







RADIO REPORT FCC 47 CFR Part 15C ISED Canada RSS-247 Frequency hopping systems operating within the 2400 – 2483.5 MHz band	
Report Reference No	G0M-1810-7783-TFC247BT-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	    DAkks - Registration number : D-PL-12092-01-03 (ISED) DAkks - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970 ISED Testing Laboratory site: 3470A-2
Applicant	Panasonic Industrial Devices Europe GmbH
Address	Zeppelinstr. 19 21337 Lüneburg GERMANY
Test Specification	According to FCC/ISED rules
Standard	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, 2018-04
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model(s)	ENWF9201A1EF
Additional Model(s)	ENWF9203A1EF
Brand Name(s)	PAN9026
Hardware Version(s)	05
Software Version(s)	01
FCC-ID	T7V-9026
IC	216Q-9026
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 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2018-10-04	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	
Approved by (+ signature) (Head of Lab)	Christian Weber	
Date of Issue	2019-05-24	
Total number of pages	145	
General Remarks:		
<p>The test results presented in this report relate only to the object tested.</p> <p>The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p>		
Additional Comments:		
The models ENWF9203A1EF and ENWF9201A1EF are completely identical with respect to the bluetooth radio interface.		

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	ENWF9208A1EF (multi region)
	Brand name	PAN9026
	Hardware Version	05
	Software Version	01
Comment: Those named additional variants above have not been tested. Those additional variants of the series have been declared by the manufacturer. The test report explicitly states that those variants were neither tested nor assessed nor evaluated.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2019-03-11	Initial Release	
02	2019-05-24	Replaced document: G0M-1810-7783-TFC247BT-V01 Replaced by: G0M-1810-7783-TFC247BT-V02 Reason: added an Additional Variant	W. Treffke

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
BR	Bluetooth Basic Rate mode
EDR	Bluetooth Enhanced Data Rate mode
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

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1 Equipment (Test Item) Under Test

Description	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module	
Model	ENWF9201A1EF	
Additional Model(s)	ENWF9203A1EF	
Brand Name(s)	PAN9026	
Serial Number(s) Model ENWF9201A1EF	1823411;00002129;00134375843B;F9201A1E;0501 (radiated) 1807211;00001040;0013436B110D;F9201A1E;0501 (conducted)	
Serial Number(s) Model ENWF9203A1EF	1829511;00000079;0013437BBD97;F9203A1E;0501 (radiated) 1829511;00000003;0013437AB217;F9203A1E;0501 (conducted)	
Hardware Version(s)	05	
Software Version(s)	01	
PMN	PAN9026	
HVIN	ENWF9203A1EF	
FVIN	-/-	
HMN	-/-	
FCC-ID	T7V-9026 (ENWF9201A1EF)	
IC	216Q-9026 (ENWF9201A1EF)	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	2400 - 2483.5 MHz	
Radio technology	Bluetooth	
Modulation	GFSK, PI/4-DQPSK, 8-DPSK	
Number of antenna ports	1	
Antenna	Type	Integrated
	Model	ANT162442DT-2001A2
	Manufacturer	TDK
	Gain	2.1 (customer declaration)
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
	Vendor	None
	Input	None
	Output	None
Manufacturer	Panasonic Industrial Devices Europe GmbH Zeppelinstr. 19 21337 Lüneburg GERMANY	

1.1 Photos – Equipment External

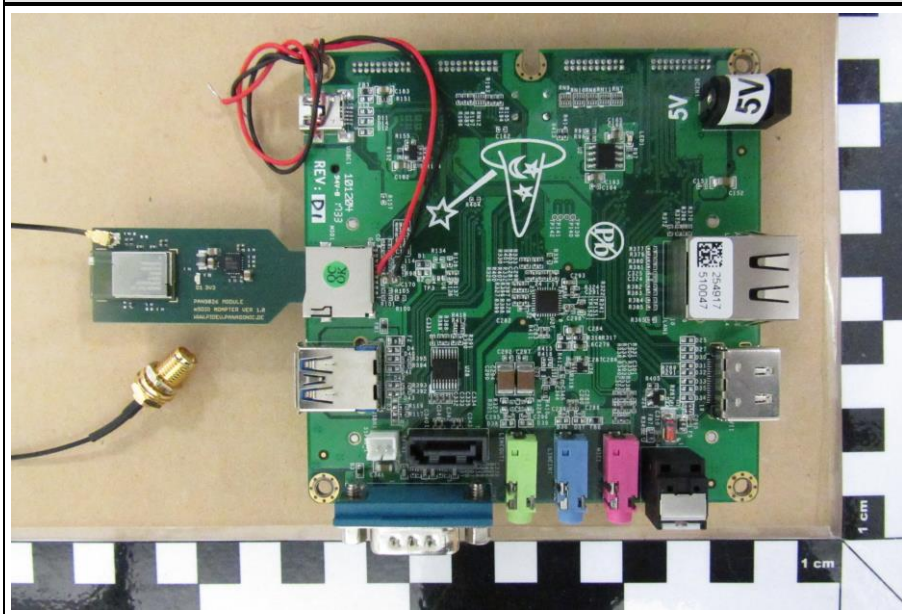
Processor board radiated, front view



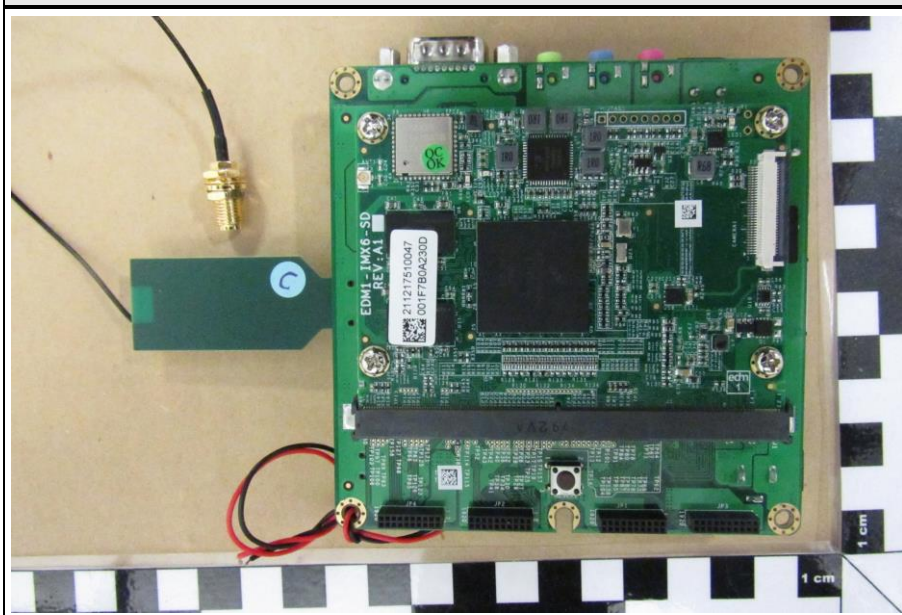
Processor board radiated, rear view



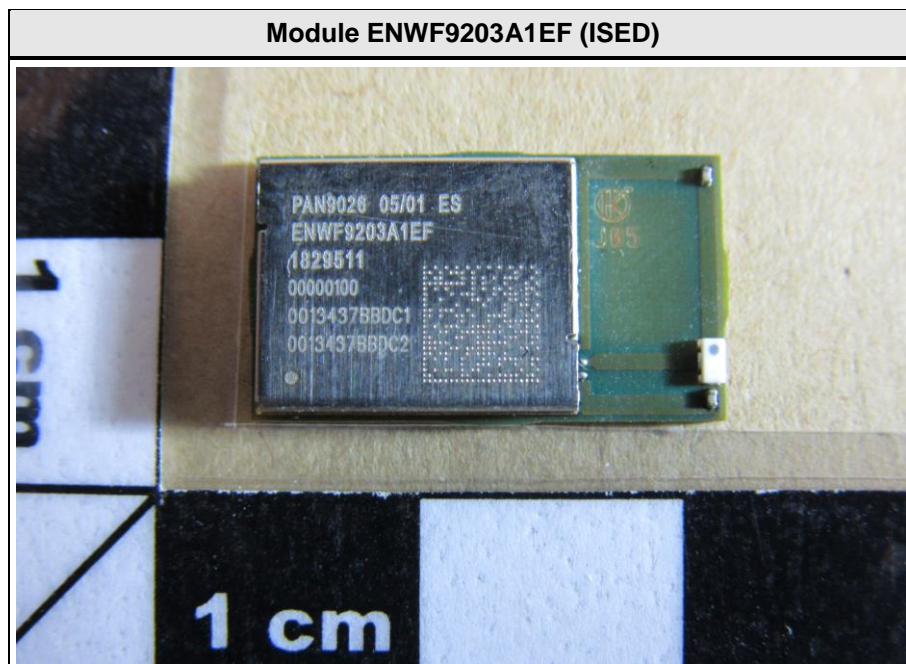
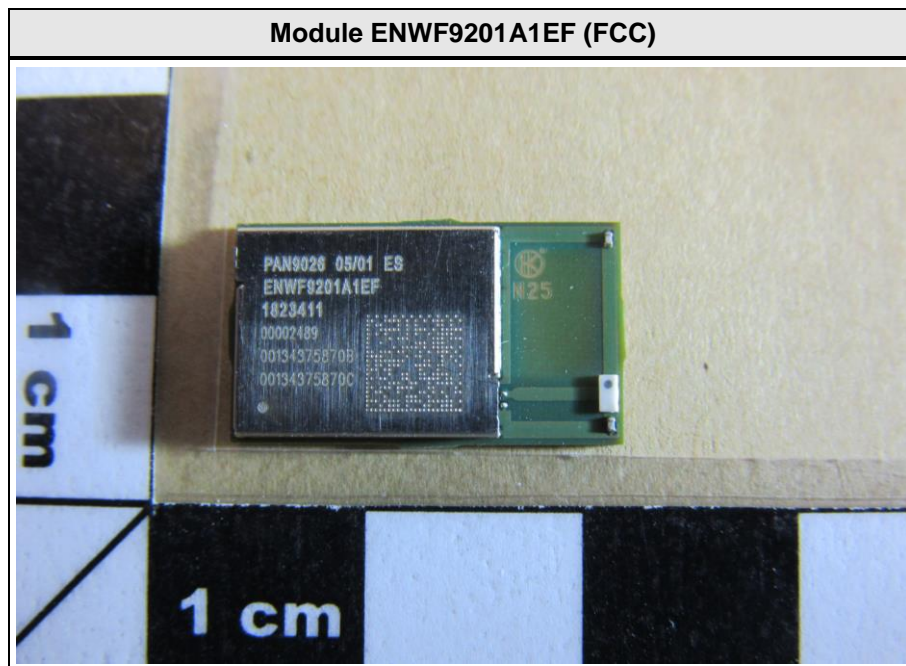
Processor board conducted, top

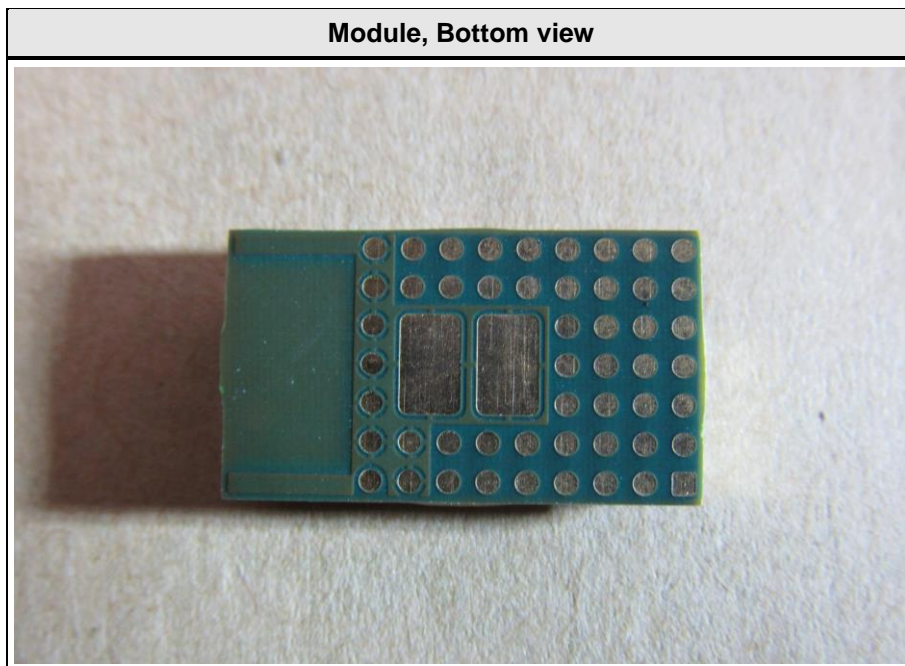
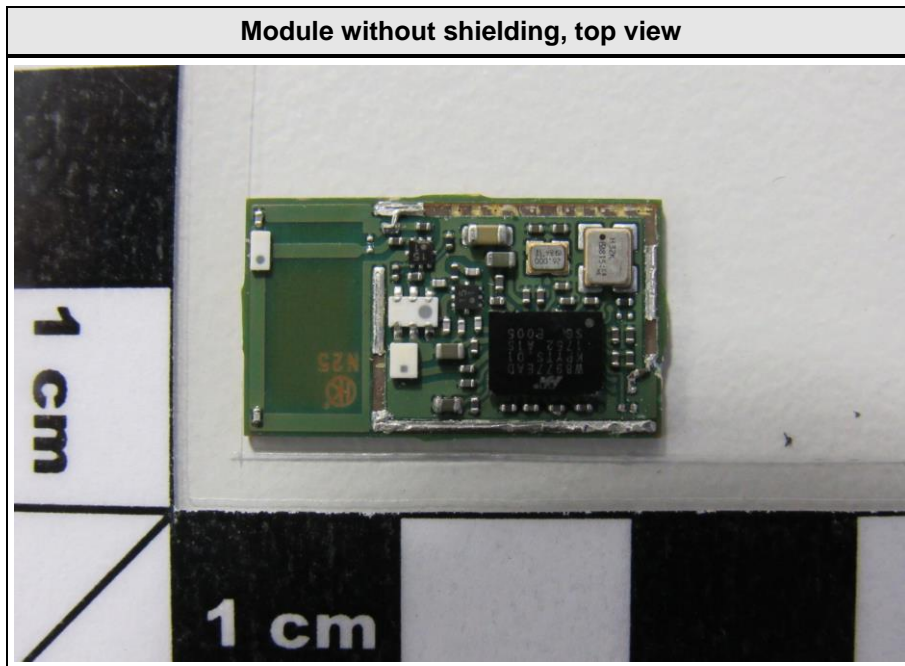


Processor board conducted, bottom

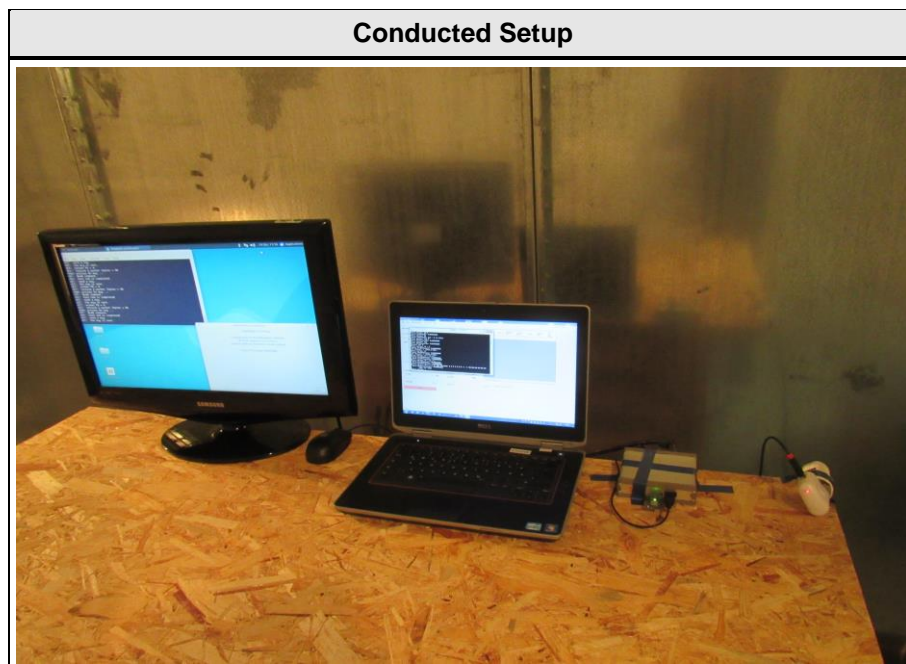
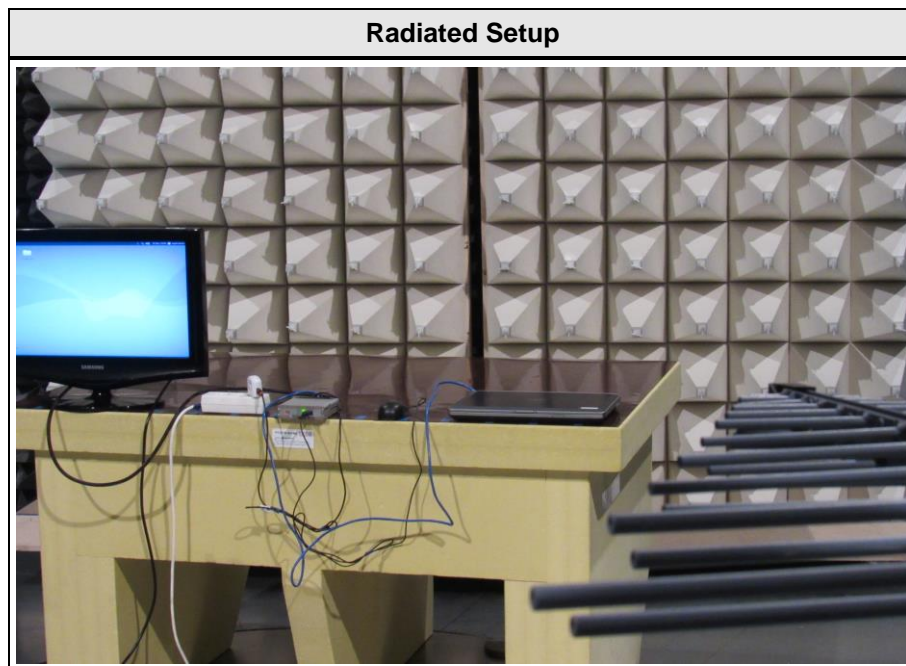


1.2 Photos – Equipment Internal





1.3 Photos – Test Setup



1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE1	Processor board	Wandboard	WBIMX6U	Wandboard with i.MX6 Dual Core
Sim	CBT Bluetooth Tester	R&S	CBT	Test mode signalling
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.5 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:	

1.6 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

1.7 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

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

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
ISED RSS-Gen, Issue 5 (section 6.6)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only tested with sample ENWF9203A1EF
FCC § 15.247(a)(1) ISED RSS-247 § 5.1 Issue 2	20 dB Bandwidth	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Number of hopping frequencies	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(a)(1) ISED RSS-247, Issue 2 (section 5.1)	Frequency hopping channel separation	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(a)(1)(iii) ISED RSS-247, Issue 2 (section 5.1)	Time of occupancy (Dwell time)	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	tested with sample ENWF9201A1EF
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	tested with sample ENWF9203A1EF
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

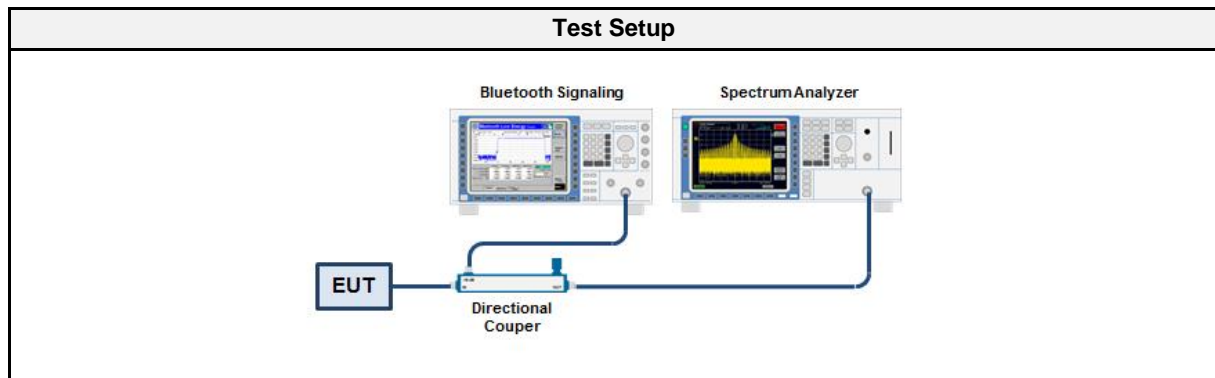
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.6)
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2018-11-14

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup



3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.1.5 Procedure

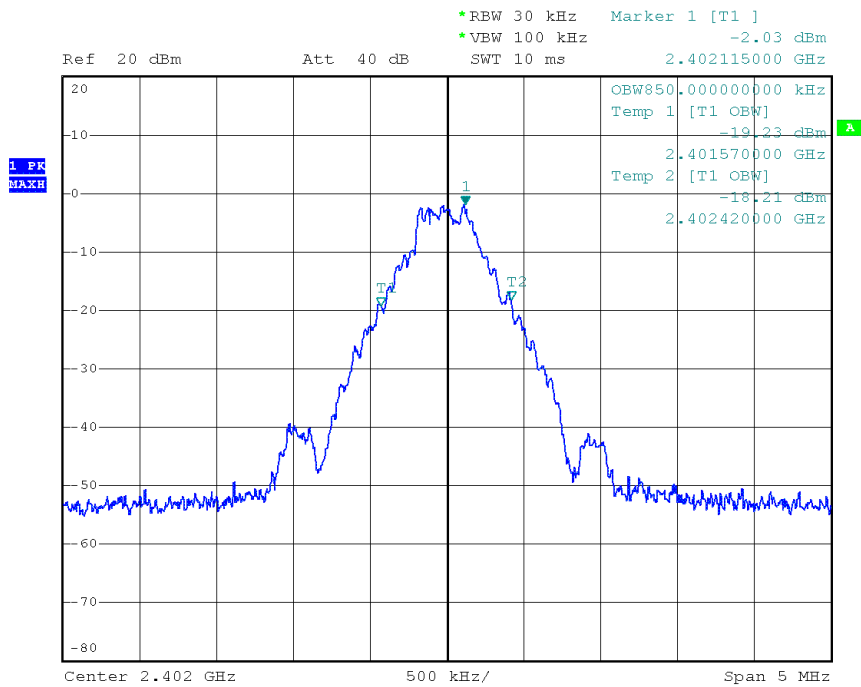
Test Procedure
<ol style="list-style-type: none"> 1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to the range of 1 % to 5 % of the occupied 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	0.850
DH5	2441	0.855
DH5	2480	0.865
2-DH5	2402	1.185
2-DH5	2441	1.185
2-DH5	2480	1.180
3-DH5	2402	1.185
3-DH5	2441	1.190
3-DH5	2480	1.185

Occupied Bandwidth

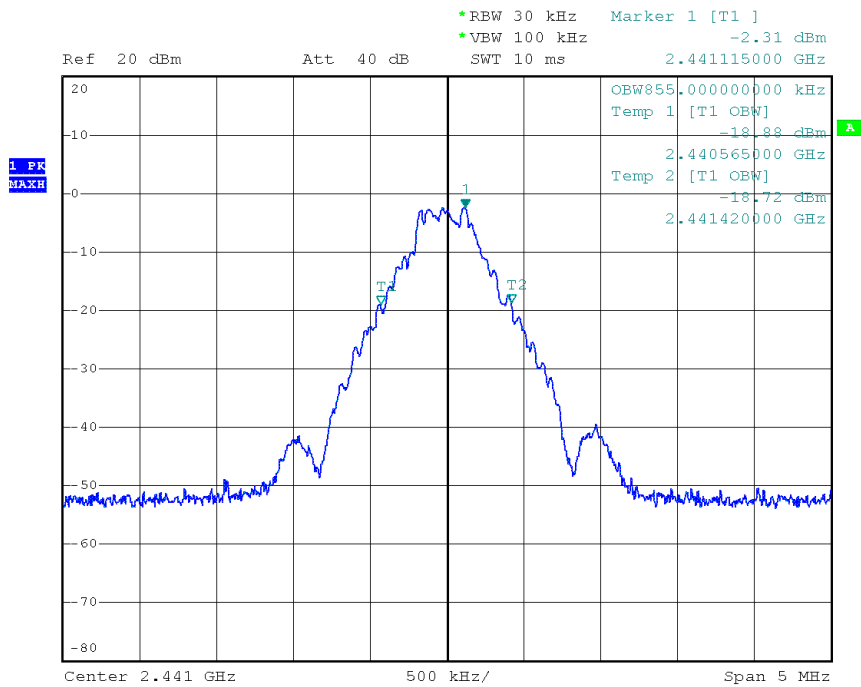
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 0.850



Date: 14.NOV.2018 09:23:27

Occupied Bandwidth

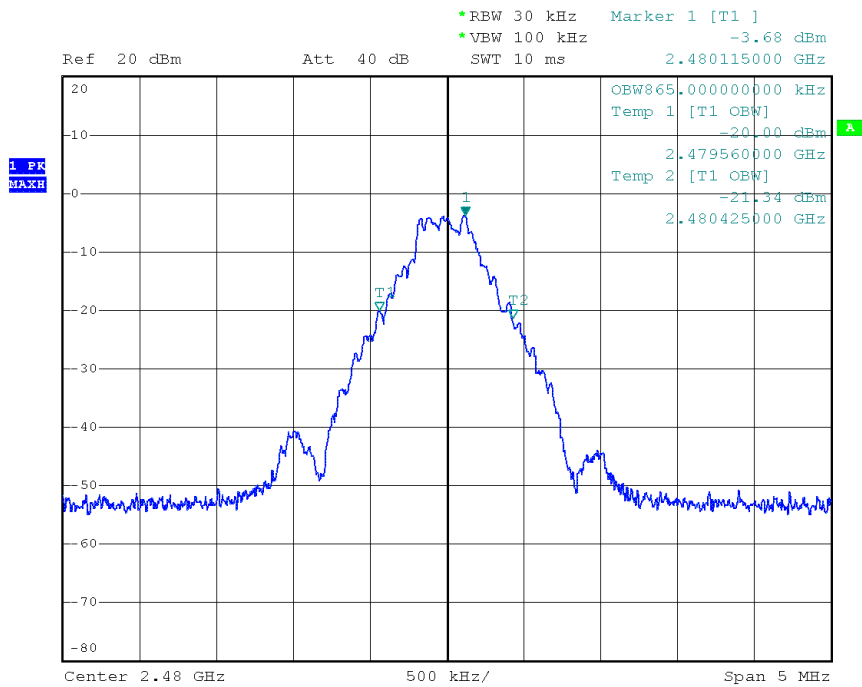
Project Number: G0M-1810-7783
Applicant: Panasonic Industrial Devices Europe GmbH
Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model: ENWF9203A1EF
Test Sample ID: 20584
Reference Standards: FCC 15.247, RSS-247
Reference Method: ANSI C63.10:2013, Section 6.9.3
Operational Mode: DH5, Channel: 39, 2441 MHz
Operating Conditions: Tnom/Vnom
Operator: Wilfried Treffke
Test Site: Eurofins Product Service GmbH
Test Date: 2018-11-14
Occupied Bandwidth [MHz]: 0.855



Date: 14.NOV.2018 09:25:51

Occupied Bandwidth

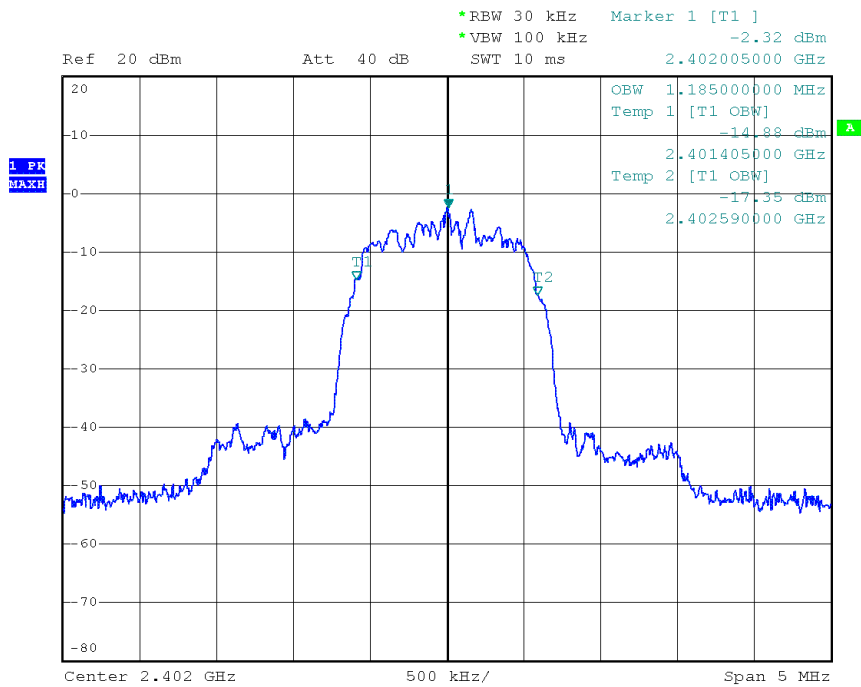
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 0.865



Date: 14.NOV.2018 09:28:15

Occupied Bandwidth

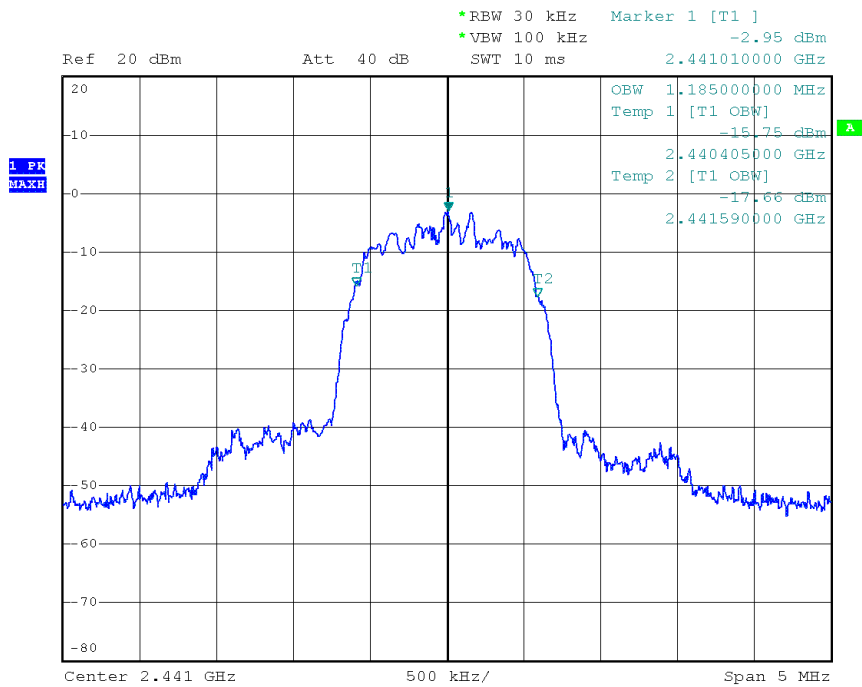
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 1.185



Date: 14.NOV.2018 09:50:57

Occupied Bandwidth

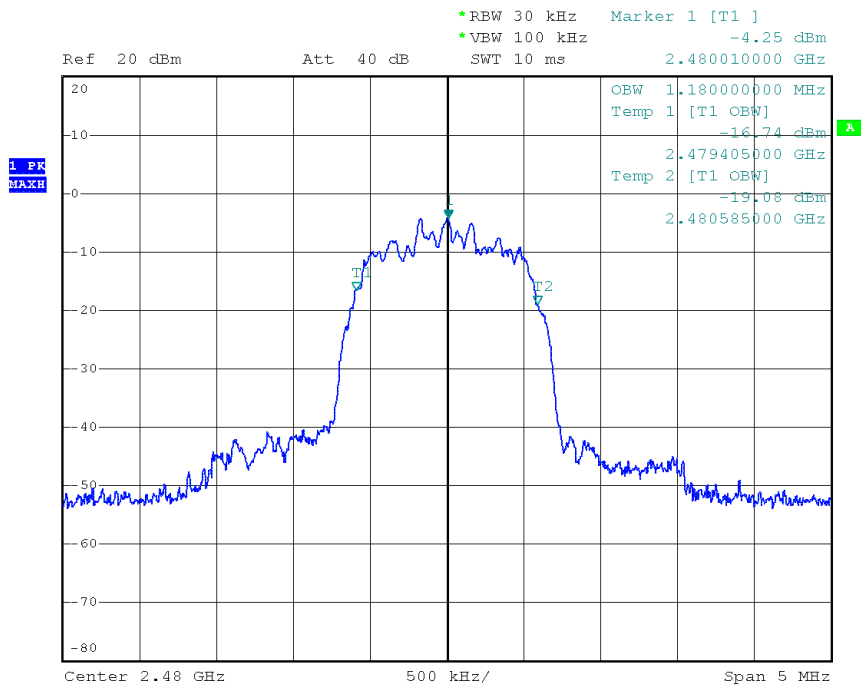
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2-DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 1.185



Date: 14.NOV.2018 09:49:36

Occupied Bandwidth

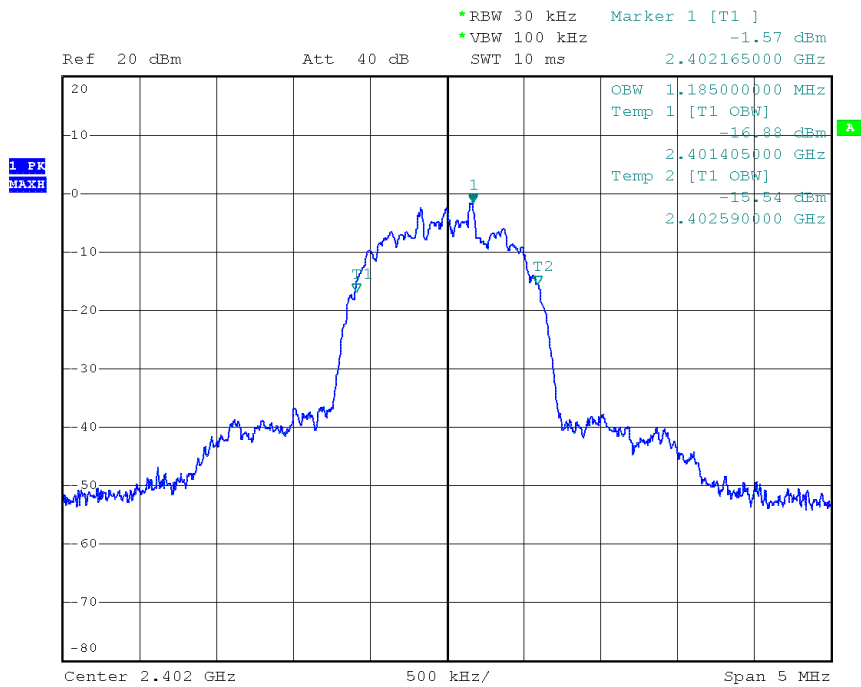
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 2-DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 1.180



Date: 14.NOV.2018 09:48:19

Occupied Bandwidth

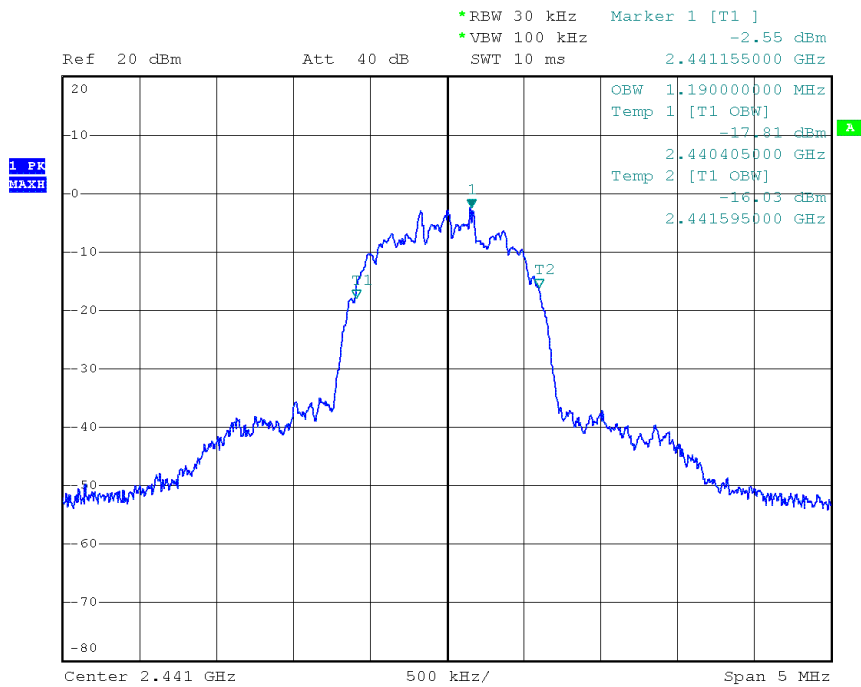
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 3-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 1.185



Date: 14.NOV.2018 09:42:57

Occupied Bandwidth

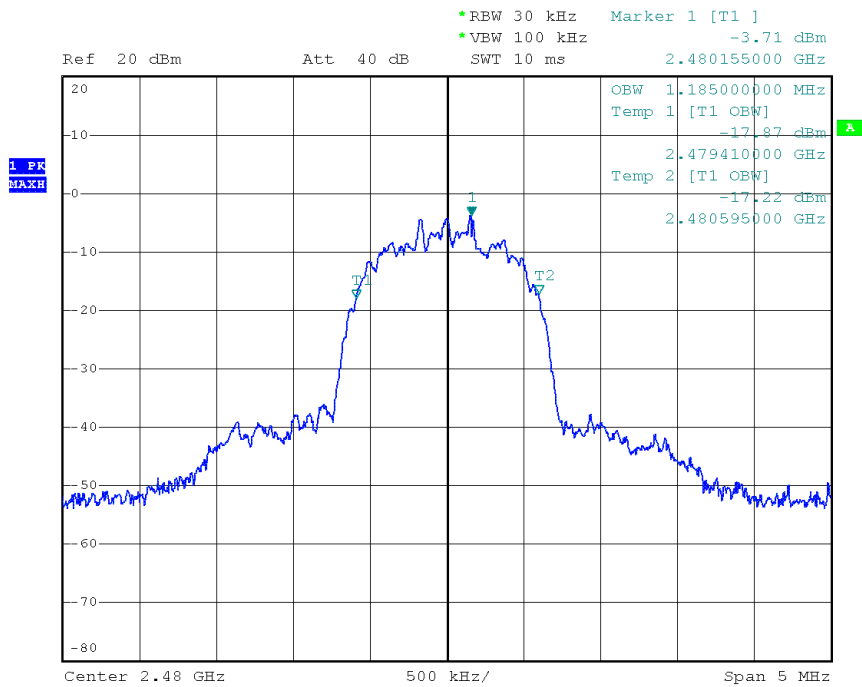
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.3
 Operational Mode: 3-DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Occupied Bandwidth [MHz]: 1.190



Date: 14.NOV.2018 09:37:58

Occupied Bandwidth

Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF
 Test Sample ID: 20584
 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: 2018-11-14
 Occupied Bandwidth [MHz]: 1.185



Date: 14.NOV.2018 09:41:47

3.2 Test Conditions and Results - 20 dB bandwidth

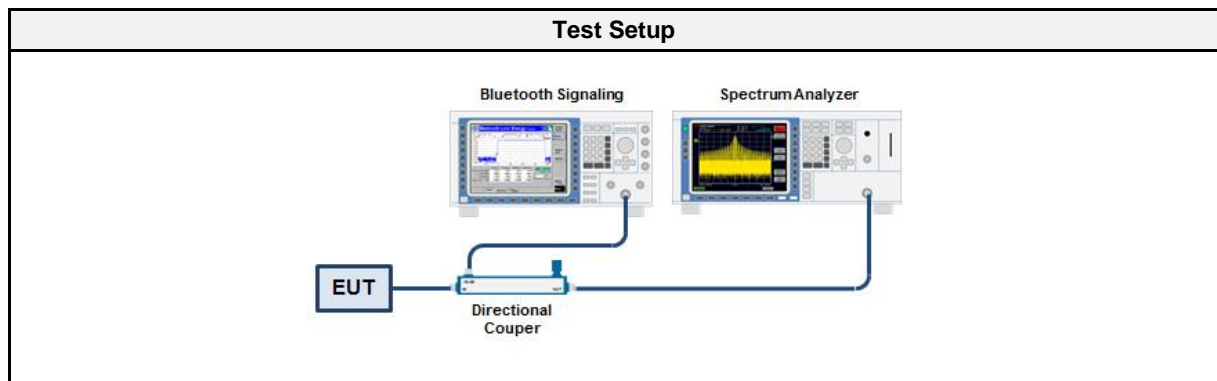
3.2.1 Information

Test Information	
Reference	FCC 15.247(a)(1) / ISED RSS-247 5.1
Measurement Method	ANSI C63.10 6.9.2
Operator	Wilfried Treffke
Date	2018-11-14

3.2.2 Limits

Limits
None (Informational only)

3.2.3 Setup



3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.2.5 Procedure

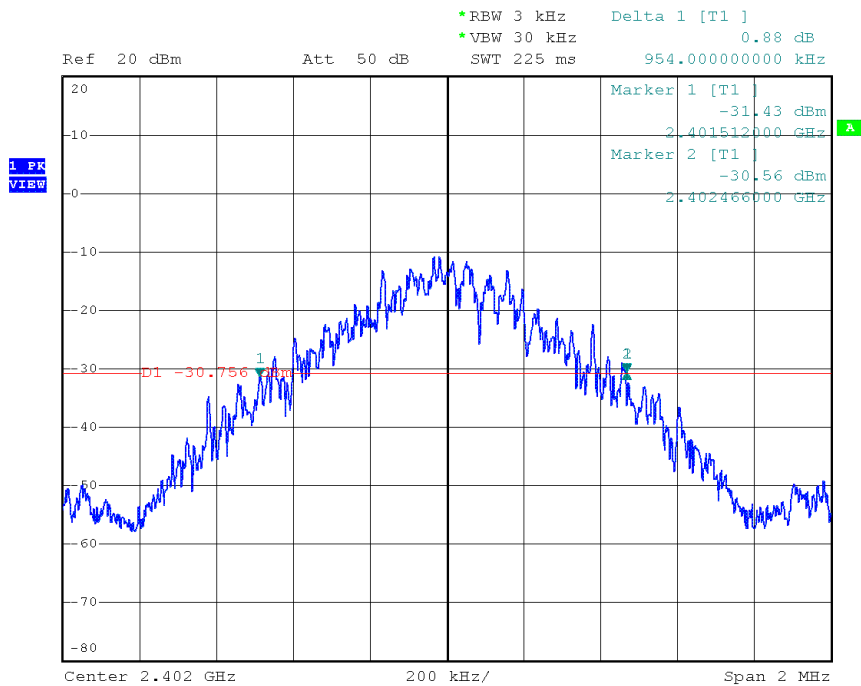
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set 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	0.954
DH5	2441	0.954
DH5	2480	0.954
2-DH5	2402	1.310
2-DH5	2441	1.310
2-DH5	2480	1.308
3-DH5	2402	1.306
3-DH5	2441	1.306
3-DH5	2480	1.306

20 dB Bandwidth

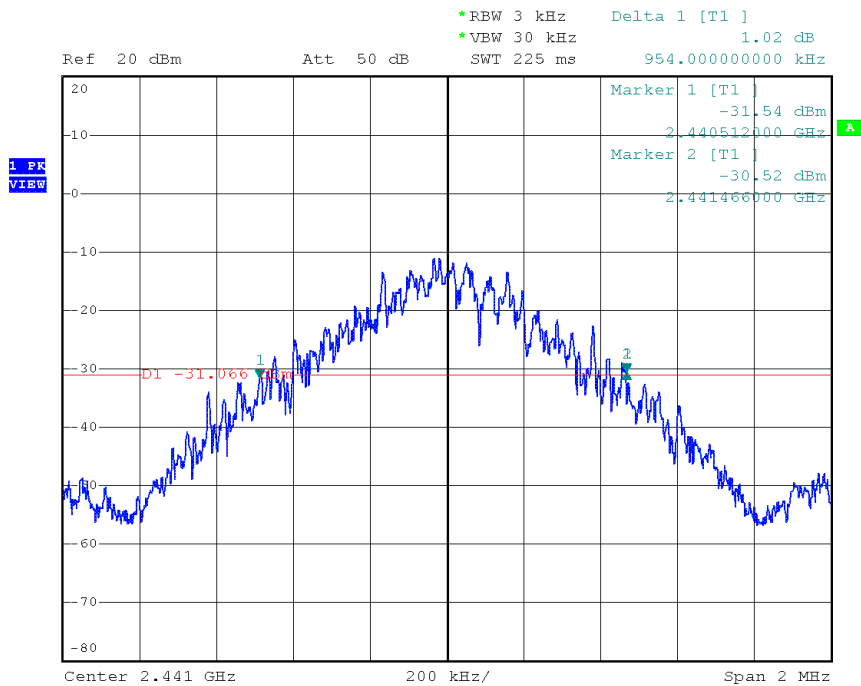
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2401.512
 Upper Frequency [MHz]: 2402.466
 20 dB Bandwidth [MHz]: 0.954



Date: 14.NOV.2018 11:18:54

20 dB Bandwidth

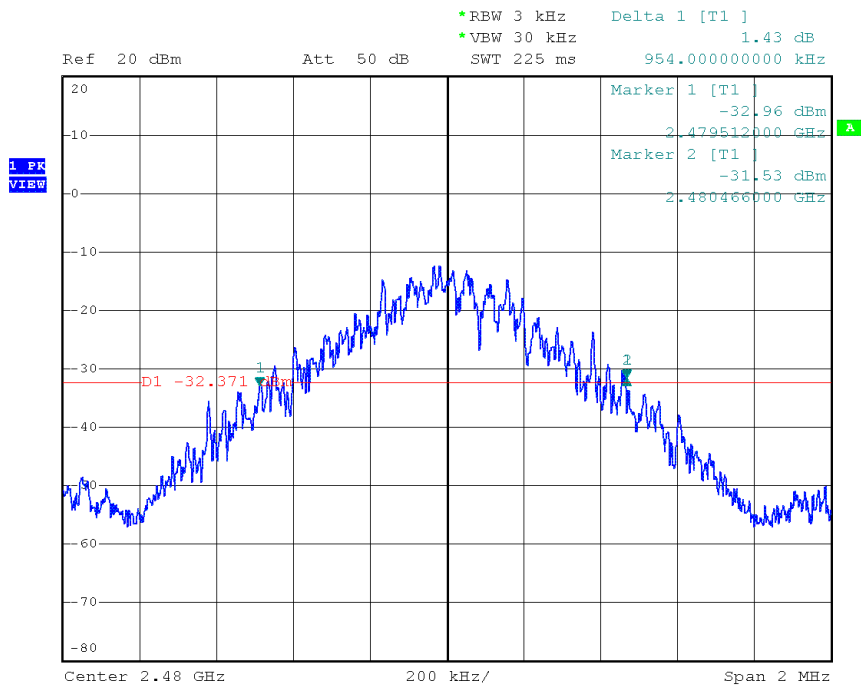
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2440.512
 Upper Frequency [MHz]: 2441.466
 20 dB Bandwidth [MHz]: 0.954



Date: 14.NOV.2018 11:20:38

20 dB Bandwidth

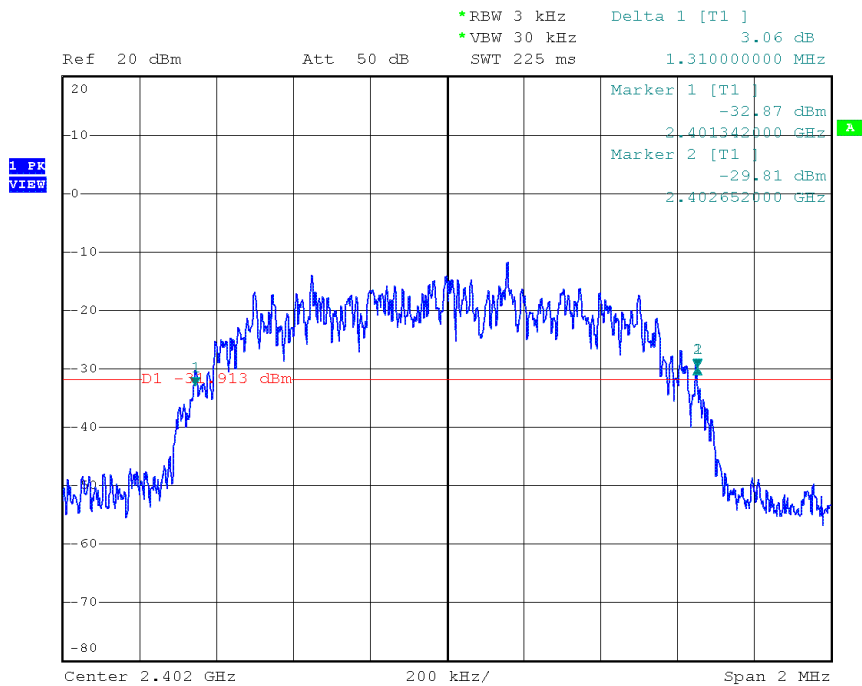
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2479.512
 Upper Frequency [MHz]: 2480.466
 20 dB Bandwidth [MHz]: 0.954



Date: 14.NOV.2018 11:22:03

20 dB Bandwidth

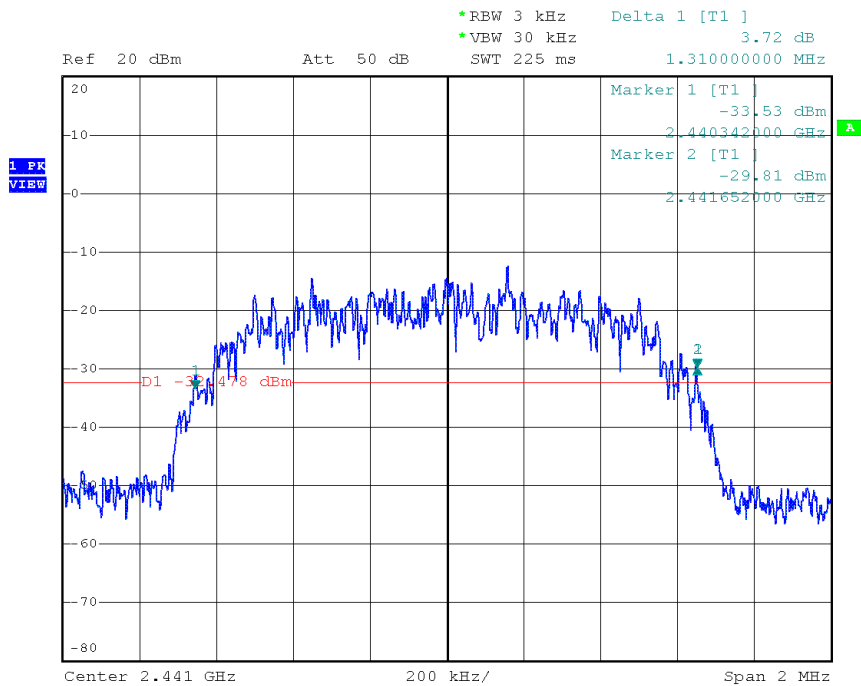
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: 2-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2401.342
 Upper Frequency [MHz]: 2402.652
 20 dB Bandwidth [MHz]: 1.310



Date: 14.NOV.2018 11:26:52

20 dB Bandwidth

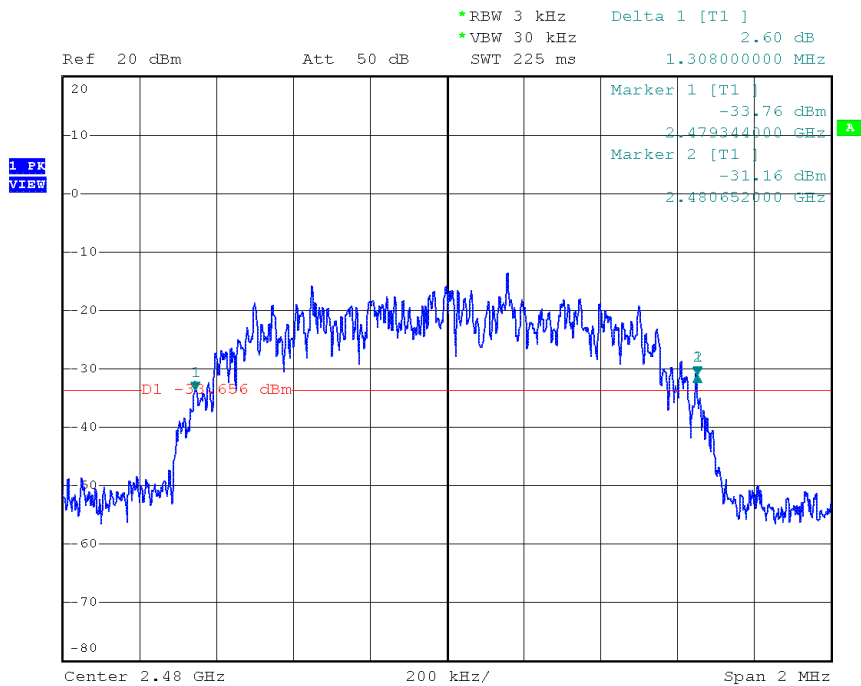
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: 2-DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2440.342
 Upper Frequency [MHz]: 2441.652
 20 dB Bandwidth [MHz]: 1.310



Date: 14.NOV.2018 11:25:10

20 dB Bandwidth

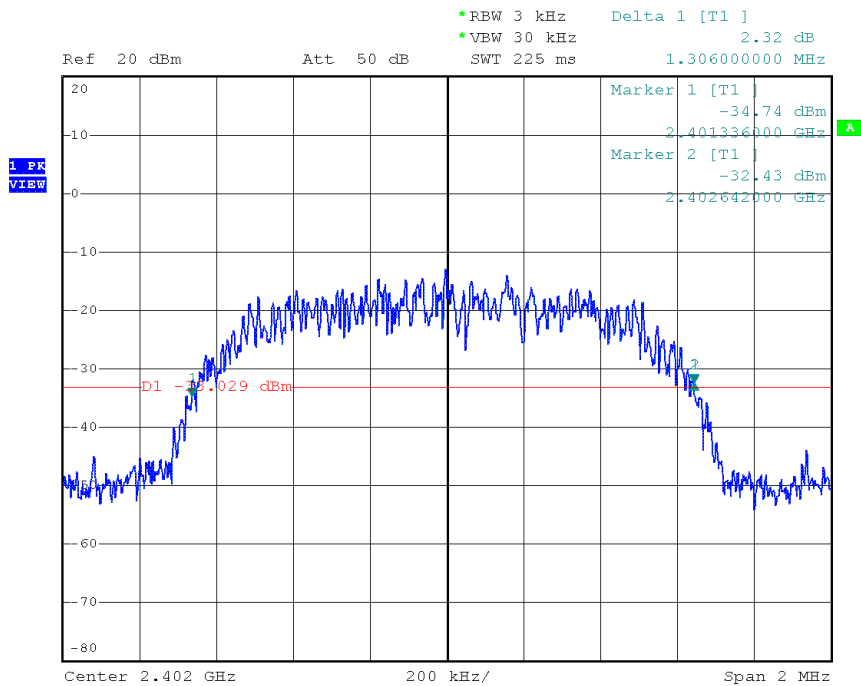
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: 2-DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2479.344
 Upper Frequency [MHz]: 2480.652
 20 dB Bandwidth [MHz]: 1.308



Date: 14.NOV.2018 11:24:05

20 dB Bandwidth

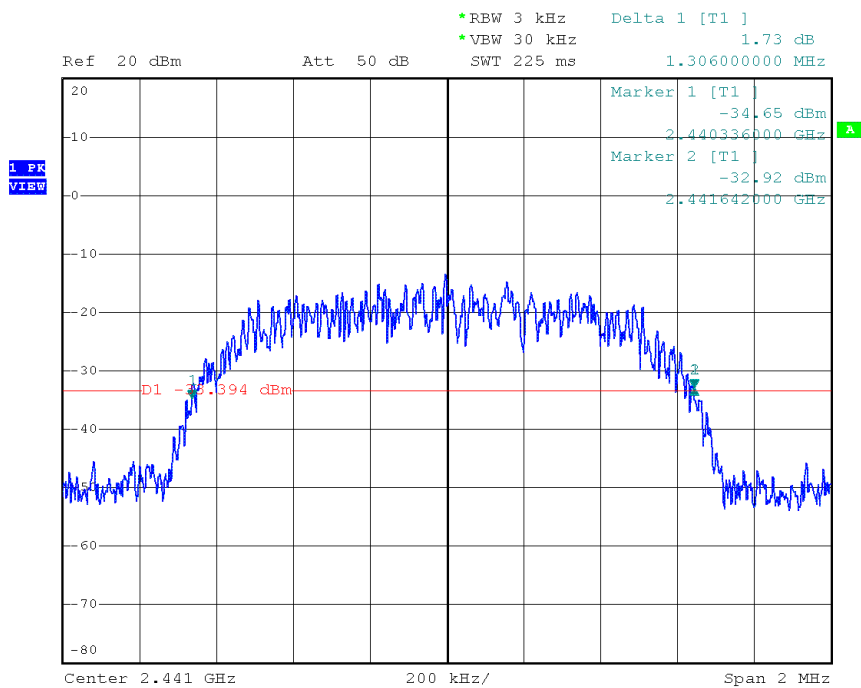
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: 3-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2401.336
 Upper Frequency [MHz]: 2402.642
 20 dB Bandwidth [MHz]: 1.306



Date: 14.NOV.2018 11:32:16

20 dB Bandwidth

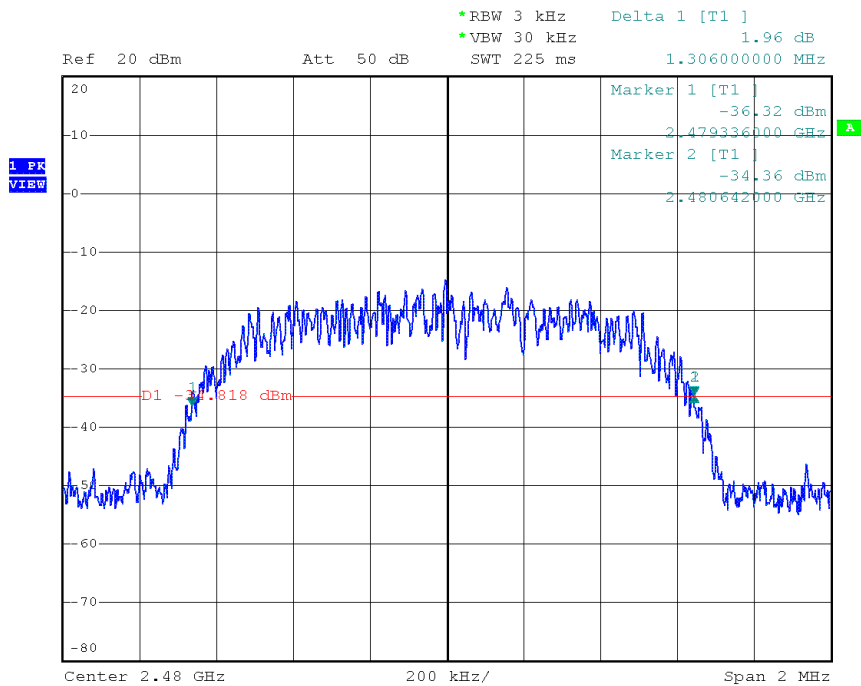
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 6.9.2
 Operational Mode: 3-DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2440.336
 Upper Frequency [MHz]: 2441.642
 20 dB Bandwidth [MHz]: 1.306



Date: 14.NOV.2018 11:33:54

20 dB Bandwidth

Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 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: W. Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Lower Frequency [MHz]: 2479.336
 Upper Frequency [MHz]: 2480.642
 20 dB Bandwidth [MHz]: 1.306



Date: 14.NOV.2018 11:35:19

3.3 Test Conditions and Results - Number of hopping frequencies

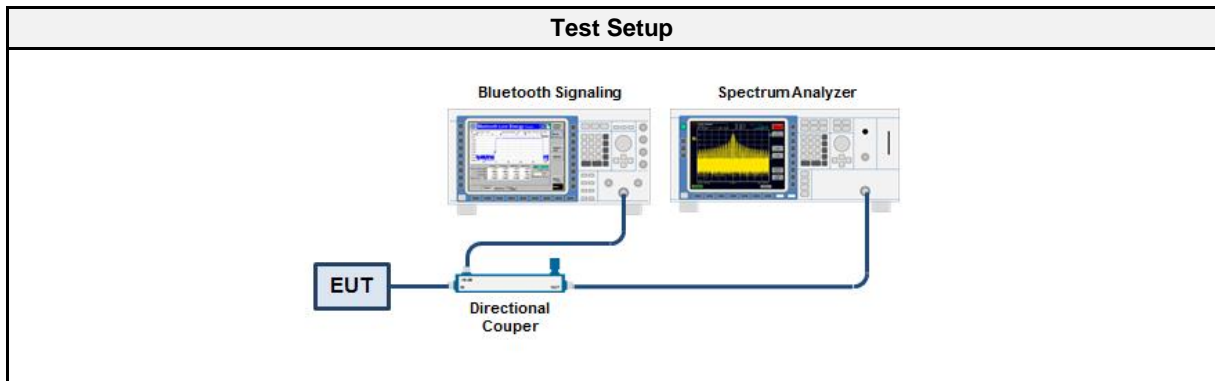
3.3.1 Information

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	2018-11-14

3.3.2 Limits

Limits
≥ 15

3.3.3 Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.3.5 Procedure

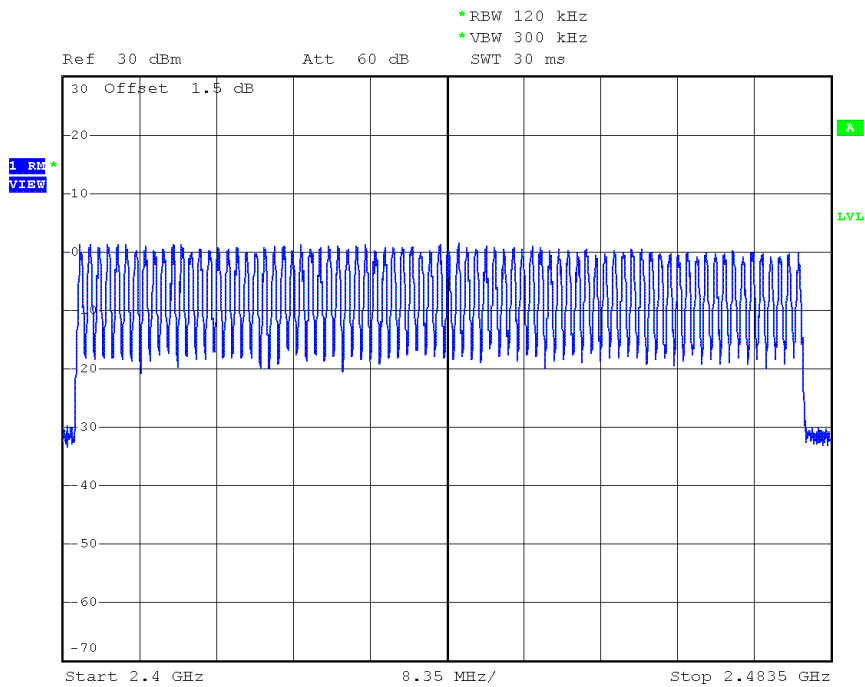
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to measurement frequency range 3. Detector set to peak and max hold 4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra 5. The number of peaks is counted to determine number of hopping frequencies

3.3.6 Results

Test Results		
Number of hopping frequencies	Limit	Margin
79	>15	64

Number of hopping frequencies

Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 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: 2018-11-14
 Number of Hopping Channels: 79



Date: 14.NOV.2018 11:42:38

3.4 Test Conditions and Results - Frequency hopping channel separation

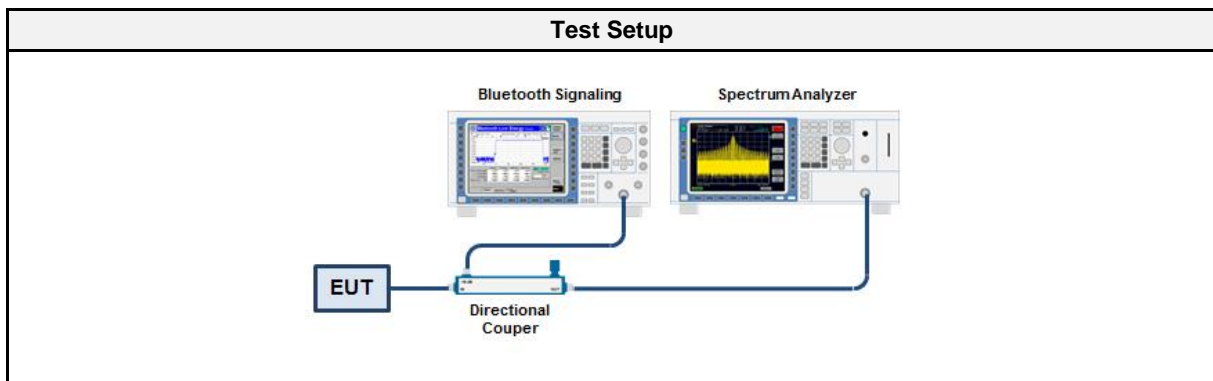
3.4.1 Information

Test Information	
Reference	FCC § 15.247(a)(1); ISED RSS-247, Issue 2 (section 5.1)
Measurement Method	ANSI C63.10 7.8.4
Operator	Wilfried Treffke
Date	2018-11-14

3.4.2 Limits

Limit
≥ 25 kHz or $\frac{1}{3}$ of 20 dB bandwidth

3.4.3 Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.4.5 Procedure

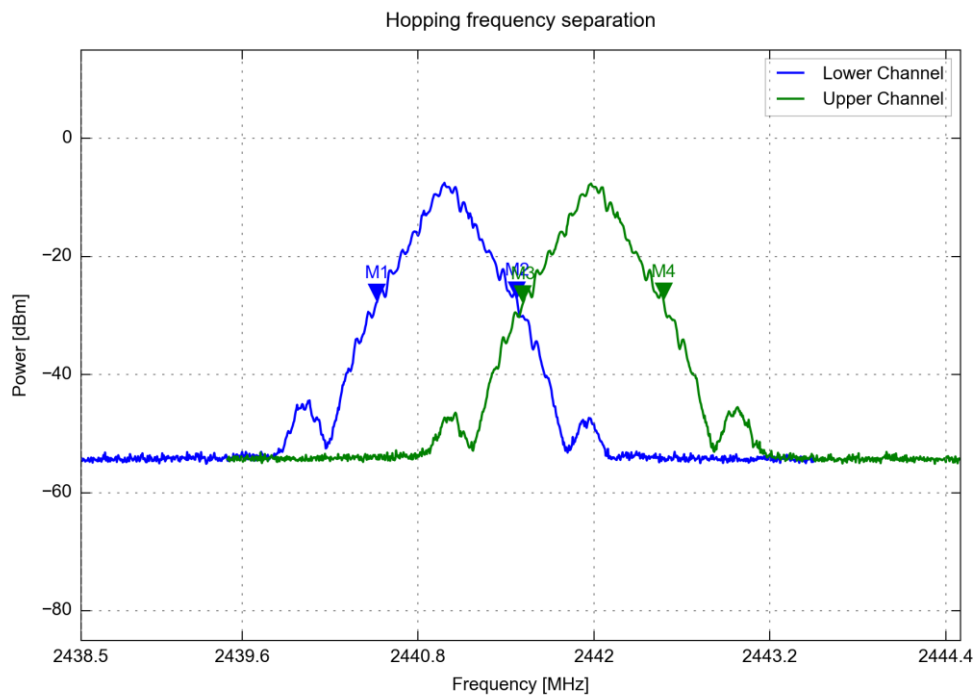
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to measurement frequency range 3. Detector set to peak and max hold 4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra 5. The two adjacent 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
997	$\geq \frac{1}{3} \cdot 1310 = 873.3$	PASS

Hopping frequency separation

Project Number:	G0M-1810-7783
Applicant:	Panasonic Industrial Devices Europe GmbH
Model Description:	Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
Model:	ENWF9201A1EF
Test Sample ID:	20576
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:	2018-11-14
Lower Frequency (M1) [MHz]:	2440.520
Upper Frequency (M2) [MHz]:	2441.475
Lower Frequency (M3) [MHz]:	2441.515
Upper Frequency (M4) [MHz]:	2442.475
Lower center Frequency [MHz]:	2440.997
Upper center Frequency [MHz]:	2441.995
Hopping Frequency Separation [MHz]:	0.997



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

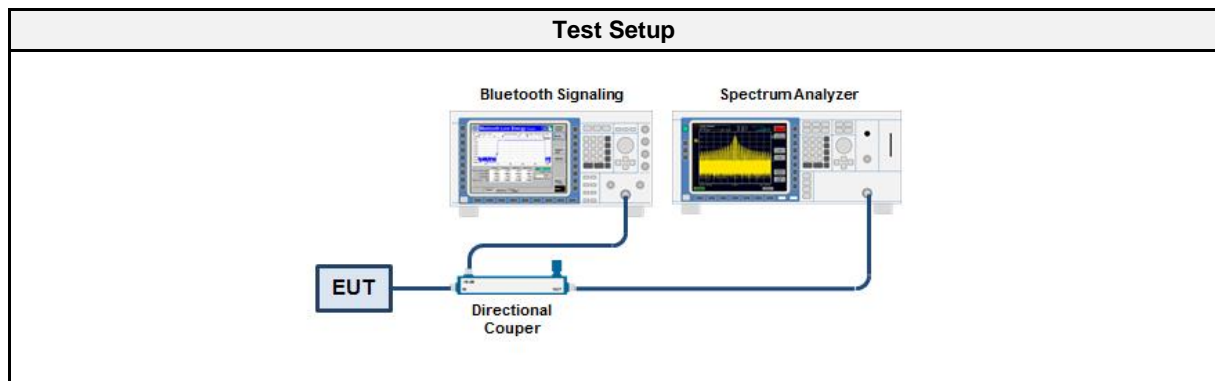
3.5.1 Information

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
Operator	Wilfried Treffke
Date	2018-11-14

3.5.2 Limits

Limits
$\leq 0.4 \text{ s within } 0.4 \text{ s} \cdot \text{Number of hopping channels}$

3.5.3 Setup



3.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.5.5 Procedure

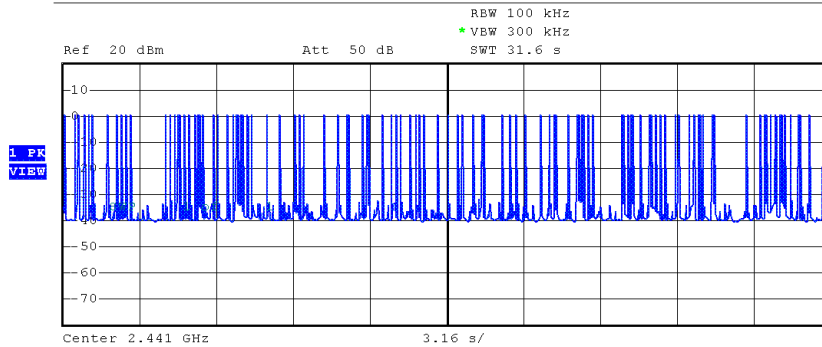
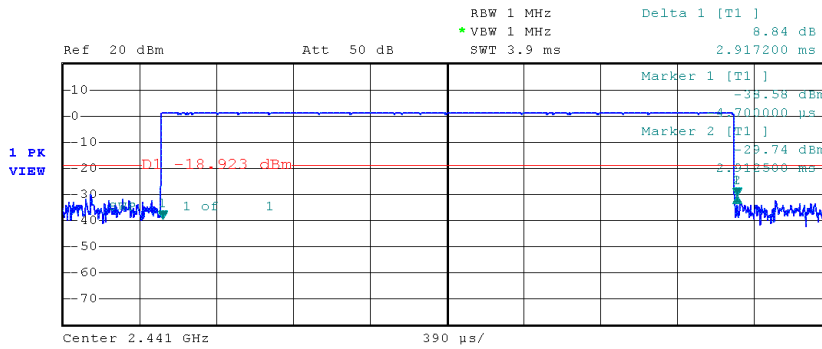
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test hopping mode (Communication tester is used if needed) 2. Analyzer span is set to zero span 3. Detector set to peak and max hold 4. RBW is set to 100 kHz and VBW to 300 kHz 5. The sweep time is set to capture one single dwell time 6. 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	63	0.002917	0.184	0.4	-0.22

Time of occupancy

Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 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: 2018-11-14
 Dwell Time per Hop [ms]: 2.917
 Number of Hops: 63
 Time of occupancy [s]: 0.184



Date: 14.NOV.2018 12:39:13

3.6 Test Conditions and Results - Maximum peak conducted output power

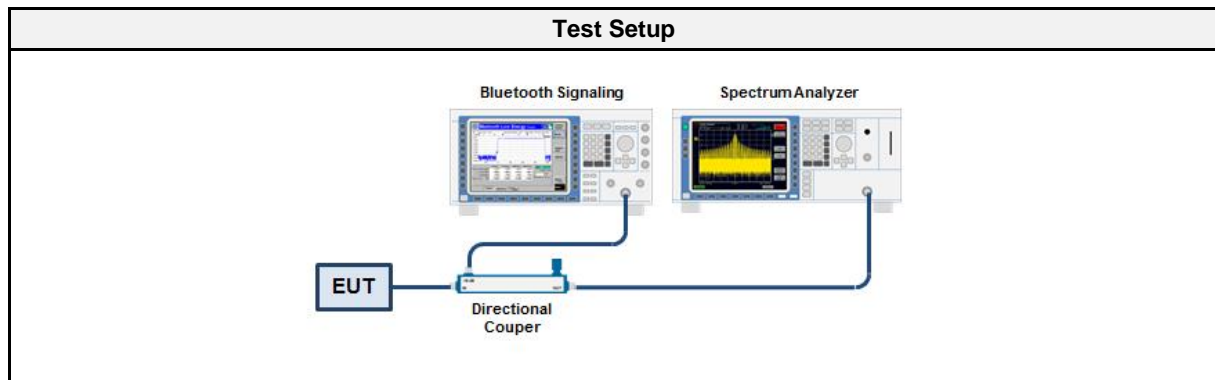
3.6.1 Information

Test Information	
Reference	FCC § 15.247(b)(1); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 7.8.5
Operator	Wilfried Treffke
Date	2018-11-14

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



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.6.5 Procedure

Test Procedure
1. EUT set to test hopping mode (Communication tester is used if needed) 2. Analyzer resolution bandwidth is set \geq 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	3.19	0.00208	1.0	PASS
2441	2.65	0.00184	1.0	PASS
2480	1.45	0.00140	1.0	PASS

Test Results - 2-DH5				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	5.12	0.00325	1.0	PASS
2441	4.75	0.00299	1.0	PASS
2480	3.39	0.00218	1.0	PASS

Test Results - 3-DH5				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2402	5.57	0.00361	1.0	PASS
2441	5.11	0.00324	1.0	PASS
2480	3.81	0.00240	1.0	PASS

3.7 Test Conditions and Results - AC powerline conducted emissions

3.7.1 Information

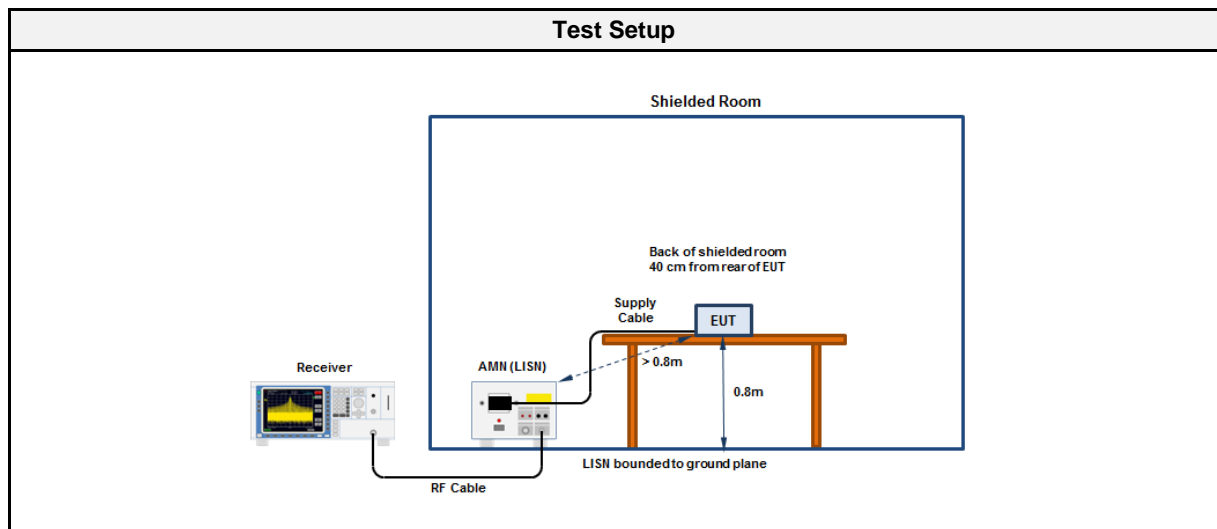
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Operator	Wilfried Treffke
Date	2018-11-29

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



3.7.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2016.1.10

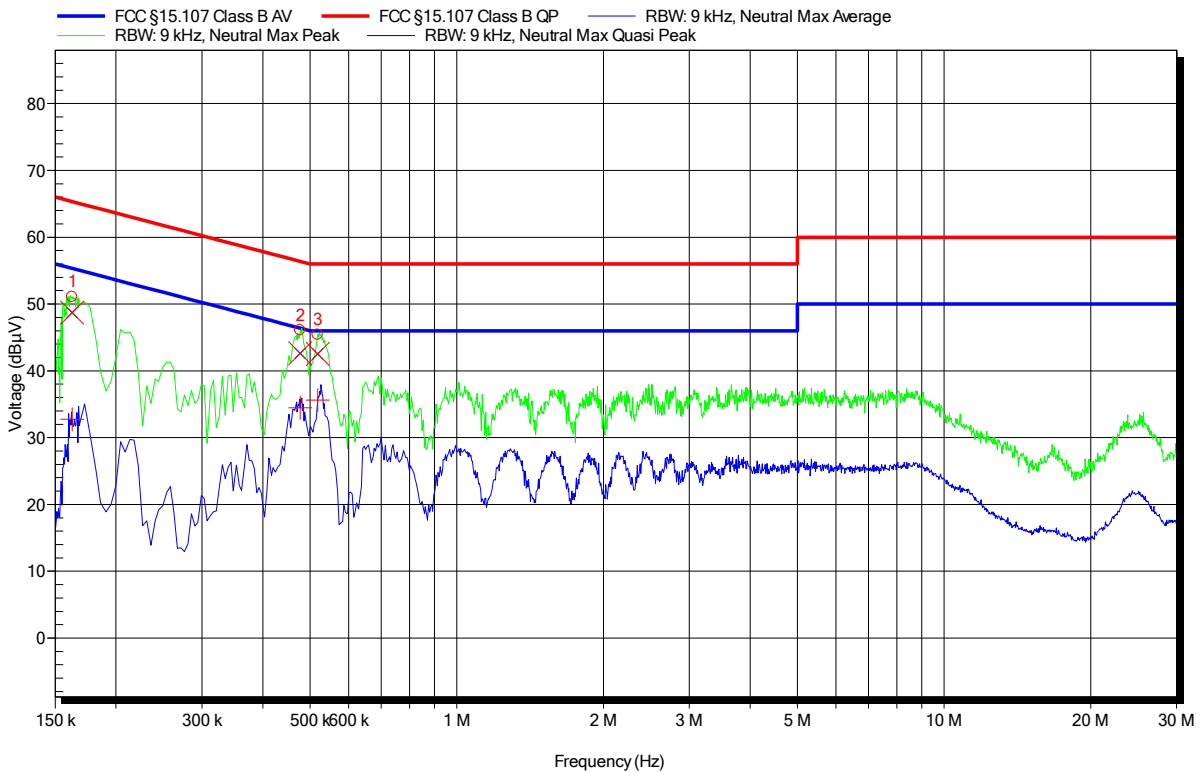
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2018-07	2019-07
LISN	R&S	ESH3-Z5	EF00036	2017-01	2019-01

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 22.3°C, Unom: 120 VAC / 60 Hz
 LISN: ESH3-Z5 (N)
 Mode: BT hopping mode
 Test Date: 2018-11-29
 Note:

Index 3



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	162.6 kHz	48.69 dBµV	65.33 dBµV	-16.64 dB	Pass
2	477.15 kHz	42.64 dBµV	56.39 dBµV	-13.75 dB	Pass
3	519 kHz	42.53 dBµV	56 dBµV	-13.47 dB	Pass

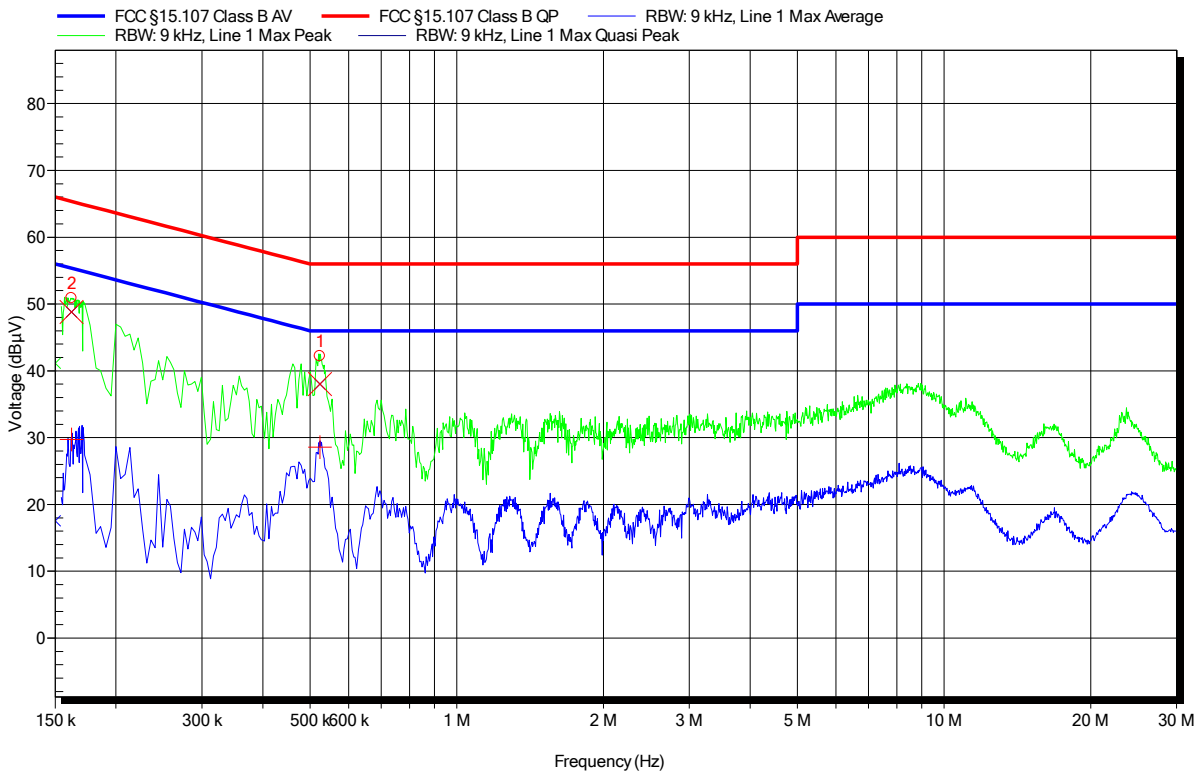
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	162.6 kHz	32.74 dBµV	55.33 dBµV	-22.59 dB	Pass
2	477.15 kHz	34.48 dBµV	46.39 dBµV	-11.91 dB	Pass
3	519 kHz	35.6 dBµV	46 dBµV	-10.4 dB	Pass

EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 22.3°C, Unom: 120 VAC / 60 Hz
 LISN: ESH3-Z5 (L)
 Mode: BT hopping mode
 Test Date: 2018-11-29
 Note:

Index 4



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	523.95 kHz	38.04 dBµV	56 dBµV	-17.96 dB	Pass
2	162.15 kHz	48.79 dBµV	65.35 dBµV	-16.56 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	523.95 kHz	28.58 dBµV	46 dBµV	-17.42 dB	Pass
2	162.15 kHz	29.72 dBµV	55.35 dBµV	-25.63 dB	Pass

3.8 Test Conditions and Results - Band-edge compliance

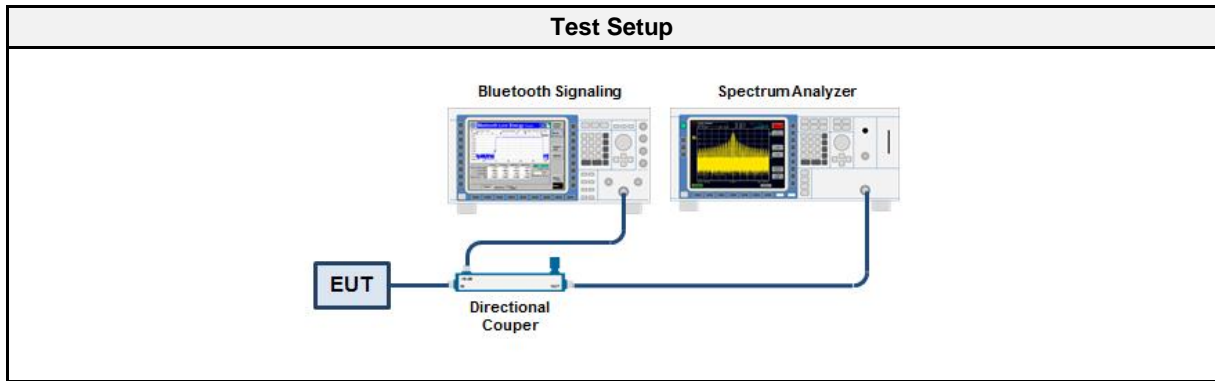
3.8.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 6.10
Operator	Wilfried Treffke
Date	2018-11-14

3.8.2 Limits

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

3.8.3 Setup



3.8.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.8.5 Procedure

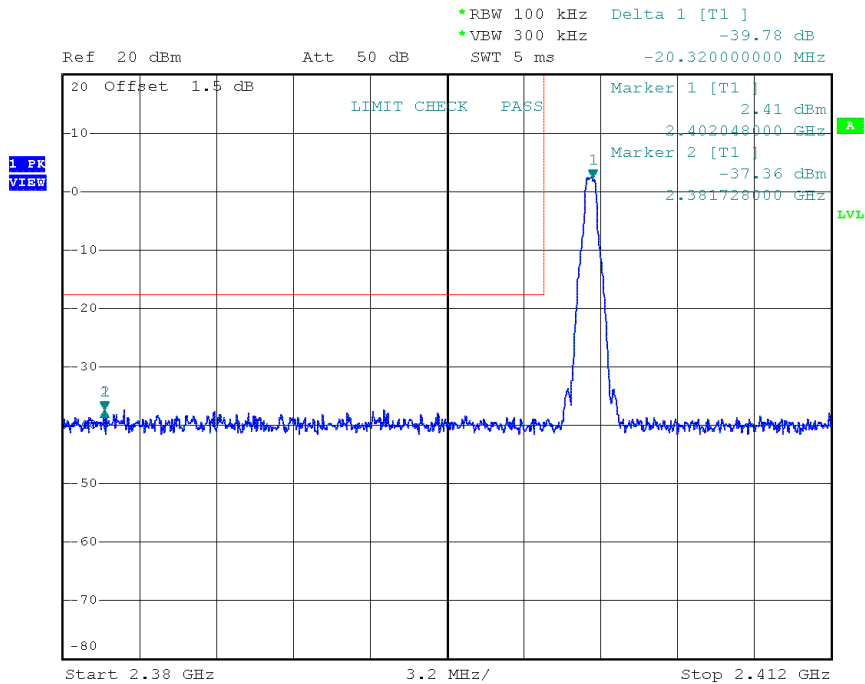
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and 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	-39.78	-20	PASS
DH5 single	2480	-37.15	-20	PASS
DH5 hopping	2402	-38.68	-20	PASS
DH5 hopping	2480	-37.51	-20	PASS
2-DH5 single	2402	-39.40	-20	PASS
2-DH5 single	2480	-37.51	-20	PASS
2-DH5 hopping	2402	-39.27	-20	PASS
2-DH5 hopping	2480	-37.72	-20	PASS
3-DH5 single	2402	-37.60	-20	PASS
3-DH5 single	2480	-37.81	-20	PASS
3-DH5 hopping	2402	-38.54	-20	PASS
3-DH5 hopping	2480	-36.83	-20	PASS

Band-edge Compliance

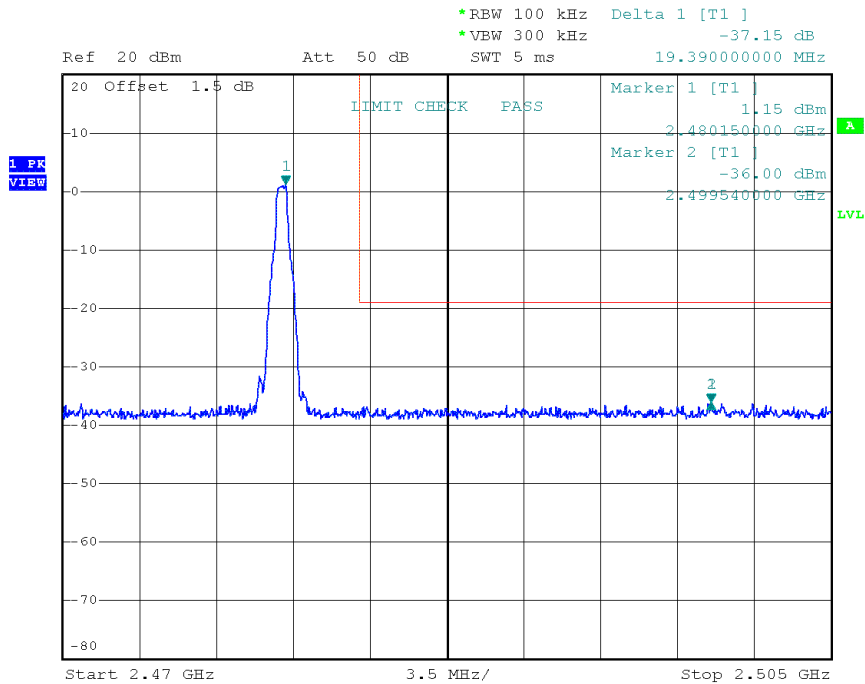
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.048
 Max. in-band Level [dBm/100 kHz]: 2.412
 Out-of-band Frequency [MHz]: 2381.728
 Max. out-of-band Level [dBm/100 kHz]: -37.364
 Attenuation [dB]: -39.78



Date: 14.NOV.2018 13:31:00

Band-edge Compliance

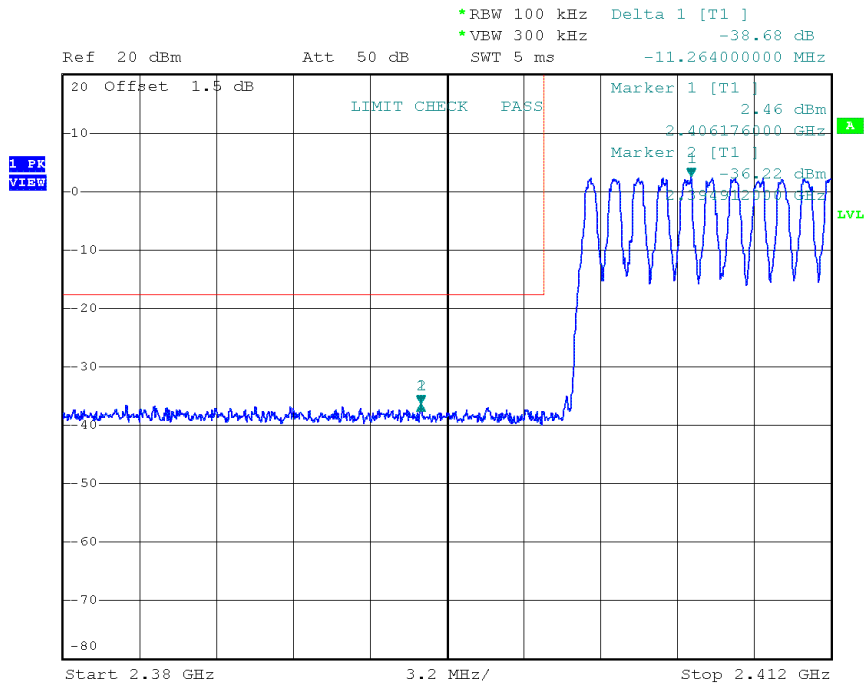
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.15
 Max. in-band Level [dBm/100 kHz]: 1.147
 Out-of-band Frequency [MHz]: 2499.54
 Max. out-of-band Level [dBm/100 kHz]: -36.003
 Attenuation [dB]: -37.15



Date: 14.NOV.2018 13:38:45

Band-edge Compliance

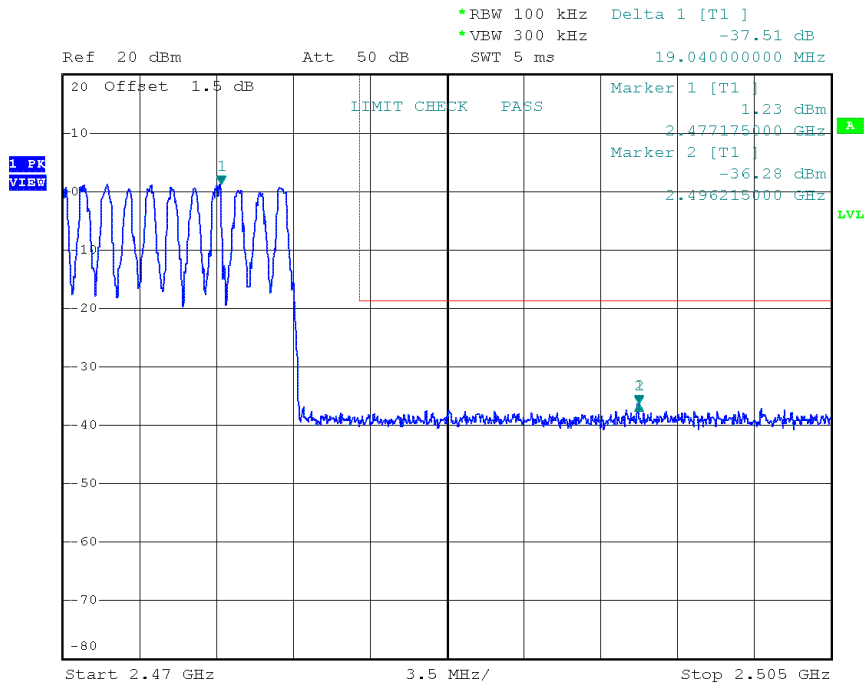
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Lower
 In-band Frequency [MHz]: 2406.176
 Max. in-band Level [dBm/100 kHz]: 2.457
 Out-of-band Frequency [MHz]: 2394.912
 Max. out-of-band Level [dBm/100 kHz]: -36.219
 Attenuation [dB]: -38.68



Date: 14.NOV.2018 13:46:43

Band-edge Compliance

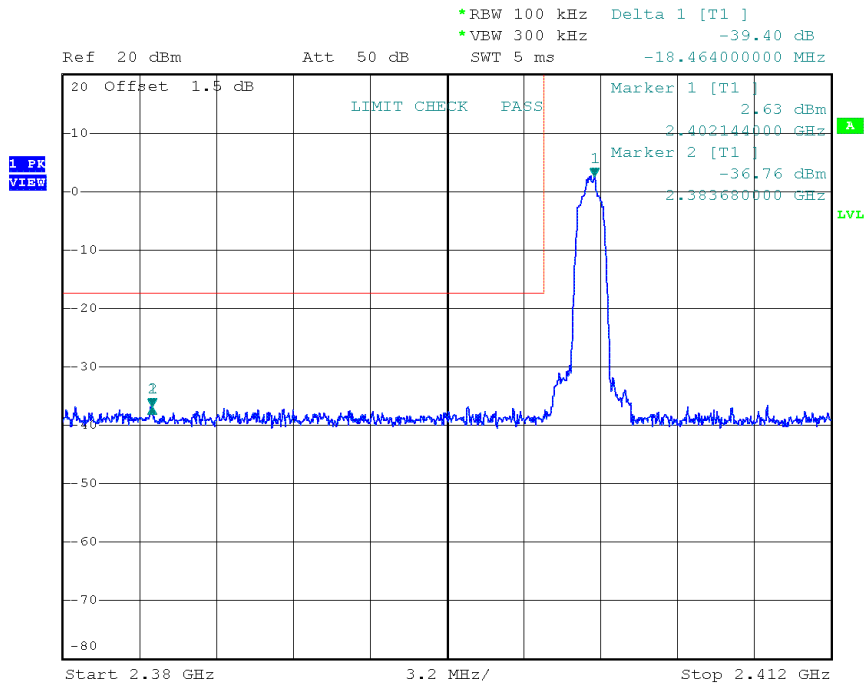
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Upper
 In-band Frequency [MHz]: 2477.175
 Max. in-band Level [dBm/100 kHz]: 1.235
 Out-of-band Frequency [MHz]: 2496.215
 Max. out-of-band Level [dBm/100 kHz]: -36.278
 Attenuation [dB]: -37.51



Date: 14.NOV.2018 13:43:02

Band-edge Compliance

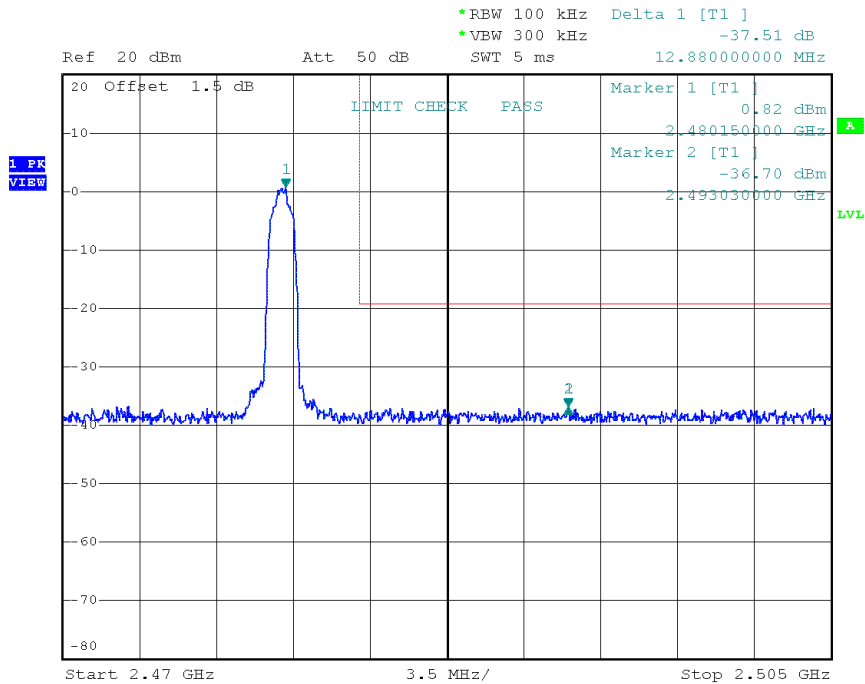
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 2-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.144
 Max. in-band Level [dBm/100 kHz]: 2.635
 Out-of-band Frequency [MHz]: 2383.68
 Max. out-of-band Level [dBm/100 kHz]: -36.762
 Attenuation [dB]: -39.4



Date: 14.NOV.2018 13:50:20

Band-edge Compliance

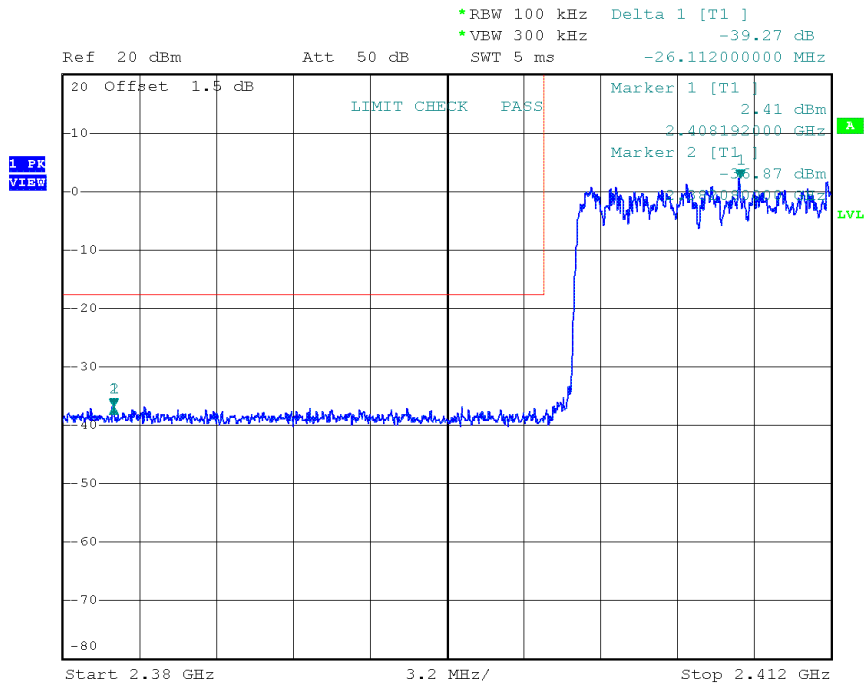
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 2-DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.15
 Max. in-band Level [dBm/100 kHz]: 0.816
 Out-of-band Frequency [MHz]: 2493.03
 Max. out-of-band Level [dBm/100 kHz]: -36.695
 Attenuation [dB]: -37.51



Date: 14.NOV.2018 13:53:07

Band-edge Compliance

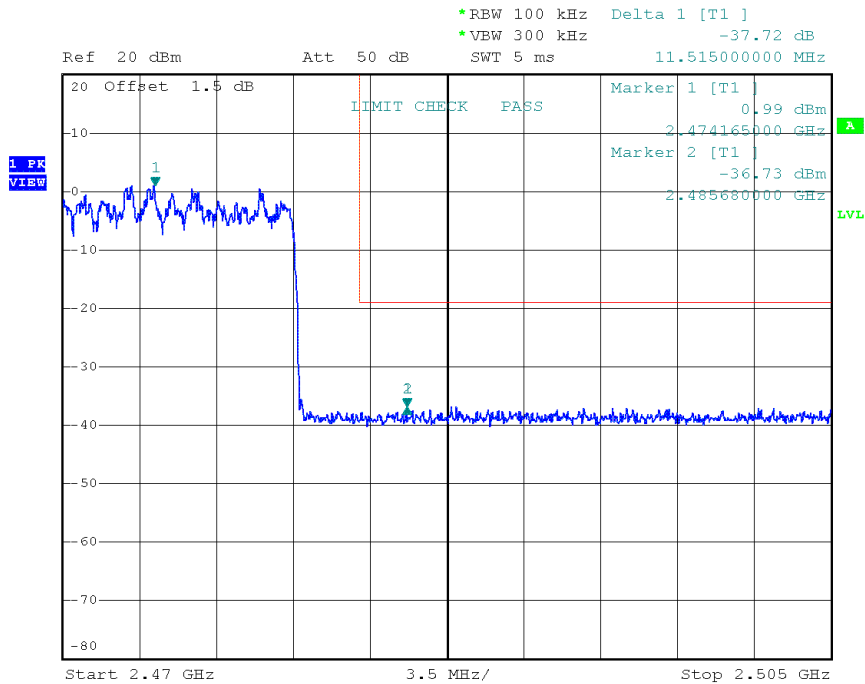
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 2-DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Lower
 In-band Frequency [MHz]: 2408.192
 Max. in-band Level [dBm/100 kHz]: 2.409
 Out-of-band Frequency [MHz]: 2382.08
 Max. out-of-band Level [dBm/100 kHz]: -36.866
 Attenuation [dB]: -39.27



Date: 14.NOV.2018 13:59:02

Band-edge Compliance

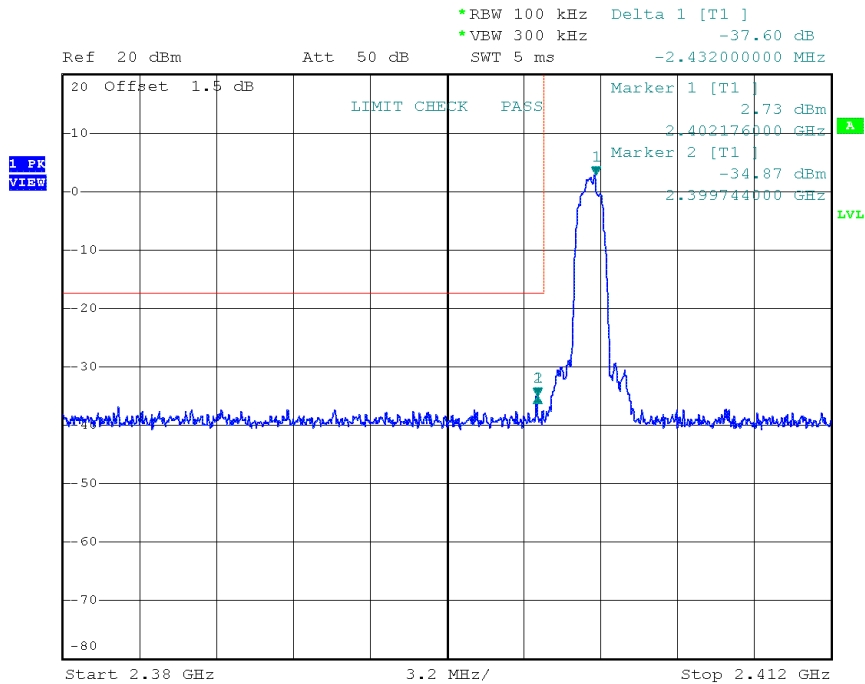
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 2-DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Upper
 In-band Frequency [MHz]: 2474.165
 Max. in-band Level [dBm/100 kHz]: 0.987
 Out-of-band Frequency [MHz]: 2485.68
 Max. out-of-band Level [dBm/100 kHz]: -36.729
 Attenuation [dB]: -37.72



Date: 14.NOV.2018 13:55:30

Band-edge Compliance

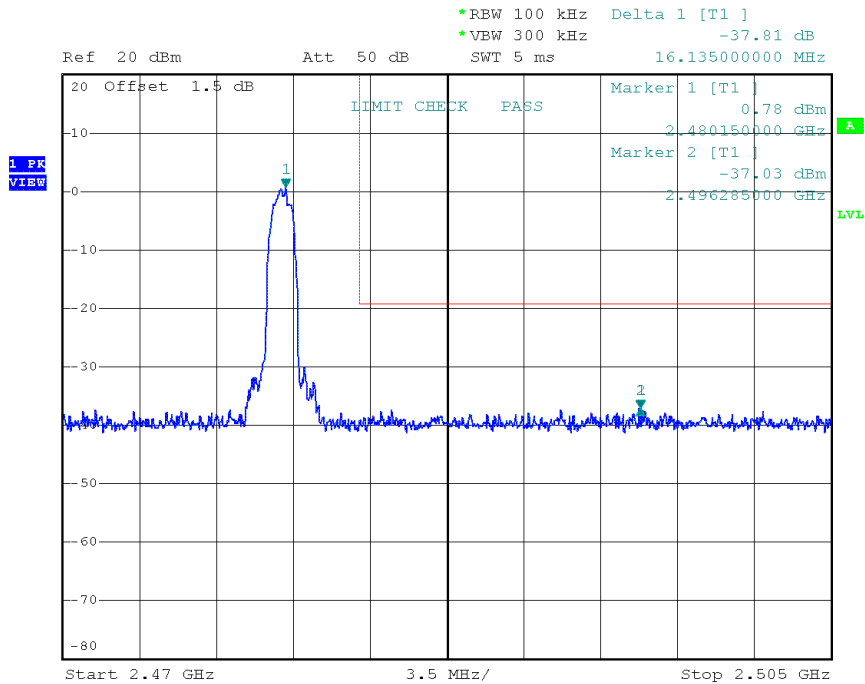
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 3-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Lower
 In-band Frequency [MHz]: 2402.176
 Max. in-band Level [dBm/100 kHz]: 2.727
 Out-of-band Frequency [MHz]: 2399.744
 Max. out-of-band Level [dBm/100 kHz]: -34.874
 Attenuation [dB]: -37.6



Date: 14.NOV.2018 14:02:00

Band-edge Compliance

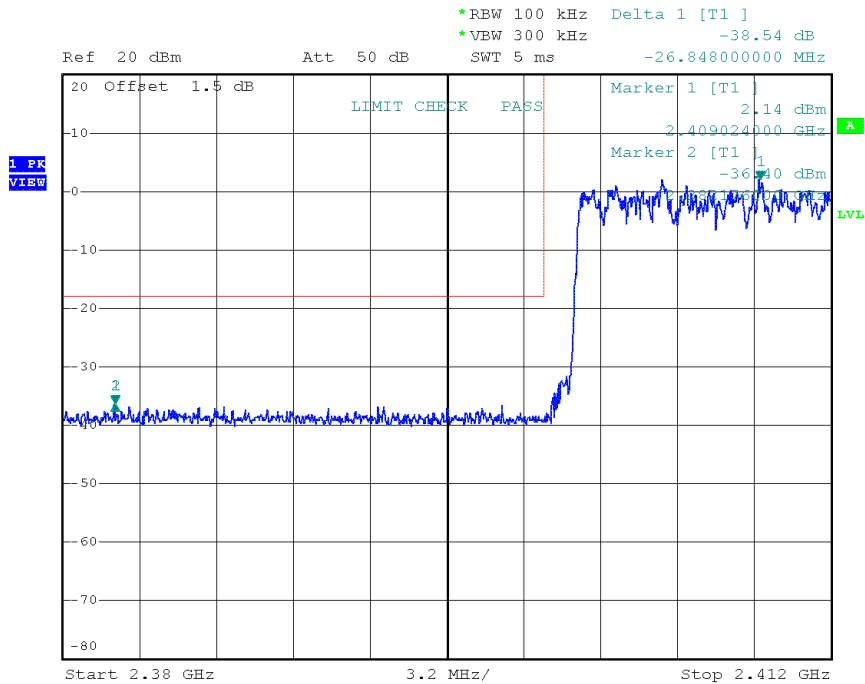
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 3-DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Upper
 In-band Frequency [MHz]: 2480.15
 Max. in-band Level [dBm/100 kHz]: 0.779
 Out-of-band Frequency [MHz]: 2496.285
 Max. out-of-band Level [dBm/100 kHz]: -37.03
 Attenuation [dB]: -37.81



Date: 14.NOV.2018 14:03:22

Band-edge Compliance

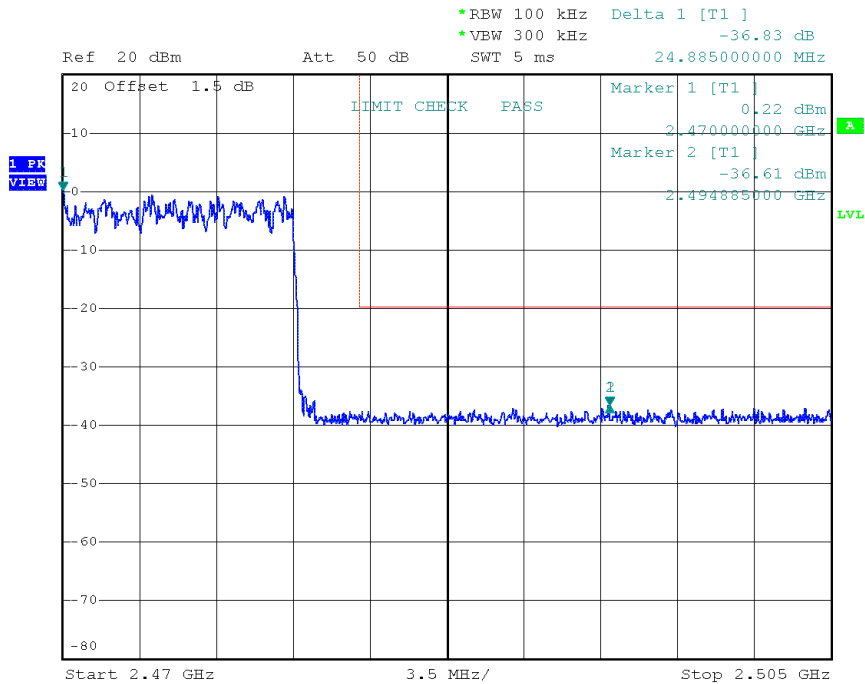
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.6, 6.10.4
 Operational Mode: 3-DH5, Hopping
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Band-edge: Lower
 In-band Frequency [MHz]: 2409.024
 Max. in-band Level [dBm/100 kHz]: 2.142
 Out-of-band Frequency [MHz]: 2382.176
 Max. out-of-band Level [dBm/100 kHz]: -36.396
 Attenuation [dB]: -38.54



Date: 14.NOV.2018 14:07:08

Band-edge Compliance

Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 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: 2018-11-14
 Band-edge: Upper
 In-band Frequency [MHz]: 2470.0
 Max. in-band Level [dBm/100 kHz]: 0.215
 Out-of-band Frequency [MHz]: 2494.885
 Max. out-of-band Level [dBm/100 kHz]: -36.611
 Attenuation [dB]: -36.83



Date: 14.NOV.2018 14:05:23

3.9 Test Conditions and Results - Conducted spurious emissions

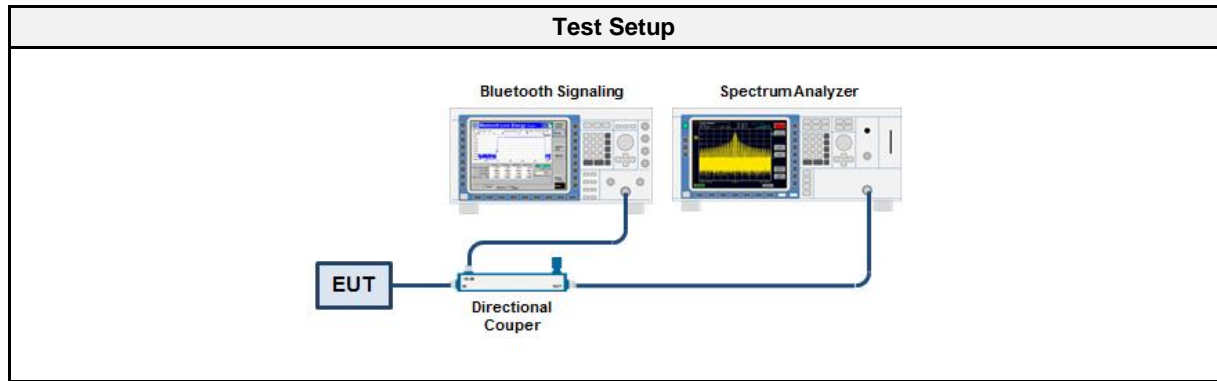
3.9.1 Information

Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 6.10
Operator	Wilfried Treffke
Date	2018-11-14

3.9.2 Limits

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

3.9.3 Setup



3.9.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP30	EF00312	2018-07	2019-07
CBT Bluetooth Tester	R&S	CBT	EF00358	2017-03	2019-03

3.9.5 Procedure

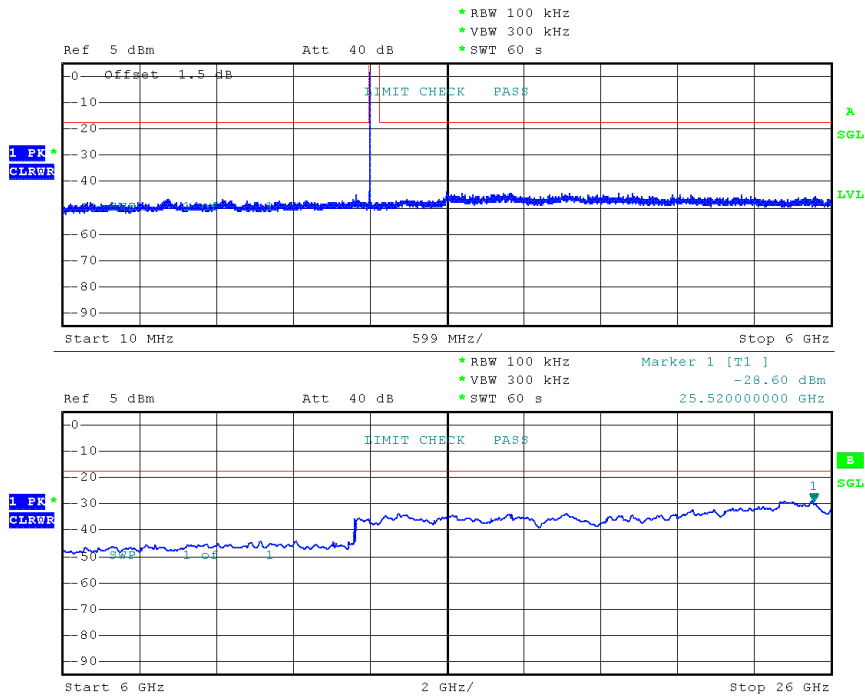
Test Procedure
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference

3.9.6 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

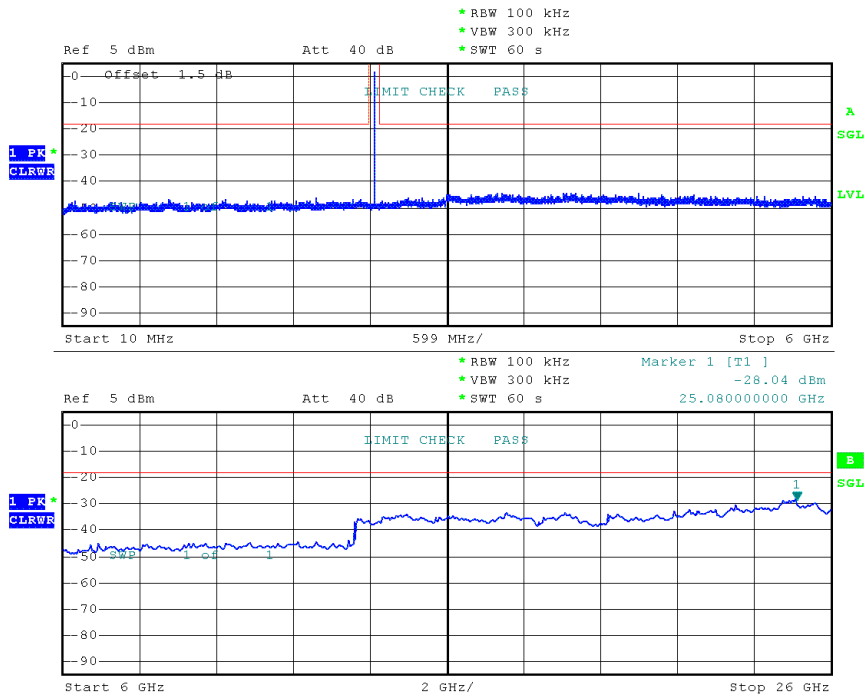
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Max. in-band Frequency [MHz]: 2402.2
 Max. in-band Level [dBm/100 kHz]: 2.5
 Out-of-band Limit [dBm/100 kHz]: -17.5



Date: 14.NOV.2018 15:11:16

Conducted Spurious Emissions

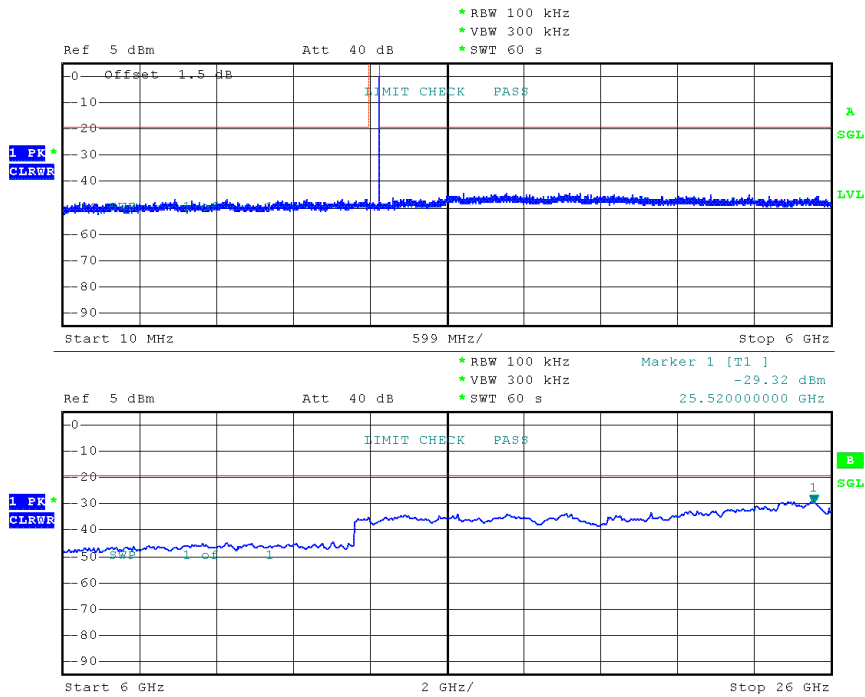
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Max. in-band Frequency [MHz]: 2441.2
 Max. in-band Level [dBm/100 kHz]: 2.1
 Out-of-band Limit [dBm/100 kHz]: -17.9



Date: 14.NOV.2018 15:55:39

Conducted Spurious Emissions

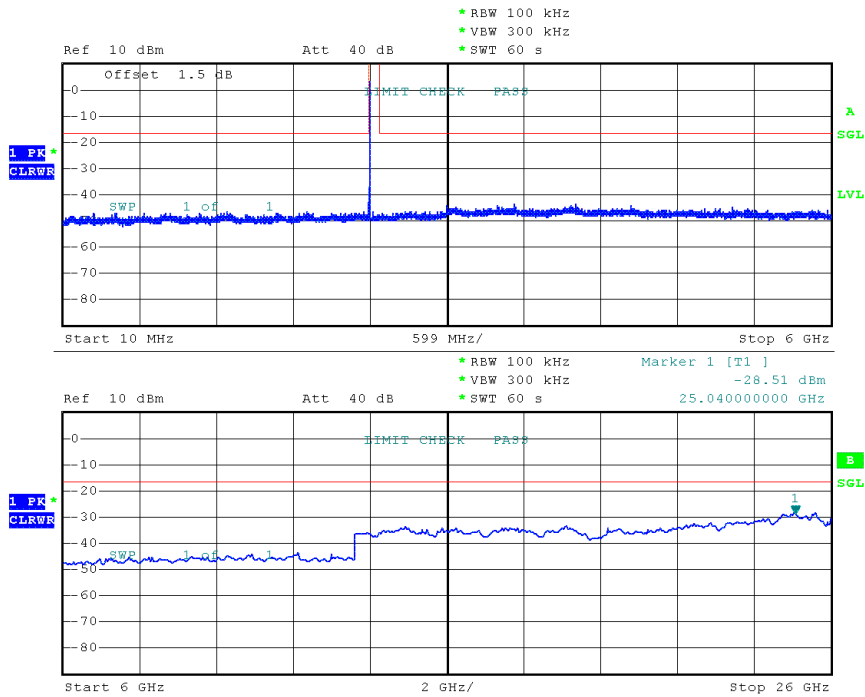
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-14
 Max. in-band Frequency [MHz]: 2480.2
 Max. in-band Level [dBm/100 kHz]: 0.8
 Out-of-band Limit [dBm/100 kHz]: -19.2



Date: 14.NOV.2018 16:00:45

Conducted Spurious Emissions

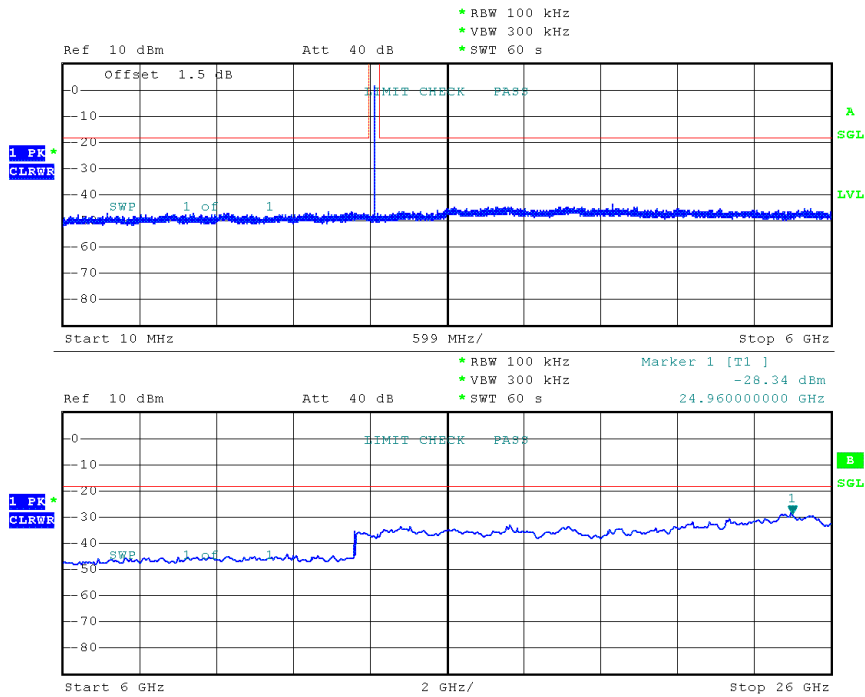
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: 2-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-28
 Max. in-band Frequency [MHz]: 2402.2
 Max. in-band Level [dBm/100 kHz]: 3.2
 Out-of-band Limit [dBm/100 kHz]: -16.8



Date: 28.NOV.2018 12:42:38

Conducted Spurious Emissions

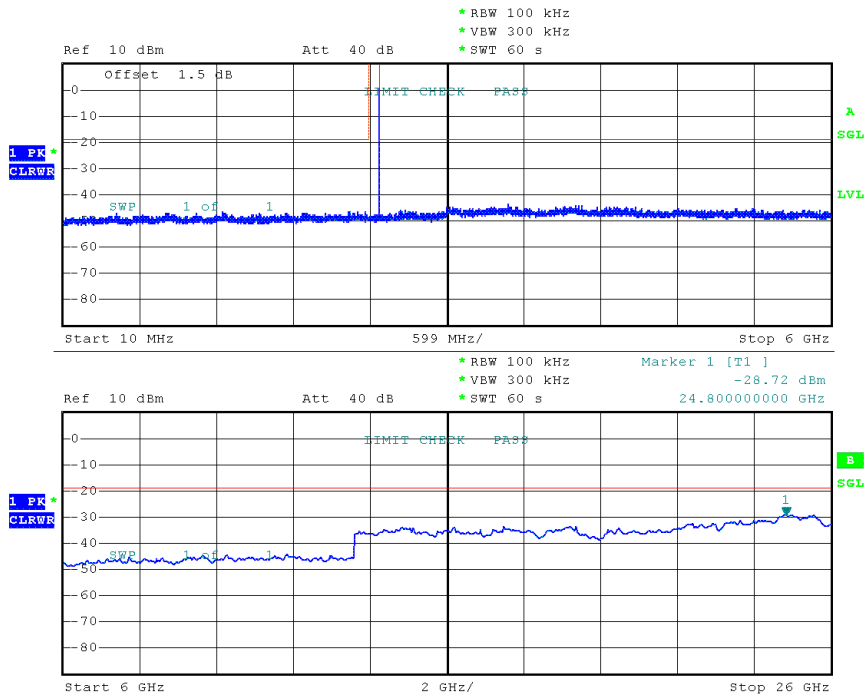
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: 2-DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-28
 Max. in-band Frequency [MHz]: 2441.2
 Max. in-band Level [dBm/100 kHz]: 1.7
 Out-of-band Limit [dBm/100 kHz]: -18.3



Date: 28.NOV.2018 12:48:15

Conducted Spurious Emissions

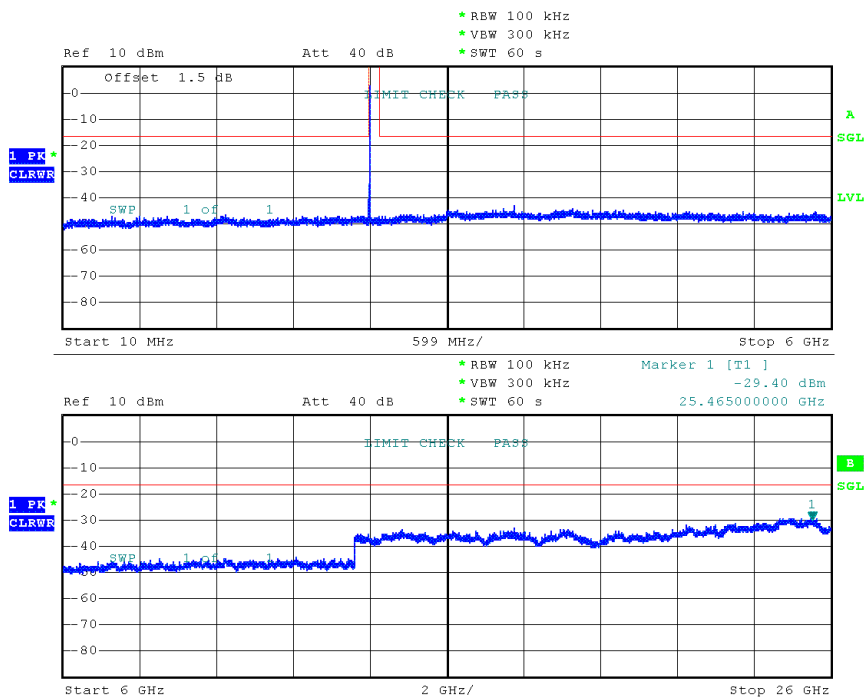
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: 2-DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-28
 Max. in-band Frequency [MHz]: 2480.2
 Max. in-band Level [dBm/100 kHz]: 1.0
 Out-of-band Limit [dBm/100 kHz]: -19.0



Date: 28.NOV.2018 12:55:34

Conducted Spurious Emissions

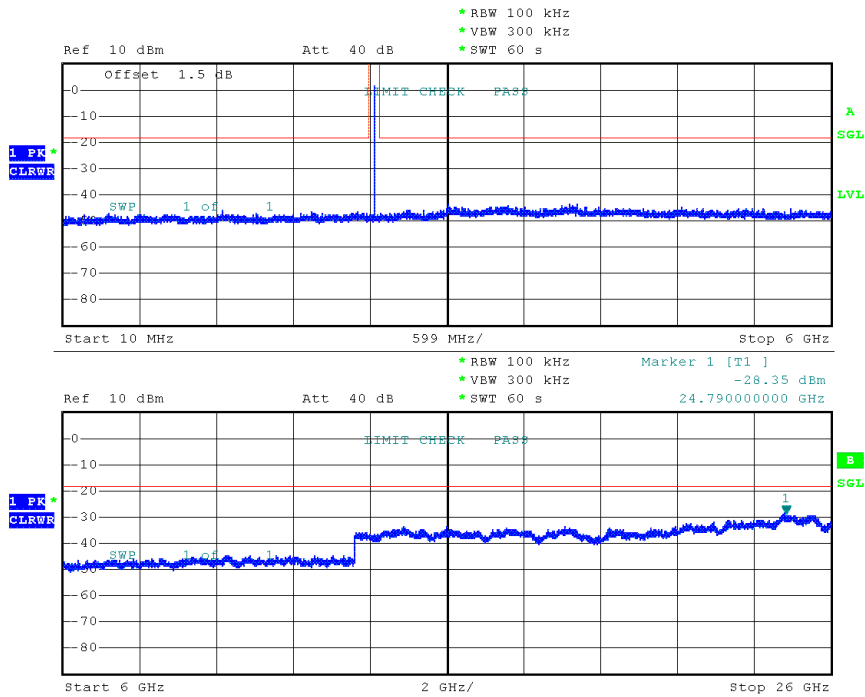
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: 3-DH5, Channel: 0, 2402 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-28
 Max. in-band Frequency [MHz]: 2401.8
 Max. in-band Level [dBm/100 kHz]: 3.4
 Out-of-band Limit [dBm/100 kHz]: -16.6



Date: 28.NOV.2018 13:01:31

Conducted Spurious Emissions

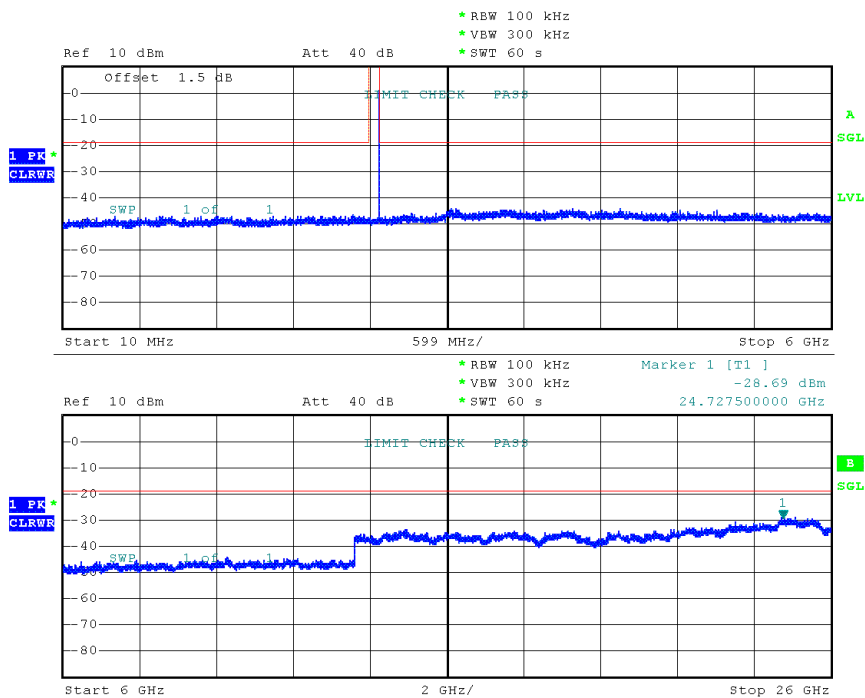
Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: 3-DH5, Channel: 39, 2441 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-28
 Max. in-band Frequency [MHz]: 2440.8
 Max. in-band Level [dBm/100 kHz]: 1.8
 Out-of-band Limit [dBm/100 kHz]: -18.2



Date: 28.NOV.2018 13:19:19

Conducted Spurious Emissions

Project Number: G0M-1810-7783
 Applicant: Panasonic Industrial Devices Europe GmbH
 Model Description: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9201A1EF
 Test Sample ID: 20576
 Reference Standards: FCC 15.247, RSS-247
 Reference Method: ANSI C63.10:2013, Section 7.8.8
 Operational Mode: 3-DH5, Channel: 78, 2480 MHz
 Operating Conditions: Tnom/Vnom
 Operator: Wilfried Treffke
 Test Site: Eurofins Product Service GmbH
 Test Date: 2018-11-28
 Max. in-band Frequency [MHz]: 2479.8
 Max. in-band Level [dBm/100 kHz]: 1.1
 Out-of-band Limit [dBm/100 kHz]: -18.9



Date: 28.NOV.2018 13:22:51

3.10 Test Conditions and Results - Transmitter radiated emissions

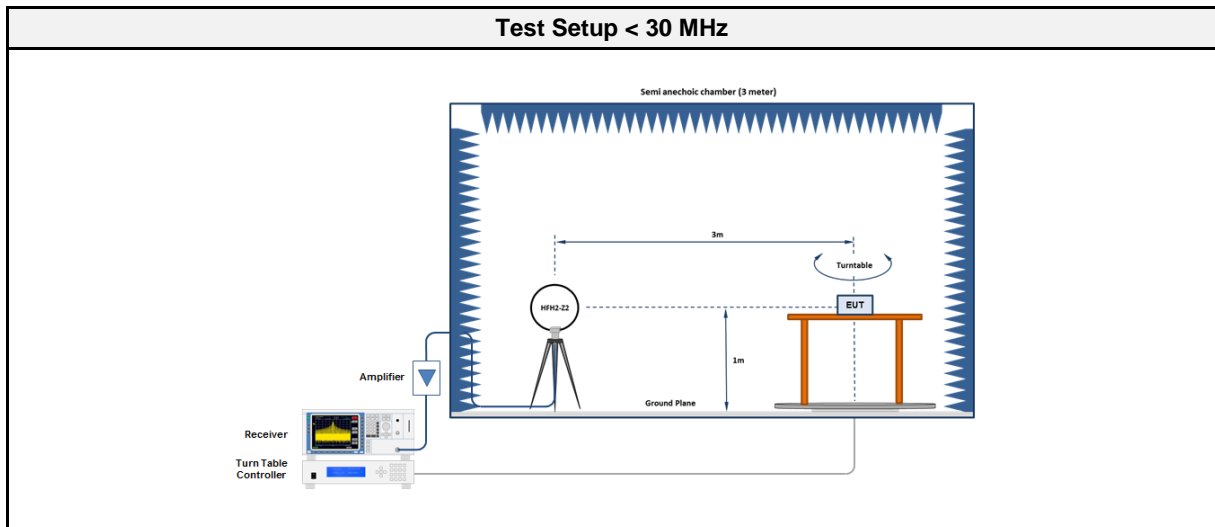
3.10.1 Information

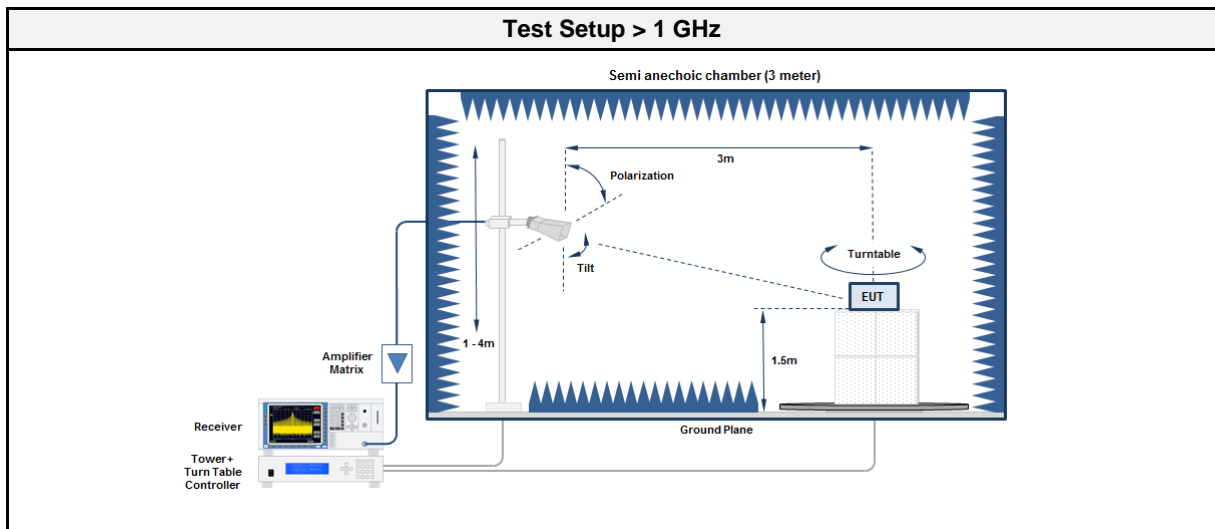
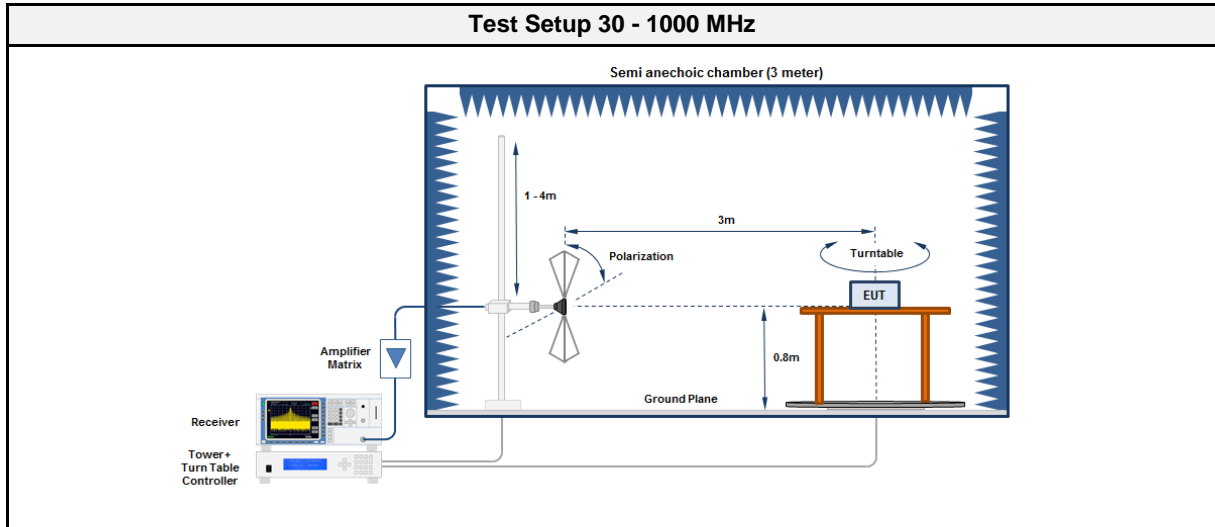
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISSED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6
Operator	Wilfried Treffke
Date	2018-11-05

3.10.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [$\mu\text{V}/\text{m}$]	Measurement distance [m]
0.009 - 0.09	Average	$2400/F[\text{kHz}]$	300
0.09 - 0.110	Quasi-Peak	$2400/F[\text{kHz}]$	300
0.110 - 0.490	Average	$2400/F[\text{kHz}]$	300
0.490 - 1.705	Quasi-Peak	$24000/F[\text{kHz}]$	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





3.10.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2015.2.4

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	R&S	VULB 9162	EF00978	2016-11	2019-11
Antenna	R&S	HK 116	EF00030	2016-04	2019-04
Antenna	R&S	HL 223	EF00212	2016-04	2019-04

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2016-09	2019-09
Antenna	Amplifier Research	AT4560	EF00302	2018-04	2019-04

3.10.5 Procedure

Test Procedure < 30 MHz
<ol style="list-style-type: none"> 1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT set to test mode 3. The EUT is rotated through 360° 4. The emissions are measured with peak detector and max hold 5. All significant emissions are measured again using the corresponding final detector

Test Procedure 30 - 1000 MHz
<ol style="list-style-type: none"> 1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT 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
<ol style="list-style-type: none"> 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 [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2402	73.65	30.00	Q-pk	ver	40.00	-10.00
2402	74.903	32.20	Q-pk	ver	40.00	-07.80
2402	247.36	38.59	pk	hor	46.00	-07.41
2402	249.92	32.36	pk	ver	46.00	-13.64
2402	407.36	32.82	pk	hor	46.00	-13.18
2402	407.36	30.78	pk	ver	46.00	-15.22
2402	1007.9	50.93	pk	ver	74.00	-23.07
2402	1007.9	48.22	avg	ver	54.00	-05.78
2402	1039.4	48.74	pk	ver	74.00	-25.26
2402	1039.4	47.19	avg	ver	54.00	-06.81
2402	1499.9	49.20	pk	ver	74.00	-24.80
2402	1499.9	45.51	avg	ver	54.00	-08.49
2402	1500	43.83	pk	hor	74.00	-30.17
2402	1583.1	42.90	pk	hor	74.00	-31.10
2402	2380.6	51.43	pk	ver	74.00	-22.57
2402	2380.6	38.37	avg	ver	54.00	-15.63
2402	2389.1	50.22	pk	hor	74.00	-23.78
2402	2389.1	38.37	avg	hor	54.00	-15.63
2402	4803	43.15	pk	hor	74.00	-30.85
2402	4804	41.95	pk	hor	74.00	-32.05
2402	4804	39.56	avg	hor	54.00	-14.44
2441	1000	51.37	pk	ver	74.00	-22.63
2441	1000	48.26	avg	ver	54.00	-05.74
2441	1039.5	54.03	pk	ver	74.00	-19.97
2441	1039.5	53.14	avg	ver	54.00	-00.86
2441	1500	52.62	pk	ver	74.00	-21.38
2441	1500	48.75	avg	ver	54.00	-05.25
2441	4877	43.05	pk	hor	74.00	-30.95
2480	4960	46.15	pk	hor	74.00	-27.85

Test Results - 2-DH5						
Channel [MHz]	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2402	1038	44.09	pk	hor	74.00	-29.91
2402	1500	43.44	pk	hor	74.00	-30.56
2402	2389.1	51.02	pk	hor	74.00	-22.98
2402	2389.1	38.45	avg	hor	54.00	-15.55
2402	4800	47.29	pk	hor	74.00	-26.71
2402	4800	41.25	pk	ver	74.00	-32.75
2441	4877	46.00	pk	hor	74.00	-28.00

3.11 Test Conditions and Results - Receiver radiated emissions

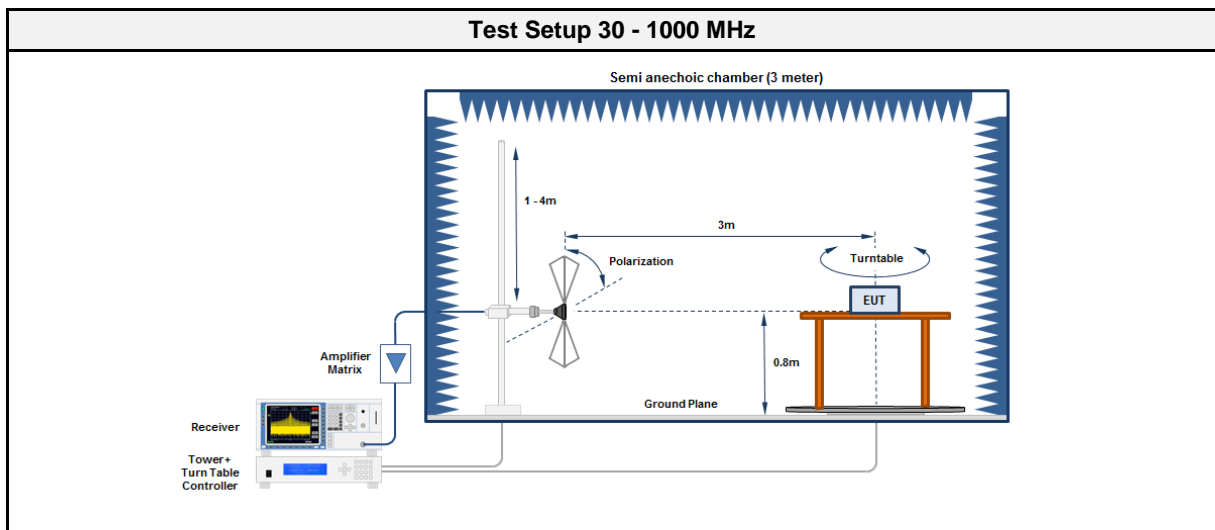
3.11.1 Information

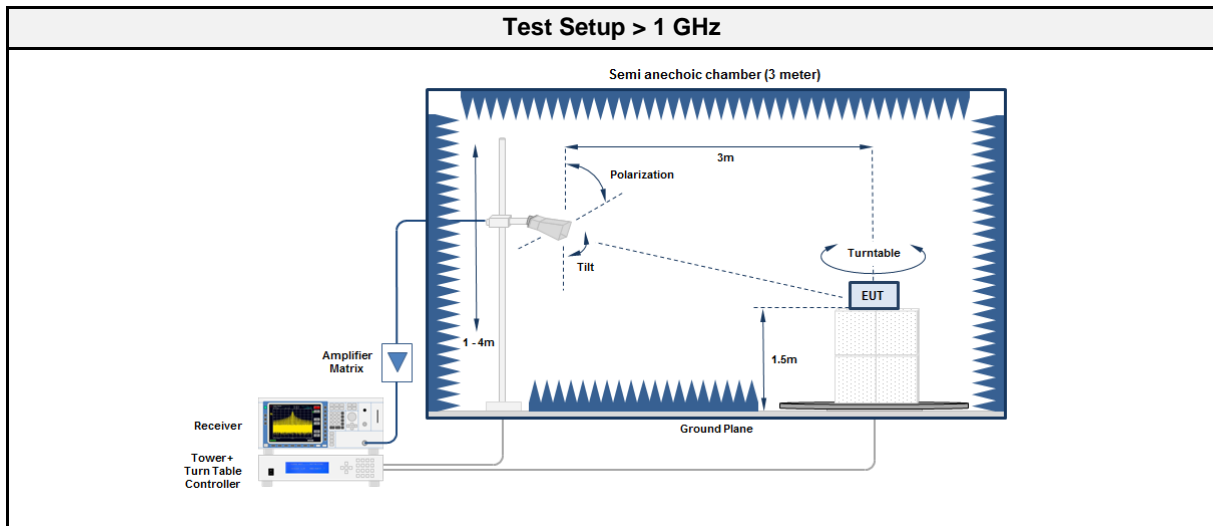
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.5, 6.6
Operator	Wilfried Treffke
Date	2018-11-08

3.11.2 Limits

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

3.11.3 Setup





3.11.4 Equipment

Test Software			
Description	Manufacturer	Name	Version
EMC Software	DARE Instruments	RadiMation	2015.2.4

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	R&S	VULB 9162	EF00978	2016-11	2019-11
Antenna	R&S	HK 116	EF00030	2016-04	2019-04
Antenna	R&S	HL 223	EF00212	2016-04	2019-04

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2018-08	2019-08
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2016-09	2019-09
Antenna	Amplifier Research	AT4560	EF00302	2018-04	2019-04

3.11.5 Procedure

Test Procedure 30 - 1000 MHz
<ol style="list-style-type: none"> 1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground 2. EUT 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 [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Margin [dB]
2441	30.611	37.54	qpk	hor	40.00	-02.46
2441	31.088	34.22	qpk	ver	40.00	-05.78
2441	49.491	37.50	qpk	ver	40.00	-02.50
2441	544.32	39.89	pk	ver	46.00	-06.11
2441	544.482	40.35	qpk	hor	46.00	-05.65
2441	643.476	42.30	qpk	ver	46.00	-03.70
2441	643.482	42.21	qpk	hor	46.00	-03.79
2441	741.44	39.73	pk	ver	46.00	-06.27
2441	742.474	41.33	qpk	hor	46.00	-04.67
2441	841.28	37.61	pk	hor	46.00	-08.39
2441	841.47	41.80	qpk	ver	46.00	-04.20
2441	939.84	39.31	pk	ver	46.00	-06.69
2441	940.465	41.72	qpk	hor	46.00	-04.28
2441	7688	51.10	pk	hor	53.98	-02.88
2441	7824	51.10	pk	ver	53.98	-02.88
2441	14310	49.46	pk	hor	53.98	-04.52

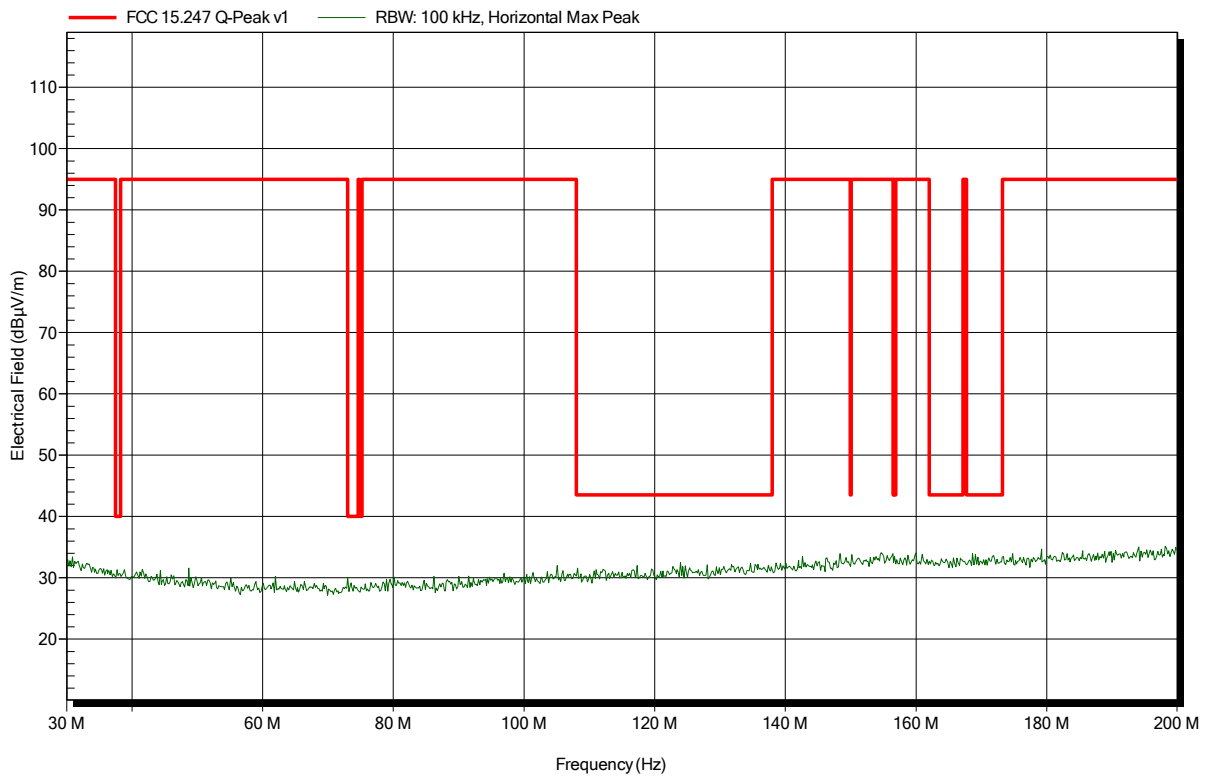
ANNEX A Transmitter spurious emissions

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 3

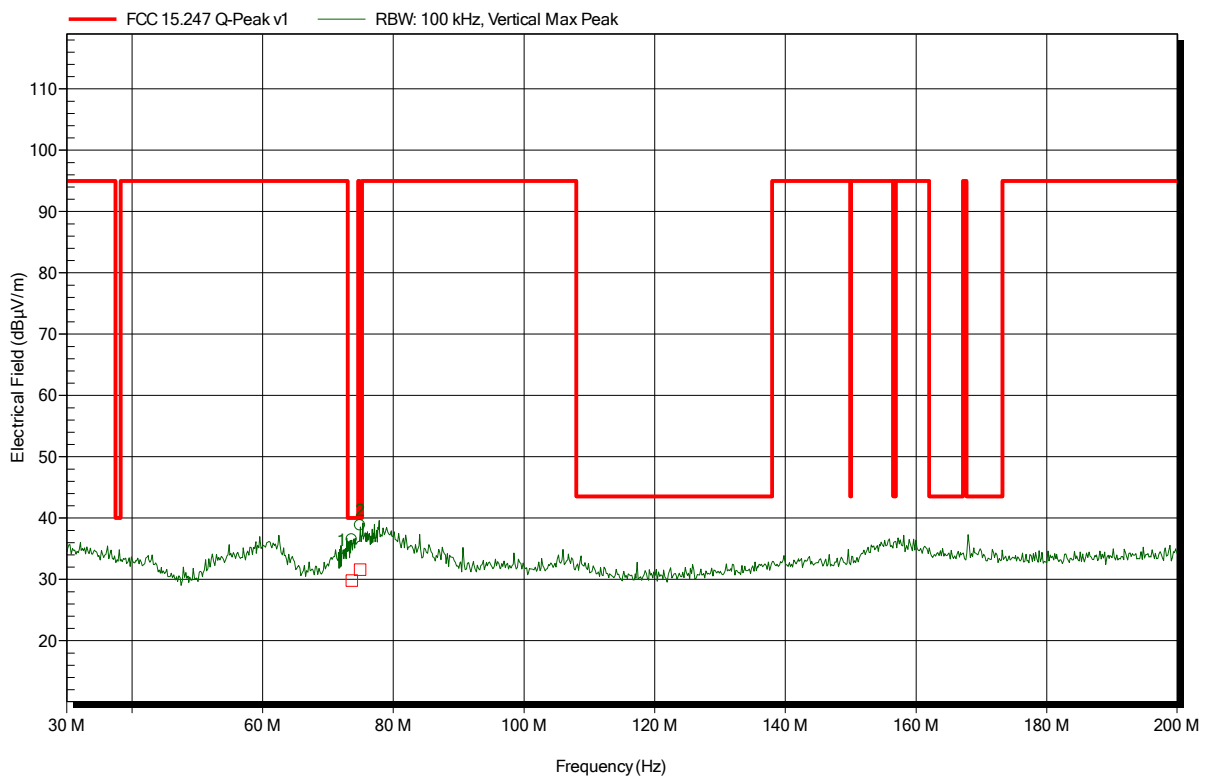


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 4



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
73.65 MHz	36.51 dBµV/m	40 dBµV/m	-3.49 dB	Pass
74.903 MHz	38.83 dBµV/m	40 dBµV/m	-1.17 dB	Pass

Frequency	Q-Peak	Q-Peak Limit	Q-Peak Difference	Q-Peak Status
73.65 MHz	30.00 dBµV/m	40 dBµV/m	-10.00 dB	Pass
74.903 MHz	32.20 dBµV/m	40 dBµV/m	-7.80 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 1



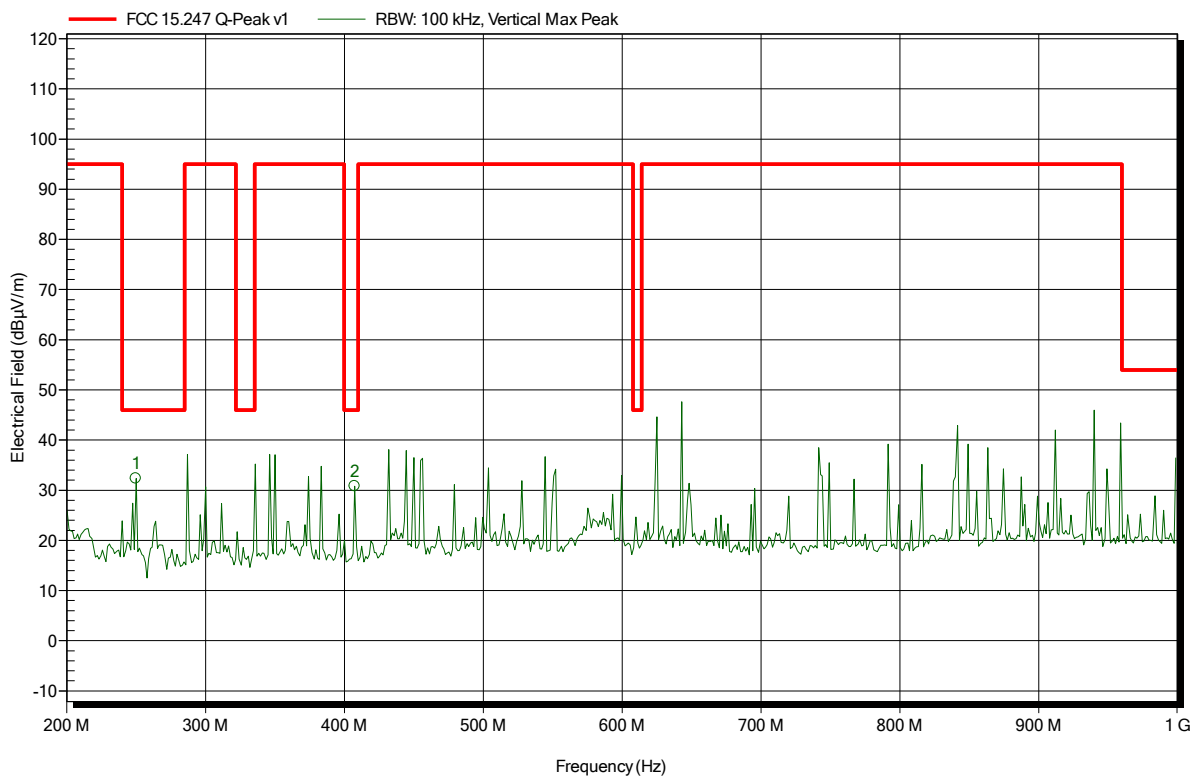
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
247.36 MHz	38.59 dBµV/m	46 dBµV/m	-7.41 dB	Pass
407.36 MHz	32.82 dBµV/m	46 dBµV/m	-13.18 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 2



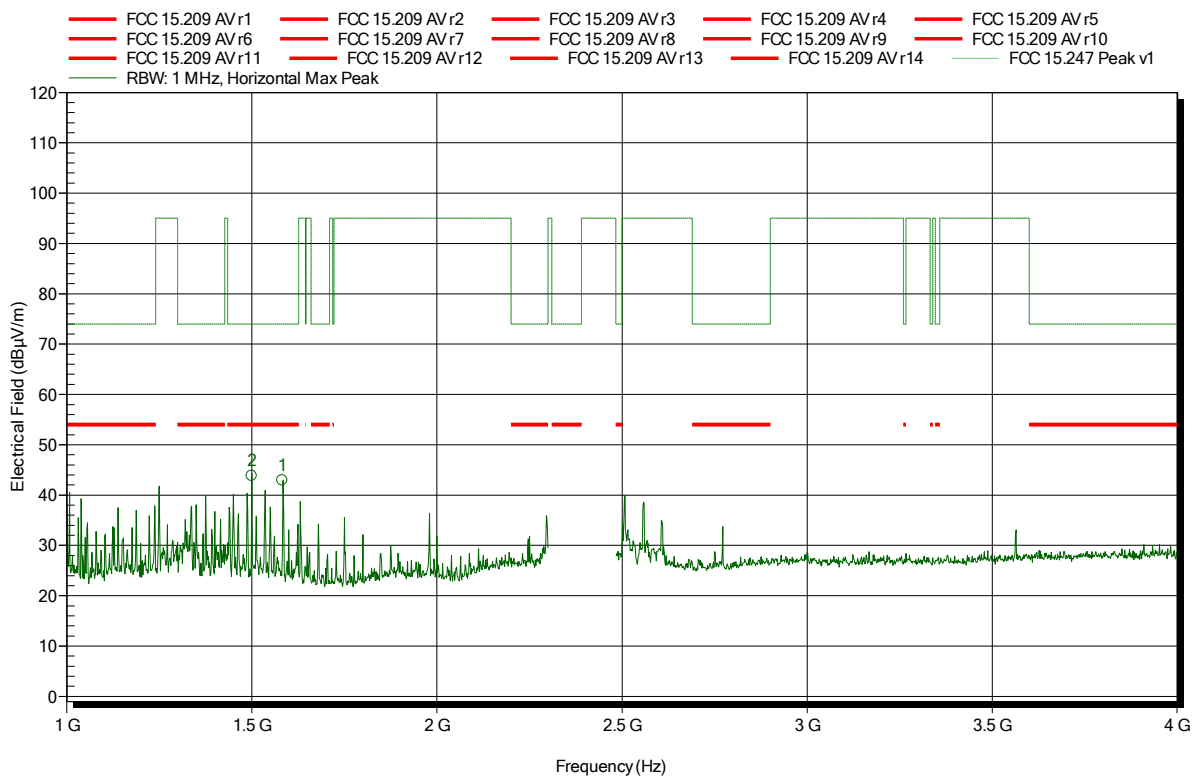
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
249.92 MHz	32.36 dBµV/m	46 dBµV/m	-13.64 dB	Pass
407.36 MHz	30.78 dBµV/m	46 dBµV/m	-15.22 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 5



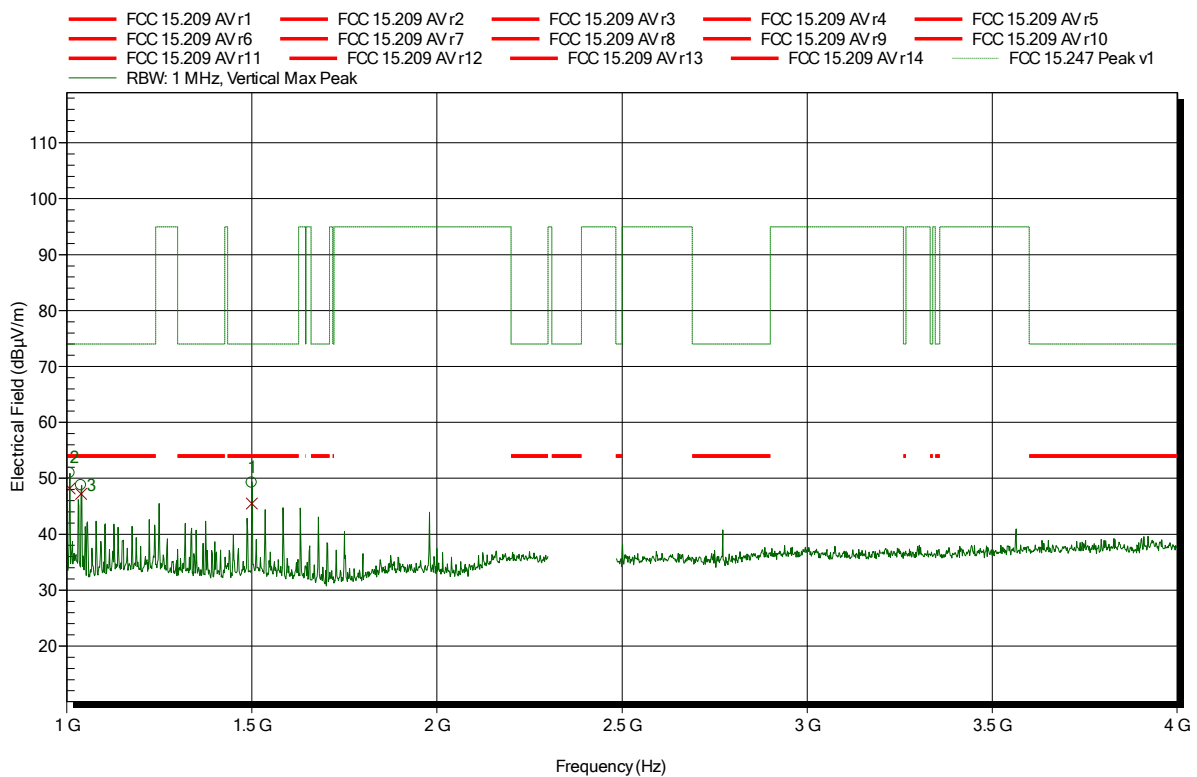
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.5 GHz	43.83 dBµV/m	74 dBµV/m	-30.17 dB	Pass
1.5831 GHz	42.9 dBµV/m	74 dBµV/m	-31.1 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 10



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.0079 GHz	50.93 dBµV/m	74 dBµV/m	-23.07 dB	Pass
1.0394 GHz	48.74 dBµV/m	74 dBµV/m	-25.26 dB	Pass
1.4999 GHz	49.2 dBµV/m	74 dBµV/m	-24.8 dB	Pass

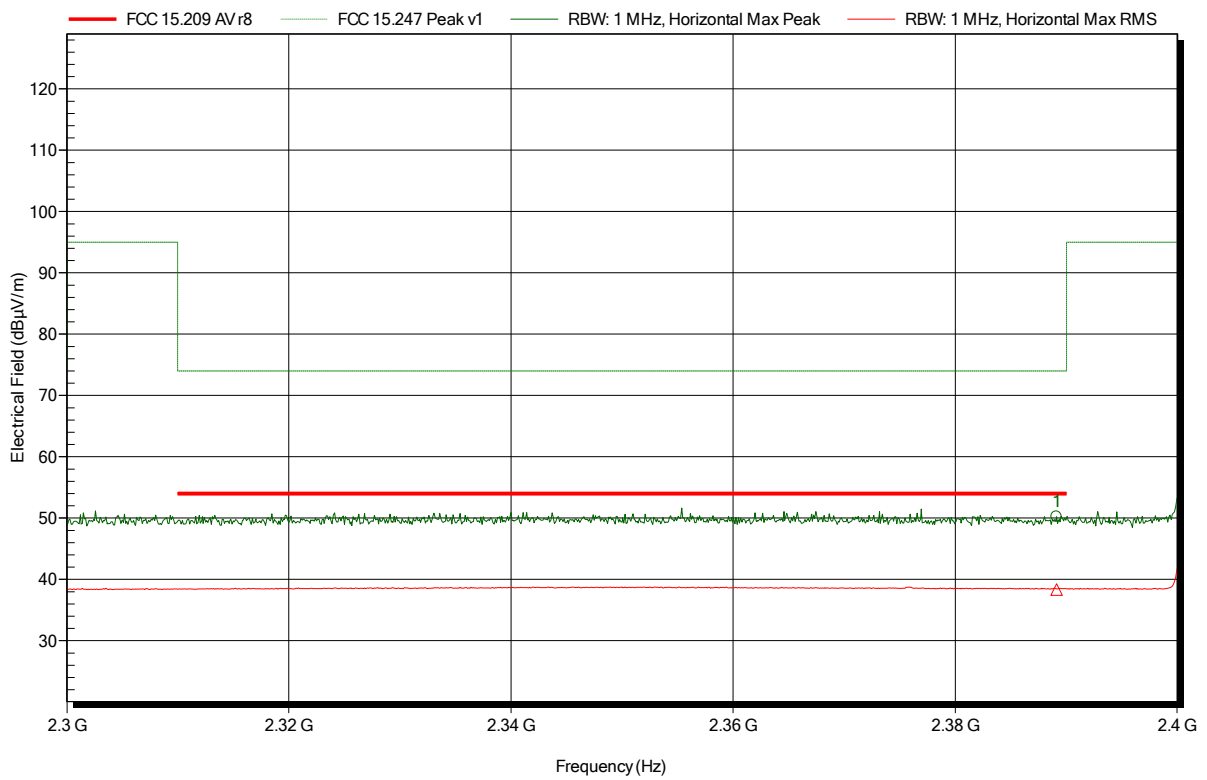
Frequency	Average	Average Limit	Average Difference	Average Status
1.0079 GHz	48.22 dBµV/m	54 dBµV/m	-5.78 dB	Pass
1.0394 GHz	47.19 dBµV/m	54 dBµV/m	-6.81 dB	Pass
1.4999 GHz	45.51 dBµV/m	54 dBµV/m	-8.49 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note: lower bandedge

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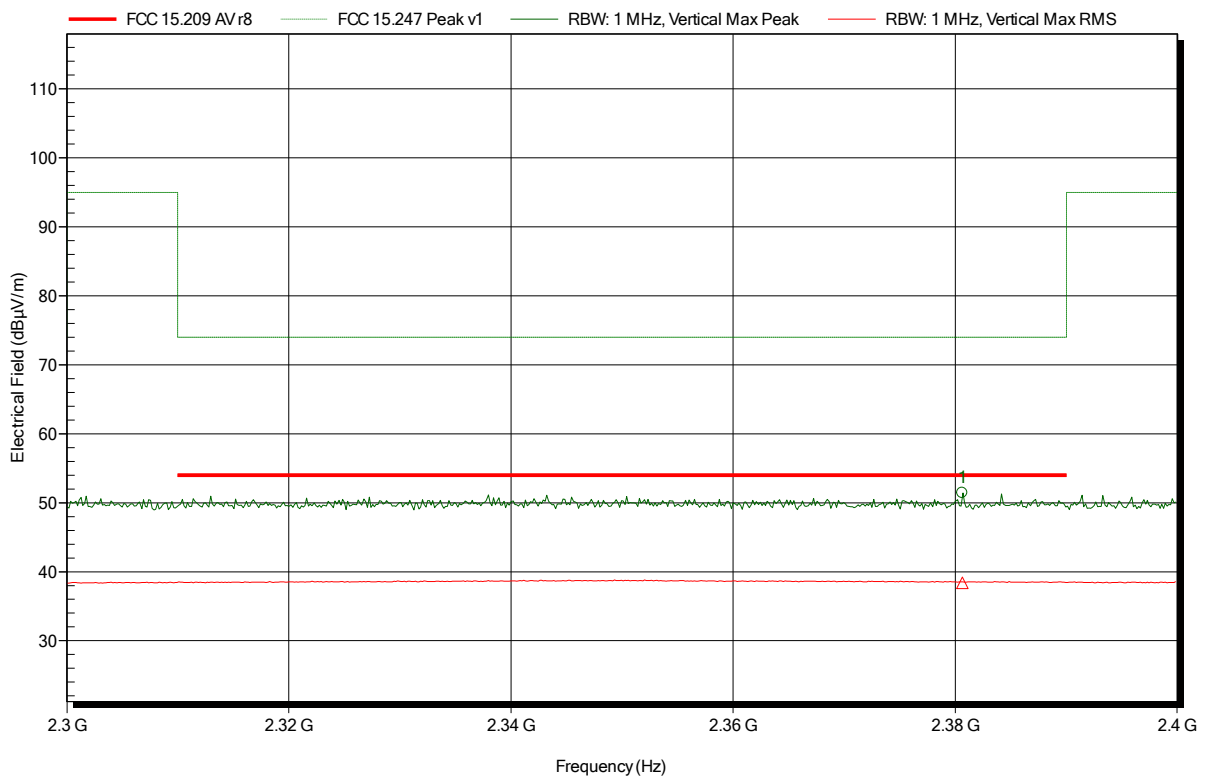
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3891 GHz	50.22 dBµV/m	74 dBµV/m	-23.78 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.3891 GHz	38.37 dBµV/m	54 dBµV/m	-15.63 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-08
 Note: lower bandedge

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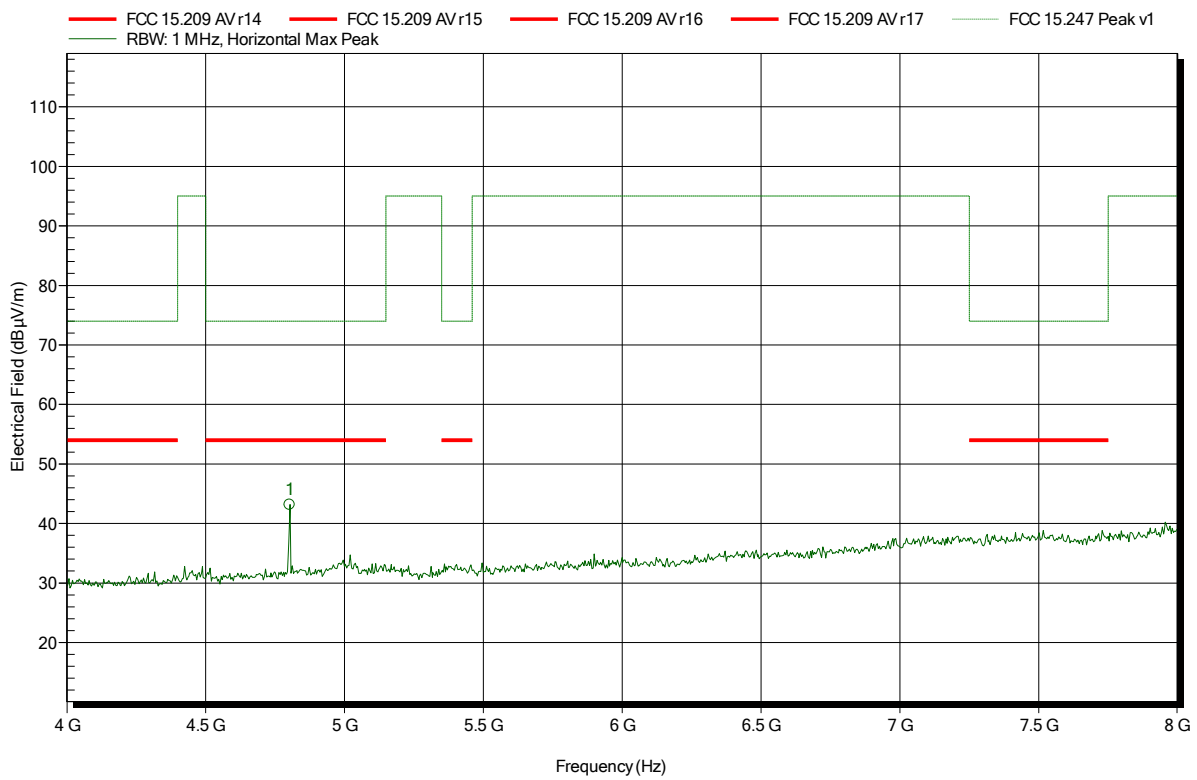
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3806 GHz	51.43 dBµV/m	74 dBµV/m	-22.57 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.3806 GHz	38.37 dBµV/m	54 dBµV/m	-15.63 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

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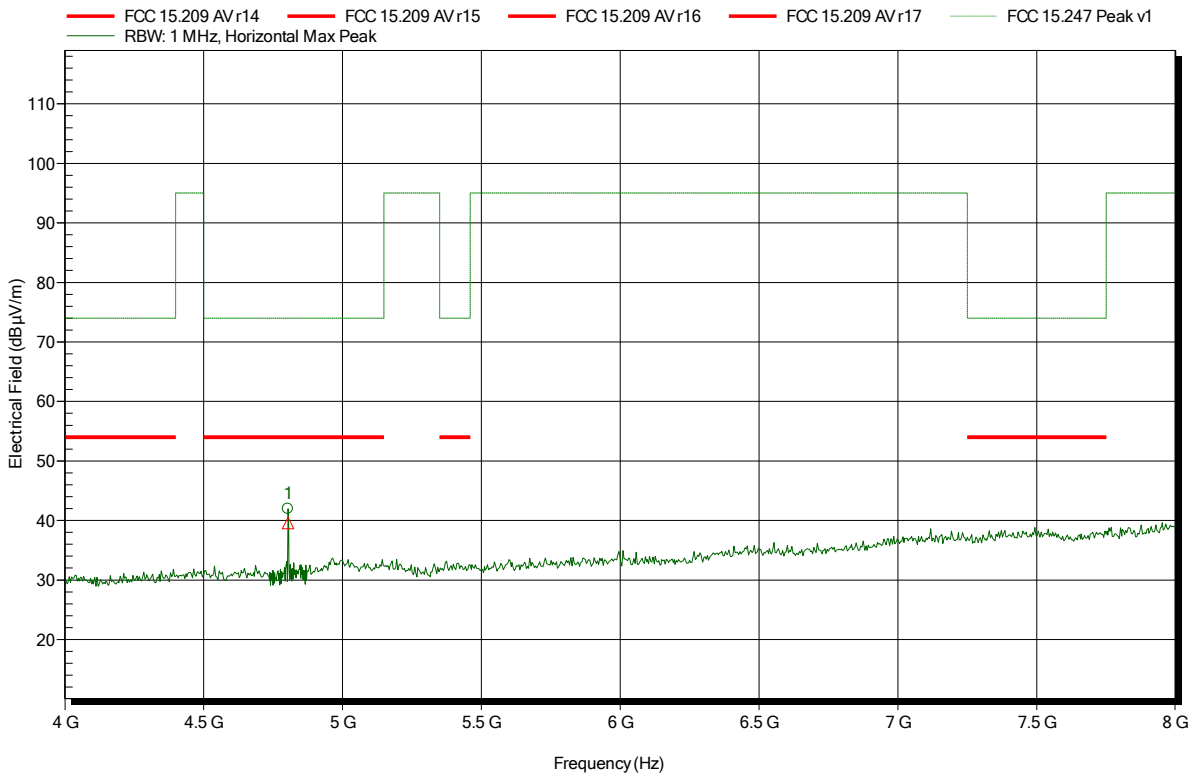
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.803 GHz	43.15 dBµV/m	74 dBµV/m	-30.85 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note: vertical

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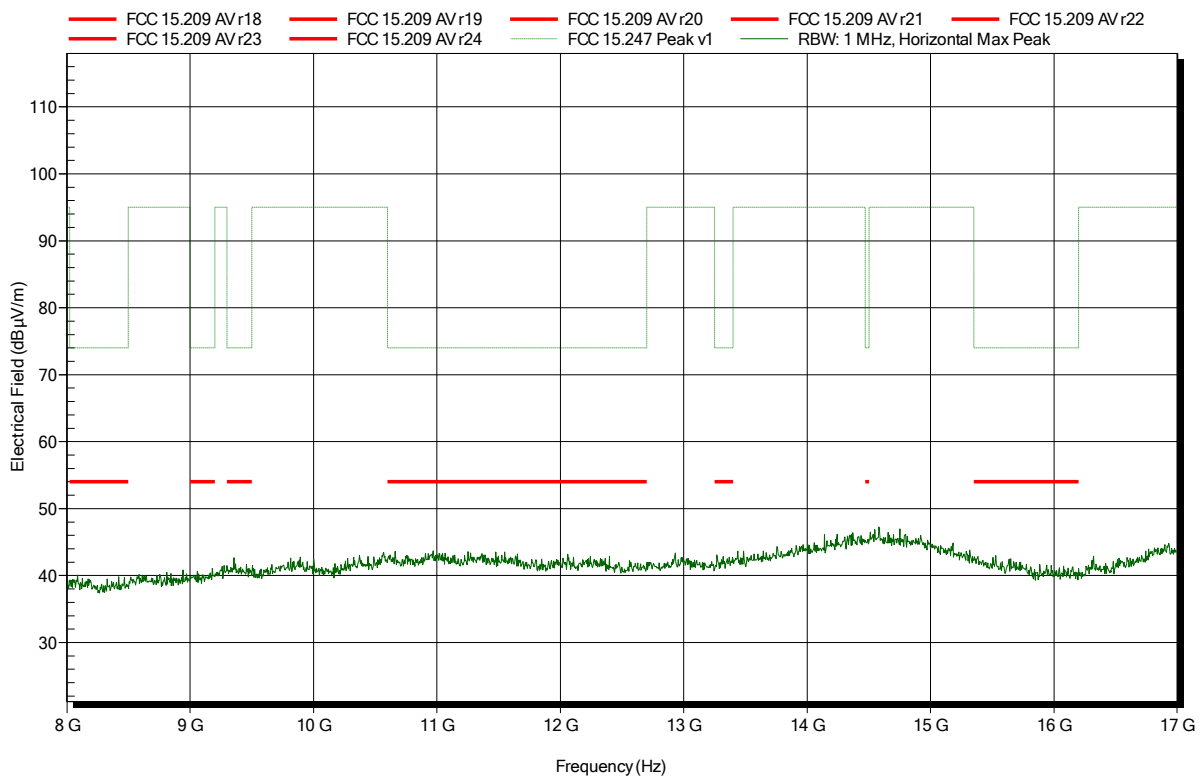
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.804 GHz	41.95 dBµV/m	74 dBµV/m	-32.05 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
4.804 GHz	39.56 dBµV/m	54 dBµV/m	-14.44 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

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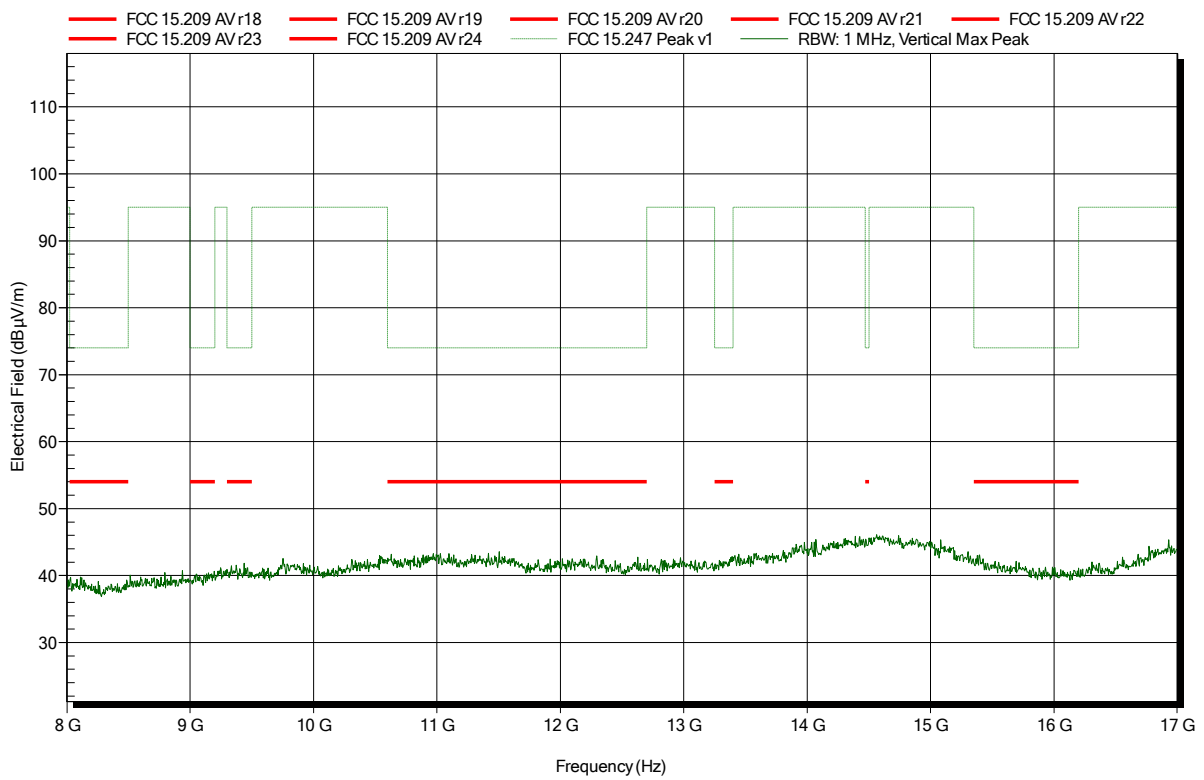


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

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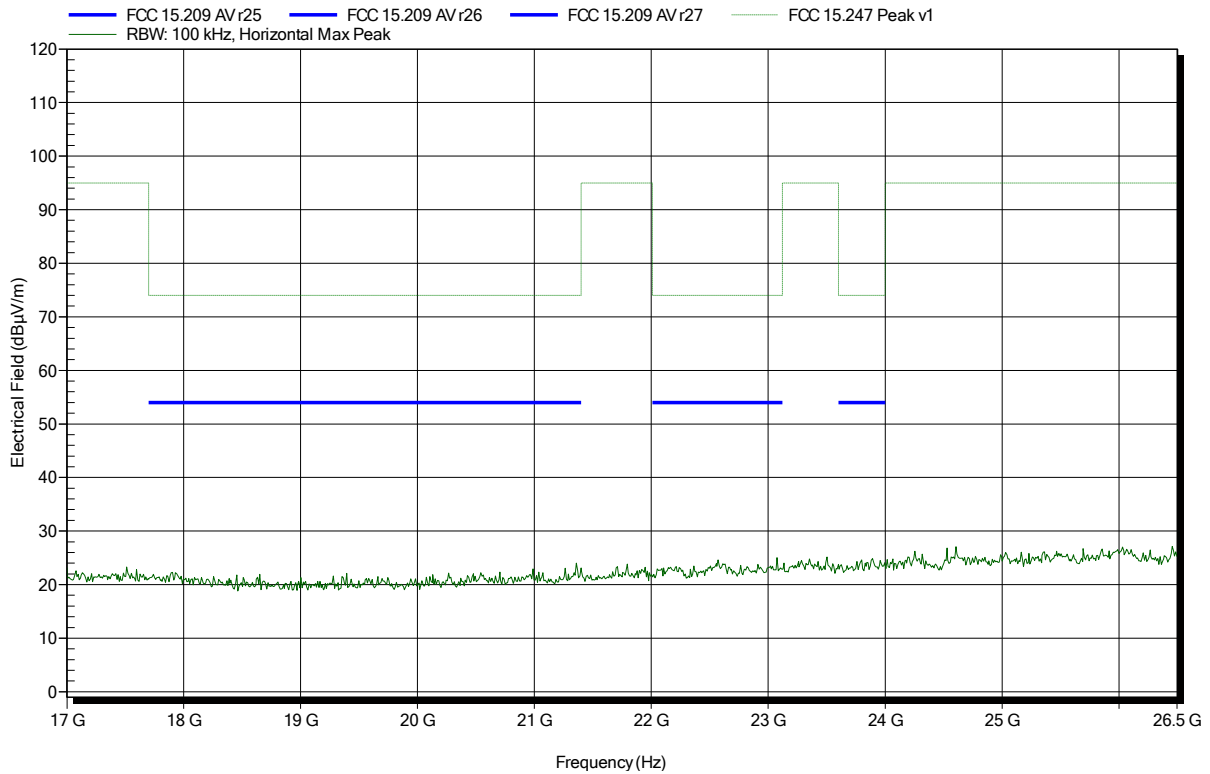


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
 Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

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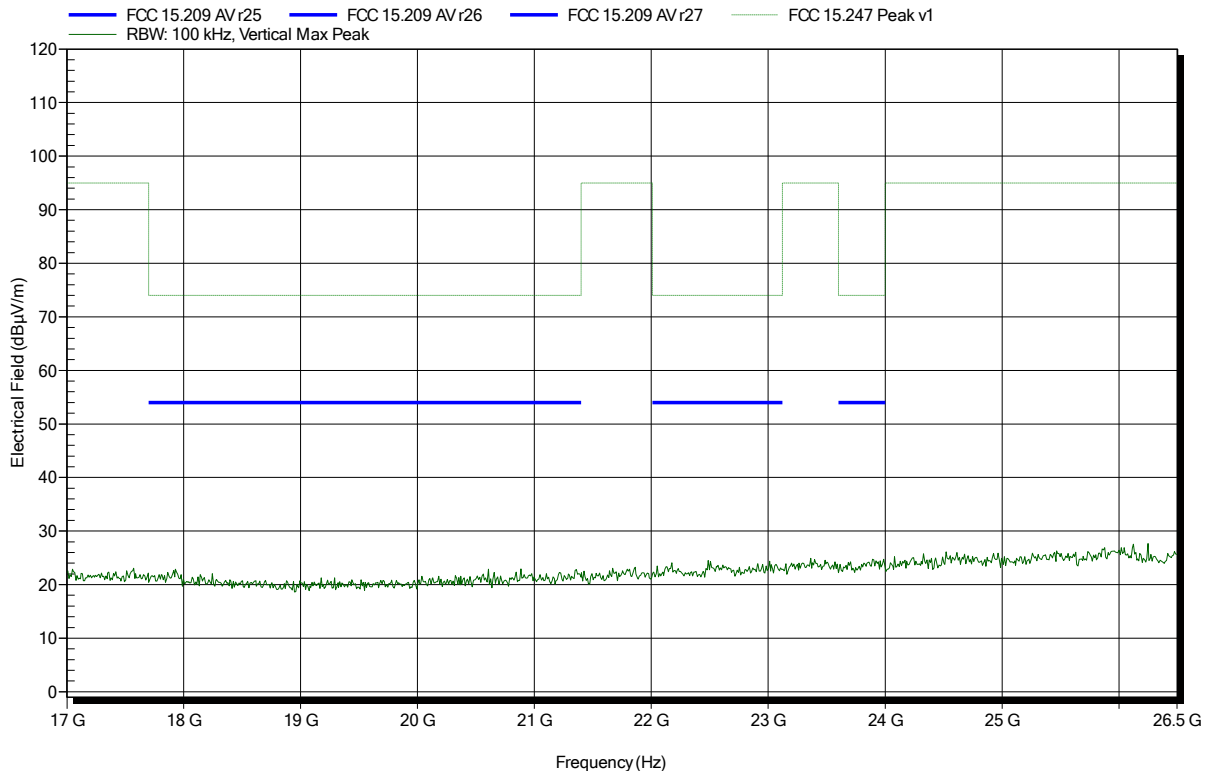


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
 Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2402 MHz
 Test Date: 2018-11-05
 Note:

Index 13

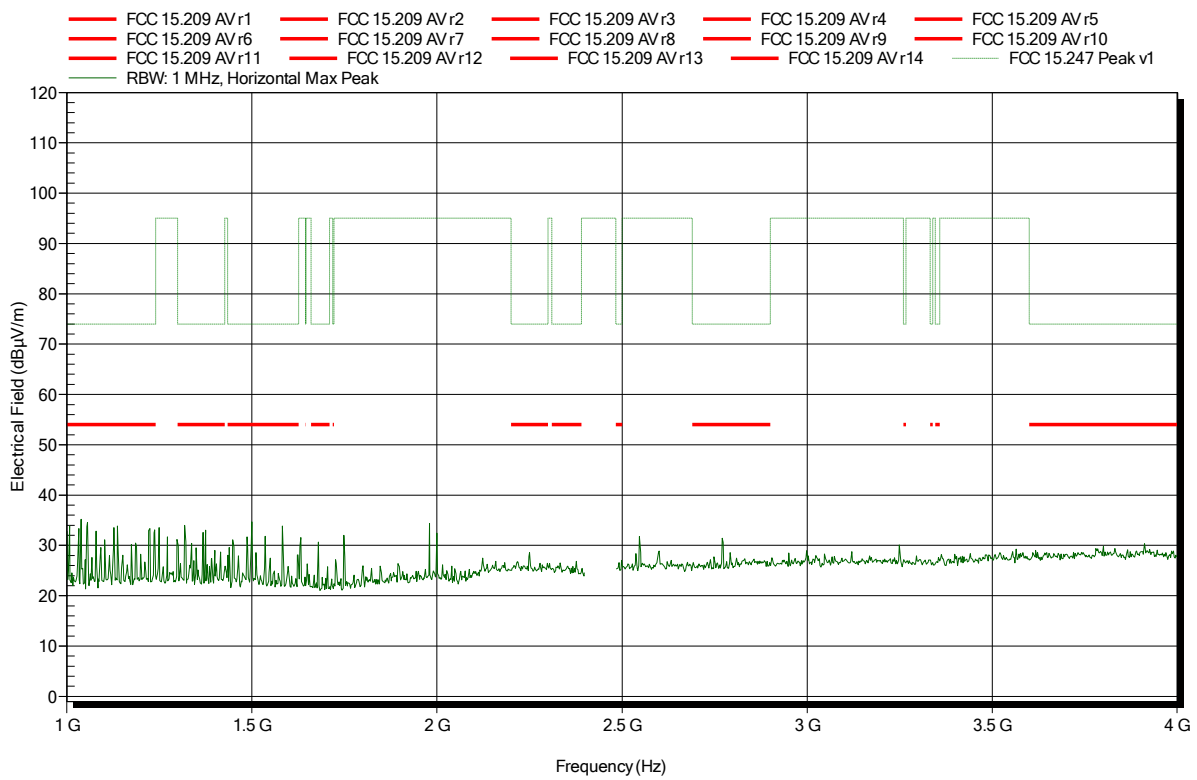


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-08
 Note:

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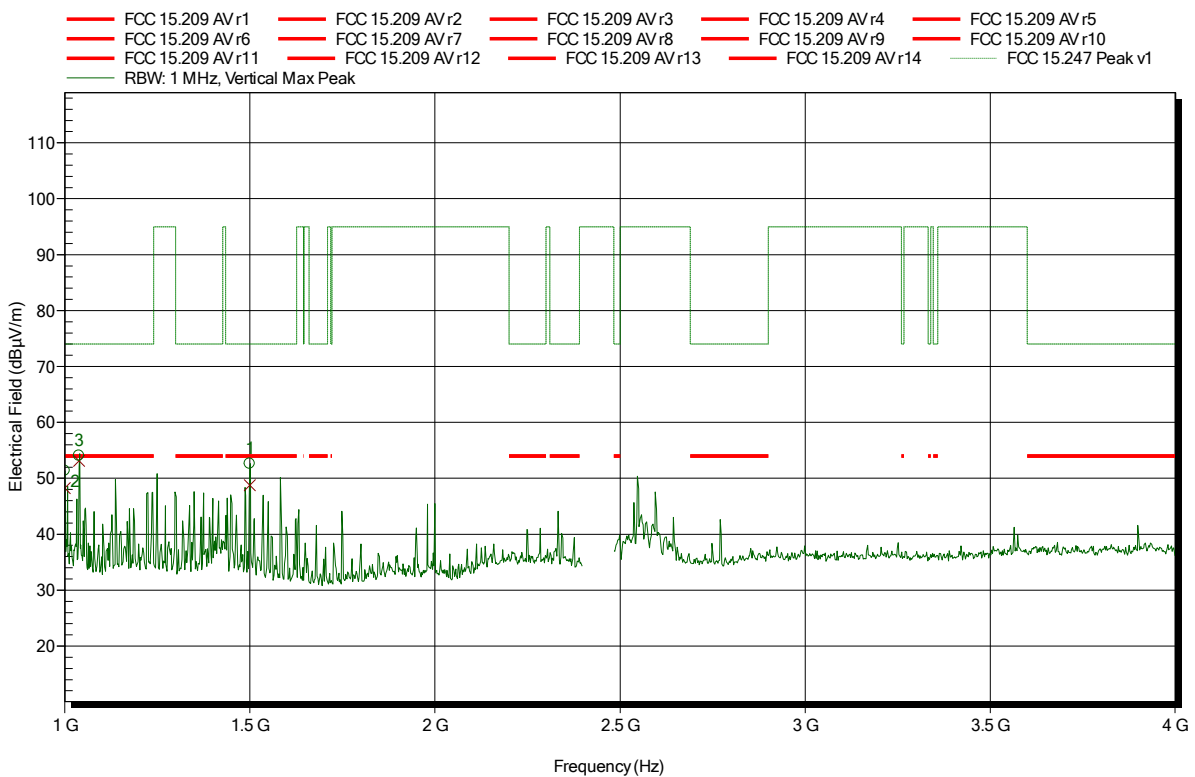


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-08
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1 GHz	51.37 dBµV/m	74 dBµV/m	-22.63 dB	Pass
1.0395 GHz	54.03 dBµV/m	74 dBµV/m	-19.97 dB	Pass
1.5 GHz	52.62 dBµV/m	74 dBµV/m	-21.38 dB	Pass

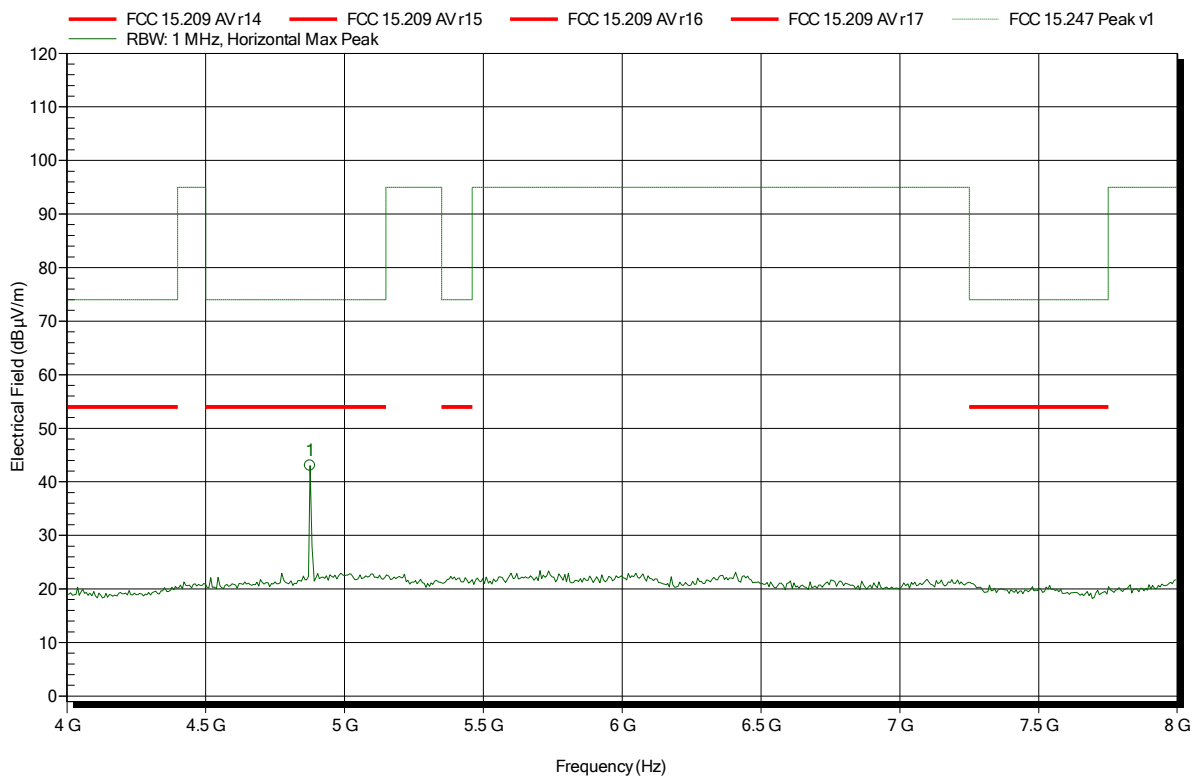
Frequency	Average	Average Limit	Average Difference	Average Status
1 GHz	48.26 dBµV/m	54 dBµV/m	-5.74 dB	Pass
1.0395 GHz	53.14 dBµV/m	54 dBµV/m	-0.86 dB	Pass
1.5 GHz	48.75 dBµV/m	54 dBµV/m	-5.25 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-08
 Note:

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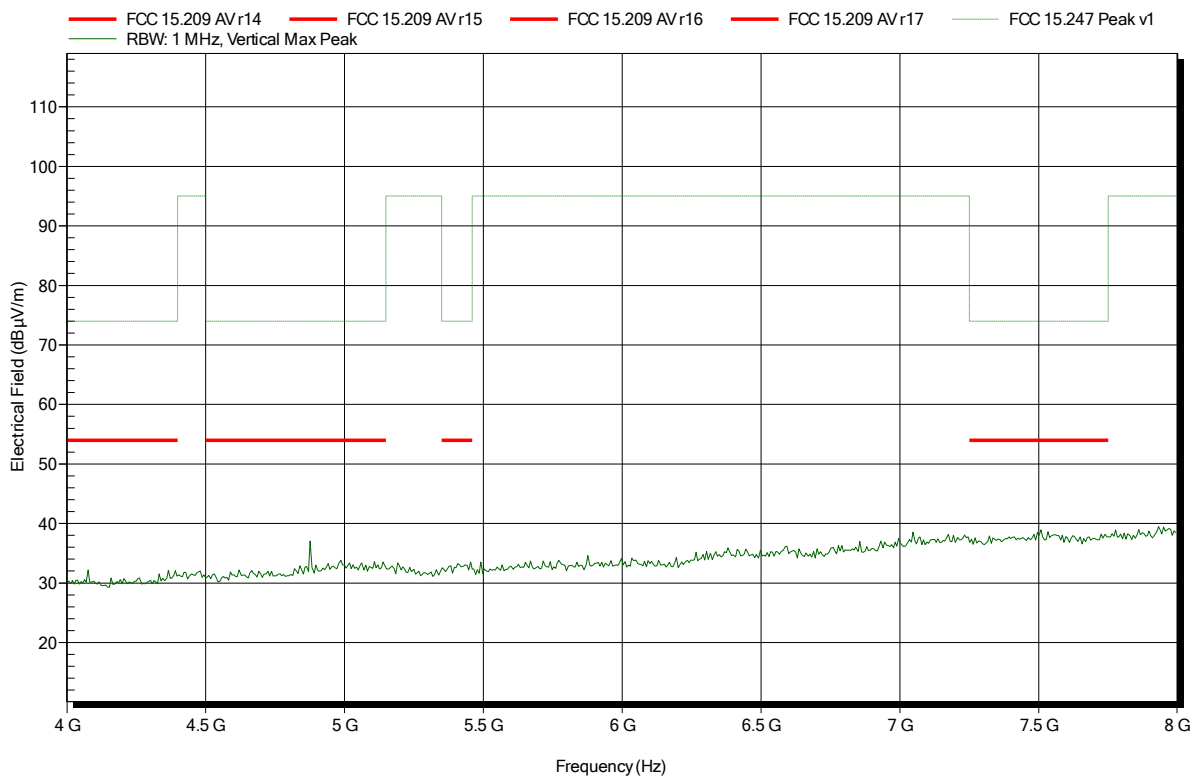
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.877 GHz	43.05 dBµV/m	74 dBµV/m	-30.95 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-09
 Note:

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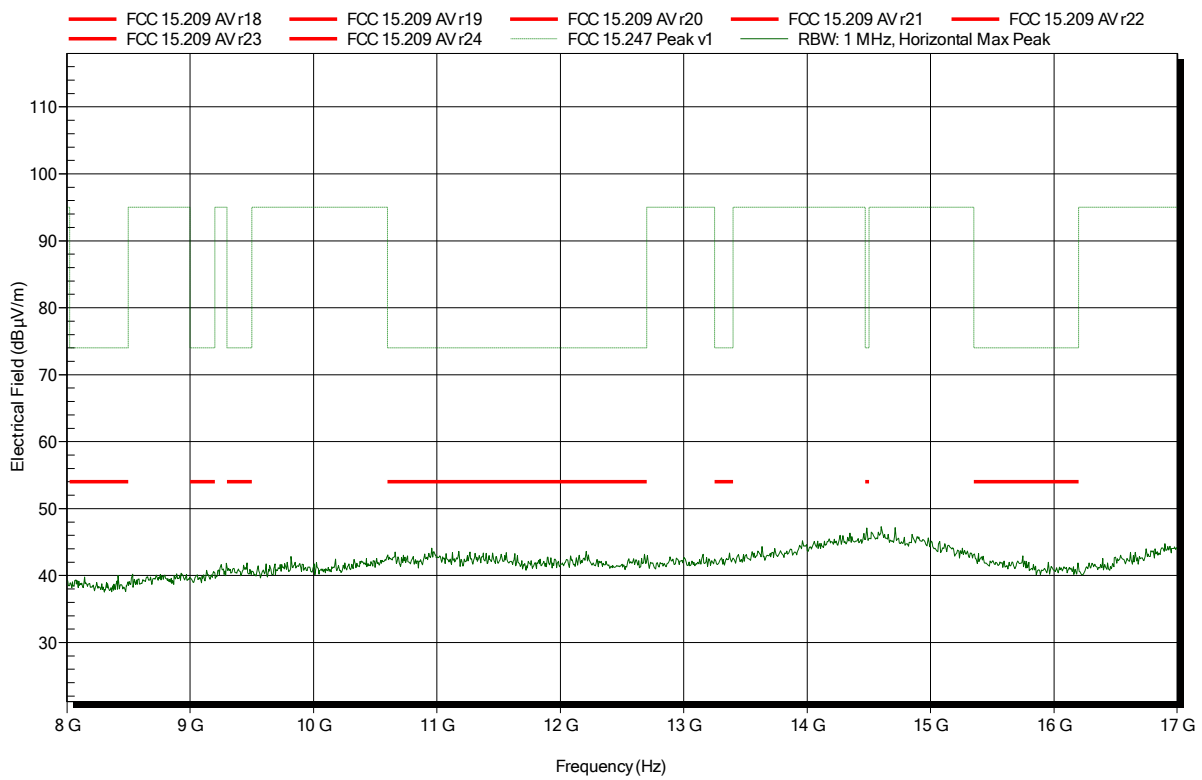


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-08
 Note:

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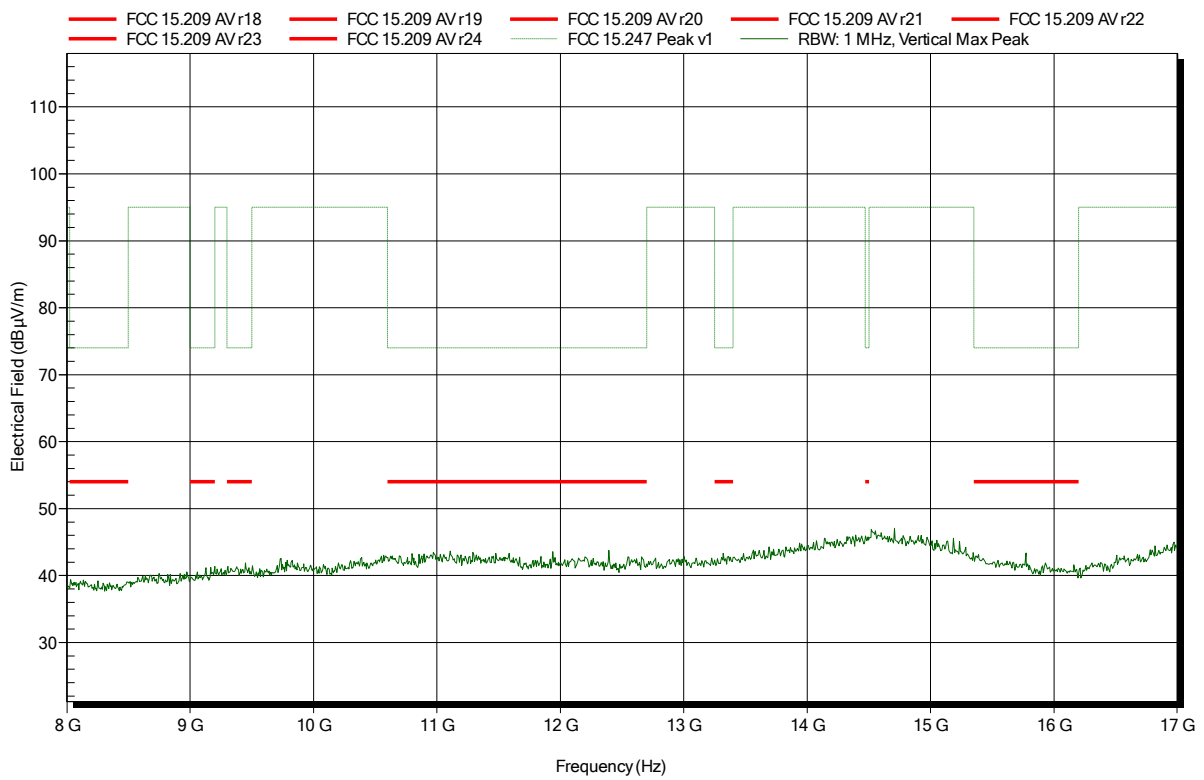


Spurious emissions according to FCC 15.247

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Applicant: Panasonic Industrial Devices Europe GmbH
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 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-08
 Note:

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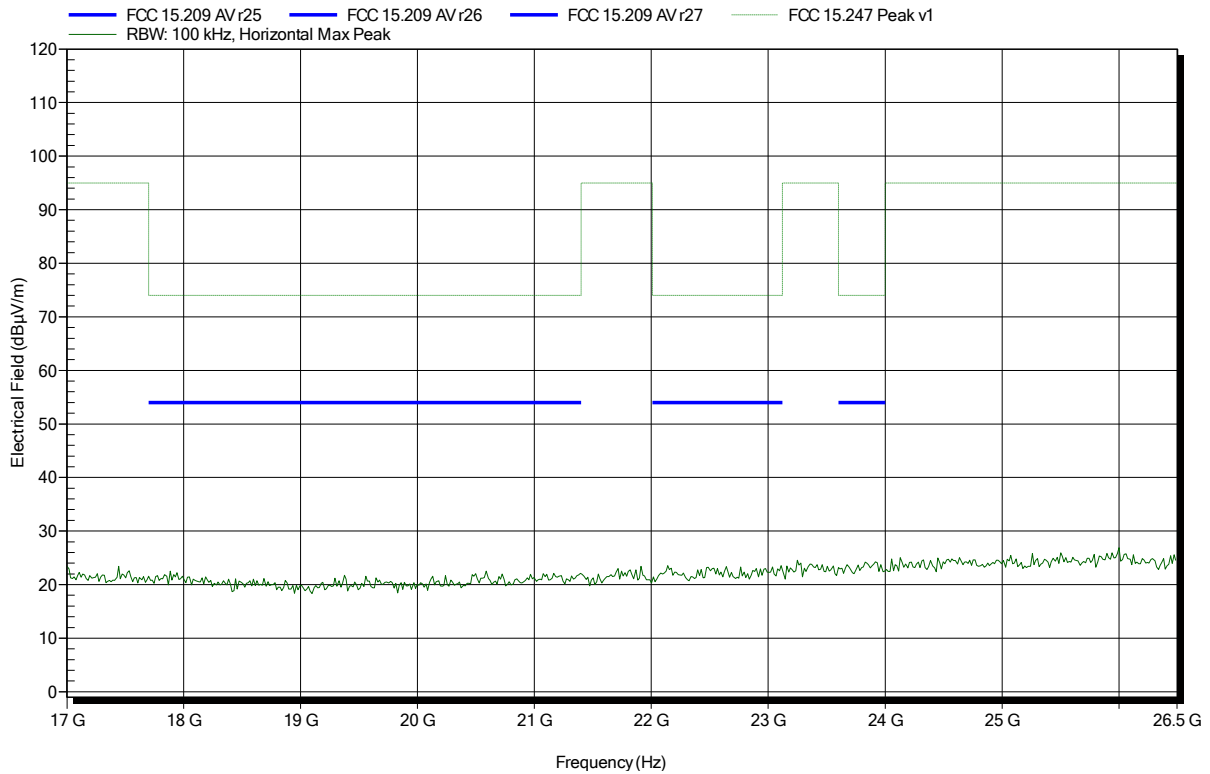


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 24°C, Vnom: 3.3 VDC
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),
 Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-09
 Note:

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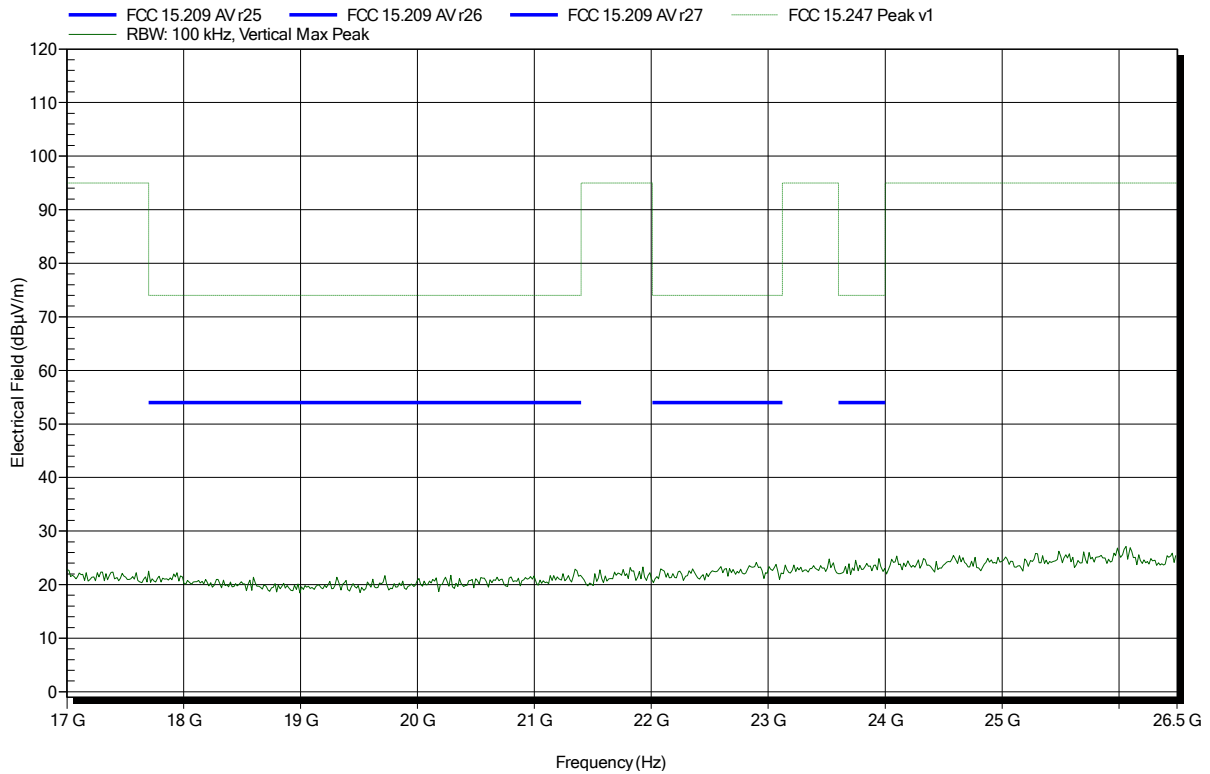


Spurious emissions according to FCC 15.247

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 Operator: Wilfried Treffke
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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2441 MHz
 Test Date: 2018-11-08
 Note:

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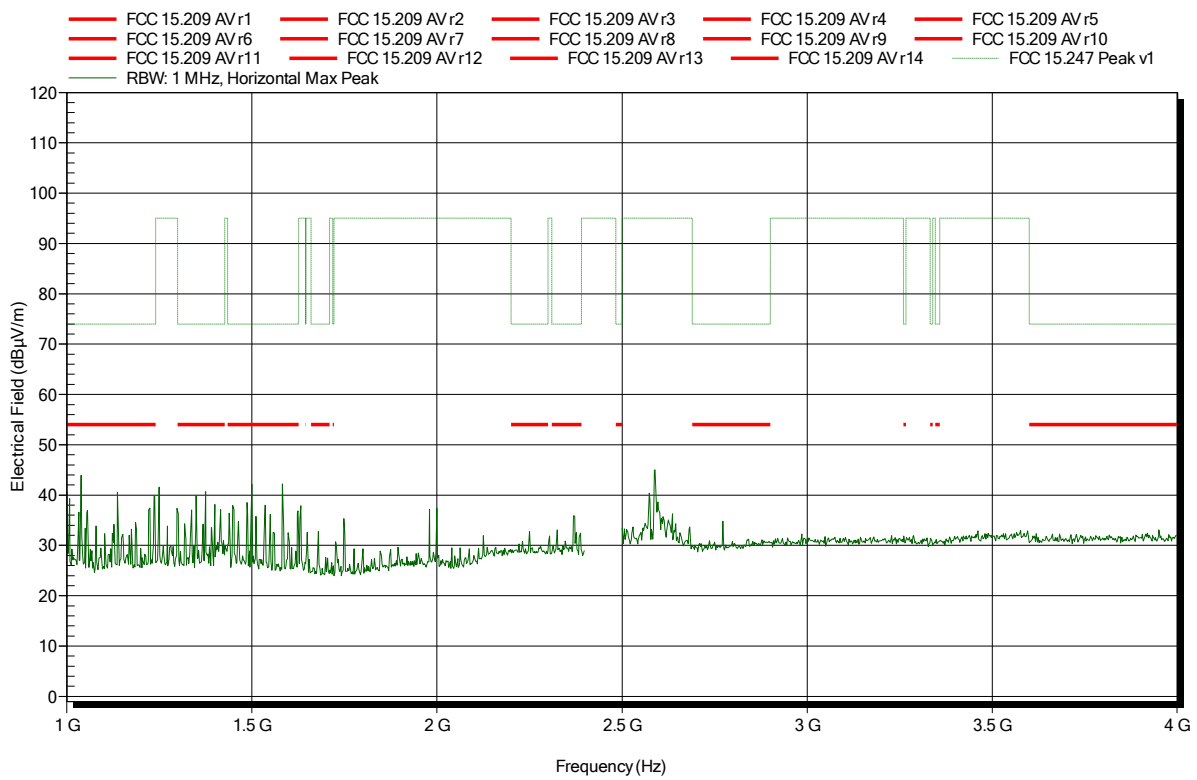


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

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 Operator: Wilfried Treffke
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 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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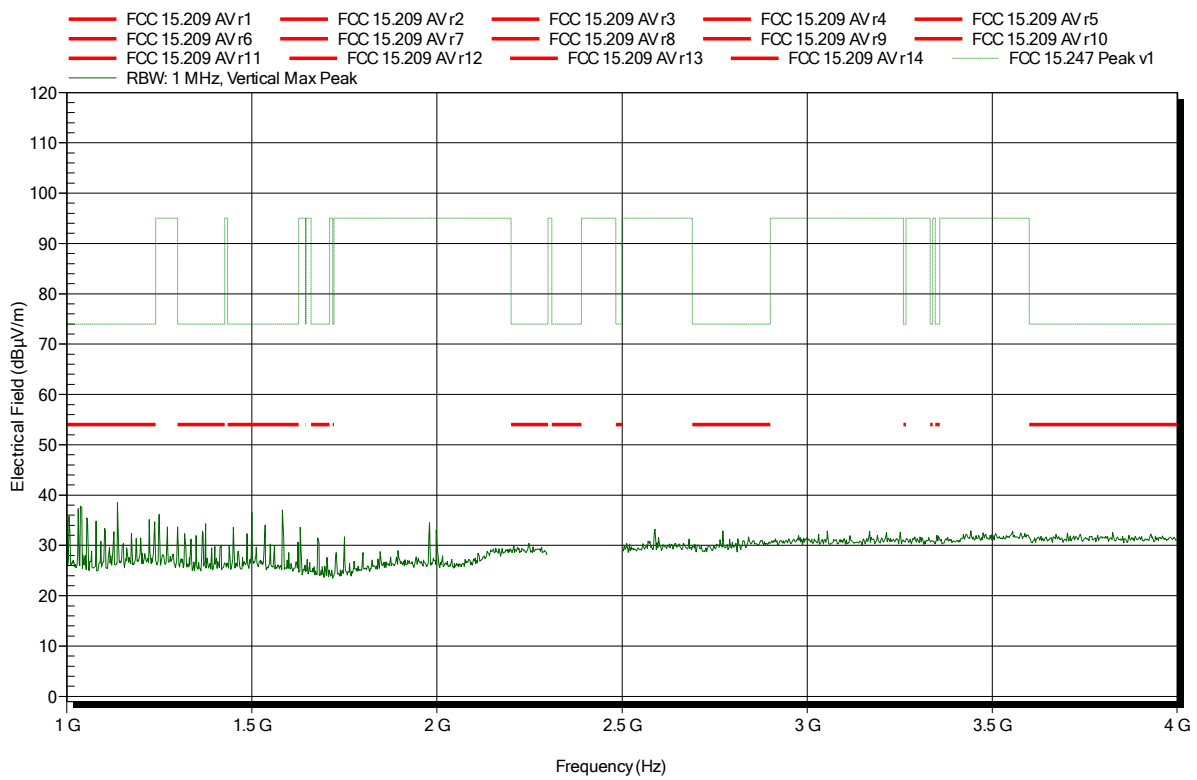


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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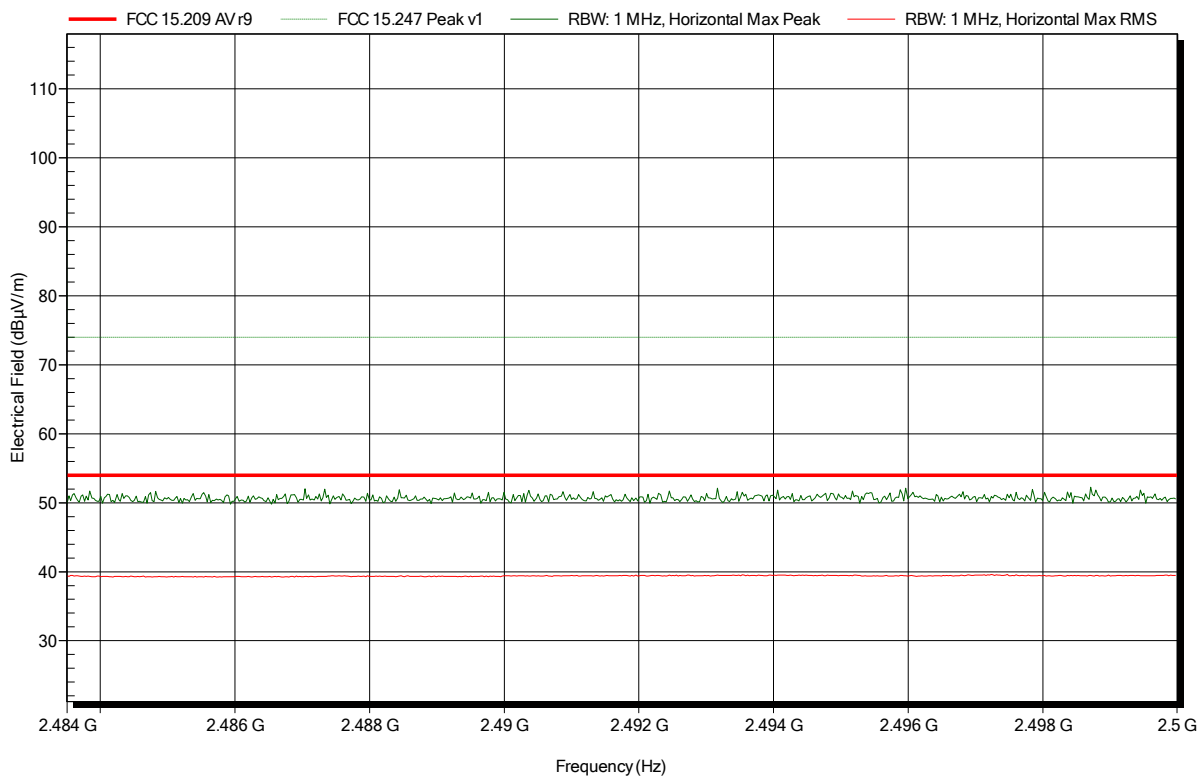


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 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note: upper bandedge

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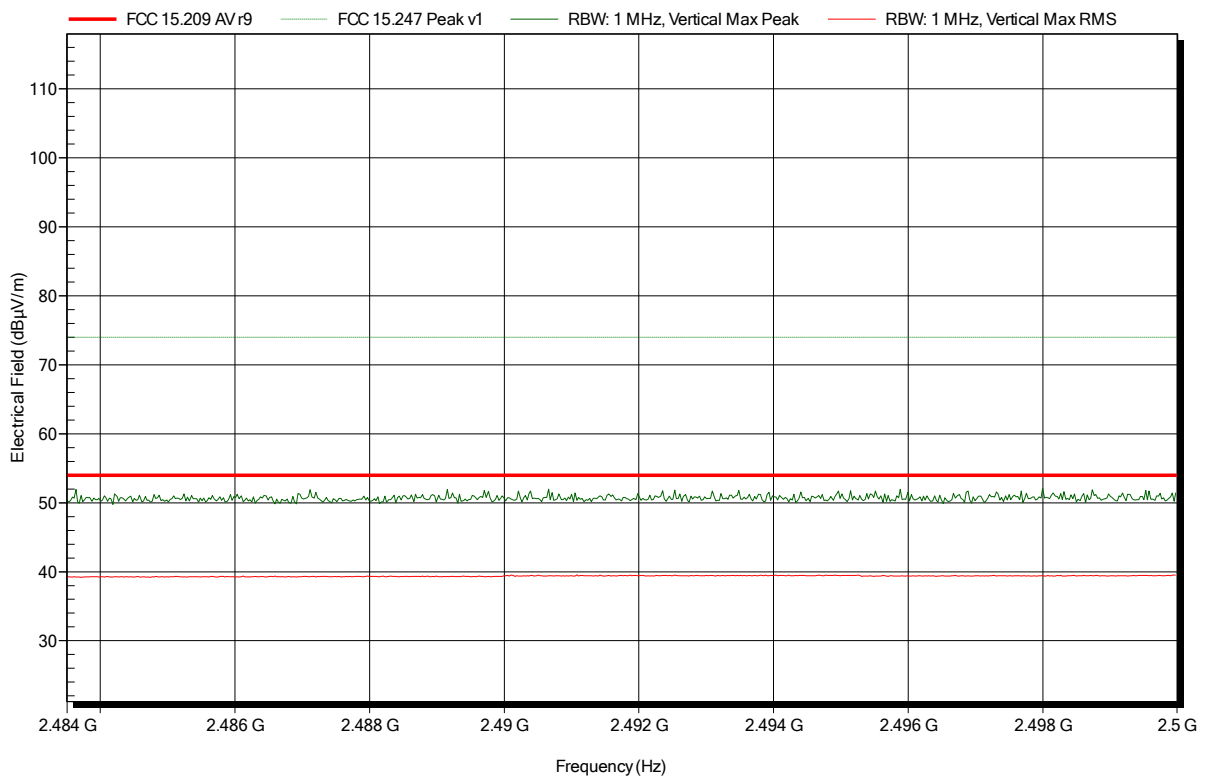


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 Test Date: 2018-11-09
 Note: upper bandedge

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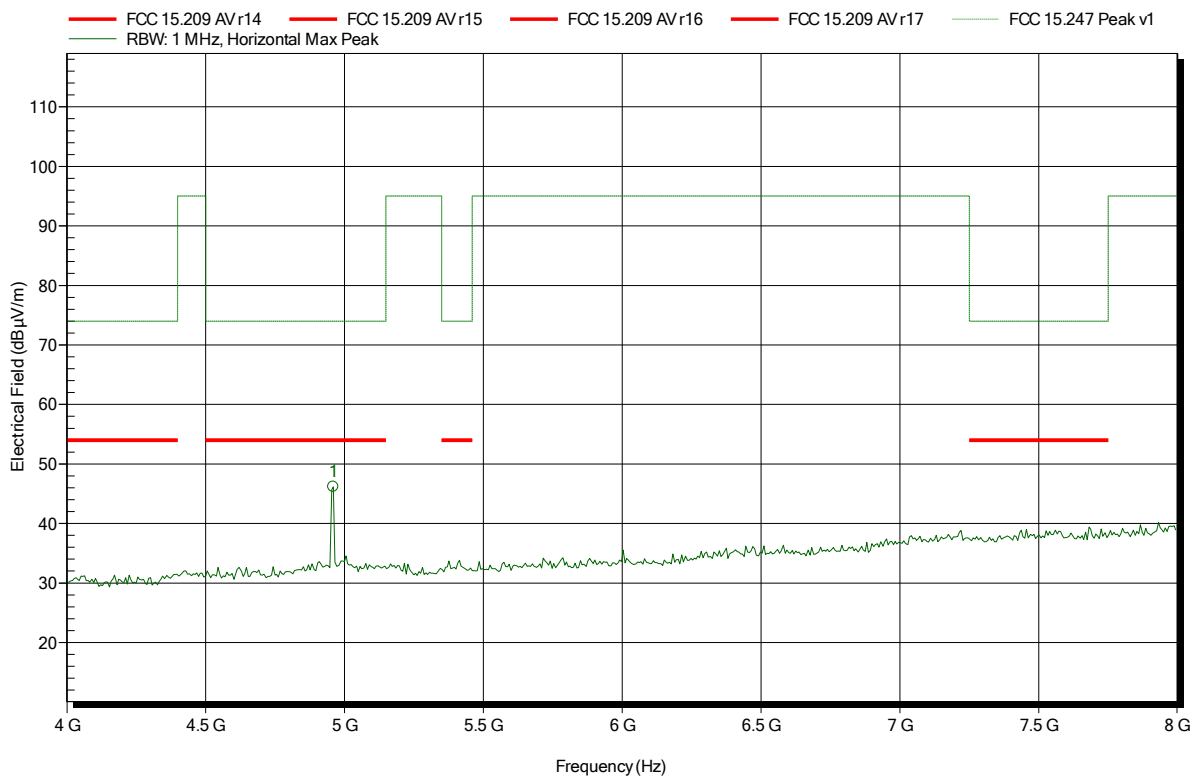


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 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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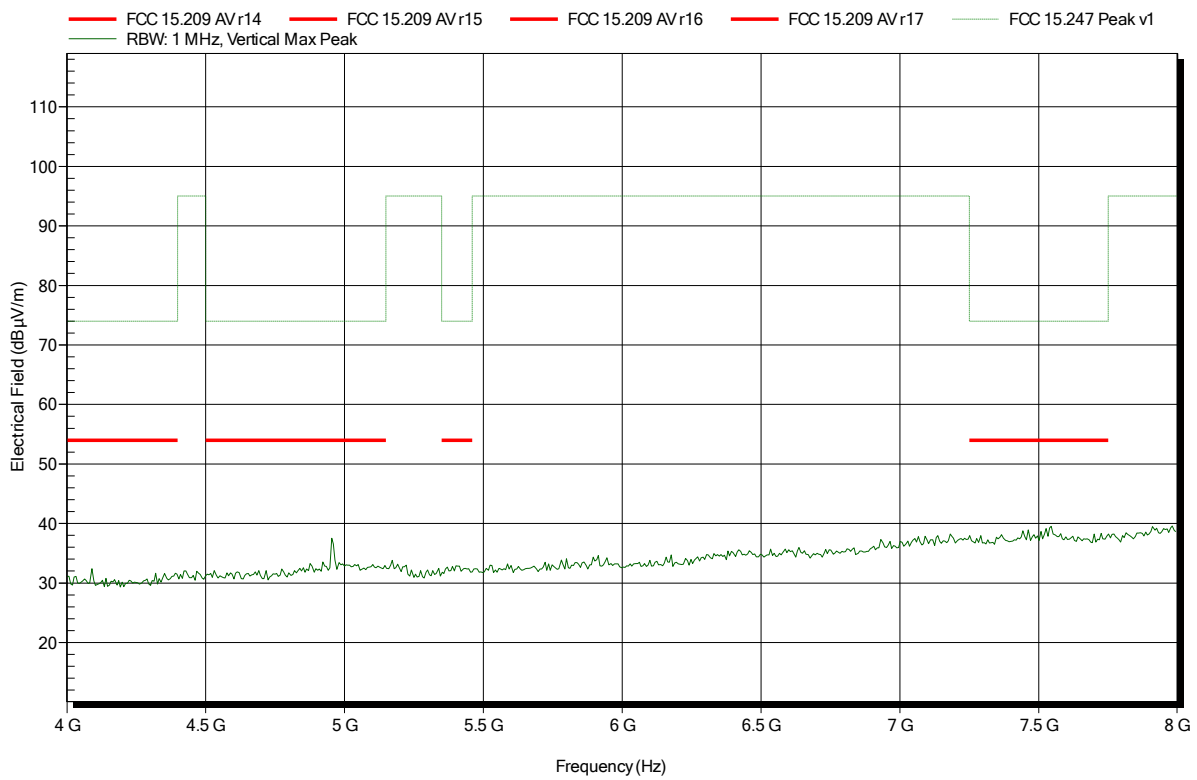
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.96 GHz	46.15 dBµV/m	74 dBµV/m	-27.85 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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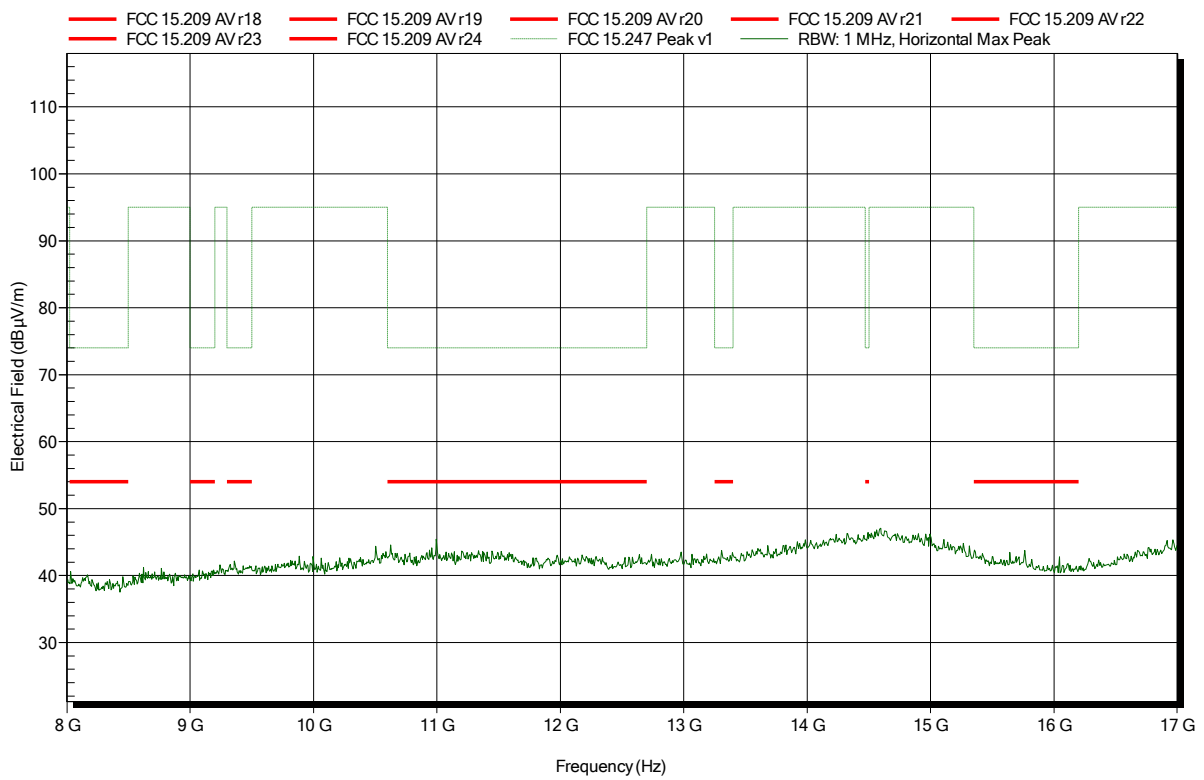


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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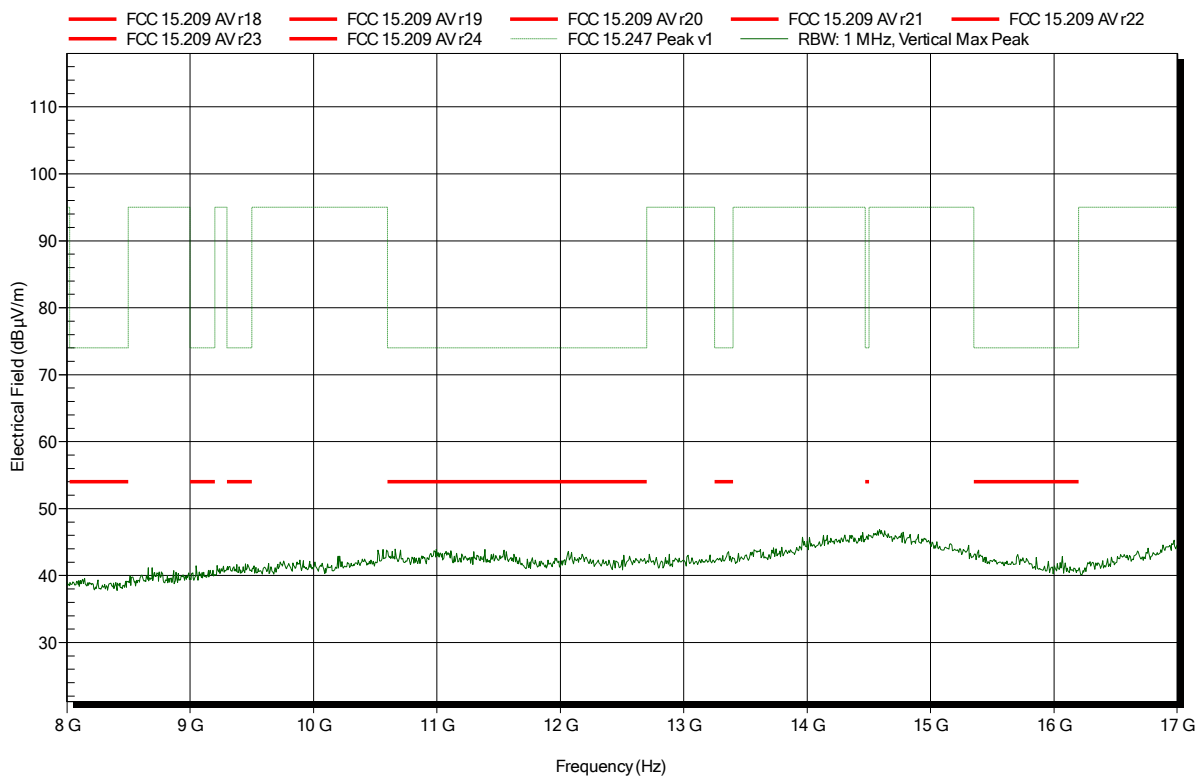


Spurious emissions according to FCC 15.247

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 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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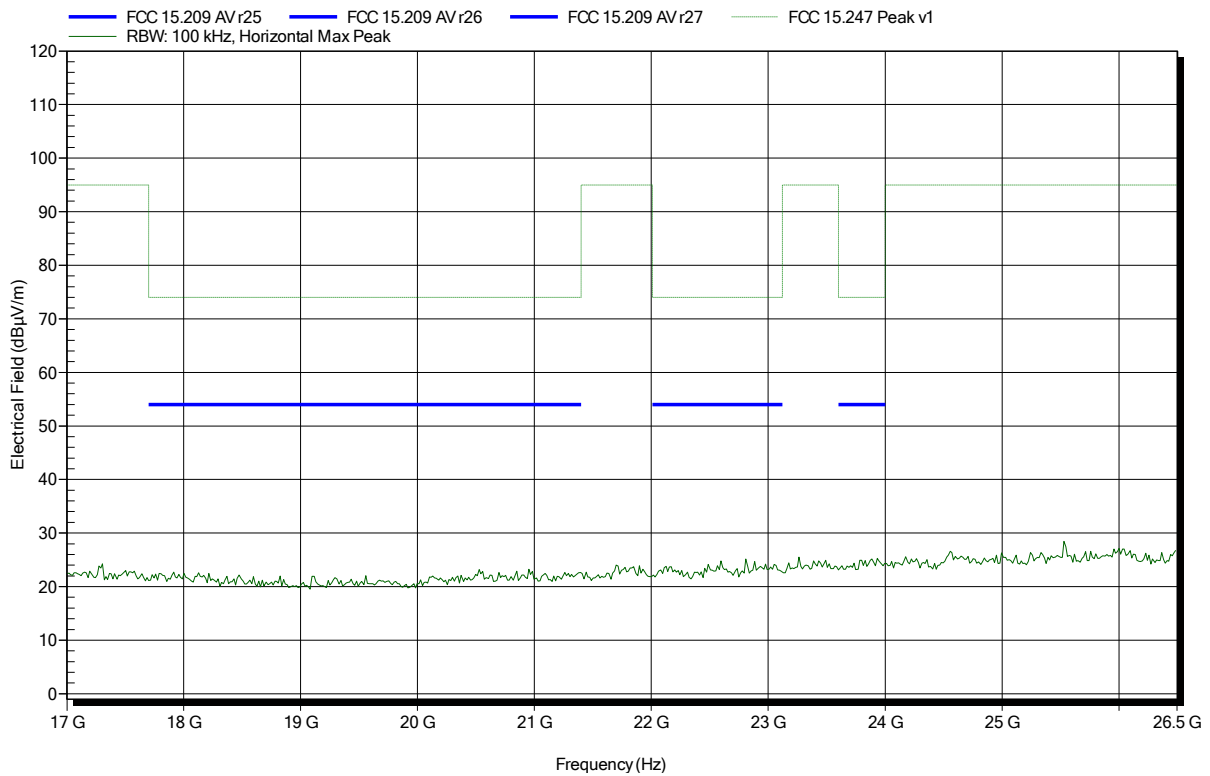


Spurious emissions according to FCC 15.247

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 Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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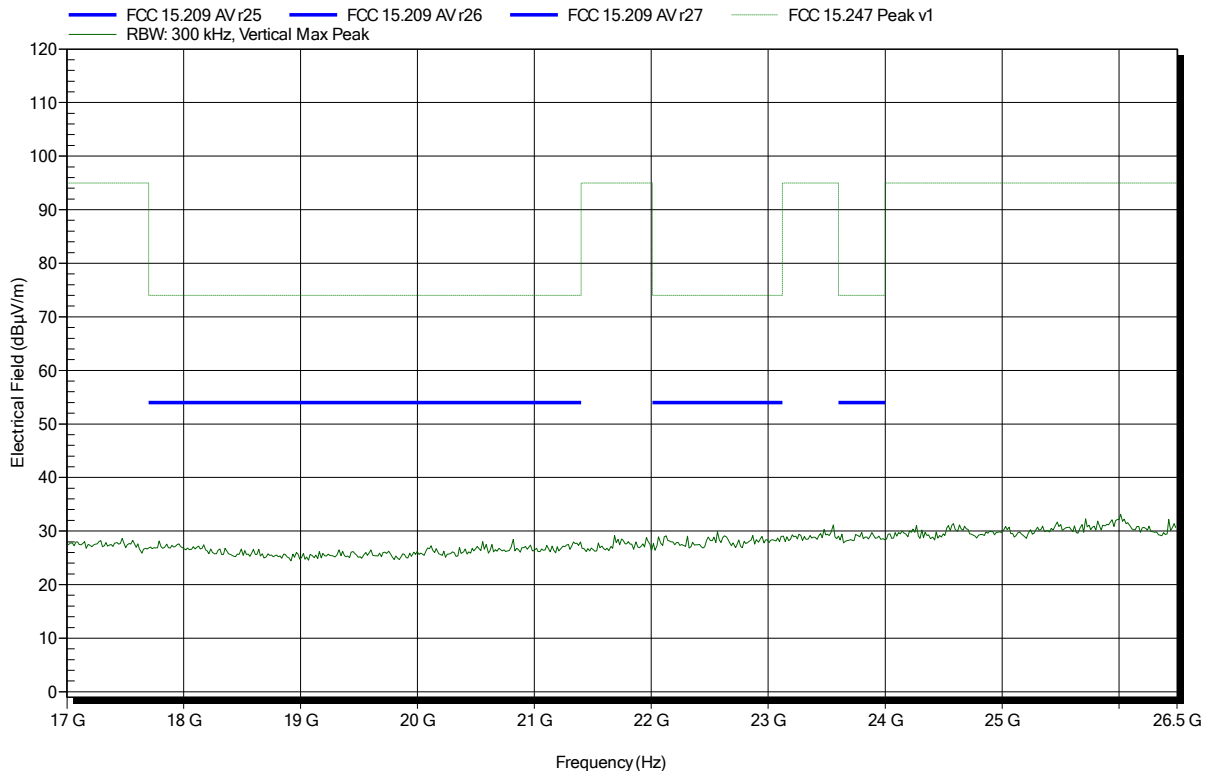


Spurious emissions according to FCC 15.247

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 Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; GFSK; DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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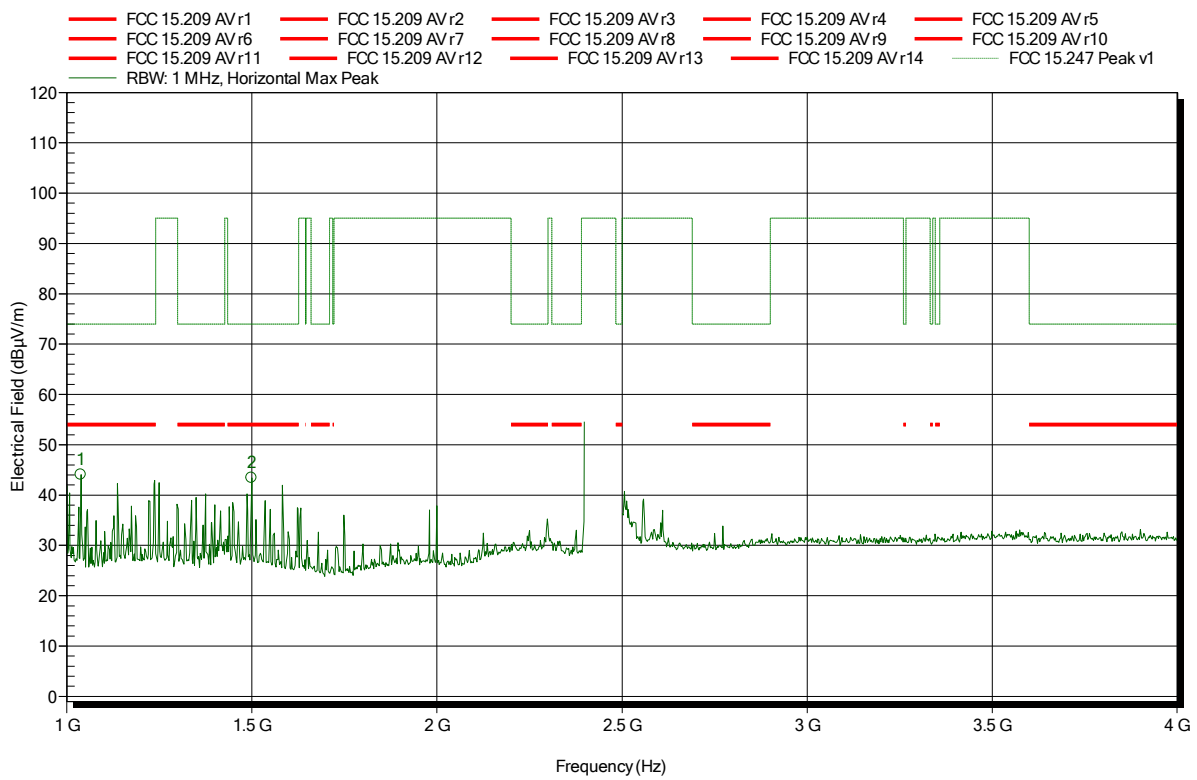


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 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note:

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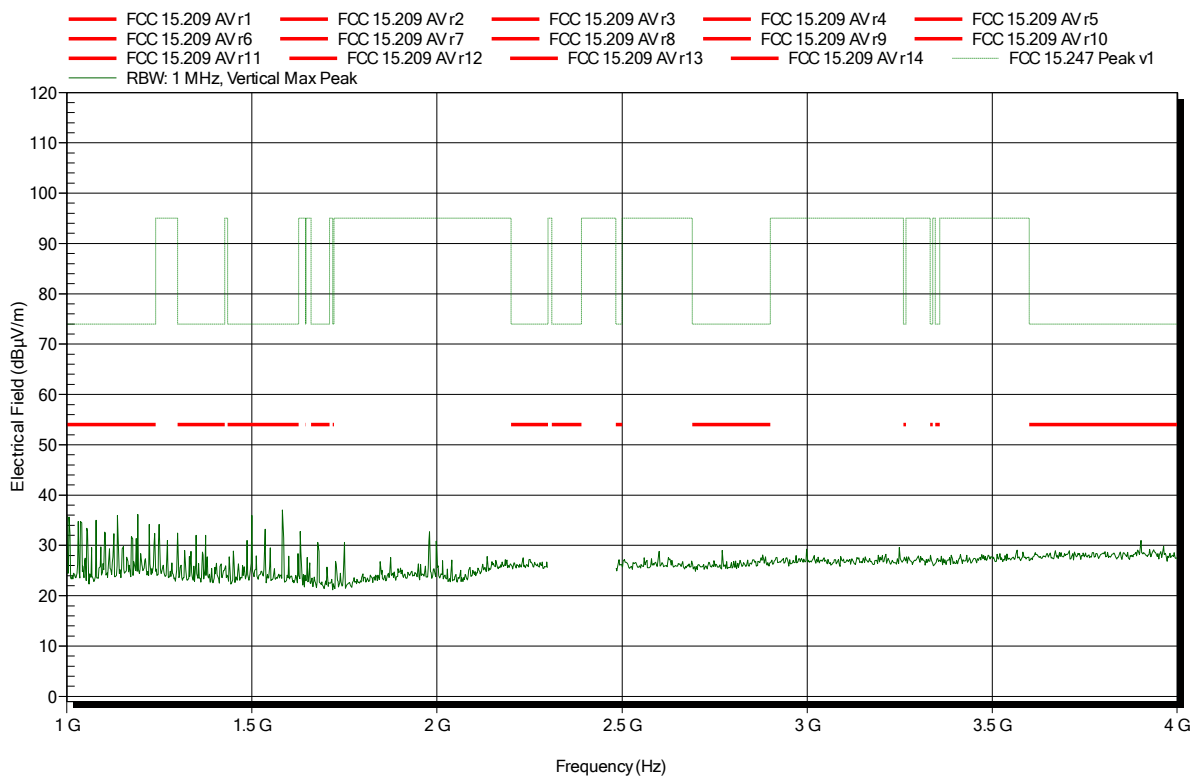
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.038 GHz	44.09 dBµV/m	74 dBµV/m	-29.91 dB	Pass
1.5 GHz	43.44 dBµV/m	74 dBµV/m	-30.56 dB	Pass

Spurious emissions according to FCC 15.247

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 Test Conditions: Tnom: 23°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note:

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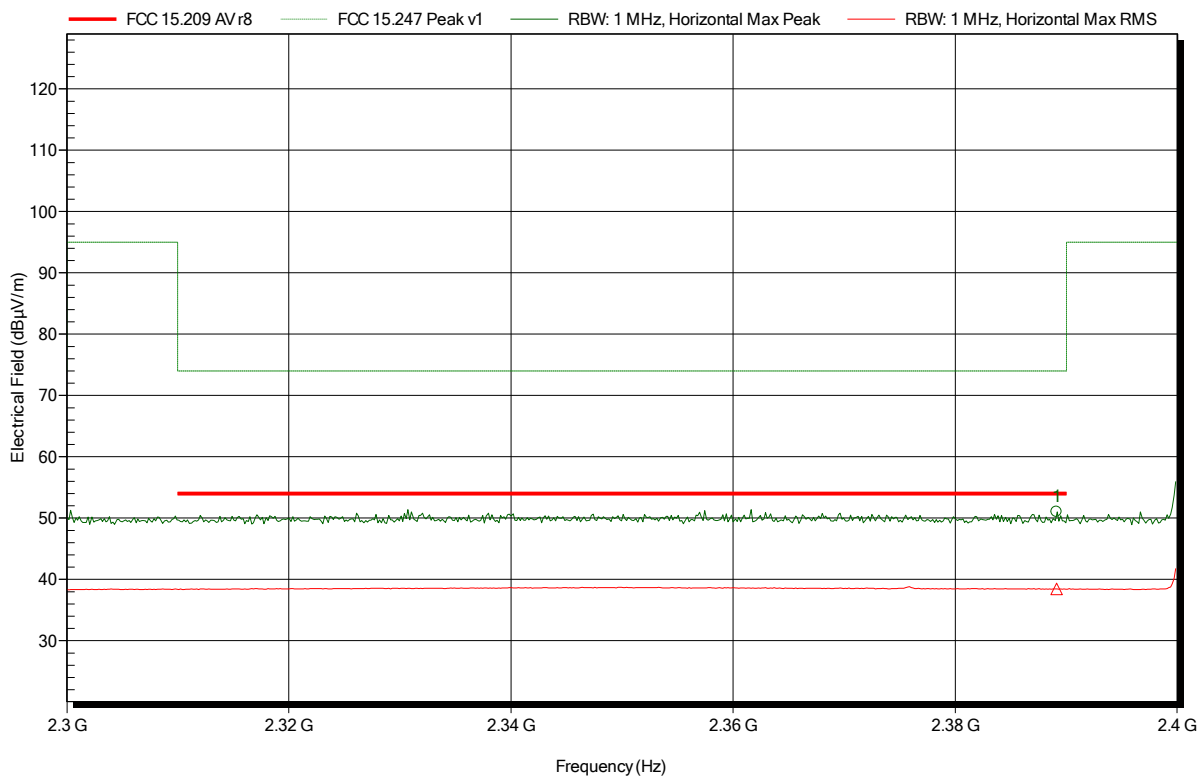


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
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 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note: lower bandedge

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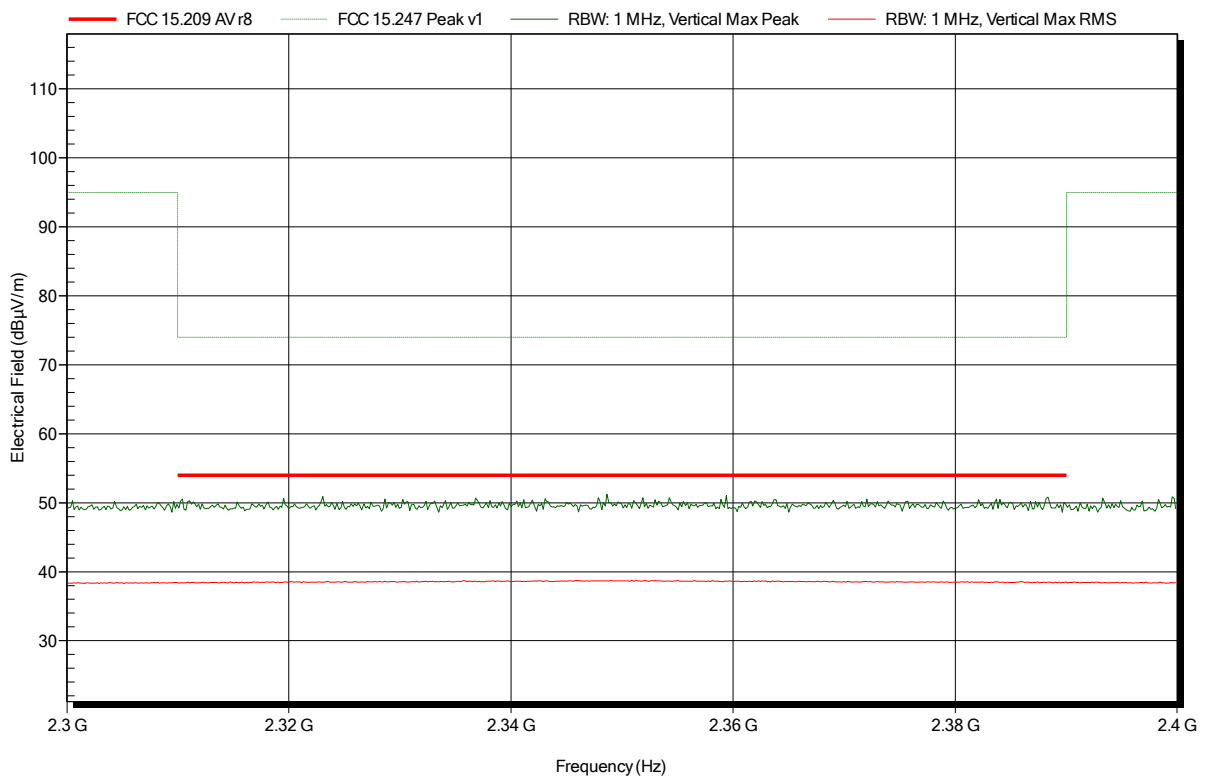
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3891 GHz	51.02 dBµV/m	74 dBµV/m	-22.98 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.3891 GHz	38.45 dBµV/m	54 dBµV/m	-15.55 dB	Pass

Spurious emissions according to FCC 15.247

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 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note: lower bandedge

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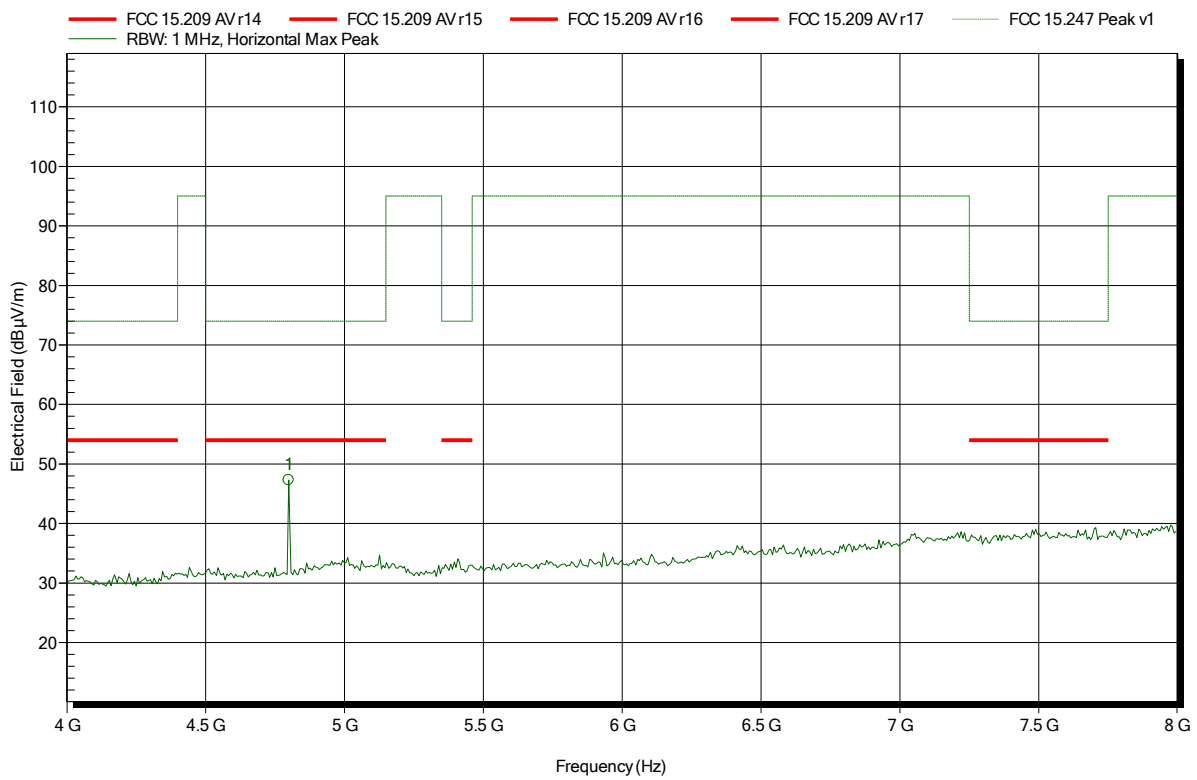


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
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 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note:

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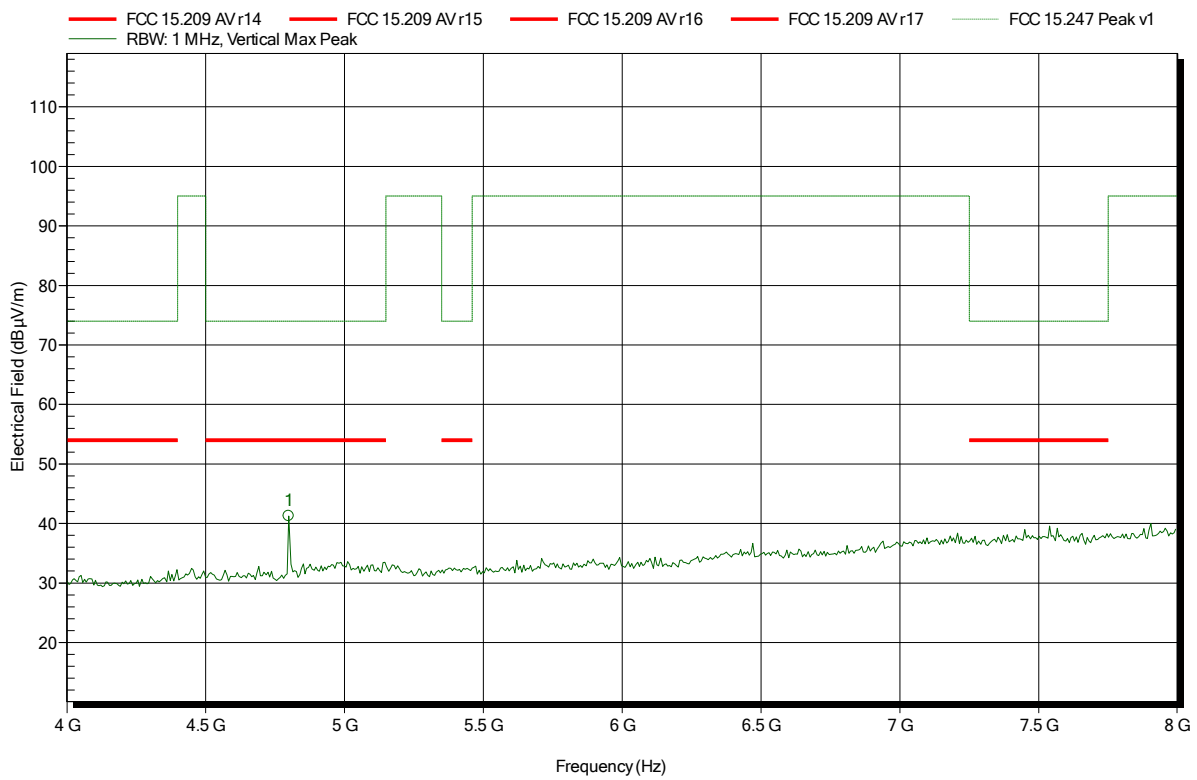
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.8 GHz	47.29 dBµV/m	74 dBµV/m	-26.71 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

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 Test Conditions: Tnom: 23°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note:

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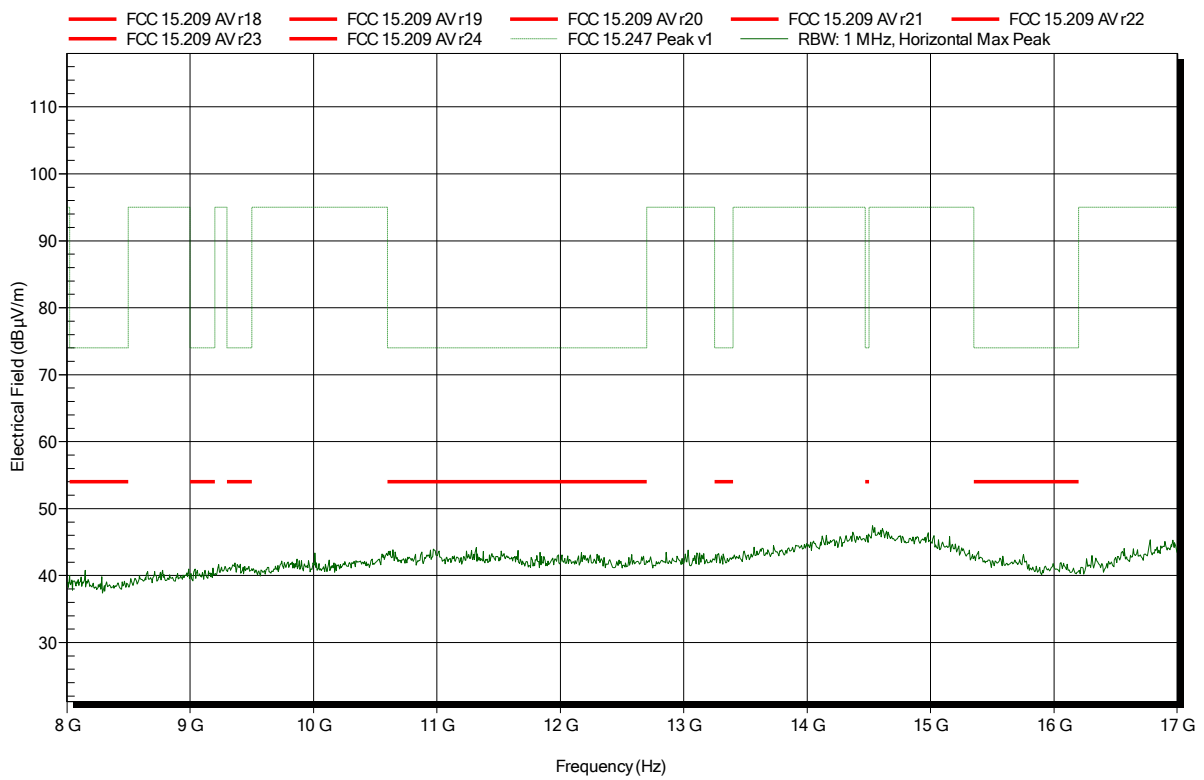
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.8 GHz	41.25 dBµV/m	74 dBµV/m	-32.75 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

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 Model: ENWF9202A1EF
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 Operator: Wilfried Treffke
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 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note:

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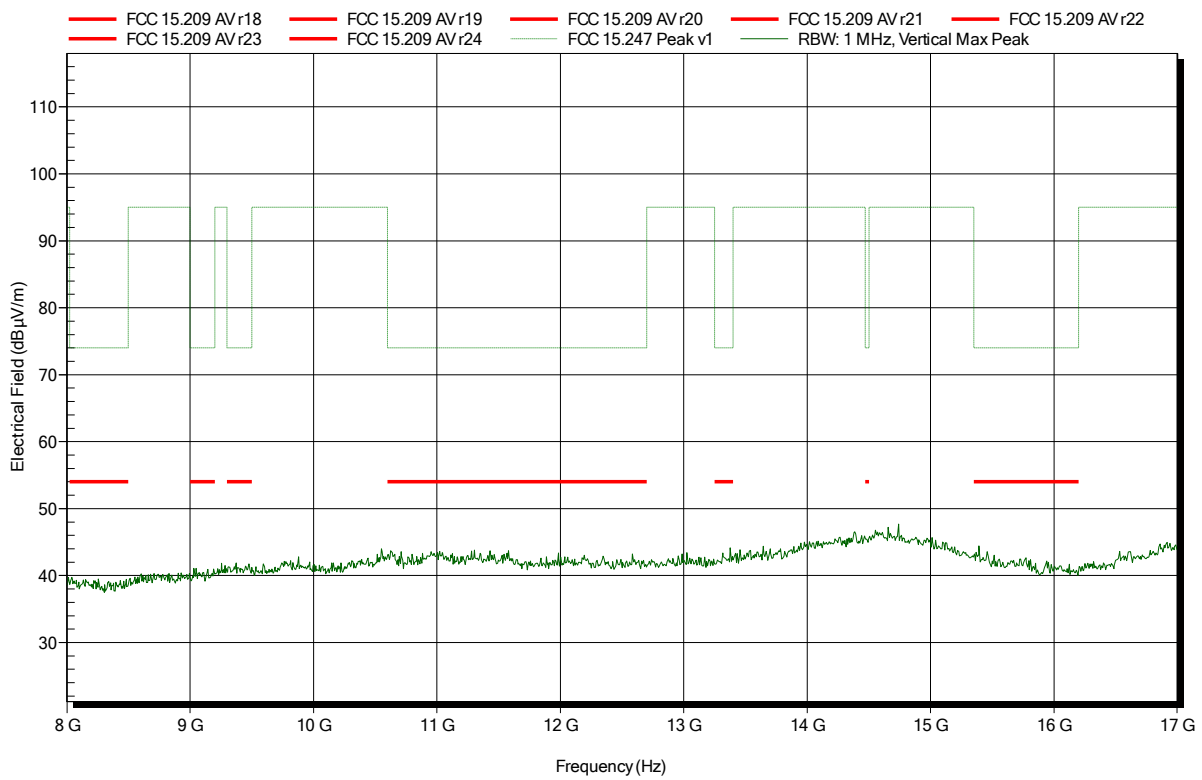


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2402 MHz
 Test Date: 2018-11-09
 Note:

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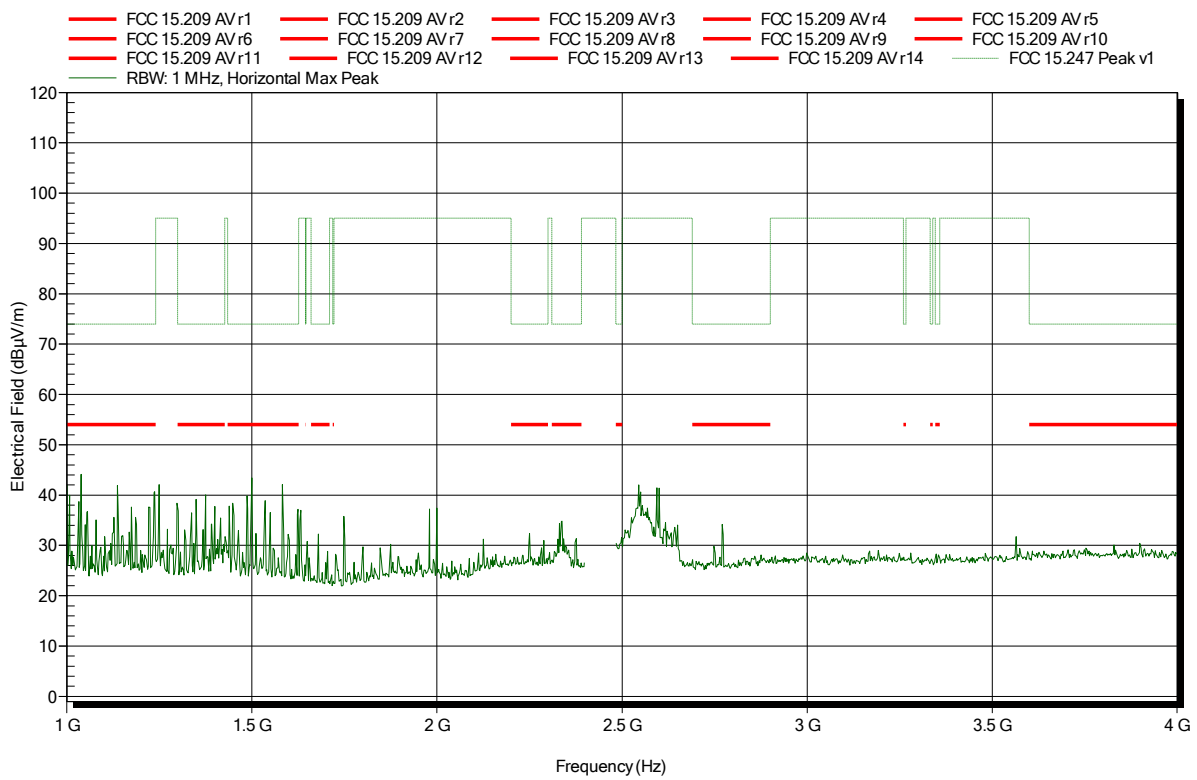


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2441 MHz
 Test Date: 2018-11-09
 Note:

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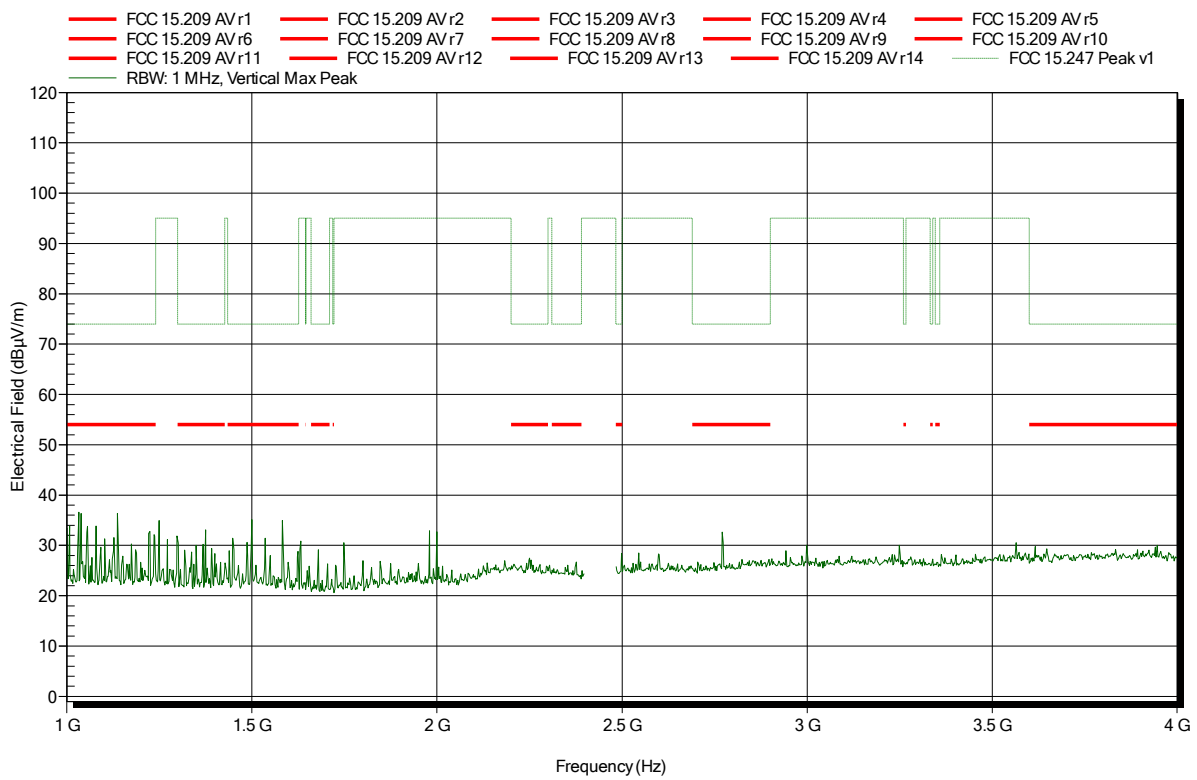


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2441 MHz
 Test Date: 2018-11-09
 Note:

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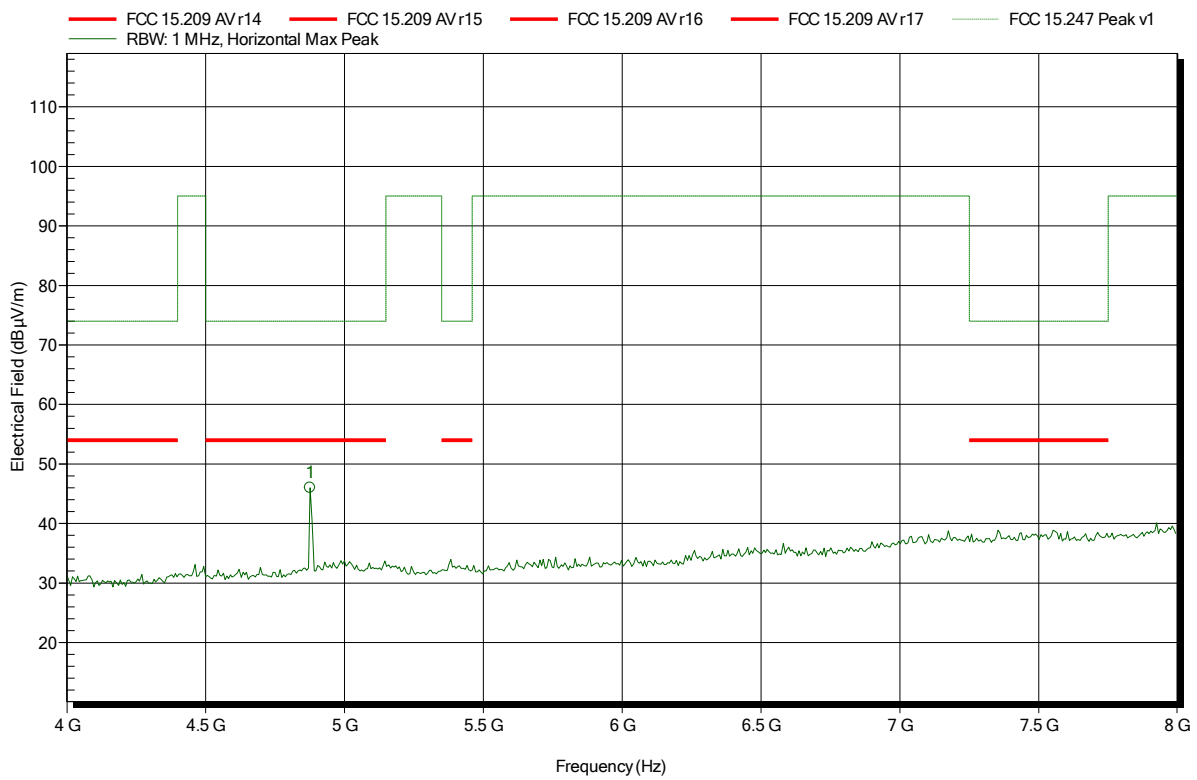


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2441 MHz
 Test Date: 2018-11-09
 Note:

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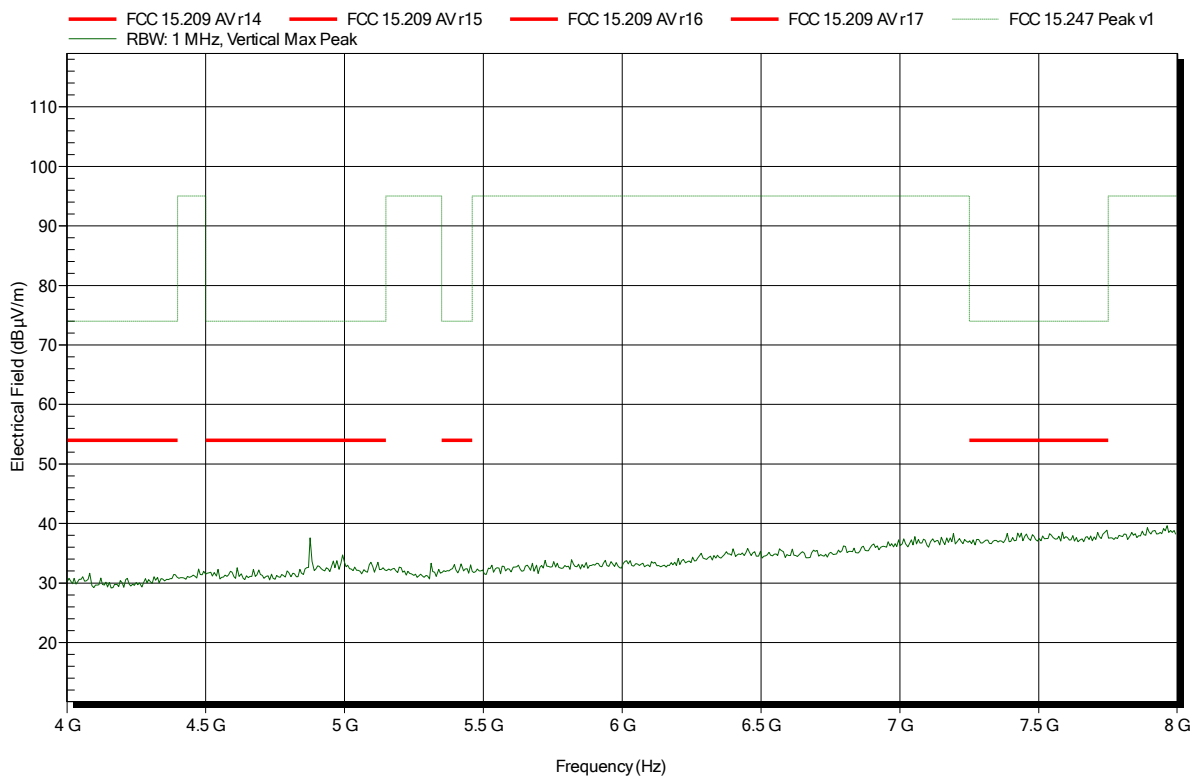
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.877 GHz	46 dBµV/m	74 dBµV/m	-28 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2441 MHz
 Test Date: 2018-11-09
 Note:

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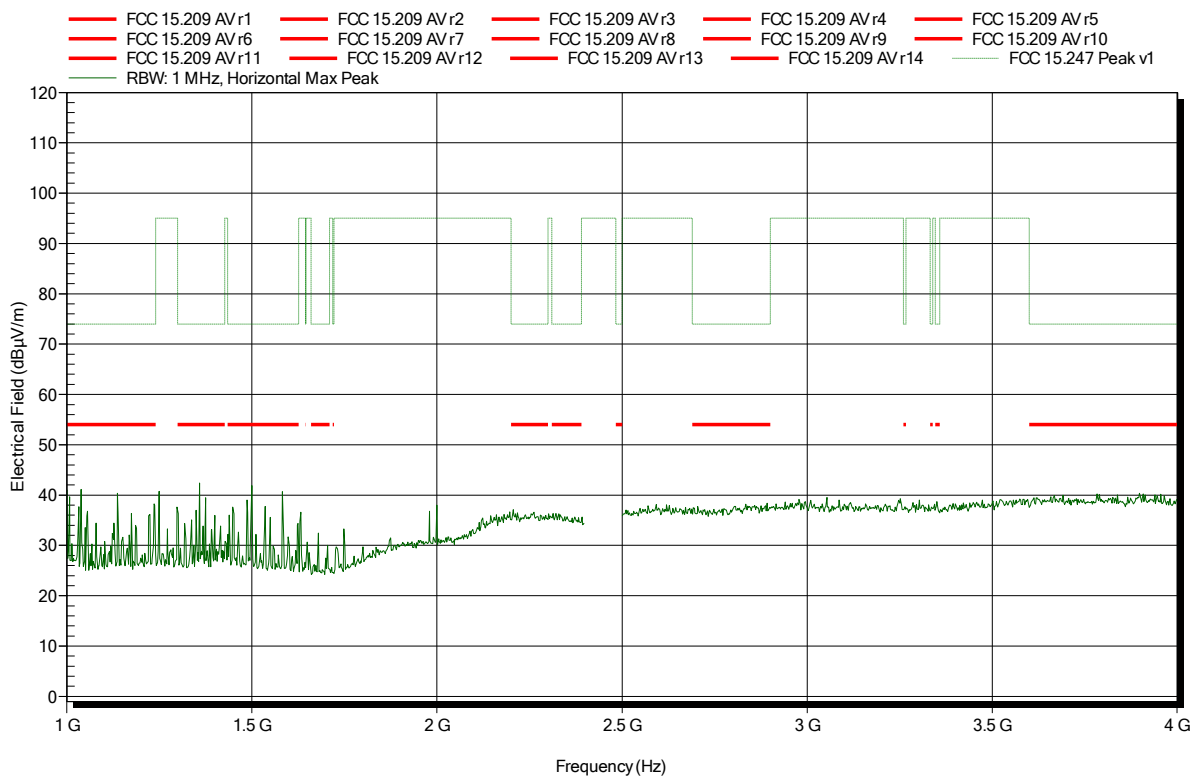


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 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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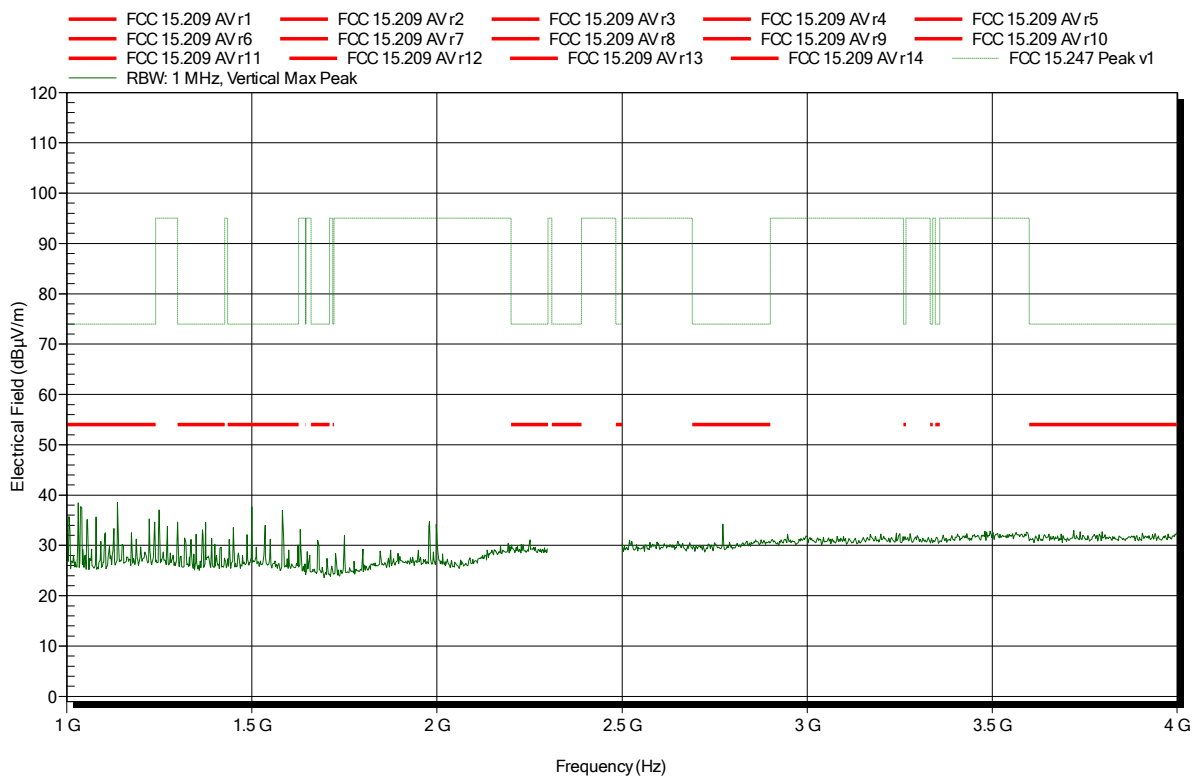


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 Measurement distance: 1 m converted to 3m
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 Test Date: 2018-11-09
 Note:

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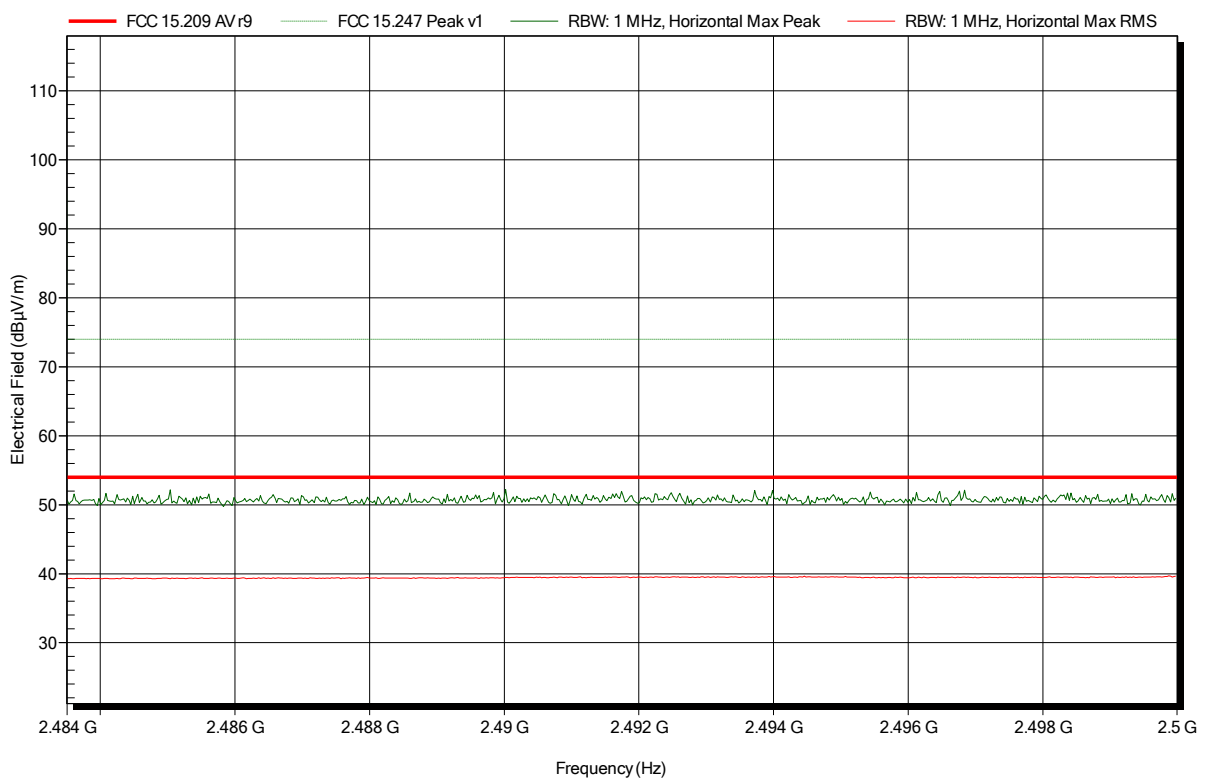


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2480 MHz
 Test Date: 2018-11-09
 Note: upper bandedge

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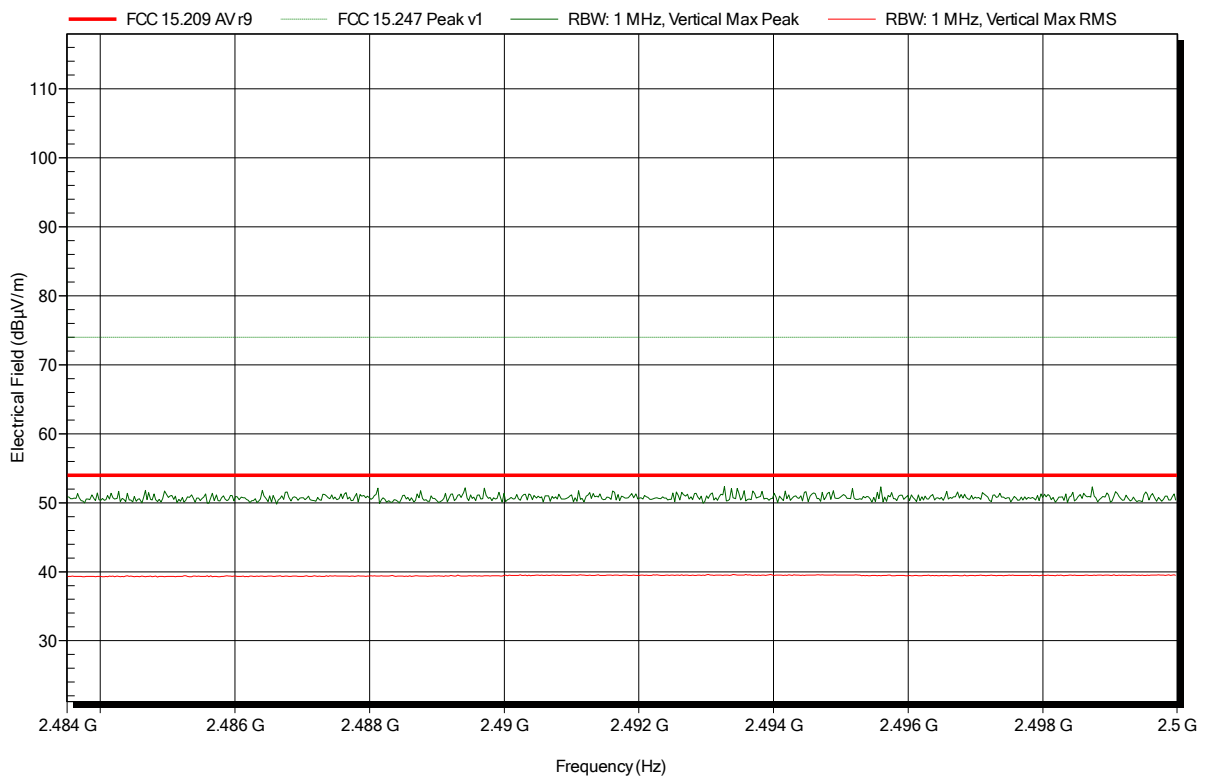


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 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2480 MHz
 Test Date: 2018-11-09
 Note: upper bandedge

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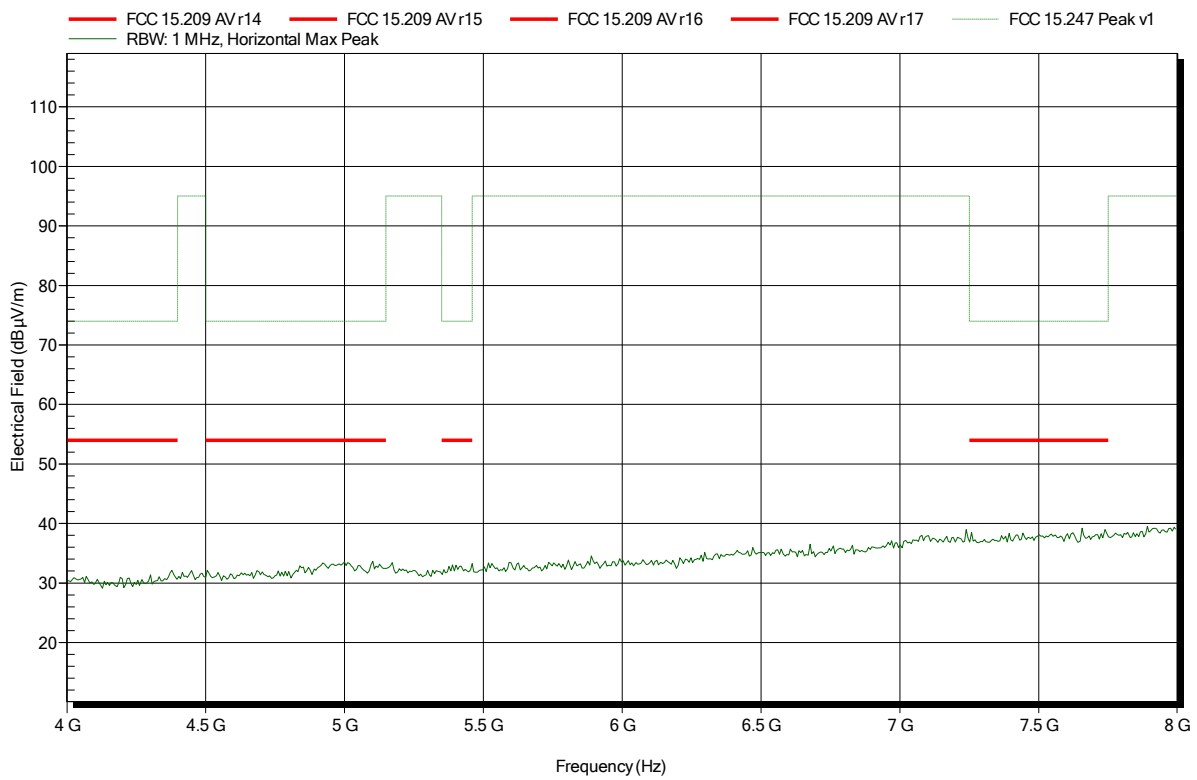


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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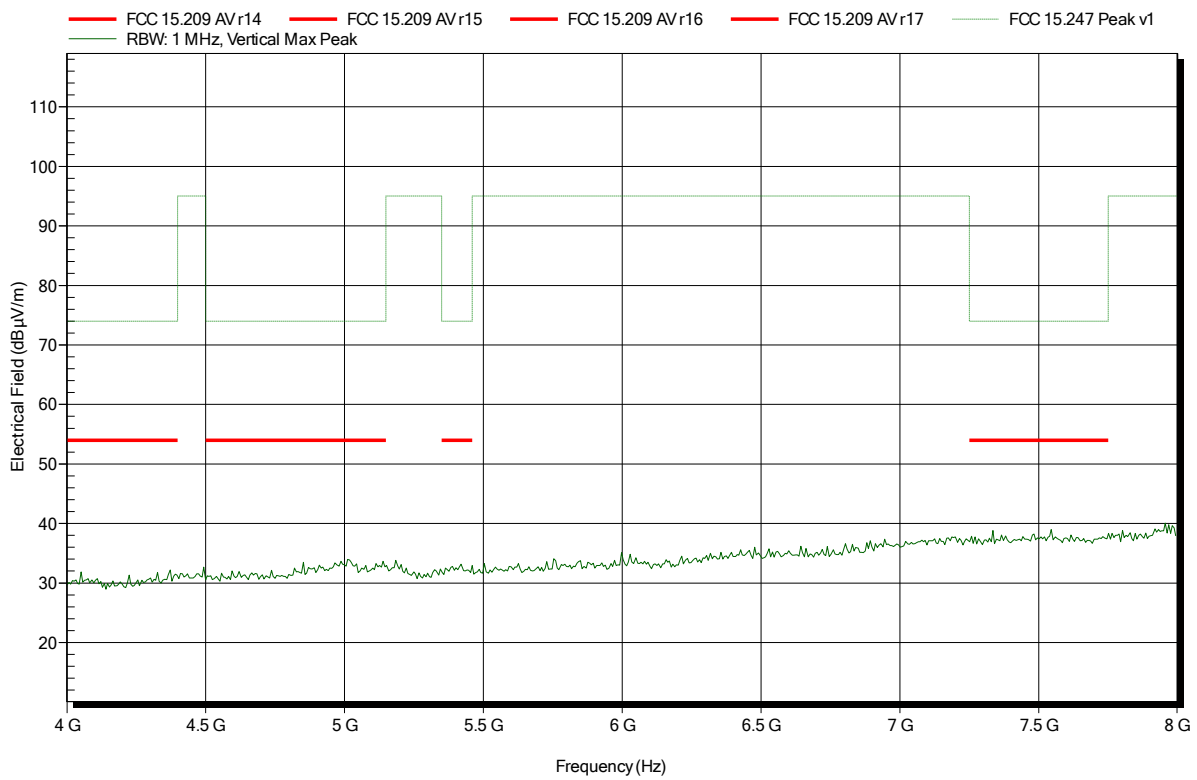


Spurious emissions according to FCC 15.247

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9202A1EF
 Test Site: Eurofins Product Service GmbH
 Operator: Wilfried Treffke
 Test Conditions: Tnom: 23°C, Vnom: 3.3 VDC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: TX; BT; PI/4-DQPSK; 2 DH5; 2480 MHz
 Test Date: 2018-11-09
 Note:

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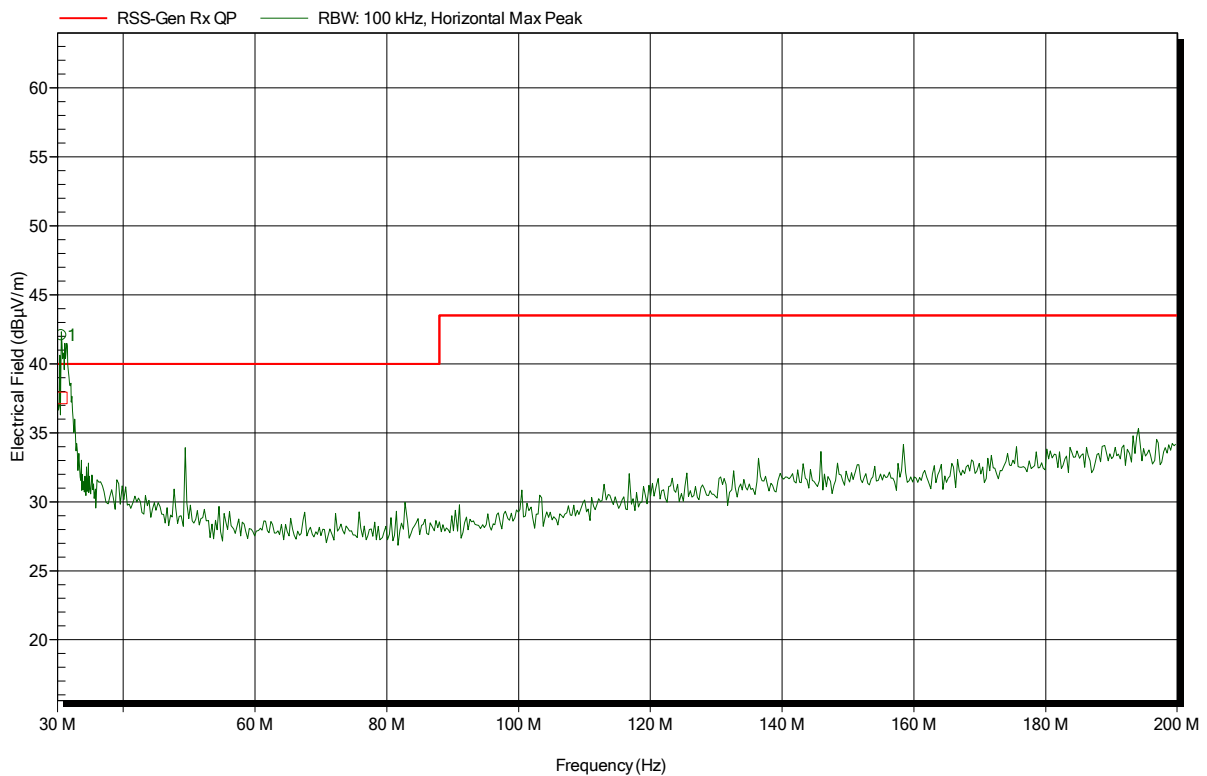
ANNEX B Receiver spurious emissions

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Rohde & Schwarz HK 116, Horizontal
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-08
 Note:

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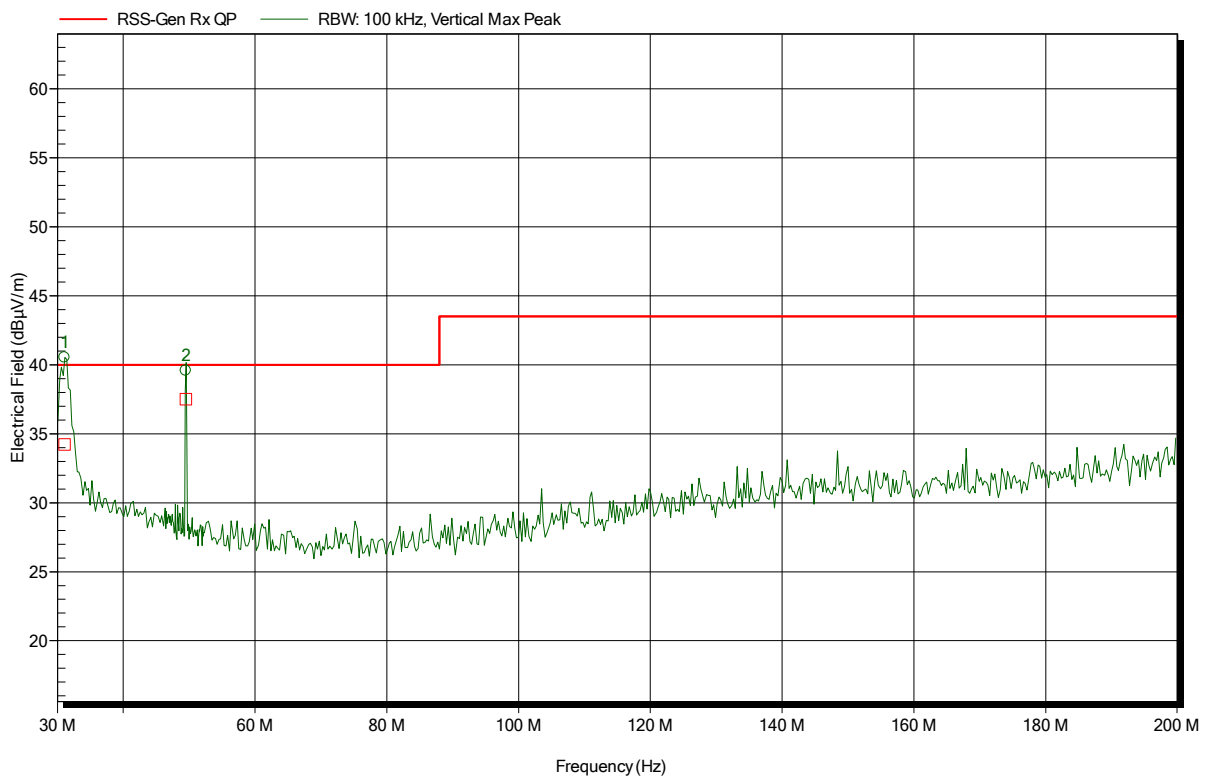
Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
30.611 MHz	42.07 dBµV/m	---	---	---	291 Degree	1.2 m
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
30.611 MHz	37.54 dBµV/m	40 dBµV/m	-2.46 dB	Pass	291 Degree	1.2 m

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-08
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
31.088 MHz	40.54 dBµV/m	---	---	---	90 Degree	1.2 m
49.491 MHz	39.57 dBµV/m	---	---	---	61 Degree	1.2 m

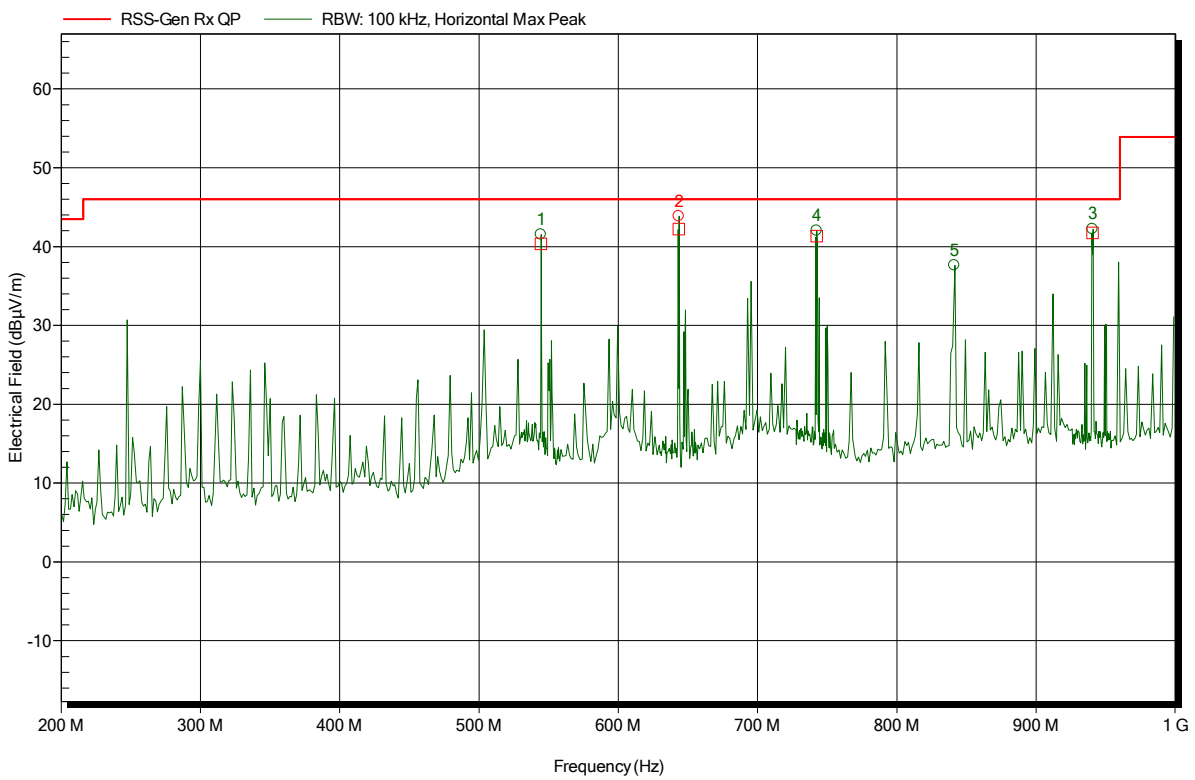
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
31.088 MHz	34.22 dBµV/m	40 dBµV/m	-5.78 dB	Pass	90 Degree	1.2 m
49.491 MHz	37.5 dBµV/m	40 dBµV/m	-2.5 dB	Pass	61 Degree	1.2 m

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Rohde & Schwarz HL 223, Horizontal
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-08
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
544.482 MHz	41.55 dBµV/m	46 dBµV/m	-4.45 dB	Pass	31 Degree	1.2 m
643.482 MHz	43.83 dBµV/m	46 dBµV/m	-2.17 dB	Pass	31 Degree	1.2 m
742.474 MHz	42.01 dBµV/m	46 dBµV/m	-3.99 dB	Pass	31 Degree	1.2 m
841.28 MHz	37.61 dBµV/m	46 dBµV/m	-8.39 dB	Pass	32 Degree	1.2 m
940.465 MHz	42.23 dBµV/m	46 dBµV/m	-3.77 dB	Pass	31 Degree	1.2 m

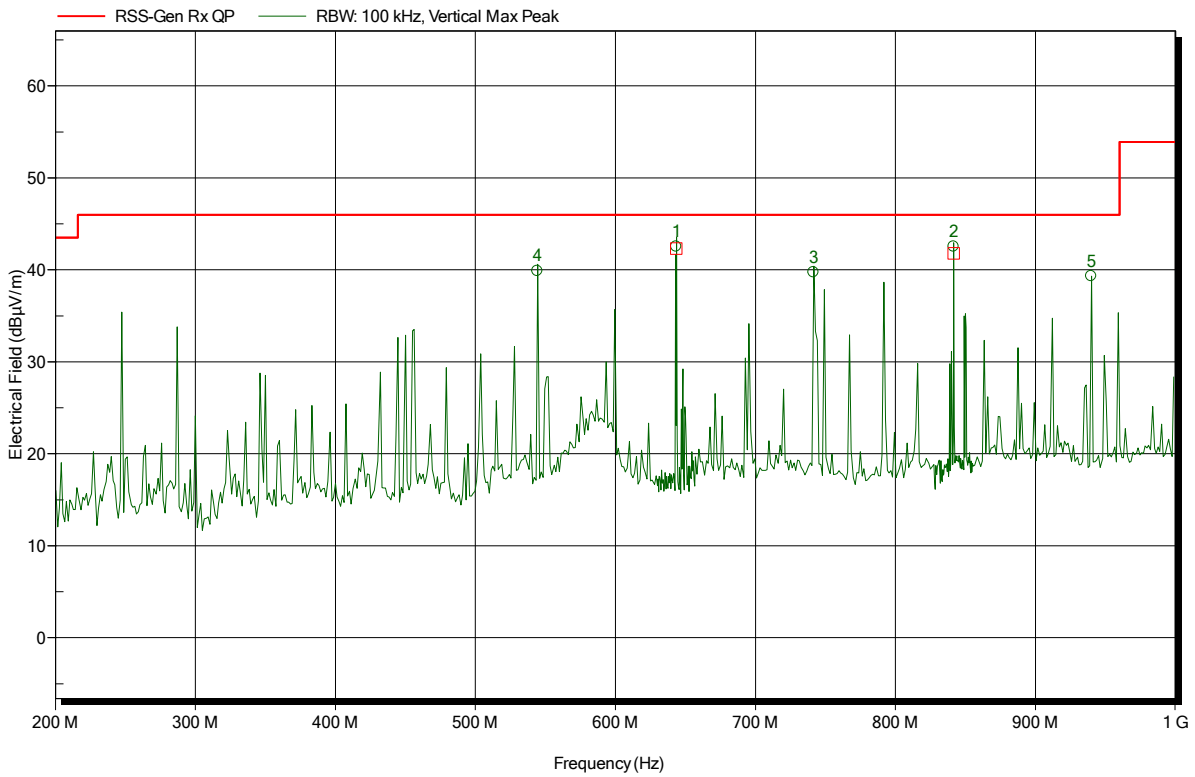
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
544.482 MHz	40.35 dBµV/m	46 dBµV/m	-5.65 dB	Pass	31 Degree	1.2 m
643.482 MHz	42.21 dBµV/m	46 dBµV/m	-3.79 dB	Pass	31 Degree	1.2 m
742.474 MHz	41.33 dBµV/m	46 dBµV/m	-4.67 dB	Pass	31 Degree	1.2 m
940.465 MHz	41.72 dBµV/m	46 dBµV/m	-4.28 dB	Pass	31 Degree	1.2 m

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-08
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
544.32 MHz	39.89 dBµV/m	46 dBµV/m	-6.11 dB	Pass	67 Degree	1.2 m
643.476 MHz	42.51 dBµV/m	46 dBµV/m	-3.49 dB	Pass	358 Degree	1.2 m
741.44 MHz	39.73 dBµV/m	46 dBµV/m	-6.27 dB	Pass	45 Degree	1.2 m
841.47 MHz	42.53 dBµV/m	46 dBµV/m	-3.47 dB	Pass	1 Degree	1.2 m
939.84 MHz	39.31 dBµV/m	46 dBµV/m	-6.69 dB	Pass	67 Degree	1.2 m

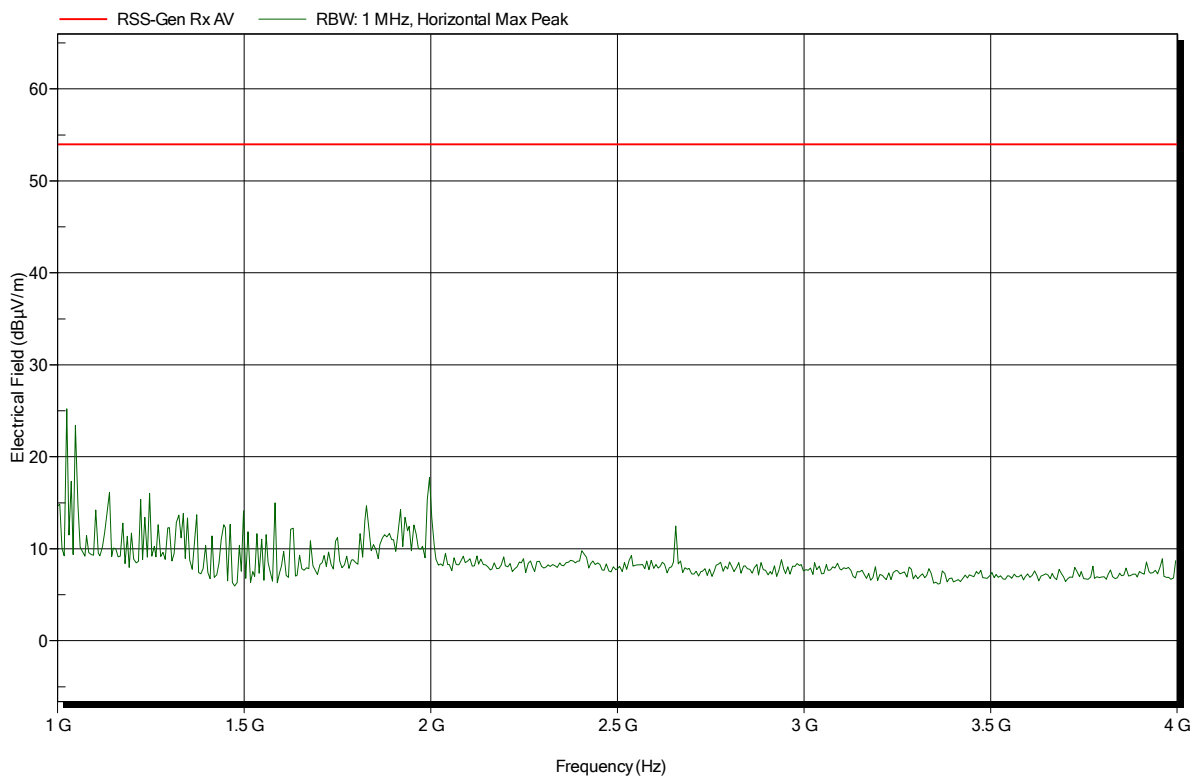
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
643.476 MHz	42.3 dBµV/m	46 dBµV/m	-3.7 dB	Pass	358 Degree	1.2 m
841.47 MHz	41.8 dBµV/m	46 dBµV/m	-4.2 dB	Pass	1 Degree	1.2 m

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: ETS-Lindgren 3117, Horizontal
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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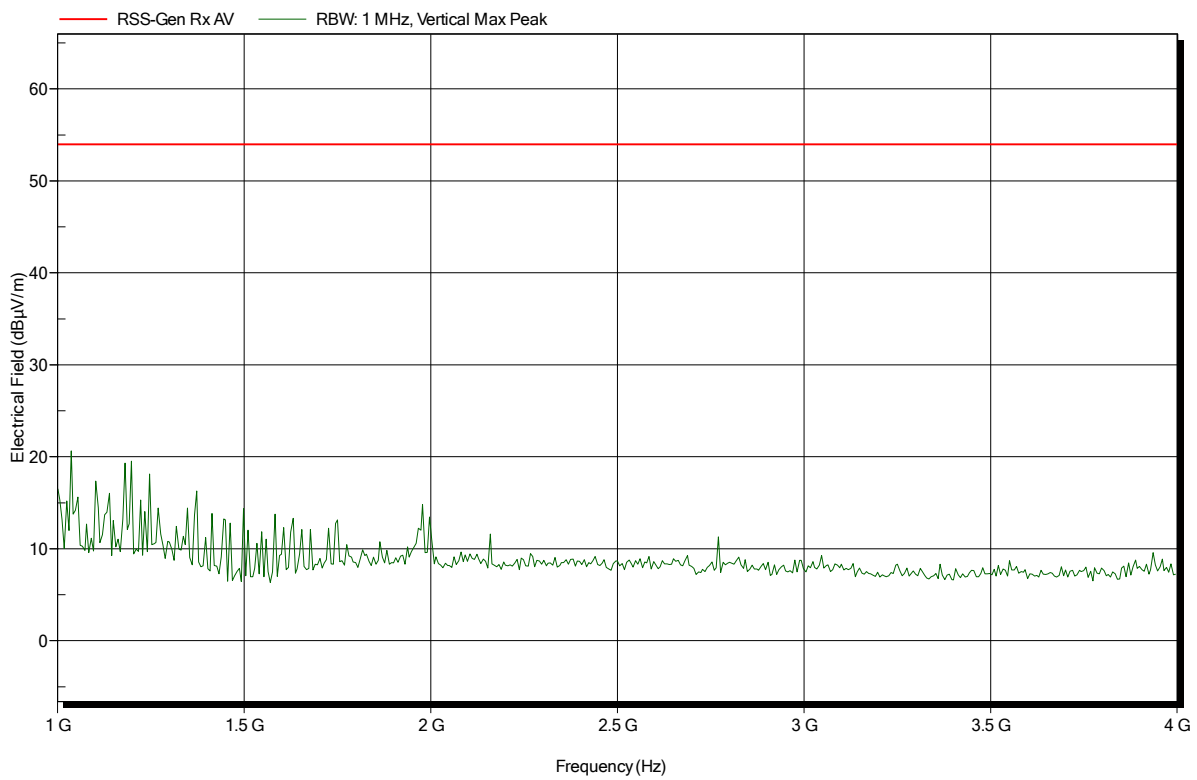


Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: ETS-Lindgren 3117, Vertical
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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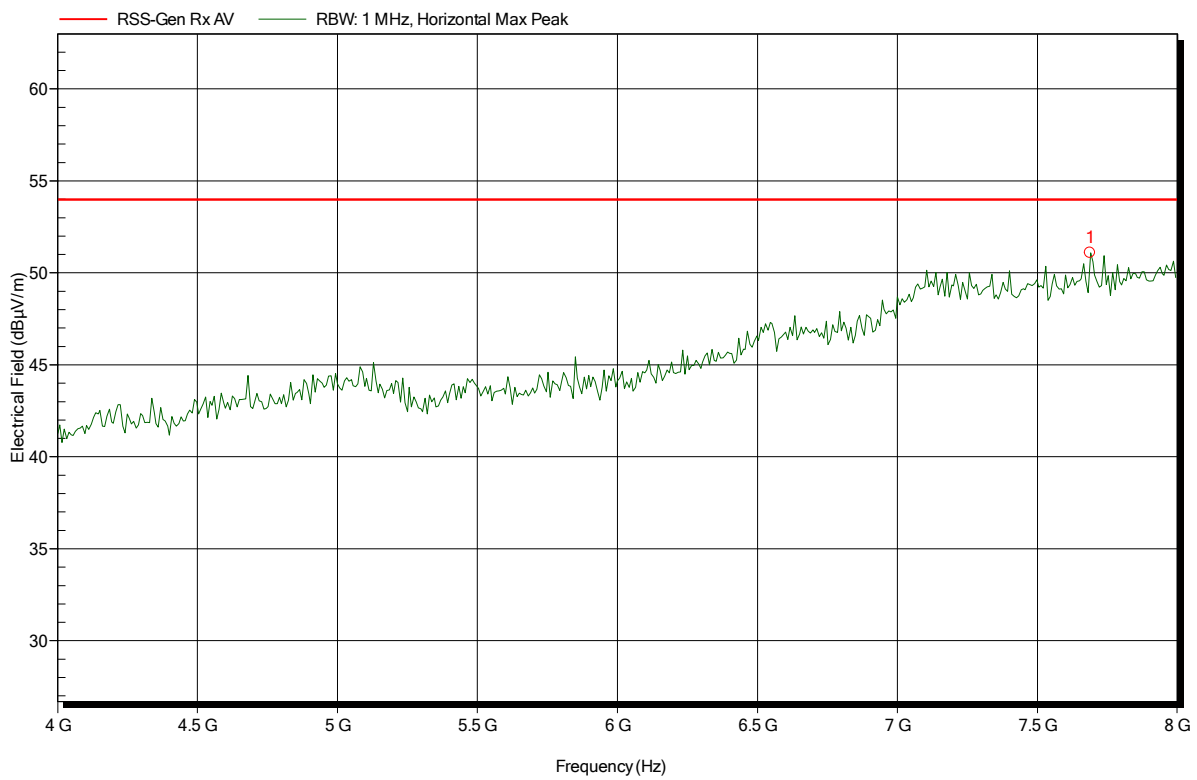


Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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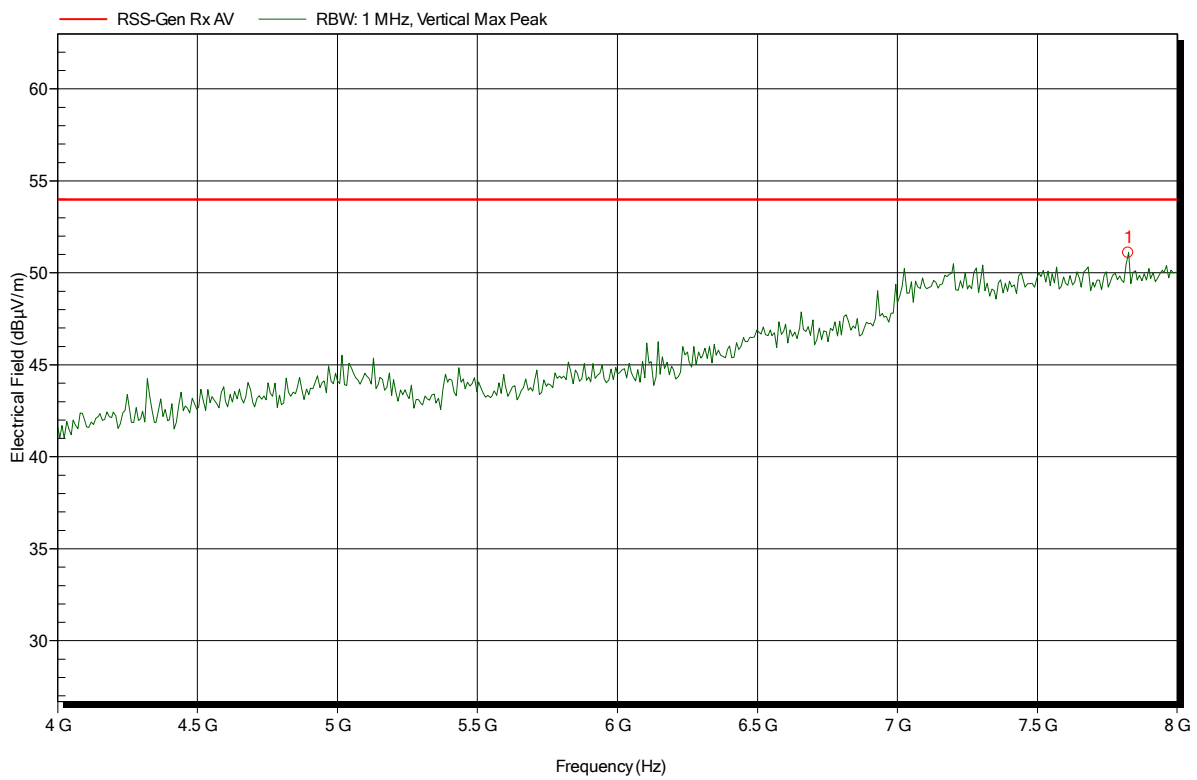
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.688 GHz	51.1 dBµV/m	53.98 dBµV/m	-2.88 dB	Pass

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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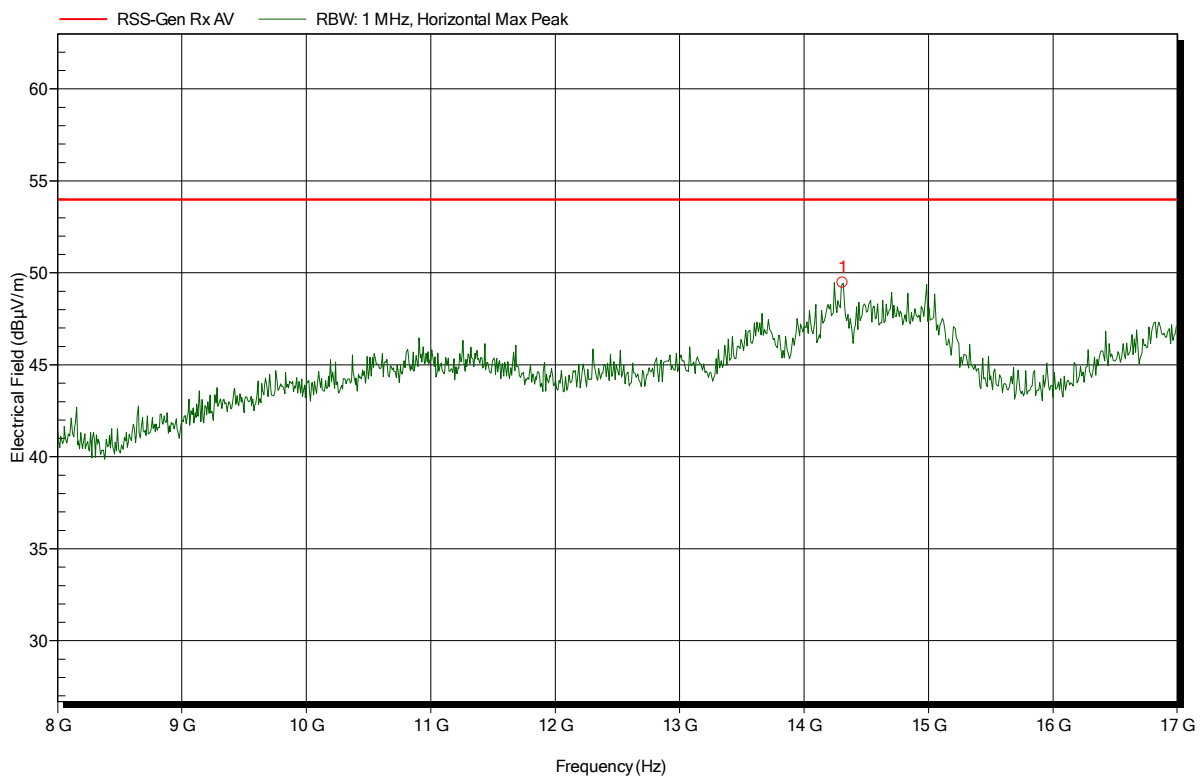
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
7.824 GHz	51.1 dBµV/m	53.98 dBµV/m	-2.88 dB	Pass

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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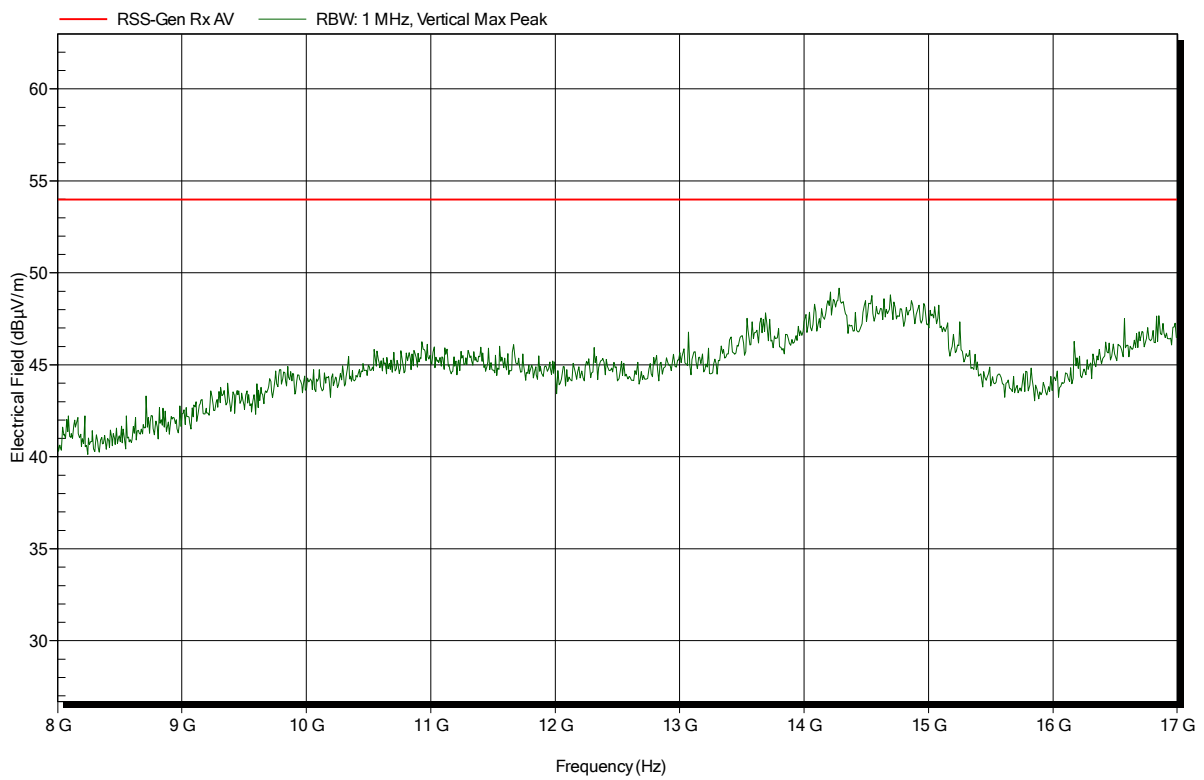
Frequency	Peak	Peak Limit	Peak Difference	Status
14.31 GHz	49.46 dBµV/m	53.98 dBµV/m	-4.52 dB	Pass

Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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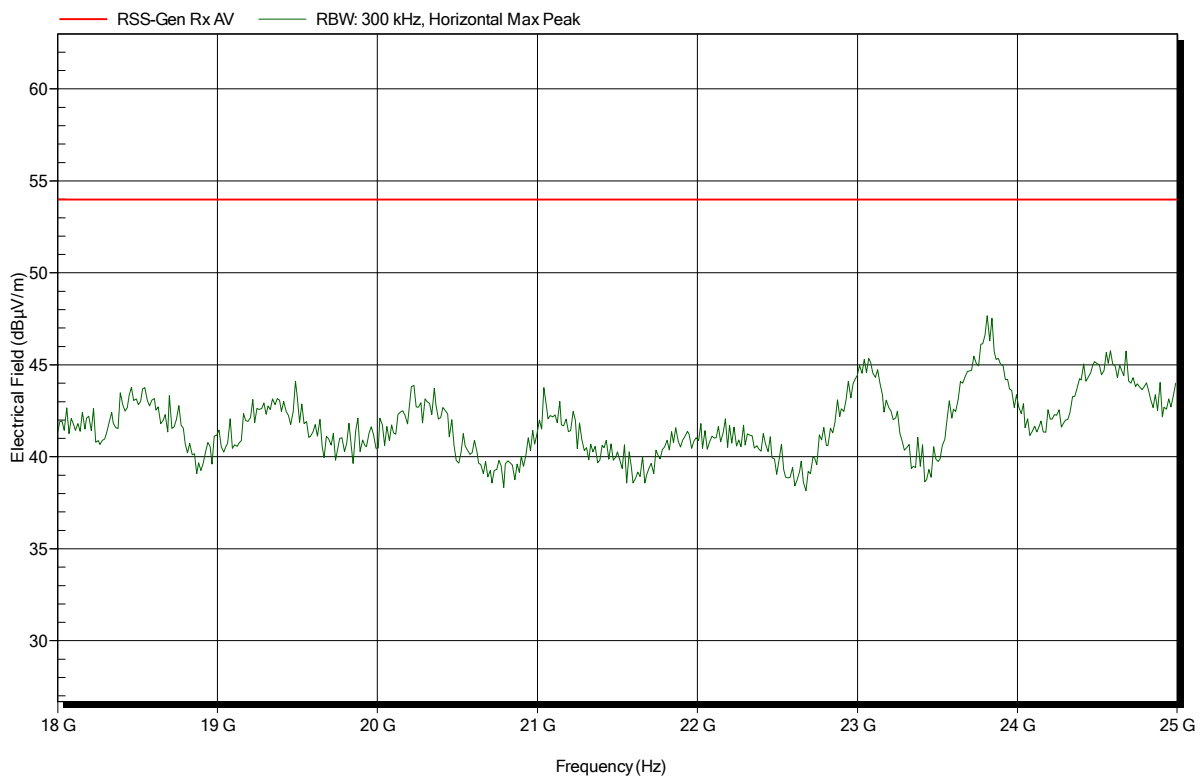


Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: ATH18G40, Horizontal
 Measurement distance: 1 m converted to 3m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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Spurious emissions according to ISED RSS-247, I1

Project number: G0M-1810-7783

Applicant: Panasonic Industrial Devices Europe GmbH
 EUT Name: Wi-Fi Dual Band 2.4/5 GHz and Bluetooth Module
 Model: ENWF9203A1EF (Sample 20581)
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom: 24°C, Vnom: 3.3 V DC
 Antenna: ATH18G40, Vertical
 Measurement distance: 1 m converted to 3m
 Mode: RX; BT; 2441 MHz
 Test Date: 2018-11-06
 Note: EUT horizontal

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