RADIO REPORT

FCC 47 CFR Part 15C
ISED Canada RSS-247

Digital transmission systems operating within the 2400 – 2483.5 MHz band

Report Reference No	G0M-1910-8555-TFC247ZB-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	DAkkS - Registration number : D-PL-12092-01-03 (ISED) ISED Testing Laboratory site: 3470A-2 DAkkS - Registration number : D-PL-12092-01-04 (FCC) FCC Filed Test Laboratory, Reg.-No.: 96970
Applicant	dresden elektronik ingenieurtechnik gmbh
Address	Enno-Heidebroek-Straße 12 01237 Dresden GERMANY
Test Specification	According to FCC/ISED rules
Standard	47 CFR Part 15C RSS-247, Issue 2, 2017-02 RSS-Gen, Issue 5, Amendment 1, 2019-03
Non-Standard Test Method	None
Equipment under Test (EUT):	
Product Description	Zigbee Radio Module for Raspberry Pi
Model(s)	RaspBee II
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	5 770 19 00.150.00
Software Version(s)	0
FCC-ID	XVV-RASPBEE2
IC	8720A-RASPBEE2
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	2019-11-08
Report:	

Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	W. Treffke .....
Approved by (+ signature) (Head of Lab)	Christian Weber	C. Weber .....
Date of Issue	2020-02-26	
Total number of pages	126	

General Remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional Comments:

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-02-26	Initial Release	

ABBREVIATIONS AND ACRONYMS

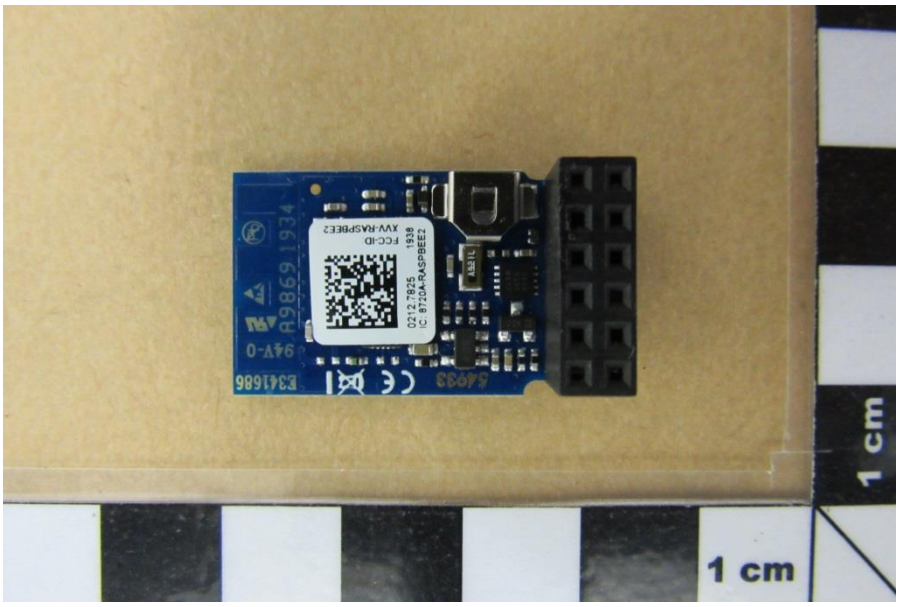
Acronyms	
Acronym	Description
DSSS	Direct Sequence Spread Spectrum
EUT	Equipment Under Test
FCC	Federal Communications Commission
IEEE 802.15.4	MAC and PHY Layer for Wireless Personal Area Networks
ISED	Innovation, Science and Economic Development Canada
O-QPSK	Offset-Quadrature Phase Shift Keying
QPSK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

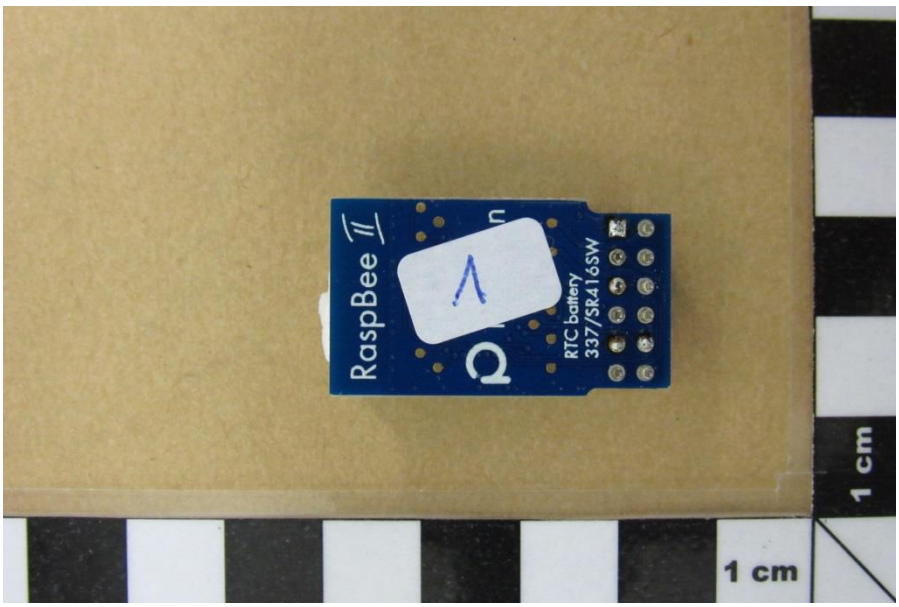
REPORT INDEX

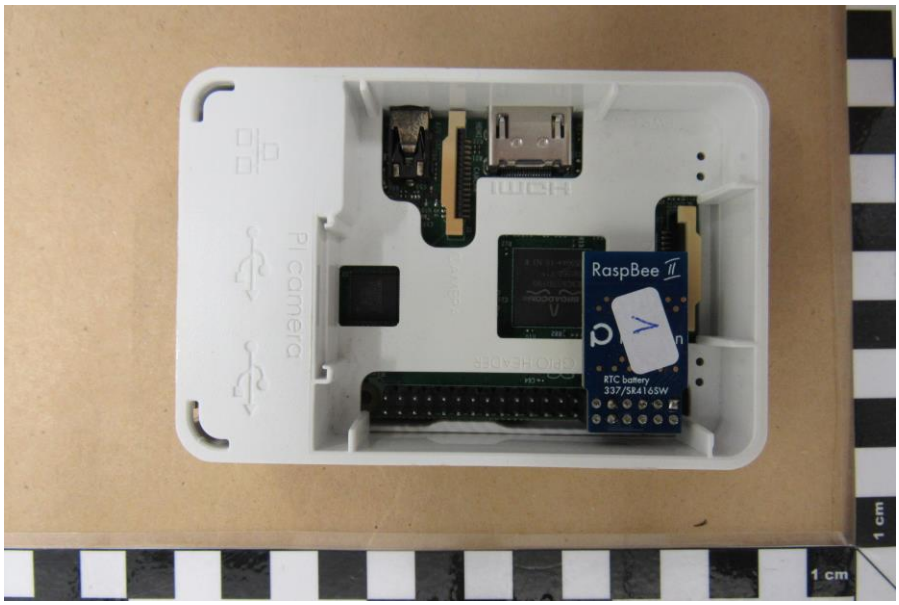
1 Equipment (Test Item) Under Test

Description	Zigbee Radio Module for Raspberry Pi	
Model	RaspBee II	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	None	
Hardware Version(s)	5 770 19 00.150.00	
Software Version(s)	0	
PMN	RaspBee II	
HVIN	RaspBee II	
FVIN	N/A	
HMN	N/A	
FCC-ID	XVV-RASPBEE2	
IC	8720A-RASPBEE2	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	2400 - 2483.5 MHz	
Radio technology	IEEE 802.15.4	
Modulation	O-QPSK	
Number of antenna ports	1	
Antenna	Type	Integrated
	Model	PCB antenna
	Manufacturer	dresden elektronik
	Gain	-0.26 dBi (antenna pattern measurement)
Supply Voltage	V_{NOM}	5.0 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
	Vendor	None
	Input	None
	Output	None
Manufacturer	dresden elektronik ingenieurtechnik gmbh Enno-Heidebroek-Straße 12 01237 Dresden GERMANY	

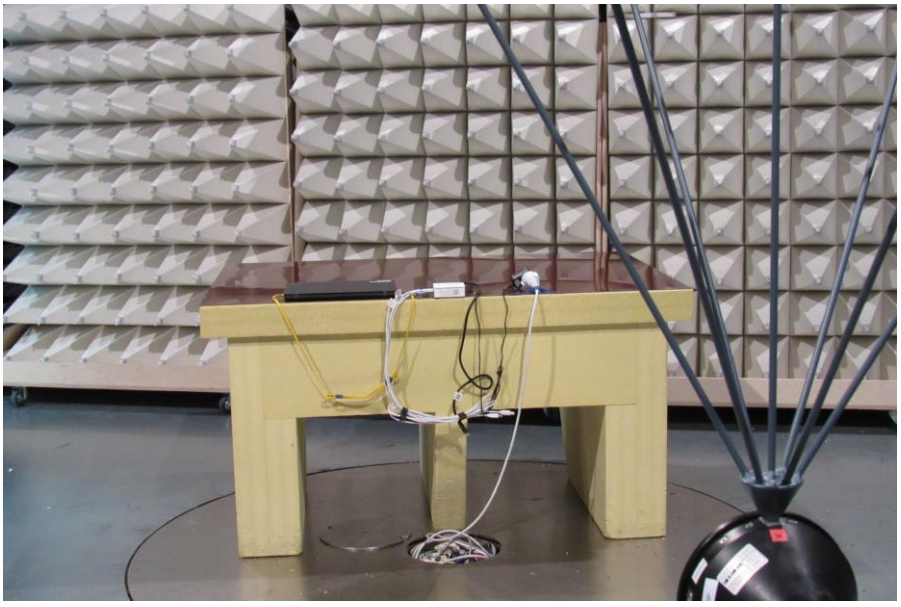
1.1 Photos – Equipment

EUT Zigbee Radio Module for Raspberry Pi; Top View


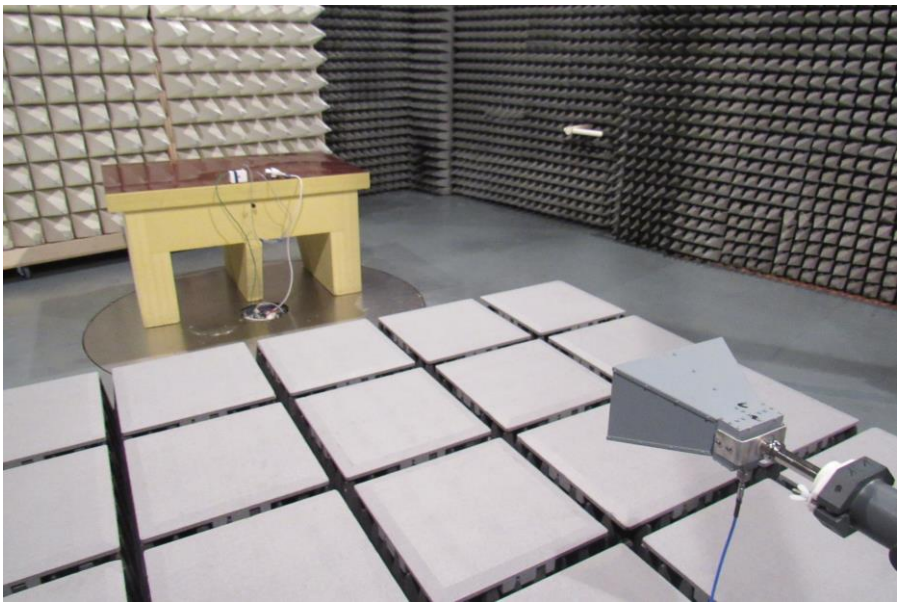
EUT Zigbee Radio Module for Raspberry Pi; Top View


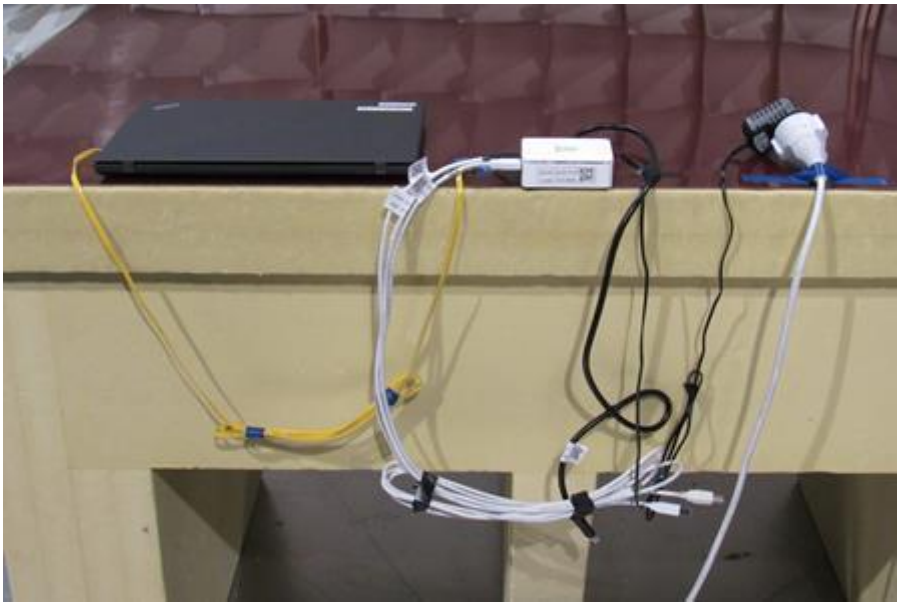
EUT inserted in evaluation board


1.2 Photos – Test Setup

Radiated Setup 1


Radiated Setup 2


Radiated Setup 3


Radiated Setup Detail View


Conducted Setup Detail


1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE 1	Zigbee USB dongle	dresden elektronik	Conbee	companion device
AE 2	Host for DUT	dresden elektronik	Raspberry Pi 3	-
SFT	EUT internal VLC-Viewer, Laptop with Putty on remote desktop			
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
SFT Note: The Equipment Under Test used an operating system with a test firmware. The driver for the tested technology was running in a manufacturer mode.				
Comment:				

1.4 Test mode duty cycle

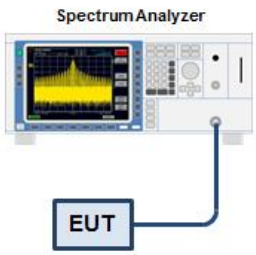
1.4.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.4.2 Requirements

Requirements	
Duty cycle	Duty cycle correction
≥ 98 %	No correction required
< 98 %	Correction required (10 x Log_{10}(1/DC)

1.4.3 Setup

Test Setup


1.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

1.4.5 Procedure

Test Procedure
1. EUT set to test mode 2. Span is set to zero span 3. Detector set to peak 4. Sweep time is set long enough to capture at least 5 bursts 5. Envelope peak value of emission spectrum is selected 6. The maximum burst duration T_{ON} is measured using two markers set to the start and the end of the longest burst 7. The minimum idle duration T_{OFF} is measured using two markers set to the start and the end of the shortest idle period 8. The duty cycle is calculated by DC = T_{ON} / (T_{ON} + T_{OFF}) 9. The duty cycle correction is calculated by DC = 10 x Log_{10}(T_{ON} / (T_{ON} + T_{OFF}))

1.4.6 Results

Duty Cycle Results		
Mode	Duty Cycle	Correction Factor [dB]
IEEE 802.15.4	100%	0

1.5 Test Modes

Mode	Description
DSSS O-QPSK	Mode = Transmit Modulation = O-QPSK Spreading = DSSS Data rate = 250 kbps Chip rate = 2000 kbps Duty cycle = 100% (test mode) Power Setting =12 (0x0C) for test channel 11 / 18 / 25 Power Setting =15 (0x0F) for test channel 26
O-QPSK	Mode = Transmit Modulation = O-QPSK Spreading = None Data rate = 2000 kbps Duty cycle = 100% (test mode) Power Setting =12 (0x0C) for test channel 11 / 18 / 25 Power Setting =15 (0x0F) for test channel 26
Receive	Mode = Receive
Comment:	

1.6 Test Frequencies

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

1.7 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
ISED RSS-Gen, Issue 5 (section 6.6)	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247, Issue 2 (section 5.2)	6 dB Bandwidth	ANSI C63.10-2013	PASS	
FCC § 15.247(b)(1) ISED RSS-247, Issue 2 (section 5.4)	Maximum peak conducted power	ANSI C63.10-2013	PASS	
FCC § 15.247(e) ISED RSS-247, Issue 2 (section 5.2)	Power spectral density	ANSI C63.10-2013	PASS	
FCC § 15.207 ISED RSS-247, Issue 2 (section 3.1)	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Band edge compliance	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247, Issue 2 (section 5.5)	Conducted spurious emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-Gen, Issue 5 (section 6.13)	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247, Issue 2 (section 3.1)	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	
Comment:				

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

3 Test Conditions and Results

3.1 Test Conditions and Results - Occupied bandwidth

3.1.1 Information

Test Information	
Reference	ISED RSS-Gen, Issue 5 (section 6.6)
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2019-12-04

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.1.4 Procedure

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

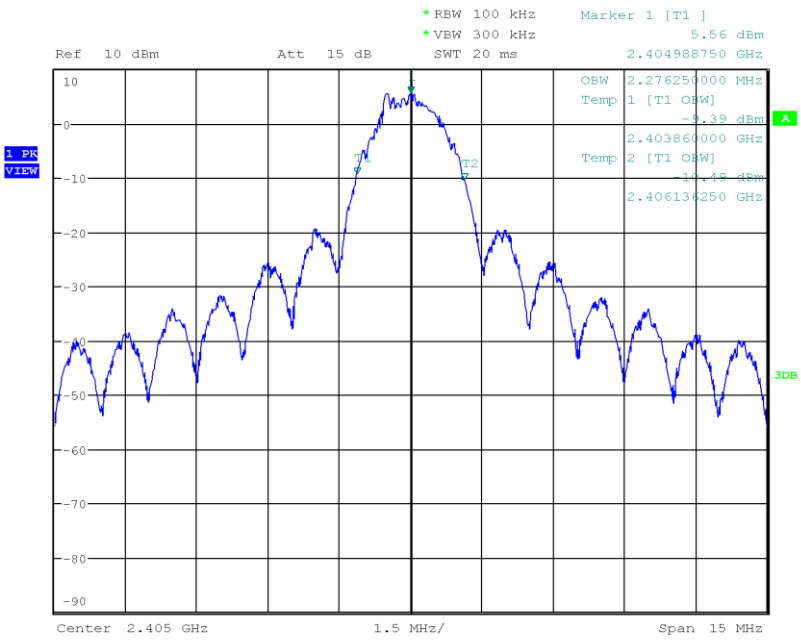
3.1.5 Results

Test Results - Data rate = 250 kbps		
Mode	Frequency [MHz]	Bandwidth [MHz]
O-QPSK	2405	2.276
O-QPSK	2440	2.299
O-QPSK	2475	2.348
O-QPSK	2480	**2.381**

Test Results - Data rate = 2000 kbps		
Mode	Frequency [MHz]	Bandwidth [MHz]
O-QPSK	2405	2.288
O-QPSK	2440	2.329
O-QPSK	2475	2.355
O-QPSK	2480	2.359

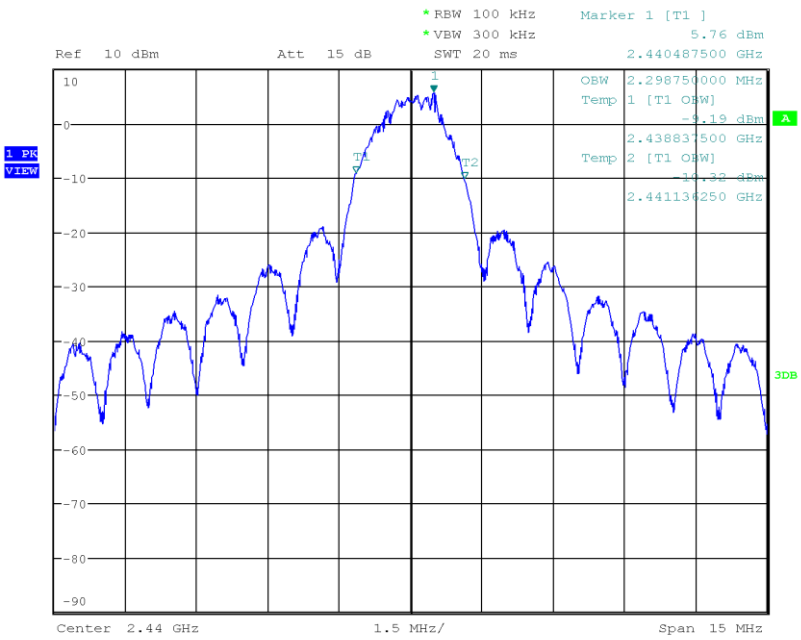
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.276



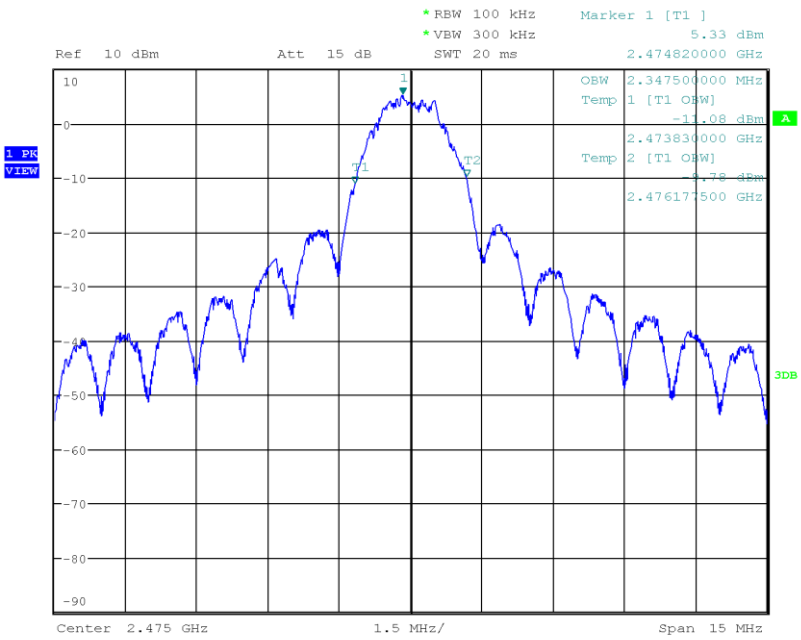
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.299



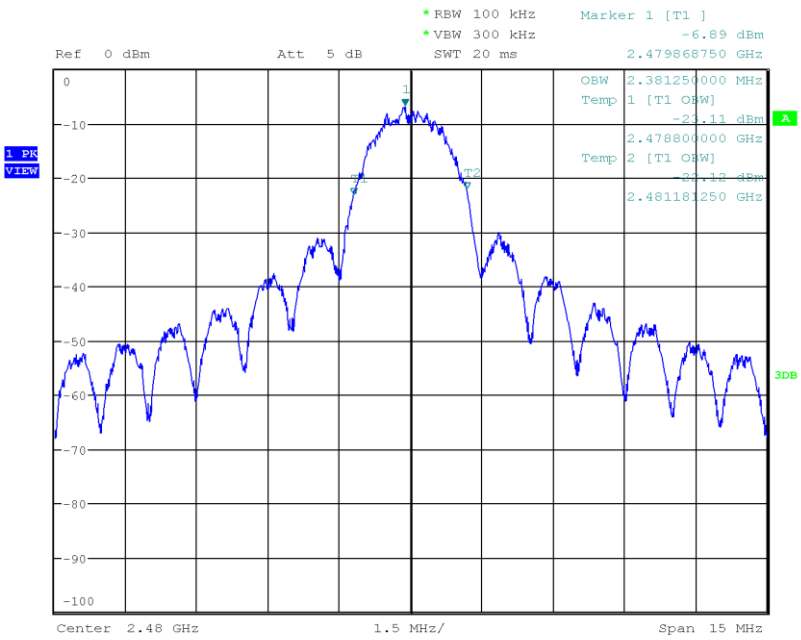
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.348



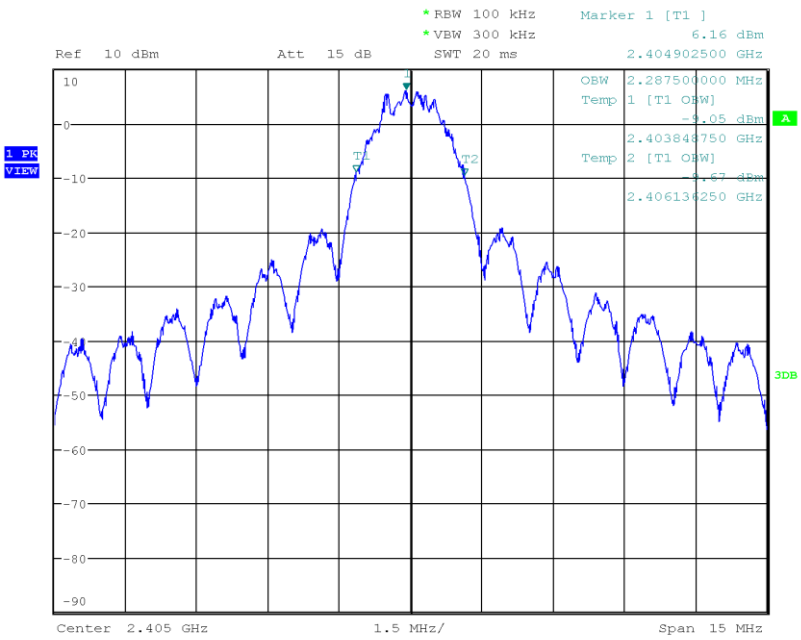
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.381



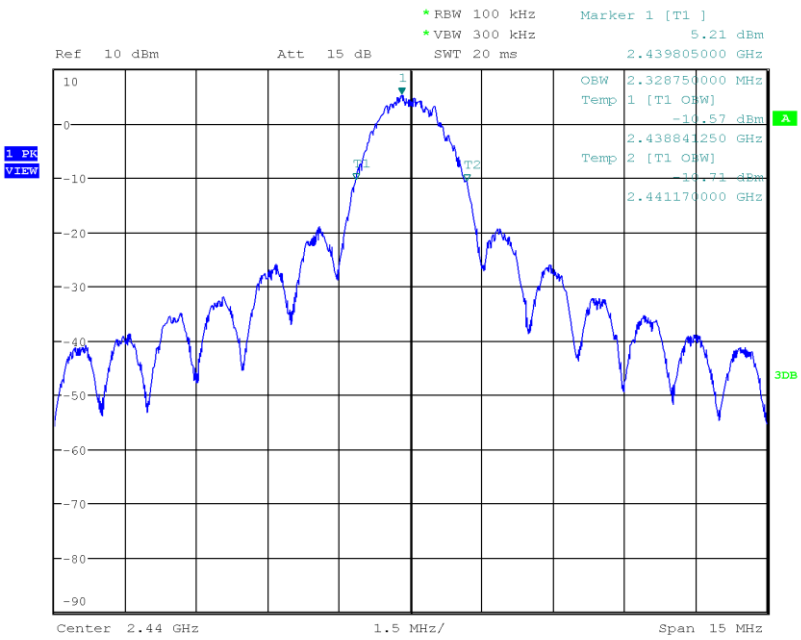
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.288



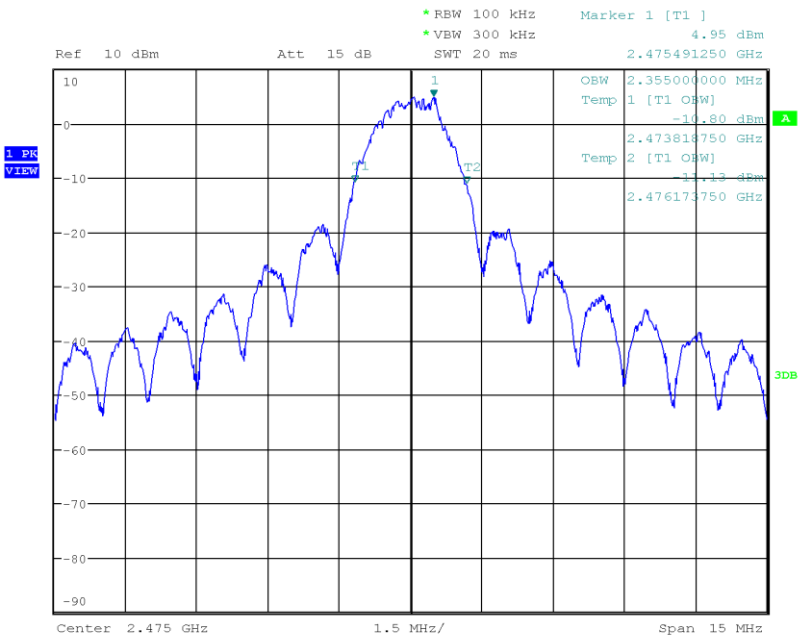
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.329



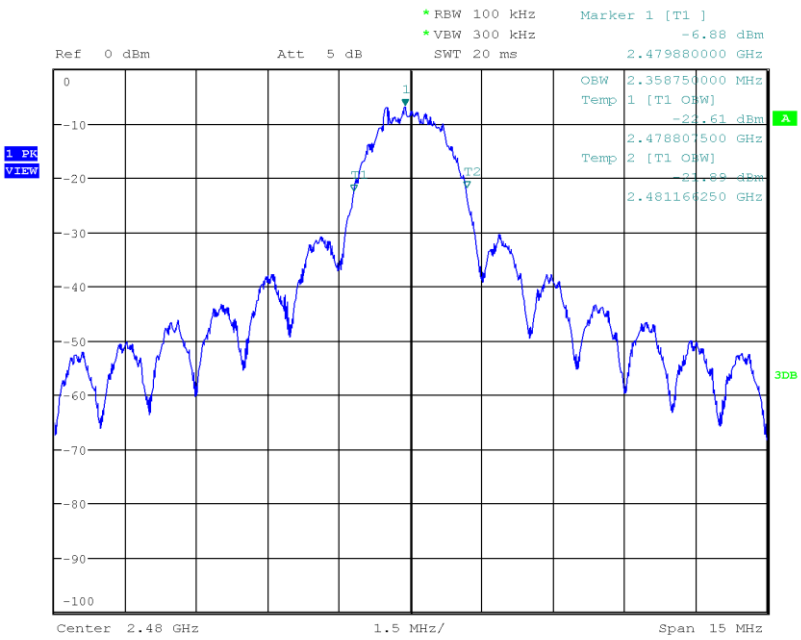
Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.355



Occupied Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Occupied Bandwidth [MHz]:	2.359



3.2 Test Conditions and Results - 6 dB bandwidth

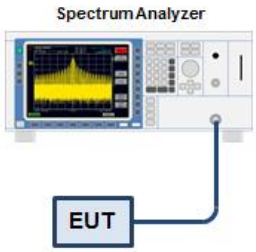
3.2.1 Information

Test Information	
Reference	FCC § 15.247(a)(2); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.8
Operator	Wilfried Treffke
Date	2019-12-04

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup

Test Setup


3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.2.5 Procedure

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

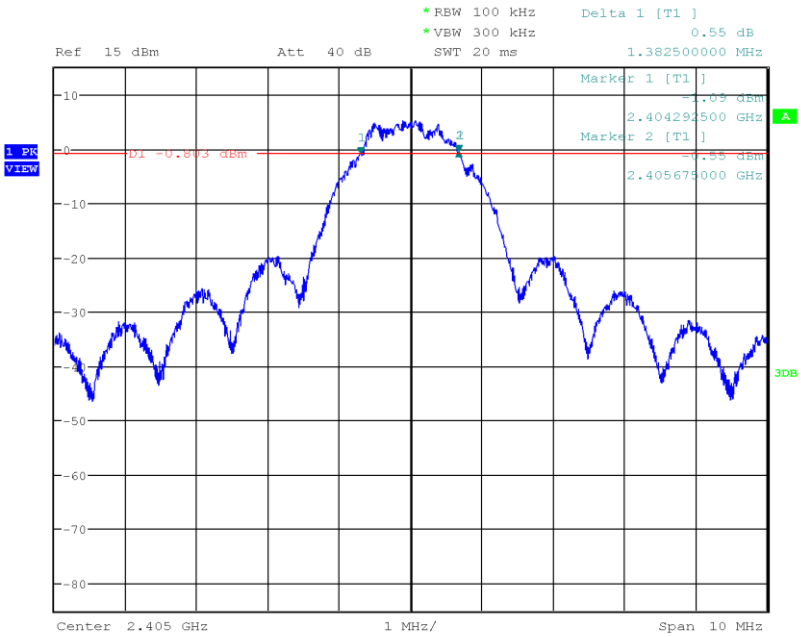
3.2.6 Results

Test Results - Data rate = 250 kbps				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
O-QPSK	2405	1382.5	500	Pass
O-QPSK	2440	1502.5	500	Pass
O-QPSK	2475	1422.5	500	Pass
O-QPSK	2480	1510.0	500	Pass

Test Results - Data rate = 2000 kbps				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
O-QPSK	2405	1380.0	500	Pass
O-QPSK	2440	1392.5	500	Pass
O-QPSK	2475	1452.5	500	Pass
O-QPSK	2480	1465.0	500	Pass

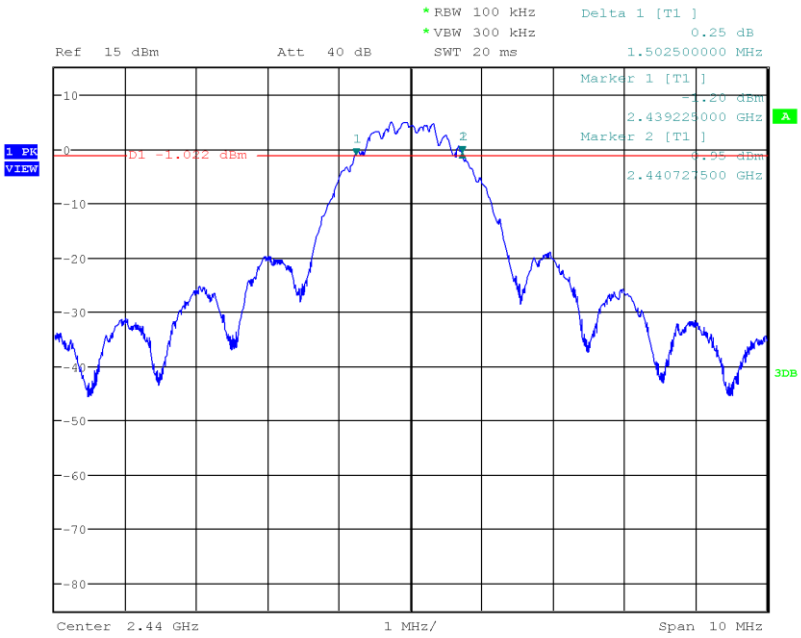
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2404.293
Upper Frequency [MHz]:	2405.675
6 dB Bandwidth [kHz]:	1382.5



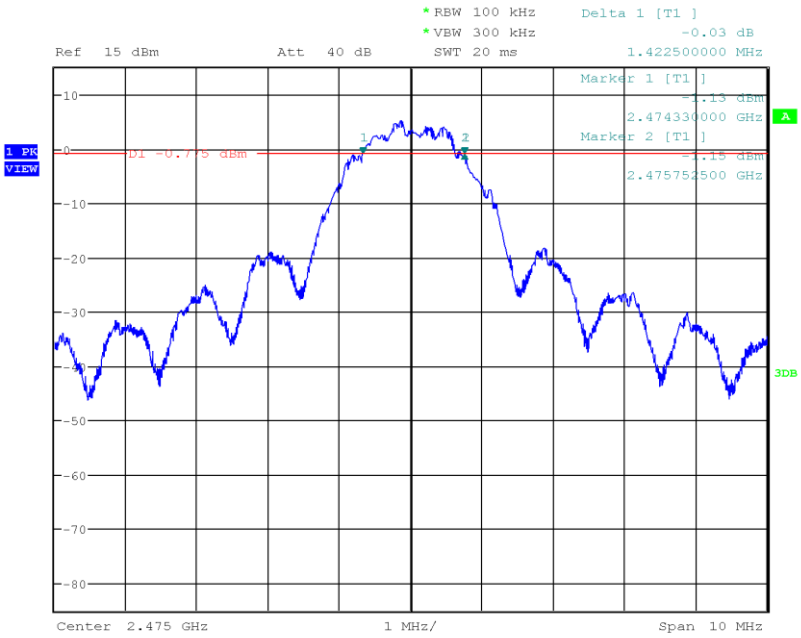
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2439.225
Upper Frequency [MHz]:	2440.727
6 dB Bandwidth [kHz]:	1502.5



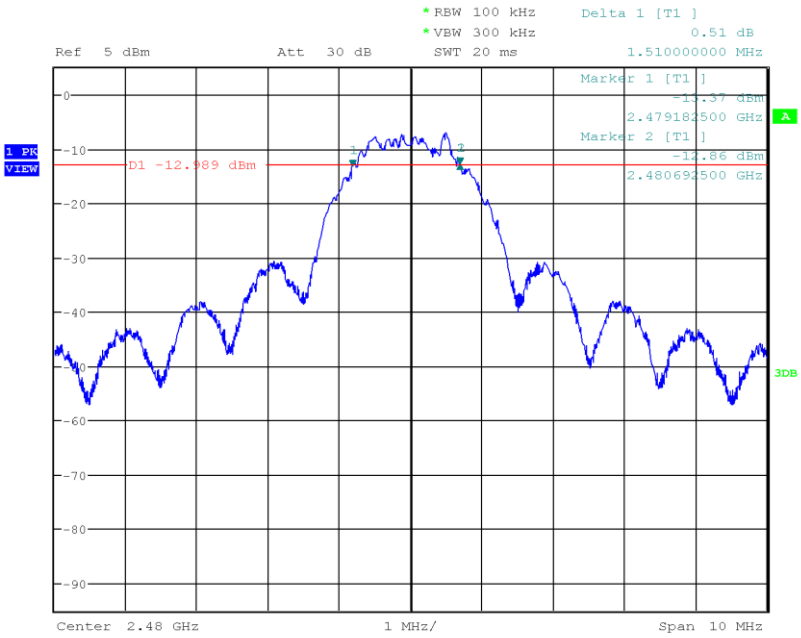
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2474.330
Upper Frequency [MHz]:	2475.753
6 dB Bandwidth [kHz]:	1422.5



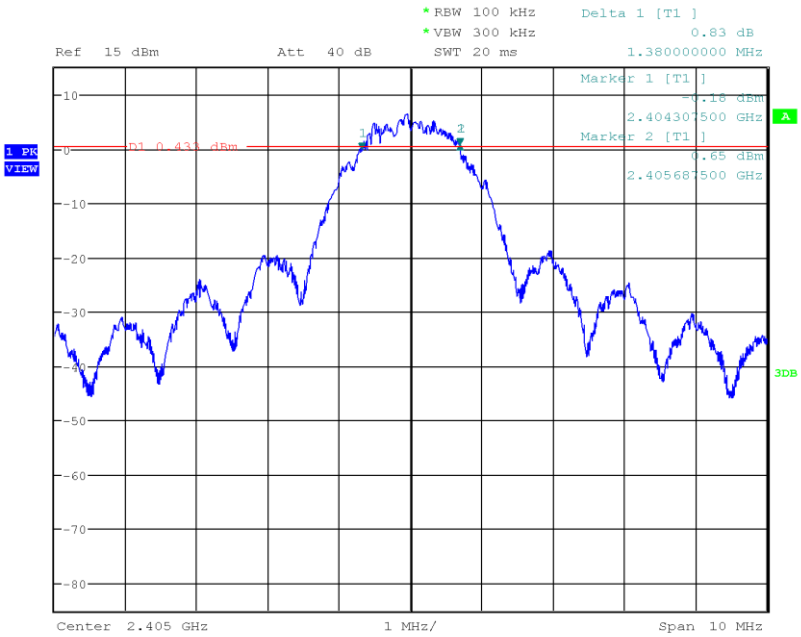
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2479.182
Upper Frequency [MHz]:	2480.693
6 dB Bandwidth [kHz]:	1510.0



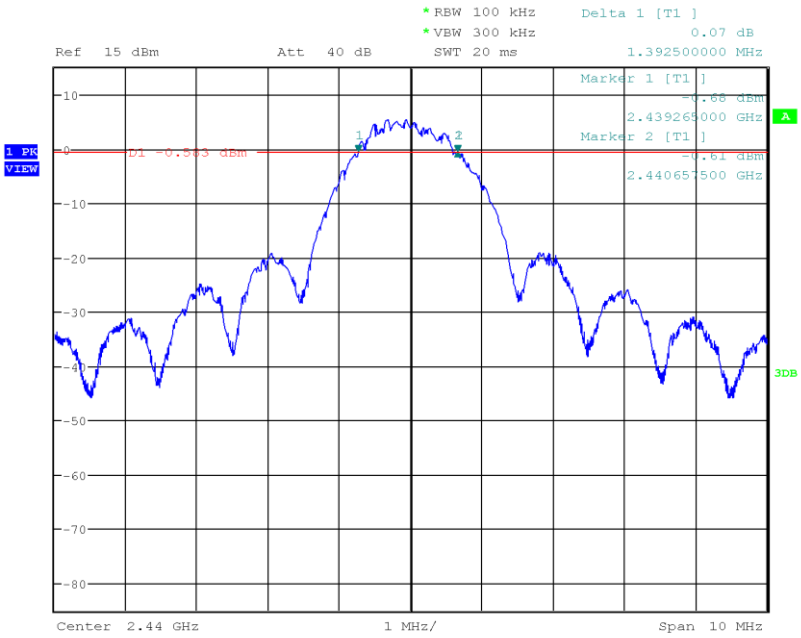
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2404.307
Upper Frequency [MHz]:	2405.688
6 dB Bandwidth [kHz]:	1380.0



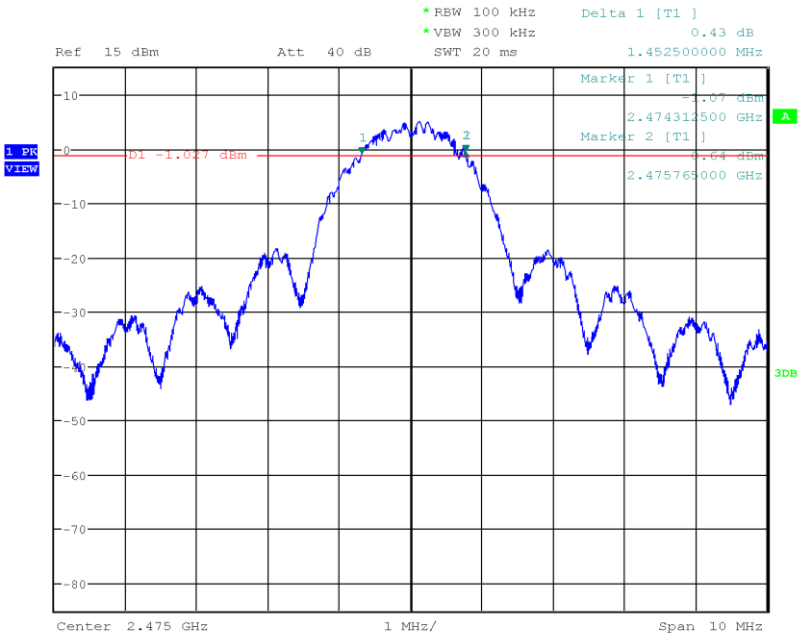
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2439.265
Upper Frequency [MHz]:	2440.657
6 dB Bandwidth [kHz]:	1392.5



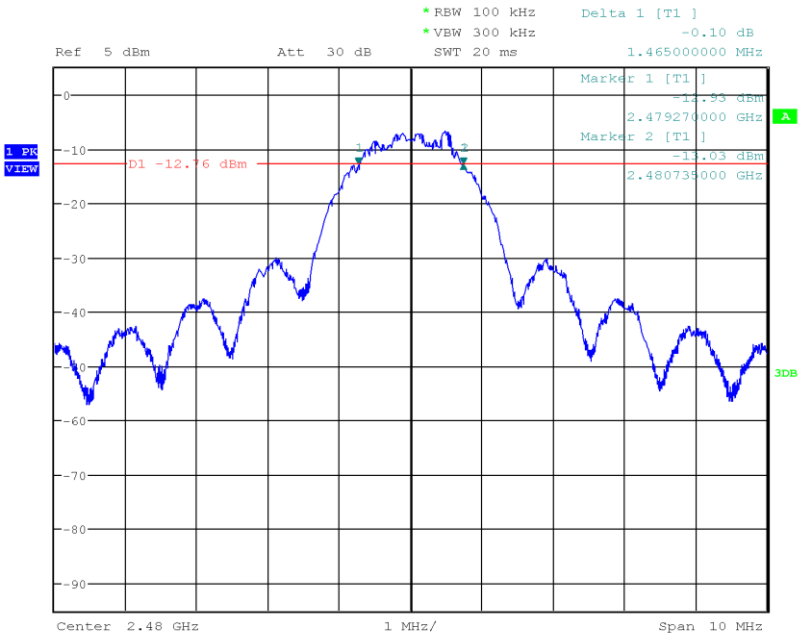
DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2474.312
Upper Frequency [MHz]:	2475.765
6 dB Bandwidth [kHz]:	1452.5



DTS (6 dB) Bandwidth

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Lower Frequency [MHz]:	2479.270
Upper Frequency [MHz]:	2480.735
6 dB Bandwidth [kHz]:	1465.0



3.3 Test Conditions and Results - Maximum peak conducted output power

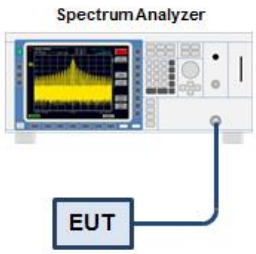
3.3.1 Information

Test Information	
Reference	FCC § 15.247(b)(1); ISED RSS-247, Issue 2 (section 5.4)
Measurement Method	ANSI C63.10 11.9.1
Operator	Wilfried Treffke
Date	2019-12-04

3.3.2 Limits

Limits
1 W (30 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.

3.3.3 Setup

Test Setup


3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.3.5 Procedure

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

3.3.6 Results

Test Results - Data rate = 250 kbps				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2405	8.991	0.007927	1.0	PASS
2440	8.846	0.007667	1.0	PASS
2475	8.635	0.007303	1.0	PASS
2480	-3.299	0.000468	1.0	PASS

Test Results - Data rate = 2000 kbps				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2405	9.061	0.008056	1.0	PASS
2440	8.849	0.007672	1.0	PASS
2475	8.458	0.007011	1.0	PASS
2480	-3.410	0.000456	1.0	PASS

3.4 Test Conditions and Results - Power spectral density

3.4.1 Information

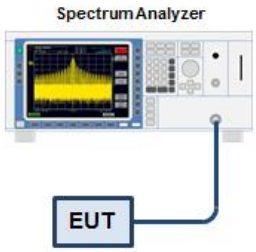
Test Information	
Reference	FCC § 15.247(e); ISED RSS-247, Issue 2 (section 5.2)
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Operator	Wilfried Treffke
Date	2019-12-04

3.4.2 Limits

Limits
8 dBm / 3 kHz

3.4.3 Setup

Test Setup



3.4.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.4.5 Procedure

Test Procedure

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

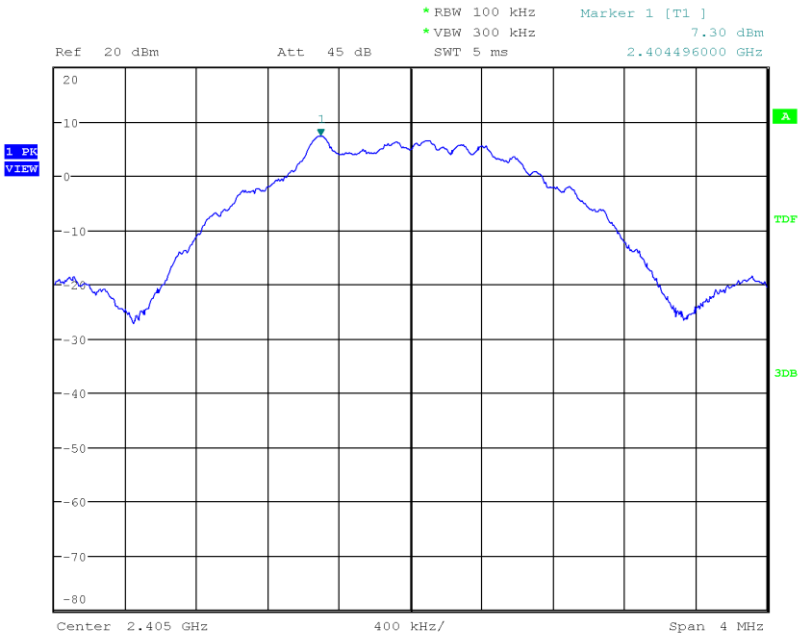
3.4.6 Results

Test Results - Data rate = 250 kbps			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2405	7.301	8.0	PASS
2440	6.288	8.0	PASS
2475	5.611	8.0	PASS
2480	-6.040	8.0	PASS
RBW = 100 kHz			

Test Results - Data rate = 2000 kbps			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2405	6.257	8.0	PASS
2440	6.984	8.0	PASS
2475	5.610	8.0	PASS
2480	-5.825	8.0	PASS
RBW = 100 kHz			

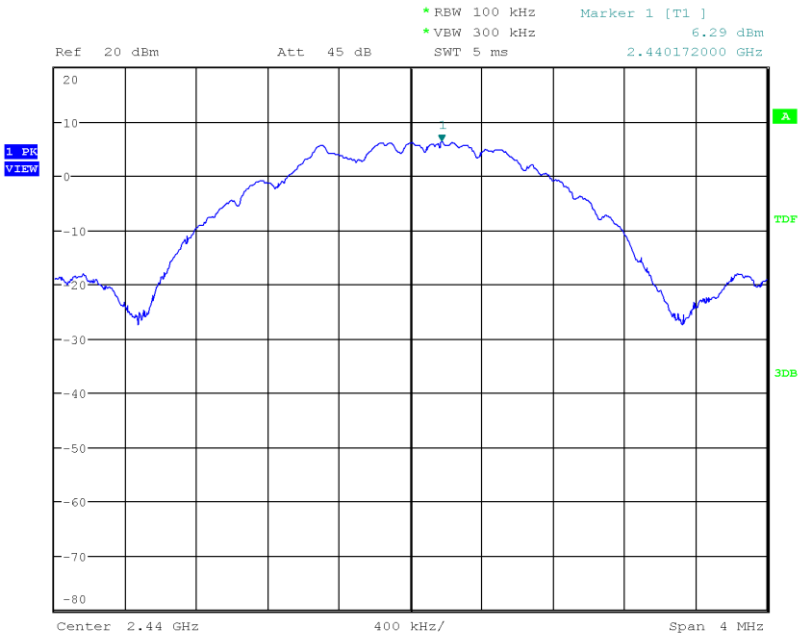
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2404.496
Spectral Density [dBm/RBW]:	7.301
Resolution Bandwidth [kHz]:	100 kHz



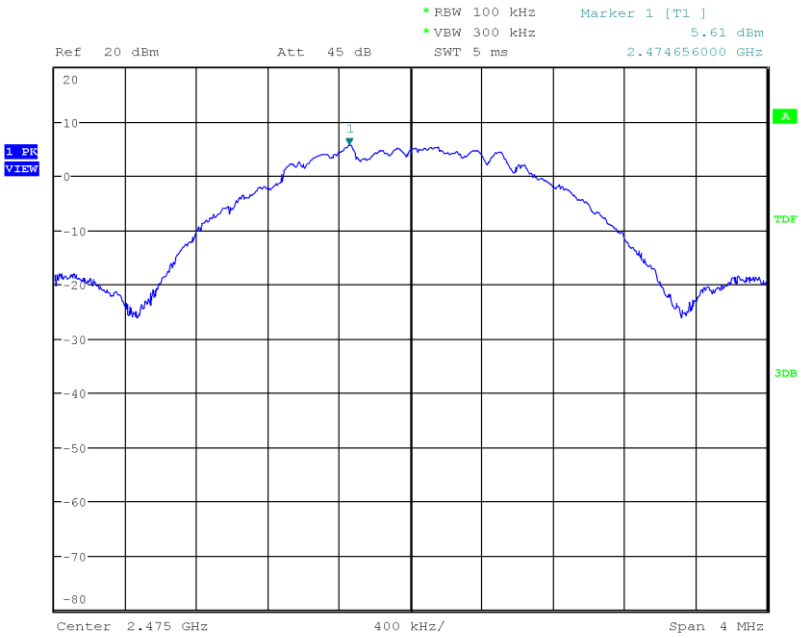
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2440.172
Spectral Density [dBm/RBW]:	6.288
Resolution Bandwidth [kHz]:	100 kHz



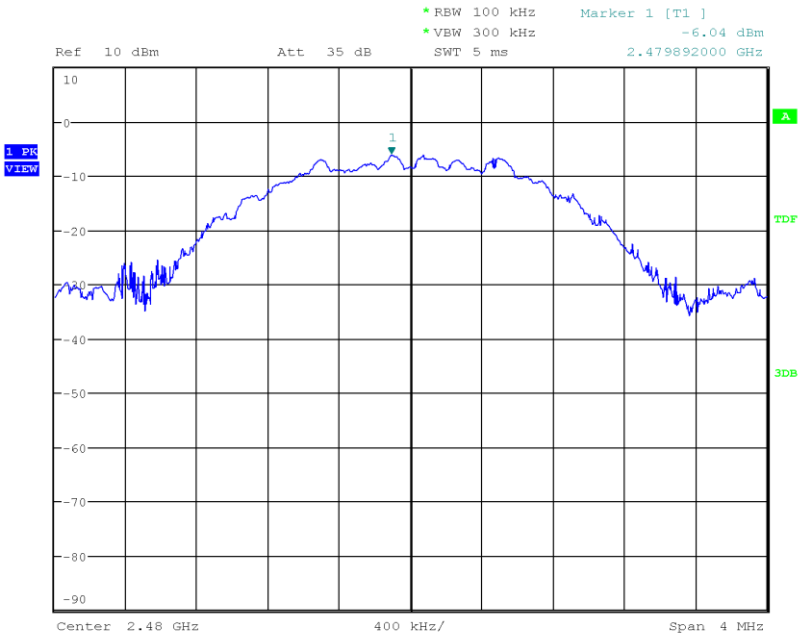
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2474.656
Spectral Density [dBm/RBW]:	5.611
Resolution Bandwidth [kHz]:	100 kHz



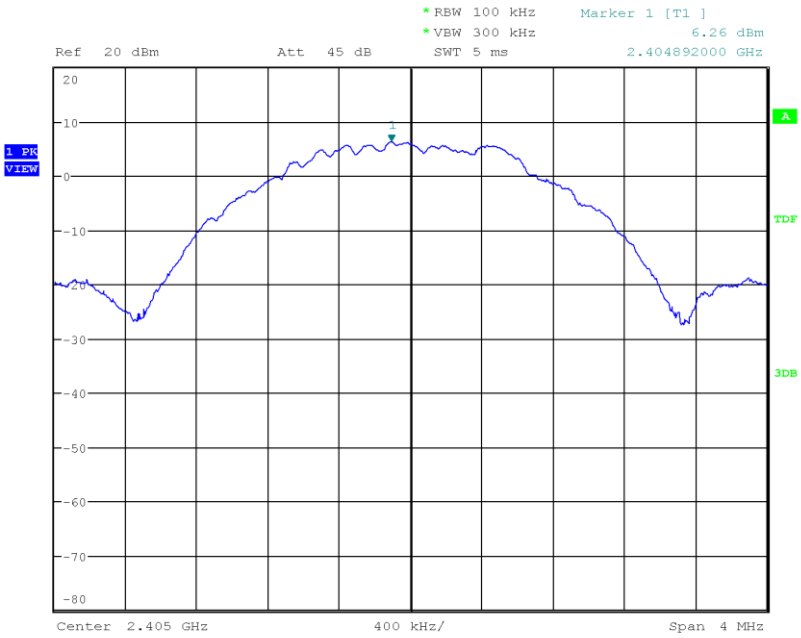
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2479.892
Spectral Density [dBm/RBW]:	-6.040
Resolution Bandwidth [kHz]:	100 kHz



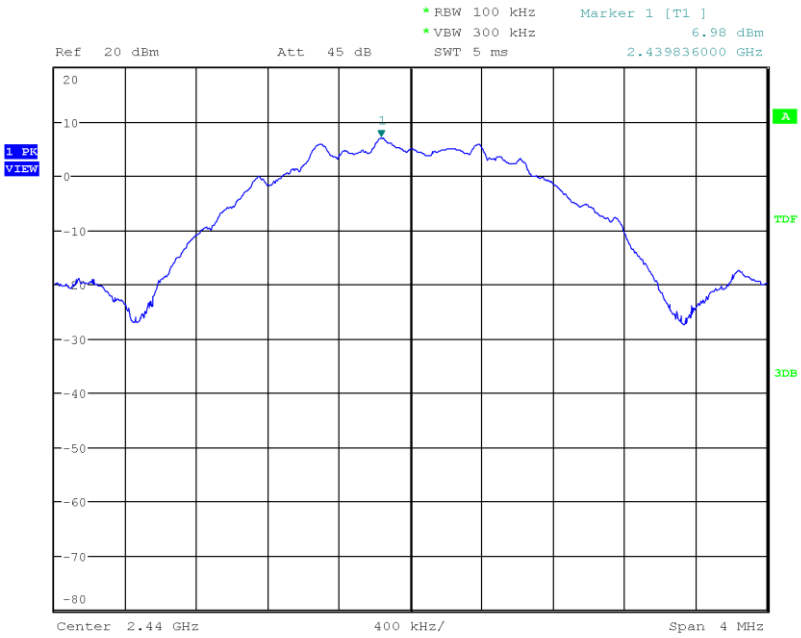
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2404.892
Spectral Density [dBm/RBW]:	6.257
Resolution Bandwidth [kHz]:	100 kHz



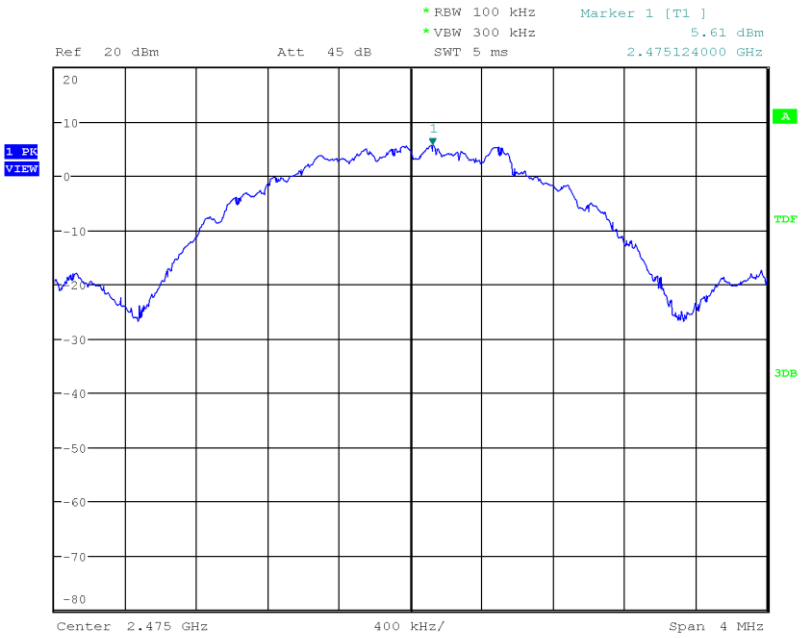
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2439.836
Spectral Density [dBm/RBW]:	6.984
Resolution Bandwidth [kHz]:	100 kHz



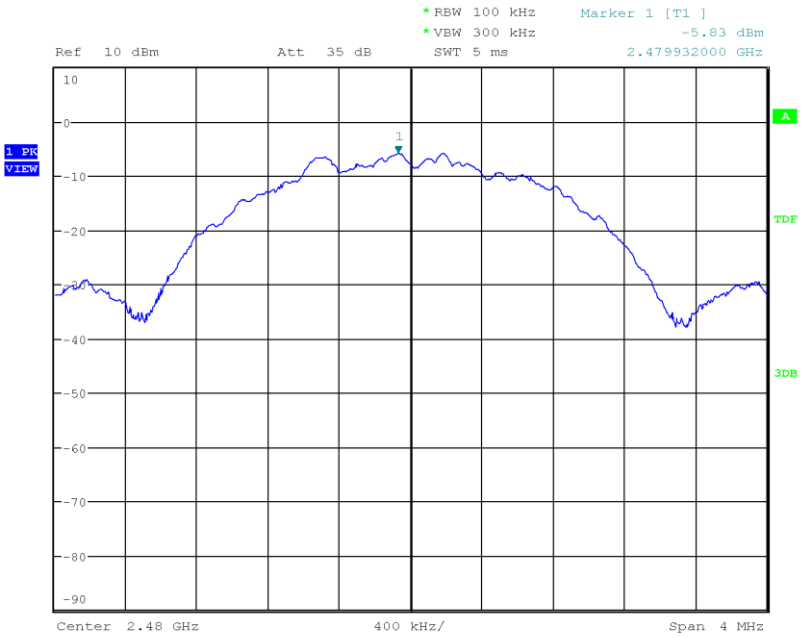
Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2475.124
Spectral Density [dBm/RBW]:	5.610
Resolution Bandwidth [kHz]:	100 kHz



Peak Power Spectral Density

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Peak Frequency [MHz]:	2479.932
Spectral Density [dBm/RBW]:	-5.825
Resolution Bandwidth [kHz]:	100 kHz



3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

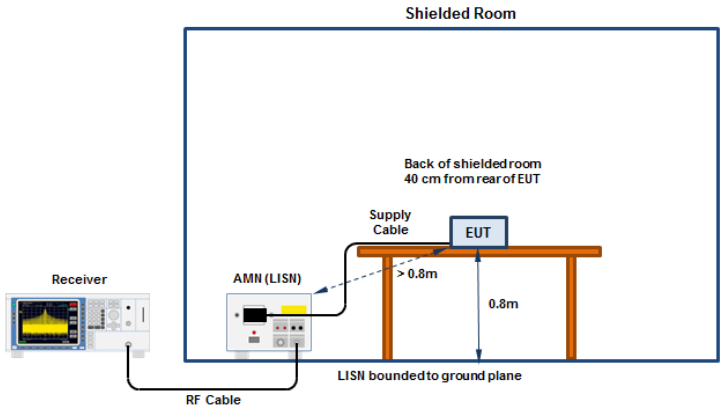
Test Information	
Reference	FCC § 15.207; ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.2
Operator	Wilfried Treffke
Date	2019-12-04

3.5.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dBµV]	Average [dBµV]
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50
* Limit decreases linearly with the logarithm of the frequency		

3.5.3 Setup

Test Setup



3.5.4 Equipment

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

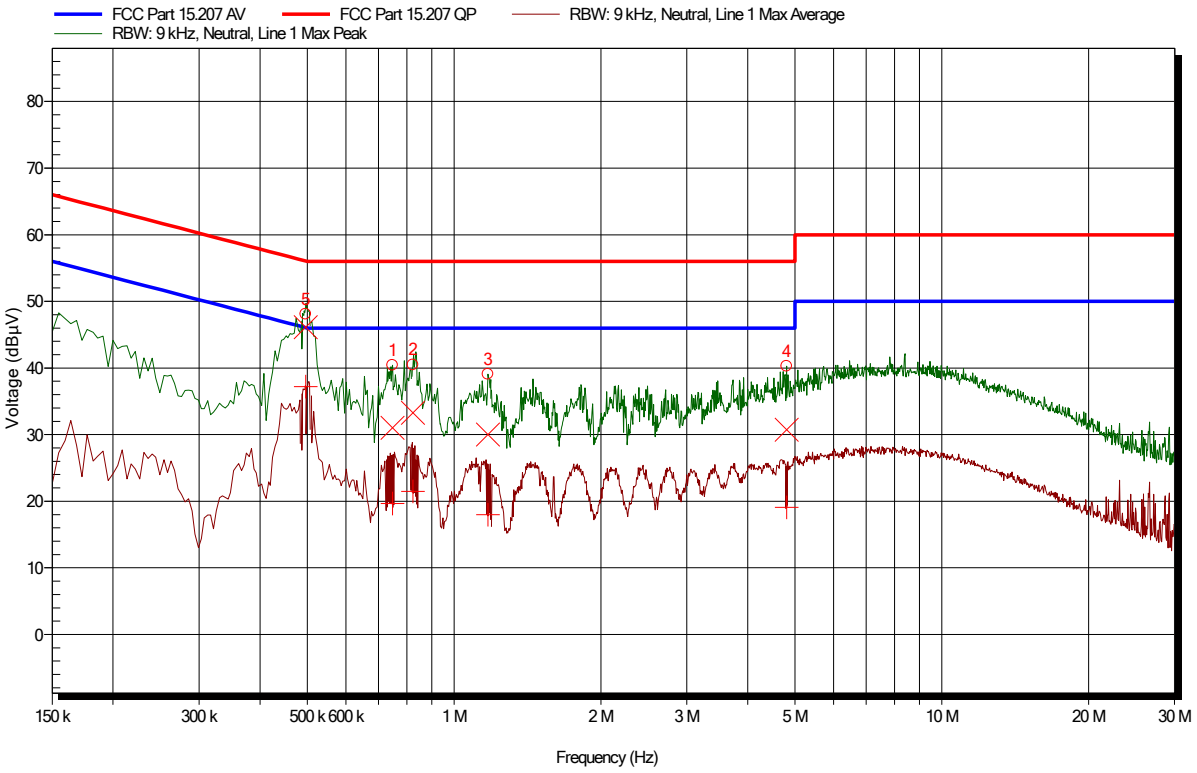
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	R&S	ESR7	EF00943	2019-10	2020-10
LISN	R&S	ESH3-Z5	EF00036	2019-07	2021-07

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

Project number: G0M-1910-8555

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 21°C, Unom: 120 VAC / 60Hz
LISN:	Rohde & Schwarz ESH3-Z5
Mode:	IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-04
Note:	max value neutral / line1

Index 100



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	748.05 kHz	31.01 dBµV	56 dBµV	-24.99 dB	Pass
2	824.1 kHz	33.26 dBµV	56 dBµV	-22.74 dB	Pass
3	1.173 MHz	30.03 dBµV	56 dBµV	-25.97 dB	Pass
4	4.807 MHz	30.73 dBµV	56 dBµV	-25.27 dB	Pass
5	496.5 kHz	46.14 dBµV	56.06 dBµV	-9.92 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	748.05 kHz	19.65 dBµV	46 dBµV	-26.35 dB	Pass
2	824.1 kHz	21.49 dBµV	46 dBµV	-24.51 dB	Pass
3	1.173 MHz	17.96 dBµV	46 dBµV	-28.04 dB	Pass
4	4.807 MHz	19.1 dBµV	46 dBµV	-26.9 dB	Pass
5	496.5 kHz	37.18 dBµV	46.06 dBµV	-8.88 dB	Pass

3.6 Test Conditions and Results - Band-edge compliance

3.6.1 Information

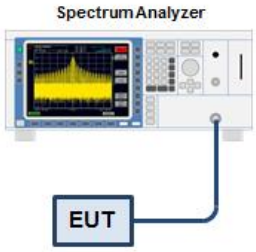
Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.13
Operator	Wilfried Treffke
Date	2019-12-04

3.6.2 Limits

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

3.6.3 Setup

Test Setup



3.6.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.6.5 Procedure

Test Procedure

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

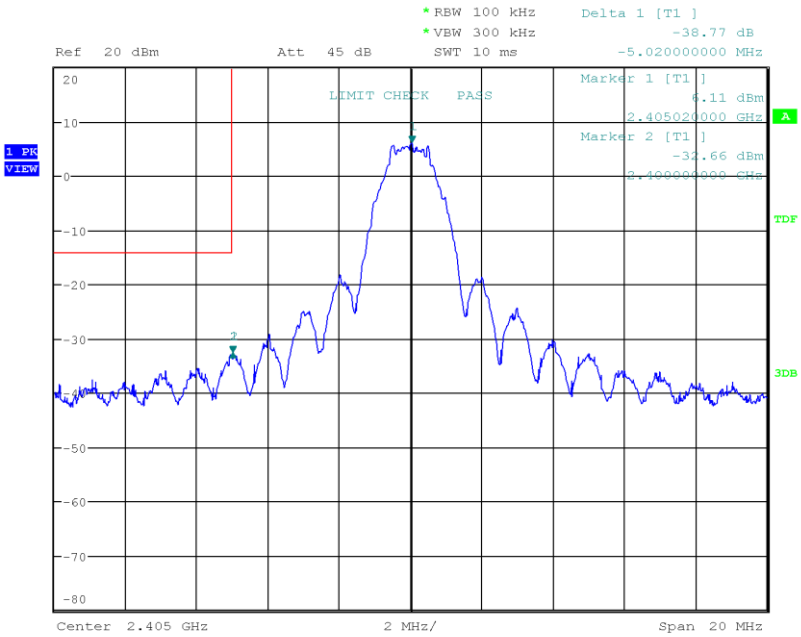
3.6.6 Results

Test Results - Data rate = 250 kbps				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
O-QPSK	2405	-38.77	-20	PASS
O-QPSK	2475	-48.41	-20	PASS
O-QPSK	2480	36.28	-20	PASS

Test Results - Data rate = 2000 kbps				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
O-QPSK	2405	-40.19	-20	PASS
O-QPSK	2475	-49.31	-20	PASS
O-QPSK	2480	-36.66	-20	PASS

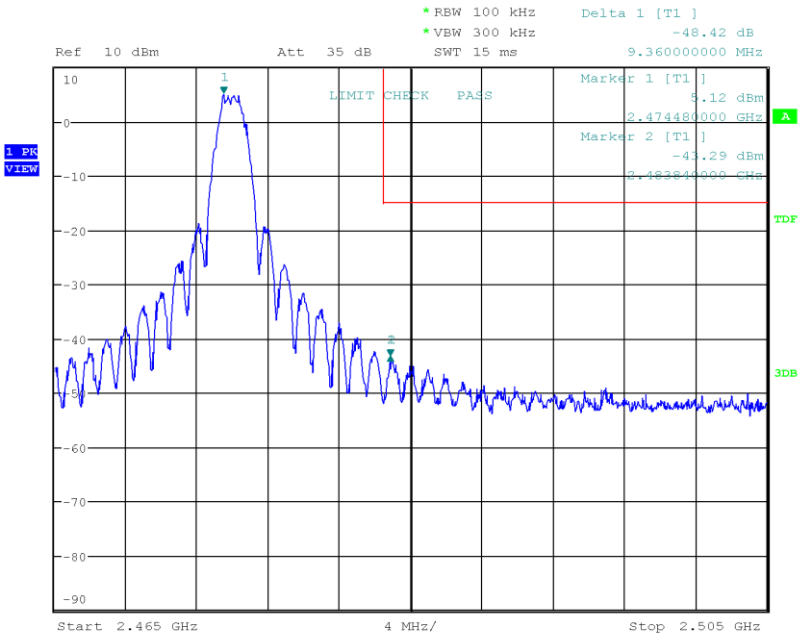
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Band-edge	Lower
In-band Frequency [MHz]:	2405.02
Max. in-band Level [dBm/100 kHz]:	6.11
Out-of-band Frequency [MHz]:	2400.0
Max. out-of-band Level [dBm/100 kHz]:	-32.662
Attenuation [dB]:	-38.77



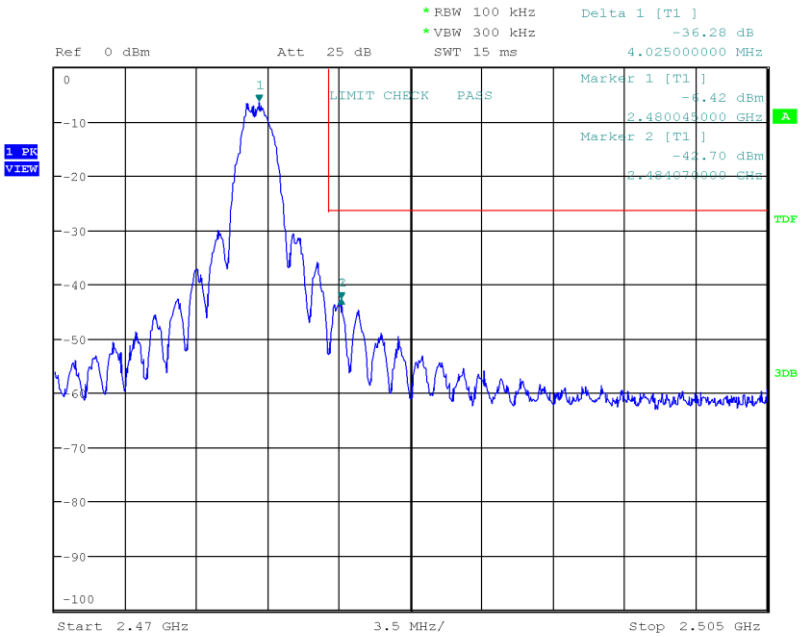
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Band-edge	Upper
In-band Frequency [MHz]:	2474.48
Max. in-band Level [dBm/100 kHz]:	5.123
Out-of-band Frequency [MHz]:	2483.84
Max. out-of-band Level [dBm/100 kHz]:	-43.292
Attenuation [dB]:	-48.41



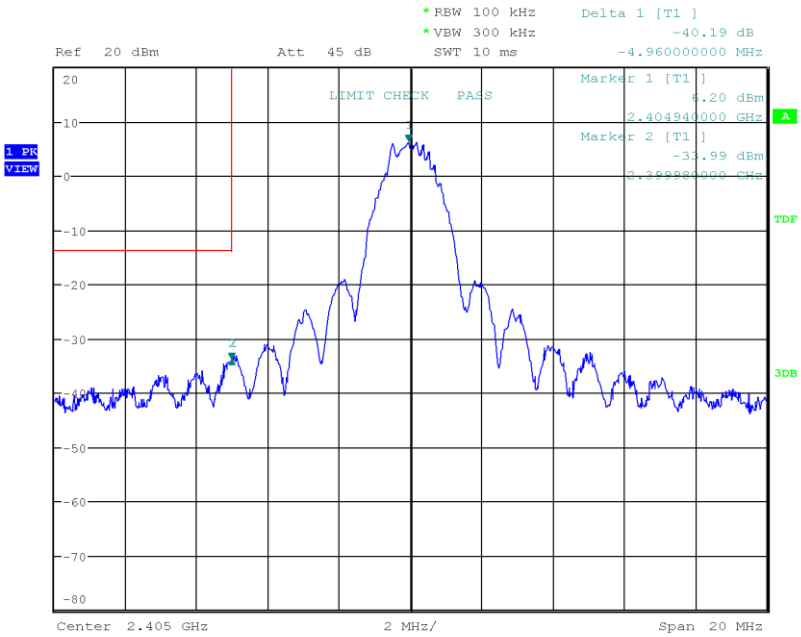
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Band-edge	Upper
In-band Frequency [MHz]:	2480.045
Max. in-band Level [dBm/100 kHz]:	-6.424
Out-of-band Frequency [MHz]:	2484.07
Max. out-of-band Level [dBm/100 kHz]:	-42.701
Attenuation [dB]:	-36.28



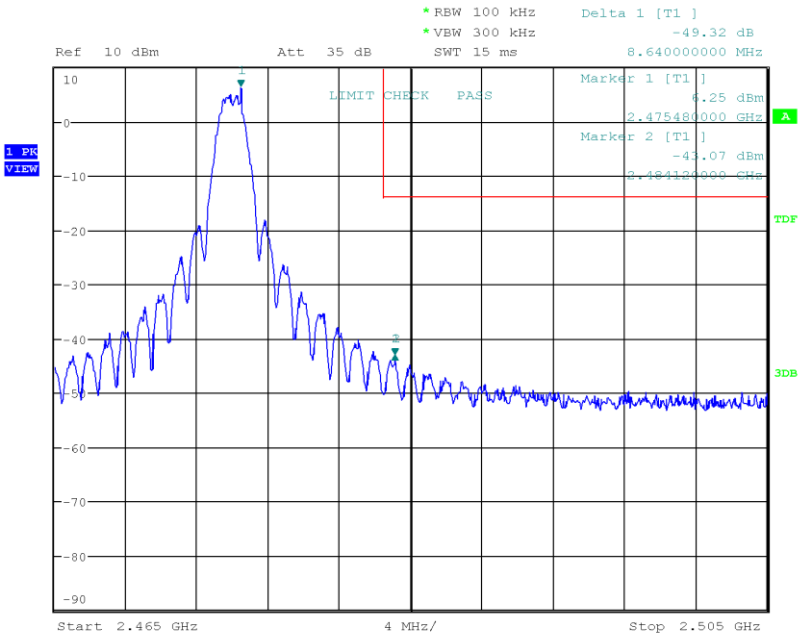
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Band-edge	Lower
In-band Frequency [MHz]:	2404.94
Max. in-band Level [dBm/100 kHz]:	6.204
Out-of-band Frequency [MHz]:	2399.98
Max. out-of-band Level [dBm/100 kHz]:	-33.988
Attenuation [dB]:	-40.19



Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Band-edge	Upper
In-band Frequency [MHz]:	2475.48
Max. in-band Level [dBm/100 kHz]:	6.247
Out-of-band Frequency [MHz]:	2484.12
Max. out-of-band Level [dBm/100 kHz]:	-43.068
Attenuation [dB]:	-49.31



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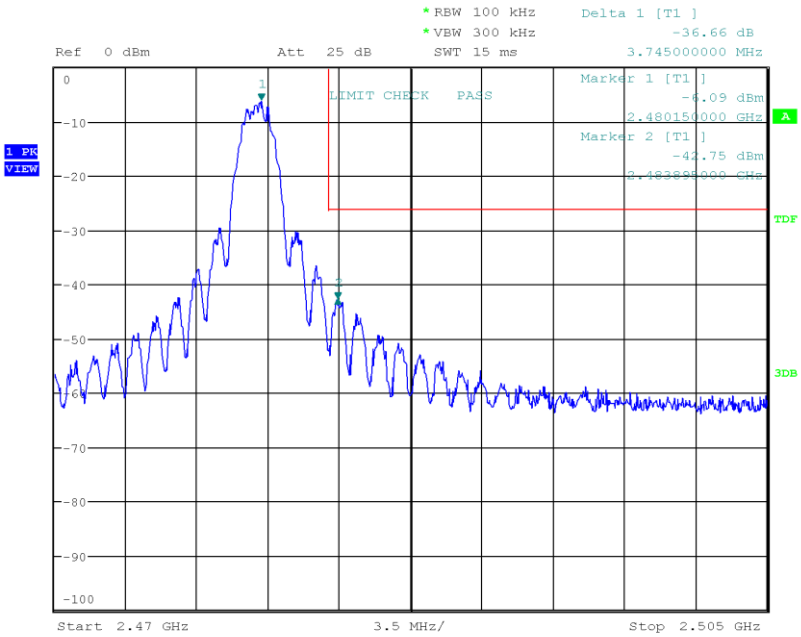
Emissions in nonrestricted frequency bands at the Band-edge

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Band-edge	Upper
In-band Frequency [MHz]:	2480.15
Max. in-band Level [dBm/100 kHz]:	-6.095
Out-of-band Frequency [MHz]:	2483.895
Max. out-of-band Level [dBm/100 kHz]:	-42.755
Attenuation [dB]:	-36.66



3.7 Test Conditions and Results - Conducted spurious emissions

3.7.1 Information

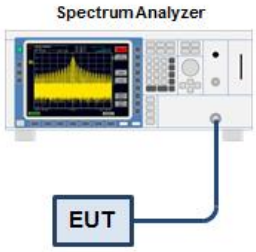
Test Information	
Reference	FCC § 15.247(d); ISED RSS-247, Issue 2 (section 5.5)
Measurement Method	ANSI C63.10 11.11
Operator	Wilfried Treffke
Date	2019-12-04

3.7.2 Limits

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

3.7.3 Setup

Test Setup



3.7.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01407	2019-07	2020-07

3.7.5 Procedure

Test Procedure

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

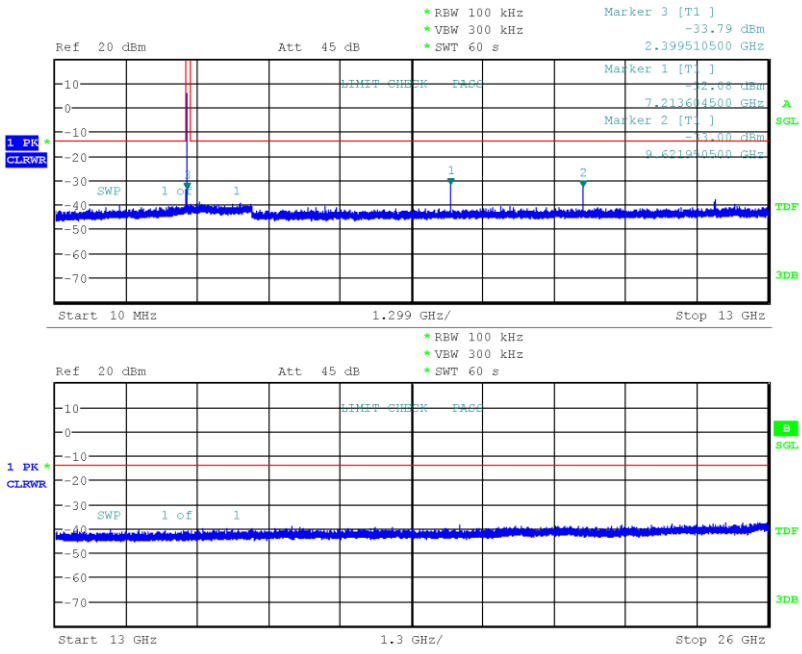
3.7.6 Results

Test Results - Data rate = 250 kbps		
Mode	Channel [MHz]	Verdict
O-QPSK	2405	PASS
O-QPSK	2440	PASS
O-QPSK	2475	PASS
O-QPSK	2480	PASS

Test Results - Data rate = 2000 kbps		
Mode	Channel [MHz]	Verdict
O-QPSK	2405	PASS
O-QPSK	2440	PASS
O-QPSK	2475	PASS
O-QPSK	2480	PASS

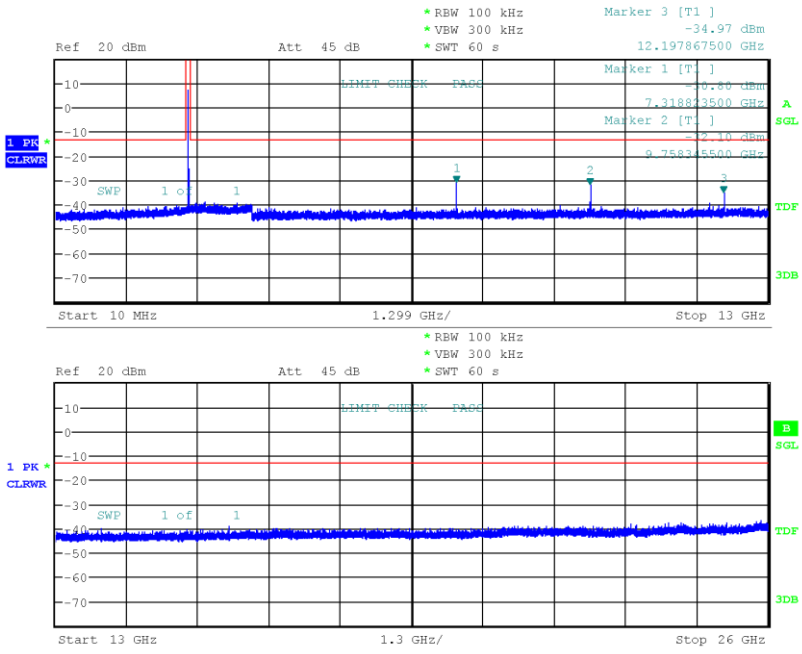
Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2404.7
Max. in-band Level [dBm/100 kHz]:	6.1
Out-of-band Limit [dBm/100 kHz]:	-13.9



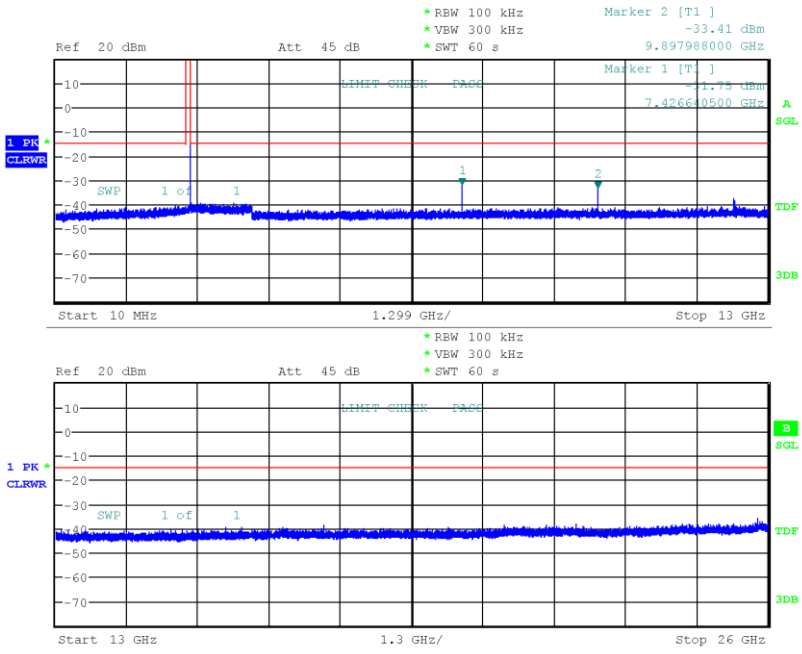
Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2439.5
Max. in-band Level [dBm/100 kHz]:	7.0
Out-of-band Limit [dBm/100 kHz]:	-13.0



Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2475.2
Max. in-band Level [dBm/100 kHz]:	5.1
Out-of-band Limit [dBm/100 kHz]:	-14.9



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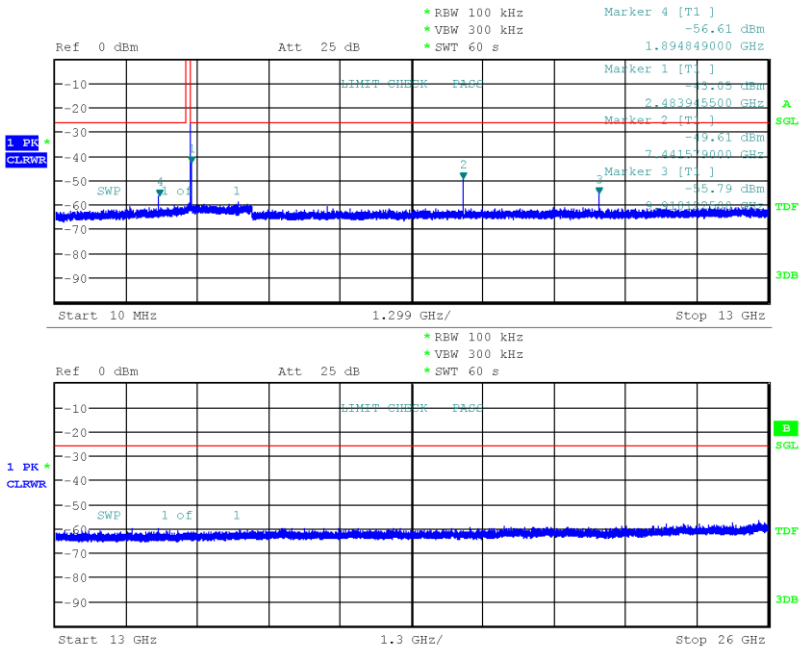
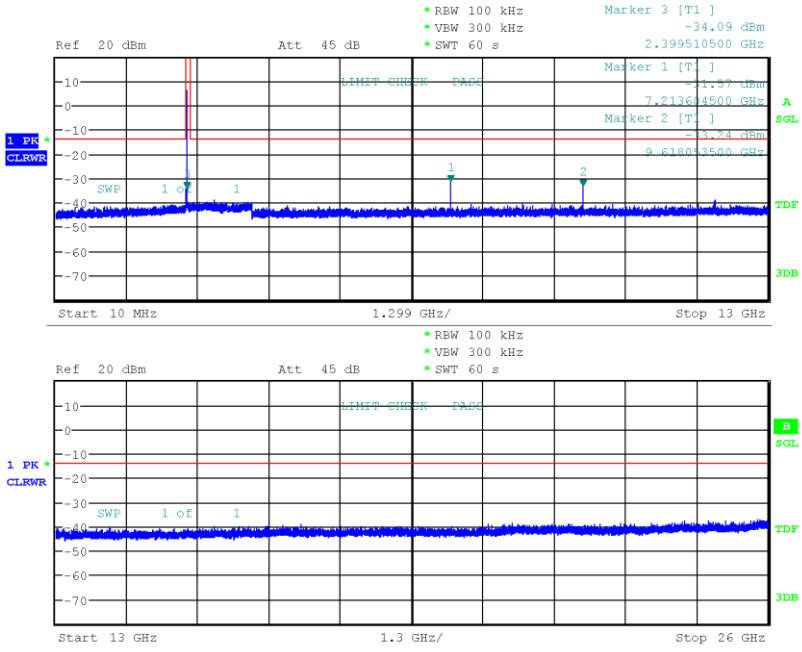
Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2479.8
Max. in-band Level [dBm/100 kHz]:	-6.0
Out-of-band Limit [dBm/100 kHz]:	-26.0



Conducted Spurious Emissions

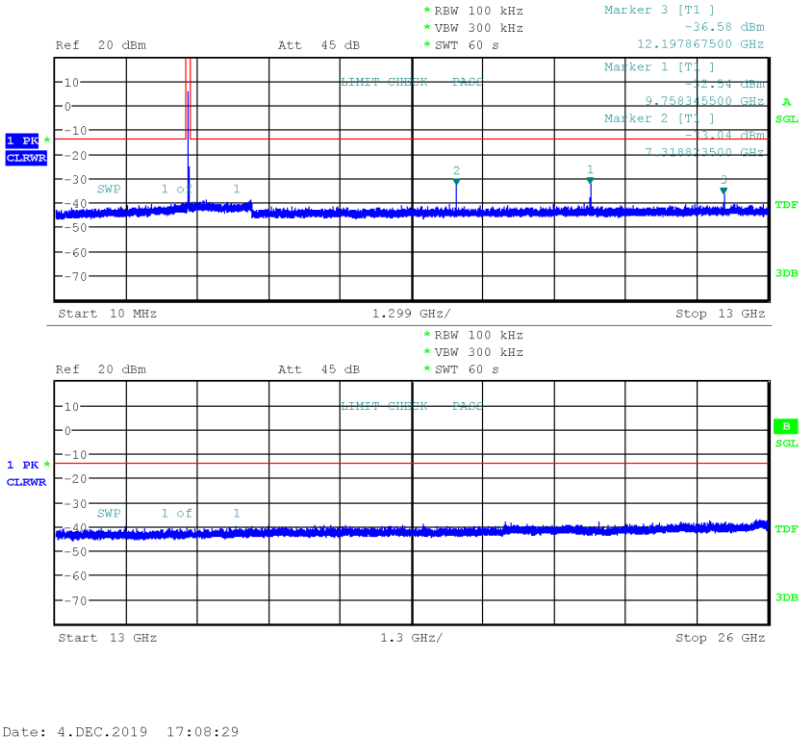
Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2405.2
Max. in-band Level [dBm/100 kHz]:	6.6
Out-of-band Limit [dBm/100 kHz]:	-13.4



Date: 4.DEC.2019 17:05:02

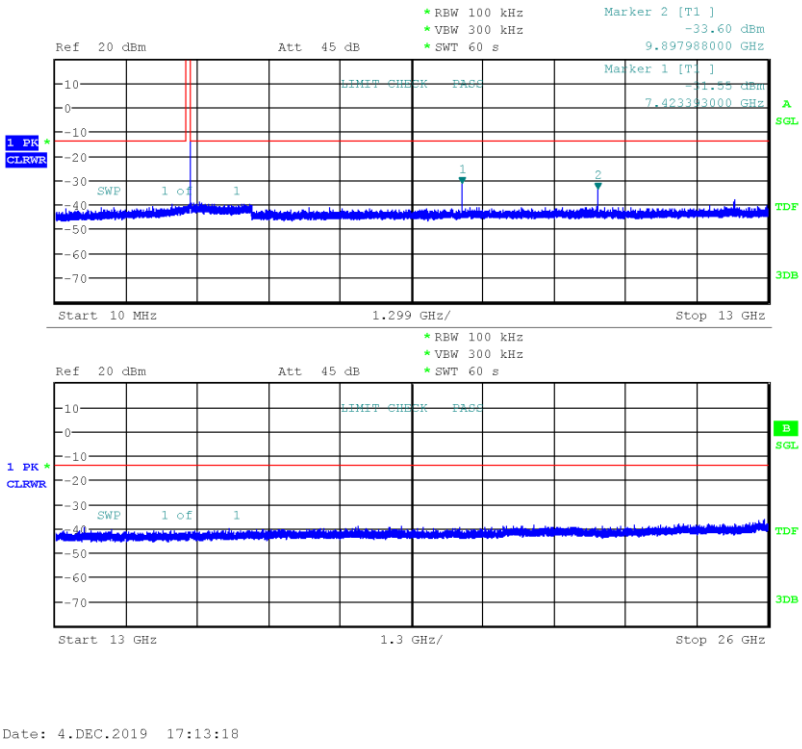
Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2439.8
Max. in-band Level [dBm/100 kHz]:	6.2
Out-of-band Limit [dBm/100 kHz]:	-13.8



Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 25, 2475 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2474.5
Max. in-band Level [dBm/100 kHz]:	6.3
Out-of-band Limit [dBm/100 kHz]:	-13.7



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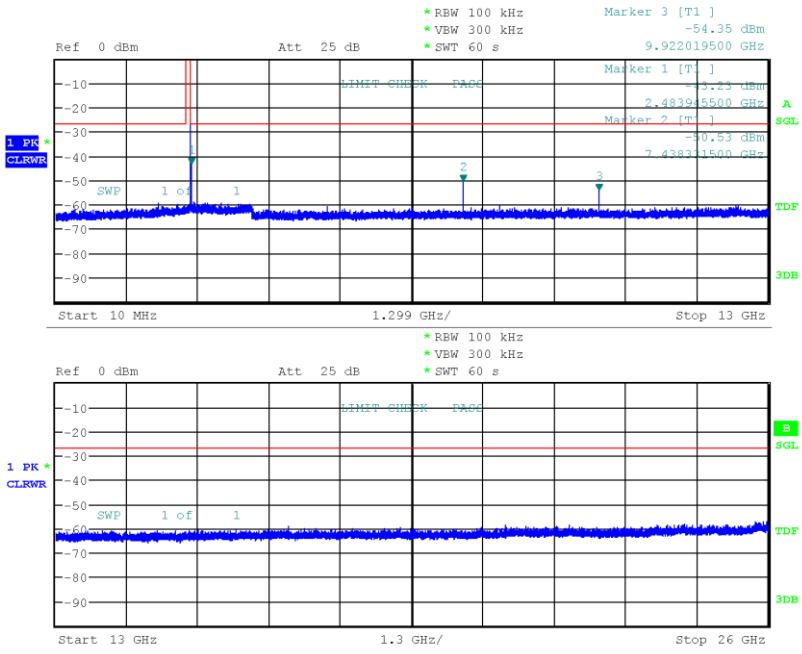
Conducted Spurious Emissions

Project Number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
Model Description:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Sample ID:	26334
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (2000 kbps), Channel: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	Wilfried Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2019-12-04
Max. in-band Frequency [MHz]:	2480.0
Max. in-band Level [dBm/100 kHz]:	-6.5
Out-of-band Limit [dBm/100 kHz]:	-26.5



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3.8 Test Conditions and Results - Transmitter radiated emissions

3.8.1 Information

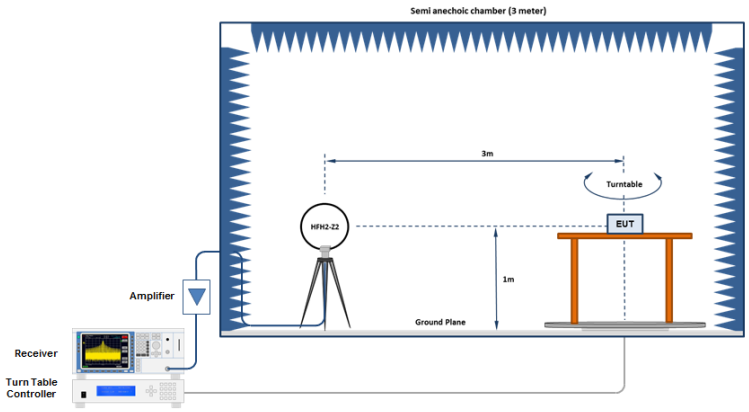
Test Information	
Reference	FCC § 15.247(d); FCC § 15.209; ISED RSS-Gen, Issue 5 (section 6.13)
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2019-12-02

3.8.2 Limits

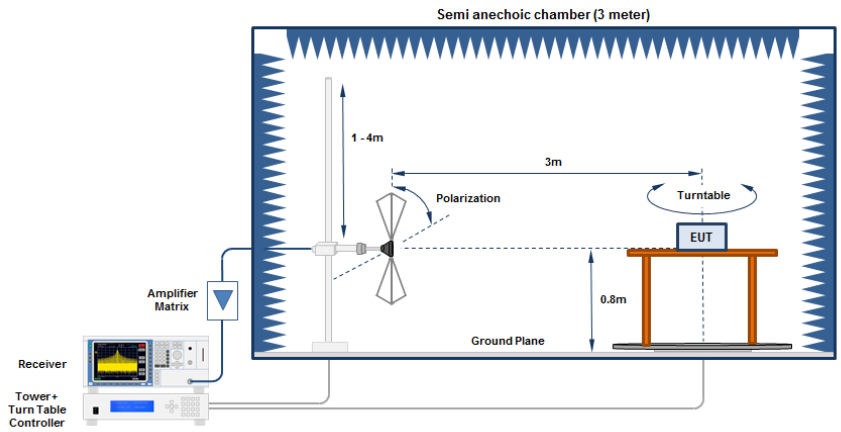
Limits			
Frequency [MHz]	Detector	Field strength [µV/m]	Measurement distance [m]
0.009 - 0.09	Average	2400/F[kHz]	300
0.09 - 0.110	Quasi-Peak	2400/F[kHz]	300
0.110 - 0.490	Average	2400/F[kHz]	300
0.490 - 1.705	Quasi-Peak	24000/F[kHz]	30
1.705 - 30.0	Quasi-Peak	30	30
30 - 88	Quasi-Peak	100	3
88 - 216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

3.8.3 Setup

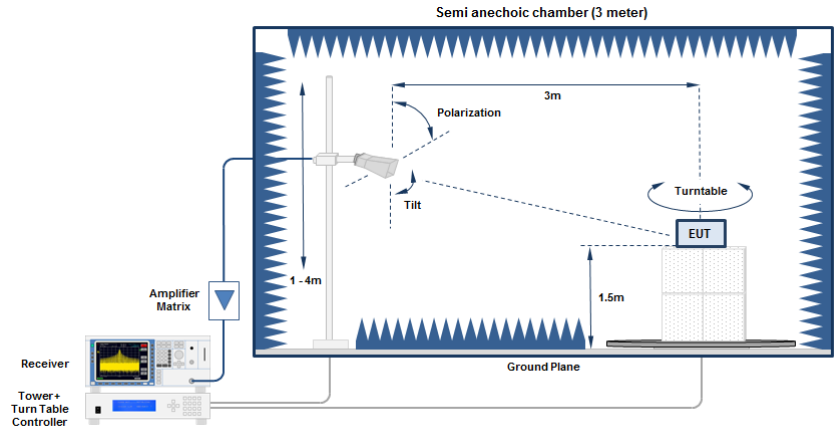
Test Setup < 30 MHz



Test Setup 30 - 1000 MHz



Test Setup > 1 GHz



3.8.4 Equipment

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

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	2019-09	2020-09
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2020-05

3.8.5 Procedure

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

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

3.8.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2405	137.7773	30.60	pk	hor	43.50	-12.93
2405	250.0034	40.90	pk	ver	46.00	-05.07
2405	250.0034	39.90	qpk	ver	46.00	-06.05
2405	332.2318	39.70	pk	ver	46.00	-06.26
2405	332.2318	37.90	qpk	ver	46.00	-08.14
2405	1075.2	48.22	pk	ver	74.00	-25.78
2405	1075.2	35.04	RMS	ver	54.00	-18.96
2405	1209.4	54.68	pk	hor	74.00	-19.32
2405	1209.4	41.61	RMS	hor	54.00	-12.39
2405	1209.5	55.66	pk	ver	74.00	-18.34
2405	1209.5	42.41	RMS	ver	54.00	-11.59
2405	1410.4	42.05	pk	hor	74.00	-31.95
2405	2389.6	50.76	pk	hor	74.00	-23.24
2405	2389.6	39.43	RMS	hor	54.00	-14.57
2405	2389.7	51.25	pk	ver	74.00	-22.75
2405	2389.7	41.07	RMS	ver	54.00	-12.93
2405	2821.3	43.35	pk	hor	74.00	-30.65
2405	4809	50.53	pk	hor	74.00	-23.47
2405	4809	47.25	RMS	hor	54.00	-06.75
2405	4811	50.01	pk	ver	74.00	-23.99
2405	4811	44.25	RMS	ver	54.00	-09.75
2405	12022	54.29	pk	ver	74.00	-19.71
2405	12022	46.60	RMS	ver	54.00	-07.40
2405	12027	55.86	pk	hor	74.00	-18.14
2405	12027	51.98	RMS	hor	54.00	-02.02
2440	1047.1	40.64	pk	hor	74.00	-33.36
2440	1047.1	40.03	pk	ver	74.00	-33.97
2440	1127.9	42.03	pk	hor	74.00	-31.97
2440	1208.7	45.65	pk	ver	74.00	-28.35
2440	1338.8	39.91	pk	hor	74.00	-34.09
2440	1410.6	42.18	pk	hor	74.00	-31.82
2440	1410.6	41.02	pk	ver	74.00	-32.98
2440	1531.7	39.00	pk	hor	74.00	-35.00
2440	2485.9	39.75	pk	ver	74.00	-34.25
2440	4879	52.10	pk	hor	74.00	-21.90
2440	4879	47.69	RMS	hor	54.00	-06.31
2440	4879	49.44	pk	ver	74.00	-24.56
2440	4879	45.35	RMS	ver	54.00	-08.65
2440	7321	55.16	pk	hor	74.00	-18.84
2440	7321	50.08	RMS	hor	54.00	-03.92
2440	7321	57.68	pk	ver	74.00	-16.32
2440	7321	52.95	RMS	ver	54.00	-01.05
2440	12197	54.59	pk	hor	74.00	-19.41
2440	12197	48.42	RMS	hor	54.00	-05.58
2440	12202	53.11	pk	ver	74.00	-20.89
2440	12202	46.59	RMS	ver	54.00	-07.41

2475	1048	44.05	pk	ver	74.00	-29.95
2475	1127	41.59	pk	ver	74.00	-32.41
2475	1208	46.12	pk	ver	74.00	-27.88
2475	1209	46.19	pk	hor	74.00	-27.81
2475	2483.9	55.25	pk	hor	74.00	-18.75
2475	2483.9	46.48	RMS	hor	54.00	-07.52
2475	2483.9	58.13	pk	ver	74.00	-15.87
2475	2483.9	49.82	RMS	ver	54.00	-04.18
2475	4949	54.21	pk	hor	74.00	-19.79
2475	4949	49.81	RMS	hor	54.00	-04.19
2475	4951	50.85	pk	ver	74.00	-23.15
2475	4951	46.12	RMS	ver	54.00	-07.88
2475	7426	55.32	pk	hor	74.00	-18.68
2475	7426	49.95	RMS	hor	54.00	-04.05
2475	7426	56.92	pk	ver	74.00	-17.08
2475	7426	51.54	RMS	ver	54.00	-02.46
2475	12373	53.94	pk	hor	74.00	-20.06
2475	12373	47.91	RMS	hor	54.00	-06.09
2480	1046	43.92	pk	ver	74.00	-30.08
2480	1208	46.36	pk	ver	74.00	-27.64
2480	2483.5	57.76	pk	hor	74.00	-16.24
2480	2483.5	48.85	RMS	hor	54.00	-05.15
2480	2483.5	60.69	pk	ver	74.00	-13.31
2480	2483.5	52.41	RMS	ver	54.00	-01.59
2480	4962	40.75	pk	hor	74.00	-33.25

3.9 Test Conditions and Results - Receiver radiated emissions

3.9.1 Information

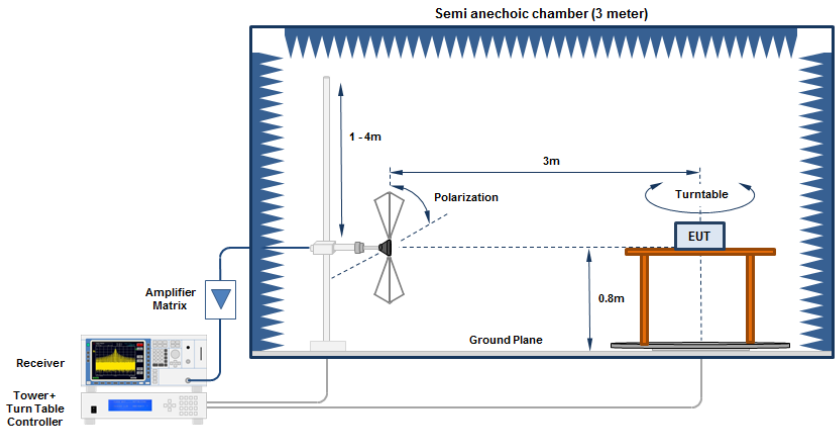
Test Information	
Reference	ISED RSS-247, Issue 2 (section 3.1)
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2019-12-03

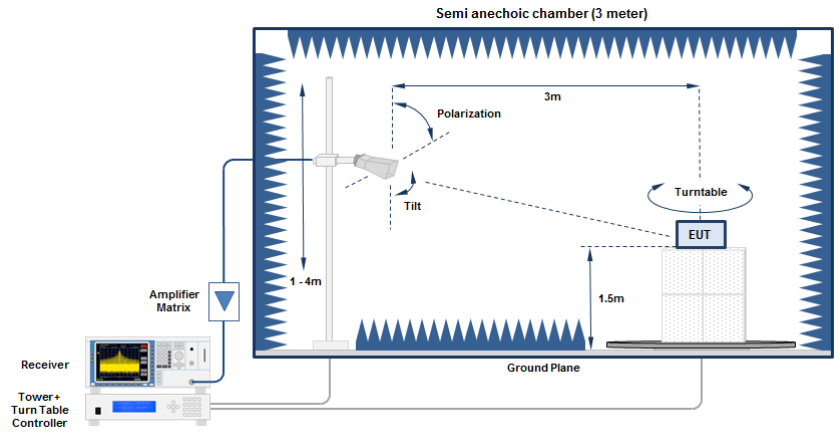
3.9.2 Limits

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

3.9.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz


3.9.4 Equipment

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

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	2019-09	2020-09
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00187	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	Schwarzbeck	BBHA 9120D	EF01153	2019-10	2020-10
Antenna	Amplifier Research	AT4560	EF00302	2019-05	2020-05

3.9.5 Procedure

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

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

3.9.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2440	33.216	25.66	qpk	ver	40.00	-14.34
2440	249.999	38.99	qpk	hor	46.00	-07.01
2440	250	35.97	qpk	ver	46.00	-10.03
2440	521.724	37.70	qpk	ver	46.00	-08.30
2440	569.121	39.47	qpk	hor	46.00	-06.53
2440	616.667	37.06	pk	hor	46.00	-08.94
2440	885.897	36.23	pk	hor	46.00	-09.77
2440	901.139	39.68	qpk	ver	46.00	-06.32
2440	901.395	36.31	qpk	hor	46.00	-09.69
2440	1048	21.22	avg	hor	53.98	-32.76
2440	1185	39.01	pk	ver	53.98	-14.97
2440	1209	49.41	pk	ver	53.98	-04.57
2440	1256	16.83	avg	ver	53.98	-37.15
2440	1289	17.95	avg	hor	53.98	-36.03
2440	1290	21.75	avg	ver	53.98	-32.23
2440	1371	18.92	avg	ver	53.98	-35.06
2440	2257	17.33	avg	hor	53.98	-36.65
2440	4026	35.56	pk	hor	53.98	-18.42
2440	4327	43.38	pk	ver	53.98	-10.60
2440	10596	44.33	pk	hor	53.98	-09.65

ANNEX A Transmitter spurious emissions

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	W. Treffke
Test Conditions:	Tnom: 21°C, Vnom: 5.0 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-04
Note:	EUT vertical

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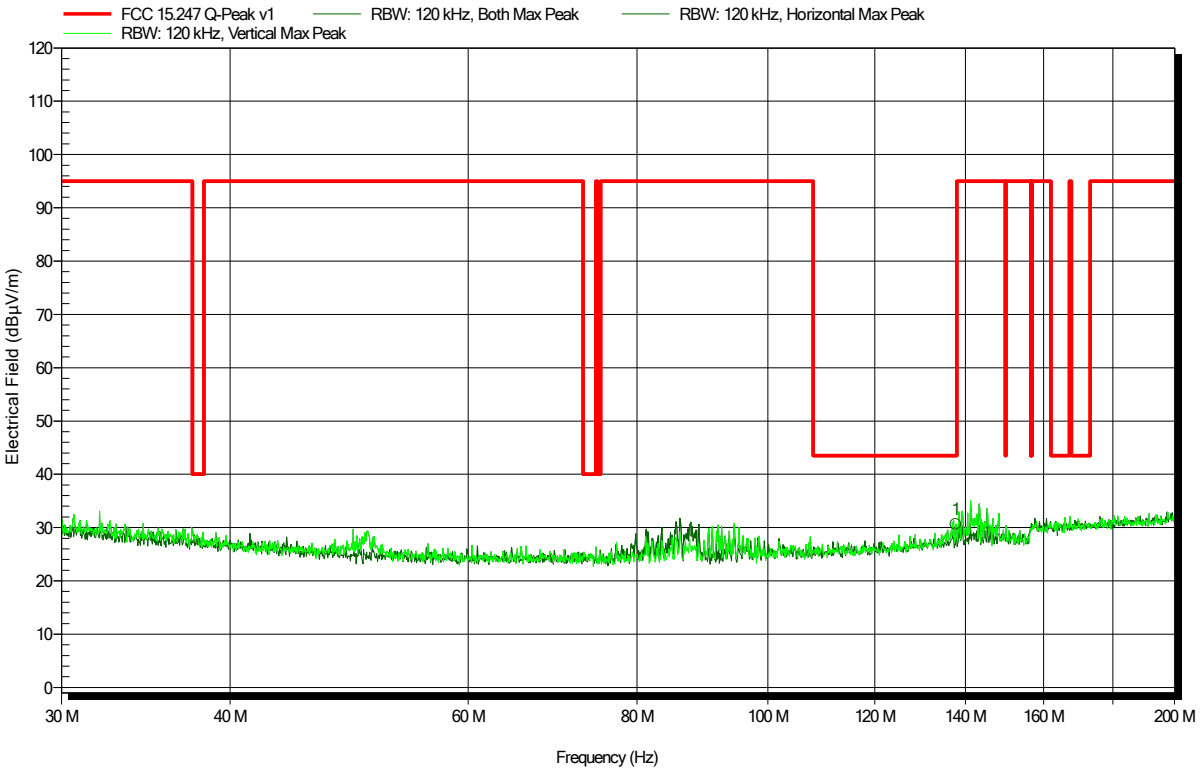

Frequency	Peak	Peak Limit	Peak Difference	Status
137.7773 MHz	30.6 dBµV/m	43.5 dBµV/m	-12.93 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	W. Treffke
Test Conditions:	Tnom: 21°C, Vnom: 5.0 VDC
Antenna:	Rohde & Schwarz HL 223
Measurement distance:	3 m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-04
Note:	

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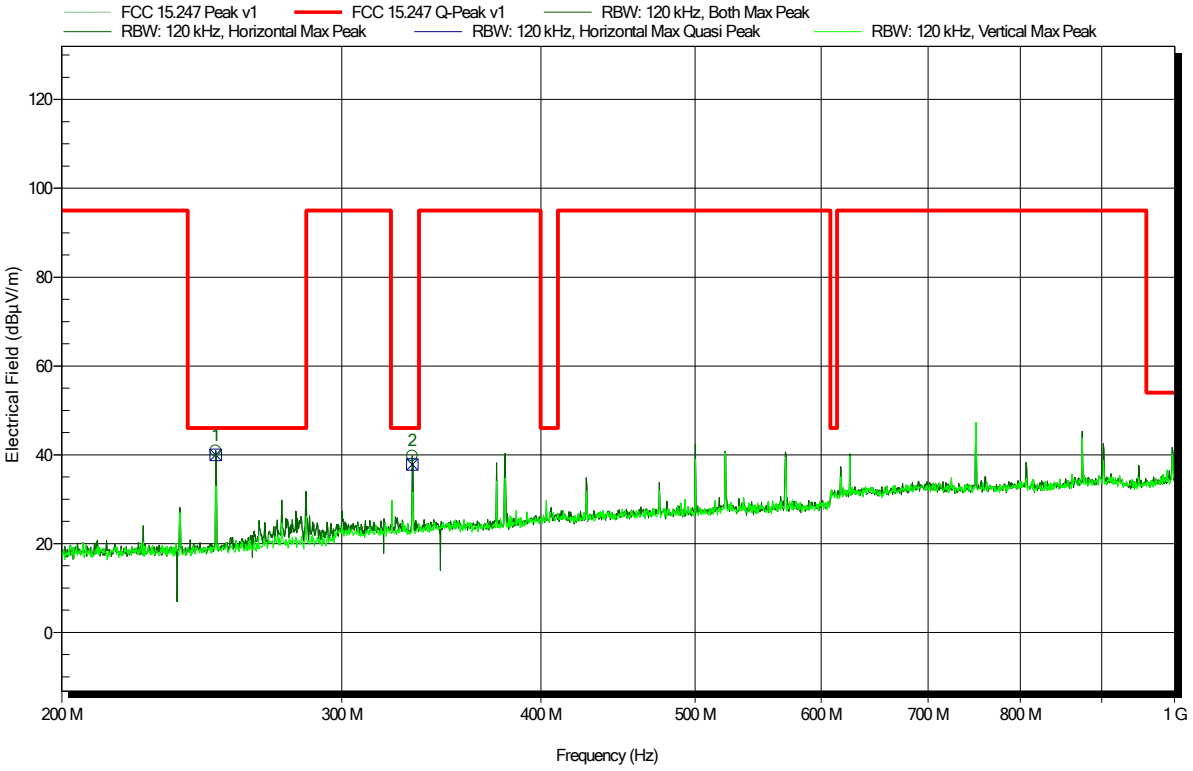

Frequency	Peak	Peak Limit	Peak Difference	Polarization	Status
250.0034 MHz	40.9 dBµV/m	46 dBµV/m	-5.07 dB	Horizontal	Pass
332.2318 MHz	39.7 dBµV/m	46 dBµV/m	-6.26 dB	Horizontal	Pass

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Polarization	Quasi-Peak Status
250.0034 MHz	39.9 dBµV/m	46 dBµV/m	-6.05 dB	Horizontal	Pass
332.2318 MHz	37.9 dBµV/m	46 dBµV/m	-8.14 dB	Horizontal	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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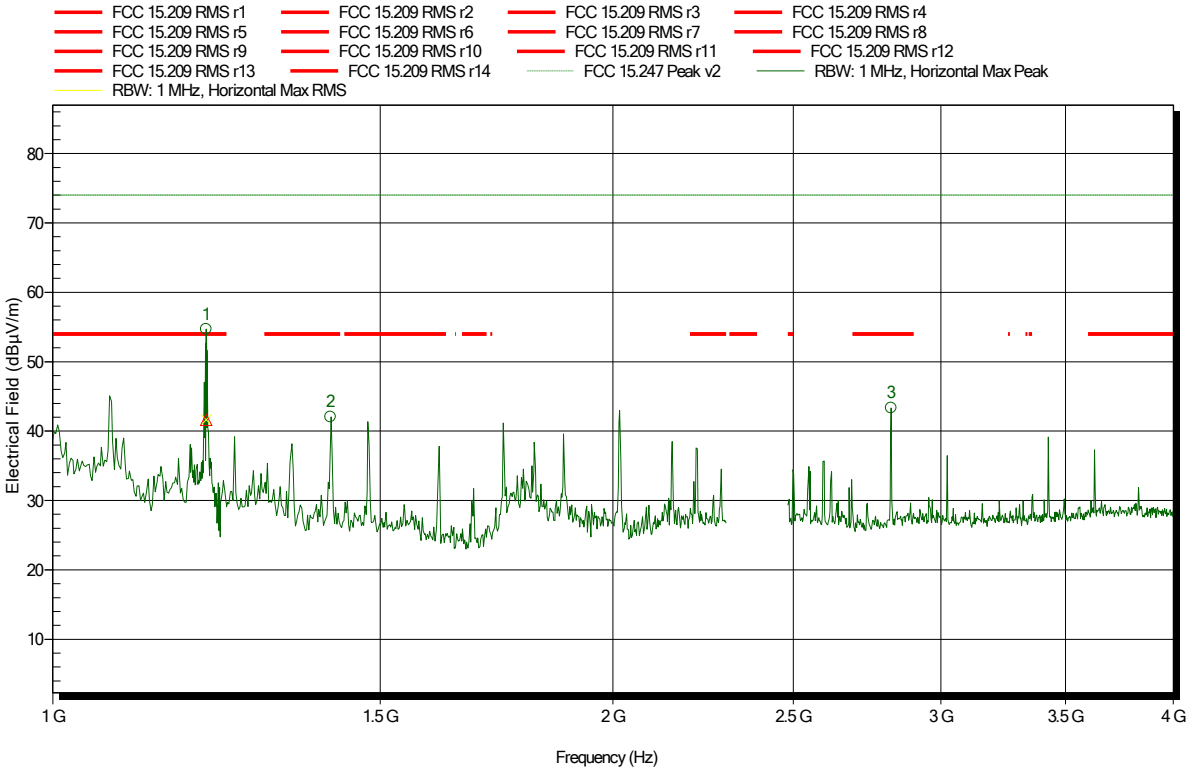

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.2094 GHz	54.68 dBµV/m	74 dBµV/m	-19.32 dB	Pass
1.4104 GHz	42.05 dBµV/m	74 dBµV/m	-31.95 dB	Pass
2.8213 GHz	43.35 dBµV/m	74 dBµV/m	-30.65 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.2094 GHz	41.61 dBµV/m	54 dBµV/m	-12.39 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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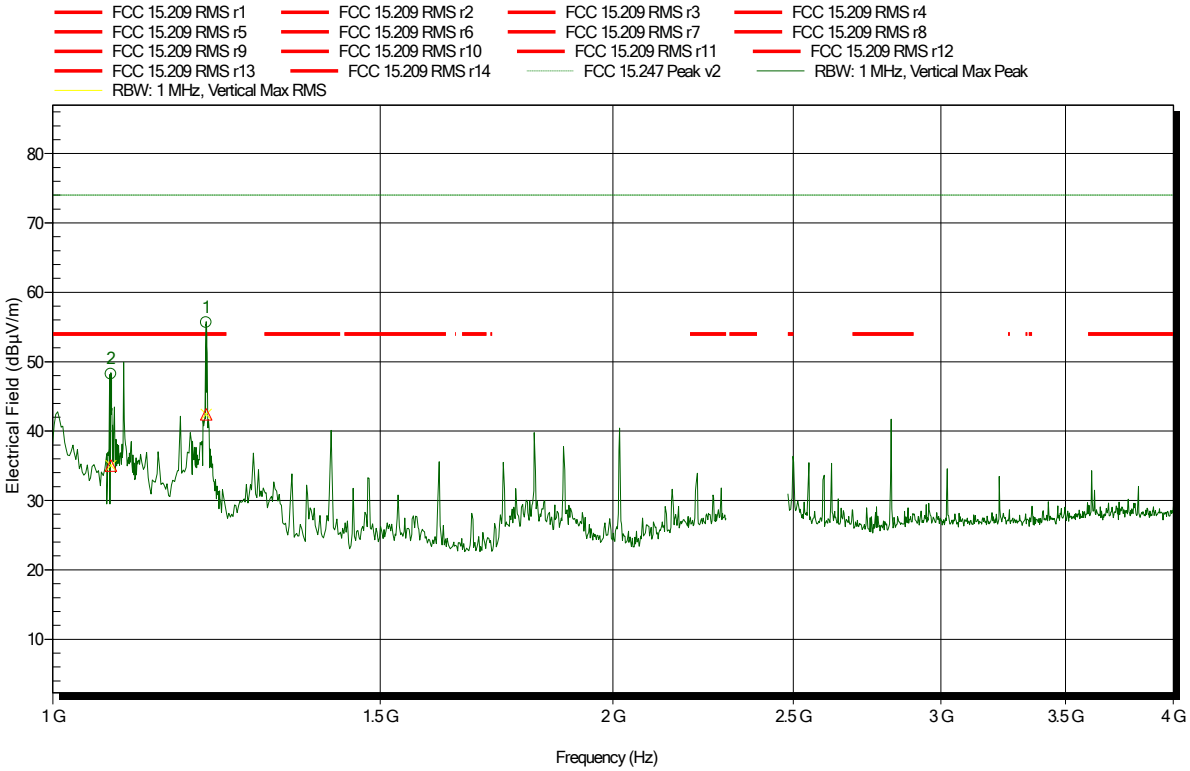

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.0752 GHz	48.22 dBµV/m	74 dBµV/m	-25.78 dB	Pass
1.2095 GHz	55.66 dBµV/m	74 dBµV/m	-18.34 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
1.0752 GHz	35.04 dBµV/m	54 dBµV/m	-18.96 dB	Pass
1.2095 GHz	42.41 dBµV/m	54 dBµV/m	-11.59 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	lower bandedge

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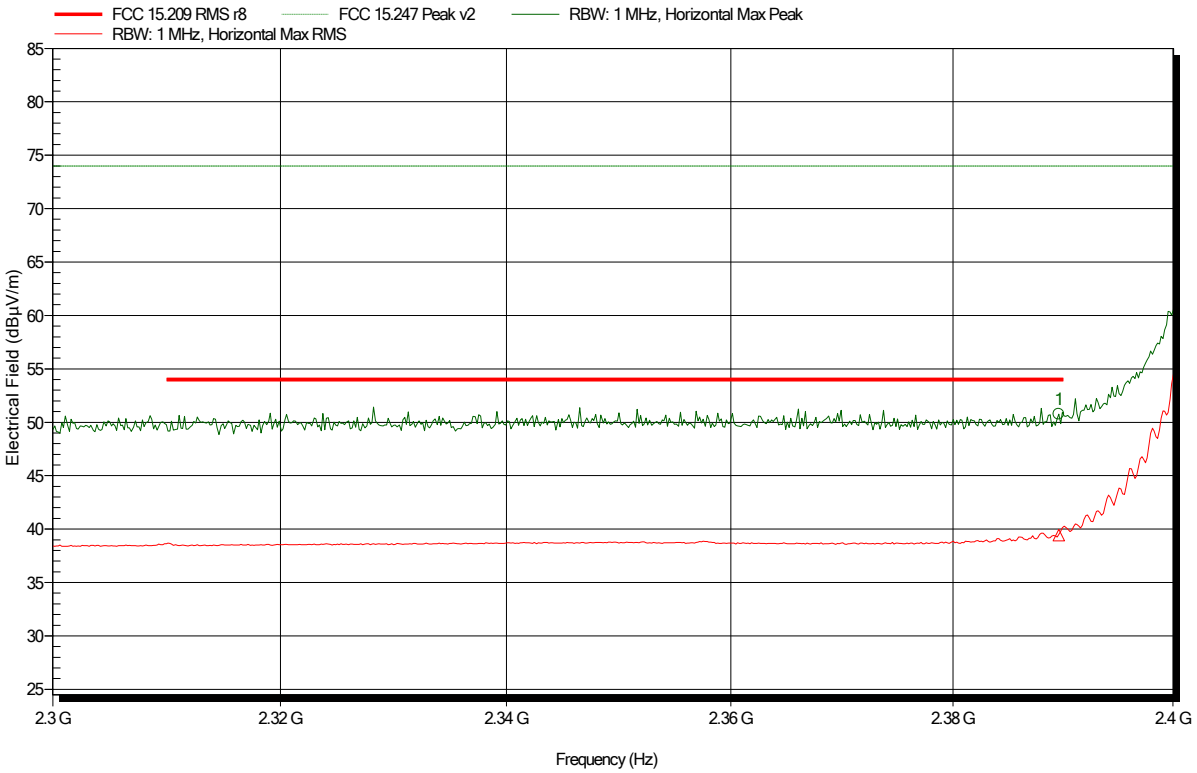

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3896 GHz	50.76 dBµV/m	74 dBµV/m	-23.24 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.3896 GHz	39.43 dBµV/m	54 dBµV/m	-14.57 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	lower bandedge

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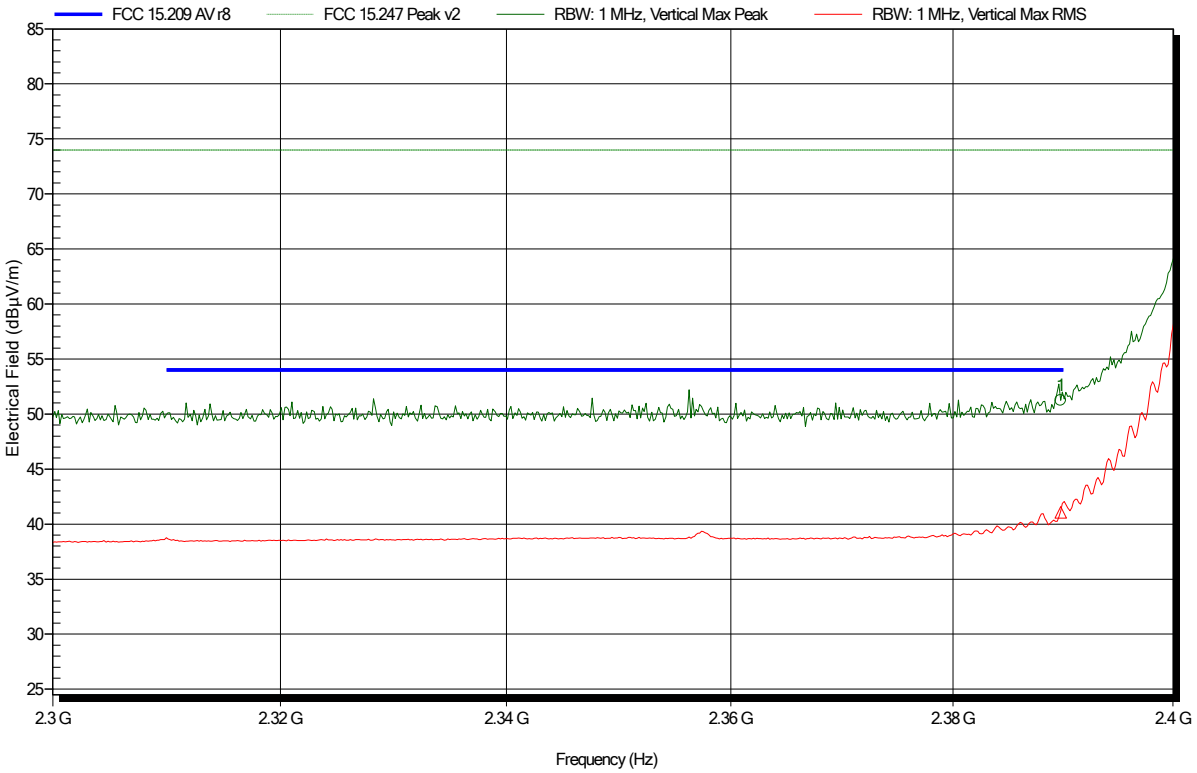

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3897 GHz	51.25 dBµV/m	74 dBµV/m	-22.75 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.3897 GHz	41.07 dBµV/m	54 dBµV/m	-12.93 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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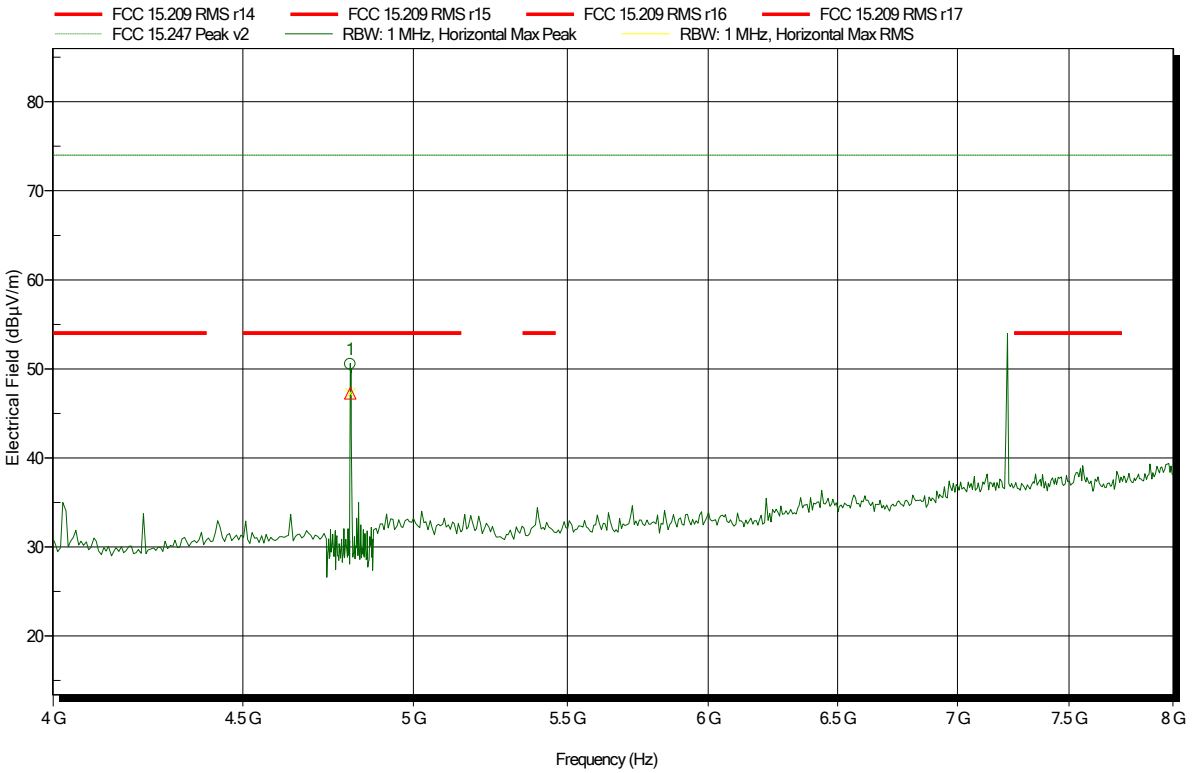

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.809 GHz	50.53 dBµV/m	74 dBµV/m	-23.47 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
4.809 GHz	47.25 dBµV/m	54 dBµV/m	-6.75 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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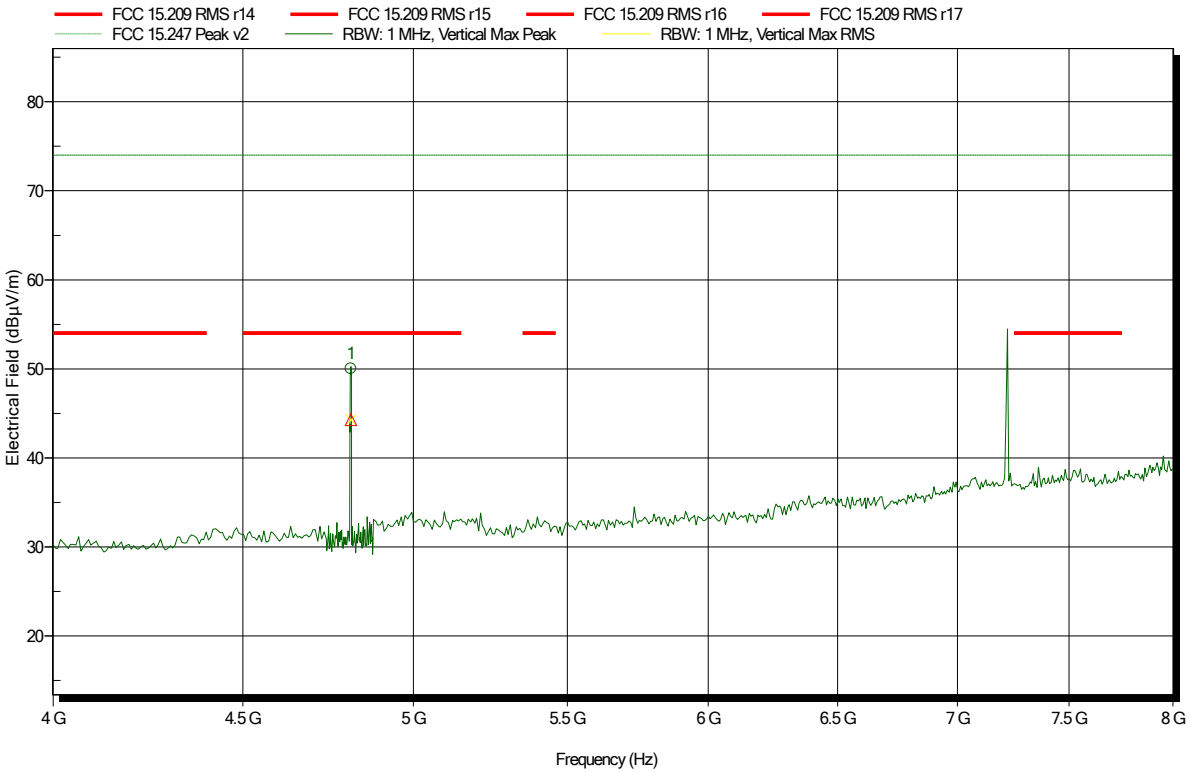

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.811 GHz	50.01 dBµV/m	74 dBµV/m	-23.99 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
4.811 GHz	44.25 dBµV/m	54 dBµV/m	-9.75 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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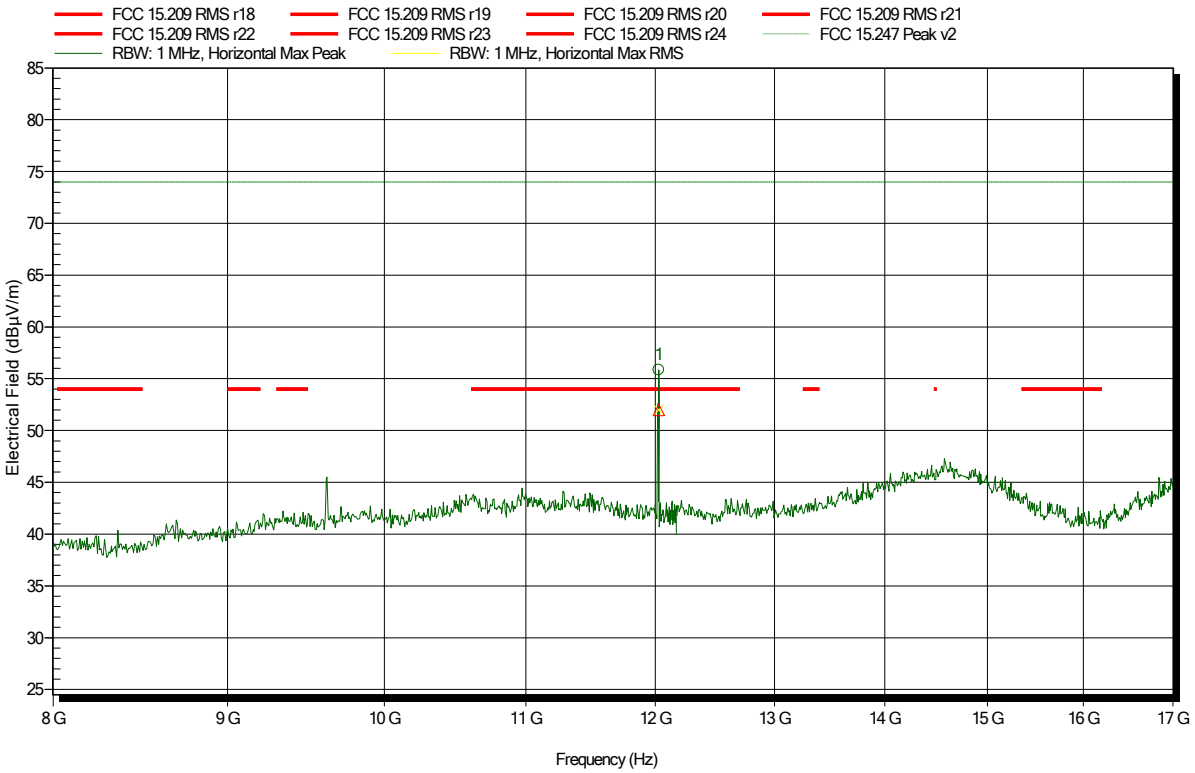

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.027 GHz	55.86 dBµV/m	74 dBµV/m	-18.14 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
12.027 GHz	51.98 dBµV/m	54 dBµV/m	-2.02 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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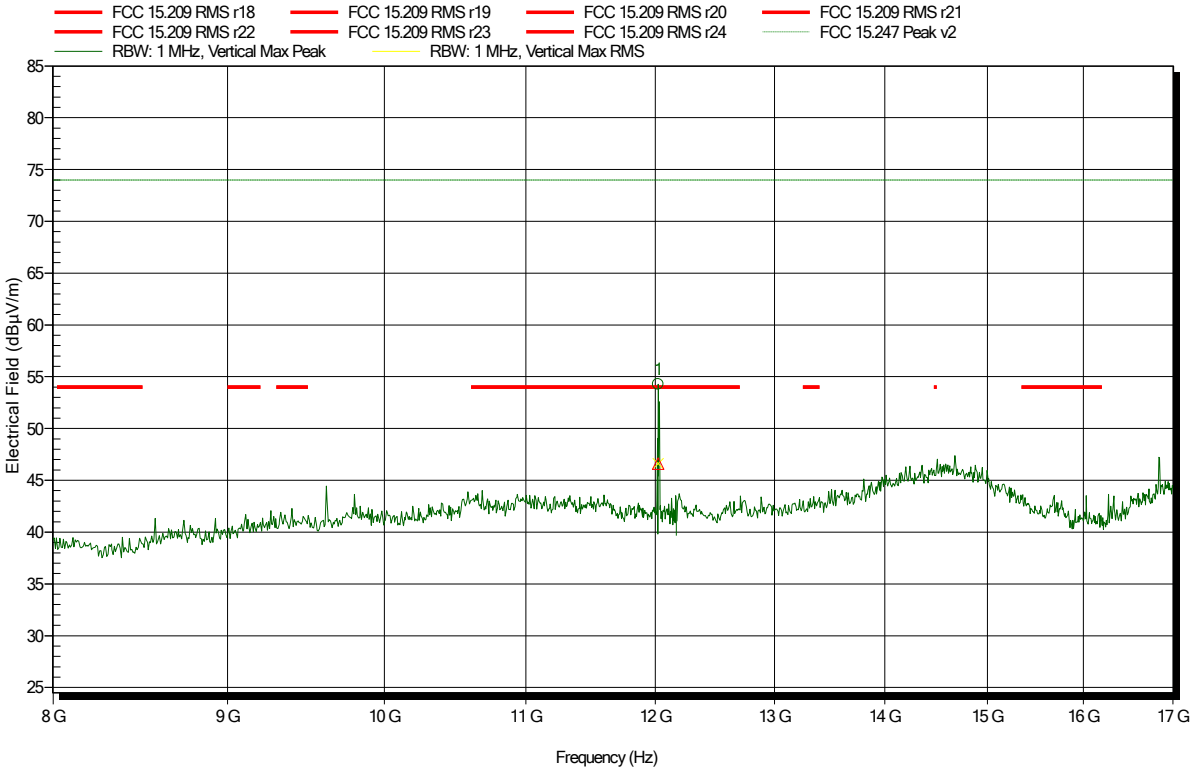

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.022 GHz	54.29 dBµV/m	74 dBµV/m	-19.71 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
12.022 GHz	46.6 dBµV/m	54 dBµV/m	-7.4 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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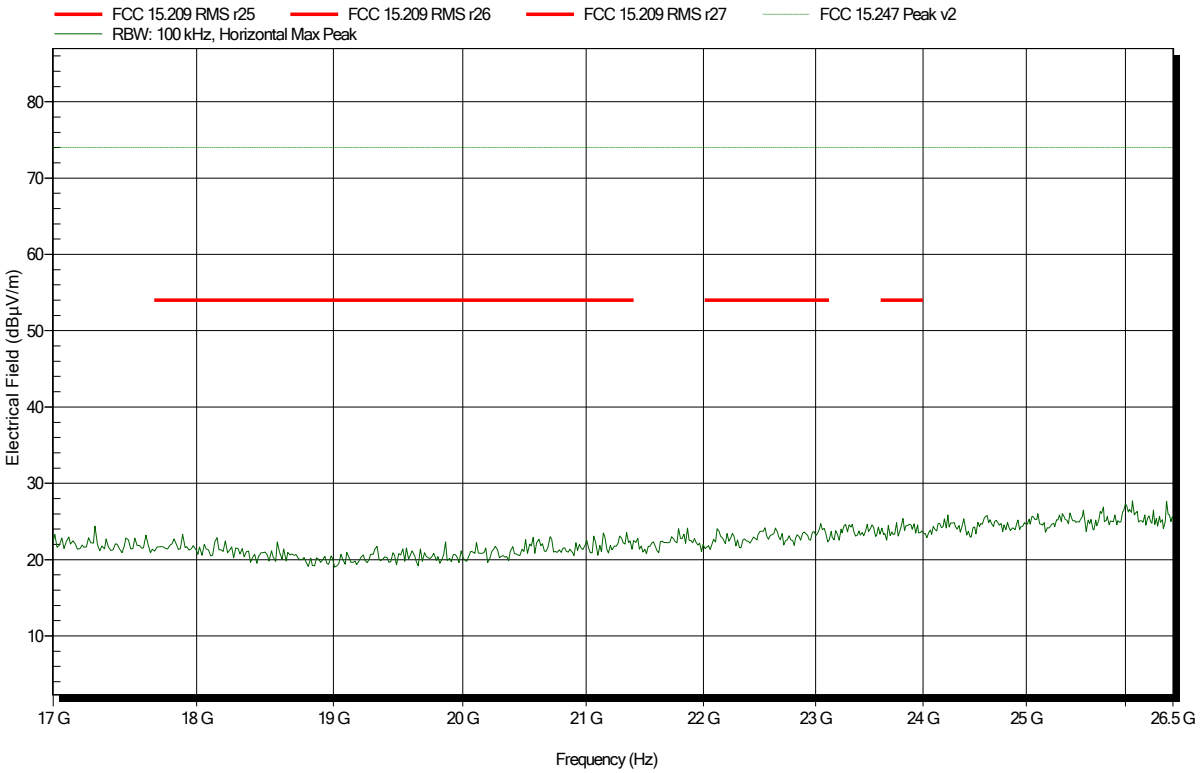

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz; P=12
Test Date:	2019-12-02
Note:	

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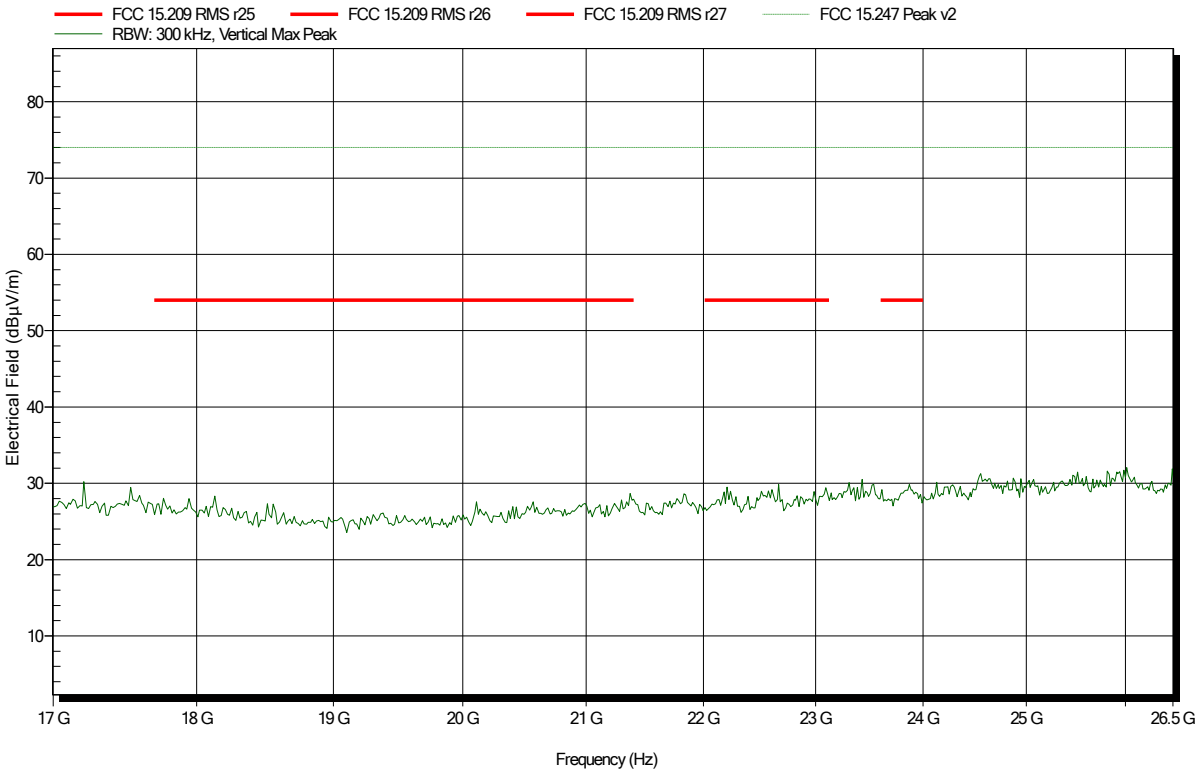

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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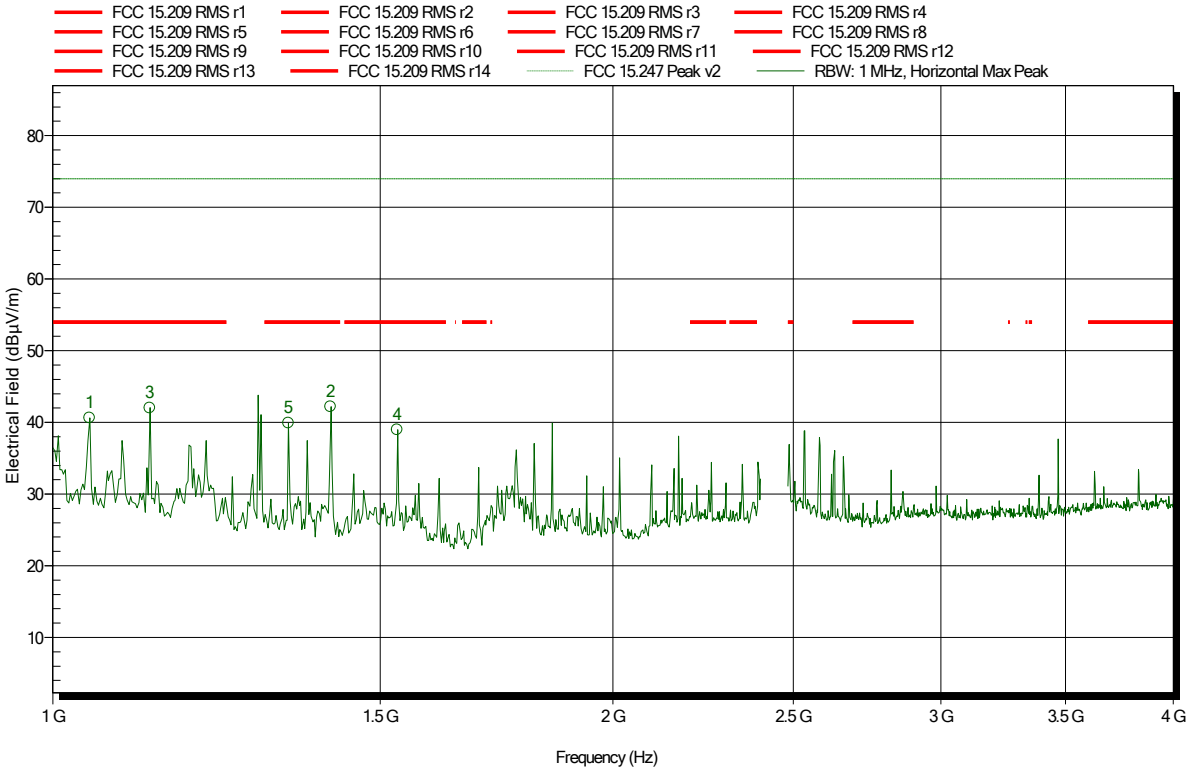

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.0471 GHz	40.64 dBµV/m	74 dBµV/m	-33.36 dB	Pass
1.1279 GHz	42.03 dBµV/m	74 dBµV/m	-31.97 dB	Pass
1.3388 GHz	39.91 dBµV/m	74 dBµV/m	-34.09 dB	Pass
1.4106 GHz	42.18 dBµV/m	74 dBµV/m	-31.82 dB	Pass
1.5317 GHz	39 dBµV/m	74 dBµV/m	-35 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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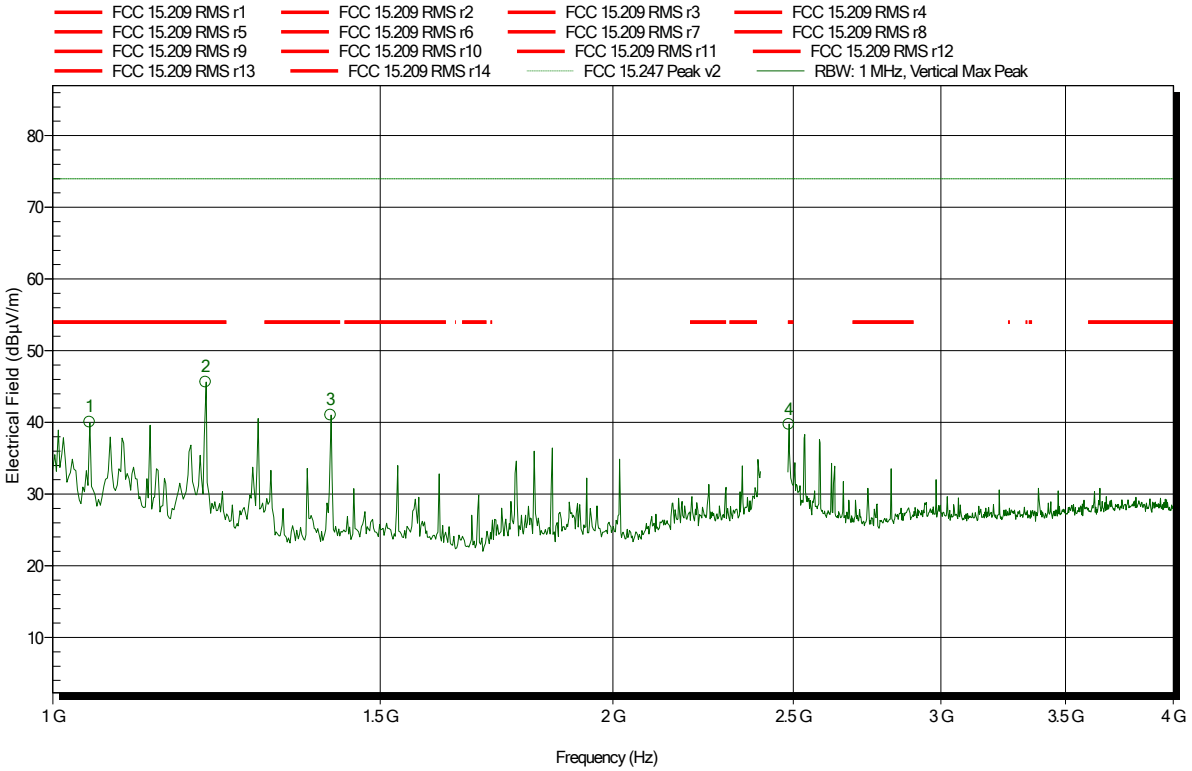

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.0471 GHz	40.03 dBµV/m	74 dBµV/m	-33.97 dB	Pass
1.2087 GHz	45.65 dBµV/m	74 dBµV/m	-28.35 dB	Pass
1.4106 GHz	41.02 dBµV/m	74 dBµV/m	-32.98 dB	Pass
2.4859 GHz	39.75 dBµV/m	74 dBµV/m	-34.25 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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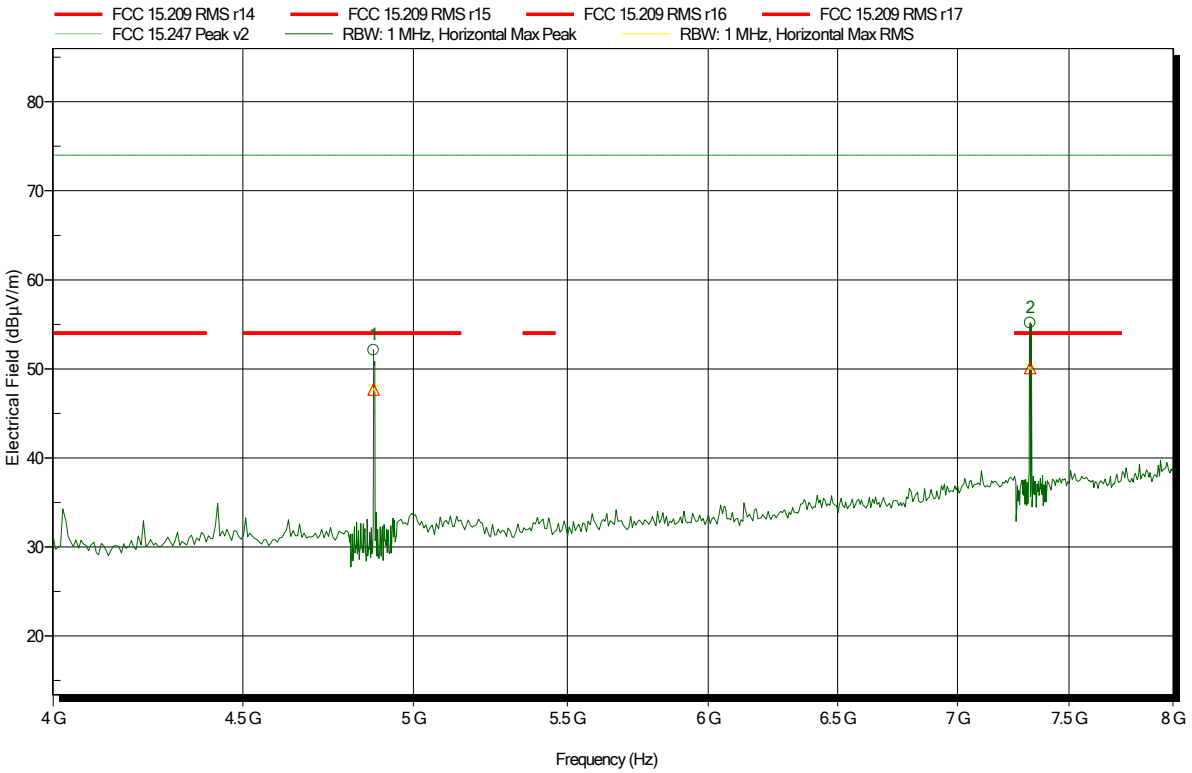

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.879 GHz	52.1 dBµV/m	74 dBµV/m	-21.9 dB	Pass
7.321 GHz	55.16 dBµV/m	74 dBµV/m	-18.84 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
4.879 GHz	47.69 dBµV/m	54 dBµV/m	-6.31 dB	Pass
7.321 GHz	50.08 dBµV/m	54 dBµV/m	-3.92 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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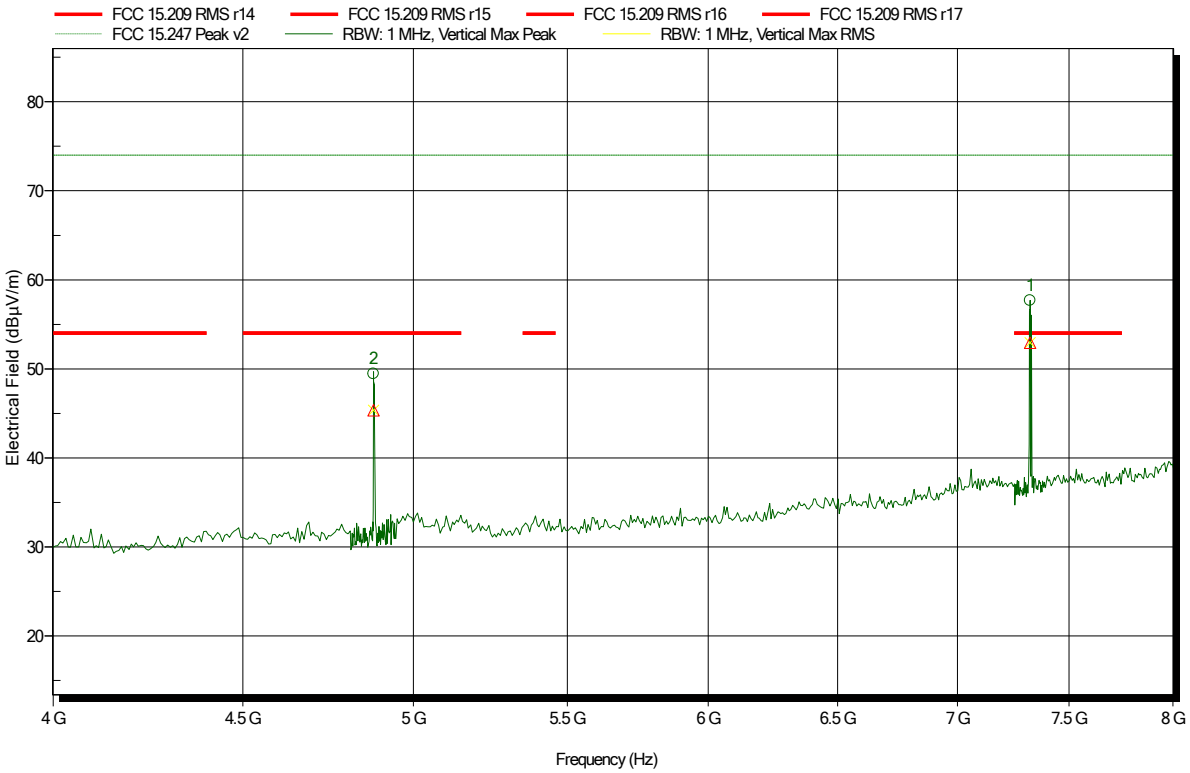

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.879 GHz	49.44 dBµV/m	74 dBµV/m	-24.56 dB	Pass
7.321 GHz	57.68 dBµV/m	74 dBµV/m	-16.32 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
4.879 GHz	45.35 dBµV/m	54 dBµV/m	-8.65 dB	Pass
7.321 GHz	52.95 dBµV/m	54 dBµV/m	-1.05 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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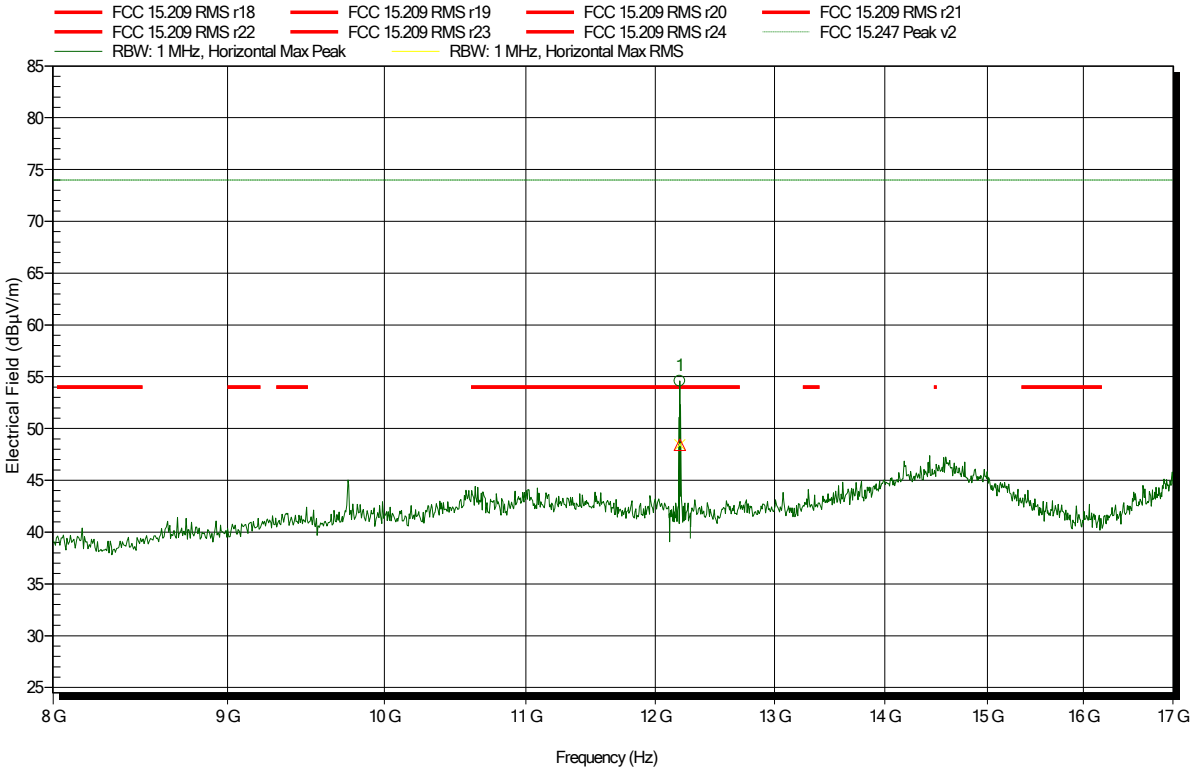

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.197 GHz	54.59 dBµV/m	74 dBµV/m	-19.41 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
12.197 GHz	48.42 dBµV/m	54 dBµV/m	-5.58 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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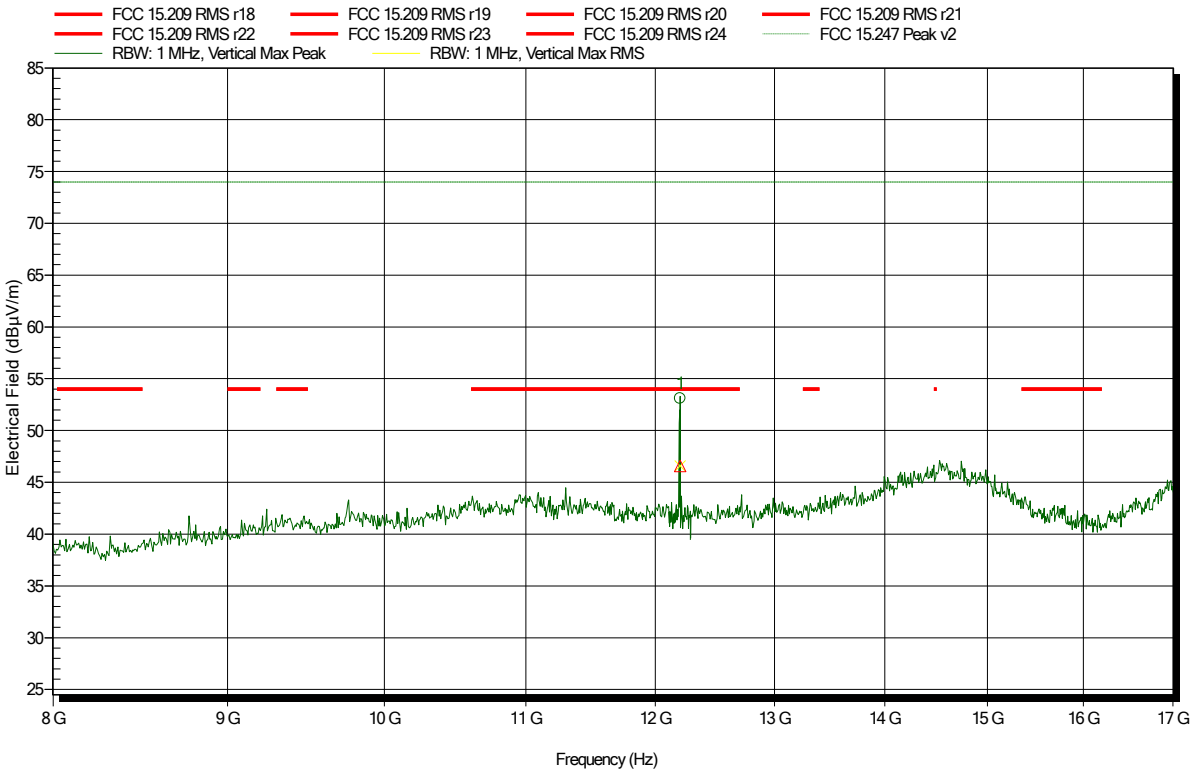

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.202 GHz	53.11 dBµV/m	74 dBµV/m	-20.89 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
12.202 GHz	46.59 dBµV/m	54 dBµV/m	-7.41 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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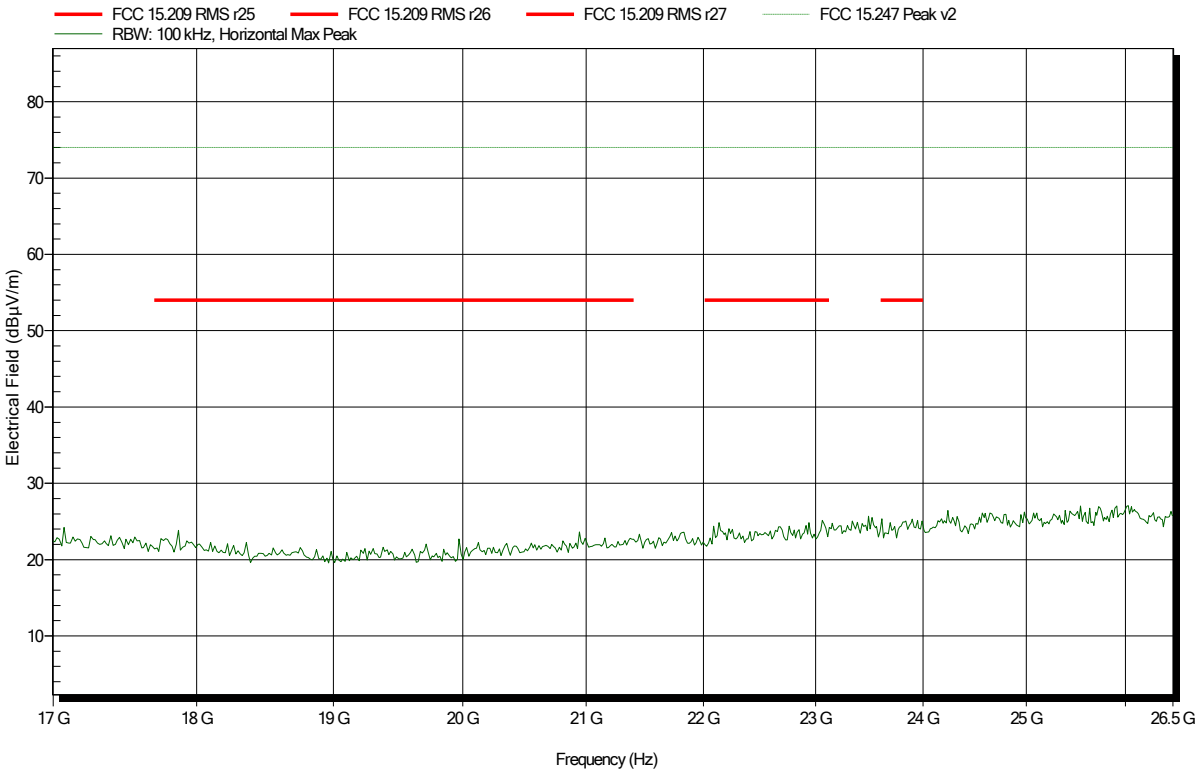

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz; P=12
Test Date:	2019-12-03
Note:	

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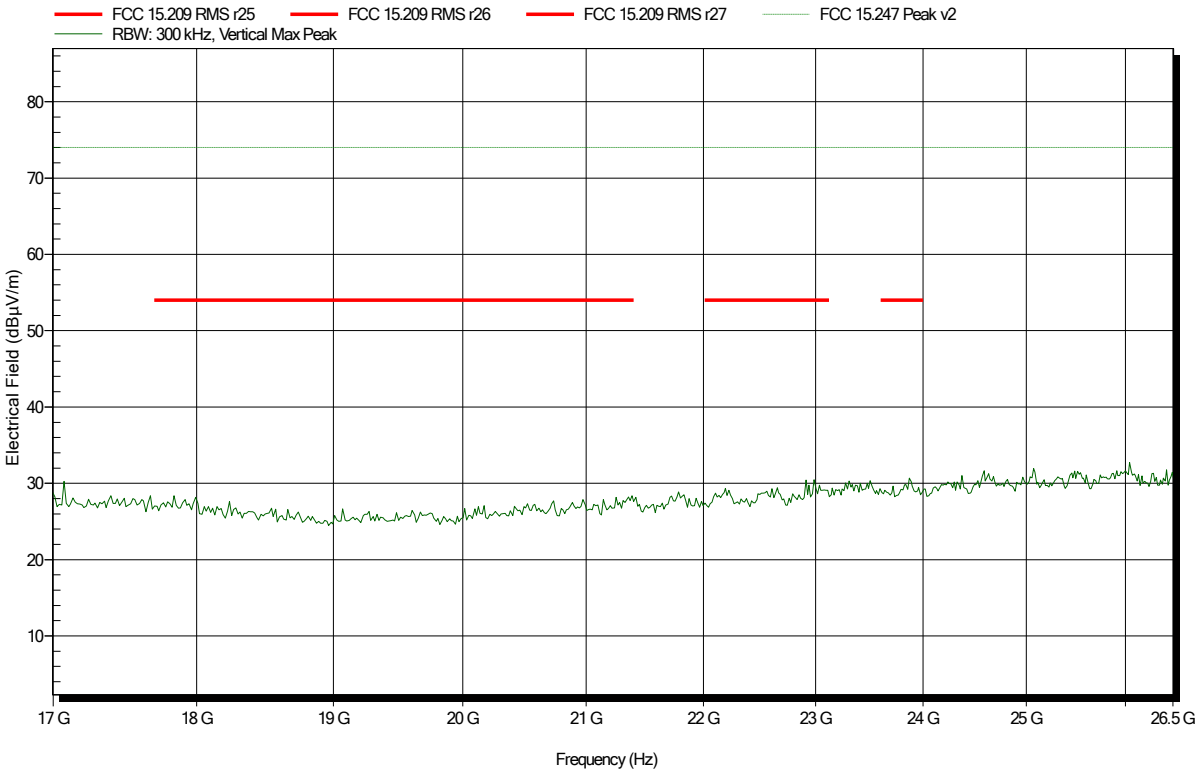

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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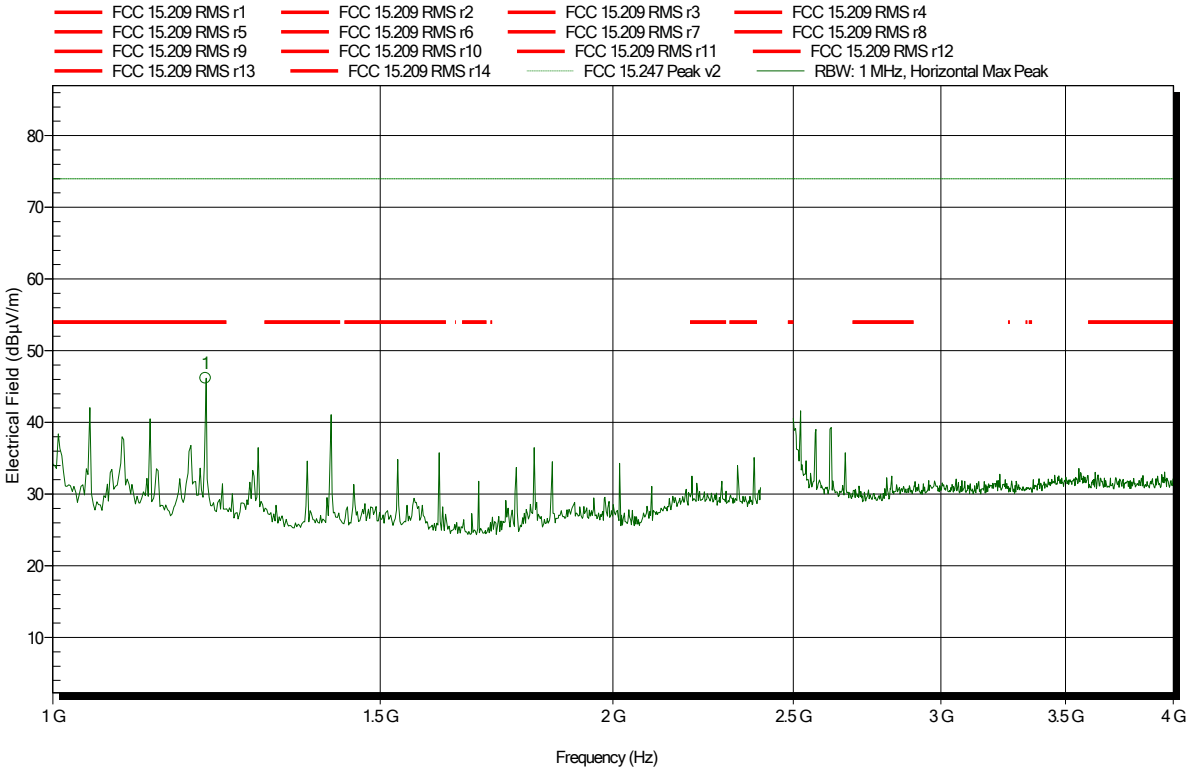

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.209 GHz	46.19 dBµV/m	74 dBµV/m	-27.81 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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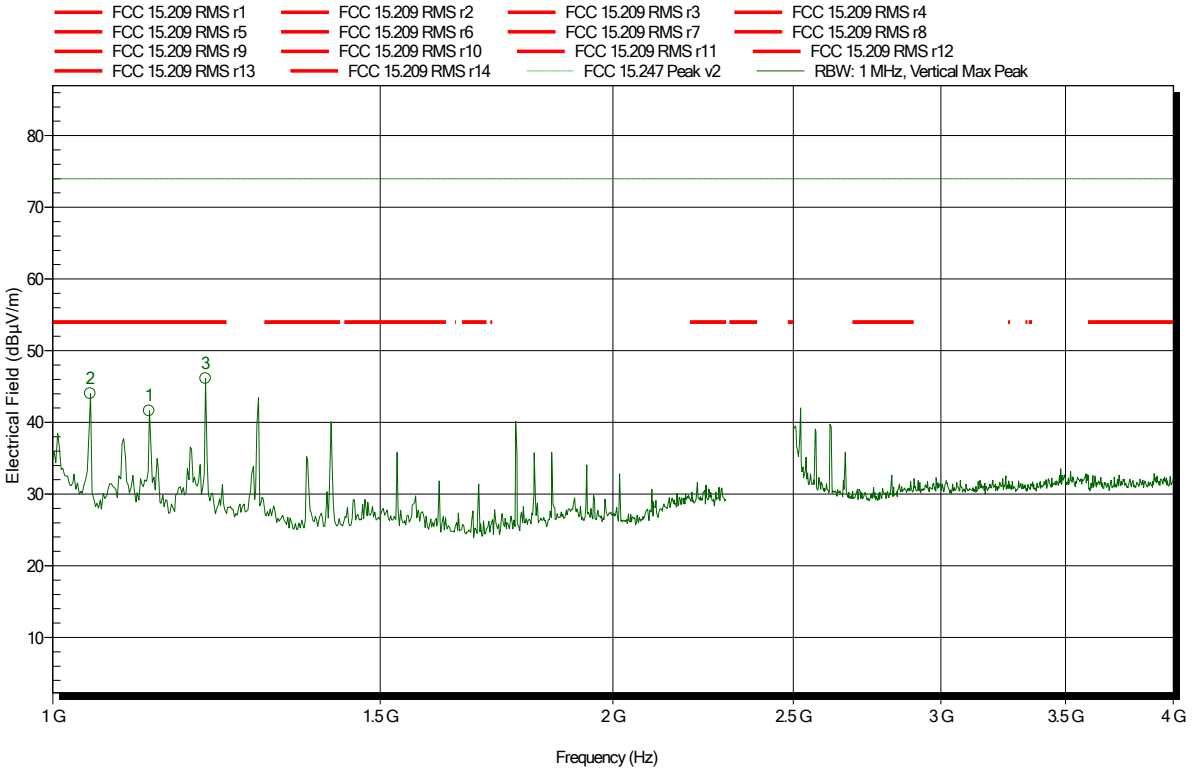

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.048 GHz	44.05 dBµV/m	74 dBµV/m	-29.95 dB	Pass
1.127 GHz	41.59 dBµV/m	74 dBµV/m	-32.41 dB	Pass
1.208 GHz	46.12 dBµV/m	74 dBµV/m	-27.88 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	upper bandedge

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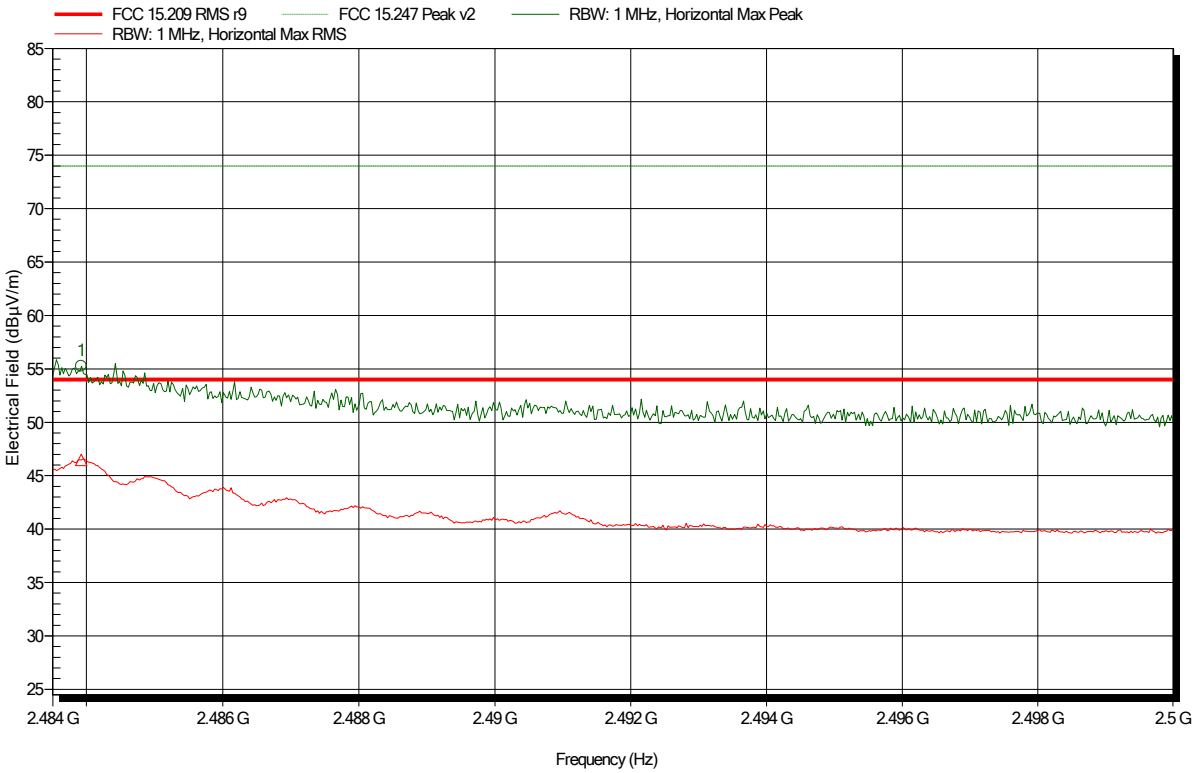

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4839 GHz	55.25 dBµV/m	74 dBµV/m	-18.75 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4839 GHz	46.48 dBµV/m	54 dBµV/m	-7.52 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	upper bandedge

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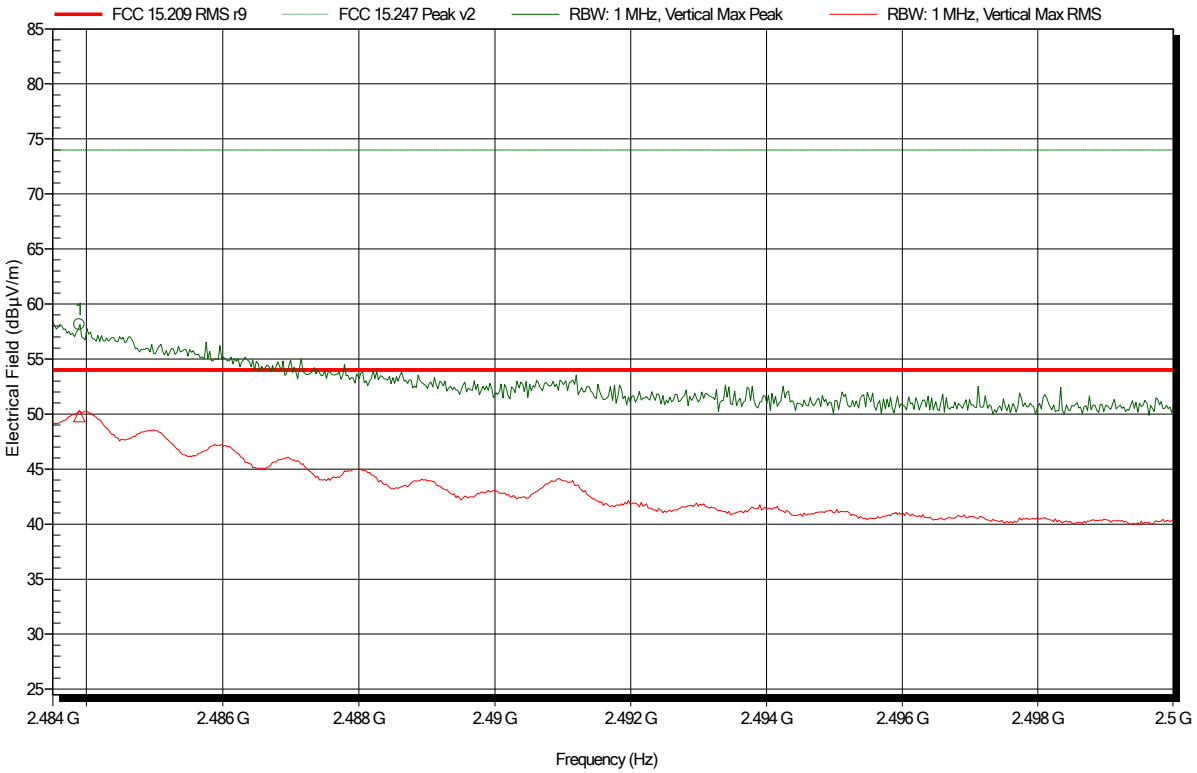

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4839 GHz	58.13 dBµV/m	74 dBµV/m	-15.87 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4839 GHz	49.82 dBµV/m	54 dBµV/m	-4.18 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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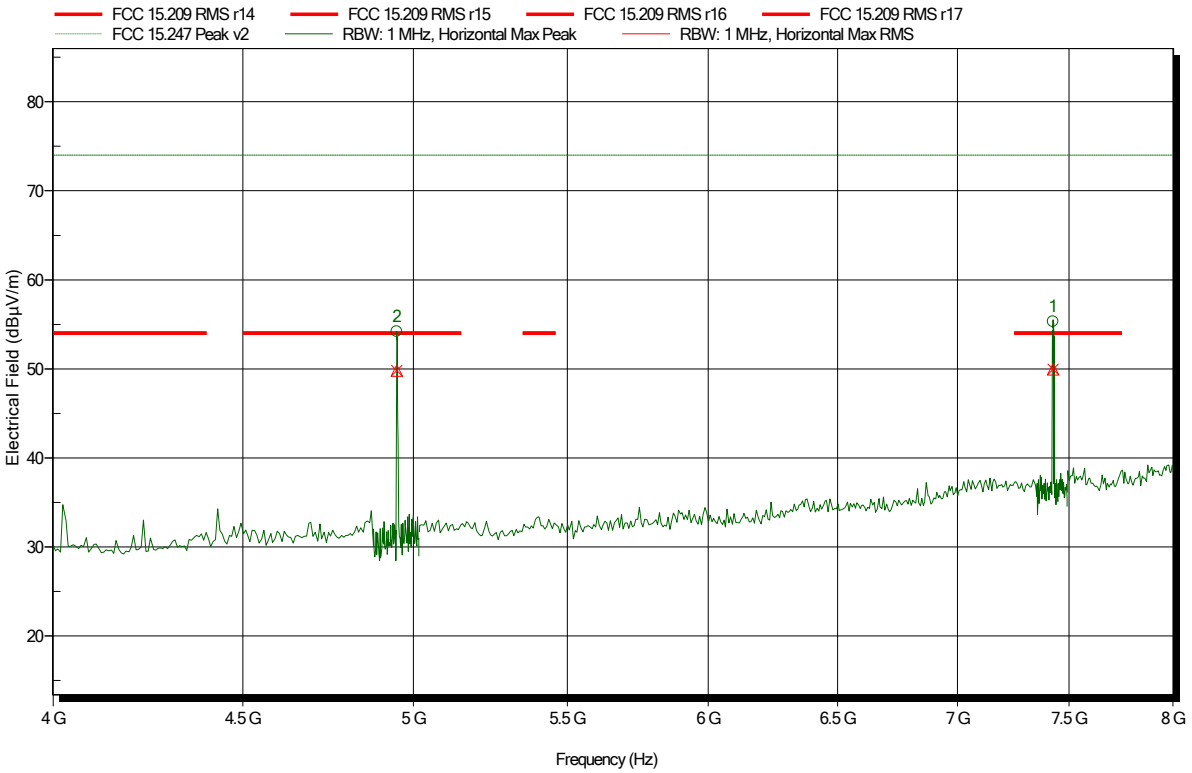

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.949 GHz	54.21 dBµV/m	74 dBµV/m	-19.79 dB	Pass
7.426 GHz	55.32 dBµV/m	74 dBµV/m	-18.68 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
4.949 GHz	49.81 dBµV/m	54 dBµV/m	-4.19 dB	Pass
7.426 GHz	49.95 dBµV/m	54 dBµV/m	-4.05 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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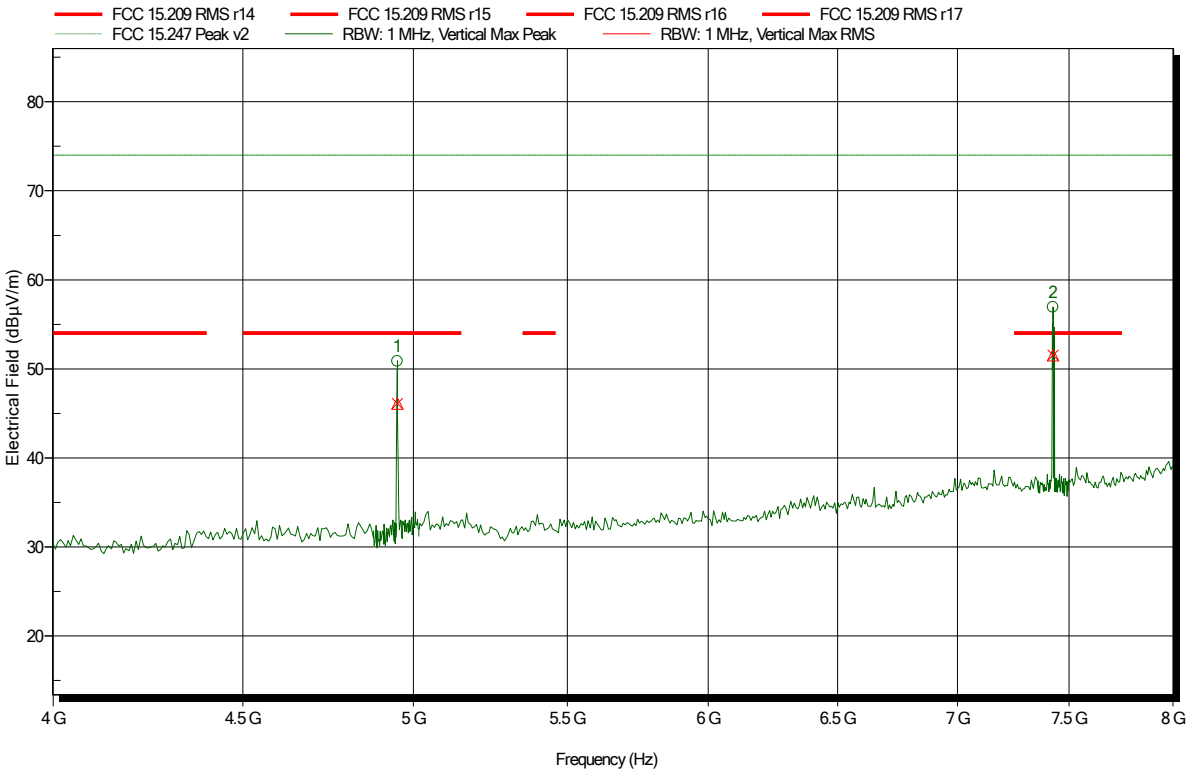

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.951 GHz	50.85 dBµV/m	74 dBµV/m	-23.15 dB	Pass
7.426 GHz	56.92 dBµV/m	74 dBµV/m	-17.08 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
4.951 GHz	46.12 dBµV/m	54 dBµV/m	-7.88 dB	Pass
7.426 GHz	51.54 dBµV/m	54 dBµV/m	-2.46 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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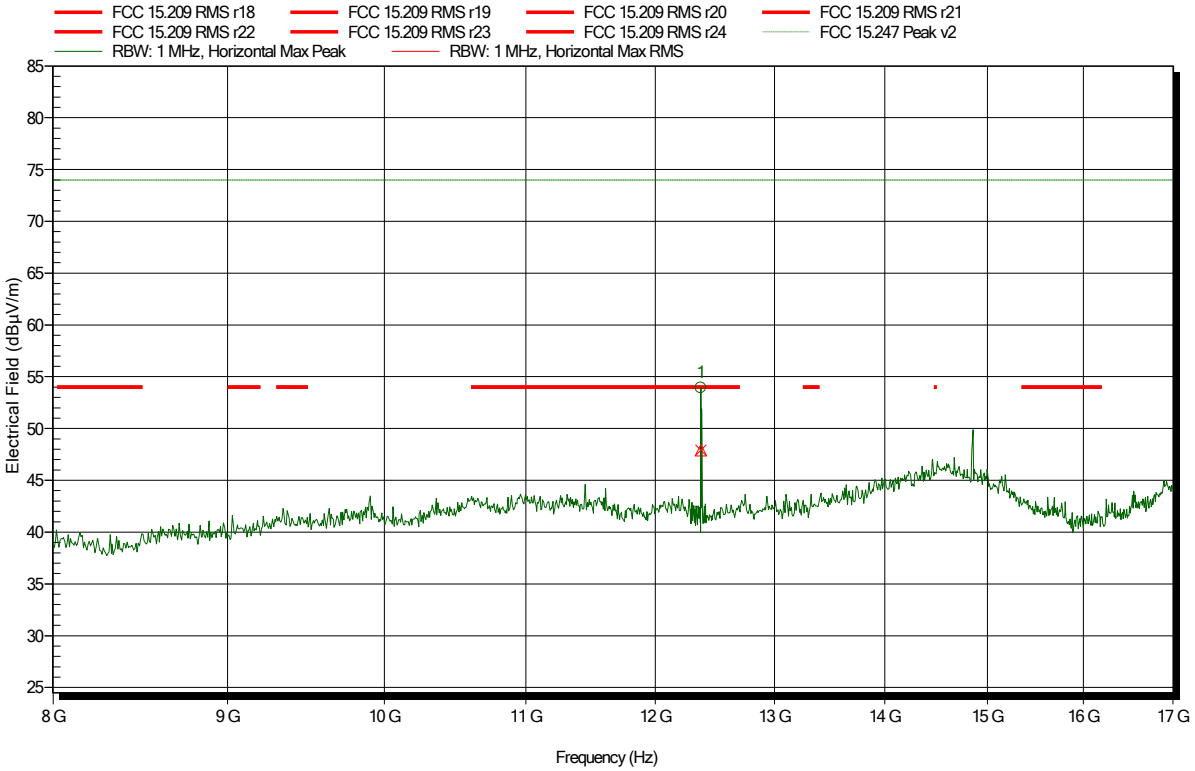

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.373 GHz	53.94 dBµV/m	74 dBµV/m	-20.06 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
12.373 GHz	47.91 dBµV/m	54 dBµV/m	-6.09 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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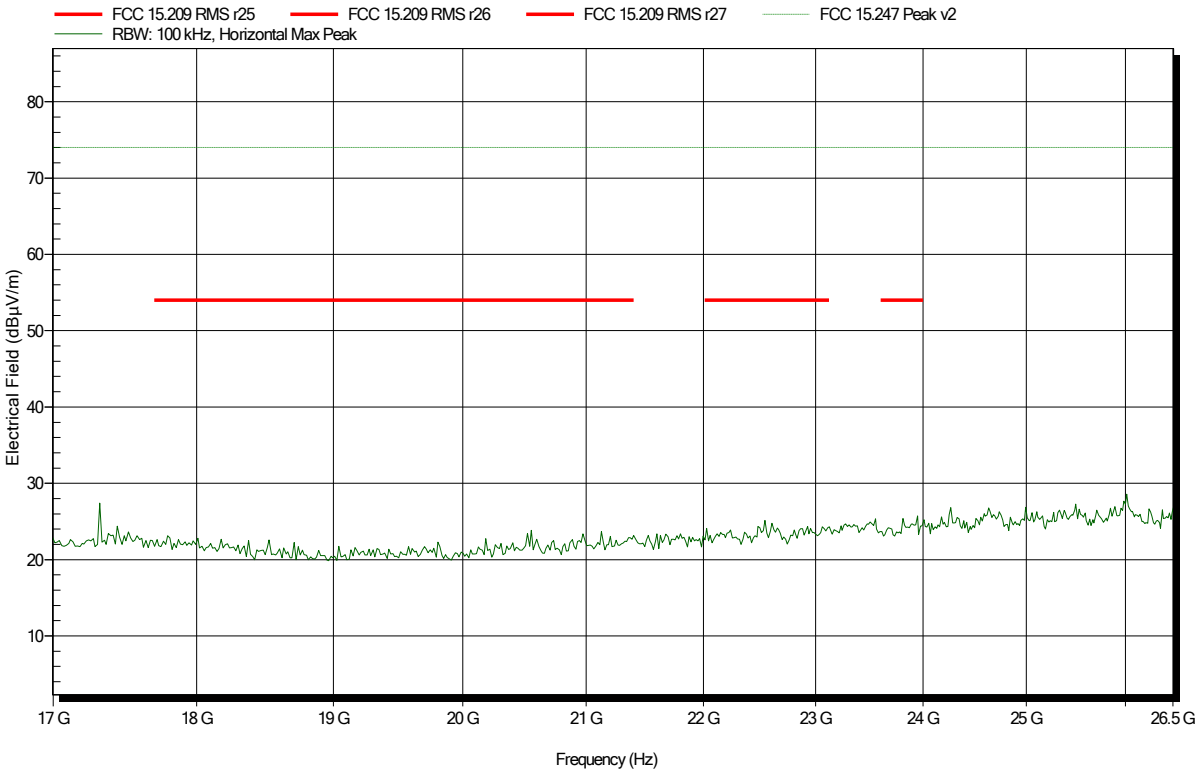

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2475 MHz; P=12
Test Date:	2019-12-03
Note:	

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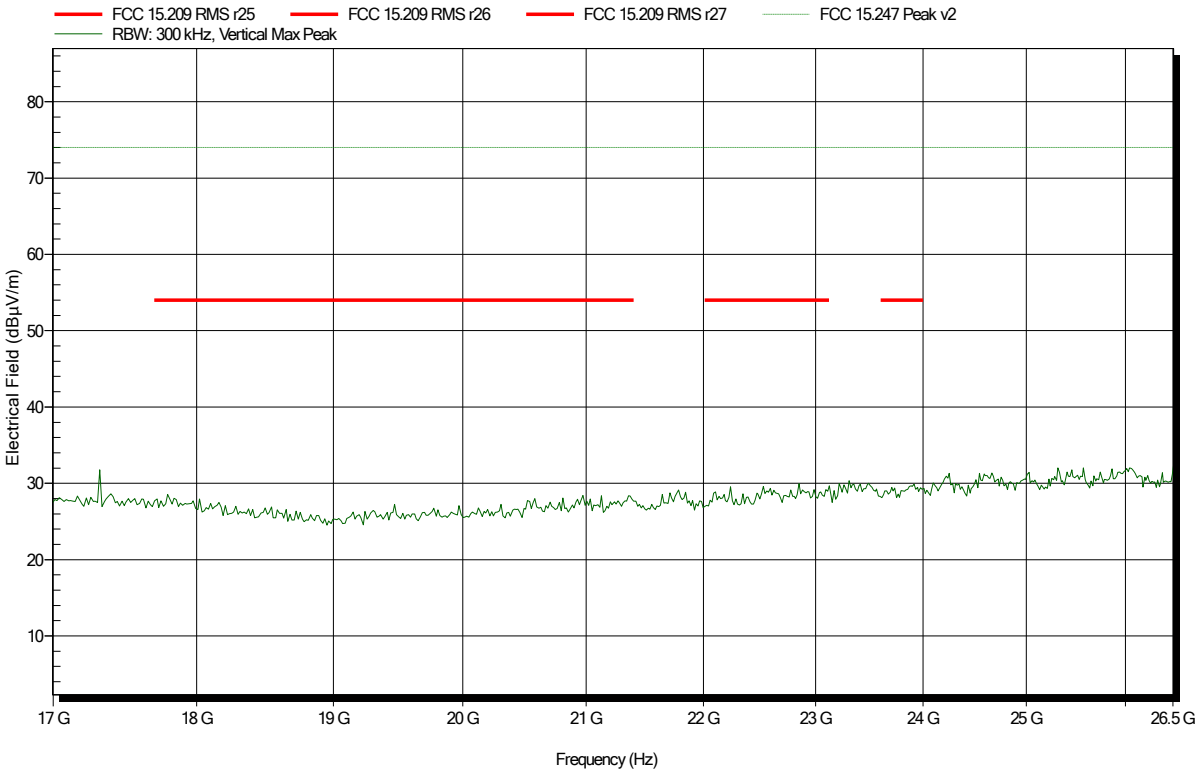

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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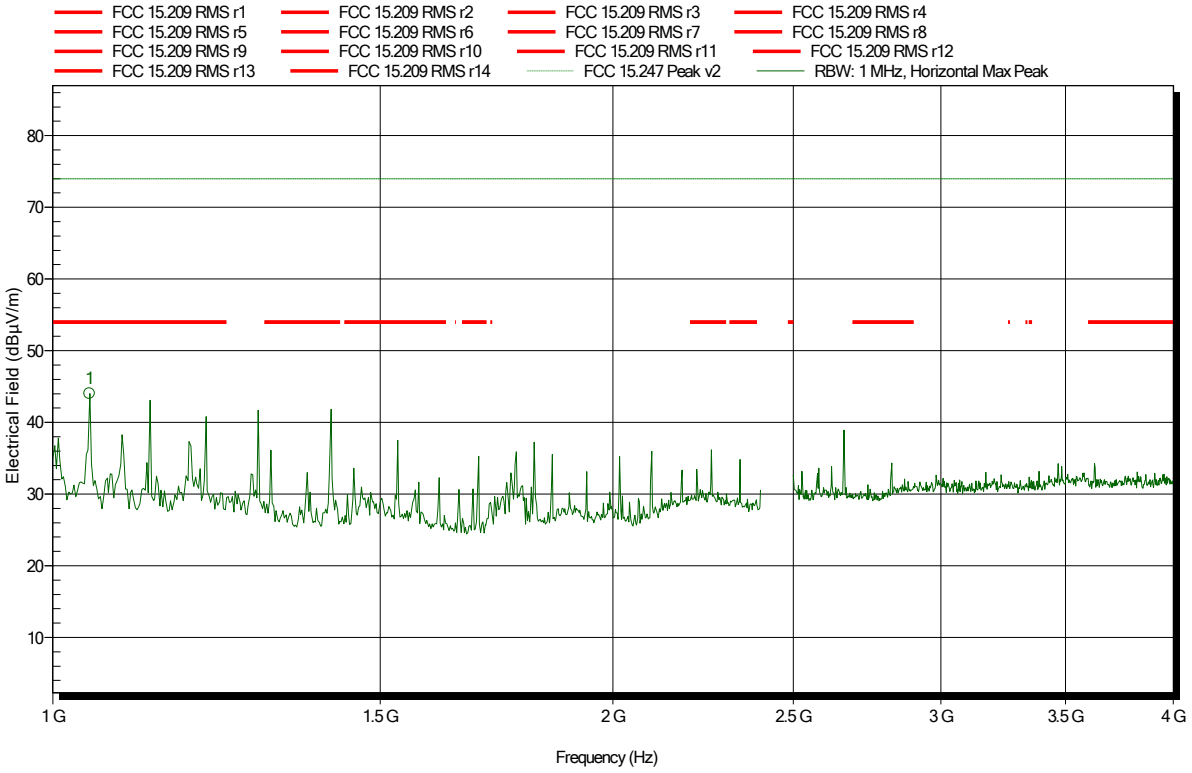

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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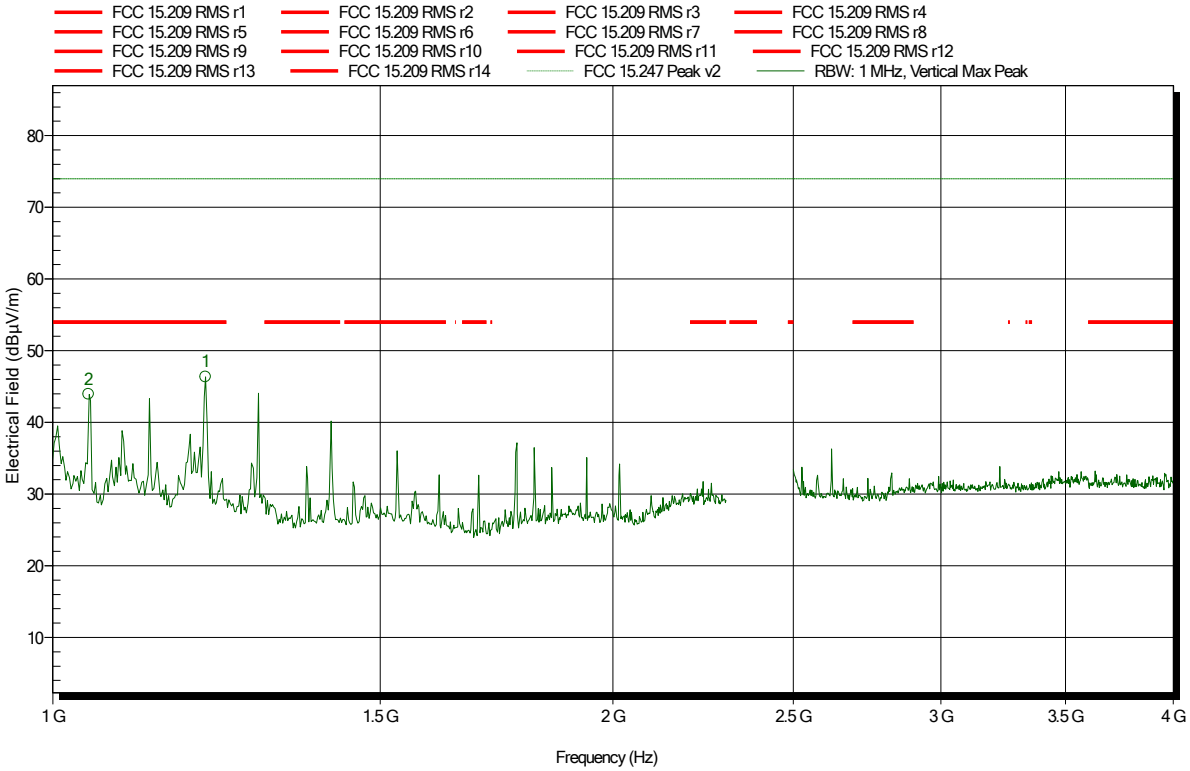

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.046 GHz	43.92 dBµV/m	74 dBµV/m	-30.08 dB	Pass
1.208 GHz	46.36 dBµV/m	74 dBµV/m	-27.64 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	upper bandedge

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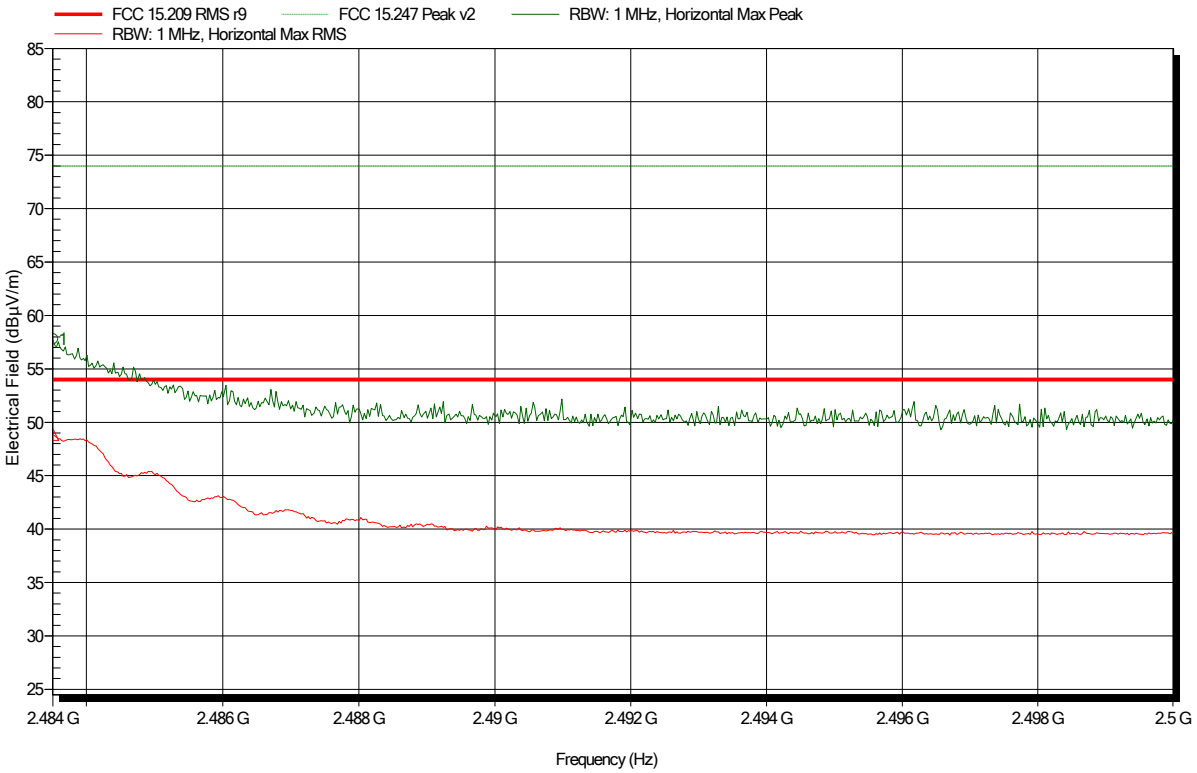

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	57.76 dBµV/m	74 dBµV/m	-16.24 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	48.85 dBµV/m	54 dBµV/m	-5.15 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	upper bandedge

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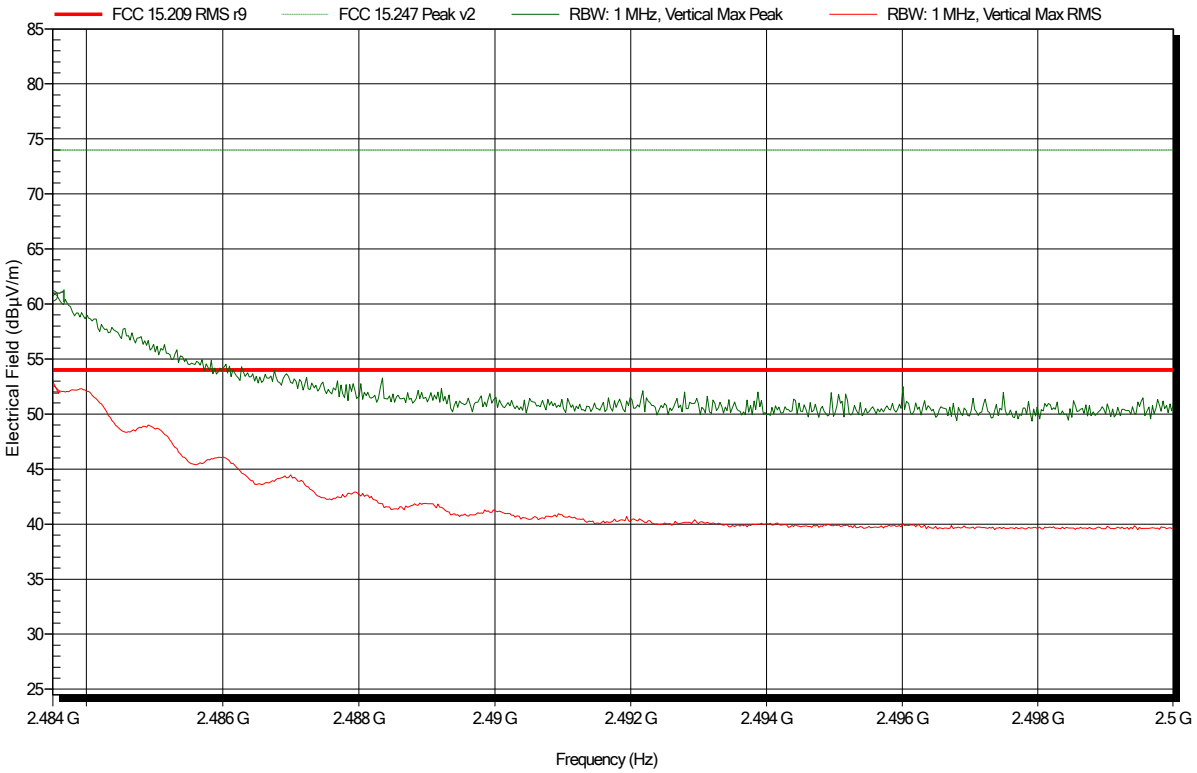

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	60.69 dBµV/m	74 dBµV/m	-13.31 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	52.41 dBµV/m	54 dBµV/m	-1.59 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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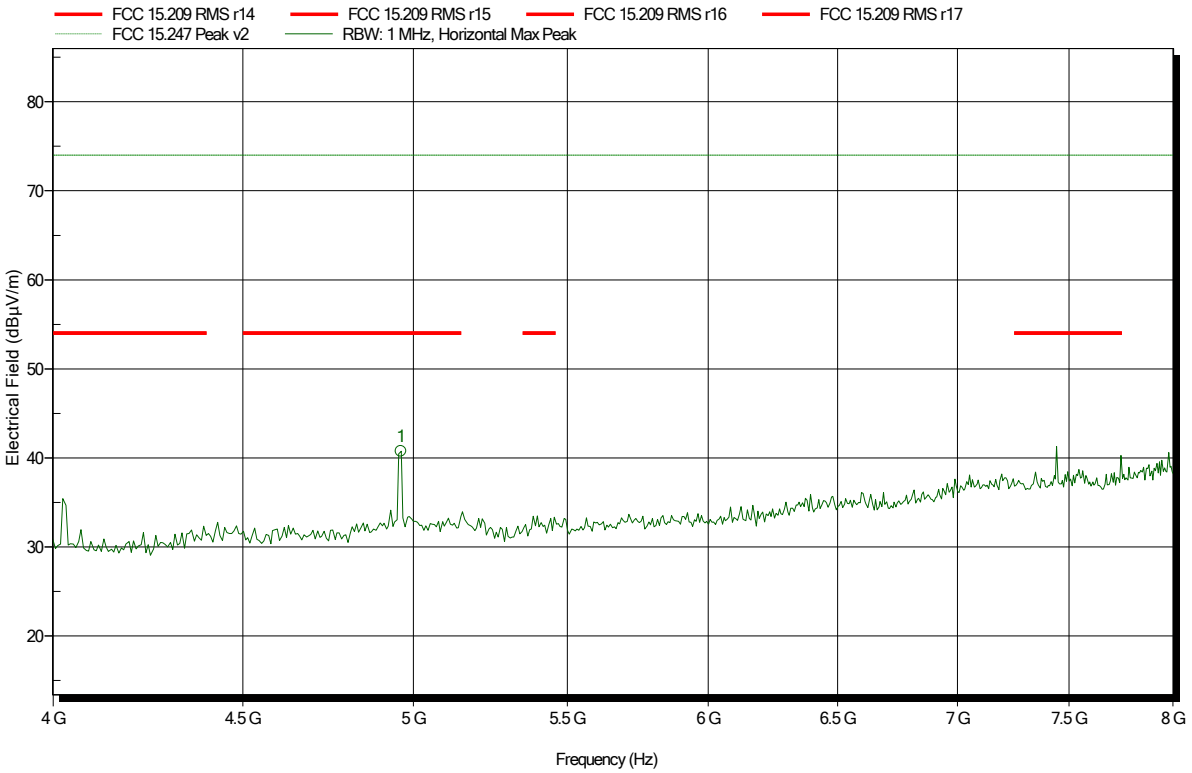

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	40.75 dBµV/m	74 dBµV/m	-33.25 dB	Pass

Frequency
4.962 GHz

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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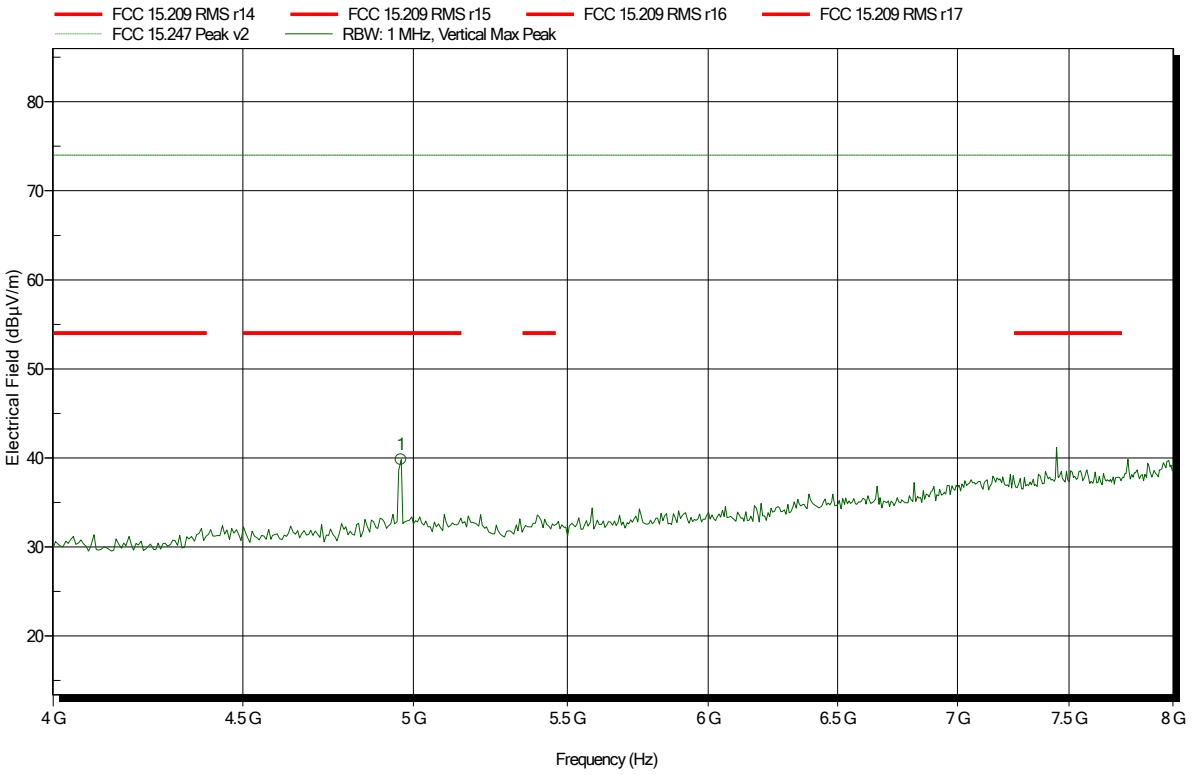

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.962 GHz	39.81 dBµV/m	74 dBµV/m	-34.19 dB	Pass

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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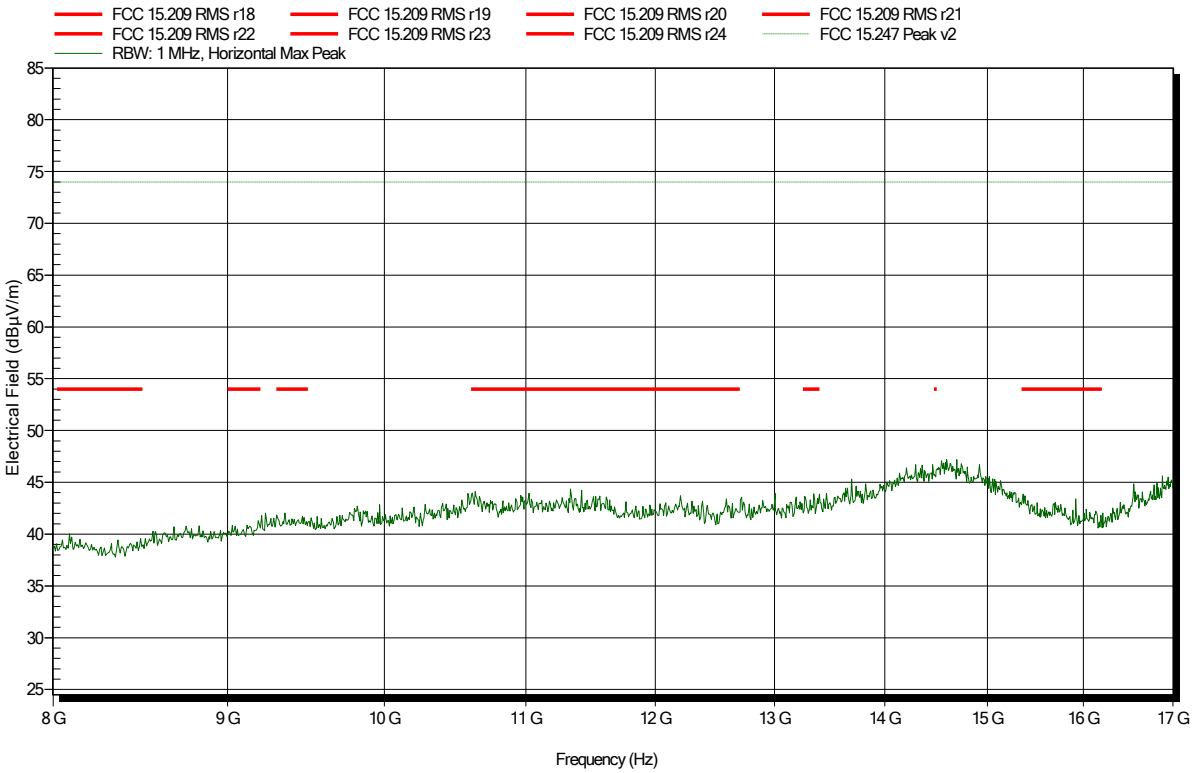

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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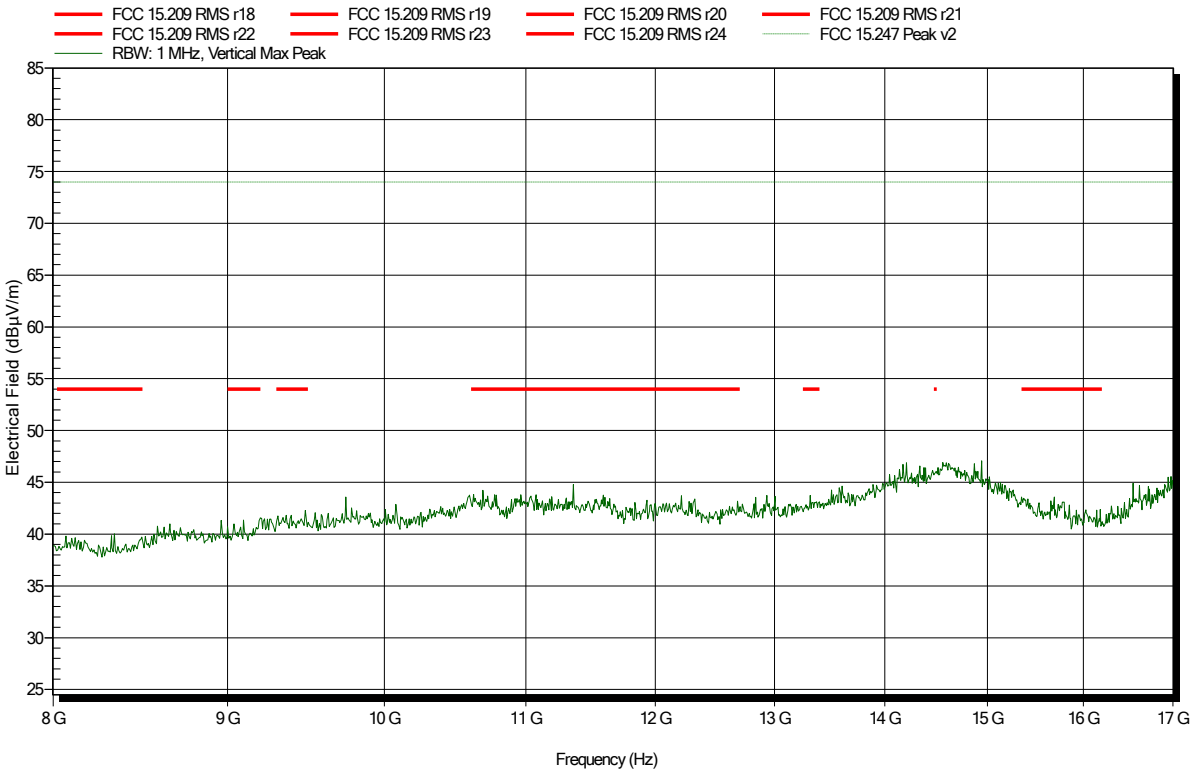

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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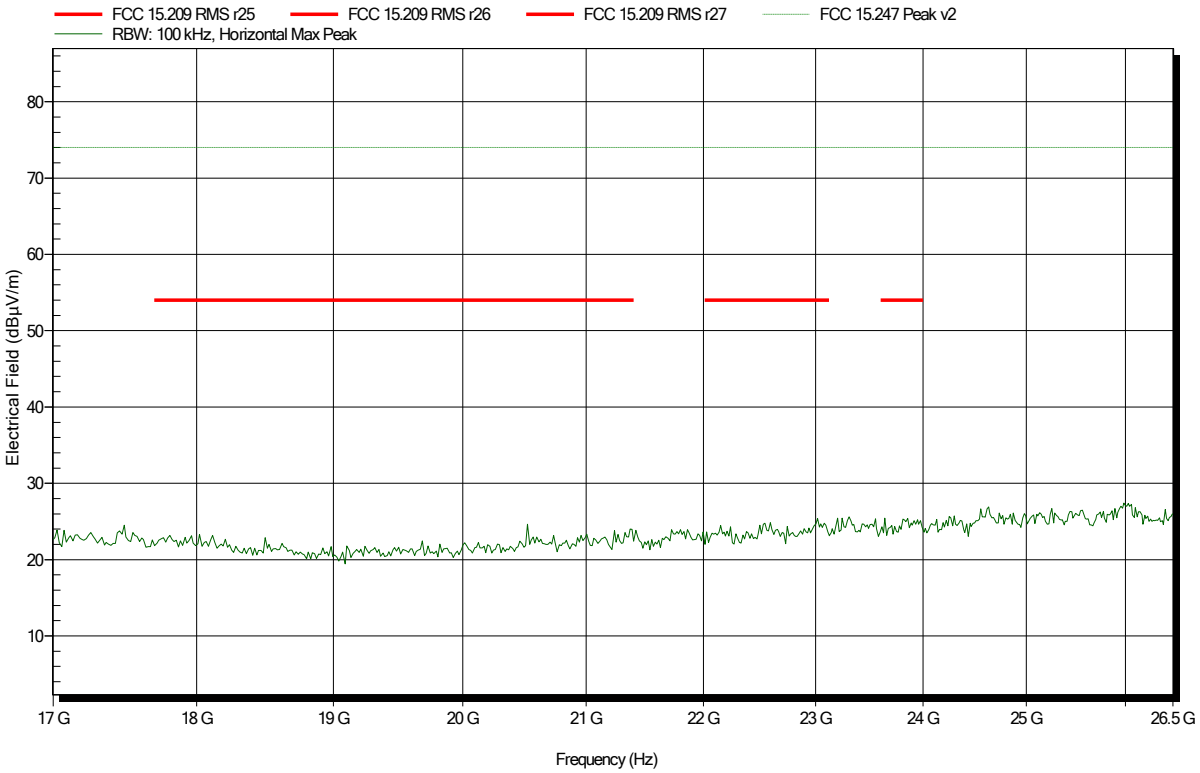

Spurious emissions according to FCC 47 e-CFR §15.247

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Amplifier Research AT4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz; P=15
Test Date:	2019-12-03
Note:	

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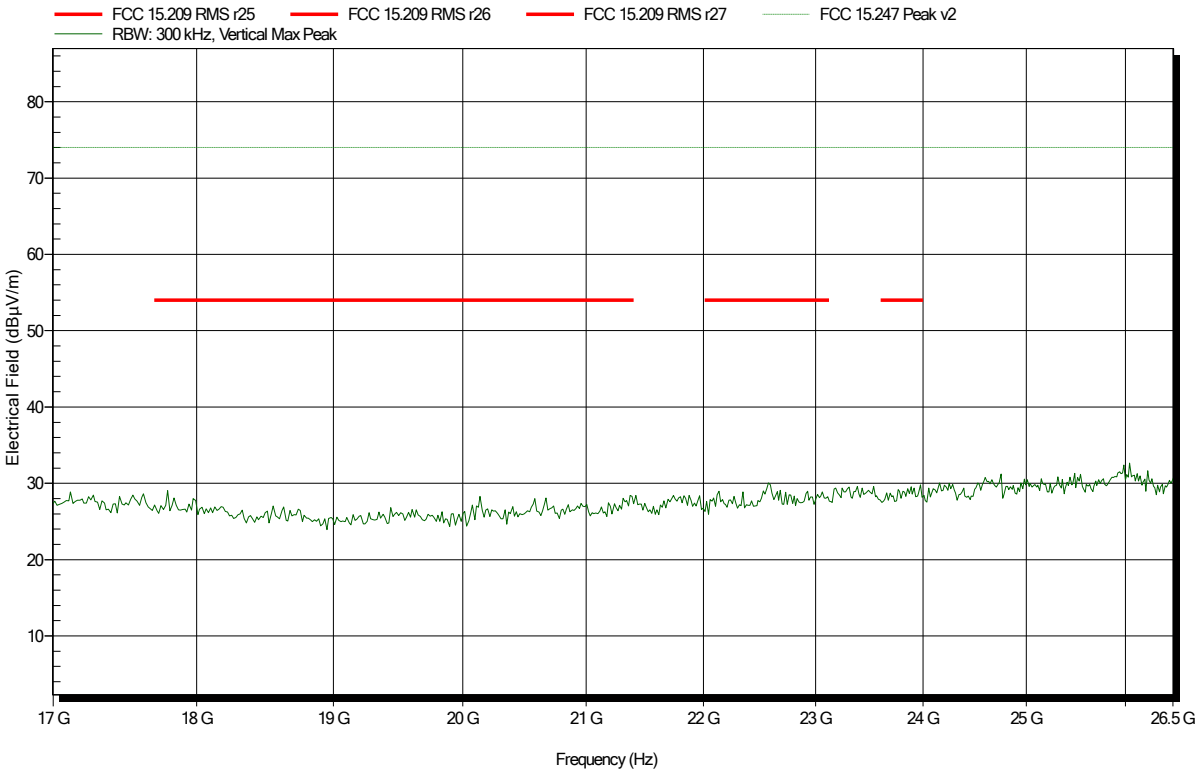

ANNEX B Receiver spurious emissions

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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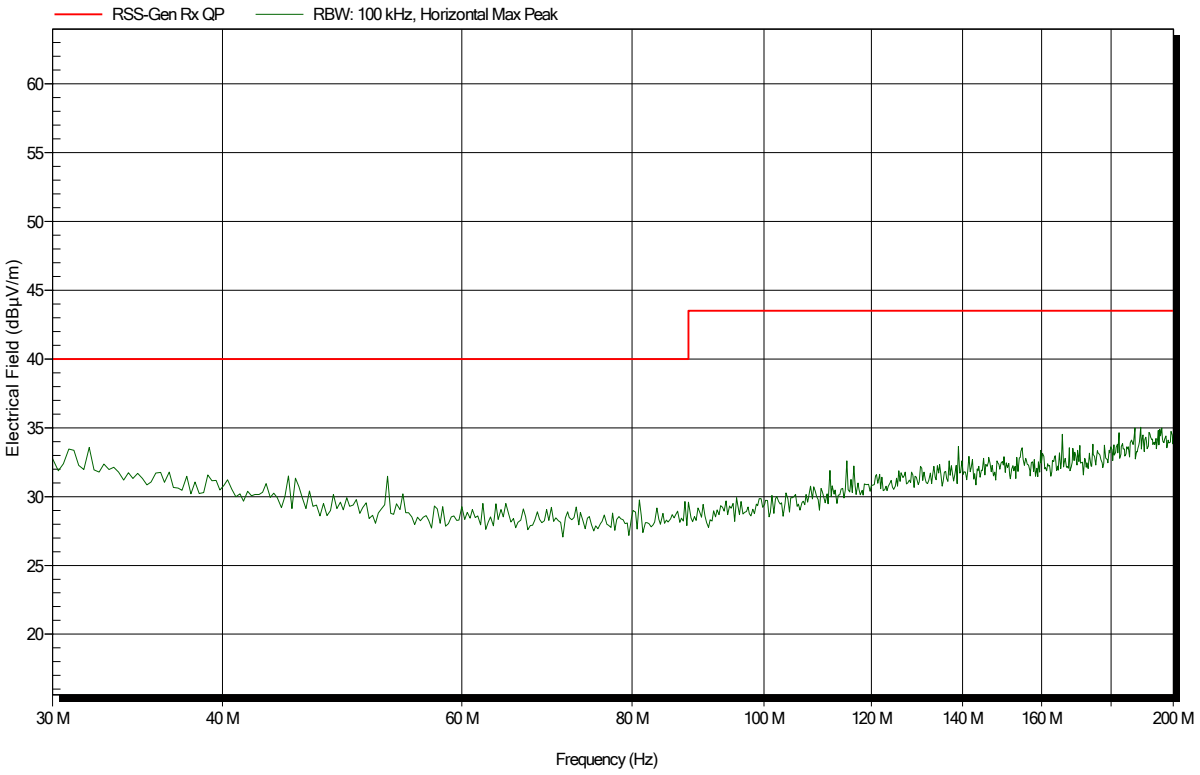

Spurious emissions according to ISED RSS-247 Issue 2 (February 2017)

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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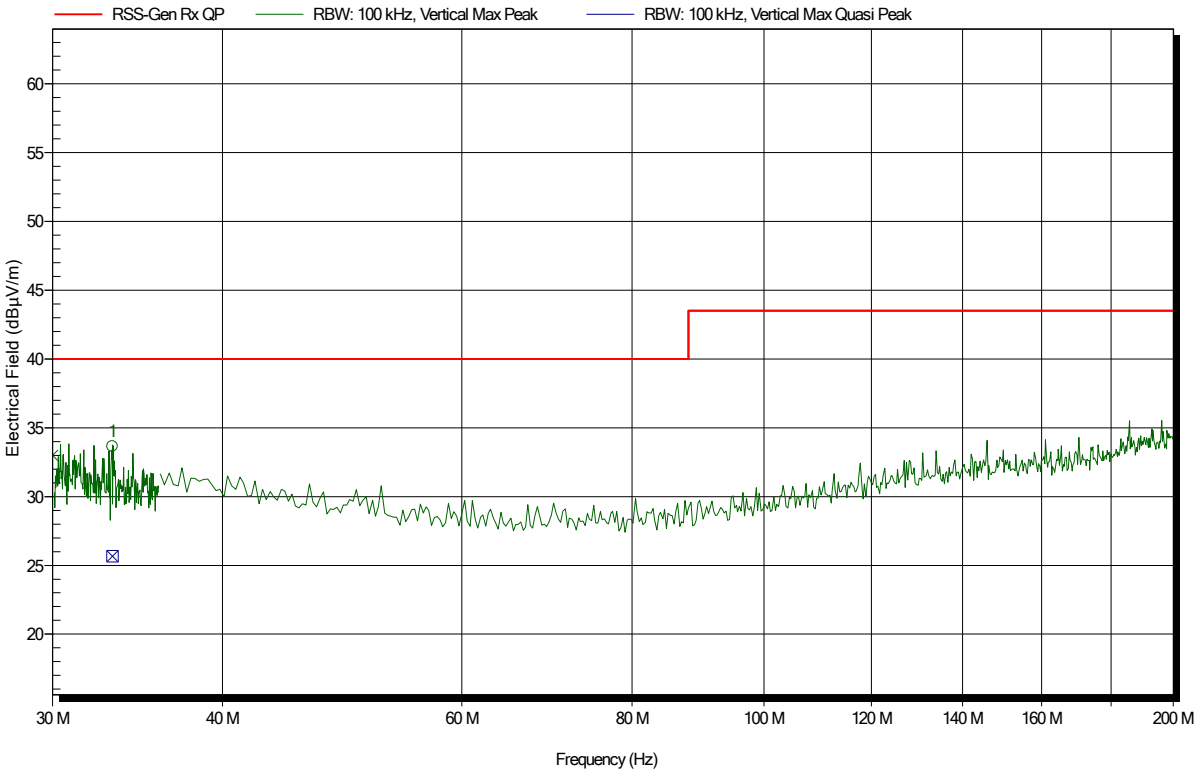

Frequency	Peak	Peak Limit	Peak Difference	Status
33.216 MHz	33.64 dBµV/m	-	-	-

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
33.216 MHz	25.66 dBµV/m	40 dBµV/m	-14.34 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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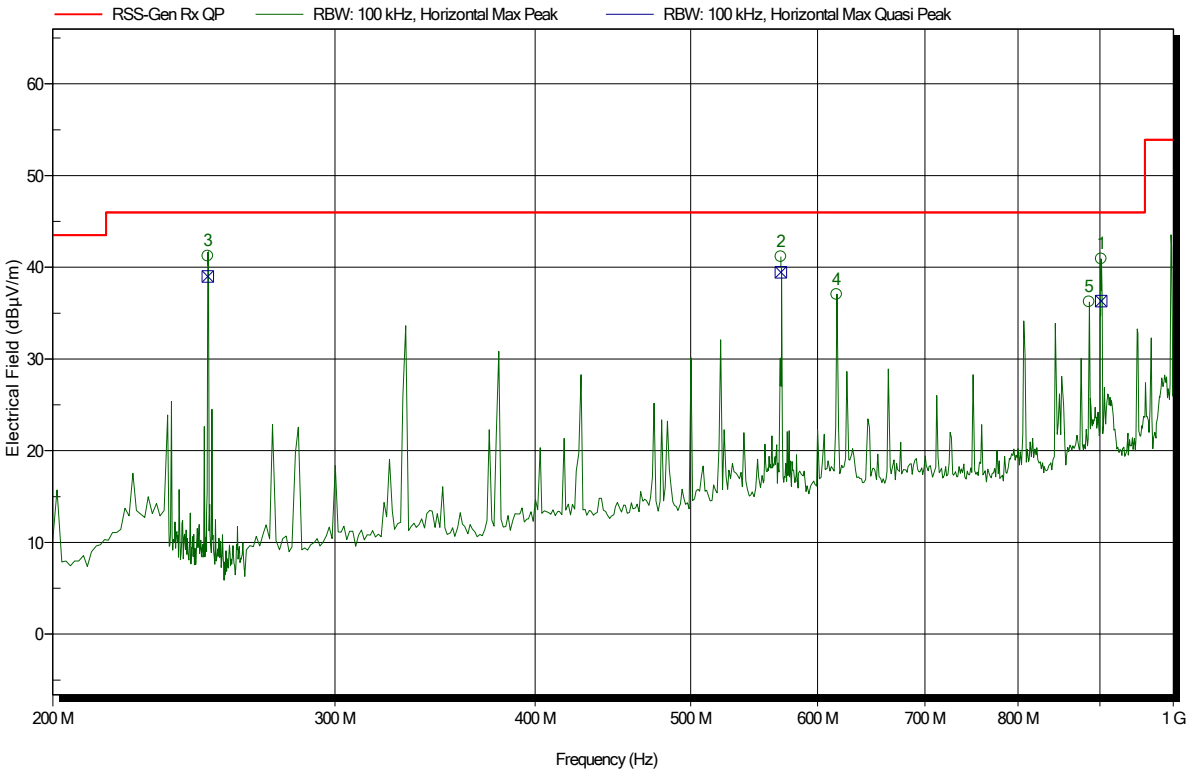

Frequency	Peak	Peak Limit	Peak Difference	Status
249.999 MHz	41.24 dBµV/m	-	-	-
569.121 MHz	41.16 dBµV/m	-	-	-
616.667 MHz	37.06 dBµV/m	46 dBµV/m	-8.94 dB	Pass
885.897 MHz	36.23 dBµV/m	46 dBµV/m	-9.77 dB	Pass
901.395 MHz	40.91 dBµV/m	-	-	-

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
249.999 MHz	38.99 dBµV/m	46 dBµV/m	-7.01 dB	Pass
569.121 MHz	39.47 dBµV/m	46 dBµV/m	-6.53 dB	Pass
901.395 MHz	36.31 dBµV/m	46 dBµV/m	-9.69 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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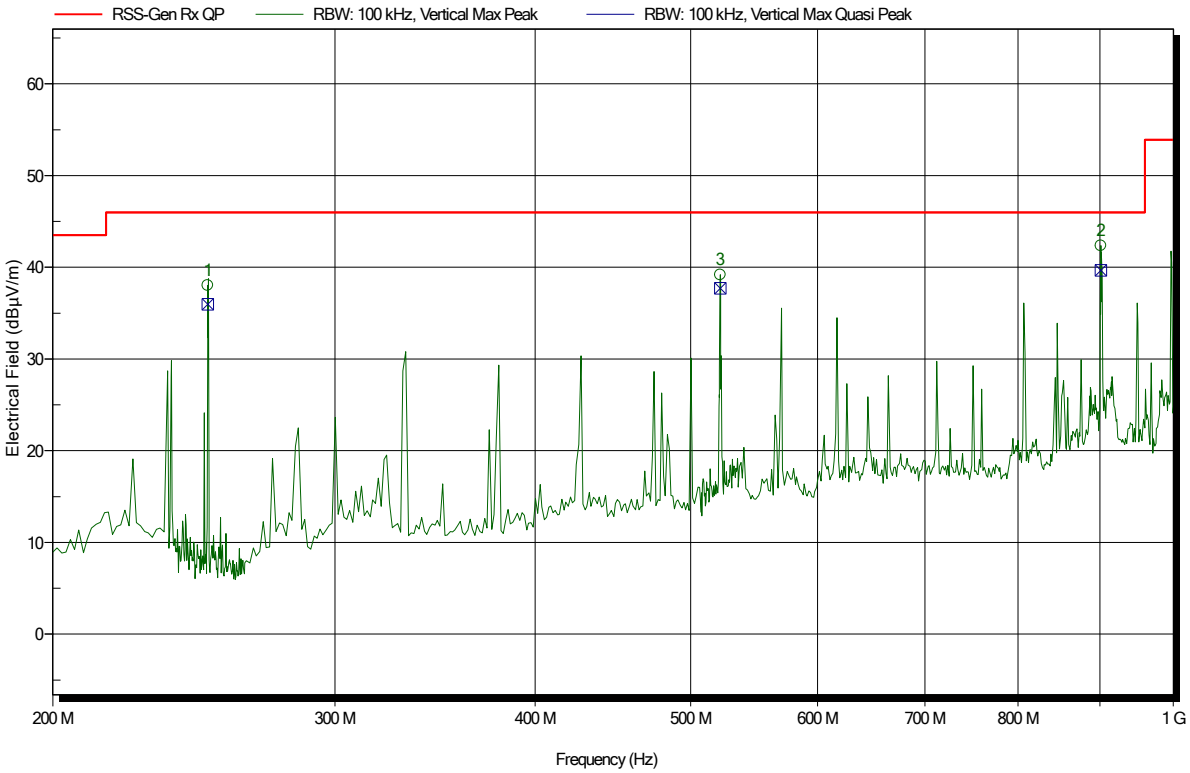

Frequency	Peak	Peak Limit	Peak Difference	Status
250 MHz	38.02 dBµV/m	-	-	-
521.724 MHz	39.17 dBµV/m	-	-	-
901.139 MHz	42.35 dBµV/m	-	-	-

Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
250 MHz	35.97 dBµV/m	46 dBµV/m	-10.03 dB	Pass
521.724 MHz	37.7 dBµV/m	46 dBµV/m	-8.3 dB	Pass
901.139 MHz	39.68 dBµV/m	46 dBµV/m	-6.32 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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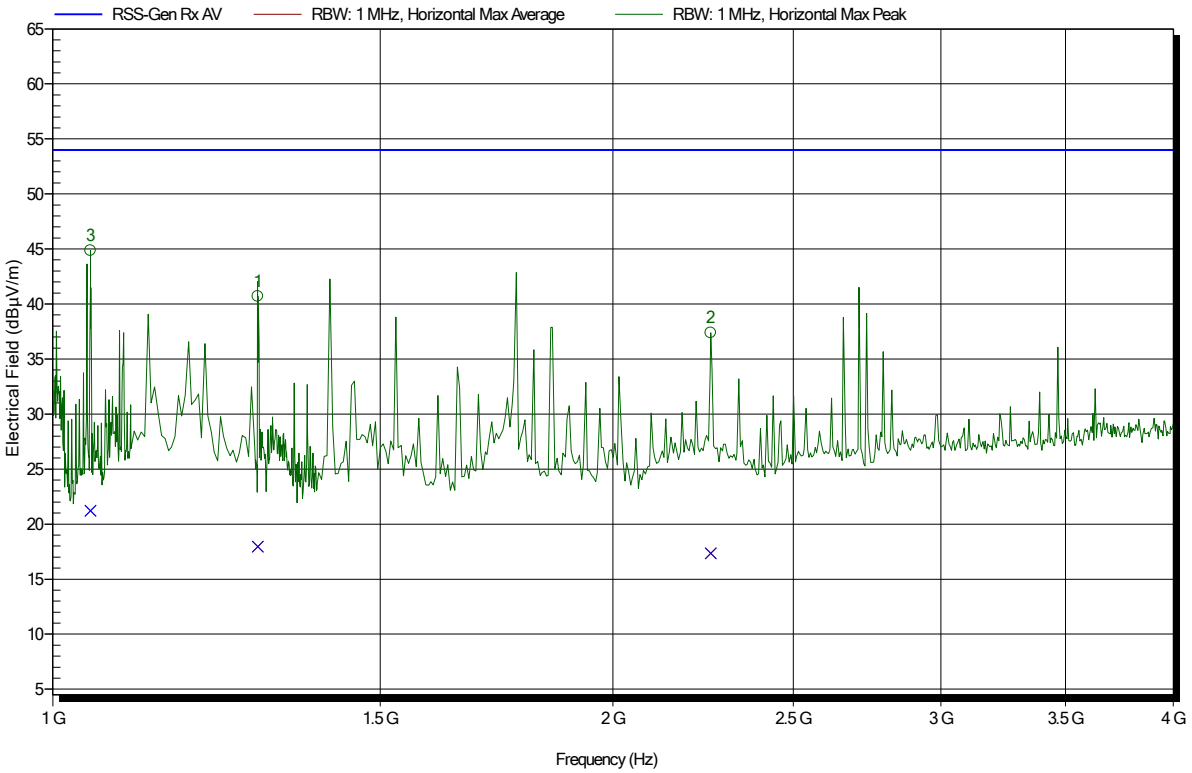

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.048 GHz	44.86 dBµV/m	-	-	-
1.289 GHz	40.7 dBµV/m	-	-	-
2.257 GHz	37.38 dBµV/m	-	-	-

Frequency	Average	Average Limit	Average Difference	Average Status
1.048 GHz	21.22 dBµV/m	53.98 dBµV/m	-32.76 dB	Pass
1.289 GHz	17.95 dBµV/m	53.98 dBµV/m	-36.03 dB	Pass
2.257 GHz	17.33 dBµV/m	53.98 dBµV/m	-36.65 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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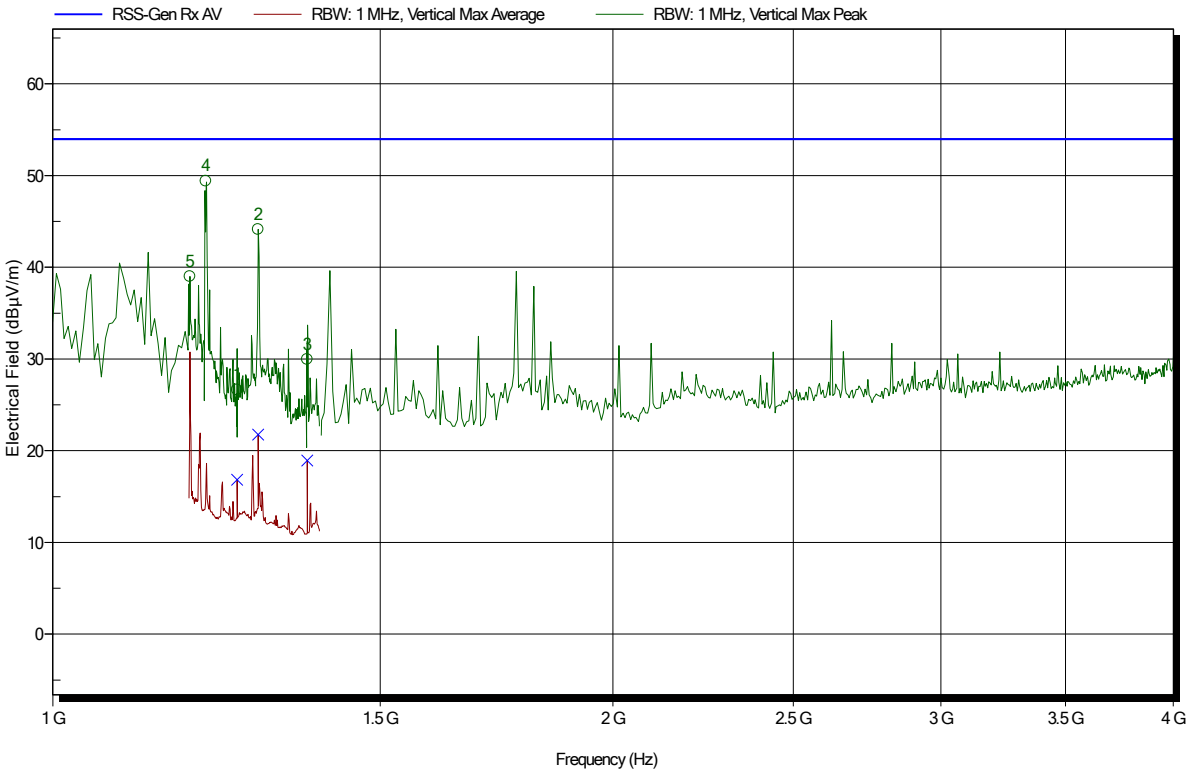

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.185 GHz	39.01 dBµV/m	53.98 dBµV/m	-14.97 dB	Pass
1.209 GHz	49.41 dBµV/m	53.98 dBµV/m	-4.57 dB	Pass
1.256 GHz	26.64 dBµV/m	-	-	-
1.29 GHz	44.15 dBµV/m	-	-	-
1.371 GHz	29.98 dBµV/m	-	-	-

Frequency	Average	Average Limit	Average Difference	Average Status
1.256 GHz	16.83 dBµV/m	53.98 dBµV/m	-37.15 dB	Pass
1.29 GHz	21.75 dBµV/m	53.98 dBµV/m	-32.23 dB	Pass
1.371 GHz	18.92 dBµV/m	53.98 dBµV/m	-35.06 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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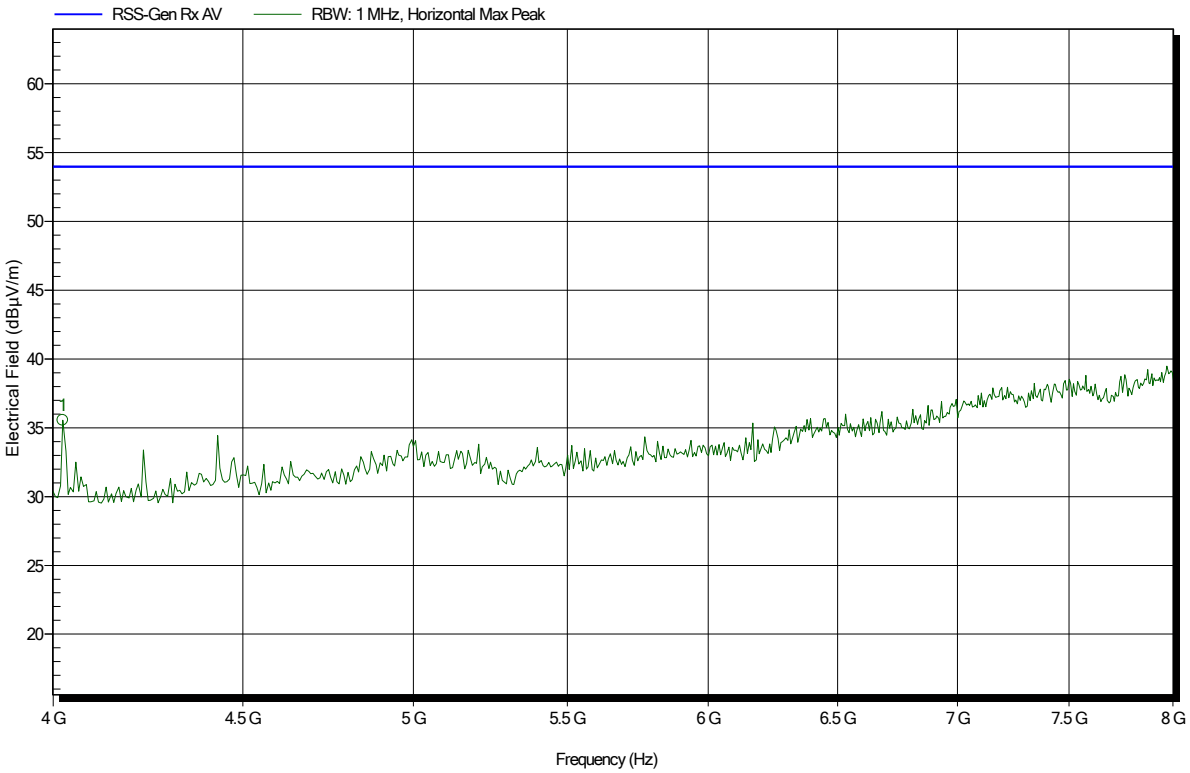

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.026 GHz	35.56 dBµV/m	53.98 dBµV/m	-18.42 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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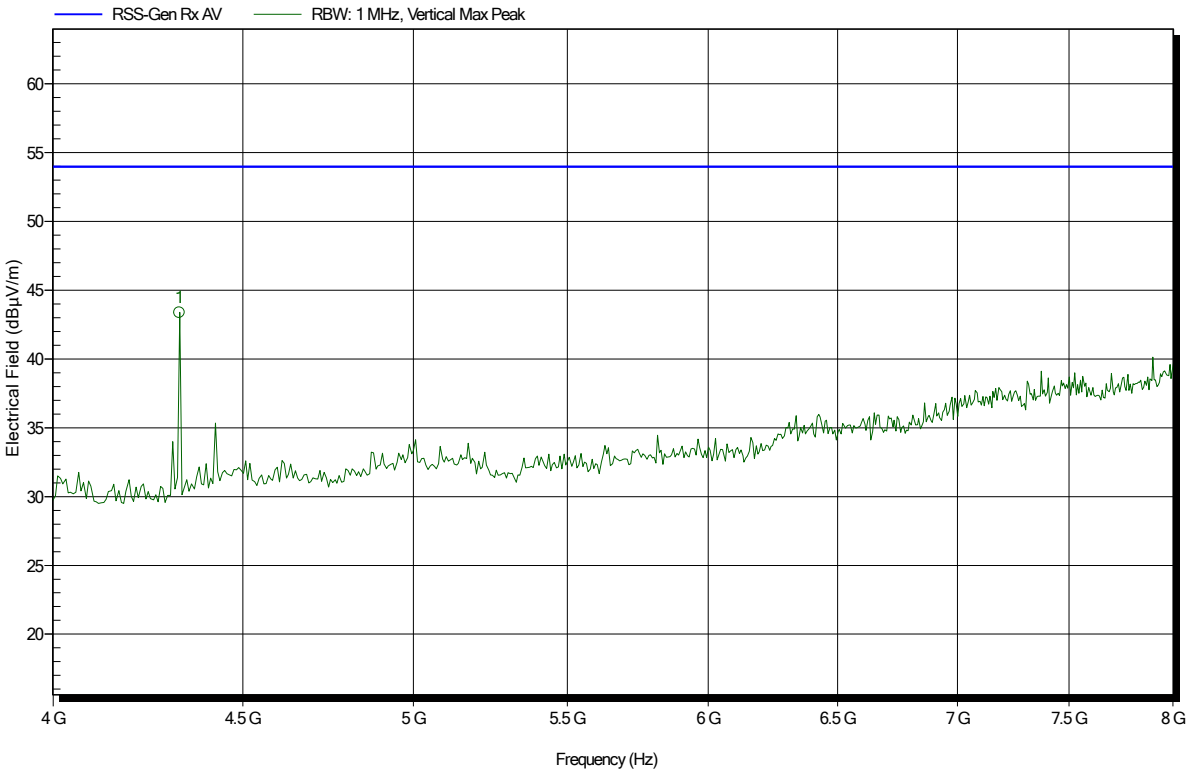

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.327 GHz	43.38 dBµV/m	53.98 dBµV/m	-10.6 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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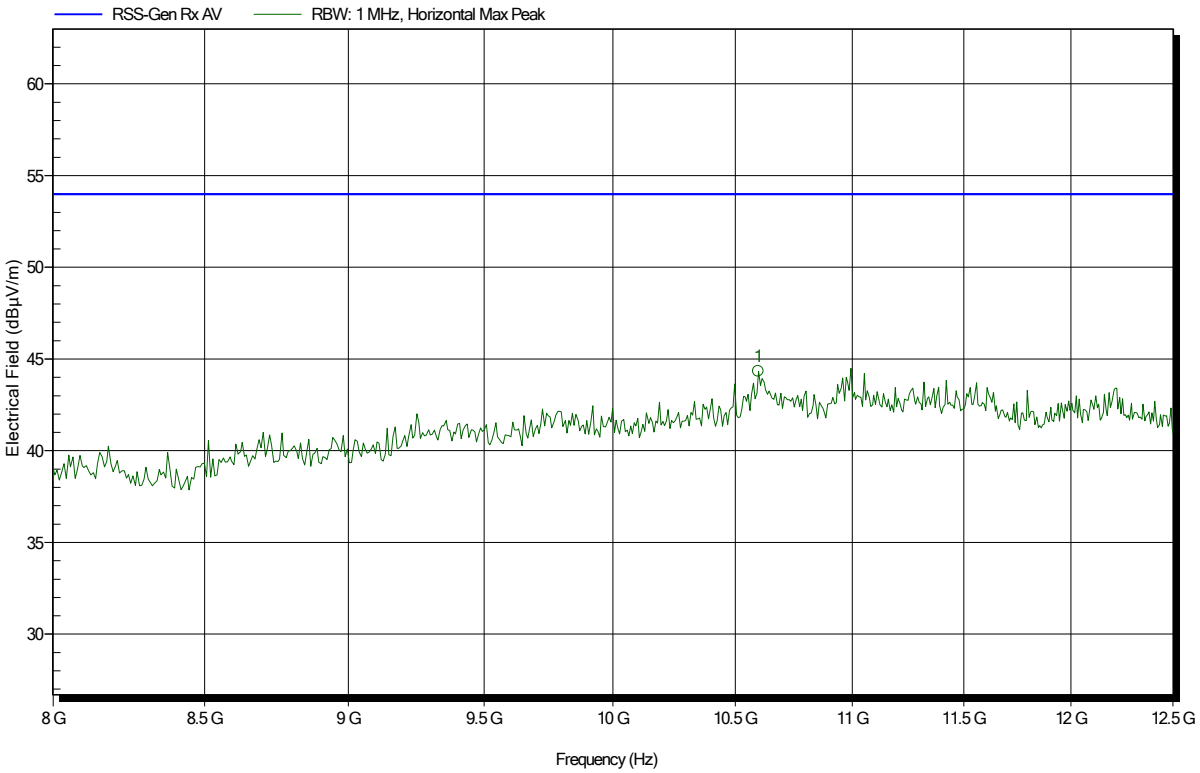

Frequency	Peak	Peak Limit	Peak Difference	Status
10.596 GHz	44.33 dBµV/m	53.98 dBµV/m	-9.65 dB	Pass

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

Project number:	G0M-1910-8555
Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	Zigbee Radio Module for Raspberry Pi
Model:	RaspBee II
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0 VDC
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2019-12-03
Note:	

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