Kevin Wang |

## 1.2 Testing laboratory

### 1.2.1 Location

OATS
No.5-1, Lishui, Shuang Sing Village,
Wanli Dist., New Taipei City 207,
Taiwan (R.O.C.)
3 meter semi-anechoic chamber
No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
TEL:886-2-6613-0228
FAX:886-2-2791-5046

Company
Worldwide Testing Services(Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

### 1.2.2 Details of accreditation status

Accredited testing laboratory
A2LA accredited number: 2732.01
FCC filed test laboratory Reg. No. TW1477, TW0020, TW1072
Industry Canada filed test laboratory Reg. No. 20037

**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: | HFCL Limited |
| Street: | 8, Commercial Complex, Masjid Moth, Greater Kailash - 2, |
| Town: | New Delhi-110048, |
| Country: | India |
| Telephone: | +91-9811096312 |
| Fax: | ./. |

## 1.4 Application details

| | |
|---|---|
| Date of receipt of test item: | August 28, 2019 |
| Date of test: | from August 29, 2019 to December 25, 2019 |

## 1.5 General information of Test item

| | |
|---|---|
| Type of test item: | Dual band 4X4:4 0utdoor Access Point (AP) with integrated/external antenna |
| Model Number: | ion8/ion8e |
| Brand Name: | io |
| Multi-listing model number: | ion8 |
| Photos: | see Appendix |

**Technical data**

| | |
|---|---|
| Frequency band: | 2.4 GHz – 2.4835 GHz |

**802.11b, g, n 20MHz**

| | |
|---|---|
| Frequency ( ch 1): | 2.412 GHz |
| Frequency ( ch 6): | 2.437 GHz |
| Frequency ( ch 11): | 2.462 GHz |

**802.11n 40MHz**

| | |
|---|---|
| Frequency ( ch 1): | 2.422 GHz |
| Frequency ( ch 4): | 2.437 GHz |
| Frequency ( ch 7): | 2.452 GHz |

**Bluetooth Low Energy**

| | |
|---|---|
| Frequency ( ch 0): | 2.402 GHz |
| Frequency ( ch 19): | 2.440 GHz |
| Frequency ( ch 39): | 2.480 GHz |

| | |
|---|---|
| Number of Channels: | 802.11b, g, n 20MHz: 11 channels, 11n 40MHz: 7 channels<br>BLE 40 channels |
| Operation modes: | duplex |
| Modulation Type: | DSSS / OFDM, GFSK |
| Fixed point-to-point operation: | ☐ Yes / ☒ No |
| Type of Antenna: | Integrated antenna: Patch antenna (for WLAN & BLE)<br>External antenna: Rubber Duck antenna |

| | |
|---|---|
| Antenna gain: | WLAN<br>ANT 1- ANT 4: 6 dBi (for Integrated antenna & External antenna)<br>Bluetooth Low Energy: 4 dBi |
| Directional gain: | 12.02 dBi |

According to KDB 662911, Unequal antenna gains, with equal transmit powers. For antenna gains given by $G_1$, $G_2$, …, $G_N$ dBi. If transmit signals are correlated, then Directional gain $=10\log[(10^{G_1/20}+10^{G_2/20}+\ldots+10^{G_N/20})^2/N]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

| | |
|---|---|
| Power supply: | PoE 48Vd.c.<br>Wherever power is mentioned as 48Vd.c. in this report, it refers to PoE 48Vd.c. |
| Emission designator: | 802.11b: DSSS: 13M4G1D<br>802.11g: OFDM: 16M7D1D<br>802.11n 20MHz: OFDM: 17M8D1D<br>802.11n 40MHz: OFDM: 36M5D1D<br>BLE: 1M06G1D |
| Host device: | none |

Classification:

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

| **Transmitter** | **Unom** |
|---|---|
| **Antenna 1** | |
| **Mode A (802.11b)** | |
| Power ( ch 1 or A): | Conducted: 11.40 dBm |
| Power ( ch 6 or B): | Conducted: 12.45 dBm |
| Power ( ch 11 or C): | Conducted: 12.32 dBm |
| **Mode B (802.11g)** | |
| Power ( ch 1 or A): | Conducted: 10.40 dBm |
| Power ( ch 6 or B): | Conducted: 11.47 dBm |
| Power ( ch 11 or C): | Conducted: 11.32 dBm |
| **Mode C (802.11n 20 MHz)** | |
| Power ( ch 1 or A): | Conducted: 11.85 dBm |
| Power ( ch 6 or B): | Conducted: 13.05 dBm |
| Power ( ch 11 or C): | Conducted: 12.93 dBm |

**Mode D (802.11n 40 MHz)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 14.53 dBm |
| Power ( ch 4 or B): | Conducted: 15.47 dBm |
| Power ( ch 7 or C): | Conducted: 15.44 dBm |

**Antenna 2**

**Mode E (802.11b)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 11.29 dBm |
| Power ( ch 6 or B): | Conducted: 11.88 dBm |
| Power ( ch 11 or C): | Conducted: 11.93 dBm |

**Mode F (802.11g)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 10.46 dBm |
| Power ( ch 6 or B): | Conducted: 11.08 dBm |
| Power ( ch 11 or C): | Conducted: 11.02 dBm |

**Mode G (802.11n 20 MHz)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 11.27 dBm |
| Power ( ch 6 or B): | Conducted: 12.18 dBm |
| Power ( ch 11 or C): | Conducted: 11.91 dBm |

**Mode H (802.11n 40 MHz)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 14.00 dBm |
| Power ( ch 4 or B): | Conducted: 14.71 dBm |
| Power ( ch 7 or C): | Conducted: 14.72 dBm |

**Antenna 3**

**Mode I (802.11b)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 10.68 dBm |
| Power ( ch 6 or B): | Conducted: 11.59 dBm |
| Power ( ch 11 or C): | Conducted: 11.65 dBm |

**Mode J (802.11g)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 9.80 dBm |
| Power ( ch 6 or B): | Conducted: 10.72 dBm |
| Power ( ch 11 or C): | Conducted: 10.82 dBm |

**Mode K (802.11n 20 MHz)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 10.72 dBm |
| Power ( ch 6 or B): | Conducted: 11.40 dBm |
| Power ( ch 11 or C): | Conducted: 11.50 dBm |

**Mode L (802.11n 40 MHz)**

| | |
|---|---|
| Power ( ch 1 or A): | Conducted: 13.32 dBm |
| Power ( ch 4 or B): | Conducted: 13.95 dBm |
| Power ( ch 7 or C): | Conducted: 14.16 dBm |

**Antenna 4**
**Mode M (802.11b)**
Power ( ch 1 or A): Conducted: 11.26 dBm
Power ( ch 6 or B): Conducted: 12.18 dBm
Power ( ch 11 or C): Conducted: 12.09 dBm

**Mode N (802.11g)**
Power ( ch 1 or A): Conducted: 10.79 dBm
Power ( ch 6 or B): Conducted: 11.64 dBm
Power ( ch 11 or C): Conducted: 11.37 dBm

**Mode O (802.11n 20 MHz)**
Power ( ch 1 or A): Conducted: 11.69 dBm
Power ( ch 6 or B): Conducted: 12.88 dBm
Power ( ch 11 or C): Conducted: 12.73 dBm

**Mode P (802.11n 40 MHz)**
Power ( ch 1 or A): Conducted: 14.57 dBm
Power ( ch 4 or B): Conducted: 15.62 dBm
Power ( ch 7 or C): Conducted: 15.66 dBm

| Combine | mW | | | dBm | | |
|---|---|---|---|---|---|---|
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 55.27 | 69.91 | 68.03 | 17.42 | 18.45 | 18.33 |
| 802.11n 40MHz | 103.62 | 126.13 | 127.51 | 20.15 | 21.01 | 21.06 |

**Mode Q (Bluetooth Low energy)**
Power ( ch 0 or A): Conducted: 2.31 dBm
Power ( ch 19 or B): Conducted: 2.44 dBm
Power ( ch 39 or C): Conducted: 1.54 dBm

**Manufacturer: (if applicable)**
Name: HFCL Limited
Street: Electronic Complex, Chambaghat,
Town: Solan (H.P.)-173213, Himachal Pradesh,
Country: lndia

## 1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART C § 15.247 (2018-10)

# 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 were ascertained in the course of the tests performed. ☐

## 2.2 Test environment

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Power supply: PoE 48Vd.c.
Wherever power is mentioned as 48Vd.c. in this report, it refers to PoE 48Vd.c.

Extreme conditions parameters: ./.

| Test item Name | Uncertainty |
|---|---|
| Estimation Result of Uncertainty of Conducted Emission | Expanded Uncertainty:<br>AMN: 1.30 dB<br>Voltage probe: 1.36 dB |
| Estimation Result of Uncertainty of Radiated Emission(3M) | Expanded Uncertainty:<br>0.009-30 MHz: 2.02 dB<br>30-1000 MHz: 3.49 dB<br>1-18 GHz: 3.01 dB<br>18-40 GHz: 2.43 dB |
| Estimation Result of Uncertainty of Bandwidth Measurement 20 dB Bandwidth, Occupied bandwidth, Channel bandwidth, Necessary Bandwidth | Expanded Uncertainty: 0.45 kHz |
| Estimation Result of Uncertainty of Conducted Output Power Measurement Output power | Expanded Uncertainty: 1.72 dB |
| Estimation Result of Uncertainty of Power Density Measurement Power density | Expanded Uncertainty: 1.73 dB |
| Estimation Result of Uncertainty of Band Edge Measurement | Expanded Uncertainty: 0.98 dBc |
| Estimation Result of Uncertainty of Frequency Separation Measurement Hopping channel separation | Expanded Uncertainty: 554.14 Hz |
| Estimation Result of Uncertainty of Duty Cycle Measurement Dwell time | Expanded Uncertainty: 0.1 ms |

The decision rule is: Measurement uncertainty is not taken into account.

## 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 | 2019/6/4 | 2020/6/3 |
| 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 | 2019/11/1 | 2020/10/31 |
| ETSTW-CE 006 | IMPULSBEGRENZER PULSE LIMITER | ESH3-Z2 | 100226 | R&S | 2019/9/24 | 2020/9/23 |
| 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 | 2019/7/23 | 2020/7/22 |
| ETSTW-CE 016 | TWO-LINE V-NETWORK | ENV216 | 100050 | R&S | 2019/10/3 | 2020/10/2 |
| ETSTW-CE 028 | MXE EMI Receiver | N9038A | MY53220110 | Agilent | 2019/7/18 | 2020/7/17 |
| ETSTW-RE 003 | EMI TEST RECEIVER | ESI 26 | 831438/001 | R&S | 2019/6/4 | 2020/6/3 |
| ETSTW-RE 004 | EMI TEST RECEIVER | ESI 40 | 832427/004 | R&S | 2019/5/29 | 2020/5/28 |
| 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 | 2019/7/25 | 2020/7/24 |
| ETSTW-RE 027 | Passive Loop Antenna | 6512 | 00034563 | ETS-Lindgren | 2019/7/22 | 2020/7/21 |
| ETSTW-RE 030 | Double-Ridged Guide Horn Antenna | 3117 | 00035224 | ETS-Lindgren | 2019/4/2 | 2020/4/1 |
| ETSTW-RE 042 | Biconical Antenna | HK116 | 100172 | R&S | 2019/1/29 | 2020/1/28 |
| ETSTW-RE 043 | Log-Periodic Dipole Antenna | HL223 | 100166 | R&S | 2019/4/23 | 2020/4/22 |
| ETSTW-RE 044 | Log-Periodic Antenna | HL050 | 100094 | R&S | 2019/5/13 | 2020/5/12 |
| ETSTW-RE 045 | ESA-E SERIES SPECTRUM ANALYZER | E4404B | MY45111242 | Agilent | Pre-test Use | |
| ETSTW-RE 050 | Attenuator 10dB | 50HF-010-1 | None | JFW | 2019/2/27 | 2020/2/26 |
| ETSTW-RE 051 | Attenuator 6dB | 50HF-006-1 | None | JFW | 2019/2/27 | 2020/2/26 |
| ETSTW-RE 053 | Attenuator 3dB | 50HF-003-1 | None | JFW | 2019/2/27 | 2020/2/26 |
| ETSTW-RE 055 | SPECTRUM ANALYZER | FSU 26 | 200074 | R&S | 2019/3/5 | 2020/3/4 |
| ETSTW-RE 060 | Attenuator 30dB | 5015-30 | F651012z-01 | ATM | 2019/2/27 | 2020/2/26 |
| ETSTW-RE 062 | Amplifier Module | CHC 2 | None | KMIC | 2019/5/16 | 2020/5/15 |
| ETSTW-RE 064 | Bluetooth Test Set | MT8852B-042 | 6K00005709 | Anritsu | Function Test | |
| ETSTW-RE 069 | Double-Ridged Guide Horn Antenna | 3117 | 00069377 | ETS-Lindgren | Function Test | |
| ETSTW-RE 072 | CELL SITE TEST SET | 8921A | 3339A00375 | HP | 2019/9/23 | 2020/9/22 |
| ETSTW-RE 088 | SOLID STATE AMPLIFIER | KMA180265A01 | 99057 | KMIC | 2019/9/18 | 2020/9/17 |
| ETSTW-RE 091 | Match Pad | MDCS1500 | None | WOKEN | 2019/5/9 | 2020/5/8 |
| ETSTW-RE 099 | DC Block | 50DB-007-1 | None | JFW | 2019/2/22 | 2020/2/21 |
| ETSTW-RE 112 | AC POWER SOURCE | TFC-1005 | T-0A023536 | T-Power | Function test | |
| ETSTW-RE 115 | 2.4GHz Notch Filter | N0124411 | 473874 | MICROWAVE CIRCUITS | 2019/1/14 | 2020/1/13 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ETSTW-RE 120 | RF Player | MP9200 | MP9210-111022 | ADIVIC | Function test | |
| ETSTW-RE 122 | SIGNAL GENERATOR | SMF100A | 102149 | R&S | 2019/6/3 | 2020/6/2 |
| ETSTW-RE 125 | 5GHz Notch filter | 5NSL11-5200/E221.3-O/O | 1 | K&L Microwave | 2019/8/8 | 2020/8/7 |
| ETSTW-RE 126 | 5GHz Notch filter | 5NSL12-5800/E221.3-O/O | 1 | K&L Microwave | 2019/8/8 | 2020/8/7 |
| ETSTW-RE 127 | RF Switch Box | RFS-01 | None | WTS | 2019/2/26 | 2020/2/25 |
| ETSTW-RE 128 | 5.3GHz Notch filter | N0153001 | SN487233 | Microwave Circuits | 2019/8/8 | 2020/8/7 |
| ETSTW-RE 129 | 5.5GHz Notch filter | N0555984 | SN487234 | Microwave Circuits | 2019/8/8 | 2020/8/7 |
| ETSTW-RE 130 | Handheld RF Spectrum Analyzer | N9340A | CN0147000204 | Agilent | Pre-test Use | |
| ETSTW-RE 142 | Amplifier | 8447D | 2805A03378 | Agilent | 2019/5/16 | 2020/5/15 |
| ETSTW-RE 147 | Bi-log Hybrid Antenna | MCTD 2786B | BLB16M04005 | ETC | 2019/4/2 | 2020/4/1 |
| ETSTW-RF 002 | Electromagnetic field probe | LF-30 | K-0007 | STT | 2019/5/27 | 2020/5/26 |
| ETSTW-EMI 011 | USB Compact Modulator | SFC-U | 101689 | R&S | 2019/5/16 | 2020/5/15 |
| ETSTW-GSM 002 | Universal Radio Communication Tester | CMU 200 | 109439 | R&S | 2019/3/5 | 2020/3/4 |
| ETSTW-GSM 003 | Radio Communication Analyzer | MT8820C | 6201342073 | Anritsu | 2019/3/26 | 2020/3/25 |
| ETSTW-GSM 004 | Wideband Radio Communication Tester | CMW500 | 128092 | R&S | 2019/10/25 | 2020/10/24 |
| ETSTW-GSM 019 | Band Reject Filter | WRCTF824/849-822/851-40 /12+9SS | 3 | WI | 2019/1/14 | 2020/1/13 |
| ETSTW-GSM 020 | Band Reject Filter | WRCD1747/1748-1743/1752-32/5SS | 1 | WI | 2019/1/14 | 2020/1/13 |
| ETSTW-GSM 021 | Band Reject Filter | WRCD1879.5/1880.5-1875.5/1884.5-32/5SS | 3 | WI | 2019/1/14 | 2020/1/13 |
| ETSTW-GSM 022 | Band Reject Filter | WRCT901.9/903.1-904.25-50/8SS | 1 | WI | 2019/1/14 | 2020/1/13 |
| ETSTW-GSM 023 | Power Divider | 4901.19.A | None | SUHNER | 2019/9/12 | 2020/9/11 |
| ETSTW-GSM 024 | Radio Communication Analyzer | MT8821C | None | Anritsu | 2019/3/5 | 2020/3/4 |
| ETSTW-GSM 025 | Band Reject Filter | BRM19835 | 001 | Micro-Tronics | 2019/8/9 | 2020/8/8 |
| ETSTW-Cable 011 | SMA to N type Cable | RGU-400 | None | THERMAX | Pre-test Use NCR | |
| ETSTW-Cable 016 | BNC Cable | Switch Box | B Cable 1 | Schwarz beck | 2019/2/21 | 2020/2/20 |
| ETSTW-Cable 017 | BNC Cable | X Cable | B Cable 2 | Schwarz beck | 2019/2/21 | 2020/2/20 |
| ETSTW-Cable 018 | BNC Cable | Y Cable | B Cable 3 | Schwarz beck | 2019/2/21 | 2020/2/20 |
| ETSTW-Cable 019 | BNC Cable | Z Cable | B Cable 4 | Schwarz beck | 2019/2/21 | 2020/2/20 |
| ETSTW-Cable 020 | N TYPE Cable | OATS Cable 1 | N30N30-L335-15M | JYE BAO CO.,LTD. | 2019/7/2 | 2020/7/1 |
| ETSTW-Cable 026 | Microwave Cable | SUCOFLEX 104 | 279075 | HUBER+SUHNER | 2019/2/25 | 2020/2/24 |
| ETSTW-Cable 027 | Microwave Cable | SUCOFLEX 104 | 279083 | HUBER+SUHNER | 2019/5/14 | 2020/5/13 |
| ETSTW-Cable 028 | Microwave Cable | FA147A0015M2020 | 30064-2 | UTIFLEX | 2019/9/18 | 2020/9/17 |
| ETSTW-Cable 029 | Microwave Cable | FA147A0015M2020 | 30064-3 | UTIFLEX | 2019/9/18 | 2020/9/17 |
| ETSTW-Cable 030 | Microwave Cable | SUCOFLEX 104（S_Cable 9） | 279067 | HUBER+SUHNER | 2019/2/25 | 2020/2/24 |
| ETSTW-Cable 043 | Microwave Cable | SUCOFLEX 104 | 317576 | HUBER+SUHNER | 2019/5/16 | 2020/5/15 |
| ETSTW-Cable 058 | Microwave Cable | SUCOFLEX 104 | none | HUBER+SUHNER | 2019/6/6 | 2020/6/5 |
| ETSTW-Cable 064 | Microwave Cable | SUCOFLEX 104 | MY28891 | HUBER+SUHNER | 2019/5/16 | 2020/5/15 |
| ETSTW-Cable 066 | SMA type cable | 32022 | None | ASTROLAB | 2019/9/24 | 2020/9/23 |

| | | | | | | |
|---|---|---|---|---|---|---|
| ETSTW-Cable 071 | N TYPE CABLE | EMCCFD400-NM-NM-25000 | 170239 | EMCI | 2019/6/6 | 2020/6/5 |
| ETSTW-Cable 072 | SMA type cable (8m) | SUCOFLEX 104 | 805800/4 | HUBER+SUHNER | 2019/5/16 | 2020/5/15 |
| ETSTW-Cable 074 | SMA type cable (2m) | SUCOFLEX 104 | 802563/4 | HUBER+SUHNER | 2019/5/16 | 2020/5/15 |
| WTSTW-SW 002 | EMI TEST SOFTWARE | EZ_EMC | None | Farad | Version ETS-03A1 | |
| WTSTW-SW 006 | EMI TEST SOFTWARE | e3 | None | AUDIX | Version 9.161014 | |
| WTSTW-SW 008 | Signal studio | Agilent | None | AUDIX | Version 2.0.0.1 | |
| ETSTW-TH 001 | Thermohygrometer | 608-H1 | 45204316 | Testo | 2019/9/9 | 2020/9/8 |
| ETSTW-TH 002 | Thermohygrometer | 608-H1 | 45204317 | Testo | 2019/9/9 | 2020/9/8 |

## 2.4 General Test Procedure

**POWER LINE CONDUCTED INTERFERENCE:** The procedure used was ANSI STANDARD C63.10-2013 6.2 using a 50µH LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

**RADIATION INTERFERENCE:** The test procedure used was according to ANSI STANDARD C63.10-2013 6.3 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

**FORMULA OF CONVERSION FACTORS:** The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of 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 C63.10-2013 6.2.2. 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.

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

ANSI STANDARD C63.10-2013 B.2.7: Any measurements that utilize special test software shall be indicated and referenced in the test report. During testing, test software 'EZ EMC' was used for setting up different operation modes.

## 3 Test results (enclosure)

| TEST CASE | Para. Number | Required | Test passed | Test failed |
|---|---|---|---|---|
| Peak Output Power | 15.247(b)(3) | ☒ | ☒ | ☐ |
| Equivalent isotropically radiated Power | 15.247(b)(3) | ☒ | ☒ | ☐ |
| Spurious Emissions radiated – Transmitter operating | 15.247(d): 15.209 | ☒ | ☒ | ☐ |
| Band Edge Measurement | 15.247(d) | ☒ | ☒ | ☐ |
| Minimum 6 dB Bandwidth | 15.247(a) | ☒ | ☒ | ☐ |
| Peak Power Spectral Density | 15.247(e) | ☒ | ☒ | ☐ |
| Radiated Emission from Receiver Part | 15.109 | ☐ | ☐ | ☐ |
| Power Line Conducted Emission | 15.207 | ☐ | ☐ | ☐ |

**Note:**

1. This EUT incorporates a MIMO function with IEEE 802.11b, 802.11g, and 802.11n. Physically, this EUT includes two transmitters and two receivers with two incoherent streams. This device uses multiplexing and also employ cyclic delay diversity to improve range and throughput, and this device simultaneously operates on two adjacent channels.
2. This EUT is 2*2 spatial MIMO (2Tx&2Rx) without beam forming function. That operates dual chain configuration. The Pre-test was performed to determine the worst case mode from all possible combinations between all available modulations, data rates, bandwidths, and spatial stream modes.
3. The detail of chosen mode for full testing are as below:

| Mode | Available channel | Chosen Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|---|---|---|---|---|---|
| 802.11b | 1 to 11 | 1,6,11 | DSSS | DBPSK, DQPSK, CCK | 1 |
| 802.11g | 1 to 11 | 1,6,11 | OFDM | BPSK, QPSK, 16QAM, 64QAM | 6 |
| 802.11n (20MHz) | 1 to 11 | 1,6,11 | OFDM | BPSK, QPSK, 16QAM, 64QAM | 6.5 |
| 802.11n (40MHz) | 1 to 7 | 1,4,7 | OFDM | BPSK, QPSK, 16QAM, 64QAM | 13.5 |

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

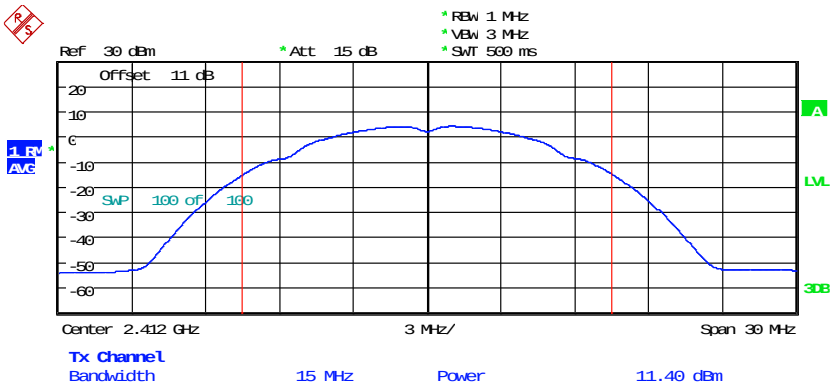
## 3.1 Peak Output Power (transmitter)

FCC Rule: 15.247(b)(3)

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).

WLAN
ANT 1




MAX OUTPUT POWER 802.11B CH01
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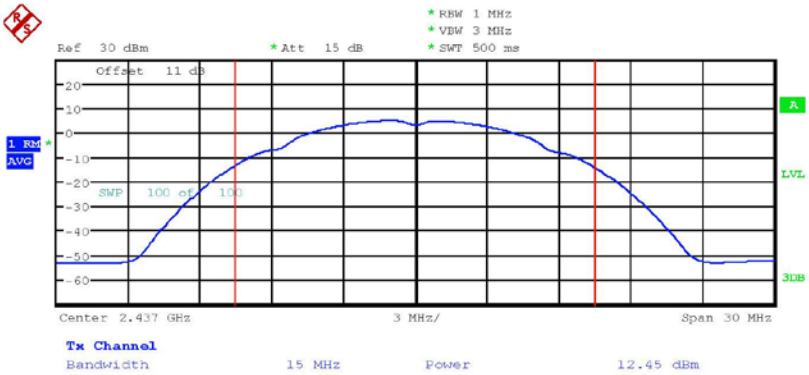
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11B CH06

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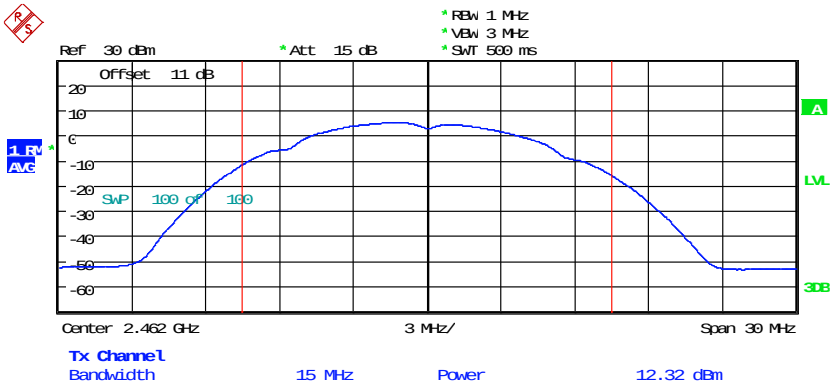


MAX OUTPUT POWER 802.11B CH011

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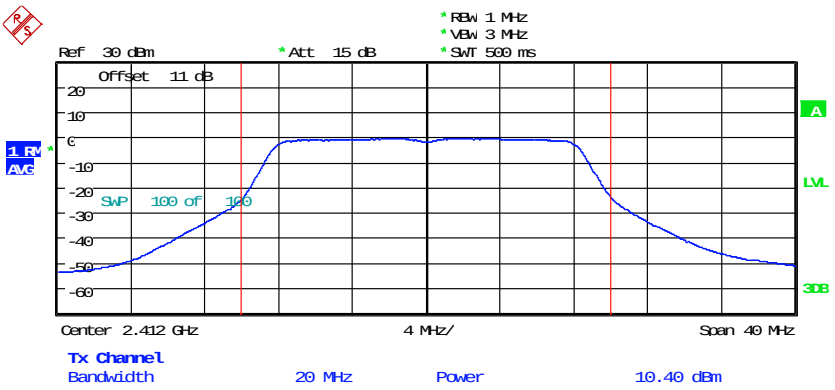
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11G CH01
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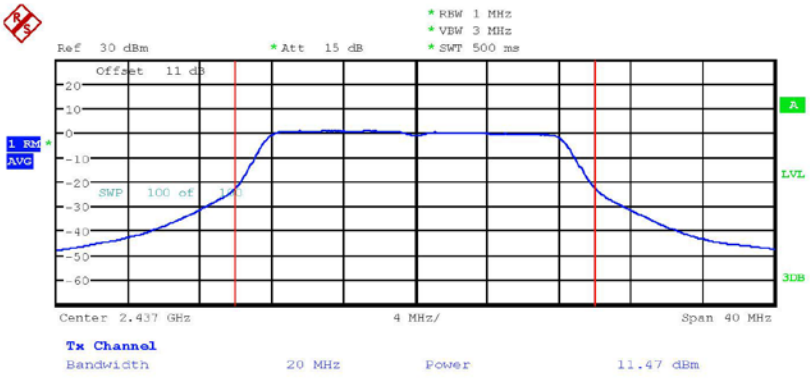


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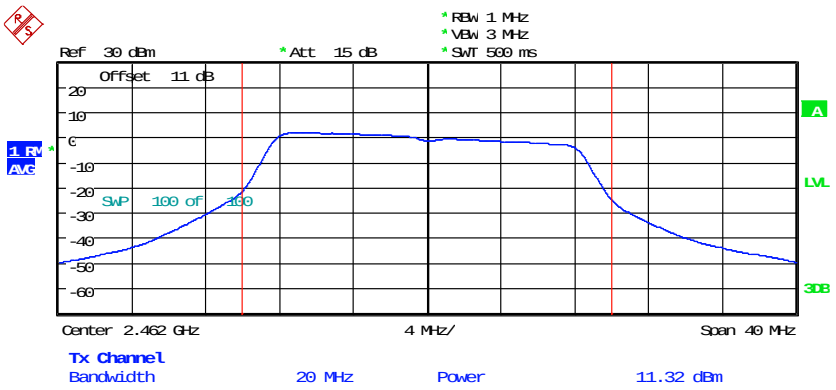
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11G CH11

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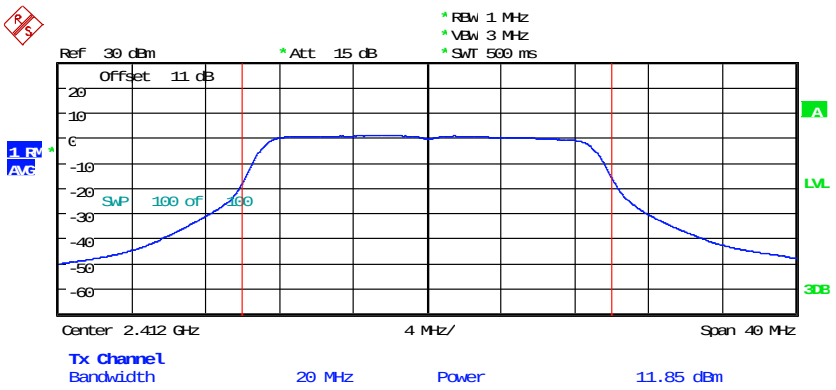


MAX OUTPUT POWER 802.11N 20MHZ CH1

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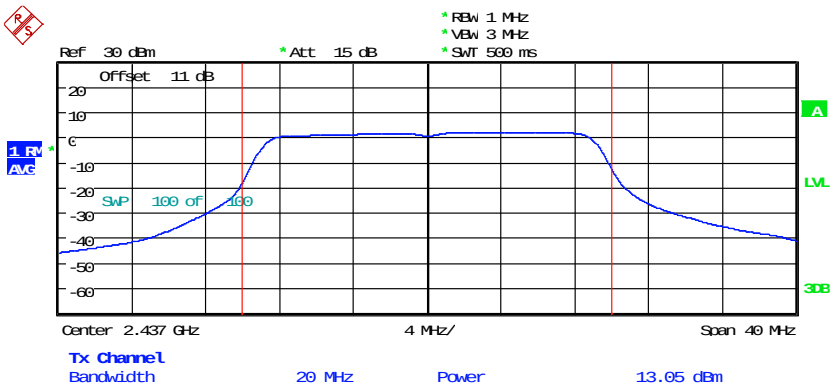
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11N 20MHZ CH6

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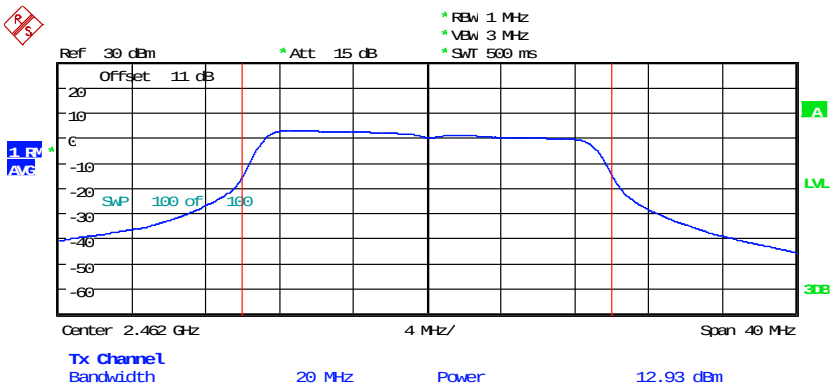


MAX OUTPUT POWER 802.11N 20MHZ CH11

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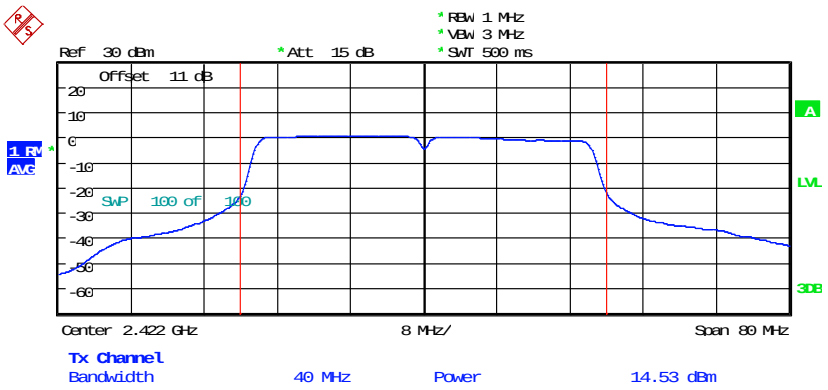
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11N 40MHZ CH1

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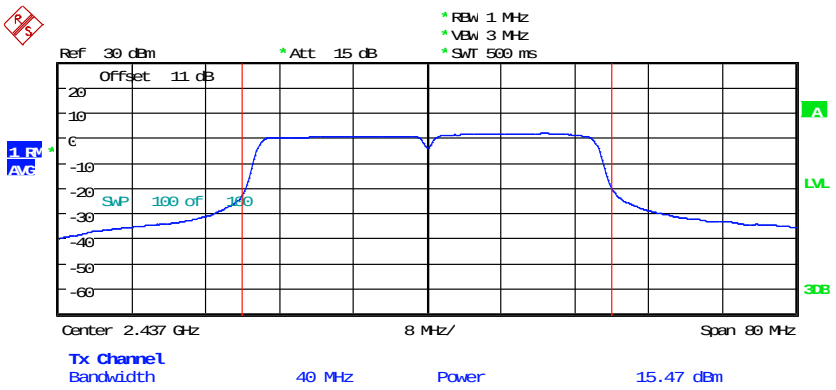


MAX OUTPUT POWER 802.11N 40MHZ CH4

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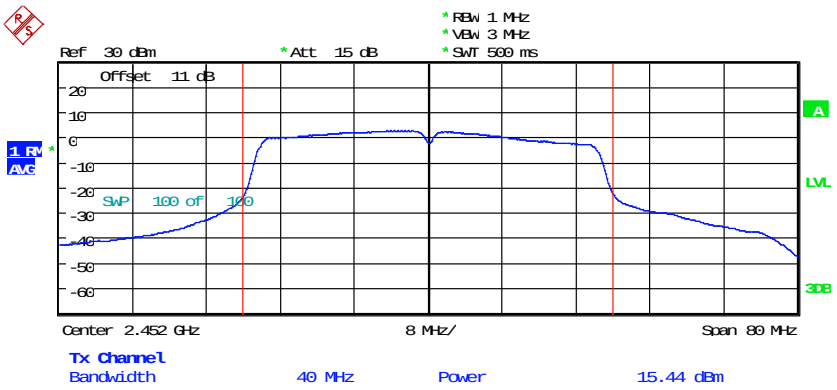


MAX OUTPUT POWER 802.11N 40MHZ CH7
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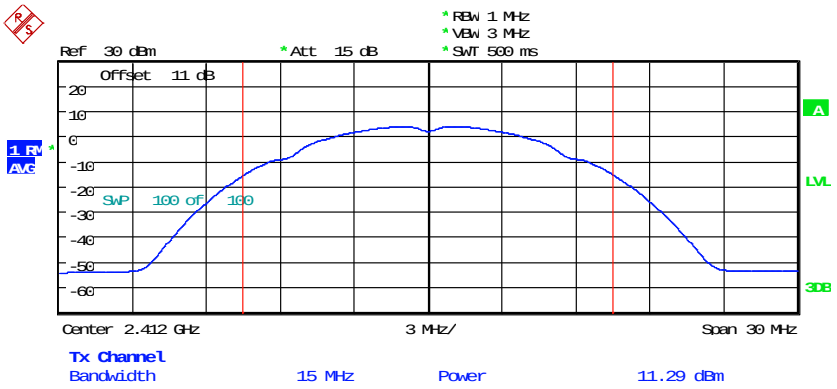
ANT 2




MAX OUTPUT POWER 802.11B CH01
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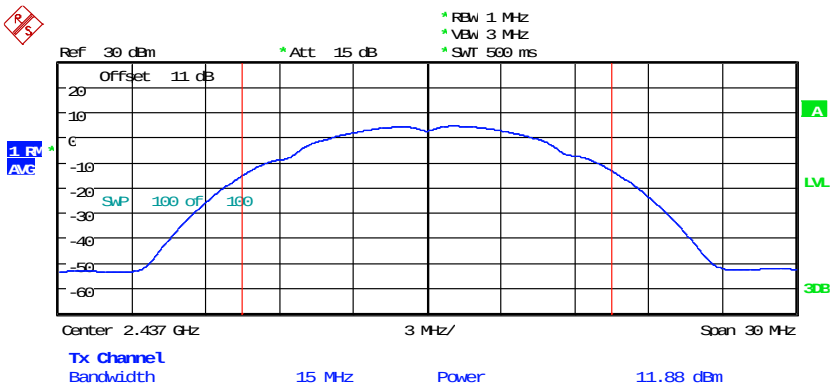
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11B CH06

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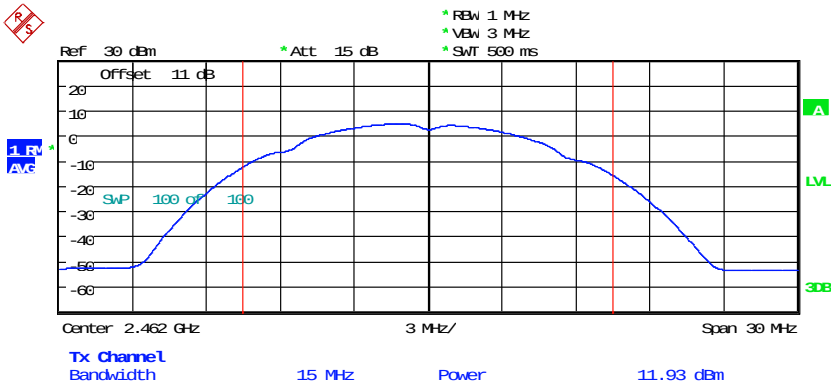


MAX OUTPUT POWER 802.11B CH11

Date: 14.NOV.2019 15:43:48

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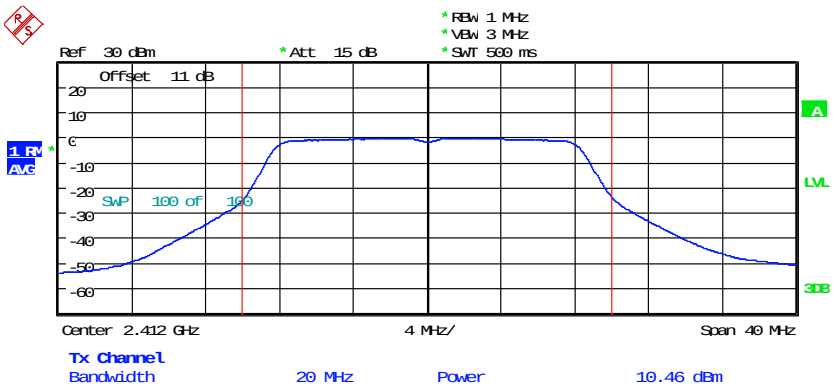


MAX OUTPUT POWER 802.11G CH01

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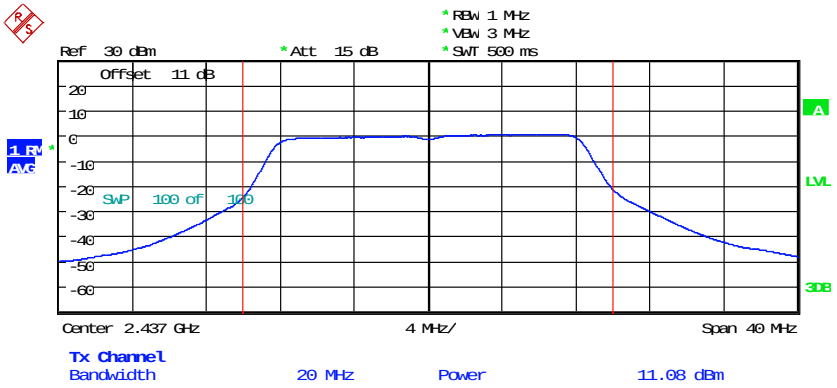


MAX OUTPUT POWER 802.11G CH06

Date: 14.NOV.2019 15:00:20

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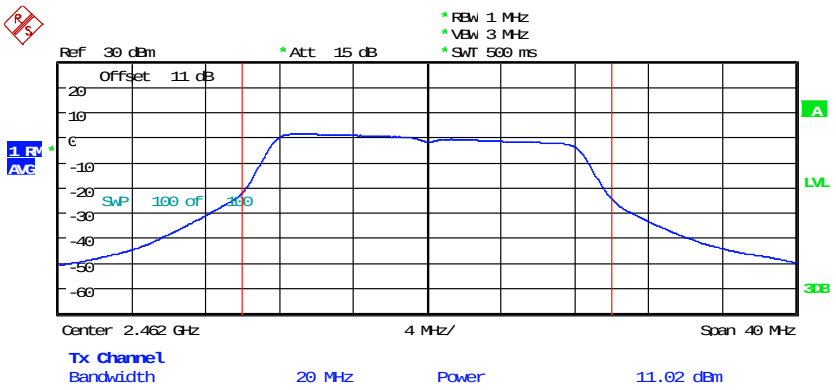


MAX OUTPUT POWER 802.11G CH11

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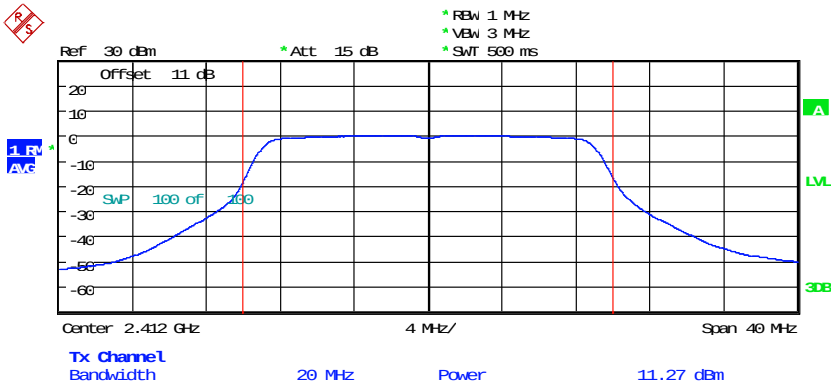


MAX OUTPUT POWER 802.11N 20M CH01

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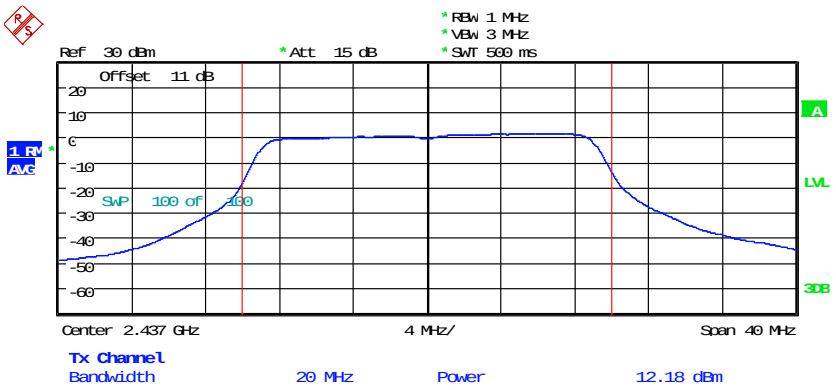
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11N 20M CH06

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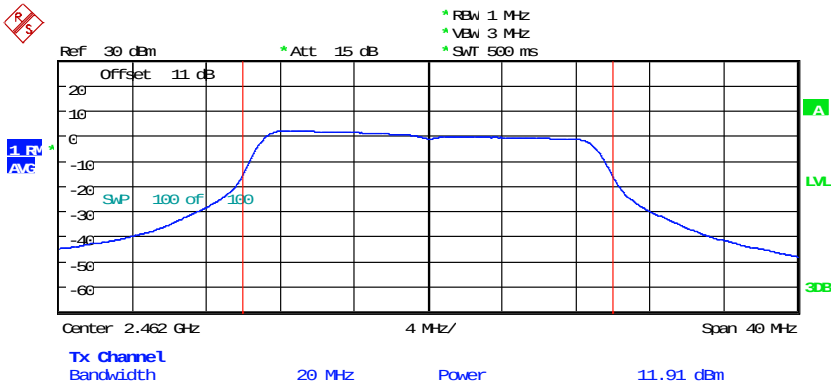


MAX OUTPUT POWER 802.11N 20M CH11

Date: 14.NOV.2019 15:07:33

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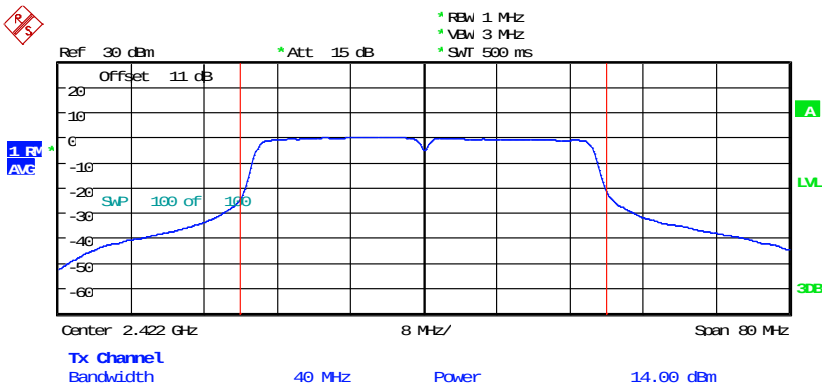
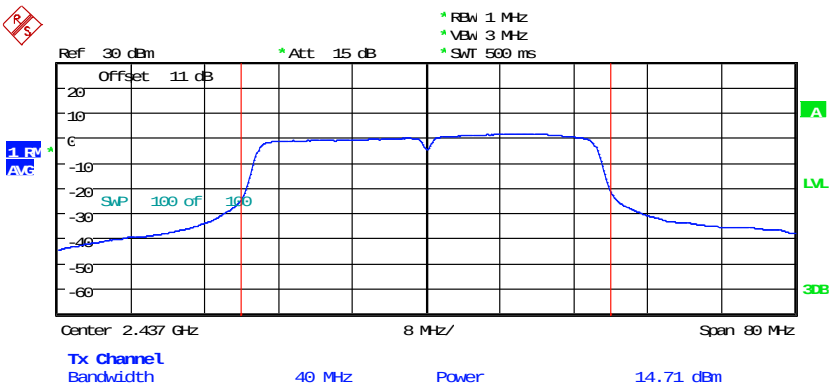



MAX OUTPUT POWER 802.11N 40MHZ CH1

Date: 14.NOV.2019 15:15:33




MAX OUTPUT POWER 802.11N 40MHZ CH4

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Registration number: W6M21903-18922-C-1
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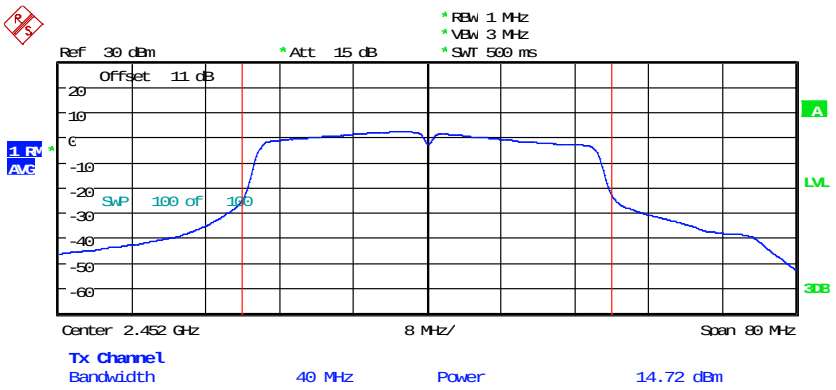


MAX OUTPUT POWER 802.11N 40MHZ CH7
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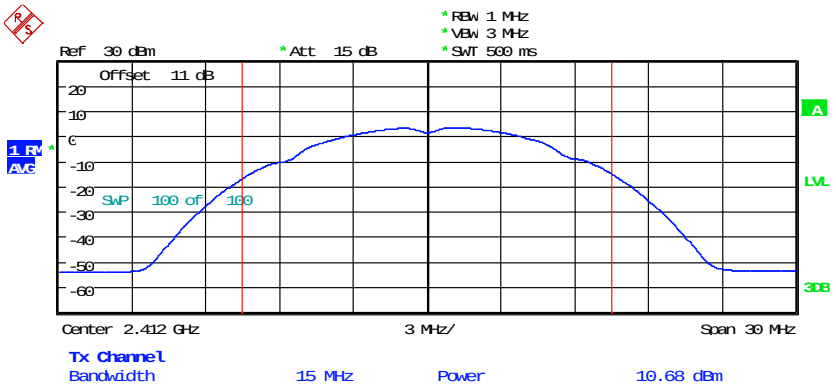
ANT 3




MAX OUTPUT POWER 802.11B CH01
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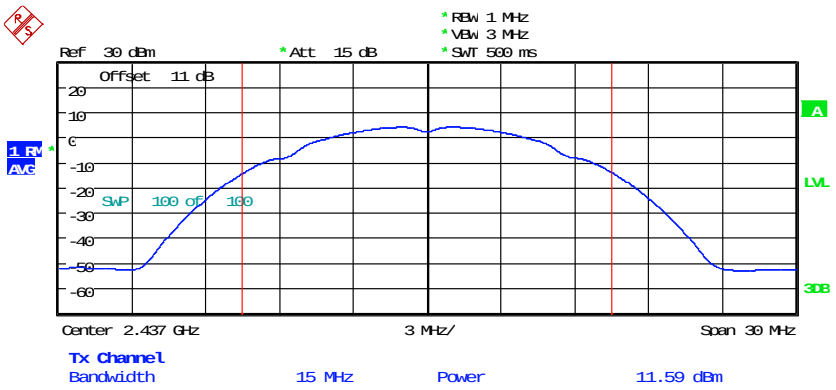
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11B CH06

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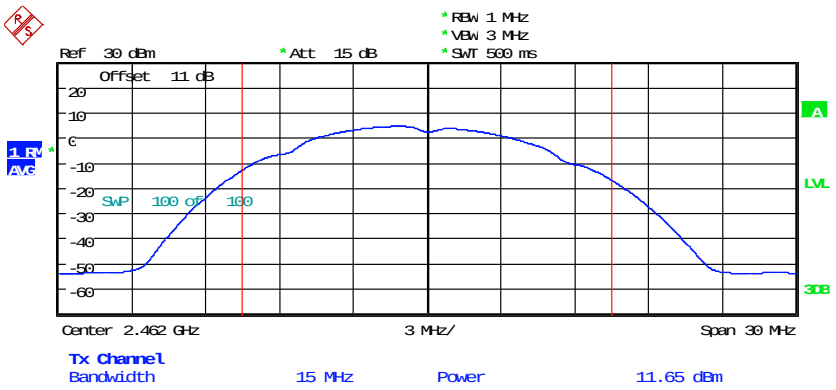


MAX OUTPUT POWER 802.11B CH11

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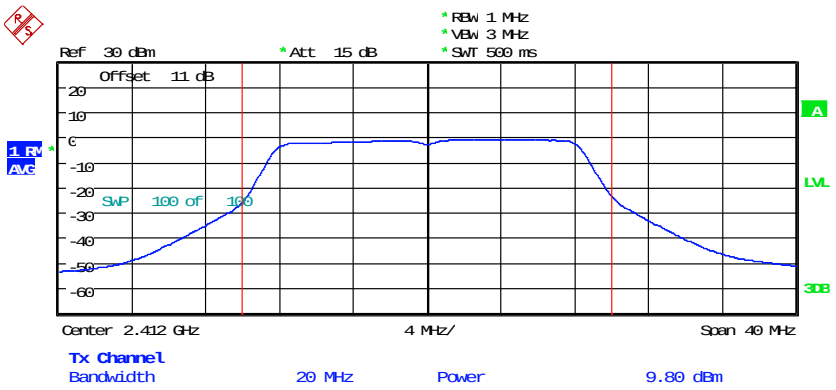
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11G CH01

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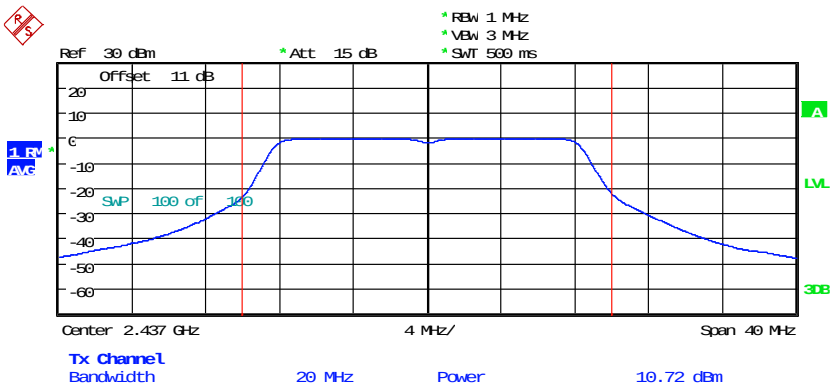


MAX OUTPUT POWER 802.11G CH06

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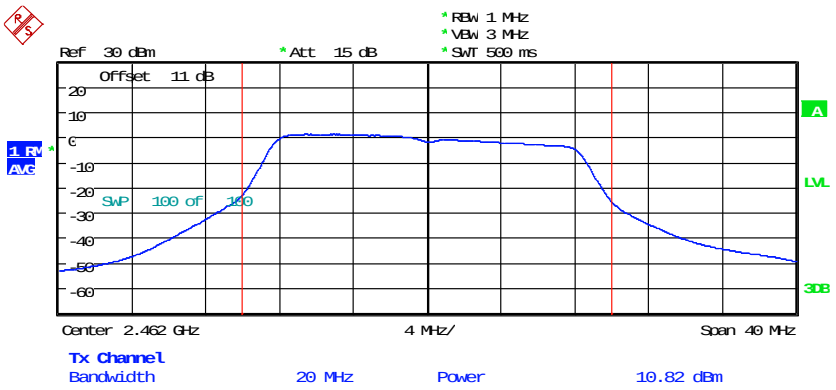


MAX OUTPUT POWER 802.11G CH11

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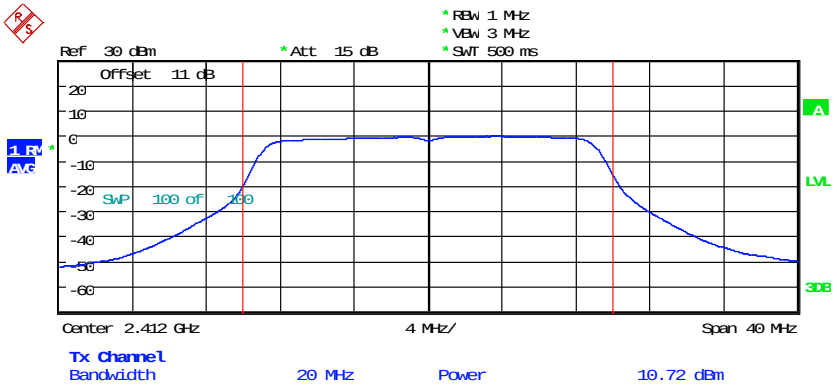


MAX OUTPUT POWER 802.11N 20MHZ CH1

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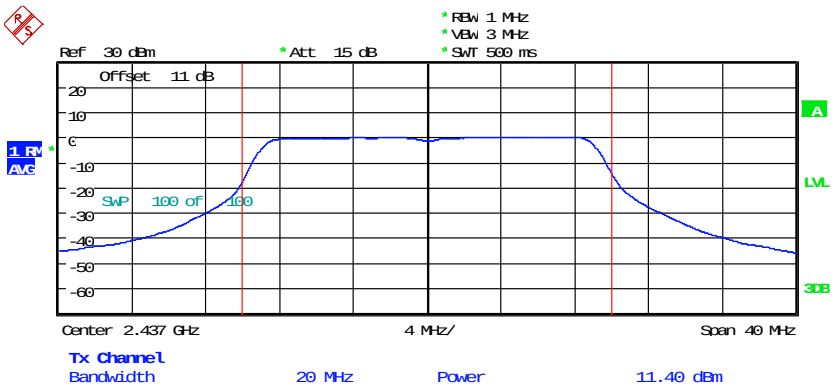
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11N 20MHZ CH6

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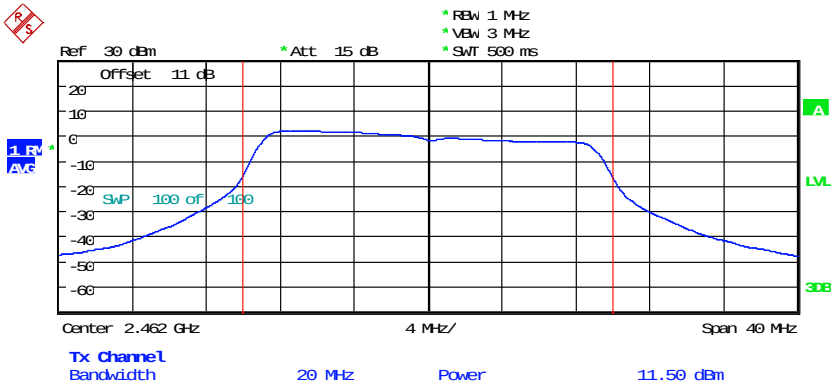


MAX OUTPUT POWER 802.11N 20MHZ CH11

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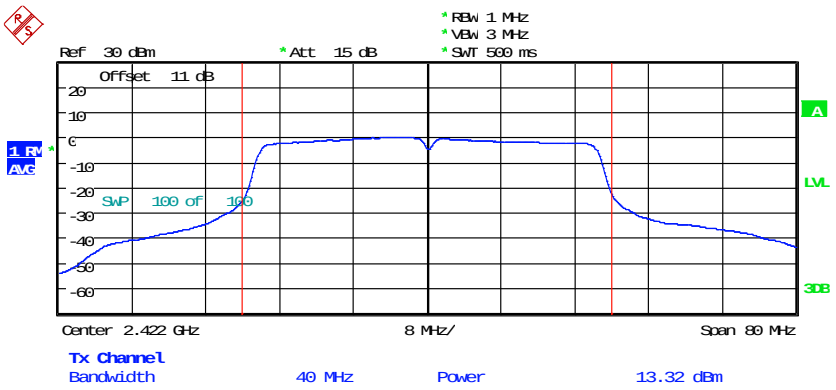


MAX OUTPUT POWER 802.11N 40MHZ CH1

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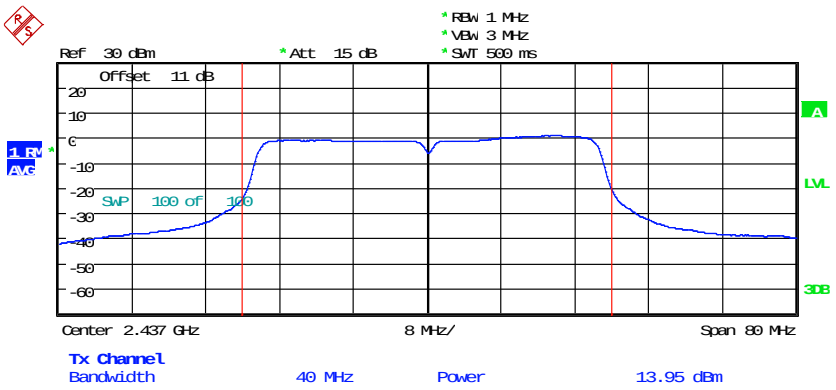
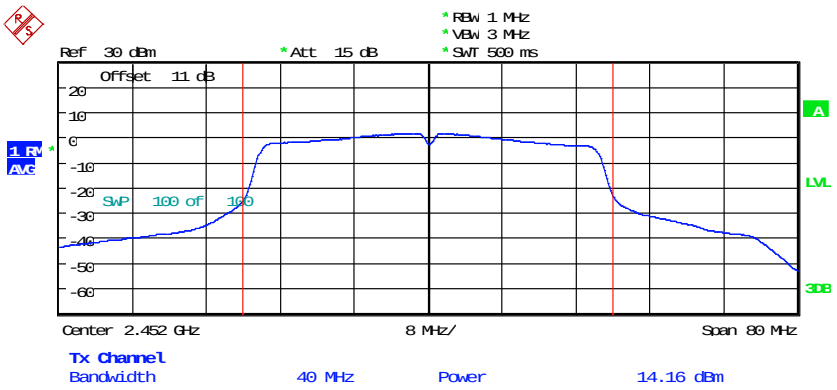



MAX OUTPUT POWER 802.11N 40MHZ CH4

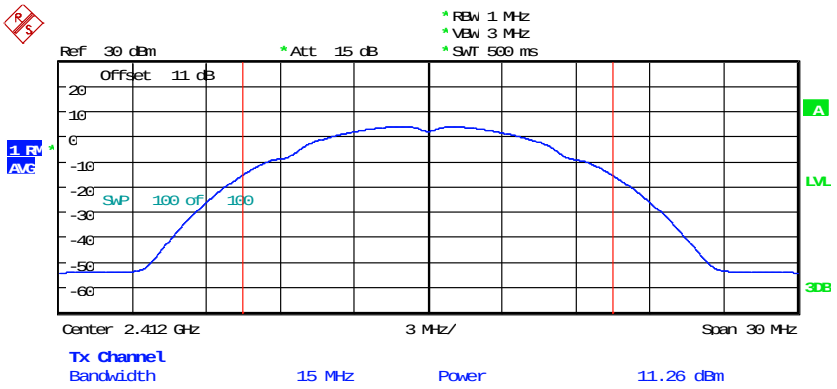
Date: 14.NOV.2019 21:27:00

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



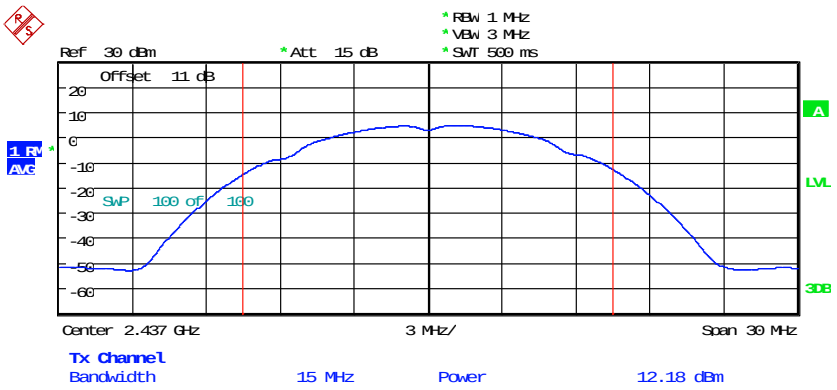

MAX OUTPUT POWER 802.11N 40MHZ CH7
Date: 14.NOV.2019 21:28:54

ANT 4



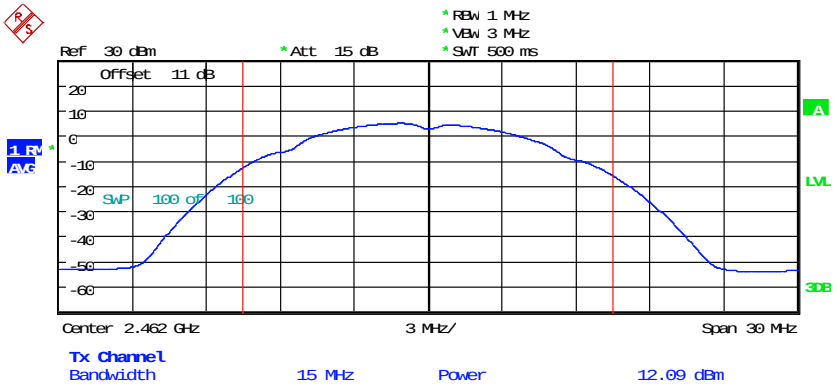

MAX OUTPUT POWER 802.11B CH1
Date: 14.NOV.2019 20:23:30

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11B CH6

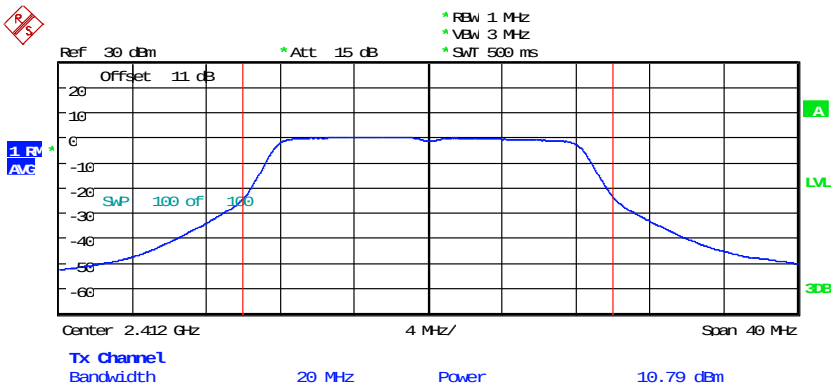
Date: 14.NOV.2019 20:25:33




MAX OUTPUT POWER 802.11B CH11

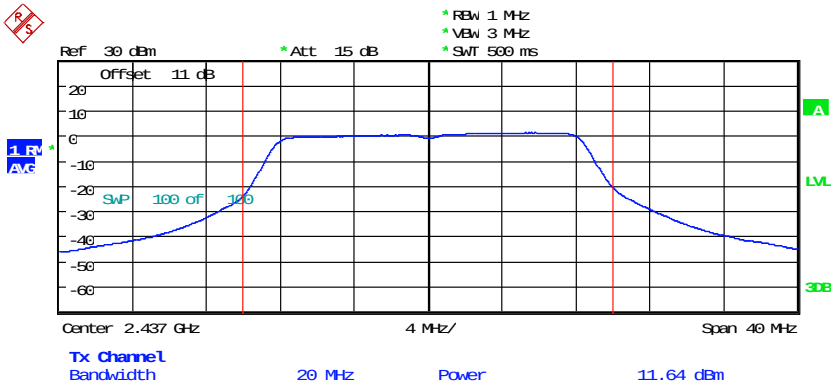
Date: 14.NOV.2019 20:27:27

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11G CH1

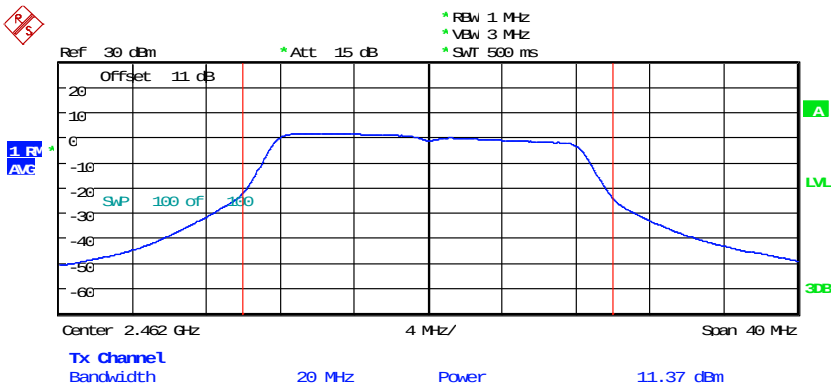
Date: 14.NOV.2019 20:18:09




MAX OUTPUT POWER 802.11G CH6

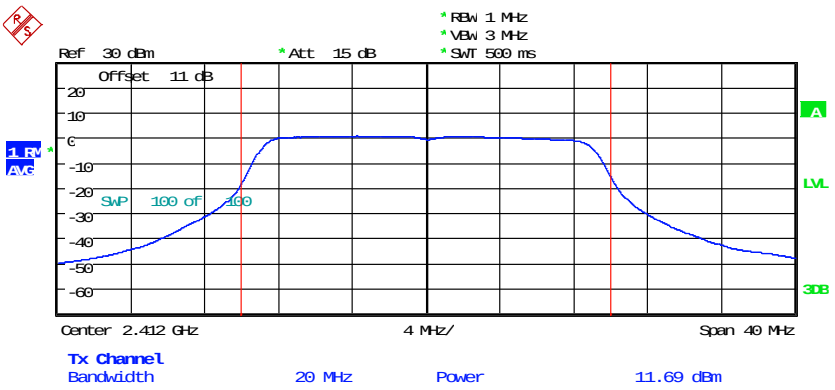
Date: 14.NOV.2019 20:19:36

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11G CH11

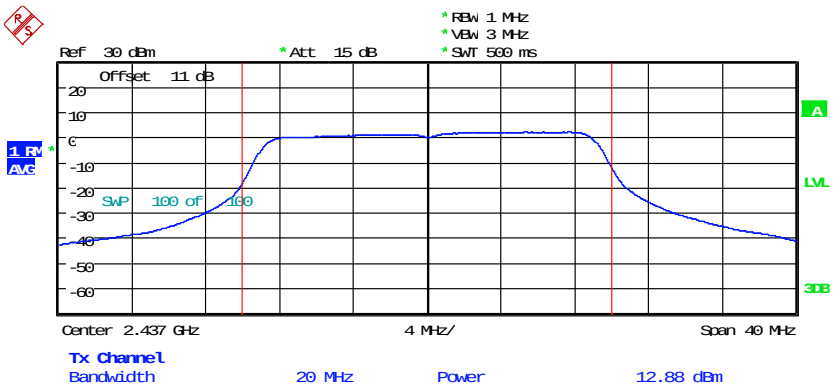
Date: 14.NOV.2019 20:21:31




MAX OUTPUT POWER 802.11N 20MHZ CH1

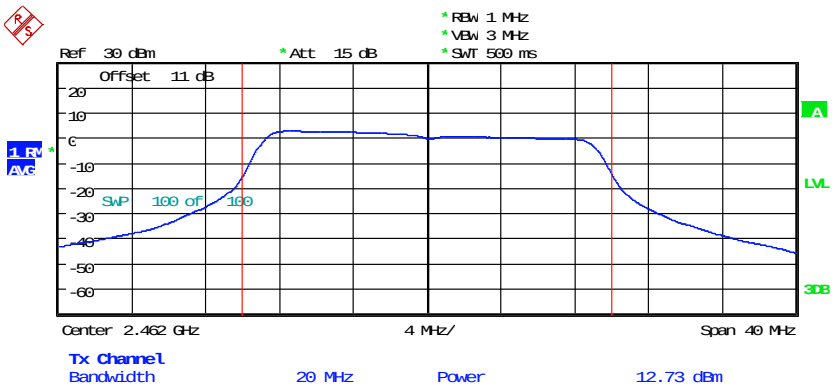
Date: 14.NOV.2019 19:52:49

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11N 20MHZ CH6

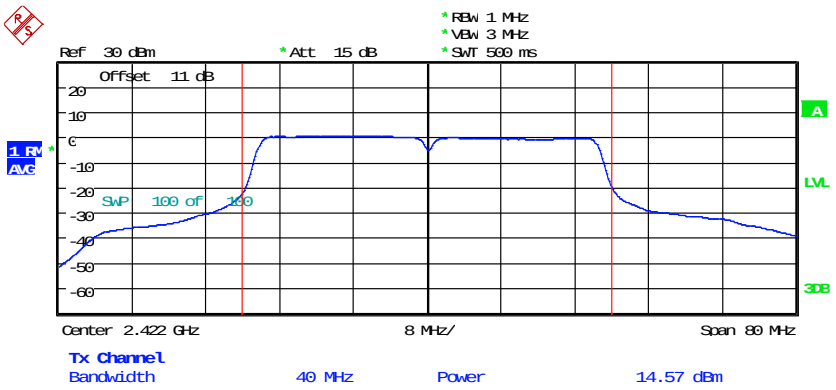
Date: 14.NOV.2019 19:54:35




MAX OUTPUT POWER 802.11N 20MHZ CH11

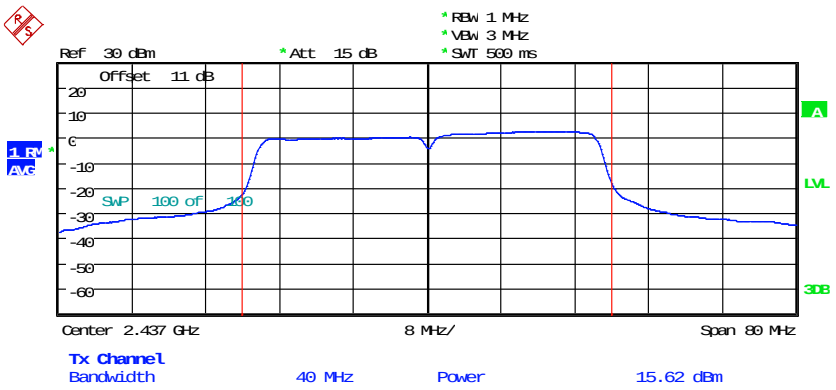
Date: 14.NOV.2019 20:16:00

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




MAX OUTPUT POWER 802.11N 40MHZ CH1

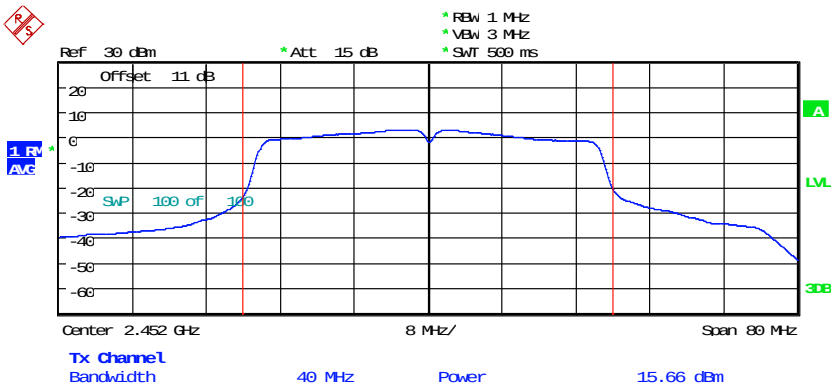
Date: 14.NOV.2019 19:47:16




MAX OUTPUT POWER 802.11N 40MHZ CH4

Date: 14.NOV.2019 19:48:56

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

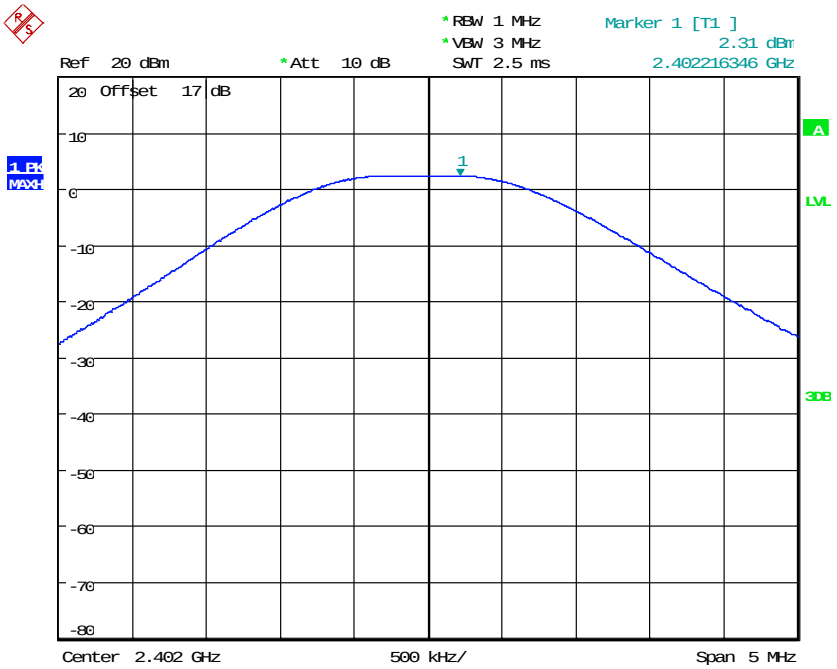



MAX OUTPUT POWER 802.11N 40MHZ CH7
Date: 14.NOV.2019 19:50:22

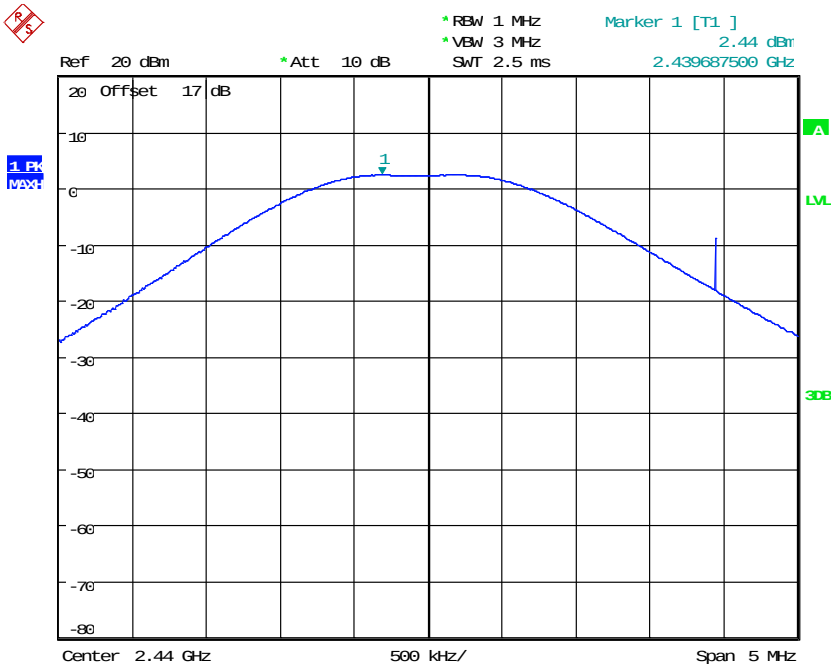
| ANT 1 | mW | | | dBm | | |
|---|---|---|---|---|---|---|
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 15.31 | 20.18 | 19.63 | 11.85 | 13.05 | 12.93 |
| 802.11n 40MHz | 28.38 | 35.24 | 34.99 | 14.53 | 15.47 | 15.44 |
| ANT 2 | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 13.4 | 16.52 | 15.52 | 11.27 | 12.18 | 11.91 |
| 802.11n 40MHz | 25.12 | 29.58 | 29.65 | 14.00 | 14.71 | 14.72 |
| ANT 3 | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 11.80 | 13.80 | 14.13 | 10.72 | 11.40 | 11.50 |
| 802.11n 40MHz | 21.48 | 24.83 | 26.06 | 13.32 | 13.95 | 14.16 |
| ANT 4 | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 14.76 | 19.41 | 18.75 | 11.69 | 12.88 | 12.73 |
| 802.11n 40MHz | 28.64 | 36.48 | 36.81 | 14.57 | 15.62 | 15.66 |
| Combine | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 55.27 | 69.91 | 68.03 | 17.42 | 18.45 | 18.33 |
| 802.11n 40MHz | 103.62 | 126.13 | 127.51 | 20.15 | 21.01 | 21.06 |

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

BLE

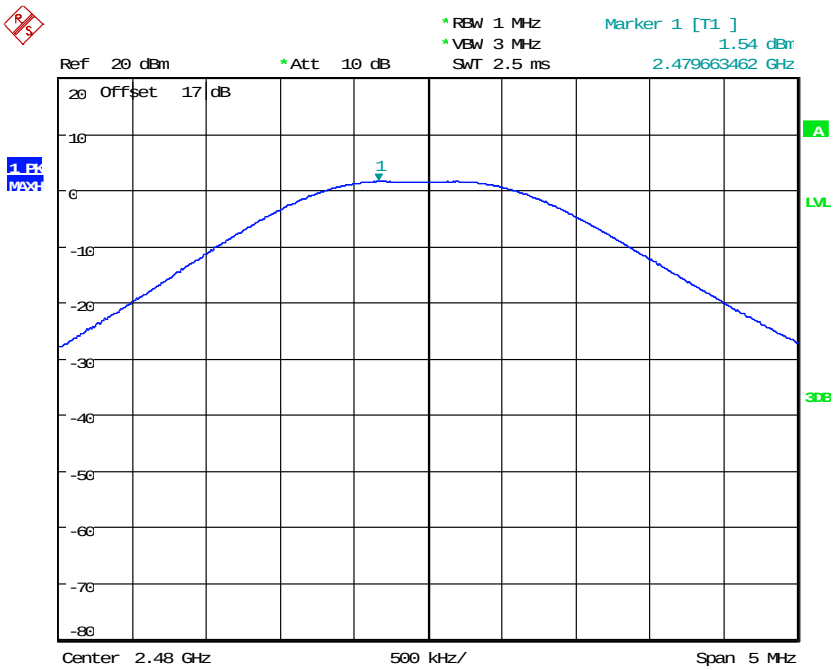



MAX OUTPUT POWER BT4.0 CH00
Date: 16.NOV.2019 22:09:16




MAX OUTPUT POWER BT4.0 CH19
Date: 16.NOV.2019 22:19:18

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




Limits:

| Frequency<br>MHz | Power<br>dBm |
|---|---|
| 902 - 928 | 30 |
| 2400 – 2483.5 | 30 |
| 5725 – 5850 | 30 |

In case of employing transmitter antennas having antenna gain ＞ 6 dBi and using fixed point-to point operation consider §15.247 (b)(4)

Test equipment used: ETSTW-RE 055, ETSTW-RE 050, ETSTW-RE 064

## 3.2 Equivalent Isotropic Radiated Power (EIRP)

FCC Rule: 15.247(b)(3)

WLAN
EIRP = max. conducted output power + antenna gain
EIRP = 21.06 dBm + (12.02 dBi [antenna gain claimed by manufacturer] = 33.08 dBm = 2032.3570 mW

BLE
EIRP = max. conducted output power + antenna gain
EIRP = 2.44 dBm + (4 dBi [antenna gain claimed by manufacturer] = 6.44 dBm = 4.4055 mW

## 3.3 Exemption Limits for Routine Evaluation according to 47 CFR FCC Part 2 Subpart J, section 2.1091

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.
The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case” or conservative prediction.

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20 cm normally can be maintained between the user and the device.

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

## MPE Calculation Method

**(A) Limits for Occupational/Controlled Exposure**

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) ($mW/cm^2$) | Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-3.0 | 614 | 1.63 | (100)* | 6 |
| 3.0-30 | 1842/f | 4.89/f | ($900/f^2$)* | 6 |
| 30-300 | 61.4 | 0.163 | 1.0 | 6 |
| 300-1500 | -- | -- | f/300 | 6 |
| 1500-100,000 | -- | -- | 5 | 6 |

**(B) Limits for General Population/Uncontrolled Exposure**

| Frequency Range (MHz) | Electric Field Strength (E) (V/m) | Magnetic Field Strength (H) (A/m) | Power Density (S) ($mW/cm^2$) | Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes) |
|---|---|---|---|---|
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | ($180/f^2$)* | 30 |
| 30-300 | 27.5 | 0.073 | 0.2 | 30 |
| 300-1500 | -- | -- | f/1500 | 30 |
| 1500-100,000 | -- | -- | 1.0 | 30 |

f = frequency in MHz *Plane-wave equivalent power density

E = Electric field (V/m) P = output power (W) G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)
The formula can be changed to $mW/cm^2$.

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

**WLAN**
Established separation distance is 20 cm.

Operating frequency band: 802.11b, g, n 20MHz: 2412-2462 MHz, 802.11n 40MHz: 2422-2452 MHz,

The product meets RF exposure requirement.
Because the power density of 0.4042 mW/cm$^2$ at 2452 MHz is below the power density limit of 1 mW/cm$^2$.

**BLE**
Established separation distance is 20 cm.

Operating frequency band: 2402-2480 MHz

The product meets RF exposure requirement.
Because the power density of 0.0009 mW/cm$^2$ at 2440 MHz is below the power density limit of 1 mW/cm$^2$.

Limits:

| **Limit for General Population / Uncontrolled Exposure** | |
|---|---|
| Frequency (MHz) | Power Density (mW/cm$^2$) |
| 1500 – 100.000 | 1.0 |

## 3.4 Transmitter Radiated Emissions in Restricted Bands

FCC Rules: 15.247 (d), 15.205, 15.209, 15.35
Radiated emission measurements were performed from 30 MHz to 26500 MHz.
For radiated emission tests, the analyzer setting was as followings:

Frequency ≦ 1 GHz, RBW:100 kHz, VBW: 100 kHz (Peak measurements)
Frequency ＞1 GHz, RBW: 1 MHz, VBW: 1 MHz (Peak measurements)
Frequency ＞1 GHz , RBW:1 MHz , VBW: 10 Hz (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 | 500 | 54.0 |

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of Digit Transmission Systems:
"If the emission is pulsed, modify the unit for continuous operation, use the setting shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation."

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

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

Note: No duty cycle correction was added to the reading of this EUT.

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))

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 above 1GHz (Peak measurements).
Modified Limit for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

For frequencies above 1GHz (Average measurements).
Max. reading – 20dB

Max. reading – 20 dB
Guidance on Measurement of Digit Transmission 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.”

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

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

Note: No duty cycle correction was added to the reading of EUT.

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance with 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 and 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 "Correction Factor".

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

Model: ion8/ion8e Date: --
Mode: -- Temperature: -- °C Engineer: --
Polarization: -- Humidity: -- %

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |

| Frequency (MHz) | Reading (dBuV) | | Factor (dB) | Result (dBuV/m) | | Limit (dBuV/m) | | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | | | |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**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. **After evaluated, the test result in this report adopt the worst case to measure, please see attached diagrams in appendix.**

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

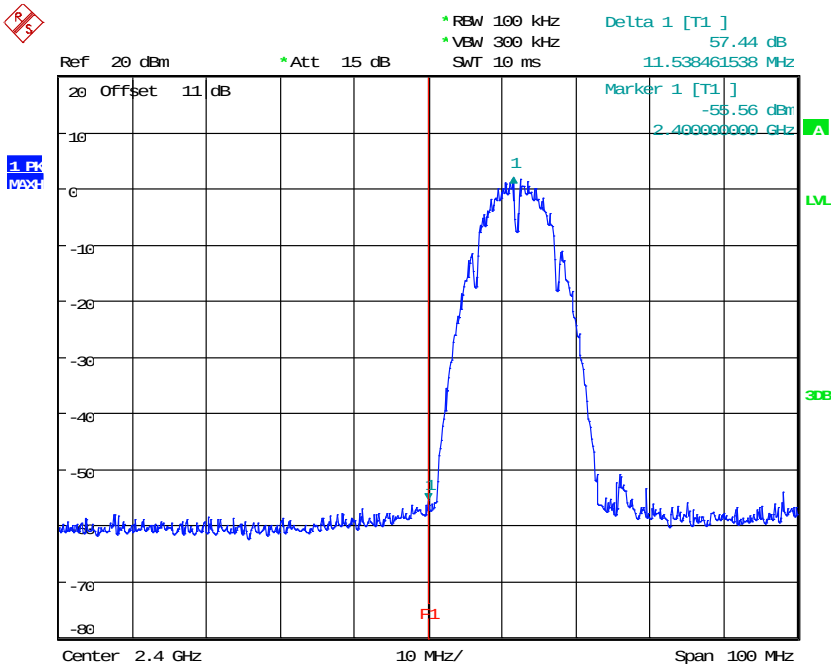
Test equipment used: ETSTW-RE 030, ETSTW-RE 111, ETSTW-RE 088, ETSTW-RE 018, ETSTW-RE 064

## 3.6 Radiated Emission on the band edge

According to FCC rules part 15 subpart C §15.247(d) 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.

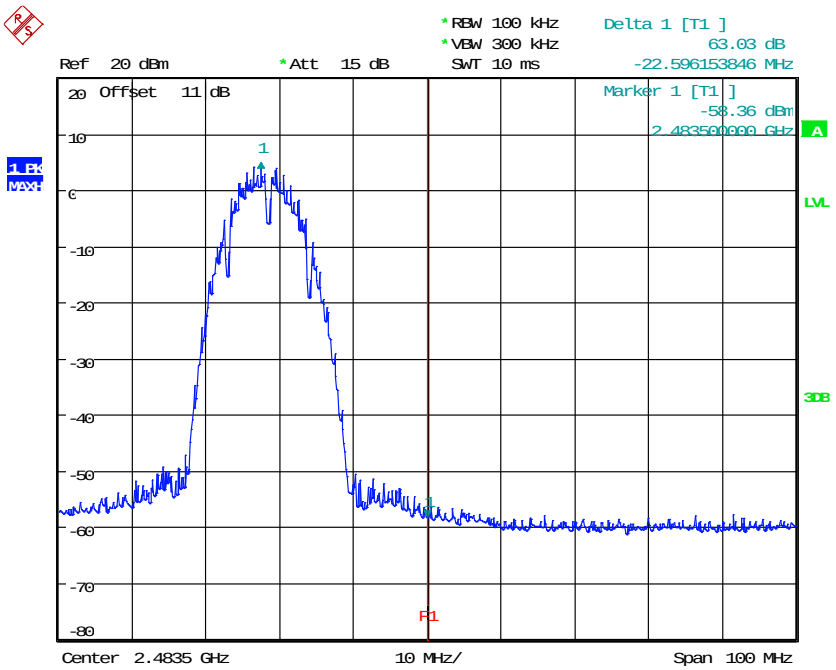
In addition radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also with the radiated emission limits.

WLAN
ANT 1



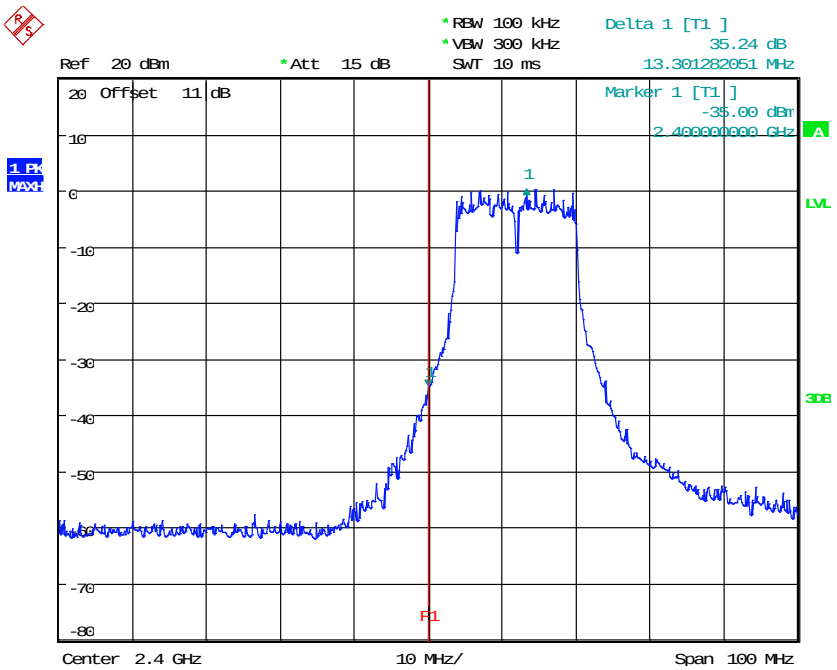

BANDEDGE 802.11B CH01
Date: 13.NOV.2019 17:27:13

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11B CH11

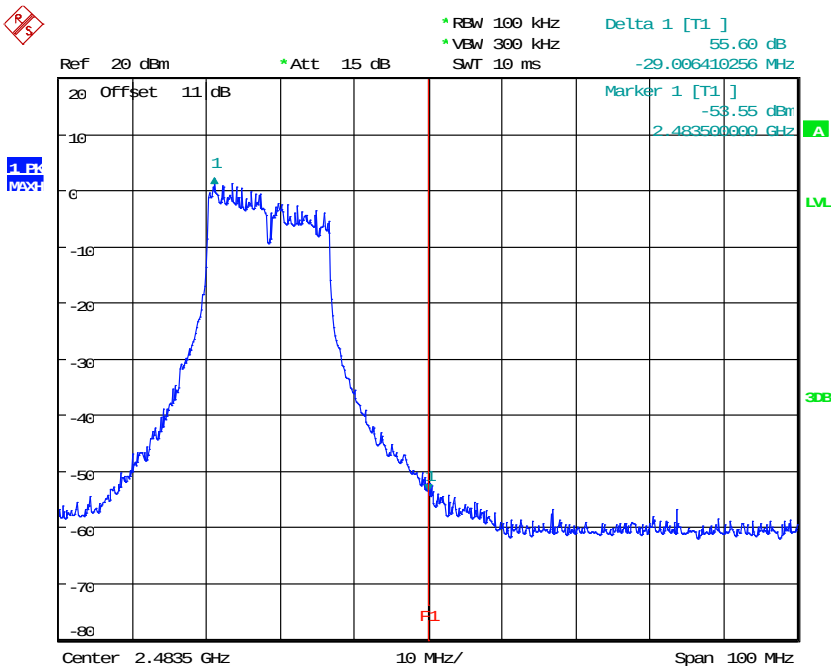
Date: 13.NOV.2019 17:30:41




BANDEDGE 802.11G CH01

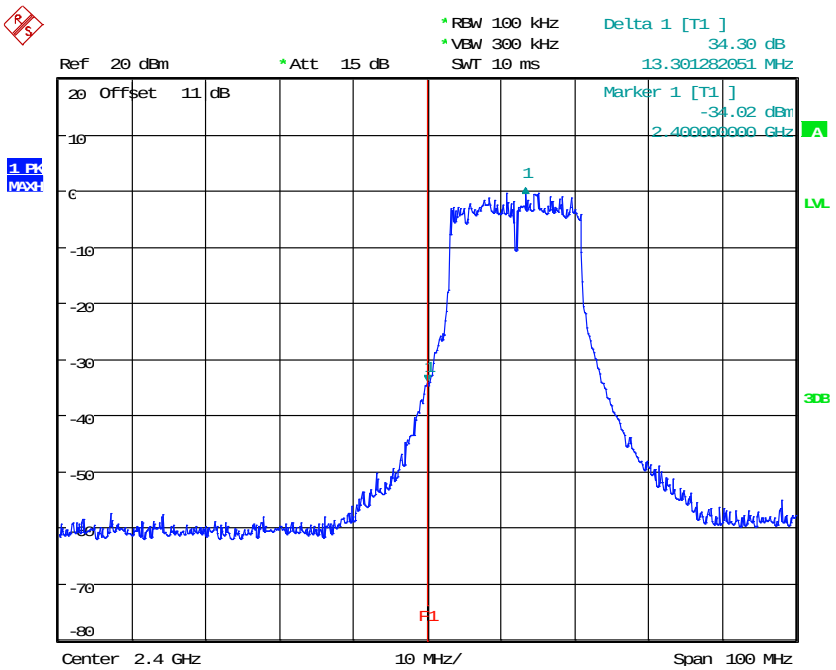
Date: 13.NOV.2019 17:32:21

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11G CH11

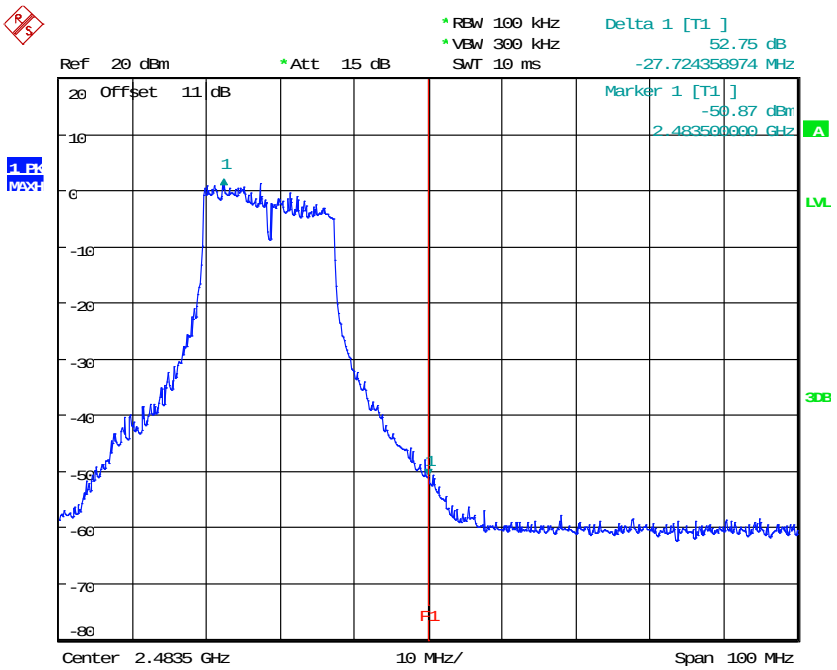
Date: 13.NOV.2019 17:35:46




BANDEDGE 802.11N 20MHZ CH01

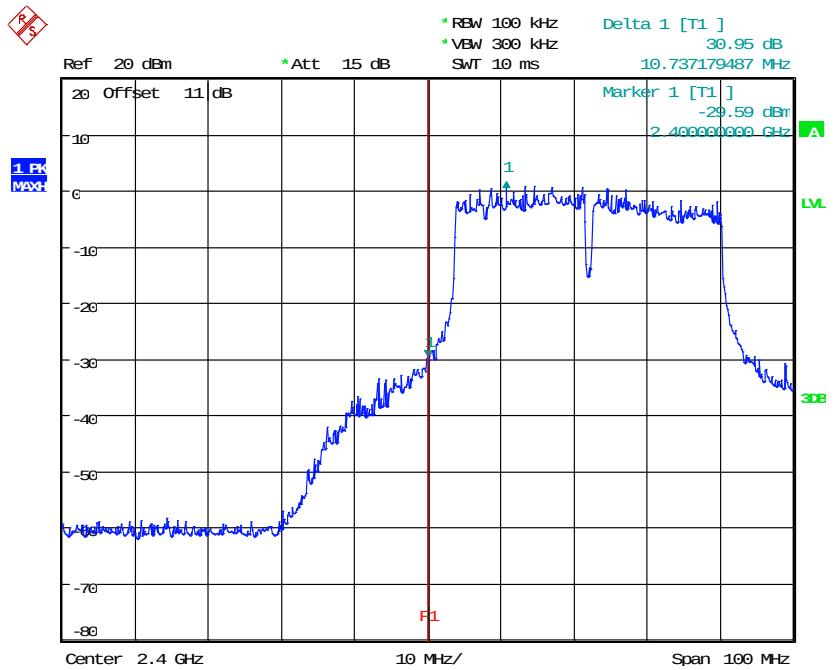
Date: 13.NOV.2019 17:39:02

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11N 20MHZ CH11

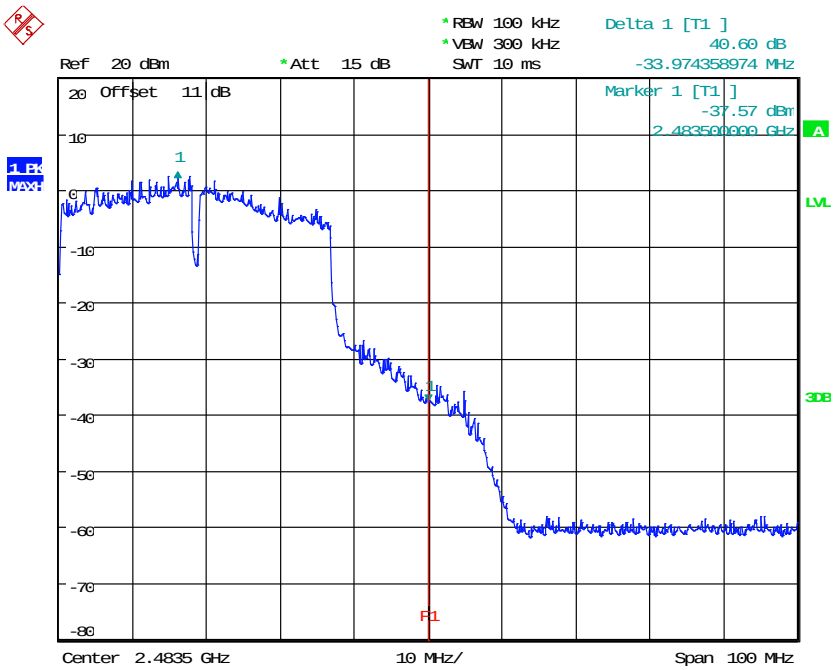
Date: 13.NOV.2019 17:40:59




BANDEDGE 802.11N 40MHZ CH01

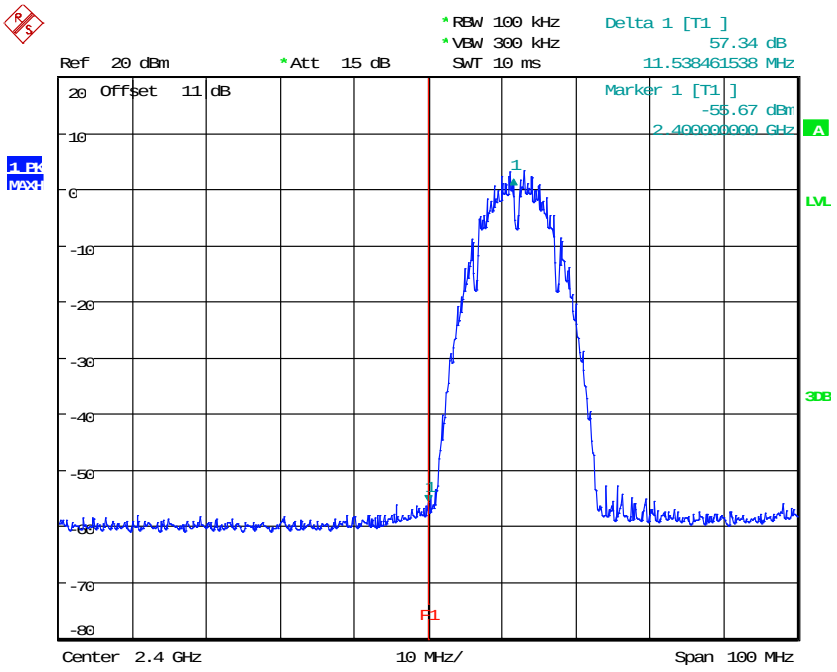
Date: 13.NOV.2019 17:43:15

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



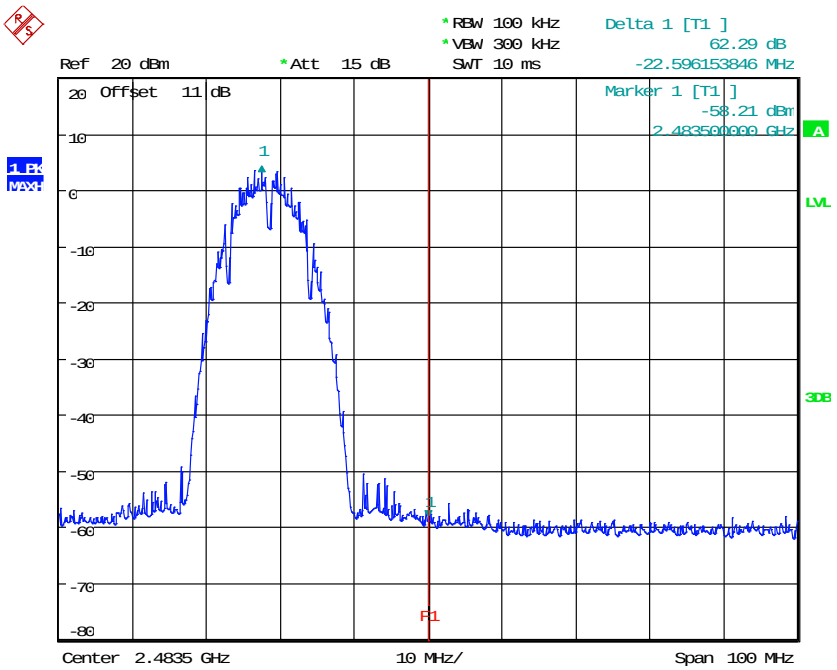

BANDEDGE 802.11N 40MHZ CH07
Date: 13.NOV.2019 17:47:15

ANT 2



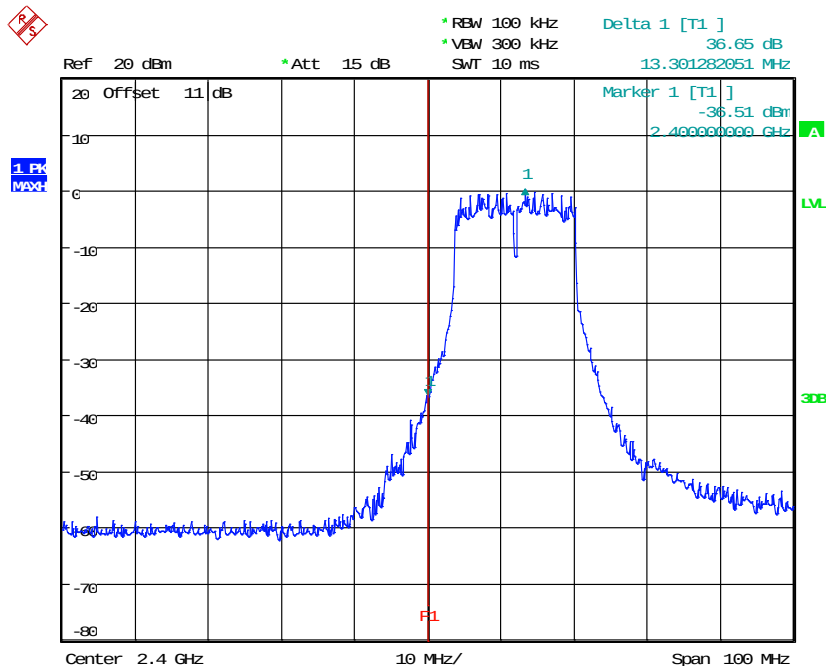

BANDEDGE 802.11B CH01
Date: 14.NOV.2019 14:04:58

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11B CH11

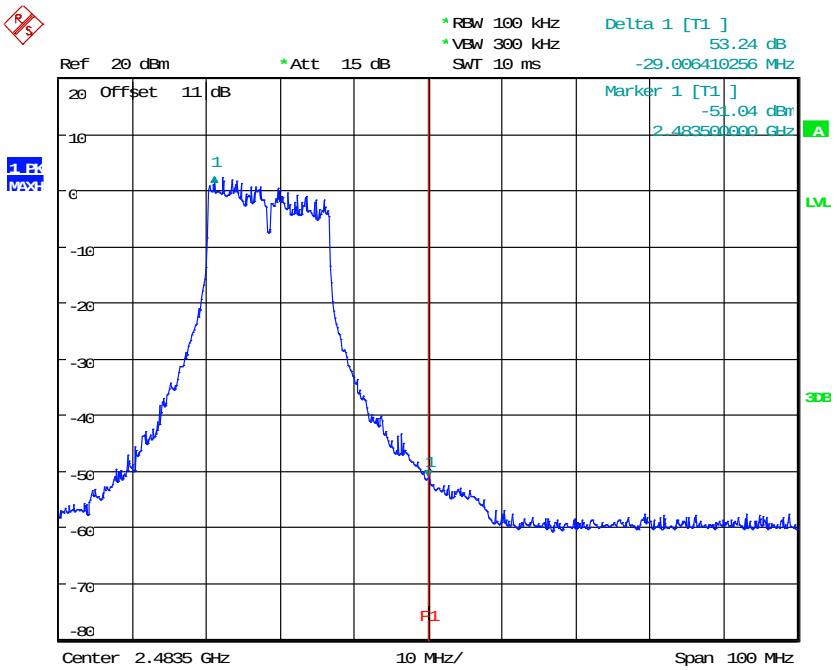
Date: 14.NOV.2019 14:09:02



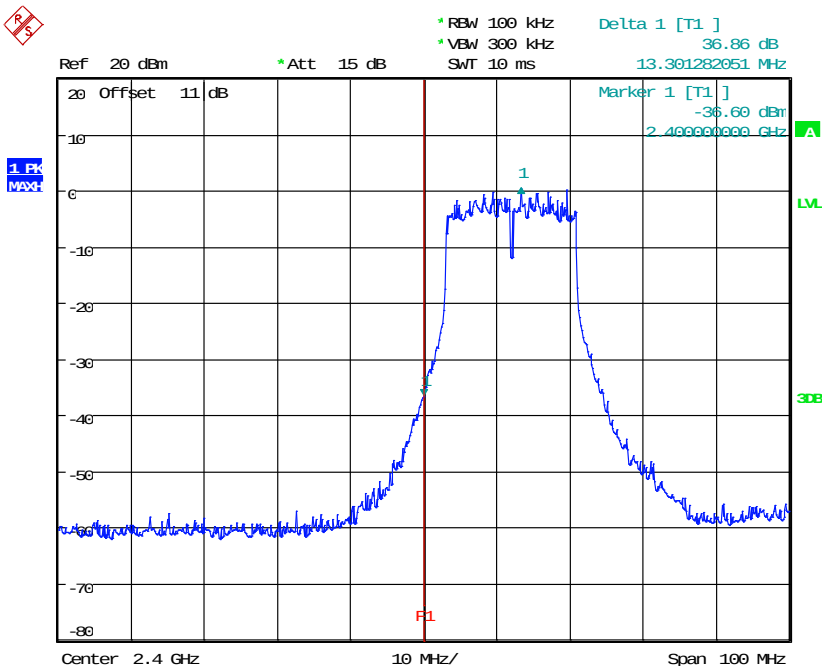

BANDEDGE 802.11G CH01

Date: 14.NOV.2019 14:10:53

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

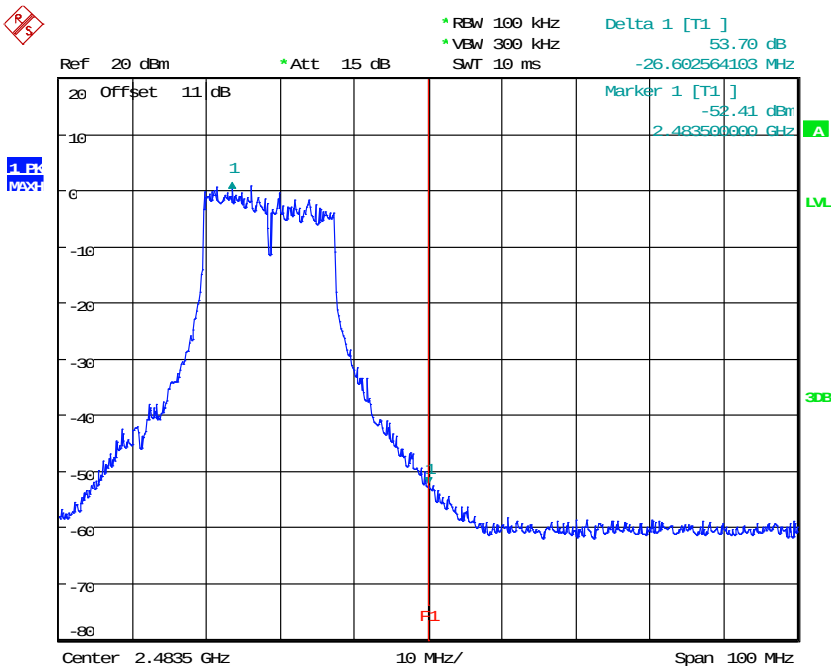



BANDEDGE 802.11G CH11
Date: 14.NOV.2019 14:19:11



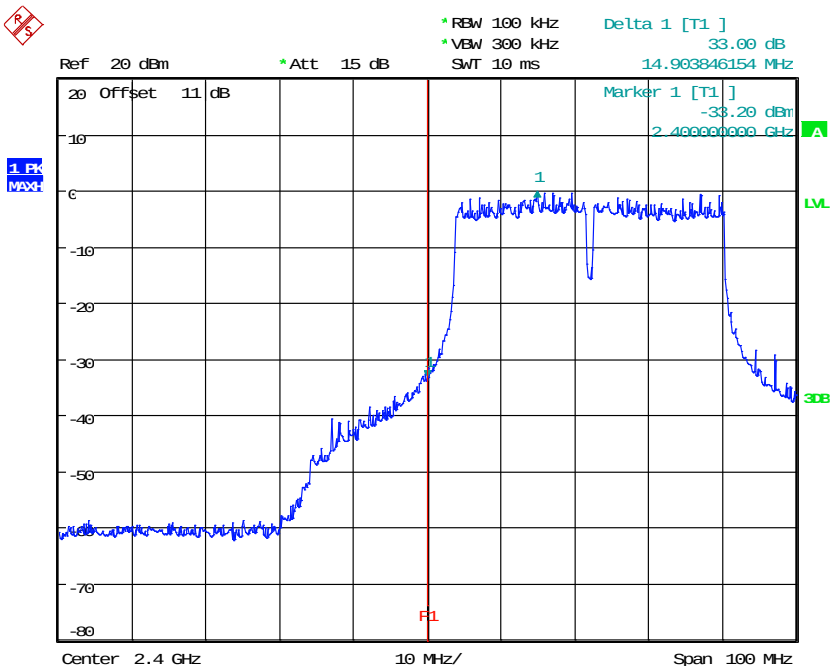

BANDEDGE 802.11N 20MHZ CH01
Date: 14.NOV.2019 14:20:35

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11N 20MHZ CH11

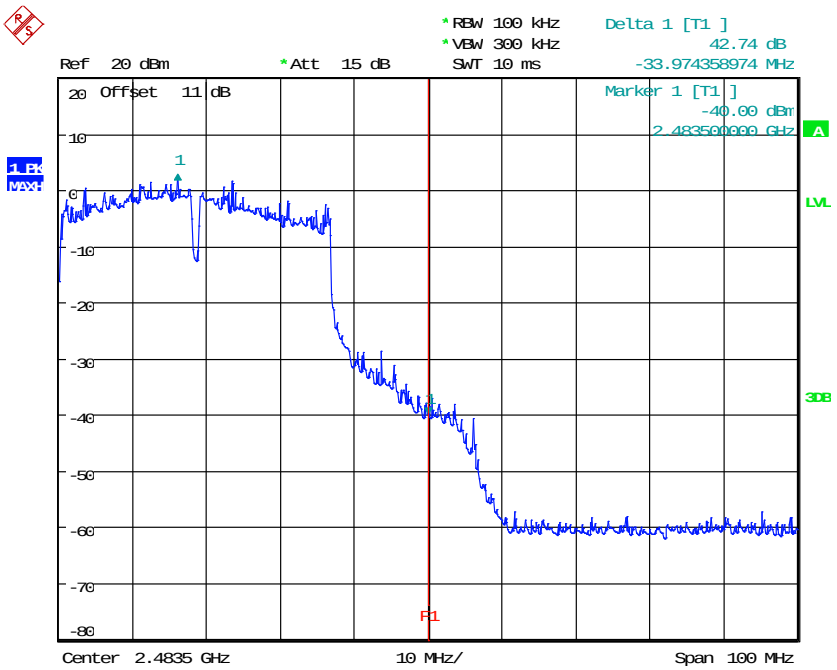
Date: 14.NOV.2019 14:22:58




BANDEDGE 802.11N 40MHZ CH01

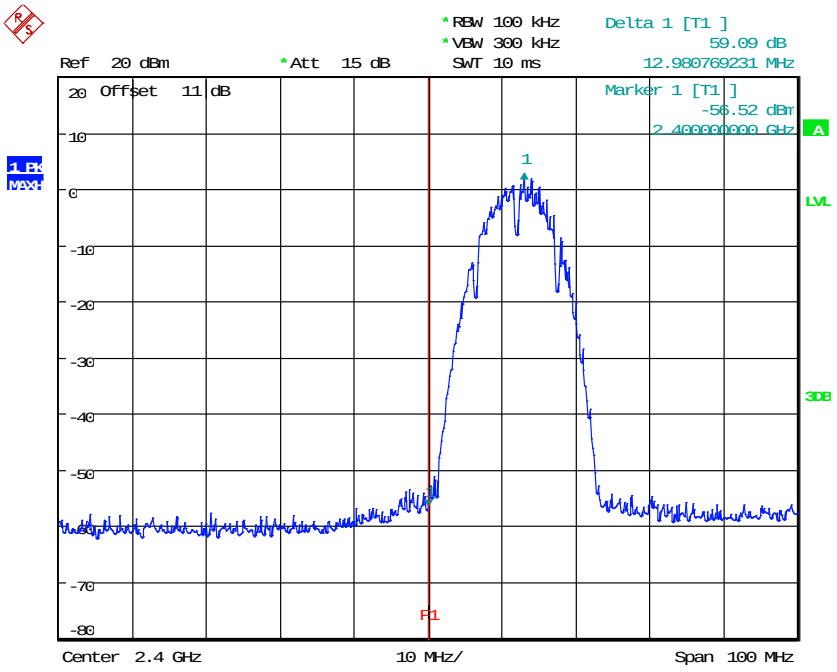
Date: 14.NOV.2019 14:24:08

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



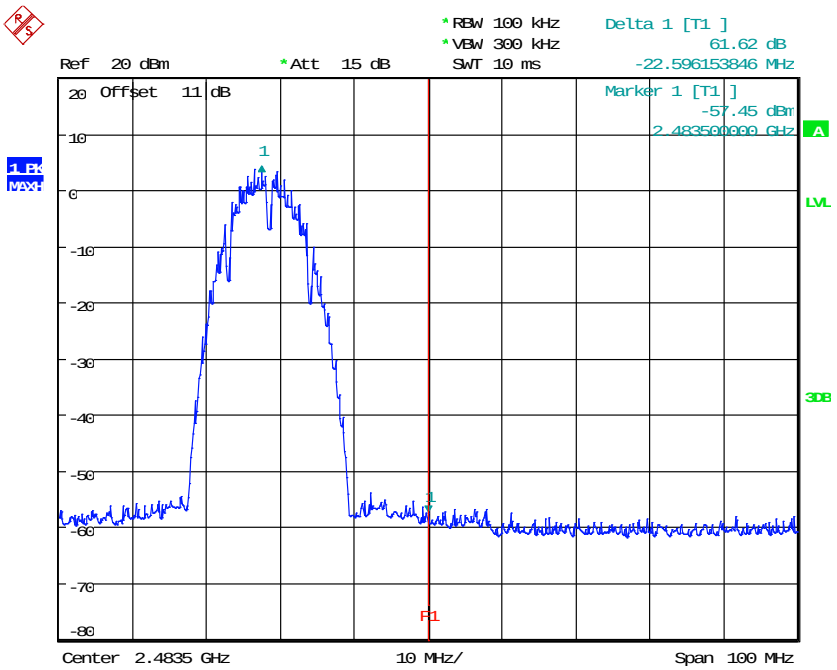

BANDEDGE 802.11N 40MHZ CH07
Date: 14.NOV.2019 14:27:11

ANT 3



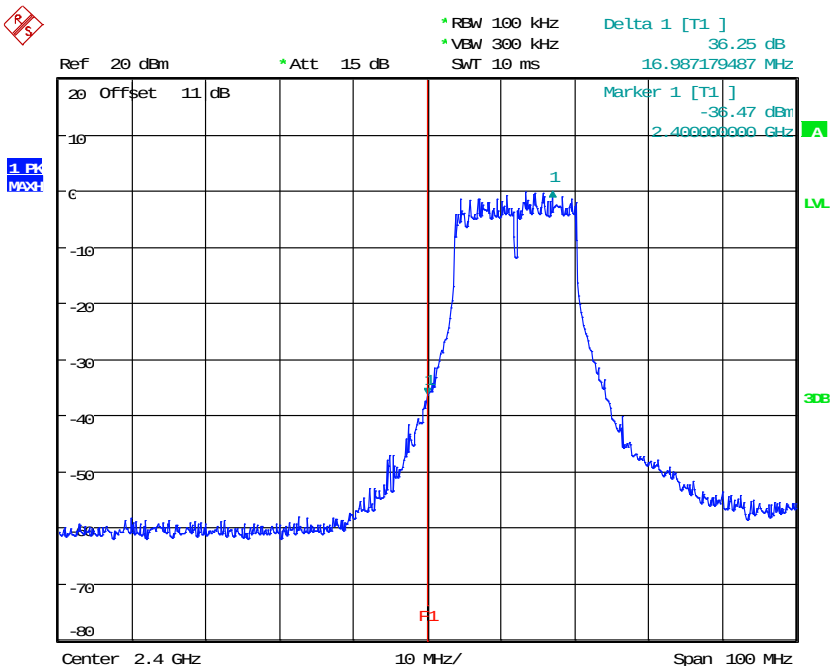

BANDEDGE 802.11B CH01
Date: 14.NOV.2019 15:56:10

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11B CH11

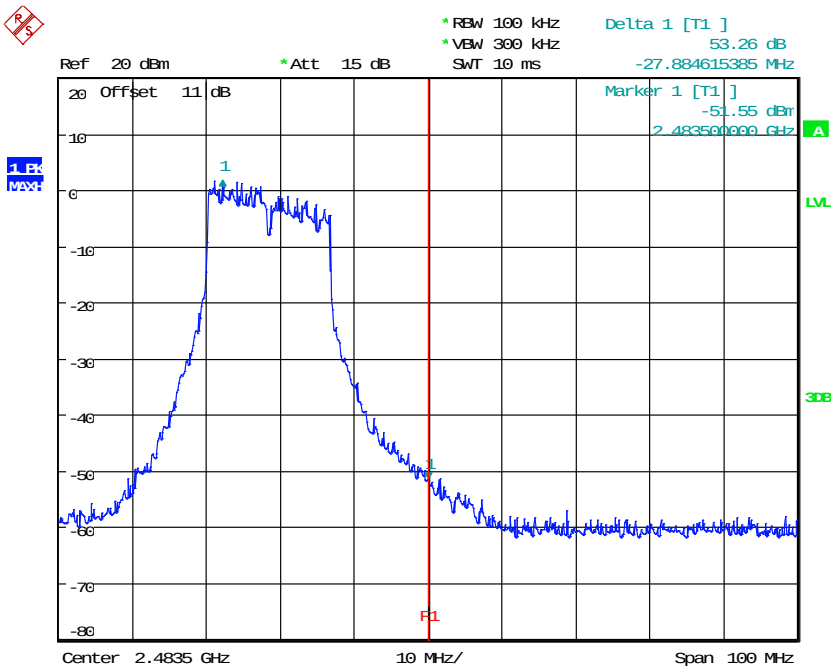
Date: 14.NOV.2019 16:00:24




BANDEDGE 802.11G CH01

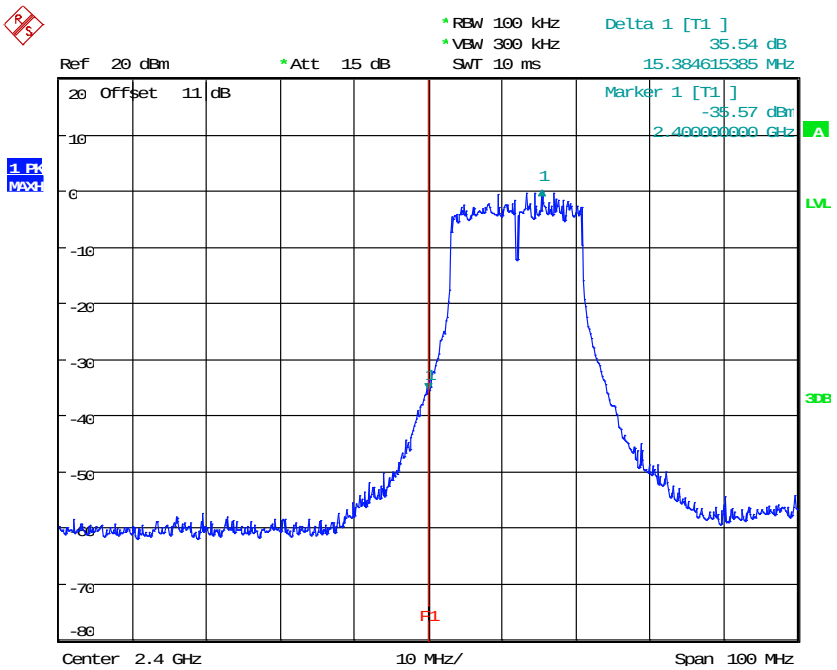
Date: 14.NOV.2019 16:02:00

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11G CH11

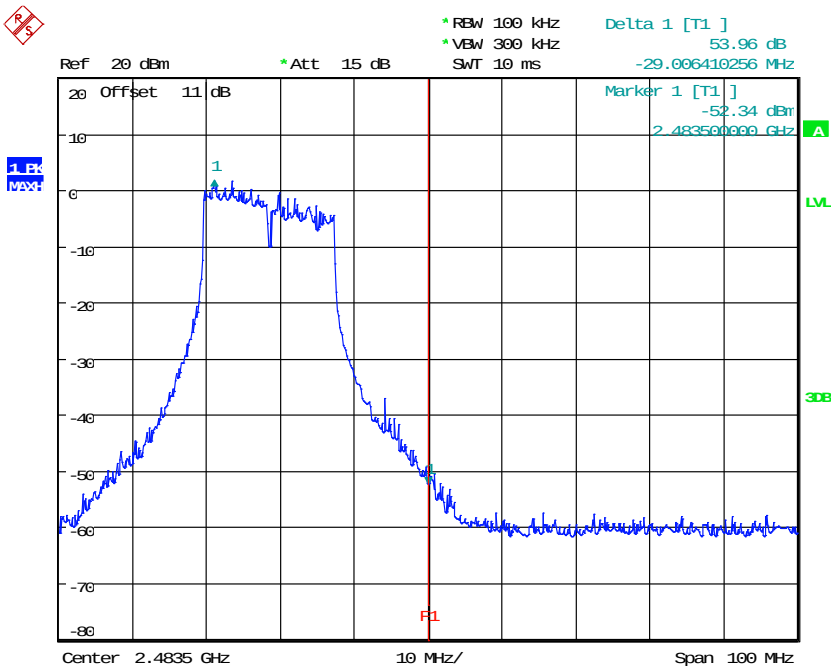
Date: 14.NOV.2019 16:20:00




BANDEDGE 802.11N 20MHZ CH01

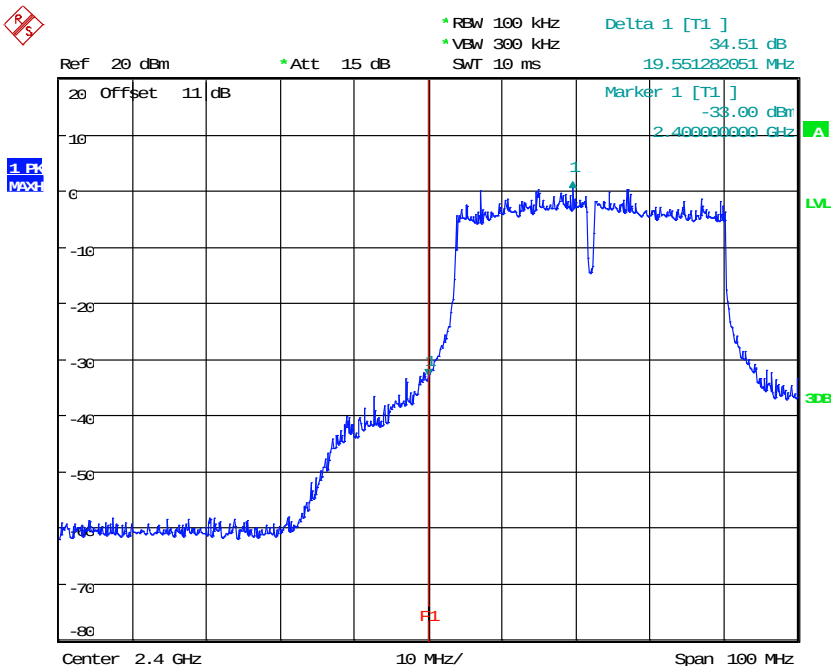
Date: 14.NOV.2019 16:21:03

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11N 20MHZ CH11

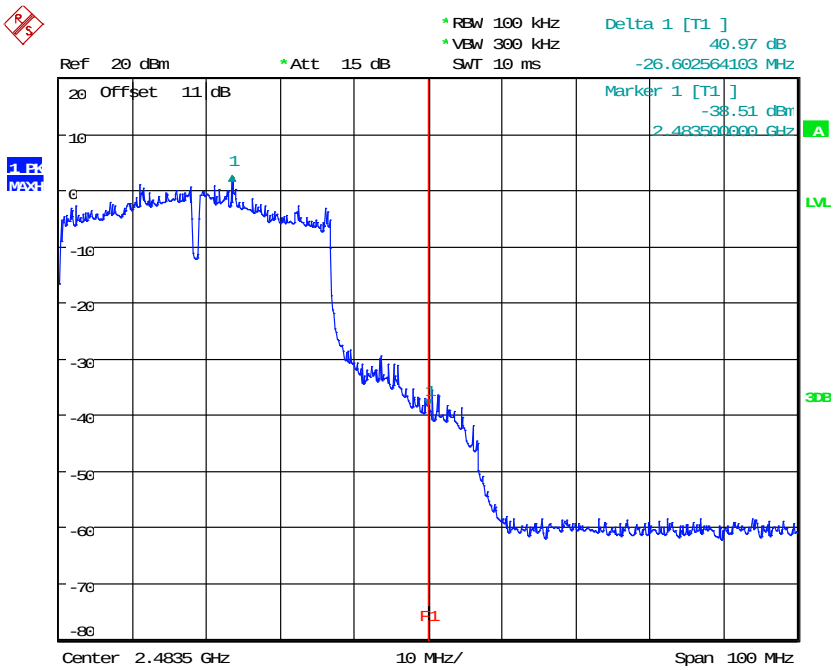
Date: 14.NOV.2019 16:23:18




BANDEDGE 802.11N 40MHZ CH01

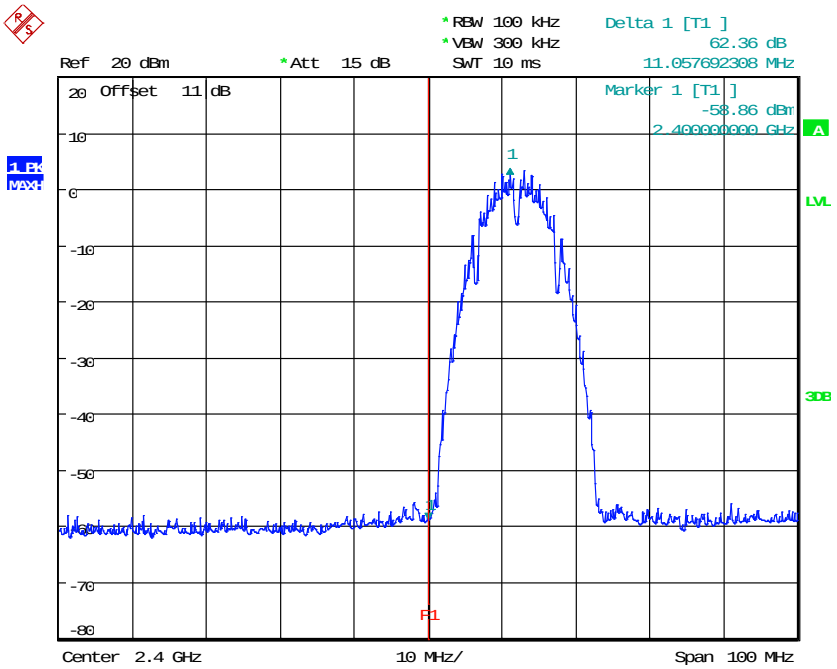
Date: 14.NOV.2019 16:24:33

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



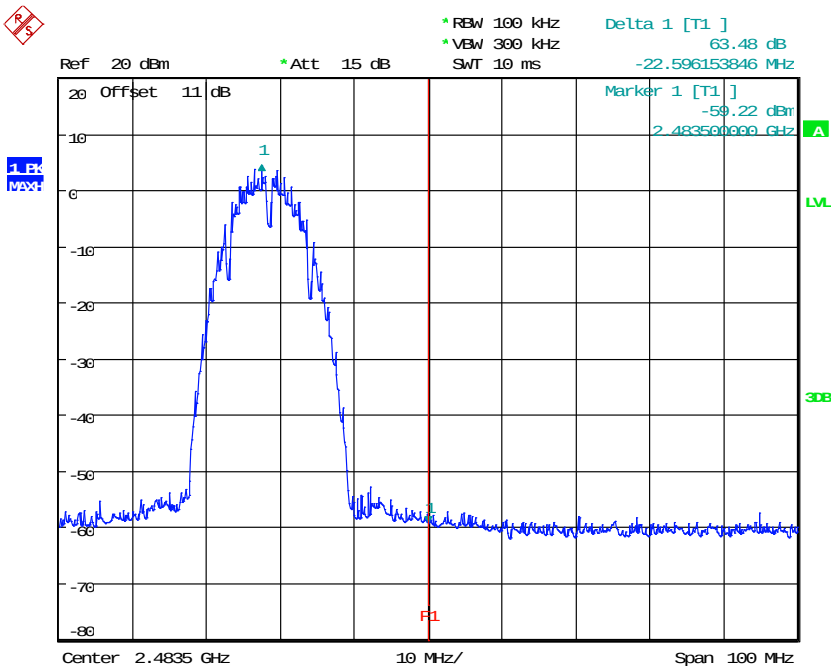

BANDEDGE 802.11N 40MHZ CH07
Date: 14.NOV.2019 16:30:20

ANT 4



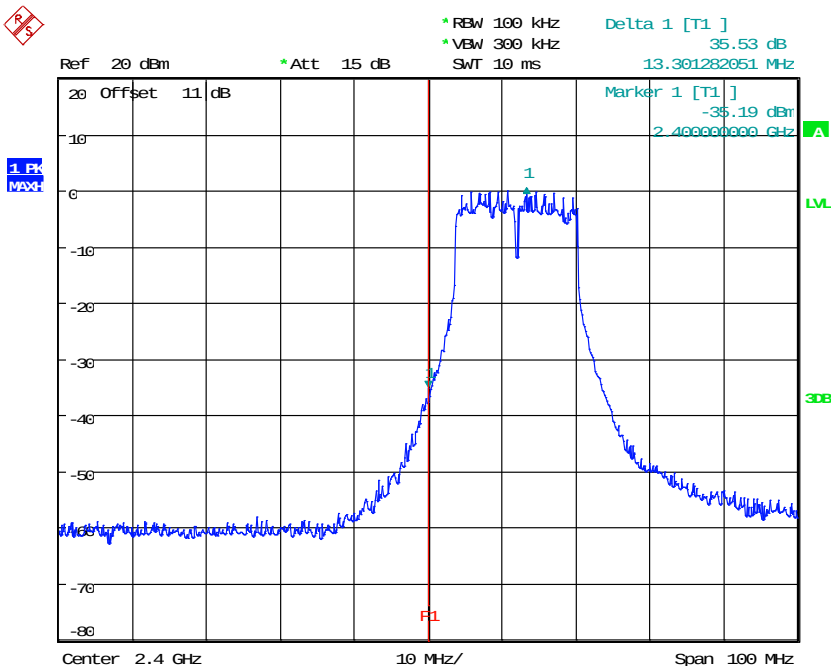

BANDEDGE 802.11B CH01
Date: 14.NOV.2019 17:33:43

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11B CH11

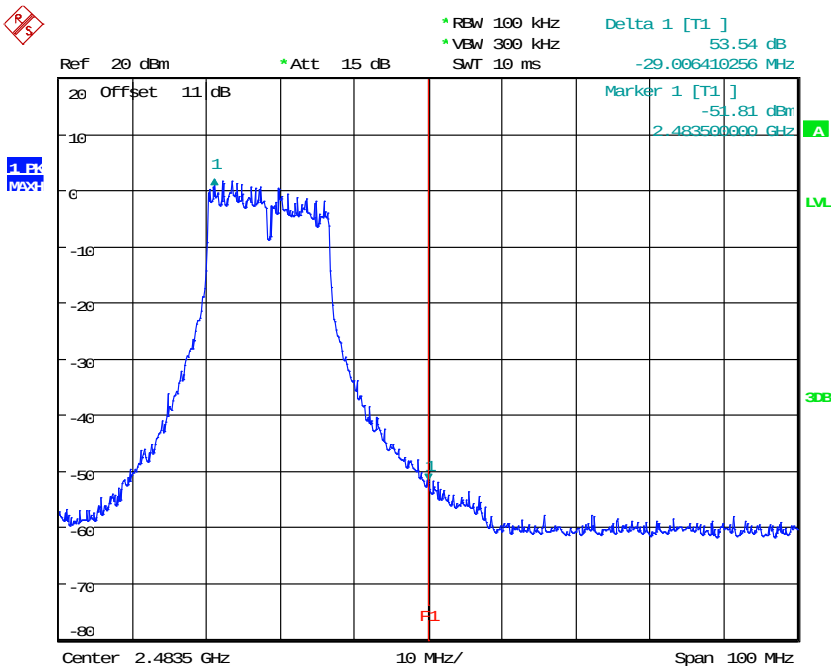
Date: 14.NOV.2019 17:35:22




BANDEDGE 802.11G CH01

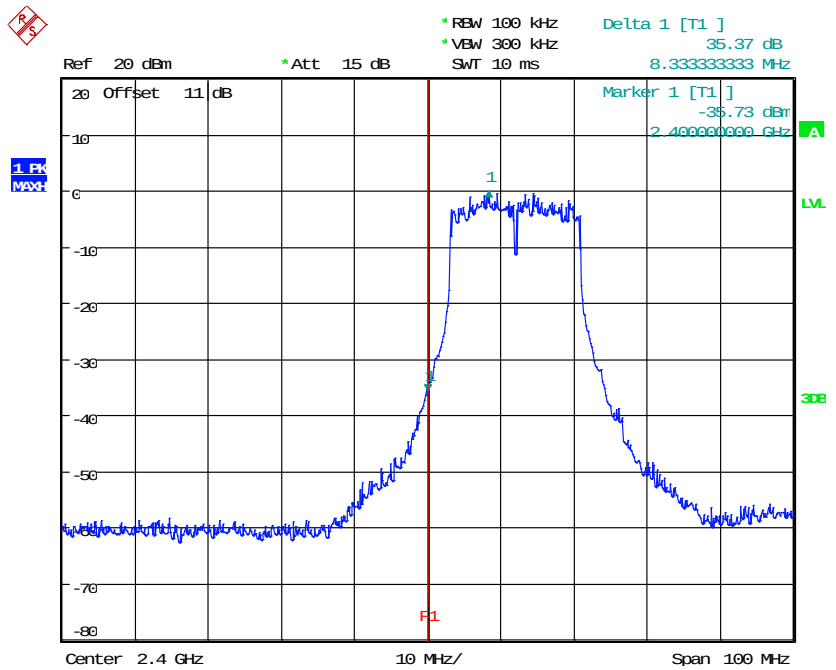
Date: 14.NOV.2019 17:36:12

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11G CH11

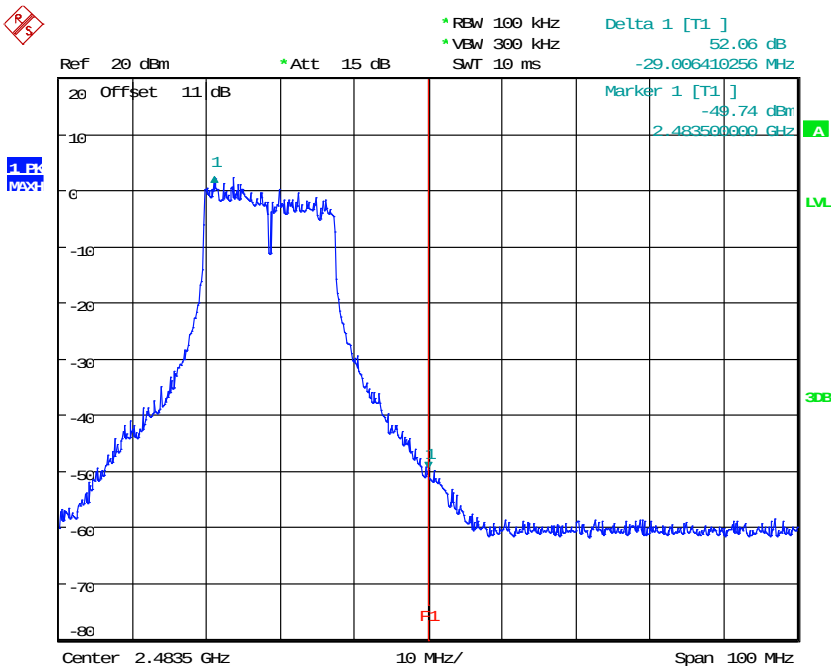
Date: 14.NOV.2019 17:37:45




BANDEDGE 802.11N 20MHZ CH01

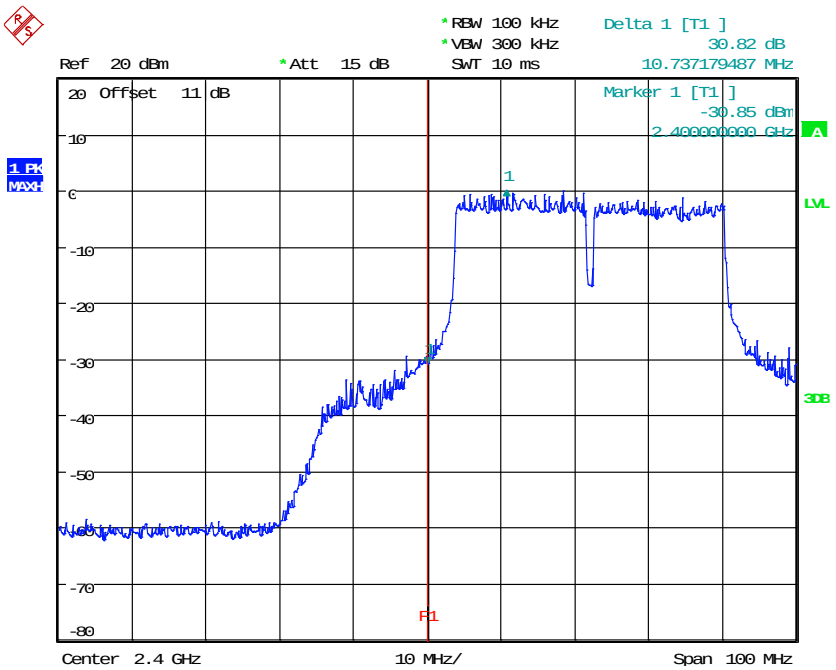
Date: 14.NOV.2019 17:40:27

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE 802.11N 20MHZ CH11

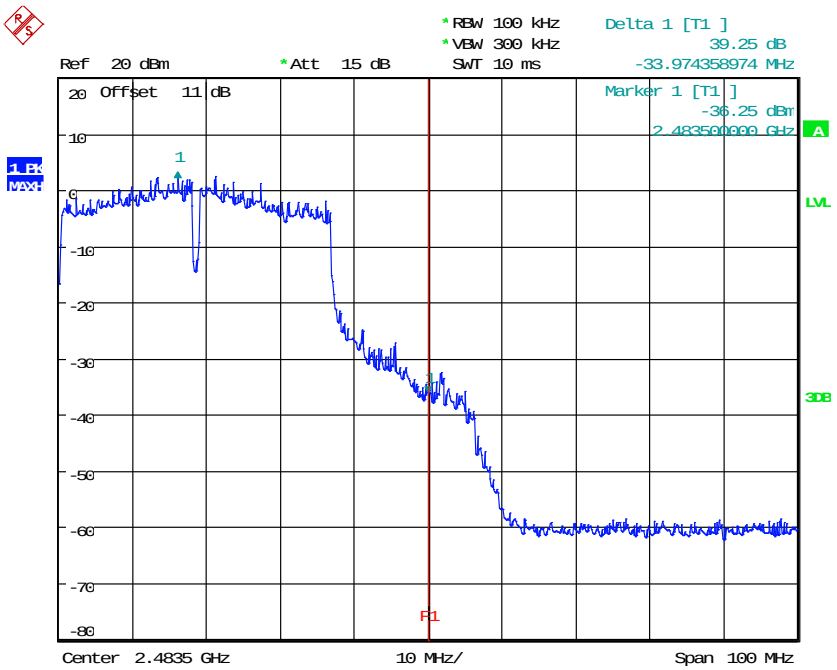
Date: 14.NOV.2019 19:39:07




BANDEDGE 802.11N 40MHZ CH01

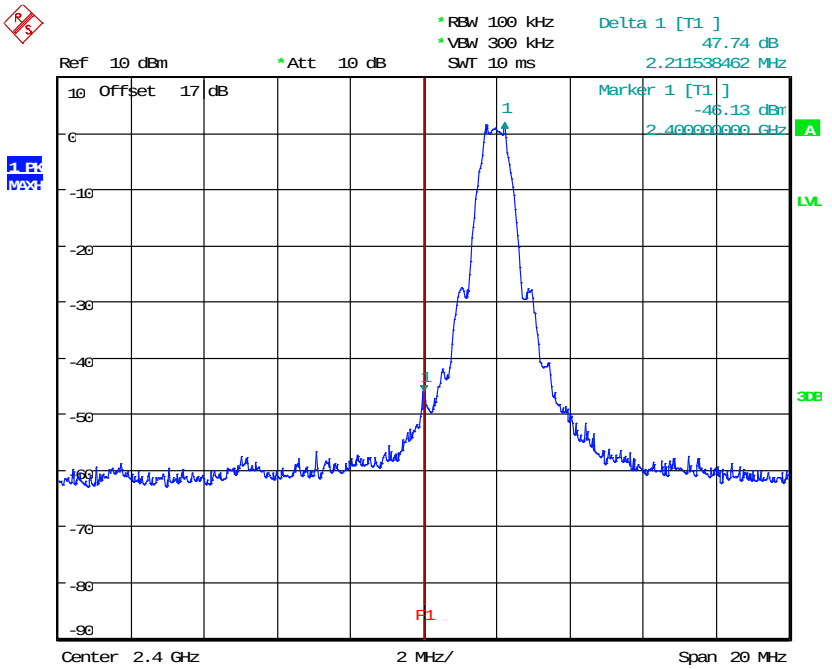
Date: 14.NOV.2019 19:40:06

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



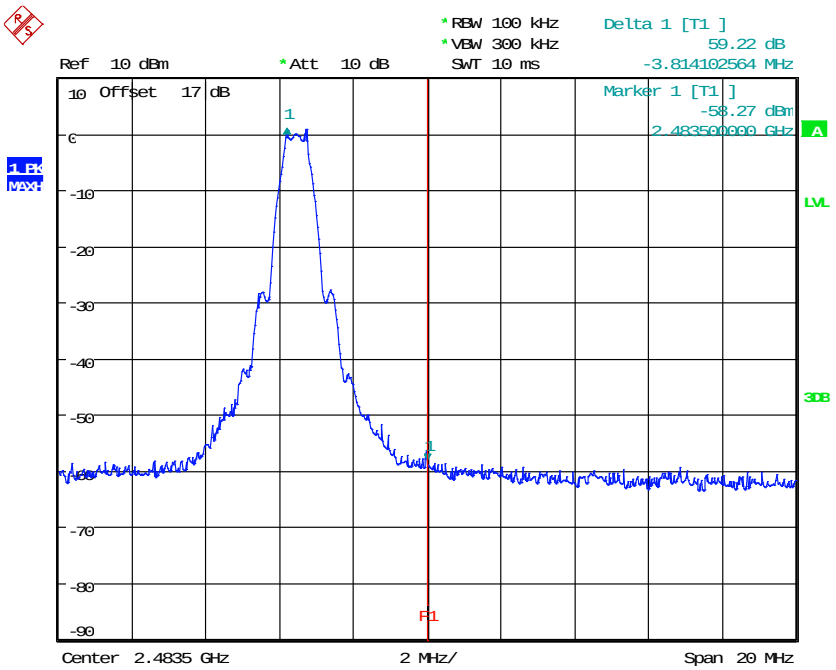

BANDEDGE 802.11N 40MHZ CH07
Date: 14.NOV.2019 19:43:55

BLE




BANDEDGE BT4.0 CH00
Date: 16.NOV.2019 22:09:44

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




BANDEDGE BT4.0 CH39
Date: 16.NOV.2019 22:23:26

Limit:

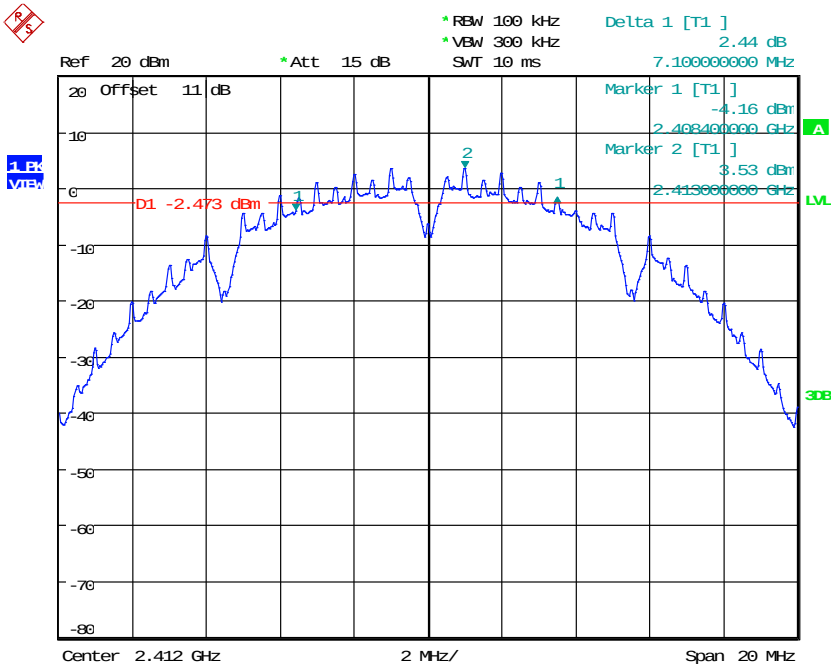
| Frequency Range / MHz | Limit |
|---|---|
| 902 –928<br>2400 – 2483.5<br>5725 - 5850 | - 20 dB |

Test equipment used: ETSTW-RE 055, ETSTW-RE 050

## 3.7 Minimum 6 dB Bandwidth

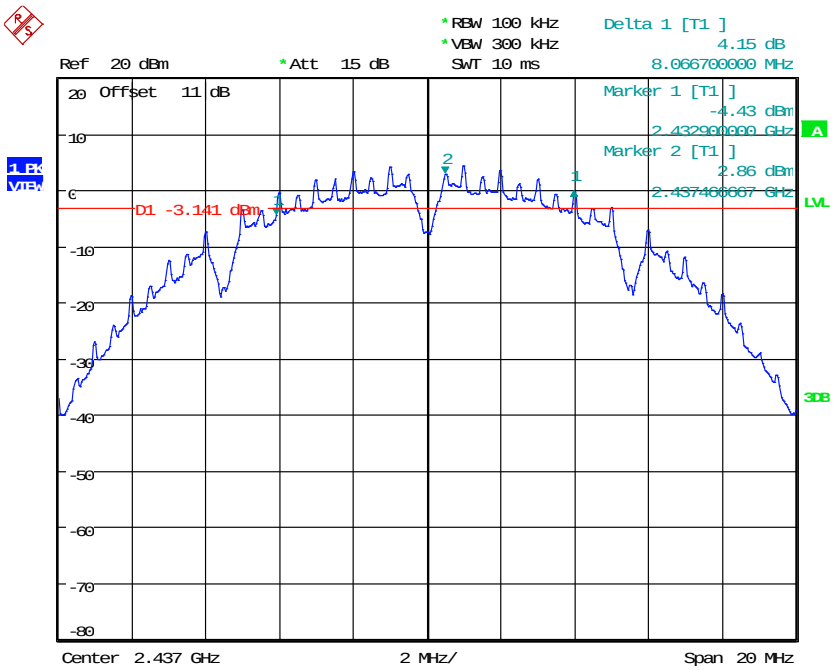
The analyzer ResBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK reading was taken, two markers were set 6 dB below the maximum level on the right and the left side of the emission.
The 6 dB bandwidth is the frequency difference between the two markers.

WLAN
ANT 1



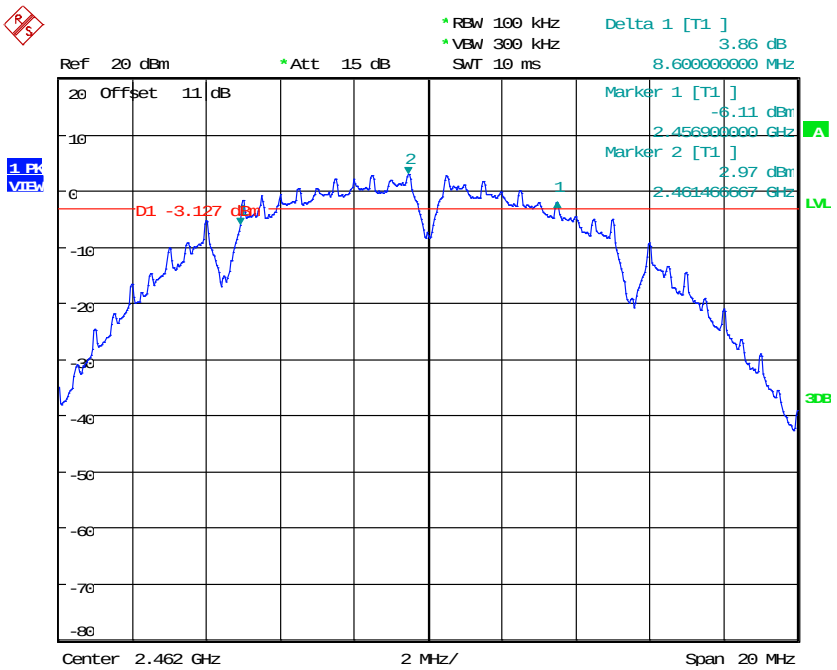

6DB BANDWIDTH 802.11B CH01
Date: 13.NOV.2019 17:27:01

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11B CH06

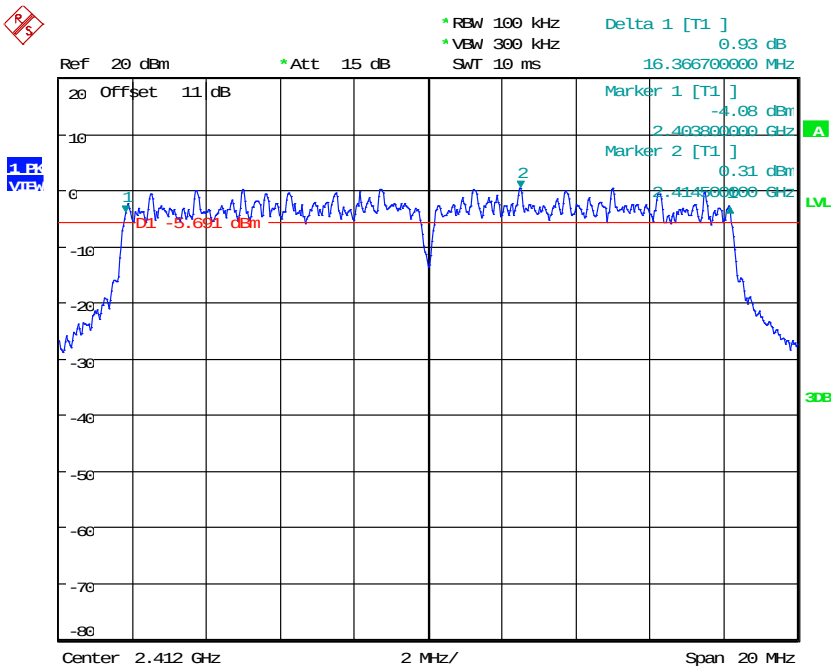
Date: 13.NOV.2019 17:27:56




6DB BANDWIDTH 802.11B CH11

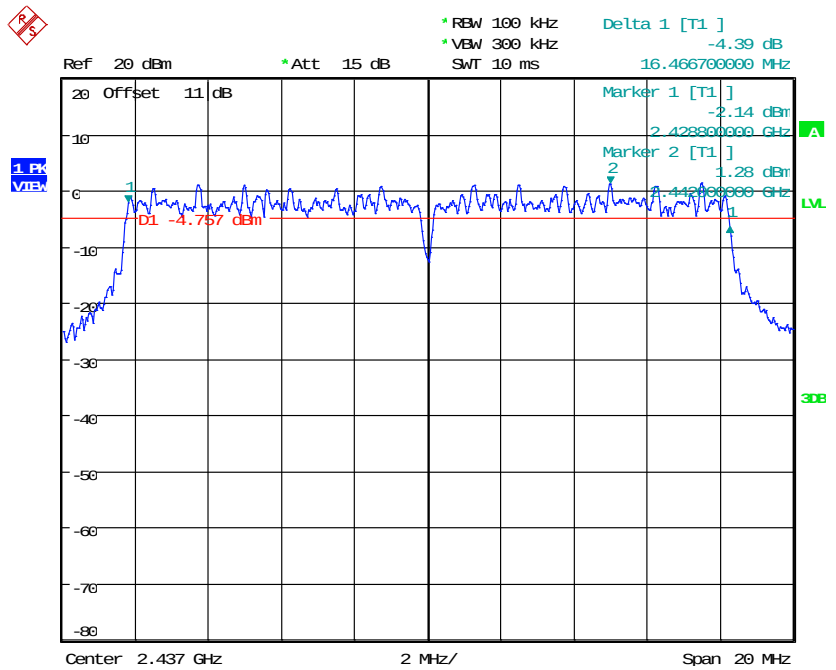
Date: 13.NOV.2019 17:30:08

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11G CH01

Date: 13.NOV.2019 17:32:09




6DB BANDWIDTH 802.11G CH06

Date: 13.NOV.2019 17:34:16

Registration number: W6M21903-18922-C-1
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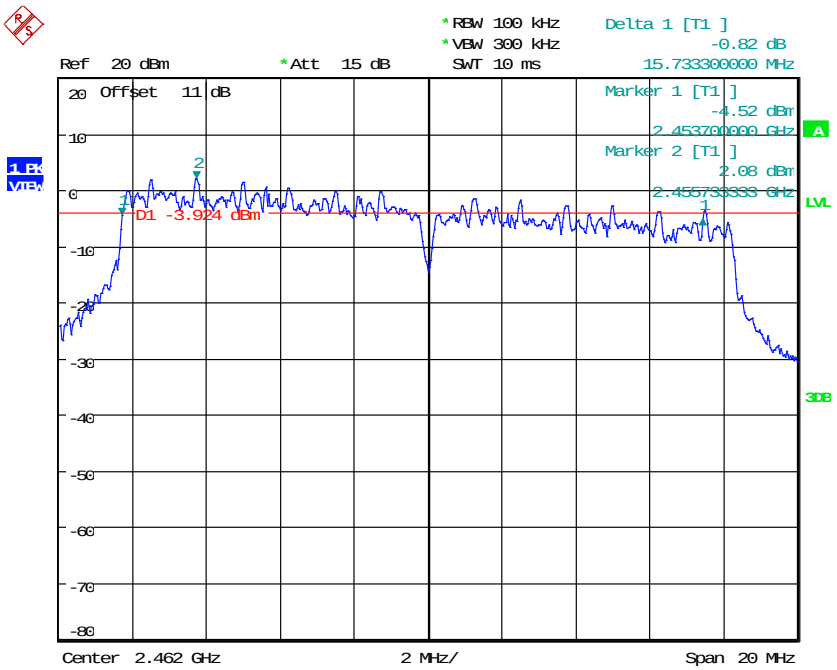
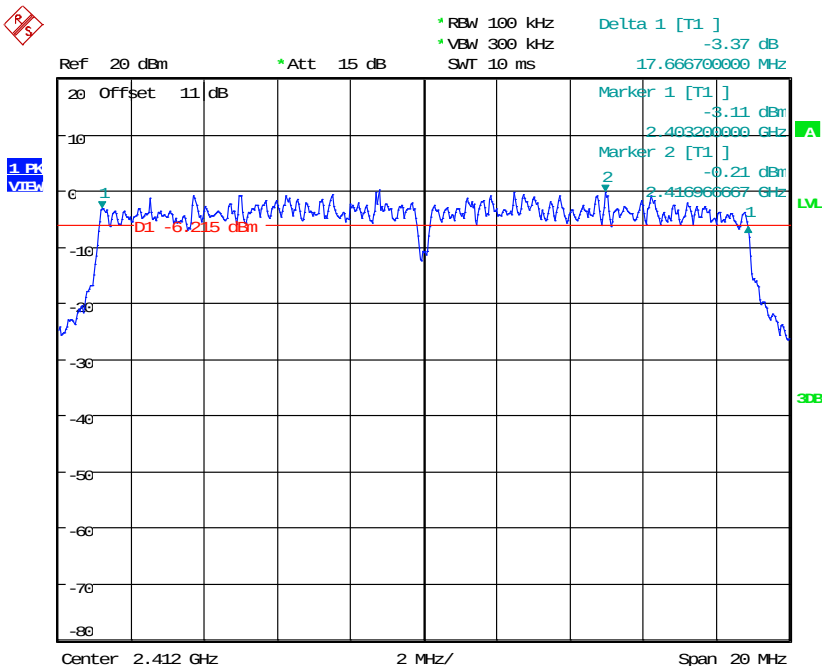



6DB BANDWIDTH 802.11G CH11

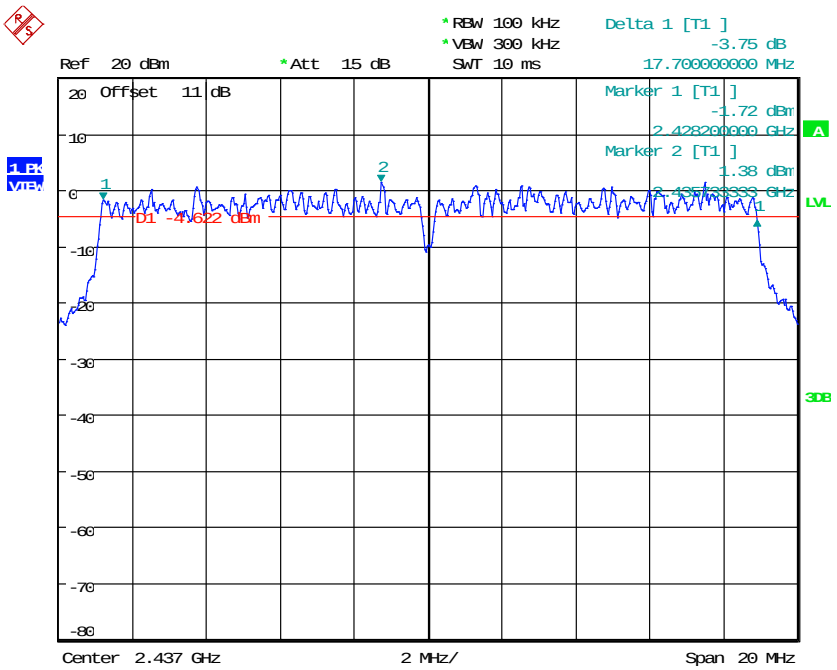
Date: 13.NOV.2019 17:35:34




6DB BANDWIDTH 802.11N 20MHZ CH1

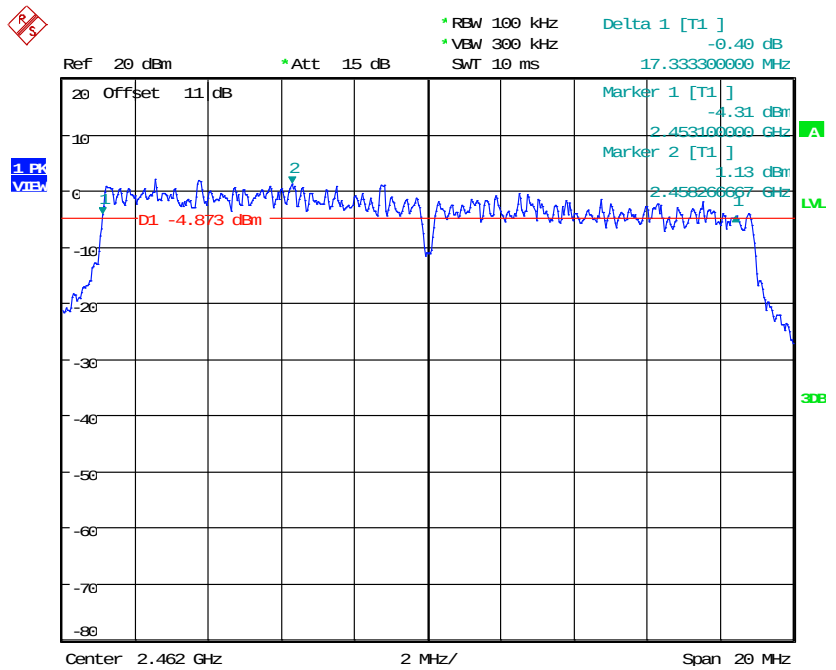
Date: 13.NOV.2019 17:38:50

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 20MHZ CH6

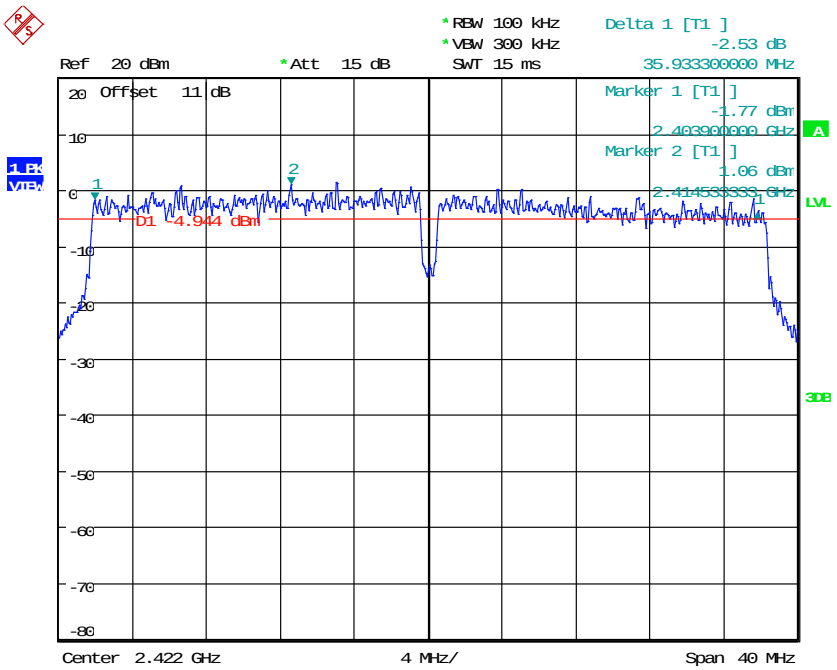
Date: 13.NOV.2019 17:39:46




6DB BANDWIDTH 802.11N 20MHZ CH11

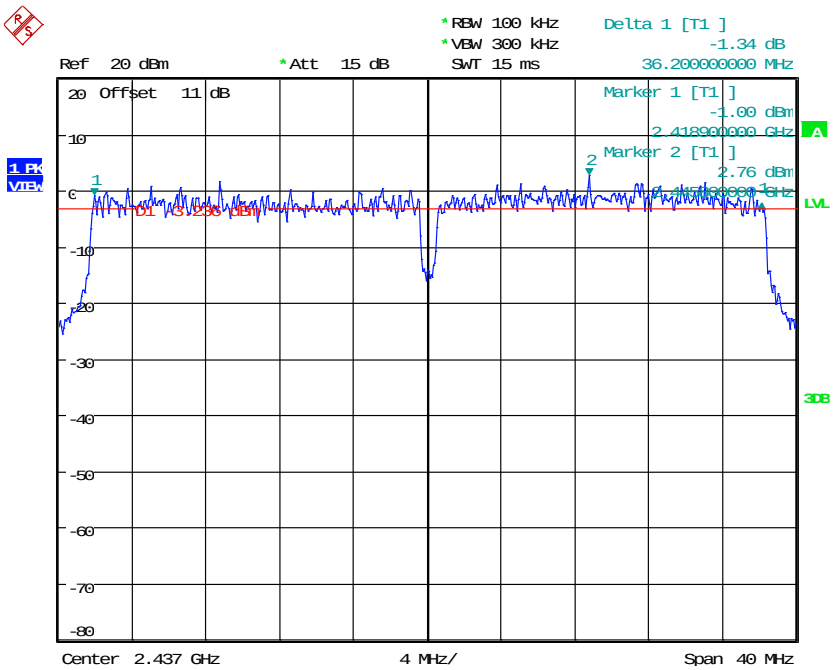
Date: 13.NOV.2019 17:40:47

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHZ CH1

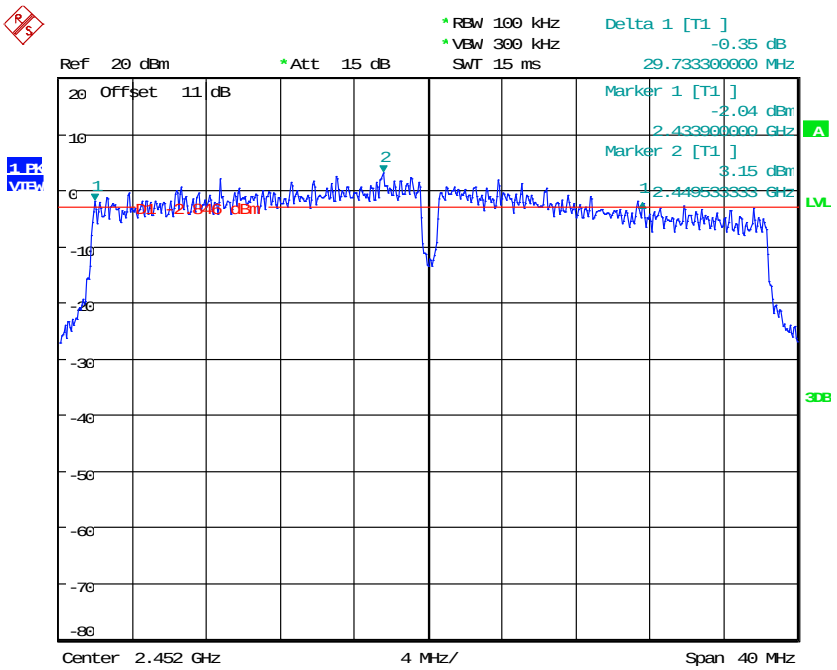
Date: 13.NOV.2019 17:42:56




6DB BANDWIDTH 802.11N 40MHZ CH4

Date: 13.NOV.2019 17:44:55

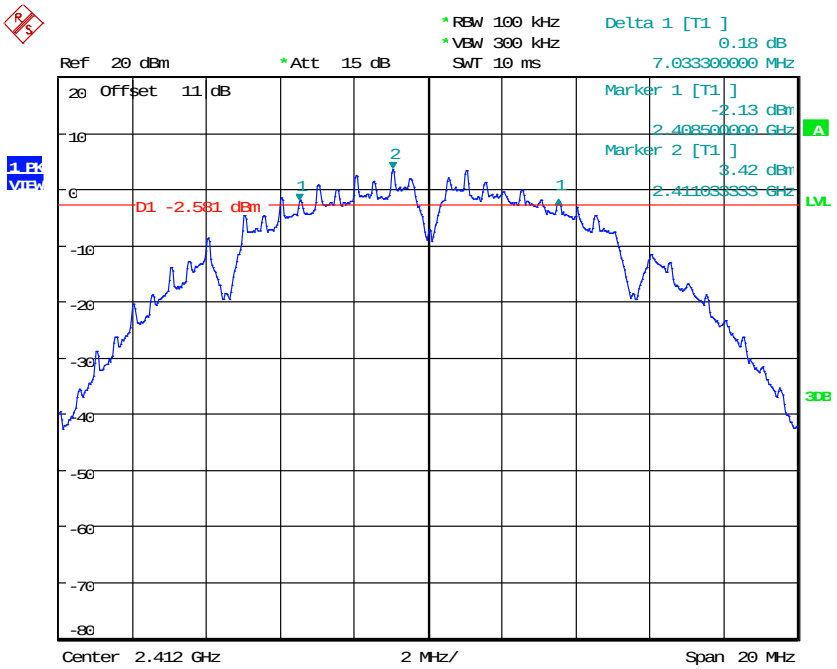
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHZ CH7

Date: 13.NOV.2019 17:46:56

ANT 2




6DB BANDWIDTH 802.11B CH01

Date: 14.NOV.2019 15:37:40

Registration number: W6M21903-18922-C-1
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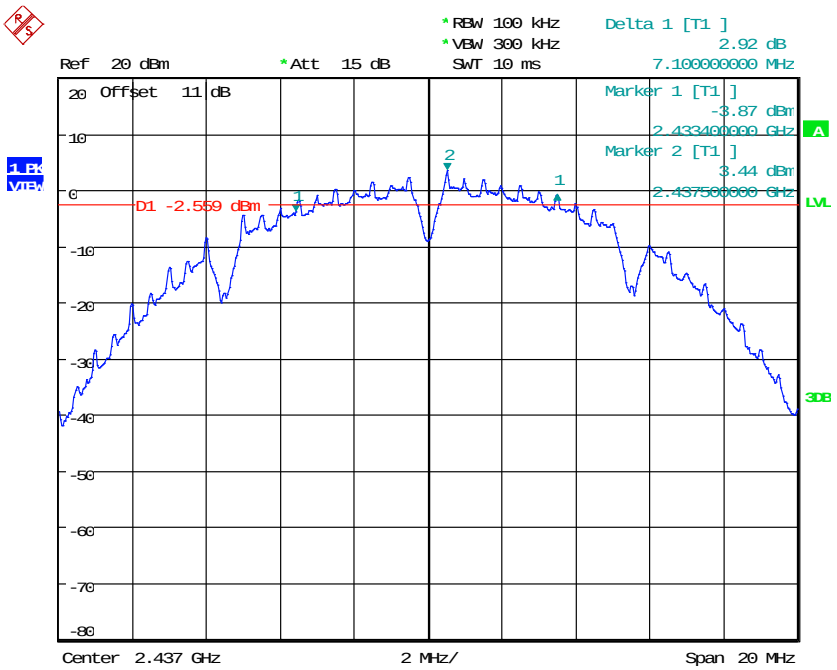
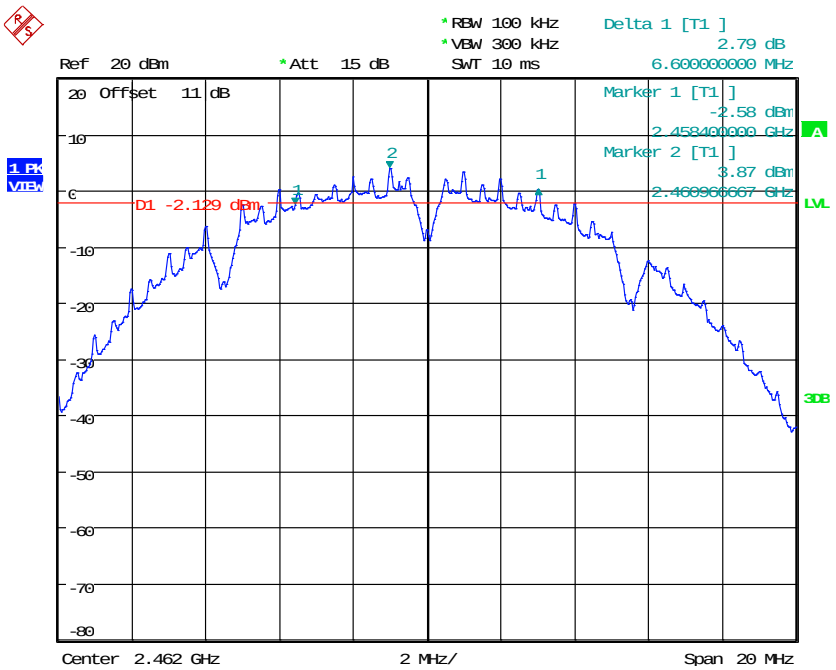



6DB BANDWIDTH 802.11B CH06

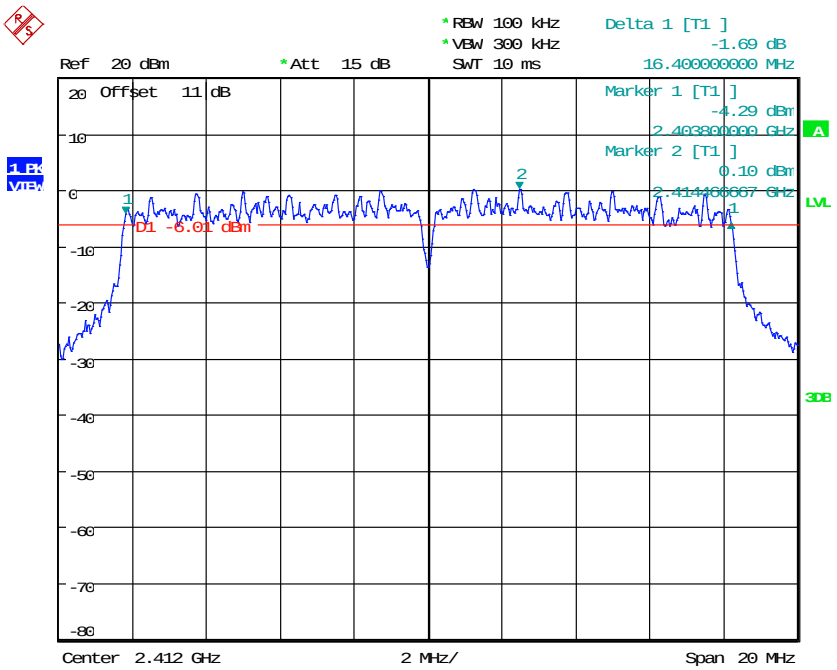
Date: 14.NOV.2019 14:05:56




6DB BANDWIDTH 802.11B CH11

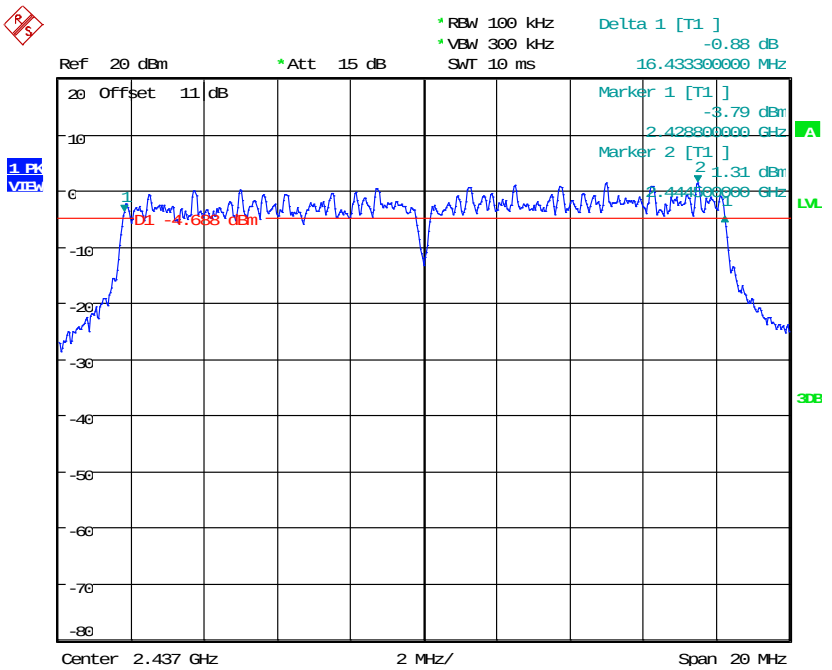
Date: 14.NOV.2019 14:08:50

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11G CH01

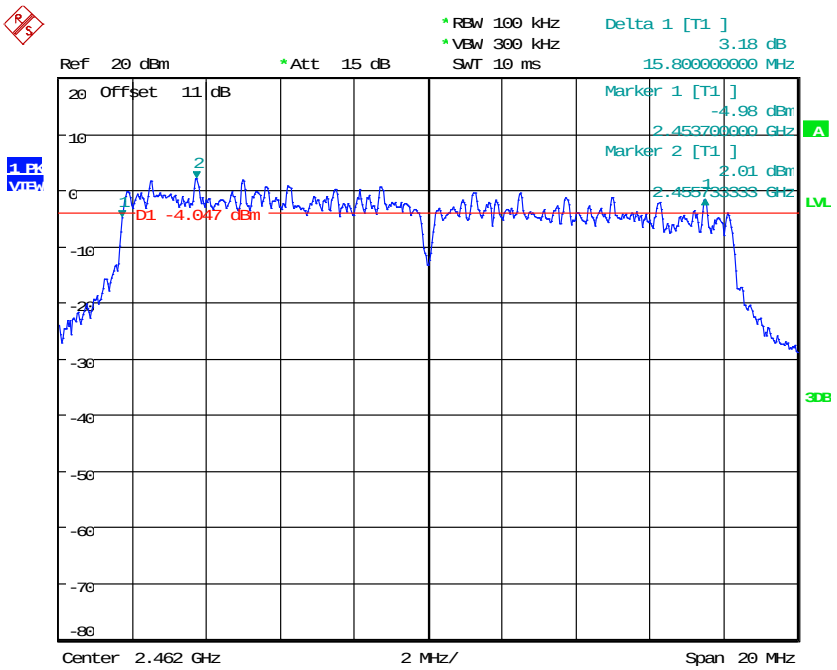
Date: 14.NOV.2019 14:10:41




6DB BANDWIDTH 802.11G CH06

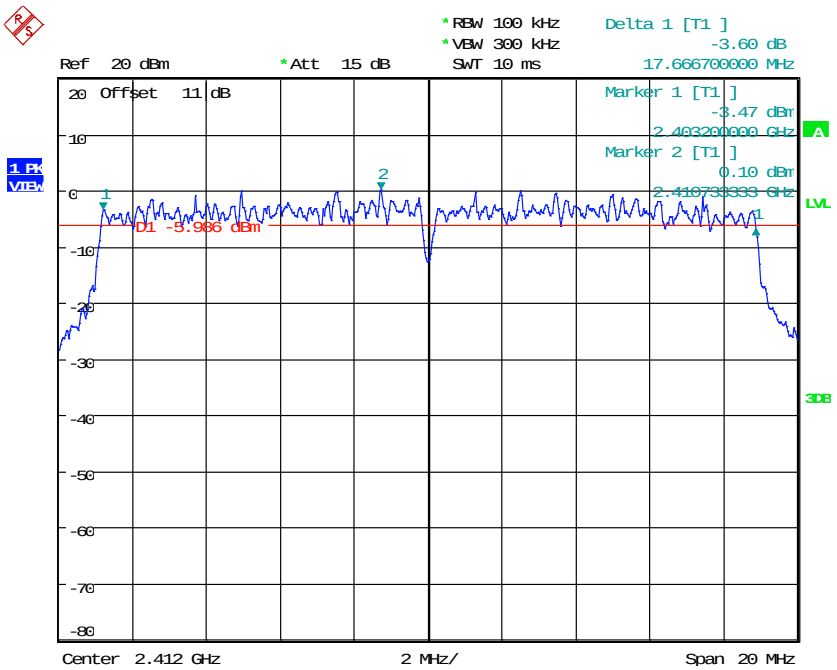
Date: 14.NOV.2019 14:11:28

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11G CH11

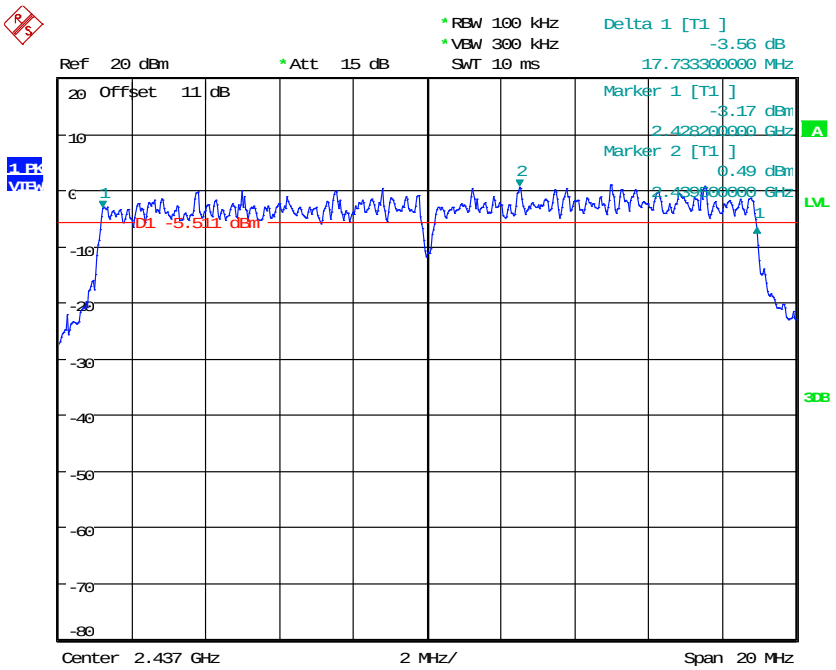
Date: 14.NOV.2019 14:12:16




6DB BANDWIDTH 802.11N 20MHZ CH1

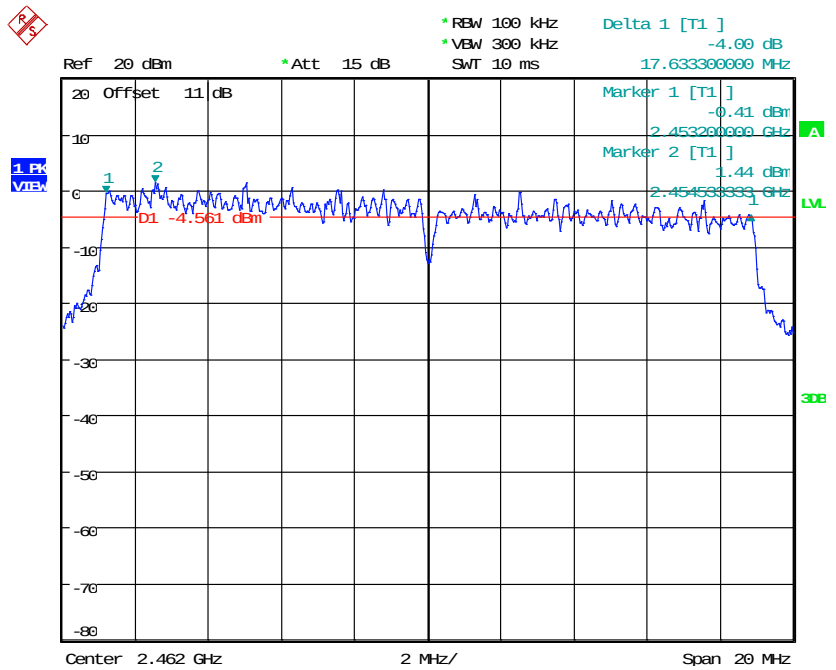
Date: 14.NOV.2019 14:20:23

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 20MHZ CH6

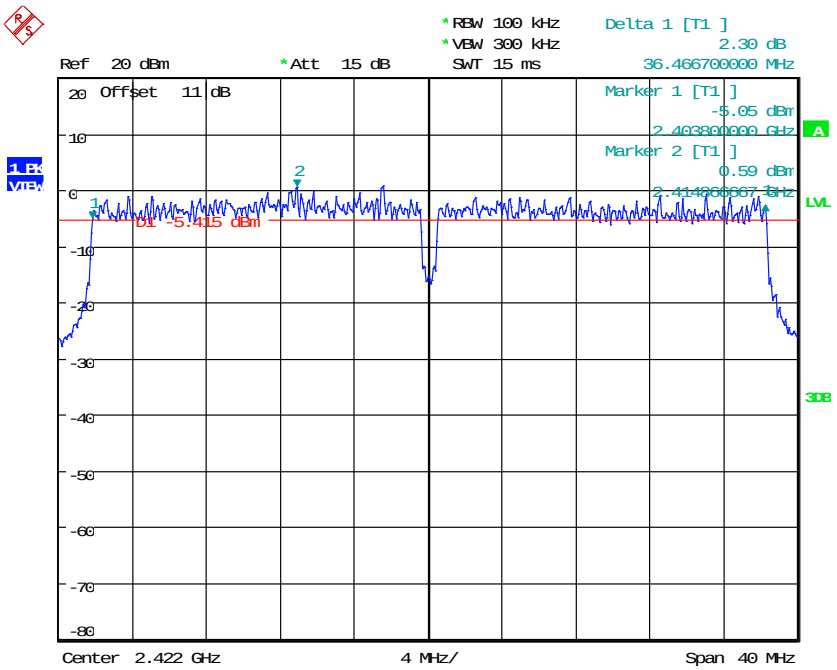
Date: 14.NOV.2019 14:21:35




6DB BANDWIDTH 802.11N 20MHZ CH11

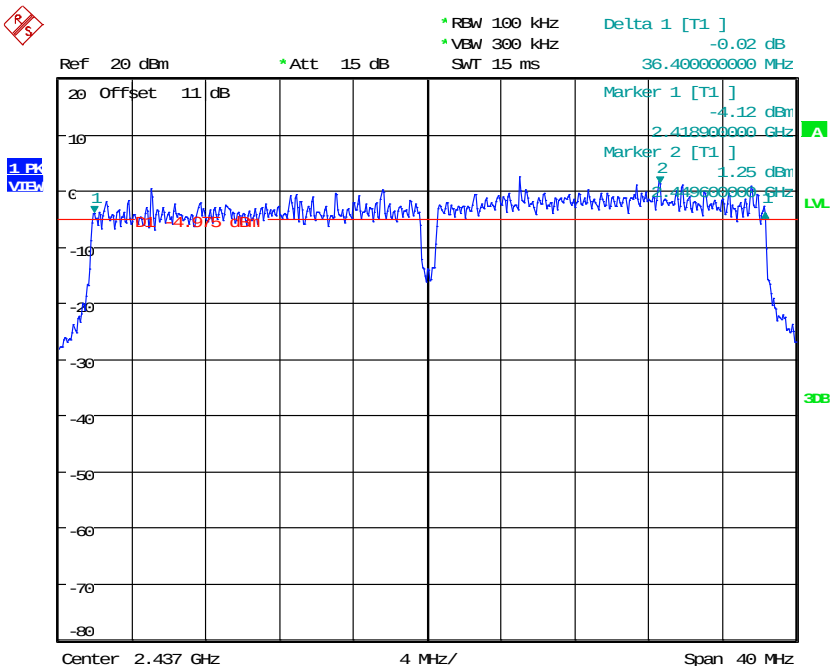
Date: 14.NOV.2019 14:22:44

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHZ CH1

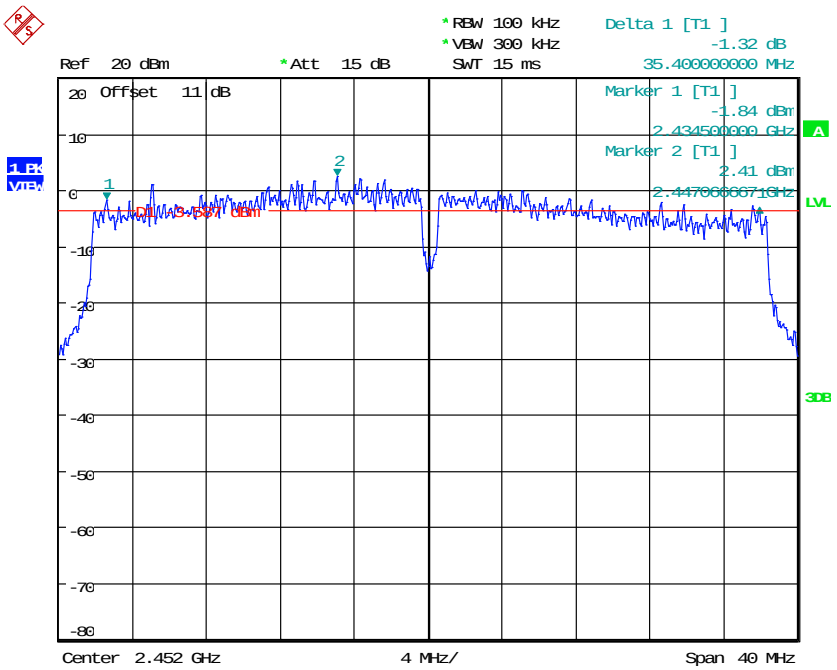
Date: 14.NOV.2019 14:23:47




6DB BANDWIDTH 802.11N 40MHZ CH4

Date: 14.NOV.2019 14:24:45

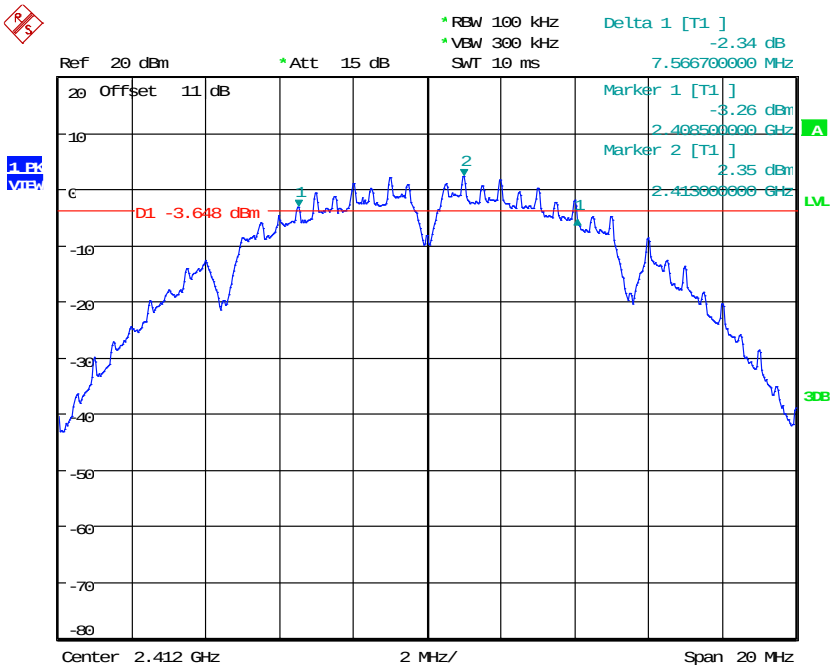
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHZ CH7

Date: 14.NOV.2019 14:26:52

ANT 3




6DB BANDWIDTH 802.11B CH01

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Registration number: W6M21903-18922-C-1
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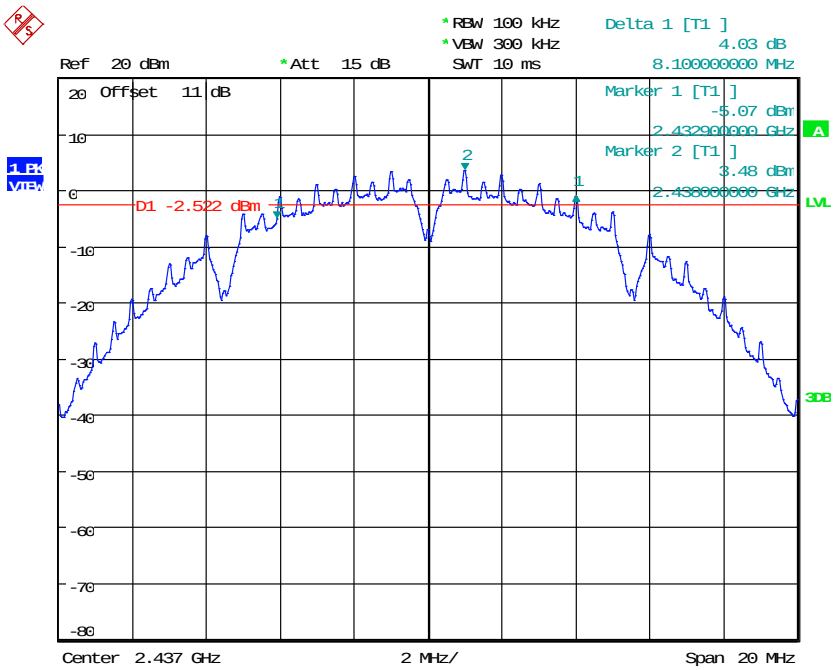


6DB BANDWIDTH 802.11B CH06

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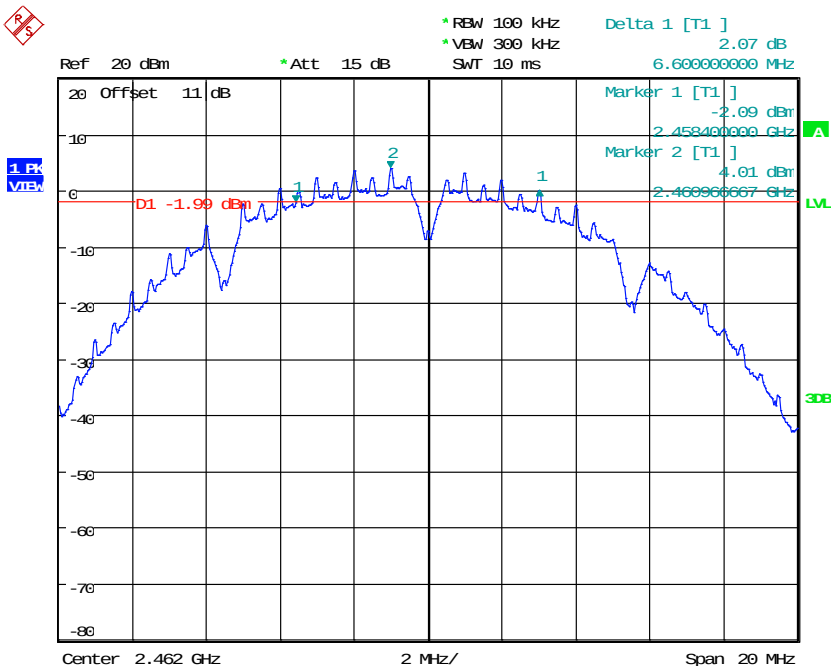


6DB BANDWIDTH 802.11B CH11

Date: 14.NOV.2019 16:00:12

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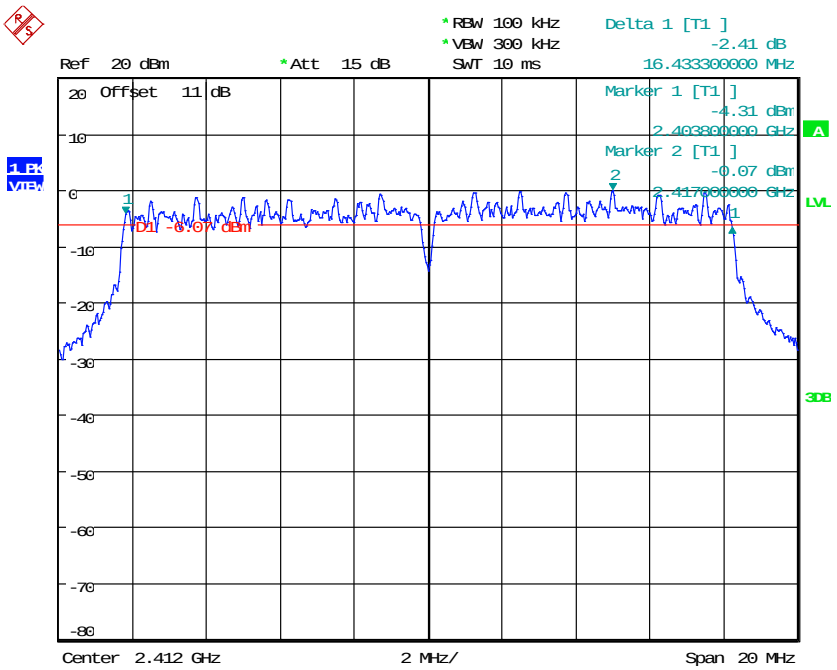


6DB BANDWIDTH 802.11G CH01

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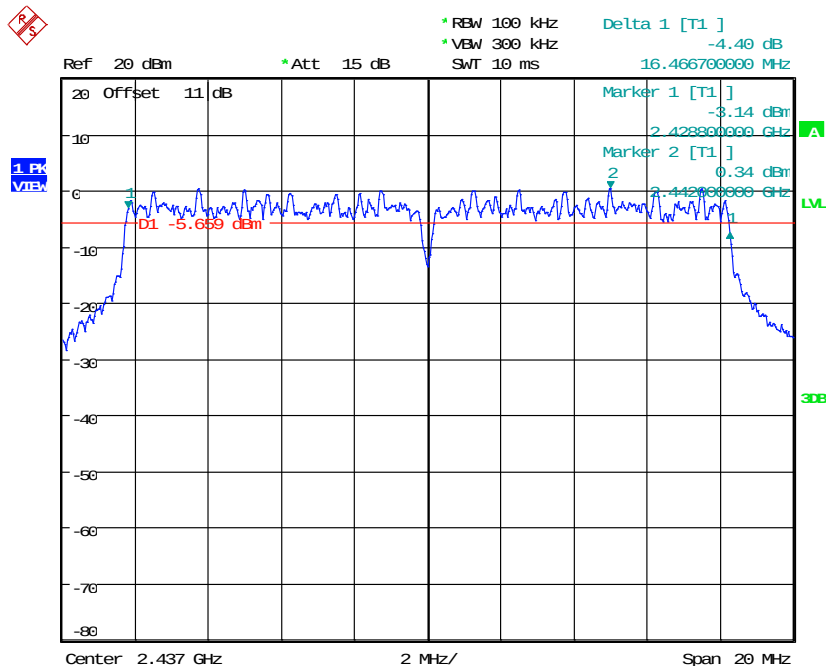


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Date: 14.NOV.2019 16:03:06

Registration number: W6M21903-18922-C-1
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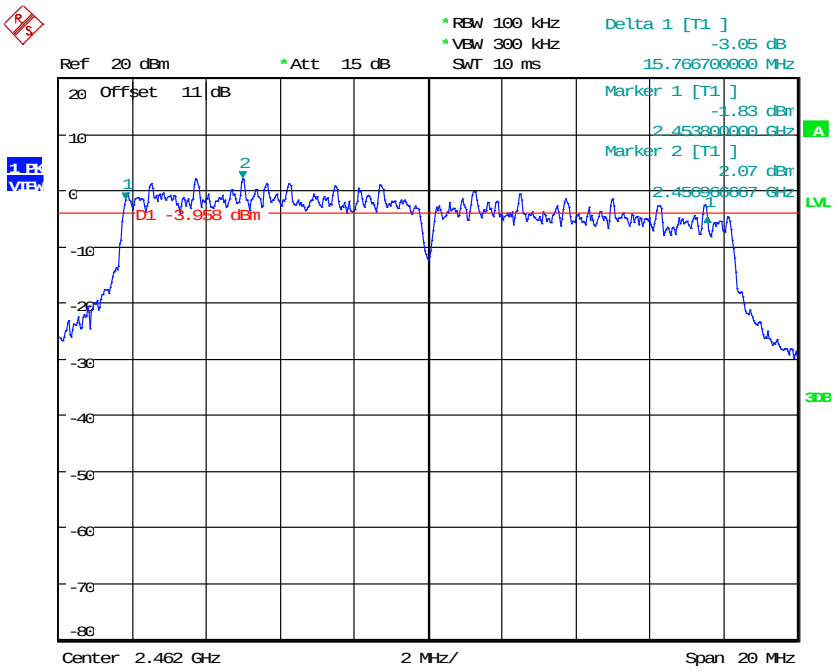


6DB BANDWIDTH 802.11G CH11

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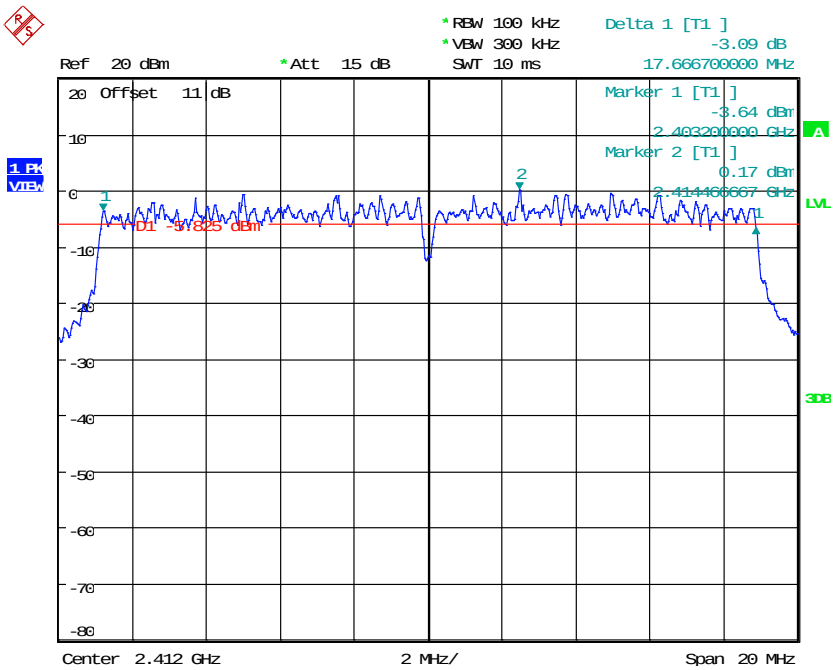
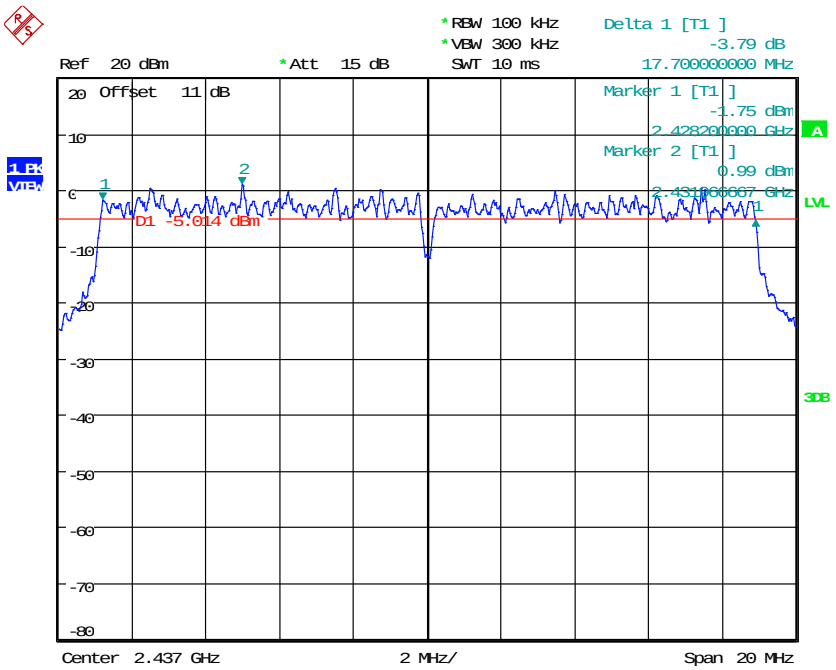



6DB BANDWIDTH 802.11N 20MHZ CH1

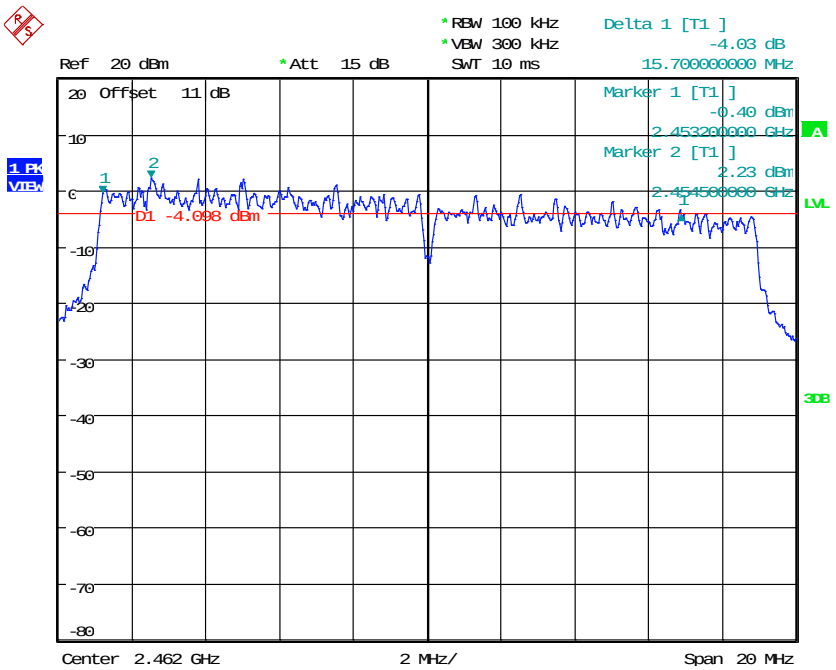
Date: 14.NOV.2019 16:20:51

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 20MHZ CH6

Date: 14.NOV.2019 16:22:07




6DB BANDWIDTH 802.11N 20MHZ CH11

Date: 14.NOV.2019 16:23:06

Registration number: W6M21903-18922-C-1
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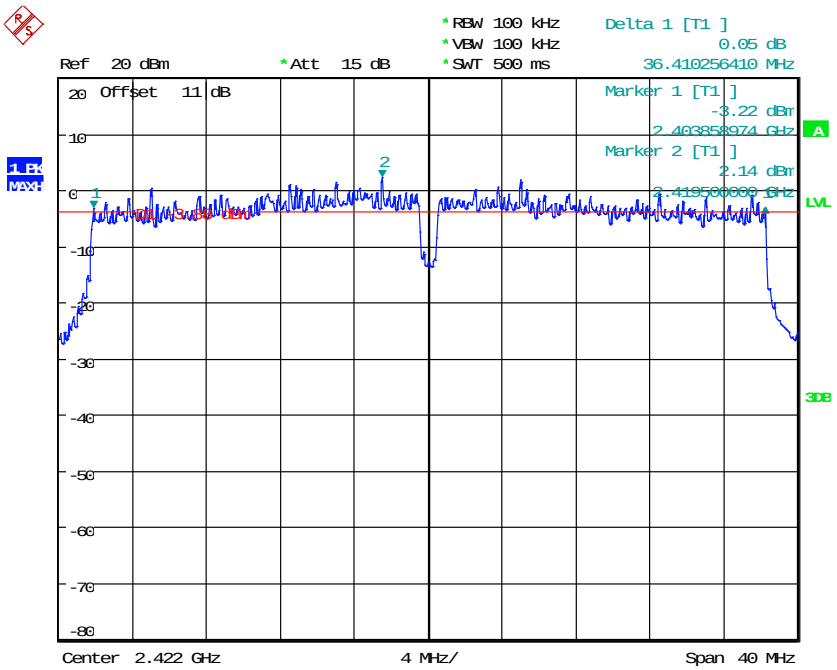
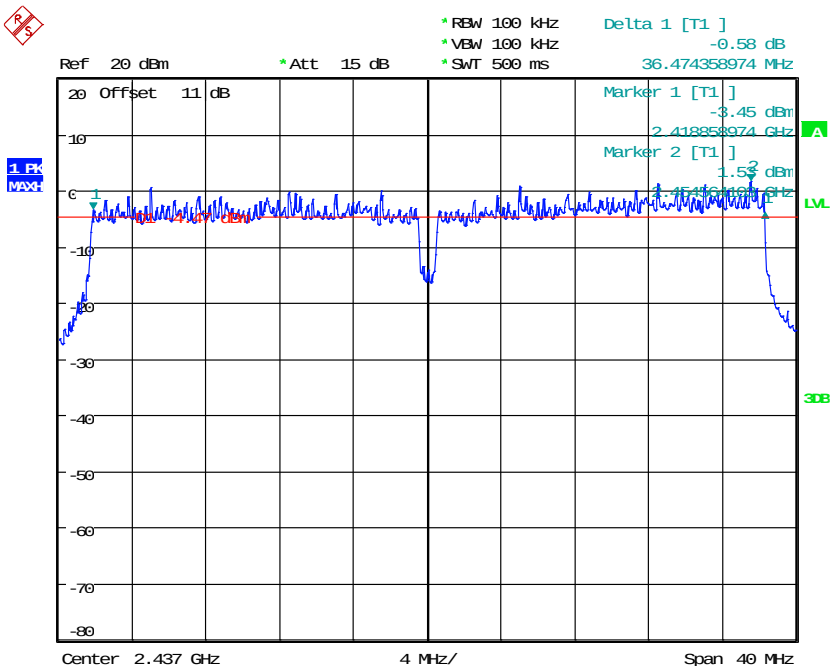



6DB BANDWIDTH 802.11N 40MHz CH1

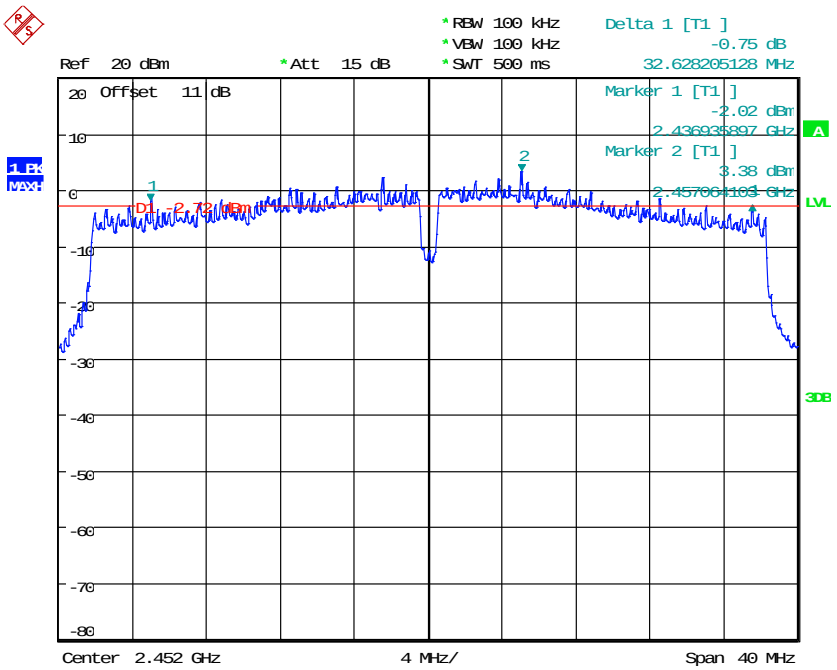
Date: 24.DEC.2019 20:14:43




6DB BANDWIDTH 802.11N 40MHz CH4

Date: 24.DEC.2019 20:16:13

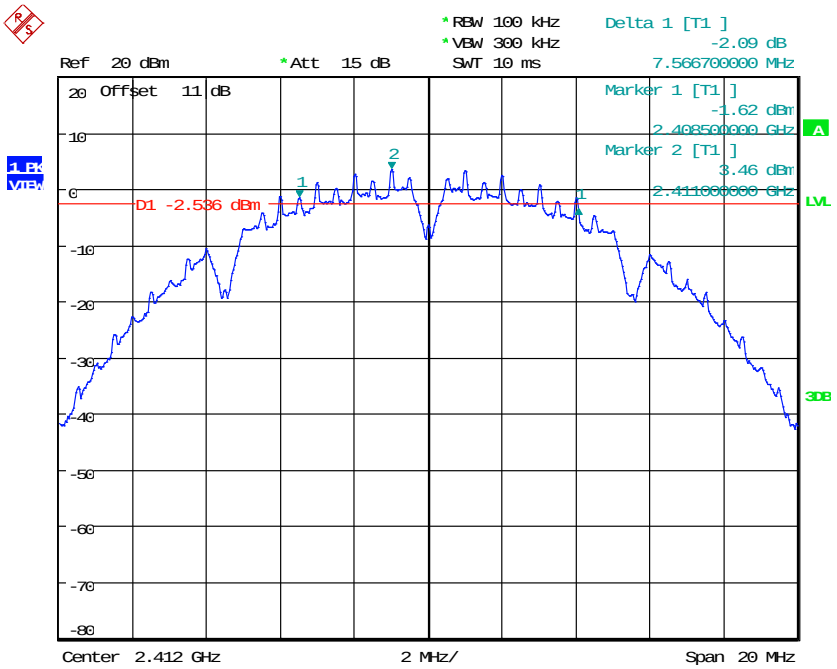
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHz CH7

Date: 24.DEC.2019 20:23:36

ANT 4




6DB BANDWIDTH 802.11B CH01

Date: 14.NOV.2019 17:33:31

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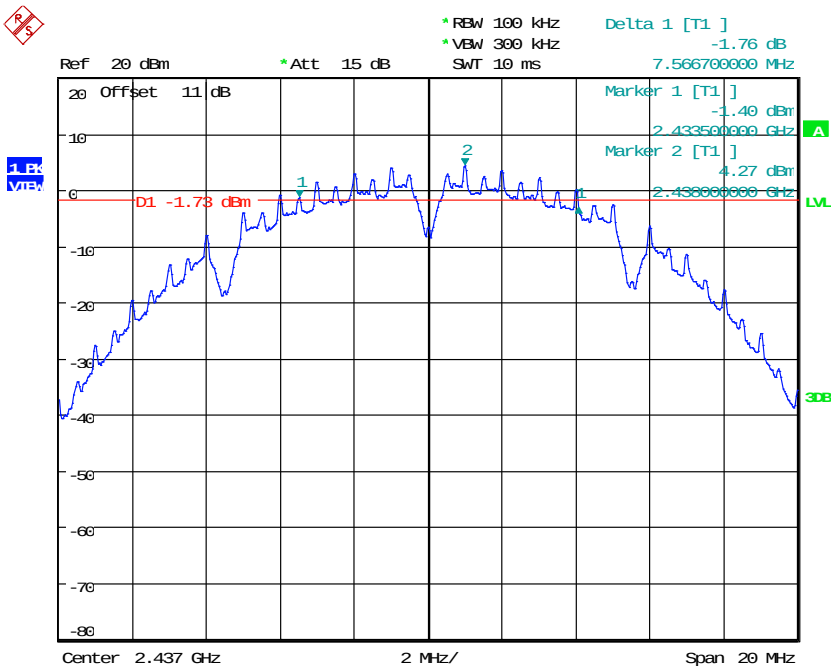
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11B CH06

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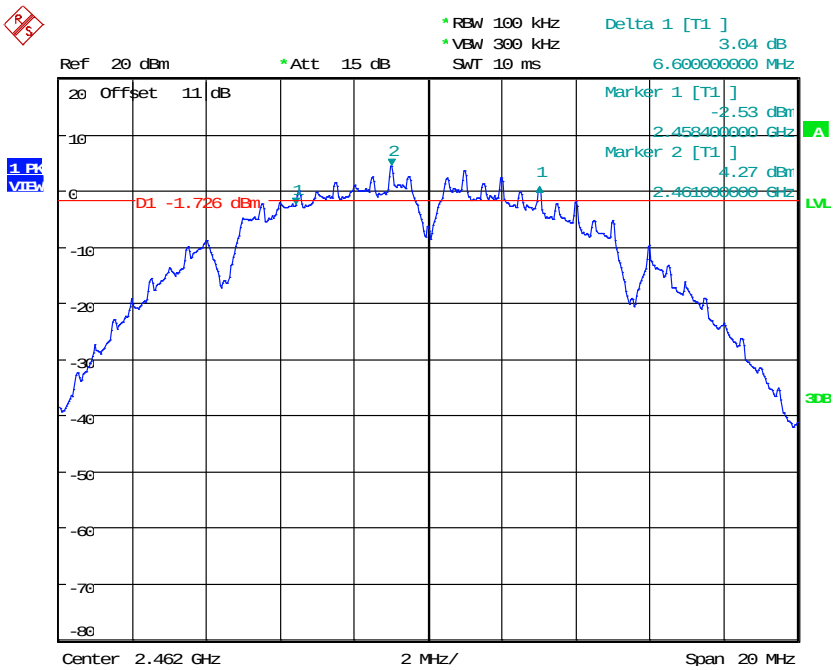


6DB BANDWIDTH 802.11B CH11

Date: 14.NOV.2019 17:35:10

Registration number: W6M21903-18922-C-1
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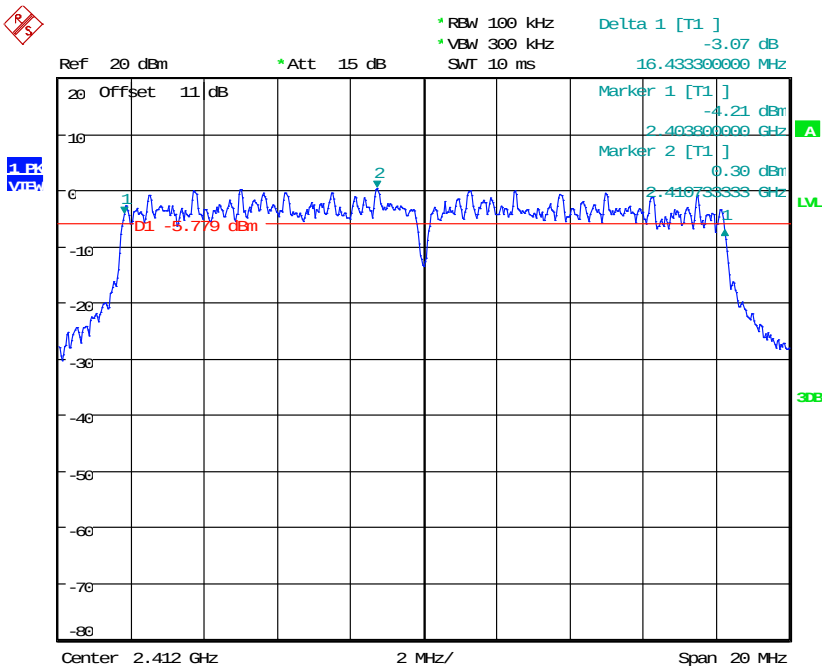
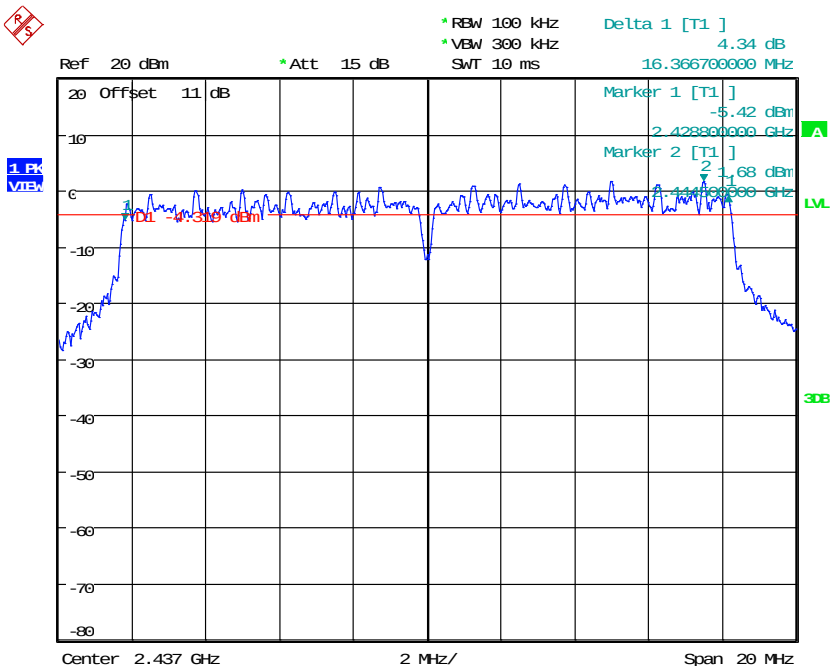



6DB BANDWIDTH 802.11G CH01

Date: 14.NOV.2019 17:36:00




6DB BANDWIDTH 802.11G CH06

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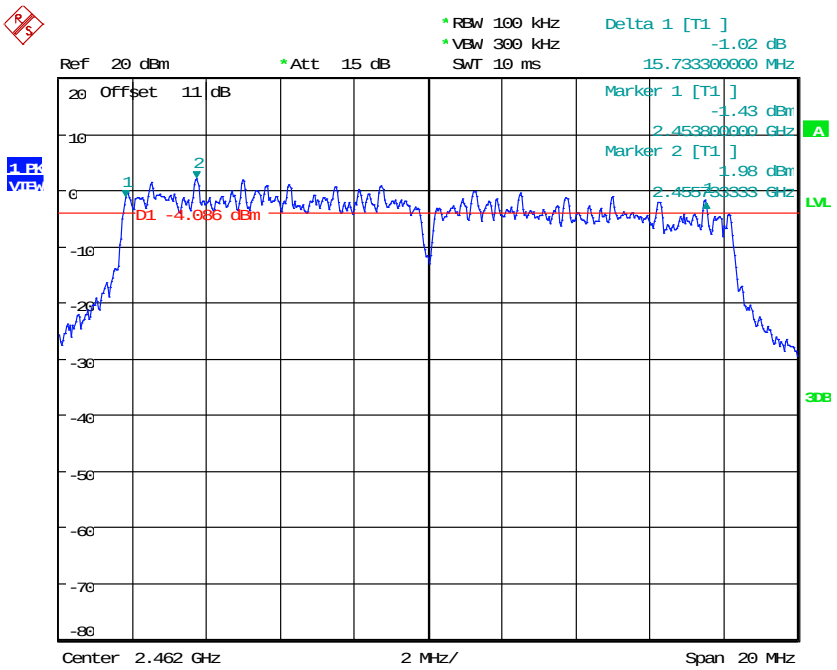
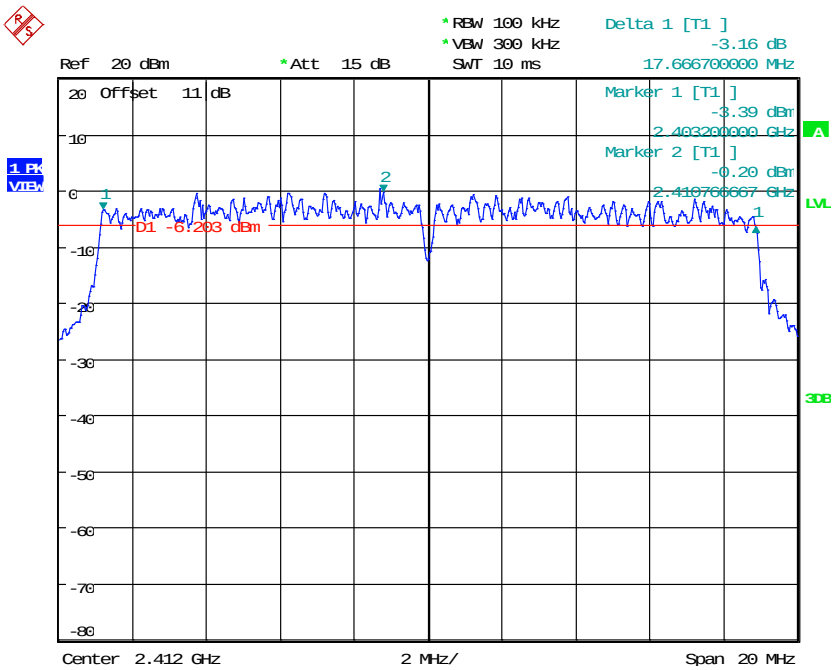



6DB BANDWIDTH 802.11G CH11

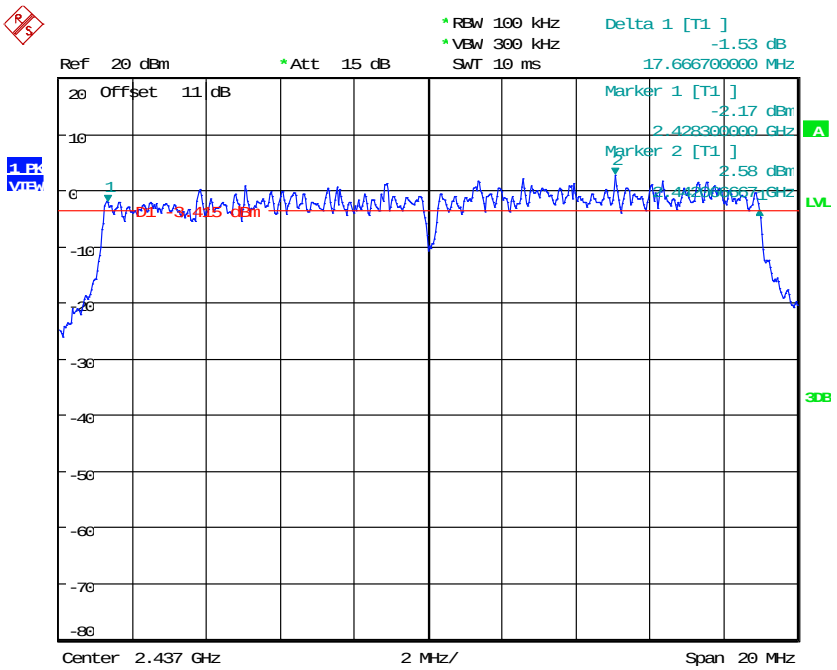
Date: 14.NOV.2019 17:37:33




6DB BANDWIDTH 802.11N 20MHZ CH1

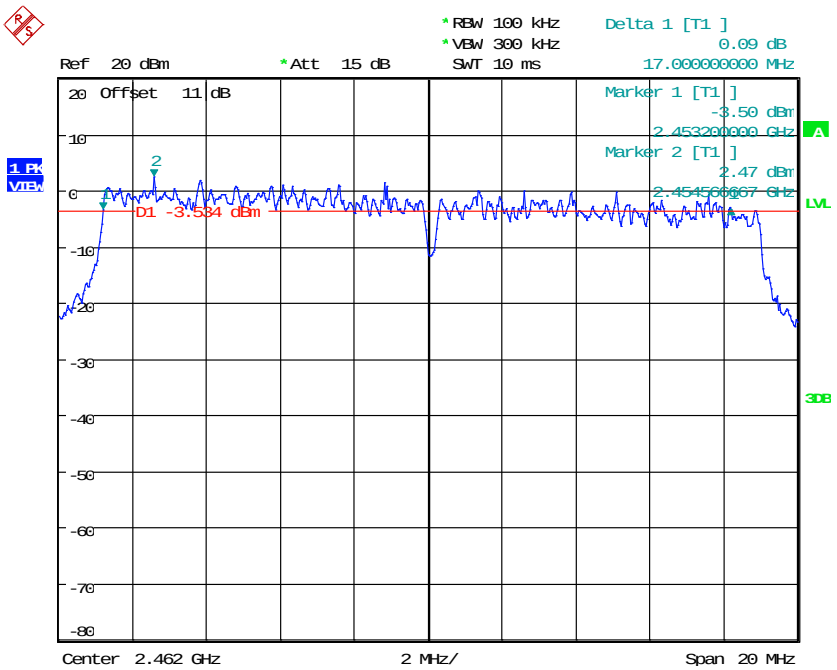
Date: 14.NOV.2019 17:40:15

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 20MHZ CH6

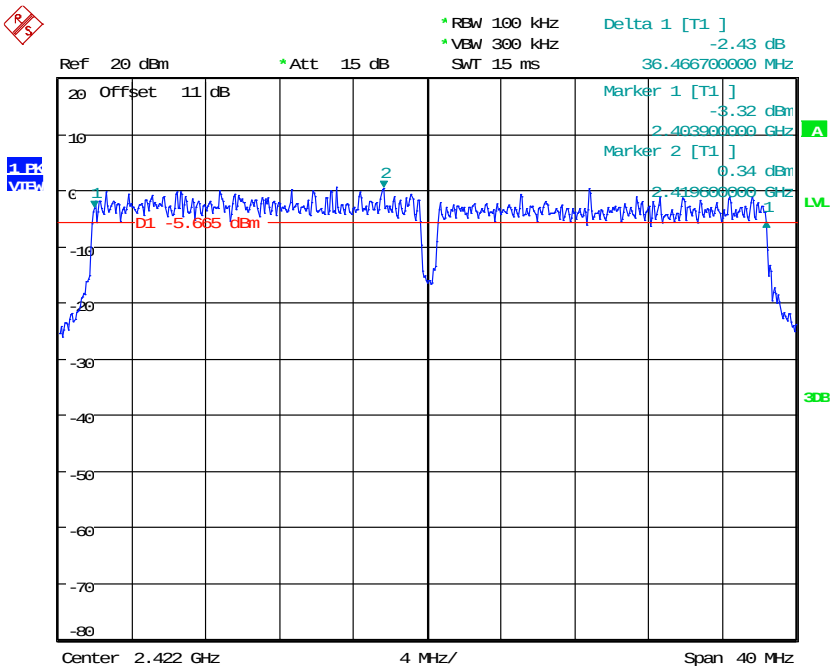
Date: 14.NOV.2019 19:37:55




6DB BANDWIDTH 802.11N 20MHZ CH11

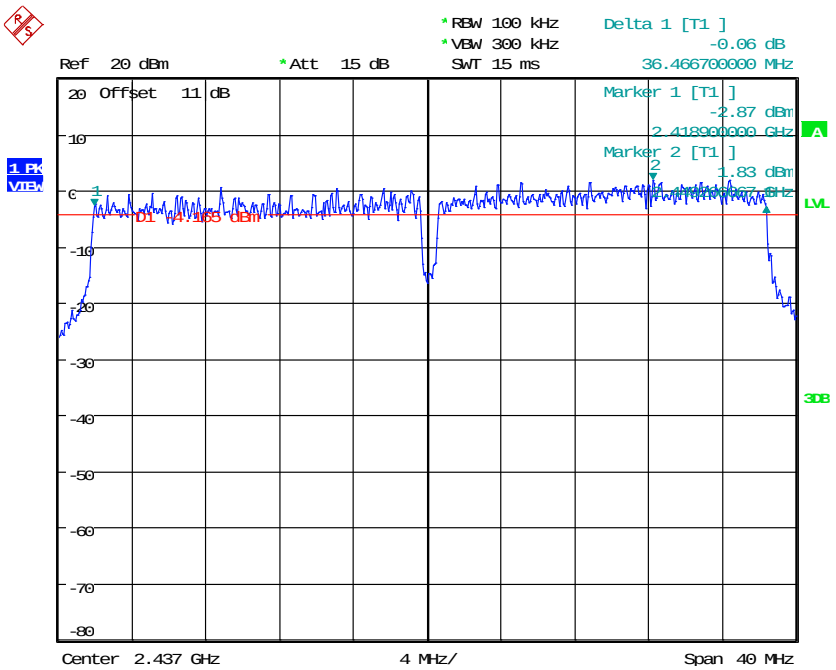
Date: 14.NOV.2019 19:38:55

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHZ CH1

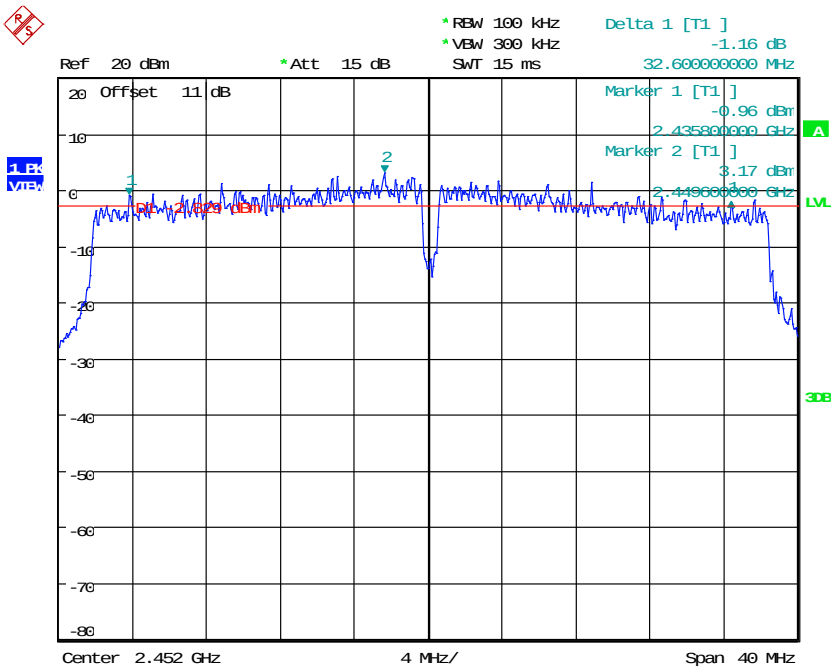
Date: 14.NOV.2019 19:39:47




6DB BANDWIDTH 802.11N 40MHZ CH4

Date: 14.NOV.2019 19:42:06

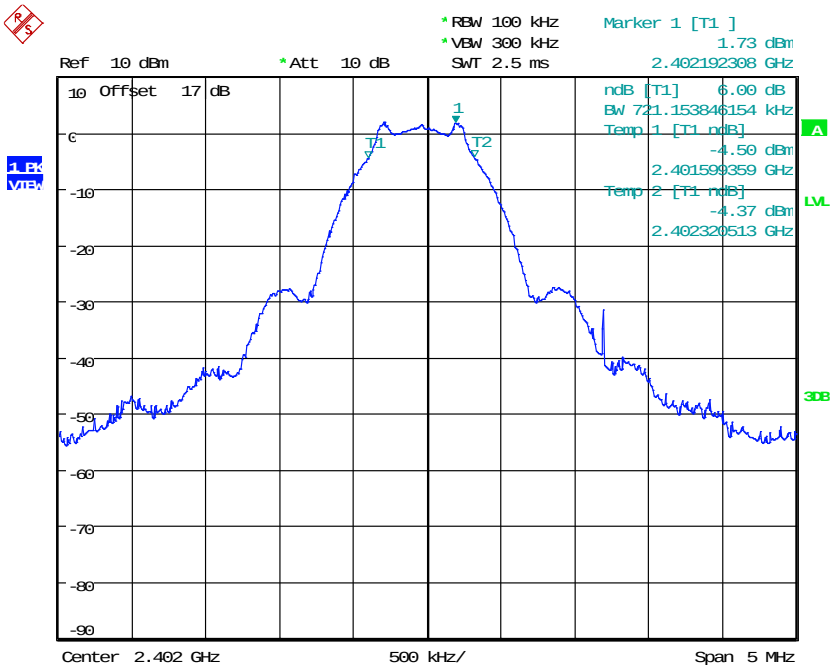
Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH 802.11N 40MHZ CH7

Date: 14.NOV.2019 19:43:36

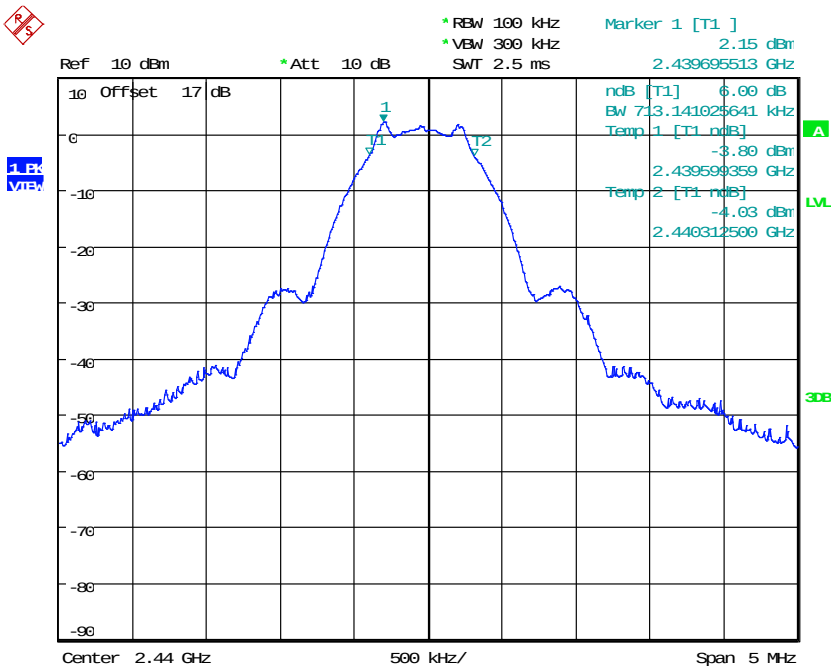
BLE




6DB BANDWIDTH BT4.0 CH00

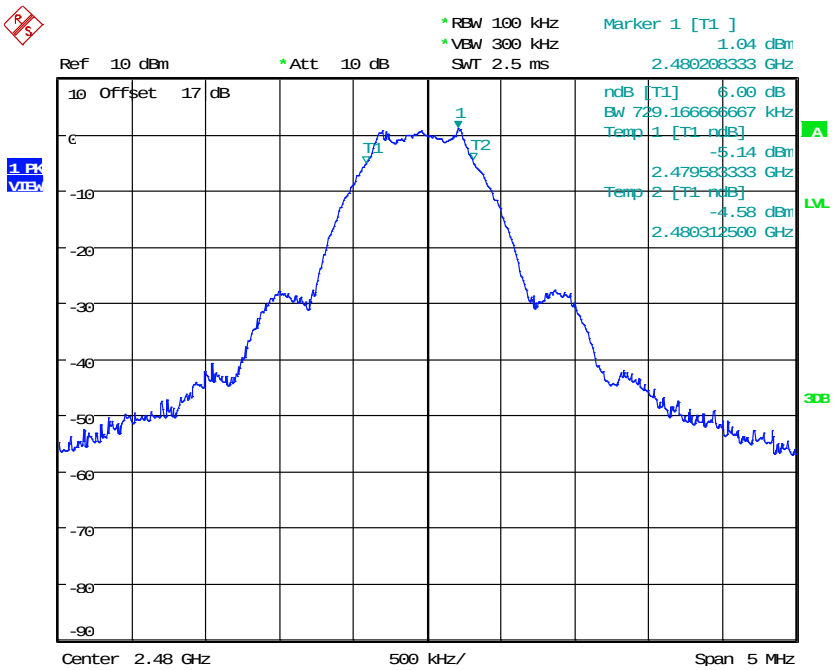
Date: 16.NOV.2019 22:09:26

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




6DB BANDWIDTH BT4.0 CH19

Date: 16.NOV.2019 22:19:28




6DB BANDWIDTH BT4.0 CH39

Date: 16.NOV.2019 22:23:08

**Limits:**

| Frequency Range MHz | **Limits** |
|---|---|
| 902-928 | min 500 kHz |
| 2400-2483.5 | min 500 kHz |
| 5725-5850 | min 500 kHz |

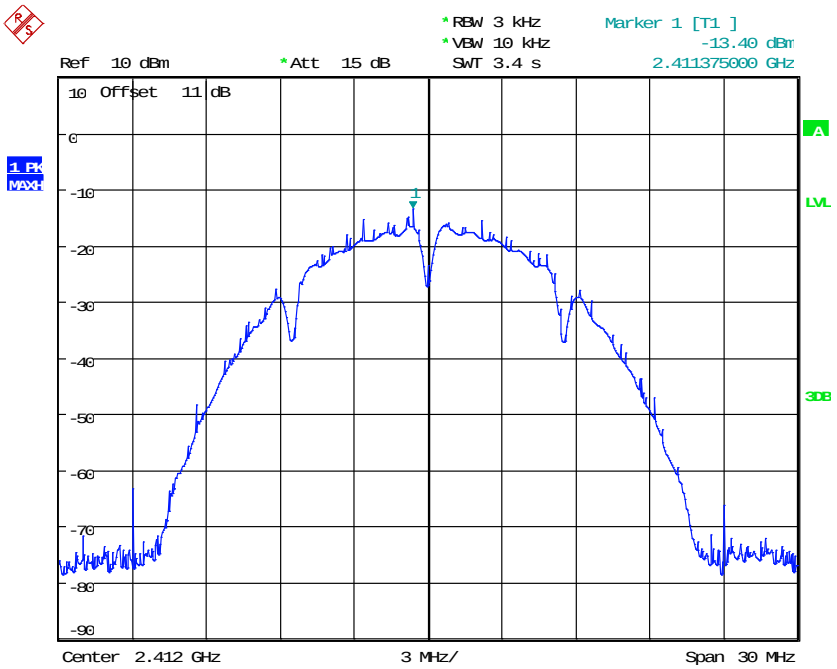
Test equipment used: ETSTW-RE 055, ETSTW-RE 050.

## 3.8 Peak Power Spectral Density

Peak Power Spectral density is a measured at low, middle and high channel.

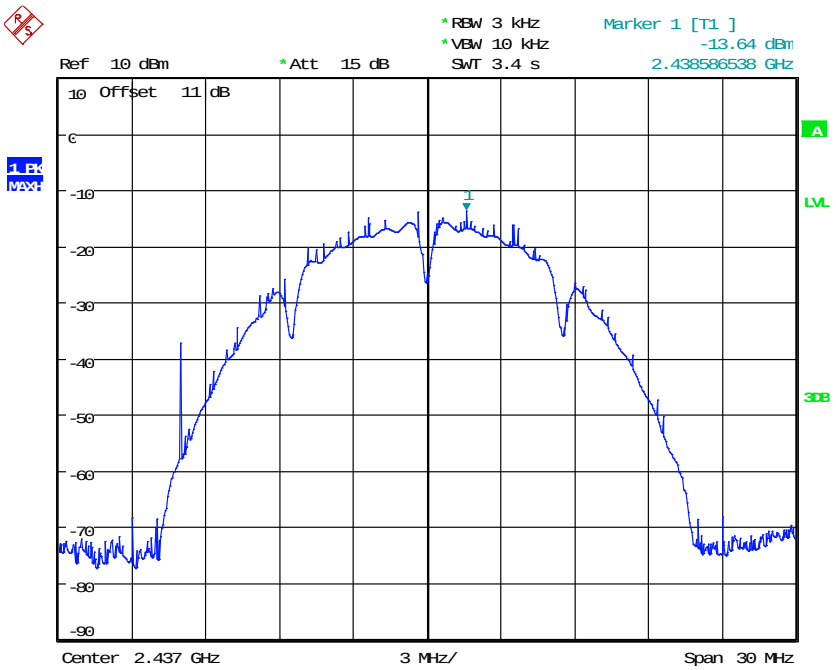
The peak output power is measured with a measurement bandwidth of 10 MHz and displayed on diagram together with Peak Power Spectral Density result which was measured with a bandwidth of 3 kHz, appreciate frequency span and sweep time.

WLAN
ANT 1

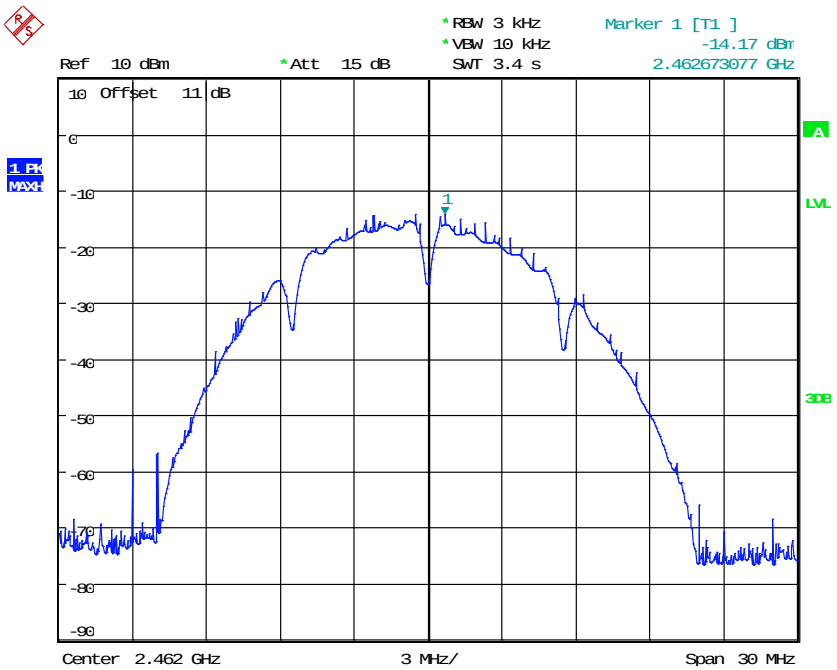



POWER DENSITY 802.11B CH01
Date: 13.NOV.2019 17:27:09

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11B CH06
Date: 13.NOV.2019 17:28:04




POWER DENSITY 802.11B CH11
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Registration number: W6M21903-18922-C-1
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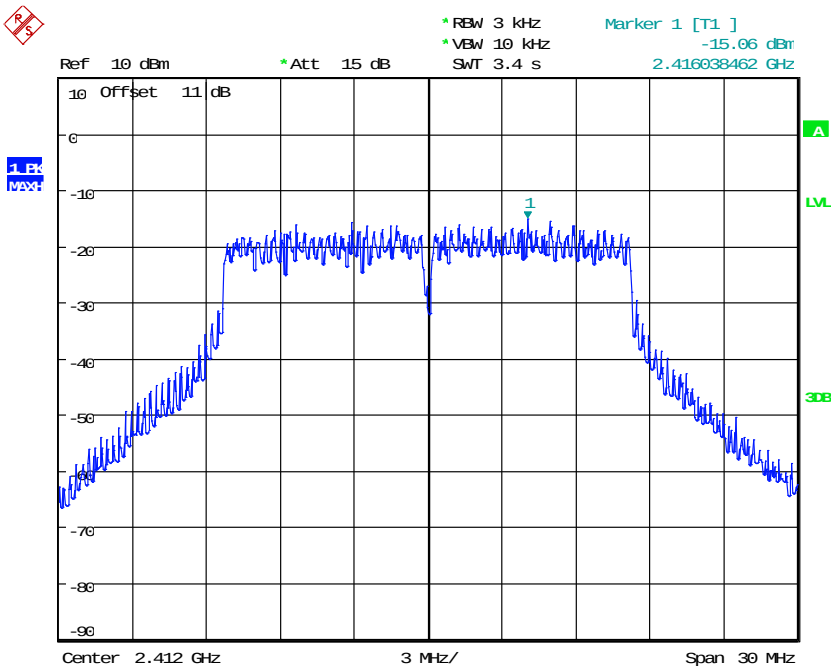
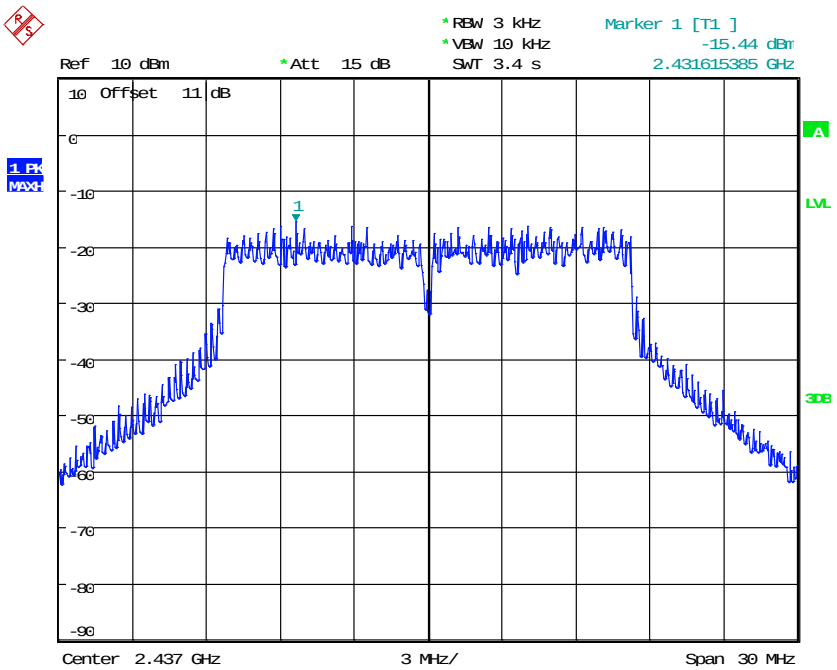



POWER DENSITY 802.11G CH01

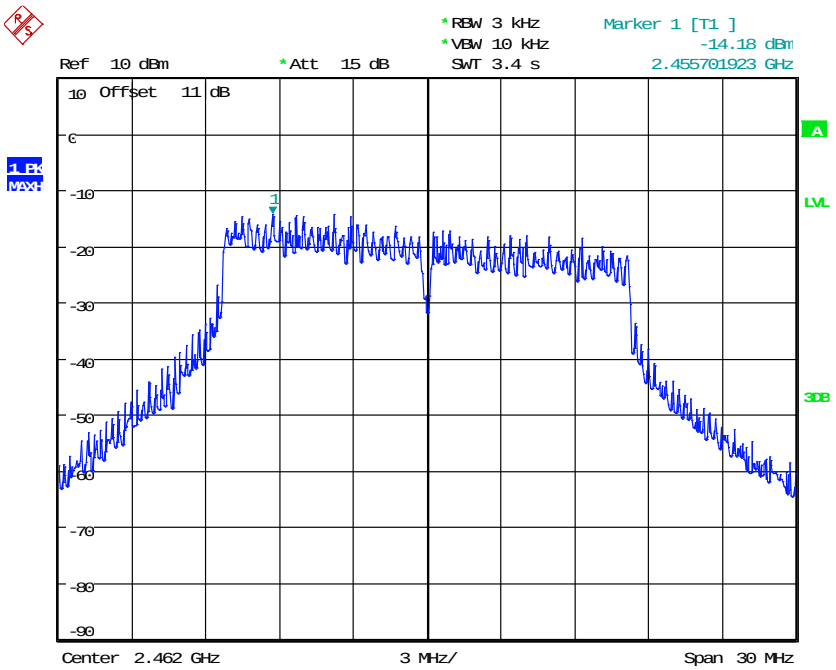
Date: 13.NOV.2019 17:32:17



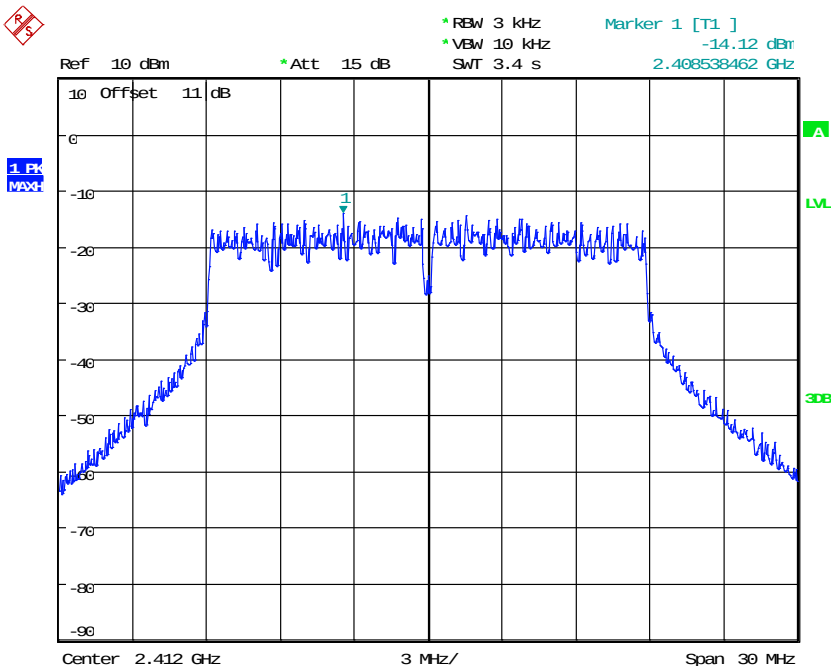

POWER DENSITY 802.11G CH06

Date: 13.NOV.2019 17:34:24

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

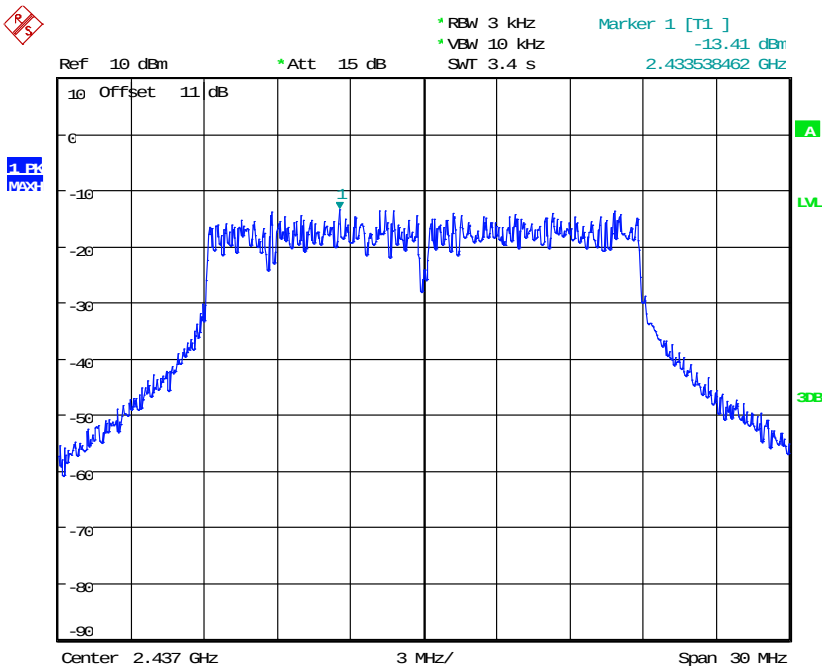



POWER DENSITY 802.11G CH11
Date: 13.NOV.2019 17:35:42

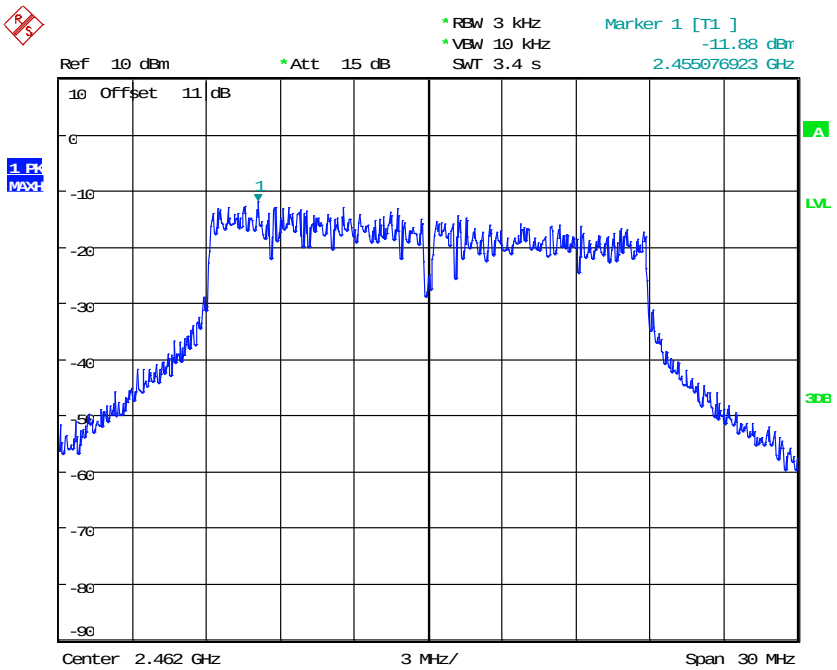



POWER DENSITY 802.11N 20MHZ CH1
Date: 13.NOV.2019 17:38:58

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

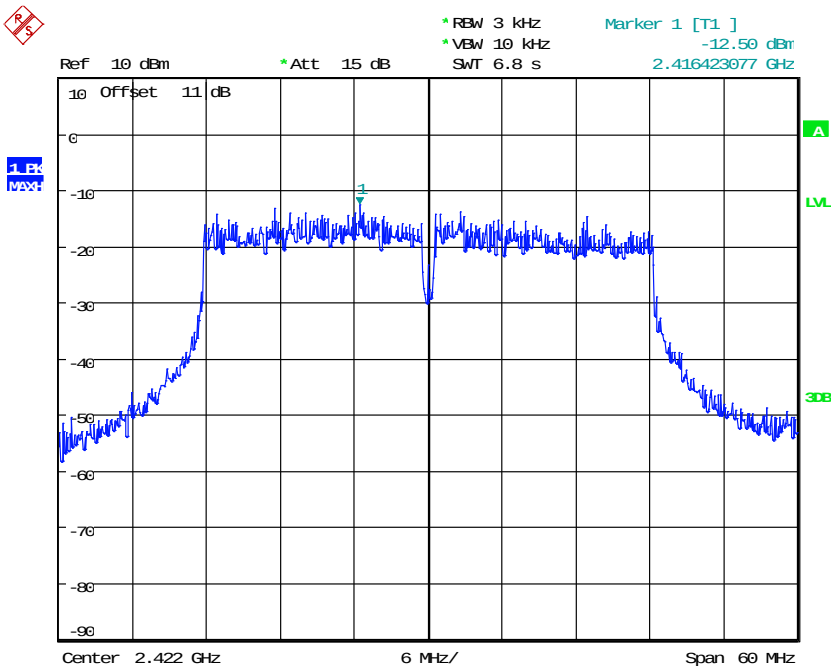



POWER DENSITY 802.11N 20MHZ CH6
Date: 13.NOV.2019 17:39:54



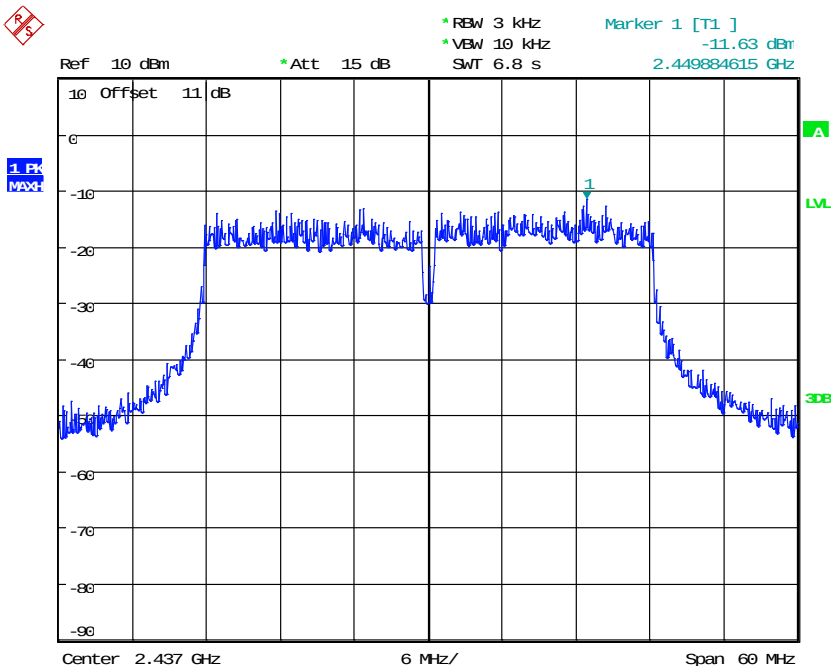

POWER DENSITY 802.11N 20MHZ CH11
Date: 13.NOV.2019 17:40:55

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11N 40MHZ CH1

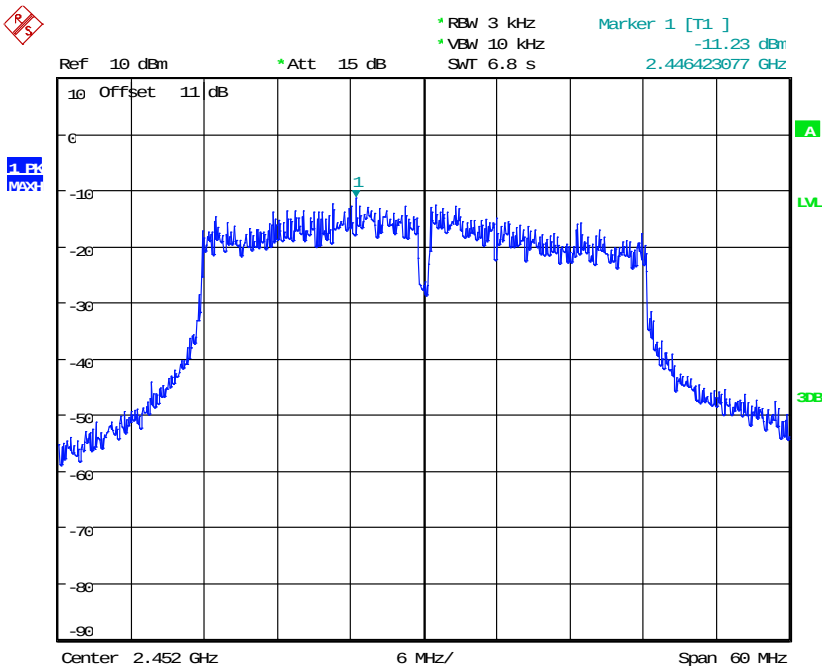
Date: 13.NOV.2019 17:43:11




POWER DENSITY 802.11N 40MHZ CH4

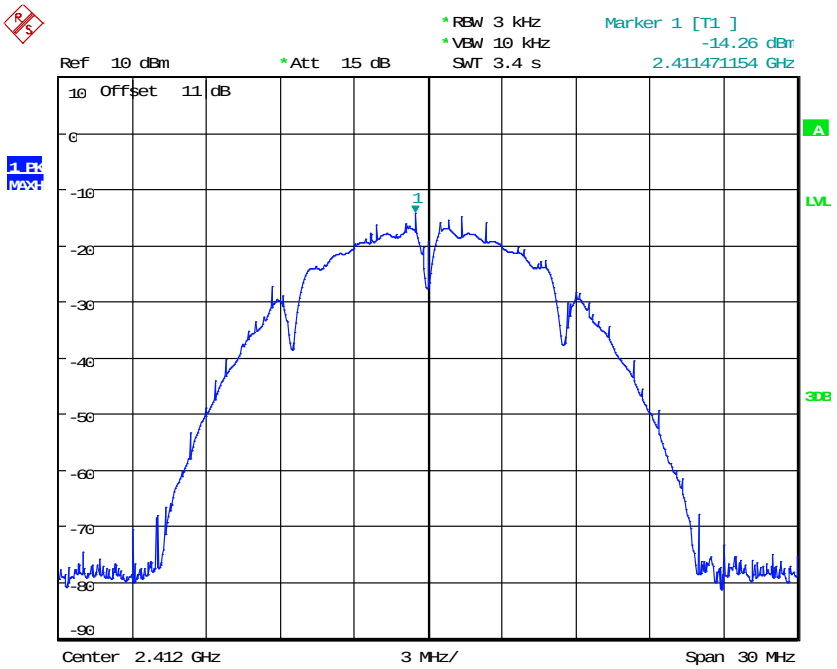
Date: 13.NOV.2019 17:45:10

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



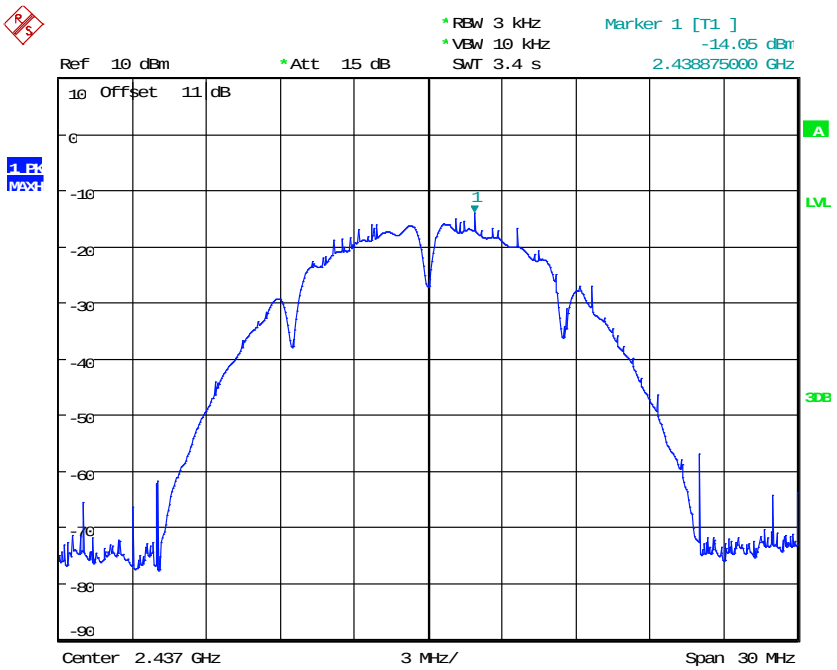

POWER DENSITY 802.11N 40MHZ CH7
Date: 13.NOV.2019 17:47:11

ANT 2

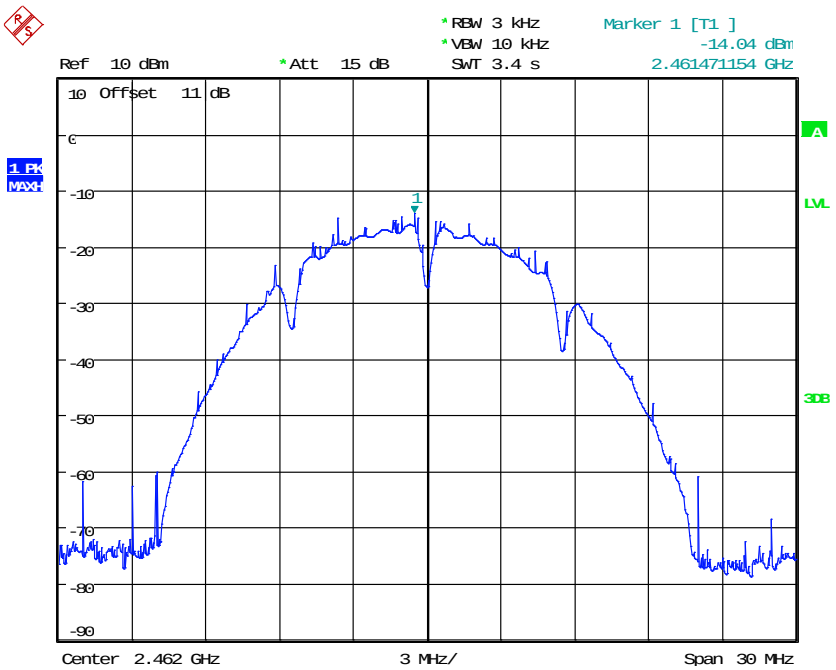



POWER DENSITY 802.11B CH01
Date: 14.NOV.2019 14:02:49

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

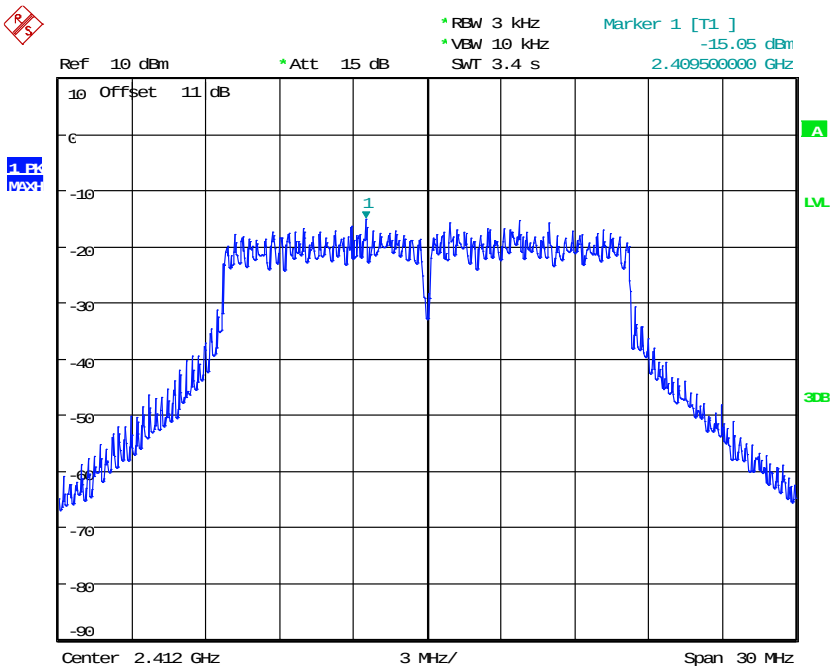



POWER DENSITY 802.11B CH06
Date: 14.NOV.2019 14:06:04



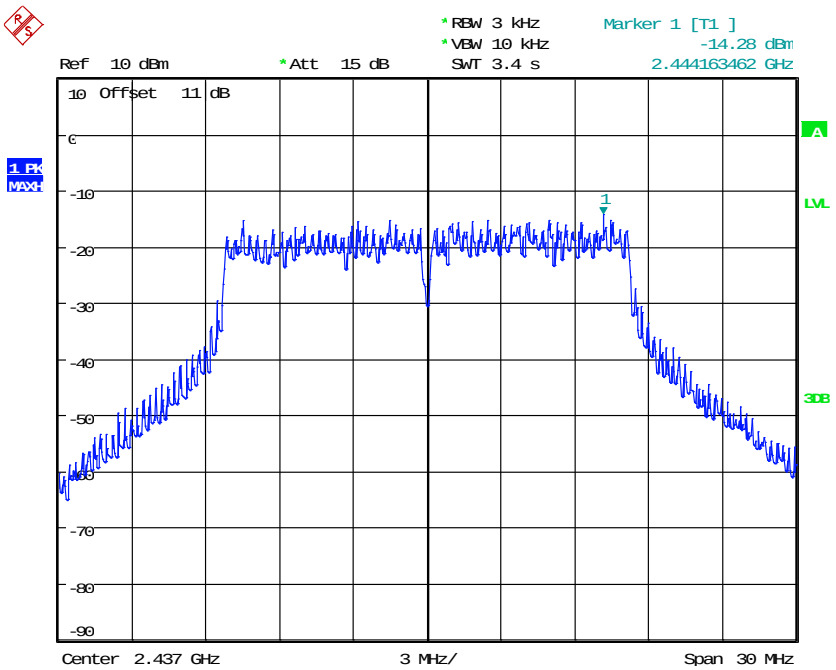

POWER DENSITY 802.11B CH11
Date: 14.NOV.2019 14:08:58

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11G CH01

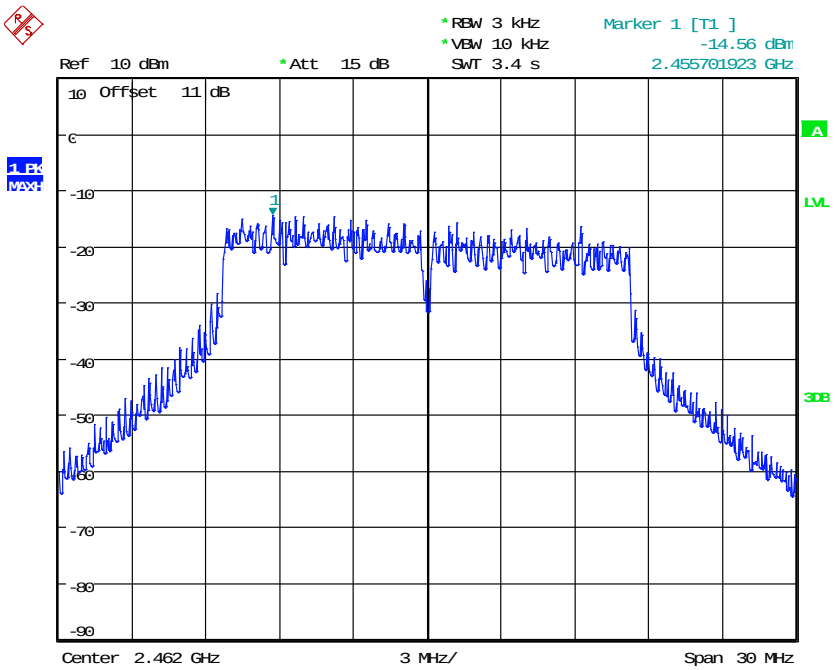
Date: 14.NOV.2019 14:10:49




POWER DENSITY 802.11G CH06

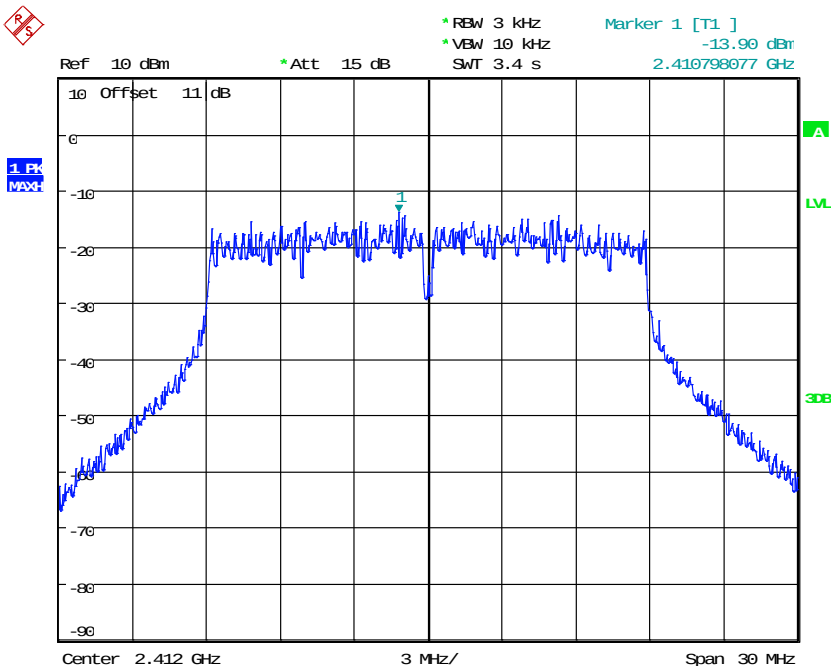
Date: 14.NOV.2019 14:11:36

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11G CH11

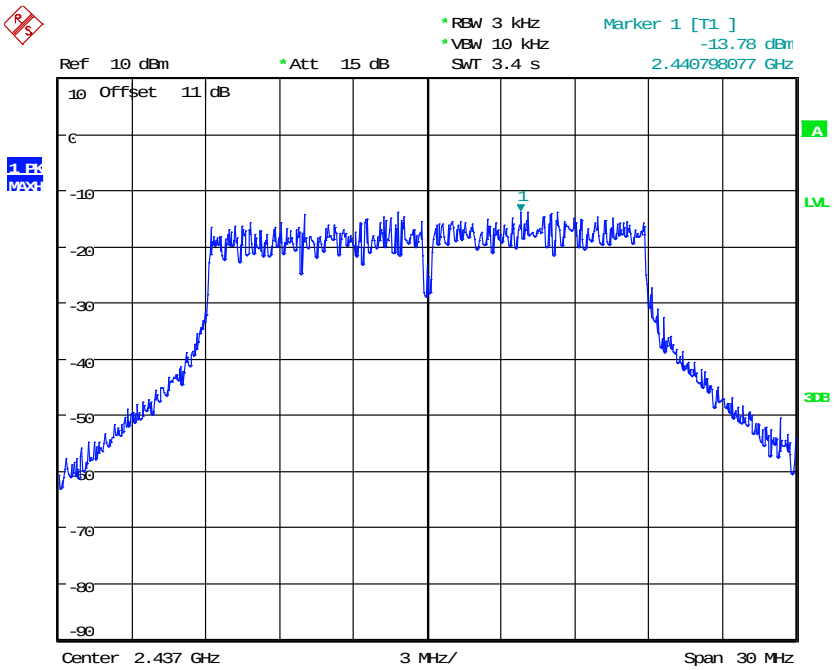
Date: 14.NOV.2019 14:12:24



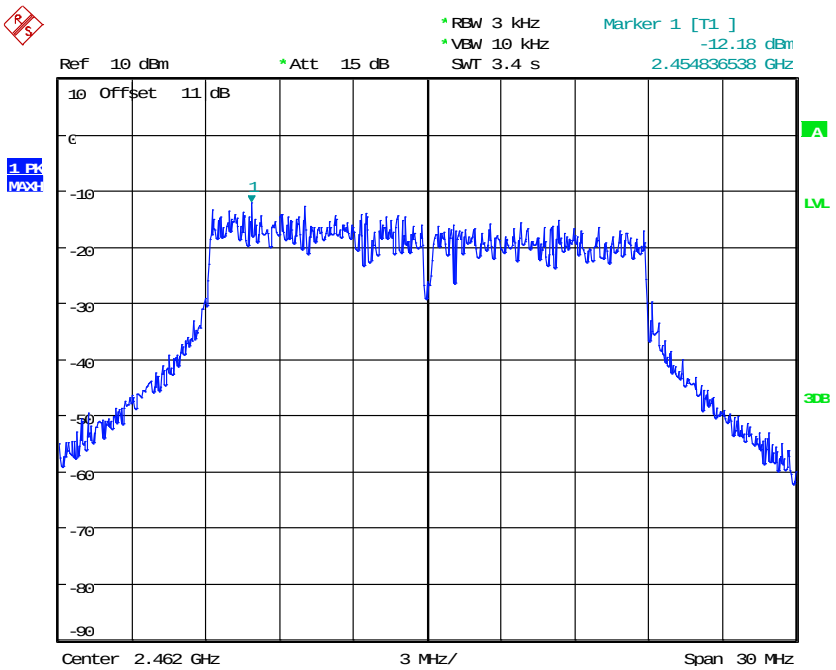

POWER DENSITY 802.11N 20MHZ CH1

Date: 14.NOV.2019 14:20:31

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

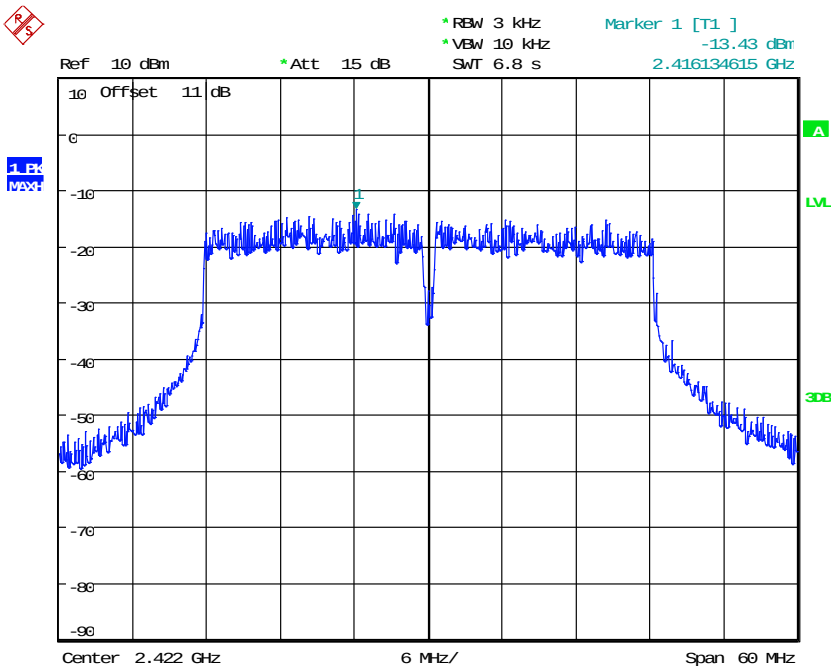



POWER DENSITY 802.11N 20MHZ CH6
Date: 14.NOV.2019 14:21:45

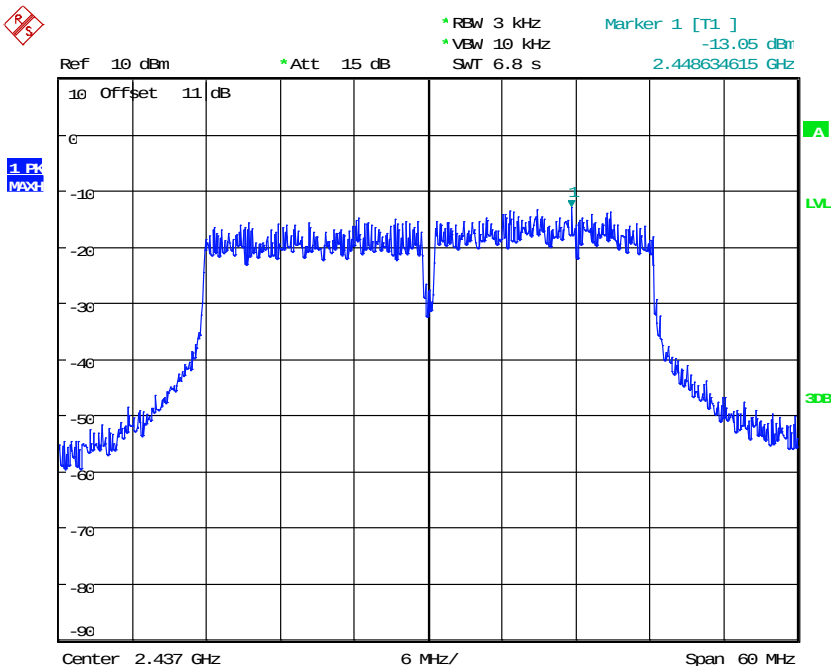



POWER DENSITY 802.11N 20MHZ CH11
Date: 14.NOV.2019 14:22:54

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

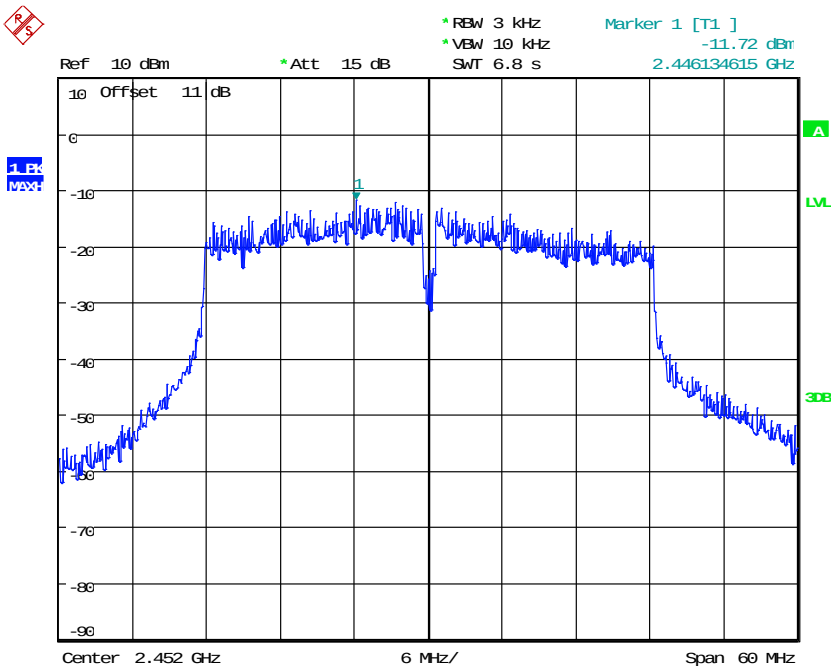



POWER DENSITY 802.11N 40MHZ CH1
Date: 14.NOV.2019 14:24:02



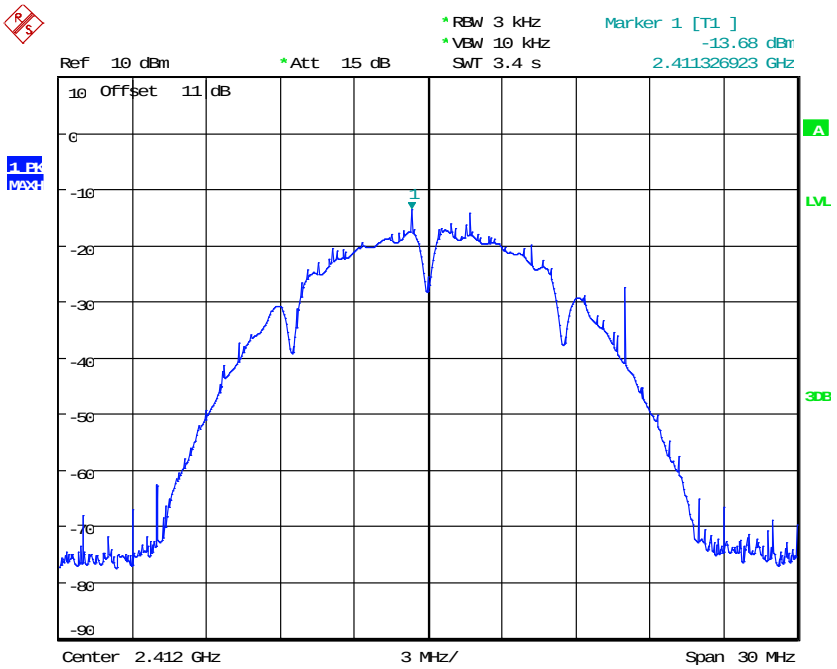

POWER DENSITY 802.11N 40MHZ CH4
Date: 14.NOV.2019 14:25:00

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



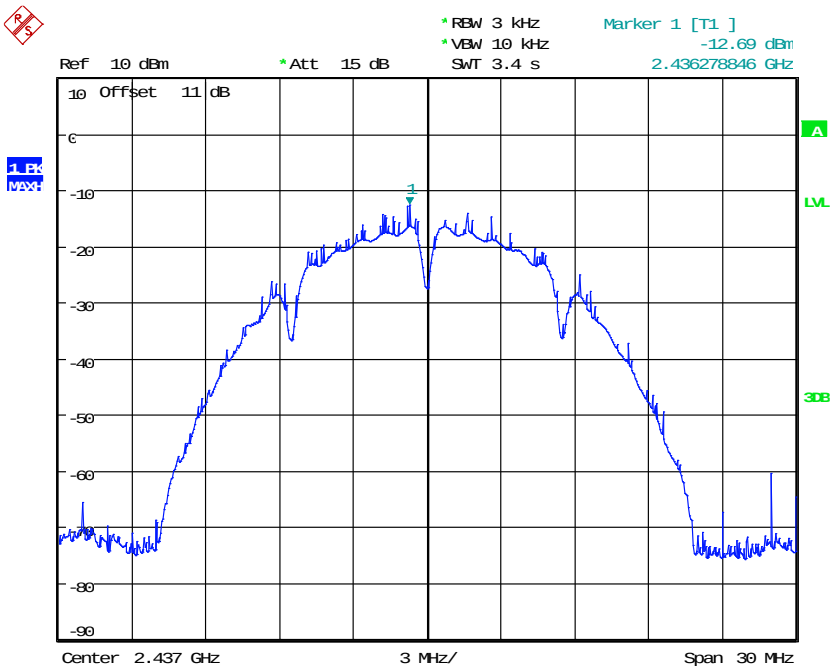

POWER DENSITY 802.11N 40MHZ CH7
Date: 14.NOV.2019 14:27:07

ANT 3

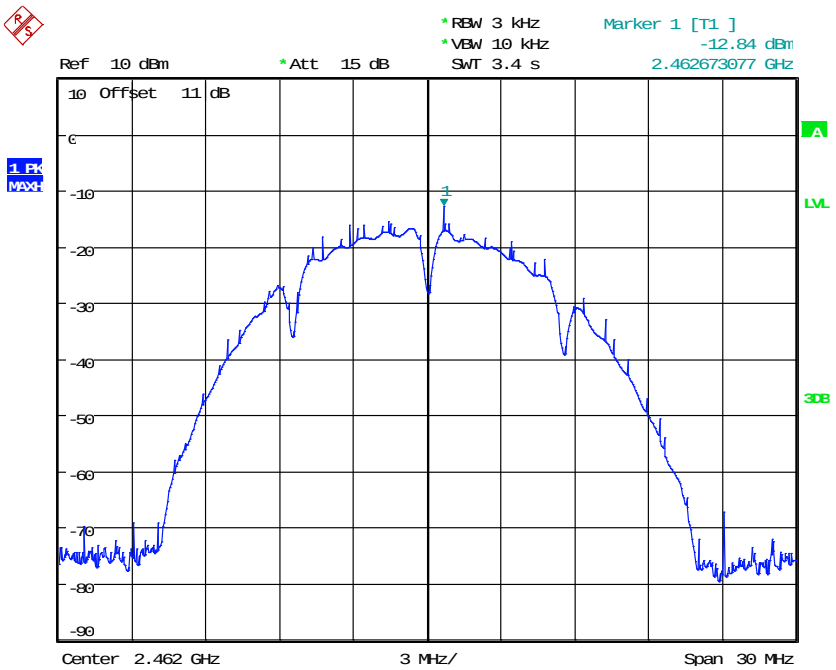



POWER DENSITY 802.11B CH01
Date: 14.NOV.2019 15:56:06

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

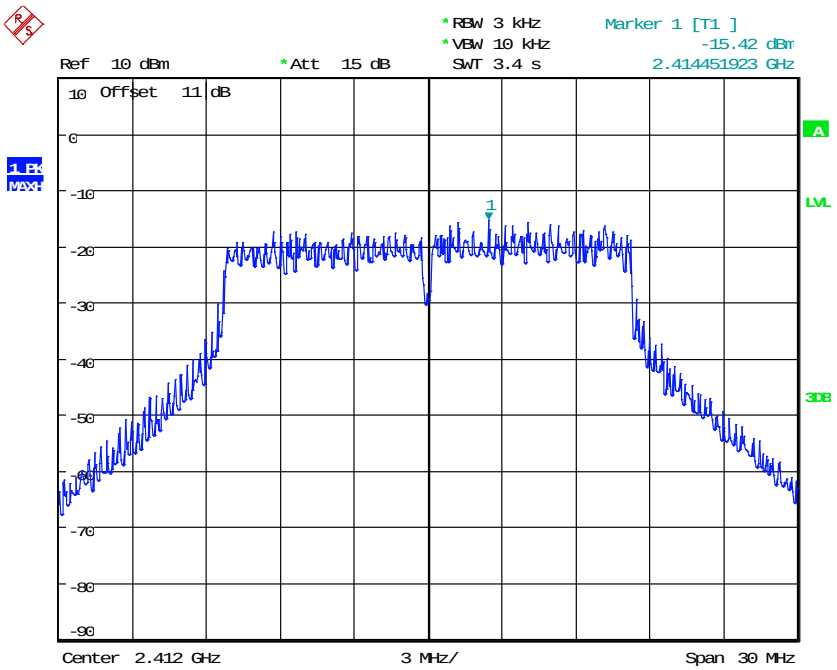



POWER DENSITY 802.11B CH06
Date: 14.NOV.2019 15:59:11



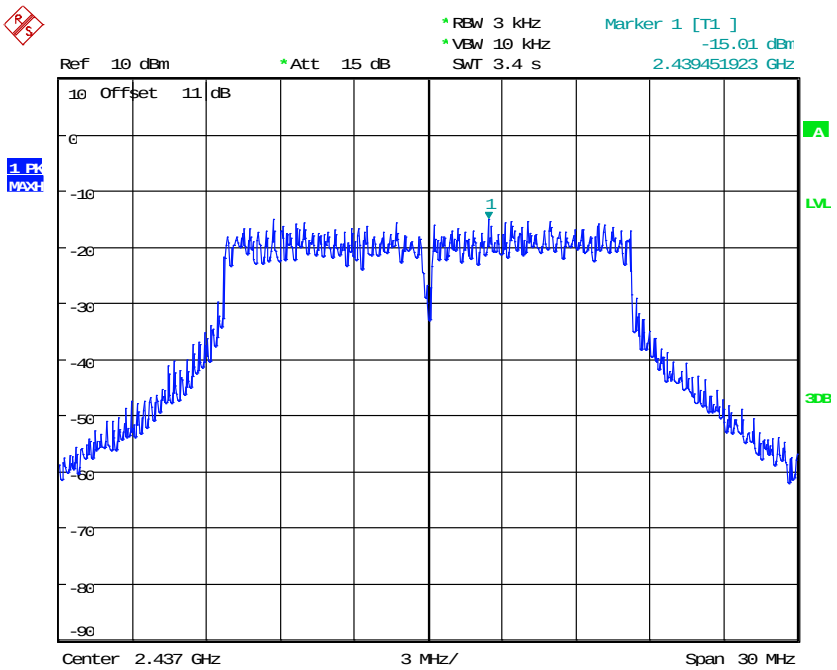

POWER DENSITY 802.11B CH11
Date: 14.NOV.2019 21:30:45

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11G CH01

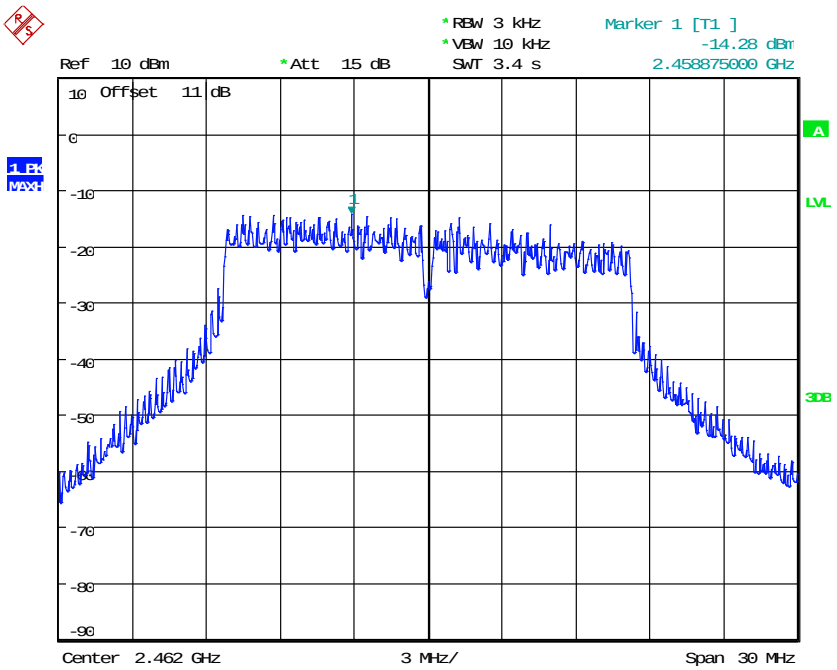
Date: 14.NOV.2019 16:01:56



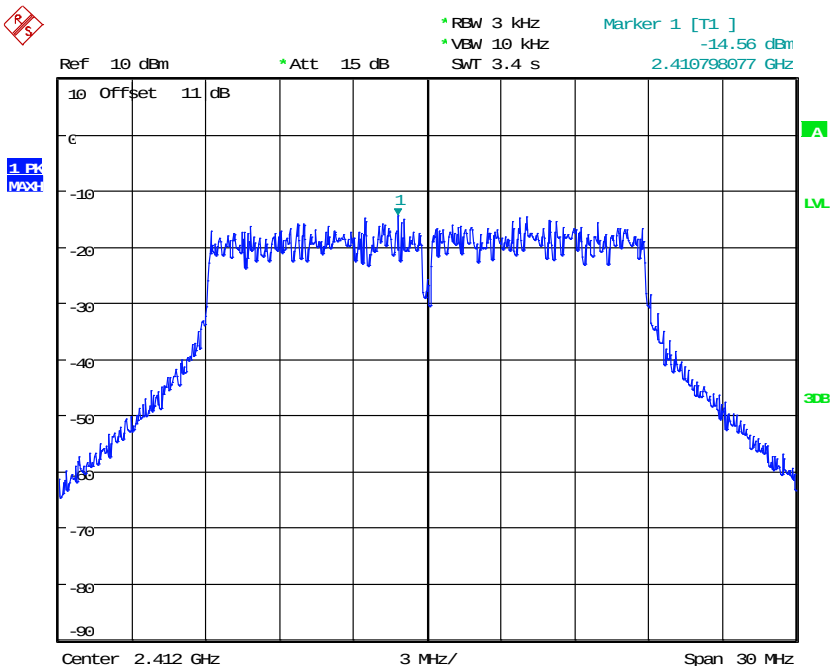

POWER DENSITY 802.11G CH06

Date: 14.NOV.2019 16:03:14

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

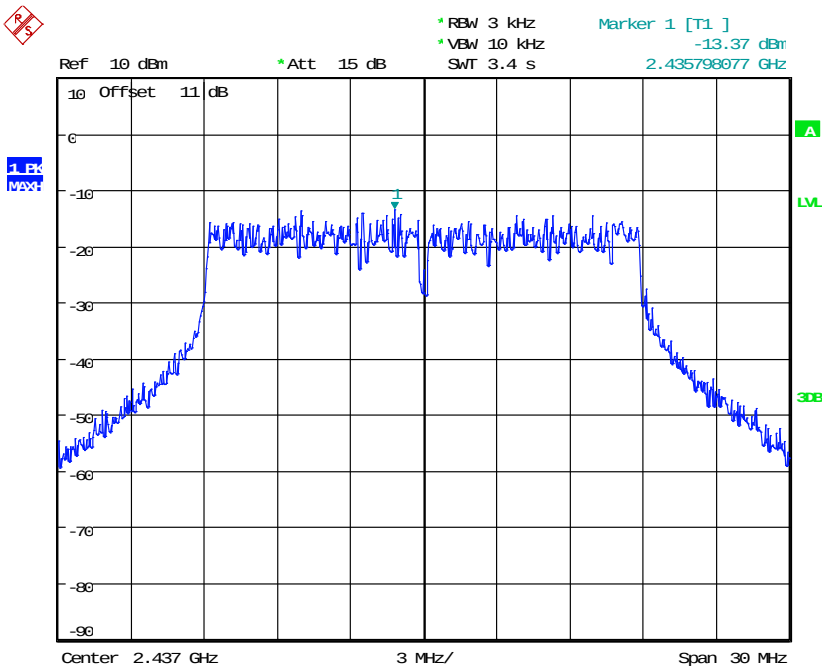



POWER DENSITY 802.11G CH11
Date: 14.NOV.2019 16:19:56

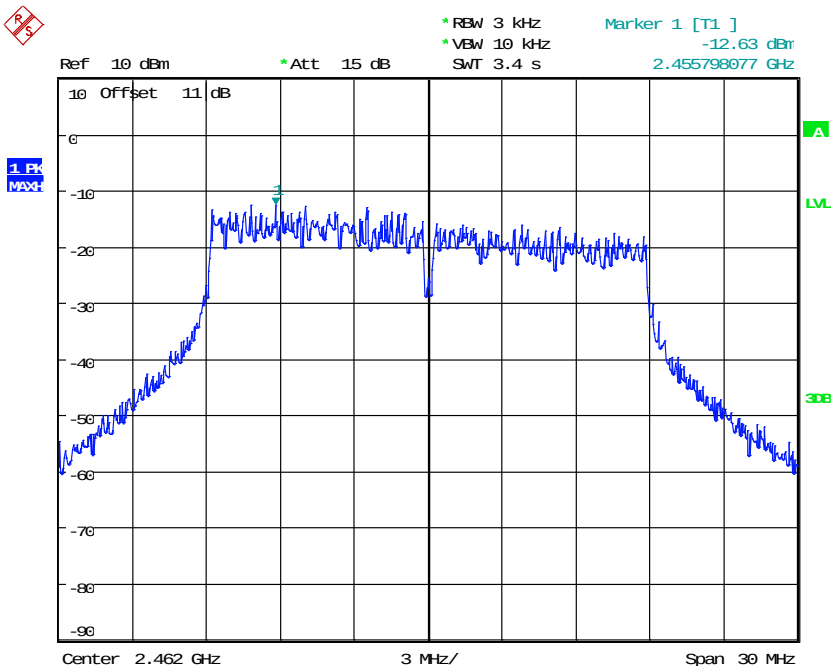



POWER DENSITY 802.11N 20MHZ CH1
Date: 14.NOV.2019 16:20:59

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

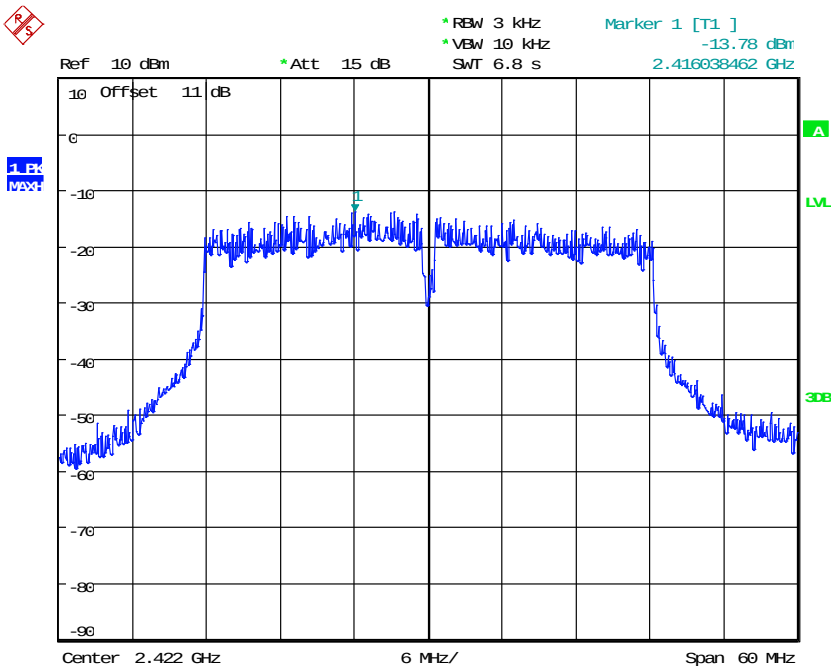



POWER DENSITY 802.11N 20MHZ CH6
Date: 14.NOV.2019 16:22:15

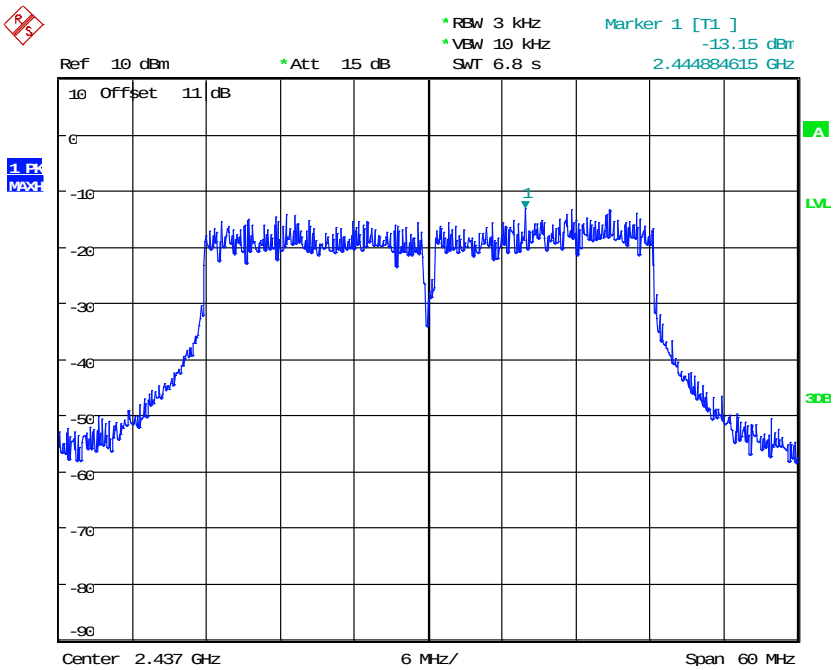



POWER DENSITY 802.11N 20MHZ CH11
Date: 14.NOV.2019 16:23:14

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

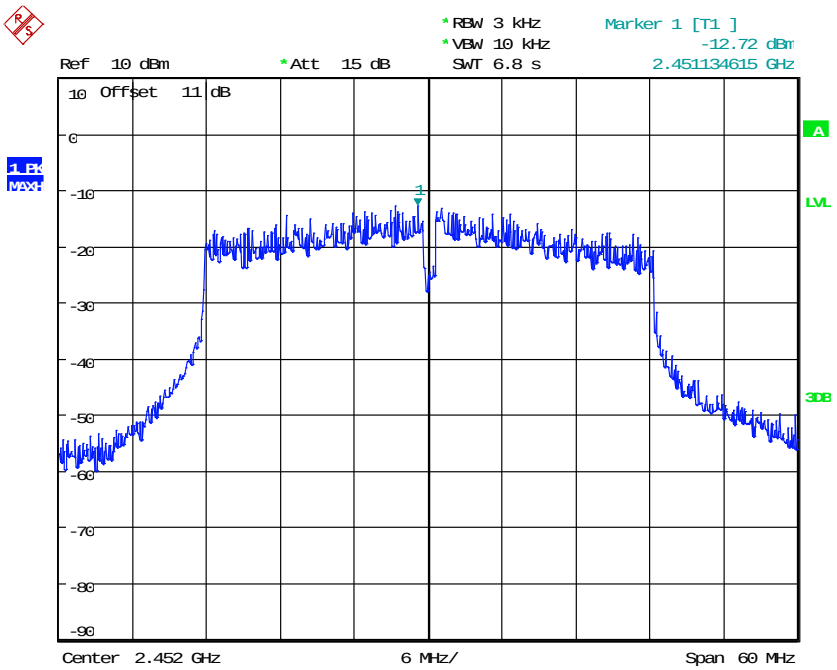



POWER DENSITY 802.11N 40MHZ CH1
Date: 14.NOV.2019 16:24:29



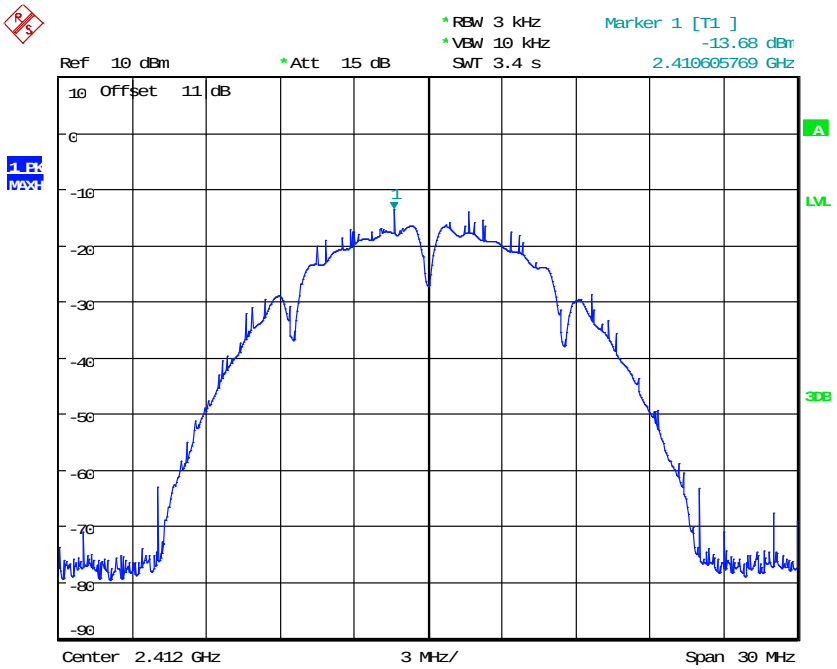

POWER DENSITY 802.11N 40MHZ CH4
Date: 14.NOV.2019 16:27:11

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



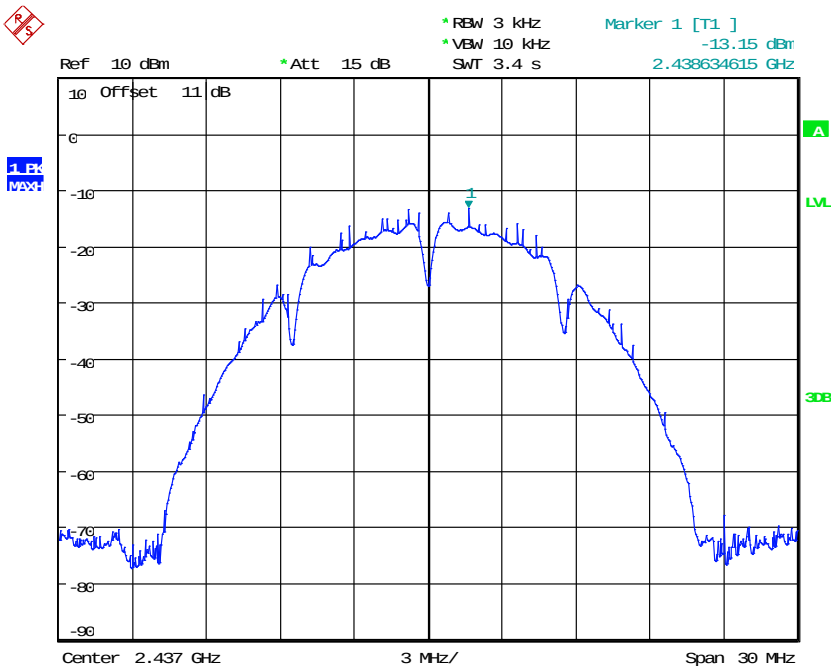

POWER DENSITY 802.11N 40MHZ CH7
Date: 14.NOV.2019 16:30:16

ANT 4



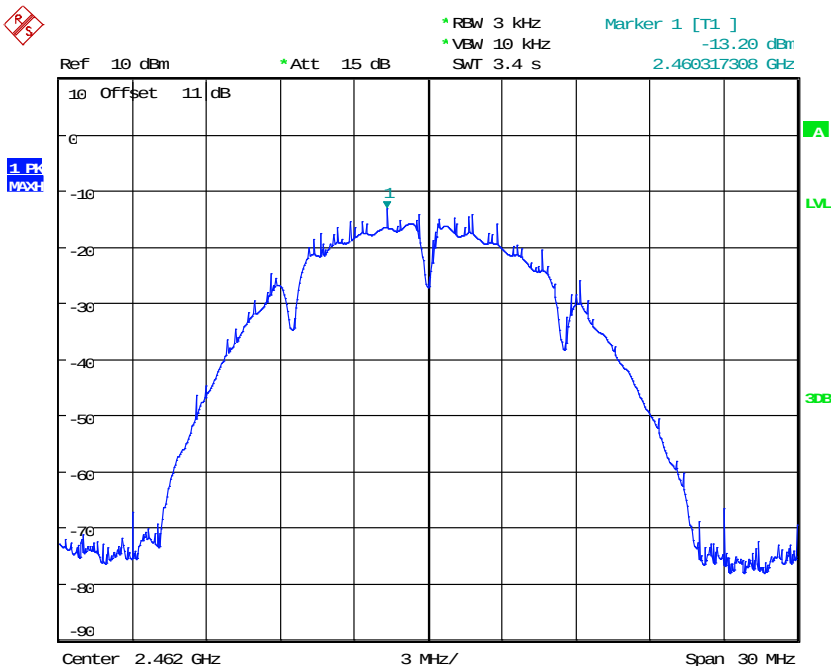

POWER DENSITY 802.11B CH01
Date: 14.NOV.2019 17:33:39

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11B CH06

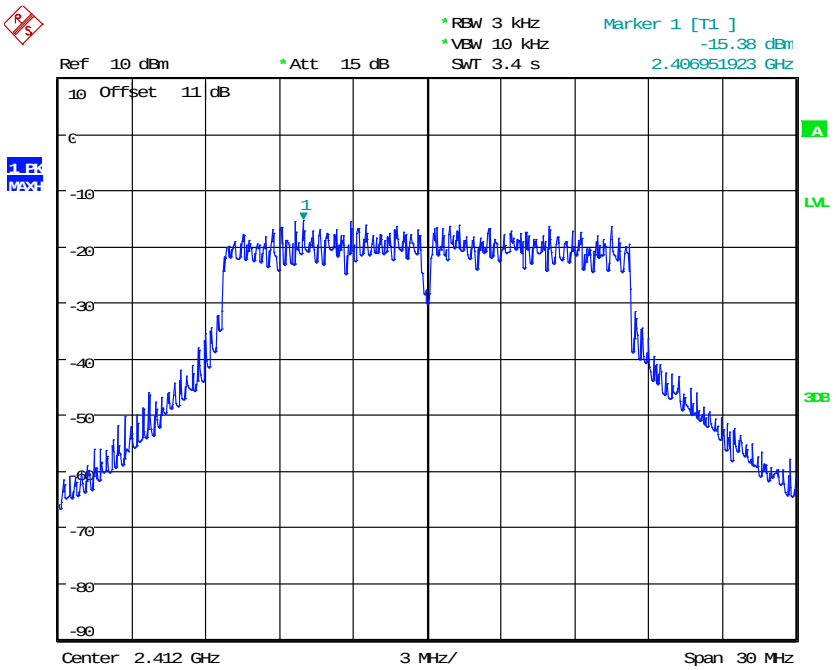
Date: 14.NOV.2019 17:34:34



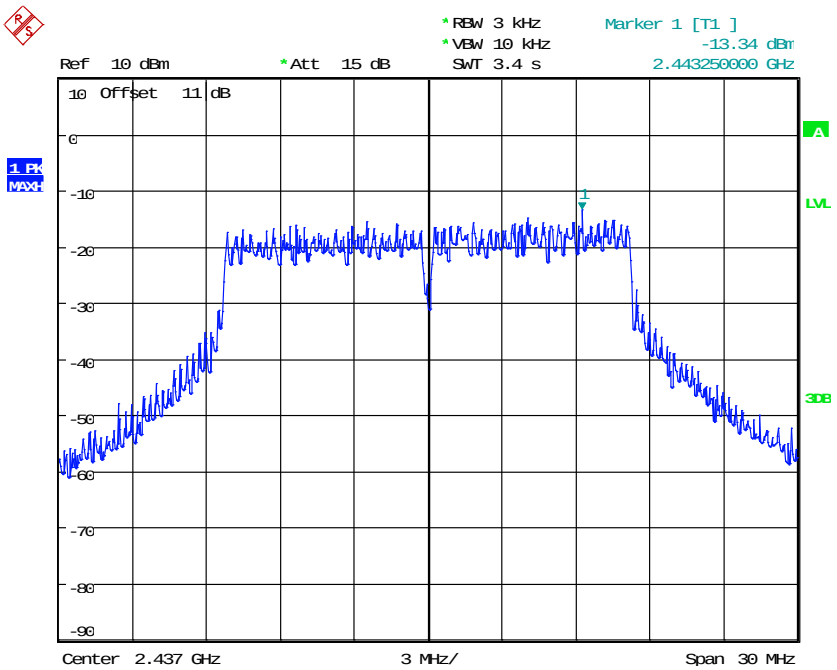

POWER DENSITY 802.11B CH11

Date: 14.NOV.2019 17:35:18

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

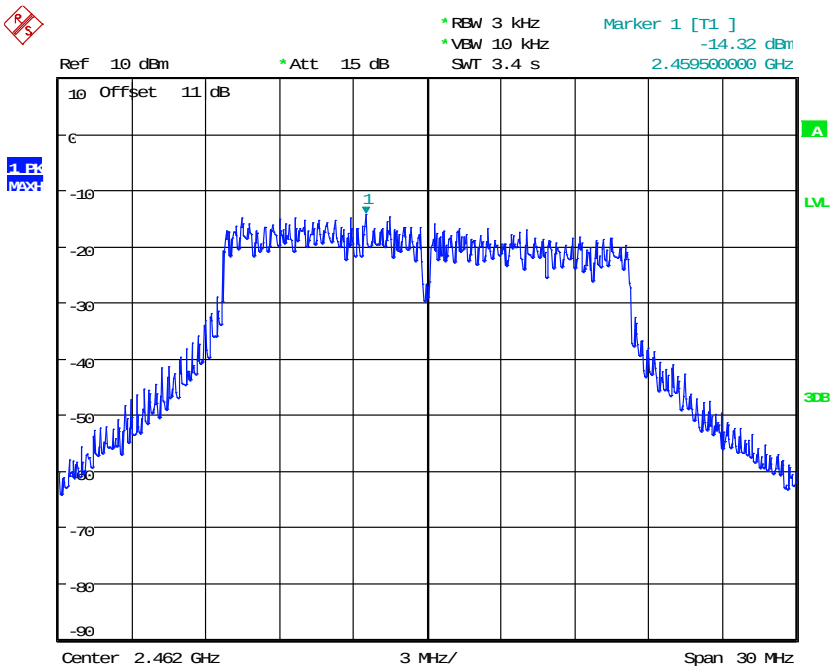



POWER DENSITY 802.11G CH01
Date: 14.NOV.2019 17:36:08

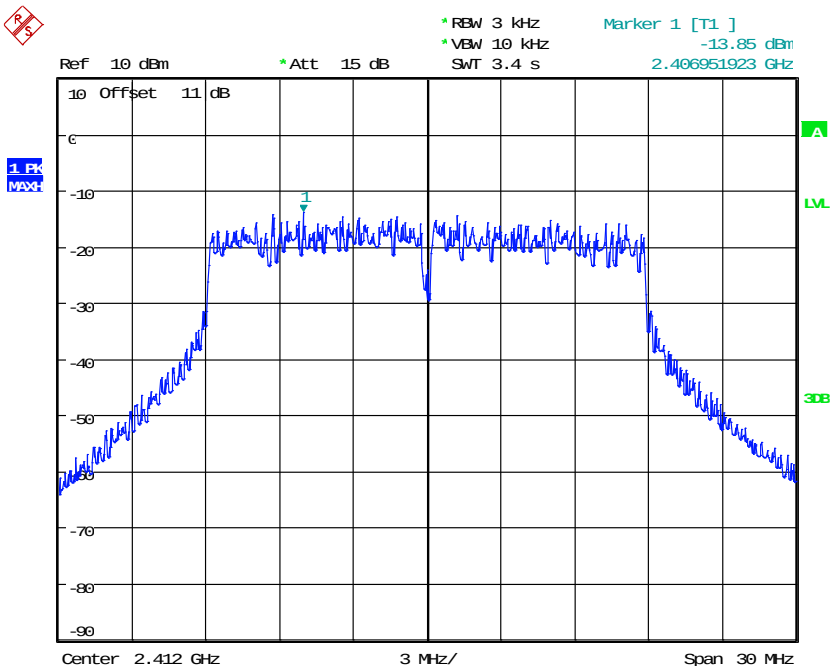



POWER DENSITY 802.11G CH06
Date: 14.NOV.2019 17:36:53

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

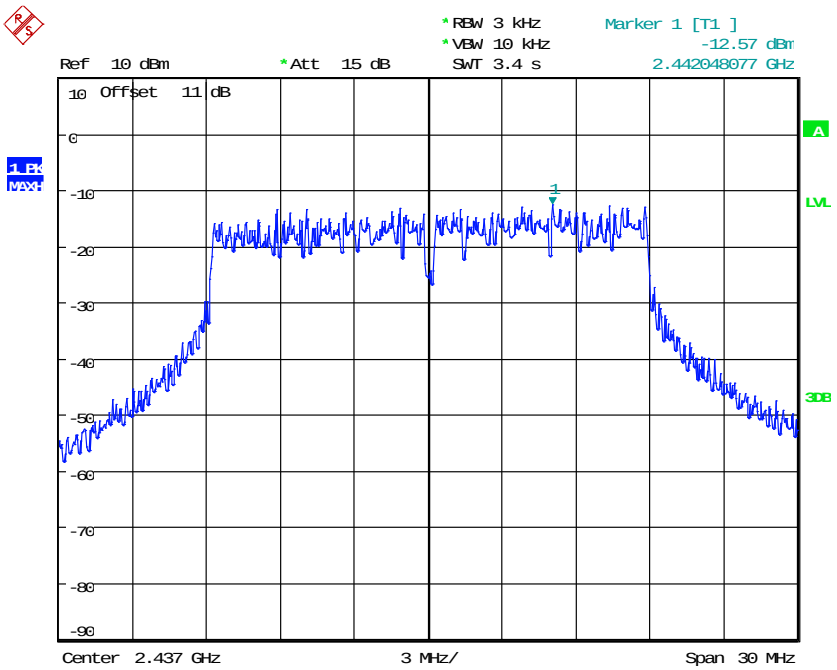



POWER DENSITY 802.11G CH11
Date: 14.NOV.2019 17:37:41



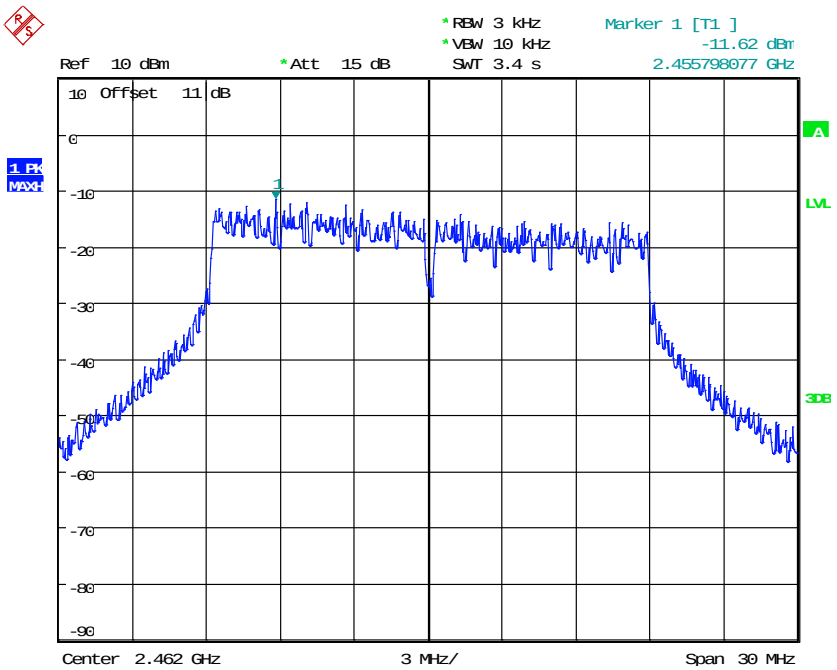

POWER DENSITY 802.11N 20MHZ CH1
Date: 14.NOV.2019 17:40:23

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY 802.11N 20MHZ CH6

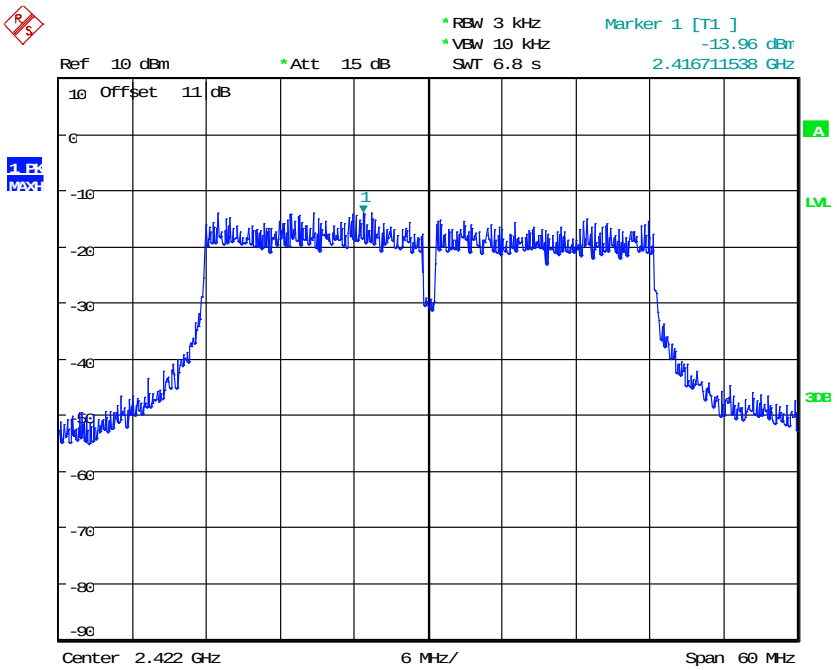
Date: 14.NOV.2019 19:38:03



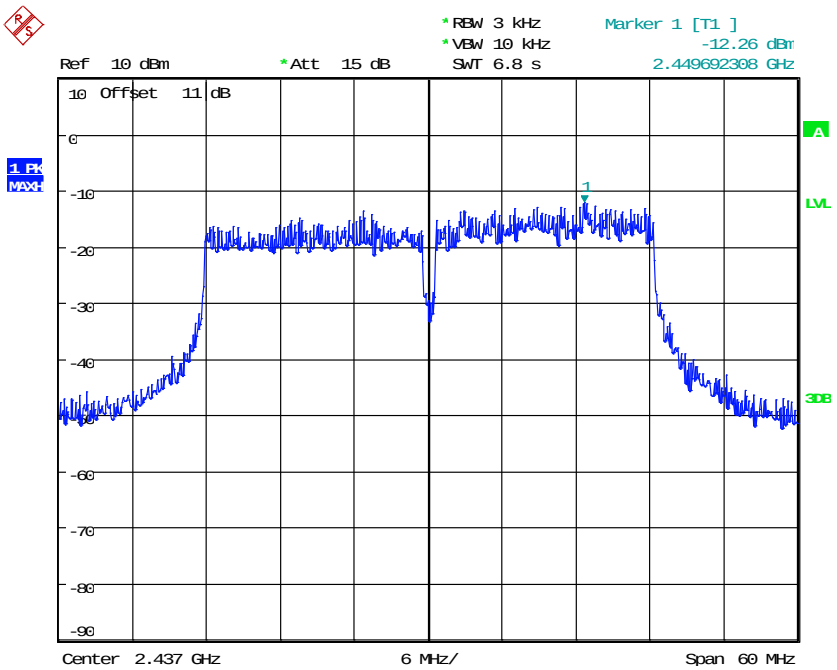

POWER DENSITY 802.11N 20MHZ CH11

Date: 14.NOV.2019 19:39:03

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

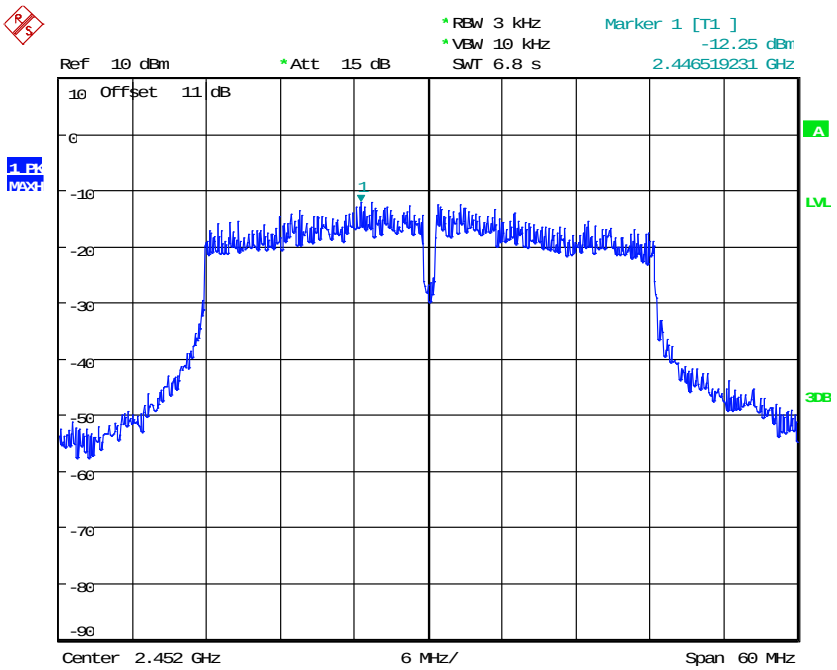



POWER DENSITY 802.11N 40MHZ CH1
Date: 14.NOV.2019 19:40:02



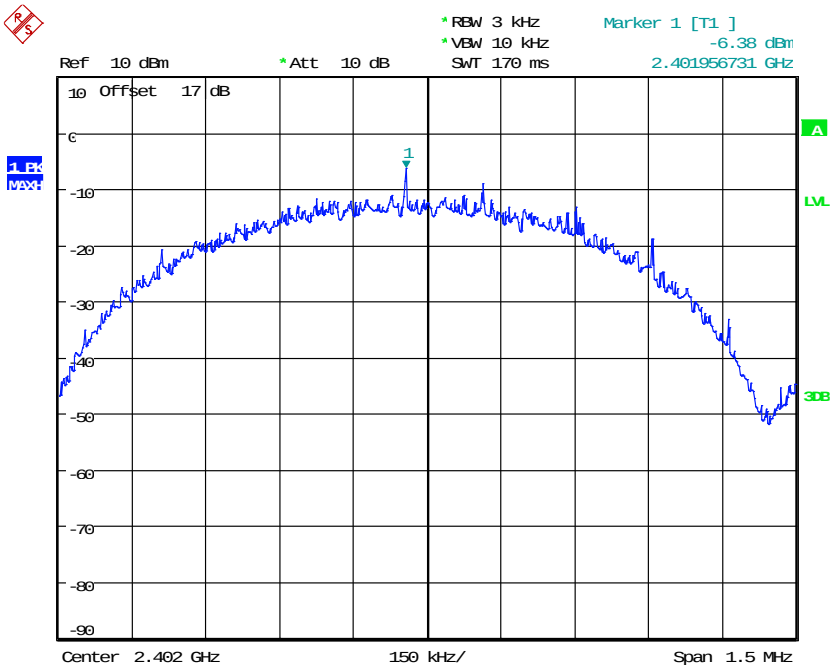

POWER DENSITY 802.11N 40MHZ CH4
Date: 14.NOV.2019 19:42:21

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E



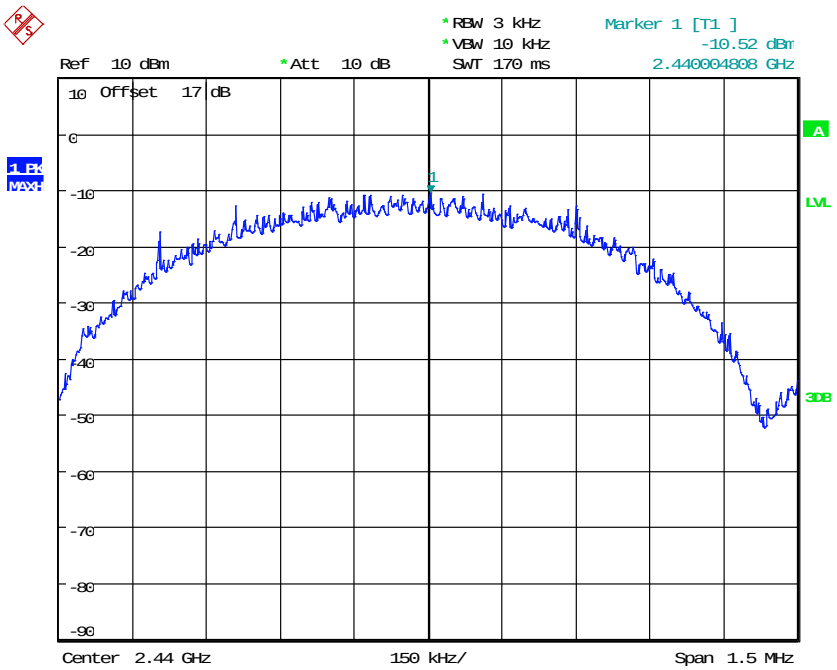

POWER DENSITY 802.11N 40MHZ CH7
Date: 14.NOV.2019 19:43:51

BLE



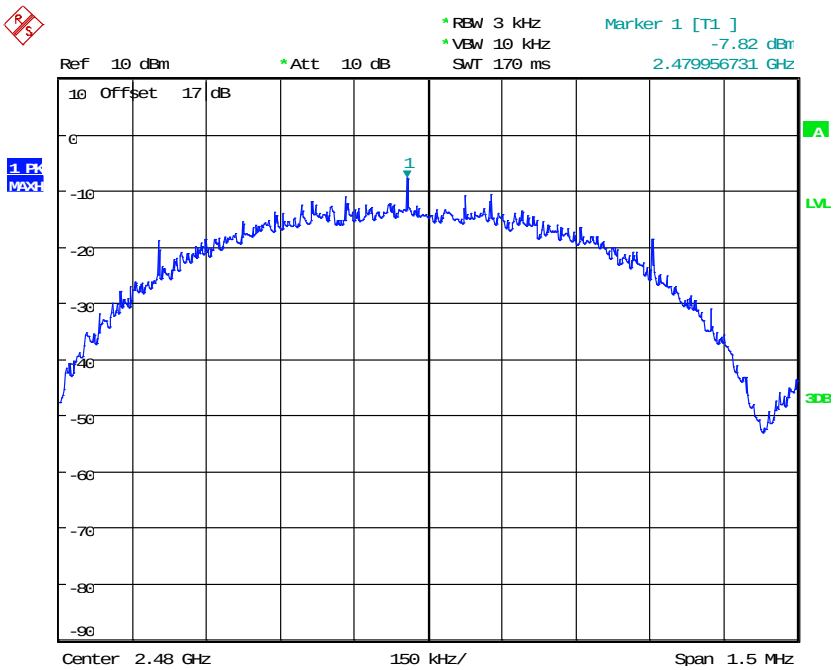

POWER DENSITY BT4.0 CH00
Date: 16.NOV.2019 22:09:36

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E




POWER DENSITY BT4.0 CH19

Date: 16.NOV.2019 22:19:38




POWER DENSITY BT4.0 CH39

Date: 16.NOV.2019 22:23:18

Registration number: W6M21903-18922-C-1
FCC ID: 2AUISION8ION8E

| ANT 1 | mW | | | dBm | | |
|---|---|---|---|---|---|---|
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 0.04 | 0.05 | 0.07 | -14.12 | -13.41 | -11.88 |
| 802.11n 40MHz | 0.06 | 0.07 | 0.08 | -12.50 | -11.63 | -11.23 |
| ANT 2 | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 0.04 | 0.04 | 0.06 | -13.90 | -13.78 | -12.18 |
| 802.11n 40MHz | 0.05 | 0.05 | 0.07 | -13.43 | -13.05 | -11.72 |
| ANT 3 | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 0.04 | 0.05 | 0.06 | -14.56 | -13.37 | -12.63 |
| 802.11n 40MHz | 0.04 | 0.05 | 0.05 | -13.78 | -13.15 | -12.72 |
| ANT 4 | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 0.04 | 0.06 | 0.07 | -13.85 | -12.57 | -11.62 |
| 802.11n 40MHz | 0.04 | 0.06 | 0.06 | -13.96 | -12.26 | -12.25 |
| Combine | mW | | | dBm | | |
| | Ch Low | Ch Mid | Ch High | Ch Low | Ch Mid | Ch High |
| 802.11n 20MHz | 0.16 | 0.19 | 0.25 | -8.07 | -7.24 | -6.02 |
| 802.11n 40MHz | 0.18 | 0.23 | 0.26 | -7.38 | -6.46 | -5.94 |

**Limits:**

| Frequency Range MHz | dBm |
|---|---|
| 902-928 | 8 |
| 2400-2483.5 | 8 |
| 5725-5850 | 8 |

Test equipment used: ETSTW-RE 055, ETSTW-RE 050

## 3.9 Radiated Emission from Receiver Part

Model: ion8/ion8e Date: --
Mode: -- Temperature: -- °C Engineer: --
Polarization: -- Humidity: -- %

| Frequency (MHz) | Reading (dBuV) | Detector | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- |

| Frequency (MHz) | Reading (dBuV) | | Factor (dB) | Result (dBuV/m) | | Limit (dBuV/m) | | Margin (dB) | Table Degree (Deg.) | Ant. High (cm) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Peak | Ave. | Corr. | Peak | Ave. | Peak | Ave. | | | |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

**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. **The test results are listed in the separated test report no.: W6M21903-18922-P-15B.**

Test equipment used: ETSTW-RE 030, ETSTW-RE 055, ETSTW-RE 064, ETSTW-RE 111

## 3.10 Power Line Conducted Emission

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

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

Model: ion8/ion8e Date: - -
Mode: - - Temperature: - - °C Engineer: - -
Polarization: N Humidity: - - %

| Frequency (MHz) | Reading (dBuV) QP | Reading (dBuV) Ave. | Factor (dB) Corr. | Result (dBuV) QP | Result (dBuV) Ave. | Limit (dBuV) QP | Limit (dBuV) Ave. | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |

Polarization: L1

| Frequency (MHz) | Reading (dBuV) QP | Reading (dBuV) Ave. | Factor (dB) Corr. | Result (dBuV) QP | Result (dBuV) Ave. | Limit (dBuV) QP | Limit (dBuV) Ave. | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |
| - - | - - | - - | - - | - - | - - | - - | - - | - - |

**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.**
6. **The test is not required.**

**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 016, ETSTW-RE 045.

# Appendix

## Measurement diagrams

Spurious Emissions radiated

TX Integrated Antenna1 2.4 GHz WiFi

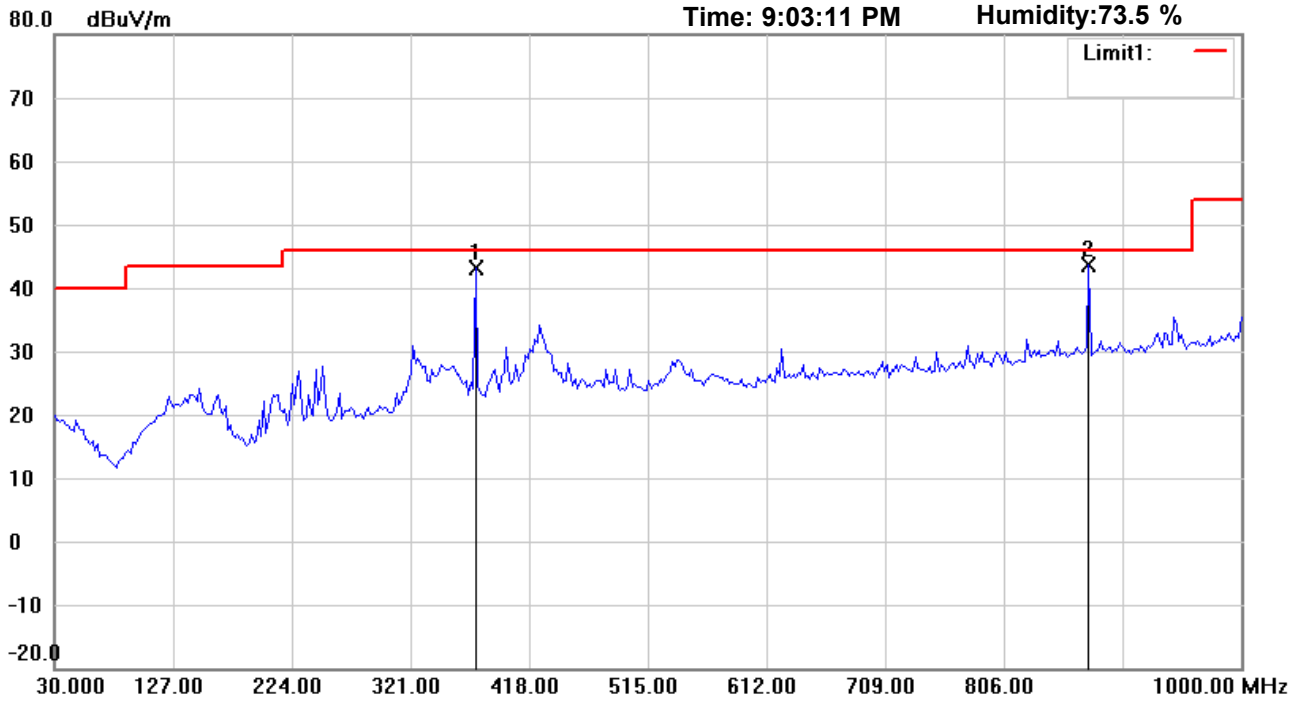
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

**Radiated Emission Measurement**

Operator: Sky

File :1_ANT1_TX 802 Data :#1 Date: 10/25/2019 Time: 9:03:11 PM

Temperature:23.1 ℃
Humidity:73.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_30-1000MHz

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 374.0681 | 47.61 | peak | -4.50 | 43.11 | 46.00 | 100 | 150 | -2.89 | |
| * | 875.5910 | 40.78 | peak | 2.93 | 43.71 | 46.00 | 100 | 315 | -2.29 | |

*:Maximum data x:Over limit !:over margin

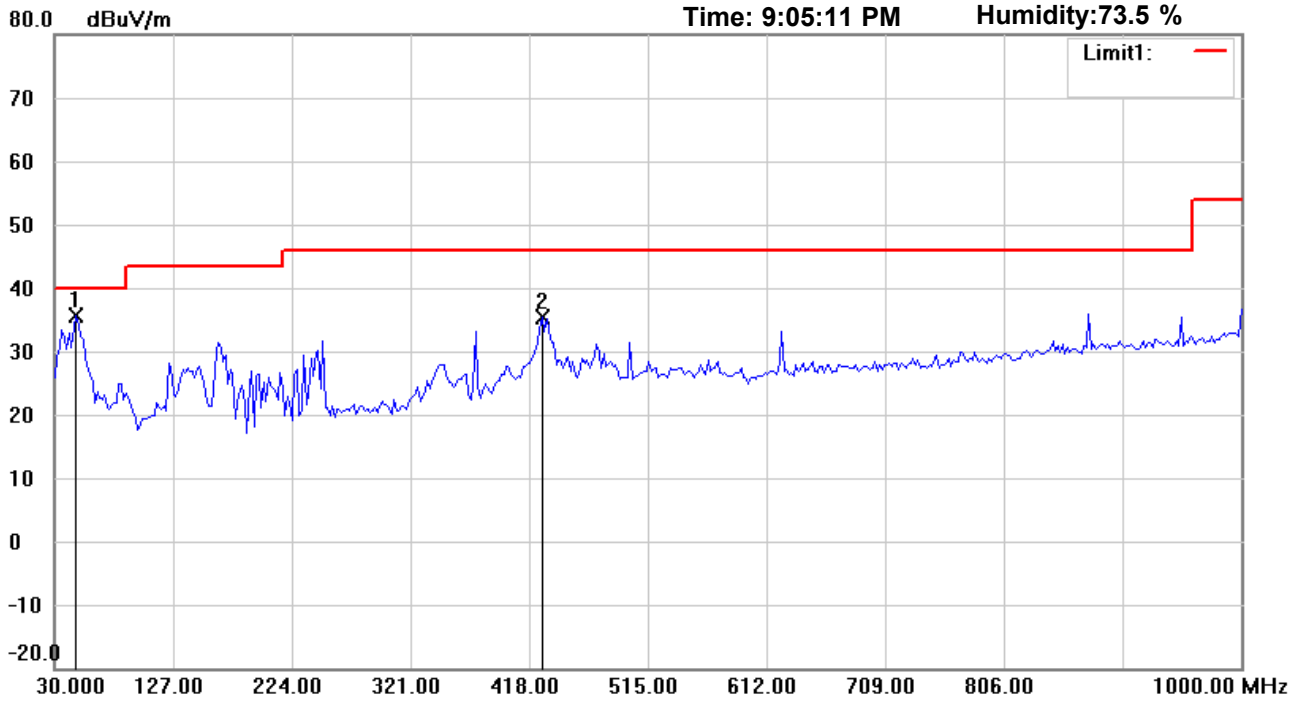
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Sky

File :1_ANT1_TX 802 Data :#2 Date: 10/25/2019 Time: 9:05:11 PM

Temperature:23.1 ℃
Humidity:73.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_30-1000MHz

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| * | 47.4950 | 45.48 | peak | -9.91 | 35.57 | 40.00 | 100 | 25 | -4.43 | |
| | 428.4970 | 39.18 | peak | -3.77 | 35.41 | 46.00 | 100 | 170 | -10.59 | |

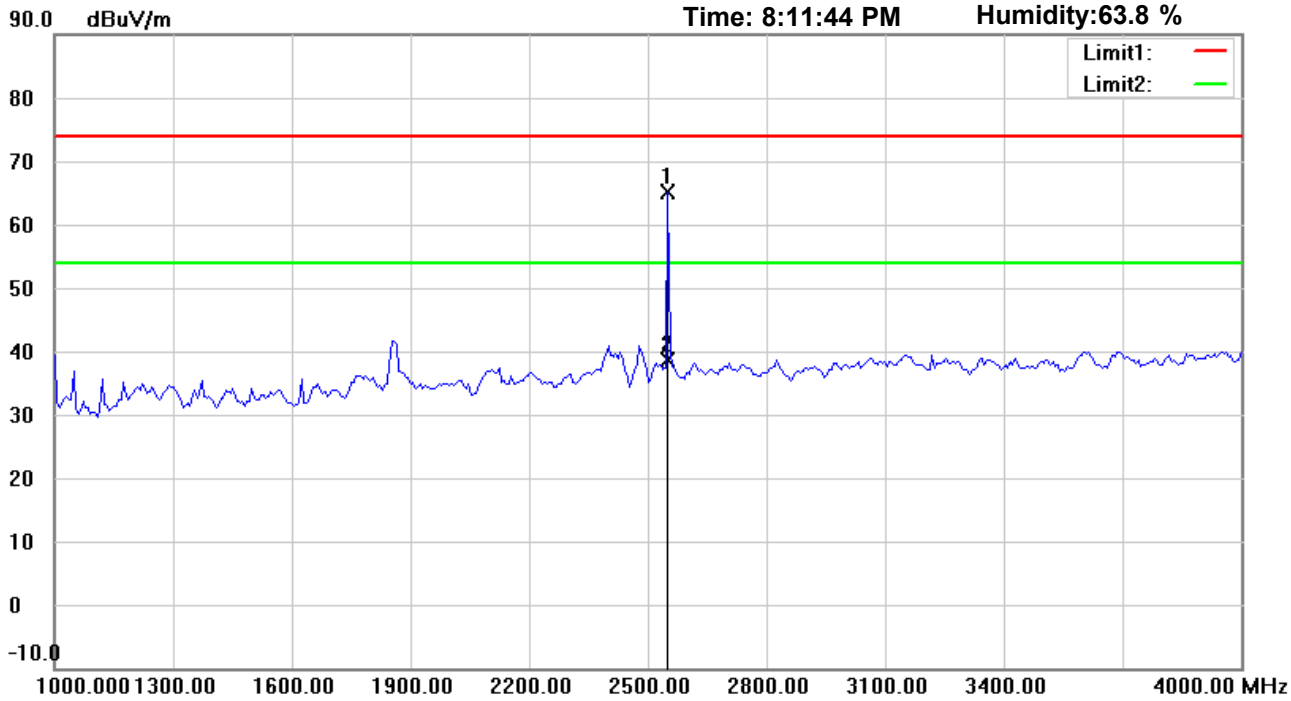
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#1 | Date: 10/10/2019 | Time: 8:11:44 PM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| * | 2551.102 | 70.08 | peak | -4.92 | 65.16 | 74.00 | 150 | 136 | -8.84 | |
| | 2551.102 | 43.66 | AVG | -4.92 | 38.74 | 54.00 | 150 | 136 | -15.26 | |

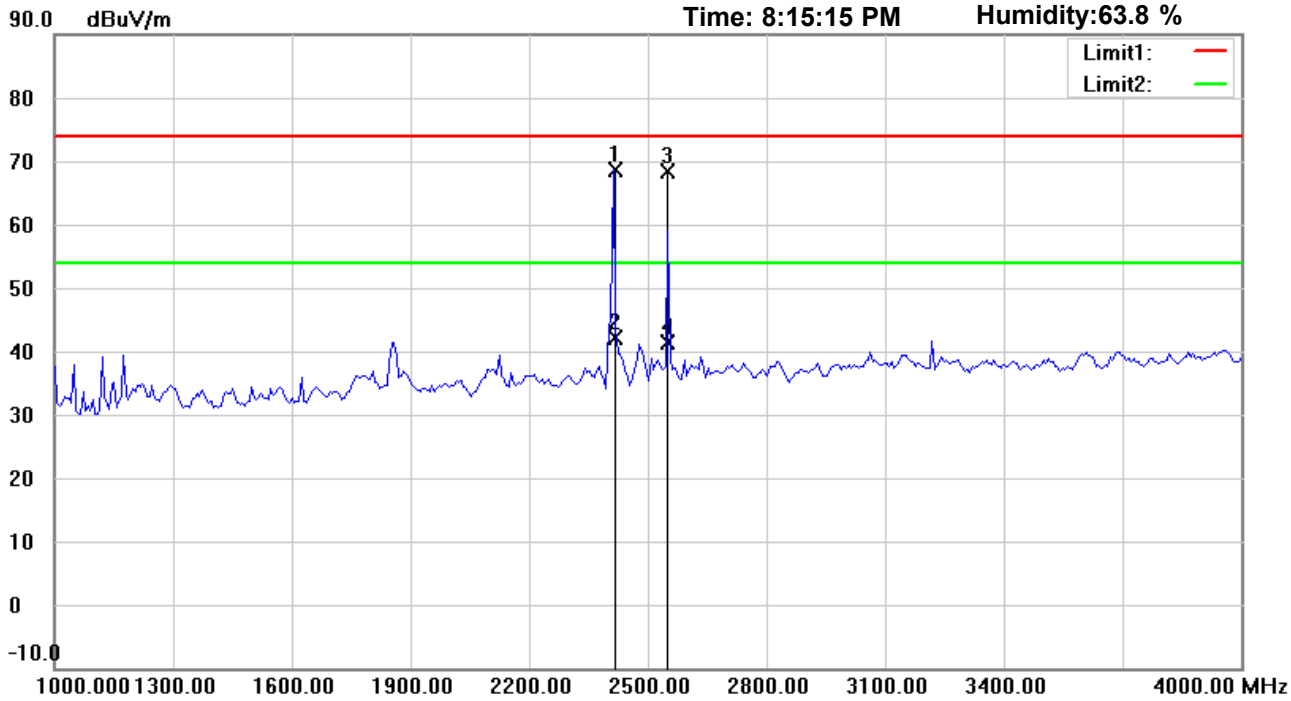
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#6 | Date: 10/10/2019 | Time: 8:15:15 PM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| * | 2412.826 | 74.23 | peak | -5.50 | 68.73 | 74.00 | 179 | 237 | -5.27 | |
| | 2412.826 | 47.65 | AVG | -5.50 | 42.15 | 54.00 | 179 | 237 | -11.85 | |
| | 2548.517 | 73.24 | peak | -4.90 | 68.34 | 74.00 | 185 | 290 | -5.66 | |
| | 2548.517 | 46.27 | AVG | -4.90 | 41.37 | 54.00 | 185 | 290 | -12.63 | |

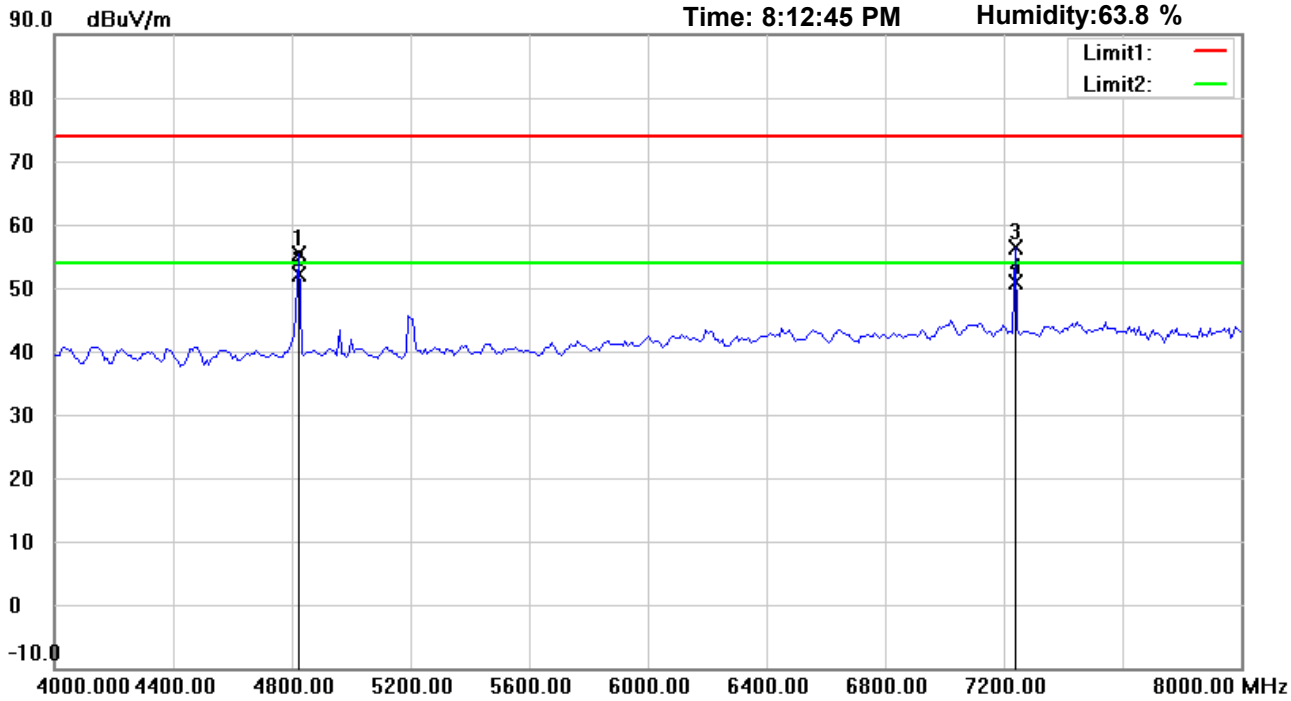
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#2 | Date: 10/10/2019 | Time: 8:12:45 PM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4825.651 | 57.19 | peak | -1.87 | 55.32 | 74.00 | 150 | 275 | -18.68 | |
| * | 4825.651 | 54.08 | AVG | -1.87 | 52.21 | 54.00 | 150 | 275 | -1.79 | |
| | 7238.477 | 53.15 | peak | 3.28 | 56.43 | 74.00 | 155 | 196 | -17.57 | |
| | 7238.477 | 47.57 | AVG | 3.28 | 50.85 | 54.00 | 155 | 196 | -3.15 | |

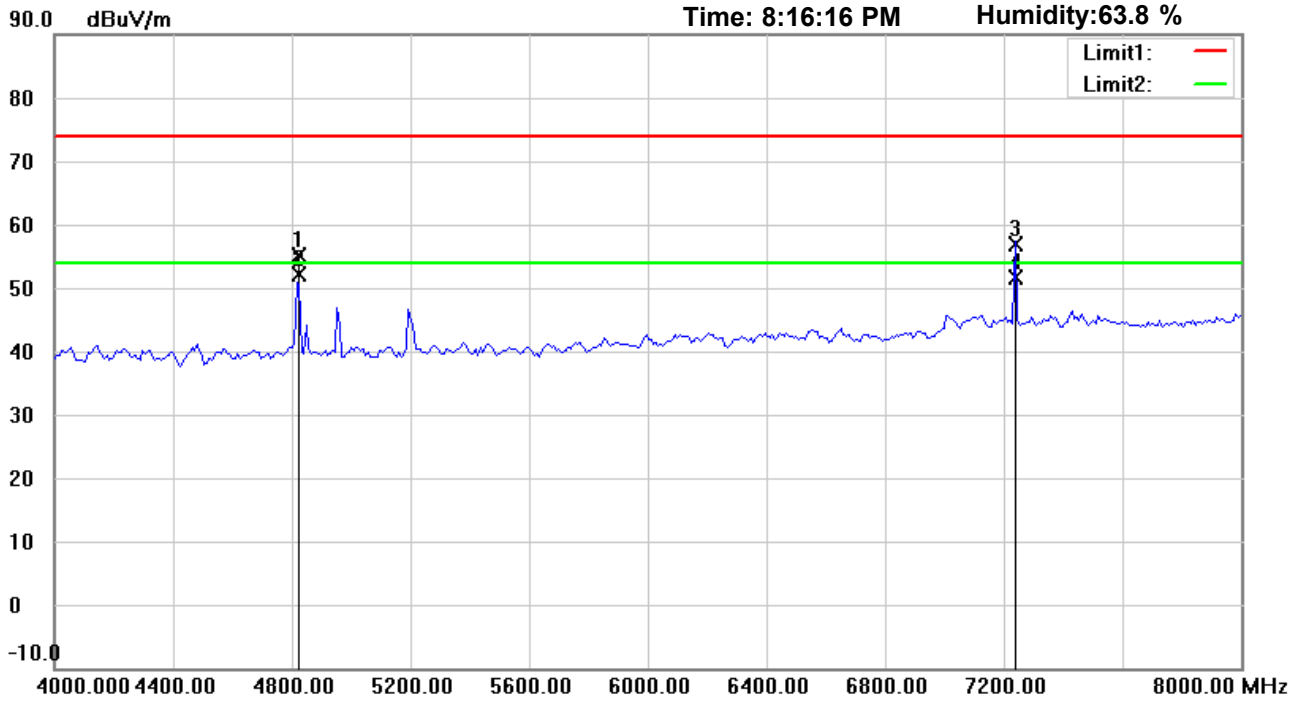
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#7 | Date: 10/10/2019 | Time: 8:16:16 PM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4824.063 | 57.07 | peak | -1.88 | 55.19 | 74.00 | 150 | 119 | -18.81 | |
| * | 4824.063 | 54.12 | AVG | -1.88 | 52.24 | 54.00 | 150 | 119 | -1.76 | |
| | 7236.804 | 53.66 | peak | 3.28 | 56.94 | 74.00 | 181 | 240 | -17.06 | |
| | 7236.804 | 48.27 | AVG | 3.28 | 51.55 | 54.00 | 181 | 240 | -2.45 | |

*:Maximum data x:Over limit !:over margin

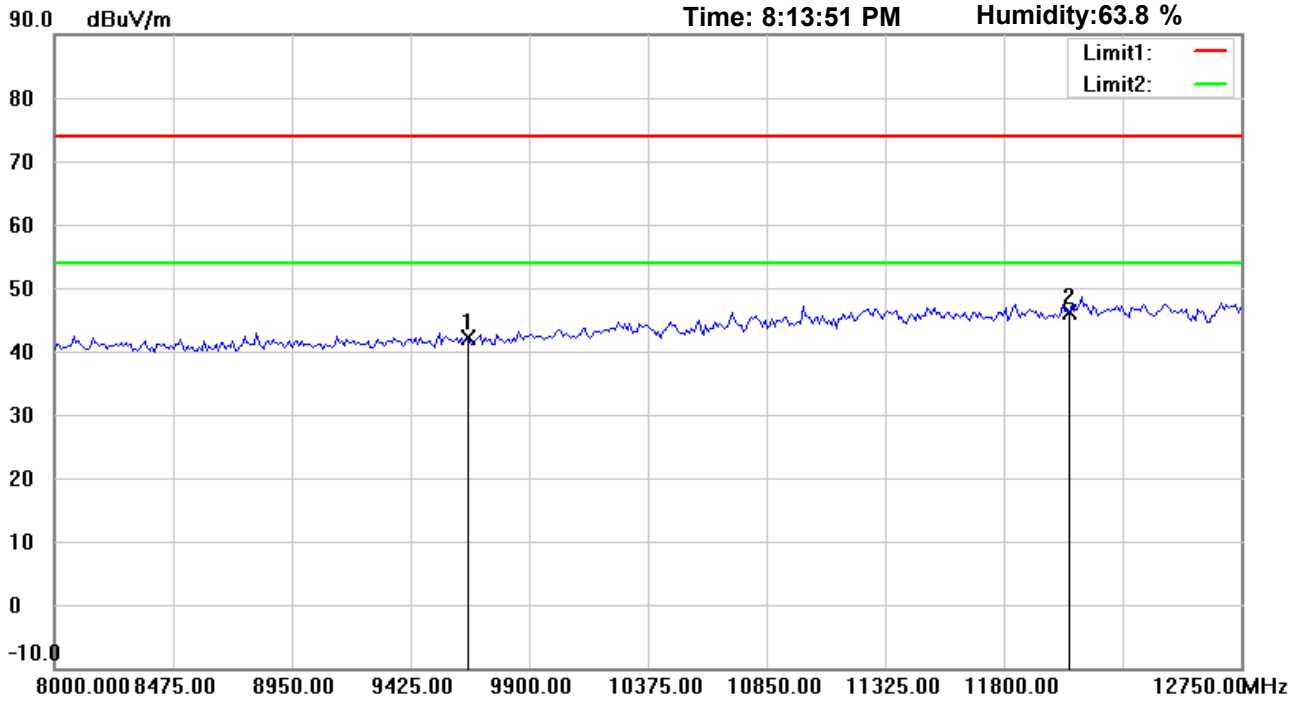
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 Data :#3 Date: 10/10/2019 Time: 8:13:51 PM

Temperature:25.0 ℃
Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9648.000 | 35.59 | peak | 6.60 | 42.19 | 74.00 | 150 | 53 | -31.81 | |
| * | 12060.000 | 34.03 | peak | 12.21 | 46.24 | 74.00 | 150 | 270 | -27.76 | |

*:Maximum data x:Over limit !:over margin

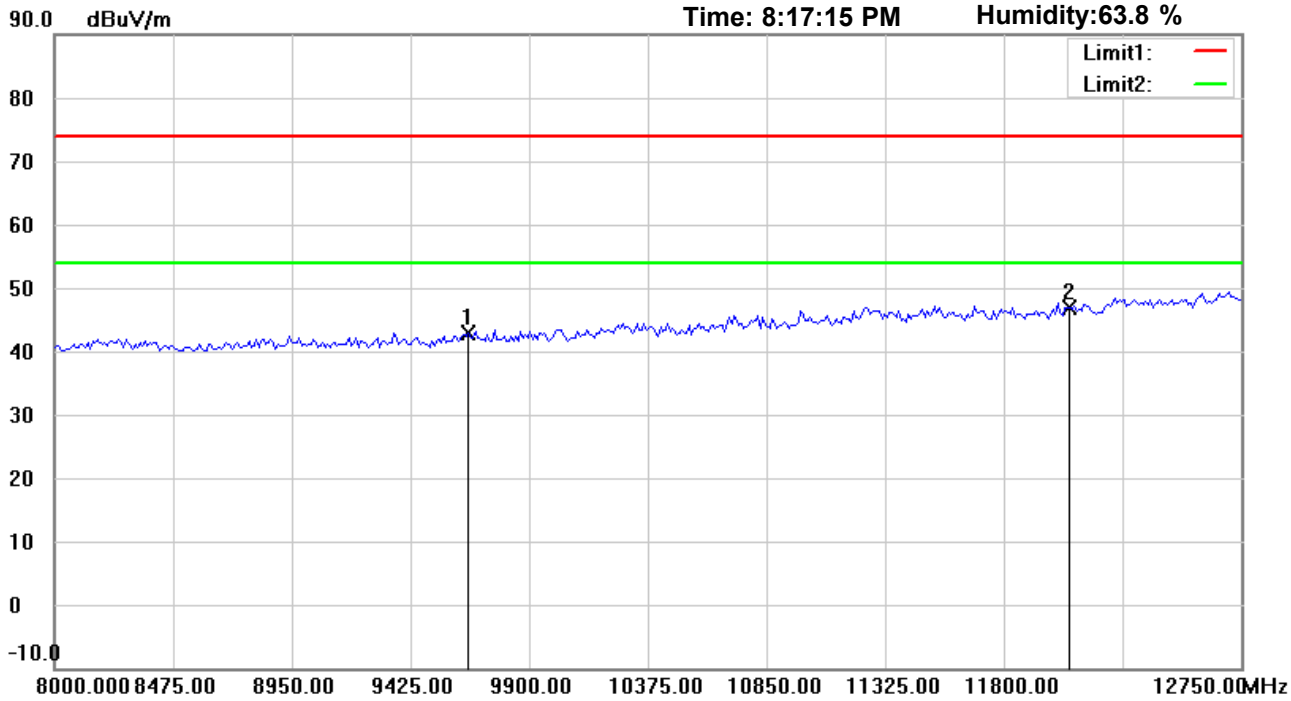
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 Data :#8 Date: 10/10/2019 Time: 8:17:15 PM

Temperature:25.0 ℃
Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9648.000 | 36.21 | peak | 6.60 | 42.81 | 74.00 | 150 | 175 | -31.19 | |
| * | 12060.000 | 34.66 | peak | 12.21 | 46.87 | 74.00 | 150 | 230 | -27.13 | |

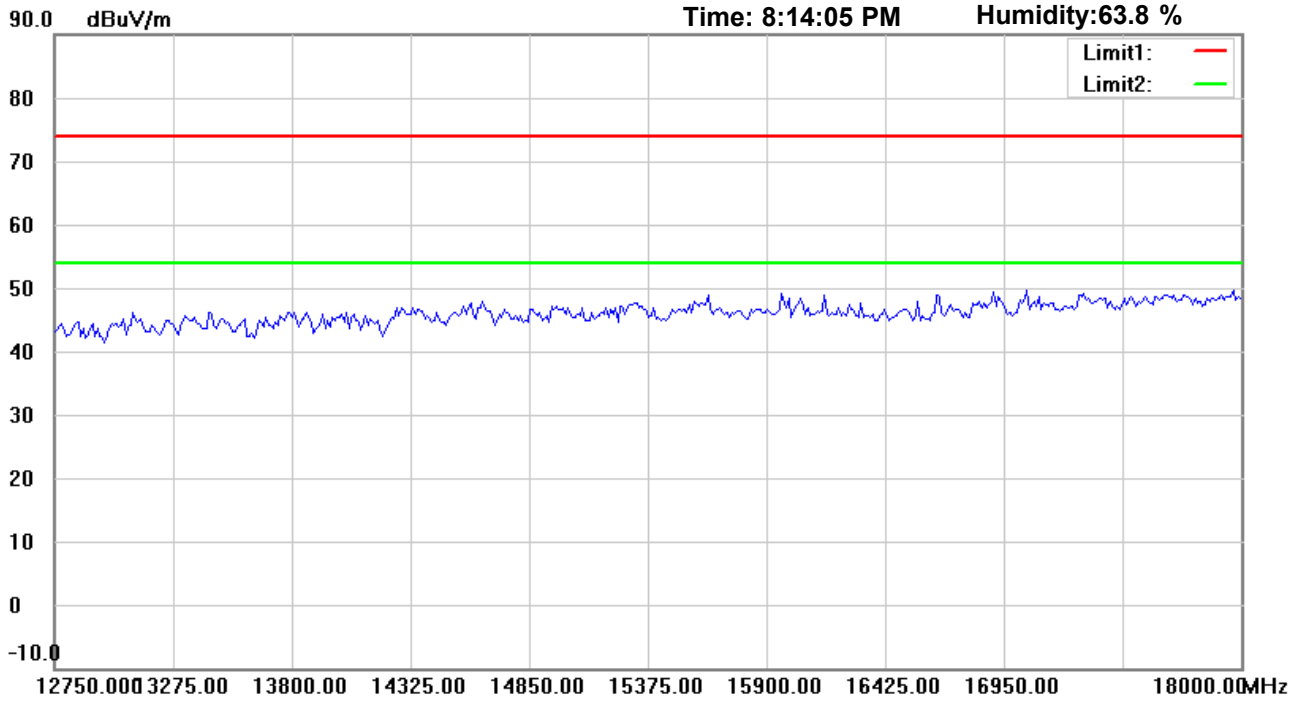
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#4 | Date: 10/10/2019 | Time: 8:14:05 PM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

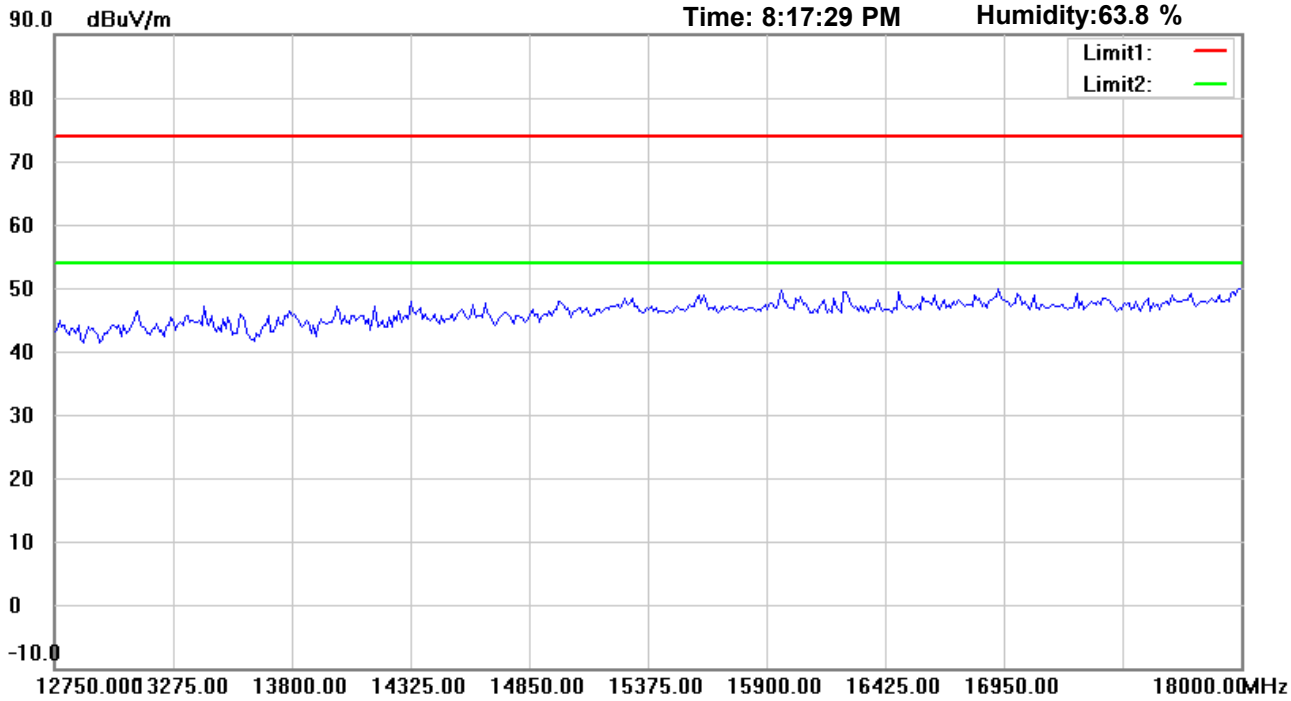
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 Data :#9 Date: 10/10/2019 Time: 8:17:29 PM

Temperature:25.0 ℃
Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

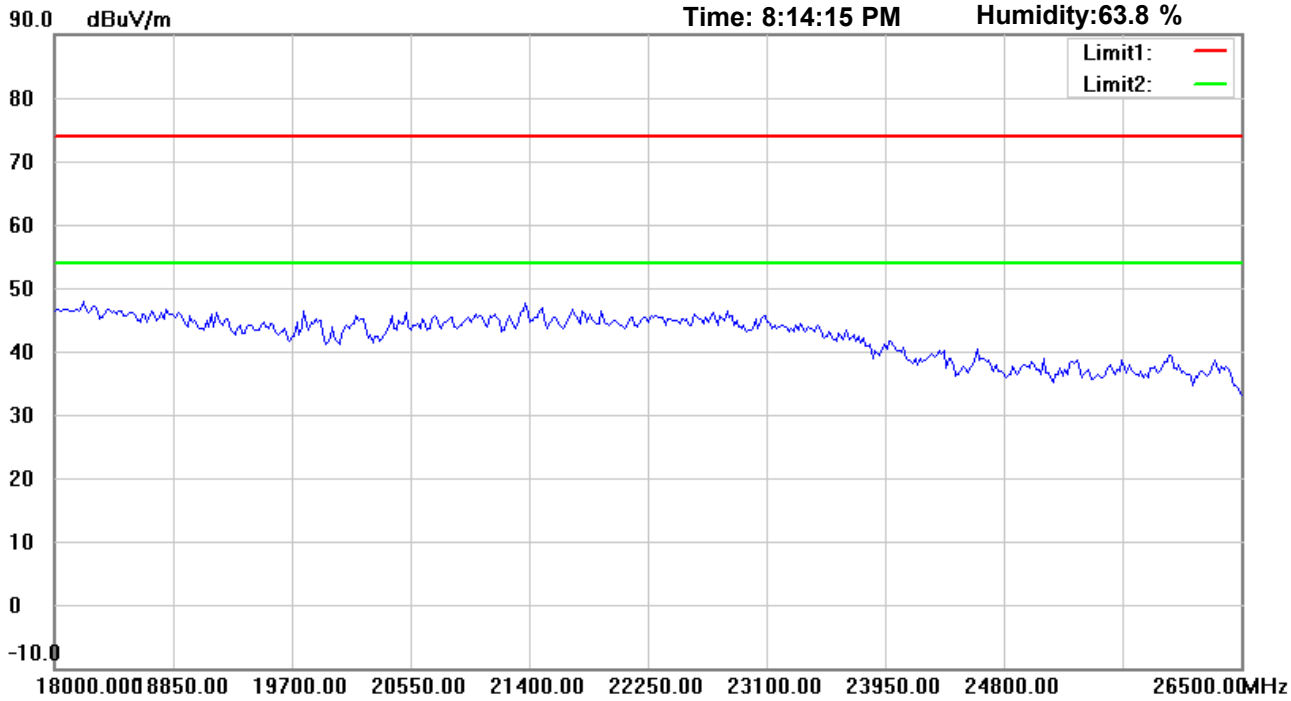
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 Data :#5 Date: 10/10/2019 Time: 8:14:15 PM

Temperature:25.0 ℃
Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

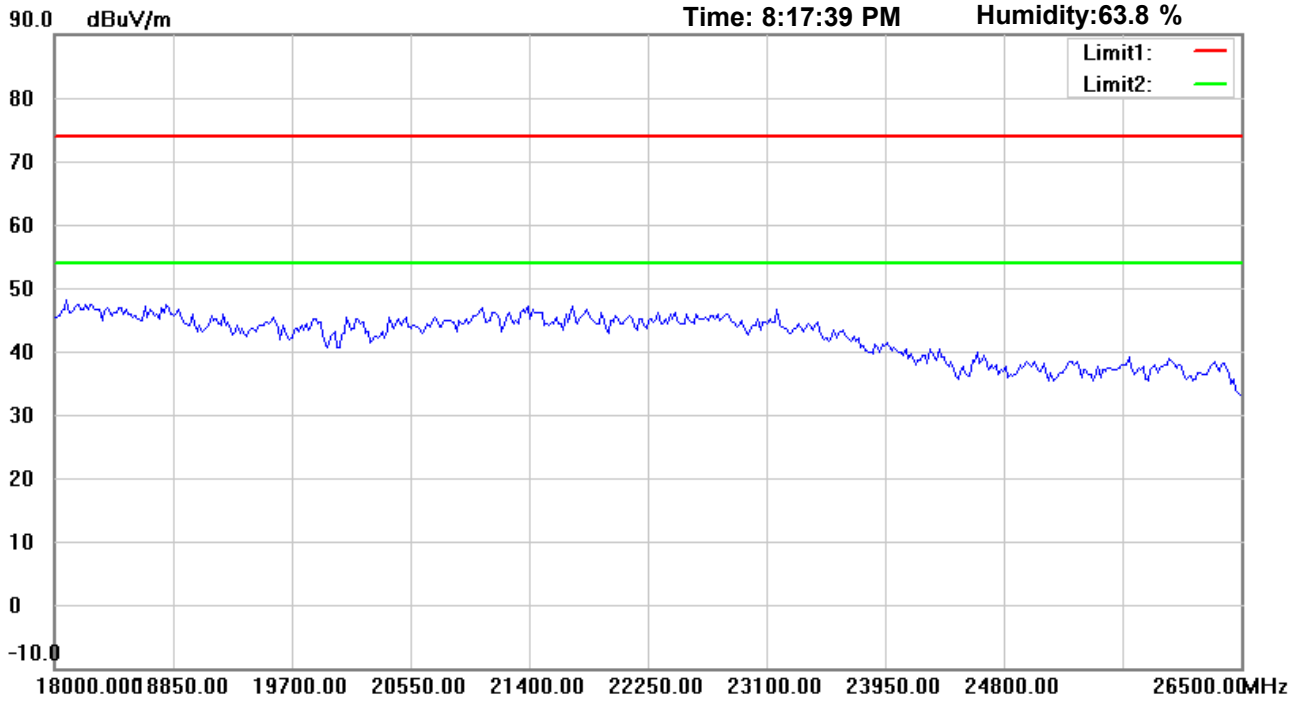
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#10 | Date: 10/10/2019 | Time: 8:17:39 PM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

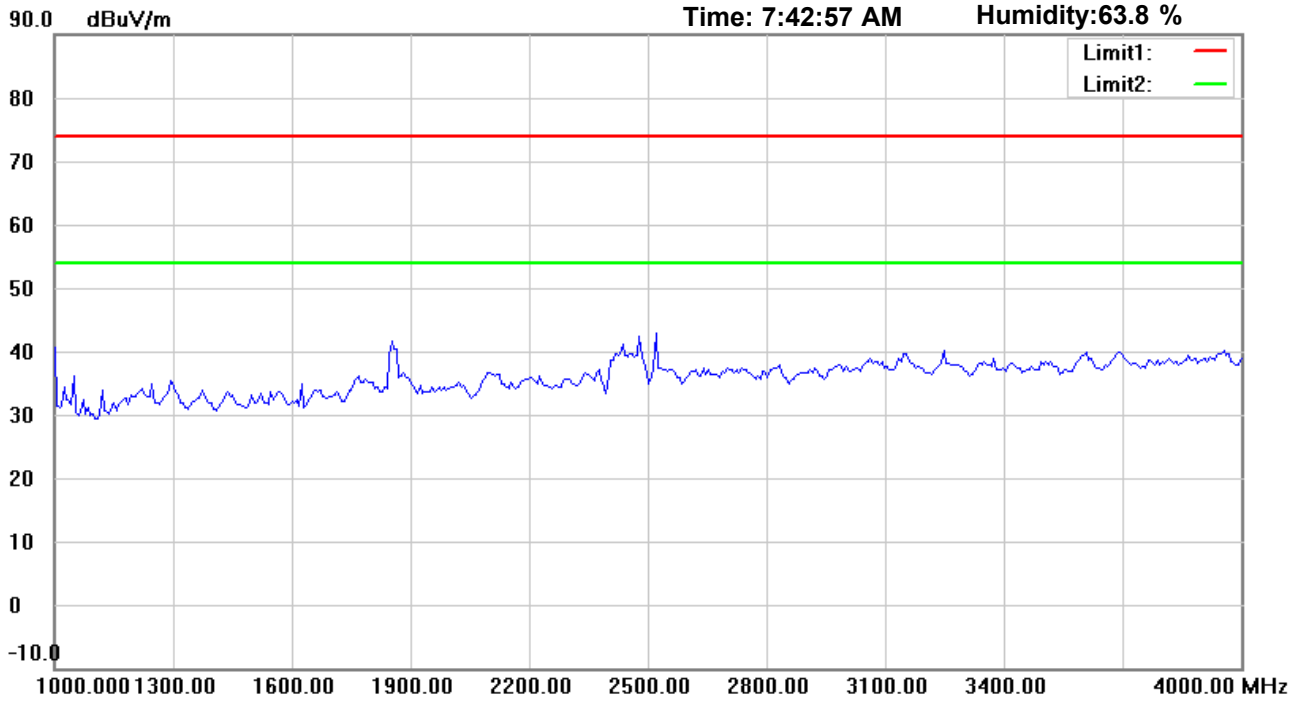
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#1 | Date: 10/11/2019 | Time: 7:42:57 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

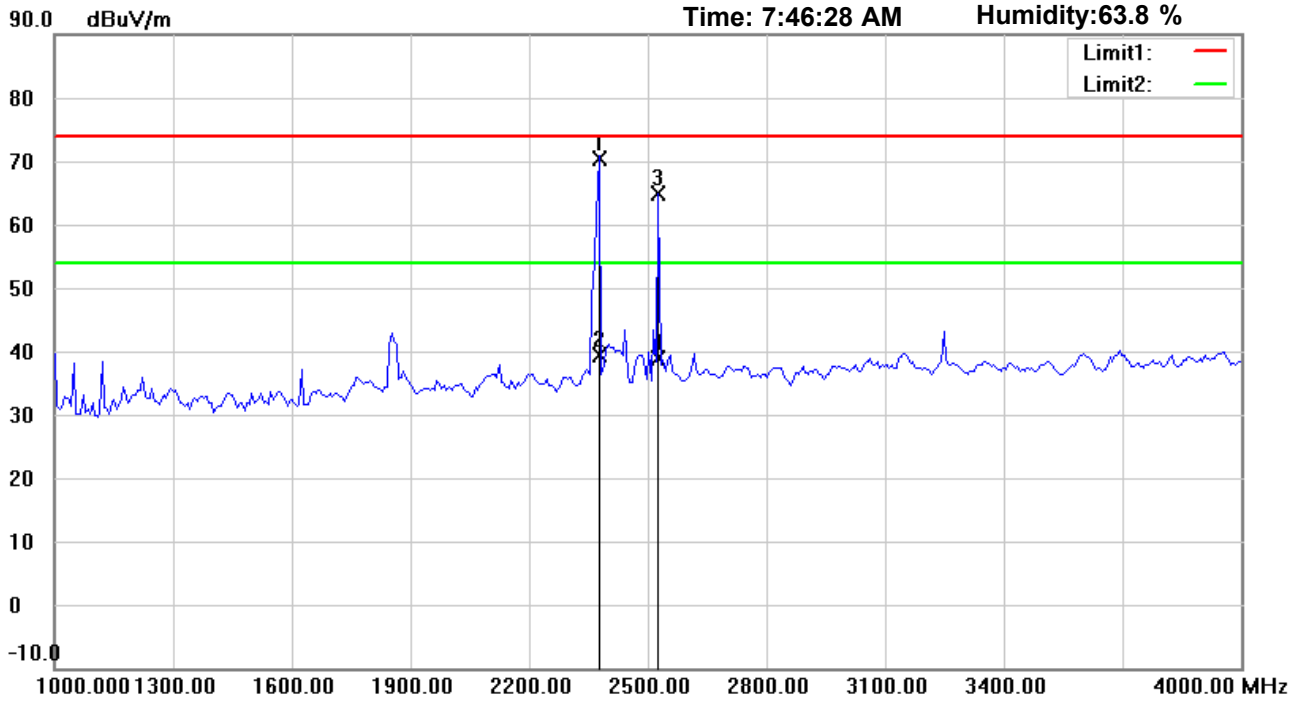
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#6 | Date: 10/11/2019 | Time: 7:46:28 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| * | 2375.015 | 76.25 | peak | -5.89 | 70.36 | 74.00 | 190 | 119 | -3.64 | |
| | 2375.015 | 45.31 | AVG | -5.89 | 39.42 | 54.00 | 190 | 119 | -14.58 | |
| | 2527.054 | 69.59 | peak | -4.75 | 64.84 | 74.00 | 135 | 237 | -9.16 | |
| | 2527.054 | 43.57 | AVG | -4.75 | 38.82 | 54.00 | 135 | 237 | -15.18 | |

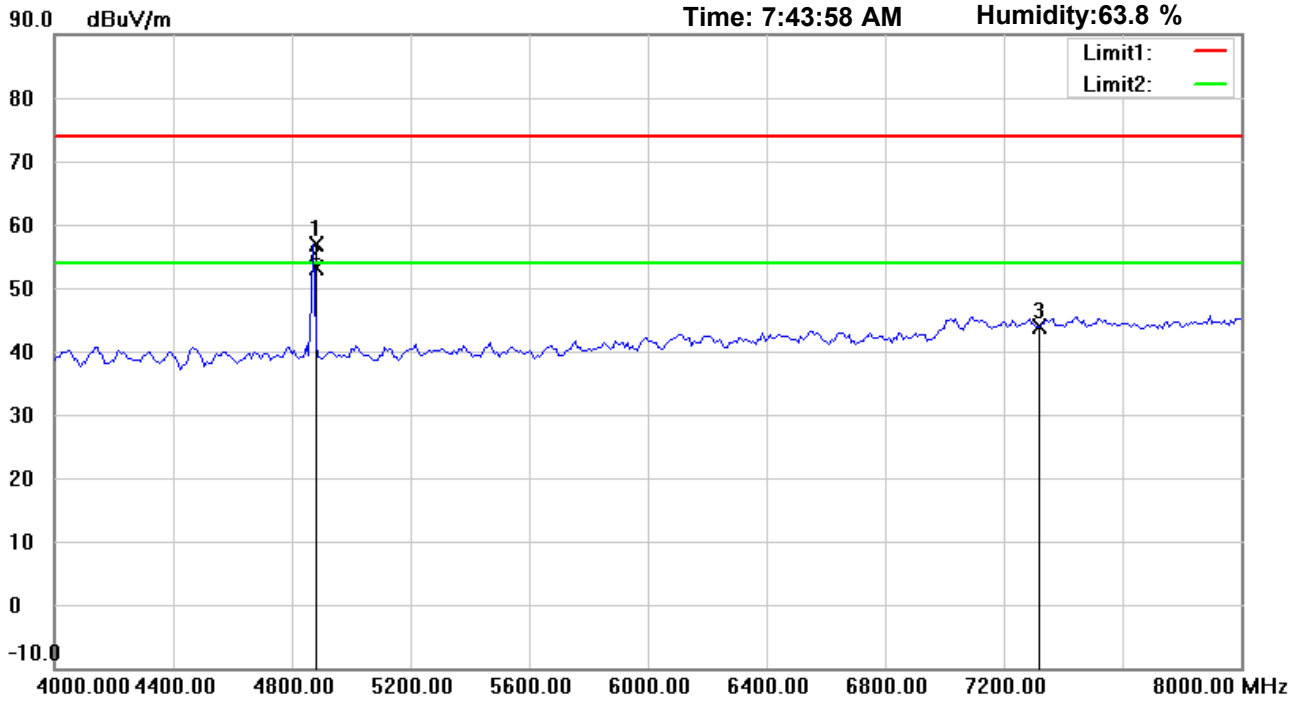
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#2 | Date: 10/11/2019 | Time: 7:43:58 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4873.748 | 58.54 | peak | -1.70 | 56.84 | 74.00 | 170 | 125 | -17.16 | |
| * | 4873.748 | 54.81 | AVG | -1.70 | 53.11 | 54.00 | 170 | 125 | -0.89 | |
| | 7311.000 | 40.58 | peak | 3.42 | 44.00 | 74.00 | 150 | 90 | -30.00 | |

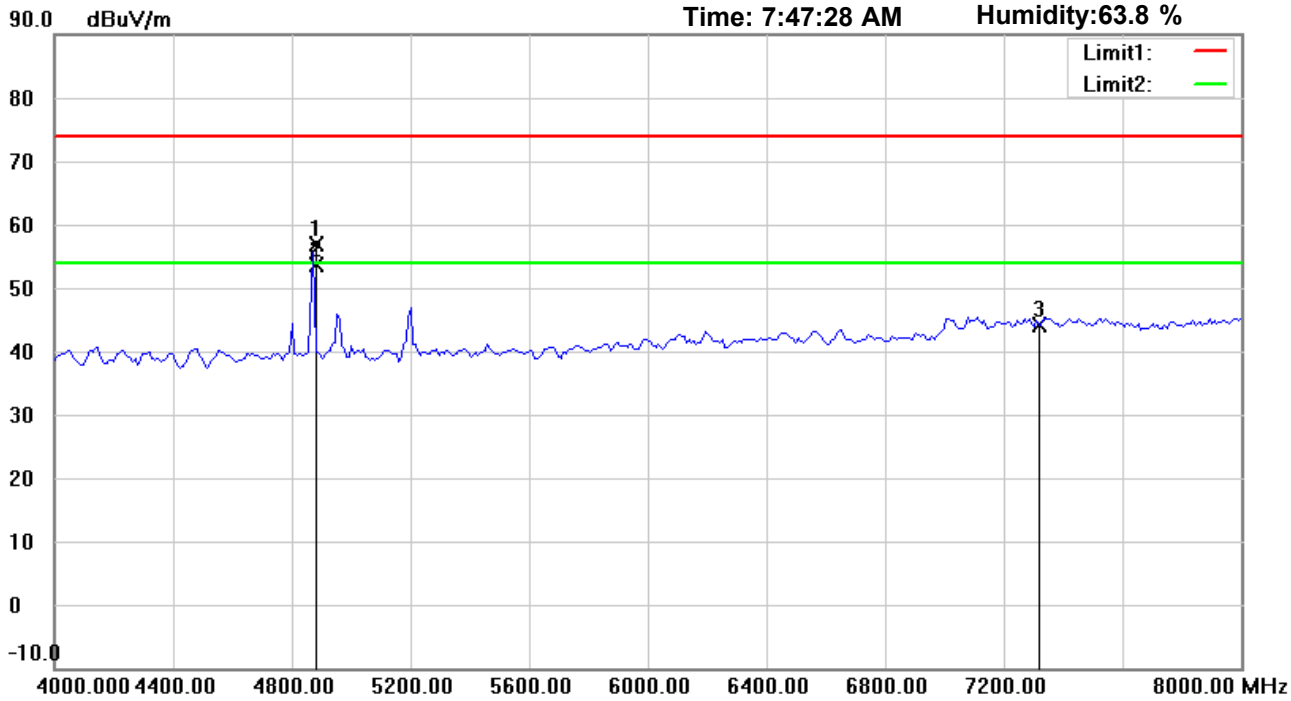
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#7 | Date: 10/11/2019 | Time: 7:47:28 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4873.953 | 58.56 | peak | -1.70 | 56.86 | 74.00 | 205 | 100 | -17.14 | |
| * | 4873.953 | 55.38 | AVG | -1.70 | 53.68 | 54.00 | 205 | 100 | -0.32 | |
| | 7311.000 | 40.82 | peak | 3.42 | 44.24 | 74.00 | 150 | 375 | -29.76 | |

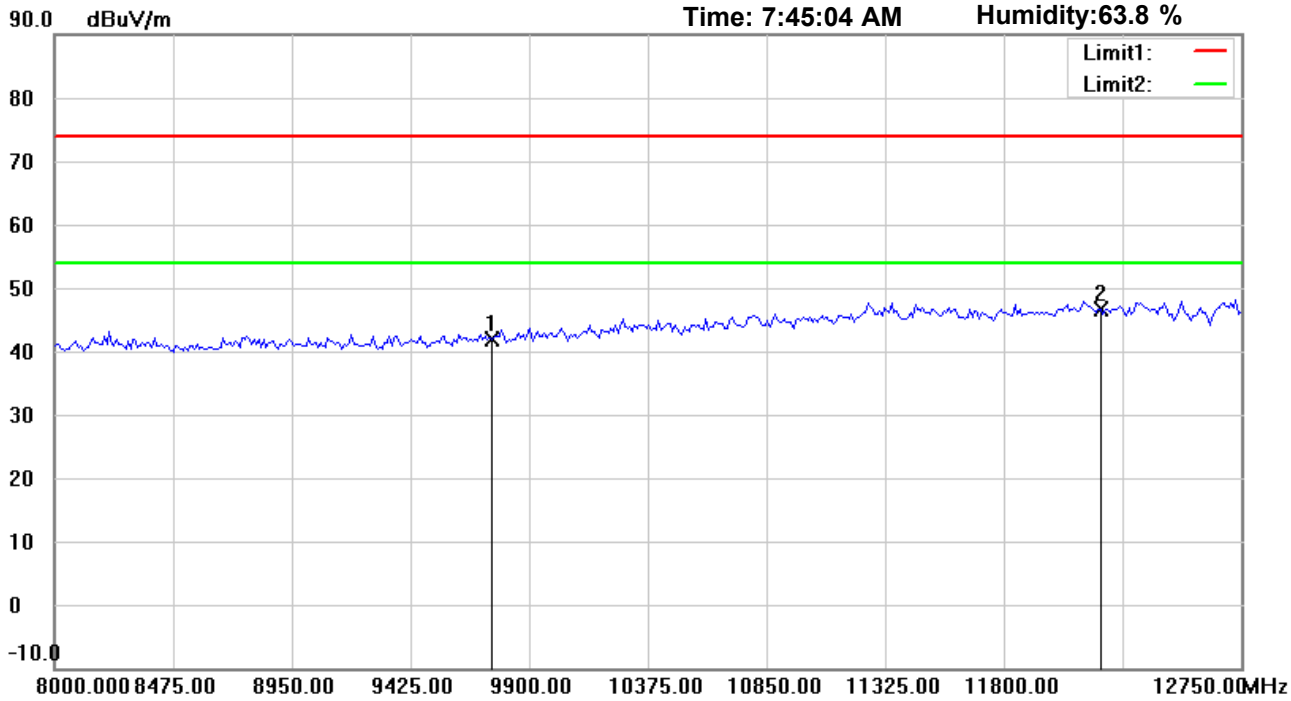
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#3 | Date: 10/11/2019 | Time: 7:45:04 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9748.000 | 35.15 | peak | 6.75 | 41.90 | 74.00 | 150 | 257 | -32.10 | |
| * | 12185.000 | 33.78 | peak | 12.83 | 46.61 | 74.00 | 150 | 140 | -27.39 | |

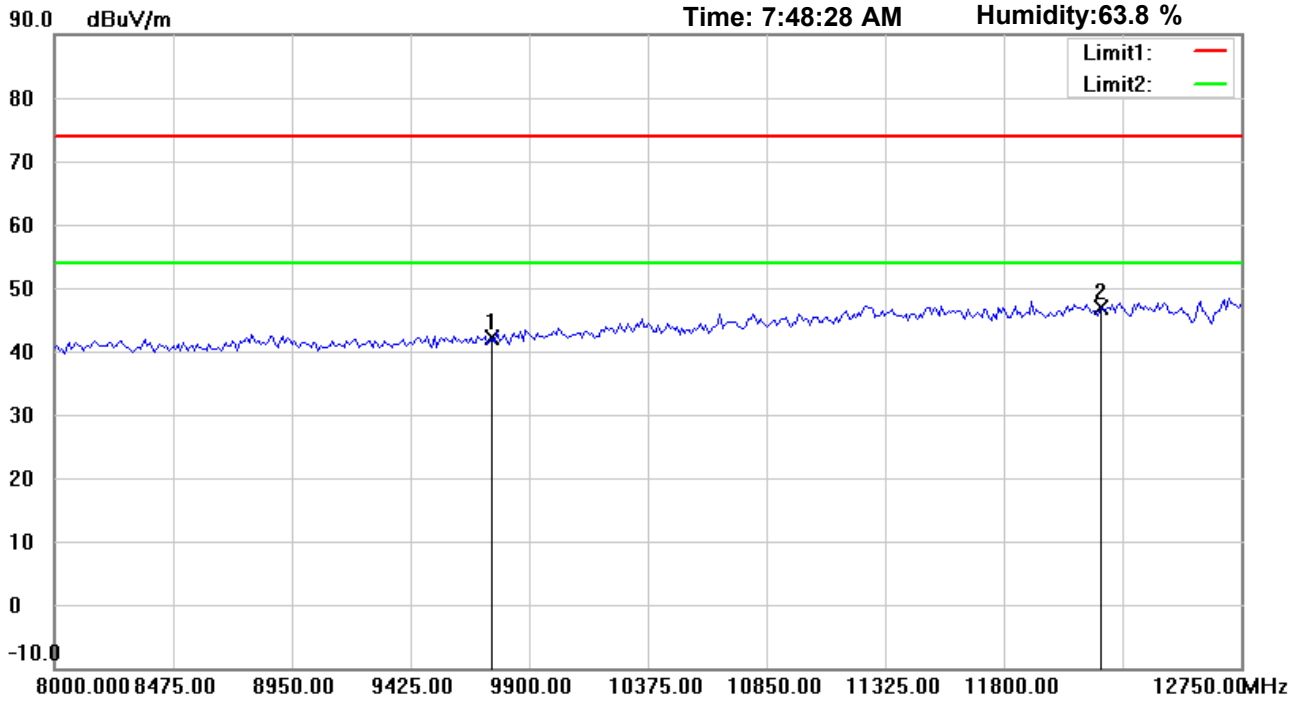
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#8 | Date: 10/11/2019 | Time: 7:48:28 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9748.000 | 35.41 | peak | 6.75 | 42.16 | 74.00 | 150 | 75 | -31.84 | |
| * | 12185.000 | 34.02 | peak | 12.83 | 46.85 | 74.00 | 150 | 240 | -27.15 | |

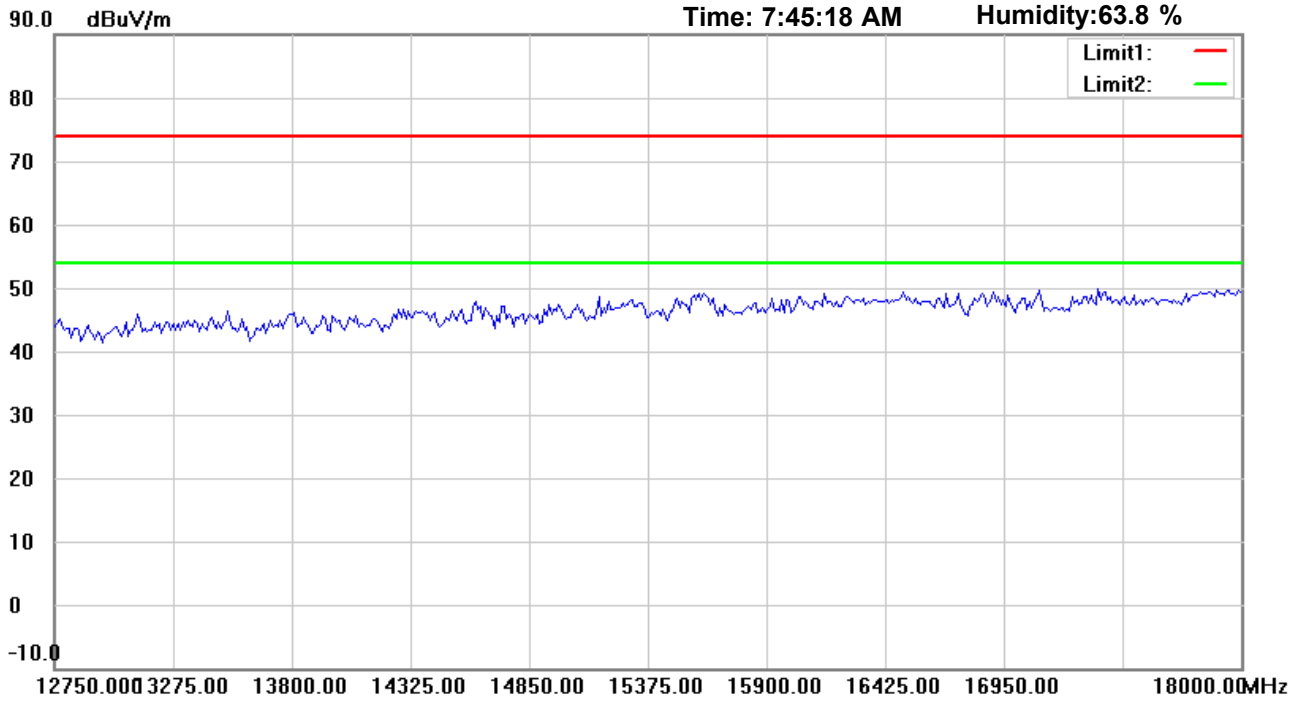
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#4 | Date: 10/11/2019 | Time: 7:45:18 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
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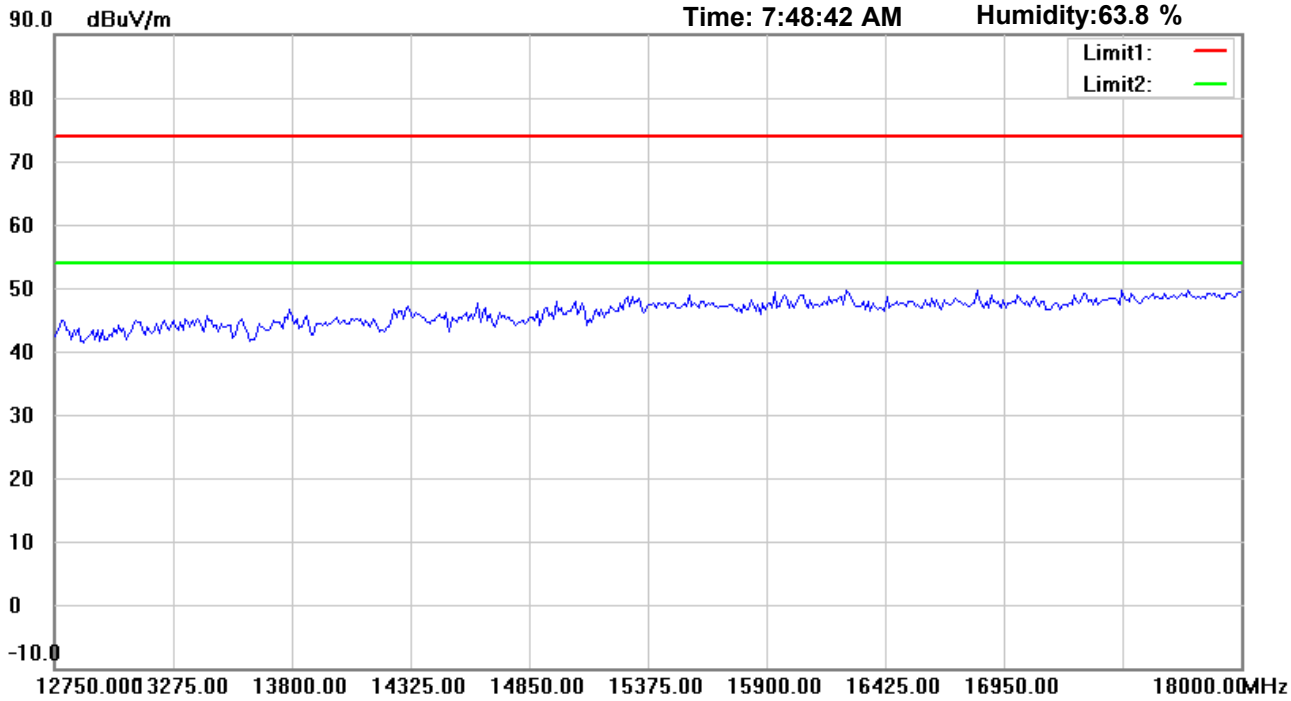
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#9 | Date: 10/11/2019 | Time: 7:48:42 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
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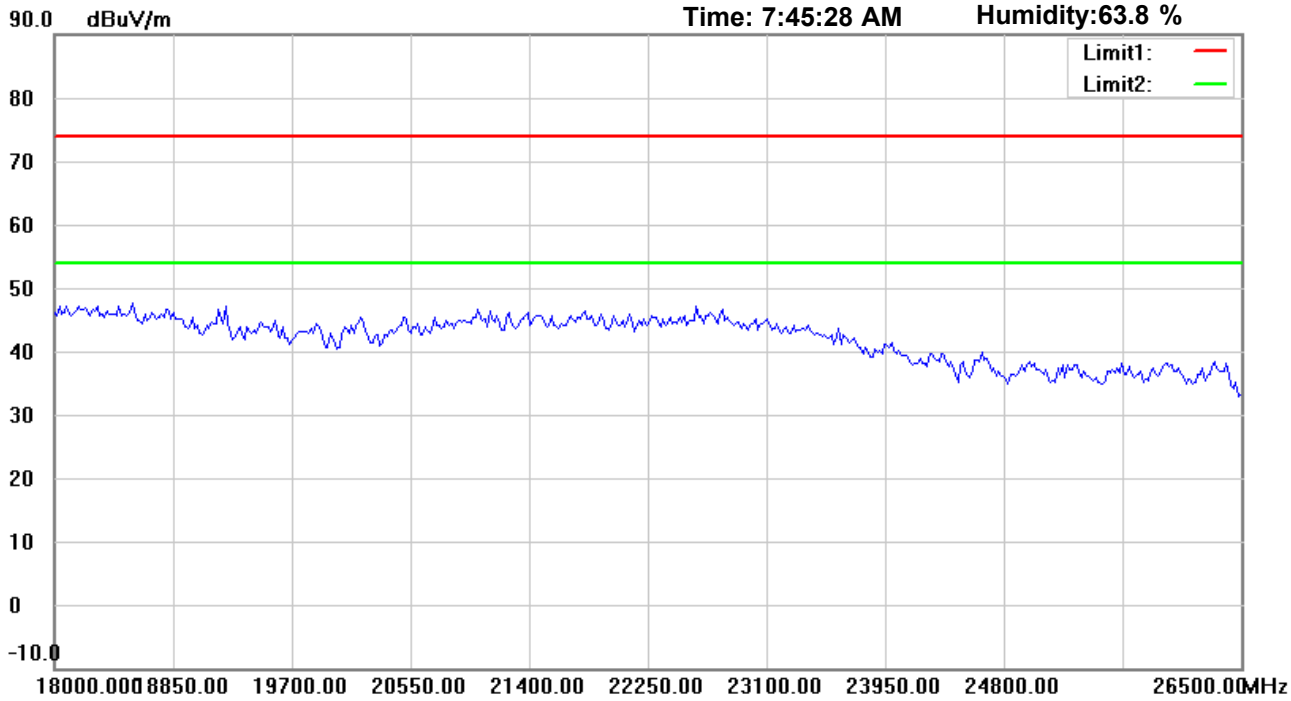
## Radiated Emission Measurement

Operator: Leon

File :3 Data :#5 Date: 10/11/2019 Time: 7:45:28 AM

Temperature:25.0 ℃
Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

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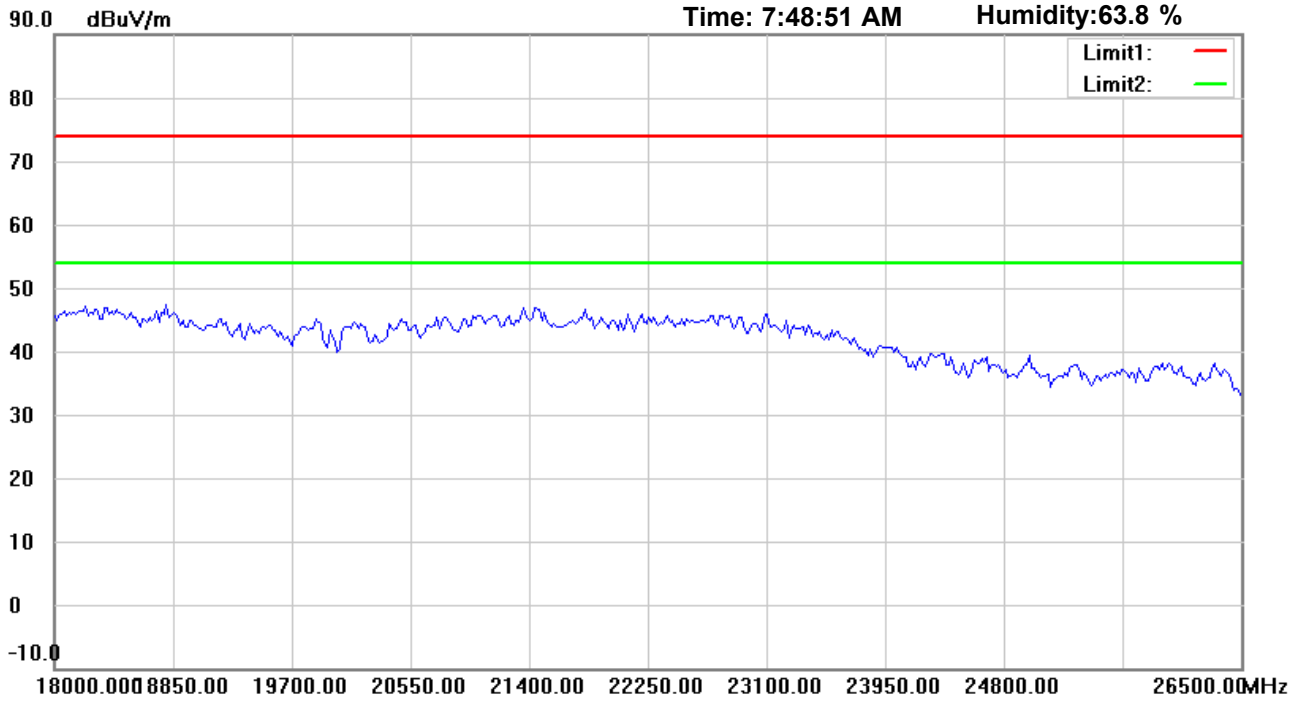
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#10 | Date: 10/11/2019 | Time: 7:48:51 AM | Temperature:25.0 ℃ | Humidity:63.8 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH6

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

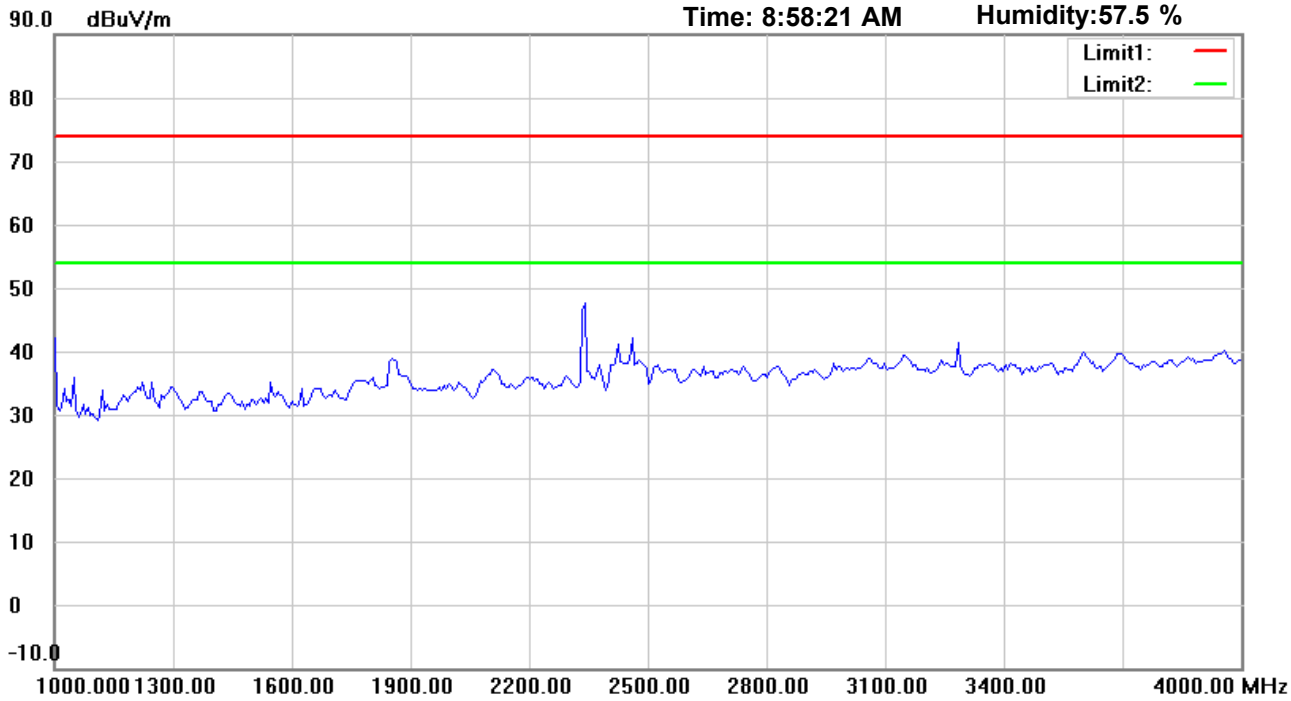
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#1 | Date: 10/11/2019 | Time: 8:58:21 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

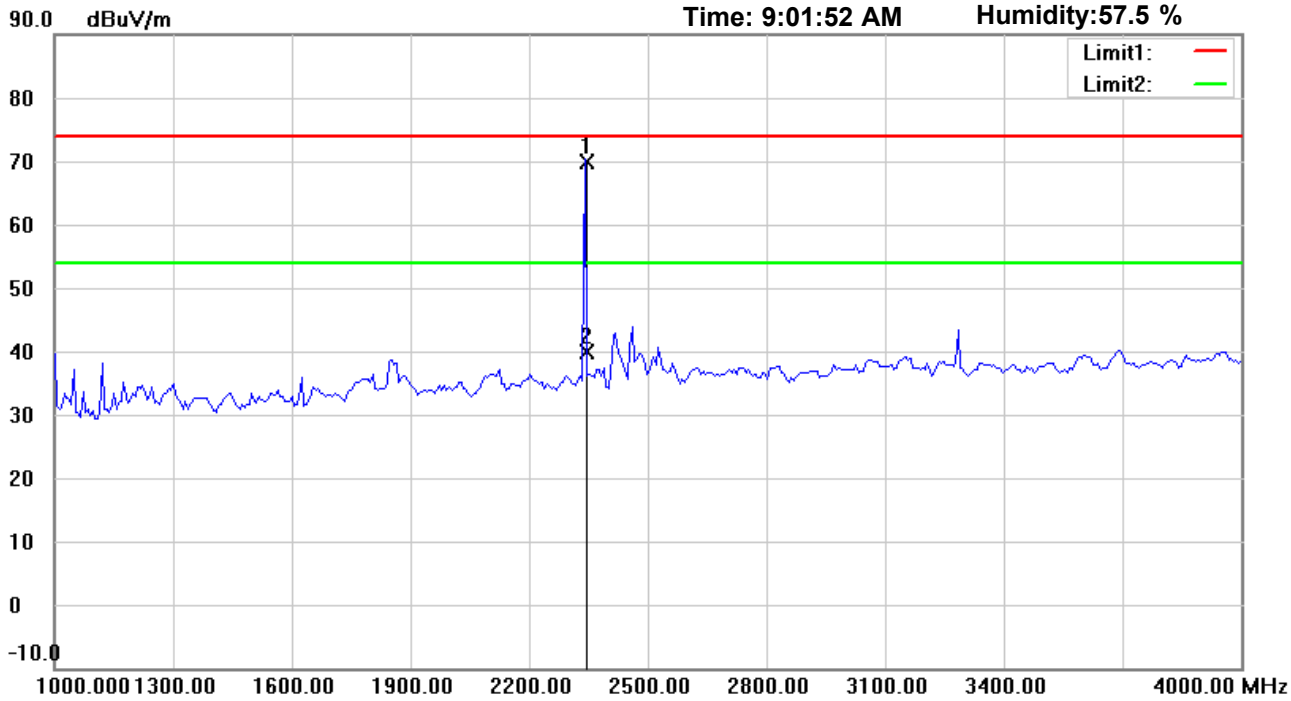
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#6 | Date: 10/11/2019 | Time: 9:01:52 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| * | 2343.056 | 76.20 | peak | -6.20 | 70.00 | 74.00 | 260 | 119 | -4.00 | |
| | 2343.056 | 45.97 | AVG | -6.20 | 39.77 | 54.00 | 260 | 119 | -14.23 | |

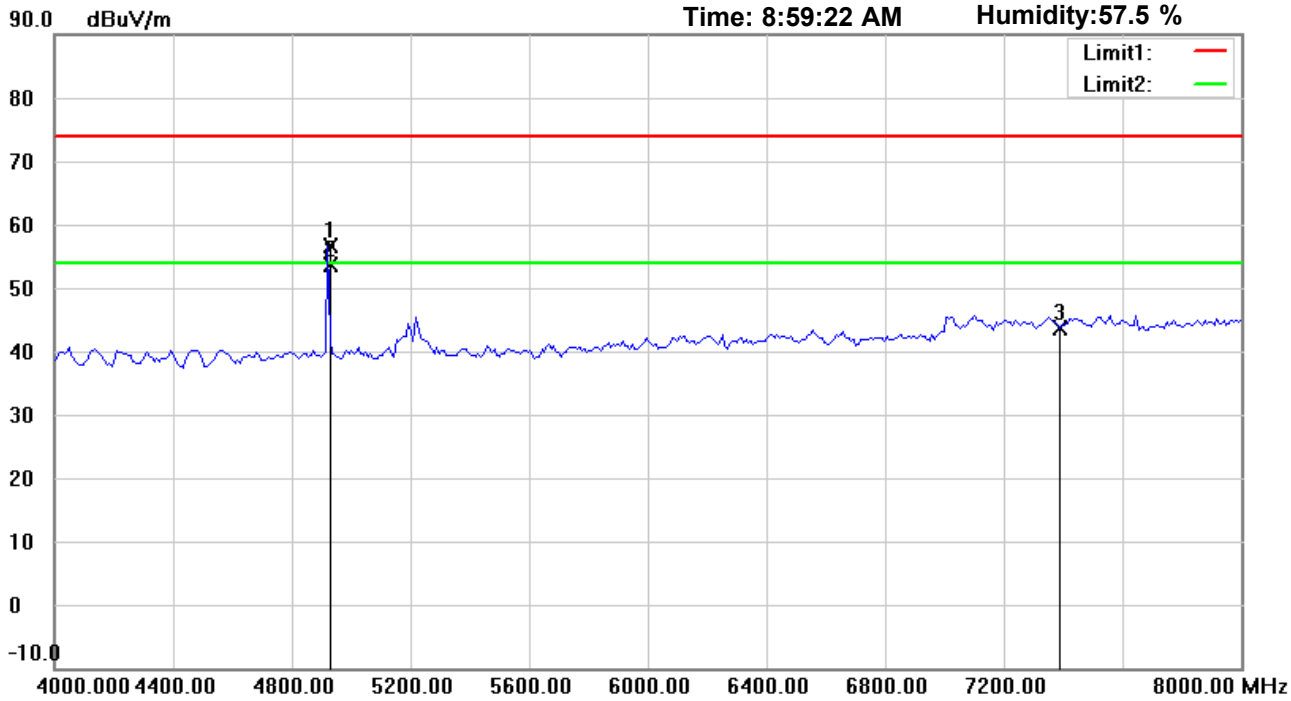
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#2 | Date: 10/11/2019 | Time: 8:59:22 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4924.013 | 58.04 | peak | -1.51 | 56.53 | 74.00 | 240 | 155 | -17.47 | |
| * | 4924.013 | 55.13 | AVG | -1.51 | 53.62 | 54.00 | 240 | 155 | -0.38 | |
| | 7386.000 | 40.00 | peak | 3.72 | 43.72 | 74.00 | 150 | 117 | -30.28 | |

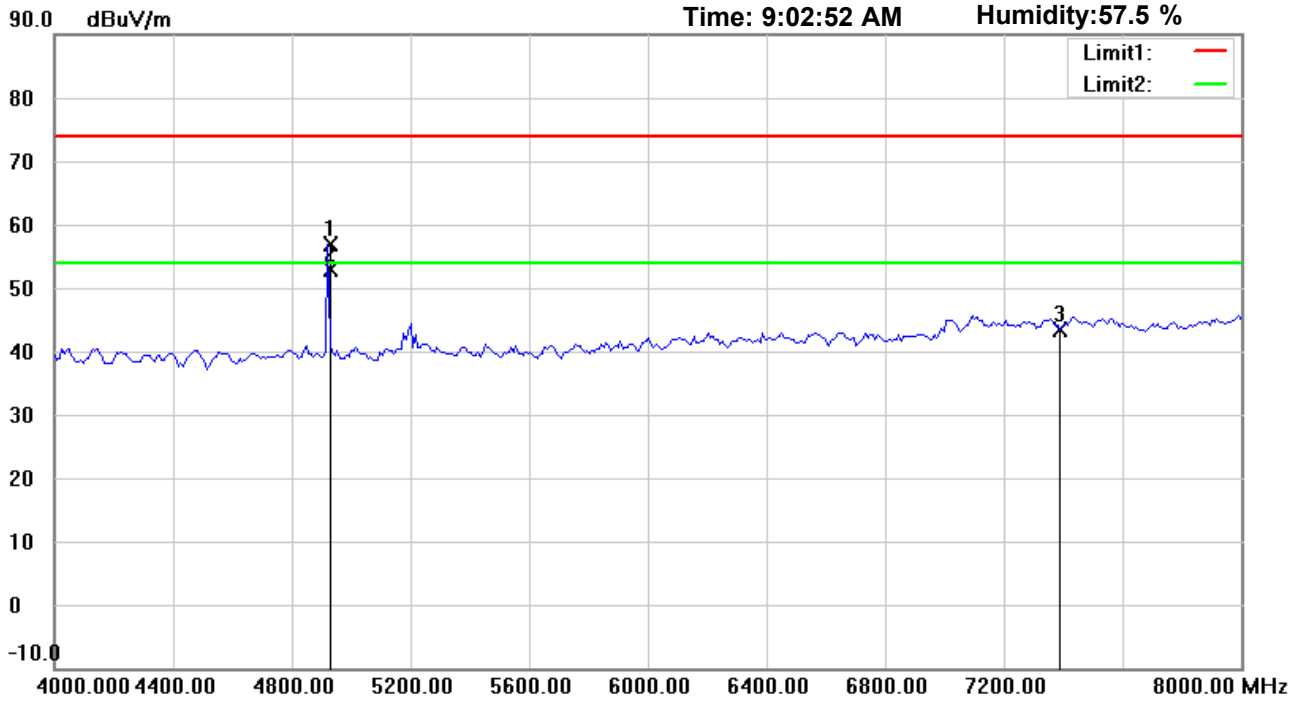
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#7 | Date: 10/11/2019 | Time: 9:02:52 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4921.844 | 58.30 | peak | -1.52 | 56.78 | 74.00 | 175 | 90 | -17.22 | |
| * | 4921.844 | 54.38 | AVG | -1.52 | 52.86 | 54.00 | 175 | 90 | -1.14 | |
| | 7386.000 | 39.62 | peak | 3.72 | 43.34 | 74.00 | 150 | 260 | -30.66 | |

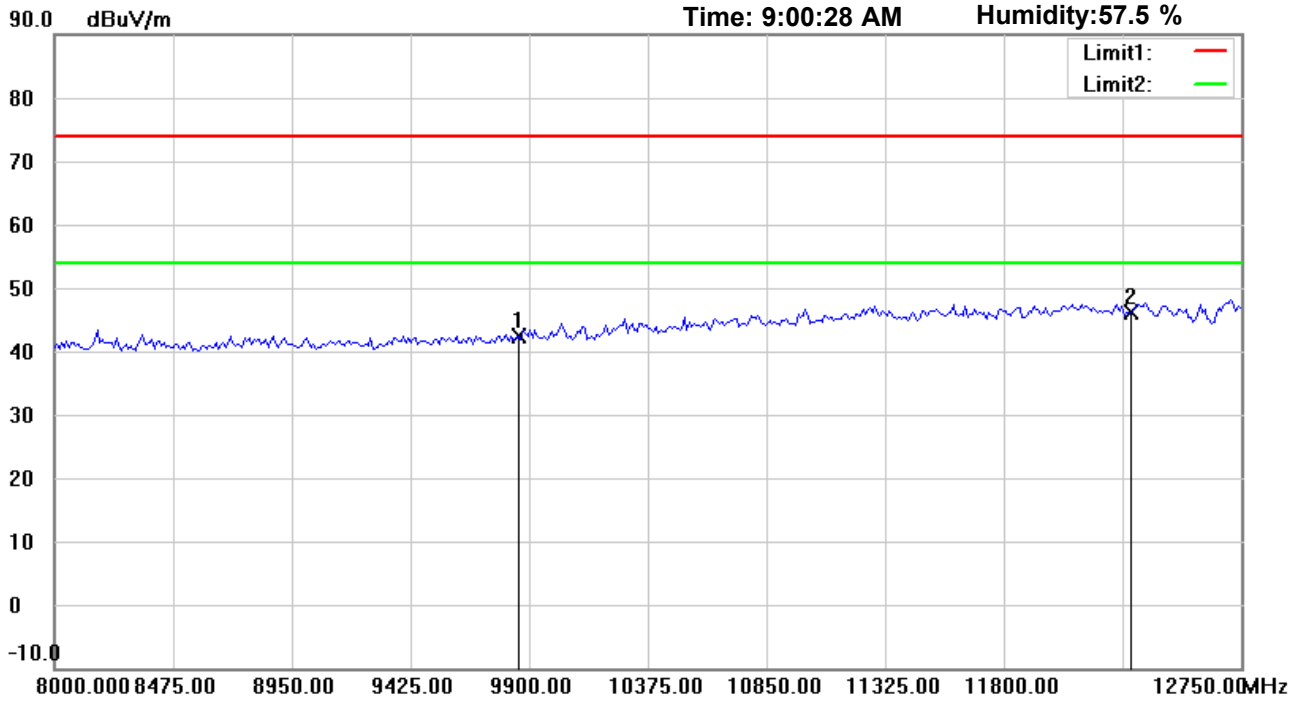
*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#3 | Date: 10/11/2019 | Time: 9:00:28 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9848.000 | 35.54 | peak | 6.96 | 42.50 | 74.00 | 150 | 275 | -31.50 | |
| * | 12310.000 | 33.94 | peak | 12.18 | 46.12 | 74.00 | 150 | 40 | -27.88 | |

*:Maximum data x:Over limit !:over margin

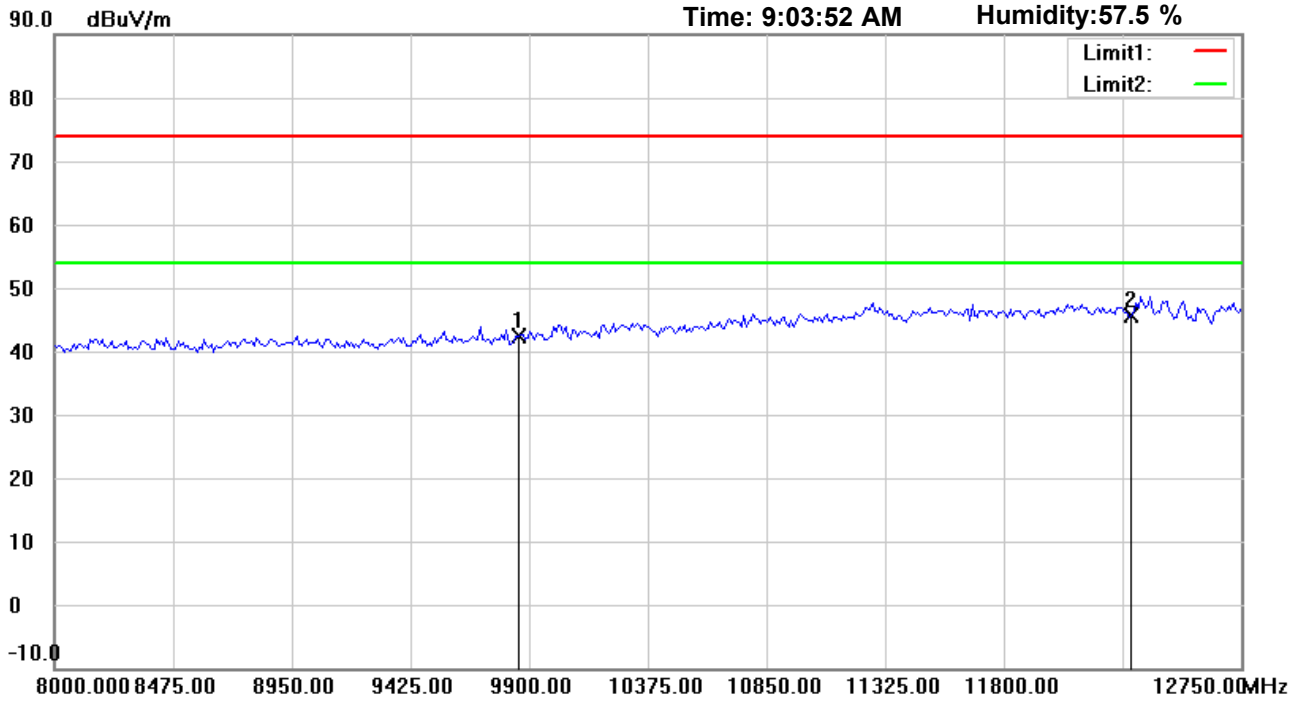
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 Data :#8 Date: 10/11/2019 Time: 9:03:52 AM

Temperature:23.8 ℃
Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9848.000 | 35.33 | peak | 6.96 | 42.29 | 74.00 | 150 | 270 | -31.71 | |
| * | 12310.000 | 33.42 | peak | 12.18 | 45.60 | 74.00 | 150 | 293 | -28.40 | |

*:Maximum data x:Over limit !:over margin

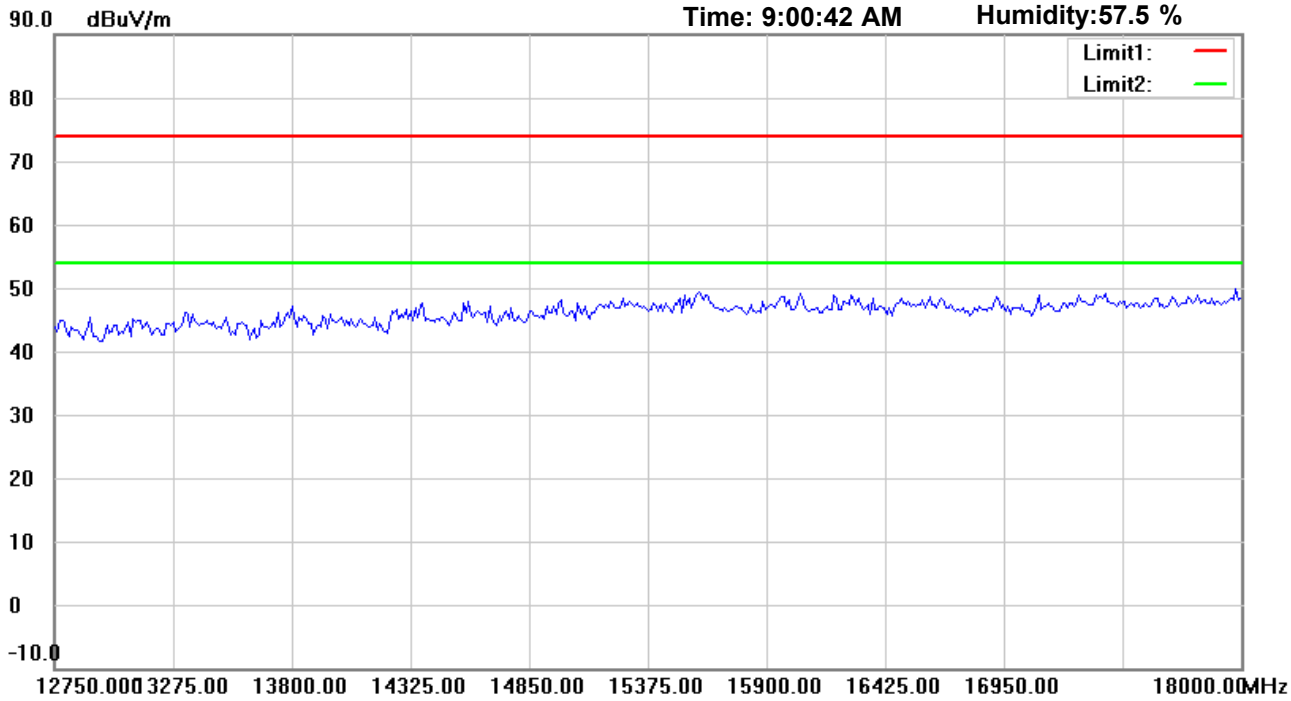
Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
Tel:+886-2-6606-8877
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 Data :#4 Date: 10/11/2019 Time: 9:00:42 AM

Temperature:23.8 ℃
Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

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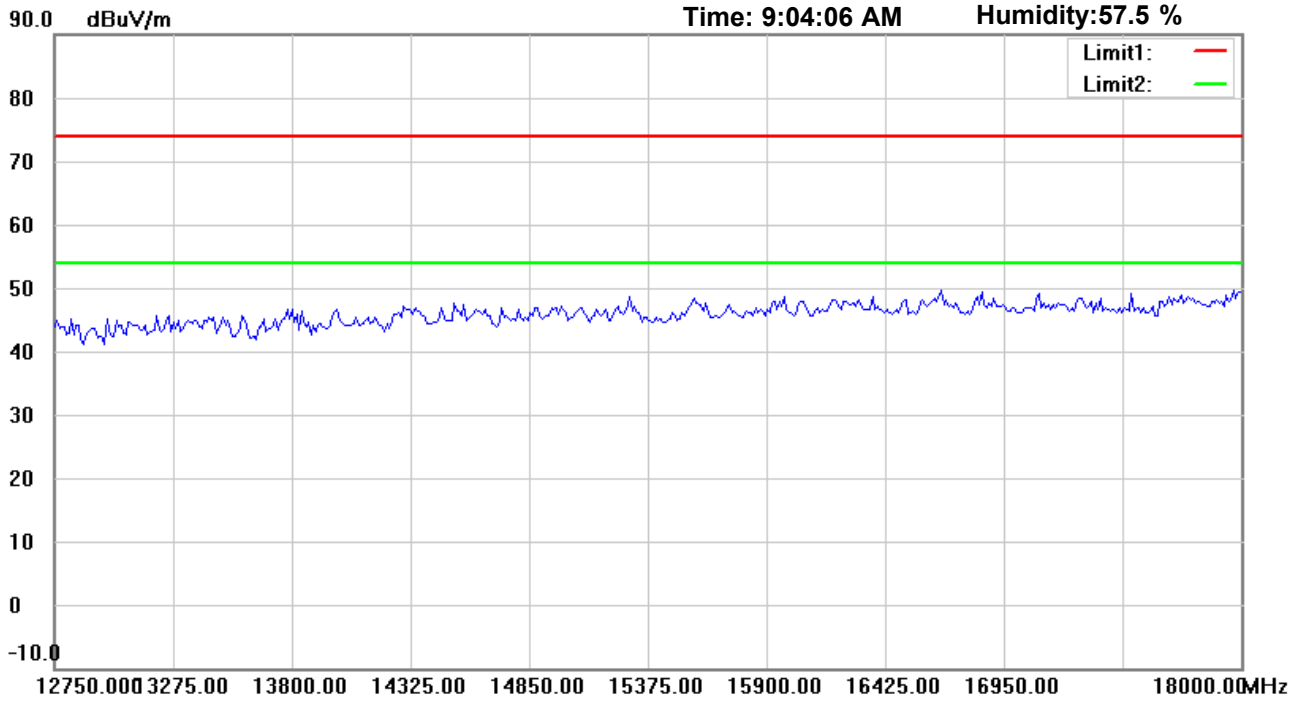
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#9 | Date: 10/11/2019 | Time: 9:04:06 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

Address:6F.,No.58,Ln 188,Ruey Kuang Rd,Neihu,Taipei
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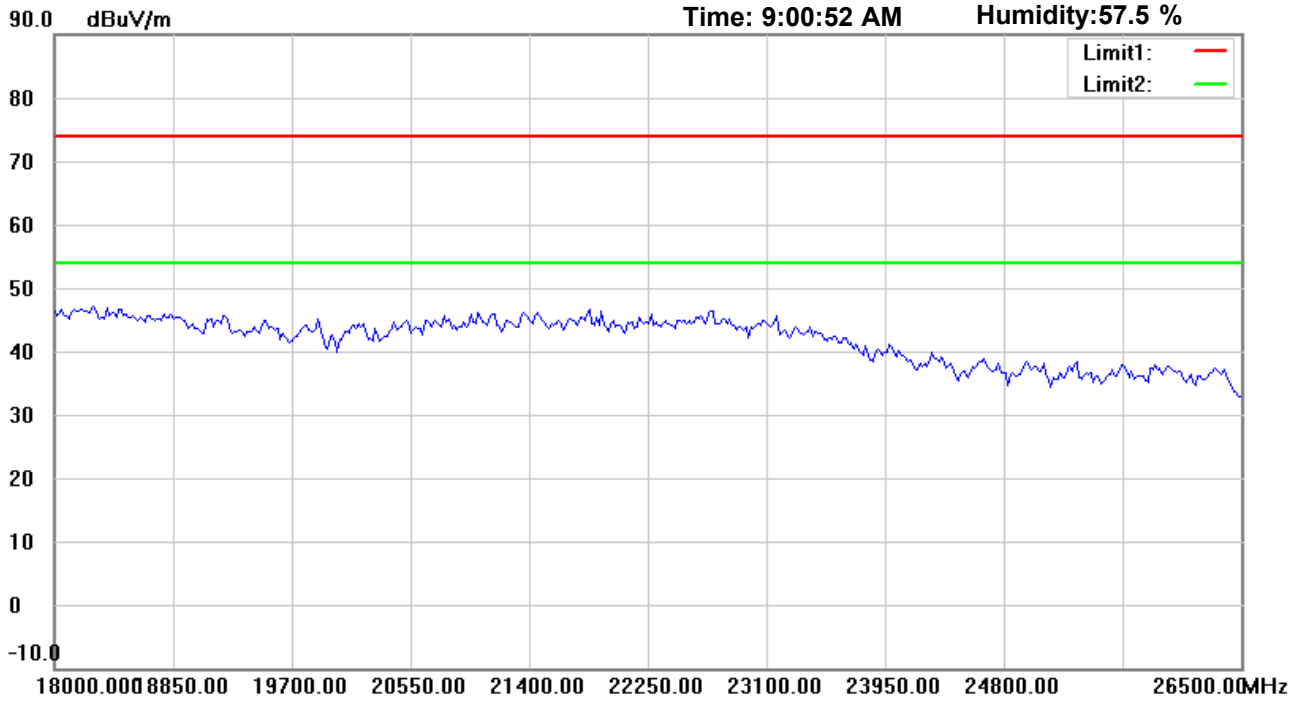
Fax:+886-2-6606-8879

## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#5 | Date: 10/11/2019 | Time: 9:00:52 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

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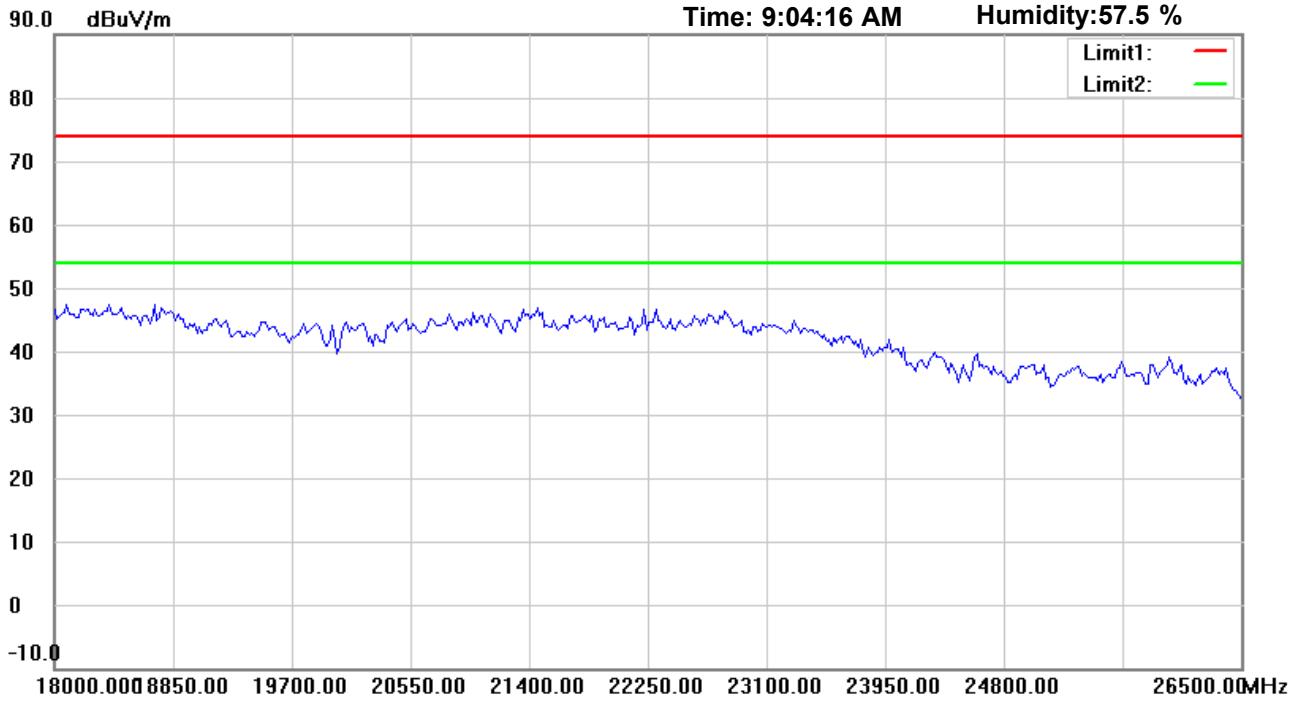
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#10 | Date: 10/11/2019 | Time: 9:04:16 AM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11b CH11

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|

*:Maximum data x:Over limit !:over margin

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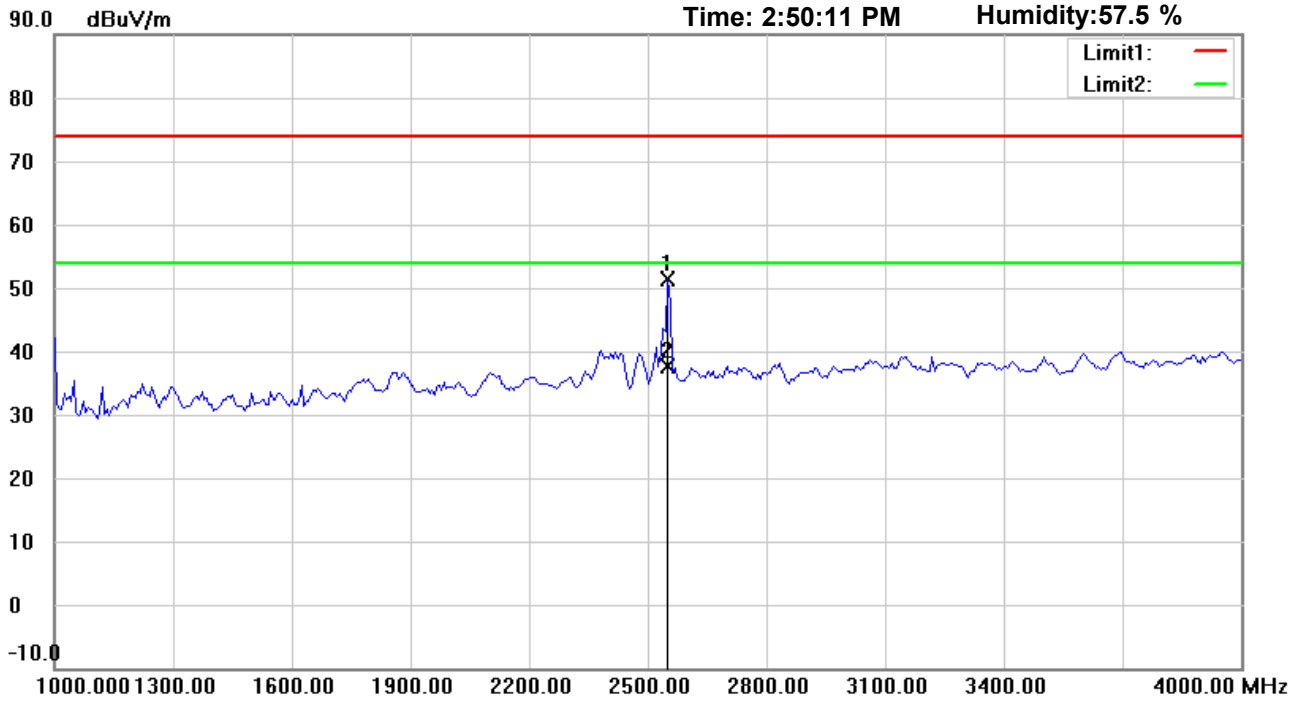
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#1 | Date: 10/11/2019 | Time: 2:50:11 PM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11g CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2551.102 | 56.36 | peak | -4.92 | 51.44 | 74.00 | 150 | 127 | -22.56 | |
| * | 2551.102 | 42.51 | AVG | -4.92 | 37.59 | 54.00 | 150 | 127 | -16.41 | |

*:Maximum data x:Over limit !:over margin

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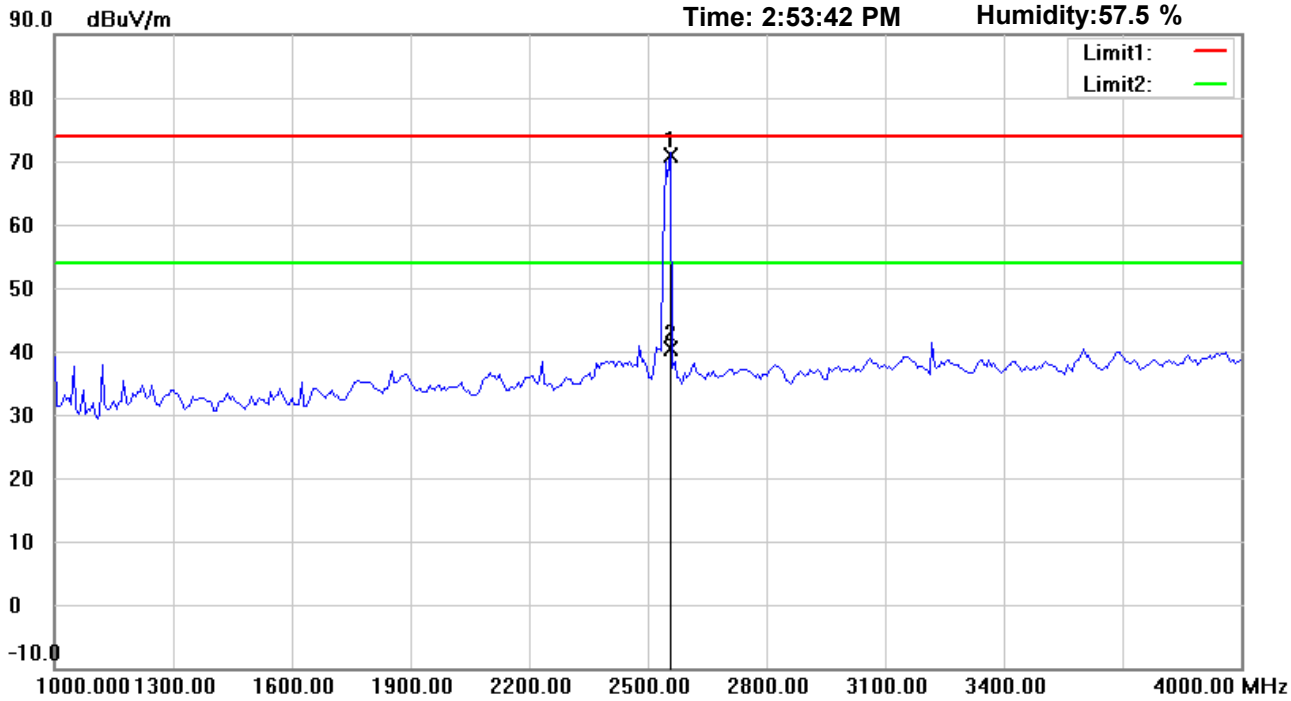
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#6 | Date: 10/11/2019 | Time: 2:53:42 PM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11g CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| * | 2555.110 | 75.76 | peak | -4.95 | 70.81 | 74.00 | 150 | 165 | -3.19 | |
| | 2555.110 | 45.33 | AVG | -4.95 | 40.38 | 54.00 | 150 | 165 | -13.62 | |

*:Maximum data x:Over limit !:over margin

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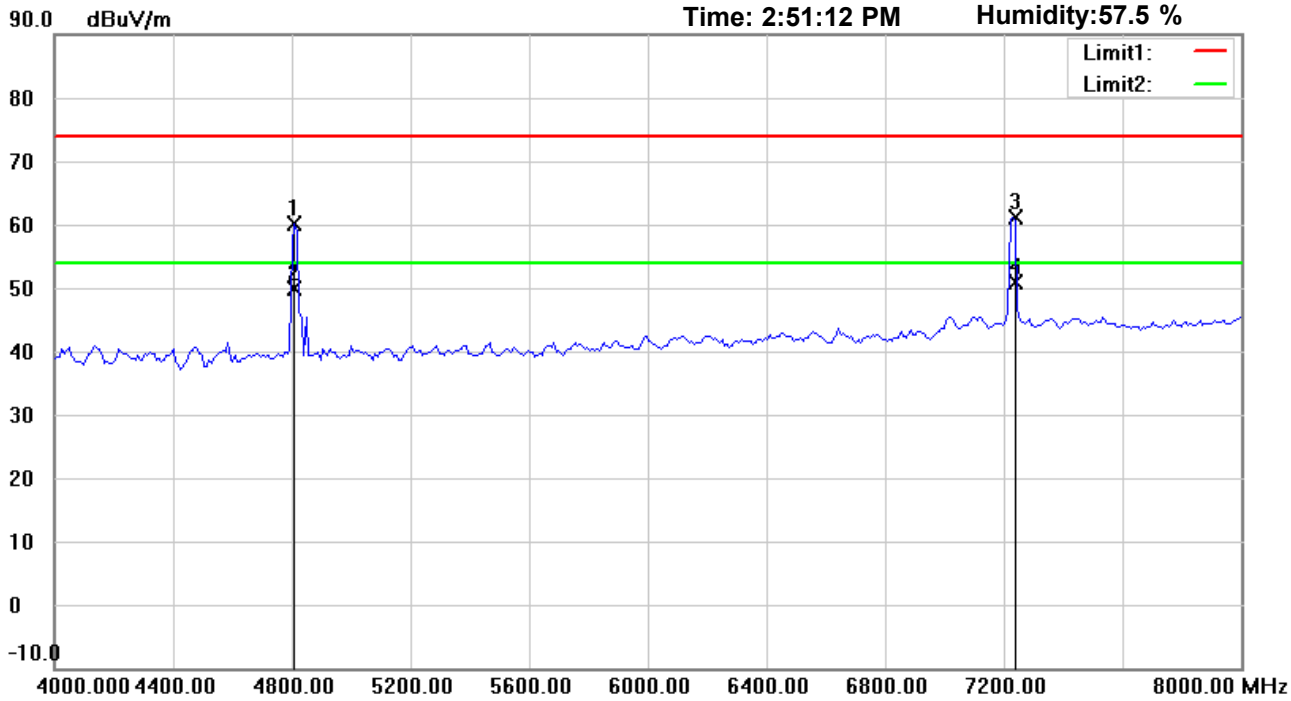
## Radiated Emission Measurement

Operator: Leon

File :3 Data :#2 Date: 10/11/2019 Time: 2:51:12 PM

Temperature:23.8 ℃
Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11g CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4809.619 | 62.08 | peak | -1.93 | 60.15 | 74.00 | 150 | 235 | -13.85 | |
| | 4809.619 | 51.79 | AVG | -1.93 | 49.86 | 54.00 | 150 | 235 | -4.14 | |
| | 7230.461 | 57.85 | peak | 3.27 | 61.12 | 74.00 | 150 | 317 | -12.88 | |
| * | 7230.461 | 47.63 | AVG | 3.27 | 50.90 | 54.00 | 150 | 317 | -3.10 | |

*:Maximum data x:Over limit !:over margin

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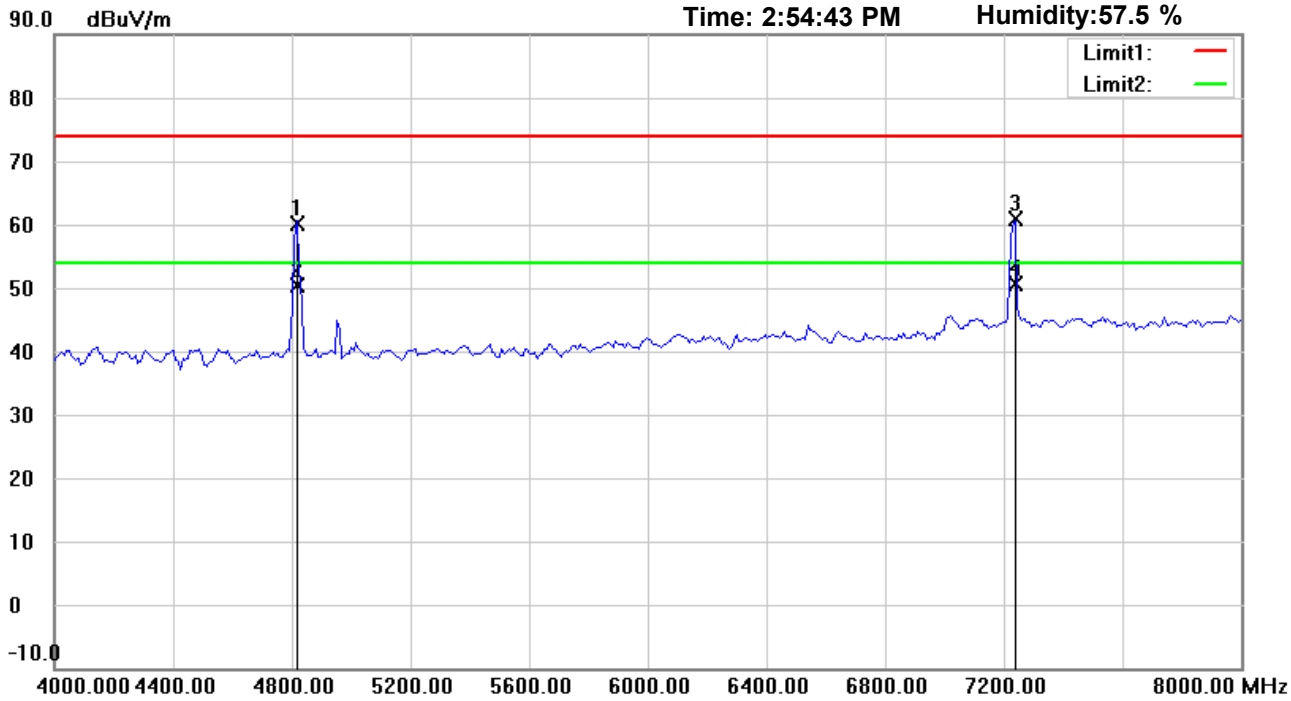
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#7 | Date: 10/11/2019 | Time: 2:54:43 PM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Vertical*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11g CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 4810.290 | 62.02 | peak | -1.92 | 60.10 | 74.00 | 150 | 238 | -13.90 | |
| | 4810.290 | 52.37 | AVG | -1.92 | 50.45 | 54.00 | 150 | 238 | -3.55 | |
| | 7231.203 | 57.56 | peak | 3.27 | 60.83 | 74.00 | 183 | 139 | -13.17 | |
| * | 7231.203 | 47.29 | AVG | 3.27 | 50.56 | 54.00 | 183 | 139 | -3.44 | |

*:Maximum data x:Over limit !:over margin

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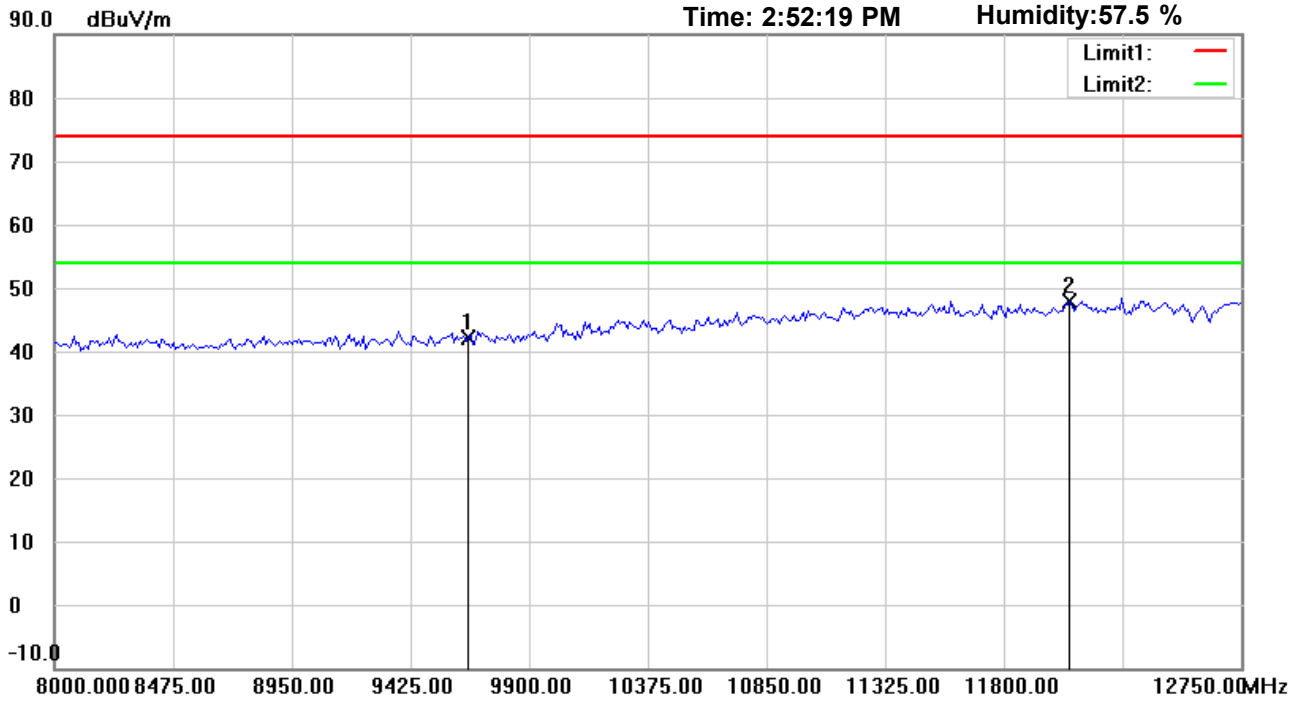
## Radiated Emission Measurement

Operator: Leon

File :3 | Data :#3 | Date: 10/11/2019 | Time: 2:52:19 PM | Temperature:23.8 ℃ | Humidity:57.5 %




Site : Chamber

Condition : FCC_part 15 RE-Class C_Above 1GHz_PK

Polarization: *Horizontal*

EUT : W6M21903-18922

Power : 48 Vd.c.

M/N:

Distance: 3m

Test Mode : TX 802.11g CH1

Note :

| Mk. | Frequency (MHz) | Reading (dBuV) | Detector | Corr. factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Ant.Pos (cm) | Tab.Pos (deg.) | Margin (dB) | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| | 9648.000 | 35.63 | peak | 6.60 | 42.23 | 74.00 | 150 | 65 | -31.77 | |
| * | 12060.000 | 35.73 | peak | 12.21 | 47.94 | 74.00 | 150 | 132 | -26.06 | |

*:Maximum data x:Over limit !:over margin