

RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Digital transmission systems operating within the 2400.0 MHz - 2483.5 MHz band	
Report Reference No	G0M-2309-2215-TFC247ZB-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	Panasonic Industrial Devices Europe GmbH
Address	Zeppelinstr. 19 21337 Lüneburg GERMANY
Test Specification	47 CFR Part 15C RSS-247, Issue 3, 2023-08 RSS-Gen, Issue 5, Amendment 2, 2021-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
Model(s)	ENWF9511C1KF
Additional Model(s)	None
Brand Name(s)	PAN9019A
Hardware Version(s)	03
Software Version(s)	01
FCC ID	T7V9019
IC	216Q-9019
Test Result	PASSED

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C - 30 °C	
Test Lab Humidity	25 % - 55 %	
Date of receipt of test item	2023-12-11	
Report:		
Compiled by	Md Abu Bakar Siddique	
Tested by (+ signature) (Responsible for Test)	Md Abu Bakar Siddique	
Approved by (+ signature) (Test Lab Engineer)	Wilfried Treffke	
Date of Issue	2024-03-18	
Total number of pages	121	
General Remarks:		
The test results presented in this report relate only to the object tested. The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		
None		

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	Description	
1	Product Type Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz and Bluetooth® Module
	Model name	ENWF9501C1KF
	Brand name	PAN9019
	PMN	PAN9019
	HVIN	ENWF9501C1KF
	FVIN	--
	HMN	--
	Hardware Version	03
	Software Version	01
2	Product Type Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module, M.2 card
	Model name	ENWF9511CMKF
	Brand name	PAN9019A-M2E-EVD
	PMN	PAN9019A-M2E-EVD
	HVIN	ENWF9511CMKF
	FVIN	--
	HMN	--
	Hardware Version	01
	Software Version	01
3	Product Type Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz and Bluetooth® Module, M.2 card
	Model name	ENWF9501CMKF
	Brand name	PAN9019-M2E-EVD
	PMN	PAN9019-M2E-EVD
	HVIN	ENWF9501CMKF
	FVIN	--
	HMN	--
	Hardware Version	01
	Software Version	01
4	Product Type Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module, M.2 card with chip antenna
	Model name	ENWF9511AMKF
	Brand name	PAN9019A-M2E-C-EVD
	PMN	PAN9019A-M2E-C-EVD
	HVIN	ENWF9511AMKF
	FVIN	--
	HMN	--
	Hardware Version	01
	Software Version	01
5	Product Type Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz and Bluetooth®, M.2 card with chip antenna
	Model name	ENWF9501AMKF
	Brand name	PAN9019-M2E-C-EVD
	PMN	PAN9019-M2E-C-EVD
	HVIN	ENWF9501AMKF
	FVIN	--
	HMN	--
	Hardware Version	01
	Software Version	01
Comment: Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2024-03-18	Initial Release	--

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
DSSS	Direct Sequence Spread Spectrum
EUT	Equipment Under Test
FCC	Federal Communications Commission
IEEE 802.15.4	MAC and PHY Layer for Wireless Personal Area Networks
ISED	Innovation, Science and Economic Development Canada
O-QPSK	Offset-Quadrature Phase Shift Keying
QPSK	Quadrature Phase Shift Keying
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

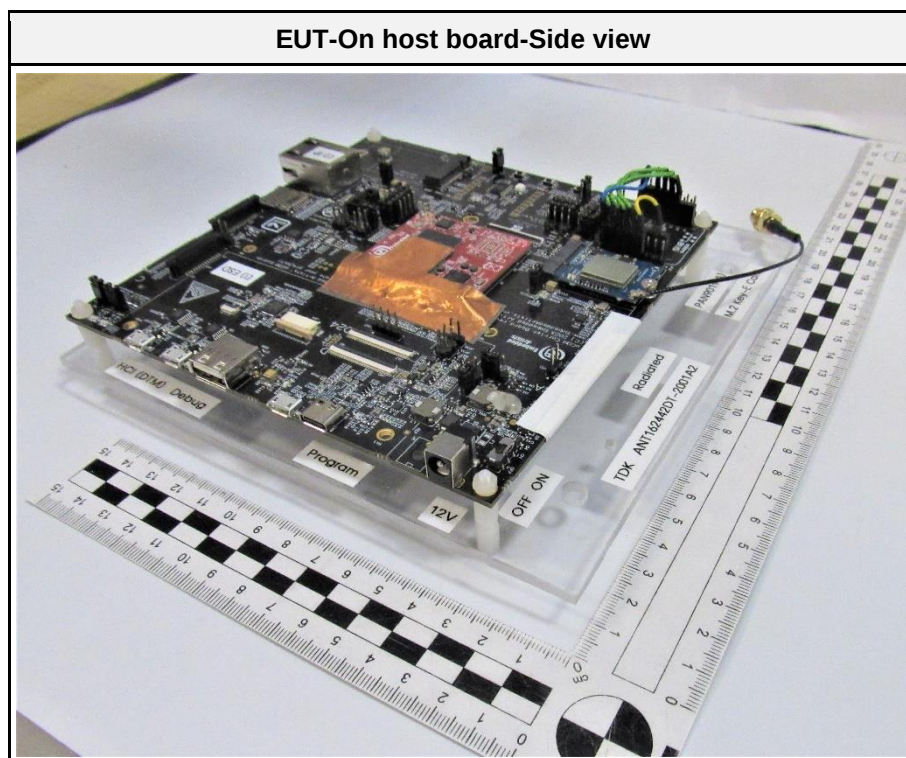
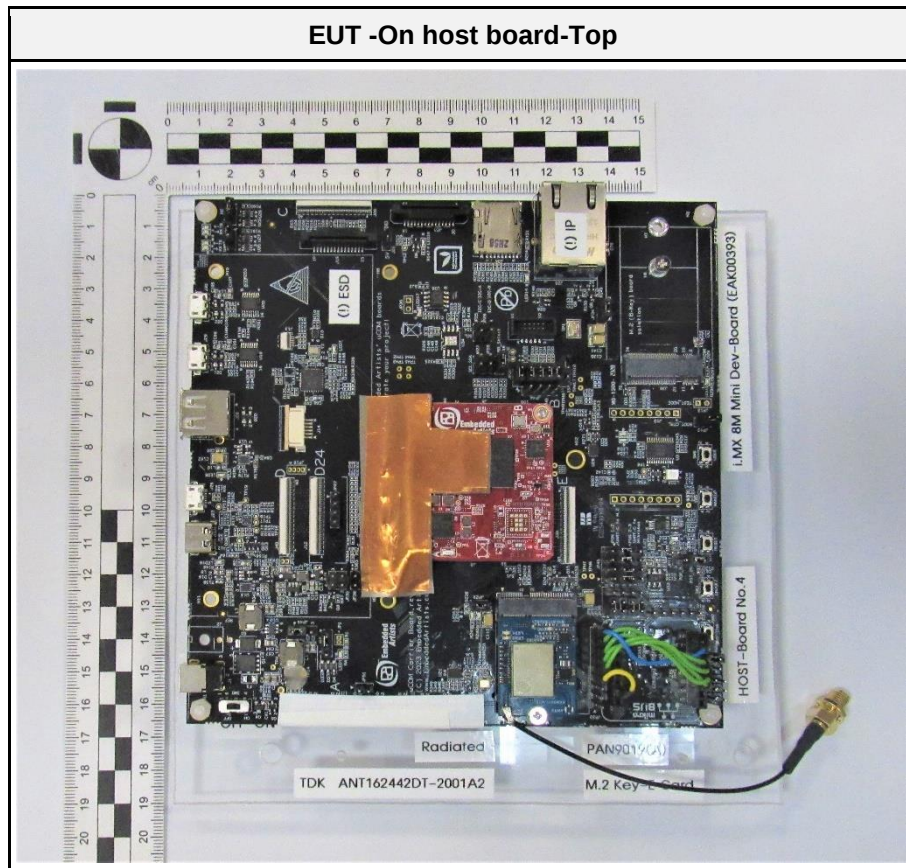
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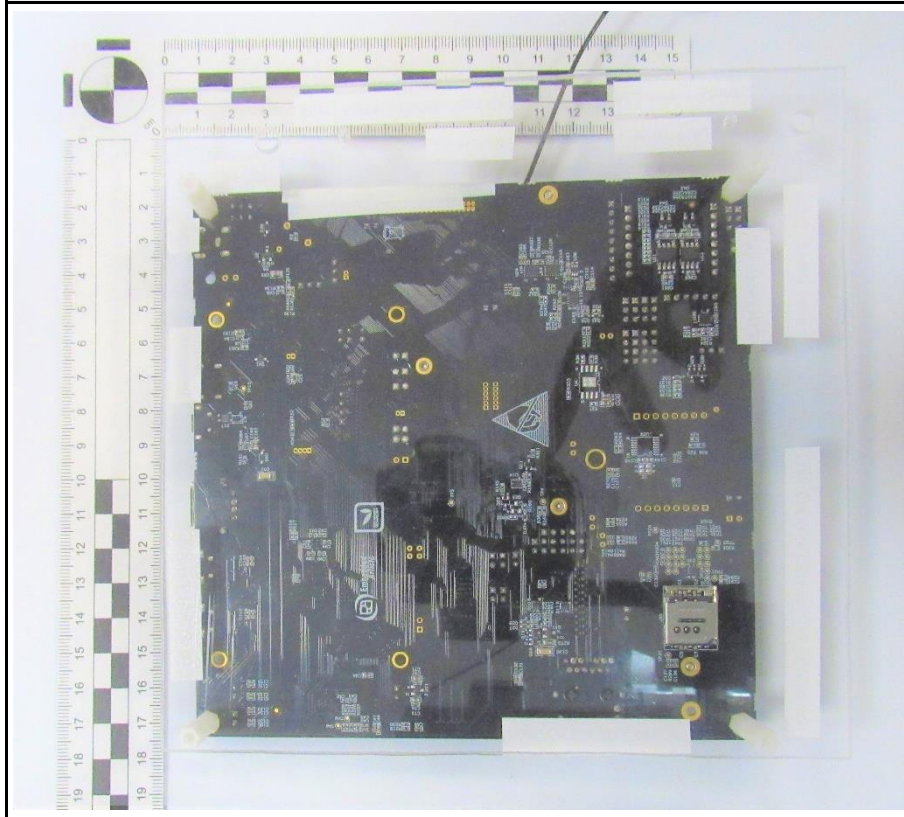
1 Equipment (Test Item) Under Test

Description	Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module		
Model	ENWF9511C1KF		
Additional Model(s)	None		
Brand Name(s)	PAN9019A		
Sample Identification	EUT #	Sample-ID	Serial Number
	PAN9019A with Antenna 1	46902	00000330
	PAN9019A with Antenna 2	46856	00000306
	PAN9019A with Antenna 3	46898	00000279
Hardware Version(s)	03		
Software Version(s)	01		
PMN	PAN9019A		
HVIN	ENWF9511C1KF		
FVIN	--		
HMN	--		
FCC ID	T7V9019		
IC	216Q-9019		
Equipment type	Radio Module		
Radio type	Transceiver		
Assigned frequency bands	2400.0 MHz - 2483.5 MHz		
Radio technology	IEEE 802.15.4		
Modulation	O-QPSK		
Number of antenna ports	1		
Antenna 1	Type	External antenna	
	Model	GW.51.5153	
	Manufacturer	Taoglas	
	Gain	5.2 dBi	
Antenna 2	Type	External antenna	
	Model	2JF1002P	
	Manufacturer	2J Antennas	
	Gain	4.2 dBi	
Antenna 3	Type	External antenna	
	Model	ANT162442DT-2001A2	
	Manufacturer	TDK	
	Gain	2.1 dBi	
Supply Voltage	V _{NOM}	1.8/3.3 VDC	
	V _{MIN}	1.71/3.14 VDC	
	V _{MAX}	1.89/3.46 VDC	
Operating Temperature	T _{NOM}	25 °C	
	T _{MIN}	-40 °C	
	T _{MAX}	85 °C	
AC/DC-Adaptor	None		
Manufacturer	Panasonic Industrial Devices Europe GmbH Zeppelinstr. 19 21337 Lüneburg GERMANY		

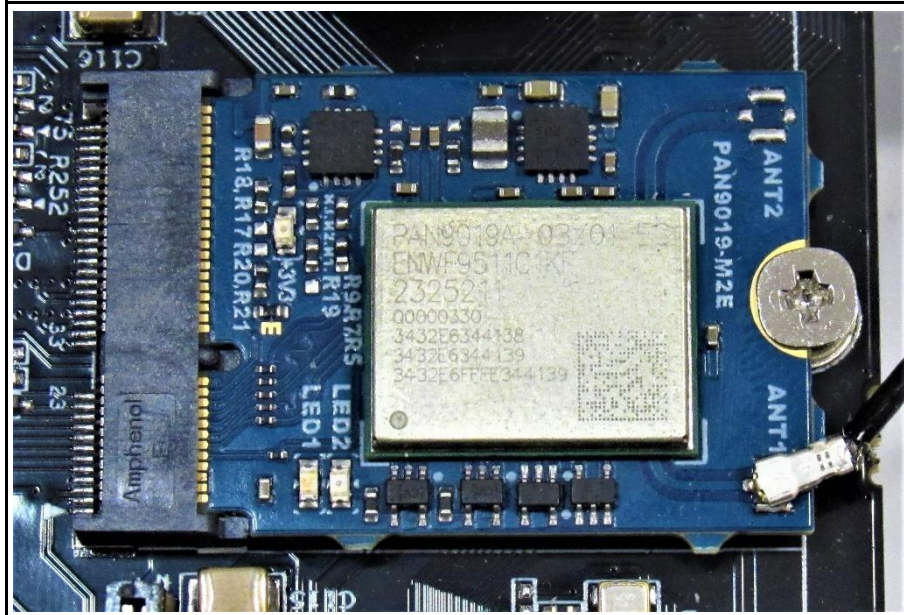
1.1 Photos – Equipment External



EUT-On host board-Bottom



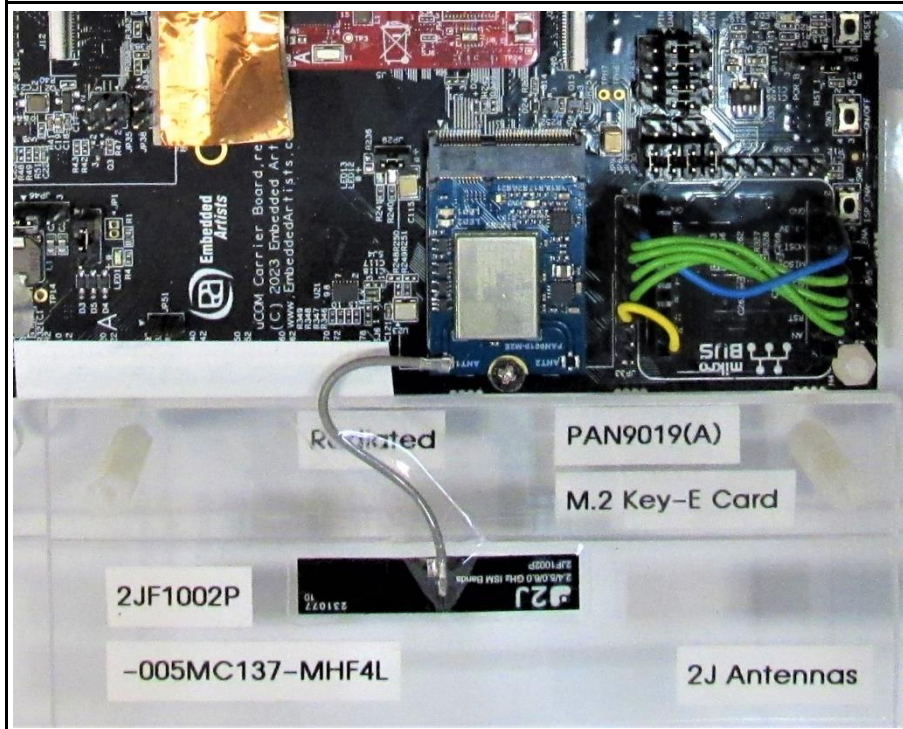
EUT-Radio Module



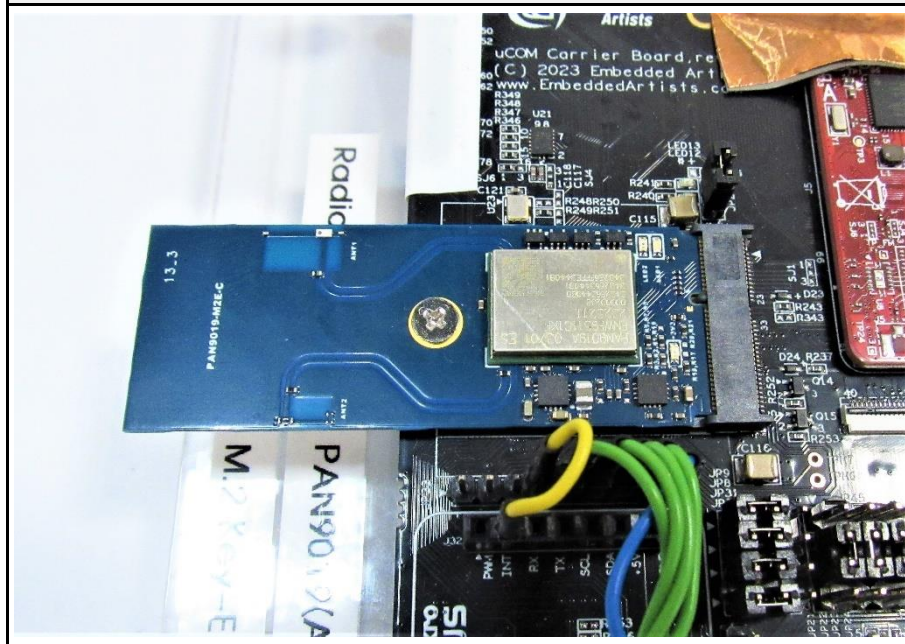
EUT -On host board-With Antenna 1



EUT -On host board-With Antenna 2

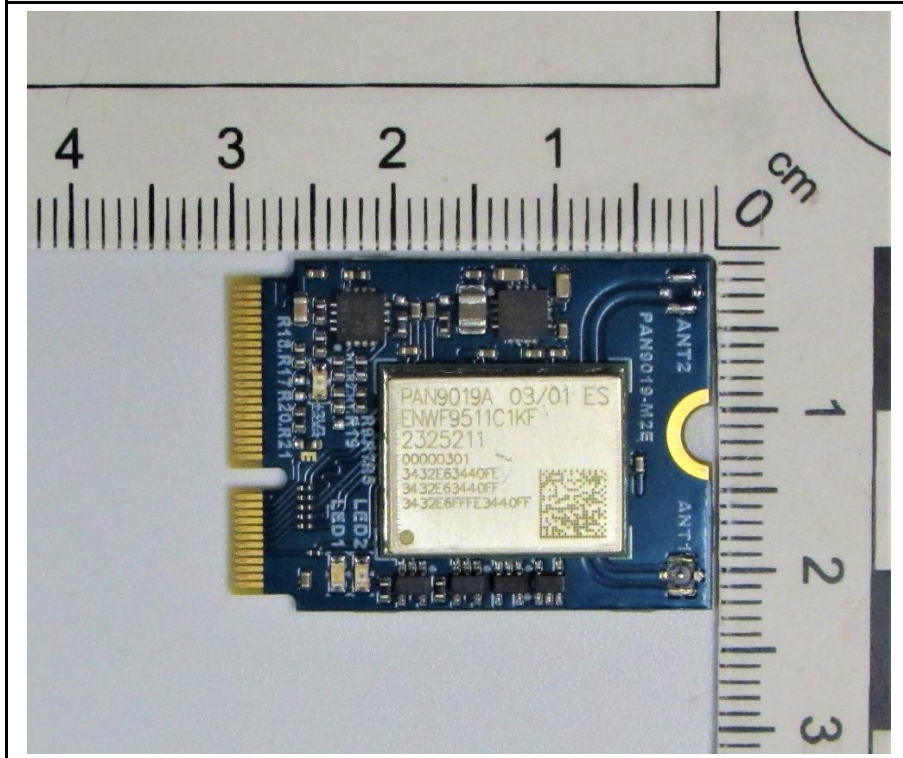


EUT -On host board-With Antenna 3

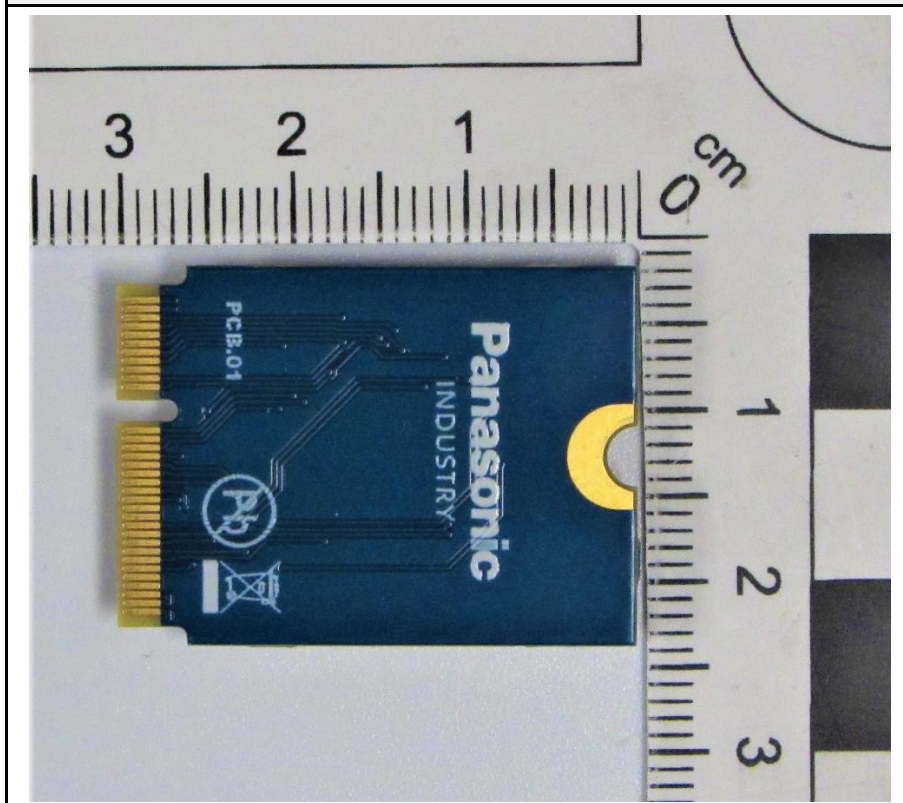


1.2 Photos – Equipment Internal

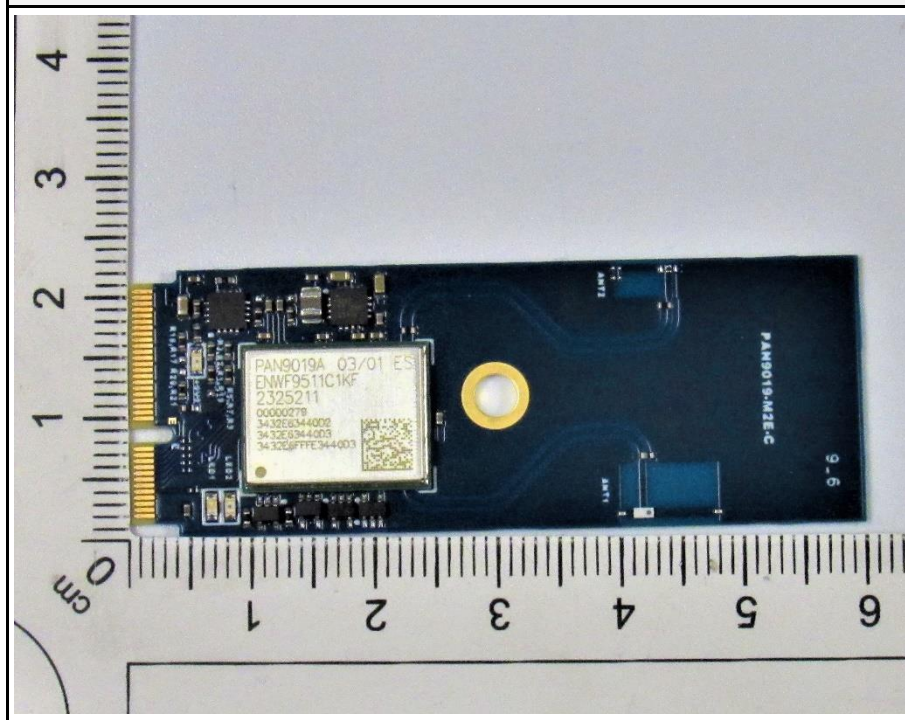
RF Module-PAN9019(A)-top



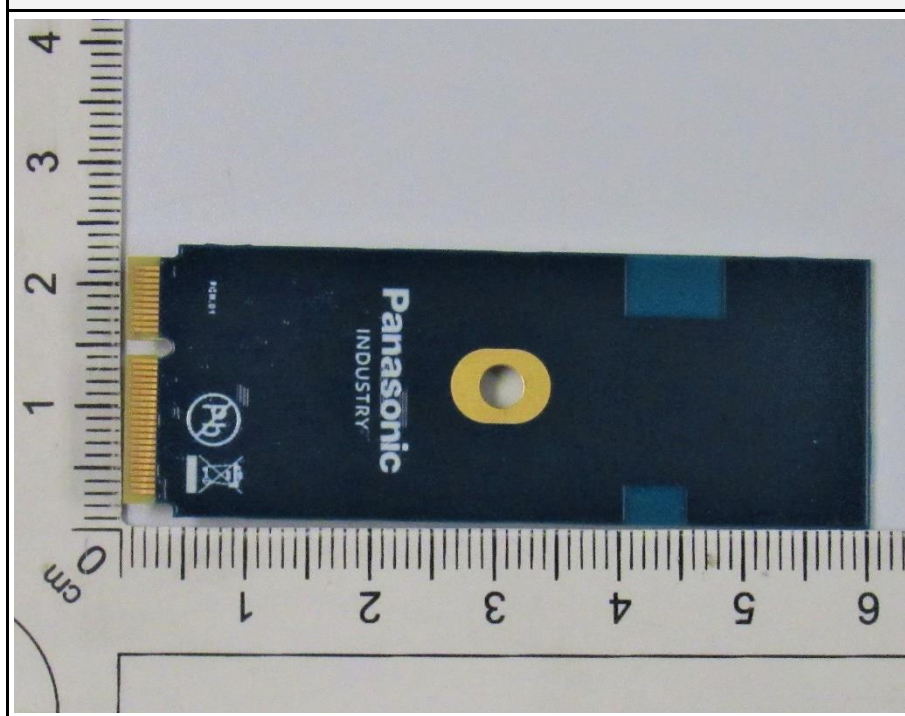
RF Module-PAN9019(A)-bottom



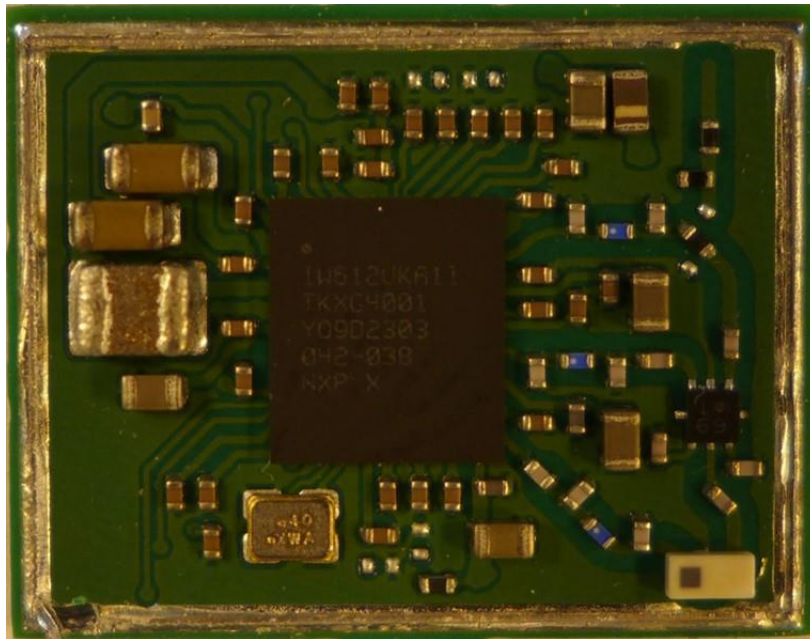
RF Module-PAN9019(A)-With antenna 3-top



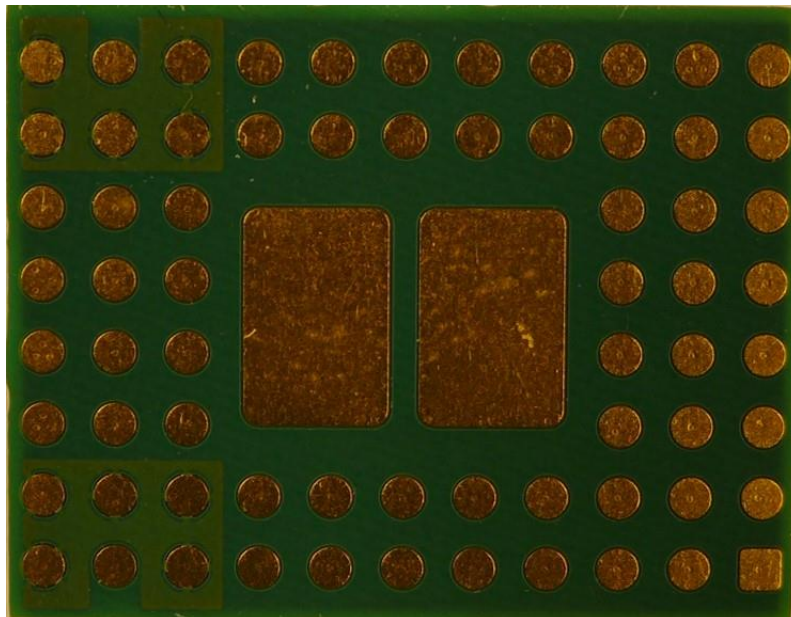
RF Module-PAN9019(A)-With antenna 3-bottom



RF Module-PAN9019(A)-top without shielding



RF Module-PAN9019(A)-bottom top without shielding



1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Host-Board-iMX8M Mini Developer’s Kit V3	Embedded Artists	EAK00393	For configuring test modes
AE	Notebook	Lenovo	Thinkpad	
AE	AC/DC Adapter	Phihong Technology Co. Ltd.	PSAA30R-120	To power the evaluation board
CBL	Ethernet	---	---	Connection between evaluation board and notebook
SFT	Web GUI	Panasonic	---	For test mode activation
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
SFT : The Equipment Under Test used an operating system with a test firmware. The driver for the tested technology was running in a manufacturer mode.				
Comment:				

1.4 Test mode duty cycle

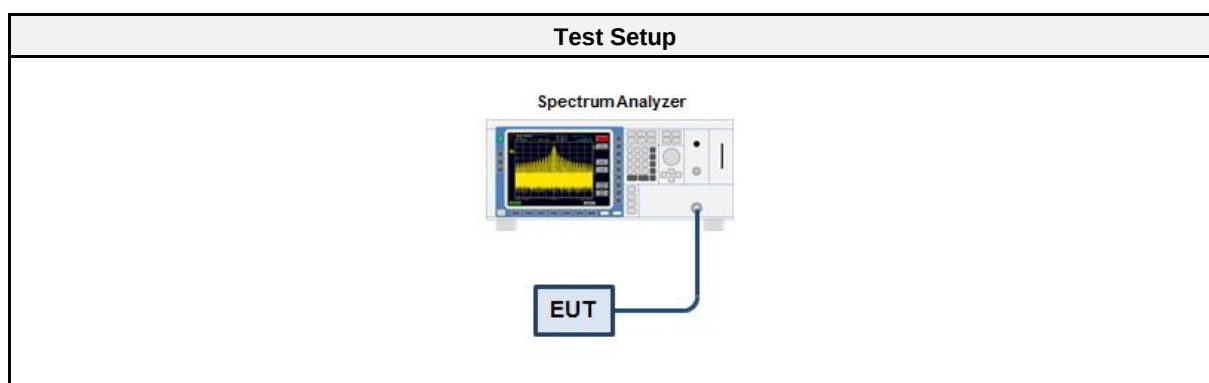
1.4.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.4.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required ($10 \times \log_{10}(1/DC)$)

1.4.3 Setup



1.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2023-08	2024-08

1.4.5 Procedure

Test Procedure
- EUT set to test mode - Span is set to zero span - Detector set to peak - Sweep time is set long enough to capture at least 5 bursts - Envelope peak value of emission spectrum is selected - The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst - The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period - The duty cycle is calculated by $DC = T_{ON} / (T_{ON} + T_{OFF})$ - The duty cycle correction is calculated by $DC = -10 \times \log_{10}(T_{ON} / (T_{ON} + T_{OFF}))$

1.4.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
IEEE 802.15.4	0.265	5.75

1.5 Test Modes

Mode	Description
DSSS O-QPSK	Mode = Transmit Modulation = O-QPSK Spreading = DSSS Data rate = 250 kbps Chip rate = 2000 kbps Duty cycle = 26.5%
Receive	Mode = Receive
Comment:	

1.6 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	11	2405
F2	Tx / Rx	18	2440
F3	Tx / Rx	25	2475
F4	Tx / Rx	26	2480

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dB μ V. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

$$\text{Reading on Analyzer (dB}\mu\text{V)} + \text{A.F. (dB/m)} = \text{Net field strength (dB}\mu\text{V/m)}$$

Net:

This is the net field strength measurement (as shown above).

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Field strength limit:

This is the FCC Class B radiated emission limit (in units of dB μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ V/m:

$$\text{Field strength limit (dB}\mu\text{V/m)} = 20 \cdot \log (\mu\text{V/m})$$

Example only for radiated field strength:

Reading + AF	= Net Reading	:	Net reading	- Field strength limit	= Margin
+21.5 dB μ V	+ 26 dB/m	:	47.5 dB μ V/m	- 57.0 dB μ V/m	= -9.5

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 A2 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	--
FCC § 15.247(b) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	--
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	--
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	--
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	--
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	--
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 A2 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	--
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.4-2014	PASS	--
Comment: The Decision Rule is applied on the basis of ETSI TR 102 273 and ETSI TR 100 028. These standards provide guidance on how to calculate and apply measurement uncertainty whilst providing maximum uncertainties allowance. In all cases due consideration will be given to ILAC-G8:09/2019. Where a result is considered conditional in respect of its proximity to the limit line, the customer would be made aware of situation so that they can make an informed decision on how to proceed.				

Possible Test Case Verdicts	
PASS	Test object does meet the requirements
FAIL	Test object does not meet the requirements
N/T	Required by standard but not tested
N/R	Not required by standard for the test object

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

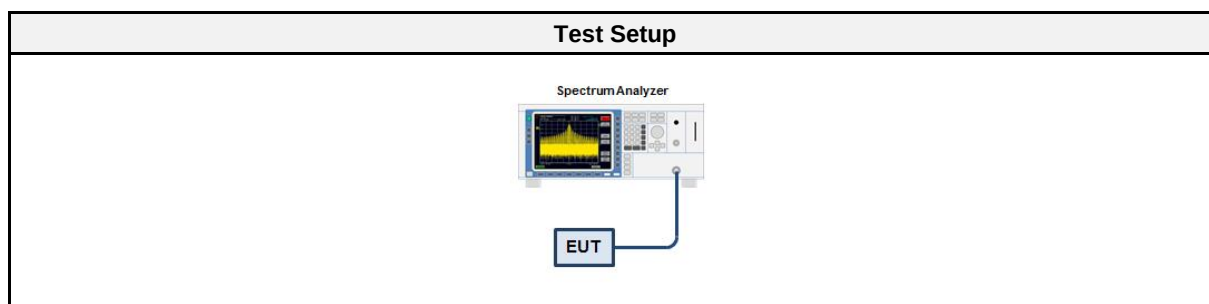
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 A2 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	$\pm 1.26 \%$
Test Sample ID	46902
Operator	Md Abu Bakar Siddique
Date	2024-02-23

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01407	2023-08	2024-08
Cable(CAABR)	HUBER+SUHNER AG	Sucoflex 102EA	EF00779	2023-03	2024-03

3.1.5 Procedure

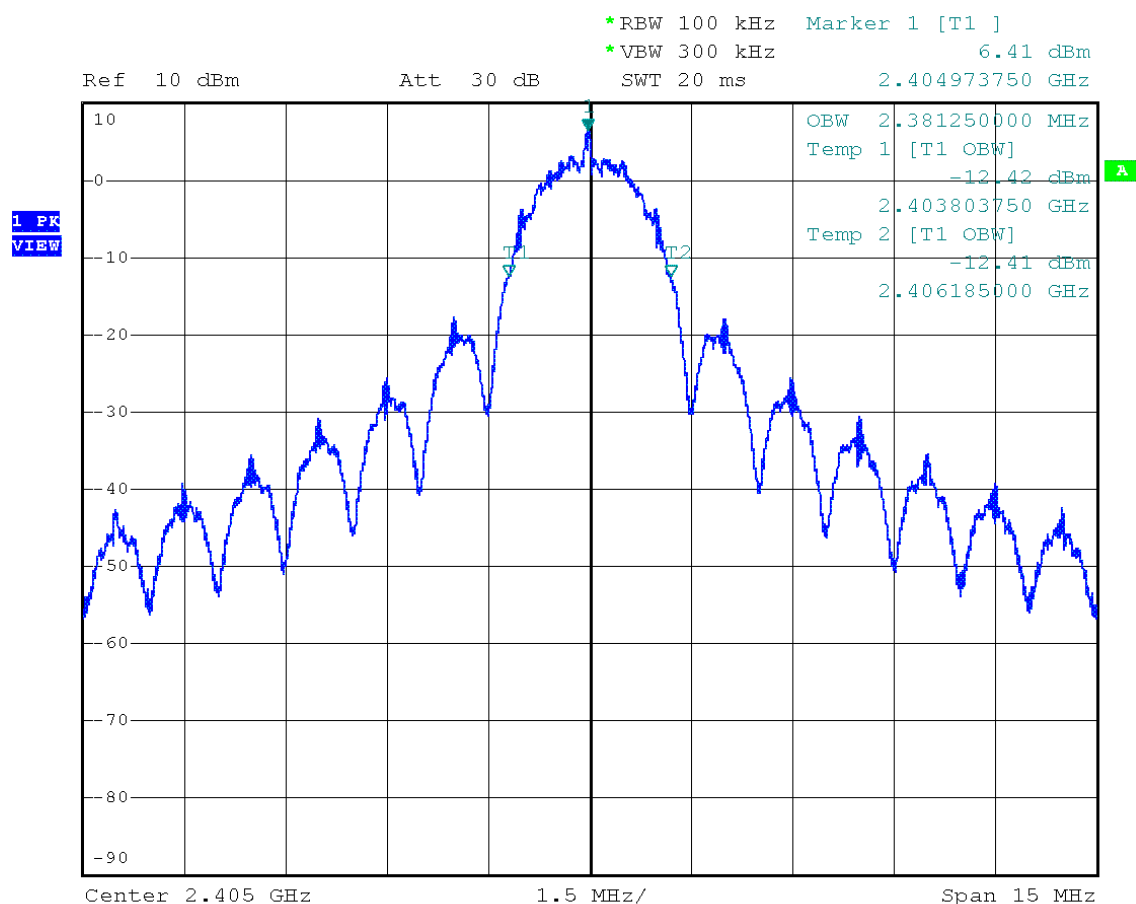
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth is measured with the build-in analyzer function

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
O-QPSK	2405	2.381
O-QPSK	2440	2.408
O-QPSK	2475	2.411
O-QPSK	2480	2.261

Occupied Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Occupied Bandwidth [MHz]: 2.381



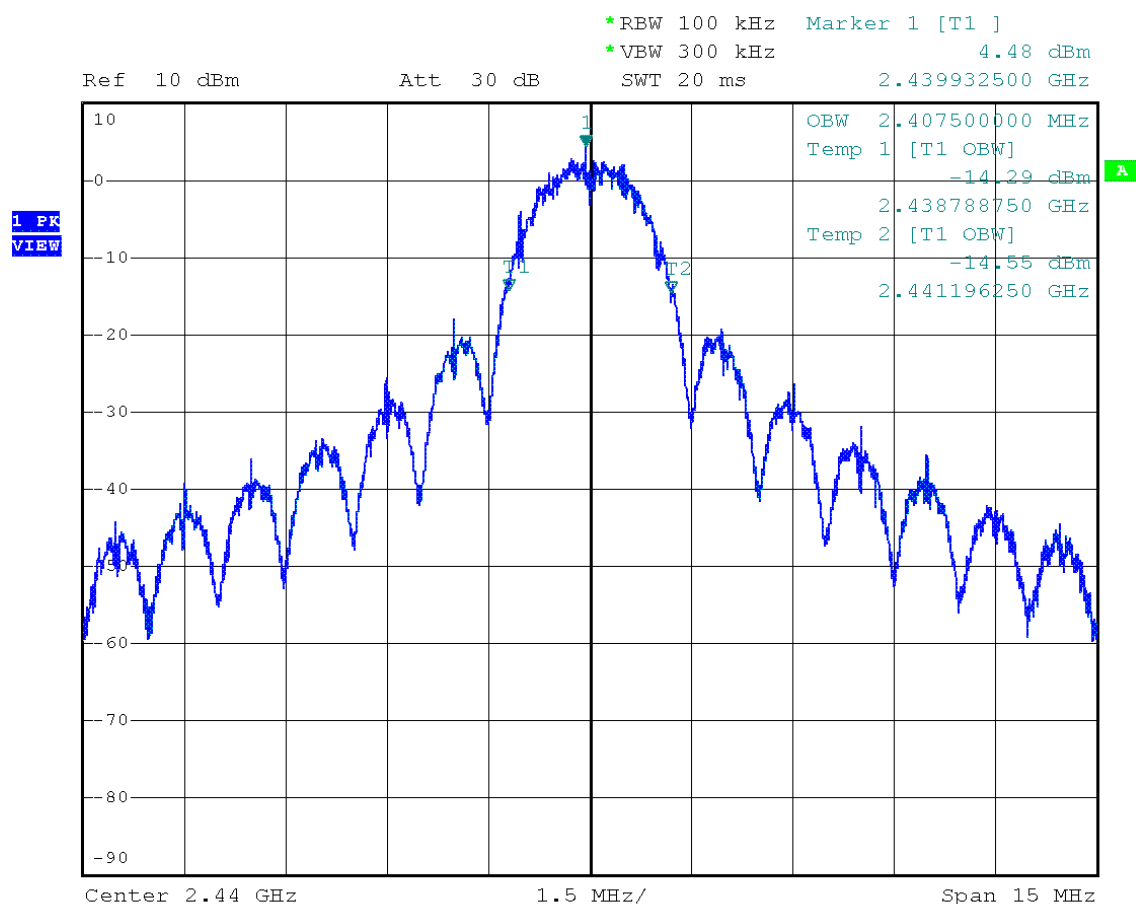
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Occupied Bandwidth [MHz]: 2.408



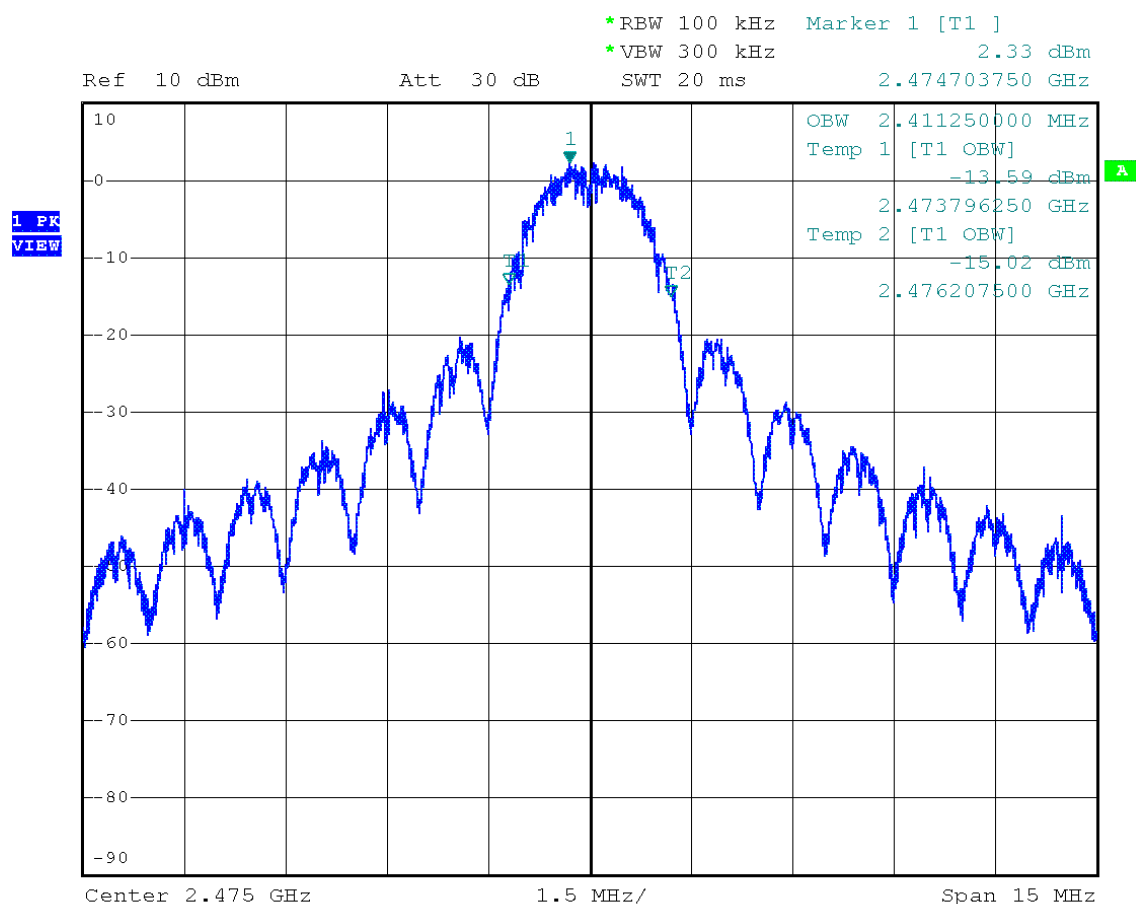
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Occupied Bandwidth [MHz]: 2.411



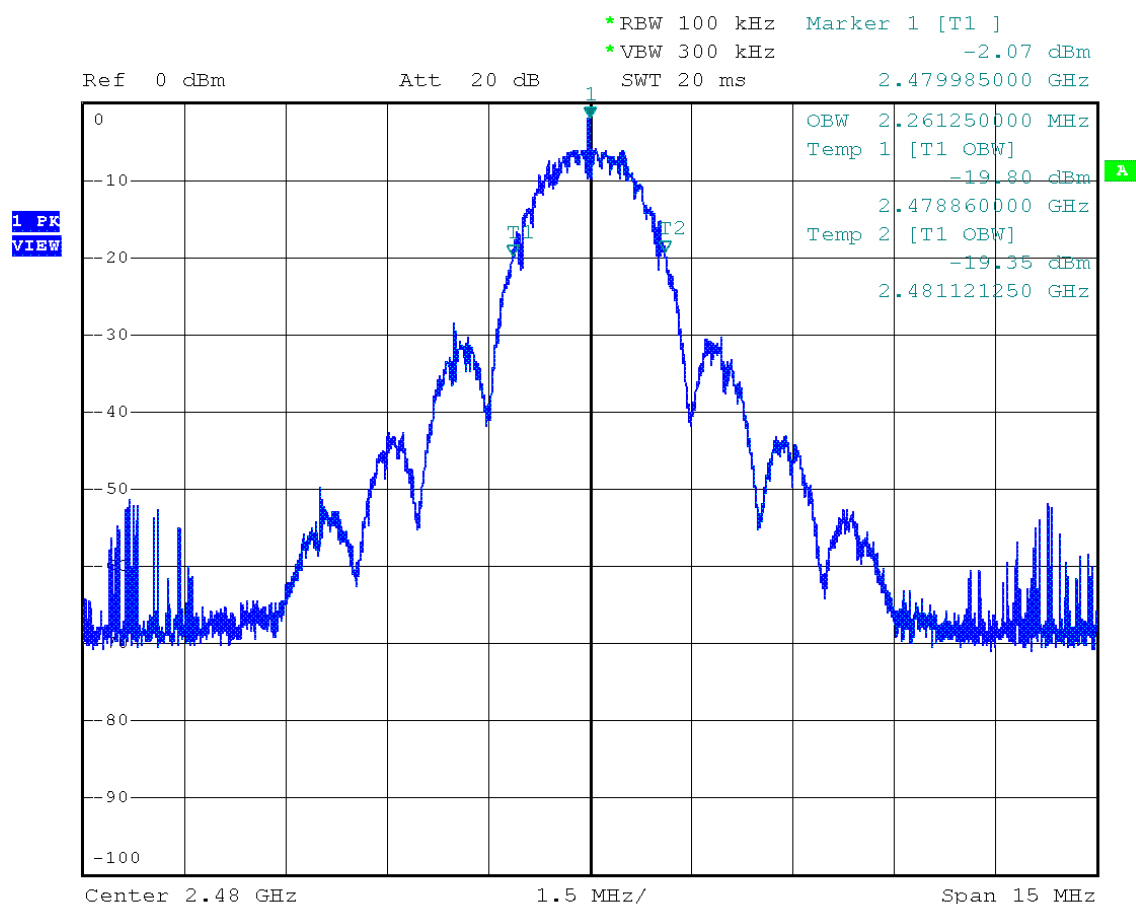
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Occupied Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Occupied Bandwidth [MHz]: 2.261



Date: 23.FEB.2024 11:34:09

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.2 Test Conditions and Results - 6 dB bandwidth

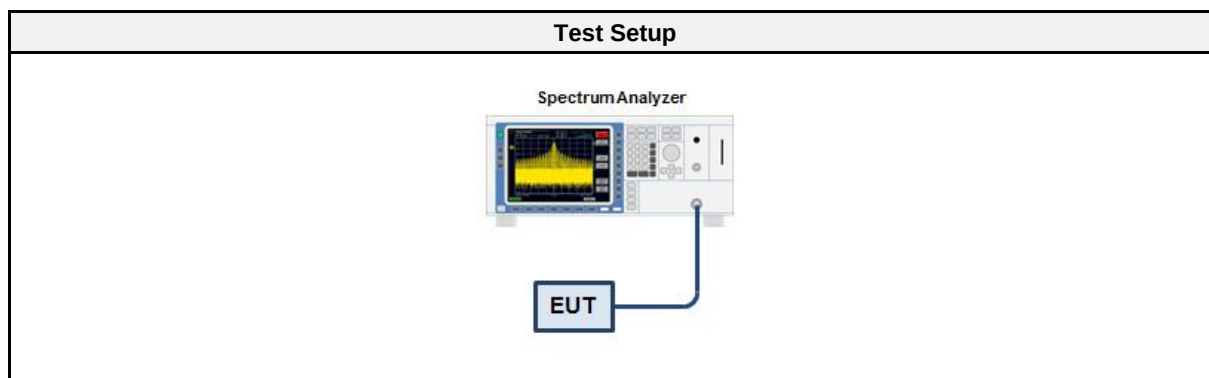
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 3 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Measurement Uncertainty	± 1.26 %
Operator	Md Abu Bakar Siddique
Date	2024-02-23

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01407	2023-08	2024-08
Cable(CAABR)	HUBER+SUHNER AG	Sucoflex 102EA	EF00779	2023-03	2024-03

3.2.5 Procedure

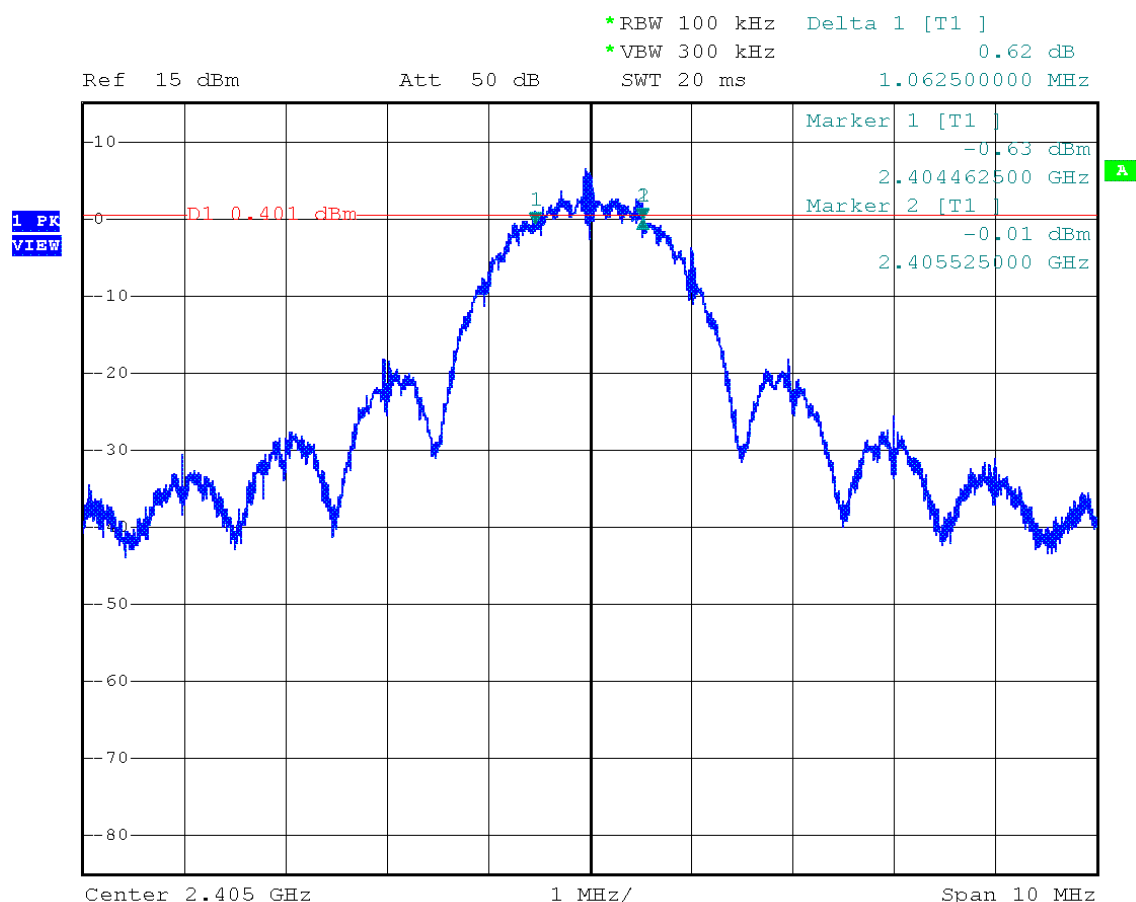
Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak 7. 6 dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
O-QPSK	2405	1062.5	500	PASS
O-QPSK	2440	1130.0	500	PASS
O-QPSK	2475	1115.0	500	PASS
O-QPSK	2480	1557.5	500	PASS

DTS (6 dB) Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Lower Frequency [MHz]: 2404.463
 Upper Frequency [MHz]: 2405.525
 6 dB Bandwidth [kHz]: 1062.5



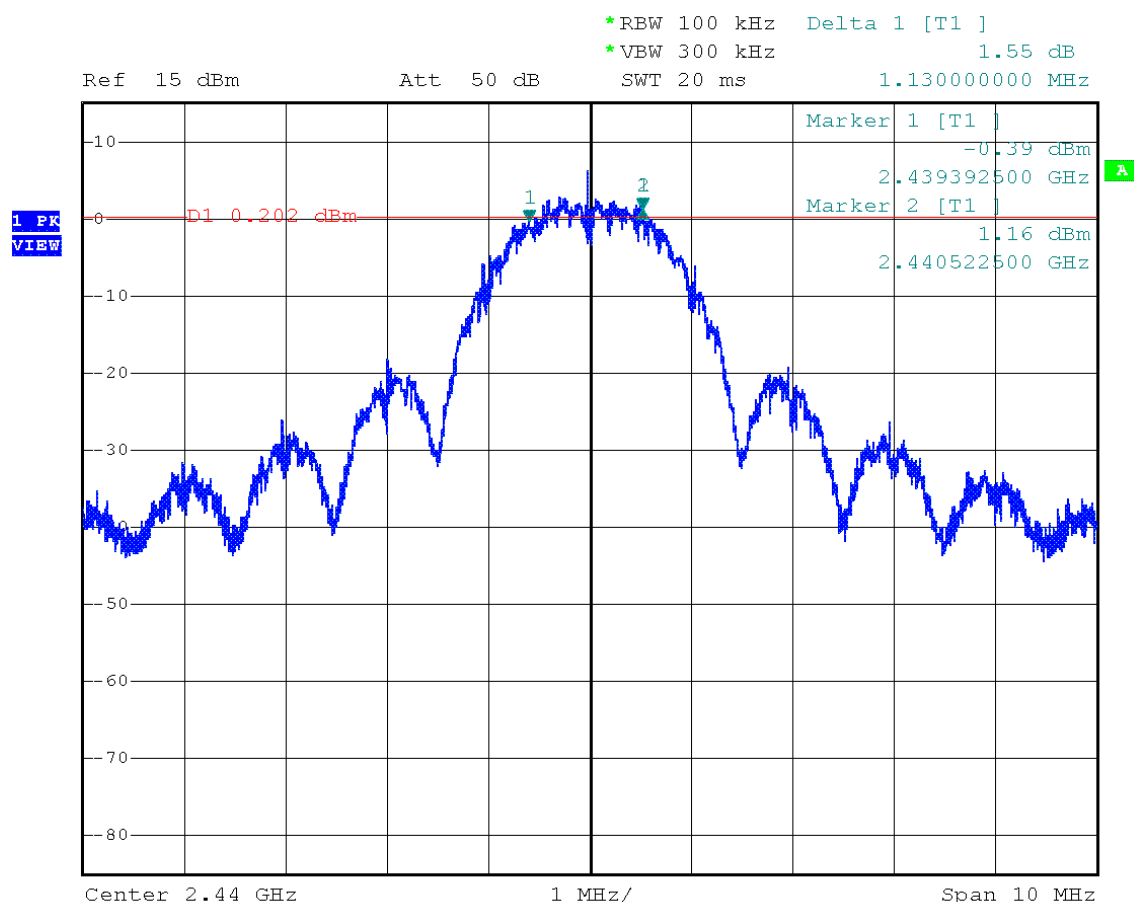
Date: 23.FEB.2024 11:43:11

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Lower Frequency [MHz]: 2439.392
 Upper Frequency [MHz]: 2440.523
 6 dB Bandwidth [kHz]: 1130.0



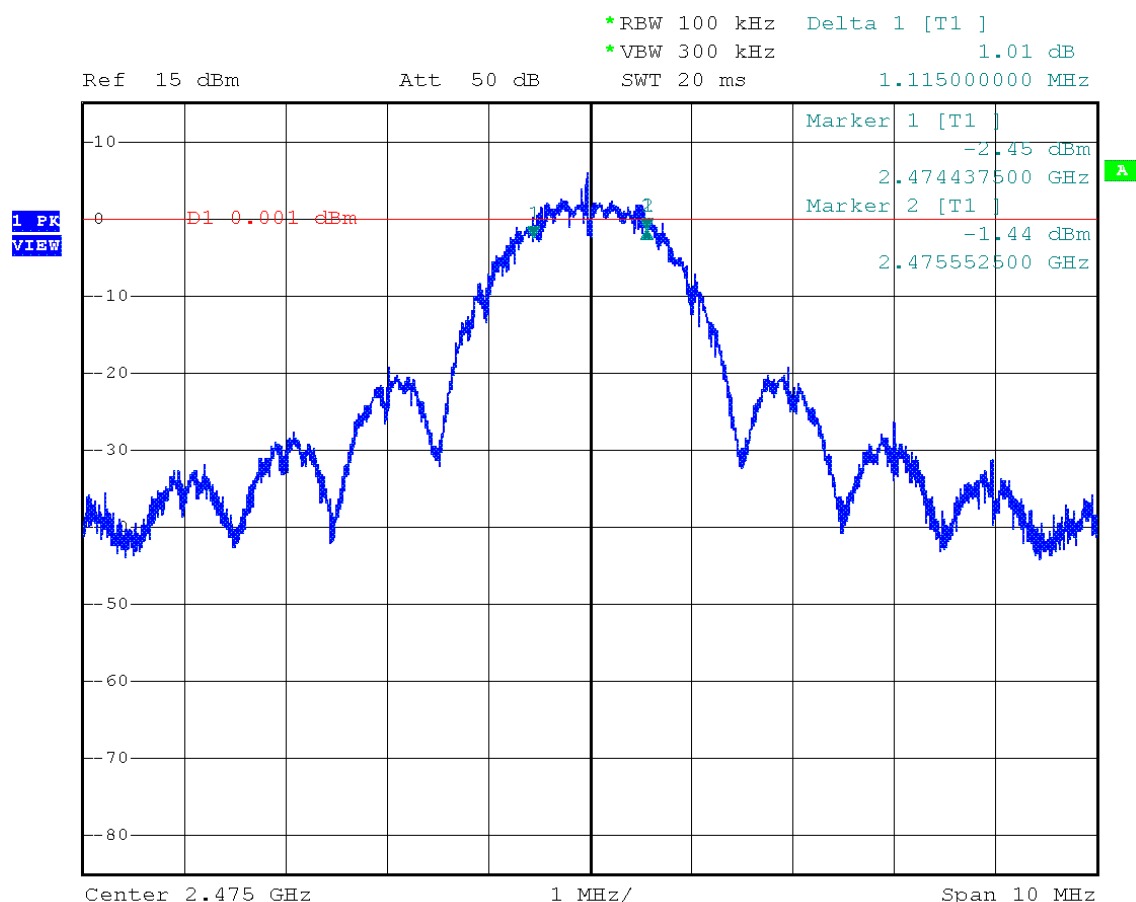
Date: 23.FEB.2024 11:44:06

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Lower Frequency [MHz]: 2474.438
 Upper Frequency [MHz]: 2475.552
 6 dB Bandwidth [kHz]: 1115.0



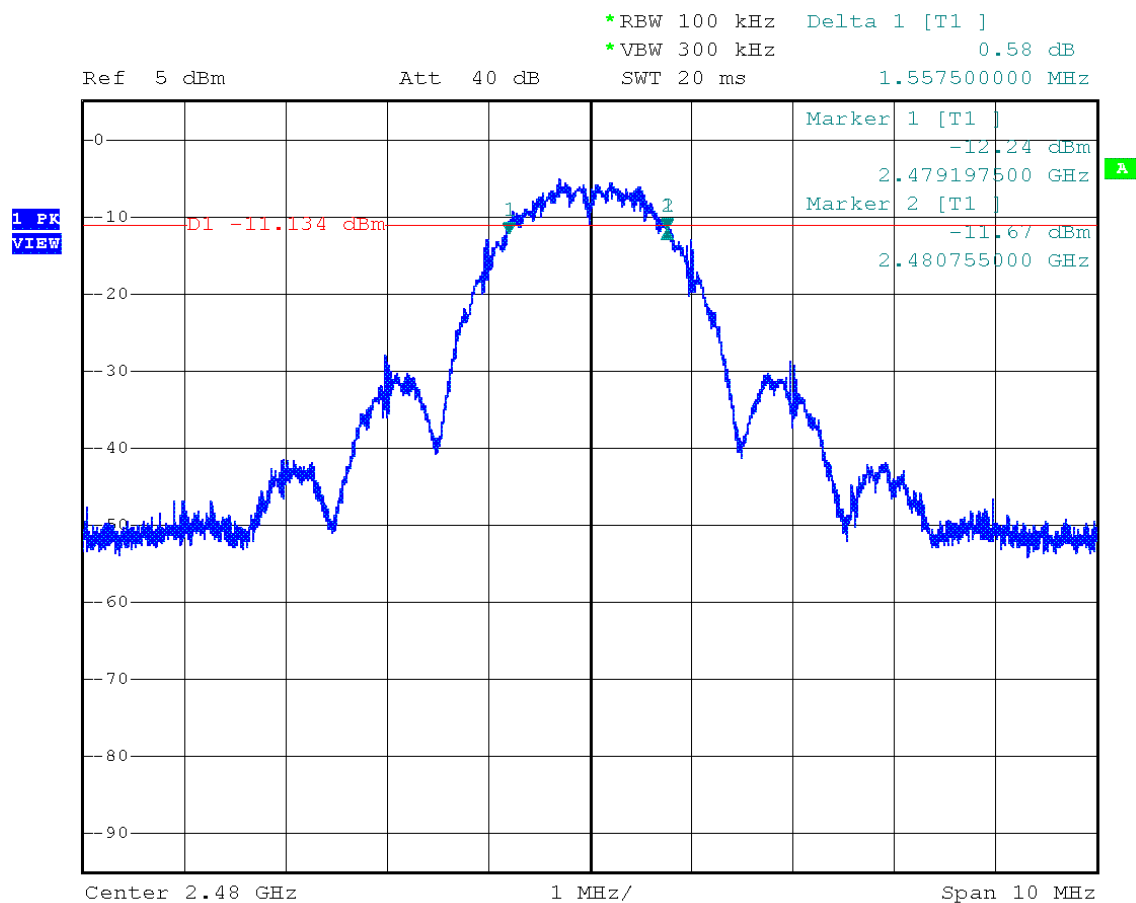
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

DTS (6 dB) Bandwidth

Project Number: G0M-2309-2215
Applicant: Panasonic Industrial Devices Europe GmbH
Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
Model: ENWF9511C1KF
Test Sample ID: 46902
Reference Standards: FCC 15.247, RSS-247
Reference Method: ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
Operating Conditions: Tnom/Vnom
Operator: Md Abu Bakar Siddique
Test Site: Eurofins Product Service GmbH
Test Date: 2024-02-23
Lower Frequency [MHz]: 2479.198
Upper Frequency [MHz]: 2480.755
6 dB Bandwidth [kHz]: 1557.5



Date: 23.FEB.2024 11:46:03

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.3 Test Conditions and Results - Maximum peak conducted output power

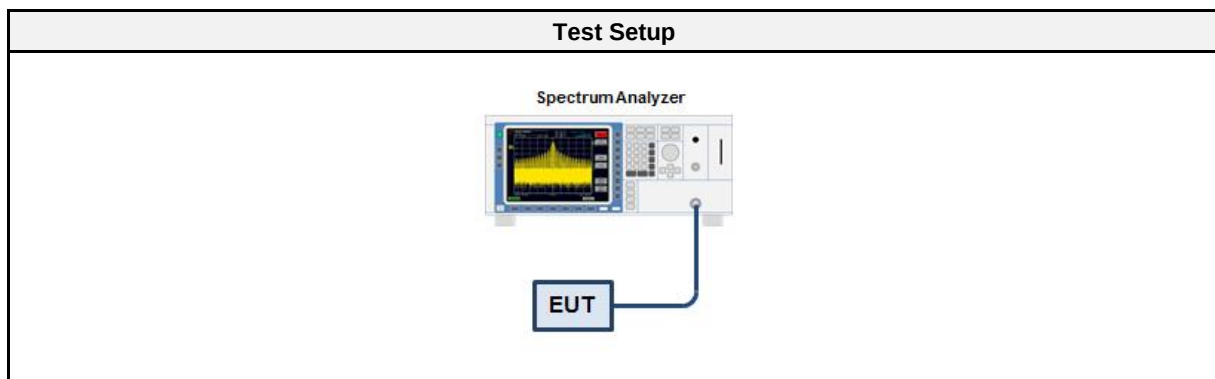
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b); ISSED RSS-247, Issue 3 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Measurement Uncertainty	± 2.86 dB
Operator	Md Abu Bakar Siddique
Date	2024-02-23

3.3.2 Limits

Limits
1 W (30 dBm)
FCC: The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
ISED: The e.i.r.p. shall not exceed 4 W, except fixed point-to-point systems in the bands 2400-2483.5 MHz and 5725-5850 MHz are permitted to have an e.i.r.p. higher than 4 W provided that the higher e.i.r.p. is achieved by employing higher gain directional antennas and not higher transmitter output powers.

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01407	2023-08	2024-08
Cable(CAABR)	HUBER+SUHNER AG	Sucoflex 102EA	EF00779	2023-03	2024-03

3.3.5 Procedure

Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set ≥ DTS bandwidth 3. Detector set to peak and max hold 4. Sweep time is set to auto 5. After the trace has stabilized a marker is set to peak of envelope

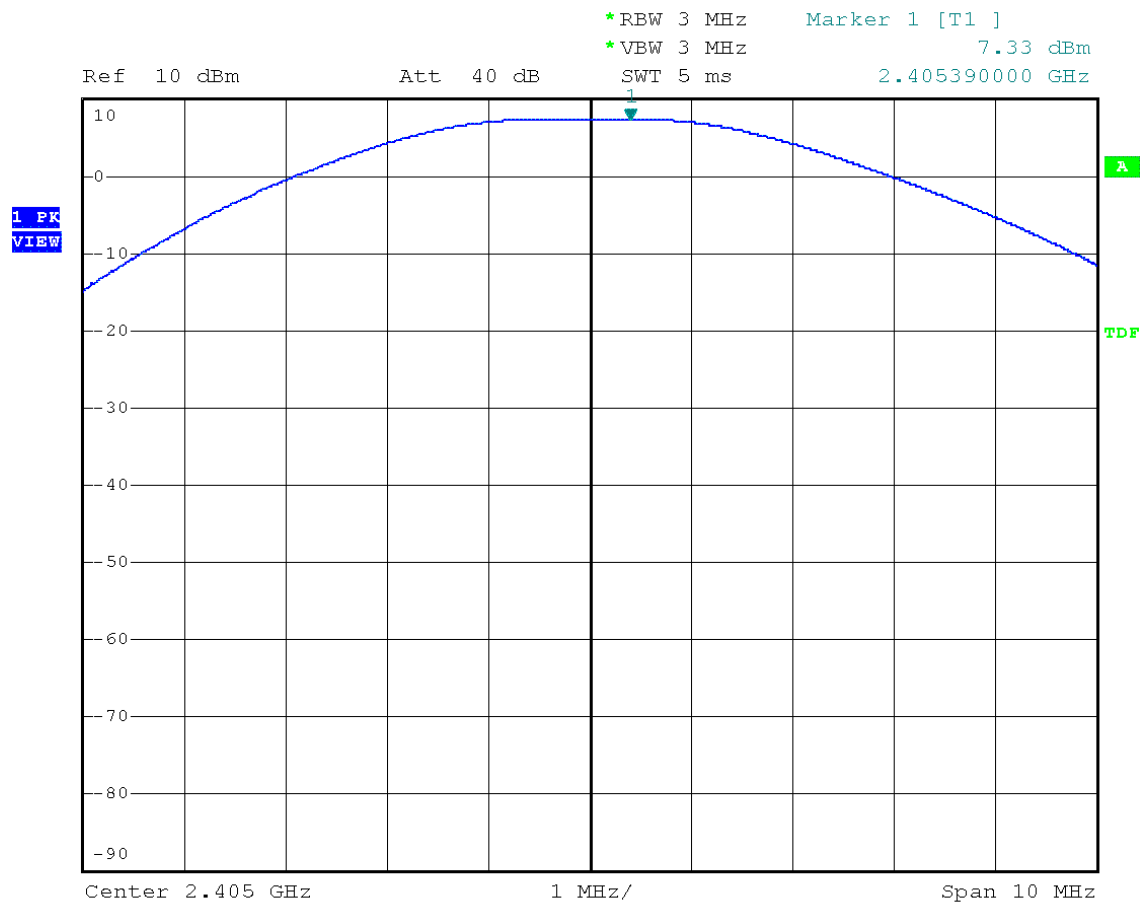
3.3.6 Results

Test Results - FCC				
Channel [MHz]	Conducted Power [dBm]	Conducted Power [W]	Conducted Limit [W]	Verdict
2405	7.329	0.0054	1.0	PASS
2440	7.139	0.0052	1.0	PASS
2475	6.919	0.0049	1.0	PASS
2480	-1.161	0.0008	1.0	PASS

Test Results DSSS - ISSED							
Channel [MHz]	Conducted Power [dBm]	Conducted Power [W]	Conducted Limit [W]	EIRP Power [dBm]	EIRP Power [W]	EIRP Limit [W]	Verdict
2405	7.329	0.0054	1.0	12.529	0.0179	4.0	PASS
2440	7.139	0.0052	1.0	12.339	0.0171	4.0	PASS
2475	6.919	0.0049	1.0	12.119	0.0163	4.0	PASS
2480	-1.161	0.0008	1.0	4.039	0.0025	4.0	PASS
Comment: worst case: with maximum antenna gain (5.2 dBi)							

Peak Conducted Output Power

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Power [dBm]: 7.329
 Peak Power [W]: 0.005406



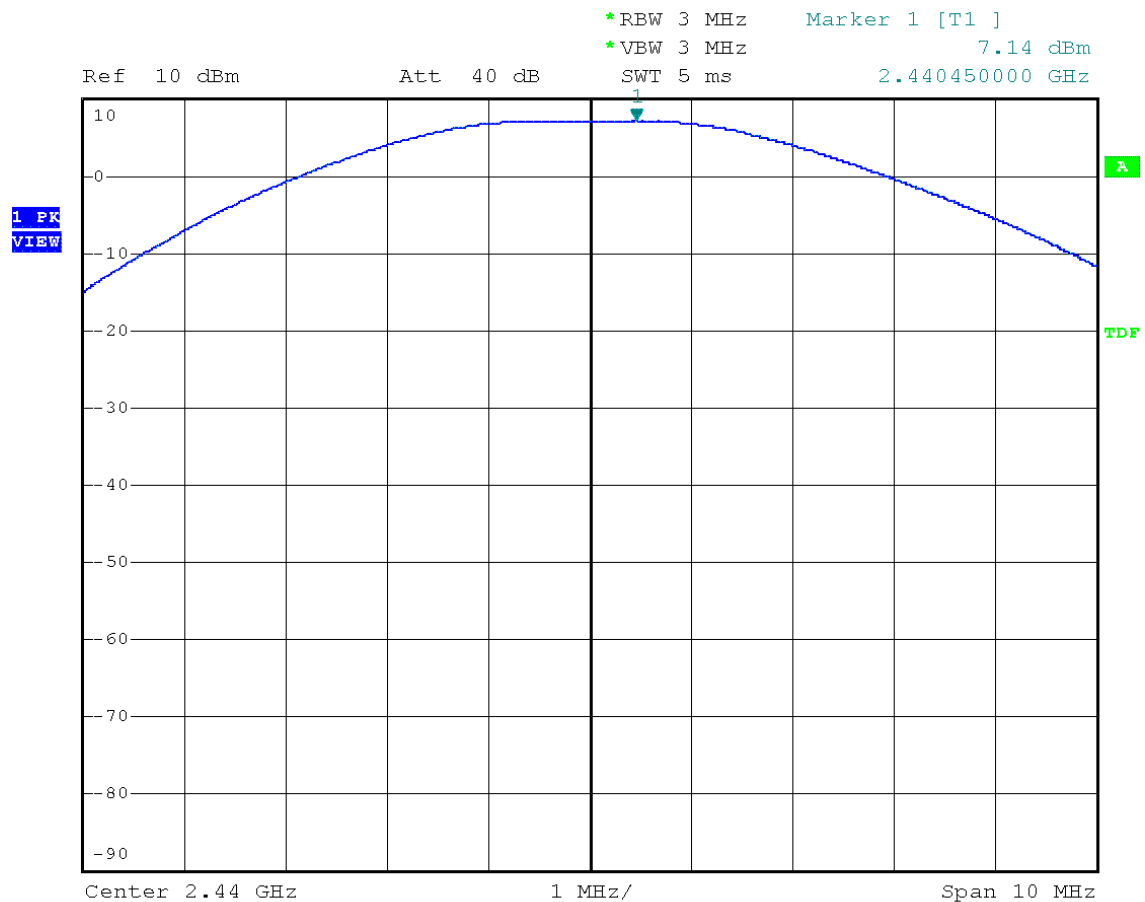
Date: 23.FEB.2024 11:51:25

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Power [dBm]: 7.139
 Peak Power [W]: 0.005175



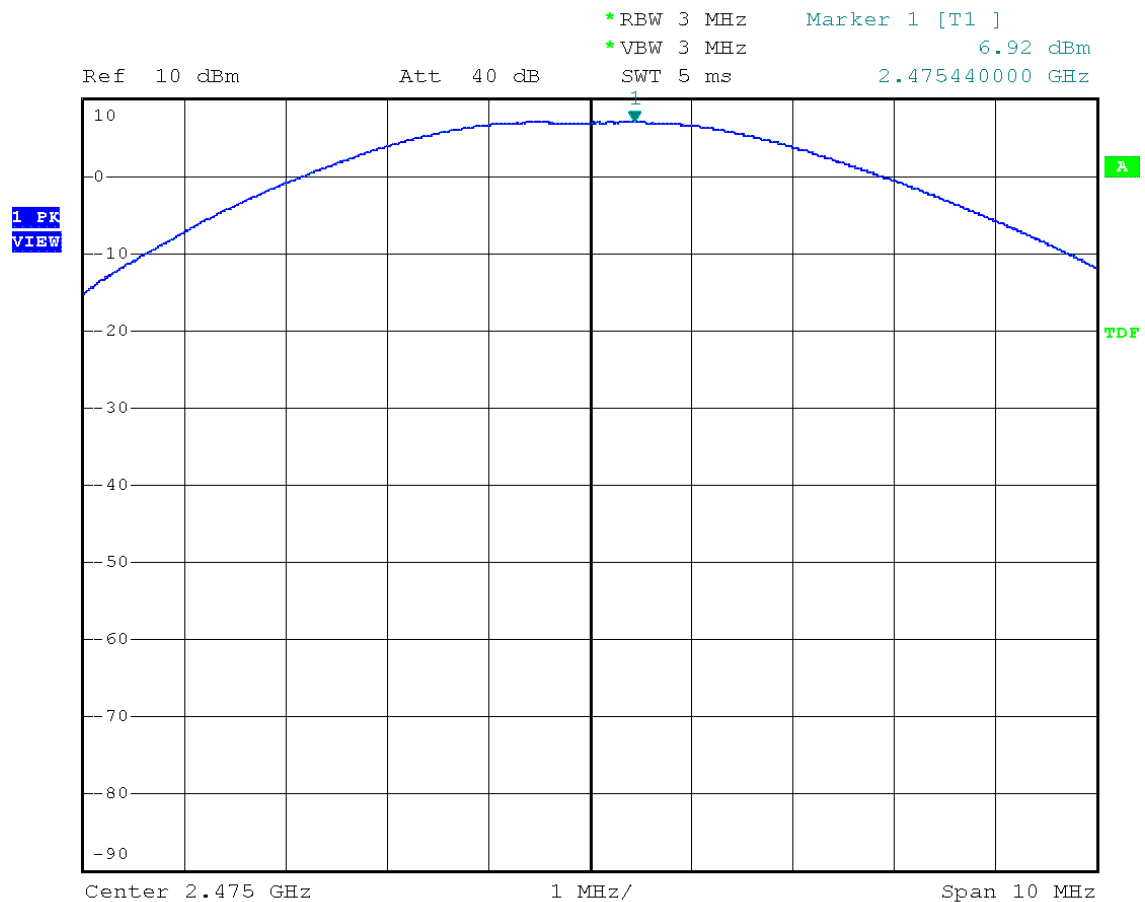
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Power [dBm]: 6.919
 Peak Power [W]: 0.004919



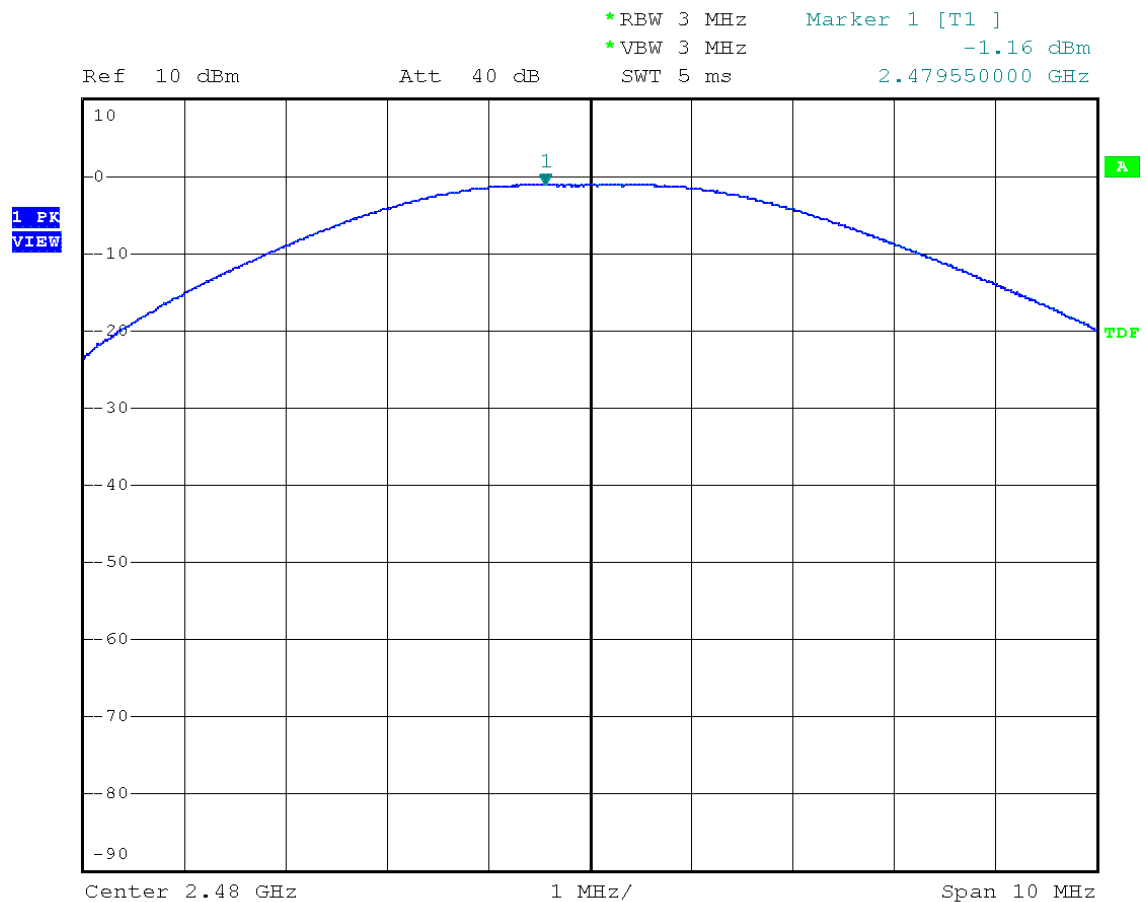
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Conducted Output Power

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.9.1.1
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Power [dBm]: -1.161
 Peak Power [W]: 0.000765



Date: 23.FEB.2024 11:55:00

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.4 Test Conditions and Results - Power spectral density

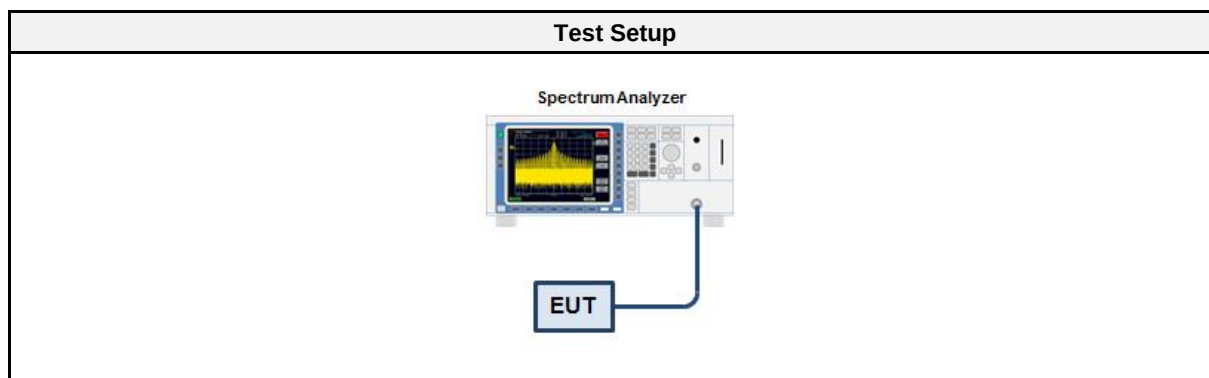
3.4.1 Information

Test Information	
Reference	FCC § 15.247(e); ISED RSS-247, Issue 3 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Measurement Uncertainty	± 2.86 dB
Operator	Md Abu Bakar Siddique
Date	2024-02-23

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01407	2023-08	2024-08
Cable(CAABR)	HUBER+SUHNER AG	Sucoflex 102EA	EF00779	2023-03	2024-03

3.4.5 Procedure

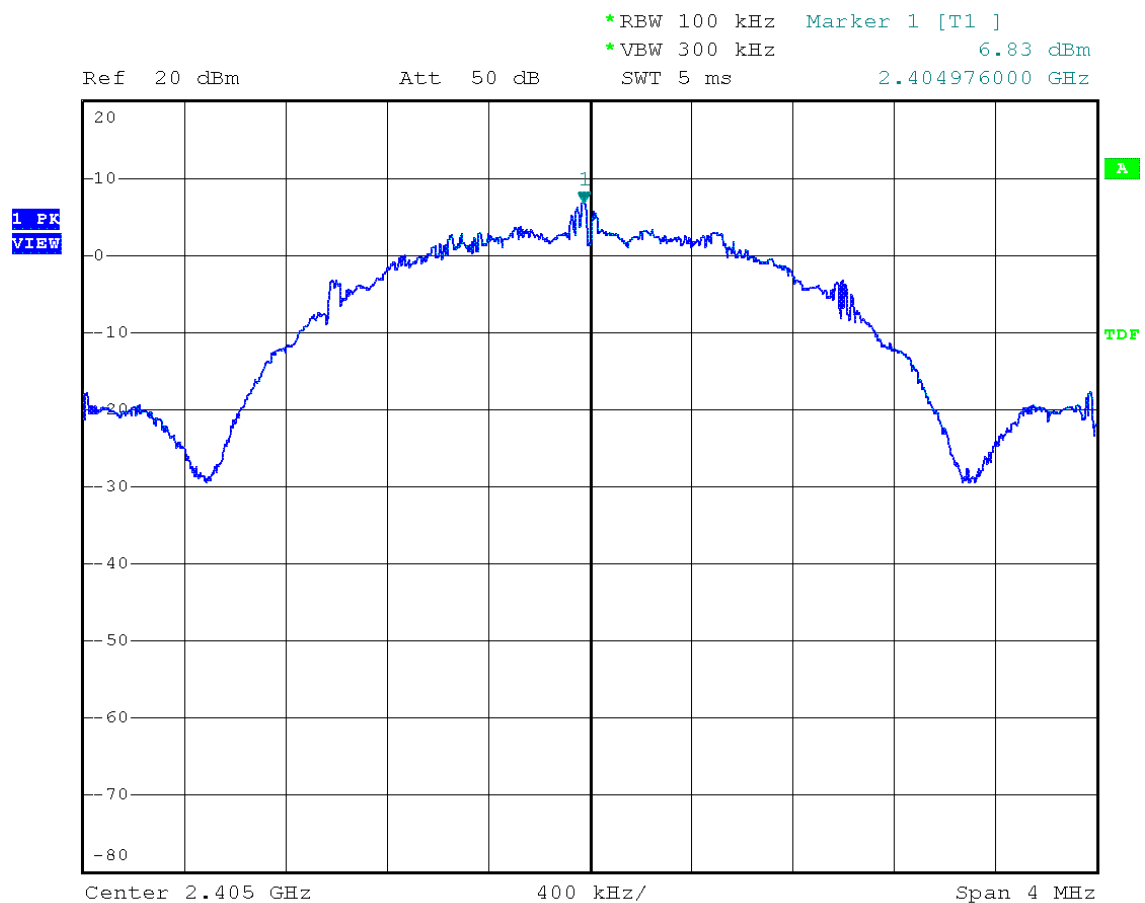
Test Procedure
1. EUT set to test mode 2. The analyzer is set to DTS channel center frequency with a span of 1.5 times the DTS bandwidth 3. The RBW is set to 100 kHz with VBW $\geq$ RBW and the detector is set to peak with max hold 4. After the trace has stabilized a marker is set to the envelope maximum 5. If the power spectral density is above the limit the RBW is reduced (not lower than 3 kHz) and the measurement is repeated 6. If the EUT has more than one transmit chain the procedure is repeated for each transmit chain

3.4.6 Results

Test Results			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2405	6.826	8.0	PASS
2440	5.695	8.0	PASS
2475	6.366	8.0	PASS
2480	-1.697	8.0	PASS
RBW = 100 kHz			

Peak Power Spectral Density

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Frequency [MHz]: 2404.976
 Spectral Density [dBm/RBW]: 6.826
 Resolution Bandwidth [kHz]: 100 kHz



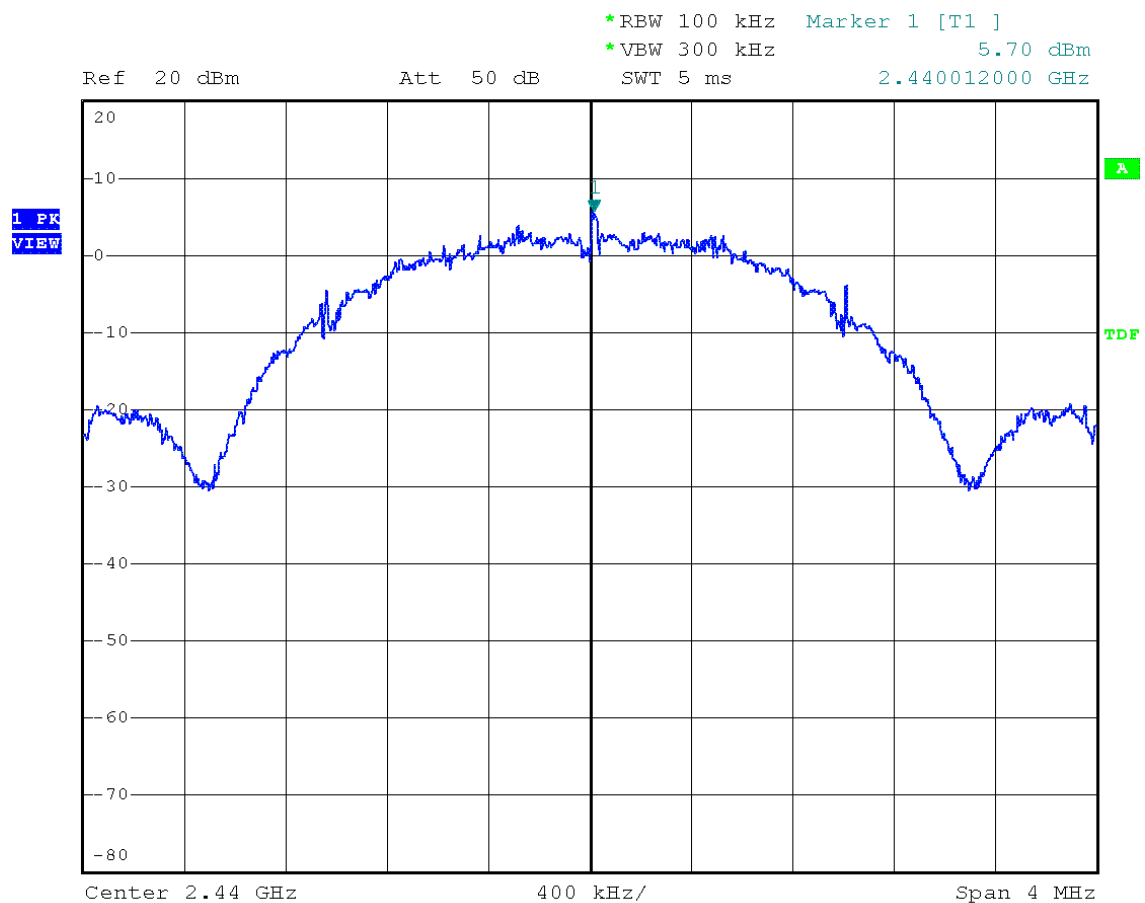
Date: 23.FEB.2024 12:03:26

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Frequency [MHz]: 2440.012
 Spectral Density [dBm/RBW]: 5.695
 Resolution Bandwidth [kHz]: 100 kHz



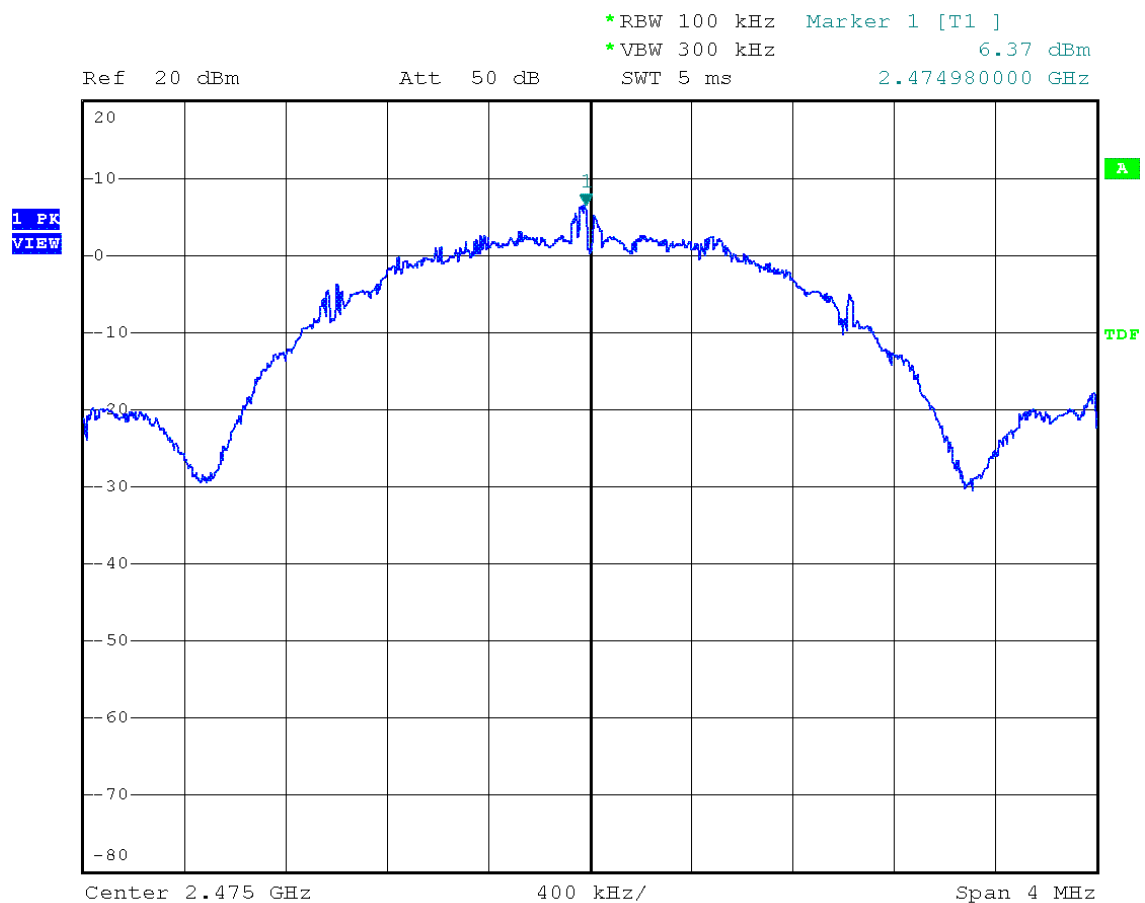
Date: 23.FEB.2024 12:05:03

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Frequency [MHz]: 2474.980
 Spectral Density [dBm/RBW]: 6.366
 Resolution Bandwidth [kHz]: 100 kHz



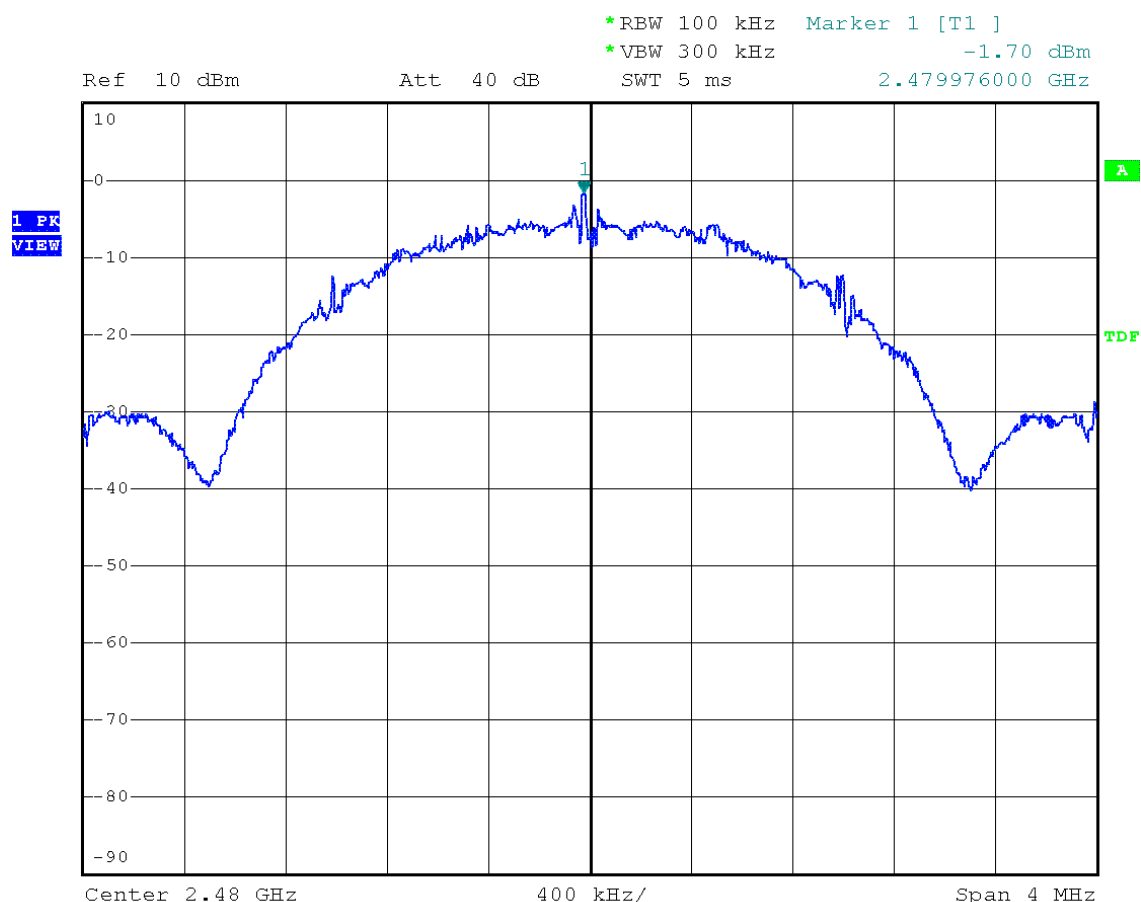
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Peak Power Spectral Density

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.10.2
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Peak Frequency [MHz]: 2479.976
 Spectral Density [dBm/RBW]: -1.697
 Resolution Bandwidth [kHz]: 100 kHz



Date: 23.FEB.2024 12:07:02

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

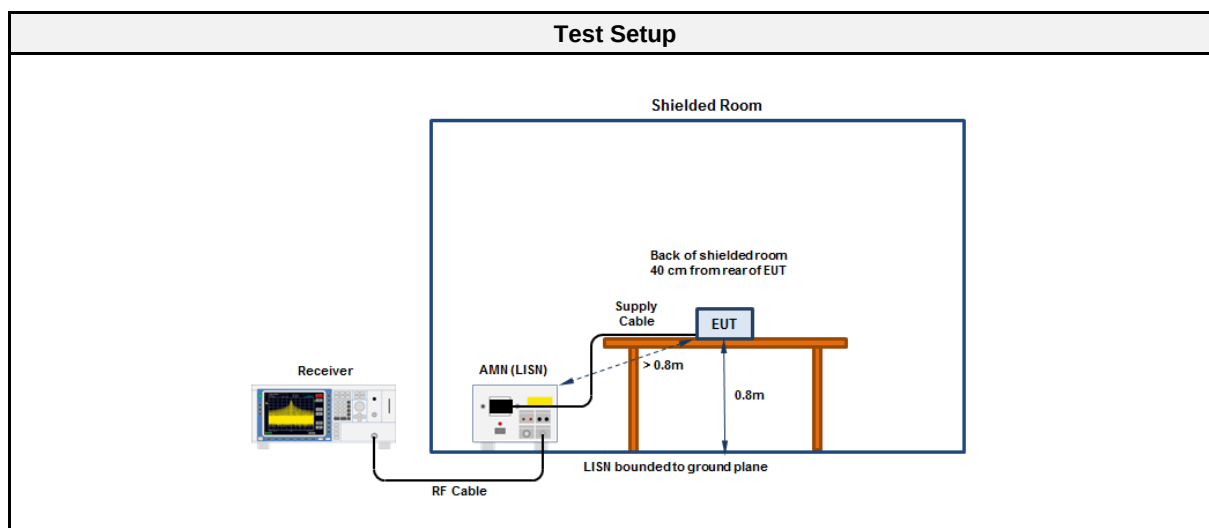
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 3 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Md Abu Bakar Siddique
Date	2024-02-09

3.5.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBμV]	Average [dBμV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50

* Limit decreases linearly with the logarithm of the frequency

3.5.3 Setup

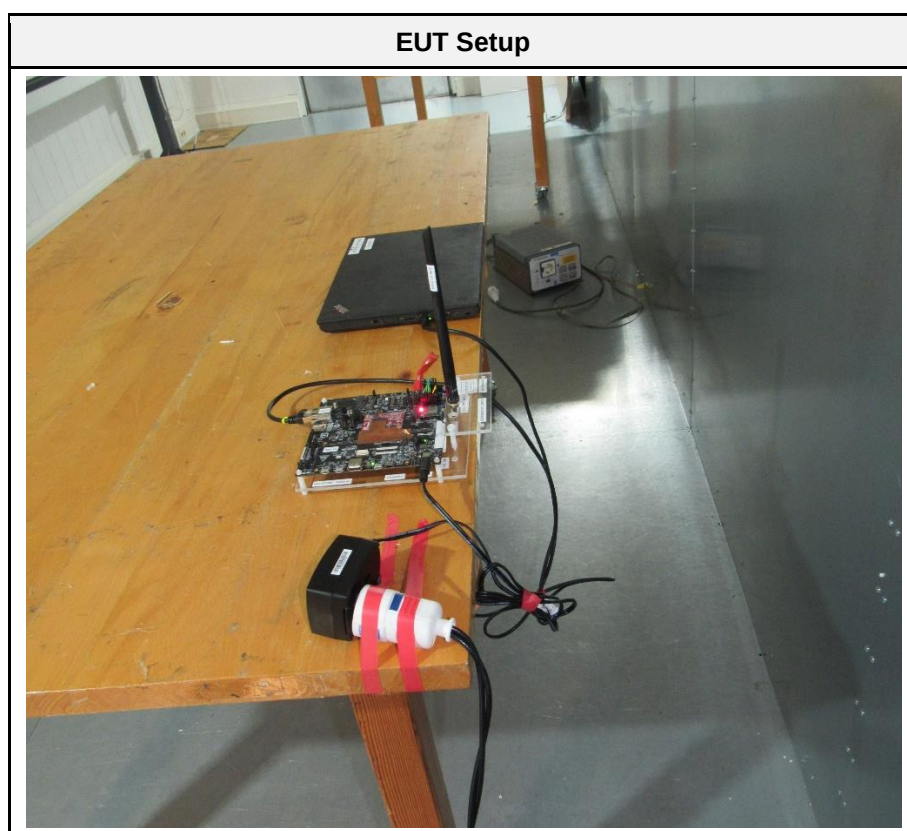
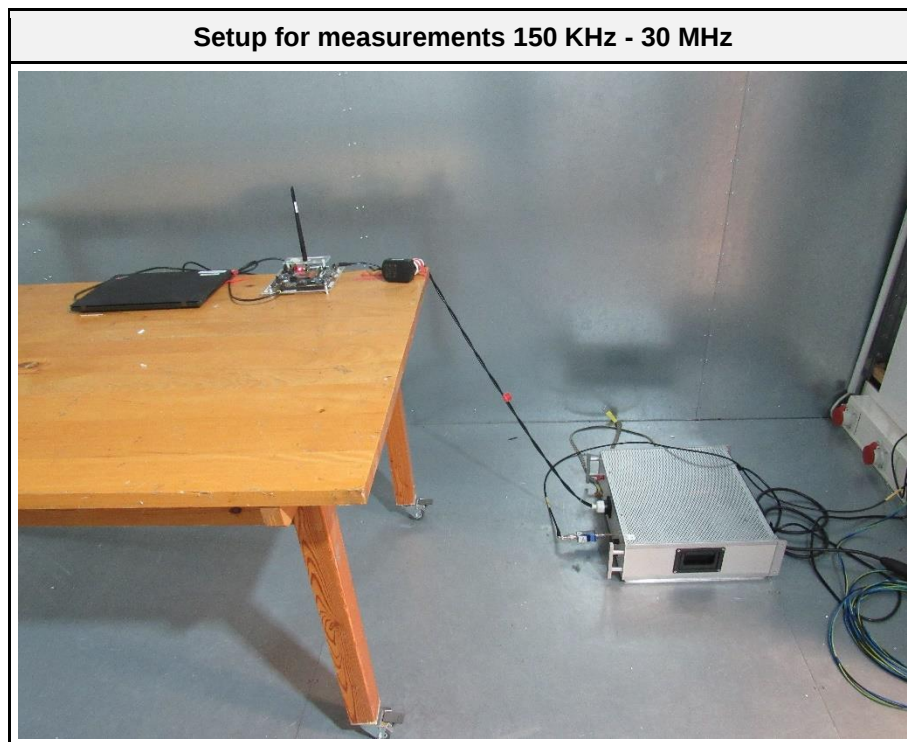


3.5.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESCS 30	EF00297	2023-08	2024-08
Pulse Limiter	R&S	ESH3-Z2	EF01222	2023-08	2025-08
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2023-06	2024-06
AC & DC Power Supply	Chroma ATE Inc.	61604	EF01380	2023-08	2025-08

3.5.5 Setup Photos

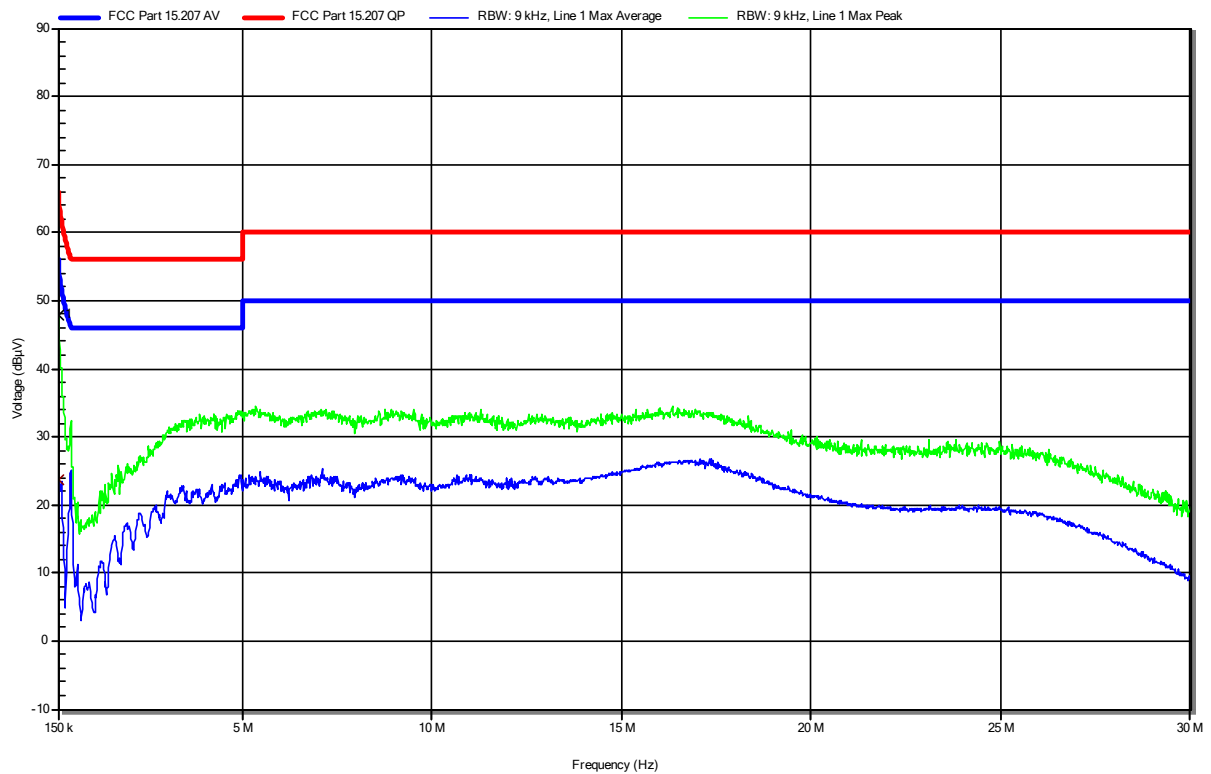


Conducted emissions at the mains power port according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Test Date: 2024-02-09
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 12 V DC via AC/DC-Adapter (120 V AC / 60 Hz)
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: Tx: ZB, O-QPSK, L
 Applied to Port: Port of the AC/DC-Adapter

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RadiMation



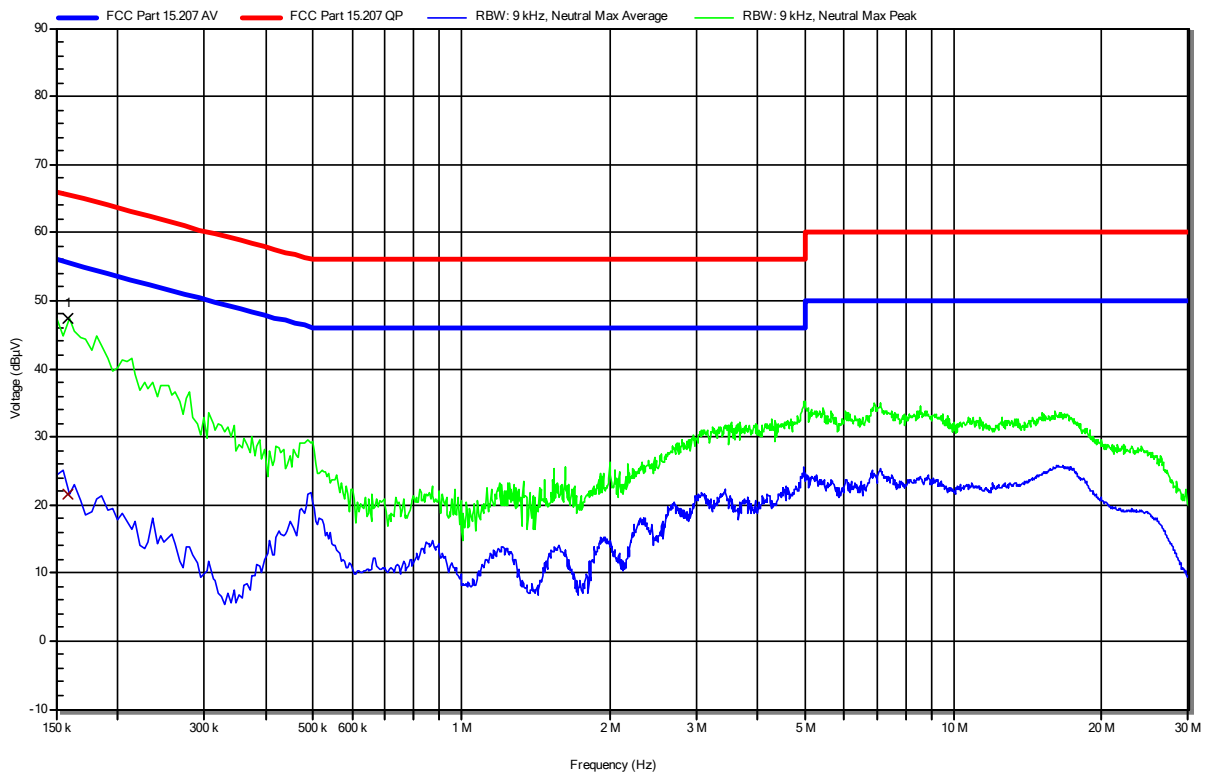
Peak Number	Frequency			LISN		
1	154.5 kHz			Line 1		
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	154.5 kHz	23.76 dBµV	55.75 dBµV	-32 dB	Pass	Line 1

Conducted emissions at the mains power port according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Test Date: 2024-02-09
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 12 V DC via AC/DC-Adapter (120 V AC / 60 Hz)
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: Tx: ZB, O-QPSK, N
 Applied to Port: Port of the AC/DC-Adapter

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RadiMation



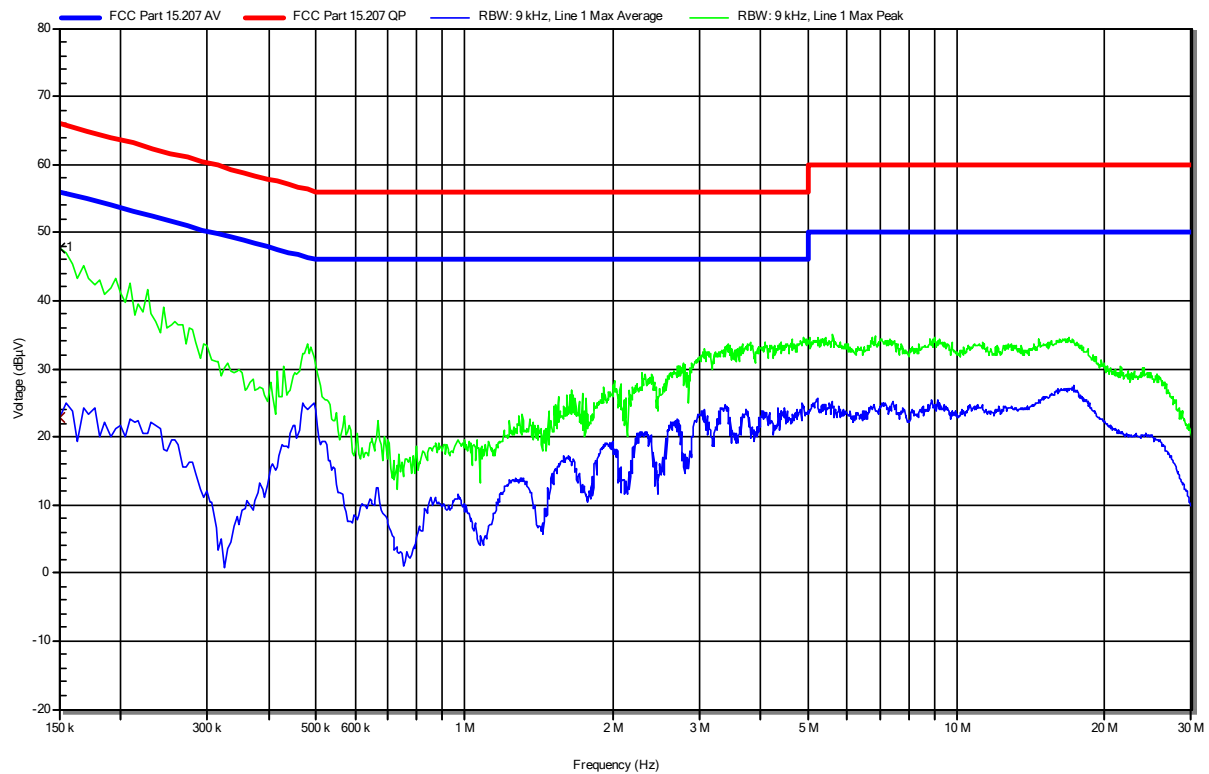
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	159 kHz	21.64 dBµV	55.52 dBµV	-33.88 dB	Pass	Neutral

Conducted emissions at the mains power port according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Test Date: 2024-02-09
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 12 V DC via AC/DC-Adapter (120 V AC / 60 Hz)
 LISN: Schwarzbeck NSLK 8127 RC L1
 Operational Mode: Tx: ZB, O-QPSK, Receive mode, L
 Applied to Port: Port of the AC/DC-Adapter

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RadiMation



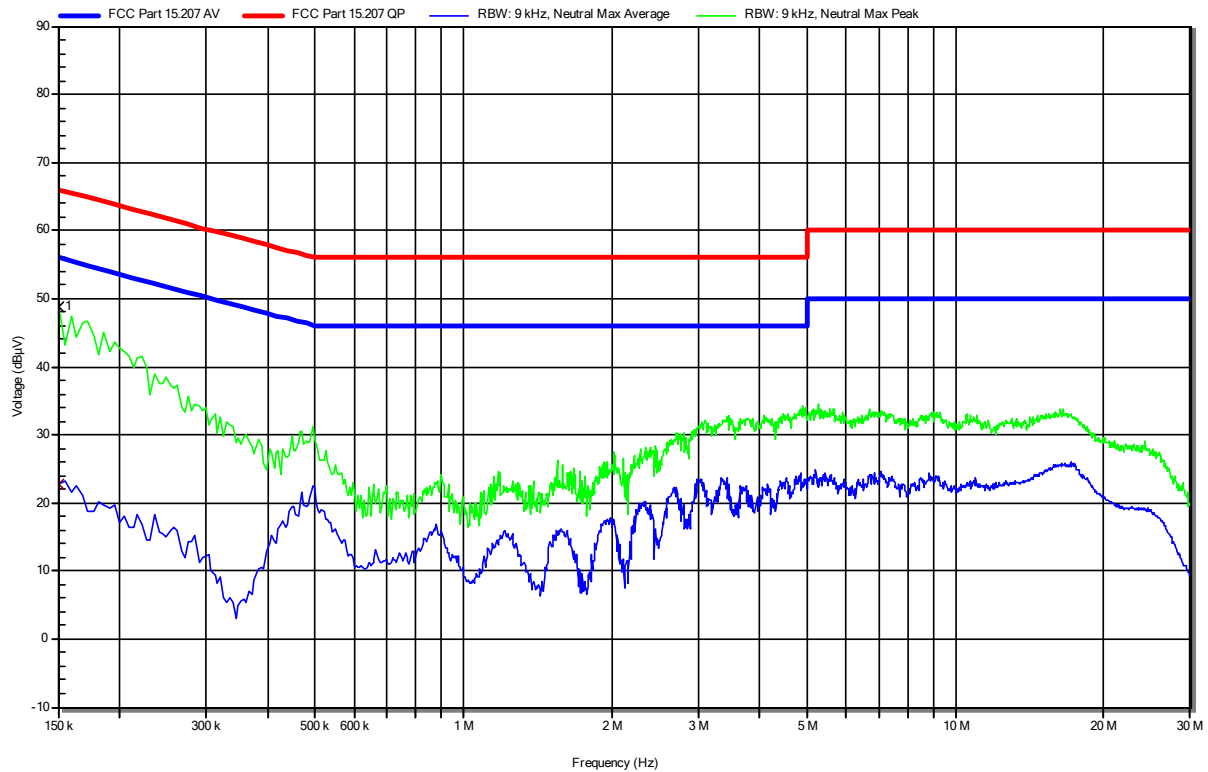
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	22.8 dBµV	56 dBµV	-33.2 dB	Pass	Line 1

**Conducted emissions at the mains power port
according to 47 CFR Part 15.247**

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Test Date: 2024-02-09
 Operating Conditions: ambient temperature: 23 °Celsius
 power input: 12 V DC via AC/DC-Adapter (120 V AC / 60 Hz)
 LISN: Schwarzbeck NSLK 8127
 Operational Mode: Tx: ZB, O-QPSK, Receive mode, N
 Applied to Port: Port of the AC/DC-Adapter

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RadiMation



Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	150 kHz	22.85 dBµV	56 dBµV	-33.15 dB	Pass	Neutral

3.6 Test Conditions and Results - Band-edge compliance

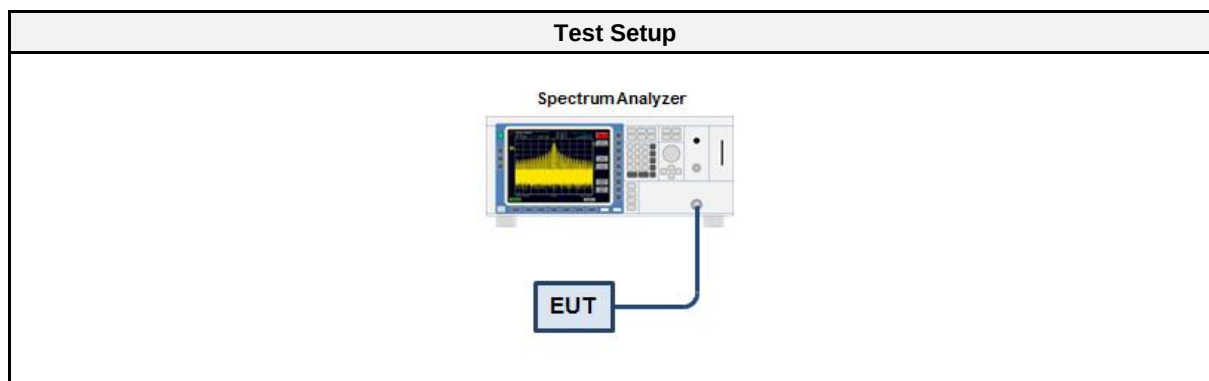
3.6.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 3 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 11.13
Operator	Md Abu Bakar Siddique
Date	2024-02-23

3.6.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.6.3 Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01407	2023-08	2024-08
Cable(CAABR)	HUBER+SUHNER AG	Sucoflex 102EA	EF00779	2023-03	2024-03

3.6.5 Procedure

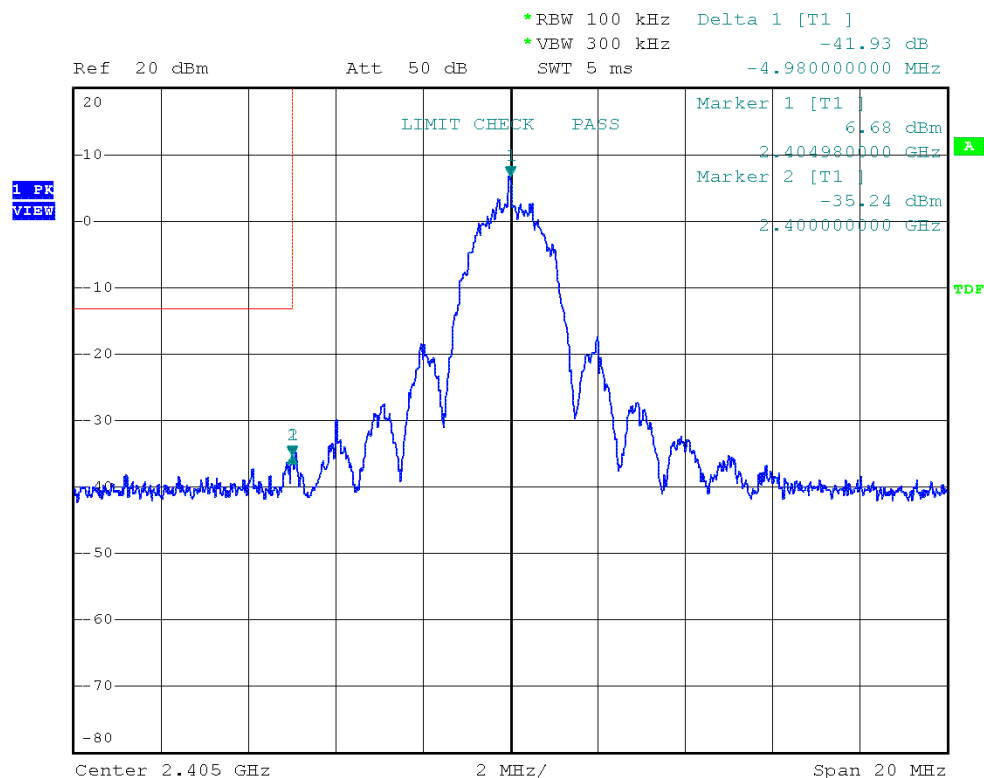
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.6.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
O-QPSK	2405	-41.93	-20	PASS
O-QPSK	2475	-53.88	-20	PASS
O-QPSK	2480	-42.50	-20	PASS

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Band-edge: Lower
 In-band Frequency [MHz]: 2404.98
 Max. in-band Level [dBm/100 kHz]: 6.684
 Out-of-band Frequency [MHz]: 2400.0
 Max. out-of-band Level [dBm/100 kHz]: -35.244
 Attenuation [dB]: -41.93



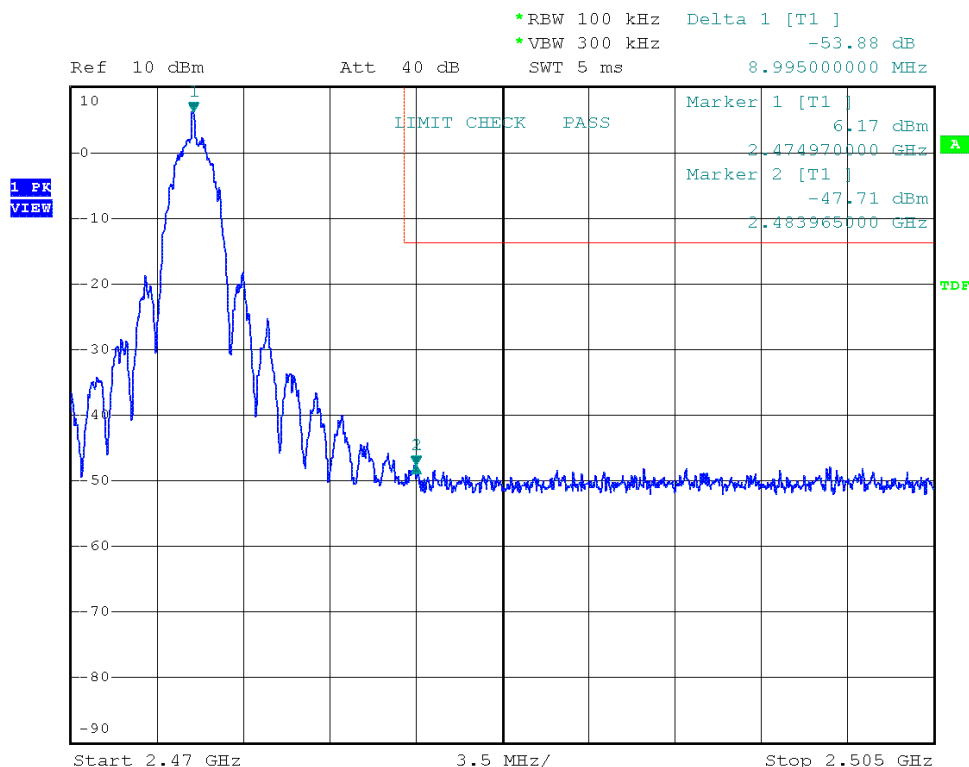
Date: 23.FEB.2024 12:11:59

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: GOM-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Band-edge: Upper
 In-band Frequency [MHz]: 2474.97
 Max. in-band Level [dBm/100 kHz]: 6.17
 Out-of-band Frequency [MHz]: 2483.965
 Max. out-of-band Level [dBm/100 kHz]: -47.714
 Attenuation [dB]: -53.88



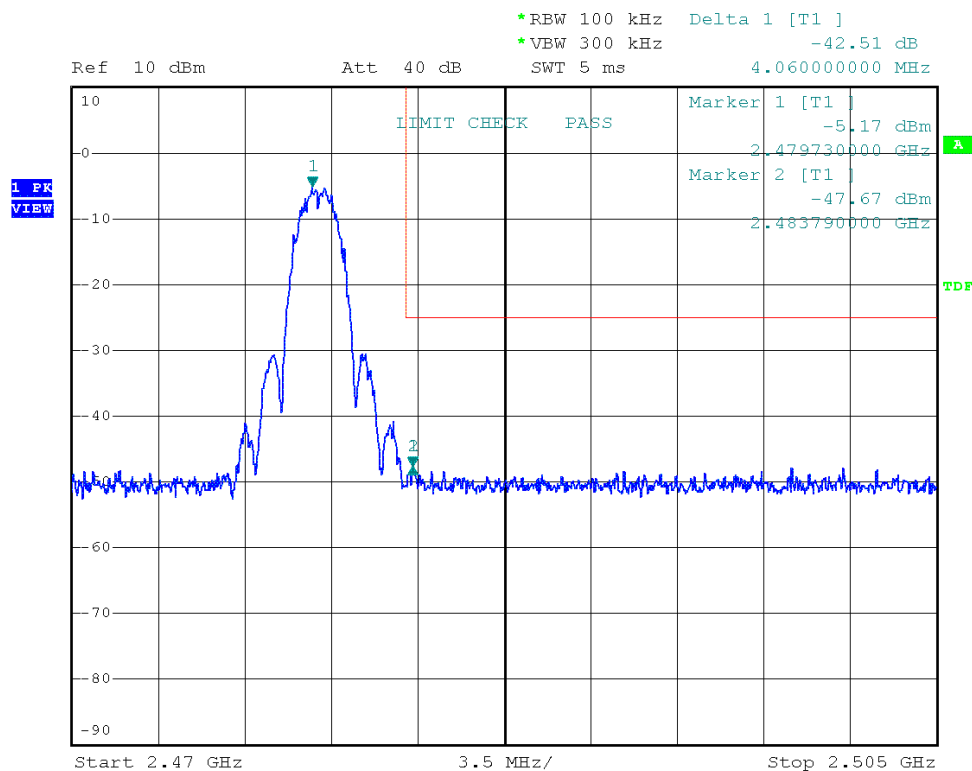
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Test Report No.: GOM-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Emissions in nonrestricted frequency bands at the Band-edge

Project Number: GOM-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Band-edge: Upper
 In-band Frequency [MHz]: 2479.73
 Max. in-band Level [dBm/100 kHz]: -5.17
 Out-of-band Frequency [MHz]: 2483.79
 Max. out-of-band Level [dBm/100 kHz]: -47.675
 Attenuation [dB]: -42.5



Date: 23.FEB.2024 12:13:28

Test Report No.: GOM-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.7 Test Conditions and Results - Conducted spurious emissions

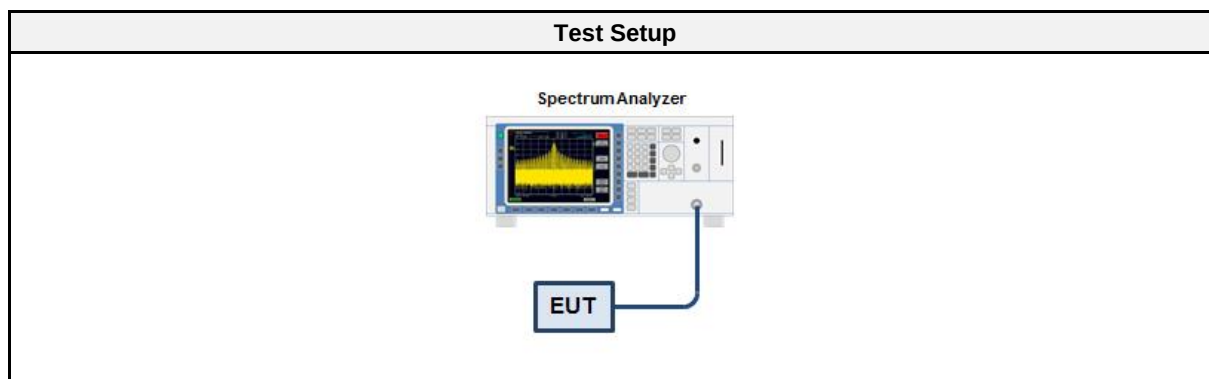
3.7.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 3 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 11.11
Operator	Md Abu Bakar Siddique
Date	2024-02-23

3.7.2 Limits

Limits	
Power Measurement	Out-of-band attenuation [dB]
Peak	20
RMS	30

3.7.3 Setup



3.7.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01407	2023-08	2024-08
Cable(CAABR)	HUBER+SUHNER AG	Sucoflex 102EA	EF00779	2023-03	2024-03

3.7.5 Procedure

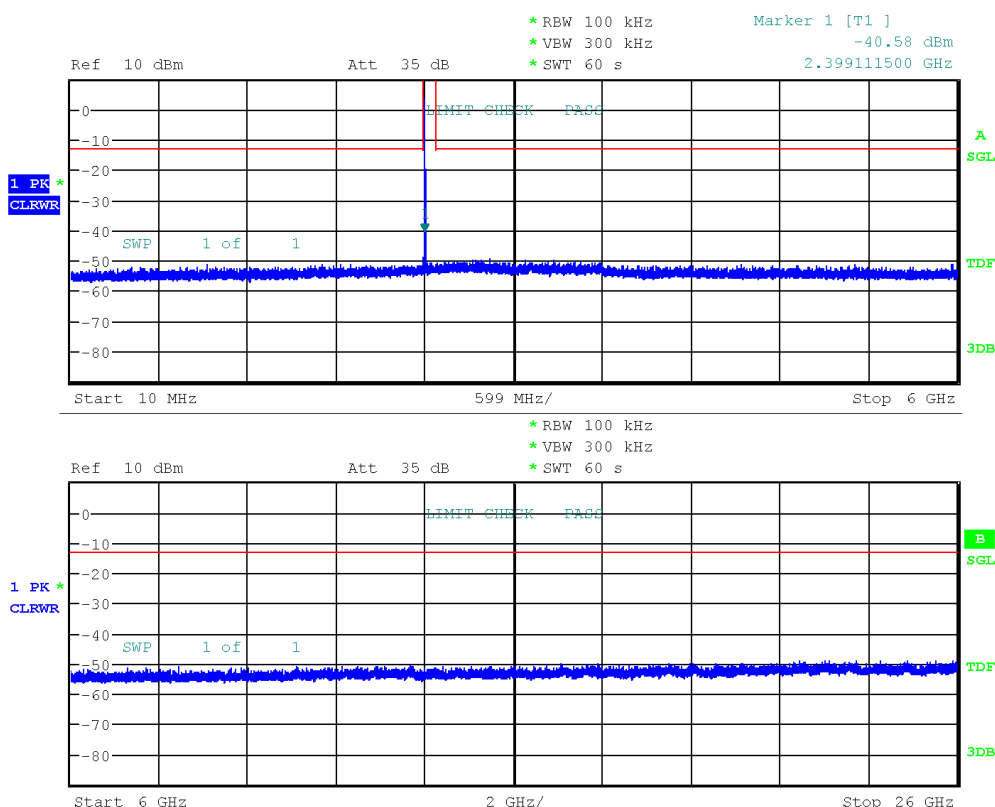
Test Procedure
1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels outside frequency band

3.7.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
O-QPSK	2405	PASS
O-QPSK	2440	PASS
O-QPSK	2475	PASS
O-QPSK	2480	PASS

Conducted Spurious Emissions

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Max. in-band Frequency [MHz]: 2405.0
 Max. in-band Level [dBm/100 kHz]: 7.1
 Out-of-band Limit [dBm/100 kHz]: -12.9



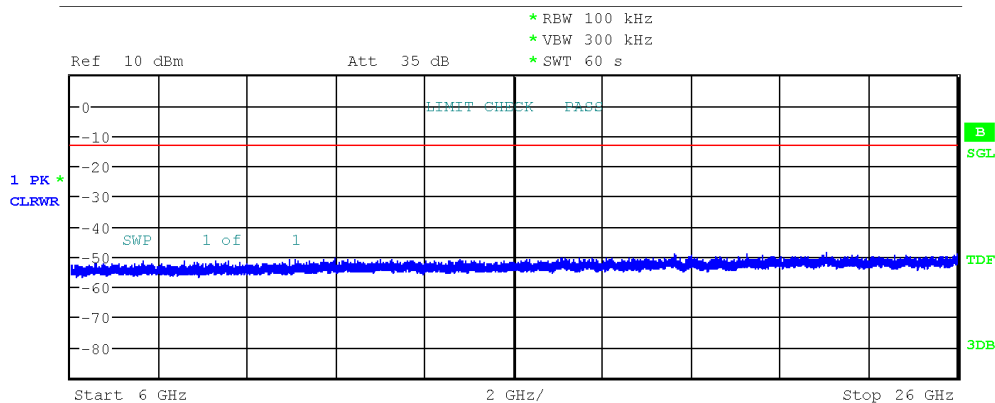
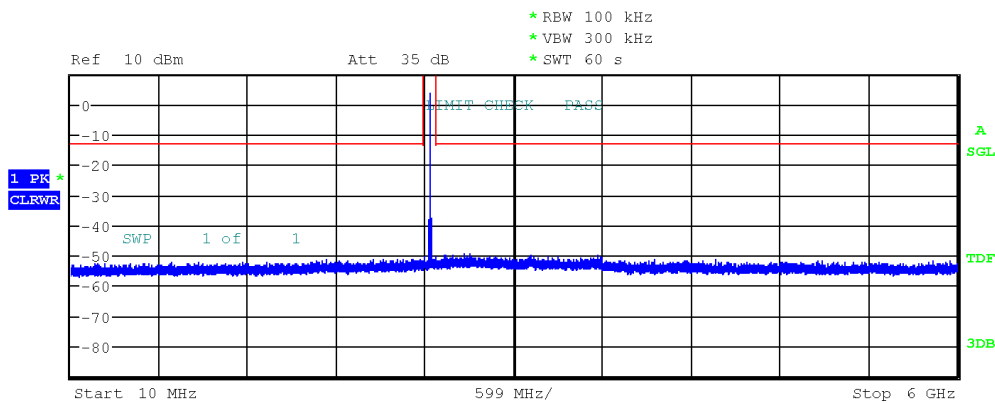
Date: 23.FEB.2024 14:10:45

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted Spurious Emissions

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Max. in-band Frequency [MHz]: 2440.0
 Max. in-band Level [dBm/100 kHz]: 6.7
 Out-of-band Limit [dBm/100 kHz]: -13.3



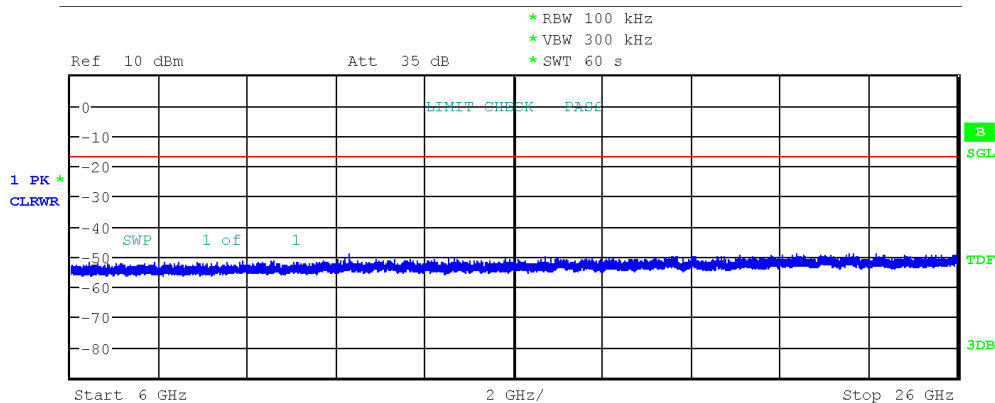
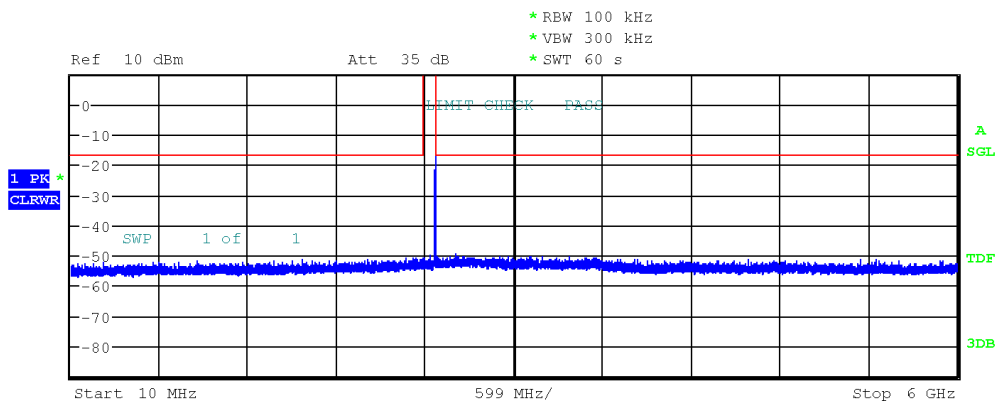
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted Spurious Emissions

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Max. in-band Frequency [MHz]: 2475.2
 Max. in-band Level [dBm/100 kHz]: 3.1
 Out-of-band Limit [dBm/100 kHz]: -16.9



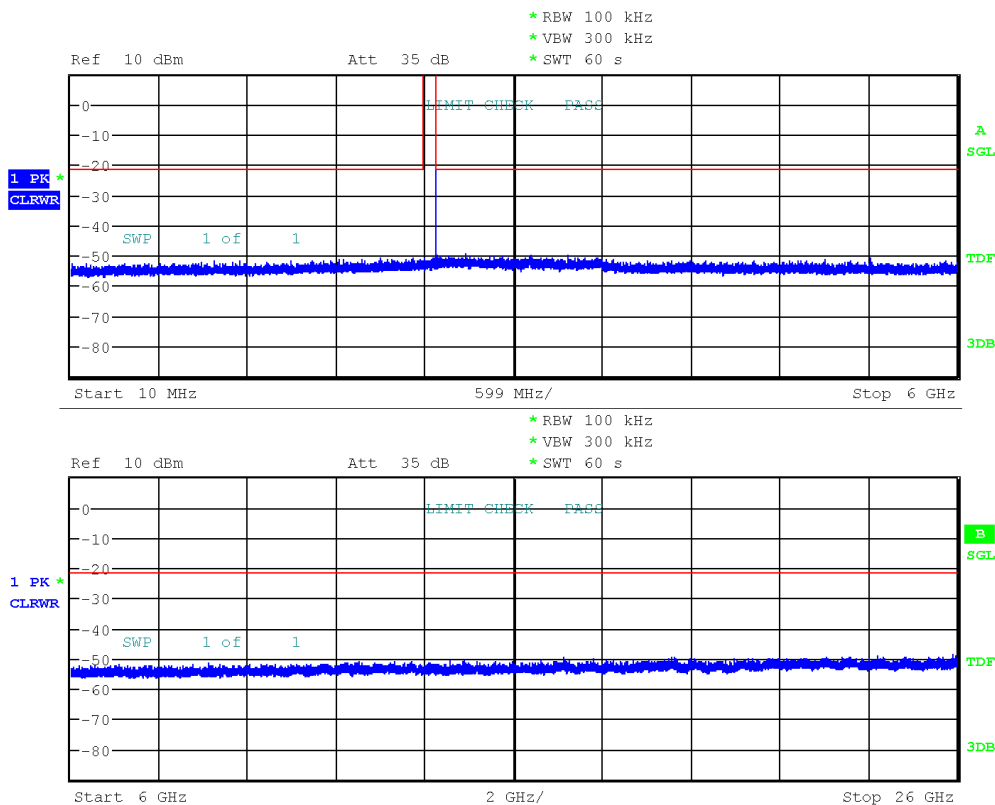
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Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted Spurious Emissions

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 11.11
 Operational Mode: IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Md Abu Bakar Siddique
 Test Site: Eurofins Product Service GmbH
 Test Date: 2024-02-23
 Max. in-band Frequency [MHz]: 2480.0
 Max. in-band Level [dBm/100 kHz]: -1.1
 Out-of-band Limit [dBm/100 kHz]: -21.1



Date: 23.FEB.2024 14:21:48

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

3.8 Test Conditions and Results - Transmitter radiated emissions

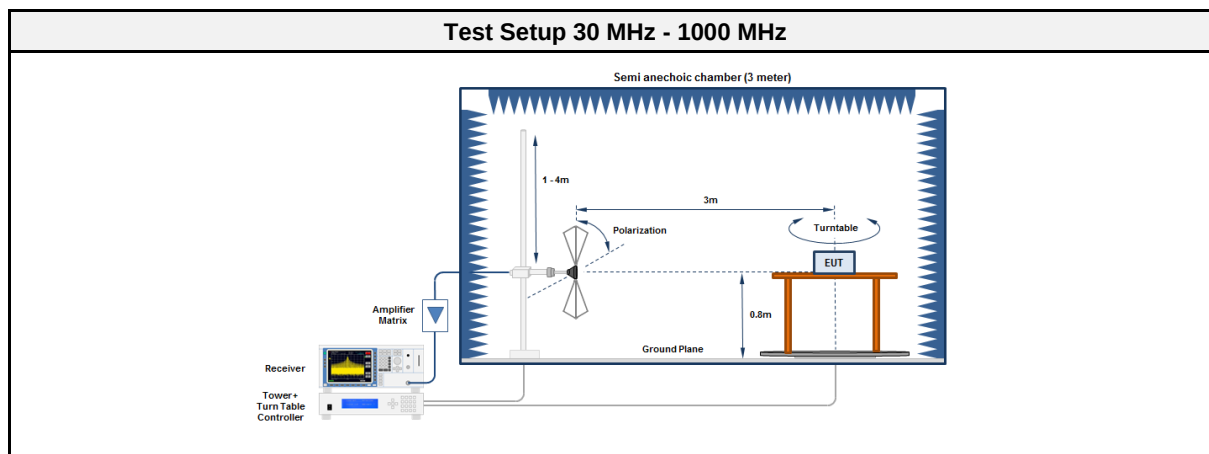
3.8.1 Information

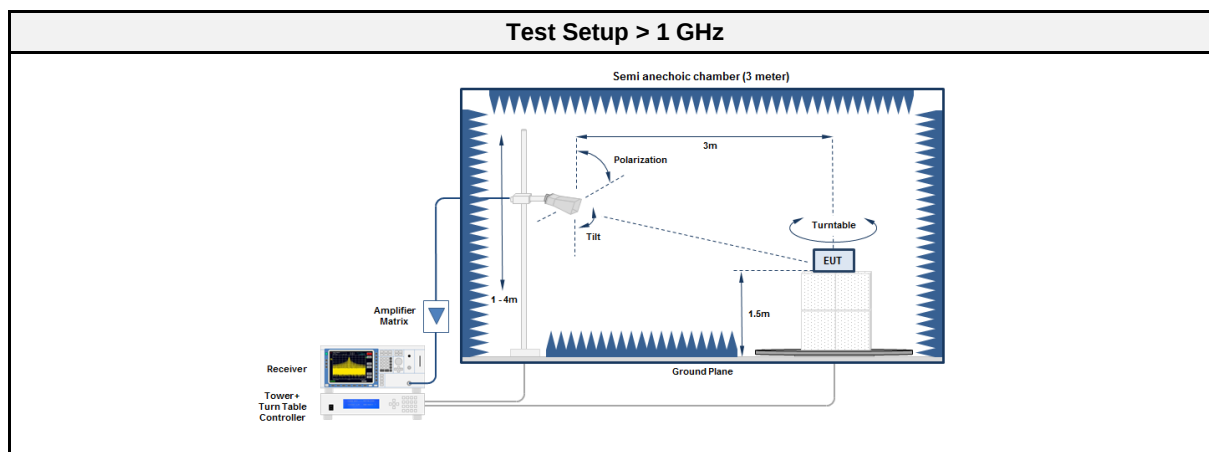
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 A2 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Md Abu Bakar Siddique
Date	2024-02-07

3.8.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V/m}$]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.8.3 Setup





3.8.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2022-11	2025-11
Measurement Receiver	R&S	ESU8	EF00379	2023-08	2024-08
Antenna	Schwarzbeck	VULB 9168	EF01824	2022-10	2025-10

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2023-12	2024-12
Spectrum analyzer	R&S	FSW43	EF00896	2023-08	2024-08
Antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2024-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03

3.8.5 Procedure

Test Procedure 30 MHz - 1000 MHz
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

Test Procedure > 1 GHz
1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground 2. EUT set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector

3.8.6 Results

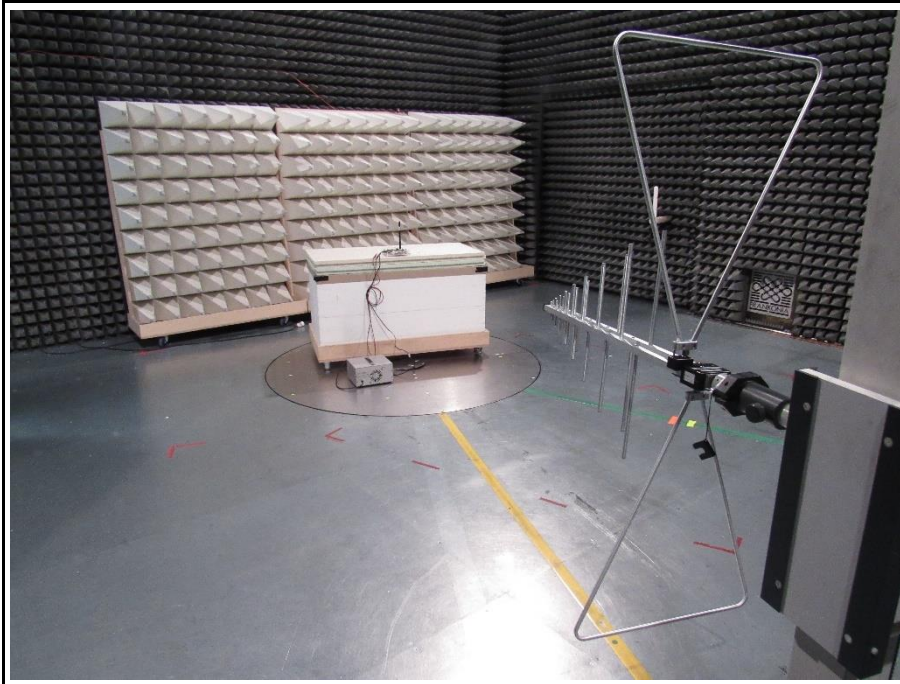
Test Results – Antenna 1 (External, ANT-Taoglas-GW.51.5153) – Annex A						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2405	610.3187	35.50	pk	ver	46.00	-10.46
2405	2244.6	47.14	pk	ver	74.00	-26.86
2405	2244.6	33.18	avg	ver	54.00	-20.82
2405	2284.5	45.67	pk	ver	74.00	-28.33
2405	2284.5	33.59	avg	ver	54.00	-20.41
2405	2389.9	56.68	pk	ver	74.00	-17.32
2405	2389.9	40.65	avg	ver	54.00	-13.35
2440	608.1523	36.30	pk	hor	46.00	-09.68
2440	1155.3	54.98	pk	hor	74.00	-19.02
2440	1155.3	29.50	avg	hor	54.00	-24.50
2440	3903.4	43.64	pk	ver	74.00	-30.36
2440	3903.4	41.43	avg	ver	54.00	-12.57
2475	3904	46.4	pk	ver	74.00	-27.6
2475	3904	40.89	avg	ver	54.00	-13.11
2475	2483.5	55.99	pk	ver	74.00	-18.01
2475	2483.5	48.35	avg	ver	54.00	-6.65
2480	1087	47.15	pk	ver	74.00	-26.85
2480	1087	30.00	avg	ver	54.00	-24.00
2480	1220	50.00	pk	hor	74.00	-24.00
2480	1220	30.34	avg	hor	54.00	-23.66
2480	2483.5	60.55	pk	ver	74.00	-13.45
2480	2483.5	51.01	avg	ver	54.00	-02.99
2480	3903	46.59	pk	ver	74.00	-27.41
2480	3903	39.73	avg	ver	54.00	-14.27

Test Results – Antenna 2 (External, ANT-2J Antennas-2JF1002P) – Annex B						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2405	612.9053	37.20	pk	ver	46.00	-08.82
2405	2389.9	55.18	pk	hor	74.00	-18.82
2405	2389.9	40.59	avg	hor	54.00	-13.41
2405	2752.7	45.68	pk	ver	74.00	-28.32
2405	2752.7	29.37	avg	ver	54.00	-24.63
2475	2356	47.03	pk	hor	74.00	-26.97
2475	2356	38.00	avg	hor	54.00	-16.00
2475	2483.5	58.24	pk	ver	74.00	-15.76
2475	2483.5	48.72	avg	ver	54.00	-5.28
2480	1437	43.50	pk	ver	74.00	-30.50
2480	1437	27.31	avg	ver	54.00	-26.69
2480	2483.5	59.41	pk	hor	74.00	-14.59
2480	2483.5	52.51	avg	hor	54.00	-01.49

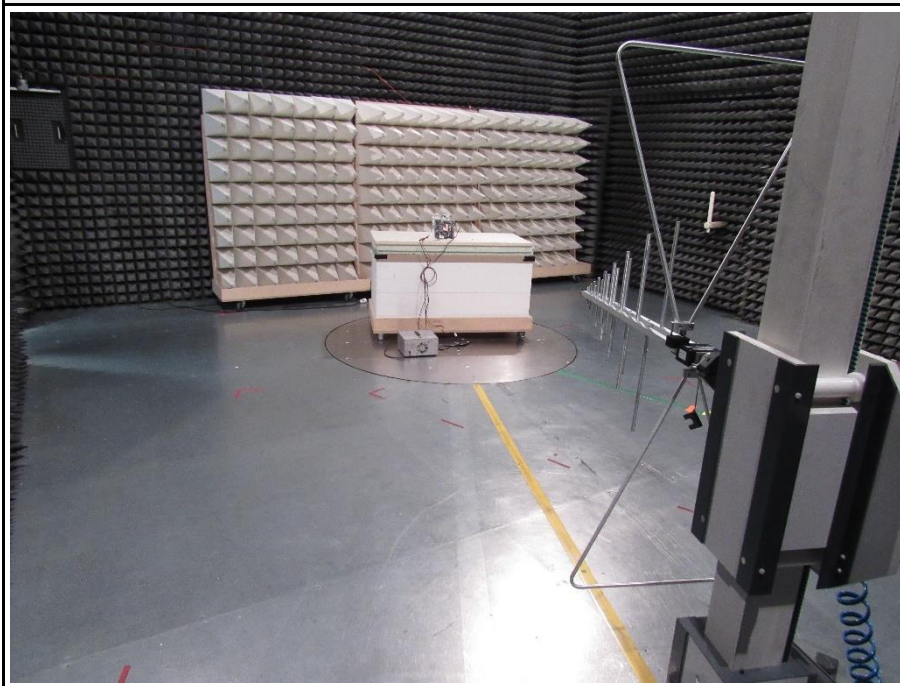
Test Results – Antenna 3 (External, ANT-TDK-ANT162442DT-2001A2) – Annex C						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2405	3952.1	45.64	pk	ver	74.00	-28.36
2405	3952.1	32.86	avg	ver	54.00	-21.14
2475	3980.0	45.10	pk	ver	74.00	-28.90
2475	3980.0	32.66	avg	ver	54.00	-21.34
2480	2483.5	58.57	pk	ver	74.00	-15.43
2480	2483.5	49.23	avg	ver	54.00	-04.77

3.8.7 Setup Photos

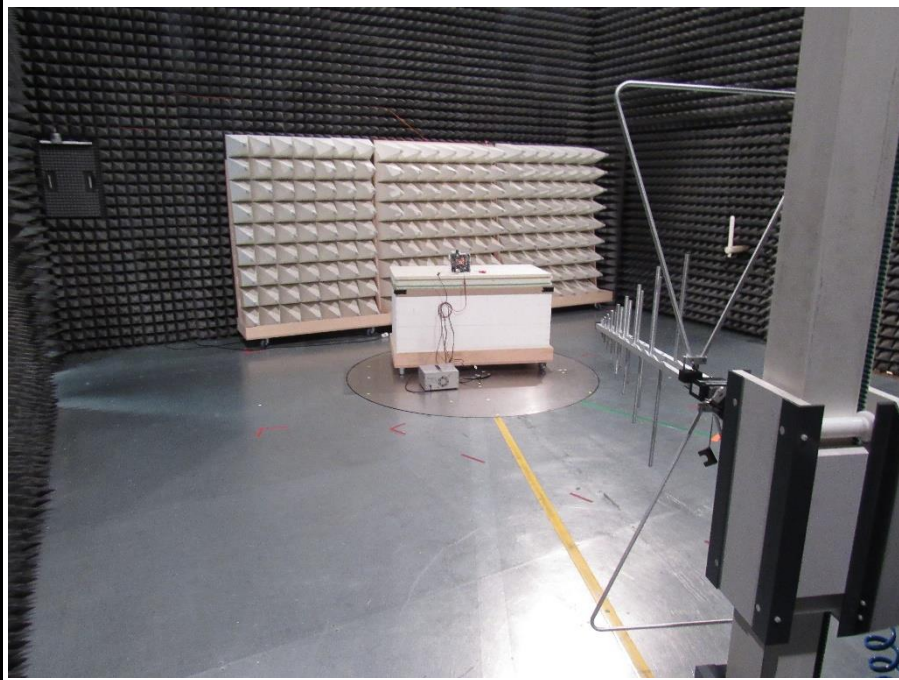
Setup for measurements below 1 GHz- Antenna 1



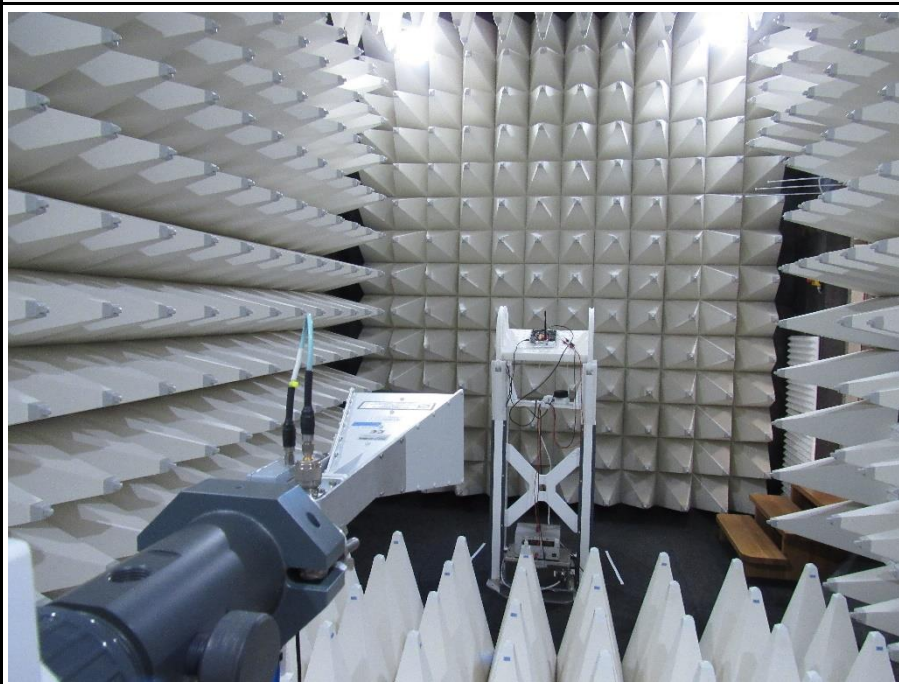
Setup for measurements below 1 GHz- Antenna 2



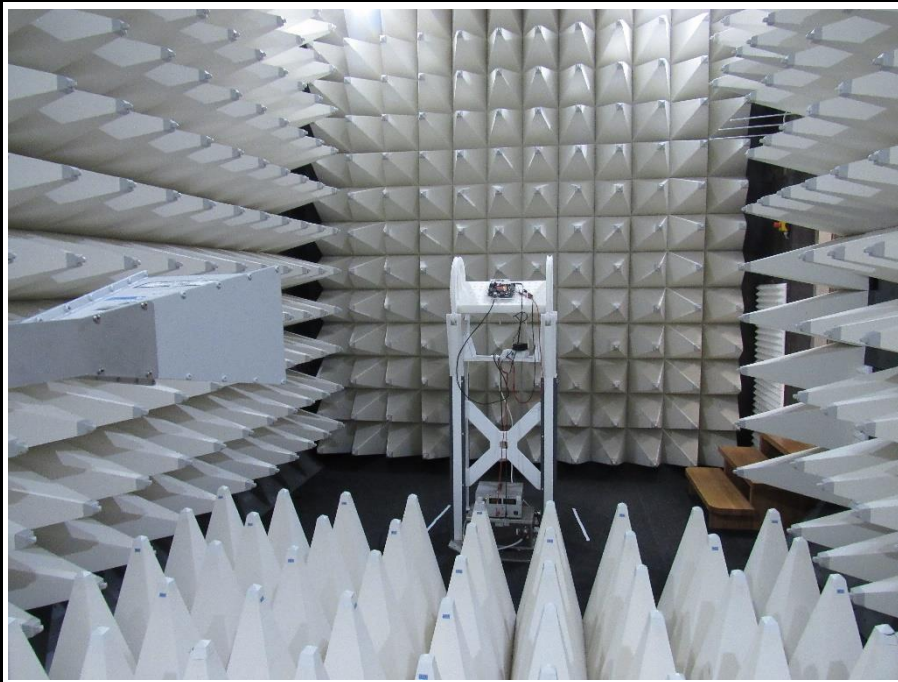
Setup for measurements below 1 GHz- Antenna 3



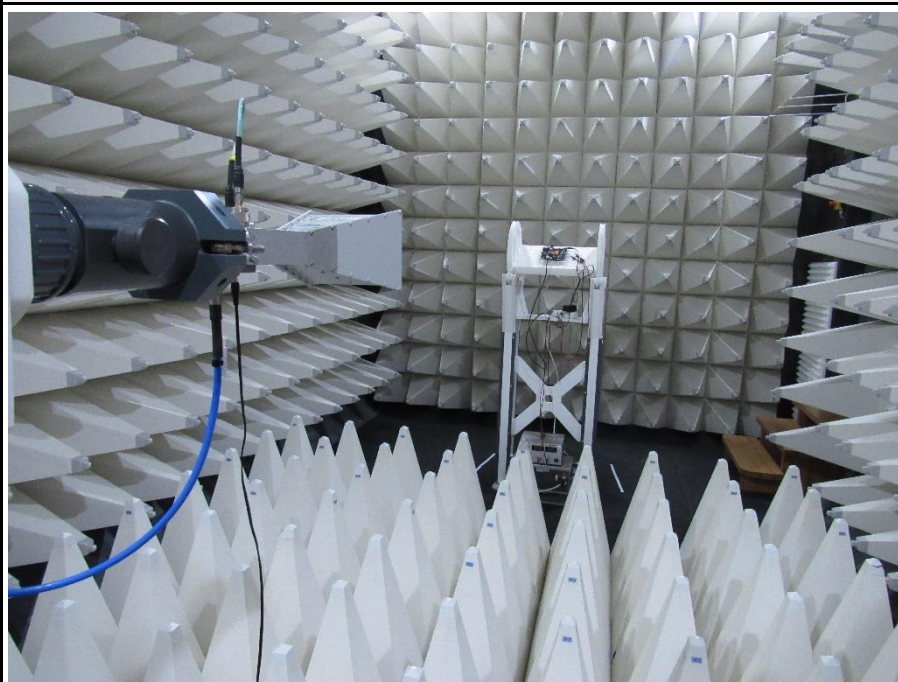
Setup for measurements above 1 GHz-Antenna 1



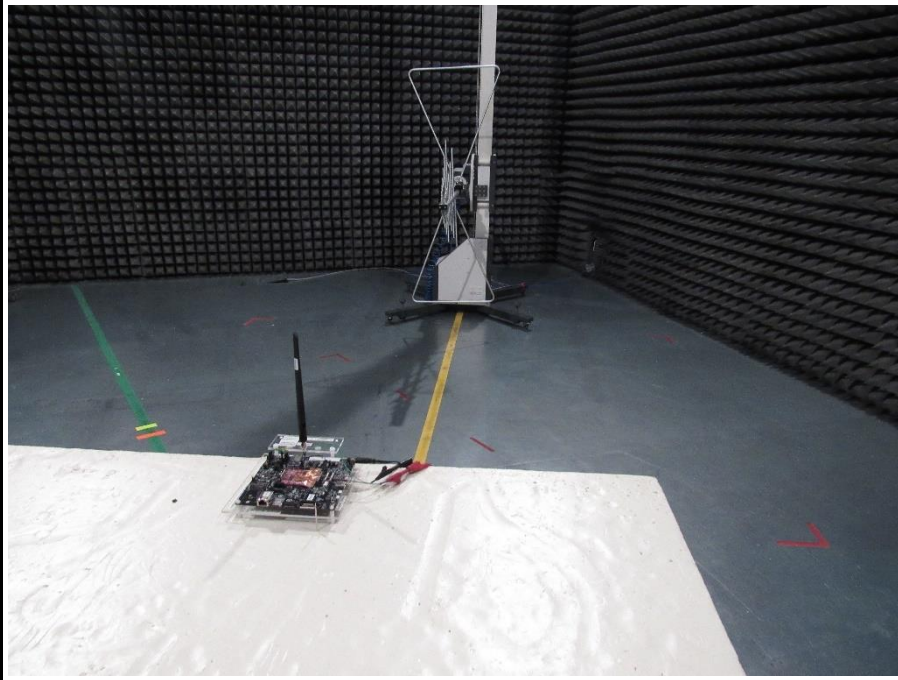
Setup for measurements above 1 GHz-Antenna 2



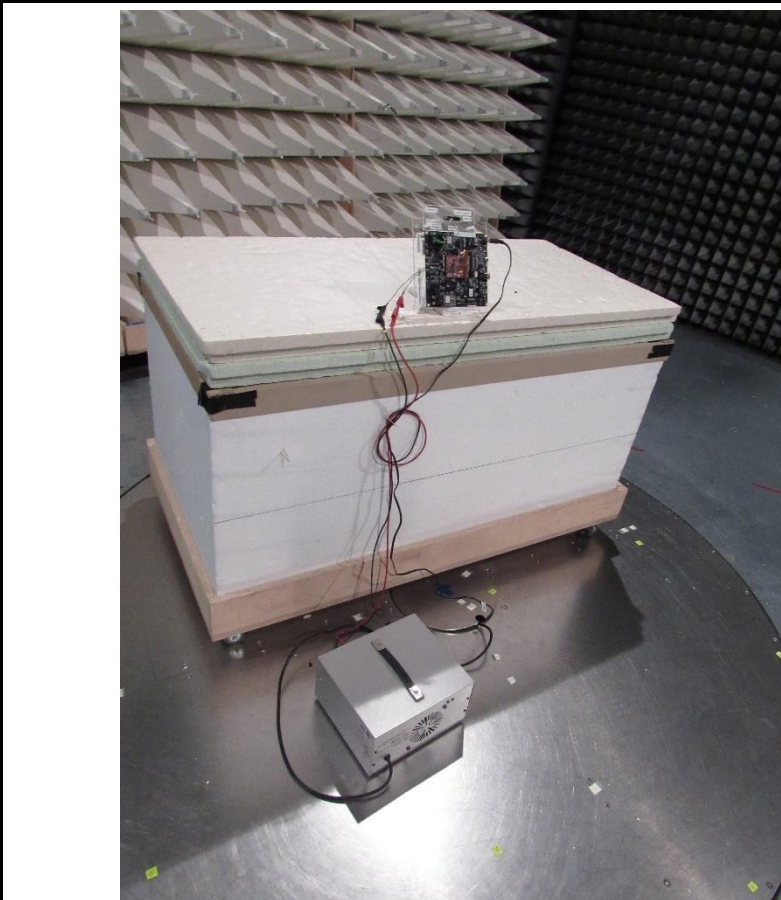
Setup for measurements above 1 GHz-Antenna 3



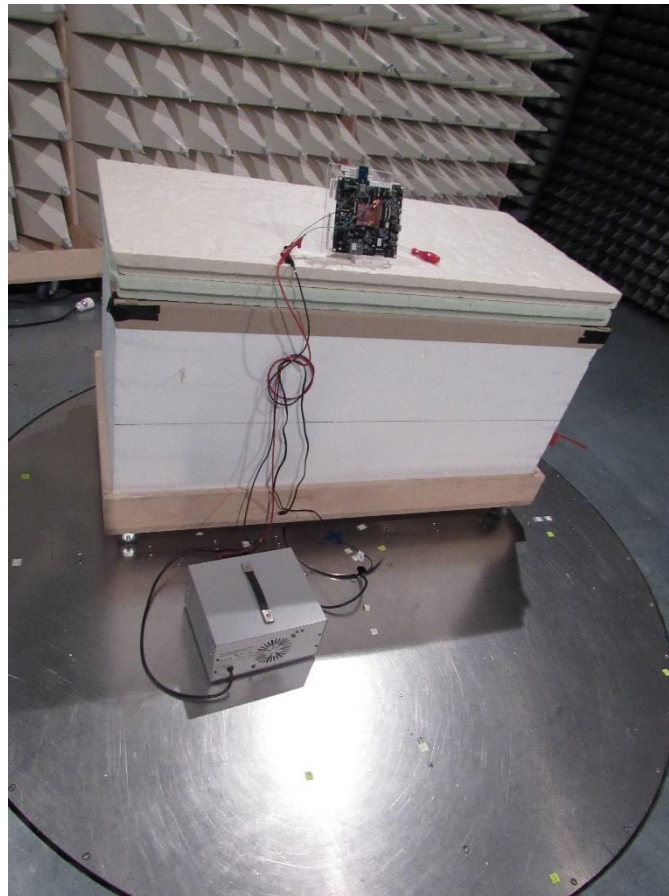
EUT Test Setup below 1 GH- Antenna 1



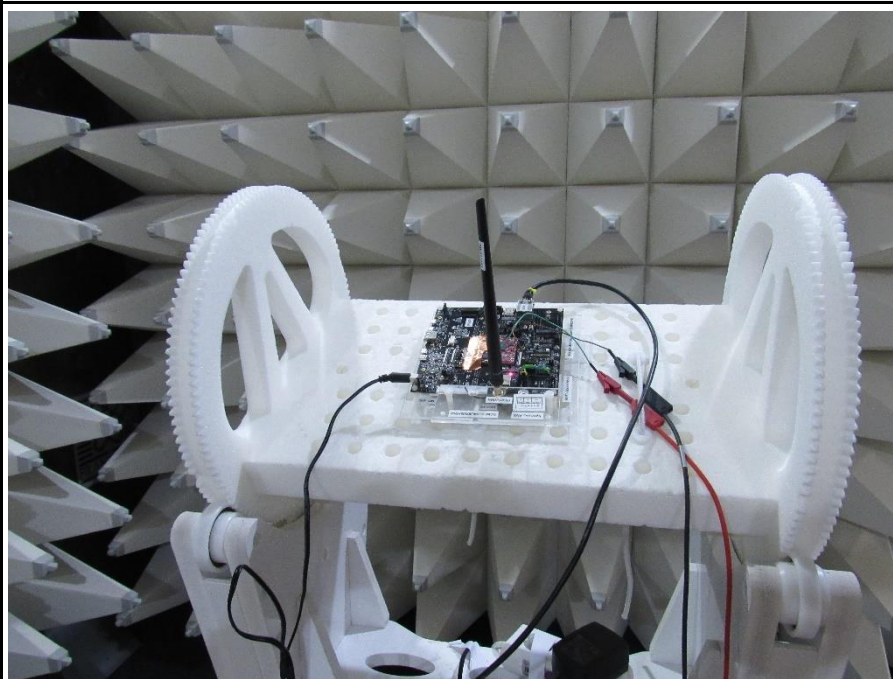
EUT Test Setup below 1 GH- Antenna 2



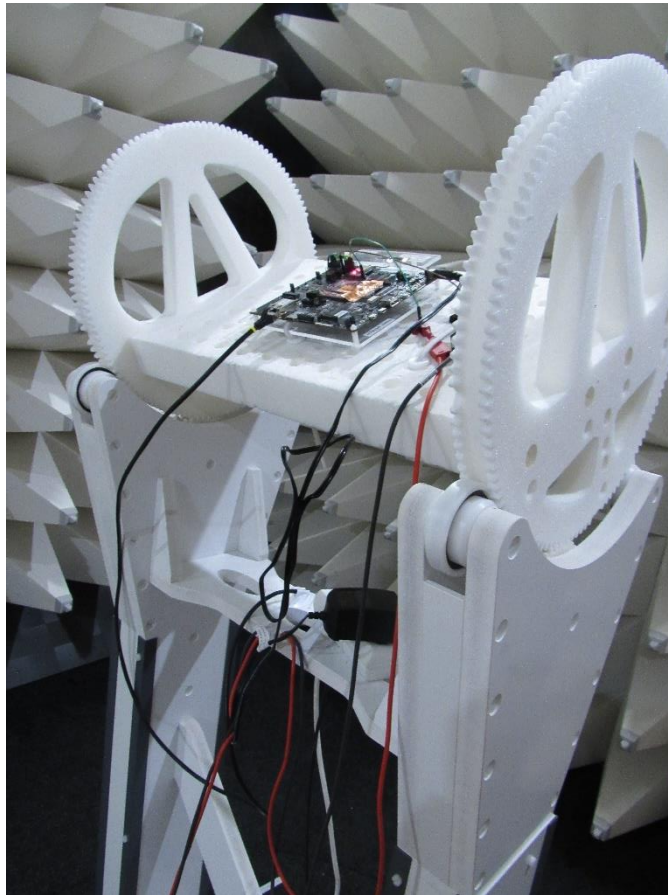
EUT Test Setup below 1 GH- Antenna 3



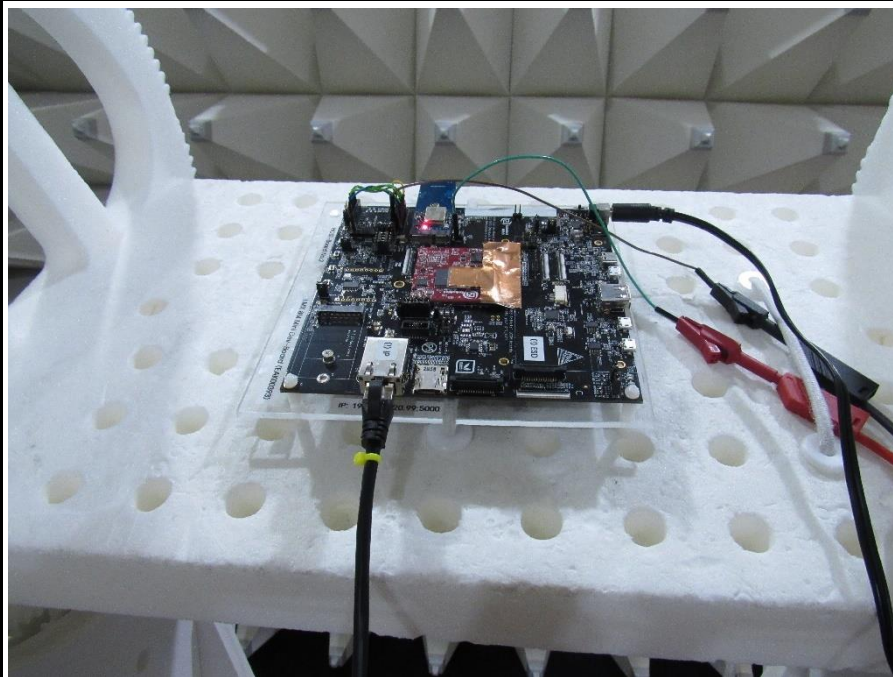
EUT Test Setup above 1 GHz-Antenna 1



EUT Test Setup above 1 GHz-Antenna 2



EUT Test Setup above 1 GHz-Antenna 3



3.9 Test Conditions and Results - Receiver radiated emissions

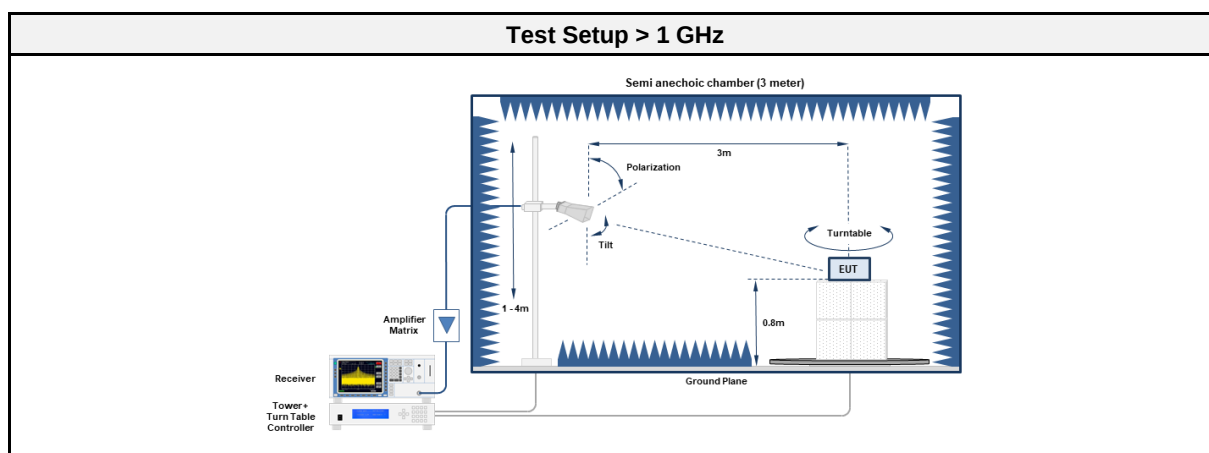
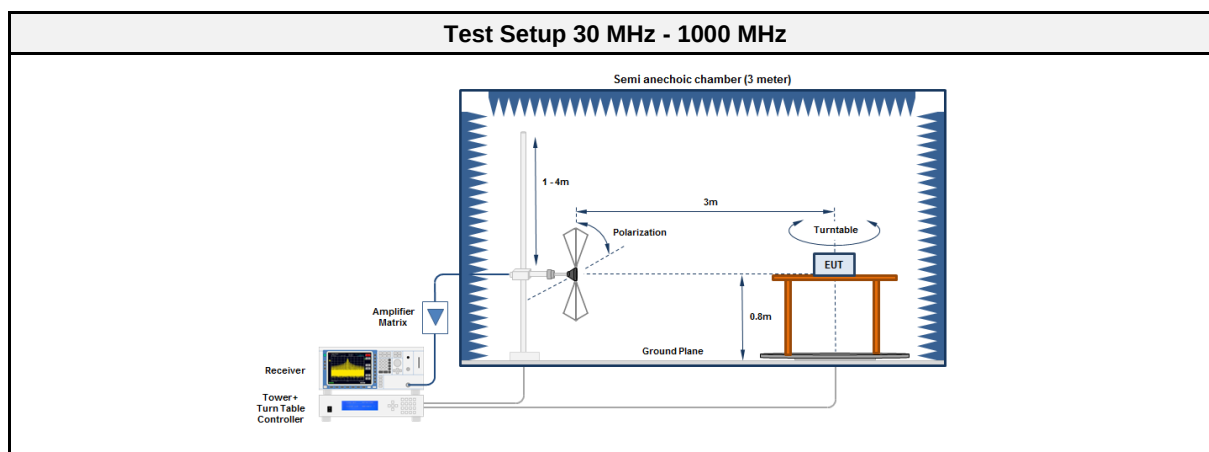
3.9.1 Information

Test Information	
Reference	ISED RSS-247, Issue 3 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.4-2014 8.1-8.3
Operator	Md Abu Bakar Siddique
Date	2024-02-05

3.9.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V/m}$]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.9.3 Setup



3.9.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2020.1.8

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2022-11	2025-11
Measurement Receiver	R&S	ESU8	EF00379	2023-08	2024-08
Antenna	Schwarzbeck	VULB 9168	EF01824	2022-10	2025-10

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC2	EF01616	2023-12	2024-12
Spectrum analyzer	R&S	FSW43	EF00896	2023-08	2024-08
Antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2024-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2024-03

3.9.5 Procedure

Test Procedure	
1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT is set to test mode 3. The receiver is set to peak detection with max hold 4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m 5. All significant emissions are measured again using the corresponding final detector	

3.9.6 Results

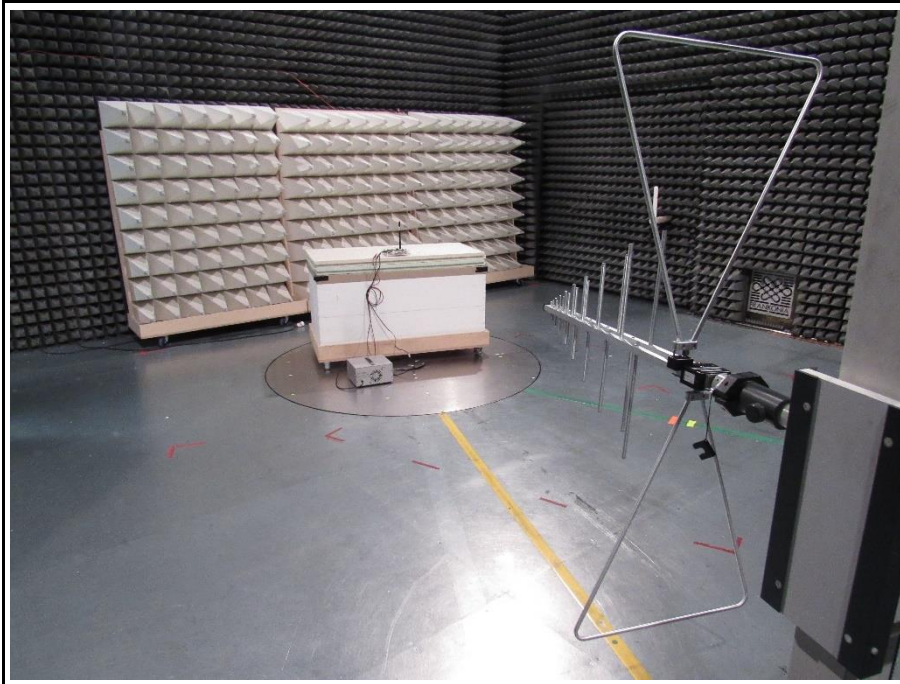
Test Results – Antenna 1 (External, ANT-Taoglas-GW.51.5153) – Annex D						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2405	2000	40.27	pk	ver	53.98	-13.71
2405	3419	43.75	pk	hor	53.98	-10.23

Test Results – Antenna 2 (External, ANT-2J Antennas-2JF1002P) – Annex E						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
No significant emission was detected						

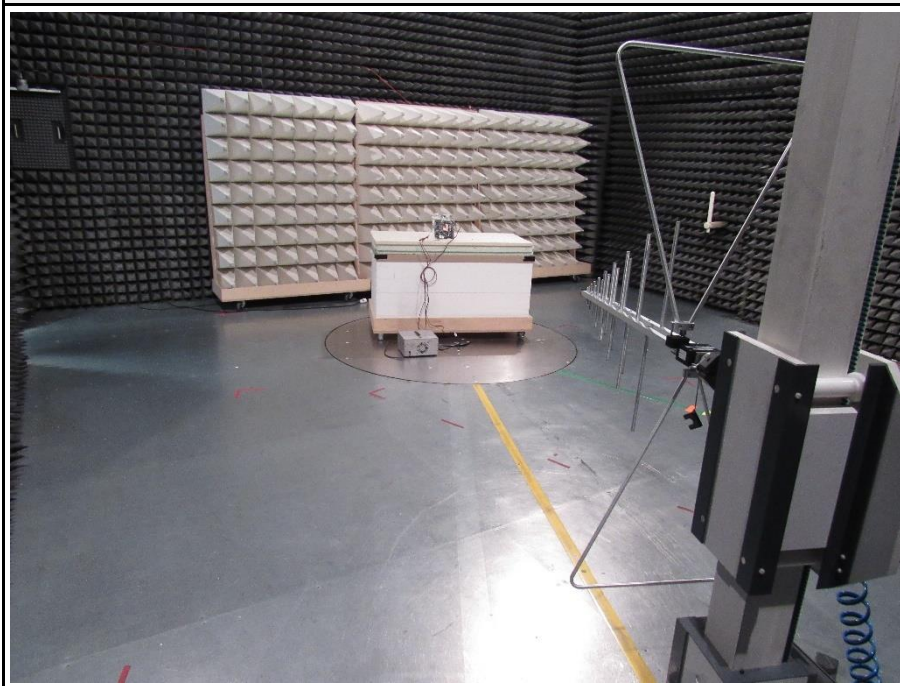
Test Results – Antenna 3 (External, ANT-TDK-ANT162442DT-2001A2) – Annex F						
Channel [MHz]	Emission [MHz]	Level [dBμV/m]	Det.	Pol.	Limit [dBμV/m]	Margin [dB]
2405	1134	43.42	pk	hor	53.98	-10.56

3.9.7 Setup Photos

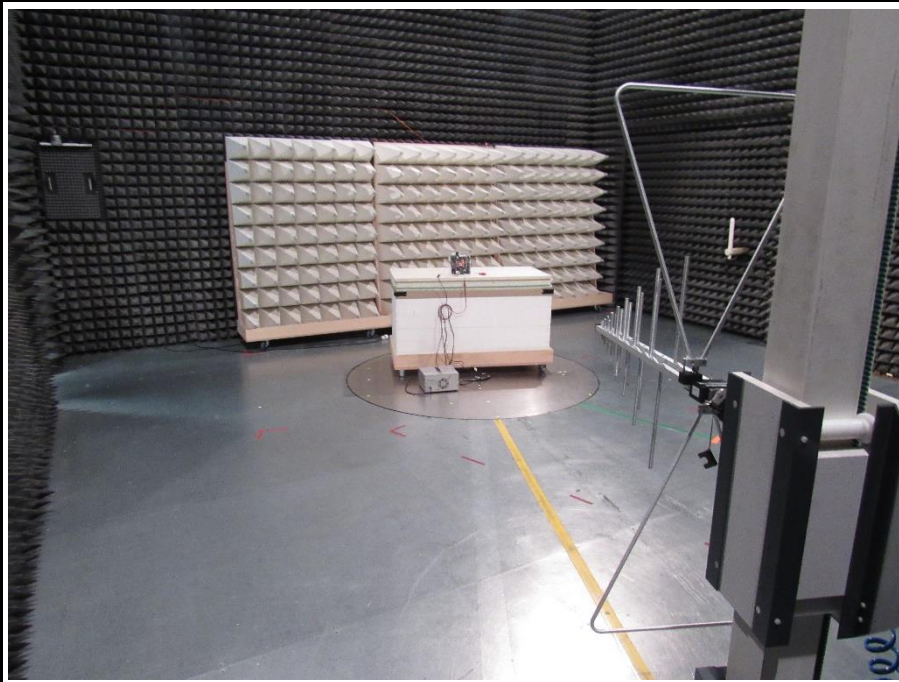
Setup for measurements below 1 GHz- Antenna 1



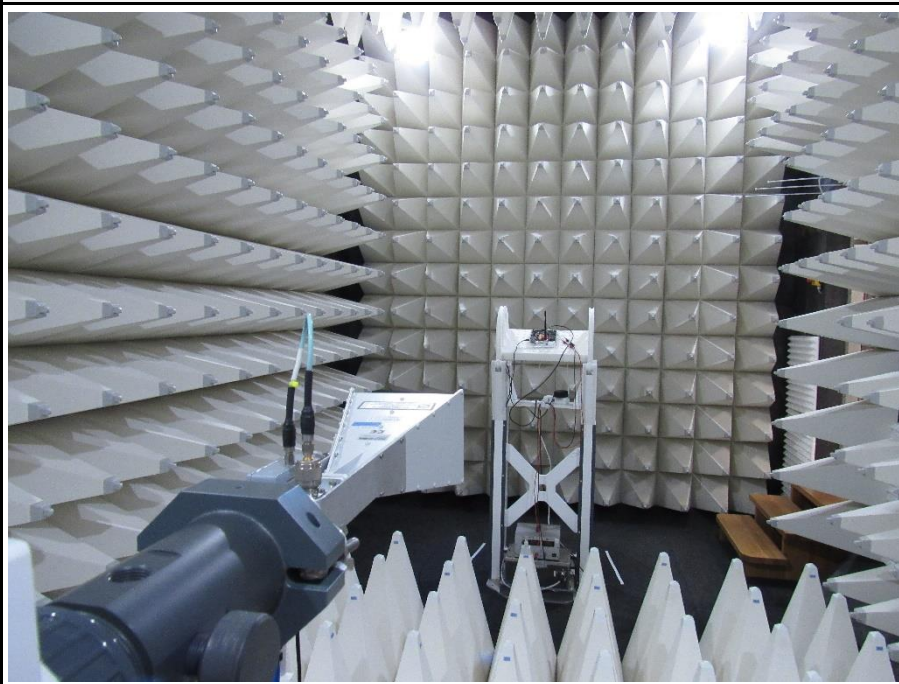
Setup for measurements below 1 GHz- Antenna 2



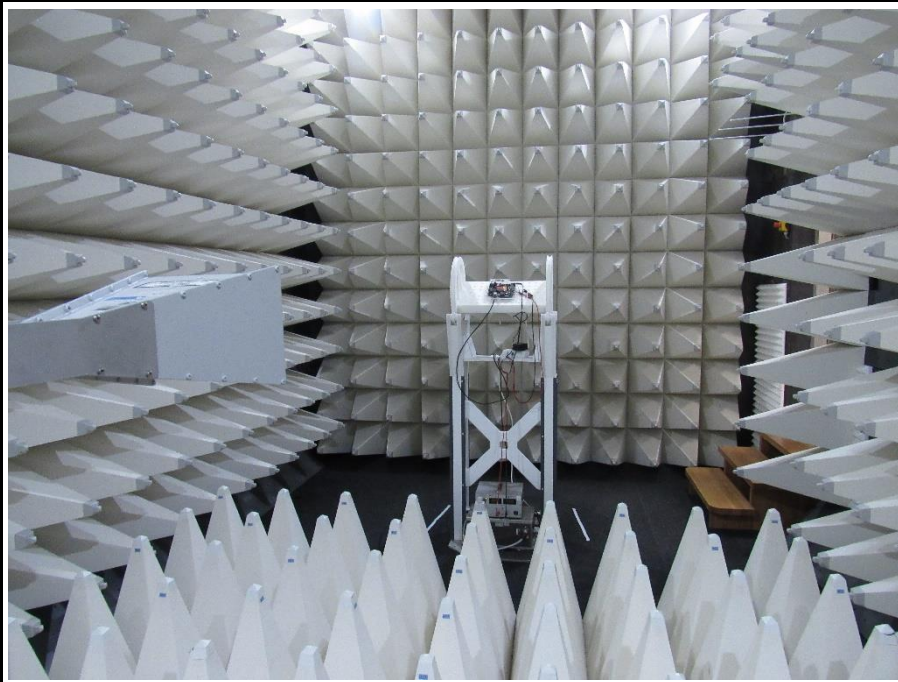
Setup for measurements below 1 GHz- Antenna 3



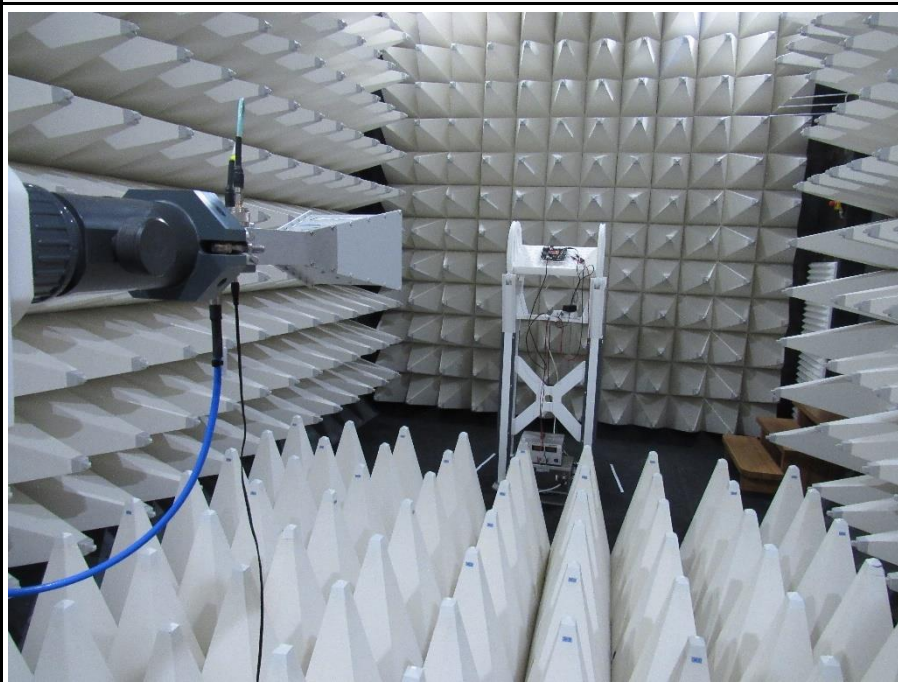
Setup for measurements above 1 GHz-Antenna 1



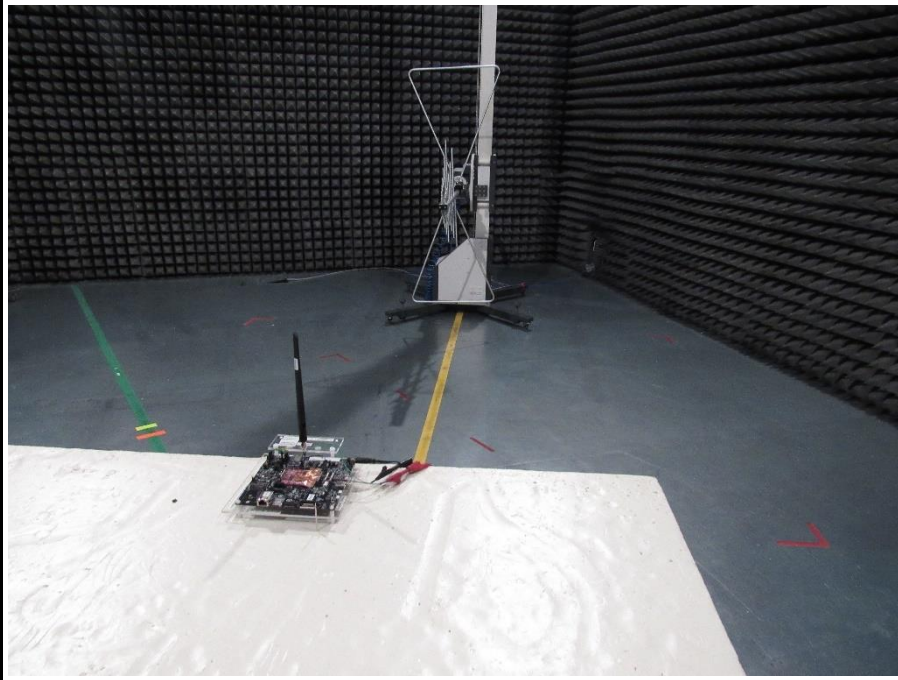
Setup for measurements above 1 GHz-Antenna 2



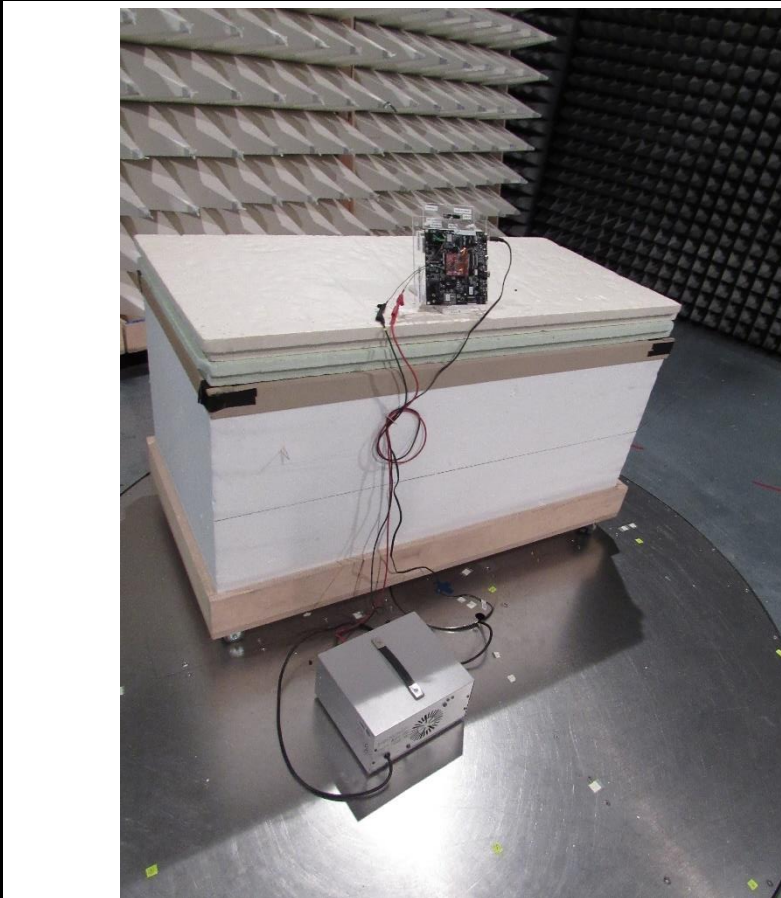
Setup for measurements above 1 GHz-Antenna 3



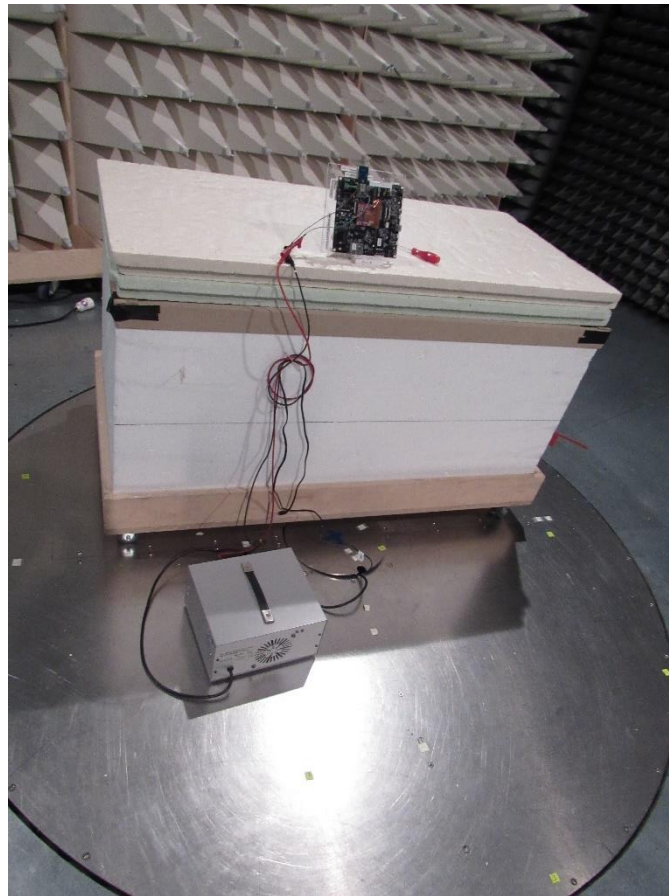
EUT Test Setup below 1 GH- Antenna 1



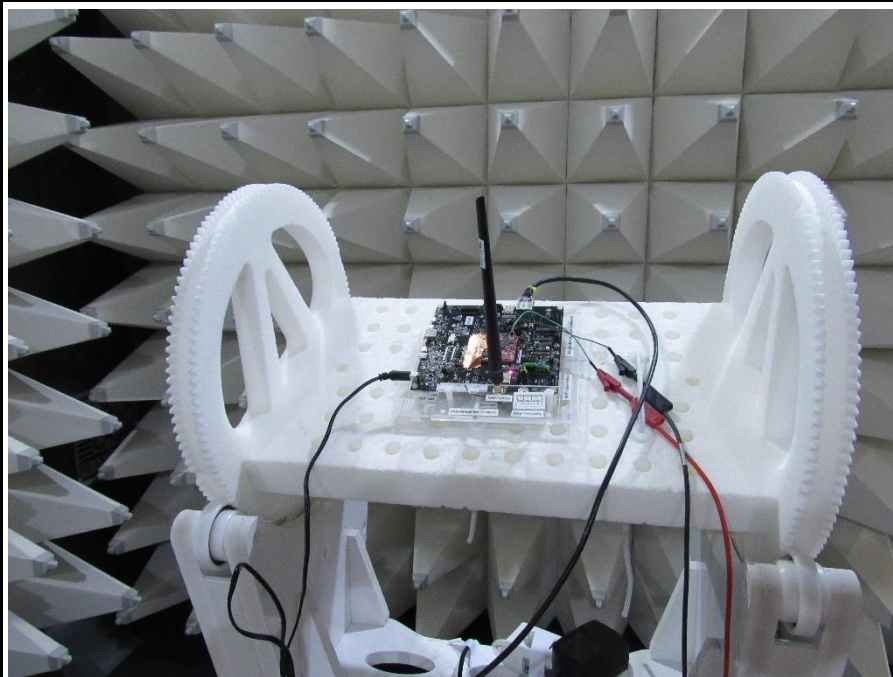
EUT Test Setup below 1 GH- Antenna 2



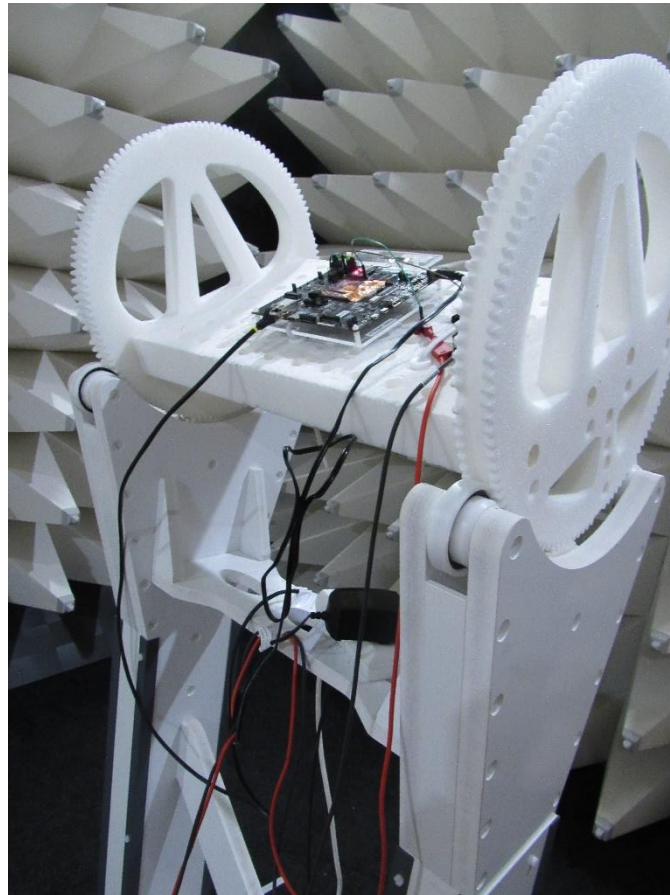
EUT Test Setup below 1 GH- Antenna 3



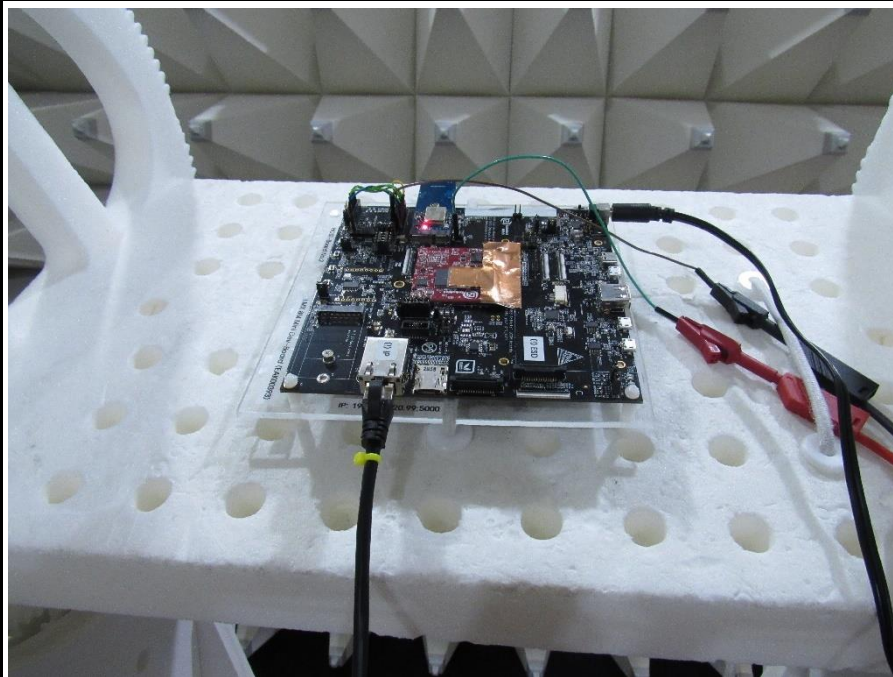
EUT Test Setup above 1 GHz-Antenna 1



EUT Test Setup above 1 GHz-Antenna 2



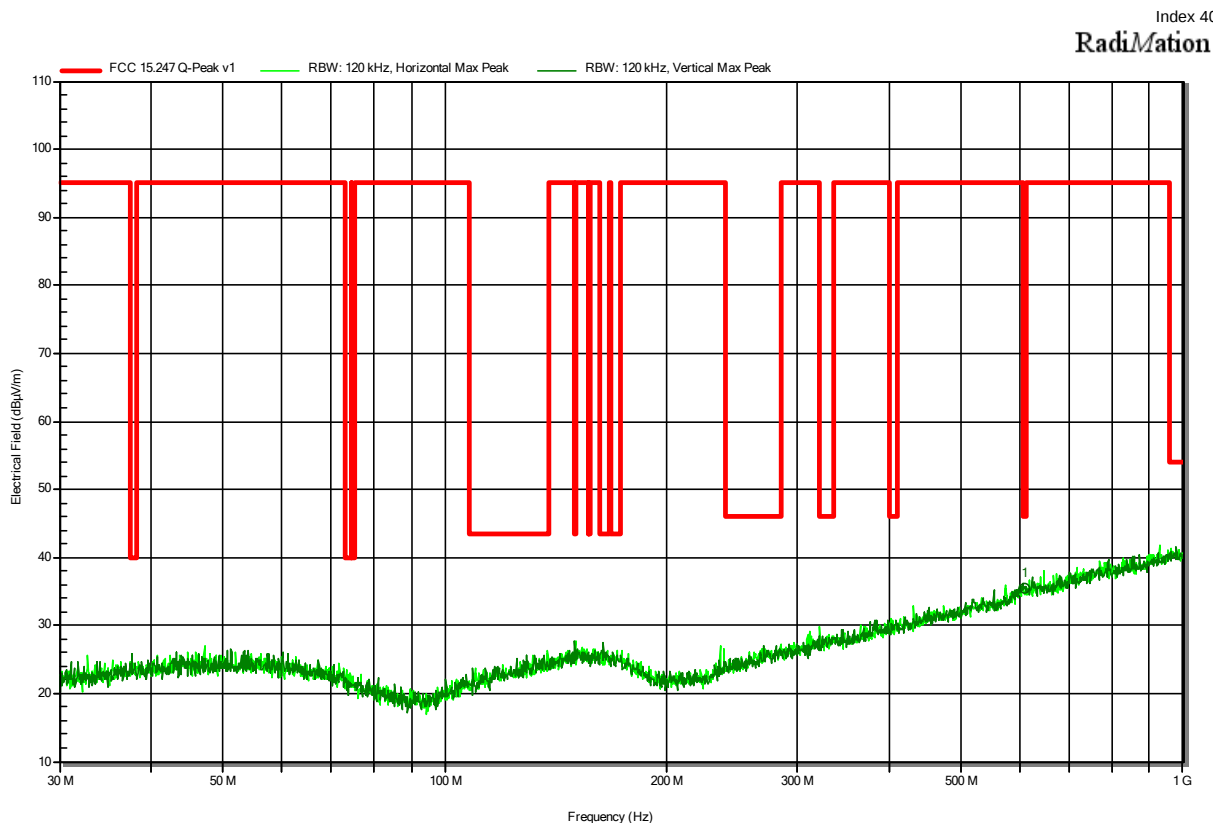
EUT Test Setup above 1 GHz-Antenna 3



ANNEX A Transmitter spurious emissions in the spurious domain with Antenna 1 (External, ANT-Taoglas-GW.51.5153)

Radiated Spurious Emissions according to 47 CFR Part 15.247

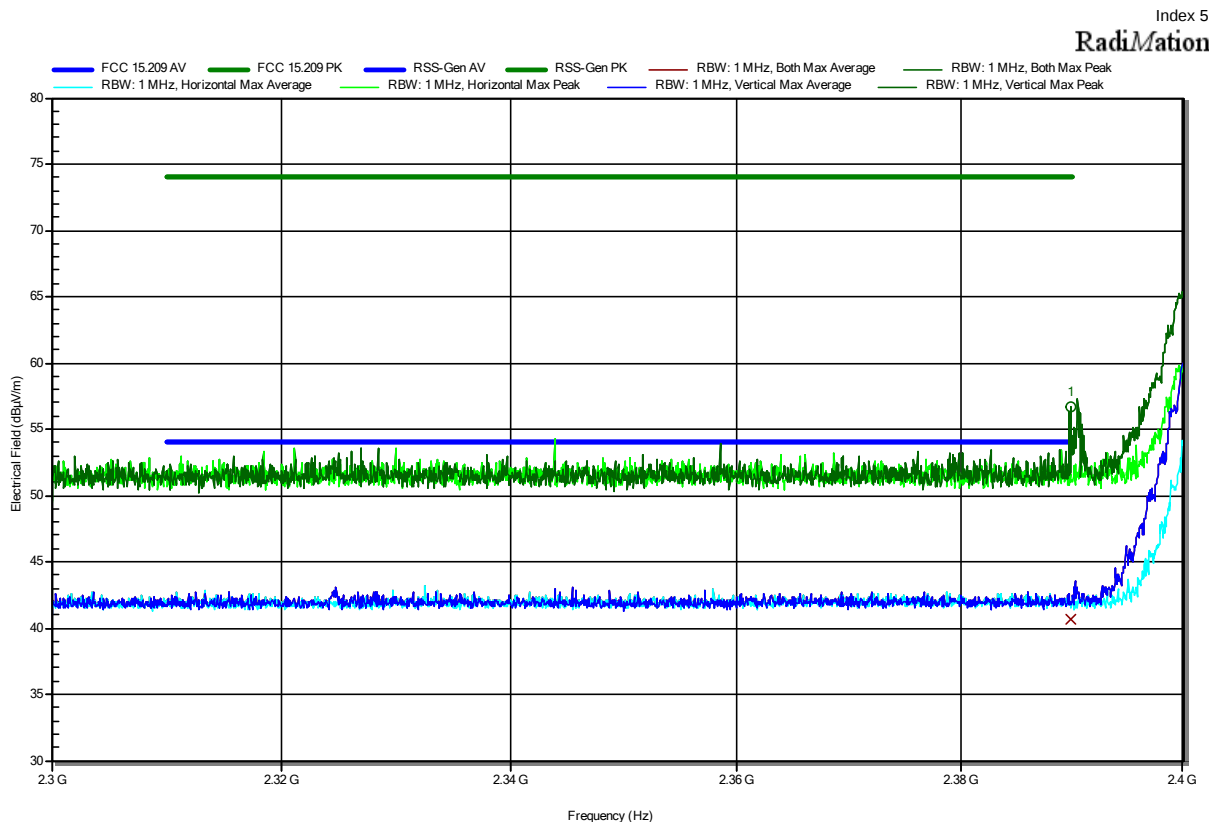
Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-05



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
610.3187 MHz	35.5 dBμV/m	46 dBμV/m	-10.46 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-09
 Note: lower bandedge



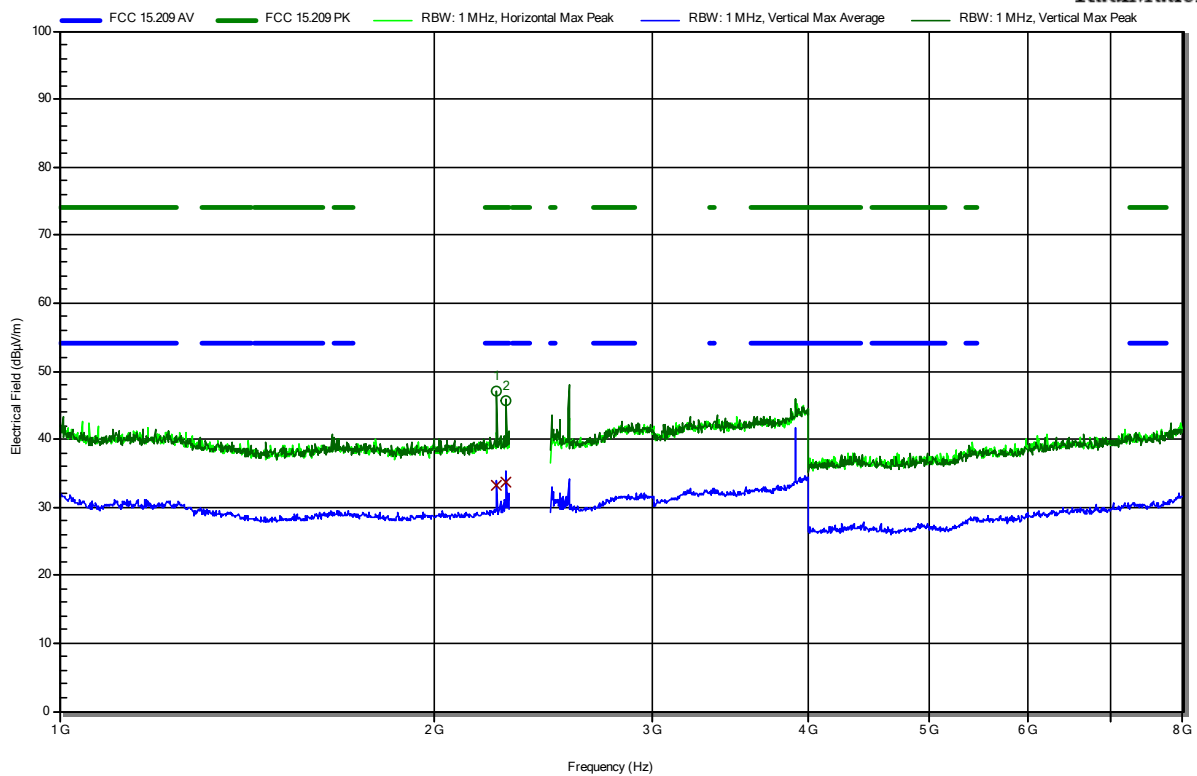
Frequency 2.3899 GHz	Peak 56.68 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -17.32 dB	Peak Status Pass	Polarization Vertical
Frequency 2.3899 GHz	Average 40.65 dBµV/m	Average Limit 54 dBµV/m	Average Difference -13.35 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-09

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RadiMation



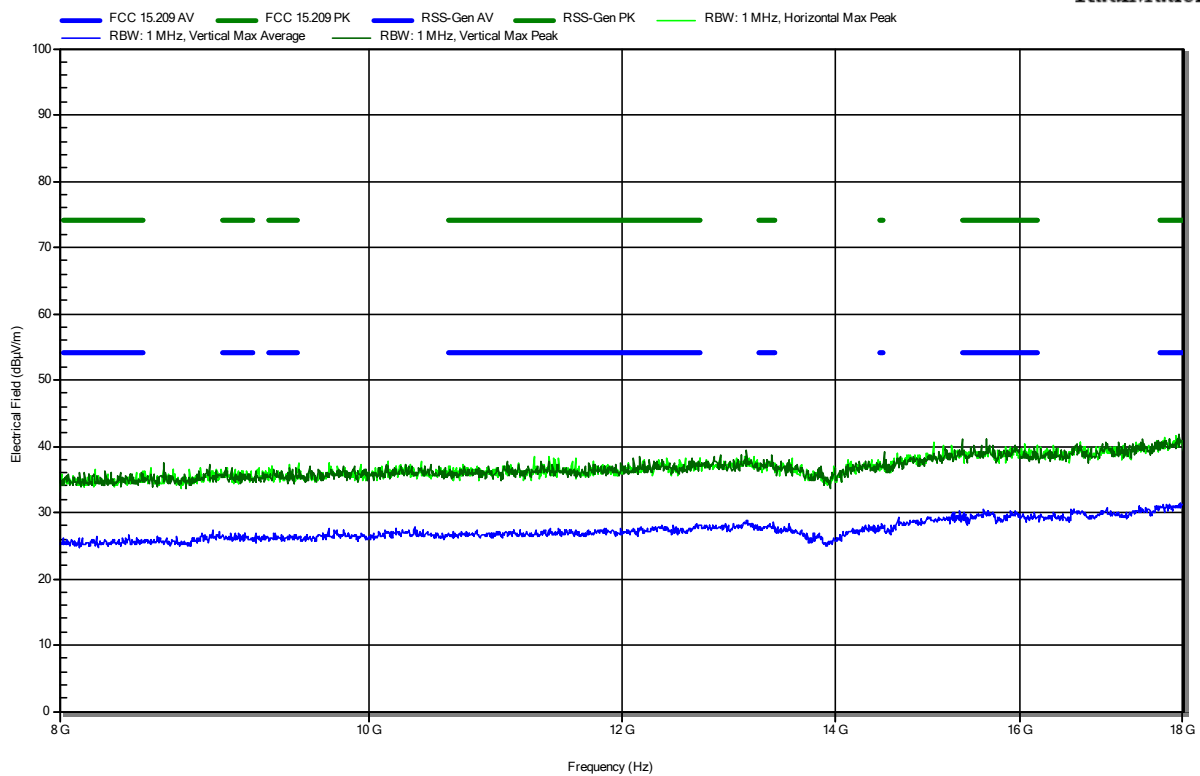
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.2446 GHz	47.14 dBµV/m	74 dBµV/m	-26.86 dB	Pass	Vertical
2.2845 GHz	45.67 dBµV/m	74 dBµV/m	-28.33 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.2446 GHz	33.18 dBµV/m	54 dBµV/m	-20.82 dB	Pass	Vertical
2.2845 GHz	33.59 dBµV/m	54 dBµV/m	-20.41 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-07

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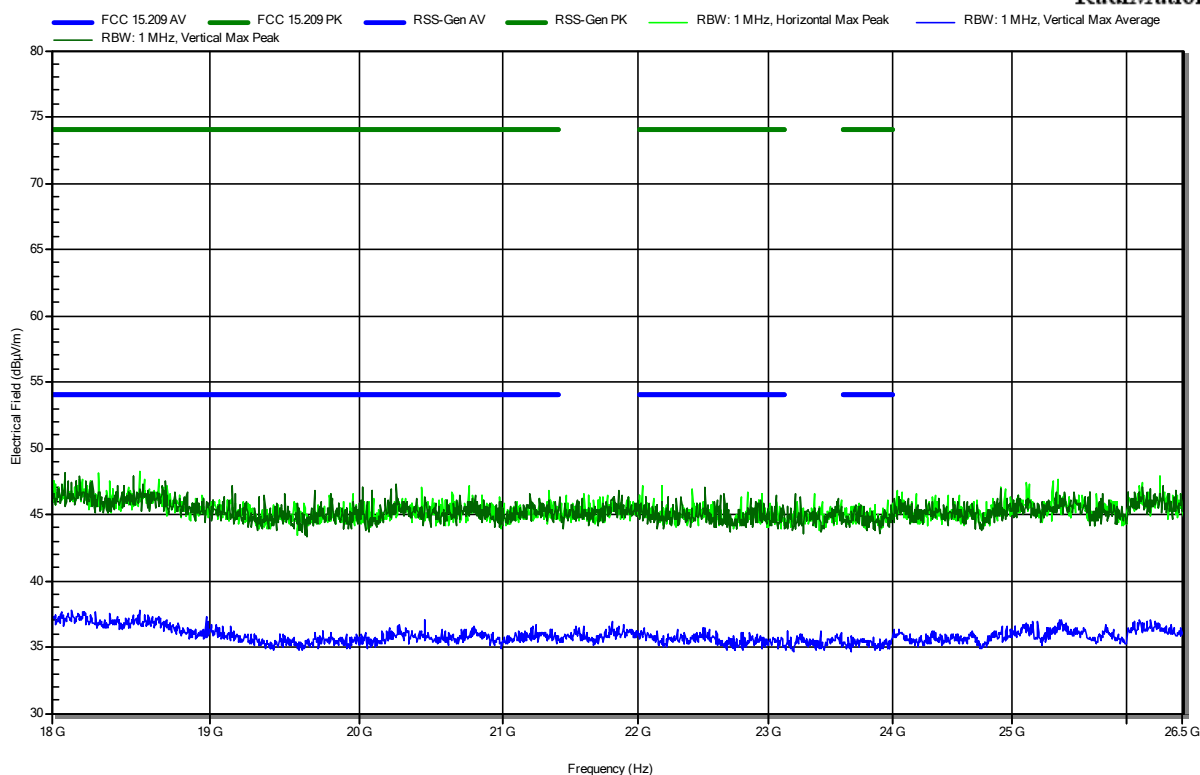


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-07

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RadiMation

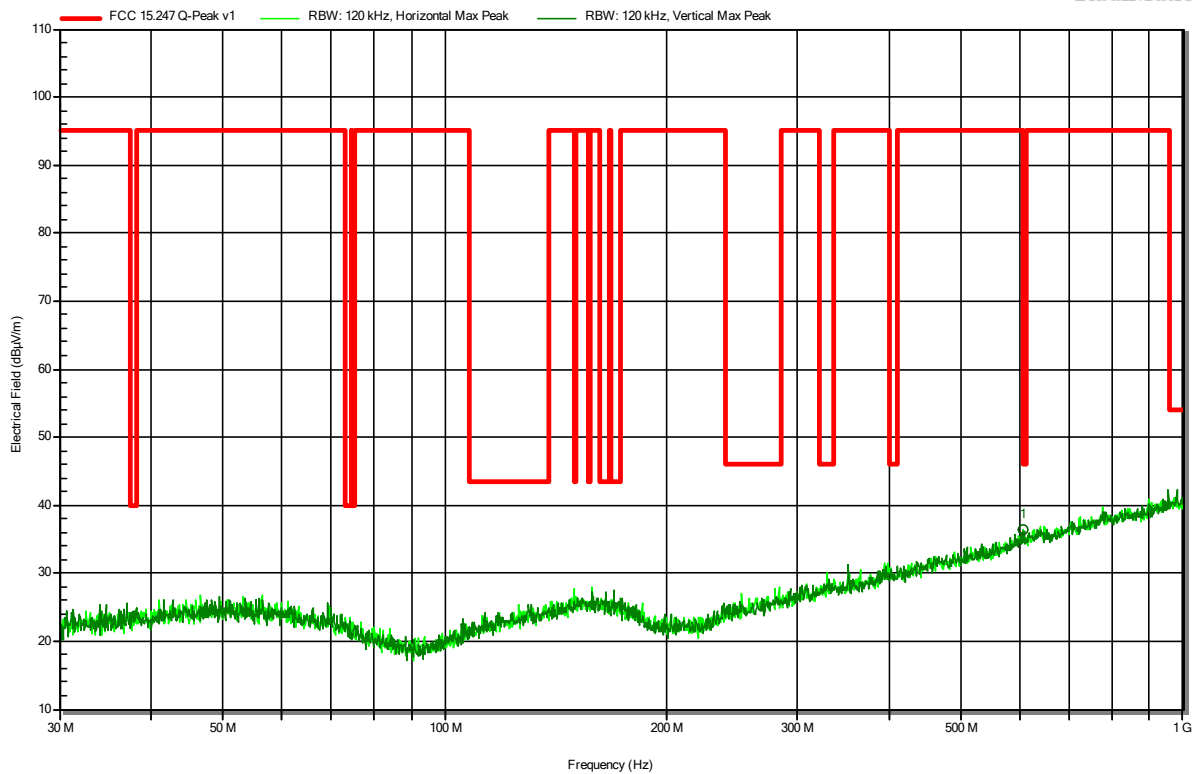


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2440 MHz, O-QPSK
 Test Date: 2024-02-05

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RadiMation



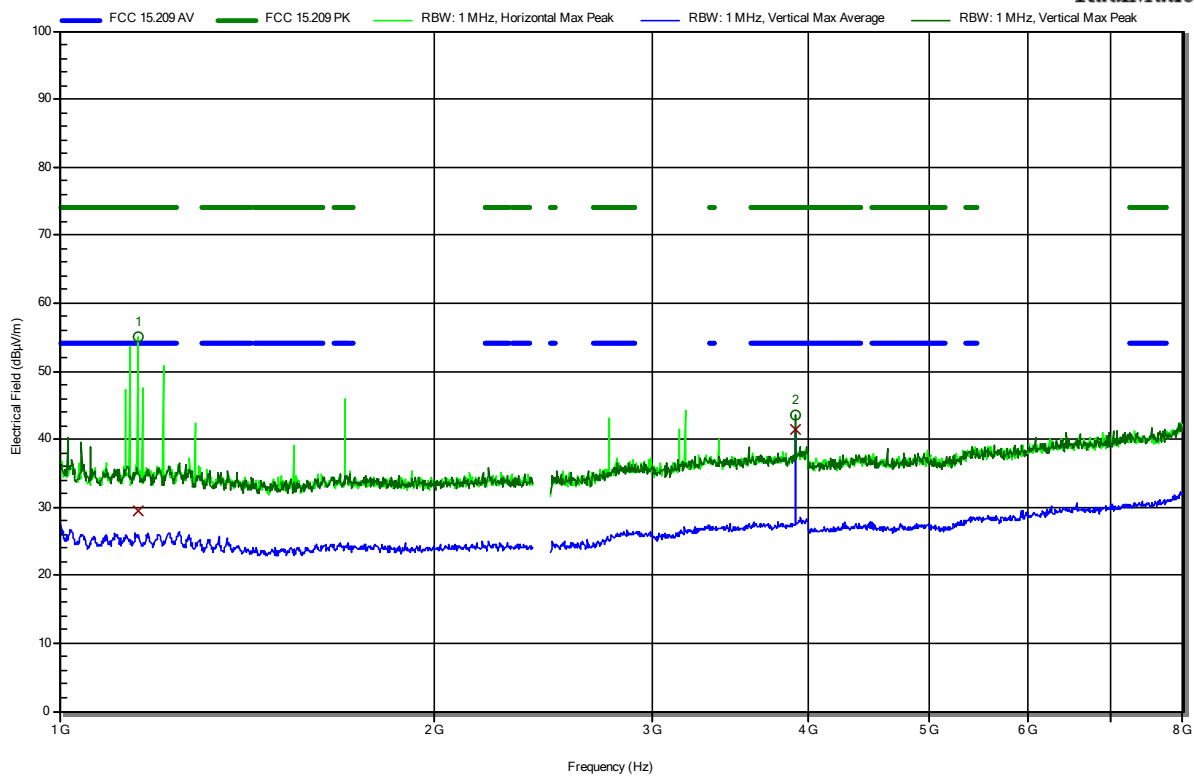
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
608.1523 MHz	36.3 dBμV/m	46 dBμV/m	-9.68 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2440 MHz, O-QPSK
 Test Date: 2024-02-07

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.1553 GHz	54.98 dBμV/m	74 dBμV/m	-19.02 dB	Pass	Horizontal
3.9034 GHz	43.64 dBμV/m	74 dBμV/m	-30.36 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.1553 GHz	29.5 dBμV/m	54 dBμV/m	-24.5 dB	Pass	Horizontal
3.9034 GHz	41.43 dBμV/m	54 dBμV/m	-12.57 dB	Pass	Vertical

Test Report No.: G0M-2309-2215-TFC247ZB-V01

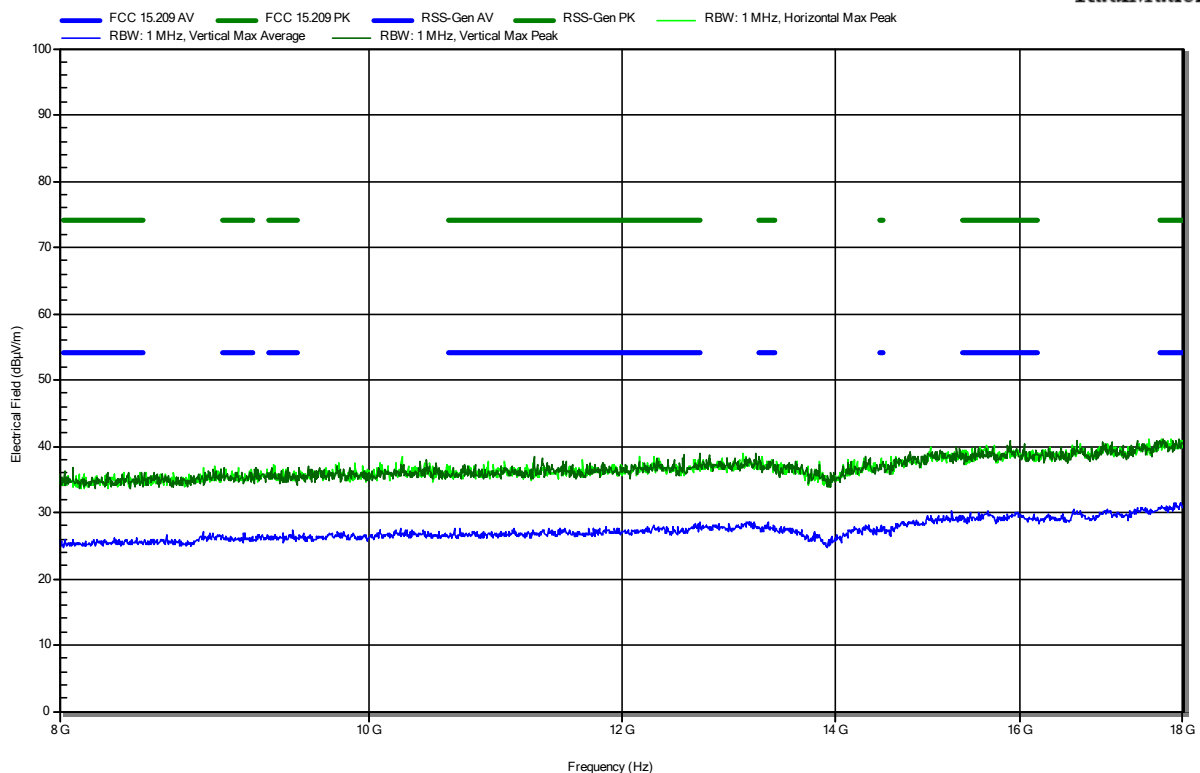
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; ZB, 2440 MHz, O-QPSK
 Test Date: 2024-02-07

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RadiMation

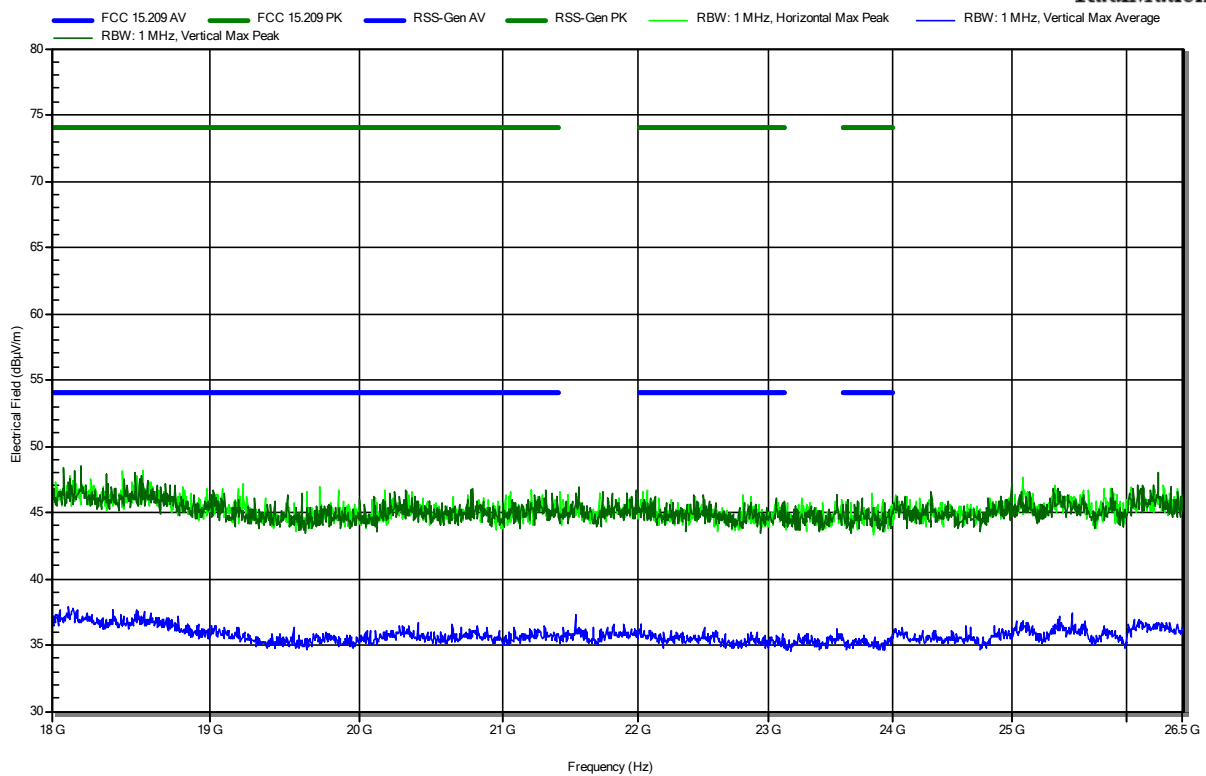


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; ZB, 2440 MHz, O-QPSK
 Test Date: 2024-02-07

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RadiMation

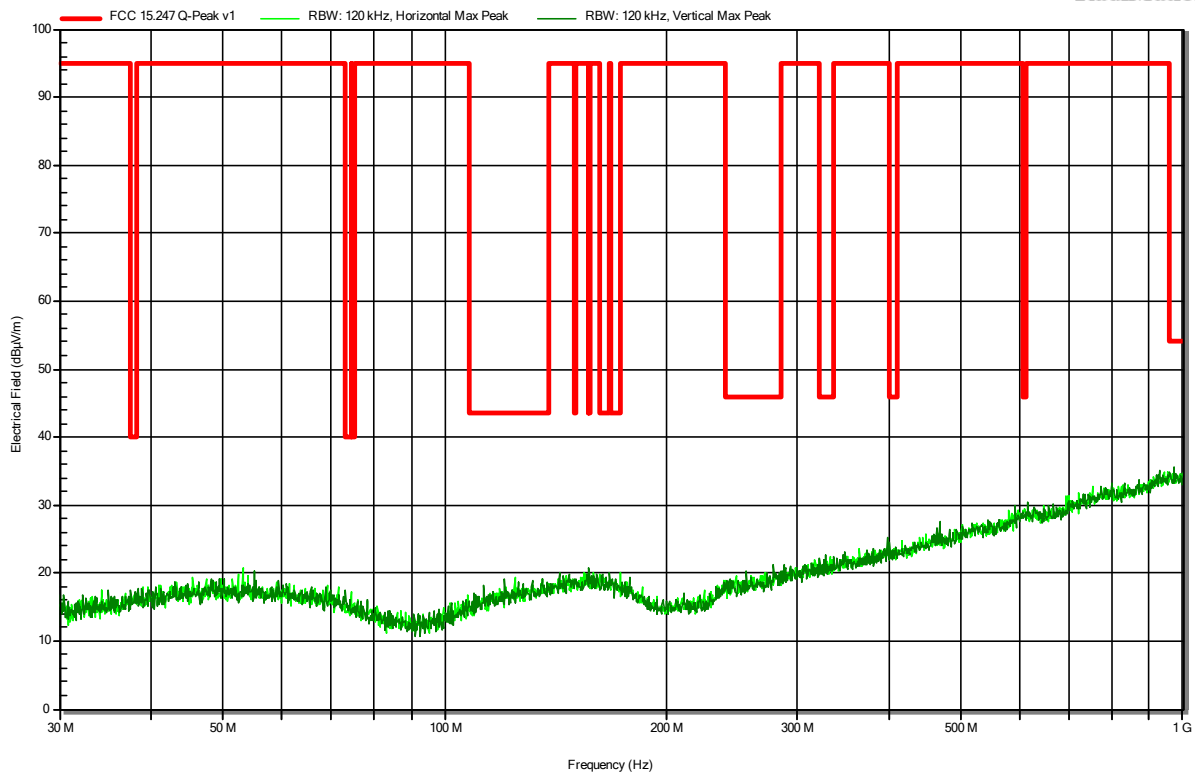


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46900
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-24

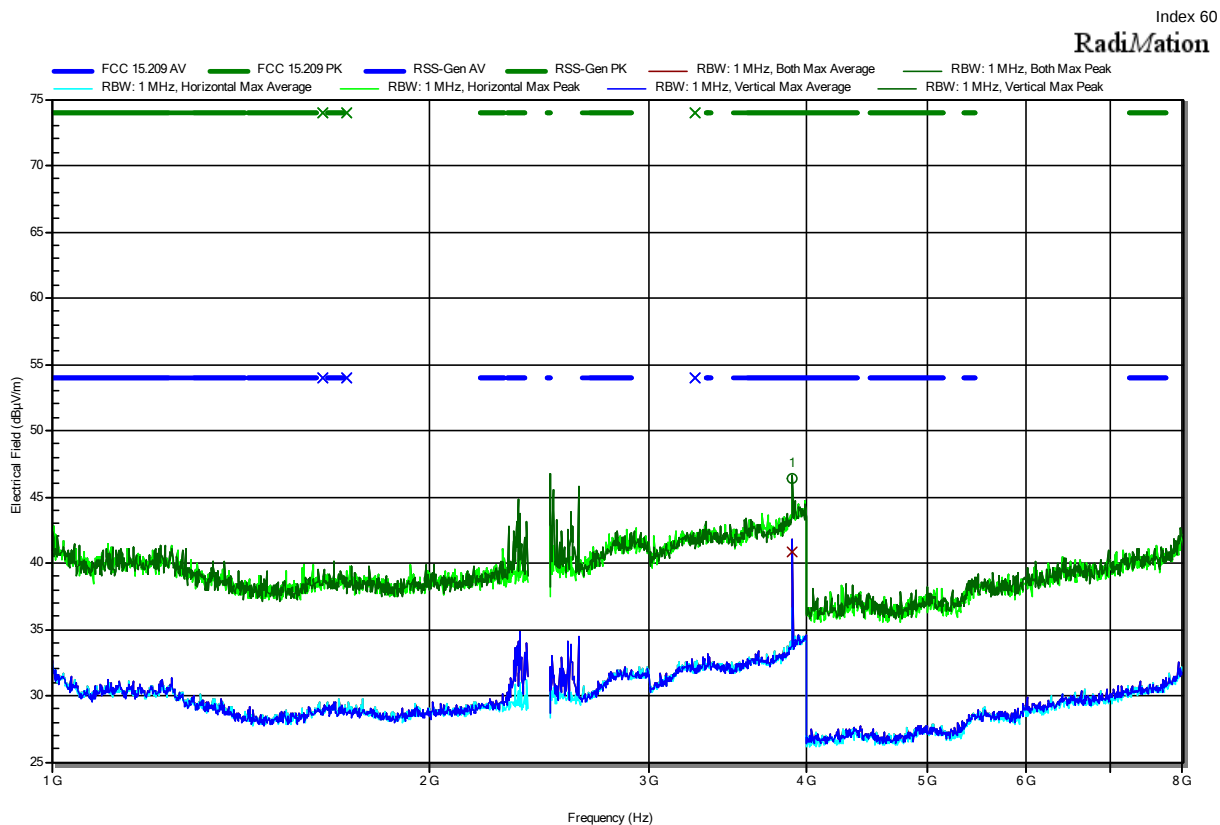
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Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46900
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22



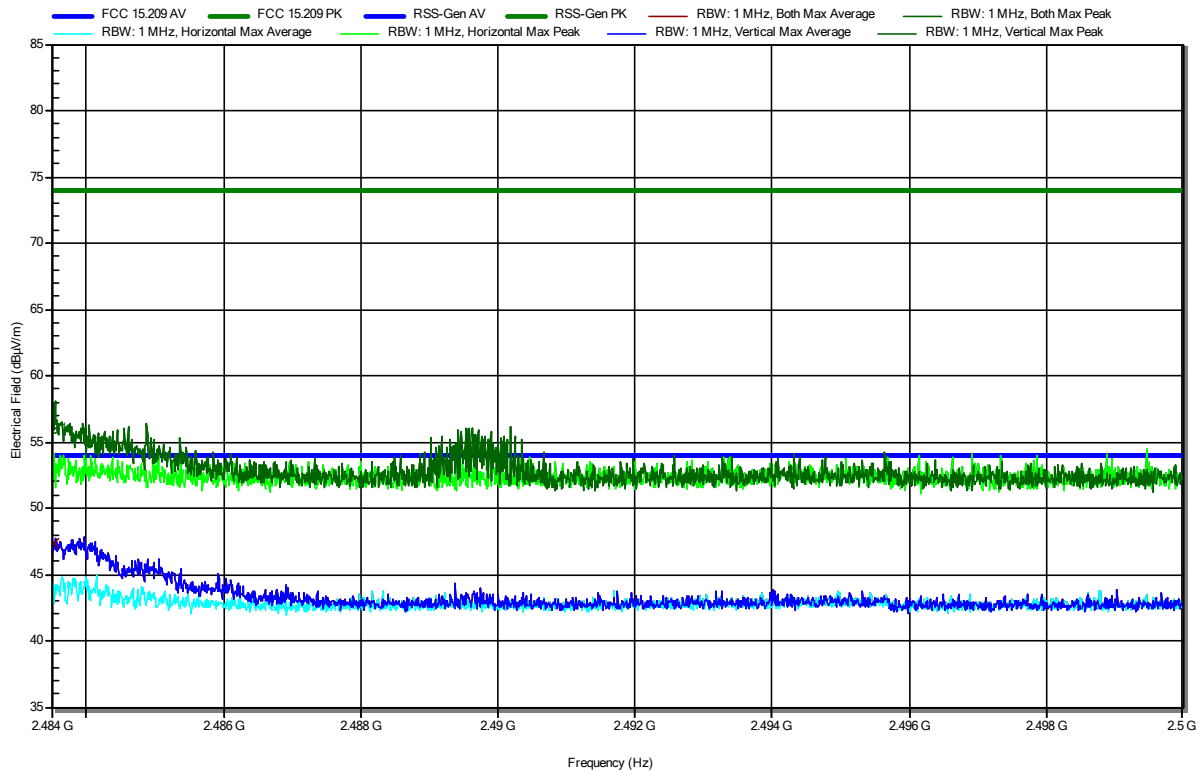
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
3.904 GHz	46.4 dBµV/m	74 dBµV/m	-27.6 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
3.904 GHz	40.89 dBµV/m	54 dBµV/m	-13.11 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
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 Model: ENWF9511C1KF
 Test Sample ID: 46900
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22
 Note: upper bandedge

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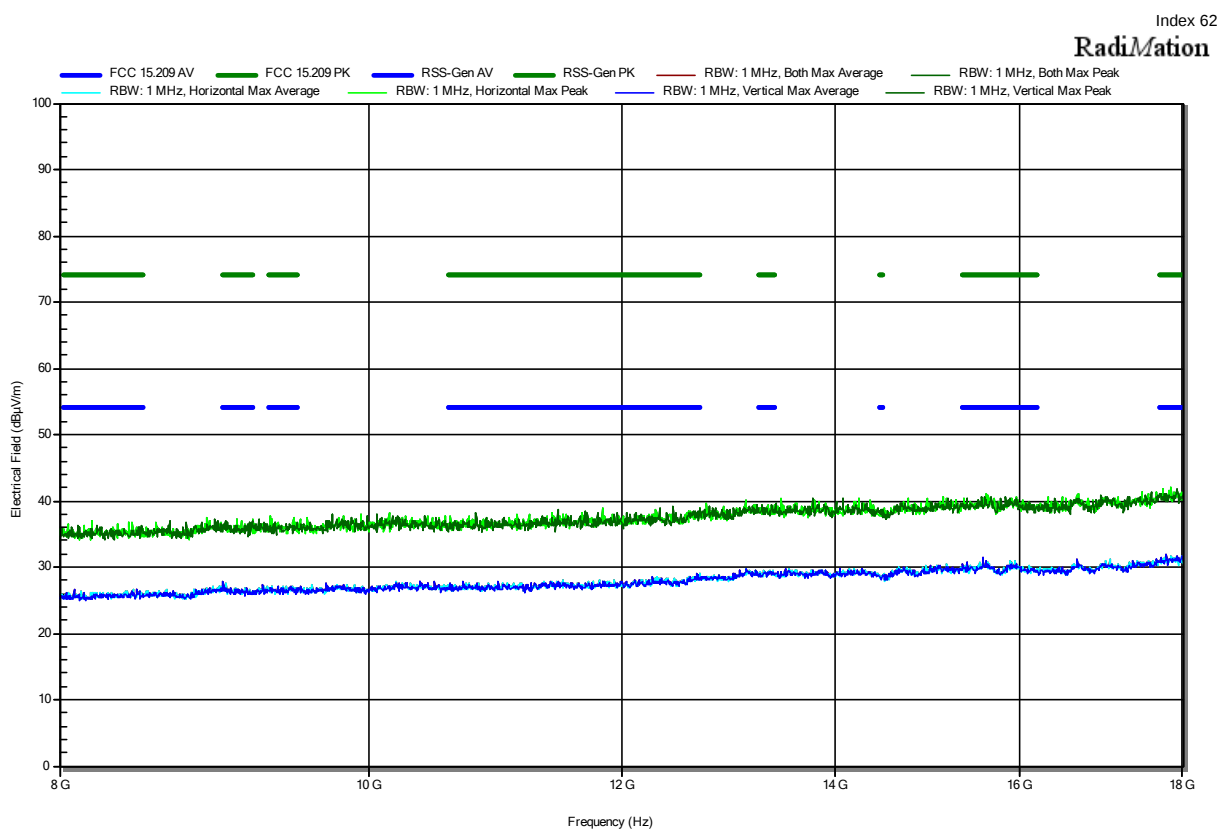
RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4835 GHz	55.99 dBµV/m	74 dBµV/m	-18.01 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4835 GHz	47.35 dBµV/m	54 dBµV/m	-6.65 dB	Pass	Vertical

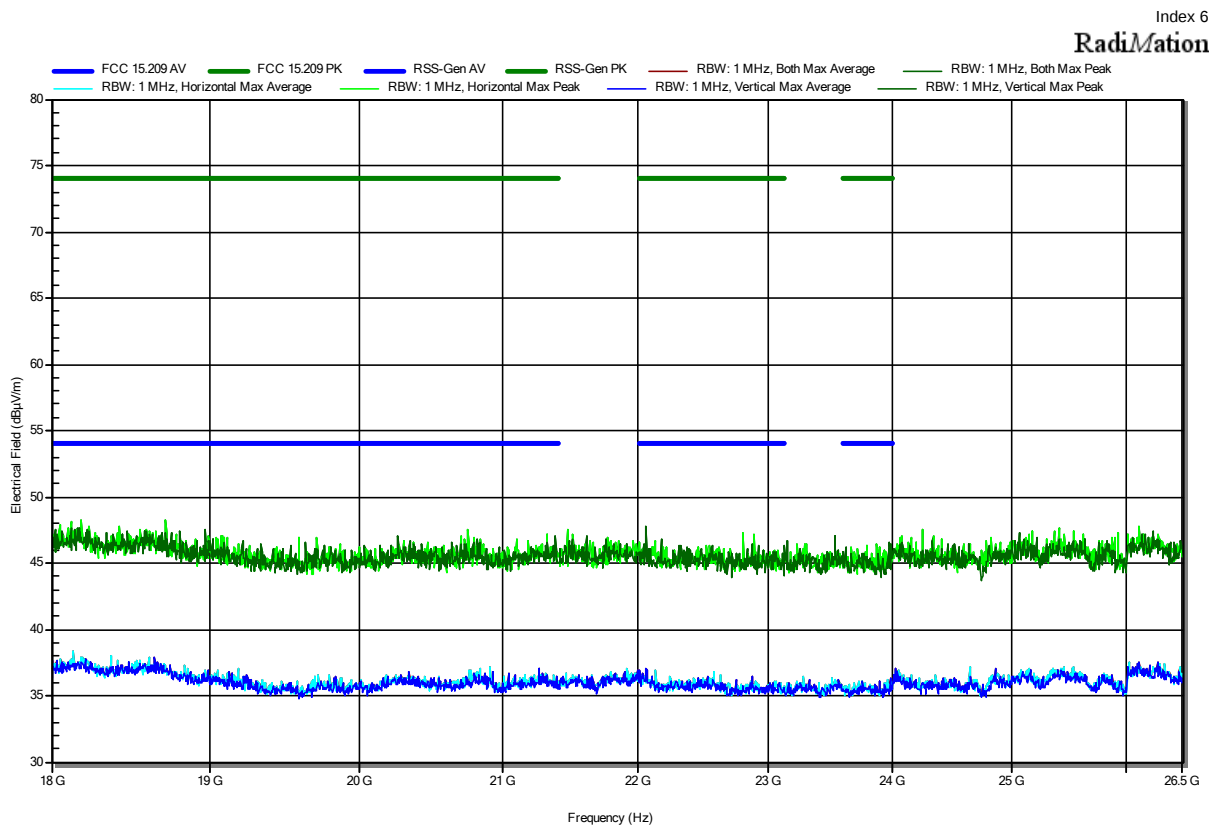
Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46900
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22



Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46900
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22

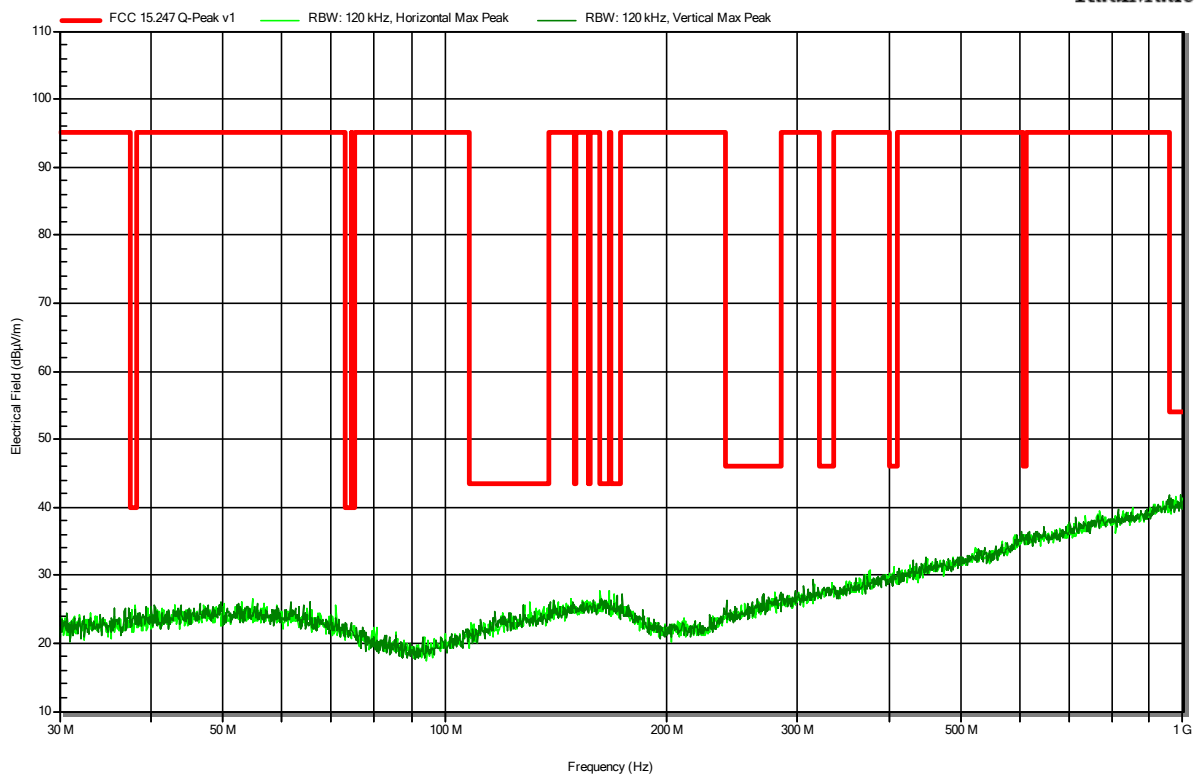


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-05

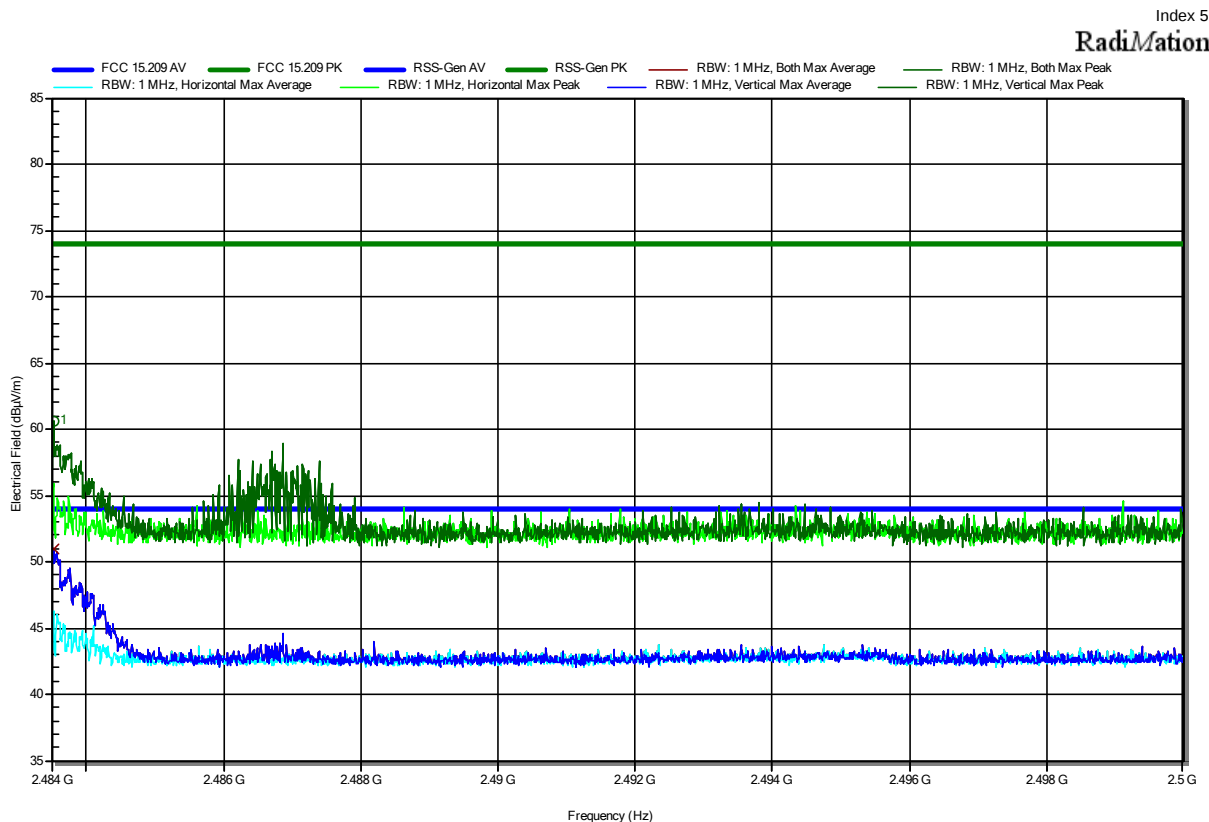
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Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-09
 Note: upper bandedge



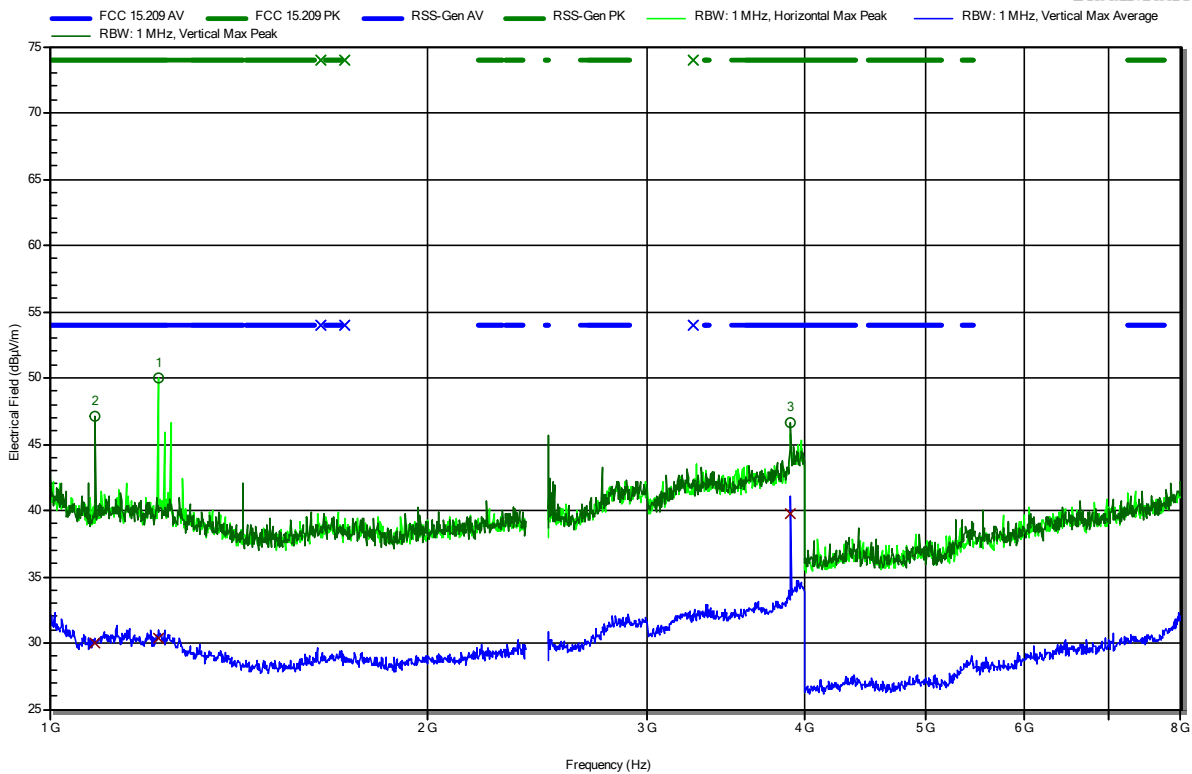
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4835 GHz	60.55 dBµV/m	74 dBµV/m	-13.45 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4835 GHz	51.01 dBµV/m	54 dBµV/m	-2.99 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

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 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-09

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.087 GHz	47.15 dBµV/m	74 dBµV/m	-26.85 dB	Pass	Vertical
1.22 GHz	50 dBµV/m	74 dBµV/m	-24 dB	Pass	Horizontal
3.903 GHz	46.59 dBµV/m	74 dBµV/m	-27.41 dB	Pass	Vertical

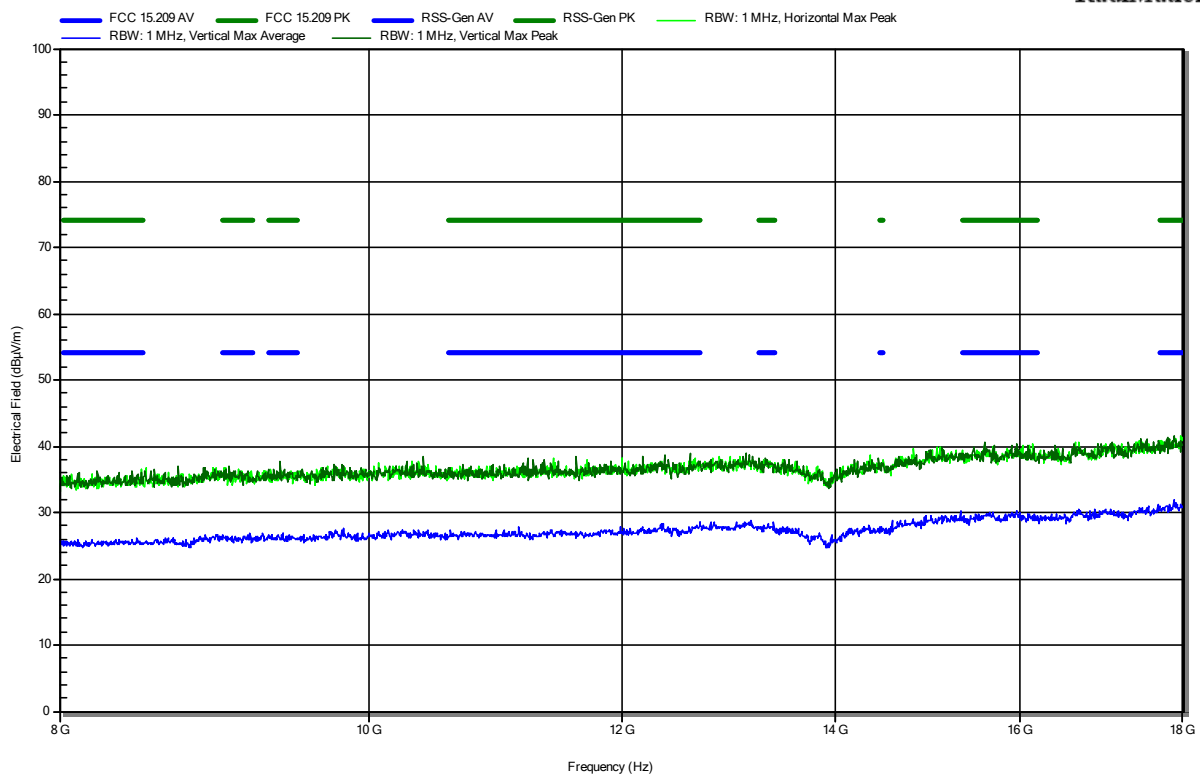
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.087 GHz	30 dBµV/m	54 dBµV/m	-24 dB	Pass	Vertical
1.22 GHz	30.34 dBµV/m	54 dBµV/m	-23.66 dB	Pass	Horizontal
3.903 GHz	39.73 dBµV/m	54 dBµV/m	-14.27 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-07

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RadiMation

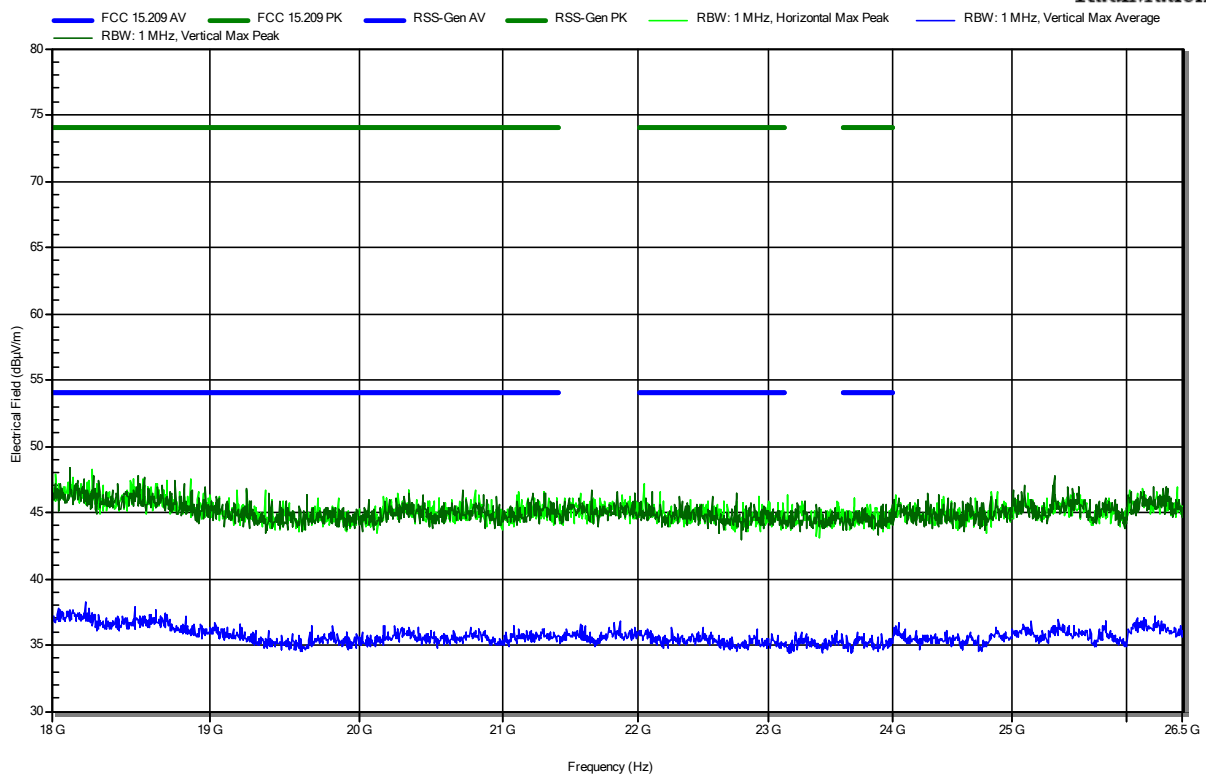


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-07

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RadiMation



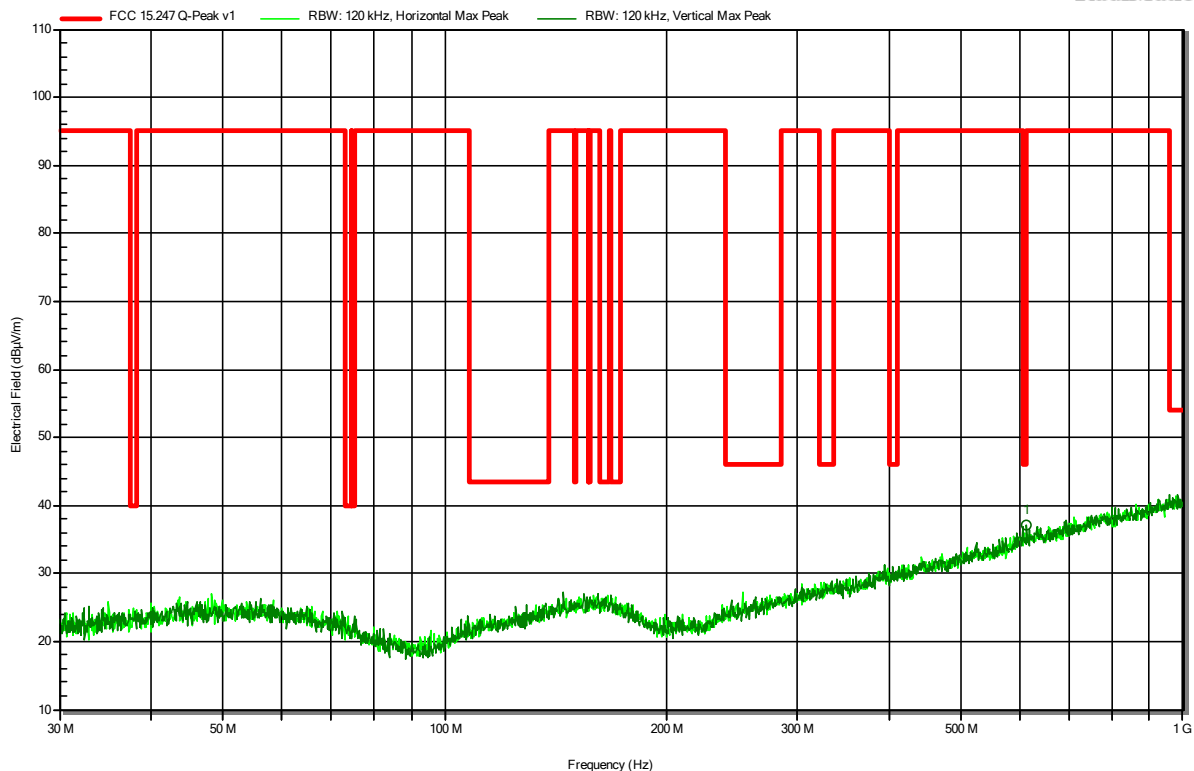
ANNEX B Transmitter spurious emissions in the spurious domain with Antenna 2 (External, ANT-2J Antennas-2JF1002P)

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-05

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RadiMation



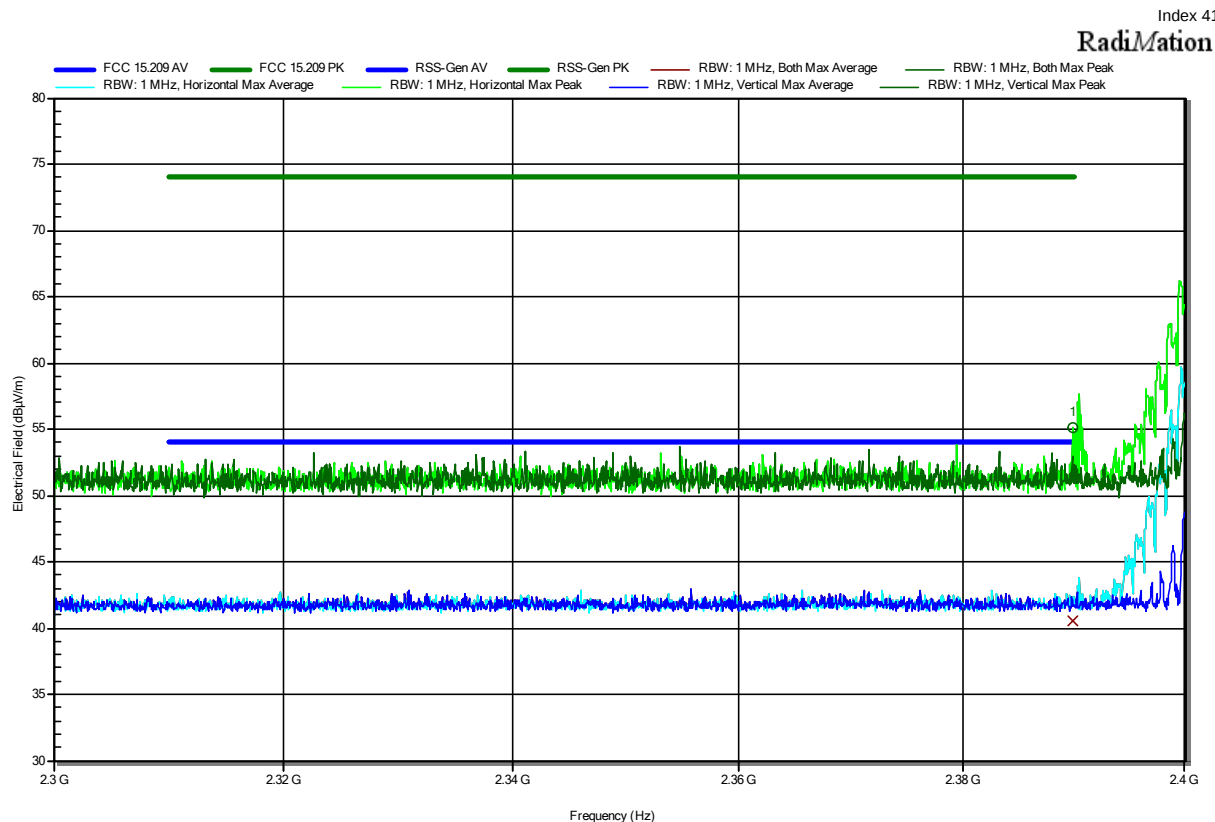
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
612.9053 MHz	37.2 dBμV/m	46 dBμV/m	-8.82 dB	Pass	Vertical

Test Report No.: G0M-2309-2215-TFC247ZB-V01

Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-07
 Note: lower bandedge



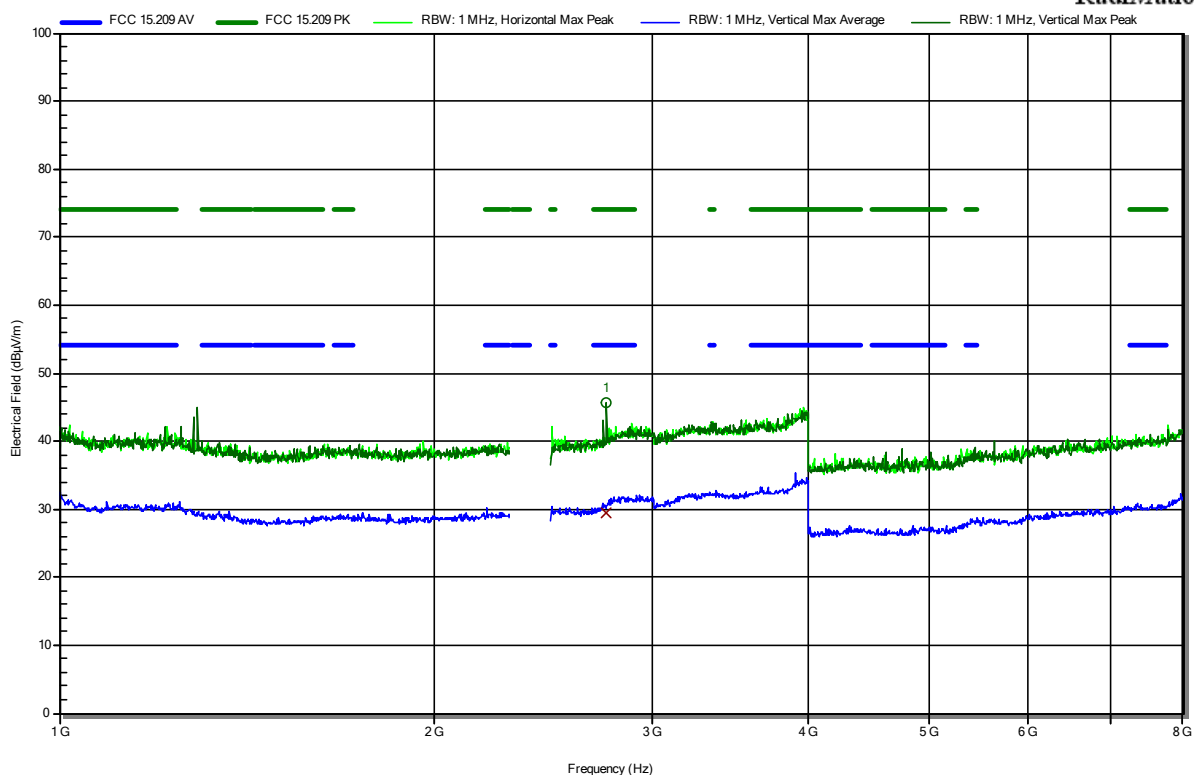
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.3899 GHz	55.18 dBµV/m	74 dBµV/m	-18.82 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.3899 GHz	40.59 dBµV/m	54 dBµV/m	-13.41 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-07

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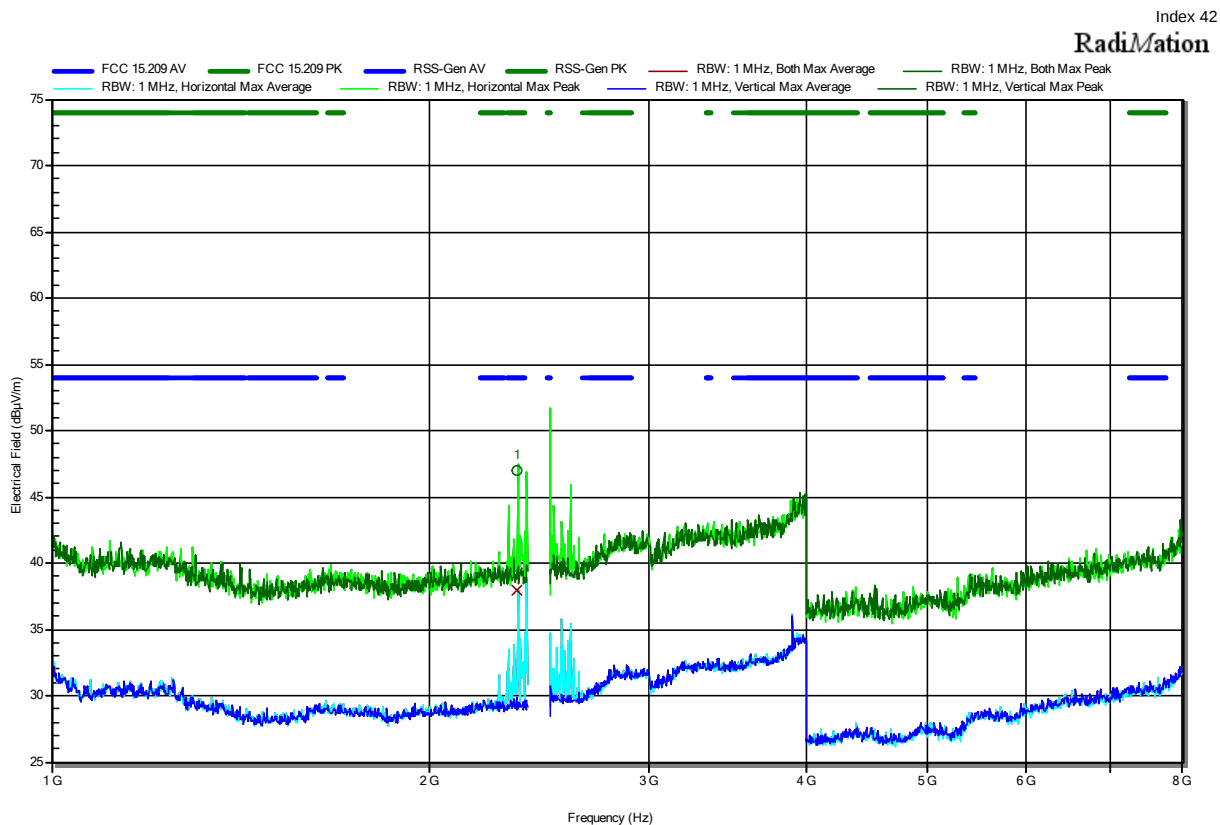
RadiMation



Frequency 2.7527 GHz	Peak 45.68 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -28.32 dB	Peak Status Pass	Polarization Vertical
Frequency 2.7527 GHz	Average 29.37 dBμV/m	Average Limit 54 dBμV/m	Average Difference -24.63 dB	Average Status Pass	Polarization Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22



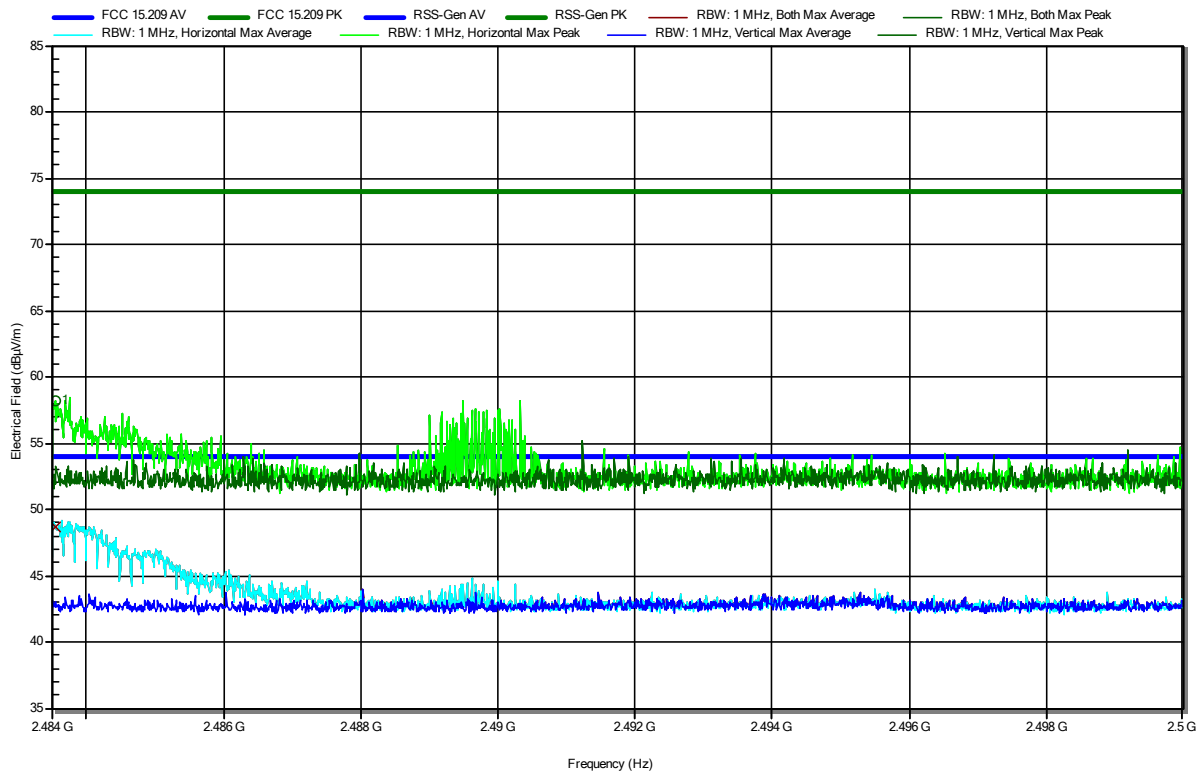
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.356 GHz	47.03 dBµV/m	74 dBµV/m	-26.97 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.356 GHz	38 dBµV/m	54 dBµV/m	-16 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22
 Note: upper bandedge

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RadiMation



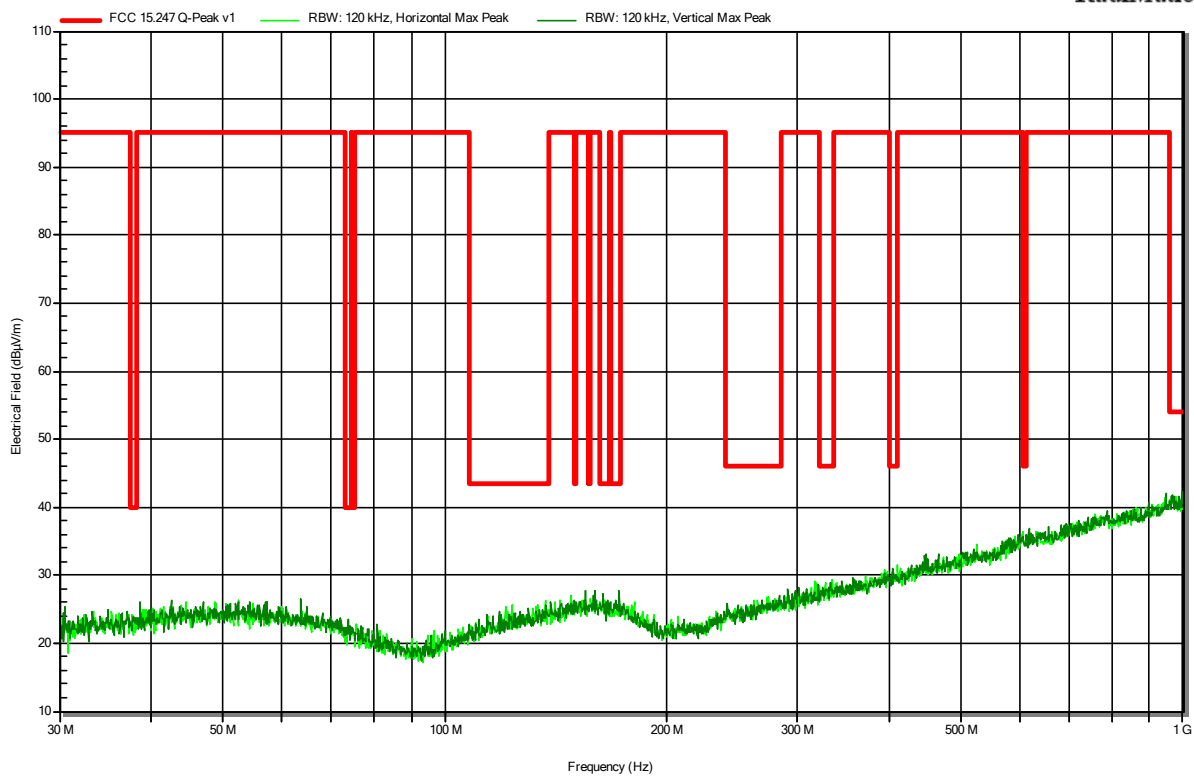
Frequency 2.4835 GHz	Peak 58.24 dBµV/m	Peak Limit 74 dBµV/m	Peak Difference -15.76 dB	Peak Status Pass	Polarization Horizontal
Frequency 2.4835 GHz	Average 48.72 dBµV/m	Average Limit 54 dBµV/m	Average Difference -5.28 dB	Average Status Pass	Polarization Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-05

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RadiMation

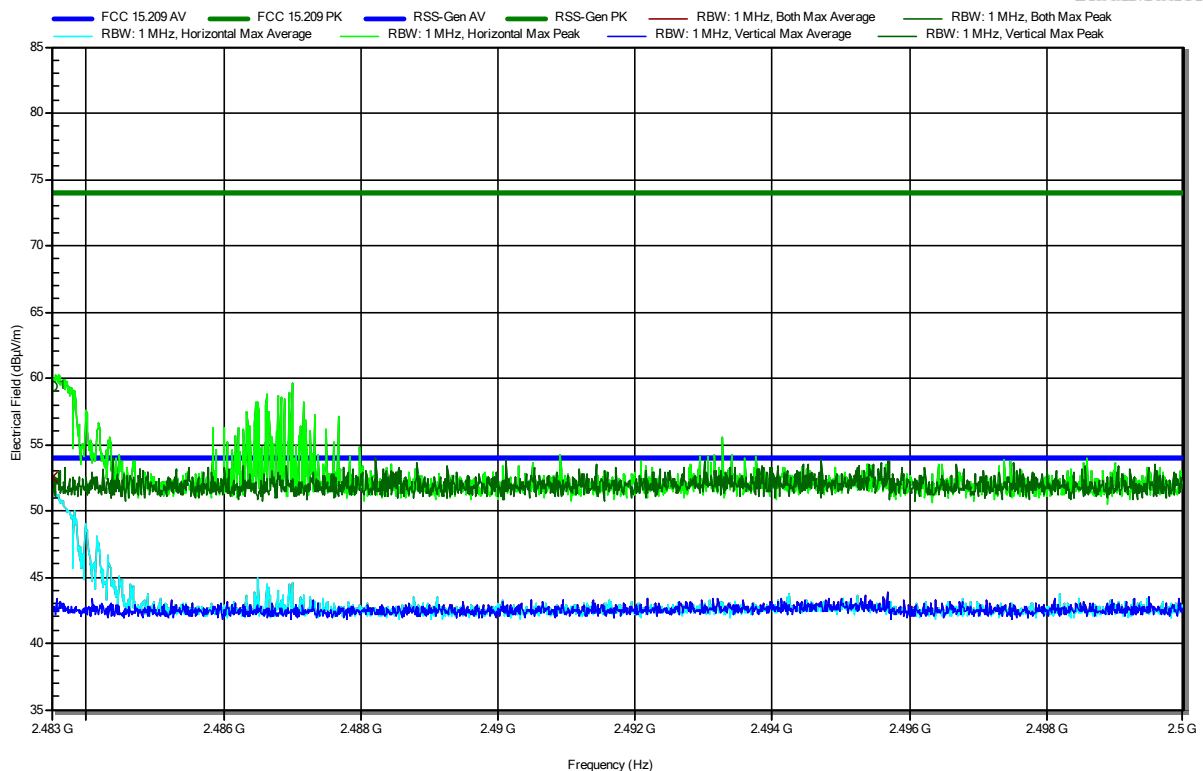


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-07
 Note: upper bandedge

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RadiMation



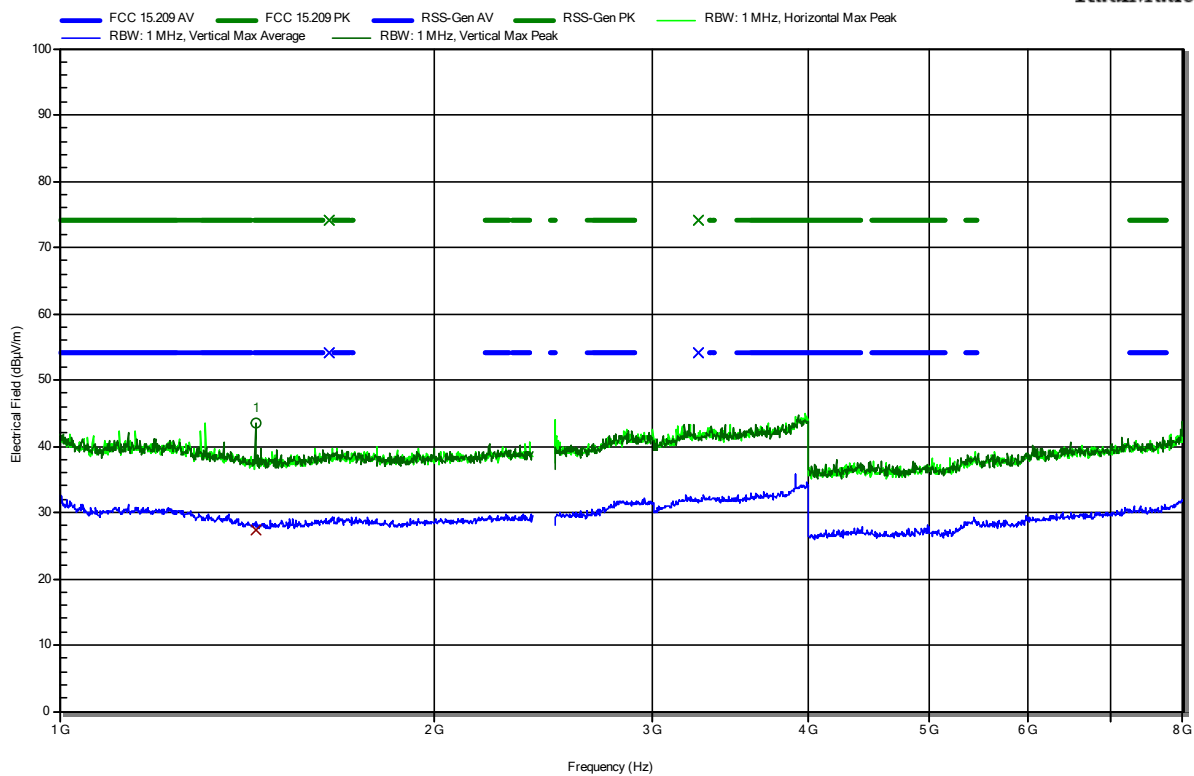
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4835 GHz	59.41 dBµV/m	74 dBµV/m	-14.59 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4835 GHz	52.51 dBµV/m	54 dBµV/m	-1.49 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-07

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RadiMation



Frequency 1.437 GHz	Peak 43.5 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -30.5 dB	Peak Status Pass	Polarization Vertical
Frequency 1.437 GHz	Average 27.31 dBμV/m	Average Limit 54 dBμV/m	Average Difference -26.69 dB	Average Status Pass	Polarization Vertical

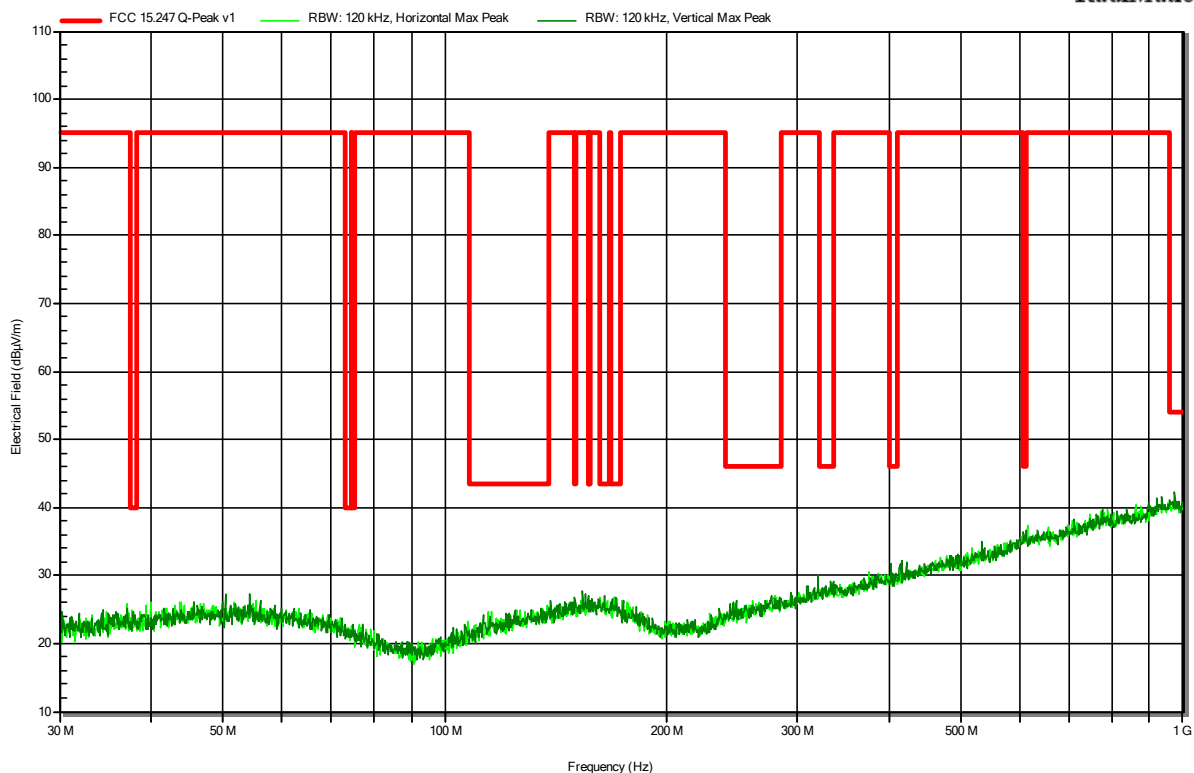
ANNEX C Transmitter spurious emissions in the spurious domain with Antenna 3 (External, ANT-TDK-ANT162442DT-2001A2)

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-05

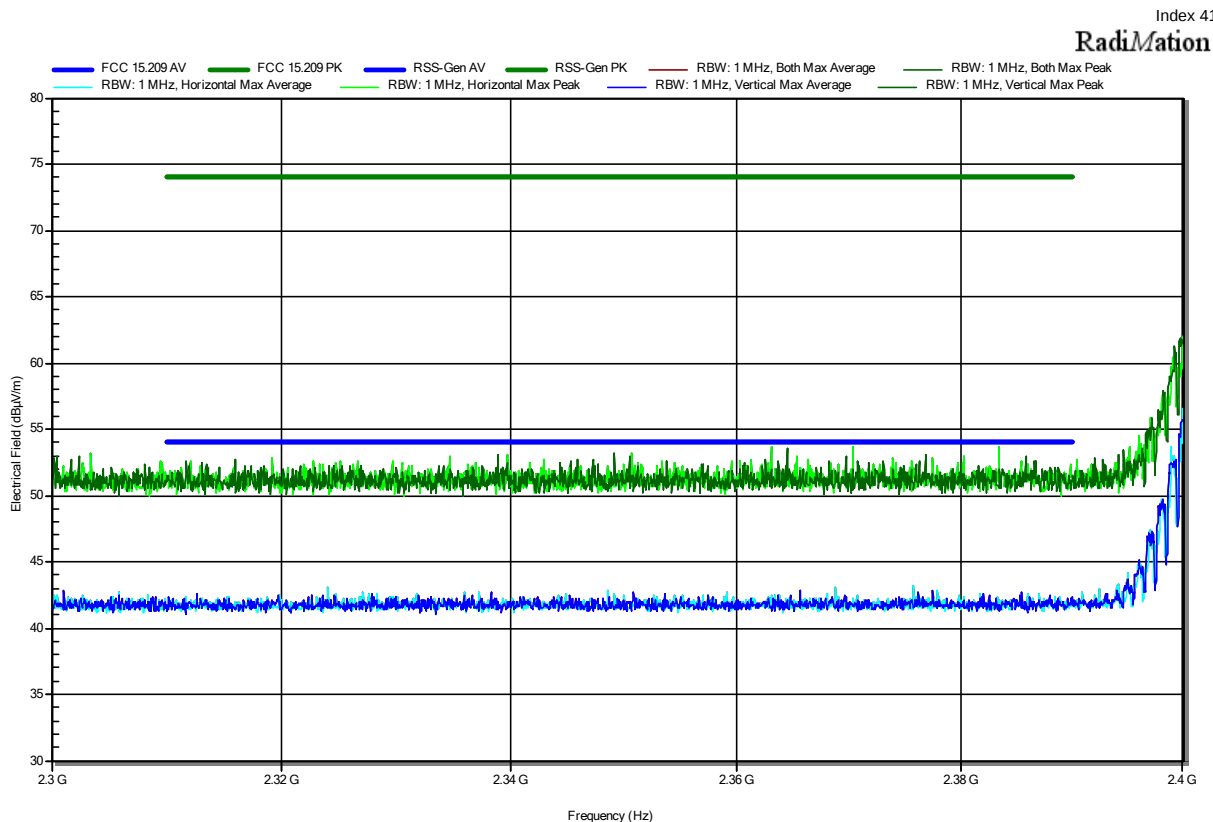
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RadiMation



Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-07
 Note: lower bandedge

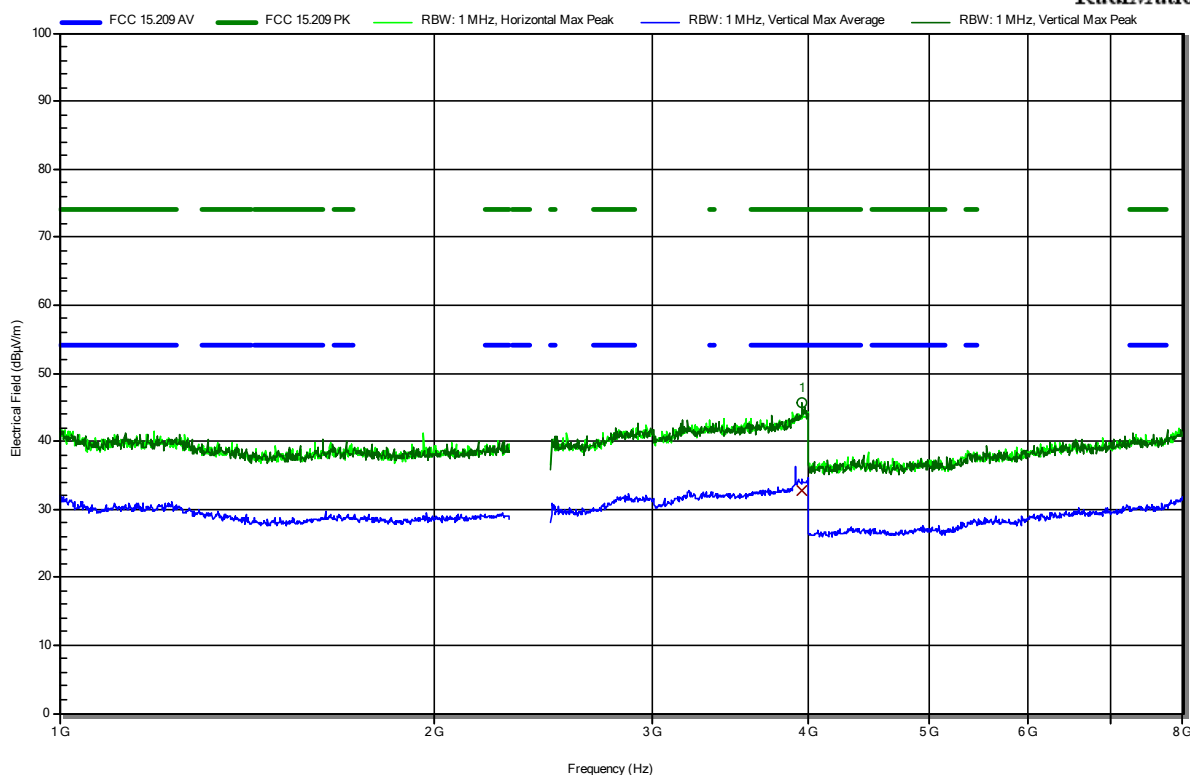


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2405 MHz, O-QPSK
 Test Date: 2024-02-07

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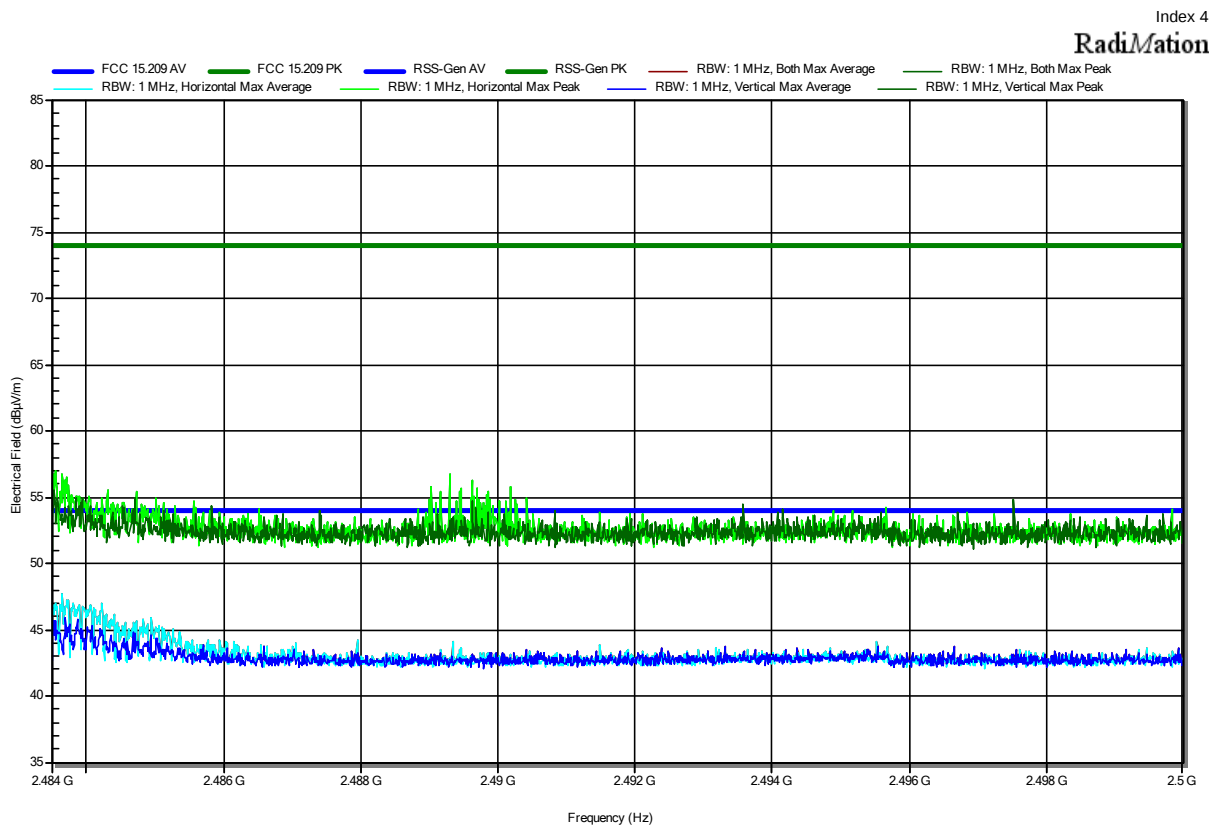
RadiMation



Frequency 3.9521 GHz	Peak 45.64 dBμV/m	Peak Limit 74 dBμV/m	Peak Difference -28.36 dB	Peak Status Pass	Polarization Vertical
Frequency 3.9521 GHz	Average 32.86 dBμV/m	Average Limit 54 dBμV/m	Average Difference -21.14 dB	Average Status Pass	Polarization Vertical

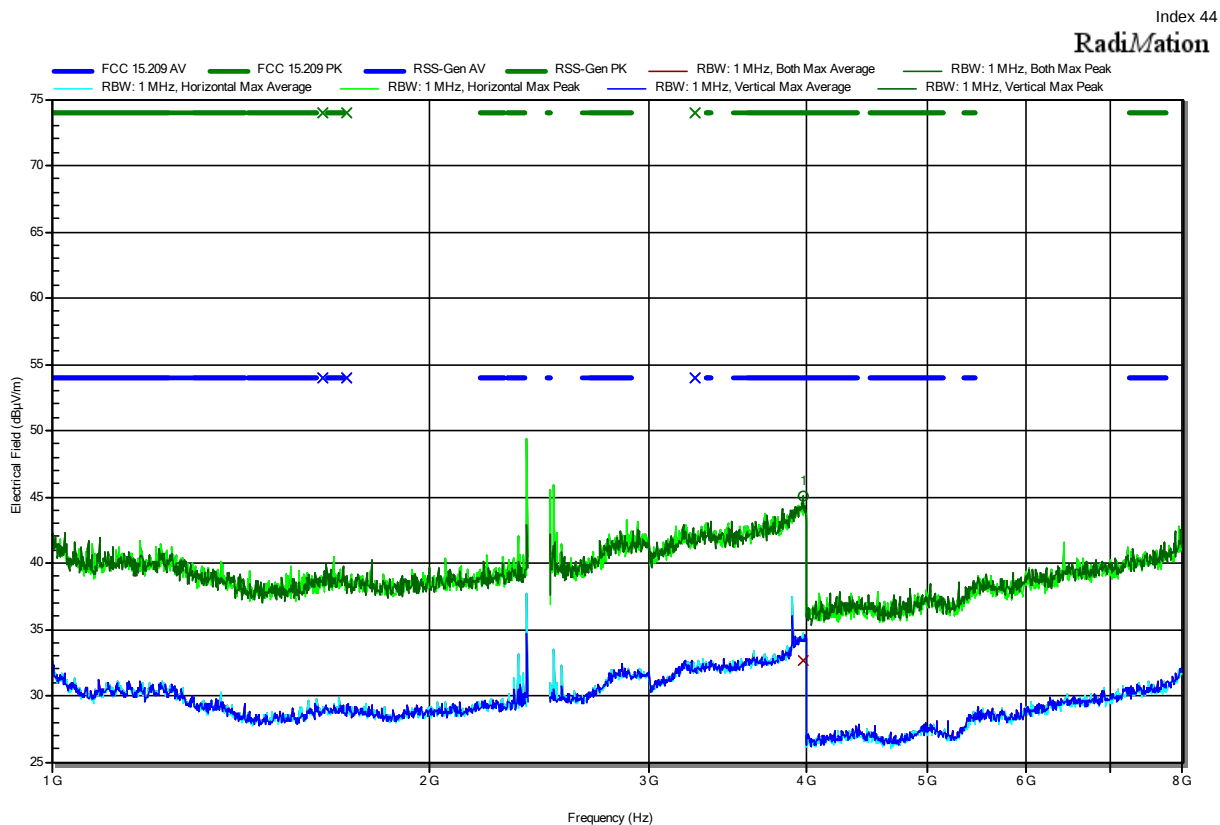
Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22
 Note: upper bandedge



Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2475 MHz, O-QPSK
 Test Date: 2024-02-22



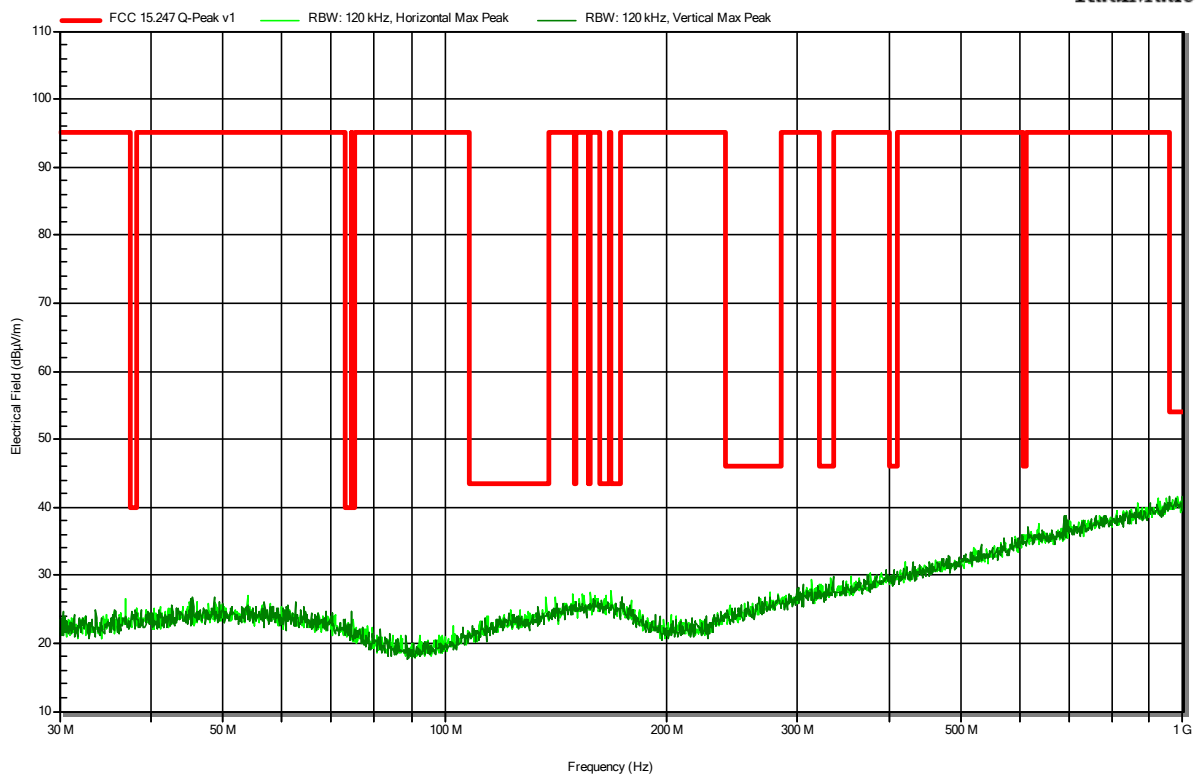
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
3.98 GHz	45.1 dBµV/m	74 dBµV/m	-28.9 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
3.98 GHz	32.66 dBµV/m	54 dBµV/m	-21.34 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck VULB 9168
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-05

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RadiMation

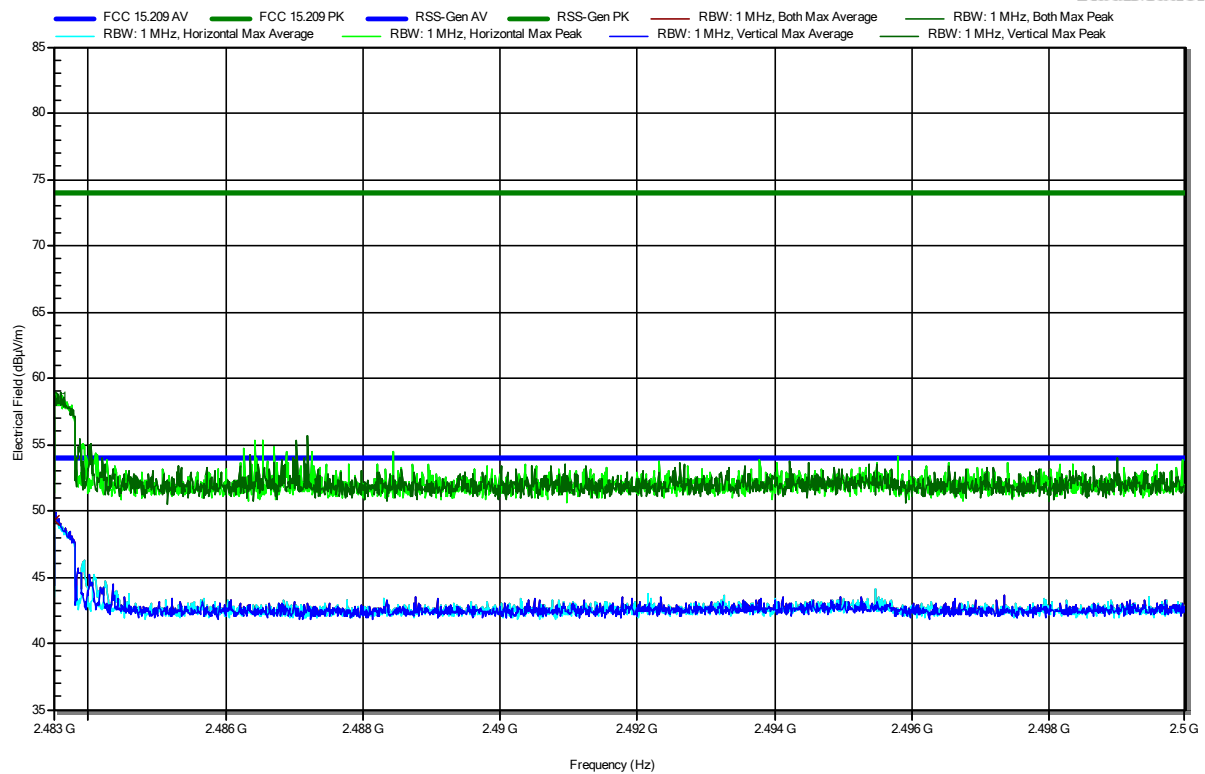


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-07
 Note: upper bandedge

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RadiMation



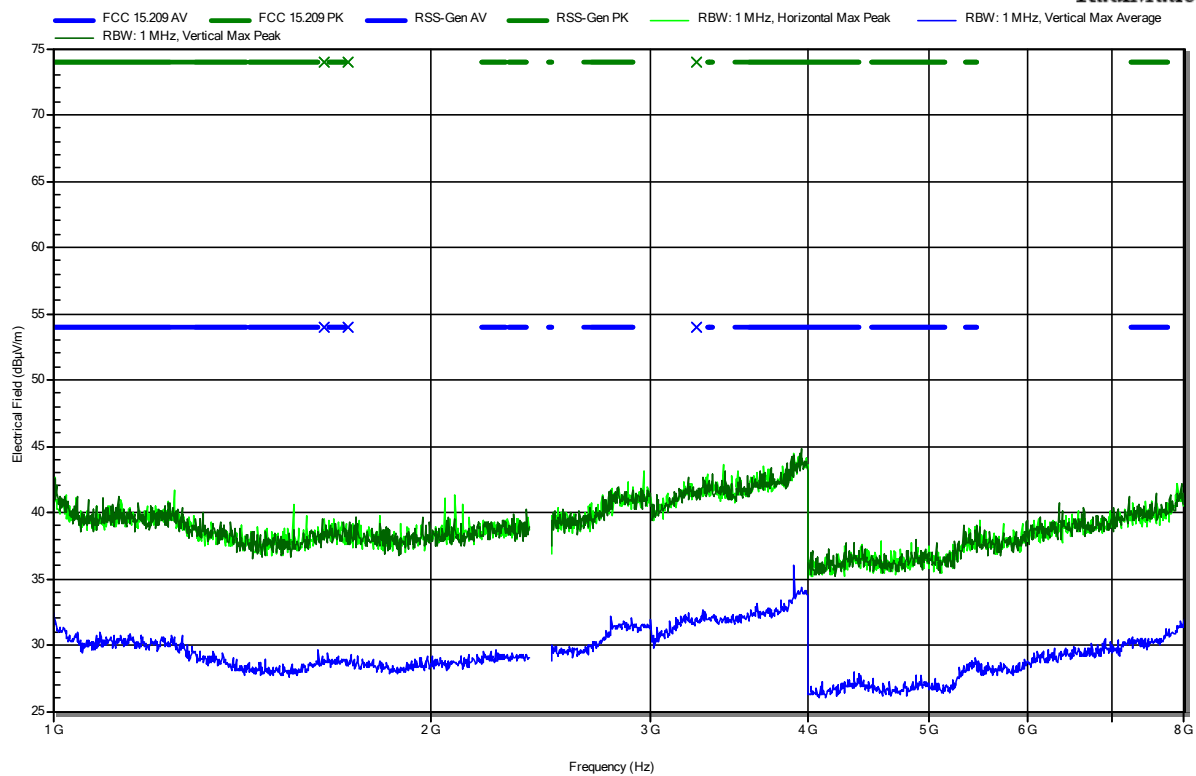
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4835 GHz	58.57 dBμV/m	74 dBμV/m	-15.43 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4835 GHz	49.23 dBμV/m	54 dBμV/m	-4.77 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; ZB, 2480 MHz, O-QPSK
 Test Date: 2024-02-07

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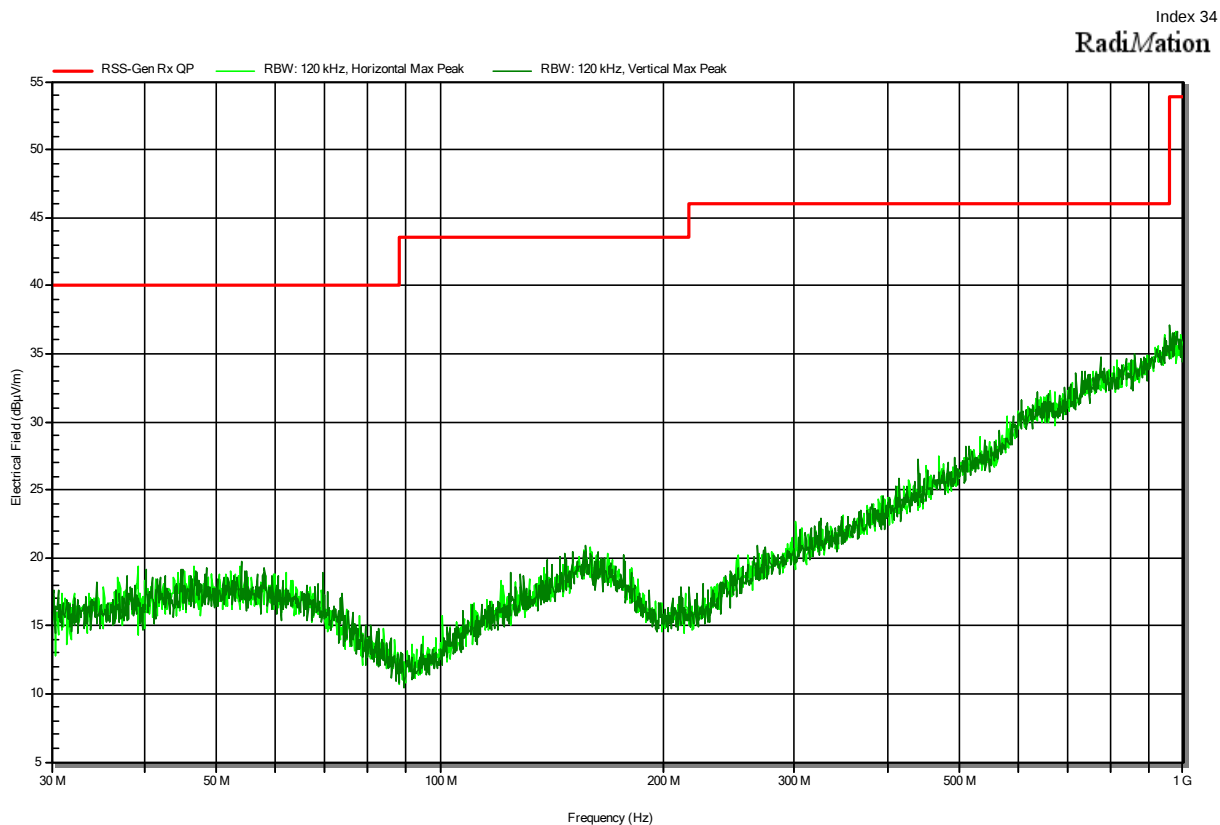
RadiMation



ANNEX D Receiver spurious emissions with Antenna 1 (External, ANT-Taoglas-GW.51.5153)

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
Applicant: Panasonic Industrial Devices Europe GmbH
Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
Model: ENWF9511C1KF
Test Sample ID: 46902
Test Site: Eurofins Product Service GmbH
Operator: Mr. Siddique
Measurement software: RadiMation, version 2020.1.8
Test Conditions: Tnom: 22 °Celsius, Vnom:
Antenna: Schwarzbeck VULB 9168
Measurement distance: 3 m
Mode: Rx; ZB, 2405 MHz
Test Date: 2024-02-05

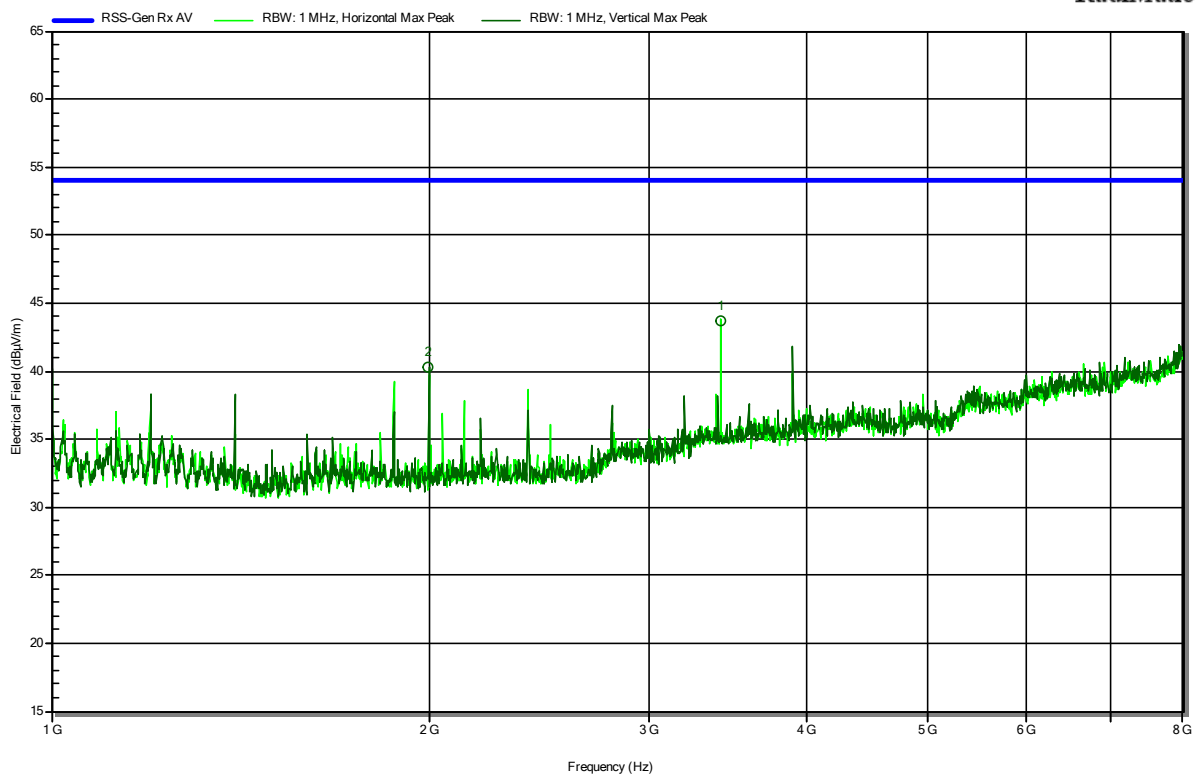


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Rx; ZB, 2405 MHz
 Test Date: 2024-02-07

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RadiMation



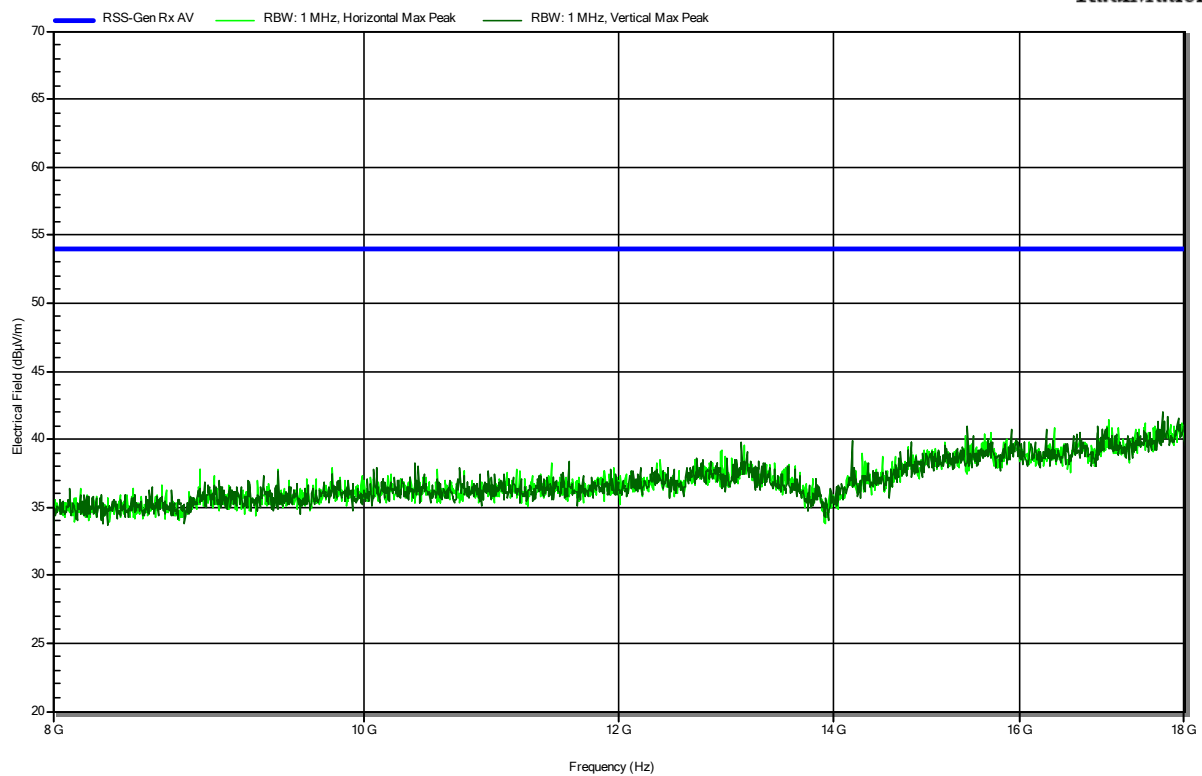
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2 GHz	40.27 dBµV/m	53.98 dBµV/m	-13.71 dB	Pass	Vertical
3.419 GHz	43.75 dBµV/m	53.98 dBµV/m	-10.23 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46902
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom:
 Antenna: Schwarzbeck HWRD 650, Vertical
 Measurement distance: 3 m
 Mode: Rx; ZB, 2405 MHz
 Test Date: 2024-02-07

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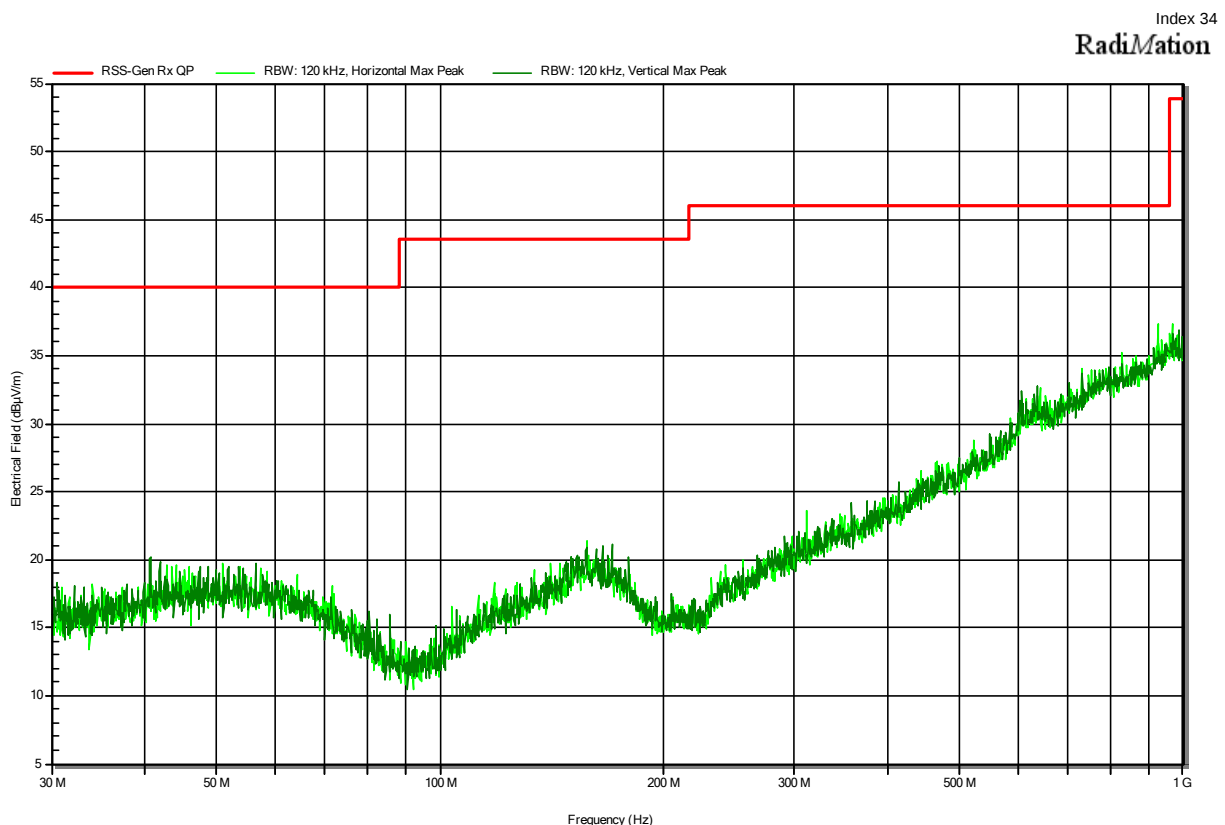
RadiMation



ANNEX E Receiver spurious emissions with Antenna 2 (External, ANT-2J Antennas-2JF1002P)

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
Applicant: Panasonic Industrial Devices Europe GmbH
Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
Model: ENWF9511C1KF
Test Sample ID: 46856
Test Site: Eurofins Product Service GmbH
Operator: Mr. Siddique
Measurement software: RadiMation, version 2020.1.8
Test Conditions: Tnom: 25 °Celsius, Vnom:
Antenna: Schwarzbeck VULB 9168
Measurement distance: 3 m
Mode: Rx; ZB, 2405 MHz
Test Date: 2024-02-05
Note: EUT horizontal

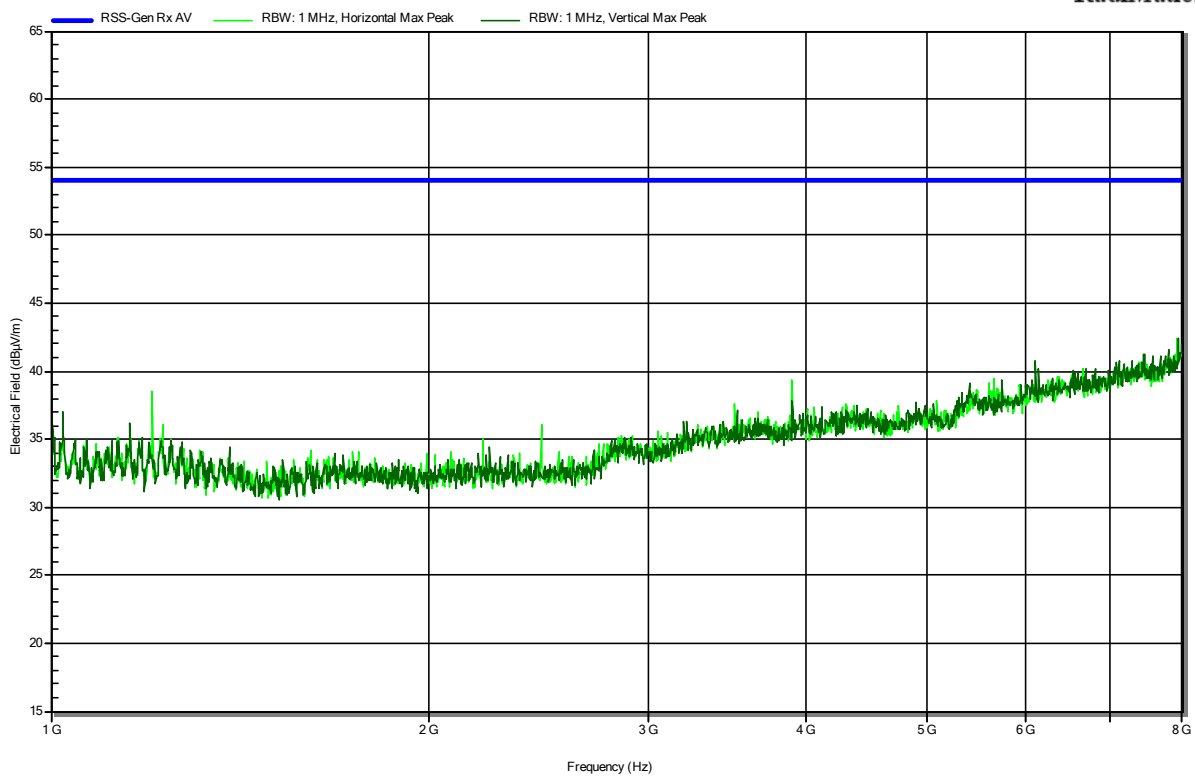


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46856
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 25 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Rx; ZB, 2405 MHz
 Test Date: 2024-02-07

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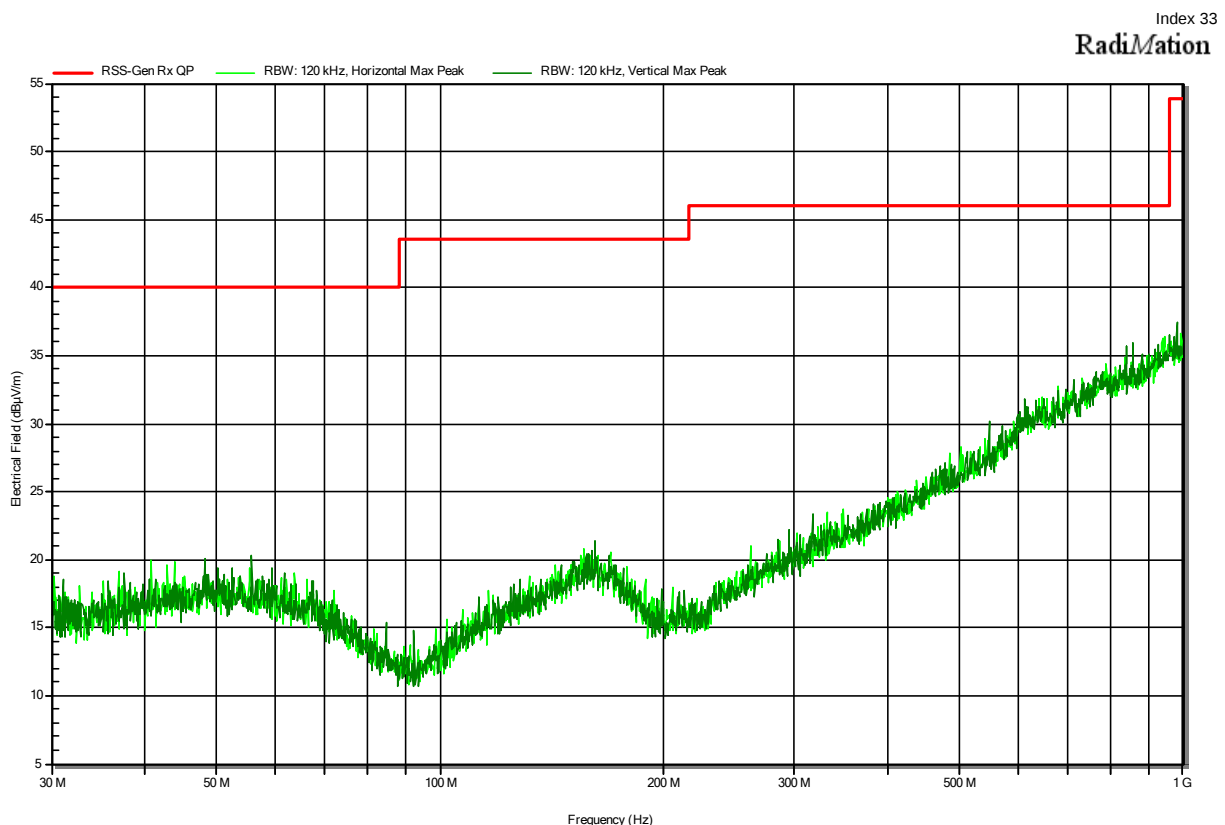
RadiMation



ANNEX F Receiver spurious emissions with Antenna 3 (External, ANT-TDK-ANT162442DT-2001A2)

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
Applicant: Panasonic Industrial Devices Europe GmbH
Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
Model: ENWF9511C1KF
Test Sample ID: 46898
Test Site: Eurofins Product Service GmbH
Operator: Mr. Siddique
Measurement software: RadiMation, version 2020.1.8
Test Conditions: Tnom: 23 °Celsius, Vnom:
Antenna: Schwarzbeck VULB 9168
Measurement distance: 3 m
Mode: Rx; ZB, 2405 MHz
Test Date: 2024-02-05
Note: EUT horizontal

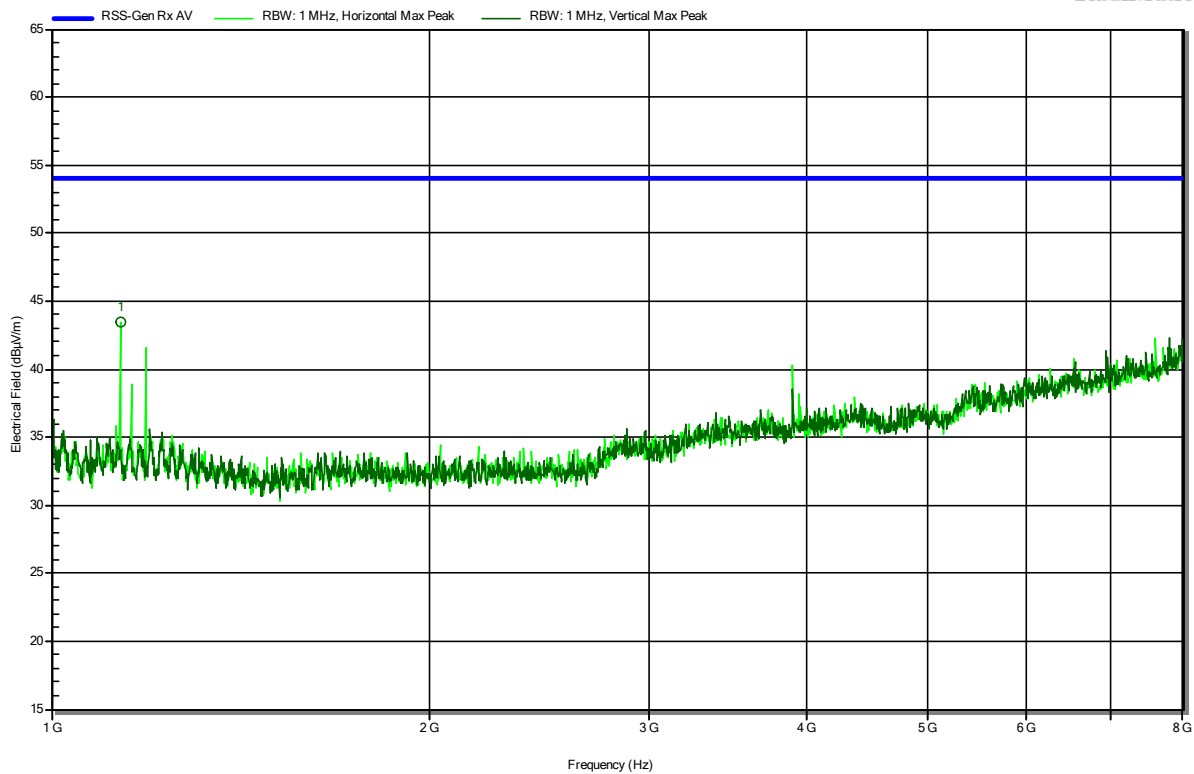


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2309-2215
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi 6 Dual Band 2.4 GHz/5 GHz, Bluetooth® and 802.15.4 Module
 Model: ENWF9511C1KF
 Test Sample ID: 46898
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Siddique
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 23 °Celsius, Vnom:
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Rx; ZB, 2405 MHz
 Test Date: 2024-02-07

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.134 GHz	43.42 dBμV/m	53.98 dBμV/m	-10.56 dB	Pass	Horizontal

== = END OF TEST REPORT == =