# TEST REPORT

| | |
|---|---|
| **Application No.:** | SUCR2401000008IT |
| **Applicant:** | JL MARINE SYSTEMS, INC. |
| **Address of Applicant:** | 9010 Palm River Road, Tampa, FL 33619, USA |
| **Manufacturer:** | JL MARINE SYSTEMS, INC. |
| **Address of Manufacturer:** | 9010 Palm River Road, Tampa, FL 33619, USA |
| **EUT Description:** | Marine Tablet |
| **Model No.:** | Vision 12 |
| **Trade Mark:** | Power-Pole |
| **FCC ID:** | A7FVISION12 |
| **Standards:** | FCC 47 CFR Part 2, Subpart J<br>FCC 47 CFR Part 15, Subpart E |
| **Date of Receipt:** | 2023/11/17 |
| **Date of Test:** | 2023/12/18 to 2024/01/18 |
| **Date of Issue:** | 2024/06/17 |
| **Test Result :** | **PASS *** |

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Well Wei
Wireless Laboratory Manager

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# 1 Version

| Revision Record | | | | |
|---|---|---|---|---|
| ***Version*** | ***Chapter*** | ***Date*** | ***Modifier*** | ***Remark*** |
| 01 | | 2024/06/17 | | Original |

| | | |
|---|---|---|
| **Prepared By** | | **(Ives Cheng) / Test Engineer** |
| **Checked By** | | **(Stone Gu) / Reviewer** |

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# 2 Test Summary

| Test Item | Band[1] | FCC rules No. | Test Requirements | Test Result | Result | Lab[2] |
|---|---|---|---|---|---|---|
| Antenna Requirement | -- | 15.203/15.407(a) | -- | Clause 4.1 | PASS | -- |
| 26dB Emission Bandwidth | Band I | 15.407(a)(1) | No limit. | Clause 4.5 | For Report Purpose | A |
| | Band II-A | 15.407(a)(2) | | | | |
| | Band II-C | 15.407(a)(2) | | | | |
| 6dB Emission Bandwidth | Band III | 15.407(e) | ≥ 500 kHz. | Clause 4.6 | PASS | A |
| 99% Occupied Bandwidth | Band I | KDB 789033 D02§ D | No limit. | Clause 4.7 | For Report Purpose | A |
| | Band II-A | | | | | |
| | Band II-C | | | | | |
| | Band III | | | | | |
| Duty Cycle | Band I<br>Band II-A<br>Band II-C<br>Band III | -- | No limit. | Clause 4.3 | For Report Purpose | A |
| Maximum Conducted Output Power | Band I | 15.407(a)(iv) | < 250mW | Clause 4.4 | PASS | A |
| | Band II-A | 15.407(a)(2) | <MIN{250mW,11dBm+10*lg(EBW)} | | | |
| | Band II-C | | | | | |
| | Band III | 15.407(a)(3) | < 1W | | | |
| Maximum Power Spectral Density | Band I | 15.407(a)(iv) | <11dBm/MHz | Clause 4.8 | PASS | A |
| | Band II-A | 15.407(a)(2) | <11dBm/MHz | | | |
| | Band II-C | | | | | |
| | Band III | 15.407(a)(3) | <30dBm/500KHz | | | |
| Radiated Spurious Emissions | Band I | 15.407(b)<br>15.205/15.209 | F<1GHz:<br>§15.209 limit (QP).<br>F≥1GHz & out-restricted:<br><-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz).<br>F≥1GHz & in-restricted:<br>§15.209 limit (AV&PK). | Clause 4.9 | PASS | B |
| | Band II-A | 15.407(b)<br>15.205/15.209 | F<1GHz:<br>§15.209 limit (QP).<br>F≥1GHz & out-restricted:<br><-27dBm/MHz PK e.i.r.p. (exl. 5.25-5.35 GHz).<br>F≥1GHz & in-restricted:<br>§15.209 limit (AV&PK). | | PASS | |
| | Band II-C | 15.407(b)<br>15.205/15.209 | F<1GHz:<br>§15.209 limit (QP).<br>F≥1GHz & out-restricted:<br><-27dBm/MHz PK e.i.r.p. (exl. 5.47-5.725 GHz).<br>F≥1GHz & in-restricted:<br>§15.209 limit (AV&PK). | | PASS | |
| | Band III | 15.407(b)<br>15.205/15.209 | F<1GHz:<br>§15.209 limit (QP)<br>F≥1GHz &out-restricted:(PK) | | PASS | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | 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.<br>F≥1GHz & in-restricted:<br>§15.209 limit (AV&PK). | | | |
| Restricted bands around fundamental frequency | Band I<br>Band II-A<br>Band II-C<br>Band III | 15.407(b)<br>15.205/15.209 | --- | Clause 4.10 | PASS | B |
| AC Power Line Conducted Emissions | Band I<br>Band II-A<br>Band II-C<br>Band III | 15.207 | --- | Clause 4.2 | PASS | B |
| Dynamic Frequency Selection | Band II-A<br>Band II-C | 15.407 | Channel Move Time:10 Seconds | Clause 4.11 | PASS | A |
| Frequency Stability | Band I<br>Band II-A<br>Band II-C<br>Band III | 15.407(g) | Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual | N/A | N/A | N/A |

Note 1:
Band I: 5150-5250MHz
Band II-A: 5250-5350MHz
Band II-C: 5470-5725MHz
Band III: 5725-5850MHz
Note 2:
Lab A SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Lab B SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd.

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# 3 General Information

## 3.1 Details of Client

| | |
|---|---|
| Applicant: | JL MARINE SYSTEMS, INC. |
| Address of Applicant: | 9010 Palm River Road, Tampa, FL 33619, USA |
| Manufacturer: | JL MARINE SYSTEMS, INC. |
| Address of Manufacturer: | 9010 Palm River Road, Tampa, FL 33619, USA |

## 3.2 Test Location

| | |
|---|---|
| **Lab A:** | |
| Company: | SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd. |
| Address: | South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone |
| Post code: | 215000 |
| Test engineer: | Ives Cheng |
| | |
| **Lab B:** | |
| Company: | SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. |
| Address: | 1/F, Unit D, Building 1, Kanghong Orange Science Park, No.137, Keyuan 3rd Road, Fengdong New Town, Xi' an, Shaanxi China |
| Post code: | 710086 |
| Test engineer: | Abbott Wang |

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## 3.3 Test Facility

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

| Lab A: |
|---|
| **• A2LA (Certificate No. 6336.01)**<br>SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.<br>**• Innovation, Science and Economic Development Canada**<br>SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.<br>CAB identifier: CN0120.<br>IC#: 27594.<br>**• FCC –Designation Number: CN1312**<br>SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.<br>Designation Number: CN1312.<br>Test Firm Registration Number: 717327 |
| **Lab B:** |
| **•A2LA (Certificate No. 4854.01)**<br>SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.<br>**• Innovation, Science and Economic Development Canada**<br>SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.<br>CAB identifier: CN0095.<br>IC#: 25613.<br>**• FCC –Designation Number: CN1337**<br>SGS-CSTC Standards Technical Services (Xi'an) Co., Ltd. has been recognized as an accredited testing laboratory.<br>Designation Number: CN1337.<br>Test Firm Registration Number: 917410 |

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## 3.4 General Description of EUT

| | | |
|---|---|---|
| EUT Description: | Marine Tablet | |
| Model No.: | Vision 12 | |
| Trade Mark: | Power-Pole | |
| Hardware Version: | V3.0 | |
| Software Version: | Vision12_20240522 | |
| IMEI: | RF Conducted | IMEI1: 352323930001722<br>IMEI2: 352323930001730 |
| | RSE & AC power line | 352323930001144 |
| WLAN Mode Supported: | 802.11a: | 20 MHz channel bandwidth |
| | 802.11n: | 20 MHz / 40 MHz channel bandwidth |
| | 802.11ac: | 20 MHz / 40 MHz channel bandwidth |
| Operation Frequency: | 5150MHz to 5250MHz<br>5250MHz to 5350MHz<br>5470MHz to 5725MHz<br>5725MHz to 5850MHz | |
| Modulation Type: | 802.11a: | OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| | 802.11n: | OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| | 802.11ac: | OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM) |
| Channel Spacing: | 20MHz: | 802.11a/n(HT20)/ac(VHT20) |
| | 40MHz: | 802.11n(HT40)/ac(VHT40) |
| Antenna Type: | ☐ External, ☒ Integrated | |
| Antenna Gain: | 5150MHz to 5250MHz: 2.7dBi (Ant1);<br>5250MHz to 5350MHz: 2.54dBi (Ant1);<br>5470MHz to 5725MHz: 2.89dBi (Ant1);<br>5725MHz to 5850MHz: 2.41dBi (Ant1); | |
| | Note:<br>The antenna gain are derived from the gain information report provided by the manufacturer. | |
| Smart System: | ☒ SISO | 802.11a/n/ac |
| TPC Function: | ☐Support, ☒Not Support | |
| DFS Function: | ☐Master | |
| | ☐Slave with radar detection | ☒Slave without radar detection |
| RF Cable: | 2.0dB | |
| Remark:<br>As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information. | | |

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Remark:
In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

| Frequency range over which device operates | Number of Measurement Frequencies Required | Location of Measurement Frequency in Band of Operation |
|---|---|---|
| 1 MHz or less | 1 | centre |
| 1 MHz to 10 MHz | 2 | 1 near high end, 1 near low end |
| Greater than 10 MHz | 3 | 1 near high end, 1 near centre |

**For UNII Band I:**

| Mode | Channel | Frequency(MHz) |
|---|---|---|
| IEEE 802.11a/n/ac 20MHz | The Lowest channel | 5180 |
| | The Middle channel | 5200 |
| | The Highest channel | 5240 |
| IEEE 802.11n/ac 40MHz | The Lowest channel | 5190 |
| | The Highest channel | 5230 |

**For UNII Band II-A:**

| Mode | Channel | Frequency(MHz) |
|---|---|---|
| IEEE 802.11a/n/ac 20MHz | The Lowest channel | 5260 |
| | The Middle channel | 5280 |
| | The Highest channel | 5320 |
| IEEE 802.11n/ac 40MHz | The Lowest channel | 5270 |
| | The Highest channel | 5310 |

**For UNII Band II-C:**

| Mode | Channel | Frequency(MHz) |
|---|---|---|
| IEEE 802.11a/n/ac 20MHz | The Lowest channel | 5500 |
| | The Middle channel | 5580 |
| | The Highest channel | 5700 |
| IEEE 802.11n/ac 40MHz | The Lowest channel | 5510 |
| | The Middle channel | 5550 |
| | The Highest channel | 5670 |

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| For UNII Band III: | | |
|---|---|---|
| Mode | Channel | Frequency(MHz) |
| IEEE 802.11a/n/ac 20MHz | The Lowest channel | 5745 |
| | The Middle channel | 5785 |
| | The Highest channel | 5825 |
| IEEE 802.11n/ac 40MHz | The Lowest channel | 5755 |
| | The Highest channel | 5795 |

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## 3.5 Test Environment and Mode

| Environment Parameter | 96.0~101.0 kPa Selected Values During Tests | |
|---|---|---|
| Relative Humidity | 40-60 % RH Ambient | |
| Value | Temperature(℃) | Voltage(V) |
| NTNV | 22~25 | 12 |
| Remark:<br>NV: Normal Voltage<br>NT: Normal Temperature | | |

## 3.6 Description of Support Units

| Description | Manufacturer | Model No. |
|---|---|---|
| Router | ASUS | GT-AXE11000<br>(FCC ID MSQ-RTAXJF00) |

## 3.7 Worst-case configuration and mode

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. Following are the worst-case data rates set for test:

| Modulation Type | SISO - Data Rate | MIMO - Data Rate |
|---|---|---|
| 802.11a | 6 Mbps | / |
| 802.11n (HT 20) | MCS0 (6.5 Mbps) | / |
| 802.11n (HT 40) | MCS0 (13.5 Mbps) | / |
| 802.11ac (VHT 20) | MCS0 (6.5 Mbps) | / |
| 802.11ac (VHT 40) | MCS0 (13.5 Mbps) | / |

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# 4 Test results and Measurement Data

## 4.1 Antenna Requirement

| **Standard requirement:** | 47 CFR Part 15 Section 15.203 |
|---|---|

The antenna is Integrated Antenna and no consideration of replacement.
The best case gain of the antenna is
5150MHz to 5250MHz: 2.7dBi (Ant1);*
5250MHz to 5350MHz: 2.54dBi (Ant1);*
5470MHz to 5725MHz: 2.89dBi (Ant1);*
5725MHz to 5850MHz: 2.41dBi (Ant1);*

**Note:*
*The antenna gain are derived from the gain information report provided by the manufacturer.*
*Remark:*
*As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.*

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## 4.2 AC Power Line Conducted Emissions

| | | | |
|---|---|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.207 | | |
| Test Method: | ANSI C63.10: 2013 Section 6.2 | | |
| Test Frequency Range: | 150kHz to 30MHz | | |
| Receiver Setup: | RBW = 9kHz, VBW = 30kHz | | |
| Limit: | Frequency range (MHz) | Limit (dBuV) | |
| | | Quasi-peak | Average |
| | 0.15-0.5 | 66 to 56* | 56 to 46* |
| | 0.5-5 | 56 | 46 |
| | 5-30 | 60 | 50 |
| | * Decreases with the logarithm of the frequency. | | |
| Test Procedure: | 1) The mains terminal disturbance voltage test was conducted in a shielded room.<br>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.<br>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,<br>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.<br>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. | | |

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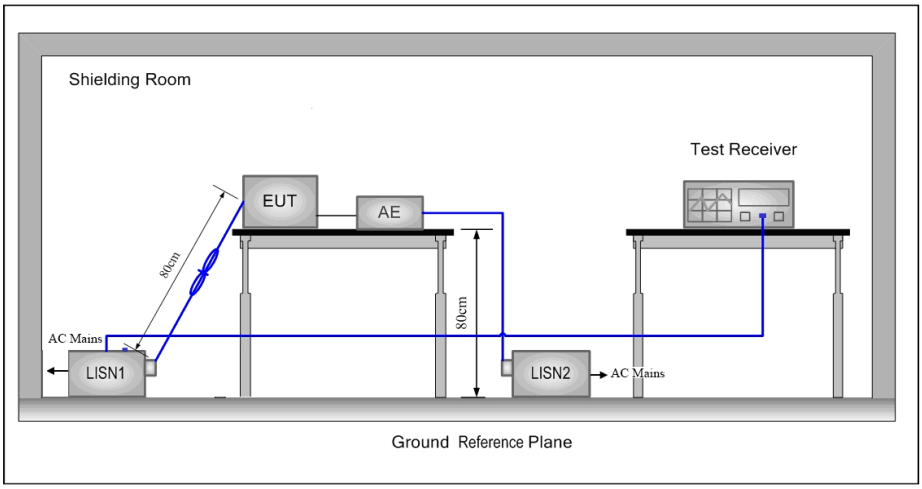
| | |
|---|---|
| Test Setup: |  |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.<br>Charge + Transmitting mode. |
| Final Test Mode: | Refer to section 3.7 for details.<br>Only the worst case is recorded in the report. |
| Instruments Used: | Refer to section 6 for details. |
| Test Results: | Pass |

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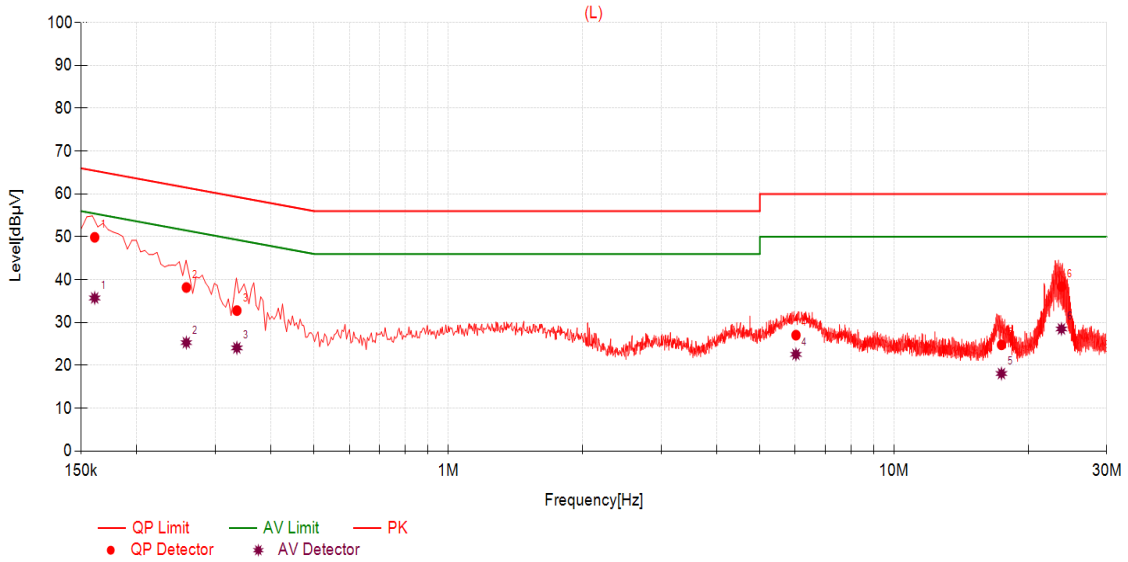
Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

| Phase: | Line |
|---|---|




Data List

| NO. | Freq. [MHz] | Factor [dB] | QP Reading [dBµV] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Reading [dBµV] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1609 | 9.86 | 40.04 | 49.90 | 65.42 | 15.52 | 25.88 | 35.74 | 55.42 | 19.68 | PASS |
| 2 | 0.2583 | 9.88 | 28.30 | 38.18 | 61.49 | 23.31 | 15.44 | 25.32 | 51.49 | 26.17 | PASS |
| 3 | 0.3354 | 9.89 | 22.90 | 32.79 | 59.32 | 26.53 | 14.20 | 24.09 | 49.32 | 25.23 | PASS |
| 4 | 6.0244 | 9.90 | 17.16 | 27.06 | 60.00 | 32.94 | 12.69 | 22.59 | 50.00 | 27.41 | PASS |
| 5 | 17.4193 | 10.24 | 14.57 | 24.81 | 60.00 | 35.19 | 7.86 | 18.10 | 50.00 | 31.90 | PASS |
| 6 | 23.7462 | 10.29 | 28.10 | 38.39 | 60.00 | 21.61 | 18.22 | 28.51 | 50.00 | 21.49 | PASS |

Remark:
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
3. Margin = Limit[dBµV] – Value[dBµV]

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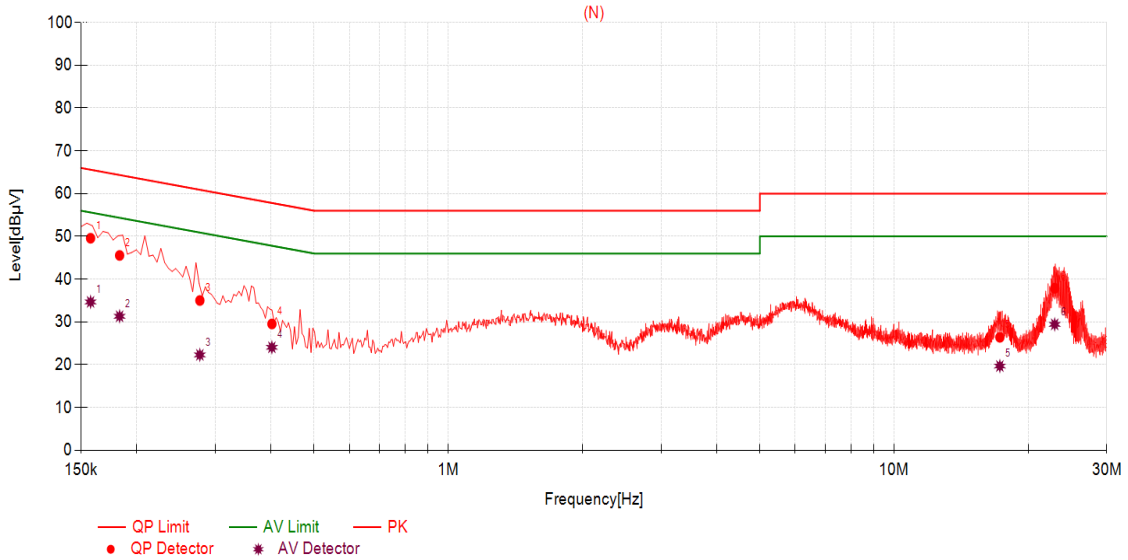
| Phase: | Neutral |
|---|---|




Data List

| NO. | Freq. [MHz] | Factor [dB] | QP Reading [dBµV] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Reading [dBµV] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1575 | 9.78 | 39.80 | 49.58 | 65.59 | 16.01 | 24.91 | 34.69 | 55.59 | 20.90 | PASS |
| 2 | 0.1830 | 9.82 | 35.74 | 45.56 | 64.35 | 18.79 | 21.51 | 31.33 | 54.35 | 23.02 | PASS |
| 3 | 0.2770 | 9.80 | 25.23 | 35.03 | 60.91 | 25.88 | 12.51 | 22.31 | 50.91 | 28.60 | PASS |
| 4 | 0.4019 | 9.81 | 19.73 | 29.54 | 57.81 | 28.27 | 14.27 | 24.08 | 47.81 | 23.73 | PASS |
| 5 | 17.2750 | 10.31 | 16.11 | 26.42 | 60.00 | 33.58 | 9.39 | 19.70 | 50.00 | 30.30 | PASS |
| 6 | 22.9332 | 10.32 | 27.56 | 37.88 | 60.00 | 22.12 | 19.12 | 29.44 | 50.00 | 20.56 | PASS |

Remark:
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
3. Margin = Limit[dBµV] – Value[dBµV]

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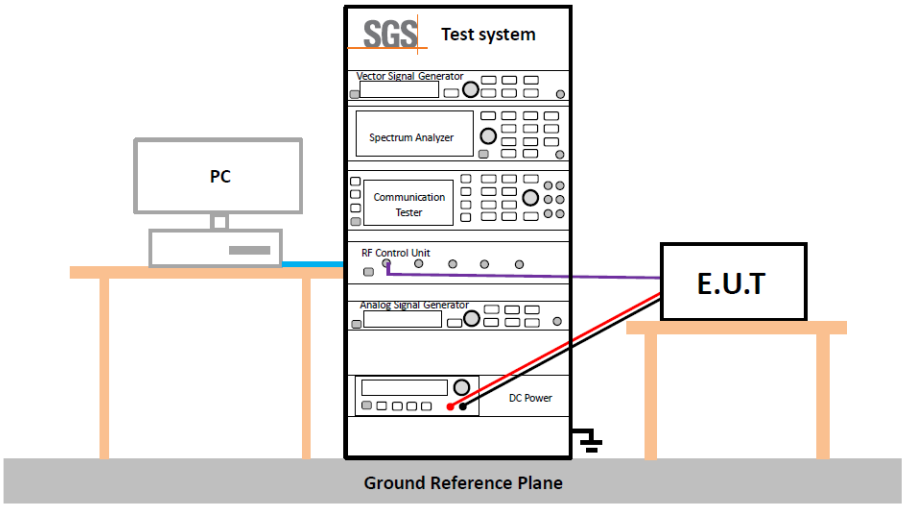
## 4.3 Duty Cycle

| | |
|---|---|
| Test Requirement: | ANSI C63.10 :2013 Section 12.2 |
| Test Method: | ANSI C63.10 :2013 Section 12.2 |
| Test Setup: |  |
| Instruments Used: | Refer to section 6 for details |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Refer to section 3.7 for details. |
| Limit: | No restriction limits |
| Test Results: | For report purpose |
| The detailed test data see: **Appendix** | |

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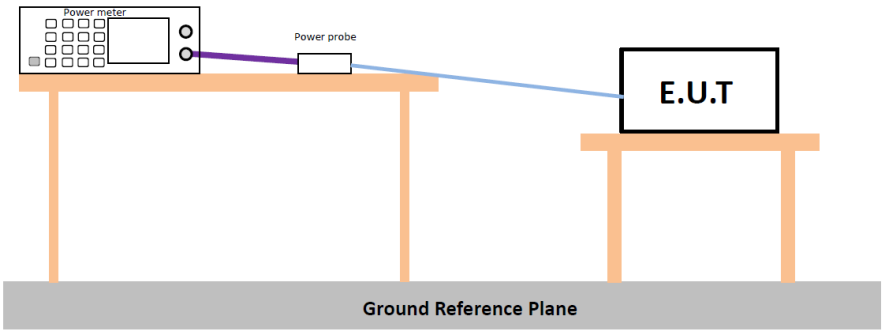
## 4.4 Conducted Output Power

| | | |
|---|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.407(a) | |
| Test Method: | ANSI C63.10 :2013 Section 12.3.3.2 | |
| Test Setup: |  <br>* Test with power meter (Detector function: Average)<br>Method PM-G is measurement using a gated RF average power meter. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required. | |
| Test Instruments: | Refer to section 6 for details. | |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates | |
| Final Test Mode: | Refer to section 3.7 for details. | |
| Limit: | Frequency Band | Limit |
| | 5150-5250MHz | Not exceed 250mW(23.98dBm) |
| | 5250-5350MHz | The lesser of 250mW(23.98dBm) or 11+ 10logB |
| | 5470-5725MHz | The lesser of 250mW(23.98dBm) or 11+ 10logB |
| | 5725-5850MHz | Not exceed 1W(30dBm) |
| | *Where B is the 26dB emission bandwidth in MHz | |
| Test Results: | Pass | |
| The detailed test data see: **Appendix** | | |

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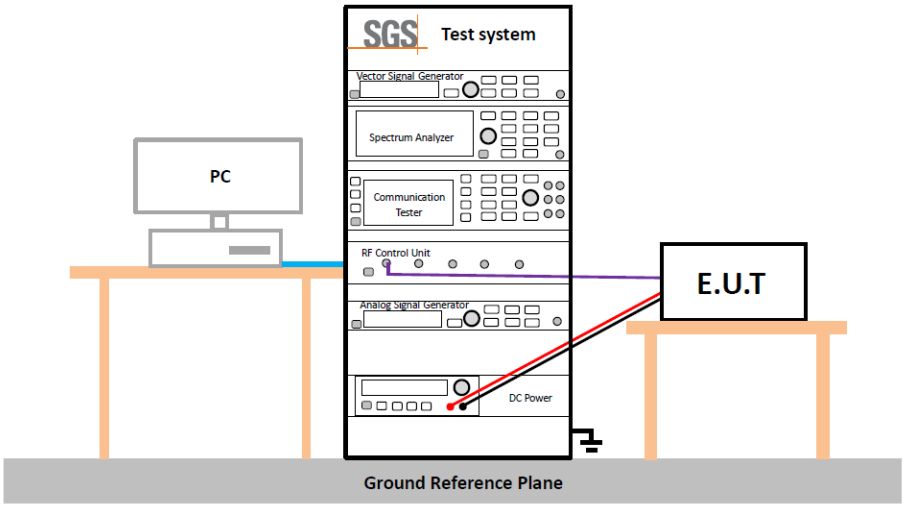
## 4.5 26dB Emission Bandwidth

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.407(a), KDB 789033 D02& C |
| Test Method: | ANSI C63.10: 2013 Section 12.4.1 |
| Test Setup: |  |
| Instruments Used: | Refer to section 6 for details. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Refer to section 3.7 for details. |
| Limit: | No restriction limits |
| Test Results: | For Report Purpose |
| The detailed test data see: **Appendix** | |

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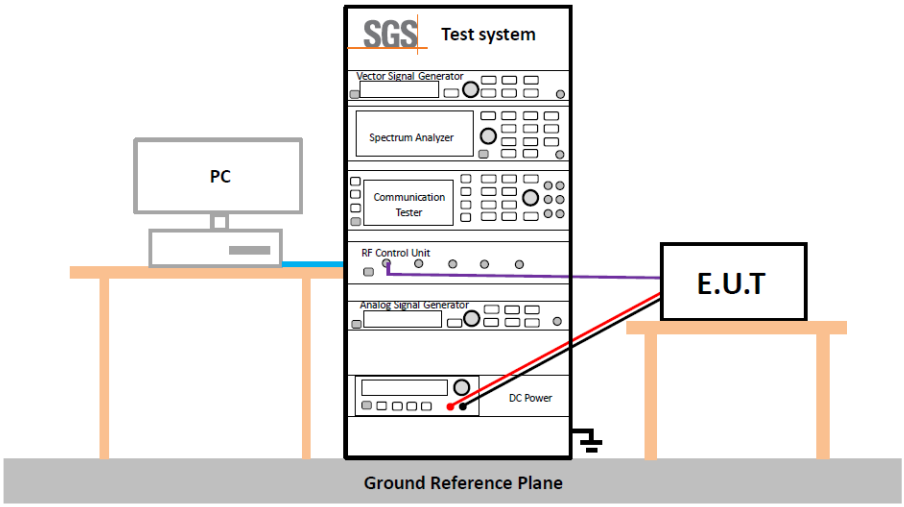
## 4.6 6dB Emission Bandwidth

| | | |
|---|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.407(e) | |
| Test Method: | ANSI C63.10: 2013 Section 12.4.1 | |
| Test Setup: |  | |
| Test Instruments: | Refer to section 6 for details. | |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates | |
| Final Test Mode: | Refer to section 3.7 for details. | |
| Limit: | Frequency Band | Limit |
| | 5725-5850MHz | At least 500kHz |
| Test Results: | Pass | |
| The detailed test data see: **Appendix** | | |

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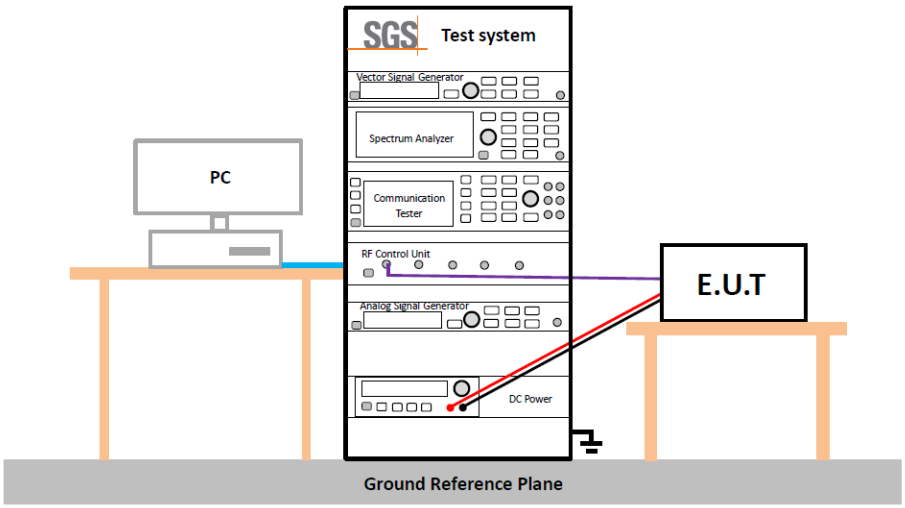
## 4.7 99% Occupied Bandwidth

| | |
|---|---|
| Test Requirement: | KDB 789033 D02§ D |
| Test Method: | ANSI C63.10: 2013 Section 12.4.2 |
| Test Setup: |  |
| Instruments Used: | Refer to section 6 for details. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates |
| Final Test Mode: | Refer to section 3.7 for details. |
| Limit: | No restriction limits |
| Test Results: | For Report Purpose |
| The detailed test data see: **Appendix** | |

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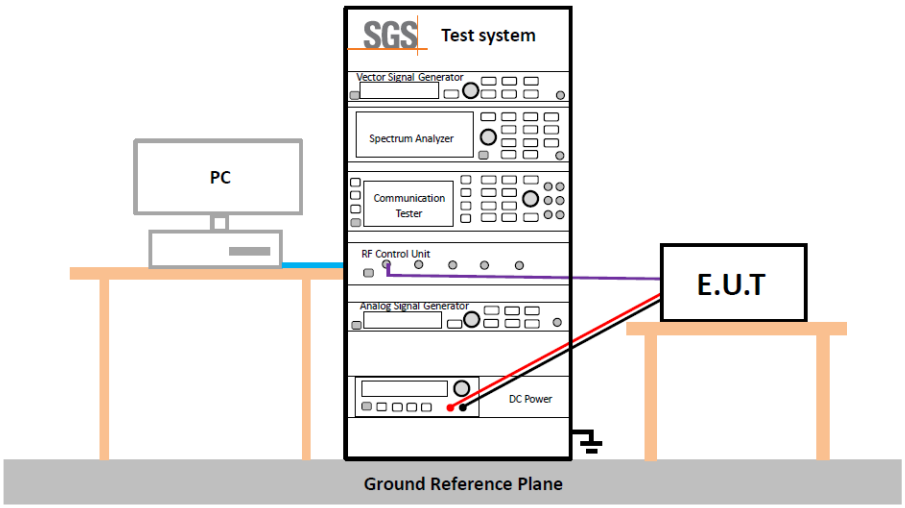
## 4.8 Power Spectral Density

| | | |
|---|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.407(a) | |
| Test Method: | ANSI C63.10: 2013 Section 12.5<br>KDB 789033 D02 v02r01, Section F. | |
| Test Setup: |  | |
| Instruments Used: | Refer to section 6 for details. | |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates | |
| Final Test Mode: | Refer to section 3.7 for details. | |
| Limit: | Frequency Band | Limit |
| | 5150-5250MHz | The power spectral density less than 11dBm/1MHz |
| | 5250-5350MHz | The power spectral density less than 11dBm/1MHz |
| | 5470-5725MHz | The power spectral density less than 11dBm/1MHz |
| | 5725-5850MHz | The power spectral density less than <30dBm/500KHz |
| Test Results: | Pass | |
| The detailed test data see: **Appendix** | | |

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## 4.9 Radiated Spurious Emissions

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.205 and 15.209 |
| Test Method: | ANSI C63.10: 2013 Section 6.4 / 6.5 / 6.6 |
| Test Site: | Measurement Distance: 3m or 10m (Semi-Anechoic Chamber) |
| Test frequency: | 9kHz ~ 40GHz(or 10 Harmonic) |

Test Setup:

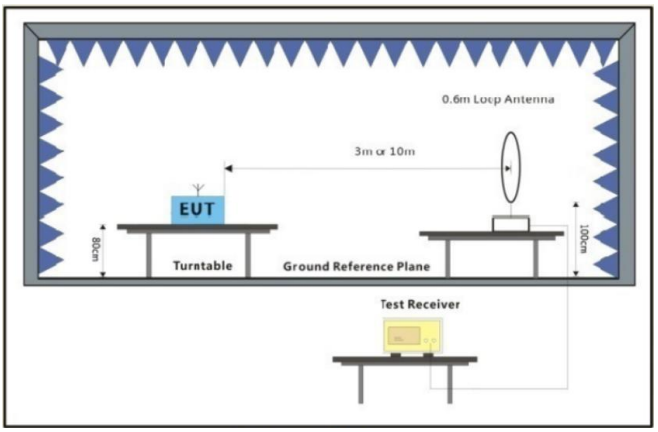


Figure 1. 9kHz to 30MHz

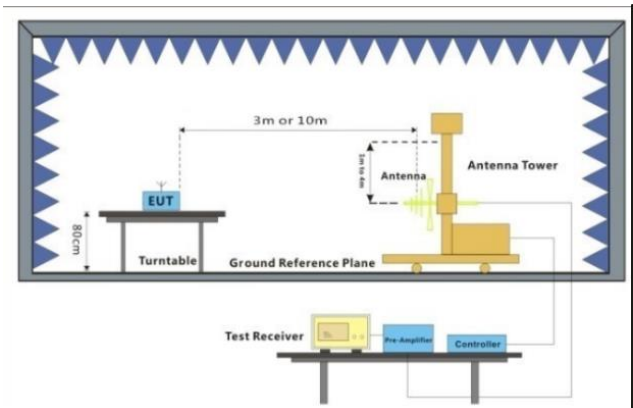


Figure 1. 30MHz to 1GHz

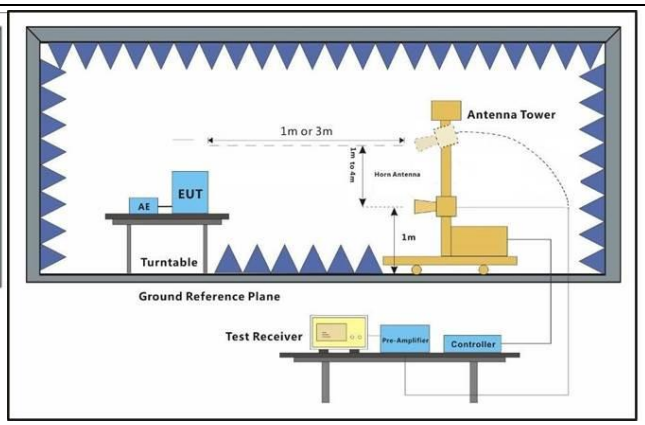


Figure 2. Above 1 GHz

| | |
|---|---|
| Test Procedure: | a. For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>b. For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. (Distance from antenna to EUT is 1m for measurements >18GHz).<br>c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. |

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| | |
|---|---|
| | e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>g. Test the EUT in the outermost channels.<br>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Z axis positioning which it is worse case.<br>i. Repeat above procedures until all frequencies measured was complete.<br>j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported<br>k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.<br>l. At a measurement distance of 1 meter the limit line was increased by 20*LOG(3/1) = 9.54 dB. |
| Test Configuration: | Measurements below 30MHz<br>• RBW = 10 kHz<br>• VBW = 30 kHz<br>• Detector = Peak & Average & Quasi-peak<br>• Trace mode = max hold<br>Measurements Below 1000MHz<br>• RBW = 120 kHz<br>• VBW = 300 kHz<br>• Detector = Quasi-peak<br>• Trace mode = max hold<br>Peak Measurements Above 1000 MHz<br>• RBW = 1 MHz<br>• VBW ≥ 3 MHz<br>• Detector = Peak<br>• Sweep time = auto<br>• Trace mode = max hold<br>Average Measurements Above 1000MHz<br>• RBW = 1 MHz<br>• VBW = 10Hz, when duty cycle is no less than 98 percent.<br>• VBW ≥ 1/T, when duty cycle is less than 98 percent where Tis the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates.<br>Charge + Transmitting mode. |
| Final Test Mode: | Refer to section 3.7 for details.<br>For below 1GHz part, through pre-scan all channels, but only the worst case is recorded in the report. |
| Instruments Used: | Refer to section 6 for details. |

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| Test Results: | Pass |
|---|---|
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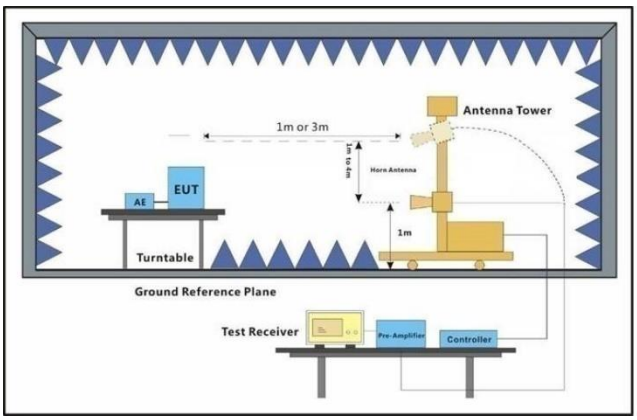
## 4.10 Restricted bands around fundamental frequency

| | | | |
|---|---|---|---|
| Test Requirement: | 47 CFR Part 15 Section 15.407(b) | | |
| Test Method: | ANSI C63.10: 2013 Section 12.7 | | |
| Test Site: | Measurement Distance: 3m (Semi-Anechoic Chamber) | | |
| Limit: | Frequency | Limit (dBuV/m) | Remark |
| | 30MHz-88MHz | 40.0 | Quasi-peak |
| | 88MHz-216MHz | 43.5 | Quasi-peak |
| | 216MHz-960MHz | 46.0 | Quasi-peak |
| | 960MHz-1GHz | 54.0 | Quasi-peak |
| | Above 1GHz | 54.0 | Average Value |
| | | 74.0 | Peak Value |

Test Setup:




Test Procedure:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.
g. Test the EUT in the outermost channels.
h. The radiation measurements are performed in X, Y, Z axis positioning for

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| | |
|---|---|
| | Transmitting mode,And found the Z axis positioning which it is worse case.<br>i. Repeat above procedures until all frequencies measured was complete. |
| Test Configuration: | Measurements Below 1000MHz<br>• RBW = 120 kHz<br>• VBW = 300 kHz<br>• Detector = Quasi-peak<br>• Trace mode = max hold<br>Peak Measurements Above 1000 MHz<br>• RBW = 1 MHz<br>• VBW ≥ 3 MHz<br>• Detector = Peak<br>• Sweep time = auto<br>• Trace mode = max hold<br>Average Measurements Above 1000MHz<br>• RBW = 1 MHz<br>• VBW = 10Hz, when duty cycle is no less than 98 percent.<br>• VBW ≥ 1/T, when duty cycle is less than 98 percent where Tis the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. |
| Exploratory Test Mode: | Transmitting with all kind of modulations, data rates.<br>Charge + Transmitting mode. |
| Final Test Mode: | Refer to section 3.7 for details. |
| Instruments Used: | Refer to section 6 for details. |
| Test Results: | Pass |
| The detailed test data see: **Appendix** | |

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## 4.11 Dynamic Frequency Selection

### 4.11.1 DFS Overview

**Table 1: Applicability of DFS Requirements Prior to Use of a Channel**

| Requirement | Operational Mode | | |
|---|---|---|---|
| | Master | Client Without Radar Detection | Client With Radar Detection |
| *Non-Occupancy Period* | Yes | Not required | Yes |
| *DFS Detection Threshold* | Yes | Not required | Yes |
| *Channel Availability Check Time* | Yes | Not required | Not required |
| *U-NII Detection Bandwidth* | Yes | Not required | Yes |

**Table 2: Applicability of DFS requirements during normal operation**

| Requirement | Operational Mode | |
|---|---|---|
| | Master Device or Client with Radar Detection | Client Without Radar Detection |
| *DFS Detection Threshold* | Yes | Not required |
| *Channel Closing Transmission Time* | Yes | Yes |
| *Channel Move Time* | Yes | Yes |
| *U-NII Detection Bandwidth* | Yes | Not required |

| Additional requirements for devices with multiple bandwidth modes | Master Device or Client with Radar Detection | Client Without Radar Detection |
|---|---|---|
| *U-NII Detection Bandwidth and Statistical Performance Check* | All BW modes must be tested | Not required |
| *Channel Move Time and Channel Closing Transmission Time* | Test using widest BW mode available | Test using the widest BW mode available for the link |
| *All other tests* | Any single BW mode | Not required |

**Note:** Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

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### 4.11.2 DFS Detection Thresholds

**Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection**

| **Maximum Transmit Power** | **Value (See Notes 1, 2, and 3)** |
|---|---|
| EIRP ≥ 200 milliwatt | -64 dBm |
| EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz | -62 dBm |
| EIRP < 200 milliwatt that do not meet the power spectral density requirement | -64 dBm |
| **Note 1:** This is the level at the input of the receiver assuming a 0 dBi receive antenna.<br>**Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.<br>**Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01. | |

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### 4.11.3 RADAR TEST WAVEFORMS

**Table 5 – Short Pulse Radar Test Waveforms**

| Radar Type | Pulse Width (µsec) | PRI (µsec) | Number of Pulses | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---|---|---|---|---|---|
| 0 | 1 | 1428 | 18 | See Note 1 | See Note 1 |
| 1 | 1 | Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a | $\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$ | 60% | 30 |
| | | Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A | | | |
| 2 | 1-5 | 150-230 | 23-29 | 60% | 30 |
| 3 | 6-10 | 200-500 | 16-18 | 60% | 30 |
| 4 | 11-20 | 200-500 | 12-16 | 60% | 30 |
| Aggregate (Radar Types 1-4) | | | | 80% | 120 |

**Note 1:** Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

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**Table 5a - Pulse Repetition Intervals Values for Test A**

| Pulse Repetition Frequency Number | Pulse Repetition Frequency (Pulses Per Second) | Pulse Repetition Interval (Microseconds) |
|---|---|---|
| 1 | 1930.5 | 518 |
| 2 | 1858.7 | 538 |
| 3 | 1792.1 | 558 |
| 4 | 1730.1 | 578 |
| 5 | 1672.2 | 598 |
| 6 | 1618.1 | 618 |
| 7 | 1567.4 | 638 |
| 8 | 1519.8 | 658 |
| 9 | 1474.9 | 678 |
| 10 | 1432.7 | 698 |
| 11 | 1392.8 | 718 |
| 12 | 1355 | 738 |
| 13 | 1319.3 | 758 |
| 14 | 1285.3 | 778 |
| 15 | 1253.1 | 798 |
| 16 | 1222.5 | 818 |
| 17 | 1193.3 | 838 |
| 18 | 1165.6 | 858 |
| 19 | 1139 | 878 |
| 20 | 1113.6 | 898 |
| 21 | 1089.3 | 918 |
| 22 | 1066.1 | 938 |
| 23 | 326.2 | 3066 |

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

| Radar Type | Number of Trials | Number of Successful Detections | Minimum Percentage of Successful Detection |
|---|---|---|---|
| 1 | 35 | 29 | 82.9% |
| 2 | 30 | 18 | 60% |
| 3 | 30 | 27 | 90% |
| 4 | 50 | 44 | 88% |
| Aggregate (82.9% + 60% + 90% + 88%)/4 = 80.2% | | | |

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**Table 6 – Long Pulse Radar Test Waveform**

| Radar Type | Pulse Width (µsec) | Chirp Width (MHz) | PRI (µsec) | Number of Pulses per *Burst* | Number of *Bursts* | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---|---|---|---|---|---|---|---|
| 5 | 50-100 | 5-20 | 1000-2000 | 1-3 | 8-20 | 80% | 30 |

**Table 7 – Frequency Hopping Radar Test Waveform**

| Radar Type | Pulse Width (µsec) | PRI (µsec) | Pulses per Hop | Hopping Rate (kHz) | Hopping Sequence Length (msec) | Minimum Percentage of Successful Detection | Minimum Number of Trials |
|---|---|---|---|---|---|---|---|
| 6 | 1 | 333 | 9 | 0.333 | 300 | 70% | 30 |

### 4.11.4 Response Requirements

**Table 4: DFS Response Requirement Values**

| **Parameter** | **Value** |
|---|---|
| *Non-occupancy period* | Minimum 30 minutes |
| *Channel Availability Check Time* | 60 seconds |
| *Channel Move Time* | 10 seconds<br>See Note 1. |
| *Channel Closing Transmission Time* | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.<br>See Notes 1 and 2. |
| *U-NII Detection Bandwidth* | Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3. |
| **Note 1:** *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.<br>**Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.<br>**Note 3:** During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic. | |

The detailed test data see: **Appendix**

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# 5 Measurement Uncertainty (95% confidence levels, k=2)

**Lab A:**

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Total RF power, conducted | ±0.54dB |
| 2 | RF power density, conducted | ±1.03dB |
| 3 | Spurious emissions, conducted | ±0.54dB |
| 4 | Radio Frequency | ±1.0 % |
| 5 | Duty Cycle | ±0.37% |
| 6 | Occupied Bandwidth | ±1.0 % |

Remark:
The $U_{lab}$ (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

**Lab B:**

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Conduction Emission | ± 3.0dB (150kHz to 30MHz) |
| 2 | Radiated Emission | ± 4.6dB (9kHz to 30MHz) |
| | | ± 4.9dB (30MHz to 1GHz) |
| | | ± 4.9dB (1GHz to 6GHz) |
| | | ± 4.7dB (6GHz to 18GHz) |
| | | ± 5.26dB (Above 18GHz) |

Remark:
The $U_{lab}$ (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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# 6 Equipment List

**Lab A:**

| RF Test Equipment | | | | | |
|---|---|---|---|---|---|
| **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal. date (yyyy/mm/dd)** | **Cal.Due date (yyyy/mm/dd)** |
| Shielding Room | Brilliant-emc | N/A | SUWI-04-01-06 | 2021/05/08 | 2024/05/07 |
| Temperature and humidity meter | MingGao | TH101B | SUWI-01-01-07 | 2023/02/06 | 2024/02/05 |
| Signal Analyzer | ROHDE&SCHWARZ | FSV3030 | SUWI-01-02-02 | 2023/05/11 | 2024/05/10 |
| Measurement Software | Tonscend | JS1120-3 Test System V 3.3.20 | SUWI-02-09-09 | NCR | NCR |
| Measurement Software | TST | TST-272 V2.0 | SUWI-03-55-03 | NCR | NCR |
| Signal Analyzer | ROHDE&SCHWARZ | FSW43 | SUWI-01-02-04 | 2023/05/11 | 2024/05/10 |
| Temperature Chamber | ESPEC | SU-242 | SUWI-01-13-01 | 2023/02/06 | 2024/02/05 |
| Wideband Radio Communication Tester | ROHDE&SCHWARZ | CMW500 | SUWI-01-16-05 | 2023/02/06 | 2024/02/05 |
| DC Power Supply | HYELEC | HY3005B | SUWI-01-18-01 | 2023/02/06 | 2024/02/05 |
| Power meter | Anritsu | ML2495A | SUWI-01-31-01 | 2023/11/21 | 2024/11/20 |
| Pulse power sensor | Anritsu | MA2411B | SUWI-01-32-01 | 2023/11/21 | 2024/11/20 |
| MXG Vector signal genitor | KEYSIGHT | N5182B | SUWI-01-38-01 | 2023/02/06 | 2024/02/05 |
| Signal Generator | ROHDE&SCHWARZ | SMM100A | SUWI-01-07-04 | 2023/02/16 | 2024/02/15 |
| Signal Analyzer | KEYSIGHT | N9020A | SUWI-01-02-07 | 2023/11/21 | 2024/11/20 |

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**Lab B:**

| CE Test System | | | | | |
|---|---|---|---|---|---|
| **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal. date (yyyy/mm/dd)** | **Cal.Due date (yyyy/mm/dd)** |
| Shielding Room | Brilliant-emc | N/A | XAW04-03-01 | N/A | N/A |
| Test receiver | ROHDE&SCHWARZ | ESR | XAW01-08-01 | 2023/08/30 | 2024/08/29 |
| Artificial network | ROHDE&SCHWARZ | ENV216 | XAW01-04-01 | 2023/06/30 | 2024/06/29 |
| Temperature and humidity meter | MingGao | TH101B | XAW01-01-02 | 2023/08/30 | 2024/08/29 |
| Measurement Software | Tonscend | TS+ V4.0.0.0 | XAW02-07-01 | NCR | NCR |
| Radio communication analyzer | ROHDE&SCHWARZ | CMW 500 | XAW01-03-07 | 2023/08/30 | 2024/08/29 |
| Artificial network | ROHDE&SCHWARZ | ENV216 | XAW01-04-02 | 2023/06/30 | 2024/06/29 |

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| RSE Test System | | | | | |
|---|---|---|---|---|---|
| **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal. date (yyyy/mm/dd)** | **Cal.Due date (yyyy/mm/dd)** |
| Semi-Anechoic Chamber | Brilliant-emc | N/A | XAW03-35-01 | 2021/09/09 | 2024/09/08 |
| MXA signal analyzer | Keysight | N9020A | XAW01-06-01 | 2023/02/16 | 2024/02/15 |
| Spectrum Analyzer | ROHDE& SCHWARZ | FSV3044 | XAW01-13-05 | 2023/05/15 | 2024/05/14 |
| Test receiver | ROHDE& SCHWARZ | ESR | XAW01-08-01 | 2023/08/30 | 2024/08/29 |
| Receiving antenna (30MHz-3GHz) | Schwarzbeck | VULB 9163 | XAW01-09-01 | 2022/07/28 | 2024/07/27 |
| Receiving antenna (1GHz~18GHz) | Schwarzbeck | BBHA 9120D | XAW01-09-02 | 2022/07/28 | 2024/07/27 |
| Receiving antenna (15GHz~40GHz) | Schwarzbeck | BBHA 9170 | XAW01-09-03 | 2022/07/23 | 2024/07/22 |
| Directional antenna rack controller | Max-Full | MF-7802BS | XAW03-03-01 | NCR | NCR |
| High-speed antenna rack controller | Max-Full | MF-7802 | XAW03-04-01 | NCR | NCR |
| Filter bank | Tonscend | JS0806-F | XAW03-05-01 | NCR | NCR |
| Filter bank | Tonscend | JS0806s | XAW03-05-02 | NCR | NCR |
| Amplifier | Tonscend | TAP9K3G32 | XAW01-41-01 | 2023/05/15 | 2024/05/14 |
| Amplifier | Tonscend | TAP01018048 | XAW01-41-02 | 2023/08/30 | 2024/08/29 |
| Amplifier | Tonscend | TAP18040048 | XAW01-41-03 | 2023/08/30 | 2024/08/29 |
| Amplifier | Shanghai Steed | YX28980930 | XAW01-41-06 | 2023/08/30 | 2024/08/29 |
| Temperature and humidity meter | MingGao | TH101B | XAW01-01-02 | 2023/09/04 | 2024/09/03 |
| Measurement Software | Tonscend | TS+ V4.0.0.0 | XAW02-05-01 | NCR | NCR |
| Loop Antenna | Schwarzbeck | FMZB 1519B | XAW01-48-02 | 2022/05/26 | 2024/05/25 |

Remark: NCR=No Calibration Requirement

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# 7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.

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# Appendix

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# Emission Bandwidth

## Test Result

| TestMode | Antenna | Frequency[MHz] | 26dB EBW [MHz] | FL[MHz] | FH[MHz] | Verdict |
|---|---|---|---|---|---|---|
| 11a | Ant1 | 5180 | 19.48 | 5170.16 | 5189.64 | For Report Purpose |
| 11a | Ant1 | 5220 | 19.80 | 5210.20 | 5230.00 | |
| 11a | Ant1 | 5240 | 19.68 | 5230.28 | 5249.96 | |
| 11a | Ant1 | 5260 | 19.80 | 5250.00 | 5269.80 | |
| 11a | Ant1 | 5300 | 19.40 | 5290.28 | 5309.68 | |
| 11a | Ant1 | 5320 | 19.68 | 5310.08 | 5329.76 | |
| 11a | Ant1 | 5500 | 19.88 | 5490.16 | 5510.04 | |
| 11a | Ant1 | 5580 | 19.64 | 5570.24 | 5589.88 | |
| 11a | Ant1 | 5700 | 19.76 | 5690.20 | 5709.96 | |
| 11a | Ant1 | 5745 | 19.80 | 5734.96 | 5754.76 | |
| 11a | Ant1 | 5785 | 19.56 | 5775.32 | 5794.88 | |
| 11a | Ant1 | 5825 | 20.00 | 5815.04 | 5835.04 | |
| 11n20SISO | Ant1 | 5180 | 19.72 | 5170.12 | 5189.84 | |
| 11n20SISO | Ant1 | 5220 | 20.16 | 5209.92 | 5230.08 | |
| 11n20SISO | Ant1 | 5240 | 19.88 | 5230.12 | 5250.00 | |
| 11n20SISO | Ant1 | 5260 | 20.20 | 5249.92 | 5270.12 | |
| 11n20SISO | Ant1 | 5300 | 19.88 | 5290.16 | 5310.04 | |
| 11n20SISO | Ant1 | 5320 | 19.64 | 5310.24 | 5329.88 | |
| 11n20SISO | Ant1 | 5500 | 20.12 | 5490.04 | 5510.16 | |
| 11n20SISO | Ant1 | 5580 | 20.08 | 5570.00 | 5590.08 | |
| 11n20SISO | Ant1 | 5700 | 20.08 | 5690.04 | 5710.12 | |
| 11n20SISO | Ant1 | 5745 | 20.08 | 5735.12 | 5755.20 | |
| 11n20SISO | Ant1 | 5785 | 19.84 | 5775.12 | 5794.96 | |
| 11n20SISO | Ant1 | 5825 | 19.72 | 5815.20 | 5834.92 | |
| 11n40SISO | Ant1 | 5190 | 40.24 | 5169.92 | 5210.16 | |
| 11n40SISO | Ant1 | 5230 | 40.48 | 5209.84 | 5250.32 | |
| 11n40SISO | Ant1 | 5270 | 40.80 | 5249.60 | 5290.40 | |
| 11n40SISO | Ant1 | 5310 | 40.40 | 5289.68 | 5330.08 | |
| 11n40SISO | Ant1 | 5510 | 40.48 | 5489.76 | 5530.24 | |
| 11n40SISO | Ant1 | 5550 | 40.00 | 5530.00 | 5570.00 | |
| 11n40SISO | Ant1 | 5670 | 40.88 | 5649.60 | 5690.48 | |
| 11n40SISO | Ant1 | 5755 | 40.72 | 5734.68 | 5775.40 | |
| 11n40SISO | Ant1 | 5795 | 40.96 | 5774.60 | 5815.56 | |

Remark:

For 802.11n HT20/ac VHT20 and 802.11n HT40/ac VHT40 mode, the whole testing have assessed only, 802.11n HT20/40 by referring to their higher output power.

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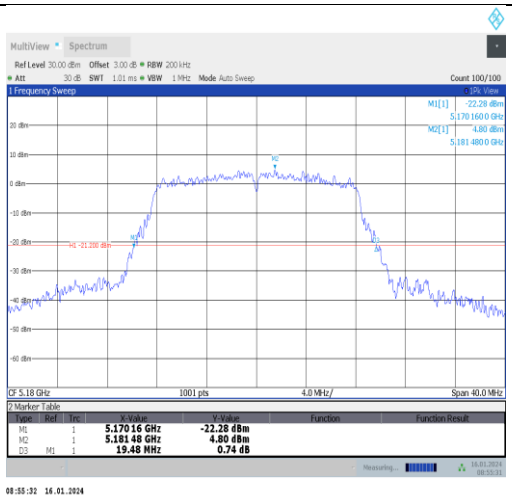
## Test Graphs

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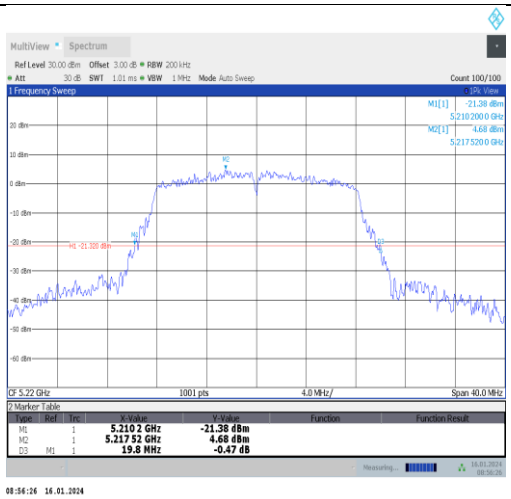


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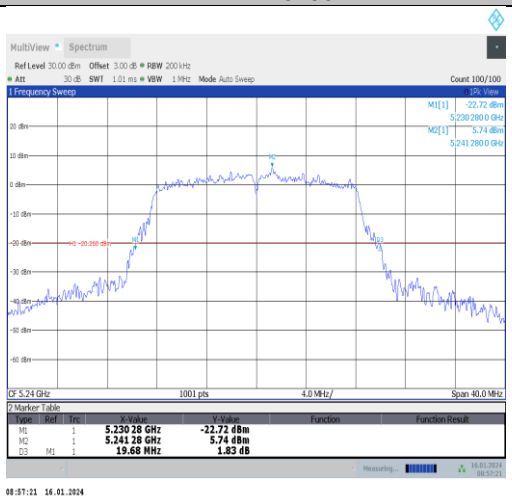


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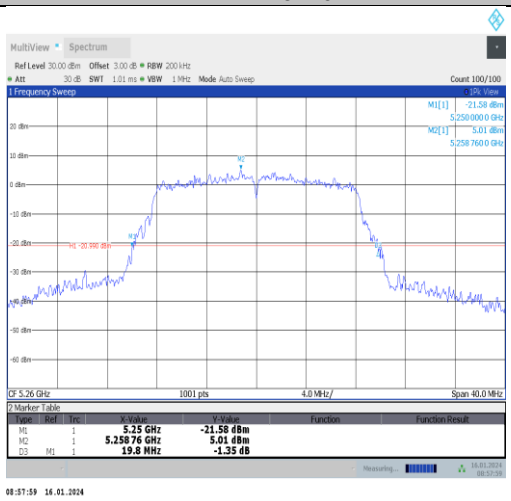


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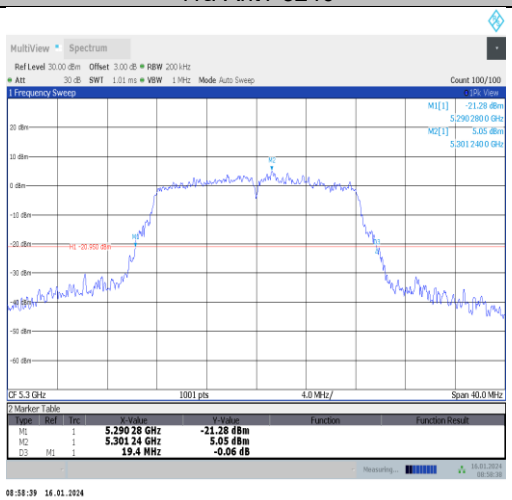


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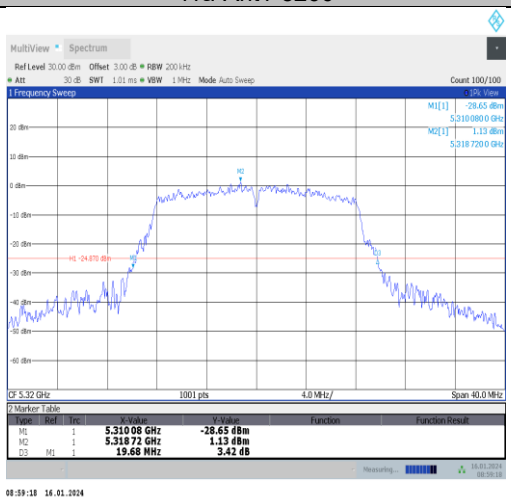


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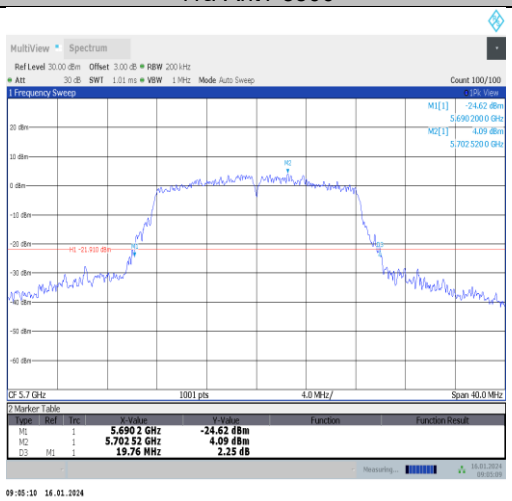


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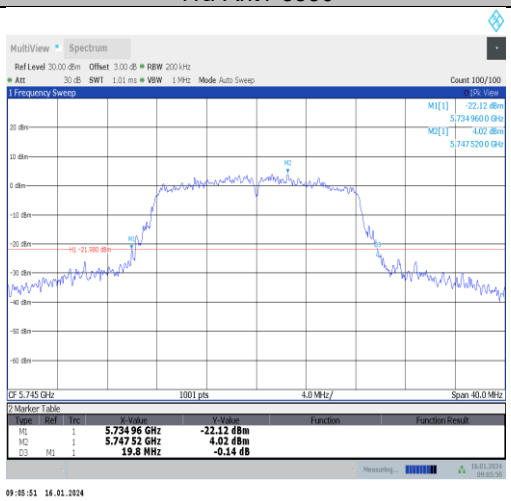


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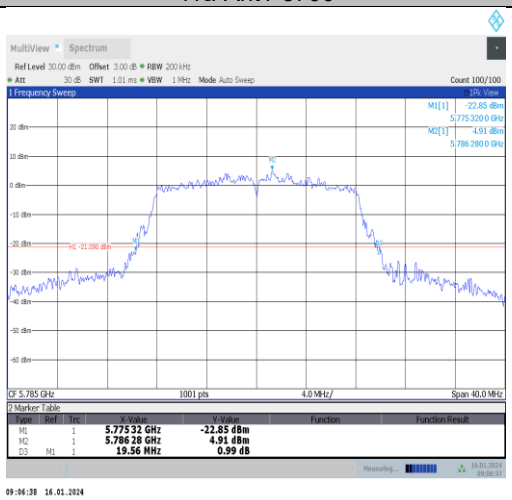


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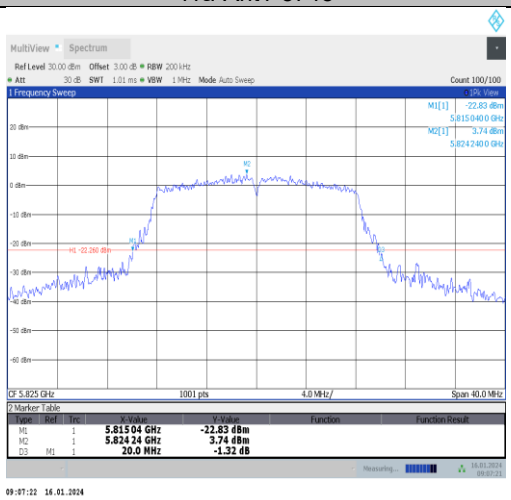


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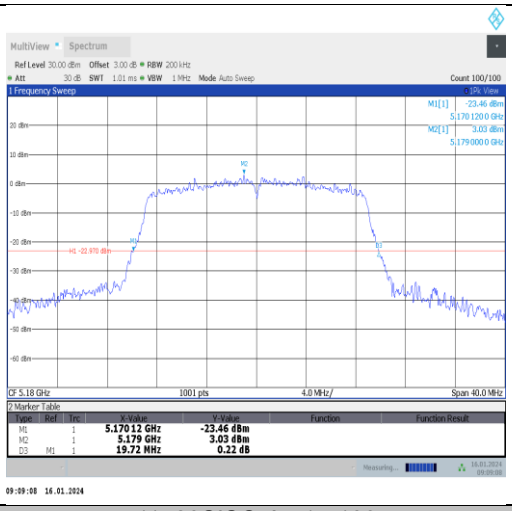


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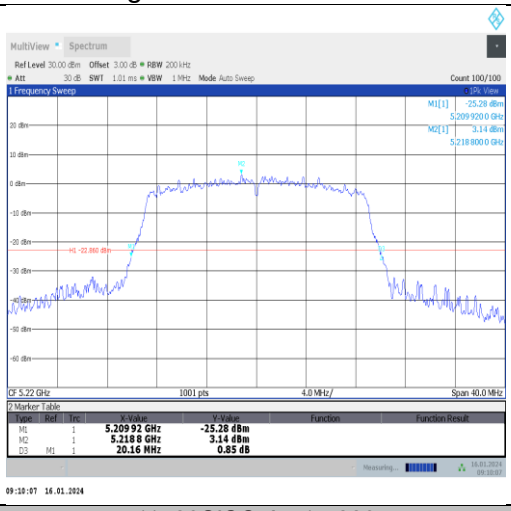


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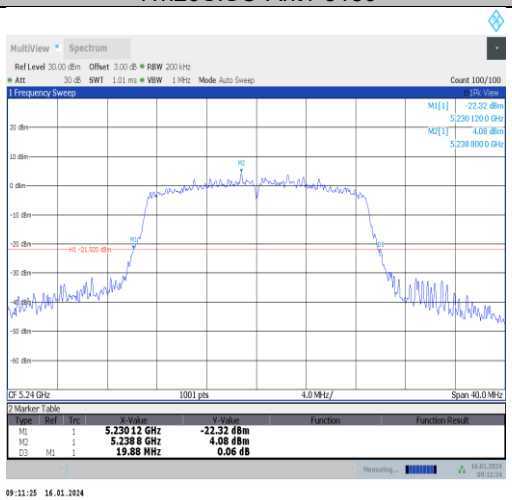


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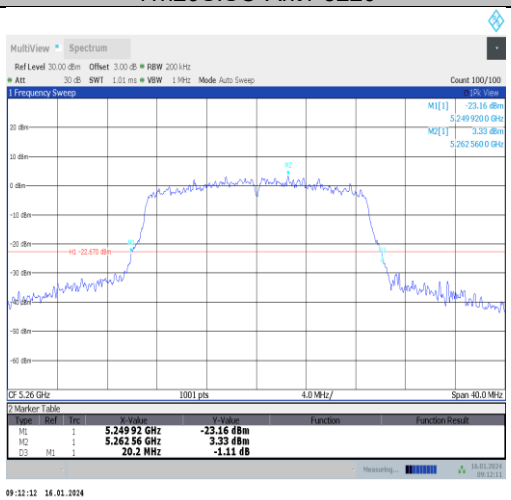


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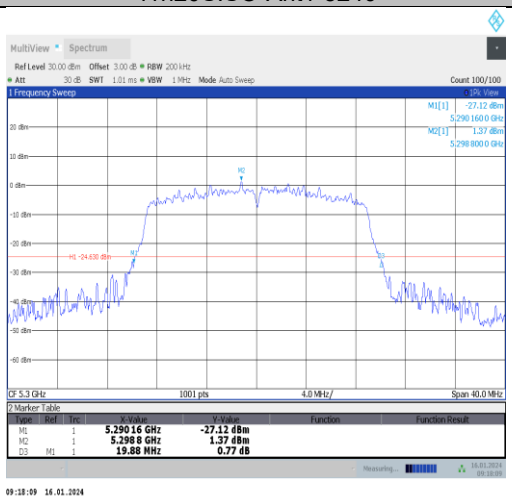


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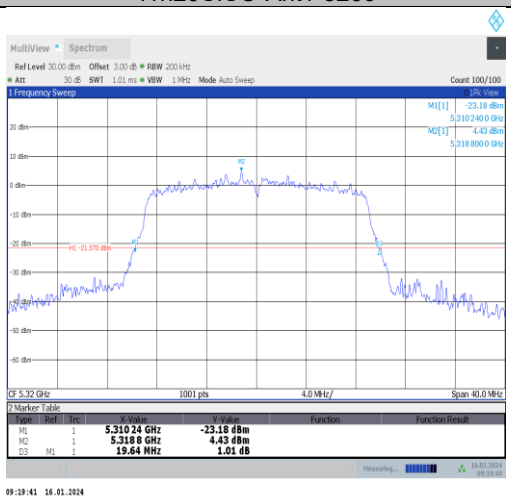


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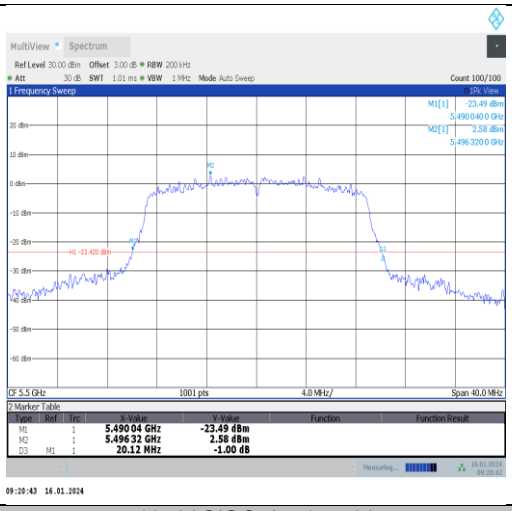


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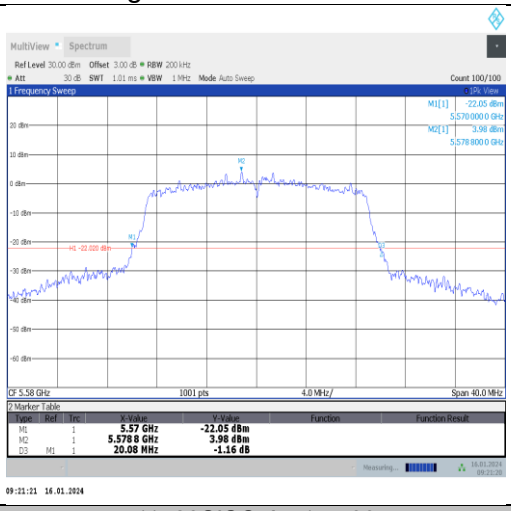


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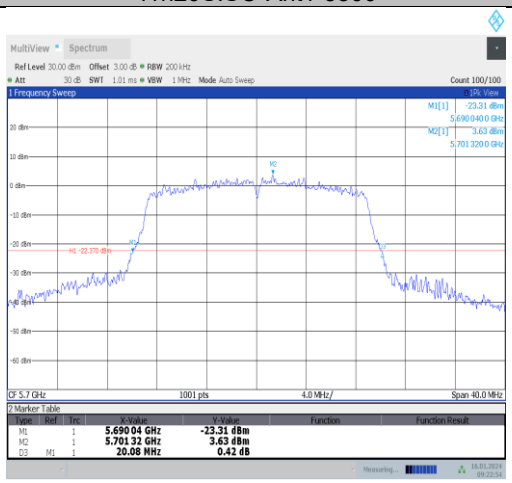


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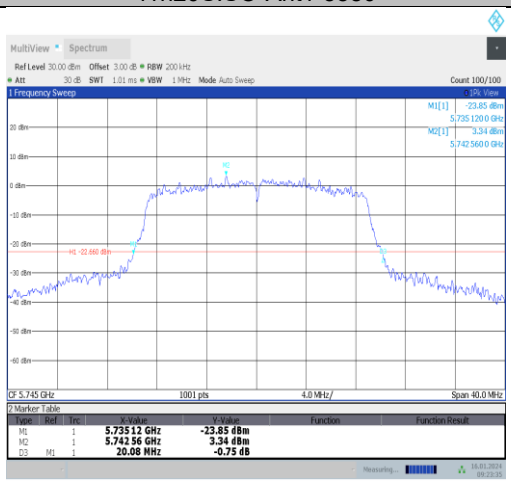


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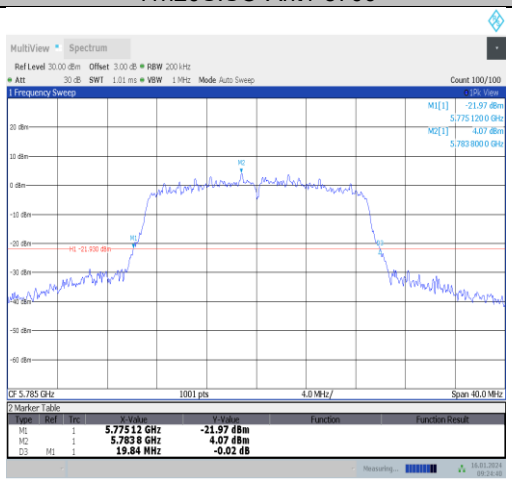


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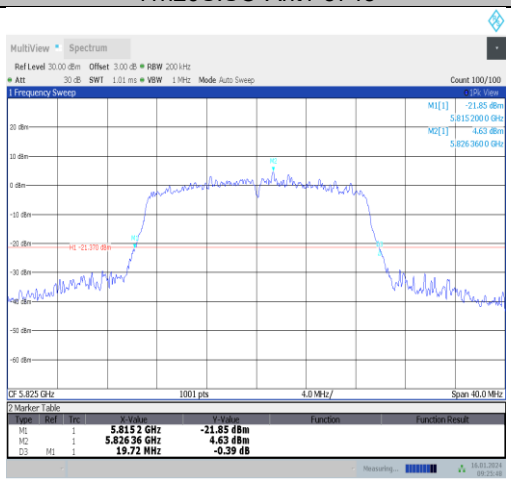


11n20SISO-Ant1-5825

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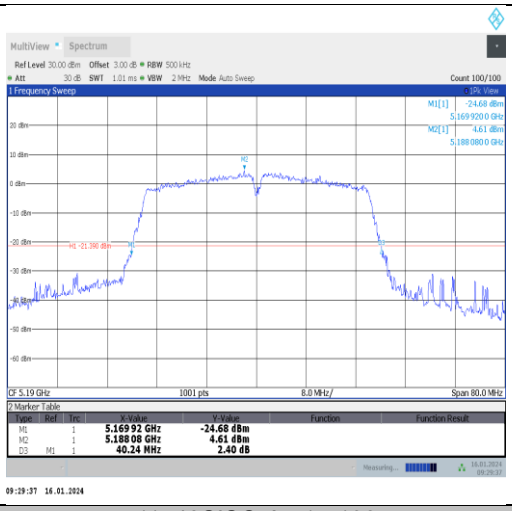


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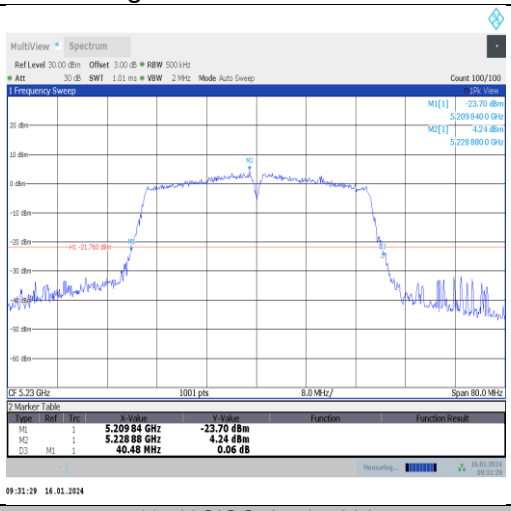


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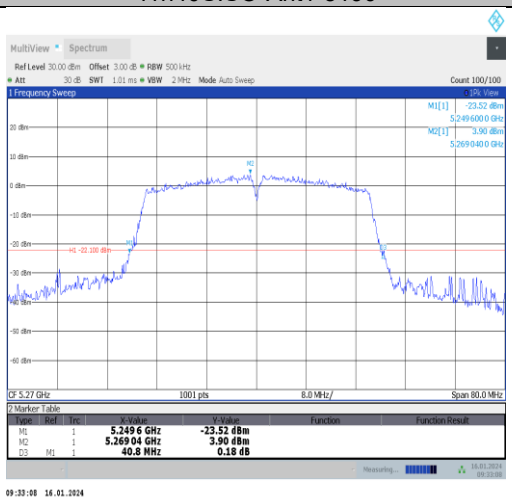


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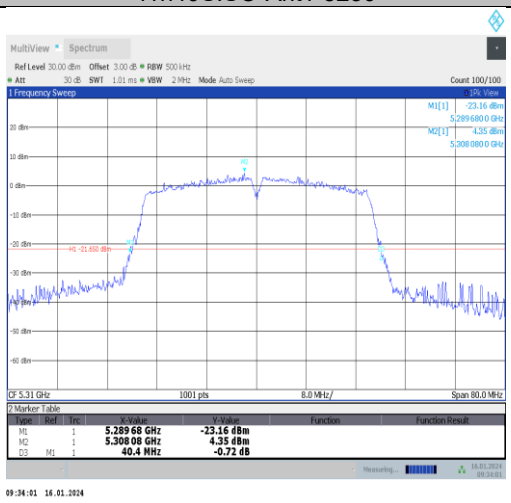


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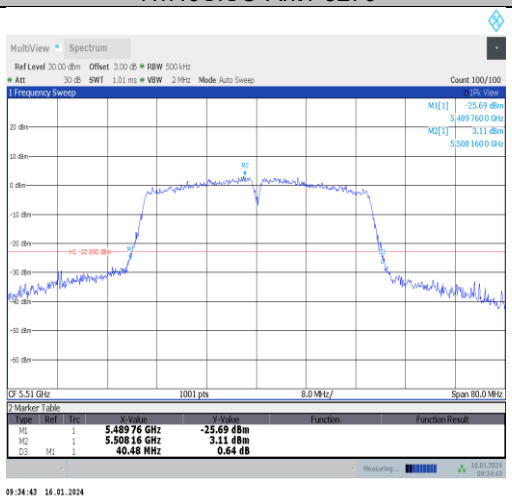


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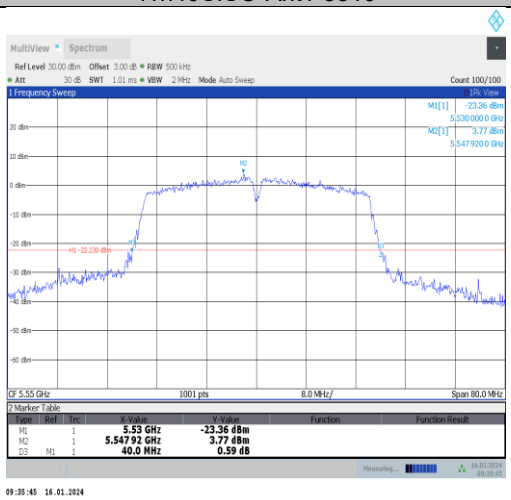


11n40SISO-Ant1-5550

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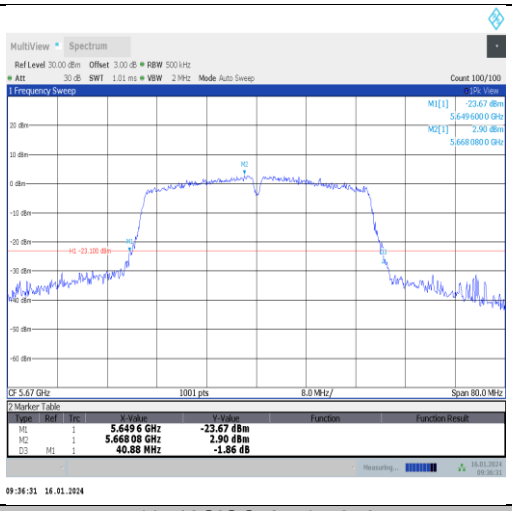


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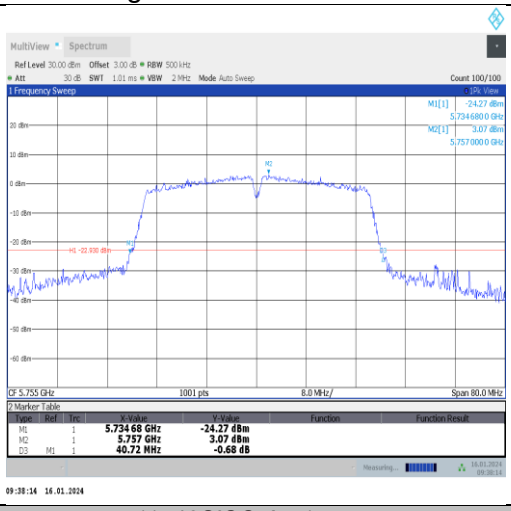


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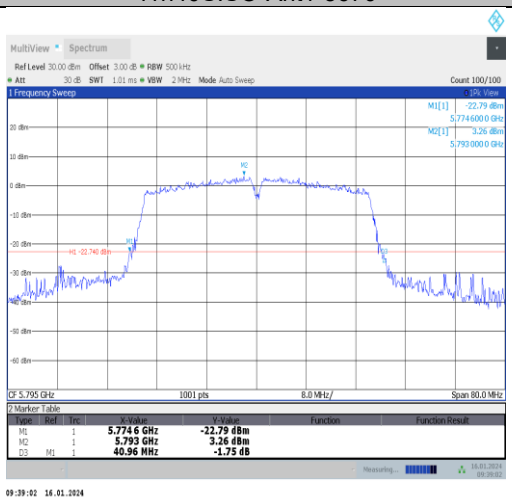


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# Occupied channel bandwidth

## Test Result

| TestMode | Antenna | Frequency[MHz] | OCB [MHz] | FL[MHz] | FH[MHz] | Verdict |
|---|---|---|---|---|---|---|
| 11a | Ant1 | 5180 | 16.912 | 5171.5293 | 5188.4417 | For Report Purpose |
| 11a | Ant1 | 5220 | 16.978 | 5211.4907 | 5228.4691 | |
| 11a | Ant1 | 5240 | 17.029 | 5231.4530 | 5248.4815 | |
| 11a | Ant1 | 5260 | 17.037 | 5251.4770 | 5268.5136 | |
| 11a | Ant1 | 5300 | 17.061 | 5291.4131 | 5308.4741 | |
| 11a | Ant1 | 5320 | 16.984 | 5311.4276 | 5328.4120 | |
| 11a | Ant1 | 5500 | 17.151 | 5491.4103 | 5508.5618 | |
| 11a | Ant1 | 5580 | 17.026 | 5571.4693 | 5588.4954 | |
| 11a | Ant1 | 5700 | 17.023 | 5691.5438 | 5708.5667 | |
| 11a | Ant1 | 5745 | 17.051 | 5736.4580 | 5753.5086 | |
| 11a | Ant1 | 5785 | 17.116 | 5776.4497 | 5793.5653 | |
| 11a | Ant1 | 5825 | 16.955 | 5816.5389 | 5833.4940 | |
| 11n20SISO | Ant1 | 5180 | 17.772 | 5171.1430 | 5188.9149 | |
| 11n20SISO | Ant1 | 5220 | 17.798 | 5211.1420 | 5228.9397 | |
| 11n20SISO | Ant1 | 5240 | 17.755 | 5231.1677 | 5248.9226 | |
| 11n20SISO | Ant1 | 5260 | 17.792 | 5251.1304 | 5268.9226 | |
| 11n20SISO | Ant1 | 5300 | 17.834 | 5291.1537 | 5308.9881 | |
| 11n20SISO | Ant1 | 5320 | 17.772 | 5311.1659 | 5328.9381 | |
| 11n20SISO | Ant1 | 5500 | 17.802 | 5491.1545 | 5508.9560 | |
| 11n20SISO | Ant1 | 5580 | 17.802 | 5571.1633 | 5588.9651 | |
| 11n20SISO | Ant1 | 5700 | 17.8 | 5691.1811 | 5708.9810 | |
| 11n20SISO | Ant1 | 5745 | 17.819 | 5736.1742 | 5753.9935 | |
| 11n20SISO | Ant1 | 5785 | 17.76 | 5776.2069 | 5793.9671 | |
| 11n20SISO | Ant1 | 5825 | 17.824 | 5816.1580 | 5833.9823 | |
| 11n40SISO | Ant1 | 5190 | 36.199 | 5172.0594 | 5208.2579 | |
| 11n40SISO | Ant1 | 5230 | 36.204 | 5212.0500 | 5248.2540 | |
| 11n40SISO | Ant1 | 5270 | 36.179 | 5252.0778 | 5288.2572 | |
| 11n40SISO | Ant1 | 5310 | 36.185 | 5292.0435 | 5328.2286 | |
| 11n40SISO | Ant1 | 5510 | 36.177 | 5492.0348 | 5528.2120 | |
| 11n40SISO | Ant1 | 5550 | 36.238 | 5532.0290 | 5568.2672 | |
| 11n40SISO | Ant1 | 5670 | 36.23 | 5652.0677 | 5688.2973 | |
| 11n40SISO | Ant1 | 5755 | 36.258 | 5737.0829 | 5773.3404 | |
| 11n40SISO | Ant1 | 5795 | 36.233 | 5777.0511 | 5813.2842 | |

Remark:

For 802.11n HT20/ac VHT20 and 802.11n HT40/ac VHT40 mode, the whole testing have assessed only, 802.11n HT20/40 by referring to their higher output power.

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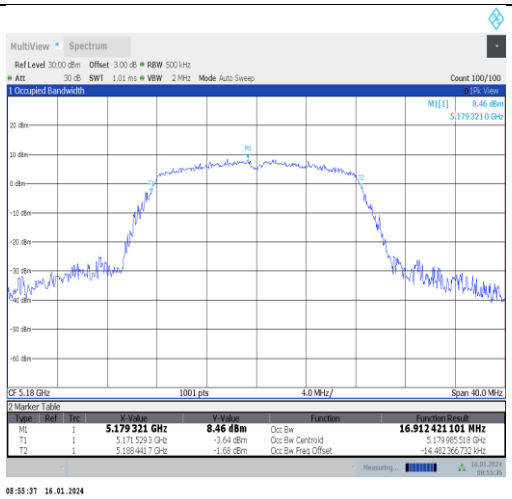
## Test Graphs

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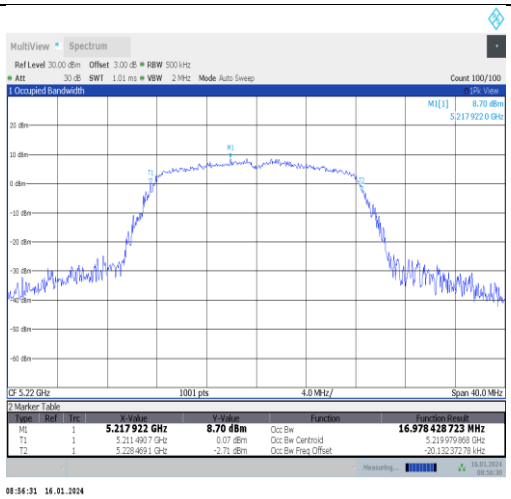


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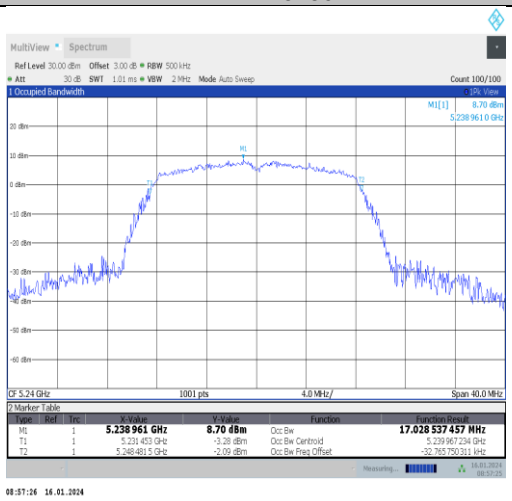


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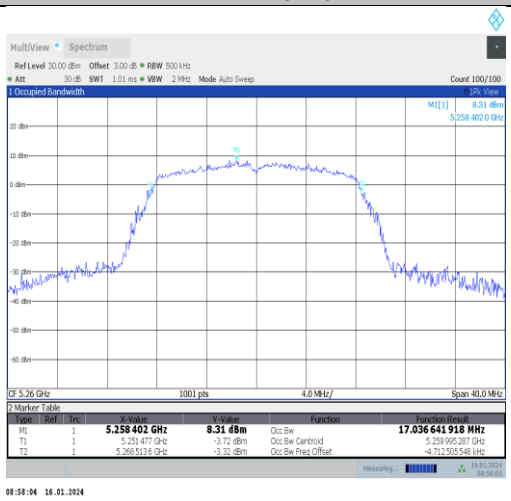


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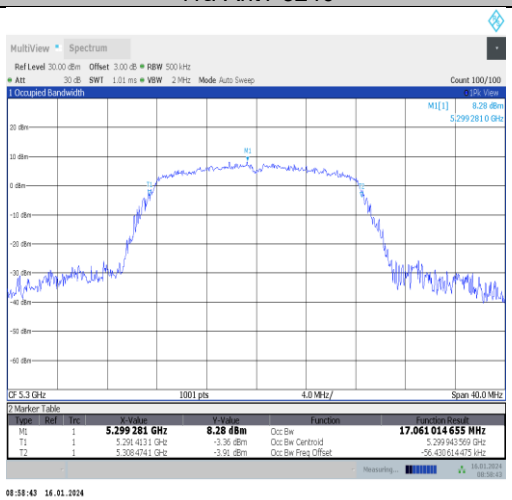


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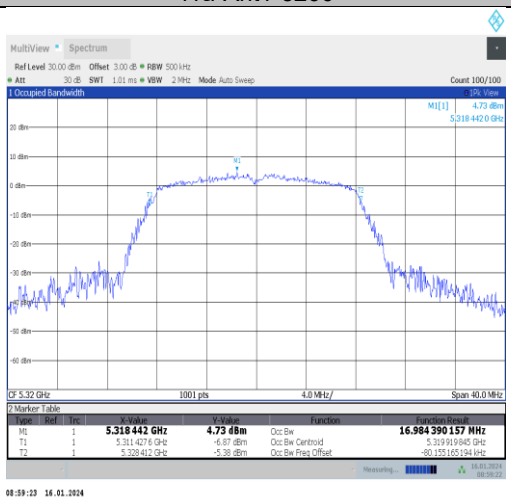


11a-Ant1-5320

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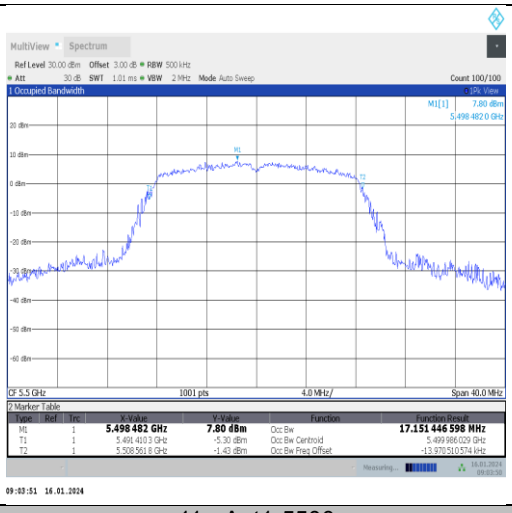


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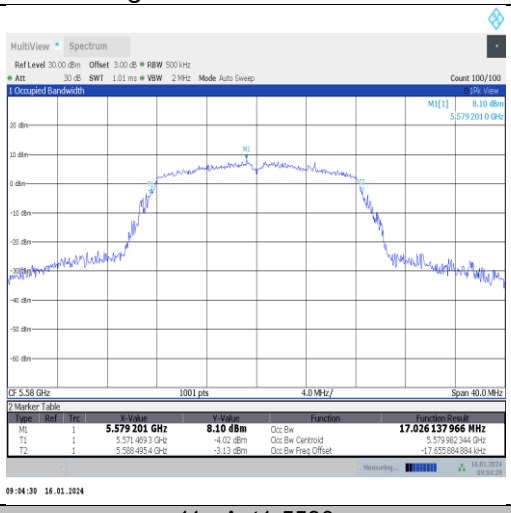


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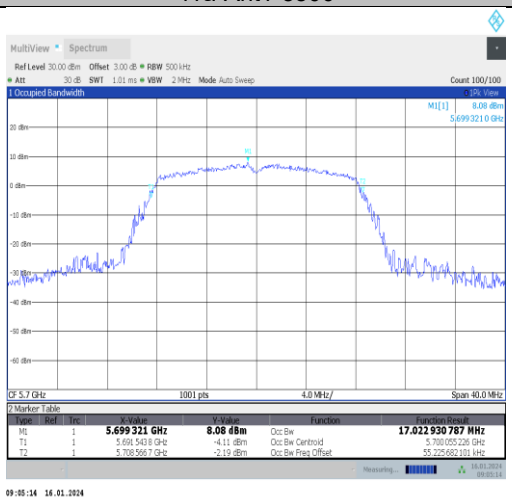


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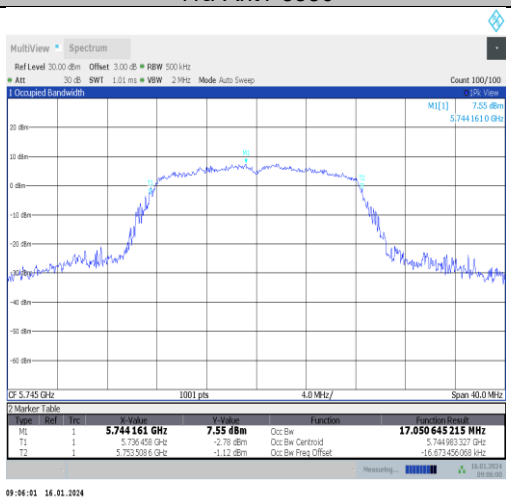


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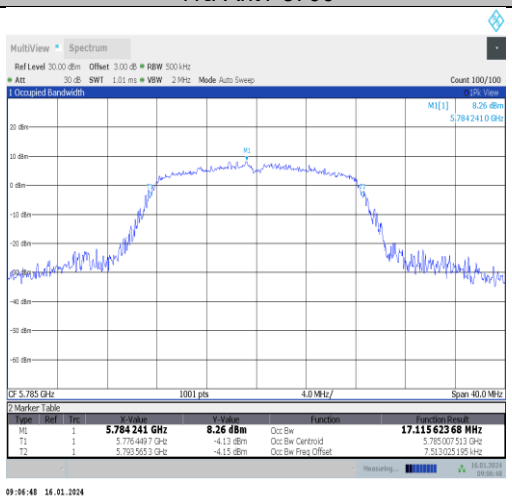


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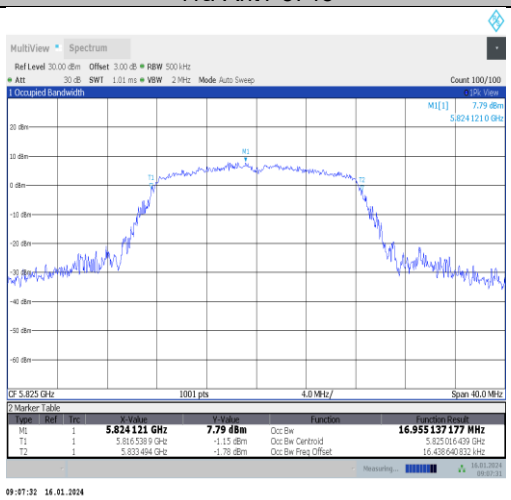


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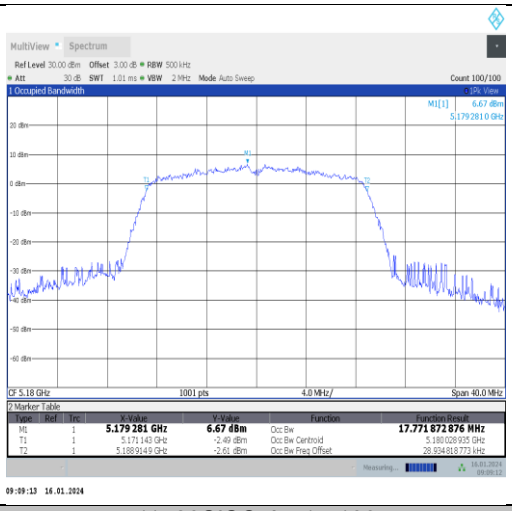


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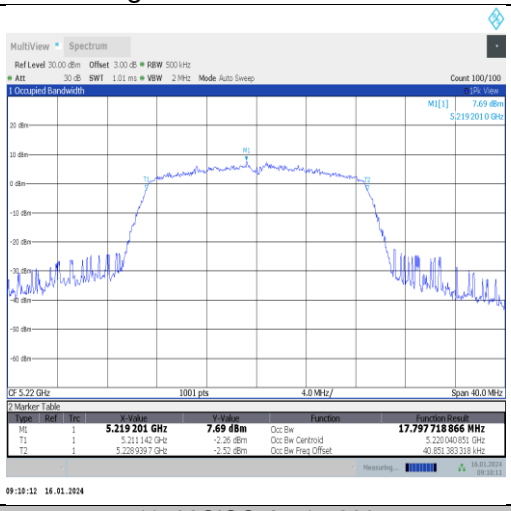


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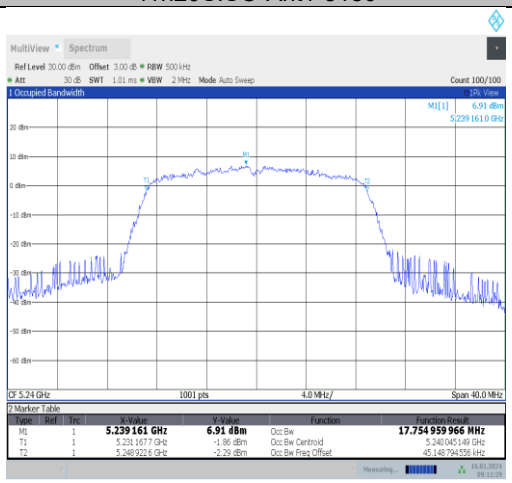


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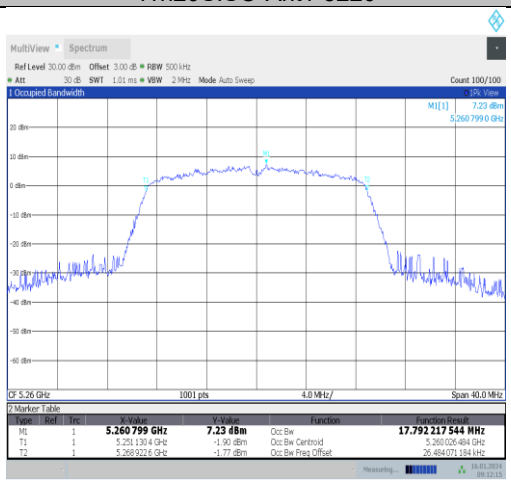


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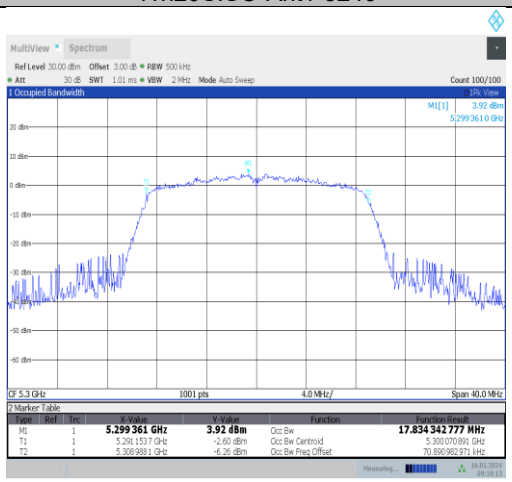


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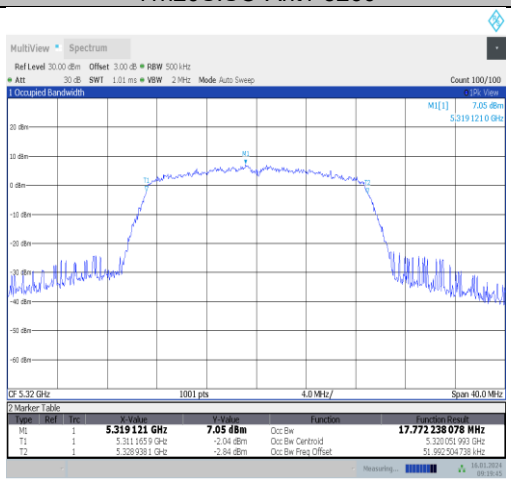


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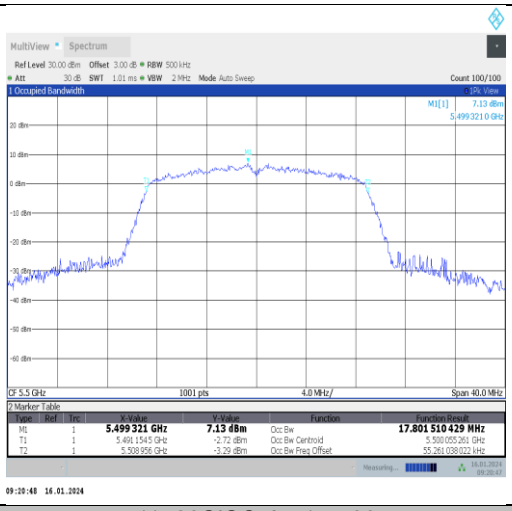


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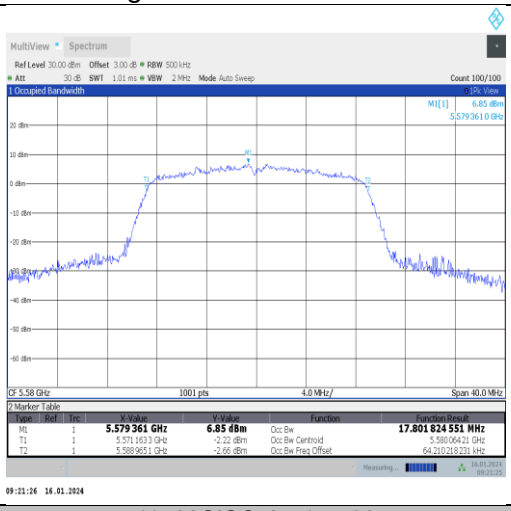


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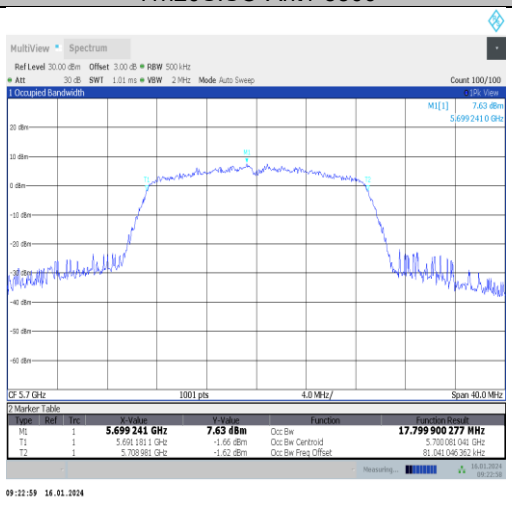


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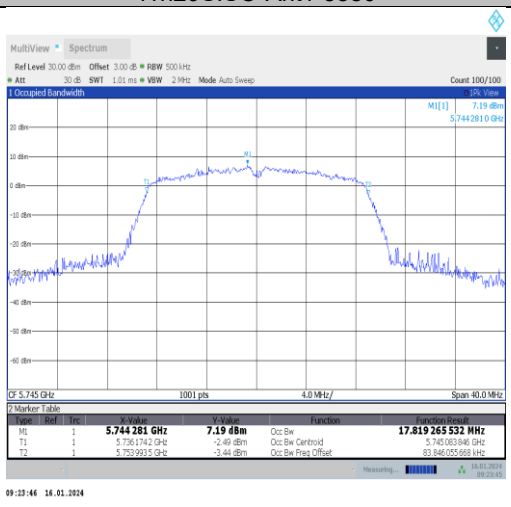


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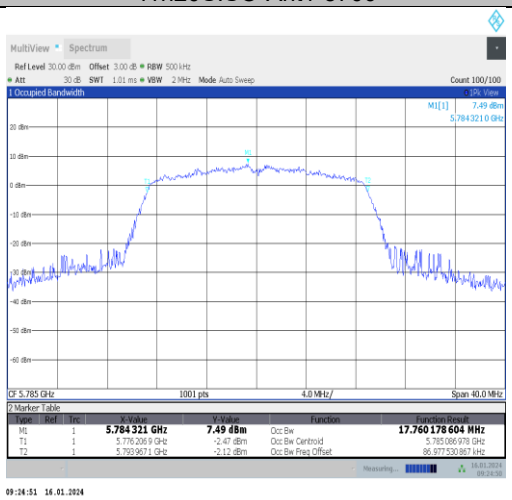


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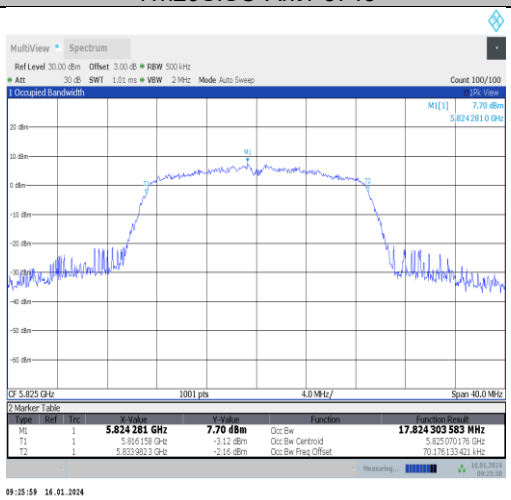


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