**Shenzhen Huaxia Testing Technology Co., Ltd.**

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Report Template Version: V05
Report Template Revision Date: 2021-11-03

# TEST REPORT

| | |
|---|---|
| **Report No.:** | CQASZ20221101941E -02 |
| **Applicant:** | Shenzhen DO Intelligent Technology Co., Ltd |
| **Address of Applicant:** | 11th Floor, 3# Building, Guole Tech Park, Lirong Road, Dalang, Longhua District, Shenzhen, China |
| **Equipment Under Test (EUT):** | |
| **EUT Name:** | Smart Watch |
| **Model No.:** | IDW15, IDW15 Plus, IDW15 Plus BT |
| **Test Model No.:** | IDW15 |
| **Brand Name:** | IDO |
| **FCC ID:** | 2AHFT499 |
| **Standards:** | 47 CFR Part 15.247 |
| **Date of Receipt:** | 2022-11-16 |
| **Date of Test:** | 2022-11-21 to 2022-11-24 |
| **Date of Issue:** | 2022-12-30 |
| **Test Result:** | Pass* |

* In the configuration tested, the EUT compiled with the standards with above.

***Tested By:*** lewis zhou
***( Lewis Zhou)***

***Reviewed By:*** Timo Lei
***( Timo Lei )***

***Approved By:*** Jack Ai
***( Jack Ai )***

# 1 Version

**Revision History of Report**

| Report No. | Version | Description | Issue Date |
|---|---|---|---|
| CQASZ20221101941E -02 | Rev. 01 | Initial report | 2022-12-30 |

# 2 Test Summary

| Test Item | Standard | Test Method | Class / Severity | Result |
|---|---|---|---|---|
| Antenna requirement | 47 CFR Part 15.247 | | Part 15.203 | Pass |
| Occupied Bandwidth | 47 CFR Part 15.247 | ANSI C63.10-2013, section 11.8 | 47 CFR 15.247(a)(2) | Pass |
| Maximum Conducted Output Power | 47 CFR Part 15.247 | ANSI C63.10-2013, section 11.9.1 | 47 CFR 15.247(b)(3) | Pass |
| Power Spectral Density | 47 CFR Part 15.247 | ANSI C63.10-2013, section 11.10 | 47 CFR 15.247(e) | Pass |
| Emissions in non-restricted frequency bands | 47 CFR Part 15.247 | ANSI C63.10-2013 section 11.11 | 47 CFR 15.247(d) | Pass |
| Emissions around the fundamental | 47 CFR Part 15.247 | ANSI C63.10-2013 section 6.6.4 | 47 CFR 15.247(d) | Pass |
| Emissions in restricted frequency bands (below 1GHz) | 47 CFR Part 15.247 | ANSI C63.10-2013 section 6.6.4 | 47 CFR 15.247(d) | Pass |
| Emissions in restricted frequency bands (above 1GHz) | 47 CFR Part 15.247 | ANSI C63.10-2013 section 6.6.4 | 47 CFR 15.247(d) | Pass |

# 3 Contents

Page

# 4 General Information

## 4.1 Client Information

| | |
|---|---|
| Applicant: | Shenzhen DO Intelligent Technology Co., Ltd |
| Address of Applicant: | 11th Floor, 3# Building, Guole Tech Park, Lirong Road, Dalang, Longhua District, Shenzhen, China |
| Manufacturer: | Shenzhen DO Intelligent Technology Co., Ltd |
| Address of Manufacturer: | 11th Floor, 3# Building, Guole Tech Park, Lirong Road, Dalang, Longhua District, Shenzhen, China |
| Factory: | Shenzhen DO Intelligent Technology Co., Ltd |
| Address of Factory: | 11th Floor, 3# Building, Guole Tech Park, Lirong Road, Dalang, Longhua District, Shenzhen, China |

## 4.2 General Description of EUT

| | |
|---|---|
| Product Name: | Smart Watch |
| Model No.: | IDW15, IDW15 Plus, IDW15 Plus BT |
| Test Model No.: | IDW15 |
| Trade Mark: | IDO |
| Power Supply: | Li-ion battery DC 3.8V 300mAh, Charge by DC 5V for adapter |
| Operation Frequency: | 2402MHz to 2480MHz |
| Number of Channels: | 40 |
| Software Version: | IDW15_V1.0.1 |
| Hardware Version: | V1.1 |
| Modulation Type: | GFSK |
| Antenna Type: | FPC |
| Antenna Gain: | -0.18dBi |
| Bluetooth Version: | V5.3 |

## 4.3 Description of Support Units

The EUT was tested as an independent device.

## 4.4 Test Mode

| No | Title | Description |
|---|---|---|
| TM1 | TX mode | Keep the EUT works in continuously transmitting mode with GFSK modulation. |
| TM2 | Test of difference 1# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |
| TM3 | Test of difference 2# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |
| TM4 | Test of difference 3# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |
| TM5 | Test of difference 4# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |

| | | |
|---|---|---|
| TM6 | Test of difference 5# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |
| TM7 | Test of difference 6# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |
| TM8 | Test of difference 7# | Keep the EUT works in continuously transmitting mode with GFSK modulation. |

Note:
TM1-4 and TM5-8 flash are different, the former is 64Mb and the latter 128Mb
EUT Flash comes in two sizes, 128Mb and 64Mb, and there are four screen vendors
The four screen differences are internal wiring, layout, supplier, component LCD ID resistor resistance value these changes does not affect the radio performance

## 4.5 Test Location

Shenzhen Huaxia Testing Technology Co., Ltd.
1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

## 4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:
• IC Registration No.: 22984-1
The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing
• CNAS (No. CNAS L5785)
CNAS has accredited Shenzhen Huaxia Testing Technology Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.
• A2LA (Certificate No. 4742.01)
Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.
• FCC Registration No.: 522263
Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

## 4.7 Deviation from Standards

None

## 4.8 Abnormalities from Standard Condition

None

## 4.9 Other Information Requested by the Customer

None.

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

| Test Item | Measurement Uncertainty |
|---|---|
| Occupied Bandwidth | 1.1% |
| RF Conducted Power | 0.86dB |
| RF Power Density | 0.74dB |
| Conducted Spurious Emissions | 0.86dB |

# 5 Equipment List

| Occupied Bandwidth | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| DC power | KEYSIGHT | E3631A | CQA-028 | 2022-09-09 | 2023-09-08 |
| Universal Radio Communication Tester | Rohde & Schwarz | CMW500 | CQA-022 | 2022-09-09 | 2023-09-08 |
| Signal generator | R&S | SME06 | CQA-024 | 2022-09-09 | 2023-09-08 |
| Vector signal generator | R&S | SMBV100A | CQA-039 | 2022-09-09 | 2023-09-08 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2022-09-09 | 2023-09-08 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2022-09-09 | 2023-09-08 |
| RF Control Unit | Tonsced | JS0806-2 | CQA-057 | 2022-09-09 | 2023-09-08 |
| RF Cable (9KHz~40GHz) | CQA | N/A | C005 | 2022-09-09 | 2023-09-08 |
| high-low temperature chamber | Auchno | OJN-9606 | CQA-S003 | 2022-09-09 | 2023-09-08 |

| Maximum Conducted Output Power | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| DC power | KEYSIGHT | E3631A | CQA-028 | 2022-09-09 | 2023-09-08 |
| Universal Radio Communication Tester | Rohde & Schwarz | CMW500 | CQA-022 | 2022-09-09 | 2023-09-08 |
| Signal generator | R&S | SME06 | CQA-024 | 2022-09-09 | 2023-09-08 |
| Vector signal generator | R&S | SMBV100A | CQA-039 | 2022-09-09 | 2023-09-08 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2022-09-09 | 2023-09-08 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2022-09-09 | 2023-09-08 |
| RF Control Unit | Tonsced | JS0806-2 | CQA-057 | 2022-09-09 | 2023-09-08 |
| RF Cable (9KHz~40GHz) | CQA | N/A | C005 | 2022-09-09 | 2023-09-08 |
| high-low temperature chamber | Auchno | OJN-9606 | CQA-S003 | 2022-09-09 | 2023-09-08 |

| Power Spectral Density | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| DC power | KEYSIGHT | E3631A | CQA-028 | 2022-09-09 | 2023-09-08 |
| Universal Radio Communication Tester | Rohde & Schwarz | CMW500 | CQA-022 | 2022-09-09 | 2023-09-08 |
| Signal generator | R&S | SME06 | CQA-024 | 2022-09-09 | 2023-09-08 |

| | | | | | |
|---|---|---|---|---|---|
| Vector signal generator | R&S | SMBV100A | CQA-039 | 2022-09-09 | 2023-09-08 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2022-09-09 | 2023-09-08 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2022-09-09 | 2023-09-08 |
| RF Control Unit | Tonsced | JS0806-2 | CQA-057 | 2022-09-09 | 2023-09-08 |
| RF Cable (9KHz~40GHz) | CQA | N/A | C005 | 2022-09-09 | 2023-09-08 |
| high-low temperature chamber | Auchno | OJN-9606 | CQA-S003 | 2022-09-09 | 2023-09-08 |

| **Emissions in non-restricted frequency bands** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| DC power | KEYSIGHT | E3631A | CQA-028 | 2022-09-09 | 2023-09-08 |
| Universal Radio Communication Tester | Rohde & Schwarz | CMW500 | CQA-022 | 2022-09-09 | 2023-09-08 |
| Signal generator | R&S | SME06 | CQA-024 | 2022-09-09 | 2023-09-08 |
| Vector signal generator | R&S | SMBV100A | CQA-039 | 2022-09-09 | 2023-09-08 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2022-09-09 | 2023-09-08 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2022-09-09 | 2023-09-08 |
| RF Control Unit | Tonsced | JS0806-2 | CQA-057 | 2022-09-09 | 2023-09-08 |
| RF Cable (9KHz~40GHz) | CQA | N/A | C005 | 2022-09-09 | 2023-09-08 |
| high-low temperature chamber | Auchno | OJN-9606 | CQA-S003 | 2022-09-09 | 2023-09-08 |

| **Emissions around the fundamental** | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| Loop antenna | SCHWARZBECK | FMZB 1516 | CQA-060 | 2021-09-16 | 2024-09-15 |
| Horn Antenna | R&S | BBHA 9170 | CQA-088 | 2021-09-16 | 2024-09-15 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2021-09-16 | 2024-09-15 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2021-09-16 | 2024-09-15 |
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2022-09-09 | 2023-09-08 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2022-09-09 | 2023-09-08 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2022-09-09 | 2023-09-08 |
| Coaxial cable (1GHz~40GHz) | CQA | N/A | C007 | 2022-09-09 | 2023-09-08 |
| Coaxial cable (9KHz~1GHz) | CQA | N/A | C013 | 2022-09-09 | 2023-09-08 |

| | | | | | |
|---|---|---|---|---|---|
| Full anechoic chamber | CQA | 966 | CQA-009 | 2022-09-09 | 2023-09-08 |

| Emissions in restricted frequency bands (below 1GHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| Loop antenna | SCHWARZBECK | FMZB 1516 | CQA-060 | 2021-09-16 | 2024-09-15 |
| Horn Antenna | R&S | BBHA 9170 | CQA-088 | 2021-09-16 | 2024-09-15 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2021-09-16 | 2024-09-15 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2021-09-16 | 2024-09-15 |
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2022-09-09 | 2023-09-08 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2022-09-09 | 2023-09-08 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2022-09-09 | 2023-09-08 |
| Coaxial cable (1GHz~40GHz) | CQA | N/A | C007 | 2022-09-09 | 2023-09-08 |
| Coaxial cable (9KHz~1GHz) | CQA | N/A | C013 | 2022-09-09 | 2023-09-08 |
| Full anechoic chamber | CQA | 966 | CQA-009 | 2022-09-09 | 2023-09-08 |

| Emissions in restricted frequency bands (above 1GHz) | | | | | |
|---|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model No** | **Inventory No** | **Cal Date** | **Cal Due Date** |
| Loop antenna | SCHWARZBECK | FMZB 1516 | CQA-060 | 2021-09-16 | 2024-09-15 |
| Horn Antenna | R&S | BBHA 9170 | CQA-088 | 2021-09-16 | 2024-09-15 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2021-09-16 | 2024-09-15 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2021-09-16 | 2024-09-15 |
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2022-09-09 | 2023-09-08 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2022-09-09 | 2023-09-08 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2022-09-09 | 2023-09-08 |
| Coaxial cable (1GHz~40GHz) | CQA | N/A | C007 | 2022-09-09 | 2023-09-08 |
| Coaxial cable (9KHz~1GHz) | CQA | N/A | C013 | 2022-09-09 | 2023-09-08 |
| Full anechoic chamber | CQA | 966 | CQA-009 | 2022-09-09 | 2023-09-08 |

# 6 Evaluation Results (Evaluation)

## 6.1 Antenna requirement

| | |
|---|---|
| **Standard requirement:** | 47 CFR Part 15C Section 15.203 /247(c) |
| 15.203 requirement:<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.<br>15.247(b) (4) requirement:<br>The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. | |
| **EUT Antenna:** |  |
| **The antenna is FPC antenna. The best case gain of the antenna is -0.18dBi.** | |

# 7 Radio Spectrum Matter Test Results (RF)

## 7.1 Occupied Bandwidth

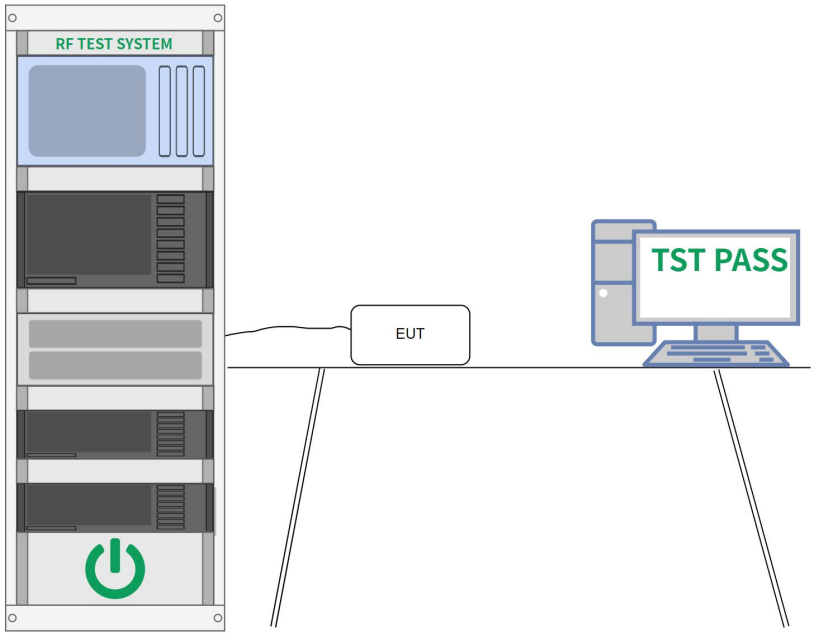
| | |
|---|---|
| Test Requirement: | Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |
| Test Method: | DTS bandwidth |
| Test Limit: | Section (a)(2), Systems using digital modulation techniques may operate in the 902-928 MHz, and 2400-2483.5 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz. |
| Procedure: | a) Set RBW = 100 kHz.<br>b) Set the VBW >= [3 × RBW].<br>c) Detector = peak.<br>d) Trace mode = max hold.<br>e) Sweep = auto couple.<br>f) Allow the trace to stabilize.<br>g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level |

| | |
|---|---|
| | measured in the fundamental emission. |

### 7.1.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 24.6 °C |
| Humidity: | 42.7 % |
| Atmospheric Pressure: | 101 kPa |
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 7.1.2 Test Setup Diagram:




### 7.1.3 Test Data:

Please Refer to Appendix for Details.

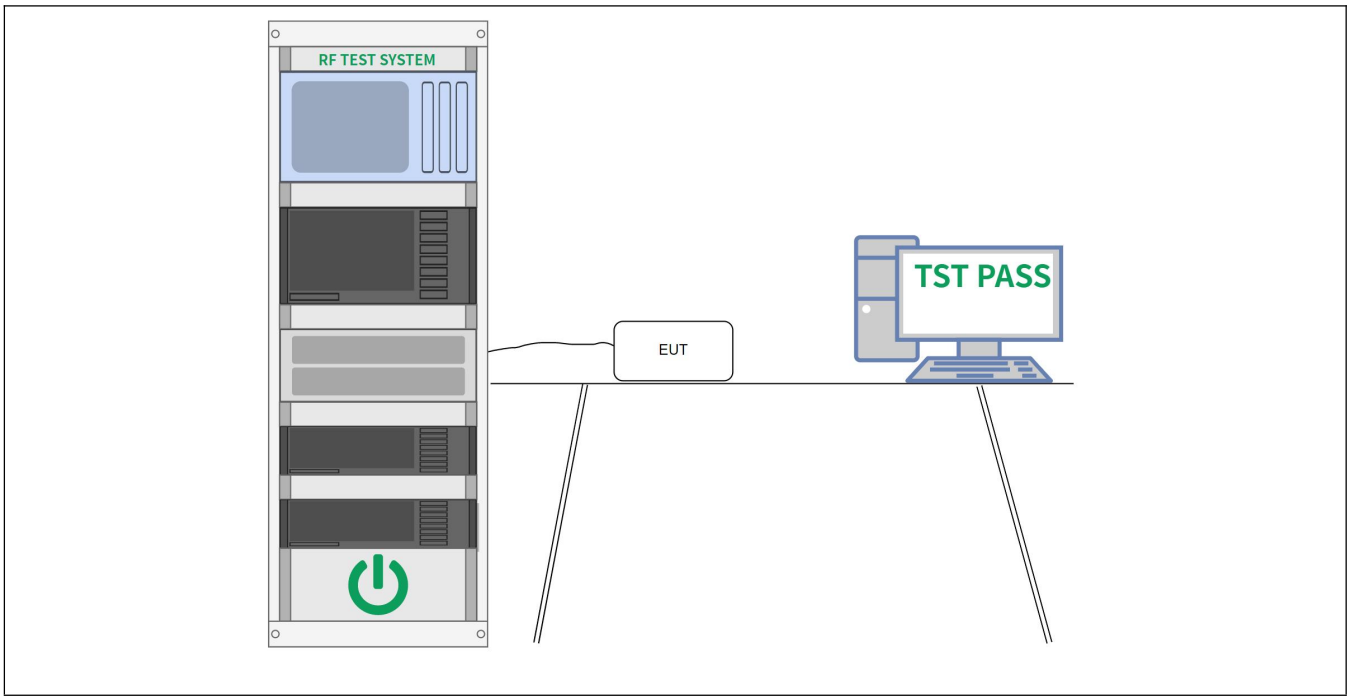
## 7.2 Maximum Conducted Output Power

| | |
|---|---|
| Test Requirement: | For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode. |
| Test Method: | Maximum peak conducted output power |
| Test Limit: | For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode. |
| Procedure: | ANSI C63.10-2013, section 11.9.1 Maximum peak conducted output power |

### 7.2.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 24.6 °C |
| Humidity: | 42.7 % |
| Atmospheric Pressure: | 101 kPa |
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 7.2.2 Test Setup Diagram:




### 7.2.3 Test Data:

Please Refer to Appendix for Details.

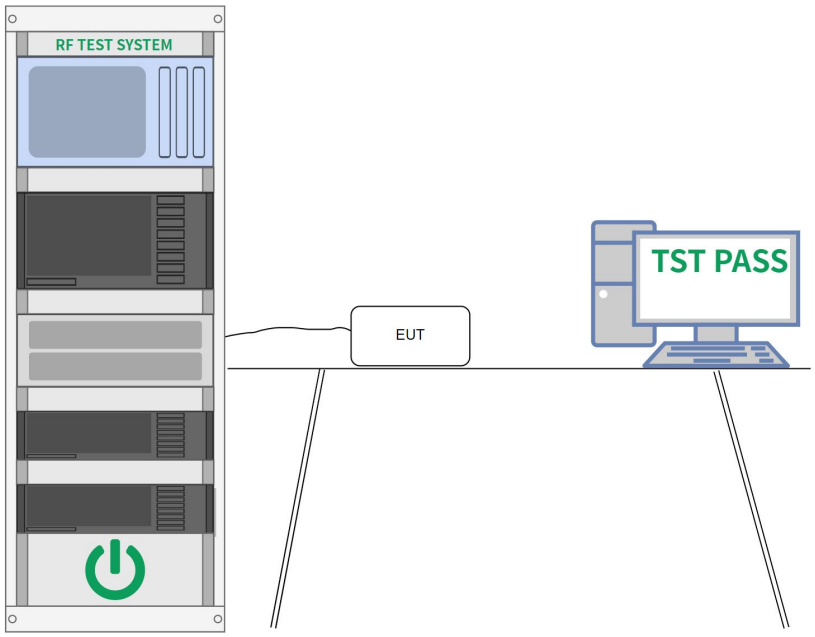
## 7.3 Power Spectral Density

| | |
|---|---|
| Test Requirement: | For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density. |
| Test Method: | Maximum power spectral density level in the fundamental emission |
| Test Limit: | For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density. |

### 7.3.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 24.6 °C |
| Humidity: | 42.7 % |
| Atmospheric Pressure: | 101 kPa |
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 7.3.2 Test Setup Diagram:




### 7.3.3 Test Data:

Please Refer to Appendix for Details.

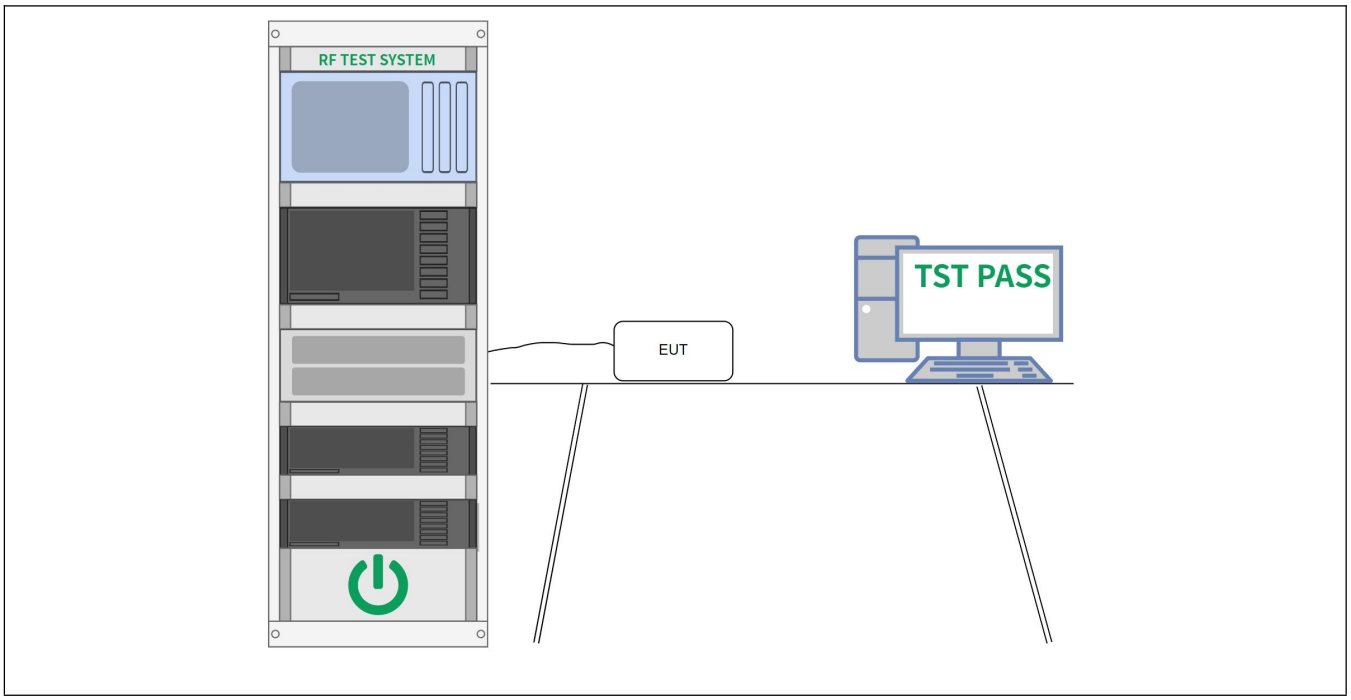
## 7.4 Emissions in non-restricted frequency bands

| | |
|---|---|
| Test Requirement: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. |
| Test Method: | Emissions in nonrestricted frequency bands |
| Test Limit: | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required. |
| Procedure: | ANSI C63.10-2013<br>Section 11.11.1, Section 11.11.2, Section 11.11.3 |

### 7.4.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 24.6 °C |
| Humidity: | 42.7 % |
| Atmospheric Pressure: | 101 kPa |
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 7.4.2 Test Setup Diagram:




### 7.4.3 Test Data:

Please Refer to Appendix for Details.

## 7.5 Emissions around the fundamental

<table>
<tr><td>Test Requirement:</td><td>In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Method:</td><td>Radiated emissions tests</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.,<br>§§ 15.231 and 15.241.
</td></tr>
<tr><td>Procedure:</td><td>ANSI C63.10-2013 section 6.6.4</td></tr>
</table>

### 7.5.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 25.5 °C |
| Humidity: | 53 % |
| Atmospheric Pressure: | 100.9 kPa |
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 7.5.2 Test Data:

Please Refer to 7.7 for Details.

## 7.6 Emissions in restricted frequency bands (below 1GHz)

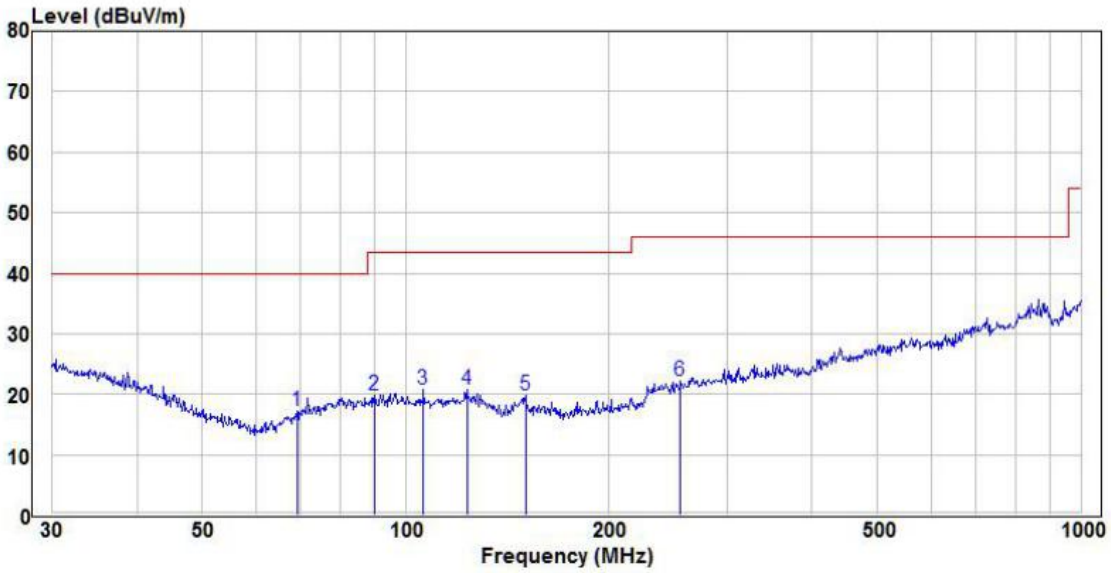
<table>
<tr><td>Test Requirement:</td><td>In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Method:</td><td>Radiated emissions tests</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.,<br>§§ 15.231 and 15.241.
</td></tr>
<tr><td>Procedure:</td><td>ANSI C63.10-2013 section 6.6.4</td></tr>
</table>

### 7.6.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 25.5 °C |
| Humidity: | 53 % |
| Atmospheric Pressure: | 100.9 kPa |
| Pre test mode: | TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8 |
| Final test mode: | TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8 |

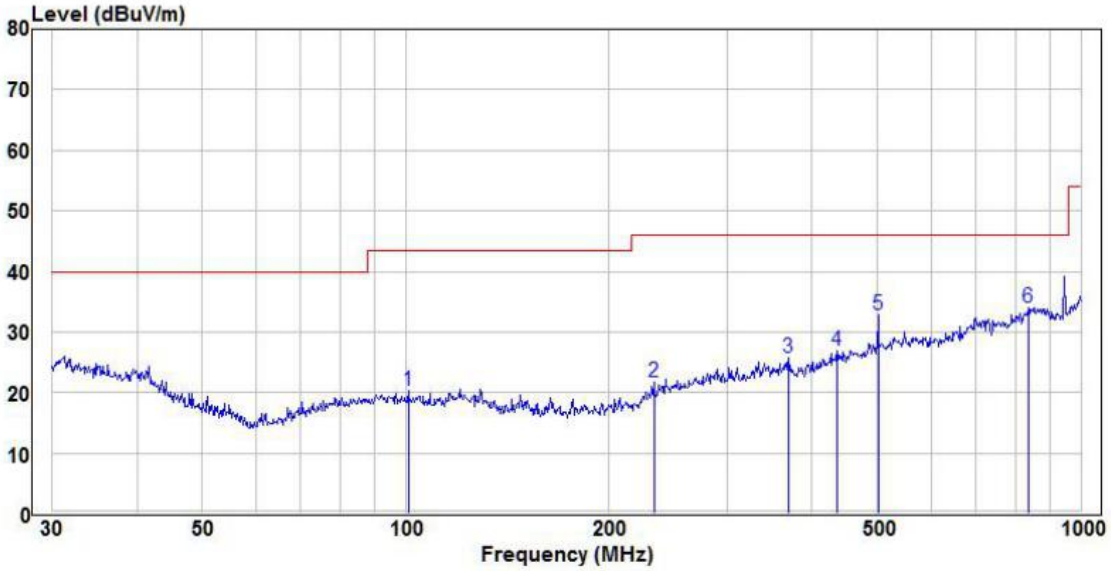
### 7.6.2 Test Data:

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



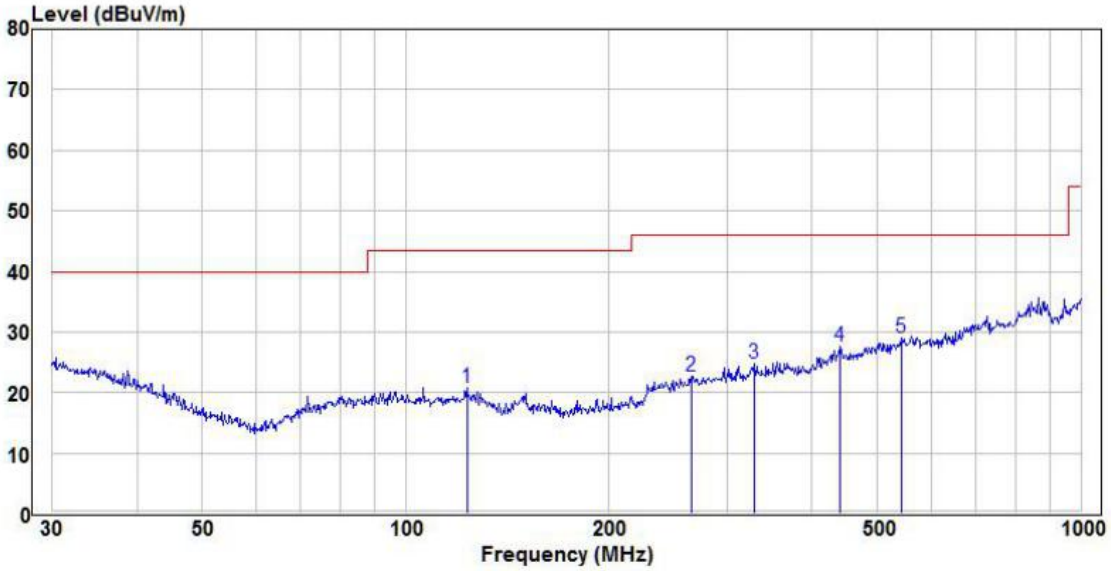

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 69.11 | 9.41 | 7.53 | 17.29 | 40.00 | -22.71 | Peak | HORIZONTAL | --- | --- |
| 2 | 89.90 | 9.77 | 9.60 | 19.79 | 43.50 | -23.71 | Peak | HORIZONTAL | --- | --- |
| 3 | 106.39 | 10.32 | 9.88 | 20.67 | 43.50 | -22.83 | Peak | HORIZONTAL | --- | --- |
| 4 | 123.27 | 10.29 | 10.07 | 20.87 | 43.50 | -22.63 | Peak | HORIZONTAL | --- | --- |
| 5 | 150.54 | 11.49 | 7.86 | 19.92 | 43.50 | -23.58 | Peak | HORIZONTAL | --- | --- |
| 6 | 255.62 | 10.01 | 9.52 | 22.27 | 46.00 | -23.73 | Peak | HORIZONTAL | --- | --- |

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



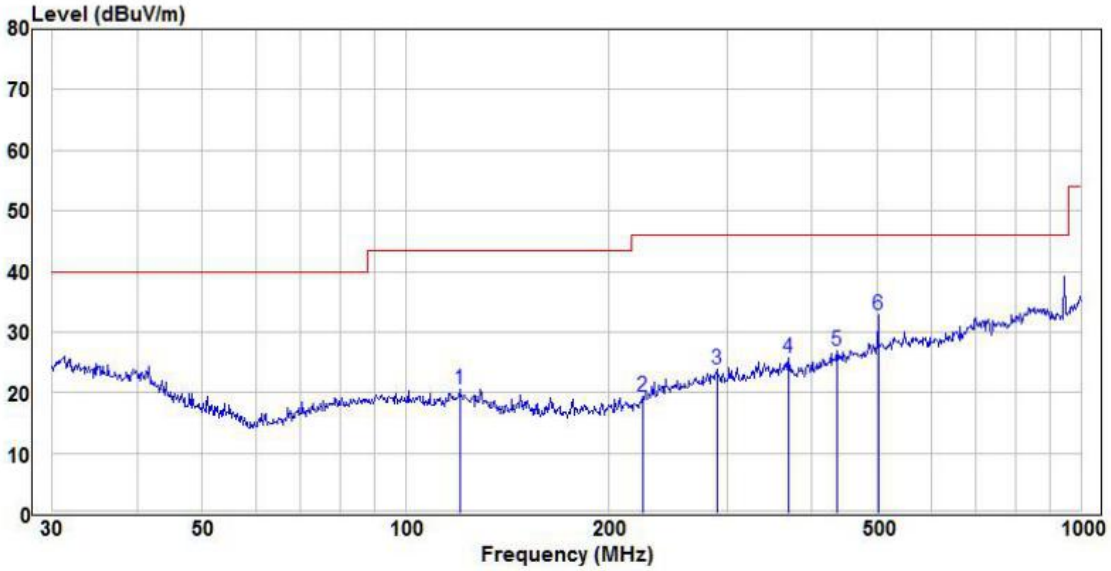

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 100.93 | 9.68 | 10.15 | 20.28 | 43.50 | -23.22 | Peak | VERTICAL | --- | --- |
| 2 | 233.35 | 10.90 | 8.83 | 21.72 | 46.00 | -24.28 | Peak | VERTICAL | --- | --- |
| 3 | 369.40 | 10.34 | 12.50 | 25.76 | 46.00 | -20.24 | Peak | VERTICAL | --- | --- |
| 4 | 435.59 | 10.56 | 14.23 | 26.83 | 46.00 | -19.17 | Peak | VERTICAL | --- | --- |
| 5 | 501.18 | 14.45 | 16.11 | 32.74 | 46.00 | -13.26 | Peak | VERTICAL | --- | --- |
| 6 | 836.24 | 9.86 | 19.08 | 33.98 | 46.00 | -12.02 | Peak | VERTICAL | --- | --- |

TM2 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



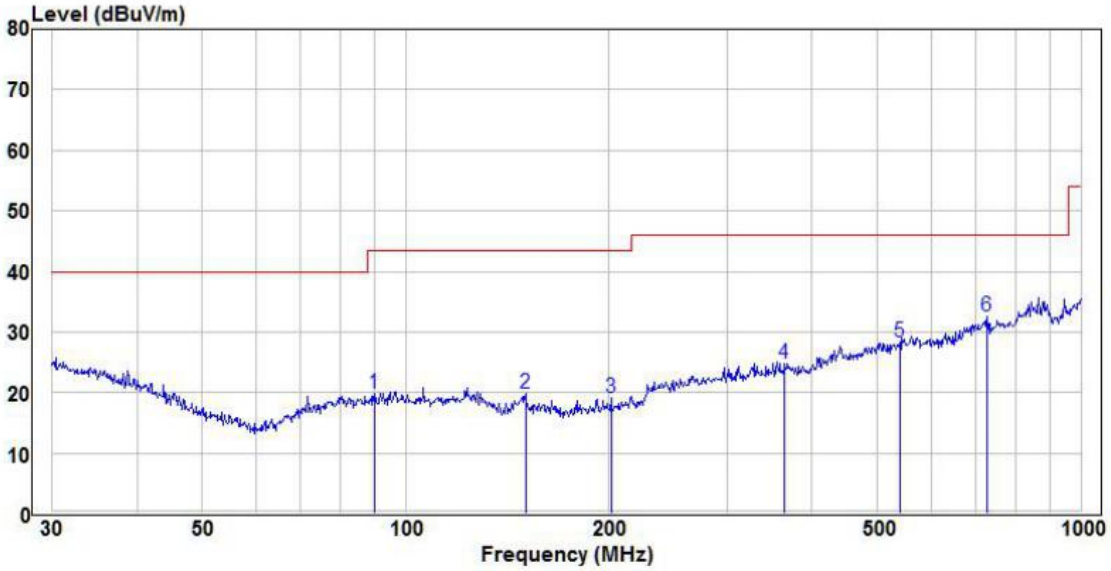

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 123.27 | 10.29 | 10.07 | 20.87 | 43.50 | -22.63 | Peak | HORIZONTAL | --- | --- |
| 2 | 264.75 | 10.08 | 9.81 | 22.65 | 46.00 | -23.35 | Peak | HORIZONTAL | --- | --- |
| 3 | 327.89 | 10.35 | 11.54 | 24.76 | 46.00 | -21.24 | Peak | HORIZONTAL | --- | --- |
| 4 | 440.20 | 11.18 | 14.37 | 27.60 | 46.00 | -18.40 | Peak | HORIZONTAL | --- | --- |
| 5 | 543.27 | 10.20 | 16.49 | 28.93 | 46.00 | -17.07 | Peak | HORIZONTAL | --- | --- |

TM2 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



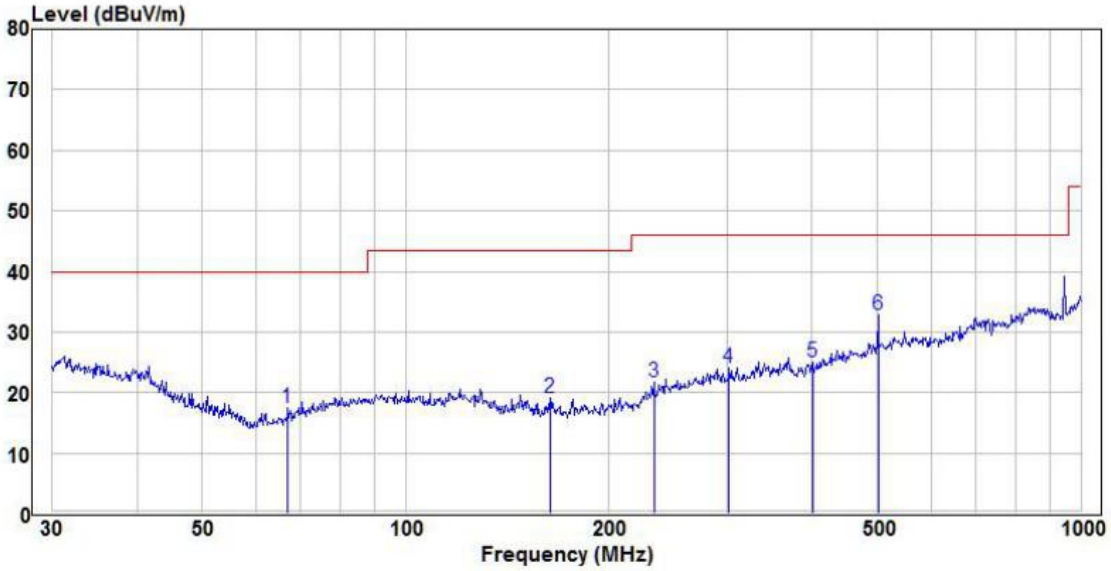

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 120.28 | 9.85 | 10.19 | 20.54 | 43.50 | -22.96 | Peak | VERTICAL | --- | --- |
| 2 | 224.52 | 9.61 | 8.56 | 19.33 | 46.00 | -26.67 | Peak | VERTICAL | --- | --- |
| 3 | 289.00 | 10.53 | 10.56 | 23.90 | 46.00 | -22.10 | Peak | VERTICAL | --- | --- |
| 4 | 369.40 | 10.34 | 12.50 | 25.76 | 46.00 | -20.24 | Peak | VERTICAL | --- | --- |
| 5 | 435.59 | 10.56 | 14.23 | 26.83 | 46.00 | -19.17 | Peak | VERTICAL | --- | --- |
| 6 | 501.18 | 14.45 | 16.11 | 32.74 | 46.00 | -13.26 | Peak | VERTICAL | --- | --- |

TM3 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



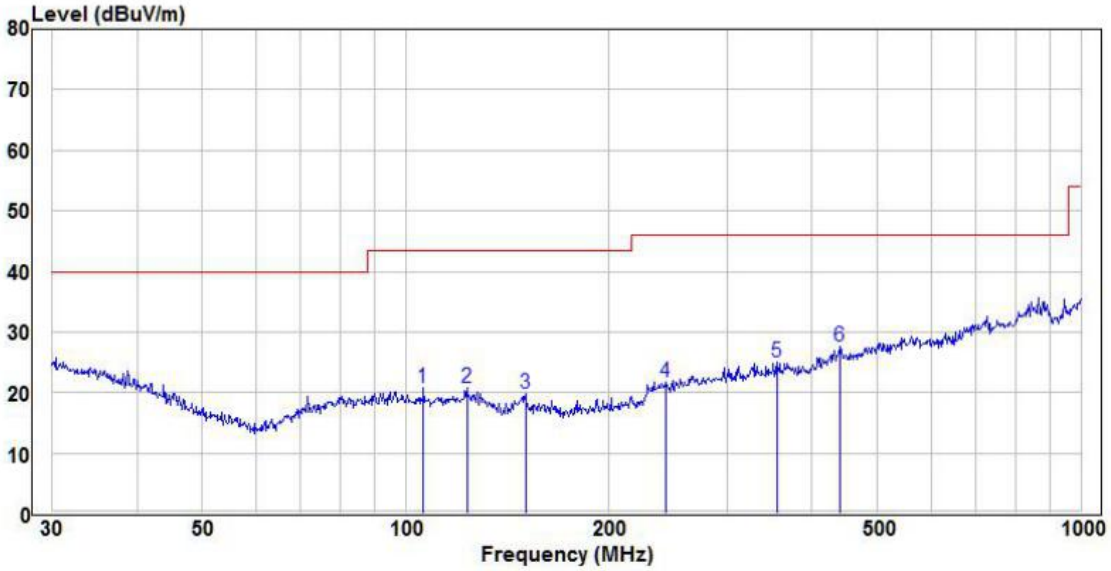

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 89.90 | 9.77 | 9.60 | 19.79 | 43.50 | -23.71 | Peak | HORIZONTAL | --- | --- |
| 2 | 150.54 | 11.49 | 7.86 | 19.92 | 43.50 | -23.58 | Peak | HORIZONTAL | --- | --- |
| 3 | 201.39 | 10.55 | 7.84 | 19.08 | 43.50 | -24.42 | Peak | HORIZONTAL | --- | --- |
| 4 | 364.26 | 9.49 | 12.38 | 24.78 | 46.00 | -21.22 | Peak | HORIZONTAL | --- | --- |
| 5 | 539.48 | 9.61 | 16.46 | 28.31 | 46.00 | -17.69 | Peak | HORIZONTAL | --- | --- |
| 6 | 726.81 | 11.33 | 18.86 | 32.60 | 46.00 | -13.40 | Peak | HORIZONTAL | --- | --- |

TM3 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



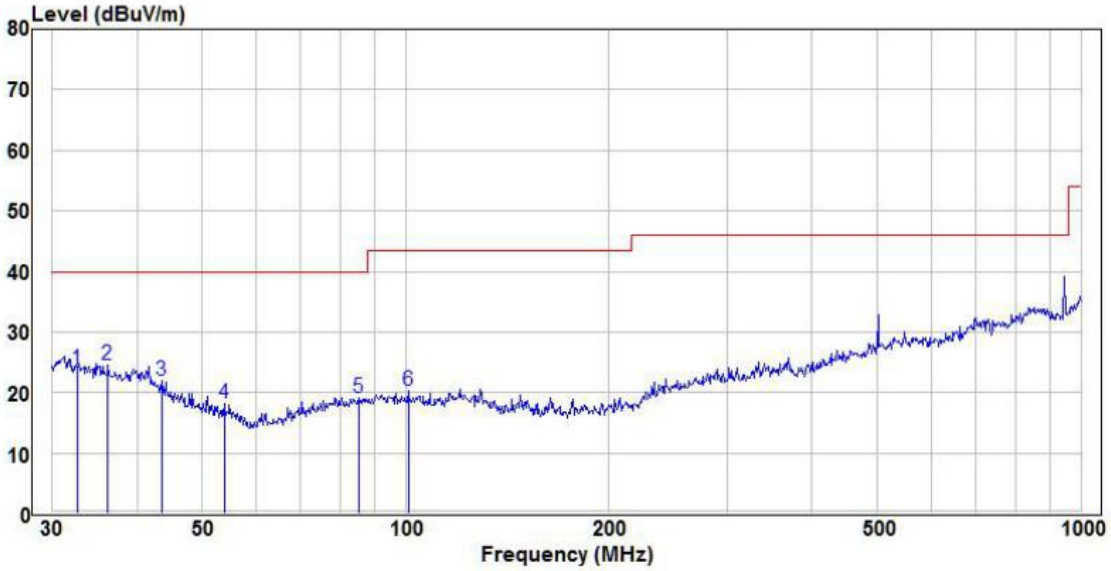

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 66.97 | 10.29 | 6.86 | 17.49 | 40.00 | -22.51 | Peak | VERTICAL | --- | --- |
| 2 | 163.76 | 11.39 | 7.12 | 19.11 | 43.50 | -24.39 | Peak | VERTICAL | --- | --- |
| 3 | 233.35 | 10.90 | 8.83 | 21.72 | 46.00 | -24.28 | Peak | VERTICAL | --- | --- |
| 4 | 301.42 | 10.24 | 10.93 | 24.00 | 46.00 | -22.00 | Peak | VERTICAL | --- | --- |
| 5 | 400.43 | 9.93 | 13.21 | 25.09 | 46.00 | -20.91 | Peak | VERTICAL | --- | --- |
| 6 | 501.18 | 14.45 | 16.11 | 32.74 | 46.00 | -13.26 | Peak | VERTICAL | --- | --- |

TM4 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



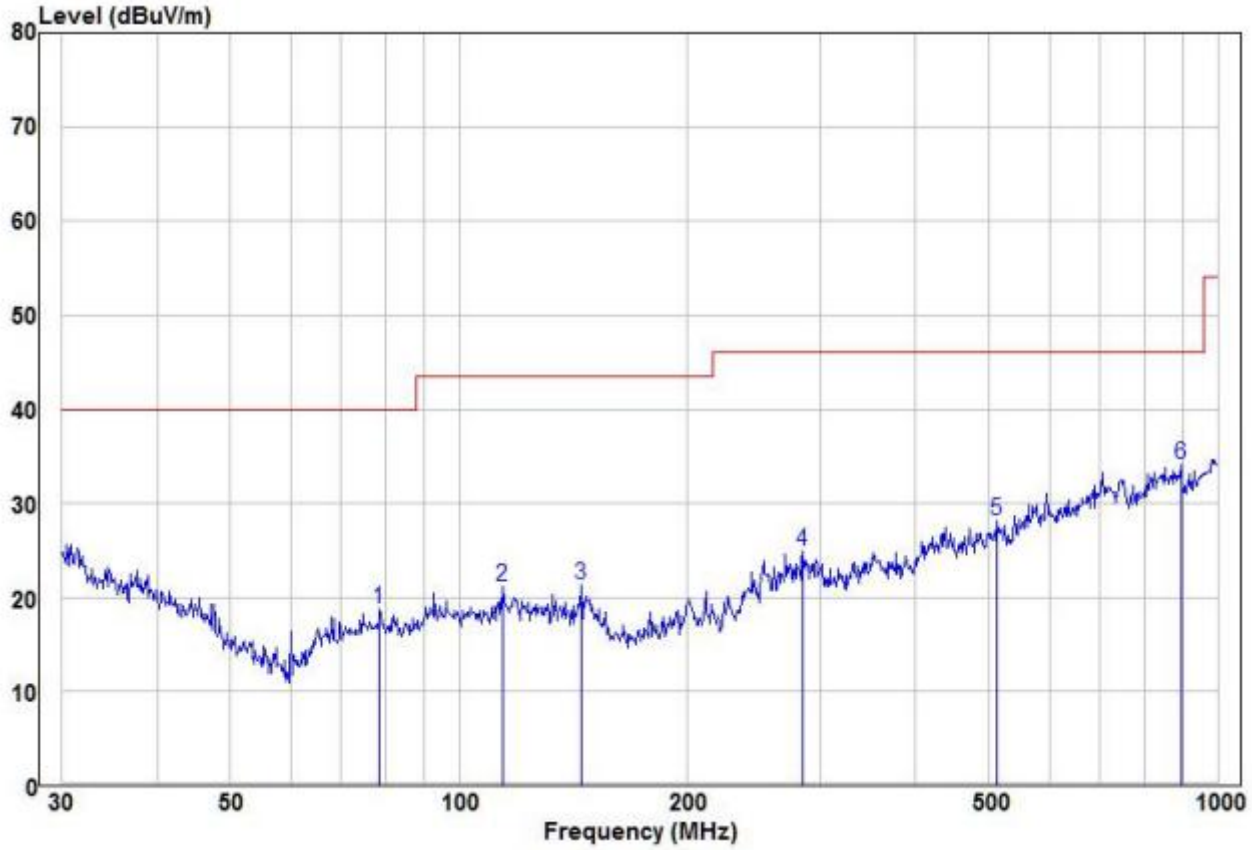

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 106.39 | 10.32 | 9.88 | 20.67 | 43.50 | -22.83 | Peak | HORIZONTAL | --- | --- |
| 2 | 123.27 | 10.29 | 10.07 | 20.87 | 43.50 | -22.63 | Peak | HORIZONTAL | --- | --- |
| 3 | 150.54 | 11.49 | 7.86 | 19.92 | 43.50 | -23.58 | Peak | HORIZONTAL | --- | --- |
| 4 | 243.38 | 9.90 | 9.14 | 21.70 | 46.00 | -24.30 | Peak | HORIZONTAL | --- | --- |
| 5 | 355.43 | 9.97 | 12.17 | 25.05 | 46.00 | -20.95 | Peak | HORIZONTAL | --- | --- |
| 6 | 440.20 | 11.18 | 14.37 | 27.60 | 46.00 | -18.40 | Peak | HORIZONTAL | --- | --- |

TM4 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



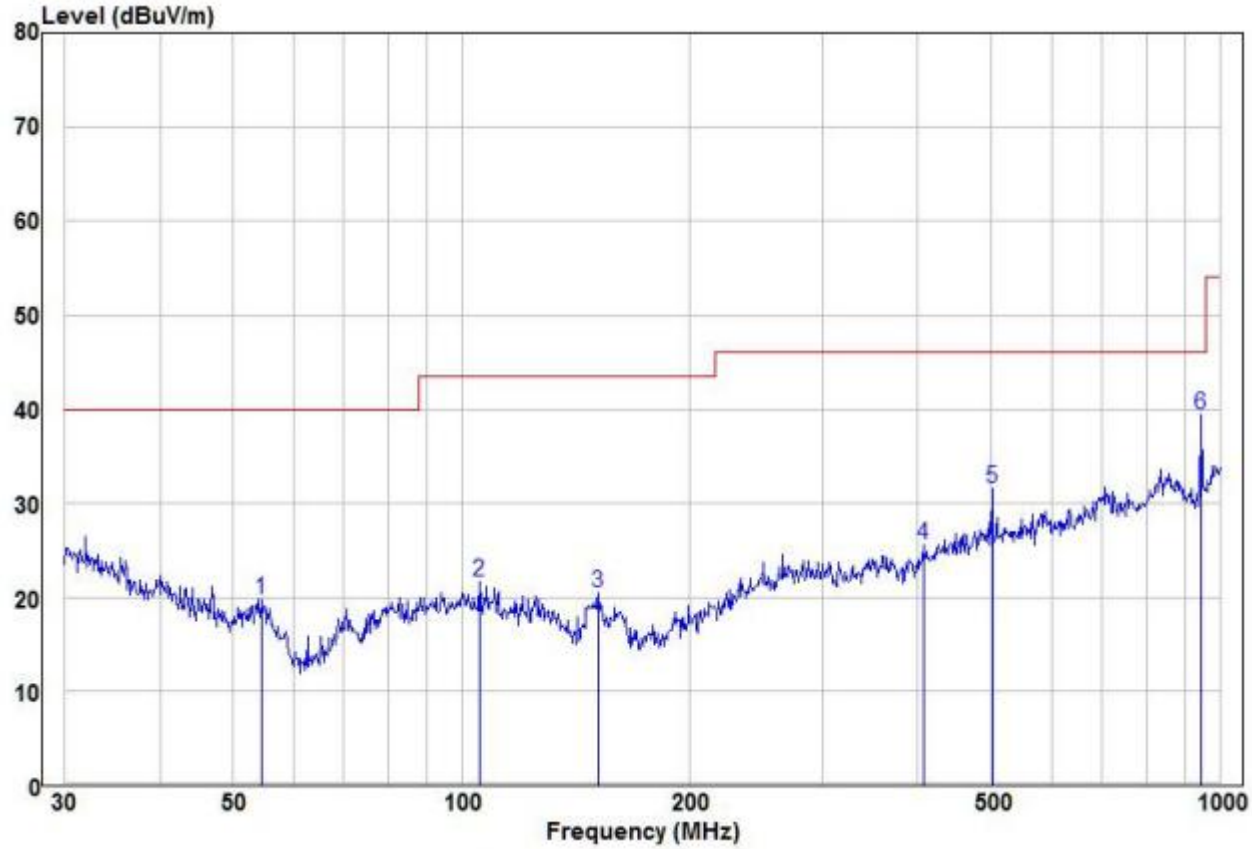

| | Freq. | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase | APos | TPos |
|---|---|---|---|---|---|---|---|---|---|---|
| | dBuV | dBuV | dBuV | dBuV | dBuV | dBuV | | | | |
| 1 | 32.63 | 8.57 | 17.15 | 23.79 | 40.00 | -16.21 | Peak | VERTICAL | --- | --- |
| 2 | 36.25 | 10.37 | 15.85 | 24.52 | 40.00 | -15.48 | Peak | VERTICAL | --- | --- |
| 3 | 43.51 | 10.85 | 12.50 | 22.00 | 40.00 | -18.00 | Peak | VERTICAL | --- | --- |
| 4 | 53.88 | 10.95 | 7.21 | 18.24 | 40.00 | -21.76 | Peak | VERTICAL | --- | --- |
| 5 | 85.30 | 9.21 | 9.51 | 19.12 | 40.00 | -20.88 | Peak | VERTICAL | --- | --- |
| 6 | 100.93 | 9.68 | 10.15 | 20.28 | 43.50 | -23.22 | Peak | VERTICAL | --- | --- |

TM5 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



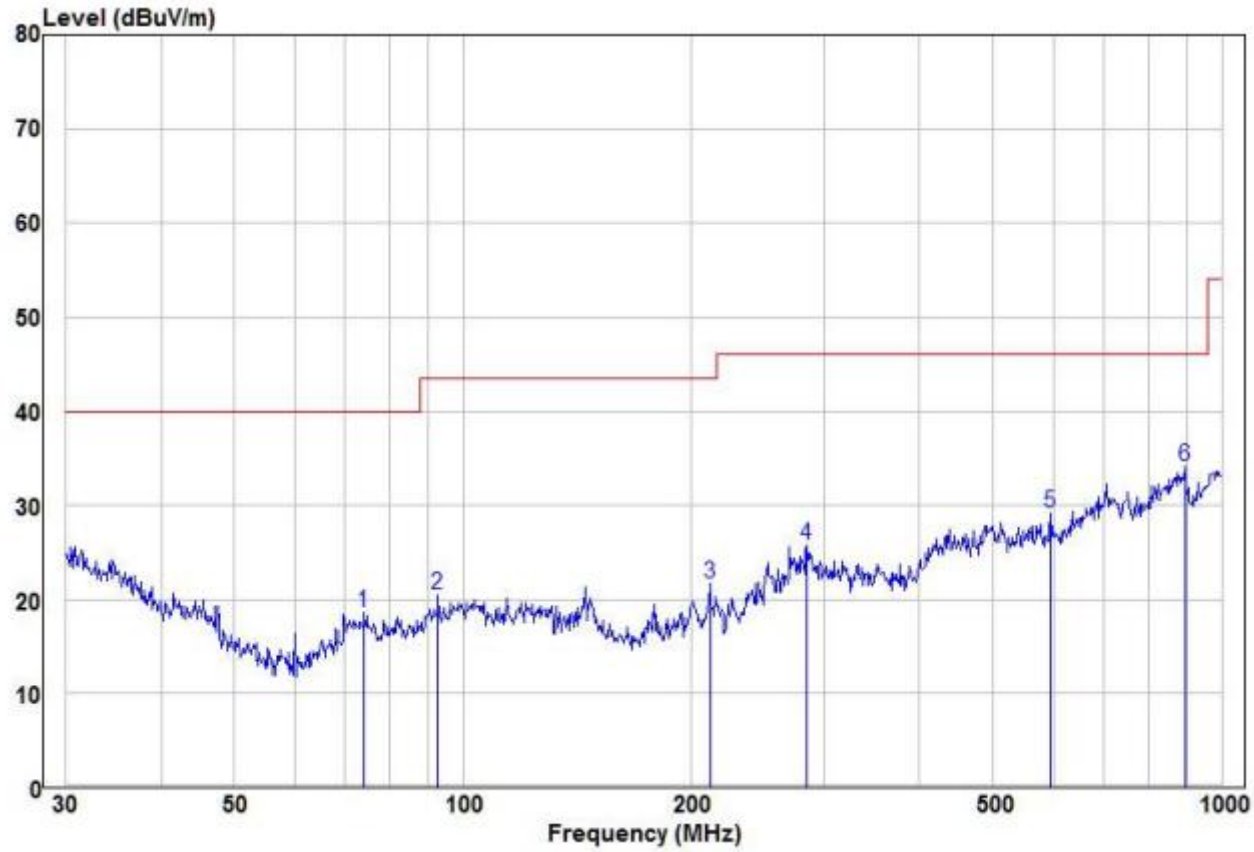

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 78.69 | 9.20 | 9.57 | 18.77 | 40.00 | -21.23 | Peak | HORIZONTAL |
| 2 | 114.11 | 10.81 | 10.39 | 21.20 | 43.50 | -22.30 | Peak | HORIZONTAL |
| 3 | 144.84 | 13.09 | 8.25 | 21.34 | 43.50 | -22.16 | Peak | HORIZONTAL |
| 4 | 283.98 | 11.63 | 13.20 | 24.83 | 46.00 | -21.17 | Peak | HORIZONTAL |
| 5 | 511.84 | 9.68 | 18.41 | 28.09 | 46.00 | -17.91 | Peak | HORIZONTAL |
| 6 pp | 893.86 | 10.17 | 23.87 | 34.04 | 46.00 | -11.96 | Peak | HORIZONTAL |

TM5 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



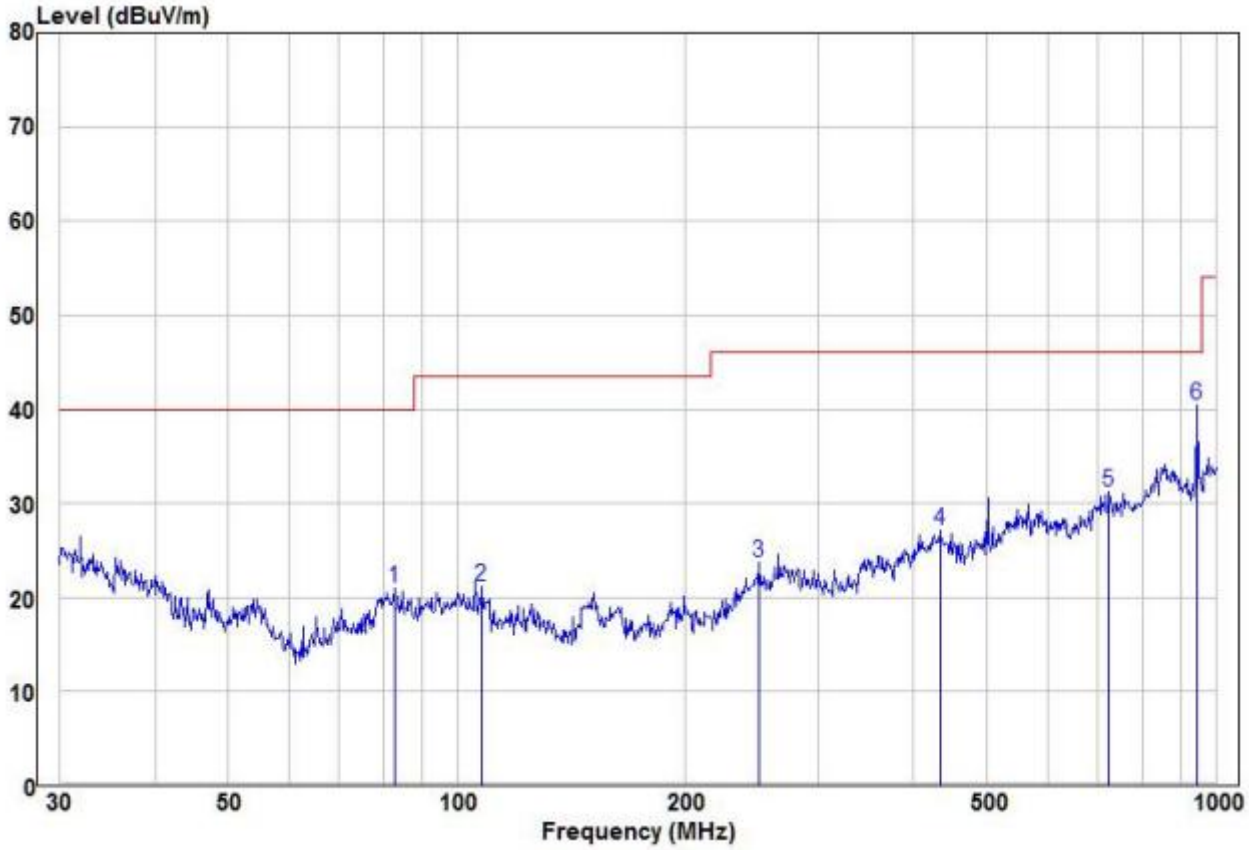

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 54.45 | 12.57 | 7.16 | 19.73 | 40.00 | -20.27 | Peak | VERTICAL |
| 2 | 105.64 | 11.24 | 10.38 | 21.62 | 43.50 | -21.88 | Peak | VERTICAL |
| 3 | 151.60 | 12.15 | 8.36 | 20.51 | 43.50 | -22.99 | Peak | VERTICAL |
| 4 | 406.09 | 10.22 | 15.35 | 25.57 | 46.00 | -20.43 | Peak | VERTICAL |
| 5 | 501.18 | 13.27 | 18.29 | 31.56 | 46.00 | -14.44 | Peak | VERTICAL |
| 6 pp | 945.44 | 15.74 | 23.62 | 39.36 | 46.00 | -6.64 | Peak | VERTICAL |

TM6 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



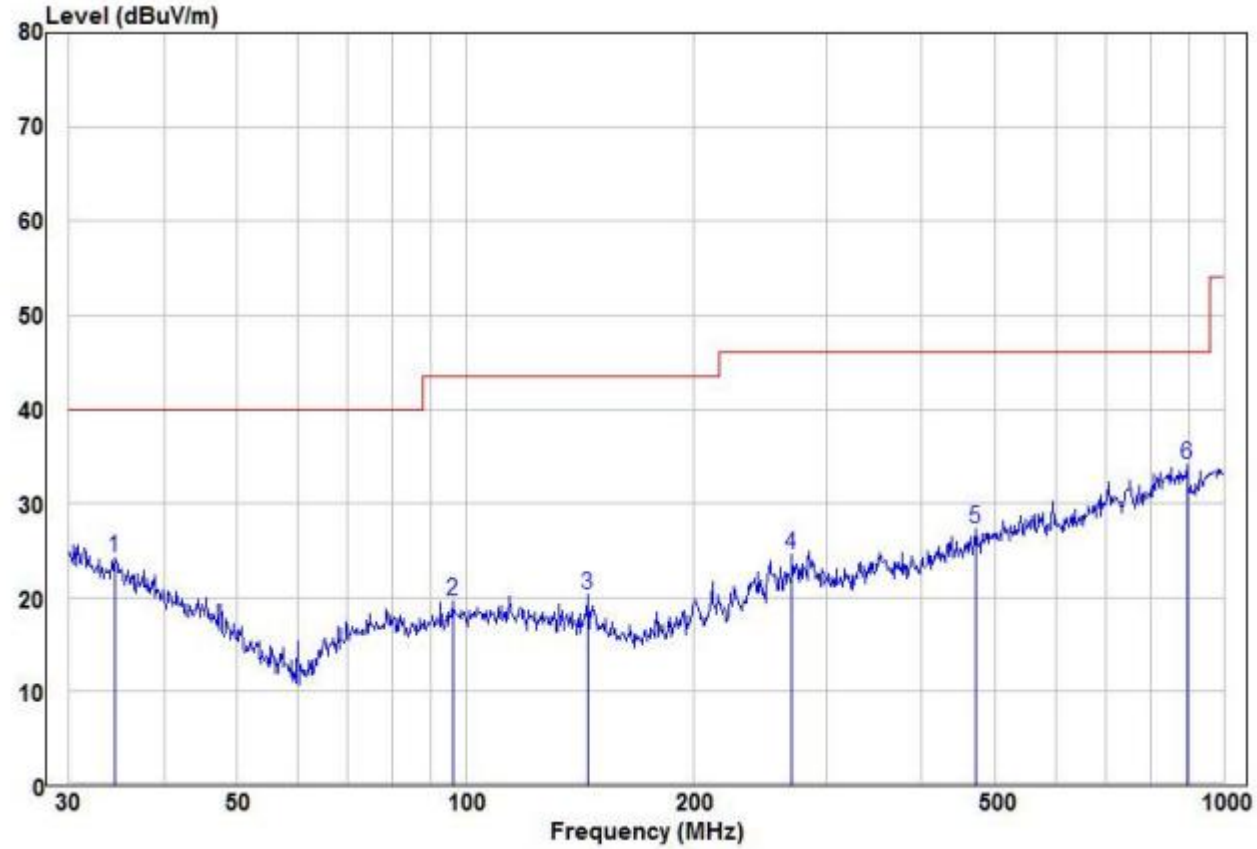

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 74.14 | 9.70 | 8.83 | 18.53 | 40.00 | -21.47 | Peak | HORIZONTAL |
| 2 | 92.79 | 10.29 | 10.20 | 20.49 | 43.50 | -23.01 | Peak | HORIZONTAL |
| 3 | 211.53 | 12.82 | 8.86 | 21.68 | 43.50 | -21.82 | Peak | HORIZONTAL |
| 4 | 283.98 | 12.63 | 13.20 | 25.83 | 46.00 | -20.17 | Peak | HORIZONTAL |
| 5 | 595.13 | 10.37 | 18.76 | 29.13 | 46.00 | -16.87 | Peak | HORIZONTAL |
| 6 pp | 893.86 | 10.17 | 23.87 | 34.04 | 46.00 | -11.96 | Peak | HORIZONTAL |

TM6 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



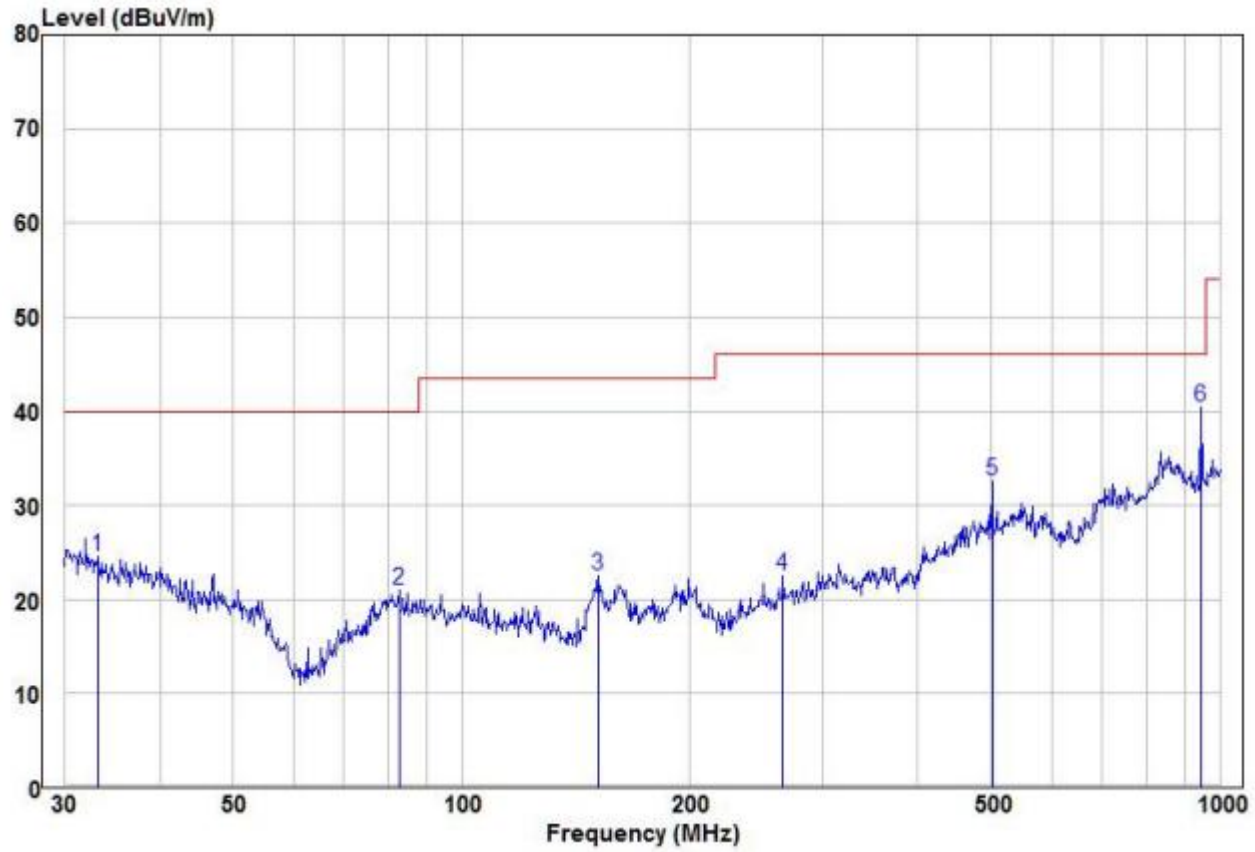

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 82.65 | 11.20 | 9.84 | 21.04 | 40.00 | -18.96 | Peak | VERTICAL |
| 2 | 107.89 | 10.86 | 10.28 | 21.14 | 43.50 | -22.36 | Peak | VERTICAL |
| 3 | 250.30 | 11.62 | 12.09 | 23.71 | 46.00 | -22.29 | Peak | VERTICAL |
| 4 | 432.55 | 10.90 | 16.17 | 27.07 | 46.00 | -18.93 | Peak | VERTICAL |
| 5 | 724.26 | 9.96 | 21.25 | 31.21 | 46.00 | -14.79 | Peak | VERTICAL |
| 6 pp | 945.44 | 16.74 | 23.62 | 40.36 | 46.00 | -5.64 | Peak | VERTICAL |

TM7 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L



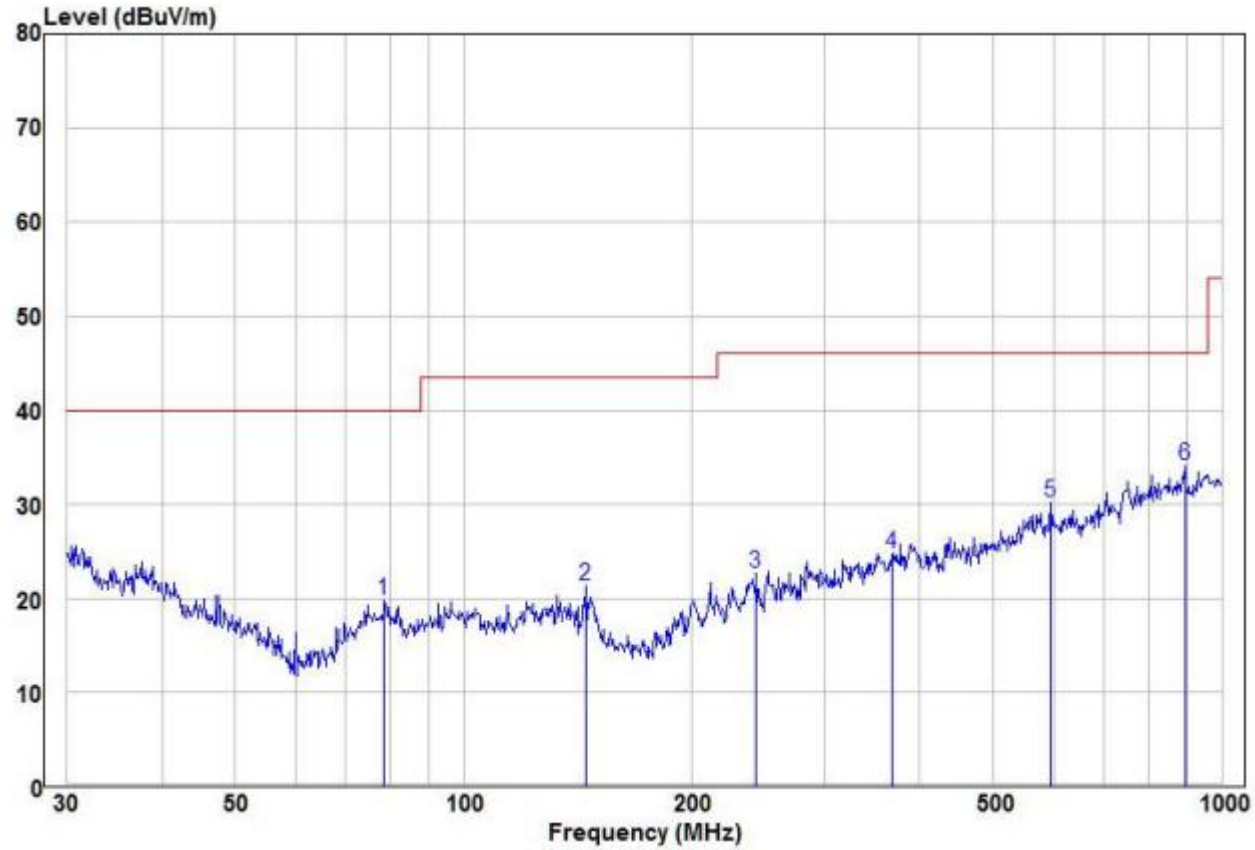

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 34.52 | 9.50 | 14.73 | 24.23 | 40.00 | -15.77 | Peak | HORIZONTAL |
| 2 | 96.10 | 9.29 | 10.41 | 19.70 | 43.50 | -23.80 | Peak | HORIZONTAL |
| 3 | 144.84 | 12.09 | 8.25 | 20.34 | 43.50 | -23.16 | Peak | HORIZONTAL |
| 4 | 269.43 | 11.93 | 12.72 | 24.65 | 46.00 | -21.35 | Peak | HORIZONTAL |
| 5 | 470.52 | 10.01 | 17.37 | 27.38 | 46.00 | -18.62 | Peak | HORIZONTAL |
| 6 pp | 893.86 | 10.17 | 23.87 | 34.04 | 46.00 | -11.96 | Peak | HORIZONTAL |

TM7 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L



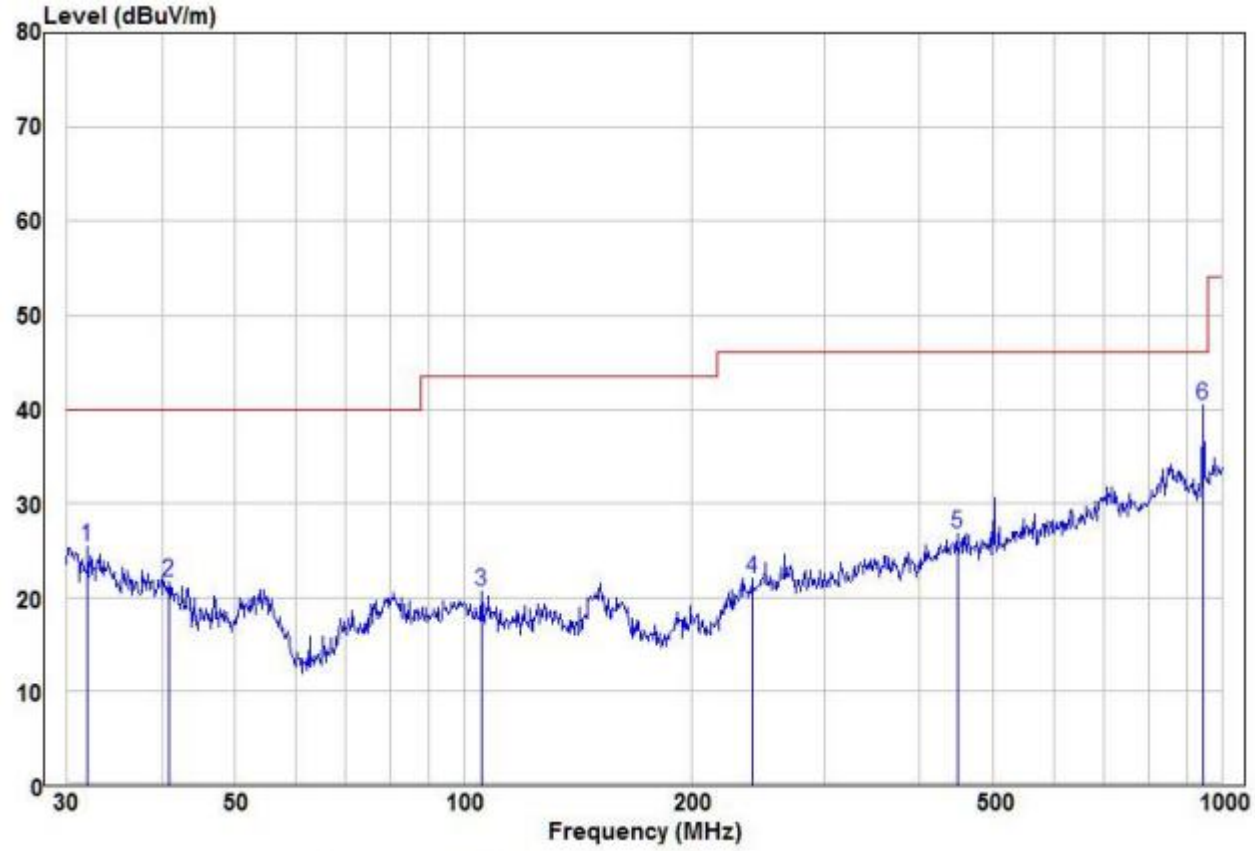

| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 33.09 | 9.50 | 15.11 | 24.61 | 40.00 | -15.39 | Peak | VERTICAL |
| 2 | 82.65 | 11.20 | 9.84 | 21.04 | 40.00 | -18.96 | Peak | VERTICAL |
| 3 | 151.60 | 14.15 | 8.36 | 22.51 | 43.50 | -20.99 | Peak | VERTICAL |
| 4 | 265.68 | 9.95 | 12.60 | 22.55 | 46.00 | -23.45 | Peak | VERTICAL |
| 5 | 501.18 | 14.27 | 18.29 | 32.56 | 46.00 | -13.44 | Peak | VERTICAL |
| 6 pp | 945.44 | 16.74 | 23.62 | 40.36 | 46.00 | -5.64 | Peak | VERTICAL |

TM8 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 78.69 | 10.20 | 9.57 | 19.77 | 40.00 | -20.23 | Peak | HORIZONTAL |
| 2 | 144.84 | 13.09 | 8.25 | 21.34 | 43.50 | -22.16 | Peak | HORIZONTAL |
| 3 | 243.38 | 10.95 | 11.80 | 22.75 | 46.00 | -23.25 | Peak | HORIZONTAL |
| 4 | 366.82 | 9.44 | 15.36 | 24.80 | 46.00 | -21.20 | Peak | HORIZONTAL |
| 5 | 595.13 | 11.37 | 18.76 | 30.13 | 46.00 | -15.87 | Peak | HORIZONTAL |
| 6 pp | 893.86 | 10.17 | 23.87 | 34.04 | 46.00 | -11.96 | Peak | HORIZONTAL |

TM8 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 31.95 | 10.07 | 15.41 | 25.48 | 40.00 | -14.52 | Peak | VERTICAL |
| 2 | 40.84 | 9.30 | 12.40 | 21.70 | 40.00 | -18.30 | Peak | VERTICAL |
| 3 | 105.64 | 10.24 | 10.38 | 20.62 | 43.50 | -22.88 | Peak | VERTICAL |
| 4 | 239.99 | 10.51 | 11.56 | 22.07 | 46.00 | -23.93 | Peak | VERTICAL |
| 5 | 447.98 | 10.07 | 16.66 | 26.73 | 46.00 | -19.27 | Peak | VERTICAL |
| 6 pp | 945.44 | 16.74 | 23.62 | 40.36 | 46.00 | -5.64 | Peak | VERTICAL |

## 7.7 Emissions in restricted frequency bands (above 1GHz)

<table>
<tr><td>Test Requirement:</td><td>In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`</td></tr>
<tr><td>Test Method:</td><td>Radiated emissions tests</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.,<br>§§ 15.231 and 15.241.
</td></tr>
<tr><td>Procedure:</td><td>a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 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. 2) Above 1G: 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. Note: For the radiated emission test above 1GHz:<br>Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.<br>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.<br>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.<br>a. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>b. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>c. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be</td></tr>
</table>

| | |
|---|---|
| | re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.<br>d. Test the EUT in the lowest channel (2402MHz),the middle channel (2441MHz),the Highest channel (2480MHz)<br>e. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.<br>Repeat above procedures until all frequencies measured was complete.<br>Remark:<br>The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic<br>equation with a sample calculation is as follows:<br>Factor= Antenna Factor + Cable Factor – Preamplifier Factor,<br>Level = Read Level + Factor,<br>Over Limit=Level-Limit Line.<br><br>1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:<br>Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor<br>Scan from 9kHz to 25GHz, the disturbance above 10GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report. |

### 7.7.1 E.U.T. Operation:

| Operating Environment: | |
|---|---|
| Temperature: | 25.5 °C |
| Humidity: | 53 % |
| Atmospheric Pressure: | 100.9 kPa |
| Pre test mode: | TM1 |
| Final test mode: | TM1 |

### 7.7.2 Test Data:

| Worse case mode: | | GFSK(1Mbps) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| **2390** | **53.99** | **-9.2** | **44.79** | **74** | **-29.21** | **Peak** | **H** |
| 2400 | 56.18 | -9.39 | 46.79 | 74 | -27.21 | Peak | H |
| 4804 | 51.27 | -4.33 | 46.94 | 74 | -27.06 | Peak | H |
| 7206 | 49.36 | 1.01 | 50.37 | 74 | -23.63 | Peak | H |
| **2390** | **52.32** | **-9.2** | **43.12** | **74** | **-30.88** | **Peak** | **V** |
| 2400 | 52.18 | -9.39 | 42.79 | 74 | -31.21 | Peak | V |
| 4804 | 52.97 | -4.33 | 48.64 | 74 | -25.36 | Peak | V |
| 7206 | 50.44 | 1.01 | 51.45 | 74 | -22.55 | Peak | V |

| Worse case mode: | | GFSK(1Mbps) | | Test channel: | | Middle | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 4880 | 51.86 | -4.11 | 47.75 | 74 | -26.25 | peak | H |
| 7320 | 48.68 | 1.51 | 50.19 | 74 | -23.81 | peak | H |
| 4880 | 53.51 | -4.11 | 49.40 | 74 | -24.60 | peak | V |
| 7320 | 50.04 | 1.51 | 51.55 | 74 | -22.45 | peak | V |

| Worse case mode: | | GFSK(1Mbps) | | Test channel: | | Highest | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| **2483.5** | **55.34** | **-9.29** | **46.05** | **74** | **-27.95** | **Peak** | **H** |
| 4960 | 50.65 | -4.04 | 46.61 | 74 | -27.39 | Peak | H |
| 7440 | 49.48 | 1.57 | 51.05 | 74 | -22.95 | Peak | H |
| **2483.5** | **57.05** | **-9.29** | **47.76** | **74** | **-26.24** | **Peak** | **V** |
| 4960 | 50.03 | -4.04 | 45.99 | 74 | -28.01 | Peak | V |
| 7440 | 48.71 | 1.57 | 50.28 | 74 | -23.72 | Peak | V |

| Worse case mode: | | GFSK(2Mbps) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| **2390** | **54.57** | **-9.2** | **45.37** | **74** | **-28.63** | **Peak** | **H** |
| 2400 | 56.44 | -9.39 | 47.05 | 74 | -26.95 | Peak | H |
| 4804 | 52.49 | -4.33 | 48.16 | 74 | -25.84 | Peak | H |
| 7206 | 49.85 | 1.01 | 50.86 | 74 | -23.14 | Peak | H |
| **2390** | **54.51** | **-9.2** | **45.31** | **74** | **-28.69** | **Peak** | **V** |
| 2400 | 52.86 | -9.39 | 43.47 | 74 | -30.53 | Peak | V |
| 4804 | 52.83 | -4.33 | 48.50 | 74 | -25.50 | Peak | V |
| 7206 | 49.45 | 1.01 | 50.46 | 74 | -23.54 | Peak | V |

| Worse case mode: | | GFSK(2Mbps) | | Test channel: | | Middle | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| 4880 | 51.52 | -4.11 | 47.41 | 74 | -26.59 | peak | H |
| 7320 | 50.40 | 1.51 | 51.91 | 74 | -22.09 | peak | H |
| 4880 | 51.29 | -4.11 | 47.18 | 74 | -26.82 | peak | V |
| 7320 | 49.95 | 1.51 | 51.46 | 74 | -22.54 | peak | V |

| Worse case mode: | | GFSK(2Mbps) | | Test channel: | | Highest | |
|---|---|---|---|---|---|---|---|
| Frequency | Meter Reading | Factor | Emission Level | Limits | Over | Detector Type | Ant. Pol. |
| (MHz) | (dBμV) | (dB) | (dBμV/m) | (dBμV/m) | (dB) | | H/V |
| **2483.5** | **54.42** | **-9.29** | **45.13** | **74** | **-28.87** | **Peak** | **H** |
| 4960 | 51.64 | -4.04 | 47.60 | 74 | -26.40 | Peak | H |
| 7440 | 49.49 | 1.57 | 51.06 | 74 | -22.94 | Peak | H |
| **2483.5** | **58.07** | **-9.29** | **48.78** | **74** | **-25.22** | **Peak** | **V** |
| 4960 | 50.72 | -4.04 | 46.68 | 74 | -27.32 | Peak | V |
| 7440 | 50.38 | 1.57 | 51.95 | 74 | -22.05 | Peak | V |

Remark:

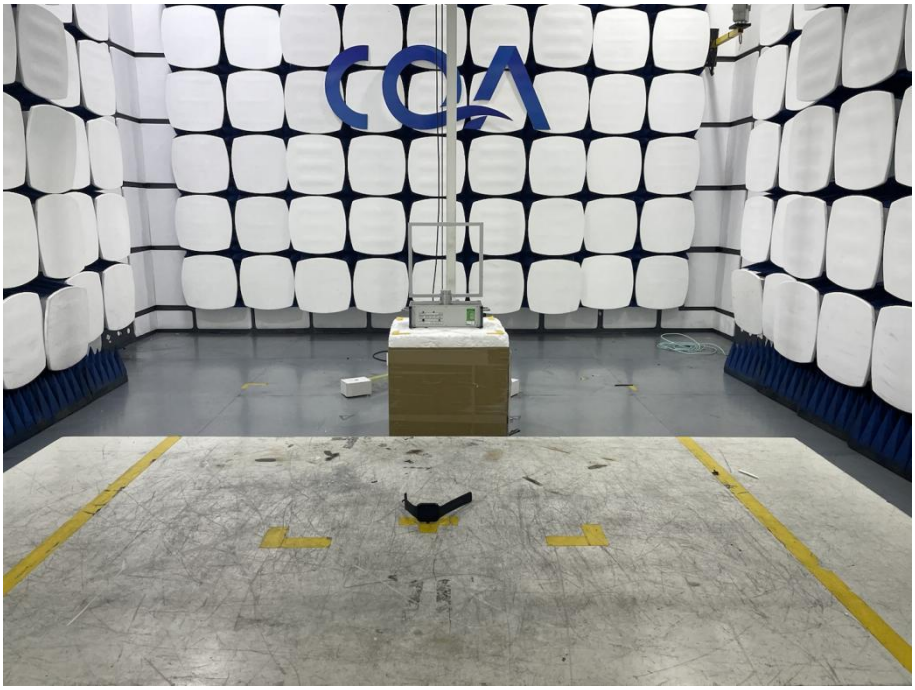
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

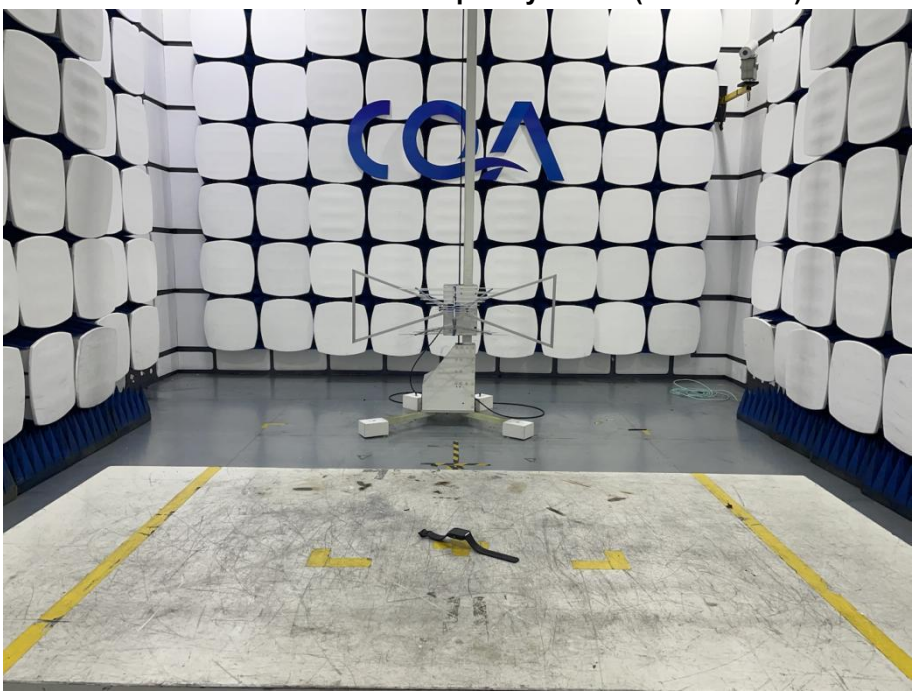
Scan from 9kHz to 25GHz, the disturbance above 10GHz and below 30MHz was very low. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

# 8 Test Setup Photos

**Emissions around the fundamental**



**Emissions in restricted frequency bands (below 1GHz)**



**Emissions in restricted frequency bands (above 1GHz)**

# 9 Photographs of EUT

Refer to PHOTOGRAPHS OF EUT for CQASZ20221101941E-01.

# Appendix

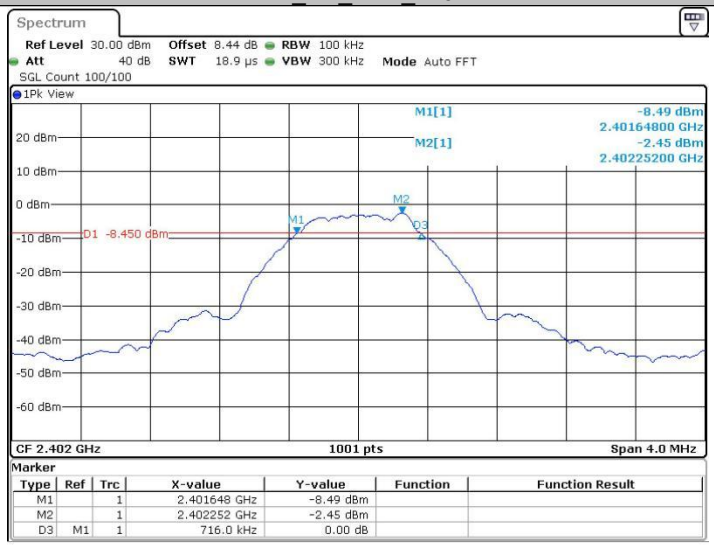
## 9.1 Appendix A: DTS Bandwidth

### 9.1.1 Test Result

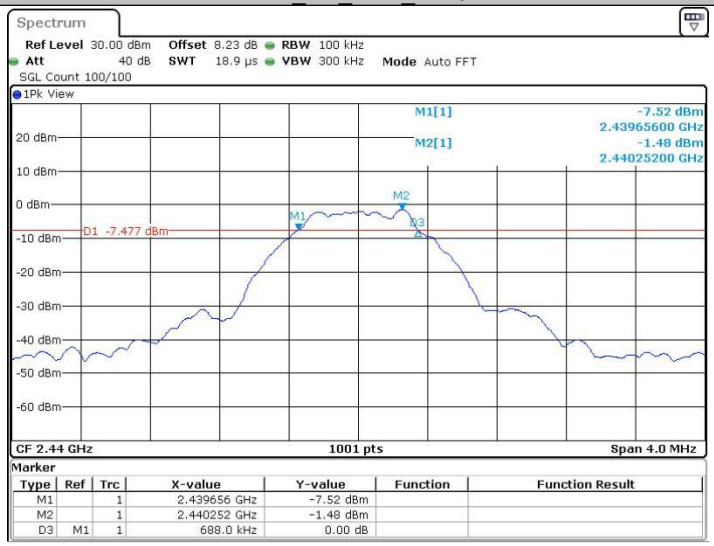
| TestMode | Antenna | Channel | DTS BW [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 0.716 | 2401.648 | 2402.364 | 0.5 | PASS |
| | | 2440 | 0.688 | 2439.656 | 2440.344 | 0.5 | PASS |
| | | 2480 | 0.716 | 2479.640 | 2480.356 | 0.5 | PASS |
| BLE_2M | Ant1 | 2402 | 1.132 | 2401.428 | 2402.560 | 0.5 | PASS |
| | | 2440 | 1.112 | 2439.432 | 2440.544 | 0.5 | PASS |
| | | 2480 | 1.140 | 2479.428 | 2480.568 | 0.5 | PASS |

### 9.1.2 Test Graphs

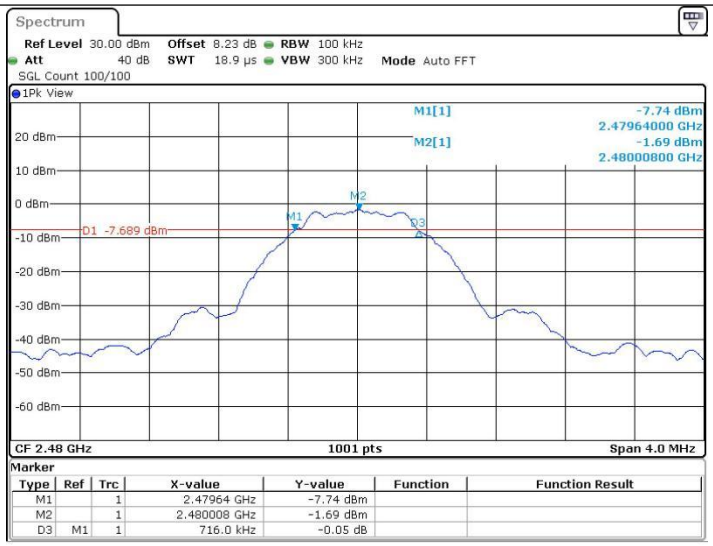
BLE_1M_Ant1_2402



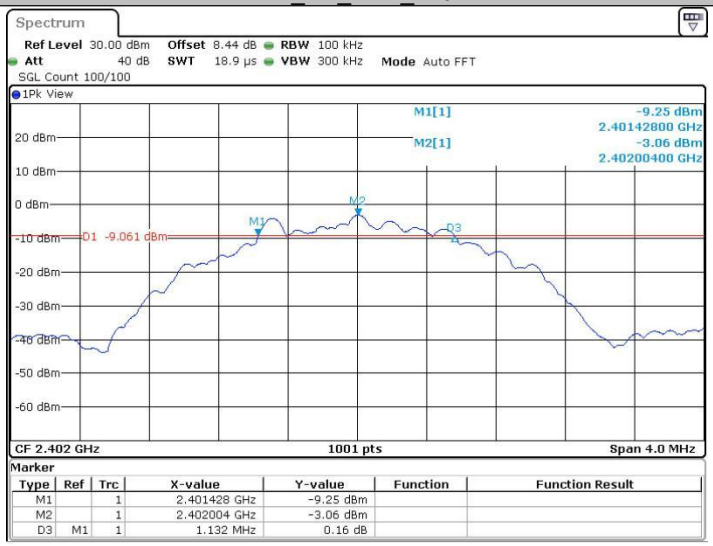

BLE_1M_Ant1_2440



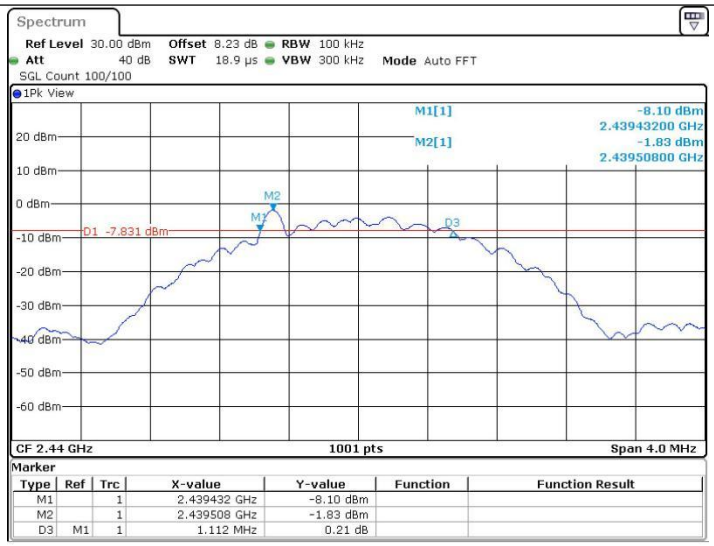

BLE_1M_Ant1_2480




BLE_2M_Ant1_2402

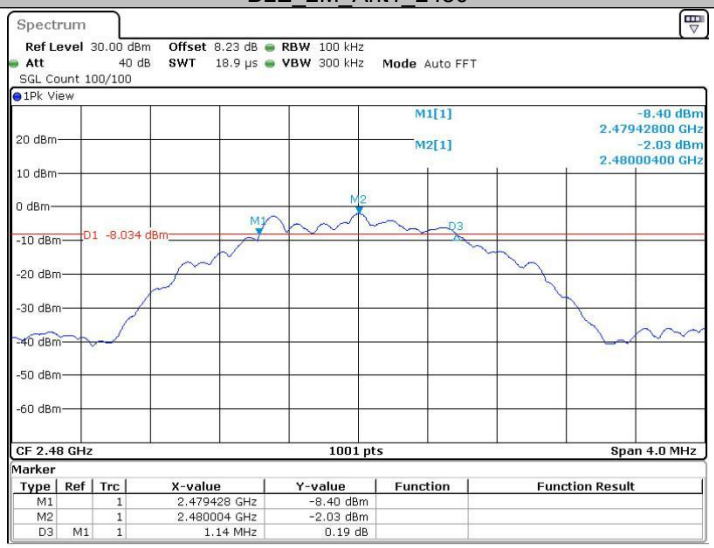



BLE_2M_Ant1_2440




Date: 21.NOV.2022 04:05:42

BLE_2M_Ant1_2480




Date: 21.NOV.2022 04:07:20

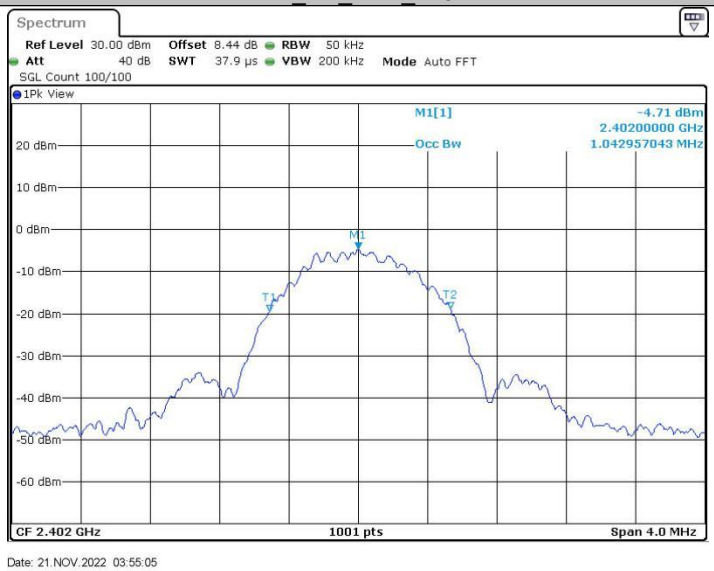
## 9.2 Appendix B: Occupied Channel Bandwidth

### 9.2.1 Test Result

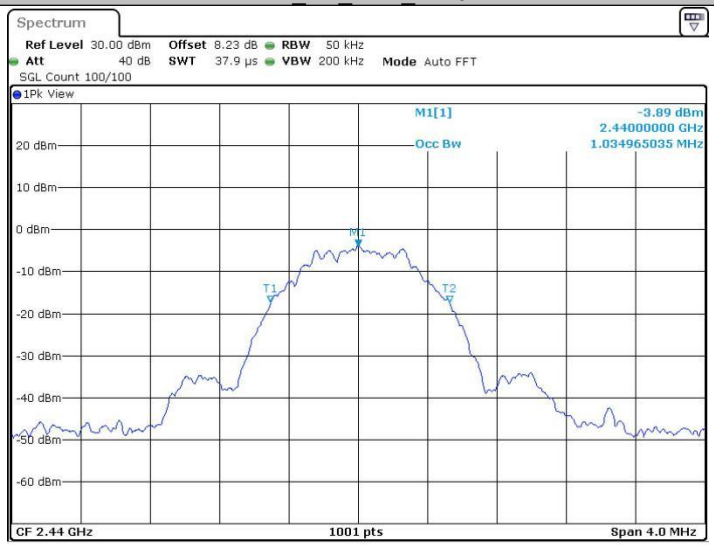
| TestMode | Antenna | Channel | OCB [MHz] | FL[MHz] | FH[MHz] | Limit[MHz] | Verdict |
|---|---|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | 1.043 | 2401.489 | 2402.531 | --- | PASS |
| | | 2440 | 1.035 | 2439.493 | 2440.527 | --- | PASS |
| | | 2480 | 1.039 | 2479.489 | 2480.527 | --- | PASS |
| BLE_2M | Ant1 | 2402 | 1.982 | 2401.021 | 2403.003 | --- | PASS |
| | | 2440 | 1.95 | 2439.041 | 2440.991 | --- | PASS |
| | | 2480 | 1.95 | 2479.037 | 2480.987 | --- | PASS |

### 9.2.2 Test Graphs

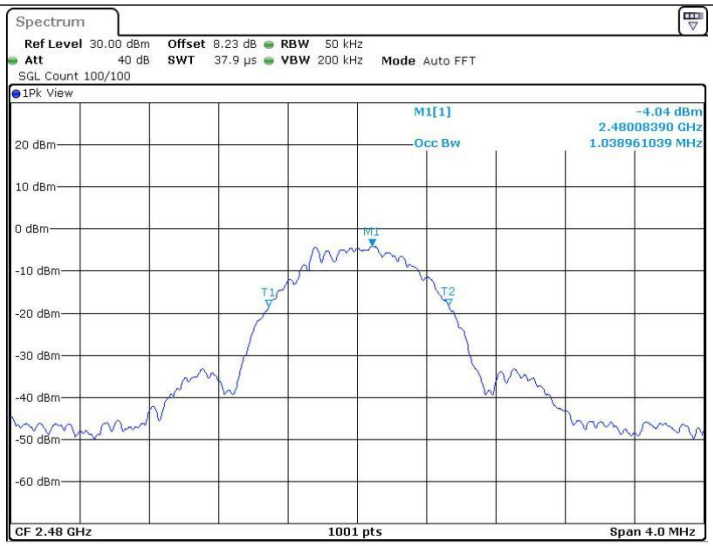
BLE_1M_Ant1_2402



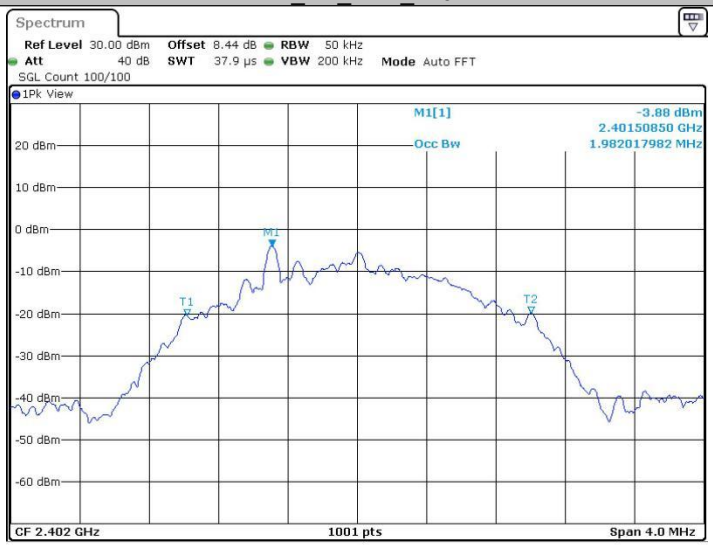

BLE_1M_Ant1_2440



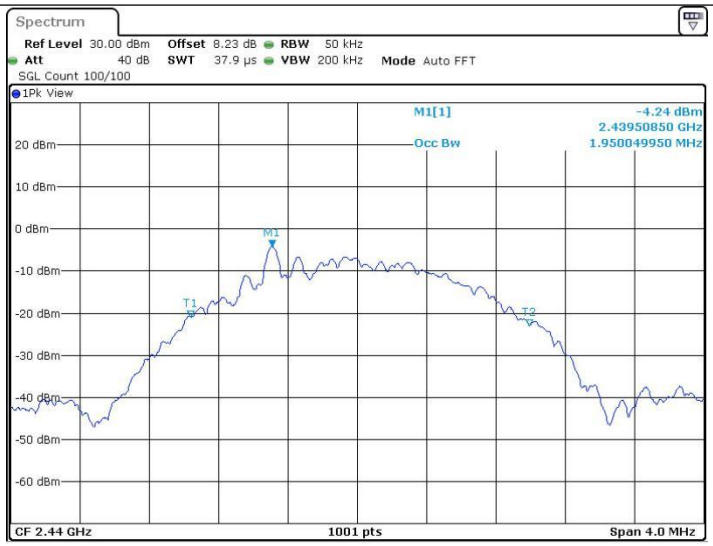

BLE_1M_Ant1_2480




BLE_2M_Ant1_2402




BLE_2M_Ant1_2440




Date: 21.NOV.2022 04:05:53

BLE_2M_Ant1_2480


Date: 21.NOV.2022 04:07:31

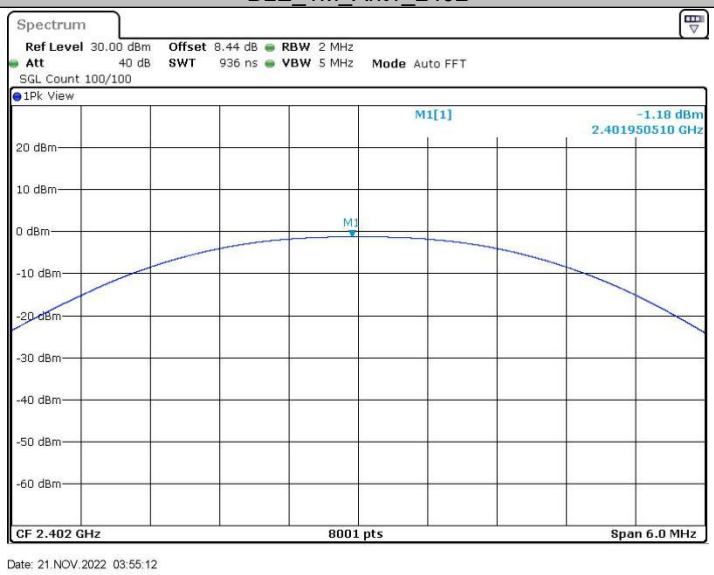
## 9.3 Appendix C: Maximum conducted output power

### 9.3.1 Test Result

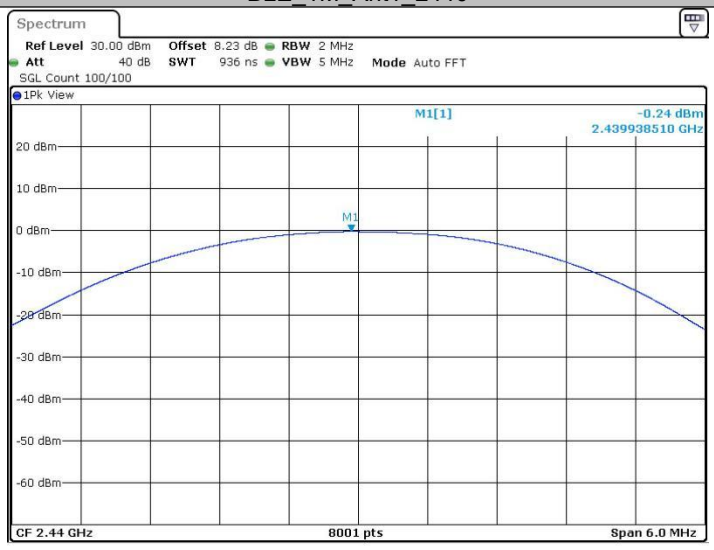
| TestMode | Antenna | Channel | Result[dBm] | Limit[dBm] | Verdict |
|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | -1.18 | ≤30 | PASS |
| | | 2440 | -0.24 | ≤30 | PASS |
| | | 2480 | -0.34 | ≤30 | PASS |
| BLE_2M | Ant1 | 2402 | -1.59 | ≤30 | PASS |
| | | 2440 | -0.64 | ≤30 | PASS |
| | | 2480 | -0.71 | ≤30 | PASS |

### 9.3.2 Test Graphs

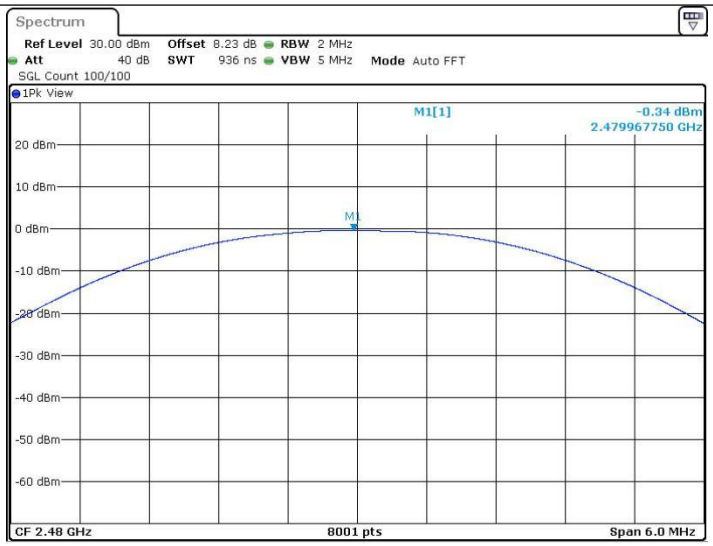
BLE_1M_Ant1_2402



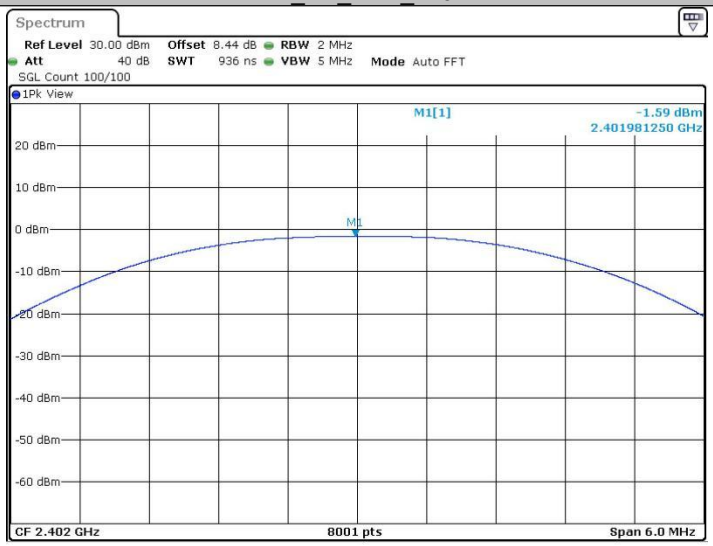

BLE_1M_Ant1_2440



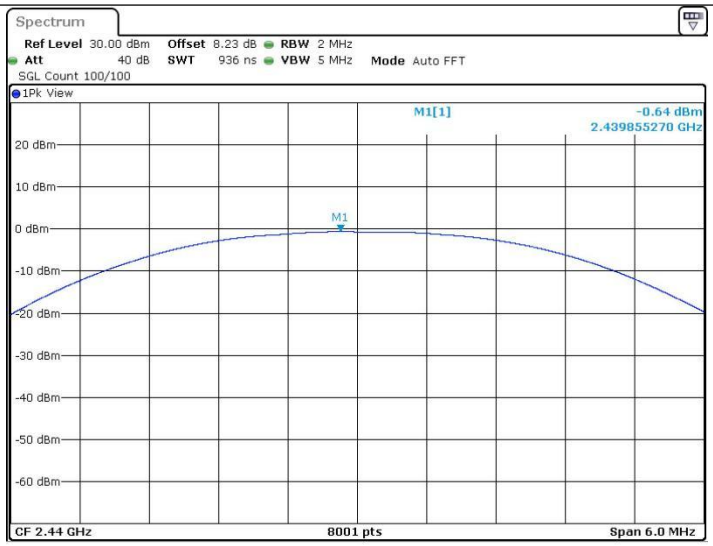

BLE_1M_Ant1_2480



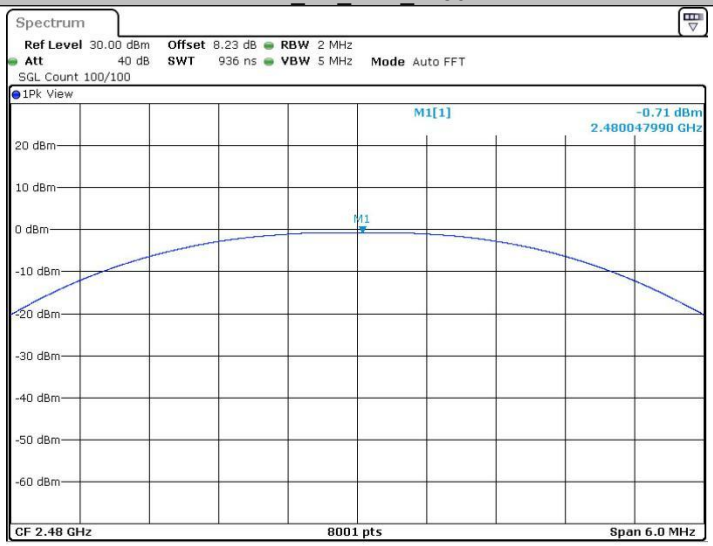

BLE_2M_Ant1_2402




BLE_2M_Ant1_2440




BLE_2M_Ant1_2480



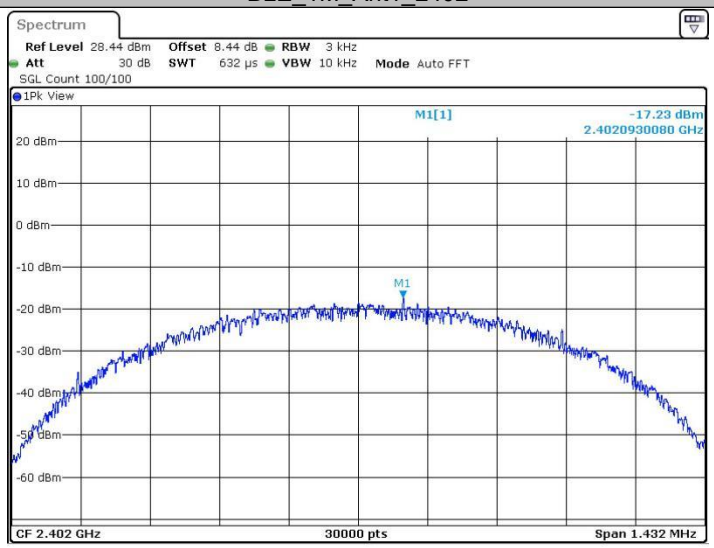
## 9.4 Appendix D: Maximum power spectral density

### 9.4.1 Test Result

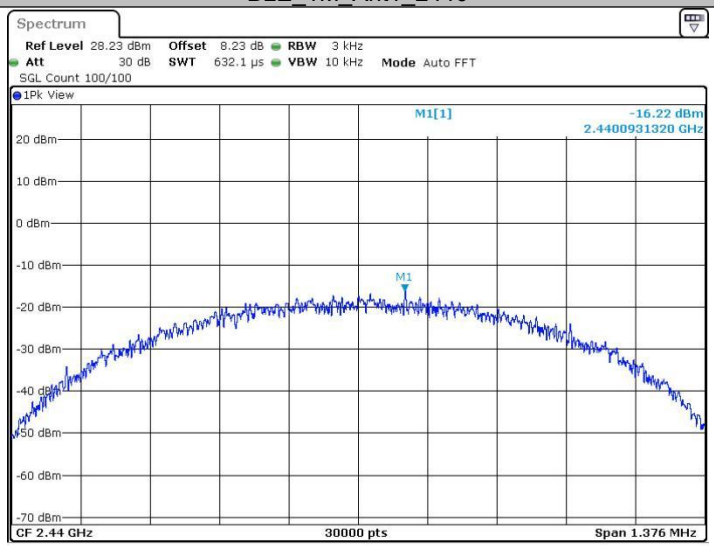
| TestMode | Antenna | Channel | Result[dBm/3-100kHz] | Limit[dBm/3kHz] | Verdict |
|---|---|---|---|---|---|
| BLE_1M | Ant1 | 2402 | -17.23 | ≤8 | PASS |
| | | 2440 | -16.22 | ≤8 | PASS |
| | | 2480 | -16.4 | ≤8 | PASS |
| BLE_2M | Ant1 | 2402 | -20.64 | ≤8 | PASS |
| | | 2440 | -19.72 | ≤8 | PASS |
| | | 2480 | -19.89 | ≤8 | PASS |

### 9.4.2 Test Graphs

BLE_1M_Ant1_2402




BLE_1M_Ant1_2440




BLE_1M_Ant1_2480