





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-2108-9951-TFC247WF-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 <p>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</p>
Applicant	Panasonic Industrial Devices Europe GmbH
Address	Zeppelinstr. 19 21337 Lüneburg GERMANY
Test Specification	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 2, 2021-02
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model(s)	ENWF9408A1EF
Additional Model(s)	None
Brand Name(s)	PAN9028
Hardware Version(s)	04
Software Version(s)	01
FCC ID	T7V9028
IC	216Q-9028
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	2021-12-09	
Report:		
Compiled by	Odai Qawasmeh	
Tested by (+ signature)	Odai Qawasmeh	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2022-04-27	
Total number of pages	70	
General Remarks:		
<p>The test results presented in this report relate only to the object tested.</p> <p>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.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p>		

ADDITIONAL VARIANTS

Additional Variants (not tested and not evaluated variants)		
Not-tested Variant	Description	
1	Product Type Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
	Model name	ENWF9408A2EF
	Brand name	PAN9028
	Hardware Version	04
	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	2022-04-27	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
BPSK	Binary Phase Shift Keying
DSSS	Direct Sequence Spread Spectrum
EUT	Equipment Under Test
FCC	Federal Communications Commission
HT	High Throughput
IEEE 802.11	MAC and PHY Layer for WiFi
ISED	Innovation, Science and Economic Development Canada
OFDM	Orthogonal Frequency Division Multiplexing
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V _{NOM}	Nominal supply voltage

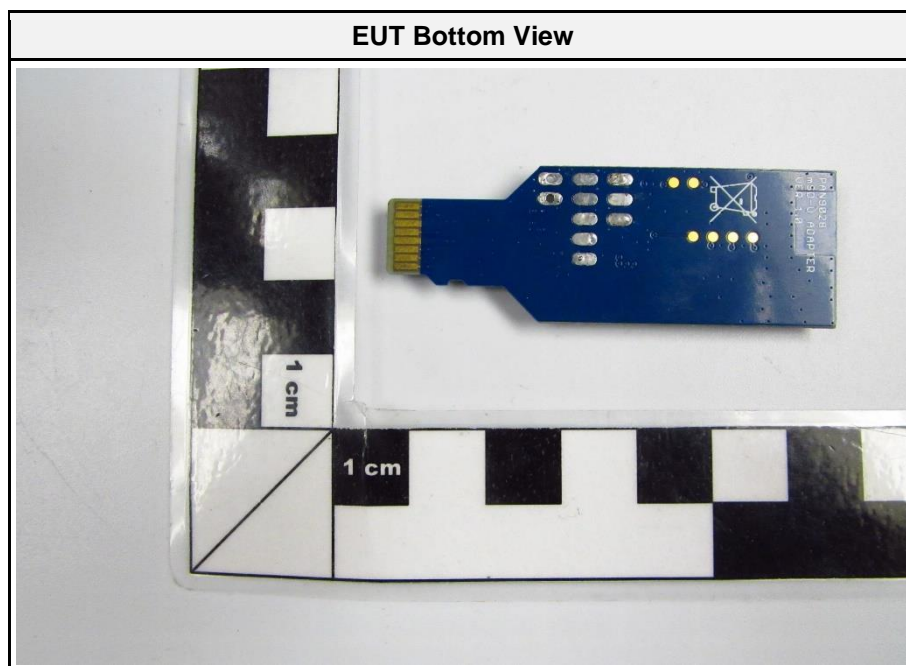
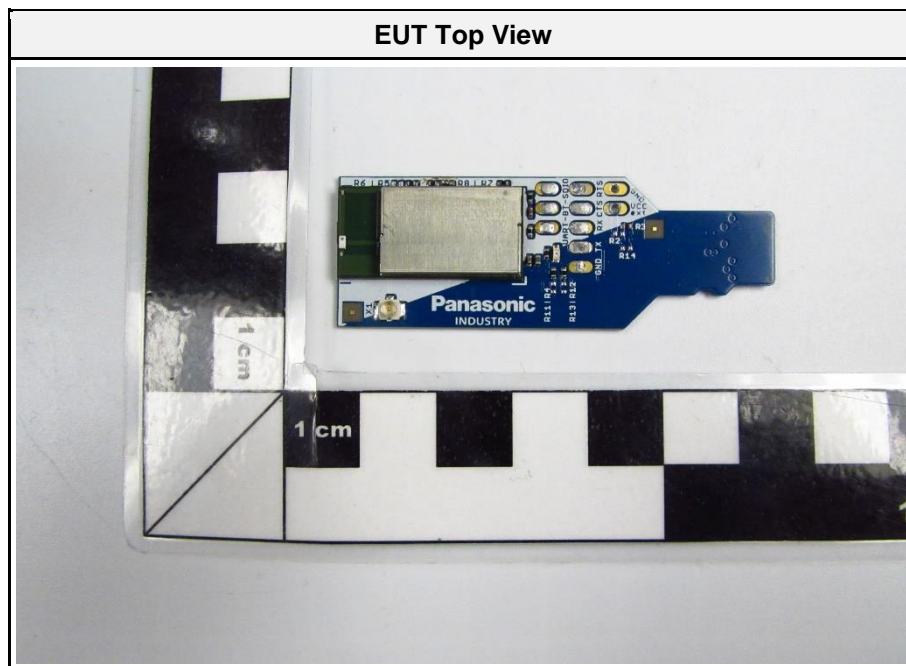
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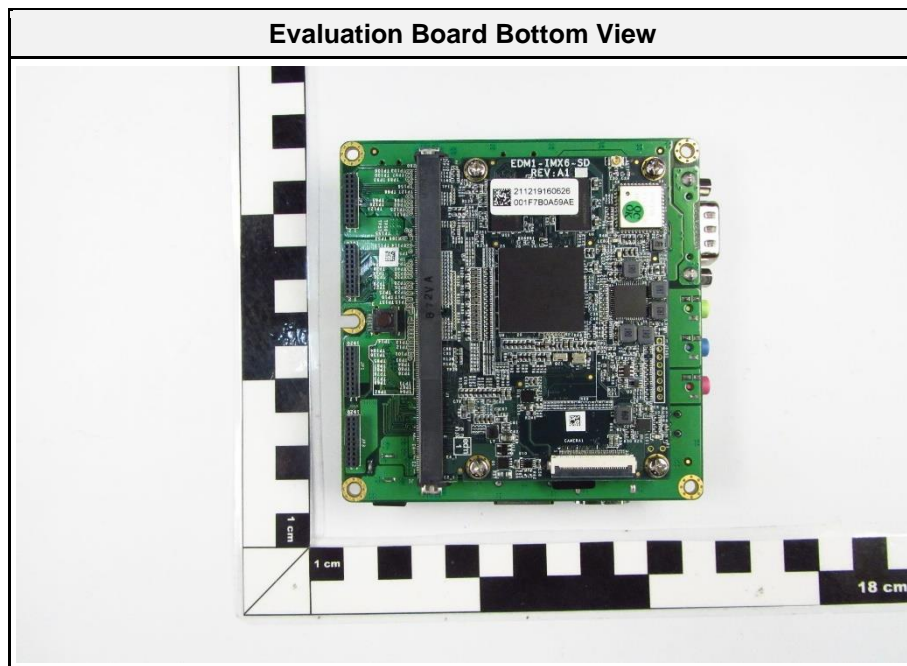
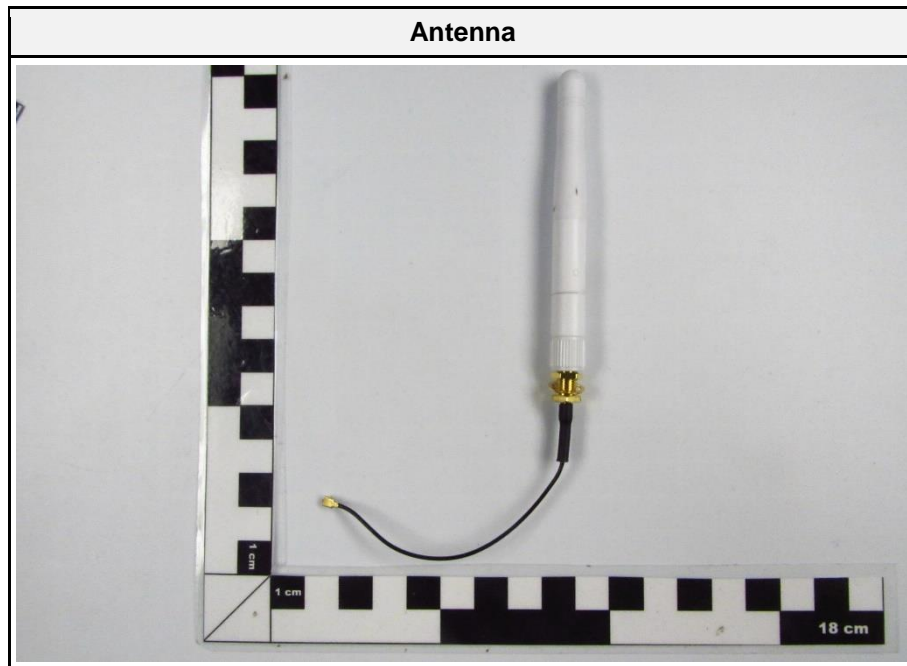
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1 Equipment (Test Item) Under Test

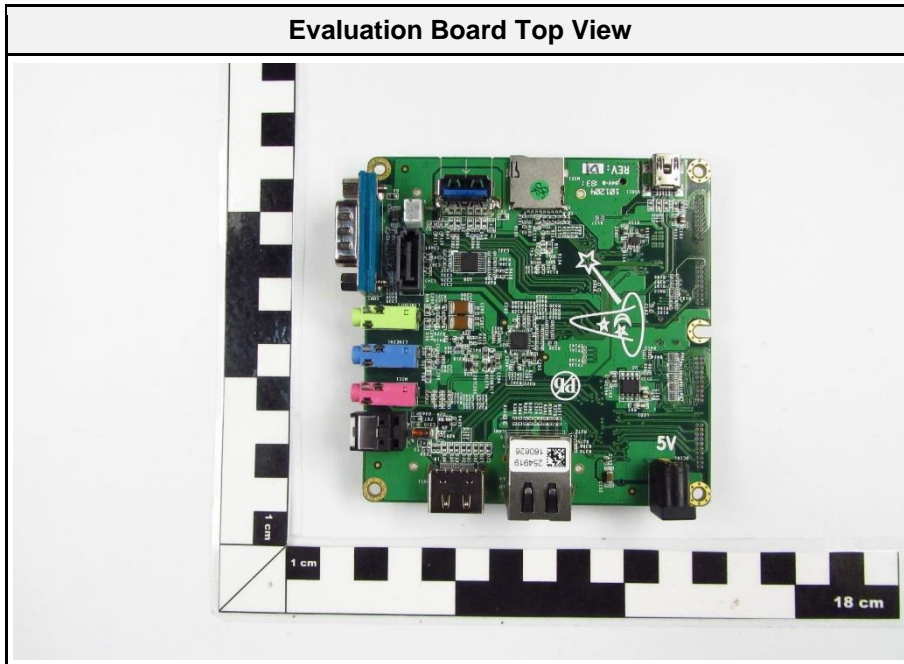
Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module	
Model	ENWF9408A1EF	
Additional Model(s)	None	
Brand Name(s)	PAN9028	
Serial Number(s)	Prototype	Test Sample ID 37322
Hardware Version(s)	04	
Software Version(s)	01	
PMN	1. PAN9028 2. PAN9028	
HVIN	1. ENWF9408A1EF 2. ENWF9408A2EF	
FVIN	N/A	
HMN	N/A	
FCC ID	T7V9028	
IC	216Q-9028	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	IEEE 802.11 b/g/n (HT20 + HT40)	
Modulation	BPSK, QPSK, 16-QAM, 64-QAM	
Number of antenna ports	1	
Antenna	Type	External
	Model	X9001091-W3DRMW
	Manufacturer	Kyocera AVX
	Gain	1.8 dBi (declared by manufacturer)
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
Manufacturer	Panasonic Industrial Devices Europe GmbH Zeppelinstr. 19 21337 Lüneburg GERMANY	

1.1 Photos – Equipment External

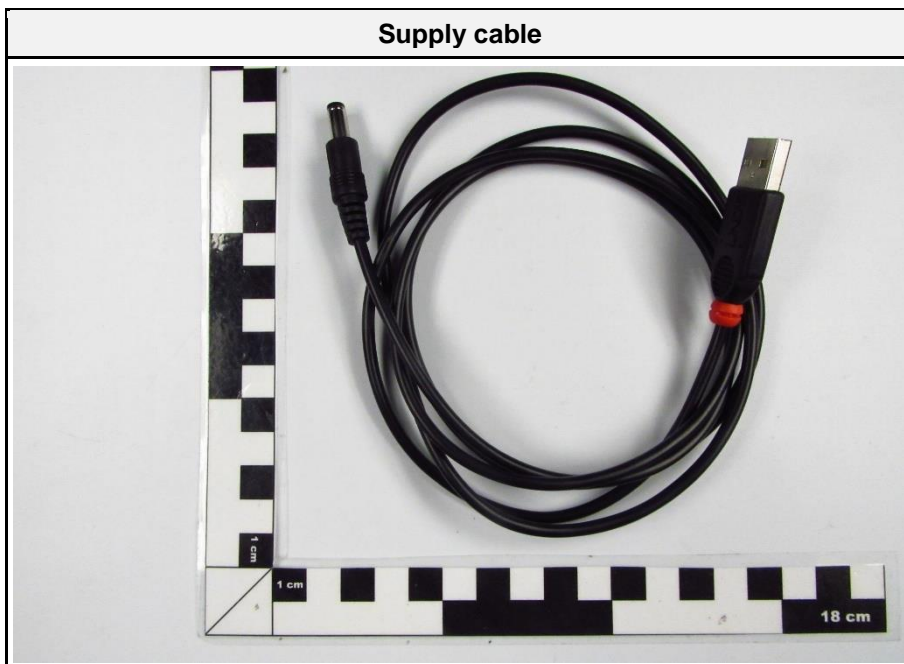




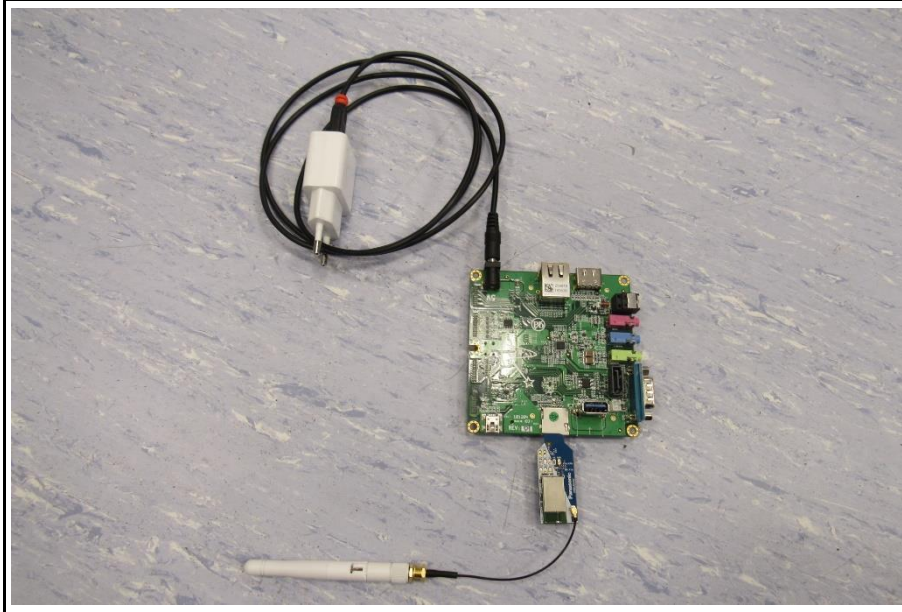
Evaluation Board Top View



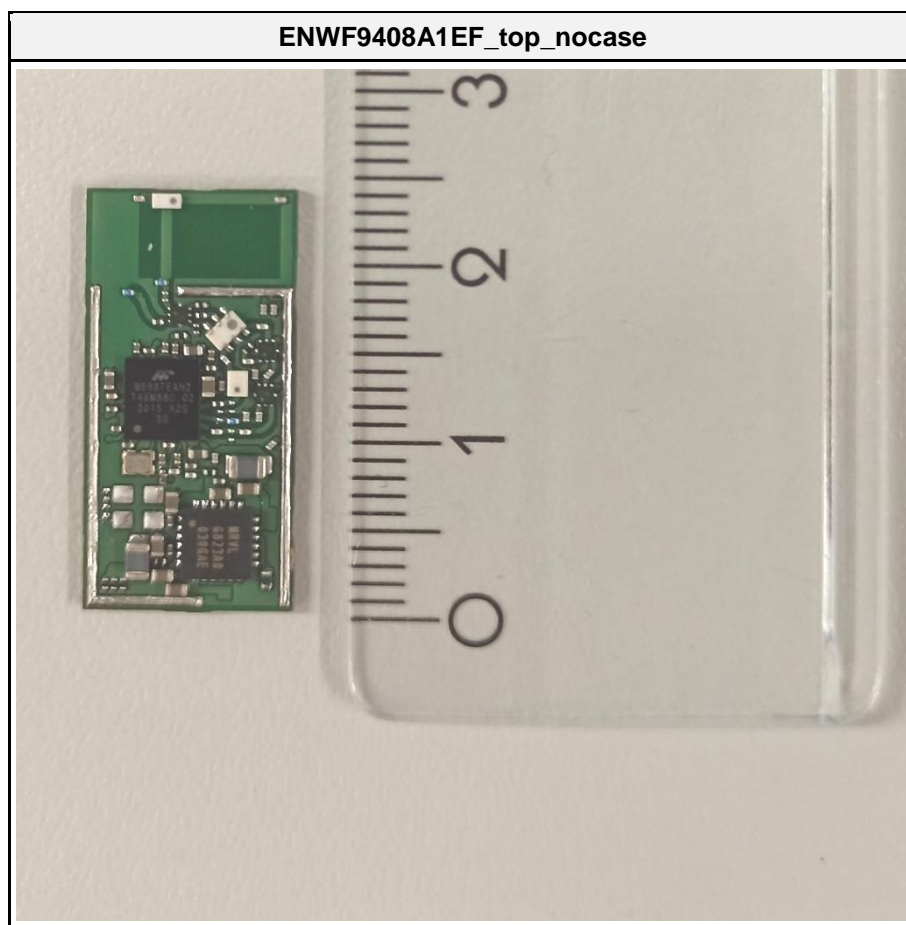
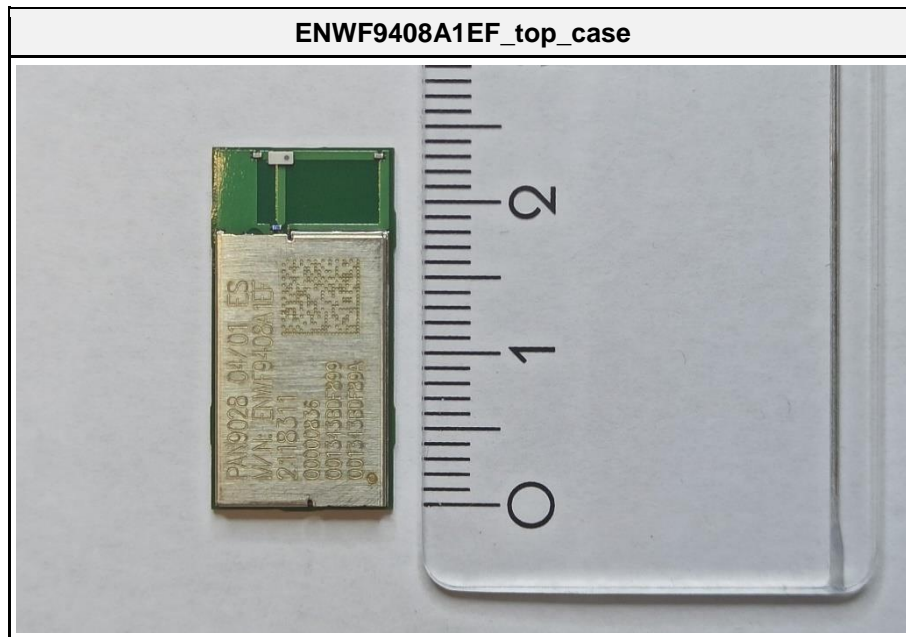
Supply cable

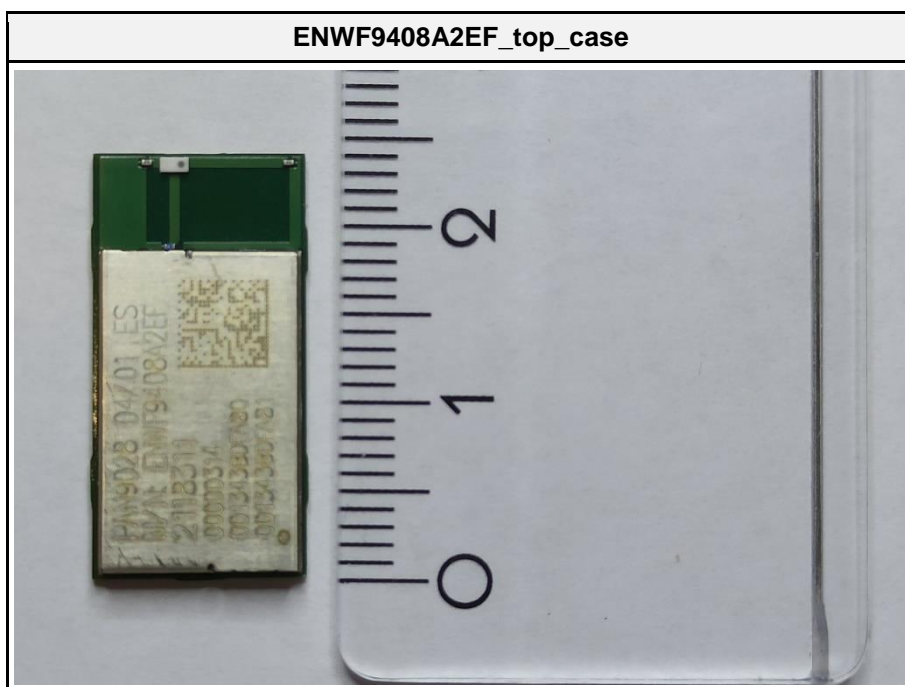
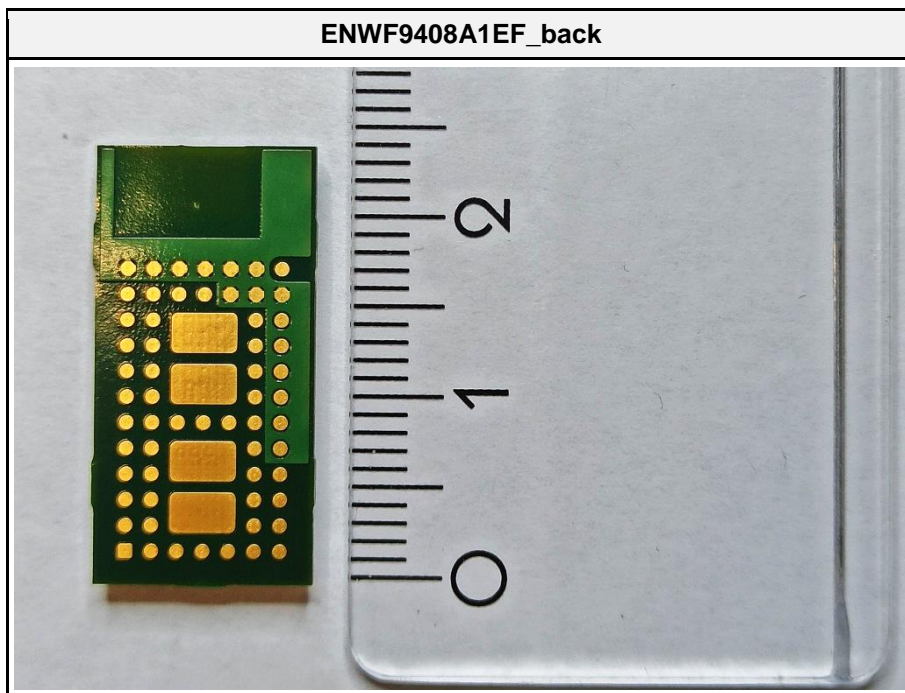


EUT with auxiliary equipment

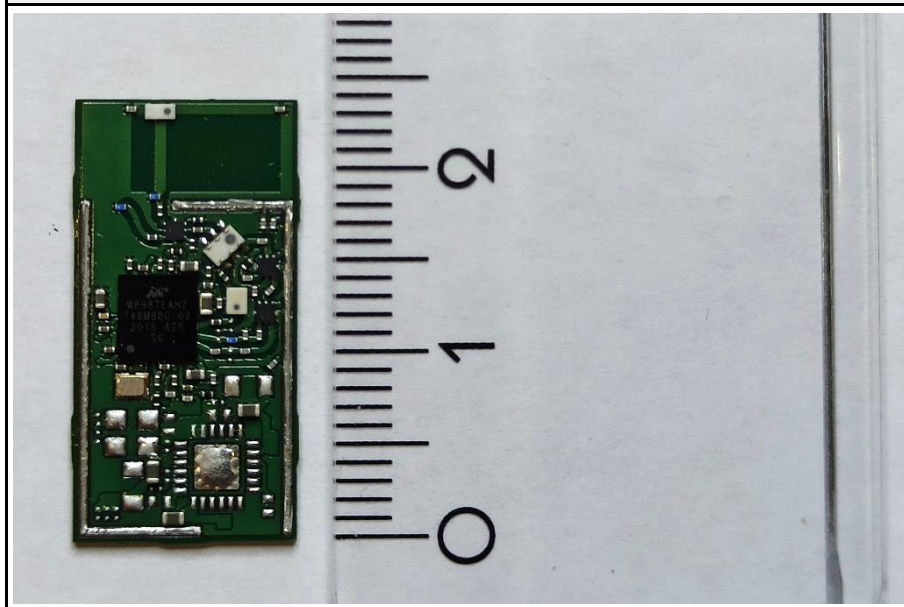


1.1 Photos – Equipment Internal

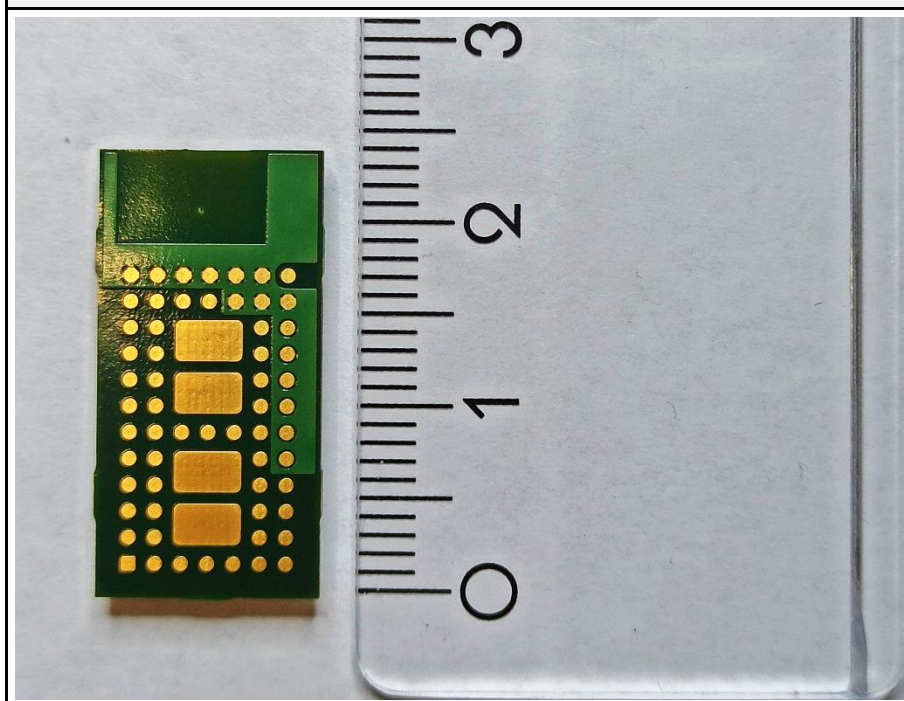




ENWF9408A2EF_top_nocase



ENWF9408A2EF_back



1.2 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Controller	Wandboard	WBIMX6U	Wandboard with i.MX6 Dual Core
SFT	WLANipulator	Panasonic	-	for configuring test modes
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

1.3 Test Modes

Mode	Description
DSSS (IEEE 802.11b)	Mode = Transmit Modulation = BPSK Spreading = DSSS Bandwidth = 20 MHz Duty cycle = 100% Power setting = Maximum Data rate = 1 Mbps
OFDM (IEEE 802.11g)	Mode = Transmit Modulation = OFDM Bandwidth = 20 MHz Duty cycle = 100% Power setting = Maximum Data rate = 9 Mbps
HT20 (IEEE 802.11n)	Mode = Transmit Modulation = OFDM Bandwidth = 20 MHz Duty cycle = 100% Power setting = Maximum Data rate = MCS 2
HT40 (IEEE 802.11n)	Mode = Transmit Modulation = OFDM Bandwidth = 40 MHz Duty cycle = 100% Power setting = Maximum Data Rate = MCS 0
Receive	Mode = Receive
Comment: The above settings were found as worst case during pre-tests.	

1.4 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx	1	2412
F3	Tx / Rx	6	2437
F5	Tx	11	2462

1.5 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 dBµV. 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).

Limit:

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

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

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.

Example only:

Reading + AF	=	Net Reading	:	Net reading - FCC limit	=	Margin
+21.5 dBµV + 26 dB/m		= 47.5 dBµV/m		47.5 dBµV/m - 57.0 dBµV/m		= -9.5 dB

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	N/T	
FCC § 15.247(b) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	N/T	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	N/T	
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	N/T	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	N/T	
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:				

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 - AC powerline conducted emissions

3.1.1 Information

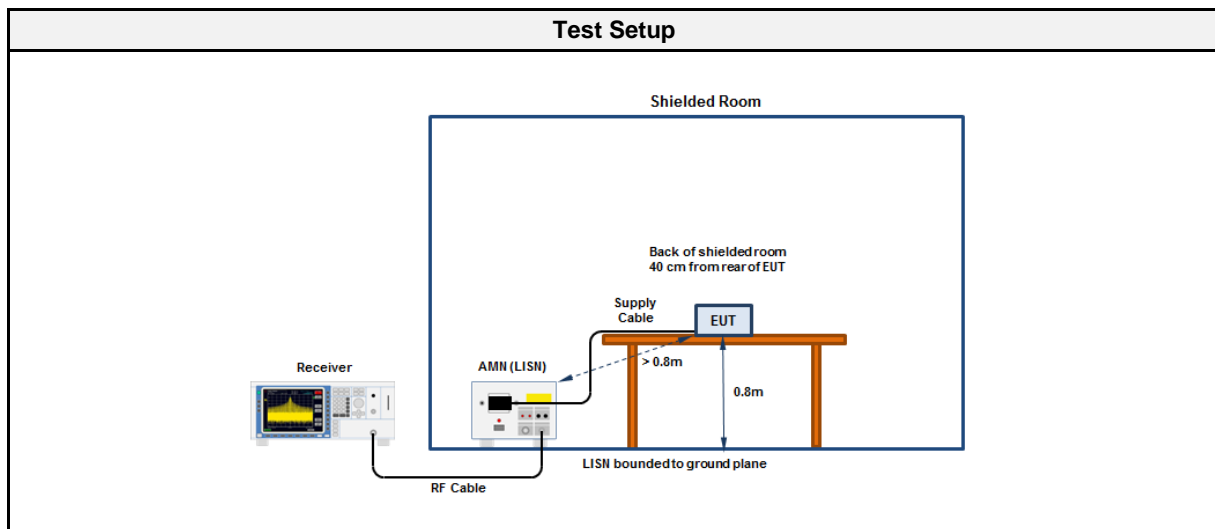
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Odai Qawasmeh
Date	2022-03-25

3.1.2 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

3.1.3 Setup

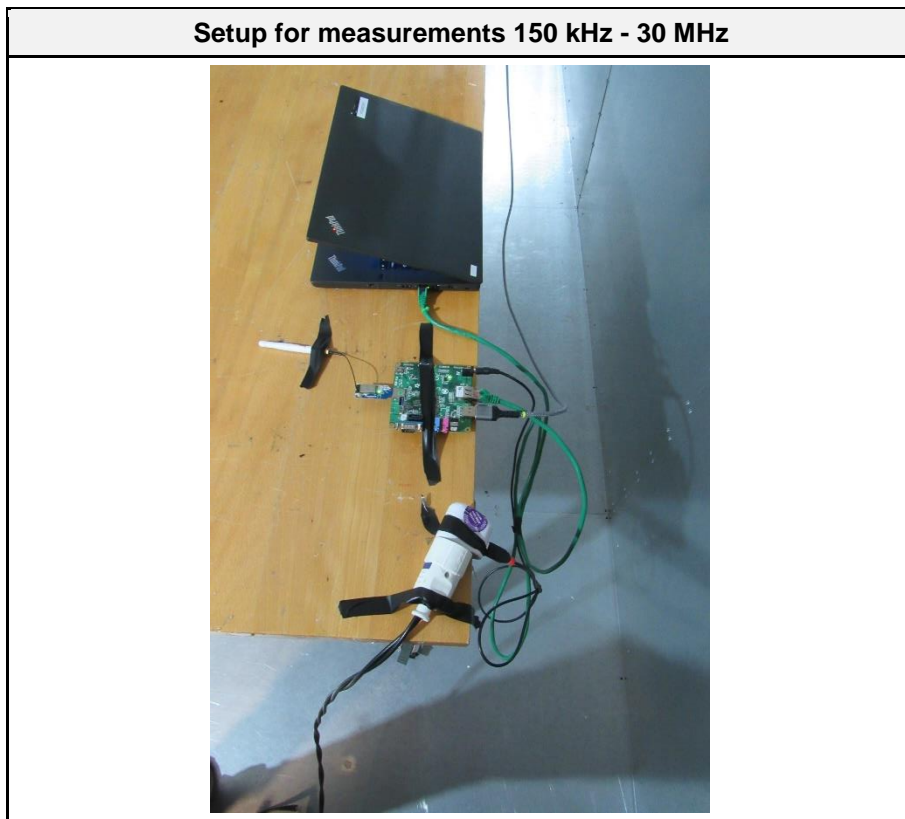
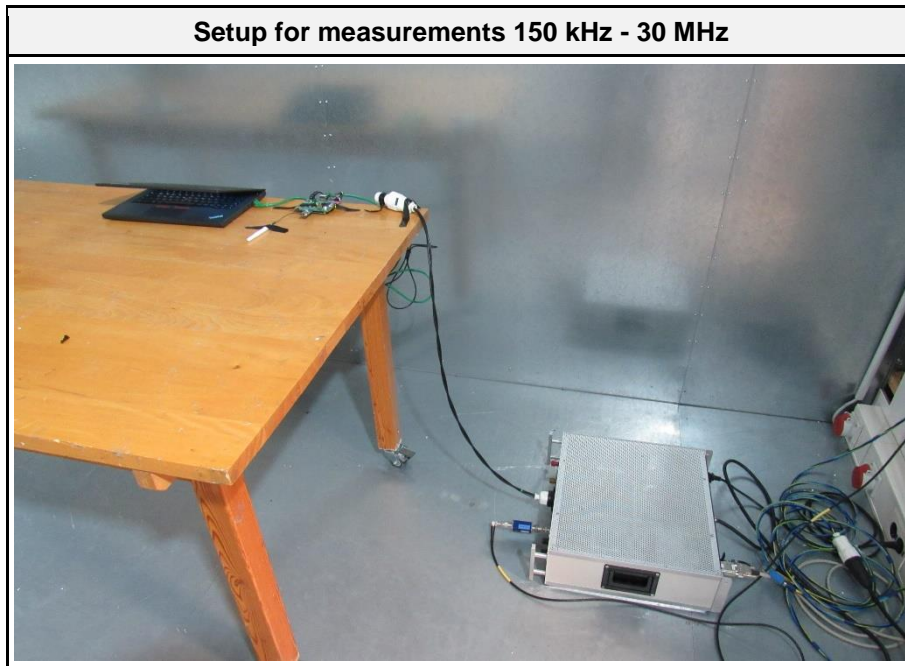


3.1.4 Equipment

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	ESR7	EF00943	2021-08	2022-08
Pulse Limiter	R&S	ESH3-Z2	EF01222	2021-07	2022-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2021-07	2022-07

3.1.5 Setup Photos

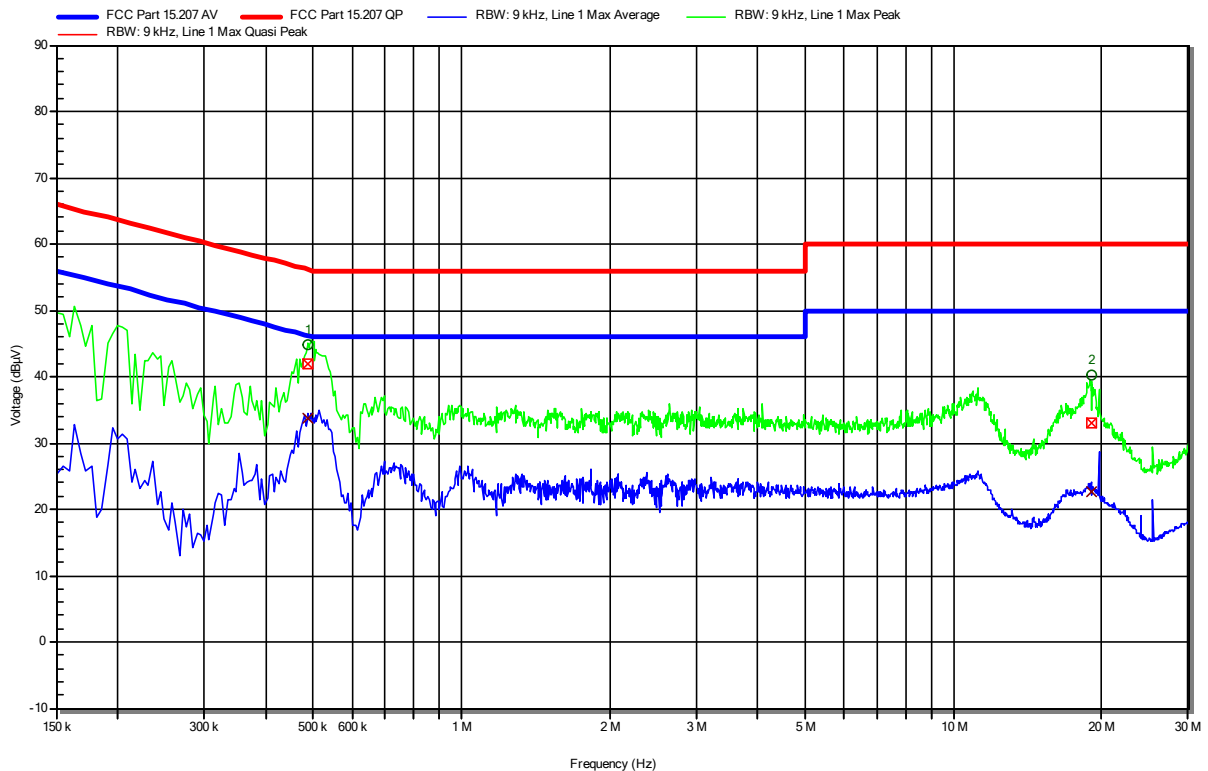


Conducted emissions at the mains power port according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-03-24
 Operating Conditions: ambient temperature: 20 °Celsius
 power input: 3.3 VDC
 LISN: Schwarzbeck NSLK 8127 RC L
 Operational Mode: IEEE802.11 b; 1 Mbps; ext. antenna; 2437 MHz
 EUT Configuration:
 Applied to Port: 3.3 VDC via Evaluation Board (supplied with AC/DC Adapter 120 VAC / 60 Hz)

Note 1:

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	487.5 kHz	41.92 dBµV	56.21 dBµV	-14.29 dB	Pass	Line 1
2	19.086 MHz	33.04 dBµV	60 dBµV	-26.96 dB	Pass	Line 1

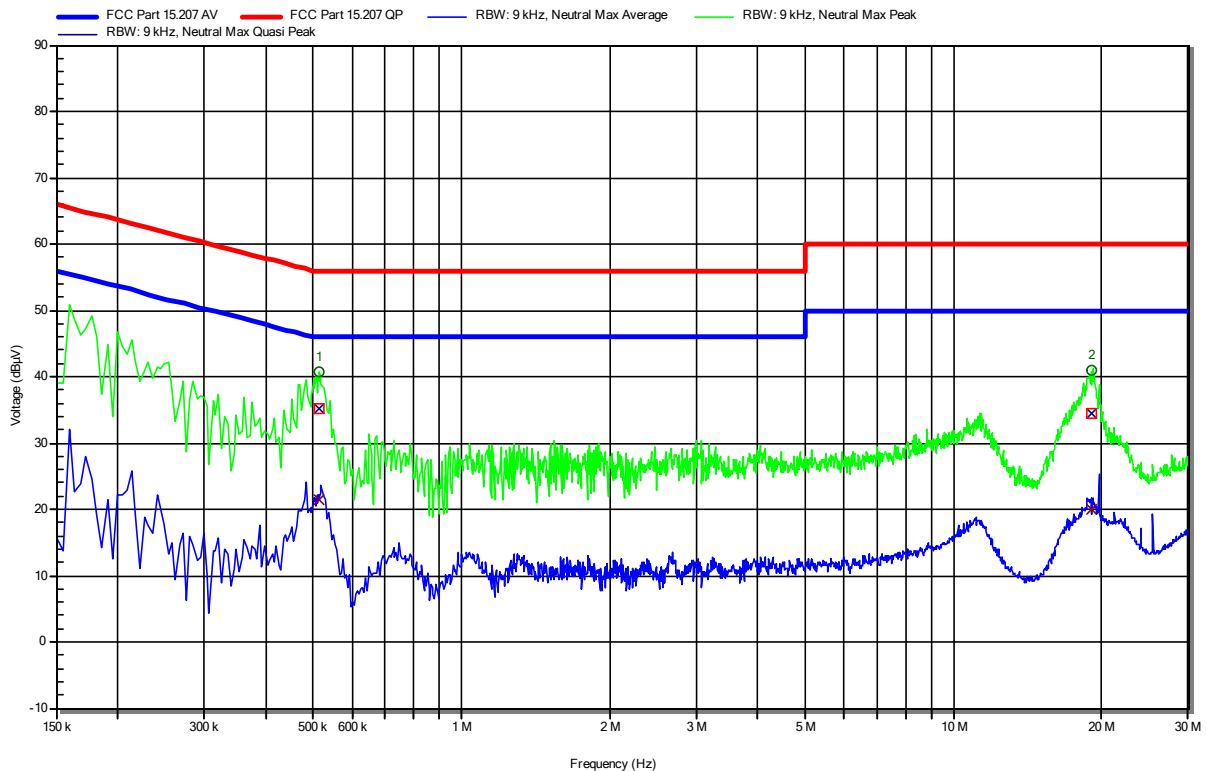
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	487.5 kHz	33.67 dBµV	46.21 dBµV	-12.54 dB	Pass	Line 1
2	19.086 MHz	22.6 dBµV	50 dBµV	-27.4 dB	Pass	Line 1

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

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-03-24
 Operating Conditions: ambient temperature: 20 °Celsius
 power input: 3.3 VDC
 LISN: Schwarzbeck NSLK 8127 RC N
 Operational Mode: IEEE802.11 b; 1 Mbps; ext. antenna; 2437 MHz
 EUT Configuration:
 Applied to Port: 3.3 VDC via Evaluation Board (supplied with AC/DC Adapter 120 VAC / 60 Hz)

Note 1:

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	514.95 kHz	35.26 dBµV	56 dBµV	-20.74 dB	Pass	Neutral
2	19.023 MHz	34.57 dBµV	60 dBµV	-25.43 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	514.95 kHz	21.56 dBµV	46 dBµV	-24.44 dB	Pass	Neutral
2	19.023 MHz	20 dBµV	50 dBµV	-30 dB	Pass	Neutral

Test Report No.: G0M-2108-9951-TFC247WF-V01

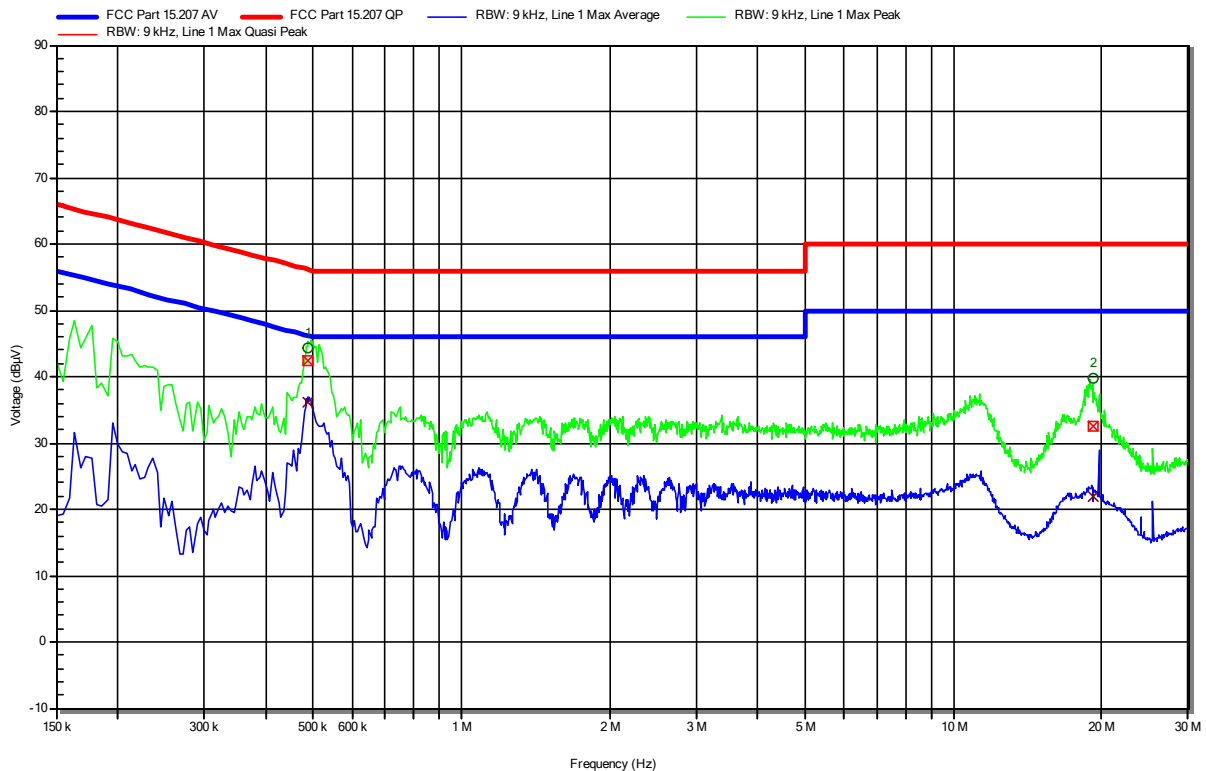
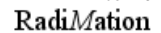
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Conducted emissions at the mains power port according to RSS-247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-03-24
 Operating Conditions: ambient temperature: 20 °Celsius
 power input: 3.3 VDC
 LISN: Schwarzbeck NSLK 8127 RC L
 Operational Mode: IEEE802.11; ext. antenna; 2437 MHz
 EUT Configuration:
 Applied to Port: 3.3 VDC via Evaluation Board (supplied with AC/DC Adapter 120 VAC / 60 Hz)

Note 1:

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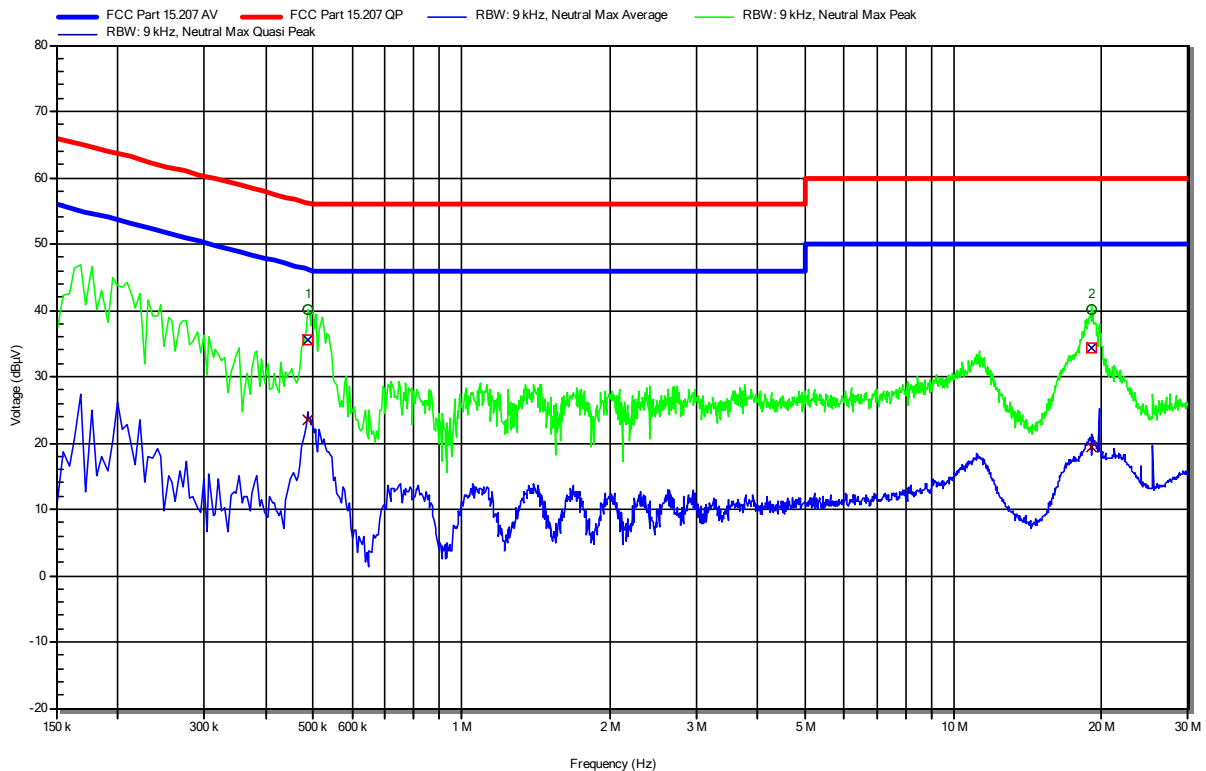
Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	487.5 kHz	42.32 dBµV	56.21 dBµV	-13.89 dB	Pass	Line 1
2	19.176 MHz	32.41 dBµV	60 dBµV	-27.59 dB	Pass	Line 1
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	487.5 kHz	36.13 dBµV	46.21 dBµV	-10.08 dB	Pass	Line 1
2	19.176 MHz	22.01 dBµV	50 dBµV	-27.99 dB	Pass	Line 1

Conducted emissions at the mains power port according to RSS-247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Test Date: 2022-03-24
 Operating Conditions: ambient temperature: 20 °Celsius
 power input: 3.3 VDC
 LISN: Schwarzbeck NSLK 8127 RC N
 Operational Mode: IEEE802.11; ext. antenna; 2437 MHz
 EUT Configuration:
 Applied to Port: 3.3 VDC via Evaluation Board (supplied with AC/DC Adapter 120 VAC / 60 Hz)

Note 1:

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Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	487.5 kHz	35.48 dBµV	56.21 dBµV	-20.73 dB	Pass	Neutral
2	19.055 MHz	34.25 dBµV	60 dBµV	-25.75 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	487.5 kHz	23.44 dBµV	46.21 dBµV	-22.77 dB	Pass	Neutral
2	19.055 MHz	19.31 dBµV	50 dBµV	-30.69 dB	Pass	Neutral

3.2 Test Conditions and Results - Transmitter radiated emissions

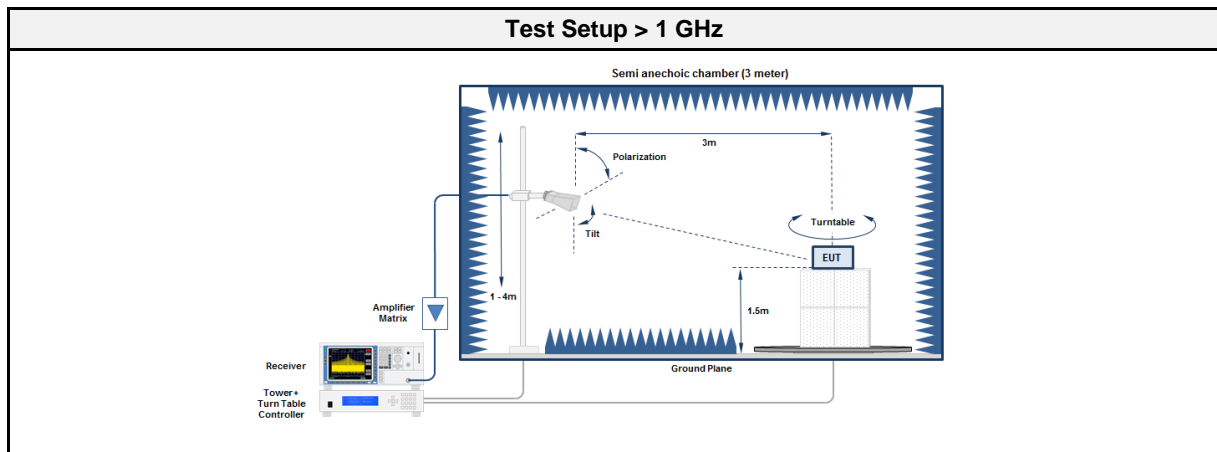
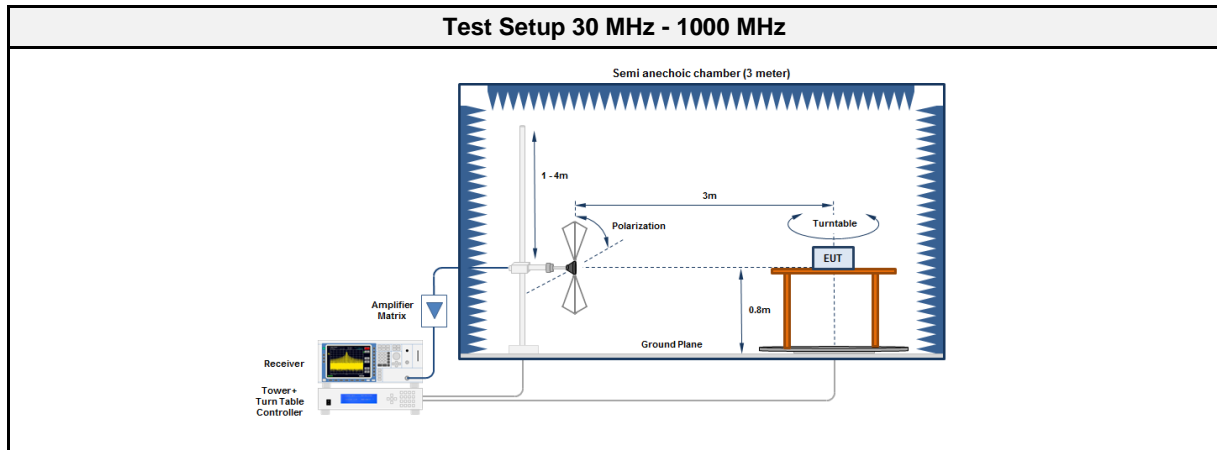
3.2.1 Information

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	Wilfried Treffke
Date	2021-12-15

3.2.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [μ 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

3.2.3 Setup



3.2.4 Equipment

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

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC6	EF00062	2021-07	2024-07
EMI Test Receiver	R&S	ESU26	EF00887	2021-07	2022-07
Trilog Broadband Antenna	Schwarzbeck	VULB 9162	EF00978	2019-10	2022-10

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic chamber	Frankonia	AC 2	EF01616	2021-09	2022-09
Spectrum analyzer	R&S	FSU43	EF01631	2021-07	2022-07
Antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2022-03
Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2022-03
Antenna	Amplifier Research	AT4560	EF00302	2021-06	2023-06

3.2.5 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

3.2.6 Results

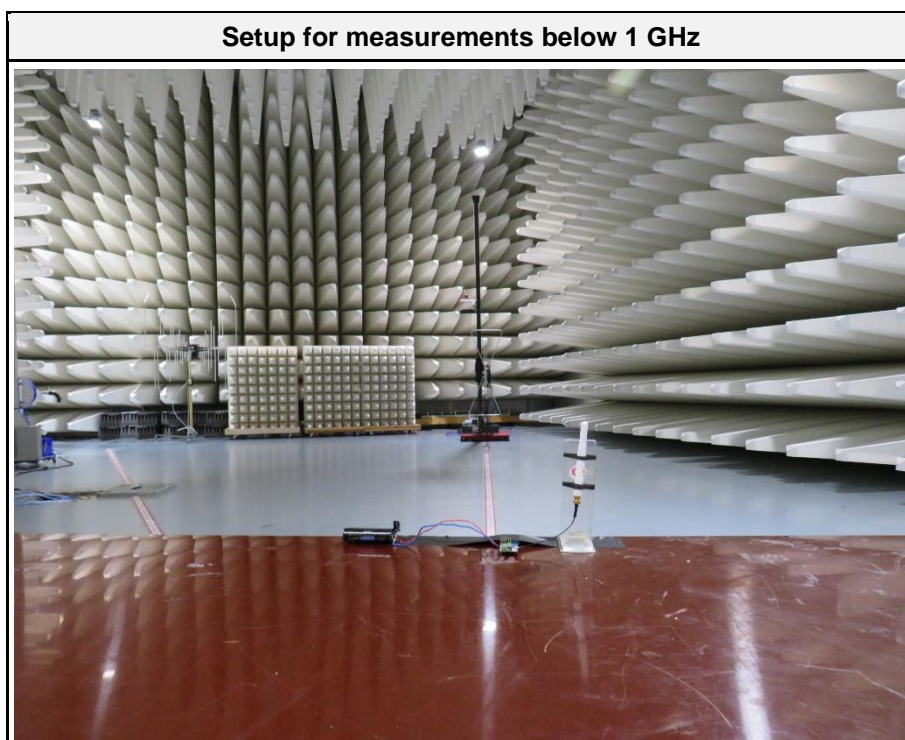
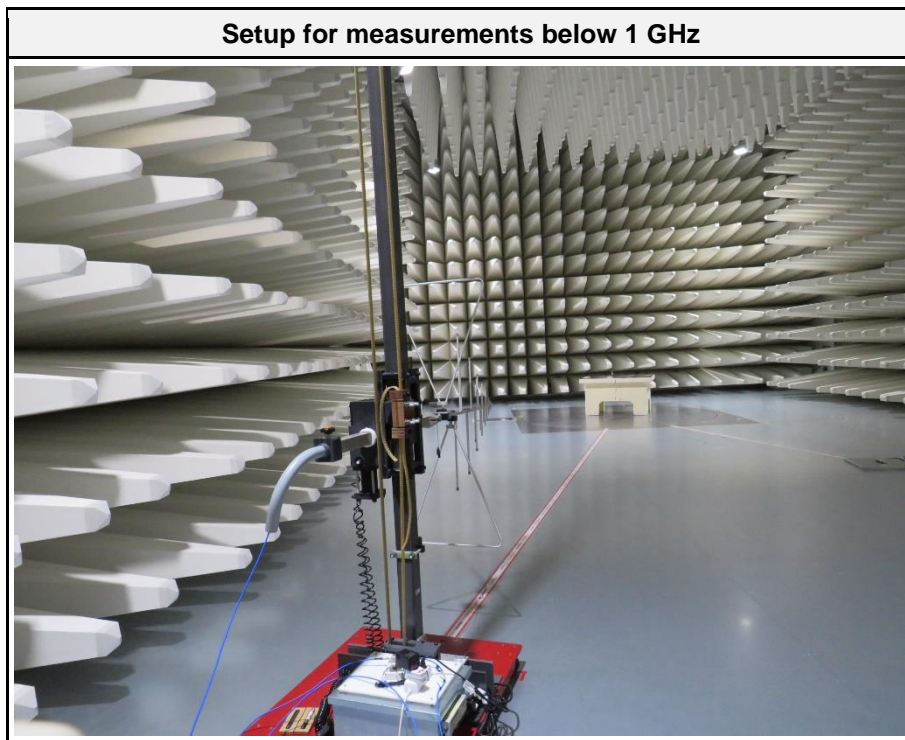
Test Results - DSSS						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2412	2386.2	57.43	pk	ver	74.00	-16.57
2412	2386.2	47.36	avg	ver	54.00	-06.64
2412	4824	48.45	pk	ver	74.00	-25.55
2412	4824	46.59	avg	ver	54.00	-07.41
2412	12058	39.90	pk	ver	74.00	-34.10
2412	12058	35.04	avg	ver	54.00	-18.96
2412	14472	41.88	pk	ver	74.00	-32.12
2412	14472	38.50	avg	ver	54.00	-15.50
2437	4874	48.84	pk	ver	74.00	-25.16
2437	4874	47.48	avg	ver	54.00	-06.52
2437	12186	41.88	pk	ver	74.00	-32.12
2437	12186	35.77	avg	ver	54.00	-18.23
2462	1250	45.77	pk	ver	74.00	-28.23
2462	1250	43.95	avg	ver	54.00	-10.05
2462	2486.9	56.72	pk	ver	74.00	-17.28
2462	2486.9	48.50	avg	ver	54.00	-05.50
2462	4924	47.22	pk	ver	74.00	-26.78
2462	4924	45.03	avg	ver	54.00	-08.97
2462	12309	41.97	pk	ver	74.00	-32.03
2462	12309	35.84	avg	ver	54.00	-18.16

Test Results - OFDM						
Channel [MHz]	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2412	1111	40.16	pk	ver	74.00	-33.84
2412	1111	36.62	avg	ver	54.00	-17.38
2412	1375.1	41.78	pk	ver	74.00	-32.22
2412	1375.1	37.32	avg	ver	54.00	-16.68
2412	2383	59.60	pk	ver	74.00	-14.40
2412	2383	49.49	avg	ver	54.00	-04.51
2412	2389.4	68.82	pk	ver	74.00	-05.18
2412	2389.4	48.85	avg	ver	54.00	-05.15
2412	4827.7	48.33	pk	ver	74.00	-25.67
2412	4827.7	36.99	avg	ver	54.00	-17.01
2437	1500	42.67	pk	ver	74.00	-31.33
2437	1500	40.87	avg	ver	54.00	-13.13
2437	4871.1	43.96	pk	ver	74.00	-30.04
2437	4871.1	36.99	avg	ver	54.00	-17.01
2462	1250	42.38	pk	ver	74.00	-31.62
2462	1250	39.05	avg	ver	54.00	-14.95
2462	2485.2	68.49	pk	ver	74.00	-05.51
2462	2485.2	46.99	avg	ver	54.00	-07.01

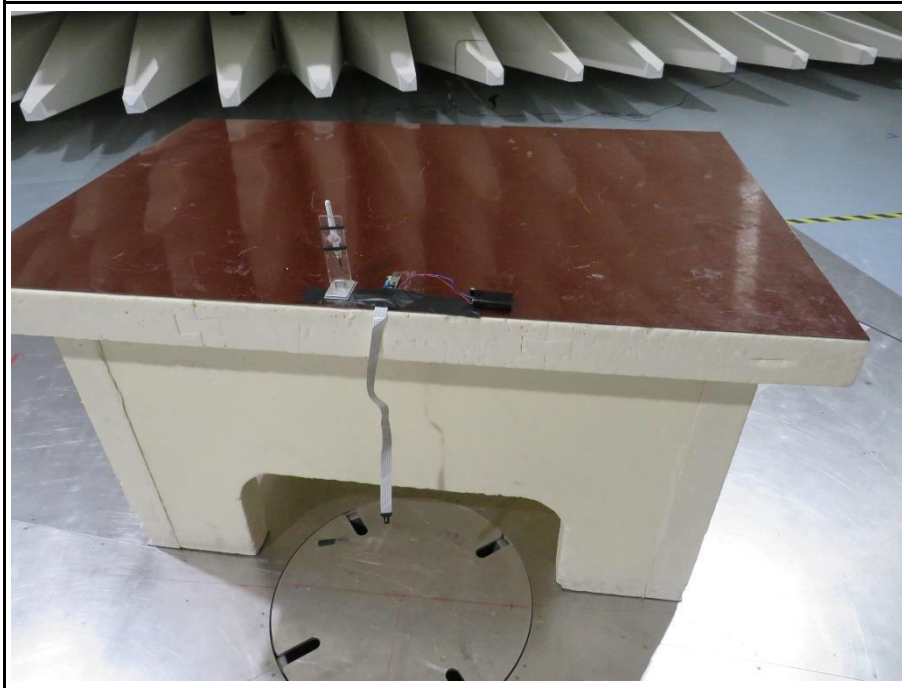
Test Results - HT20						
Channel [MHz]	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2412	1375	41.02	pk	ver	74.00	-32.98
2412	1375	37.10	avg	ver	54.00	-16.90
2412	2390	68.55	pk	ver	74.00	-05.45
2412	2390	50.13	avg	ver	54.00	-03.87
2412	4814.8	45.36	pk	ver	74.00	-28.64
2412	4814.8	36.12	avg	ver	54.00	-17.88
2437	1375	41.63	pk	ver	74.00	-32.37
2437	1375	37.60	avg	ver	54.00	-16.40
2437	2388.3	47.69	pk	ver	74.00	-26.31
2437	2388.3	37.11	avg	ver	54.00	-16.89
2437	4874.8	44.56	pk	ver	74.00	-29.44
2437	4874.8	36.51	avg	ver	54.00	-17.49
2462	1250	45.92	pk	ver	74.00	-28.08
2462	1250	43.07	avg	ver	54.00	-10.93
2462	1500	42.83	pk	ver	74.00	-31.17
2462	1500	39.64	avg	ver	54.00	-14.36
2462	2484.6	61.34	pk	ver	74.00	-12.66
2462	2484.6	49.37	avg	ver	54.00	-04.63
2462	2484.9	69.08	pk	ver	74.00	-04.92
2462	2484.9	47.10	avg	ver	54.00	-06.90

Test Results - HT40						
Channel [MHz]	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2412	1031.9	41.25	pk	ver	74.00	-32.75
2412	1031.9	36.75	avg	ver	54.00	-17.25
2412	1375	40.82	pk	ver	74.00	-33.18
2412	1375	38.42	avg	ver	54.00	-15.58
2412	2388.3	70.30	pk	ver	74.00	-03.70
2412	2388.3	47.44	avg	ver	54.00	-06.56
2437	1375.1	41.65	pk	ver	74.00	-32.35
2437	1375.1	38.80	avg	ver	54.00	-15.20
2437	1500.2	43.31	pk	ver	74.00	-30.69
2437	1500.2	39.92	avg	ver	54.00	-14.08
2462	1250	45.81	pk	ver	74.00	-28.19
2462	1250	44.01	avg	ver	54.00	-09.99
2462	1375	42.12	pk	ver	74.00	-31.88
2462	1375	38.86	avg	ver	54.00	-15.14
2462	2484.7	68.71	pk	ver	74.00	-05.29
2462	2484.7	48.10	avg	ver	54.00	-05.90

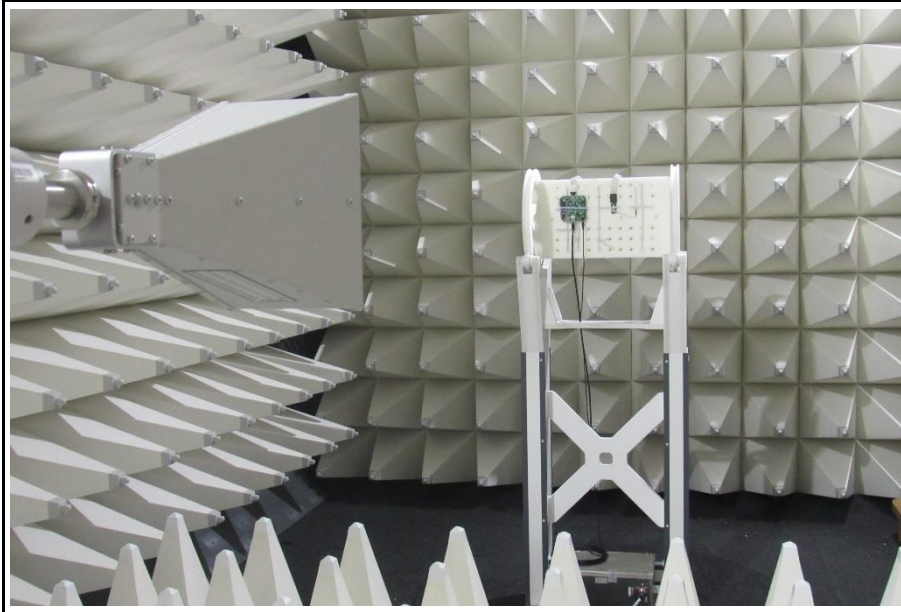
3.2.7 Setup Photos



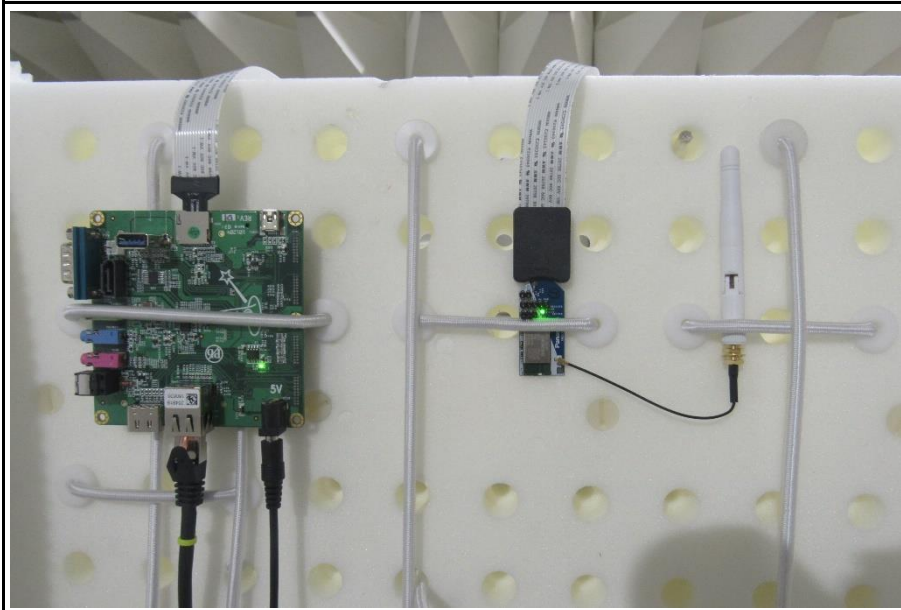
Test Setup



Setup for measurement above 1 GHz



Test Setup



3.3 Test Conditions and Results - Receiver radiated emissions

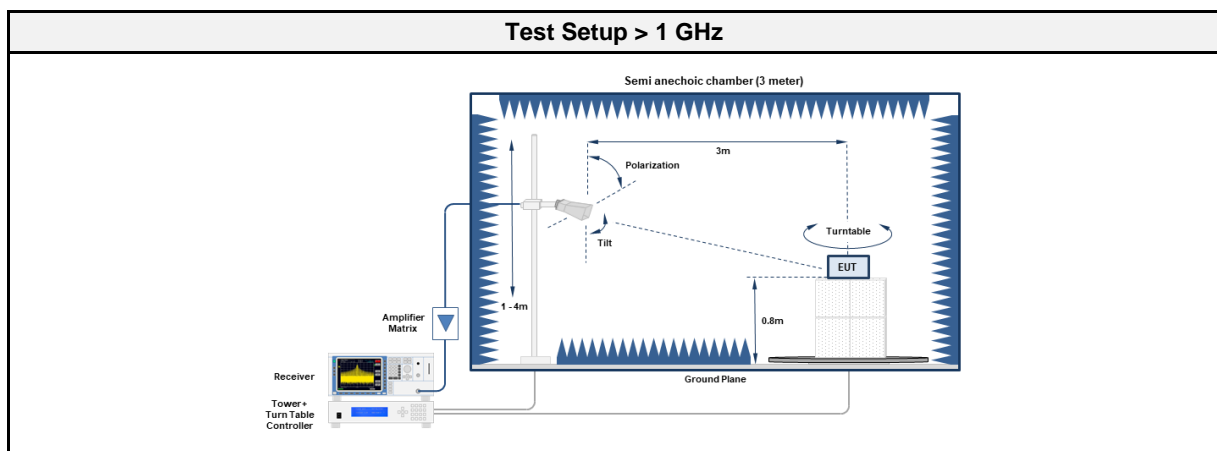
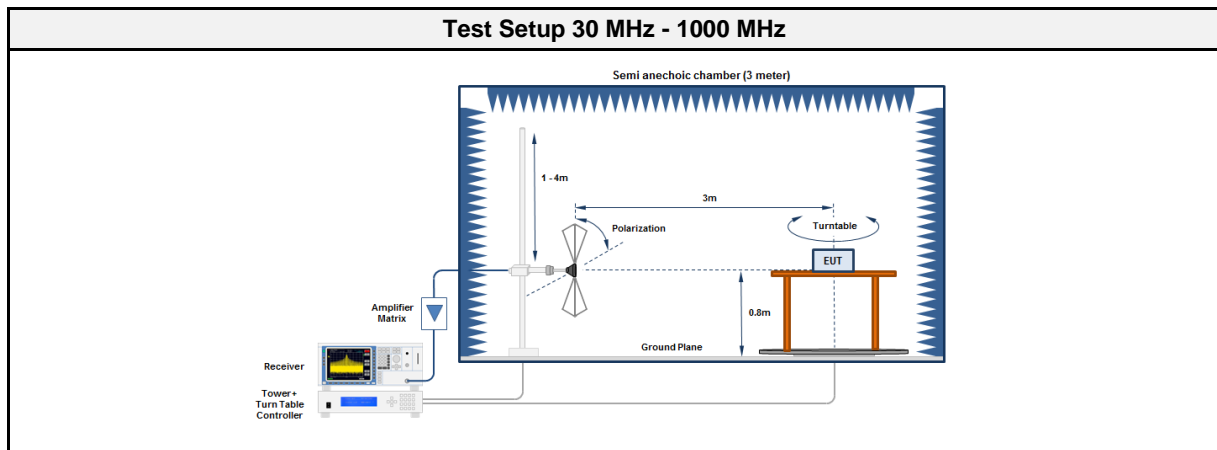
3.3.1 Information

Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.4-2014 8.1-8.3
Operator	Odai Qawasmeh
Date	2022-03-17

3.3.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [$\mu\text{V}/\text{m}$]	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

3.3.3 Setup



3.3.4 Equipment

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

Test Equipment 30 MHz - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC6	EF00062	2021-02	2024-02
EMI Test Receiver	R&S	ESU26	EF00887	2021-07	2022-07
Trilog Broadband Antenna	Schwarzbeck	VULB 9162	EF00978	2019-10	2022-10

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2021-07	2022-07
Horn antenna	Schwarzbeck	BBHA 9120B	EF01678	2021-03	2022-03
Horn Antenna	Schwarzbeck	HWRD 650	EF01679	2021-03	2022-03

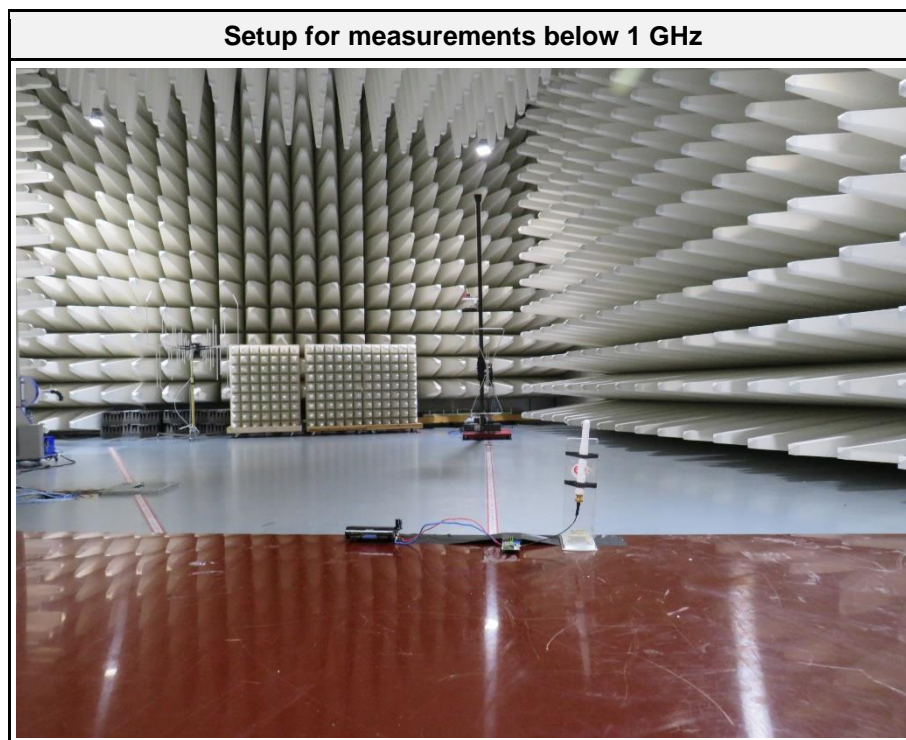
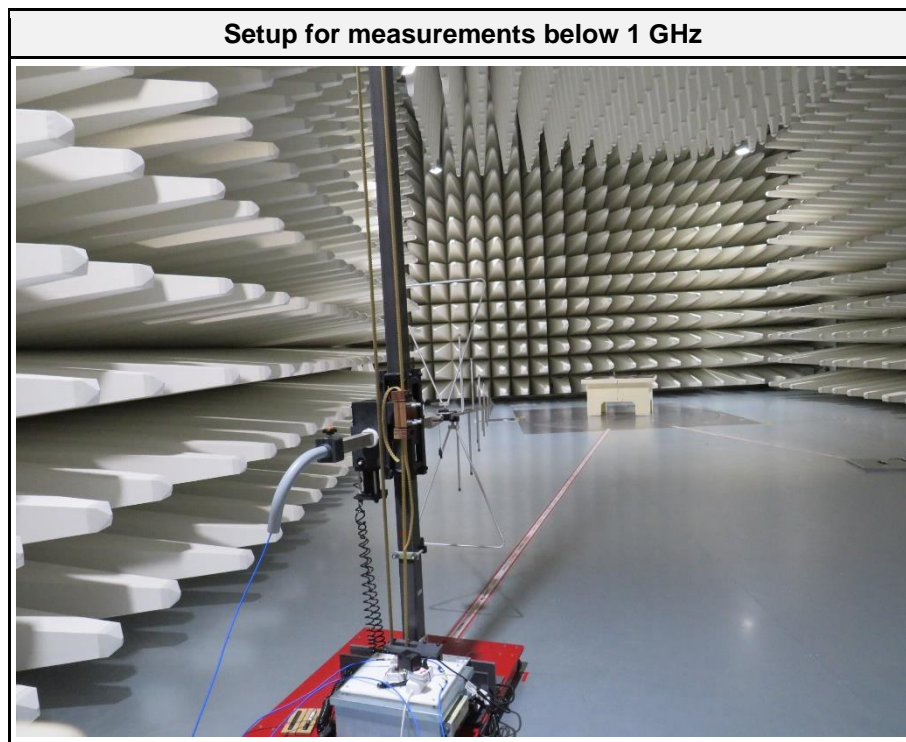
3.3.5 Procedure

Test Procedure
<ol style="list-style-type: none"> 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

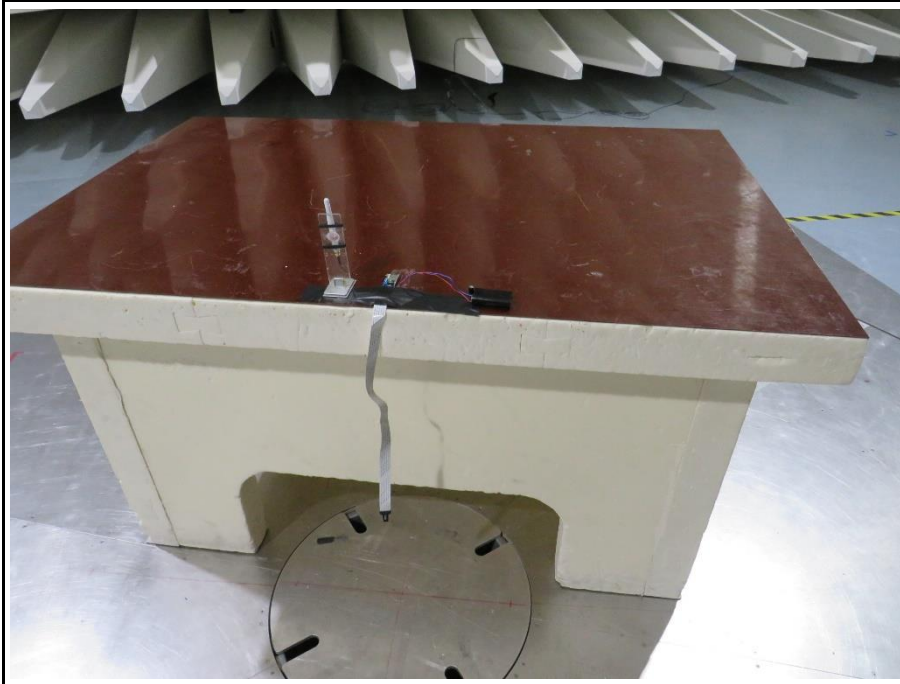
3.3.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2437	97.835	23.90	pk	ver	43.50	-19.60
2437	6470	48.06	pk	ver	74.00	-25.94
2437	6470	40.61	avg	ver	53.98	-13.37
2437	17977	49.55	pk	ver	74.00	-24.45
2437	17977	36.97	avg	ver	53.98	-17.01

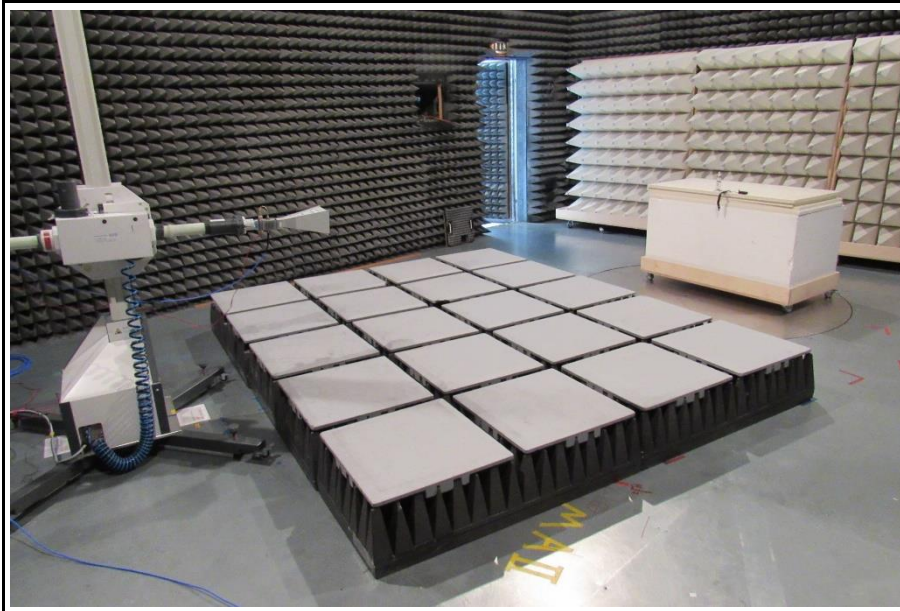
3.3.7 Setup Photos

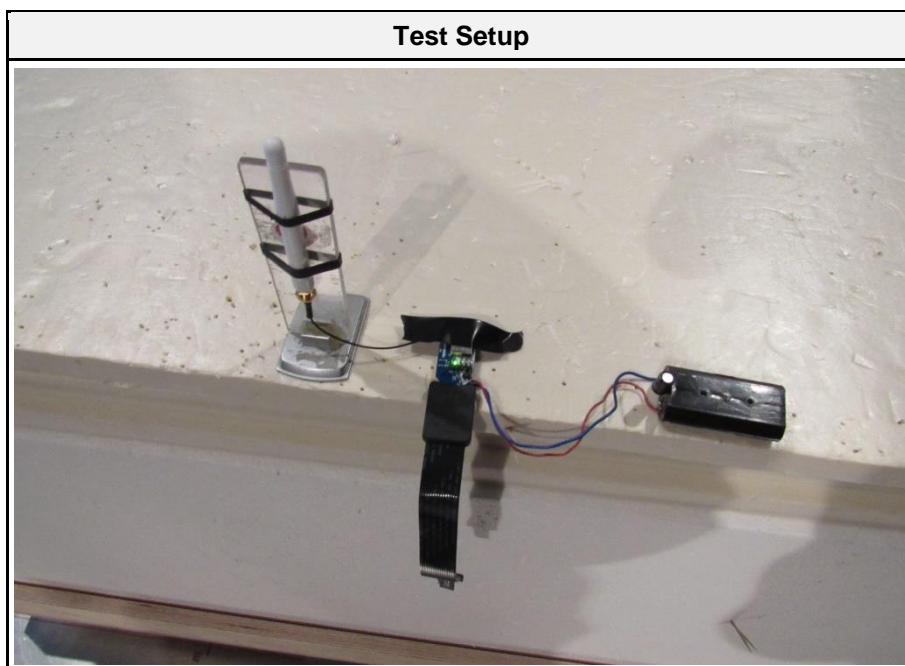
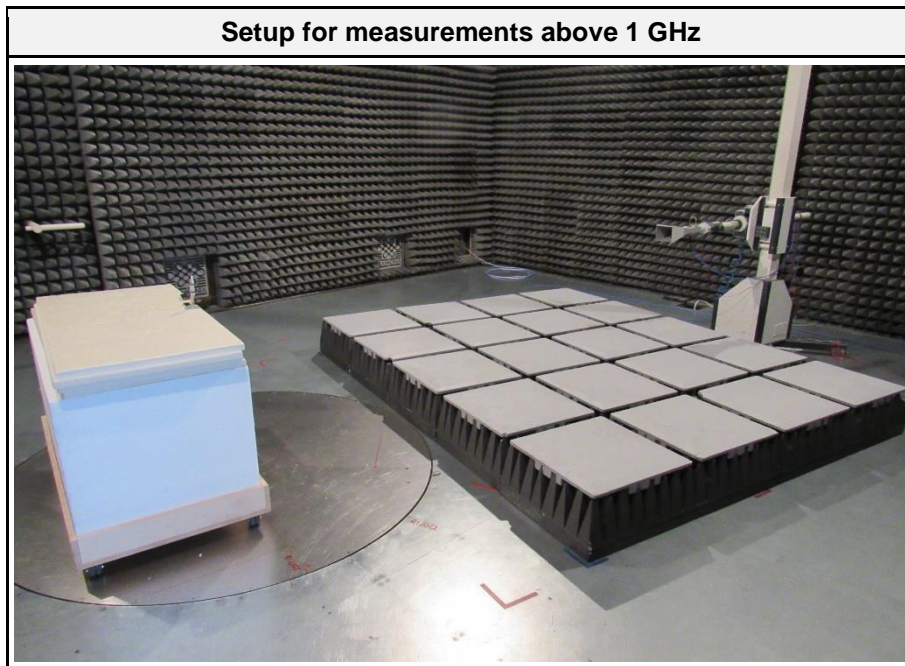


Test Setup



Setup for measurements above 1 GHz





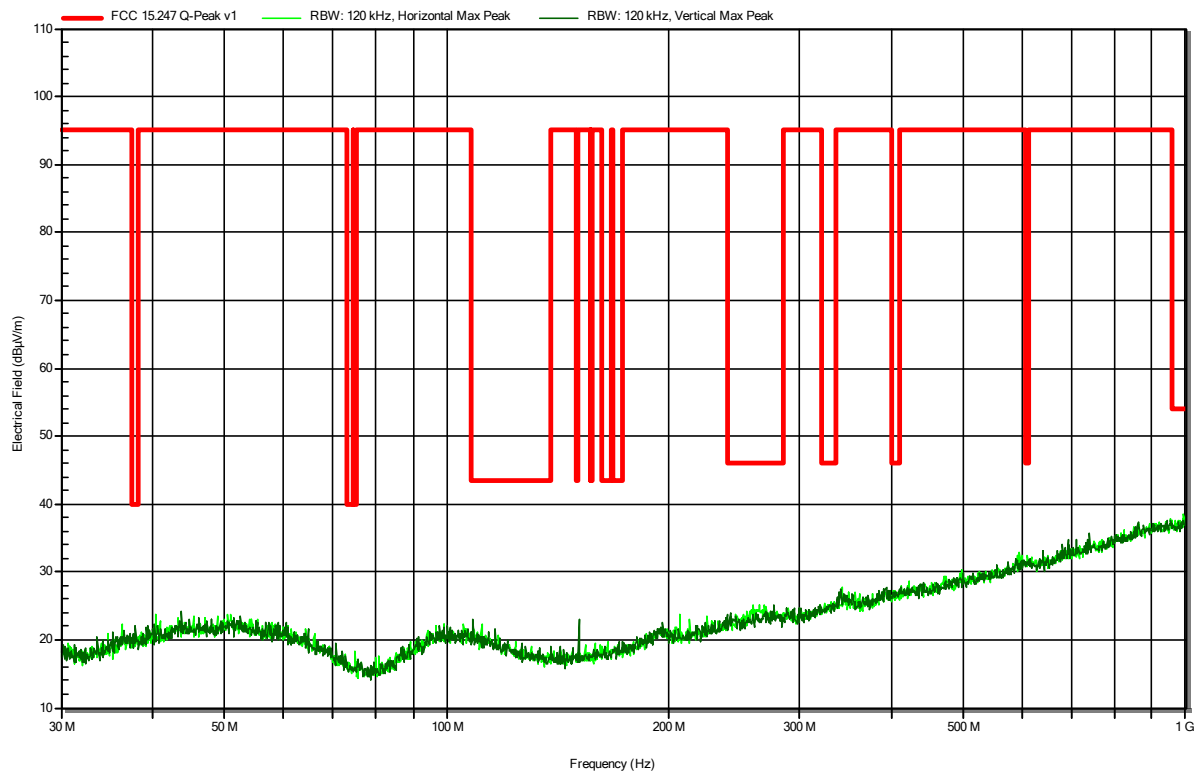
ANNEX A Transmitter spurious emissions

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9162
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2412 MHz
 Test Date: 2022-03-17
 Note:

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RadiMation

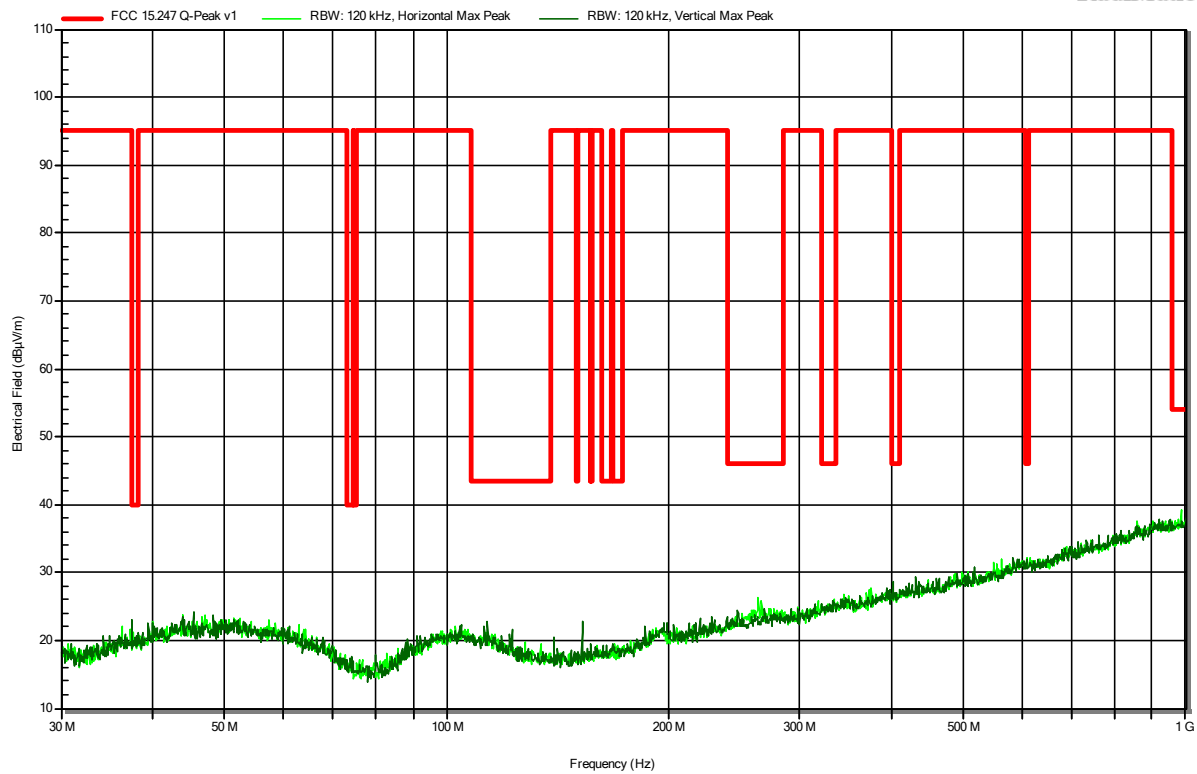


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9162
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2437 MHz
 Test Date: 2022-03-17
 Note:

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RadiMation

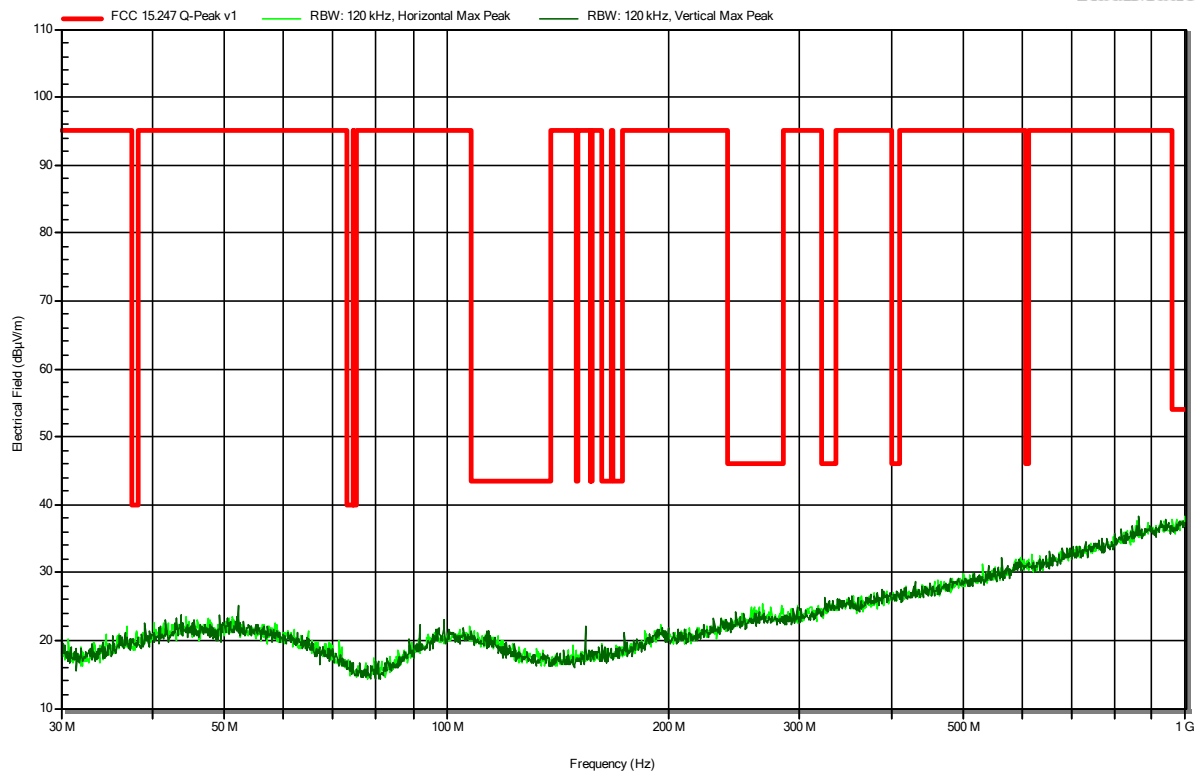


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9162
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2462 MHz
 Test Date: 2022-03-17
 Note:

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RadiMation

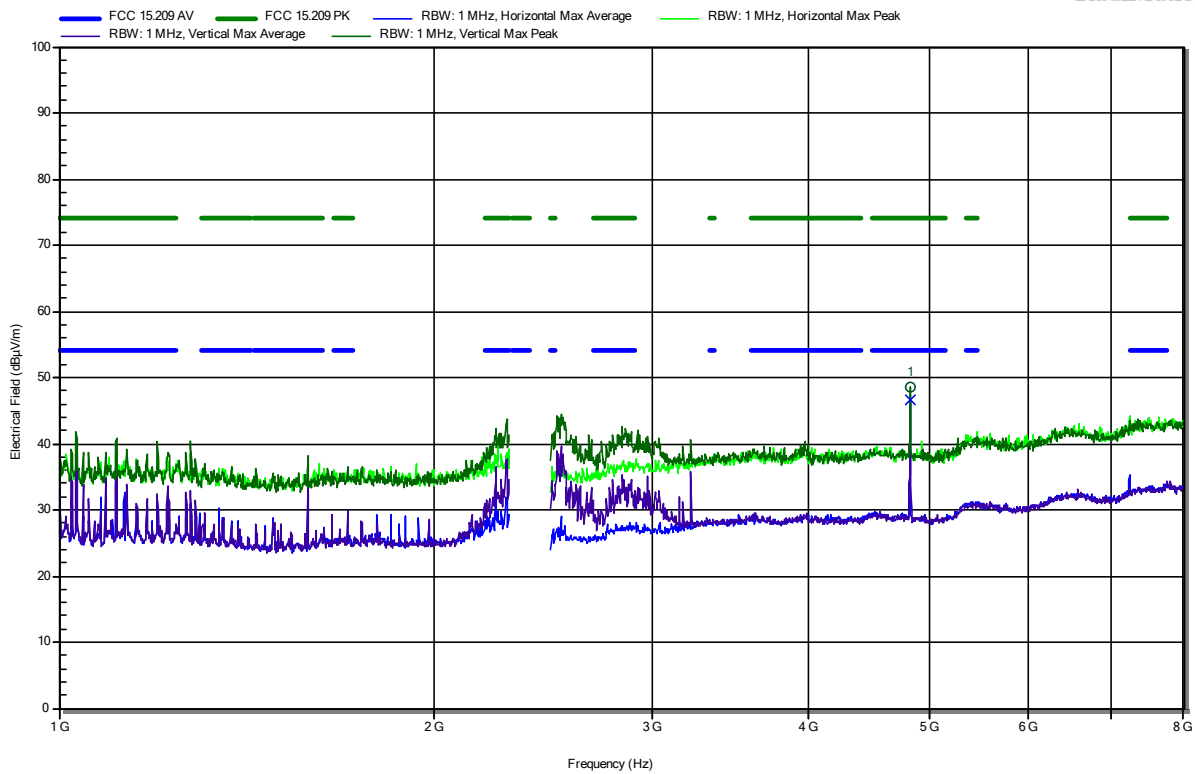


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



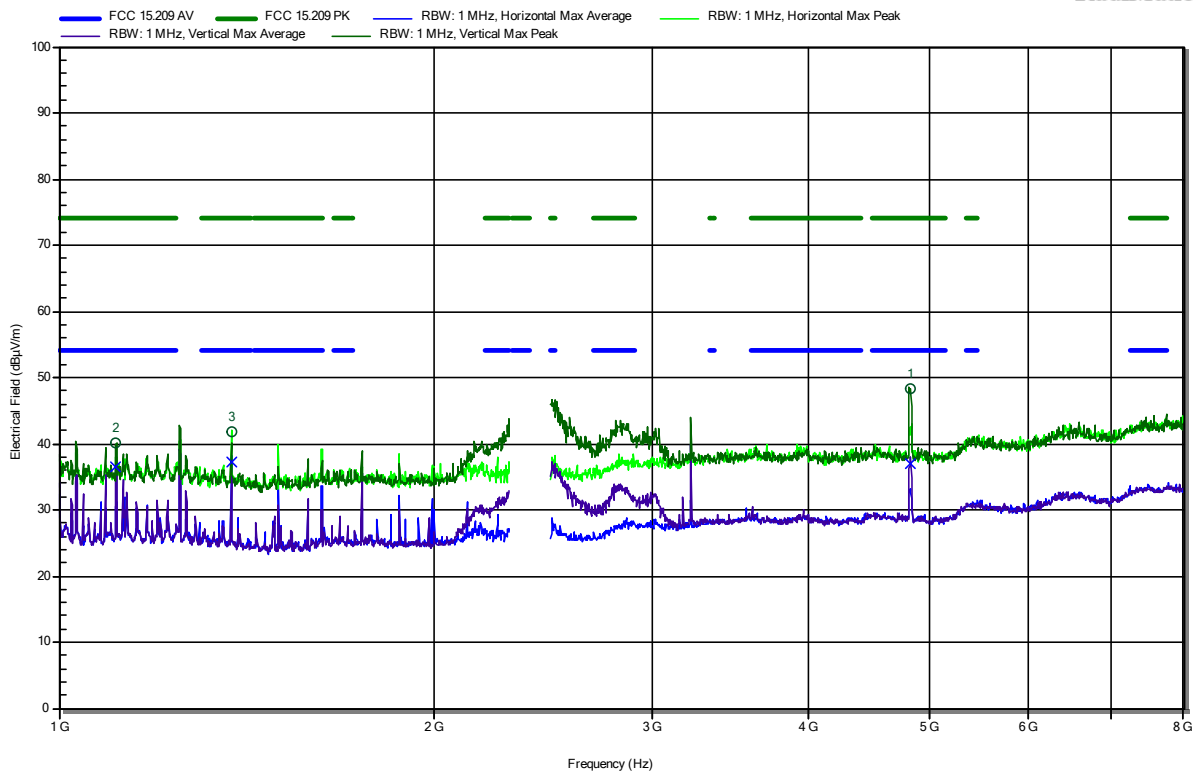
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.824 GHz	48.45 dBµV/m	74 dBµV/m	-25.55 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.824 GHz	46.59 dBµV/m	54 dBµV/m	-7.41 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 g; 9 Mbps; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.111 GHz	40.16 dBµV/m	74 dBµV/m	-33.84 dB	Pass	Vertical
1.3751 GHz	41.78 dBµV/m	74 dBµV/m	-32.22 dB	Pass	Horizontal
4.8277 GHz	48.33 dBµV/m	74 dBµV/m	-25.67 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.111 GHz	36.62 dBµV/m	54 dBµV/m	-17.38 dB	Pass	Vertical
1.3751 GHz	37.32 dBµV/m	54 dBµV/m	-16.68 dB	Pass	Horizontal
4.8277 GHz	36.99 dBµV/m	54 dBµV/m	-17.01 dB	Pass	Vertical

Test Report No.: G0M-2108-9951-TFC247WF-V01

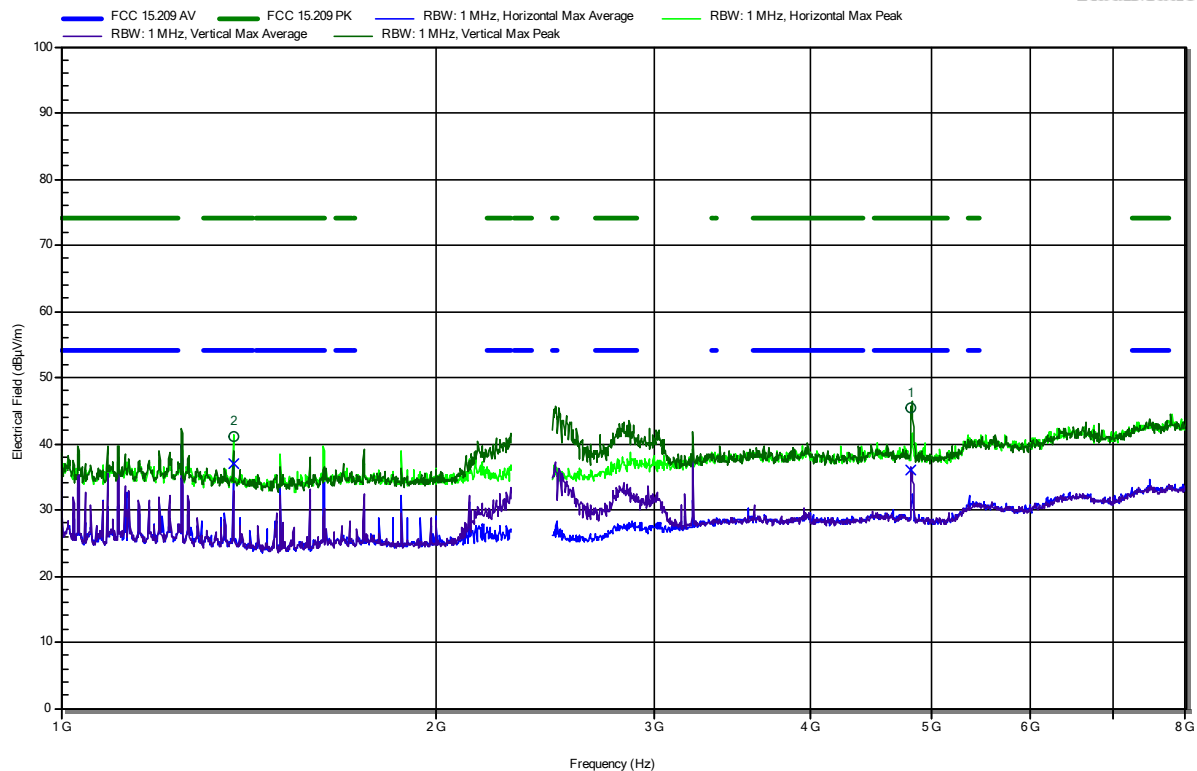
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT20; MCS 2; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.375 GHz	41.02 dBµV/m	74 dBµV/m	-32.98 dB	Pass	Horizontal
4.8148 GHz	45.36 dBµV/m	74 dBµV/m	-28.64 dB	Pass	Vertical

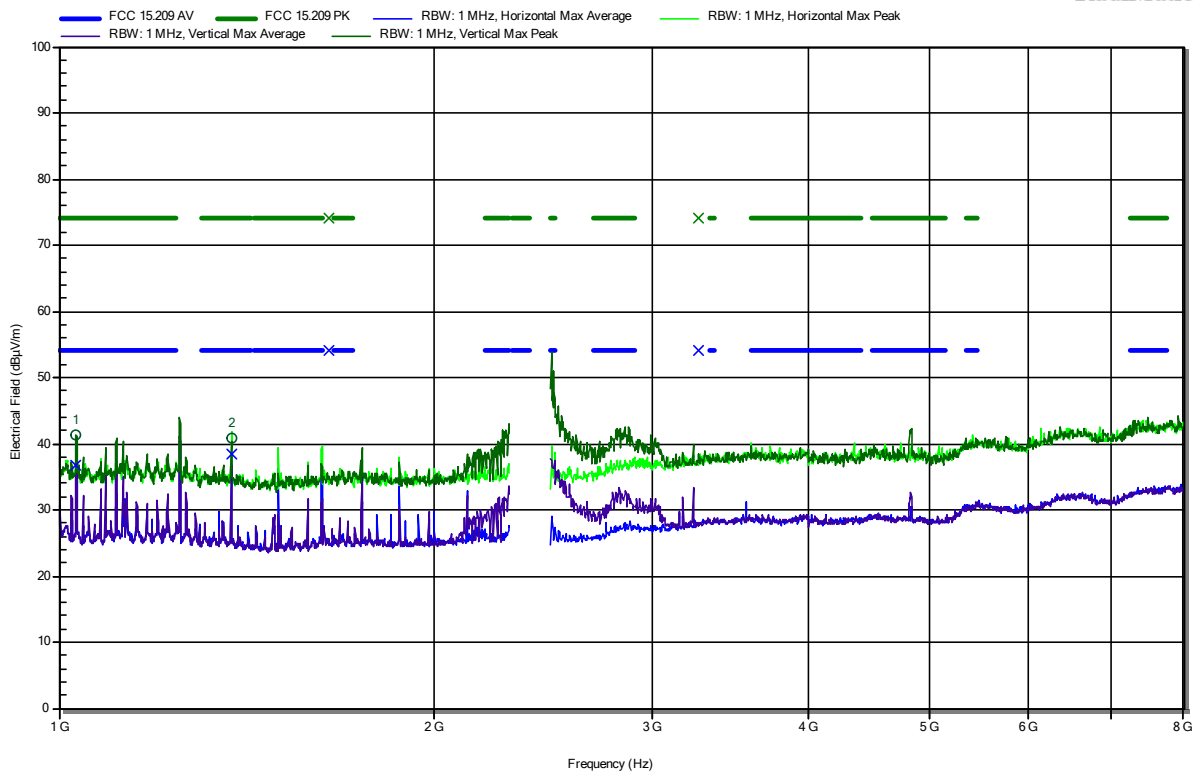
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.375 GHz	37.1 dBµV/m	54 dBµV/m	-16.9 dB	Pass	Horizontal
4.8148 GHz	36.12 dBµV/m	54 dBµV/m	-17.88 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT40; MCS 0; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.0319 GHz	41.25 dBµV/m	74 dBµV/m	-32.75 dB	Pass	Vertical
1.375 GHz	40.82 dBµV/m	74 dBµV/m	-33.18 dB	Pass	Horizontal

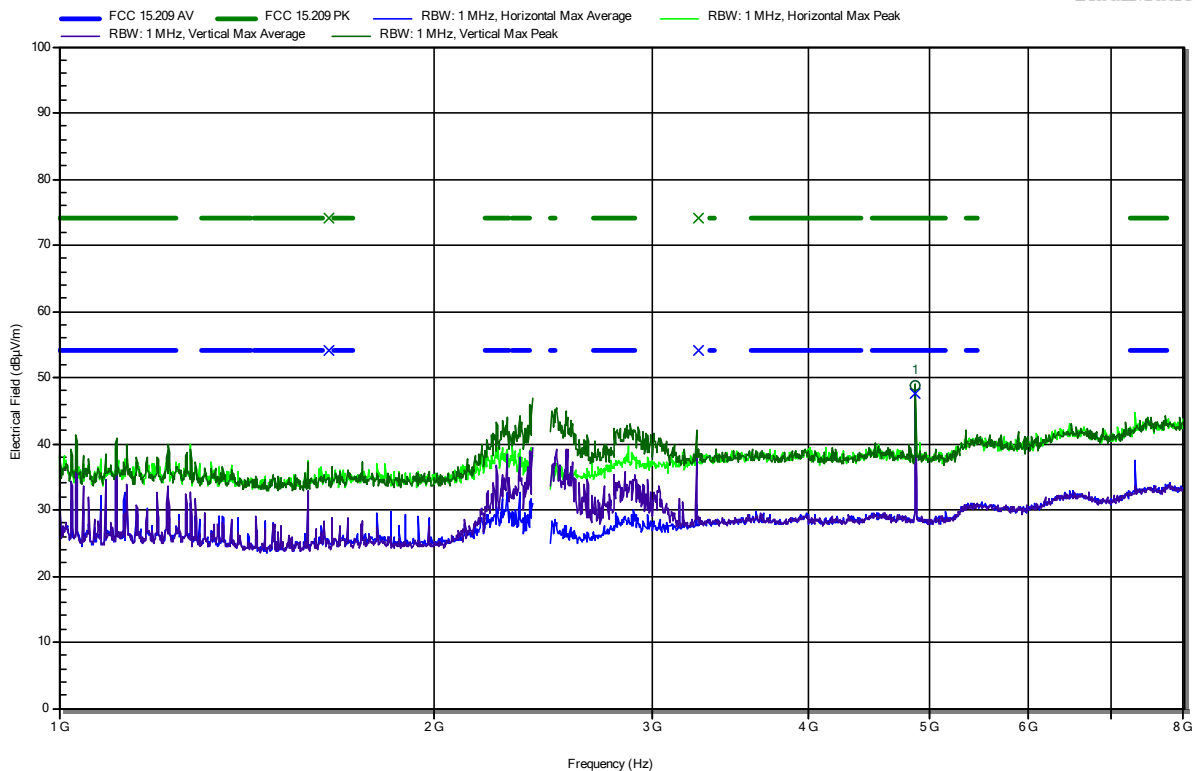
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.0319 GHz	36.75 dBµV/m	54 dBµV/m	-17.25 dB	Pass	Vertical
1.375 GHz	38.42 dBµV/m	54 dBµV/m	-15.58 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2437 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



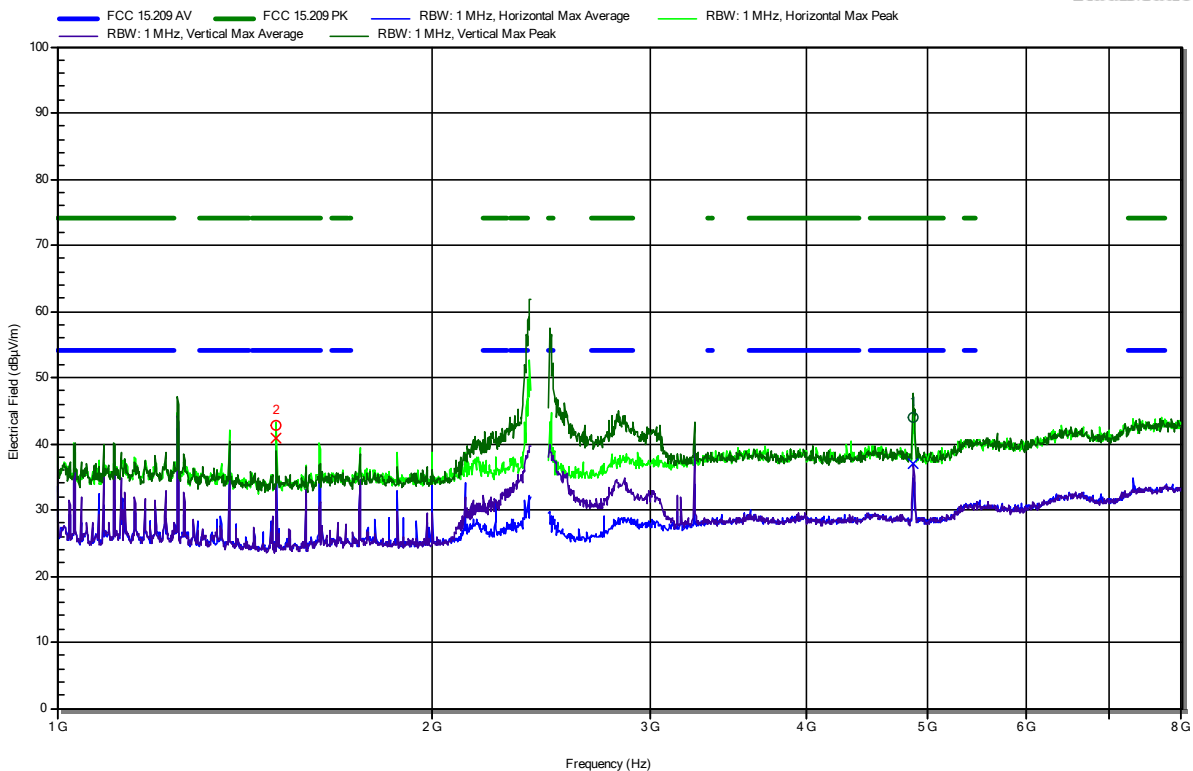
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
4.874 GHz	48.84 dBµV/m	74 dBµV/m	-25.16 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
4.874 GHz	47.48 dBµV/m	54 dBµV/m	-6.52 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 g; 9 Mbps; ext. antenna; 2437 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.5 GHz	42.67 dBµV/m	74 dBµV/m	-31.33 dB	Pass	Horizontal
4.8711 GHz	43.96 dBµV/m	74 dBµV/m	-30.04 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.5 GHz	40.87 dBµV/m	54 dBµV/m	-13.13 dB	Pass	Horizontal
4.8711 GHz	36.99 dBµV/m	54 dBµV/m	-17.01 dB	Pass	Vertical

Test Report No.: G0M-2108-9951-TFC247WF-V01

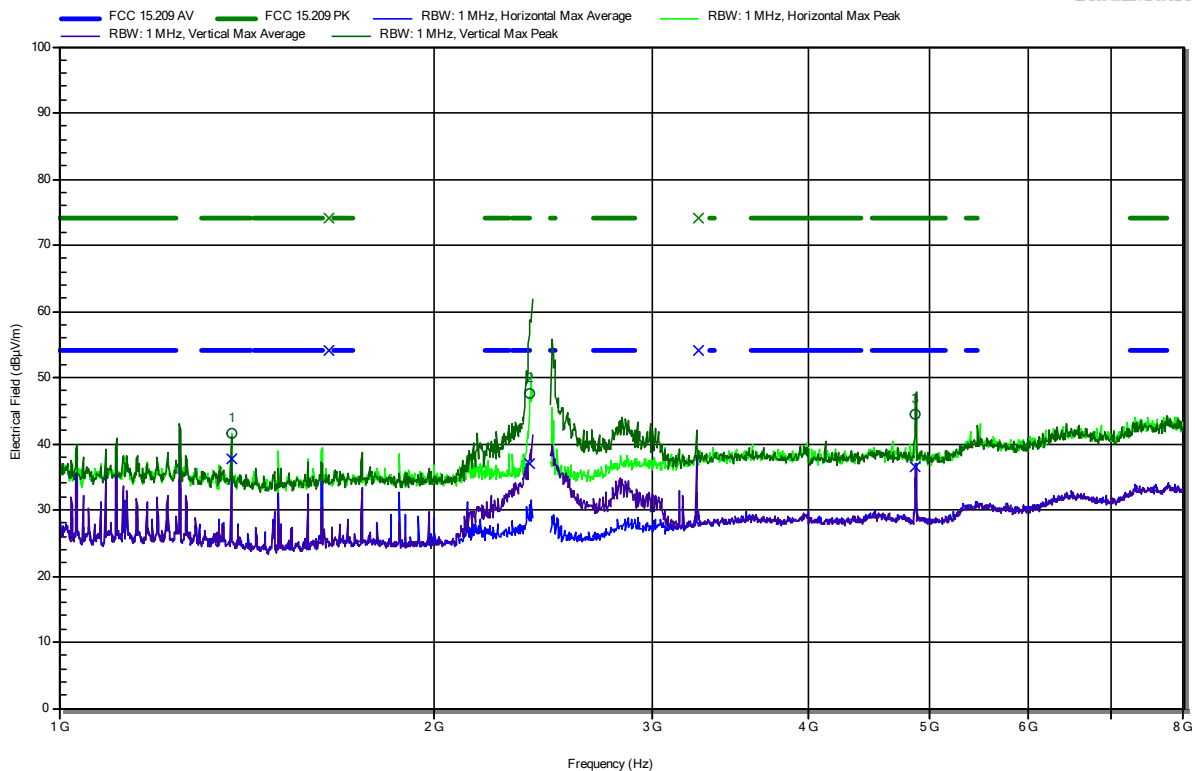
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT20; MCS 2; ext. antenna; 2437 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.375 GHz	41.63 dBµV/m	74 dBµV/m	-32.37 dB	Pass	Horizontal
2.3883 GHz	47.69 dBµV/m	74 dBµV/m	-26.31 dB	Pass	Vertical
4.8748 GHz	44.56 dBµV/m	74 dBµV/m	-29.44 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.375 GHz	37.6 dBµV/m	54 dBµV/m	-16.4 dB	Pass	Horizontal
2.3883 GHz	37.11 dBµV/m	54 dBµV/m	-16.89 dB	Pass	Vertical
4.8748 GHz	36.51 dBµV/m	54 dBµV/m	-17.49 dB	Pass	Vertical

Test Report No.: G0M-2108-9951-TFC247WF-V01

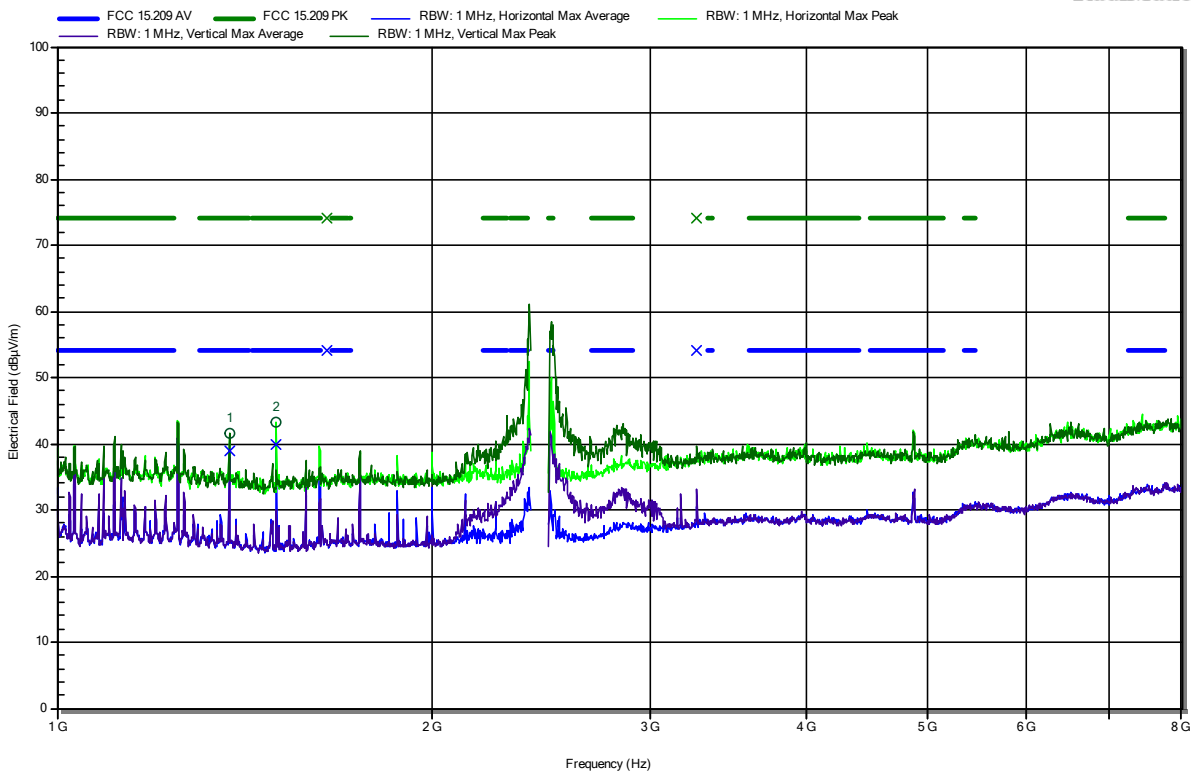
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT40; MCS 0; ext. antenna; 2437 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.3751 GHz	41.65 dBµV/m	74 dBµV/m	-32.35 dB	Pass	Horizontal
1.5002 GHz	43.31 dBµV/m	74 dBµV/m	-30.69 dB	Pass	Horizontal

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.3751 GHz	38.8 dBµV/m	54 dBµV/m	-15.2 dB	Pass	Horizontal
1.5002 GHz	39.92 dBµV/m	54 dBµV/m	-14.08 dB	Pass	Horizontal

Test Report No.: G0M-2108-9951-TFC247WF-V01

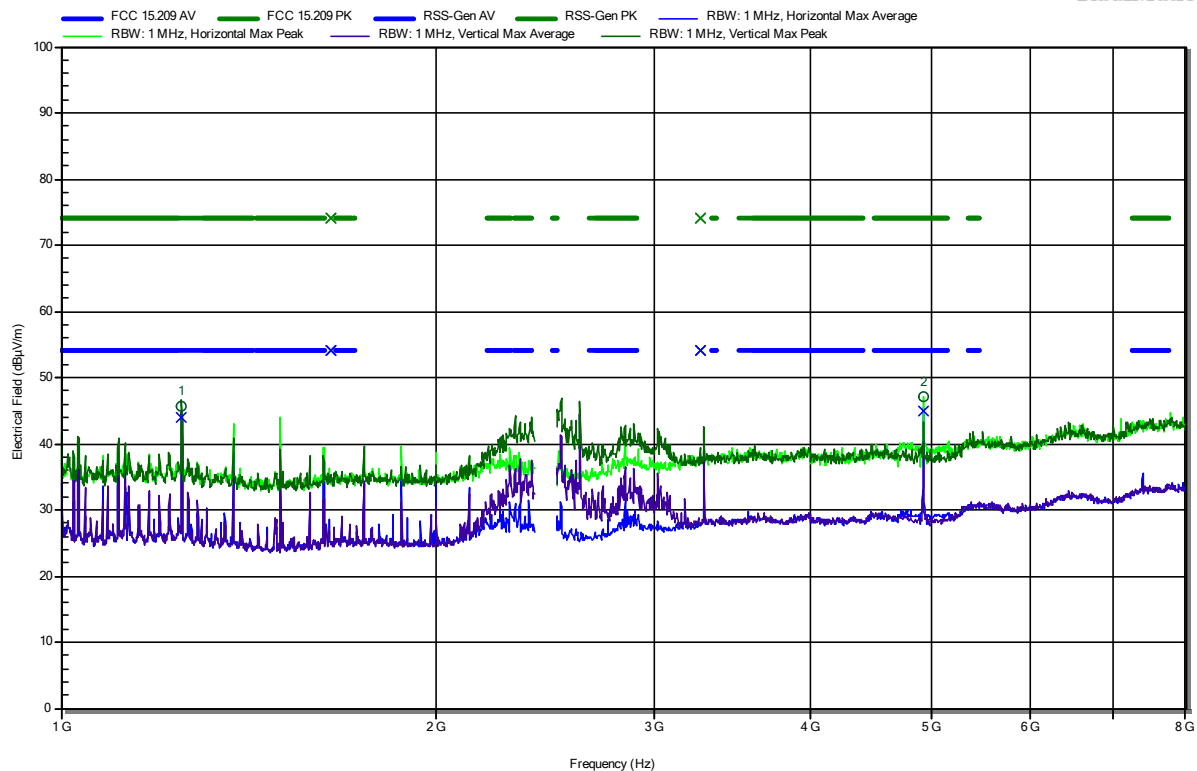
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.25 GHz	45.77 dBµV/m	74 dBµV/m	-28.23 dB	Pass	Vertical
4.924 GHz	47.22 dBµV/m	74 dBµV/m	-26.78 dB	Pass	Horizontal

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.25 GHz	43.95 dBµV/m	54 dBµV/m	-10.05 dB	Pass	Vertical
4.924 GHz	45.03 dBµV/m	54 dBµV/m	-8.97 dB	Pass	Horizontal

Test Report No.: G0M-2108-9951-TFC247WF-V01

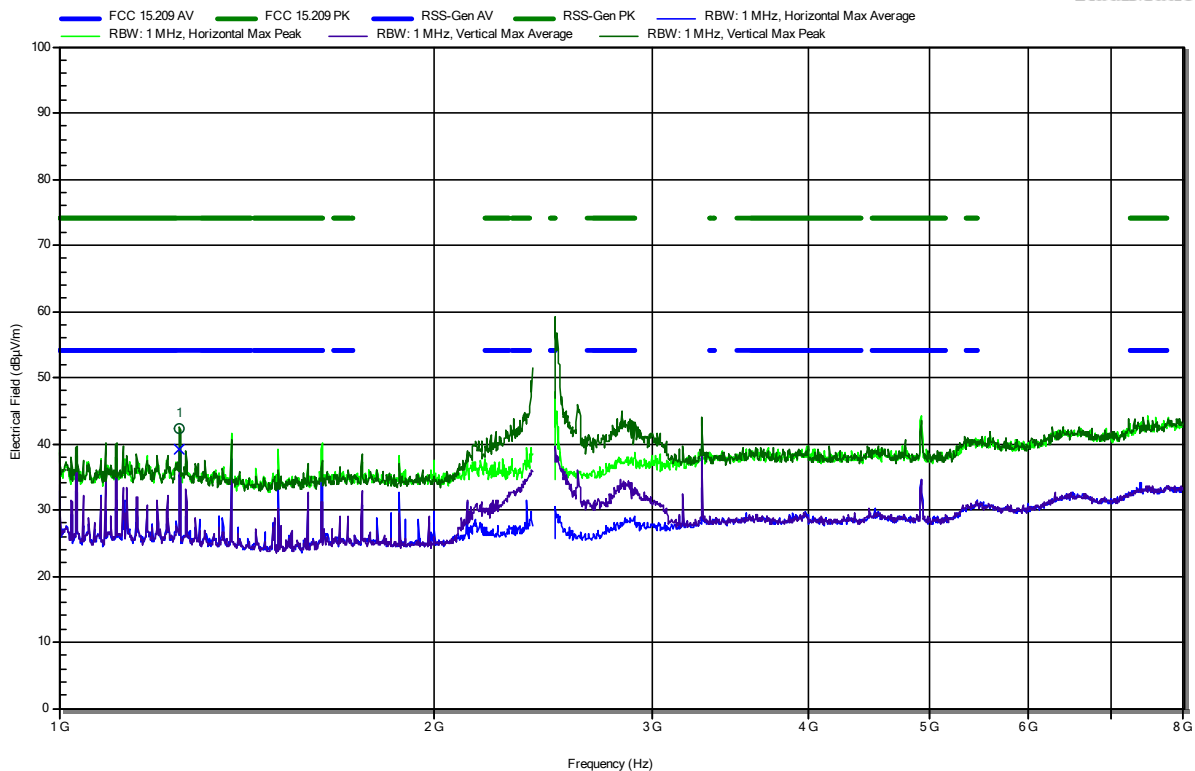
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 g; 9 Mbps; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.25 GHz	42.38 dBµV/m	74 dBµV/m	-31.62 dB	Pass	Vertical

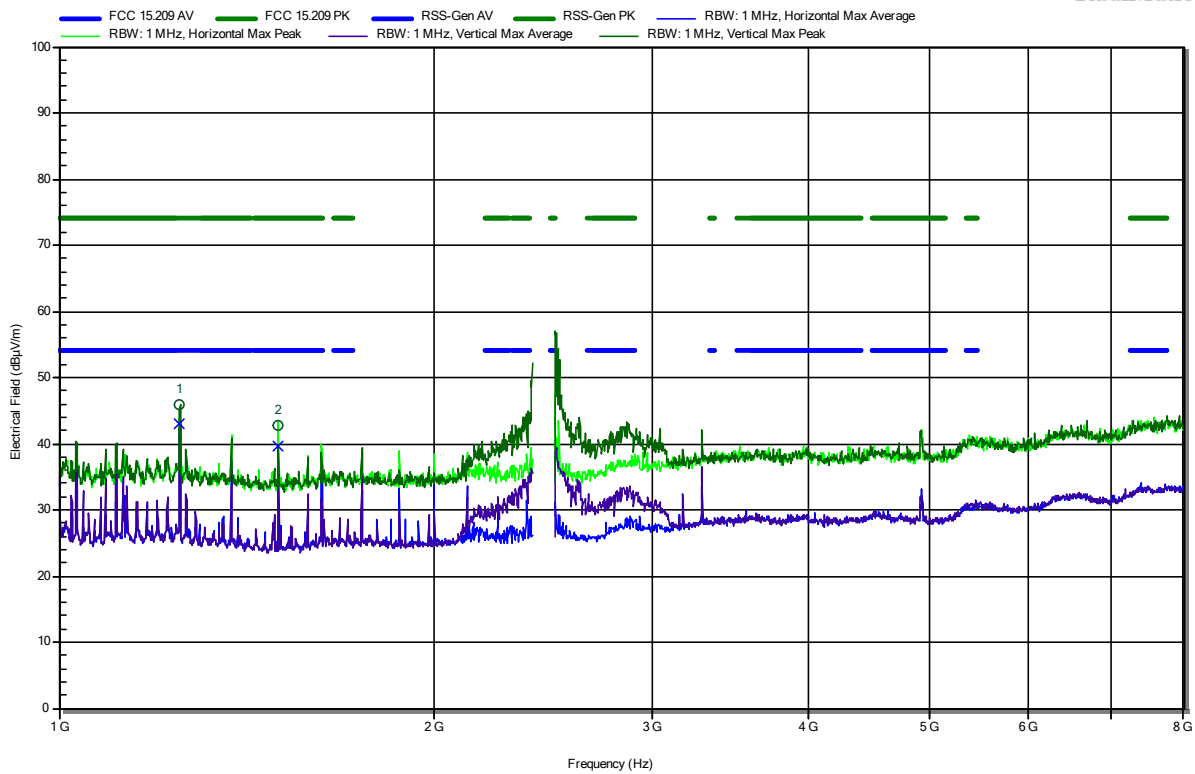
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.25 GHz	39.05 dBµV/m	54 dBµV/m	-14.95 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT20; MCS 2; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.25 GHz	45.92 dBµV/m	74 dBµV/m	-28.08 dB	Pass	Vertical
1.5 GHz	42.83 dBµV/m	74 dBµV/m	-31.17 dB	Pass	Horizontal

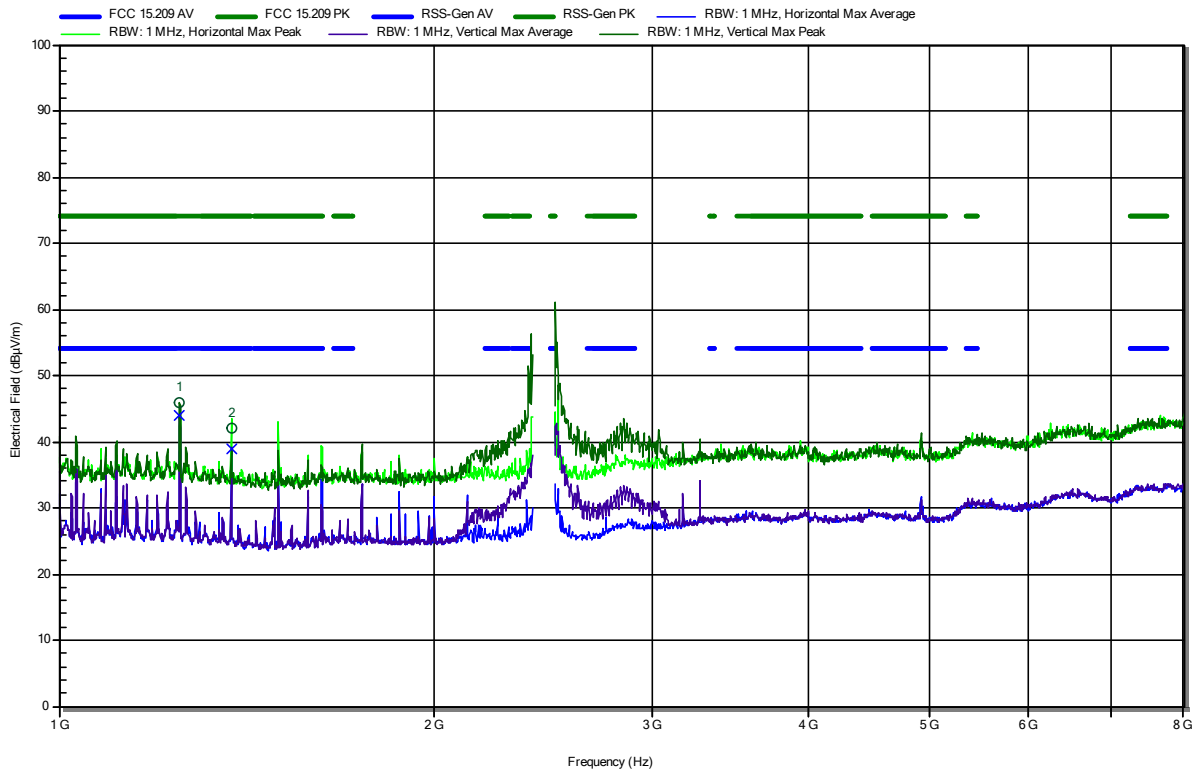
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.25 GHz	43.07 dBµV/m	54 dBµV/m	-10.93 dB	Pass	Vertical
1.5 GHz	39.64 dBµV/m	54 dBµV/m	-14.36 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT40; MCS 0; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
1.25 GHz	45.81 dBµV/m	74 dBµV/m	-28.19 dB	Pass	Vertical
1.375 GHz	42.12 dBµV/m	74 dBµV/m	-31.88 dB	Pass	Horizontal

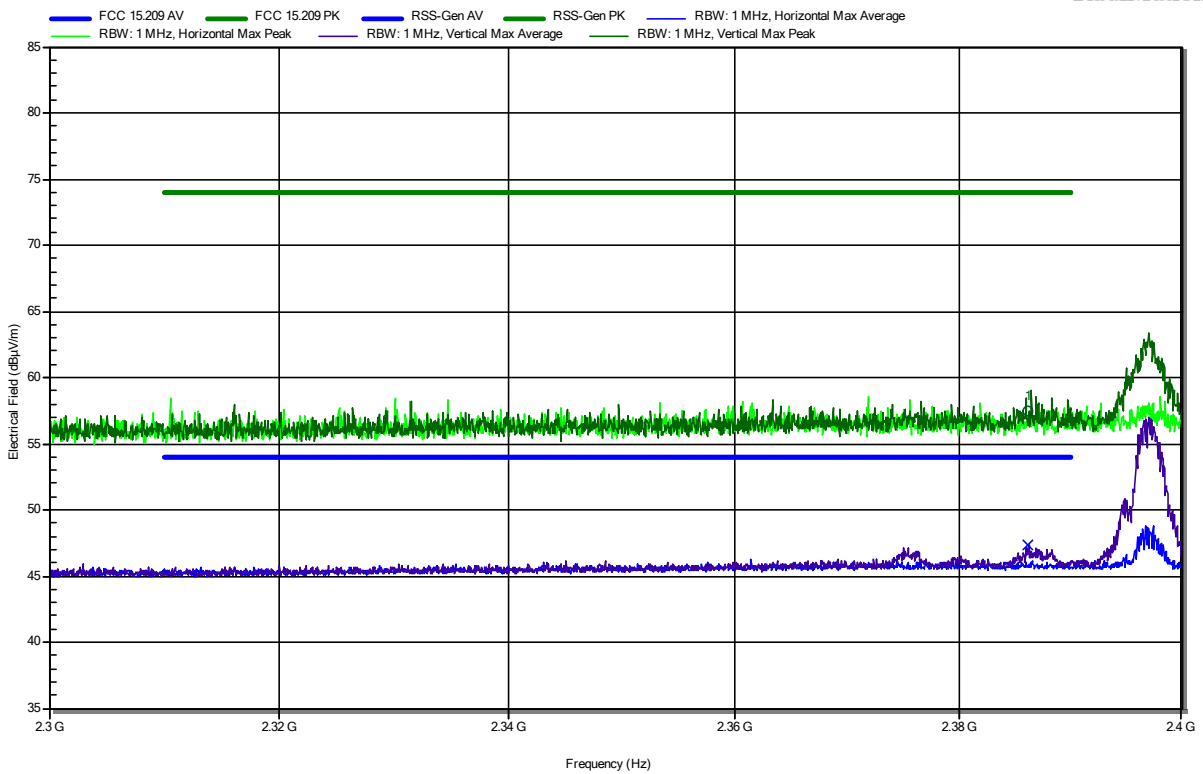
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
1.25 GHz	44.01 dBµV/m	54 dBµV/m	-9.99 dB	Pass	Vertical
1.375 GHz	38.86 dBµV/m	54 dBµV/m	-15.14 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note: lower bandedge

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.3862 GHz	57.43 dBµV/m	74 dBµV/m	-16.57 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.3862 GHz	47.36 dBµV/m	54 dBµV/m	-6.64 dB	Pass	Vertical

Test Report No.: G0M-2108-9951-TFC247WF-V01

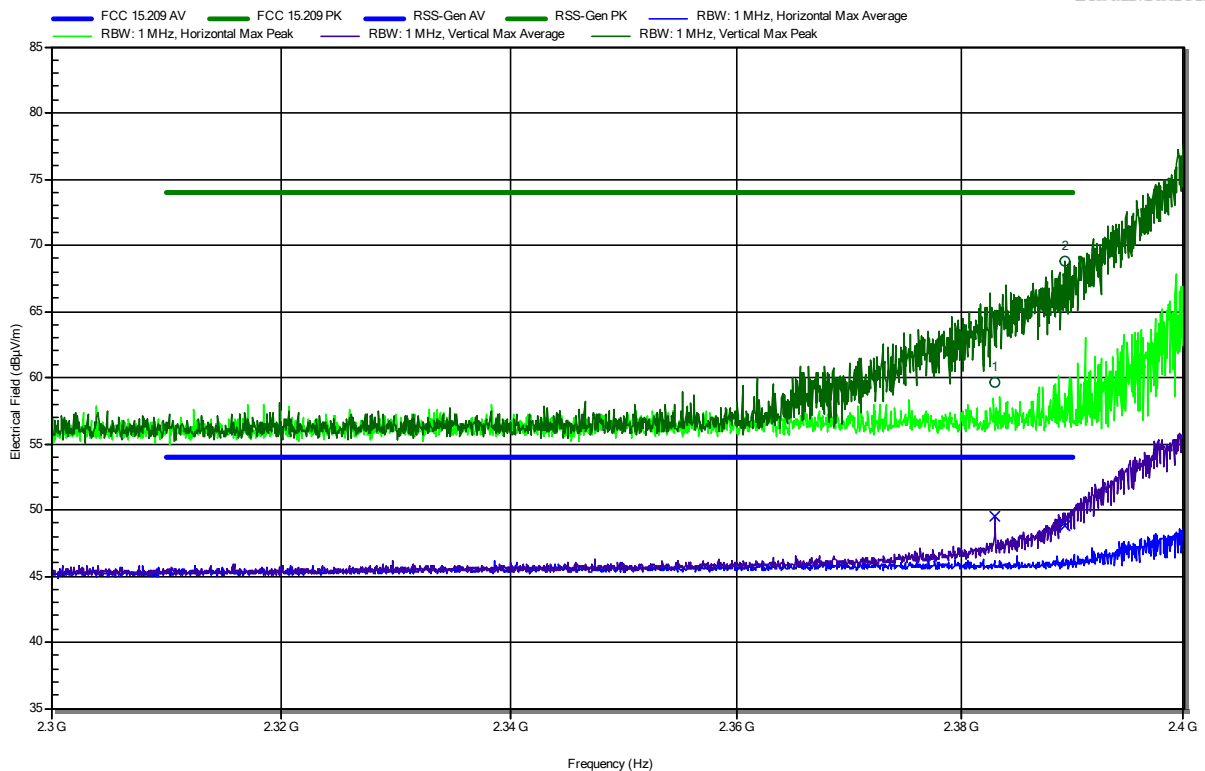
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 g; 9 Mbps; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note: lower bandedge

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.383 GHz	59.6 dBµV/m	74 dBµV/m	-14.4 dB	Pass	Vertical
2.3894 GHz	68.82 dBµV/m	74 dBµV/m	-5.18 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.383 GHz	49.49 dBµV/m	54 dBµV/m	-4.51 dB	Pass	Vertical
2.3894 GHz	48.85 dBµV/m	54 dBµV/m	-5.15 dB	Pass	Vertical

Test Report No.: G0M-2108-9951-TFC247WF-V01

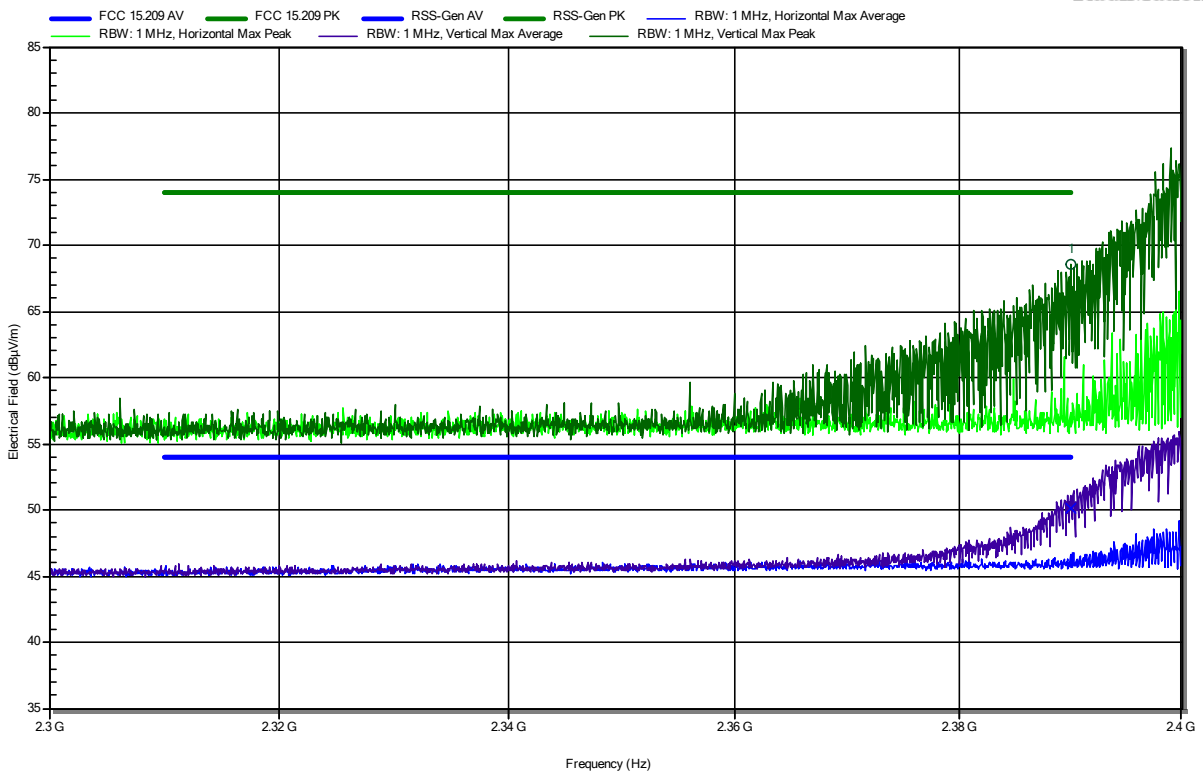
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT20; MCS 2; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note: lower bandedge

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RadiMation



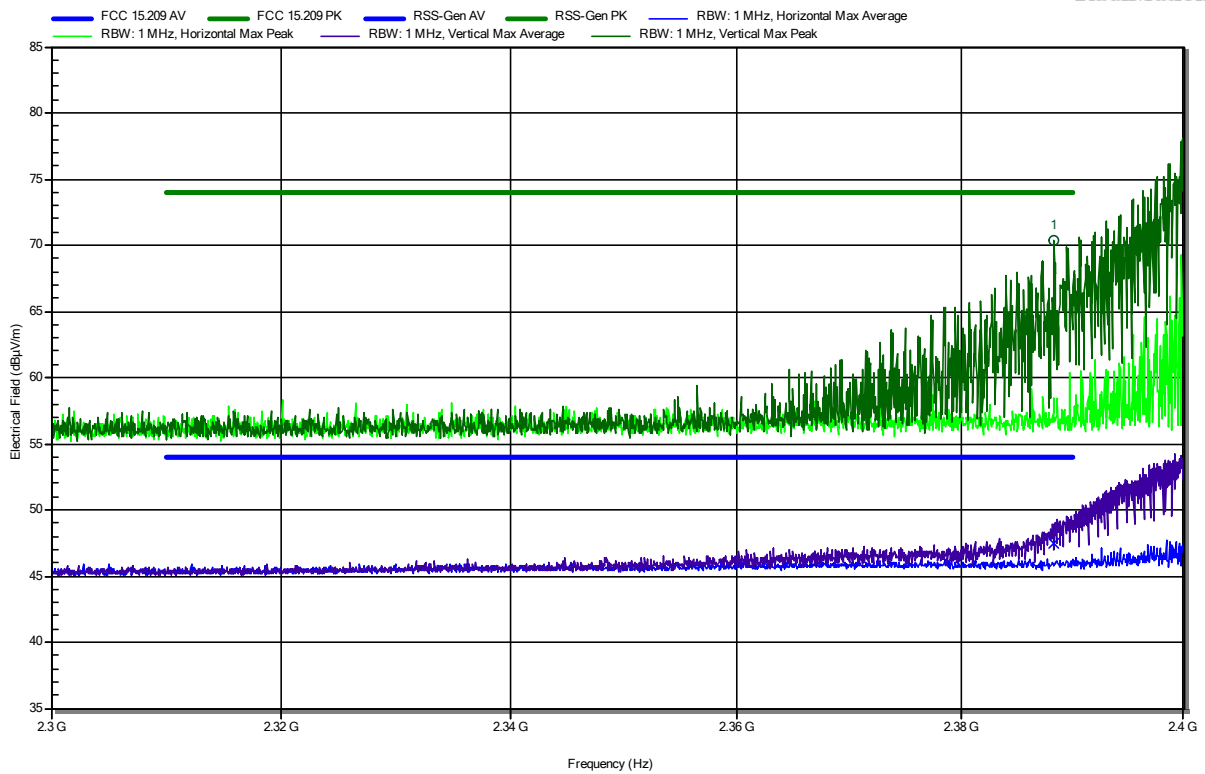
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.39 GHz	68.55 dBµV/m	74 dBµV/m	-5.45 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.39 GHz	50.13 dBµV/m	54 dBµV/m	-3.87 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT40; MCS 0; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note: lower bandedge

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RadiMation



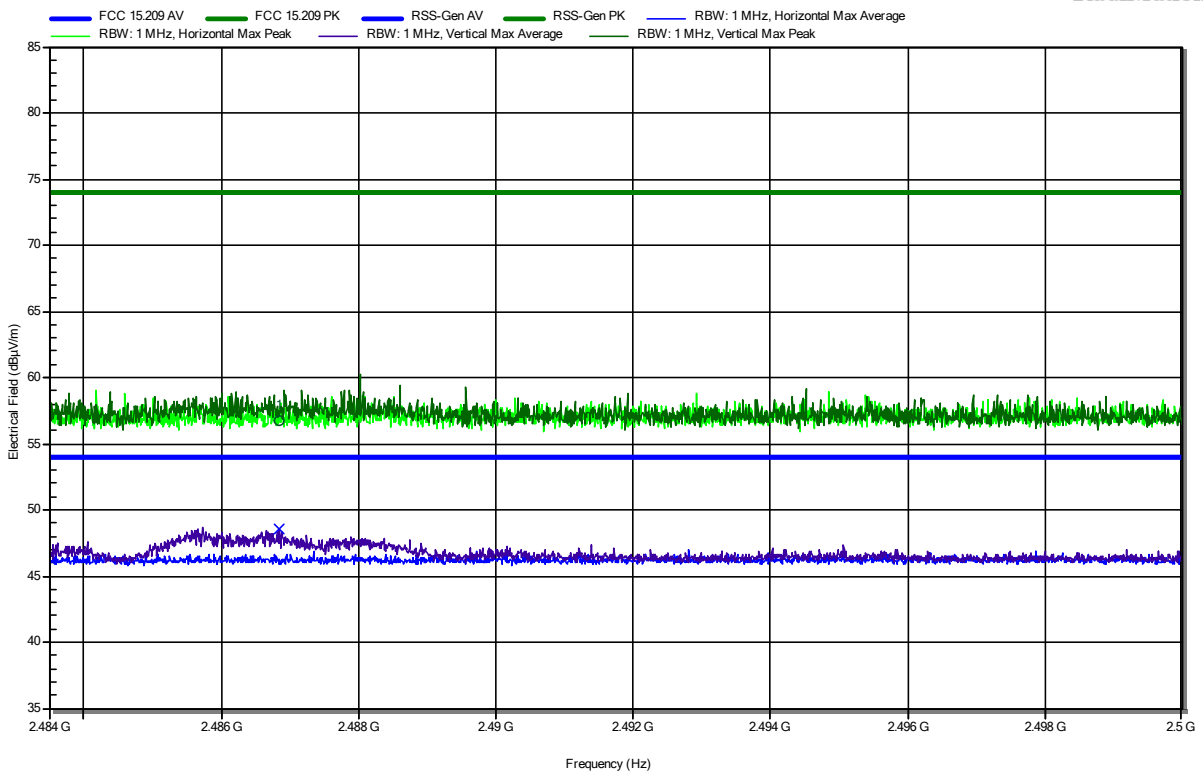
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.3883 GHz	70.3 dBµV/m	74 dBµV/m	-3.7 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.3883 GHz	47.44 dBµV/m	54 dBµV/m	-6.56 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note: upper bandedge

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RadiMation



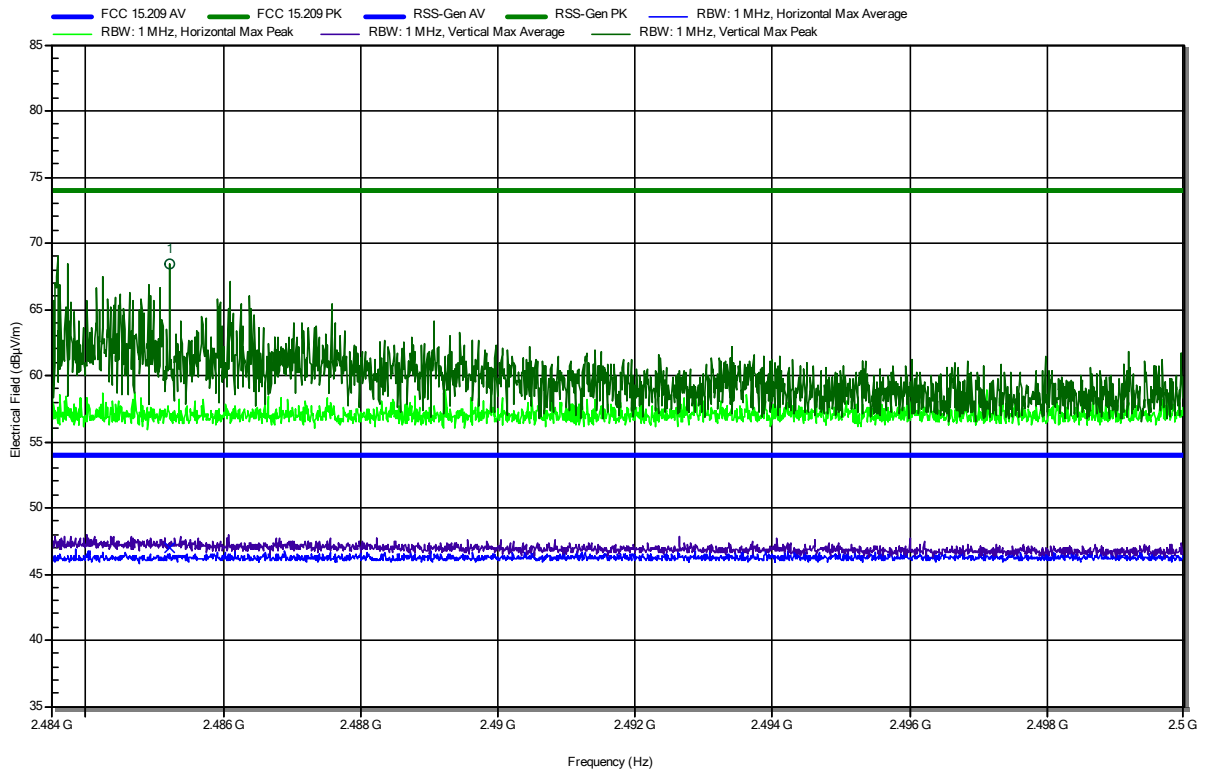
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4869 GHz	56.72 dBµV/m	74 dBµV/m	-17.28 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4869 GHz	48.5 dBµV/m	54 dBµV/m	-5.5 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 g; 9 Mbps; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note: upper bandedge

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RadiMation



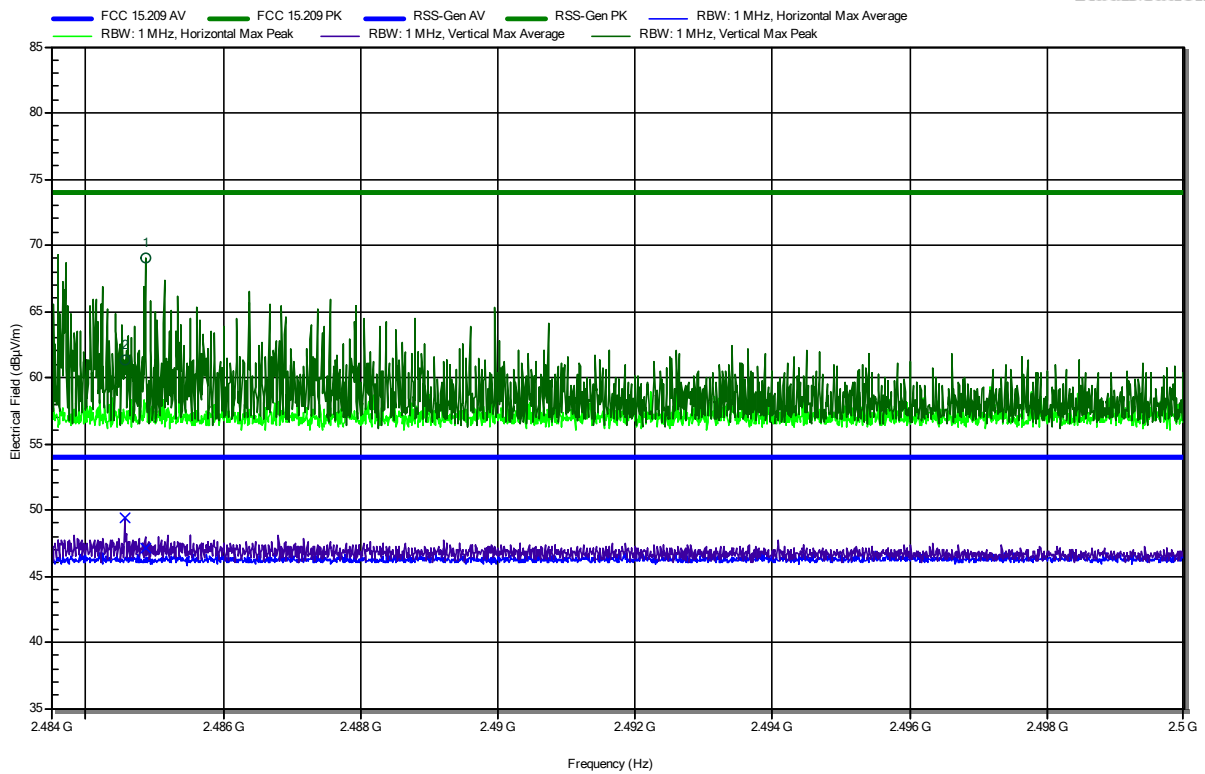
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4852 GHz	68.49 dBµV/m	74 dBµV/m	-5.51 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4852 GHz	46.99 dBµV/m	54 dBµV/m	-7.01 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT20; MCS 2; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note: upper bandedge

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4846 GHz	61.34 dBµV/m	74 dBµV/m	-12.66 dB	Pass	Vertical
2.4849 GHz	69.08 dBµV/m	74 dBµV/m	-4.92 dB	Pass	Vertical

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4846 GHz	49.37 dBµV/m	54 dBµV/m	-4.63 dB	Pass	Vertical
2.4849 GHz	47.1 dBµV/m	54 dBµV/m	-6.9 dB	Pass	Vertical

Test Report No.: G0M-2108-9951-TFC247WF-V01

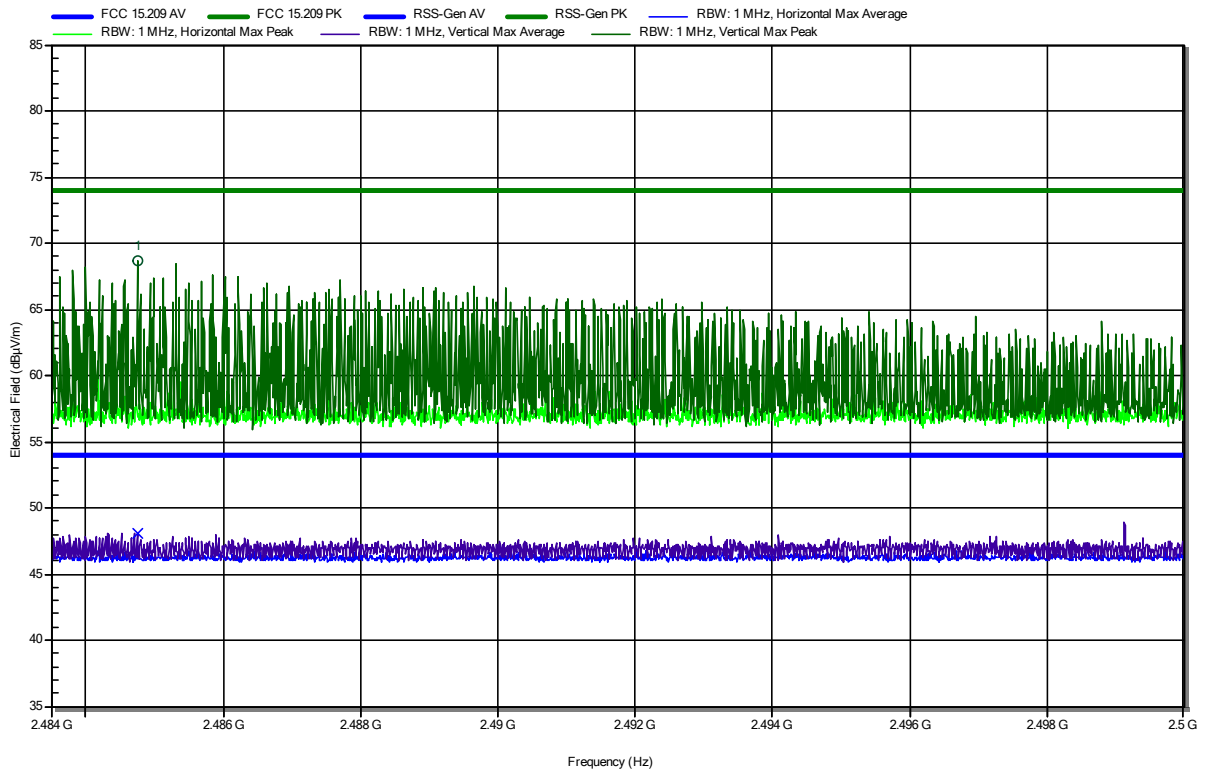
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120B
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 n; HT40; MCS 0; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note: upper bandedge

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RadiMation



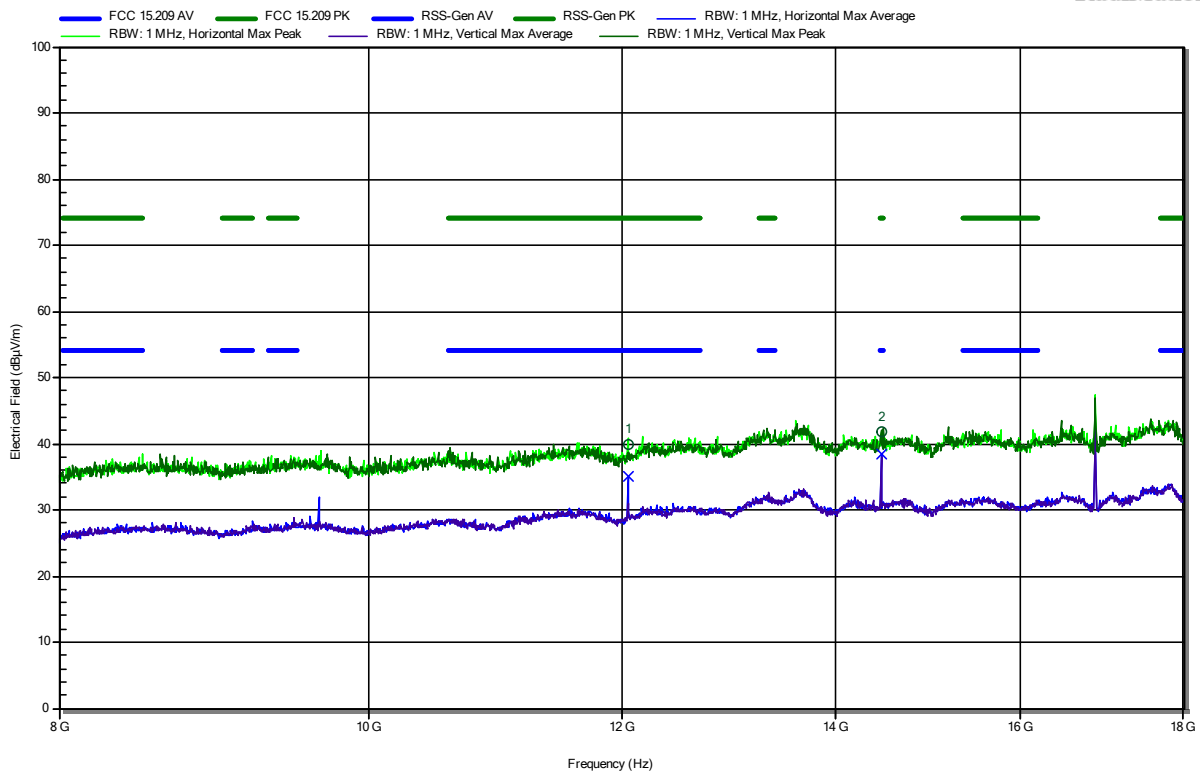
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
2.4847 GHz	68.71 dBµV/m	74 dBµV/m	-5.29 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
2.4847 GHz	48.1 dBµV/m	54 dBµV/m	-5.9 dB	Pass	Vertical

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2412 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
12.058 GHz	39.9 dBµV/m	74 dBµV/m	-34.1 dB	Pass	Horizontal
14.472 GHz	41.88 dBµV/m	74 dBµV/m	-32.12 dB	Pass	Horizontal

Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
12.058 GHz	35.04 dBµV/m	54 dBµV/m	-18.96 dB	Pass	Horizontal
14.472 GHz	38.5 dBµV/m	54 dBµV/m	-15.5 dB	Pass	Horizontal

Test Report No.: G0M-2108-9951-TFC247WF-V01

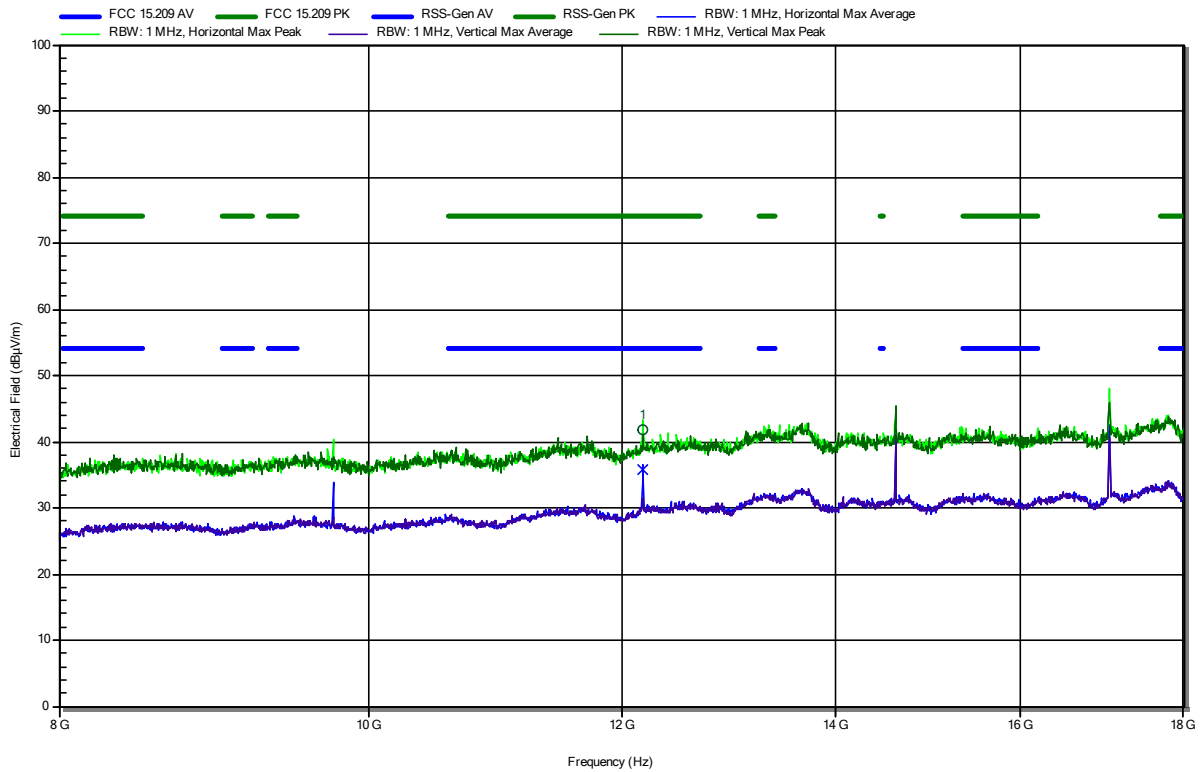
Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2437 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



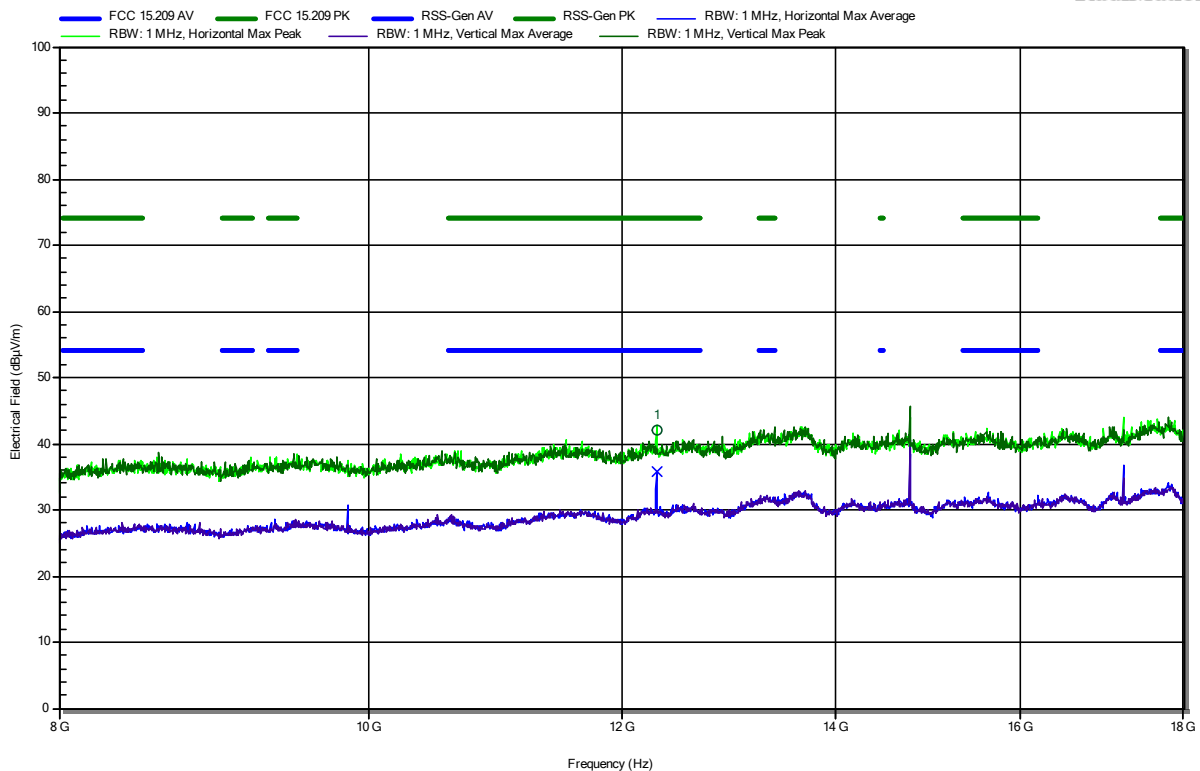
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
12.186 GHz	41.88 dBµV/m	74 dBµV/m	-32.12 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
12.186 GHz	35.77 dBµV/m	54 dBµV/m	-18.23 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2462 MHz
 Test Date: 2021-12-15
 Note:

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RadiMation



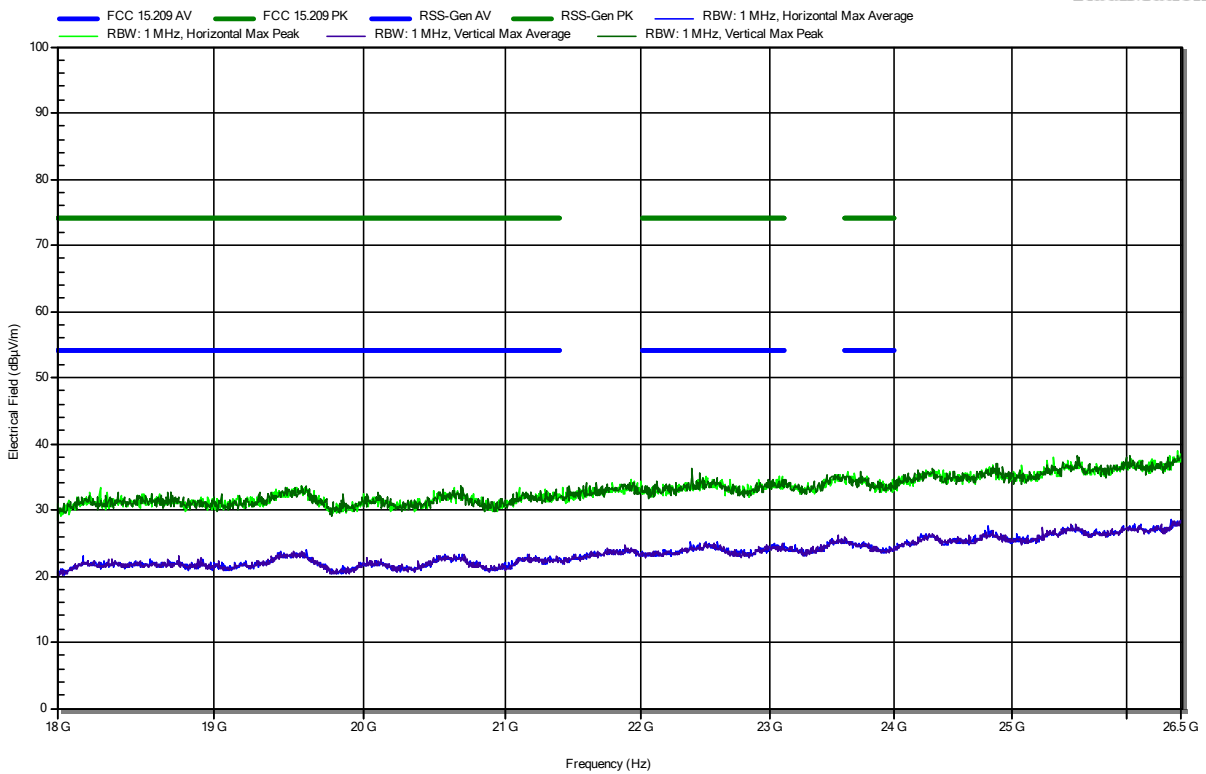
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
12.309 GHz	41.97 dBµV/m	74 dBµV/m	-32.03 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
12.309 GHz	35.84 dBµV/m	54 dBµV/m	-18.16 dB	Pass	Horizontal

Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2412 MHz
 Test Date: 2021-12-16
 Note:

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RadiMation

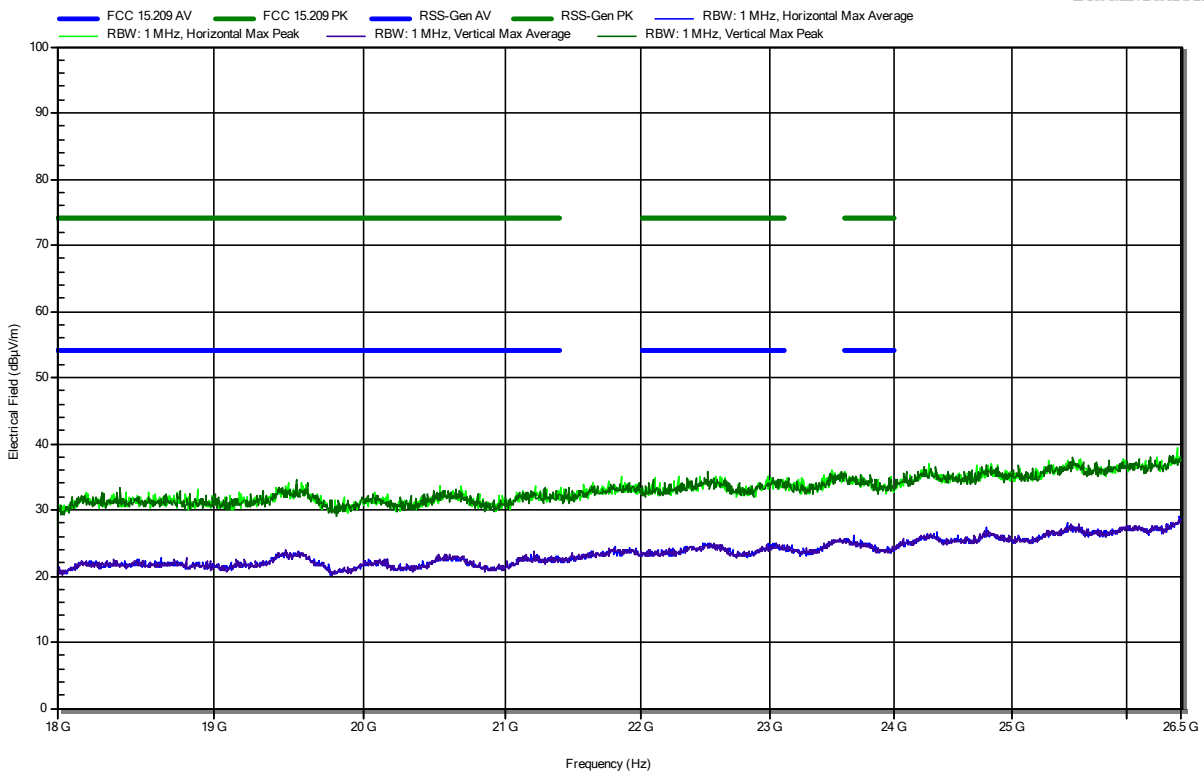


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2437 MHz
 Test Date: 2021-12-16
 Note:

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RadiMation

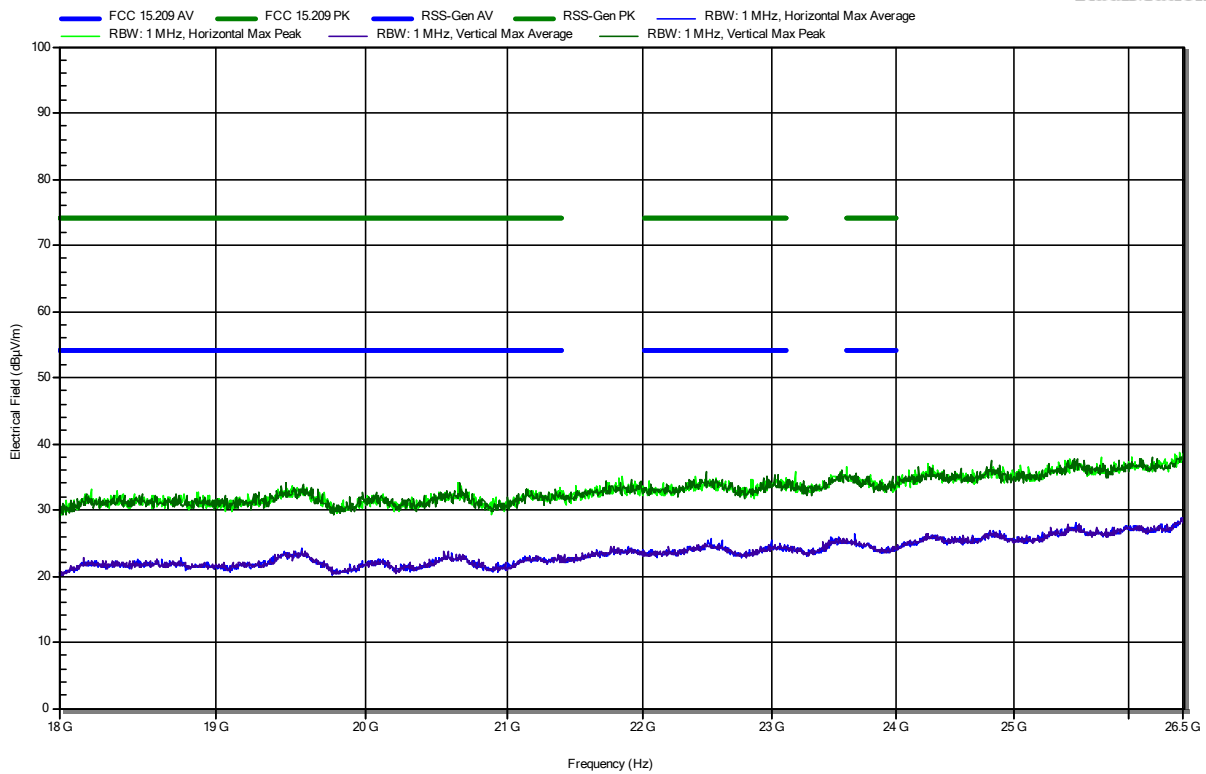


Radiated Spurious Emissions according to 47 CFR Part 15.247

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT4560
 Measurement distance: 3 m
 Mode: Tx; IEEE802.11 b; 1 Mbps; ext. antenna; 2462 MHz
 Test Date: 2021-12-16
 Note:

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RadiMation



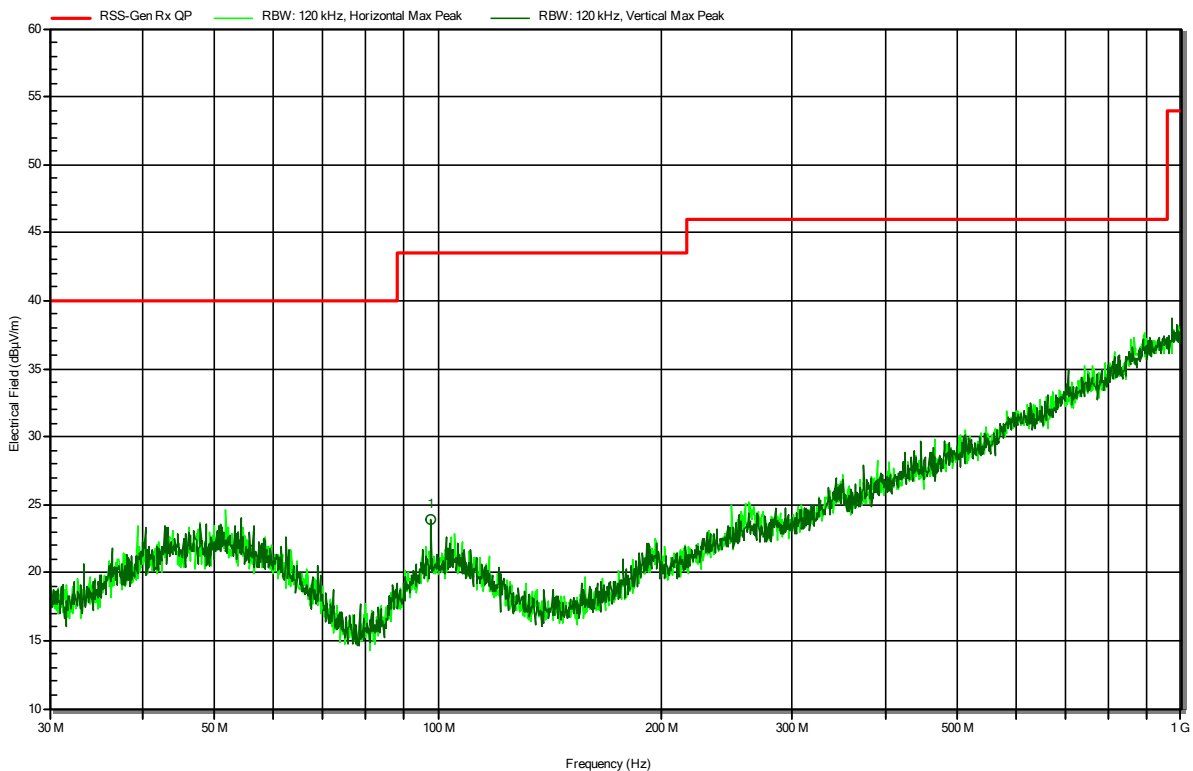
ANNEX B Receiver spurious emissions

Radiated Spurious Emissions according to RSS-247, RSS-Gen

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Voigt
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 22 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck VULB 9162
 Measurement distance: 10 m
 Mode: Rx; IEEE802.11; ext. antenna; 2437 MHz
 Test Date: 2022-03-17
 Note:

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RadiMation



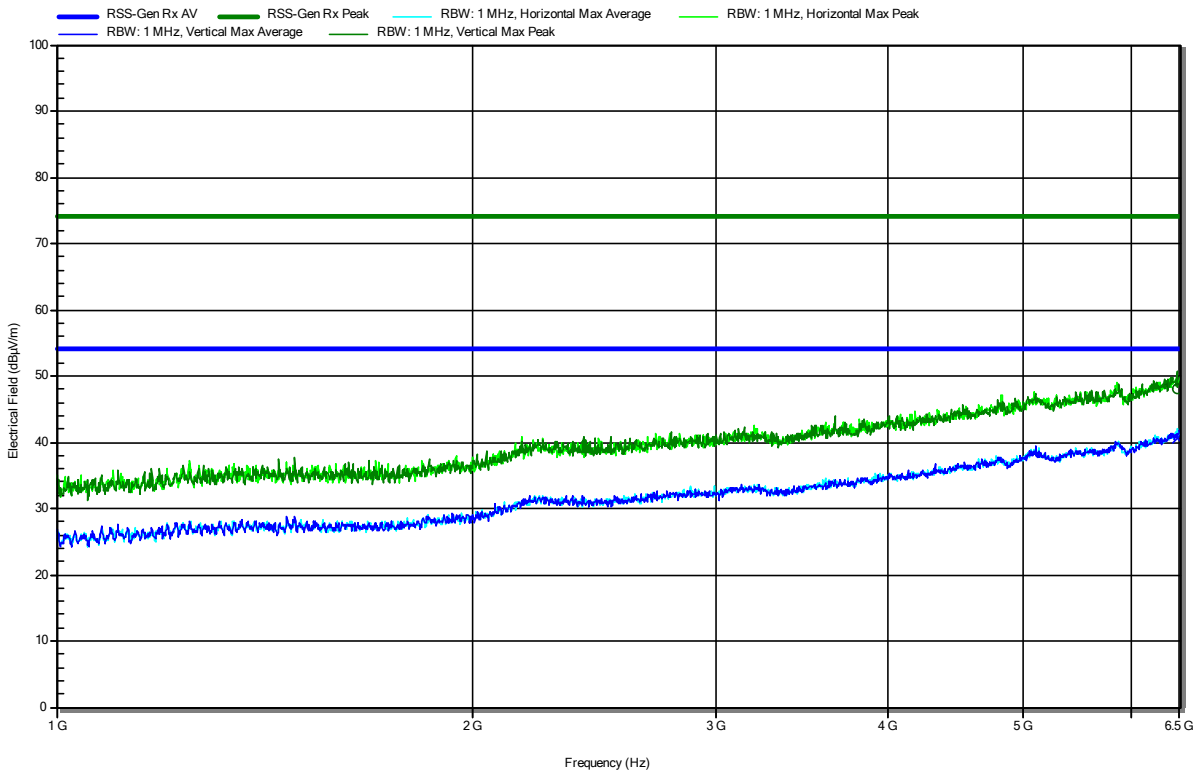
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
97.835 MHz	23.9 dBµV/m	43.5 dBµV/m	-19.6 dB	Pass	Vertical

Radiated Spurious Emissions according to RSS-247, RSS-Gen

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 20 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D
 Measurement distance: 3 m
 Mode: Rx; IEEE802.11; ext. antenna; 2437 MHz
 Test Date: 2022-03-18
 Note:

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RadiMation



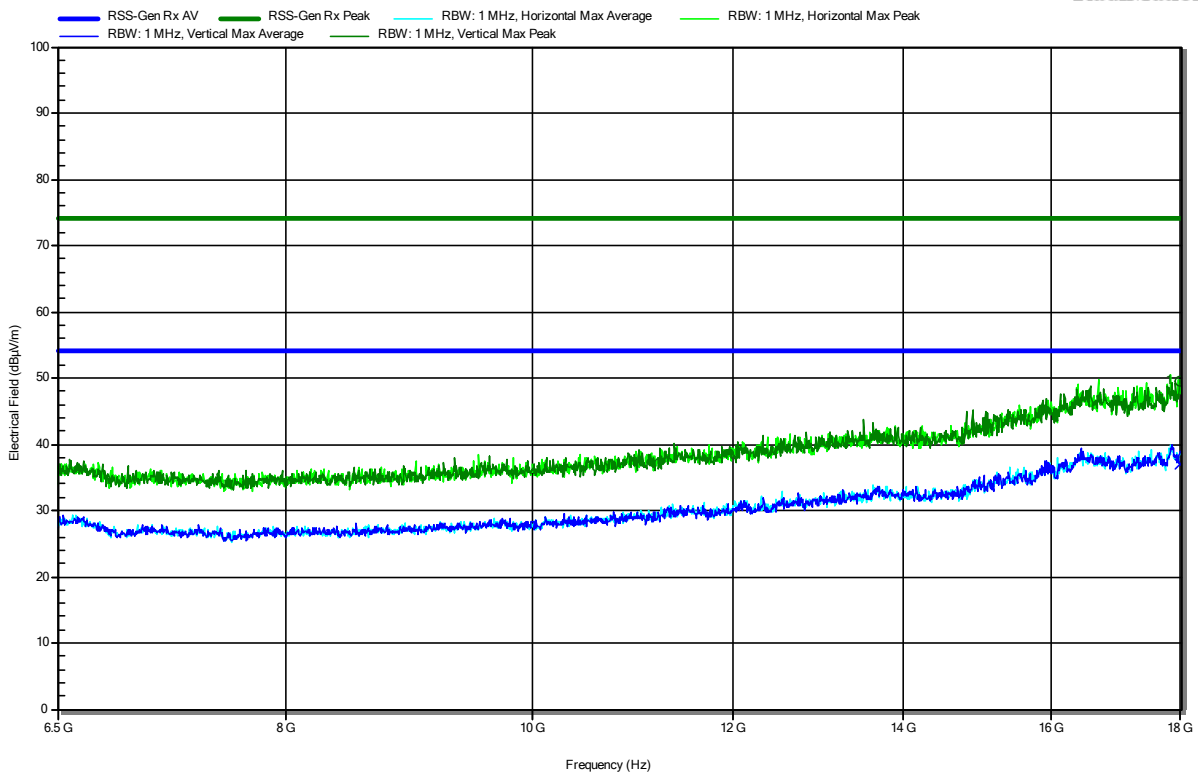
Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
6.47 GHz	48.06 dBµV/m	74 dBµV/m	-25.94 dB	Pass	Horizontal
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
6.47 GHz	40.61 dBµV/m	53.98 dBµV/m	-13.37 dB	Pass	Horizontal

Radiated Spurious Emissions according to RSS-247, RSS-Gen

Project Number: G0M-2101-9569
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9408A1EF
 Test Sample ID: 37322
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Qawasmeh
 Measurement software: RadiMation, version 2020.1.8
 Test Conditions: Tnom: 20 °Celsius, Vnom: 3.3 VDC
 Antenna: Schwarzbeck HWRD 650
 Measurement distance: 3 m
 Mode: Rx; IEEE802.11; ext. antenna; 2437 MHz
 Test Date: 2022-03-18
 Note:

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RadiMation



Frequency	Peak	Peak Limit	Peak Difference	Peak Status	Polarization
17.977 GHz	49.55 dBµV/m	74 dBµV/m	-24.45 dB	Pass	Vertical
Frequency	Average	Average Limit	Average Difference	Average Status	Polarization
17.977 GHz	36.97 dBµV/m	53.98 dBµV/m	-17.01 dB	Pass	Vertical

== = END OF TEST REPORT == =

Test Report No.: G0M-2108-9951-TFC247WF-V01

Eurofins Product Service GmbH
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