TECHNICAL REPORT

| | |
|---|---|
| Report No.: | TW2103186-02E |
| File Reference No.: | 2021-03-30 |
| Applicant: | Hangzhou Roombanker Technology Co., Ltd. |
| Product: | Wi-Fi Repeater |
| Model No.: | DSGW-072, DSGW-071, DSGW-070, DSGW-07X |
| Trademark: | N/A |
| Test Standards: | FCC Part 15 Subpart E, Paragraph 15.407 |
| Test Result: | It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10,FCC Part 15 Subpart C, Paragraph 15.247 for the evaluation of electromagnetic compatibility |

Approved By

Jack Chung

Manager

Dated: March 30, 2021

**Results appearing herein relate only to the sample tested**

**The technical reports is issued errors and omissions exempt and is subject to withdrawal at**


## SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

## Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

**CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

**FCC-Registration No.: 744189**

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

**Industry Canada (IC) —Registration No.:5205A**

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

**A2LA (Certification Number:5013.01)**

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

Test Report Conclusion

Content

1.0 **General Details**

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688

Fax: (755) 83442996

Site Listed with Federal Communications commission (FCC)

Registration Number:744189

For 3m Anechoic Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m Anechoic Chamber

1.2 Applicant Details

Applicant: Hangzhou Roombanker Technology Co., Ltd.

Address: A#801 Wantong center,Hangzhou, Zhejiang, China

Telephone: 18757285496

Fax: --

1.3 Description of EUT

| | |
|---|---|
| Product: | Wi-Fi Repeater |
| Manufacturer: | Hangzhou Roombanker Technology Co., Ltd. |
| Address: | A#801 Wantong center,Hangzhou, Zhejiang, China |
| Brand Name: | N/A |
| Additional Brand Name: | N/A |
| Model Number: | DSGW-072 |
| Additional Model Number: | DSGW-071, DSGW-070, DSGW-07X |
| Type of Modulation | IEEE 802.11a/n (HT20/HT40) : OFDM(64QAM, 16QAM, QPSK, BPSK);<br>IEEE 802.11ac: BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM |
| Frequency | Band 1: 5180MHz-5240MHz |
| Channel Separation | 802.11a/802.11n20:20MHz, 802.11n40:40MHz, 802.11ac : 80MHz |
| Air Data Rate | IEEE 802.11a : 54, 48,36, 24, 18, 12, 9, 6 Mbps<br>IEEE 802.11n/HT20: mcs0: 6.5Mbps,mcs1:13Mbps,mcs2:19.5Mbps,mcs3:26Mbps, mcs4:39Mbps,mcs5:52Mbps,mcs6:58.5Mbps,mcs7:65Mbps<br>IEEE 802.11n/HT40: mcs0:15Mbps,mcs1:30Mbps,mcs2:45Mbps,mcs3:60Mbps, mcs4:90Mbps,mcs5:120Mbps,mcs6:135Mbps,mcs7:150Mbps<br>IEEE 802.11ac: Up to 867Mbps |
| Antenna: | Two integral antennas used. |
| Antenna Gain: | 3.46dBi for each one. (get from the antenna specification provided the applicant) |
| Test Mode: | During testing, EUT was set to 100% duty cycle. 6Mbps air data rate was the worst case |

for 802.11a mode; mcs0 air data rate was the worst case for 802.11n mode; 23.9Mbps air data rate was the worst case for 802.11ac mode.

Frequency Selection By software

Input Voltage: 110~230V, 50~60Hz, 0.6A

Each Channel Operation Frequency

| Band 1 | | | | | |
|---|---|---|---|---|---|
| 802.11a / 11n HT20 / 802.11ac VHT20 | | 802.11n HT40 / 802.11acVHT40 | | 802.11ac VHT80 | |
| Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 36 | 5180MHz | 38 | 5190 MHz | 42 | 5210 MHz |
| 40 | 5200 MHz | 46 | 5230 MHz | | |
| 44 | 5220 MHz | | | | |
| 48 | 5240 MHz | | | | |

The selected test channels as follows:

| Band 1 | | | | | |
|---|---|---|---|---|---|
| 802.11a / 11n HT20 | | 802.11n HT40 | | 802.11ac VHT80 | |
| Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 36 | 5180MHz | 38 | 5190 MHz | 42 | 5210 MHz |
| 40 | 5200 MHz | 46 | 5230 MHz | | |
| 48 | 5240 MHz | | | | |

Note: 802.11ac VHT20/VHT40 is similar with 802.11n HT20/HT40.

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2021-03-12 to 2021-03-30

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by

Print Name: Terry Tang

| **2.0 Test Equipment** | | | | | |
|---|---|---|---|---|---|
| Instrument Type | Manufacturer | Model | Serial No. | Date of Cal. | Due Date |
| ESPI Test Receiver | R&S | ESPI 3 | 100379 | 2020-06-23 | 2021-06-22 |
| LISN | R&S | EZH3-Z5 | 100294 | 2020-06-23 | 2021-06-22 |
| LISN | R&S | EZH3-Z5 | 100253 | 2020-06-23 | 2021-06-22 |
| Ultra Broadband ANT | R&S | HL562 | 100157 | 2020-06-23 | 2021-06-22 |
| Impuls-Begrenzer | R&S | ESH3-Z2 | 100281 | 2020-06-23 | 2021-06-22 |
| Loop Antenna | EMCO | 6507 | 00078608 | 2018-06-25 | 2021-06-24 |
| Spectrum | R&S | FSIQ26 | 100292 | 2020-06-23 | 2021-06-22 |
| Horn Antenna | A-INFO | LB-180400-KF | J211060660 | 2019-06-21 | 2021-06-20 |
| Horn Antenna | R&S | BBHA 9120D | 9120D-631 | 2018-07-09 | 2021-07-08 |
| Power meter | Anritsu | ML2487A | 6K00003613 | 2020-08-21 | 2021-08-20 |
| Power sensor | Anritsu | MA2491A | 32263 | 2020-08-21 | 2021-08-20 |
| Bilog Antenna | Schwarebeck | VULB9163 | 9163/340 | 2018-07-04 | 2021-07-03 |
| 9*6*6 Anechoic | -- | -- | N/A | 2018-02-07 | 2021-02-06 |
| EMI Test Receiver | RS | ESVB | 826156/011 | 2020-06-23 | 2021-06-22 |
| EMI Test Receiver | RS | ESH3 | 860904/006 | 2020-06-23 | 2021-06-22 |
| Spectrum | HP/Agilent | E4407B | MY50441392 | 2020-06-23 | 2021-06-22 |
| Spectrum | RS | FSP | 1164.4391.38 | 2021-01-16 | 2022-01-15 |
| RF Cable | Zhengdi | ZT26-NJ-NJ-8 M/FA | -- | 2020-06-23 | 2021-06-22 |
| RF Cable | Zhengdi | 7m | -- | 2020-06-23 | 2021-06-22 |
| RF Switch | EM | EMSW18 | 060391 | 2020-06-23 | 2021-06-22 |
| Pre-Amplifier | Schwarebeck | BBV9743 | #218 | 2020-06-23 | 2021-06-22 |
| Pre-Amplifier | HP/Agilent | 8449B | 3008A00160 | 2020-06-23 | 2021-06-22 |
| LISN | SCHAFFNER | NNB42 | 00012 | 2021-01-06 | 2022-01-05 |

2.2 Automation Test Software

For Conducted Emission Test

| Name | Version |
|---|---|
| EZ-EMC | Ver.EMC-CON 3A1.1 |

For Radiated Emissions

| Name | Version |
|---|---|
| EMI Test Software BL410-EV18.91 | V18.905 |
| EMI Test Software BL410-EV18.806 High Frequency | V18.06 |

## 3.0 Technical Details

### 3.1 Summary of test results

**The EUT has been tested according to the following specifications:**

| Standard | Test Type | Result | Notes |
|---|---|---|---|
| FCC Part 15, Paragraph 15.107 & 15.407 | Conducted Emission Test | PASS | Complies |
| FCC Part 15 Subpart E Paragraph 15.407 (b1/4/5/6/7), Part 15.205 and Part 15.209 | Undesirable Emission and Restrict band | PASS | Complies |
| FCC Part 15, Paragraph 15.407 (a1/2/3) | Peak Transmit Power | PASS | Complies |
| FCC Part 15, Paragraph 15.407 (a)(6) | Peak Power Excursion | PASS | Complies |
| FCC Part 15, Paragraph 15.407 (a/1/2/3) | Peak Power Spectral Density | PASS | Complies |
| FCC Part 15, Paragraph 15.407(g) | Frequency Stability | PASS | Complies |

### 3.2 Test Standards

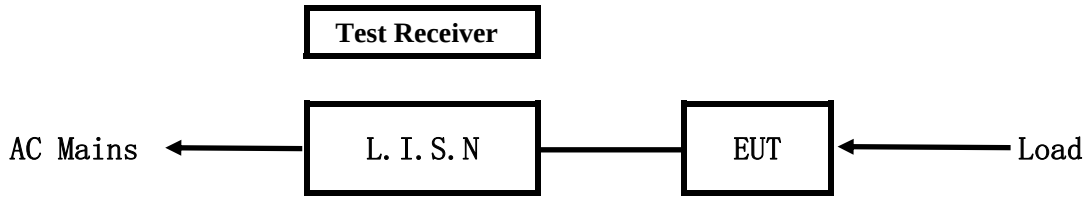
**FCC Part 15 Subpart & Subpart C, Paragraph 15.247, ANSI C63.10 :2013, ANSI C63.4 :2014**
**789033 D02 General UNII Test Procedures New Rules v01r04**

## 4.0 EUT Modification

**No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.**

## 5. Power Line Conducted Emission Test

5.1 Schematics of the test



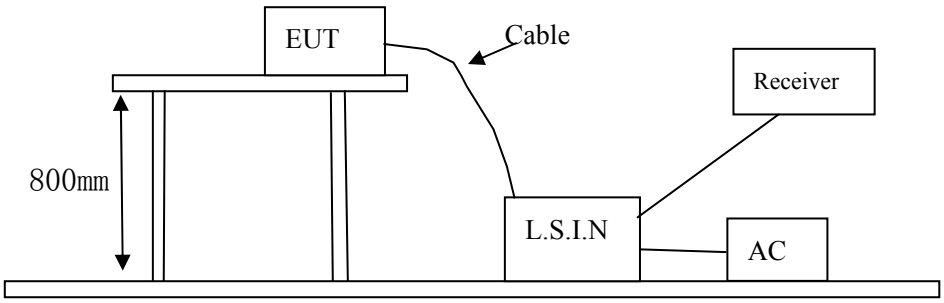

EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2009.The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10–2013.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup




5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

| Device | Manufacturer | Model | FCC ID |
|---|---|---|---|
| Wi-Fi Repeater | Hangzhou Roombanker Technology Co., Ltd. | DSGW-072, DSGW-071, DSGW-070, DSGW-07X | 2AUXB-DSGW-07X |

B. Internal Device

| Device | Manufacturer | Model | Rating |
|---|---|---|---|
| | | | |

C. Peripherals

| Device | Manufacturer | Model | Rating |
|---|---|---|---|
| N/A | | | |

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10 -2013.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

| Frequency (MHz) | Class B Limits (dB μ V) | |
|---|---|---|
| | Quasi-peak Level | Average Level |
| 0.15 ～ 0.50 | 66.0～56.0* | 56.0～46.0* |
| 0.50 ～ 5.00 | 56.0 | 46.0 |
| 5.00 ～ 30.00 | 60.0 | 50.0 |

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

**A: Conducted Emission on Live Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

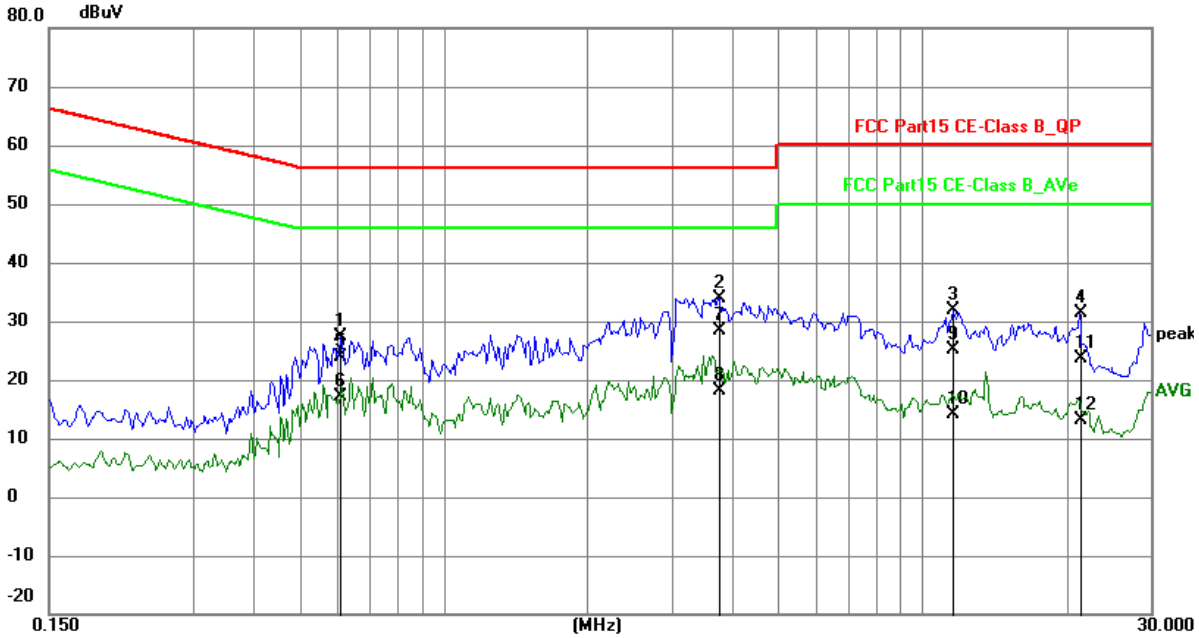
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: Keeping WIFI Transmitting**

**Equipment Level: Class B**

**Results: PASS**

Please refer to following diagram for individual




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.6102 | 17.68 | 9.78 | 27.46 | 56.00 | -28.54 | peak | P |
| 2 | 3.7566 | 24.08 | 9.88 | 33.96 | 56.00 | -22.04 | peak | P |
| 3 | 11.5877 | 21.59 | 10.23 | 31.82 | 60.00 | -28.18 | peak | P |
| 4 | 21.3027 | 20.67 | 10.76 | 31.43 | 60.00 | -28.57 | peak | P |
| 5 | 0.6102 | 13.98 | 9.78 | 23.76 | 56.00 | -32.24 | QP | P |
| 6 | 0.6102 | 7.44 | 9.78 | 17.22 | 46.00 | -28.78 | AVG | P |
| 7 | 3.7566 | 18.53 | 9.88 | 28.41 | 56.00 | -27.59 | QP | P |
| 8 | 3.7566 | 8.19 | 9.88 | 18.07 | 46.00 | -27.93 | AVG | P |
| 9 | 11.5877 | 15.02 | 10.23 | 25.25 | 60.00 | -34.75 | QP | P |
| 10 | 11.5877 | 3.92 | 10.23 | 14.15 | 50.00 | -35.85 | AVG | P |
| 11 | 21.3027 | 12.89 | 10.76 | 23.65 | 60.00 | -36.35 | QP | P |
| 12 | 21.3027 | 2.36 | 10.76 | 13.12 | 50.00 | -36.88 | AVG | P |

**B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)**

**EUT Operating Environment**

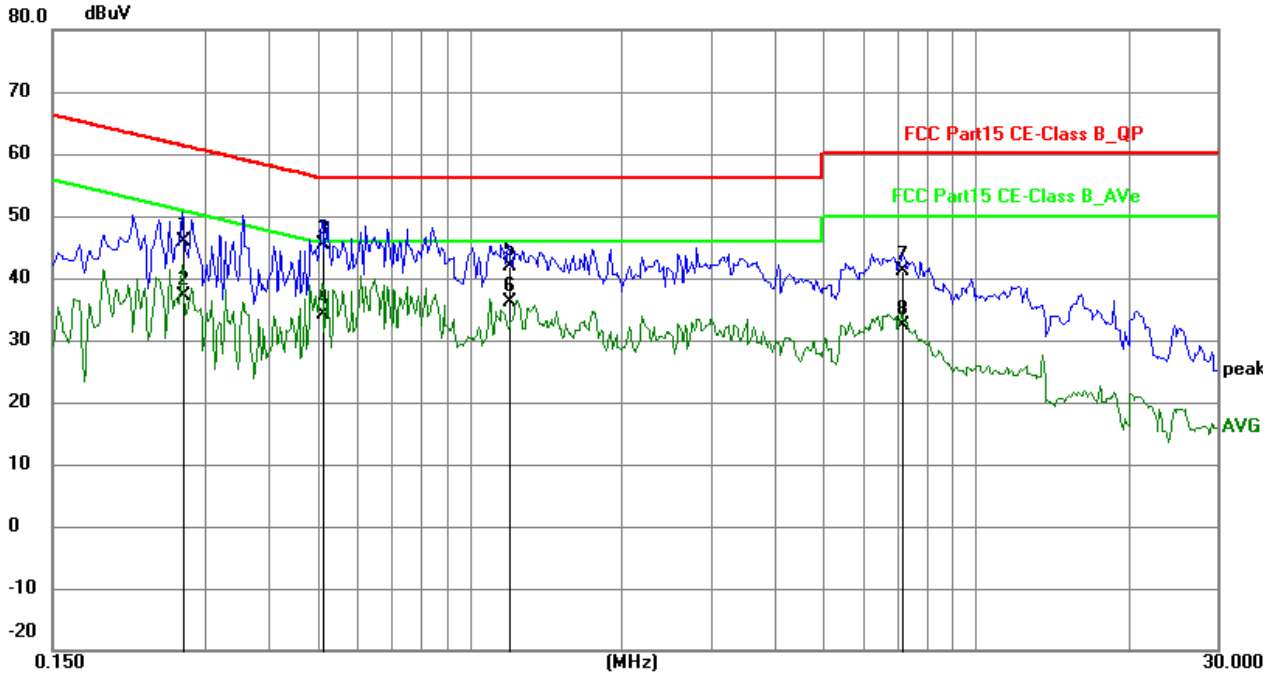
Temperature: 26℃ Humidity: 65%RH Atmospheric Pressure: 101 KPa

**EUT set Condition: Keeping WIFI Transmitting**

**Equipment Level: Class B**

**Results: Pass**

Please refer to following diagram for individual




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.2709 | 36.15 | 9.75 | 45.90 | 61.09 | -15.19 | QP | P |
| 2 | 0.2709 | 27.49 | 9.75 | 37.24 | 51.09 | -13.85 | AVG | P |
| 3 | 0.5127 | 35.51 | 9.77 | 45.28 | 56.00 | -10.72 | QP | P |
| 4 | 0.5127 | 24.39 | 9.77 | 34.16 | 46.00 | -11.84 | AVG | P |
| 5 | 1.1913 | 32.15 | 9.79 | 41.94 | 56.00 | -14.06 | QP | P |
| 6 | 1.1913 | 26.31 | 9.79 | 36.10 | 46.00 | -9.90 | AVG | P |
| 7 | 7.1574 | 31.05 | 10.02 | 41.07 | 60.00 | -18.93 | QP | P |
| 8 | 7.1574 | 22.32 | 10.02 | 32.34 | 50.00 | -17.66 | AVG | P |

## 6 Undesirable Emission and Restrict band

6.1 Test Method and test Procedure:

(1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189

(2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.

(3) The frequency spectrum from 30 MHz to 40 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=1MHz, VBW=3MHz and PK detector.
Measurements were made at 3 meters.

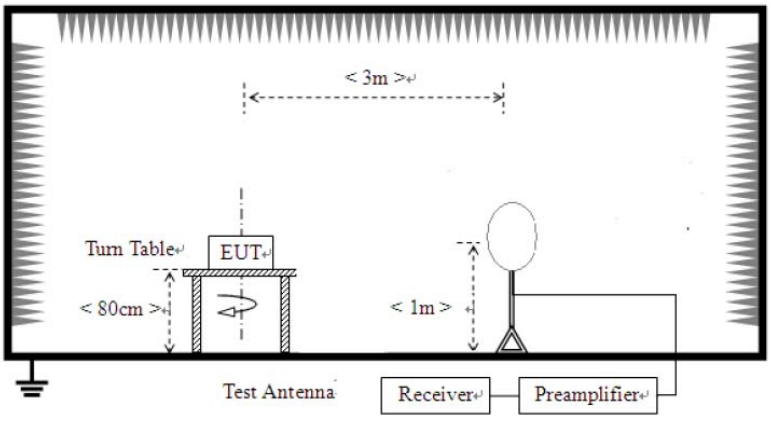
(4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.

(5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.

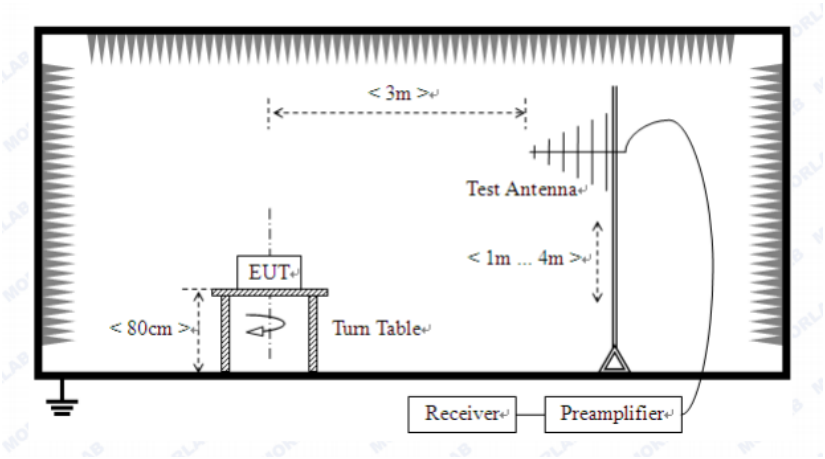
(6) The antenna polarization : Vertical polarization and Horizontal polarization.

**Block diagram of Test setup**

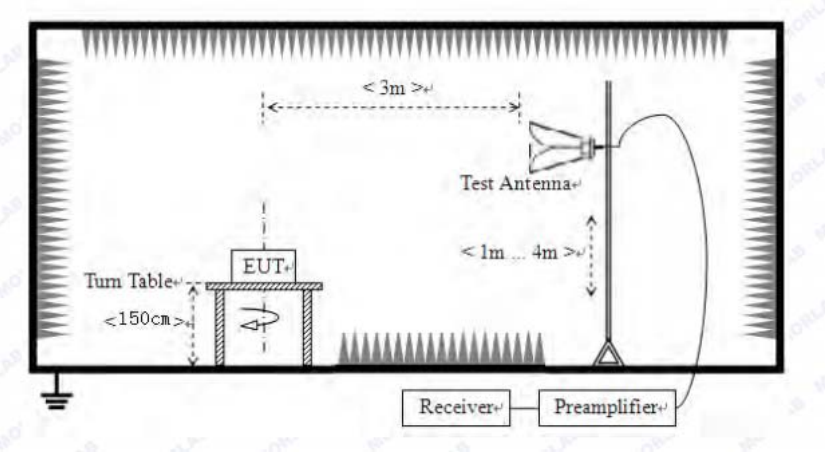
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz




For radiated emissions above 1GHz




6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

**Frequencies in restricted band are complied to limit on Paragraph 15.209**

| Frequency Range (MHz) | Distance (m) | Field strength (dB μ V/m) |
|---|---|---|
| 30-88 | 3 | 40.0 |
| 88-216 | 3 | 43.5 |
| 216-960 | 3 | 46.0 |
| Above 960 | 3 | 54.0 |

(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm/MHz

(2) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27dBm/MHz.

Note: 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the higher limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

**Test result**

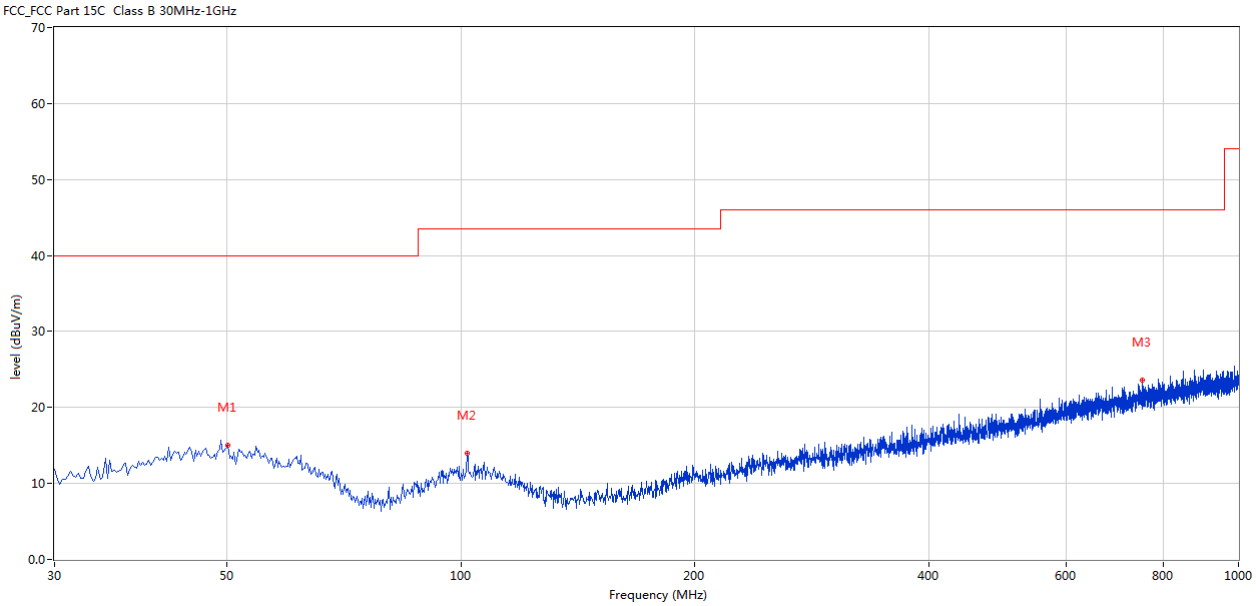
## General Radiated Emission Data and Harmonics Radiated Emission Data

**Radiated Emission In Horizontal (30MHz----1000MHz)**

**EUT set Condition:** **Keeping WIFI Transmitting**

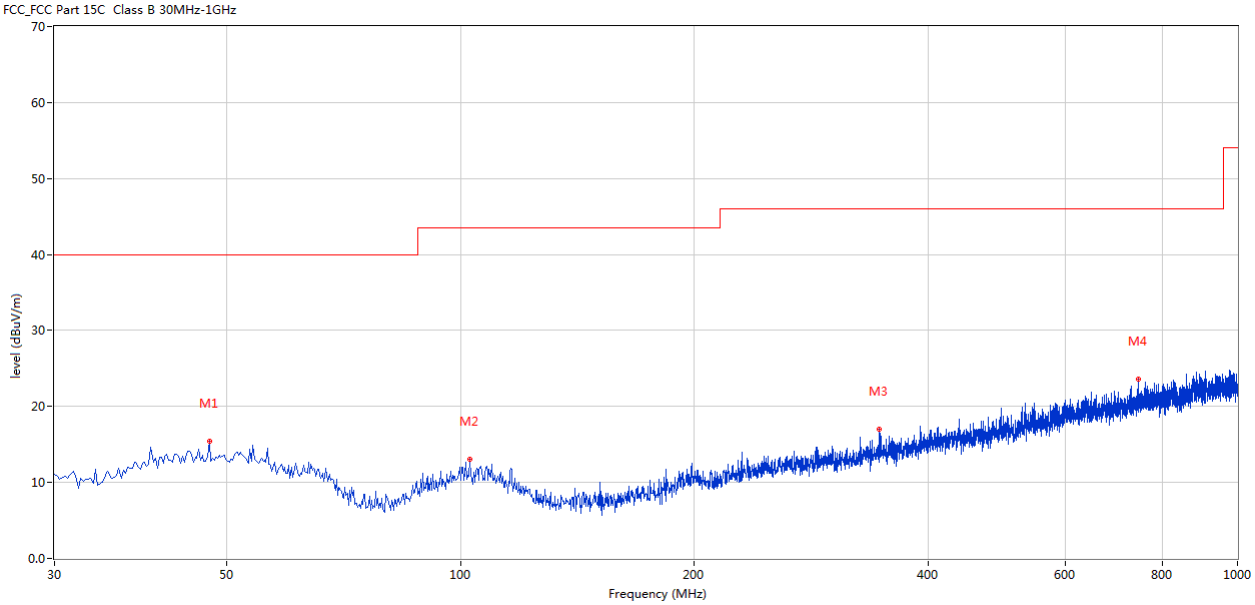
**Results:** **Pass**

Test Figure:




| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 50.122 | 15.07 | -11.38 | 40.0 | -24.93 | Peak | 148.00 | 100 | Horizontal | Pass |
| 2 | 101.762 | 13.98 | -13.43 | 43.5 | -29.52 | Peak | 168.00 | 100 | Horizontal | Pass |
| 3 | 751.985 | 23.56 | -3.43 | 46.0 | -22.44 | Peak | 258.00 | 100 | Horizontal | Pass |

Test Figure:




| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (o) | Height (cm) | ANT | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 47.456 | 15.46 | -11.38 | 40.0 | -24.54 | Peak | 31.00 | 100 | Vertical | Pass |
| 2 | 102.732 | 13.11 | -13.39 | 43.5 | -30.39 | Peak | 29.00 | 100 | Vertical | Pass |
| 3 | 346.141 | 16.96 | -9.48 | 46.0 | -29.04 | Peak | 9.00 | 100 | Vertical | Pass |
| 4 | 745.439 | 23.63 | -3.43 | 46.0 | -22.37 | Peak | 49.00 | 100 | Vertical | Pass |

**Operation Mode: Keeping Transmitting under CH36 for 11g at 6Mbps**

| Frequency (MHz) | Level@3m (dB μ V/m) | Antenna Polarity | Limit@3m (dB μ V/m) |
|---|---|---|---|
| 5180.00 | 96.09（PK） | H | Fundamental Frequency |
| 5180.00 | 99.65（PK） | V | |
| 10360 | 49.88（PK） | H | 74(Peak)/ 54(AV) |
| 10360 | 49.68（PK） | V | 74(Peak)/ 54(AV) |
| 15540 | -- | V | 74(Peak)/ 54(AV) |
| 20720 | -- | H/V | 74(Peak)/ 54(AV) |
| 25900 | -- | H/V | 74(Peak)/ 54(AV) |
| 31080 | -- | H/V | 74(Peak)/ 54(AV) |
| 36260 | -- | H/V | 74(Peak)/ 54(AV) |

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

**Operation Mode: Keeping Transmitting under CH40 for 11g at 6Mbps**

| Frequency (MHz) | Level@3m (dB μ V/m) | Antenna Polarity | Limit@3m (dB μ V/m) |
|---|---|---|---|
| 5200.00 | 96.96（PK） | H | Fundamental Frequency |
| 5200.00 | 101.19（PK） | V | |
| 10400 | 49.06（PK） | H | 74(Peak)/ 54(AV) |
| 10400 | 50.04（PK） | V | 74(Peak)/ 54(AV) |
| 15600 | -- | V | 74(Peak)/ 54(AV) |
| 20800 | -- | H/V | 74(Peak)/ 54(AV) |
| 26000 | -- | H/V | 74(Peak)/ 54(AV) |
| 31200 | -- | H/ | 74(Peak)/ 54(AV) |
| 36400 | -- | H/V | 74(Peak)/ 54(AV) |

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11a mode 6Mbps

**Operation Mode: Keeping Transmitting under CH48 for 11g at 6Mbps**

| Frequency (MHz) | Level@3m (dB μ V/m) | Antenna Polarity | Limit@3m (dB μ V/m) |
|---|---|---|---|
| 5240.00 | 97.28（PK） | H | Fundamental Frequency |
| 5240.00 | 99.90（PK） | V | |
| 10480 | 49.90（PK） | H | 74(Peak)/ 54(AV) |
| 15720 | 49.25（PK） | V | 74(Peak)/ 54(AV) |
| 20960 | -- | H/V | 74(Peak)/ 54(AV) |
| 26200 | -- | H/V | 74(Peak)/ 54(AV) |
| 31440 | -- | H/V | 74(Peak)/ 54(AV) |
| 36680 | -- | H/V | 74(Peak)/ 54(AV) |

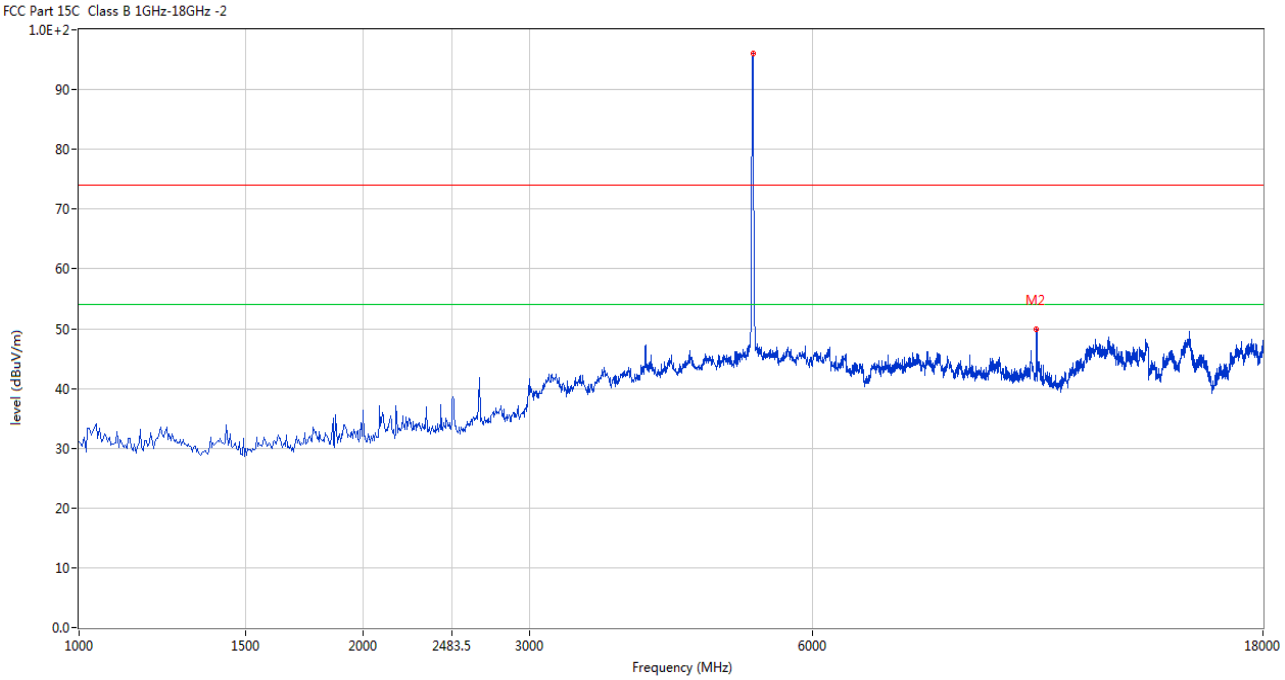
Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

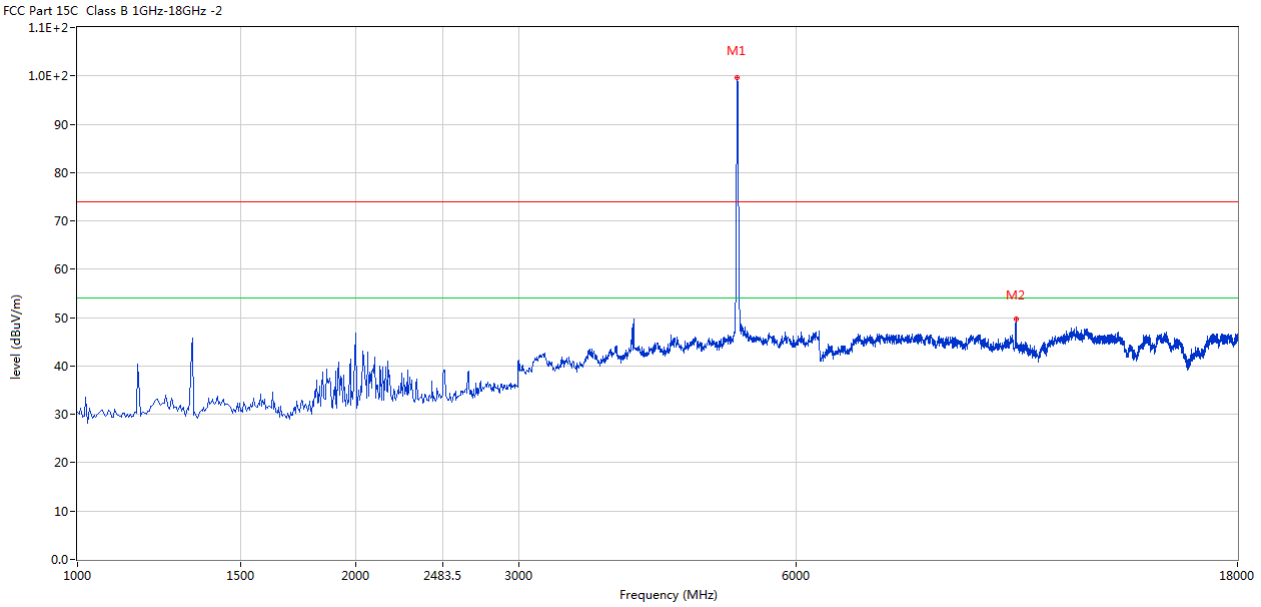
3. For 802.11a mode 6Mbps

Please refer to the following test plots for details:

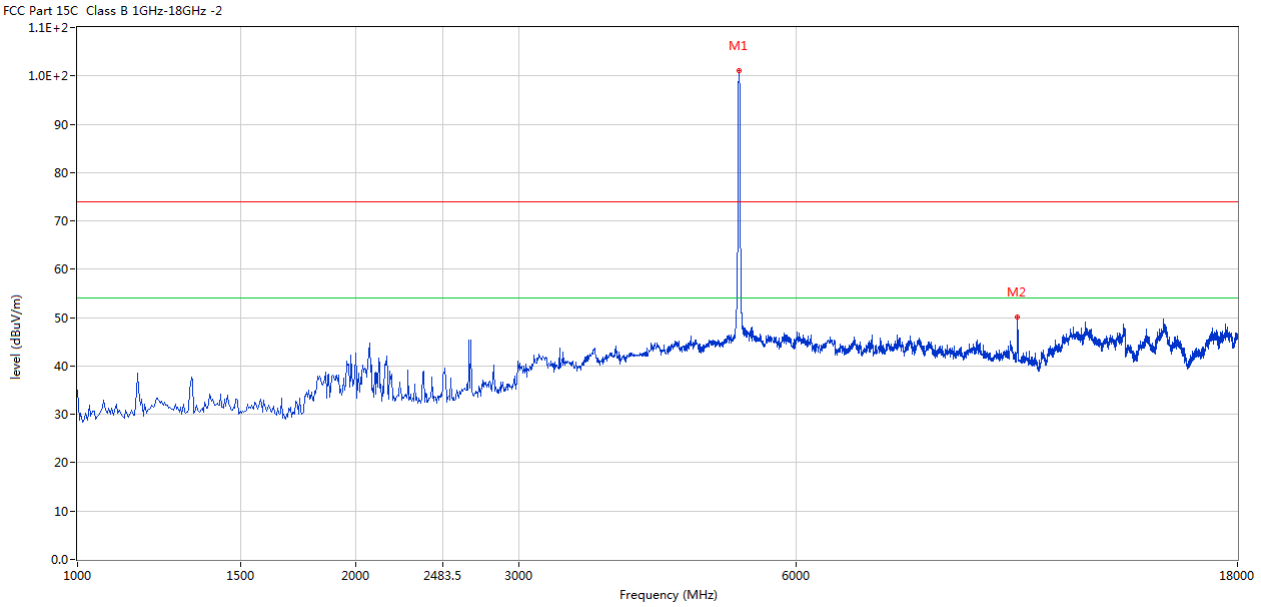
**CH36 for 11a at 6Mbps: Horizontal**



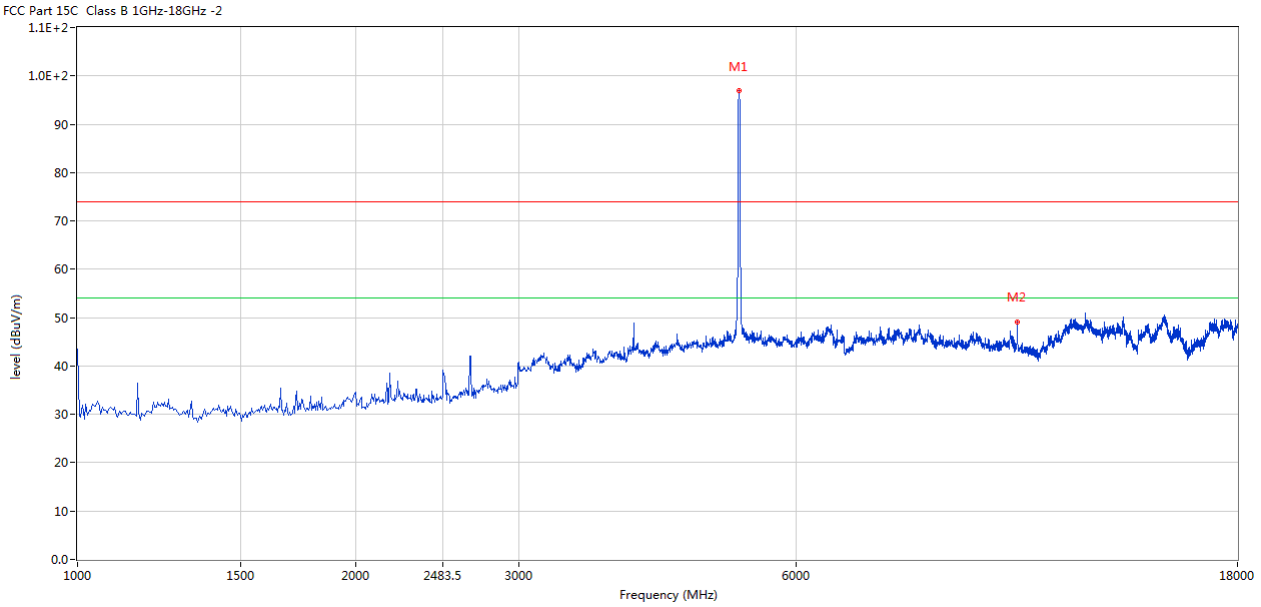

**CH36 for 11a at 6Mbps: Vertical**



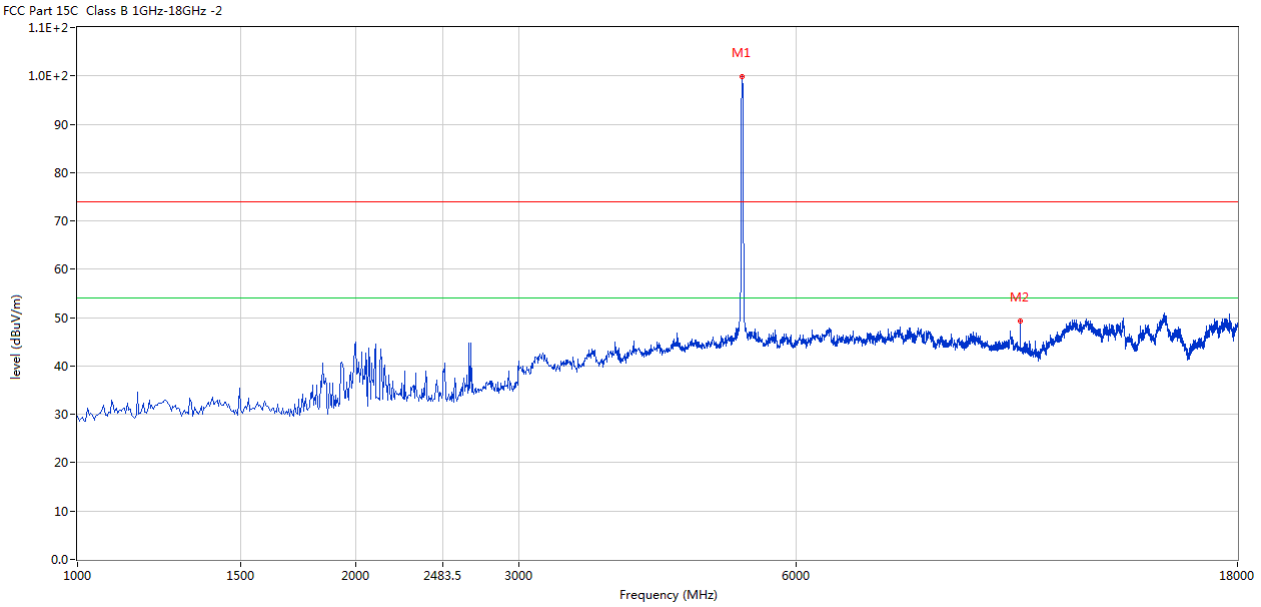
## CH40 for 11a at 6Mbps: Vertical



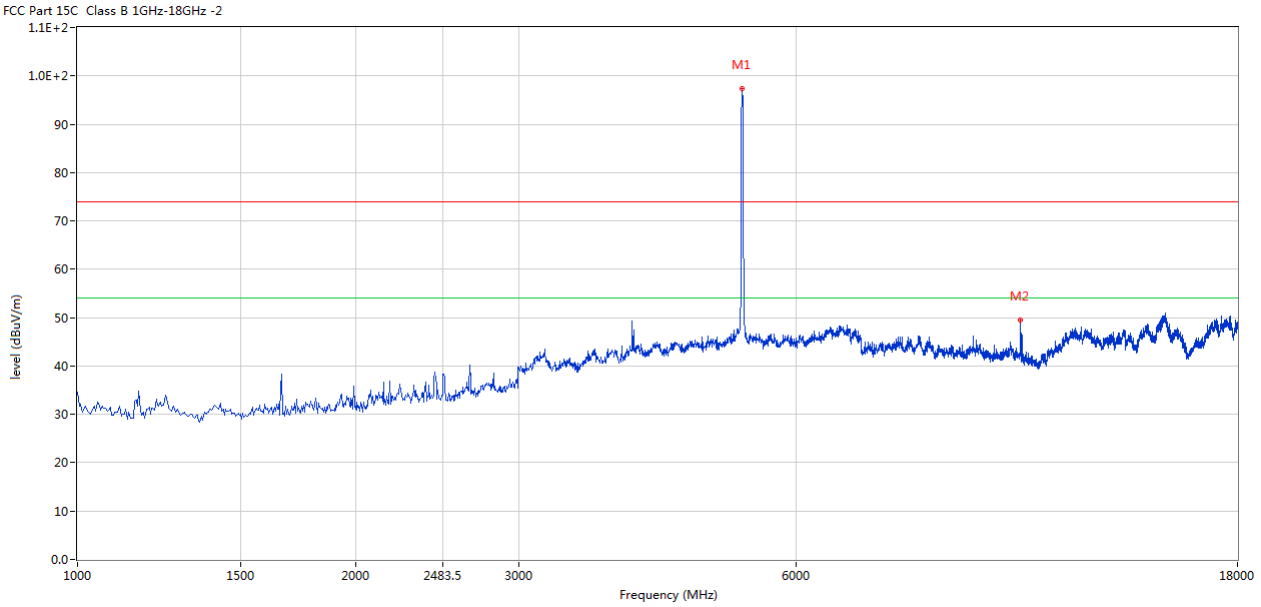

## CH40 for 11a at 6Mbps: Horizontal



**CH48 for 11a at 6Mbps: Vertical**

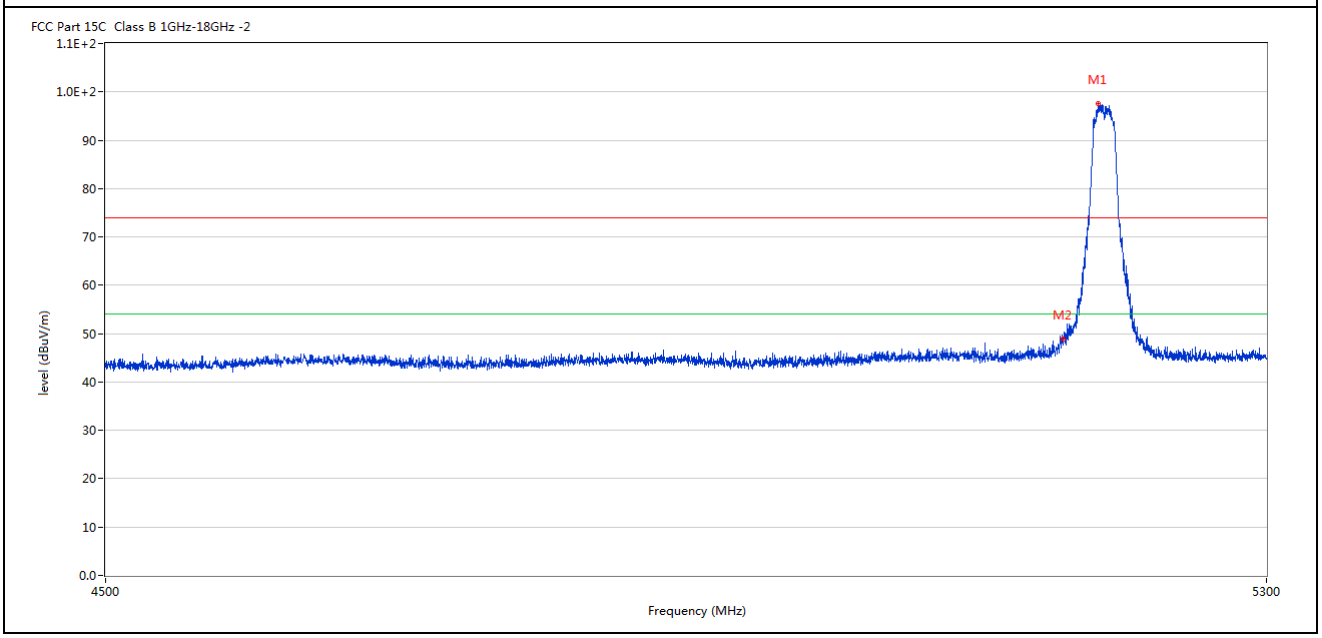



**CH48 for 11g at 6Mbps: Horizontal**




Note: 1.For radiated Emissions from 18-40GHz and below 30MHz, it is only the floor noise.
2. 802.11a is the worst case.

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 36 (5180MHz)-11a |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 48.84 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -46.36 | | |
| Polarity | Horizontal | | -- | -- |
| Test Figure | | | | |




Remark: 1. According to KDB 789033 v01r03 section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

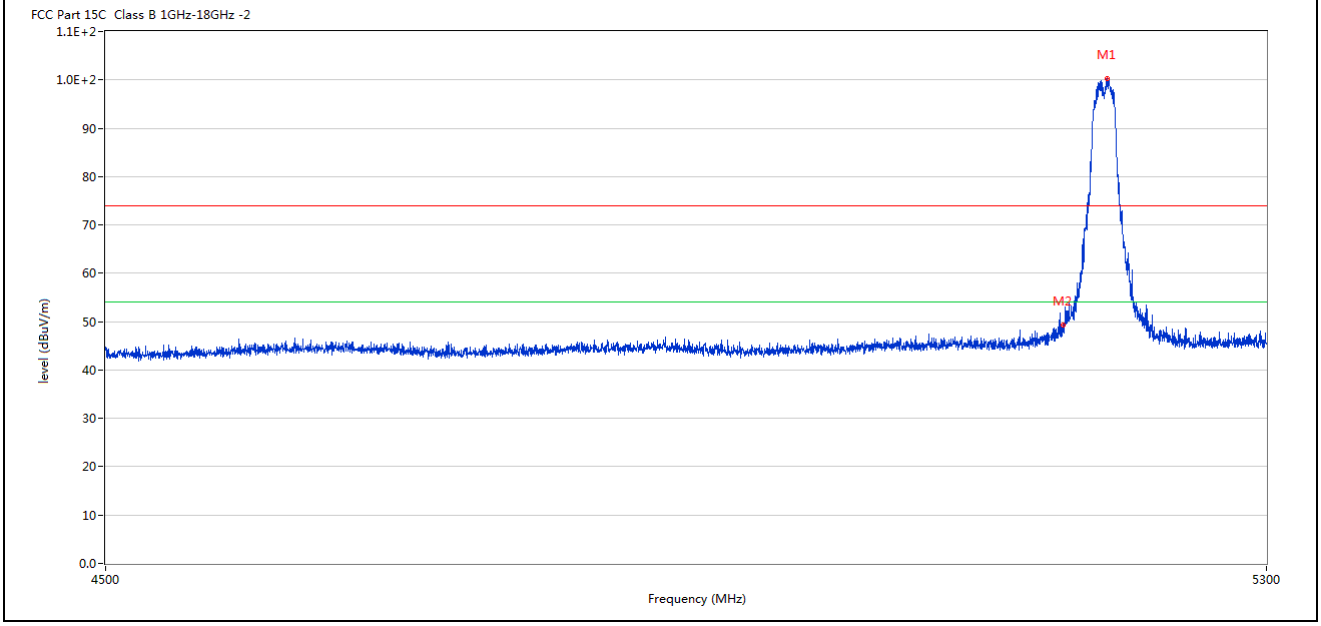
EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]= 48.84 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=48.84-95.2= -46.36dBm

2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 36 (5180MHz)-11a |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 49.27 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -45.93 | | |
| Polarity | Vertical | | -- | -- |
| Test Figure | | | | |




Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

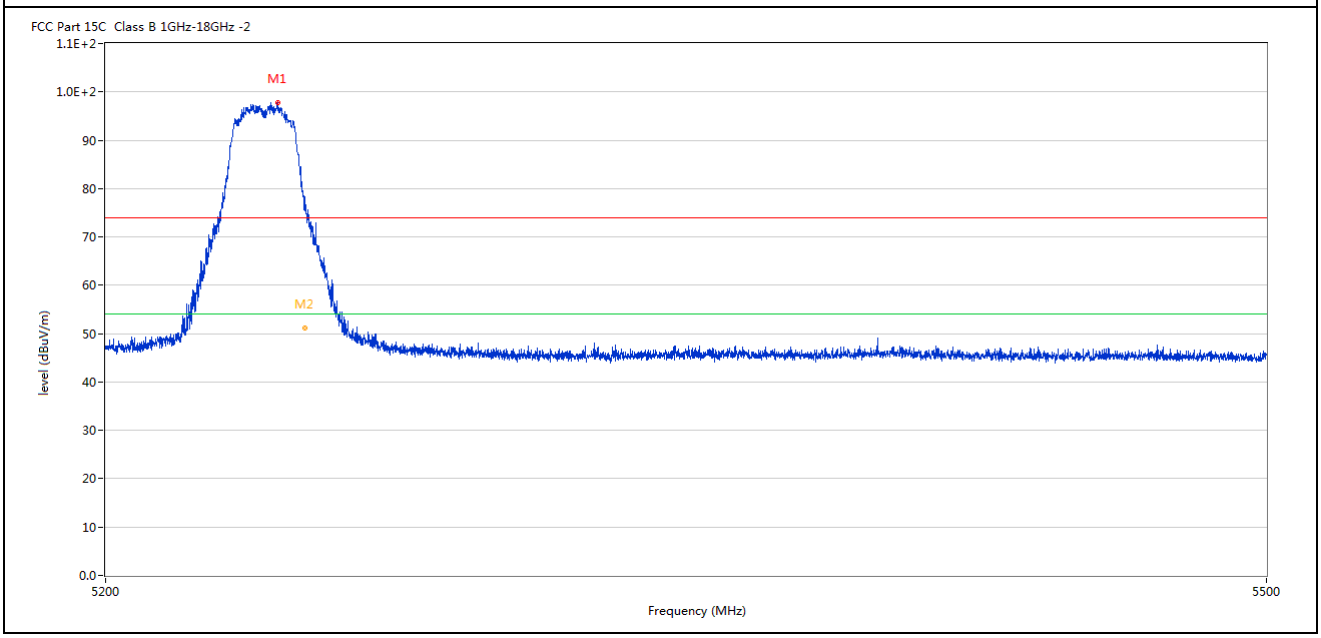
EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]= 49.27 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=49.27-95.2= -45.93dBm

2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 48 (5240MHz)-11a |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5250 | PK (dBμV/m) | 64.35 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -30.85 | | |
| Polarity | Horizontal | | | |
| Test Figure | | | | |




Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

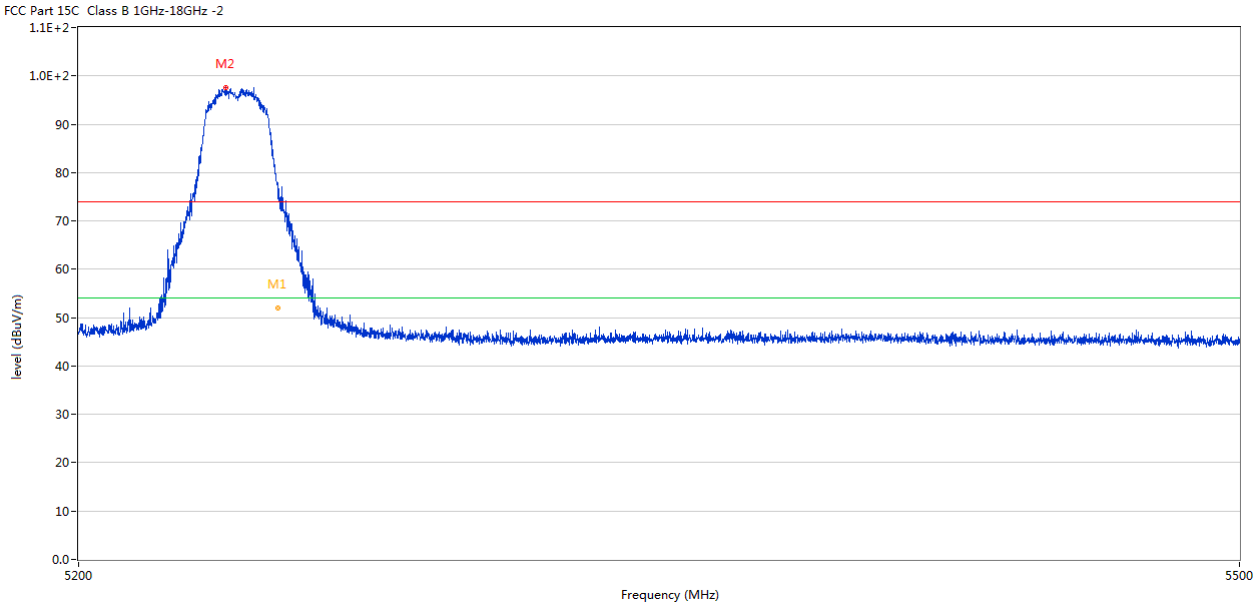
EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]= 64.35 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=64.35-95.2= -30.85dBm

2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 48 (5240MHz)-11a |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5250 | PK (dBμV/m) | 63.72 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -31.48 | | |
| Polarity | Vertical | | -- | -- |
| Test Figure | | | | |




Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:

EIRP[dBm] = E[dBμV/m] – 95.2

For Example, if E[dBμV/m]=63.72 dBμV/m,

EIRP[dBm] = E[dBμV/m] – 95.2=63.72-95.2= -31.48dBm

2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 36 (5180MHz)-11n/HT20 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 47.96 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -47.24 | | |
| Polarity | Horizontal | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 47.96dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=47.96-95.2= -47.24dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 36 (5180MHz)-11n/HT20 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 47.38 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -47.82 | | |
| Polarity | Vertical | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 47.38 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=47.38-95.2= -47.82dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 48 (5240MHz)-11n/HT20 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5250 | PK (dBμV/m) | 59.64(PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -35.56 | | |
| Polarity | Horizontal | | | |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 59.64 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=59.64-95.2= -35.56dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 48 (5240MHz)-11n/HT20 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5250 | PK (dBμV/m) | 58.20(PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -45.00 | | |
| Polarity | Vertical | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 58.20dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=58.20-95.2= -37.00 dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 38 (5190MHz)-11n/HT40 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 48.23 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -46.97 | | |
| Polarity | Horizontal | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 48.23 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=48.23-95.2= -46.97dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 38 (5190MHz)-11n/HT40 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 49.76 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -45.44 | | |
| Polarity | Vertical | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 49.76 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=49.76-95.2= -45.44dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 46 (5230MHz)-11n/HT40 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5250 | PK (dBμV/m) | 60.14(PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -35.06 | | |
| Polarity | Horizontal | | | |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]=60.14dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=60.14-95.2= -35.06dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 46 (5230MHz)-11n/HT40 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5250 | PK (dBμV/m) | 60.38(PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -34.82 | | |
| Polarity | Vertical | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 60.38 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=60.38-95.2= -34.82dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 42 (5210MHz)-11ac/VHT80 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 46.78 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -48.42 | | |
| Polarity | Horizontal | | -- | -- |

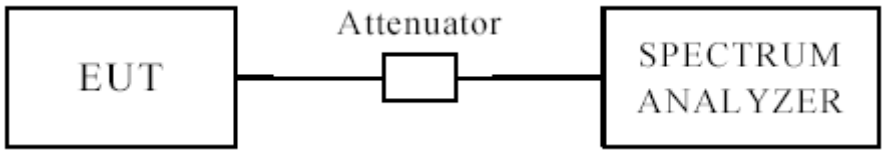
Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]= 46.78 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=46.78-95.2= -48.42dBm
2. RBW=1MHz, VBW=3MHz

| Restricted band Measurement | | | | |
|---|---|---|---|---|
| EUT | Wi-Fi Repeater | | Test Mode: | Channel 42 (5210MHz)-11ac/VHT80 |
| Mode | Keeping Transmitting | | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | | Humidity | 56% RH |
| Test Result: | Pass | | Detector | PK |
| 5150 | PK (dBμV/m) | 48.19 (PK) | Limit | -27dBm/MHz |
| | EIRP (dBm) | -47.01 | | |
| Polarity | Vertical | | -- | -- |

Remark: 1. According to KDB 789033 D02 General UNII Test Procedures New Rules v01 section G) d) (ii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:
EIRP[dBm] = E[dBμV/m] - 95.2
For Example, if E[dBμV/m]=48.19 dBμV/m,
EIRP[dBm] = E[dBμV/m] - 95.2=48.19-95.2= -47.01dBm
2. RBW=1MHz, VBW=3MHz

## 7.0 Emission Bandwidth

### 7.1 Test Setup




### 7.3 Test Procedure for Emission Bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set VBW> RBW
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

### 7.4 Test Procedure for Minimum Bandwidth for the Band 5725-5850MHz

1. Set RBW = 100 kHz.
2. Set VBW≥ 3 × RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 7.5 Test Procedure for 99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency
2. Set span = 1.5 times to 5.0 times OBW
3. Set RBW= 1% TO 5% of the OBW
4. Set VBW≥ 3 × RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Other, peak detection and max mode (until trace stabilizes) shall be used.
6. Use the 99% power bandwidth function of the instrument

## 7.6 Test Result

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11a | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

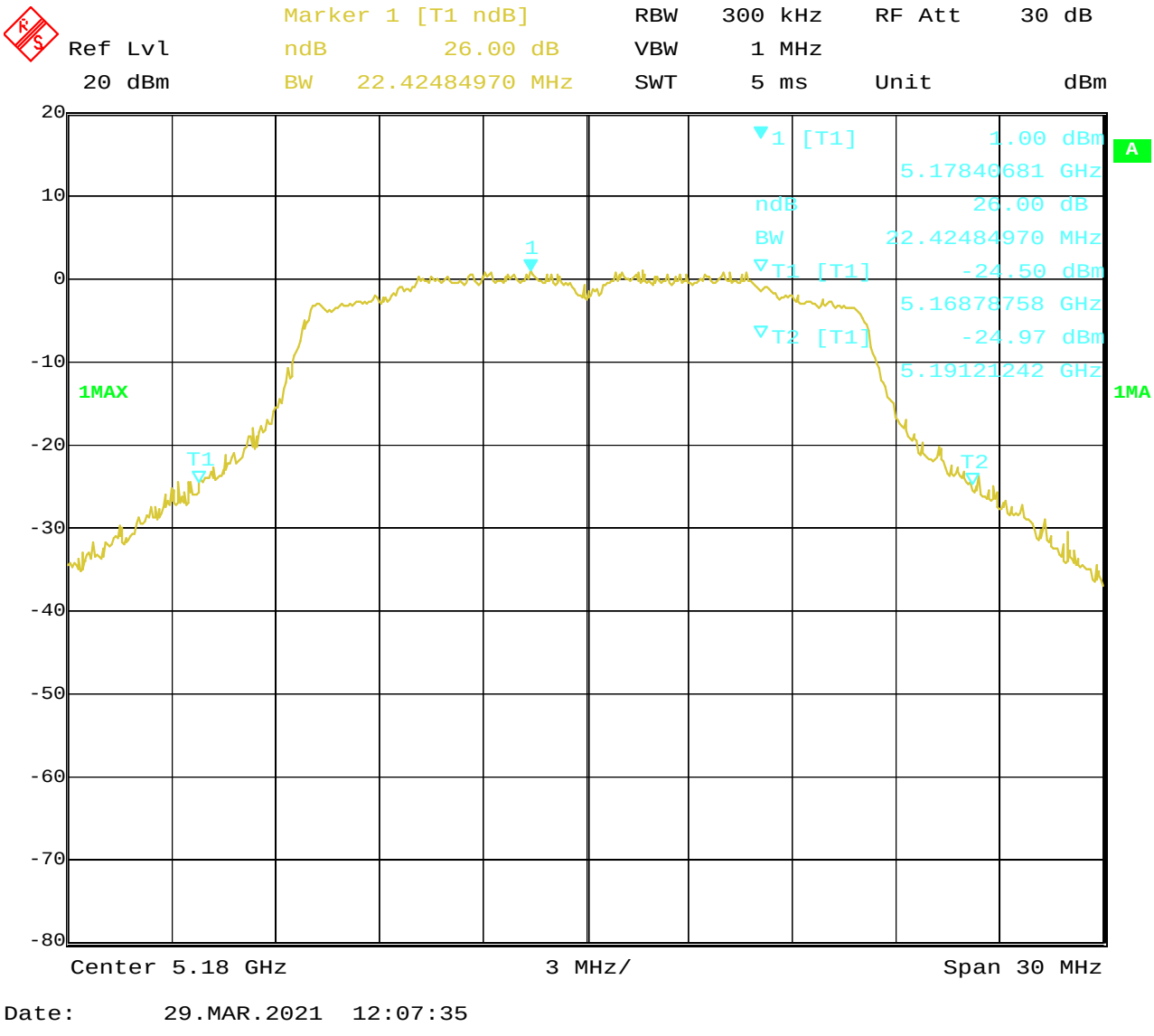
| Channel | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | Bandwidth (MHz) | Minimum Limit (MHz) | Pass/ Fail |
|---|---|---|---|---|---|
| **26dB Bandwidth** | | | | | |
| 36 | 5180 | 6 | 22.42 | -- | Pass |
| 40 | 5200 | 6 | 22.30 | -- | Pass |
| 48 | 5240 | 6 | 21.58 | -- | Pass |
| | | | | | |
| **99% Bandwidth** | | | | | |
| 36 | 5180 | 6 | 16.77 | -- | Pass |
| 40 | 5200 | 6 | 16.77 | -- | Pass |
| 48 | 5240 | 6 | 16.83 | -- | Pass |

Note: Two antennas were tested and only the worst cased was recorded in the test report. Antenna E8 was the worst case.

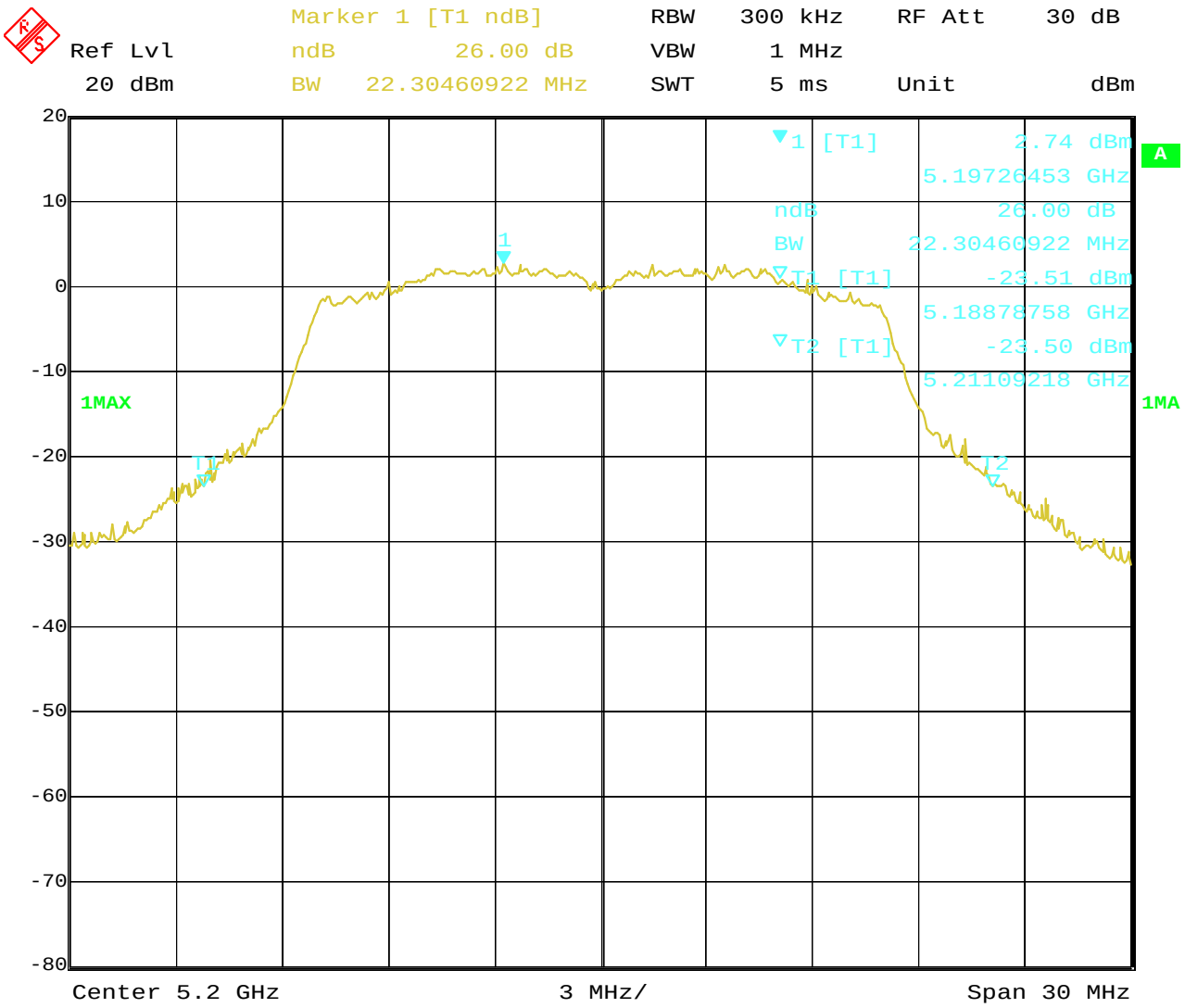
Test Figure:

**26dB Bandwidth**

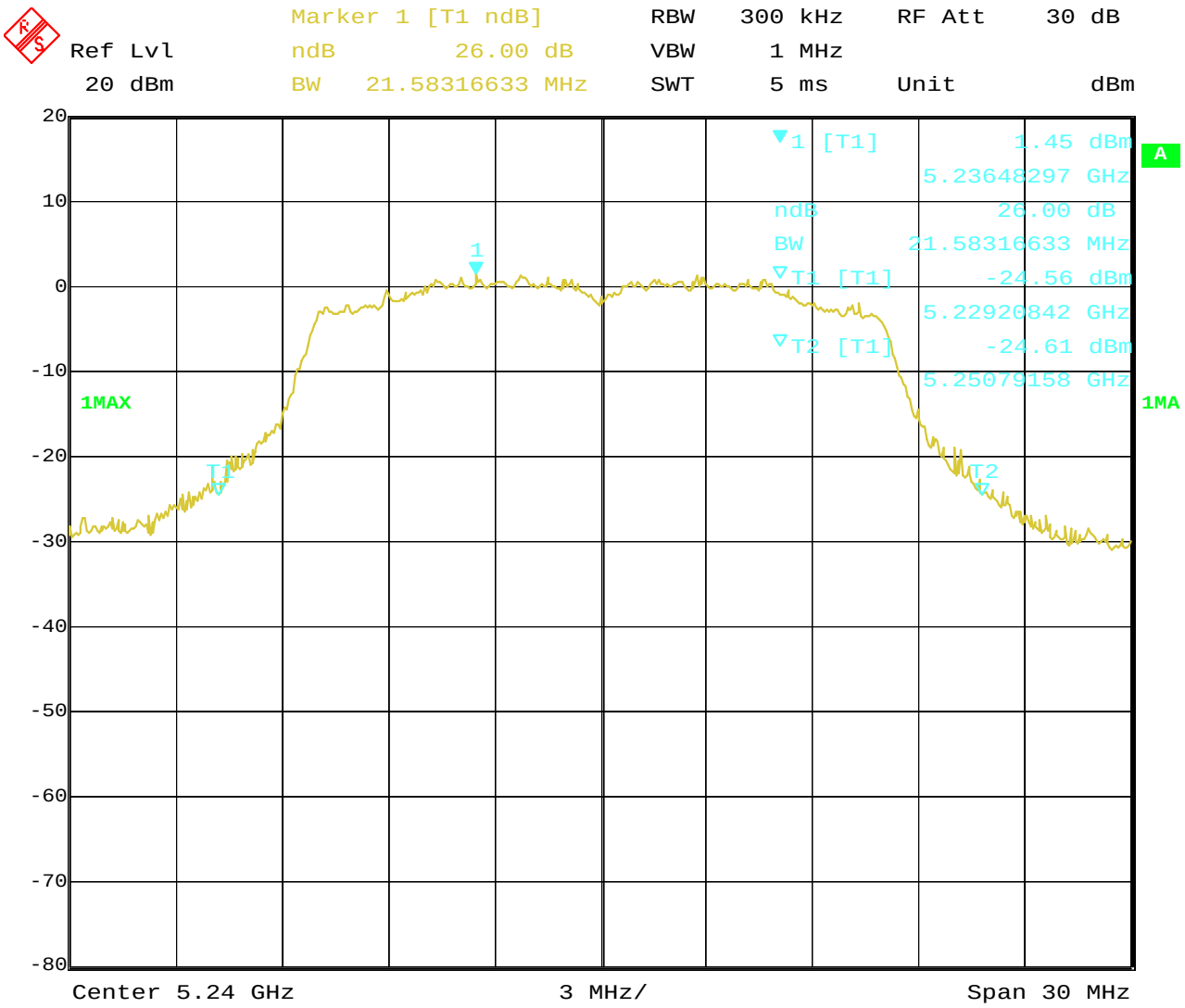
Channel 36



Channel 40



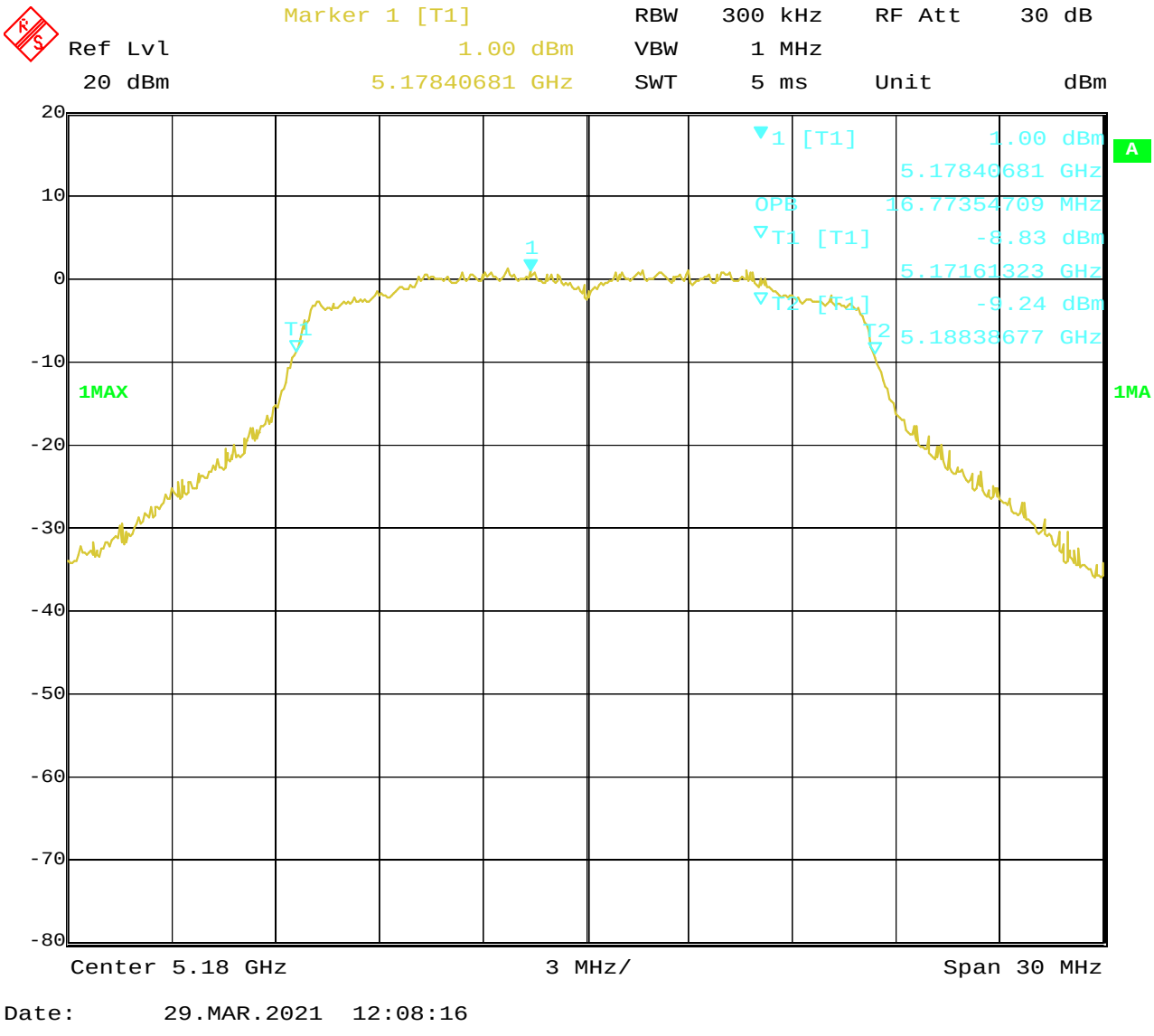
Channel 48



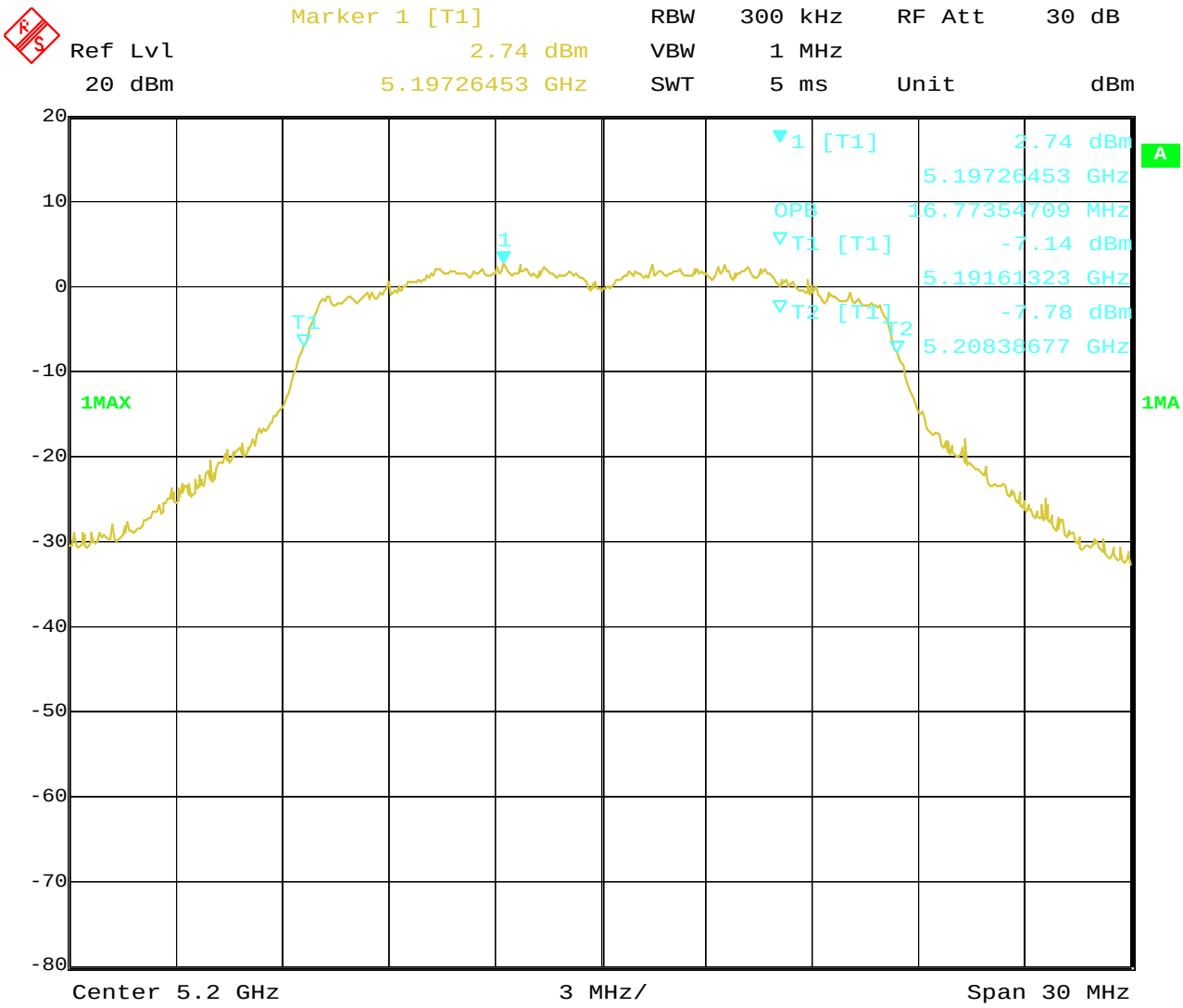
Test Figure:

**99% Bandwidth**

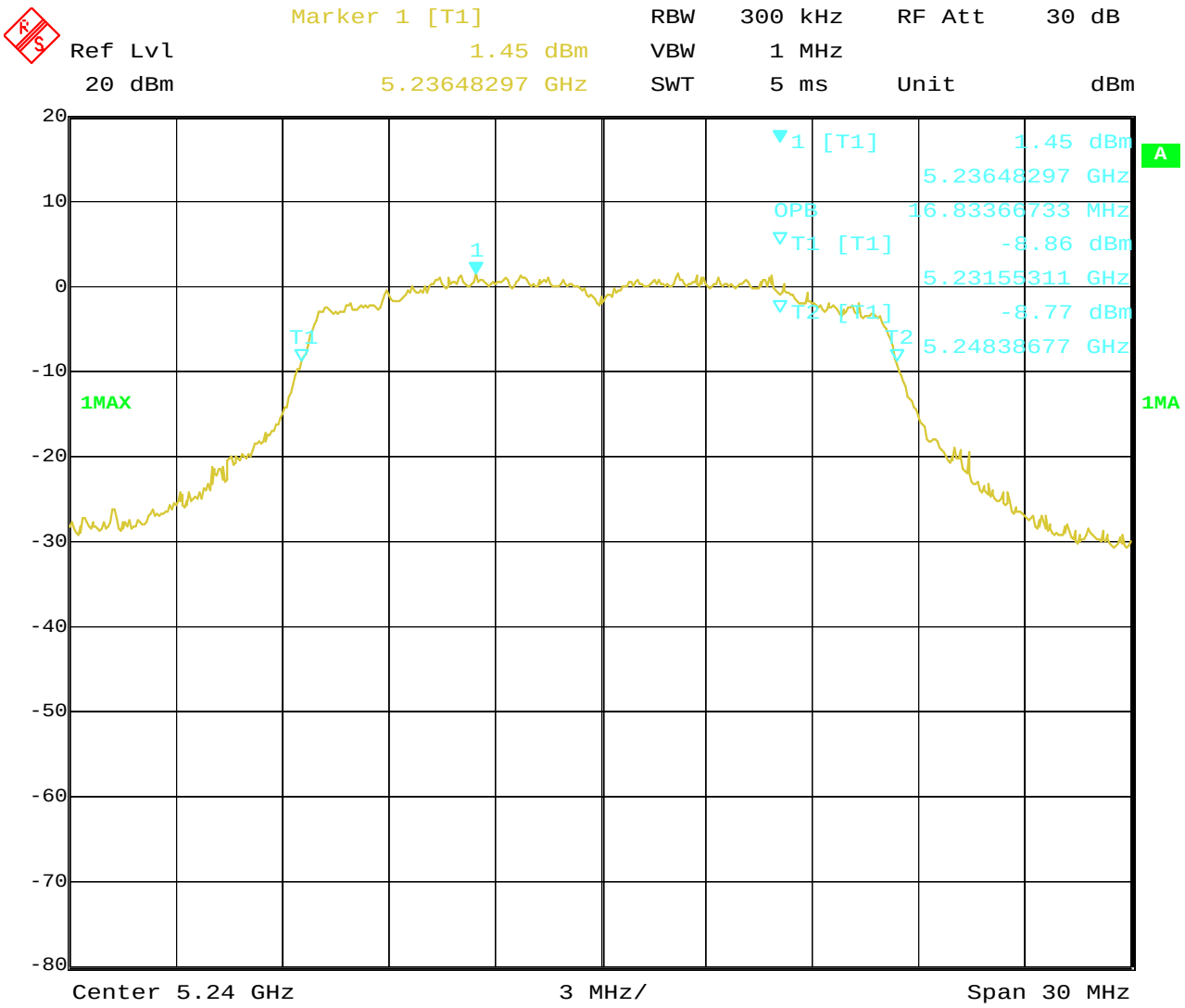
Channel 36



Channel 40



Channel 48



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11n HT20 | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

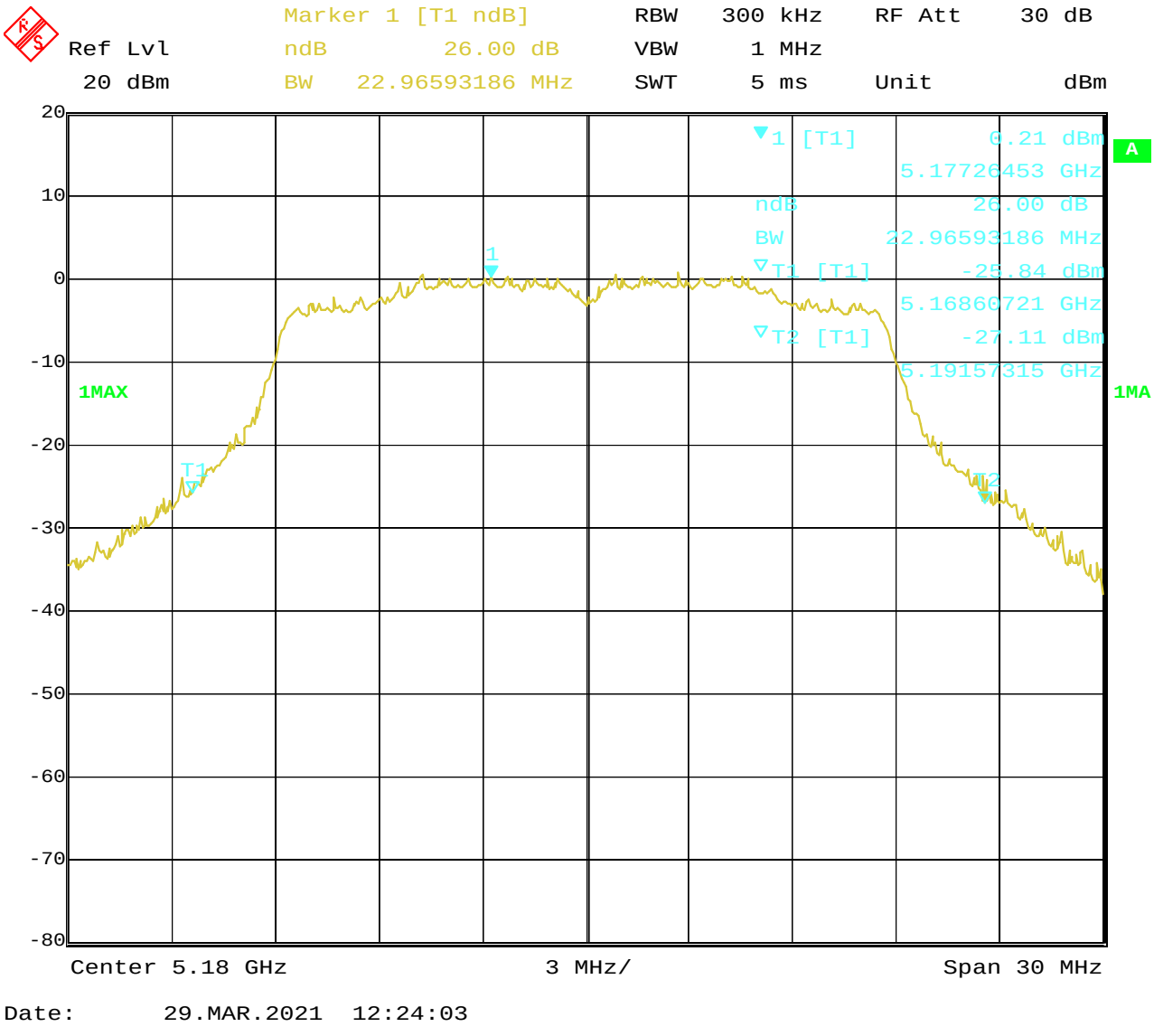
| Channel | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | Bandwidth (MHz) | Minimum Limit (MHz) | Pass/ Fail |
|---|---|---|---|---|---|
| **26dB Bandwidth** | | | | | |
| 36 | 5180 | mcs0 | 22.97 | -- | Pass |
| 40 | 5200 | mcs0 | 23.15 | -- | Pass |
| 48 | 5240 | mcs0 | 23.09 | -- | Pass |
| | | | | | |
| **99% Bandwidth** | | | | | |
| 36 | 5180 | mcs0 | 17.80 | -- | Pass |
| 40 | 5200 | mcs0 | 17.92 | -- | Pass |
| 48 | 5240 | mcs0 | 17.92 | -- | Pass |

Note: Two antennas were tested and only the worst cased was recorded in the test report. Antenna E8 was the worst case.

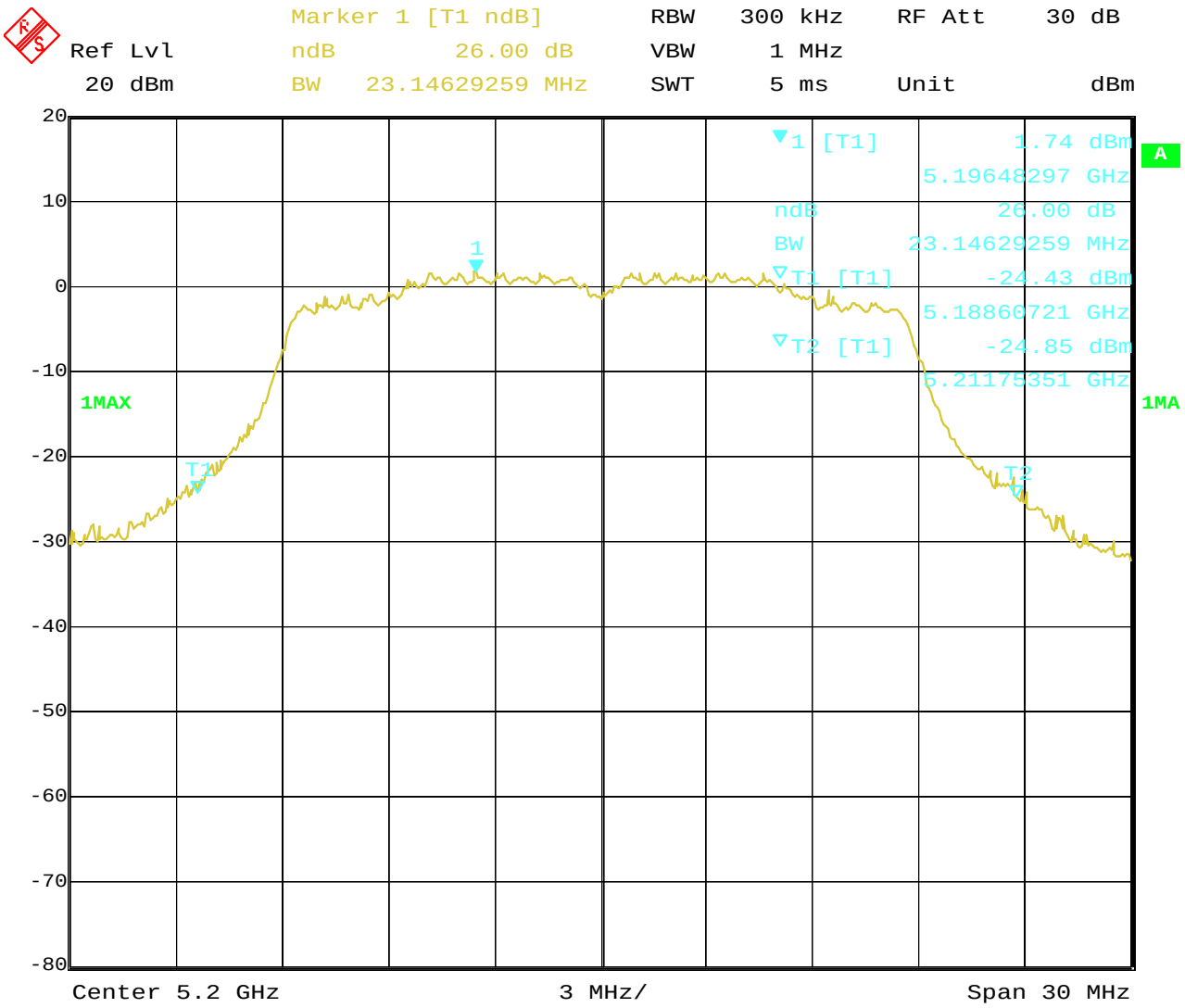
Test Configure

## 26dB Bandwidth

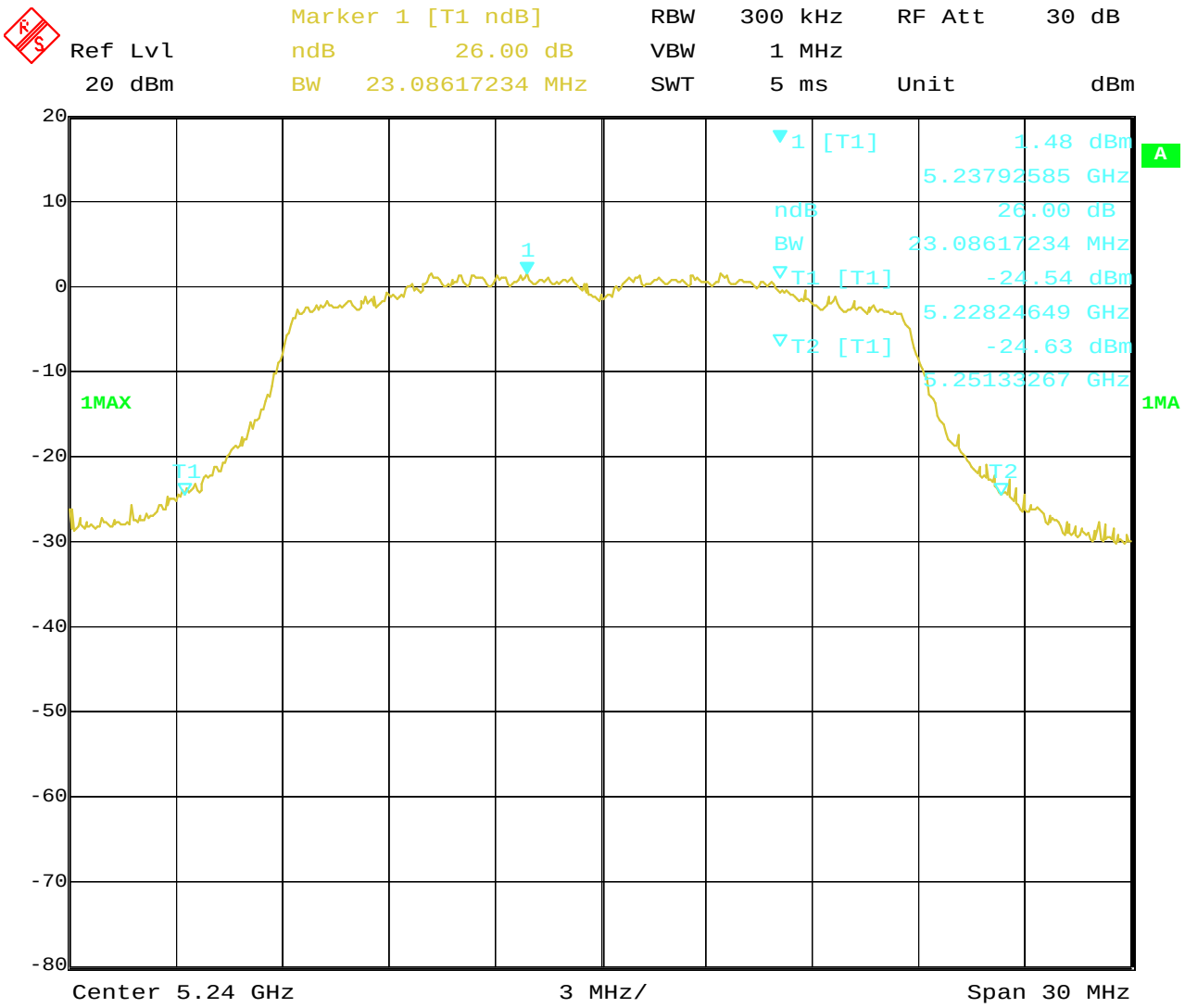
Channel 36



Channel 40



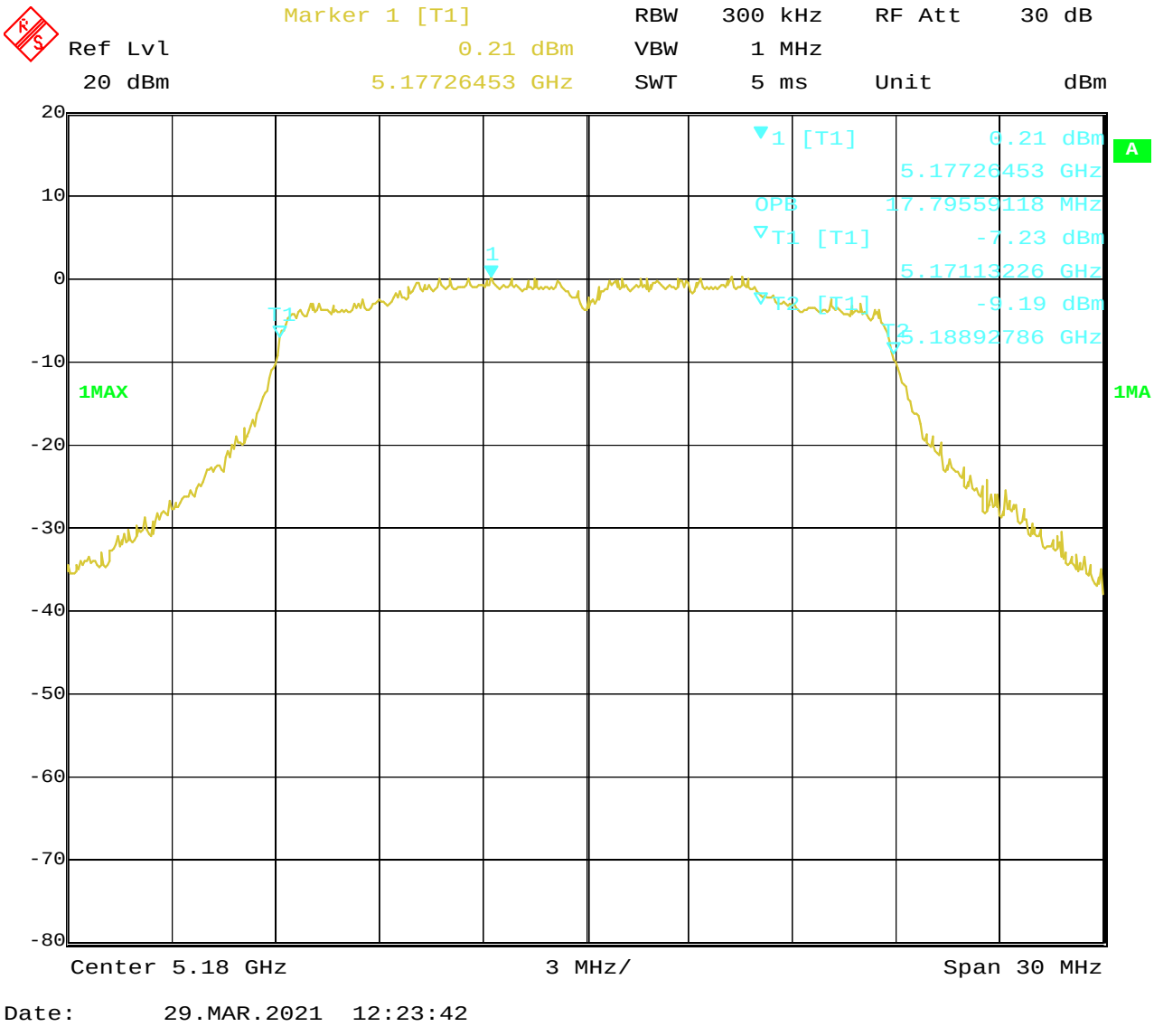
Channel 48



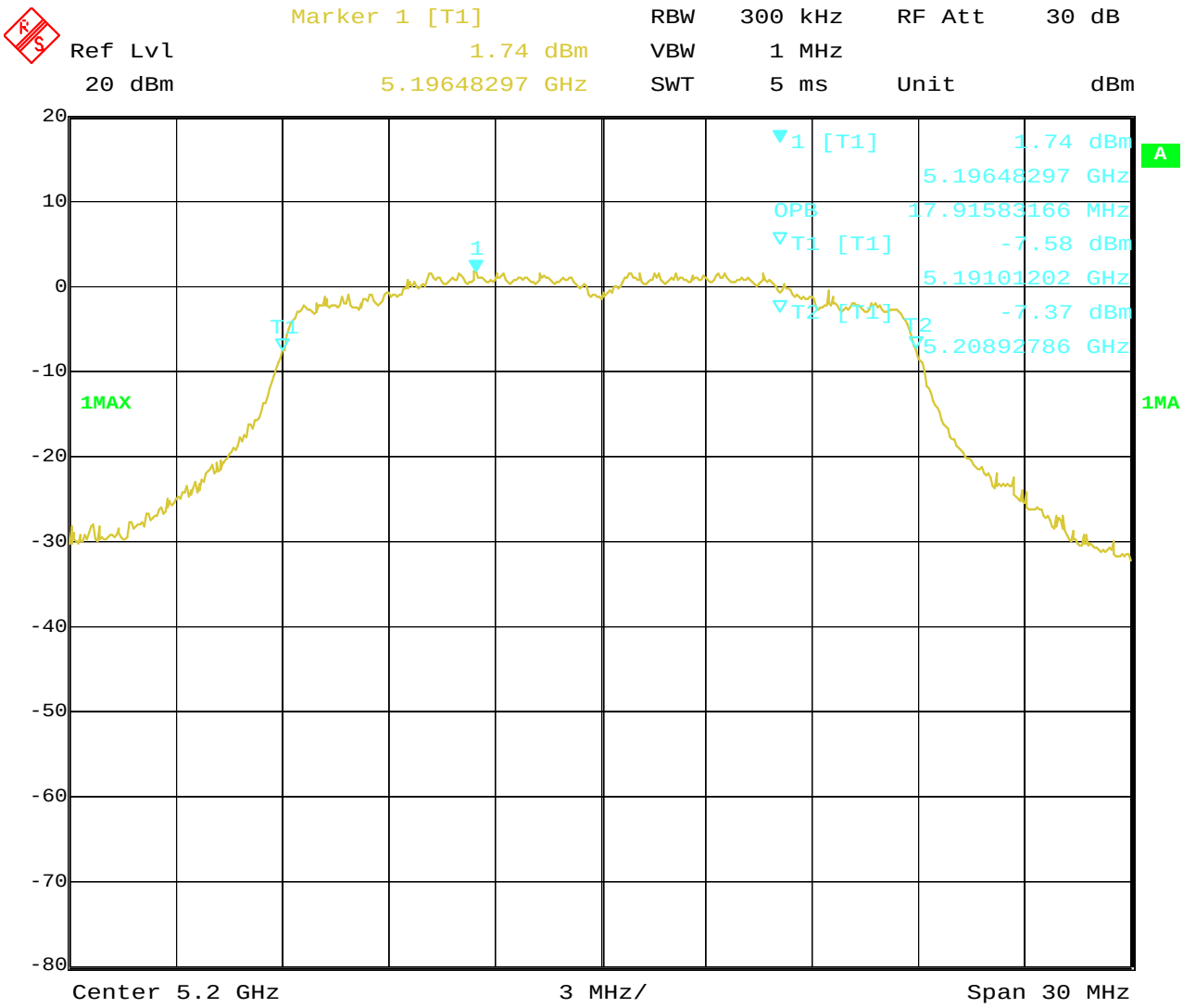
Test Configure

**99% Bandwidth**

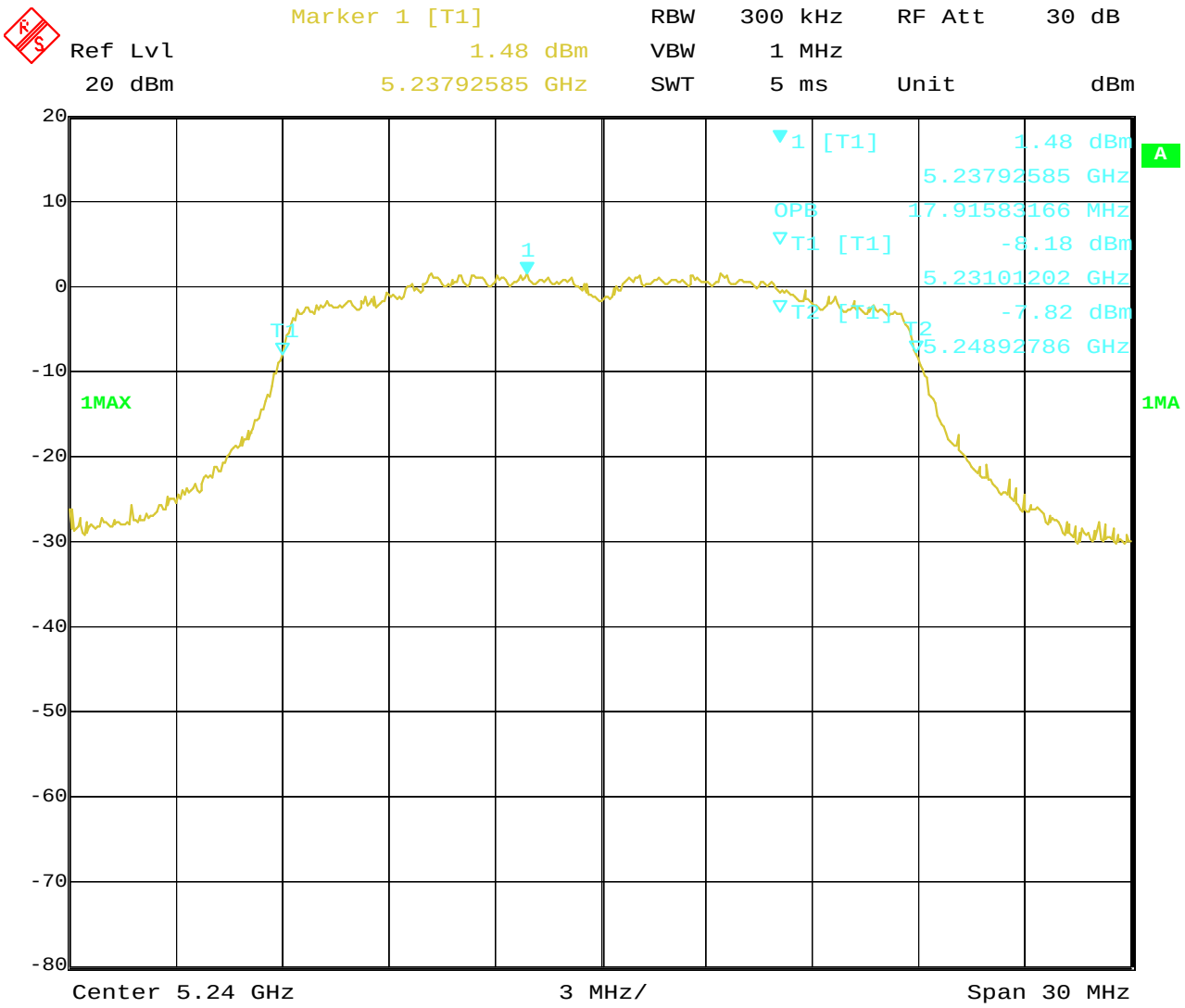
Channel 36



Channel 40



Channel 48



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11n HT40 | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

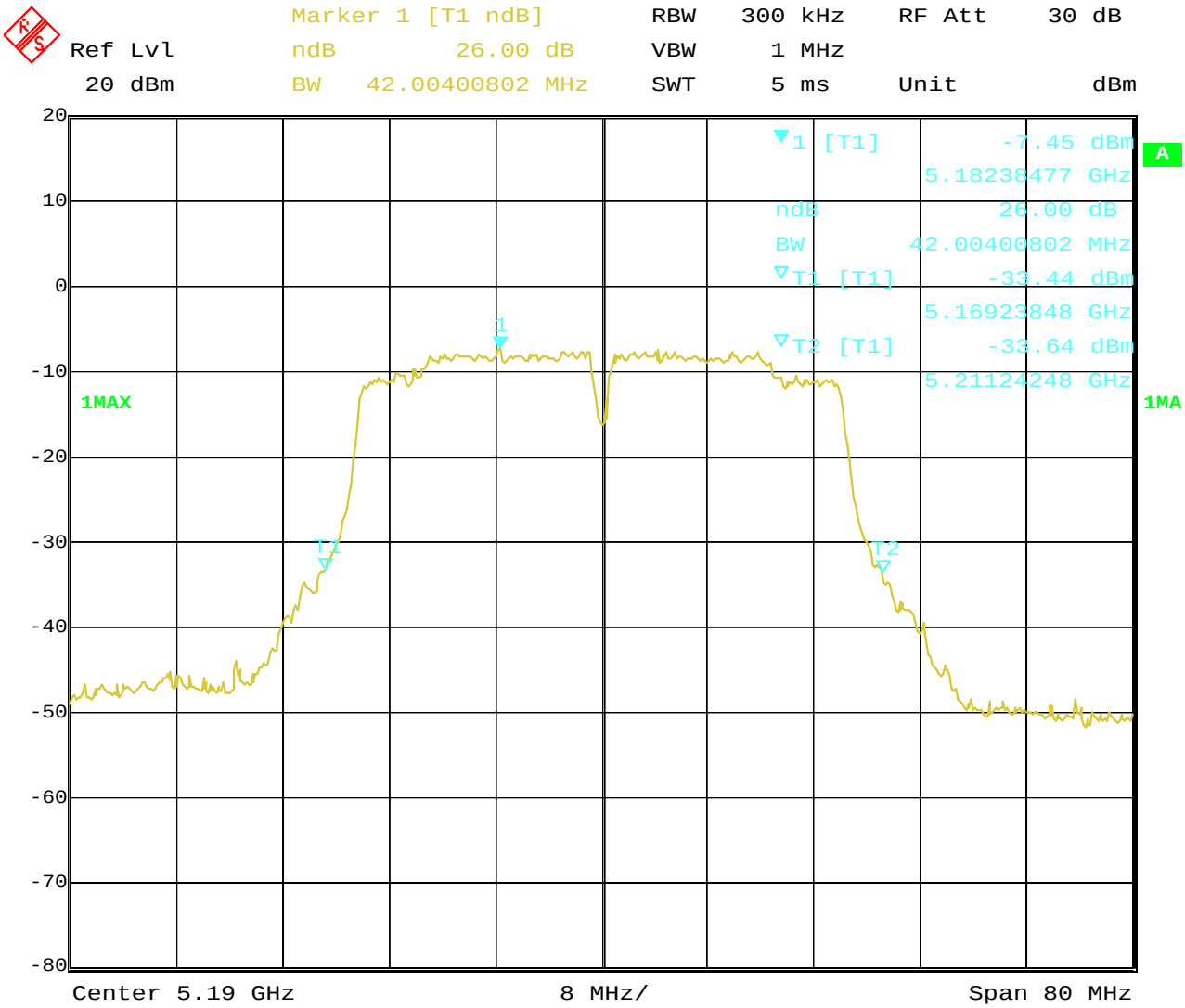
| Channel | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | Bandwidth (MHz) | Minimum Limit (MHz) | Pass/ Fail |
|---|---|---|---|---|---|
| **26dB Bandwidth** | | | | | |
| 38 | 5190 | mcs0 | 42.00 | -- | Pass |
| 46 | 5230 | mcs0 | 41.36 | -- | Pass |
| | | | | | |
| **99% Bandwidth** | | | | | |
| 38 | 5190 | mcs0 | 36.23 | -- | Pass |
| 46 | 5230 | mcs0 | 36.23 | -- | Pass |

Note: Two antennas were tested and only the worst cased was recorded in the test report. Antenna E8 was the worst case.

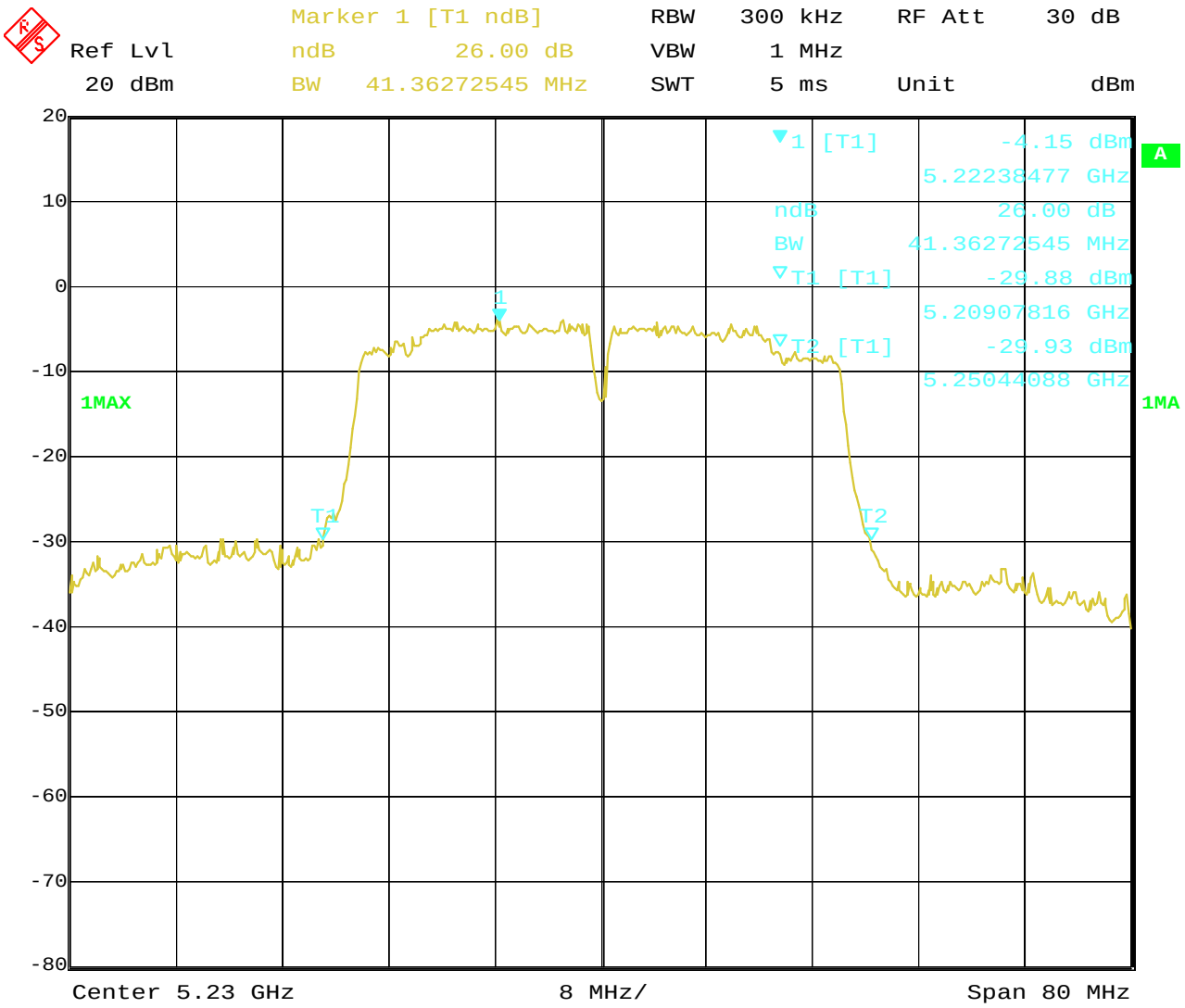
Test Configure

## 26dB Bandwidth

Channel 38



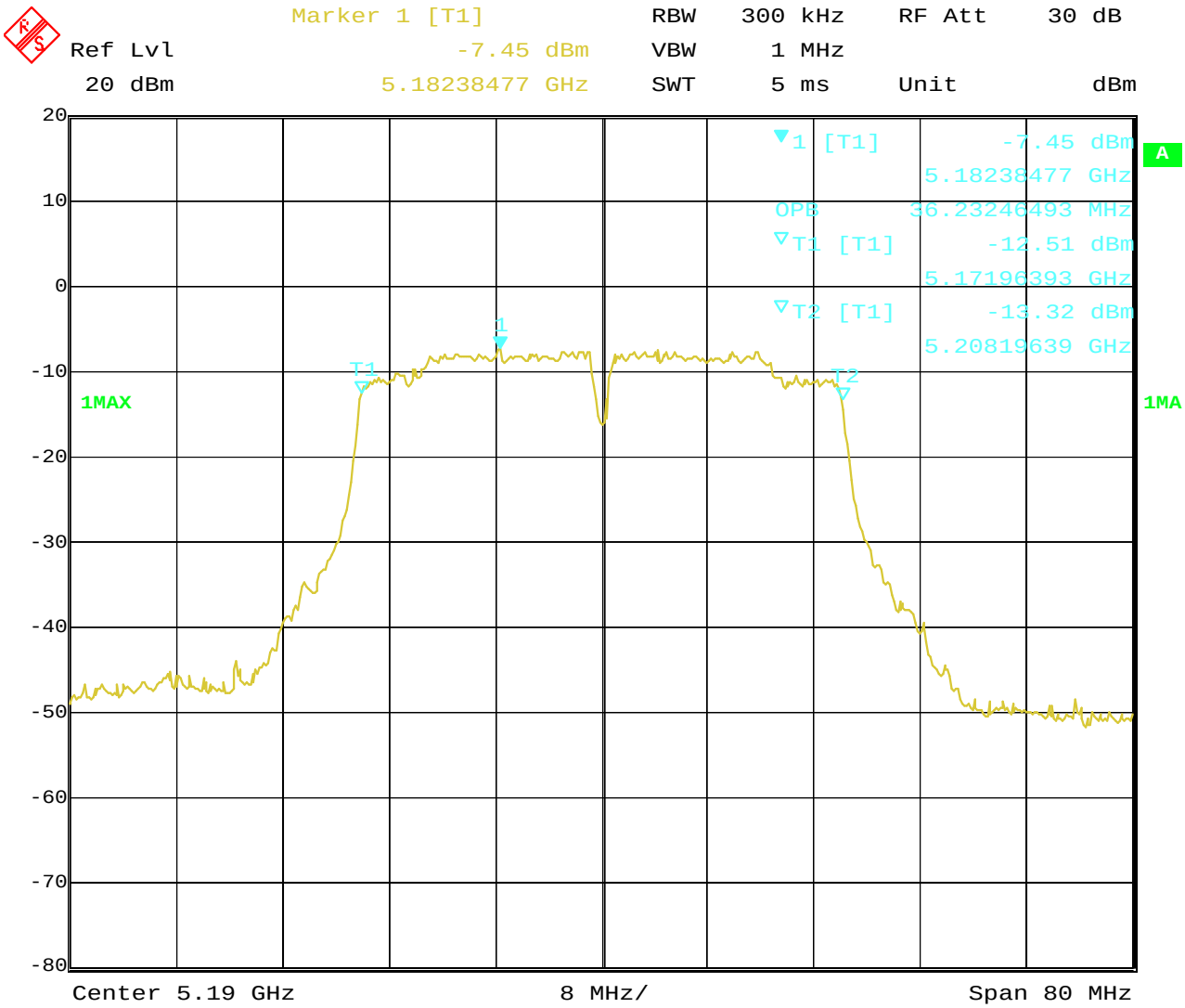
Channel 46



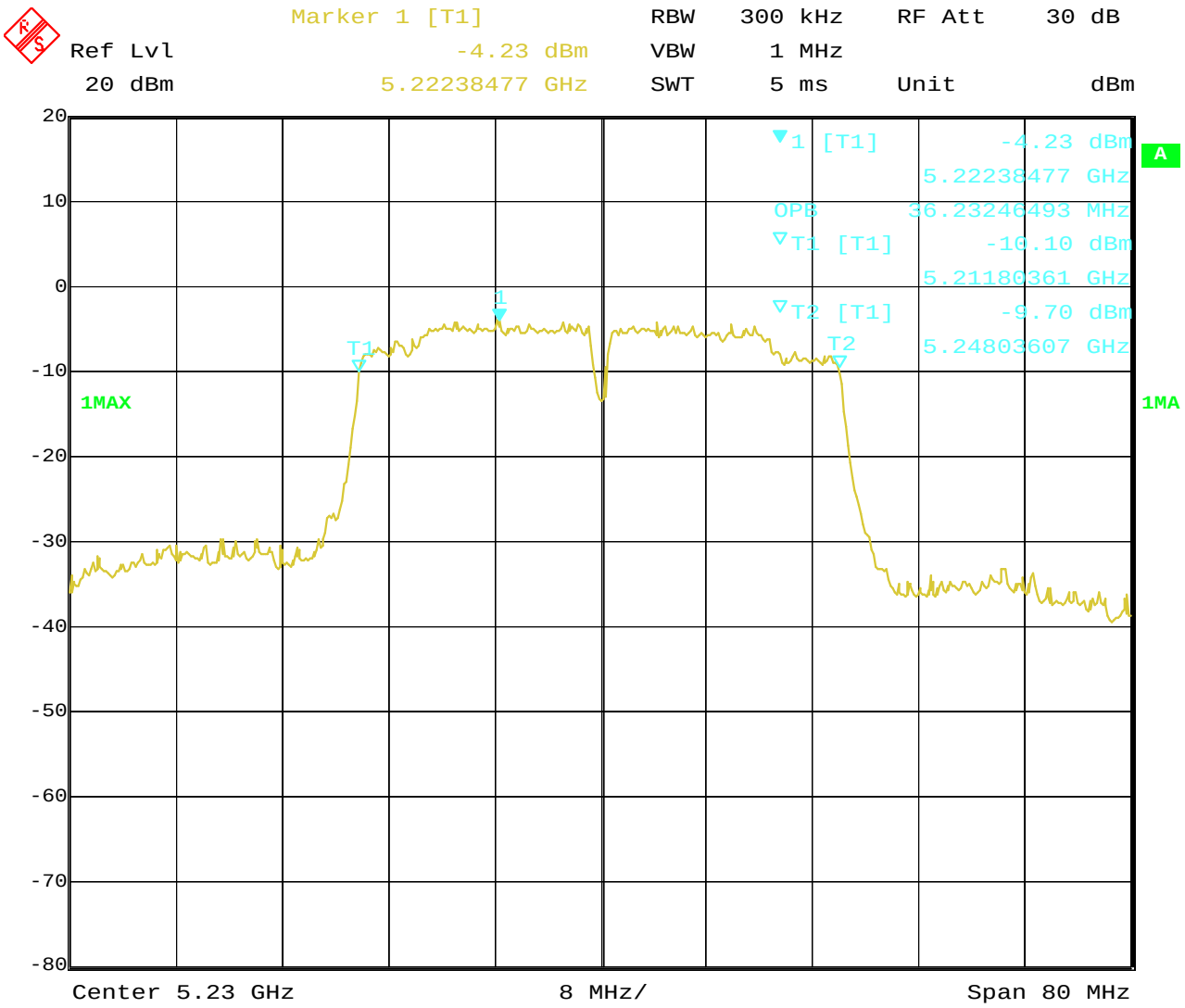
Test Configure

**99% Bandwidth**

Channel 38



Channel 46



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT20 | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

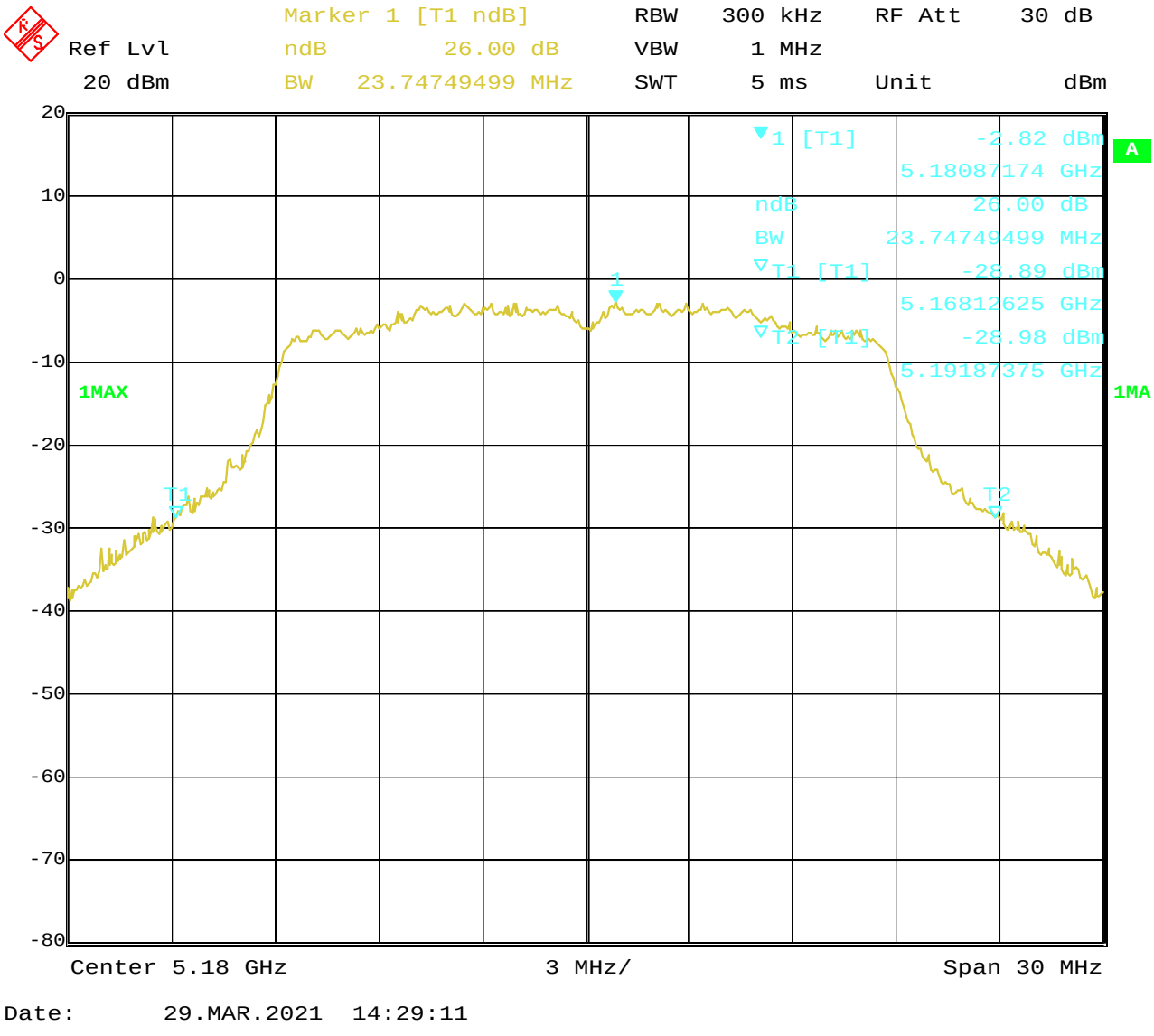
| Channel | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | Bandwidth (MHz) | Minimum Limit (MHz) | Pass/ Fail |
|---|---|---|---|---|---|
| **26dB Bandwidth** | | | | | |
| 36 | 5180 | mcs0 | 23.74 | -- | Pass |
| 40 | 5200 | mcs0 | 23.09 | -- | Pass |
| 48 | 5240 | mcs0 | 22.97 | -- | Pass |
| | | | | | |
| **99% Bandwidth** | | | | | |
| 36 | 5180 | mcs0 | 17.98 | -- | Pass |
| 40 | 5200 | mcs0 | 17.92 | -- | Pass |
| 48 | 5240 | mcs0 | 17.92 | -- | Pass |

Note: Two antennas were tested and only the worst cased was recorded in the test report. Antenna E8 was the worst case.

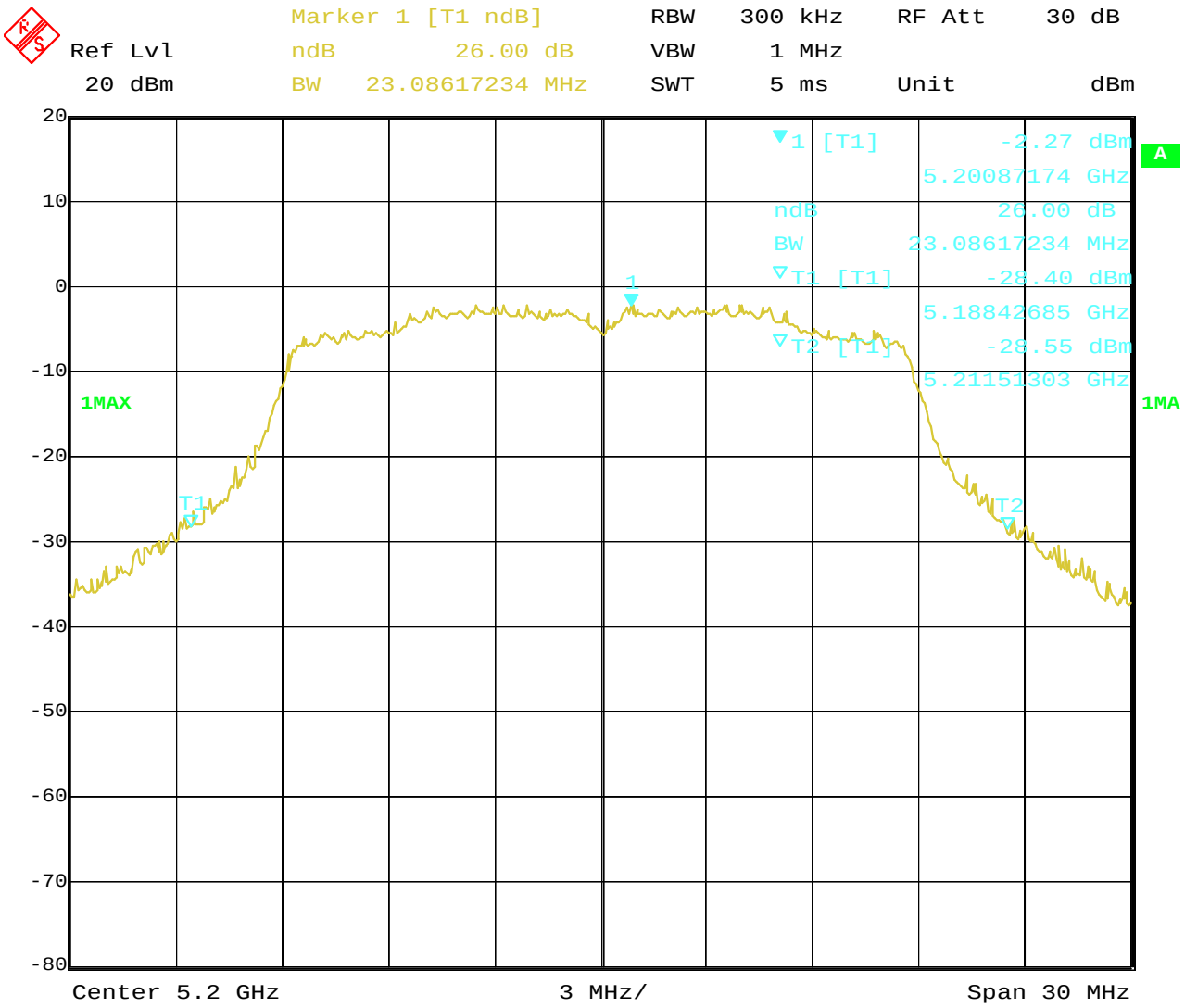
Test Configure

## 26dB Bandwidth

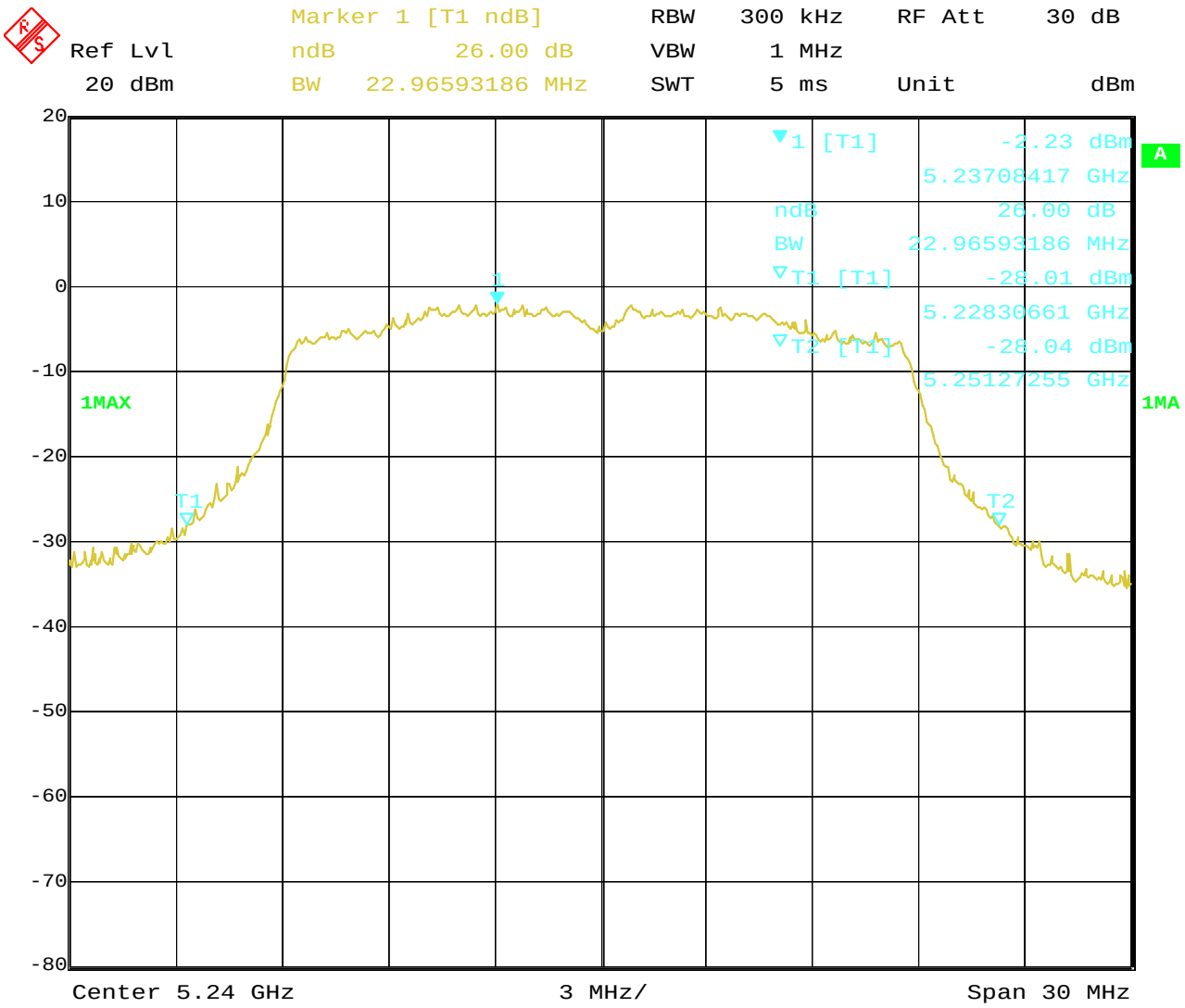
Channel 36



Channel 40



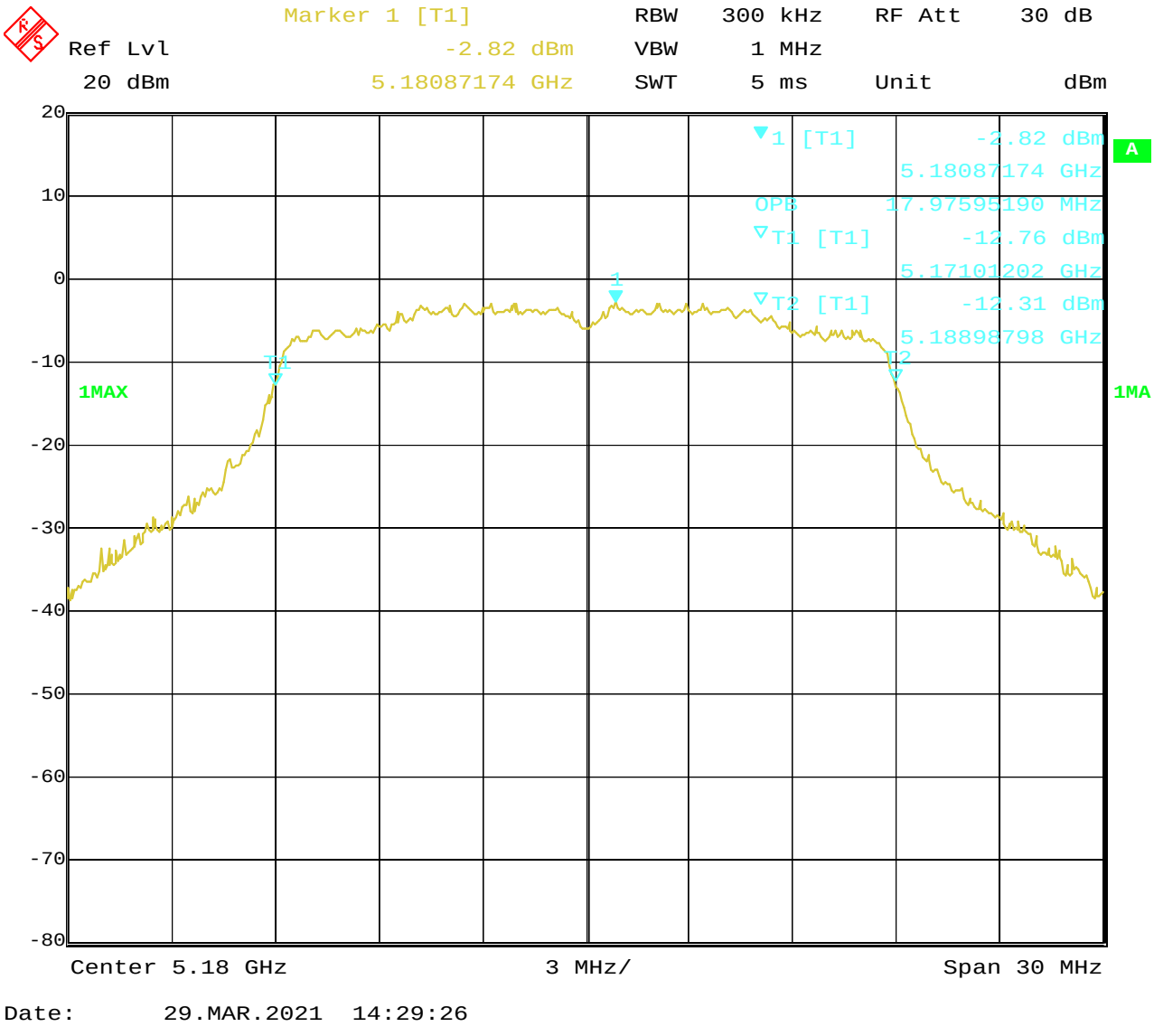
Channel 48



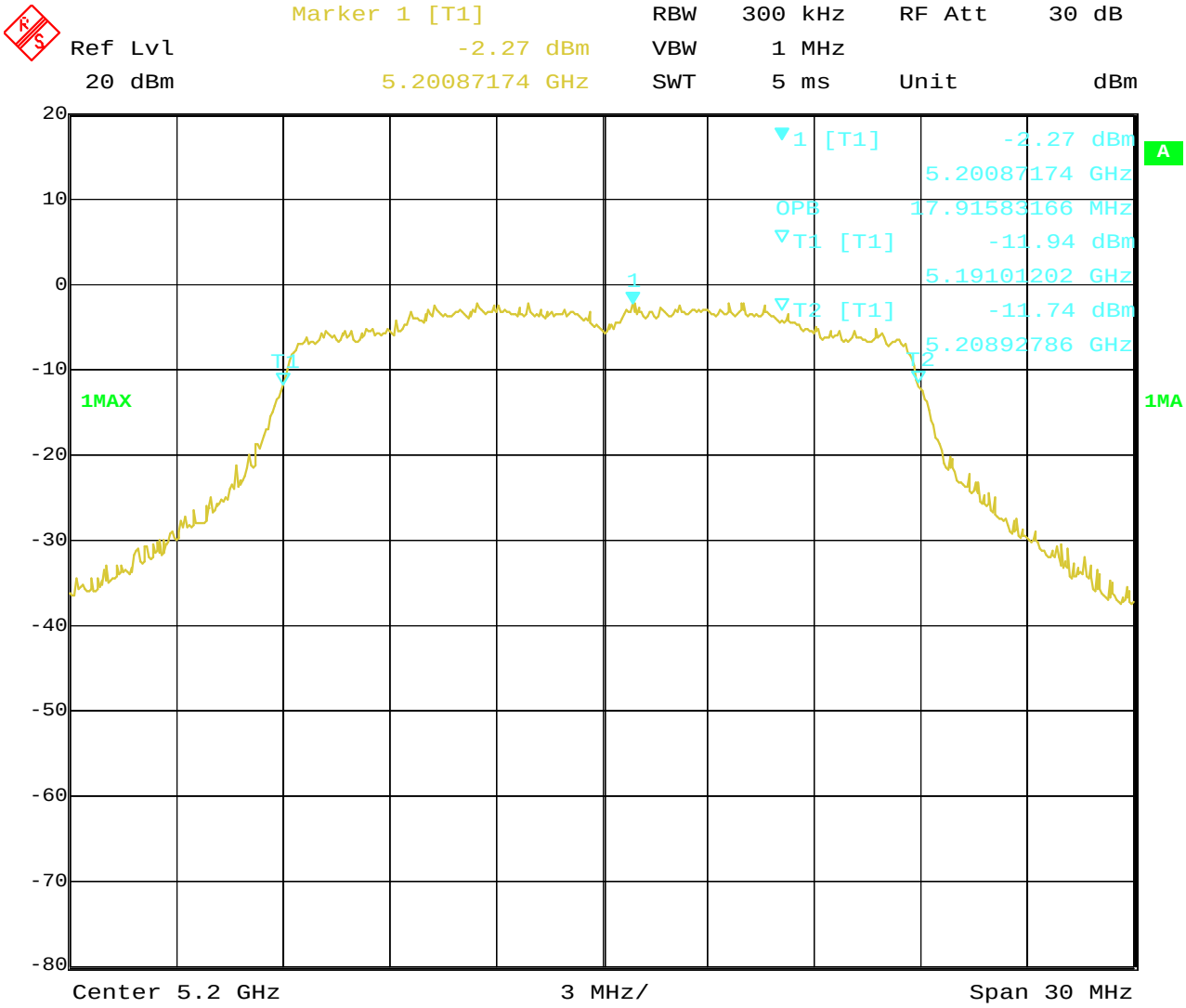
Test Configure

**99% Bandwidth**

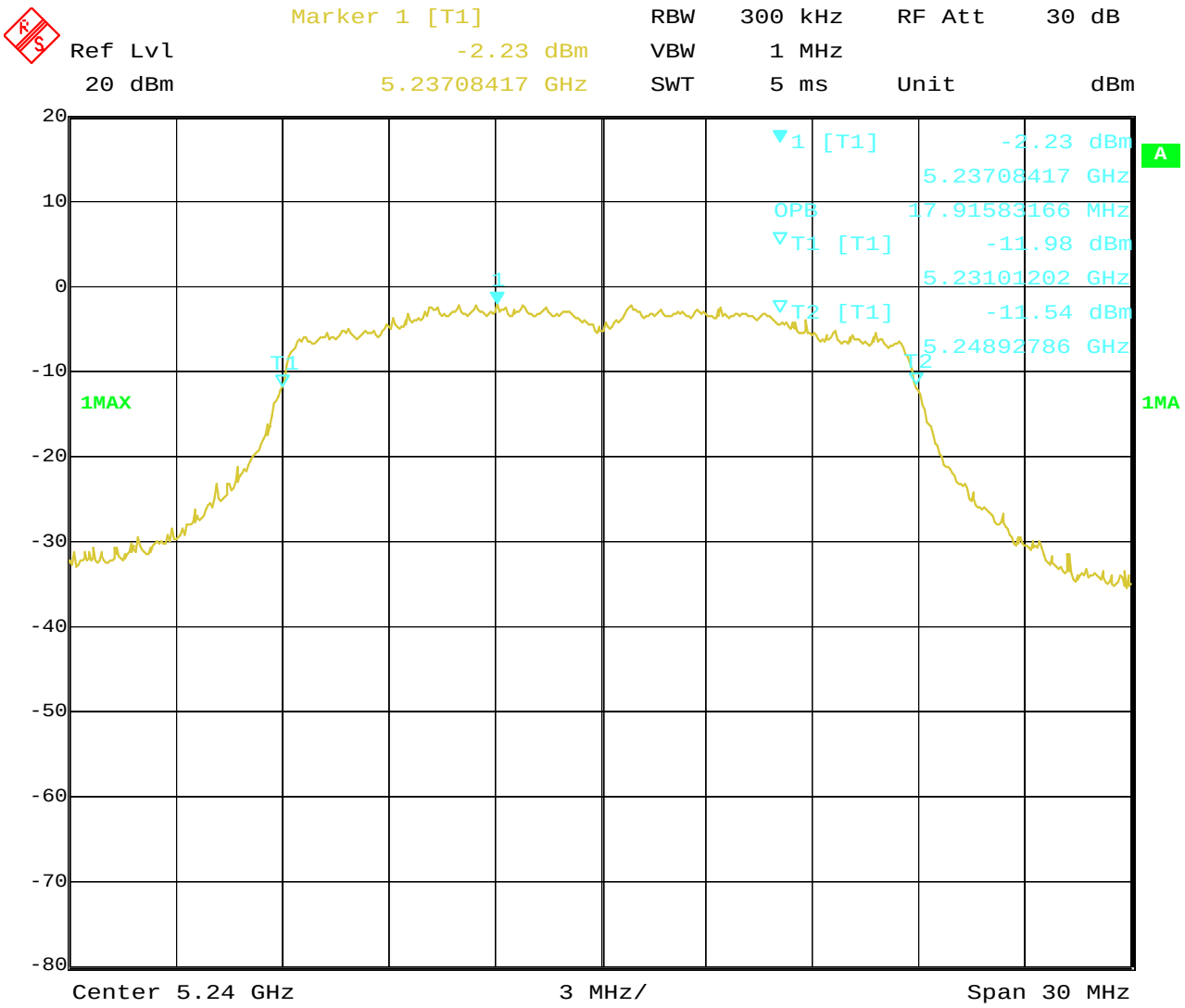
Channel 36



Channel 40



Channel 48



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT40 | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

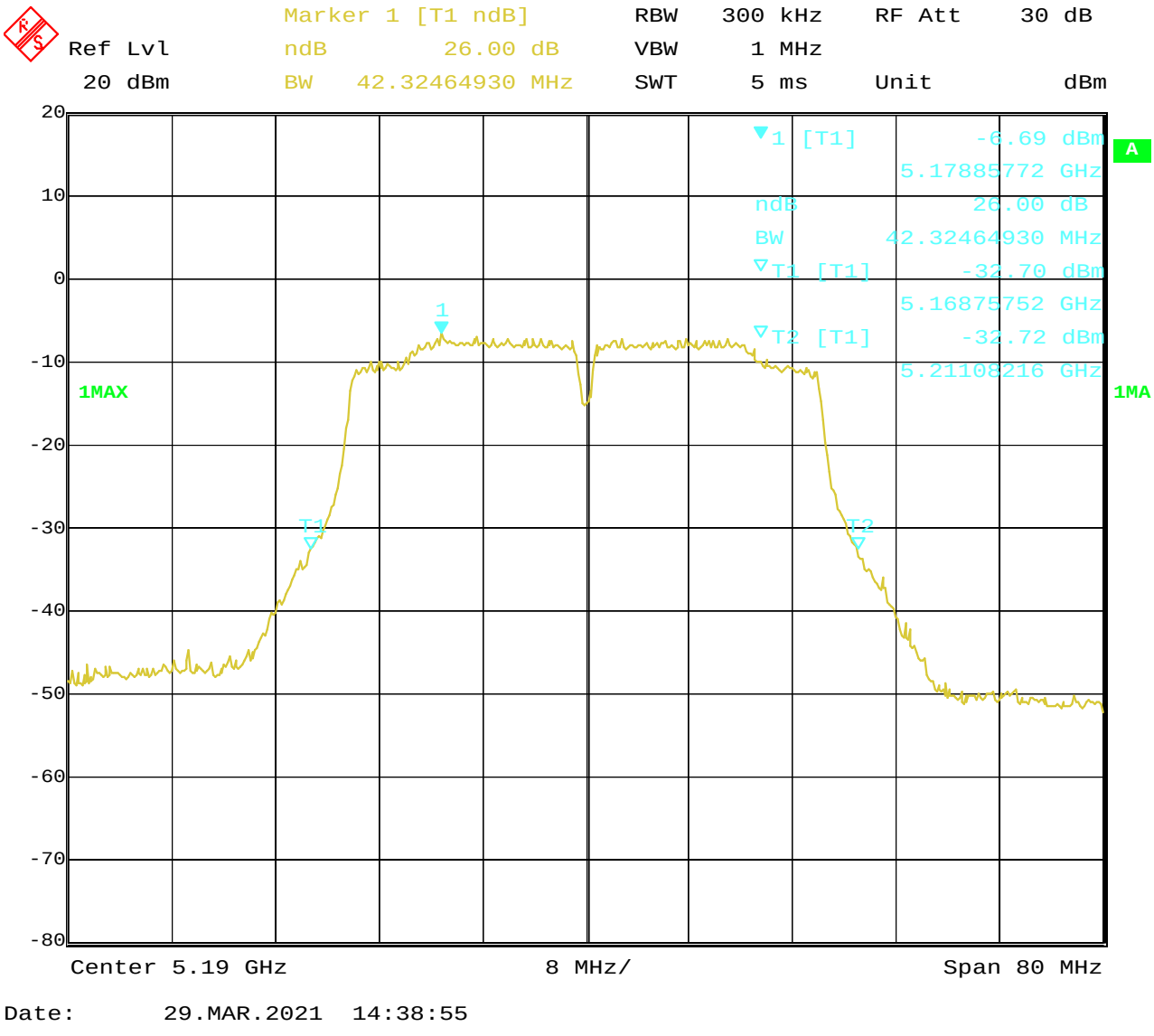
| Channel | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | Bandwidth (MHz) | Minimum Limit (MHz) | Pass/ Fail |
|---|---|---|---|---|---|
| **26dB Bandwidth** | | | | | |
| 38 | 5190 | mcs0 | 42.32 | -- | Pass |
| 46 | 5230 | mcs0 | 41.04 | -- | Pass |
| | | | | | |
| **99% Bandwidth** | | | | | |
| 38 | 5190 | mcs0 | 36.07 | -- | Pass |
| 46 | 5230 | mcs0 | 36.23 | -- | Pass |

Note: Two antennas were tested and only the worst cased was recorded in the test report. Antenna E8 was the worst case.

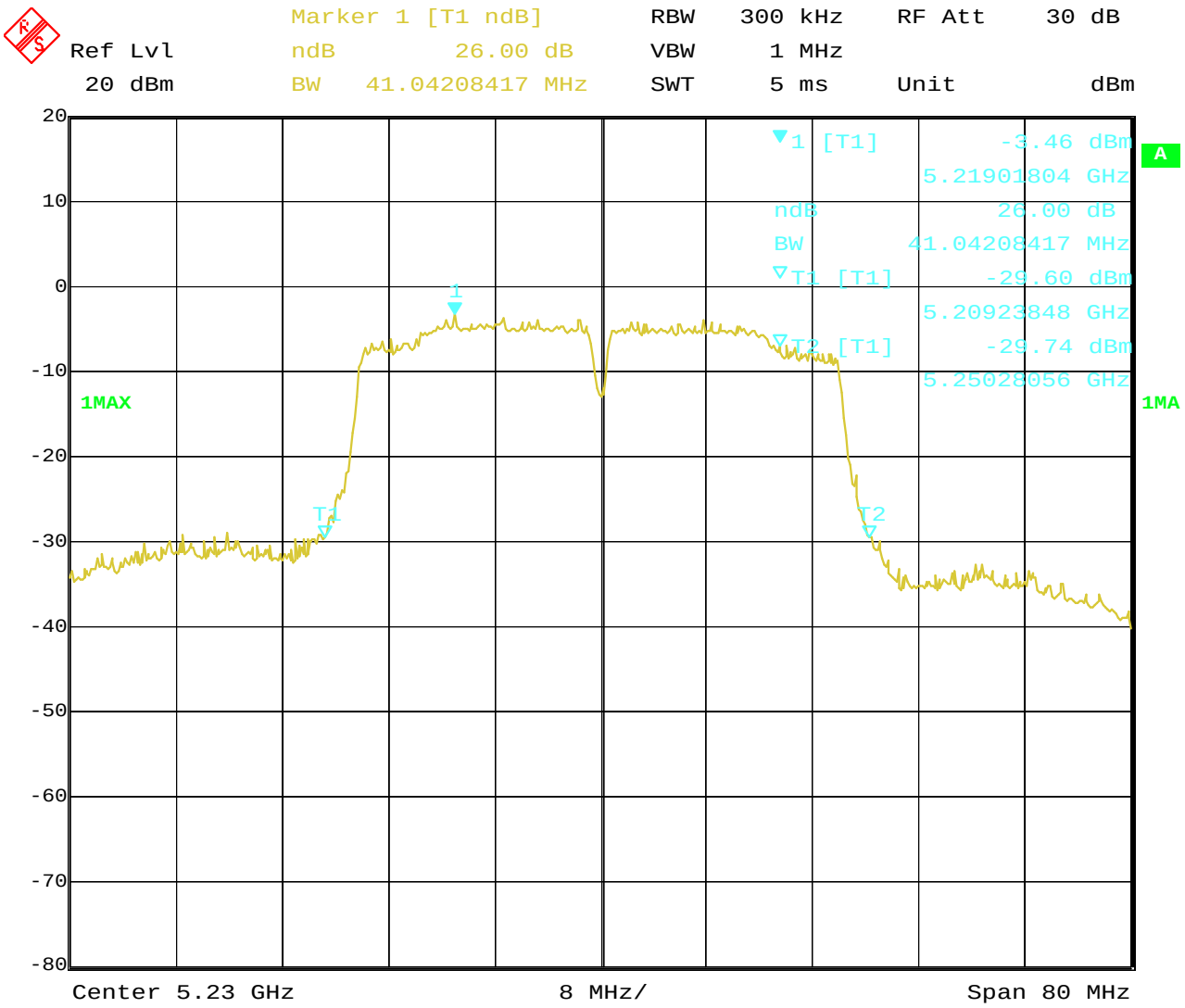
Test Configure

## 26dB Bandwidth

Channel 38



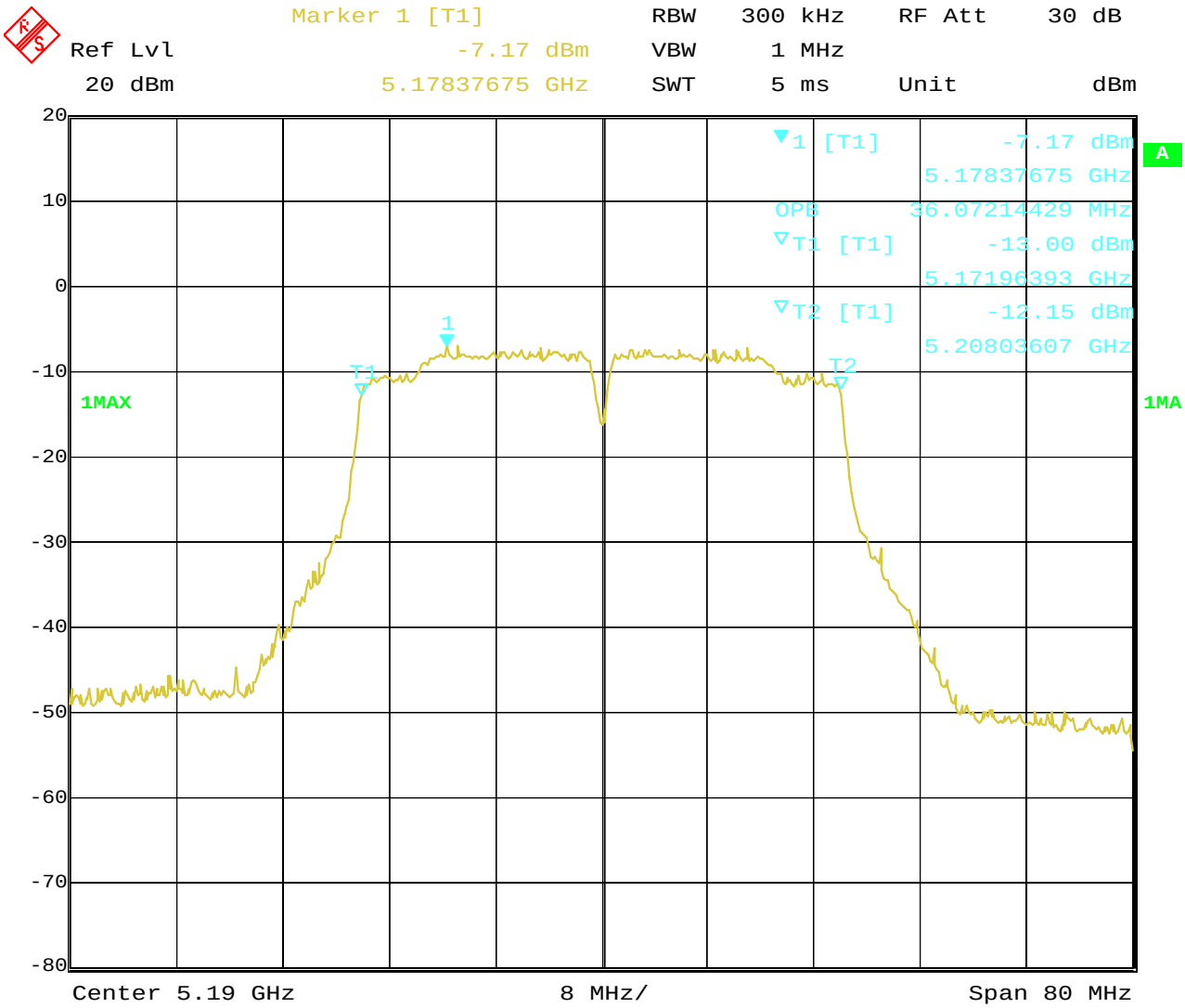
Channel 46



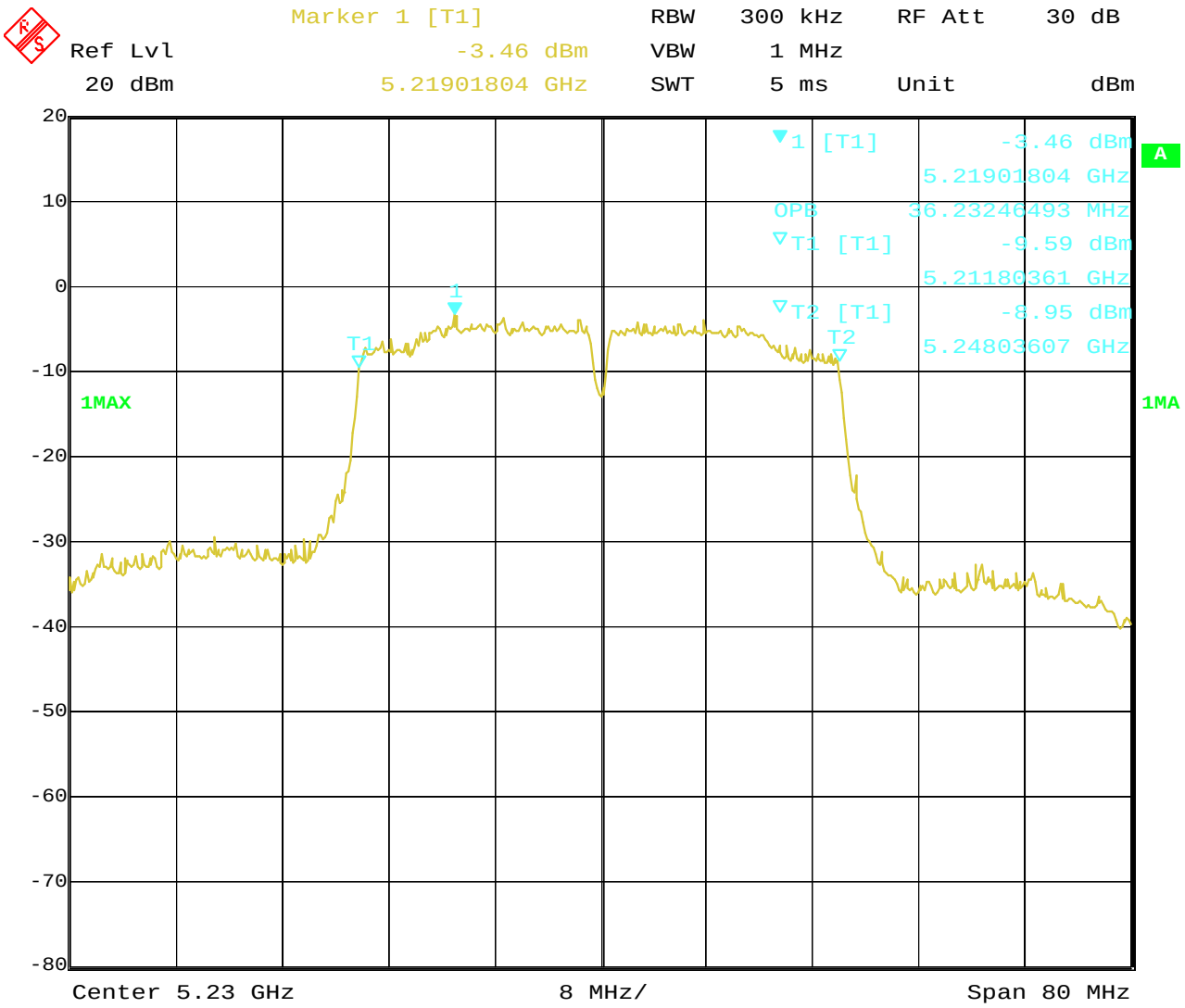
Test Configure

**99% Bandwidth**

Channel 38



Channel 46



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT80 | Input Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

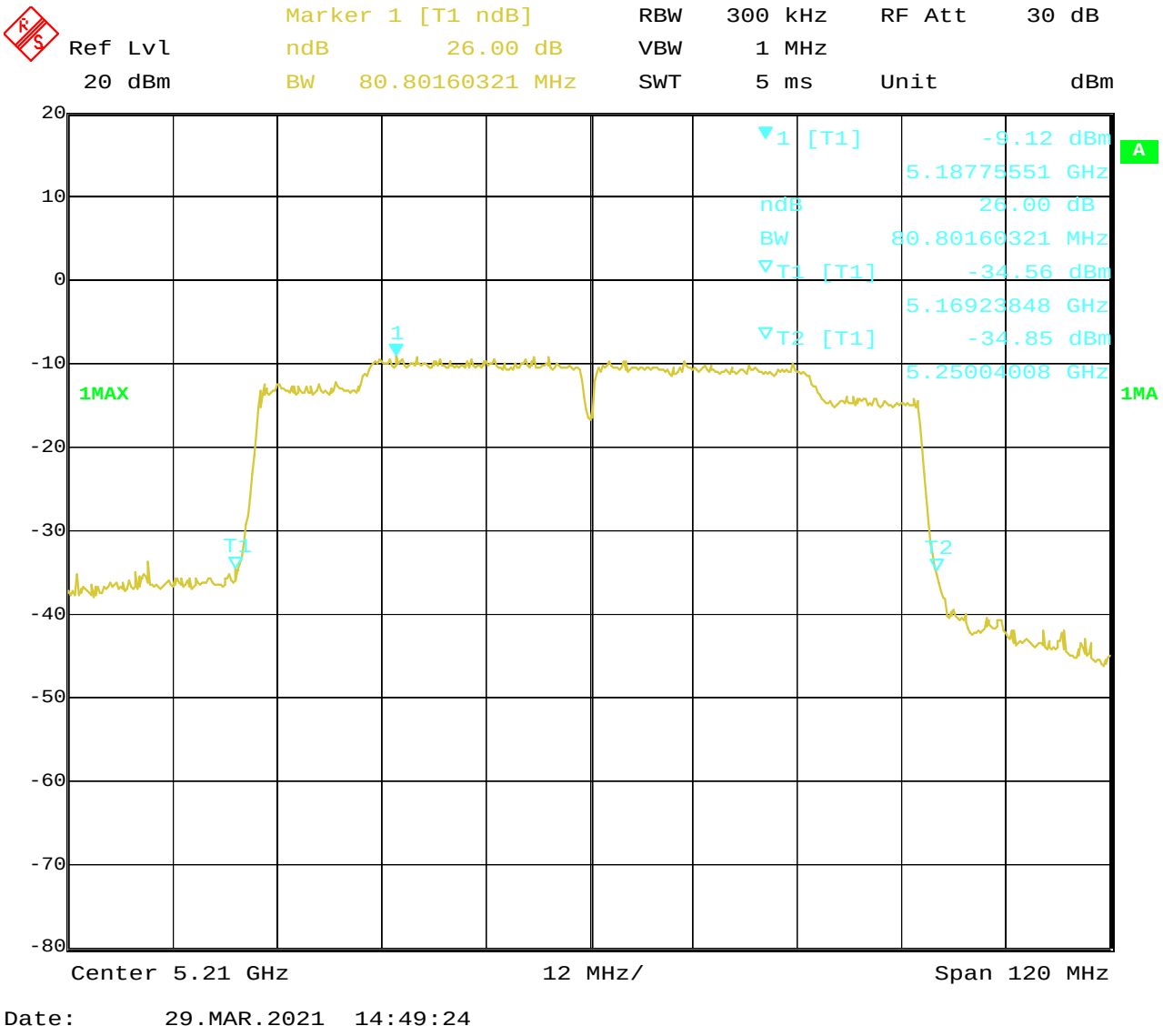
| Channel | Channel Frequency (MHz) | Data Transfer Rate (Mbps) | Bandwidth (MHz) | Minimum Limit (MHz) | Pass/ Fail |
|---|---|---|---|---|---|
| **26dB Bandwidth** | | | | | |
| 42 | 5210 | 23.9 | 80.80 | -- | Pass |
| | | | | | |
| **99% Bandwidth** | | | | | |
| 42 | 5210 | 23.9 | 75.51 | -- | Pass |

Note: Two antennas were tested and only the worst cased was recorded in the test report. Antenna E8 was the worst case.

Test Configure

## 26dB Bandwidth

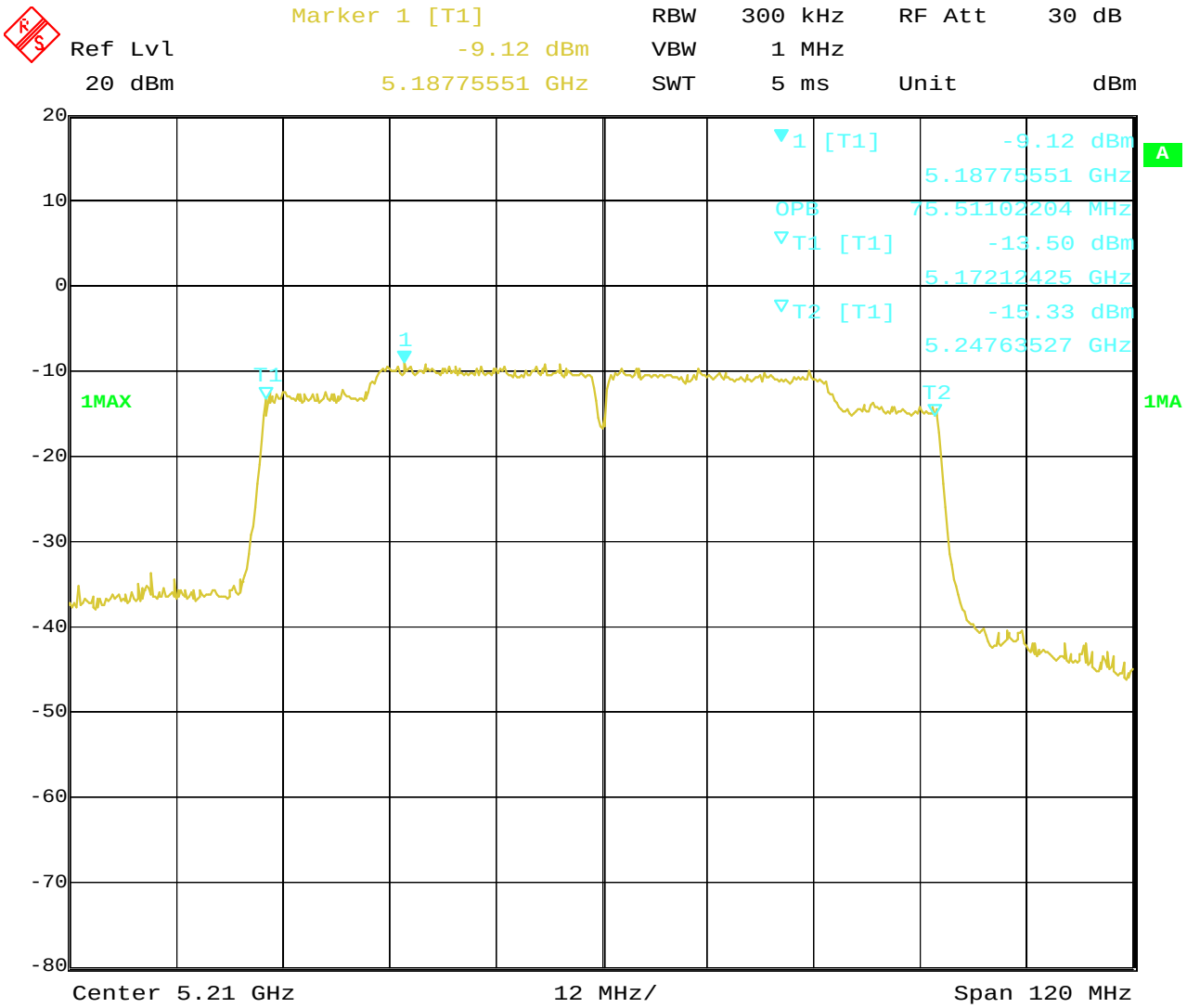
Channel 42



Test Configure

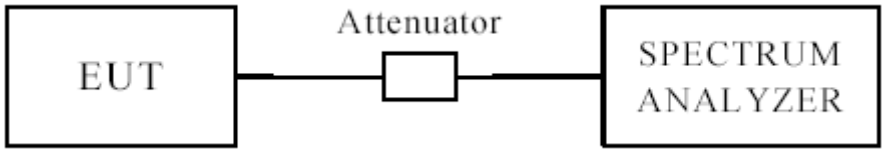
**99% Bandwidth**

Channel 42



## 8.0 Peak Transmit Power Measurement

### 8.1 Test Setup




### 8.2 Limits of Peak Transmit Power Measurement

| Operation Band | EUT Category | Limit |
|---|---|---|
| U-NII-2A | | For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 $\log_{10}$ B*, dBm, whichever is less |
| | √ | For other devices, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$ B*, dBm, whichever power is less |

Note: 1.Where B is the 99% emission bandwidth in MHz.

2. EIRP was measured, EIRP=AV Power +Antenna Gain

| | | |
|---|---|---|
| U-NII-2A | -- | 250mW (24 dBm) or 11 dBm+10 log B* |
| U-NII-2C | -- | 250mW (24 dBm) or 11 dBm+10 log B* |
| U-NII-3 | -- | 1 Watt (30 dBm) |

Note: 1. Where B is the 26dB emission bandwidth in MHz.

2. The average power was measured

### 8.3 Test Procedure

The average power output was measured with a Spectrum analyzer connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

**Note: the average power was measured**

**8.4Test Results**

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11a | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Antenna E8 Power | | Antenna E9 Power | | Total Power (dBm) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | | dBm | mW | dBm | mW | | | |
| 36 | 5180 | 4.85 | 3.05 | 4.69 | 2.94 | 7.78 | 22.38 | Pass |
| 40 | 5200 | 5.69 | 3.71 | 5.47 | 3.52 | 8.59 | 22.38 | Pass |
| 48 | 5240 | 5.29 | 3.38 | 5.11 | 3.24 | 8.21 | 22.38 | Pass |

Note: 1. At finial test to get the worst-case emission at 6Mbps for CH36, CH40 and CH48

2. The result basic equation calculation as follow:

Average Power Output = AV Power Reading + Cable loss + Attenuator

3. The worse case was recorded

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11n HT20 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Antenna E8 Power | | Antenna E9 Power | | Total Power (dBm) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | | dBm | mW | dBm | mW | | | |
| 36 | 5180 | 4.75 | 2.99 | 4.53 | 2.84 | 7.65 | 22.38 | Pass |
| 40 | 5200 | 6.01 | 3.99 | 5.77 | 3.78 | 8.90 | 22.38 | Pass |
| 48 | 5240 | 5.14 | 3.27 | 5.03 | 3.18 | 8.10 | 22.38 | Pass |

Note: 1. At finial test to get the worst-case emission at mcs0 (6.5Mbps) for CH36, CH40, CH48, CH149, CH153 and CH161

2. The result basic equation calculation as follow:

Average Power Output = AV Power Reading + Cable loss + Attenuator

3. The worse case was recorded

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11n HT40 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Antenna E8 Power | | Antenna E9 Power | | Total Power (dBm) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | | dBm | mW | dBm | mW | | | |
| 38 | 5190 | 3.53 | 2.25 | 3.21 | 2.09 | 6.38 | 23.01 | Pass |
| 46 | 5230 | 6.86 | 4.85 | 6.45 | 4.42 | 9.67 | 23.01 | Pass |

Note: 1. At finial test to get the worst-case emission at mcs0 (13.5Mbps) for CH38 and CH46
2. The result basic equation calculation as follow:
Average Power Output = AV Power Reading + Cable loss + Attenuator
3. The worse case was recorded

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT20 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Antenna E8 Power | | Antenna E9 Power | | Total Power (dBm) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | | dBm | mW | dBm | mW | | | |
| 36 | 5180 | 4.69 | 2.94 | 4.31 | 2.70 | 7.51 | 22.58 | Pass |
| 40 | 5200 | 5.94 | 3.93 | 5.67 | 3.69 | 8.82 | 22.58 | Pass |
| 48 | 5240 | 5.12 | 3.25 | 4.95 | 3.13 | 8.05 | 22.58 | Pass |

Note: 1. At finial test to get the worst-case emission at mcs0 (6.5Mbps) for CH36, CH40 and CH48
2. The result basic equation calculation as follow:
Average Power Output = AV Power Reading + Cable loss + Attenuator
3. The worse case was recorded

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT40 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Antenna E8 Power | | Antenna E9 Power | | Total Power (dBm) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | | dBm | mW | dBm | mW | | | |
| 38 | 5190 | 3.68 | 2.33 | 3.32 | 2.15 | 6.51 | 23.01 | Pass |
| 46 | 5230 | 6.96 | 4.97 | 6.59 | 4.56 | 9.79 | 23.01 | Pass |

Note: 1. At finial test to get the worst-case emission at mcs0 (13.5Mbps) for CH38 and CH46
2. The result basic equation calculation as follow:
Average Power Output = AV Power Reading + Cable loss + Attenuator
3. The worse case was recorded

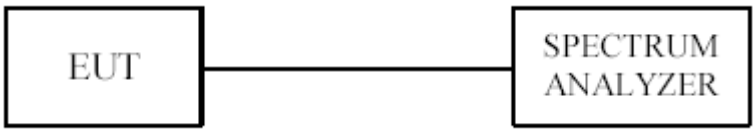
| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT80 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Antenna E8 Power | | Antenna E9 Power | | Total Power (dBm) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|---|---|
| | | dBm | mW | dBm | mW | | | |
| 42 | 5210 | 4.00 | 2.51 | 3.72 | 2.36 | 6.87 | 23.01 | Pass |

Note: 1. At finial test to get the worst-case emission at 23.9Mbps for CH42
2. The result basic equation calculation as follow:
Average Power Output = AV Power Reading + Cable loss + Attenuator
3. The worse case was recorded

## 9. Power Spectral Density Measurement

### 9.1 Test Setup




### 9.2 Limits of Power Spectral Density Measurement

| Operation Band | Limit |
|---|---|
| U-NII-1 | 10dBm/MHz |
| U-NII-2A | 11dBm/MHz |
| U-NII-2C | 11dBm/MHz |
| U-NII-3 | 30dBm/500kHz |

### 9.3 Test Procedure

1. The EUT was directly connected to the spectrum analyzer
2. Set the RBW = 1MHz.
3. Set the VBW =3MHz.
4. Set the span to encompass the entire emissions bandwidth (EBW) of the signal
5. Detector = RMS
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.

**9.4Test Result**

| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11a 6Mbps | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Power Spectral Density(dBm/MHz) | Factor | Total Spectral Density (dBm/MHz) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|
| 36 | 5180 | -3.93 | 3.01 | -0.93 | 10 | Pass |
| 40 | 5200 | -2.67 | 3.01 | 0.34 | 10 | Pass |
| 48 | 5240 | -3.35 | 3.01 | -0.34 | 10 | Pass |

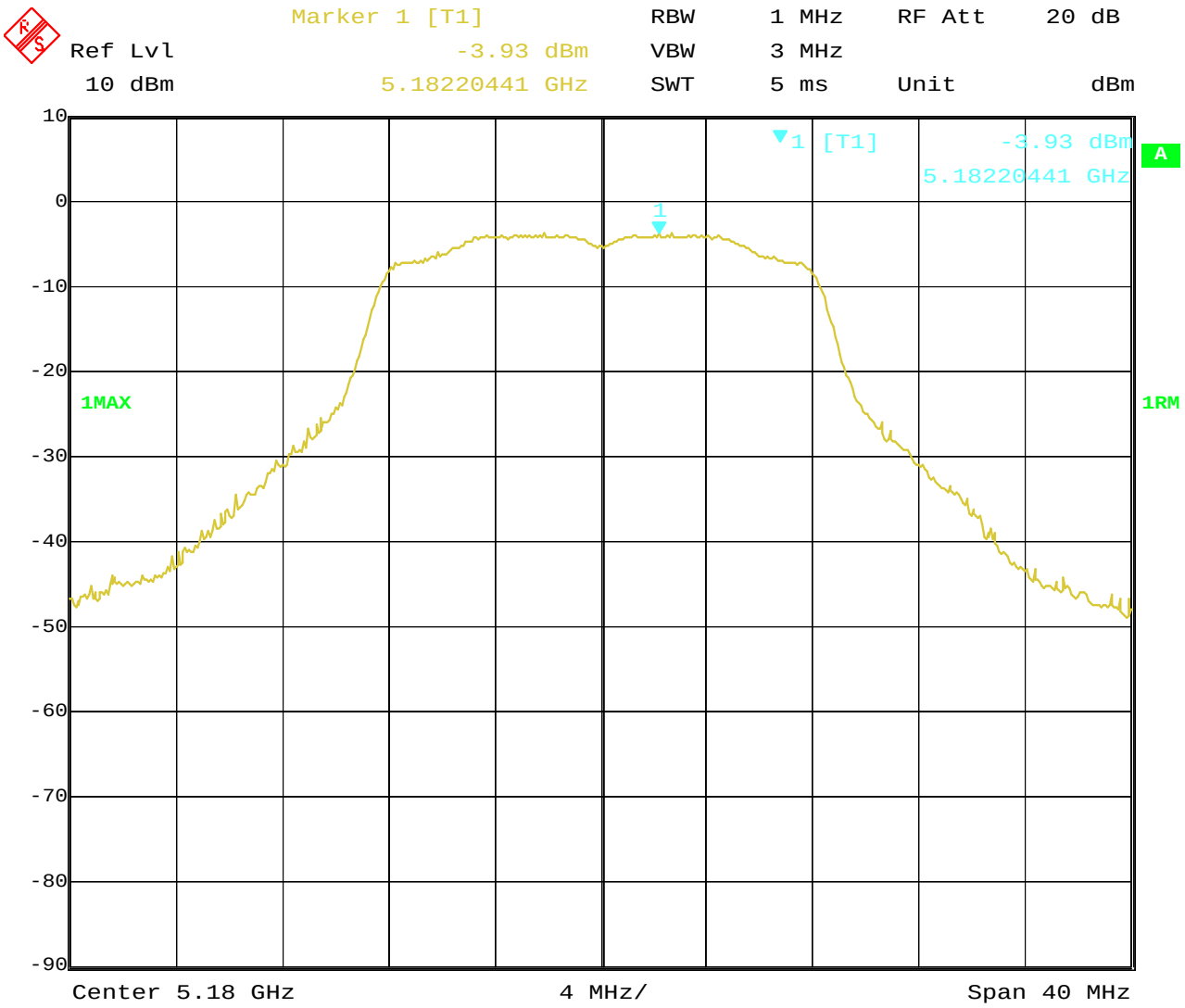
Note: 1. Total Power Spectral Density = Ant1 Power Spectral Density + Factor

2. Factor=10log2=3.01

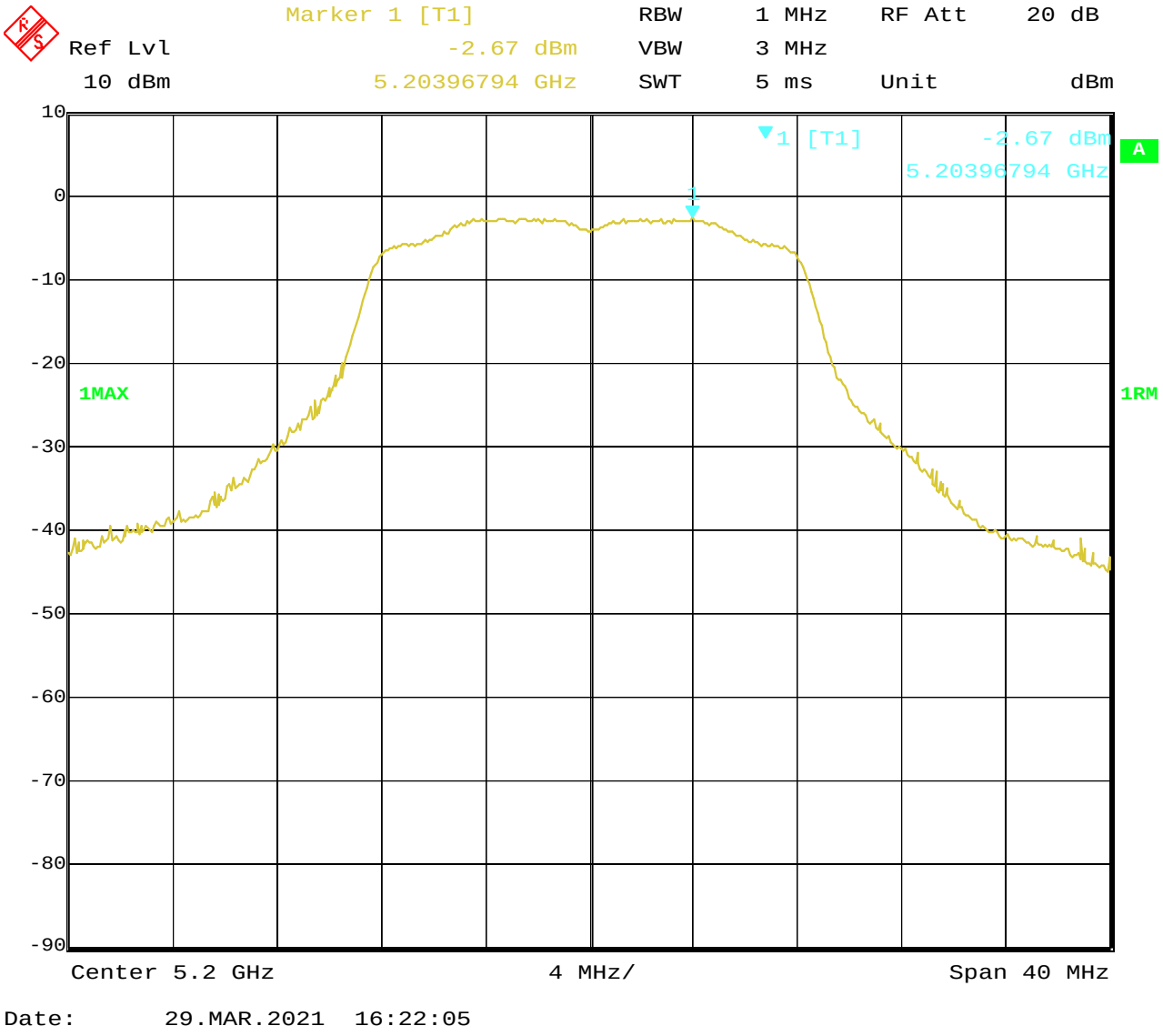
3. Antenna E8 and Antenna E9 were tested and Antenna E8 was the worst case

## 9.5 Plots of Power Spectral Density Measurement

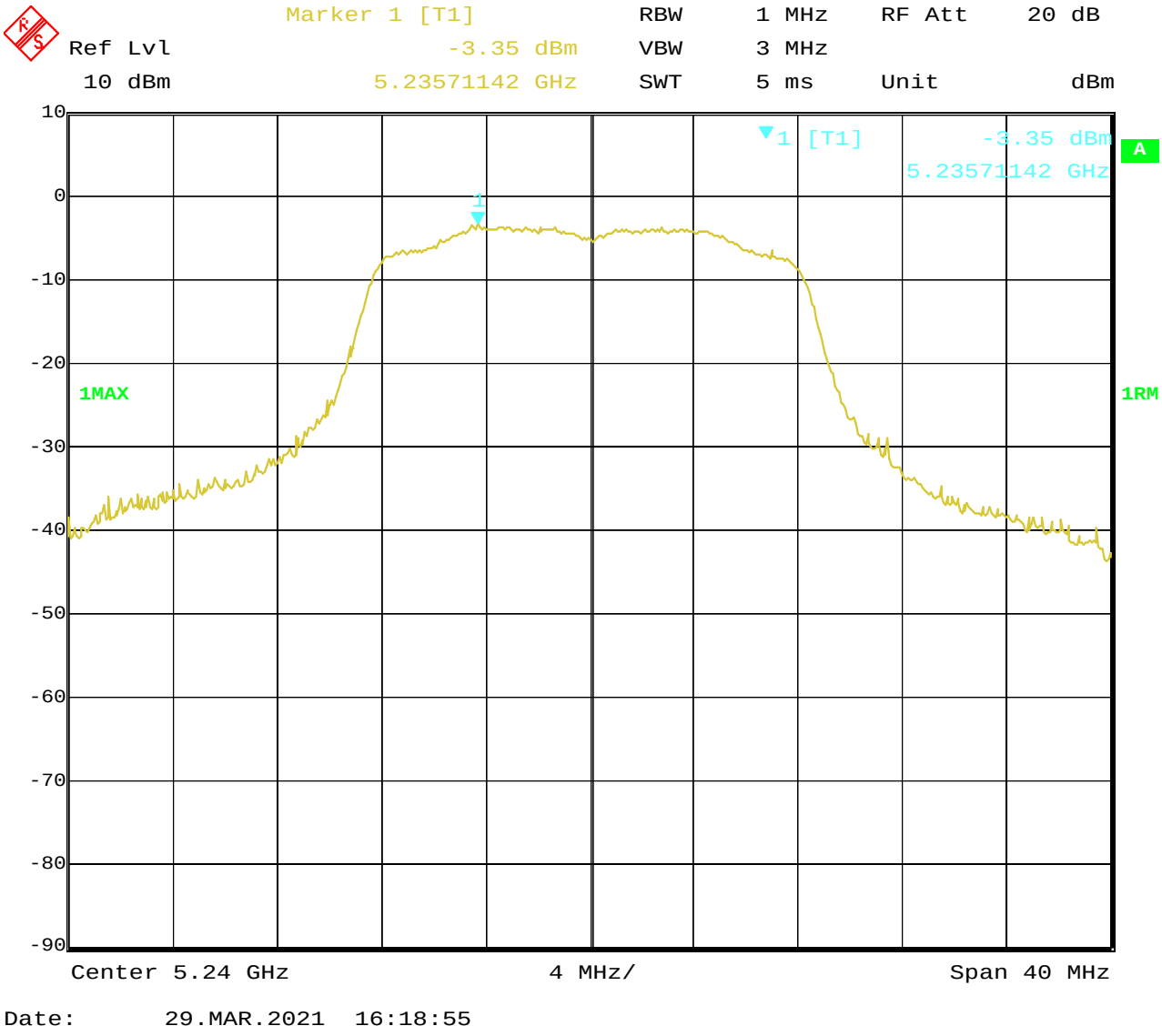
1.802.11a at 6Mbps of CH36



2.802.11a at 6Mbps of CH40



3.802.11a at 6Mbps of CH48



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11n HT20 mcs0 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Power Spectral Density(dBm/MHz) | Factor | Total Spectral Density (dBm/MHz) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|
| 36 | 5180 | -4.14 | 3.01 | -1.13 | 10 | Pass |
| 40 | 5200 | -3.32 | 3.01 | -0.31 | 10 | Pass |
| 48 | 5240 | -3.70 | 3.01 | -0.69 | 10 | Pass |

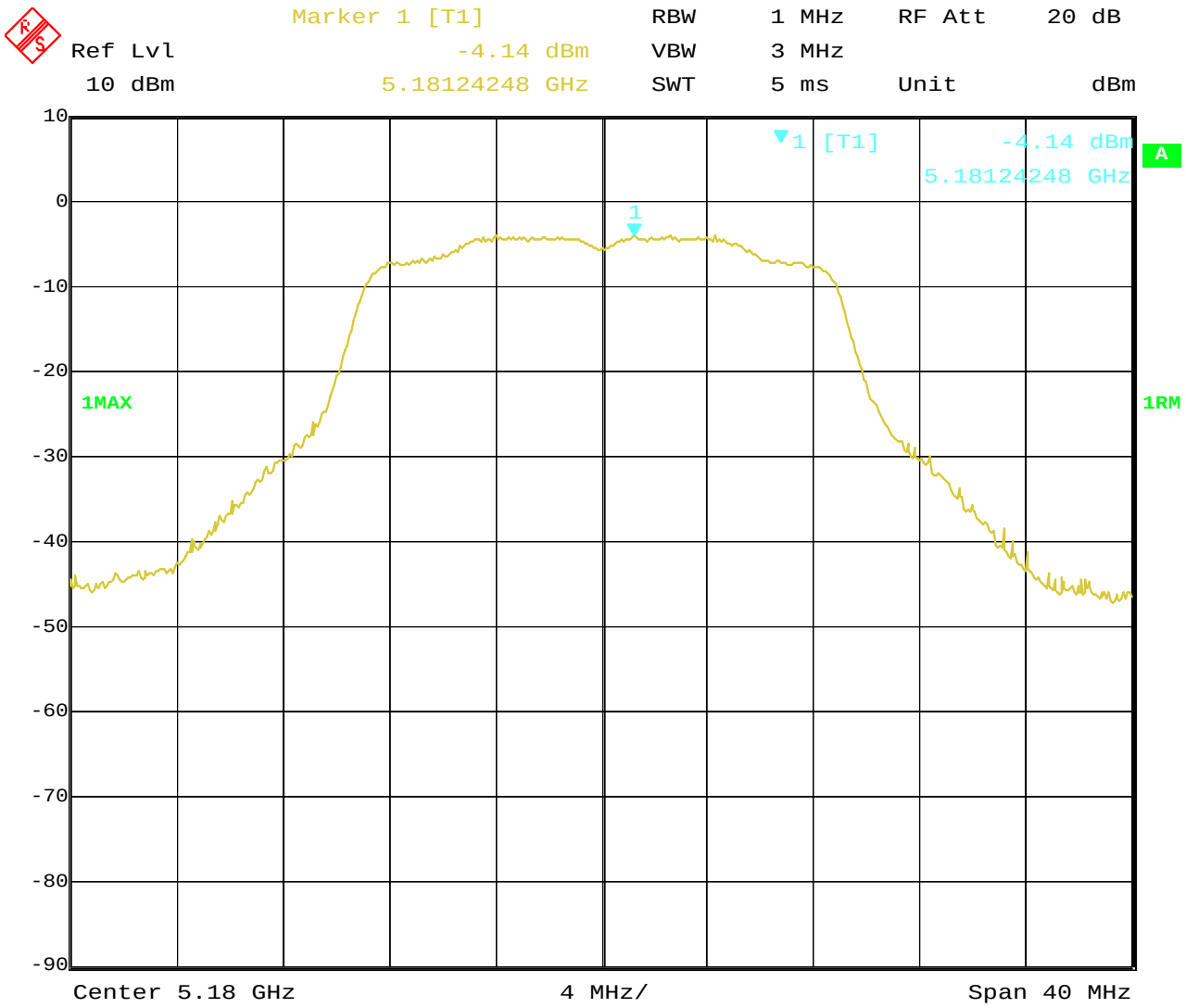
Note: 1. Total Power Spectral Density = Ant1 Power Spectral Density + Factor

2. Factor=10log2=3.01

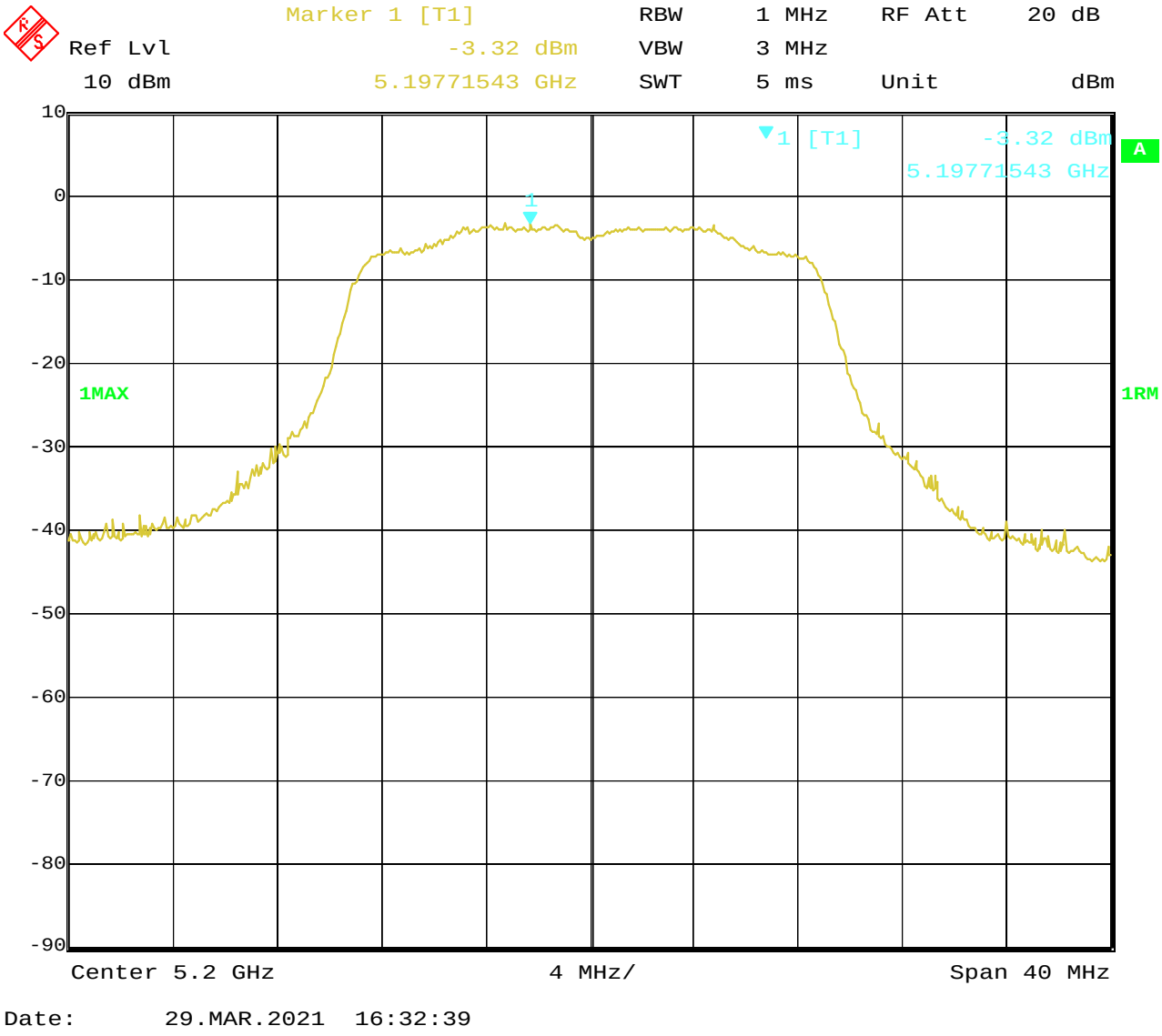
3. Antenna E8 and Antenna E9 were tested and Antenna E8 was the worst case

**Test Plots**

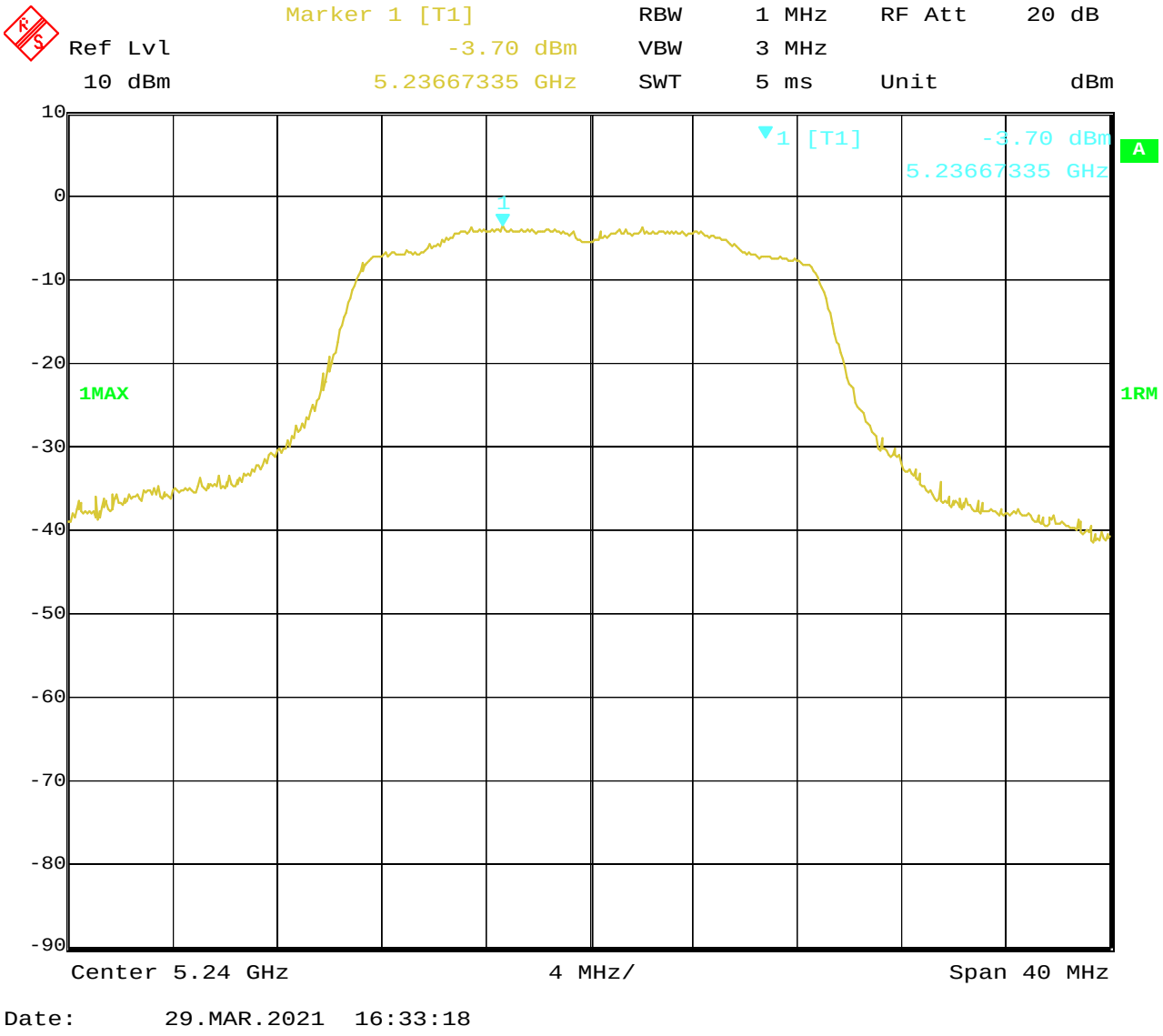
1.802.11n at mcs0 of CH36



2.802.11n at mcs0 of CH40



3.802.11n at mcs0 of CH48



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11n HT40 mcs0 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Power Spectral Density(dBm/MHz) | Factor | Total Spectral Density (dBm/MHz) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|
| 38 | 5190 | -7.99 | 3.01 | -4.98 | 10 | Pass |
| 46 | 5230 | -5.01 | 3.01 | -2.00 | 10 | Pass |

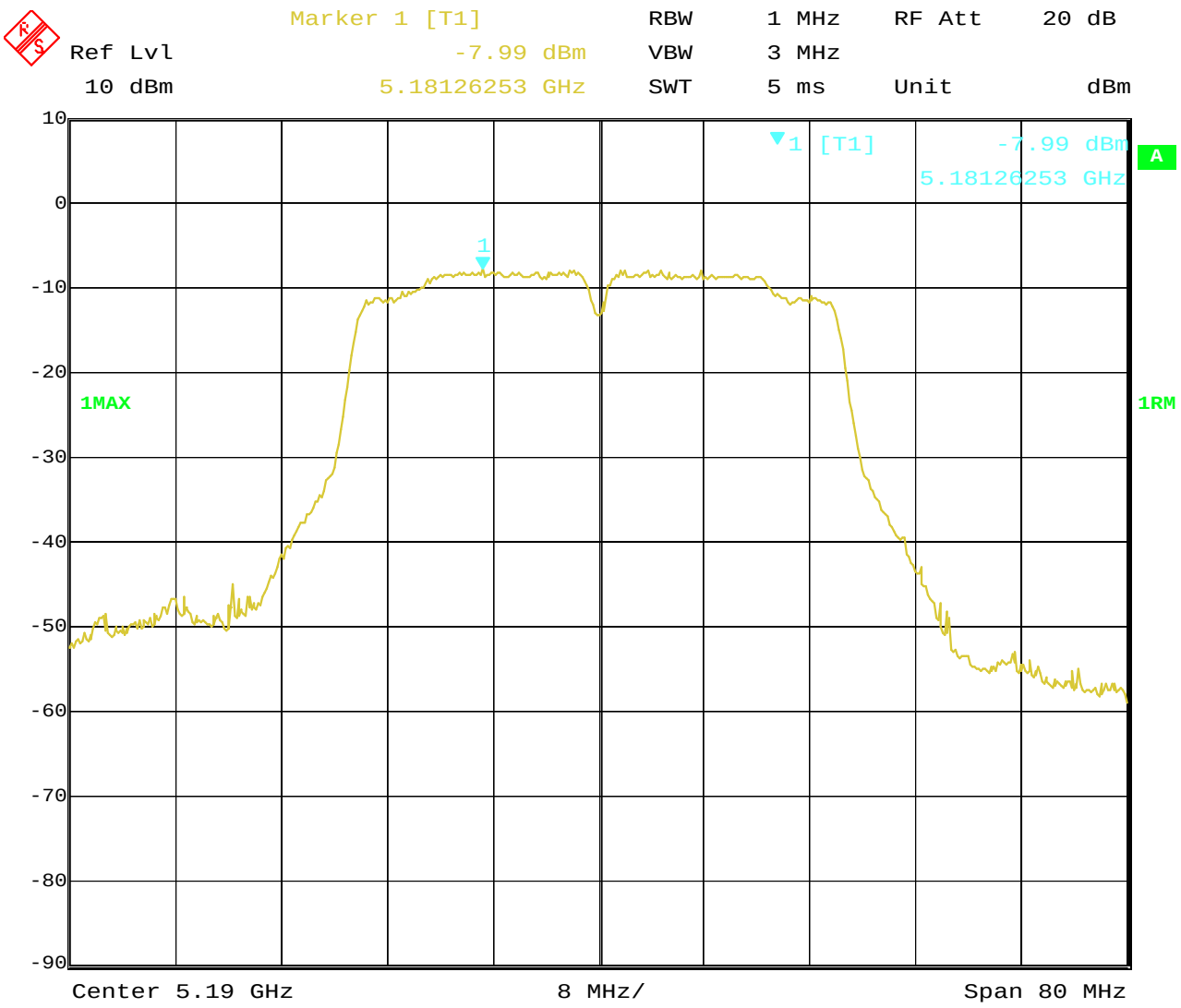
Note: 1. Total Power Spectral Density = Ant1 Power Spectral Density + Factor

2. Factor=10log2=3.01

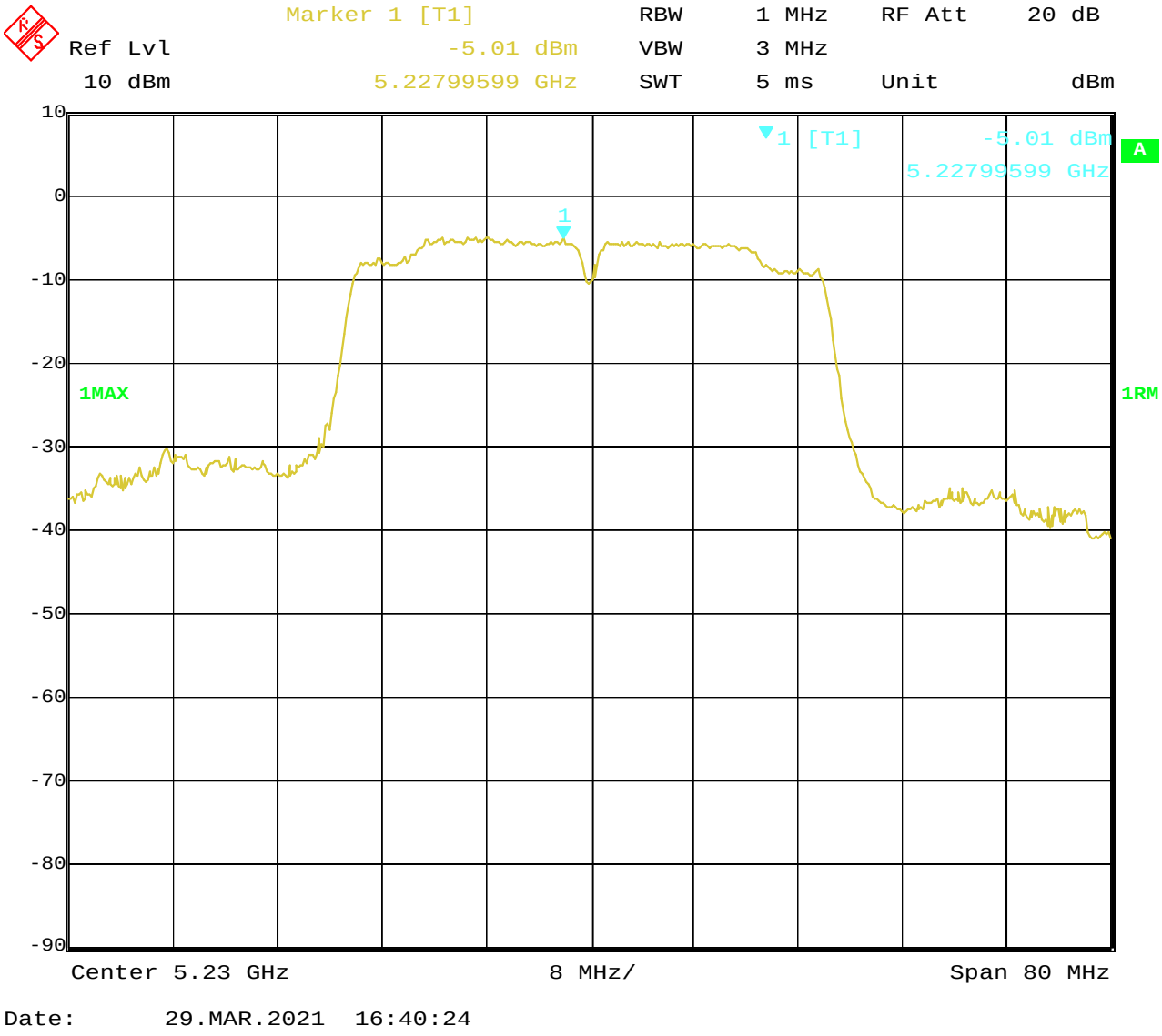
3. Antenna E8 and Antenna E9 were tested and Antenna E8 was the worst case

**Test Plots**

1.802.11n HT40 at mcs0 of CH38



2.802.11n HT40 at mcs0 of CH46



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT20 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Power Spectral Density(dBm/MHz) | Factor | Total Spectral Density (dBm/MHz) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|
| 36 | 5180 | -3.61 | 3.01 | -0.60 | 10 | Pass |
| 40 | 5200 | -2.48 | 3.01 | 0.53 | 10 | Pass |
| 48 | 5240 | -3.30 | 3.01 | -0.29 | 10 | Pass |

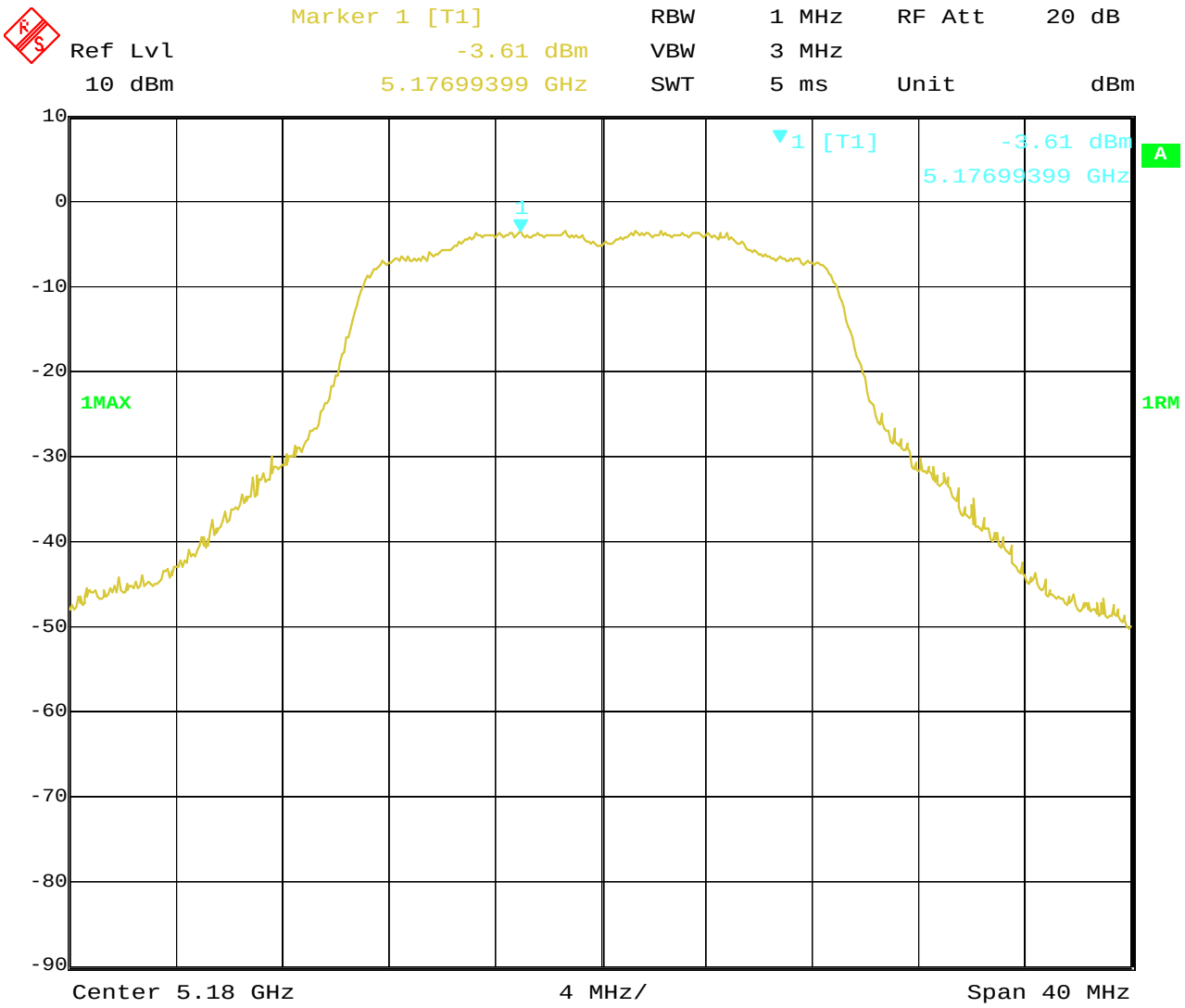
Note: 1. Total Power Spectral Density = Ant1 Power Spectral Density + Factor

2. Factor=10log2=3.01

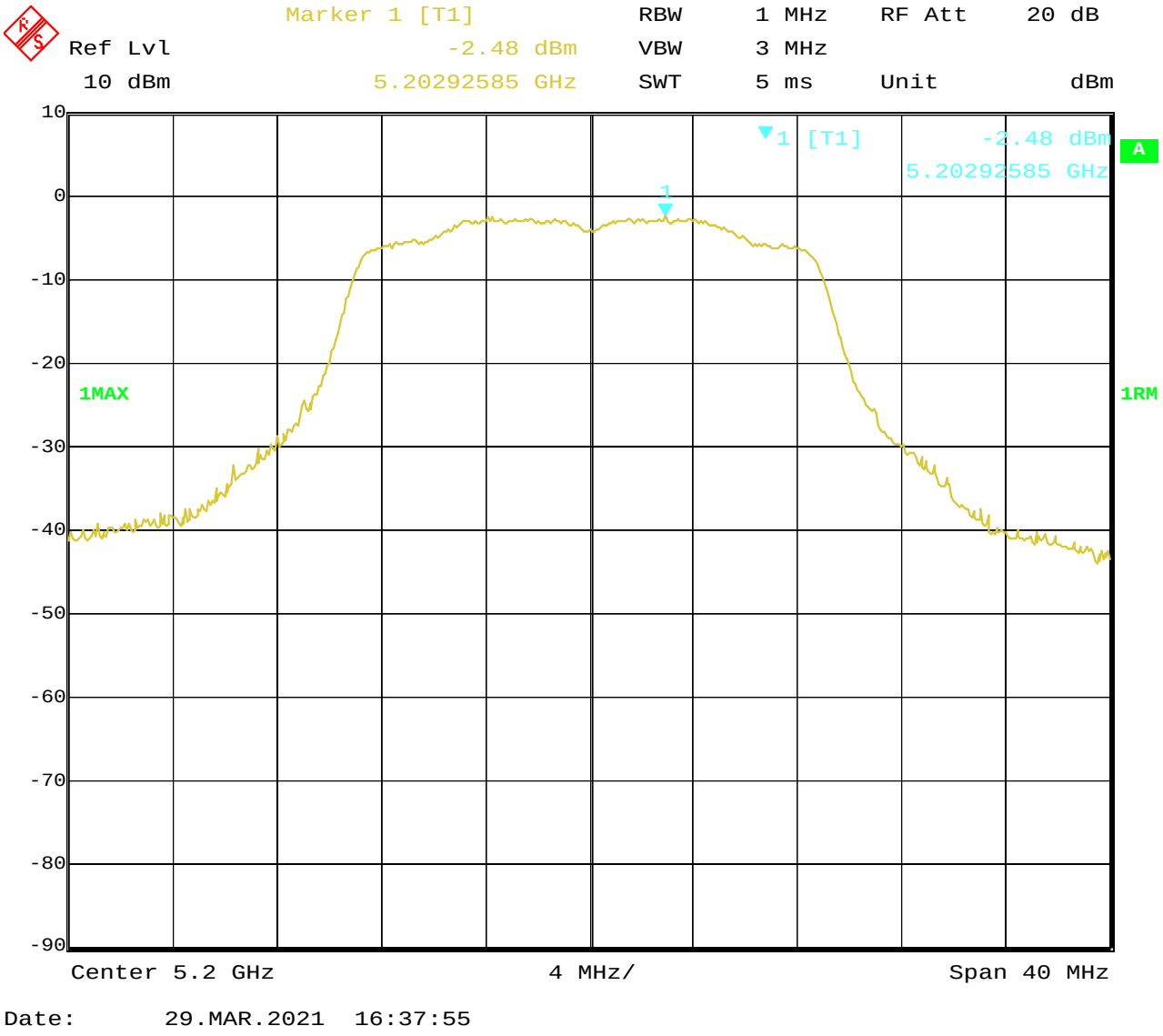
3. Antenna E8 and Antenna E9 were tested and Antenna E8 was the worst case

**Test Plots**

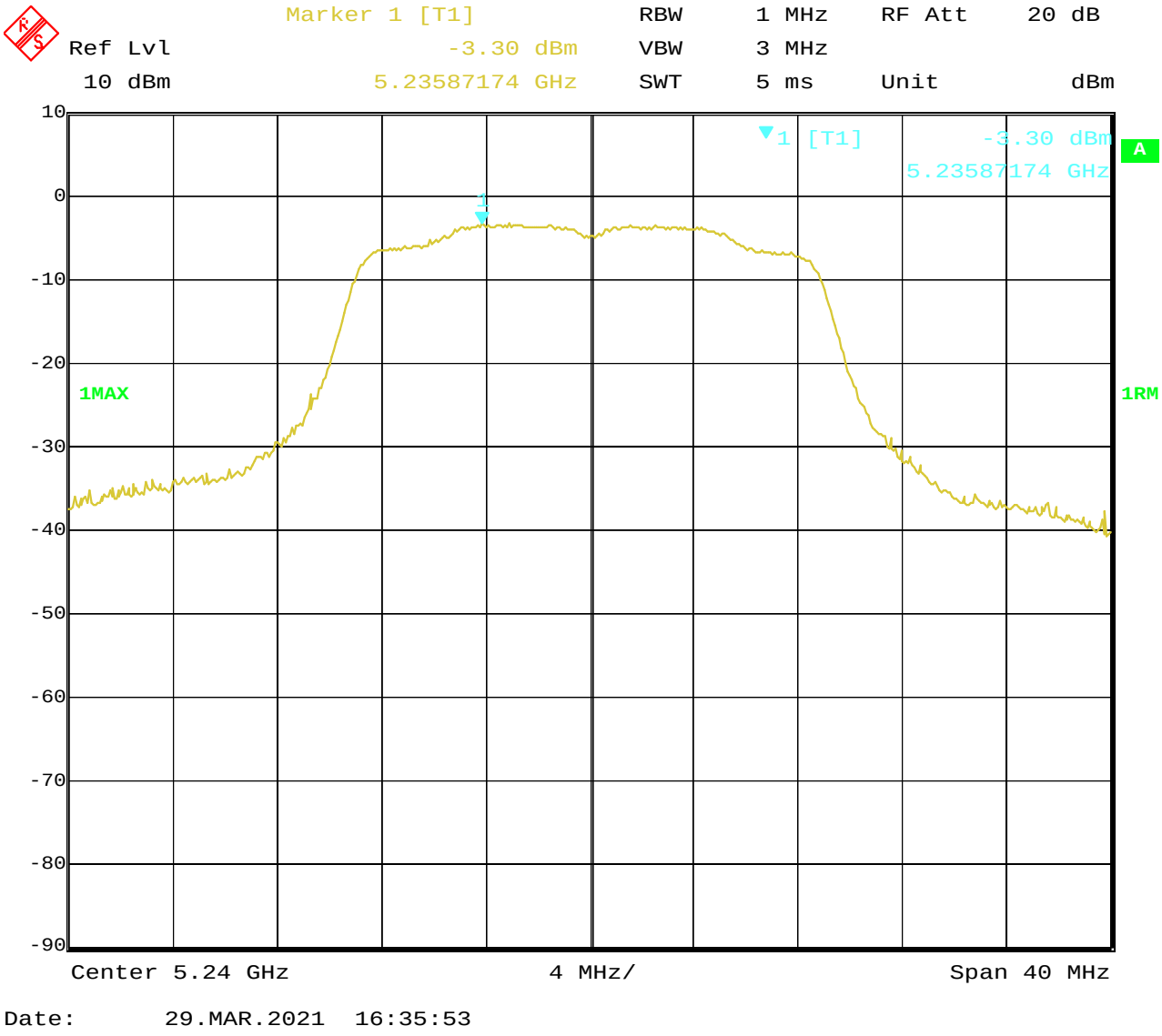
1.802.11ac at mcs0 of CH36



2.802.11ac at mcs0 of CH40



3.802.11ac at mcs0 of CH48



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT40 | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Power Spectral Density(dBm/MHz) | Factor | Total Spectral Density (dBm/MHz) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|
| 38 | 5190 | -7.95 | 3.01 | -4.94 | 10 | Pass |
| 46 | 5230 | -5.17 | 3.01 | -2.16 | 10 | Pass |

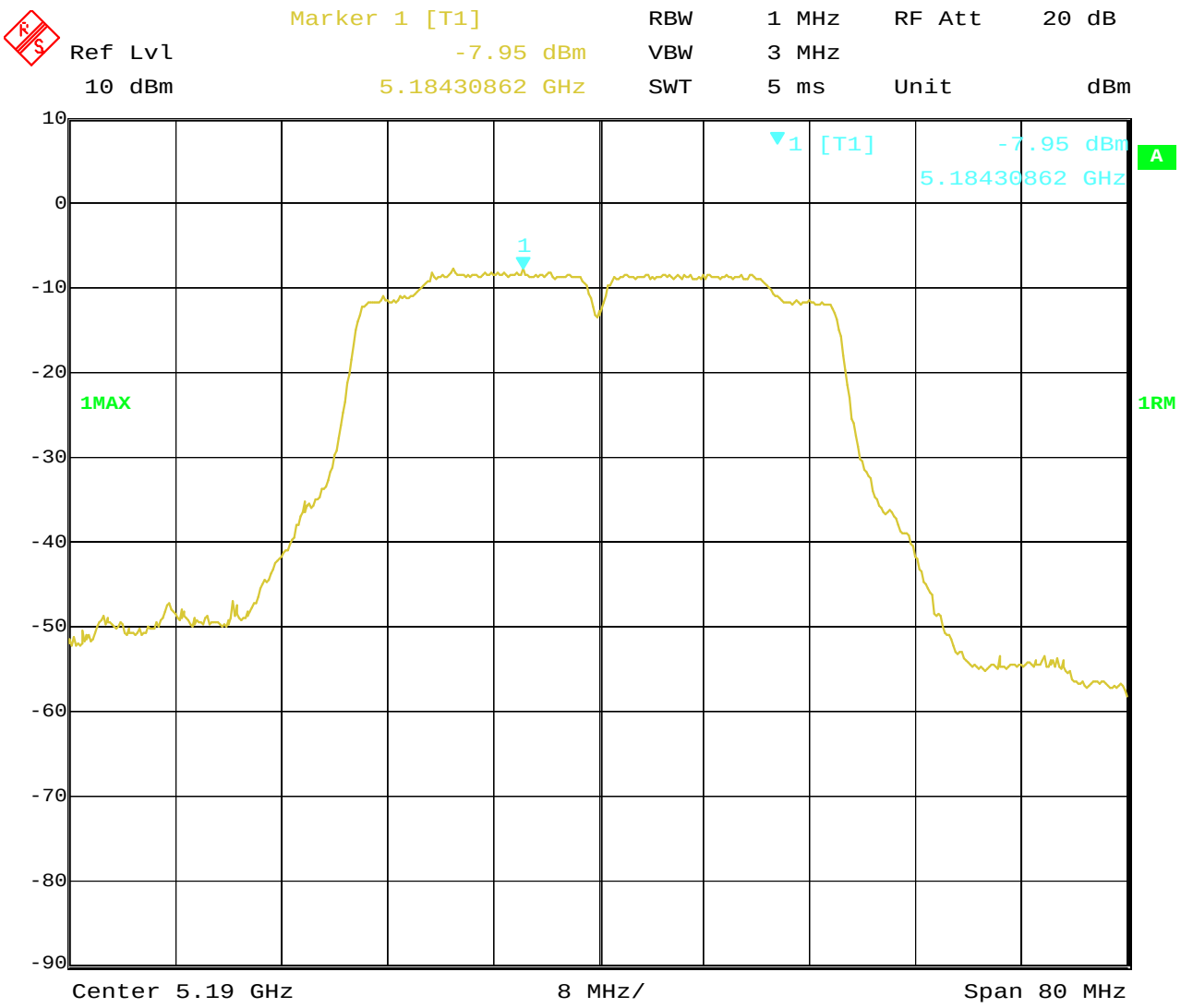
Note: 1. Total Power Spectral Density = Ant1 Power Spectral Density + Factor

2. Factor=10log2=3.01

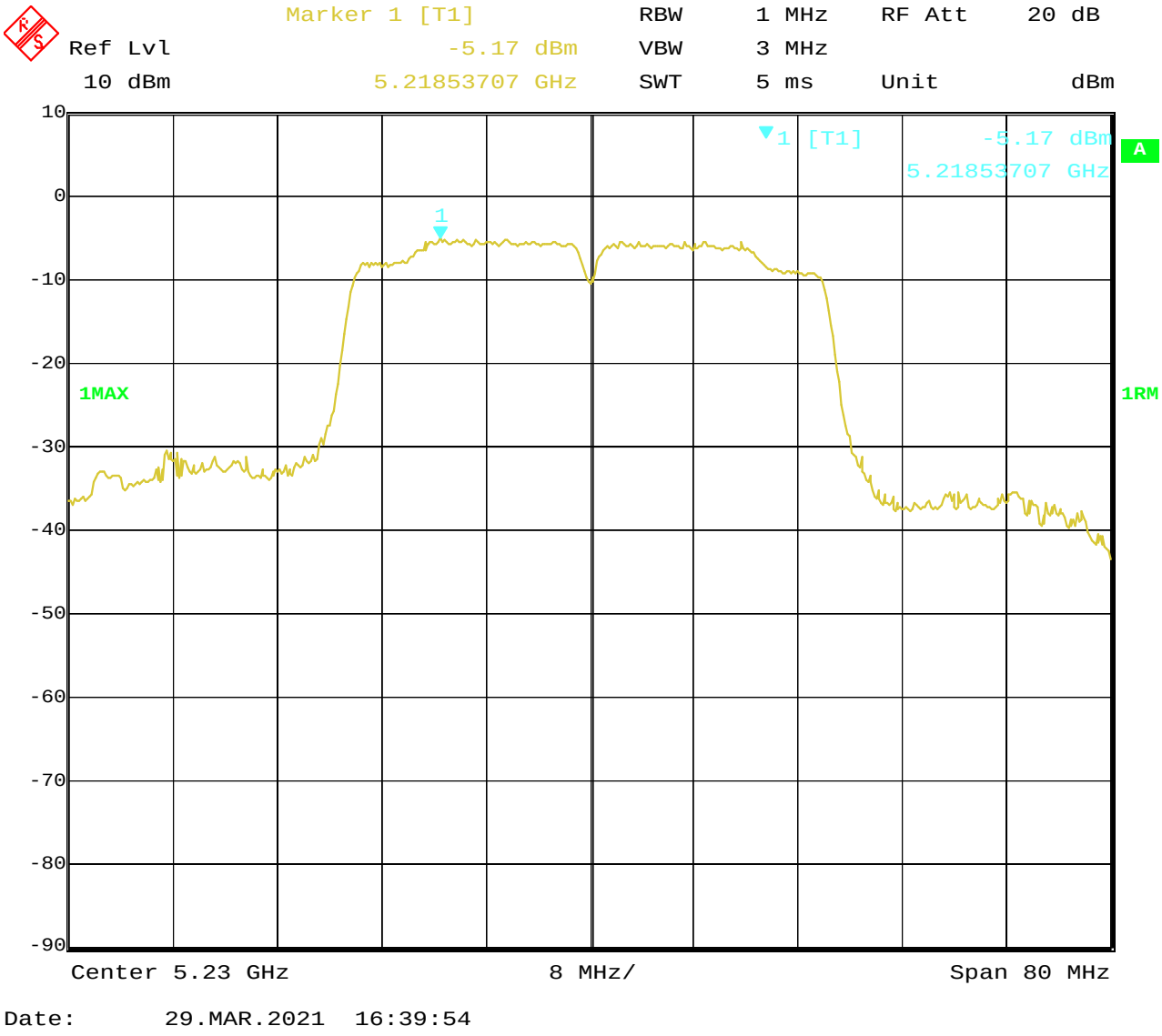
3. Antenna E8 and Antenna E9 were tested and Antenna E8 was the worst case

**Test Plots**

1.802.11ac at mcs0 of CH38



2.802.11ac at mcs0 of CH46



| EUT | Wi-Fi Repeater | Model | DSGW-072 |
|---|---|---|---|
| Mode | 802.11ac VHT80 23.9Mbps | Test Voltage | 120V~ |
| Temperature | 24 deg. C, | Humidity | 56% RH |

| Channel | Frequency (MHz) | Power Spectral Density(dBm/MHz) | Factor | Total Spectral Density (dBm/MHz) | Limit (dBm) | Pass/ Fail |
|---|---|---|---|---|---|---|
| 42 | 5210 | -10.17 | 3.01 | -7.16 | 10 | Pass |

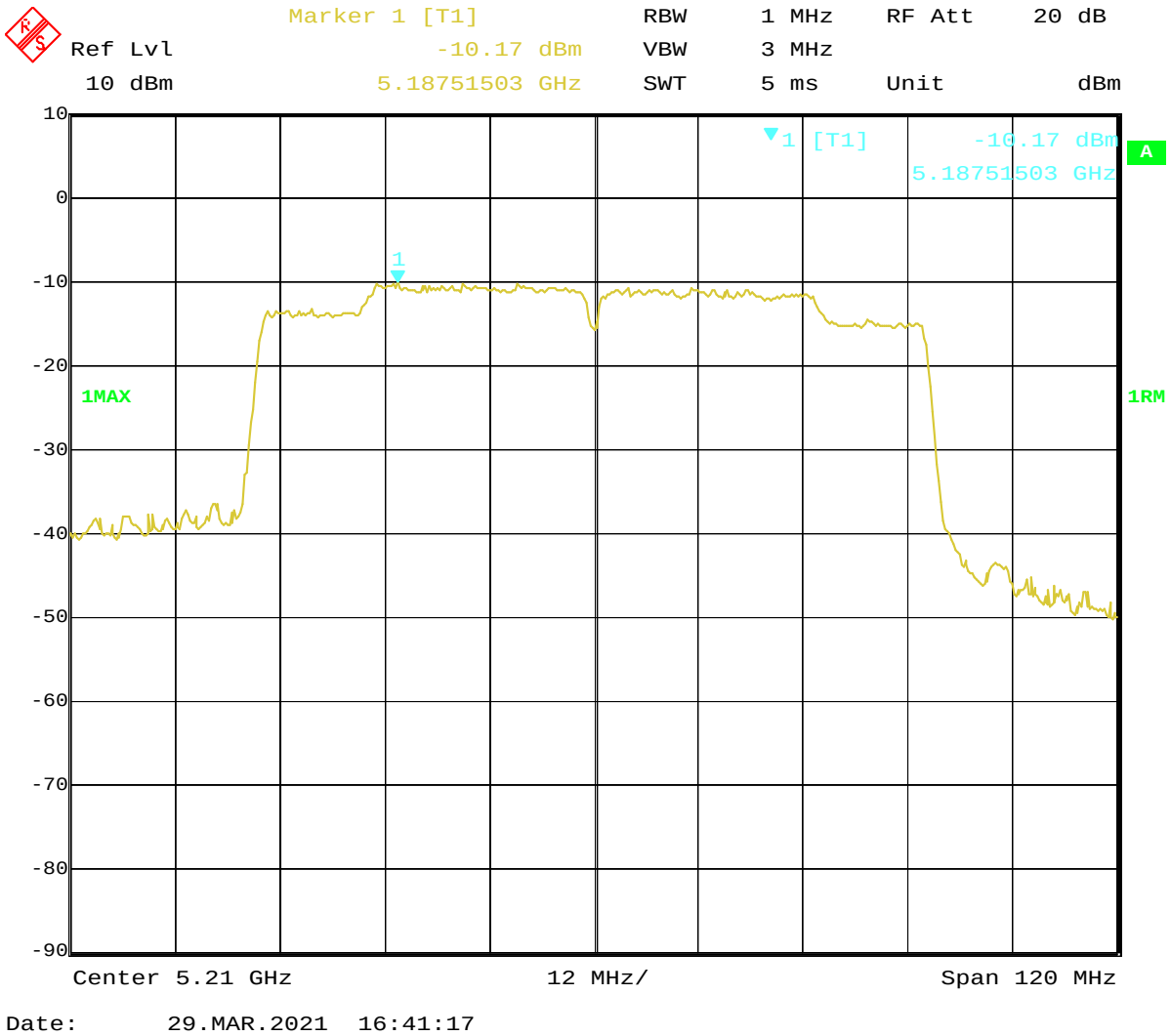
Note: 1. Total Power Spectral Density = Ant1 Power Spectral Density + Factor

2. Factor=10log2=3.01

3. Antenna E8 and Antenna E9 were tested and Antenna E8 was the worst case

**Test Plots**

1.802.11ac at 23.9Mbps of CH42



## 10.0 Frequency Stability

### 10.1 Limits of Frequency Stability Measurement

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of –30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees

### 10.2 Test Procedure

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

**10.3 Test Result**

**Channel 36 (5180MHz)**

**V**oltage vs. Frequency Stability

| Voltage | Measurement Frequency (MHz) |
|---|---|
| 138V | 5179.9816 |
| 120V | 5179.9826 |
| 102V | 5179.9837 |
| Max. Deviation (MHz) | 0.0184 |
| Max. Deviation (ppm) | 3.55 |

Rated working voltage: 120V~

**Temperature vs. Frequency Stability**

| Temperature（℃） | Measurement Frequency (MHz) |
|---|---|
| -30 | 5179.9812 |
| -20 | 5179.9830 |
| -10 | 5179.9827 |
| 0 | 5179.9803 |
| 10 | 5179.9841 |
| 20 | 5179.9825 |
| 30 | 5179.9838 |
| 40 | 5179.9809 |
| 50 | 5179.9805 |
| Max. Deviation (MHz) | 0.0195 |
| Max. Deviation (ppm) | 3.76 |

# 11.0 Antenna Requirement

## 11.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

## 11.2 Antenna Connected construction

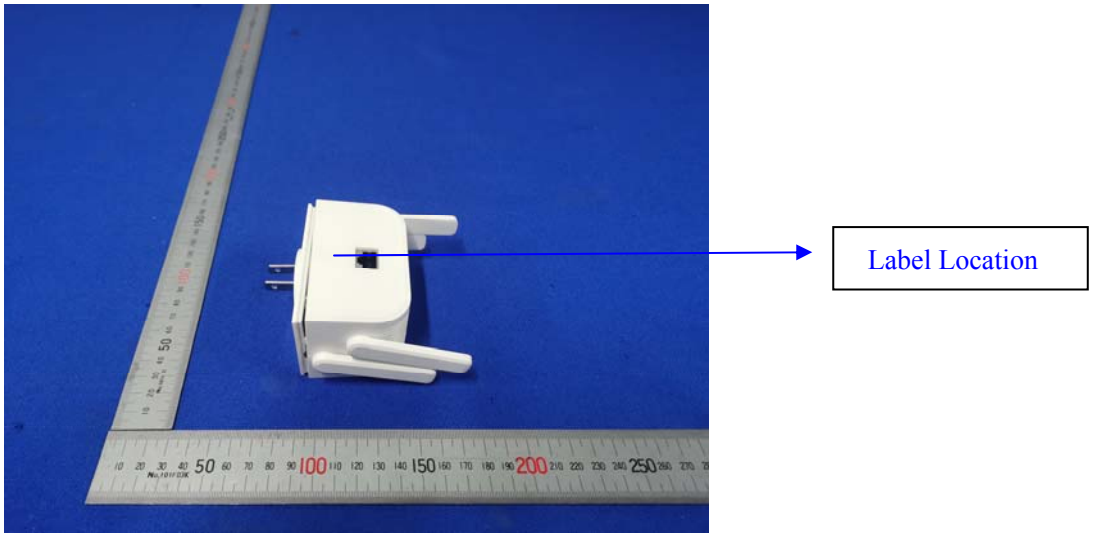
Two Integral antenna used. The maximum Gain is 3.46dBi for each one.

## 12.0 FCC Label

**FCC ID: 2AUXB-DSGW-07X**

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

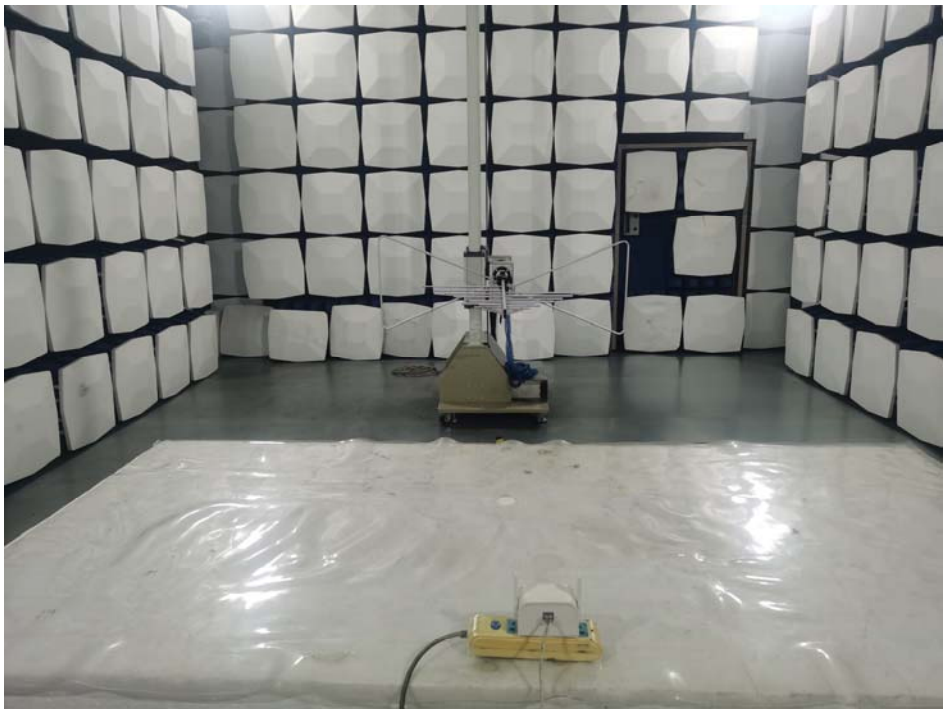
**Mark Location:**

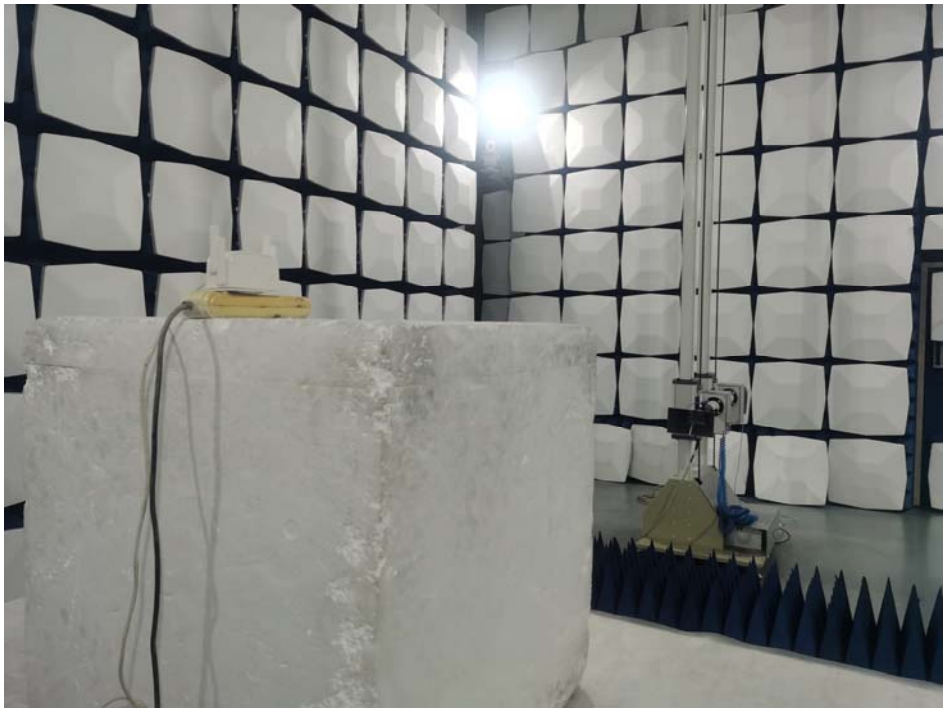


## 13.0 Photo of testing

Conducted Emission Test Setup:

Radiated Emission Test Setup:





**Photos of EUT**

Please refer test report TW2103186-01E

**End of the report**