

Prüfbericht-Nr.: Test report no.:	IN26CTRA 001	Auftrags-Nr.: Order no.:	147171094 020	Seite 1 von 44 Page 1 of 44
Kunden-Referenz-Nr.: Client reference no.:	2115186	Auftragsdatum: Order date:	2026-02-23	
Auftraggeber: Client:	Minda Corporation Limited D-6-11, Sector 59, Noida, U.P., 201301, India			
Prüfgegenstand: Test item:	KEY FOB			
Bezeichnung / Typ-Nr.: Identification / Type no.:	ER-365006A			
Auftrags-Inhalt: Order content:	Testing and issue of Test Report			
Prüfgrundlage: Test specification:	FCC Part15 SubpartC 15.247; 15.205; 15.207; 15.209 RSS Gen Issue 5; RSS 247 Issue 4			
Wareneingangsdatum: Date of sample receipt:	2026-04-02			
Prüfmuster-Nr.: Test sample no:	A004242225-002 A004242225-003			
Prüfzeitraum: Testing period:	2026-04-06 - 2026-04-09			
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: 2026-04-27		Ausstellungsdatum: Issue date: 2026-04-27		
Stellung / Position:	Darshan D Senior Engineer	Stellung / Position:	M.V.Naveen Kumar Senior Engineer	
Sonstiges / Other:	FCC ID:2A29L-365006A IC:23641-365006A HVIN:ER-365006A			
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	<table border="1"> <tr> <td data-bbox="140 705 534 772">Other Sonstiges</td><td data-bbox="534 705 1493 840">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.</td></tr> </table>	Other Sonstiges	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.
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6	<table border="1"> <tr> <td data-bbox="140 851 534 918">Test sample obtaining Prüfmusterbereitstellung</td><td data-bbox="534 851 1493 952"> ☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ Others: </td></tr> </table>	Test sample obtaining Prüfmusterbereitstellung	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ Others:
Test sample obtaining Prüfmusterbereitstellung	☒ Sending by customer ☐ Sampling by TÜV Rheinland Group ☐ Others:		
7	<table border="1"> <tr> <td data-bbox="140 963 534 996">Additional Information</td><td data-bbox="534 963 1493 1055"> FCC Test site registration number: 570793 ISED Test site registration number: 27711 </td></tr> </table>	Additional Information	FCC Test site registration number: 570793 ISED Test site registration number: 27711
Additional Information	FCC Test site registration number: 570793 ISED Test site registration number: 27711		

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TEST SUMMARY

Test Item	FCC	ISED	Result
Maximum conducted (Peak) output power	15.247 (b)(3)	RSS 247 Issue 4 Section 6.3.2	Pass
Maximum Power Spectral Density	FCC 15.247(e)	RSS 247 Issue 4 Section 6.3.1	Pass
DTS Bandwidth & 99% Bandwidth	FCC 15.247(a)(2)	RSS 247 Issue 4 Section 6.3.1 RSS Gen Issue 5 Section 6.7	Pass
Emissions in non-restricted frequency bands	15.247 (d)	RSS 247 Issue 4 Section 6.6	Pass
Spurious Radiated Emissions and Restricted Bands of Operation	15.247 (d) / FCC 15.209 / FCC 15.205	RSS-Gen Issue 5, Section 8.9 /8.10	Pass
AC Power lines Conducted emission	FCC 15.207	RSS Gen Issue 5 Section 8.8	Pass
Antenna Requirement	FCC 15.203	RSS Gen Issue 5 Section 6.8	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
IN26CTRA 001	01	Initial issue of report	2026-04-27

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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. 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

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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	3.20SP2	2026.06.24	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	-	2026.05.27	Yearly	
Log-Periodic Antenna	Schwarzbeck mess-elektronik	VUSLP 9111B	9111B-324	-	2026.05.26	Yearly	
Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D-1944	-	2026.11.11	Yearly	
Double-Ridged Waveguide Horn Antenna	ETS	116706	00107323	-	2026.05.16	Yearly	
EMI Test Receiver	R & S	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	-	-	-	2026.10.04	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 key fob is a component of the keyless entry system, enabling remote control of vehicle functions such as Seat unlock, lock, unlock, and find my Vehicle.

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
Calculated e.i.r.p (dBm)		4.72dBm
Modulation		GFSK
Data Rate		1Mbps & 2Mbps
Number of antennas		1
Antenna Gain & Antenna Type		0.5dBi & Chip Antenna
Antenna Part Number		2450AT18A0100001E
Supply Voltage to Product		3V Battery from Li-Battery of CR2450
Environmental conditions	Operating Condition	-20 to 60°C
	Storage Condition	-20 to +85°C
EUT Dimension (L * W * H) in mm		54.5± 0.5mm (L) X 50.6± 0.5mm (W) X 16.9± 0.5mm (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.

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

Hardware Version Identification Number (HVIN):	ER-365006A
Test Software	TI Smart RF Studio 8
Test Software Version	Version 1.2.0
Hardware Name:	Key Fob
Hardware revision:	5.0

4.3 Special Accessories and Auxiliary Equipment

- None

4.4 Simultaneous Transmission

- None

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: A004242225-002 – Radiated test Sample.

A004242225-003 --Conducted test Sample

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5 Operational Description

Considering instrument Cluster/Speedometer is in scanning mode, if the Key FOB is in the range of Instrument Cluster. Once Instrument Cluster is connected with the Key FOB, below mentioned function can be performed from FOB by blinking the LED on every button press. Finder button of FOB for searching for the vehicle. Unlock button for unlocking the vehicle handlebar. Lock button for locking the vehicle handlebar. Seat button for Unlocking the seat/boot space

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

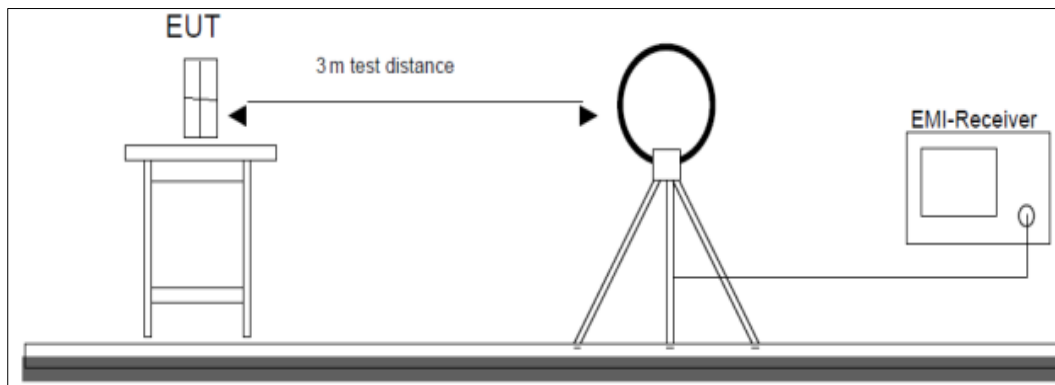


Figure 1: Frequency Range 9 kHz- 30 MHz

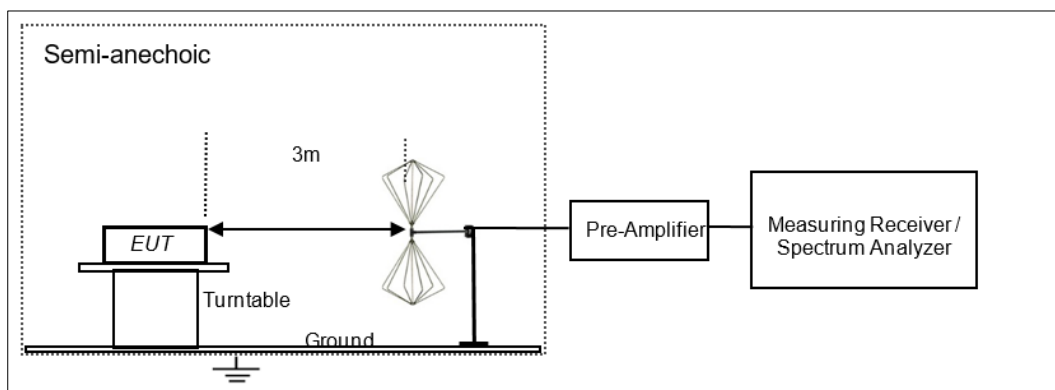


Figure 2: Frequency Range 30 MHz – 200 MHz

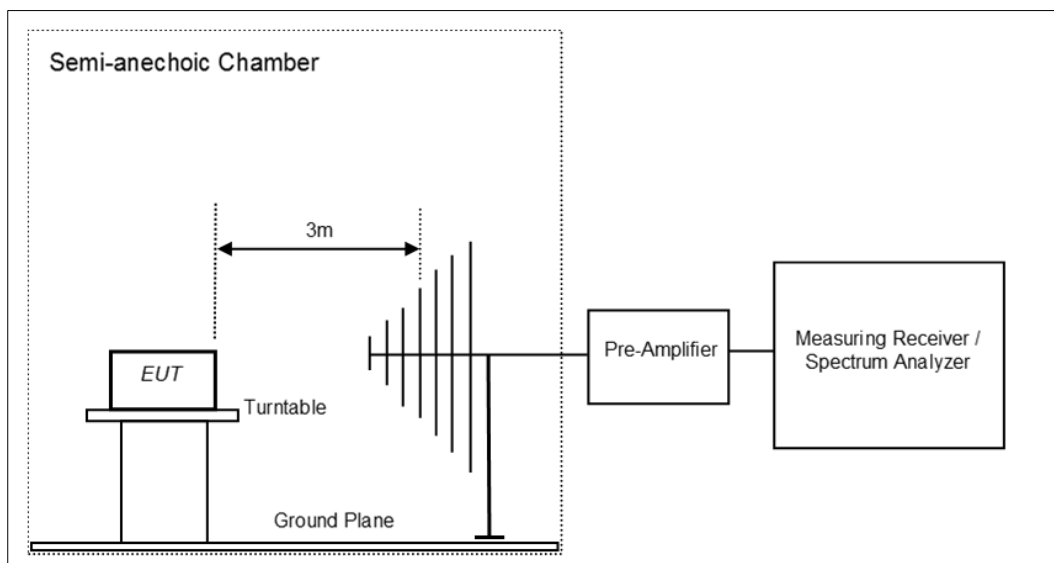


Figure 3: Frequency Range 200 MHz - 1GHz

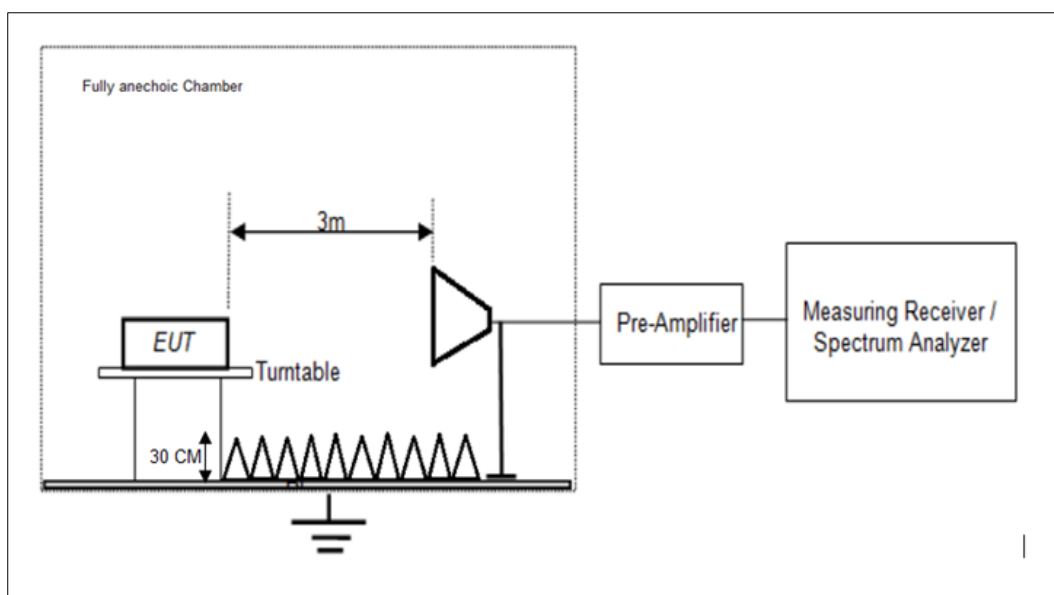


Figure 4: Frequency Range above 1 GHz

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7 TEST RESULTS

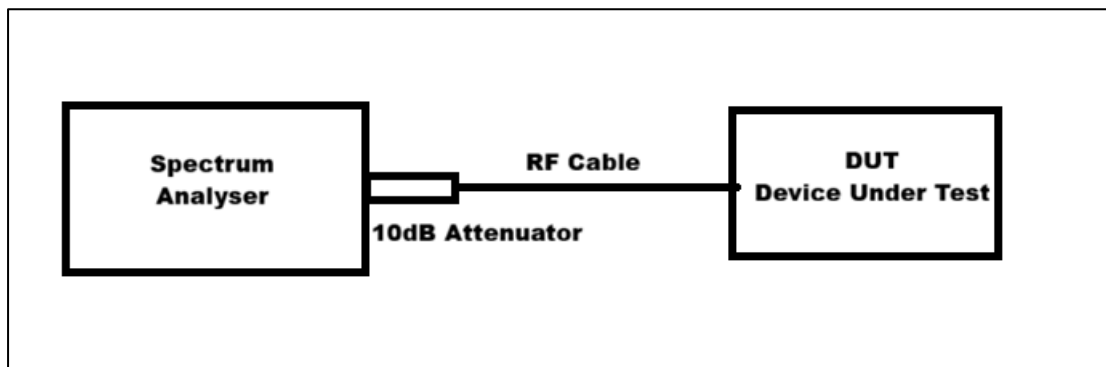
7.1 Maximum Peak Conducted Output Power

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (b)(3)/ RSS 247 Issue 4 Section 6.3.2 (a)
Test Method	ANSI C63.10:2020 and ANSI C63.10:2020+Cor. 1:2023+ C63.10a:2024
Measurement Bandwidth	1MHz
Detector	Peak
Mode of testing	Conducted mode
Requirement	Power ≤ 1 W (30 dBm) & e.i.r.p ≤ 4 W (36dBm)

Test Method:



Test Condition

Normal Test Condition:

Temperature (Norm) = +21.8°C Voltage = 3V Battery from Li-Battery of CR2450 Relative humidity: 55%

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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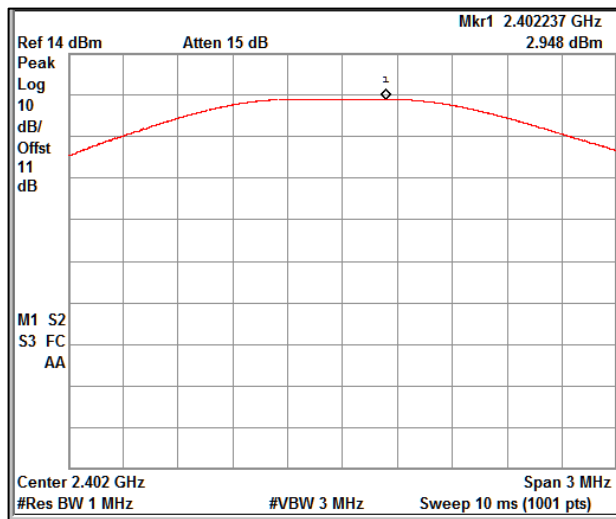
Test results:

Note:

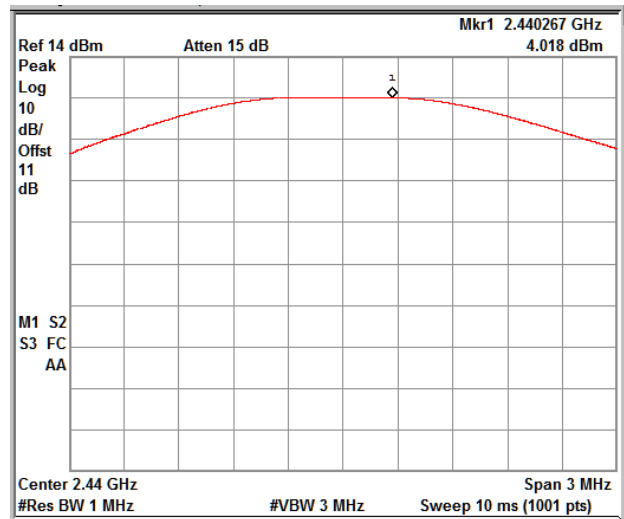
1. All the losses are included during measurement and final values are mentioned in the test report
2. Total Peak Output power (dBm) = Measured Peak power (dBm) + Cable loss (1 dB)
3. This product does not support additional beamforming gain / directional gain, it uses single antenna and antenna gain is 0.5dBi.

Data rate	Channel frequency (MHz)	Measured power (dBm)	Calculated e.i.r.p (dBm)	Limit (dBm)	e.i.r.p (dBm)
1 Mbps	2402	2.94	3.44	30.00	36.00
	2440	4.01	4.51	30.00	36.00
	2480	4.22	4.72	30.00	36.00
2 Mbps	2402	3.88	4.38	30.00	36.00
	2440	3.80	4.30	30.00	36.00
	2480	3.95	4.45	30.00	36.00

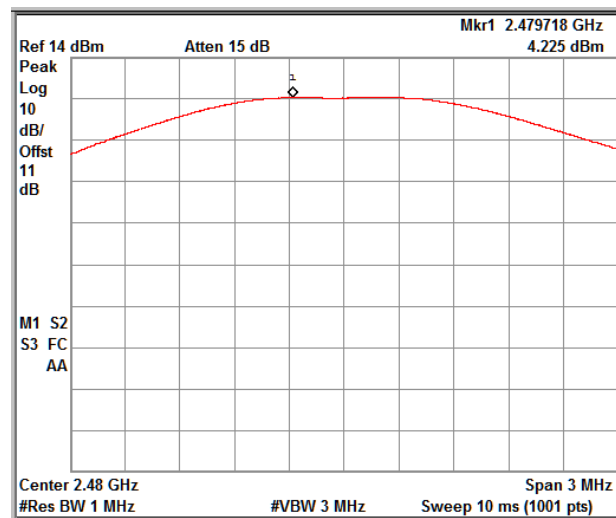
Test Plots:



Channel frequency: 2402MHz



Channel frequency: 2440MHz



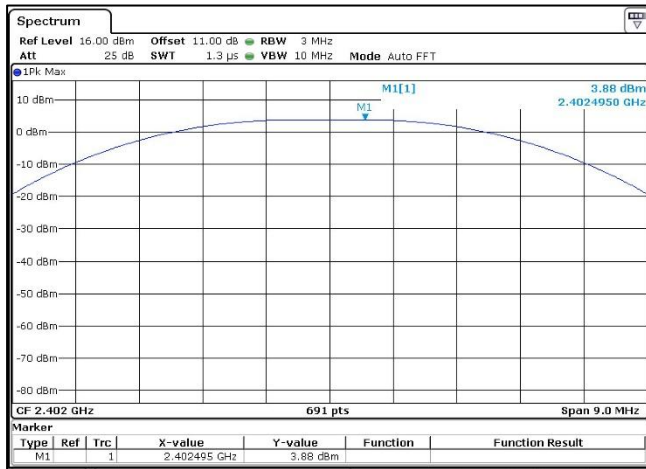
Channel frequency: 2480MHz

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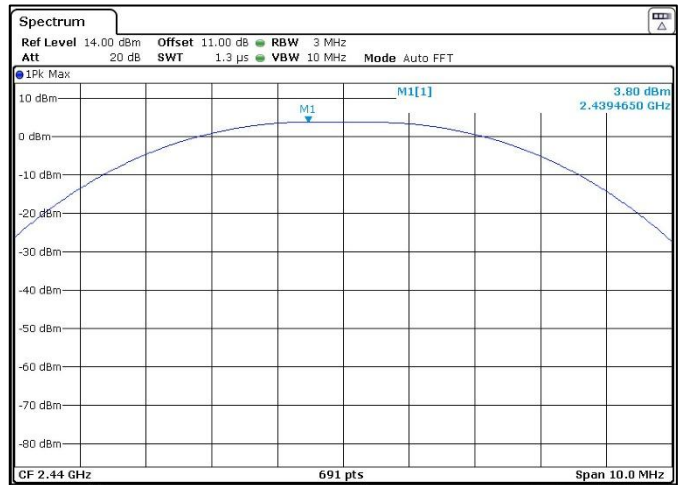
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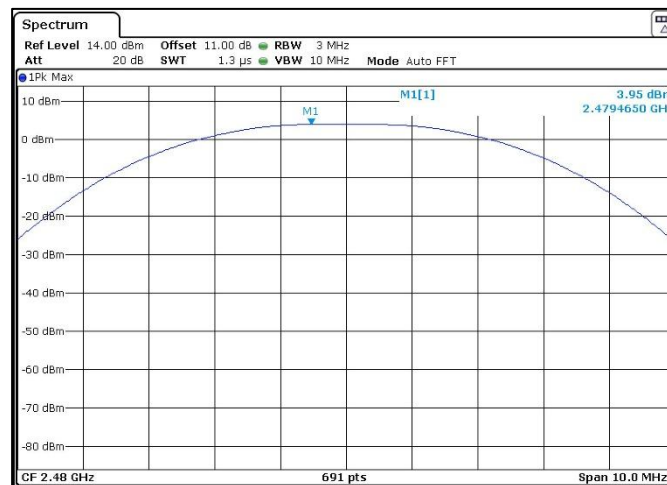
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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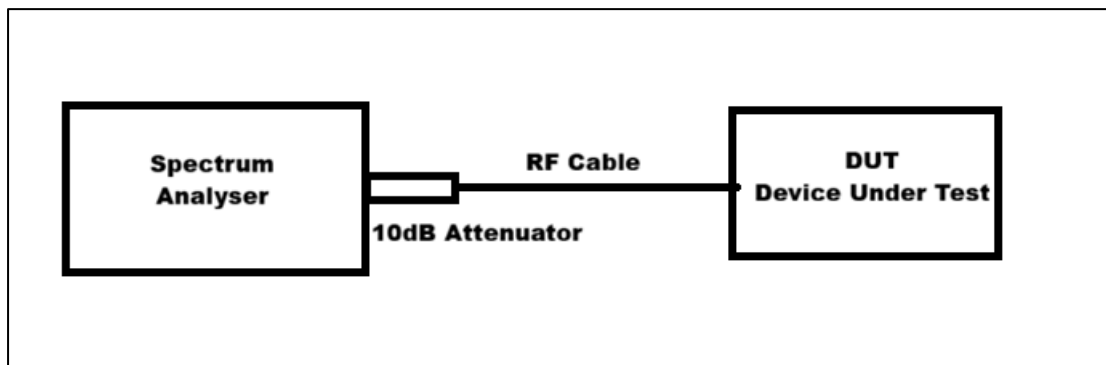
7.2 DTS Bandwidth & 99% Bandwidth

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (a) (2)/ RSS 247 Issue 4 Section 6.3.1 RSS Gen Issue 5 Section 6.7
Test Method	ANSI C63.10:2020 and ANSI C63.10:2020+Cor. 1:2023+ C63.10a:2024
Measurement Bandwidth	100 kHz for DTS Bandwidth 1% to 5% of OBW
Detector	Peak
Mode 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) = +21.8°C Voltage = 3V Battery from Li-Battery of CR2450 Relative humidity: 55%

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:

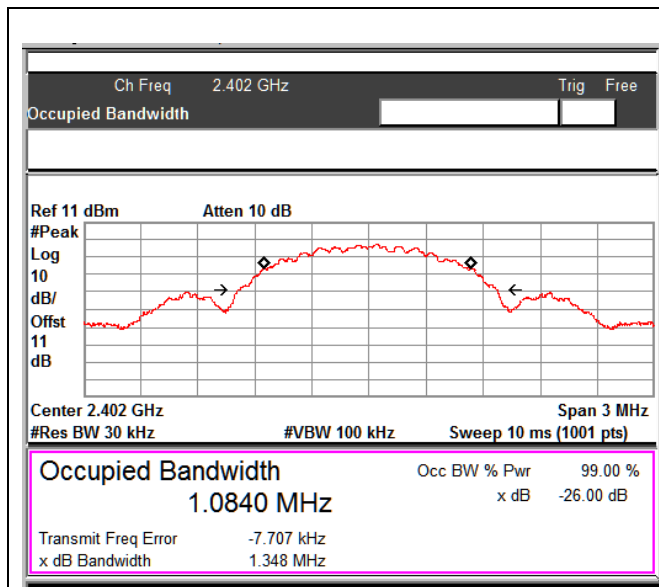
Note: All the losses are included during measurement and final values are mentioned in the test report.

Data rate	Channel frequency (MHz)	99% BW (MHz)	6dB BW (MHz)	Limit (MHz)
1 Mbps	2402	1.08	0.7507	0.5
	2440	1.08	0.7429	0.5
	2480	1.08	0.7464	0.5
2 Mbps	2402	2.08	1.429	0.5
	2440	2.09	1.435	0.5
	2480	2.10	1.432	0.5

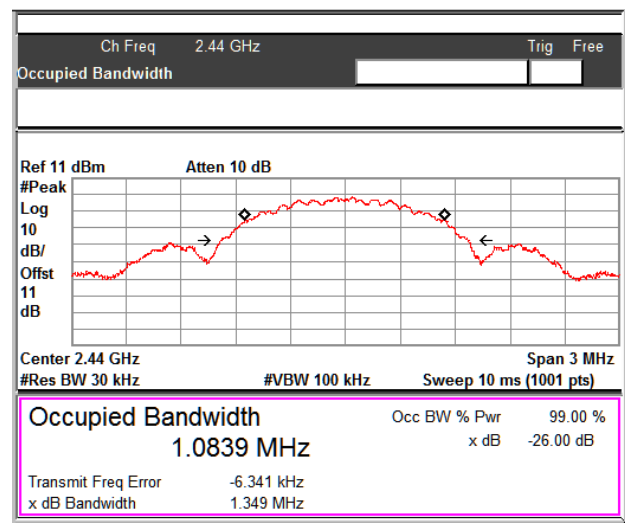
Test Plots:

99% Bandwidth:

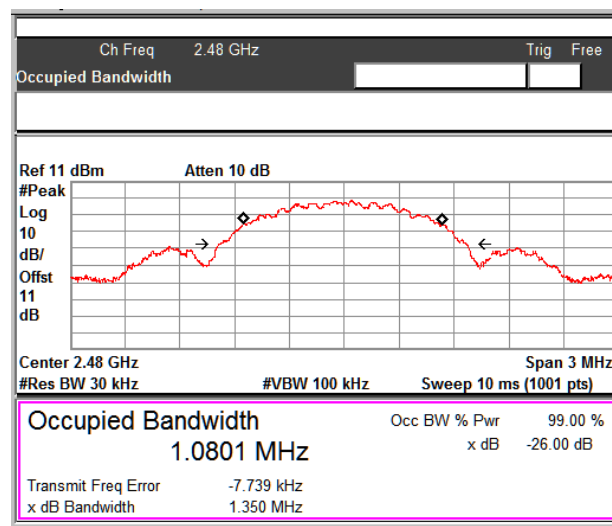
Data Rate: 1Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



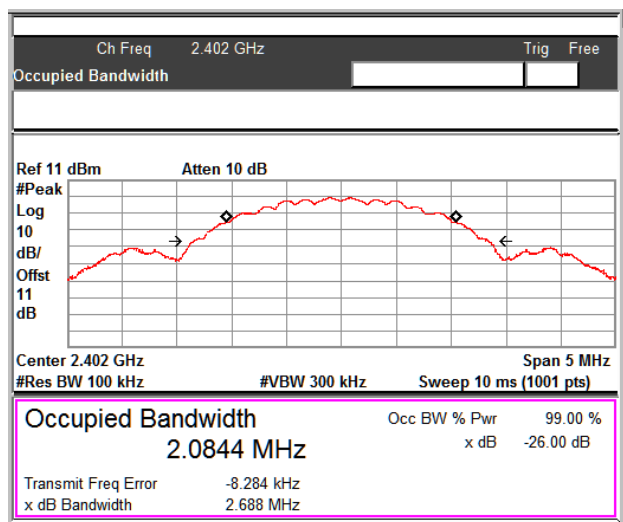
Channel frequency: 2480MHz

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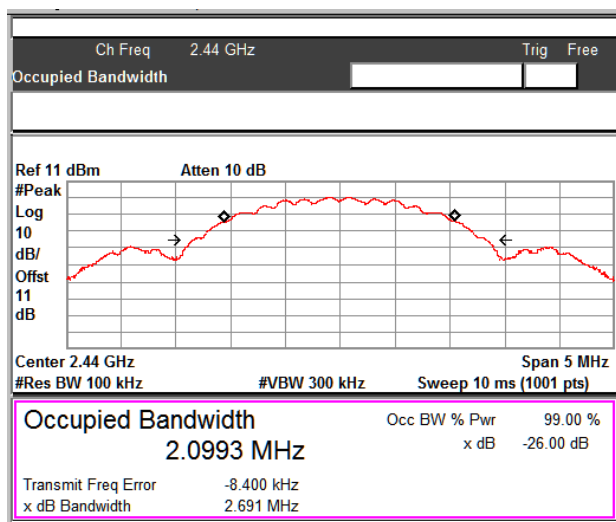
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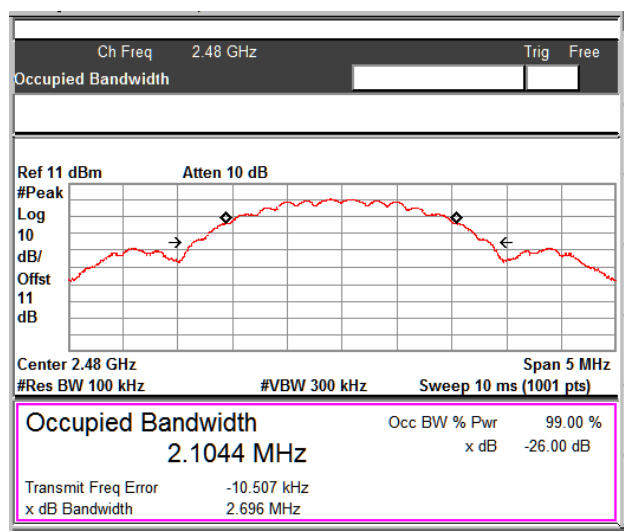
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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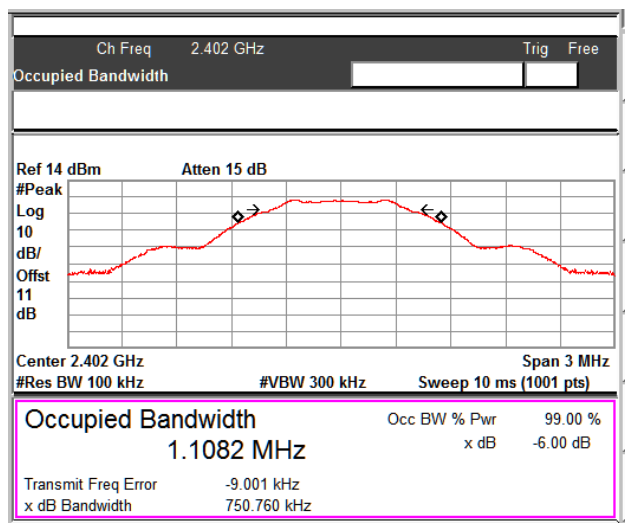
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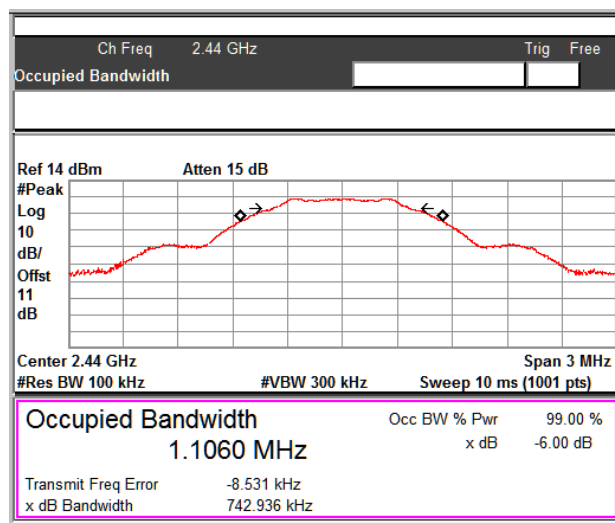
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DTS Bandwidth:

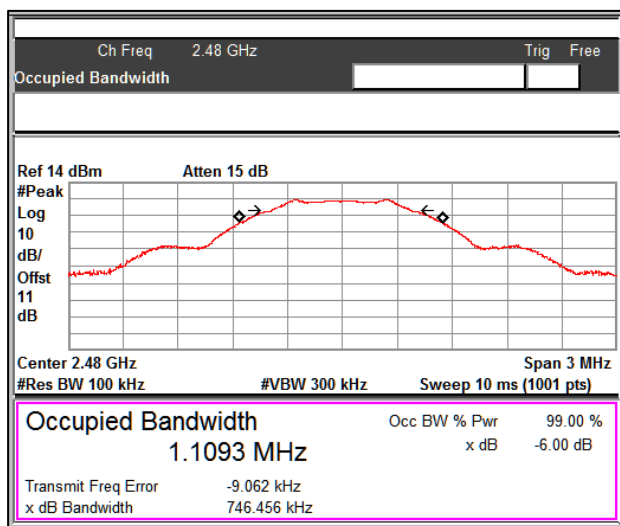
Data Rate: 1Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



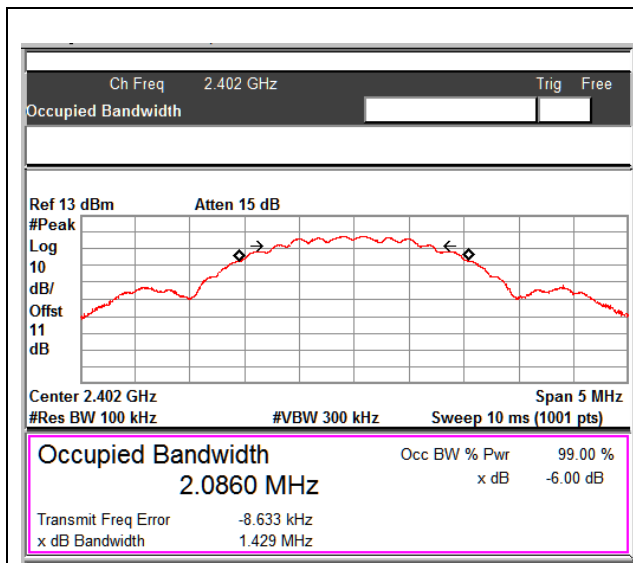
Channel frequency: 2480MHz

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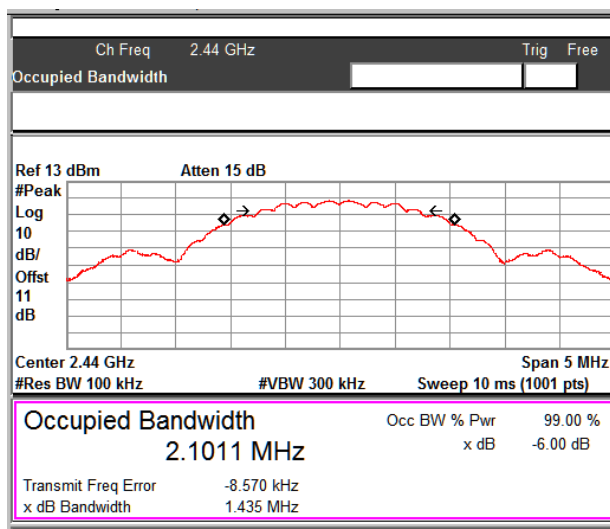
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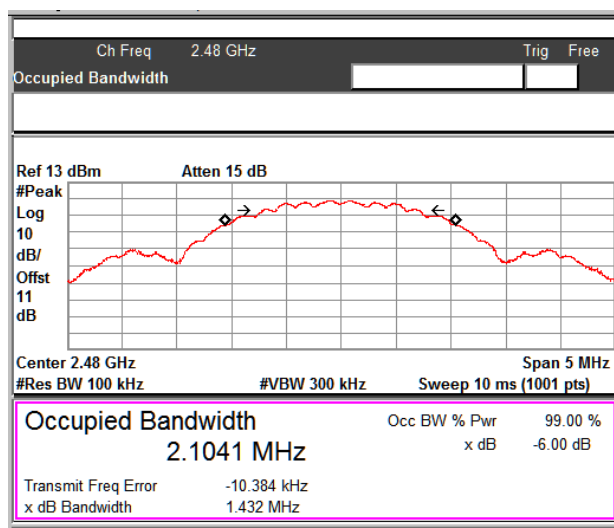
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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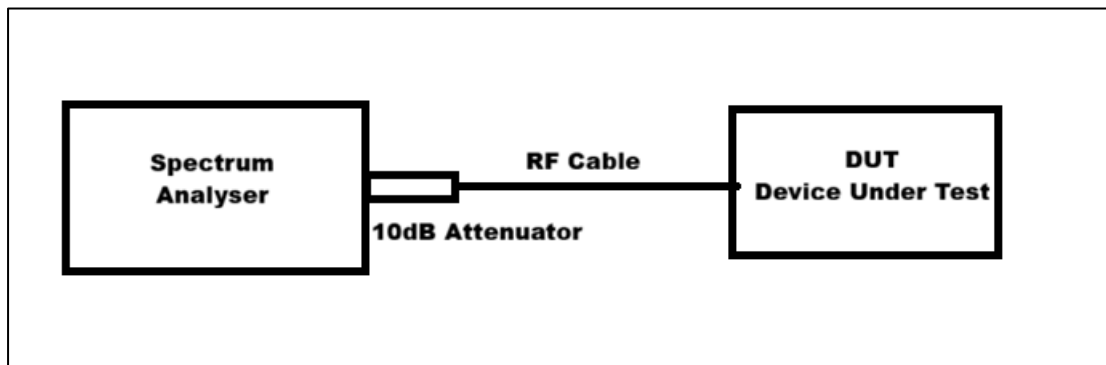
7.3 Power Spectral Density

Result

Pass

Test Specification	FCC Part 15 Subpart C Section 15.247 (e)/ RSS 247 Issue 4 Section 6.3.1
Test Method	ANSI C63.10:2020 and ANSI C63.10:2020+Cor. 1:2023+ C63.10a:2024
Measurement Bandwidth	3 kHz
Detector	Peak
Mode 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) = +21.8°C Voltage = 3V Battery from Li-Battery of CR2450 Relative humidity: 55%

KDB Guidelines applied:

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

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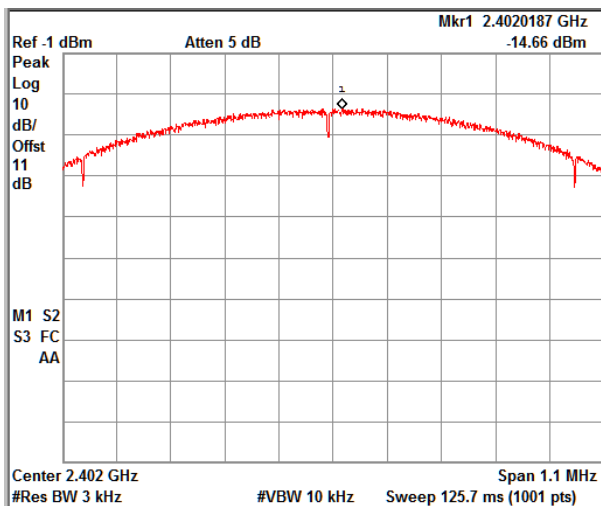
Test results:

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

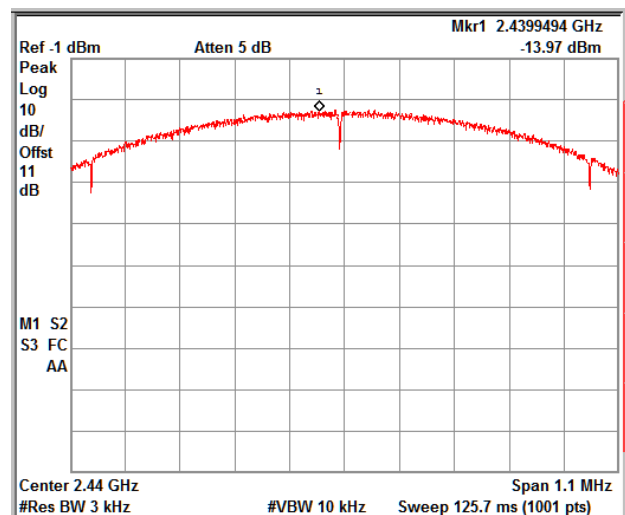
Data rate	Channel frequency (MHz)	Measured PSD (dBm/kHz)	Limit (dBm in any 3kHz)
1 Mbps	2402	-14.66	8.00
	2440	-13.97	8.00
	2480	-13.23	8.00
2 Mbps	2402	-16.35	8.00
	2440	-15.65	8.00
	2480	-14.91	8.00

Test Plots:

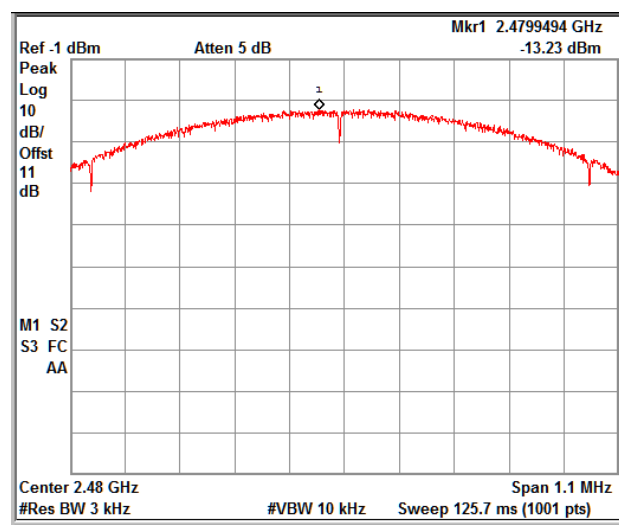
Data Rate: 1Mbps



Channel frequency: 2402MHz

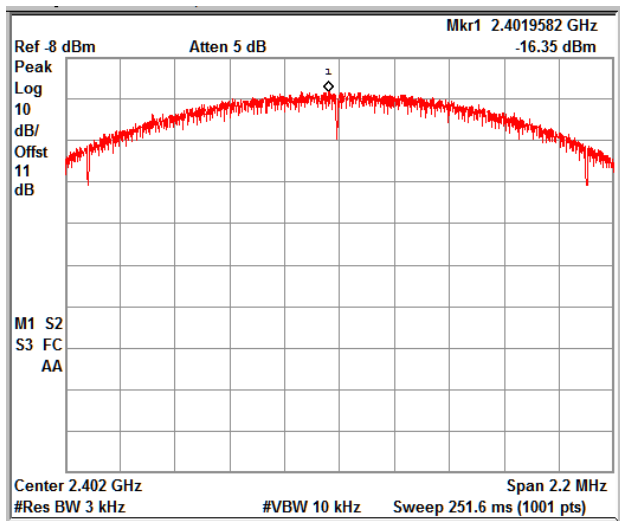


Channel frequency: 2440MHz

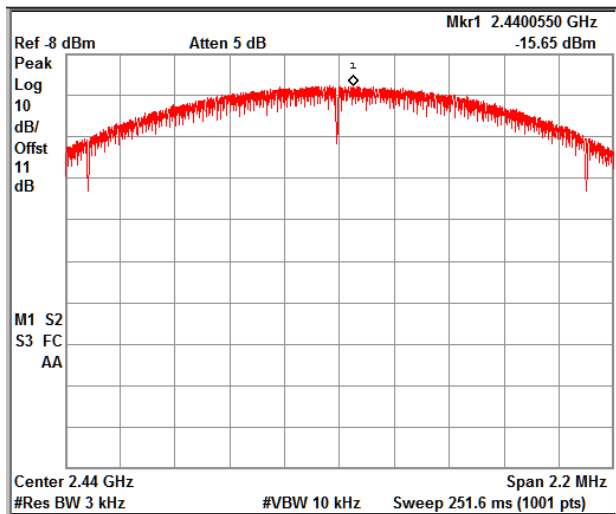


Channel frequency: 2480MHz

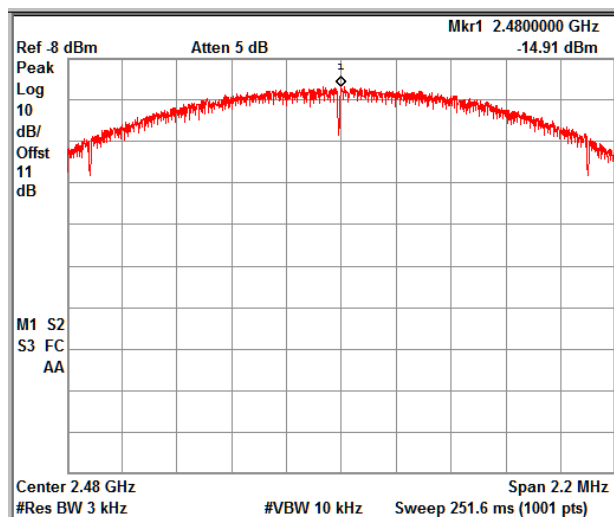
Data Rate: 2Mbps



Channel frequency: 2402MHz



Channel frequency: 2440MHz



Channel frequency: 2480MHz

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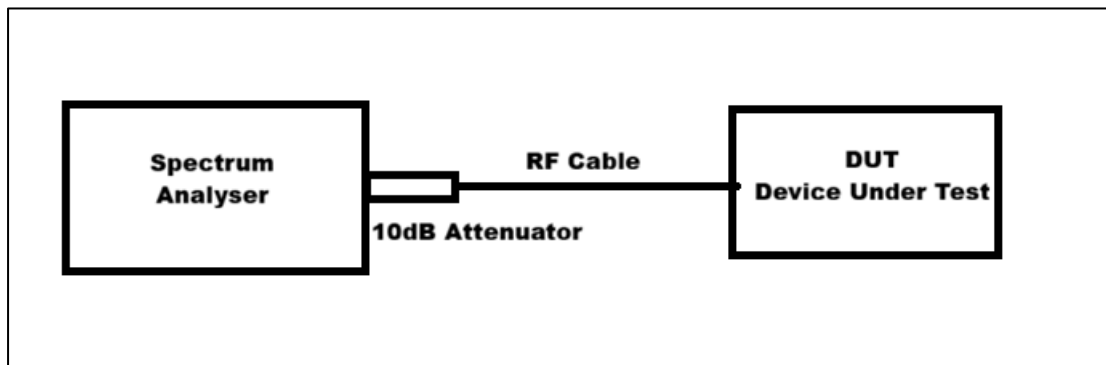
7.4 Emissions in non-restricted frequency bands and Conducted Spurious Emission

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (d)/ RSS 247 Issue 4 Section 6.6
Test Method	ANSI C63.10:2020 and ANSI C63.10:2020+Cor. 1:2023+ C63.10a:2024
Measurement Bandwidth	100 kHz
Detector	Peak
Mode 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) = +21.8°C Voltage = 3V Battery from Li-Battery of CR2450 Relative humidity: 55%

KDB Guidelines applied:

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

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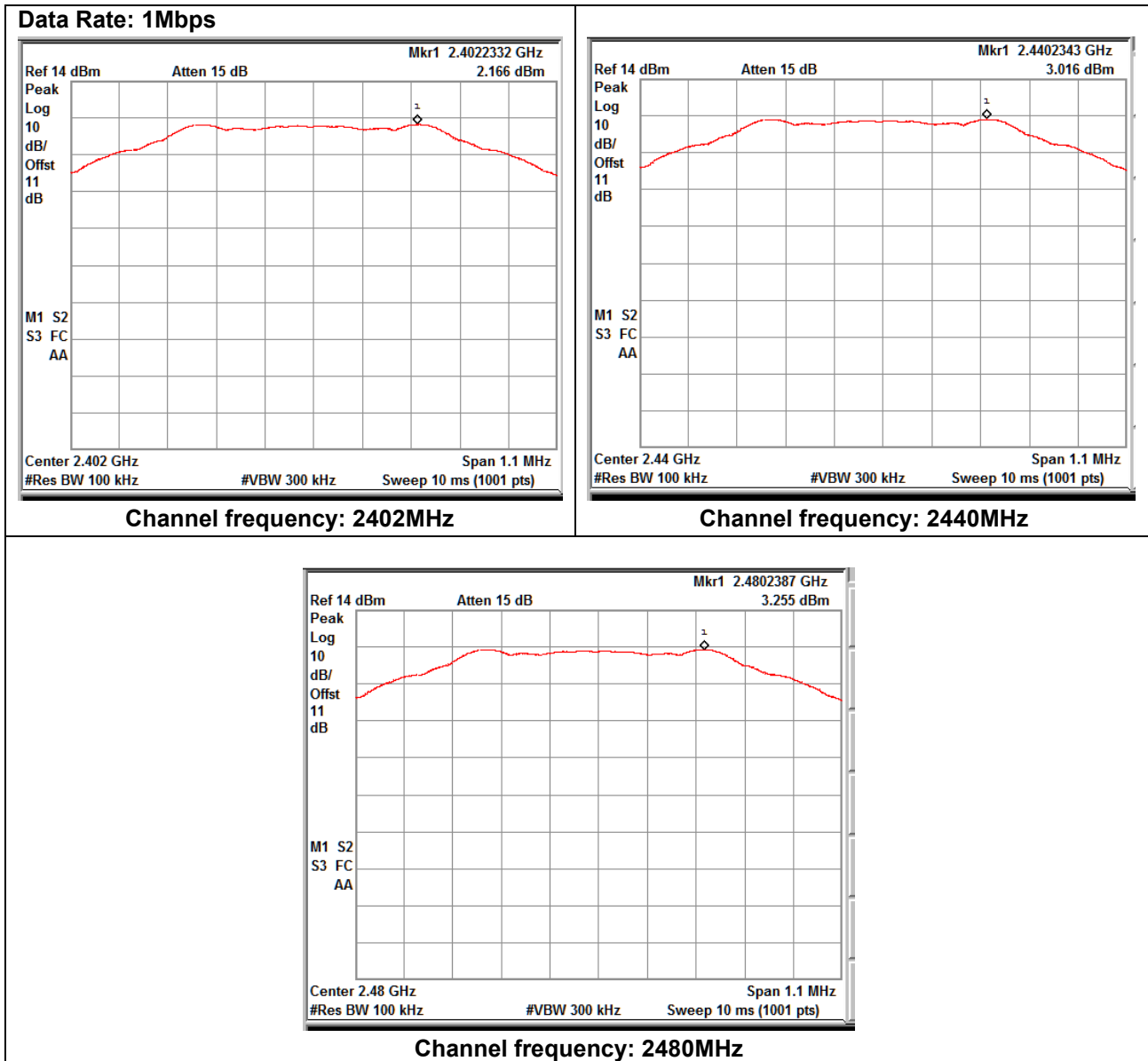
Test results:

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	-44.13	2.16	-46.29	-20.00
	2480.00	2483.50	-51.81	3.25	-55.06	-20.00
2 Mbps	2402.00	2400.00	-30.42	0.38	-30.80	-20.00
	2480.00	2483.50	-51.71	1.61	-53.32	-20.00

Reference Plots:



Prüfbericht - Nr.:

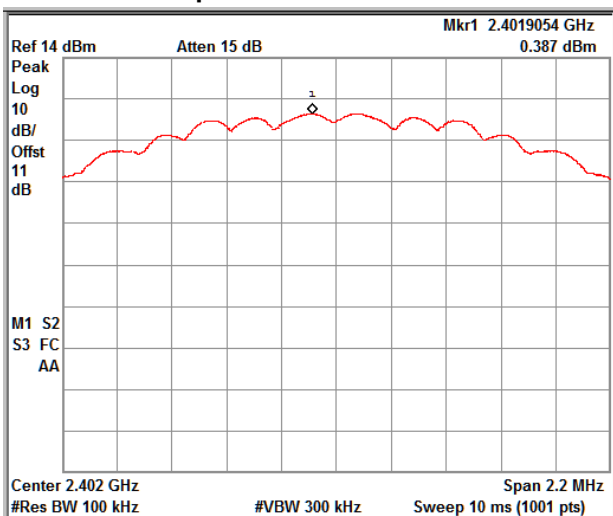
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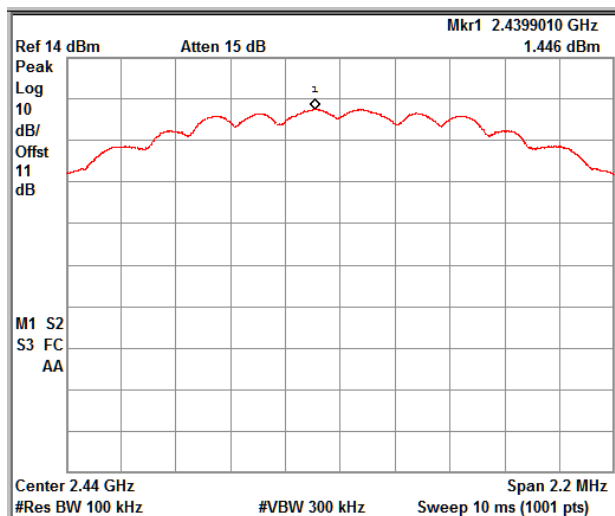
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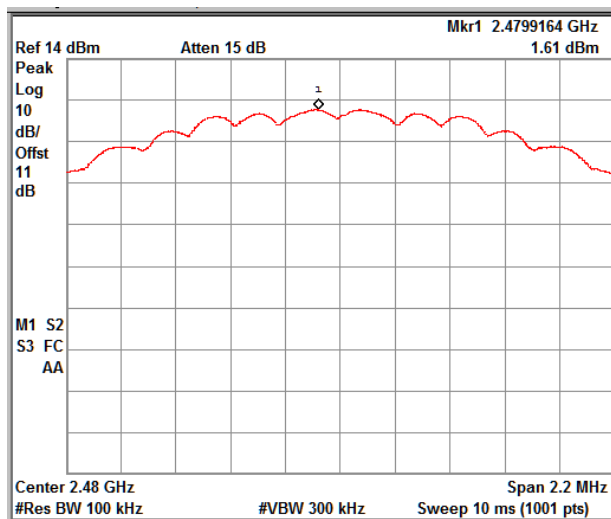
Data Rate: 2Mbps



Channel frequency: 2402MHz



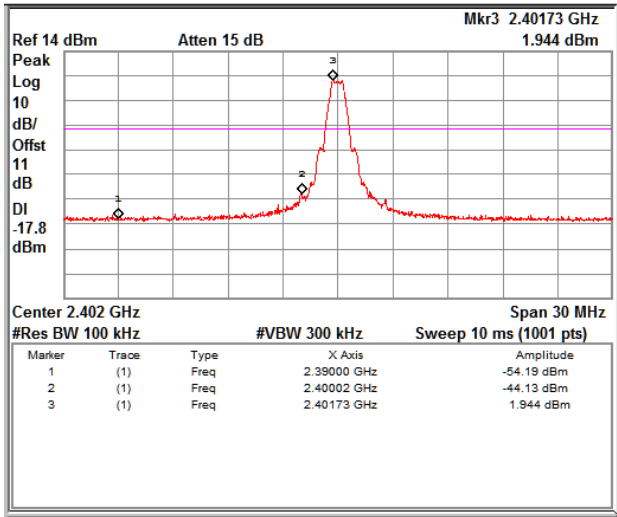
Channel frequency: 2440MHz



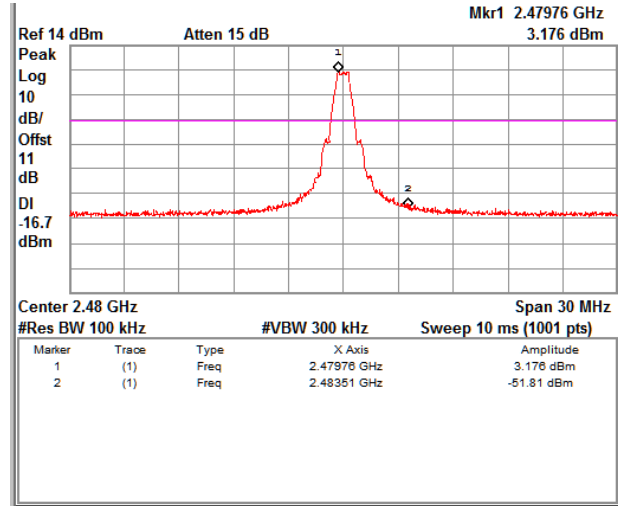
Channel frequency: 2480MHz

Bandedge Plots:

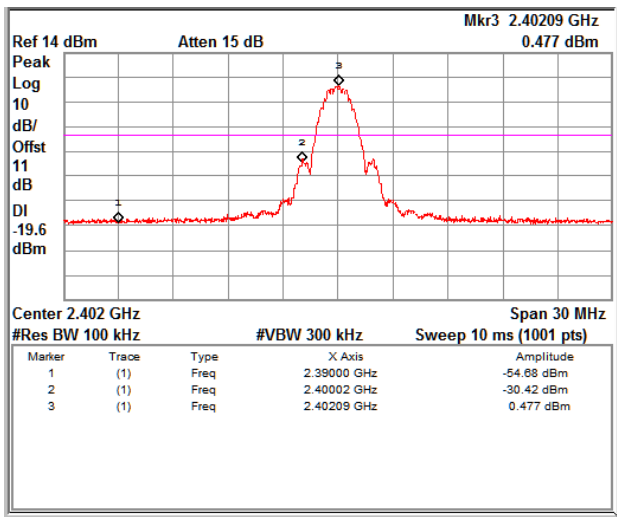
Data Rate: 1Mbps



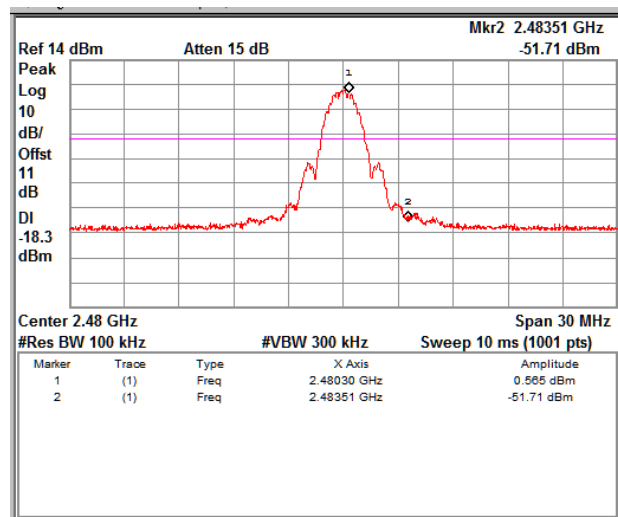
Channel frequency: 2402MHz



Channel frequency: 2480MHz



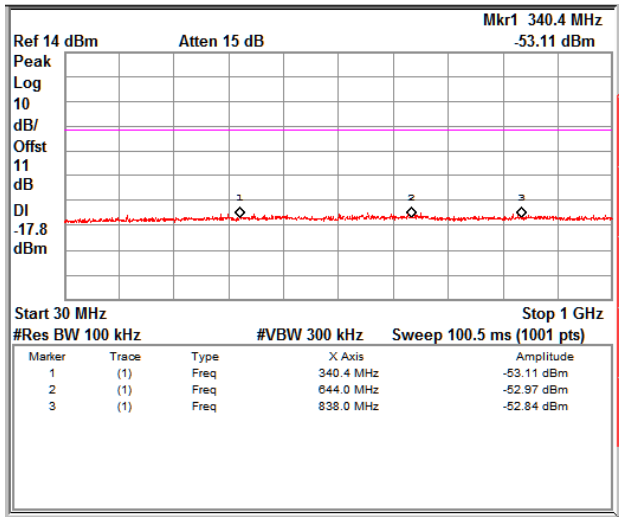
Channel frequency: 2402MHz



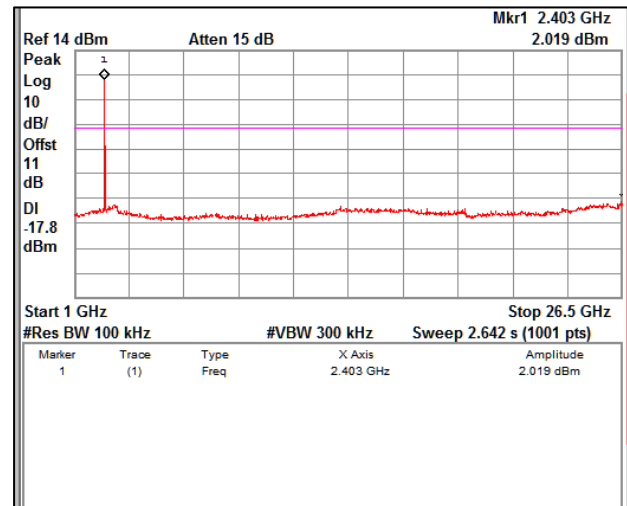
Channel frequency: 2480MHz

7.4.1 Out-Of-Band Emissions

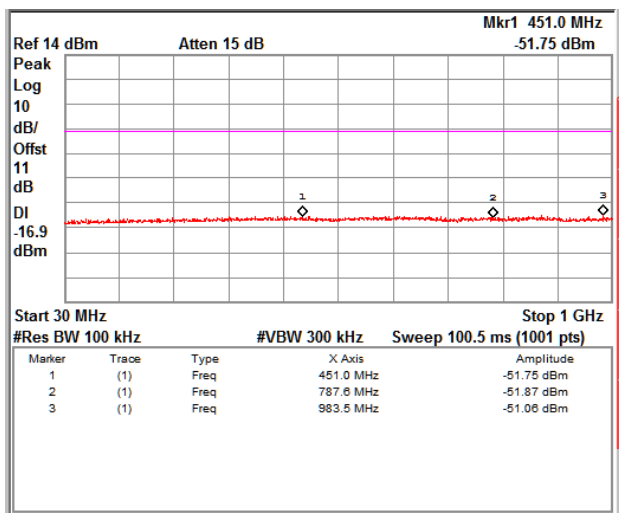
Data Rate: 1Mbps



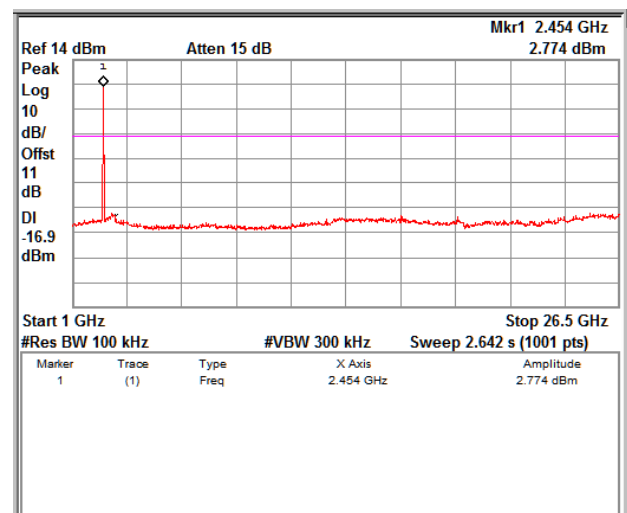
Channel Frequency: 2402MHz Frequency Range: 30MHz to 1GHz



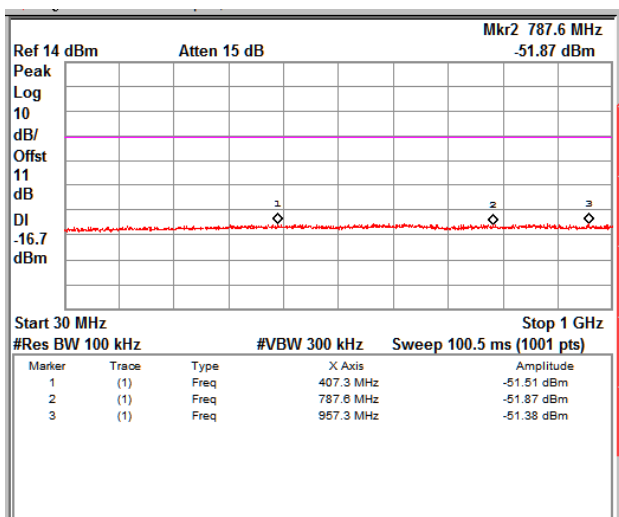
Channel Frequency: 2402MHz Frequency Range: 1GHz to 26.5GHz



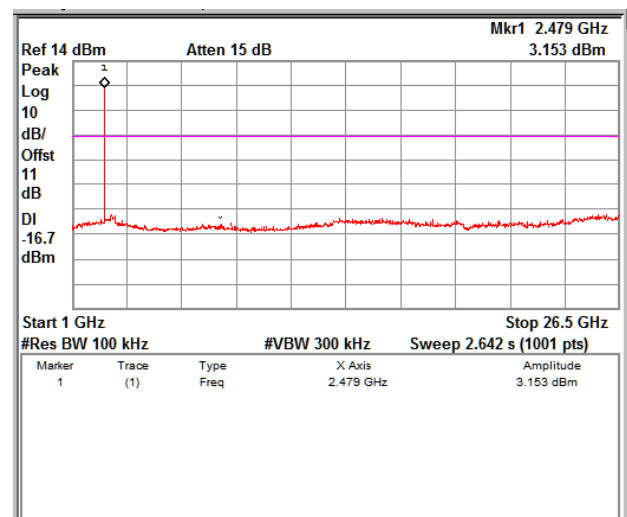
Channel Frequency: 2440MHz Frequency Range: 30MHz to 1GHz



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



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



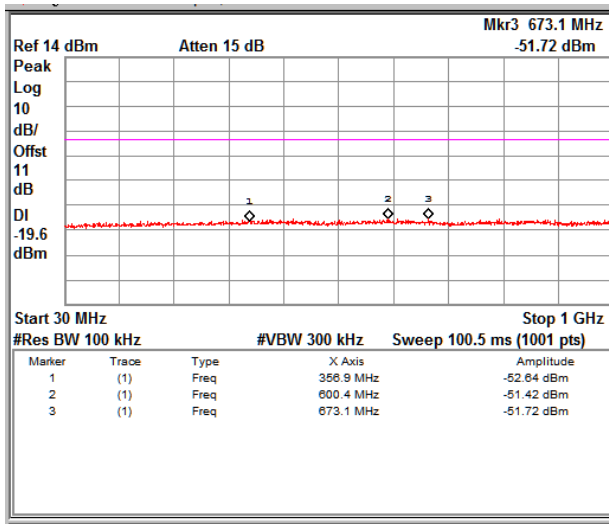
Channel Frequency: 2480MHz Frequency Range: 1GHz to 26.5GHz

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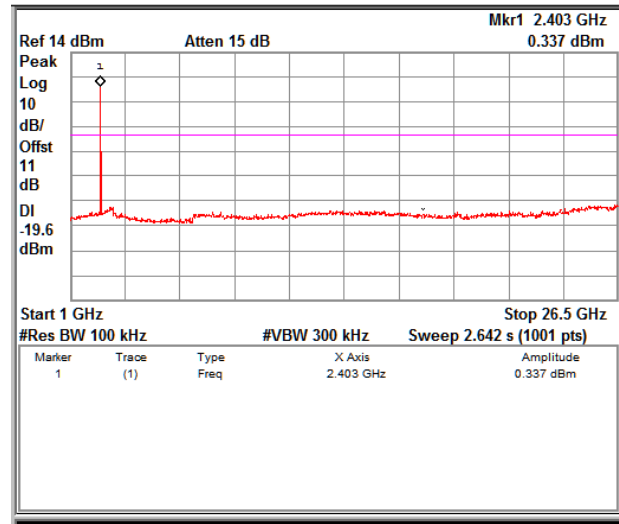
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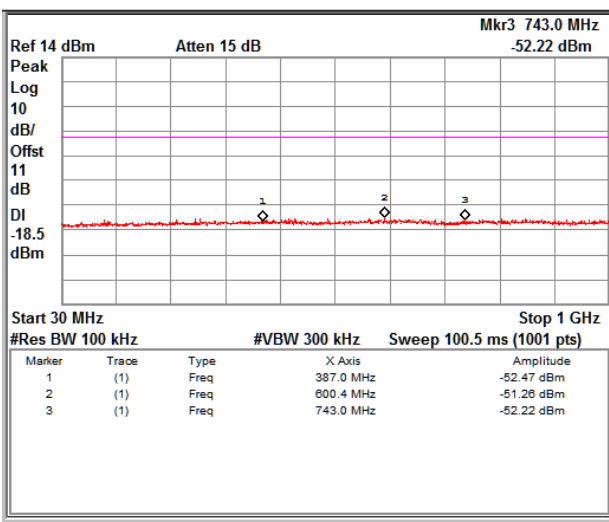
Data Rate: 2Mbps



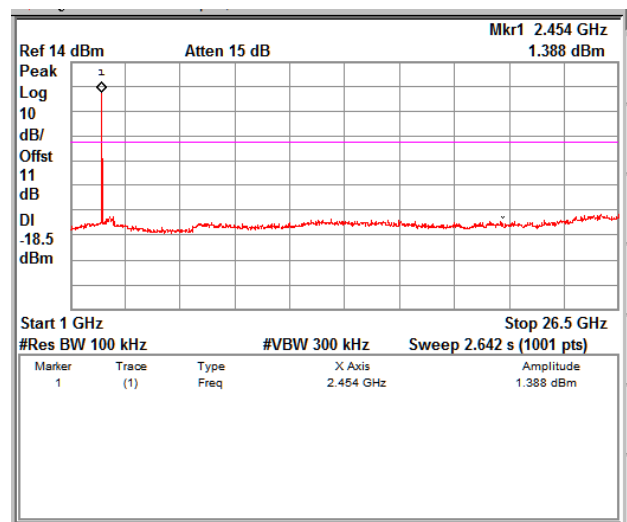
Channel Frequency: 2402MHz Frequency Range: 30MHz to 1GHz



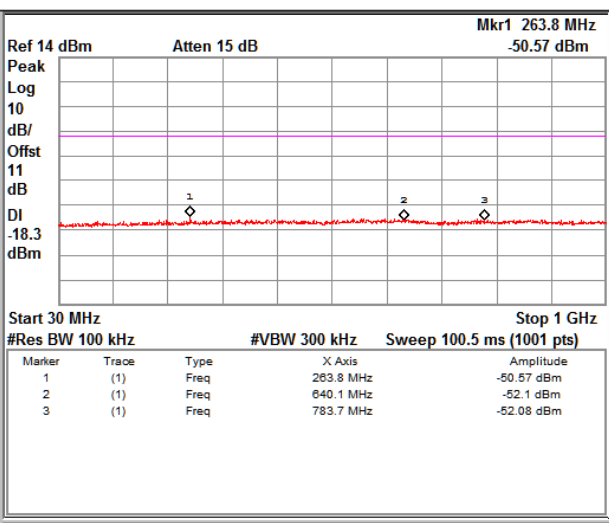
Channel Frequency: 2402MHz Frequency Range: 1GHz to 26.5GHz



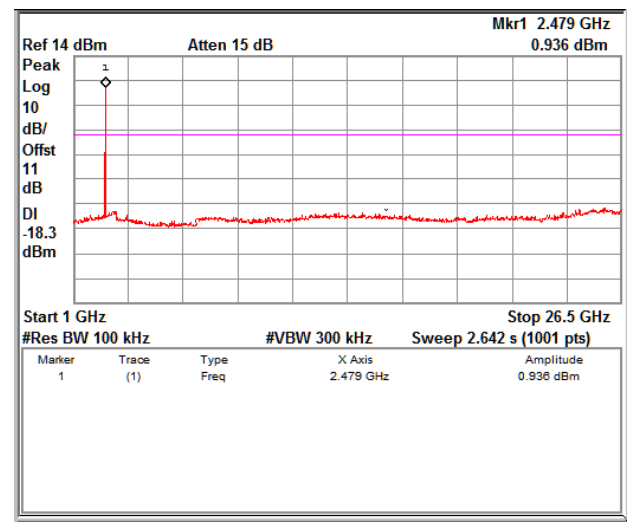
Channel Frequency: 2440MHz Frequency Range: 30MHz to 1GHz



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



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



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

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7.5 Spurious Radiated Emissions & Restricted Bands of Operation

Result

Pass

Test Specification	FCC part 15 Subpart C 15.247 (d) / (15.209 & 15.205)/ RSS-Gen Issue 5, Section 8.9 /8.10
Test Method	ANSI C63.10:2020 and ANSI C63.10:2020+Cor. 1:2023+ C63.10a:2024
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) = +21.8°C Voltage = 3V Battery from Li-Battery of CR2450 Relative humidity: 55%

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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 (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Vertical	41.49	11.05	40.00	-28.95
	52.86	11.34	40.00	-28.66
	74.19	12.40	40.00	-27.60
	145.62	10.88	43.50	-32.62
Horizontal	37.68	10.67	40.00	-29.33
	52.29	10.03	40.00	-29.97
	77.85	13.33	40.00	-26.67
	116.04	8.45	43.50	-35.05

Test Plots:

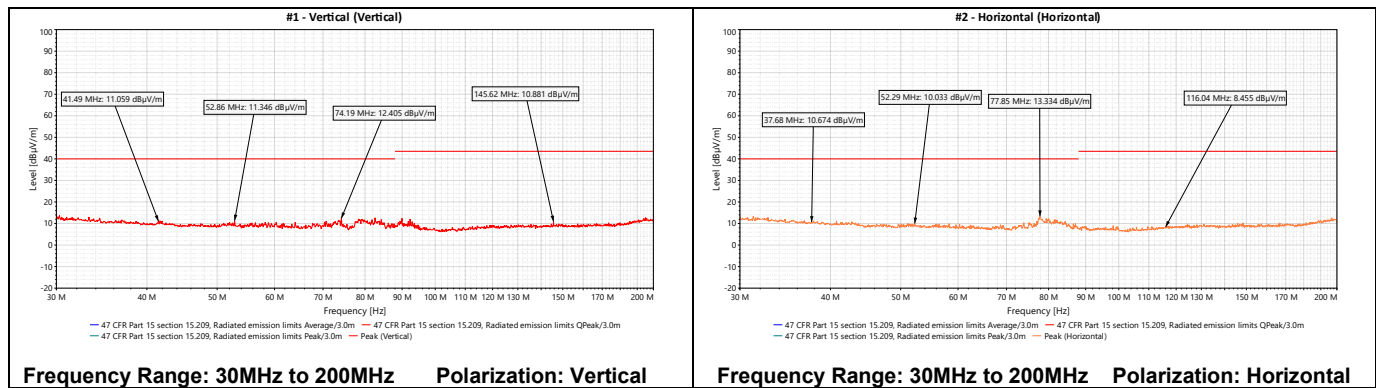


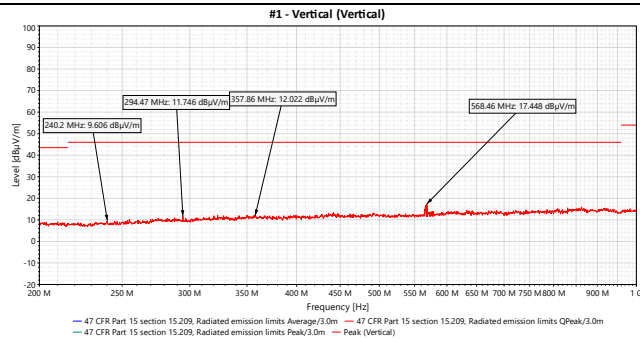
Table 8: Test results for frequency range 200MHz – 1GHz

Antenna Polarization	Measured Frequency (MHz)	Measured emission (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
Vertical	240.20	9.60	43.50	-33.90
	294.47	11.74	43.50	-31.76
	357.86	12.02	43.50	-31.48
	568.46	17.44	43.50	-26.06
Horizontal	255.14	9.36	43.50	-34.14
	349.70	12.65	43.50	-30.85
	588.20	14.07	43.50	-29.43
	682.01	15.28	43.50	-28.22

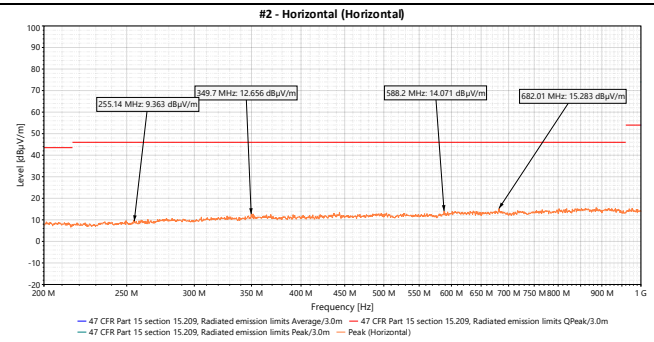
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Frequency Range: 200MHz to 1GHz Polarization: Vertical



Frequency Range: 200MHz to 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	Measured Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
2402	2402(Pk)	Vertical	92.00	-	-
	2402(Av)		90.95	-	-
	2390(Pk)		37.45	74.00*	-36.55
	2390(Av)		24.78	54.00*	-29.22
	4804(Pk)		50.24	74.00	-23.76
	4804(Av)		43.64	54.00	-10.36
	7206(Pk)		52.32	74.00	-21.68
	7206(Av)		41.25	54.00	-12.75
	9608(Pk)		57.71	74.00	-16.29
	9608(Av)		48.52	54.00	-5.48
	12010(Pk)		61.53	74.00	-12.47
	12010(Av)		51.62	54.00	-2.38
	2402(Pk)	Horizontal	101.06	-	-
	2402(Av)		100.08	-	-
	2390(Pk)		42.48	74.00*	-31.52
	2390(Av)		29.58	54.00*	-24.42
	4804(Pk)		52.77	74.00	-21.23
	4804(Av)		46.83	54.00	-7.17
	7206(Pk)		49.17	74.00	-24.83
	7206(Av)		37.30	54.00	-16.70
	9608(Pk)		51.54	74.00	-22.46
	9608(Av)		39.67	54.00	-14.33
	12010(Pk)		No Harmonics	-	-
	12010(Av)		No Harmonics	-	-
2440	2440(Pk)	Vertical	88.24	-	-
	2440(Av)		87.23	-	-
	4880(Pk)		46.58	74.00	-27.42
	4880(Av)		37.70	54.00	-16.30
	7320(Pk)		53.39	74.00	-20.61
	7320(Av)		44.17	54.00	-9.83
	9760(Pk)		56.29	74.00	-17.71
	9760(Av)		45.77	54.00	-8.23
	12200(Pk)		61.19	74.00	-12.81
	12200(Av)		51.80	54.00	-2.20
	2440(Pk)	Horizontal	99.55	-	-
	2440(Av)		98.56	-	-
	4880(Pk)		51.04	74.00	-22.96
	4880(Av)		44.69	54.00	-9.31
	7320(Pk)		49.08	74.00	-24.92
	7320(Av)		36.72	54.00	-17.28
	9760(Pk)		No Harmonics	-	-
	9760(Av)		No Harmonics	-	-
	12200(Pk)		No Harmonics	-	-
	12200(Av)		No Harmonics	-	-

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Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2480	2480(Pk)	Vertical	87.41	-	-
	2480(Av)		86.38	-	-
	2483.5(Pk)		39.98	74.00*	-34.02
	2483.5(Av)		27.81	54.00*	-26.19
	4960(Pk)		52.42	74.00	-21.58
	4960(Av)		46.21	54.00	-7.79
	7440(Pk)		55.25	74.00	-18.75
	7440(Av)		46.52	54.00	-7.48
	9920(Pk)		54.33	74.00	-19.67
	9920(Av)		43.02	54.00	-10.98
	12400(Pk)		60.95	74.00	-13.05
	12400(Av)		51.81	54.00	-2.19
	2480(Pk)	Horizontal	98.08	-	-
	2480(Av)		97.08	-	-
	2483.5(Pk)		48.98	74.00*	-25.02
	2483.5(Av)		36.55	54.00*	-17.45
	4960(Pk)		44.94	74.00	-29.06
	4960(Av)		34.23	54.00	-19.77
	7440(Pk)		49.96	74.00	-24.04
	7440(Av)		37.74	54.00	-16.26
	9920(Pk)		54.31	74.00	-19.69
	9920(Av)		39.57	54.00	-14.43
	12400(Pk)		No Harmonics	-	-
	12400(Av)		No Harmonics	-	-

_ → 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	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2402	2402(Pk)	Vertical	90.25	-	-
	2402(Av)		87.66	-	-
	2390(Pk)		35.86	74.00*	-38.14
	2390(Av)		23.81	54.00*	-30.19
	4804(Pk)		54.02	74.00	-19.99
	4804(Av)		46.05	54.00	-7.95
	7206(Pk)		55.75	74.00	-18.26
	7206(Av)		47.07	54.00	-6.93
	9608(Pk)		60.33	74.00	-13.67
	9608(Av)		50.97	54.00	-3.03
	12010(Pk)		61.01	74.00	-12.99
	12010(Av)		50.87	54.00	-3.13
	2402(Pk)	Horizontal	100.19	-	-
	2402(Av)		97.59	-	-
	2390(Pk)		41.25	74.00*	-32.75
	2390(Av)		28.51	54.00*	-25.49
	4804(Pk)		52.56	74.00	-21.44
	4804(Av)		44.40	54.00	-9.60
	7206(Pk)		48.90	74.00	-25.10
	7206(Av)		36.94	54.00	-17.06
	9608(Pk)		No Harmonics	-	-
	9608(Av)		No Harmonics	-	-
	12010(Pk)		No Harmonics	-	-
	12010(Av)		No Harmonics	-	-
2440	2440(Pk)	Vertical	36.71	-	-
	2440(Av)		26.76	-	-
	4880(Pk)		51.22	74.00	-22.78
	4880(Av)		42.53	54.00	-11.47
	7320(Pk)		53.86	74.00	-20.14
	7320(Av)		44.16	54.00	-9.84
	9760(Pk)		58.56	74.00	-15.44
	9760(Av)		48.04	54.00	-5.96
	12200(Pk)		60.86	74.00	-13.14
	12200(Av)		51.26	54.00	-2.74
	2440(Pk)	Horizontal	95.86	-	-
	2440(Av)		93.18	-	-
	4880(Pk)		47.62	74.00	-26.38
	4880(Av)		38.43	54.00	-15.57
	7320(Pk)		47.48	74.00	-26.52
	7320(Av)		36.08	54.00	-17.92
	9760(Pk)		No Harmonics	-	-
	9760(Av)		No Harmonics	-	-
	12200(Pk)		No Harmonics	-	-
	12200(Av)		No Harmonics	-	-

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Channel Frequency (MHz)	Measured Frequency (MHz)	Antenna Polarization	Measured Emission (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2480	2480(Pk)	Vertical	87.22	-	-
	2480(Av)		84.52	-	-
	2483.5(Pk)		42.08	74.00*	-31.92
	2483.5(Av)		30.49	54.00*	-23.51
	4960(Pk)		50.06	74.00	-23.94
	4960(Av)		40.97	54.00	-13.03
	7440(Pk)		53.93	74.00	-20.07
	7440(Av)		44.52	54.00	-9.48
	9920(Pk)		56.19	74.00	-17.81
	9920(Av)		43.95	54.00	-10.05
	12400(Pk)		60.80	74.00	-13.20
	12400(Av)		51.13	54.00	-2.87
	2480(Pk)	Horizontal	97.99	-	-
	2480(Av)		95.33	-	-
	2483.5(Pk)		51.81	74.00*	-22.19
	2483.5(Av)		40.32	54.00*	-13.68
	4960(Pk)		46.11	74.00	-27.89
	4960(Av)		35.54	54.00	-18.46
	7440(Pk)		49.39	74.00	-24.61
	7440(Av)		36.19	54.00	-17.81
	9920(Pk)		53.87	74.00	-20.13
	9920(Av)		39.89	54.00	-14.11
	12400(Pk)		No Harmonics	-	-
	12400(Av)		No Harmonics	-	-

_ → Fundamental Frequency

*→ Restricted Band edges

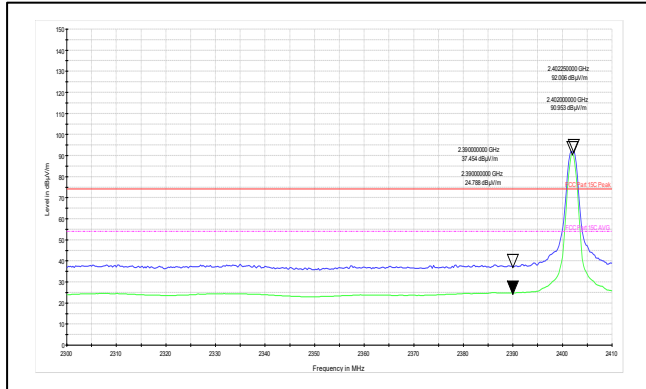
Pk: Peak Detector;

Av: Average Detector

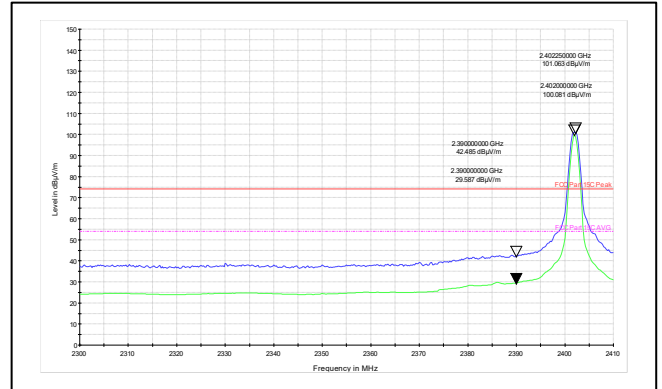
Test Plots:

Restricted Bands of Operation

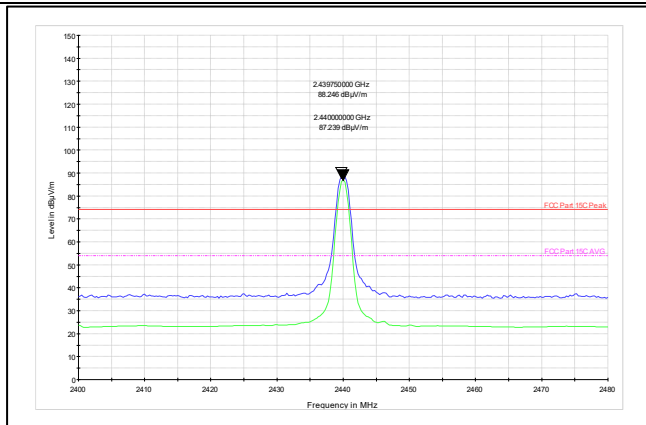
Data Rate: 1Mbps



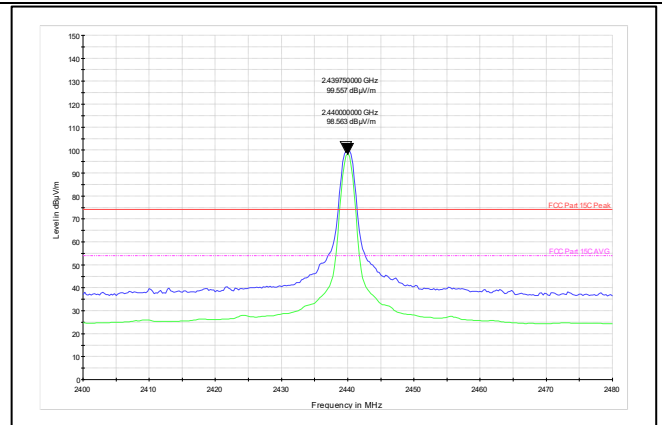
Channel Frequency: 2402MHz Polarization: Vertical



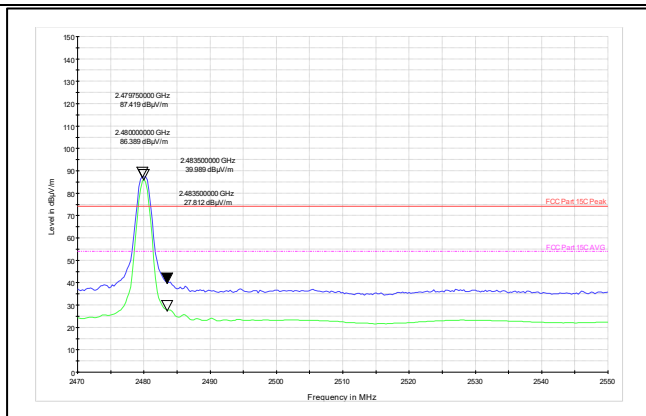
Channel Frequency: 2402MHz Polarization: Horizontal



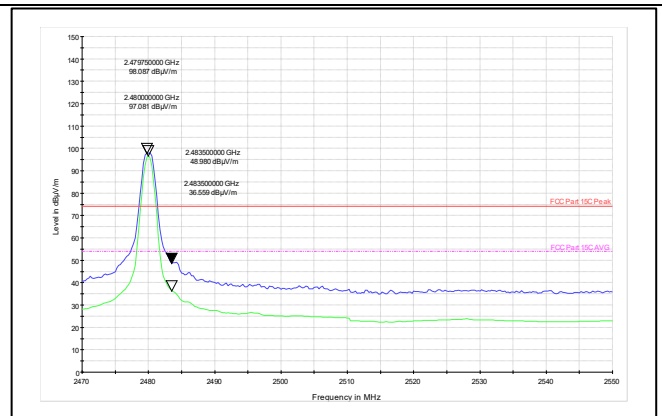
Channel Frequency: 2440MHz Polarization: Vertical



Channel Frequency: 2440MHz Polarization: Horizontal

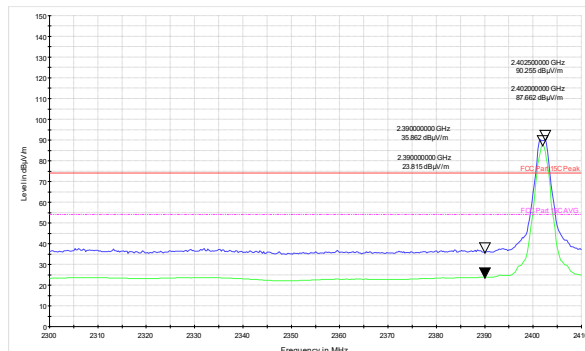


Channel Frequency: 2480MHz Polarization: Vertical

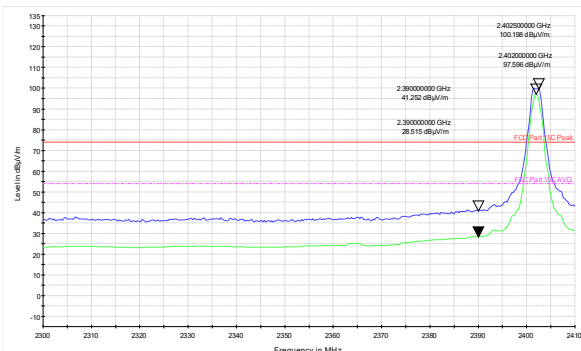


Channel Frequency: 2480MHz Polarization: Horizontal

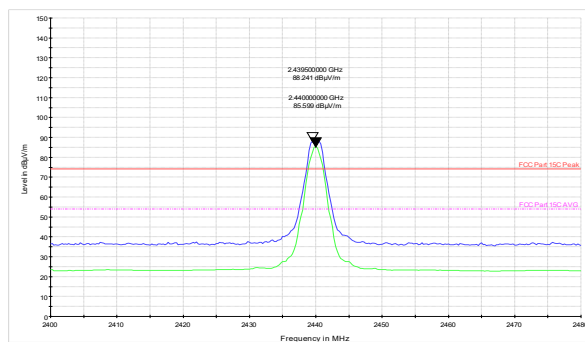
Data Rate: 2Mbps



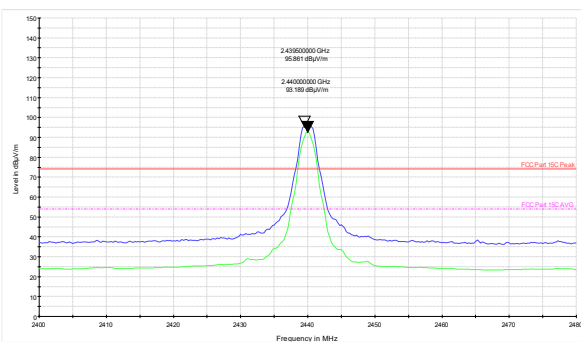
Channel Frequency: 2402MHz Polarization: Vertical



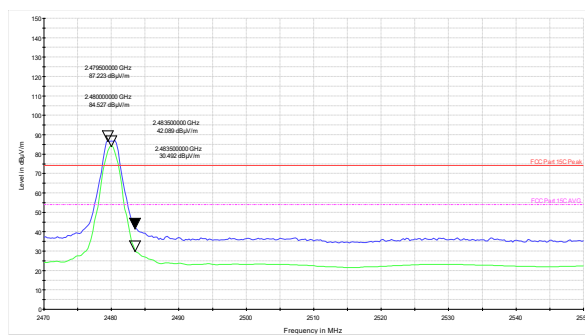
Channel Frequency: 2402MHz Polarization: Horizontal



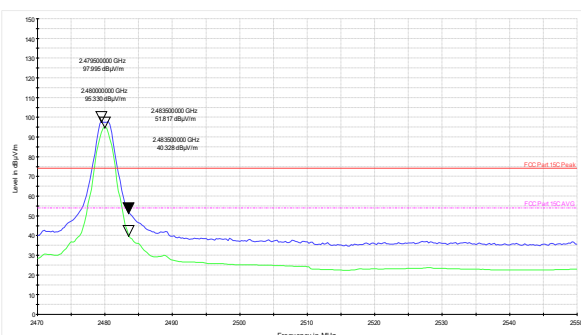
Channel Frequency: 2440MHz Polarization: Vertical



Channel Frequency: 2440MHz Polarization: Horizontal



Channel Frequency: 2480MHz Polarization: Vertical



Channel Frequency: 2480MHz Polarization: Horizontal

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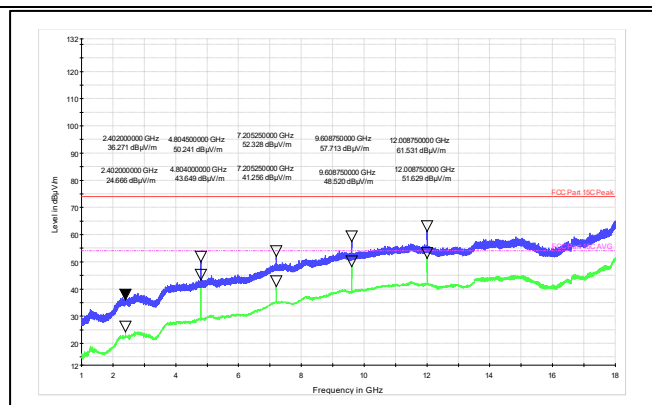
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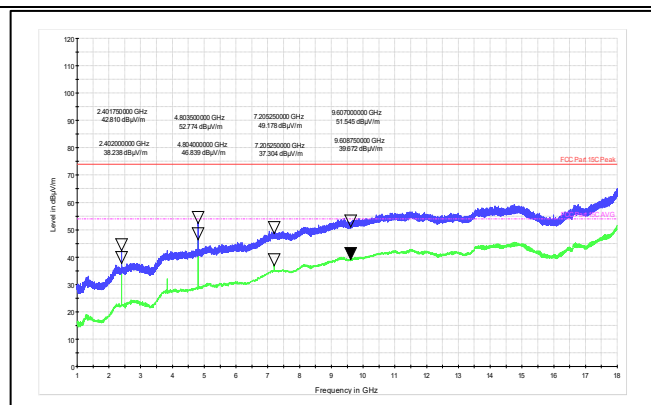
Spurious Radiated emission:

Data Rate: 1Mbps



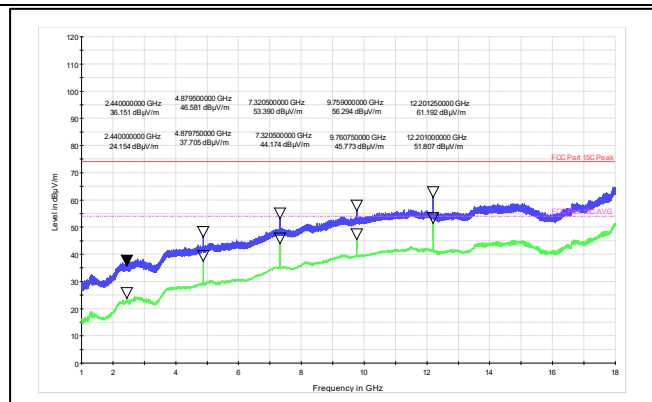
Channel Frequency: 2402MHz

Polarization: Vertical



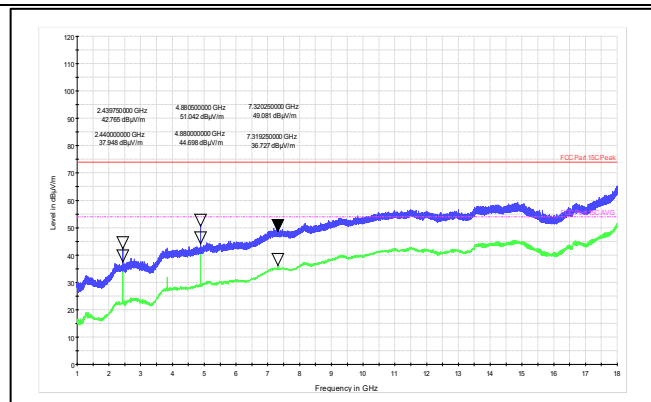
Channel Frequency: 2402MHz

Polarization: Horizontal



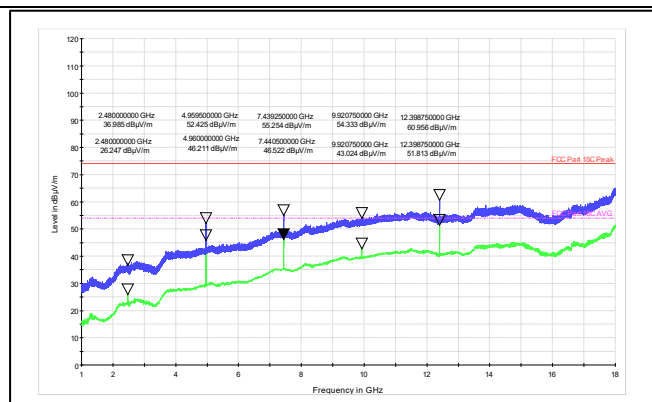
Channel Frequency: 2440MHz

Polarization: Vertical



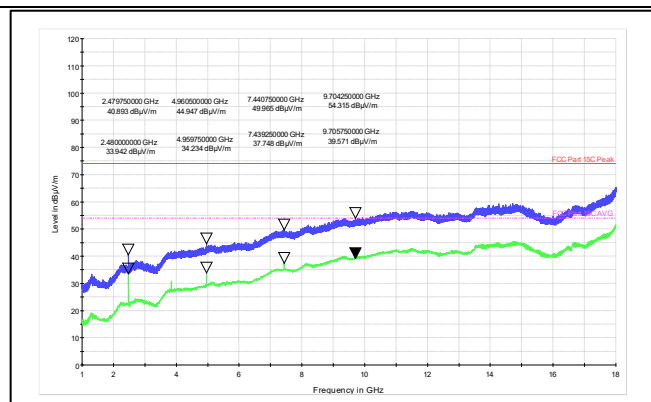
Channel Frequency: 2440MHz

Polarization: Horizontal



Channel Frequency: 2480MHz

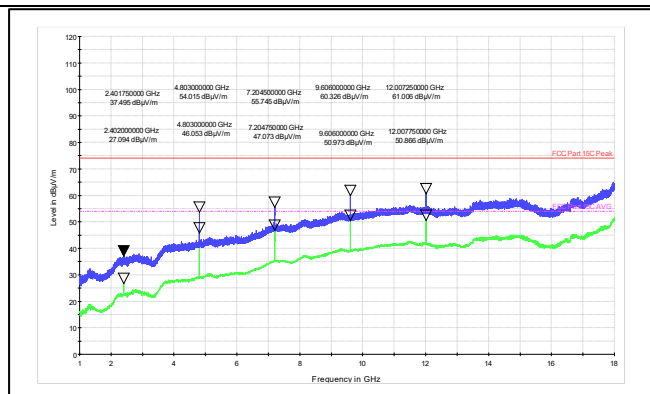
Polarization: Vertical



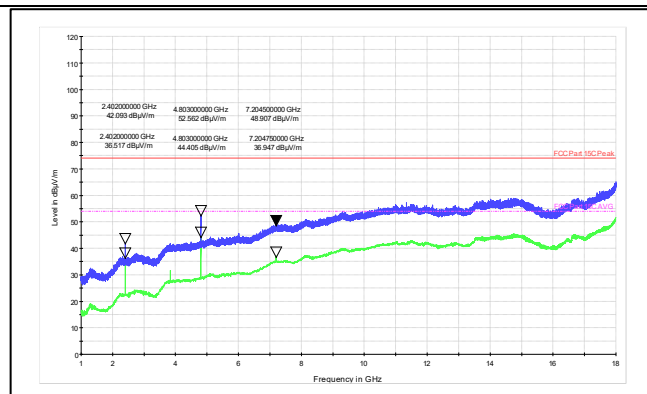
Channel Frequency: 2480MHz

Polarization: Horizontal

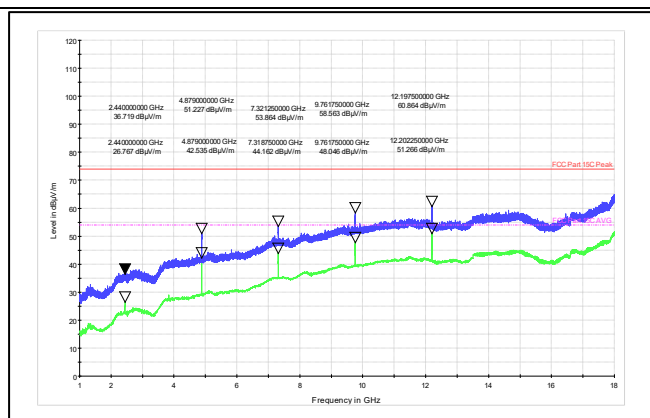
Data Rate: 2Mbps



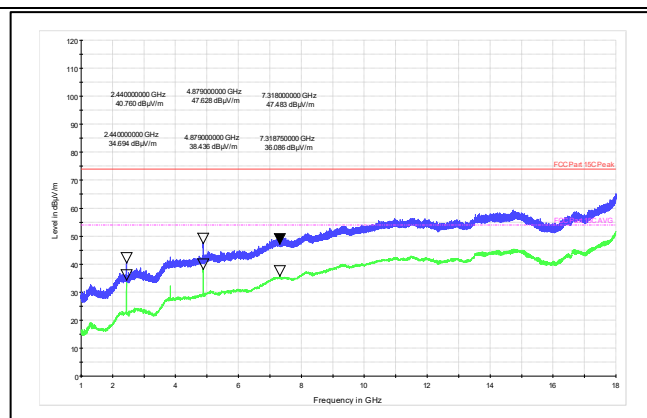
Channel Frequency: 2402MHz Polarization: Vertical



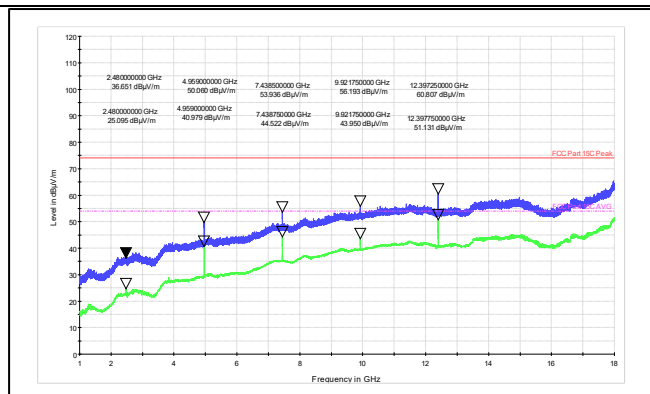
Channel Frequency: 2402MHz Polarization: Horizontal



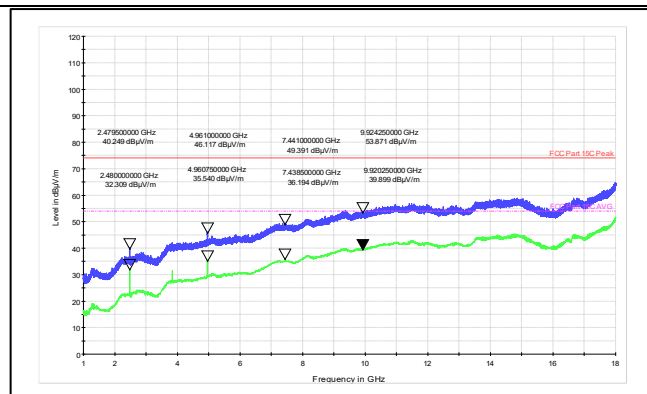
Channel Frequency: 2440MHz Polarization: Vertical



Channel Frequency: 2440MHz Polarization: Horizontal



Channel Frequency: 2480MHz Polarization: Vertical



Channel Frequency: 2480MHz Polarization: Horizontal

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End of test report