

Prüfbericht-Nr.: Test report no.:	IN26TZXI 001	Auftrags-Nr.: Order no.:	147196350 040	Seite 1 von 55 Page 1 of 55
Kunden-Referenz-Nr.: Client reference no.:	2131006	Auftragsdatum: Order date:	2026-04-24	
Auftraggeber: Client:	APTENER MECHATRONICS PRIVATE LIMITED No: R32, V N Arcade, I Floor, KSSIDC Industrial Estate, I Cross, Bommasandra, Industrial Area, II Phase, Jigani Link Road, Yarandahally, Circle, Bangalore, Karnataka, India ,560099			
Prüfgegenstand: Test item:	BLUARMOR C10			
Bezeichnung / Typ-Nr.: Identification / Type no.:	C10			
Auftrags-Inhalt: Order content:	Testing and issue of Test Report			
Prüfgrundlage: Test specification:	FCC Part15 SubpartC 15.247; 15.205; 15.209			
Wareneingangsdatum: Date of sample receipt:	2026-04-15			
Prüfmuster-Nr.: Test sample no:	A004250044-001 A004250044-005			
Prüfzeitraum: Testing period:	2026-04-25 - 2026-05-04			
Ort der Prüfung: Place of testing:	Wireless laboratory, Bangalore			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (India) Pvt.Ltd., 27/B, 2nd Cross, Electronic City Phase1 Bangalore -560 100, India			
Prüfergebnis*: Test result*:	Pass			
geprüft von: tested by:	genehmigt von: authorized by:			
Datum: Date: 2026-05-18	Ausstellungsdatum: Issue date: 2026-05-18			
Stellung / Position: Darshan D Senior Engineer	Stellung / Position: M.V.Naveen Kumar Senior Engineer			
Sonstiges / Other:	FCC ID:2BUSF-HI8763XXXX-01			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet * Legend: P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested				
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 above mentioned 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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- | | |
|---|--|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.</p> <p>Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p> |
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| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.</p> <p>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i></p> <p><i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p> |

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4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>
5	Other <i>Sonstiges</i> Test sample(s), as well sample information, description, product details and intended usage was provided by customer. The Laboratory is not be responsible for the information/data provided by the customer which can affect the validity of results.
6	Test sample obtaining <i>Prüfmusterbereitstellung</i> ☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ Others:
7	Additional Information FCC Test site registration number: 570793 ISED Test site registration number: 27711 Refer the Appendix of 1 for Test Setup Photos Refer the Appendix of 2 for External Photos Refer the Appendix of 3 for Internal Photos

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TEST SUMMARY

Test Item	FCC	Result
Maximum conducted (Peak) output power	15.247 (b)(3)	Pass
Maximum Power Spectral Density	FCC 15.247(e)	Pass
DTS Bandwidth & 99% Bandwidth	FCC 15.247(a)(2)	Pass
Emissions in non-restricted frequency bands	15.247 (d)	Pass
Spurious Radiated Emissions and Restricted Bands of Operation	15.247 (d) / FCC 15.209 / FCC 15.205	Pass
Antenna Requirement	FCC 15.203	Complied

Product Category: Electronics Testing

Test Discipline: EMC Test Facility

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REVISION HISTORY OF THIS REPORT

Report Number	Version	Description	Issue date
IN26TZXI 001	01	Initial issue of report	2026-05-18

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1 GENERAL REMARKS

1.1 Attachments

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

1. Test Setup Photos
2. External Photos
3. Internal Photos
4. FCC Label and Label Location
5. Block Diagram
6. Specification of EUT
7. Schematic Diagrams
8. Bill of Material
9. User Manual
10. Maximum Permissible Exposure Information

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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

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	103384	3.20.SP2	2026.11.20	Yearly	Radiated Spurious Emission
Loop Antenna	Schwarzbeck	FMZB 1519 B	1519B-00111	-	2026.11.17	Yearly	
Balun & Biconical Antenna	Schwarzbeck mess-elektronik	BBA 9106+VH BB 9124	9124-1117	-	2027.02.14	Yearly	
Log-Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP 9111B	9111B-324	-	2027.02.21	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-01944	-	2026.11.11	Yearly	
Double-Ridged Waveguide Horn Antenna	ETS	116706	00107323	-	2026.05.16	Yearly	
EMI Test Receiver	Rohde & Schwarz	ESW44	101773	1.72.SP1	2027.02.16	Yearly	
Semi Anechoic Chamber	Frankonia	-	-	-	-	-	
Fully Anechoic Chamber	Albatross	-	-	-	-	-	Conducted Test Parameters
Spectrum Analyzer	Agilent	E4407B	US411927 72	A.14.07	2027.01.16	Yearly	
10 dB RF Attenuator (DUT-1)	Rohde & Schwarz	-	-	-	2026.10.10	Yearly	

Table 2: Instrument application Software versions

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

3 GENERAL PRODUCT INFORMATION

3.1 Product Function and Intended Use

The BLUARMOR C10 is a wireless motorcycle helmet intercom designed for rider-to-rider and rider-to-passenger communication. It enables hands-free voice communication using Bluetooth Classic (BR/EDR) for phone calls and audio streaming, and Bluetooth Low Energy (BLE) for device configuration and control via a companion smartphone application. The device is intended to be mounted on motorcycle helmets and operated during riding. It supports connection to smartphones for music playback, GPS navigation audio, and phone calls via Bluetooth. The C10 is optimized for single-radio operation, providing reliable Bluetooth intercom and audio in a compact form factor.

3.2 Ratings and System Details of Equipment under Test

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

Protocol		BLE (Bluetooth Low Energy)
Operating Frequency Range		2402MHz to 2480MHz
Channel Spacing		2MHz
Measured output power (dBm)		18.51 dBm
Modulation		GFSK
Data Rate		1Mbps & 2Mbps
Number of antennas		1
Antenna Gain & Antenna Type		1.3dBi & Ceramic Chip Antenna
Antenna Part Number		Pulse Electronics W3008C, Ceramic Loaded PIFA
Supply Voltage to Product		3.7VDC through Battery
Environmental conditions	Operating Condition	0°C to +60°C
	Storage Condition	-20°C to +80°C
EUT Dimension		61 mm x 43 mm x 22 mm

***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.

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
RF output power, conducted	± 0.87 dB
Power Spectral Density, conducted	± 1.07 dB
Bandwidth, conducted	0.36 %
Unwanted Emissions, conducted	± 2.13 dB
All emissions, radiated	± 4.61 dB

4 TEST SET-UP AND OPERATION MODE

4.1 Principle of Configuration Selection

Transmission was enabled with highest possible duty cycle transmission on low, mid and high channel.

4.2 Test Operation and Test Software

Test Firmware:	C10_BUILD_RELEASE_V1.5.0.84
Software Name:	RTLBTAPP.exe
Hardware Name:	C10
Hardware revision:	1.1

4.3 Special Accessories and Auxiliary Equipment

- None

4.4 Simultaneous Transmission

- This product support Simultaneous transmission.

4.5 Countermeasures to achieve EMC Compliance

- None

4.6 List of frequencies

Frequency Band (MHz)	Channel No.	Channel Frequency (MHz)
2402 – 2480 BLE	0	2402
	1	2404
	2	2406
	3	2408
	:	:
	11	2424
	12	2426
	:	:
	19	2440
	20	2442
	:	:
	:	:
	:	:
	:	:
	36	2474
	37	2476
	38	2478
	39	2480

Table 5: List of BLE Centre frequencies

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Channel used for BLE testing.

Channel low: 2402MHz

Channel mid: 2440MHz

Channel high : 2480MHz

4.7 TUV Sample Identification

TUV Sample Identification number: A004250044-005- Radiated test Sample.
A004250044-001- Conducted test Sample

5 Operational Description

The C10 operates using a single radio subsystem in the 2.4 GHz ISM band (2.400–2.4835 GHz). The radio subsystem is a dual-mode Bluetooth Classic (BR/EDR) and BLE radio used for smartphone connectivity, audio streaming (A2DP), hands-free calling (HFP), remote control (AVRCP), and BLE-based device configuration. The subsystem uses frequency hopping spread spectrum (FHSS) per FCC §15.247. The device is powered by an internal rechargeable Li-ion battery with a regulated 5V DC supply rail. Audio input and output are handled via an integrated microphone and speaker housed within the helmet mount unit. Device configuration and firmware updates are performed via a companion smartphone application over BLE.

6 Test Methodology

6.1 Radiated Emission Test

The radiated emission measurement was performed according to the procedures in ANSI C63.10-2020. 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 Balloon and Biconical Antenna, and measurement 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

6.1.1 Test Setup Configuration

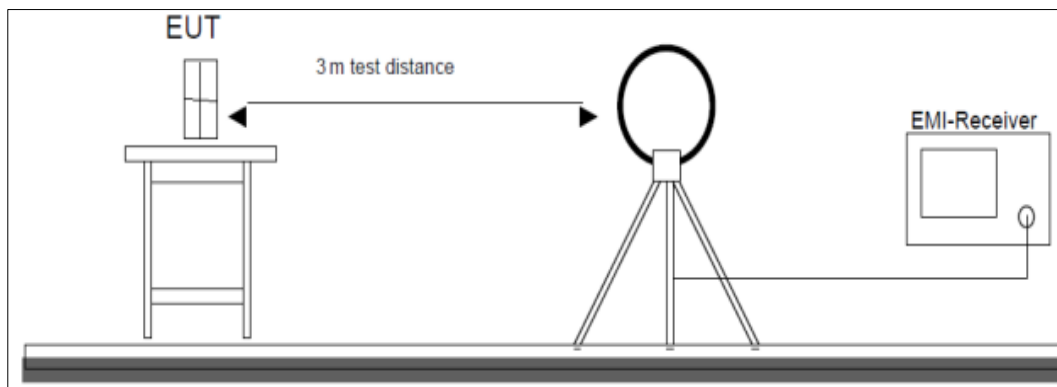


Figure 1: Frequency Range 9 kHz- 30 MHz

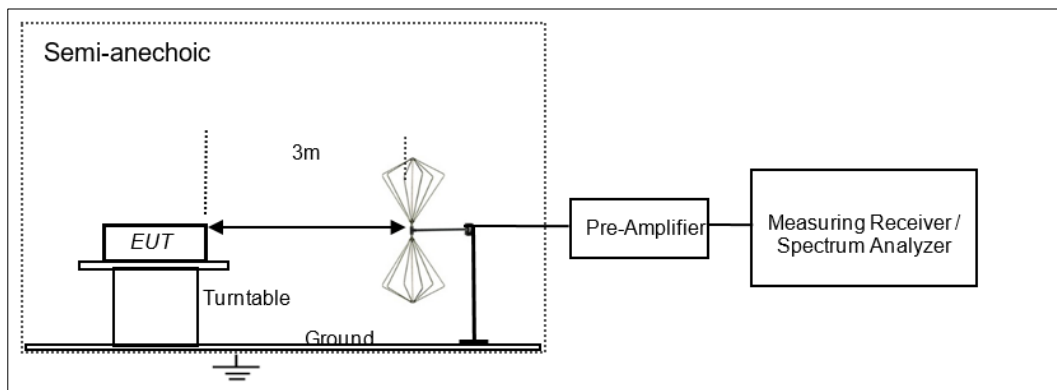


Figure 2: Frequency Range 30 MHz – 200 MHz

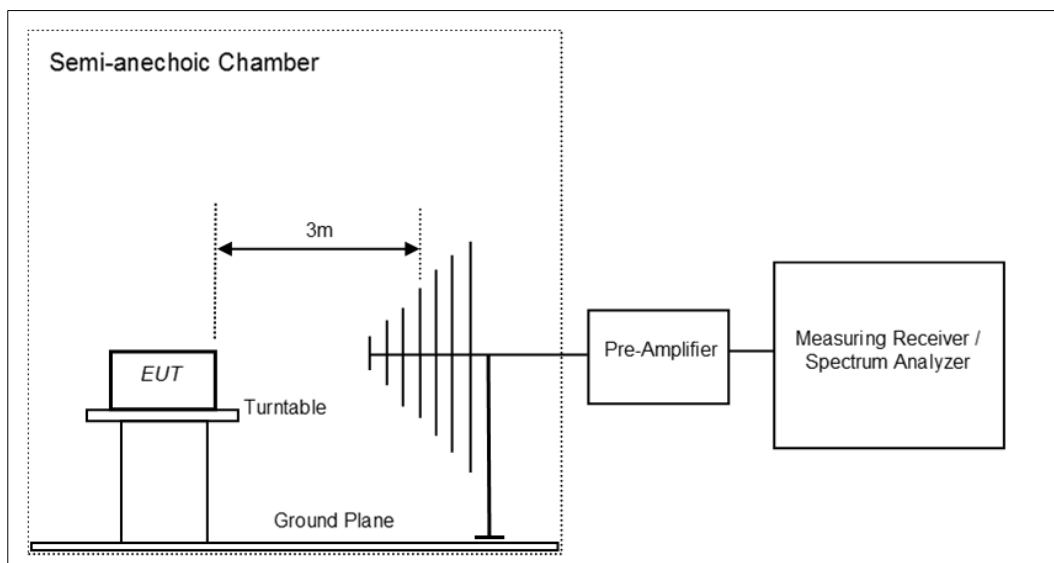


Figure 3: Frequency Range 200 MHz - 1GHz

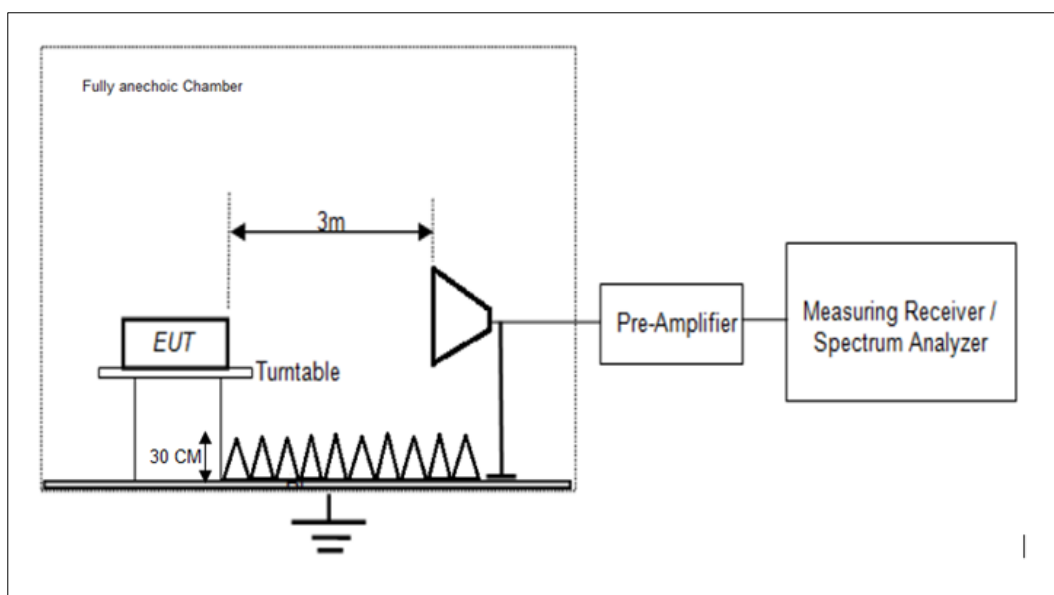
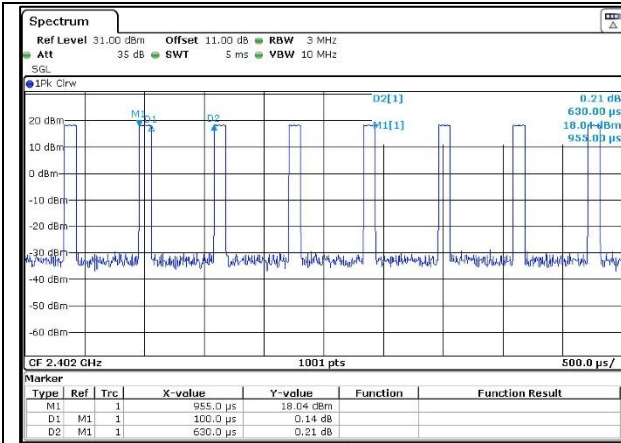


Figure 4: Frequency Range above 1 GHz

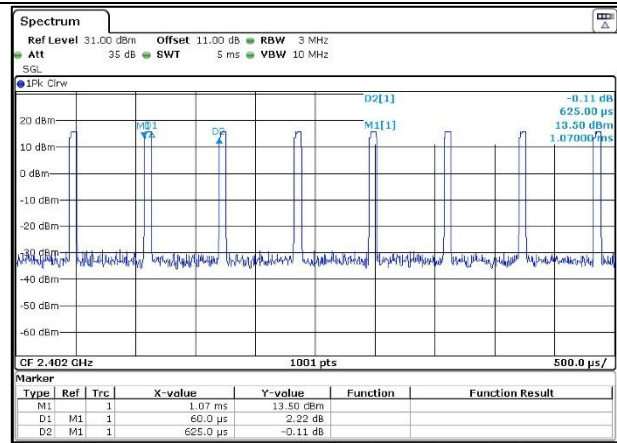
7 TEST RESULTS FOR BLE

7.1 DUTY CYCLE

Test Plot:



1Mbps



2Mbps

Duty Cycle Calculation:

Duty Cycle: On time/Total Period

Data Rate	1Mbps	On Time	100.00µSec
		Total Period	630.00µSec
		Duty Cycle	On Time ÷ Total Period
		Duty Cycle	0.1587
	2Mbps	Duty Cycle %	15.87
		On Time	60.00µSec
		Total Period	625µSec
		Duty Cycle	On Time ÷ Total Period
		Duty Cycle	0.096
		Duty Cycle %	9.60

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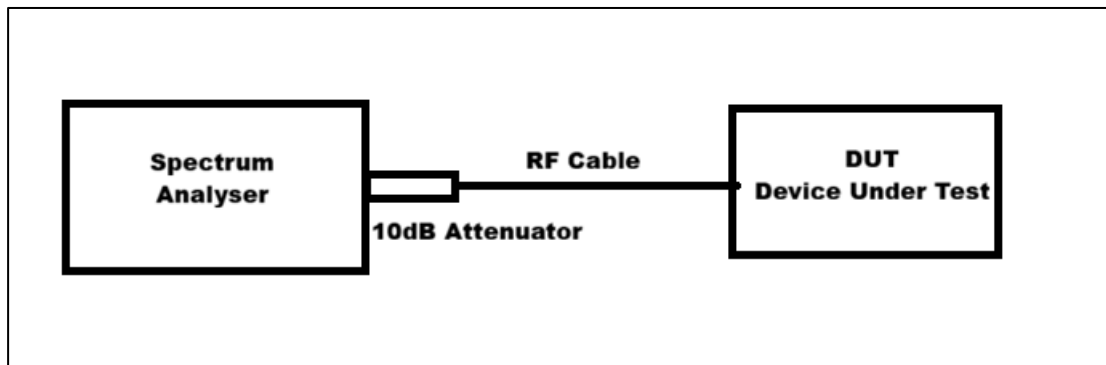
7.2 Maximum Peak Conducted Output Power

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (b)(3)
Test Method	Subclause 11.9.1.1 of ANSI C63.10:2020
Measurement Bandwidth	1MHz
Detector	Peak
Port of testing	Conducted mode
Requirement	Power $\leq$ 1 W (30 dBm)

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = +22.3°C

Voltage = 3.7VDC through Battery

Relative humidity: 58%

KDB Guidelines applied:

Measurements were made as per section 8.3.1.1 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

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Test results:

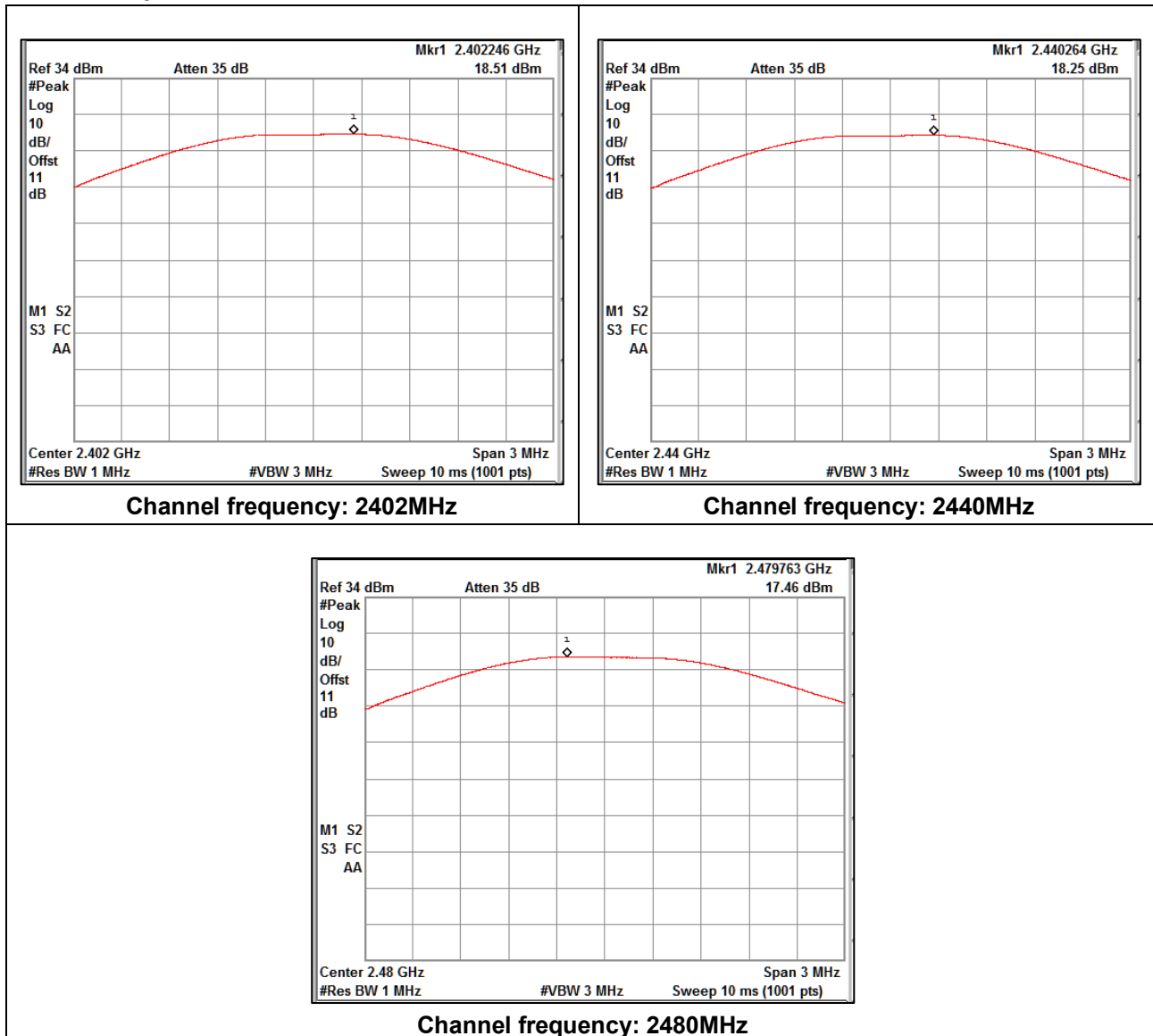
Note:

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) + Cable loss (0.8dB)
3. This product uses single antenna and gain of the antenna is 1.3 dBi

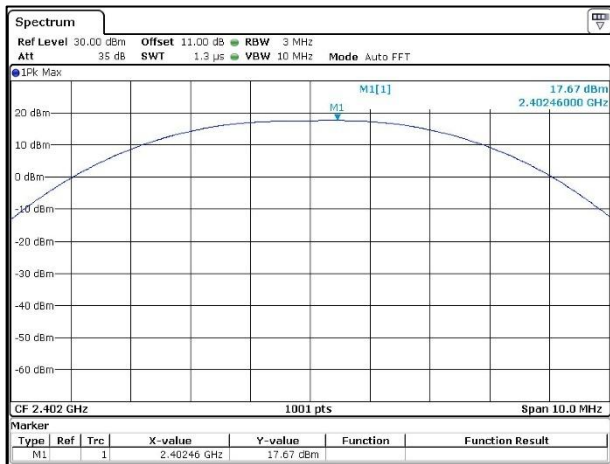
Data rate	Channel frequency	Measured Total Power (dBm)	Limit (dBm)
1 Mbps	2402.00	18.51	30.00
	2440.00	18.25	30.00
	2480.00	17.46	30.00
2 Mbps	2402.00	17.67	30.00
	2440.00	17.08	30.00
	2480.00	16.62	30.00

Test Plots:

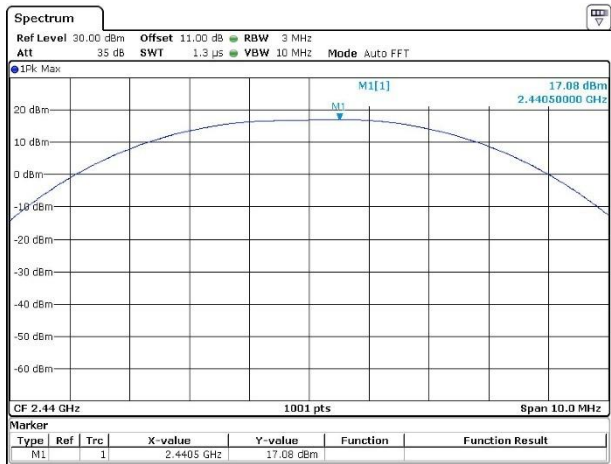
Data Rate: 1Mbps



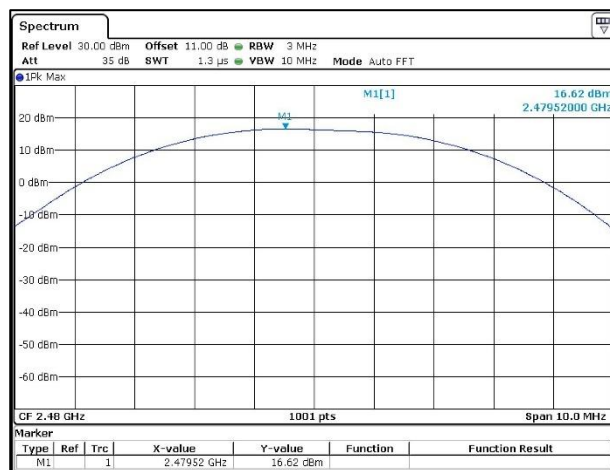
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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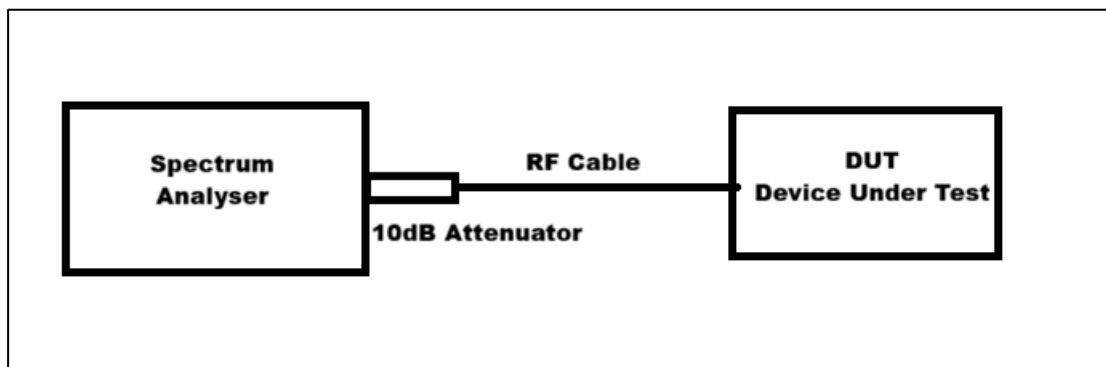
7.3 DTS Bandwidth & 99% Bandwidth

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (a) (2)
Test Method	Subclause 11.8.1 of ANSI C63.10:2020 for DTS Subclause 6.9.3 of ANSI C63.10:2020 for OBW
Measurement Bandwidth	100 kHz for DTS Bandwidth 1% to 5% of OBW
Detector	Peak
Port of testing	Conducted mode
Requirement	Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = +22.3°C Voltage = 3.7 VDC through Battery Relative humidity: 58%

KDB Guidelines applied:

Measurements were made as per section 8.2 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

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Test results:

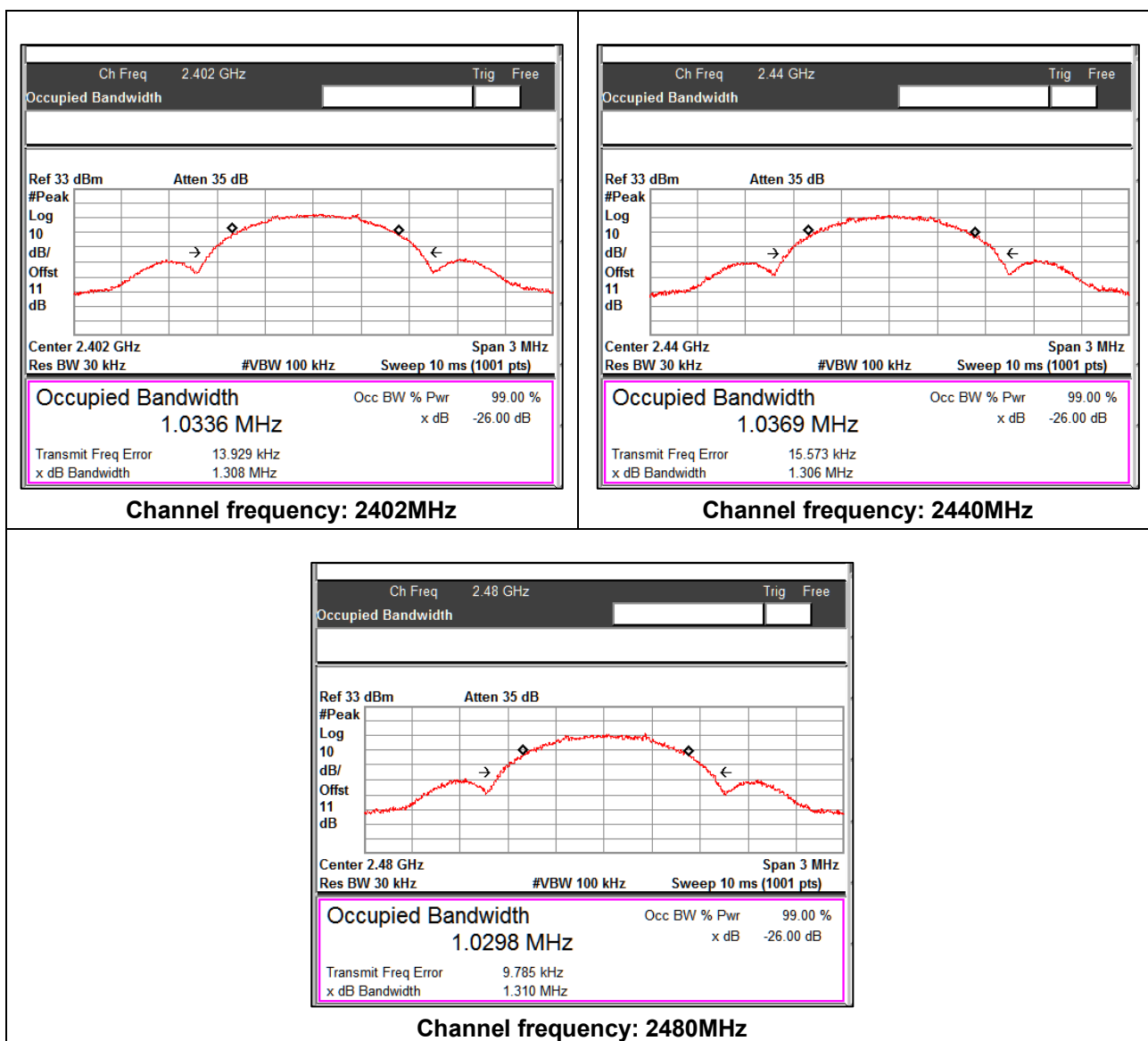
Note: All the losses are included during measurement and final values are mentioned in the test report.

Data rate	Channel frequency	99% BW (MHz)	6dB BW (MHz)	Limit (MHz)
1 Mbps	2402.00	1.03	0.71	0.50
	2440.00	1.03	0.71	0.50
	2480.00	1.02	0.72	0.50
2 Mbps	2402.00	2.06	1.41	0.50
	2440.00	2.06	1.37	0.50
	2480.00	2.07	1.40	0.50

Test Plots:

99% Bandwidth:

Data Rate: 1Mbps

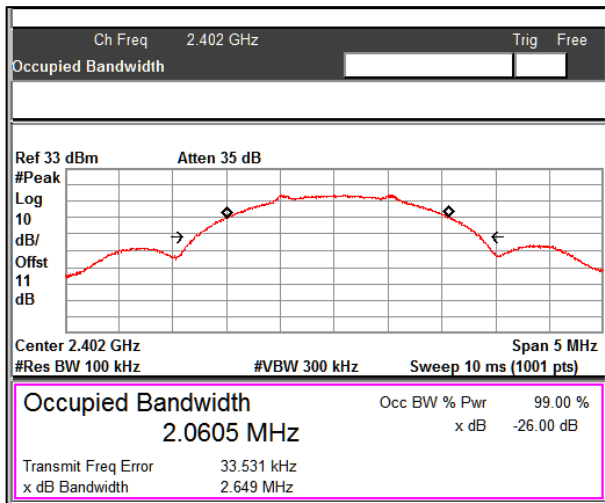


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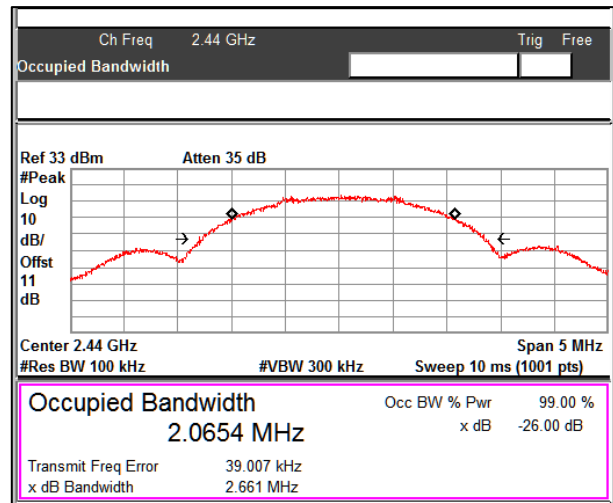
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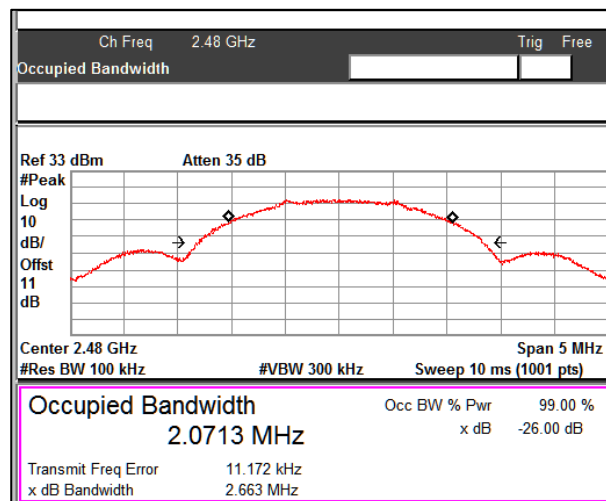
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



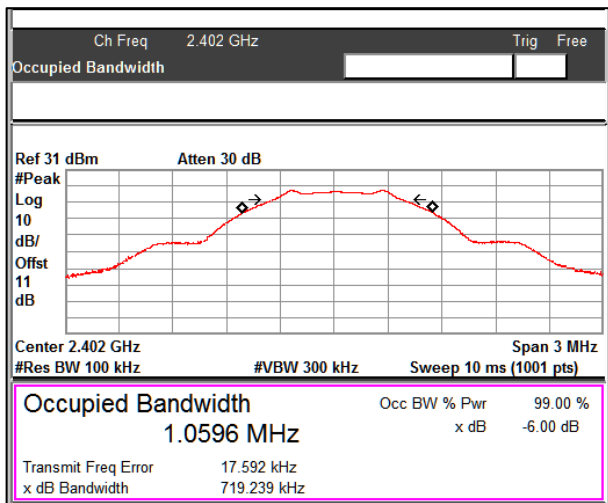
Channel frequency: 2480MHz

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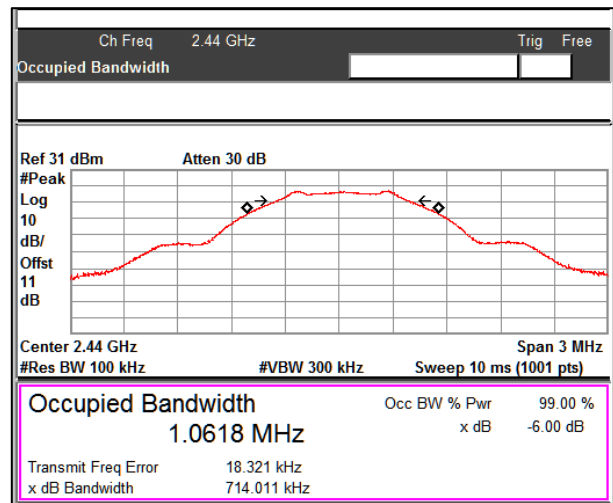
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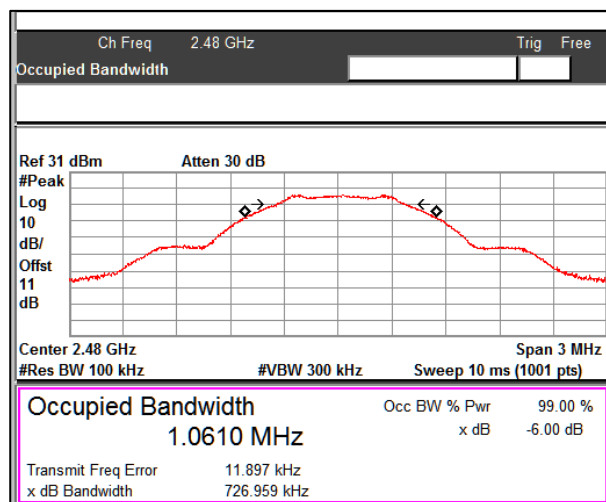
DTS Bandwidth:
Data Rate: 1Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



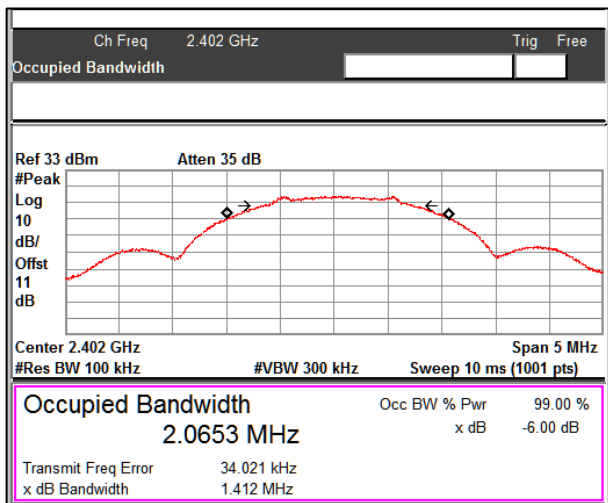
Channel frequency: 2480MHz

Prüfbericht - Nr.:
Test Report No.:

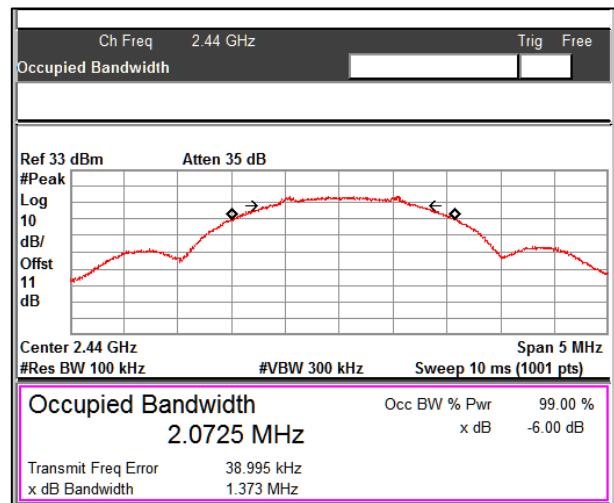
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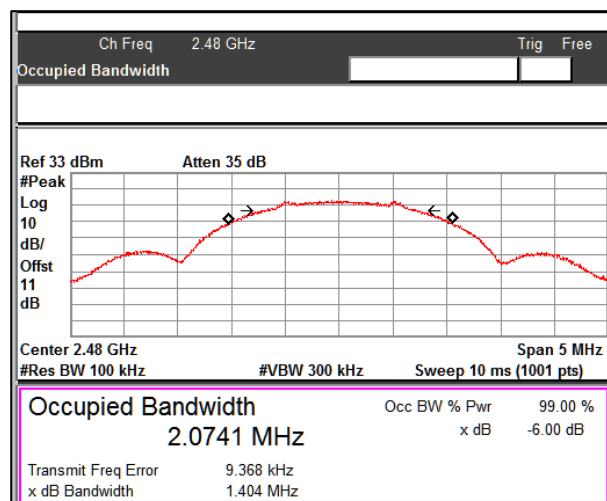
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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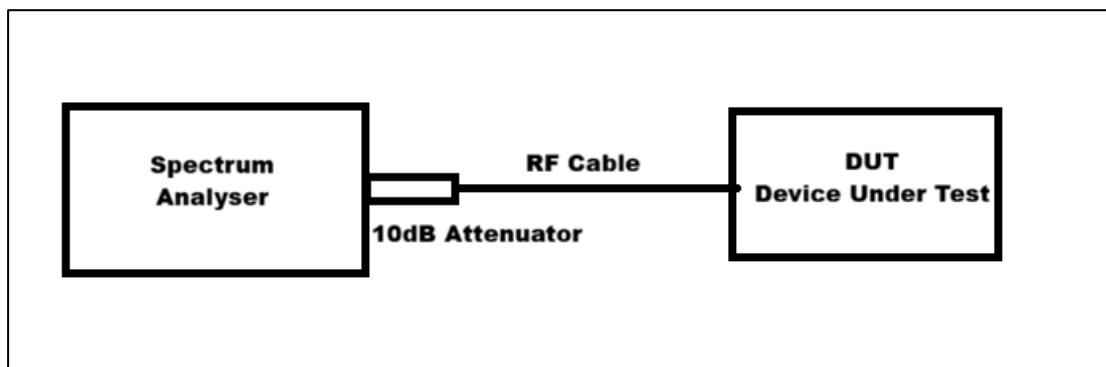
7.4 Power Spectral Density

Result

Pass

Test Specification	FCC Part 15 Subpart C Section 15.247 (e)
Test Method	Subclause 11.10.2 of ANSI C63.10:2020
Measurement Bandwidth	3 kHz
Detector	Peak
Port of testing	Conducted mode
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 100 kHz band during any time interval of continuous transmission.

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = +22.3°C Voltage = 3.7 VDC through Battery Relative humidity: 58%

KDB Guidelines applied:

Measurements were made as per section 8.4 in KDB 558074 D01 15.247 Measurement Guidance v05r02.

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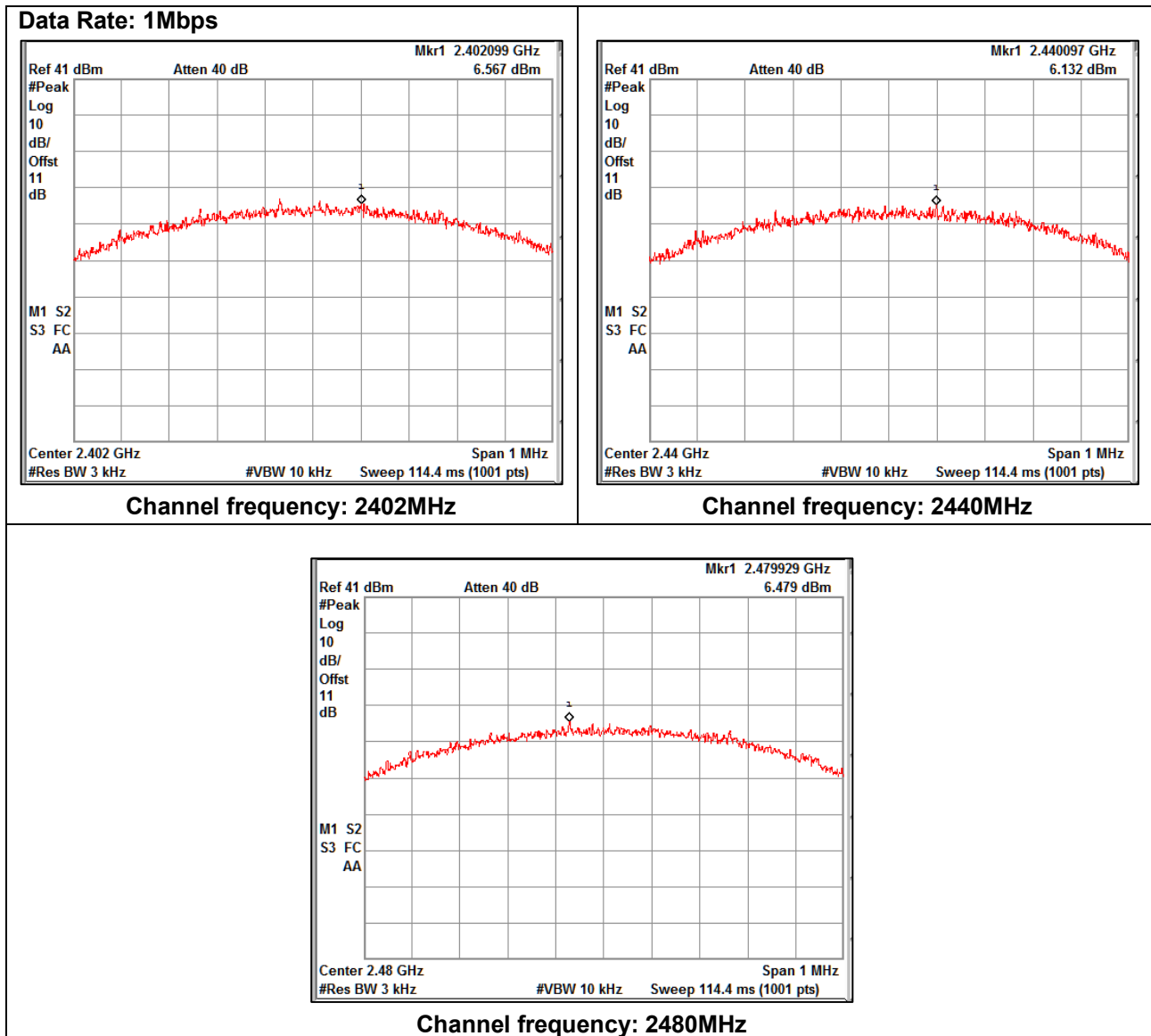
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Test results:

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

Data rate	Channel Frequency (MHz)	Measured PSD (dBm)	Limit (dBm in any 3kHz)
1 Mbps	2402.00	6.56	8.00
	2440.00	6.13	8.00
	2480.00	6.47	8.00
2 Mbps	2402.00	4.17	8.00
	2440.00	3.43	8.00
	2480.00	2.65	8.00

Test Plots:

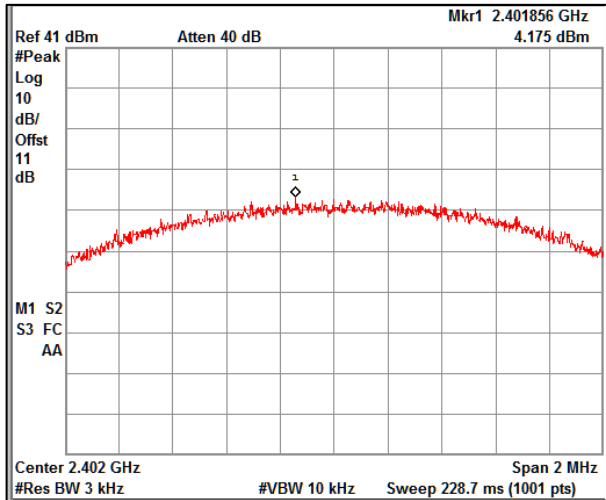


Prüfbericht - Nr.:
Test Report No.:

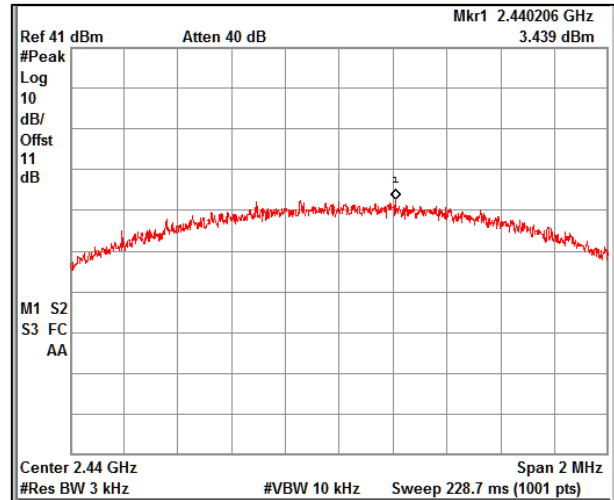
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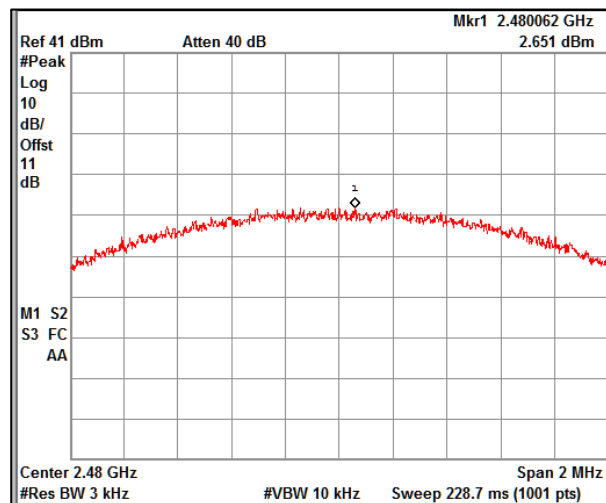
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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

Result

Pass

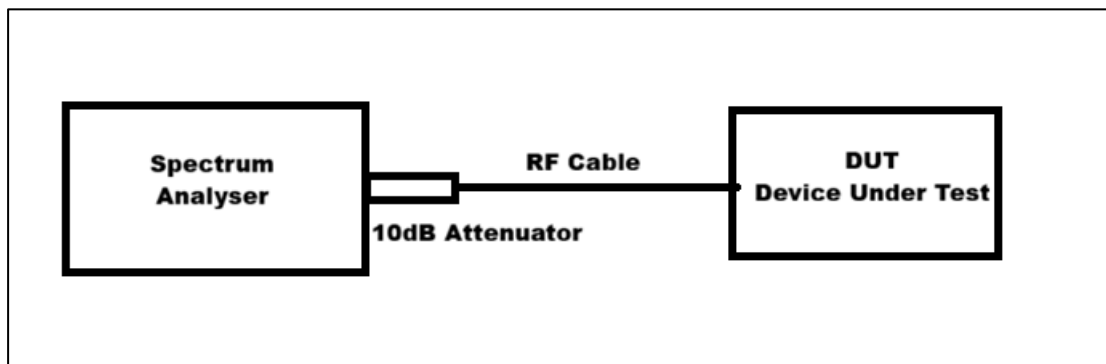
Test Specification	FCC part 15 Subpart C 15.247 (d)
Test Method	Subclause 11.11.3 of ANSI C63.10:2020
Measurement Bandwidth	100 kHz
Detector	Peak
Port of testing	Conducted mode

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) = +22.3°C

Voltage = 3.7 VDC through Battery

Relative humidity: 58%

KDB Guidelines applied:

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

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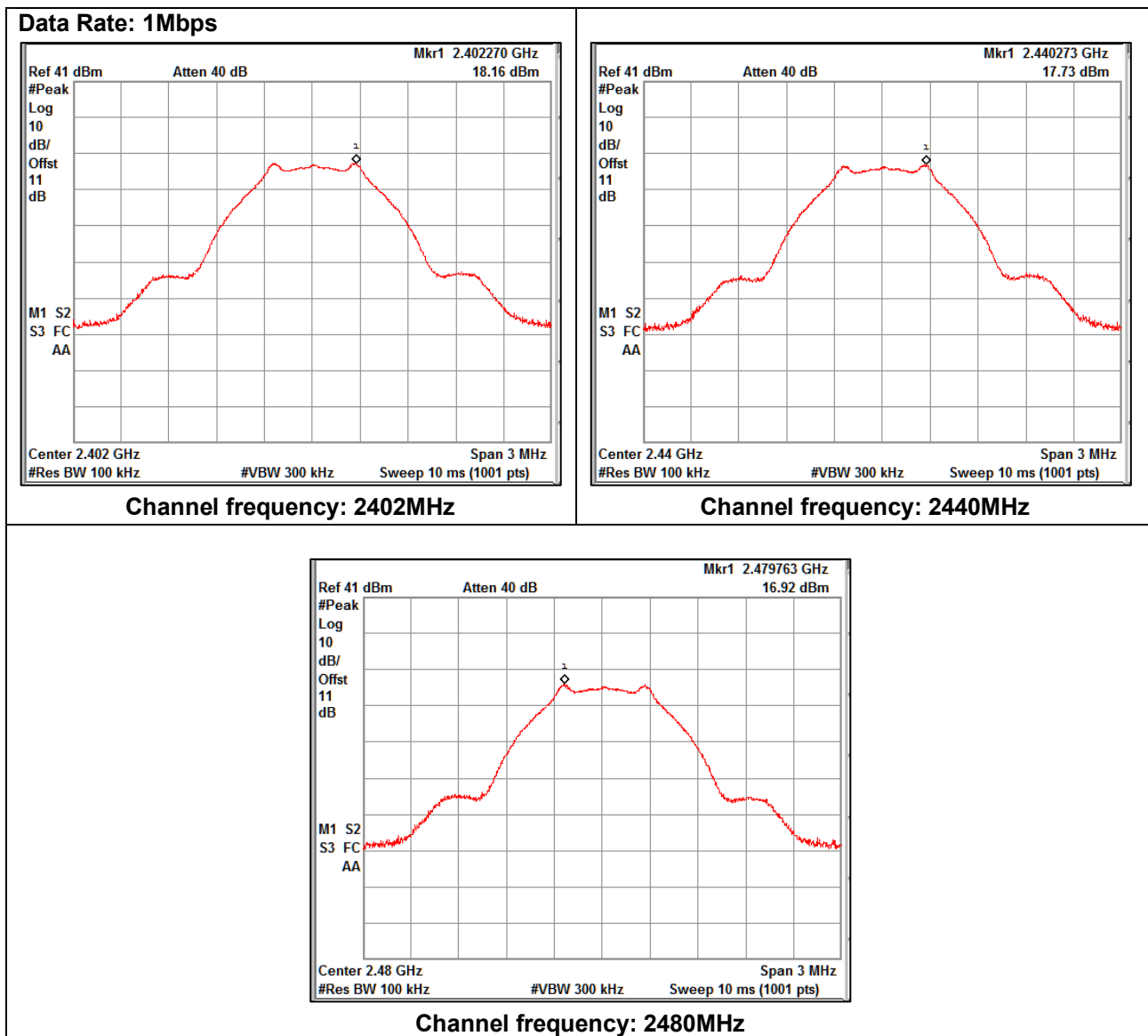
Test results:

Note: All the losses are included during measurement and final values are mentioned in the test report

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)
1 Mbps	2402.00	2400.00	-39.67	18.16	-57.83	-20.00
	2480.00	2483.50	-41.01	16.92	-57.93	-20.00
2 Mbps	2402.00	2400.00	-16.97	16.92	-33.89	-20.00
	2480.00	2483.50	-36.51	15.03	-51.54	-20.00

Reference Plots:

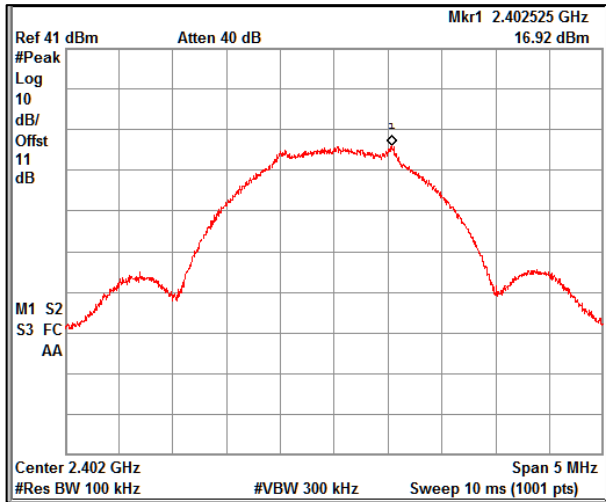


Prüfbericht - Nr.:
Test Report No.:

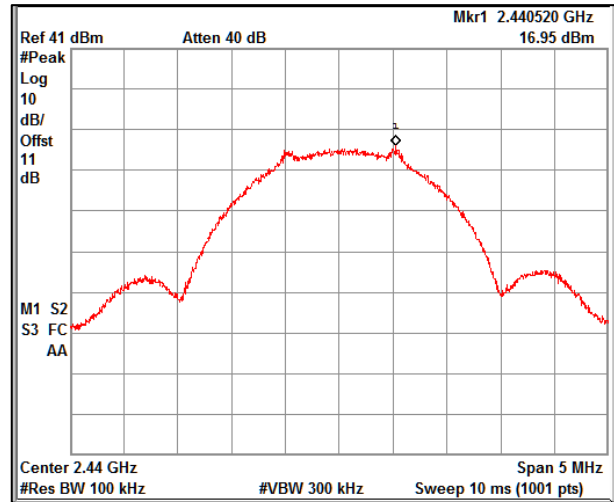
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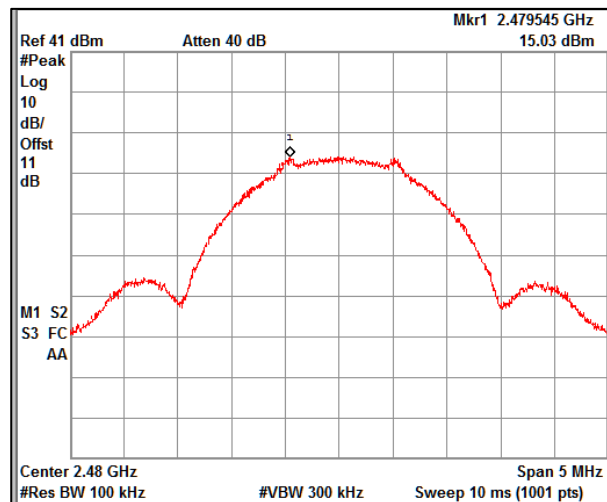
Data Rate: 2Mbps



Channel frequency: 2402MHz



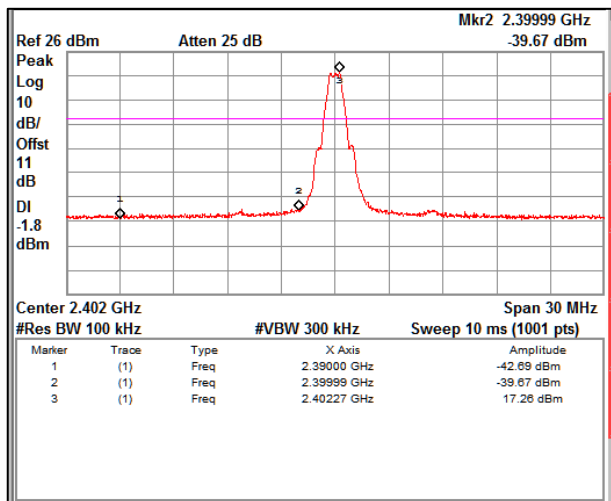
Channel frequency: 2440MHz



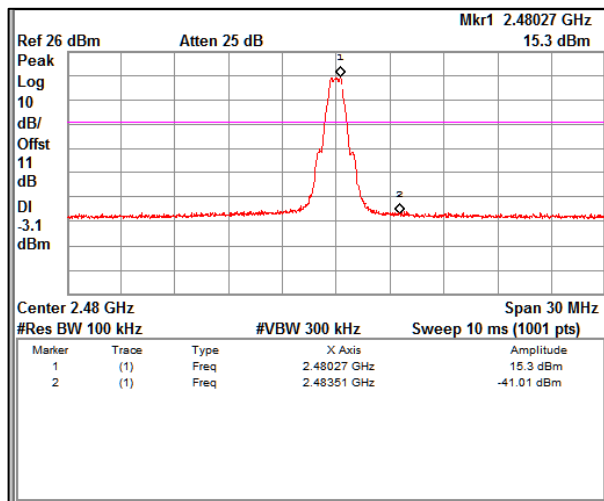
Channel frequency: 2480MHz

Bandedge Plots:

Data Rate: 1Mbps

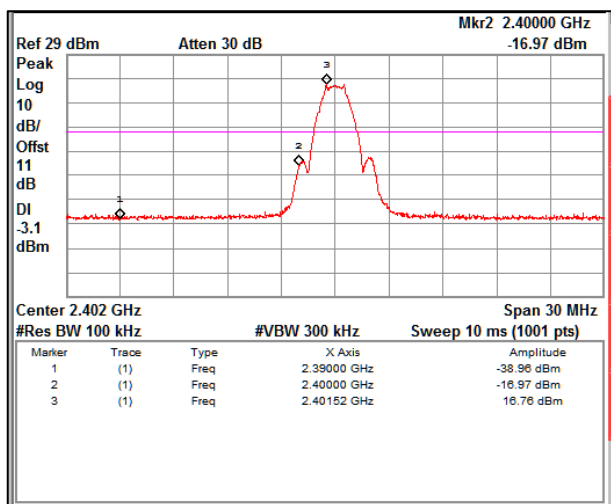


Channel frequency: 2402MHz

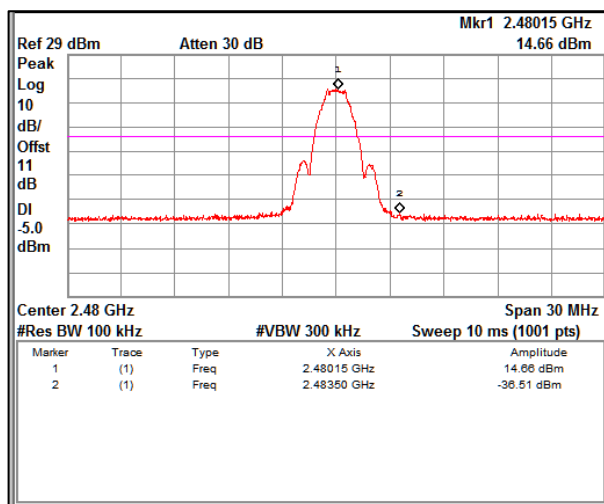


Channel frequency: 2480MHz

Data Rate: 2Mbps



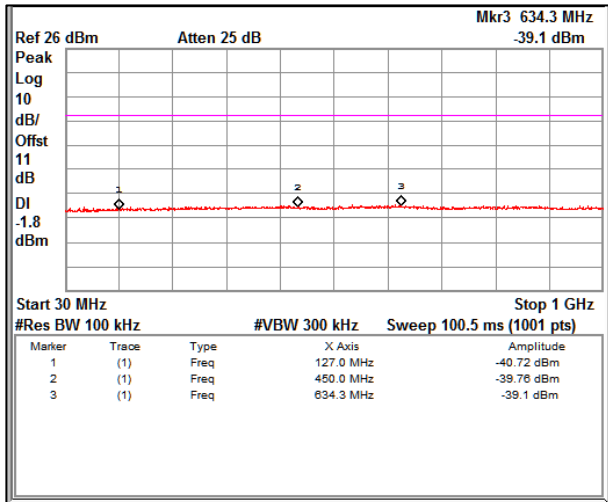
Channel frequency: 2402MHz



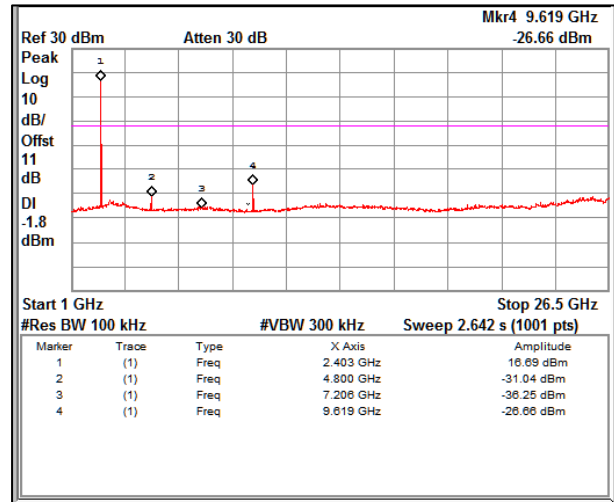
Channel frequency: 2480MHz

7.5.1 Out-Of-Band Emissions

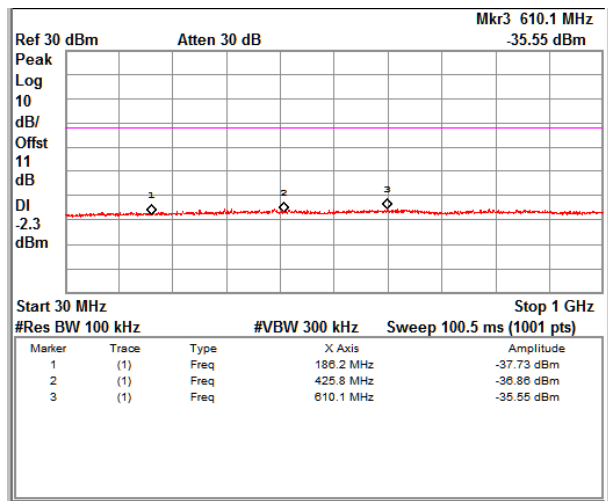
Data Rate: 1Mbps



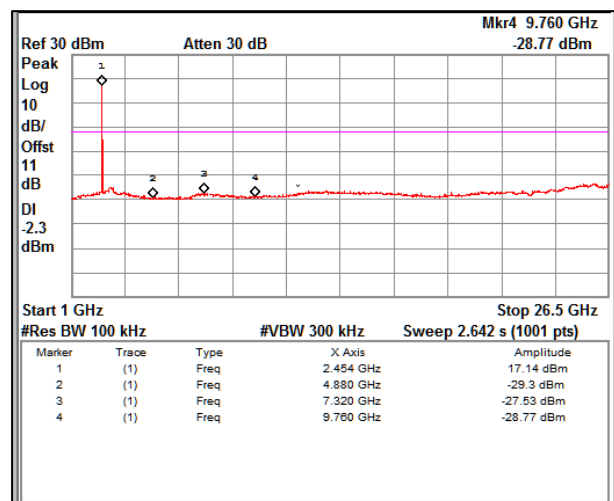
Channel Frequency: 2402MHz Frequency Range 30MHz – 1GHz



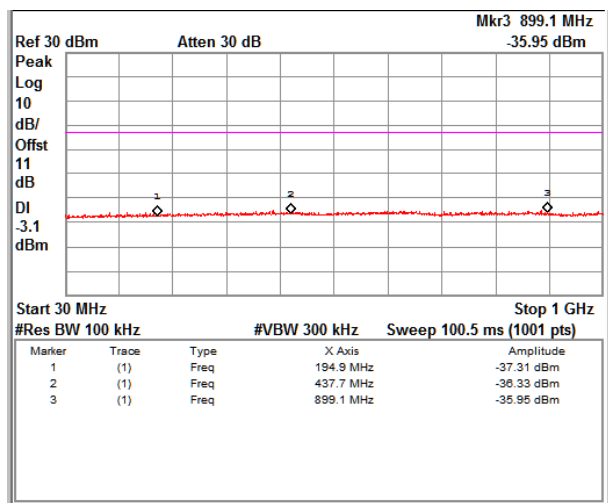
Channel Frequency: 2402MHz Frequency Range 1GHz to 26.5GHz



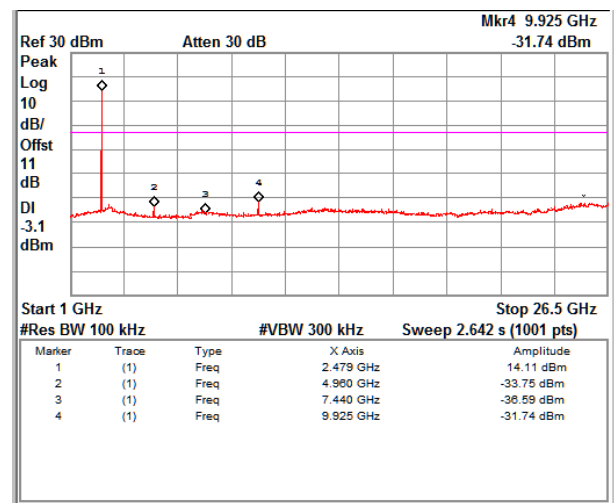
Channel Frequency: 2440MHz Frequency Range 30MHz – 1GHz



Channel Frequency: 2440MHz Frequency Range 1GHz to 26.5GHz



Channel Frequency: 2480MHz Frequency Range 30MHz – 1GHz



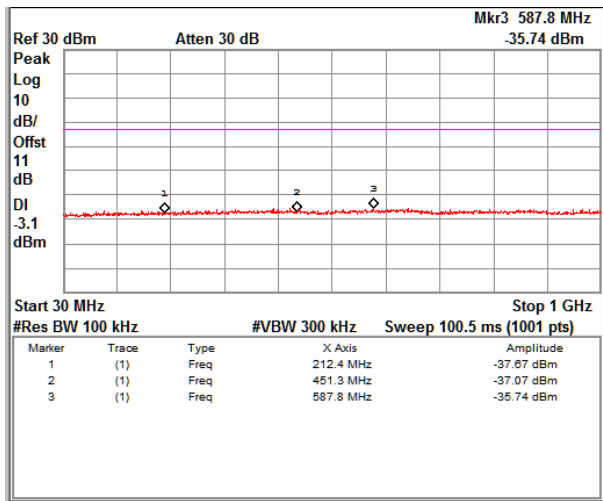
Channel Frequency: 2480MHz Frequency Range 1GHz to 26.5GHz

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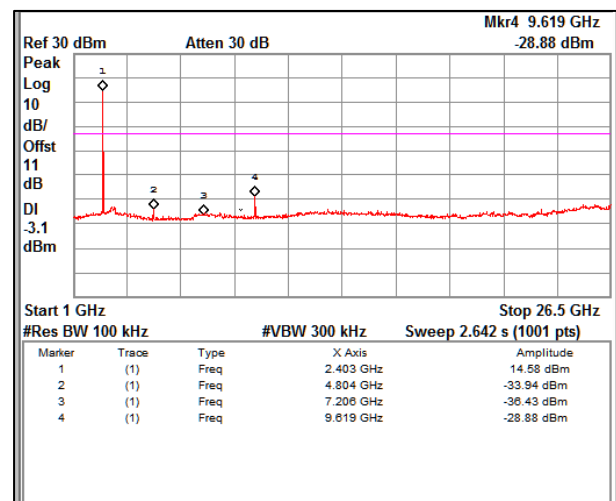
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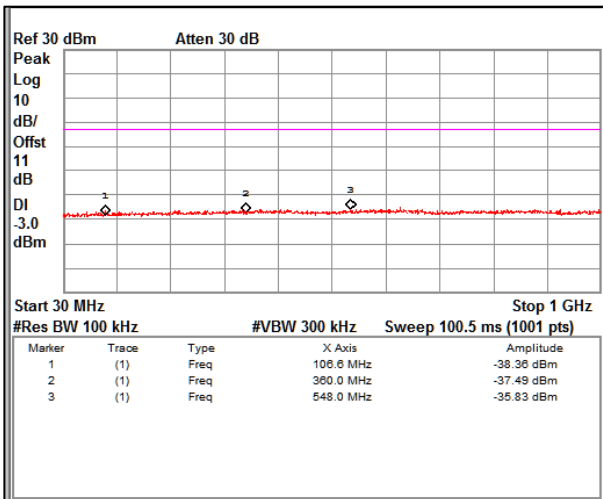
Data Rate: 2 Mbps



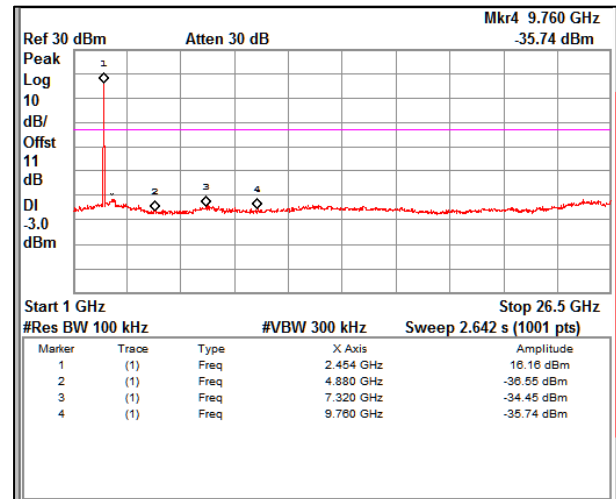
Channel Frequency:2402MHz_Frequency Range 30MHz – 1GHz



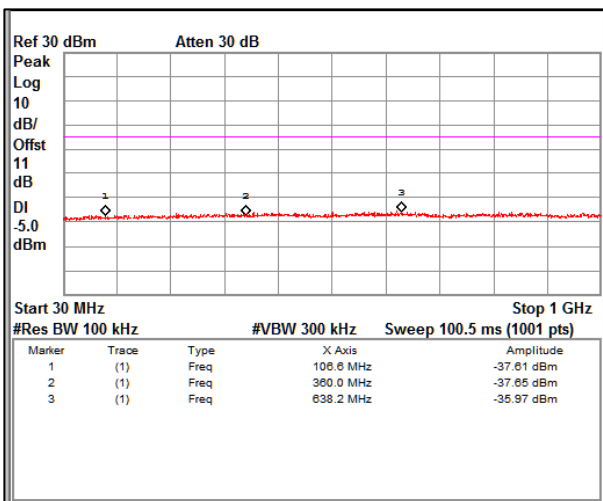
Channel Frequency: 2402MHz_Frequency Range 1GHz to 26.5GHz



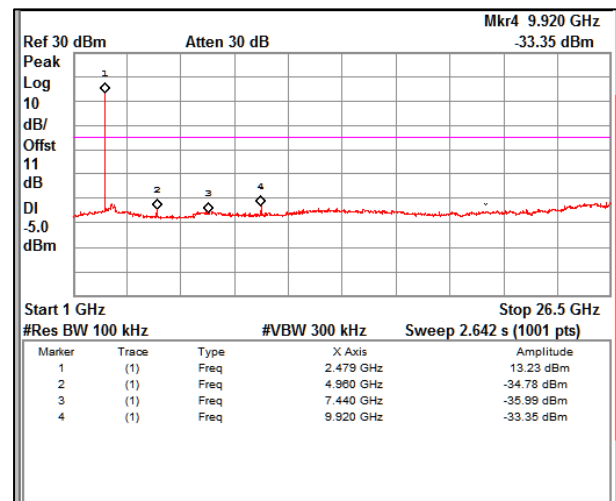
Channel Frequency:2440MHz_Frequency Range 30MHz – 1GHz



Channel Frequency: 2440MHz_Frequency Range 1GHz to 26.5GHz



Channel Frequency:2480MHz_Frequency Range 30MHz – 1GHz



Channel Frequency: 2480MHz_Frequency Range 1GHz to 26.5GHz

7.6 Spurious Radiated Emissions & Restricted Bands of Operation

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205)
Test Method	ANSI C63.10:2020
Measurement Location	Semi Anechoic Chamber 9kHz - 1 GHz Fully Anechoic Chamber 1 GHz - 26GHz
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) = +22.3°C

Voltage = 3.7 VDC through Battery

Relative humidity: 58%

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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

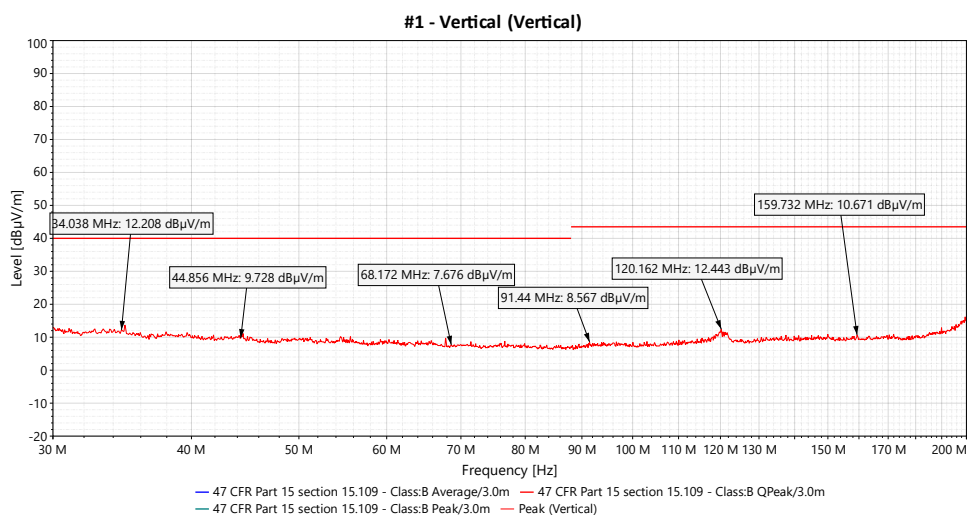
Test results for frequency range 9kHz – 30MHz

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

Table 7: Test results for frequency range 30MHz – 200MHz

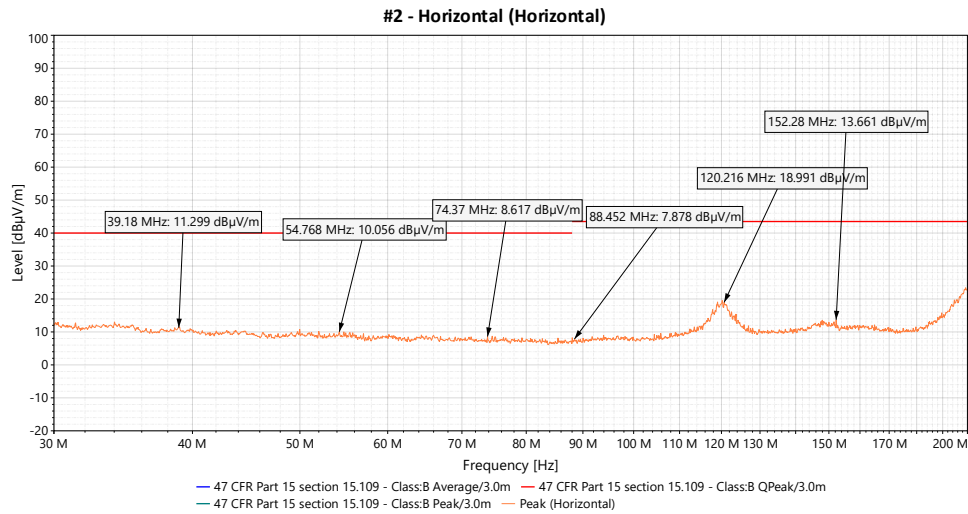
Antenna Polarization	Measured Frequency (MHz)	Measured emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Vertical	34.03	12.20	40.00	-27.80
	44.85	9.72	40.00	-30.28
	68.17	7.67	40.00	-32.33
	91.44	8.56	43.50	-34.94
	120.16	12.44	43.50	-31.06
	159.73	10.67	43.50	-32.83
Horizontal	39.18	11.29	40.00	-28.71
	54.76	10.05	40.00	-29.95
	74.37	8.61	40.00	-31.39
	88.45	7.87	43.50	-35.63
	120.21	18.99	43.50	-24.51
	152.28	13.66	43.50	-29.84

Test Plots:



Channel Frequency 30MHz – 200MHz

Polarization Vertical



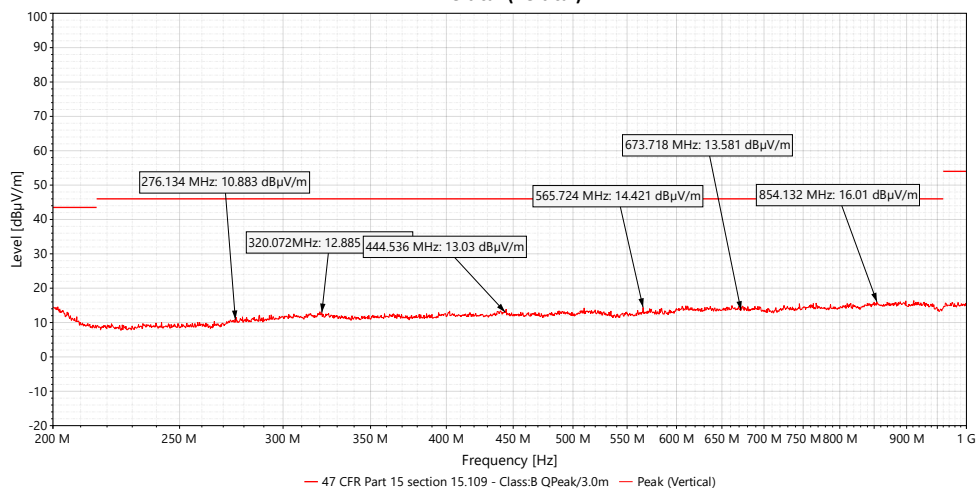
Channel Frequency 30MHz – 200MHz

Polarization Horizontal

Table 8: Test results for frequency range 200MHz – 1GHz

Antenna Polarization	Measured Frequency (MHz)	Measured emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
Vertical	276.13	10.88	46.00	-35.12
	320.07	12.88	46.00	-33.12
	444.53	13.03	46.00	-32.97
	565.72	14.42	46.00	-31.58
	673.71	13.58	46.00	-32.42
	854.13	16.01	46.00	-29.99
Horizontal	201.96	21.47	46.00	-24.53
	245.26	14.96	46.00	-31.04
	305.41	21.84	46.00	-24.16
	323.91	21.68	46.00	-24.32
	443.13	15.54	46.00	-30.46
	860.00	17.90	46.00	-28.10

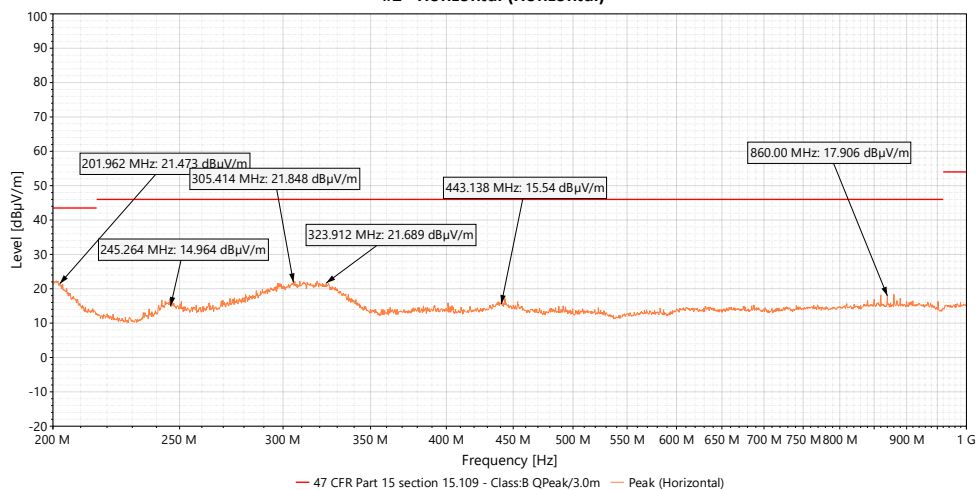
#1 - Vertical (Vertical)



Channel Frequency 200MHz – 1GHz

Polarization Vertical

#2 - Horizontal (Horizontal)



Channel Frequency 200MHz – 1GHz

Polarization Horizontal

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Table 9: Test results for the frequencies above 1GHz:

Data Rate: 1Mbps

Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Duty Correction Factor (dB)	Final Measured Emission (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
				PK	AV	PK	AV	PK	AV
2402	2402.00	Vertical	16.48	112.80	96.32	-	-	-	-
	2390.00		16.48	45.55	29.07	74.00	54.00	-28.45	-24.93
	4804.00		16.48	60.63	44.15	74.00	54.00	-13.37	-9.85
	7206.00		16.48	58.40	41.92	74.00	54.00	-15.60	-12.08
	9608.00		16.48	63.68	47.20	74.00	54.00	-10.32	-6.80
	2402.00	Horizontal	16.48	109.65	93.17	-	-	-	-
	2390.00		16.48	43.61	27.13	74.00	54.00	-30.39	-26.87
	4804.00		16.48	50.17	33.69	74.00	54.00	-23.83	-20.31
	7206.00		16.48	59.91	43.43	74.00	54.00	-14.09	-10.57
	9608.00		16.48	64.83	48.35	74.00	54.00	-9.17	-5.65
2440	2440.00	Vertical	16.48	111.71	95.23	-	-	-	-
	4882.00		16.48	60.50	44.02	74.00	54.00	-13.50	-9.98
	7323.00		16.48	61.85	45.37	74.00	54.00	-12.15	-8.63
	9760.00		16.48	62.94	46.46	74.00	54.00	-11.06	-7.54
	2440.00	Horizontal	16.48	108.99	92.51	-	-	-	-
	4882.00		16.48	47.50	31.02	74.00	54.00	-26.50	-22.98
	7323.00		16.48	60.98	44.50	74.00	54.00	-13.02	-9.50
	9760.00		16.48	65.57	49.09	74.00	54.00	-8.43	-4.91
2480	2480.00	Vertical	16.48	105.65	89.17	-	-	-	-
	2483.50		16.48	52.72	36.24	74.00	54.00	-21.28	-17.76
	4960.00		16.48	62.29	45.81	74.00	54.00	-11.71	-8.19
	7440.00		16.48	50.99	34.51	74.00	54.00	-23.01	-19.49
	9920.00		16.48	56.63	40.15	74.00	54.00	-17.37	-13.85
	2480.00	Horizontal	16.48	100.75	84.27	-	-	-	-
	2483.50		16.48	45.57	29.09	74.00	54.00	-28.43	-24.91
	4960.00		16.48	48.87	32.39	74.00	54.00	-25.13	-21.61
	7440.00		16.48	50.19	33.71	74.00	54.00	-23.81	-20.29
	9920.00		16.48	58.26	41.78	74.00	54.00	-15.74	-12.22

*Note: DCCF is added in Average detector (Duty Cycle: 15.87%)

$DCCF = 20 \cdot \log(1/D)$ where D is the duty cycle

_ → Fundamental Frequency:

*→ Restricted Band edges

Pk: Peak Detector;

Av: Average Detector

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Data Rate: 2Mbps

Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Duty Correction Factor (dB)	Final Measured Emission (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
				PK	AV	PK	AV	PK	AV
2402	2402.00	Vertical	20.92	112.67	91.75	-	-	-	-
	2390.00		20.92	46.71	25.79	74.00	54.00	-27.29	-28.21
	4804.00		20.92	59.46	38.54	74.00	54.00	-14.54	-15.46
	7206.00		20.92	60.66	39.74	74.00	54.00	-13.34	-14.26
	9608.00		20.92	63.34	42.42	74.00	54.00	-10.66	-11.58
	2402.00	Horizontal	20.92	109.89	88.97	-	-	-	-
	2390.00		20.92	44.61	23.69	74.00	54.00	-29.39	-30.31
	4804.00		20.92	48.24	27.32	74.00	54.00	-25.76	-26.68
	7206.00		20.92	59.84	38.92	74.00	54.00	-14.16	-15.08
	9608.00		20.92	65.73	44.81	74.00	54.00	-8.27	-9.19
2440	2440.00	Vertical	20.92	111.42	90.50	-	-	-	-
	4882.00		20.92	60.46	39.54	74.00	54.00	-13.54	-14.46
	7323.00		20.92	61.19	40.27	74.00	54.00	-12.81	-13.73
	9760.00		20.92	64.59	43.67	74.00	54.00	-9.41	-10.33
	2440.00	Horizontal	20.92	108.32	87.40	-	-	-	-
	4882.00		20.92	49.08	28.16	74.00	54.00	-24.92	-25.84
	7323.00		20.92	59.38	38.46	74.00	54.00	-14.62	-15.54
	9760.00		20.92	66.95	46.03	74.00	54.00	-7.05	-7.97
2480	2480.00	Vertical	20.92	105.24	84.32	-	-	-	-
	2483.50		20.92	54.12	33.20	74.00	54.00	-19.88	-20.80
	4960.00		20.92	61.90	40.98	74.00	54.00	-12.10	-13.02
	7440.00		20.92	52.04	31.12	74.00	54.00	-21.96	-22.88
	9920.00		20.92	57.13	36.21	74.00	54.00	-16.87	-17.79
	2480.00	Horizontal	20.92	101.58	80.66	-	-	-	-
	2483.50		20.92	50.70	29.78	74.00	54.00	-23.30	-24.22
	4960.00		20.92	49.77	28.85	74.00	54.00	-24.23	-25.15
	7440.00		20.92	51.56	30.64	74.00	54.00	-22.44	-23.36
	9920.00		20.92	58.13	37.21	74.00	54.00	-15.87	-16.79

*Note: DCCF is added in Average detector (Duty Cycle: 9.6%)

$DCCF = 20 \cdot \log(1/D)$ where D is the duty cycle

_ → Fundamental Frequency:

*→ Restricted Band edges

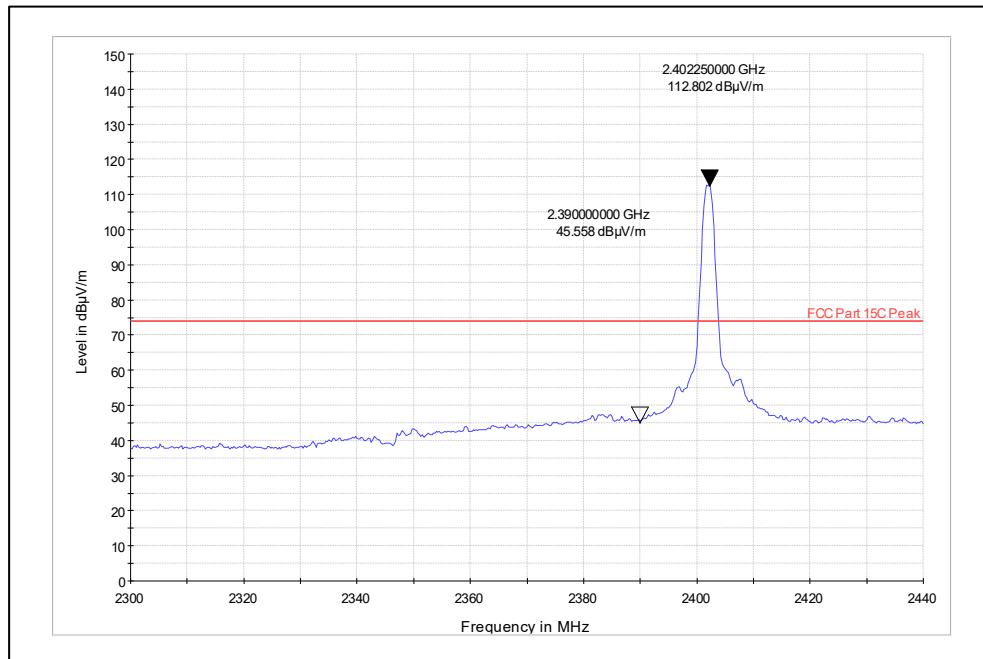
Pk: Peak Detector;

Av: Average Detector

Test Plots:

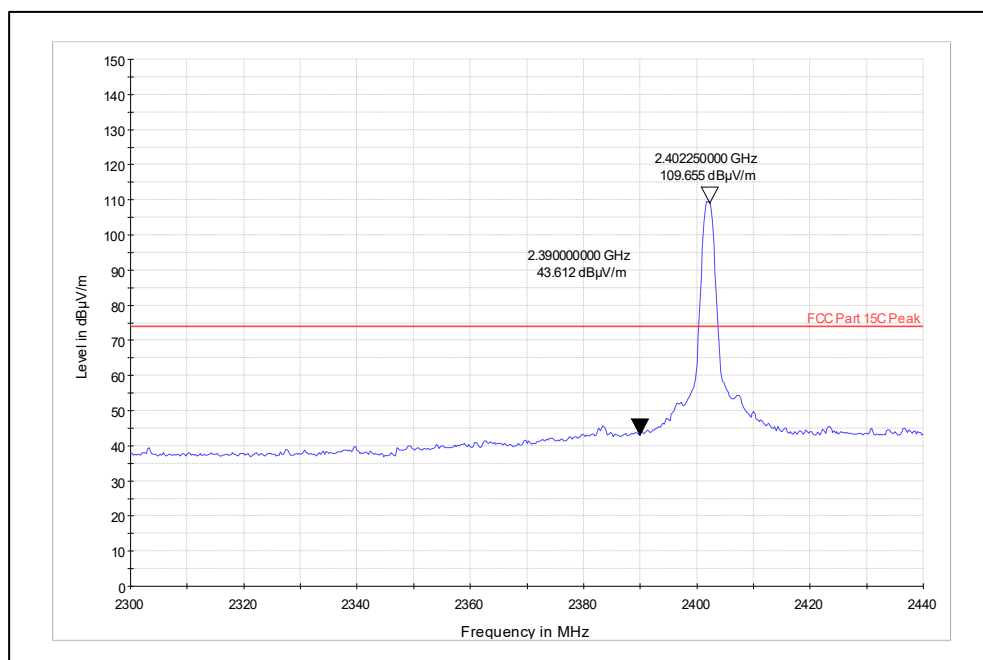
Restricted Bands of Operation

Data Rate: 1Mbps



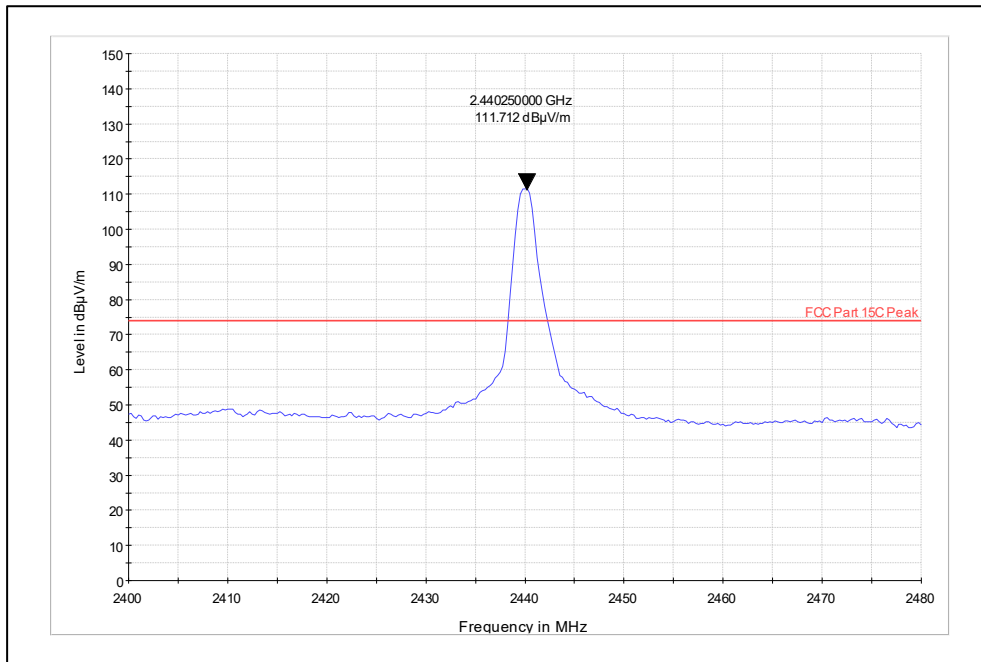
Channel Frequency: 2402MHz

Polarization: Vertical



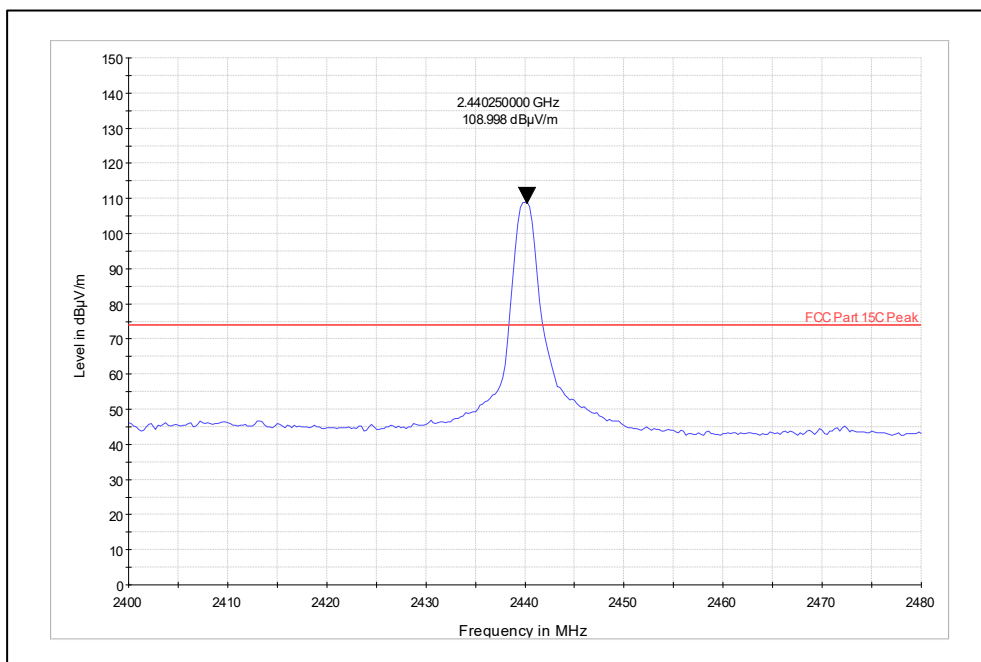
Channel Frequency: 2402MHz

Polarization: Horizontal



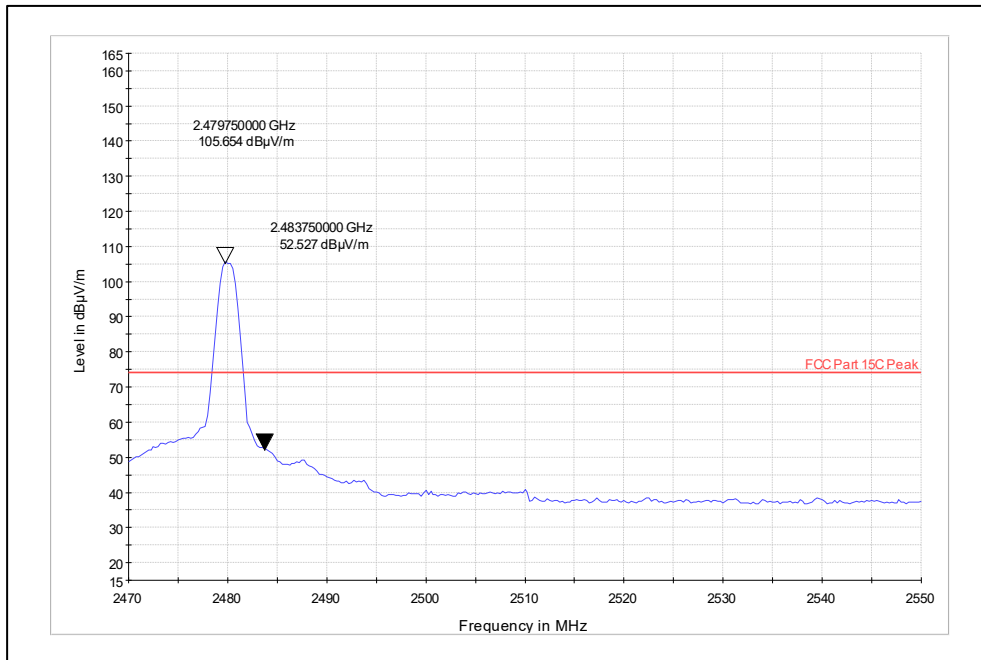
Channel Frequency: 2440MHz

Polarization: Vertical



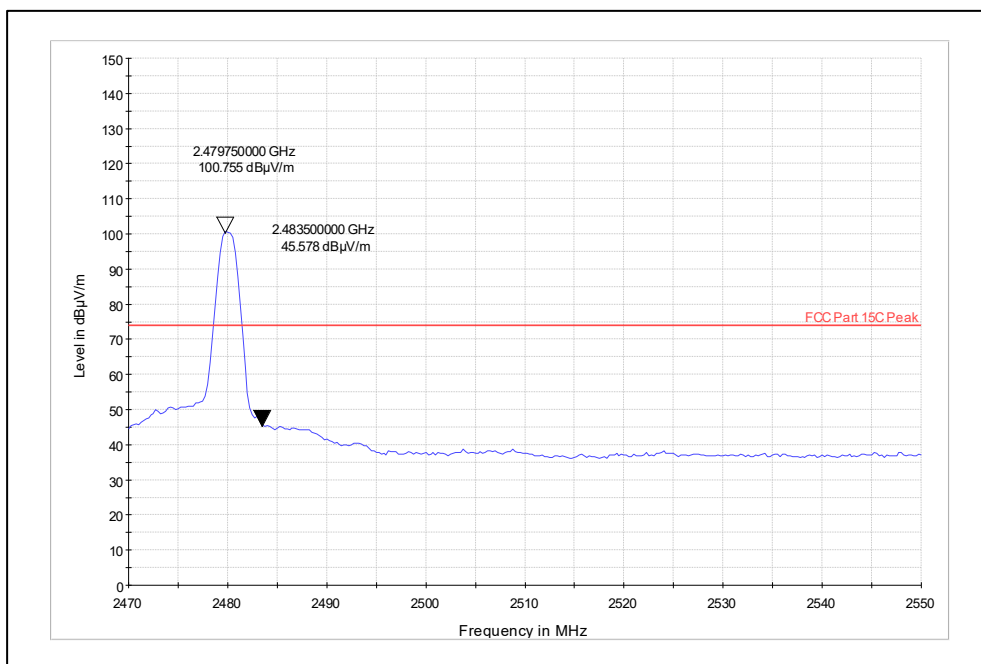
Channel Frequency: 2440MHz

Polarization: Horizontal



Channel Frequency: 2480MHz

Polarization: Vertical



Channel Frequency: 2480MHz

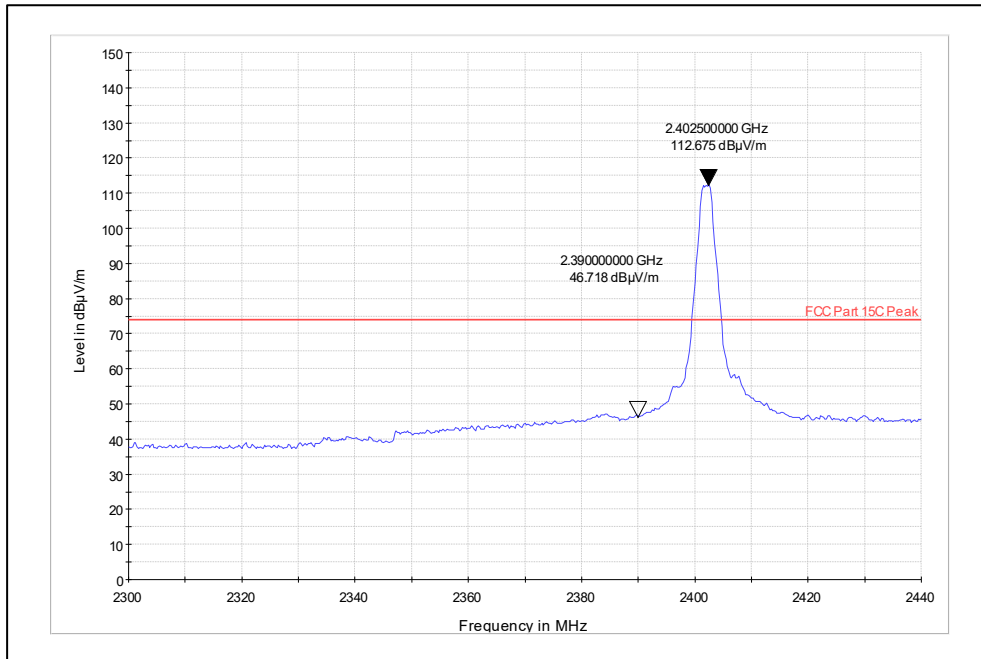
Polarization: Horizontal

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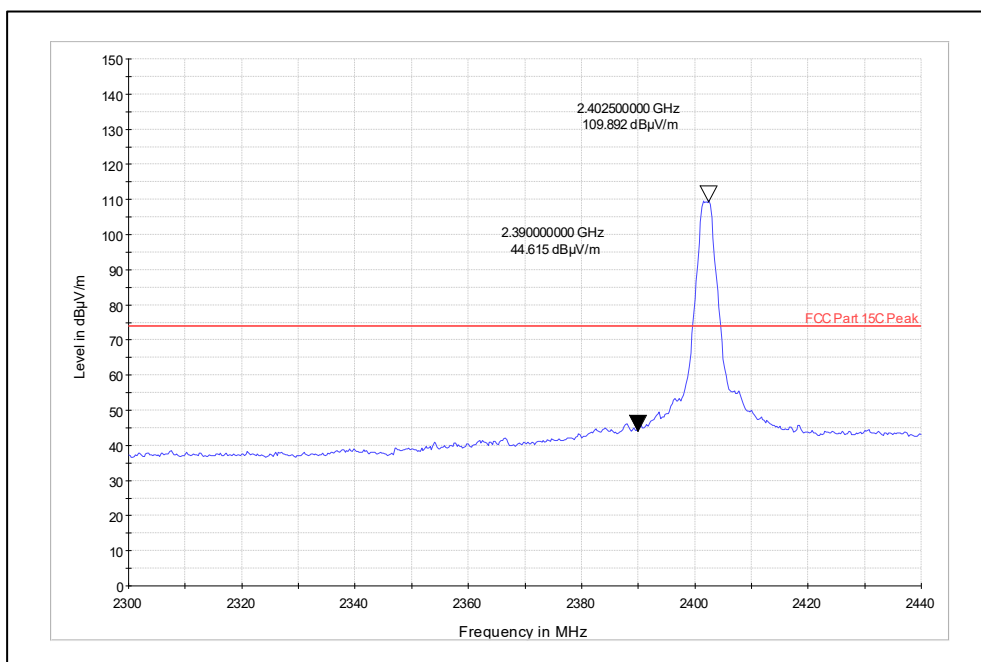
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Data Rate: 2Mbps



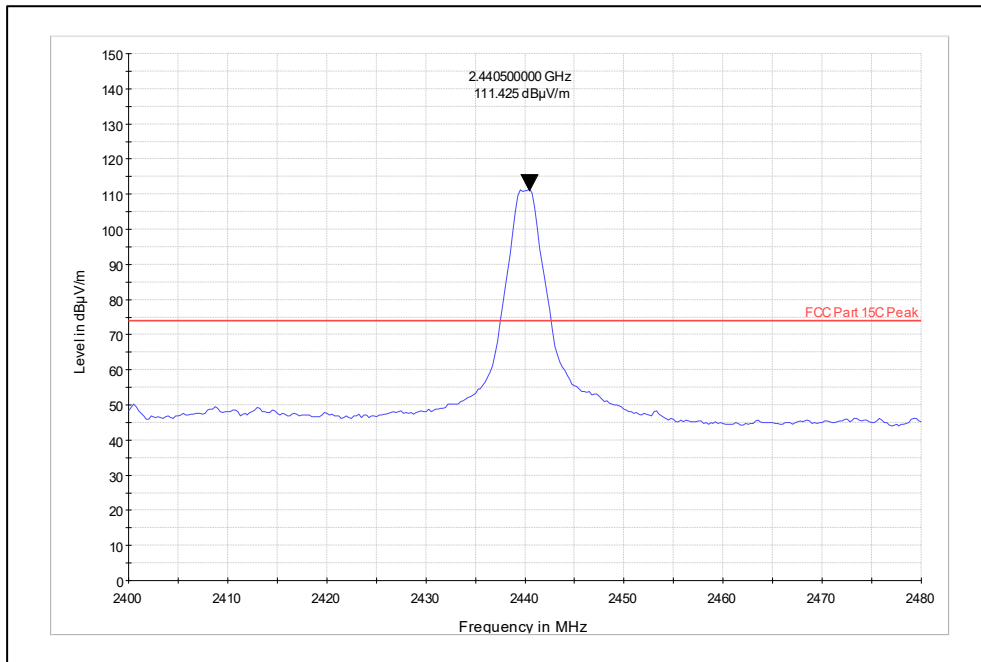
Channel Frequency: 2402MHz

Polarization: Vertical



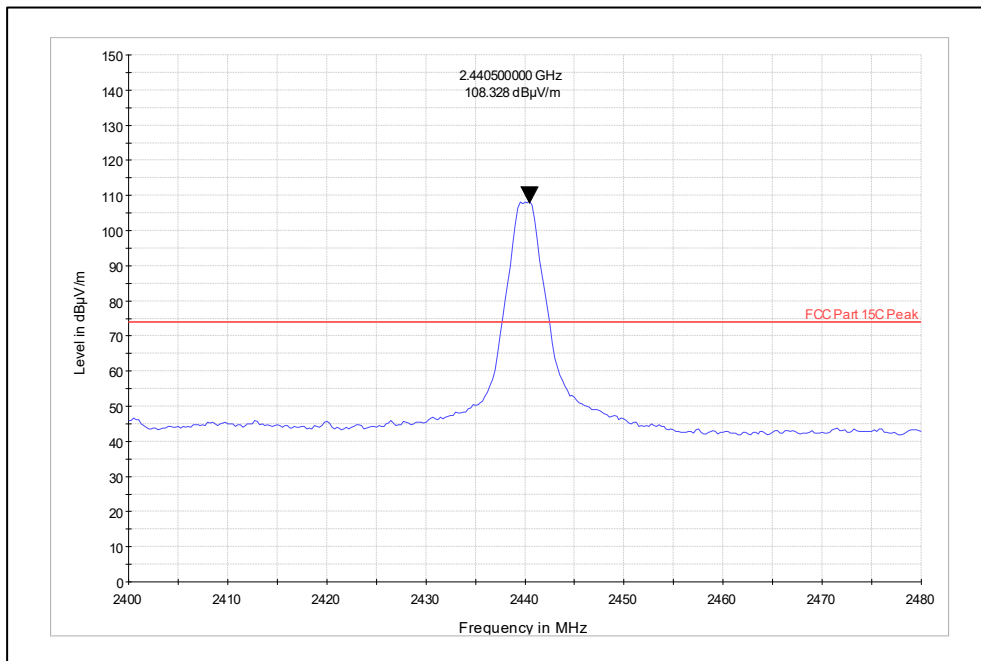
Channel Frequency: 2402MHz

Polarization: Horizontal



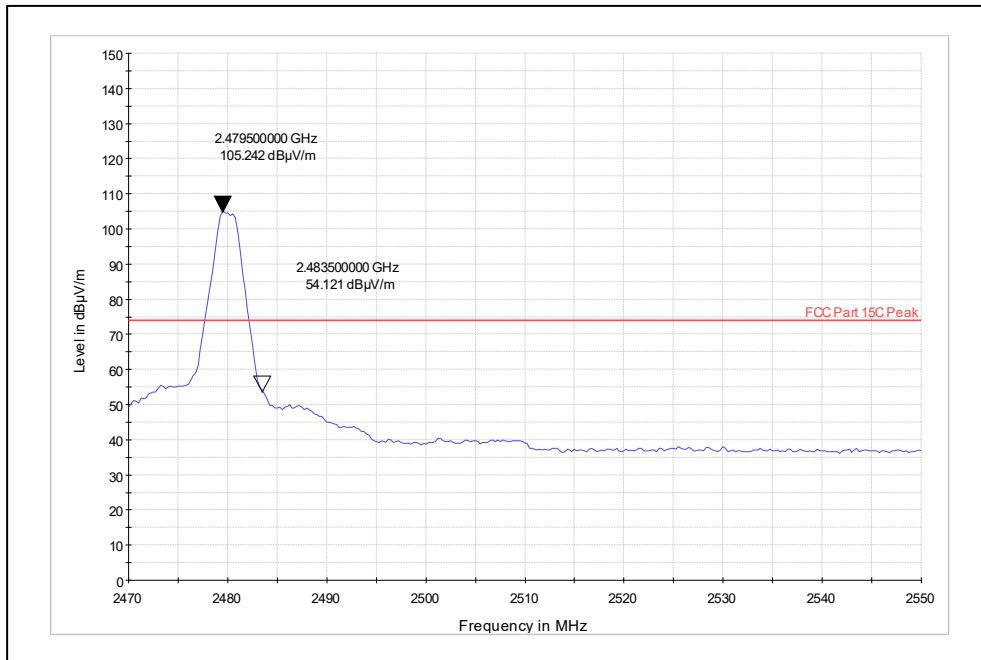
Channel Frequency: 2440MHz

Polarization: Vertical



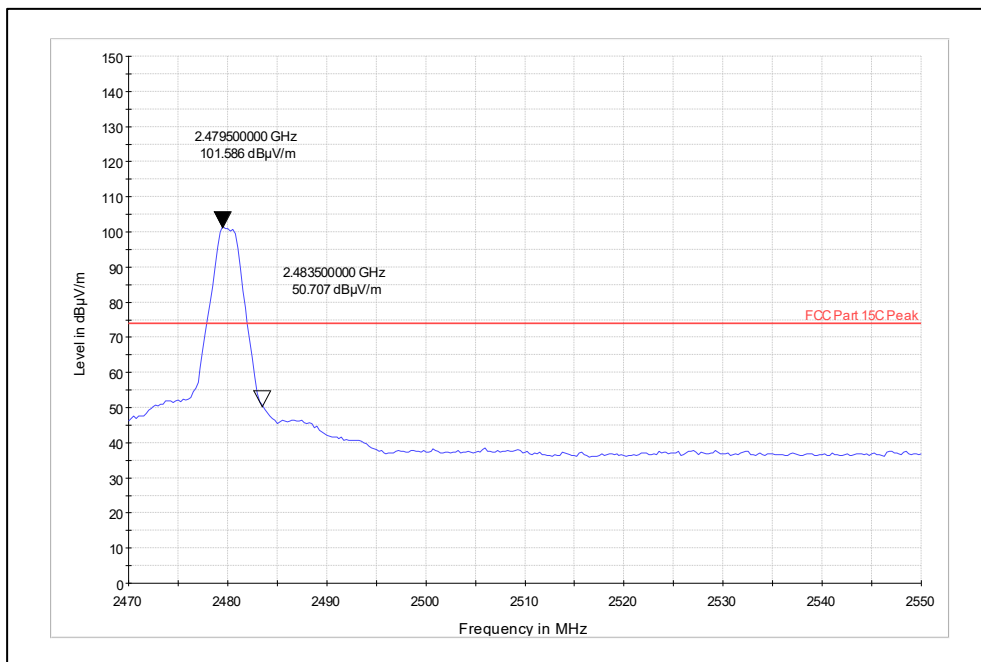
Channel Frequency: 2440MHz

Polarization: Horizontal



Channel Frequency: 2480MHz

Polarization: Vertical



Channel Frequency: 2480MHz

Polarization: Horizontal

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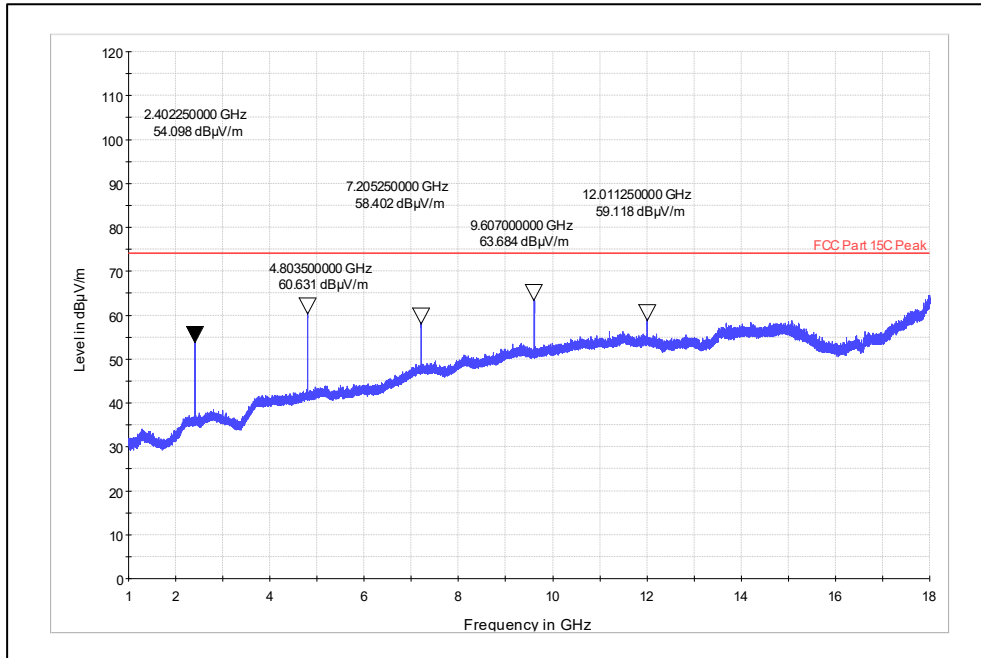
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Spurious Radiated emission:

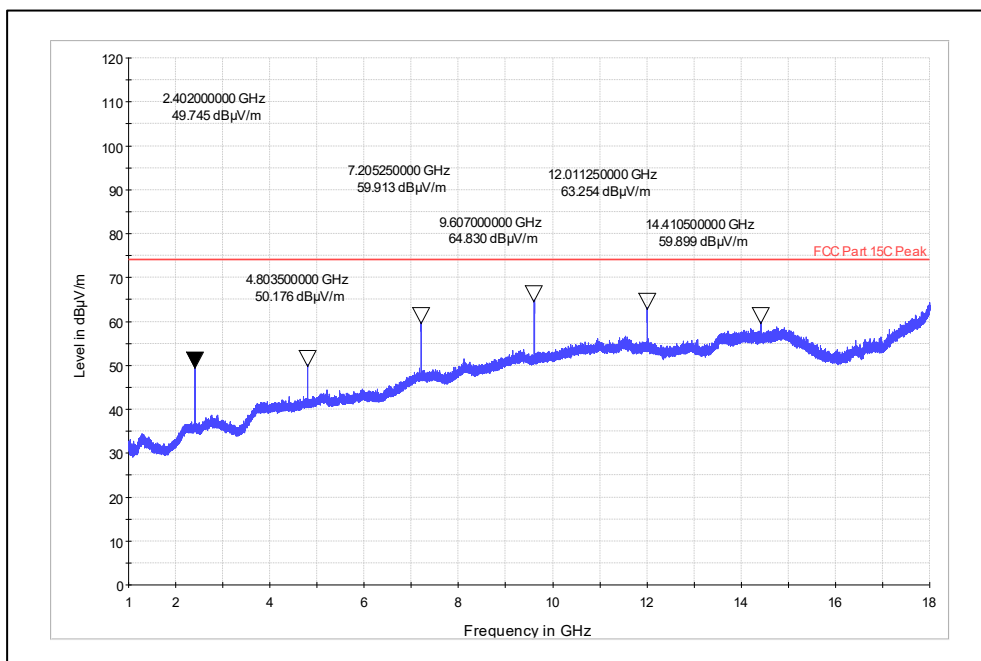
Data Rate: 1Mbps

Channel frequency: 2402MHz



Polarization: Vertical

Frequency range: 1GHz to 18GHz



Polarization: Horizontal

Frequency range: 1GHz to 18GHz

Prüfbericht - Nr.:

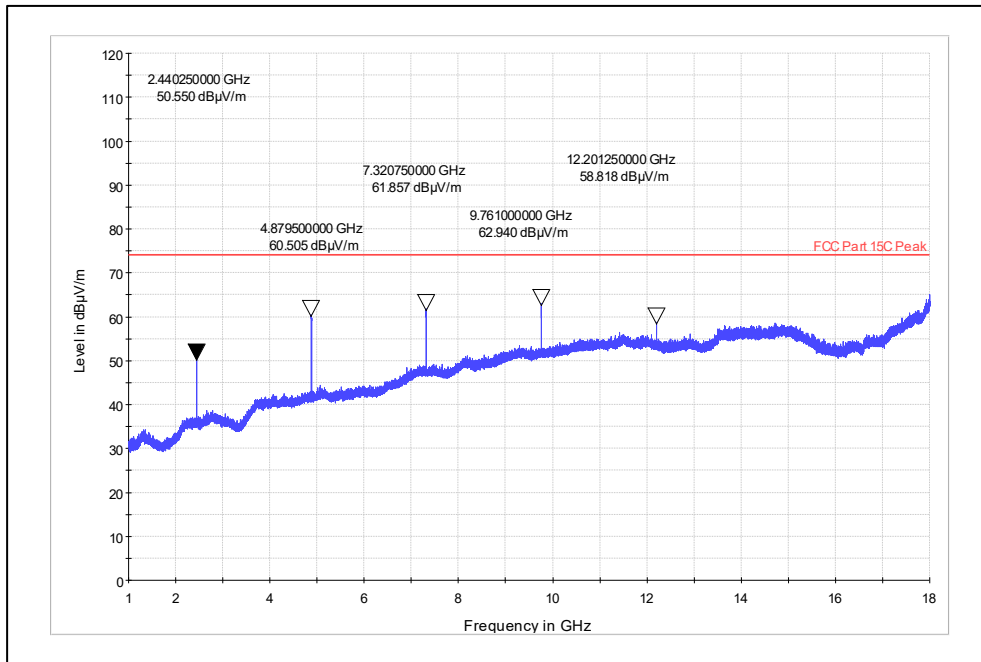
Test Report No.:

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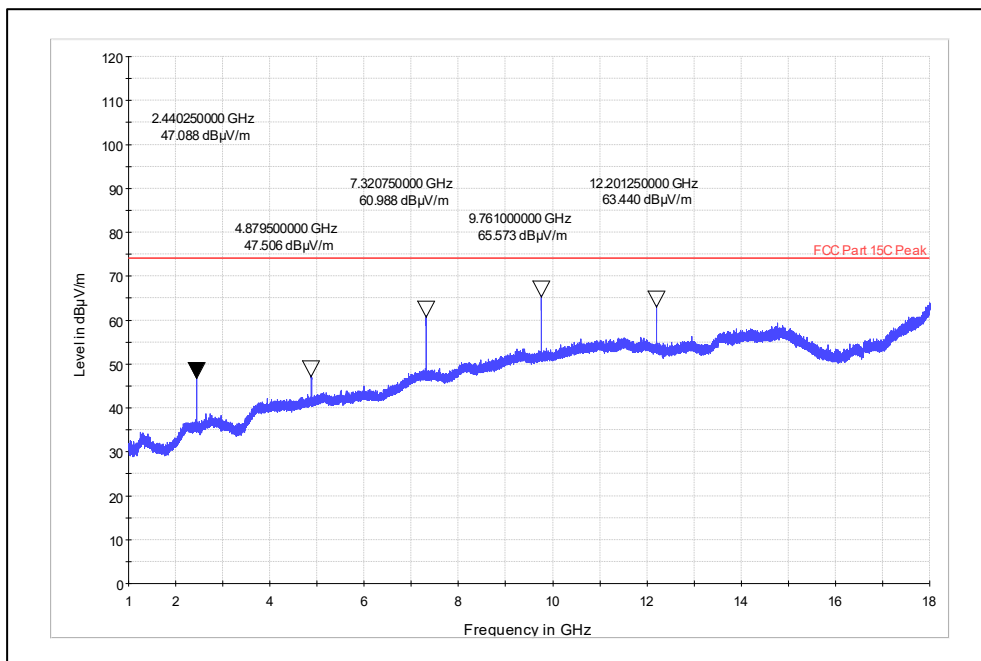
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Channel frequency:2440MHz



Polarization: Vertical

Frequency range: 1GHz to 18GHz



Polarization: Horizontal

Frequency range: 1GHz to 18GHz

Prüfbericht - Nr.:

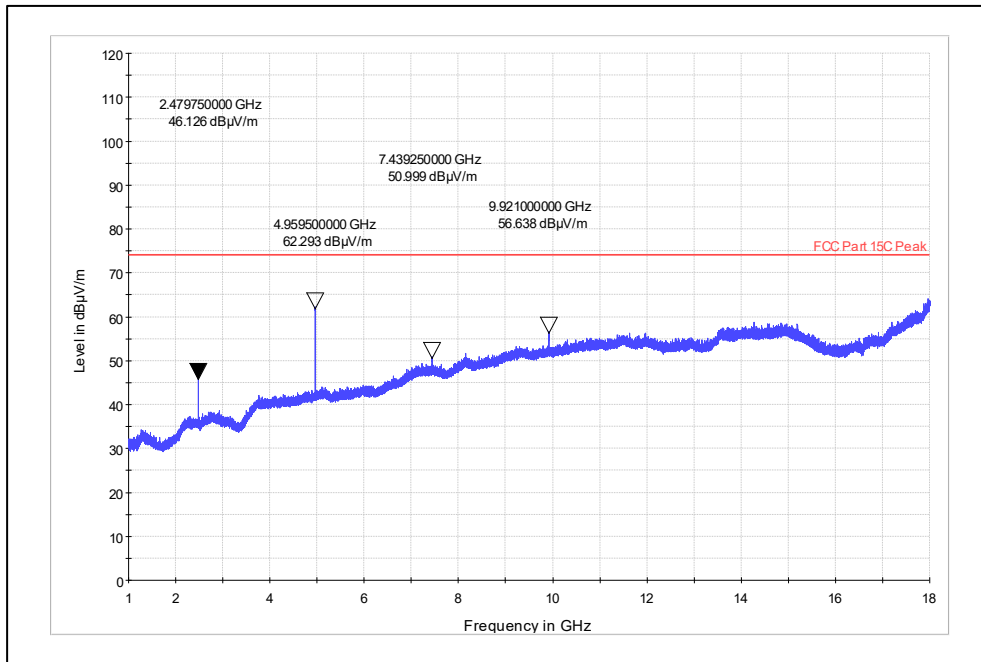
Test Report No.:

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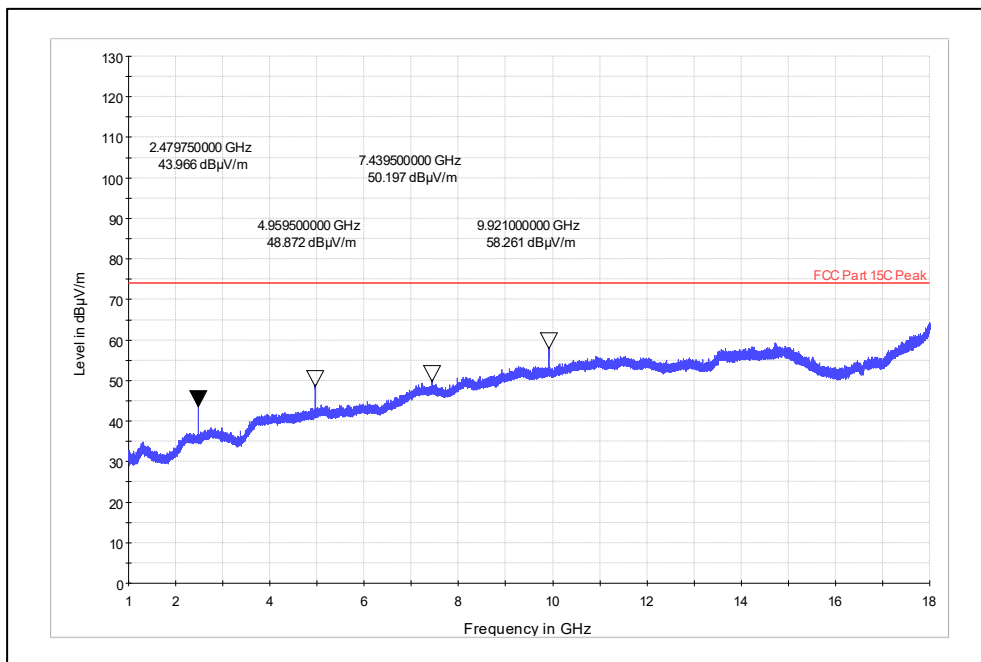
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Channel frequency: 2480MHz



Polarization: Vertical

Frequency range: 1GHz to 18GHz



Polarization: Horizontal

Frequency range: 1GHz to 18GHz

Prüfbericht - Nr.:

Test Report No.:

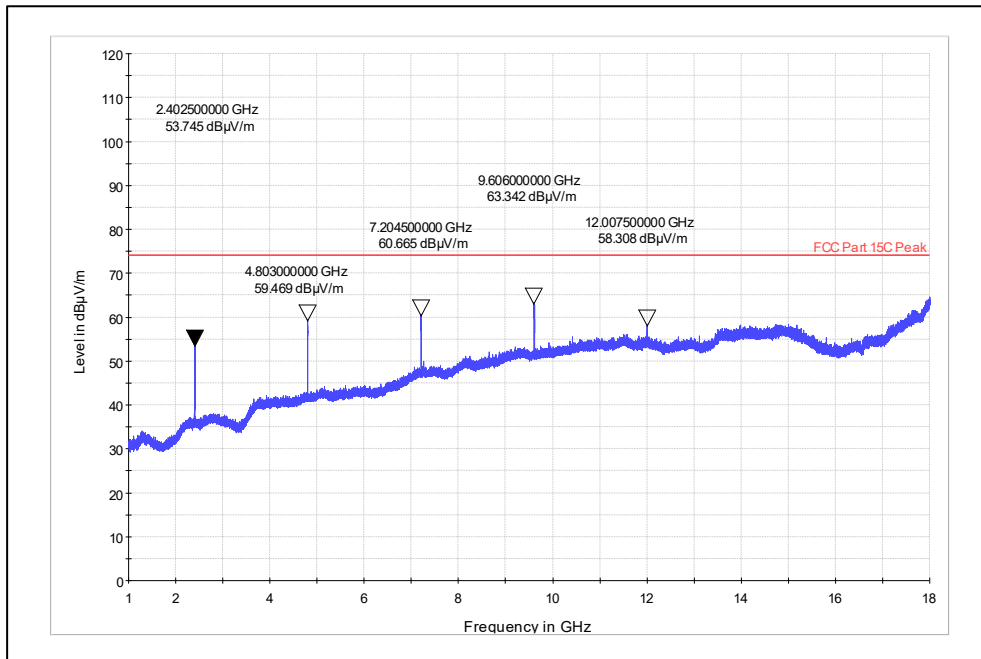
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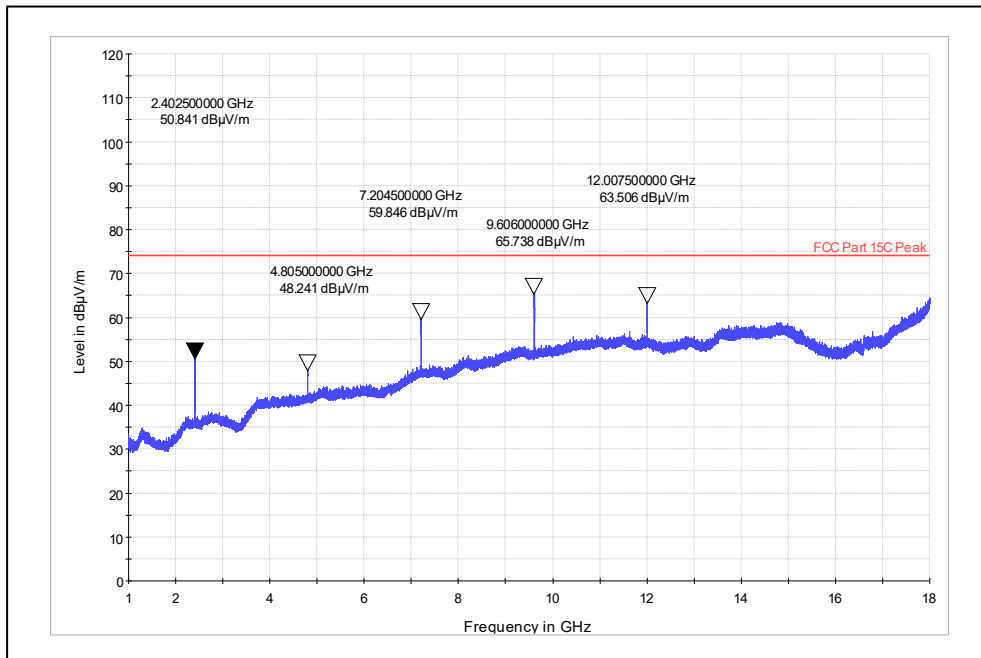
Data Rate: 2Mbps

Channel frequency: 2402MHz



Polarization: Vertical

Frequency range: 1GHz to 18GHz



Polarization: Horizontal

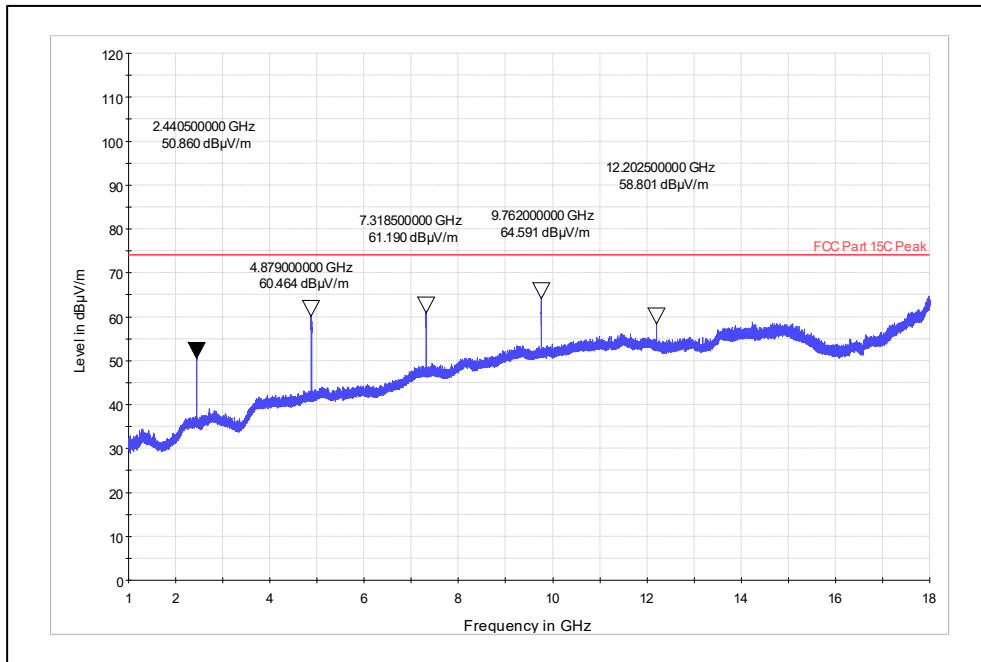
Frequency range: 1GHz to 18GHz

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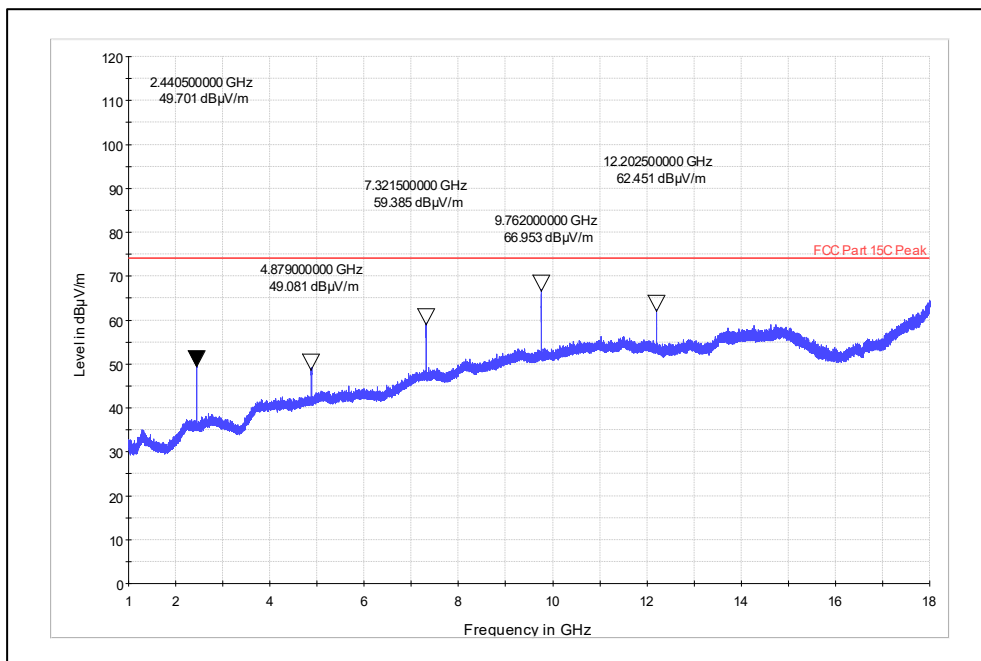
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Channel frequency: 2440MHz



Polarization: Vertical

Frequency range: 1GHz to 18GHz



Polarization: Horizontal

Frequency range: 1GHz to 18GHz

Prüfbericht - Nr.:

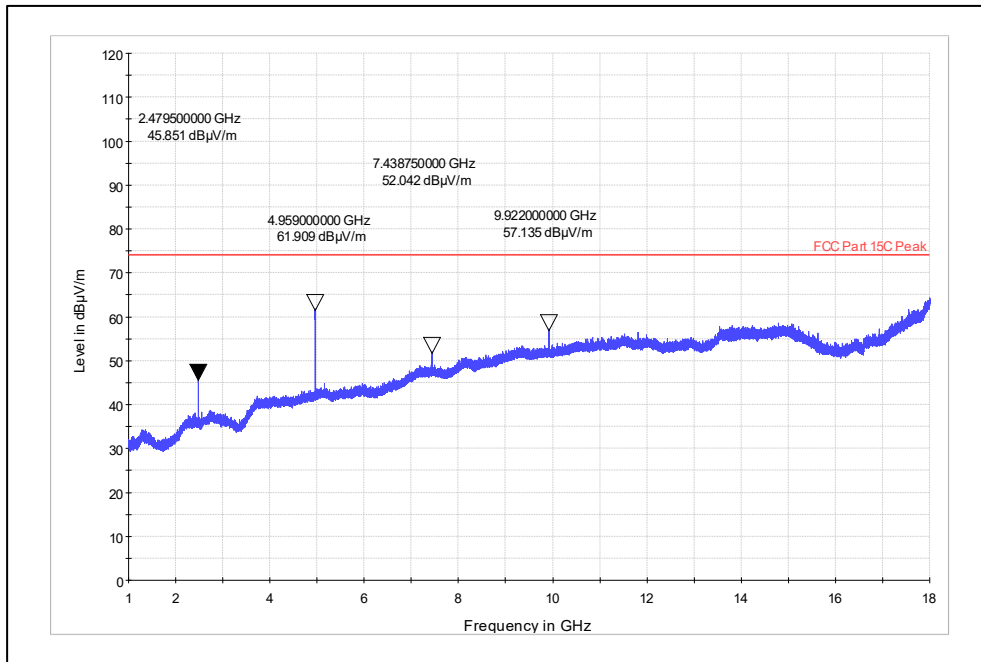
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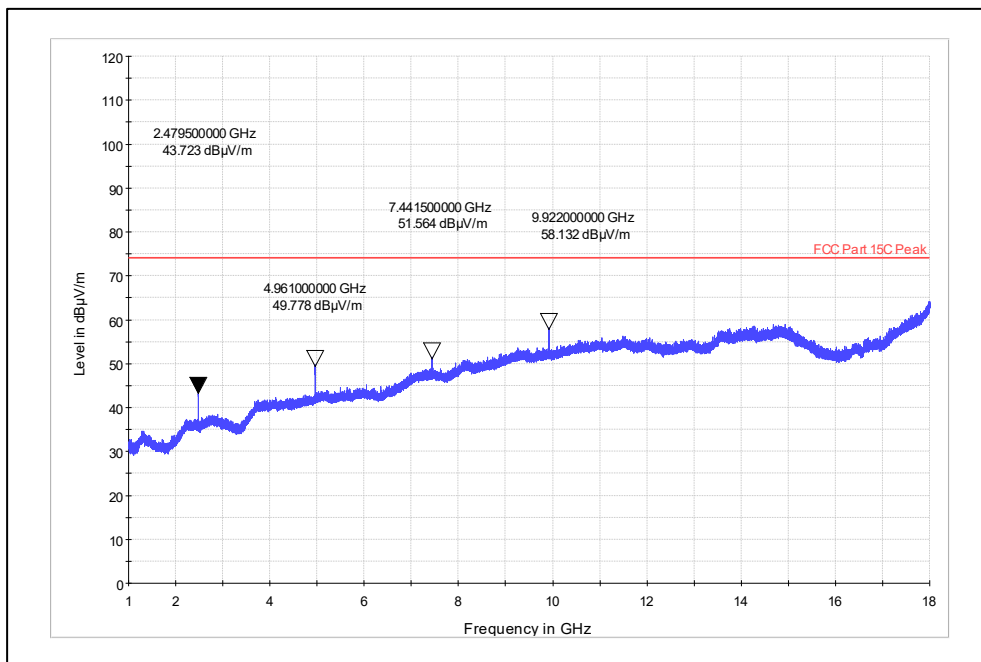
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Channel frequency: 2480MHz



Polarization: Vertical

Frequency range: 1GHz to 18GHz



Polarization: Horizontal

Frequency range: 1GHz to 18GHz

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7.7 Simultaneous Operation:

Combination	Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Duty Correction Factor (dB)	Final Measured Emission (dBµV/m)		Limit (dBµV/m)		Margin (dB)	
					PK	AV	PK	AV	PK	AV
BT (2402MHz) & BLE (2480MHz)	2402	4804.00	Vertical	20.92	59.35	38.43	74.00	54.00	-14.65	-15.57
		7206.00		20.92	61.17	40.25	74.00	54.00	-12.83	-13.75
		9608.00		20.92	63.70	42.78	74.00	54.00	-10.30	-11.22
		4804.00	Horizontal	20.92	49.26	28.34	74.00	54.00	-24.74	-25.66
		7206.00		20.92	56.49	35.57	74.00	54.00	-17.51	-18.43
		9608.00		20.92	60.92	40.00	74.00	54.00	-13.08	-14.00
	2480	4960.00	Vertical	16.48	62.73	46.25	74.00	54.00	-11.27	-7.75
		7440.00		16.48	51.56	35.08	74.00	54.00	-22.44	-18.92
		9920.00		16.48	56.59	40.11	74.00	54.00	-17.41	-13.89
		4960.00	Horizontal	16.48	50.82	34.34	74.00	54.00	-23.18	-19.66
		7440.00		16.48	51.33	34.85	74.00	54.00	-22.67	-19.15
		9920.00		16.48	58.05	41.57	74.00	54.00	-15.95	-12.43

*Note: DCCF is added in Average detector (Duty Cycle: For BLE 15.87% and For BT 9.63%)

DCCF = $20 \cdot \log(1/D)$ where D is the duty cycle

Pk: Peak Detector;

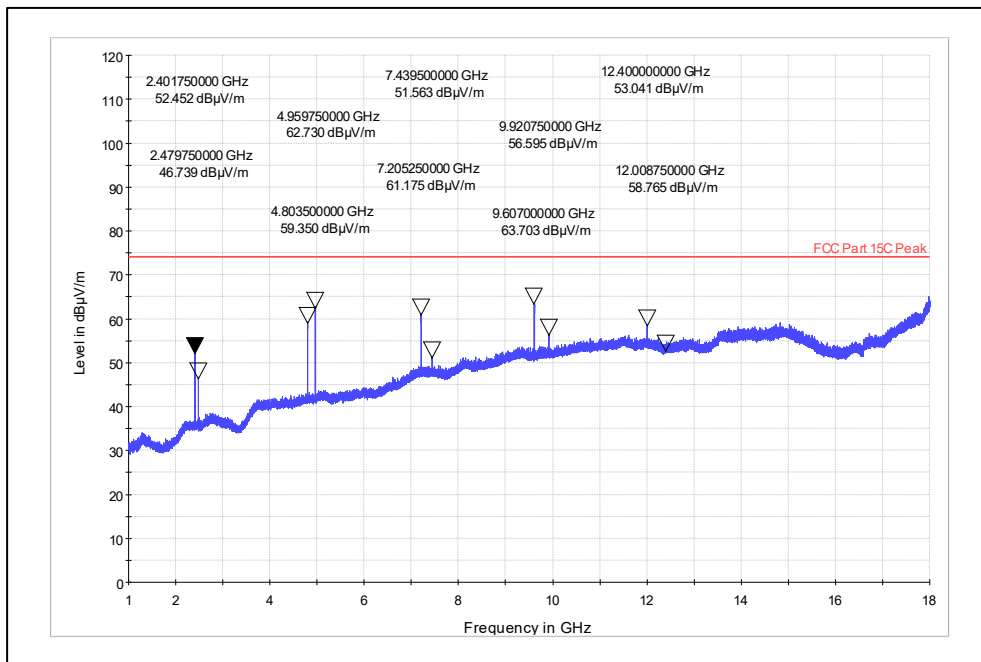
Av: Average Detector

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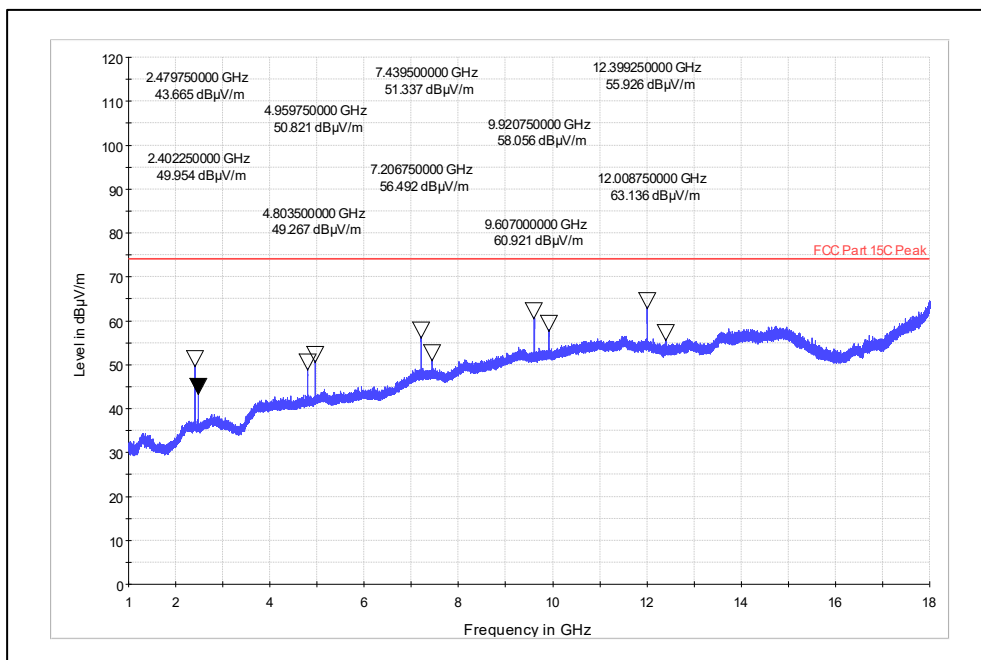
BLE_Channel frequency: 2402MHz & BT_Channel frequency: 2480MHz



Polarization: Vertical

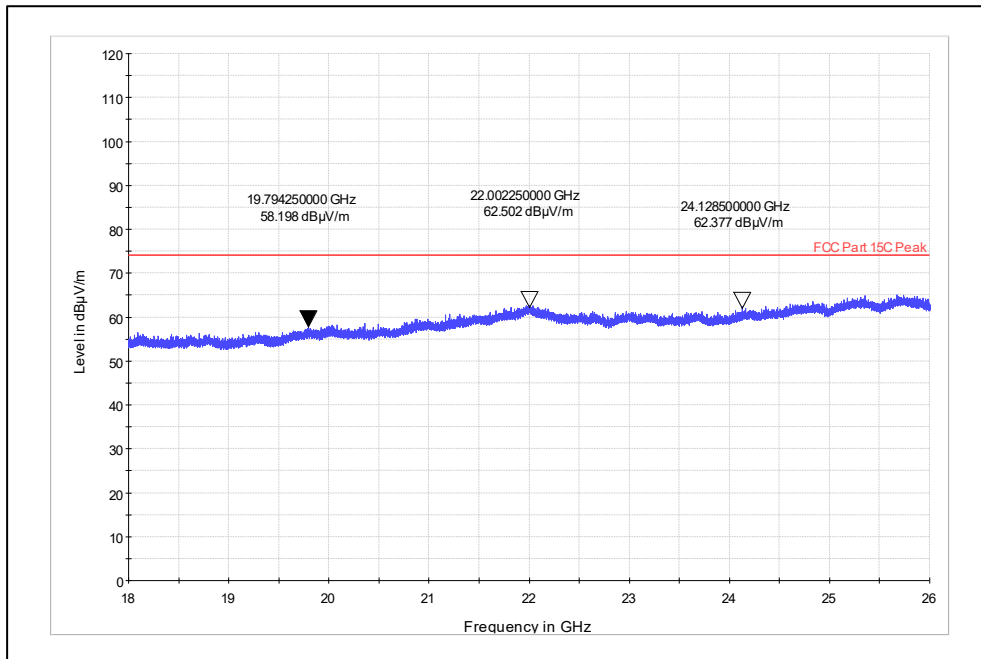
Frequency range: 1GHz to 18GHz

BLE_Channel frequency: 2402MHz & BT_Channel frequency: 2480MHz



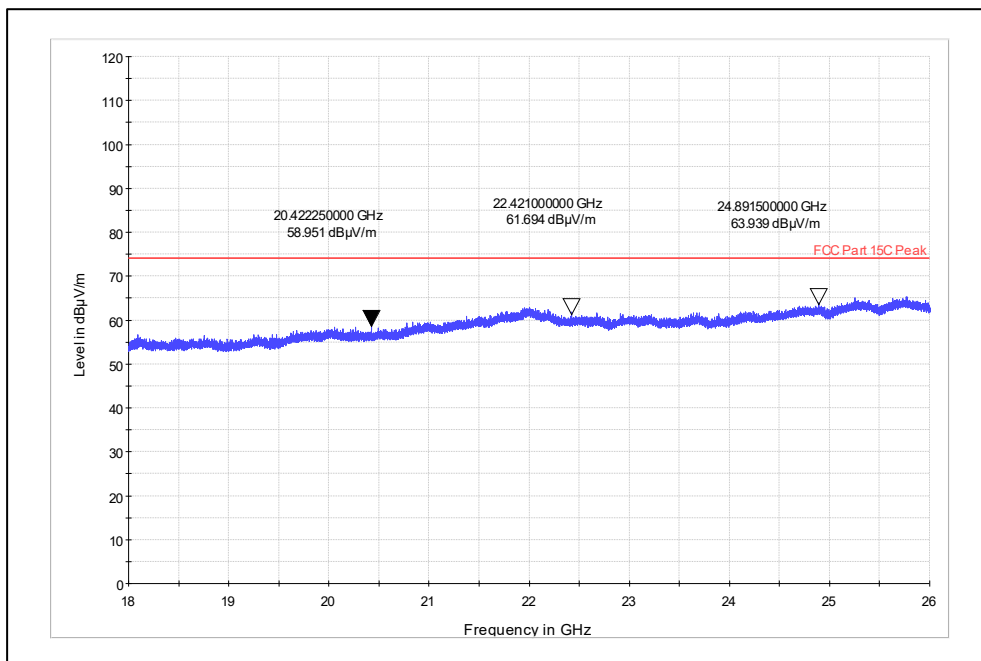
Polarization: Horizontal

Frequency range: 1GHz to 18GHz



Polarization: Vertical

Frequency range: 18GHz to 26GHz



Polarization: Horizontal

Frequency range: 18GHz to 26GHz

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*****End of test report*****