# REGULATORY COMPLIANCE TEST REPORT

## FCC CFR 47 Part 15 Subpart E 15.407

## Report No.: RDWN77-U2 Rev A

**Company:** Radwin

**Model Name:** RADWIN 2000 EC00, RADWIN 2000 E100

# REGULATORY COMPLIANCE TEST REPORT

**Company Name:** Radwin

**Model Name:** RADWIN 2000 EC00, RADWIN 2000 E100

**To:** FCC CFR 47 Part 15 Subpart E 15.407

**Test Report Serial No.:** RDWN77-U2 Rev A

This report supersedes: NONE

Applicant: Radwin
27 Habarzel Street
Tel Aviv, 6971039
Israel

Issue Date: 22nd December 2022

**This Test Report is Issued Under the Authority of:**

**MiCOM Labs, Inc.**
575 Boulder Court
Pleasanton California 94566
USA
Phone: +1 (925) 462-0304
Fax: +1 (925) 462-0306
www.micomlabs.com

ACCREDITED
TESTING CERT #2381.01

**MiCOM Labs is an ISO 17025 Accredited Testing Laboratory**

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# 1. ACCREDITATION, LISTINGS & RECOGNITION

## 1.1. TESTING ACCREDITATION

MiCOM Labs, Inc. is an accredited Electrical testing laboratory per the international standard ISO/IEC 17025:2017. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.01. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-01.pdf

ilac-MRA a2LA

**Accredited Laboratory**

A2LA has accredited

**MICOM LABS**

*Pleasanton, CA*

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 14th day of January 2022.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.01
Valid to November 30, 2023

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*



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## 1.2. RECOGNITION

MiCOM Labs, Inc is widely recognized for its wireless testing and certification capabilities. In addition to being recognized for Testing and Certification under Phase 2 Mutual Recognition Agreements (MRA) with Canada, Europe, United Kingdom and Japan, our international recognition includes Conformity Assessment Body (CAB) designation status under agreements with Asia Pacific (APEC) MRA Phase 1 countries giving acceptance of MiCOM Labs test reports. MiCOM Labs test reports are accepted globally.

| Country | Recognition Body | Status | MRA Phase | Identification No. |
|---|---|---|---|---|
| USA | Federal Communications Commission (FCC) | TCB | - | US0159<br>Test Firm Designation#: US1084 |
| Canada | Industry Canada (ISED) | FCB | APEC MRA 2 | US0159<br>ISED#: 4143A |
| Japan | MIC (Ministry of Internal Affairs and Communication) | CAB | Japan MRA 2 | RCB 210 |
| | Japan Approvals Institute for Telecommunication Equipment (JATE) | | | |
| | VCCI | -- | -- | A-0012 |
| Europe | European Commission | NB | EU MRA 2 | NB 2280 |
| United Kingdom | Department for Business, Energy & Industrial Strategy (BEIS) | AB | UK MRA 2 | AB 2280 |
| Mexico | Instituto Federal de Telecomunicaciones (IFT) | CAB | Mexico MRA 1 | US0159 |
| Australia | Australian Communications and Media Authority (ACMA) | CAB | APEC MRA 1 | US0159 |
| Hong Kong | Office of the Telecommunication Authority (OFTA) | | | |
| Korea | Ministry of Information and Communication Radio Research Laboratory (RRL) | | | |
| Singapore | Infocomm Development Authority (IDA) | | | |
| Taiwan | National Communications Commission (NCC)<br>Bureau of Standards, Metrology and Inspection (BSMI) | | | |
| Vietnam | Ministry of Communication (MIC) | | | |

TCB – Telecommunications Certification Bodies (TCB)
FCB – Foreign Certification Body
CAB – Conformity Assessment Body
NB – Notified Body
AB – Approved Body
MRA – Mutual Recognition Agreement
MRA PhasePhase I - recognition for product testing
Phase II – recognition for both product testing and certification


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## 1.3. PRODUCT CERTIFICATION

MiCOM Labs, Inc. is an accredited Product Certification Body per the international standard ISO/IEC 17065:2012. The company is accredited by the American Association for Laboratory Accreditation (A2LA) www.a2la.org test laboratory number 2381.02. MiCOM Labs test schedule is available at the following URL; http://www.a2la.org/scopepdf/2381-02.pdf

**Accredited Product Certification Body**

A2LA has accredited

**MiCOM LABS**

*Pleasanton, CA*

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This product certification body also meets the *A2LA R322 – Specific Requirements – Notified Body Accreditation Requirements* and *A2LA R308 - Specific Requirements - ISO-IEC 17065 - Telecommunication Certification Body Accreditation Program*. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 14th day of January 2022

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2381.02
Valid to November 30, 2023

*For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.*

United States of America – Telecommunication Certification Body (TCB)
Industry Canada – Certification Body, CAB Identifier – US0159
Europe – Notified Body (NB), NB Identifier - 2280
UK – Approved Body (AB), AB Identifier - 2280
Japan – Recognized Certification Body (RCB), RCB Identifier - 210


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## 2. DOCUMENT HISTORY

| Document History | | |
|---|---|---|
| Revision | Date | Comments |
| Draft | 6th December 2022 | |
| Draft #2 | 21st December 2022 | |
| Rev A | 22nd December 2022 | Initial Release |
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In the above table the latest report revision will replace all earlier versions.


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# 3. TEST RESULT CERTIFICATE

| | | | |
|---|---|---|---|
| **Manufacturer:** | Radwin<br>27 Habarzel Street<br>Tel Aviv 6971039<br>Israel | **Tested By:** | MiCOM Labs, Inc.<br>575 Boulder Court<br>Pleasanton California 94566<br>USA |
| **Model:** | RADWIN 2000 EC00, RADWIN 2000 EI00 | **Telephone:** | +1 925 462 0304 |
| **Equipment Type:** | 5 GHz High Performance PrP Outdoor Unit | **Fax:** | +1 925 462 0306 |
| **S/N's:** | Prototype | | |
| **Test Date(s):** | 22nd - 23rd Sept. and 1st - 2nd Dec. 2022 | **Website:** | www.micomlabs.com |

| STANDARD(S) | TEST RESULTS |
|---|---|
| **FCC CFR 47 Part 15 Subpart E 15.407** | **EQUIPMENT COMPLIES** |

MiCOM Labs, Inc. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.

**Notes:**

1. This document reports conditions under which testing was conducted and the results of testing performed.

2. Details of test methods used have been recorded and kept on file by the laboratory.

3. Test results apply only to the item(s) tested.

ACCREDITED
TESTING CERT #2381.01

**Approved & Released for MiCOM Labs, Inc. by**:

Graeme Grieve
Quality Manager MiCOM Labs, Inc.

Gordon Hurst
President & CEO MiCOM Labs, Inc.


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# 4. REFERENCES AND MEASUREMENT UNCERTAINTY

## 4.1. Normative References

| REF. | PUBLICATION | YEAR | TITLE |
|---|---|---|---|
| I | KDB 662911 D01, D02, D03 | D01 Oct 2013, D02 Oct 2011, D03 Oct 2020 | Guidance for measurement of output emission of devices that employ single transmitter with multiple outputs or systems with multiple transmitters operating simultaneously in the same frequency band.<br>662911 D01 Multiple Transmitter Output v02r01, 662911 D02 MIMO with Cross Polarized Antenna v01, 662911 D03 MIMO Antenna Gain Measurement v01, OET 13TR1003 Directional Gain of 802 11 MIMO with CDD 04 05 2013 |
| II | KDB 905462 D07 v02 | Aug 2016 | Test guidance to demonstrate compliance for U-NII devices subject to DFS requirements. |
| III | KDB 926956 D01 v02 | Aug 2016 | U-NII Device Transition Plan |
| IV | A2LA | 22nd June 2022 | R105 - Requirement's When Making Reference to A2LA Accreditation Status |
| V | ANSI C63.10 | 2020 | American National Standard for Testing Unlicensed Wireless Devices |
| VI | ANSI C63.4 | 2014 | American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| VII | ETSI TR 100 028 | 2001-12 | Parts 1 and 2 Electromagnetic compatibility and Radio Spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics |
| VIII | FCC 06-96 | Jun 2006 | Memorandum Opinion and Order |
| IX | FCC 47 CFR Part 15.407 | 2021 | Radio Frequency Devices; Subpart E –Unlicensed National Information Infrastructure Devices |
| X | ICES-003 | Issue 7; Oct 2020 | Information Technology Equipment (Including Digital Apparatus) |
| XI | M 3003 | EDITION 4 Oct 2019 | Expression of Uncertainty and Confidence in Measurements |
| XII | FCC 47 CFR Part 2.1033 | May 2021 | FCC requirements and rules regarding photographs and test setup diagrams. |
| XIII | KDB 905462 D02 v02 | Apr 2016 | Compliance Measurement Procedures for Unlicensed National Information Infrastructure devices operating in the 5250 to 5350 MHz and 5470 to 5725 MHz bands incorporating Dynamic Frequency Selection. |
| XIV | KDB 789033 D02 V02r01 | Dec 2017 | Guidelines For Compliance Testing Of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E |


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## 4.2. Test and Uncertainty Procedure

Conducted and radiated emission measurements were conducted in accordance with American National Standards Institute ANSI C63.4, listed in the Normative References section of this report.

Measurement uncertainty figures are calculated in accordance with ETSI TR 100 028 Parts 1 and 2.

Measurement uncertainties stated are based on a standard uncertainty multiplied by a coverage factor k = 2, providing a level of confidence of approximately 95 % in accordance with UKAS document M 3003 listed in the Normative References section of this report.


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# 5. PRODUCT DETAILS AND TEST CONFIGURATIONS

## 5.1. Technical Details

| Details | Description |
|---|---|
| Purpose: | Test of the Radwin RADWIN 2000 E to FCC CFR 47 Part 15 Subpart E 15.407 Compliance Measurement Procedures for Unlicensed National Information Infrastructure devices operating in the 5150 to 5250 band. |
| Applicant: | Radwin<br>27 Habarzel Street<br>Tel Aviv 6971039 Israel |
| Manufacturer: | As Above |
| Laboratory performing the tests: | MiCOM Labs, Inc.<br>575 Boulder Court<br>Pleasanton California 94566 USA |
| Test report reference number: | RDWN77-U2 |
| Date EUT received: | 26th September 2022 |
| Standard(s) applied: | FCC CFR 47 Part 15 Subpart E 15.407 |
| Dates of test (from - to): | 22nd - 23rd Sept. and 1st - 2nd Dec. 2022 |
| No of Units Tested: | 1 |
| Product Family Name: | RADWIN 2000 |
| Model(s): | RADWIN 2000 EC00, RADWIN 2000 EI00 |
| Location for use: | Outdoors |
| Declared Frequency Range(s): | 5150 - 5250 MHz |
| Type of Modulation: | OFDM |
| EUT Modes of Operation: | 20MHz; 40MHz; 80MHz |
| Declared Nominal Output Power (dBm): | +30 dBm |
| Transmit/Receive Operation: | Transceiver |
| Rated Input Voltage and Current: | 56VDC 1A |
| Operating Temperature Range: | -40°C to + 60°C |
| ITU Emission Designator: | 20M0W7W, 40M0W7W, 80M0W7W, |
| Equipment Dimensions: | 4.2 / 10.1 / 4.9 in |
| Weight: | 2.7 Lb |
| Hardware Rev: | Prototype |
| Software Rev: | Prototype |


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## 5.2. Scope Of Test Program

**RADWIN 2000 EC00, RADWIN 2000 EI00**

The scope of the test program was to test Radwin's RADWIN 2000 E configurations in the frequency ranges 5150 - 5250 MHz for compliance against the following specification:

Client declared models RADWIN 2000 EC00, RADWIN 2000 EI00 are similar and therefore as a result no testing was performed on these models.

**FCC CFR 47 Part 15 Subpart E 15.407**
Compliance Measurement Procedures for Unlicensed National Information Infrastructure devices operating in the 5150 to 5250 MHz.


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## 5.3. Equipment Model(s) and Serial Number(s)

| Type (EUT/ Support) | Equipment Description | Manufacturer | Model No. | Serial No. |
|---|---|---|---|---|
| EUT | 5 GHz High Performance PtP Outdoor Unit | RADWIN | RADWIN 2000 EC00, RADWIN 2000 EI00 | Prototype |
| Support | POE Power Supply | Gospell | G0566-560-100 | -- |
| Support | Laptop | Dell | -- | -- |

## 5.4. Antenna Details

| Type | Manufacturer | Model | Family | Gain (dBi) | BF Gain | Dir BW | X-Pol | Frequency Band (MHz) |
|---|---|---|---|---|---|---|---|---|
| integral | RADWIN | MR0284310 | Directional | 24.0 | - | 9 | Yes | 5150 - 5250 |
| external | RADWIN | RW-9622-5001 | Directional | 28.0 | - | 5 | Yes | 5150 - 5250 |
| external | RADWIN | RW-9721-5158 | Dish | 28.0 | - | 5.6 | Yes | 5150 - 5250 |
| external | RADWIN | RW-9732-4958 | Dish | 32.0 | - | 4 | Yes | 5150 - 5250 |
| external | RADWIN | RW-9732-4965 | Dish | 25.0 | - | 7 | Yes | 5150 - 5250 |

BF Gain - Beamforming Gain
Dir BW - Directional BeamWidth
X-Pol - Cross Polarization

## 5.5. Cabling and I/O Ports

| Port Type | Max Cable Length | # of Ports | Screened | Conn Type | Data Type | Bit Rate | Environment |
|---|---|---|---|---|---|---|---|
| Ethernet PoE IN | >30m | 1 | No | RJ45 | Packet Data | 1000 | Outdoors |


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## 5.6. Test Configurations

Results for the following configurations are provided in this report:

| Operational Mode(s) | Data Rate with Highest Power MBit/s | Channel Frequency (MHz) | | |
|---|---|---|---|---|
| | | Low | Mid | High |
| | | 5150 - 5250 MHz | | |
| OFDM-20 | 8.6 | 5,180.00 | 5,210.00 | 5,240.00 |
| OFDM-40 | 17.2 | 5,190.00 | 5,210.00 | 5,230.00 |
| OFDM-80 | 36.0 | -- | 5,210.00 | -- |

## 5.7. Equipment Modifications

The following modifications were required to bring the equipment into compliance:
1. NONE

## 5.8. Deviations from the Test Standard

The following deviations from the test standard were required in order to complete the test program:
1. NONE


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# 6. TEST SUMMARY

List of Measurements

| Test Header | Result | Data Link |
|---|---|---|
| Peak Transmit Power | Complies | View Data |
| 26 dB & 99% Bandwidth | Complies | View Data |
| Power Spectral Density | Complies | View Data |
| Radiated | Complies | - |
| TX Spurious & Restricted Band Emissions | Complies | View Data |
| Restricted Edge & Band-Edge Emissions | Complies | View Data |
| Digital Emissions | Complies | View Data |
| AC Wireline | Complies | View Data |


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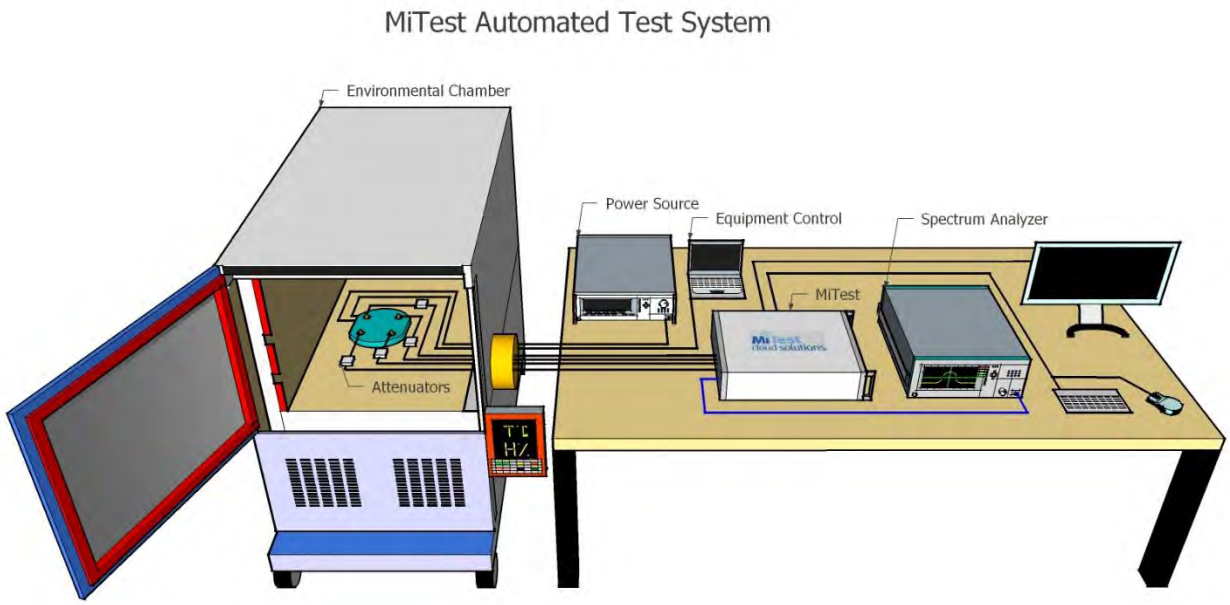
# 7. TEST EQUIPMENT CONFIGURATION(S)

## 7.1. Conducted RF




A full system calibration was performed on the test station and any resulting system losses (or gains) were taken into account in the production of all final measurement data.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| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|---|---|---|---|---|---|
| #3 SA | MiTest Box to SA | Fairview Microwave | SCA1814-0101-72 | #3 SA | 29 Jun 2023 |
| #3P1 | EUT to MiTest box port 1 | Fairview Microwave | SCA1814-0101-72 | #3P1 | 29 Jun 2023 |
| #3P2 | EUT to MiTest box port 2 | Fairview Microwave | SCA1814-0101-72 | #3P2 | 29 Jun 2023 |
| #3P3 | EUT to MiTest box port 3 | Fairview Microwave | SCA1814-0101-72 | #3P3 | 29 Jun 2023 |
| #3P4 | EUT to MiTest box port 4 | Fairview Microwave | SCA1812-0101-72 | #3P4 | 29 Jun 2023 |
| 249 | Thermocouple; Resistance Thermometer | Thermotronics | GR2105-02 | 9340 #2 | 29 Jun 2023 |
| 287 | Rohde & Schwarz 40 GHz Receiver | Rhode & Schwarz | ESIB40 | 100201 | 8 Oct 2023 |
| 398 | MiTest RF Conducted Test Software | MiCOM | MiTest ATS | Version 4.2.3.0 | Not Required |
| 405 | DC Power Supply 0-60V | Agilent | 6654A | MY4001826 | Cal when used |
| 408 | USB to GPIB interface | National Instruments | GPIB-USB HS | 14C0DE9 | Not Required |
| 441 | USB Wideband Power Sensor | Boonton | 55006 | 9179 | 20 Sep 2023 |
| 442 | USB Wideband Power Sensor | Boonton | 55006 | 9181 | 19 Oct 2023 |
| 445 | PoE Injector | D-Link | DPE-101GL | QTAH1E2000625 | Not Required |
| 461 | Spectrum Analyzer | Agilent | E4440A | MY46185537 | 27 Sep 2023 |
| 493 | USB Wideband Power Sensor | Boonton | 55006 | 9634 | 8 Oct 2023 |
| 494 | USB Wideband Power Sensor | Boonton | 55006 | 9726 | 19 Oct 2023 |
| 510 | Barometer/Thermometer | Digi Sense | 68000-49 | 170871375 | 4 Jan 2024 |
| 512 | MiTest Cloud Solutions RF Test Box | MiCOM | 2nd Gen with DFS | 512 | 29 Jun 2023 |
| 555 | Rhode & Schwarz Receiver (Firmware Version : 2.00 SP1) | Rhode & Schwarz | ESW 44 | 101893 | 28 Jun 2023 |
| 75 | Environmental Chamber | Thermatron | SE-300-2-2 | 27946 | 20 Feb 2023 |


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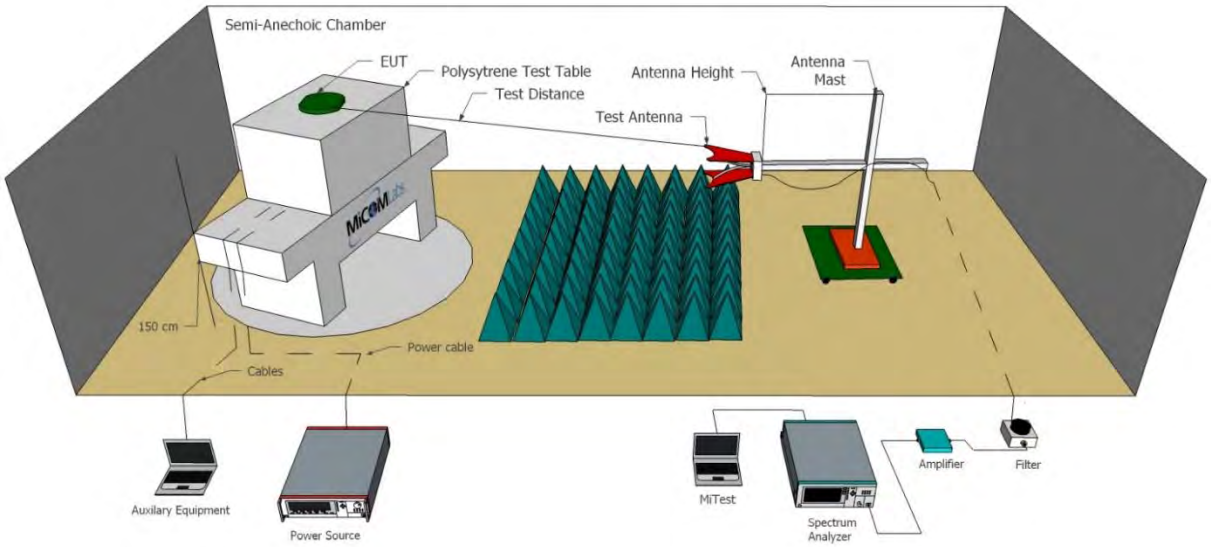
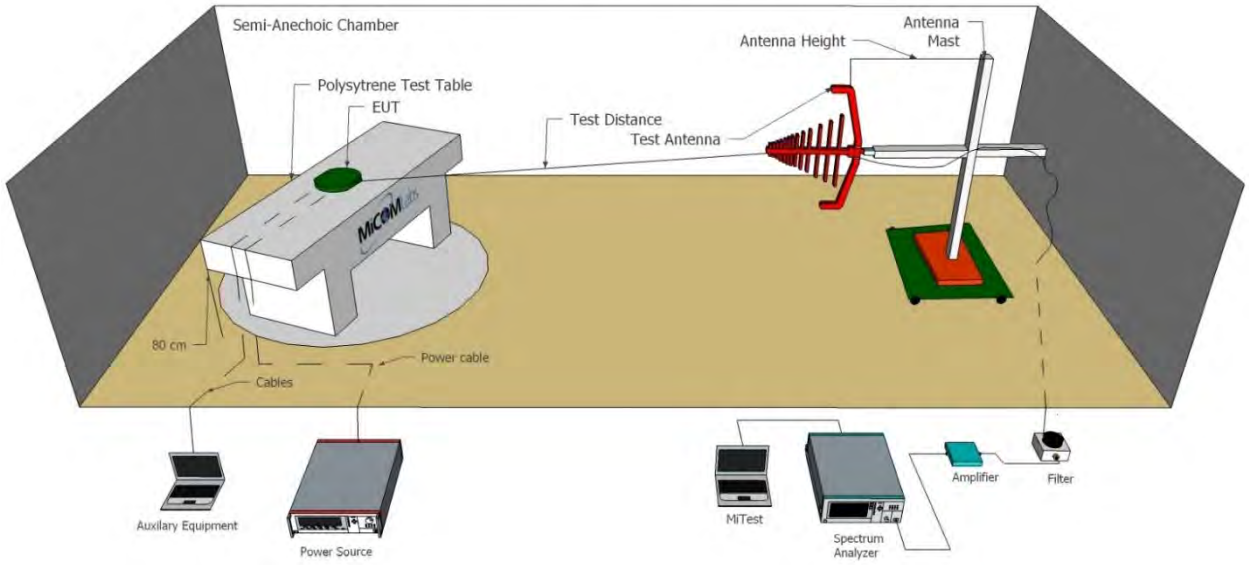
## 7.2. Radiated Emissions

The following tests were performed using the radiated test set-up shown in the diagram below. Radiated emissions above and below 1GHz.

Radiated Emissions Above 1GHz Test Setup




Radiated Emissions Below 1GHz Test Setup





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**Test Equipment Utilized**

| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|---|---|---|---|---|---|
| 170 | Video System Controller for Semi Anechoic Chamber | Panasonic | WV-CU101 | 04R08507 | Not Required |
| 287 | Rohde & Schwarz 40 GHz Receiver | Rhode & Schwarz | ESIB40 | 100201 | 8 Oct 2023 |
| 298 | 3M Radiated Emissions Chamber Maintenance Check | MiCOM | 3M Chamber | 298 | 24 Jan 2023 |
| 302 | 5150 to 5350 MHz Notch Filter | Microtronics | BRC50703 | 002 | 6 Oct 2023 |
| 303 | 5725 to 5875 MHz Notch filter | Microtronics | BRC50705 | 003 | 6 Oct 2023 |
| 330 | Variac 0-280 Vac | Staco Energy Co | 3PN1020B | 0546 | Cal when used |
| 336 | Active loop Ant 10kHz to 30 MHz | EMCO | EMCO 6502 | 00060498 | 29 Nov 2023 |
| 338 | Sunol 30 to 3000 MHz Antenna | Sunol | JB3 | A052907 | 29 Sep 2023 |
| 343 | 5.15 GHz Notch Filter | EWT | EWT-14-0200 | H1 | 6 Oct 2023 |
| 373 | 26III RMS Multimeter | Fluke | Fluke 26 series III | 76080720 | 29 Sep 2023 |
| 377 | Band Rejection Filter 5150 to 5880MHz | Microtronics | BRM50716 | 034 | 6 Oct 2023 |
| 397 | Amp 10 - 2500MHz | MiCOM Labs | Amp 10 - 2500 MHz | NA | 27 Oct 2023 |
| 399 | ETS 1-18 GHz Horn Antenna | ETS | 3117 | 00154575 | 30 Sep 2023 |
| 406 | Amplifier for Radiated Emissions | MiCOM Labs | 40dB 1 to 18GHz Amp | 0406 | 2 Nov 2023 |
| 410 | Desktop Computer | Dell | Inspiron 620 | WS38 | Not Required |
| 411 | Mast/Turntable Controller | Sunol Sciences | SC98V | 060199-1D | Not Required |
| 412 | USB to GPIB Interface | National Instruments | GPIB-USB HS | 11B8DC2 | Not Required |
| 413 | Mast Controller | Sunol Science | TWR95-4 | 030801-3 | Not Required |
| 414 | DC Power Supply 0-60V | HP | 6274 | 1029A01285 | Cal when used |
| 415 | Turntable Controller | Sunol Sciences | Turntable Controller | None | Not Required |
| 416 | Gigabit ethernet filter | ETS-Lingren | Gigafoil 260366 | None | Not Required |
| 447 | MiTest Rad Emissions Test Software | MiCOM | Rad Emissions Test Software Version 1.0 | 447 | Not Required |
| 462 | Schwarzbeck cable from Antenna to Amplifier. | Schwarzbeck | AK 9513 | 462 | 27 Oct 2023 |


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| | | | | | |
|---|---|---|---|---|---|
| 463 | Schwarzbeck cable from Amplifier to Bulkhead. | Schwarzbeck | AK 9513 | 463 | 27 Oct 2023 |
| 464 | Schwarzbeck cable from Bulkhead to Receiver | Schwarzbeck | AK 9513 | 464 | 27 Oct 2023 |
| 466 | Low Pass Filter DC-1500 MHz | Mini-Circuits | NLP-1750+ | VUU10401438 | 6 Oct 2023 |
| 480 | Cable - Bulkhead to Amp | SRC Haverhill | 157-3050360 | 480 | 6 Oct 2023 |
| 481 | Cable - Bulkhead to Receiver | SRC Haverhill | 151-3050787 | 481 | 6 Oct 2023 |
| 510 | Barometer/Thermometer | Digi Sense | 68000-49 | 170871375 | 4 Jan 2024 |
| 554 | Precision SMA Cable | Fairview Microwave | SCE18060101-400CM | 554 | 6 Oct 2023 |
| 555 | Rhode & Schwarz Receiver (Firmware Version : 2.00 SP1) | Rhode & Schwarz | ESW 44 | 101893 | 28 Jun 2023 |
| 87 | Uninterruptible Power Supply | Falcon Electric | ED2000-1/2LC | F3471 02/01 | Cal when used |
| CC05 | Confidence Check | MiCOM | CC05 | None | 27 Feb 2023 |


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# 8. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.

The MiCOM Labs "MiTest" Automated Test System" (Patent Pending)


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# 9. TEST RESULTS

## 9.1. Peak Transmit Power

| Conducted Test Conditions for Maximum Conducted Output Power | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 24.0 - 27.5 |
| **Test Heading:** | Maximum Conducted Output Power | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.407 (a) | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | See Normative References | | |

**Test Procedure for Maximum Conducted Output Power Measurement**
Method PM (Measurement using an RF average power meter). KDB 789033 defines a methodology using an average wideband power meter. Measurements were made while the EUT was operating in a continuous transmission mode (100% duty cycle) at the appropriate center frequency. All operational modes and frequency bands were measured independently and the resultant calculated. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported separately. A summation (Σ) of each antenna port output power is provided which includes any offset due to Duty Cycle Correction Factor (DCCF). Testing was performed under ambient conditions at nominal voltage.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.
Supporting Information
Calculated Power = A + G + Y+ 10 log (1/x) dBm

A = Total Power [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
G = Antenna Gain
Y = Beamforming Gain
x = Duty Cycle (average power measurements only)

**Limits Maximum Conducted Output Power**

**Operating Frequency Band 5150-5250 MHz**

15. 407 (a)(1)
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are


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used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5250-5350 and 5470 – 5725 MHz**

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5725 – 5850 MHz**

15. 407 (a)(3)
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.


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| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | OFDM-20 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 8.6 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5180.0** | 13.77 | 13.31 | -- | -- | 16.56 | -- | 29.00 | -12.44 | 12.00 |
| **5210.0** | 24.98 | 24.73 | -- | -- | 27.87 | -- | 29.00 | -1.13 | 25.50 |
| **5240.0** | 24.06 | 24.55 | -- | -- | 27.32 | -- | 29.00 | -1.68 | 25.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

For 5180.00 MHz channel frequency power reduced due to a power reduction for radiated band-edge compliance


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| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | OFDM-40 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 17.2 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5190.0** | 13.57 | 13.24 | -- | -- | 16.42 | -- | 29.00 | -12.58 | 12.00 |
| **5210.0** | 25.09 | 24.83 | -- | -- | 27.97 | -- | 29.00 | -1.03 | 25.50 |
| **5230.0** | 24.15 | 24.69 | -- | -- | 27.44 | -- | 29.00 | -1.56 | 25.50 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | ±1.33 dB |

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.

For 5190.00 MHz channel frequency power reduced due to a power reduction for radiated band-edge compliance


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| Equipment Configuration for Peak Transmit Power | | | |
|---|---|---|---|
| **Variant:** | OFDM-80 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 36 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Conducted Output Power (dBm) Port(s) | | | | Calculated Total Power | Minimum 26 dB Bandwidth | Limit | Margin | EUT Power Setting |
|---|---|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | Σ Port(s) dBm | MHz | dBm | dB | |
| **5210.0** | 10.96 | 10.58 | -- | -- | 13.78 | -- | 29.00 | 15.22 | 9.0 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-01 MEASURING RF OUTPUT POWER |
| Measurement Uncertainty: | |

The above measurements are true pulse readings and therefore a Duty Cycling correction factor is not required.


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## 9.2. 26 dB & 99% Bandwidth

| Conducted Test Conditions for 26 dB and 99% Bandwidth | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 24.0 - 27.5 |
| **Test Heading:** | 26 dB and 99 % Bandwidth | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.407 (a) | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | See Normative References | | |

**Test Procedure for 26 dB and 99% Bandwidth Measurement**
The bandwidth at 26 dB and 99 % is measured with a spectrum analyzer connected to the antenna terminal, while EUT is operating in transmission mode at the appropriate center frequency. The Resolution Bandwidth was set to approximately 1% of the emission bandwidth.
Testing was performed under ambient conditions at nominal voltage. Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured and reported.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.


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| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | OFDM-20 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 8.6 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | |
| MHz | a | b | c | d | Highest | Lowest | | |
| 5180.0 | 26.200 | 24.930 | -- | -- | 26.200 | 24.930 | | |
| 5210.0 | 26.070 | 26.330 | -- | -- | 26.330 | 26.070 | | |
| 5240.0 | 21.600 | 25.000 | -- | -- | 25.000 | 21.600 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | |
| MHz | a | b | c | d | Highest | Lowest | | |
| 5180.0 | 19.043 | 19.067 | -- | -- | 19.067 | 19.043 | | |
| 5210.0 | 19.047 | 19.066 | -- | -- | 19.066 | 19.047 | | |
| 5240.0 | 19.006 | 19.050 | -- | -- | 19.050 | 19.006 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).


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| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | OFDM-40 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 17.2 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | |
| MHz | a | b | c | d | Highest | Lowest | | |
| 5190.0 | 44.670 | 44.930 | -- | -- | 44.930 | 44.670 | | |
| 5210.0 | 44.270 | 48.530 | -- | -- | 48.530 | 44.270 | | |
| 5230.0 | 42.000 | 44.800 | -- | -- | 44.800 | 42.000 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | |
| MHz | a | b | c | d | Highest | Lowest | | |
| 5190.0 | 37.906 | 37.958 | -- | -- | 37.958 | 37.906 | | |
| 5210.0 | 37.920 | 37.961 | -- | -- | 37.961 | 37.920 | | |
| 5230.0 | 37.854 | 37.938 | -- | -- | 37.938 | 37.854 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).


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| Equipment Configuration for 26 dB & 99% Occupied Bandwidth | | | |
|---|---|---|---|
| **Variant:** | OFDM-80 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 36 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured 26 dB Bandwidth (MHz) | | | | 26 dB Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | |
| MHz | a | b | c | d | Highest | Lowest | | |
| 5210.0 | 85.800 | 97.500 | -- | -- | 97.500 | 85.800 | | |

| Test Frequency | Measured 99% Bandwidth (MHz) | | | | 99% Bandwidth (MHz) | | | |
|---|---|---|---|---|---|---|---|---|
| | Port(s) | | | | | | | |
| MHz | a | b | c | d | Highest | Lowest | | |
| 5210.0 | 77.543 | 77.627 | -- | -- | 77.627 | 77.543 | | |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

Note: click the links in the above matrix to view the graphical image (plot).


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## 9.3. Power Spectral Density

| Conducted Test Conditions for Power Spectral Density | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 24.0 - 27.5 |
| **Test Heading:** | Power Spectral Density | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.407 (a) | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | See Normative References | | |

**Test Procedure for Power Spectral Density**
The in-band power spectral density was measured using the test technique specified in KDB 789033. A 1 MHz measurement bandwidth was implemented for the analyzer sweep. Once the sweep is complete the analyzer trace data is downloaded and used for post processing purposes.
Where the device operated with multiple antenna ports i.e. MIMO device, each port was measured separately. The Peak Power Spectral Density is the highest level found across the emission bandwidth. With multiple antenna port measurements the numerical analyzer data from each port is summed (å) and a link to this additional graphic is provided.

Test configuration and setup used for the measurement was per the Conducted Test Set-up section specified in this document.

Measure and sum the spectra across the outputs. With this technique, spectra are measured at each output of the device at the required resolution bandwidth. The individual spectra are then summed mathematically in linear power units. Unlike in-band power measurements, in which the sum involves a single measured value (output power) from each output, measurements for compliance with PSD limits involve summing entire spectra across corresponding frequency bins on the various outputs. Consistency is maintained for any device with multiple transmitter outputs to be certain the individual outputs are all aligned with the same span and same number of points. In this instance, the linear power spectrum value within the first spectral bin of output 0 is summed with that in the first spectral bin of output 1, and the first spectral bin of output 2, and so on up to the Nth output to obtain the true value for the first frequency bin of the summed spectrum. The summed spectrum value for each frequency bin is computed in this fashion. These summed spectral values were post processed and the resulting numerical and graphical data presented.

NOTE: It may be observed that spectrum in some plots break the limit line however this in itself does NOT constitute a failure. In all cases a spectrum summation plot is provided in order to prove compliance. A failure occurs only after the summation of all spectrum plots have been summed and are found to be greater than the limit line.

Supporting Information
Calculated Power = A + 10 log (1/x) dBm
A = Total Power Spectral Density [10*Log10 ($10^{a/10}$ + $10^{b/10}$ + $10^{c/10}$ + $10^{d/10}$)]
x = Duty Cycle

**Limits Power Spectral Density**

**Operating Frequency Band 5150-5250 MHz**

15. 407 (a)(1)
(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any


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corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5250-5350 and 5470 – 5725 MHz**

15. 407 (a)(2)
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**Operating Frequency Band 5725 – 5850 MHz**

15. 407 (a)(3)
For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.


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## Equipment Configuration for Power Spectral Density

| | | | |
|---|---|---|---|
| **Variant:** | OFDM-20 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 17.2 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Summation Peak Marker + DCCF (+0.04 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5180.0 | -0.989 | -0.547 | -- | -- | 1.724 | 16.0 | -14.3 |
| 5210.0 | 11.726 | 11.572 | -- | -- | 14.645 | 16.0 | -1.4 |
| 5240.0 | 11.168 | 11.556 | -- | -- | 14.354 | 16.0 | -1.7 |

**Traceability to Industry Recognized Test Methodologies**

| | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).


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| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | OFDM-40 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 17.2 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Summation Peak Marker + DCCF (+0.04 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5190.0 | -3.661 | -3.060 | -- | -- | -0.484 | 16.0 | -16.5 |
| 5210.0 | 8.933 | 8.676 | -- | -- | 11.782 | 16.0 | -4.2 |
| 5230.0 | 8.342 | 8.737 | -- | -- | 11.503 | 16.0 | -4.5 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).


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| Equipment Configuration for Power Spectral Density | | | |
|---|---|---|---|
| **Variant:** | OFDM-80 | **Duty Cycle (%):** | 99.0 |
| **Data Rate:** | 36 MBit/s | **Antenna Gain (dBi):** | 24.00 |
| **Modulation:** | BPSK | **Beam Forming Gain (Y)(dB):** | Not Applicable |
| **TPC:** | Not Applicable | **Tested By:** | SB |
| **Engineering Test Notes:** | | | |

**Test Measurement Results**

| Test Frequency | Measured Power Spectral Density Port(s) (dBm/MHz) | | | | Summation Peak Marker + DCCF (+0.04 dB) | Limit | Margin |
|---|---|---|---|---|---|---|---|
| MHz | a | b | c | d | dBm/MHz | dBm/MHz | dB |
| 5210.0 | -10.119 | -9.334 | -- | -- | -7.049 | 16.0 | -23.1 |

| Traceability to Industry Recognized Test Methodologies | |
|---|---|
| Work Instruction: | WI-03 MEASURING RF SPECTRUM MASK |
| Measurement Uncertainty: | ±2.81 dB |

DCCF - Duty Cycle Correction Factor

Note: click the links in the above matrix to view the graphical image (plot).


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## 9.4. Radiated

| Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.407 | **Ambient Temp. (ºC):** | 20.0 - 24.5 |
| **Test Heading:** | Radiated Spurious and Band-Edge Emissions | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.407 (b), 15.205, 15.209 | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | See Normative References | | |

Test Procedure for Radiated Spurious and Band-Edge Emissions
Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Undesirable Measurement were per the Radiated Test Set-up specified in this document.
15.407 (b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(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 e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4)(i) For transmitters operating solely in the 5.725 – 5.850 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Limits for Restricted Bands (15.205, 15.209)
Peak emission: 74 dBuV/m
Average emission: 54 dBuV/m

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.
FS = R + AF + CORR - FO

where:
FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL


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CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss

Example:
The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dBµV/m);

$$E = 1000000 \times \sqrt{30P}/3 \ \mu V/m$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz equates to 68.23 dBuV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 mV/m

Restricted Bands of Operation (15.205)
(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| Frequency Band | | | |
|---|---|---|---|
| **MHz** | **MHz** | **MHz** | **GHz** |
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | Above 38.6 |
| 13.36-13.41 | | | |

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.


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(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to §15.213.

(4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of subparts D or F of this part.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).

Testing was performed up to 40 GHz, no emissions were found >18GHz.


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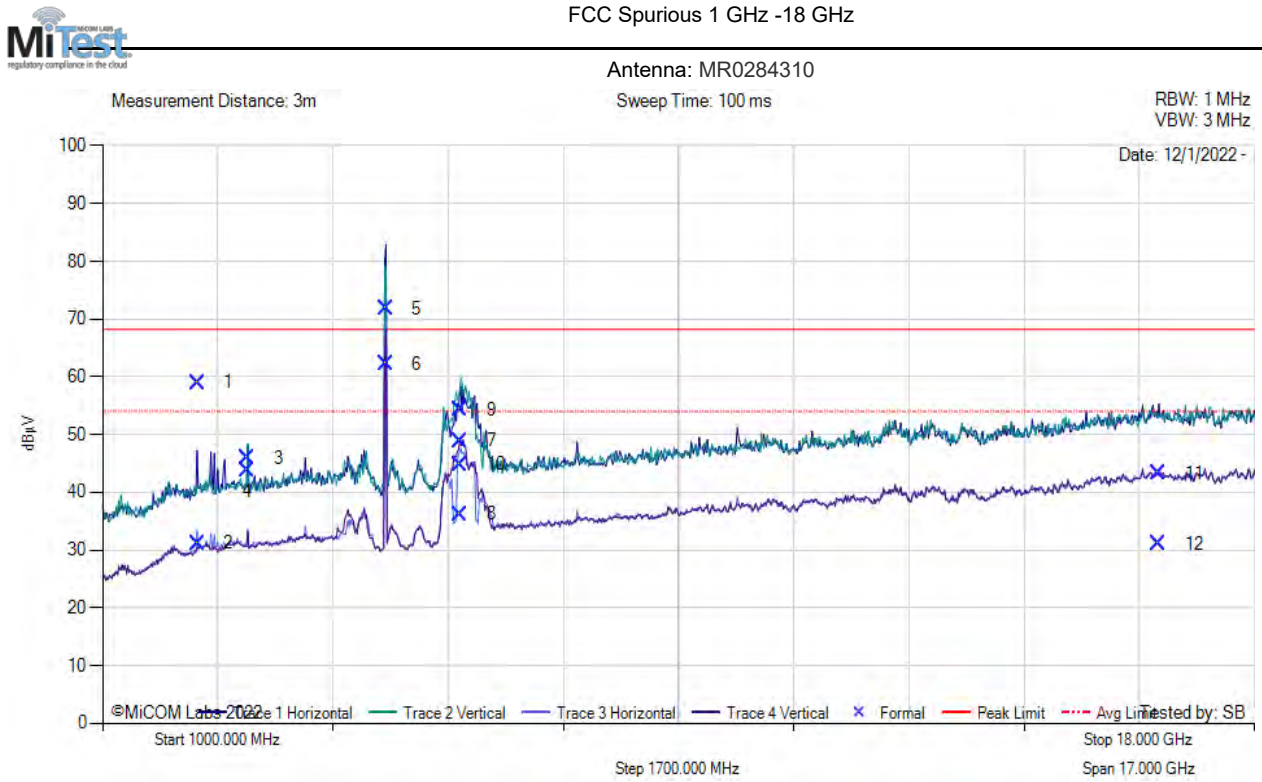
## 9.4.1. TX Spurious & Restricted Band Emissions

### 9.4.1.1. MR0248310 5150-5250MHz

| Equipment Configuration for FCC Spurious 1 GHz -18 GHz | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180.0 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**





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| 1GHz - 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2399.90 | 69.18 | 1.96 | -12.19 | 58.95 | MaxP | Horizontal | 131 | 208 | 68.2 | -9.3 | Pass |
| 2 | 2399.90 | 41.40 | 1.96 | -12.19 | 31.16 | AVG | Horizontal | 131 | 208 | 54.0 | -22.8 | Pass |
| 3 | 3142.77 | 55.26 | 2.27 | -11.64 | 45.89 | MaxP | Horizontal | 118 | 213 | 68.2 | -22.3 | Pass |
| 4 | 3142.77 | 53.16 | 2.27 | -11.64 | 43.79 | AVG | Horizontal | 118 | 213 | 54.0 | -10.2 | Pass |
| 5 | 5187.77 | 80.81 | 2.97 | -12.03 | 71.75 | MaxP | Fundamental | 148 | 0 | -- | -- | Pass |
| 6 | 5187.77 | 71.33 | 2.97 | -12.03 | 62.27 | AVG | Fundamental | 148 | 0 | -- | -- | Pass |
| 7 | 6283.03 | 54.49 | 3.29 | -8.88 | 48.91 | MaxP | Vertical | 145 | 0 | 68.2 | -19.3 | Pass |
| 8 | 6283.03 | 41.79 | 3.29 | -8.88 | 36.21 | AVG | Vertical | 145 | 0 | 54.0 | -17.8 | Pass |
| 9 | 6286.14 | 59.84 | 3.30 | -8.91 | 54.23 | MaxP | Horizontal | 146 | 0 | 68.2 | -14.0 | Pass |
| 10 | 6286.14 | 50.45 | 3.30 | -8.91 | 44.85 | AVG | Horizontal | 146 | 0 | 54.0 | -9.2 | Pass |
| 11 | 16589.72 | 37.88 | 6.19 | -0.82 | 43.25 | MaxP | Horizontal | 99 | 26 | 68.2 | -25.0 | Pass |
| 12 | 16589.72 | 25.65 | 6.19 | -0.82 | 31.02 | AVG | Horizontal | 99 | 26 | 54.0 | -23.0 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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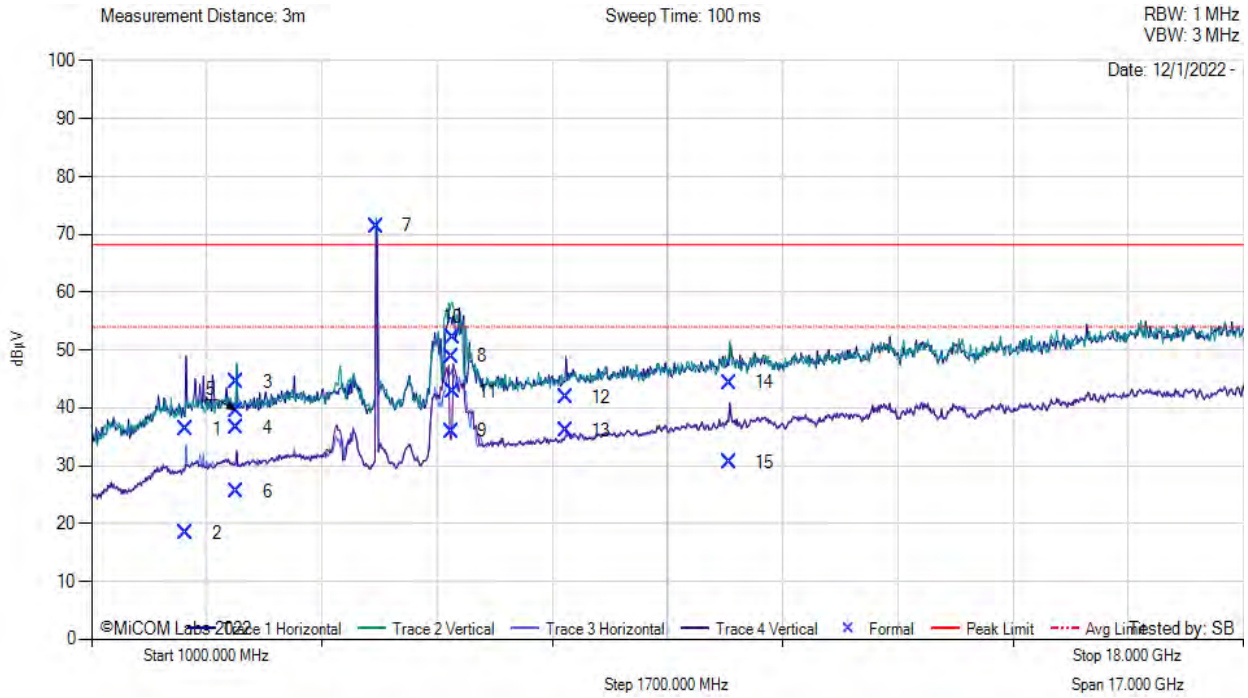
| Equipment Configuration for FCC Spurious 1 GHz -18 GHz | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz -18 GHz

Antenna: MR0284310



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| 1000.00 - 18000.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2395.54 | 46.63 | 1.96 | -12.22 | 36.37 | MaxP | Horizontal | 98 | 241 | 68.2 | -31.9 | Pass |
| 2 | 2395.54 | 28.59 | 1.96 | -12.22 | 18.33 | AVG | Horizontal | 98 | 241 | 54.0 | -35.7 | Pass |
| 3 | 3142.82 | 53.81 | 2.27 | -11.64 | 44.45 | MaxP | Vertical | 112 | 212 | 68.2 | -23.8 | Pass |
| 4 | 3142.82 | 45.88 | 2.27 | -11.64 | 36.51 | AVG | Vertical | 112 | 212 | 54.0 | -17.5 | Pass |
| 5 | 3142.90 | 48.94 | 2.27 | -11.64 | 39.57 | MaxP | Horizontal | 98 | 213 | 68.2 | -28.7 | Pass |
| 6 | 3142.90 | 34.92 | 2.27 | -11.64 | 25.55 | AVG | Horizontal | 98 | 213 | 54.0 | -28.5 | Pass |
| 7 | 5199.00 | 80.67 | 2.98 | 34.17 | 71.42 | AVG | Fundamental | 149 | 0 | -- | -- | Pass |
| 8 | 6316.43 | 54.54 | 3.36 | -9.04 | 48.86 | MaxP | Vertical | 149 | 1 | 68.2 | -19.4 | Pass |
| 9 | 6316.43 | 41.62 | 3.36 | -9.04 | 35.94 | AVG | Vertical | 149 | 1 | 54.0 | -18.1 | Pass |
| 10 | 6338.77 | 57.52 | 3.41 | -8.85 | 52.08 | MaxP | Horizontal | 142 | 0 | 68.2 | -16.1 | Pass |
| 11 | 6338.77 | 48.22 | 3.41 | -8.85 | 42.78 | AVG | Horizontal | 142 | 0 | 54.0 | -11.2 | Pass |
| 12 | 8000.06 | 45.89 | 3.91 | -8.00 | 41.81 | MaxP | Horizontal | 144 | 241 | 68.2 | -26.4 | Pass |
| 13 | 8000.06 | 40.13 | 3.91 | -8.00 | 36.04 | AVG | Horizontal | 144 | 241 | 54.0 | -18.0 | Pass |
| 14 | 10419.83 | 45.45 | 4.47 | -5.54 | 44.38 | MaxP | Vertical | 145 | 0 | 68.2 | -23.9 | Pass |
| 15 | 10419.83 | 31.64 | 4.47 | -5.54 | 30.56 | AVG | Vertical | 145 | 0 | 54.0 | -23.4 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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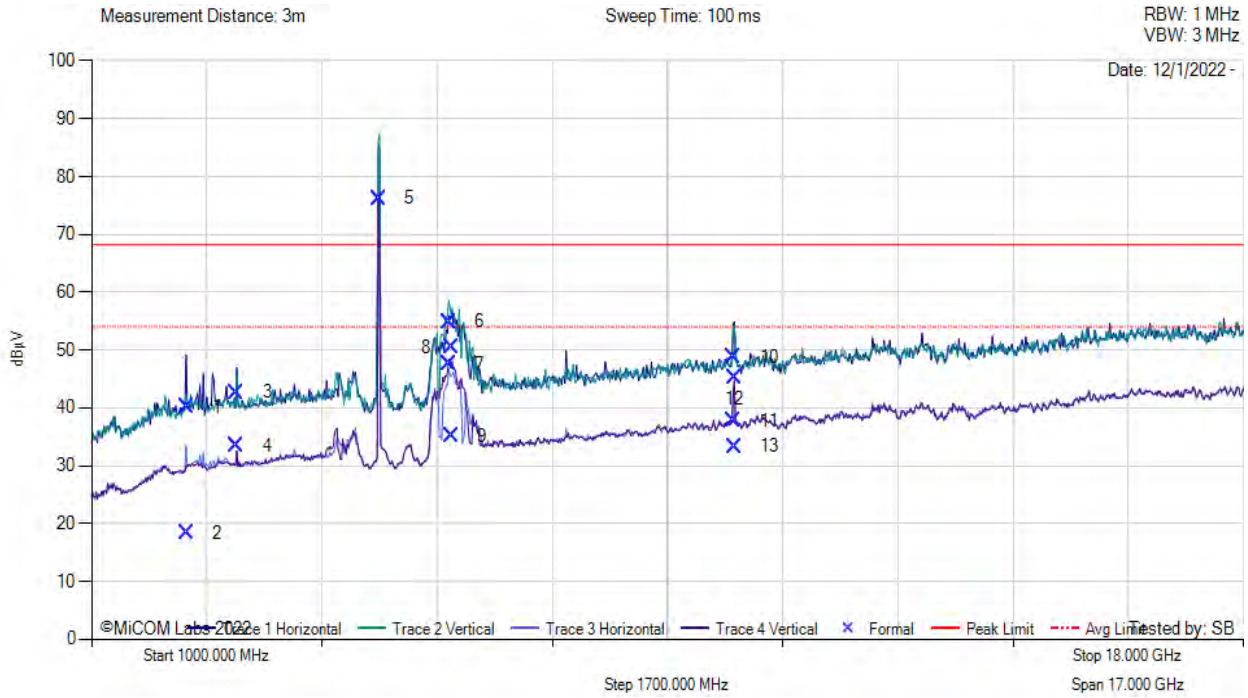
| Equipment Configuration for FCC Spurious 1 GHz - 18 GHz | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5240 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz -18 GHz

Antenna: MR0284310



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| 1 GHz - 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Num | Frequency MHz | Raw dBµV | Cable Loss dB | AF dB/m | Level dBµV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBµV/m | Margin dB | Pass /Fail |
| 1 | 2398.40 | 50.46 | 1.96 | -12.20 | 40.22 | MaxP | Horizontal | 139 | 241 | 68.2 | -28.0 | Pass |
| 2 | 2398.40 | 28.65 | 1.96 | -12.20 | 18.40 | AVG | Horizontal | 139 | 241 | 54.0 | -35.6 | Pass |
| 3 | 3142.67 | 52.01 | 2.27 | -11.64 | 42.65 | MaxP | Horizontal | 126 | 210 | 68.2 | -25.6 | Pass |
| 4 | 3142.67 | 42.75 | 2.27 | -11.64 | 33.38 | AVG | Horizontal | 126 | 210 | 54.0 | -20.6 | Pass |
| 5 | 5233.00 | 84.98 | 3.05 | 34.22 | 76.18 | AVG | Fundamental | 149 | 0 | -- | -- | Pass |
| 6 | 6276.34 | 60.39 | 3.32 | -8.84 | 54.86 | MaxP | Vertical | 149 | 0 | 68.2 | -13.4 | Pass |
| 7 | 6276.34 | 53.10 | 3.32 | -8.84 | 47.57 | AVG | Vertical | 149 | 0 | 54.0 | -6.4 | Pass |
| 8 | 6315.58 | 56.18 | 3.36 | -9.04 | 50.51 | MaxP | Horizontal | 143 | 0 | 68.2 | -17.7 | Pass |
| 9 | 6315.58 | 40.76 | 3.36 | -9.04 | 35.09 | AVG | Horizontal | 143 | 0 | 54.0 | -18.9 | Pass |
| 10 | 10480.05 | 49.31 | 4.43 | -4.92 | 48.82 | MaxP | Vertical | 149 | 0 | 68.2 | -19.4 | Pass |
| 11 | 10480.05 | 38.32 | 4.43 | -4.92 | 37.83 | AVG | Vertical | 149 | 0 | 54.0 | -16.2 | Pass |
| 12 | 10484.99 | 45.79 | 4.42 | -4.98 | 45.23 | MaxP | Horizontal | 145 | 0 | 68.2 | -23.0 | Pass |
| 13 | 10484.99 | 33.86 | 4.42 | -4.98 | 33.30 | AVG | Horizontal | 145 | 0 | 54.0 | -20.7 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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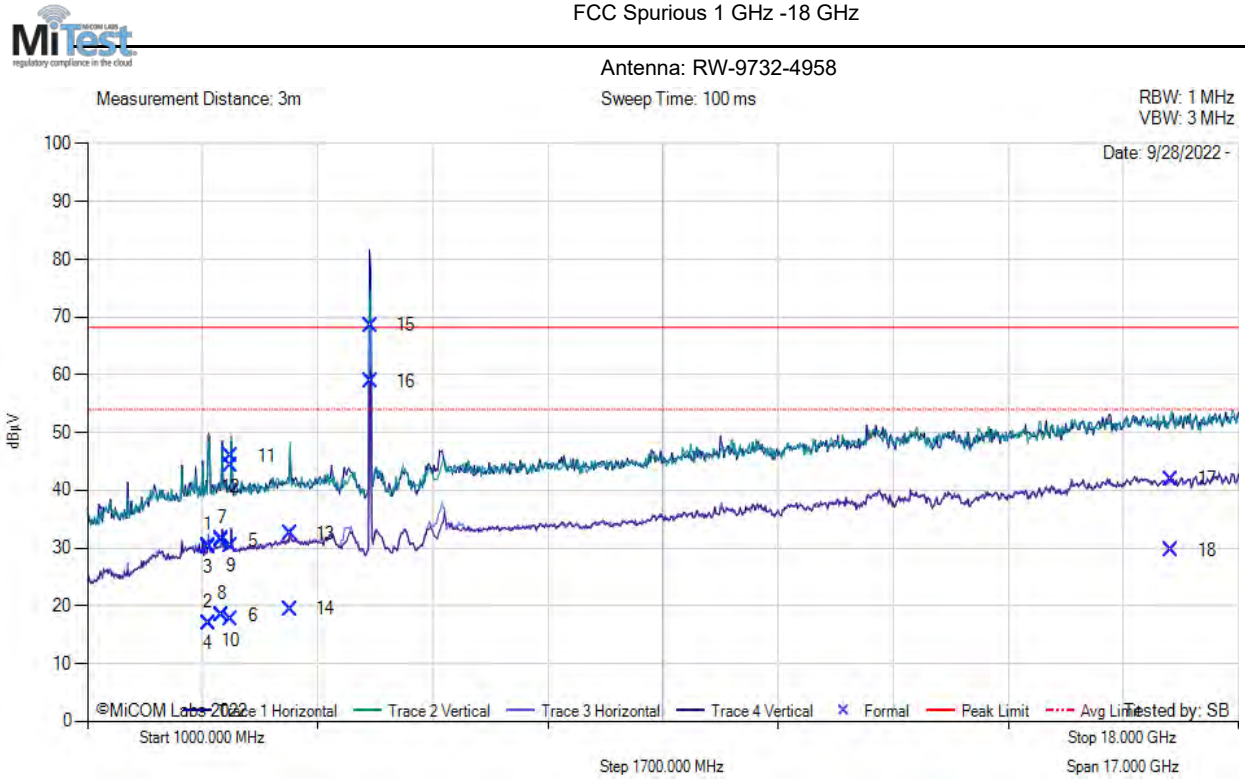
### 9.4.1.2. RW-9732-4958 5150-5250MHz

| Equipment Configuration for FCC Spurious Emissions 1 GHz - 18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4958 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 32 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**





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| 1 GHz – 18 Ghz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2783.14 | 40.24 | 2.12 | -11.86 | 30.50 | MaxP | Horizontal | 99 | 327 | 68.2 | -37.7 | Pass |
| 2 | 2783.14 | 26.78 | 2.12 | -11.86 | 17.04 | AVG | Horizontal | 99 | 327 | 54.0 | -37.0 | Pass |
| 3 | 2783.15 | 39.94 | 2.12 | -11.86 | 30.20 | MaxP | Vertical | 106 | 360 | 68.2 | -38.0 | Pass |
| 4 | 2783.15 | 26.76 | 2.12 | -11.86 | 17.02 | AVG | Vertical | 106 | 360 | 54.0 | -37.0 | Pass |
| 5 | 2988.42 | 40.59 | 2.20 | -11.44 | 31.35 | MaxP | Vertical | 133 | 342 | 68.2 | -36.9 | Pass |
| 6 | 2988.42 | 27.61 | 2.20 | -11.44 | 18.37 | AVG | Vertical | 133 | 342 | 54.0 | -35.6 | Pass |
| 7 | 2990.57 | 40.89 | 2.20 | -11.43 | 31.66 | MaxP | Horizontal | 119 | 316 | 68.2 | -36.6 | Pass |
| 8 | 2990.57 | 27.71 | 2.20 | -11.43 | 18.48 | AVG | Horizontal | 119 | 316 | 54.0 | -35.5 | Pass |
| 9 | 3124.69 | 39.71 | 2.23 | -11.52 | 30.43 | MaxP | Vertical | 110 | 341 | 68.2 | -37.8 | Pass |
| 10 | 3124.69 | 26.93 | 2.23 | -11.52 | 17.65 | AVG | Vertical | 110 | 341 | 54.0 | -36.4 | Pass |
| 11 | 3124.95 | 55.15 | 2.23 | -11.52 | 45.87 | MaxP | Horizontal | 99 | 320 | 68.2 | -22.4 | Pass |
| 12 | 3124.95 | 53.57 | 2.23 | -11.52 | 44.28 | AVG | Horizontal | 99 | 320 | 54.0 | -9.7 | Pass |
| 13 | 3993.18 | 41.53 | 2.51 | -11.58 | 32.47 | MaxP | Vertical | 119 | 351 | 68.2 | -35.8 | Pass |
| 14 | 3993.18 | 28.51 | 2.51 | -11.58 | 19.45 | AVG | Vertical | 119 | 351 | 54.0 | -34.6 | Pass |
| 15 | 5183.89 | 77.55 | 2.97 | -11.93 | 68.59 | Fundamental | Horizontal | 145 | 0 | -- | -- | Pass |
| 16 | 5183.89 | 67.86 | 2.97 | -11.93 | 58.90 | Fundamental | Horizontal | 145 | 0 | -- | -- | Pass |
| 17 | 17012.02 | 36.48 | 6.57 | -1.07 | 41.97 | MaxP | Vertical | 133 | 67 | 68.2 | -26.3 | Pass |
| 18 | 17012.02 | 24.11 | 6.57 | -1.07 | 29.61 | AVG | Vertical | 133 | 67 | 54.0 | -24.4 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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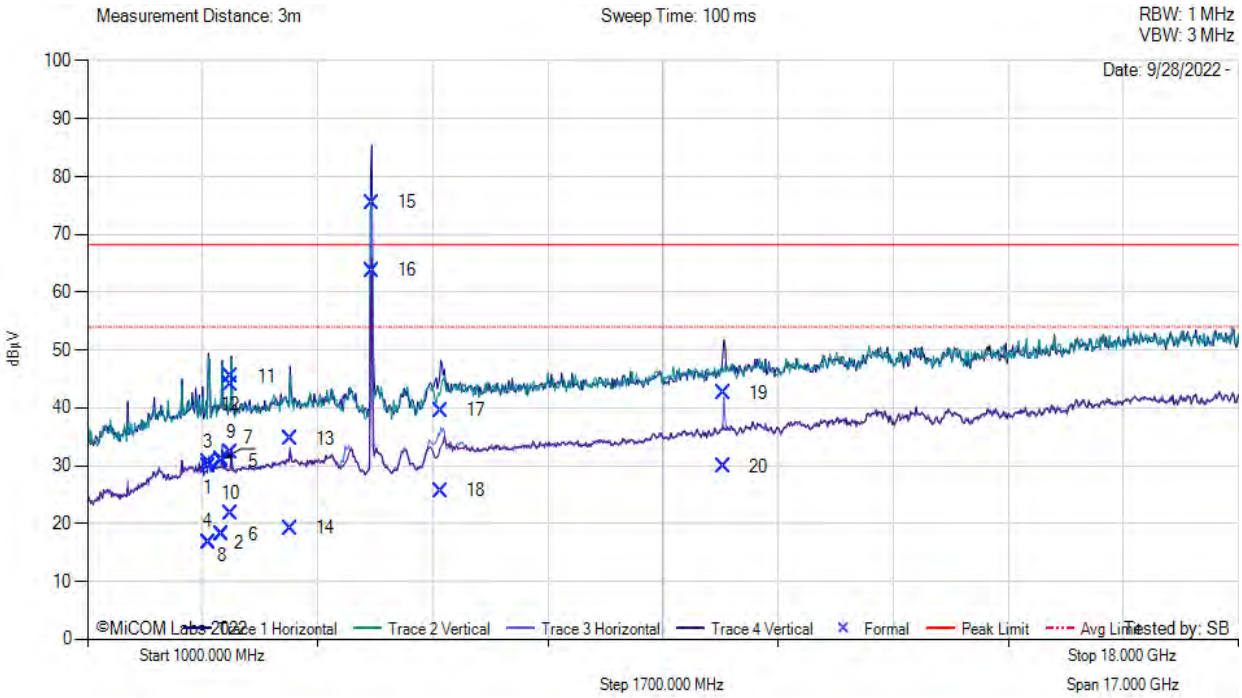
**Equipment Configuration for FCC Spurious Emissions 1 GHz - 18 GHz**

| | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4958 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 32 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210.0 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz -18 GHz

Antenna: RW-9732-4958



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| 1 GHz - 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2784.08 | 39.65 | 2.12 | -11.86 | 29.91 | MaxP | Vertical | 142 | 325 | 68.2 | -38.3 | Pass |
| 2 | 2784.08 | 26.44 | 2.12 | -11.86 | 16.70 | AVG | Vertical | 142 | 325 | 54.0 | -37.3 | Pass |
| 3 | 2786.08 | 40.35 | 2.11 | -11.85 | 30.61 | MaxP | Horizontal | 102 | 322 | 68.2 | -37.6 | Pass |
| 4 | 2786.08 | 26.53 | 2.11 | -11.85 | 16.79 | AVG | Horizontal | 102 | 322 | 54.0 | -37.2 | Pass |
| 5 | 2989.88 | 40.03 | 2.20 | -11.43 | 30.80 | MaxP | Horizontal | 148 | 268 | 68.2 | -37.4 | Pass |
| 6 | 2989.88 | 27.39 | 2.20 | -11.43 | 18.16 | AVG | Horizontal | 148 | 268 | 54.0 | -35.8 | Pass |
| 7 | 2989.99 | 40.39 | 2.20 | -11.43 | 31.16 | MaxP | Vertical | 119 | 312 | 68.2 | -37.1 | Pass |
| 8 | 2989.99 | 27.30 | 2.20 | -11.43 | 18.07 | AVG | Vertical | 119 | 312 | 54.0 | -35.9 | Pass |
| 9 | 3124.92 | 41.60 | 2.23 | -11.52 | 32.31 | MaxP | Vertical | 106 | 297 | 68.2 | -35.9 | Pass |
| 10 | 3124.92 | 31.01 | 2.23 | -11.52 | 21.72 | AVG | Vertical | 106 | 297 | 54.0 | -32.3 | Pass |
| 11 | 3124.95 | 54.74 | 2.23 | -11.52 | 45.45 | MaxP | Horizontal | 99 | 314 | 68.2 | -22.8 | Pass |
| 12 | 3124.95 | 53.36 | 2.23 | -11.52 | 44.07 | AVG | Horizontal | 99 | 314 | 54.0 | -9.9 | Pass |
| 13 | 3992.26 | 43.77 | 2.52 | -11.58 | 34.71 | MaxP | Horizontal | 105 | 319 | 68.2 | -33.5 | Pass |
| 14 | 3992.26 | 28.28 | 2.52 | -11.58 | 19.23 | AVG | Horizontal | 105 | 319 | 54.0 | -34.8 | Pass |
| 15 | 5198.72 | 84.74 | 2.98 | -12.22 | 75.50 | Fundamental | Horizontal | 145 | 0 | -- | -- | Pass |
| 16 | 5198.72 | 72.97 | 2.98 | -12.22 | 63.73 | Fundamental | Horizontal | 145 | 0 | -- | -- | Pass |
| 17 | 6220.61 | 45.57 | 3.31 | -9.33 | 39.55 | MaxP | Horizontal | 142 | 0 | 68.2 | -28.7 | Pass |
| 18 | 6220.61 | 31.67 | 3.31 | -9.33 | 25.65 | AVG | Horizontal | 142 | 0 | 54.0 | -28.4 | Pass |
| 19 | 10400.25 | 43.53 | 4.60 | -5.53 | 42.60 | MaxP | Horizontal | 141 | 0 | 68.2 | -25.6 | Pass |
| 20 | 10400.25 | 30.86 | 4.60 | -5.53 | 29.93 | AVG | Horizontal | 141 | 0 | 54.0 | -24.1 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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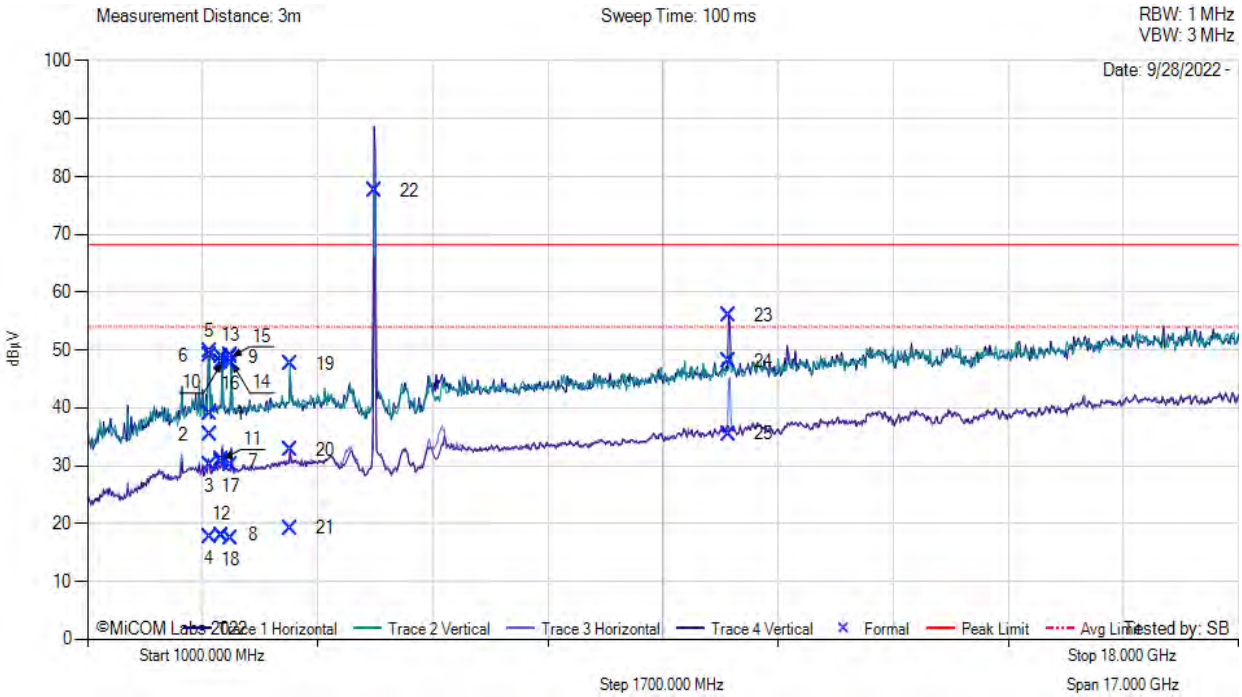
| Equipment Configuration for FCC Spurious Emissions 1 GHz - 18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4958 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 32 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5240.0 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz- 18 GHz

Antenna: RW-9732-4958



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| 1 GHz – 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2800.09 | 48.74 | 2.12 | -11.84 | 39.02 | MaxP | Horizontal | 124 | 312 | 68.2 | -29.2 | Pass |
| 2 | 2800.09 | 45.14 | 2.12 | -11.84 | 35.42 | AVG | Horizontal | 124 | 312 | 54.0 | -18.6 | Pass |
| 3 | 2800.12 | 39.76 | 2.12 | -11.84 | 30.04 | MaxP | Vertical | 127 | 317 | 68.2 | -38.2 | Pass |
| 4 | 2800.12 | 27.34 | 2.12 | -11.84 | 17.62 | AVG | Vertical | 127 | 317 | 54.0 | -36.4 | Pass |
| 5 | 2802.00 | 23.63 | 2.12 | -11.84 | 49.67 | MaxP | Vertical | 127 | 317 | 68.2 | -18.53 | Pass |
| 6 | 2802.00 | 58.82 | 2.12 | 32.41 | 49.10 | MaxP | Horizontal | 98 | 300 | 68.2 | -19.1 | Pass |
| 7 | 2988.26 | 39.98 | 2.20 | -11.44 | 30.74 | MaxP | Horizontal | 129 | 293 | 68.2 | -37.5 | Pass |
| 8 | 2988.26 | 27.26 | 2.20 | -11.44 | 18.02 | AVG | Horizontal | 129 | 293 | 54.0 | -36.0 | Pass |
| 9 | 2989.00 | 57.97 | 2.20 | 32.87 | 48.73 | MaxP | Horizontal | 149 | 300 | 68.2 | -19.5 | Pass |
| 10 | 2989.00 | 43.04 | 2.2 | 32.87 | 47.97 | MaxP | Vertical | 127 | 317 | 68.2 | -20.23 | Pass |
| 11 | 2990.34 | 40.29 | 2.20 | -11.43 | 31.06 | MaxP | Vertical | 123 | 332 | 68.2 | -37.2 | Pass |
| 12 | 2990.34 | 27.26 | 2.20 | -11.43 | 18.03 | AVG | Vertical | 123 | 332 | 54.0 | -36.0 | Pass |
| 13 | 3125.00 | 58.26 | 2.23 | 32.77 | 48.97 | MaxP | Horizontal | 98 | 330 | 68.2 | -19.3 | Pass |
| 14 | 3125.00 | 57.27 | 2.23 | 32.77 | 47.98 | MaxP | Vertical | 149 | 330 | 68.2 | -20.2 | Pass |
| 15 | 3125.01 | 58.12 | 2.23 | -11.52 | 48.83 | MaxP | Horizontal | 100 | 320 | 68.2 | -19.4 | Pass |
| 16 | 3125.01 | 57.01 | 2.23 | -11.52 | 47.73 | AVG | Horizontal | 100 | 320 | 54.0 | -6.3 | Pass |
| 17 | 3125.27 | 39.36 | 2.23 | -11.52 | 30.08 | MaxP | Vertical | 125 | 330 | 68.2 | -38.2 | Pass |
| 18 | 3125.27 | 26.70 | 2.23 | -11.52 | 17.42 | AVG | Vertical | 125 | 330 | 54.0 | -36.6 | Pass |
| 19 | 3992.00 | 56.58 | 2.52 | 33.94 | 47.52 | MaxP | Vertical | 149 | 330 | 68.2 | -20.7 | Pass |
| 20 | 3992.88 | 41.74 | 2.51 | -11.58 | 32.68 | MaxP | Vertical | 142 | 315 | 68.2 | -35.6 | Pass |
| 21 | 3992.88 | 28.23 | 2.51 | -11.58 | 19.16 | AVG | Vertical | 142 | 315 | 54.0 | -34.8 | Pass |
| 22 | 5233.00 | 86.29 | 3.05 | 34.22 | 77.48 | Fundamental | Horizontal | 149 | -- | -- | -- | Pass |
| 23 | 10469.00 | 56.23 | 4.50 | 37.26 | 55.95 | MaxP | Horizontal | 149 | 0 | 68.2 | -12.3 | Pass |
| 24 | 10469.12 | 48.34 | 4.50 | -4.78 | 48.05 | MaxP | Horizontal | 139 | 0 | 68.2 | -20.2 | Pass |
| 25 | 10469.12 | 35.82 | 4.50 | -4.78 | 35.53 | AVG | Horizontal | 139 | 0 | 54.0 | -18.5 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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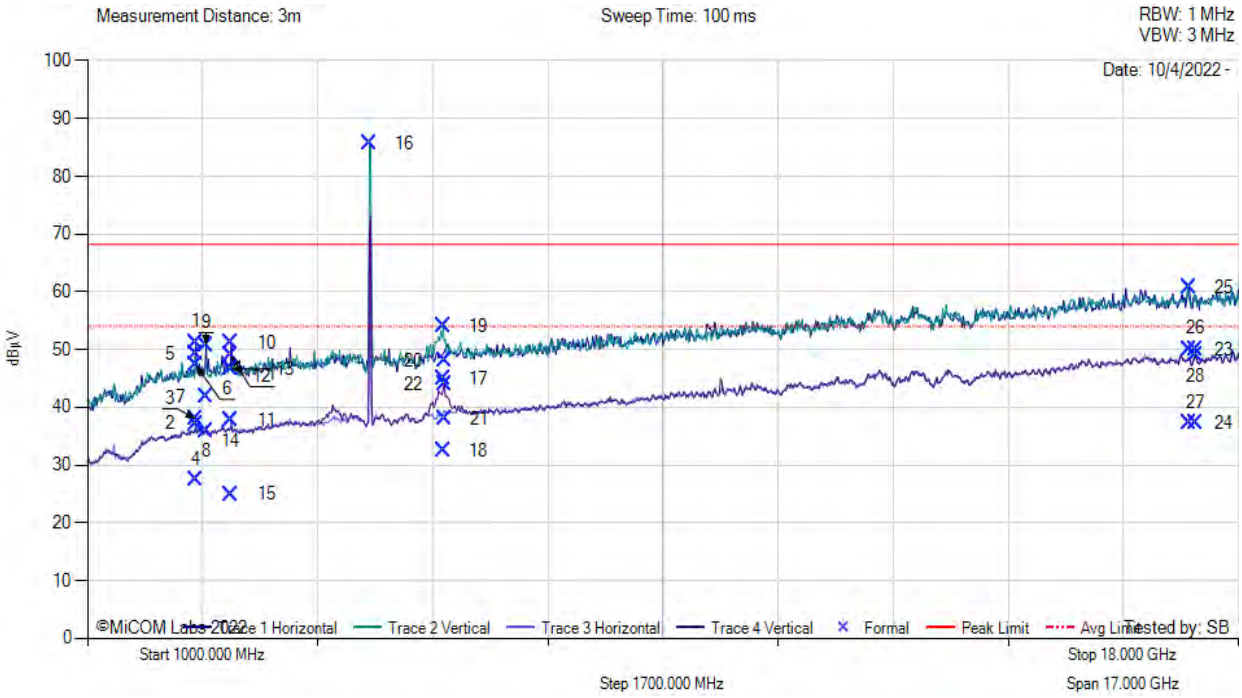
### 9.4.1.3. RW-9622-5001 5150-5250MHz

| Equipment Configuration for FCC Spurious 1 GHz -18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9622-5001 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 28 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz -18 GHz

Antenna: RW-9622-5001





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| 1 GHz- 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2598.00 | 54.86 | 2.06 | 32.52 | 51.27 | MaxP | Horizontal | 100 | 210 | 68.2 | -17.0 | Pass |
| 2 | 2598.00 | 40.79 | 2.06 | 32.52 | 37.19 | AVG | Horizontal | 100 | 180 | 54.0 | -16.8 | Pass |
| 3 | 2599.88 | 41.58 | 2.07 | -11.65 | 38.00 | MaxP | Horizontal | 101 | 204 | 68.2 | -30.2 | Pass |
| 4 | 2599.88 | 31.01 | 2.07 | -11.65 | 27.42 | AVG | Horizontal | 101 | 204 | 54.0 | -26.6 | Pass |
| 5 | 2599.97 | 52.82 | 2.07 | -11.65 | 49.23 | MaxP | Horizontal | 99 | 204 | 68.2 | -19.0 | Pass |
| 6 | 2599.97 | 50.92 | 2.07 | -11.65 | 47.34 | AVG | Horizontal | 99 | 204 | 54.0 | -6.7 | Pass |
| 7 | 2750.08 | 45.54 | 2.11 | -11.79 | 41.87 | MaxP | Horizontal | 106 | 204 | 68.2 | -26.4 | Pass |
| 8 | 2750.08 | 39.69 | 2.11 | -11.79 | 36.01 | AVG | Horizontal | 106 | 204 | 54.0 | -18.0 | Pass |
| 9 | 2751.00 | 54.31 | 2.11 | 32.40 | 50.63 | MaxP | Horizontal | 100 | 180 | 68.2 | -17.6 | Pass |
| 10 | 3125.00 | 54.40 | 2.23 | 32.77 | 51.12 | MaxP | Horizontal | 149 | 150 | 68.2 | -17.1 | Pass |
| 11 | 3125.00 | 41.12 | 2.23 | 32.77 | 37.83 | AVG | Horizontal | 100 | 150 | 54.0 | -16.2 | Pass |
| 12 | 3125.04 | 52.27 | 2.23 | -11.52 | 48.98 | MaxP | Horizontal | 104 | 151 | 68.2 | -19.2 | Pass |
| 13 | 3125.04 | 49.93 | 2.23 | -11.52 | 46.64 | AVG | Horizontal | 104 | 151 | 54.0 | -7.4 | Pass |
| 14 | 3125.13 | 41.04 | 2.23 | -11.52 | 37.76 | MaxP | Horizontal | 132 | 134 | 68.2 | -30.5 | Pass |
| 15 | 3125.13 | 28.22 | 2.23 | -11.52 | 24.94 | AVG | Horizontal | 132 | 134 | 54.0 | -29.1 | Pass |
| 16 | 5165.00 | 88.39 | 3.02 | 34.13 | 85.74 | Fundamental | Vertical | 149 | -- | -- | -- | Pass |
| 17 | 6252.12 | 44.55 | 3.30 | -8.95 | 44.90 | MaxP | Vertical | 141 | 0 | 68.2 | -23.3 | Pass |
| 18 | 6252.12 | 32.15 | 3.30 | -8.95 | 32.50 | AVG | Vertical | 141 | 0 | 54.0 | -21.5 | Pass |
| 19 | 6253.00 | 53.67 | 3.30 | 35.61 | 54.03 | MaxP | Vertical | 149 | 0 | 68.2 | -14.2 | Pass |
| 20 | 6269.78 | 47.58 | 3.32 | -8.82 | 48.08 | MaxP | Vertical | 144 | 0 | 68.2 | -20.1 | Pass |
| 21 | 6269.78 | 37.51 | 3.32 | -8.82 | 38.02 | AVG | Vertical | 144 | 0 | 54.0 | -16.0 | Pass |
| 22 | 6270.00 | 43.51 | 3.32 | 35.60 | 44.02 | AVG | Vertical | 149 | 0 | 54.0 | -10.0 | Pass |
| 23 | 17267.88 | 38.11 | 6.57 | -0.70 | 49.98 | MaxP | Horizontal | 105 | 72 | 68.2 | -18.3 | Pass |
| 24 | 17267.88 | 25.47 | 6.57 | -0.70 | 37.34 | AVG | Horizontal | 105 | 72 | 54.0 | -16.7 | Pass |
| 25 | 17269.00 | 48.93 | 6.57 | 40.90 | 60.78 | MaxP | Horizontal | 100 | 90 | 68.2 | -7.4 | Pass |
| 26 | 17369.97 | 38.54 | 6.43 | -0.87 | 50.10 | MaxP | Vertical | 100 | 269 | 68.2 | -18.1 | Pass |
| 27 | 17369.97 | 25.72 | 6.43 | -0.87 | 37.28 | AVG | Vertical | 100 | 269 | 54.0 | -16.7 | Pass |
| 28 | 17371.00 | 37.43 | 6.48 | 40.89 | 49.01 | AVG | Vertical | 100 | 239 | 54.0 | -5.0 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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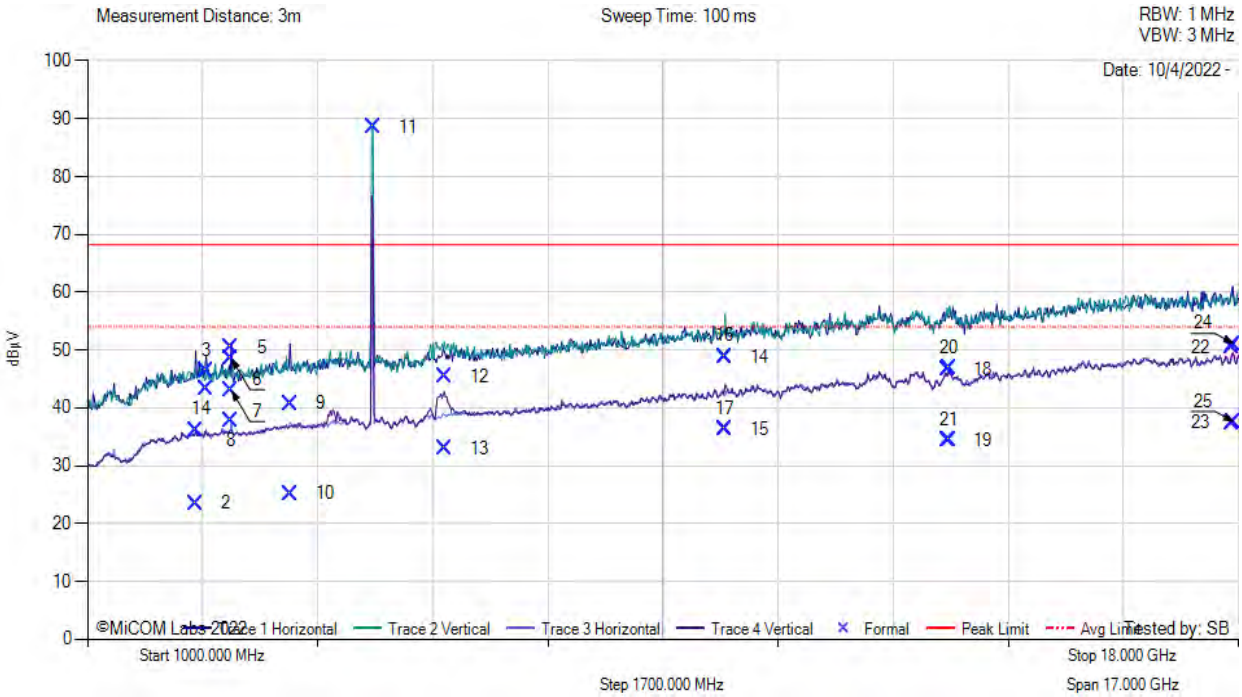
| Equipment Configuration for FCC Spurious 1 GHz - 18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9622-5001 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 28 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz -18 GHz

Antenna: RW-9622-5001



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| 1 GHz – 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2599.84 | 39.82 | 2.07 | -11.65 | 36.24 | MaxP | Horizontal | 104 | 203 | 68.2 | -32.0 | Pass |
| 2 | 2599.84 | 27.10 | 2.07 | -11.65 | 23.52 | AVG | Horizontal | 104 | 203 | 54.0 | -30.5 | Pass |
| 3 | 2750.04 | 50.01 | 2.11 | -11.79 | 46.34 | MaxP | Horizontal | 101 | 202 | 68.2 | -21.9 | Pass |
| 4 | 2750.04 | 47.05 | 2.11 | -11.79 | 43.37 | AVG | Horizontal | 101 | 202 | 54.0 | -10.6 | Pass |
| 5 | 3124.97 | 53.68 | 2.23 | -11.52 | 50.40 | MaxP | Horizontal | 104 | 150 | 68.2 | -17.8 | Pass |
| 6 | 3124.97 | 51.86 | 2.23 | -11.52 | 48.57 | AVG | Horizontal | 104 | 150 | 54.0 | -5.4 | Pass |
| 7 | 3125.08 | 46.35 | 2.23 | -11.52 | 43.06 | MaxP | Horizontal | 102 | 177 | 68.2 | -25.2 | Pass |
| 8 | 3125.08 | 41.16 | 2.23 | -11.52 | 37.88 | AVG | Horizontal | 102 | 177 | 54.0 | -16.1 | Pass |
| 9 | 3993.57 | 43.81 | 2.51 | -11.57 | 40.75 | MaxP | Horizontal | 124 | 178 | 68.2 | -27.5 | Pass |
| 10 | 3993.57 | 28.21 | 2.51 | -11.57 | 25.15 | AVG | Horizontal | 124 | 178 | 54.0 | -28.8 | Pass |
| 11 | 5216.00 | 91.88 | 2.98 | 34.20 | 88.61 | Fundamental | Vertical | 149 | 0 | -- | -- | Pass |
| 12 | 6269.62 | 44.90 | 3.32 | -8.82 | 45.41 | MaxP | Vertical | 141 | 0 | 68.2 | -22.8 | Pass |
| 13 | 6269.62 | 32.53 | 3.32 | -8.82 | 33.03 | AVG | Vertical | 141 | 0 | 54.0 | -21.0 | Pass |
| 14 | 10419.57 | 43.90 | 4.47 | -5.55 | 48.83 | MaxP | Vertical | 145 | 57 | 68.2 | -19.4 | Pass |
| 15 | 10419.57 | 31.36 | 4.47 | -5.55 | 36.29 | AVG | Vertical | 145 | 57 | 54.0 | -17.7 | Pass |
| 16 | 10419.96 | 43.95 | 4.47 | -5.54 | 48.88 | MaxP | Vertical | 144 | 0 | 68.2 | -19.3 | Pass |
| 17 | 10419.96 | 31.42 | 4.47 | -5.54 | 36.35 | AVG | Vertical | 144 | 0 | 54.0 | -17.7 | Pass |
| 18 | 13714.57 | 42.11 | 5.50 | -6.97 | 46.64 | MaxP | Vertical | 116 | 311 | 68.2 | -21.6 | Pass |
| 19 | 13714.57 | 29.87 | 5.50 | -6.97 | 34.40 | AVG | Vertical | 116 | 311 | 54.0 | -19.6 | Pass |
| 20 | 13733.70 | 42.34 | 5.55 | -6.97 | 46.92 | MaxP | Vertical | 100 | 30 | 68.2 | -21.3 | Pass |
| 21 | 13733.70 | 29.82 | 5.55 | -6.97 | 34.41 | AVG | Vertical | 100 | 30 | 54.0 | -19.6 | Pass |
| 22 | 17899.13 | 37.94 | 6.30 | 0.15 | 50.39 | MaxP | Horizontal | 115 | 263 | 68.2 | -17.8 | Pass |
| 23 | 17899.13 | 24.92 | 6.30 | 0.15 | 37.36 | AVG | Horizontal | 115 | 263 | 54.0 | -16.6 | Pass |
| 24 | 17931.95 | 38.49 | 6.50 | 0.10 | 51.09 | MaxP | Vertical | 105 | 37 | 68.2 | -17.1 | Pass |
| 25 | 17931.95 | 25.01 | 6.50 | 0.10 | 37.61 | AVG | Vertical | 105 | 37 | 54.0 | -16.4 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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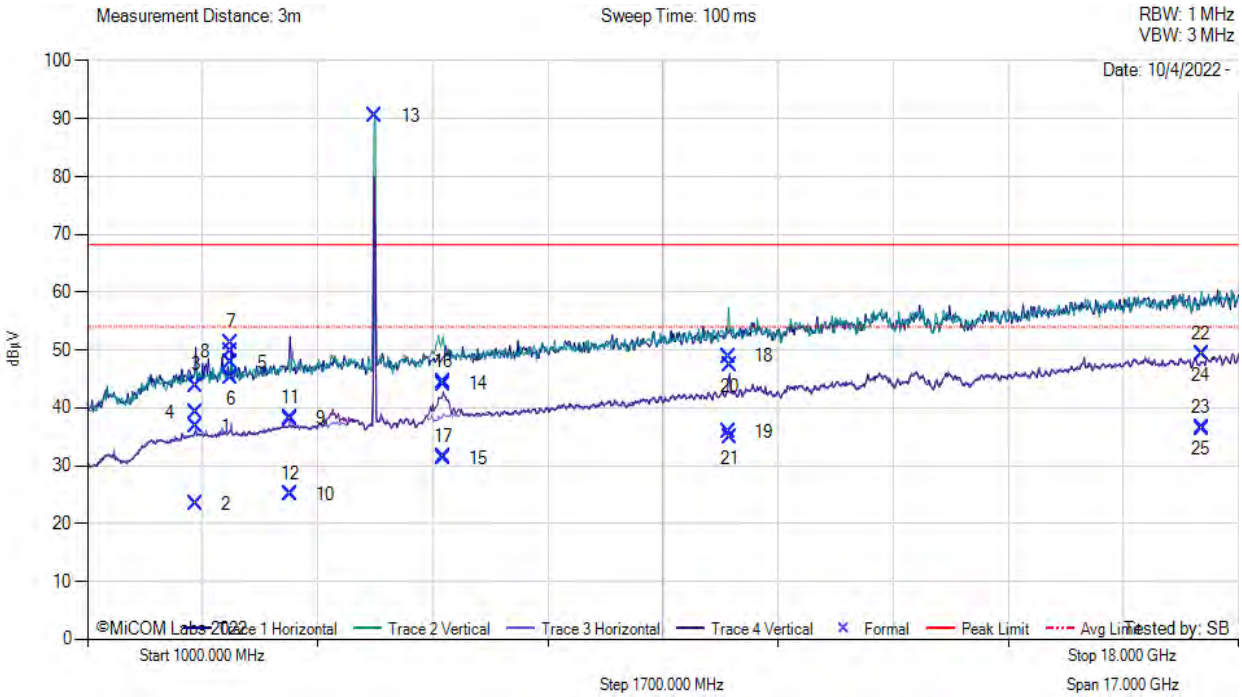
| Equipment Configuration for FCC Spurious 1 GHz - 18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9622-5001 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 28 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5240 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz -18 GHz

Antenna: RW-9622-5001

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| 1 GHz – 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2599.81 | 40.41 | 2.07 | -11.65 | 36.83 | MaxP | Horizontal | 102 | 183 | 68.2 | -31.4 | Pass |
| 2 | 2599.81 | 26.96 | 2.07 | -11.65 | 23.38 | AVG | Horizontal | 102 | 183 | 54.0 | -30.6 | Pass |
| 3 | 2599.92 | 47.50 | 2.07 | -11.65 | 43.92 | MaxP | Horizontal | 98 | 204 | 68.2 | -24.3 | Pass |
| 4 | 2599.92 | 42.76 | 2.07 | -11.65 | 39.18 | AVG | Horizontal | 98 | 204 | 54.0 | -14.8 | Pass |
| 5 | 3124.98 | 51.05 | 2.23 | -11.52 | 47.76 | MaxP | Horizontal | 135 | 225 | 68.2 | -20.5 | Pass |
| 6 | 3124.98 | 48.47 | 2.23 | -11.52 | 45.18 | AVG | Horizontal | 135 | 225 | 54.0 | -8.8 | Pass |
| 7 | 3125.01 | 54.58 | 2.23 | -11.52 | 51.29 | MaxP | Horizontal | 103 | 150 | 68.2 | -16.9 | Pass |
| 8 | 3125.01 | 53.01 | 2.23 | -11.52 | 49.73 | AVG | Horizontal | 103 | 150 | 54.0 | -4.3 | Pass |
| 9 | 3990.06 | 41.37 | 2.52 | -11.58 | 38.32 | MaxP | Horizontal | 136 | 182 | 68.2 | -29.9 | Pass |
| 10 | 3990.06 | 28.19 | 2.52 | -11.58 | 25.13 | AVG | Horizontal | 136 | 182 | 54.0 | -28.9 | Pass |
| 11 | 3993.80 | 41.20 | 2.51 | -11.57 | 38.14 | MaxP | Horizontal | 135 | 181 | 68.2 | -30.1 | Pass |
| 12 | 3993.80 | 28.12 | 2.51 | -11.57 | 25.06 | AVG | Horizontal | 135 | 181 | 54.0 | -28.9 | Pass |
| 13 | 5250.00 | 92.90 | 3.04 | 34.25 | 90.44 | Fundamental | Vertical | 149 | 0 | -- | -- | Pass |
| 14 | 6253.45 | 43.73 | 3.30 | -8.93 | 44.10 | MaxP | Vertical | 145 | 0 | 68.2 | -24.1 | Pass |
| 15 | 6253.45 | 30.92 | 3.30 | -8.93 | 31.29 | AVG | Vertical | 145 | 0 | 54.0 | -22.7 | Pass |
| 16 | 6253.79 | 44.08 | 3.30 | -8.92 | 44.45 | MaxP | Vertical | 141 | 0 | 68.2 | -23.8 | Pass |
| 17 | 6253.79 | 31.13 | 3.30 | -8.92 | 31.51 | AVG | Vertical | 141 | 0 | 54.0 | -22.5 | Pass |
| 18 | 10469.56 | 43.22 | 4.49 | -4.78 | 48.93 | MaxP | Vertical | 144 | 0 | 68.2 | -19.3 | Pass |
| 19 | 10469.56 | 30.21 | 4.49 | -4.78 | 35.92 | AVG | Vertical | 144 | 0 | 54.0 | -18.1 | Pass |
| 20 | 10484.45 | 41.87 | 4.41 | -4.98 | 47.31 | MaxP | Vertical | 145 | 0 | 68.2 | -20.9 | Pass |
| 21 | 10484.45 | 29.48 | 4.41 | -4.98 | 34.92 | AVG | Vertical | 145 | 0 | 54.0 | -19.1 | Pass |
| 22 | 17454.38 | 38.26 | 6.11 | -1.09 | 49.28 | MaxP | Vertical | 129 | 9 | 68.2 | -18.9 | Pass |
| 23 | 17454.38 | 25.48 | 6.11 | -1.09 | 36.50 | AVG | Vertical | 129 | 9 | 54.0 | -17.5 | Pass |
| 24 | 17454.59 | 38.18 | 6.11 | -1.09 | 49.20 | MaxP | Vertical | 110 | 50 | 68.2 | -19.0 | Pass |
| 25 | 17454.59 | 25.46 | 6.11 | -1.09 | 36.48 | AVG | Vertical | 110 | 50 | 54.0 | -17.5 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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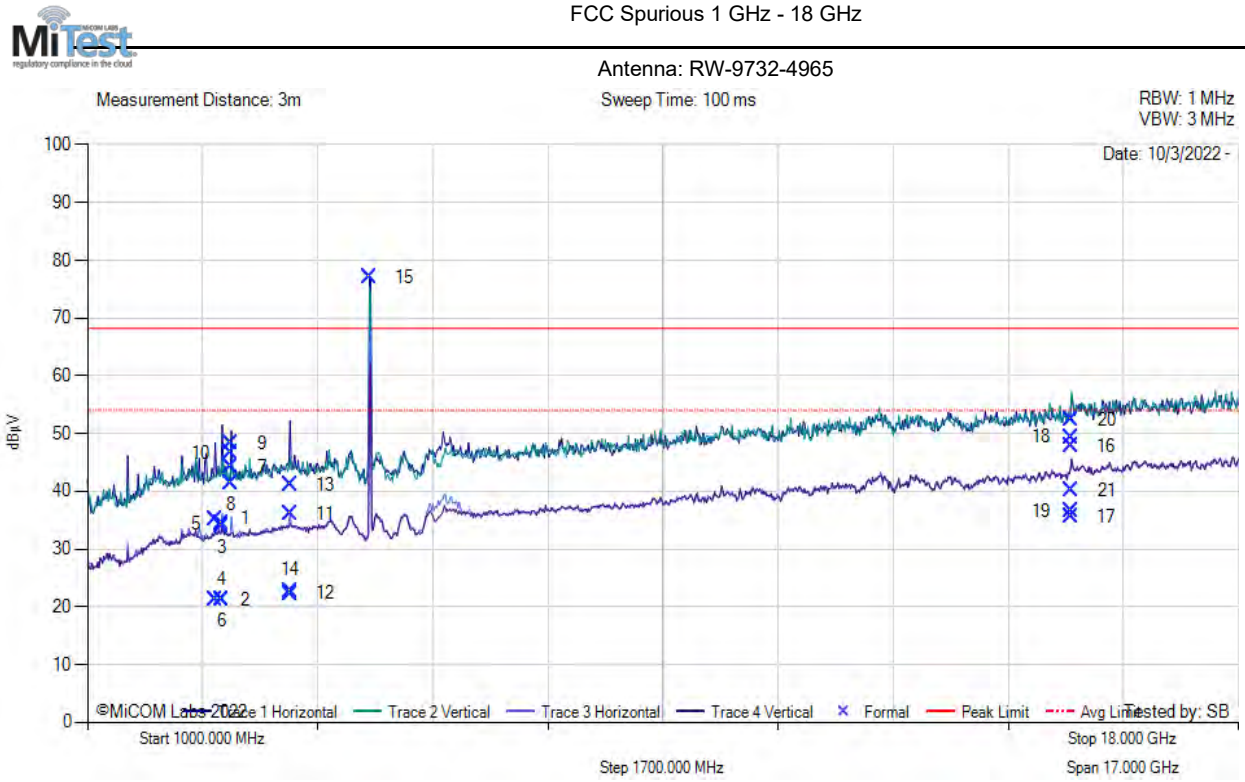
### 9.4.1.4. RW-9732-4965 5150-5250MHz

| Equipment Configuration for FCC Spurious 1 GHz - 18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4965 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 25.0 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5190 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**





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| 1 GHz– 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2885.83 | 41.77 | 2.16 | -11.67 | 35.25 | MaxP | Horizontal | 143 | 178 | 68.2 | -33.0 | Pass |
| 2 | 2885.83 | 27.76 | 2.16 | -11.67 | 21.25 | AVG | Horizontal | 143 | 178 | 54.0 | -32.8 | Pass |
| 3 | 2988.35 | 40.12 | 2.20 | -11.44 | 33.88 | MaxP | Horizontal | 101 | 227 | 68.2 | -34.4 | Pass |
| 4 | 2988.35 | 27.40 | 2.20 | -11.44 | 21.16 | AVG | Horizontal | 101 | 227 | 54.0 | -32.8 | Pass |
| 5 | 2990.69 | 40.57 | 2.20 | -11.43 | 34.34 | MaxP | Horizontal | 106 | 177 | 68.2 | -33.9 | Pass |
| 6 | 2990.69 | 27.43 | 2.20 | -11.43 | 21.20 | AVG | Horizontal | 106 | 177 | 54.0 | -32.8 | Pass |
| 7 | 3124.92 | 50.54 | 2.23 | -11.52 | 44.25 | MaxP | Horizontal | 100 | 143 | 68.2 | -24.0 | Pass |
| 8 | 3124.92 | 47.59 | 2.23 | -11.52 | 41.30 | AVG | Horizontal | 100 | 143 | 54.0 | -12.7 | Pass |
| 9 | 3125.04 | 54.56 | 2.23 | -11.52 | 48.28 | MaxP | Horizontal | 104 | 143 | 68.2 | -20.0 | Pass |
| 10 | 3125.04 | 52.94 | 2.23 | -11.52 | 46.65 | AVG | Horizontal | 104 | 143 | 54.0 | -7.3 | Pass |
| 11 | 3990.56 | 42.21 | 2.52 | -11.57 | 36.16 | MaxP | Horizontal | 101 | 134 | 68.2 | -32.1 | Pass |
| 12 | 3990.56 | 28.35 | 2.52 | -11.57 | 22.29 | AVG | Horizontal | 101 | 134 | 54.0 | -31.7 | Pass |
| 13 | 3993.53 | 47.18 | 2.51 | -11.57 | 41.12 | MaxP | Horizontal | 147 | 125 | 68.2 | -27.1 | Pass |
| 14 | 3993.53 | 28.85 | 2.51 | -11.57 | 22.78 | AVG | Horizontal | 147 | 125 | 54.0 | -31.2 | Pass |
| 15 | 5165.00 | 82.74 | 3.02 | 34.13 | 77.09 | Fundamental | Vertical | 149 | -- | -- | -- | Pass |
| 16 | 15533.06 | 41.63 | 5.69 | -2.43 | 47.89 | MaxP | Horizontal | 100 | 134 | 68.2 | -20.3 | Pass |
| 17 | 15533.06 | 29.32 | 5.69 | -2.43 | 35.58 | AVG | Horizontal | 100 | 134 | 54.0 | -18.4 | Pass |
| 18 | 15534.72 | 43.12 | 5.71 | -2.46 | 49.36 | MaxP | Vertical | 147 | 149 | 68.2 | -18.9 | Pass |
| 19 | 15534.72 | 30.32 | 5.71 | -2.46 | 36.57 | AVG | Vertical | 147 | 149 | 54.0 | -17.4 | Pass |
| 20 | 15535.95 | 46.10 | 5.72 | -2.49 | 52.33 | MaxP | Vertical | 142 | 161 | 68.2 | -15.9 | Pass |
| 21 | 15535.95 | 33.87 | 5.72 | -2.49 | 40.11 | AVG | Vertical | 142 | 161 | 54.0 | -13.9 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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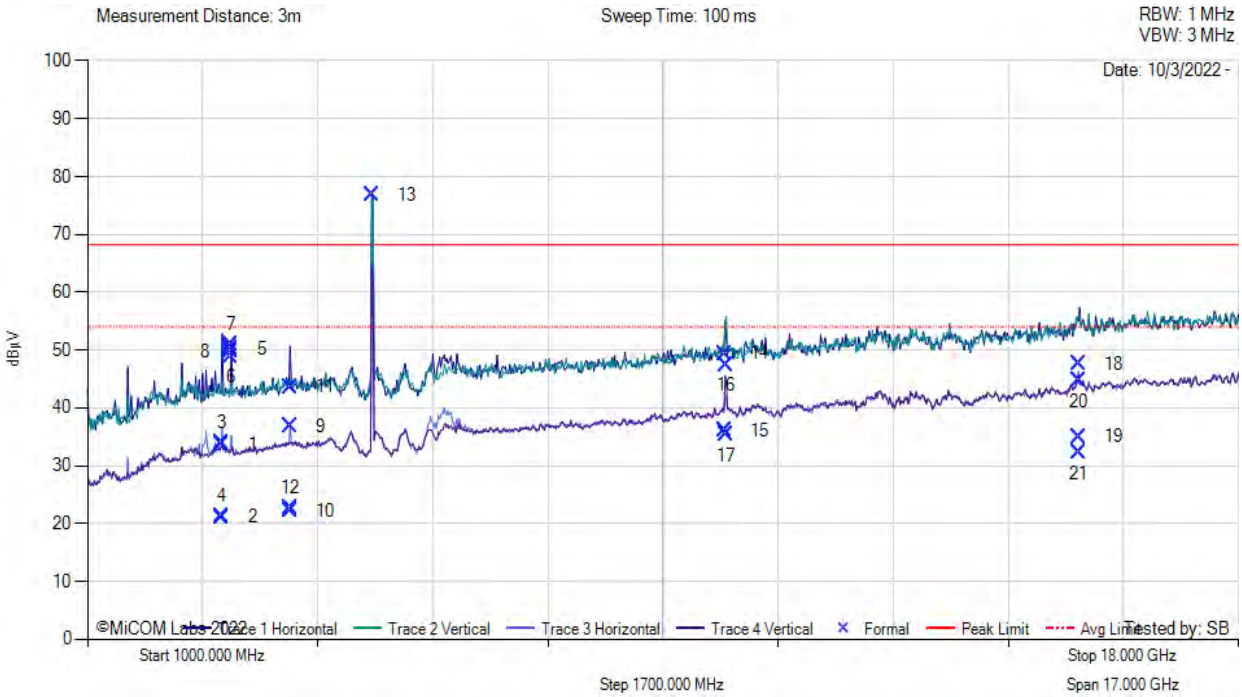
| Equipment Configuration for FCC Spurious 1 GHz -18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4965 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 25.0 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz - 18 GHz

Antenna: RW-9732-4965



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| 1 GHz – 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2989.26 | 39.92 | 2.20 | -11.44 | 33.68 | MaxP | Horizontal | 115 | 235 | 68.2 | -34.5 | Pass |
| 2 | 2989.26 | 27.37 | 2.20 | -11.44 | 21.13 | AVG | Horizontal | 115 | 235 | 54.0 | -32.9 | Pass |
| 3 | 2989.69 | 40.14 | 2.20 | -11.43 | 33.91 | MaxP | Horizontal | 99 | 207 | 68.2 | -34.3 | Pass |
| 4 | 2989.69 | 27.39 | 2.20 | -11.43 | 21.16 | AVG | Horizontal | 99 | 207 | 54.0 | -32.8 | Pass |
| 5 | 3124.97 | 56.45 | 2.23 | -11.52 | 50.17 | MaxP | Horizontal | 103 | 143 | 68.2 | -18.1 | Pass |
| 6 | 3124.97 | 55.21 | 2.23 | -11.52 | 48.92 | AVG | Horizontal | 103 | 143 | 54.0 | -5.1 | Pass |
| 7 | 3125.00 | 57.22 | 2.23 | -11.52 | 50.94 | MaxP | Horizontal | 108 | 142 | 68.2 | -17.3 | Pass |
| 8 | 3125.00 | 56.10 | 2.23 | -11.52 | 49.81 | AVG | Horizontal | 108 | 142 | 54.0 | -4.2 | Pass |
| 9 | 3990.82 | 42.89 | 2.52 | -11.57 | 36.84 | MaxP | Horizontal | 126 | 119 | 68.2 | -31.4 | Pass |
| 10 | 3990.82 | 28.30 | 2.52 | -11.57 | 22.25 | AVG | Horizontal | 126 | 119 | 54.0 | -31.8 | Pass |
| 11 | 3993.99 | 49.73 | 2.51 | -11.57 | 43.67 | MaxP | Horizontal | 144 | 133 | 68.2 | -24.6 | Pass |
| 12 | 3993.99 | 28.79 | 2.51 | -11.57 | 22.73 | AVG | Horizontal | 144 | 133 | 54.0 | -31.3 | Pass |
| 13 | 5199.00 | 82.99 | 2.98 | 34.17 | 76.74 | Fundamental | Vertical | 149 | -- | -- | -- | Pass |
| 14 | 10419.69 | 47.47 | 4.47 | -5.54 | 49.40 | MaxP | Vertical | 149 | 0 | 68.2 | -18.8 | Pass |
| 15 | 10419.69 | 34.21 | 4.47 | -5.54 | 36.13 | AVG | Vertical | 149 | 0 | 54.0 | -17.9 | Pass |
| 16 | 10434.19 | 45.17 | 4.54 | -5.22 | 47.50 | MaxP | Vertical | 148 | 0 | 68.2 | -20.7 | Pass |
| 17 | 10434.19 | 33.09 | 4.54 | -5.22 | 35.42 | AVG | Vertical | 148 | 0 | 54.0 | -18.6 | Pass |
| 18 | 15635.57 | 41.14 | 5.67 | -2.22 | 47.59 | MaxP | Horizontal | 100 | 155 | 68.2 | -20.6 | Pass |
| 19 | 15635.57 | 28.56 | 5.67 | -2.22 | 35.01 | AVG | Horizontal | 100 | 155 | 54.0 | -19.0 | Pass |
| 20 | 15652.16 | 38.28 | 5.66 | -2.19 | 44.75 | MaxP | Horizontal | 146 | 126 | 68.2 | -23.5 | Pass |
| 21 | 15652.16 | 25.81 | 5.66 | -2.19 | 32.28 | AVG | Horizontal | 146 | 126 | 54.0 | -21.7 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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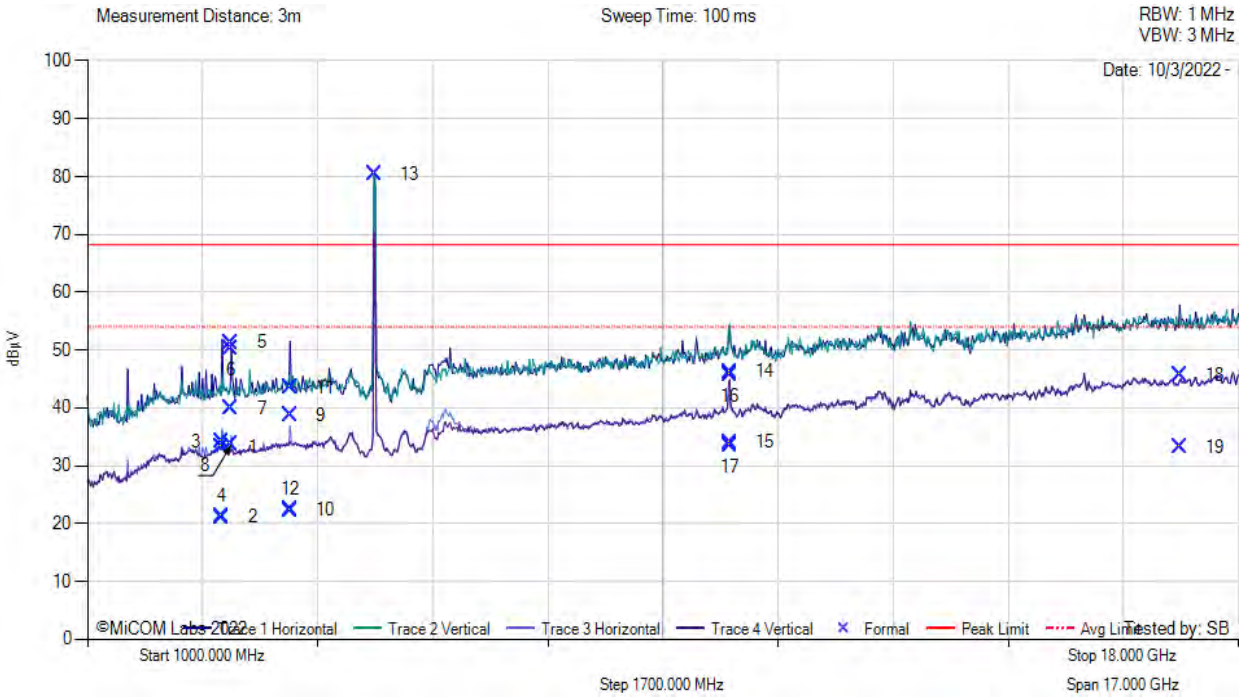
| Equipment Configuration for FCC Spurious 1 GHz -18 GHz | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4965 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 25.0 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5240 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

FCC Spurious 1 GHz - 18 GHz

Antenna: RW-9732-4965





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| 1 GHz – 18 GHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 2987.50 | 39.44 | 2.20 | -11.45 | 33.20 | MaxP | Horizontal | 125 | 210 | 68.2 | -35.0 | Pass |
| 2 | 2987.50 | 27.37 | 2.20 | -11.45 | 21.13 | AVG | Horizontal | 125 | 210 | 54.0 | -32.9 | Pass |
| 3 | 2990.62 | 40.34 | 2.20 | -11.43 | 34.11 | MaxP | Horizontal | 142 | 240 | 68.2 | -34.1 | Pass |
| 4 | 2990.62 | 27.41 | 2.20 | -11.43 | 21.18 | AVG | Horizontal | 142 | 240 | 54.0 | -32.8 | Pass |
| 5 | 3125.00 | 57.59 | 2.23 | -11.52 | 51.30 | MaxP | Horizontal | 104 | 143 | 68.2 | -16.9 | Pass |
| 6 | 3125.00 | 56.58 | 2.23 | -11.52 | 50.29 | AVG | Horizontal | 104 | 143 | 54.0 | -3.7 | Pass |
| 7 | 3125.10 | 46.14 | 2.23 | -11.52 | 39.85 | MaxP | Horizontal | 99 | 145 | 68.2 | -28.4 | Pass |
| 8 | 3125.10 | 40.01 | 2.23 | -11.52 | 33.72 | AVG | Horizontal | 99 | 145 | 54.0 | -20.3 | Pass |
| 9 | 3990.62 | 44.71 | 2.52 | -11.57 | 38.65 | MaxP | Horizontal | 138 | 124 | 68.2 | -29.6 | Pass |
| 10 | 3990.62 | 28.54 | 2.52 | -11.57 | 22.49 | AVG | Horizontal | 138 | 124 | 54.0 | -31.5 | Pass |
| 11 | 3992.92 | 49.51 | 2.51 | -11.58 | 43.45 | MaxP | Horizontal | 130 | 125 | 68.2 | -24.8 | Pass |
| 12 | 3992.92 | 28.38 | 2.51 | -11.58 | 22.32 | AVG | Horizontal | 130 | 125 | 54.0 | -31.7 | Pass |
| 13 | 5233.00 | 86.23 | 3.05 | 34.22 | 80.42 | Fundamental | Vertical | 149 | -- | -- | -- | Pass |
| 14 | 10484.34 | 43.84 | 4.41 | -4.98 | 46.27 | MaxP | Vertical | 99 | 170 | 68.2 | -22.0 | Pass |
| 15 | 10484.34 | 31.64 | 4.41 | -4.98 | 34.07 | AVG | Vertical | 99 | 170 | 54.0 | -19.9 | Pass |
| 16 | 10485.60 | 43.28 | 4.43 | -5.00 | 45.71 | MaxP | Vertical | 149 | 0 | 68.2 | -22.5 | Pass |
| 17 | 10485.60 | 31.05 | 4.43 | -5.00 | 33.48 | AVG | Vertical | 149 | 0 | 54.0 | -20.5 | Pass |
| 18 | 17132.70 | 36.81 | 6.92 | -1.10 | 45.63 | MaxP | Horizontal | 99 | 332 | 68.2 | -22.6 | Pass |
| 19 | 17132.70 | 24.38 | 6.92 | -1.10 | 33.20 | AVG | Horizontal | 99 | 332 | 54.0 | -20.8 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

Testing was performed up to 40 GHz, no emissions were found above 18GHz.


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### 9.4.2. Restricted Edge & Band-Edge Emissions

#### 9.4.2.5. MR0248310 5150-5250MHz

RESULTS SUMMARY FOR RADIATED BAND-EDGE EMISSIONS

5150 - 5250 MHz

| MR0248310 | | Band-Edge Freq | Limit 68.2dBµV/m | Limit 54.0dBµV/m | Power Setting |
|---|---|---|---|---|---|
| Operational Mode | Operating Frequency (MHz) | MHz | dBµV/m | dBµV/m | |
| 20MHz | 5180.00 | 5150.00 | 64.41 | 53.55 | 12.0 |
| 40MHz | 5190.00 | 5150.00 | 64.30 | 53.77 | 12.0 |
| 80MHz | 5210.00 | 5150.00 | 66.39 | 53.94 | 9.0 |

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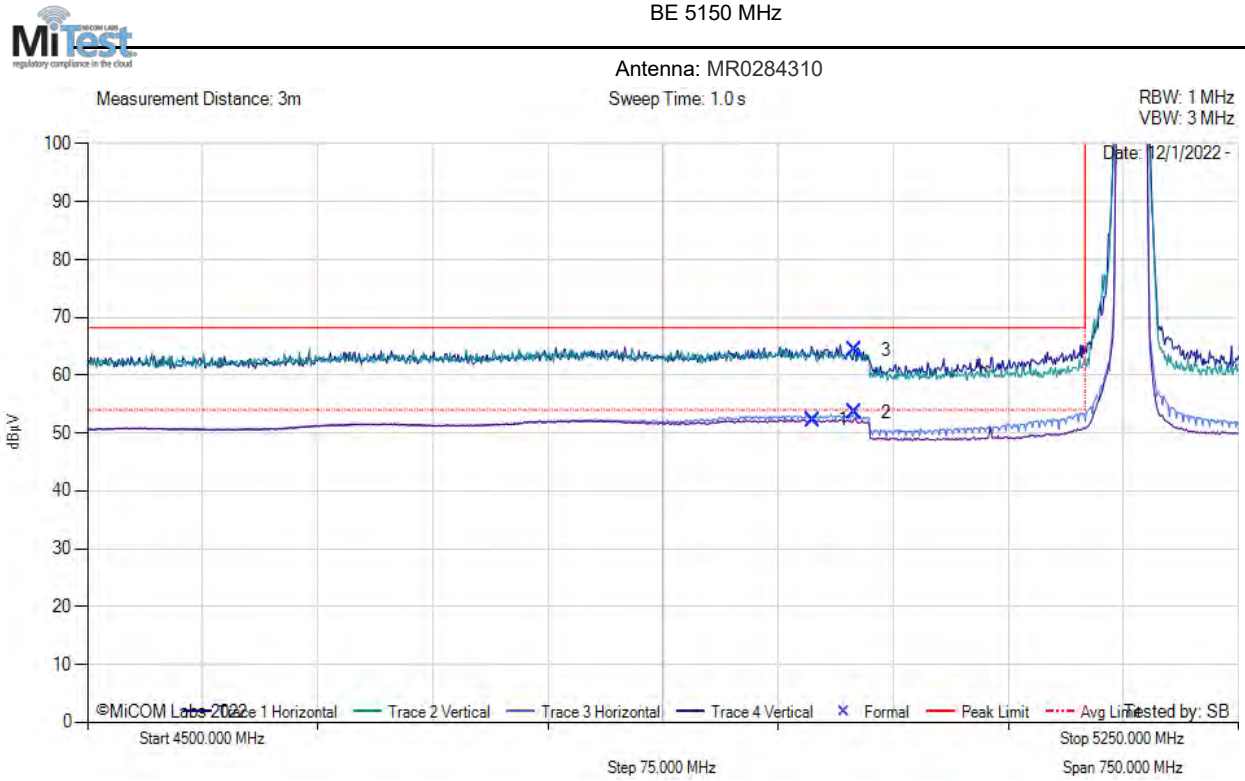
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180.0 | **Data Rate:** | 8.6 |
| **Power Setting:** | 12 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4972.5 | 15.11 | 2.94 | 34.25 | 52.3 | AVG | Vertical | 150 | 0 | 54.0 | -1.7 | Pass |
| 2 | 5000.25 | 16.35 | 2.95 | 34.25 | 53.55 | AVG | Horizontal | 150 | 1 | 54.0 | -0.5 | Pass |
| 3 | 5000.25 | 27.22 | 2.94 | 34.25 | 64.41 | MaxP | Vertical | 150 | 0 | 68.2 | -3.8 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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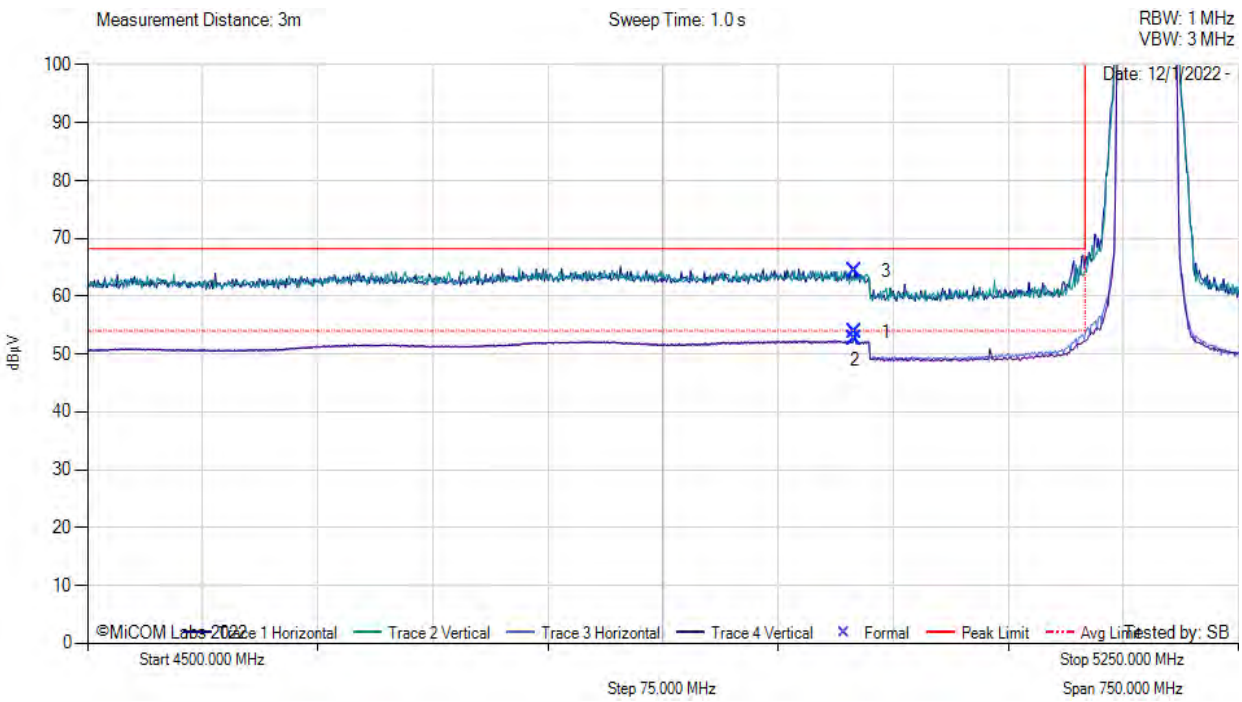
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 40MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180.0 | **Data Rate:** | 17.2 |
| **Power Setting:** | 12 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: MR0284310




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 5000.25 | 16.57 | 2.95 | 34.25 | 53.77 | AVG | Horizontal | 150 | 1 | 54.0 | -0.2 | Pass |
| 2 | 5000.25 | 15.51 | 2.95 | 34.22 | 52.68 | AVG | Vertical | 150 | 0 | 54.0 | -1.3 | Pass |
| 3 | 5000.25 | 27.13 | 2.95 | 34.22 | 64.30 | MaxP | Horizontal | 150 | 0 | 68.2 | -3.9 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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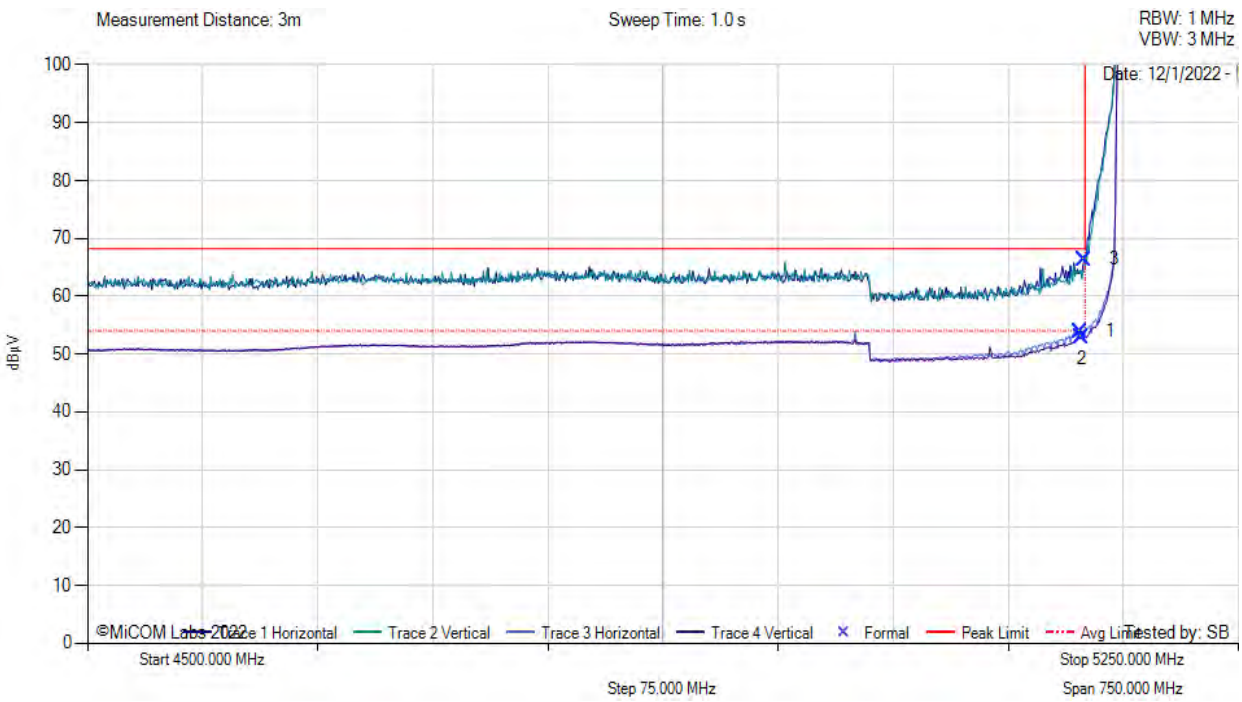
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 80MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210.0 | **Data Rate:** | 36.00 |
| **Power Setting:** | 9 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: MR0284310




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 5146.50 | 16.77 | 3.06 | 34.11 | 53.94 | AVG | Horizontal | 150 | 2 | 54.0 | -0.1 | Pass |
| 2 | 5148.00 | 15.75 | 3.06 | 34.11 | 52.92 | AVG | Vertical | 150 | 0 | 54.0 | -1.1 | Pass |
| 3 | 5149.50 | 29.22 | 3.06 | 34.11 | 66.39 | MaxP | Horizontal | 150 | 2 | 68.2 | -1.8 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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### 9.4.2.6. RW-9732-4958 5150-5250MHz

RESULTS SUMMARY FOR RADIATED BAND-EDGE EMISSIONS

5150 - 5250 MHz

| RW-9732-4958 | | Band-Edge Freq | Limit 54.0dBµV/m | Limit 54.0dBµV/m | Power Setting |
|---|---|---|---|---|---|
| Operational Mode | Operating Frequency (MHz) | MHz | dBµV/m | dBµV/m | |
| 20MHz | 5180.00 | 5150.00 | 66.16 | 52.79 | 12.0 |
| 40MHz | 5190.00 | 5150.00 | 62.25 | 53.63 | 10.0 |
| 80MHz | 5210.00 | 5150.00 | 68.00 | 53.68 | 6.0 |

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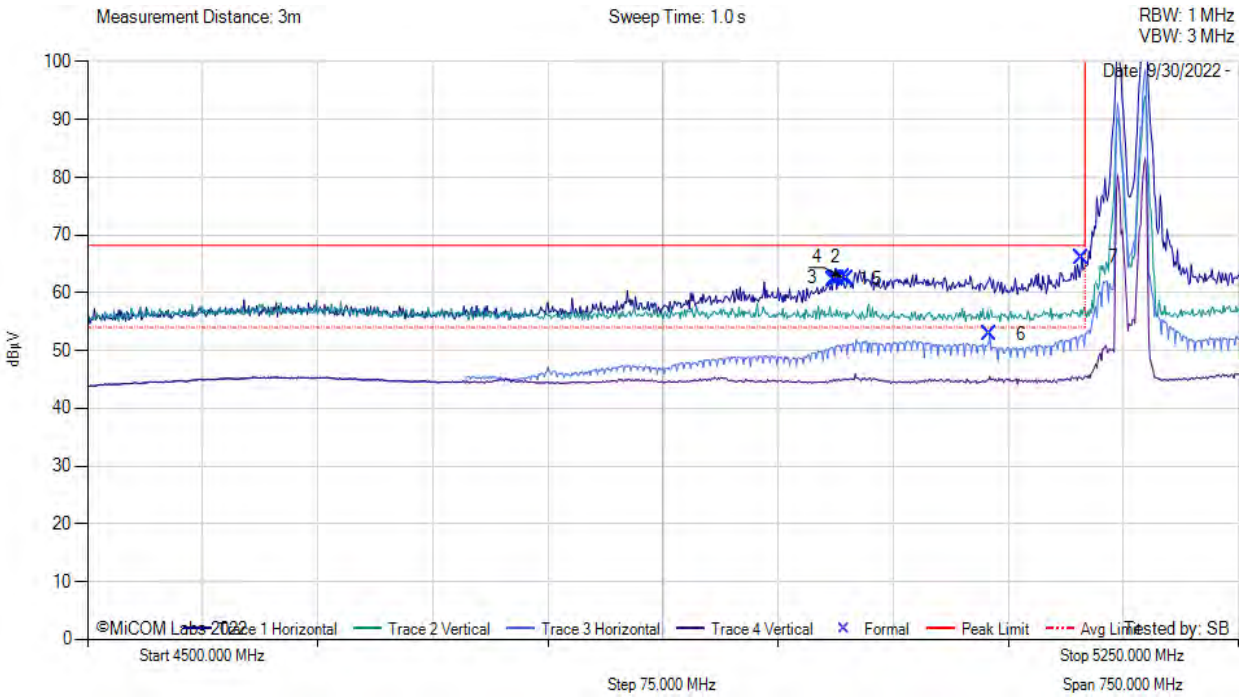
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4958 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 32 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180 | **Data Rate:** | 8.6 |
| **Power Setting:** | 12.0 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9732-4958




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4986.00 | 25.01 | 3.05 | 34.23 | 62.29 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.9 | Pass |
| 2 | 4987.50 | 25.27 | 3.08 | 34.23 | 62.58 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.6 | Pass |
| 3 | 4989.00 | 25.23 | 3.09 | 34.23 | 62.55 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.6 | Pass |
| 4 | 4992.00 | 25.30 | 3.09 | 34.23 | 62.62 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.6 | Pass |
| 5 | 4995.00 | 25.13 | 3.03 | 34.22 | 62.38 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.8 | Pass |
| 6 | 5088.00 | 15.71 | 2.93 | 34.15 | 52.79 | AVG | Horizontal | 149 | 0 | 54.0 | -1.2 | Pass |
| 7 | 5148.00 | 28.99 | 3.06 | 34.11 | 66.16 | MaxP | Horizontal | 149 | 0 | 68.2 | -2.0 | Pass |

**Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC

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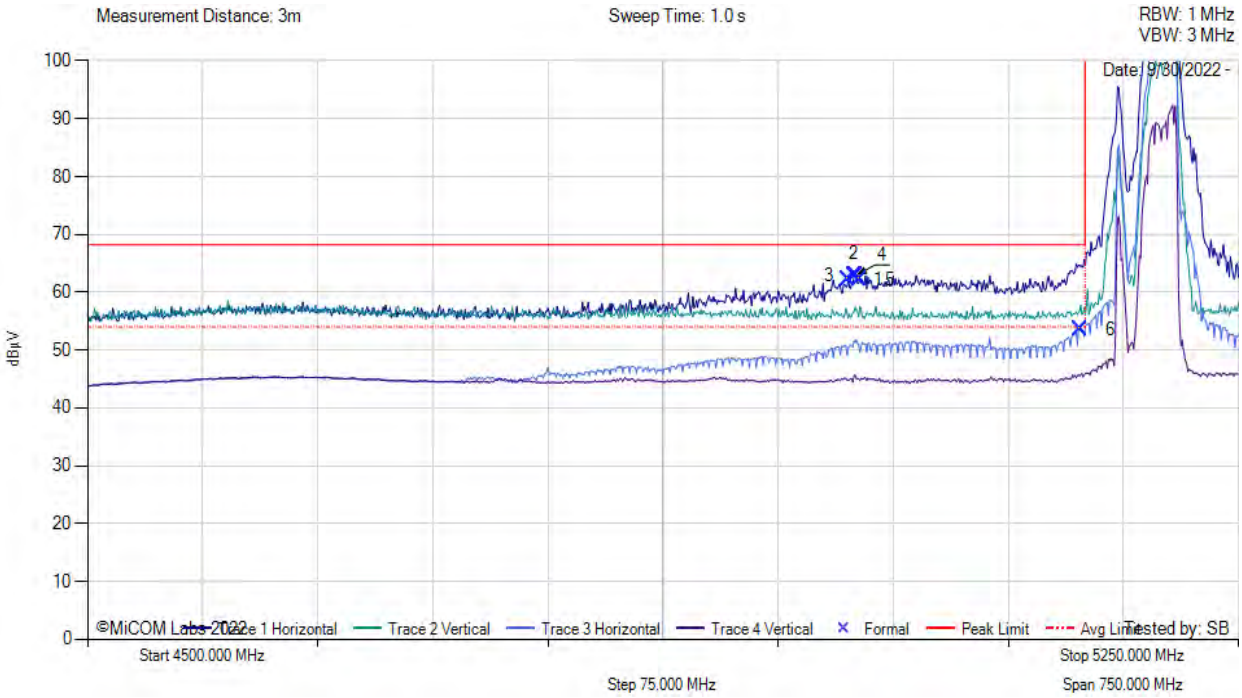
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4958 | **Variant:** | 40MHz |
| **Antenna Gain (dBi):** | 32 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5190 | **Data Rate:** | 17.2 |
| **Power Setting:** | 10.0 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9732-4958




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4995.75 | 25.00 | 3.02 | 34.22 | 62.23 | MaxP | Horizontal | 149 | 0 | 68.2 | -6.0 | Pass |
| 2 | 4999.50 | 25.90 | 2.95 | 34.22 | 63.07 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.1 | Pass |
| 3 | 5000.25 | 25.78 | 2.95 | 34.22 | 62.95 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.3 | Pass |
| 4 | 5001.00 | 25.79 | 2.93 | 34.22 | 62.94 | MaxP | Horizontal | 149 | 0 | 68.2 | -5.3 | Pass |
| 5 | 5003.25 | 25.09 | 2.93 | 34.22 | 62.25 | MaxP | Horizontal | 149 | 0 | 68.2 | -6.0 | Pass |
| 6 | 5146.50 | 16.43 | 3.08 | 34.11 | 53.63 | AVG | Horizontal | 149 | 0 | 54.0 | -0.4 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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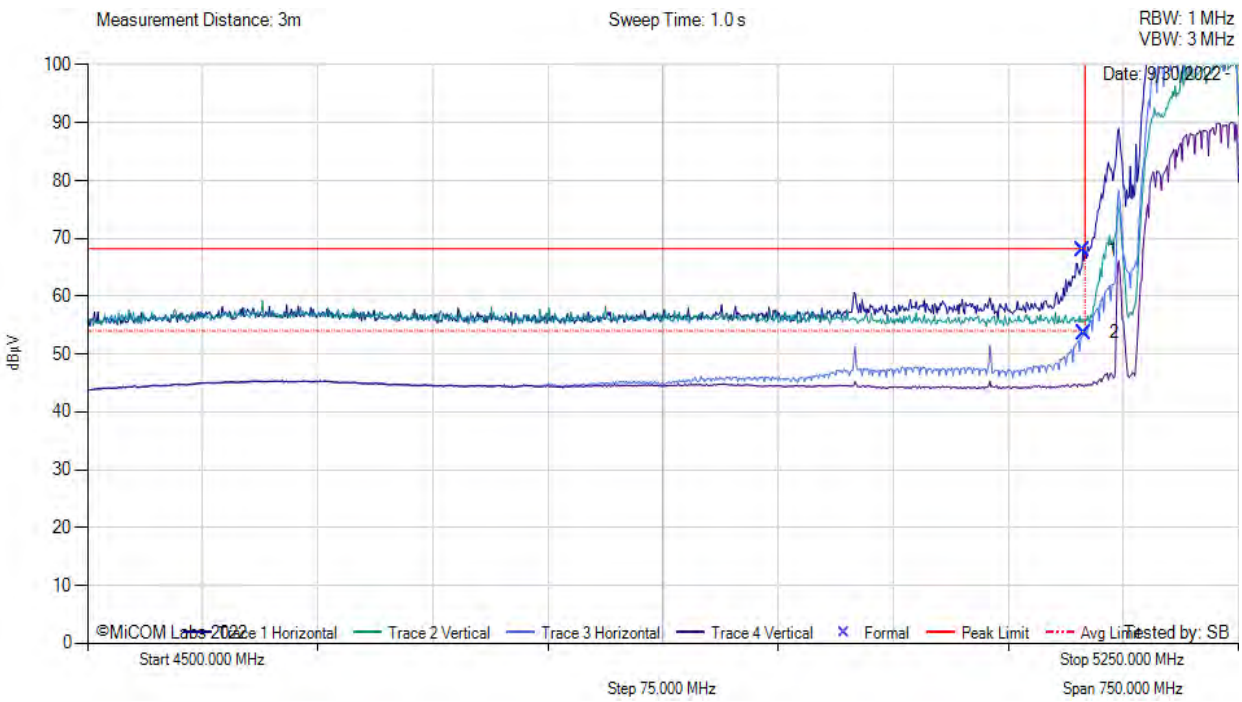
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4958 | **Variant:** | 80MHz |
| **Antenna Gain (dBi):** | 32 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210 | **Data Rate:** | 36 |
| **Power Setting:** | 6.0 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9732-4958




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 5148.75 | 30.84 | 3.06 | 34.11 | 68.00 | MaxP | Horizontal | 149 | 0 | 68.2 | -0.2 | Pass |
| 2 | 5149.50 | 16.53 | 3.05 | 34.11 | 53.68 | AVG | Horizontal | 149 | 0 | 54.0 | -0.3 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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### 9.4.2.7. RW-9622-5001 5150-5250MHz

RESULTS SUMMARY FOR RADIATED BAND-EDGE EMISSIONS

5150 - 5250 MHz

| RW-9622-5001 | | Band-Edge Freq | Limit 68.2dBµV/m | Limit 54.0dBµV/m | Power Setting |
|---|---|---|---|---|---|
| Operational Mode | Operating Frequency (MHz) | MHz | dBµV/m | dBµV/m | |
| 20MHz | 5180.00 | 5150.00 | 62.80 | 53.99 | 8.0 |
| 40MHz | 5190.00 | 5150.00 | 63.78 | 53.52 | 8.0 |
| 80MHz | 5210.00 | 5150.00 | 64.78 | 53.51 | 5.0 |

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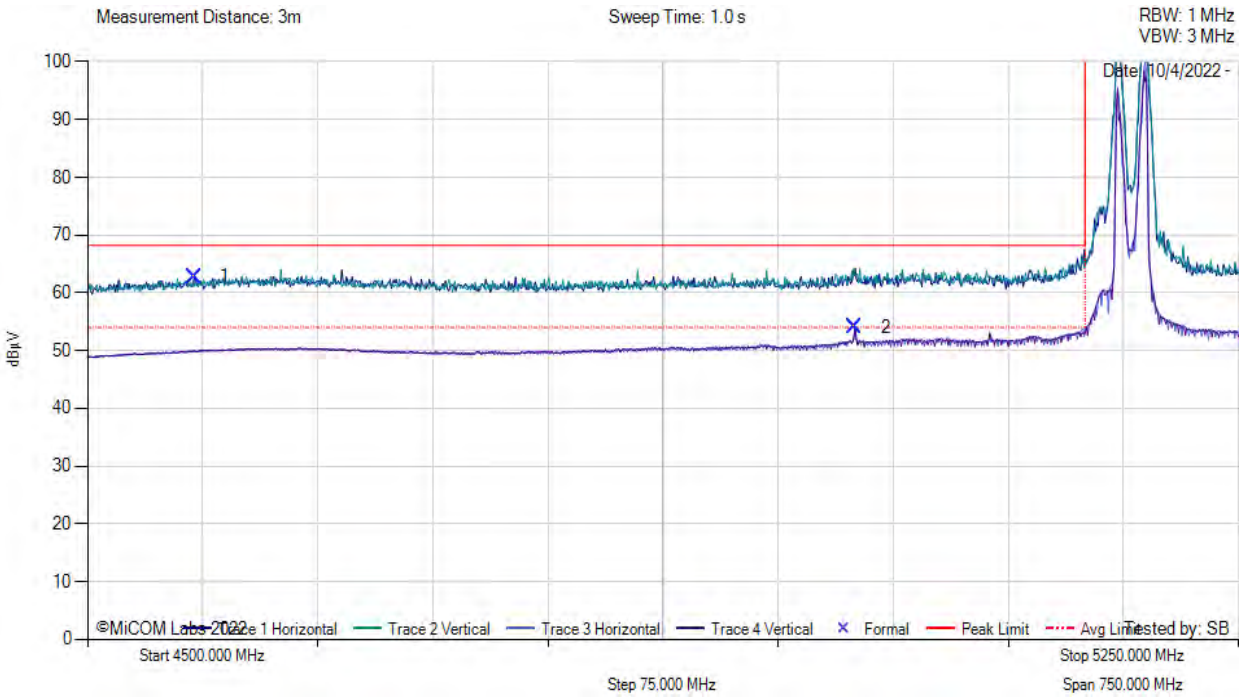
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9622-5001 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 28 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180 | **Data Rate:** | 8.6 |
| **Power Setting:** | 8.0 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9622-5001




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4569.75 | 25.90 | 2.80 | 34.10 | 62.80 | MaxP | Vertical | 149 | 210 | 68.2 | -5.4 | Pass |
| 2 | 5000.25 | 16.83 | 2.95 | 34.22 | 53.99 | AVG | Vertical | 100 | 0 | 54.0 | 0.0 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | | |

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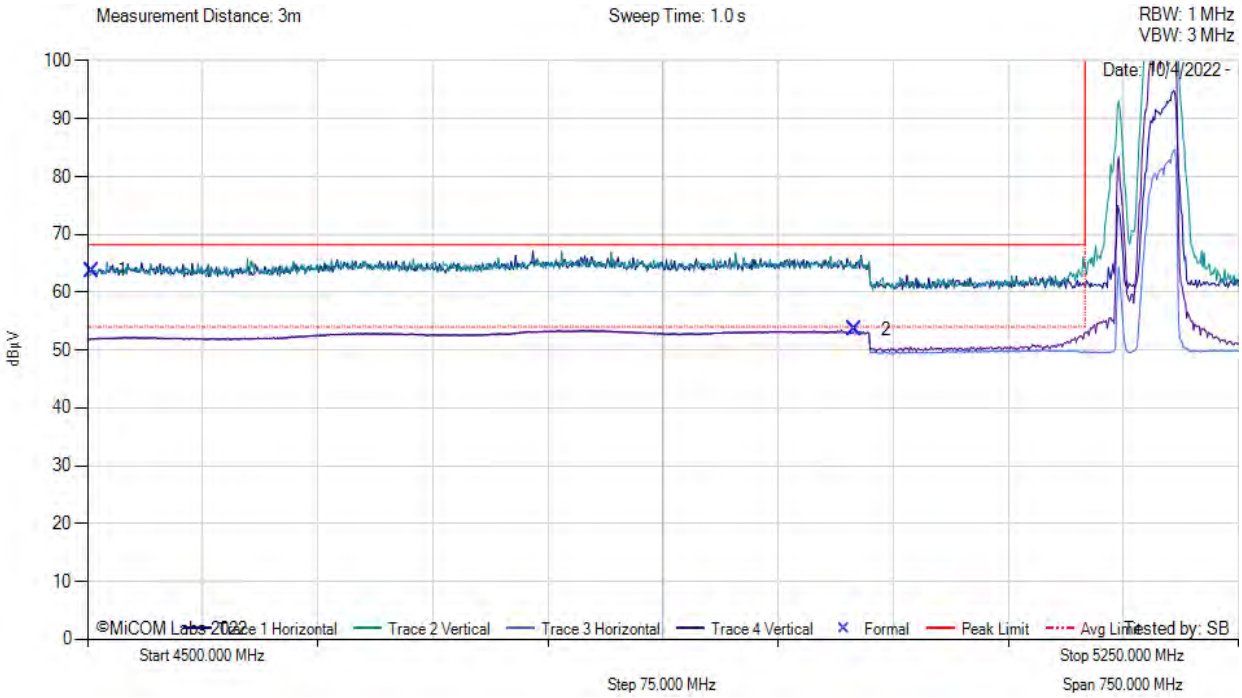
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9622-5001 | **Variant:** | 40 MHz |
| **Antenna Gain (dBi):** | 28 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5190 | **Data Rate:** | 17.2 |
| **Power Setting:** | 8.0 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9622-5001




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4503.00 | 27.18 | 2.76 | 33.84 | 63.78 | MaxP | Horizontal | 100 | 300 | 68.2 | -4.4 | Pass |
| 2 | 5000.25 | 16.36 | 2.95 | 34.22 | 53.52 | AVG | Vertical | 149 | 0 | 54.0 | -0.5 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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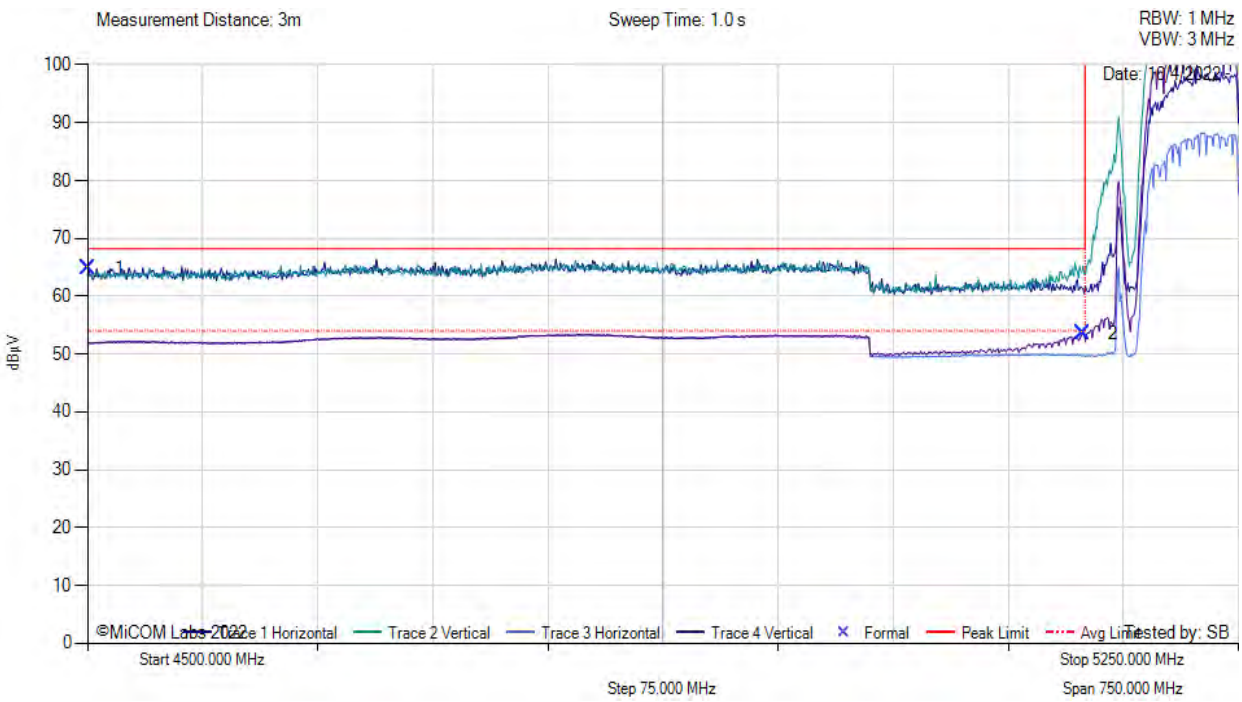
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9622-5001 | **Variant:** | 80 MHz |
| **Antenna Gain (dBi):** | 28 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210 | **Data Rate:** | 36 |
| **Power Setting:** | 5.0 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9622-5001




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4500.75 | 28.20 | 2.75 | 33.83 | 64.78 | MaxP | Horizontal | 149 | 270 | 68.2 | -3.4 | Pass |
| 2 | 5148.75 | 16.34 | 3.06 | 34.11 | 53.51 | AVG | Vertical | 149 | 0 | 54.0 | -0.5 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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### 9.4.2.8. RW-9732-4965 5150-5250MHz

RESULTS SUMMARY FOR RADIATED BAND-EDGE EMISSIONS

5150 - 5250 MHz

| RW-9732-4965 | | Band-Edge Freq | Limit 68.2dBµV/m | Limit 54.0dBµV/m | Power Setting |
|---|---|---|---|---|---|
| Operational Mode | Operating Frequency (MHz) | MHz | dBµV/m | dBµV/m | |
| 20MHz | 5180.00 | 5150.00 | 66.62 | 50.27 | 19.5 |
| 40MHz | 5190.00 | 5150.00 | 67.37 | 51.59 | 19.5 |
| 80MHz | 5210.00 | 5150.00 | 66.96 | 52.91 | 17.0 |

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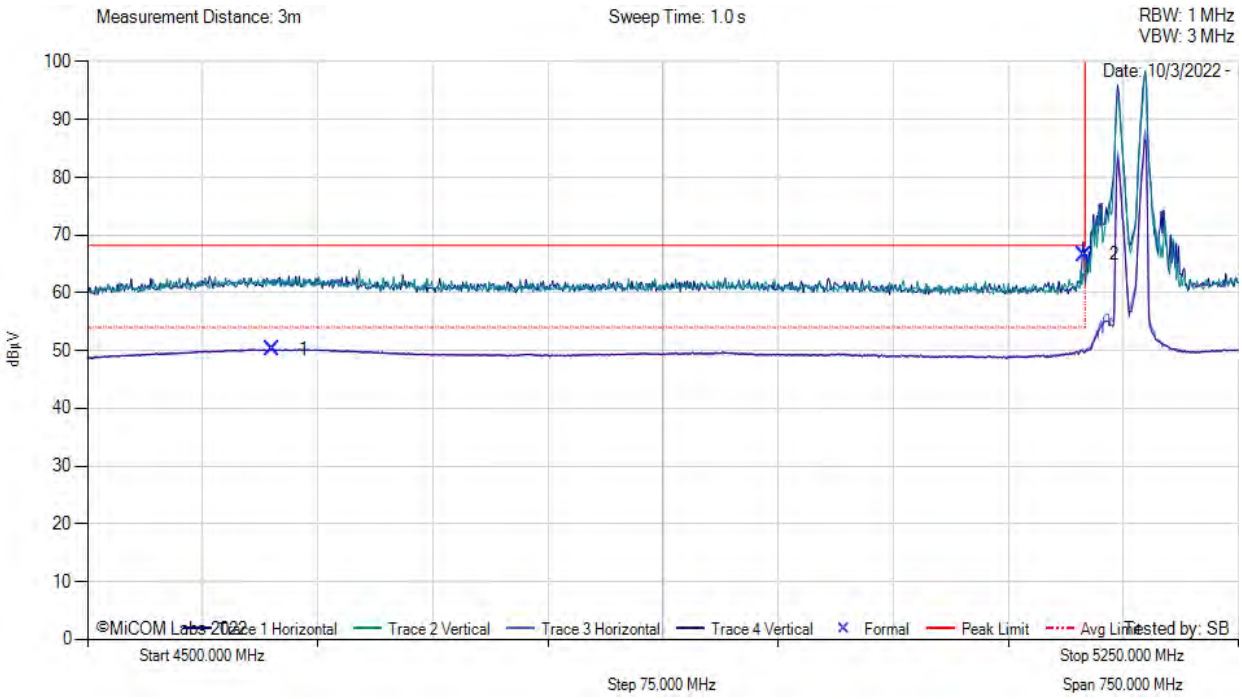
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4965 | **Variant:** | 20 MHz |
| **Antenna Gain (dBi):** | 25.0 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180 | **Data Rate:** | 8.6 |
| **Power Setting:** | 19.5 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9732-4965




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 4620.75 | 13.31 | 2.77 | 34.19 | 50.27 | AVG | Horizontal | 149 | 210 | 54.0 | -3.7 | Pass |
| 2 | 5149.50 | 29.47 | 3.05 | 34.11 | 66.62 | MaxP | Horizontal | 99 | 330 | 68.2 | -1.6 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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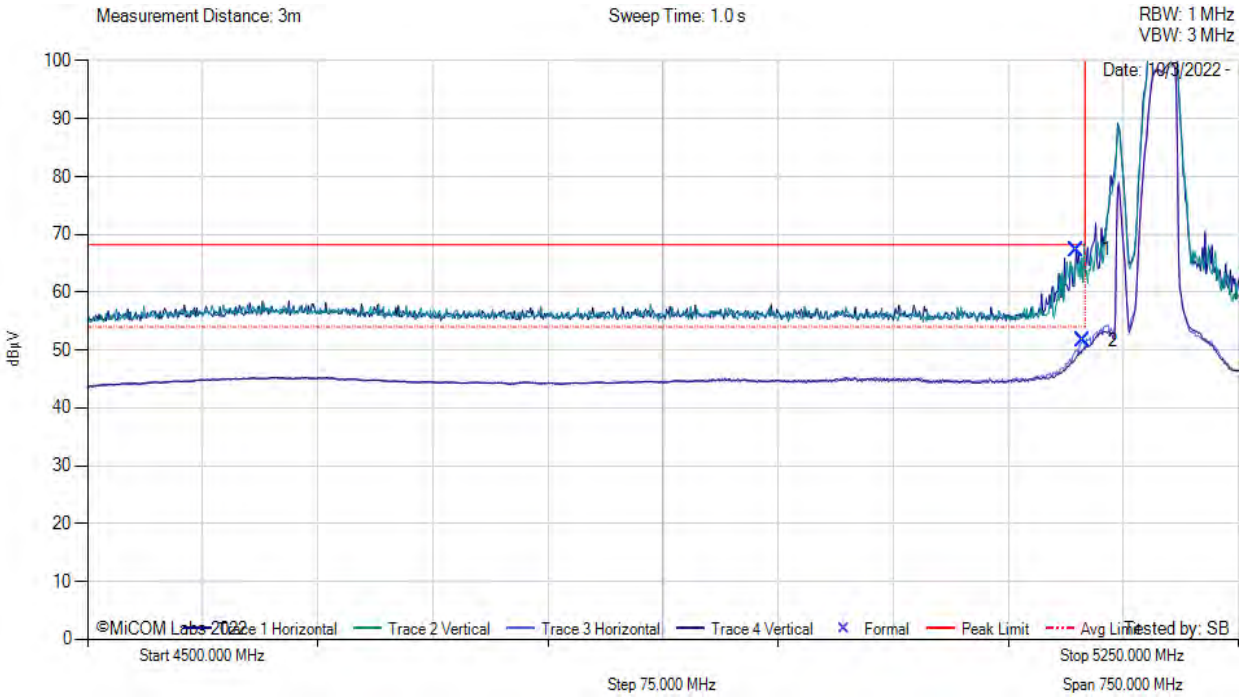
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4965 | **Variant:** | 40 MHz |
| **Antenna Gain (dBi):** | 25.0 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5190 | **Data Rate:** | 17.2 |
| **Power Setting:** | 19.5 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9732-4965




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 5144.25 | 30.14 | 3.11 | 34.12 | 67.37 | MaxP | Horizontal | 149 | 330 | 68.2 | -0.8 | Pass |
| 2 | 5148.75 | 14.42 | 3.06 | 34.11 | 51.59 | AVG | Horizontal | 149 | 330 | 54.0 | -2.4 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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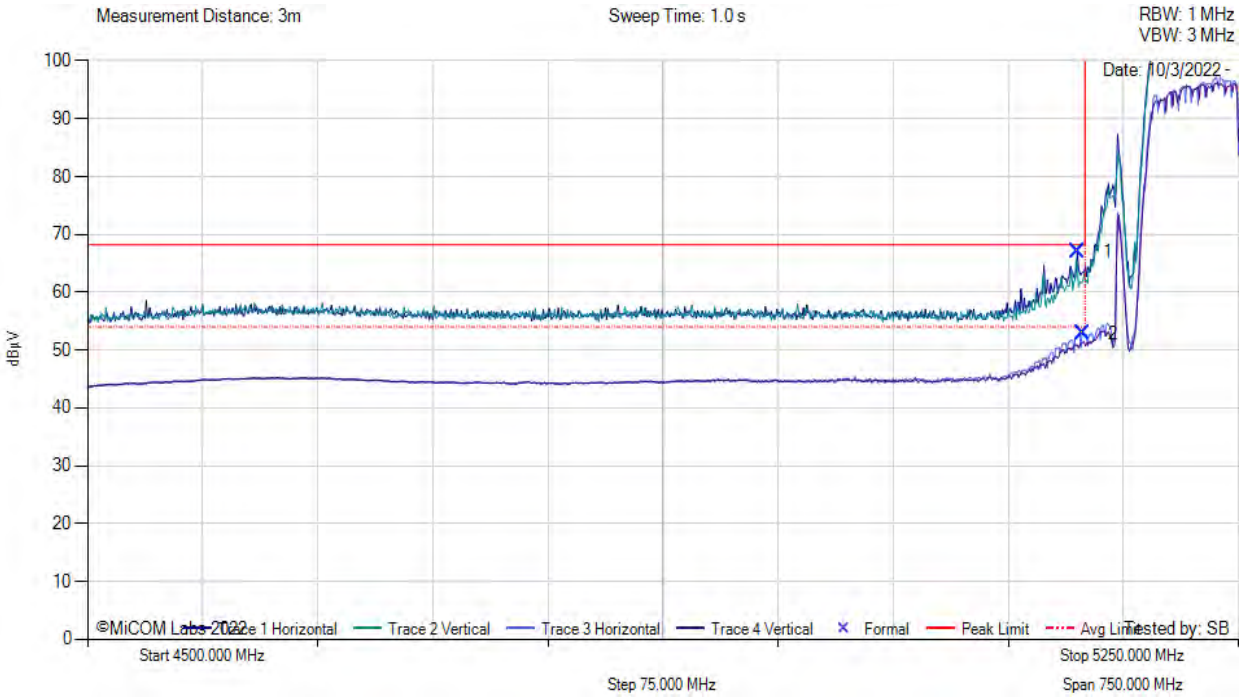
| Equipment Configuration for BE 5150 MHZ | | | |
|---|---|---|---|
| **Antenna:** | RW-9732-4965 | **Variant:** | 80 MHz |
| **Antenna Gain (dBi):** | 25.0 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5210 | **Data Rate:** | 36 |
| **Power Setting:** | 17 | **Tested By:** | SB |

**Test Measurement Results**

BE 5150 MHz

Antenna: RW-9732-4965




| 4500.00 - 5250.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 5145.00 | 29.75 | 3.10 | 34.11 | 66.96 | MaxP | Horizontal | 149 | 330 | 68.2 | -1.2 | Pass |
| 2 | 5148.75 | 15.74 | 3.06 | 34.11 | 52.91 | AVG | Horizontal | 149 | 330 | 54.0 | -1.1 | Pass |
| **Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC | | | | | | | | | | | | |

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## 9.5. Digital Emissions

| Radiated Test Conditions for Radiated Digital Emissions (0.03 – 1 GHz) | | | |
|---|---|---|---|
| **Standard:** | FCC CFR 47:15.247 | **Ambient Temp. (ºC):** | 20.0 - 24.5 |
| **Test Heading:** | Digital Emissions | **Rel. Humidity (%):** | 32 - 45 |
| **Standard Section(s):** | 15.209 | **Pressure (mBars):** | 999 - 1001 |
| **Reference Document(s):** | See Normative References | | |

**Test Procedure for Radiated Digital Emissions (0.03 – 1 GHz)**
Testing 30M-1 GHz was performed in a 3-meter anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed.

Test configuration and setup for Radiated Spurious and Band-Edge Measurement were per the Radiated Test Set-up specified in this document.

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

FS = R + AF + CORR

where:
FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBmV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3dBmV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are done as:

Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100mV/m
48 dBmV/m = 250mV/m

Limits for Radiated Digital Emissions (0.03 – 1 GHz) (15.209)

(a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength | | Measurement Distance (m) |
|---|---|---|---|
| | µV/m (microvolts/meter) | dBµV/m (dB microvolts/meter) | |
| 0.009-0.490 | 2400/F(kHz) | -- | 300 |
| 0.490-1.705 | 24000/F(kHz) | -- | 30 |


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| | | | |
|---|---|---|---|
| 1.705-30.0 | 30 | 29.5 | 30 |
| 30-88 | 100** | 40 | 3 |
| 88-216 | 150** | 43.5 | 3 |
| 216-960 | 200** | 46.0 | 3 |
| Above 960 | 500 | 54.0 | 3 |

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.
(b) In the emission table above, the tighter limit applies at the band edges. (c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector. (e) The provisions in §§15.31, 15.33, and 15.35 for measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part. (f) In accordance with §15.33(a), in some cases the emissions from an intentional radiator must be measured to beyond the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator because of the incorporation of a digital device. If measurements above the tenth harmonic are so required, the radiated emissions above the tenth harmonic shall comply with the general radiated emission limits applicable to the incorporated digital device, as shown in §15.109 and as based on the frequency of the emission being measured, or, except for emissions contained in the restricted frequency bands shown in §15.205, the limit on spurious emissions specified for the intentional radiator, whichever is the higher limit. Emissions which must be measured above the tenth harmonic of the highest fundamental frequency designed to be emitted by the intentional radiator and which fall within the restricted bands shall comply with the general radiated emission limits in §15.109 that are applicable to the incorporated digital device. (g) Perimeter protection systems may operate in the 54-72 MHz and 76-88 MHz bands under the provisions of this section. The use of such perimeter protection systems is limited to industrial, business and commercial applications.


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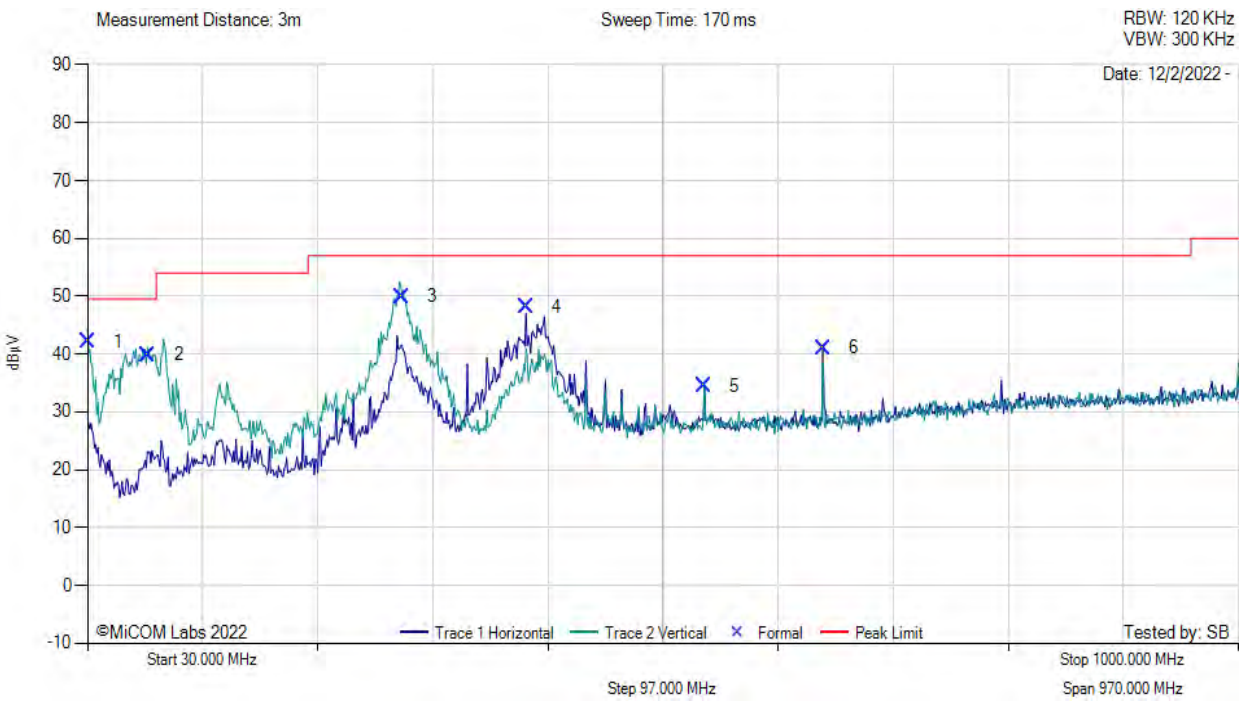
| Equipment Configuration for 0.03 - 1 GHz Class A | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180.0 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |

**Test Measurement Results**

30 MHz to 1 GHz Class A




| 30.00 - 1000.00 MHz | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Num** | **Frequency MHz** | **Raw dBµV** | **Cable Loss dB** | **AF dB/m** | **Level dBµV/m** | **Measurement Type** | **Pol** | **Hgt cm** | **Azt Deg** | **Limit dBµV/m** | **Margin dB** | **Pass /Fail** |
| 1 | 30.64 | 42.33 | 3.52 | -3.64 | 42.21 | MaxQP | Vertical | 99 | 211 | 49.5 | -7.3 | Pass |
| 2 | 81.20 | 53.44 | 3.98 | -17.57 | 39.85 | MaxQP | Vertical | 114 | 177 | 49.5 | -9.6 | Pass |
| 3 | 294.59 | 57.30 | 4.97 | -12.36 | 49.91 | MaxQP | Vertical | 181 | 0 | 57.0 | -7.1 | Pass |
| 4 | 400.02 | 52.10 | 5.35 | -9.27 | 48.18 | MaxQP | Horizontal | 172 | 184 | 57.0 | -8.8 | Pass |
| 5 | 549.99 | 36.04 | 5.86 | -7.37 | 34.53 | MaxQP | Vertical | 98 | 1 | 57.0 | -22.5 | Pass |
| 6 | 650.01 | 40.68 | 6.17 | -5.75 | 41.09 | MaxQP | Horizontal | 121 | 304 | 57.0 | -15.9 | Pass |

**Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC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## 9.6. AC Wireline

| Test Conditions for ac Wireline Emissions (0.15 – 30 MHz) | | | |
|---|---|---|---|
| Standard: | FCC CFR 47:15.247 | Ambient Temp. (ºC): | 20.0 - 24.5 |
| Test Heading: | Conducted (ac Wireline Emissions) | Rel. Humidity (%): | 32 - 45 |
| Standard Section(s): | 15.207 | Pressure (mBars): | 999 - 1001 |
| Reference Document(s): | See Normative References | | |

Test Procedure for ac Wireline Emissions (0.15 – 30 MHz)
The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test configuration and setup for ac Wireline Emission Measurement were per the ac Wireline Test Set-up specified in this document.

**Limits for ac Wireline Emissions**

(a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Limits for conducted disturbance at the mains ports of class B ITE

| Frequency of emission (MHz) | Quasi-peak dBuV | Average dBuV |
|---|---|---|
| 0.15–0.5 | 66 to 56* | 56 to 46* |
| 0.5–5 | 56 | 46 |
| 5–30 | 60 | 50 |
| Note 1 | * Decreases with the logarithm of the frequency | |
| Note 2 | * The lower limit applies at the boundary between frequency ranges | |

Limits for conducted disturbance at the mains ports of class A ITE

| Frequency of emission (MHz) | Quasi-peak dBuV | Average dBuV |
|---|---|---|
| 0.15–0.5 | 79 | 66 |
| 0.5–30 | 73 | 60 |
| Note 1 | * The lower limit shall apply at the transition frequency. | |

The limit shown in paragraph (a) of this section shall not apply to carrier current systems operating as intentional radiators on frequencies below 30 MHz. In lieu thereof, these carrier current systems shall be subject to the following standards:

(1) For carrier current system containing their fundamental emission within the frequency band 535-1705 kHz and intended to be received using a standard AM broadcast receiver: no limit on conducted emissions.

(2) For all other carrier current systems: 1000 µV within the frequency band 535-1705 kHz, as measured using a 50 µH/50 ohms LISN.

(3) Carrier current systems operating below 30 MHz are also subject to the radiated emission limits in §15.205, §15.209, §15.221, §15.223, or §15.227, as appropriate.

Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provisions for, the use of battery chargers which permit operating while charging, AC adapters or battery eliminators or that connect to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.


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**Scope**

This test assesses the ability of the EUT to limit its internal noise from being present on the AC mains power input/output ports.

**Test Procedure**

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.


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**Limits**

The equipment shall meet the class B limits given in FCC 15.207 & ICES-003. Alternatively, for equipment intended to be used in telecommunication centers only, the class A limits given in FCC 15B, ICES-003 may be used.

Limits for conducted disturbance at the mains ports of class B ITE

| Frequency of emission (MHz) | Quasi-peak dBuV | Average dBuV |
|---|---|---|
| 0.15–0.5 | 66 to 56* | 56 to 46* |
| 0.5–5 | 56 | 46 |
| 5–30 | 60 | 50 |
| Note 1 | * Decreases with the logarithm of the frequency | |
| Note 2 | * The lower limit applies at the boundary between frequency ranges | |

Limits for conducted disturbance at the mains ports of class A ITE

| Frequency of emission (MHz) | Quasi-peak dBuV | Average dBuV |
|---|---|---|
| 0.15–0.5 | 79 | 66 |
| 0.5–30 | 73 | 60 |
| Note 1 | * The lower limit shall apply at the transition frequency. | |

**Traceability**

All conducted emission measurements are traceable to national standards. The uncertainty of measurement at a confidence level of not less than 95 %, with a coverage factor of k=2, in the range 9 kHz – 30 MHz (Average & Quasi-peak) is ±2.64 dB.

| Laboratory Measurement Uncertainty | |
|---|---|
| Measurement uncertainty | ±2.64 dB |

| Method |
|---|
| Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions' |


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## Test Equipment Utilized

| Asset# | Description | Manufacturer | Model# | Serial# | Calibration Due Date |
|---|---|---|---|---|---|
| 184 | Pulse Limiter | Rhode & Schwarz | ESH3Z2 | 357.8810.52 | 24 Apr 2023 |
| 190 | LISN (two-line V-network) | Rhode & Schwarz | ESH3Z5 | 836679/006 | 11 Oct 2023 |
| 287 | Rohde & Schwarz 40 GHz Receiver | Rhode & Schwarz | ESIB40 | 100201 | 8 Oct 2023 |
| 295 | Conducted Emissions Chamber Maintenance Check | MiCOM | Conducted Emissions Chamber | 295 | 24 Feb 2023 |
| 307 | BNC-CABLE | Megaphase | 1689 1GVT4 | 15F50B002 | 24 Feb 2023 |
| 316 | Dell desktop computer workstation | Dell | Desktop | WS04 | Not Required |
| 372 | AC Variable PS | California Instruments | 1251P | L06951 | Cal when used |
| 496 | MiTest Conducted Emissions test software. | MiCOM | Conducted Emissions Test Software Version 1.0 | 496 | Not Required |
| 510 | Barometer/Thermometer | Digi Sense | 68000-49 | 170871375 | 4 Jan 2024 |
| CCEMC01 | Confidence Check. | MiCOM | CCEMC01 | None | 24 Feb 2023 |


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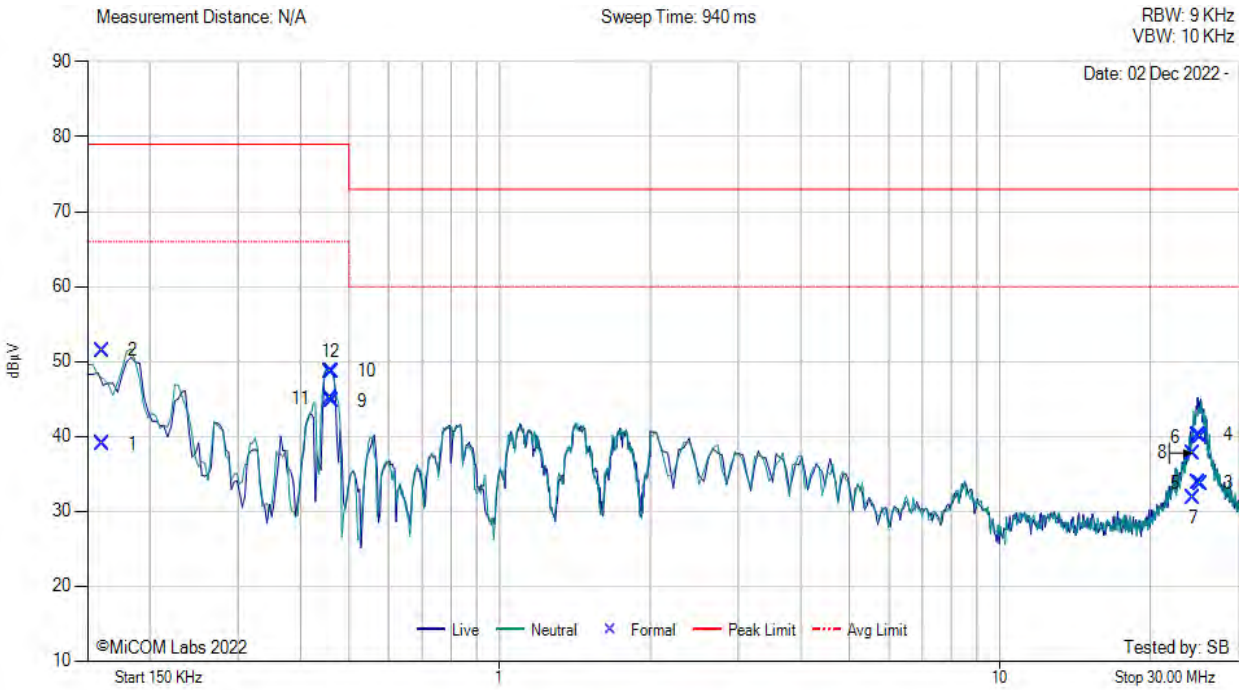
| Equipment Configuration for AC Wireline | | | |
|---|---|---|---|
| **Antenna:** | MR0284310 | **Variant:** | 20MHz |
| **Antenna Gain (dBi):** | 24 | **Modulation:** | BPSK |
| **Beam Forming Gain (Y):** | Not Applicable | **Duty Cycle (%):** | 99 |
| **Channel Frequency (MHz):** | 5180.0 | **Data Rate:** | 8.6 |
| **Power Setting:** | 25.5 | **Tested By:** | SB |
| **Test Measurement Results** | | | |




| Num | Frequency MHz | Raw dBµV | Cable Loss dB | Factor dB | Total Correction dBµV | Corrected Value dBµV | Measurement Type | Line | Limit dBµV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.161 | 29.03 | -0.04 | 9.99 | 9.95 | 38.98 | Max Avg | Neutral | 66.0 | -27.0 | Pass |
| 2 | 0.161 | 41.52 | -0.04 | 9.99 | 9.95 | 51.47 | Max Qp | Neutral | 79.0 | -27.5 | Pass |
| 3 | 24.897 | 23.15 | -0.32 | 10.93 | 10.61 | 33.76 | Max Avg | Live | 60.0 | -26.2 | Pass |
| 4 | 24.897 | 29.55 | -0.32 | 10.93 | 10.61 | 40.16 | Max Qp | Live | 73.0 | -32.8 | Pass |
| 5 | 25.276 | 23.11 | -0.33 | 10.93 | 10.60 | 33.71 | Max Avg | Neutral | 60.0 | -26.3 | Pass |
| 6 | 25.276 | 29.28 | -0.33 | 10.93 | 10.60 | 39.88 | Max Qp | Neutral | 73.0 | -33.1 | Pass |
| 7 | 24.394 | 21.25 | -0.32 | 10.93 | 10.61 | 31.86 | Max Avg | Neutral | 60.0 | -28.1 | Pass |
| 8 | 24.394 | 27.16 | -0.32 | 10.93 | 10.61 | 37.77 | Max Qp | Neutral | 73.0 | -35.2 | Pass |
| 9 | 0.461 | 34.82 | -0.06 | 9.99 | 9.93 | 44.75 | Max Avg | Neutral | 66.0 | -21.3 | Pass |
| 10 | 0.461 | 38.78 | -0.06 | 9.99 | 9.93 | 48.71 | Max Qp | Neutral | 79.0 | -30.3 | Pass |
| 11 | 0.460 | 35.12 | -0.06 | 9.99 | 9.93 | 45.05 | Max Avg | Live | 66.0 | -21.0 | Pass |
| 12 | 0.460 | 38.61 | -0.06 | 9.99 | 9.93 | 48.54 | Max Qp | Live | 79.0 | -30.5 | Pass |

**Test Notes:** POE supply inside the chamber: Manufacturer: Gospell, Model: G0566-560-100, 100-240VAC, 56VDC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# A. APPENDIX - GRAPHICAL IMAGES


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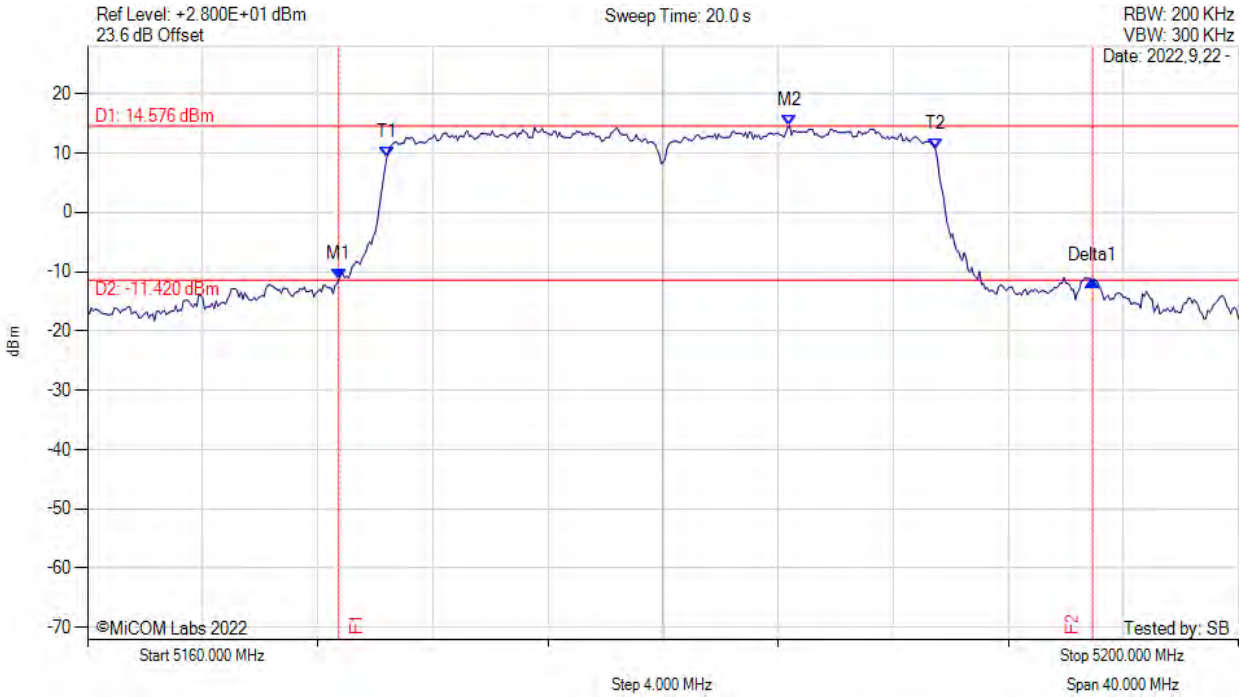
## A.1. 26 dB & 99% Bandwidth

26 dB & 99% BANDWIDTH

Variant: OFDM-20, Channel: 5180.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5168.730 MHz : -11.337 dBm<br>M2 : 5184.400 MHz : 14.576 dBm<br>Delta1 : 26.200 MHz : -0.211 dB<br>T1 : 5170.400 MHz : 9.187 dBm<br>T2 : 5189.467 MHz : 10.719 dBm<br>OBW : 19.043 MHz | Measured 26 dB Bandwidth: 26.200 MHz<br>Measured 99% Bandwidth: 19.043 MHz |

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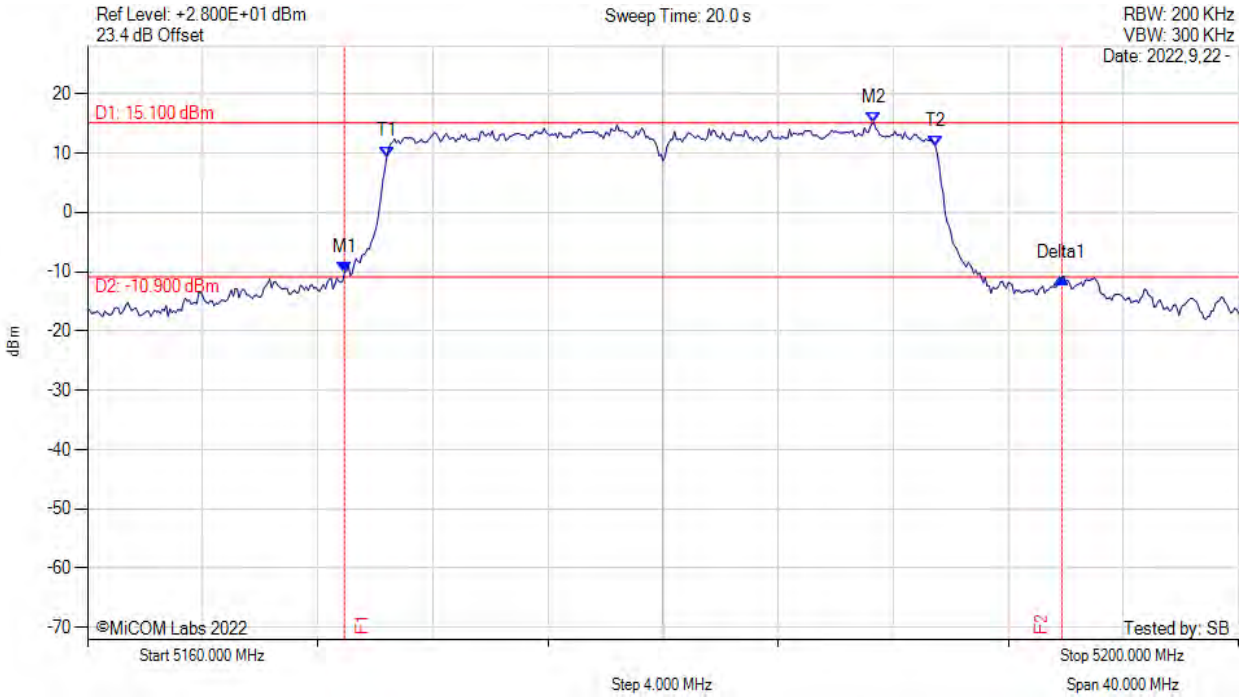
26 dB & 99% BANDWIDTH

Variant: OFDM-20, Channel: 5180.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5168.930 MHz : -10.103 dBm<br>M2 : 5187.330 MHz : 15.100 dBm<br>Delta1 : 24.930 MHz : -0.896 dB<br>T1 : 5170.400 MHz : 9.392 dBm<br>T2 : 5189.467 MHz : 11.189 dBm<br>OBW : 19.067 MHz | Measured 26 dB Bandwidth: 24.930 MHz<br>Measured 99% Bandwidth: 19.067 MHz |

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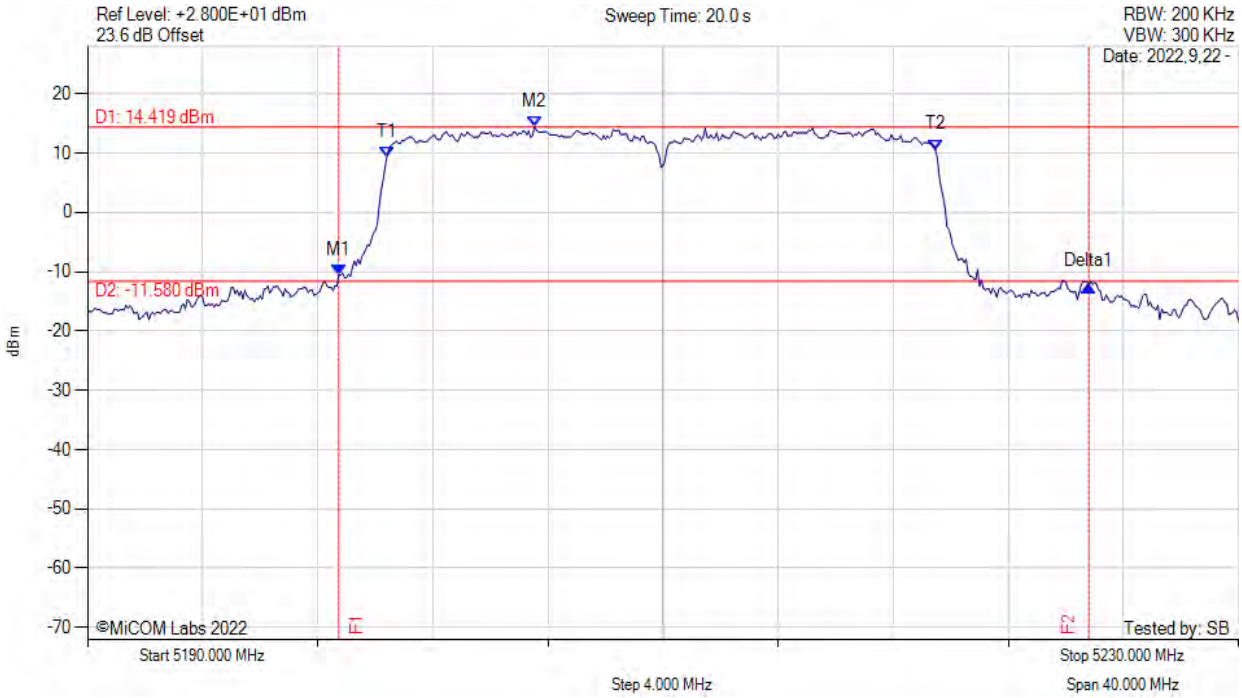
26 dB & 99% BANDWIDTH

Variant: OFDM-20, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5198.730 MHz : -10.494 dBm<br>M2 : 5205.530 MHz : 14.419 dBm<br>Delta1 : 26.070 MHz : -1.965 dB<br>T1 : 5200.400 MHz : 9.269 dBm<br>T2 : 5219.467 MHz : 10.564 dBm<br>OBW : 19.047 MHz | Measured 26 dB Bandwidth: 26.070 MHz<br>Measured 99% Bandwidth: 19.047 MHz |

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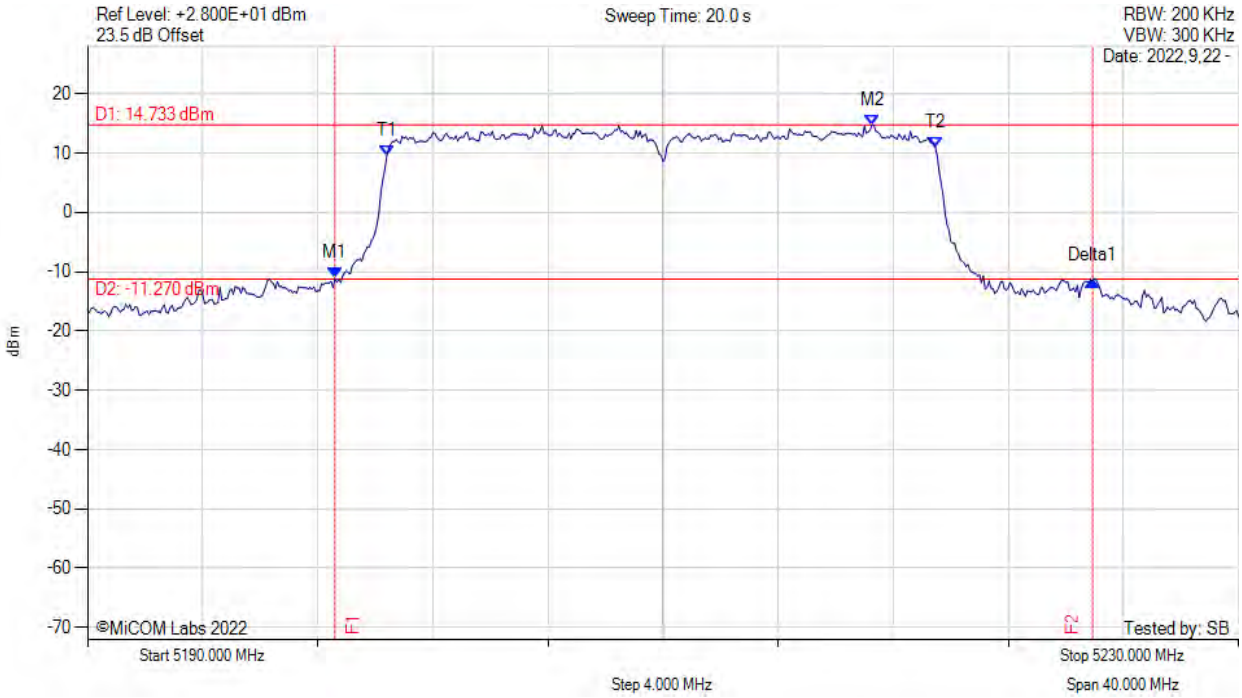
26 dB & 99% BANDWIDTH

Variant: OFDM-20, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5198.600 MHz : -11.160 dBm<br>M2 : 5217.270 MHz : 14.733 dBm<br>Delta1 : 26.330 MHz : -0.385 dB<br>T1 : 5200.400 MHz : 9.588 dBm<br>T2 : 5219.467 MHz : 10.989 dBm<br>OBW : 19.066 MHz | Measured 26 dB Bandwidth: 26.330 MHz<br>Measured 99% Bandwidth: 19.066 MHz |

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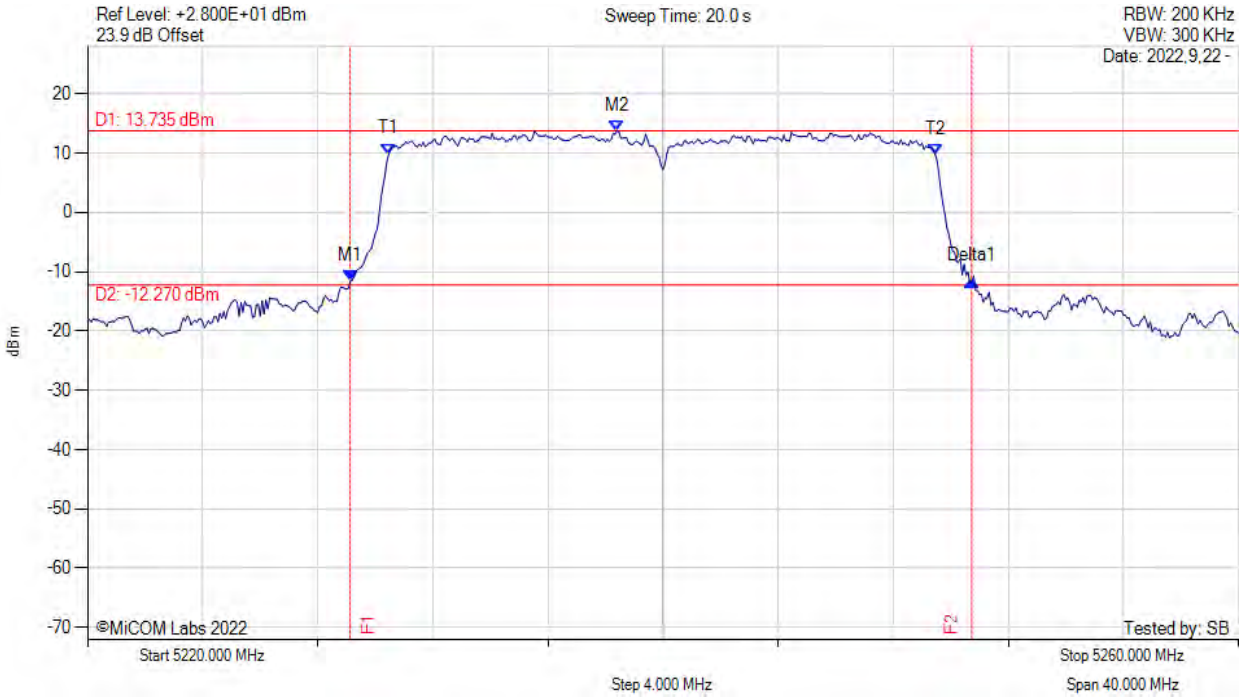
26 dB & 99% BANDWIDTH

Variant: OFDM-20, Channel: 5240.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5229.130 MHz : -11.587 dBm<br>M2 : 5238.400 MHz : 13.735 dBm<br>Delta1 : 21.600 MHz : 0.008 dB<br>T1 : 5230.467 MHz : 9.858 dBm<br>T2 : 5249.467 MHz : 9.779 dBm<br>OBW : 19.006 MHz | Measured 26 dB Bandwidth: 21.600 MHz<br>Measured 99% Bandwidth: 19.006 MHz |

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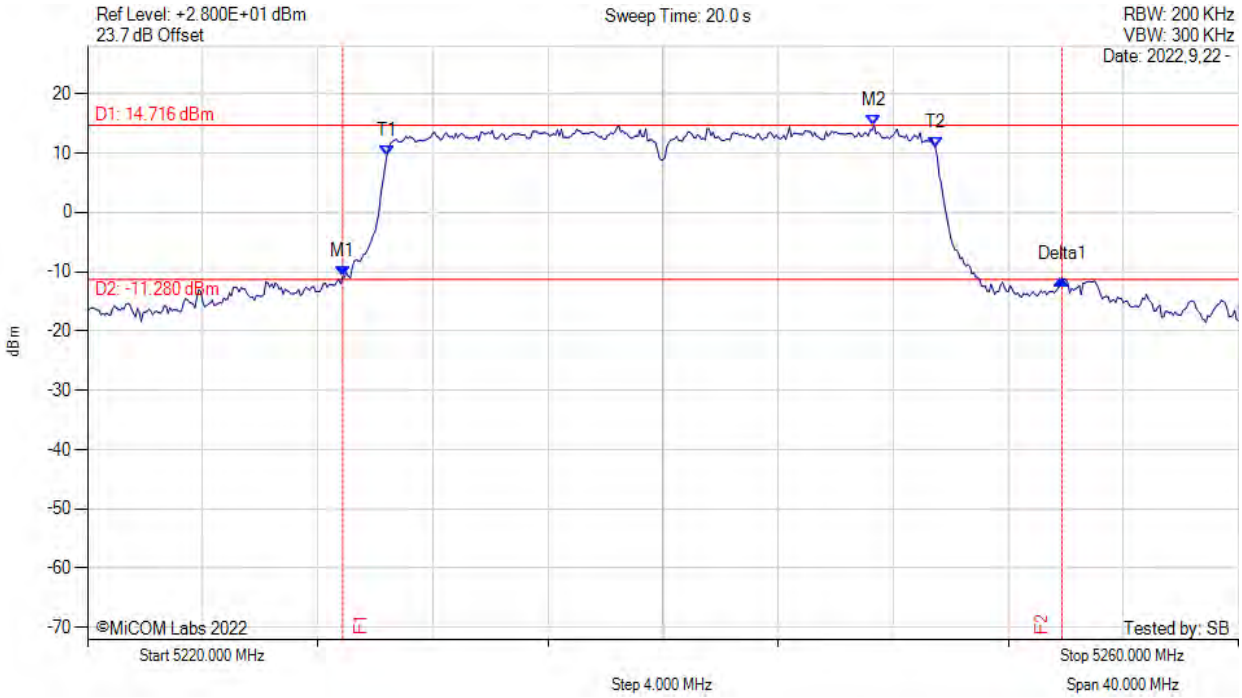
26 dB & 99% BANDWIDTH

Variant: OFDM-20, Channel: 5240.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5228.870 MHz : -10.921 dBm<br>M2 : 5247.330 MHz : 14.716 dBm<br>Delta1 : 25.000 MHz : -0.465 dB<br>T1 : 5230.400 MHz : 9.526 dBm<br>T2 : 5249.467 MHz : 10.964 dBm<br>OBW : 19.050 MHz | Measured 26 dB Bandwidth: 25.000 MHz<br>Measured 99% Bandwidth: 19.050 MHz |

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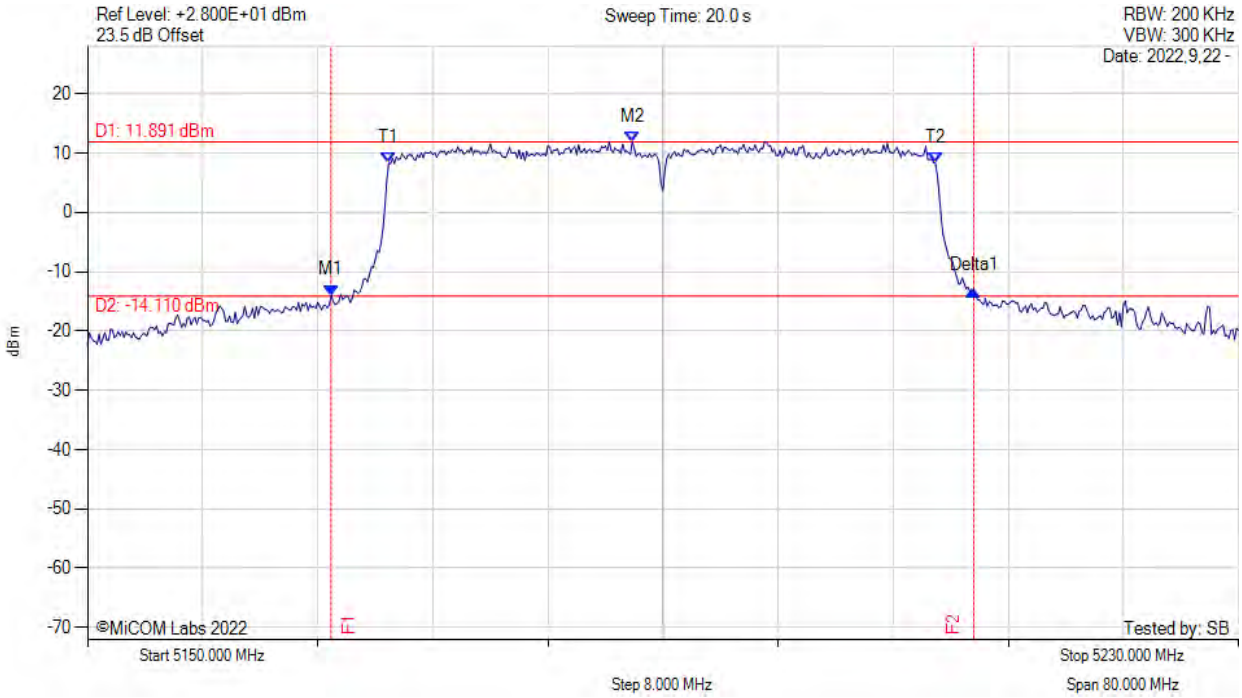
26 dB & 99% BANDWIDTH

Variant: OFDM-40, Channel: 5190.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5166.930 MHz : -13.970 dBm<br>M2 : 5187.870 MHz : 11.891 dBm<br>Delta1 : 44.670 MHz : 0.747 dB<br>T1 : 5170.933 MHz : 8.267 dBm<br>T2 : 5208.933 MHz : 8.299 dBm<br>OBW : 37.906 MHz | Measured 26 dB Bandwidth: 44.670 MHz<br>Measured 99% Bandwidth: 37.906 MHz |

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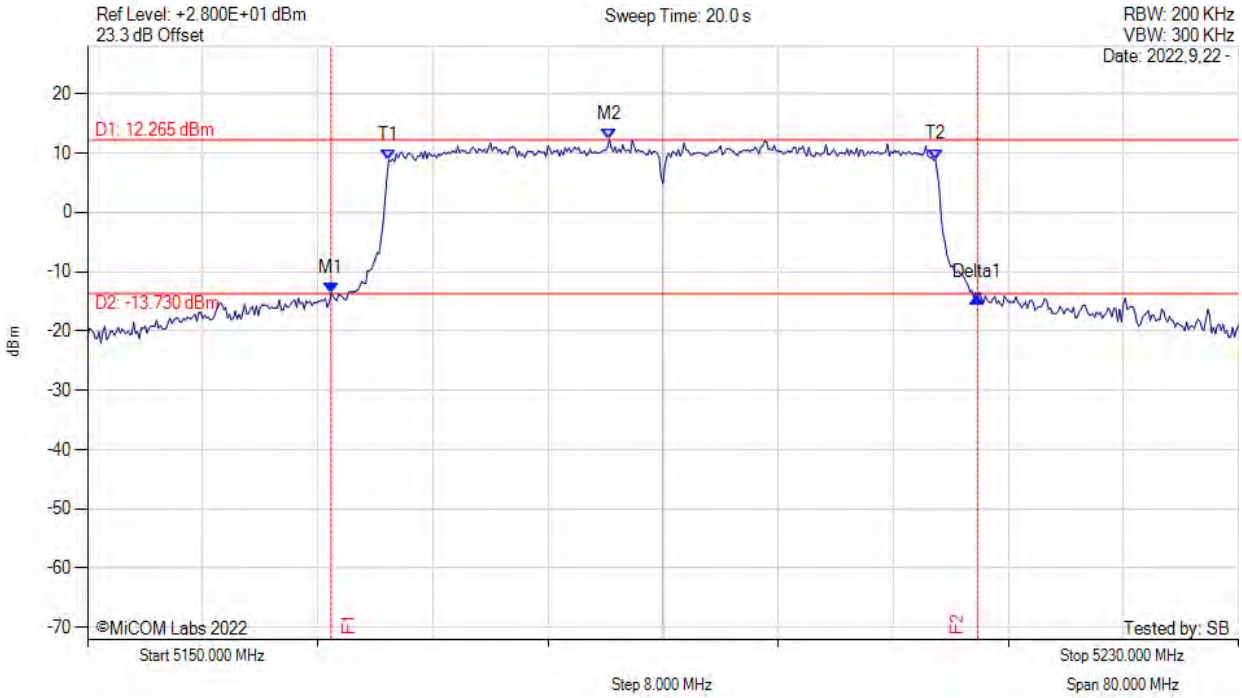
26 dB & 99% BANDWIDTH

Variant: OFDM-40, Channel: 5190.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5166.930 MHz : -13.550 dBm<br>M2 : 5186.270 MHz : 12.265 dBm<br>Delta1 : 44.930 MHz : -0.692 dB<br>T1 : 5170.933 MHz : 8.791 dBm<br>T2 : 5208.933 MHz : 8.922 dBm<br>OBW : 37.958 MHz | Measured 26 dB Bandwidth: 44.930 MHz<br>Measured 99% Bandwidth: 37.958 MHz |

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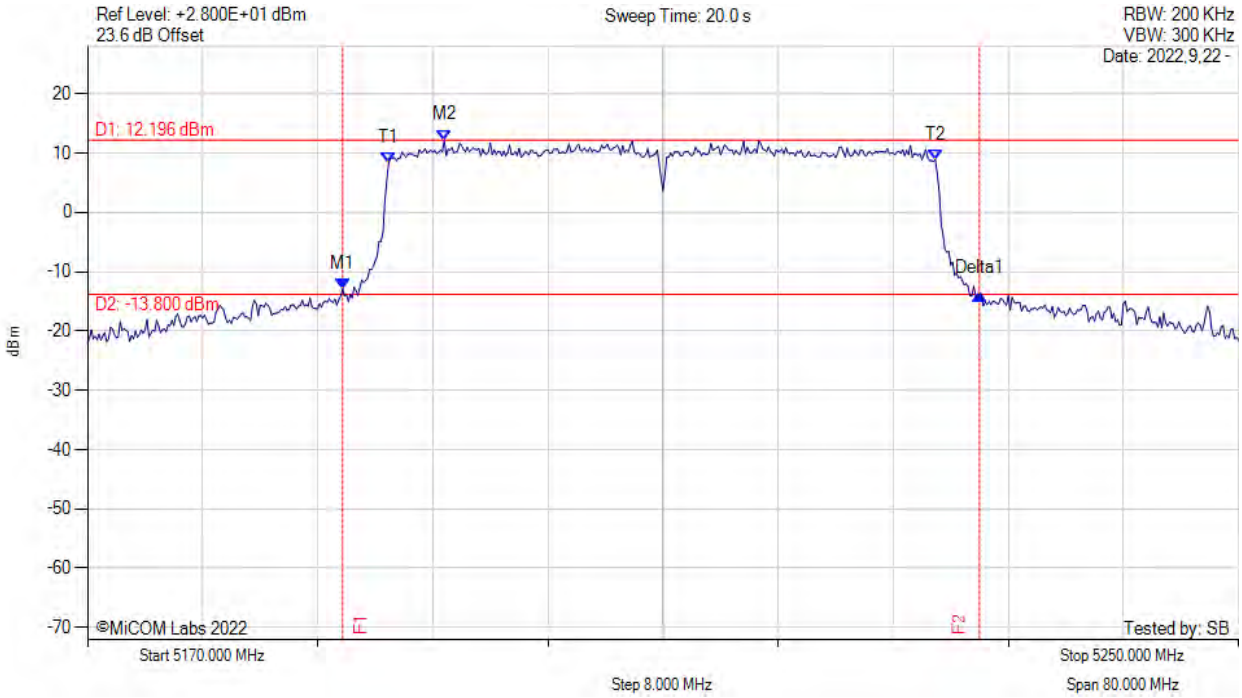
26 dB & 99% BANDWIDTH

Variant: OFDM-40, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5187.730 MHz : -12.862 dBm<br>M2 : 5194.800 MHz : 12.196 dBm<br>Delta1 : 44.270 MHz : -0.874 dB<br>T1 : 5190.933 MHz : 8.441 dBm<br>T2 : 5228.933 MHz : 8.904 dBm<br>OBW : 37.920 MHz | Measured 26 dB Bandwidth: 44.270 MHz<br>Measured 99% Bandwidth: 37.920 MHz |

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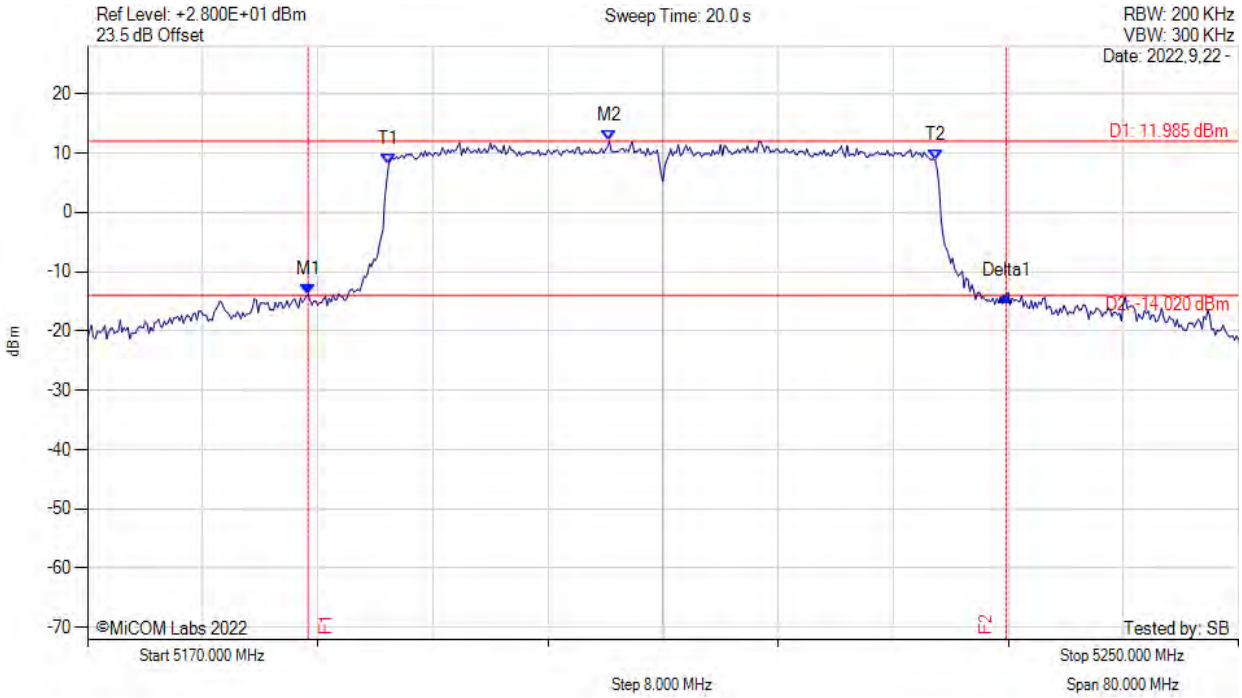
26 dB & 99% BANDWIDTH

Variant: OFDM-40, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5185.330 MHz : -13.804 dBm<br>M2 : 5206.270 MHz : 11.985 dBm<br>Delta1 : 48.530 MHz : -0.303 dB<br>T1 : 5190.933 MHz : 8.163 dBm<br>T2 : 5228.933 MHz : 8.807 dBm<br>OBW : 37.961 MHz | Measured 26 dB Bandwidth: 48.530 MHz<br>Measured 99% Bandwidth: 37.961 MHz |

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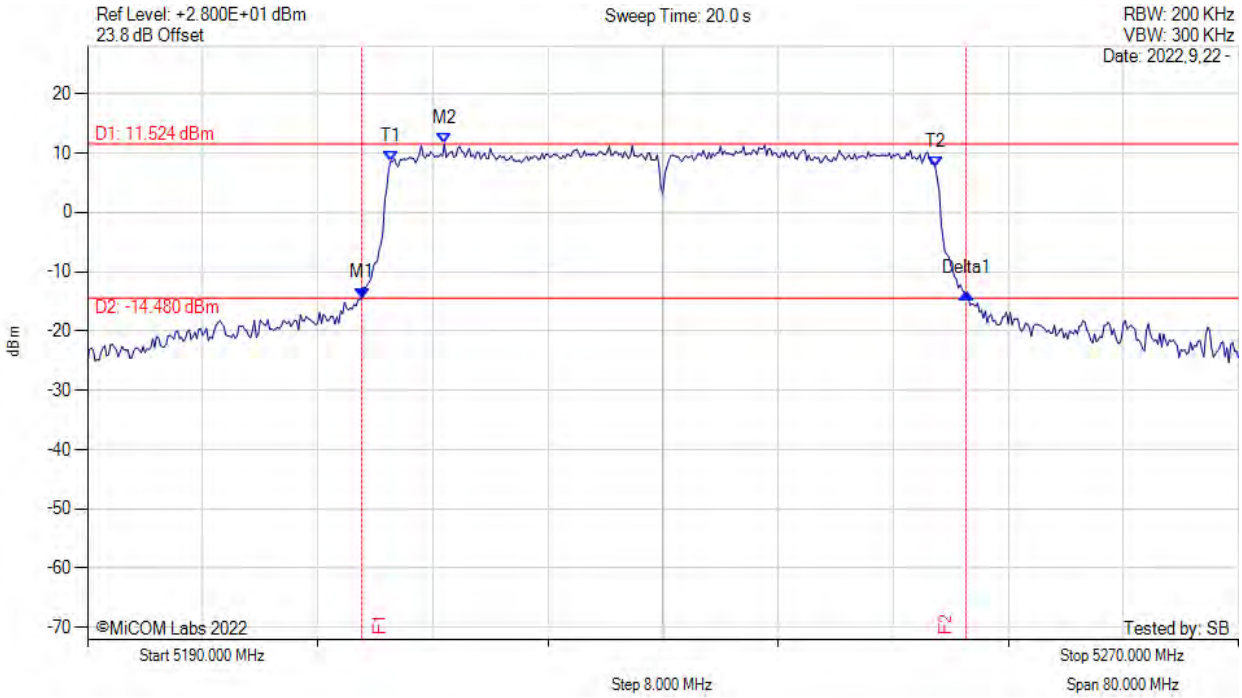
26 dB & 99% BANDWIDTH

Variant: OFDM-40, Channel: 5230.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5209.070 MHz : -14.433 dBm<br>M2 : 5214.800 MHz : 11.524 dBm<br>Delta1 : 42.000 MHz : 0.871 dB<br>T1 : 5211.067 MHz : 8.572 dBm<br>T2 : 5248.933 MHz : 7.589 dBm<br>OBW : 37.854 MHz | Measured 26 dB Bandwidth: 42.000 MHz<br>Measured 99% Bandwidth: 37.854 MHz |

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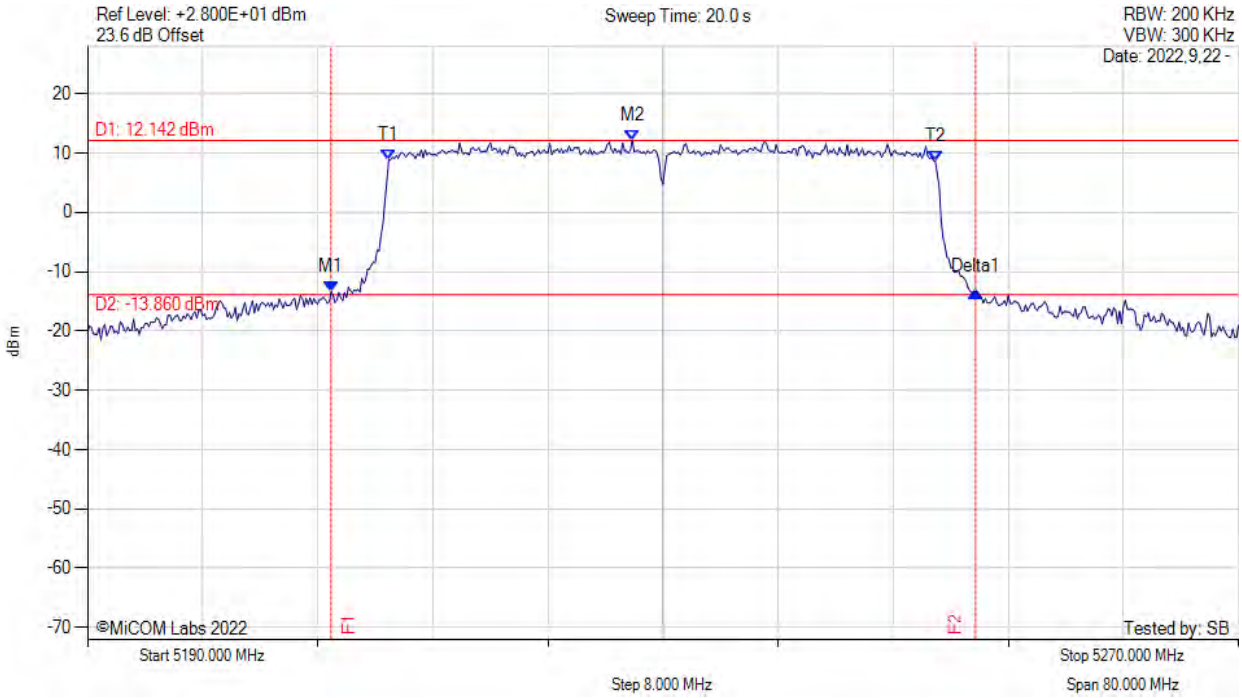
26 dB & 99% BANDWIDTH

Variant: OFDM-40, Channel: 5230.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5206.930 MHz : -13.379 dBm<br>M2 : 5227.870 MHz : 12.142 dBm<br>Delta1 : 44.800 MHz : 0.029 dB<br>T1 : 5210.933 MHz : 8.789 dBm<br>T2 : 5248.933 MHz : 8.575 dBm<br>OBW : 37.938 MHz | Measured 26 dB Bandwidth: 44.800 MHz<br>Measured 99% Bandwidth: 37.938 MHz |

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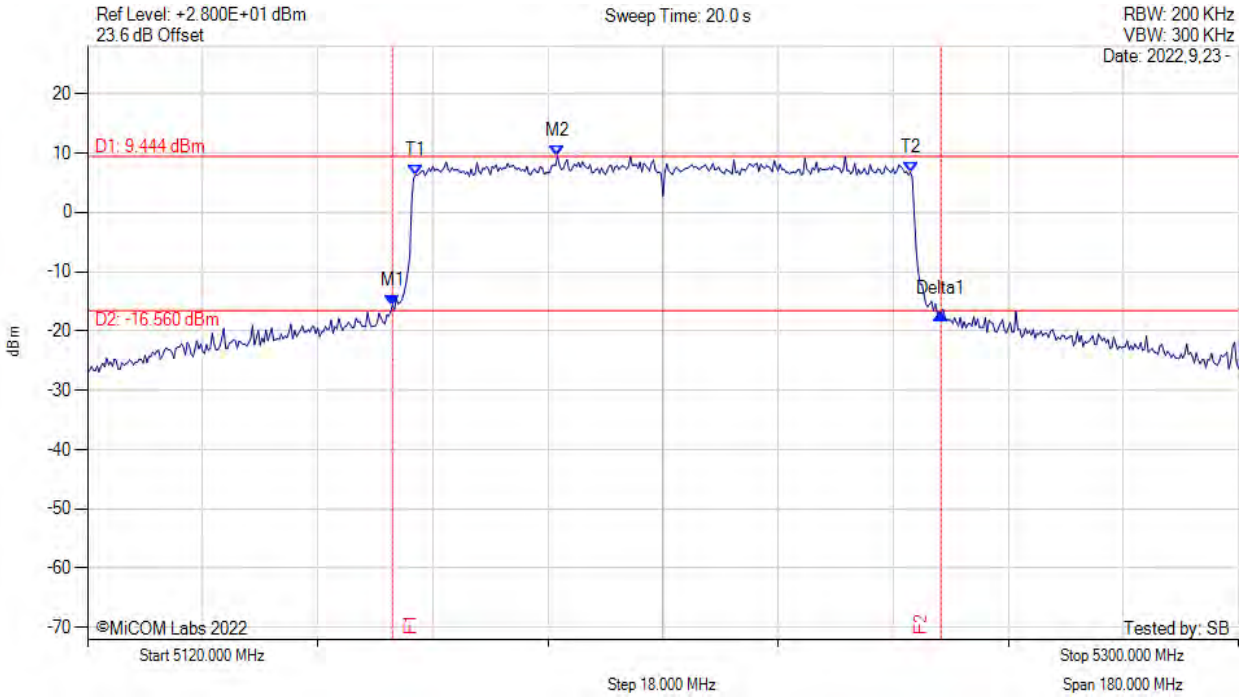
26 dB & 99% BANDWIDTH

Variant: OFDM-80, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5167.700 MHz : -15.636 dBm<br>M2 : 5193.500 MHz : 9.444 dBm<br>Delta1 : 85.800 MHz : -1.511 dB<br>T1 : 5171.300 MHz : 6.320 dBm<br>T2 : 5248.700 MHz : 6.725 dBm<br>OBW : 77.543 MHz | Measured 26 dB Bandwidth: 85.800 MHz<br>Measured 99% Bandwidth: 77.543 MHz |

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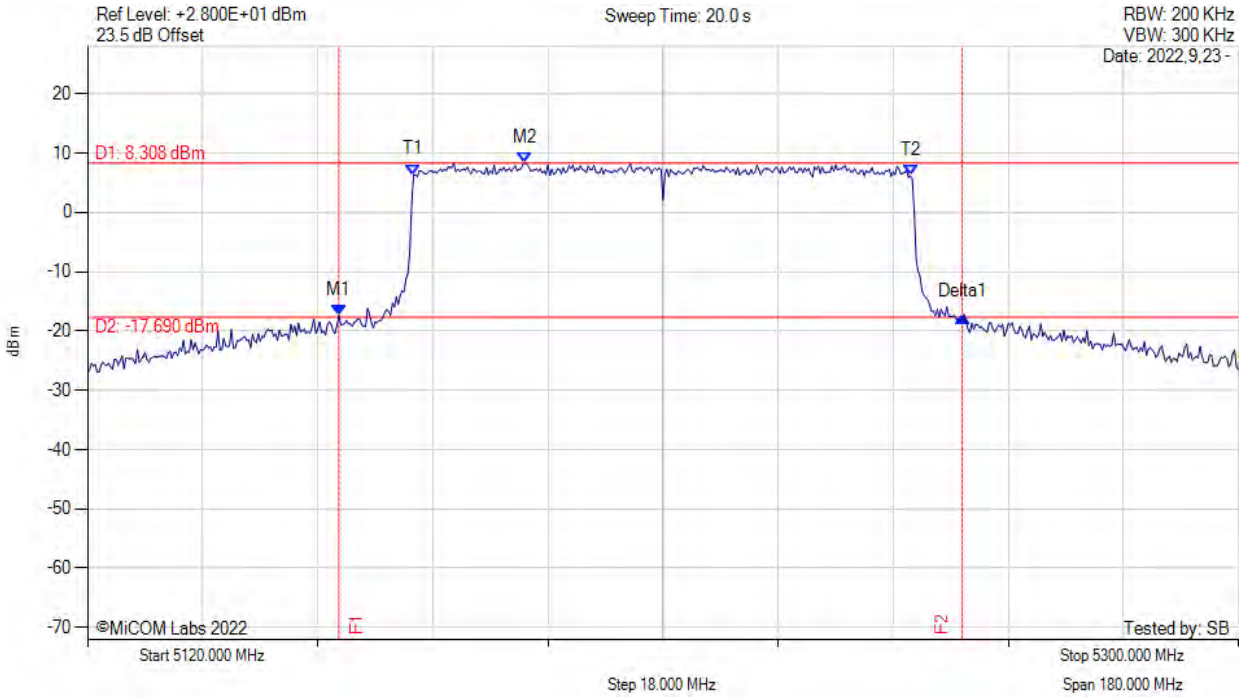
26 dB & 99% BANDWIDTH

Variant: OFDM-80, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = POS<br>Sweep Count = 0<br>RF Atten (dB) = 20<br>Trace Mode = MAXH | M1 : 5159.300 MHz : -17.434 dBm<br>M2 : 5188.400 MHz : 8.308 dBm<br>Delta1 : 97.500 MHz : -0.156 dB<br>T1 : 5171.000 MHz : 6.359 dBm<br>T2 : 5248.700 MHz : 6.148 dBm<br>OBW : 77.627 MHz | Measured 26 dB Bandwidth: 97.500 MHz<br>Measured 99% Bandwidth: 77.627 MHz |

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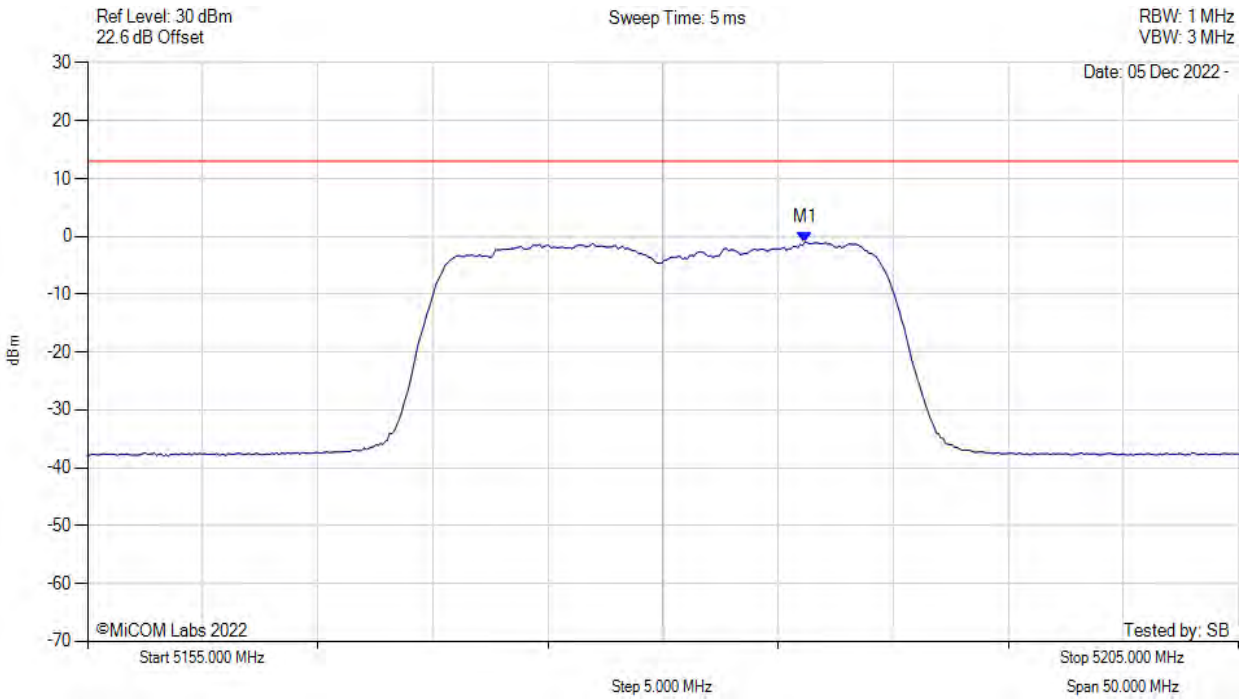
## A.2. Power Spectral Density

POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5180.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5186.162 MHz : -0.989 dBm | Limit: ≤ 12.990 dBm |

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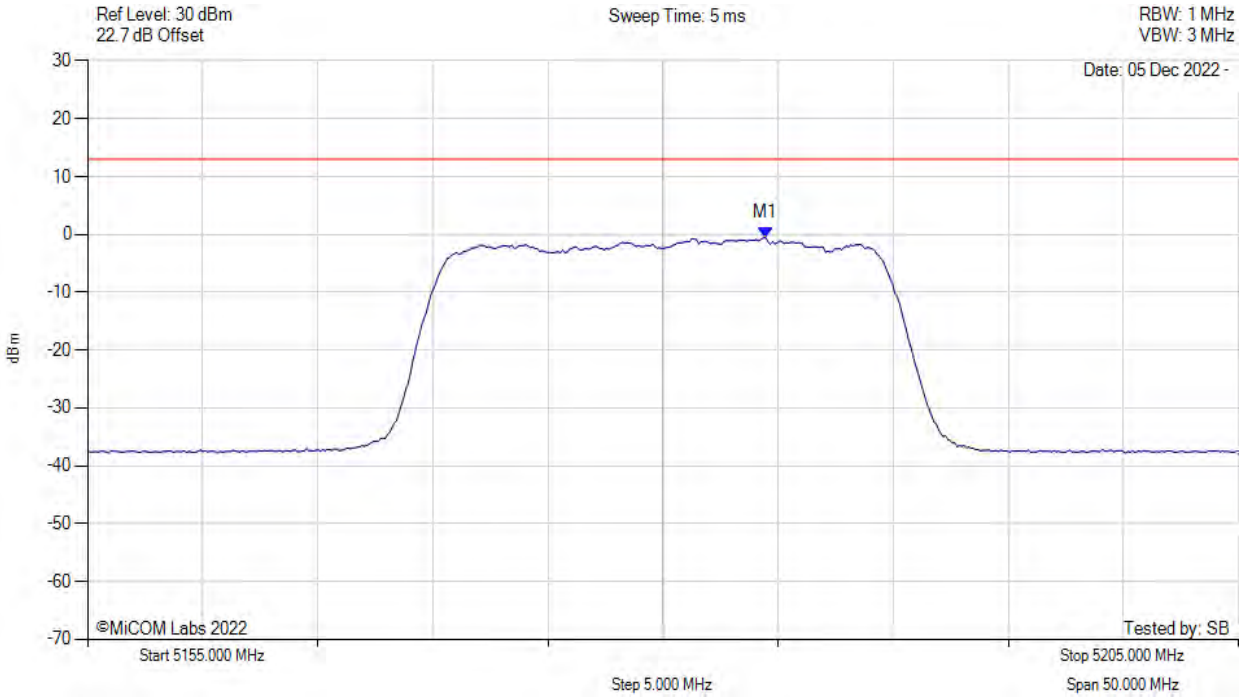
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5180.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5184.459 MHz : -0.547 dBm | Limit: ≤ 12.990 dBm |

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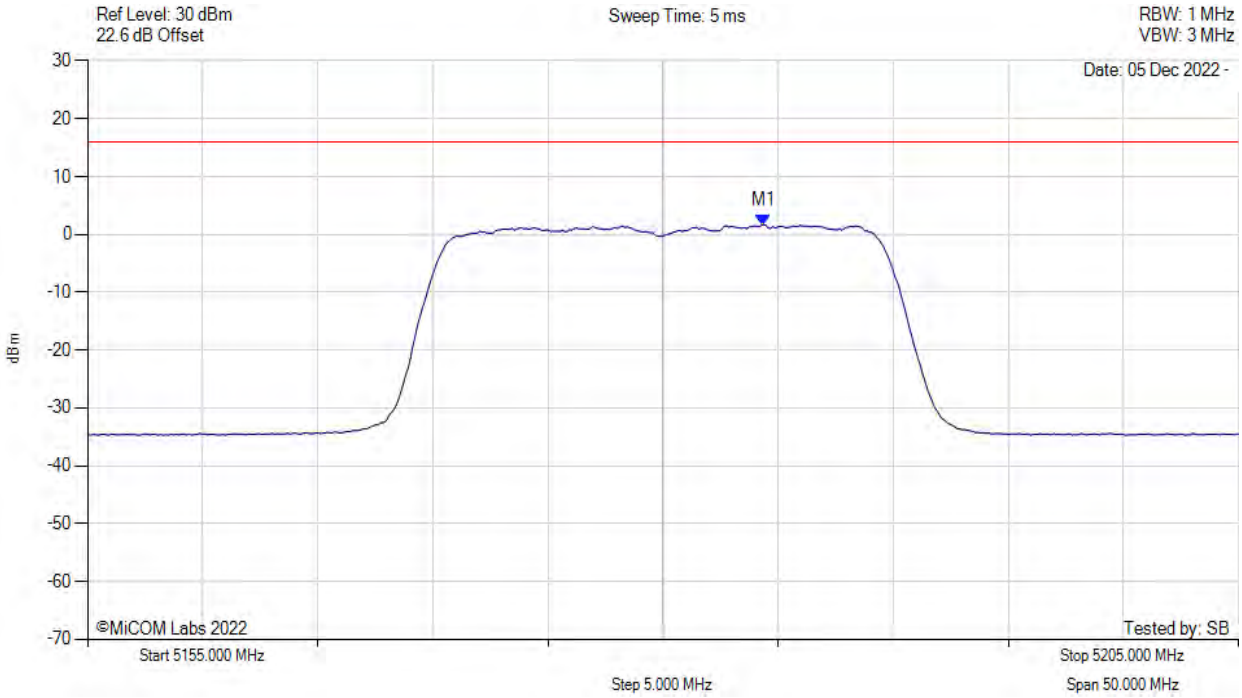
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5180.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5184.400 MHz : 1.680 dBm<br>M1 + DCCF : 5184.400 MHz : 1.724 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -14.3 dB |

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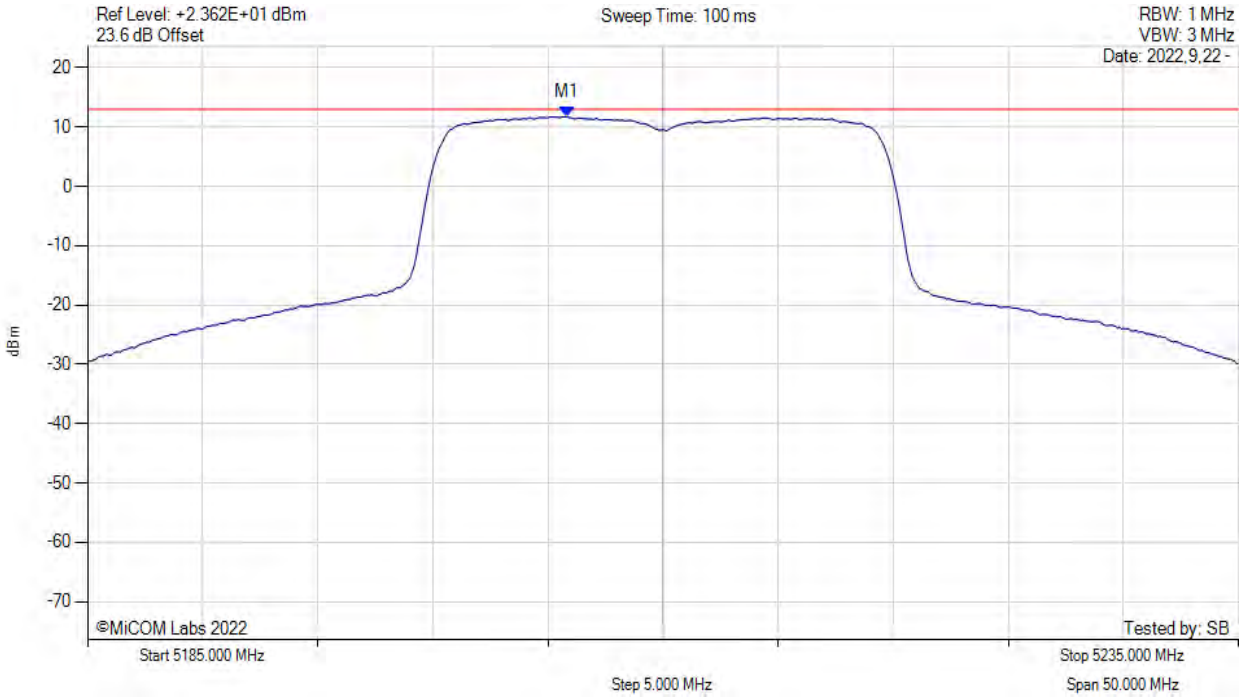
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5205.830 MHz : 11.726 dBm | Limit: ≤ 12.990 dBm |

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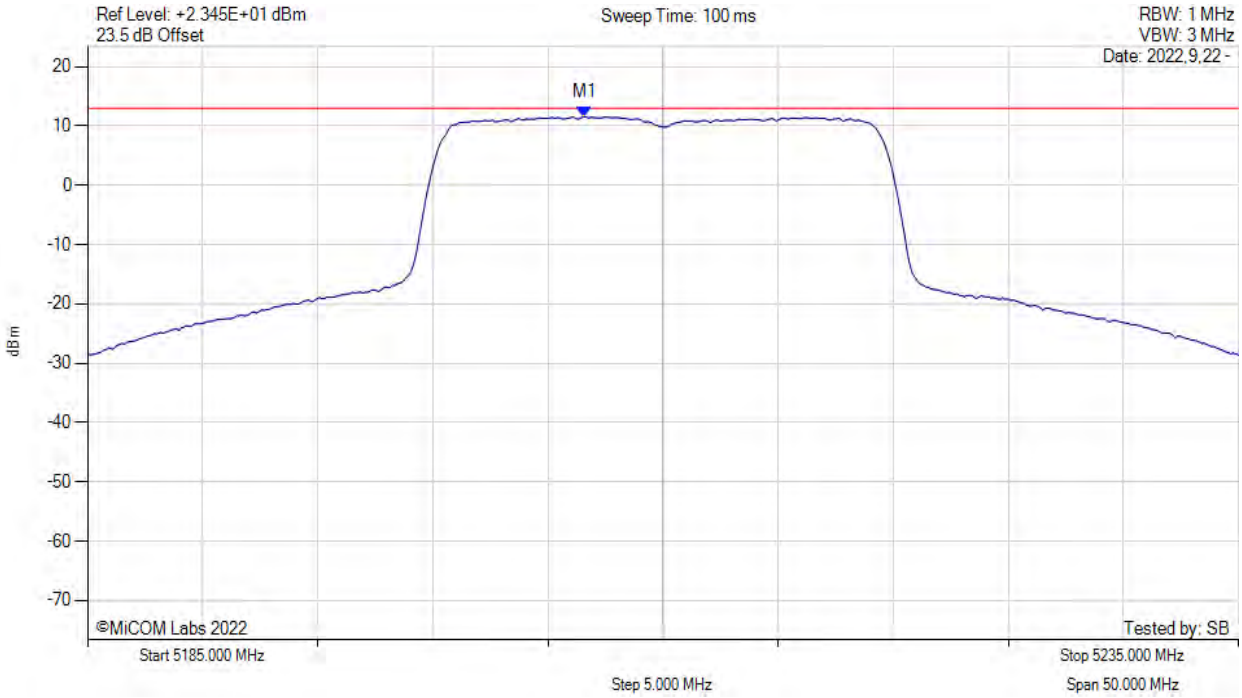
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5206.580 MHz : 11.572 dBm | Channel Frequency: 5210.00 MHz |

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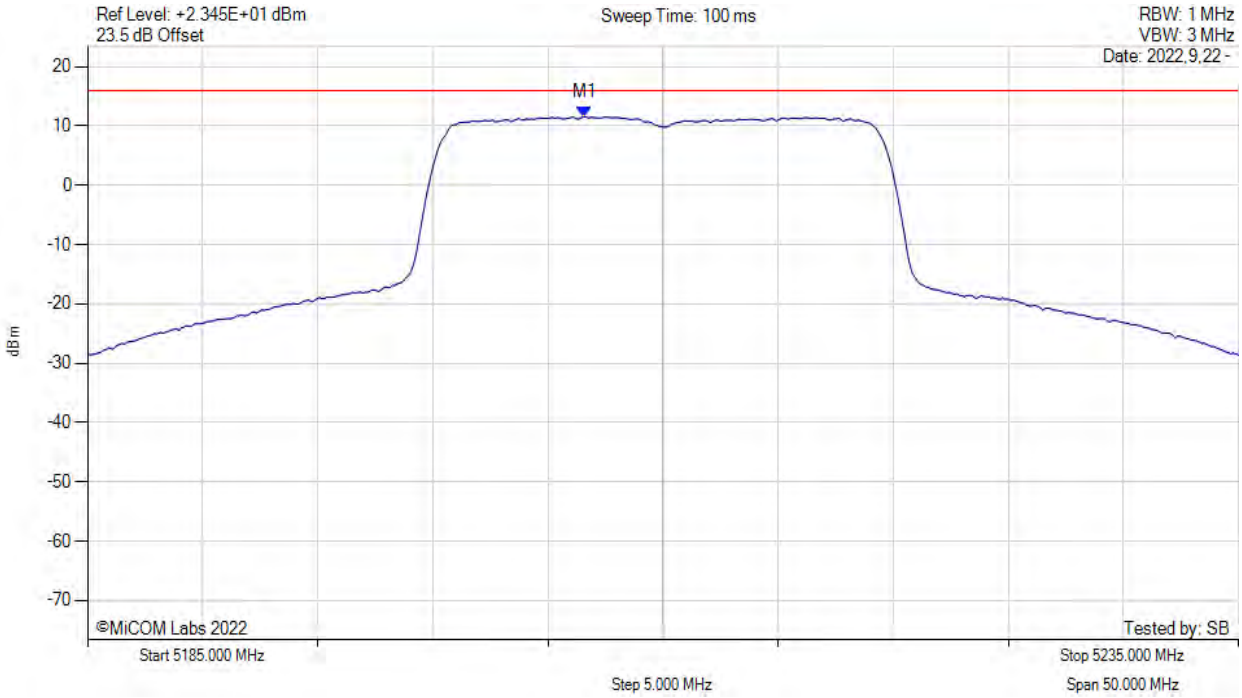
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5206.600 MHz : 11.572 dBm<br>M1 + DCCF : 5206.600 MHz : 11.616 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -4.4 dB |

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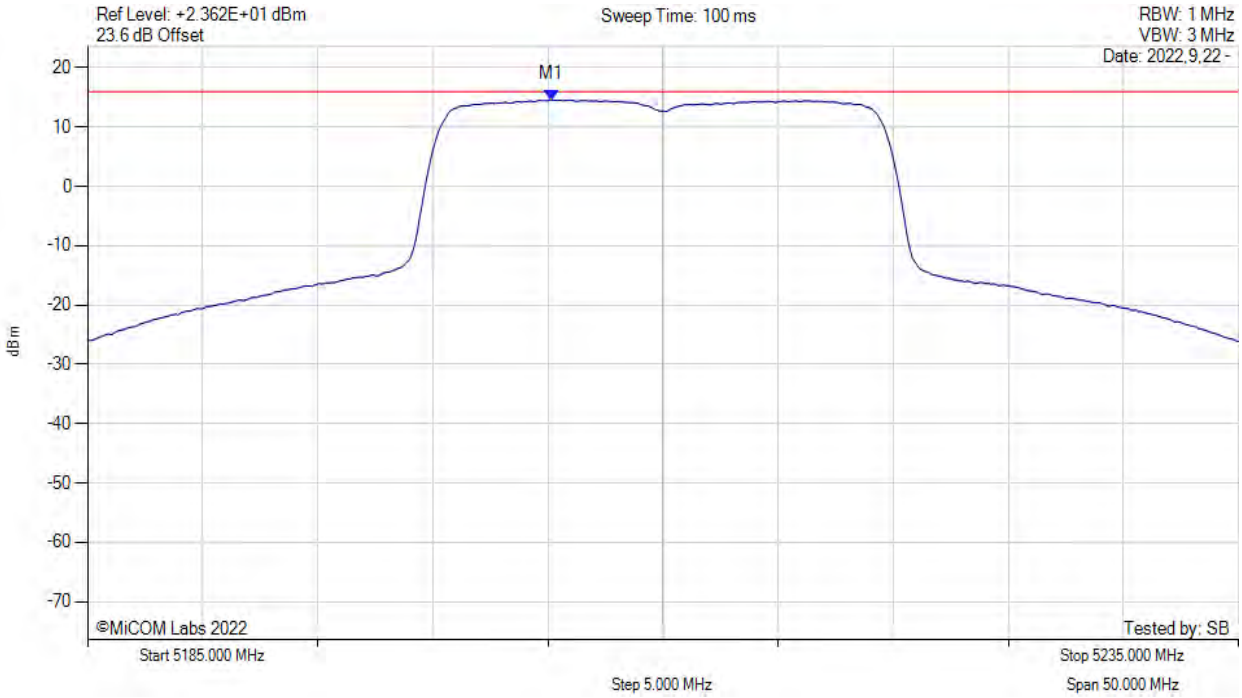
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5205.200 MHz : 14.601 dBm<br>M1 + DCCF : 5205.200 MHz : 14.645 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -1.4 dB |

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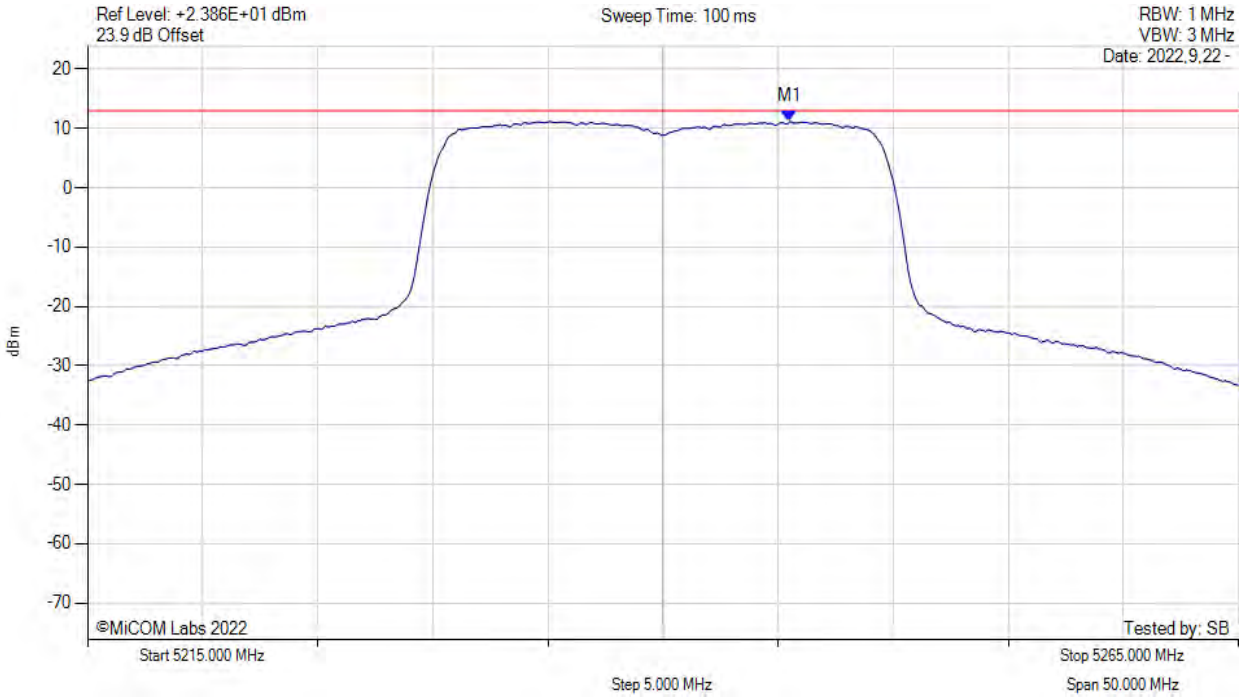
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5240.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5245.500 MHz : 11.168 dBm | Limit: ≤ 12.990 dBm |

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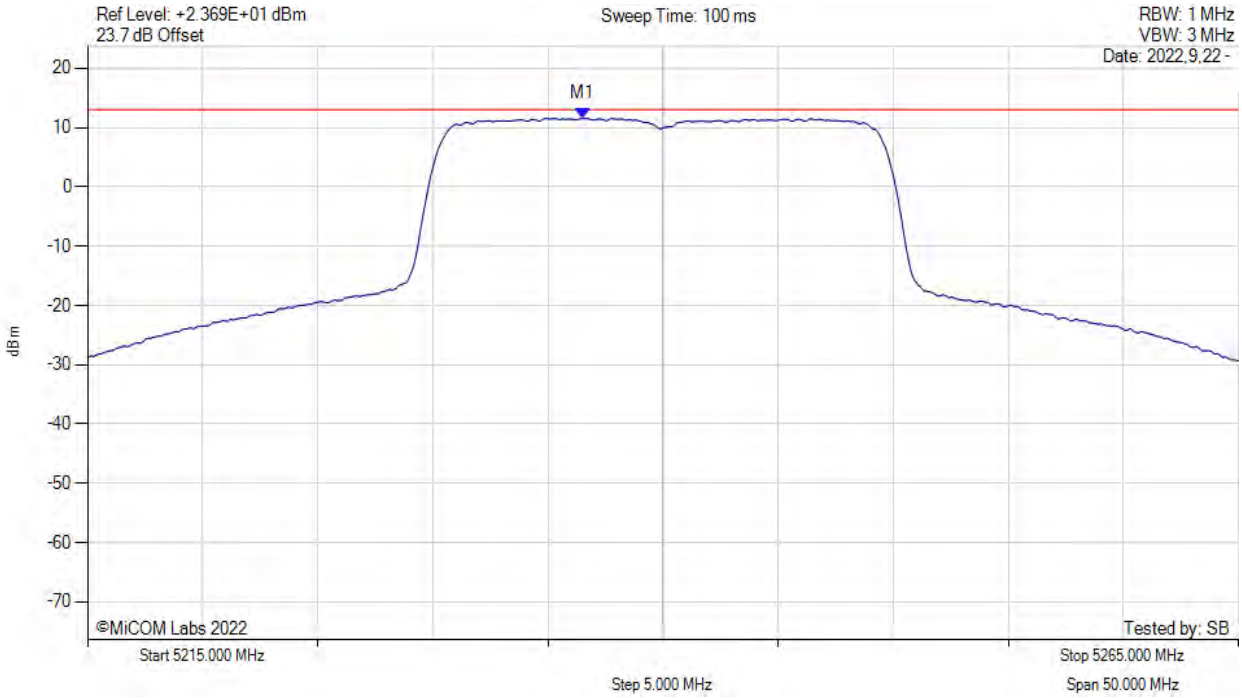
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5240.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5236.500 MHz : 11.556 dBm | Limit: ≤ 12.990 dBm |

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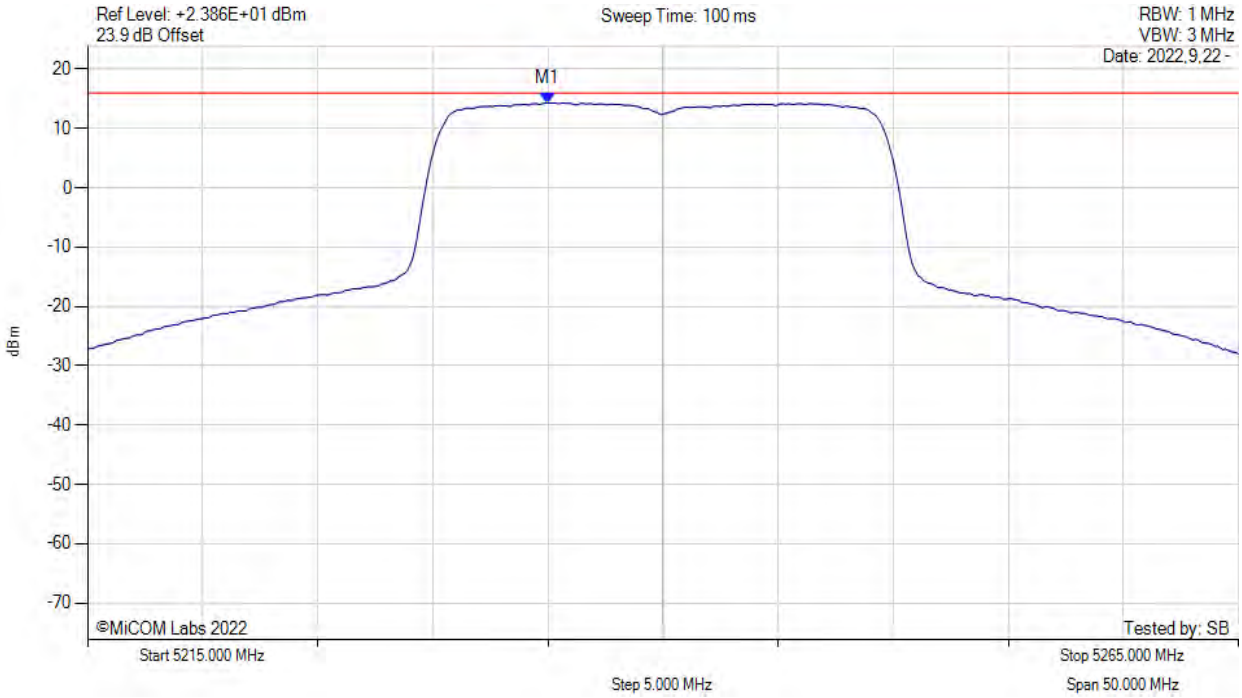
POWER SPECTRAL DENSITY

Variant: OFDM-20, Channel: 5240.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5235.000 MHz : 14.310 dBm<br>M1 + DCCF : 5235.000 MHz : 14.354 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -1.7 dB |

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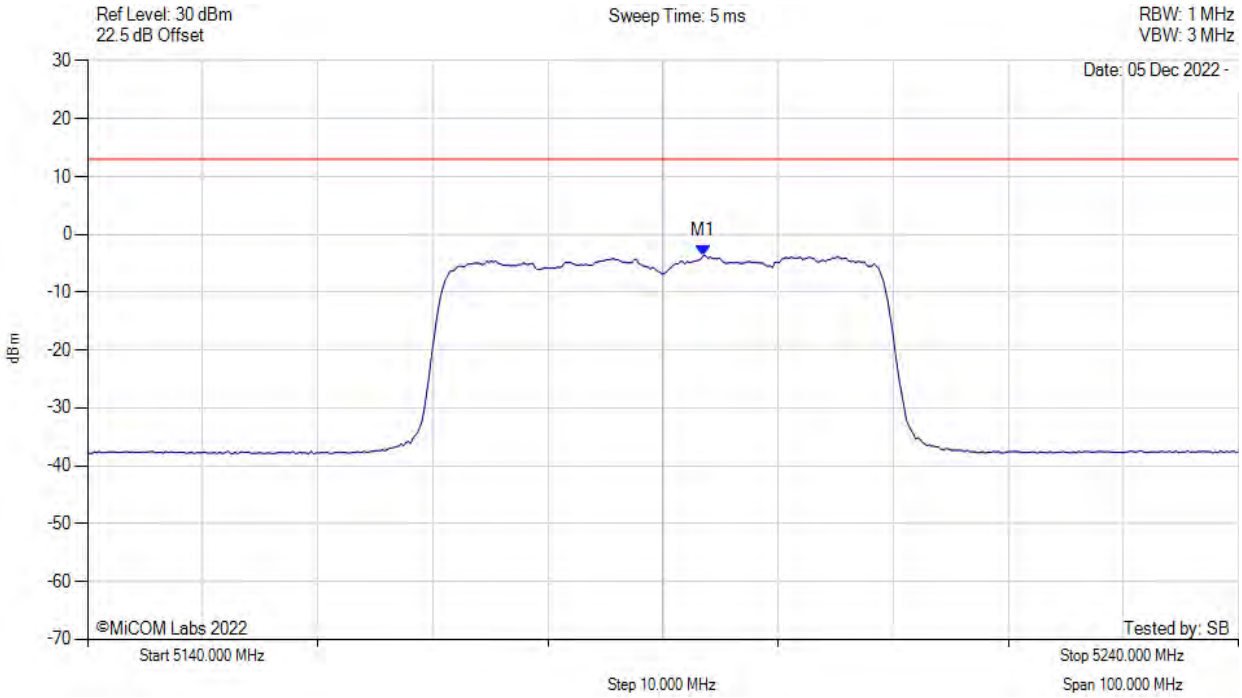
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5190.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5193.507 MHz : -3.661 dBm | Limit: ≤ 12.990 dBm |

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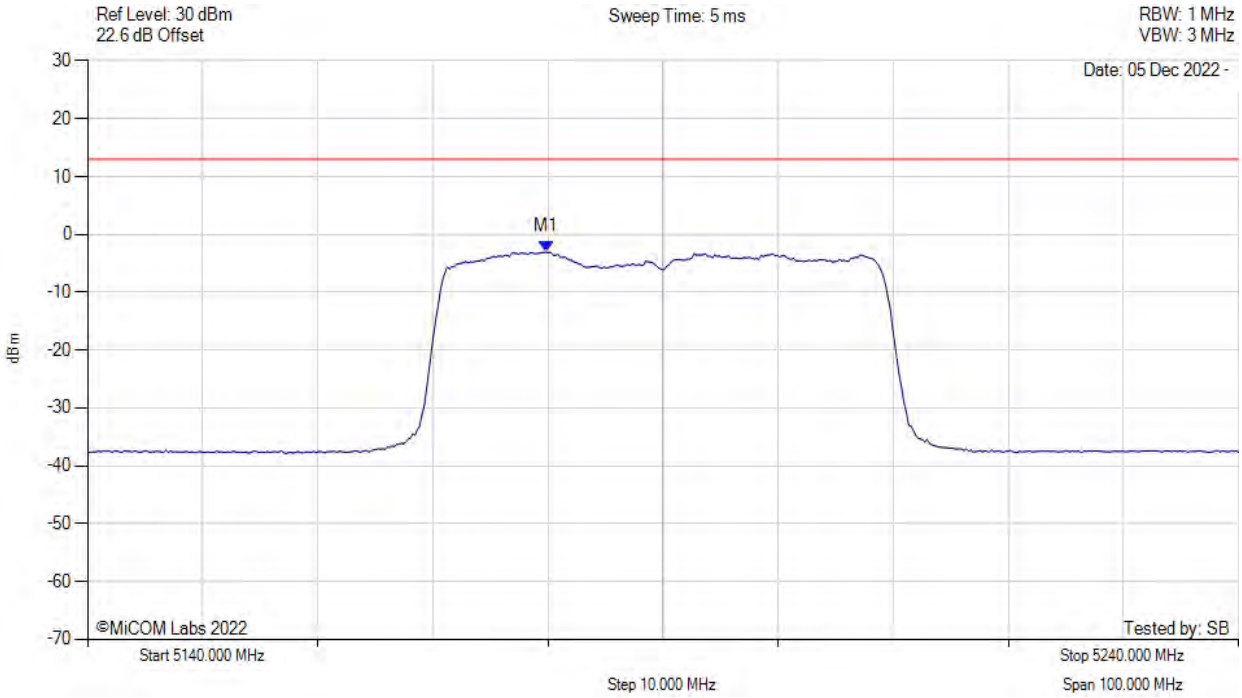
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5190.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5179.880 MHz : -3.060 dBm | Limit: ≤ 12.990 dBm |

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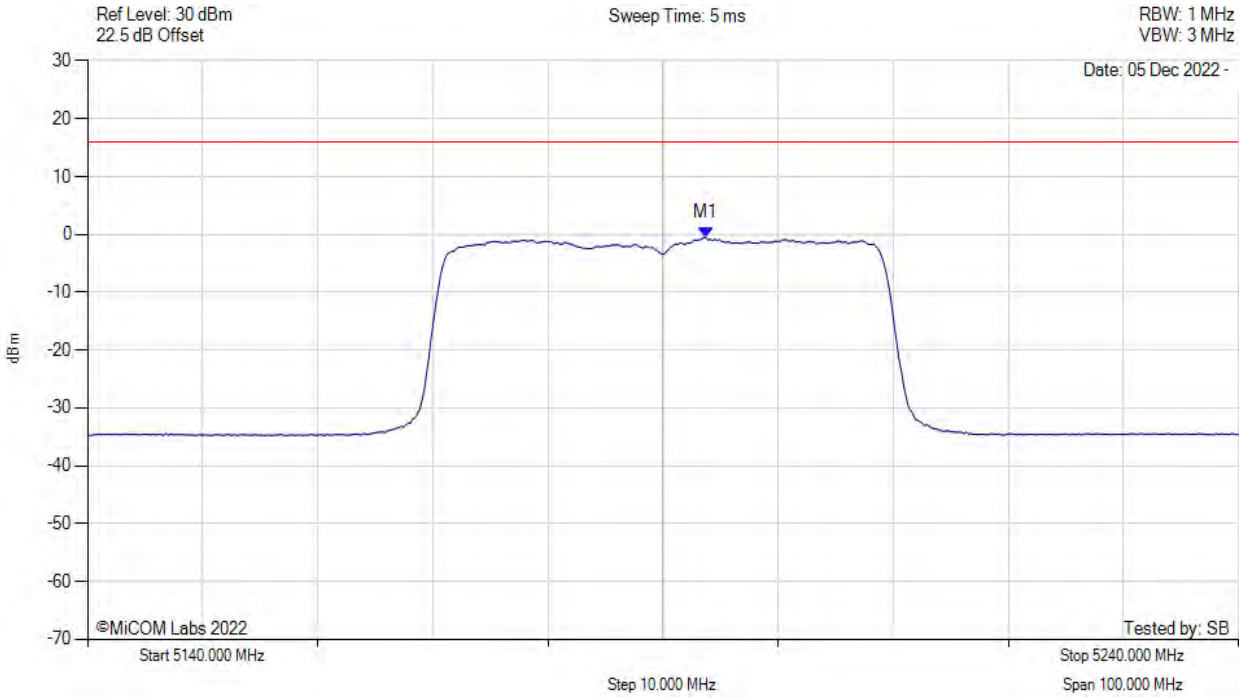
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5190.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5193.700 MHz : -0.528 dBm<br>M1 + DCCF : 5193.700 MHz : -0.484 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -16.5 dB |

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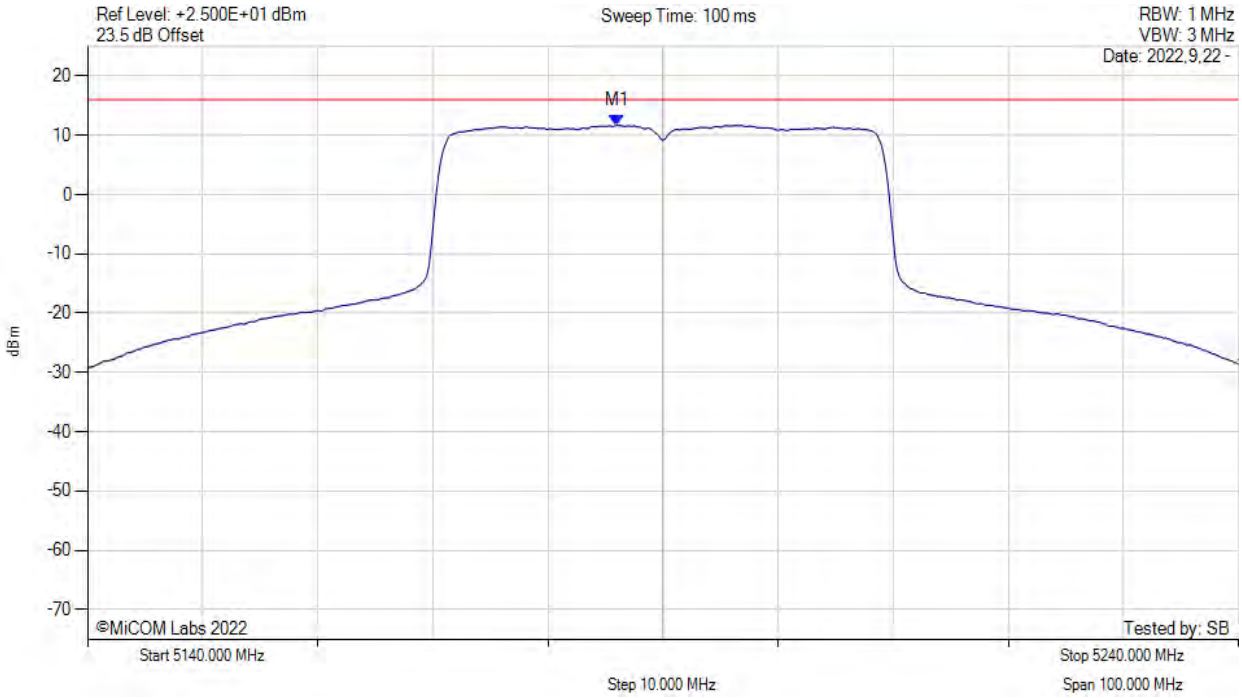
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5190.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5186.000 MHz : 11.690 dBm<br>M1 + DCCF : 5186.000 MHz : 11.734 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -4.3 dB |

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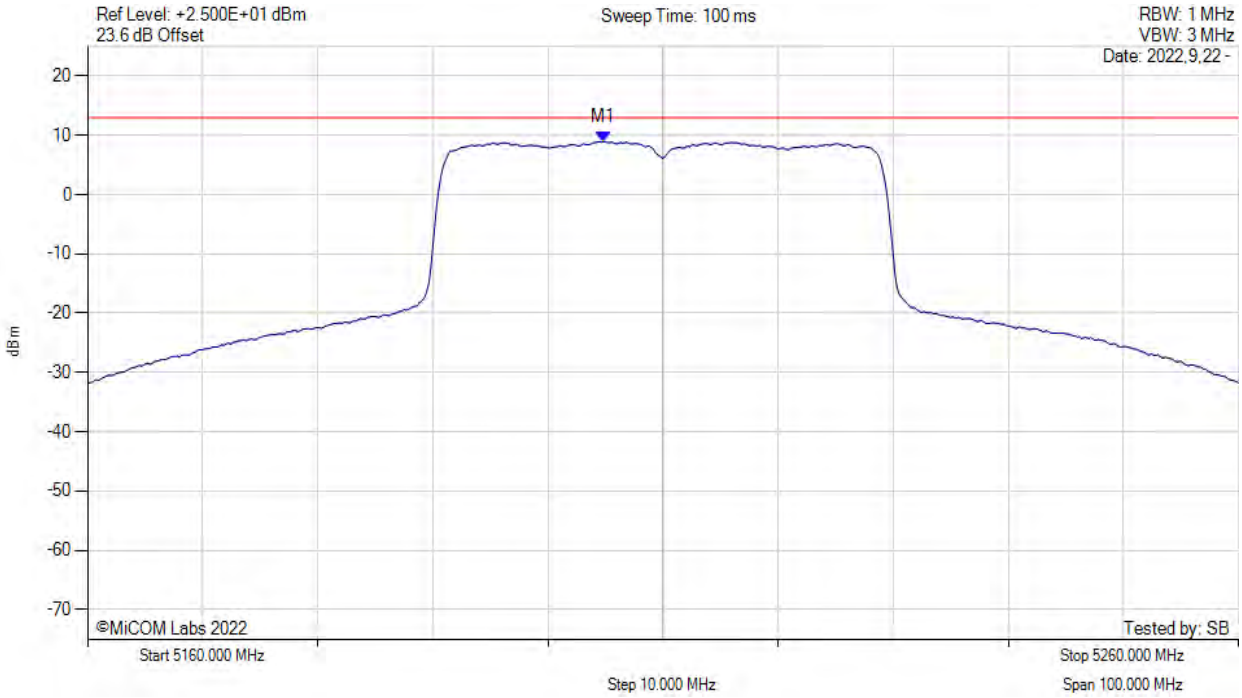
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5204.830 MHz : 8.933 dBm | Limit: ≤ 12.990 dBm |

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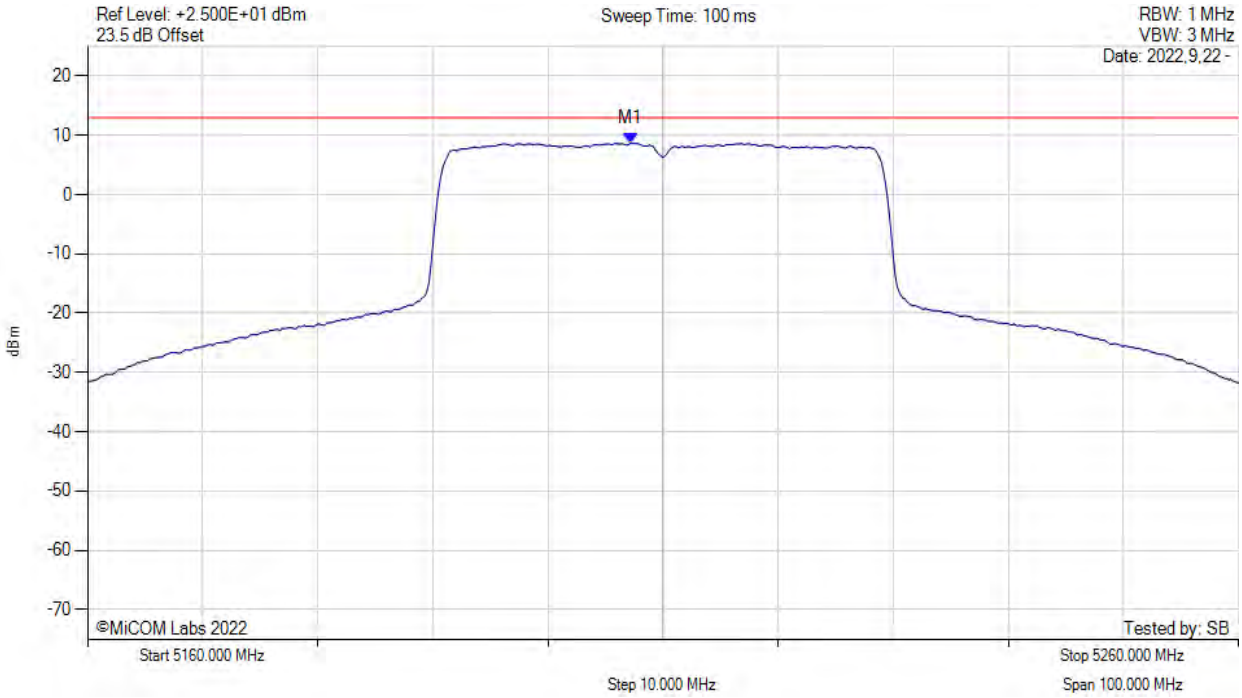
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5207.170 MHz : 8.676 dBm | Channel Frequency: 5210.00 MHz |

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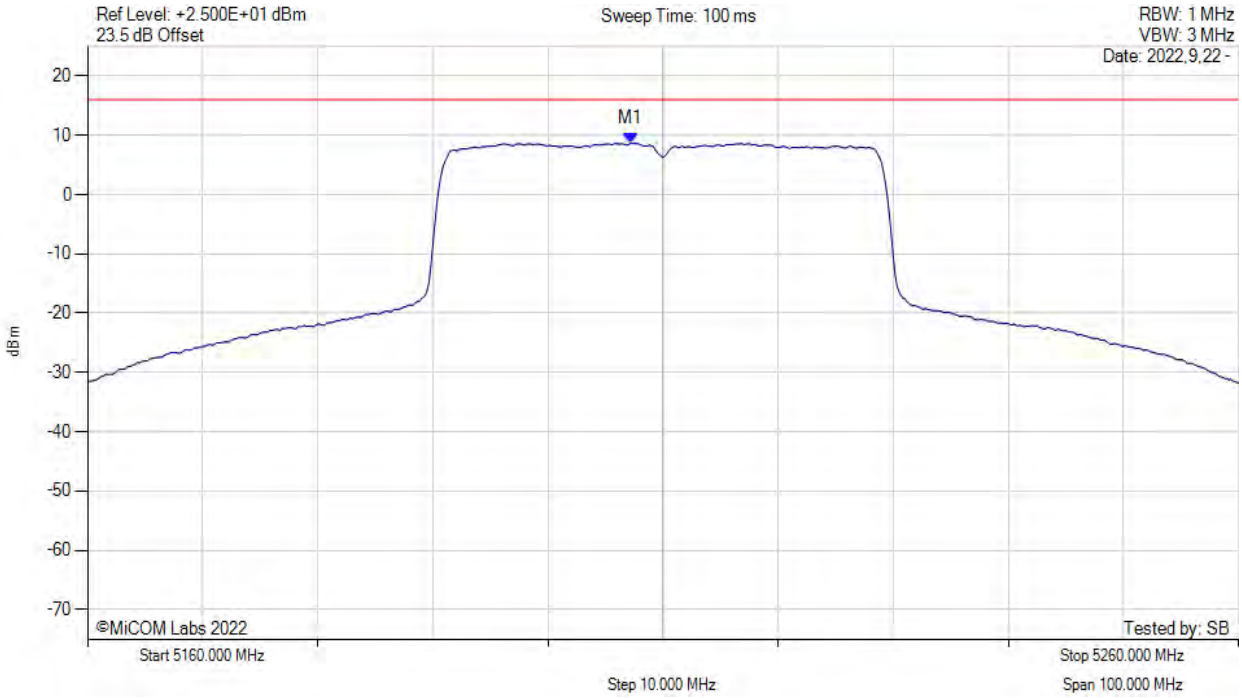
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5207.200 MHz : 8.676 dBm<br>M1 + DCCF : 5207.200 MHz : 8.720 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -7.3 dB |

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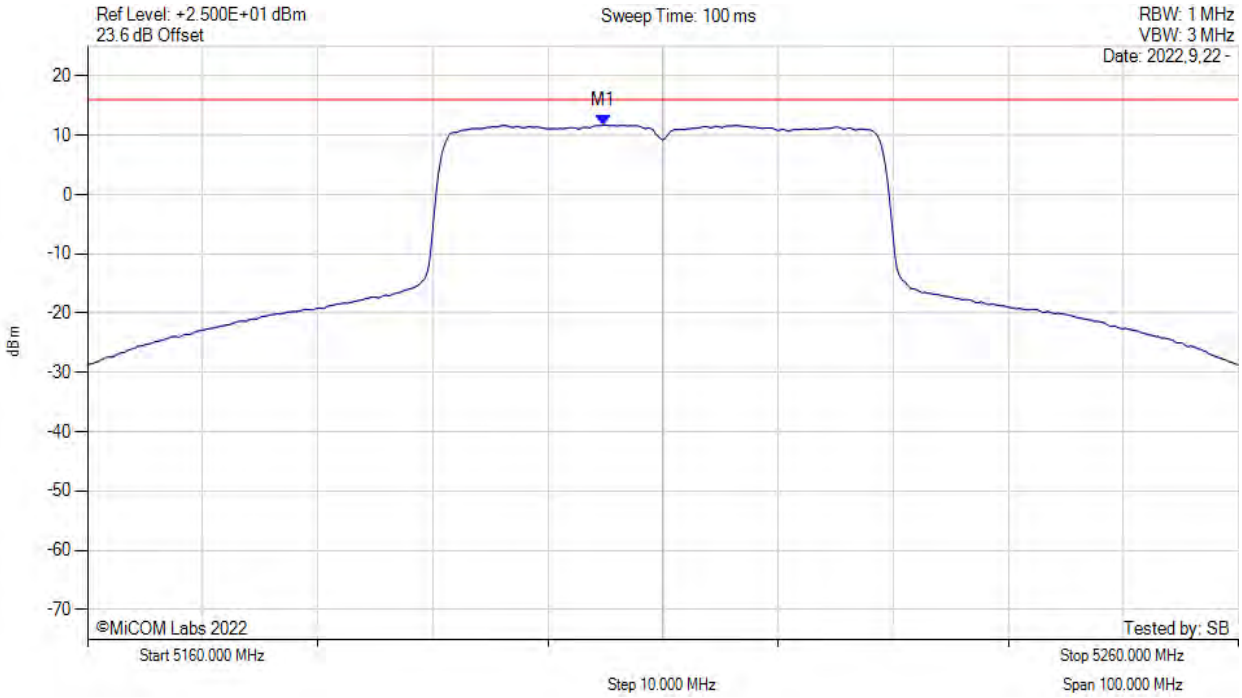
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5204.800 MHz : 11.738 dBm<br>M1 + DCCF : 5204.800 MHz : 11.782 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -4.2 dB |

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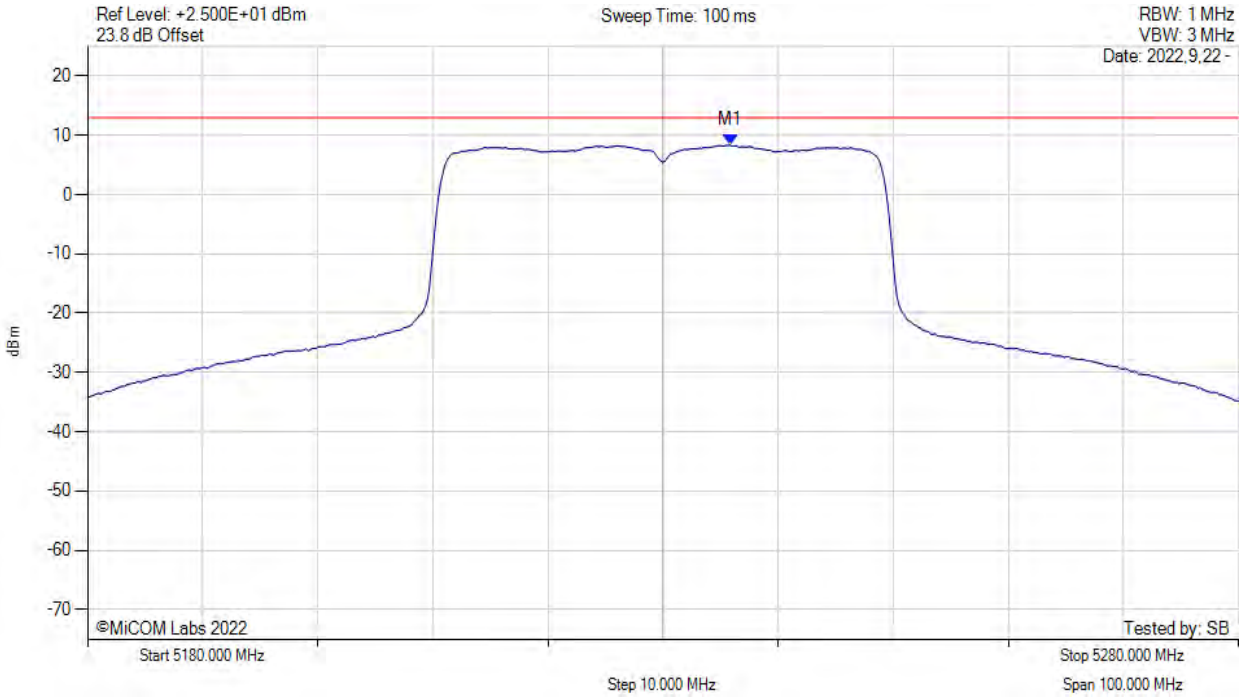
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5230.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5235.830 MHz : 8.342 dBm | Limit: ≤ 12.990 dBm |

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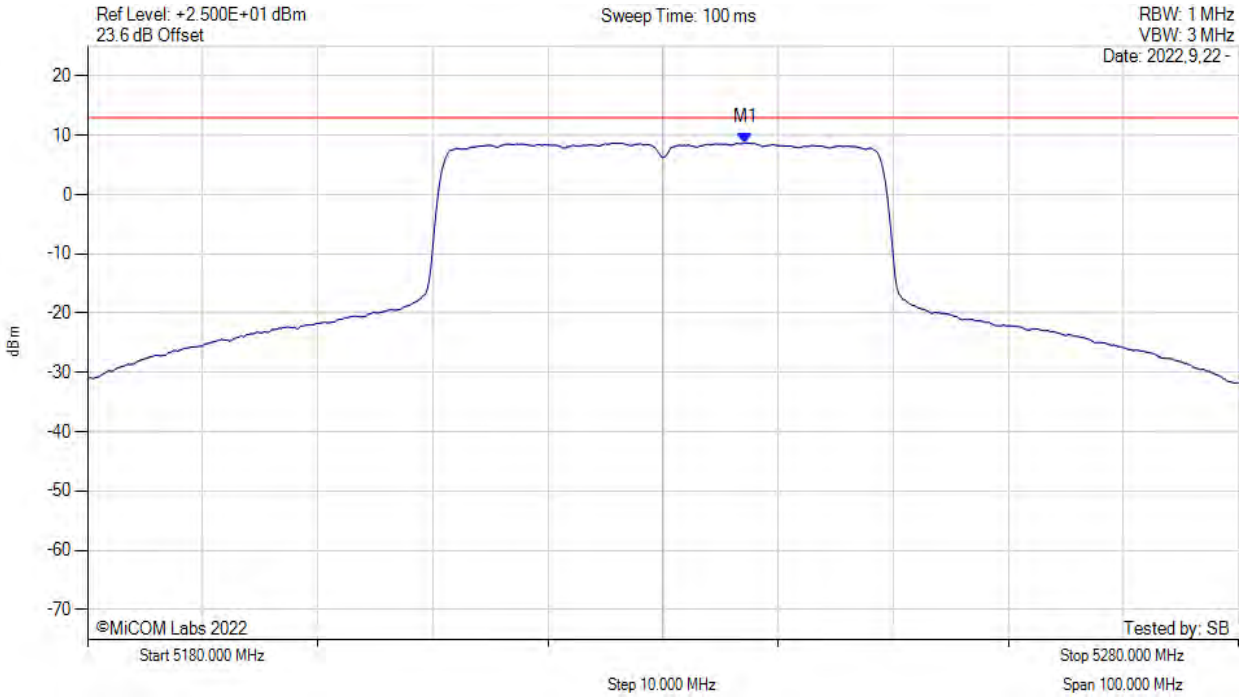
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5230.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5237.170 MHz : 8.737 dBm | Limit: ≤ 12.990 dBm |

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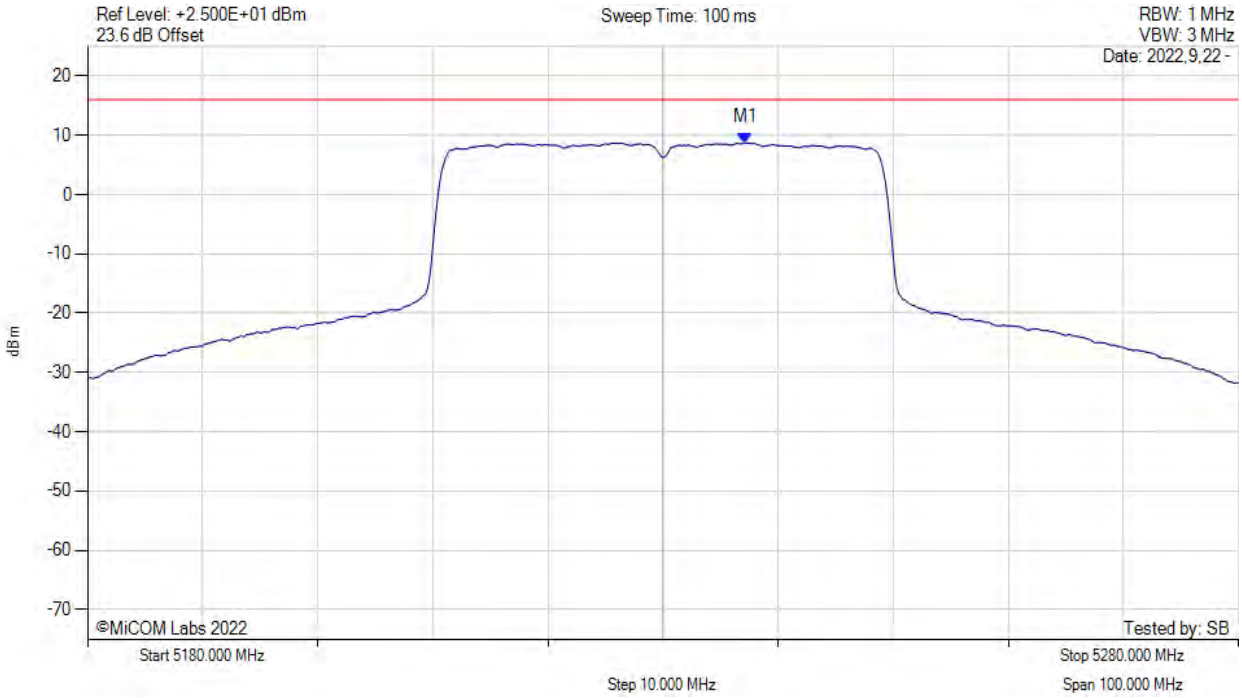
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5230.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5237.200 MHz : 8.737 dBm<br>M1 + DCCF : 5237.200 MHz : 8.781 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -7.2 dB |

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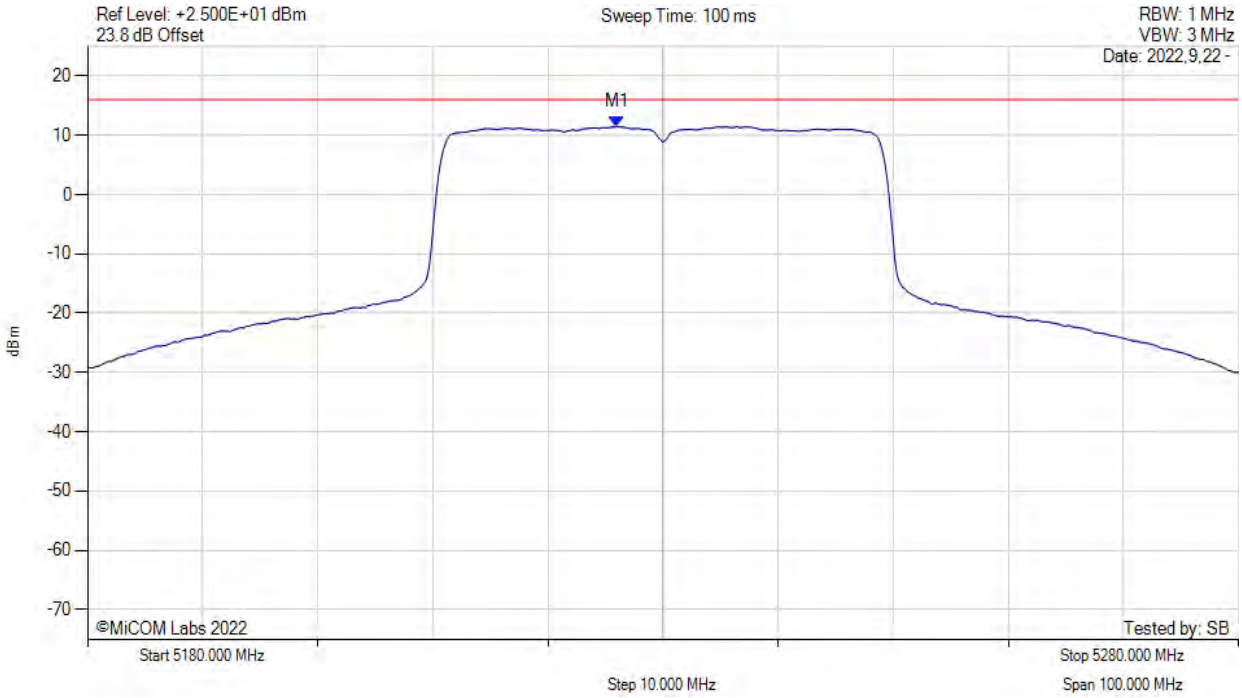
POWER SPECTRAL DENSITY

Variant: OFDM-40, Channel: 5230.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5226.000 MHz : 11.459 dBm<br>M1 + DCCF : 5226.000 MHz : 11.503 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -4.5 dB |

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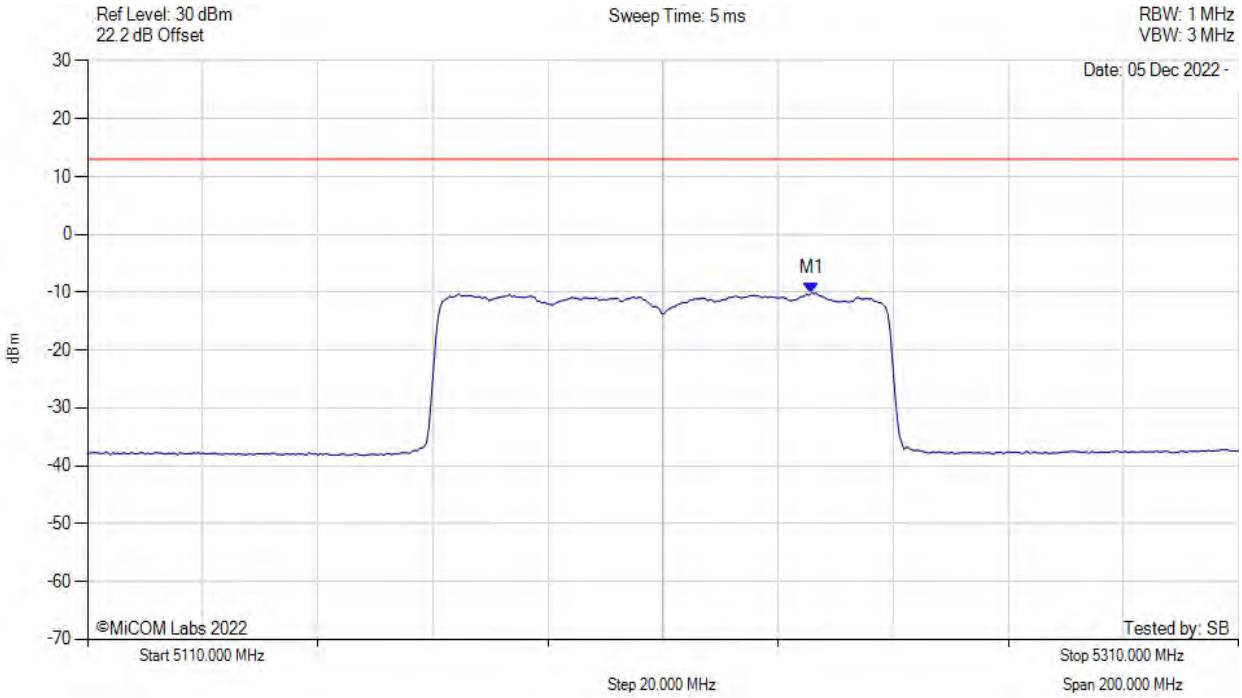
POWER SPECTRAL DENSITY

Variant: OFDM-80, Channel: 5210.00 MHz, Chain a, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5235.852 MHz : -10.119 dBm | Limit: ≤ 12.990 dBm |

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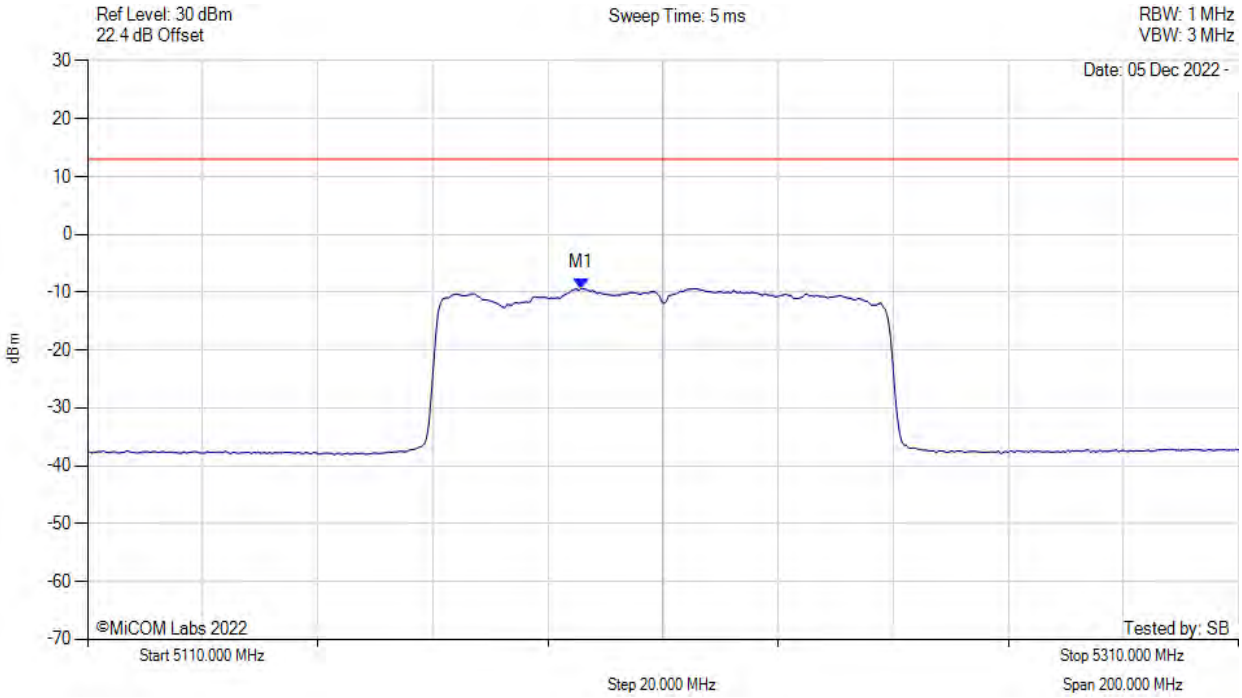
POWER SPECTRAL DENSITY

Variant: OFDM-80, Channel: 5210.00 MHz, Chain b, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5195.772 MHz : -9.334 dBm | Channel Frequency: 5210.00 MHz |

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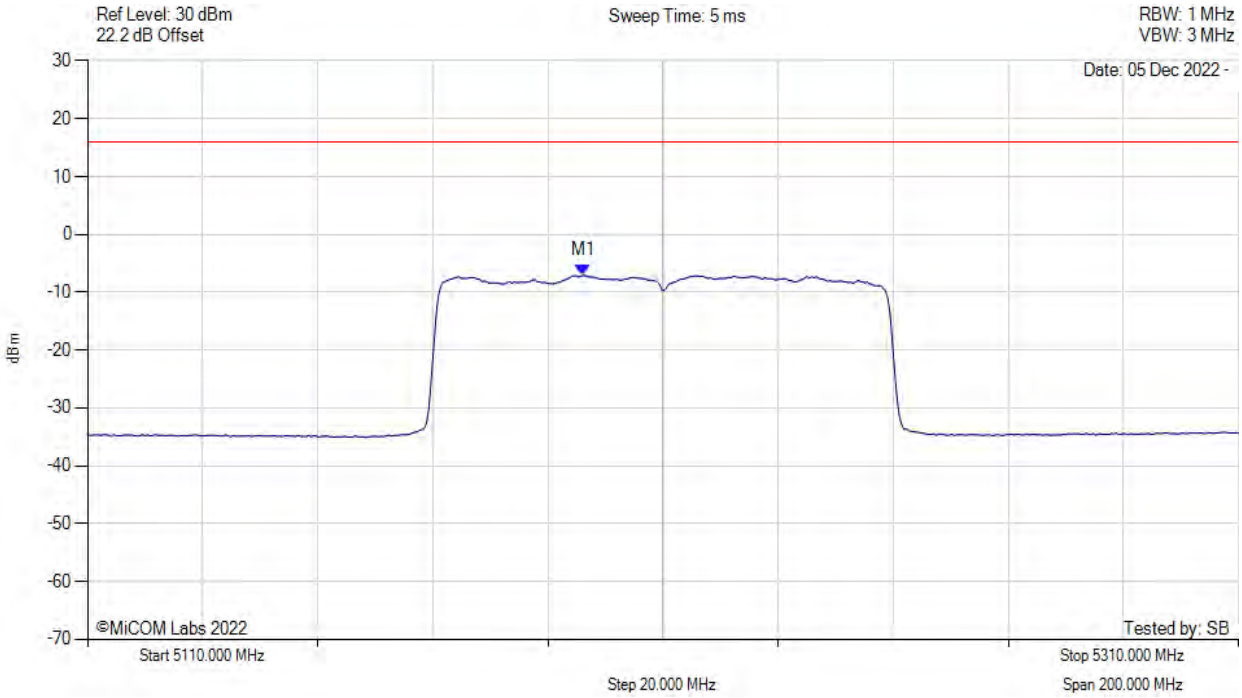
POWER SPECTRAL DENSITY

Variant: OFDM-80, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = RMS<br>Sweep Count = 100<br>RF Atten (dB) = 30<br>Trace Mode = VIEW | M1 : 5196.200 MHz : -7.093 dBm<br>M1 + DCCF : 5196.200 MHz : -7.049 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -23.1 dB |

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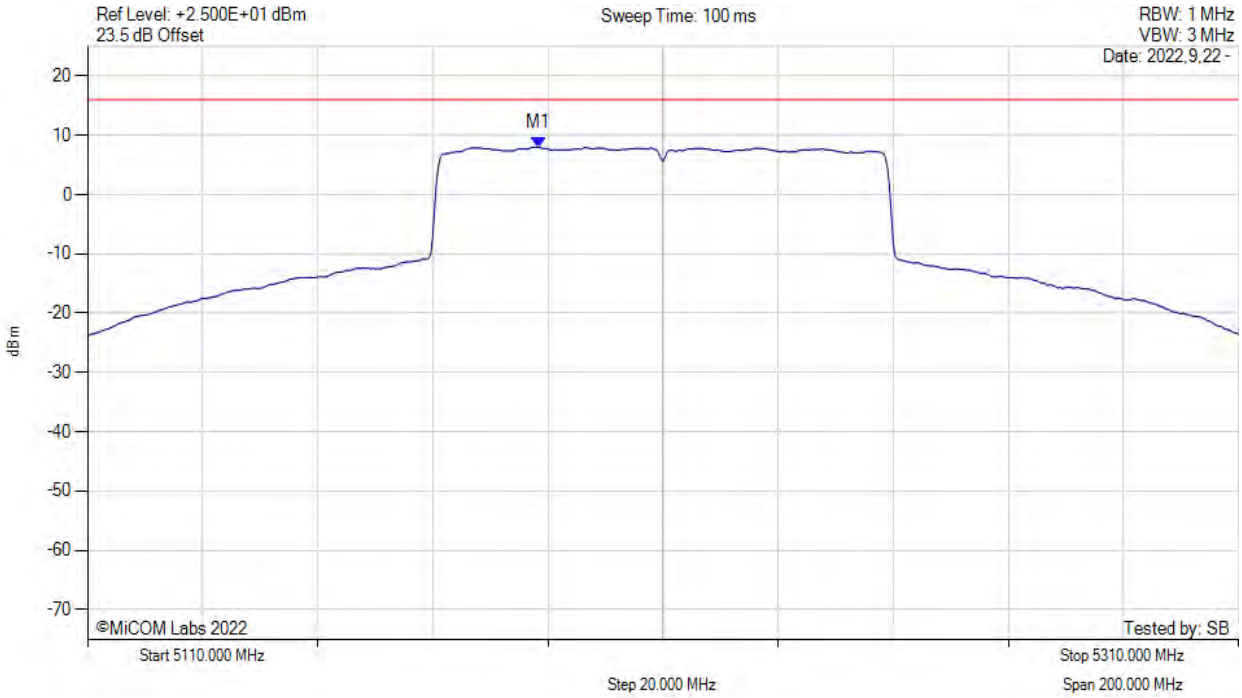
POWER SPECTRAL DENSITY

Variant: OFDM-80, Channel: 5210.00 MHz, SUM, Temp: 20, Voltage: 56 Vdc




| Analyzer Setup | Marker:Frequency:Amplitude | Test Results |
|---|---|---|
| Detector = AVER<br>Sweep Count = +100<br>RF Atten (dB) = 20<br>Trace Mode = VIEW | M1 : 5188.300 MHz : 8.008 dBm<br>M1 + DCCF : 5188.300 MHz : 8.052 dBm<br>Duty Cycle Correction Factor : +0.04 dB | Limit: ≤ 16.0 dBm<br>Margin: -8.0 dB |

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Fax: +1 (925) 462 0306
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