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-1705-6569-TFC247ZB-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	 A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC Testing Laboratory site: 3470A-2
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
Non-Standard Test Method	None
Test Scope	Full compliance test
Equipment under Test (EUT):	
Product Description	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module with u.FL antenna connector
Model(s)	deRFsamR21E-23S20
Additional Model(s)	deRFsamR21E-23S00 (DUT1: ZigBee module with integrated antenna)
Brand Name(s)	None
Hardware Version(s)	0
Software Version(s)	0
FCC-ID	XVV-23SXX
IC	N/A
Test Result	**PASSED**

Possibe test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
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	2017-06-08	
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	2017-08-11	
Total number of pages	142	
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:		
The customer declared two models with the same RF part. Full Test was performed with DUT2: 2.4GHz IEEE 802.15.4 ZigBee module with u.FL antenna connector; Model: deRFsamR21E-23S20. Partial test was performed with model name DUT1: 2.4GHz IEEE 802.15.4 ZigBee module with integrated antenna / deRFsamR21E-23S00. The DUT can operate with OQPSK250 and OQPSK2000. Test mode selection is based on pre-compliance measurement of output power and occupied bandwidth. The operational modes OQPSK250 were selected for compliance tests.		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2017-07-27	Initial Release	
02	2017-08-11	Replaced document: G0M-1705-6569-TFC247ZB-V01 Replaced by: G0M-1705-6569-TFC247ZB-V02 Reason: ANNEX A: corrected model name	W. Treffke

ABBREVIATIONS AND ACRONYMS

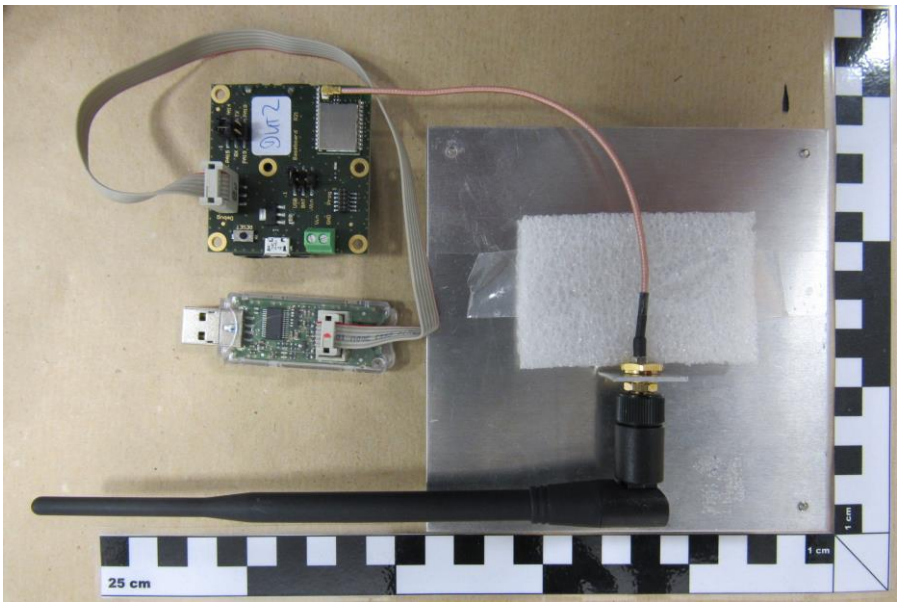
Acronyms	
Acronym	Description
DSSS	Direct Sequence Spread Spectrum
EUT	Equipment Under Test
FCC	Federal Communications Commission
IEEE 802.15.4	MAC and PHY Layer for Wireless Personal Area Networks
ISED	Innovation, Science and Economic Development Canada
O-QPSK	Offset-Quadrature Phase Shift Keying
QPSK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

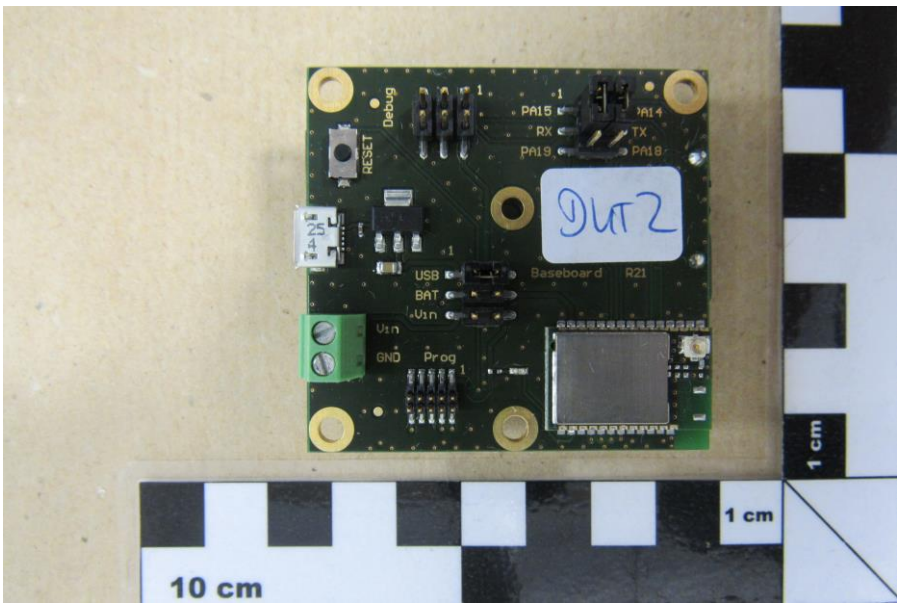
REPORT INDEX

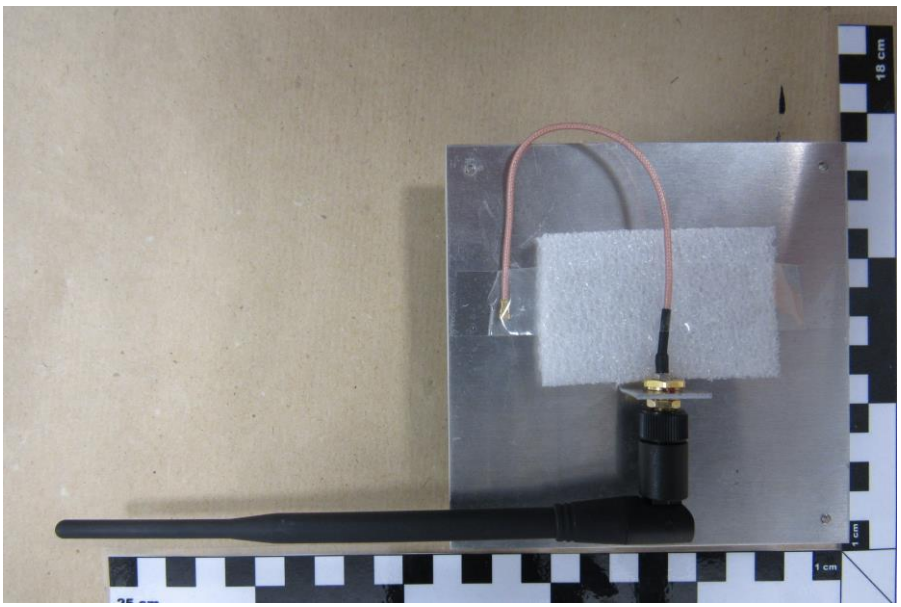
1 Equipment (Test Item) Under Test

Description	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module with UFL antenna connector	
Model	deRFsamR21E-23S20	
Additional Model(s)	deRFsamR21E-23S00 (DUT1: ZigBee module with integrated antenna)	
Brand Name(s)	None	
Serial Number(s)	None	
Hardware Version(s)	0	
Software Version(s)	0	
PMN	None	
HVIN	None	
FVIN	None	
HMN	None	
FCC-ID	XVV-23SXX	
IC	N/A	
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 DUT2	Type	Rubber Duck Antenna
	Model	17013.RSMA
	Manufacturer	WiMo
	Gain	5 dBi (customer declaration)
Antenna DUT1	Type	Integrated Chip Antenna
	Model	AMCA31-2R450G-S1F-T
	Manufacturer	Abracon
	Gain	0.5 dBi (customer declaration)
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	DSA-13PFC-0.5 FCA
	Vendor	STONTRONICS
	Input	100-240 VAC, 50/60 Hz
	Output	5.1 VDC
Manufacturer	dresden elektronik ingenieurtechnik gmbh Enno-Heidebroek-Straße 12 01237 Dresden GERMANY	

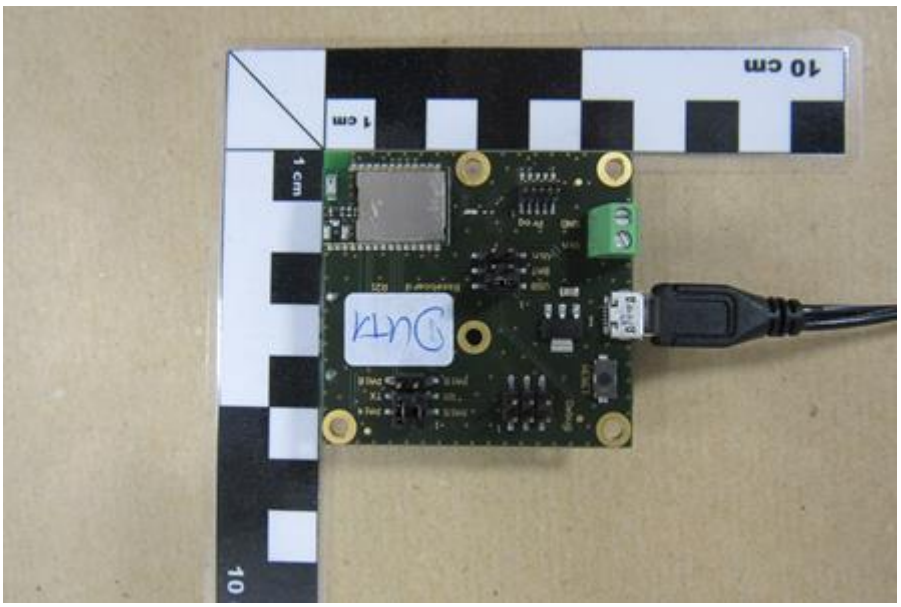
1.1 Photos – Equipment External

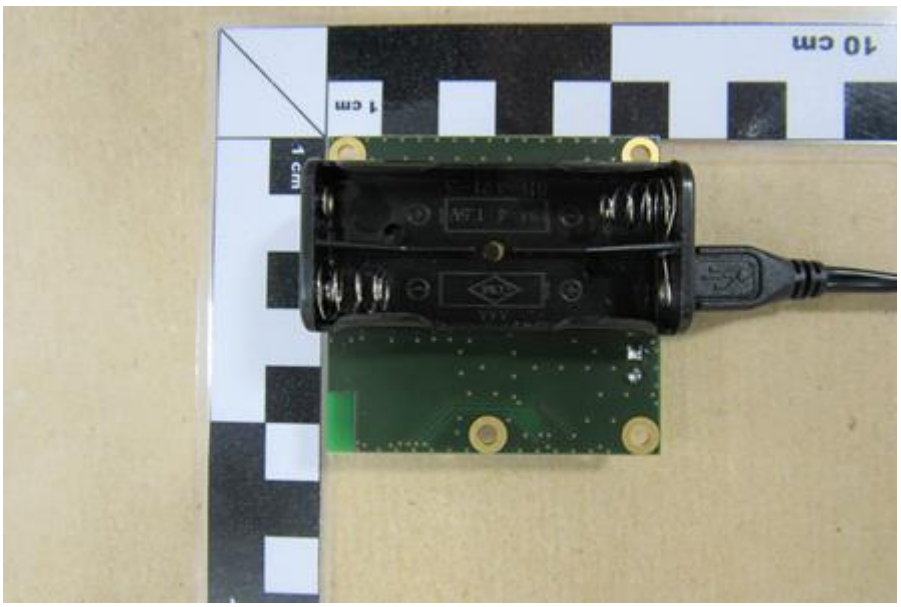
DUT2 Overview


DUT2 Evaluation Board with Module


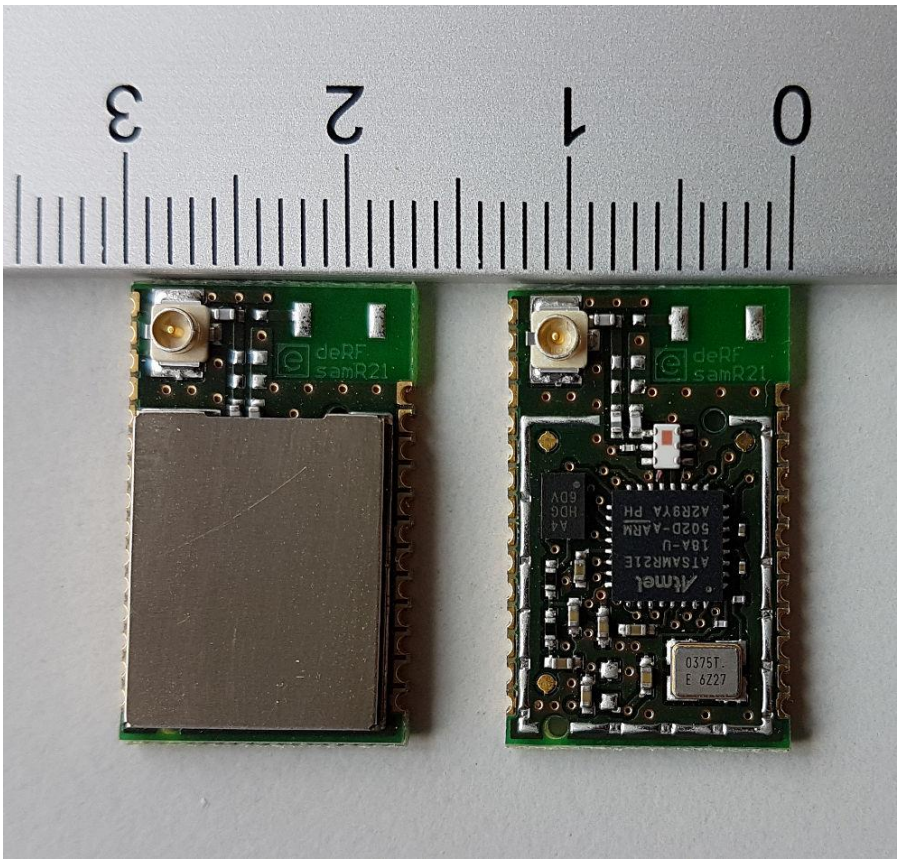
DUT2 exemplary antenna


AC/DC Adaptor


DUT1 Evaluation Board with Module Top


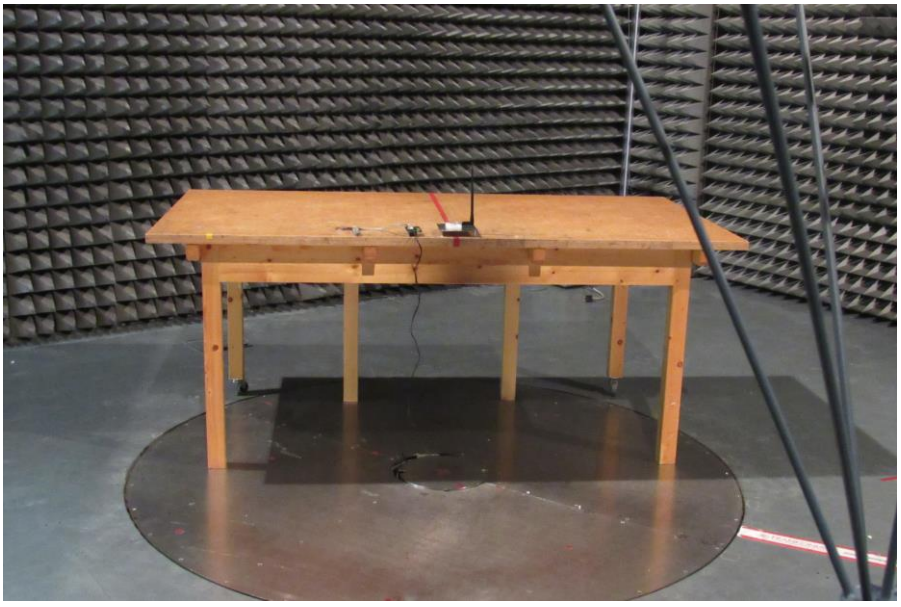
DUT1 Evaluation Board with Module Bottom


1.2 Photos – Equipment Internal

RF Module with and without Shielding


1.3 Photos – Test Setup

Conducted Emissions Setup


Radiated Emissions Setup


1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
None				
Description:				
AE	Auxillary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.5 Test mode duty cycle

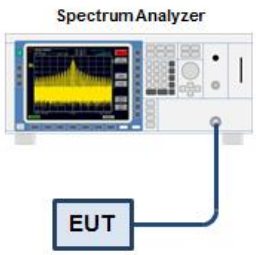
1.5.1 Information

Test Information	
Measurement Method	ANSI C63.10 11.6

1.5.2 Requirements

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

1.5.3 Setup

Test Setup


1.5.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2017-04	2018-04

1.5.5 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}))

1.5.6 Results

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

1.6 Test Modes

Mode	Description
DSSS O-QPSK DUT2	Mode = Transmit Modulation = O-QPSK Spreading = DSSS Data rate = 250 kbps Duty cycle = 100% Power Level= 4dBm (channel 11, channel 18) Power Level= 0dBm (channel 26)
DSSS O-QPSK DUT1	Mode = Transmit Modulation = O-QPSK Spreading = DSSS Data rate = 250 kbps Duty cycle = 100% Power Level= 4dBm (all channels)
Receive	Mode = Receive
Comment:	

1.7 Test Frequencies

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

1.8 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) = 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 = 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**
RSS-Gen 6.6	Occupied Bandwidth	ANSI C63.10	N/R	Informational only
FCC § 15.247(a)(2) ISED RSS-247 § 5.2	6 dB Bandwidth	ANSI C63.10	PASS	
FCC § 15.247(b)(3) ISED RSS-247 § 5.4	Maximum peak conducted power	ANSI C63.10	PASS	
FCC § 15.247(e) ISED RSS-247 § 5.2	Power spectral density	ANSI C63.10	PASS	
FCC § 15.207 ISED RSS-247 § 3.1	AC power line conducted emissions	ANSI C63.10	PASS	
FCC § 15.247(d) ISED RSS-247 § 5.5	Band edge compliance	ANSI C63.10	PASS	
FCC § 15.247(d) ISED RSS-247 § 5.5	Conducted spurious emissions	ANSI C63.10	PASS	
FCC § 15.247(d) FCC § 15.209 ISED RSS-GEN § 8.9	Transmitter radiated spurious emissions	ANSI C63.10	PASS	
ISED RSS-247 § 3.1	Receiver radiated spurious emissions	ANSI C63.10	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 6.6
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2017-07-03

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	EF01003	2017-04	2018-04

3.1.4 Procedure

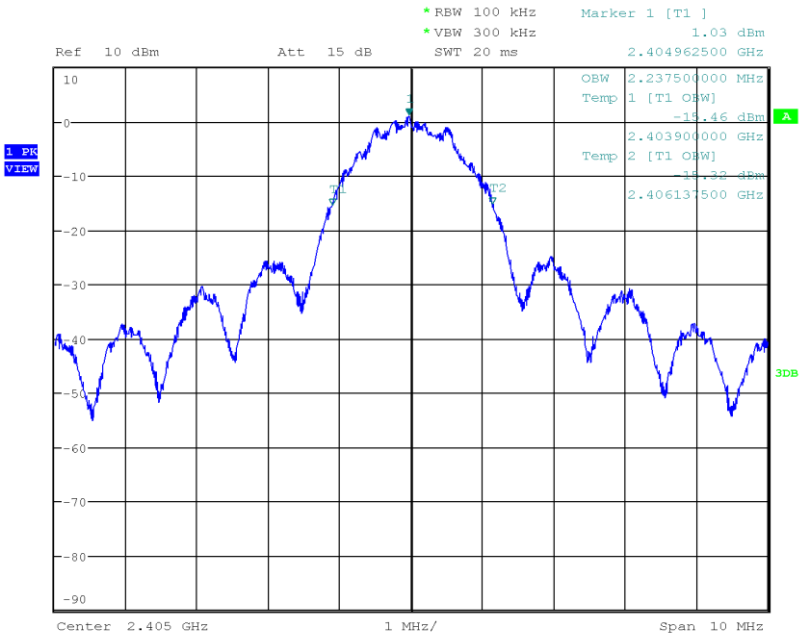
Test Procedure
1. EUT transmitter is activated in test mode under normal conditions 2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum 3. The resolution bandwidth is set to 1 % of the bandwidth 4. The occupied bandwidth is measured with the build-in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

3.1.5 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
O-QPSK	2405	2.237
O-QPSK	2440	2.275
O-QPSK	2480	2.325

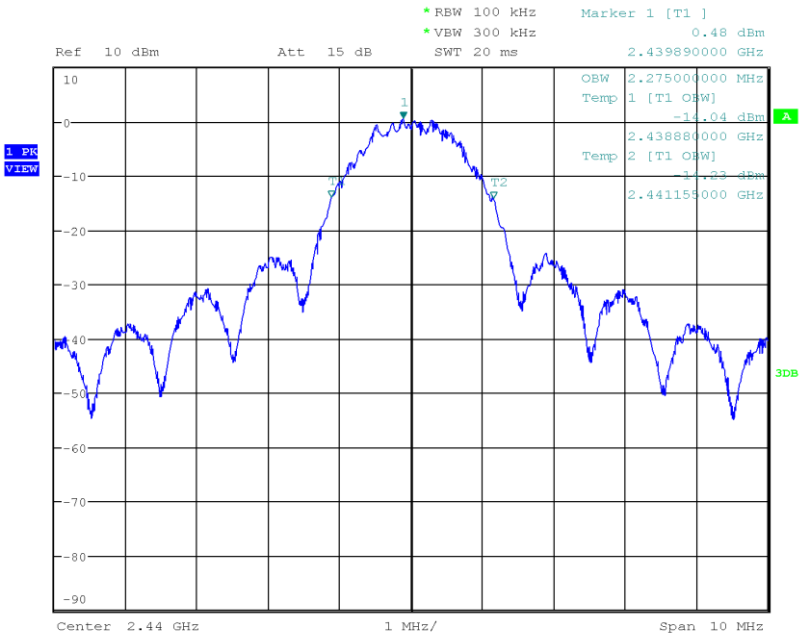
Occupied Bandwidth

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Occupied Bandwidth [MHz]:	2.237



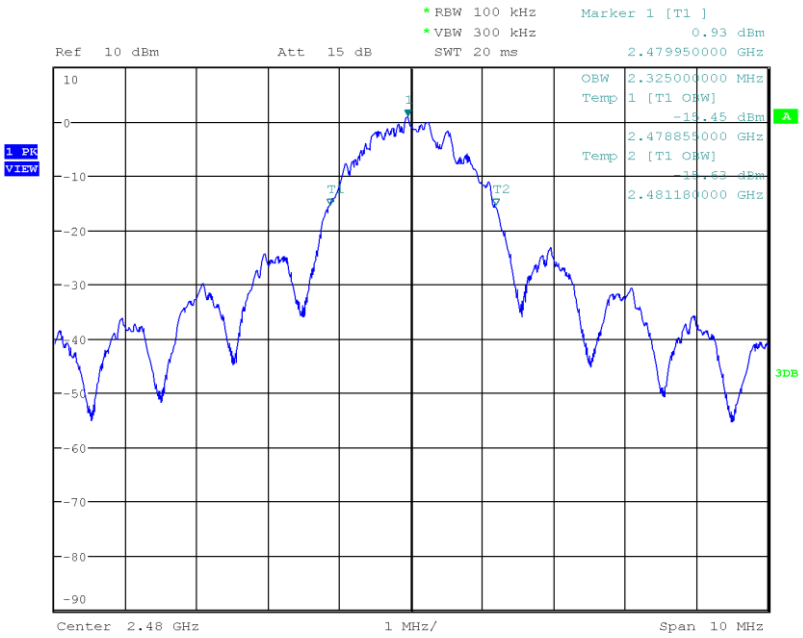
Occupied Bandwidth

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Occupied Bandwidth [MHz]:	2.275



Occupied Bandwidth

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Occupied Bandwidth [MHz]:	2.325



3.2 Test Conditions and Results - 6 dB bandwidth

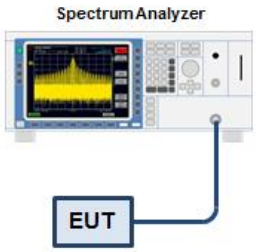
3.2.1 Information

Test Information	
Reference	FCC 15.247(a)(2) / ISED RSS-247 5.2
Measurement Method	ANSI C63.10 11.8
Operator	Wilfried Treffke
Date	2017-07-03

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	EF01003	2017-04	2018-04

3.2.5 Procedure

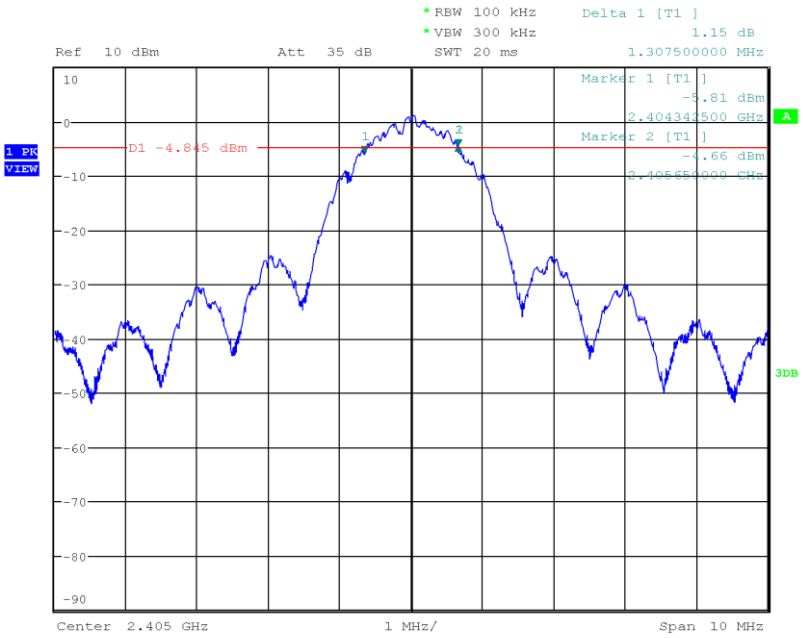
Test Procedure
1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker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

3.2.6 Results

Test Results				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
O-QPSK	2405	1307.5	500	PASS
O-QPSK	2440	1477.5	500	PASS
O-QPSK	2480	1483.5	500	PASS

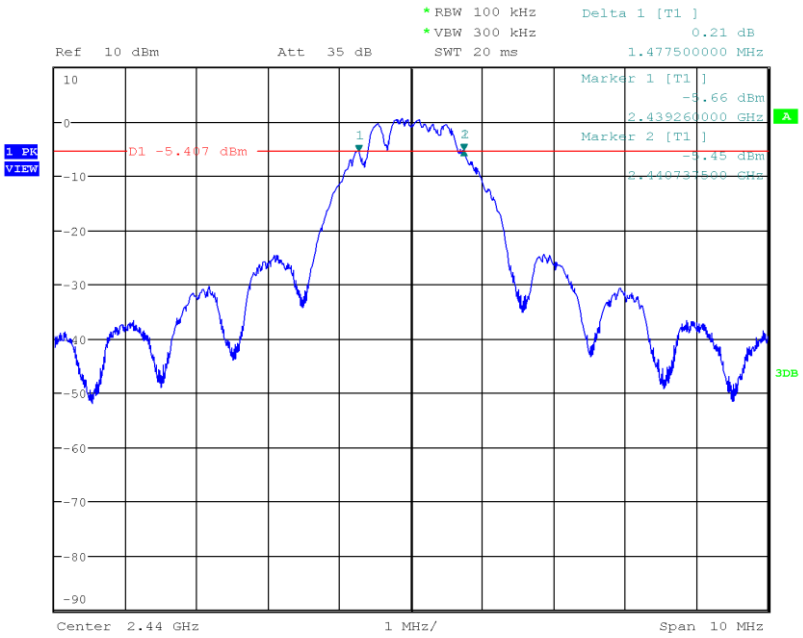
DTS (6 dB) Bandwidth

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Lower Frequency [MHz]:	2404.343
Upper Frequency [MHz]:	2405.650
6 dB Bandwidth [kHz]:	1307.5



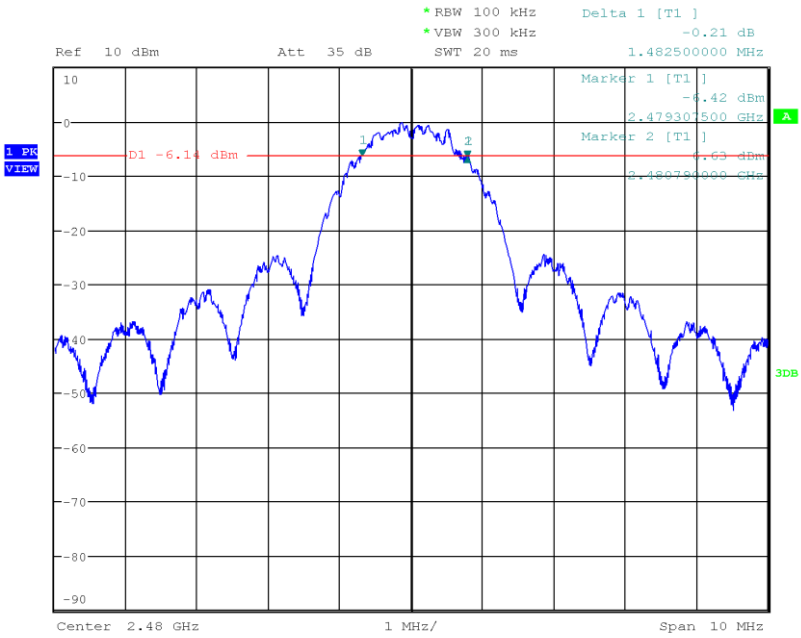
DTS (6 dB) Bandwidth

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	2.4GHz IEEE 802.15.4 ZigBee module with u.FL connector
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Lower Frequency [MHz]:	2439.260
Upper Frequency [MHz]:	2440.738
6 dB Bandwidth [kHz]:	1477.5



DTS (6 dB) Bandwidth

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	2.4GHz IEEE 802.15.4 ZigBee module with u.FL connector
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Lower Frequency [MHz]:	2479.307
Upper Frequency [MHz]:	2480.790
6 dB Bandwidth [kHz]:	1483.5



3.3 Test Conditions and Results - Maximum peak conducted output power

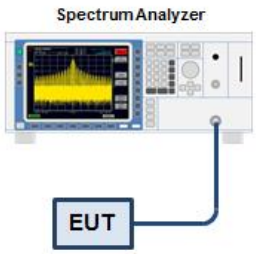
3.3.1 Information

Test Information	
Reference	FCC 15.247(b)(1) / ISED RSS-247 5.4
Measurement Method	ANSI C63.10 11.9.1
Operator	Wilfried Treffke
Date	2017-07-03

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	EF01003	2017-04	2018-04

3.3.5 Procedure

Test Procedure
1. EUT set to test hopping 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 DUT2 (U.FL connector + ext. antenna)				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2405	4.107	0.002575	1.0	PASS
2440	3.992	0.002507	1.0	PASS
2480	-0.274	0.000939	1.0	PASS
Comment: Channel 26, 2480 MHz with reduced power level=0dBm				

Test Results DUT1 (internal antenna)				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
2405	4.107	0.002575	1.0	PASS
2440	3.992	0.002507	1.0	PASS
2480	3.587	0.002284	1.0	PASS

3.4 Test Conditions and Results - Power spectral density

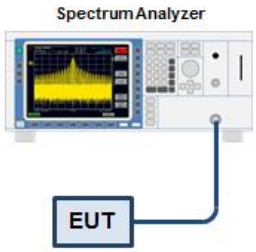
3.4.1 Information

Test Information	
Reference	FCC 15.247(e) / ISED RSS-247 5.2
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Operator	Wilfried Treffke
Date	2017-07-03

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	EF01003	2017-04	2018-04

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

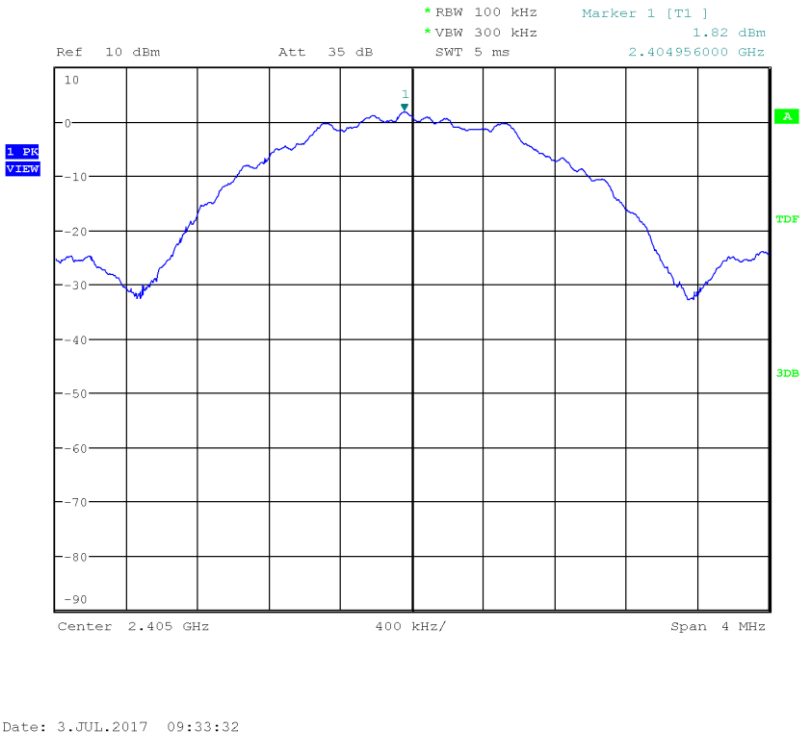
3.4.6 Results

Test Results DUT2 (U.FL connector + ext. antenna)			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2405	1.818	8.0	PASS
2440	0.672	8.0	PASS
2480	-1.928	8.0	PASS
RBW = 100 kHz			
Comment: Channel 26, 2480 MHz with reduced power level=0 dBm			

Test Results DUT1 (internal antenna)			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
2405	1.818	8.0	PASS
2440	0.672	8.0	PASS
2480	1.256	8.0	PASS
RBW = 100 kHz			

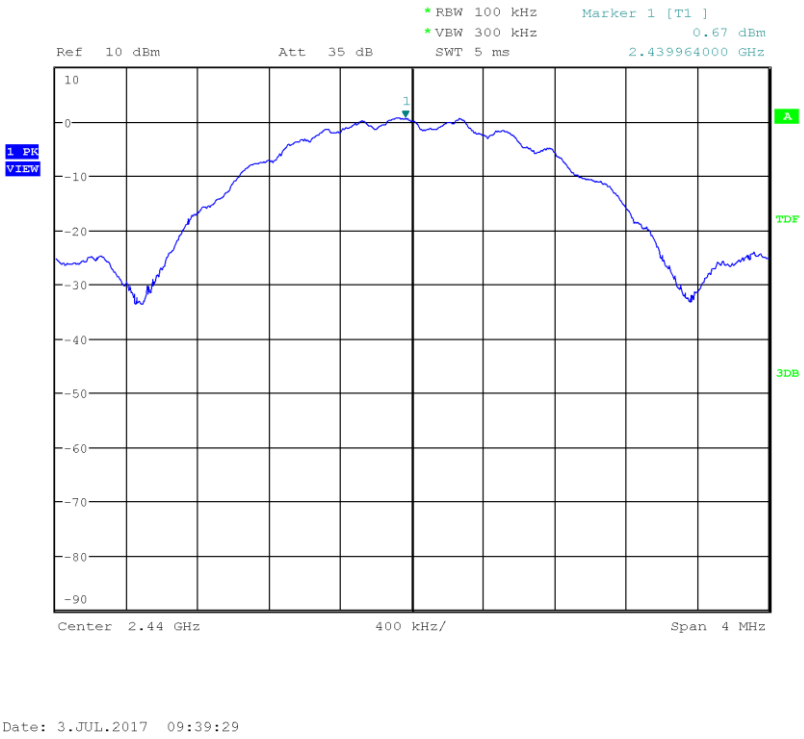
Peak Power Spectral Density

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	2.4GHz IEEE 802.15.4 ZigBee module with u.FL connector
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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; Power level=4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Peak Frequency [MHz]:	2404.956
Spectral Density [dBm/RBW]:	1.818
Resolution Bandwidth [kHz]:	100 kHz



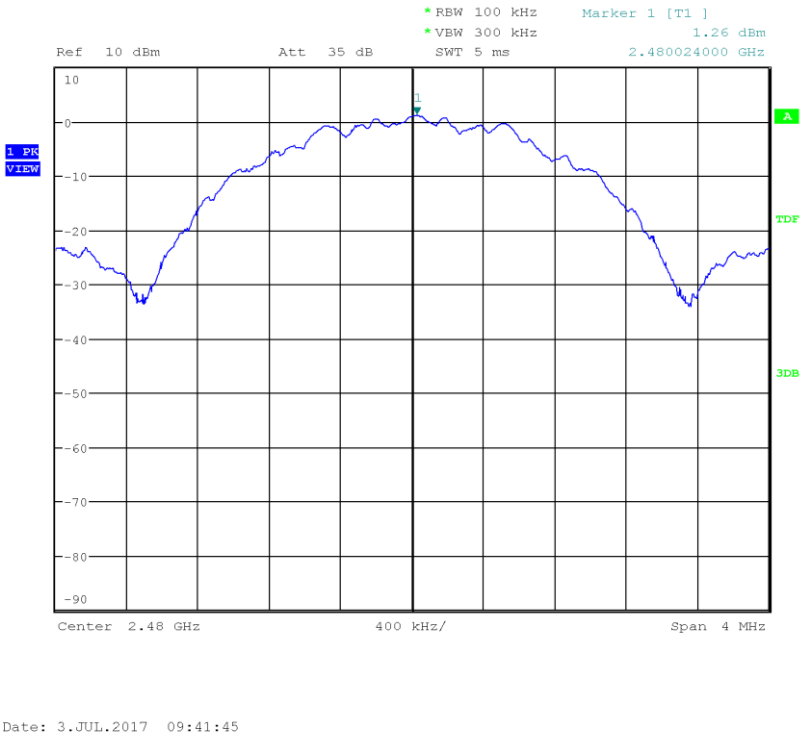
Peak Power Spectral Density

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	2.4GHz IEEE 802.15.4 ZigBee module with u.FL connector
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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; Power level=4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Peak Frequency [MHz]:	2439.964
Spectral Density [dBm/RBW]:	0.672
Resolution Bandwidth [kHz]:	100 kHz



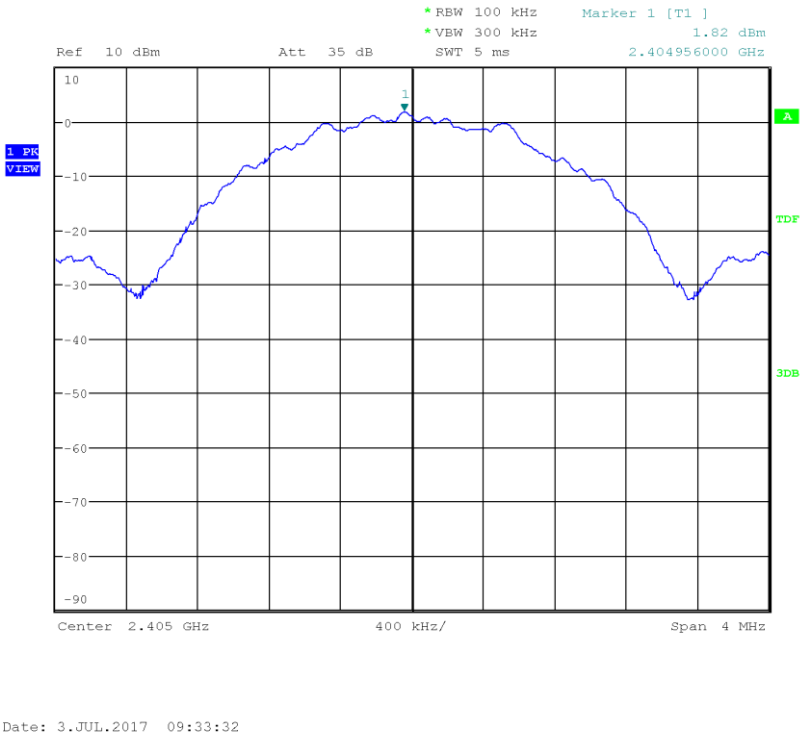
Peak Power Spectral Density

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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; Power level=4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Peak Frequency [MHz]:	2480.024
Spectral Density [dBm/RBW]:	1.256
Resolution Bandwidth [kHz]:	100 kHz



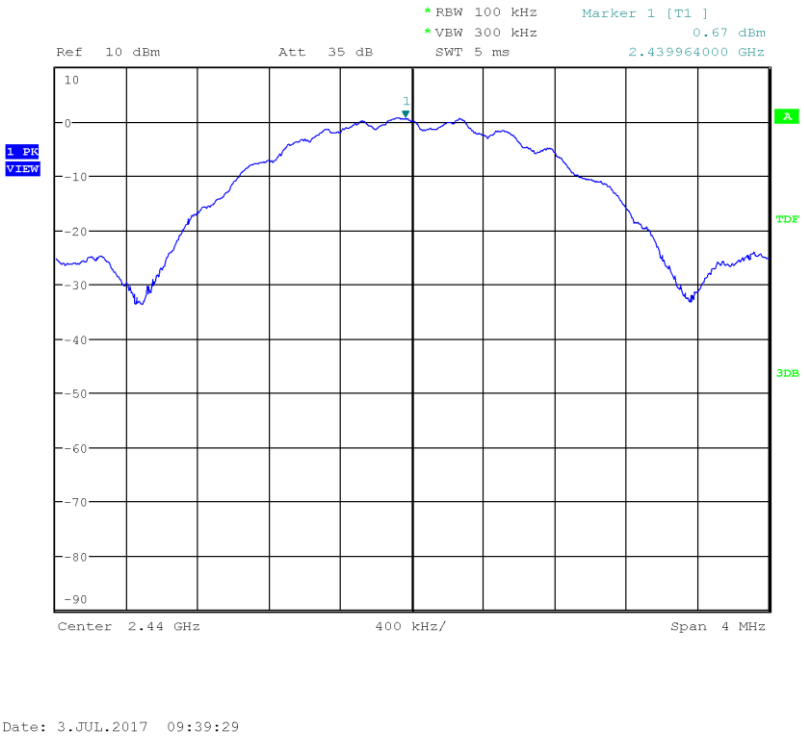
Peak Power Spectral Density

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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; Power level=4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Peak Frequency [MHz]:	2404.956
Spectral Density [dBm/RBW]:	1.818
Resolution Bandwidth [kHz]:	100 kHz



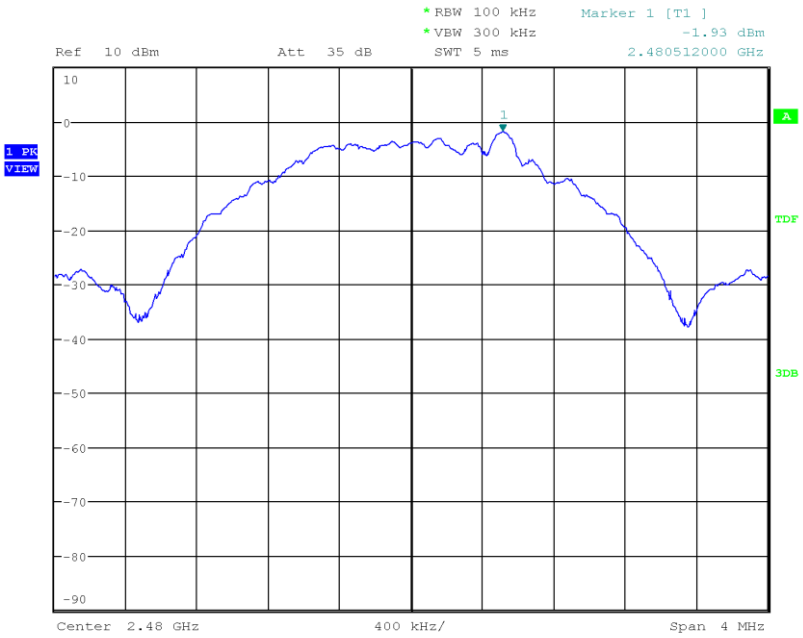
Peak Power Spectral Density

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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; Power level=4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Peak Frequency [MHz]:	2439.964
Spectral Density [dBm/RBW]:	0.672
Resolution Bandwidth [kHz]:	100 kHz



Peak Power Spectral Density

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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, Power level=0dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-06
Peak Frequency [MHz]:	2480.512
Spectral Density [dBm/RBW]:	-1.928
Resolution Bandwidth [kHz]:	100 kHz



3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

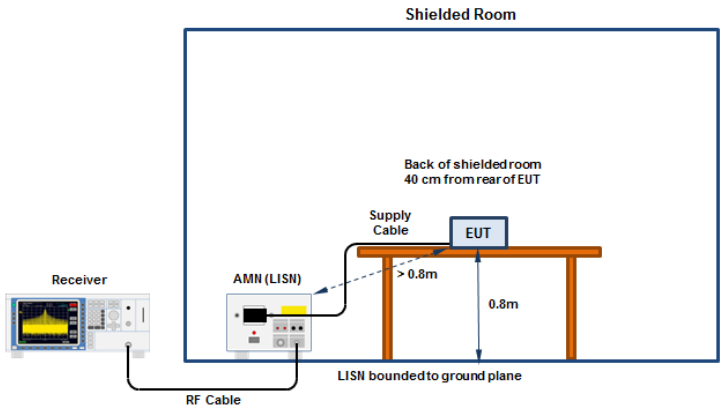
Test Information	
Reference	FCC 15.207
Measurement Method	ANSI C63.10 6.2
Operator	Wilfried Treffke
Date	2017-07-08

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 Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Receiver	R&S	ESU 26	EF00241	2016-04	2018-04
LISN	R&S	ESH2-Z5	EF00182	2017-01	2019-01

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

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Unom: 120 V AC
LISN:	ESH2-Z5 N
Mode:	IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-08
Note:	

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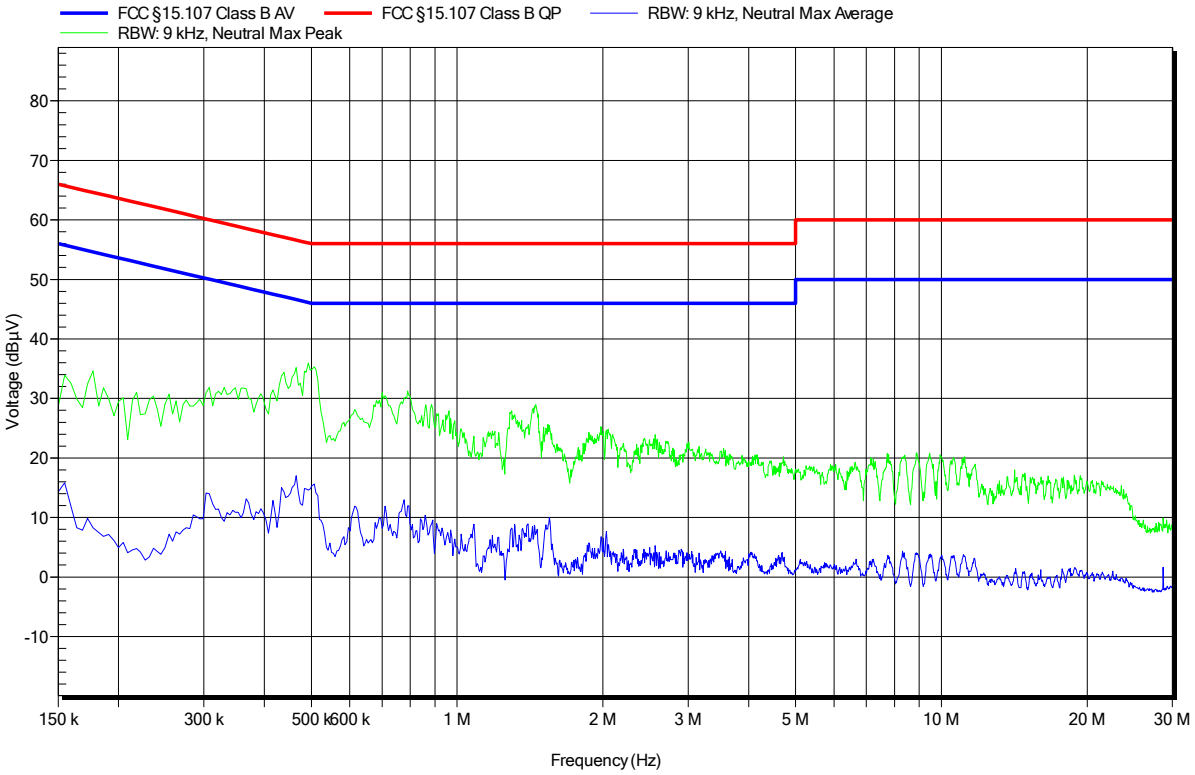

EMI voltage test in the ac-mains according to FCC 15B

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Unom: 120 V AC
LISN:	ESH2-Z5 L
Mode:	IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-08
Note:	

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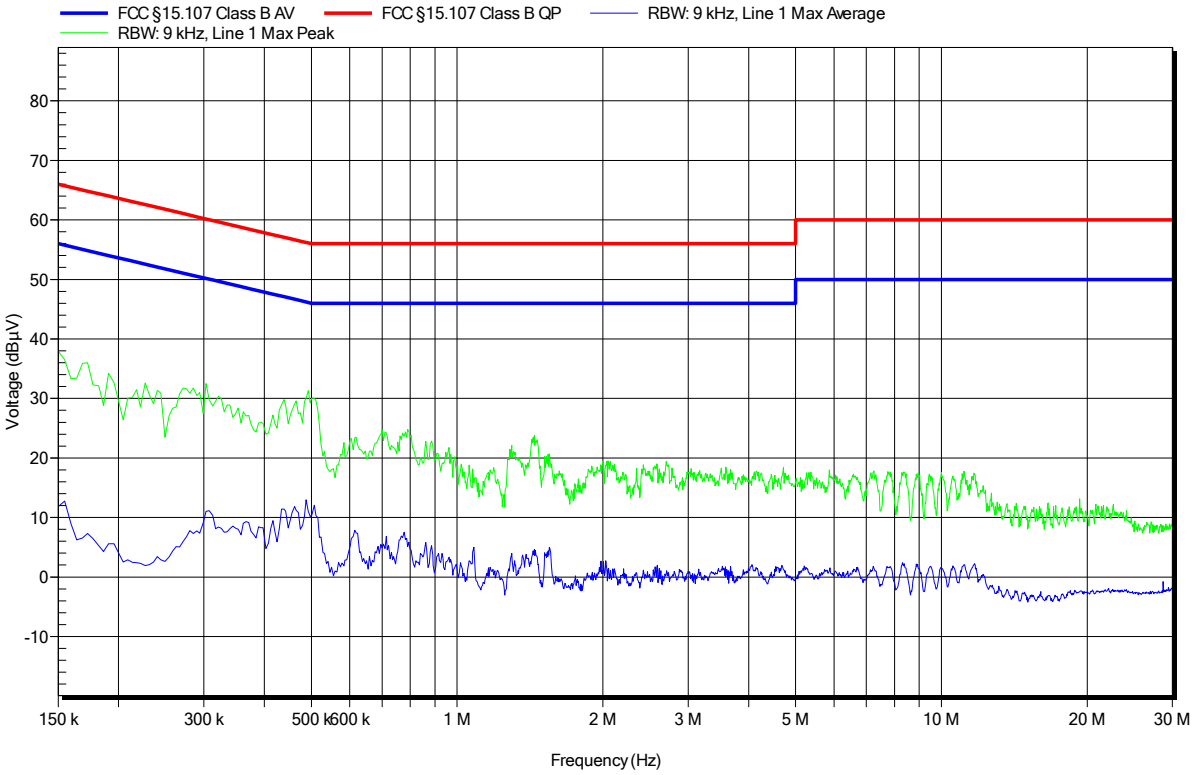


3.6 Test Conditions and Results - Band-edge compliance

3.6.1 Information

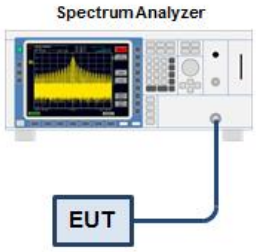
Test Information	
Reference	FCC 15.247(d) / ISED RSS-247 5.5
Measurement Method	ANSI C63.10 11.13
Operator	Wilfried Treffke
Date	2017-07-03

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	EF01003	2017-04	2018-04

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

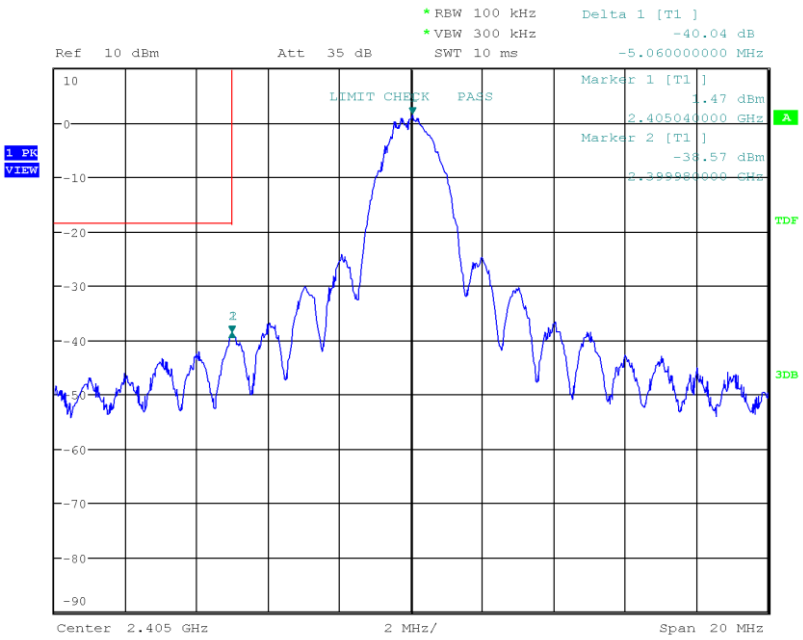
3.6.6 Results

Test Results DUT2 (U.FL connector + ext. antenna)				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
O-QPSK	2405	-40.04	-20	PASS
O-QPSK	2480	-37.44	-20	PASS
Comment: Channel 26, 2480 MHz with reduced power level=0dBm				

Test Results DUT1 (internal antenna)				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
O-QPSK	2405	-40.04	-20	PASS
O-QPSK	2480	-37.02	-20	PASS

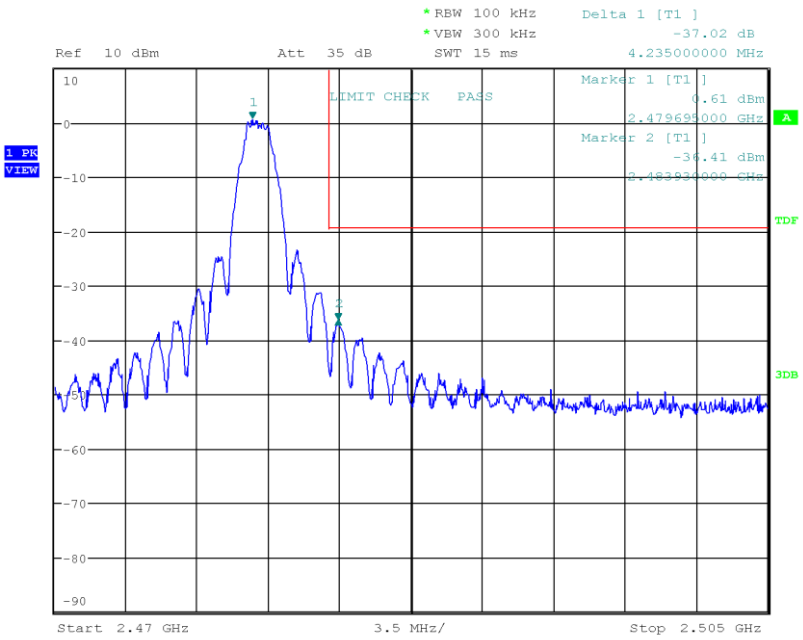
Band-edge Compliance

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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), Ch.: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Band-edge	Lower
In-band Frequency [MHz]:	2405.04
Max. in-band Level [dBm/100 kHz]:	1.473
Out-of-band Frequency [MHz]:	2399.98
Max. out-of-band Level [dBm/100 kHz]:	-38.569
Attenuation [dB]:	-40.04



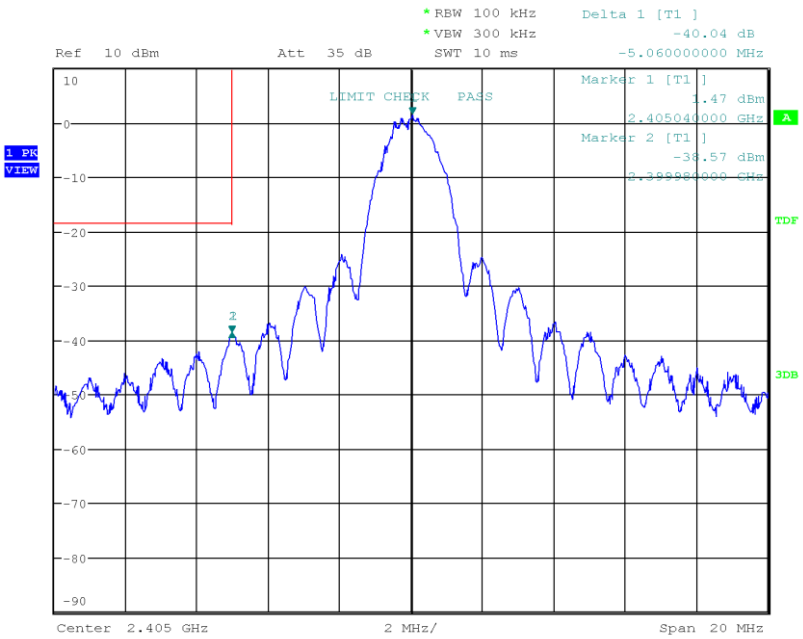
Band-edge Compliance

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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), Ch.: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Band-edge	Upper
In-band Frequency [MHz]:	2479.695
Max. in-band Level [dBm/100 kHz]:	0.608
Out-of-band Frequency [MHz]:	2483.93
Max. out-of-band Level [dBm/100 kHz]:	-36.412
Attenuation [dB]:	-37.44



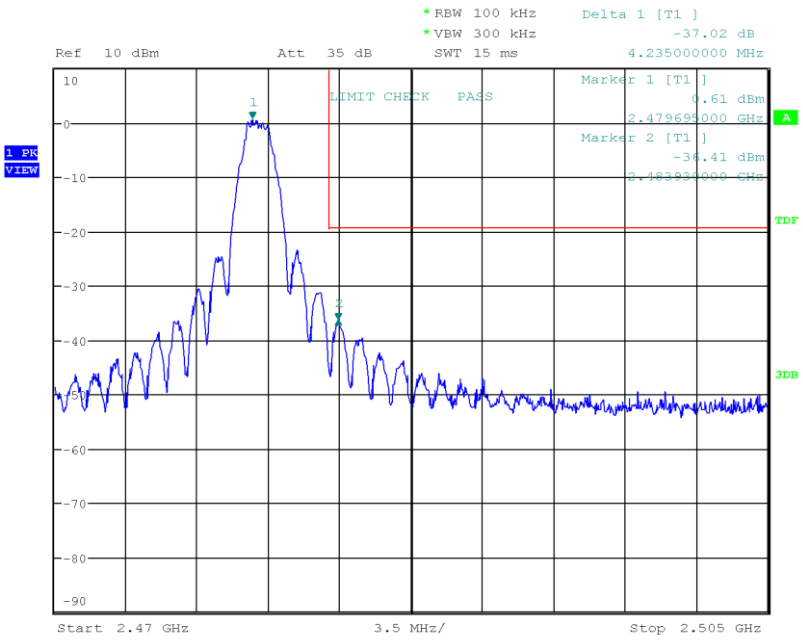
Band-edge Compliance

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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), Ch.: 11, 2405 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Band-edge	Lower
In-band Frequency [MHz]:	2405.04
Max. in-band Level [dBm/100 kHz]:	1.473
Out-of-band Frequency [MHz]:	2399.98
Max. out-of-band Level [dBm/100 kHz]:	-38.569
Attenuation [dB]:	-40.04



Band-edge Compliance

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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), Ch.: 26, 2480 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Band-edge	Upper
In-band Frequency [MHz]:	2479.695
Max. in-band Level [dBm/100 kHz]:	0.608
Out-of-band Frequency [MHz]:	2483.93
Max. out-of-band Level [dBm/100 kHz]:	-36.412
Attenuation [dB]:	-37.02



3.7 Test Conditions and Results - Conducted spurious emissions

3.7.1 Information

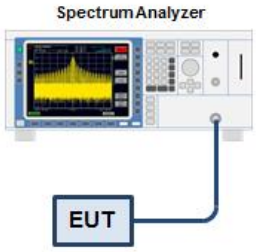
Test Information	
Reference	FCC 15.247(d) / ISED RSS-247 5.5
Measurement Method	ANSI C63.10 11.11
Operator	Wilfried Treffke
Date	2017-07-03

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	EF01003	2017-04	2018-04

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

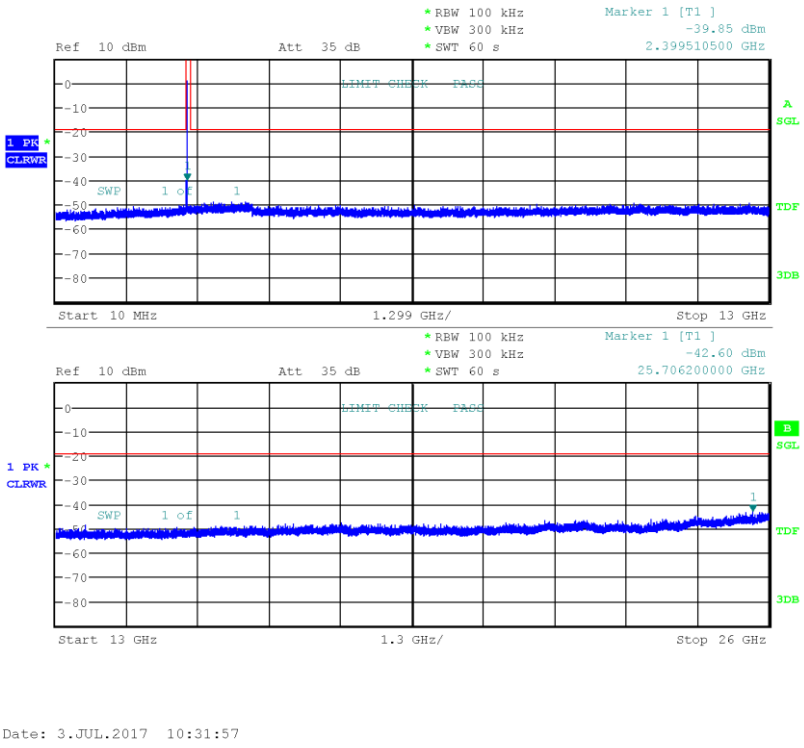
3.7.6 Results

Test Results DUT2 (U.FL connector + ext. antenna)		
Mode	Channel [MHz]	Verdict
O-QPSK	2405	PASS
O-QPSK	2440	PASS
O-QPSK	2480	PASS
Comment: Channel 26, 2480 MHz with reduced power level=0dBm		

Test Results DUT1 (internal antenna)		
Mode	Channel [MHz]	Verdict
O-QPSK	2405	PASS
O-QPSK	2440	PASS
O-QPSK	2480	PASS

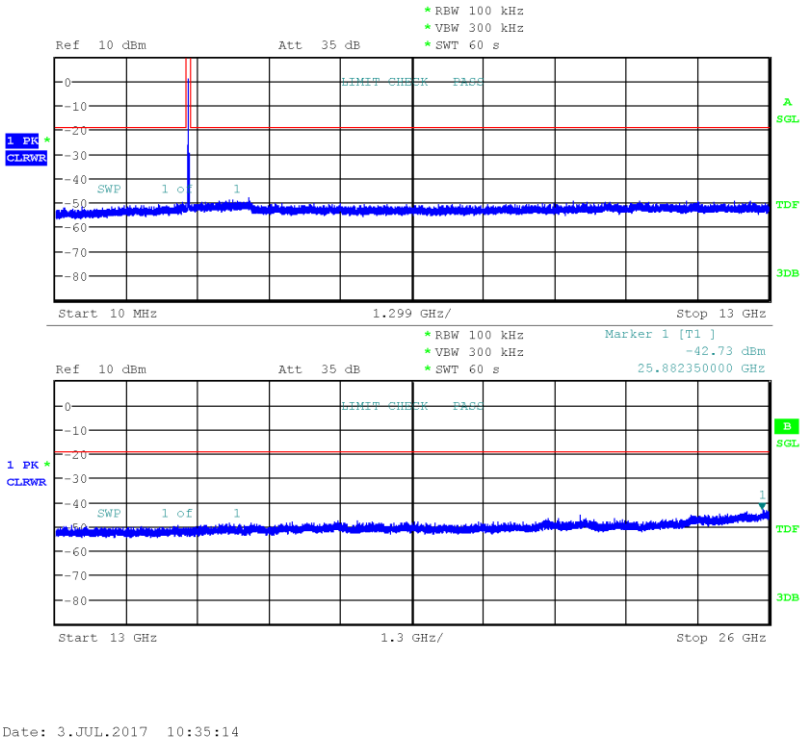
Conducted Spurious Emissions

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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, power level = 4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Max. in-band Frequency [MHz]:	2404.5
Max. in-band Level [dBm/100 kHz]:	1.2
Out-of-band Limit [dBm/100 kHz]:	-18.8



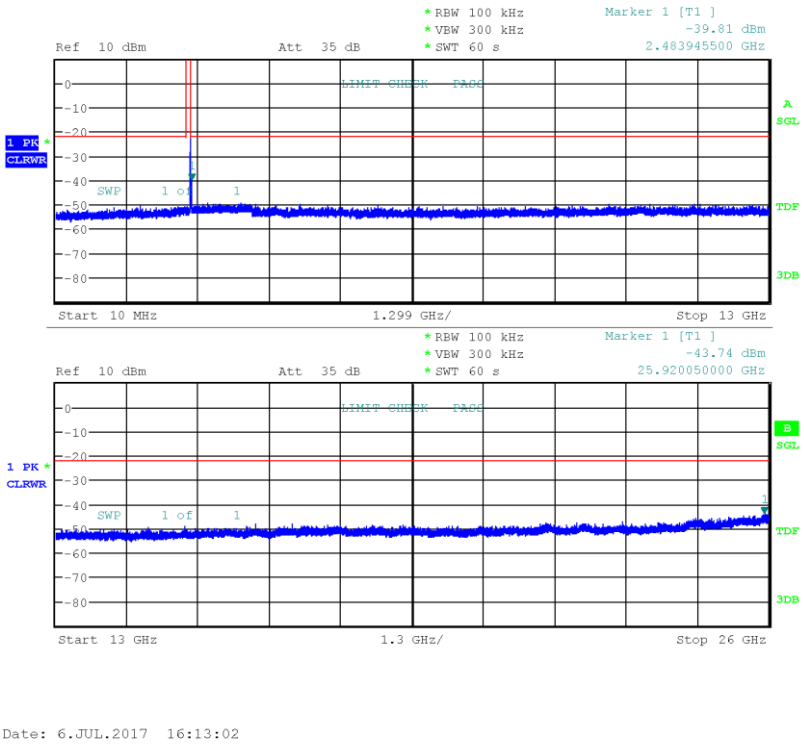
Conducted Spurious Emissions

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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, power level = 4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Max. in-band Frequency [MHz]:	2440.2
Max. in-band Level [dBm/100 kHz]:	1.0
Out-of-band Limit [dBm/100 kHz]:	-19.0



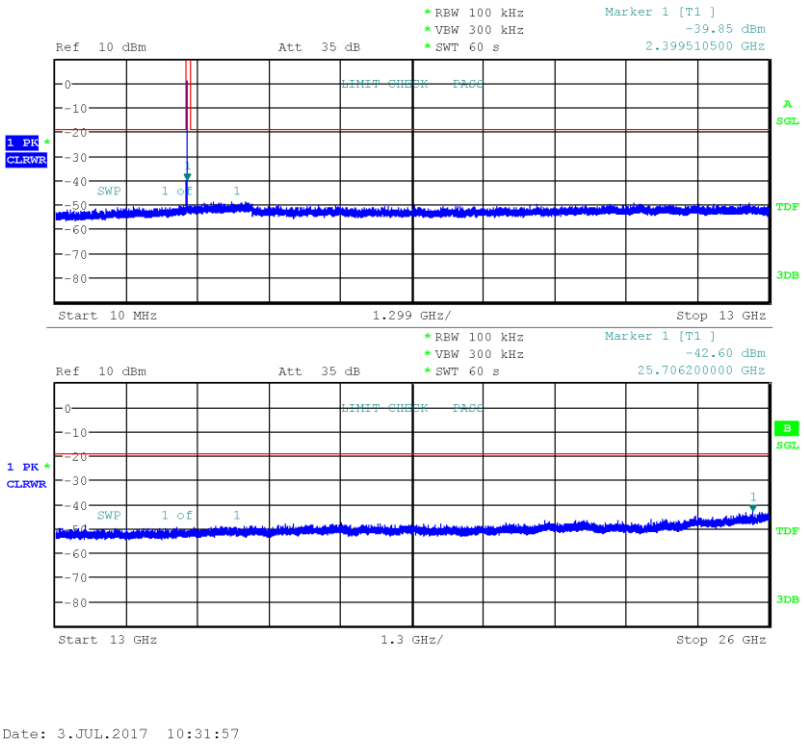
Conducted Spurious Emissions

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT2: ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Sample ID:	14041
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, power level =0 dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-06
Max. in-band Frequency [MHz]:	2480.5
Max. in-band Level [dBm/100 kHz]:	-2.0
Out-of-band Limit [dBm/100 kHz]:	-22.0



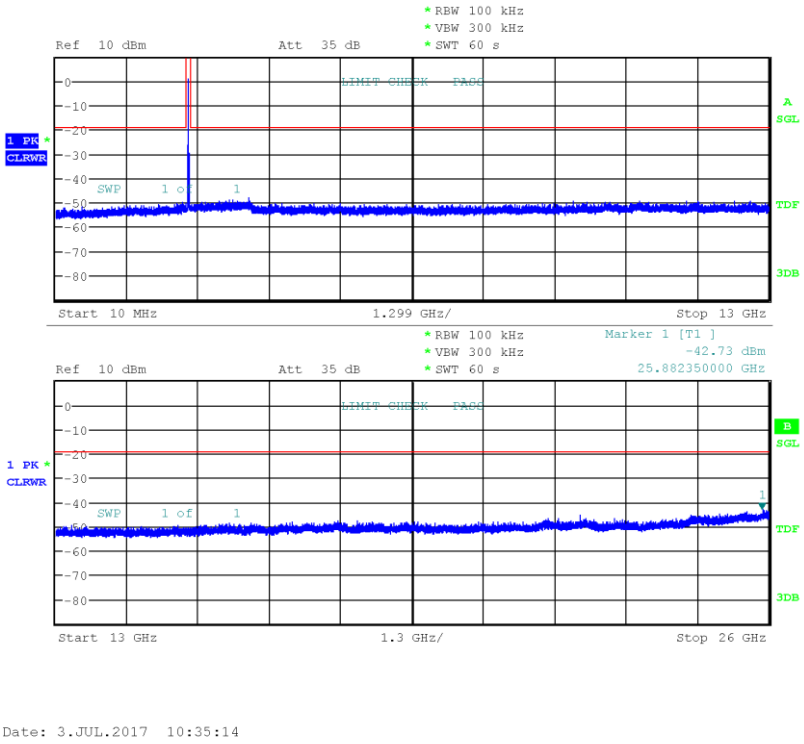
Conducted Spurious Emissions

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT1: 2.4GHz ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Sample ID:	14041
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, power level = 4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Max. in-band Frequency [MHz]:	2404.5
Max. in-band Level [dBm/100 kHz]:	1.2
Out-of-band Limit [dBm/100 kHz]:	-18.8



Conducted Spurious Emissions

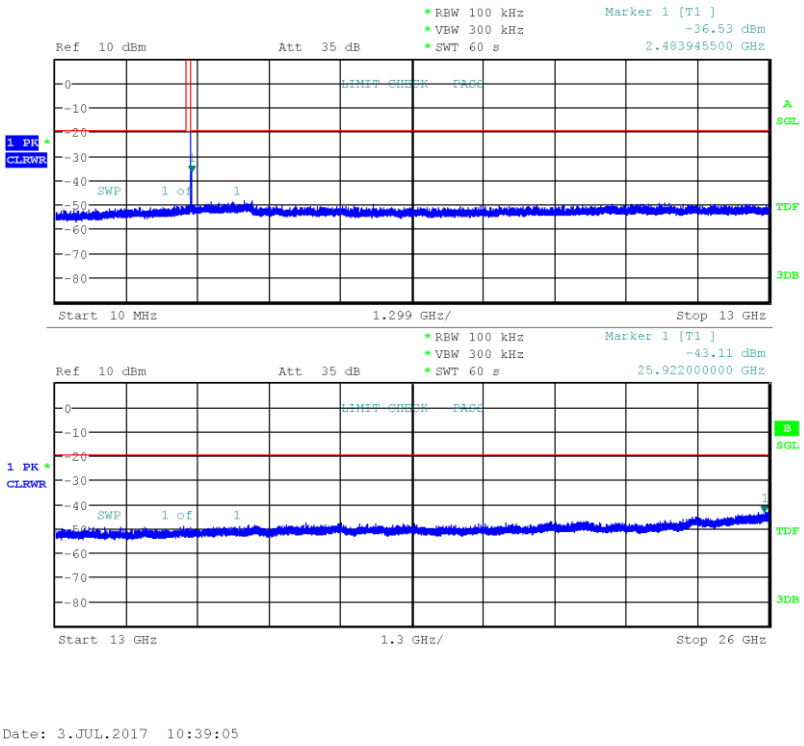
Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT1: 2.4GHz ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Sample ID:	14041
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	IEEE 802.15.4 (DSSS/250 kbps), Channel: 18, 2440 MHz
Operating Conditions:	Tnom/Vnom, power level = 4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Max. in-band Frequency [MHz]:	2440.2
Max. in-band Level [dBm/100 kHz]:	1.0
Out-of-band Limit [dBm/100 kHz]:	-19.0



Date: 3.JUL.2017 10:35:14

Conducted Spurious Emissions

Project Number:	G0M-1705-6569
Applicant	dresden elektronik ingenieurtechnik gmbh
Model Description	DUT1: 2.4GHz ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Sample ID:	14041
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, power level = 4dBm
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-07-03
Max. in-band Frequency [MHz]:	2479.9
Max. in-band Level [dBm/100 kHz]:	0.4
Out-of-band Limit [dBm/100 kHz]:	-19.6



3.8 Test Conditions and Results - Transmitter radiated emissions

3.8.1 Information

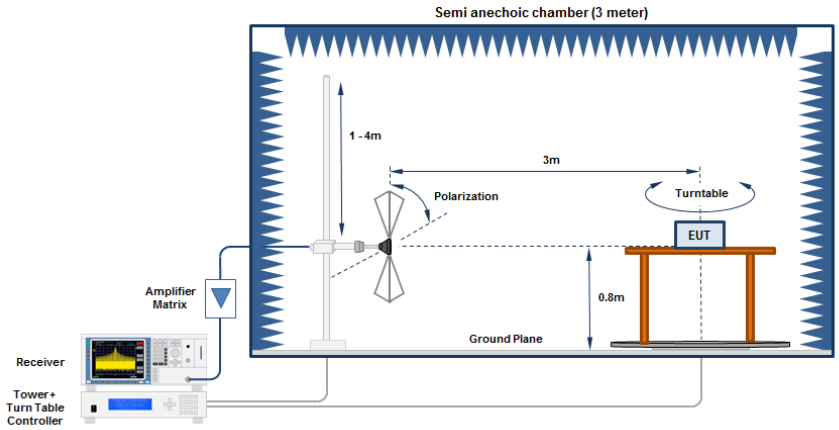
Test Information	
Reference	FCC 15.247(d) / ISED RSS-GEN 8.9
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2017-07-01

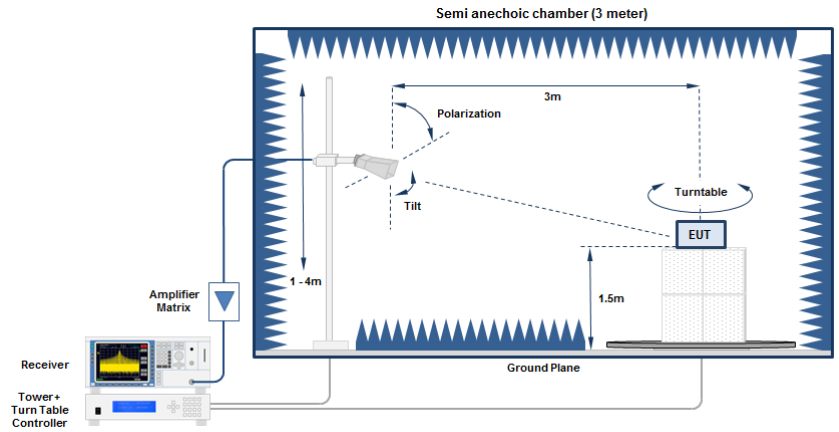
3.8.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [dBµV/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 - 1000 MHz



Test Setup > 1 GHz


3.8.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2016-08	2017-08
Antenna	R&S	HK 116	EF00030	2016-04	2019-04
Antenna	R&S	HL 223	EF00212	2016-04	2019-04

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2016-08	2017-08
Antenna	R&S	BBHA 9120D	EF01153	2016-07	2017-07
Antenna	Amplifier Research	AT4560	EF01152	2016-09	2017-09

3.8.5 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

3.8.6 Results

Test Results DUT2 (U.FL connector + ext. antenna)						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2405	2388.6	51.17	pk	hor	74.00	-22.83
2405	2388.6	38.20	RMS	hor	54.00	-15.80
2405	2390	52.78	pk	ver	74.00	-21.22
2405	2390	42.47	RMS	ver	54.00	-11.53
2440	4872	40.30	pk	ver	74.00	-33.70
2480	2483.6	54.87	pk	hor	74.00	-19.13
2480	2483.6	44.57	RMS	hor	54.00	-09.43
2480	2483.6	61.12	pk	ver	74.00	-12.88
2480	2483.6	53.14	RMS	ver	54.00	-00.86
2480	4960	39.00	pk	ver	74.00	-35.00

Test Results DUT1 (internal antenna)						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2405	2390	50.98	pk	hor	74.00	-23.02
2405	2390	38.19	RMS	hor	54.00	-15.81
2440	4872	31.57	pk	ver	74.00	-42.43
2480	2483.6	59.30	pk	hor	74.00	-14.70
2480	2483.6	51.16	RMS	hor	54.00	-02.84
2480	2483.6	53.28	pk	ver	74.00	-20.72
2480	2483.6	42.33	RMS	ver	54.00	-11.67

3.9 Test Conditions and Results - Receiver radiated emissions

3.9.1 Information

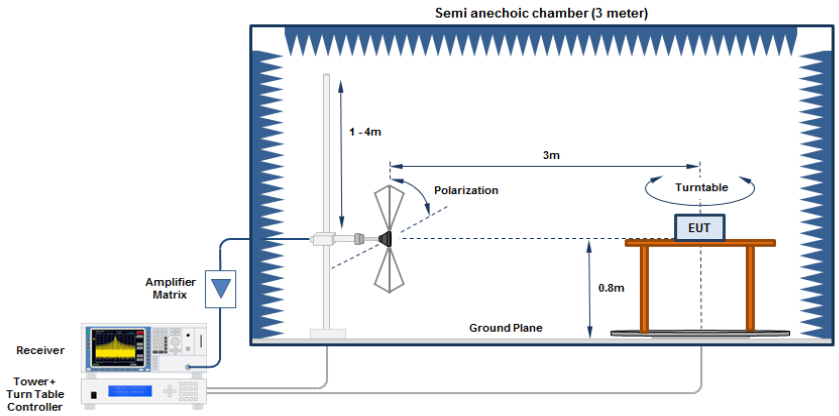
Test Information	
Reference	ISED RSS-247 3.1
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2017-07-01

3.9.2 Limits

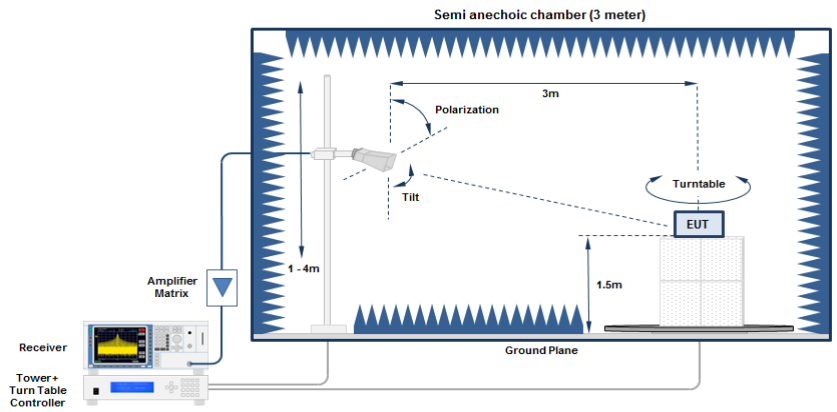
Limits			
Frequency [MHz]	Detector	Field strength [dBµV/m]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

3.9.3 Setup

Test Setup 30 - 1000 MHz



Test Setup > 1 GHz



3.9.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2016-08	2017-08
Antenna	R&S	HK 116	EF00030	2016-04	2019-04
Antenna	R&S	HL 223	EF00212	2016-04	2019-04

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2016-08	2017-08
Antenna	R&S	BBHA 9120D	EF01153	2016-07	2017-07
Antenna	Amplifier Research	AT4560	EF01152	2016-09	2017-09

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 DUT2 (U.FL connector + ext. antenna)						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2440	2434	44.44	pk	ver	53.98	-09.54

Test Results DUT1 (internal antenna)						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
2440	2434	31.85	pk	hor	53.98	-22.13

ANNEX A Transmitter sprurious emissions

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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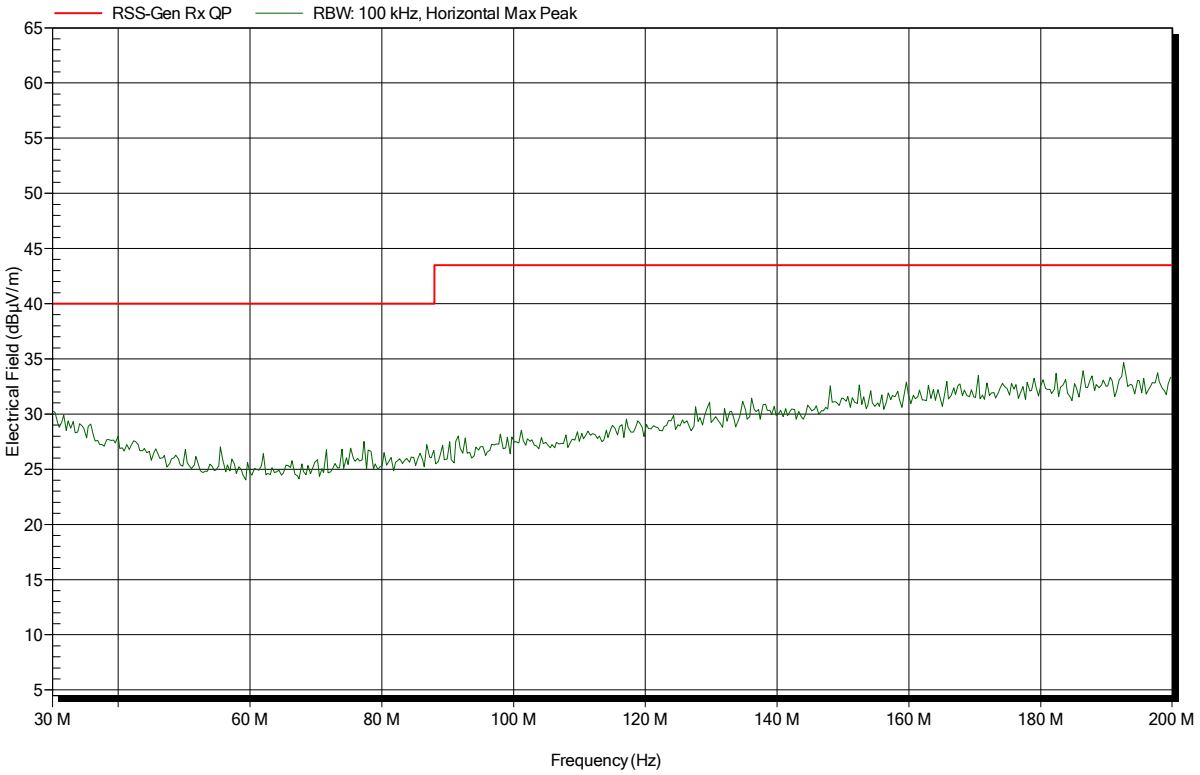

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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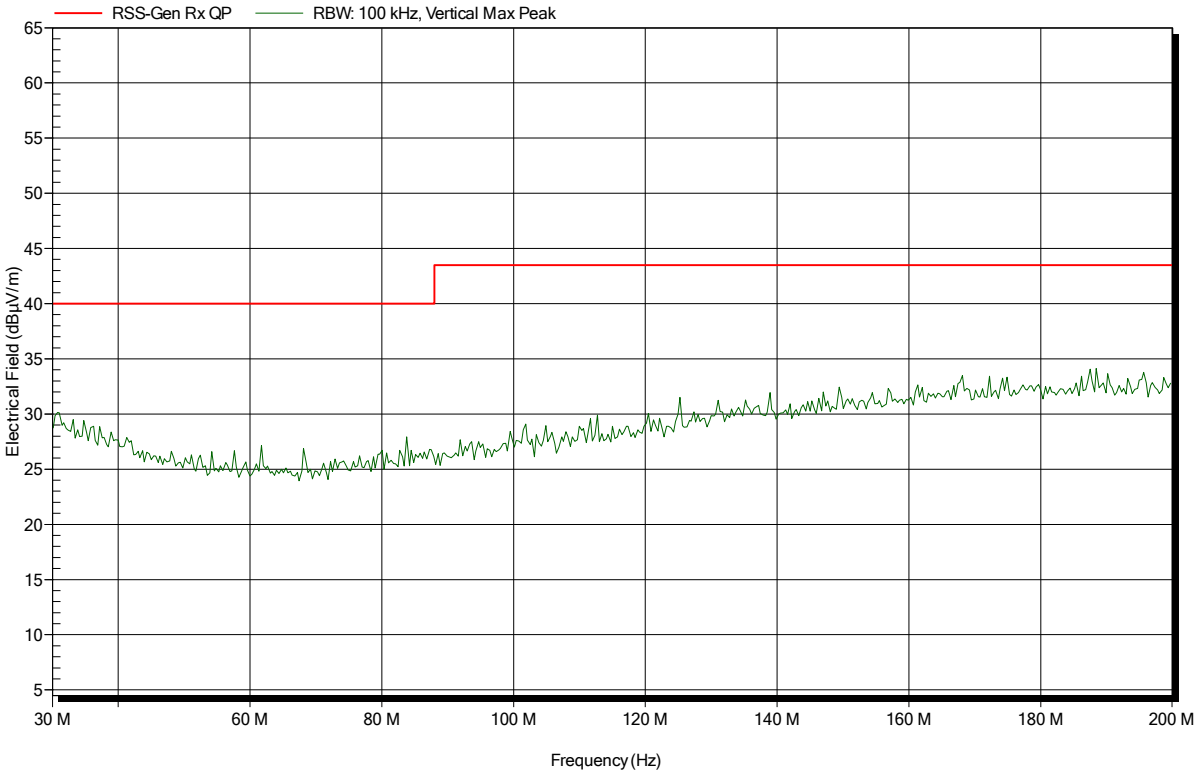

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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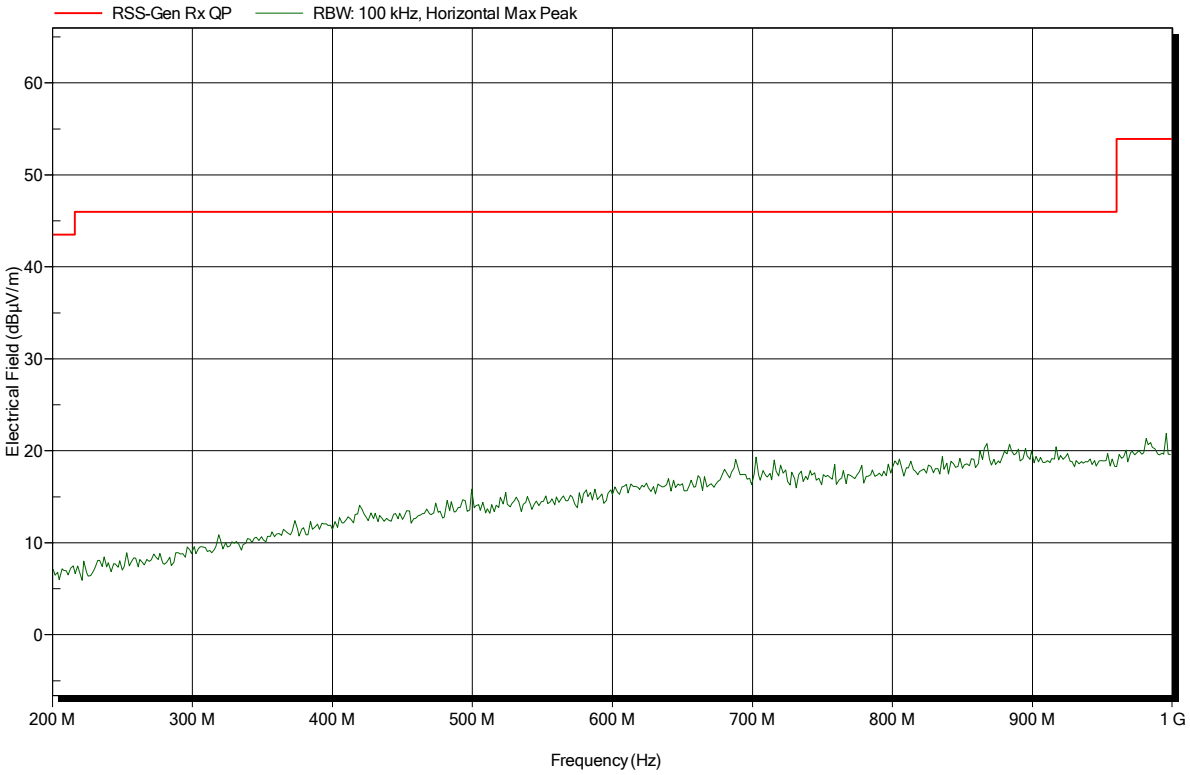

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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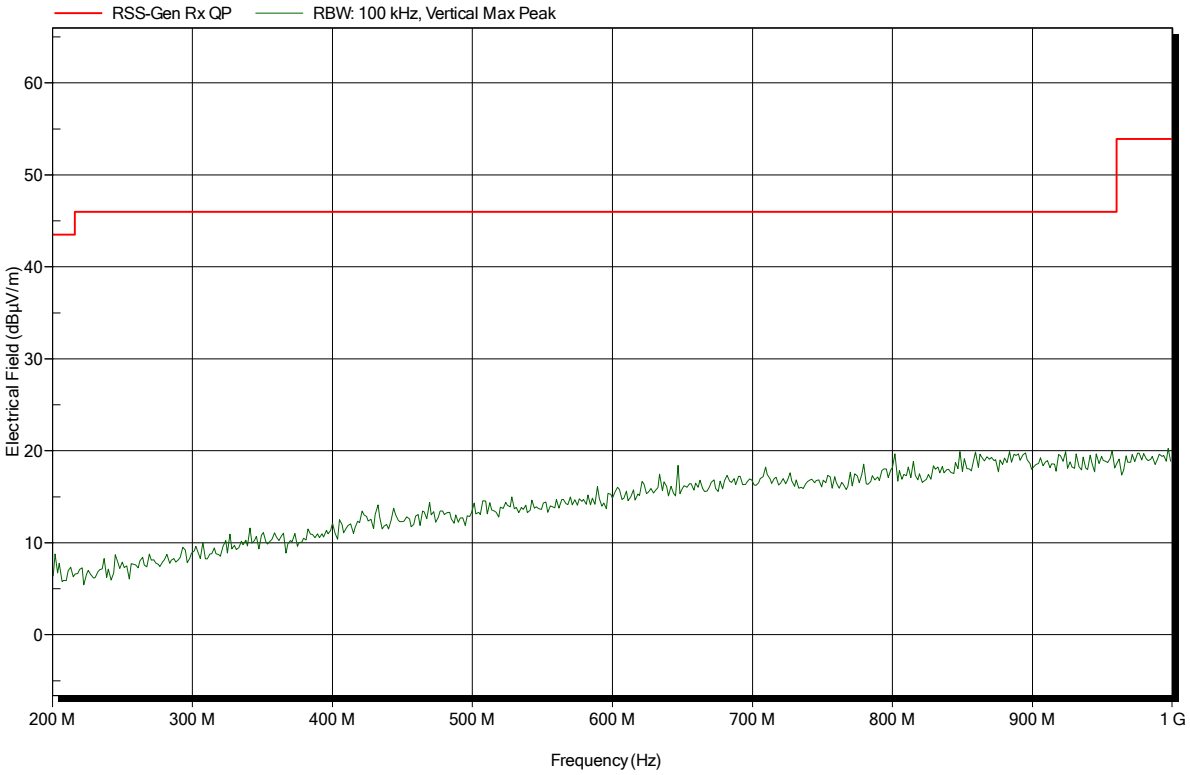
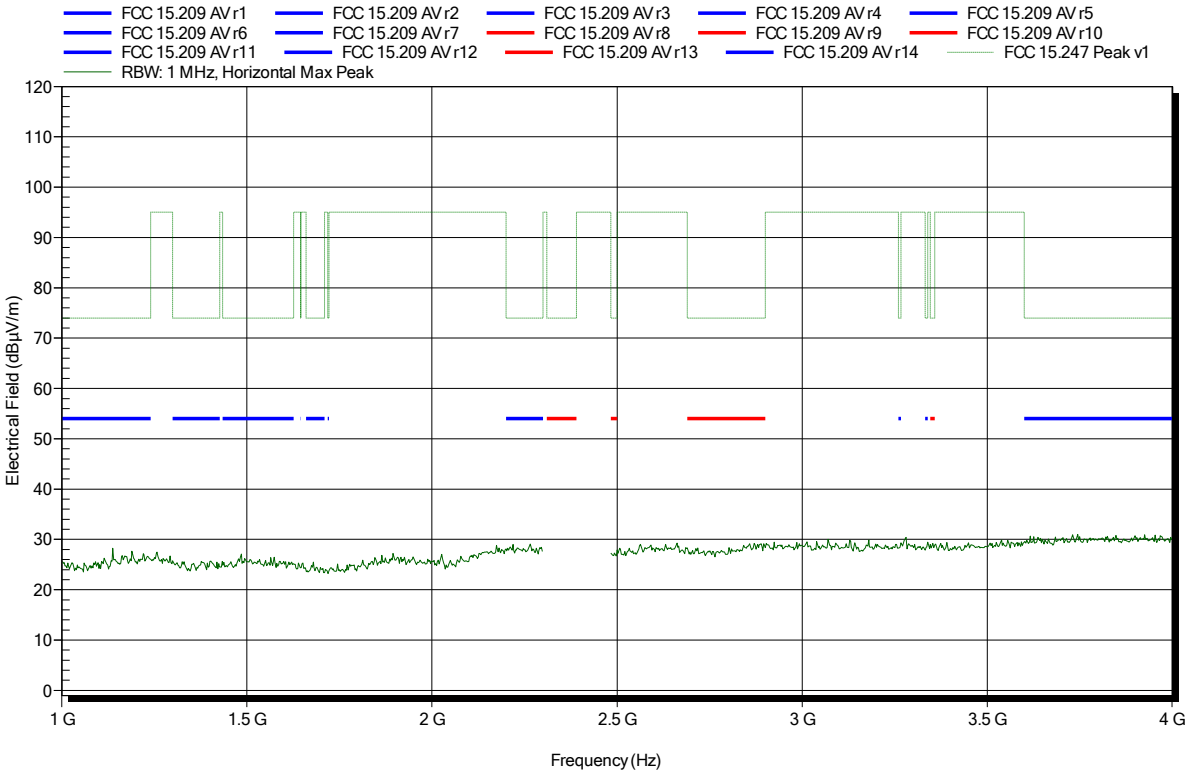


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

Index 1



Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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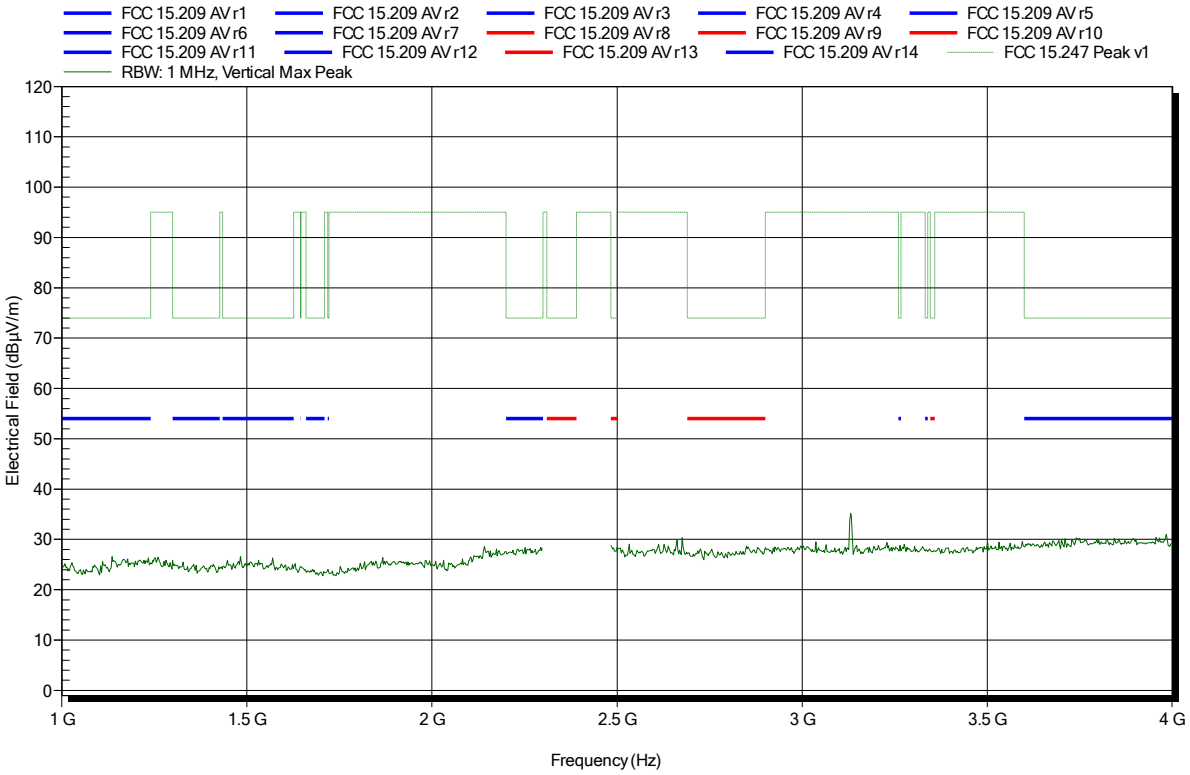
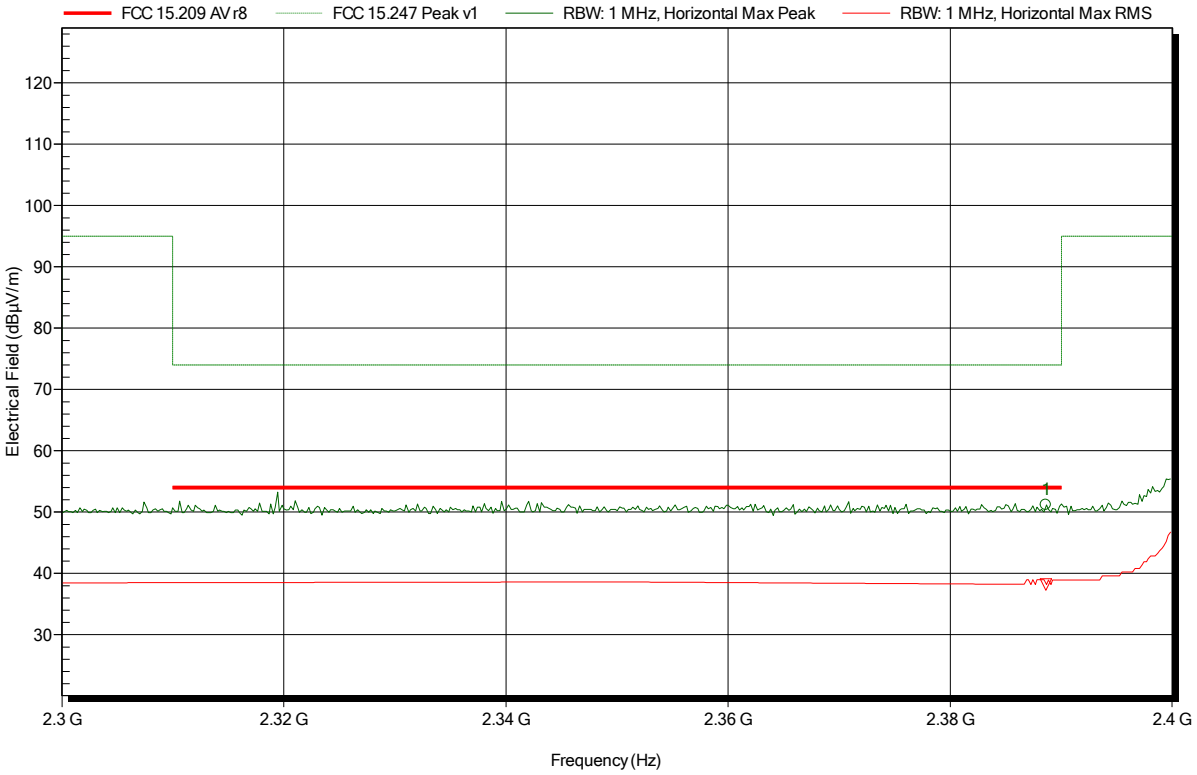


Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	lower bandedge

Index 2



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3886 GHz	51.17 dBµV/m	74 dBµV/m	-22.83 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.3886 GHz	38.2 dBµV/m	54 dBµV/m	-15.8 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	lower bandedge

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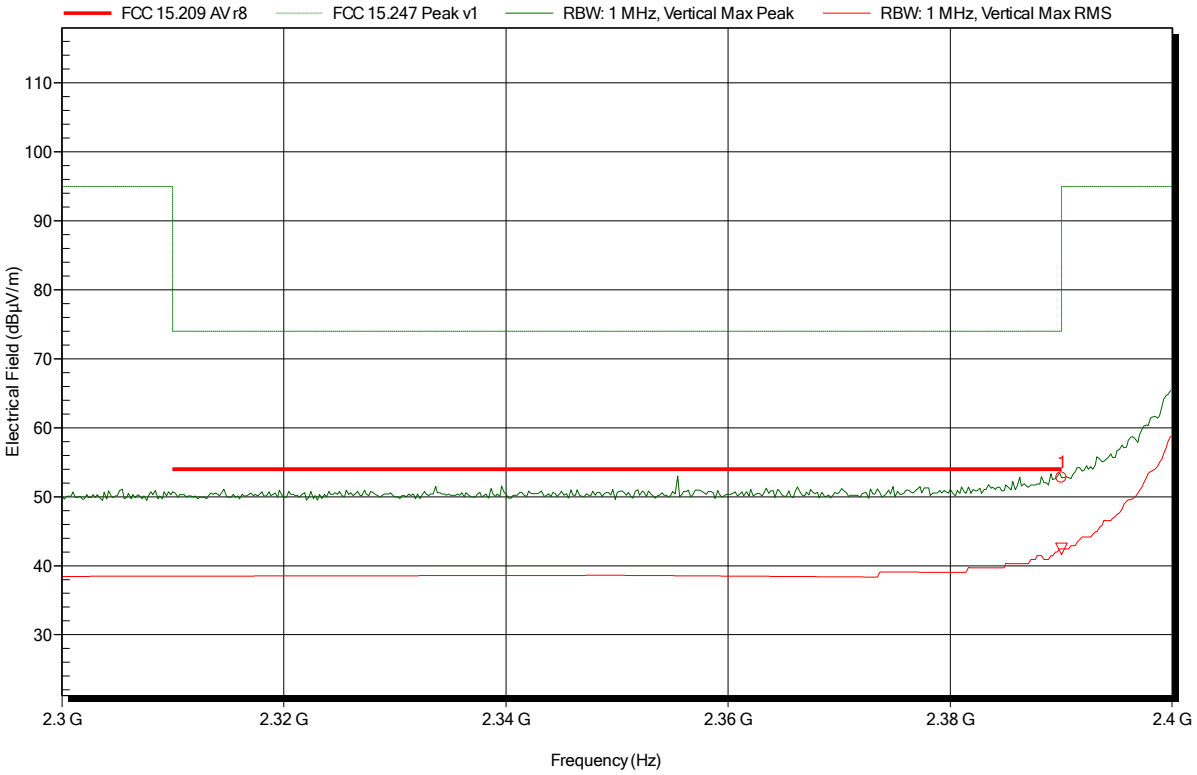


Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.39 GHz	52.78 dBµV/m	74 dBµV/m	-21.22 dB	Pass

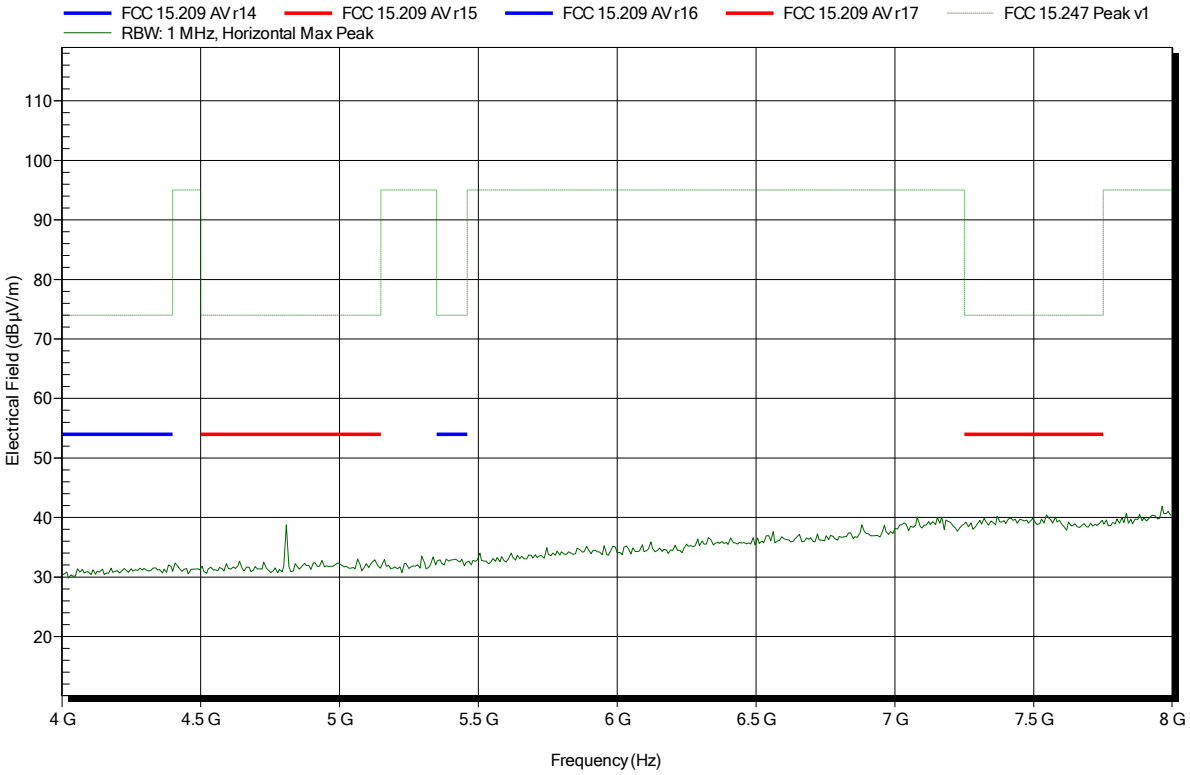
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.39 GHz	42.47 dBµV/m	54 dBµV/m	-11.53 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

Index 4



Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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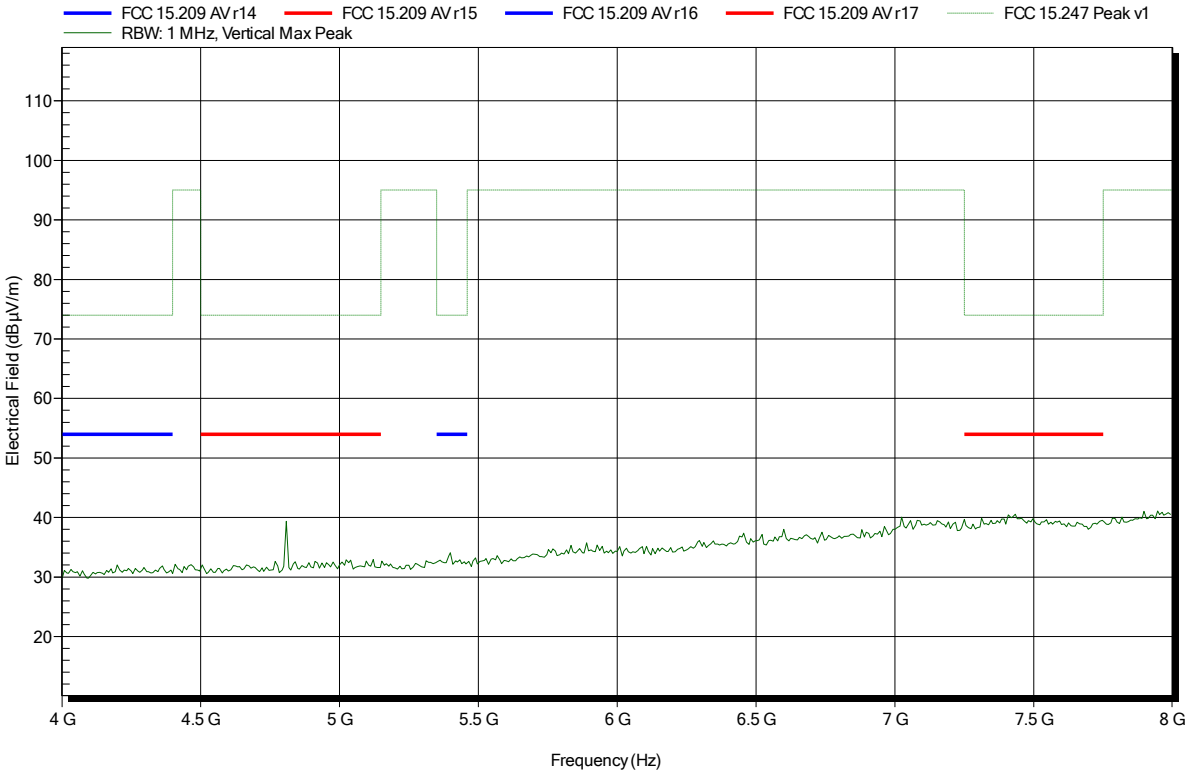

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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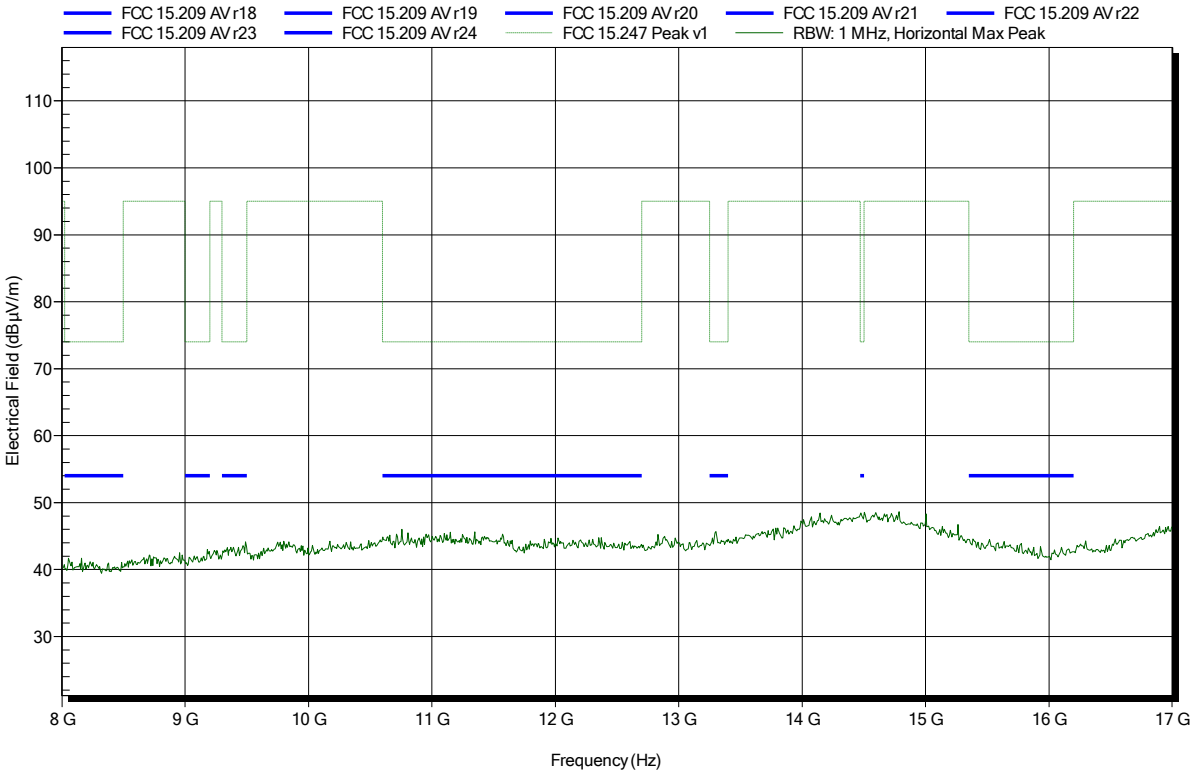

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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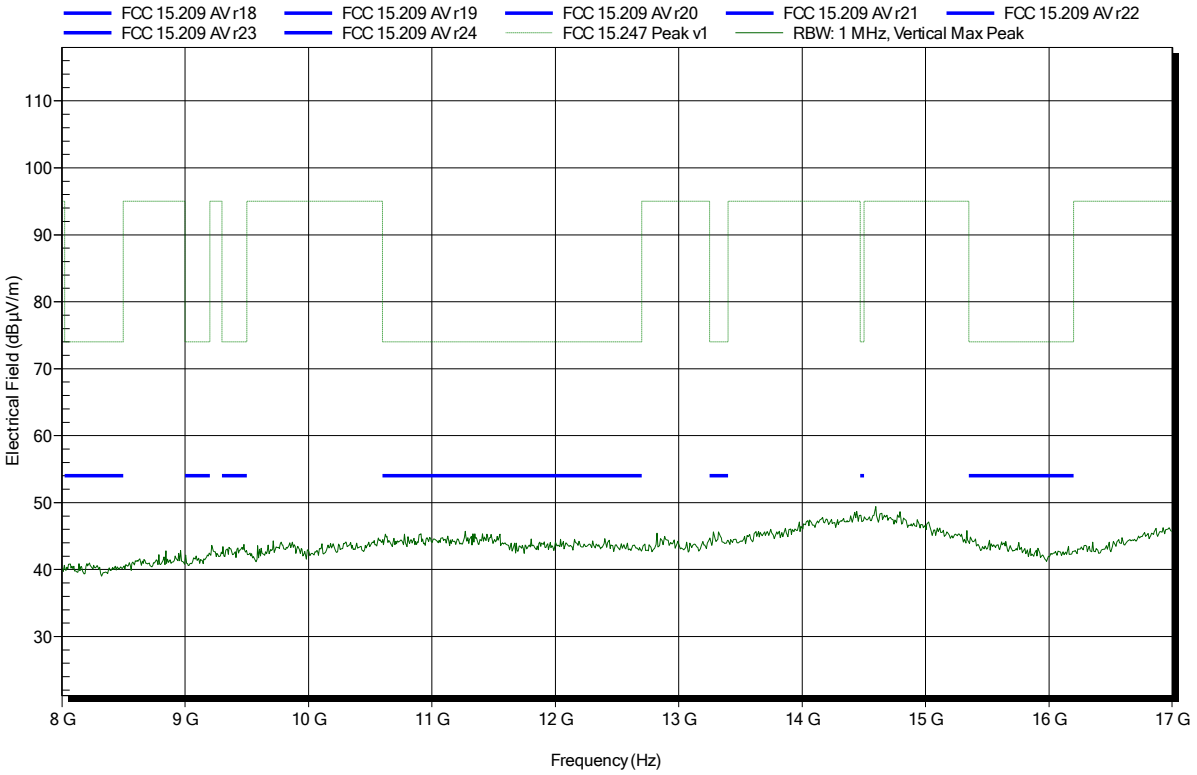

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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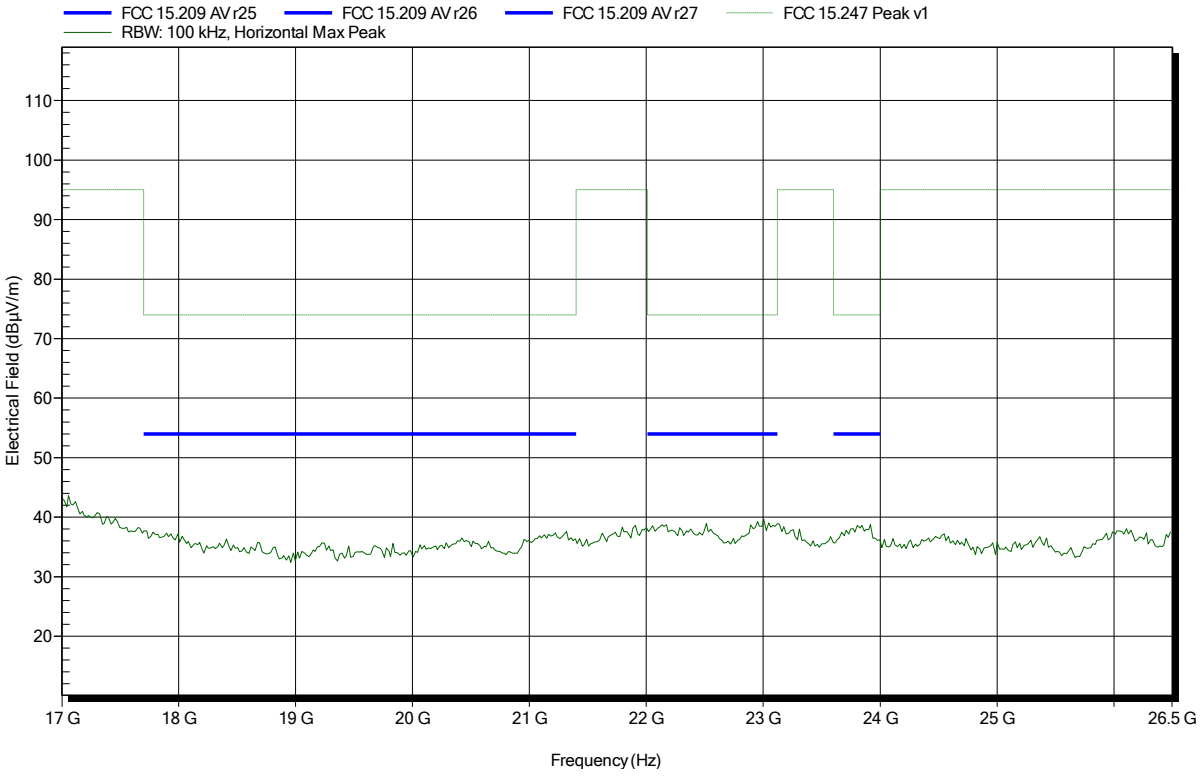

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-01
Note:	

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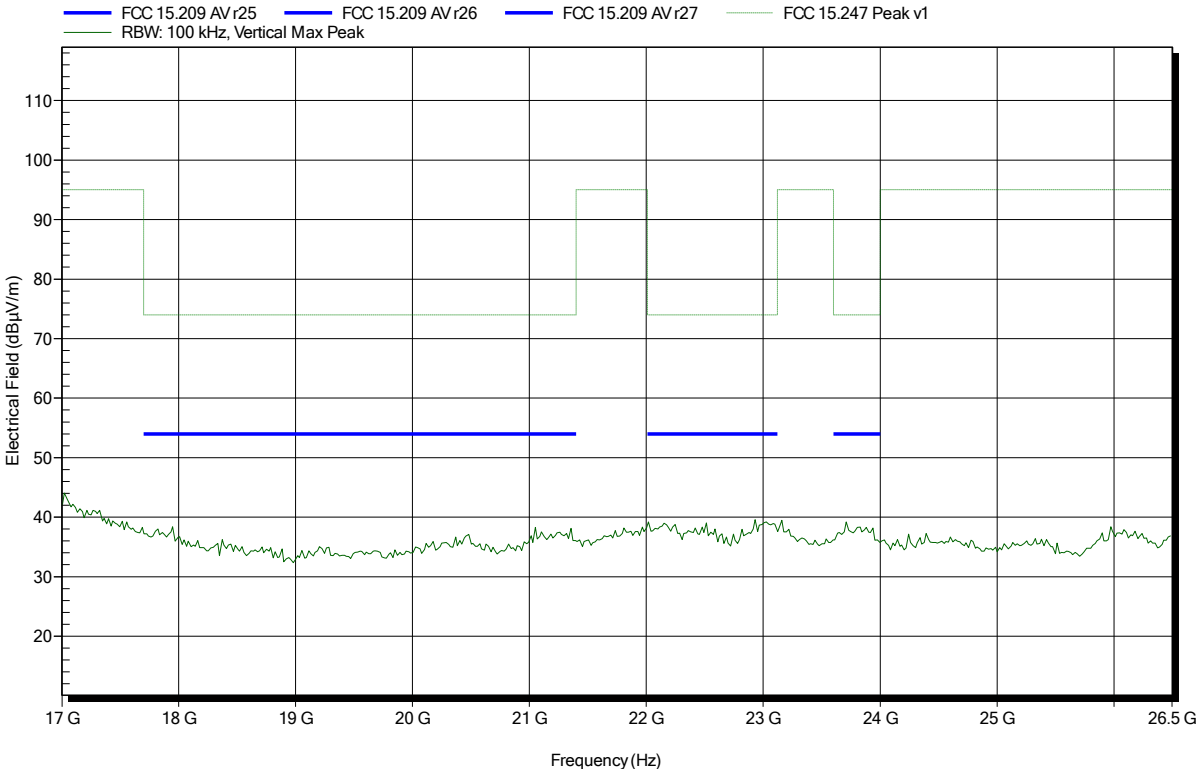

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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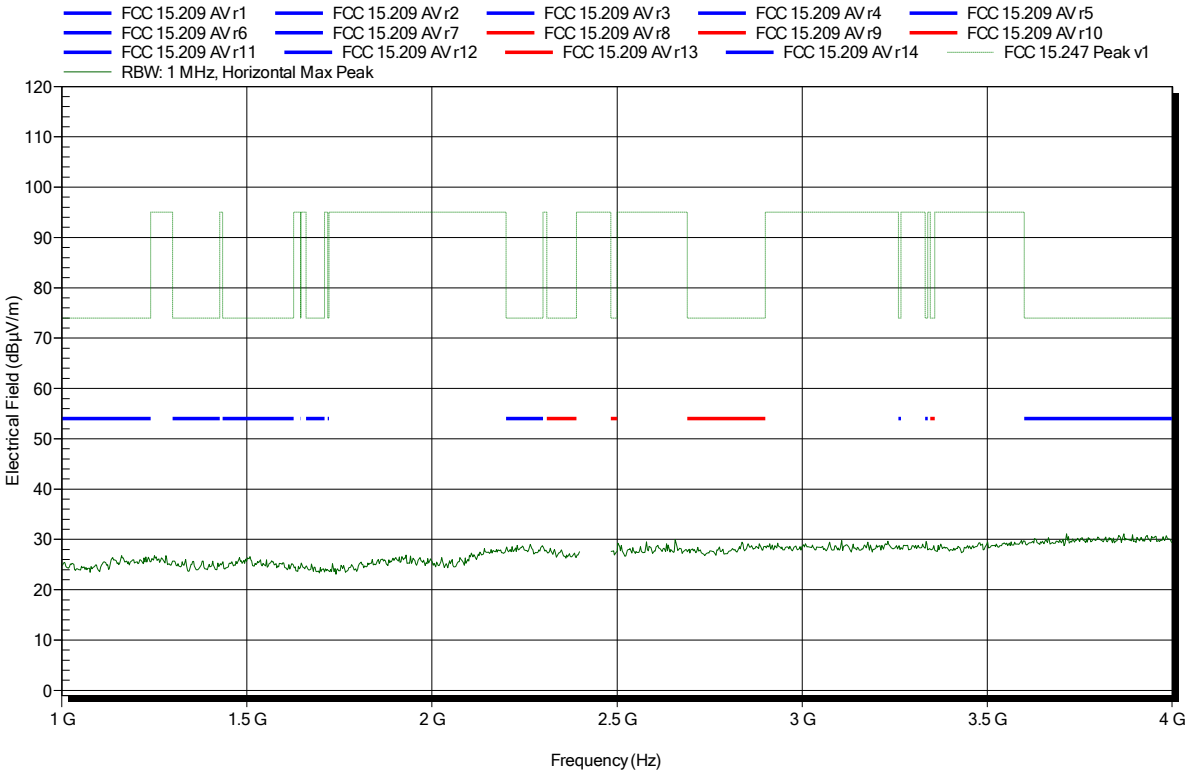

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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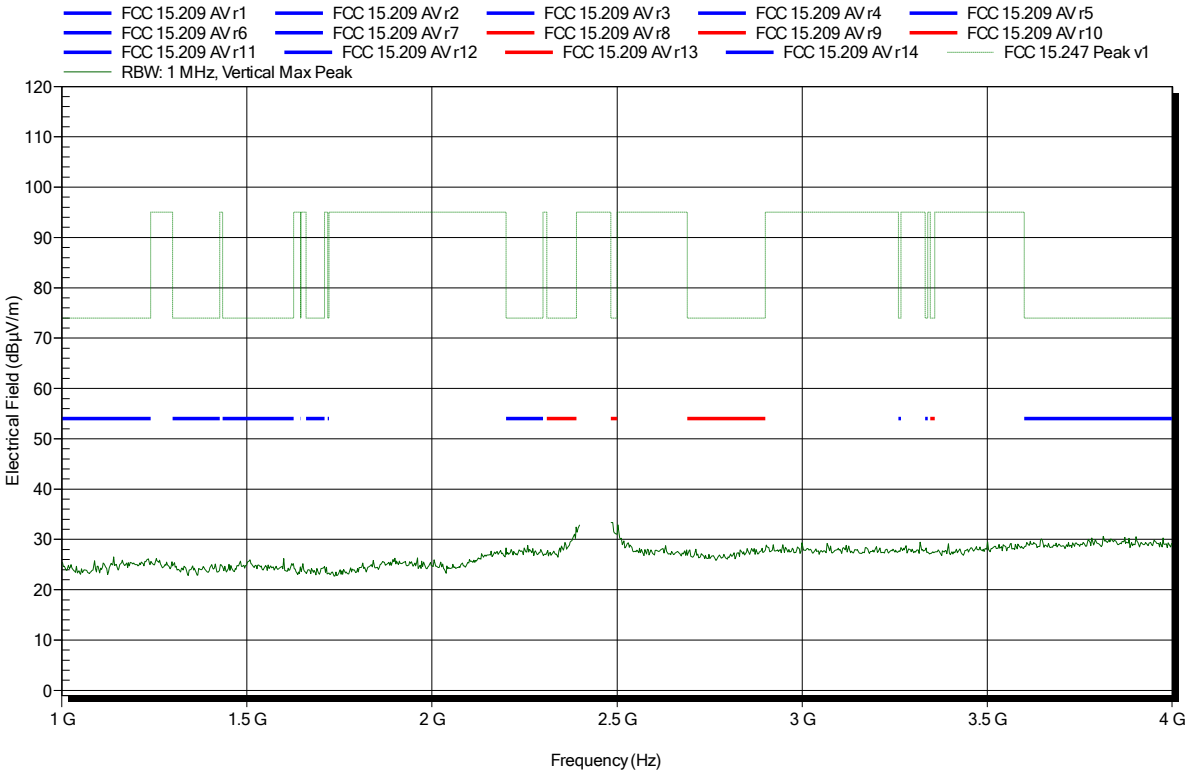

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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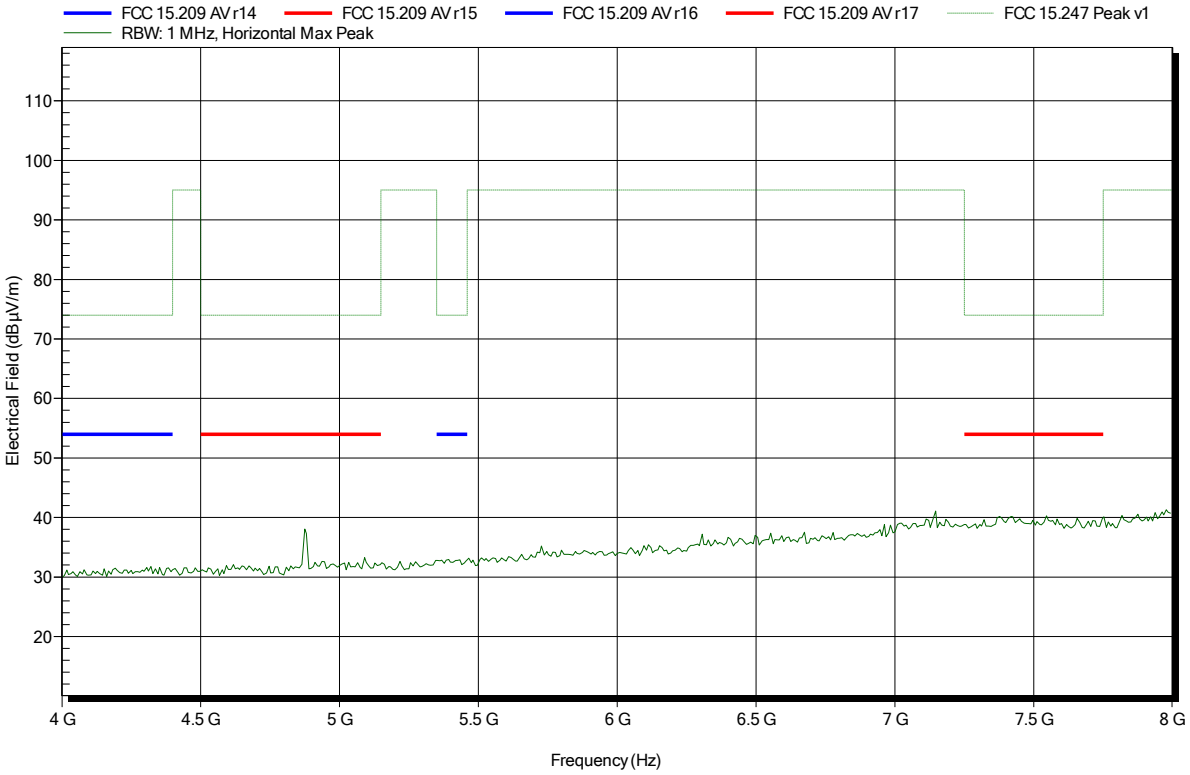

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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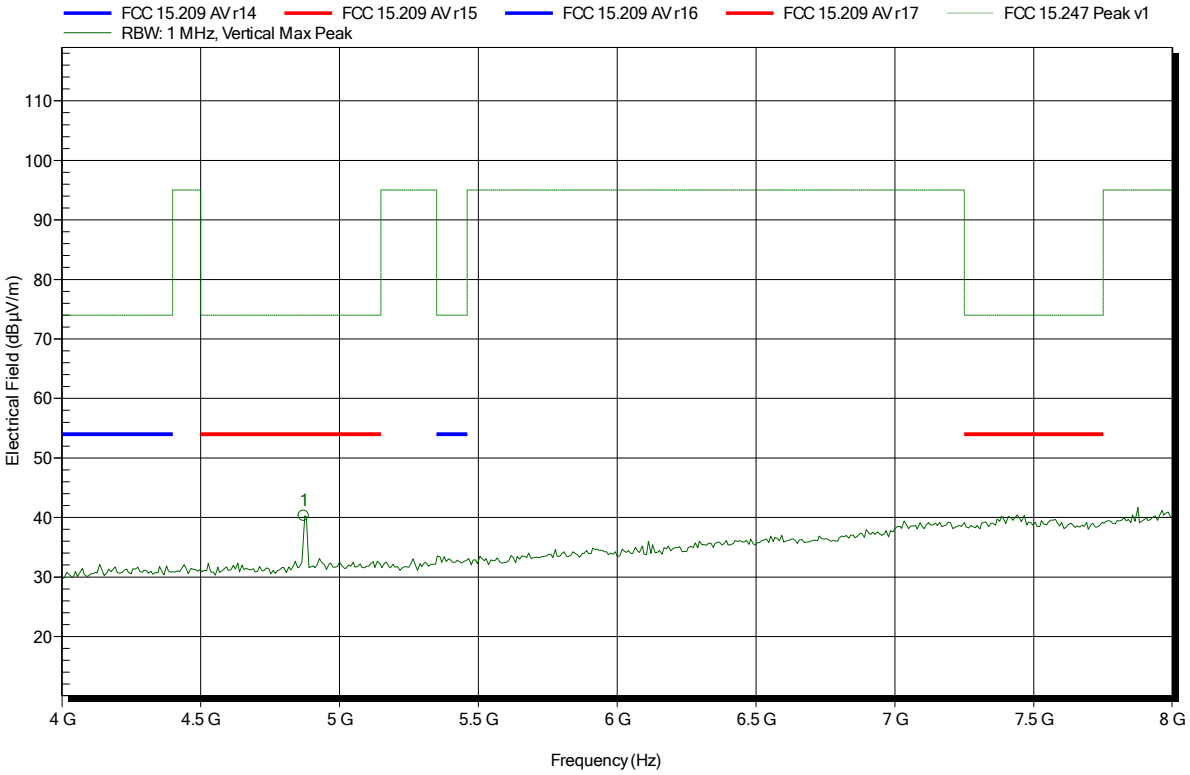

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.872 GHz	40.3 dBµV/m	74 dBµV/m	-33.7 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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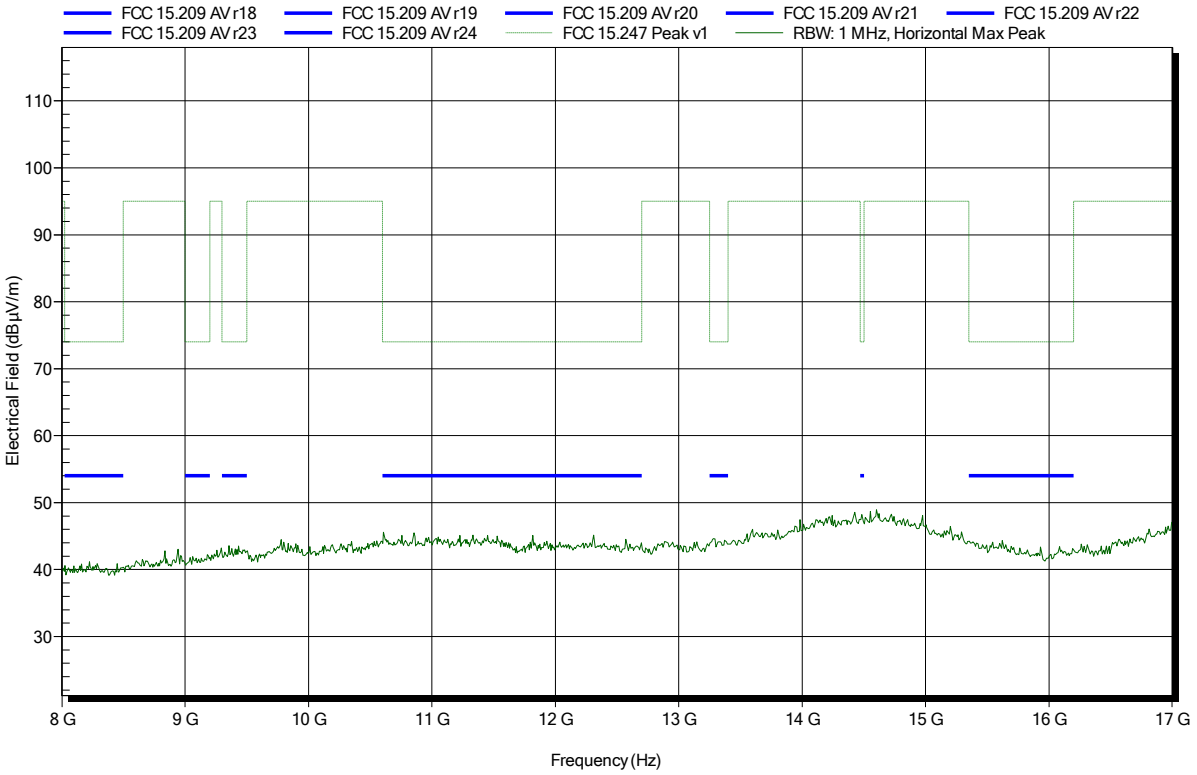

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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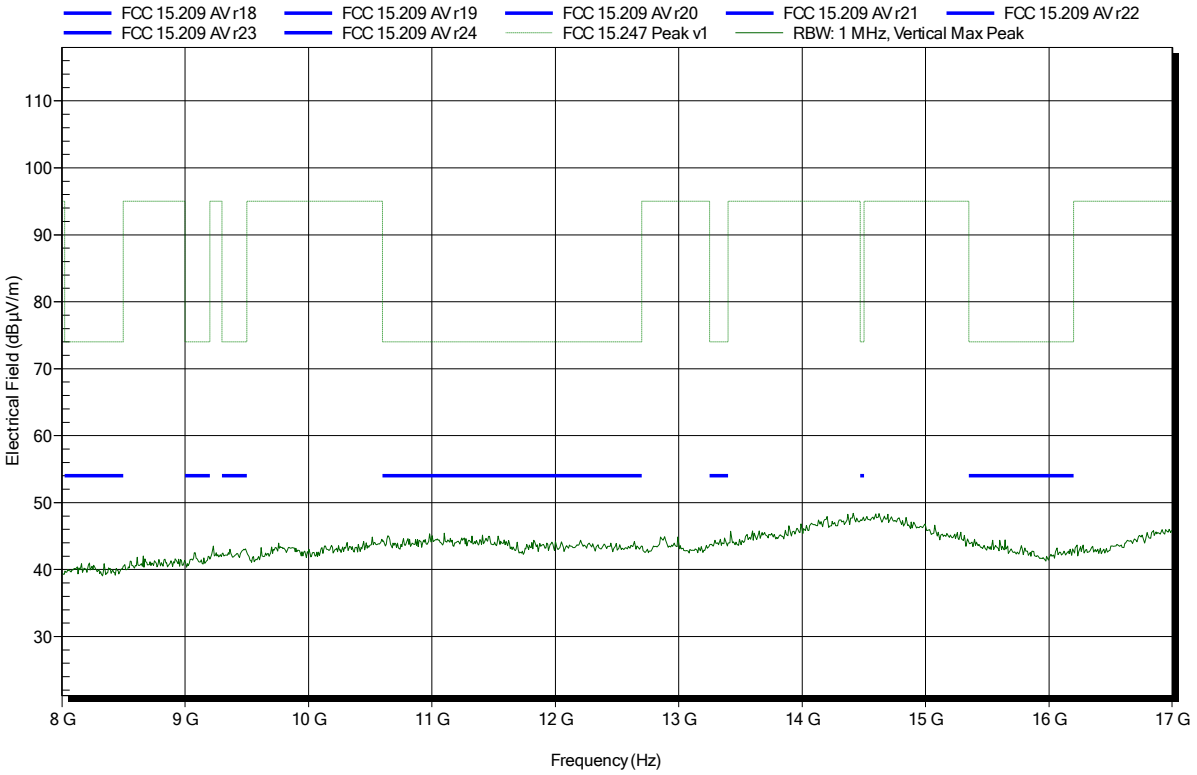

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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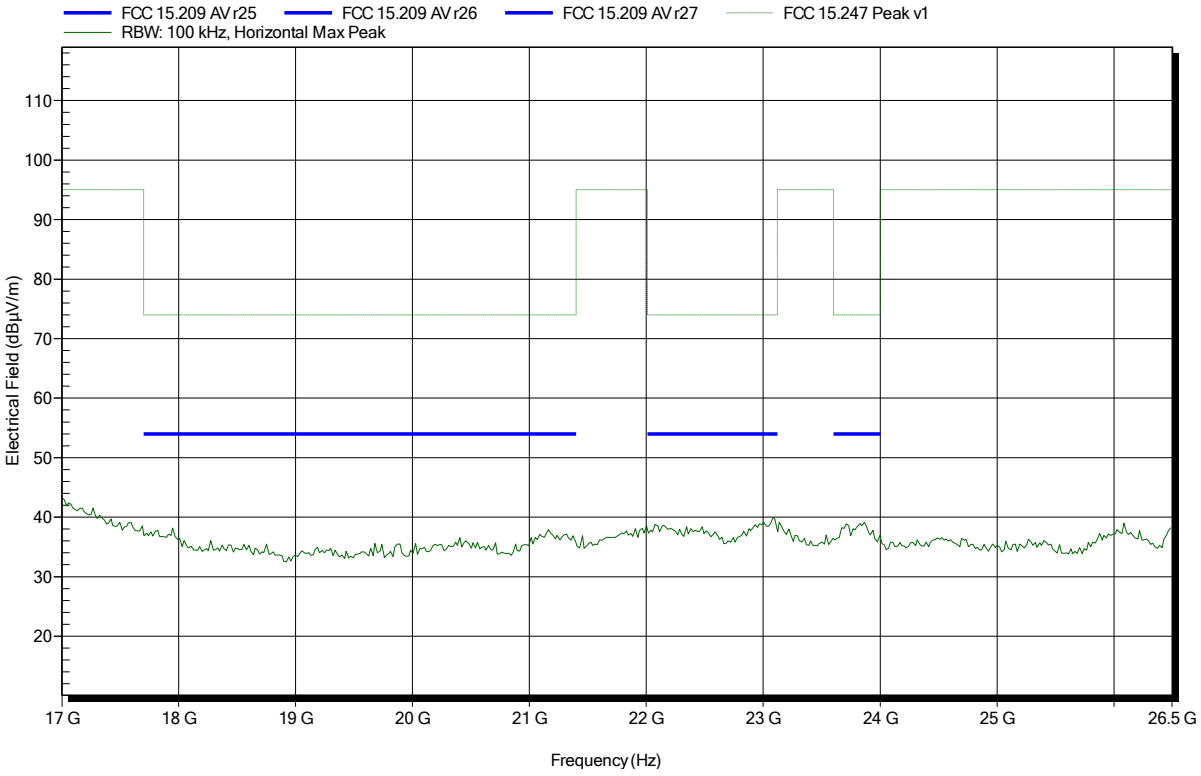

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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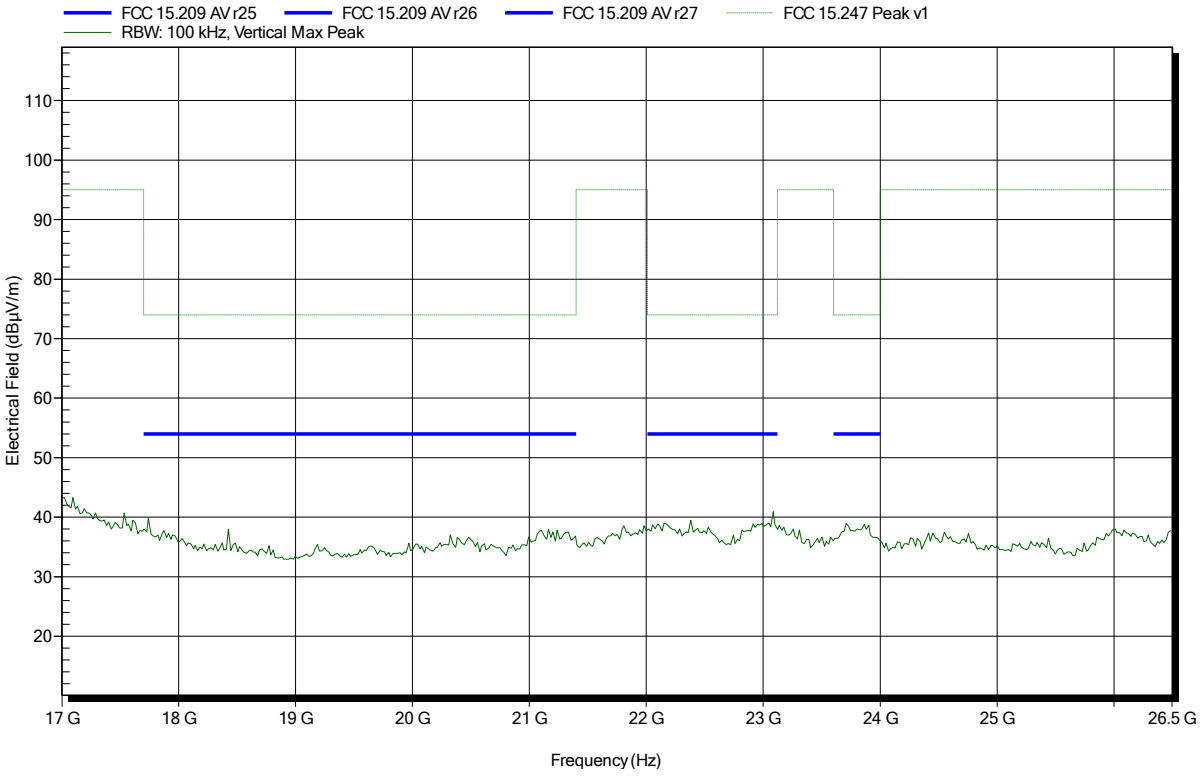

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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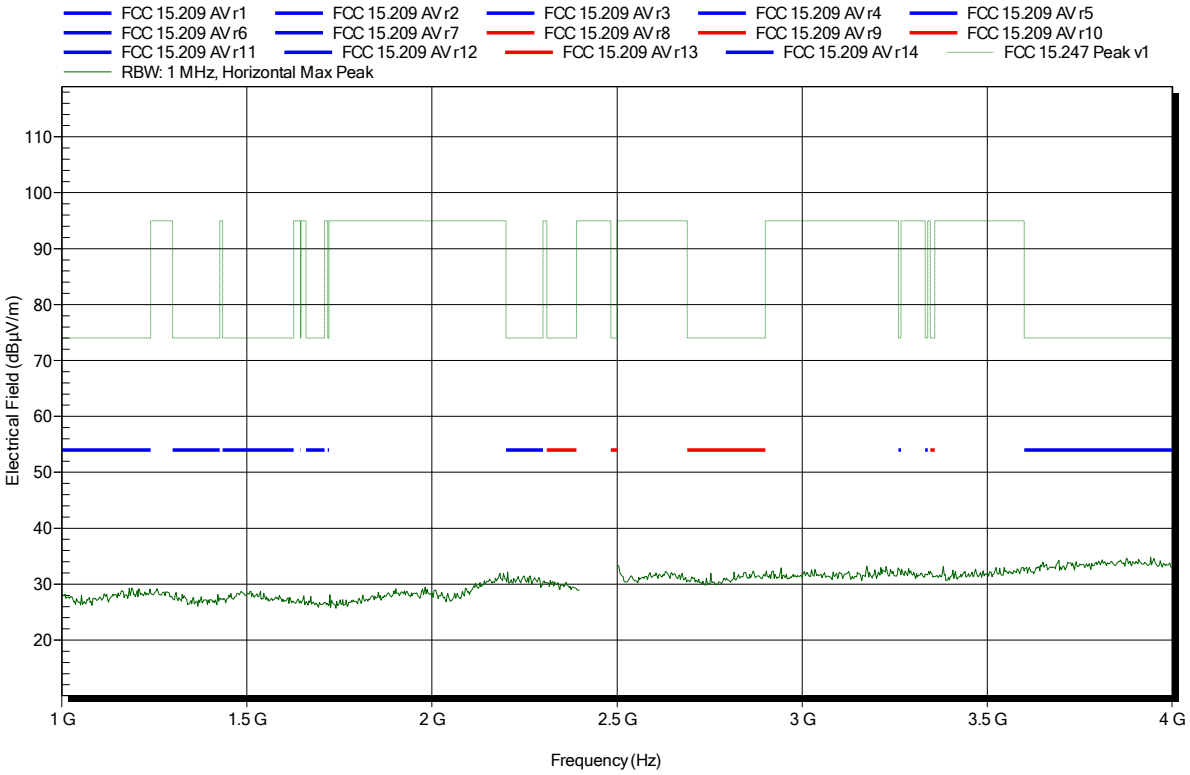

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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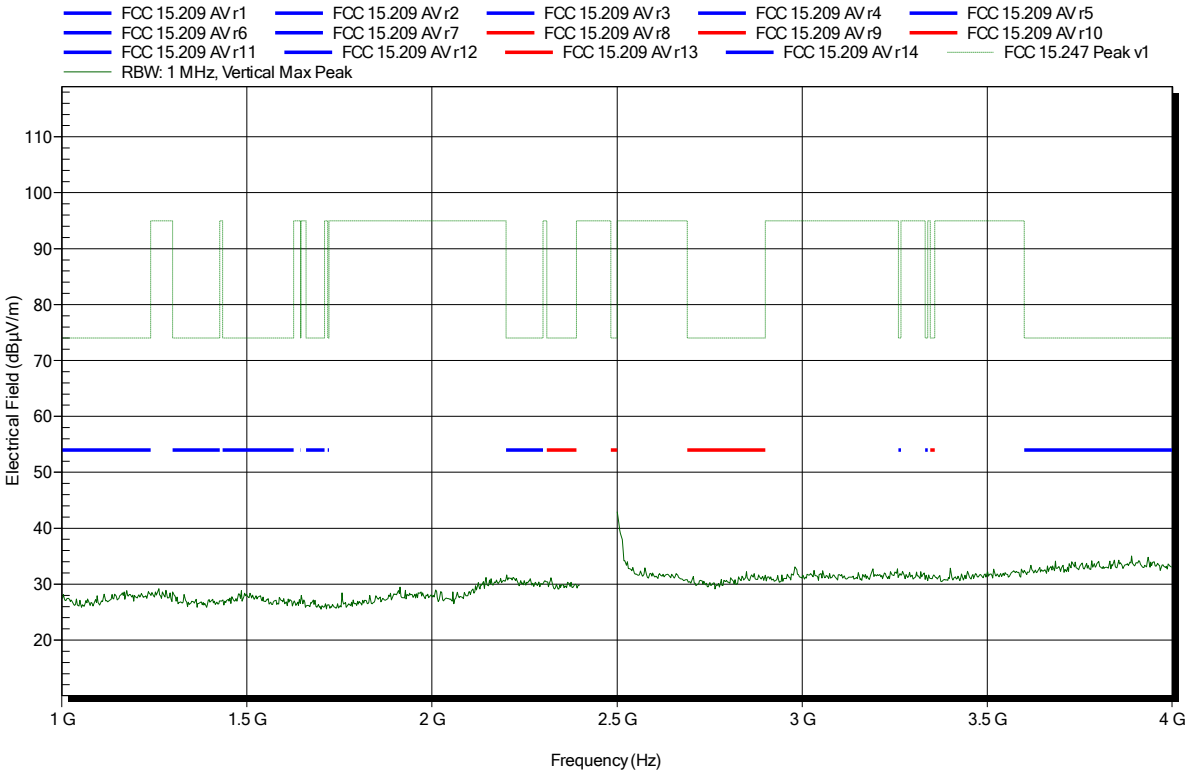

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	upper bandedge

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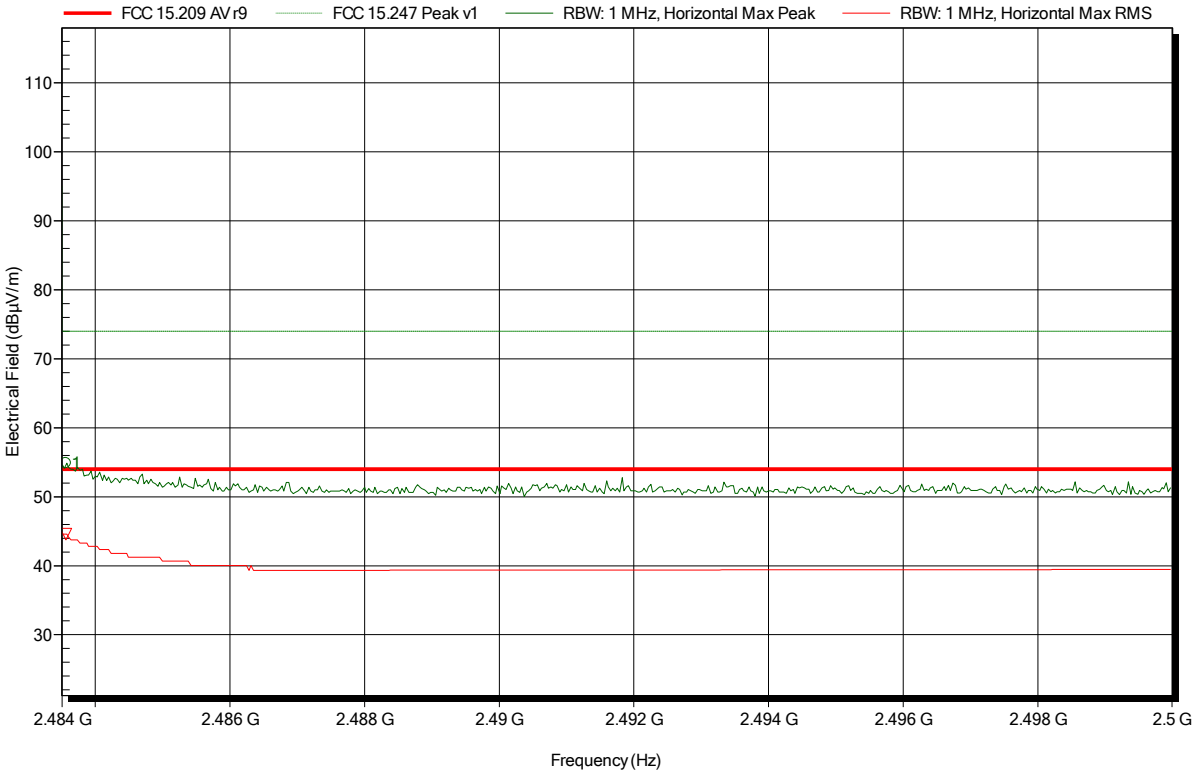

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4836 GHz	54.87 dBµV/m	74 dBµV/m	-19.13 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4836 GHz	44.57 dBµV/m	54 dBµV/m	-9.43 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	upper bandedge (0dBm)

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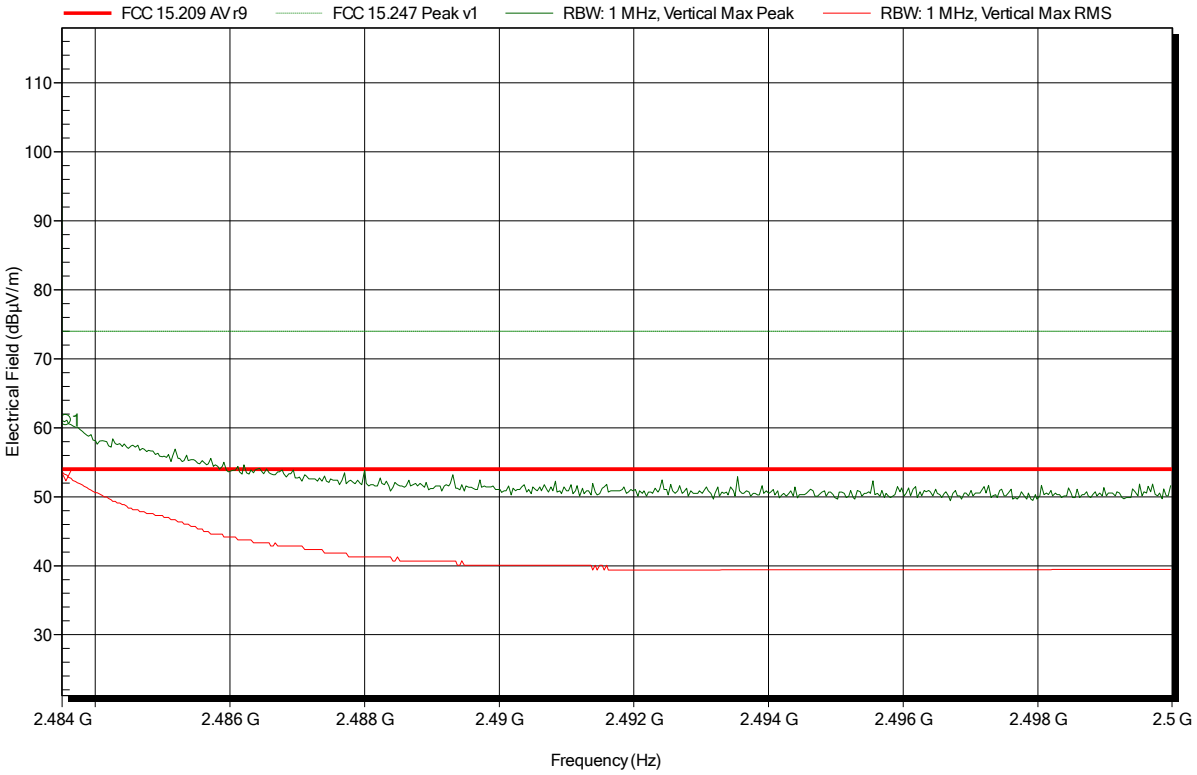

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4836 GHz	61.12 dBµV/m	74 dBµV/m	-12.88 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4836 GHz	53.14 dBµV/m	54 dBµV/m	-0.86 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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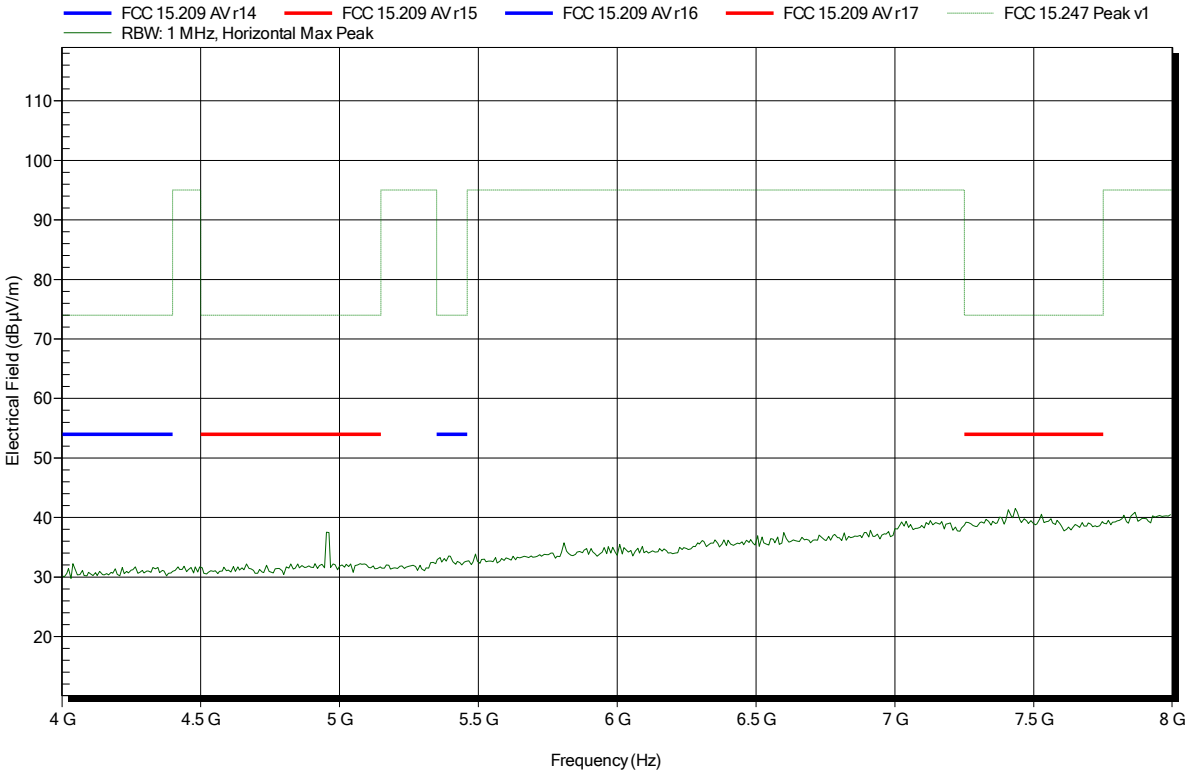

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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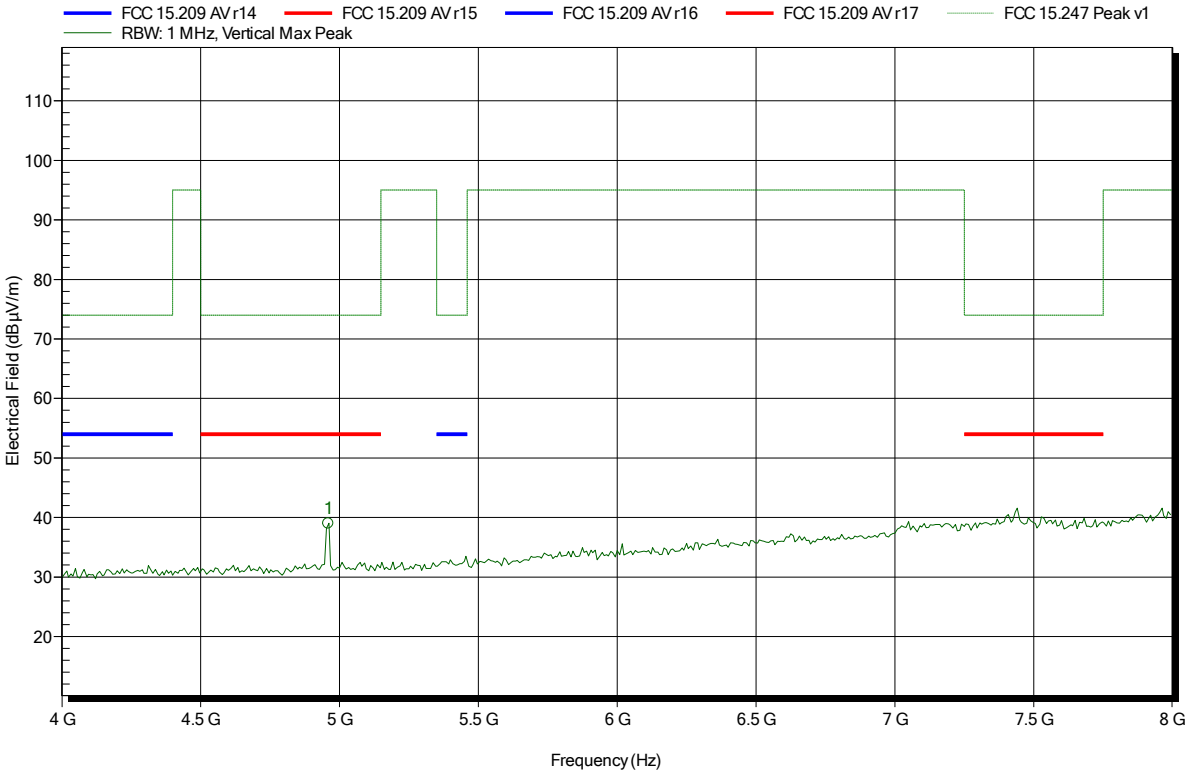

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.96 GHz	39 dBµV/m	74 dBµV/m	-35 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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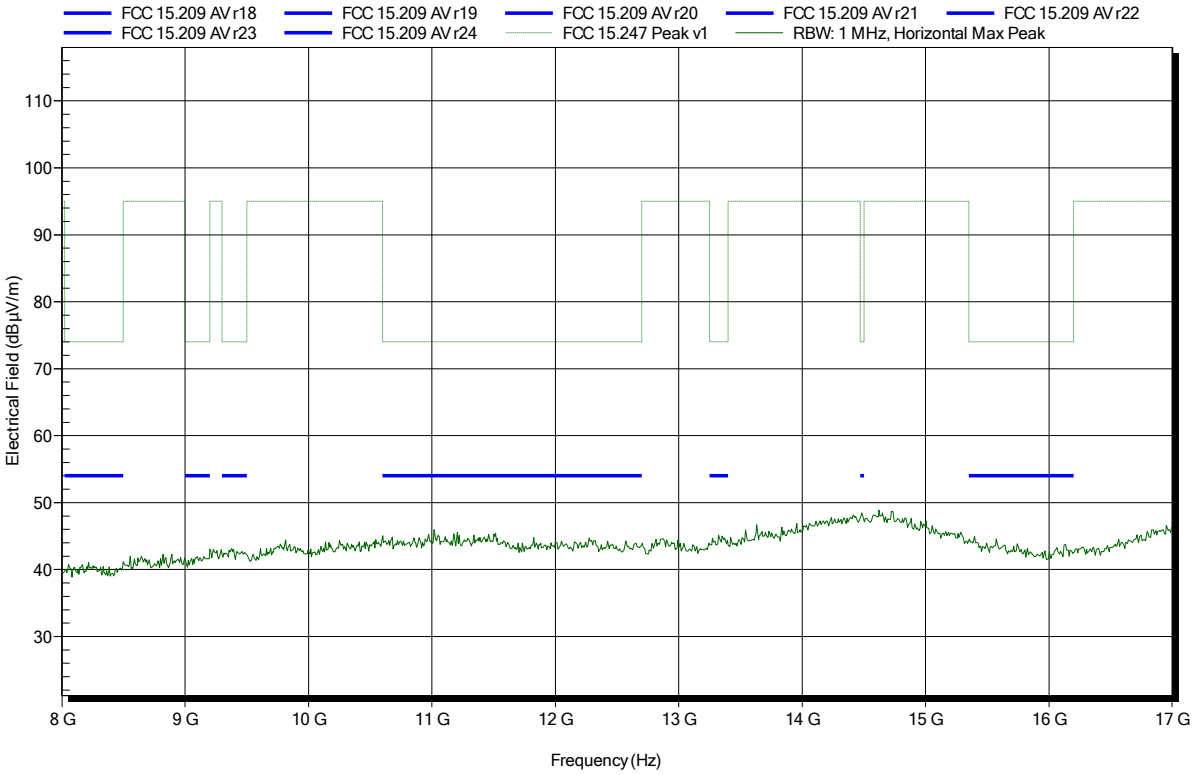

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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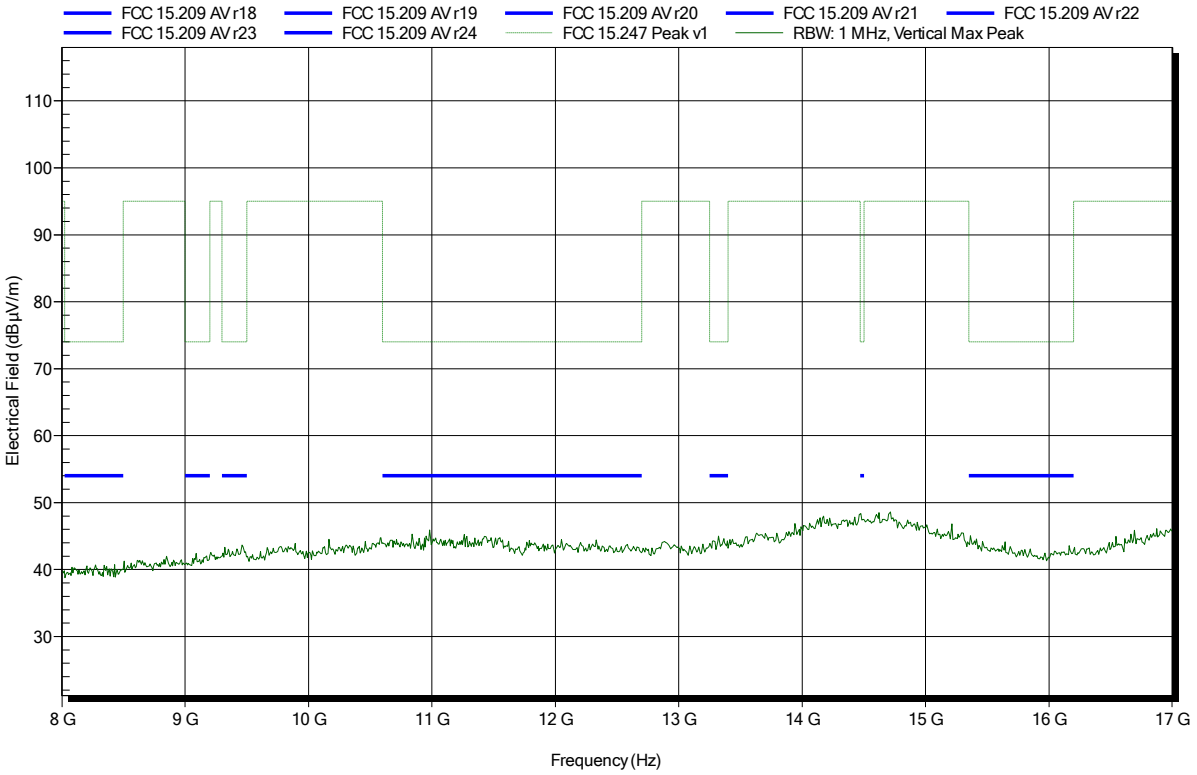

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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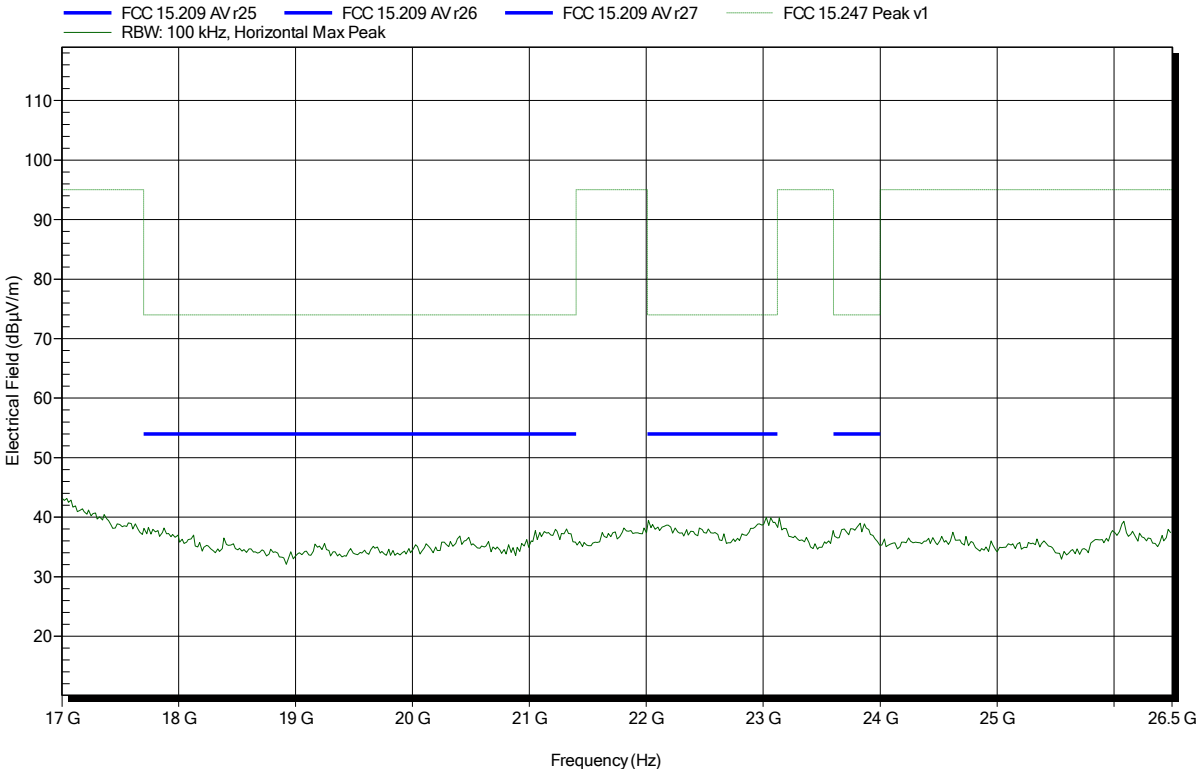

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz ZigBee module, UFL connector with exemplary antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (USB port)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-01
Note:	

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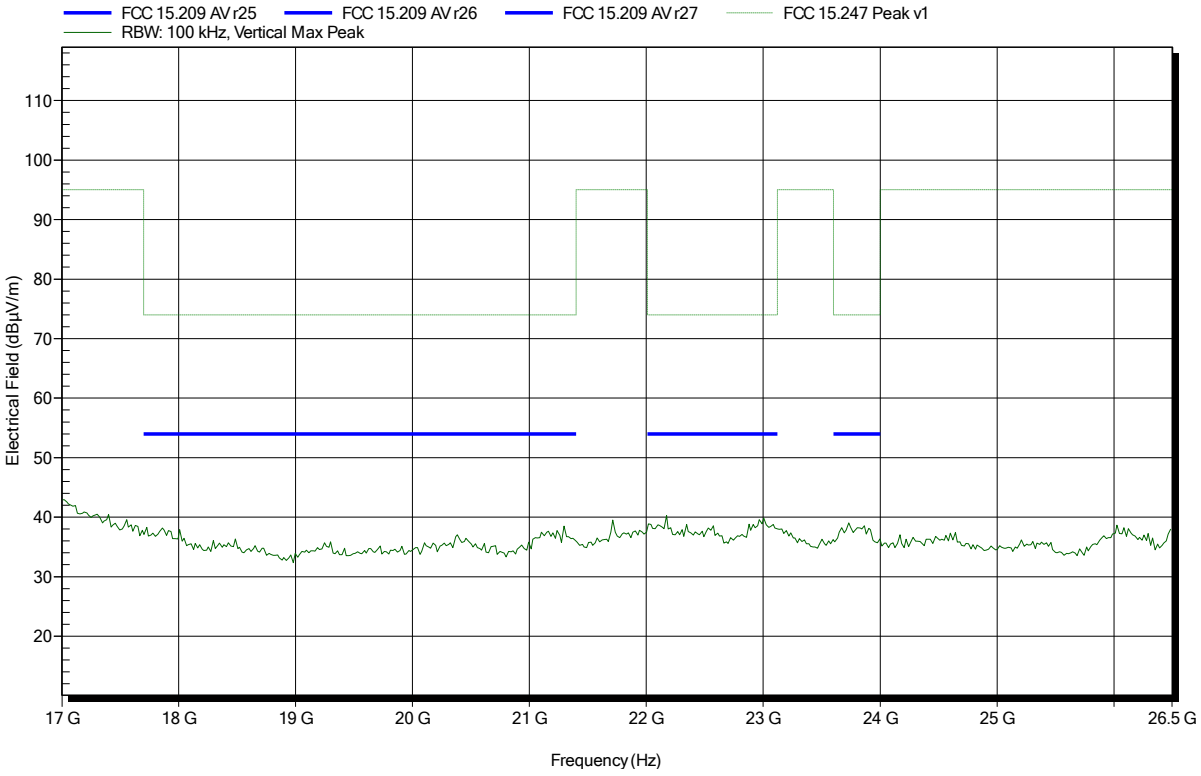

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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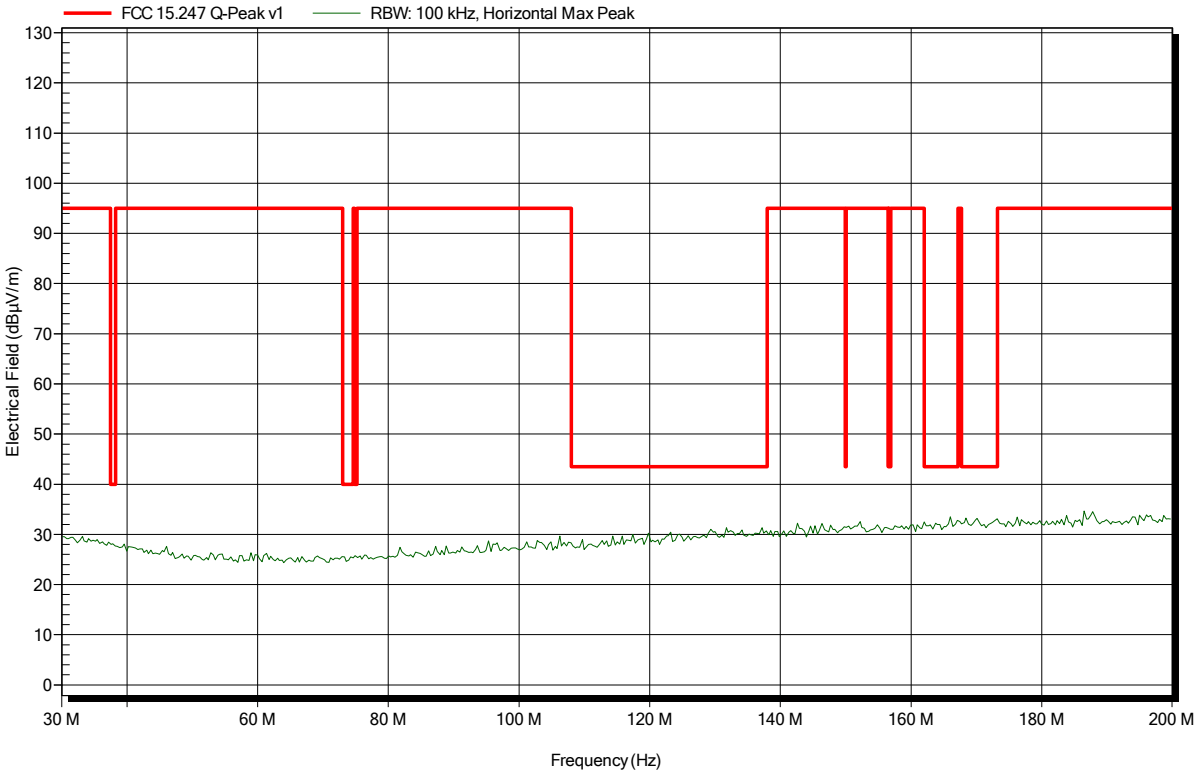

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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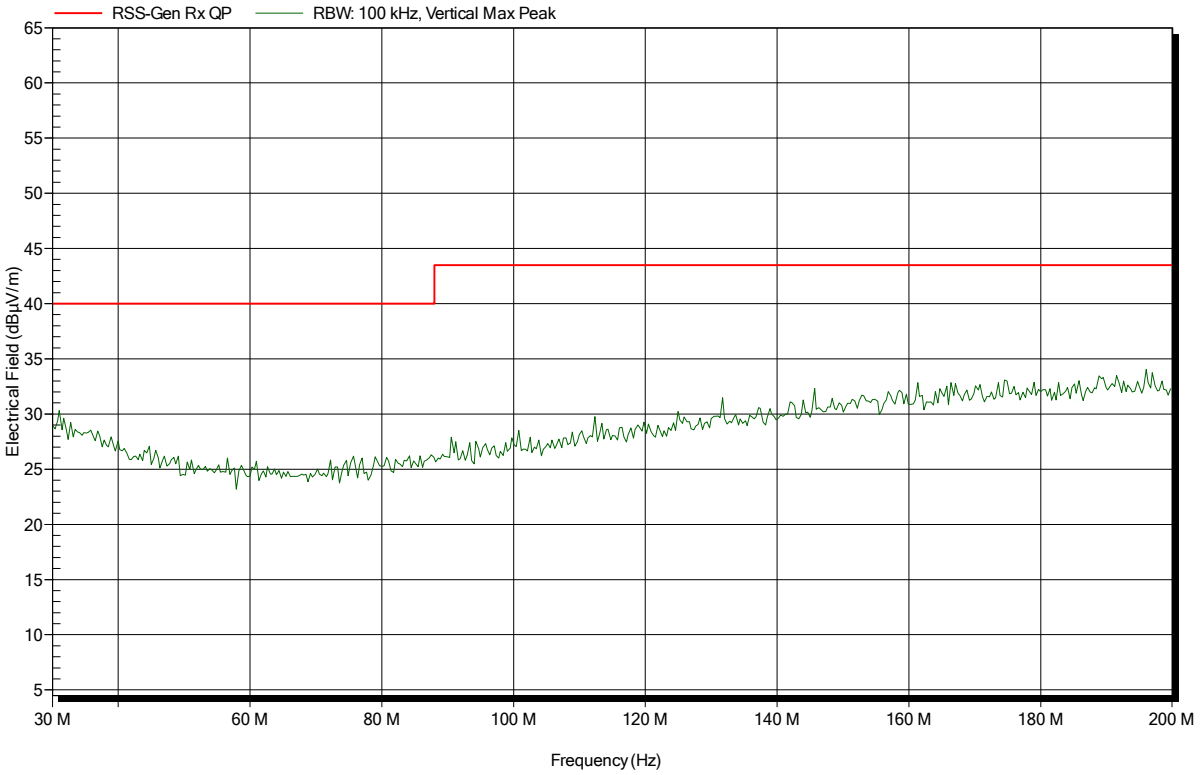

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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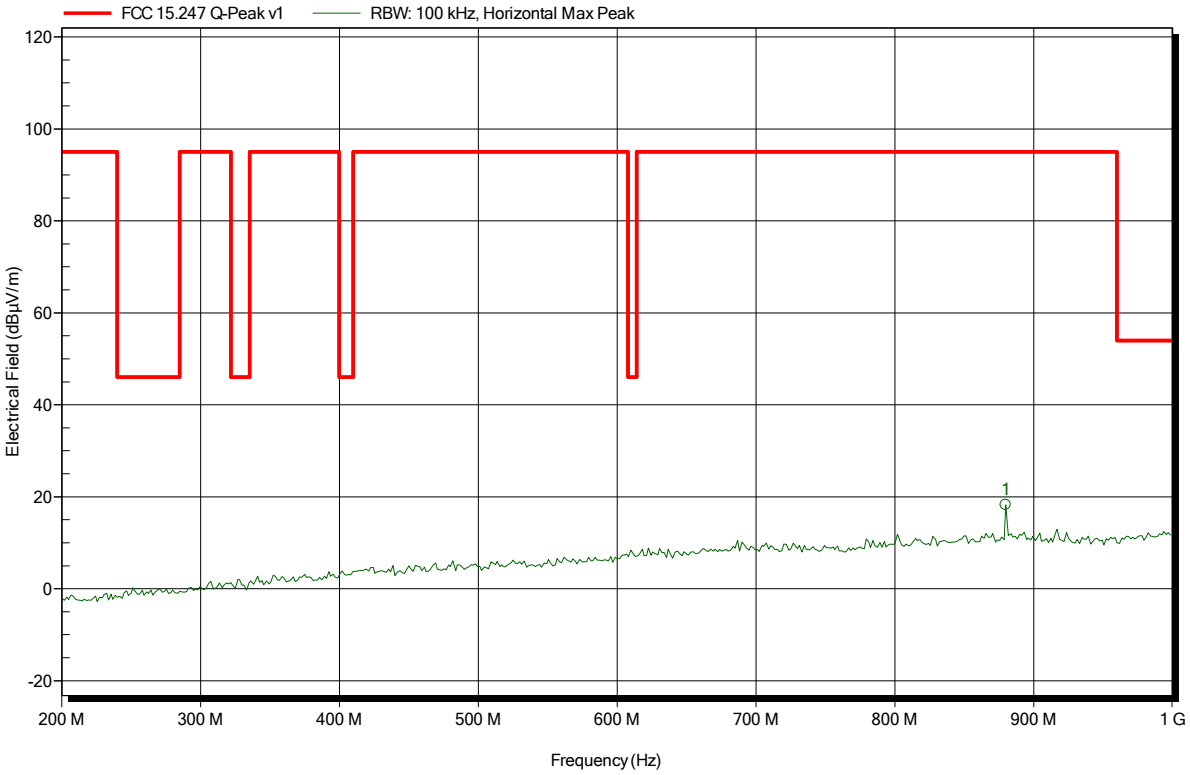

Frequency	Peak	Peak Limit	Peak Difference	Status
880 MHz	18.2 dBµV/m	95 dBµV/m	-76.8 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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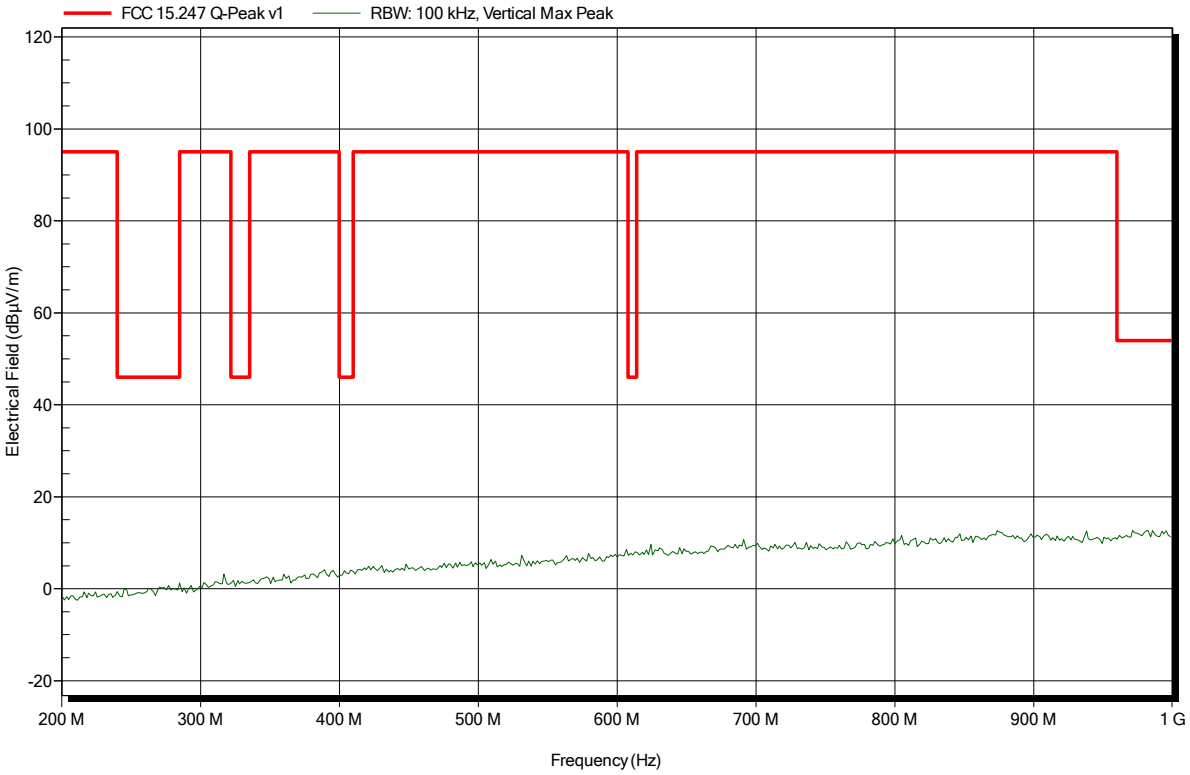

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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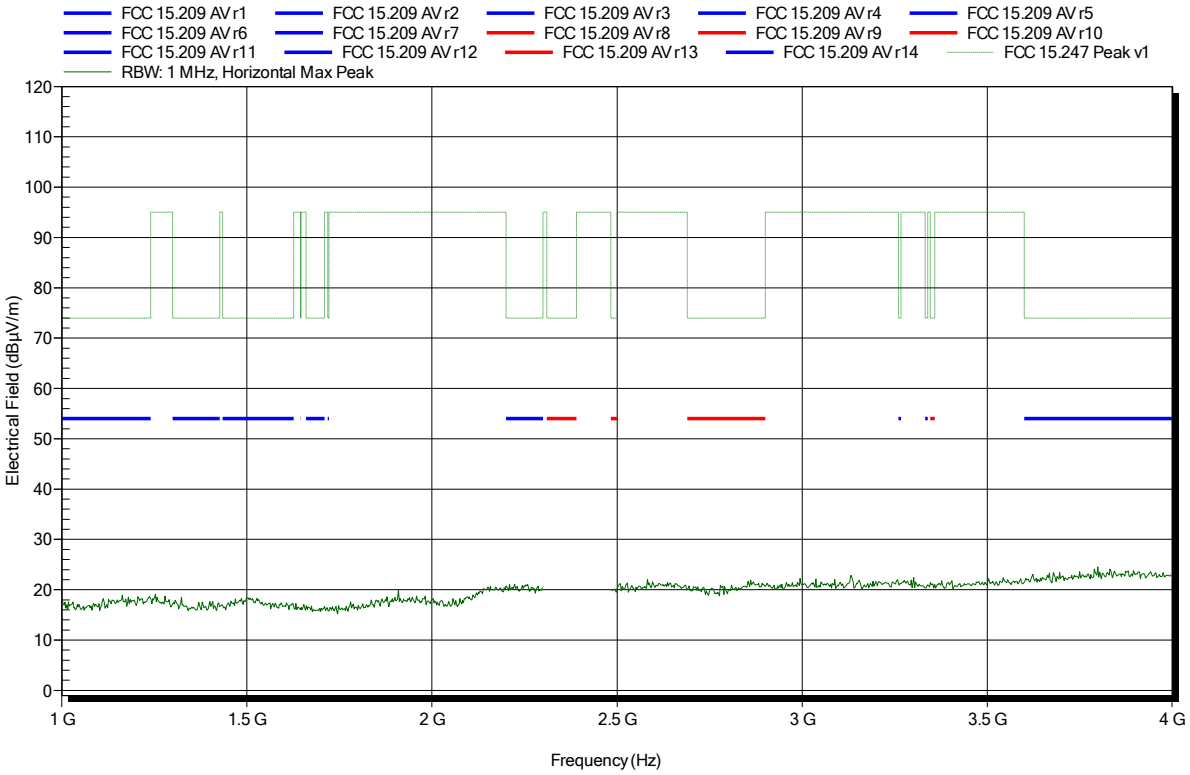

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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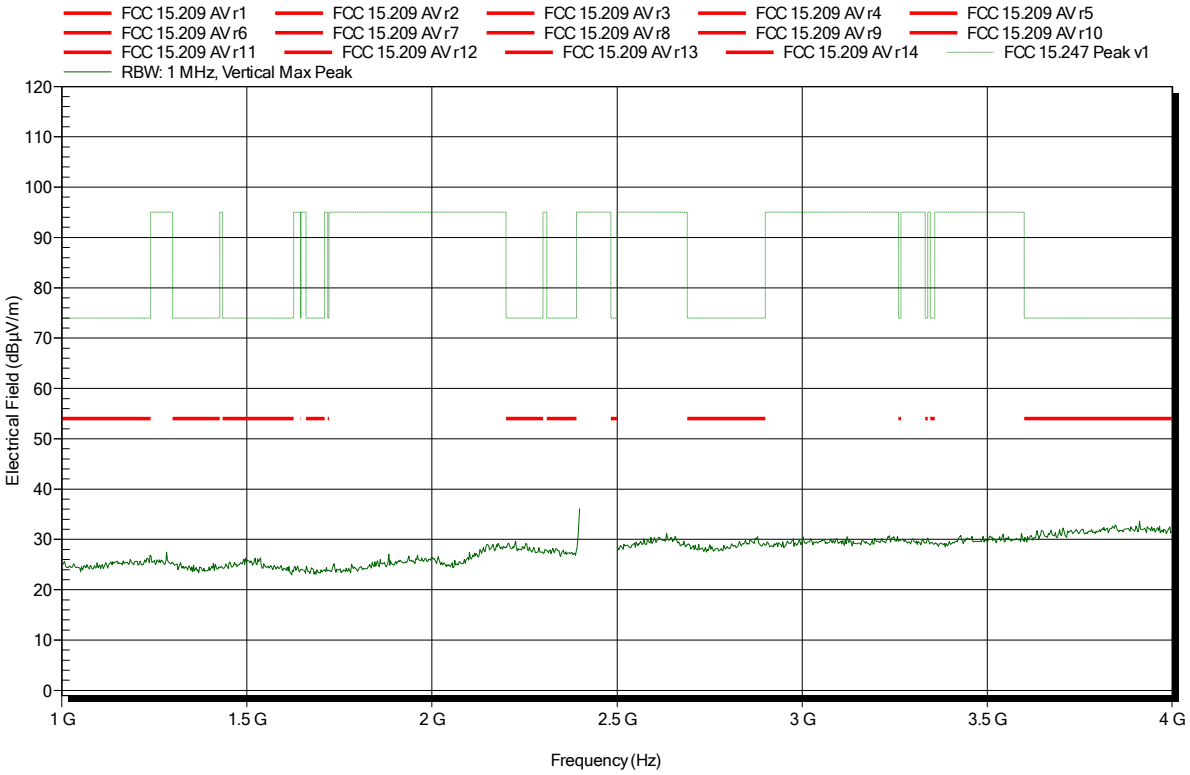

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	lower bandedge

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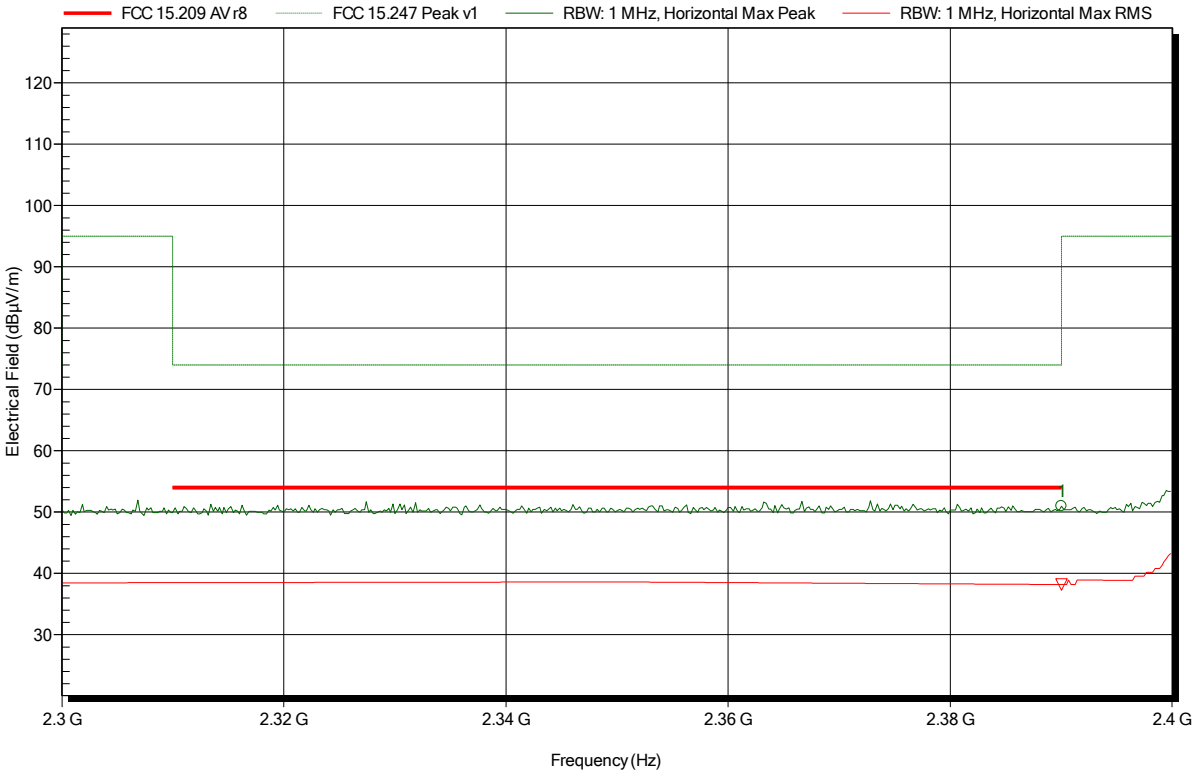

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.39 GHz	50.98 dBµV/m	74 dBµV/m	-23.02 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.39 GHz	38.19 dBµV/m	54 dBµV/m	-15.81 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	lower bandedge

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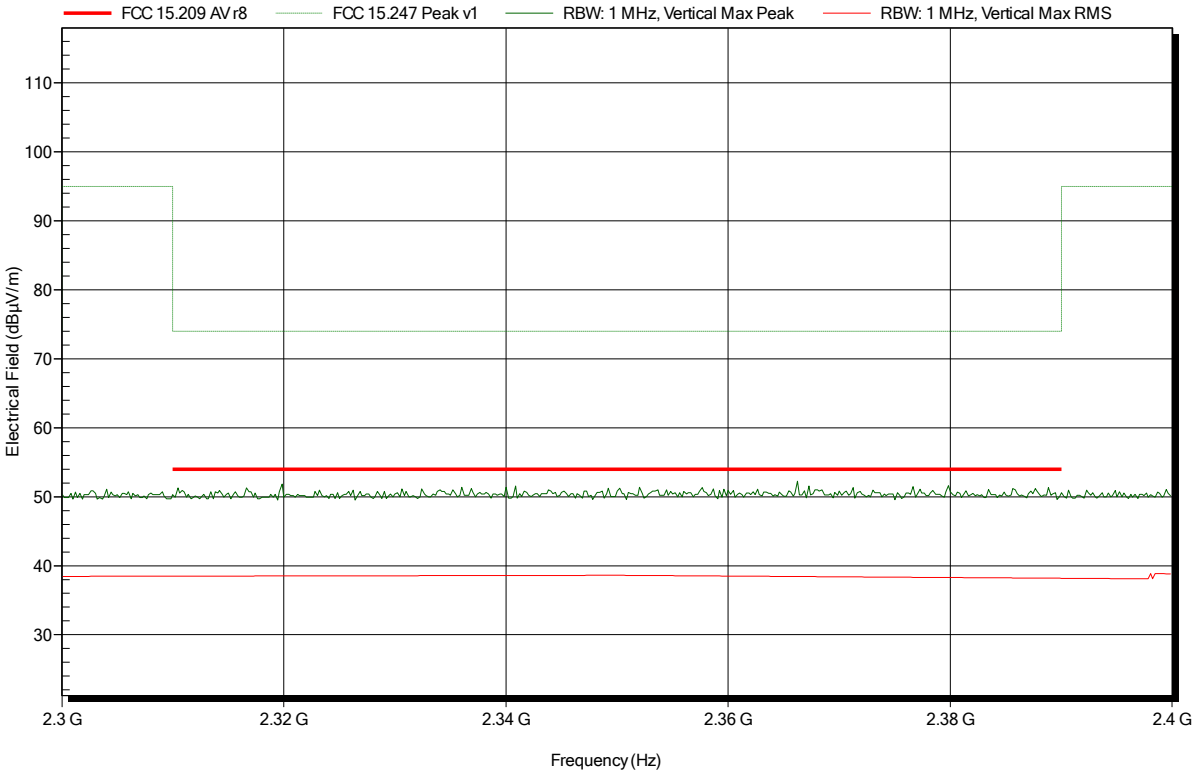

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
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Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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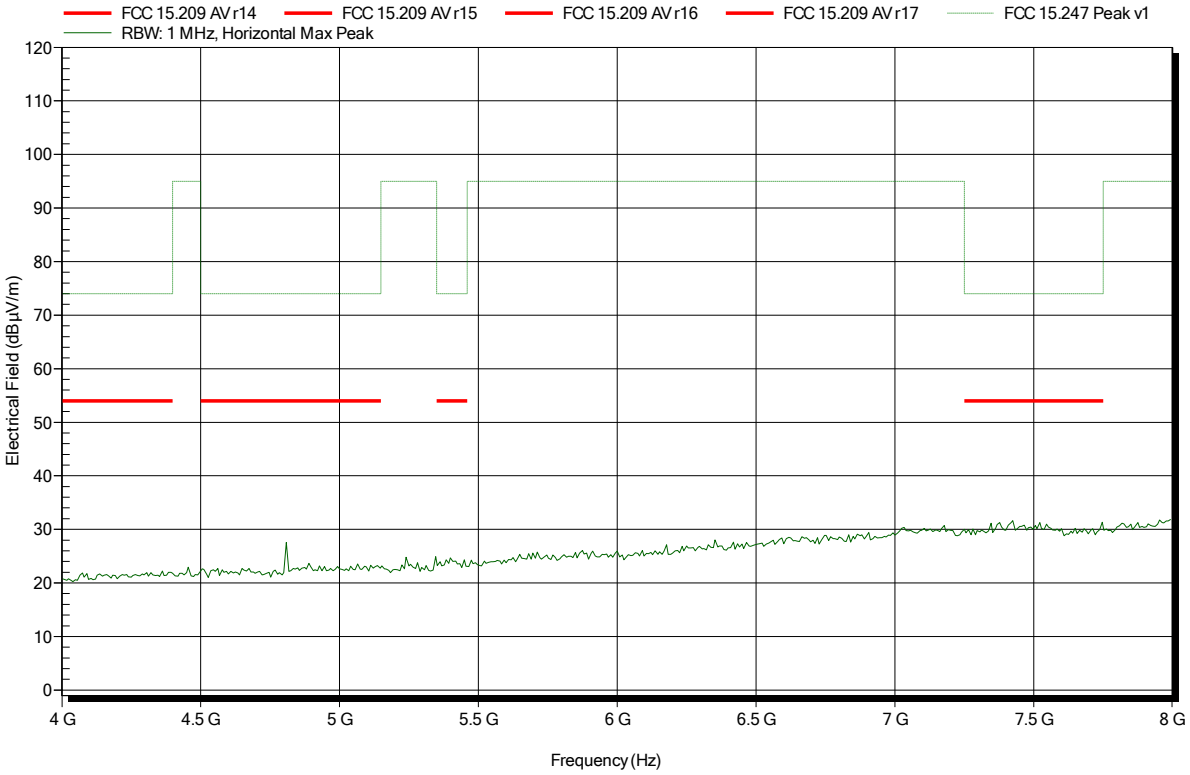

Spurious emissions according to FCC 15.247

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Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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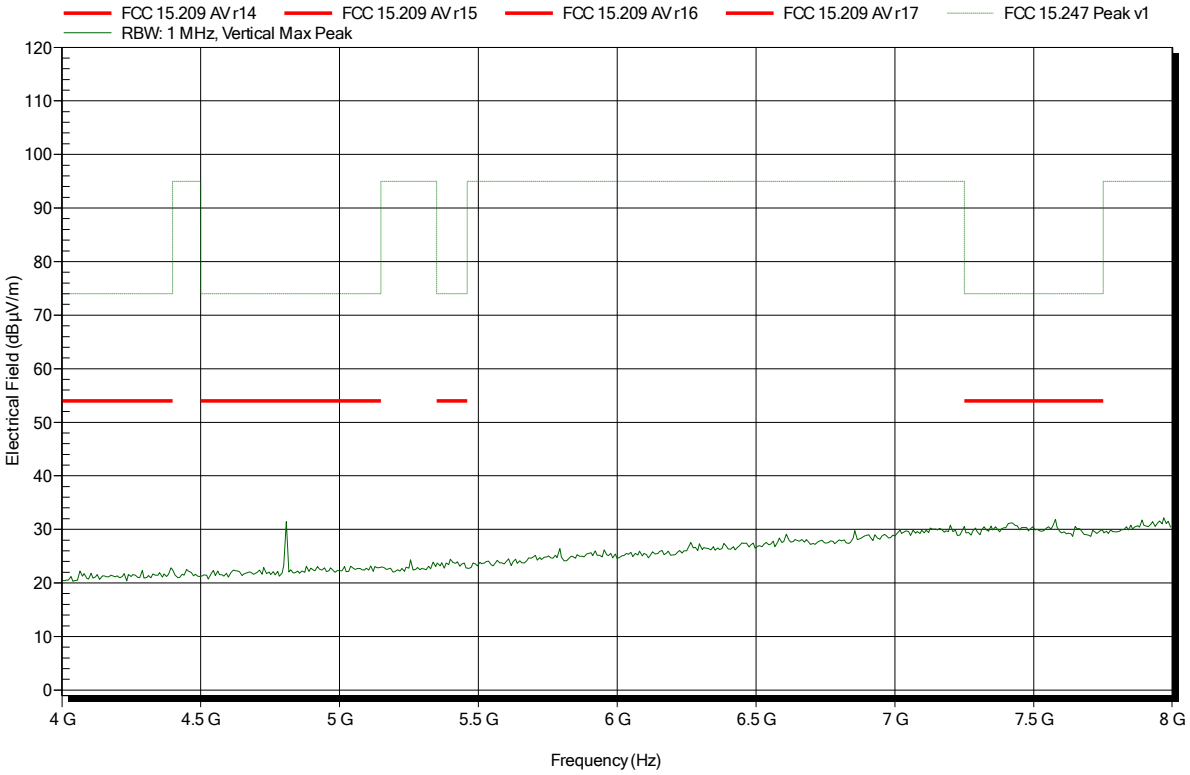

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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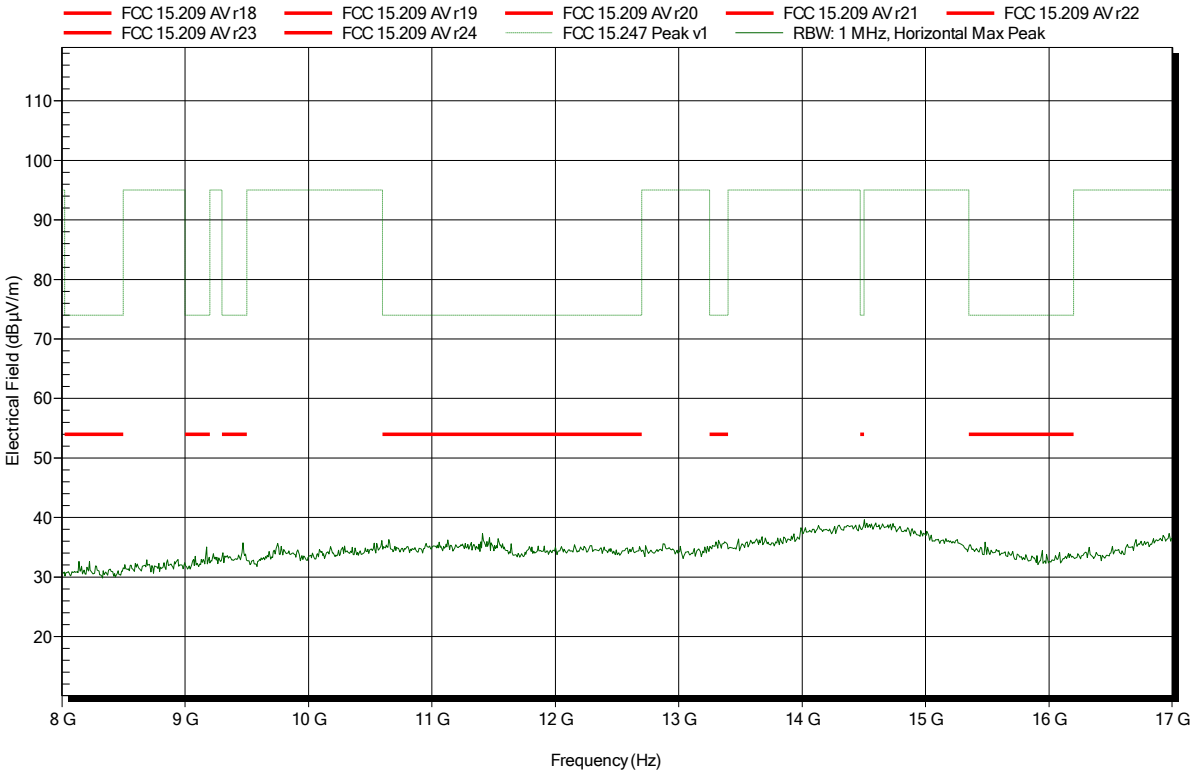

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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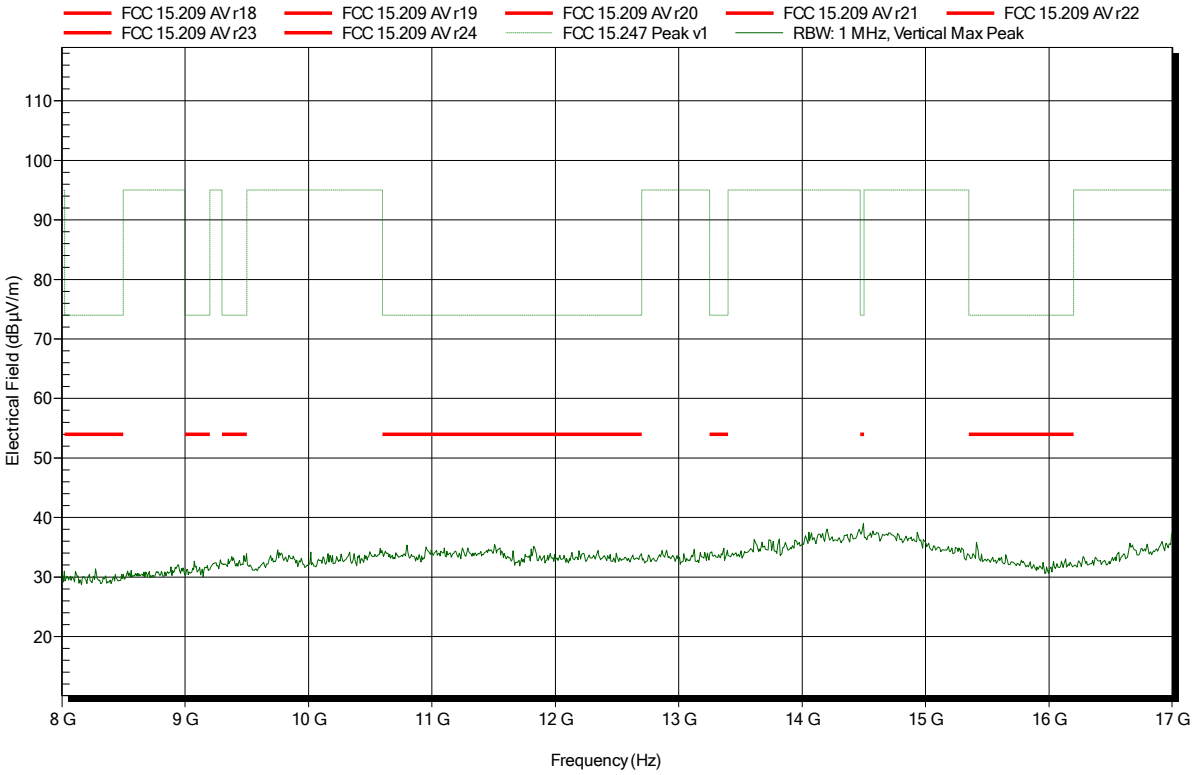

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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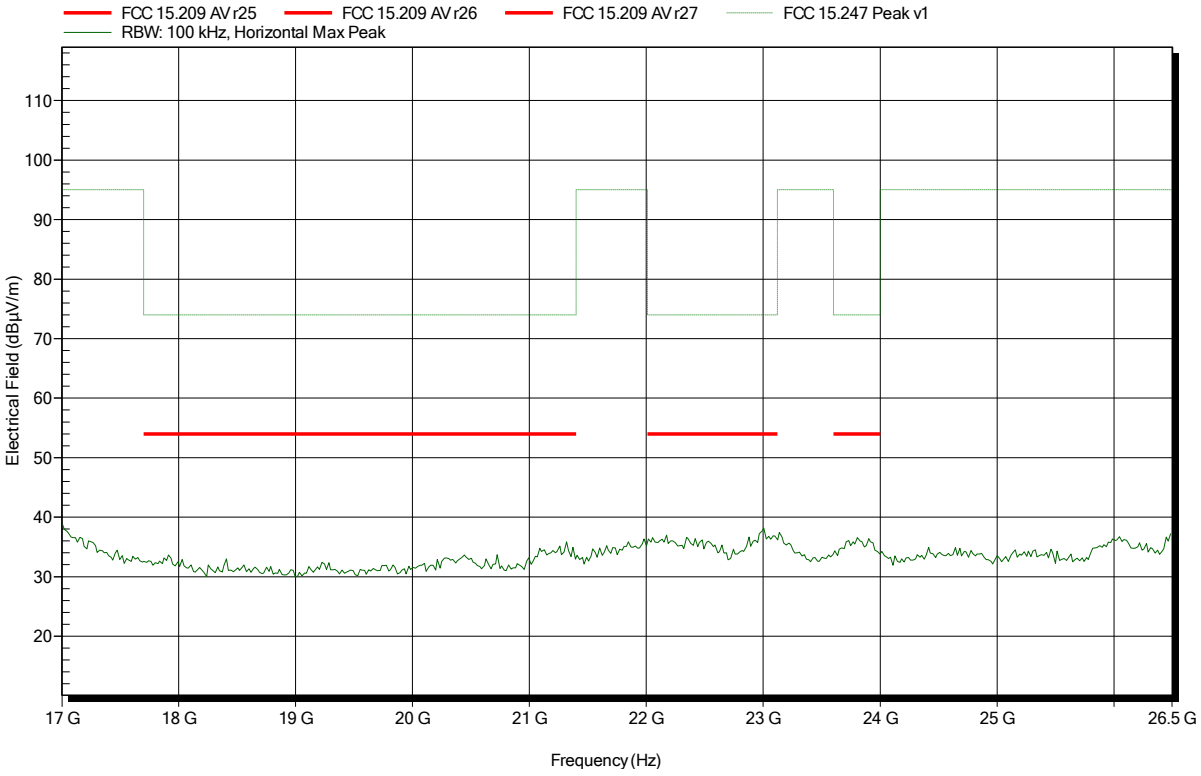

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2405 MHz
Test Date:	2017-07-06
Note:	

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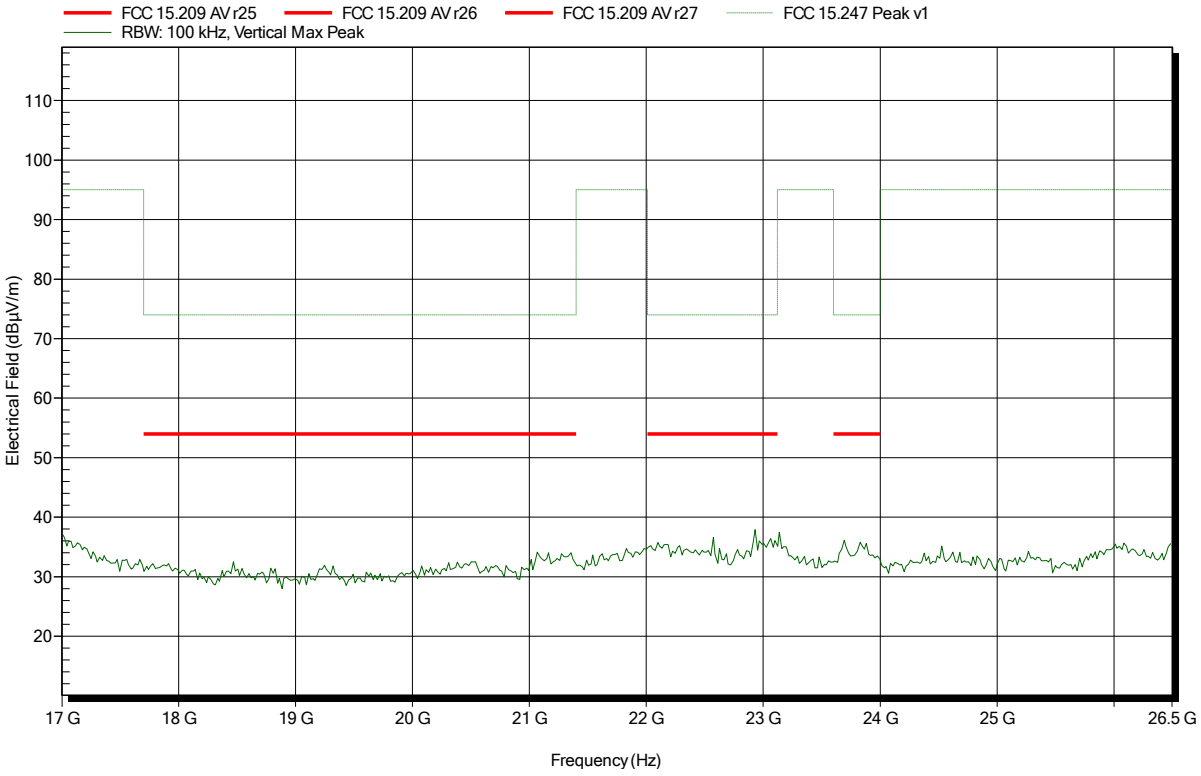

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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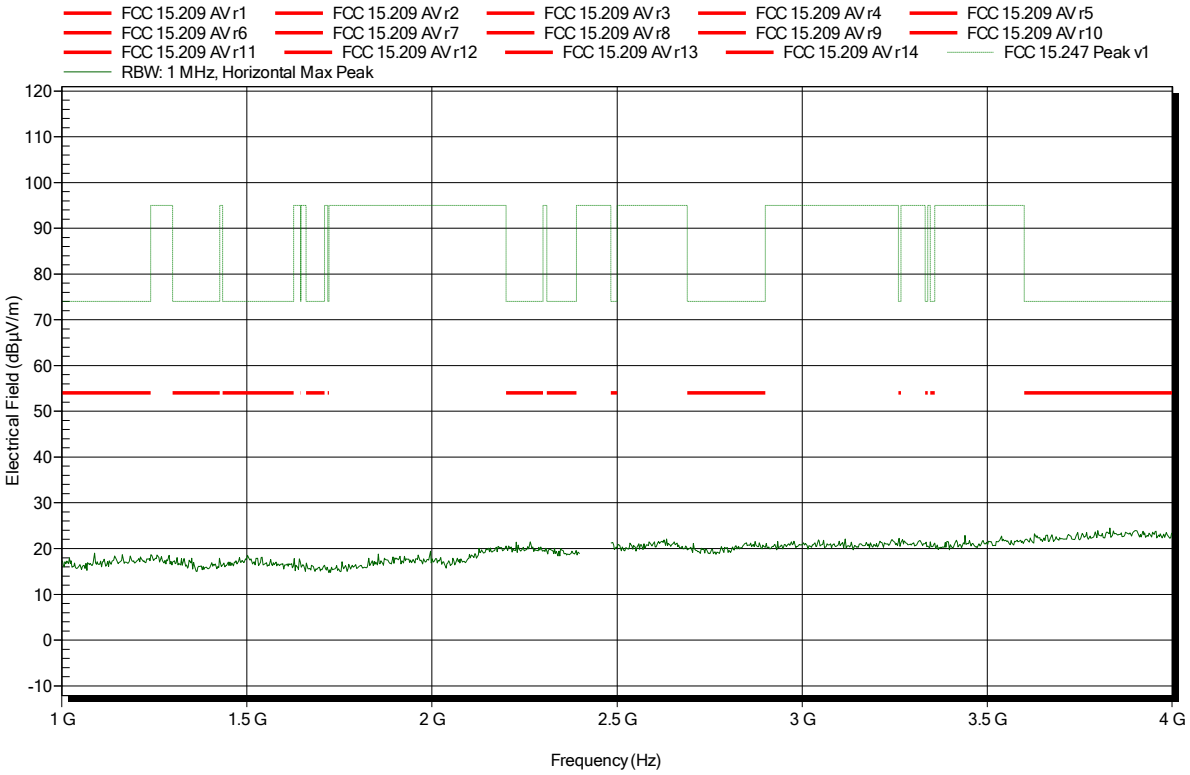

Spurious emissions according to FCC 15.247

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Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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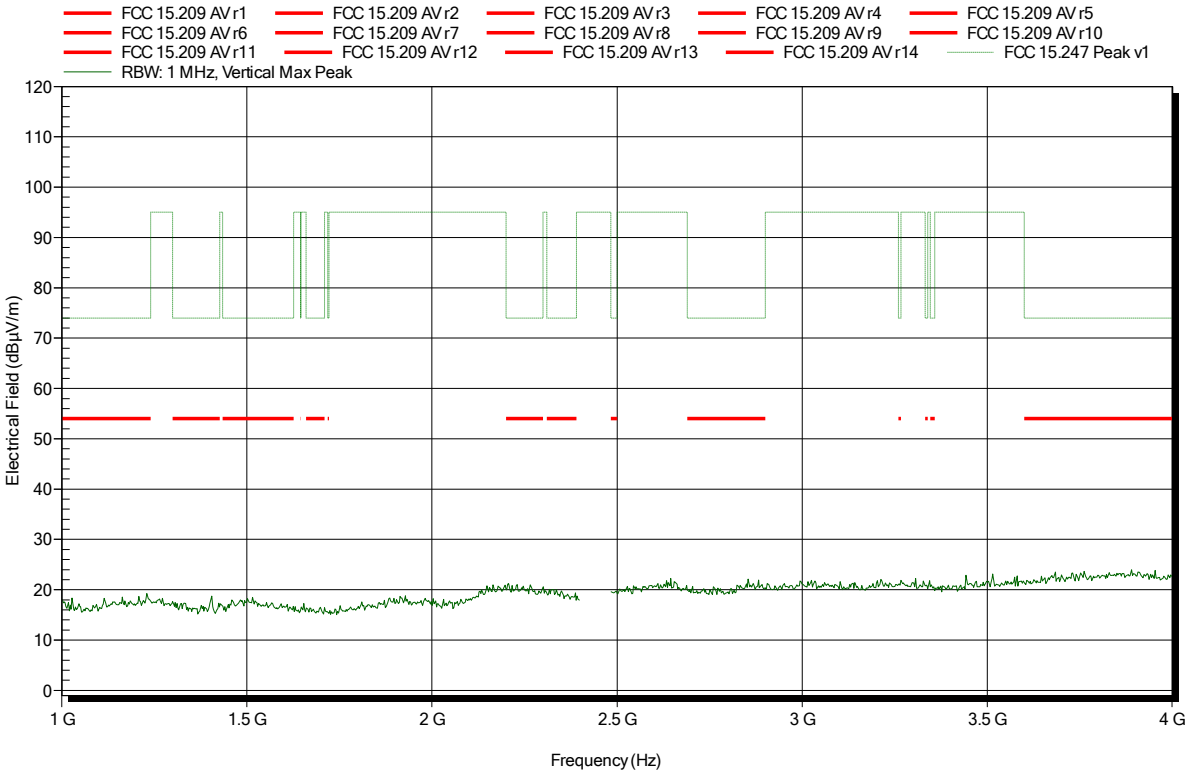

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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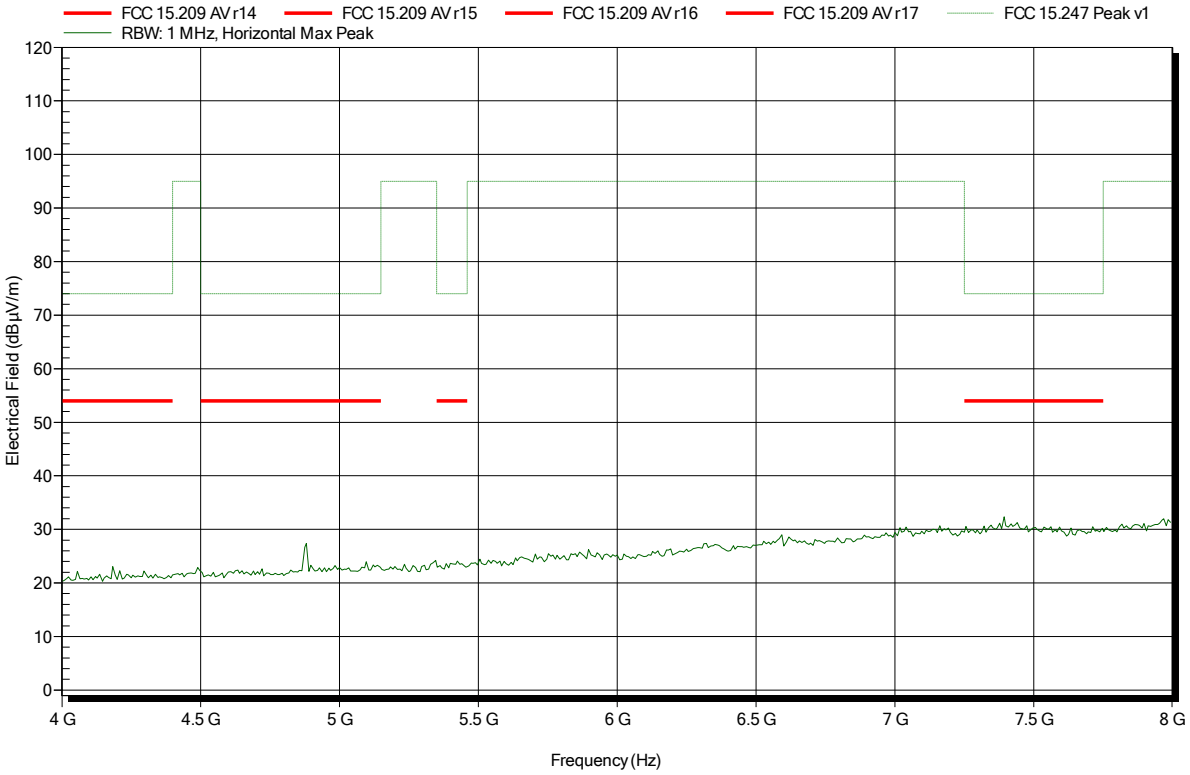

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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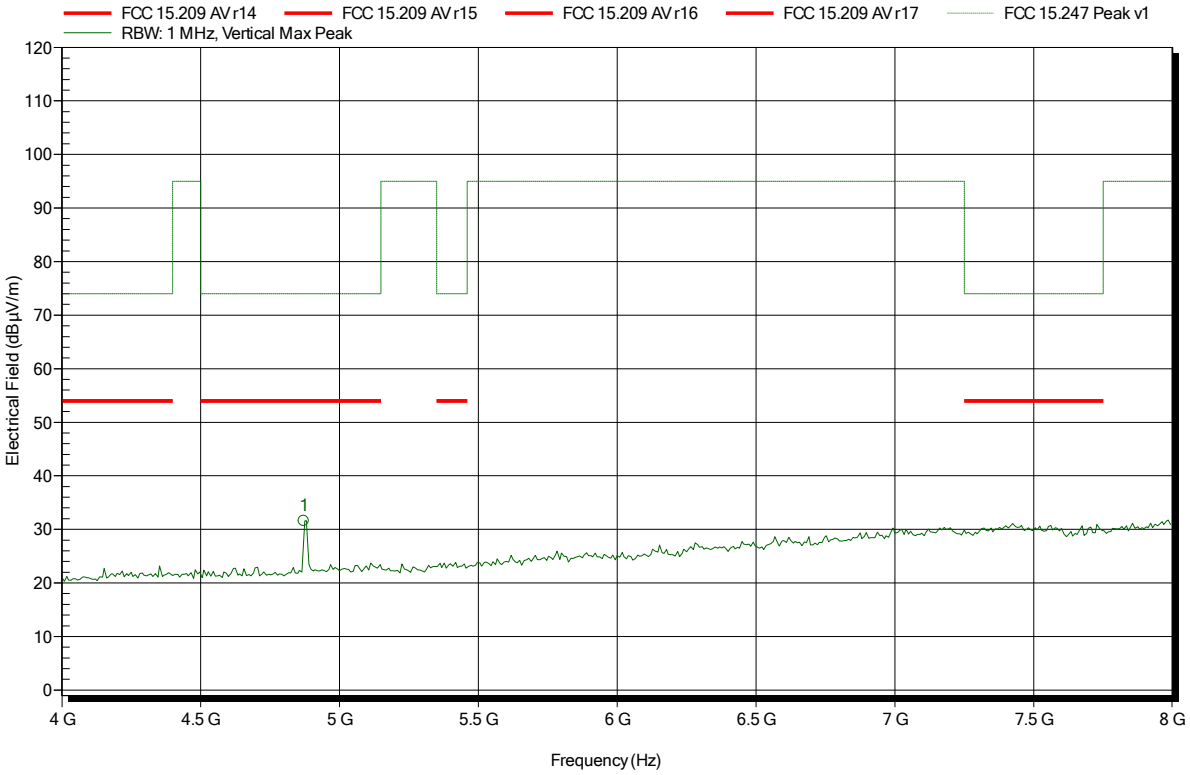

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.872 GHz	31.57 dBµV/m	74 dBµV/m	-42.43 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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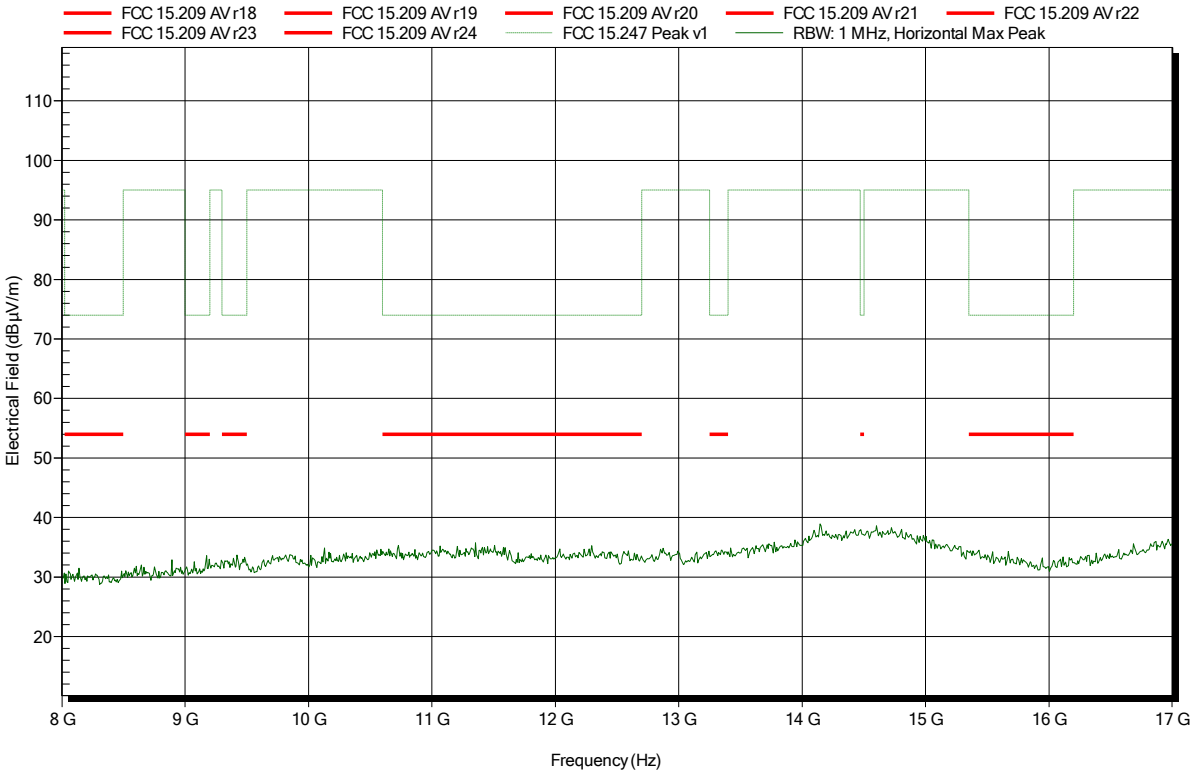

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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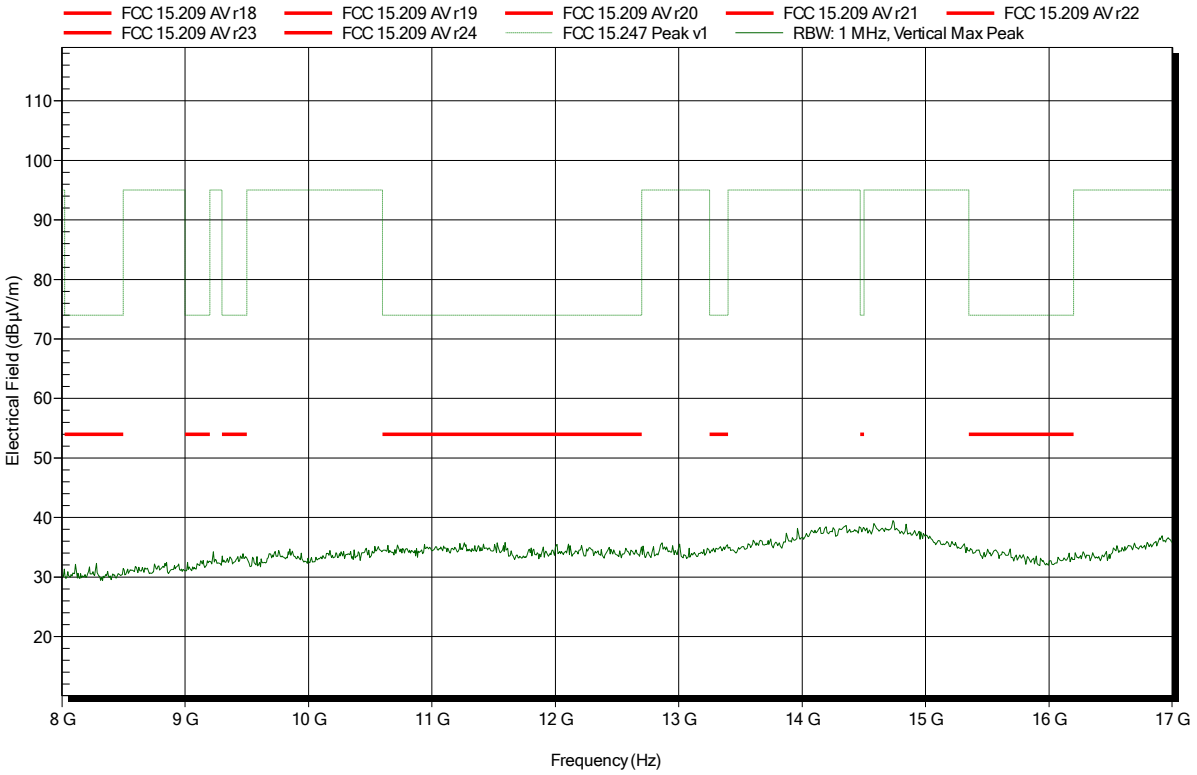

Spurious emissions according to FCC 15.247

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Antenna:	Amplifier Research AT 4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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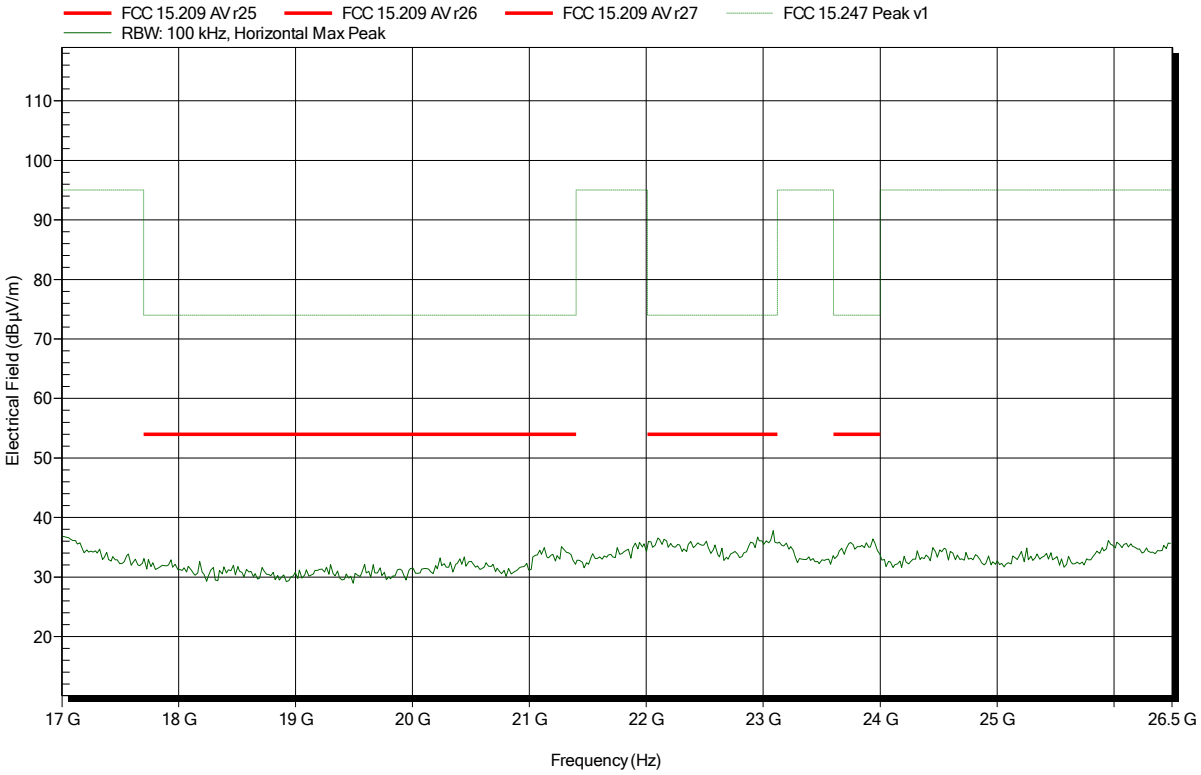

Spurious emissions according to FCC 15.247

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Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Amplifier Research AT 4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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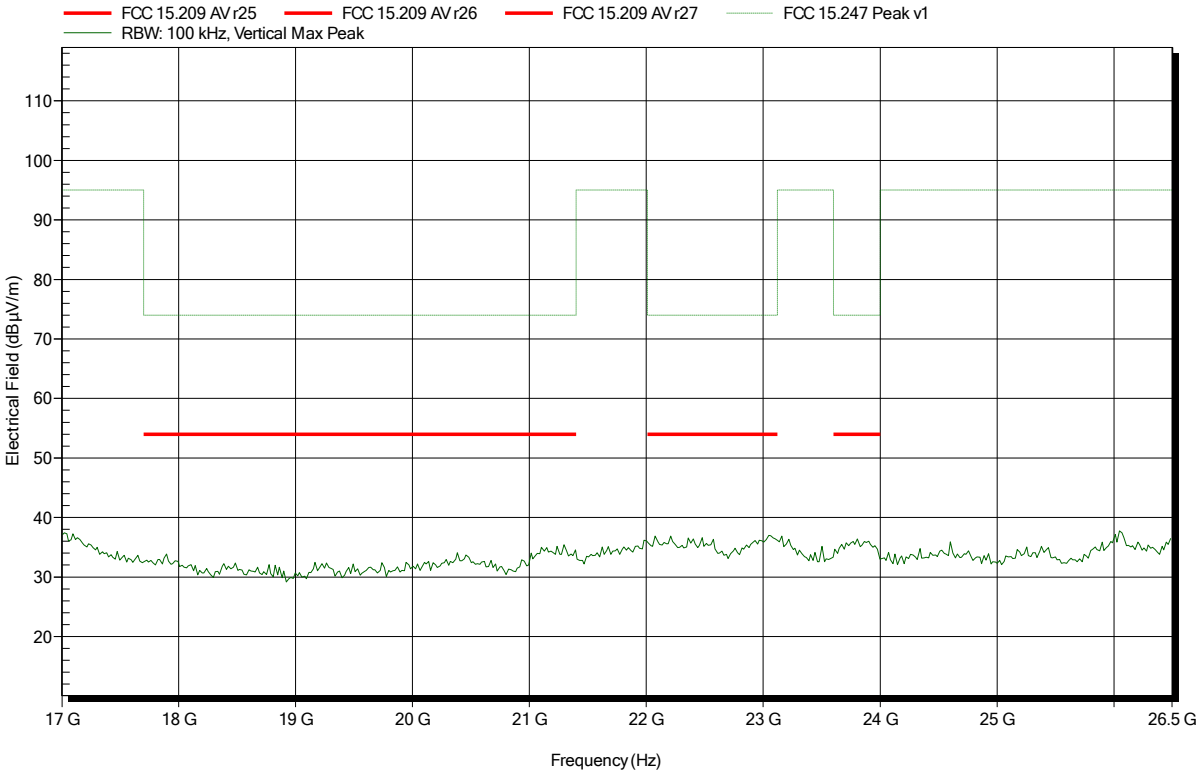

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Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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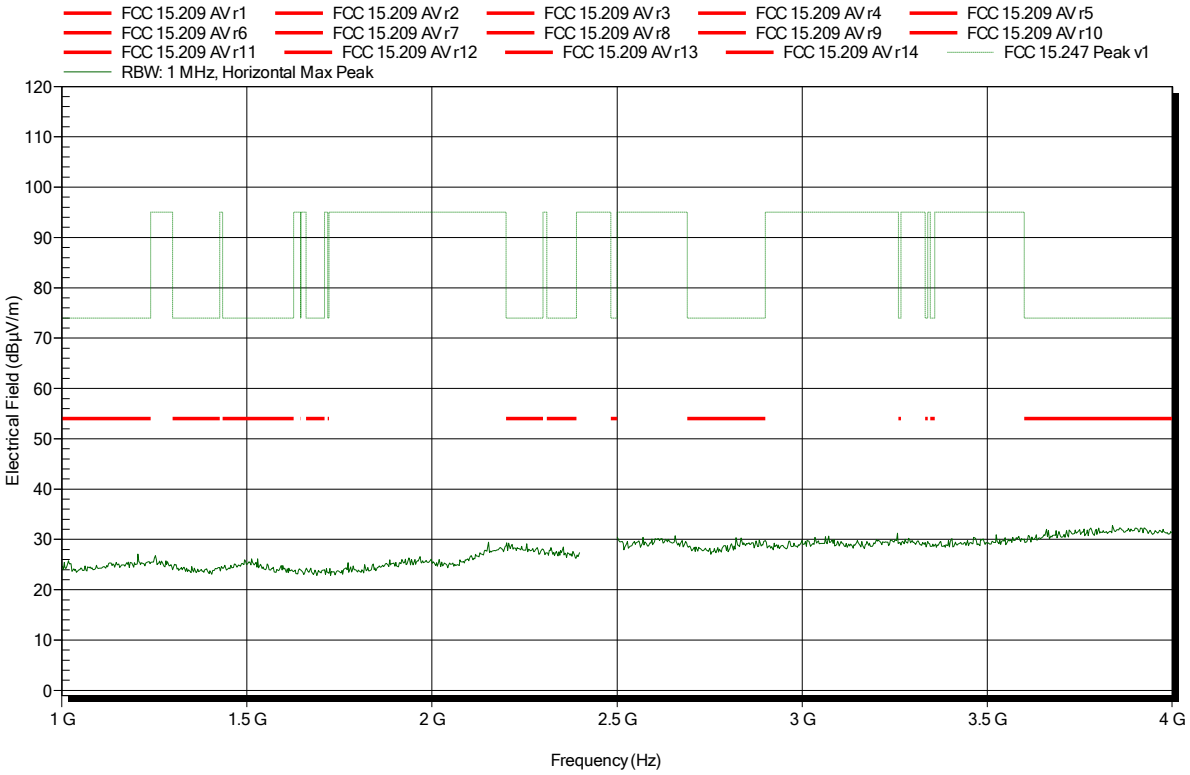

Spurious emissions according to FCC 15.247

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Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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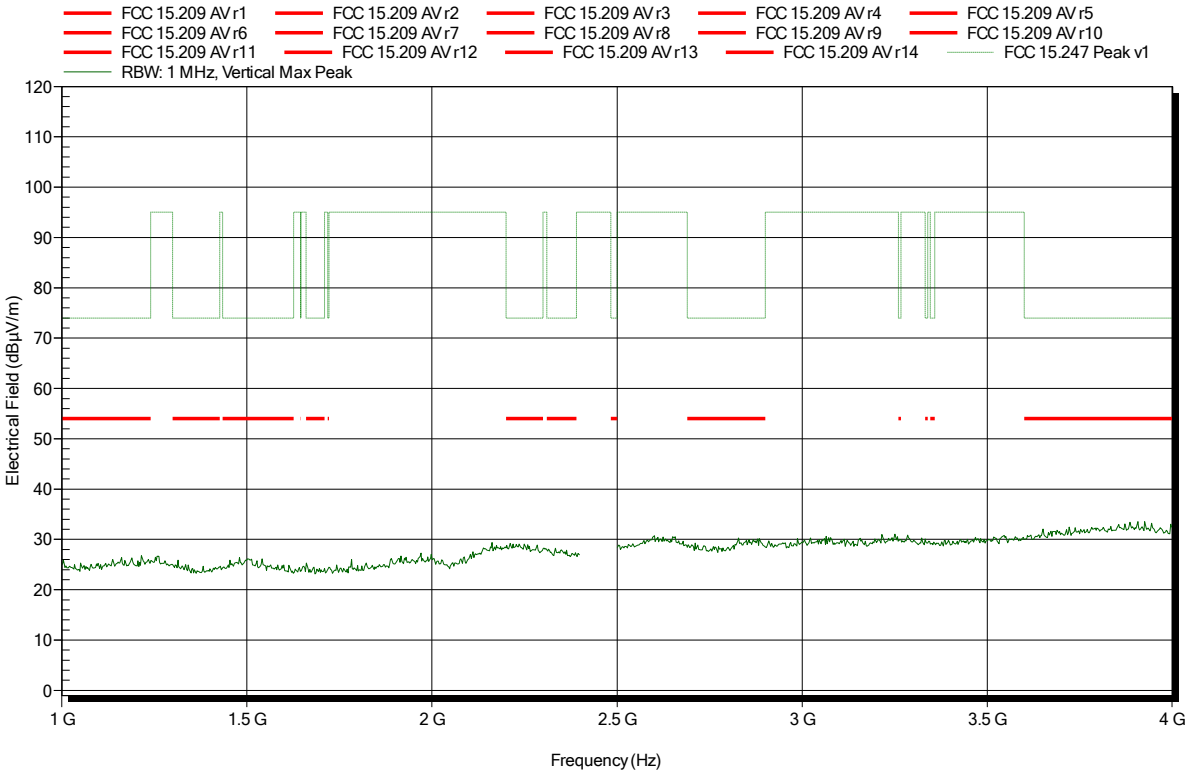

Spurious emissions according to FCC 15.247

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Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	upper bandedge

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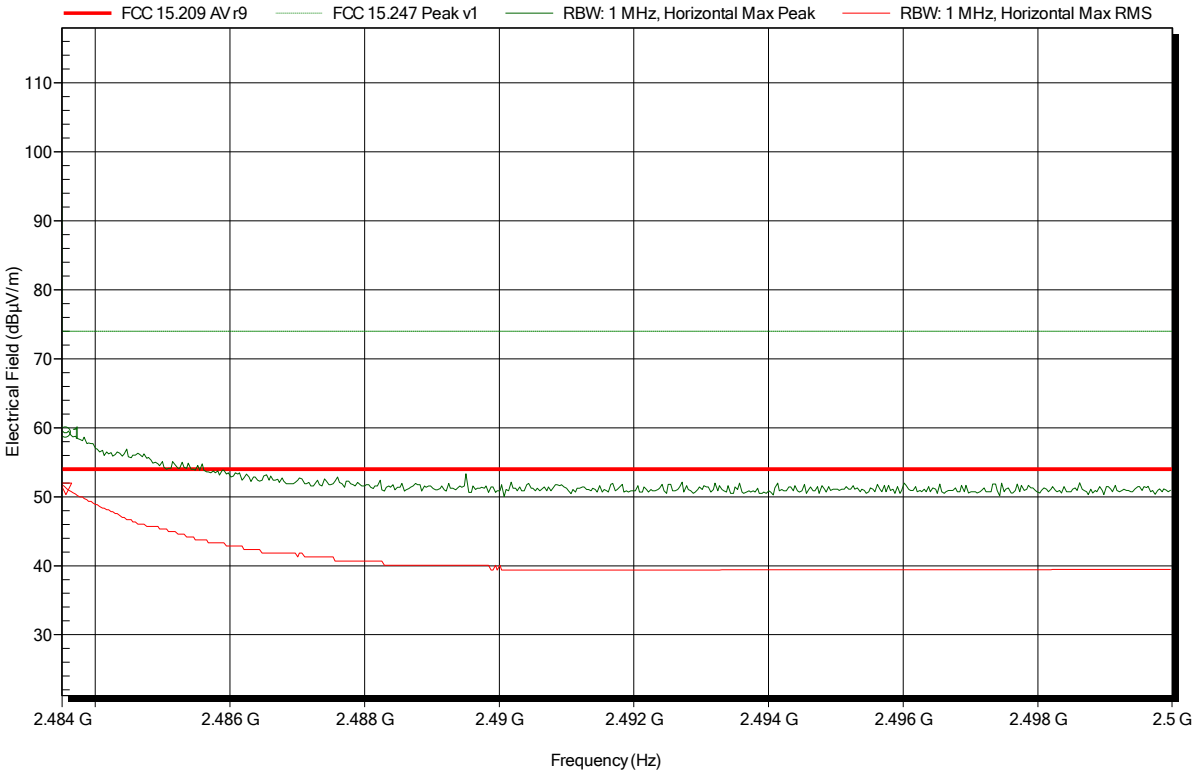

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4836 GHz	59.3 dBµV/m	74 dBµV/m	-14.7 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4836 GHz	51.16 dBµV/m	54 dBµV/m	-2.84 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
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Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	upper bandedge

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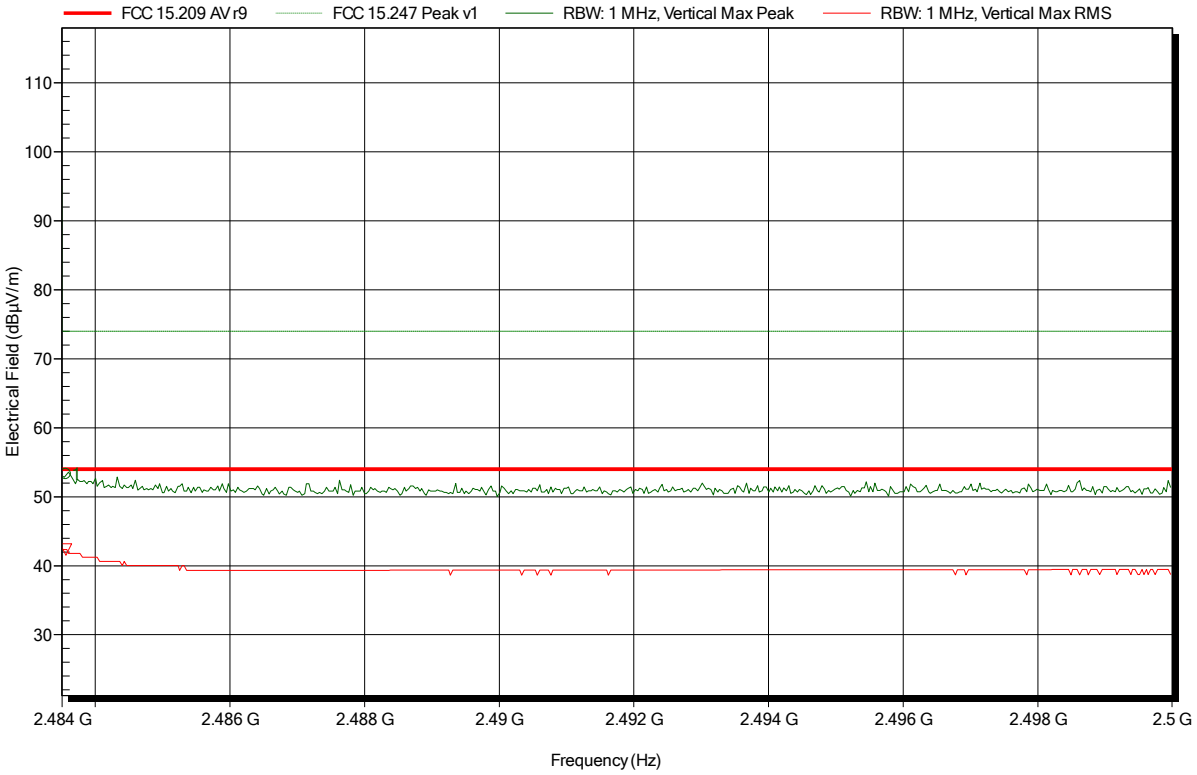

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4836 GHz	53.28 dBµV/m	74 dBµV/m	-20.72 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4836 GHz	42.33 dBµV/m	54 dBµV/m	-11.67 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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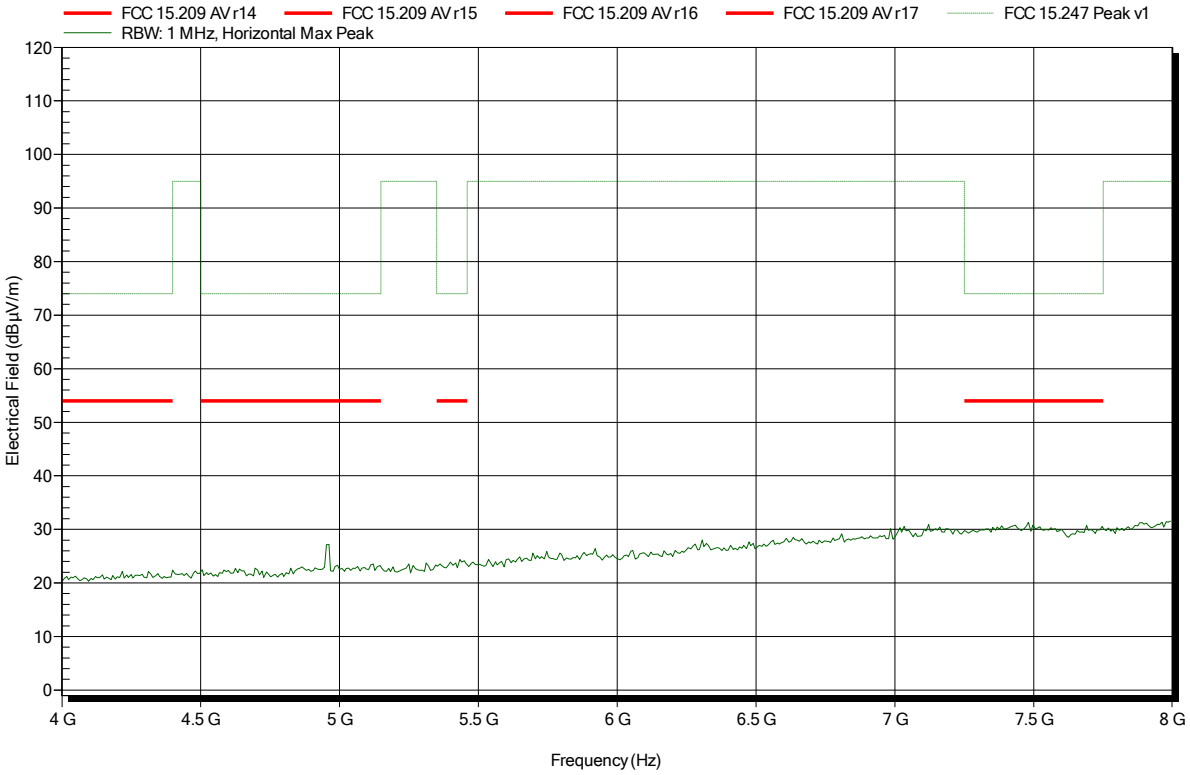

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Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
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Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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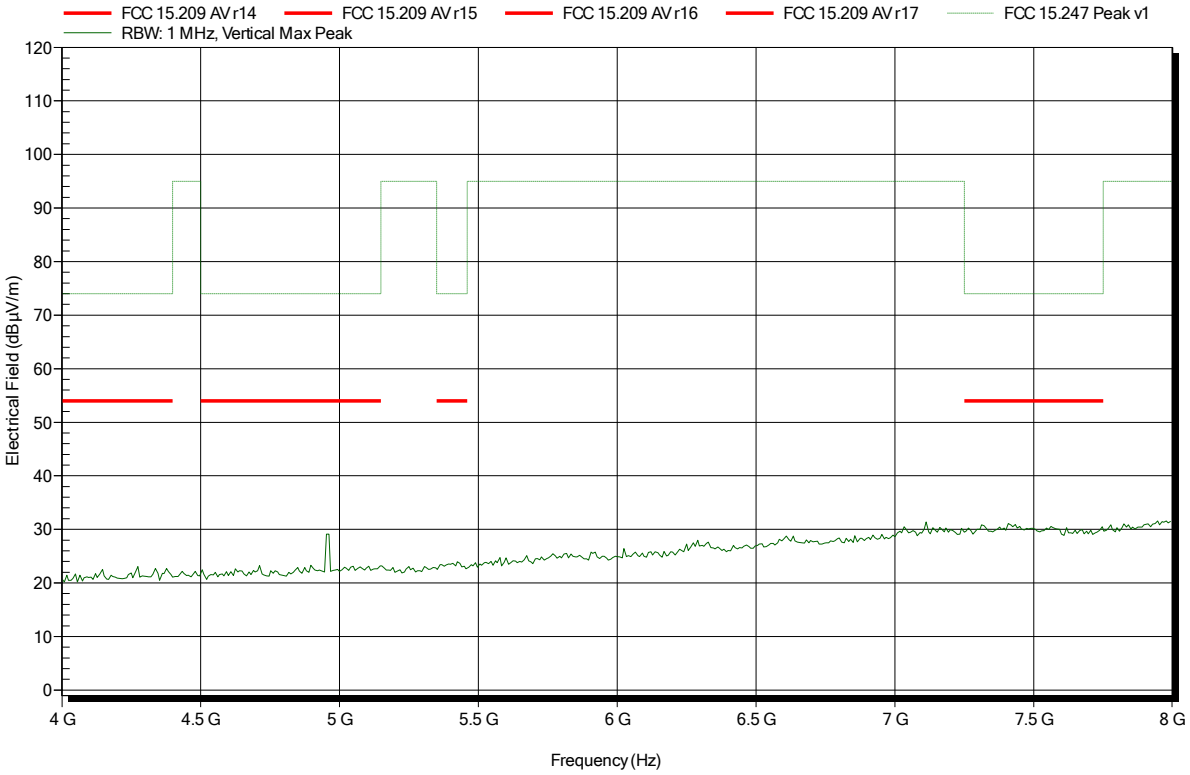

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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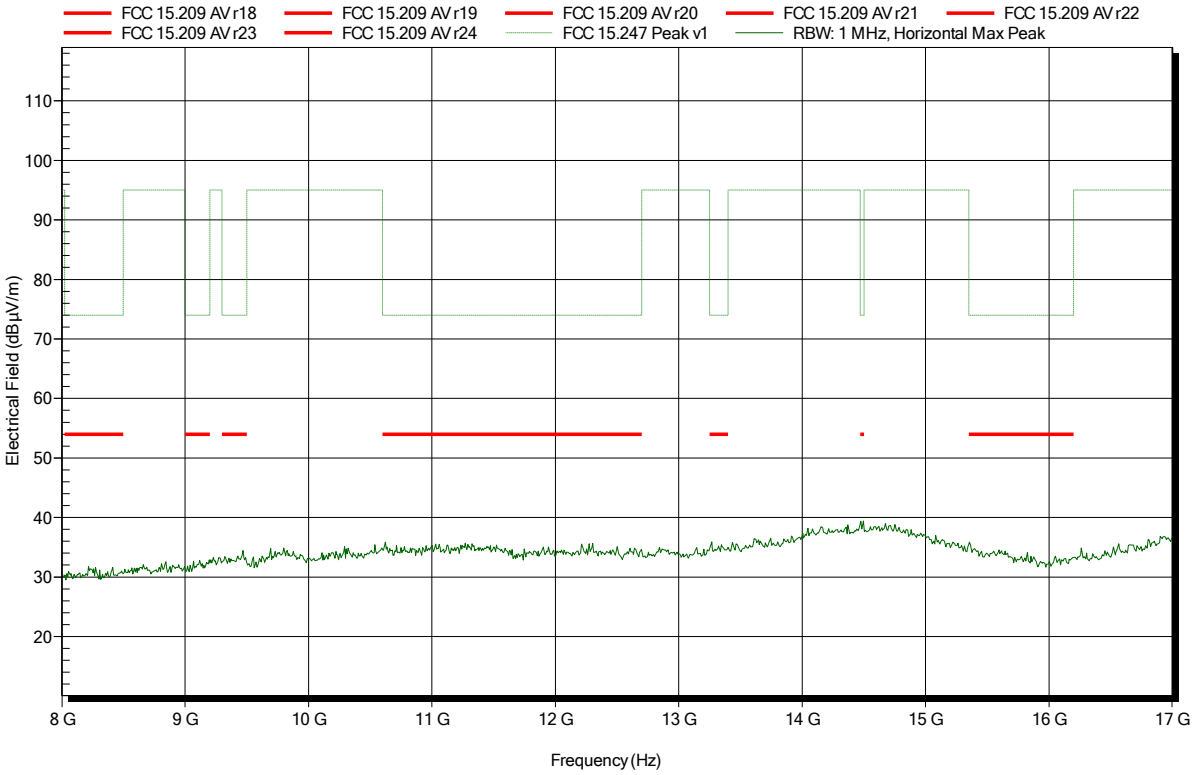

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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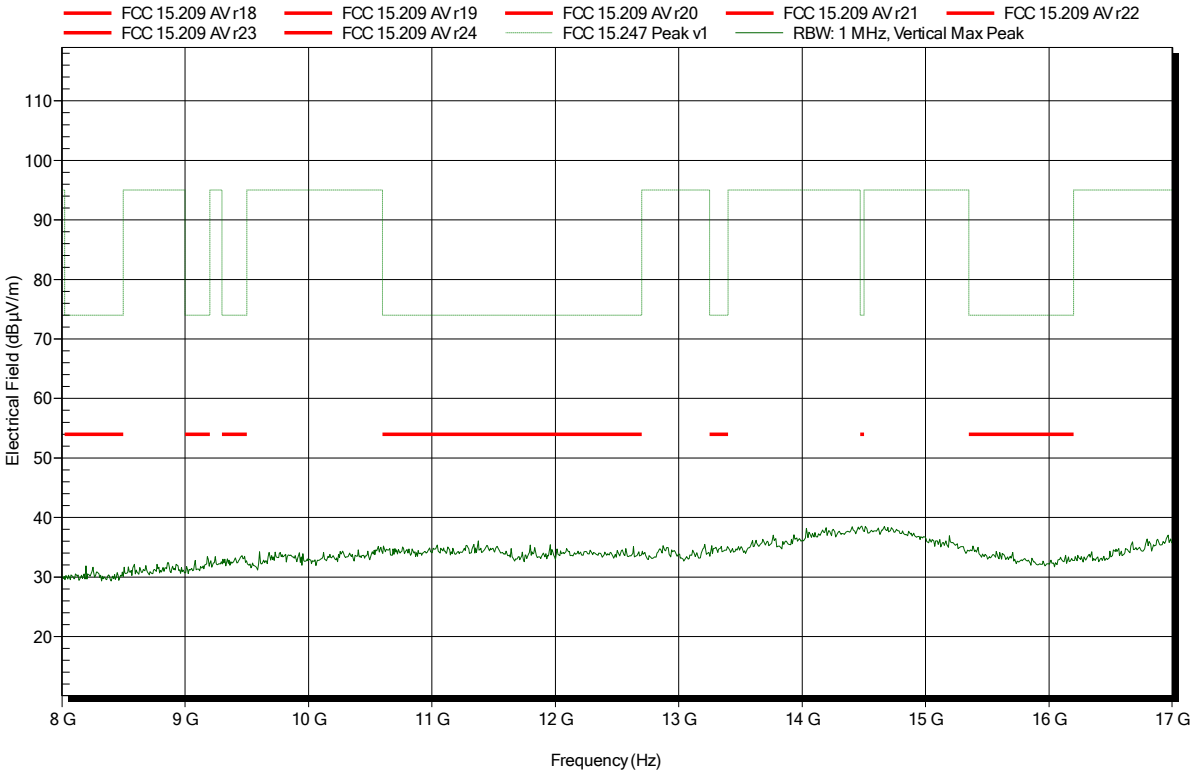

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Amplifier Research AT 4560, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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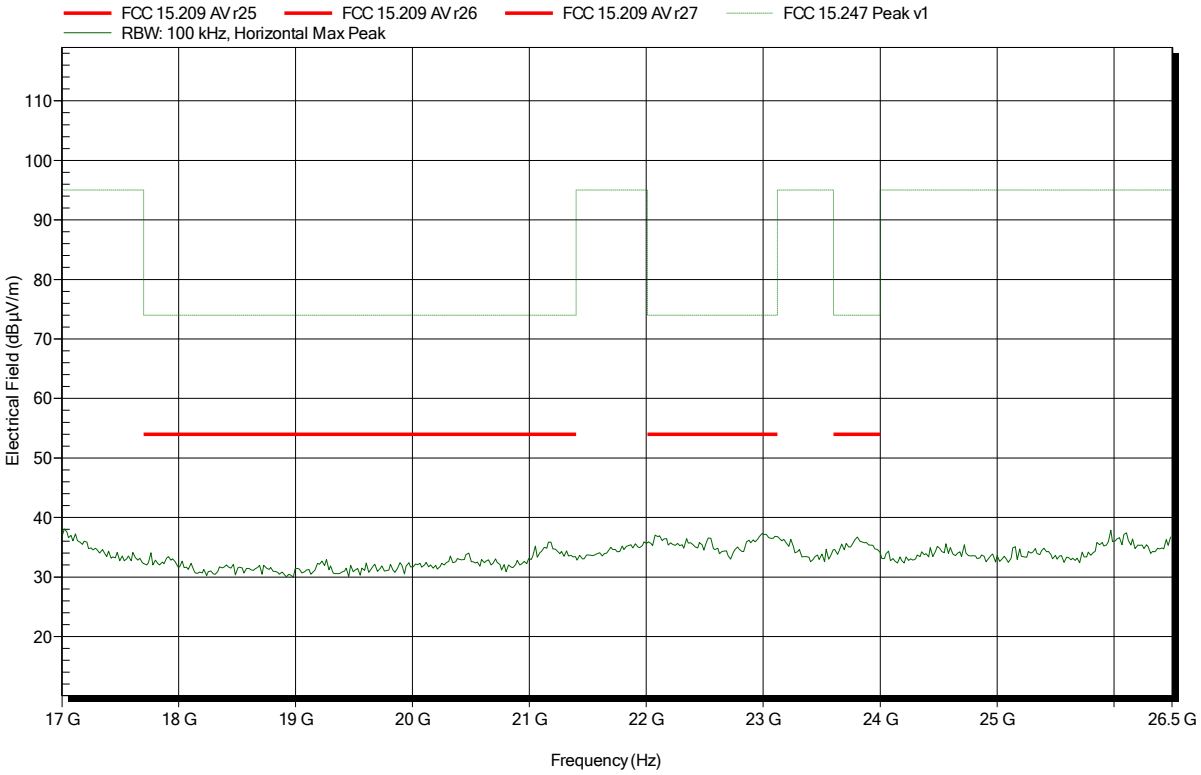

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Amplifier Research AT 4560, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; IEEE 802.15.4; 2480 MHz
Test Date:	2017-07-06
Note:	

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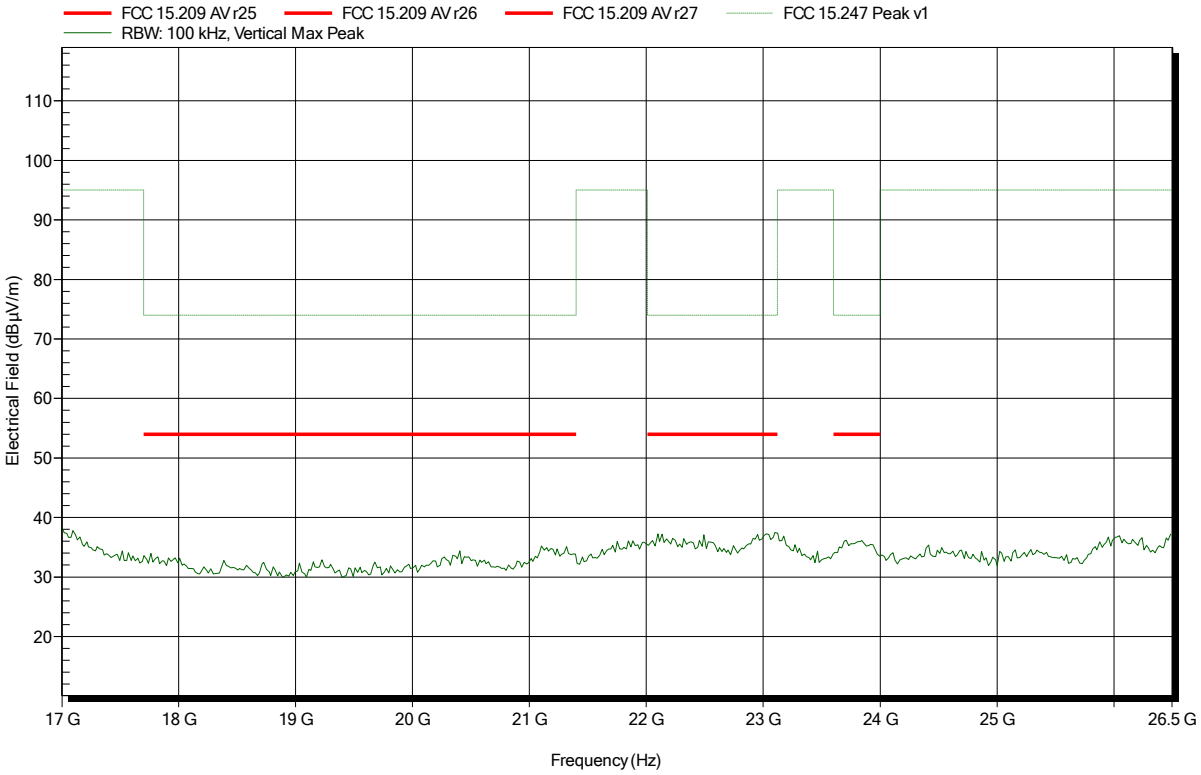

ANNEX B Receiver sprurious emissions

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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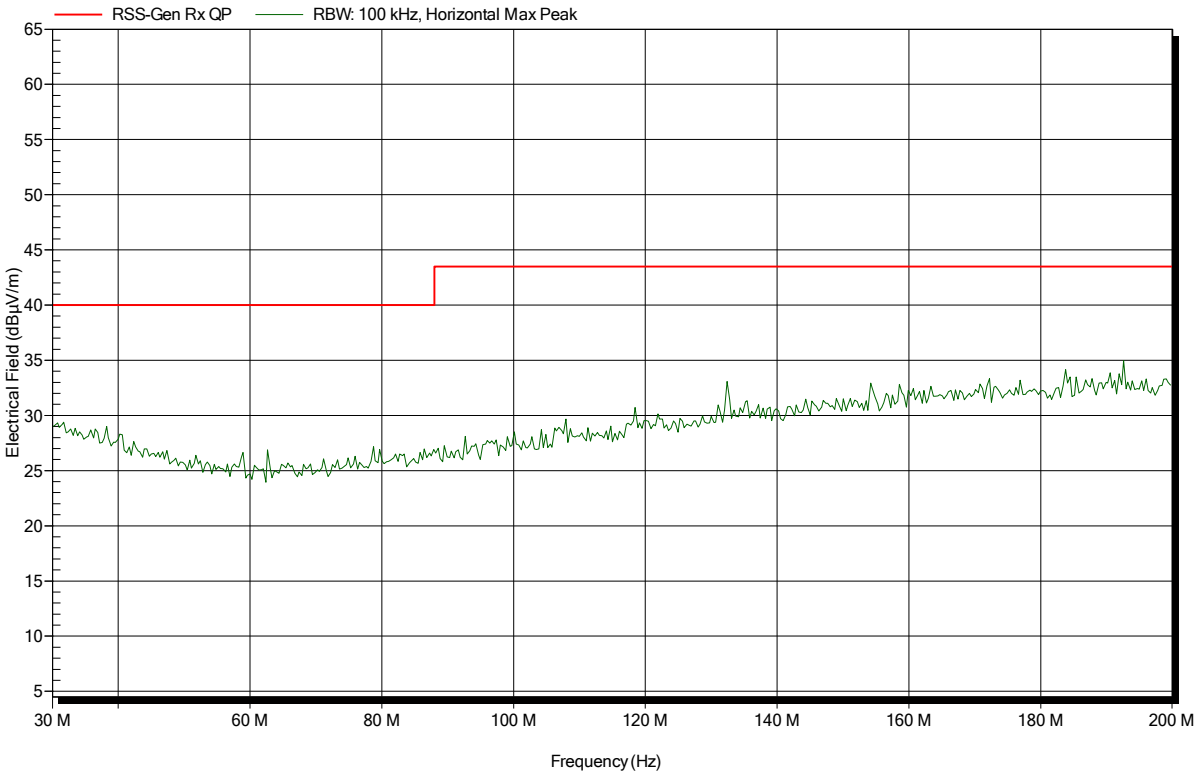

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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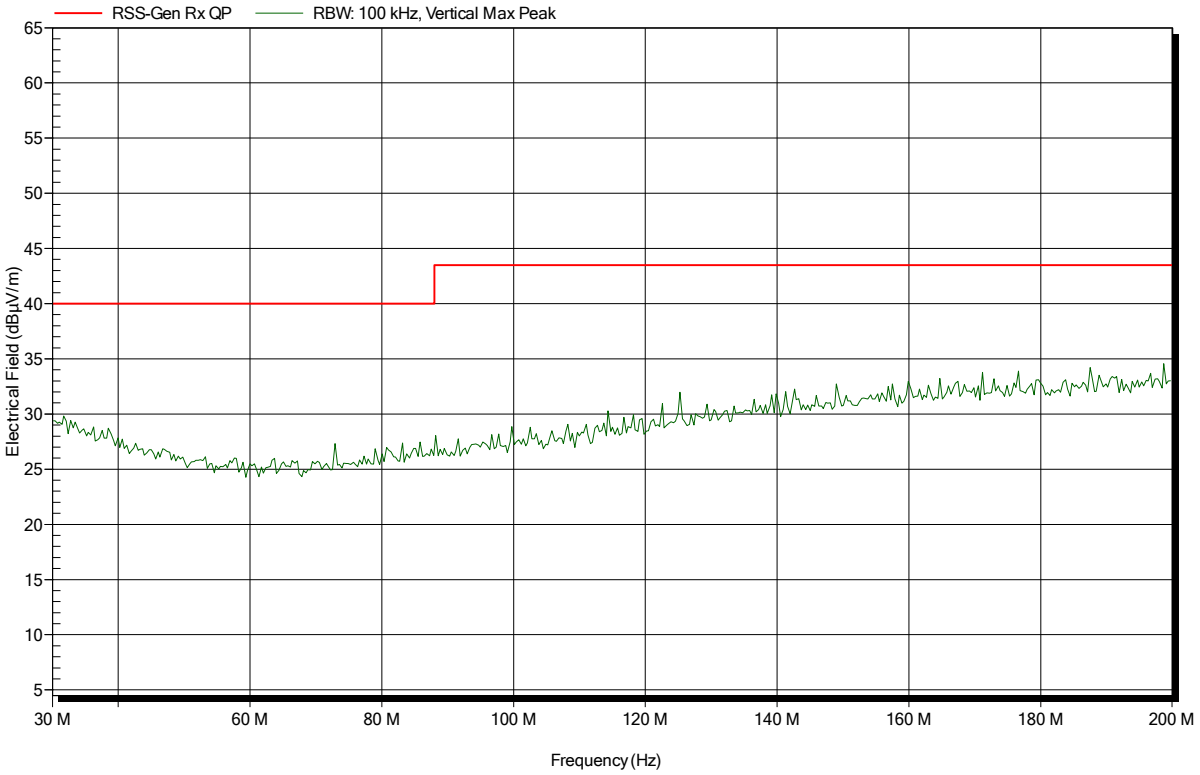

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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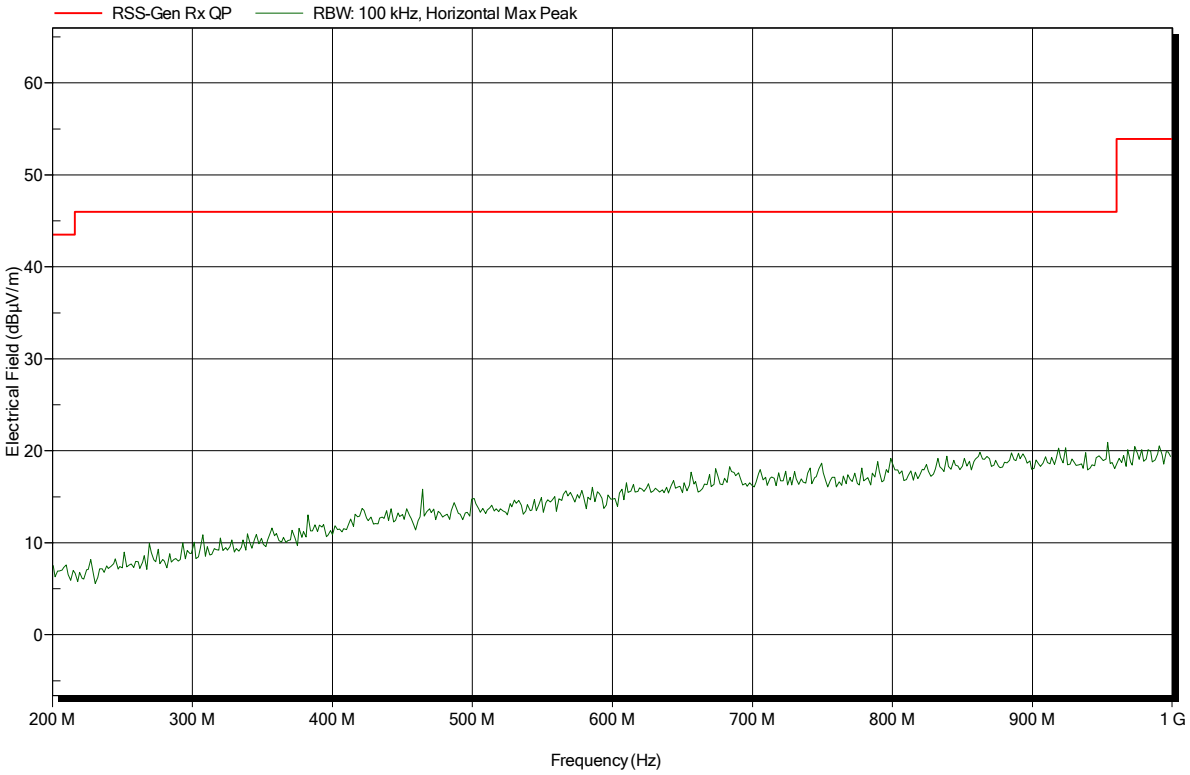

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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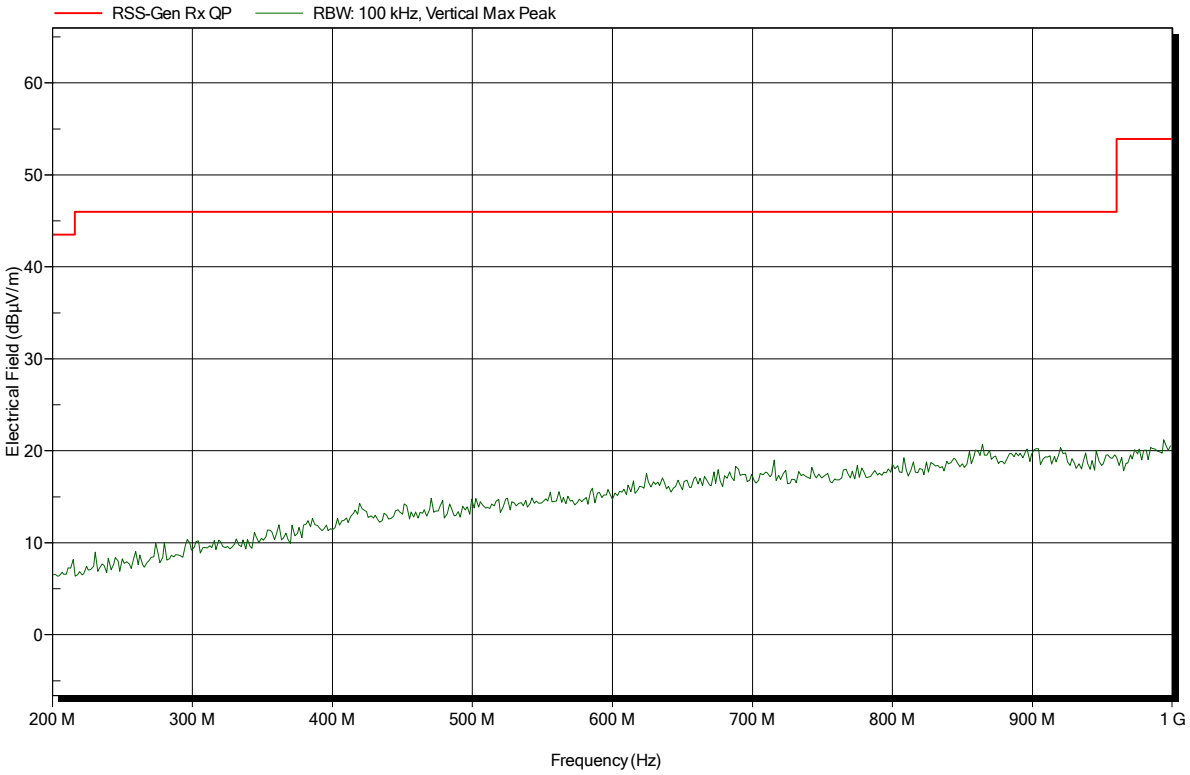

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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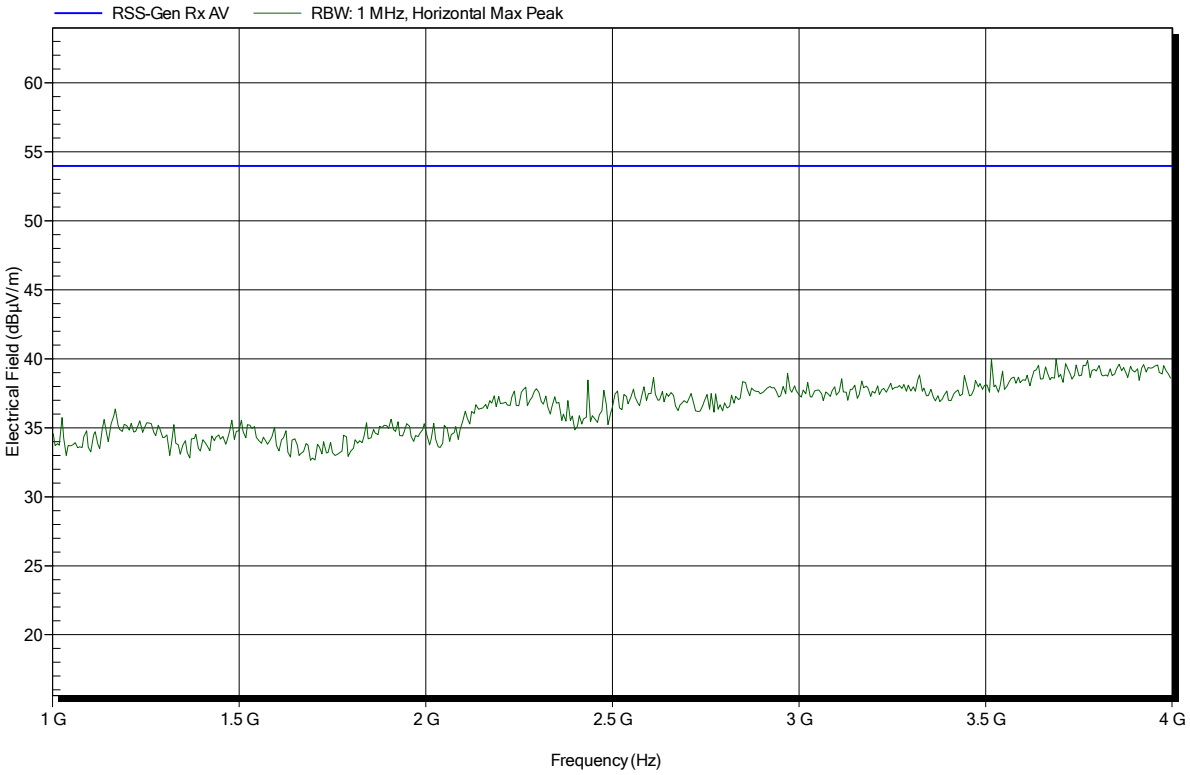

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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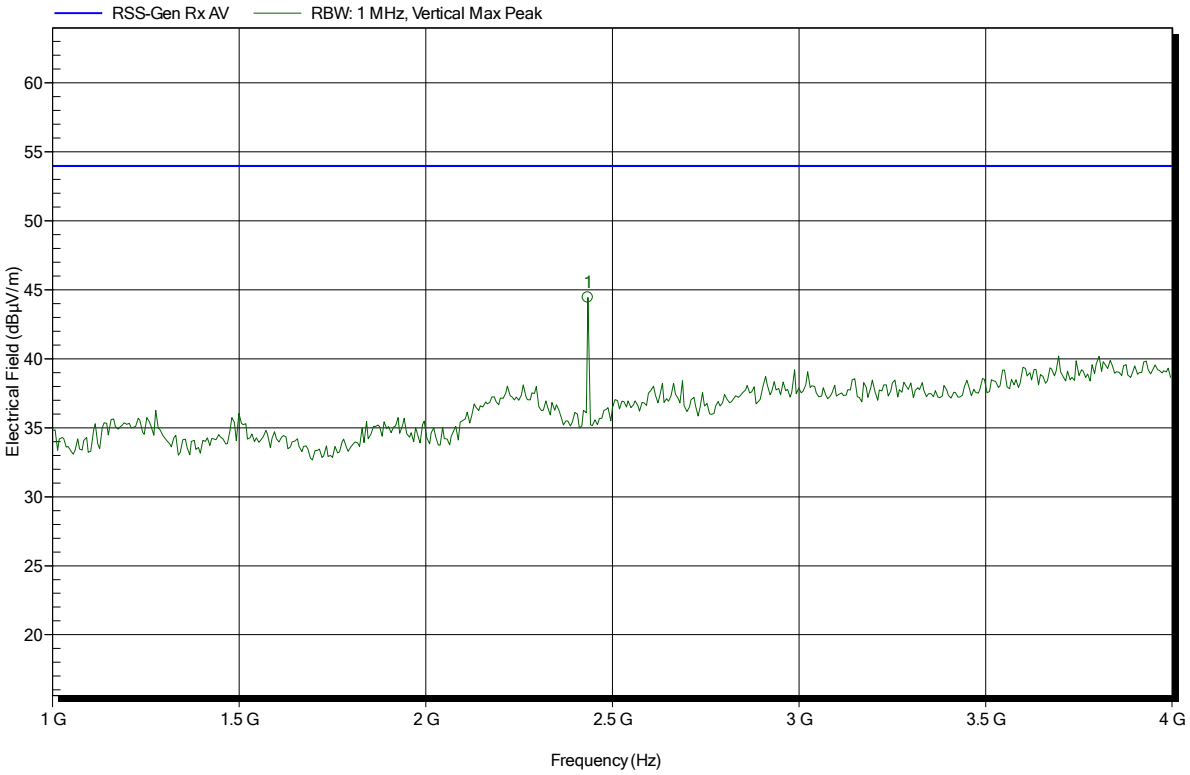

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.434 GHz	44.44 dBµV/m	53.98 dBµV/m	-9.54 dB	Pass

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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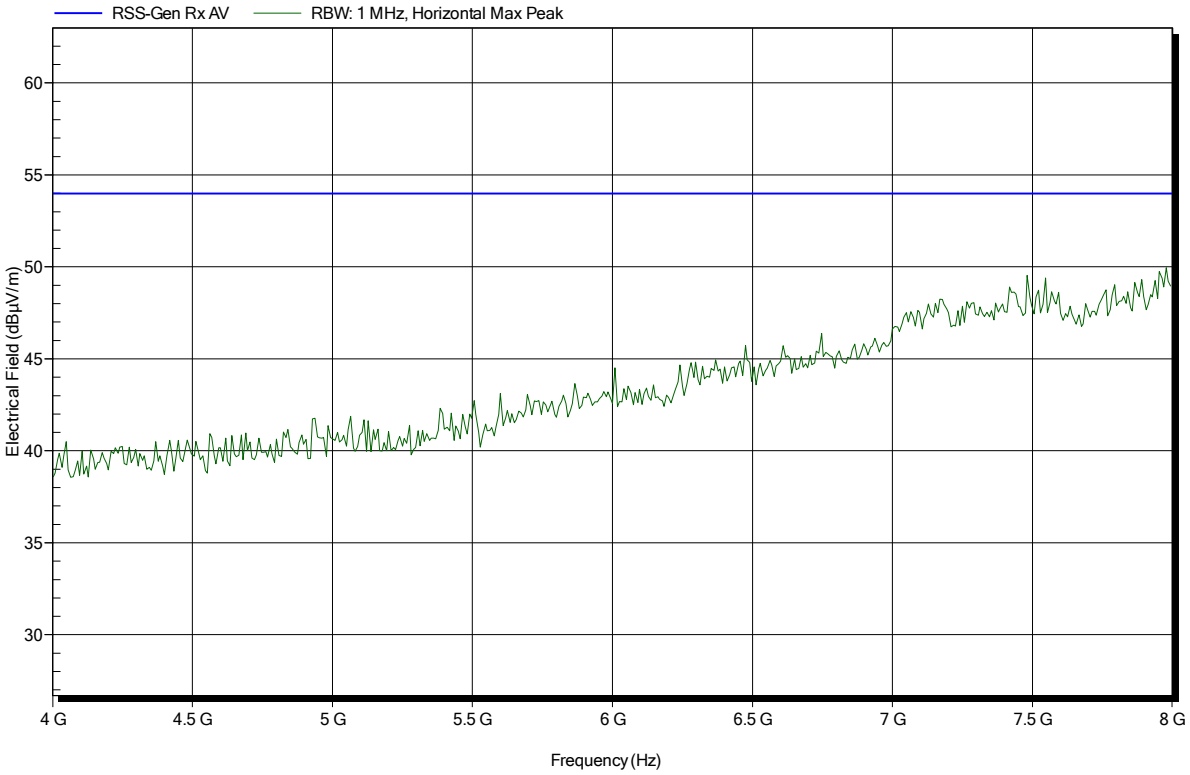

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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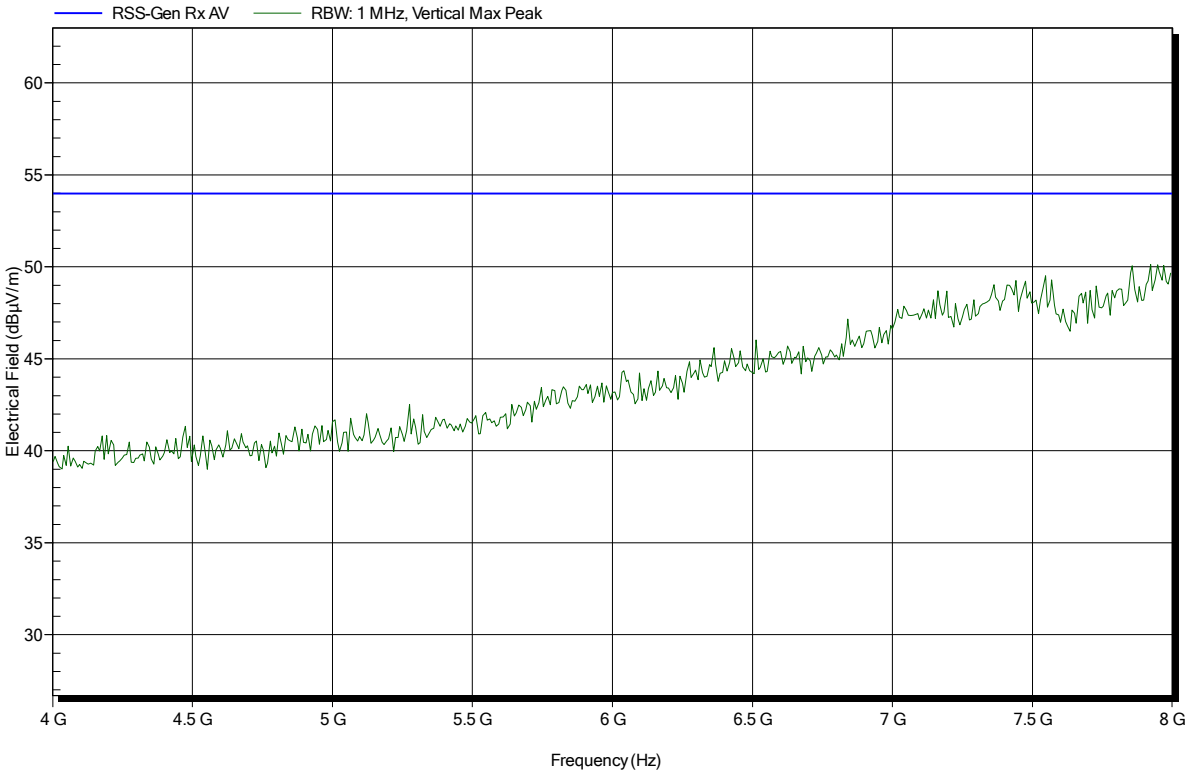

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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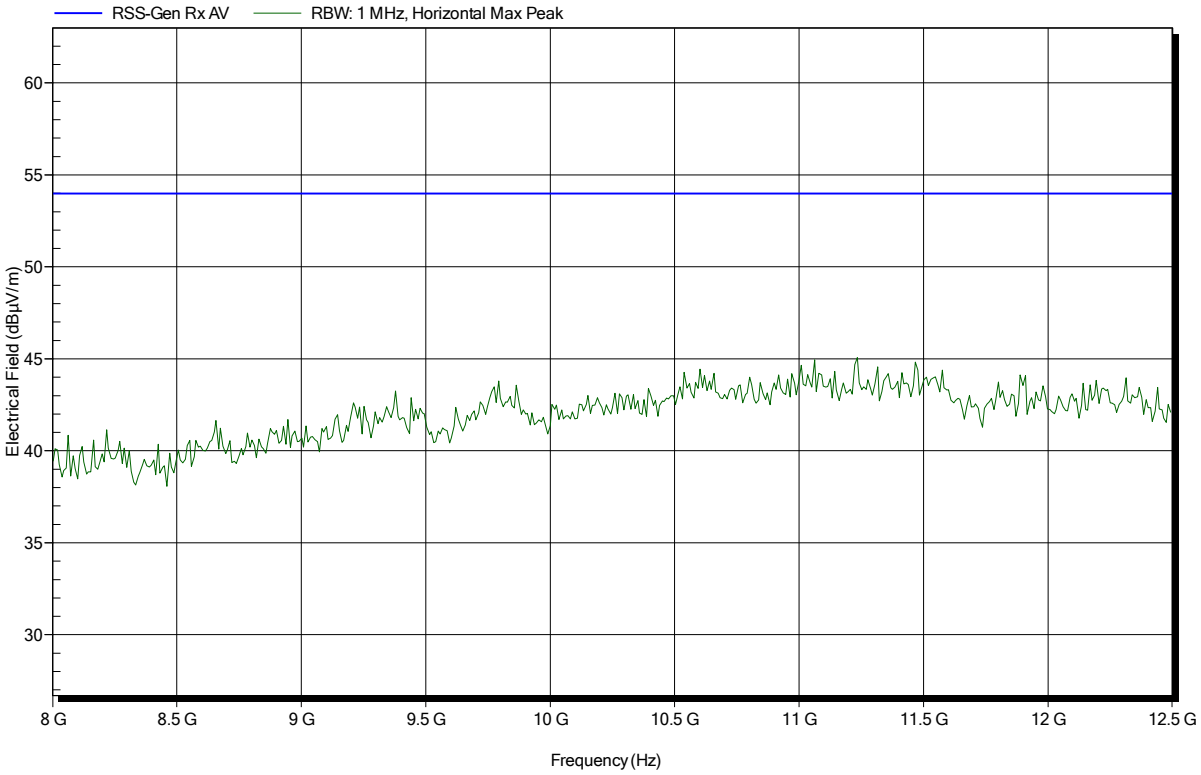

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT2: 2,4GHz IEEE 802.15.4 ZigBee module, UFL with antenna
Model:	deRFsamR21E-23S20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC Adaptor)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-01
Note:	

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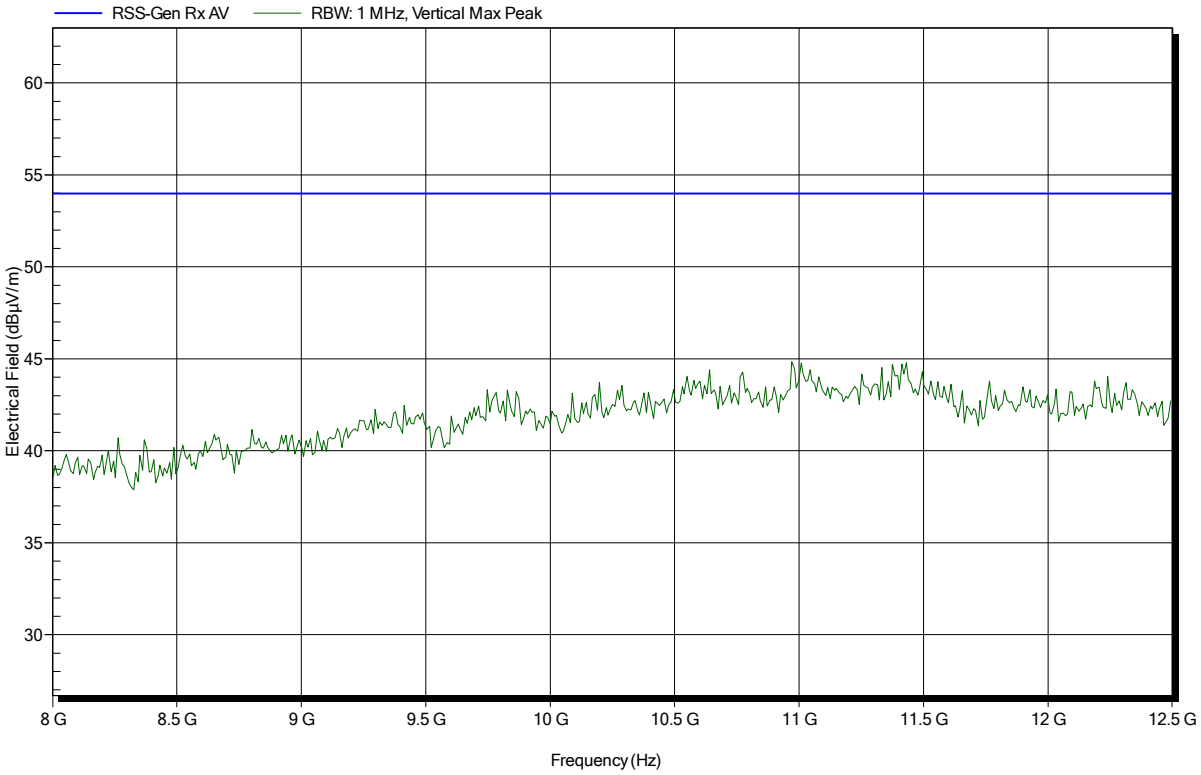

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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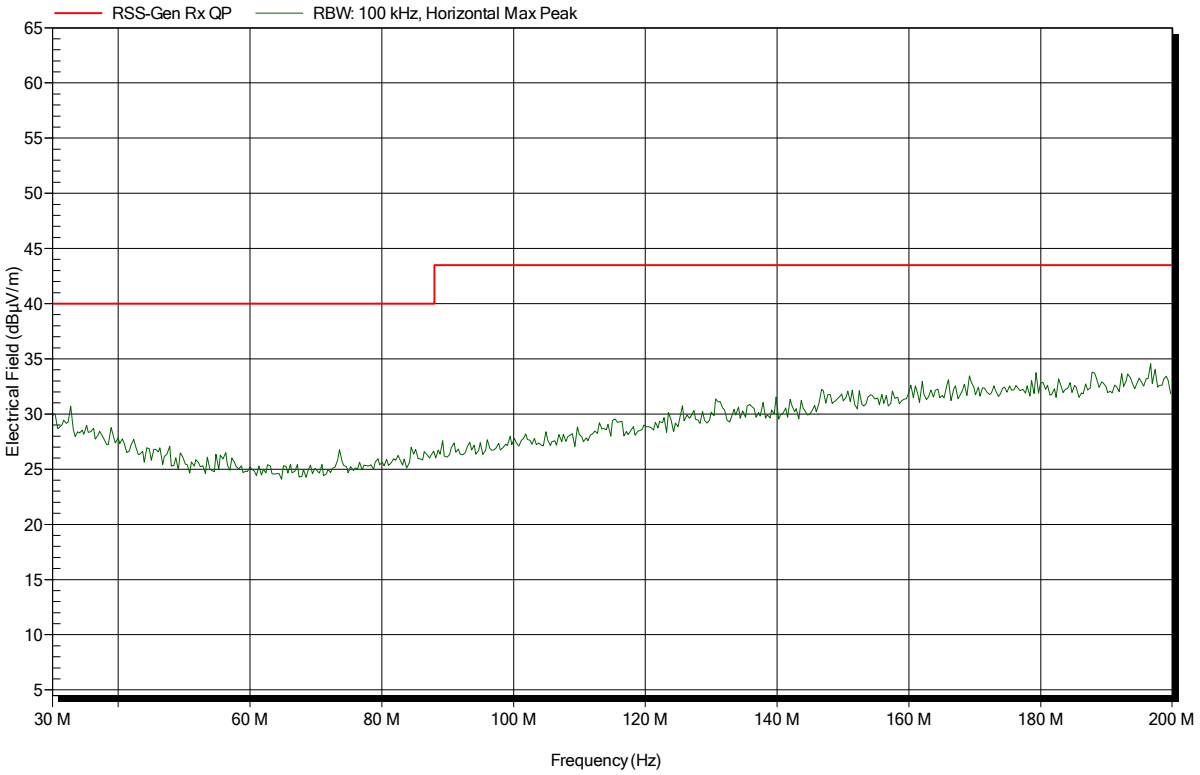

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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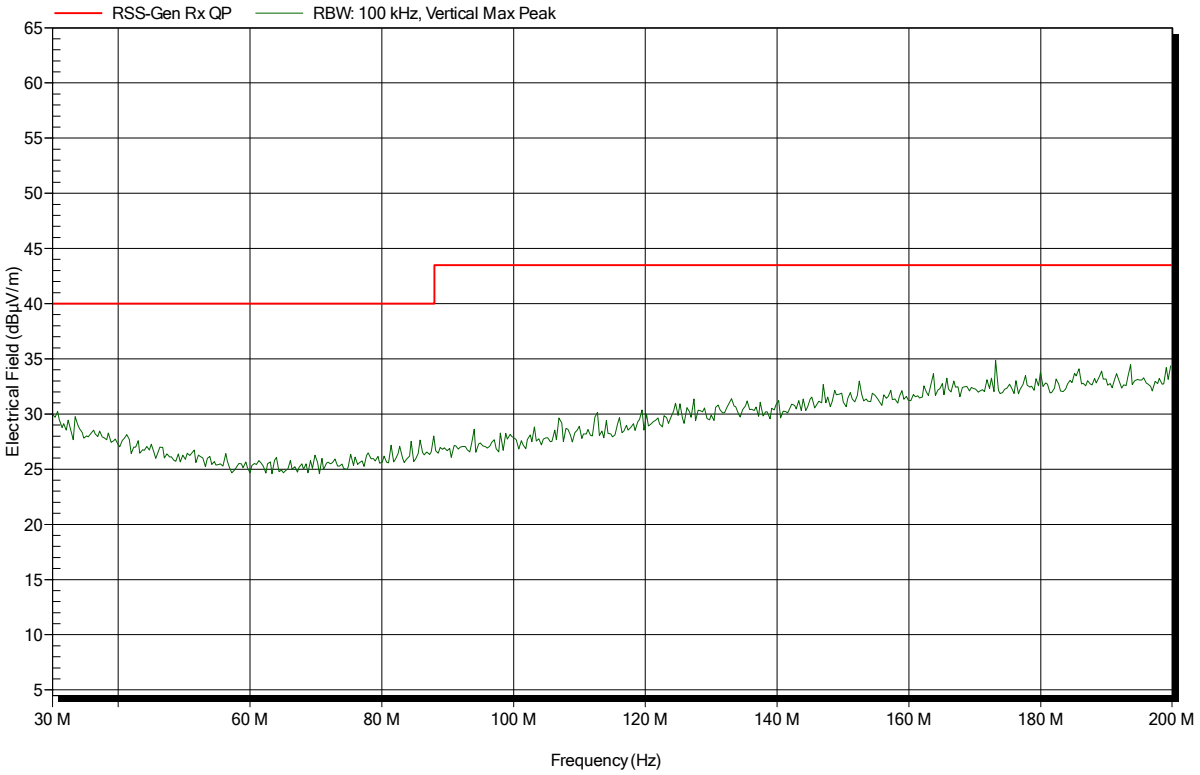

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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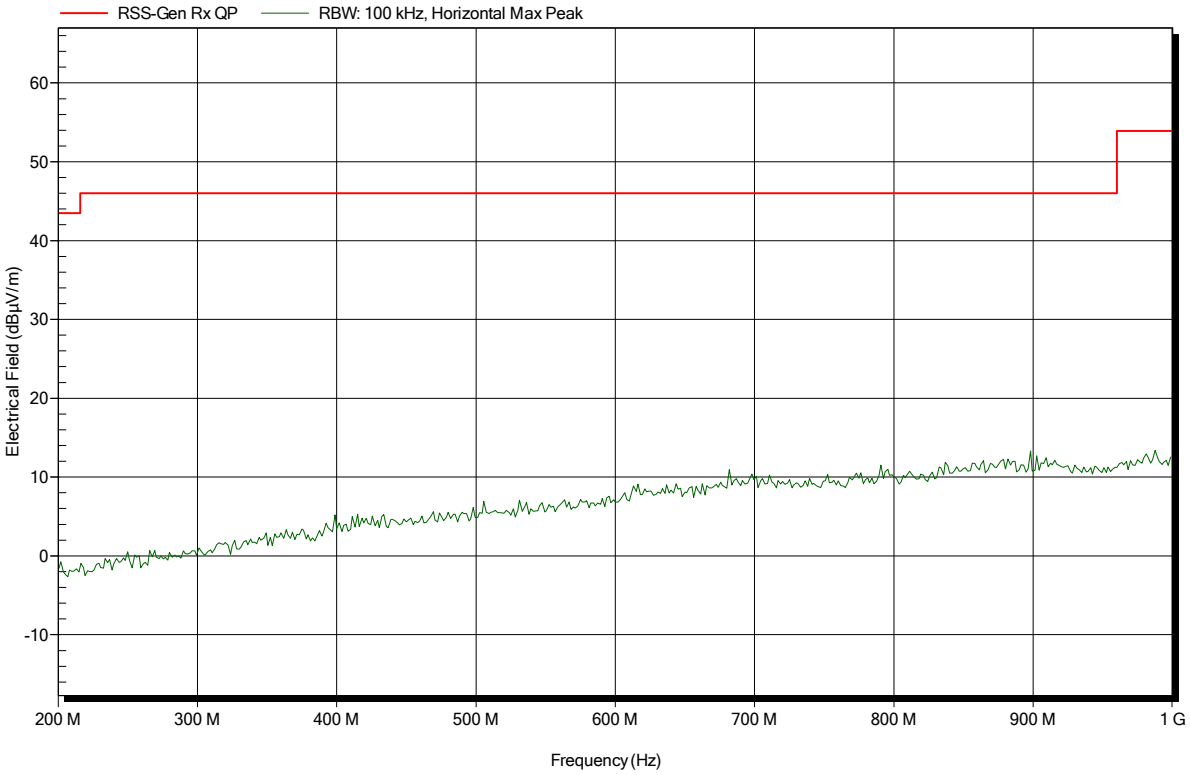

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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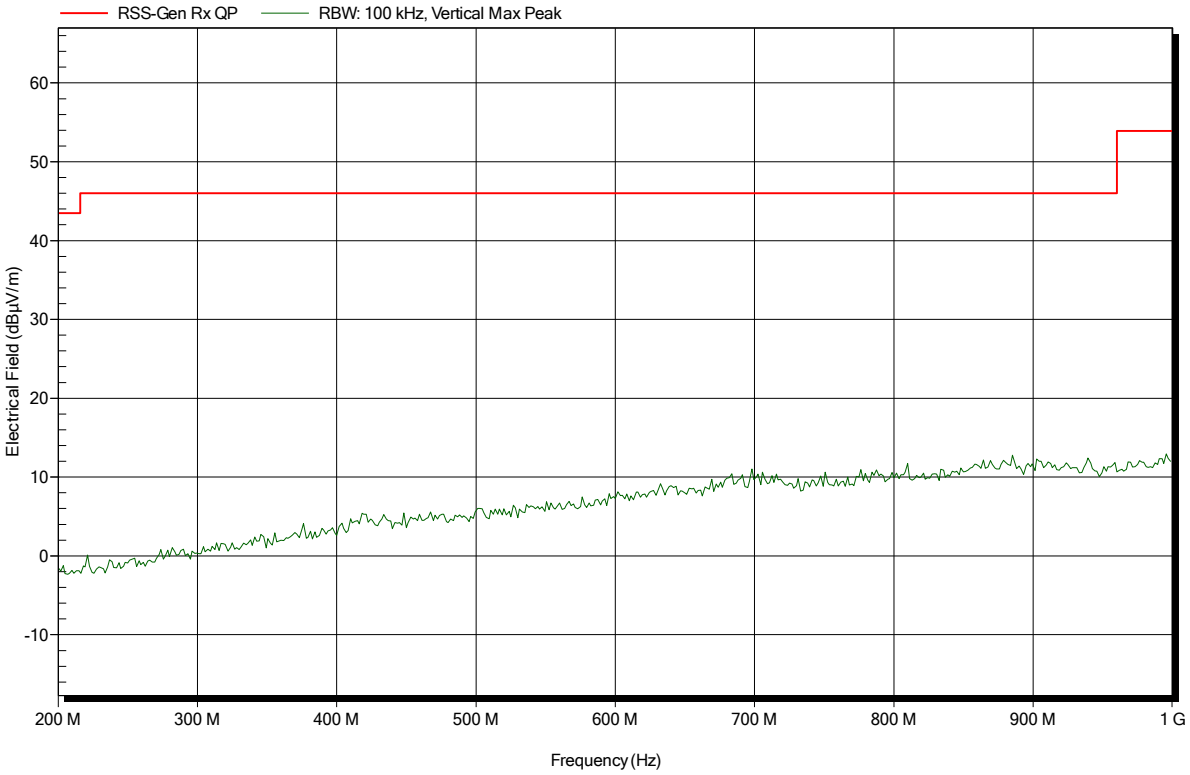

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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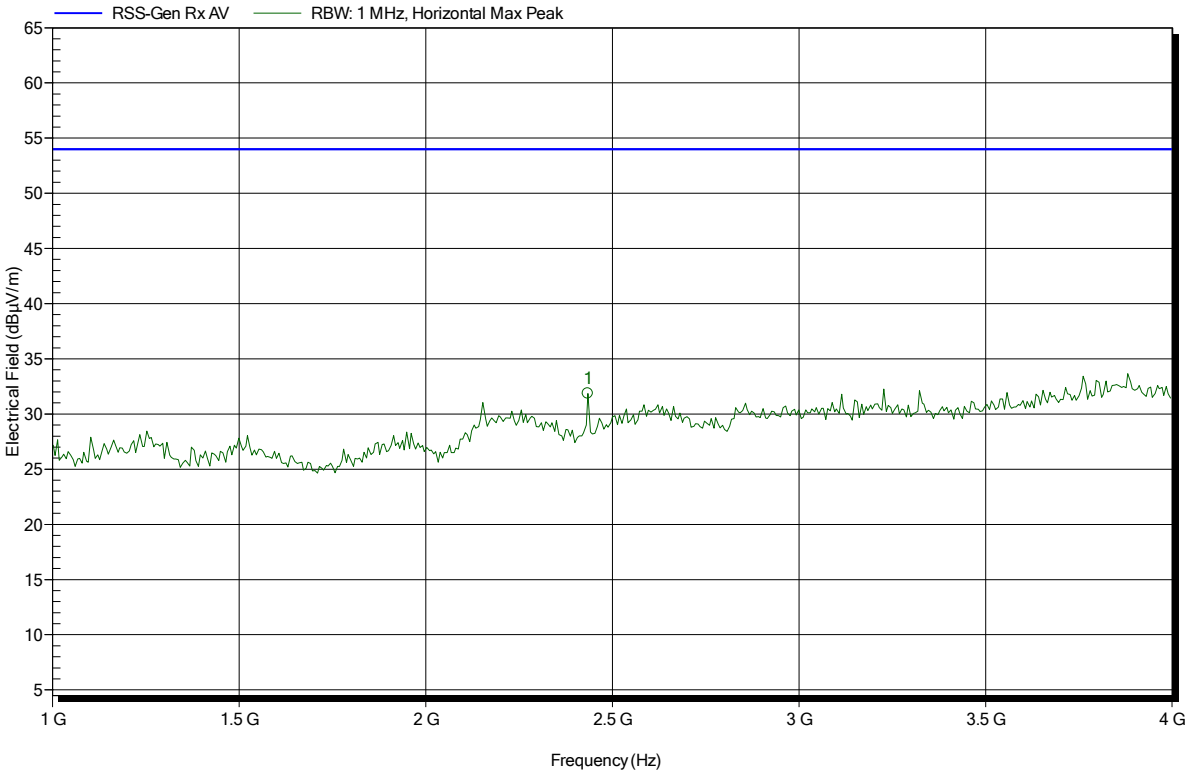

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.434 GHz	31.85 dBµV/m	53.98 dBµV/m	-22.13 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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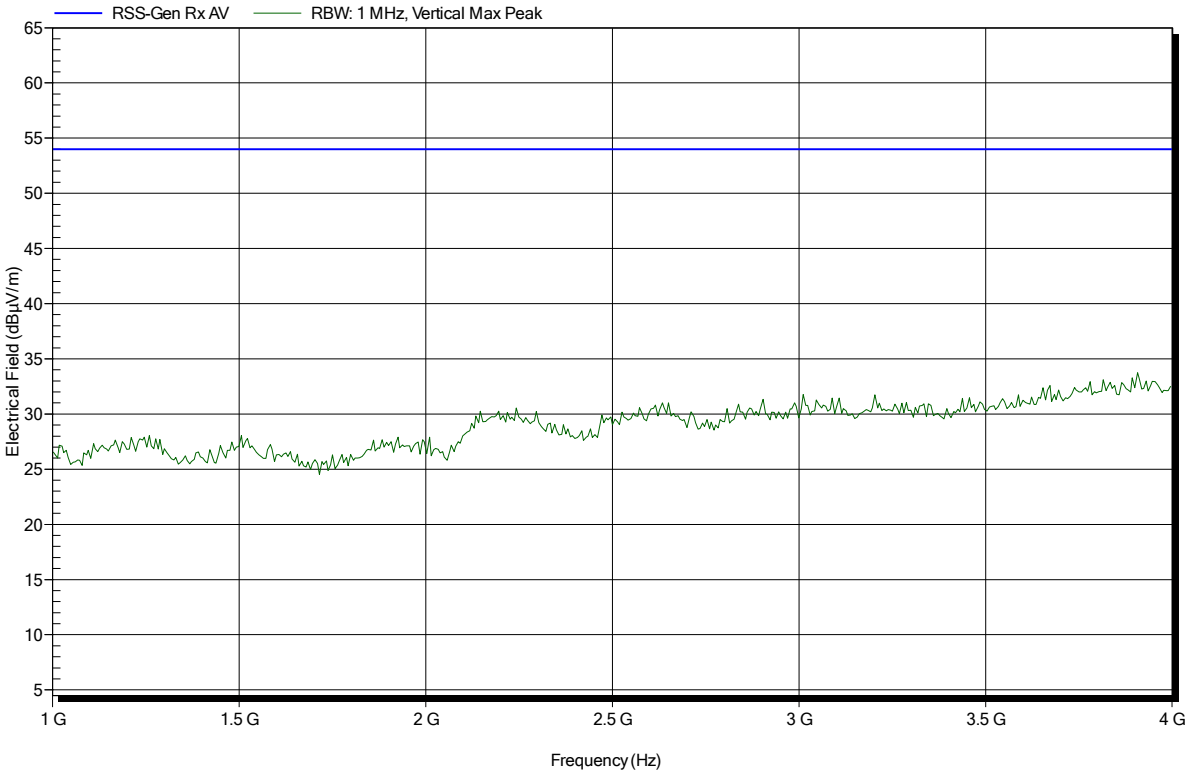

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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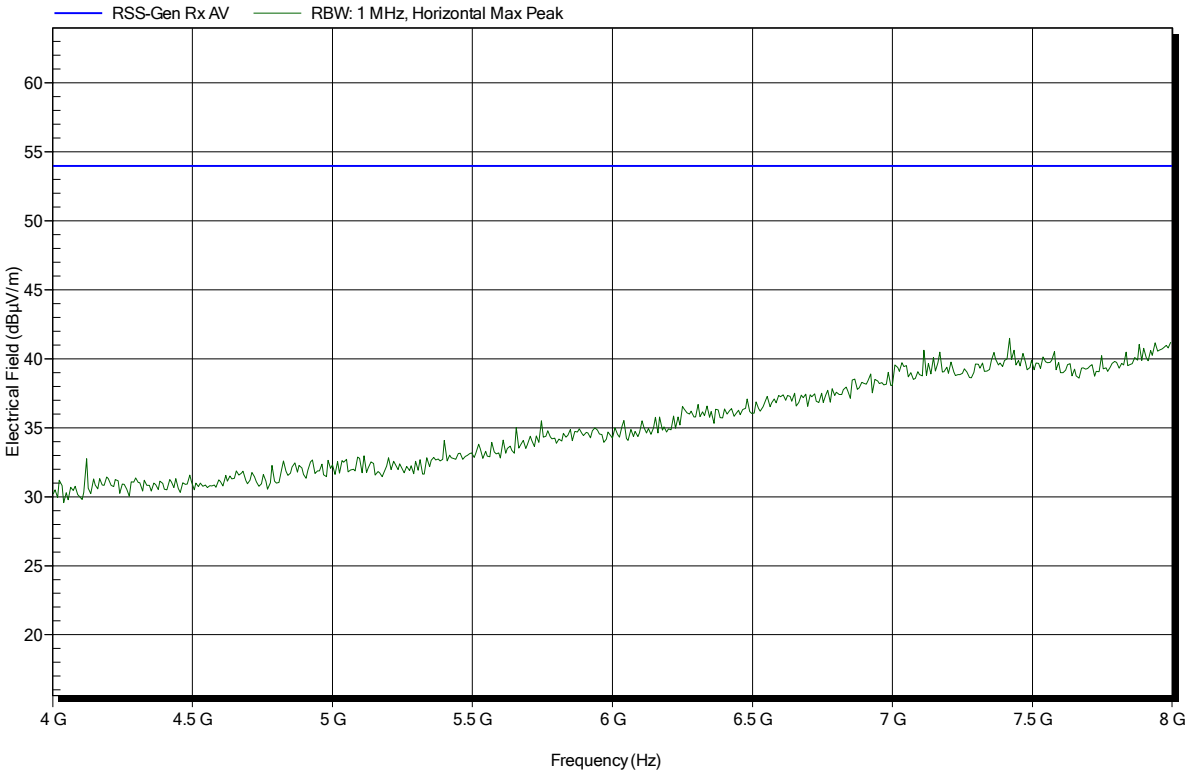

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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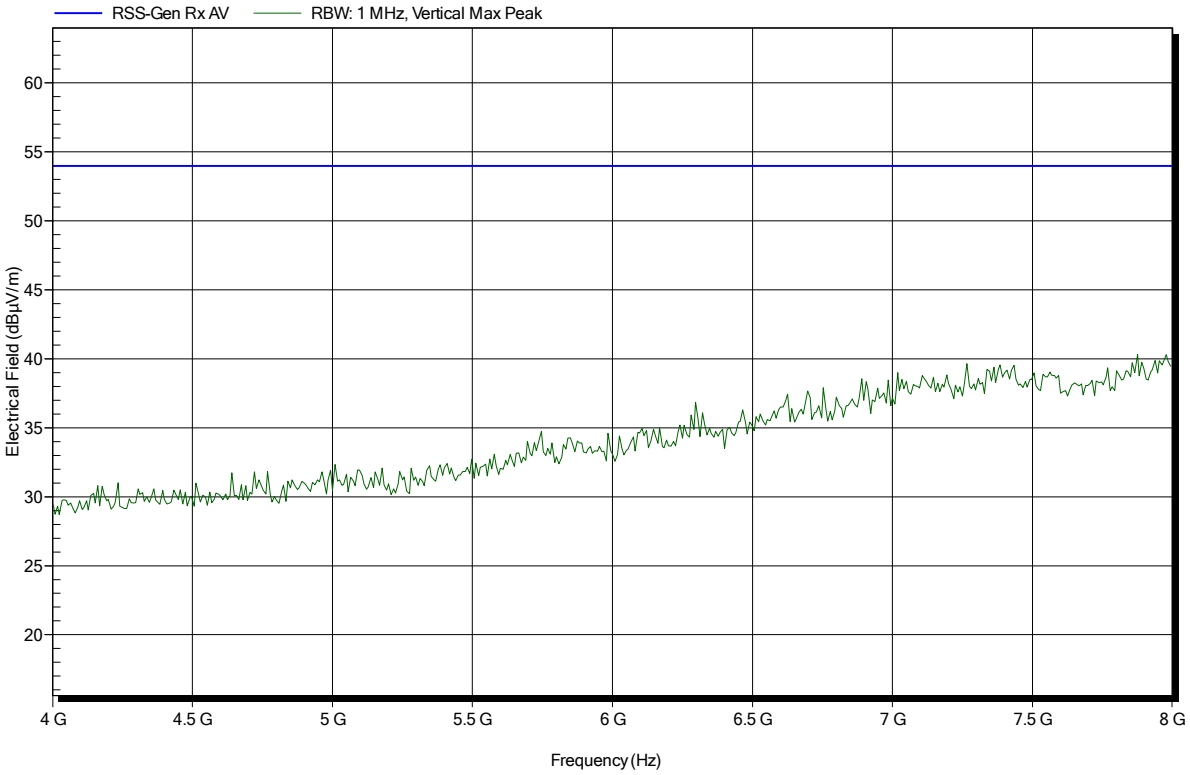

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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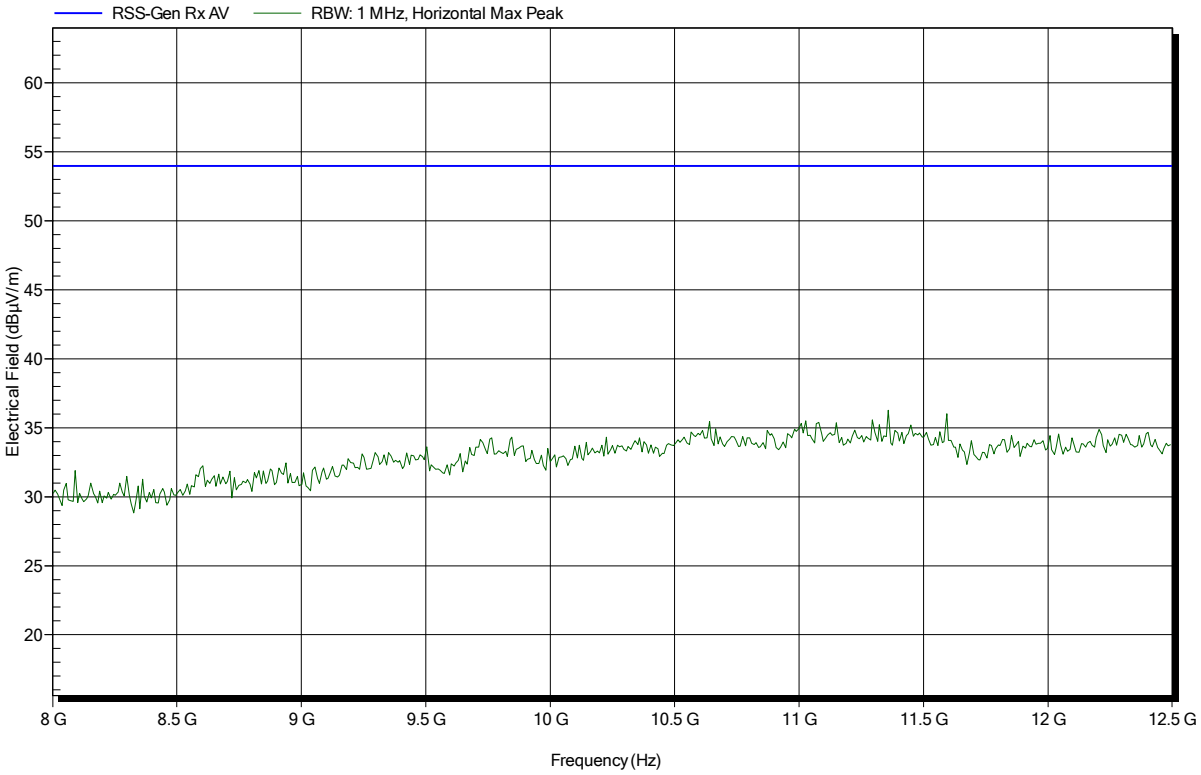

Spurious emissions according to FCC 15.247

Project number: G0M-1705-6569

Applicant:	dresden elektronik ingenieurtechnik gmbh
EUT Name:	DUT1: 2,4GHz IEEE 802.15.4 ZigBee module with integrated antenna
Model:	deRFsamR21E-23S00
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 25°C, Vnom: 5.0 V DC (AC/DC adaptor, USB)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	RX; IEEE 802.15.4; 2440 MHz
Test Date:	2017-07-06
Note:	

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