N° 1-6736
Scope available
on www.cofrac.fr

CERTIFICATE #3478.01

TEST REPORT

EUT Description	**WLAN and BT, 2x2 PCIe M.2 1216 adapter card**
Brand Name	**Intel®**
Model Name	**BE201D2WP**
FCC/IC ID	**PD2BE201D2P / 1000M-BE201D2P**
Date of Test Start/End	**2024-05-29 / 2024-06-17**
Features	**2x2 Wi-Fi - Bluetooth®** (see section 5)

Applicant	**Intel Corporation SAS**
Address	**425 Rue de Goa – Le Cargo B6 – 06600 Antibes, FRANCE**
Contact Person	**Benjamin Lavenant**
Telephone/Fax/ Email	**Benjamin.lavenant@intel.com**

Reference Standards	**FCC CFR Title 47 Part 15 C** **RSS-247 issue 3, RSS-Gen issue 5 A1** (see section 1)

Test Report identification	**240521-02.TR13**
Revision Control	**Rev. 01** **This test report revision replaces any previous test report revision** (see section 8)

The test results relate only to the samples tested.
Reference to accreditation shall be used only by full reproduction of test report.

Issued by

Digitally signed by Requin
Date: 2024.07.26 10:32:42 +02'00'

Cedric REQUIN
(Test Engineer Lead)

Intel Corporation S.A.S – WRF Lab
425 rue de Goa – Le Cargo B6 - 06600, Antibes, France
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Table of Contents

1. Standards, reference documents and applicable test methods

FCC	1. FCC Title 47 CFR part 15 - Subpart C – §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz. 2023-10-01 Edition 2. FCC Title 47 CFR part 15 - Subpart C – §15.209 Radiated emission limits; general requirements. 2023-10-01 Edition 3. FCC OET KDB 558074 D01 v05r02 - Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules. 4. FCC OET KDB 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band. 5. ANSI C63.10-2020 - American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
ISED	1. RSS-247 Issue 3 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices. 2. RSS-Gen Issue 5 A1- General Requirements for Compliance of Radio Apparatus. 3. FCC OET KDB 558074 D01 v05r02 - Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules. 4. FCC OET KDB 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band. 5. ANSI C63.10-2020 - American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

2. General conditions, competences and guarantees

- ✓ Tests performed under FCC standards identified in section 1 are covered by A2LA accreditation.
- ✓ Tests performed under ISED standards identified in section 1 are covered by Cofrac accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED #1000Y CAB identifier FR0005.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature [ºC]	22.0 ºC ± 1.1 ºC
Humidity [%]	53.3% ± 1.6%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	240521-01.S07	WiFi 7 Module	BE201D2WP	F8FE5ECDC8EB	2024-06-05	Used for conducted tests
	200203-01.S10	Laptop	HP Oleander	000951007L	2023-04-24	
	241109-03.S70	Extender Board	CRF DB 2230 BNJ	2207308398	2024-06-05	
#02	240521-02.S05	Wifi 7 Module	BE201D2WP	F8FE5ECDC9B3	2024-05-22	Used for Radiated Spurious Emissions tests
	220225-03.S07	Microwave Absorber	Eccosorb BSR-1	-	2022-03-14	
	231109-03.S48	Adaptor	PCB00866-00_A	124627	2023-11-24	
	200611-03.S31	Extender	ADEXELEC	-	2020-08-19	
	200504-04.S07	Laptop	Latitude 5401	BVHLK13	2020-06-02	
	220117-04.S13	Antenna 2.4GHz	ANT24-P624-00	-	2022-02-09	
	240521-01.S12	Antenna 2.4GHz	ANT24-P624-00	-	2022-02-09	
	231120-05.S21	WiFi 7 Module	BE201D2WP	F8FE5CDCA49	2024-02-07	
	180001-01.S21	Socket	1216SD to M.2	-	2021-06-07	
#03	240521-02.S04	Wifi 7 Module	BE201D2WP	F8FE5ECDCA08	2024-05-22	Used for Radiated Spurious Emissions tests
	220225-03.S07	Microwave Absorber	Eccosorb BSR-1	-	2022-03-14	
	231109-03.S47	Adaptor	PCB00866-00_A	124727	2023-11-24	
	220915-09.S01	Extender	ADEXELEC	-	2022-04-06	
	200611-03.S30	Laptop	Latitude 5401	6DJLK13	2020-08-19	
	220117-04.S13	Antenna 2.4GHz	ANT24-P624-00	-	2022-02-09	
	240521-01.S12	Antenna 2.4GHz	ANT24-P624-00	-	2022-02-09	
	231120-05.S20	WiFi 7 Module	BE201D2WP	F8FE5CDCA49	2024-02-07	
	180001-01.S21	Socket	1216SD to M.2	-	2021-06-07	

5. EUT Features

The herein information is provided by the customer

Intel WRF Lab declines any responsibility for the accuracy of the stated customer provided information, especially if it has any impact on the correctness of test results presented in this report

<table>
<tr><td>Brand Name</td><td>Intel®</td></tr>
<tr><td>Model Name</td><td>BE201D2WP</td></tr>
<tr><td>Software Version</td><td>DRTU.05726.99.0.86</td></tr>
<tr><td>Driver Version</td><td>99.0.86.3</td></tr>
<tr><td>Prototype / Production</td><td>Production</td></tr>
<tr><td>Supported Radios</td><td>802.11b/g/n/ax/be 2.4GHz
802.11a/n/ac/ax/be 5.2GHz
5.6GHz
5.8GHz
802.11ax/be 6GHz
Bluetooth 2.4GHz</td></tr>
<tr><td>Antenna Information</td><td>
<table>
<tr><th>Transmitter</th><th>Chain A (1)</th><th>Chain B (2)</th></tr>
<tr><td>Manufacturer</td><td>Intel</td><td>Intel</td></tr>
<tr><td>Antenna type</td><td>PIFA / Slot / Monopole</td><td>PIFA / Slot / Monopole</td></tr>
<tr><td>Part number</td><td>ANT24-P624-00 / ANT24-S624-00 / ANT24-M624-00</td><td>ANT24-P624-00 / ANT24-S624-00 / ANT24-M624-00</td></tr>
<tr><td>Max declared antenna gain (dBi) 2.4 GHz</td><td>+6.11</td><td>+6.11</td></tr>
</table>
</td></tr>
</table>

6. Remarks and comments

1. No deviations were made from the test methods listed in section 1 of this report
2. Bluetooth Low Energy tests have been performed on Chain A (1)
3. Conducted tests have been performed using the maximum antenna gain between the PIFA, Monopole and Slot antennas

7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

7.1. BLE

FCC part	RSS part	Test name	Verdict
15.247 (a) (2)	RSS-247 Clause 5.2 (a)	6dB Bandwidth	Pass
15.247 (b) (3)	RSS-247 Clause 5.4 (d)	Maximum output power and E.I.R.P.	Pass
15.247 (e)	RSS-247 Clause 5.2 (b)	Power spectral density	Pass
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen A1 Clause 8.9	Out-of-band Emissions (conducted)	Pass
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS-Gen A1 Clause 8.9	Spurious Emissions (radiated)	Pass

8. Document Revision History

Revision #	Modified by	Revision Details
Rev. 00	T.MATHIEU R.SIMONINI	First Issue
Rev. 01	C. REQUIN	Uppon customer request: In section 5. antenna gain updated 6.11dBi instead of 6.00dBi.

Annex A. Test & System Description

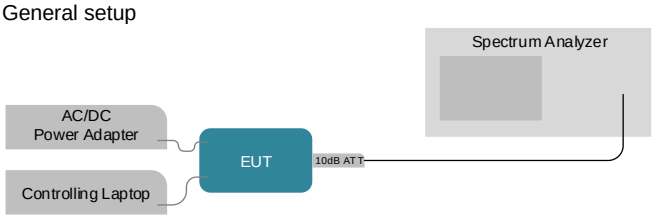
A.1 Measurement System

Measurements were performed using the following setups, made in accordance to the general provisions of FCC OET KDB 558074 D01 DTS Meas Guidance.

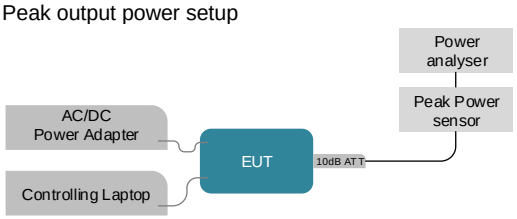
The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary tool DRTU.

Conducted test setup

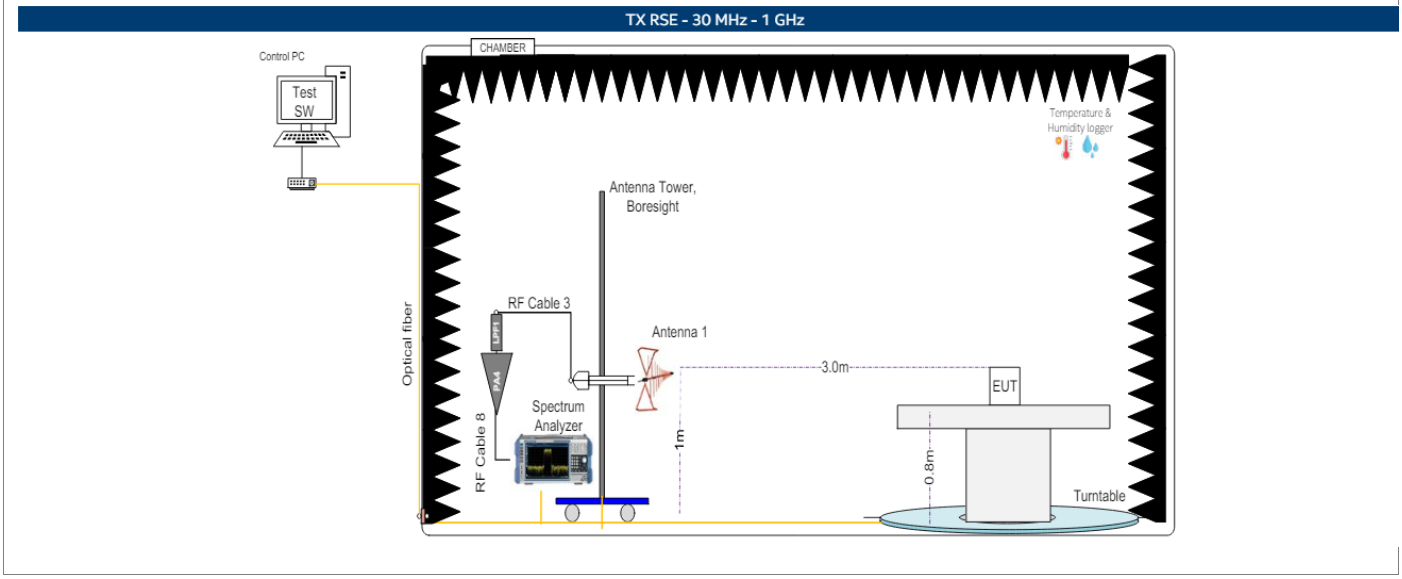
General setup

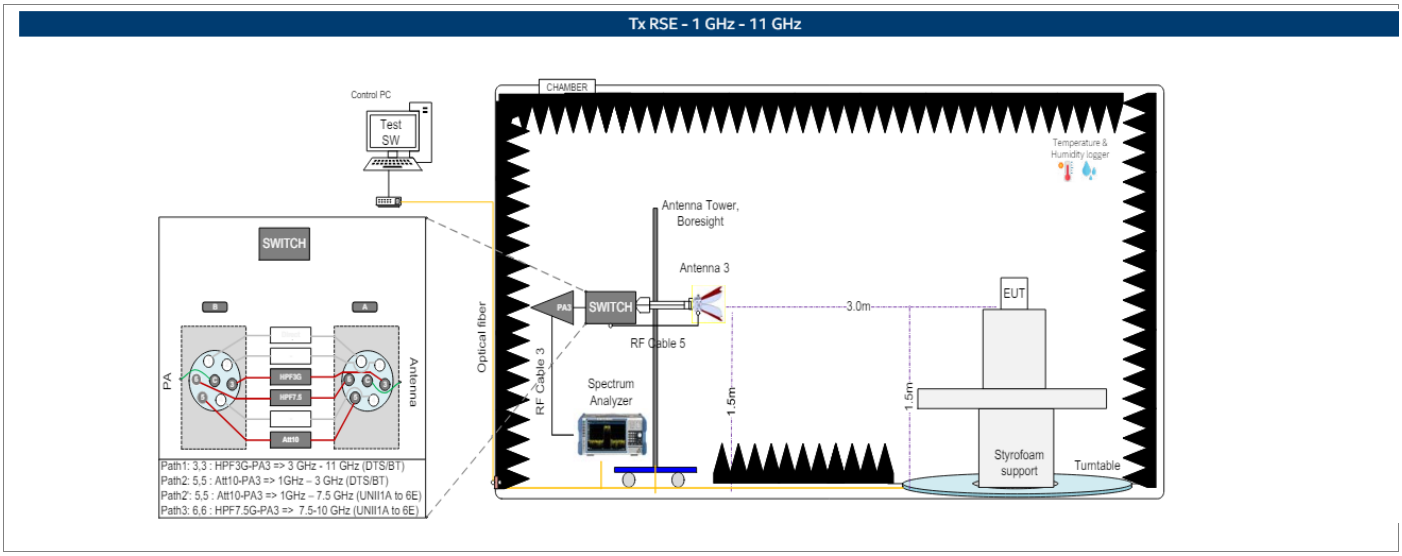


Peak output power setup

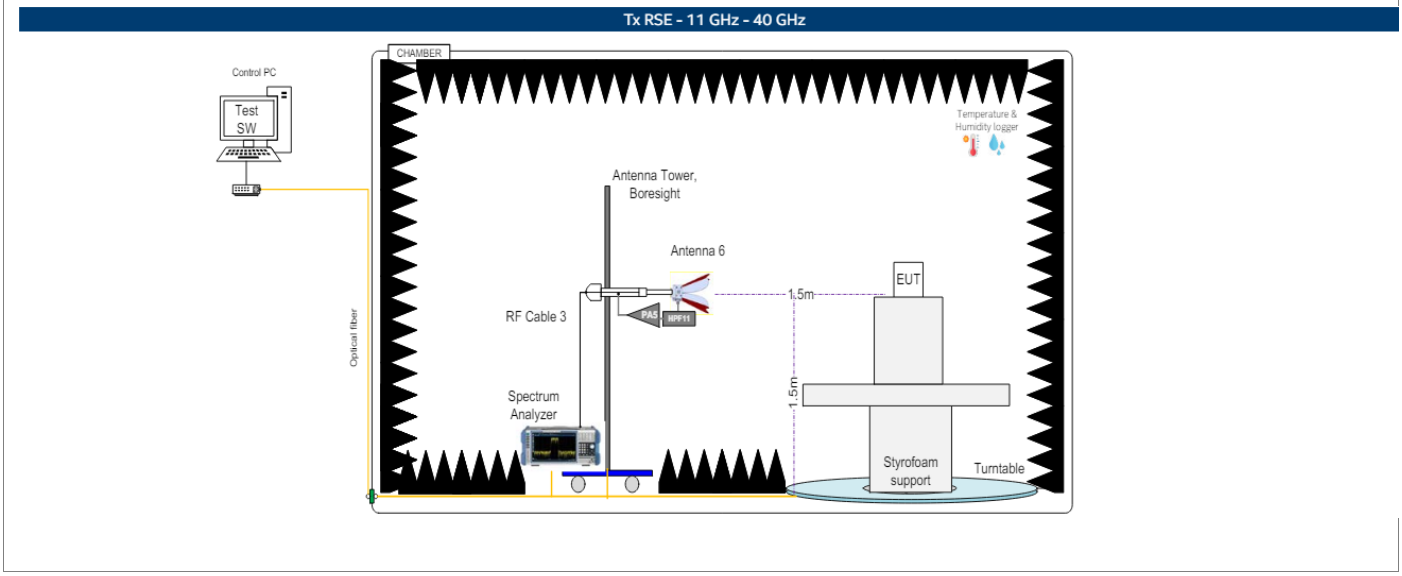


Radiated test setup





Radiated test setup



Sample Calculation

The spurious received voltage V(dBuV) in the spectrum Analyzer is converted to Electric field strength using the transducer factor F corresponding to the Rx path Loss:

F (dB/m)= Rx Antenna Factor (dB/m) + Cable losses (dB) – Amplifiers Gain (dBi)
E (dBuV/m) = V(dBuV) + F (dB/m)

For field strength measurements made at other than the distance at which the applicable limit is specified, the field strength of the emission at the distance specified by the limit is deduced as follows:

$$E_{SpecLimit} = E_{Meas} + 20*\log(D_{Meas}/D_{SpecLimit})$$

where

$E_{SpecLimit}$ is the field strength of the emission at the distance specified by the limit, in dBµV/m
E_{Meas} is the field strength of the emission at the measurement distance, in dBµV/m
D_{Meas} is the measurement distance, in m
$D_{SpecLimit}$ is the distance specified by the limit, in m

A.2 Test Equipment List

Conducted Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
273-000	Spectrum Analyzer	FSV30	103309	Rohde & Schwarz	2024-03-22	2026-03-22
019-000	RF cable 50cm	PE360-50CM	N/A	PASTERNACK	2024-02-21	2025-02-21
019-002	10dB Attenuator + MH4	PE7395-10	N/A	PASTERNACK	2024-02-21	2025-02-21
363-000	Temp & Humidity Logger	RA12E-TH1-RAS	RA12-D0EB1A	AVITECH	2023-09-28	2025-09-28
413-000	Measurement SW v1.5.4.2	Octopi	N/A	Step AT	N/A	N/A

Radiated Setup #1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
006-000	Anechoic Chamber	FACT3	5720	ETS-Lindgren	2024-01-17	2026-01-17
006-008	Measurement SW, v11.30	EMC32	100623	Rohde & Schwarz	N/A	N/A
259-000	Temp & Humidity Logger	RA12E-TH-RAS	RA12-B9BD70	Avtech	2022-06-27	2024-06-27
006-001	Turn Table	ETS	-	ETS-Lindgren	N/A	N/A
006-011	Boresight antenna mast	BAM 4.0-P	P/278/2890.01	Maturo	N/A	N/A
057-000	Double Horn Ridged antenna	3117	167062	ETS-Lindgren	2022-07-08	2024-07-08
058-000	Double Horn Ridged antenna	3116C	157511	ETS-Lindgren	2022-10-21	2024-10-21
006-061	Bi-Log Periodic antenna	CBL6143A	61382	Teseq	2022-10-24	2024-10-24
147-000	Spectrum analyzer	FSW43	101847	Rohde & Schwarz	2022-11-30	2024-11-30
301-000	Amplifier 9kHz-1300MHz	8447F	3113A07440	HP	2024-03-19	2025-03-19
261-000	Amplifier 1GHz-18GHz	3117-PA	00157993	ETS-Lindgren	2024-03-14	2025-03-14
502-006	Amplifier 0.5GHz-40GHz	DEPA0540-43	2023A05	Diamond Engineering	2024-03-19	2025-03-19
009-007	RF Filter	ZHSS-k11G+	8493 1831830	Mini-Circuits	2024-03-19	2025-03-19
006-068	RF Switch	RC-2SP6T-40	02112090061	Micro-Circuits	2024-03-14	2025-03-14
006-066	Cable 7m – 25MHz to 40GHz	R286304174	20.46.370	Radiall	2024-03-14	2025-03-14
006-063	Cable 30cm – 1GHz to 40GHz	PE371-12	-	Pasternack	2024-03-14	2025-03-14
006-064	Cable 30cm – 1GHz to 40GHz	PE371-12	-	Pasternack	2024-03-14	2025-03-14
006-065	Cable 60cm – 25MHz to 1GHz	PE300-24	-	Pasternack	2024-03-12	2025-03-12

N/A: Not Applicable

Radiated Setup #2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
007-000	Anechoic chamber	RFD-FA-100	5996	ETS Lindgren	2024-01-18	2026-01-18
127-000	Spectrum Analyzer	FSV40	101358	Rohde & Schwarz	2023-01-27	2025-01-27
007-007	Double Ridge Horn (1- 18GHz)	3117	00152266	ETS Lindgren	2024-03-26	2026-03-26
007-006	Switch & Positioner	EMCenter	00151232	ETS Lindgren	N/A	N/A
059-000	Double Ridge Horn (1- 18GHz)	3117	201542	ETS-Lindgren	2023-09-26	2025-09-26
264-000	Amplifier 1GHz-18GHz	3117-PA	00169546	ETS-Lindgren	2024-03-14	2025-03-14
007-011	RF Cable 1-18GHz - 6.5m	140-8500-11-51	001	Atem	2024-03-15	2025-03-15
007-005	Measurement SW, v11.20.00	EMC32	100401	Rohde & Schwarz	N/A	N/A
007-003	Antenna Tower	2171B-3.0M	00150123	ETS Lindgren	N/A	N/A
007-002	Turntable	-	-	ETS Lindgren	N/A	N/A
007-022	RF Cable 1-18GHz, 1.5m	0501050991200GX	19.23.493	Radiall	2024-03-12	2025-03-12
007-015	RF Cable 1GHz-18GHz 1.5m	-	-	Spirent	2024-03-12	2025-03-12
007-018	RF Cable 1-9.5GHz 1.2m	0500990991200KE	-	Radiall	2024-03-12	2025-03-12
007-020	RF Cable 1-18GHz, 1.2 m	2301761761200PJ	12.22.1104	Radiall	2024-03-15	2025-03-15
349-000	Temp & Humidity Logger	RA12E-TH1-RAS	RA12-D4F8C3	Avtech	2023-11-30	2025-11-30

N/A: Not Applicable

Shared Radiated Equipment

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
412-000	DRTU Power finder V2.1	-	-	Intel	NA	NA
139-000	Power Sensor	NRP-Z81	104383	Rohde & Schwarz	2023-04-21	2025-04-21
061-000	Power Sensor	NRP-Z81	104386	Rohde & Schwarz	2024-04-09	2026-04-09
140-000	Power Sensor	NRP-Z81	104382	Rohde & Schwarz	2024-04-04	2026-04-04

N/A: Not Applicable

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the table below with a coverage factor of k = 2 to indicate a 95% level of confidence:

Measurement type	Uncertainty	Unit
Timing	±0.12	%
Power Spectral density	±1.47	dB
Occupied bandwidth	±2.07	%
Conducted Power	±1.03	dB
Conducted Spurious Emission <26.5 GHz	±2.93	dB
Radiated tests <1GHz	±6.23	dB
Radiated tests 1GHz – 26.5 GHz	±6.10	dB

Annex B. Test Results

The herein test results were performed by:

Test case measurement	Test Peronnel
6dB Bandwidth	T.MATHIEU
Maximum output power and E.I.R.P	T.MATHIEU
Power spectral density	T.MATHIEU
Out-of-band Emissions (conducted)	T.MATHIEU
Spuirous Emissions (radiated)	K.KHATIB, R.SIMONINI

B.1 Test Results BLE

B.1.1 6dB & 99% Bandwidth

Test limits

FCC part	RSS part	Limits
15.247 (a) (2)	RSS-247 Clause 5.2 (a)	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 procedure

The conducted setup shown in section *Test & System Description* was used to measure the 6dB & 99% Bandwidth. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

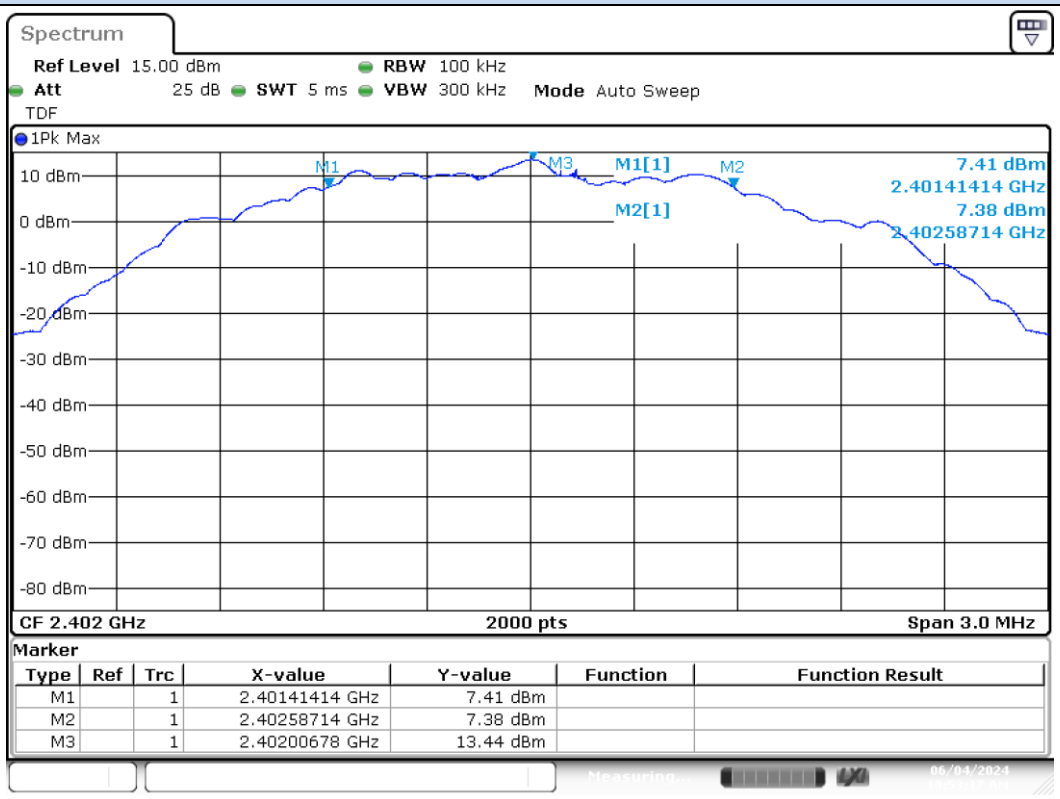
Results tables

Mode	Frequency [MHz]	6dB BW [MHz]	99% BW [MHz]
BLE	2402	1.17	2.058
	2440	1.18	2.058
	2480	1.17	2.058

Results screenshot

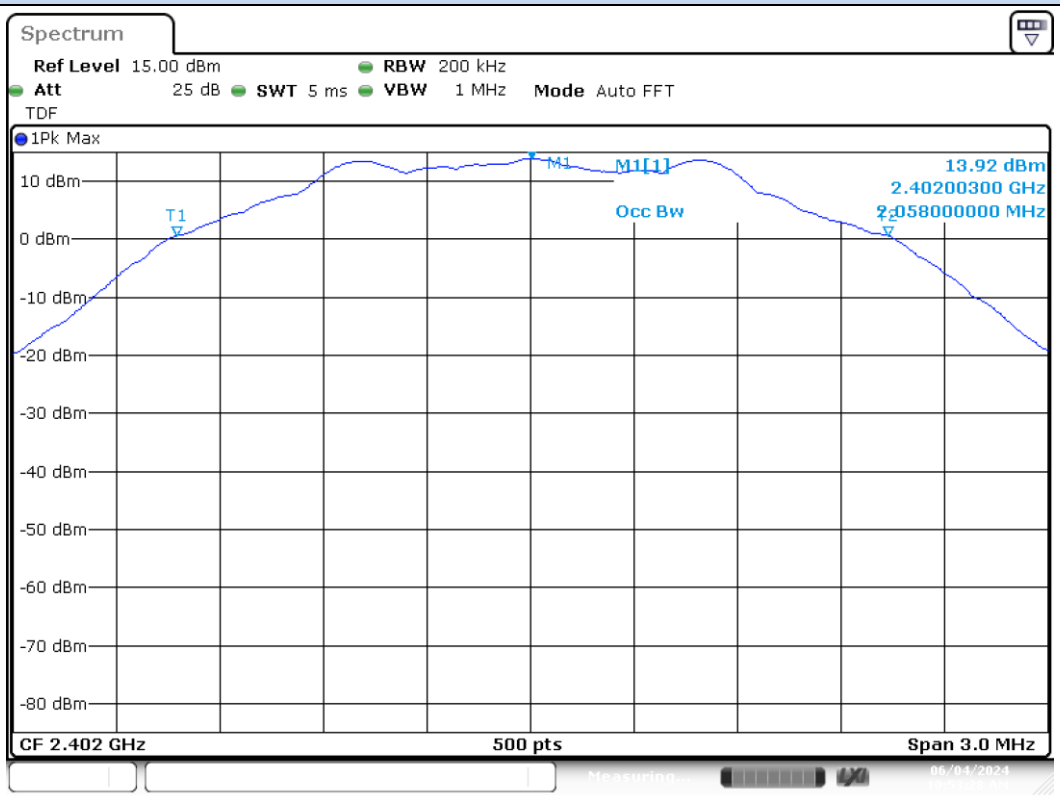
BLE

6dB BW – 2402 MHz



Date: 4.JUN.2024 10:53:17

99% BW – 2402 MHz



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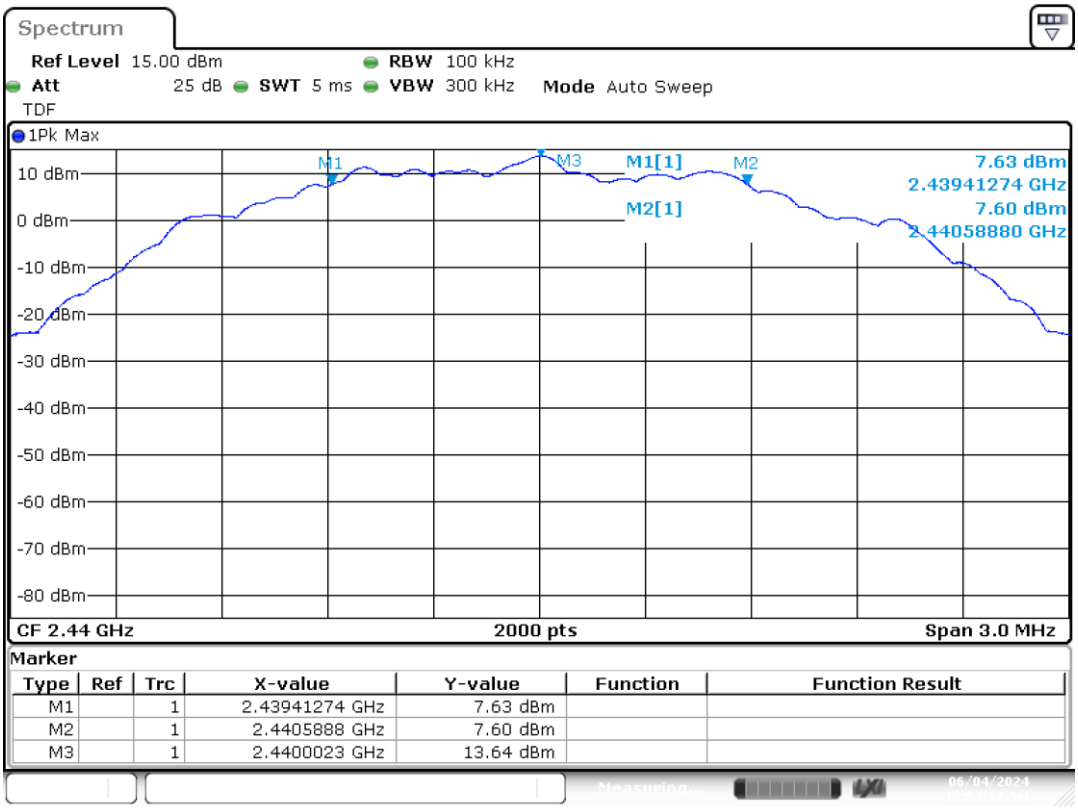
6dB BW – 2440 MHz



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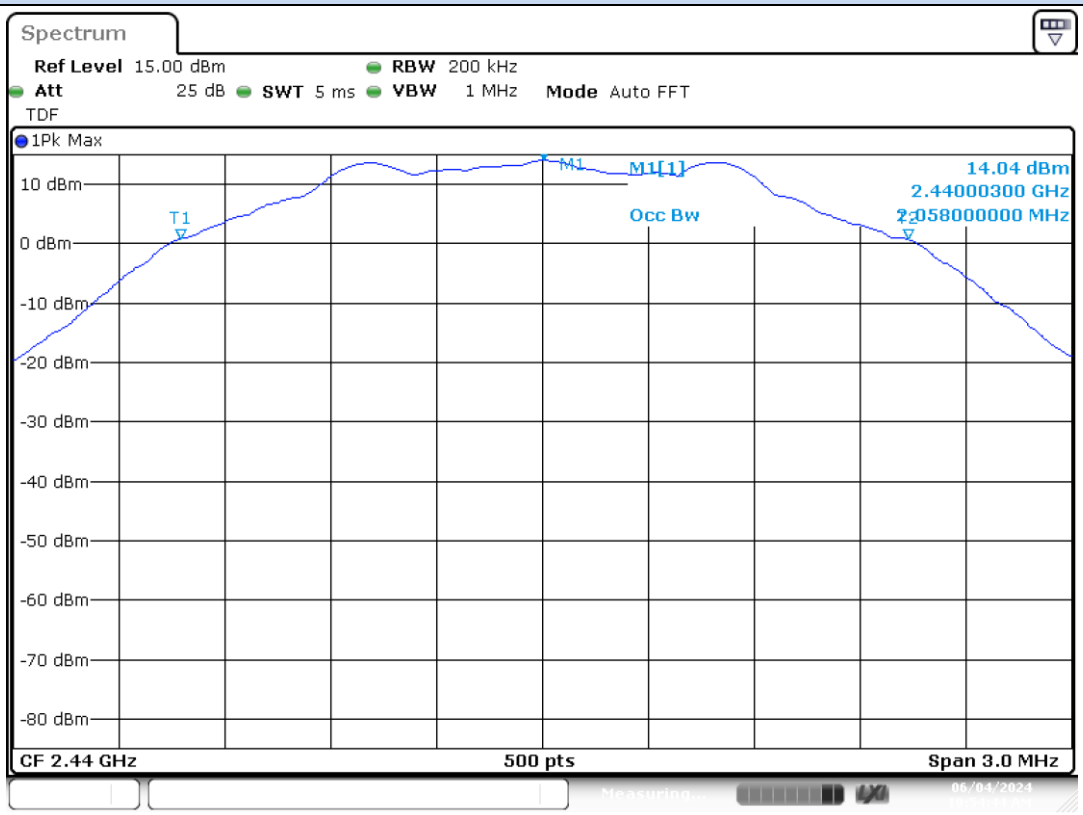
99% BW – 2440 MHz



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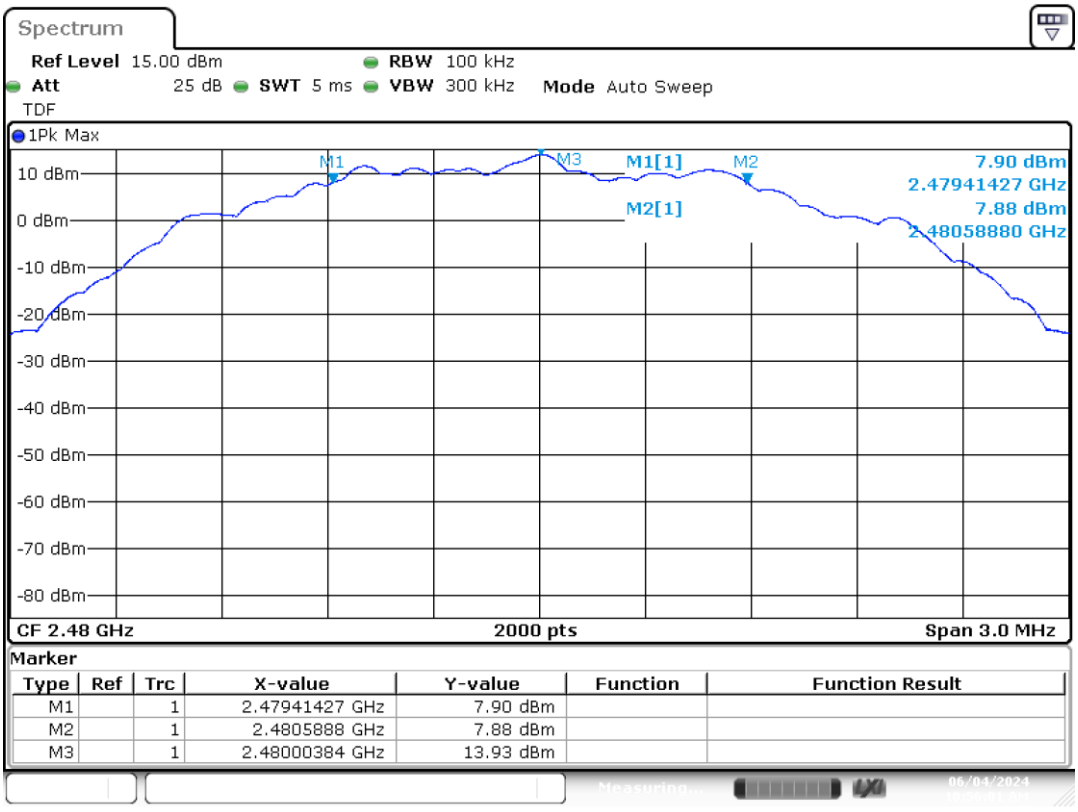
6dB BW – 2480 MHz



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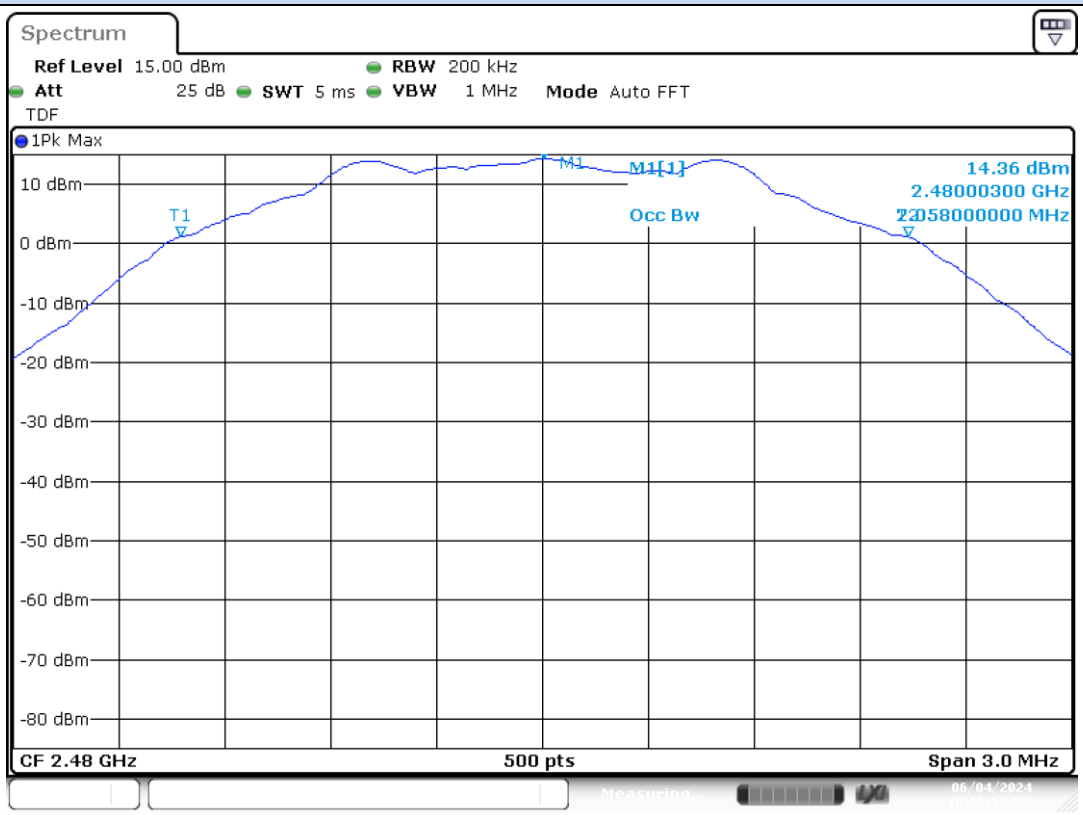
99% BW – 2480 MHz



Date: 4.JUN.2024 10:56:12

B.1.2 Maximum Output Power and antenna gain

Test limits

	Limits
FCC Part 15.247 (b) (3)	(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.
RSS-247 Clause 5.4 (d)	For DTSs employing digital modulation techniques operating in the bands 902-928 MHz and 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1W. The e.i.r.p. shall not exceed 4 W, except as provided in section 5.4(e). As an alternative to a peak power measurement, compliance can be based on a measurement of the maximum conducted output power. The maximum conducted output power is the total transmit power delivered to all antennas and antenna elements, averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or transmitting at a reduced power level. If multiple modes of operation are implemented, the maximum conducted output power is the highest total transmit power occurring in any mode

Test procedure:

The Maximum peak conducted output power was measured using the *RBW ≥ DTS bandwidth* method defined in paragraph 11.9.1.1 of ANSI C63.10-2020.

The Maximum conducted average output power was measured using the channel integration method according to Method AVGSA-2, defined in paragraph 11.9.2.2.4 of ANSI C63.10-2020.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

The conducted setup shown in section *Test & System Description* was used to measure the maximum conducted output power. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Results tables

			Peak Power [dBm]		
Mode	Meas. Duty Cycle [%]	Frequency [MHz]	Measured Conducted Output Power	EIRP	Peak Output Power [mW]
BLE	30.22	2402	14.56	20.67	28.58
		2440	14.65	20.76	29.17
		2480	14.91	21.02	30.97

Max Value
Min Value

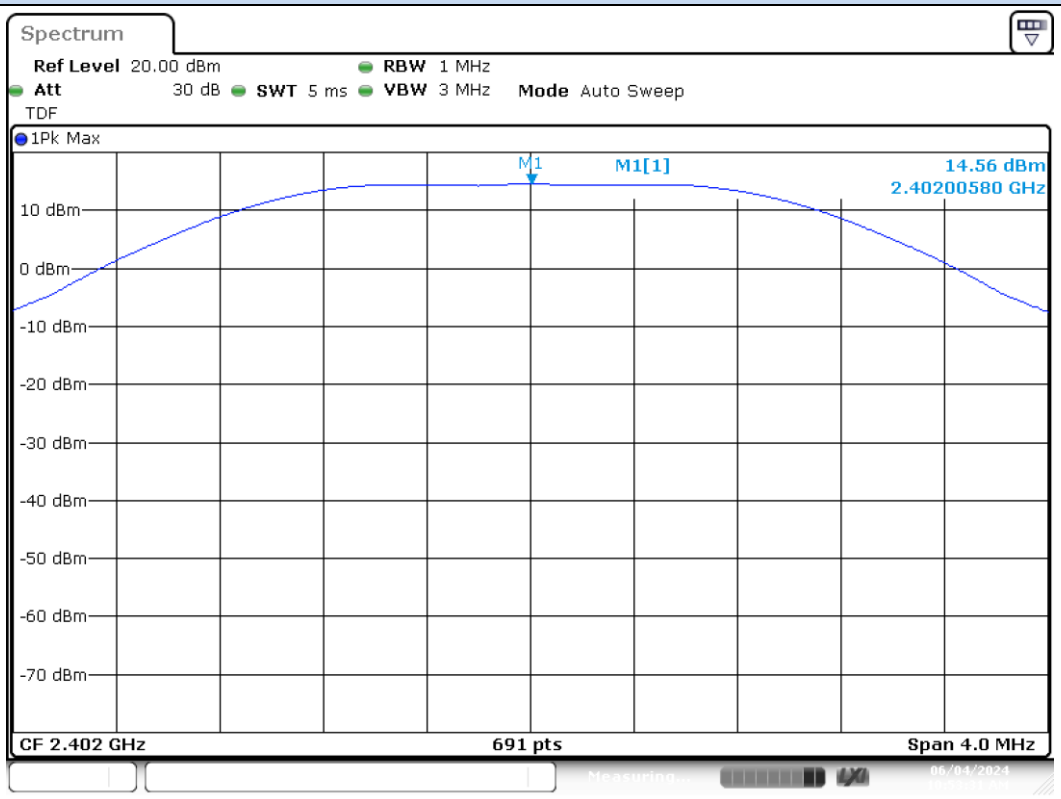
			Average Output Power* [dBm]			
Mode	Meas. Duty Cycle [%]	Frequency [MHz]	Maximum Conducted Output Power	Maximum Conducted Output Power Duty cycle Compensated	EIRP	Average Output Power [mW]
BLE	30.22	2402	9.23	14.43	20.54	27.72
		2440	9.42	14.62	20.73	28.96
		2480	9.71	14.91	21.02	30.96

* Output Power RMS values are shown for indicative purpose only

Results screenshot

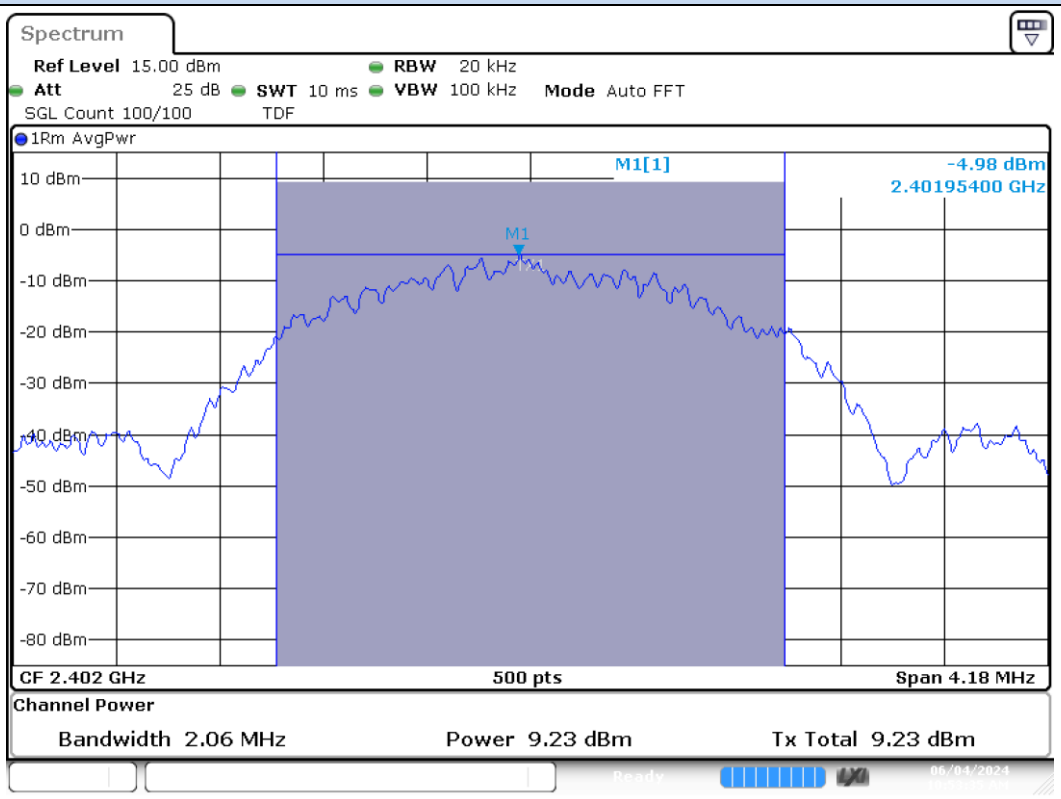
BLE

Max Power Peak – 2402 MHz



Date: 4.JUN.2024 10:53:32

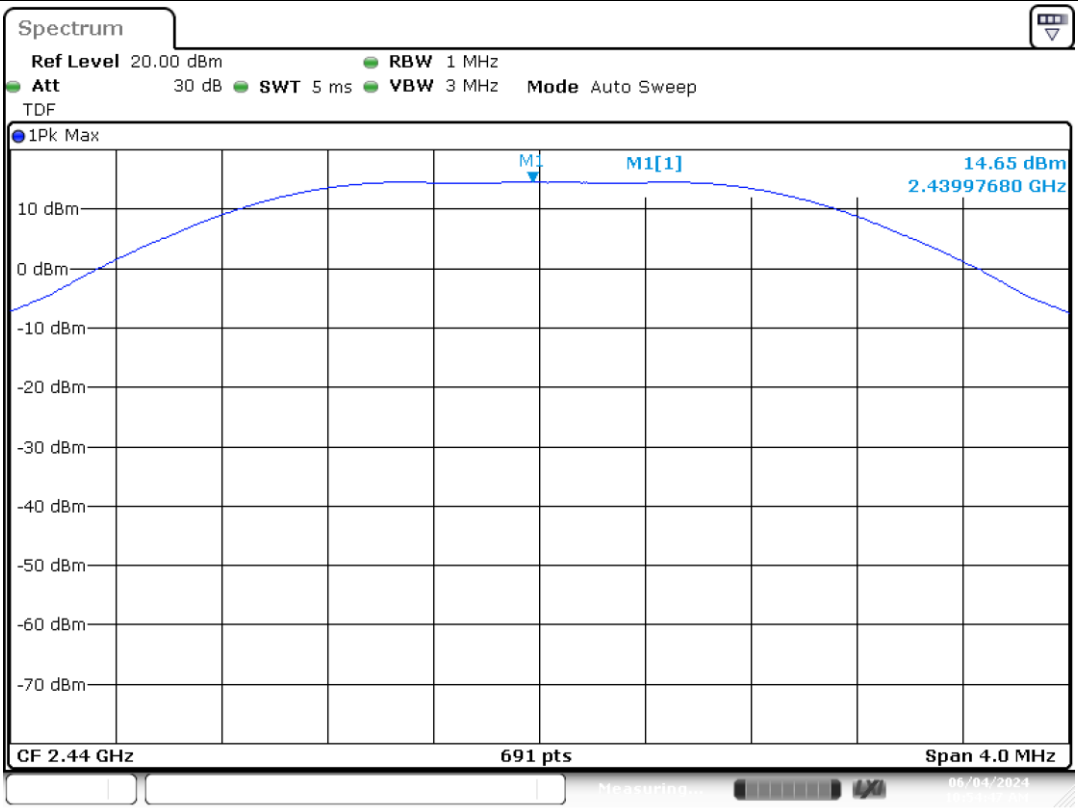
Max Power RMS – 2402 MHz



Date: 4.JUN.2024 10:53:36

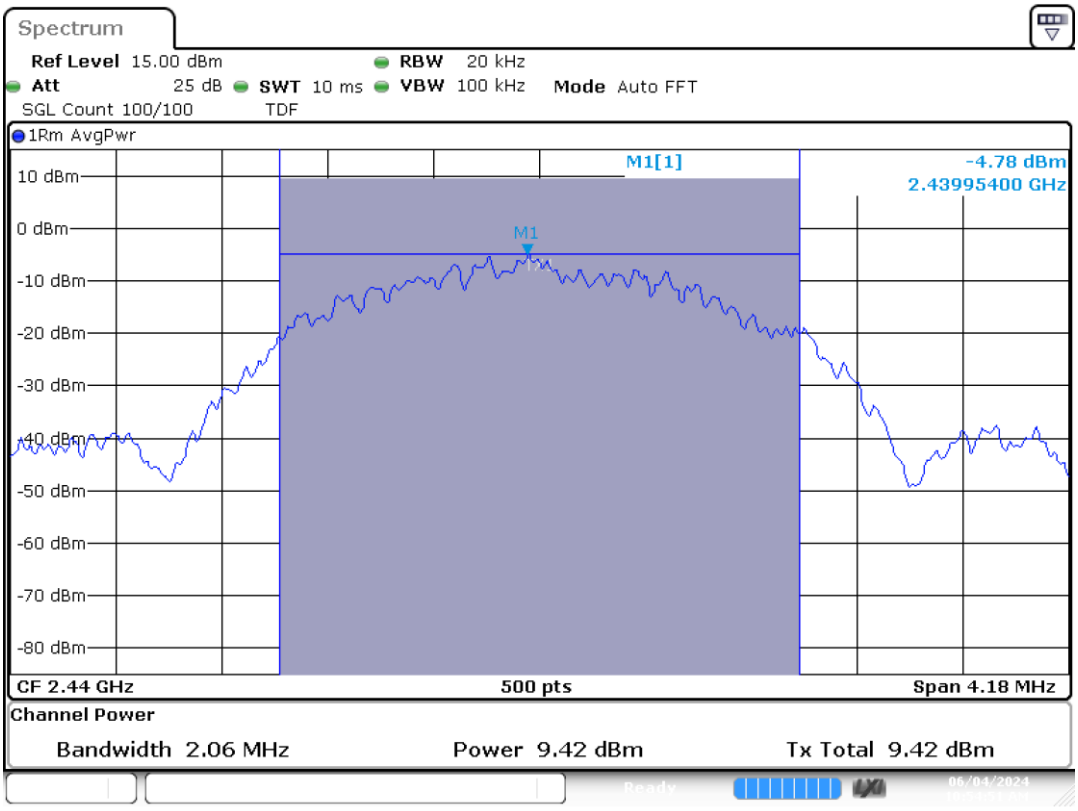
BLE

Max Power Peak – 2440 MHz



Date: 4.JUN.2024 10:54:48

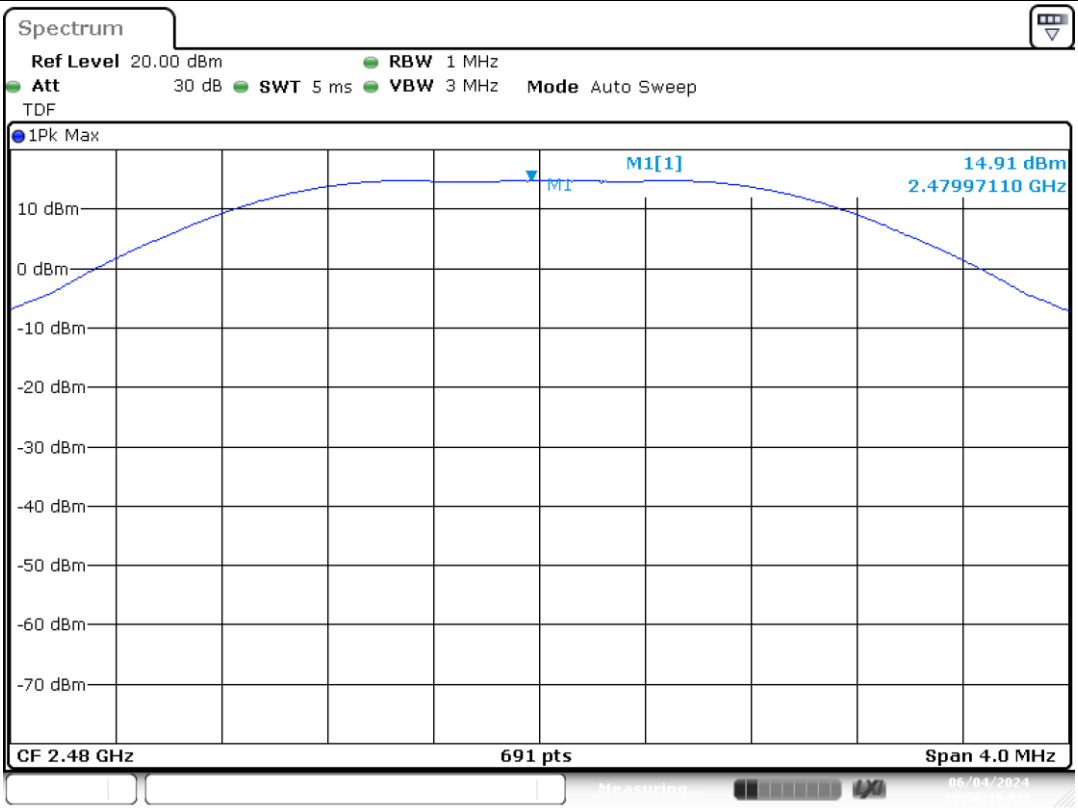
Max Power RMS – 2440 MHz



Date: 4.JUN.2024 10:54:51

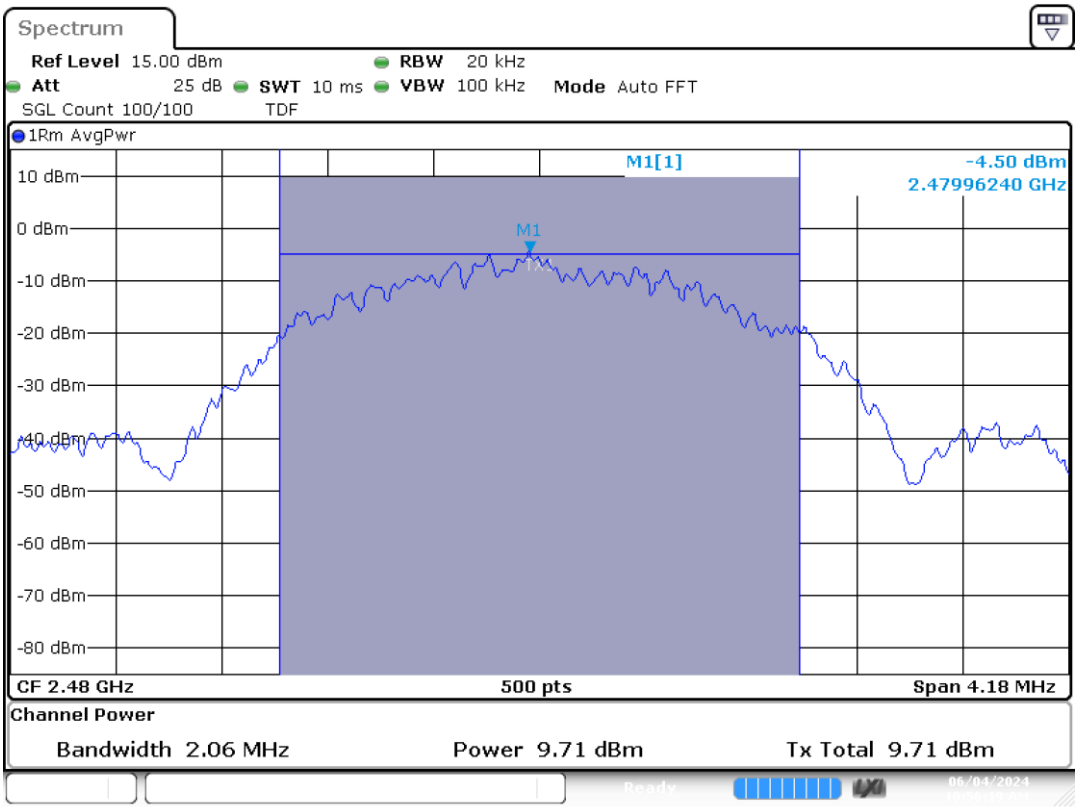
BLE

Max Power Peak – 2480 MHz



Date: 4.JUN.2024 10:56:16

Max Power RMS – 2480 MHz



Date: 4.JUN.2024 10:56:19

B.1.3 Power Spectral Density

Test limits

FCC part	RSS part	Limits
15.247 (e)	RSS-247 Clause 5.2 (b)	For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test procedure

The maximum peak power spectral density level of the fundamental emission was measured using the method PKPSD, defined in paragraph 11.10.2 of ANSI C63.10-2020.

The conducted setup shown in section *Test & System Description* was used to measure the power spectral density. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

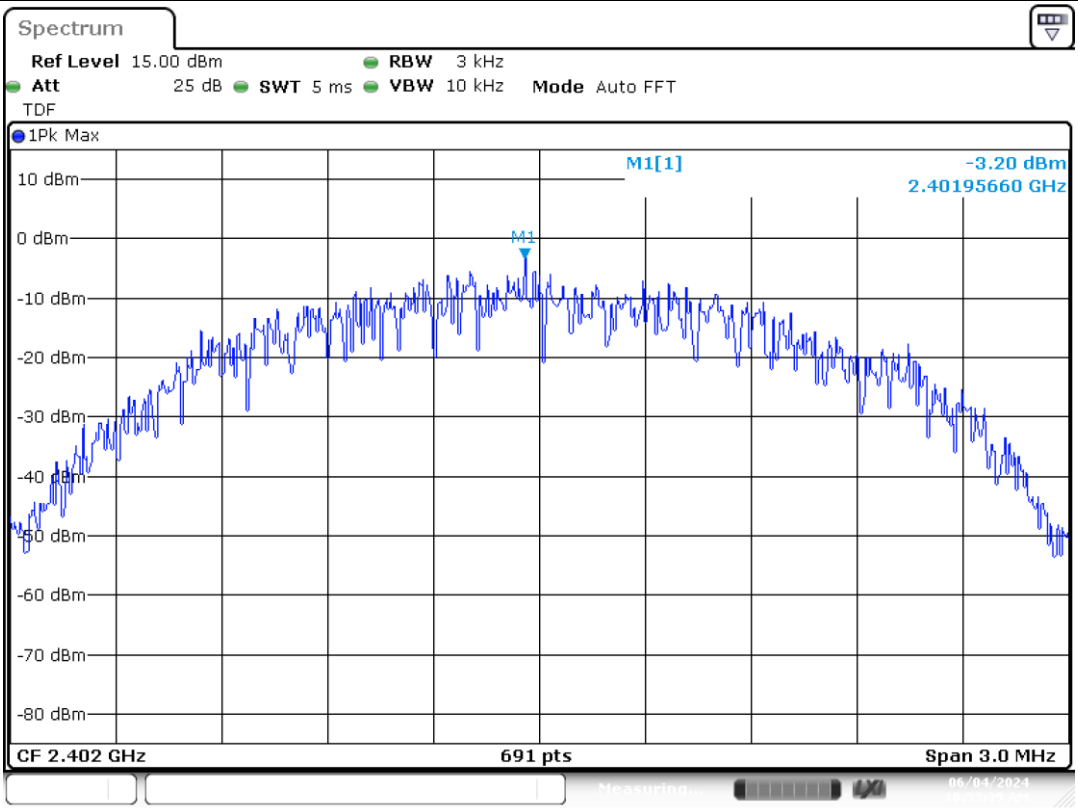
Results tables

Mode	CH	Frequency [MHz]	PSD Peak [dBm/3kHz]
BLE	0	2402	-3.20
	19	2440	-3.00
	39	2480	-2.73

*Note: these PSD_{Peak} values are shown just as a reference for the compliance of the Out-of-band Measurements. Thus the RBW used for these measurements was 100kHz.

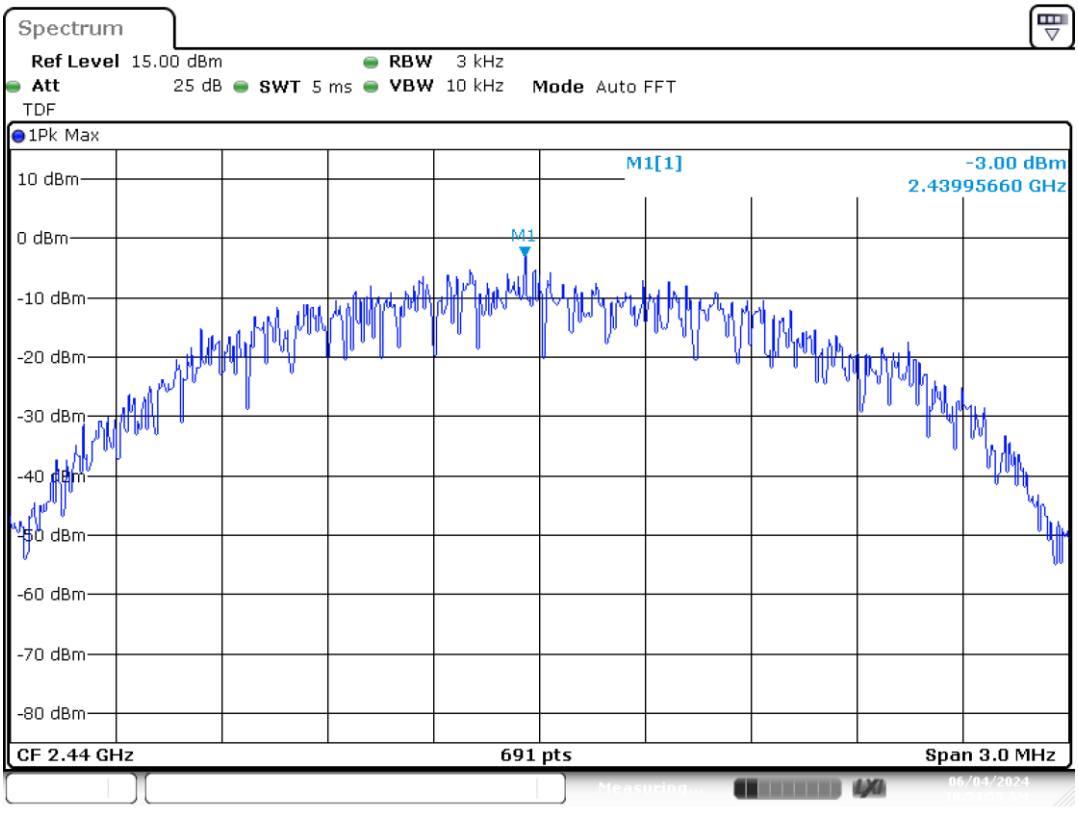
BLE

PSD Peak – 2402 MHz

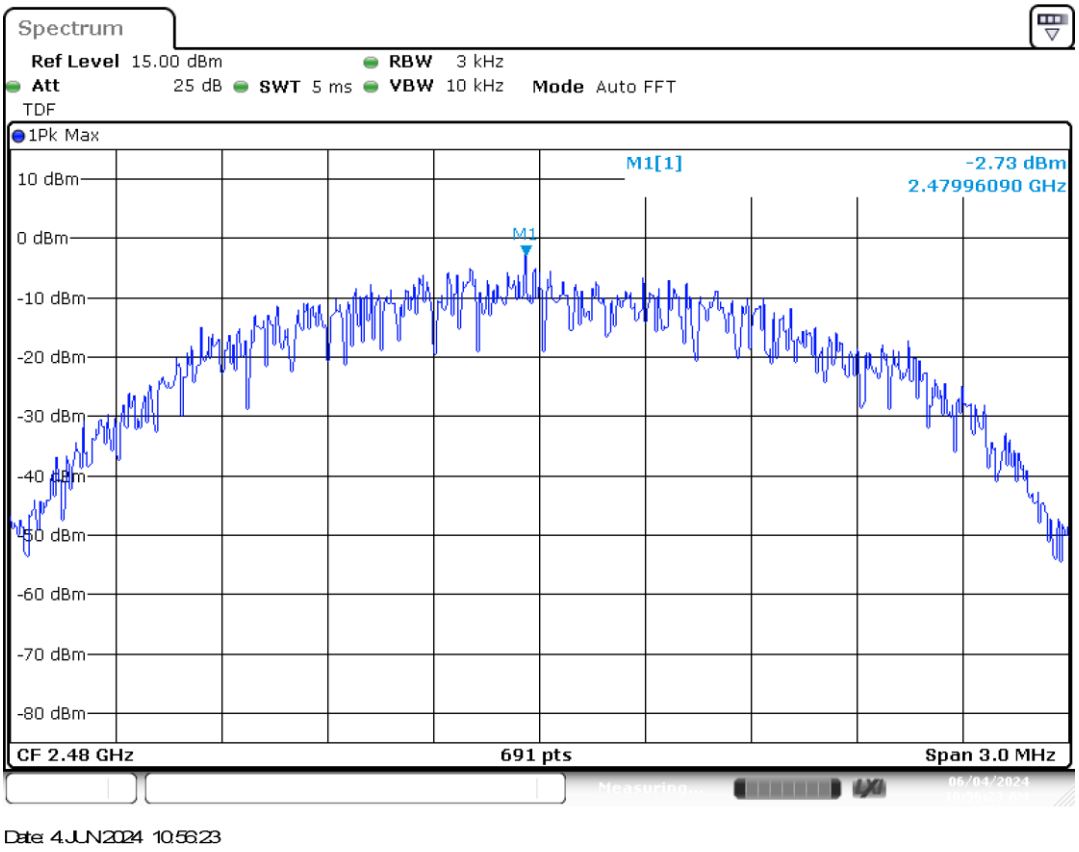


Date: 4.JUN.2024 10:53:39

PSD Peak – 2440 MHz



Date: 4.JUN.2024 10:54:55

PSD Peak – 2480 MHz


B.1.4 Out-of-band emission (Conducted)

Test Limits

<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.247 (d)</td><td>RSS-247
Clause 5.5</td><td>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.</td></tr>
<tr><td>15.209</td><td>RSS-Gen A1
Clause 8.9</td><td>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):
<table>
<tr><th>Freq Range (MHz)</th><th>Field Stregth (µV/m)</th><th>Field Stregth (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<tr><td>30-88</td><td>100</td><td>40</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>43.5</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>46</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>54</td><td>3</td></tr>
</table>
The emission limits shown in the above table are based on measurements employing 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.
For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</td></tr>
</table>

Test procedure

In case of band edge measurements falling in restricted bands, the declared Antenna Gain is also compensated in the graph.

For band edge measurements falling in restricted bands, the following limits in dBm were applied for the average detector after the conversion from the limits detailed above in dBµV/m, according to FCC 47 CFR part 15 - Subpart C – §15.209(a). The limits in dBm for peak detector are 20dB above the indicated values in the table.

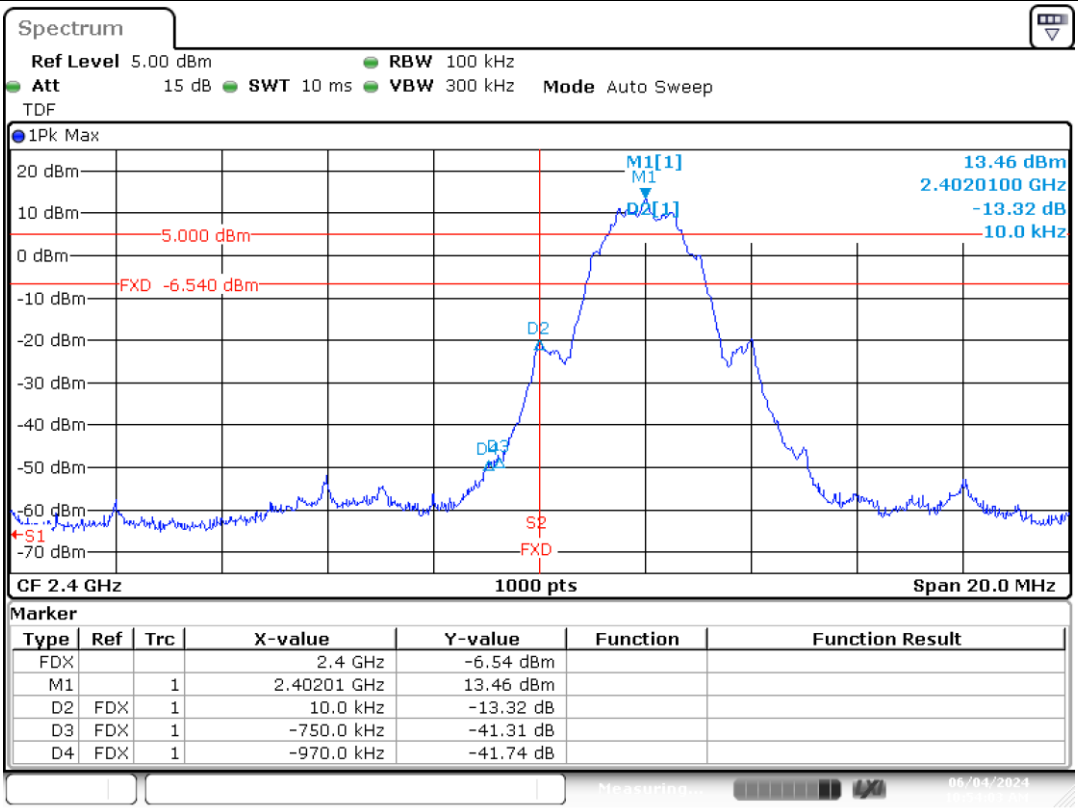
§15.209(a)			Converted values	
Freq Range (MHz)	Distance (m)	Field strength (microvolts/meter)	Field strength (dB microvolts/meter)	Power (dBm)
Above 960	3	500	54.0	-41.2

The conducted setup shown in section *Test & System Description* was used to measure the out-of-band emissions. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Note: For the compliance of the out-of-band Measurements, PSD_{Peak} were measured with 100kHz RBW and values are shown just as a reference in section B.1.3.

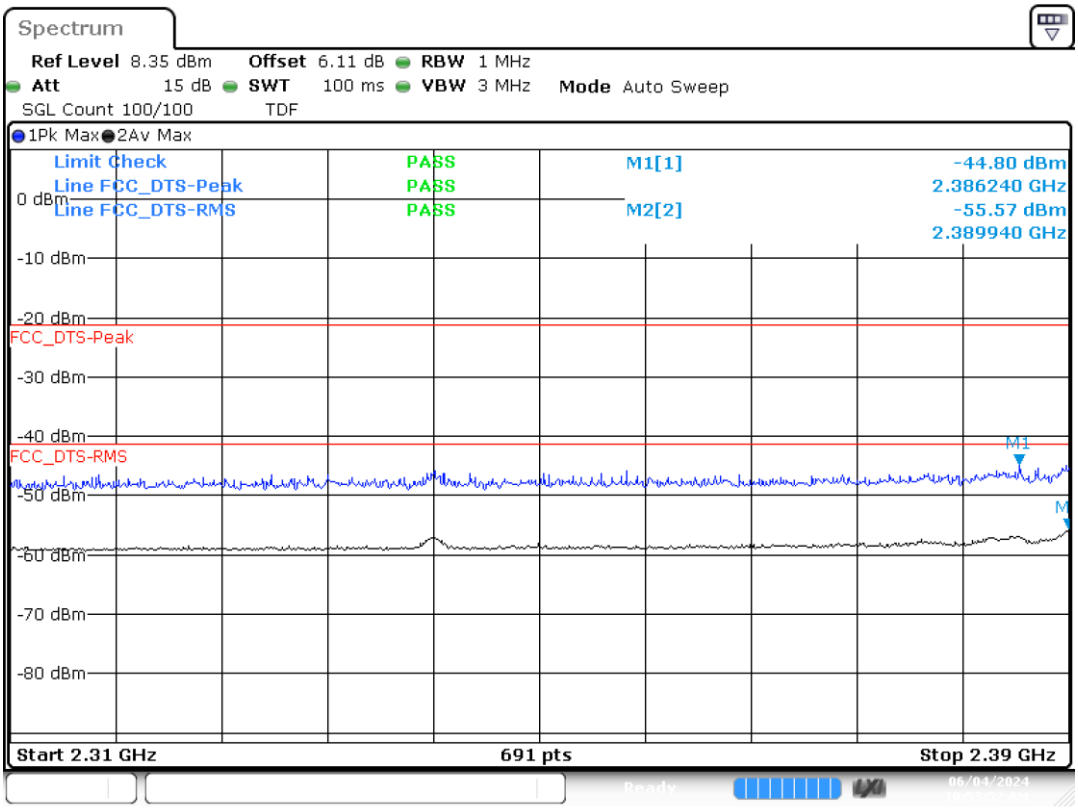
BLE

BE Low (Non Restricted) – 2402 MHz



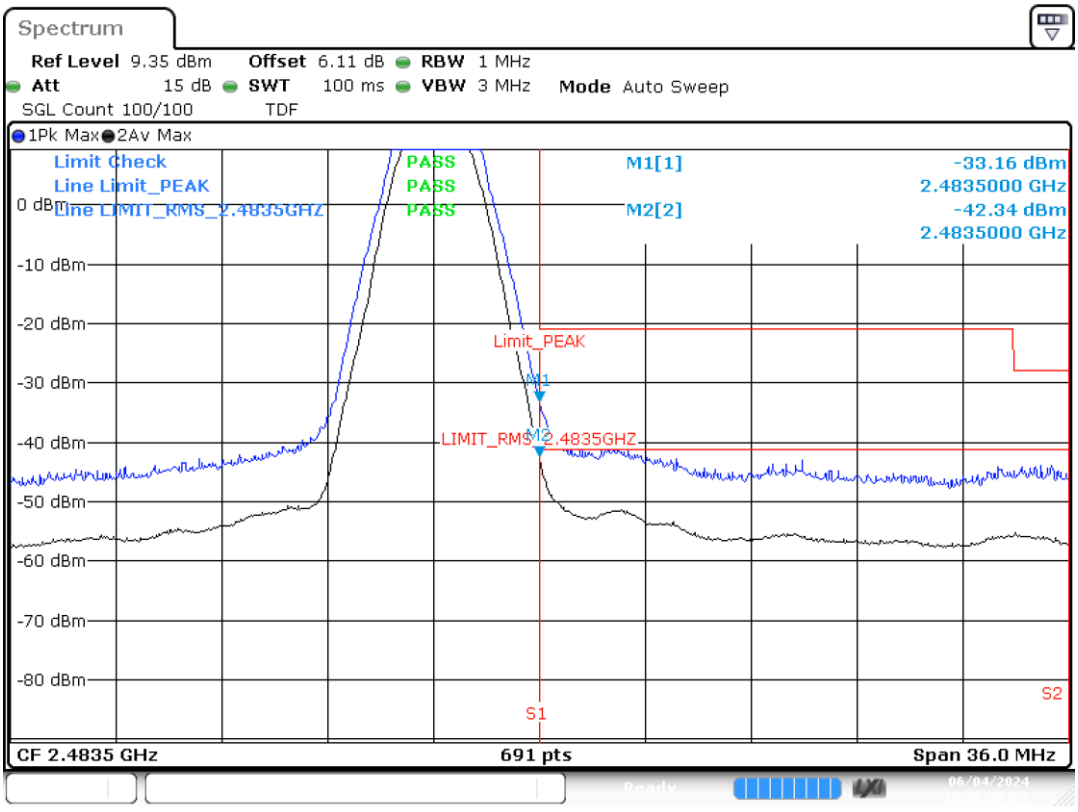
Date: 4.JUN.2024 10:54:04

BE Low (Restricted) – 2402 MHz



Date: 4.JUN.2024 10:53:52

BE High (Restricted) – 2480 MHz



B.1.5 Radiated spurious emission

Standards references

<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.247 (d)
15.209</td><td>RSS-247
Clause 5.5
RSS-Gen A1
Clause 8.9</td><td>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):
<table>
<tr><th>Freq Range (MHz)</th><th>Field Stregth (µV/m)</th><th>Field Stregth (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<tr><td>30-88</td><td>100</td><td>40</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>43.5</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>46</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>54</td><td>3</td></tr>
</table>
The emission limits shown in the above table are based on measurements employing 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.
For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</td></tr>
</table>

Test procedure

The radiated setups shown in section *Test & System Description* were used to measure the radiated spurious emissions. were used to measure the radiated spurious emissions.
Depending of the frequency range and bands being tested, different antennas and filters were used.
The final measurement is done by varying the antenna height from 1 to 4 meters, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.
The radiated spurious emissions were measured on the lowest, middle and highest channels.

Test Results

Radiated spurious - 30 MHz to 1 GHz

Radiated Spurious – All modes

Frequency	Level	Detector	Limit	Margin	Polarization
MHz	dBµV/m	---	dBµV/m	dB	---
34.0	34.9	Quasi-Peak	40.0	5.1	V
50.0	37.6	Quasi-Peak	40.0	2.4	V

Note 1: The spurious signals detected do not depend on either the operating channel or the modulation mode.

1 GHz – 26 GHz, BLE

Radiated Spurious – 2402 MHz

Frequency	Level	Detector	Limit	Margin	Polar
MHz	dBµV/m	---	dBµV/m	dB	---
10499.8	59.8	Peak	74.0	14.2	H
10499.8	48.0	Average	54.0	6.0	V
11990.0	47.1	Peak	74.0	26.9	V
11990.0	36.7	Average	54.0	17.3	V
25997.5	51.5	Peak	74.0	22.5	V
25997.5	40.1	Average	54.0	13.9	V

Radiated Spurious – 2440 MHz

Frequency	Level	Detector	Limit	Margin	Polar
MHz	dBµV/m	---	dBµV/m	dB	---
10339.7	47.9	Average	54.0	6.1	V
10340.7	61.4	Peak	74.0	12.6	V
11994.9	36.8	Average	54.0	17.2	V
11996.0	48.9	Peak	74.0	25.1	V
25996.0	51.9	Peak	74.0	22.1	H
25996.0	40.0	Average	54.0	14.0	V

Radiated Spurious – 2480 MHz

Frequency	Level	Detector	Limit	Margin	Polar
MHz	dBµV/m	---	dBµV/m	dB	---
10499.8	59.7	Peak	74.0	14.3	V
10499.8	48.0	Average	54.0	**6.0**	V
11993.8	47.0	Peak	74.0	27.0	V
11993.8	36.7	Average	54.0	17.3	V
25982.0	51.8	Peak	74.0	22.2	V
25982.0	40.1	Average	54.0	13.9	V