RADIO REPORT

FCC 47 CFR Part 15C
ISED Canada RSS-247

Frequency hopping systems operating within the 2400.0 MHz - 2483.5 MHz MHz band

Report Reference No	G0M-2101-9569-TFC247BT-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 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
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	2021-05-27	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2021-08-20	
Total number of pages	154	
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:		

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
	PMN	PAN9028
	HVIN	ENWF9408A2EF
	FVIN	n/a
	HMN	n/a
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	2021-08-20	Initial Release	

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
BR	Basic Rate (Bluetooth)
EDR	Enhanced Data Rate (Bluetooth)
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V_{NOM}	Nominal supply voltage

REPORT INDEX

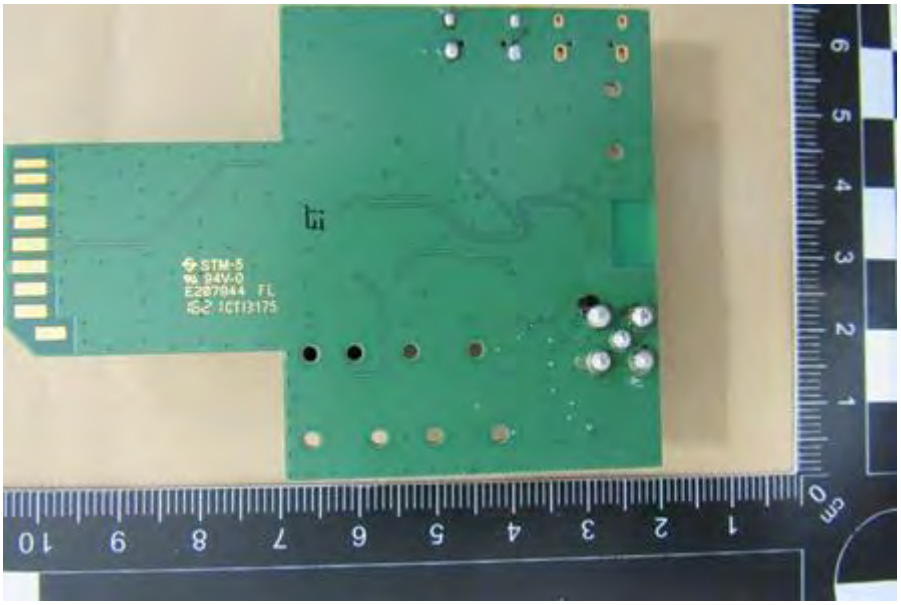
1 Equipment (Test Item) Under Test

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)	A1 8 SerNr: 826 Radiated Test Sample ID 34968	
Hardware Version(s)	04	
Software Version(s)	01	
PMN	PAN9028	
HVIN	ENWF9408A1EF	
FVIN	n/a	
HMN	n/a	
FCC ID	T7V9028	
IC	216Q-9028	
Equipment type	End Product	
Radio type	Transceiver	
Assigned frequency bands	2400.0 MHz - 2483.5 MHz	
Radio technology	Bluetooth	
Modulation	GFSK, PI/4-DQPSK, 8-DPSK	
Number of antenna ports	1	
Antenna	Type	Integrated antenna
	Model	ANT162442DT-2001A2
	Manufacturer	TDK
	Gain	2.1 dBi (declared by applicant)
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
Manufacturer	Panasonic Industrial Devices Europe GmbH Zeppelinstr. 19 21337 Lüneburg GERMANY	

1.1 Photos – Equipment External

EUT Overview

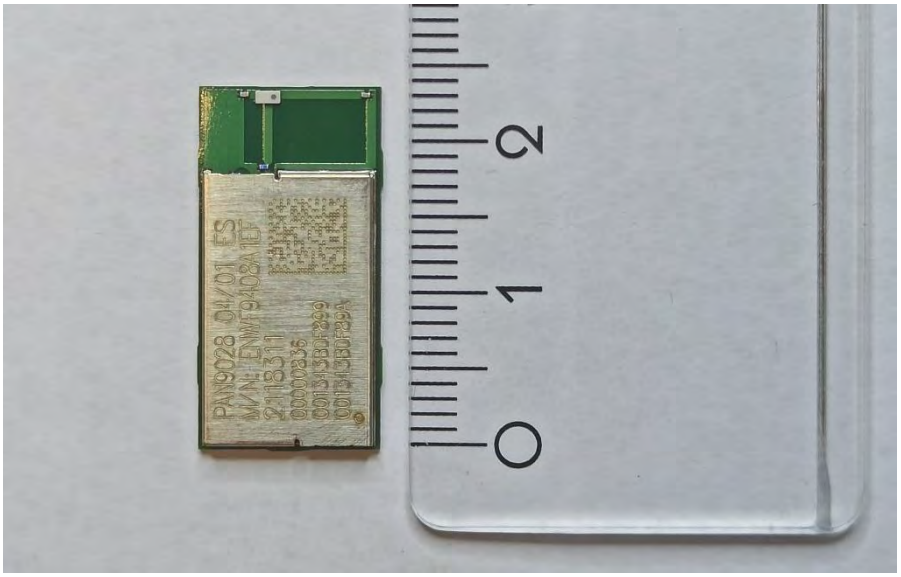

IMG_3311 A1 8 SerNr: 826


EUT Bottom View


AE 1: Wandboard WBIMX6U, Top View


AE 1: Wandboard WBIMX6U, Bottom View

1.2 Photos – Equipment Internal

ENWF9408A1EF_top_case


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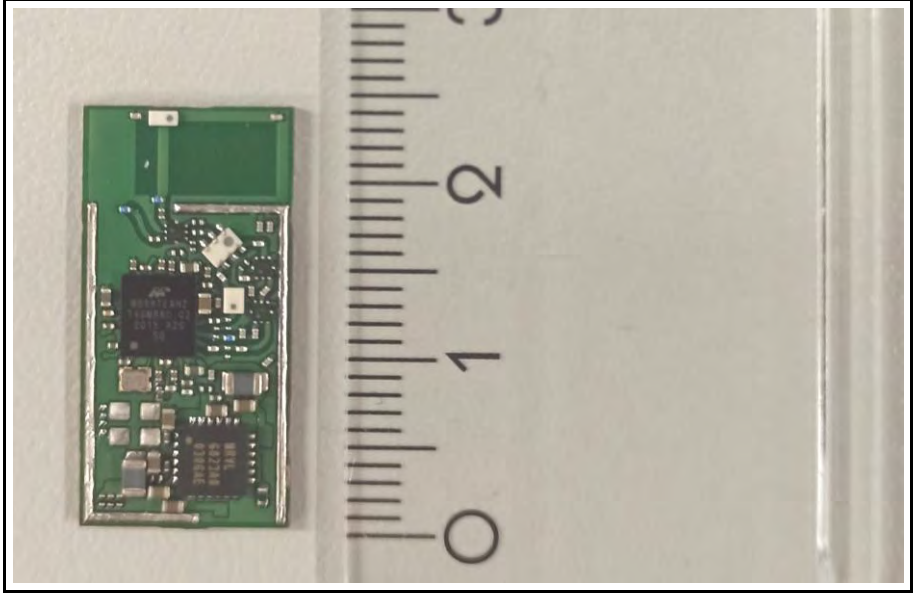

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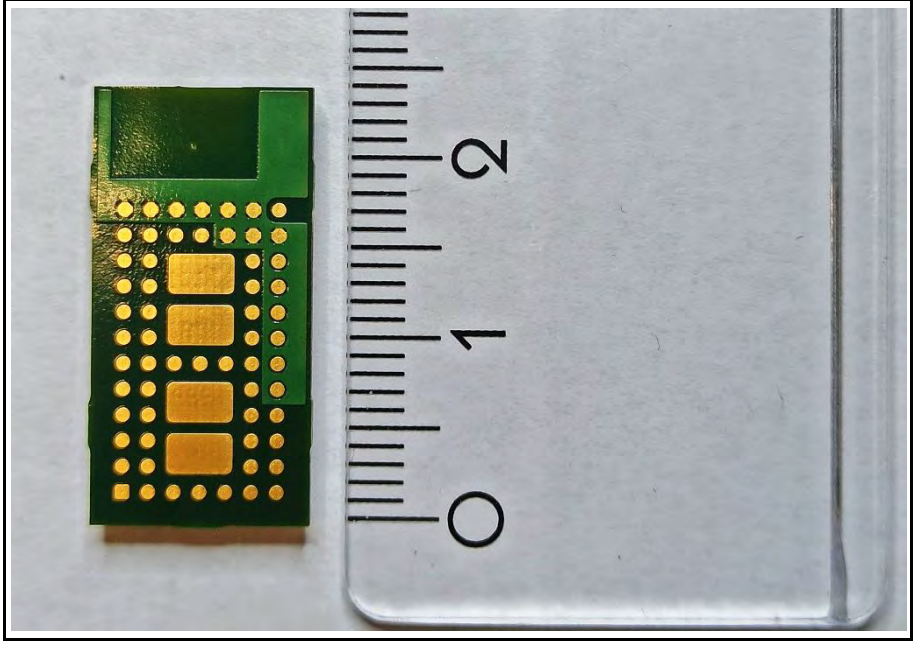

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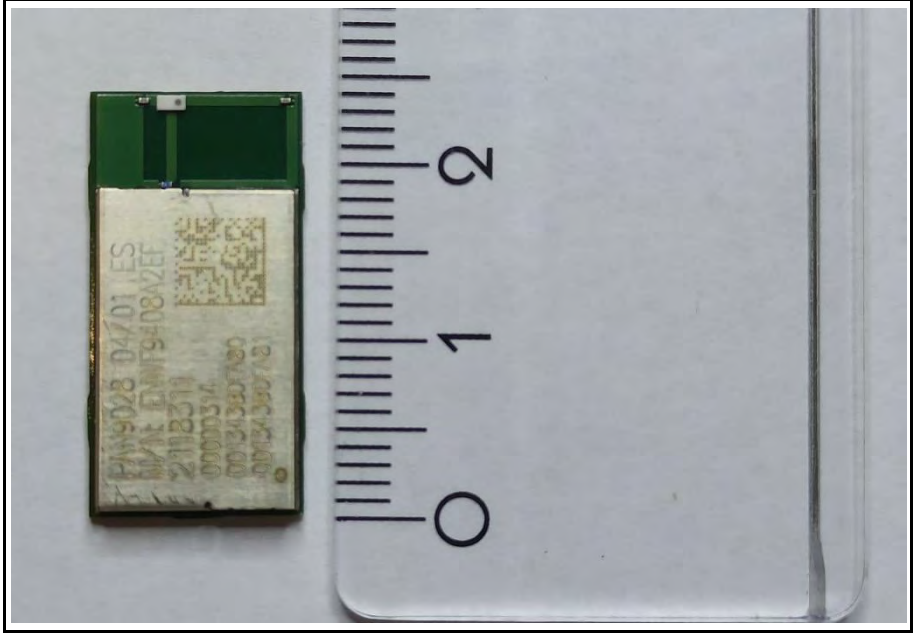

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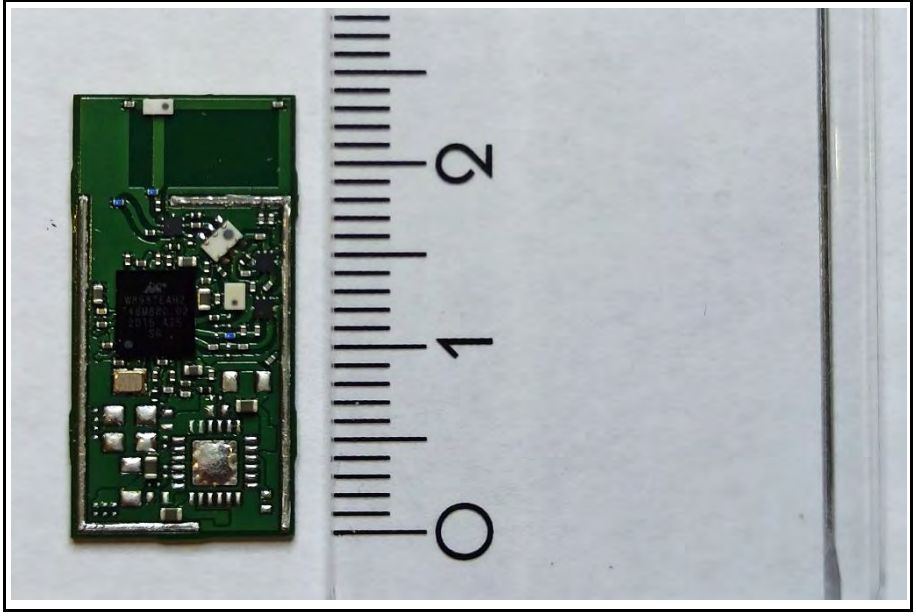
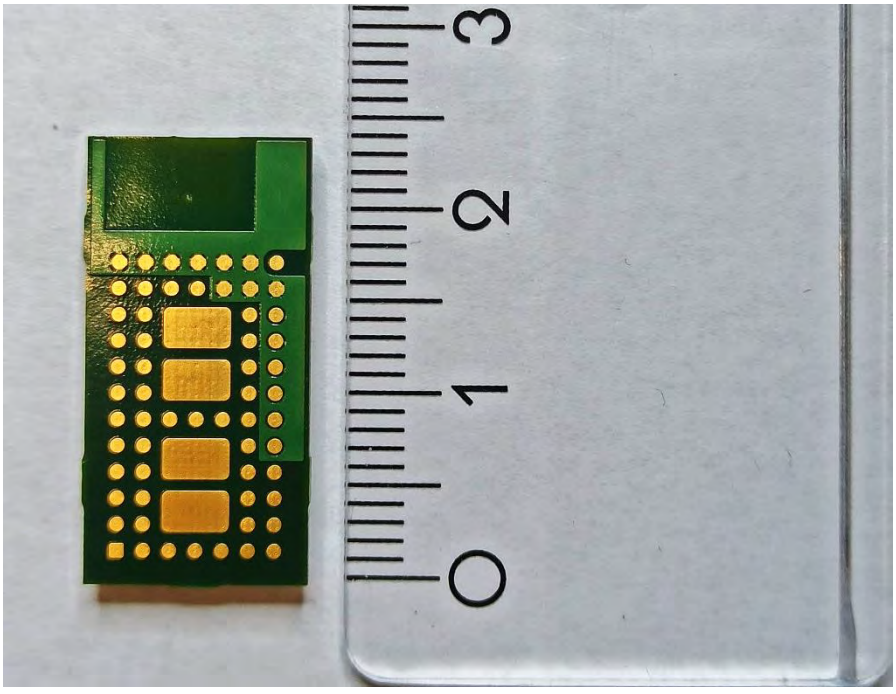
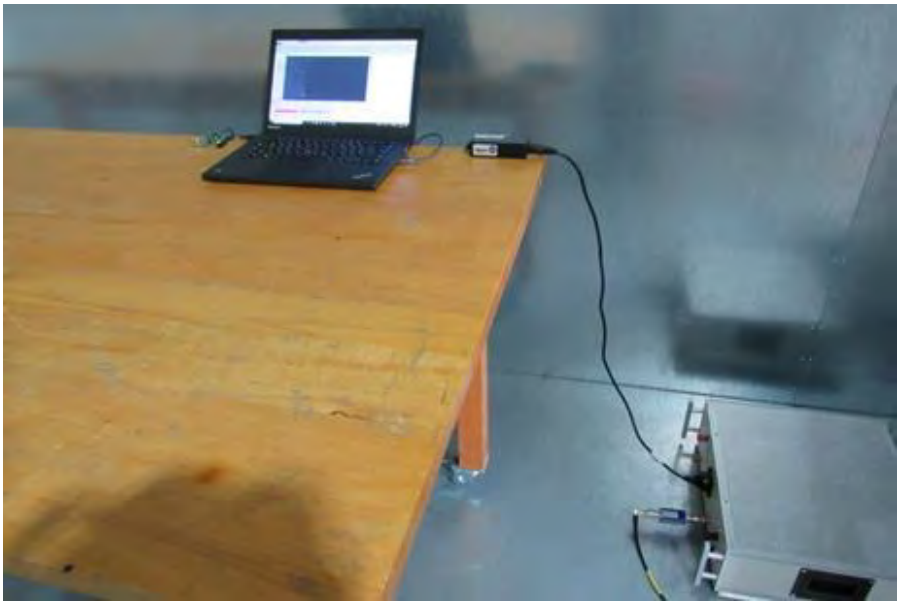


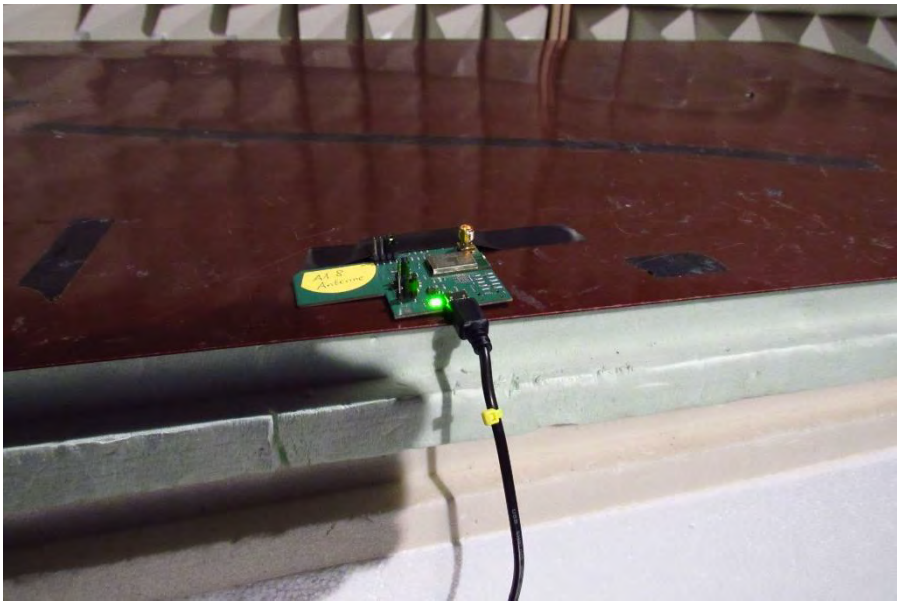
ENWF9408A2EF_back


1.1 Photos – Test Setup

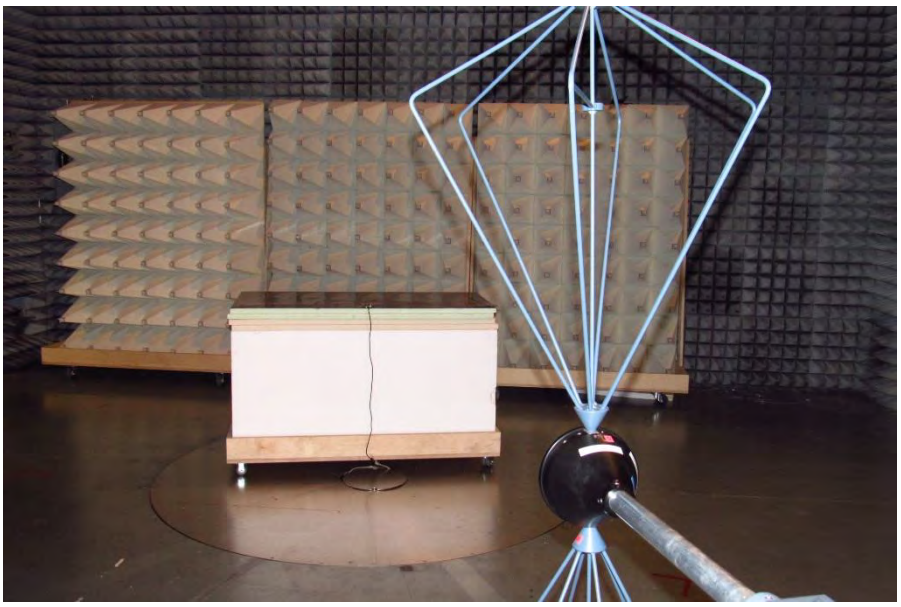
Test setup A - conducted measurement


Test setup B - conducted measurement

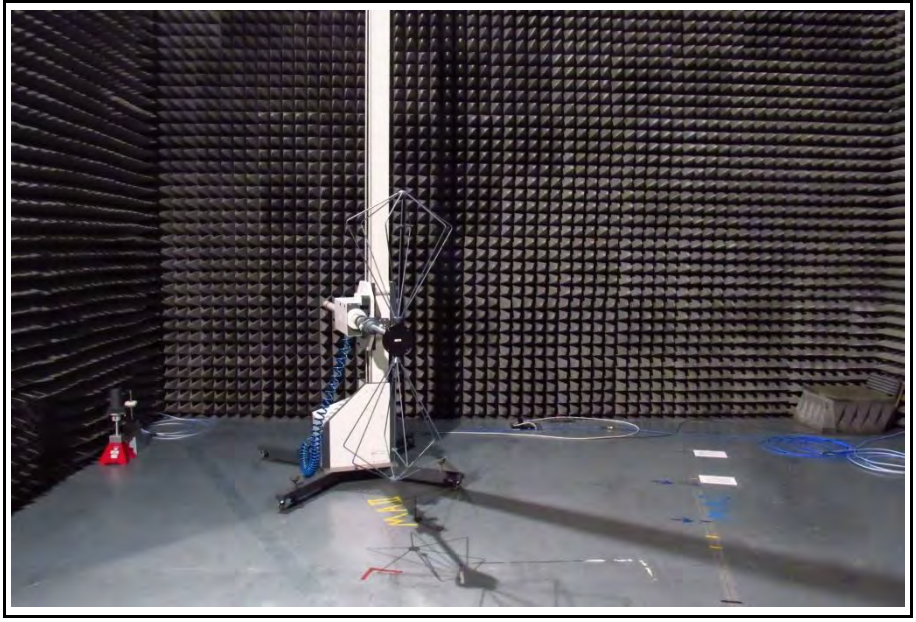

Radiated Setup - View A



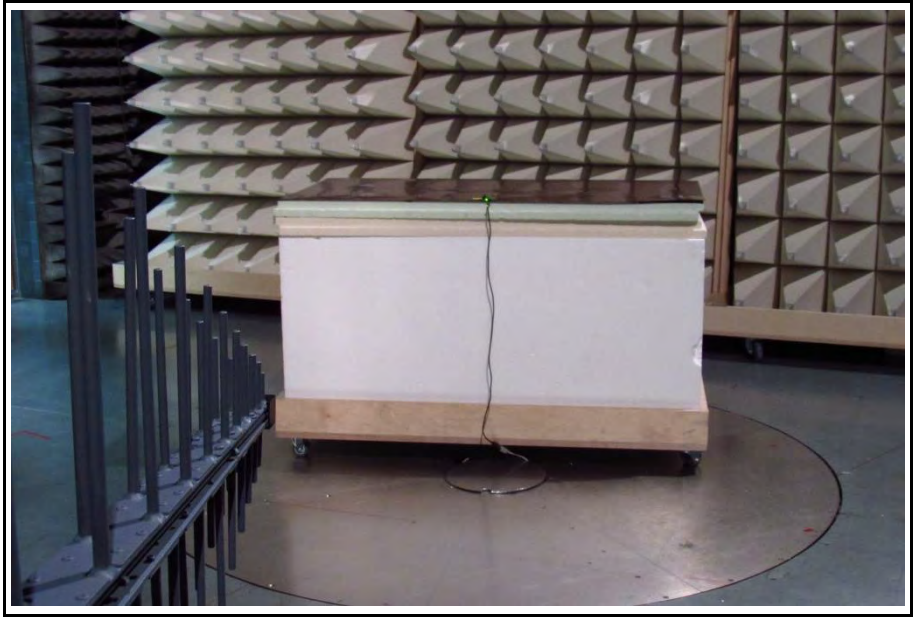
Radiated Setup - View B



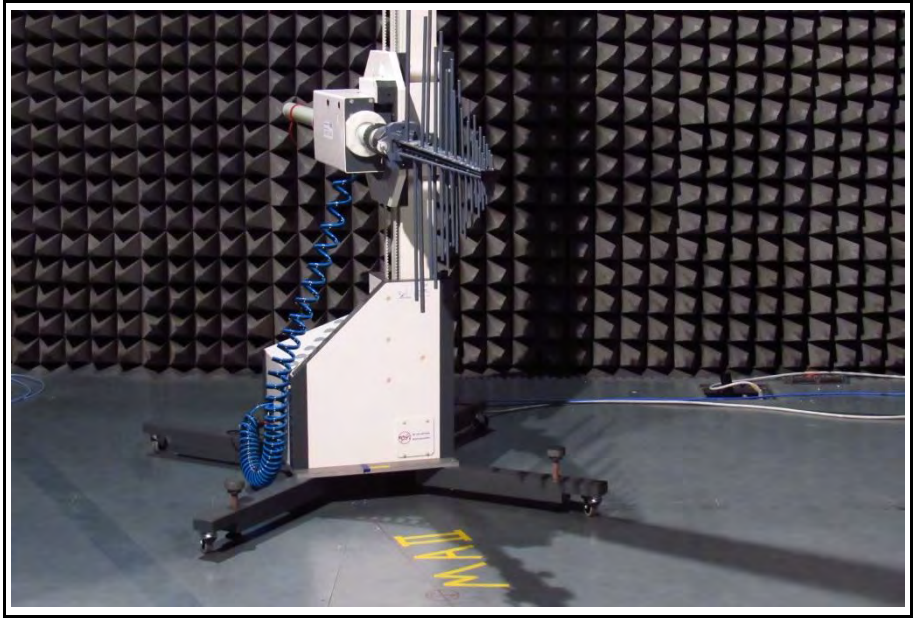
Radiated Setup - View C



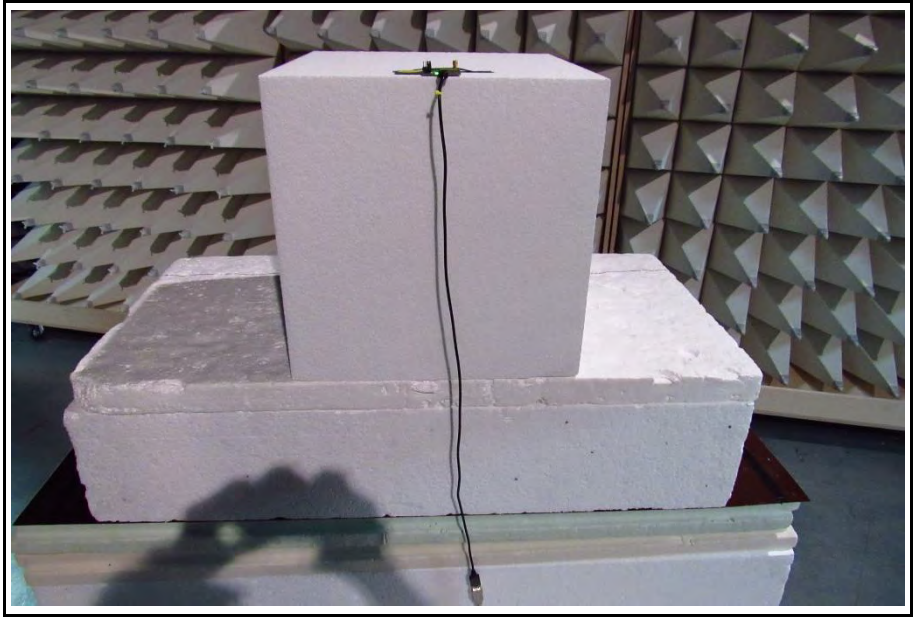
Radiated Setup - View D



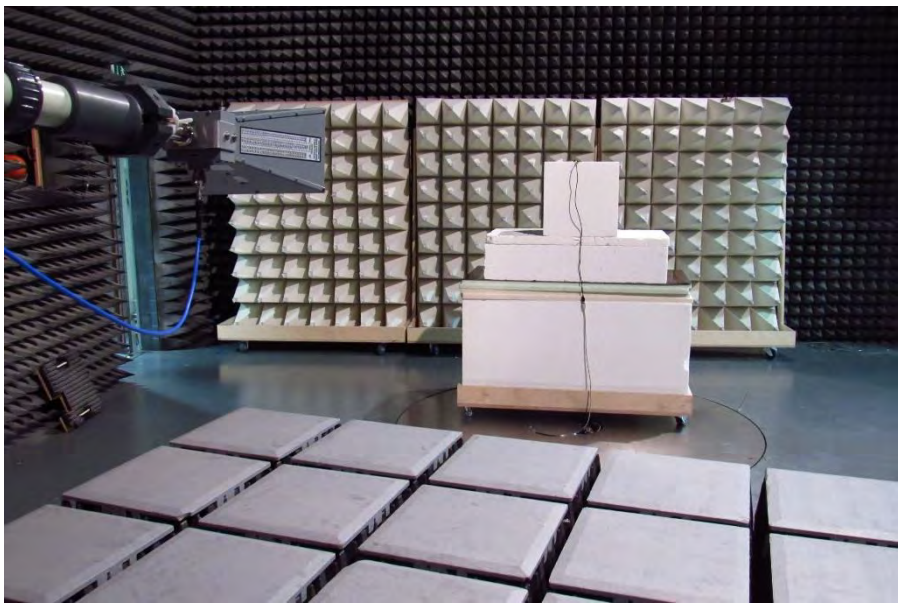
Radiated Setup - View E



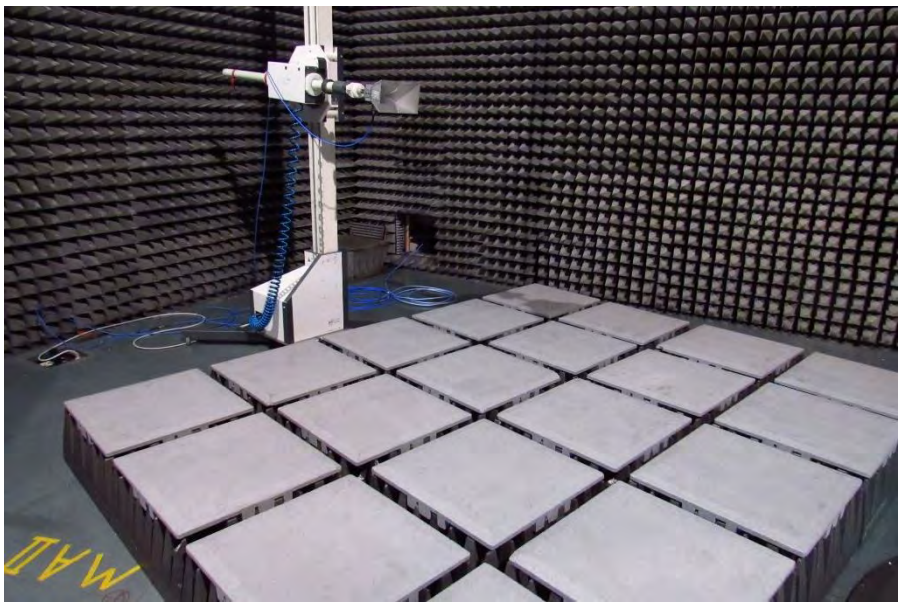
Radiated Setup - View F



Radiated Setup - View G



Radiated Setup - View H



1.2 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Controller	Wandboard	WBIMX6U	Wandboard with i.MX6 Dual Core
AE	PAN9028 EngBrd_V30	Panasonic Industrial Devices Europe	PAN9028 EngBrd_V30	SDIO Stick
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
SFT Note: 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:				

1.3 Test Modes

Mode	Description
DH5 Single	Mode = Transmit Modulation = GFSK Spreading = None Packet type = DH5 Duty cycle = 78%
2-DH5 Single	Mode = Transmit Modulation = PI/4-DQPSK Spreading = None Packet type = 2-DH5 Duty cycle = 78%
3-DH5 Single	Mode = Transmit Modulation = 8-DPSK Spreading = None Packet type = 3-DH5 Duty cycle = 78%
DH5 Hopping	Mode = Transmit Modulation = GFSK Spreading = FHSS Packet type = DH5 Duty cycle = 78%
2-DH5 Hopping	Mode = Transmit Modulation = PI/4-DQPSK Spreading = FHSS Packet type = 2-DH5 Duty cycle = 78%
3-DH5 Hopping	Mode = Transmit Modulation = 8-DPSK Spreading = FHSS Packet type = 3-DH5 Duty cycle = 78%
Receive	Mode = Receive
Comment:	

1.4 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	0	2402
F2	Tx / Rx	39	2441
F3	Tx / Rx	40	2442
F4	Tx / Rx	78	2480

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:

Reading on Analyzer (dBµV) + A.F. (dB/m) = Net field strength (dBµV/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:

Limit (dBµV/m) = 20*log (µV/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 (section 6.7)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(1) ISED RSS-247 § 5.1 Issue 2	20 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Number of hopping frequencies	ANSI C63.10-2013	PASS	
FCC § 15.247(a)(1) ISED RSS-247, Issue 2 (section 5.1)	Frequency hopping channel separation	ANSI C63.10-2013	PASS	
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Time of occupancy (Dwell time)	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 § 15.207 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 (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 C63.10-2013	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 - Occupied bandwidth

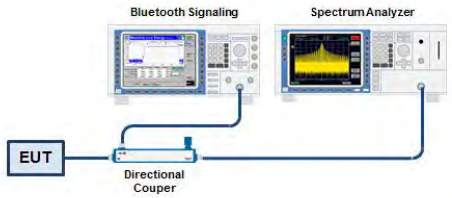
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.7)
Measurement Method	ANSI C63.10 6.9.3
Measurement Uncertainty	± 1.26 %
Test Sample ID	34968, (A1 8 SerNr: 826)
Operator	Wilfried Treffke
Date	2021-07-26

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup

Test Setup


3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.1.5 Procedure

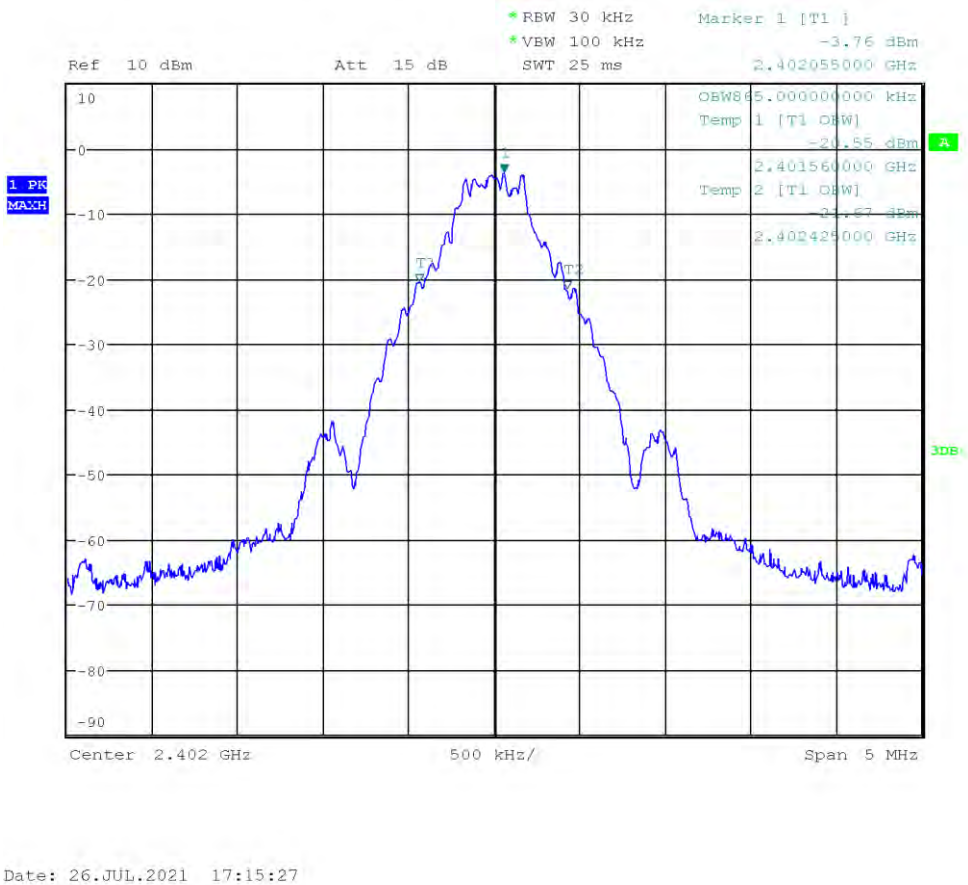
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied bandwidth 4. The occupied bandwidth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

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
DH5	2402	0.865
DH5	2441	0.860
DH5	2480	0.860
2-DH5	2402	1.170
2-DH5	2441	1.170
2-DH5	2480	1.170
3-DH5	2402	1.175
3-DH5	2441	1.175
3-DH5	2480	1.180

Occupied Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	0.865



Occupied Bandwidth

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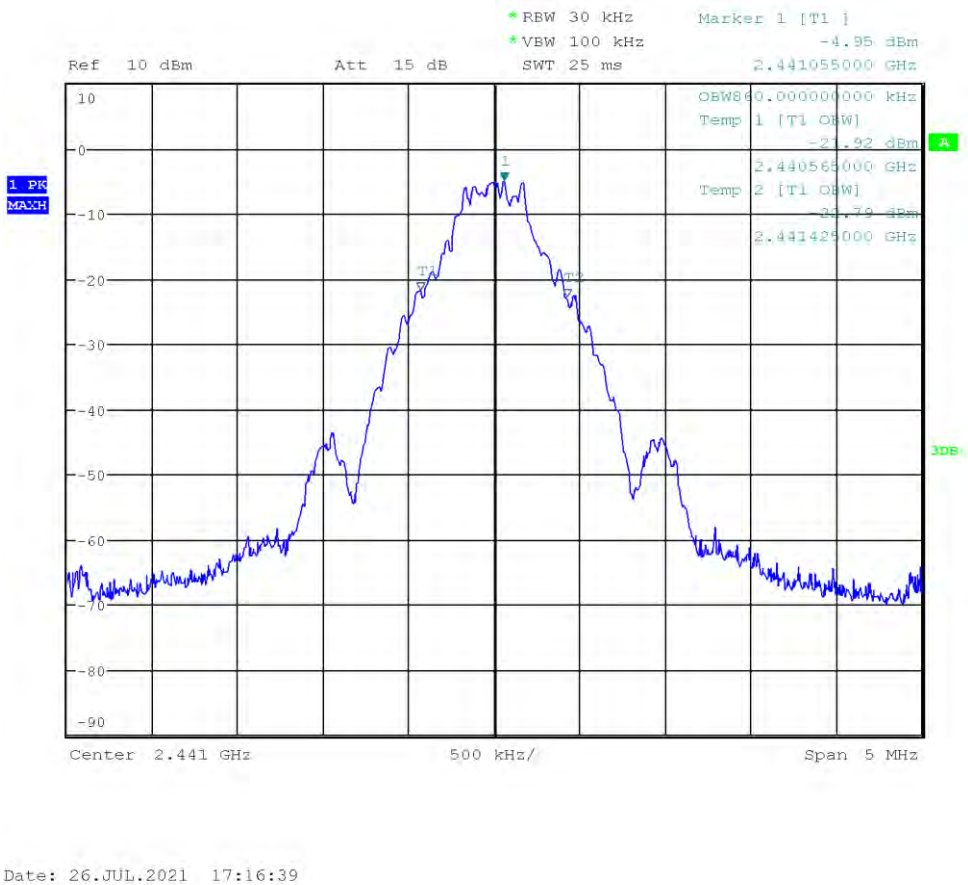
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9408A1EF
Test Sample ID:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	0.860



Occupied Bandwidth

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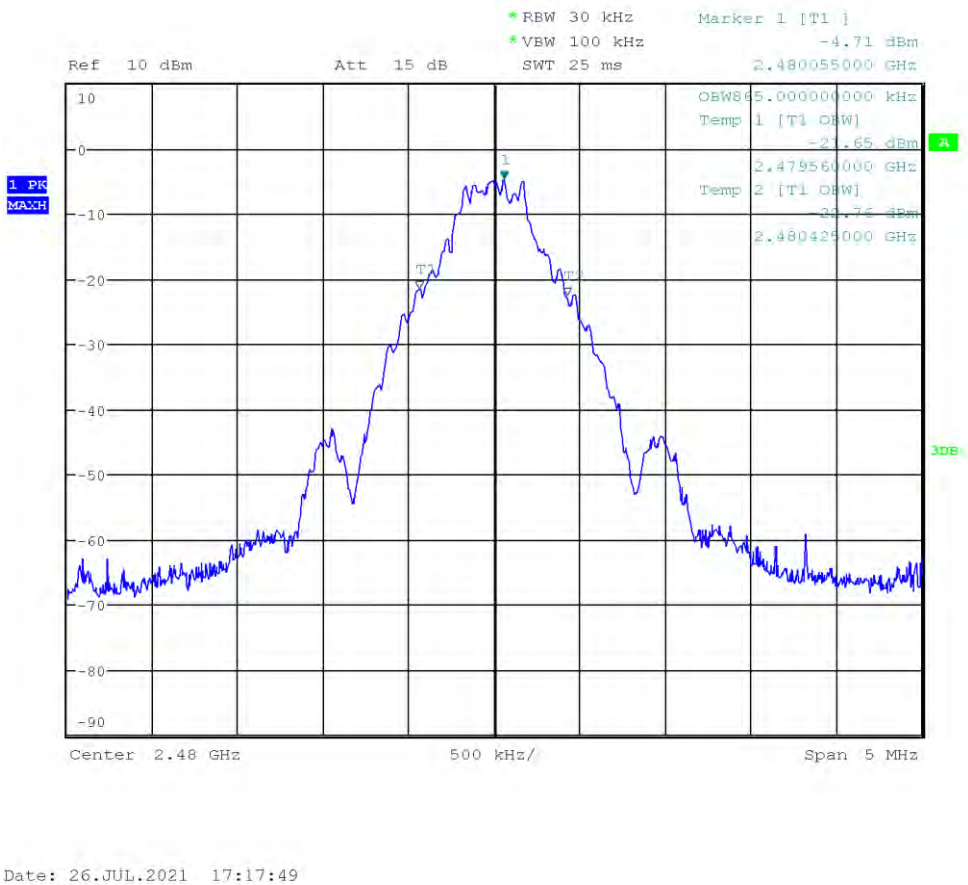
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9408A1EF
Test Sample ID:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	0.860



Occupied Bandwidth

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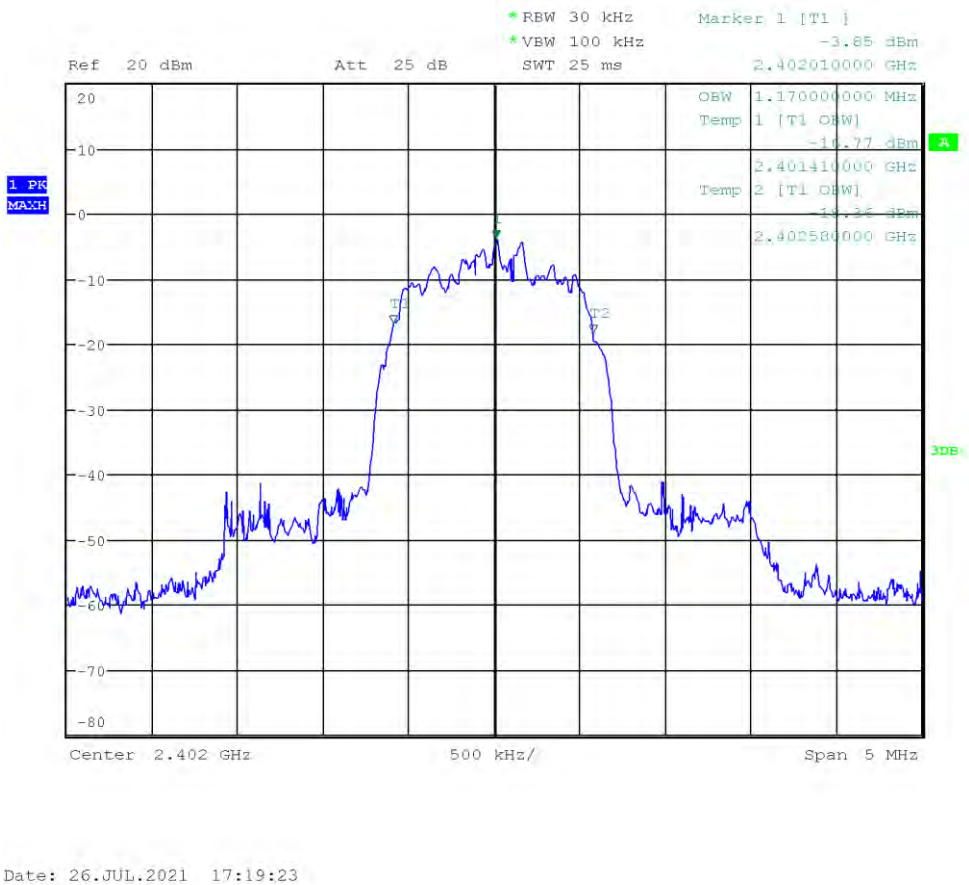
Model:	ENWF9408A1EF
Test Sample ID:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	2-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	1.170



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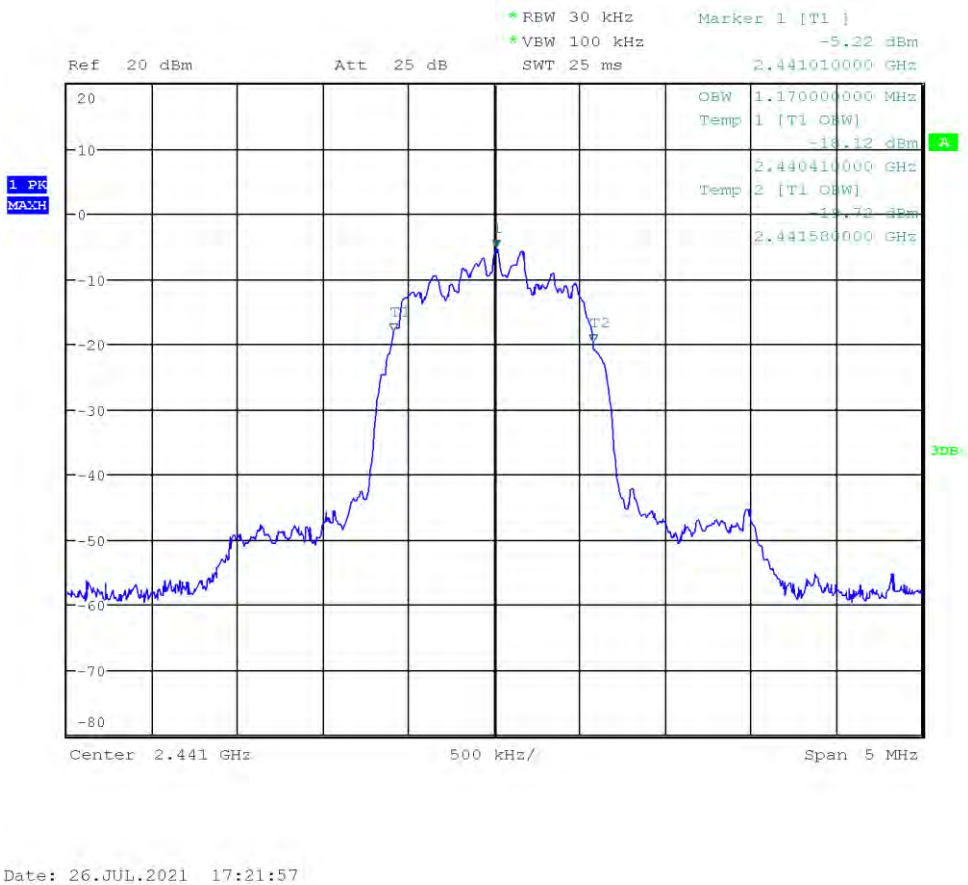
Test Sample ID:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	2-DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	1.170



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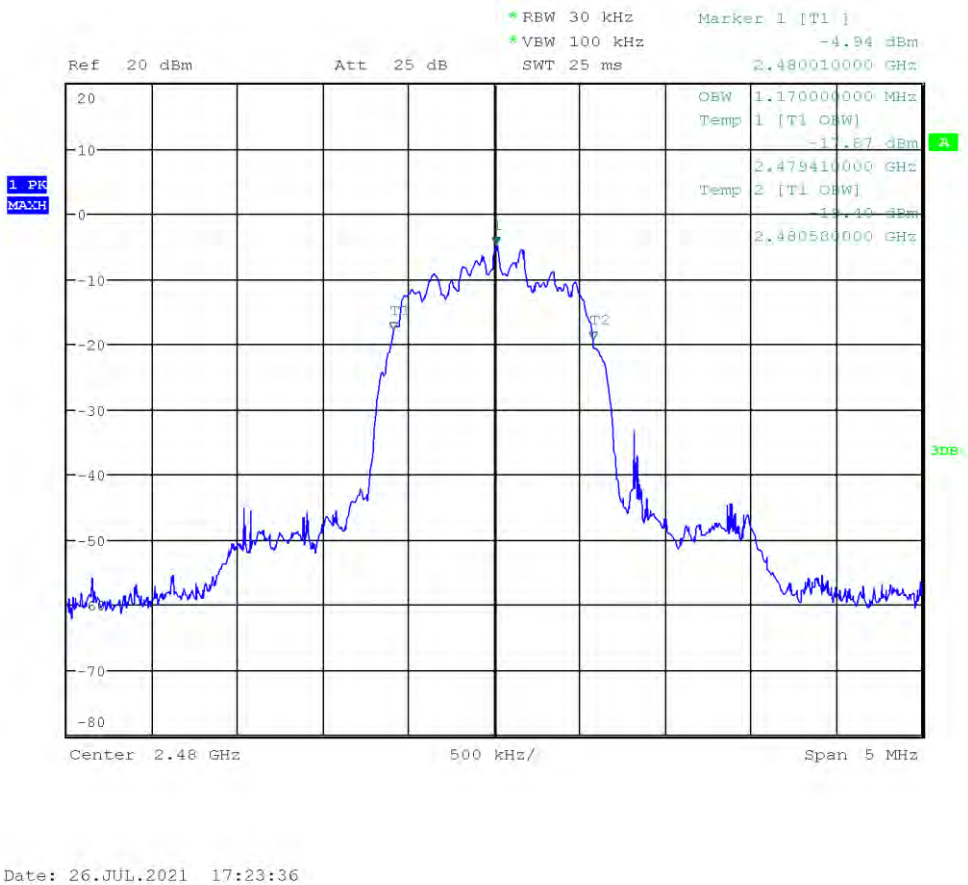
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	2-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	1.170



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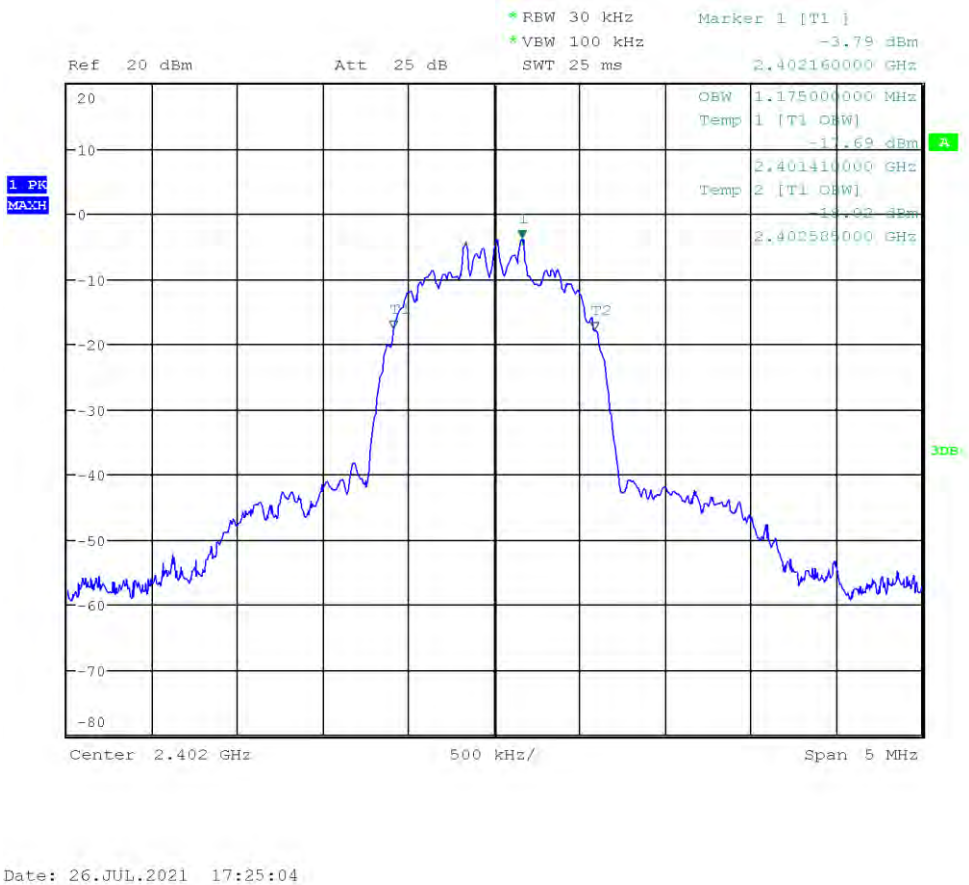
Model:	ENWF9408A1EF
Test Sample ID:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	3-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	1.175



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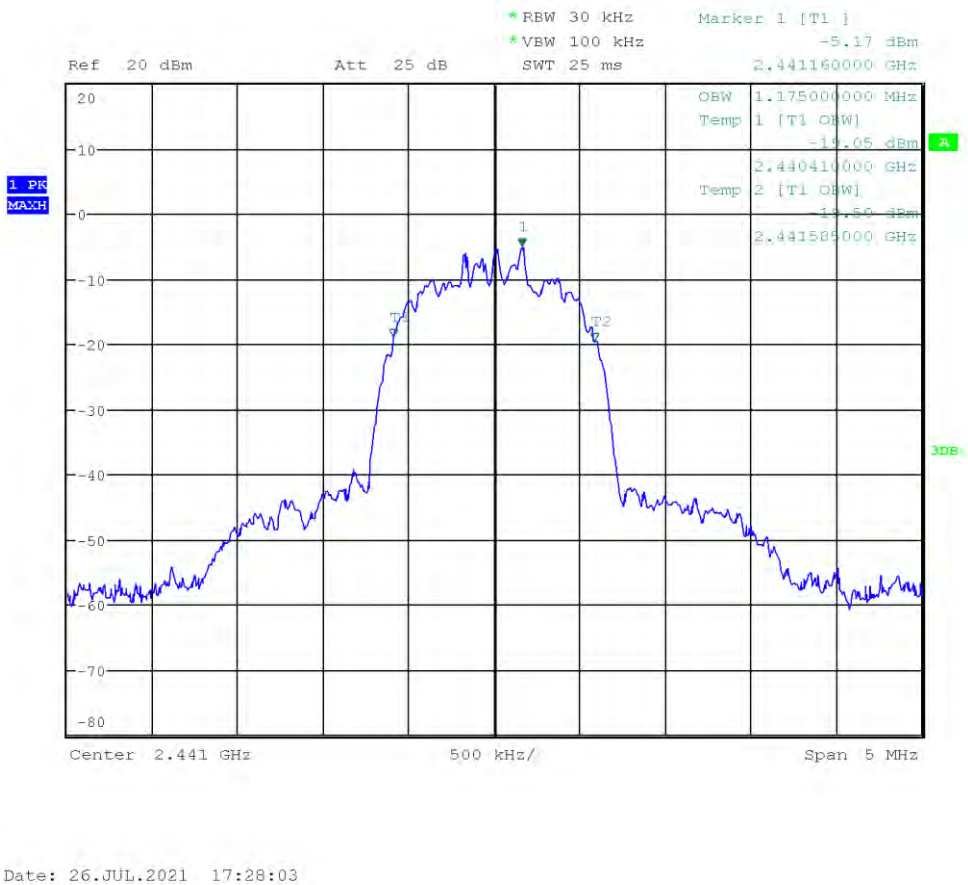
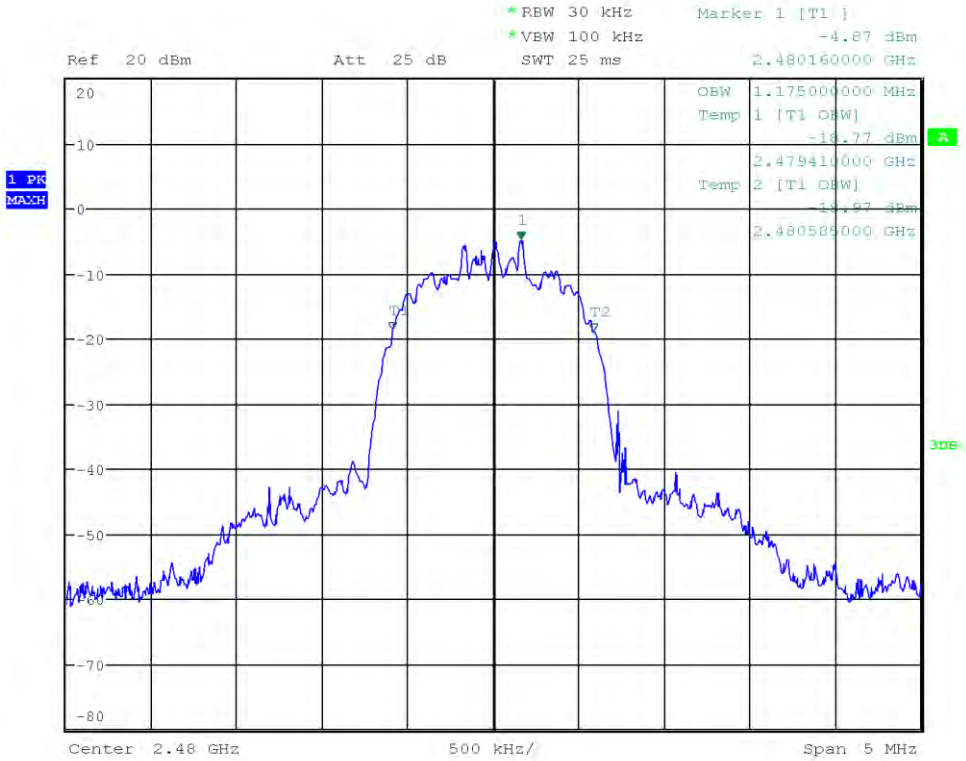
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	3-DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	1.175



Occupied Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	3-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Occupied Bandwidth [MHz]:	1.180



3.2 Test Conditions and Results - 20 dB bandwidth

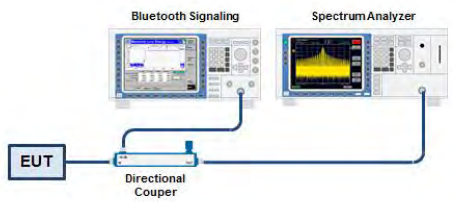
3.2.1 Information

Test Information	
Reference	FCC 15.247(a)(1) / ISED RSS-247 5.1
Measurement Method	ANSI C63.10 6.9.2
Measurement Uncertainty	± 1.26 %
Test Sample ID	34968, (A1 8 SerNr: 826)
Operator	Wilfried Treffke
Date	2021-07-26

3.2.2 Limits

Limits
None (Informational only)

3.2.3 Setup

Test Setup


3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.2.5 Procedure

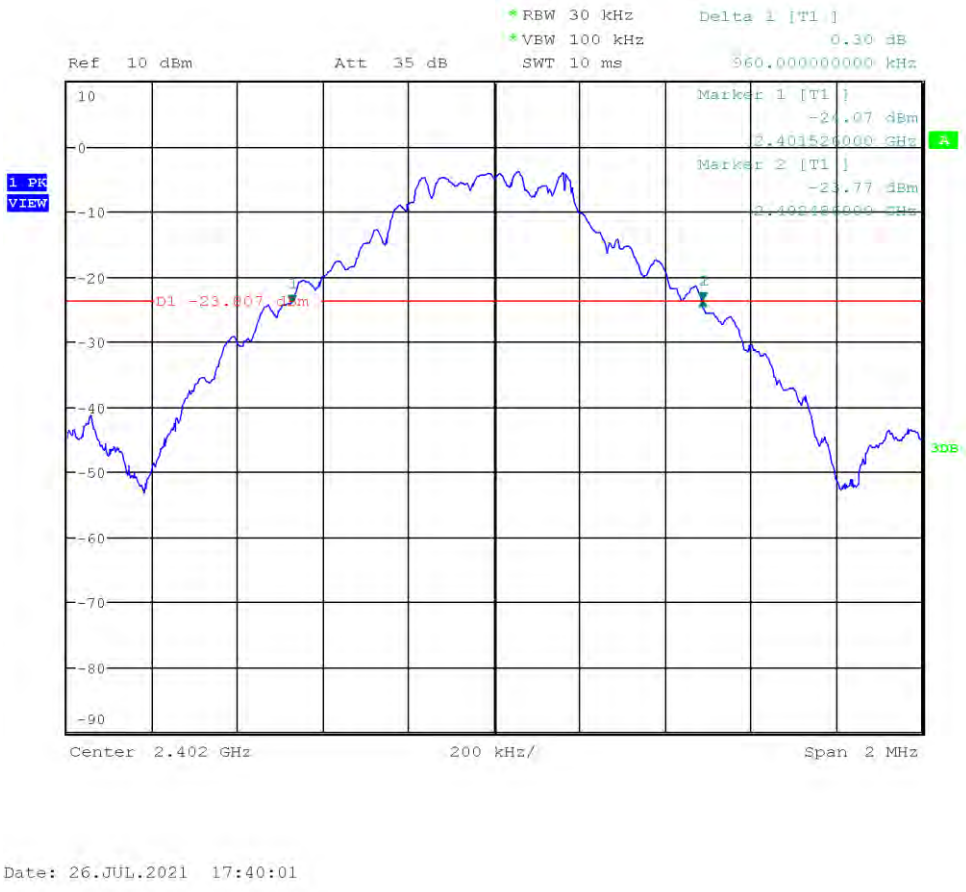
Test Procedure
1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Detector set to peak and max hold
4. Envelope peak value of emission spectrum is selected
5. Marker on envelope of spectrum is set to level of -20 dB to the left of the peak
6. Marker on envelope of spectrum is set to level of -20 dB to the right of the peak
7. 20dB Bandwidth is determined by marker frequency separation

3.2.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
DH5	2402	0.960
DH5	2441	0.956
DH5	2480	0.958
2-DH5	2402	1.328
2-DH5	2441	1.324
2-DH5	2480	1.326
3-DH5	2402	1.304
3-DH5	2441	1.304
3-DH5	2480	1.302

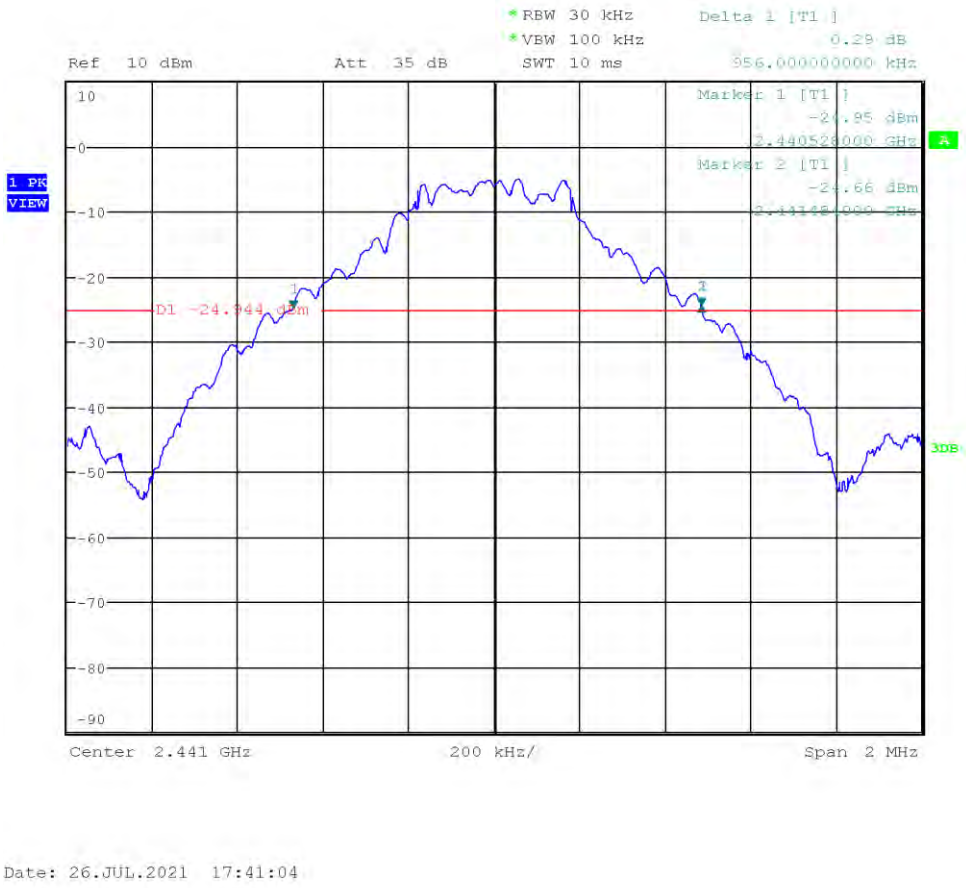
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2401.526
Upper Frequency [MHz]:	2402.486
20 dB Bandwidth [MHz]:	0.960



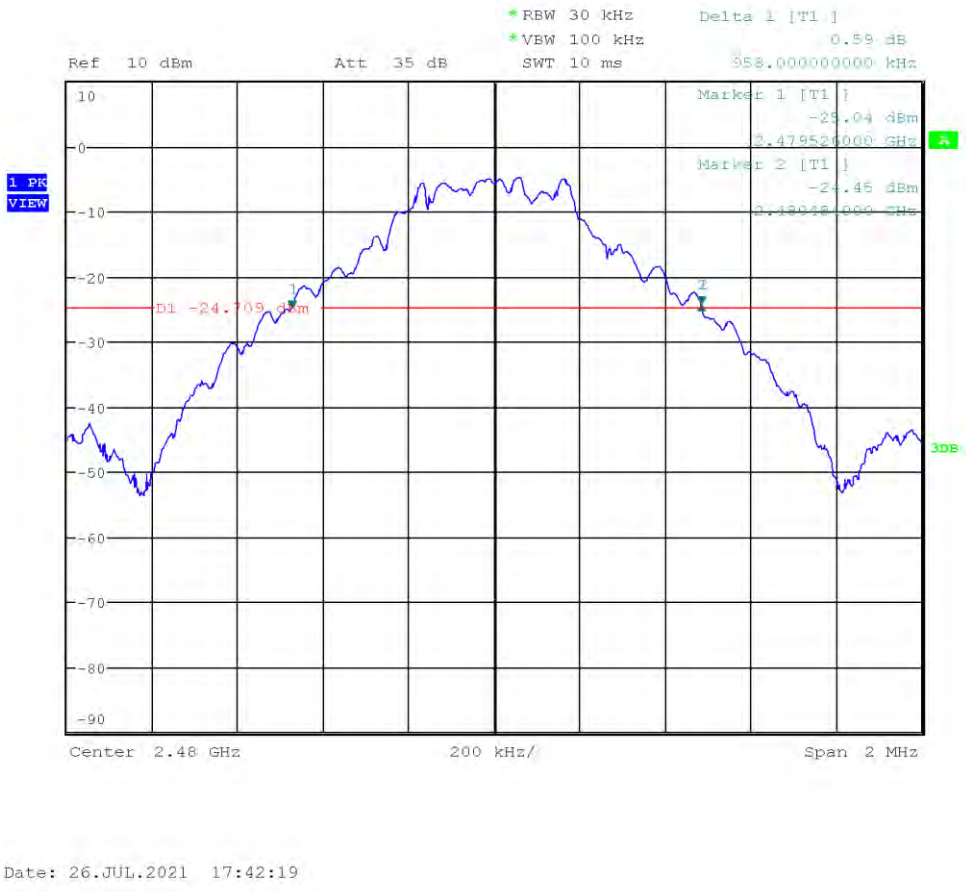
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2440.528
Upper Frequency [MHz]:	2441.484
20 dB Bandwidth [MHz]:	0.956



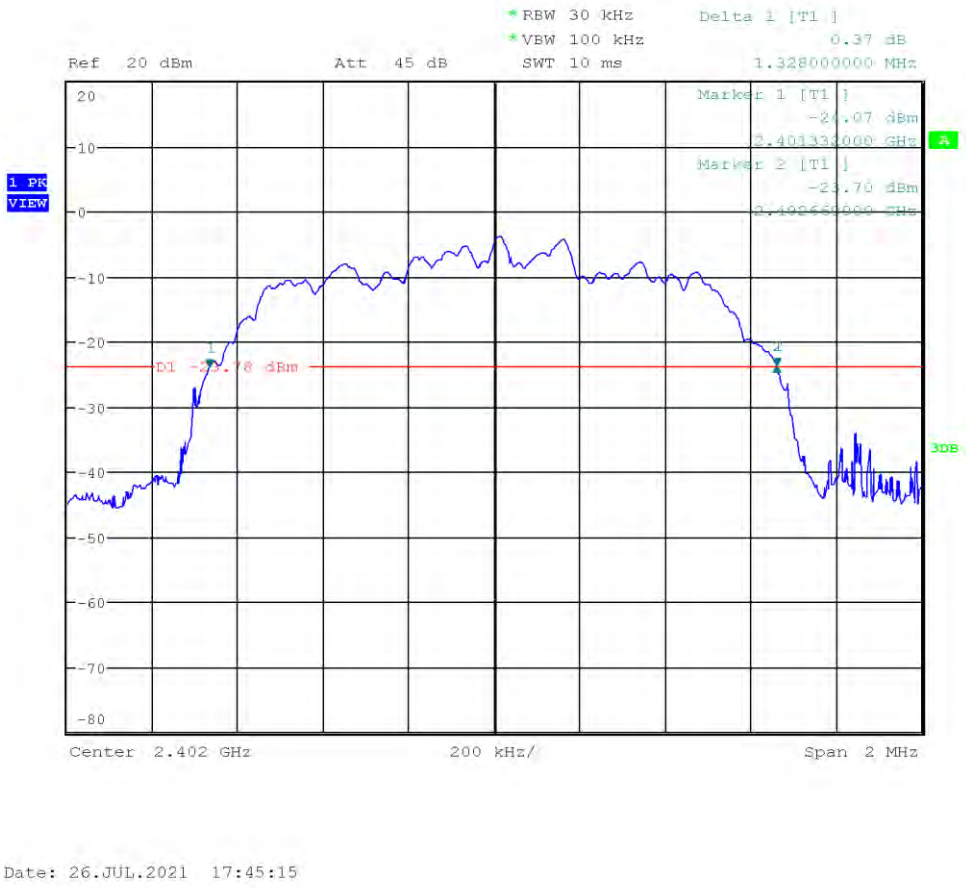
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2479.526
Upper Frequency [MHz]:	2480.484
20 dB Bandwidth [MHz]:	0.958



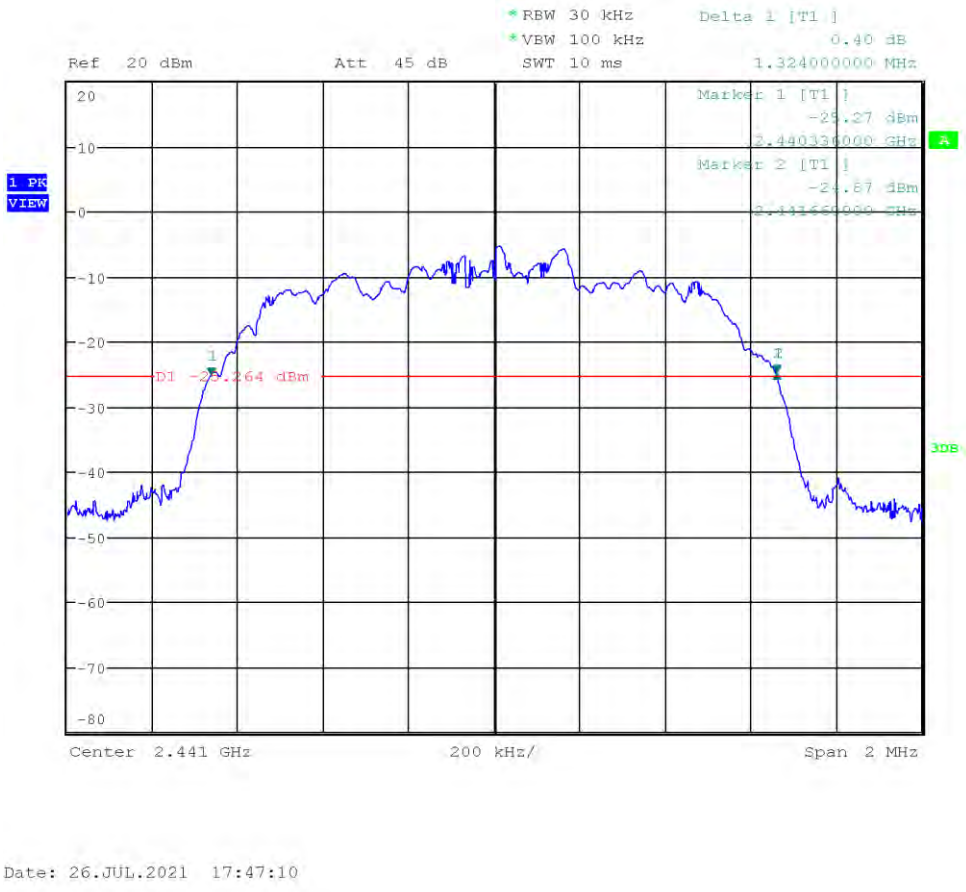
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	2-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2401.332
Upper Frequency [MHz]:	2402.660
20 dB Bandwidth [MHz]:	1.328



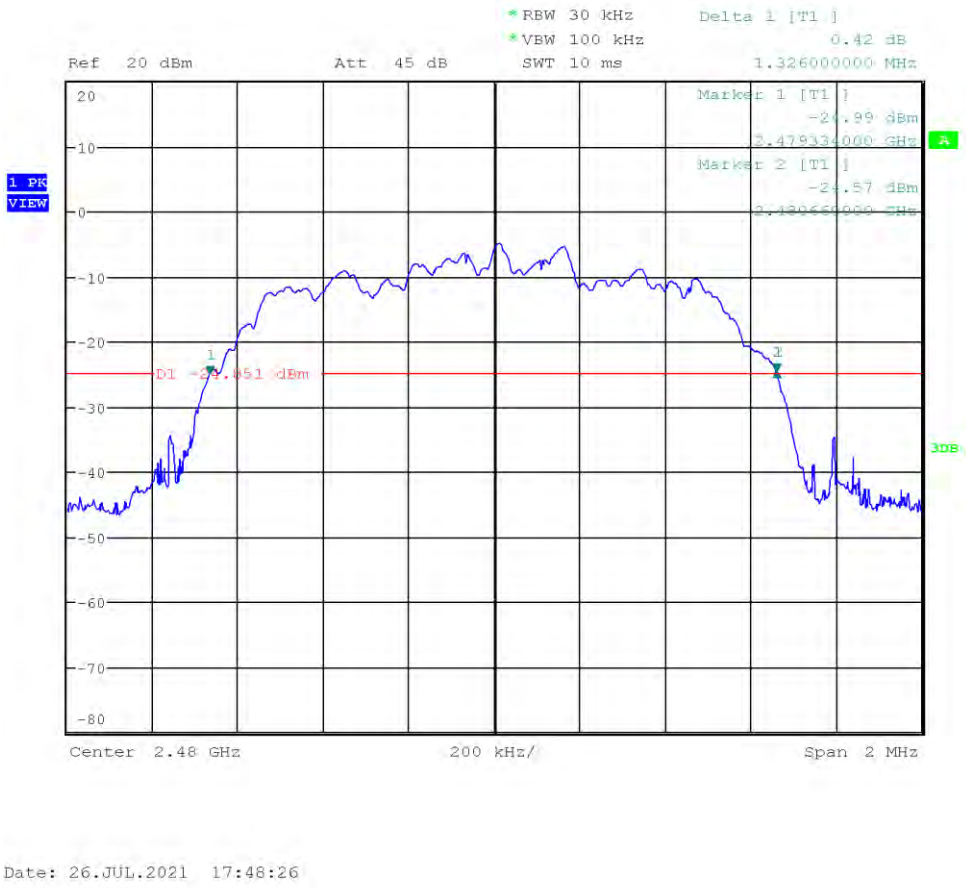
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	2-DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2440.336
Upper Frequency [MHz]:	2441.660
20 dB Bandwidth [MHz]:	1.324



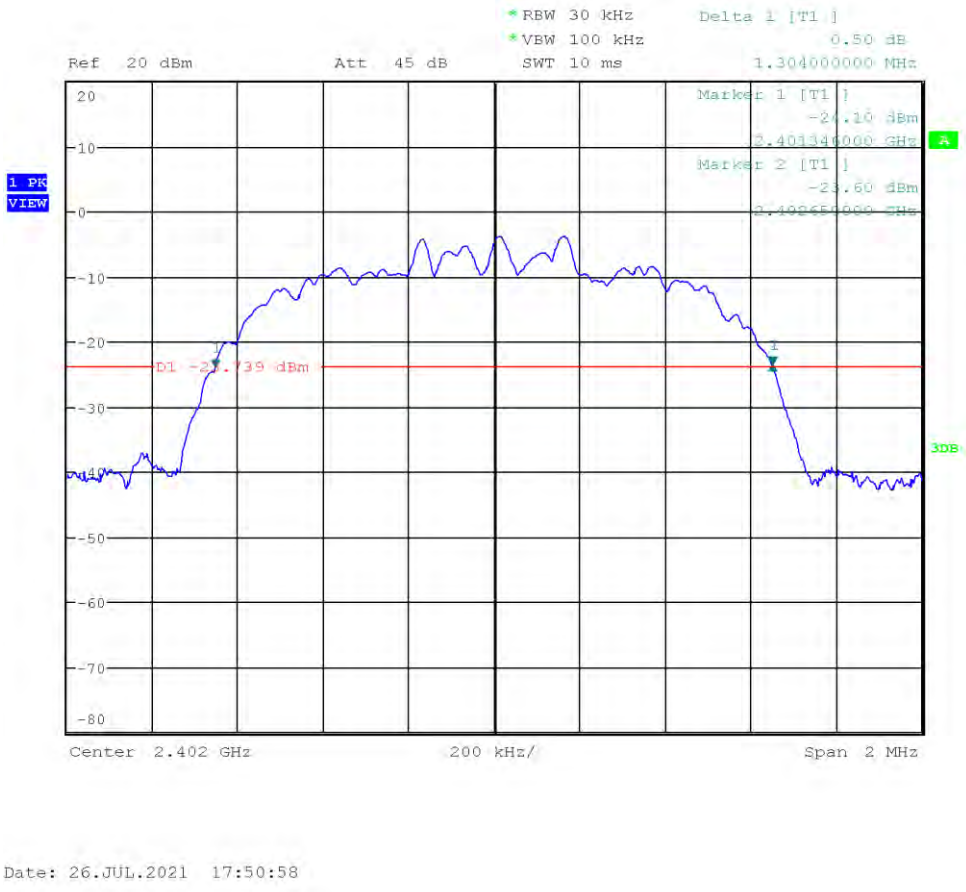
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	2-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2479.334
Upper Frequency [MHz]:	2480.660
20 dB Bandwidth [MHz]:	1.326



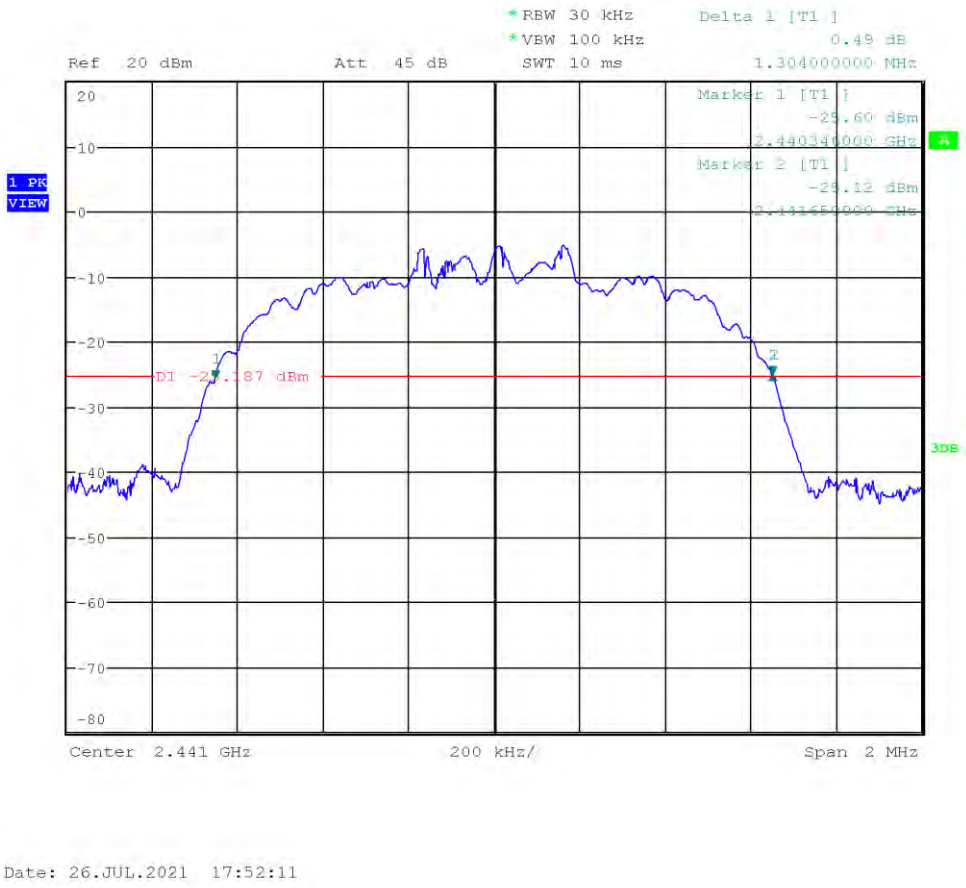
20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	3-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2401.346
Upper Frequency [MHz]:	2402.650
20 dB Bandwidth [MHz]:	1.304



20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	3-DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2440.346
Upper Frequency [MHz]:	2441.650
20 dB Bandwidth [MHz]:	1.304



20 dB Bandwidth

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.2
Operational Mode:	3-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency [MHz]:	2479.346
Upper Frequency [MHz]:	2480.648
20 dB Bandwidth [MHz]:	1.302

3.3 Test Conditions and Results - Number of hopping frequencies

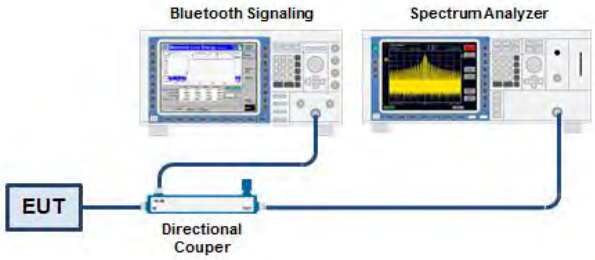
3.3.1 Information

Test Information	
Reference	FCC § 15.247(a)(1)(iii); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.3
Operator	Wilfried Treffke
Date	2021-07-26

3.3.2 Limits

Limits
≥ 15

3.3.3 Setup

Test Setup


3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.3.5 Procedure

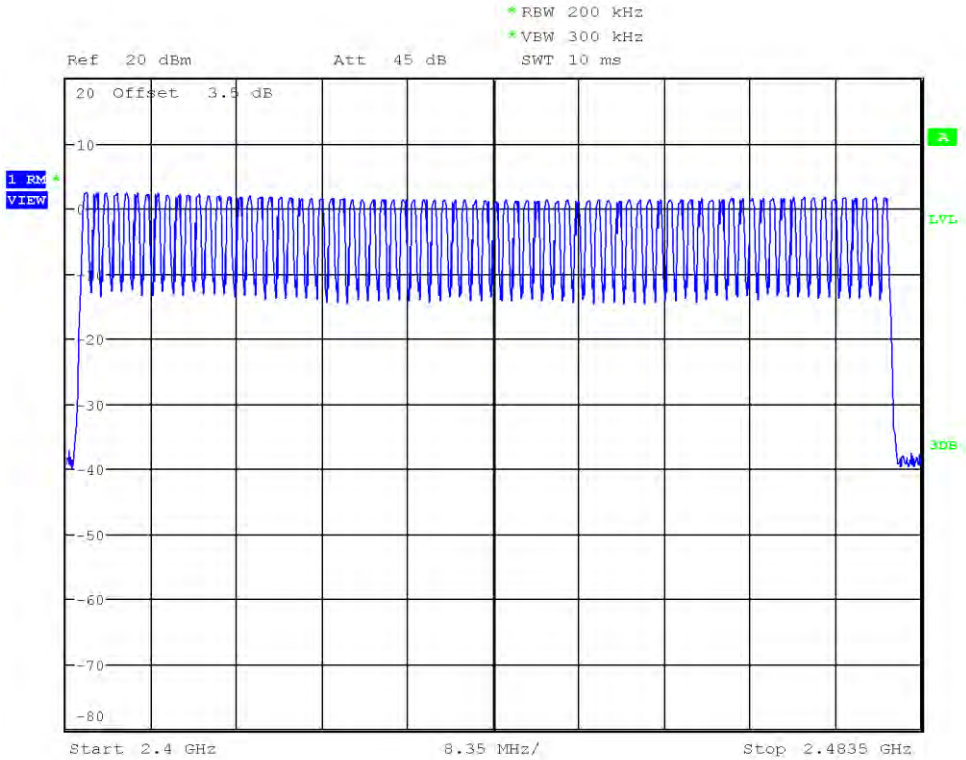
Test Procedure
1. EUT set to test mode (Communication tester is used if needed)
2. Span set to measurement frequency range
3. Detector set to peak and max hold
4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra
5. The number of peaks is counted to determine number of hopping frequencies

3.3.6 Results

Test Results		
Number of hopping frequencies	Limit	Verdict
79	>15	PASS

Number of hopping frequencies

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.27 (a)(1)(iii)
Reference Method:	ANSI C63.10:2013 7.8.3
Operational Mode:	Bluetooth, DH5, Hopping Mode
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Number of Hopping Channels:	79



3.4 Test Conditions and Results - Frequency hopping channel separation

3.4.1 Information

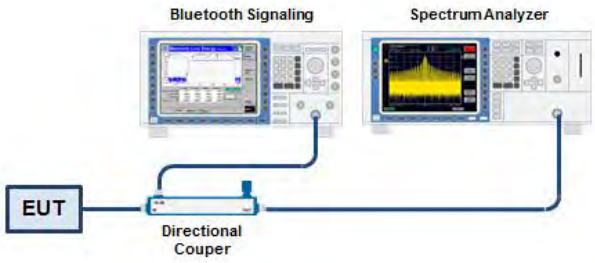
Test Information	
Reference	FCC § 15.247(a)(1); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.4
Measurement Uncertainty	± 3.14 %
Operator	Wilfried Treffke
Date	2021-07-26

3.4.2 Limits

Limit
≥ 25 kHz or ⅔ of 20 dB bandwidth

3.4.3 Setup

Test Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.4.5 Procedure

Test Procedure

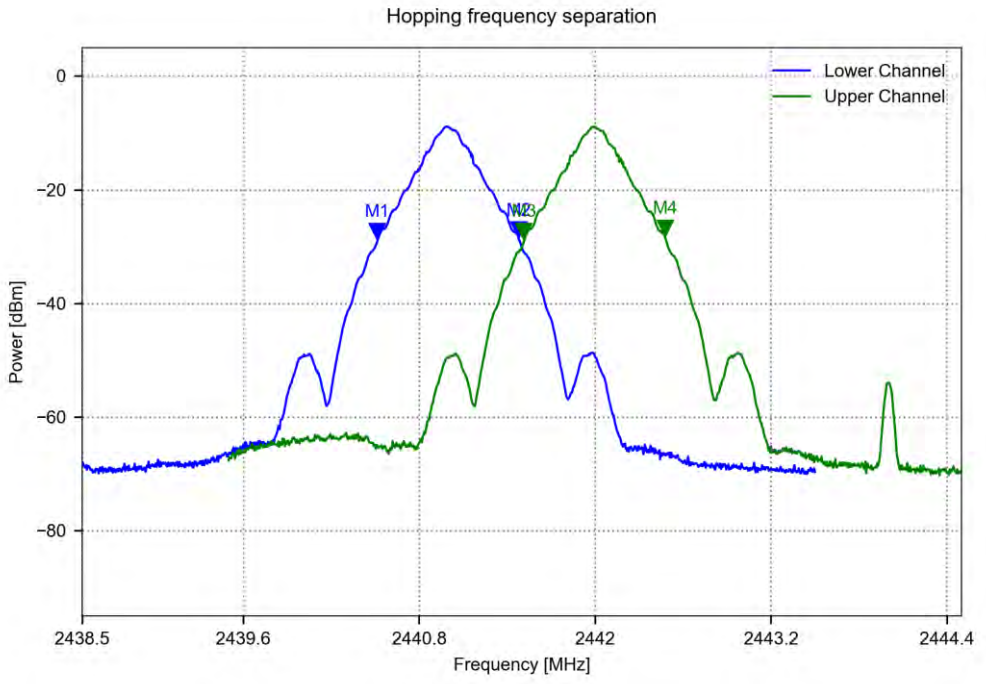
1. EUT set to test mode (Communication tester is used if needed)
2. Span set to measurement frequency range
3. Detector set to peak and max hold
4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra
5. The two adjacent channel peaks are marked
6. Channel separation is determined from frequency separation of markers

3.4.6 Results

Test Results		
Channel separation [kHz]	Limit [kHz]	Verdict
1000	≥ ⅔ · 956= 637.3	PASS

Hopping frequency separation

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247(a)(1)
Reference Method:	ANSI C63.10:2013 7.8.2
Operational Mode:	Bluetooth, DH5, Channels: 2441 + 2442 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Lower Frequency (M1) [MHz]:	2440.515
Upper Frequency (M2) [MHz]:	2441.480
Lower Frequency (M3) [MHz]:	2441.515
Upper Frequency (M4) [MHz]:	2442.480
Lower center Frequency [MHz]:	2440.997
Upper center Frequency [MHz]:	2441.997
Hopping Frequency Separation [MHz]:	1.000



3.5 Test Conditions and Results - Time of occupancy (Dwell time)

3.5.1 Information

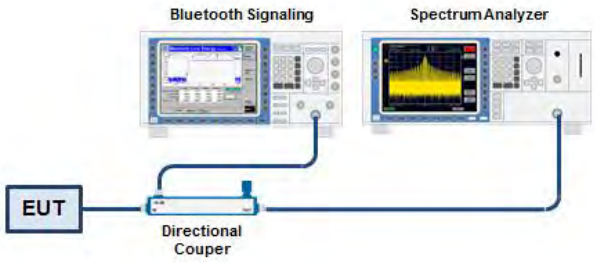
Test Information	
Reference	FCC § 15.247(a)(1)(iii); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.2
Measurement Uncertainty	± 78.53 %
Operator	Wilfried Treffke
Date	2021-07-26

3.5.2 Limits

Limits
≤ 0.4 s within 0.4 s · Number of hopping channels

3.5.3 Setup

Test Setup



3.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.5.5 Procedure

Test Procedure

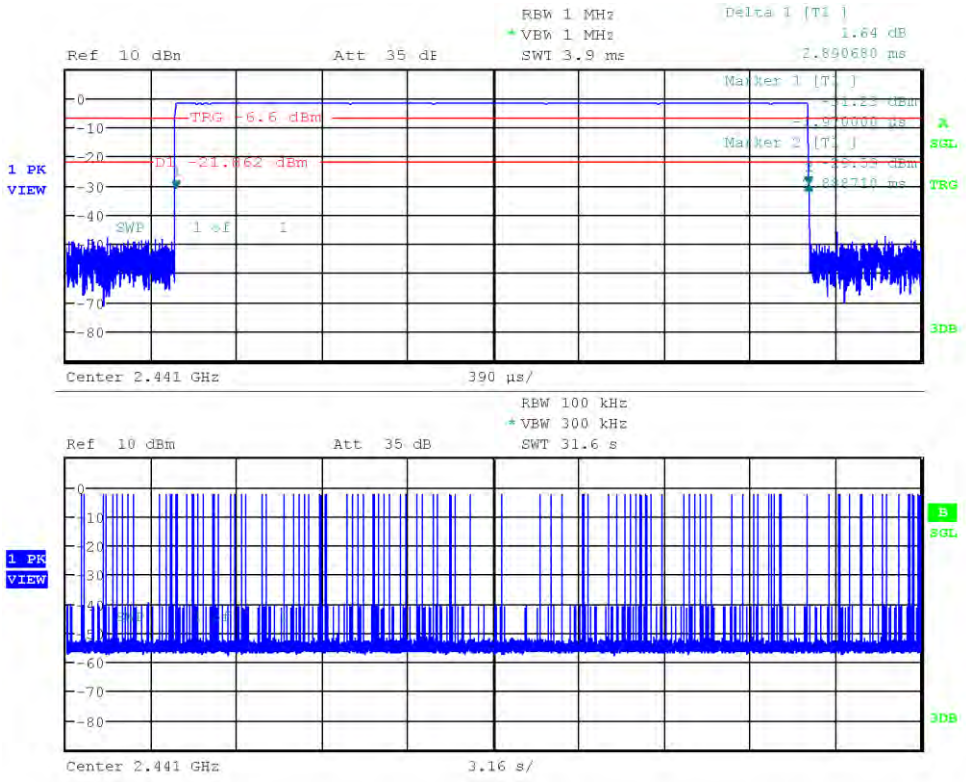
1. EUT set to test hopping mode (Communication tester is used if needed)
2. Analyzer span is set to zero span
3. Detector set to peak and max hold
4. RBW is set to 100 kHz and VBW to 300 kHz
5. The sweep time is set to capture one single dwell time
6. Trigger is set to video trigger
7. A marker is set to the start and end positions of the burst
8. The dwell time is determined from the marker difference
9. Another sweep is initiated without trigger and sweep time set to the observation time
10. The number of hops is counted
11. The total time of occupancy is calculated from the dwell time per hop multiplied by the number of hops

3.5.6 Results

Test Results					
Observation Period [s]	Number of Hops	Dwell time per Hop [s]	Time of occupancy [s]	Limit [s]	Margin [s]
31.6	106	0.002891	0.306	0.4	-0.09

Time of occupancy

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:	34968, (A1 8 SerNr: 826)
Reference Method:	ANSI C63.10:2013 7.8.4
Operational Mode:	DH5, Hopping mode
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Dwell Time per Hop [ms]:	2.891
Number of Hops:	106
Time of occupancy [s]:	0.306



Date: 26.JUL.2021 19:12:04

3.6 Test Conditions and Results - Maximum peak conducted output power

3.6.1 Information

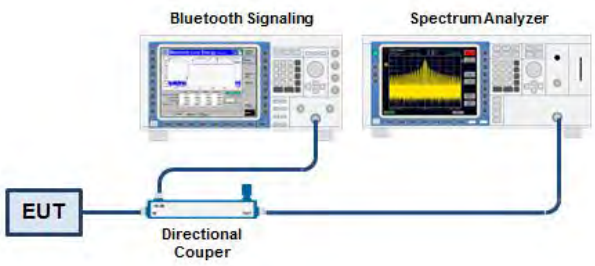
Test Information	
Reference	FCC § 15.247(b); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 7.8.5
Measurement Uncertainty	± 2.86 dB
Operator	Wilfried Treffke
Date	2021-07-26

3.6.2 Limits

Limits	
Condition	Power
Number of hopping channels ≥ 75	1 W (30 dBm)
75 > Number of hopping channels ≥ 15	0.125 W (21 dBm)
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.	

3.6.3 Setup

Test Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.6.5 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

3.6.6 Results

Test Results - DH5				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	2.826	0.0019	1.0	PASS
2441	1.650	0.0015	1.0	PASS
2480	2.112	0.0016	1.0	PASS

Test Results - 2-DH5				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	5.267	0.0034	1.0	PASS
2441	3.935	0.0025	1.0	PASS
2480	4.317	0.0027	1.0	PASS

Test Results - 3-DH5				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	5.623	0.0037	1.0	PASS
2441	4.251	0.0027	1.0	PASS
2480	4.628	0.0029	1.0	PASS

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	2.826
Peak Power [W]:	0.0019

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	1.650
Peak Power [W]:	0.0015

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	2.112
Peak Power [W]:	0.0016

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	2-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	5.267
Peak Power [W]:	0.0034

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	2-DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	3.935
Peak Power [W]:	0.0025

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	2-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	4.317
Peak Power [W]:	0.0027

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	3-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	5.623
Peak Power [W]:	0.0037

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	3-DH5, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	4.251
Peak Power [W]:	0.0027

Peak Conducted Output Power

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.5
Operational Mode:	3-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Peak Power [dBm]:	4.628
Peak Power [W]:	0.0029

3.7 Test Conditions and Results - AC powerline conducted emissions

3.7.1 Information

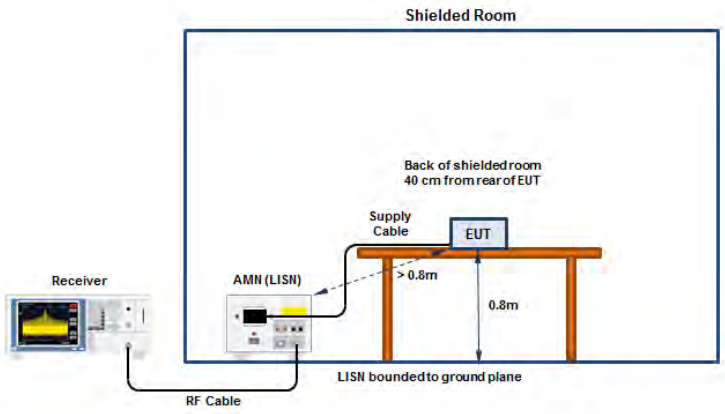
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Measurement Uncertainty	± 3.82 dB
Operator	Wilfried Treffke
Date	2021-06-10

3.7.2 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		

3.7.3 Setup

Test Setup



3.7.4 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	2020-07	2021-07
Pulse Limiter	R&S	ESH3-Z2	EF01222	2020-07	2021-07
LISN	Schwarzbeck	NSLK 8127 RC	EF01592	2020-07	2021-07

Conducted emissions at the mains power port
according to FCC 47 CFR Part 15 Subpart C

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:	34967
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Date:	2021-06-10
Operating Conditions:	ambient temperature: 22 °Celsius power input: 120 VAC
LISN:	Schwarzbeck NSLK 8127 RC L
Operational Mode &	BT, 1 Mbps; 2402 MHz
Applied to Port:	AC mains

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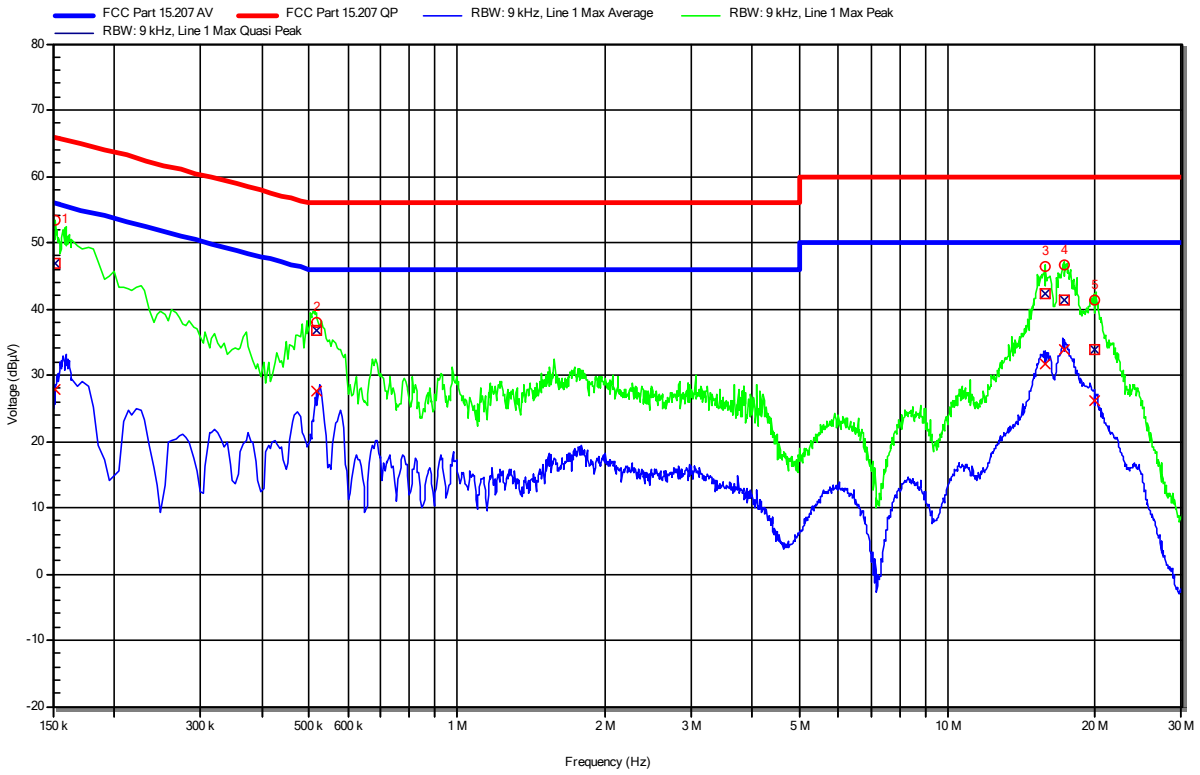
RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	151.8 kHz	46.75 dBµV	65.9 dBµV	-19.15 dB	Pass	Line 1
2	518.55 kHz	36.74 dBµV	56 dBµV	-19.26 dB	Pass	Line 1
3	15.864 MHz	42.21 dBµV	60 dBµV	-17.79 dB	Pass	Line 1
4	17.309 MHz	41.33 dBµV	60 dBµV	-18.67 dB	Pass	Line 1
5	19.946 MHz	33.94 dBµV	60 dBµV	-26.06 dB	Pass	Line 1

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	151.8 kHz	27.92 dBµV	55.9 dBµV	-27.98 dB	Pass	Line 1
2	518.55 kHz	27.66 dBµV	46 dBµV	-18.34 dB	Pass	Line 1
3	15.864 MHz	31.8 dBµV	50 dBµV	-18.2 dB	Pass	Line 1
4	17.309 MHz	33.94 dBµV	50 dBµV	-16.06 dB	Pass	Line 1
5	19.946 MHz	26.1 dBµV	50 dBµV	-23.9 dB	Pass	Line 1

Conducted emissions at the mains power port
according to FCC 47 CFR Part 15 Subpart C

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:	34967
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Date:	2021-06-10
Operating Conditions:	ambient temperature: 22 °Celsius power input:
LISN:	Schwarzbeck NSLK 8127 RC N
Applied to Port:	AC mains

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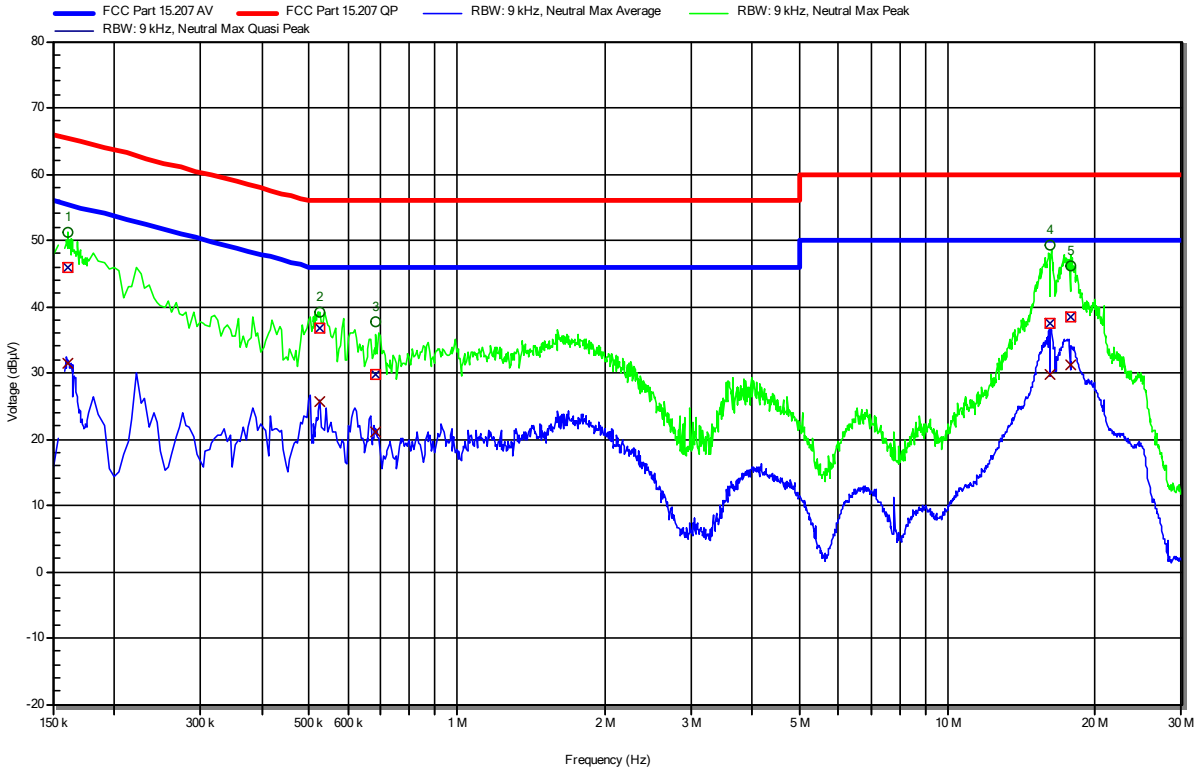
RadiMation



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	LISN
1	160.8 kHz	45.83 dBµV	65.42 dBµV	-19.59 dB	Pass	Neutral
2	523.5 kHz	36.66 dBµV	56 dBµV	-19.34 dB	Pass	Neutral
3	681 kHz	29.76 dBµV	56 dBµV	-26.24 dB	Pass	Neutral
4	16.179 MHz	37.37 dBµV	60 dBµV	-22.63 dB	Pass	Neutral
5	17.777 MHz	38.35 dBµV	60 dBµV	-21.65 dB	Pass	Neutral

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status	LISN
1	160.8 kHz	31.37 dBµV	55.42 dBµV	-24.05 dB	Pass	Neutral
2	523.5 kHz	25.65 dBµV	46 dBµV	-20.35 dB	Pass	Neutral
3	681 kHz	21.11 dBµV	46 dBµV	-24.89 dB	Pass	Neutral
4	16.179 MHz	29.79 dBµV	50 dBµV	-20.21 dB	Pass	Neutral
5	17.777 MHz	31.23 dBµV	50 dBµV	-18.77 dB	Pass	Neutral

3.8 Test Conditions and Results - Band-edge compliance

3.8.1 Information

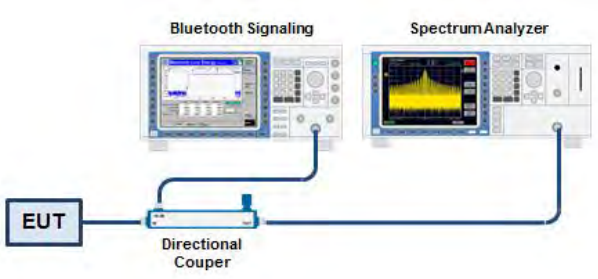
Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 3.64 dB
Measurement Method	ANSI C63.10 6.10
Operator	Wilfried Treffke
Date	2021-07-26

3.8.2 Limits

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

3.8.3 Setup

Test Setup



3.8.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.8.5 Procedure

Test Procedure

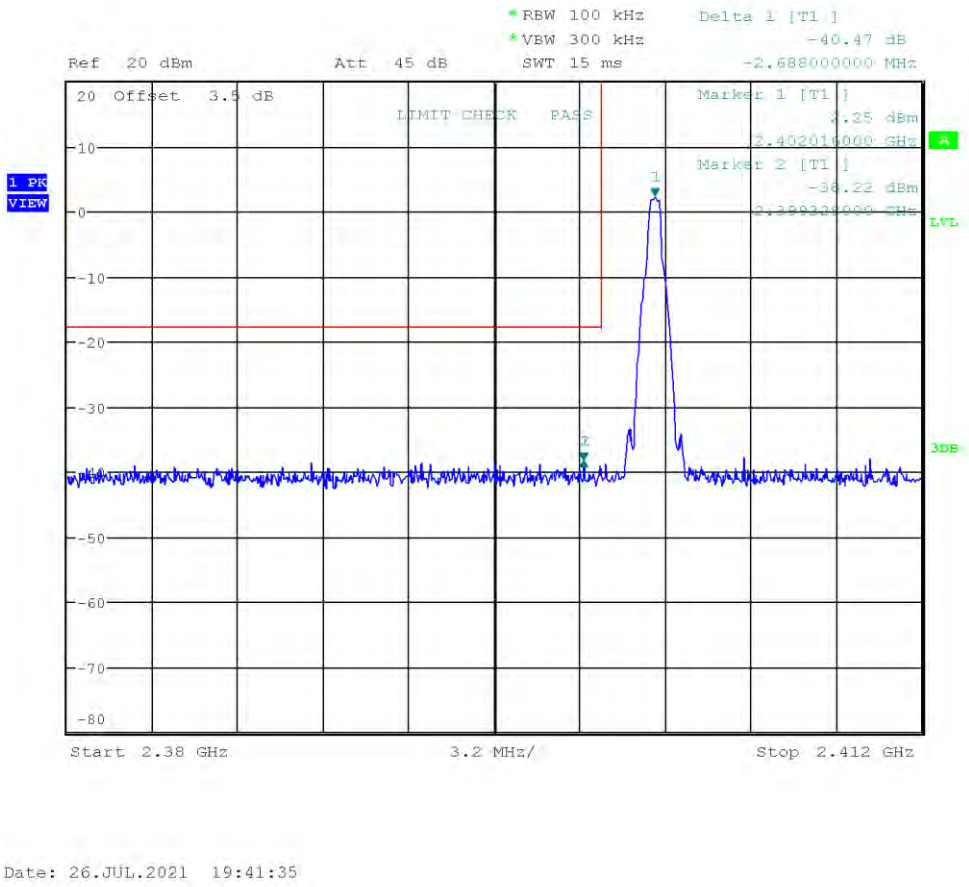
1. EUT set to test mode (Communication tester is used if needed)
2. Span set around lower band edge and detector is set to peak and max hold
3. Resolution bandwidth is set to 100 kHz
4. Markers are set to peak emission levels within frequency band and outside frequency band
5. Band edge attenuation is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

3.8.6 Results

Test Results				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
DH5 single	2402	-40.47	-20	PASS
DH5 single	2480	-39.04	-20	PASS
DH5 hopping	2402	-39.64	-20	PASS
DH5 hopping	2480	-38.95	-20	PASS
2-DH5 single	2402	-40.66	-20	PASS
2-DH5 single	2480	-40.04	-20	PASS
2-DH5 hopping	2402	-39.93	-20	PASS
2-DH5 hopping	2480	-38.72	-20	PASS
3-DH5 single	2402	-39.98	-20	PASS
3-DH5 single	2480	-39.26	-20	PASS
3-DH5 hopping	2402	-39.92	-20	PASS
3-DH5 hopping	2480	-38.27	-20	PASS

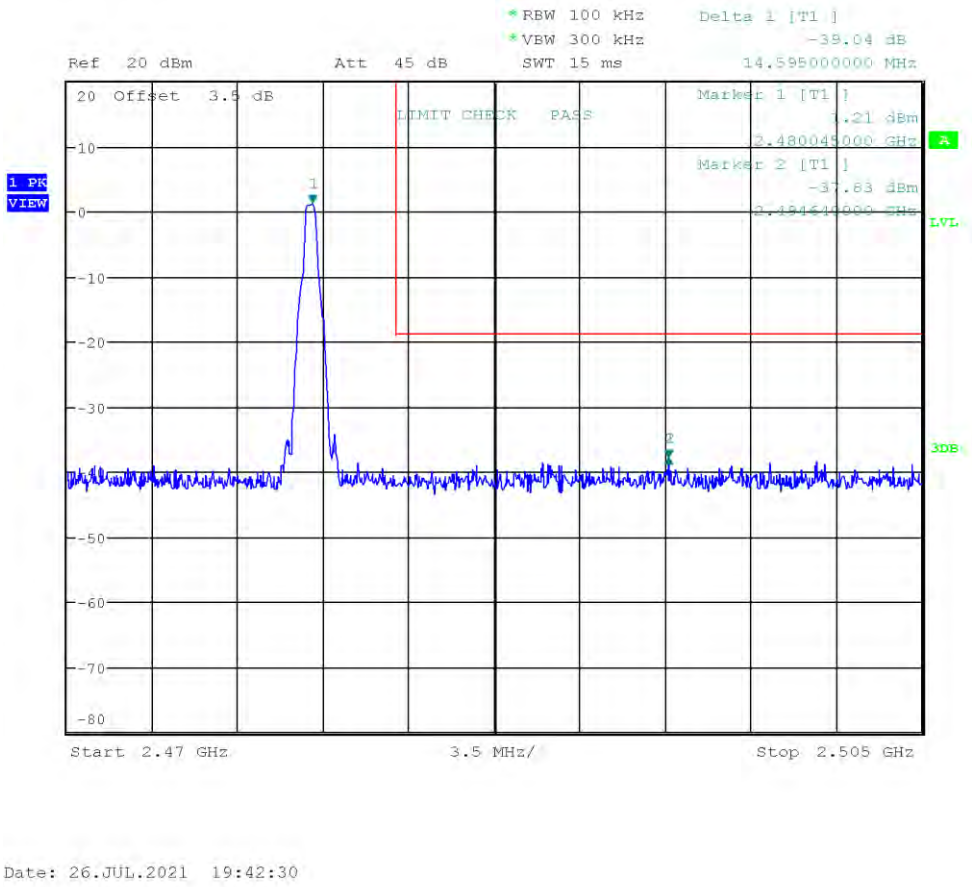
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Lower
In-band Frequency [MHz]:	2402.016
Max. in-band Level [dBm/100 kHz]:	2.247
Out-of-band Frequency [MHz]:	2399.328
Max. out-of-band Level [dBm/100 kHz]:	-38.22
Attenuation [dB]:	-40.47



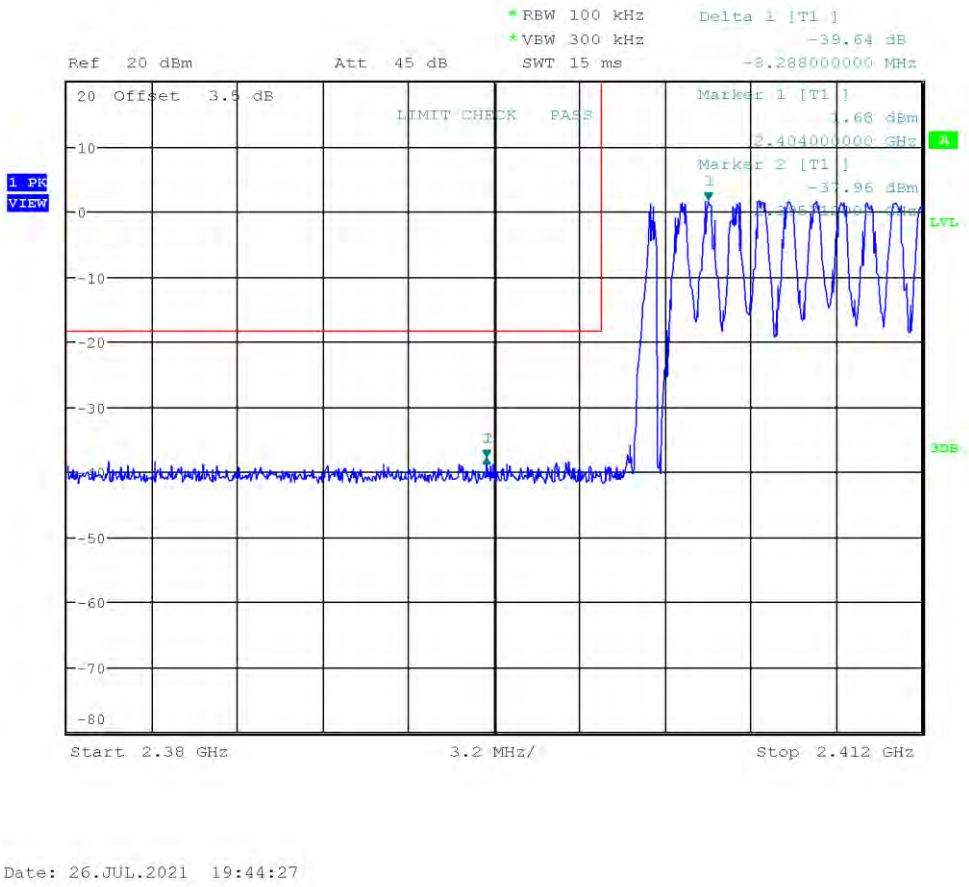
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Upper
In-band Frequency [MHz]:	2480.045
Max. in-band Level [dBm/100 kHz]:	1.209
Out-of-band Frequency [MHz]:	2494.64
Max. out-of-band Level [dBm/100 kHz]:	-37.828
Attenuation [dB]:	-39.04



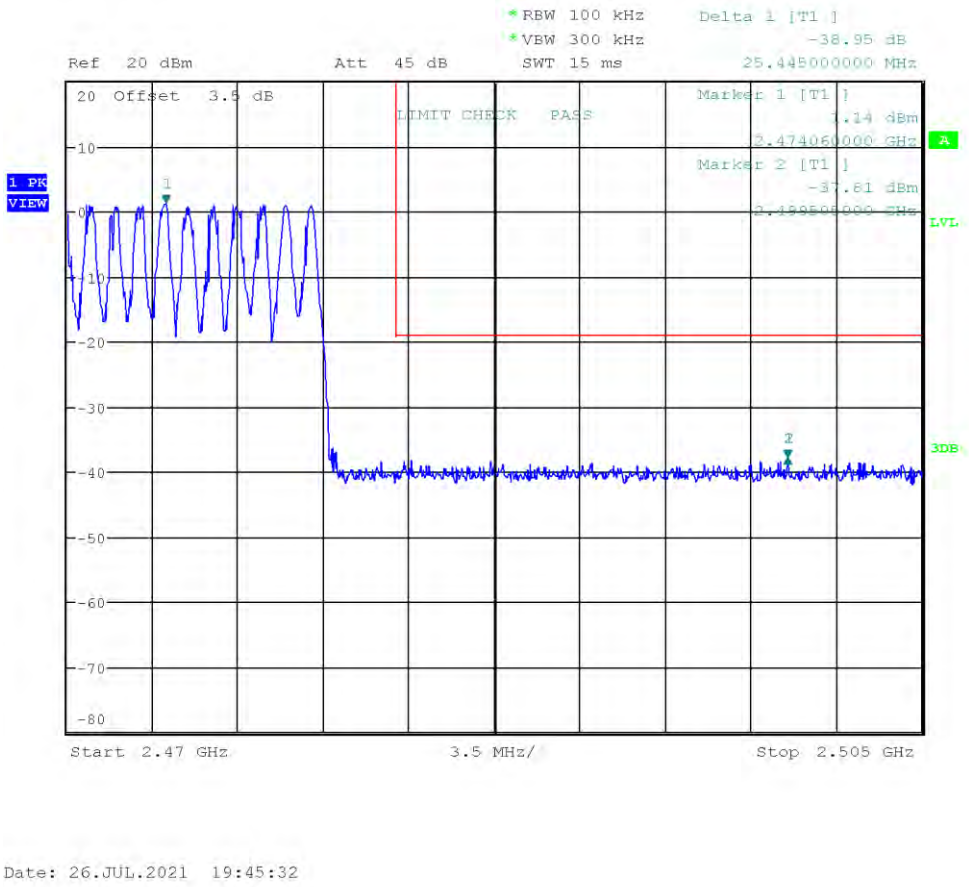
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	DH5, Hopping
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Lower
In-band Frequency [MHz]:	2404.0
Max. in-band Level [dBm/100 kHz]:	1.682
Out-of-band Frequency [MHz]:	2395.712
Max. out-of-band Level [dBm/100 kHz]:	-37.959
Attenuation [dB]:	-39.64



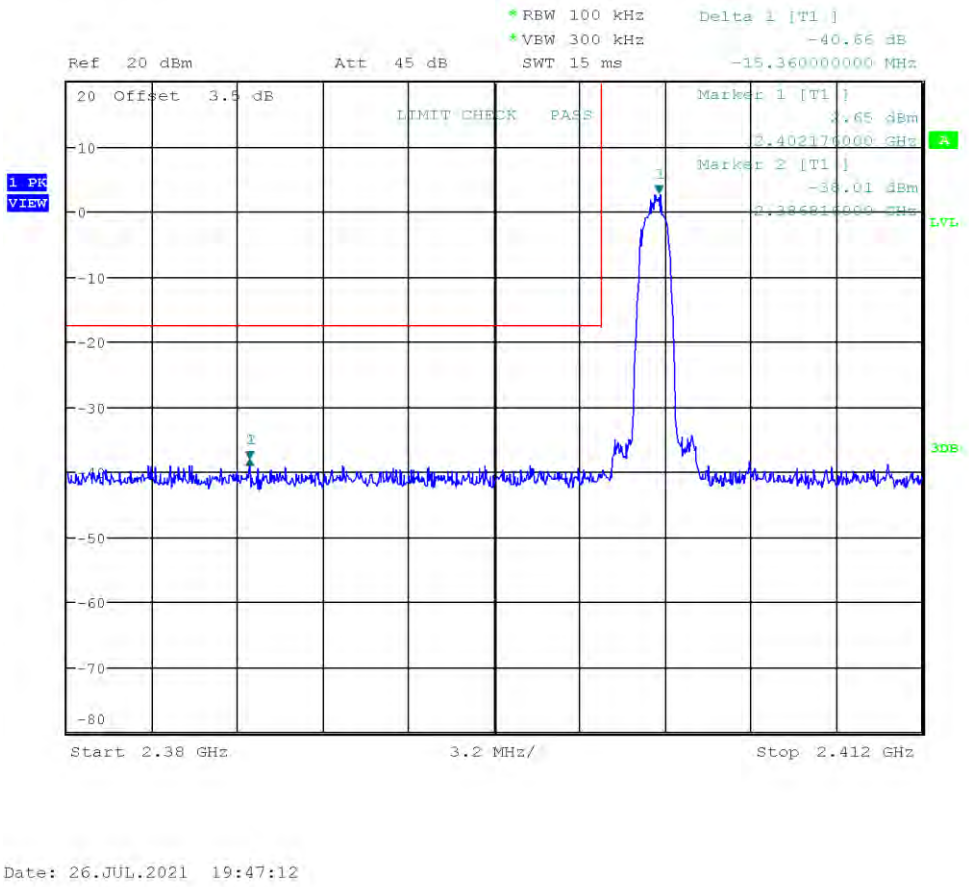
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	DH5, Hopping
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Upper
In-band Frequency [MHz]:	2474.06
Max. in-band Level [dBm/100 kHz]:	1.139
Out-of-band Frequency [MHz]:	2499.505
Max. out-of-band Level [dBm/100 kHz]:	-37.809
Attenuation [dB]:	-38.95



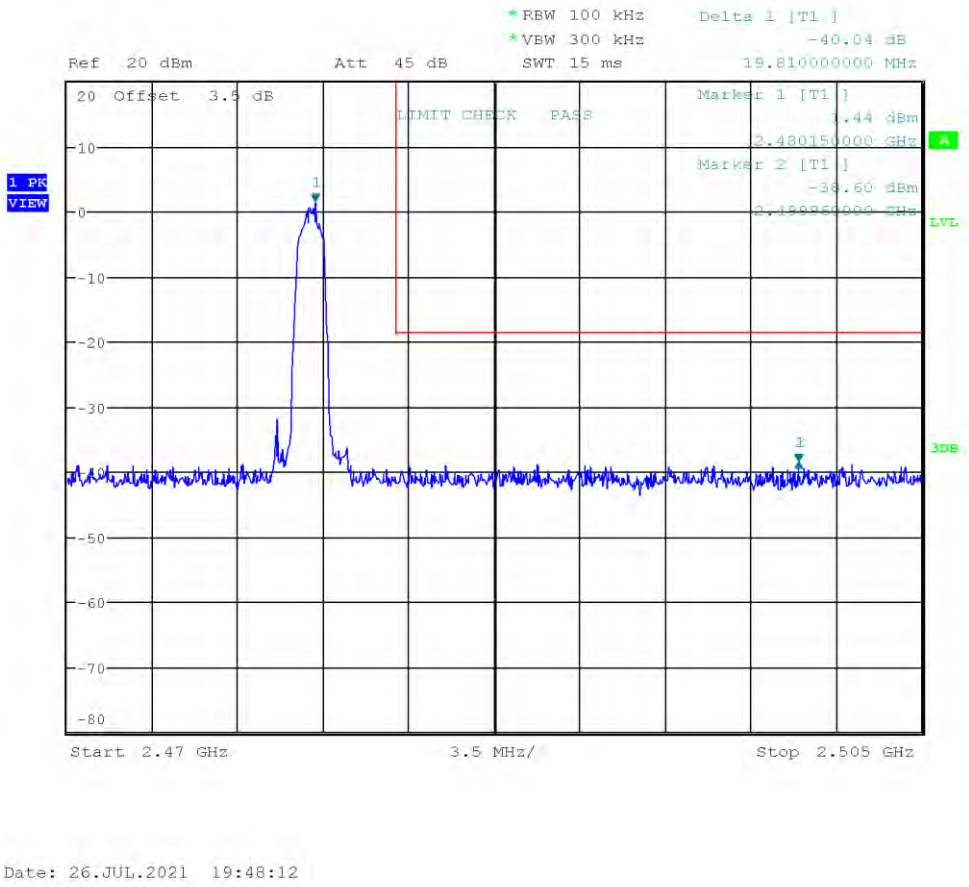
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	2-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Lower
In-band Frequency [MHz]:	2402.176
Max. in-band Level [dBm/100 kHz]:	2.645
Out-of-band Frequency [MHz]:	2386.816
Max. out-of-band Level [dBm/100 kHz]:	-38.015
Attenuation [dB]:	-40.66



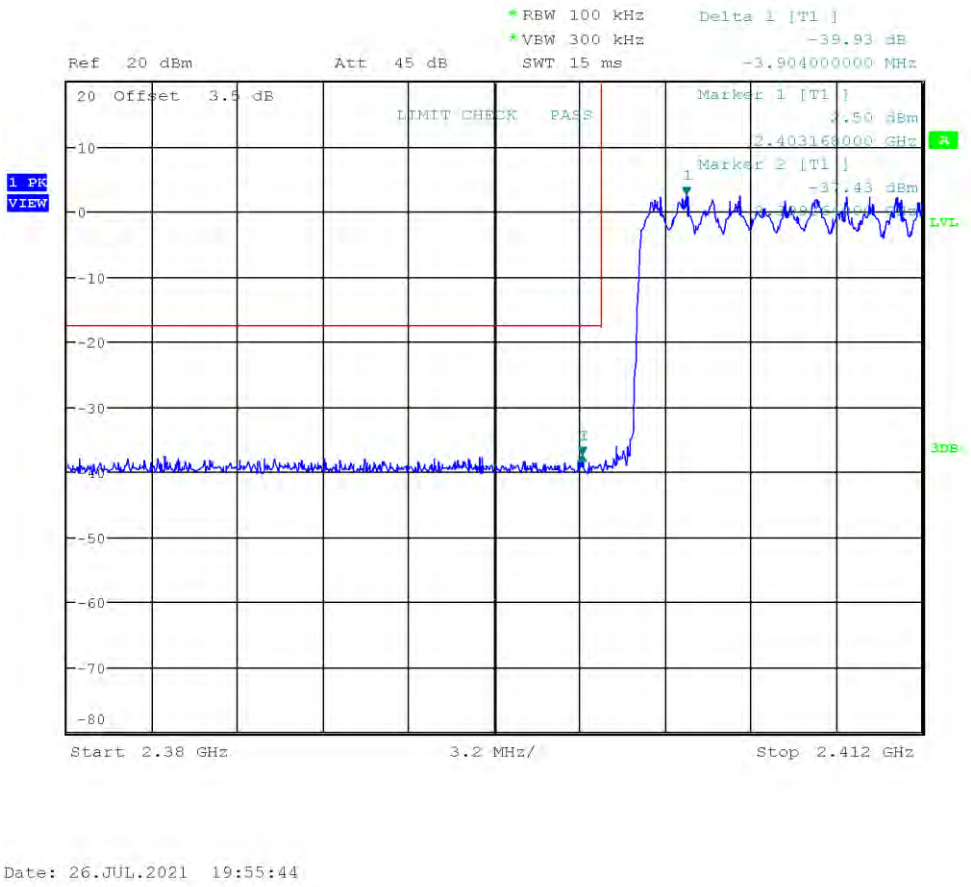
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	2-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Upper
In-band Frequency [MHz]:	2480.15
Max. in-band Level [dBm/100 kHz]:	1.442
Out-of-band Frequency [MHz]:	2499.96
Max. out-of-band Level [dBm/100 kHz]:	-38.597
Attenuation [dB]:	-40.04



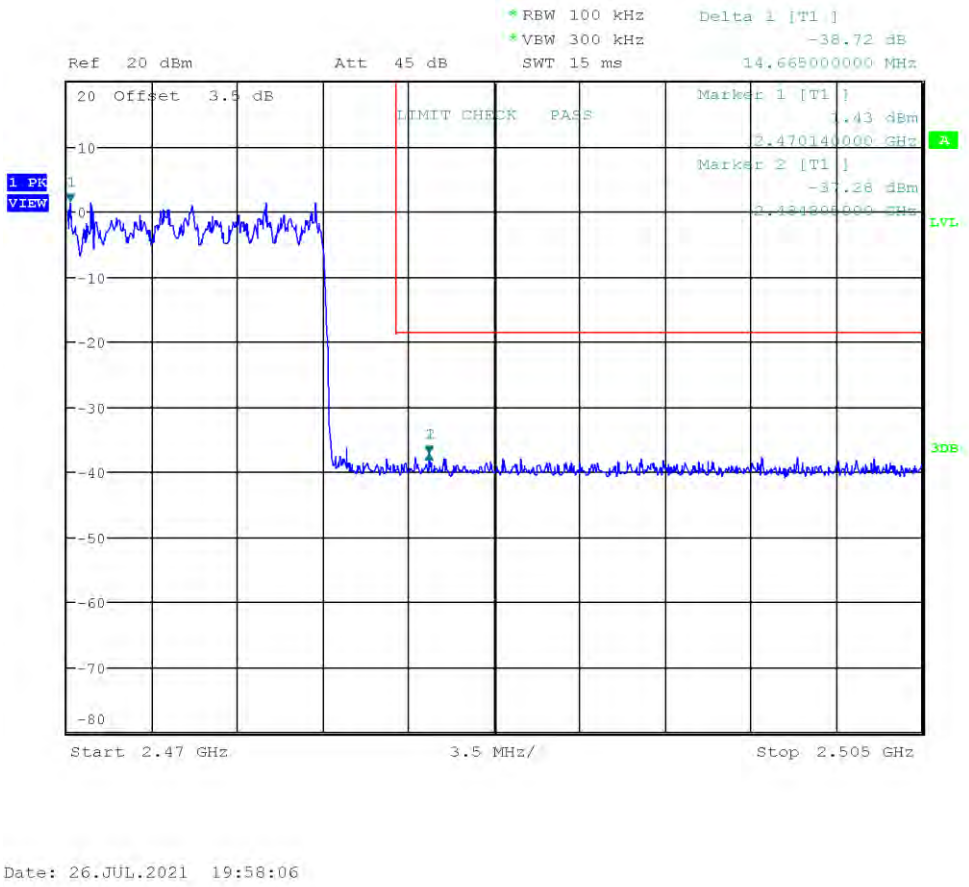
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	2-DH5, Hopping
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Lower
In-band Frequency [MHz]:	2403.168
Max. in-band Level [dBm/100 kHz]:	2.501
Out-of-band Frequency [MHz]:	2399.264
Max. out-of-band Level [dBm/100 kHz]:	-37.432
Attenuation [dB]:	-39.93



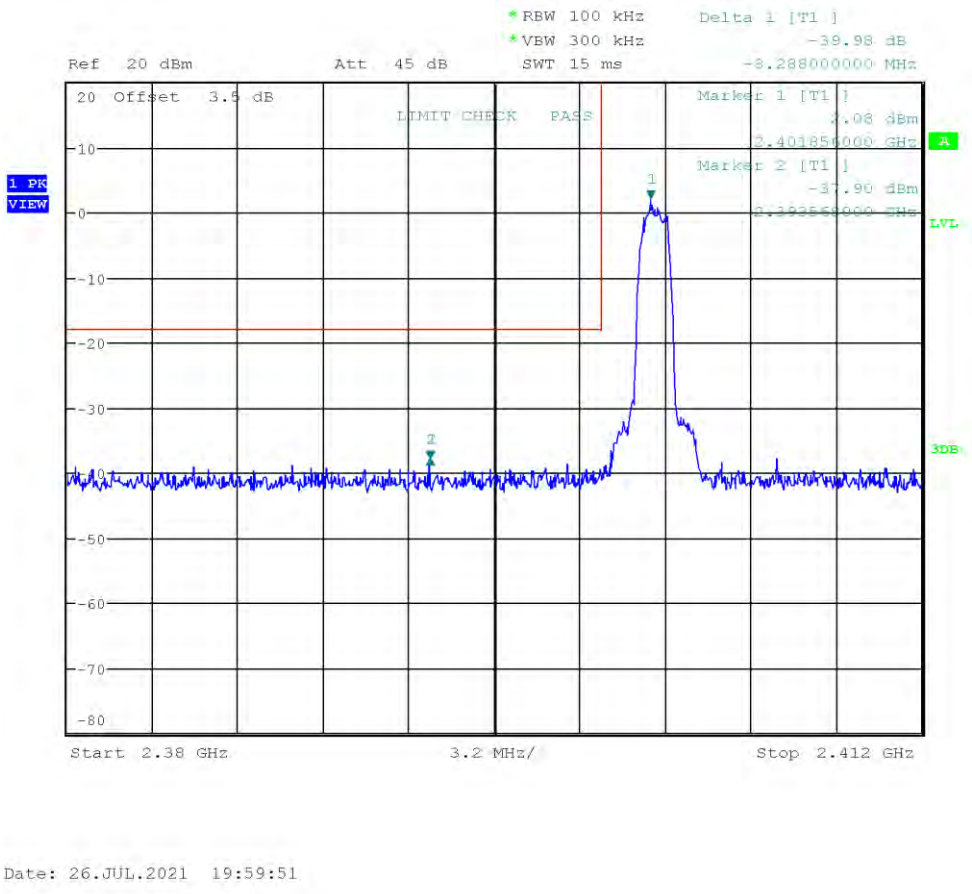
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	2-DH5, Hopping
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Upper
In-band Frequency [MHz]:	2470.14
Max. in-band Level [dBm/100 kHz]:	1.434
Out-of-band Frequency [MHz]:	2484.805
Max. out-of-band Level [dBm/100 kHz]:	-37.283
Attenuation [dB]:	-38.72



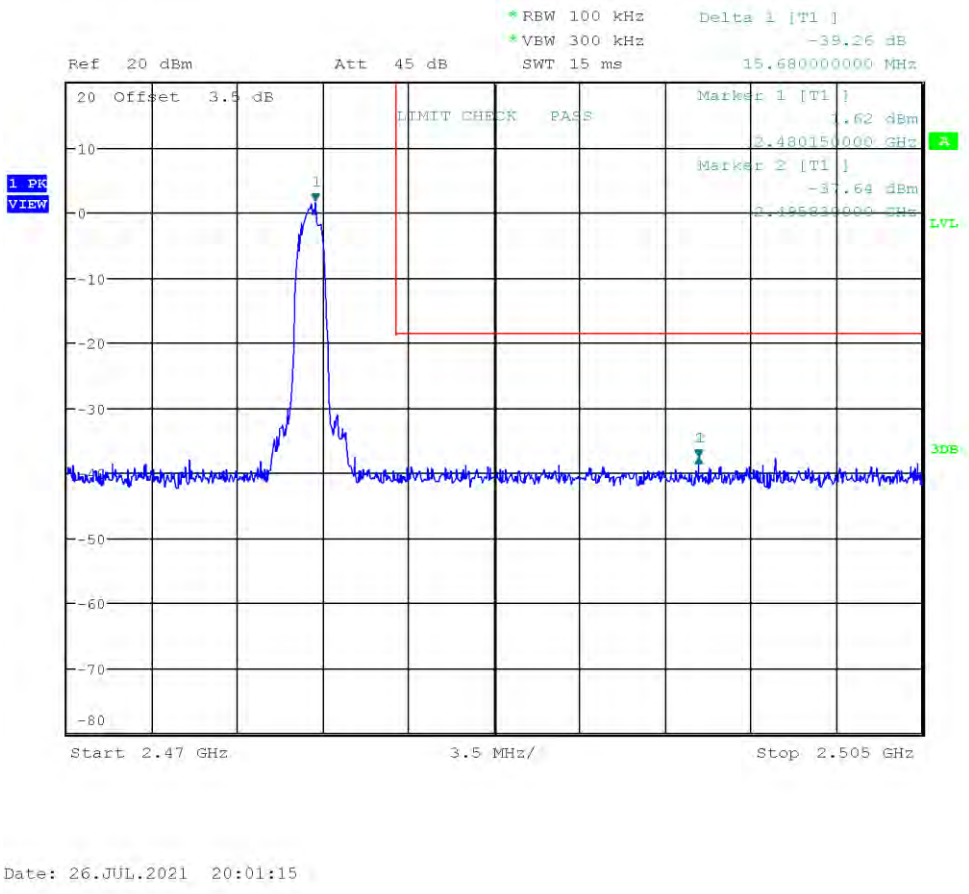
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	3-DH5, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Lower
In-band Frequency [MHz]:	2401.856
Max. in-band Level [dBm/100 kHz]:	2.083
Out-of-band Frequency [MHz]:	2393.568
Max. out-of-band Level [dBm/100 kHz]:	-37.901
Attenuation [dB]:	-39.98



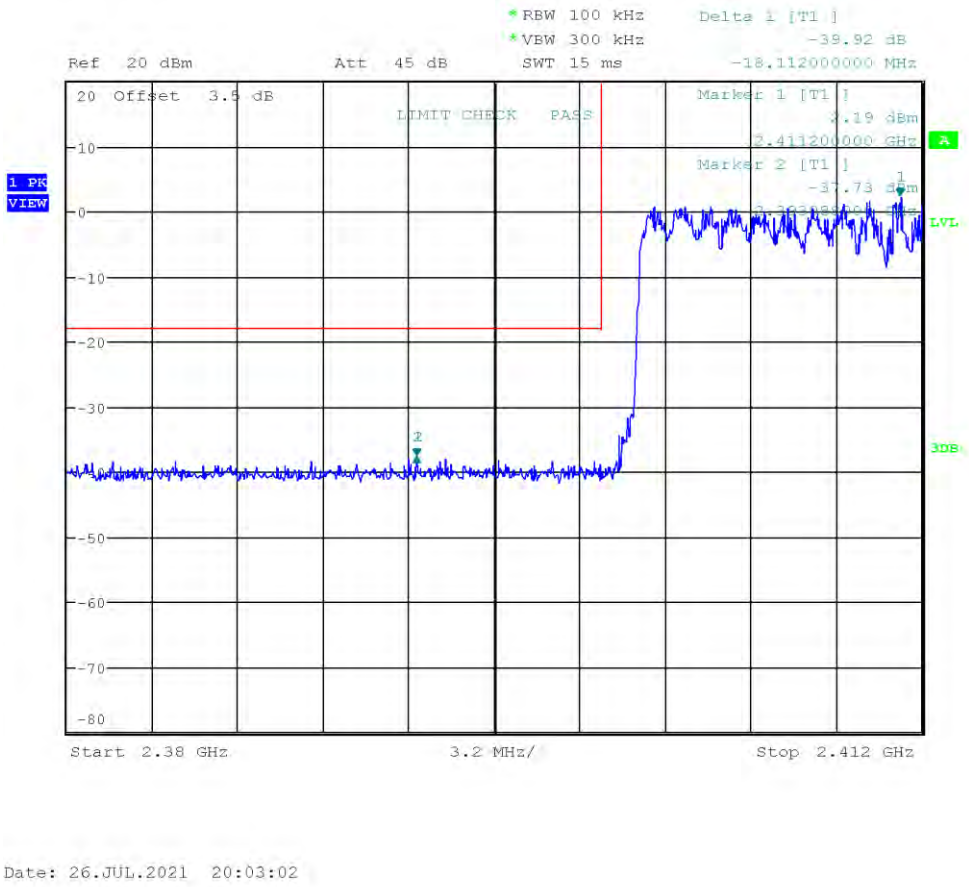
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	3-DH5, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Upper
In-band Frequency [MHz]:	2480.15
Max. in-band Level [dBm/100 kHz]:	1.618
Out-of-band Frequency [MHz]:	2495.83
Max. out-of-band Level [dBm/100 kHz]:	-37.639
Attenuation [dB]:	-39.26



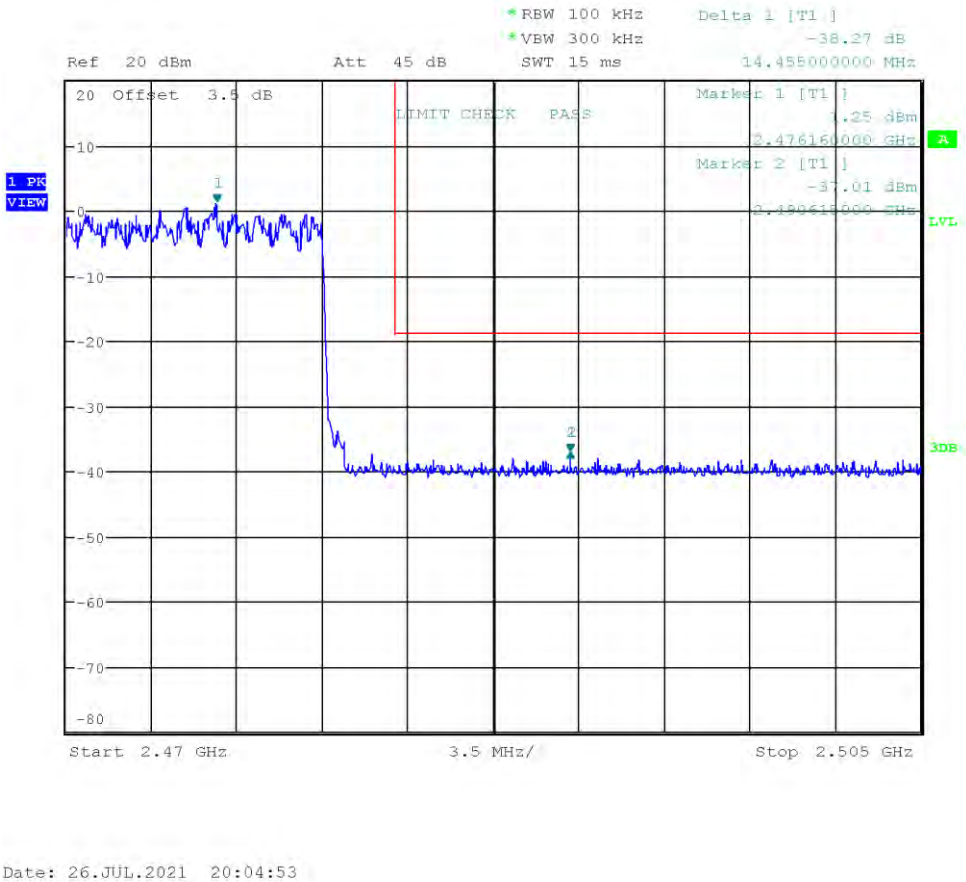
Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	3-DH5, Hopping
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Lower
In-band Frequency [MHz]:	2411.2
Max. in-band Level [dBm/100 kHz]:	2.19
Out-of-band Frequency [MHz]:	2393.088
Max. out-of-band Level [dBm/100 kHz]:	-37.732
Attenuation [dB]:	-39.92



Emissions in nonrestricted frequency bands at the Band-edge

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 7.8.6, 6.10.4
Operational Mode:	3-DH5, Hopping
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Band-edge	Upper
In-band Frequency [MHz]:	2476.16
Max. in-band Level [dBm/100 kHz]:	1.254
Out-of-band Frequency [MHz]:	2490.615
Max. out-of-band Level [dBm/100 kHz]:	-37.014
Attenuation [dB]:	-38.27



3.9 Test Conditions and Results - Conducted spurious emissions

3.9.1 Information

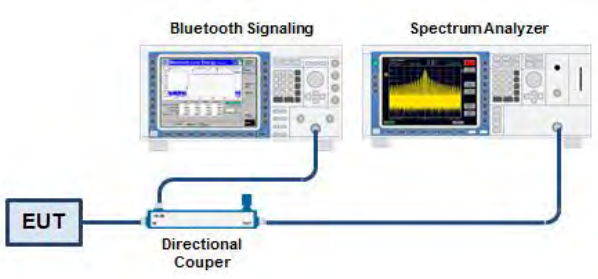
Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Uncertainty	± 4.25 dB
Measurement Method	ANSI C63.10 6.10
Operator	Wilfried Treffke
Date	2021-07-26

3.9.2 Limits

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

3.9.3 Setup

Test Setup



3.9.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyser	R&S	FSU 26	EF01709	2021-02	2022-02
Cable	Gigalane	SMS111B	EF00779 CAAAZ	2020-12	2021-12

3.9.5 Procedure

Test Procedure

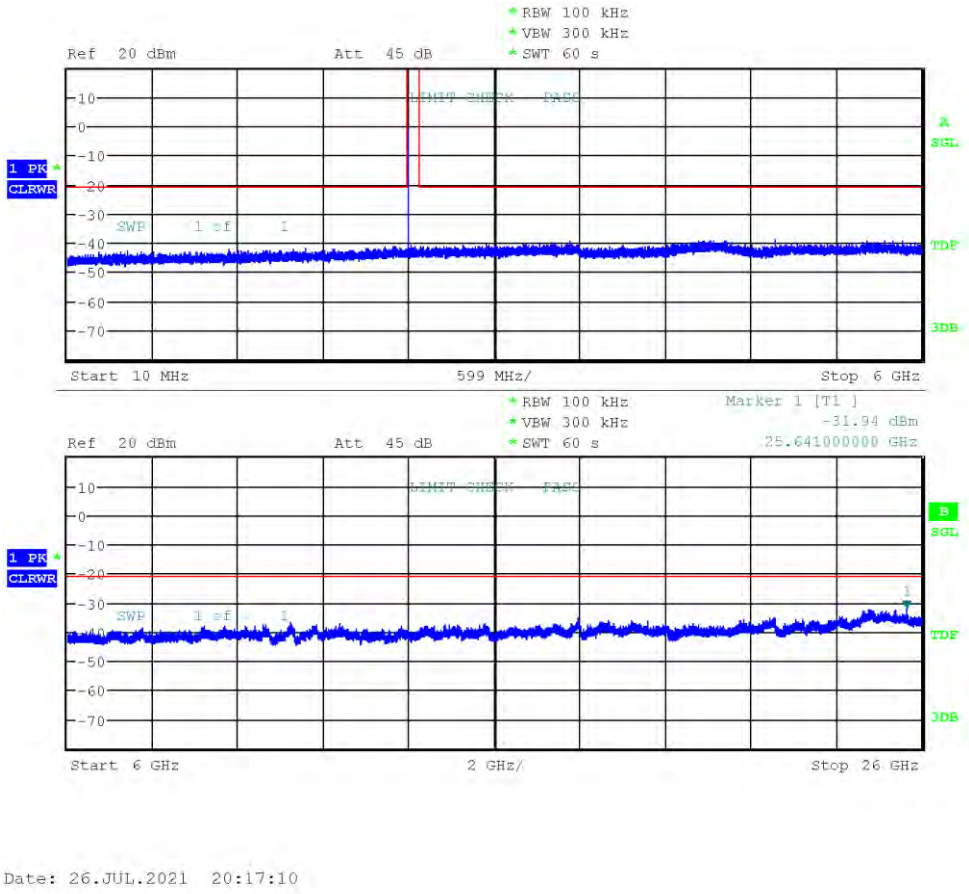
1. EUT set to test mode (Communication tester is used if needed)
2. Span set around lower band edge and detector is set to peak and max hold
3. Resolution bandwidth is set to 100 kHz
4. Markers are set to peak emission levels outside frequency band

3.9.6 Results

Test Results		
Mode	Channel [MHz]	Verdict
DH5	2402	PASS
DH5	2441	PASS
DH5	2480	PASS
2-DH5	2402	PASS
2-DH5	2441	PASS
2-DH5	2480	PASS
3-DH5	2402	PASS
3-DH5	2441	PASS
3-DH5	2480	PASS

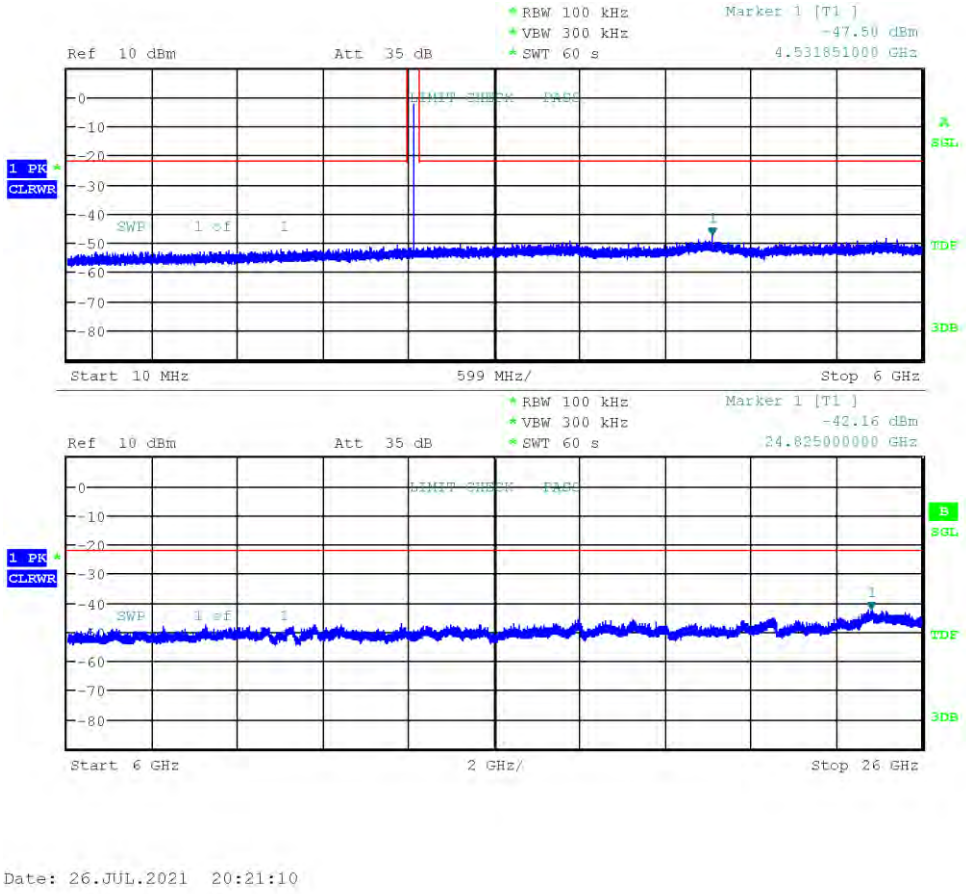
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	DH5
Max. in-band Frequency [MHz]:	2402.2
Max. in-band Level [dBm/100 kHz]:	-0.6
Out-of-band Limit [dBm/100 kHz]:	-20.6



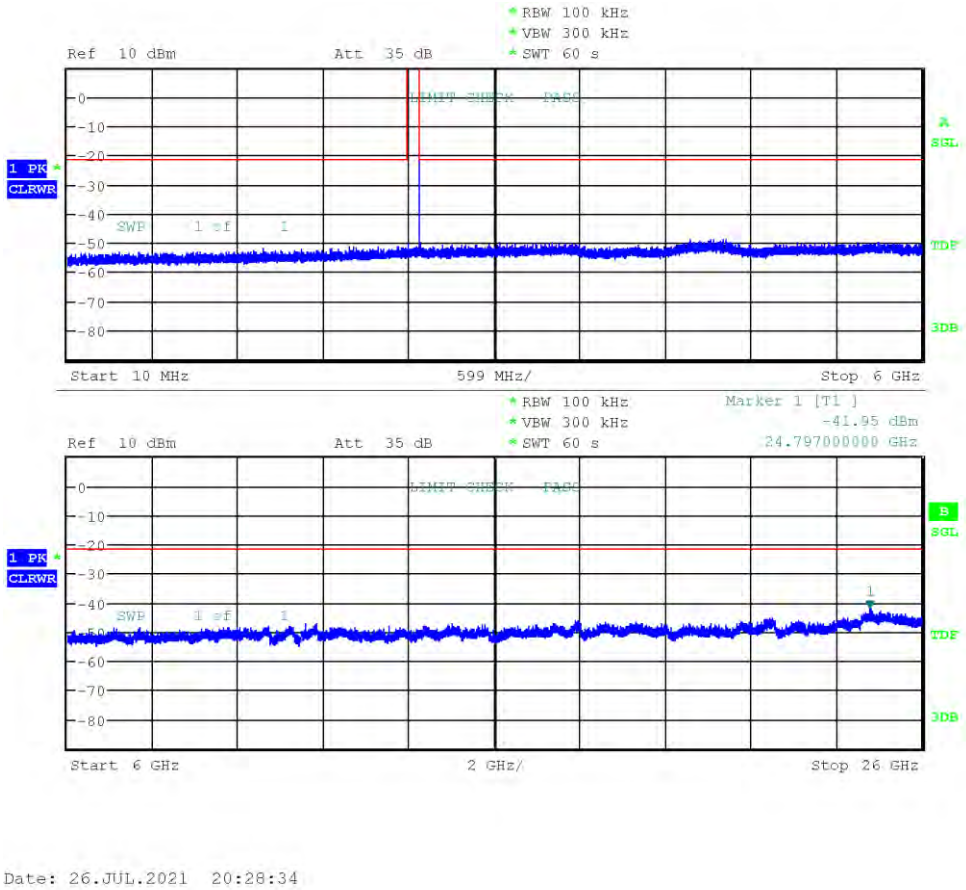
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	DH5
Max. in-band Frequency [MHz]:	2441.2
Max. in-band Level [dBm/100 kHz]:	-1.6
Out-of-band Limit [dBm/100 kHz]:	-21.6



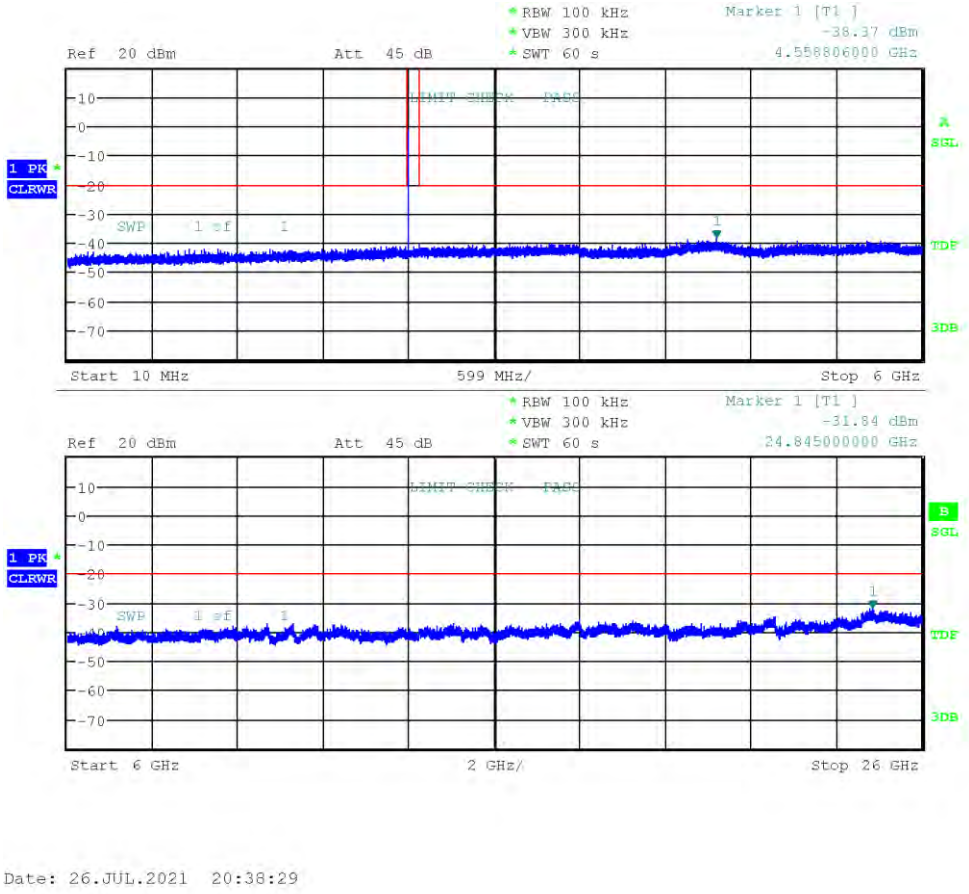
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	DH5
Max. in-band Frequency [MHz]:	2480.2
Max. in-band Level [dBm/100 kHz]:	-1.4
Out-of-band Limit [dBm/100 kHz]:	-21.4



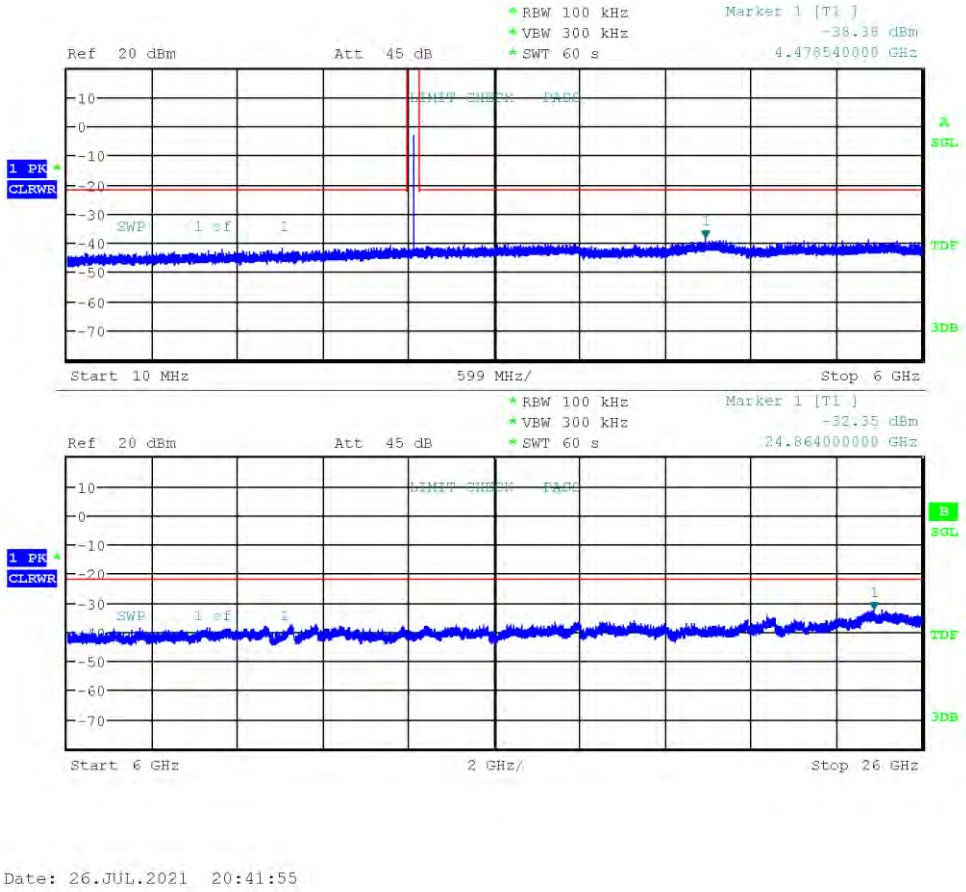
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	2DH5
Max. in-band Frequency [MHz]:	2402.2
Max. in-band Level [dBm/100 kHz]:	-0.3
Out-of-band Limit [dBm/100 kHz]:	-20.3



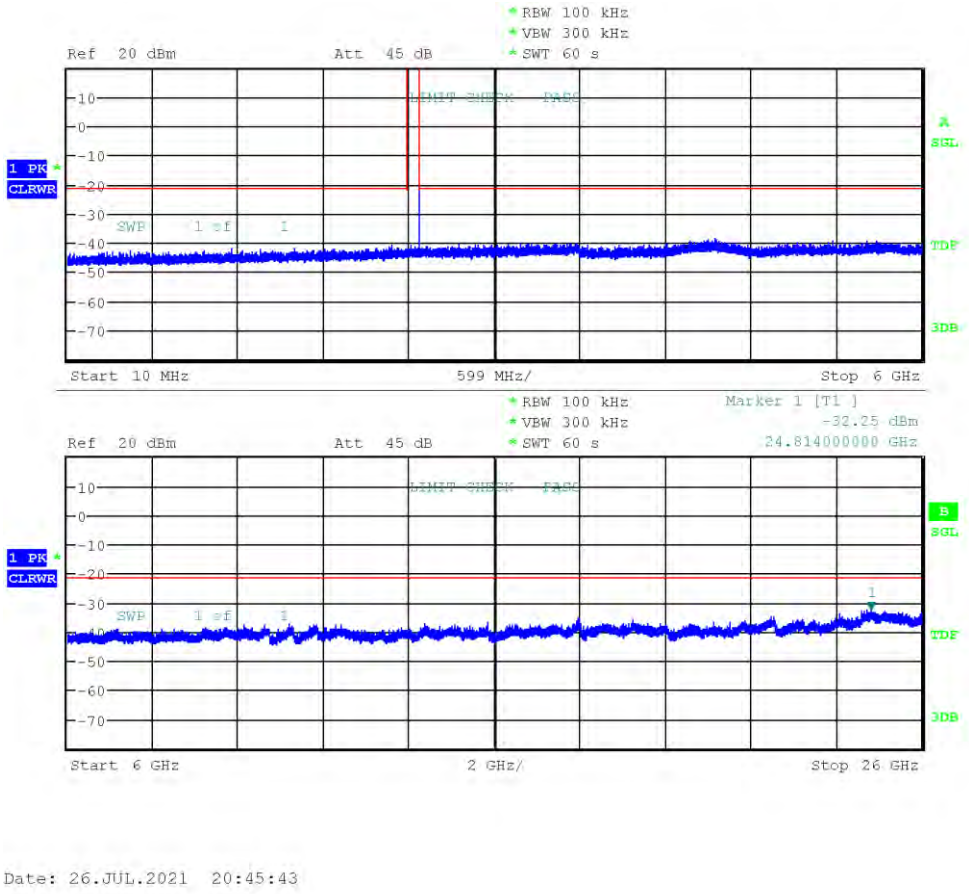
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	2DH5
Max. in-band Frequency [MHz]:	2441.0
Max. in-band Level [dBm/100 kHz]:	-1.7
Out-of-band Limit [dBm/100 kHz]:	-21.7



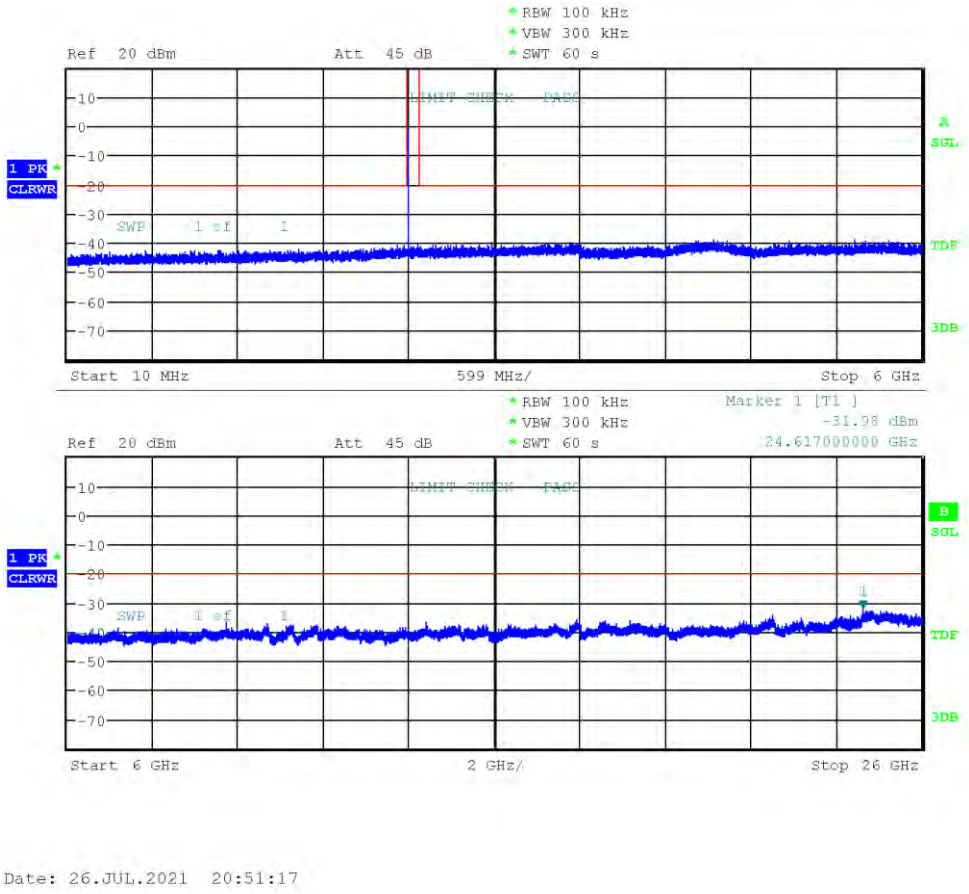
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	2DH5
Max. in-band Frequency [MHz]:	2480.0
Max. in-band Level [dBm/100 kHz]:	-1.4
Out-of-band Limit [dBm/100 kHz]:	-21.4



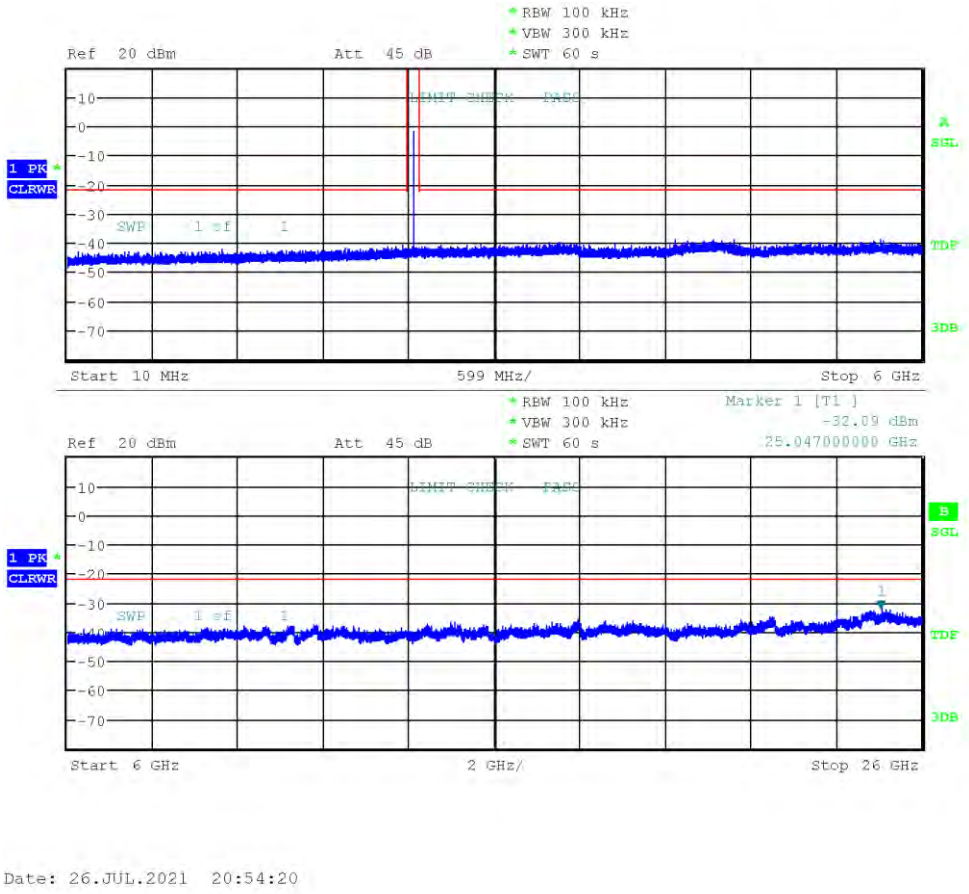
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 0, 2402 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	3DH5
Max. in-band Frequency [MHz]:	2402.2
Max. in-band Level [dBm/100 kHz]:	-0.2
Out-of-band Limit [dBm/100 kHz]:	-20.2



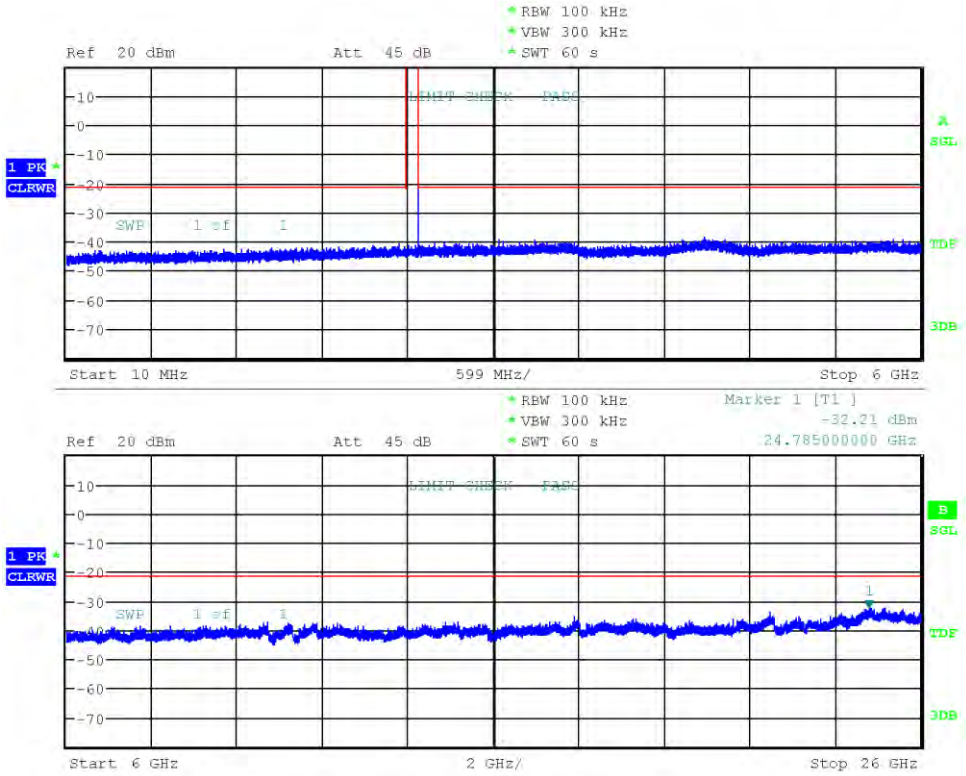
Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 39, 2441 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	3DH5
Max. in-band Frequency [MHz]:	2441.0
Max. in-band Level [dBm/100 kHz]:	-1.9
Out-of-band Limit [dBm/100 kHz]:	-21.9



Conducted Spurious Emissions

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:	34968, (A1 8 SerNr: 826)
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	GFSK, Channel: 78, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2021-07-26
Note:	3DH5
Max. in-band Frequency [MHz]:	2480.2
Max. in-band Level [dBm/100 kHz]:	-1.2
Out-of-band Limit [dBm/100 kHz]:	-21.2



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3.10 Test Conditions and Results - Transmitter radiated emissions

3.10.1 Information

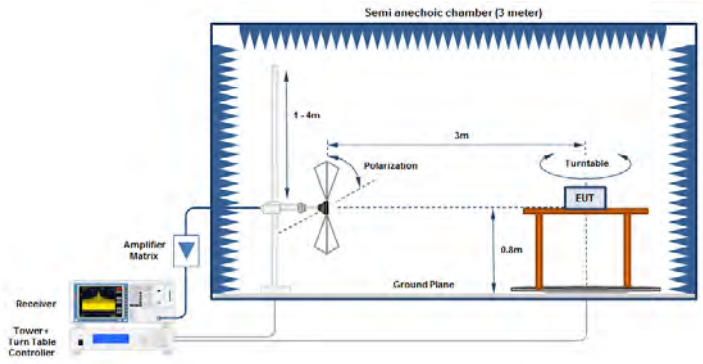
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISED RSS-Gen, Issue 5 (section 6.13)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6
Operator	Wilfried Treffke
Date	2021-07-27

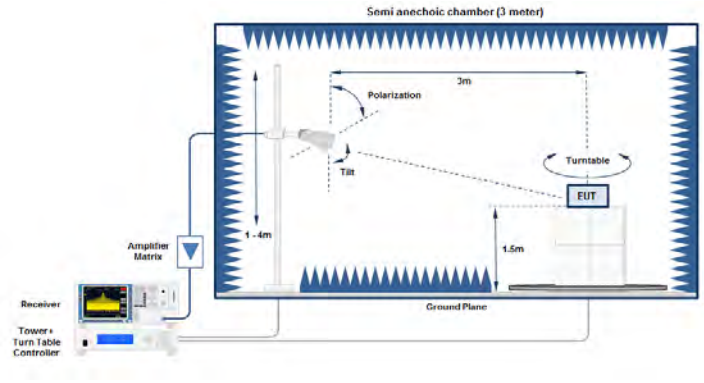
3.10.2 Limits

Limits			
Frequency range [MHz]	Detector	Field strength [µV/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

3.10.3 Setup

Test Setup 30 MHz - 1000 MHz



Test Setup > 1 GHz


3.10.4 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	AC1	EF00062	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-07	2021-07
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

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	2020-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2020-11	2021-11
Antenna	Amplifier Research	AT4560	EF01152	2020-11	2022-11

3.10.5 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

3.10.6 Results

Test Results - DH5						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2402	2388.1	51.63	pk	hor	74.00	-22.37
2402	2388.1	37.81	avg	hor	54.00	-16.19
2402	2498.1	41.20	pk	hor	74.00	-32.80
2441	2343.9	41.78	pk	hor	74.00	-32.22
2480	2380	44.85	pk	hor	74.00	-29.15
2480	2485.9	57.89	pk	hor	74.00	-16.11
2480	2485.9	38.57	avg	hor	54.00	-15.43

Test Results - 3-DH5						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2402	2379.3	51.92	pk	hor	74.00	-22.08
2402	2379.3	38.01	avg	hor	54.00	-15.99
2402	4801	37.64	pk	ver	74.00	-36.36
2441	2339.4	38.47	pk	hor	74.00	-35.53
2480	4955	40.31	pk	ver	74.00	-33.69

3.11 Test Conditions and Results - Receiver radiated emissions

3.11.1 Information

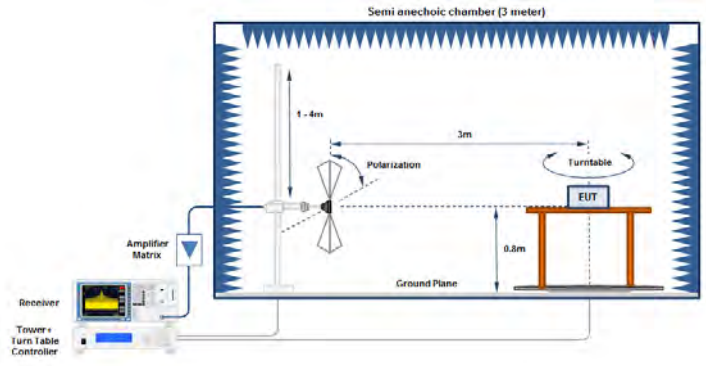
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Uncertainty	± 5.95 dB
Measurement Method	ANSI C63.10 6.5, 6.6
Operator	Wilfried Treffke
Date	2021-07-27

3.11.2 Limits

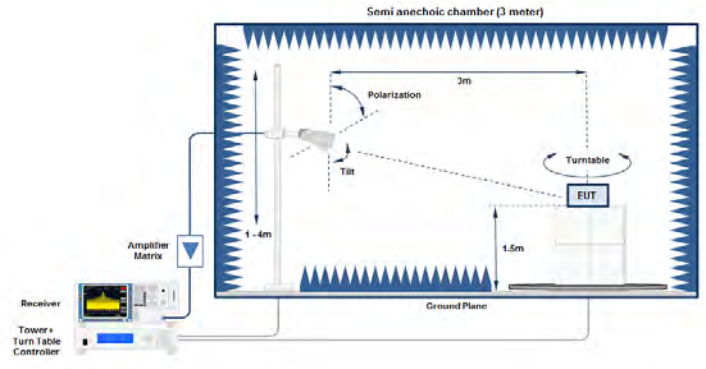
Limits			
Frequency range [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.11.3 Setup

Test Setup 30 MHz - 1000 MHz



Test Setup > 1 GHz



3.11.4 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	AC1	EF00062	2021-02	2024-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2020-07	2021-07
Antenna	R&S	HK 116	EF00030	2021-05	2024-05
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

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	2020-07	2021-07
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2020-11	2021-11

3.11.5 Procedure

Test Procedure 30 - 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

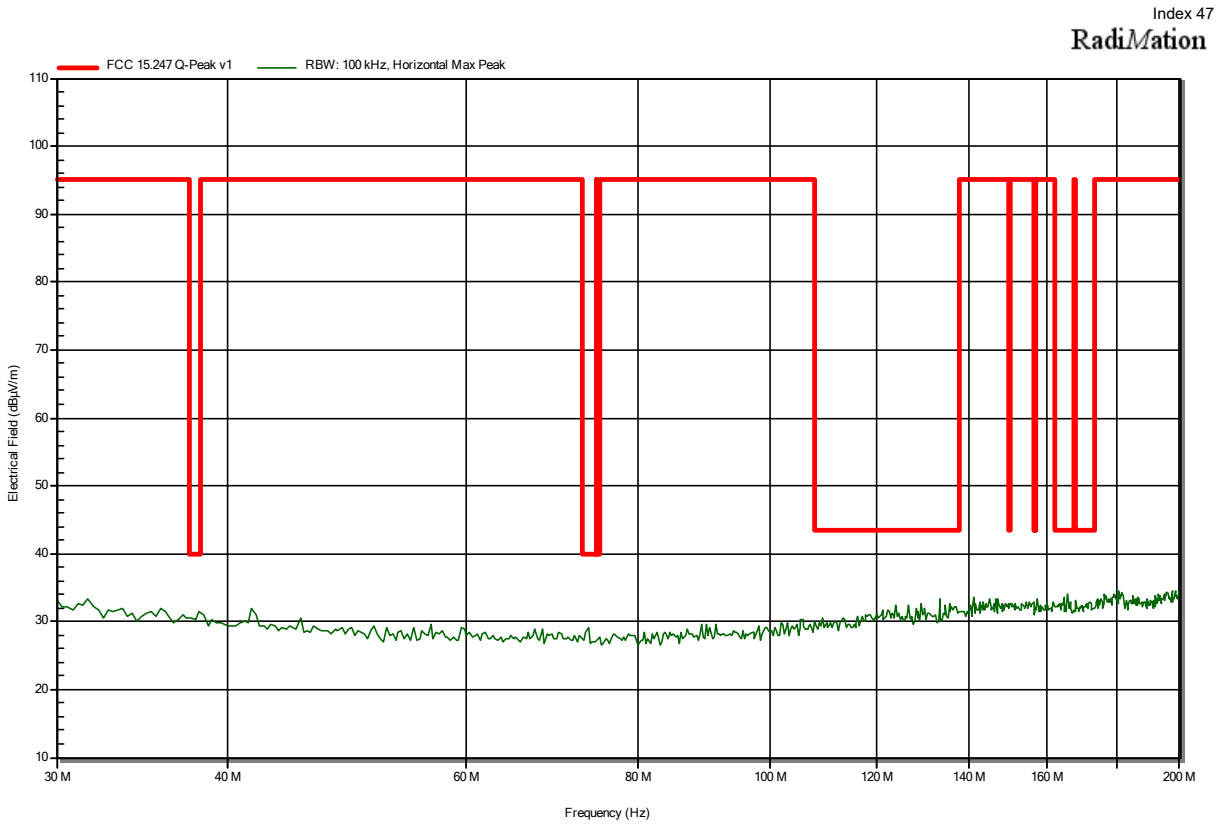
3.11.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2441	3269	29.01	pk	hor	53.98	-24.97
2441	7897	39.08	pk	ver	53.98	-14.90
2441	7955	39.19	pk	hor	53.98	-14.79
2441	11050	44.24	pk	hor	53.98	-09.74

ANNEX A Transmitter spurious emissions

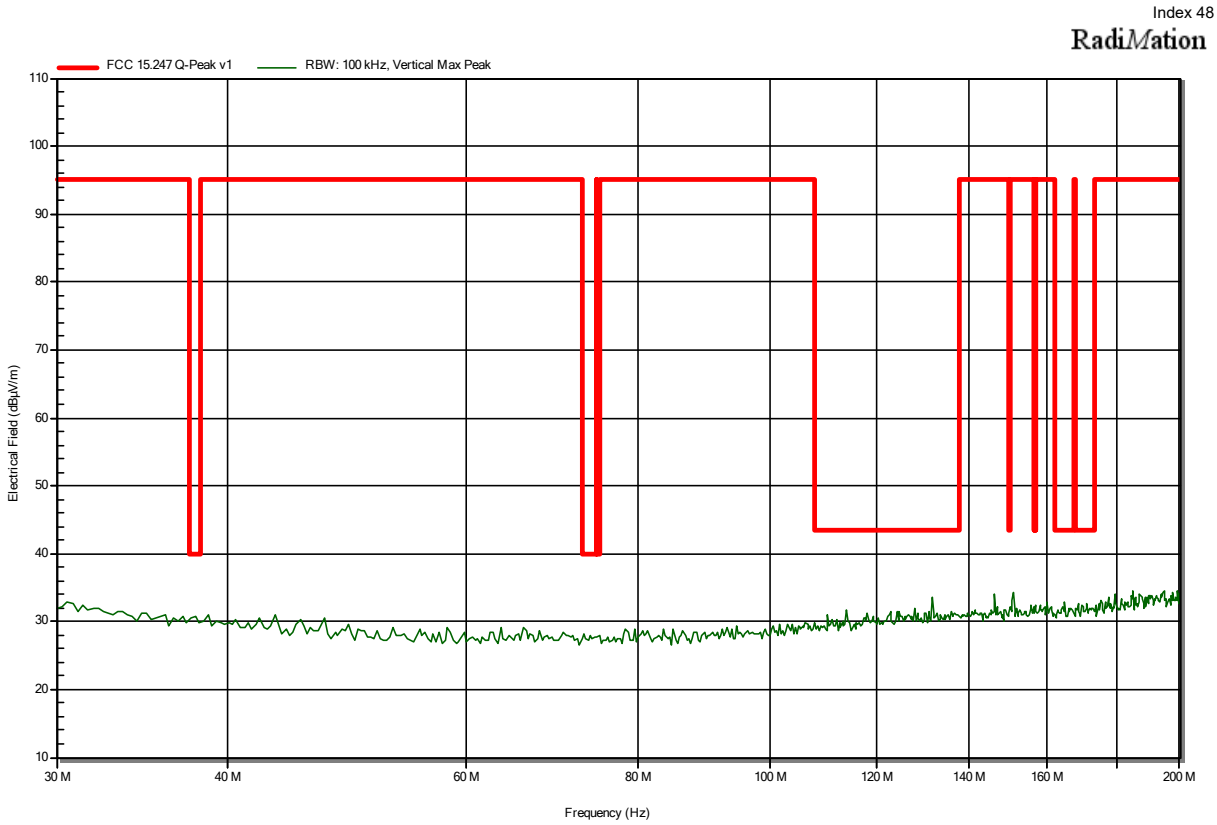
Radiated Spurious Emissions according to FCC 47 CFR 15.247

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



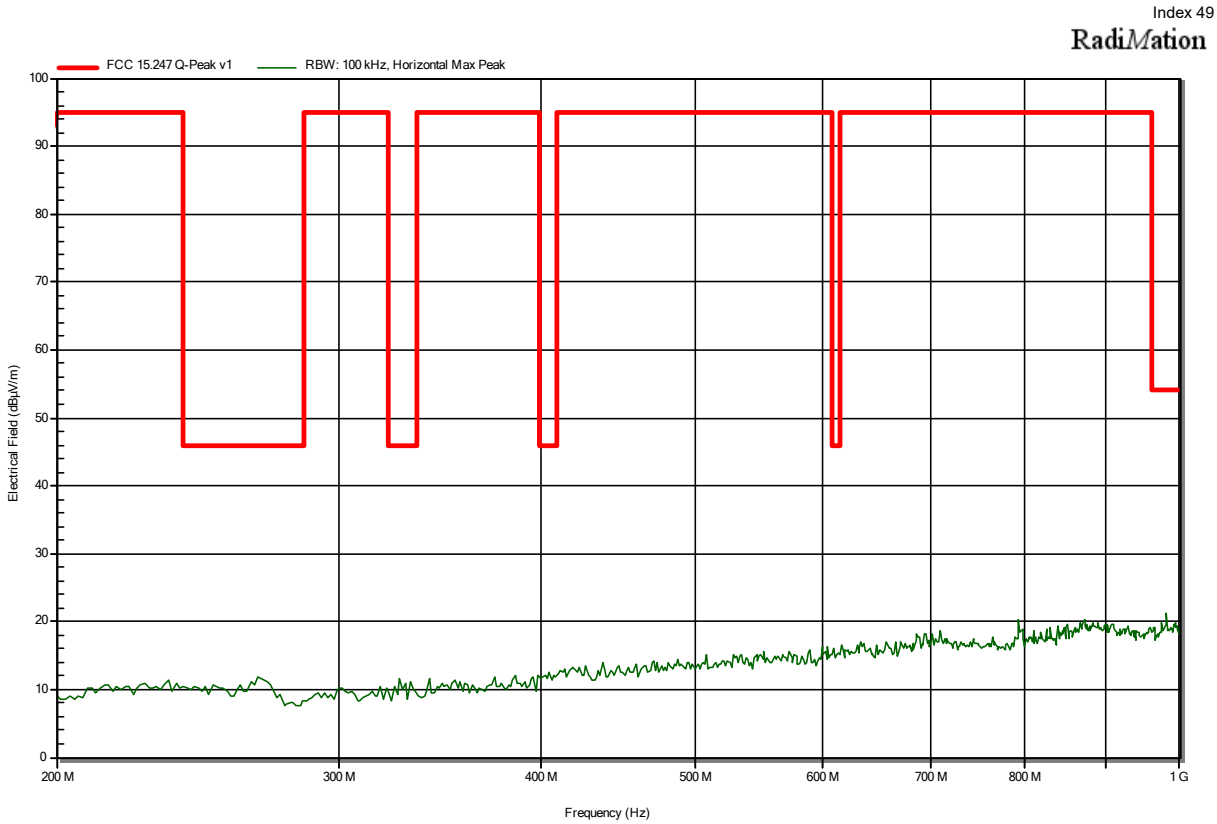
Radiated Spurious Emissions according to FCC 47 CFR 15.247

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



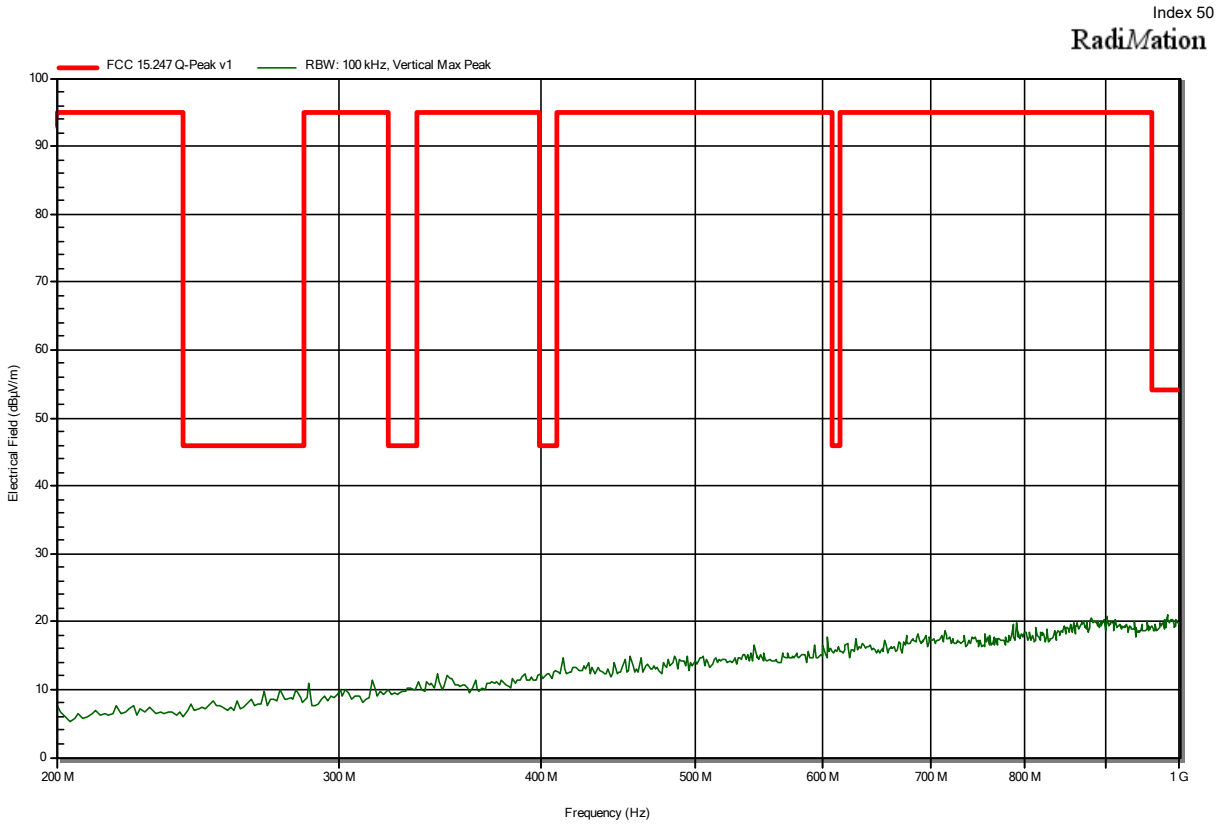
Radiated Spurious Emissions according to FCC 47 CFR 15.247

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



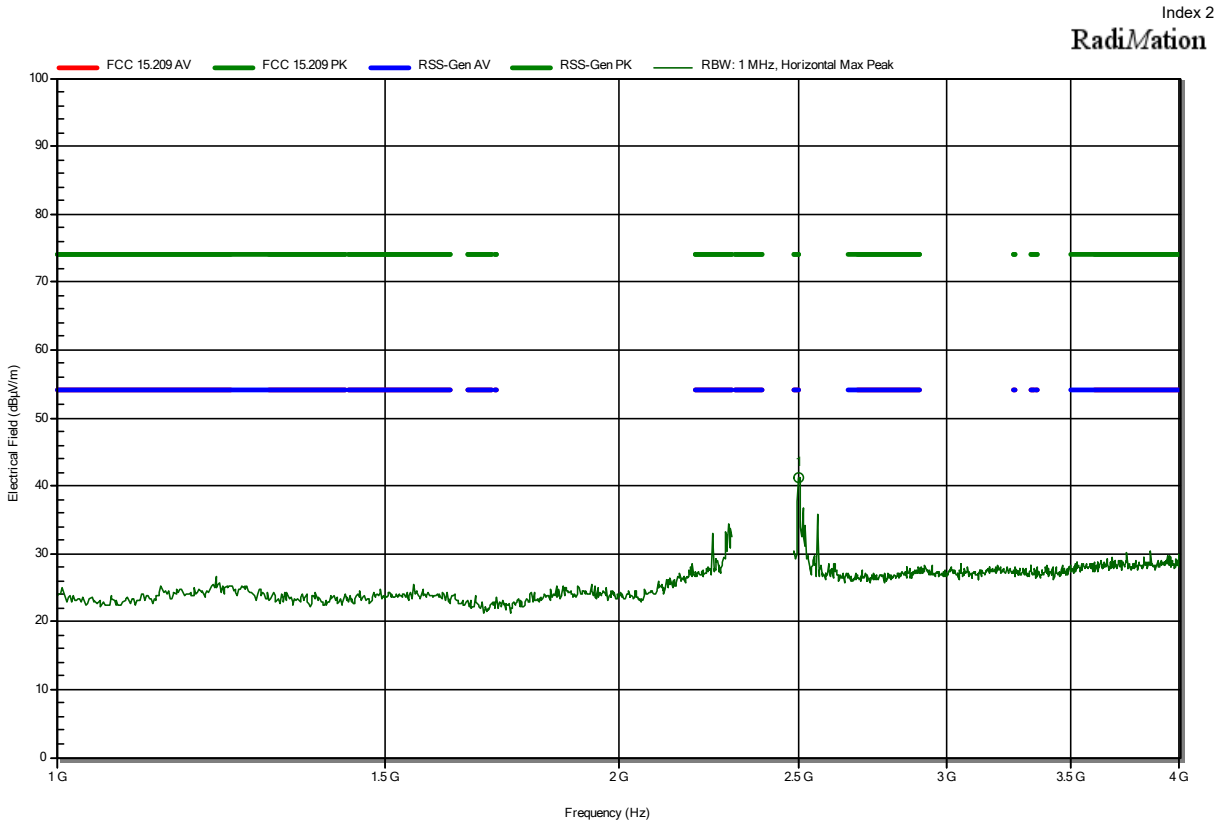
Radiated Spurious Emissions according to FCC 47 CFR 15.247

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

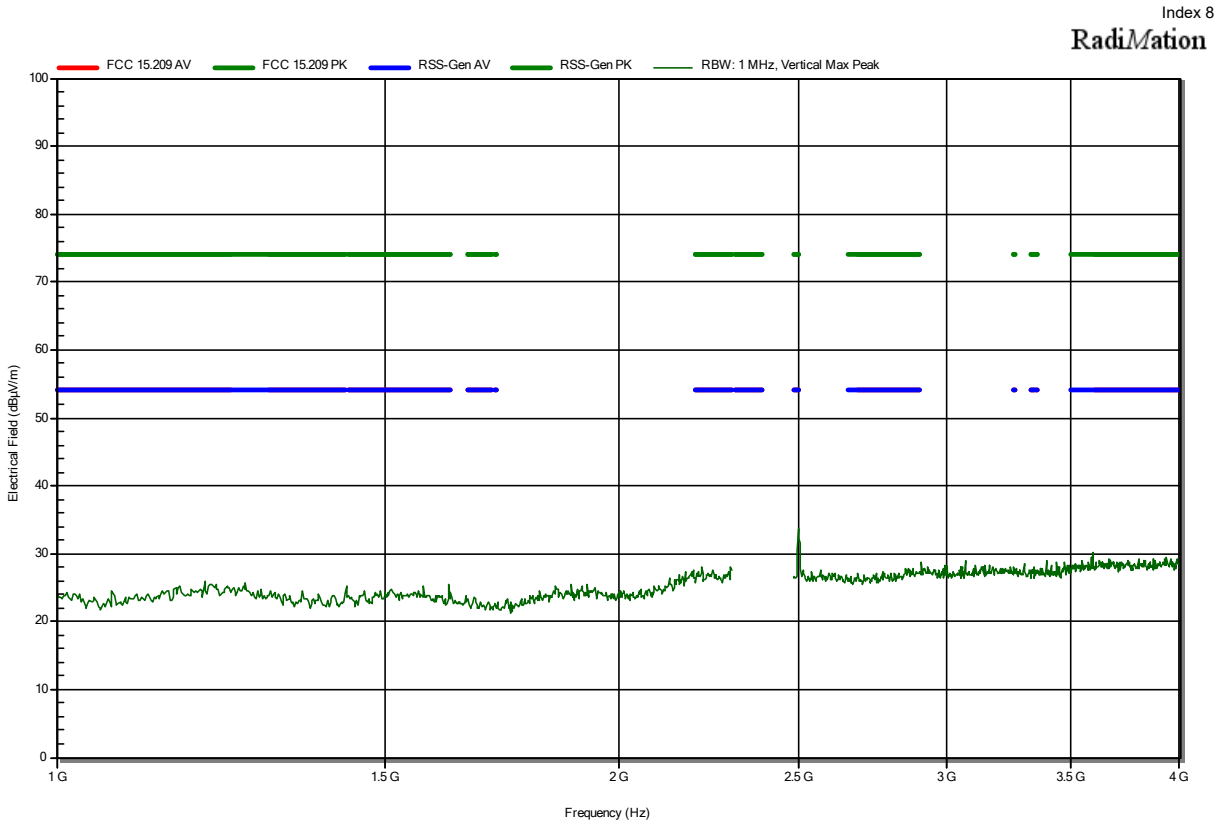
Project Number:	G0M-2101-9569
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4981 GHz	41.2 dBµV/m	74 dBµV/m	-32.8 dB	Pass

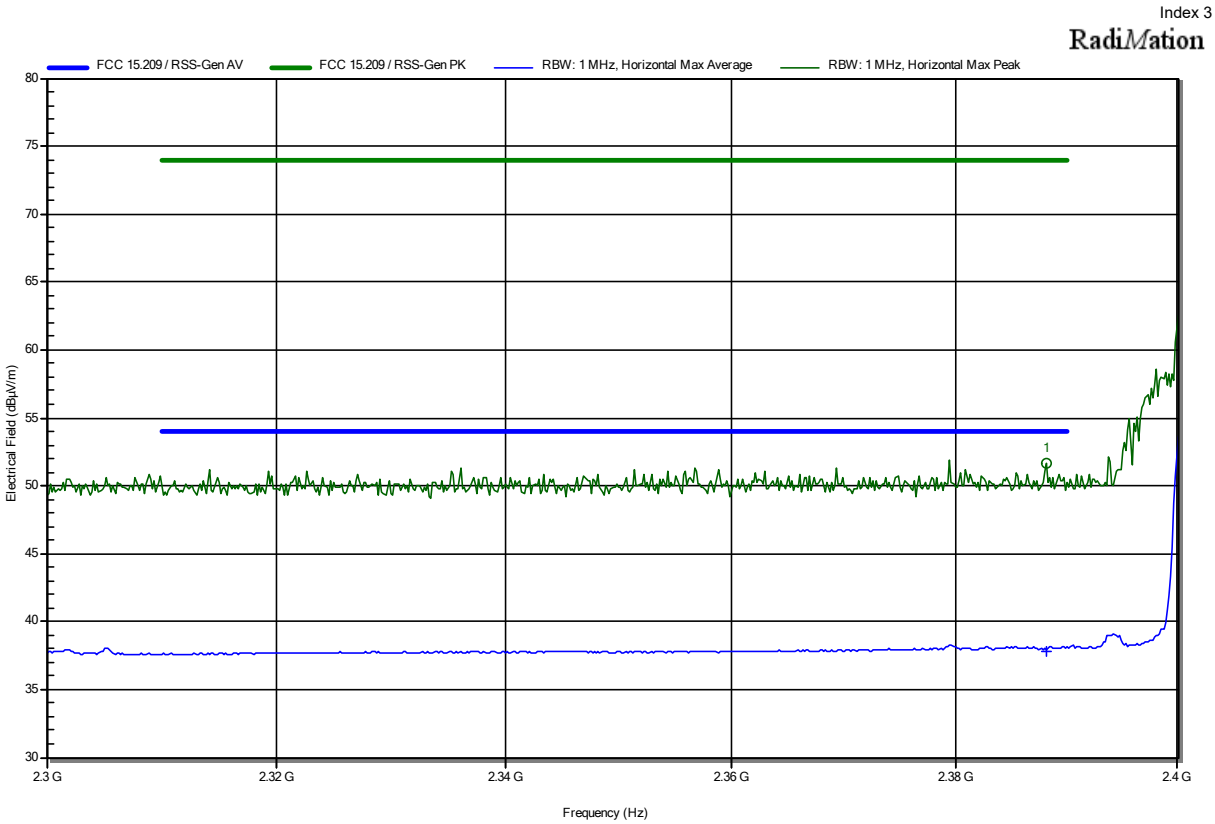
Radiated Spurious Emissions according to FCC 47 CFR 15.247

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	lower bandedge

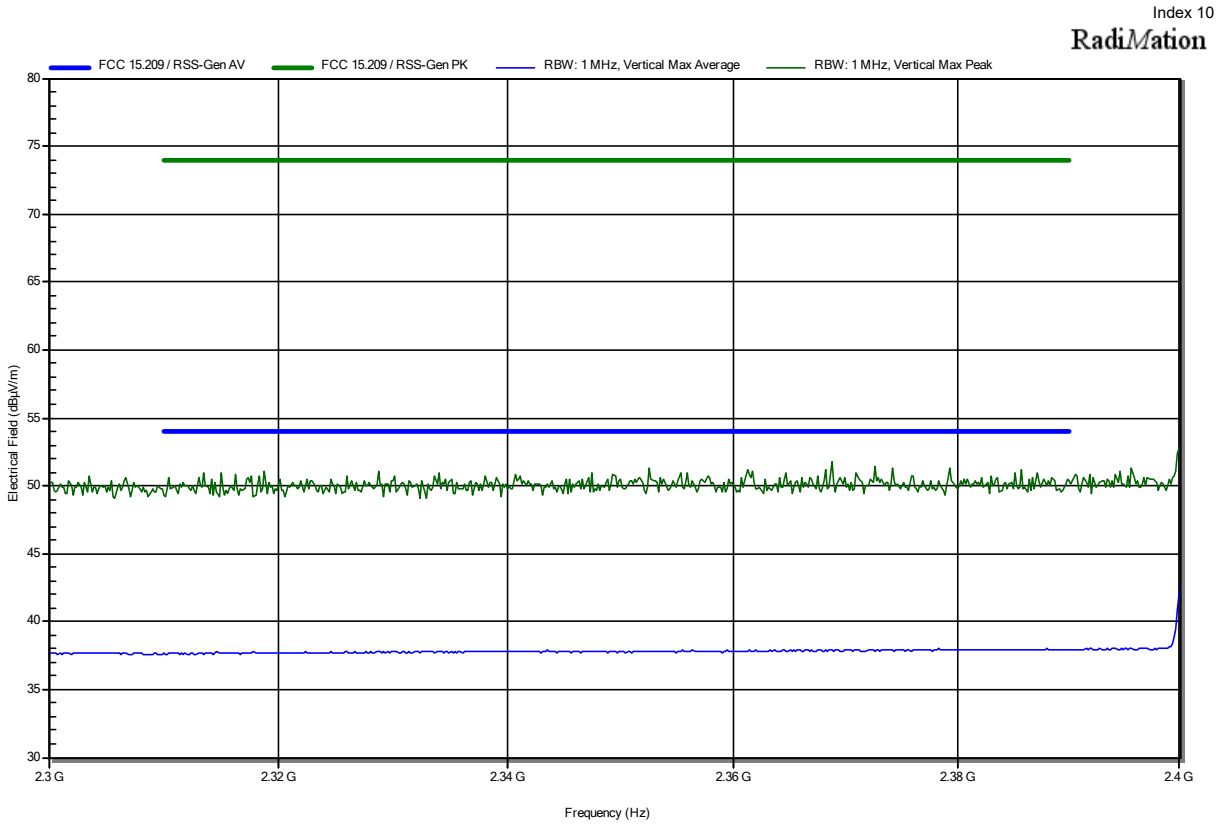


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3881 GHz	51.63 dBµV/m	74 dBµV/m	-22.37 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.3881 GHz	37.81 dBµV/m	54 dBµV/m	-16.19 dB	Pass

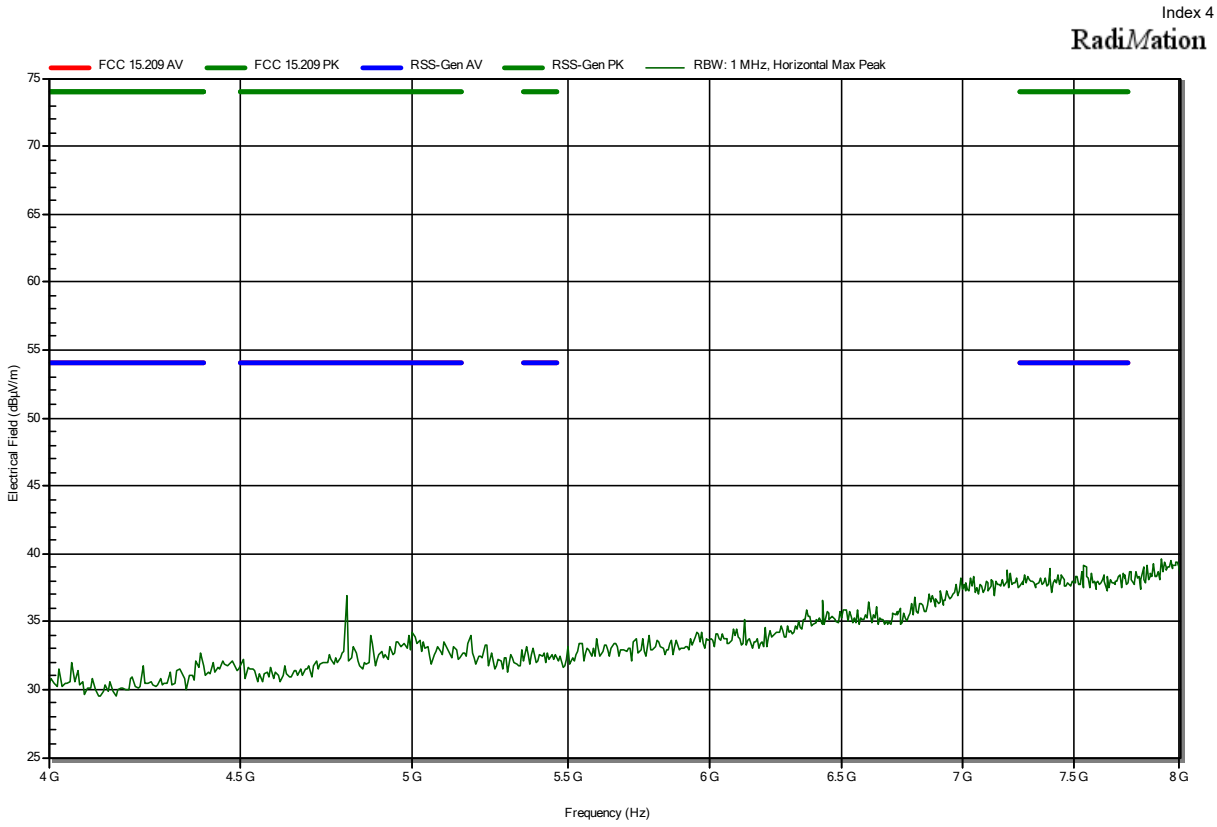
Radiated Spurious Emissions according to FCC 47 CFR 15.247

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	lower bandedge



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 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
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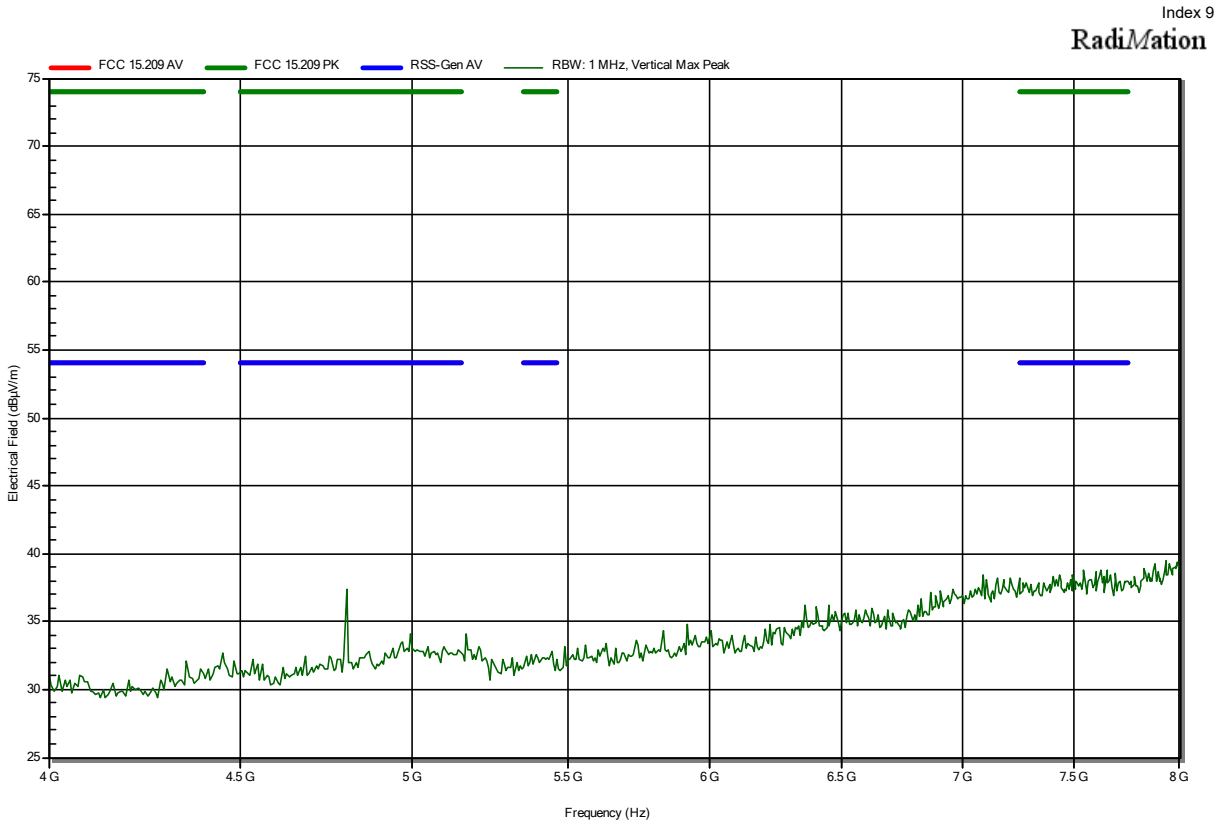
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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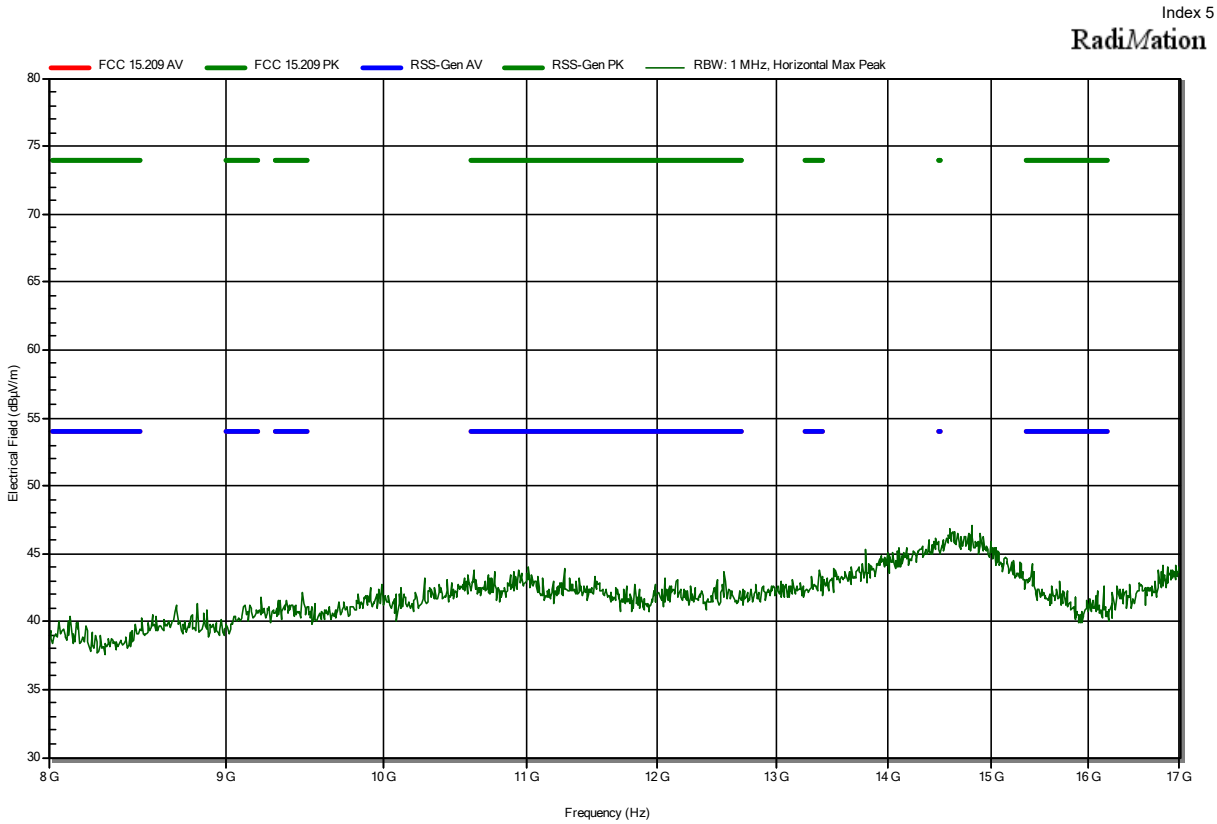
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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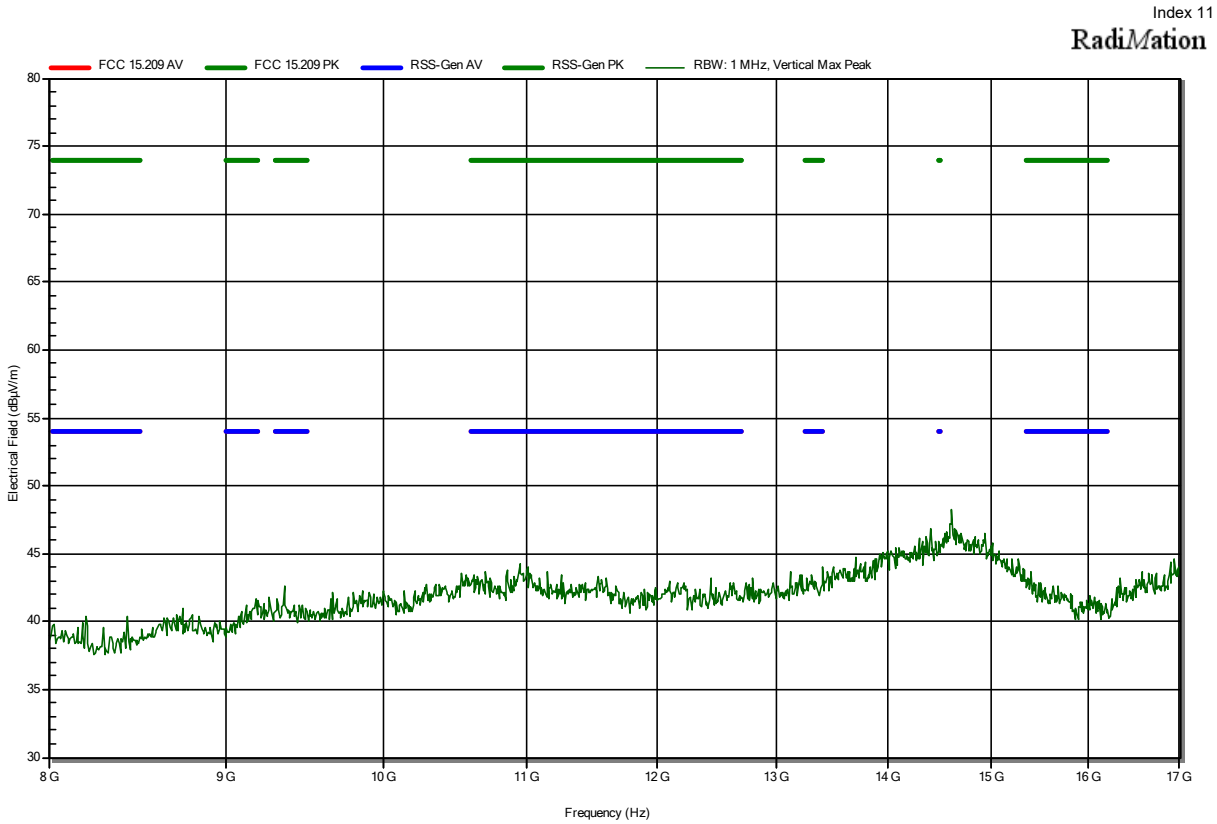
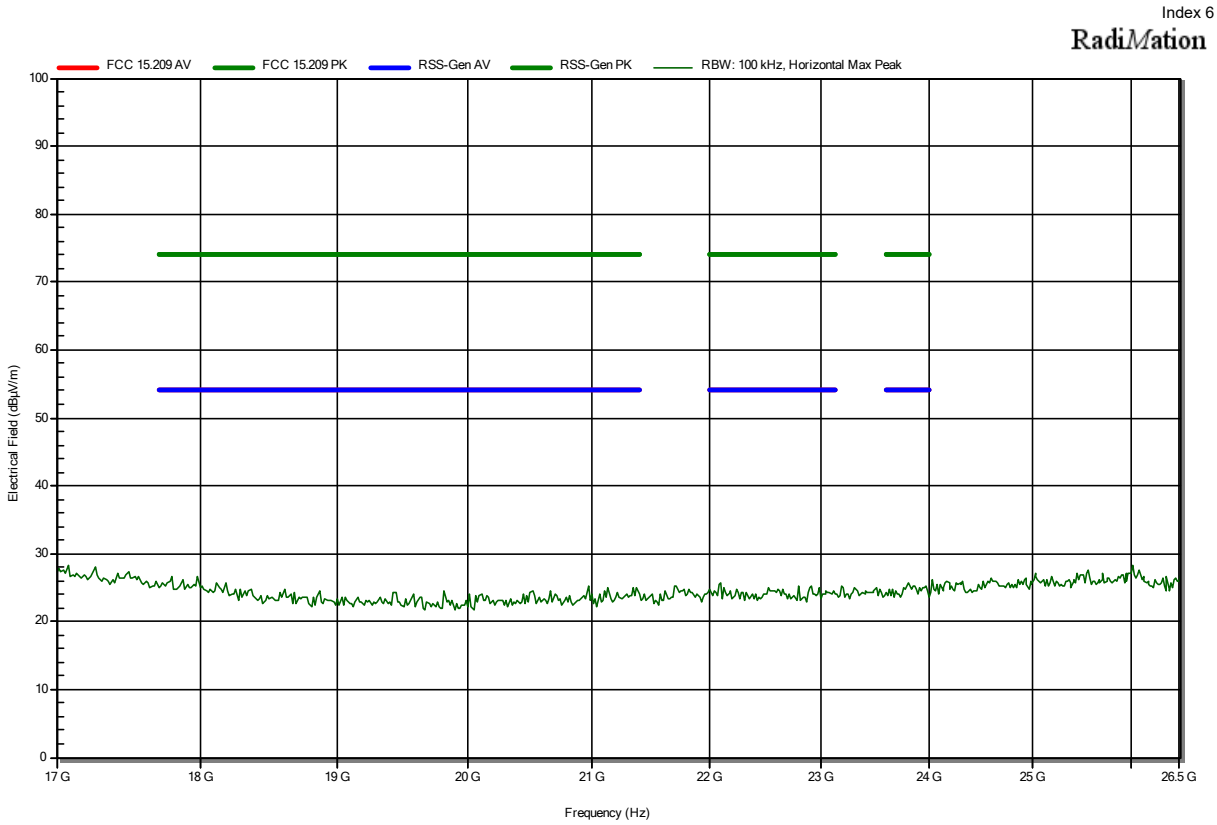
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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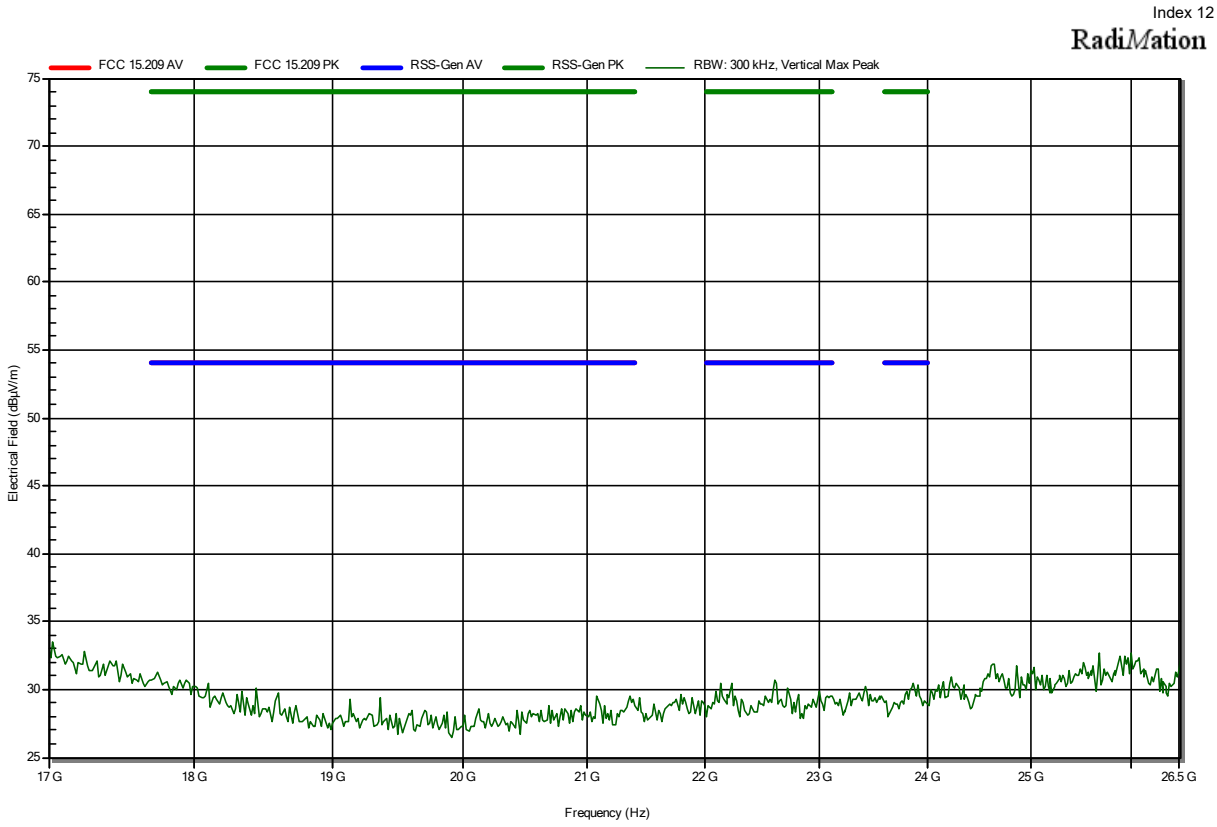
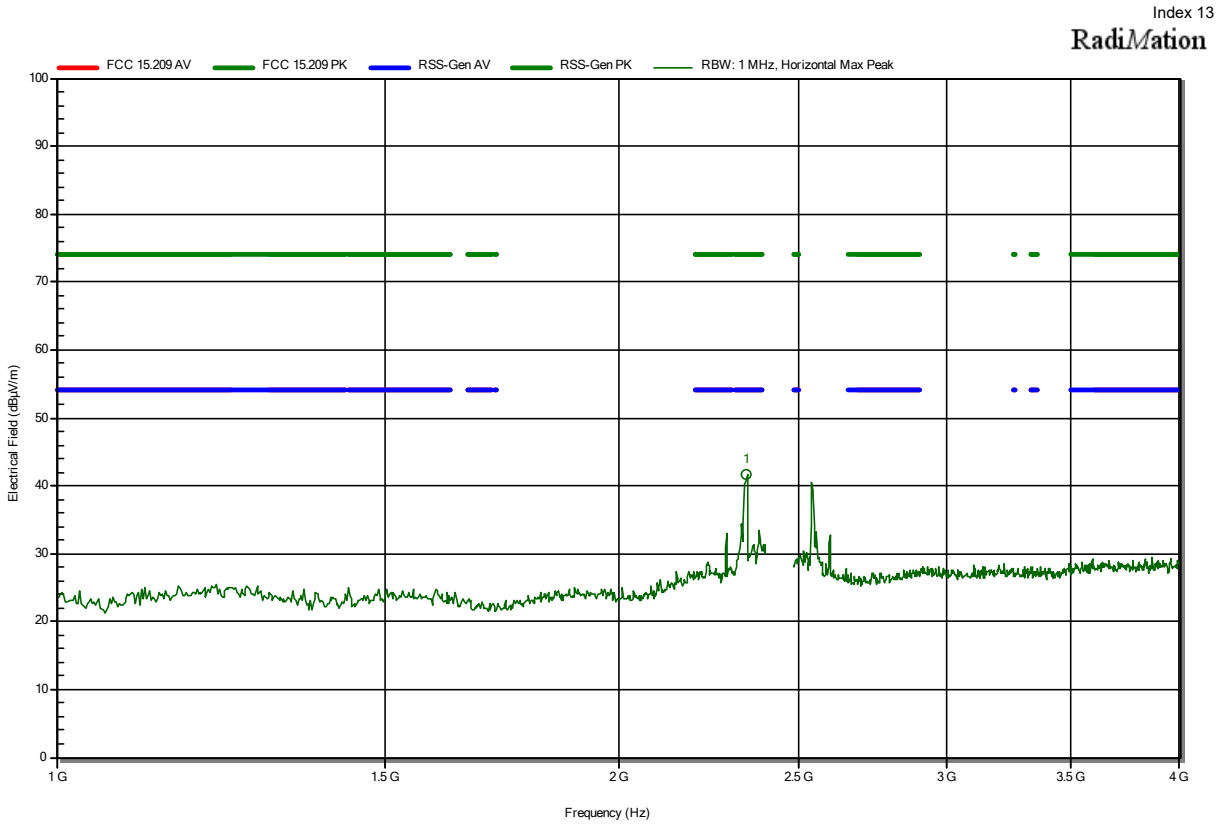
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

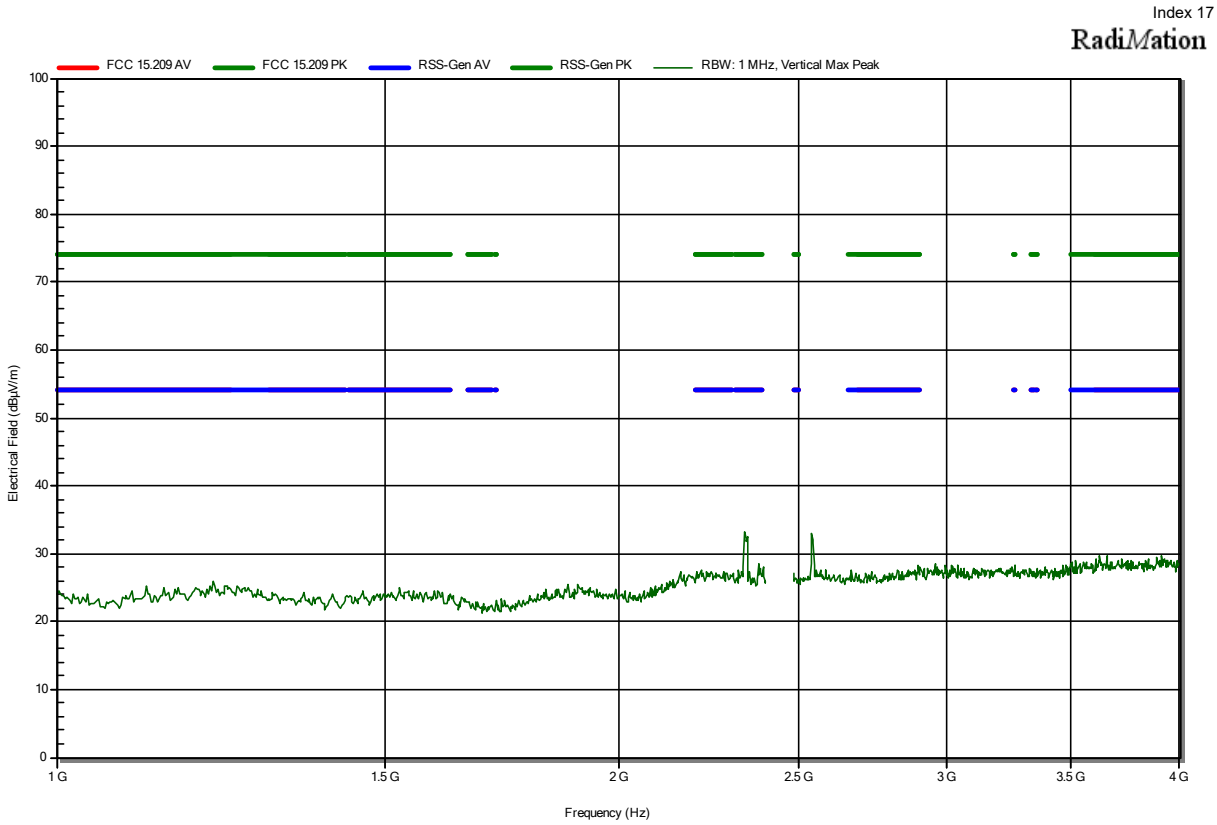
Project Number:	G0M-2101-9569
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3439 GHz	41.78 dBµV/m	74 dBµV/m	-32.22 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
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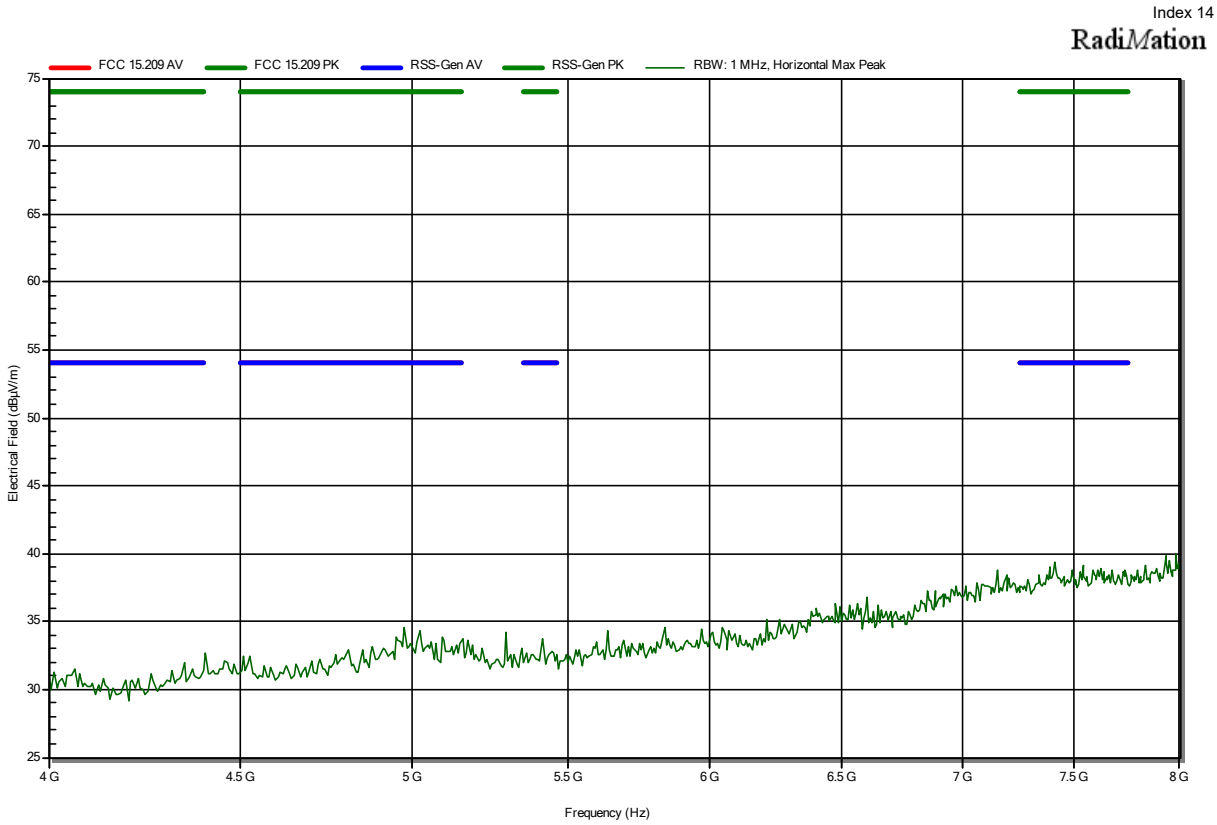
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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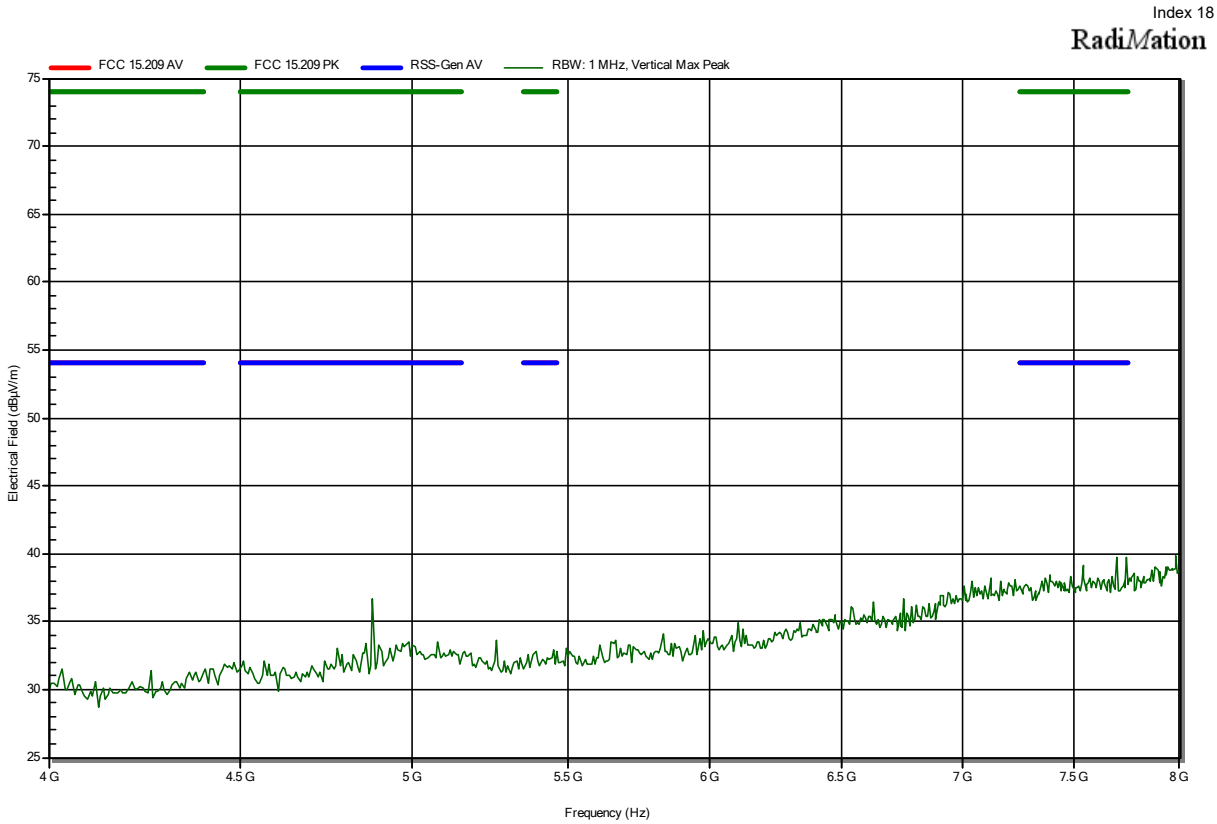
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
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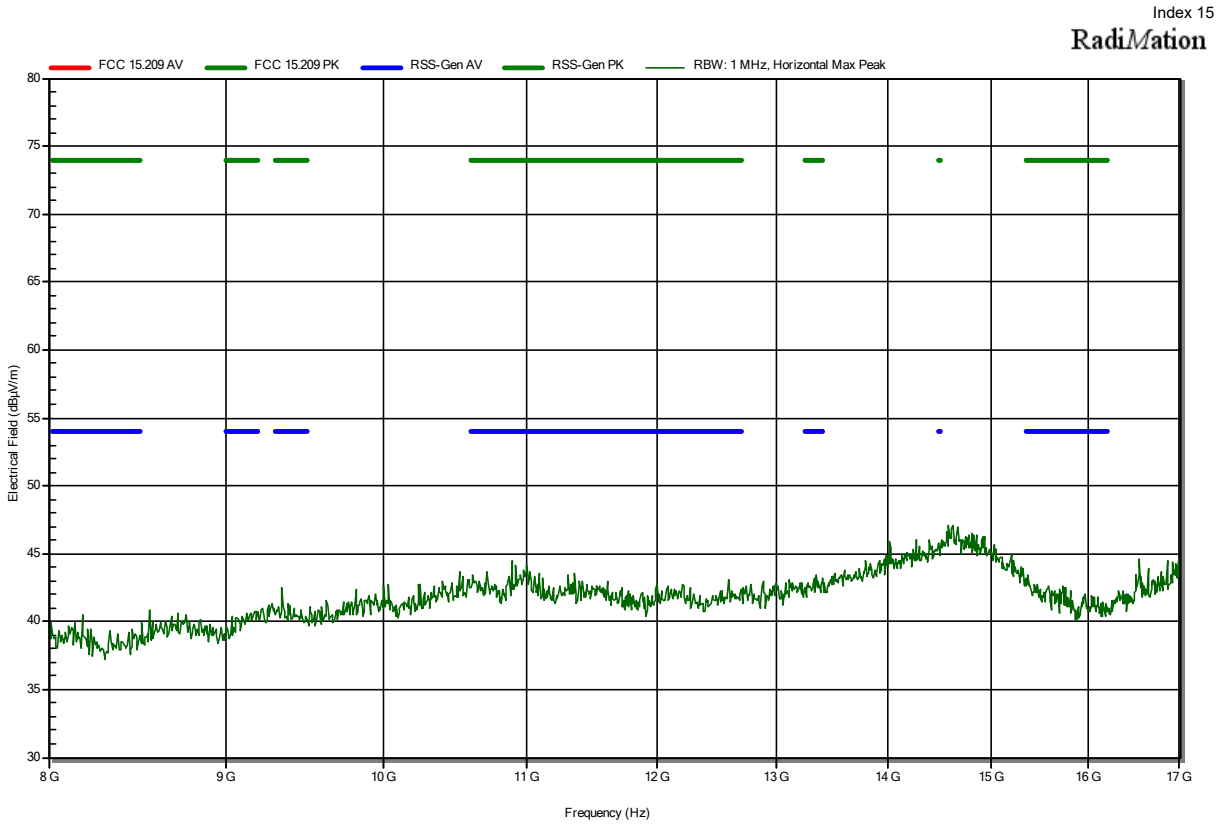
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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Project Number:	G0M-2101-9569
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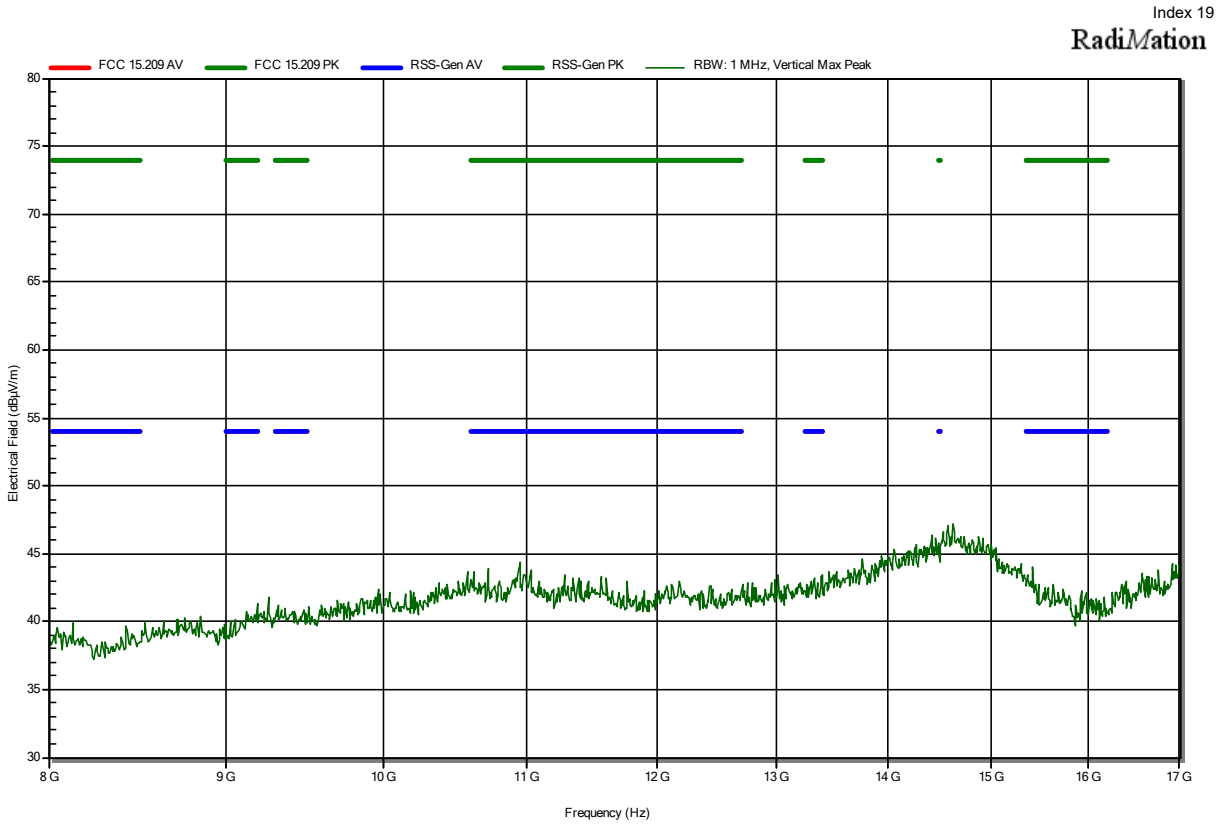
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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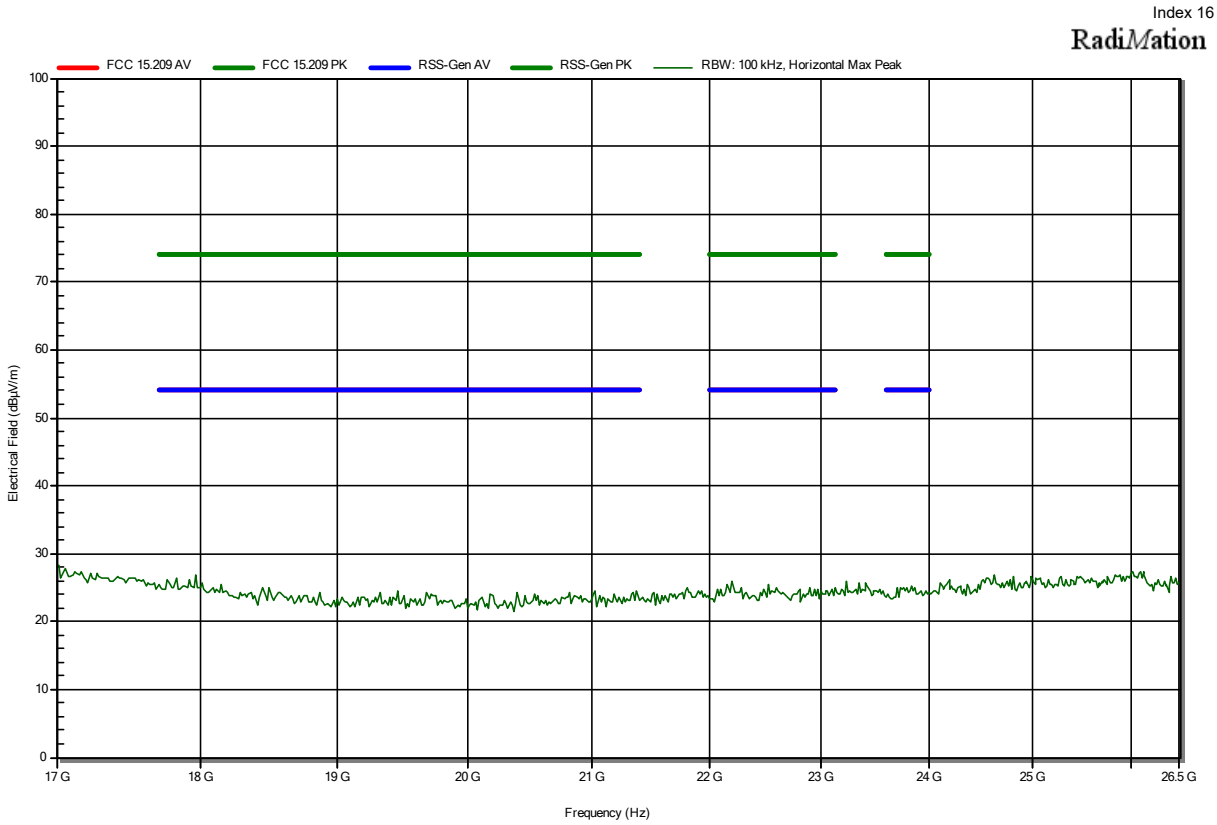
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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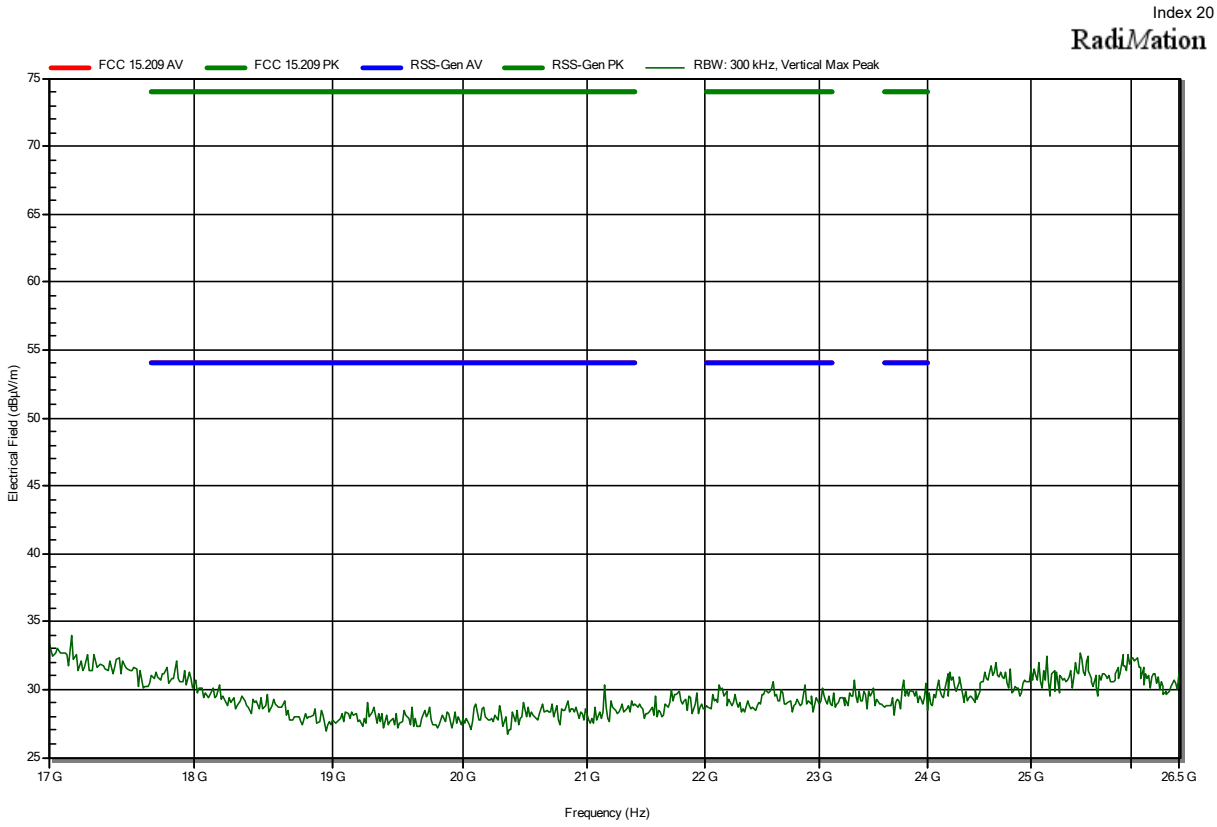
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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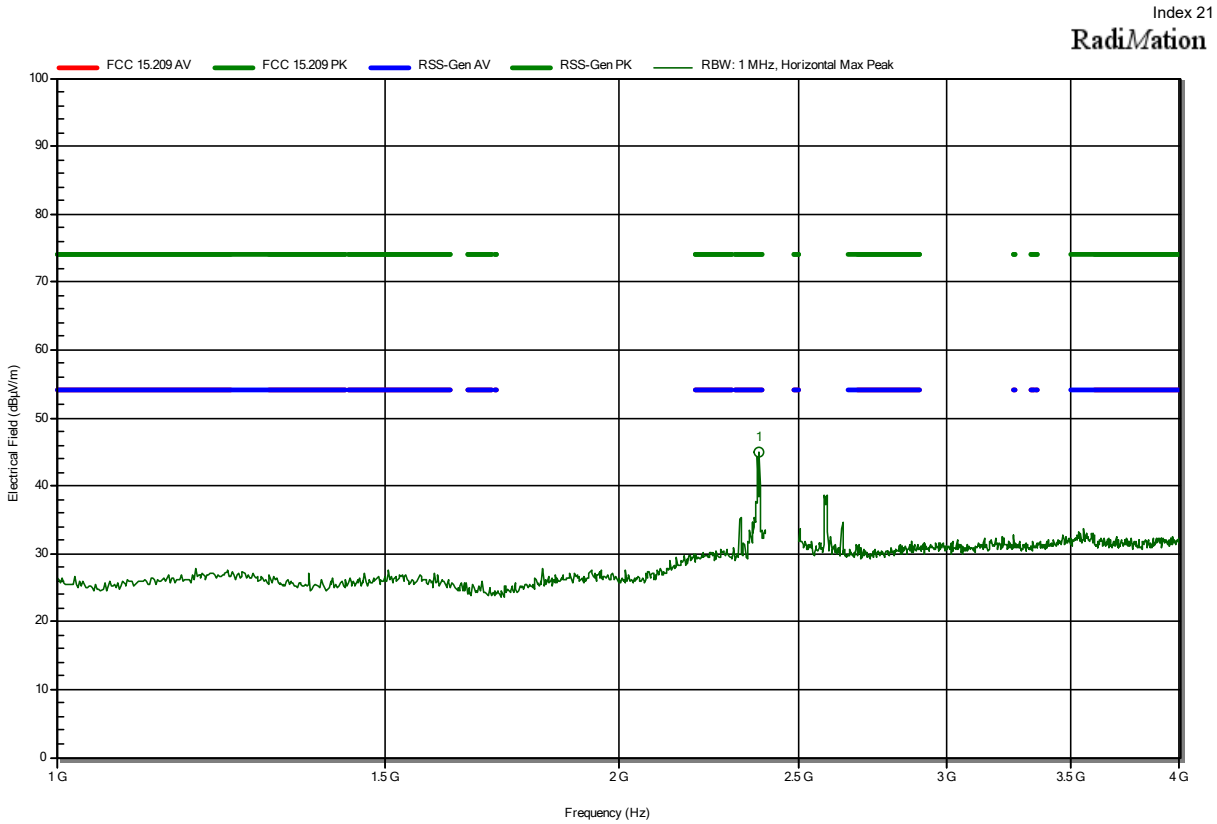
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.38 GHz	44.85 dBµV/m	74 dBµV/m	-29.15 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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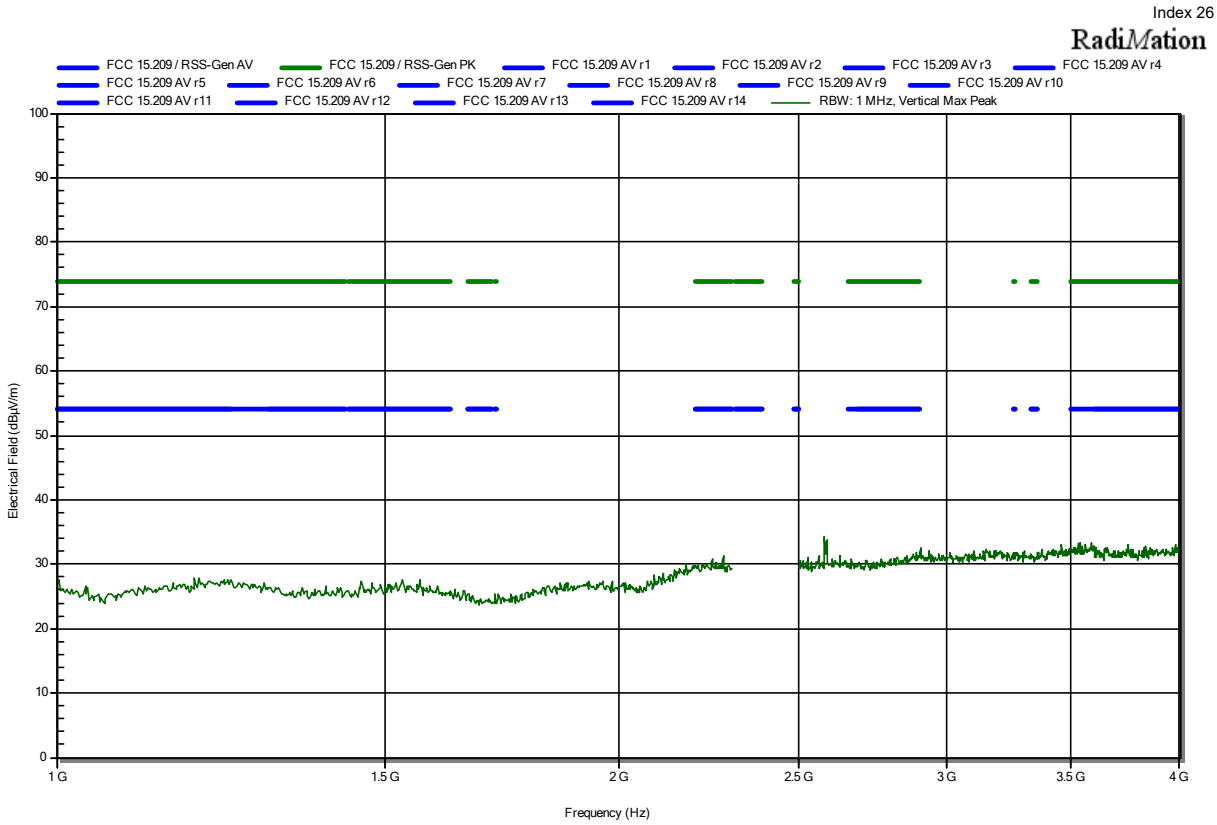
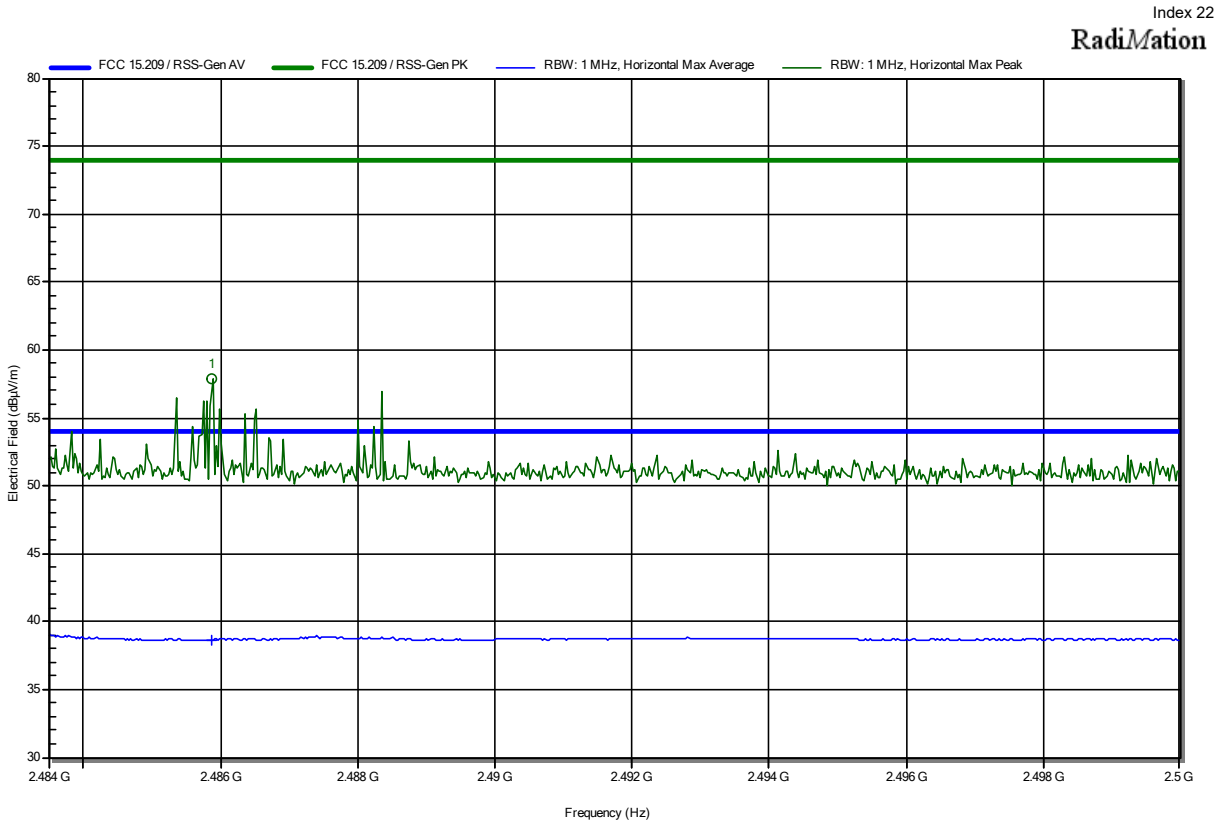
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	upper bandedge



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4859 GHz	57.89 dBµV/m	74 dBµV/m	-16.11 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.4859 GHz	38.57 dBµV/m	54 dBµV/m	-15.43 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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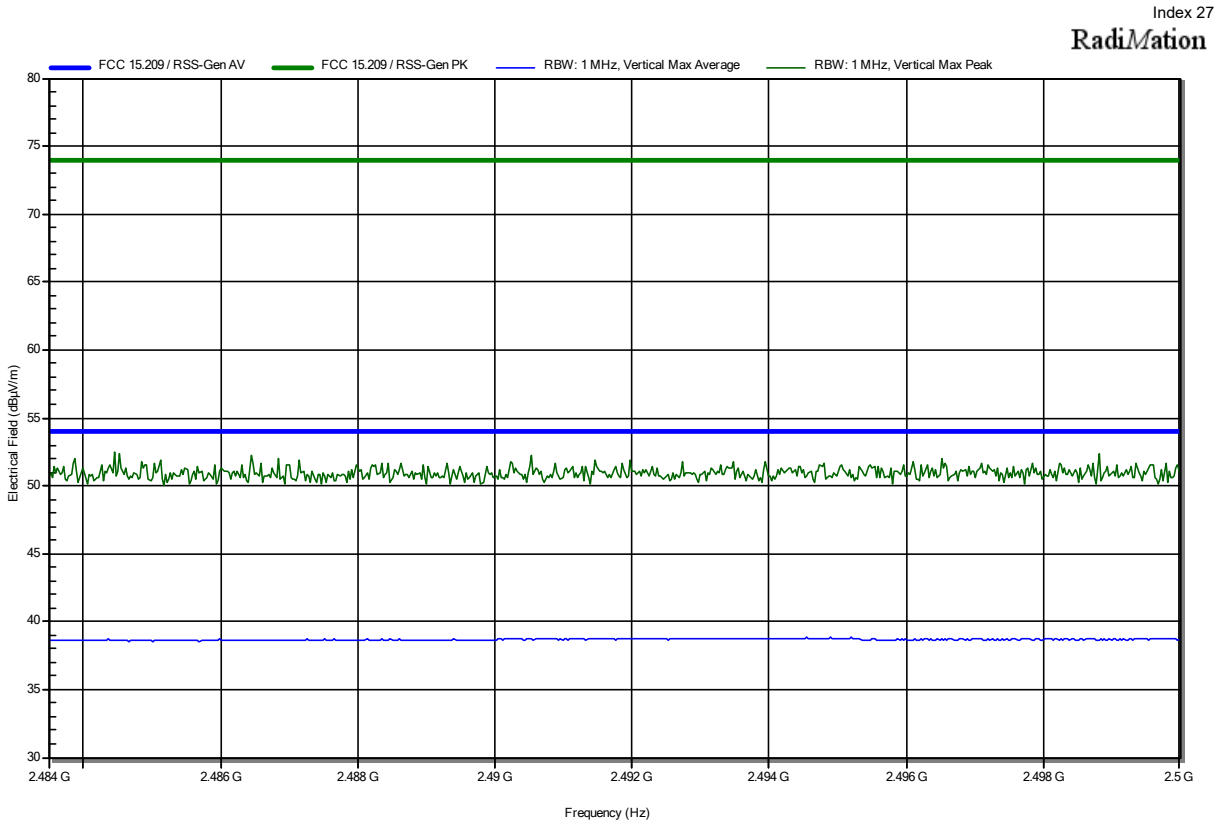
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	upper bandedge



Radiated Spurious Emissions according to FCC 47 CFR 15.247

Project Number:	G0M-2101-9569
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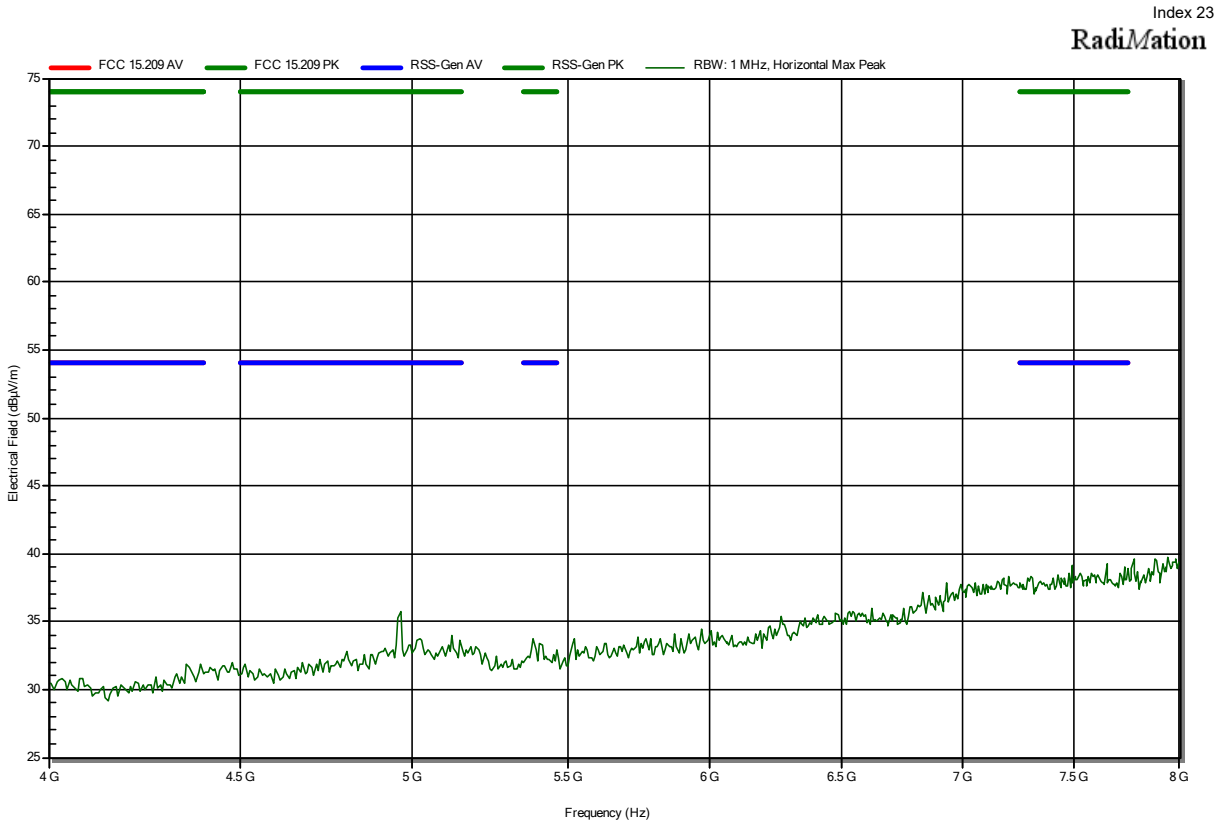
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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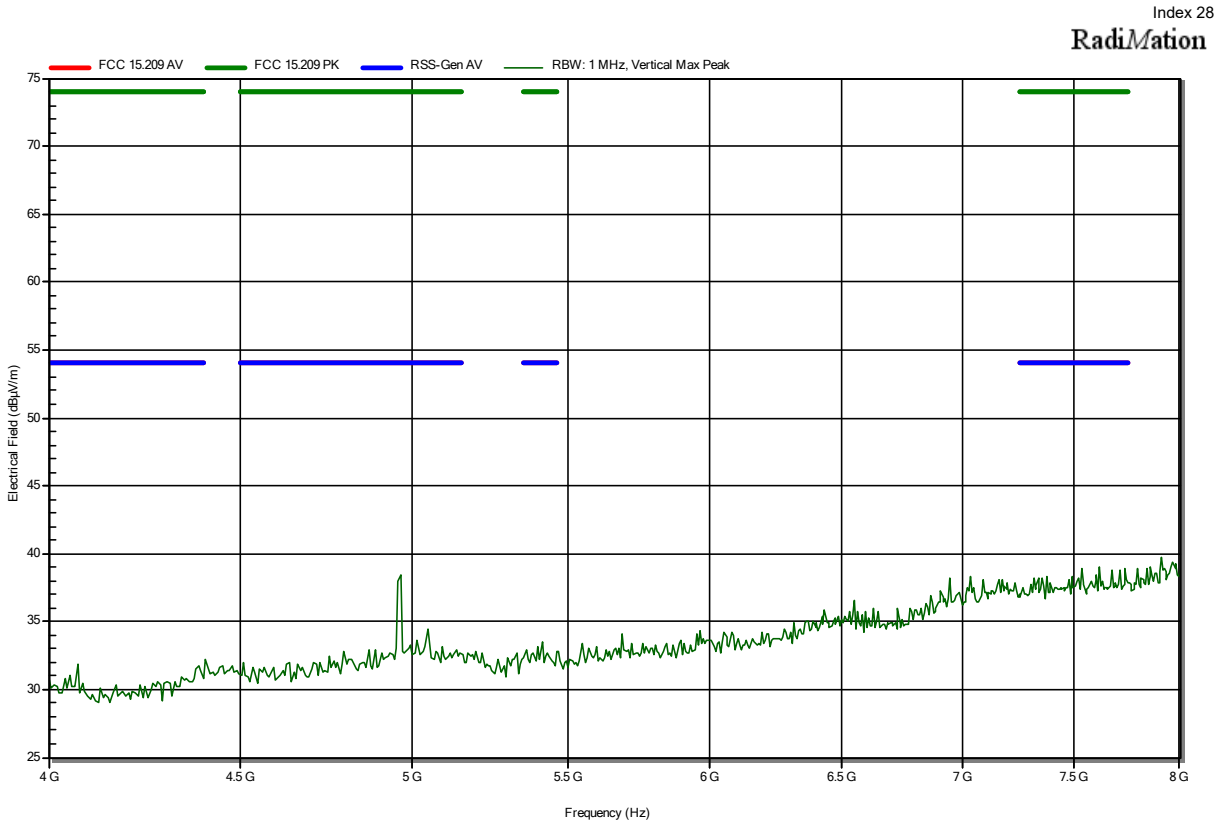
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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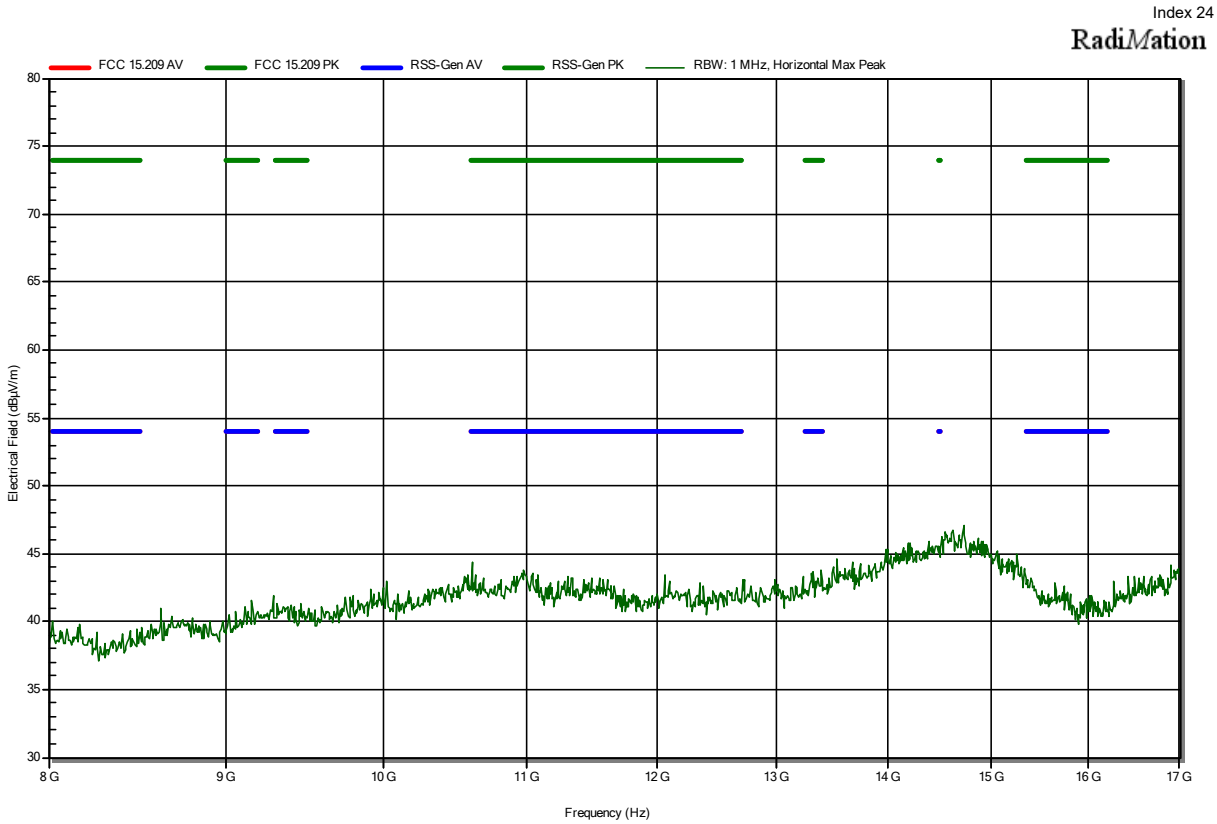
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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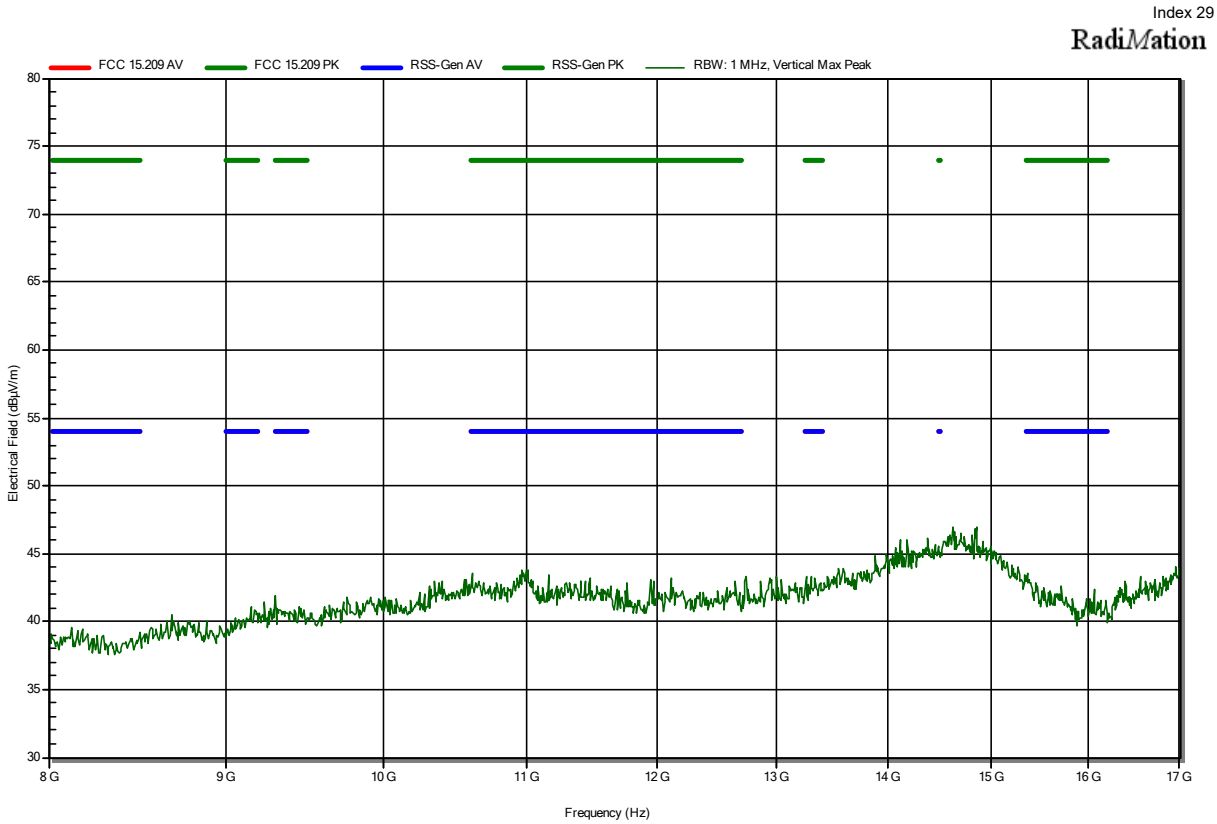
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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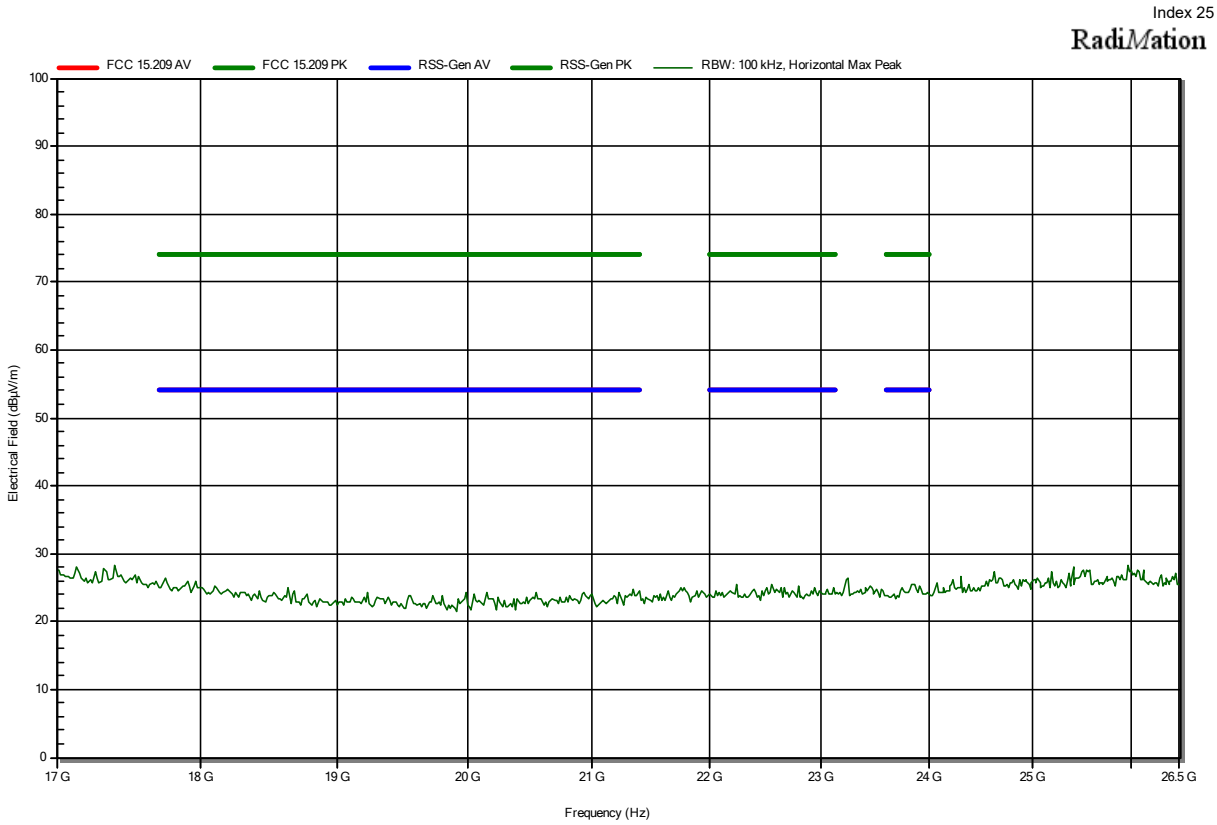
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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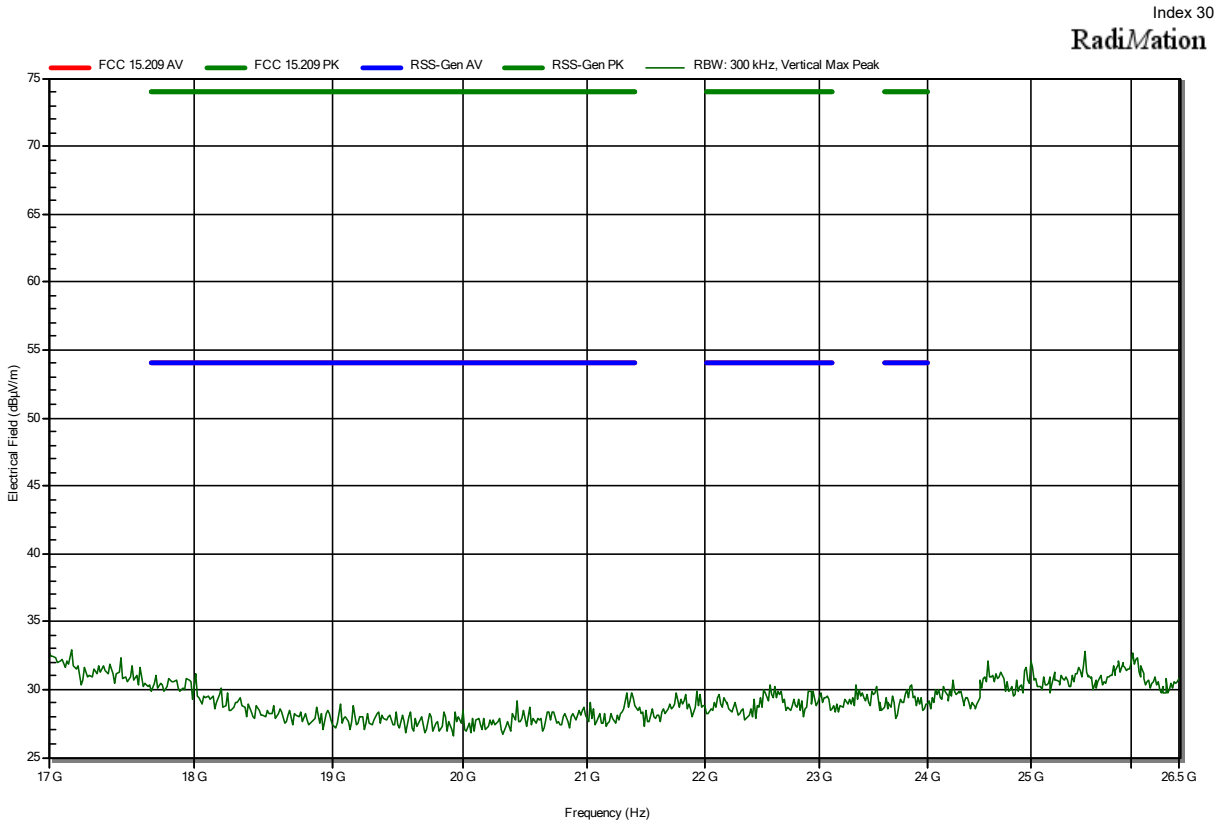
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; DH5; 1Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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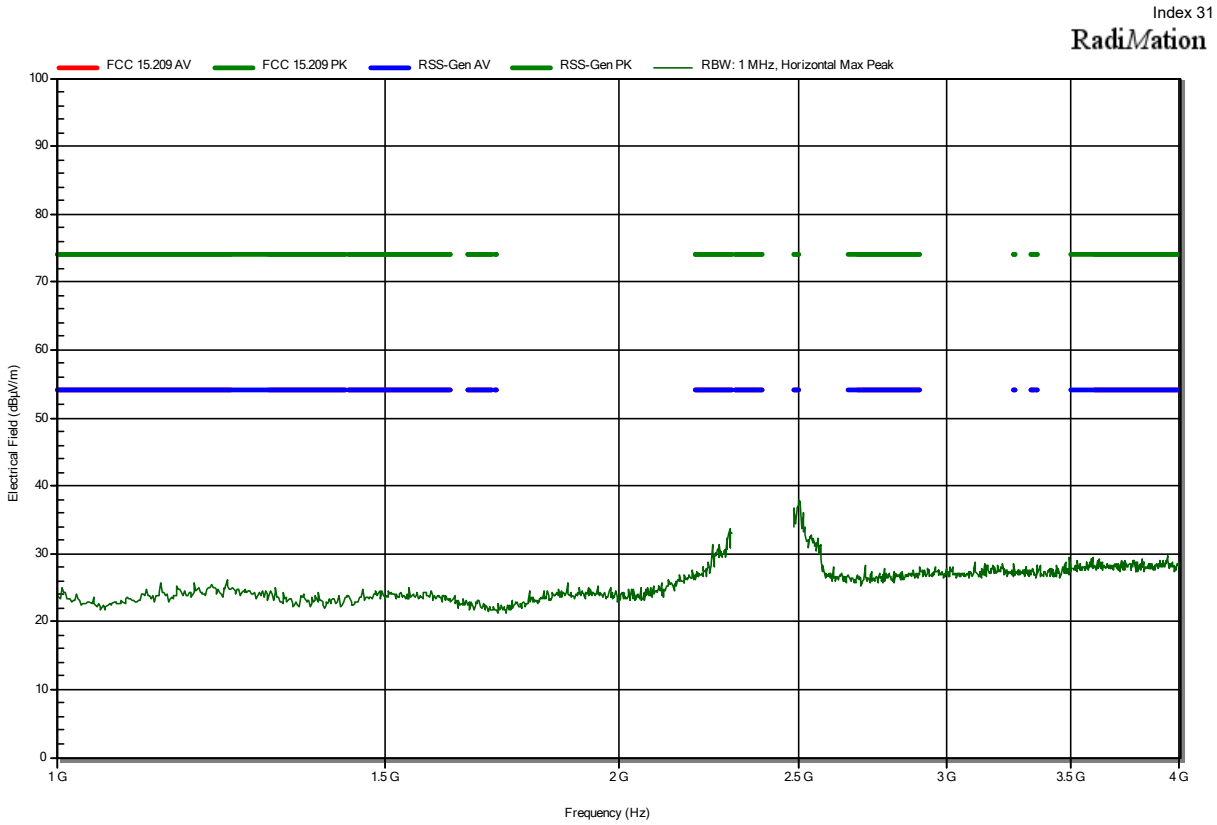
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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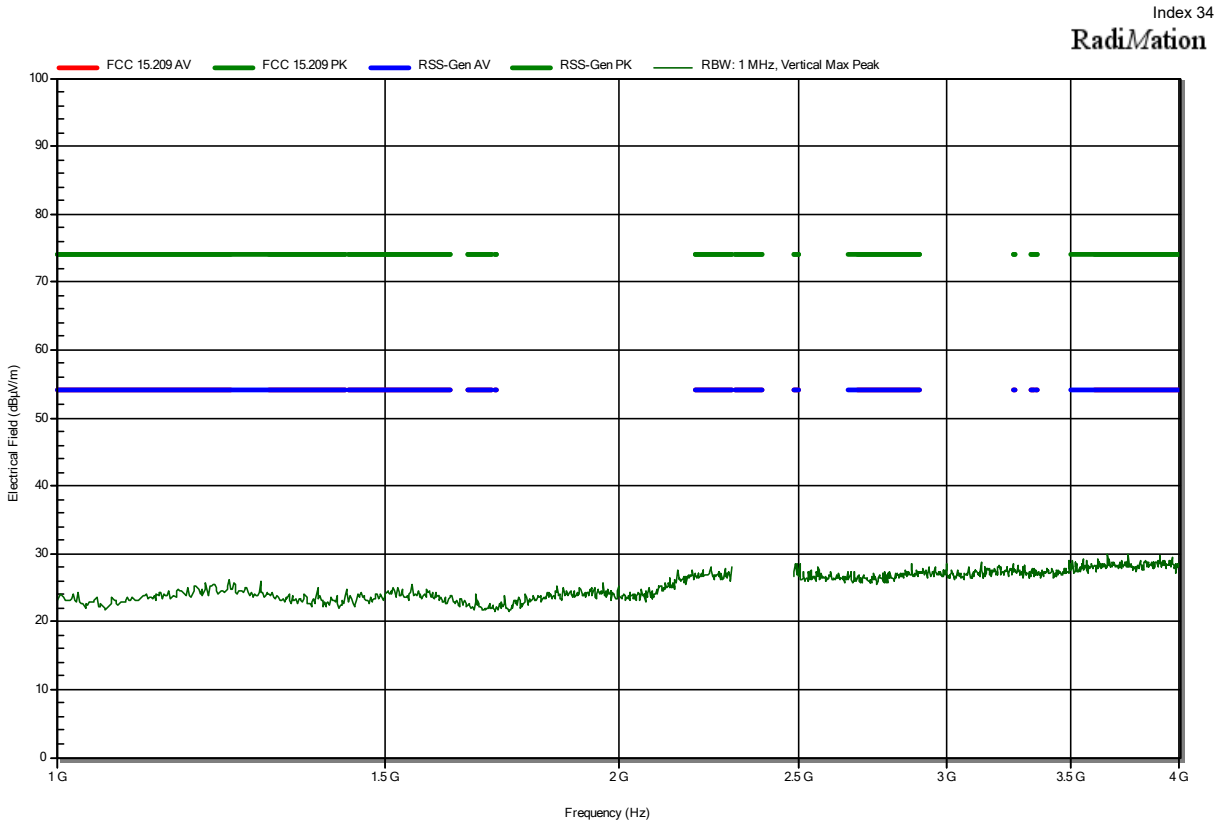
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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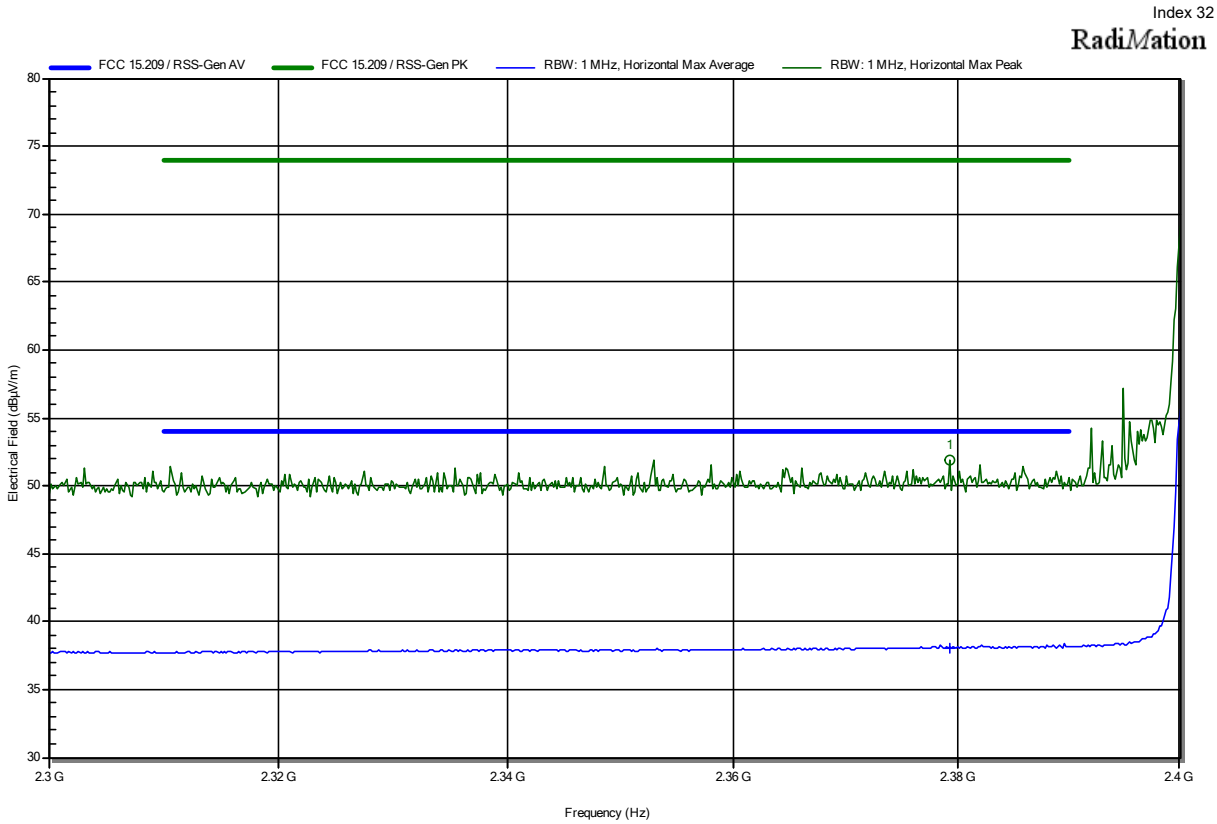
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	lower bandedge



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3793 GHz	51.92 dBµV/m	74 dBµV/m	-22.08 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.3793 GHz	38.01 dBµV/m	54 dBµV/m	-15.99 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

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Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
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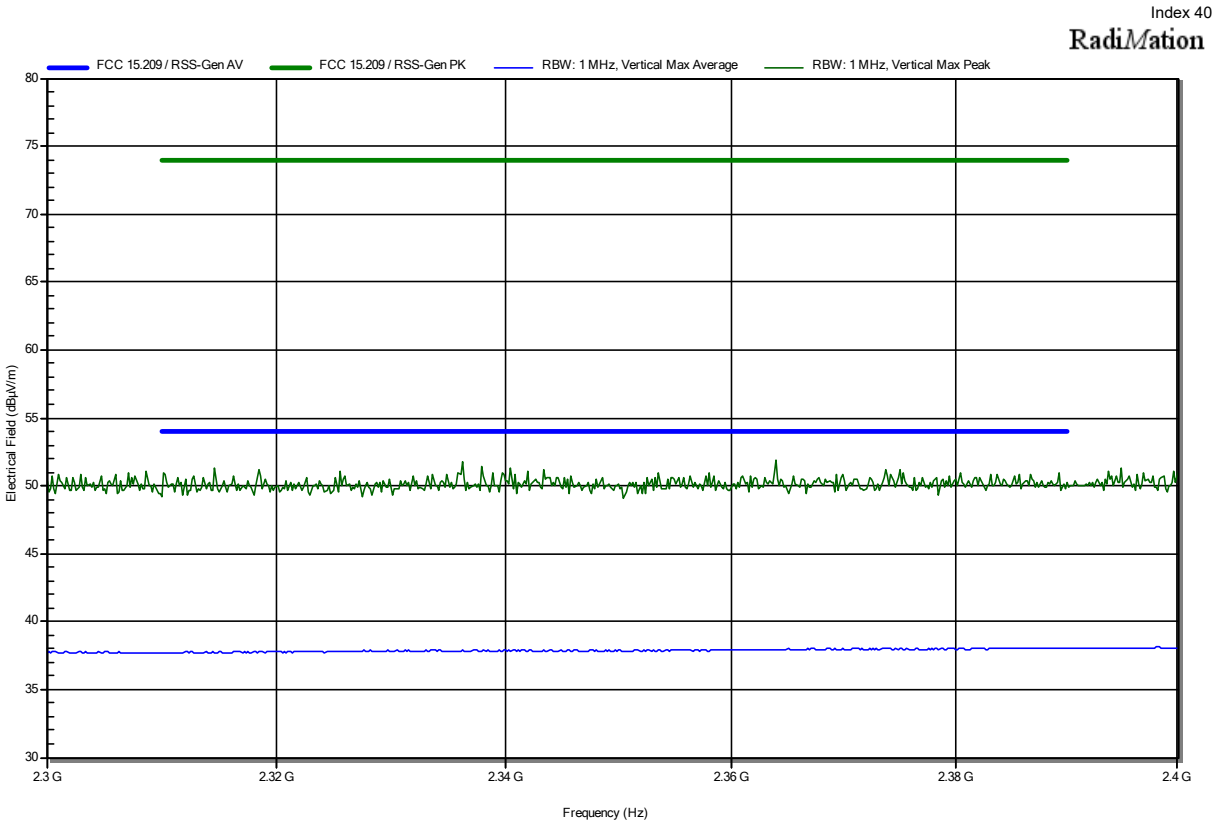
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	lower bandedge



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
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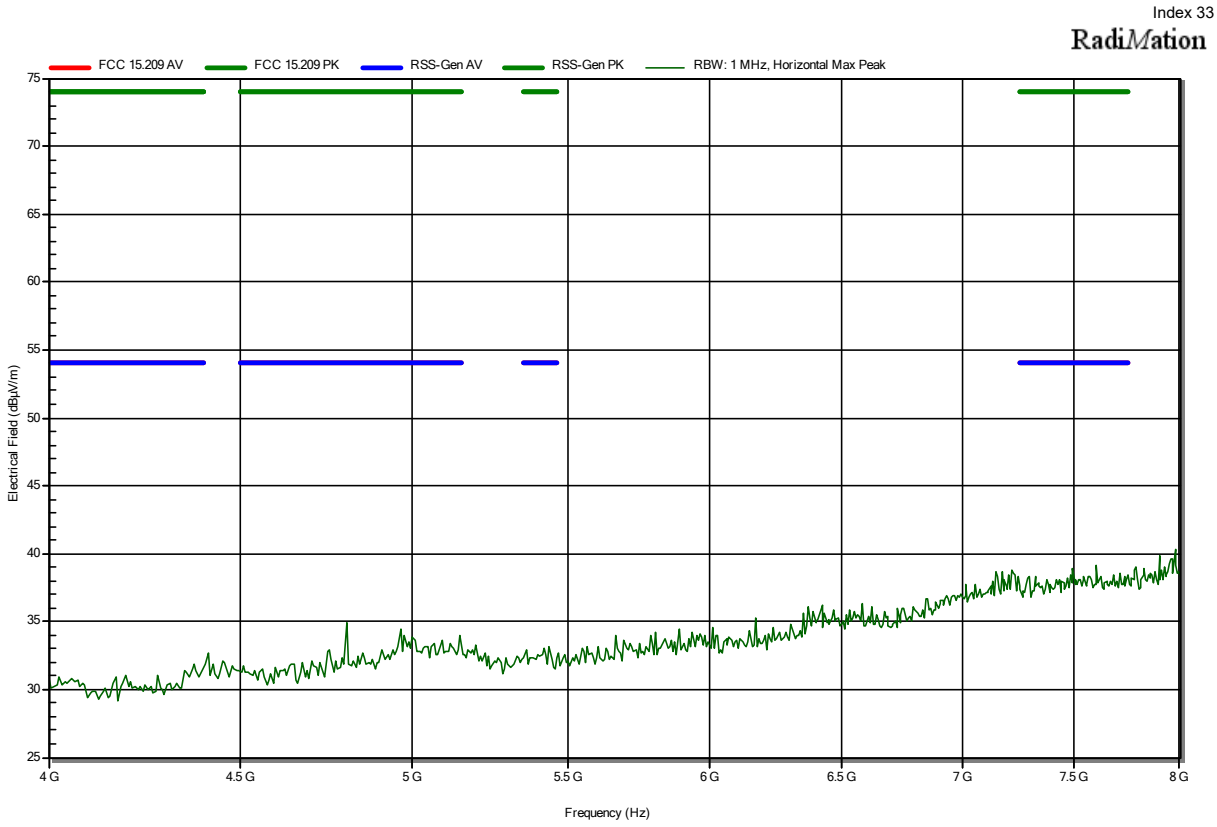
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to FCC 47 CFR 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
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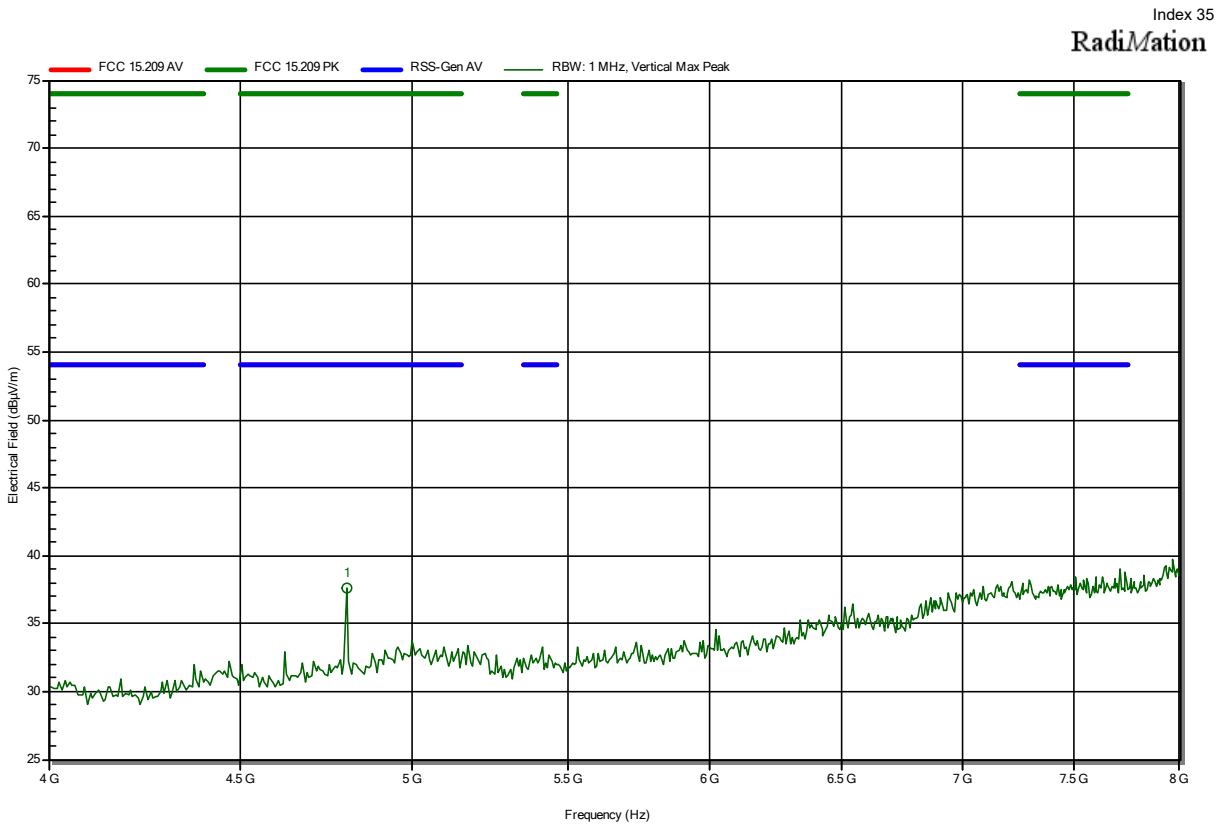
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2402 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.801 GHz	37.64 dBµV/m	74 dBµV/m	-36.36 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

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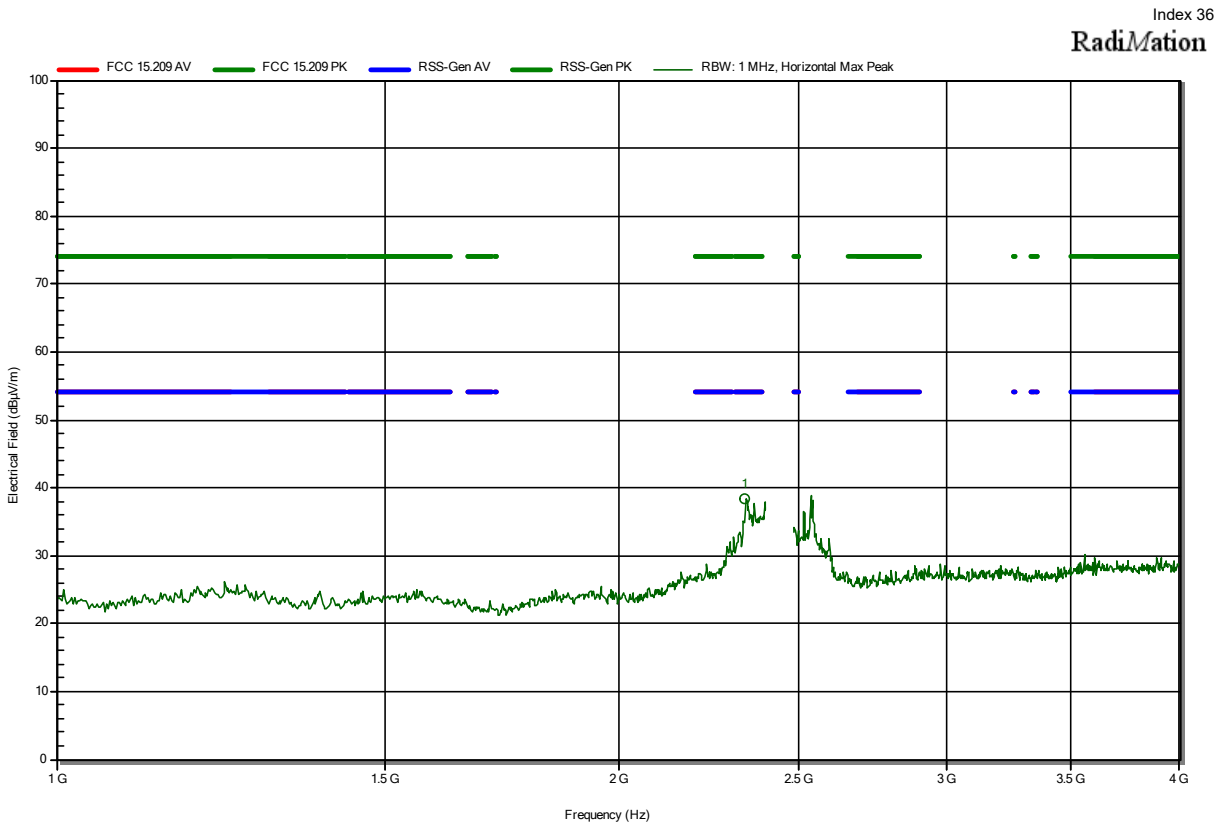
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3394 GHz	38.47 dBµV/m	74 dBµV/m	-35.53 dB	Pass

Radiated Spurious Emissions according to FCC 47 CFR 15.247

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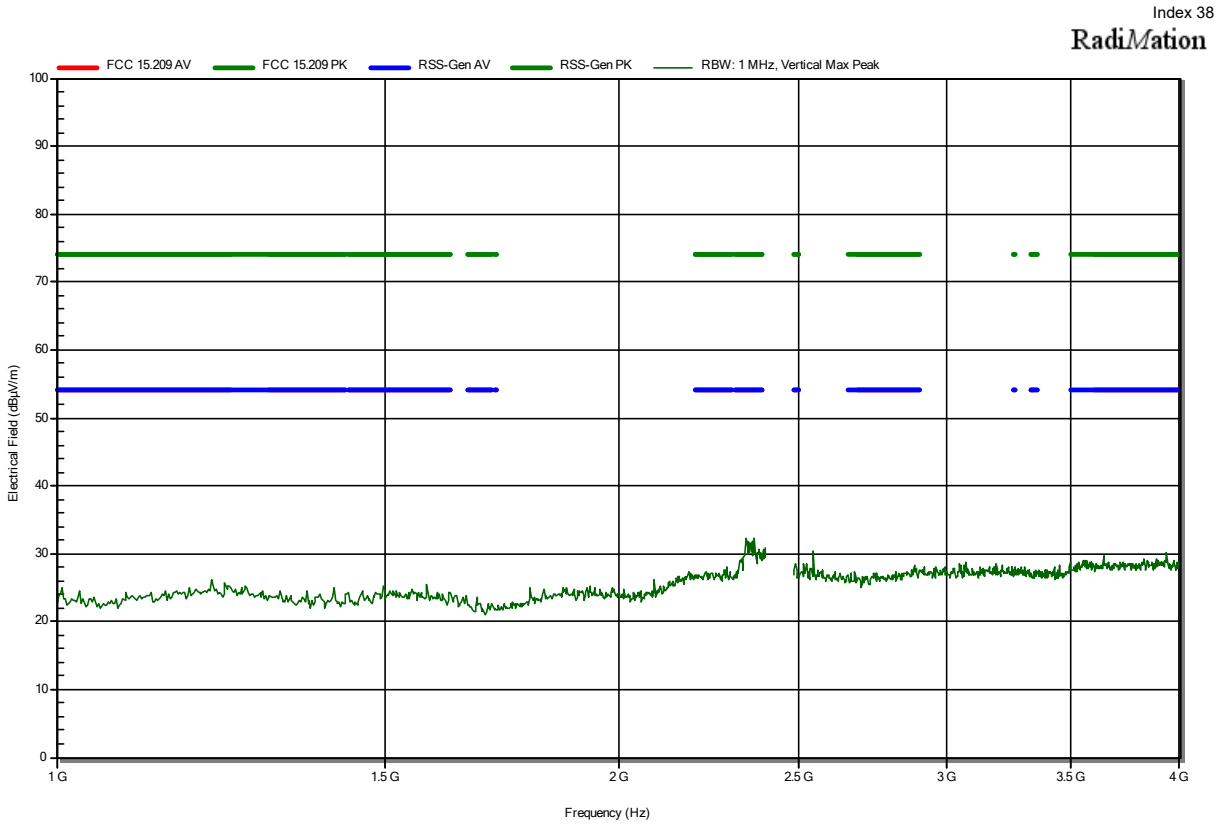
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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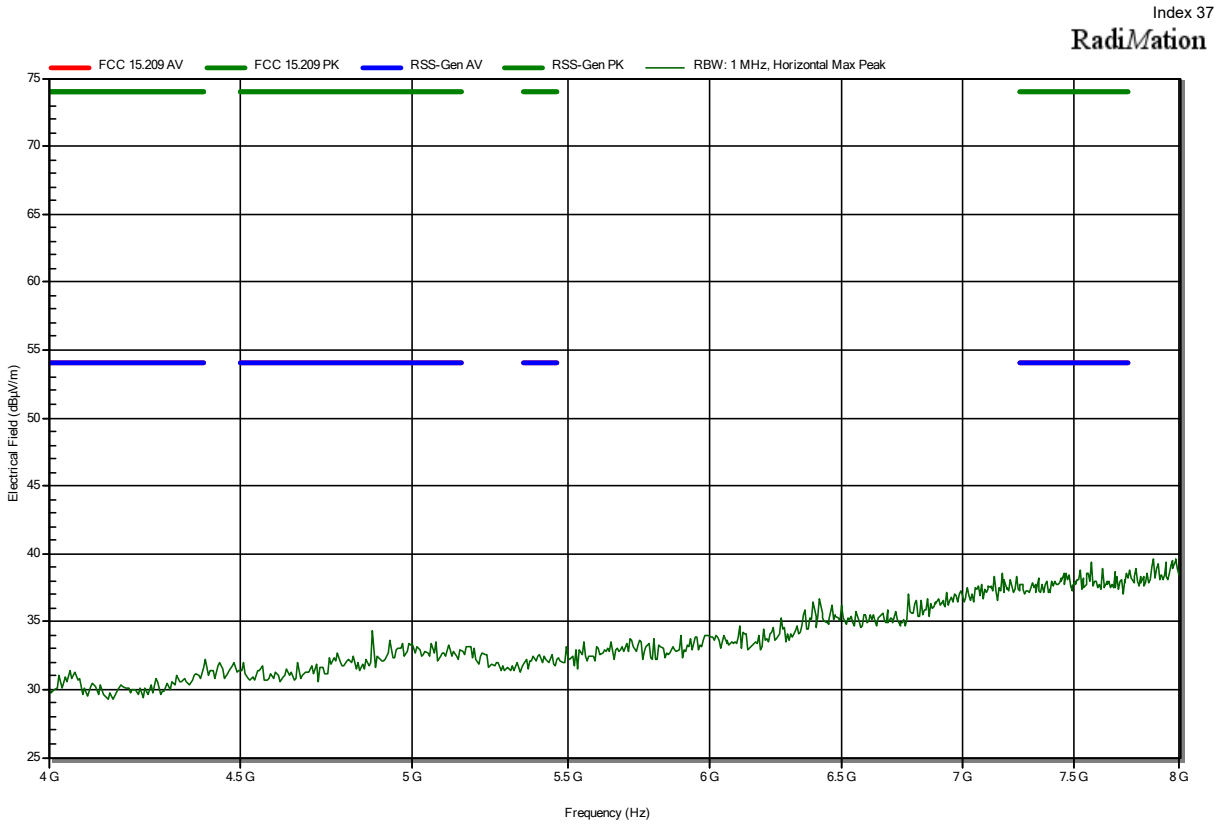
Test Date:	2021-07-27
Note:	EUT horizontal



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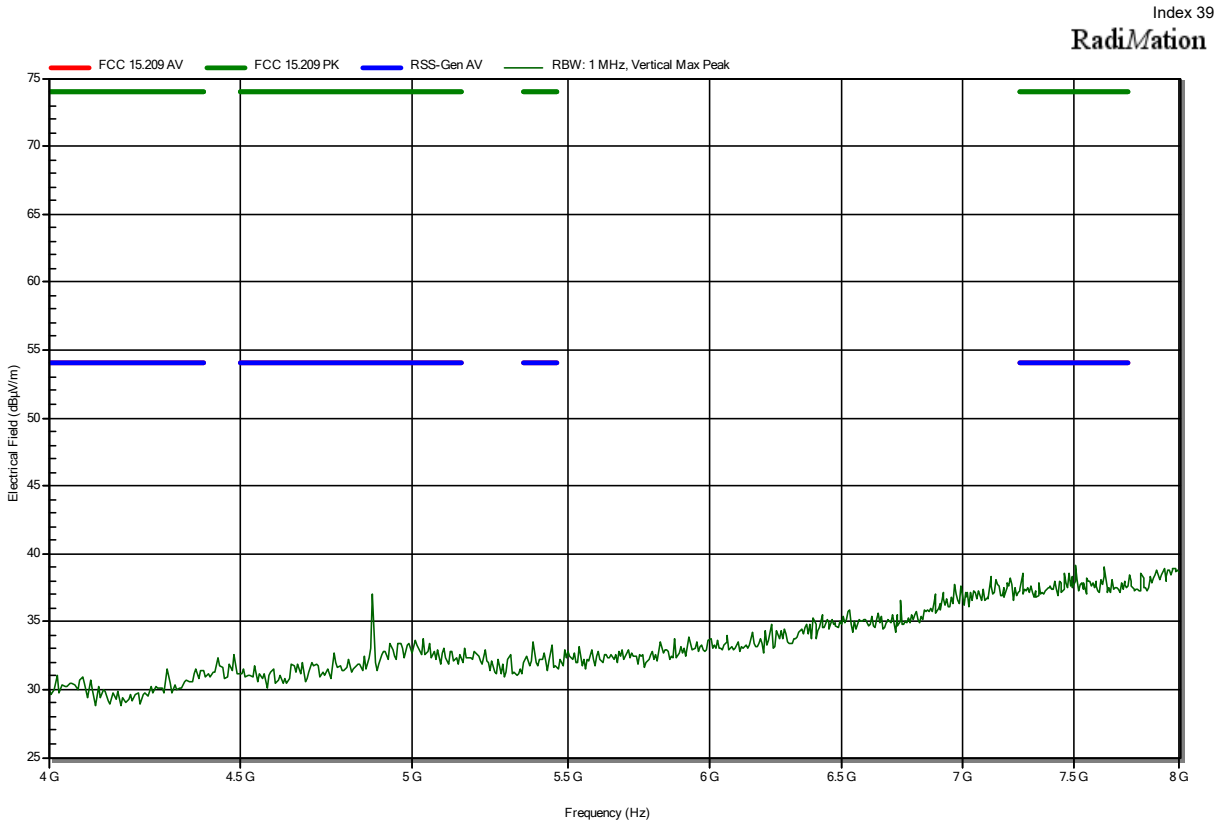
Note:	EUT horizontal



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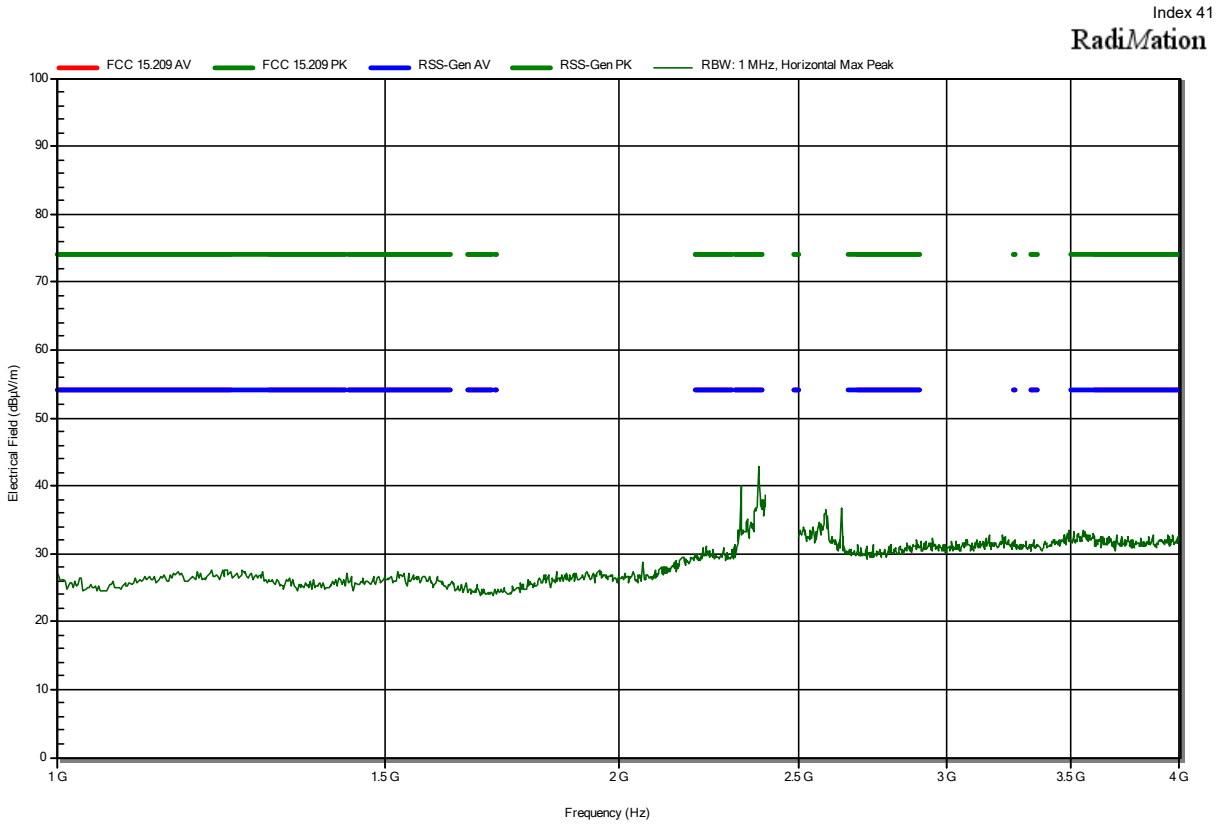
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



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Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2480 MHz
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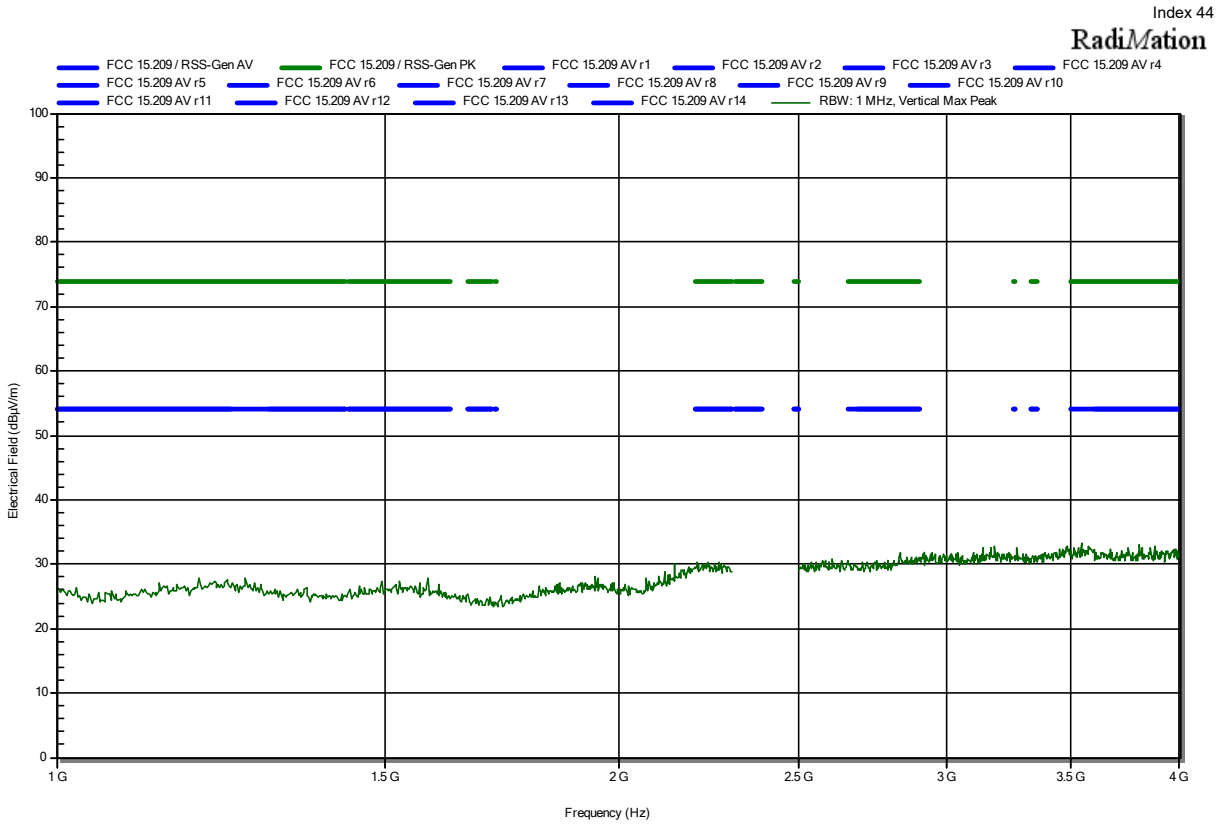
Note:	EUT horizontal



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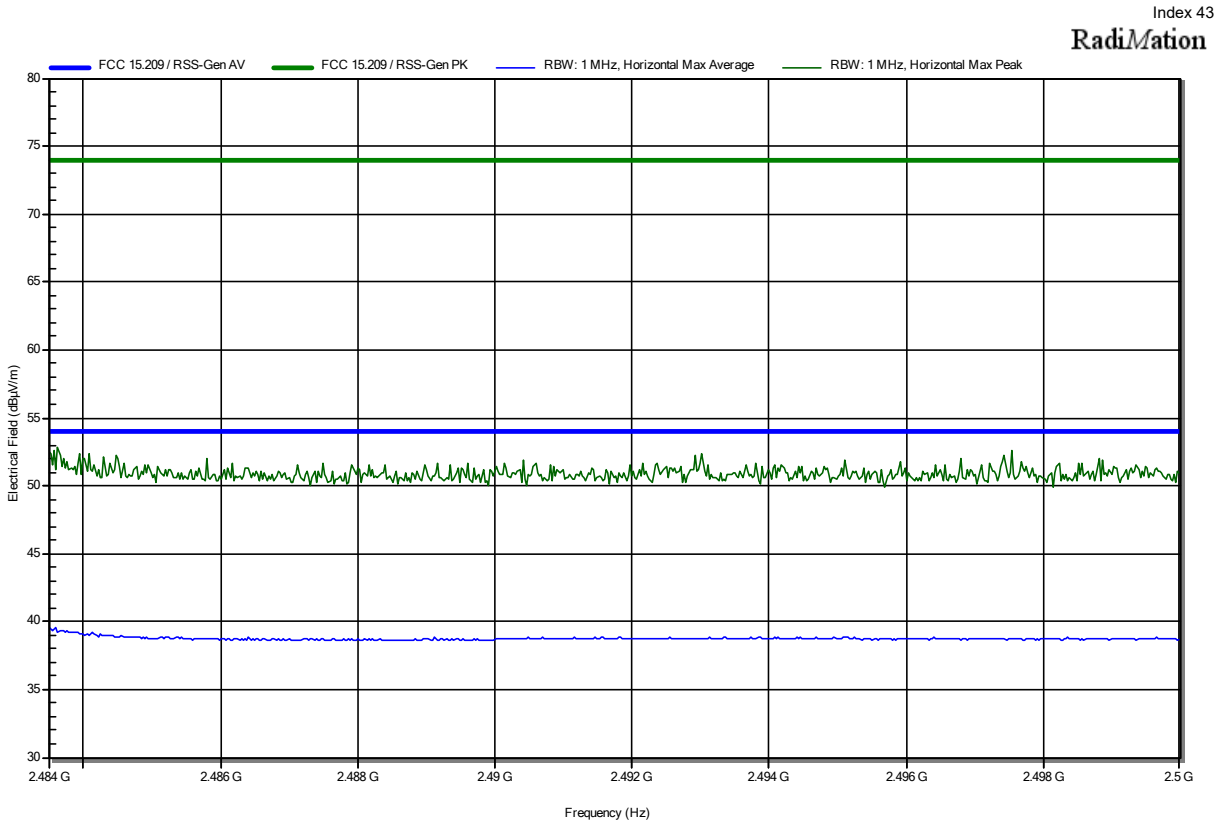
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	upper bandedge



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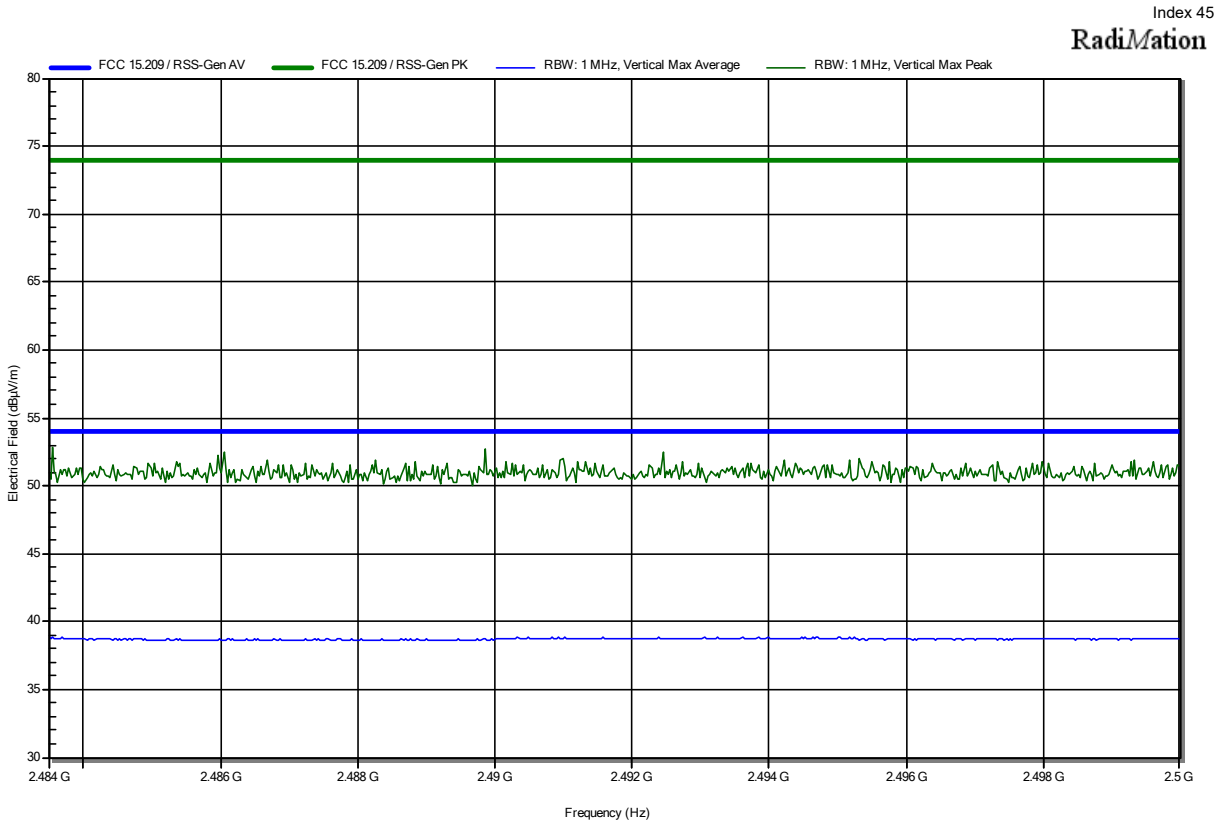
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	upper bandedge



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal

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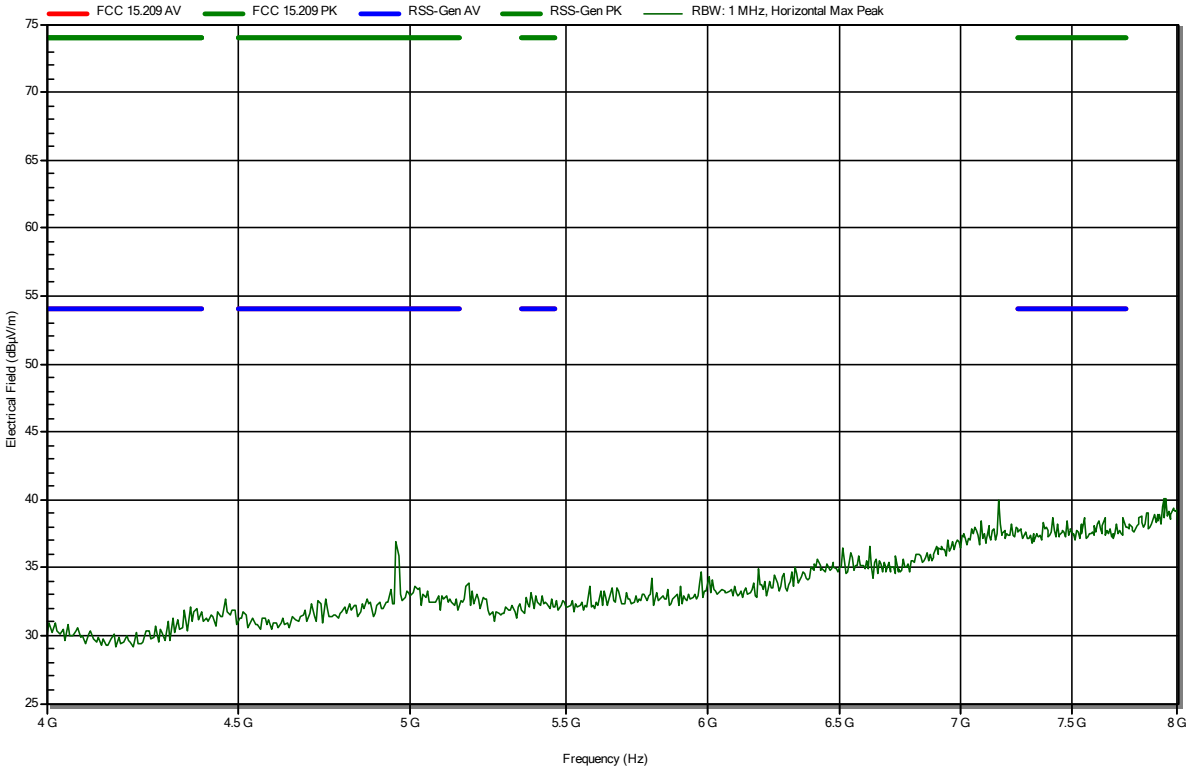
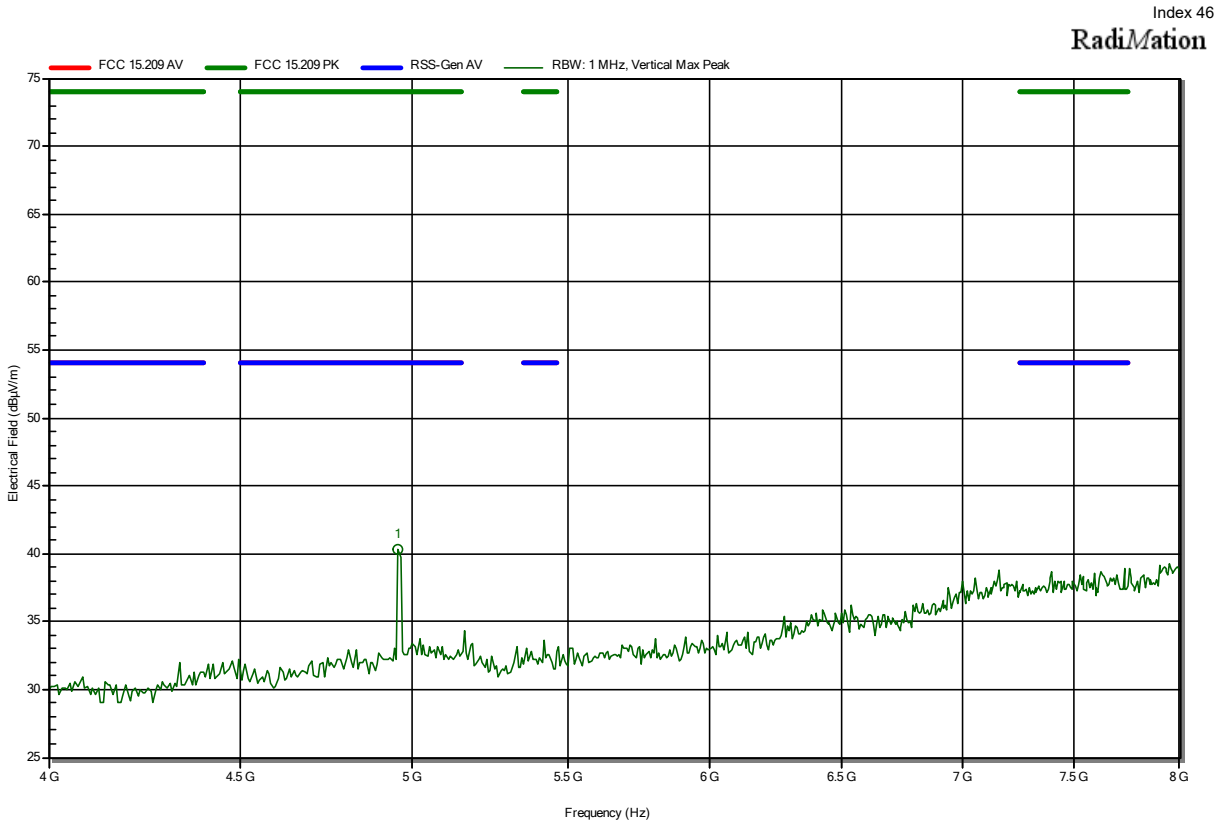
RadiMation



Radiated Spurious Emissions according to FCC 47 CFR 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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m, converted to 3 m
Mode:	Tx; BT; 3DH5; 3Mbps; 2480 MHz
Test Date:	2021-07-27
Note:	EUT horizontal

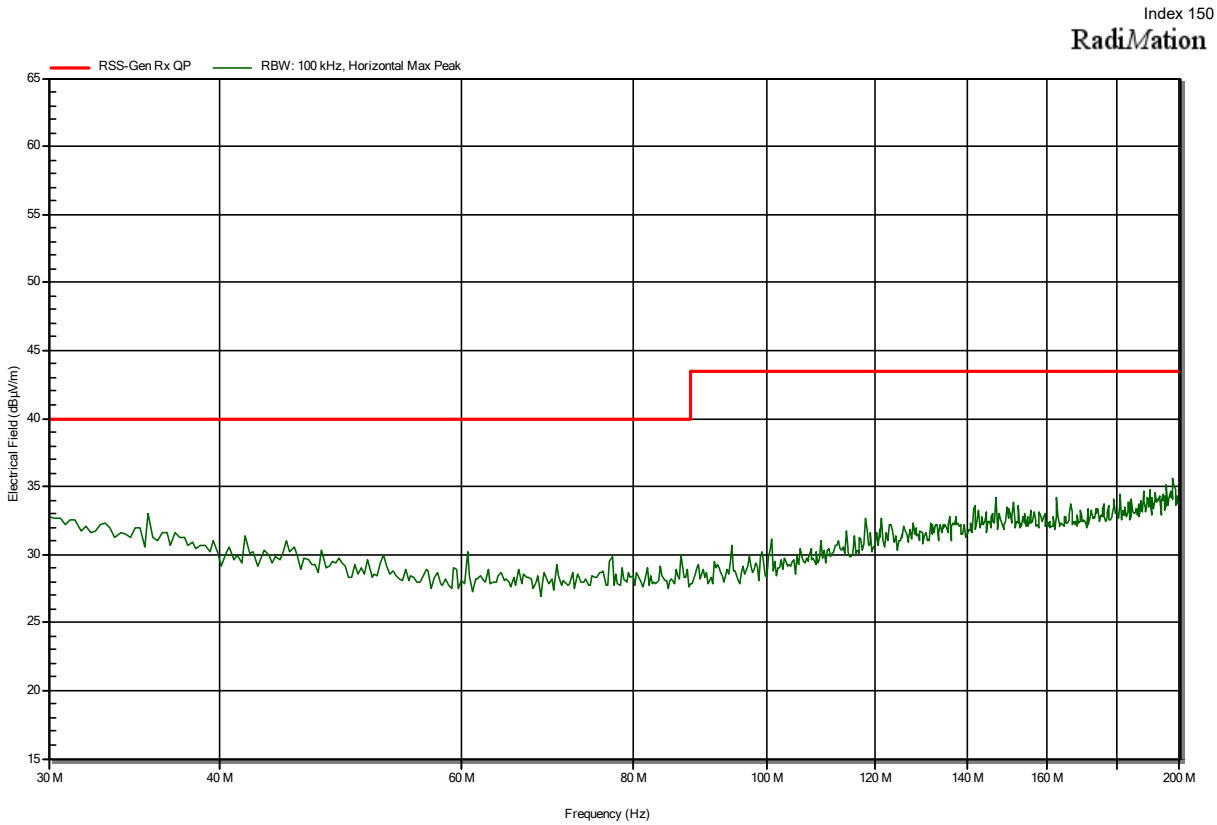


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.955 GHz	40.31 dBµV/m	74 dBµV/m	-33.69 dB	Pass

ANNEX B Receiver spurious emissions

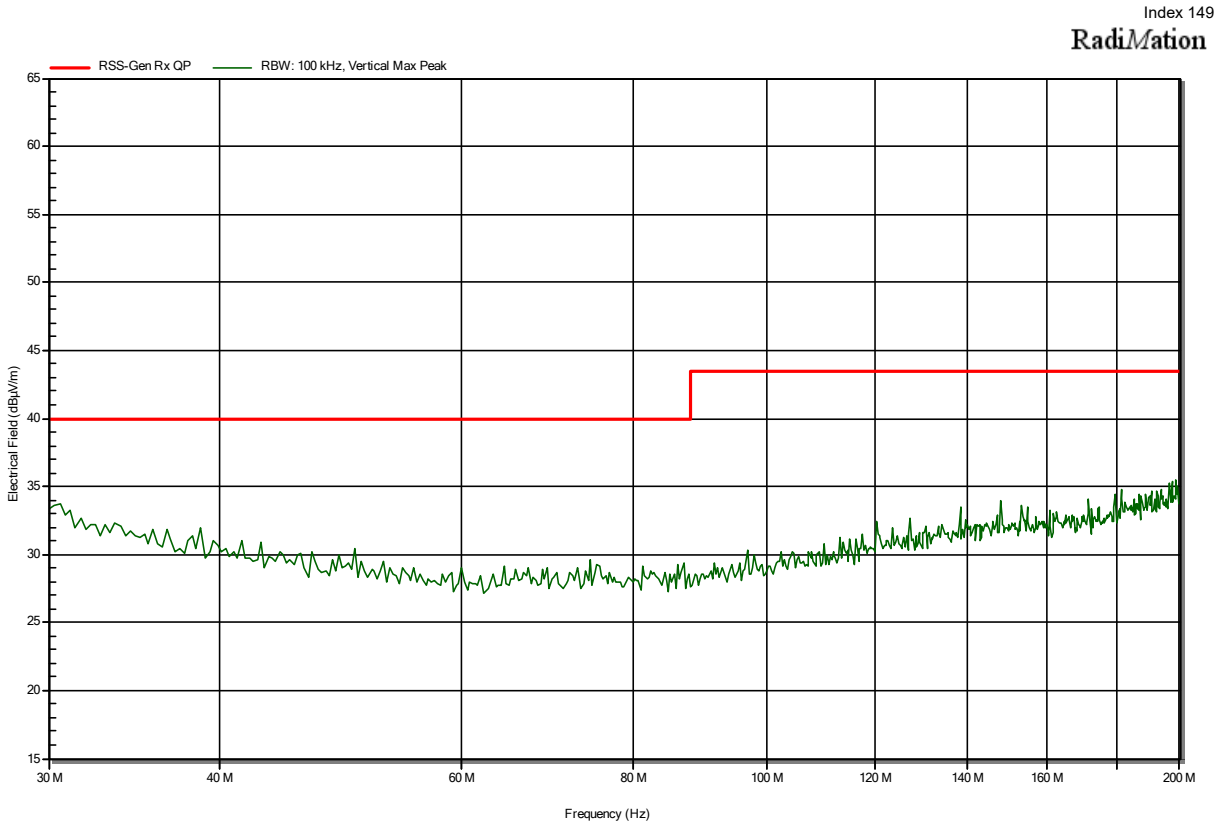
Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-22
Note:	EUT horizontal



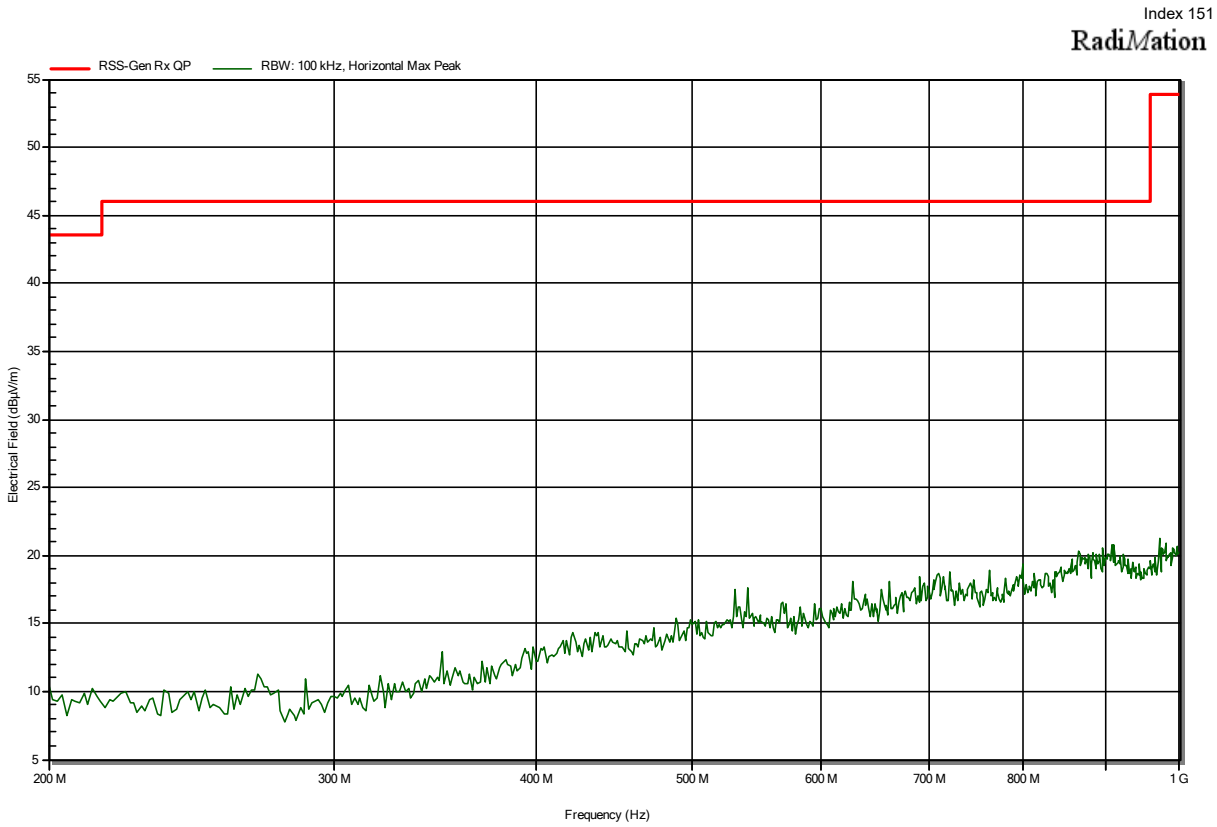
Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-22
Note:	EUT horizontal



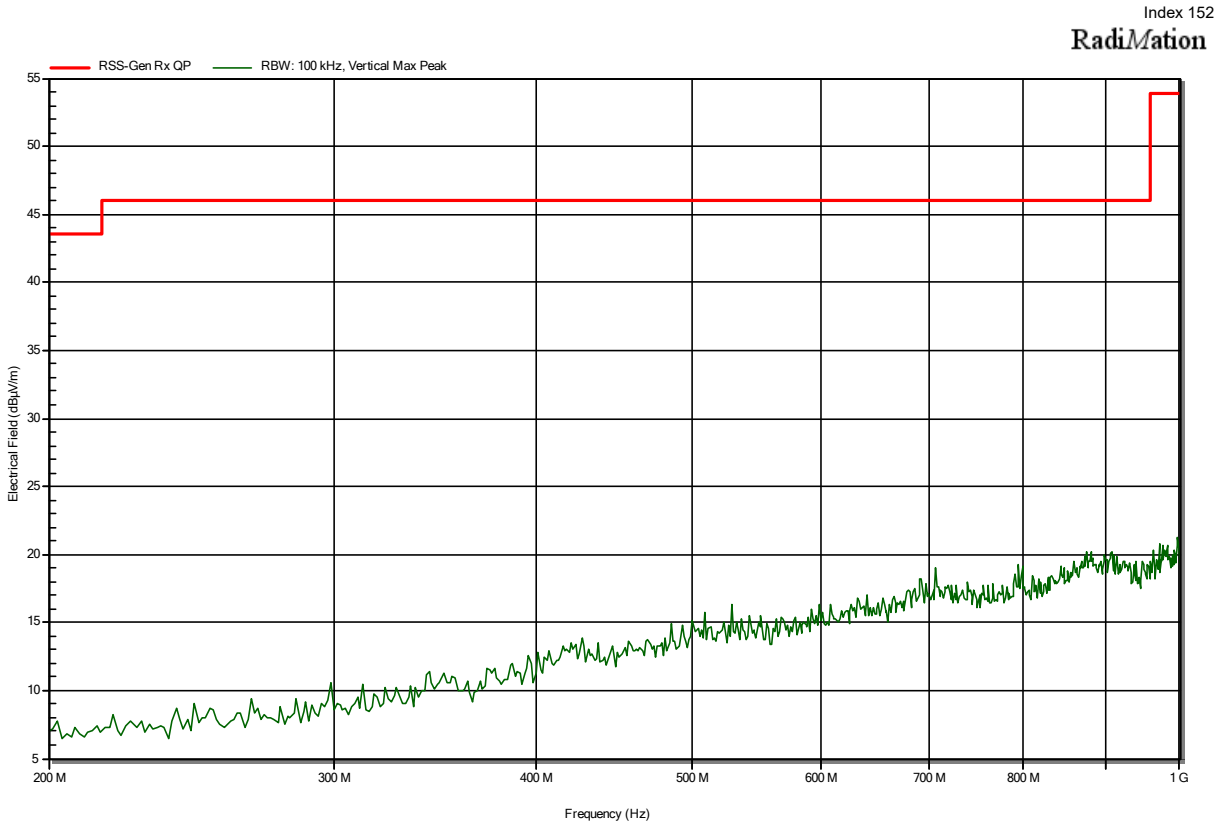
Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-22
Note:	EUT horizontal



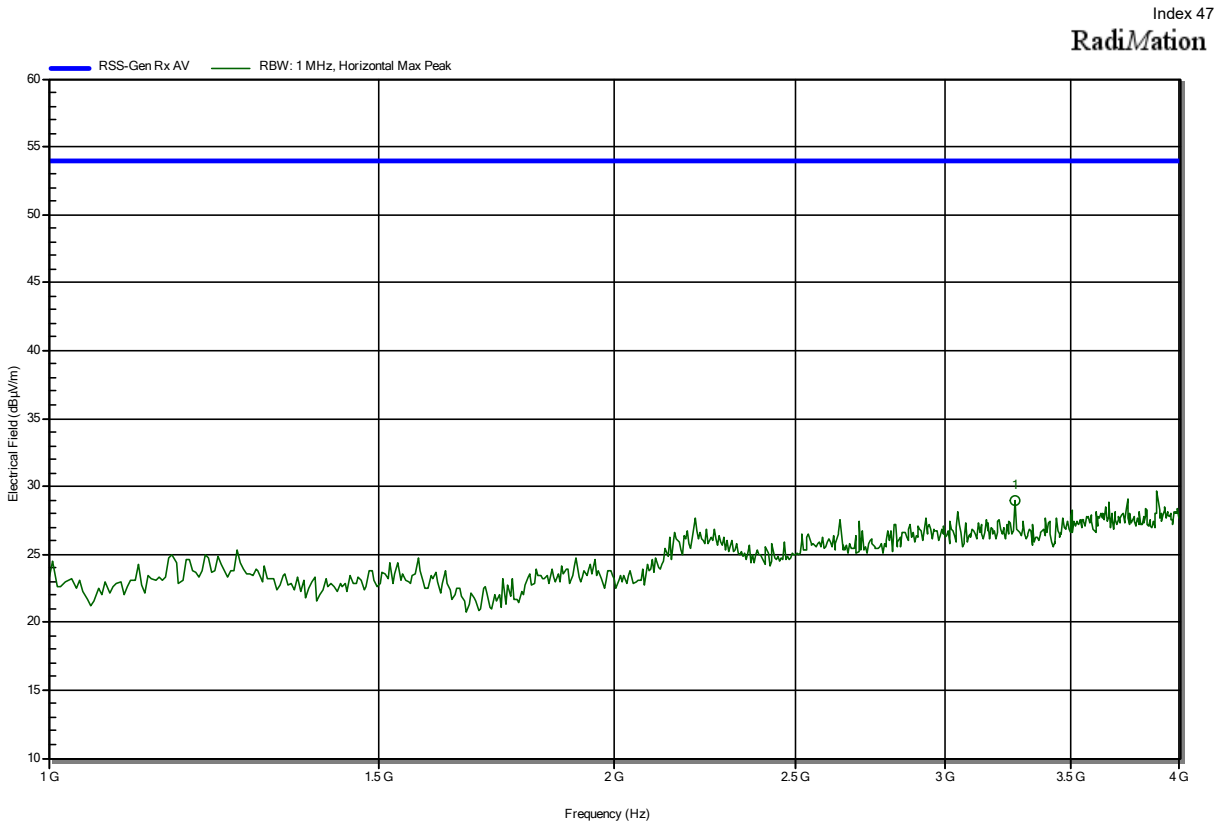
Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 24 °Celsius, Vnom: 3.3 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-22
Note:	EUT horizontal



Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

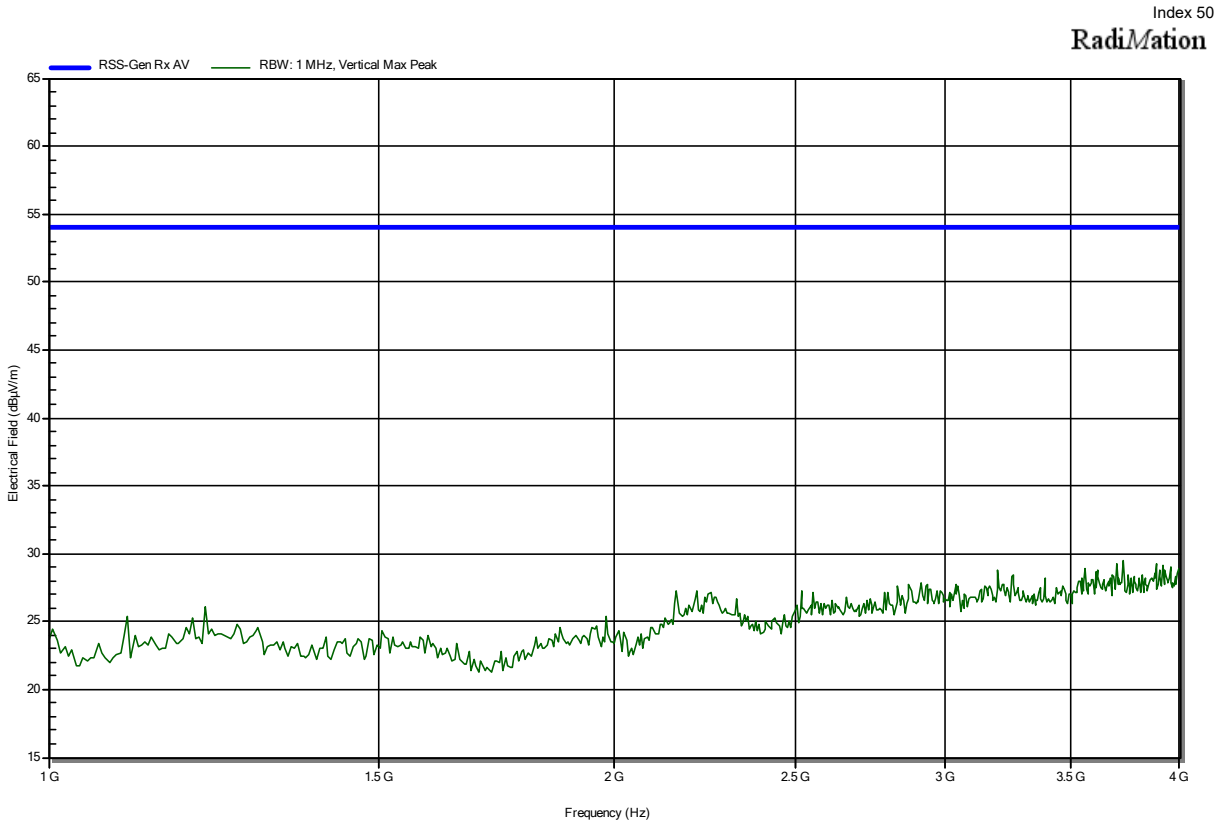
Project Number:	G0M-2101-9569
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.269 GHz	29.01 dBµV/m	53.98 dBµV/m	-24.97 dB	Pass

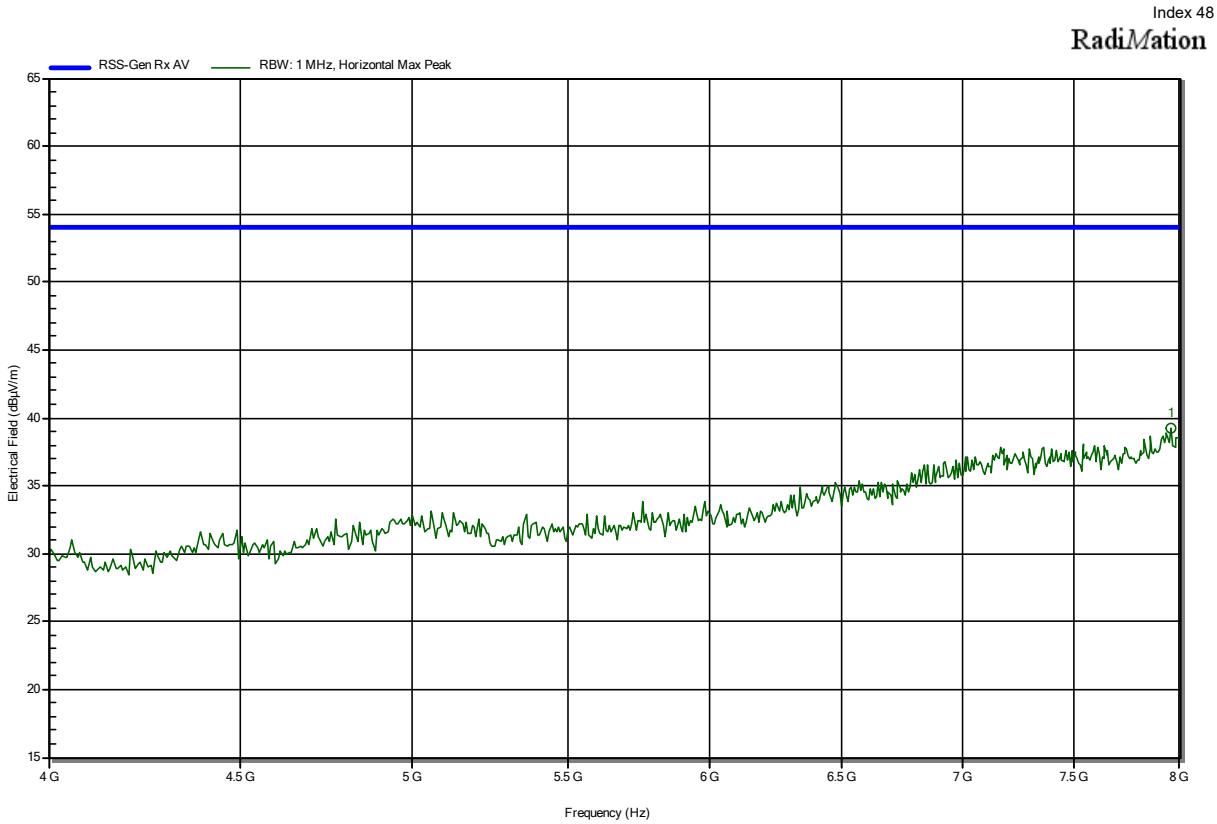
Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.955 GHz	39.19 dBµV/m	53.98 dBµV/m	-14.79 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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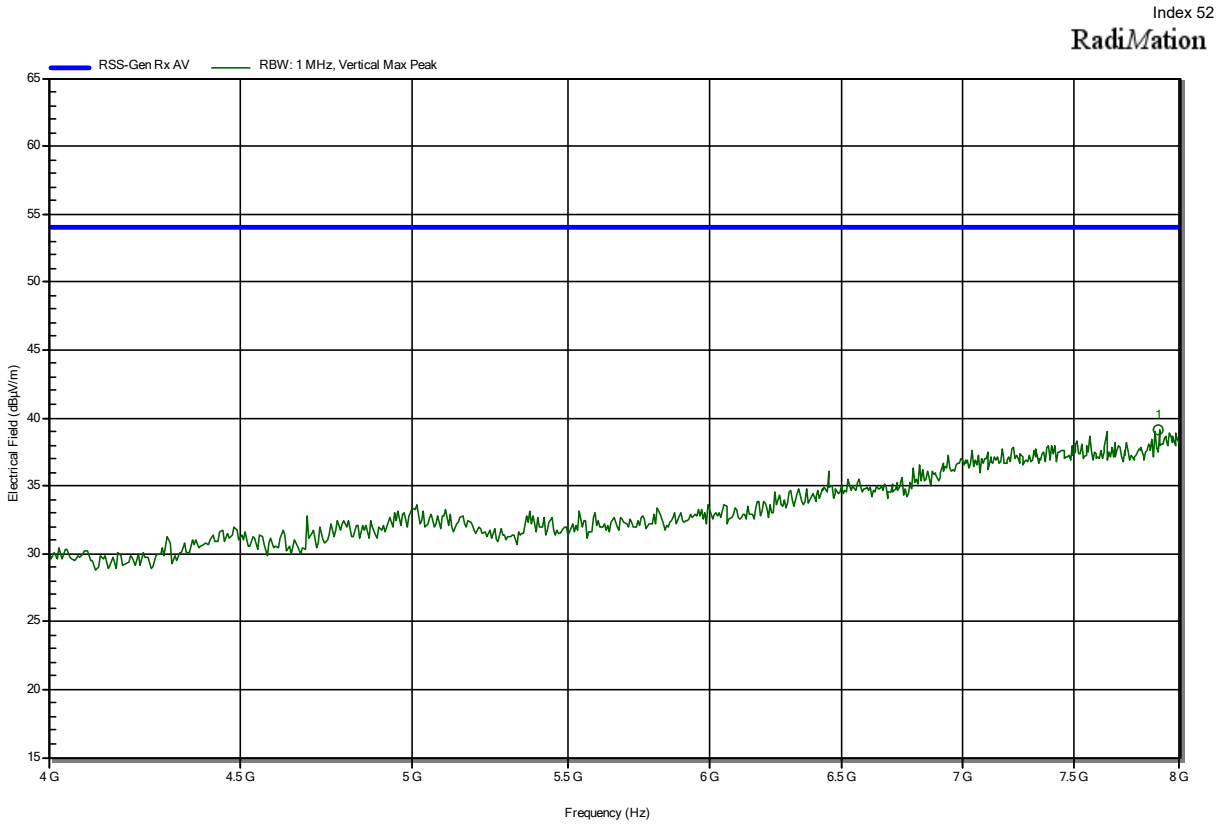
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.897 GHz	39.08 dBµV/m	53.98 dBµV/m	-14.9 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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Applicant:	Panasonic Industrial Devices Europe GmbH
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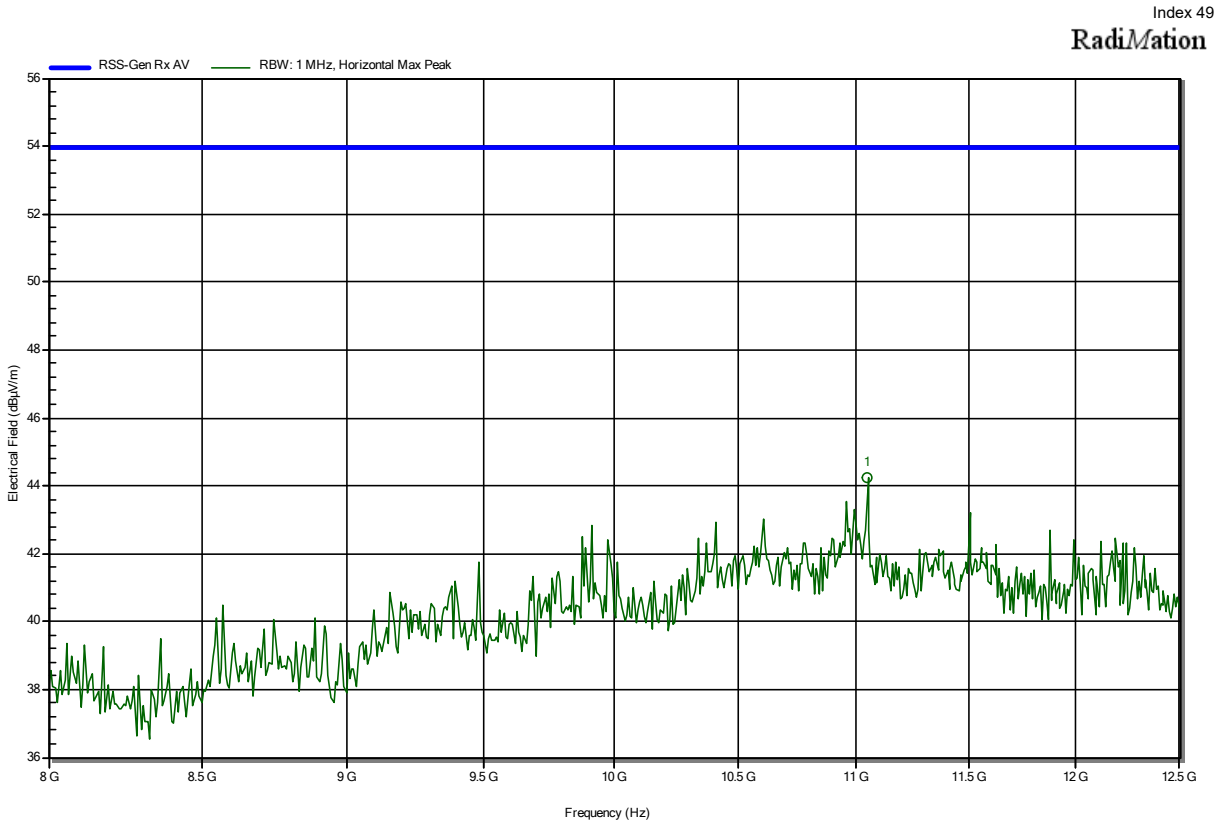
Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
11.05 GHz	44.24 dBµV/m	53.98 dBµV/m	-9.74 dB	Pass

Radiated Spurious Emissions according to ISED RSS-247 Issue 2 (February 2017)

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Model:	ENWF9408A1EF
Test Sample ID:	34968 (A1 8 SerNr: 826)
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Measurement software:	RadiMation, version 2020.1.8
Test Conditions:	Tnom: 25 °Celsius, Vnom: 3.3 V DC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	Rx; BT; 2441 MHz
Test Date:	2021-07-27
Note:	EUT horizontal