

| | | | | |
|--|---|--|--|-------------------------------------|
| Prüfbericht-Nr.: <i>Test report no.:</i> | IN23FG6K 001 | Auftrags-Nr.: <i>Order no.:</i> | 146742971 0010 | Seite 1 von 55 Page 1 of 55 |
| Kunden-Referenz-Nr.: <i>Client reference no.:</i> | 2119359 | Auftragsdatum: <i>Order date:</i> | 2022-12-06 | |
| Auftraggeber: <i>Client:</i> | 1.HONEYWELL INTERNATIONAL INC,Honeywell Safety and Productivity Solutions 9680 OLD BAILES RD, FORT MILL, SC 29707, USA | | | |
| Prüfgegenstand: <i>Test item:</i> | HWBPM11AX-PRTM | Product Type | Wi-Fi BT Module | |
| Bezeichnung: <i>Identification .:</i> | HWBPM11AX-PRT | | | |
| Auftrags-Inhalt: <i>Order content:</i> | Testing and issue of Test Report and Grant Certificate | | | |
| Prüfgrundlage: <i>Test specification:</i> | FCC Part 15 Subpart C 15.247, 15.207, 15.205 & 15.209 RSS 247 Issue 2 and RSS GEN Issue 5 | | | |
| Wareneingangsdatum: <i>Date of sample receipt:</i> | 2022-12-07 | | | |
| Prüfmuster-Nr & Serien-Nr.: <i>Test sample no & serial no.:</i> | A003385546-022 & A003385546-04 2022120701 & 2022120702 | | | |
| Prüfzeitraum: <i>Testing period:</i> | 2022-12-07 - 2023-01-06 | | | |
| Ort der Prüfung: <i>Place of testing:</i> | Wireless laboratory, Bangalore | | | |
| Prüflaboratorium: <i>Testing laboratory:</i> | TÜV Rheinland (India) Pvt.Ltd., 27/B, 2nd Cross, Electronic City Phase1 Bangalore -560 100, India FCC Test site registration number: 496599 ISED Test site registration number: 3466E-1 | | | |
| Prüfergebnis*: <i>Test result*:</i> | Pass | | | |
| geprüft von: <i>tested by:</i> | Likhithesh M D Senior Engineer | | genehmigt von: <i>authorized by:</i> | Madhu K.N Senior Engineer |
| Datum: <i>Date:</i> | 2023-01-09 | | Ausstellatum: <i>Issue date:</i> | 2023-02-09 |
| Sonstiges / Other: | FCC ID: HD5-PM11AX IC: 1693B-PM11AX | | | |
| Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i> | Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i> | | | |
| * Legende: | 1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n) | 2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n) | 3 = befriedigend N/A = nicht anwendbar | 4 = ausreichend N/T = nicht |
| * Legend: | 1 = very good P(ass) = passed a.m. test specification(s) | 2 = good F(ail) = failed a.m. test specification(s) | 3 = satisfactory N/A = not applicable | 4 = sufficient N/T = not |
| Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i> | | | | |



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TEST SUMMARY

| Test Item | Applicable Standard | | Result |
|---|-------------------------|------------------------------------|--------|
| | FCC | ISED | |
| Maximum conducted (Peak) output power | FCC 15.247(b)(1) | RSS 247 Issue 2, Section 5.4 (b) | Pass |
| Maximum Power Spectral Density | FCC 15.247(e) | RSS 247 Issue 2, Section 5.2 (b) | NA |
| DTS Bandwidth | FCC 15.247(a)(iii) | RSS 247 Issue 2, Section 5.1 (b) | Pass |
| Channel Frequency Separation | 15.247(a)(1) | RSS 247 Issue 2, Section 5.1 (b) | Pass |
| Number of Hopping Channels | 15.247(a)(iii) | RSS 247 Issue 2, Section 5.1 (d) | Pass |
| Time of Occupancy(Dwell Time) | 15.247(a)(iii) | RSS 247 Issue 2, Section 5.1 (d) | Pass |
| Emissions in non-restricted frequency bands | FCC 15.247(d) | RSS 247 Issue 2, Section 5.5 | Pass |
| Spurious Radiated Emissions and Restricted Bands of Operation | FCC 15.209 / FCC 15.205 | RSS-Gen Issue 5, Section 8.9 /8.10 | Pass |
| Conducted Emissions on a.c power Lines | FCC 15.207 | RSS-Gen Issue 5, Section 8.8 | Pass |

Product Category: Electronics Testing
Test Discipline: EMC Test Facility

Compliance statement for Part 15.203:

“THE ANTENNA WITH A STANDARD CONNECTOR (RP-SMA) AND (U.FL) USED, WITH NO POSSIBILITY OF REPLACEMENT WITH A NON-APPROVED ANTENNA BY THE END-USER. THEREFORE, THE EUT IS CONSIDERED TO COMPLY WITH THIS PROVISION.”

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REVISION HISTORY OF THIS REPORT

| Report Number | Version | Description | Issue date |
|---------------|---------|------------------------------|------------|
| IN23FG6K 001 | 01 | Initial Issue of Test Report | 01-02-2023 |
| IN23FG6K 001 | 02 | Reviewer comments updated | 09-02-2023 |

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1 GENERAL REMARKS

1.1 Attachments

All attachments are part of this test report and are issued in separate document

- 1: TEST SETUP PHOTOS
- 2: EUT EXTERNAL PHOTOS
- 3: EUT INTERNAL PHOTOS
- 4: FCC LABEL AND LABEL LOCATION
- 5: BLOCK DIAGRAM
- 6: SPECIFICATION OF EUT
- 7: SCHEMATIC DIAGRAM
- 8: BILL OF MATERIAL
- 9: USER MANUAL
- 10: MAXIMUM PERMISSIBLE EXPOSURE INFORMATION

2 TEST SITES

2.1 Testing Facilities

1. TÜV Rheinland (India) Pvt.Ltd.,
27/B, 2nd Cross,
ElectronicCityPhase1
Bangalore – 560 100,
India

2. TUV Rheinland (India) Pvt.Ltd.,
108 , Beside ISBR Business School,
Electronic city Phase I
Bangalore - 560 100.
India

Radiated Measurement site type :
Fully anechoic chamber (used for above 1 GHz
measurements)

Radiated Measurement site type :
Semi anechoic chamber (used for below 1 GHz
measurements)

2.2 List of Test and Measurement Instruments

Table 1: List of test and measurement instruments

| Equipment | Manufacturer | Model Name | Serial Number | Firmware Versions | Calibration Due Date | Periodicity | Test Facility |
|--------------------------------------|-----------------------------|----------------------|---------------|-------------------|----------------------|-------------|------------------------------|
| EMI Receiver | Rohde & Schwarz | ESW 44 | 101732 | 4.73 SP5 | 04.08.2023 | Yearly | Radiated Spurious Emission |
| Active loop antenna | Frankonia | LAX-10 | LAX-10-800 | - | 31.01.2023 | Yearly | |
| Baloon and Biconical Antenna | Schwarzbeck mess-elektronik | VHBB-9124 / BBA-9106 | 01028 | - | 03.02.2023 | Yearly | |
| Log-Periodic Antenna | Schwarzbeck mess-elektronik | VUSLP-9111B | 9111B-111 | - | 26.01.2023 | Yearly | |
| Horn Antenna | Schwarzbeck | BBHA 9120 D | 9120D-01944 | - | 11.10.2023 | Yearly | |
| EMI Test Receiver | Rohde & Schwarz | ESW44 | 101773 | 1.72.SP1 | 12.02.2023 | Yearly | |
| Semi Anechoic Chamber | Frankonia | - | - | - | - | - | |
| Fully Anechoic Chamber | Albatross | - | - | - | - | - | Conducted Test Parameters |
| Spectrum Analyzer | Agilent | E4407B | US41192772 | A.14.07 | 21-12-2023 | Yearly | |
| 10dB Attenuator | H+S Electronics Pvt. Ltd | 6810.17.A | 770041 | - | 19-03-2023 | Yearly | |
| Signal Analyser | Rohde & Schwarz | FSV7 | 101644 | FW 3.40 | 25-01-2023 | Yearly | |
| Signal Analyser | Anritsu Corporation | MS2830A | 6261983953 | - | 18-10-2023 | Yearly | Conducted AC Power line Test |
| EMI Receiver | Rohde & Schwarz | ESR7 | 101133 | 3.48 SP3 | 22.07.2023 | Yearly | |
| Line Impedance Stabilization Network | Rohde & Schwarz | ENV 216 | 101434 | - | 11.04.2023 | Yearly | |
| Pulse Limiter | Rohde & Schwarz | ESH3-Z2 | 100811 | - | 12.07.2023 | Yearly | |

Table 2: Instrument application Software versions

| SL. No. | Test Type | Application software | Version |
|---------|---|----------------------|-----------|
| 1 | Radiated spurious emission measurement in 10mtr-SAC | BAT EMC | 3.20.0.17 |
| 2 | Radiated spurious emission measurement in FAC | EMC 32 | 10.60.20 |

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

HWBPM11AX-PRTM is a carrier board with System on Module. The module to be used inside the Honeywell Products. The Module has Dual Band WIFI (2.4GHz & 5GHz) and BLUETOOTH radio interface. This module communicates with external host using SDIO interface for WIFI and UART for BLUETOOTH.

This Module supports 802.11a/b/g/n/ac/ax for WIFI and Supports BT (Basic , EDR & BLE) The module will act as Access Point / Master only in NON - DFS bands. In the DFS band, the Module acts as Slave /Station device which do not have Radar detection functionality.

Powered with BCM43752, **HWBPM11AX-PRTM** achieve the best possible connectivity and performance in RF Environment.

This Module will be used to provide the WIFI & BLUETOOTH wireless connectivity for Honeywell Products

3.2 Ratings and System Details of Equipment under Test

Table 3: Ratings and System Details as declared by Client*

| | | |
|---|---|---|
| Radio Protocol | Bluetooth | |
| Operating Frequency Range | 2402MHz to 2480MHz | |
| No. of Channels | 79 | |
| Channel Spacing | 1MHz | |
| Transmitting Power Level | Refer clause 11 | |
| Maximum Measured Power (e.i.r.p) | <u>MAF94367 (Omni Directional Antenna)</u> 19.73 dBm(1 Mbps 2440MHz) | |
| | <u>1001932PT(Flex/PCB Antenna)</u> 19.88 dBm(1 Mbps 2440MHz) | |
| | <u>FPA3020-10A (Flex/PCB Antenna)</u> 21.61 dBm(1 Mbps 2440MHz) | |
| Modulation | GFSK, pi/4-DQPSK,8-DPSK | |
| Number of antennas | 3 | |
| Antenna Type & Gain | MAF94367 (Omni Directional Antenna) | 2.35dBi |
| | 1001932PT(Flex/PCB Antenna) | 2.50dBi |
| | FPA3020-10A (Flex/PCB Antenna) | 4.23dBi |
| Supply Voltage to Product | 5.0VDC through AC/DC Adapter , <1A | |
| Environmental conditions | Storage | -20degC to +70degC Relative Humidity <95% |
| | Operating | -20degC to +60degC Relative Humidity <95% |
| EUT Dimension | 8.0 x 3.7 x 0.5 CM (L x W x H) | |

***Disclaimer:** The information/data is supplied by the client and the same is considered to arrive at the final value. Any changes made apart from the specified specification, can directly impact on the tests results. Refer the products user manual for more details.

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Note: Product **HWBPM11AX-PRTM** has multiple protocols. All the supported wireless protocols and their respective test results are issued in separate test reports, refer clause 4.7 Report references

3.3 Measurement Uncertainty:

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k = 2$

Table 4: Measurement Uncertainty

| Parameter | Uncertainty |
|-----------------------------------|-------------|
| Occupied Channel Bandwidth | ±5 % |
| RF output power, conducted | ±1.5 dB |
| Power Spectral Density, conducted | ±3 dB |
| Unwanted Emissions, conducted | ±3 dB |
| All emissions, radiated | ±6 dB |
| Temperature | ±3 °C |
| Supply Voltages | ±3 % |
| Time | ±5 % |

Note: The Listed Measurement Uncertainties are the worst-case uncertainty, for the respective test cases. Above Table is for reporting purpose only and not used in determining Final Pass/Fail verdict.

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle on low, mid and high channels

4.2 UUT Operation and Software

Hardware Version Identification number (HVIN) : 3011-2325-001
Software version : 18.35.387.23.1301.62

4.3 Special Accessories and Auxiliary Equipment

Test laptop (Tera Term VT ver 4.105),
LAN cable

4.4 Simultaneous Transmission

This product supports Simultaneous transmission

4.5 Countermeasures to achieve EMC Compliance

- None

4.6 List of frequencies

| Frequency Band (MHz) | Channel No. | Channel Frequency (MHz) |
|------------------------------|-------------|-------------------------|
| 2400 – 2483.5 BT(BDR+EDR) | 0 | 2402 |
| | 1 | 2403 |
| | 2 | 2404 |
| | 3 | 2405 |
| | : | : |
| | : | : |
| | : | : |
| | 37 | 2439 |
| | 38 | 2440 |
| | 39 | 2441 |
| | 40 | 2442 |
| | : | : |
| | : | : |
| | : | : |
| | 74 | 2476 |
| | 75 | 2477 |
| | : | : |
| : | : | |
| 78 | 2480 | |

Table 5: List of Bluetooth center Frequencies

Channel used for Bluetooth testing

Channel low : 2402MHz

Channel mid : 2440MHz

Channel high : 2480MHz

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Note:

TUV Sample Identification number : A003385546-022 – Radiated test Sample
A003385546-04 – Conducted test Sample

4.7 Report references

Note: Product **HWBPM11AX-PRTM** has multiple protocols. All the supported wireless protocols and their respective test results are issued in separate test reports, following table lists the report numbers.

| Radio Protocol | Report Number |
|--|----------------------|
| RF test report for Wi-Fi (2.4GHz) & BLE (2.4GHz) | IN23WDIF 001 |
| RF test report for Bluetooth (2.4GHz) → This Report | IN23FG6K 001 |
| RF test report for Wi-Fi (5GHz) | IN23ESPY 001 |

5 Operational Description

This **HWBPM11AX-PRTM** module is a Wi-Fi, BT system on module which will be placed inside the Honeywell products like printers, barcode scanners, RFID readers etc. to enable wireless connectivity.

This module includes MAC & physical layer of 802.11a/b/g/n/ac/ax and the Bluetooth modem.

This module operates on 5.0V DC Power supply with internal on-board regulation to generate 3.3v for powering ON all the circuits.

The module uses internal power amplifier and LNA for 2.4GHz frequency band and an external front end chip for 5GHz frequency band.

All filters and diplexers are included in the module to ensure maximum power flatness and optimum VSWR.

The module has one antenna chain for 2X2 output for Wi-Fi.

The module shall use WM-BAX-BM-57 USI SiP module with Broadcom BCM43752 chipset which includes LNA, switch, and internal power amplifier (iPA) for small form factor and optimum performance. All filters and diplexers will be included in the module to ensure maximum power flatness and optimum VSWR. The module will perform with all legacy hardware having data rates as low as 1Mbps. When running 802.11 ac in 2 x 2 MIMO mode, data rates are expected to reach 1200 Mbps or more.

This chipset also supports concurrent operation of Bluetooth (Version 5.1) for wireless connectivity during browsing or other device applications. Along with both standard and high speed (HS) Bluetooth data rates, Bluetooth low energy modes are also supported.

Hardware WAPI acceleration engine, AES, TKIP, WPA and WPA2 are supported to provide the latest security requirement on your network

The Device communicates with HOST using SDIO interface for WIFI and UART interface for BLUETOOTH..

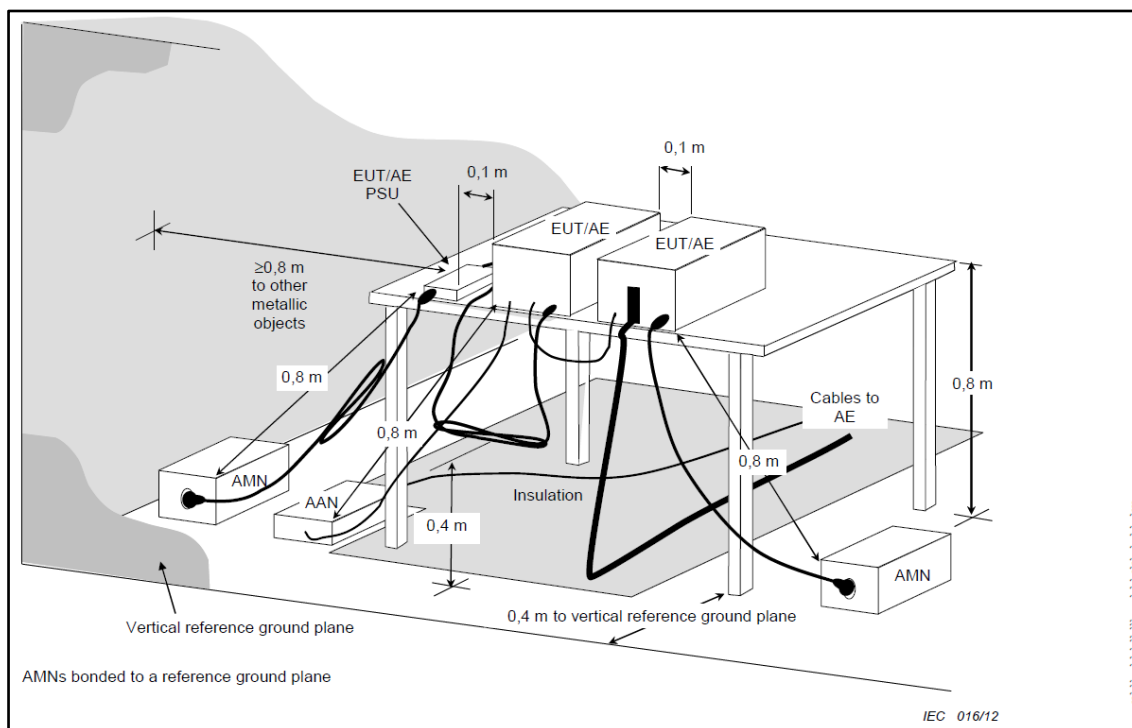
6 TEST METHODOLOGY

6.1 Conducted Spurious Emission Test on AC Power Line

Measured levels of ac power-line conducted emission across the 50 Ω LISN port (to which the EUT is connected). All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer.

The device is placed on the test table, raised 80cm above the reference ground plane. The vertical conducting plane is located 40cm to the rear of the device. AC Conducted emission measurement is made over frequency range from 150kHz to 30MHz, this measurement was performed with EUT powered with an AC adaptor with 110V AC 60Hz supply.

6.1.1 Test Setup Configuration



6.2 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2013. The equipment under test (EUT) was placed at the middle of the 80 cm high turntable for below 1 GHz & 1.5 m height for above 1 GHz measurement, and the EUT is 3 meters far from the measuring antenna. The turntable was rotated 360° for obtaining the maximum emission. The height of the measuring antennas was scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. Repeat the measurement steps until the maximum emissions were obtained. The measurement above 1000 MHz was performed by horn antenna, The measurement below 30 MHz was performed by loop antenna, Measurement from 30 MHz to 200 MHz was performed by Baloon and Biconical Antenna, and mesurement from 200 MHz to 1 GHz was performed by Log-Periodic Antenna.

The EUT was rotated around the X-, Y-, and Z-Axis and the results from worst case axis are recorded

6.2.1 Test Setup Configuration

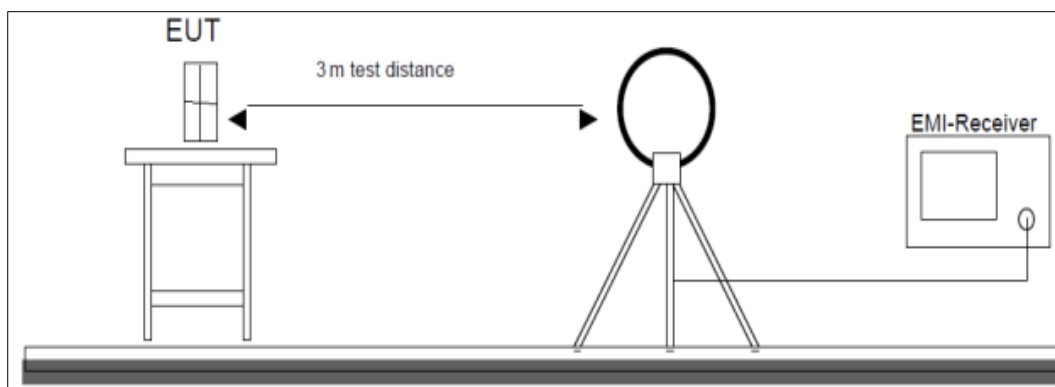


Figure 1: Frequency Range 9 kHz- 30 MHz

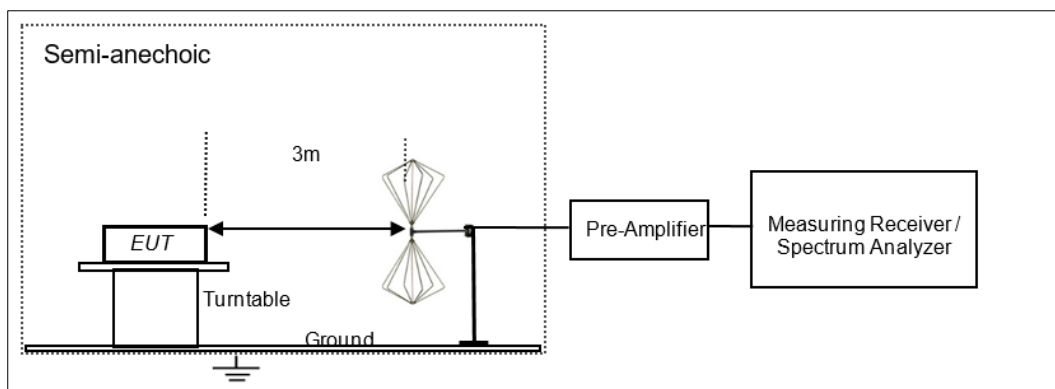


Figure 2: Frequency Range 30 MHz – 200 MHz

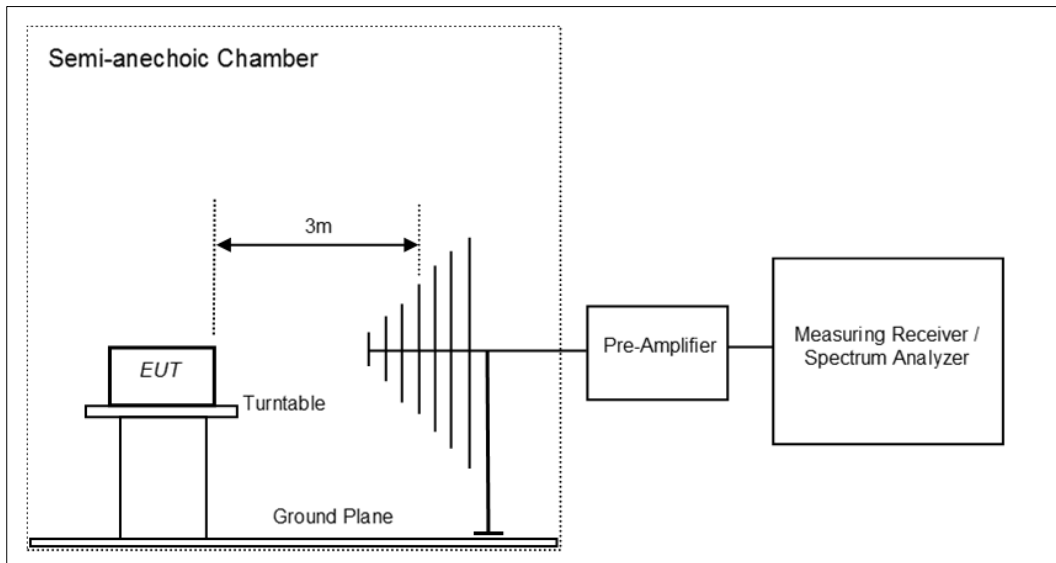


Figure 3: Frequency Range 200 MHz - 1GHz

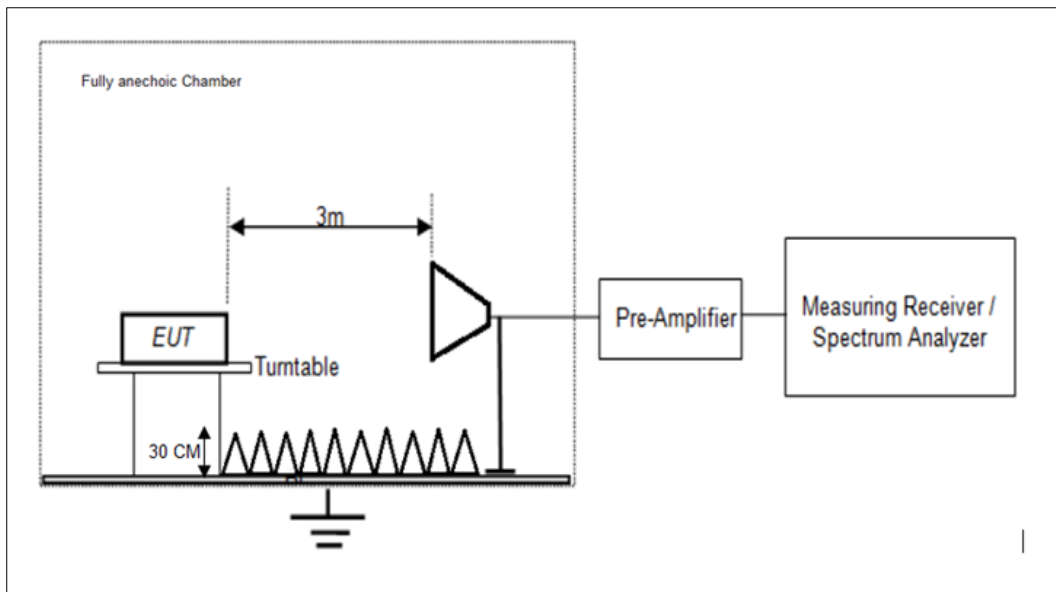


Figure 4: Frequency Range above 1 GHz

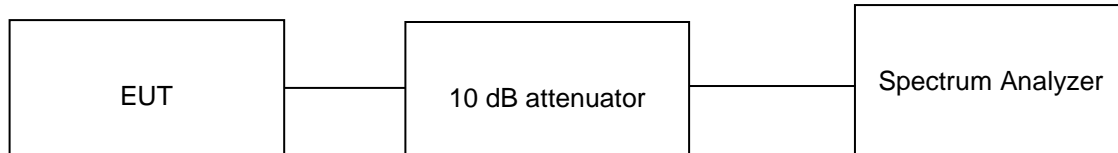
7 TEST RESULTS FOR BLUETOOTH

7.1 Maximum Peak Conducted Output Power

Result

Pass

| | |
|-----------------------|--|
| Test Specification | FCC part 15 Subpart C 15.247 (b)(1) / RSS 247 Issue 2, Section 5.4 (b) |
| Test Method | Subclause 7.8.5 of ANSI C63.10 |
| Measurement Bandwidth | 1MHz & 3MHz |
| Detector | Peak |
| Port of testing | Antenna port |
| Requirement | Power \leq 1 W (30 dBm) & e.i.r.p \leq 4 W (36 dBm) |



Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.6 °C

Voltage = 5.0V AC to DC Adaptor

Relative humidity: 62%

KDB Guidelines applied:

Measurements were made as per section 9 b) in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:

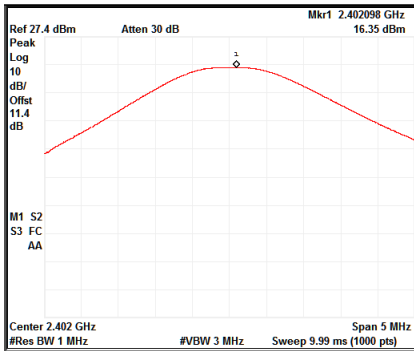
Note:

1. All the losses are included during measurement and final values are mentioned in the test report.
2. Total Peak Output power (dBm) = Measured Peak power (dBm) + Attenuator factor (10dB) + Cable loss (1.4dB)

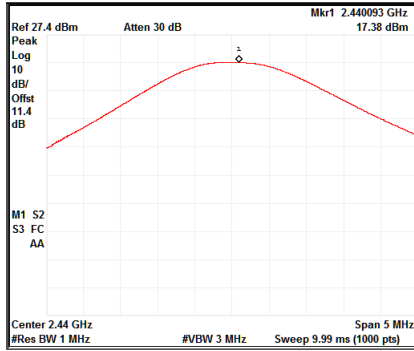
| Antenna Type | Data Rate (Mbps) | Channel Frequency (MHz) | Maximum Peak Conducted Output Power (dBm) | Maximum (e.i.r.p) | Power Limit (dBm) | Limit (e.i.r.p) |
|--------------------------------|------------------|-------------------------|---|-------------------|-------------------|-----------------|
| Omni Directional Antenna RPSMA | 1 | 2402 | 16.35 | 18.70 | 30.00 | 36.00 |
| | | 2440 | 17.38 | 19.73 | 30.00 | 36.00 |
| | | 2480 | 16.96 | 19.31 | 30.00 | 36.00 |
| | 2 | 2402 | 11.88 | 14.23 | 30.00 | 36.00 |
| | | 2440 | 12.40 | 14.75 | 30.00 | 36.00 |
| | | 2480 | 11.91 | 14.26 | 30.00 | 36.00 |
| | 3 | 2402 | 12.06 | 14.41 | 30.00 | 36.00 |
| | | 2440 | 12.62 | 14.97 | 30.00 | 36.00 |
| | | 2480 | 12.30 | 14.65 | 30.00 | 36.00 |
| 1001932PT PCB/Flex Antenna | 1 | 2402 | 16.35 | 18.85 | 30.00 | 36.00 |
| | | 2440 | 17.38 | 19.88 | 30.00 | 36.00 |
| | | 2480 | 16.96 | 19.46 | 30.00 | 36.00 |
| | 2 | 2402 | 11.88 | 14.38 | 30.00 | 36.00 |
| | | 2440 | 12.40 | 14.90 | 30.00 | 36.00 |
| | | 2480 | 11.91 | 14.41 | 30.00 | 36.00 |
| | 3 | 2402 | 12.06 | 14.56 | 30.00 | 36.00 |
| | | 2440 | 12.62 | 15.12 | 30.00 | 36.00 |
| | | 2480 | 12.30 | 14.80 | 30.00 | 36.00 |
| FPA3020-10A PCB/Flex Antenna | 1 | 2402 | 16.35 | 20.58 | 30.00 | 36.00 |
| | | 2440 | 17.38 | 21.61 | 30.00 | 36.00 |
| | | 2480 | 16.96 | 21.19 | 30.00 | 36.00 |
| | 2 | 2402 | 11.88 | 16.11 | 30.00 | 36.00 |
| | | 2440 | 12.40 | 16.63 | 30.00 | 36.00 |
| | | 2480 | 11.91 | 16.14 | 30.00 | 36.00 |
| | 3 | 2402 | 12.06 | 16.29 | 30.00 | 36.00 |
| | | 2440 | 12.62 | 16.85 | 30.00 | 36.00 |
| | | 2480 | 12.30 | 16.53 | 30.00 | 36.00 |

Test Plots:

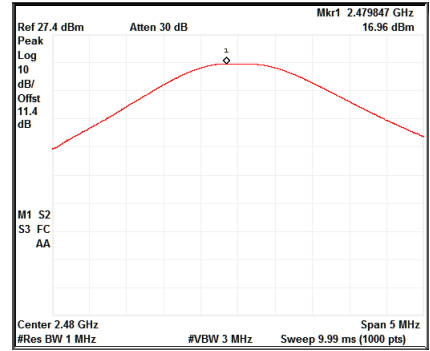
Data Rate: 1Mbps



Channel Frequency:2402MHz

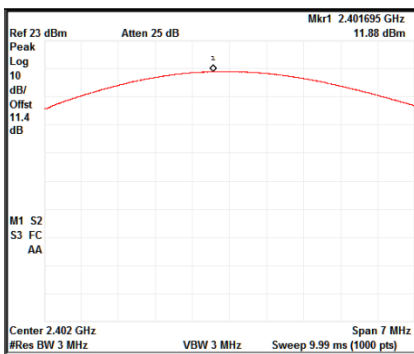


Channel Frequency:2440MHz

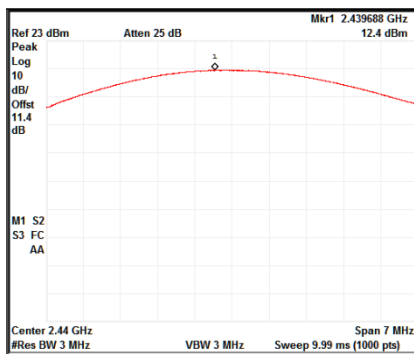


Channel Frequency:2480MHz

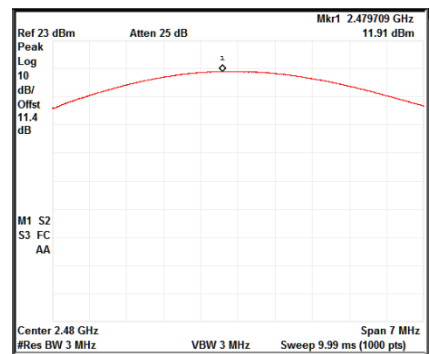
Data Rate: 2Mbps



Channel Frequency:2402MHz

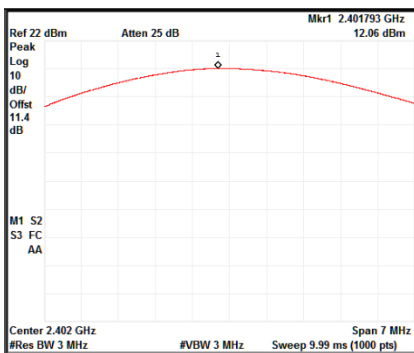


Channel Frequency:2440MHz

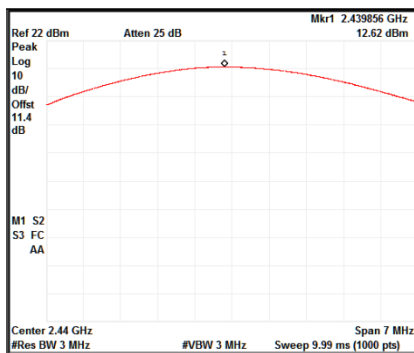


Channel Frequency:2480MHz

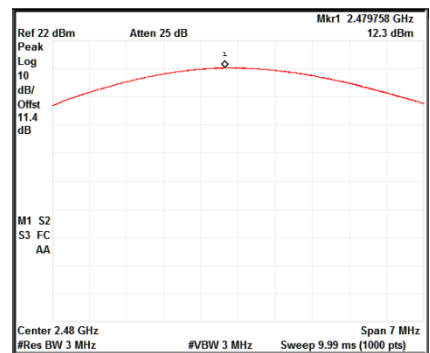
Data Rate: 3Mbps



Channel Frequency:2402MHz



Channel Frequency:2440MHz



Channel Frequency:2480MHz

7.2 20dB Bandwidth & 99% Bandwidth

Result

Pass

Test Specification

FCC part 15 Subpart C 15.247 (a) (i) / RSS 247 Issue 2, Section 5.1 (b)

Test Method

Subclause 7.8.7 of ANSI C63.10

Measurement Bandwidth

30 kHz

Detector

Peak

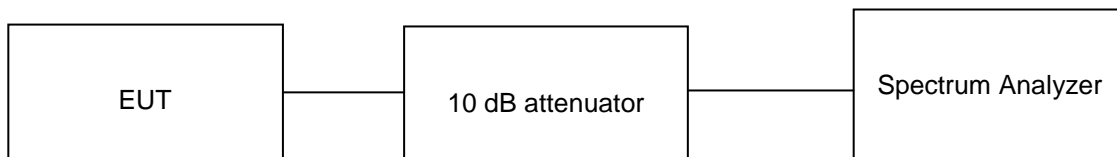
Port of testing

Antenna port

Requirement

The bandwidth of frequency hopping channel is the 20 dB emission bandwidth ,measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hopset. The hopset shall be such that the near-term distribution of frequencies appears random , with sequential hops randomly distributed in both direction and magnitude of change in the hopset while the long-term distribution appears evenly distributed.

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 22.3°C

Voltage = 5.0V AC to DC Adaptor

Relative humidity: 62 %

KDB Guidelines applied:

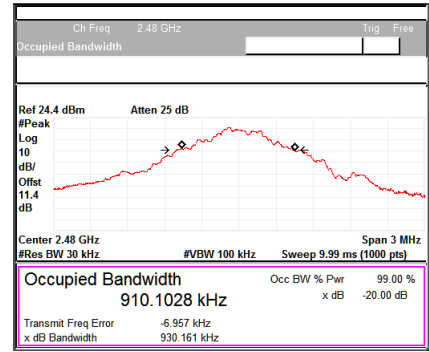
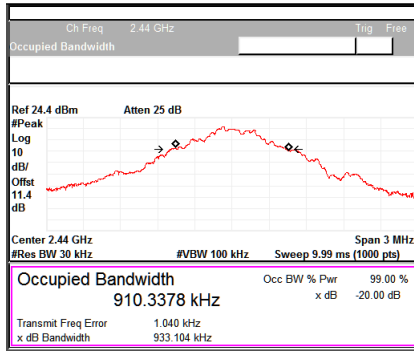
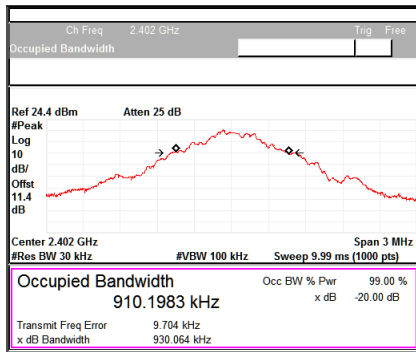
Measurements were made as per section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02.

Test results:

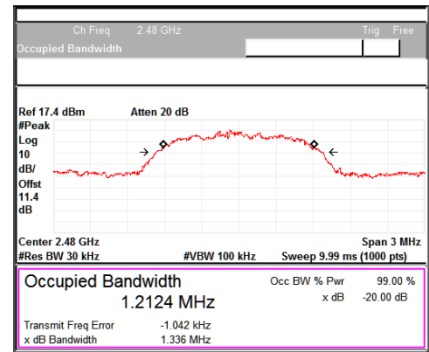
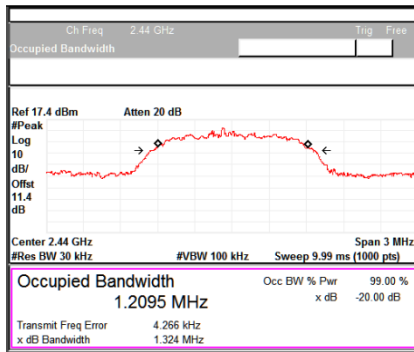
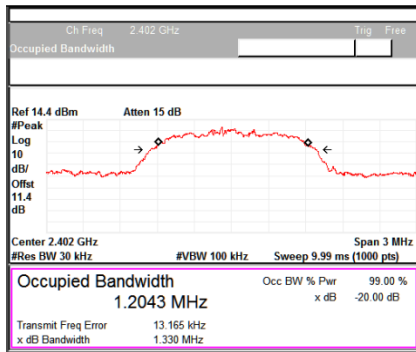
1. All the losses are included during measurement and final values are mentioned in the test report.

| Data Rate (Mbps) | Channel Frequency (MHz) | 20 dB Bandwidth (MHz) | 99% OBW (MHz) |
|------------------|-------------------------|-----------------------|---------------|
| 1 | 2402 | 0.930 | 0.910 |
| | 2440 | 0.933 | 0.910 |
| | 2480 | 0.930 | 0.910 |
| 2 | 2402 | 1.20 | 1.33 |
| | 2440 | 1.20 | 1.32 |
| | 2480 | 1.21 | 1.33 |
| 3 | 2402 | 1.20 | 1.30 |
| | 2440 | 1.21 | 1.30 |
| | 2480 | 1.22 | 1.31 |

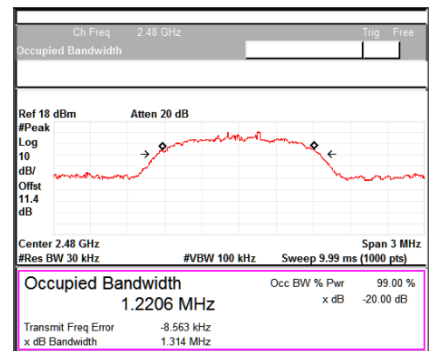
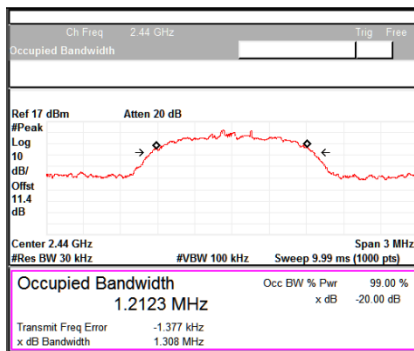
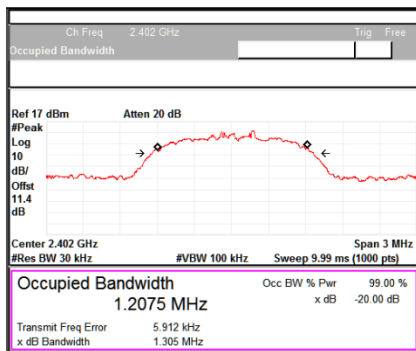
Data Rate: 1Mbps



Data Rate: 2Mbps



Data Rate: 3Mbps



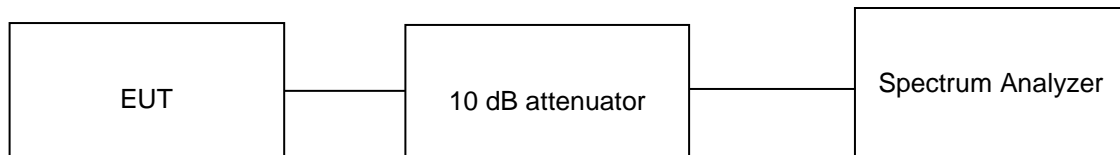
7.3 Number of Hopping Channels

Result

Pass

| | |
|-----------------------|--|
| Test Specification | FCC Part 15 Subpart C Section 15.247 (a) (i) / RSS 247 Issue 2, Section 5.1 (d) |
| Test Method | Subclause 7.8.3 of ANSI C63.10 |
| Measurement Bandwidth | 100 kHz |
| Detector | Peak |
| Port of testing | Antenna port |
| Requirement | Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels |

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 25 °C Voltage = 5.0V AC to DC Adaptor Relative humidity: 62 %

KDB Guidelines applied:

Measurements were made as per section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02.

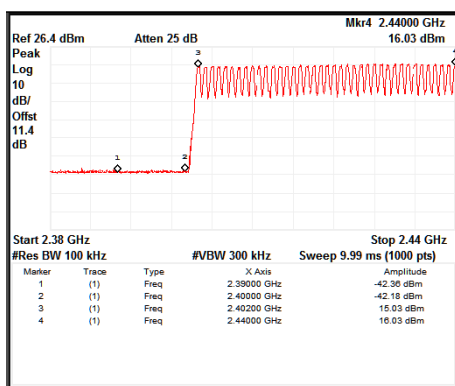
Test results:

Note:

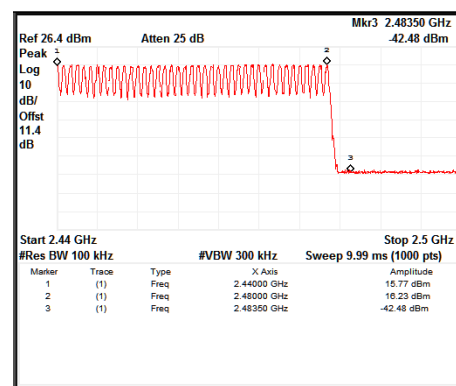
- All the losses are included during measurement and final values are mentioned in the test report.

Test Plots:

Data Rate: 1Mbps

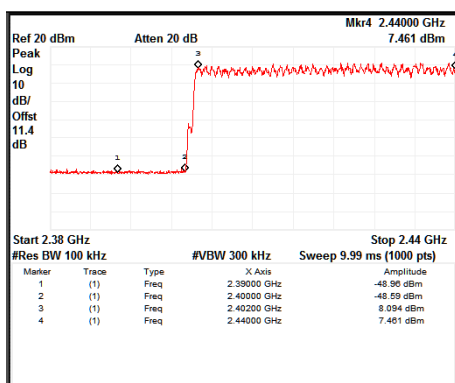


Frequency range: 2380MHz to 2440MHz

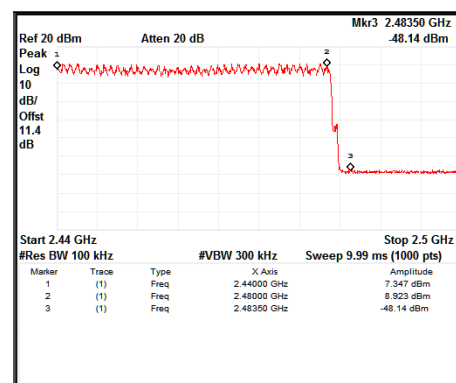


Frequency range: 2440MHz to 2500MHz

Data Rate: 2Mbps

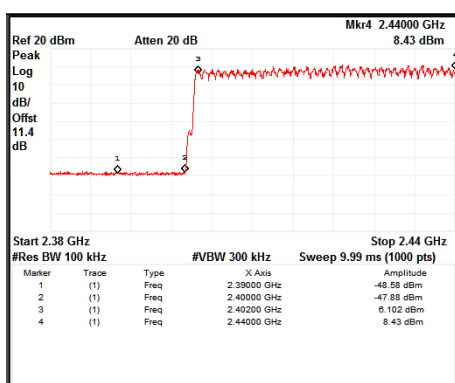


Frequency range: 2380MHz to 2440MHz

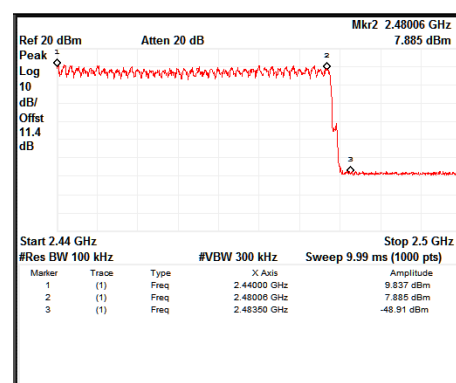


Frequency range: 2440MHz to 2500MHz

Data Rate: 3Mbps



Frequency range: 2380MHz to 2440MHz



Frequency range: 2440MHz to 2500MHz

Number of Hopping frequencies for all data rates = 79

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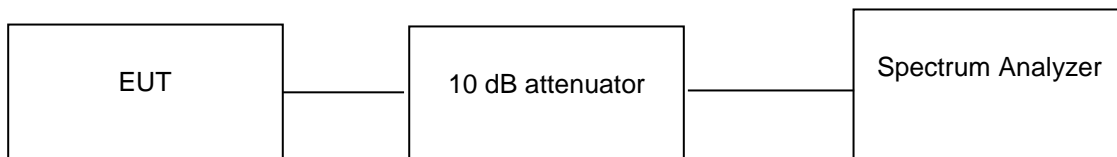
7.4 Carrier Frequency Separation

Result

Pass

| | |
|-----------------------|---|
| Test Specification | FCC Part 15 Subpart C Section 15.247 (a) (1) / RSS 247 Issue 2, Section 5.1 (b) |
| Test Method | Clause 7.8.2 of ANSI C63.10 |
| Measurement Bandwidth | 300 kHz |
| Detector | Peak |
| Port of testing | Antenna port |
| Requirement | Frequency hopping systems shall have hopping channel carrier frequency separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater |

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 25 °C

Voltage = 5.0V AC to DC Adaptor

Relative humidity: 62%

KDB Guidelines applied:

Measurements were made as per section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02.

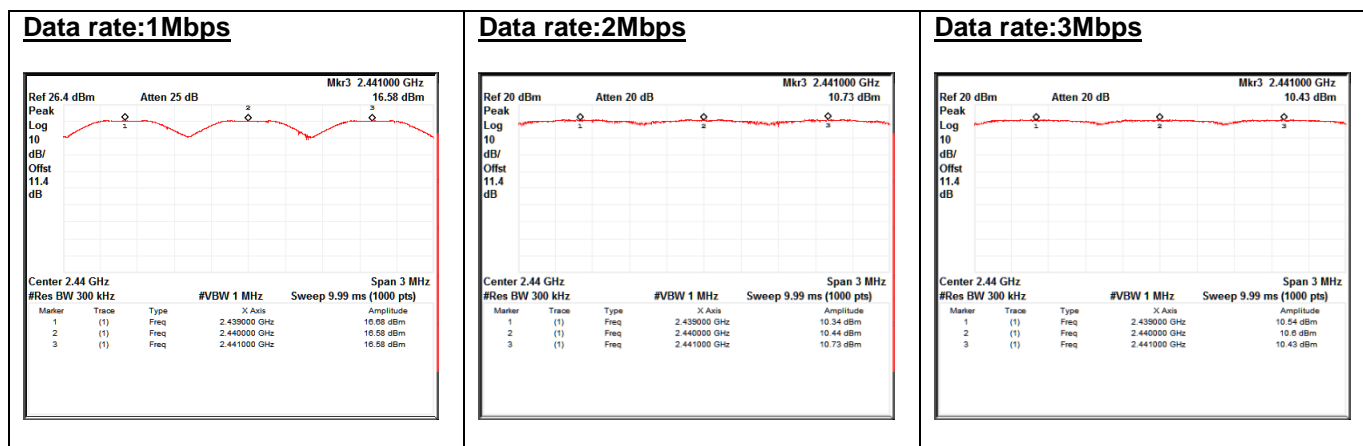
Test results:

Note:

- All the losses are included during measurement and final values are mentioned in the test report.

| Data rate (Mbps) | Channel Frequency (MHz) | Channel spacing Observed (MHz) | 20 dB Bandwidth (MHz) |
|------------------|-------------------------|--------------------------------|-----------------------|
| 1 | 2439 | 1 | 0.930 |
| | 2440 | 1 | 0.933 |
| | 2441 | 1 | 0.930 |
| 2 | 2439 | 1 | 1.33 |
| | 2440 | 1 | 1.32 |
| | 2441 | 1 | 1.33 |
| 3 | 2439 | 1 | 1.30 |
| | 2440 | 1 | 1.30 |
| | 2441 | 1 | 1.31 |

Test Plots:



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7.5 Time Of Occupancy(Dwell Time)

Result

Pass

Test Specification FCC Part 15 Subpart C Section 15.247 (a) (i) / RSS 247
Issue 2,Section 5.1 (d)

Test Method Clause 7.8.4 of ANSI C63.10

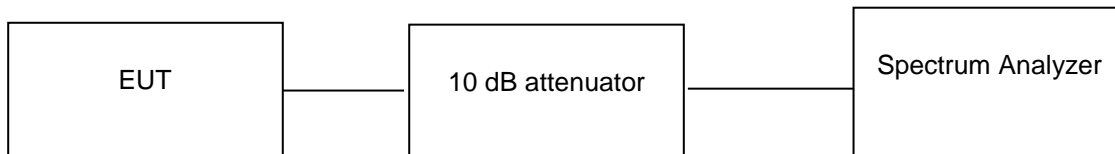
Measurement Bandwidth 100 kHz

Detector Peak

Port of testing Antenna port

Requirement The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = + 25 °C

Voltage = 5.0V AC to DC Adaptor

Relative humidity: 62%

KDB Guidelines applied:

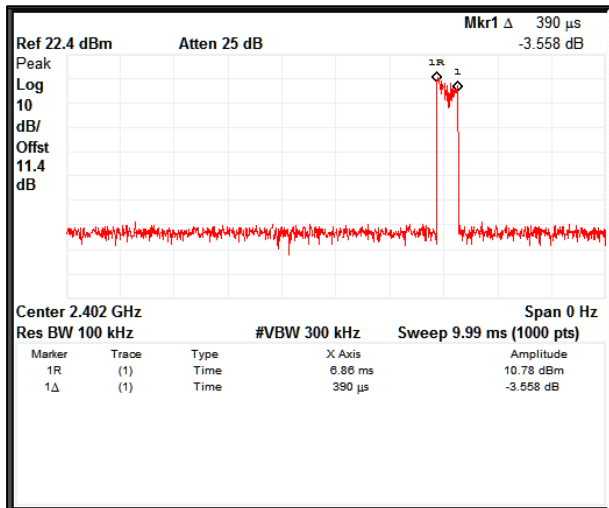
Measurements were made as per section 9(b) in KDB 558074 D01 15.247 Measurement Guidance v05r02

Test results:

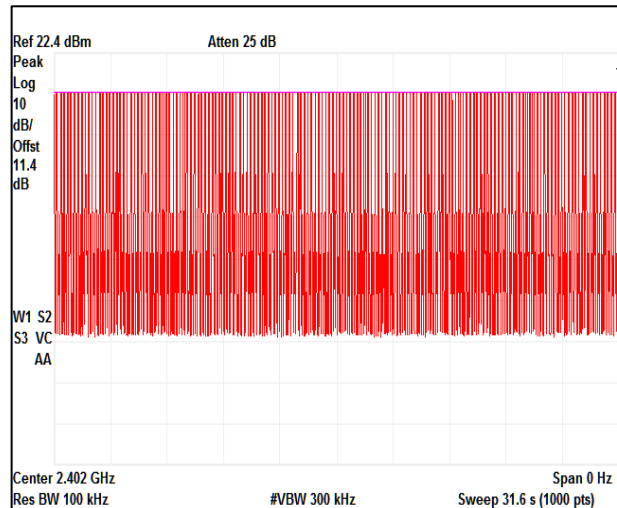
Note:

1. All the losses are included during measurement and final values are mentioned in the test report
2. Testing is performed for all the applicable data rates only worst case graphs are reported (DH5)

Data Rate: DH5



Dwell time



No. of Bin Calculation

| | | |
|--|--------------|-----------|
| Single Burst | 390 | μs |
| Measured Span (Seconds) | 31.6 | sec |
| No. Of Bins/Bursts in Measured Span | 166 | No. |
| Observation Period (79 hop ch x0.4s) - Seconds | 31.6 | sec |
| Total Burst in 31.6sec | 64.74 | ms |
| Limit | 400.00 | ms |

7.6 Emissions in non-restricted frequency bands and Conducted Spurious Emission

Result

Pass

Test Specification: FCC part 15 Subpart C 15.247 (d) / RSS 247 Issue 2, Section 5.5

Test Method: Subclause 11.11 of ANSI C63.10

Measurement Bandwidth: 100 kHz

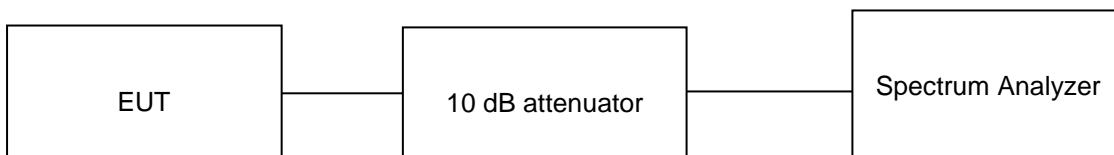
Detector: Peak

Port of testing: Antenna port

Requirement: In any 100kHz 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 30dB below that in the 100kHz 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = +25 °C

Voltage = 5.0V AC to DC Adaptor

Relative humidity: 62 %

KDB Guidelines applied:

Measurements were made as per section 8.5 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

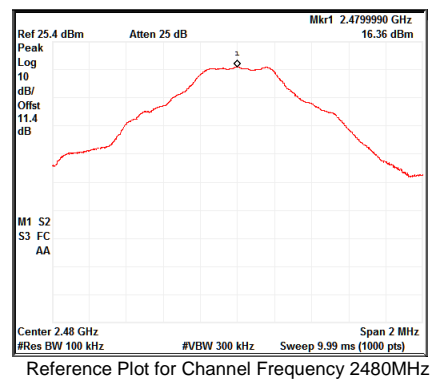
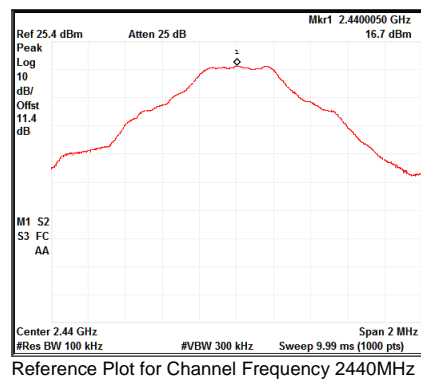
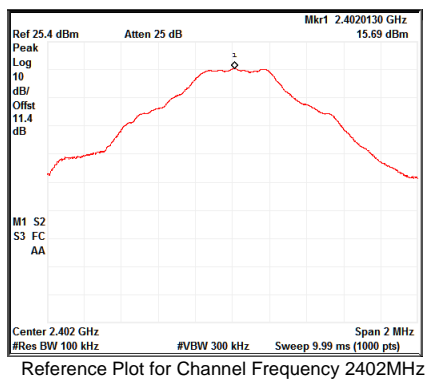
Test results:

Note:

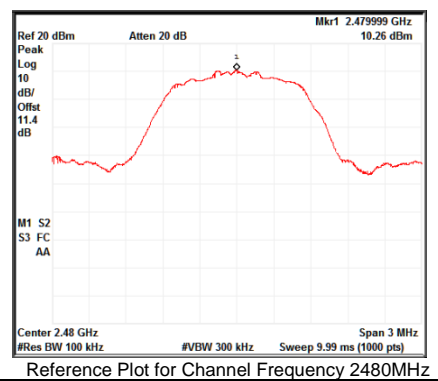
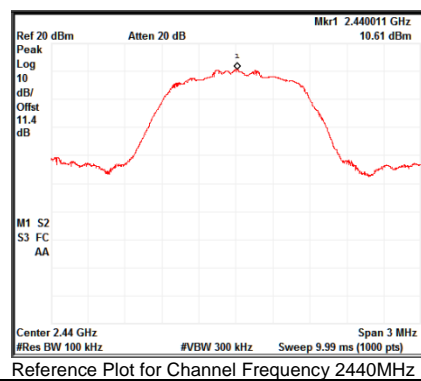
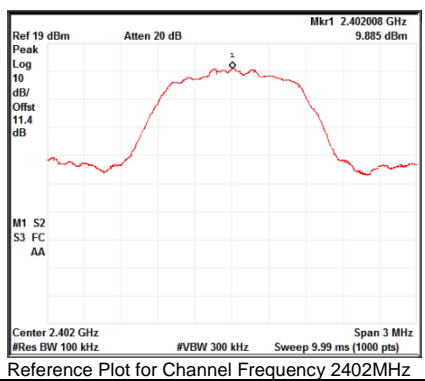
1. All the losses are included during measurement and final values are mentioned in the test report.
2. Final Value (dBm) = Measured Value (dBm) + Attenuator factor (10dB) + Cable loss (0.5dB)
3. This product do not support additional beamforming gain / directional gain, it uses signal antenna and hence directional gain of the single antenna is 2.35 dBi

7.6.1 Reference plots

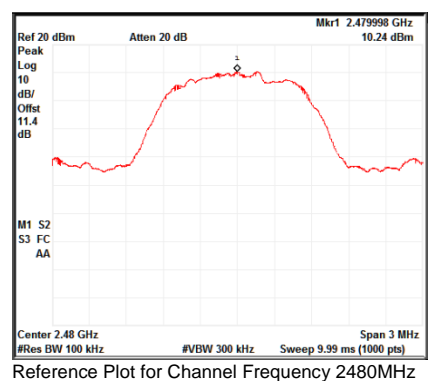
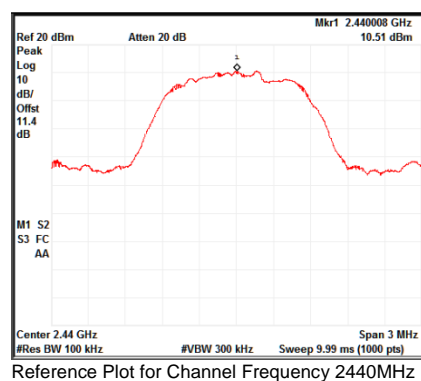
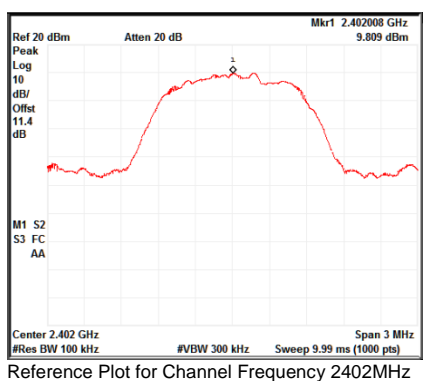
Data Rate: 1Mbps



Data Rate: 2Mbps

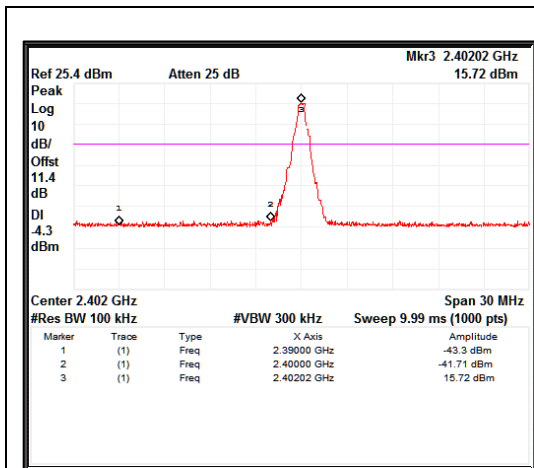


Data Rate: 3Mbps

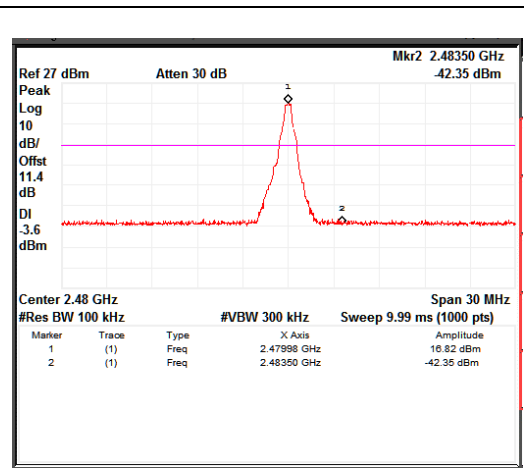


7.6.2 Band Edge

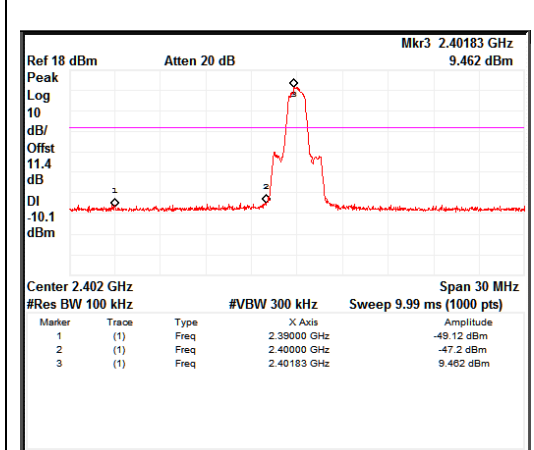
| Data rate | Channel Frequency (MHz) | Band edge frequency (MHz) | Value at band edge (A) (dBm) | Reference value (B) (dBm) | A-B (dBc) | Minimum Limit (dBc) |
|-----------|-------------------------|---------------------------|------------------------------|---------------------------|-----------|---------------------|
| 1Mbps | 2402.00 | 2400.00 | -41.71 | 15.69 | -57.40 | -20 |
| | 2480.00 | 2483.50 | -42.35 | 16.36 | -58.71 | -20 |
| 2Mbps | 2402.00 | 2400.00 | -47.20 | 9.88 | -57.08 | -20 |
| | 2480.00 | 2483.50 | -49.32 | 10.26 | -59.58 | -20 |
| 3Mbps | 2402.00 | 2400.00 | -45.48 | 9.80 | -55.28 | -20 |
| | 2480.00 | 2483.50 | -47.74 | 10.24 | -57.98 | -20 |



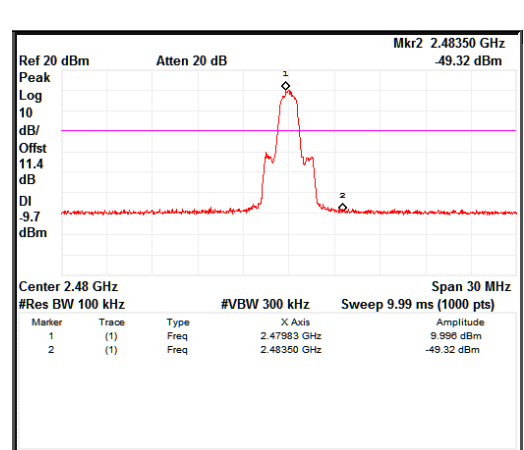
Data rate: 1Mbps Channel Frequency 2402MHz



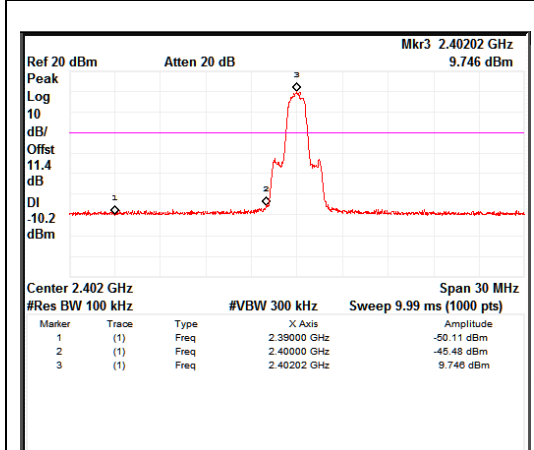
Data rate: 1Mbps Channel Frequency 2480MHz



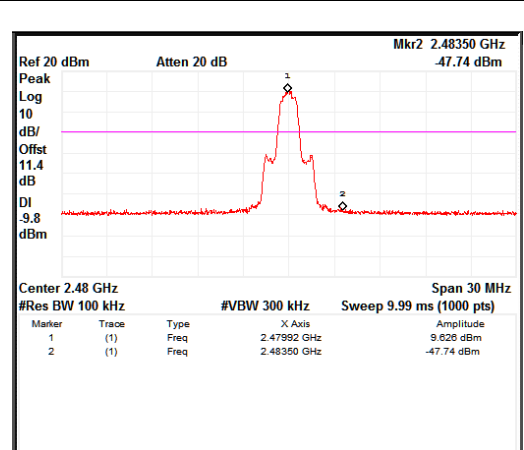
Data rate: 2Mbps Channel Frequency 2402MHz



Data rate: 2Mbps Channel Frequency 2480MHz



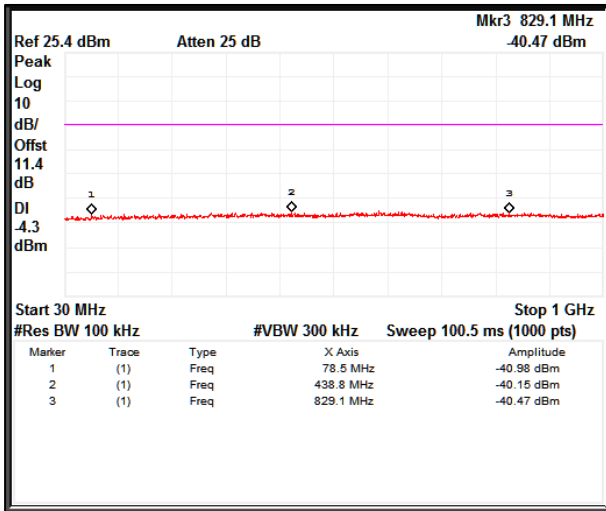
Data rate: 3Mbps Channel Frequency 2402MHz



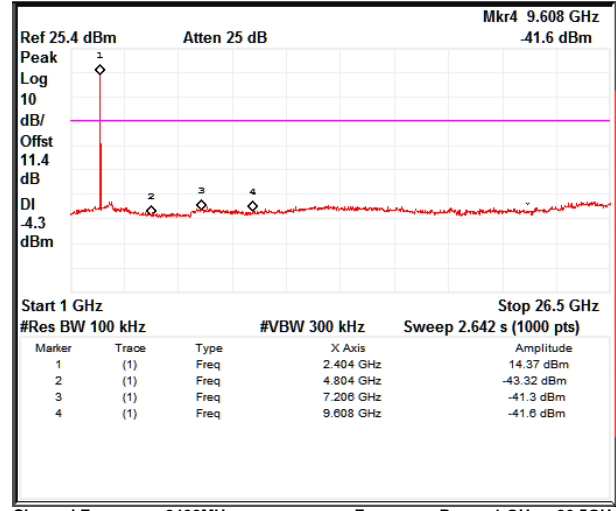
Data rate: 3Mbps Channel Frequency 2480MHz

7.6.3 Out-Of-Band Emissions

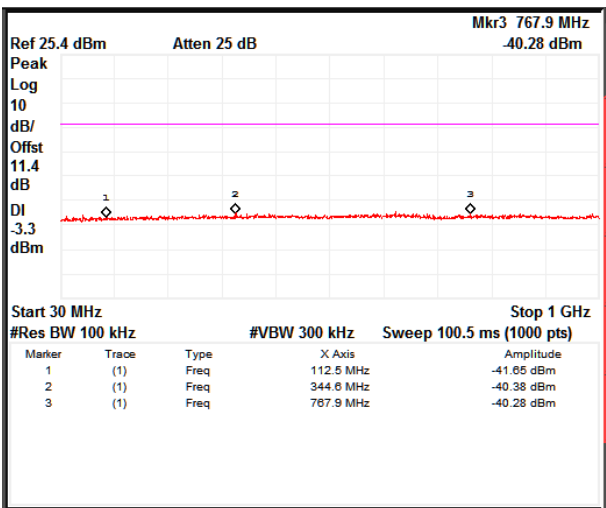
Data Rate: 1Mbps



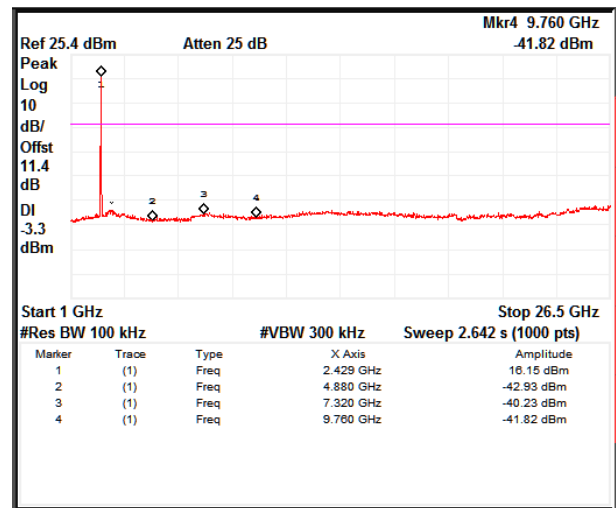
Channel Frequency 2402MHz Frequency Range 30 MHz - 1GHz



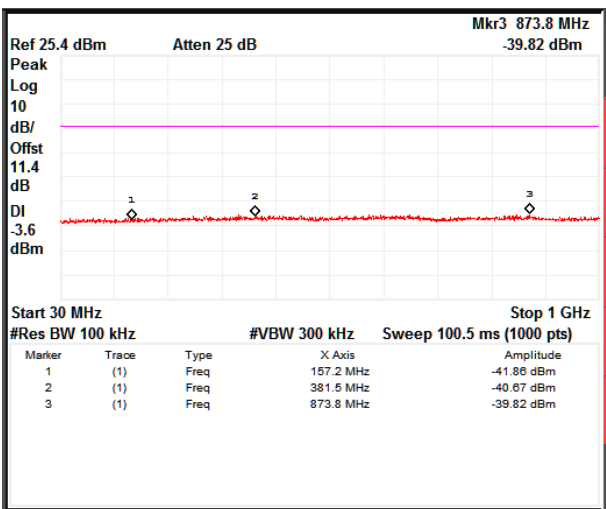
Channel Frequency 2402MHz Frequency Range 1 GHz - 26.5GHz



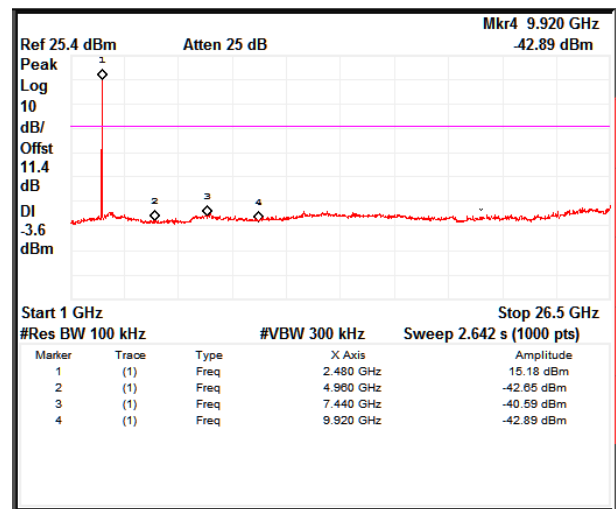
Channel Frequency 2440MHz Frequency Range 30 MHz - 1GHz



Channel Frequency 2440MHz Frequency Range 1 GHz - 26.5GHz

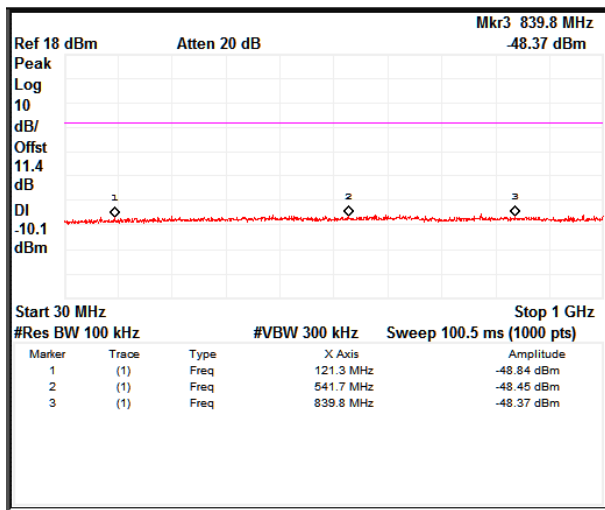


Channel Frequency 2480MHz Frequency Range 30 MHz - 1GHz

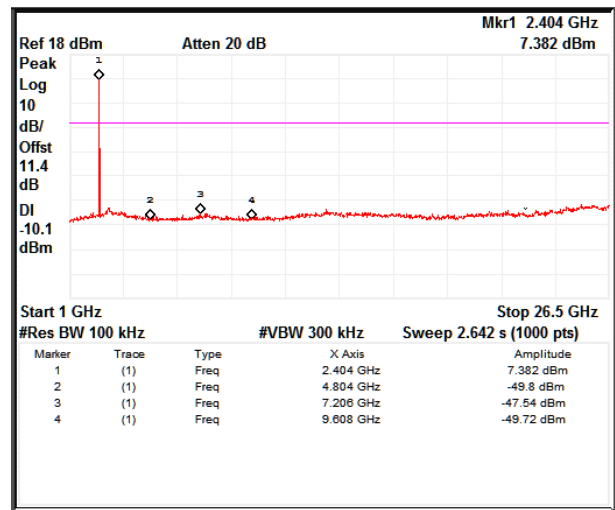


Channel Frequency 2480MHz Frequency Range 1 GHz - 26.5GHz

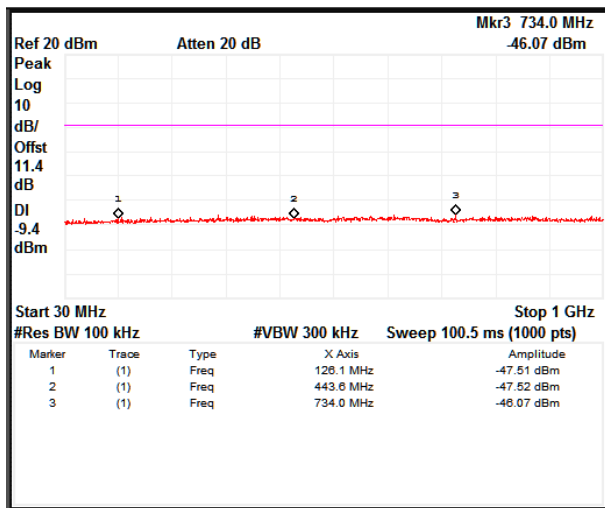
Data Rate: 2Mbps



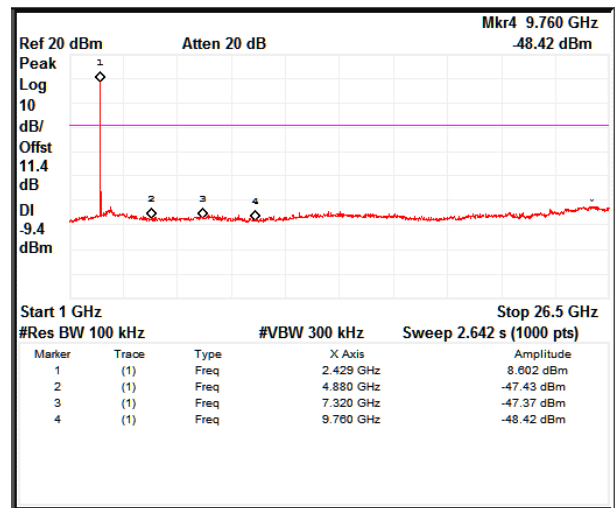
Channel Frequency 2402MHz Frequency Range 30 MHz - 1GHz



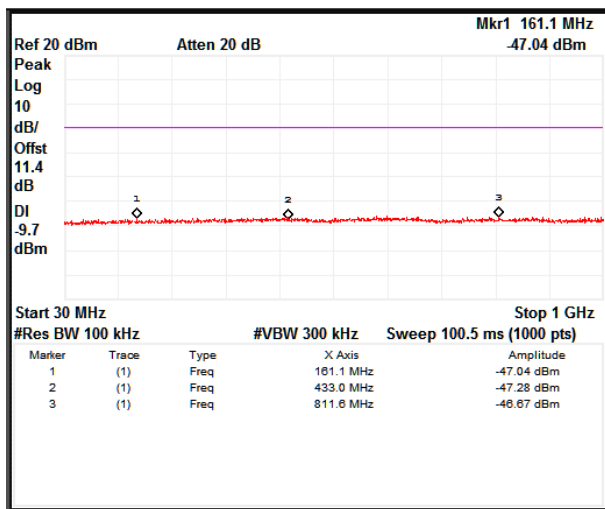
Channel Frequency 2402MHz Frequency Range 1 GHz - 26.5GHz



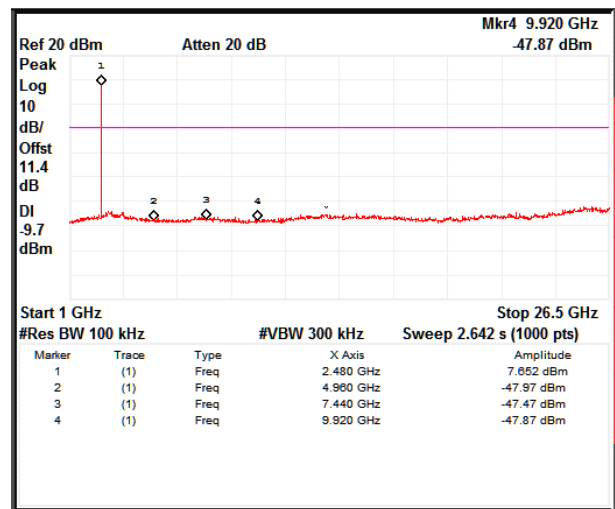
Channel Frequency 2440MHz Frequency Range 30 MHz - 1GHz



Channel Frequency 2440MHz Frequency Range 1 GHz - 26.5GHz

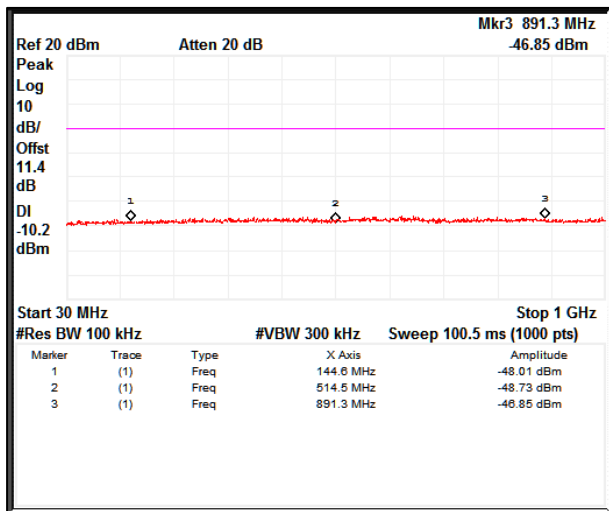


Channel Frequency 2480MHz Frequency Range 30 MHz - 1GHz

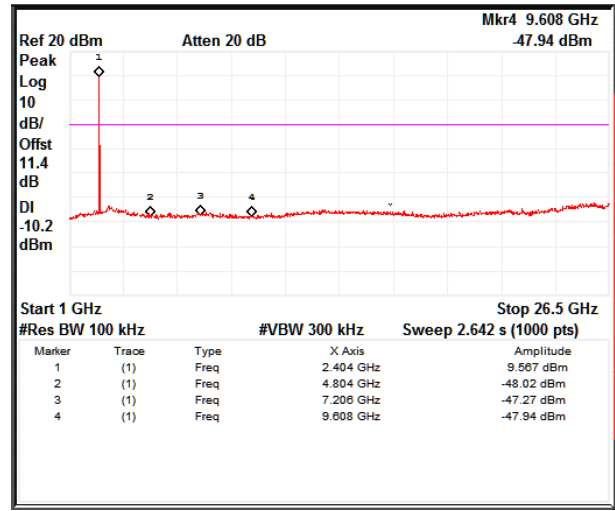


Channel Frequency 2480MHz Frequency Range 1 GHz - 26.5GHz

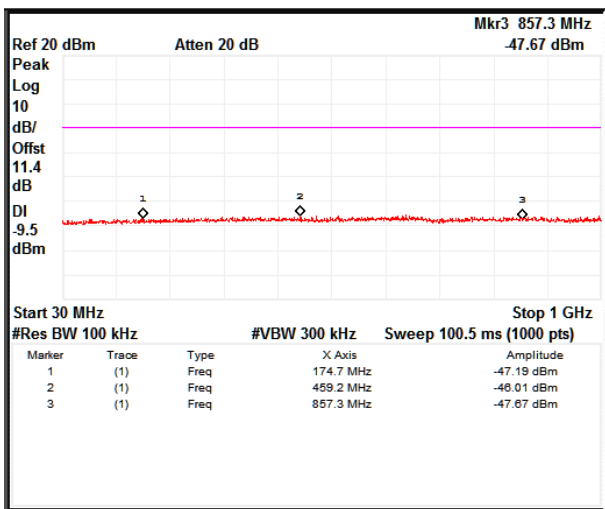
Data Rate: 3Mbps



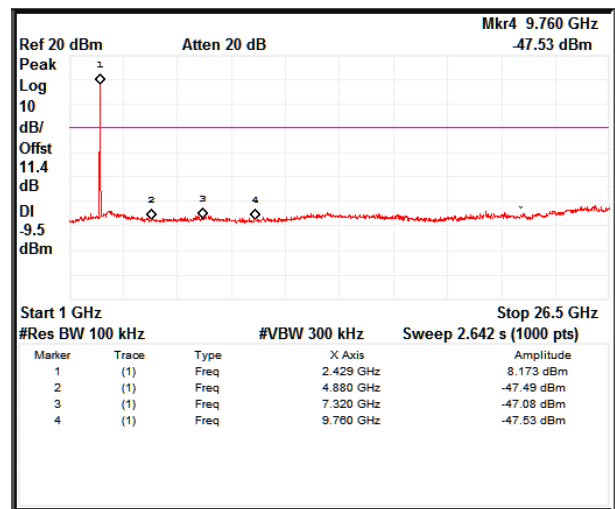
Channel Frequency 2402MHz Frequency Range 30 MHz – 1GHz



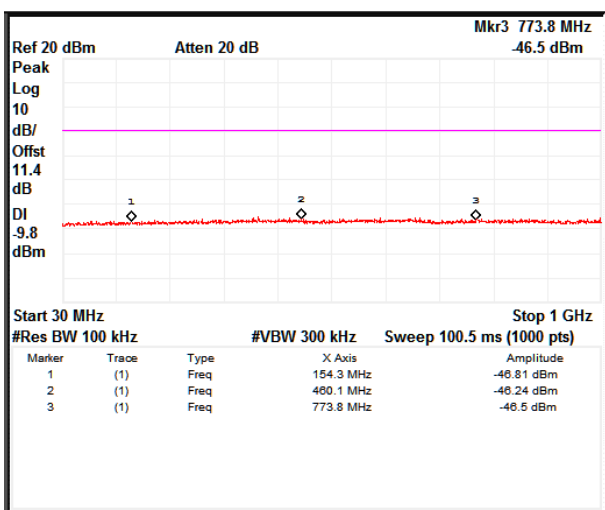
Channel Frequency 2402MHz Frequency Range 1 GHz – 26.5GHz



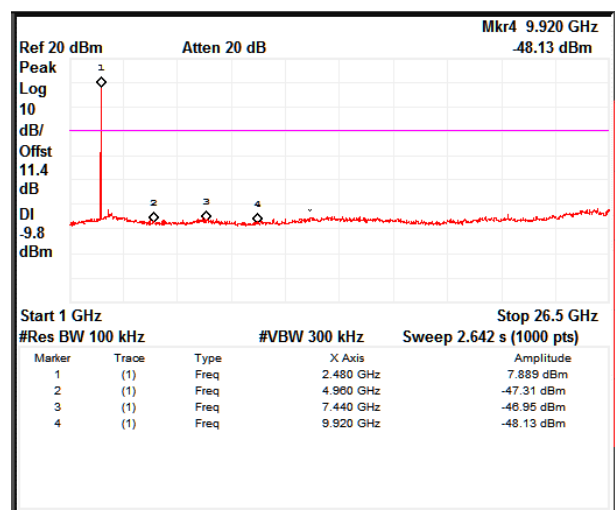
Channel Frequency 2440MHz Frequency Range 30 MHz – 1GHz



Channel Frequency 2440MHz Frequency Range 1 GHz – 26.5GHz



Channel Frequency 2480MHz Frequency Range 30 MHz – 1GHz



Channel Frequency 2480MHz Frequency Range 1 GHz – 26.5GHz

7.7 Spurious Radiated Emissions & Restricted Bands of Operation

| Result | Pass |
|-----------------------|---|
| Test Specification | FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205) / IC RSS-GEN, Section 8.9 and 8.10 |
| Test Method | ANSI C63.10 |
| Measurement Location | Semi Anechoic Chamber 30MHz - 1 GHz Fully Anechoic Chamber 1 GHz - 40GHz |
| Measurement Bandwidth | 100 kHz for frequency range < 1GHz 1 MHz for Frequency range >1GHz |
| Detector | Refer remarks below |
| Measuring Distance | 3 m |
| Requirement | As per the limits mentioned in the below table |
| Test setup | Refer TEST METHODOLOGY |

Table 6: Transmitter limits for Radiated emission

| Frequency (MHz) | Field strength (μV/m) | Field strength (dBμV/m) | Distance of Measurement (m) |
|-----------------|-----------------------|-------------------------|-----------------------------|
| 0.009 – 0.490 | 2400/F(kHz) | 48.50 – 13.80 | 300* |
| 0.490 – 1.705 | 24000/F(kHz) | 33.80 – 23.00 | 30* |
| 1.705 -30 | 30 | 29.54 | 30* |
| 30-88 | 100 | 40.0 | 3 |
| 88-216 | 150 | 43.5 | 3 |
| 216-960 | 200 | 46.0 | 3 |
| Above 960 | 500 | 54.0 | 3 |

Remark: * The limit shows in the table above of frequency range 0.009 – 0.490, 0.490 – 1.705 MHz and 1.705-30MHz is at 300 meter, 30 meter and 30 meter range respectively, which corresponds to 128.51 – 93.80, 73.80 – 62.96 and 69.54 dBμV/m at 3m range by extrapolation calculation and the measurement of loop antenna.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Conditions:

Temperature (Norm) = + 21.6 °C Voltage = 5.0V AC to DC Adaptor Relative humidity = 62 %

Test results:

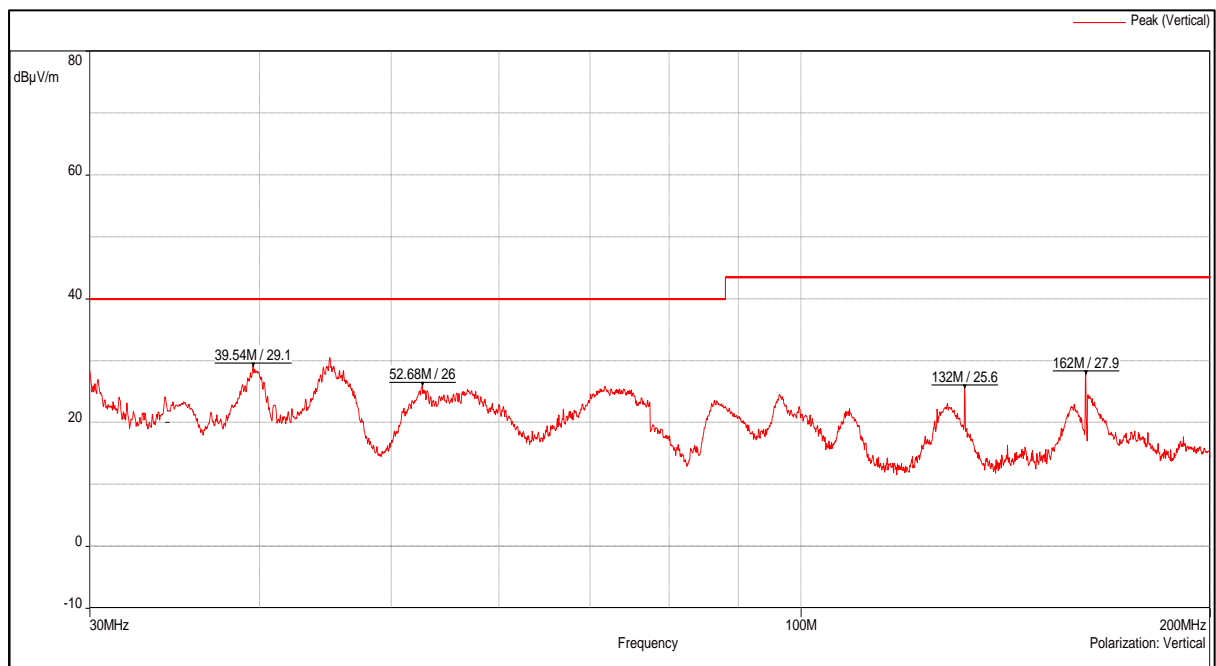
Note: All the losses are included during measurement and final values are mentioned in the test report. Refer TEST METHODOLOGY for more details

Test results for frequency range 9kHz – 30MHz

No emissions found in frequency range 9 kHz to 30 MHz, and measured levels are below 20dB from the limit line, hence not reported

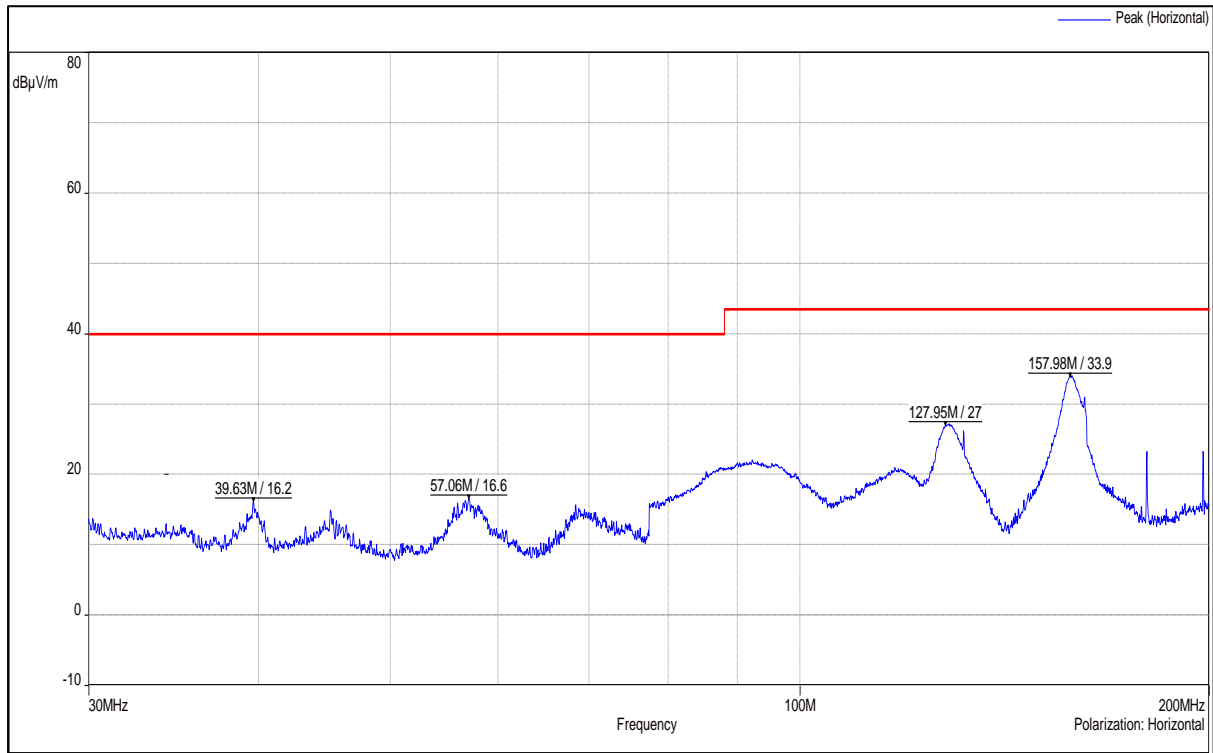
Test results for frequency range 30MHz – 1GHz

| Antenna Polarization | Measured Frequency (MHz) | Measured Value (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|----------------------|--------------------------|-------------------------|----------------|-------------|
| Vertical | 39.54 | 29.10 | 40.00 | -10.90 |
| | 52.68 | 26.00 | 40.00 | -14.00 |
| | 132.00 | 25.60 | 43.50 | -17.90 |
| | 162.00 | 27.90 | 43.50 | -15.60 |
| | 238.64 | 9.99 | 46.00 | -36.01 |
| | 395.99 | 12.90 | 46.00 | -33.10 |
| | 653.45 | 14.90 | 46.00 | -31.10 |
| Horizontal | 39.63 | 16.20 | 40.00 | -23.80 |
| | 57.06 | 16.60 | 43.50 | -26.90 |
| | 127.95 | 27.00 | 43.50 | -16.50 |
| | 157.98 | 33.93 | 43.50 | -9.57 |
| | 263.99 | 3.93 | 46.00 | -42.07 |
| | 395.99 | 18.70 | 46.00 | -27.30 |
| | 659.84 | 14.20 | 46.00 | -31.80 |



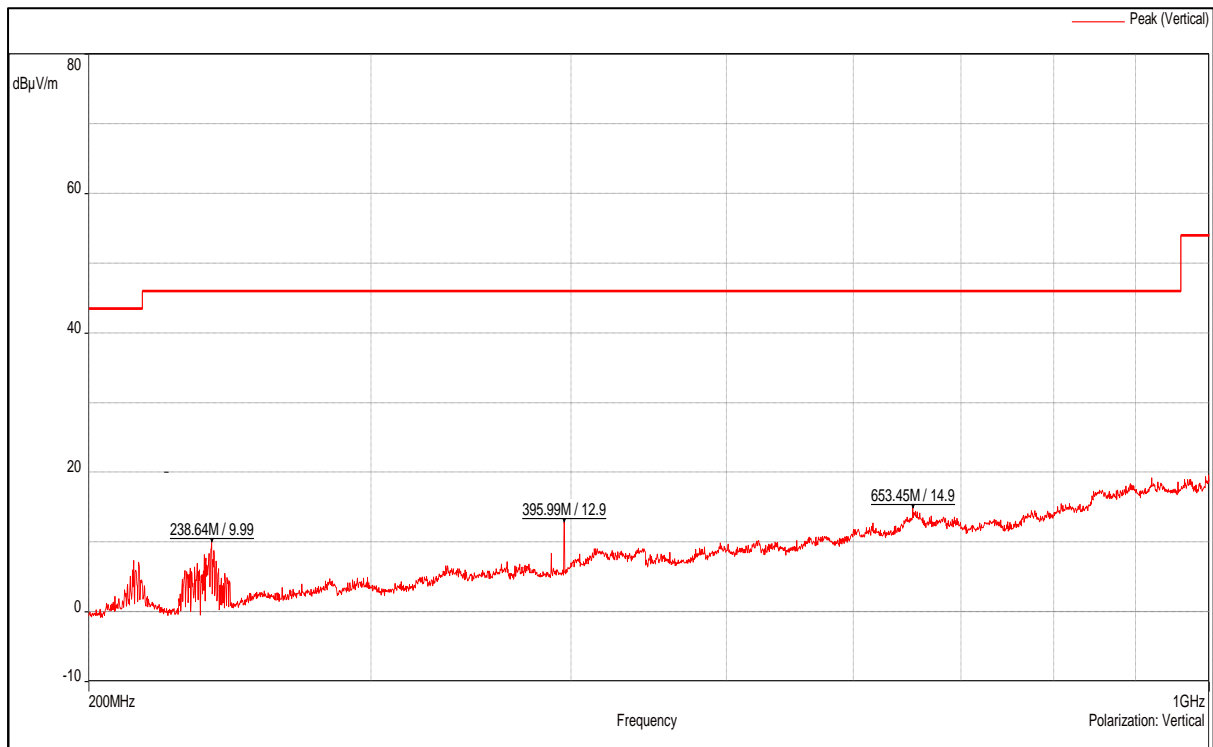
Channel Frequency 30MHz – 200MHz

Polarization Vertical



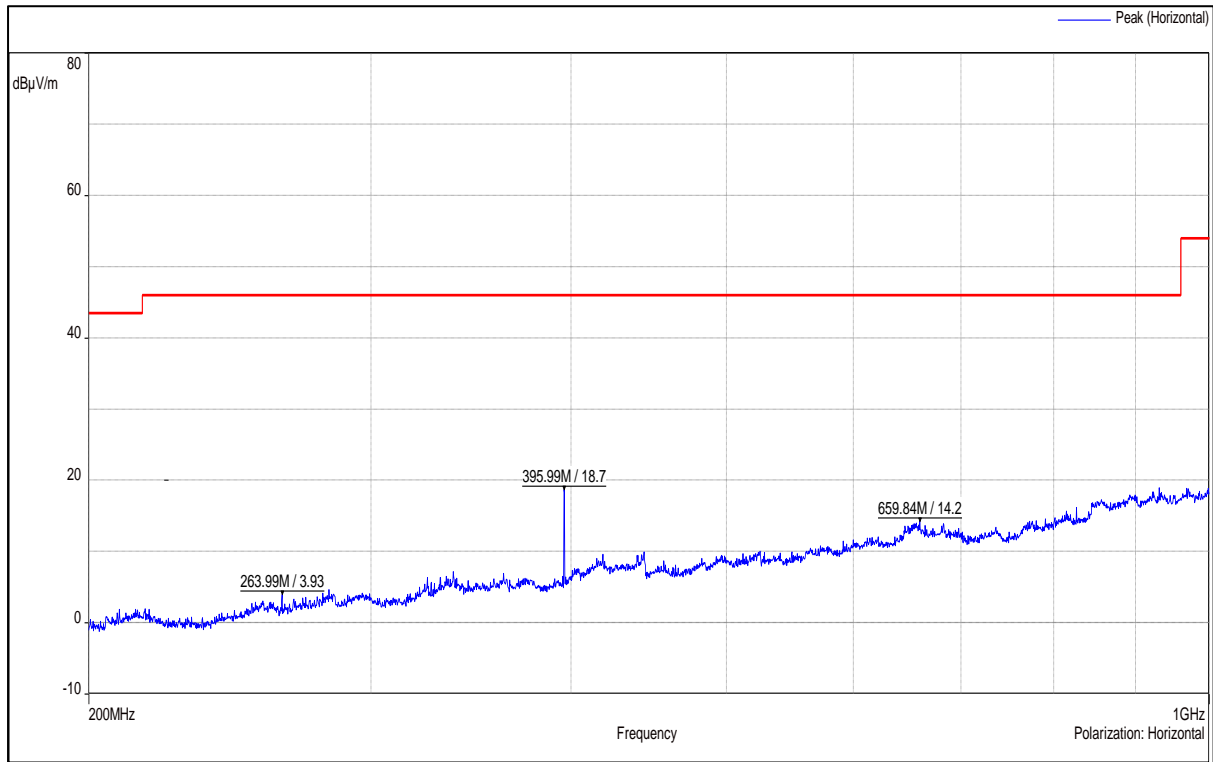
Channel Frequency 30MHz – 200MHz

Polarization Horizontal



Channel Frequency 200MHz – 1GHz

Polarization Vertical



Channel Frequency 200MHz – 1GHz

Polarization Horizontal

Test results for the frequencies above 1GHz

Antenna Type: (Omni Directional Antenna) RPSMA Results

| Data rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|
| 1 | 2402 | 2390(Pk) | Vertical | 40.77 | 74.00* | -33.23 |
| | | 2390(Av) | | 26.51 | 54.00* | -27.49 |
| | | 2402(Pk) | | 107.74 | - | - |
| | | 2402(Av) | | 94.79 | - | - |
| | | 4804(Pk) | | 41.91 | 74.00 | -32.09 |
| | | 4804(Av) | | 29.83 | 54.00 | -24.17 |
| | | 7206(Pk) | | 47.31 | 74.00 | -26.69 |
| | | 7206(Av) | | 35.28 | 54.00 | -18.72 |
| | | 2390(Pk) | Horizontal | 38.29 | 74.00* | -35.71 |
| | | 2390(Av) | | 25.03 | 54.00* | -28.97 |
| | | 2402(Pk) | | 102.23 | - | - |
| | | 2402(Av) | | 89.26 | - | - |
| | | 4804(Pk) | | 41.53 | 74.00 | -32.47 |
| | | 4804(Av) | | 29.59 | 54.00 | -24.41 |
| | | 7206(Pk) | | 49.31 | 74.00 | -24.69 |
| | | 7206(Av) | | 35.21 | 54.00 | -18.79 |
| | 2440 | Vertical | 2440(Pk) | 107.95 | - | - |
| | | | 2440(Av) | 94.93 | - | - |
| | | | 4880(Pk) | 43.88 | 74.00 | -30.12 |
| | | | 4880(Av) | 31.14 | 54.00 | -22.86 |
| | | | 7320(Pk) | 46.68 | 74.00 | -27.32 |
| | | | 7320(Av) | 35.14 | 54.00 | -18.86 |
| | | Horizontal | 2440(Pk) | 103.17 | - | - |
| | | | 2440(Av) | 90.15 | - | - |
| | | | 4880(Pk) | 41.42 | 74.00 | -32.58 |
| | | | 4880(Av) | 29.63 | 54.00 | -24.37 |
| | | | 7320(Pk) | 48.18 | 74.00 | -25.82 |
| | | | 7320(Av) | 35.22 | 54.00 | -18.78 |
| | 2480 | Vertical | 2480(Pk) | 107.12 | - | - |
| | | | 2480(Av) | 94.43 | - | - |
| | | | 2483.5(Pk) | 51.37 | 74.00* | -22.63 |
| | | | 2483.5(Av) | 29.83 | 54.00* | -24.17 |
| | | | 4960(Pk) | 46.03 | 74.00 | -27.97 |
| | | | 4960(Av) | 32.99 | 54.00 | -21.01 |
| | | | 7440(Pk) | 47.37 | 74.00 | -26.63 |
| | | | 7440(Av) | 35.22 | 54.00 | -18.78 |
| Horizontal | | | 2480(Pk) | 102.73 | - | - |
| | | 2480(Av) | 90.05 | - | - | |
| | | 2483.5(Pk) | 47.00 | 74.00* | -27.00 | |
| | | 2483.5(Av) | 28.02 | 54.00* | -25.98 | |
| | | 4960(Pk) | 42.05 | 74.00 | -31.95 | |
| | | 4960(Av) | 29.73 | 54.00 | -24.27 | |
| | | 7440(Pk) | 47.42 | 74.00 | -26.58 | |
| | | 7440(Av) | 35.18 | 54.00 | -18.82 | |

* : Indicate restricted band of operation §15.205

- : Fundamental Frequency

Pk: Peak Detector; Av: Average Detector

| Data rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|
| 2 | 2402 | 2390(Pk) | Vertical | 39.61 | 74.00* | -34.39 |
| | | 2390(Av) | | 26.88 | 54.00* | -27.12 |
| | | 2402(Pk) | | 107.17 | - | - |
| | | 2402(Av) | | 100.20 | - | - |
| | | 4804(Pk) | | 41.77 | 74.00 | -32.23 |
| | | 4804(Av) | | 30.05 | 54.00 | -23.95 |
| | | 7206(Pk) | | 47.86 | 74.00 | -26.14 |
| | | 7206(Av) | | 35.08 | 54.00 | -18.92 |
| | | 2390(Pk) | Horizontal | 37.71 | 74.00* | -36.29 |
| | | 2390(Av) | | 25.20 | 54.00* | -28.80 |
| | | 2402(Pk) | | 101.47 | - | - |
| | | 2402(Av) | | 94.46 | - | - |
| | | 4804(Pk) | | 41.33 | 74.00 | -32.67 |
| | | 4804(Av) | | 29.48 | 54.00 | -24.52 |
| | | 7206(Pk) | | 47.57 | 74.00 | -26.43 |
| | | 7206(Av) | | 35.04 | 54.00 | -18.96 |
| | 2440(Pk) | Vertical | 107.28 | - | - | |
| | 2440(Av) | | 100.25 | - | - | |
| | 4880(Pk) | | 43.28 | 74.00 | -30.72 | |
| | 4880(Av) | | 31.74 | 54.00 | -22.26 | |
| | 7320(Pk) | | 47.41 | 74.00 | -26.59 | |
| | 7320(Av) | | 35.05 | 54.00 | -18.95 | |
| | 2440(Pk) | Horizontal | 102.70 | - | - | |
| | 2440(Av) | | 95.68 | - | - | |
| | 4880(Pk) | | 41.47 | 74.00 | -32.53 | |
| | 4880(Av) | | 29.86 | 54.00 | -24.14 | |
| | 7320(Pk) | | 47.30 | 74.00 | -26.70 | |
| | 7320(Av) | | 35.36 | 54.00 | -18.64 | |
| | 2480(Pk) | Vertical | 106.96 | - | - | |
| | 2480(Av) | | 100.19 | - | - | |
| | 2483.5(Pk) | | 51.05 | 74.00* | -22.95 | |
| | 2483.5(Av) | | 32.13 | 54.00* | -21.87 | |
| | 4960(Pk) | | 47.21 | 74.00 | -26.79 | |
| | 4960(Av) | | 36.85 | 54.00 | -17.15 | |
| | 7440(Pk) | | 47.31 | 74.00 | -26.69 | |
| | 7440(Av) | | 35.36 | 54.00 | -18.64 | |
| 2480(Pk) | Horizontal | 102.49 | - | - | | |
| 2480(Av) | | 95.75 | - | - | | |
| 2483.5(Pk) | | 46.37 | 74.00* | -27.63 | | |
| 2483.5(Av) | | 29.60 | 54.00* | -24.40 | | |
| 4960(Pk) | | 41.82 | 74.00 | -32.18 | | |
| 4960(Av) | | 29.75 | 54.00 | -24.25 | | |
| 7440(Pk) | | 48.12 | 74.00 | -25.88 | | |
| 7440(Av) | | 35.29 | 54.00 | -18.71 | | |

* : Indicate restricted band of operation §15.205

- : Fundamental Frequency

Pk: Peak Detector; Av: Average Detector

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| Data Rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) | |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|--------|
| 3 | 2402 | 2390(Pk) | Vertical | 39.63 | 74.00* | -34.37 | |
| | | 2390(Av) | | 26.90 | 54.00* | -27.10 | |
| | | 2402(Pk) | | 106.35 | - | - | |
| | | 2402(Av) | | 100.47 | - | - | |
| | | 4804(Pk) | | 41.74 | 74.00 | -32.26 | |
| | | 4804(Av) | | 29.85 | 54.00 | -24.15 | |
| | | 7206(Pk) | | 47.08 | 74.00 | -26.92 | |
| | | 7206(Av) | | 35.26 | 54.00 | -18.74 | |
| | | 2390(Pk) | | Horizontal | 38.25 | 74.00* | -35.75 |
| | | 2390(Av) | 25.21 | | 54.00* | -28.79 | |
| | | 2402(Pk) | 100.93 | | - | - | |
| | | 2402(Av) | 95.04 | | - | - | |
| | | 4804(Pk) | 41.59 | | 74.00 | -32.41 | |
| | | 4804(Av) | 29.55 | | 54.00 | -24.45 | |
| | | 7206(Pk) | 47.13 | | 74.00 | -26.87 | |
| | | 7206(Av) | 35.18 | | 54.00 | -18.82 | |
| | | 2440 | Vertical | | 2440(Pk) | 107.26 | - |
| | | | | 2440(Av) | 101.37 | - | - |
| | 4880(Pk) | | | 45.25 | 74.00 | -28.75 | |
| | 4880(Av) | | | 34.21 | 54.00 | -19.79 | |
| | 7320(Pk) | | | 47.14 | 74.00 | -26.86 | |
| | 7320(Av) | | | 35.20 | 54.00 | -18.80 | |
| | Horizontal | | 2440(Pk) | 102.56 | - | - | |
| | | | 2440(Av) | 96.67 | - | - | |
| | | | 4880(Pk) | 42.21 | 74.00 | -31.79 | |
| | | | 4880(Av) | 30.08 | 54.00 | -23.92 | |
| | | | 7320(Pk) | 47.01 | 74.00 | -26.99 | |
| | | | 7320(Av) | 35.16 | 54.00 | -18.84 | |
| | 2480 | Vertical | 2480(Pk) | 106.83 | - | - | |
| | | | 2480(Av) | 101.17 | - | - | |
| | | | 2483.5(Pk) | 49.73 | 74.00* | -24.27 | |
| | | | 2483.5(Av) | 32.49 | 54.00* | -21.51 | |
| | | | 4960(Pk) | 45.95 | 74.00 | -28.05 | |
| | | | 4960(Av) | 35.24 | 54.00 | -18.76 | |
| | | | 7440(Pk) | 47.56 | 74.00 | -26.44 | |
| | | | 7440(Av) | 35.29 | 54.00 | -18.71 | |
| Horizontal | | | 2480(Pk) | 102.21 | - | - | |
| | | 2480(Av) | 96.55 | - | - | | |
| | | 2483.5(Pk) | 45.41 | 74.00* | -28.59 | | |
| | | 2483.5(Av) | 29.30 | 54.00* | -24.70 | | |
| | | 4960(Pk) | 44.57 | 74.00 | -29.43 | | |
| | | 4960(Av) | 31.03 | 54.00 | -22.97 | | |
| | | 7440(Pk) | 47.31 | 74.00 | -26.69 | | |
| | | 7440(Av) | 35.18 | 54.00 | -18.82 | | |

* : Indicate restricted band of operation §15.205
 - : Fundamental Frequency
 Pk: Peak Detector; Av: Average Detector

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Antenna Type: 1001932PT (PCB/Flex) MIMO Antenna Results

| Data rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|
| 1 | 2402 | 2390(Pk) | Vertical | 37.01 | 74.00* | -36.99 |
| | | 2390(Av) | | 24.94 | 54.00* | -29.06 |
| | | 2402(Pk) | | 100.83 | - | - |
| | | 2402(Av) | | 87.99 | - | - |
| | | 4804(Pk) | | 42.66 | 74.00 | -31.34 |
| | | 4804(Av) | | 29.51 | 54.00 | -24.49 |
| | | 7206(Pk) | | 46.89 | 74.00 | -27.11 |
| | | 7206(Av) | | 35.15 | 54.00 | -18.85 |
| | | 2390(Pk) | Horizontal | 38.73 | 74.00* | -35.27 |
| | | 2390(Av) | | 26.21 | 54.00* | -27.79 |
| | | 2402(Pk) | | 105.30 | - | - |
| | | 2402(Av) | | 92.47 | - | - |
| | | 4804(Pk) | | 41.88 | 74.00 | -32.12 |
| | | 4804(Av) | | 29.78 | 54.00 | -24.22 |
| | | 7206(Pk) | | 46.59 | 74.00 | -27.41 |
| | | 7206(Av) | | 35.08 | 54.00 | -18.92 |
| | 2440 | Vertical | 2440(Pk) | 101.30 | - | - |
| | | | 2440(Av) | 88.62 | - | - |
| | | | 4880(Pk) | 41.44 | 74.00 | -32.56 |
| | | | 4880(Av) | 29.80 | 54.00 | -24.20 |
| | | | 7320(Pk) | 47.25 | 74.00 | -26.75 |
| | | | 7320(Av) | 35.13 | 54.00 | -18.87 |
| | | Horizontal | 2440(Pk) | 105.38 | - | - |
| | | | 2440(Av) | 92.73 | - | - |
| | | | 4880(Pk) | 44.34 | 74.00 | -29.66 |
| | | | 4880(Av) | 31.27 | 54.00 | -22.73 |
| | 2480 | Vertical | 7320(Pk) | 47.67 | 74.00 | -26.33 |
| | | | 7320(Av) | 35.12 | 54.00 | -18.88 |
| | | | 2480(Pk) | 101.67 | - | - |
| | | | 2480(Av) | 89.72 | - | - |
| | | | 2483.5(Pk) | 54.98 | 74.00* | -19.02 |
| | | | 2483.5(Av) | 31.55 | 54.00* | -22.45 |
| | | | 4960(Pk) | 42.53 | 74.00 | -31.47 |
| | | | 4960(Av) | 29.30 | 54.00 | -24.70 |
| | | Horizontal | 7440(Pk) | 47.58 | 74.00 | -26.42 |
| | | | 7440(Av) | 35.34 | 54.00 | -18.66 |
| 2480(Pk) | | | 108.47 | - | - | |
| 2480(Av) | | | 96.52 | - | - | |
| 2483.5(Pk) | | | 61.51 | 74.00* | -12.49 | |
| 2483.5(Av) | | | 37.35 | 54.00* | -16.65 | |
| 2480 | Horizontal | 4960(Pk) | 49.62 | 74.00 | -24.38 | |
| | | 4960(Av) | 35.43 | 54.00 | -18.57 | |
| | | 7440(Pk) | 48.13 | 74.00 | -25.87 | |
| | | 7440(Av) | 35.62 | 54.00 | -18.38 | |

* : Indicate restricted band of operation §15.205
 - : Fundamental Frequency
 Pk: Peak Detector; Av: Average Detector

| Data rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|
| 2 | 2402 | 2390(Pk) | Vertical | 36.63 | 74.00* | -37.37 |
| | | 2390(Av) | | 25.02 | 54.00* | -28.98 |
| | | 2402(Pk) | | 99.81 | - | - |
| | | 2402(Av) | | 92.89 | - | - |
| | | 4804(Pk) | | 41.27 | 74.00 | -32.73 |
| | | 4804(Av) | | 29.49 | 54.00 | -24.51 |
| | | 7206(Pk) | | 46.77 | 74.00 | -27.23 |
| | | 7206(Av) | | 35.10 | 54.00 | -18.90 |
| | | 2390(Pk) | | Horizontal | 38.48 | 74.00* |
| | | 2390(Av) | 26.32 | | 54.00* | -27.68 |
| | | 2402(Pk) | 104.57 | | - | - |
| | | 2402(Av) | 97.67 | | - | - |
| | | 4804(Pk) | 42.21 | | 74.00 | -31.79 |
| | | 4804(Av) | 29.96 | | 54.00 | -24.04 |
| | | 7206(Pk) | 47.30 | | 74.00 | -26.70 |
| | | 7206(Av) | 35.11 | | 54.00 | -18.89 |
| | | 2440(Pk) | Vertical | | 103.08 | - |
| | | 2440(Av) | | 96.43 | - | - |
| | 4880(Pk) | 42.29 | | 74.00 | -31.71 | |
| | 4880(Av) | 29.52 | | 54.00 | -24.48 | |
| | 7320(Pk) | 47.55 | | 74.00 | -26.45 | |
| | 7320(Av) | 35.14 | | 54.00 | -18.86 | |
| | 2440(Pk) | Horizontal | 107.54 | - | - | |
| | 2440(Av) | | 100.90 | - | - | |
| | 4880(Pk) | | 44.41 | 74.00 | -29.59 | |
| | 4880(Av) | | 33.14 | 54.00 | -20.86 | |
| | 7320(Pk) | | 47.42 | 74.00 | -26.58 | |
| | 7320(Av) | | 35.17 | 54.00 | -18.83 | |
| | 2480(Pk) | Vertical | 100.83 | - | - | |
| | 2480(Av) | | 94.64 | - | - | |
| | 2483.5(Pk) | | 52.77 | 74.00* | -21.23 | |
| | 2483.5(Av) | | 35.46 | 54.00* | -18.54 | |
| | 4960(Pk) | | 42.02 | 74.00 | -31.98 | |
| | 4960(Av) | | 29.38 | 54.00 | -24.62 | |
| | 7440(Pk) | | 47.61 | 74.00 | -26.39 | |
| | 7440(Av) | | 35.52 | 54.00 | -18.48 | |
| 2480(Pk) | Horizontal | 107.39 | - | - | | |
| 2480(Av) | | 101.20 | - | - | | |
| 2483.5(Pk) | | 59.42 | 74.00* | -14.58 | | |
| 2483.5(Av) | | 41.38 | 54.00* | -12.62 | | |
| 4960(Pk) | | 48.29 | 74.00 | -25.71 | | |
| 4960(Av) | | 38.65 | 54.00 | -15.35 | | |
| 7440(Pk) | | 48.85 | 74.00 | -25.15 | | |
| 7440(Av) | | 36.05 | 54.00 | -17.95 | | |

* : Indicate restricted band of operation §15.205
 - : Fundamental Frequency
 Pk: Peak Detector; Av: Average Detector

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| Data Rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) | |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|---|
| 3 | 2402 | 2390(Pk) | Vertical | 37.50 | 74.00* | -36.50 | |
| | | 2390(Av) | | 24.99 | 54.00* | -29.01 | |
| | | 2402(Pk) | | 100.22 | - | - | |
| | | 2402(Av) | | 94.51 | - | - | |
| | | 4804(Pk) | | 41.44 | 74.00 | -32.56 | |
| | | 4804(Av) | | 29.59 | 54.00 | -24.41 | |
| | | 7206(Pk) | | 47.75 | 74.00 | -26.25 | |
| | | 7206(Av) | | 35.29 | 54.00 | -18.71 | |
| | | 2390(Pk) | Horizontal | 39.80 | 74.00* | -34.20 | |
| | | 2390(Av) | | 26.38 | 54.00* | -27.62 | |
| | | 2402(Pk) | | 105.23 | - | - | |
| | | 2402(Av) | | 99.55 | - | - | |
| | | 4804(Pk) | | 41.85 | 74.00 | -32.15 | |
| | | 4804(Av) | | 30.25 | 54.00 | -23.75 | |
| | | 7206(Pk) | | 47.12 | 74.00 | -26.88 | |
| | | 7206(Av) | | 35.20 | 54.00 | -18.80 | |
| | | 2440(Pk) | Vertical | 2440(Pk) | 103.32 | - | - |
| | | 2440(Av) | | 97.81 | - | - | |
| | | 4880(Pk) | | 41.62 | 74.00 | -32.38 | |
| | | 4880(Av) | | 29.53 | 54.00 | -24.47 | |
| | | 7320(Pk) | | 47.48 | 74.00 | -26.52 | |
| | | 7320(Av) | | 35.12 | 54.00 | -18.88 | |
| | | 2440(Pk) | Horizontal | 2440(Pk) | 108.07 | - | - |
| | | 2440(Av) | | 102.55 | - | - | |
| | 4880(Pk) | 43.96 | | 74.00 | -30.04 | | |
| | 4880(Av) | 32.61 | | 54.00 | -21.39 | | |
| | 7320(Pk) | 47.29 | | 74.00 | -26.71 | | |
| | 7320(Av) | 35.15 | | 54.00 | -18.85 | | |
| | 2480(Pk) | Vertical | 2480(Pk) | 100.87 | - | - | |
| | 2480(Av) | | 95.84 | - | - | | |
| | 2483.5(Pk) | | 54.43 | 74.00* | -19.57 | | |
| | 2483.5(Av) | | 36.64 | 54.00* | -17.36 | | |
| | 4960(Pk) | | 41.81 | 74.00 | -32.19 | | |
| | 4960(Av) | | 30.45 | 54.00 | -23.55 | | |
| | 7440(Pk) | | 48.09 | 74.00 | -25.91 | | |
| | 7440(Av) | | 36.13 | 54.00 | -17.87 | | |
| | 2480(Pk) | | Horizontal | 2480(Pk) | 107.36 | - | - |
| | 2480(Av) | | | 102.35 | - | - | |
| | 2483.5(Pk) | | | 60.44 | 74.00* | -13.56 | |
| | 2483.5(Av) | | | 42.84 | 54.00* | -11.16 | |
| | 4960(Pk) | 47.90 | | 74.00 | -26.10 | | |
| | 4960(Av) | 38.93 | | 54.00 | -15.07 | | |
| | 7440(Pk) | 47.33 | 74.00 | -26.67 | | | |
| | 7440(Av) | 35.55 | 54.00 | -18.45 | | | |

* : Indicate restricted band of operation §15.205
- : Fundamental Frequency
Pk: Peak Detector; Av: Average Detector

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Antenna Type: FPA3020-10A (PCB/Flex) MIMO Antenna Results

| Data Rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|
| 1 | 2402 | 2390(Pk) | Vertical | 37.37 | 74.00* | -36.63 |
| | | 2390(Av) | | 24.95 | 54.00* | -29.05 |
| | | 2402(Pk) | | 103.15 | - | - |
| | | 2402(Av) | | 90.22 | - | - |
| | | 4804(Pk) | | 41.51 | 74.00 | -32.49 |
| | | 4804(Av) | | 29.61 | 54.00 | -24.39 |
| | | 7206(Pk) | | 48.22 | 74.00 | -25.78 |
| | | 7206(Av) | | 35.28 | 54.00 | -18.72 |
| | | 2390(Pk) | Horizontal | 39.22 | 74.00* | -34.78 |
| | | 2390(Av) | | 26.20 | 54.00* | -27.80 |
| | | 2402(Pk) | | 106.30 | - | - |
| | | 2402(Av) | | 93.36 | - | - |
| | | 4804(Pk) | | 41.93 | 74.00 | -32.07 |
| | | 4804(Av) | | 29.68 | 54.00 | -24.32 |
| | | 7206(Pk) | | 48.05 | 74.00 | -25.95 |
| | | 7206(Av) | | 35.25 | 54.00 | -18.75 |
| | 2440 | Vertical | 2440(Pk) | 106.28 | - | - |
| | | | 2440(Av) | 93.81 | - | - |
| | | | 4880(Pk) | 41.63 | 74.00 | -32.37 |
| | | | 4880(Av) | 29.88 | 54.00 | -24.12 |
| | | | 7320(Pk) | 46.94 | 74.00 | -27.06 |
| | | 7320(Av) | 35.39 | 54.00 | -18.61 | |
| | | Horizontal | 2440(Pk) | 107.35 | - | - |
| | | | 2440(Av) | 94.85 | - | - |
| | | | 4880(Pk) | 45.01 | 74.00 | -28.99 |
| | | | 4880(Av) | 32.39 | 54.00 | -21.61 |
| | 7320(Pk) | | 46.67 | 74.00 | -27.33 | |
| | 7320(Av) | 35.34 | 54.00 | -18.66 | | |
| | 2480 | Vertical | 2480(Pk) | 104.41 | - | - |
| | | | 2480(Av) | 92.44 | - | - |
| | | | 2483.5(Pk) | 57.61 | 74.00* | -16.39 |
| | | | 2483.5(Av) | 33.39 | 54.00* | -20.61 |
| | | | 4960(Pk) | 43.24 | 74.00 | -30.76 |
| | | | 4960(Av) | 30.28 | 54.00 | -23.72 |
| | | | 7440(Pk) | 50.78 | 74.00 | -23.22 |
| | | | 7440(Av) | 36.60 | 54.00 | -17.40 |
| Horizontal | | 2480(Pk) | 105.98 | - | - | |
| | | 2480(Av) | 94.02 | - | - | |
| | | 2483.5(Pk) | 59.01 | 74.00* | -14.99 | |
| | | 2483.5(Av) | 34.57 | 54.00* | -19.43 | |
| | | 4960(Pk) | 47.63 | 74.00 | -26.37 | |
| | | 4960(Av) | 34.72 | 54.00 | -19.28 | |
| | | 7440(Pk) | 47.04 | 74.00 | -26.96 | |
| | | 7440(Av) | 35.47 | 54.00 | -18.53 | |

* : Indicate restricted band of operation §15.205
 - : Fundamental Frequency
 Pk: Peak Detector; Av: Average Detector

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| Data Rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) | |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|--------|
| 2 | 2402 | 2390(Pk) | Vertical | 37.69 | 74.00* | -36.31 | |
| | | 2390(Av) | | 25.00 | 54.00* | -29.00 | |
| | | 2402(Pk) | | 102.77 | - | - | |
| | | 2402(Av) | | 95.82 | - | - | |
| | | 4804(Pk) | | 42.09 | 74.00 | -31.91 | |
| | | 4804(Av) | | 29.72 | 54.00 | -24.28 | |
| | | 7206(Pk) | | 47.63 | 74.00 | -26.37 | |
| | | 7206(Av) | | 35.30 | 54.00 | -18.70 | |
| | | 2390(Pk) | | Horizontal | 38.21 | 74.00* | -35.79 |
| | | 2390(Av) | 26.34 | | 54.00* | -27.66 | |
| | | 2402(Pk) | 105.77 | | - | - | |
| | | 2402(Av) | 98.87 | | - | - | |
| | | 4804(Pk) | 42.09 | | 74.00 | -31.91 | |
| | | 4804(Av) | 29.90 | | 54.00 | -24.10 | |
| | | 7206(Pk) | 47.22 | | 74.00 | -26.78 | |
| | | 7206(Av) | 35.30 | | 54.00 | -18.70 | |
| | | 2440 | Vertical | | 2440(Pk) | 105.81 | - |
| | | | | 2440(Av) | 99.27 | - | - |
| | 4880(Pk) | | | 42.56 | 74.00 | -31.44 | |
| | 4880(Av) | | | 30.15 | 54.00 | -23.85 | |
| | 7320(Pk) | | | 47.28 | 74.00 | -26.72 | |
| | 7320(Av) | | | 35.45 | 54.00 | -18.55 | |
| | Horizontal | | 2440(Pk) | 107.72 | - | - | |
| | | | 2440(Av) | 101.23 | - | - | |
| | | | 4880(Pk) | 43.25 | 74.00 | -30.75 | |
| | | | 4880(Av) | 30.96 | 54.00 | -23.04 | |
| | | | 7320(Pk) | 47.28 | 74.00 | -26.72 | |
| | | | 7320(Av) | 35.34 | 54.00 | -18.66 | |
| | 2480 | Vertical | 2480(Pk) | 104.10 | - | - | |
| | | | 2480(Av) | 98.07 | - | - | |
| | | | 2483.5(Pk) | 56.82 | 74.00* | -17.18 | |
| | | | 2483.5(Av) | 38.53 | 54.00* | -15.47 | |
| | | | 4960(Pk) | 43.47 | 74.00 | -30.53 | |
| | | | 4960(Av) | 30.49 | 54.00 | -23.51 | |
| | | | 7440(Pk) | 49.62 | 74.00 | -24.38 | |
| | | | 7440(Av) | 38.38 | 54.00 | -15.62 | |
| Horizontal | | 2480(Pk) | 105.61 | - | - | | |
| | | 2480(Av) | 99.56 | - | - | | |
| | | 2483.5(Pk) | 58.07 | 74.00* | -15.93 | | |
| | | 2483.5(Av) | 39.76 | 54.00* | -14.24 | | |
| | | 4960(Pk) | 42.76 | 74.00 | -31.24 | | |
| | | 4960(Av) | 30.28 | 54.00 | -23.72 | | |
| 7440(Pk) | 47.10 | 74.00 | -26.90 | | | | |
| 7440(Av) | 35.56 | 54.00 | -18.44 | | | | |

* : Indicate restricted band of operation §15.205
 - : Fundamental Frequency
 Pk: Peak Detector; Av: Average Detector

| Data Rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Measured Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|----------------------------|----------------|-------------|
| 3 | 2402 | 2390(Pk) | Vertical | 37.63 | 74.00* | -36.37 |
| | | 2390(Av) | | 25.05 | 54.00* | -28.95 |
| | | 2402(Pk) | | 102.46 | - | - |
| | | 2402(Av) | | 96.63 | - | - |
| | | 4804(Pk) | | 41.67 | 74.00 | -32.33 |
| | | 4804(Av) | | 29.64 | 54.00 | -24.36 |
| | | 7206(Pk) | | 48.44 | 74.00 | -25.56 |
| | | 7206(Av) | | 35.25 | 54.00 | -18.75 |
| | | 2390(Pk) | Horizontal | 39.13 | 74.00* | -34.87 |
| | | 2390(Av) | | 26.36 | 54.00* | -27.64 |
| | | 2402(Pk) | | 105.27 | - | - |
| | | 2402(Av) | | 99.45 | - | - |
| | | 4804(Pk) | | 41.41 | 74.00 | -32.59 |
| | | 4804(Av) | | 29.80 | 54.00 | -24.20 |
| | | 7206(Pk) | | 47.46 | 74.00 | -26.54 |
| | | 7206(Av) | | 35.27 | 54.00 | -18.73 |
| | 2440 | Vertical | 2440(Pk) | 105.62 | - | - |
| | | | 2440(Av) | 100.22 | - | - |
| | | | 4880(Pk) | 42.64 | 74.00 | -31.36 |
| | | | 4880(Av) | 30.06 | 54.00 | -23.94 |
| | | | 7320(Pk) | 47.78 | 74.00 | -26.22 |
| | | 7320(Av) | 35.50 | 54.00 | -18.50 | |
| | | Horizontal | 2440(Pk) | 107.46 | - | - |
| | | | 2440(Av) | 102.01 | - | - |
| | | | 4880(Pk) | 41.41 | 74.00 | -32.59 |
| | | | 4880(Av) | 30.02 | 54.00 | -23.98 |
| | 7320(Pk) | | 47.00 | 74.00 | -27.00 | |
| | 7320(Av) | 35.29 | 54.00 | -18.71 | | |
| | 2480 | Vertical | 2480(Pk) | 103.88 | - | - |
| | | | 2480(Av) | 99.05 | - | - |
| | | | 2483.5(Pk) | 57.77 | 74.00* | -16.23 |
| | | | 2483.5(Av) | 40.40 | 54.00* | -13.60 |
| | | | 4960(Pk) | 41.95 | 74.00 | -32.05 |
| | | | 4960(Av) | 30.46 | 54.00 | -23.54 |
| | | | 7440(Pk) | 50.49 | 74.00 | -23.51 |
| | | | 7440(Av) | 38.05 | 54.00 | -15.95 |
| Horizontal | | 2480(Pk) | 105.57 | - | - | |
| | | 2480(Av) | 100.74 | - | - | |
| | | 2483.5(Pk) | 59.25 | 74.00* | -14.75 | |
| | | 2483.5(Av) | 41.96 | 54.00* | -12.04 | |
| | | 4960(Pk) | 43.43 | 74.00 | -30.57 | |
| | | 4960(Av) | 31.99 | 54.00 | -22.01 | |
| 7440(Pk) | 47.08 | 74.00 | -26.92 | | | |
| 7440(Av) | 35.36 | 54.00 | -18.64 | | | |

* : Indicate restricted band of operation §15.205
- : Fundamental Frequency
Pk: Peak Detector; Av: Average Detector

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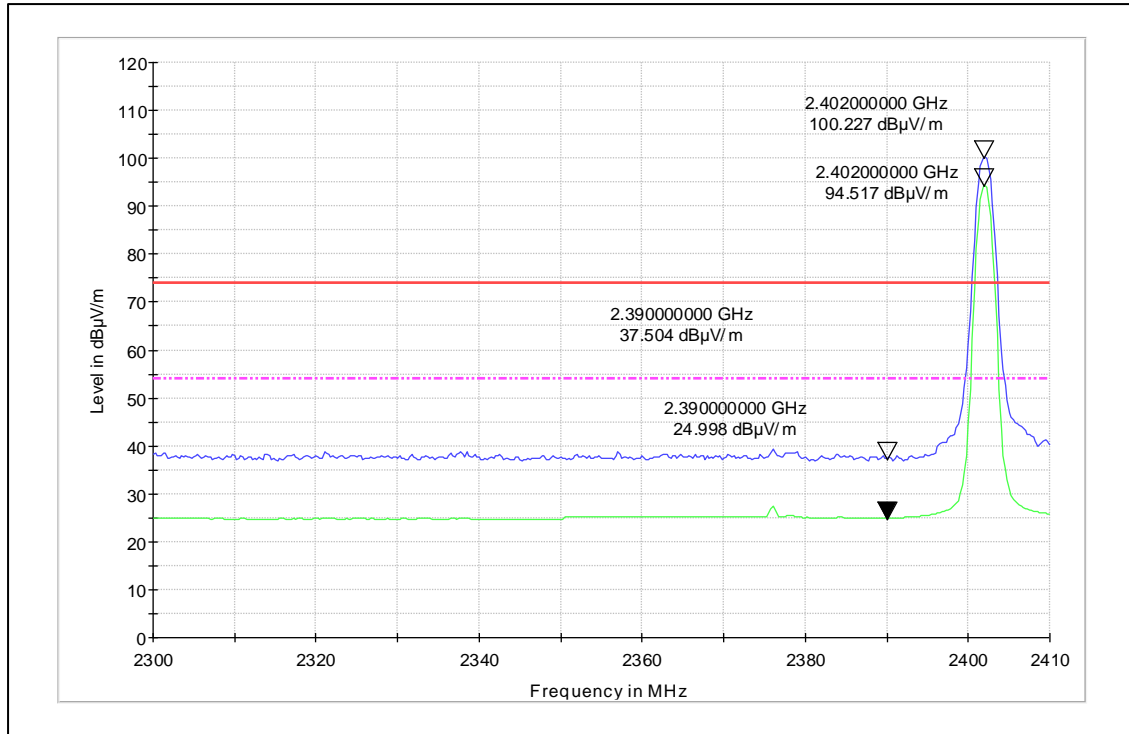
Simultaneous Operation:

Combination of Wi-Fi 2.4GHz and Bluetooth 2.4GHz:

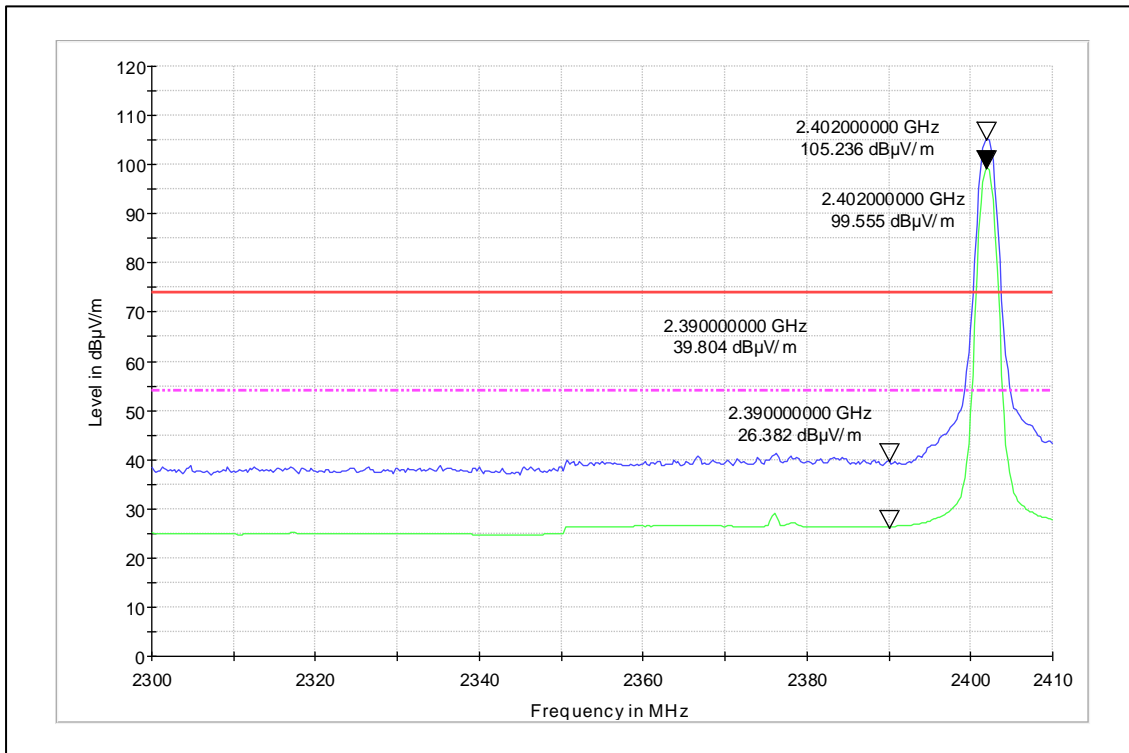
| Data Rate (Mbps) | Channel Frequency (MHz) | Measured Frequency (MHz) | Antenna Polarization | Emission (dBµV/m) | Limit (dBµV/m) | Margin (dB) |
|------------------|-------------------------|--------------------------|----------------------|-------------------|----------------|-------------|
| 1 | 2412 | 4824(Pk) | Vertical | 50.33 | 74 | -23.67 |
| | | 4824(Av) | | 46.97 | 54 | -7.03 |
| | | 7236(Pk) | | 49.24 | 74 | -24.76 |
| | | 7236(Av) | | 38.40 | 54 | -15.60 |
| | 2480 | 4960(Pk) | | 55.77 | 74 | -18.23 |
| | | 4960(Av) | | 43.79 | 54 | -10.21 |
| | | 7440(Pk) | | 48.56 | 74 | -25.44 |
| | | 7440(Av) | | 35.42 | 54 | -18.58 |
| | 2412 | 4824(Pk) | Horizontal | 42.96 | 74 | -31.04 |
| | | 4824(Av) | | 34.18 | 54 | -19.82 |
| | | 7236(Pk) | | 47.52 | 74 | -26.48 |
| | | 7236(Av) | | 34.35 | 54 | -19.65 |
| | 2480 | 4960(Pk) | | 40.51 | 74 | -33.49 |
| | | 4960(Av) | | 30.30 | 54 | -23.70 |
| | | 7440(Pk) | | 46.39 | 74 | -27.61 |
| | | 7440(Av) | | 34.32 | 54 | -19.68 |

Worst Case Plots Reported

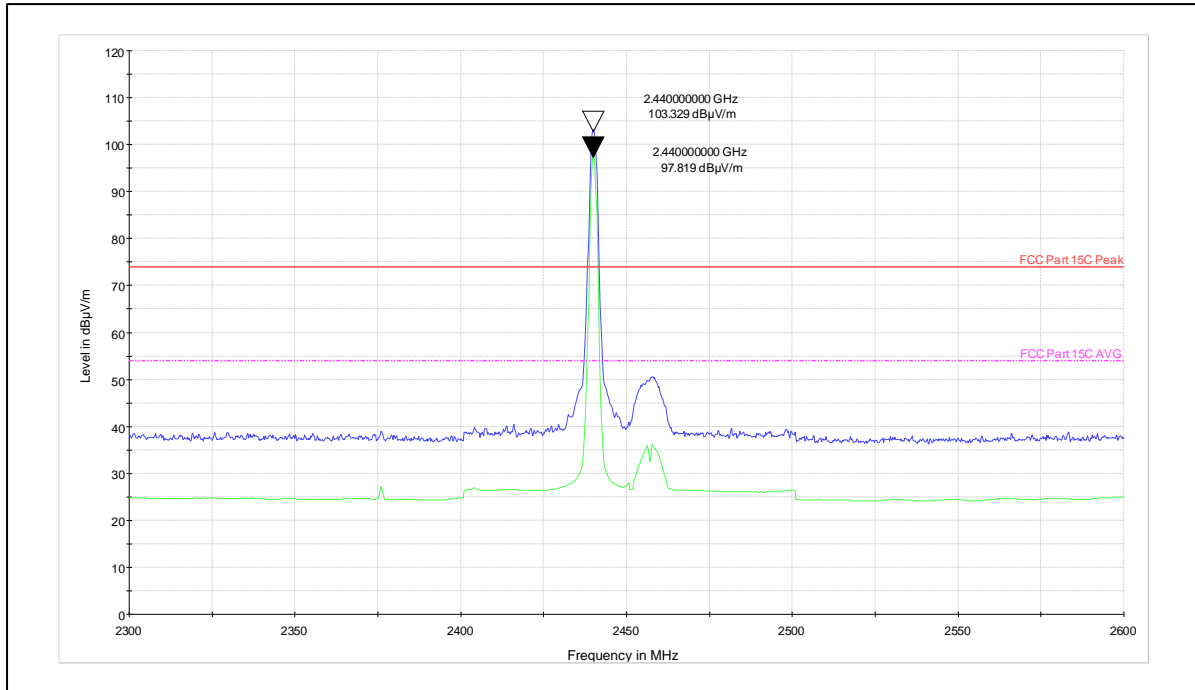
Channel Frequency -2402MHz_Veritical Polarization



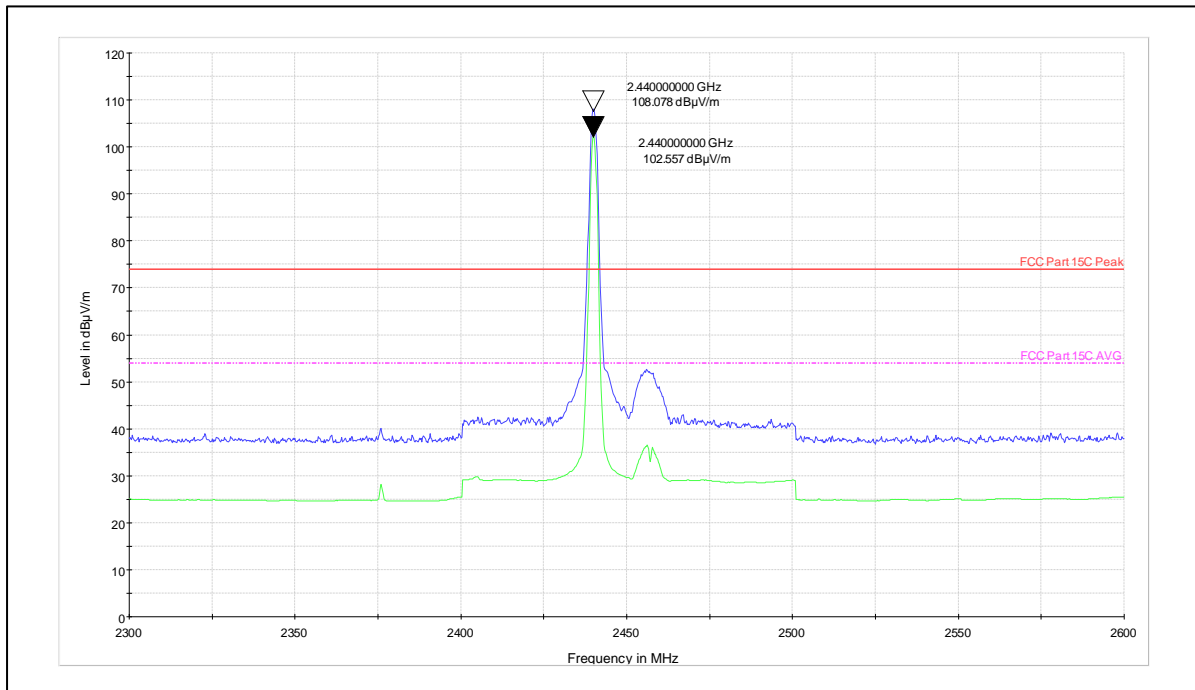
Channel Frequency -2440MHz_Horizontal Polarization



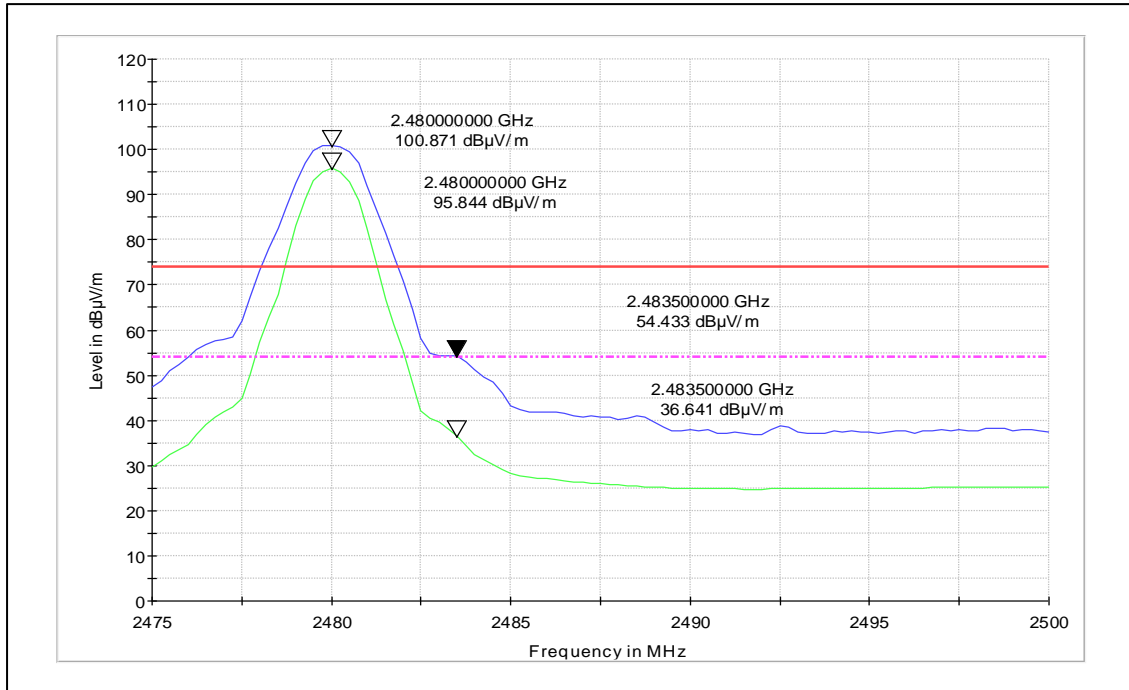
Channel Frequency -2440MHz_Vertical Polarization



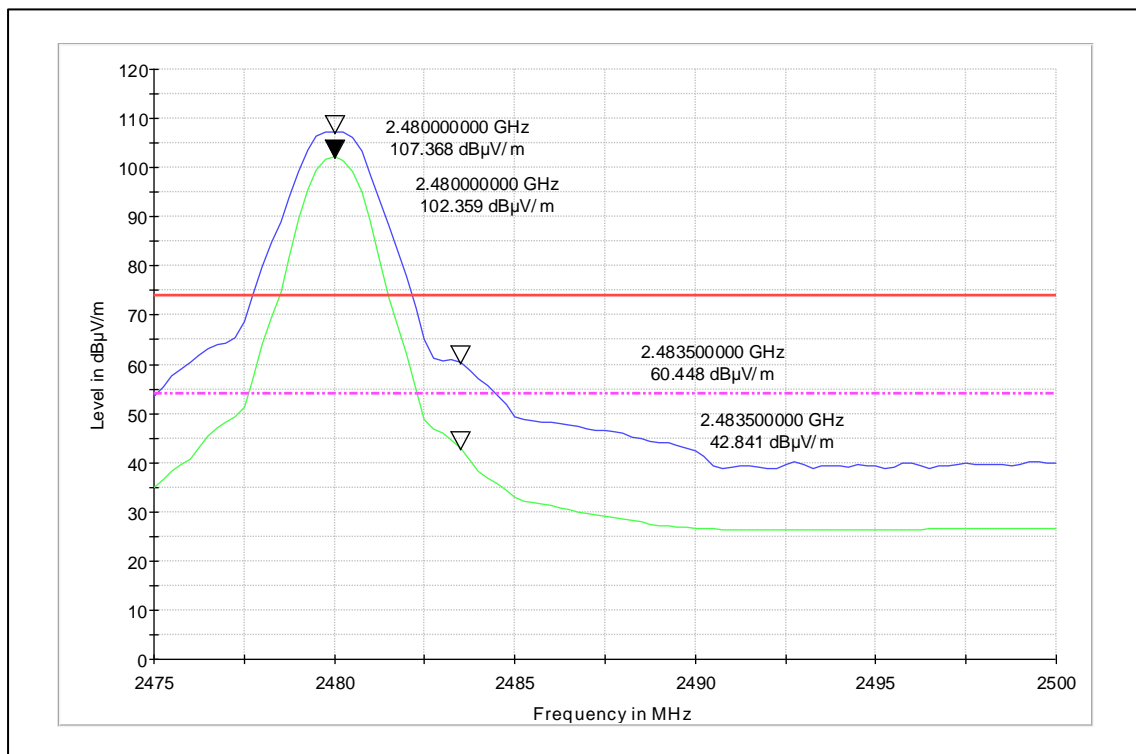
Channel Frequency -2440MHz_Horizontal Polarization



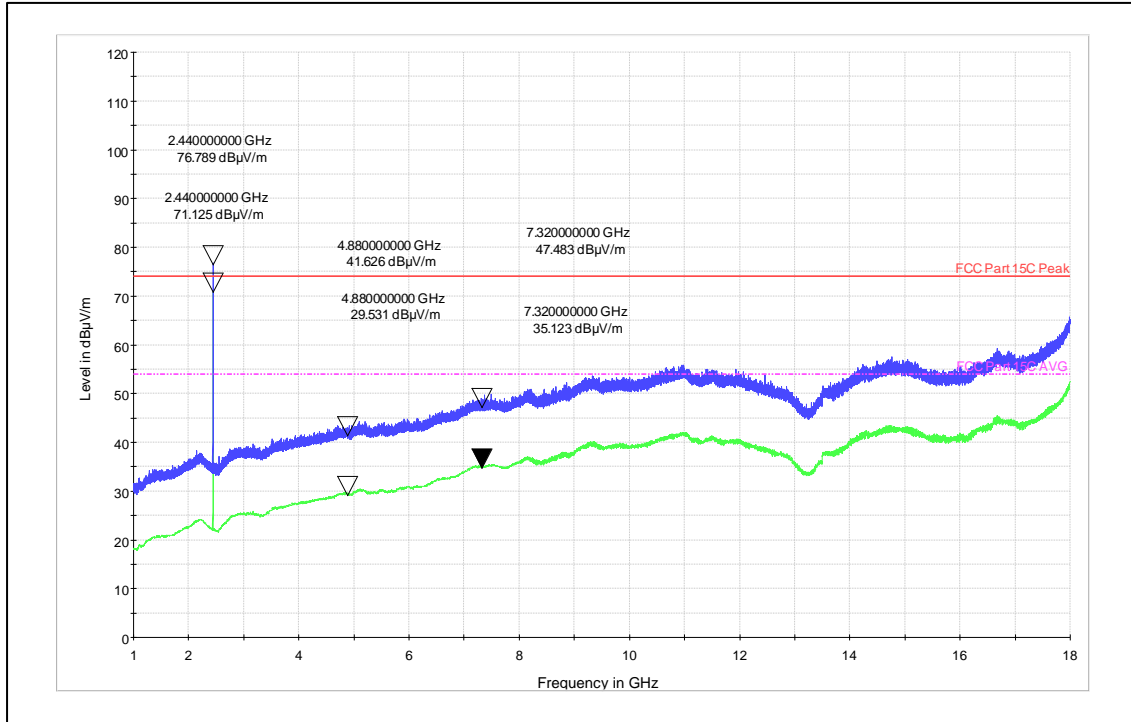
Channel Frequency -2480MHz_Vertical Polarization



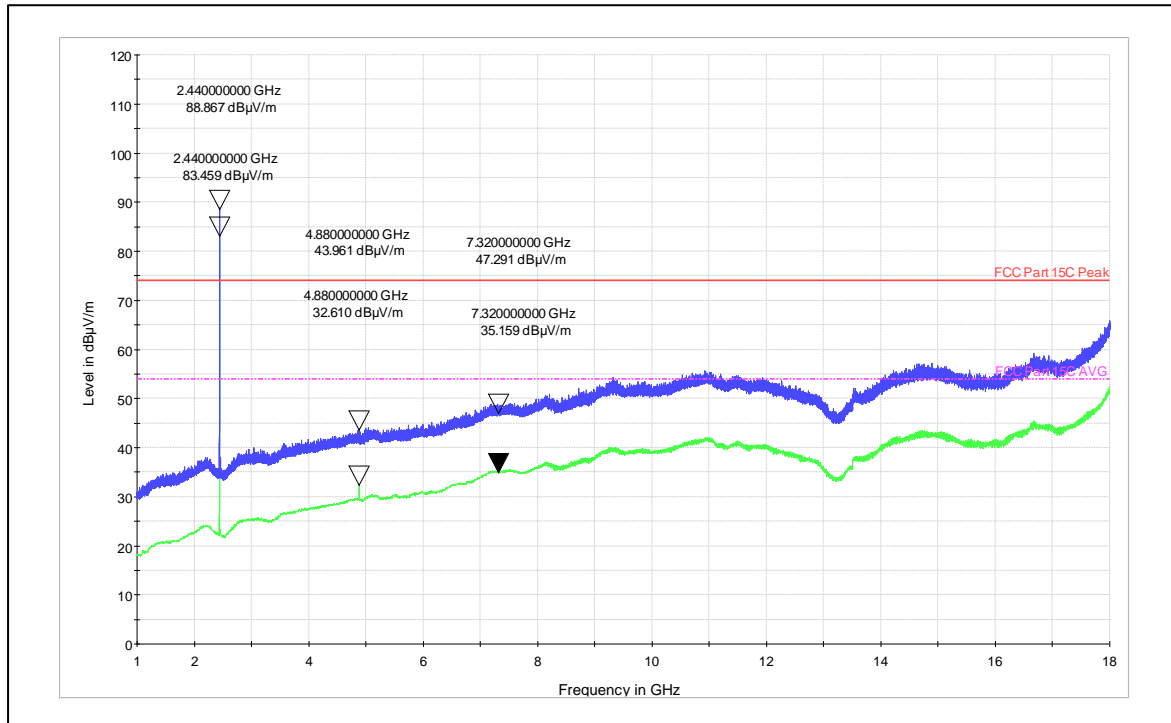
Channel Frequency -2480MHz_Horizontal Polarization



Channel Frequency -2440MHz_Vertical Polarization _1-18GHz

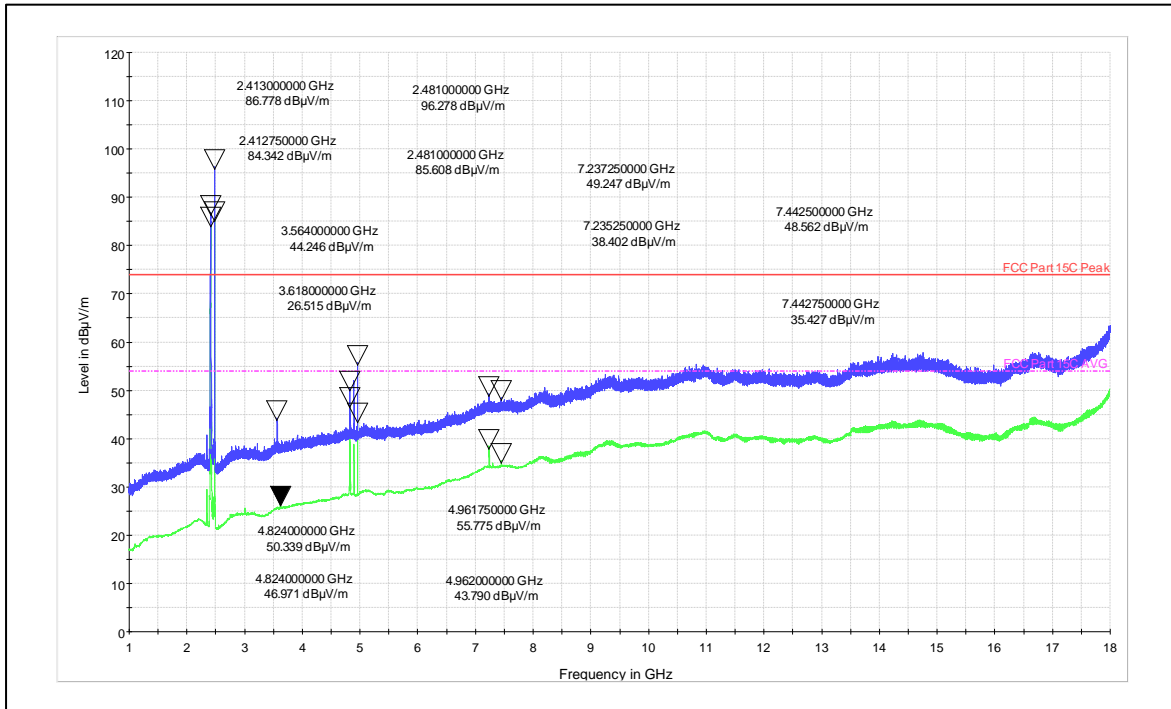


Channel Frequency-2440MHz_Horizontal Polarization _1-18GHz

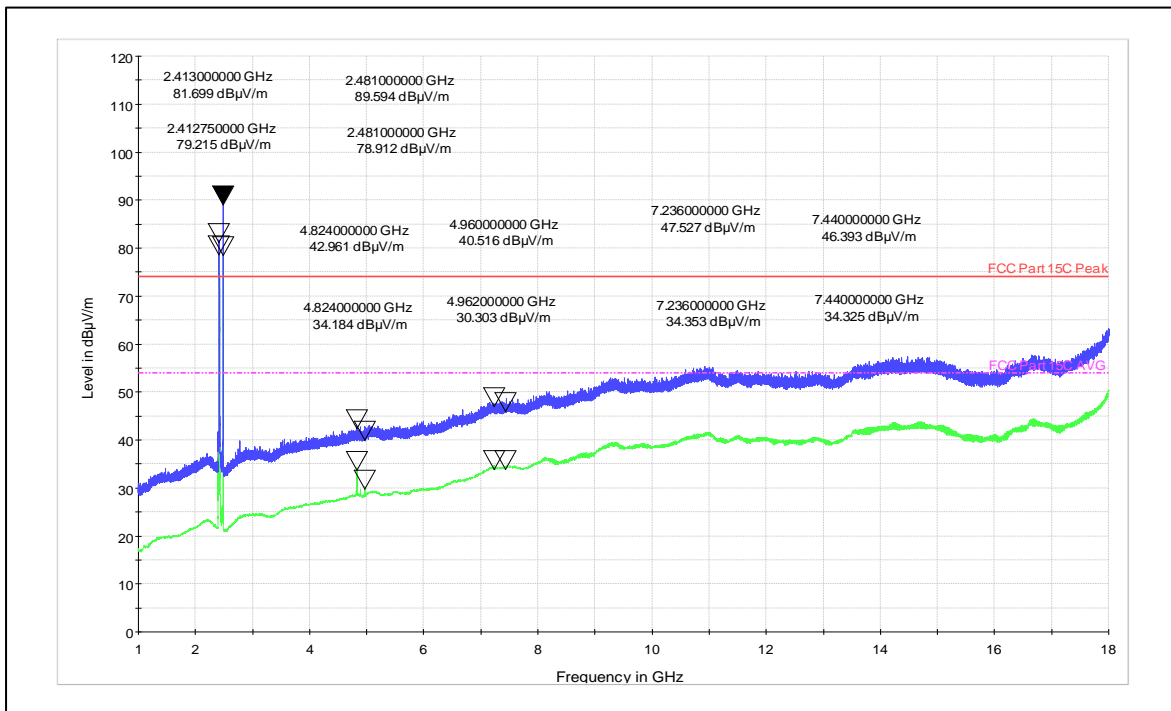


Simultaneous Operation:

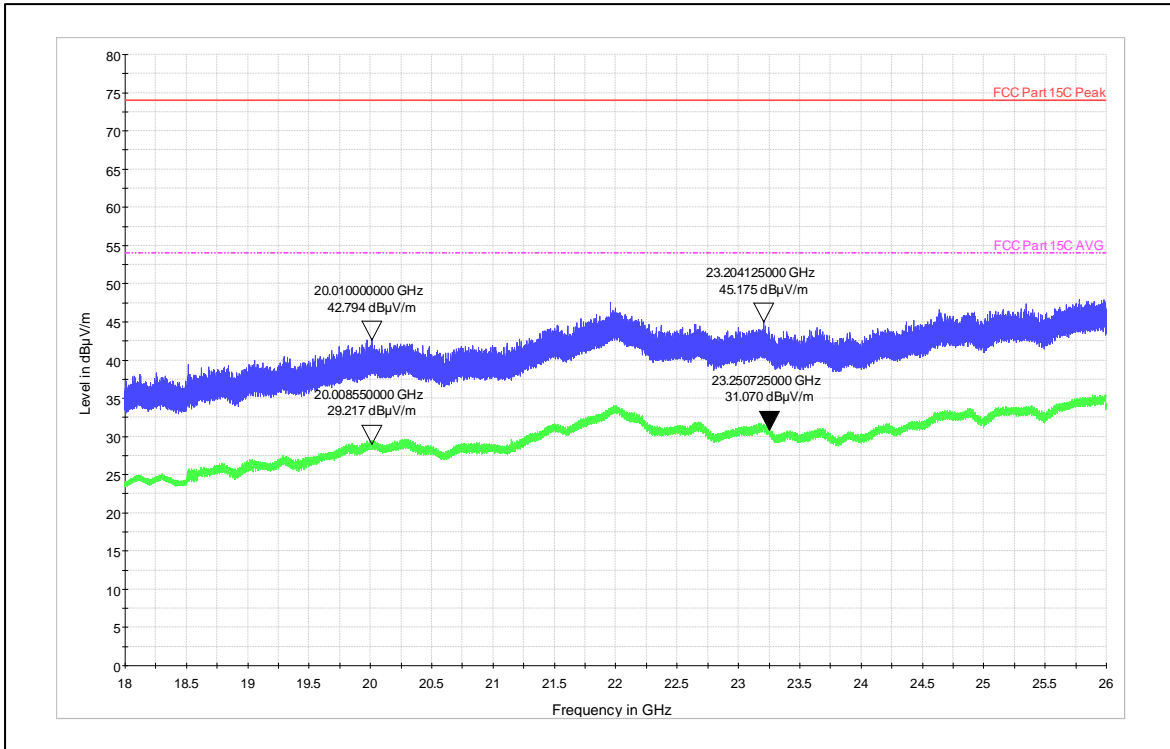
Combination of Wi-Fi 2.4GHz and Bluetooth 2.4GHz:



Channel Frequency -2412MHz and Channel Frequency 2480MHz _Vertical Polarization _1-18GHz

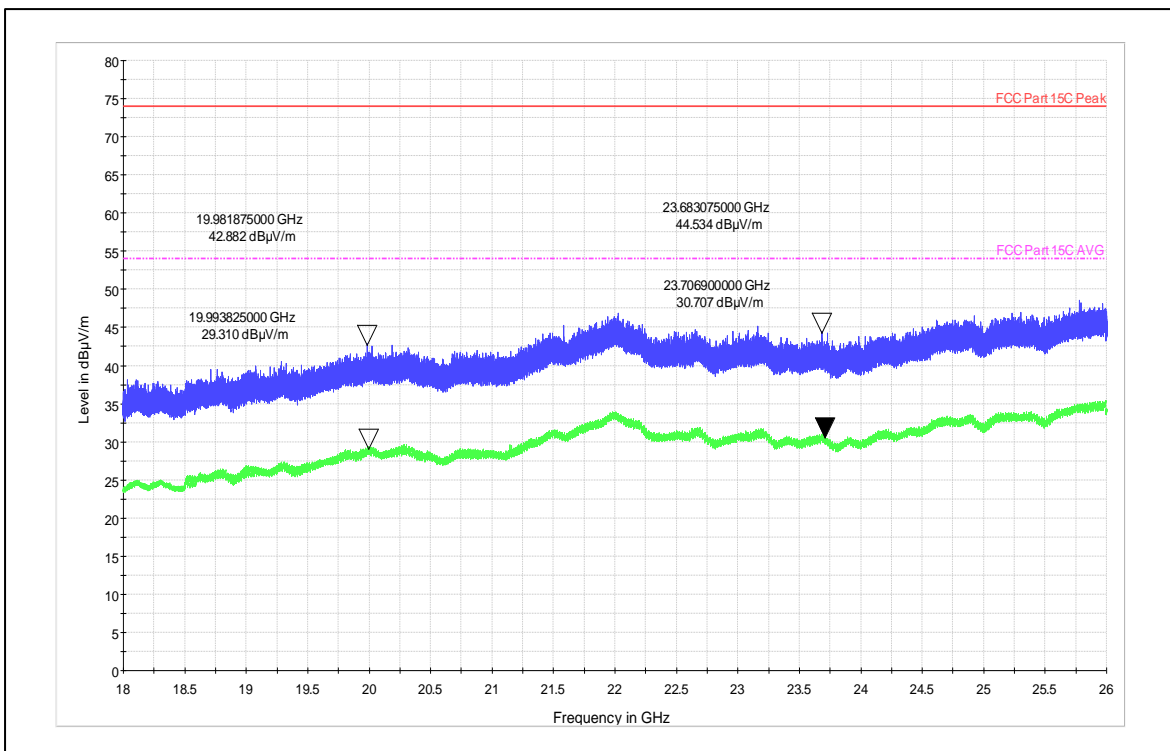


Channel Frequency -2412MHz and Channel Frequency 2480MHz_Horizontal Polarization _1-18GHz



Frequency Range: 18 - 40 GHz

Polarization: Vertical



Frequency Range: 18 - 40 GHz

Polarization: Horizontal

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8 Conducted Spurious Emission Test on AC Power Line

Result

Pass

Test Specification : FCC Part 15 Section 15.207 / RSS Gen Issue 5 Section 8.8
 Test Method : ANSI C 63.10-2013
 Testing Location : Screened room
 Measurement Bandwidth : 9kHz
 Frequency Range : 150kHz – 30MHz
 Supply Voltage : 110VAC,60Hz
 Test Method : Refer TEST METHODOLOGY

Limits of section 15.207

| Frequency of emission (MHz) | QP Limit (dBµV) | AV Limit (dBµV) |
|--------------------------------|--------------------|--------------------|
| 0.15 – 0.5 | 66 – 56* | 56 – 46* |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |

* Decreases with the logarithm of the frequency

Test Conditions:

Normal Temperature = +24°C Voltage (V norm) = 110V AC (Through AC to DC Adapter) Relative Humidity = 64%

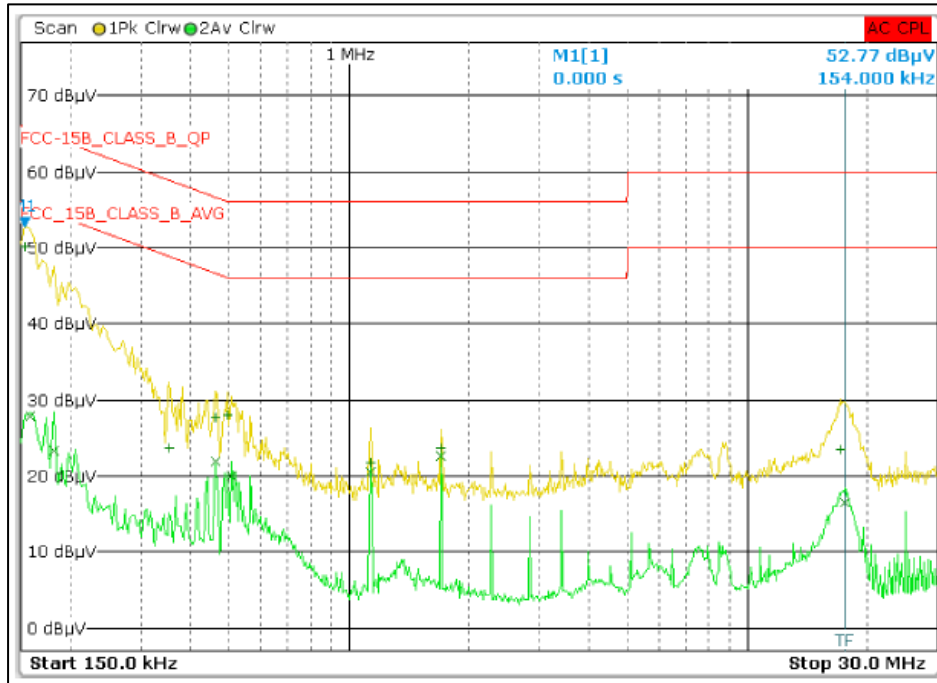
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Test result:

Power: 110V 60HZ_LINE

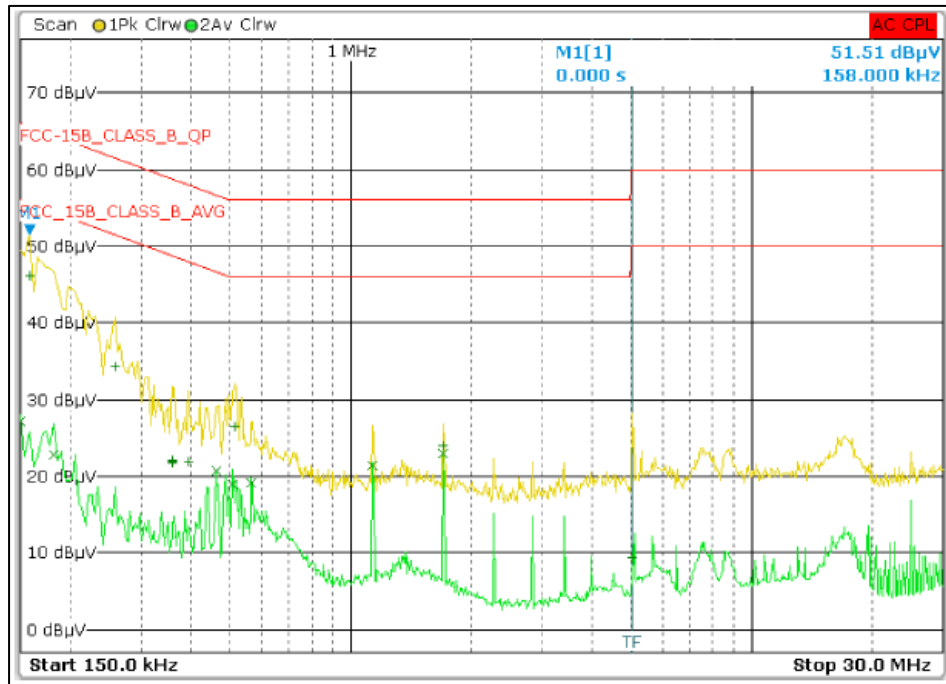


Line Graph

| Trace | Frequency | Level (dBµV) | Phase | Detector | Delta Limit/dB |
|-------|------------------|--------------|-------|------------|----------------|
| 1 | 154.00000000 kHz | 50.20 | | Quasi Peak | -15.58 |
| 2 | 1.70200000 MHz | 22.70 | | Average | -23.30 |
| 2 | 462.00000000 kHz | 21.96 | | Average | -24.70 |
| 2 | 1.13400000 MHz | 20.59 | | Average | -25.41 |
| 2 | 506.00000000 kHz | 19.96 | | Average | -26.04 |
| 2 | 158.00000000 kHz | 27.82 | | Average | -27.75 |
| 1 | 494.00000000 kHz | 27.97 | | Quasi Peak | -28.13 |
| 1 | 462.00000000 kHz | 27.73 | | Quasi Peak | -28.93 |
| 2 | 182.00000000 kHz | 23.32 | | Average | -31.07 |
| 1 | 1.70200000 MHz | 23.69 | | Quasi Peak | -32.31 |
| 2 | 17.55800000 MHz | 16.60 | | Average | -33.40 |
| 1 | 1.13400000 MHz | 21.83 | | Quasi Peak | -34.17 |
| 1 | 354.00000000 kHz | 23.74 | | Quasi Peak | -35.13 |
| 1 | 17.20600000 MHz | 23.44 | | Quasi Peak | -36.56 |

Line Table

Power: 110V60Hz_NEUTRAL



Neutral Graph

| Trace | Frequency | Level (dBµV) | Phase | Detector | Delta Limit/dB |
|-------|------------------|--------------|-------|------------|----------------|
| 1 | 158.00000000 kHz | 46.23 | | Quasi Peak | -19.34 |
| 2 | 1.70200000 MHz | 23.02 | | Average | -22.98 |
| 2 | 1.13400000 MHz | 21.40 | | Average | -24.60 |
| 2 | 462.00000000 kHz | 20.64 | | Average | -26.02 |
| 2 | 566.00000000 kHz | 19.17 | | Average | -26.83 |
| 2 | 506.00000000 kHz | 18.92 | | Average | -27.08 |
| 1 | 258.00000000 kHz | 34.31 | | Quasi Peak | -27.19 |
| 2 | 150.00000000 kHz | 27.21 | | Average | -28.79 |
| 1 | 514.00000000 kHz | 26.41 | | Quasi Peak | -29.59 |
| 2 | 182.00000000 kHz | 22.79 | | Average | -31.60 |
| 1 | 1.70200000 MHz | 24.01 | | Quasi Peak | -31.99 |
| 1 | 394.00000000 kHz | 21.96 | | Quasi Peak | -36.02 |
| 1 | 394.00000000 kHz | 21.90 | | Quasi Peak | -36.08 |
| 1 | 358.00000000 kHz | 22.14 | | Quasi Peak | -36.63 |
| 1 | 358.00000000 kHz | 21.94 | | Quasi Peak | -36.83 |
| 1 | 358.00000000 kHz | 21.68 | | Quasi Peak | -37.09 |
| 1 | 5.03400000 MHz | 9.29 | | Quasi Peak | -50.71 |

Neutral Table

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11 Power level used for testing

Bluetooth 2.4GHz

| Channel BandWidth | Data rate (Mbps) | Channels | MAF94367 (Omni Directional Antenna) | 1001932PT (Flex/PCB) Antenna | FPA3020-10A (Flex/PCB) Antenna |
|-------------------|------------------|----------|-------------------------------------|------------------------------|--------------------------------|
| 1MHz | 1 | Low | 16.5 | 16.5 | 16.5 |
| | | Mid | 16.5 | 16.5 | 16.5 |
| | | High | 16.5 | 16.5 | 16.5 |
| | 2 | Low | 14.0 | 14.0 | 14.0 |
| | | Mid | 14.0 | 14.0 | 14.0 |
| | | High | 14.0 | 14.0 | 14.0 |
| | 3 | Low | 14.0 | 14.0 | 14.0 |
| | | Mid | 14.0 | 14.0 | 14.0 |
| | | High | 14.0 | 14.0 | 14.0 |

*****END OF TEST REPORT*****