RADIO REPORT

FCC 47 CFR Part 15C
ISED Canada RSS-247

Digital transmission systems operating within the 902 – 928 MHz band

Report Reference No	G0M-1711-7013-TFC247DT-V02
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008 IC Testing Laboratory site: 3470A-2
Applicant	IDT Europe GmbH
Address	Grenzstr. 28 01109 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	Sub-GHz 6LoWPAN Short Range Device
Model(s)	ZWIR4532
Additional Model(s)	None
Brand Name(s)	None
Hardware Version(s)	1.0
Software Version(s)	1.11
FCC-ID	COR-ZWIR4532
IC	24477-ZWIR4532
Test Result	**PASSED**

Possible test case verdicts:		
required by standard but not tested	N/T	
not required by standard	N/R	
not applicable to EUT	N/A	
test object does meet the requirement	P(PASS)	
test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2017-11-22	
Report:		
Compiled by	Wilfried Treffke	
Tested by (+ signature) (Responsible for Test)	Wilfried Treffke	W. Treffke .....
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	T. J .....
Date of Issue	2018-11-16	
Total number of pages	104	
General Remarks:		
The test results presented in this report relate only to the object tested. **The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.** This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.		
Additional Comments:		

VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2018-11-16	Initial Release	
02	2018-11-16	Replaced document: G0M-1711-7013-TFC247DT-V01 Replaced by: G0M-1711-7013-TFC247DT-V02 Reason: Typo because of Assigned frequency bands	W. Treffke

ABBREVIATIONS AND ACRONYMS

Acronyms	
Acronym	Description
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V_{NOM}	Nominal supply voltage

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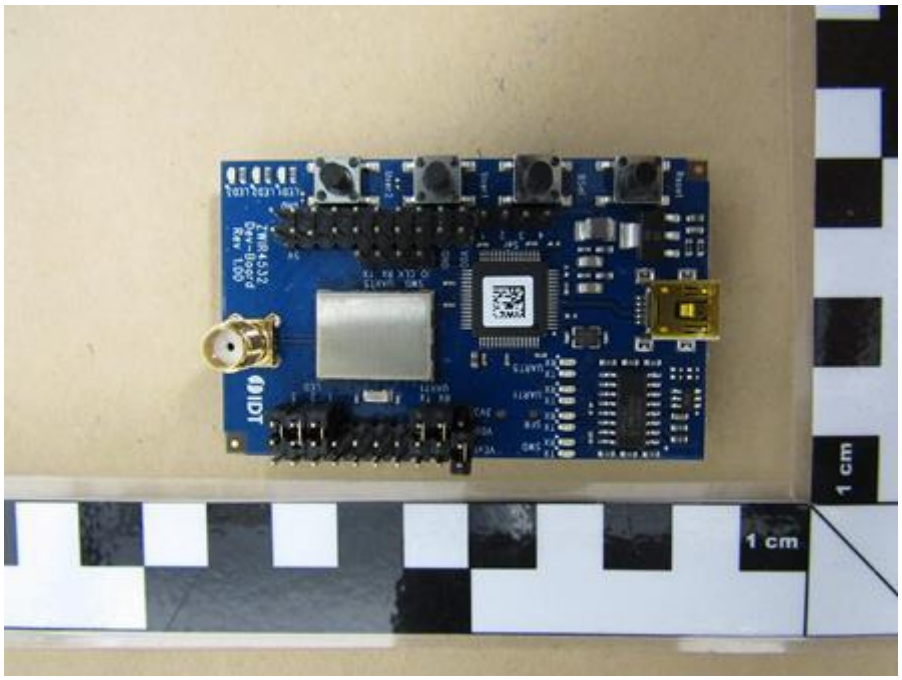
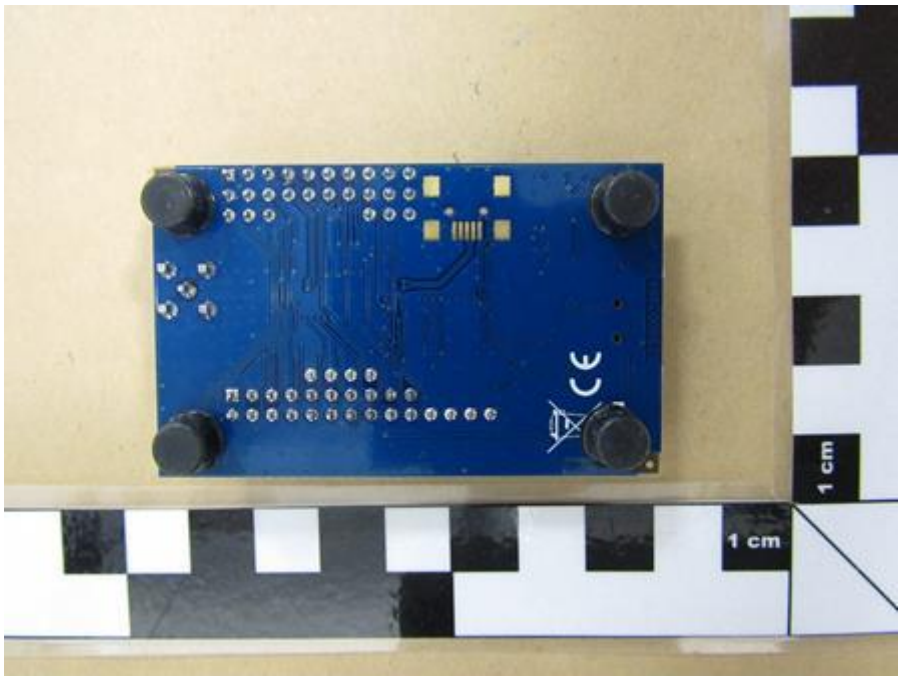
1 Equipment (Test Item) Under Test

Description	Sub-GHz 6LoWPAN Short Range Device	
Model	ZWIR4532	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	None	
Hardware Version(s)	1.0	
Software Version(s)	1.11	
PMN	ZWIR4532	
HVIN	ZWIR4532	
FVIN	1.11	
HMN	None	
FCC-ID	COR-ZWIR4532	
IC	24477-ZWIR4532	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	902 - 928 MHz	
Radio technology	Digital Modulation	
Modulation	BPSK, QPSK	
Number of antenna ports	1	
Antenna	Type	External
	Model	EXE902SM
	Manufacturer	Laird
	Gain	4.0 dBi (declaration)
Supply Voltage	V_{NOM}	3.3 VDC
Operating Temperature	T_{NOM}	25 °C
AC/DC-Adaptor	Model	None
	Vendor	None
	Input	None
	Output	None
Manufacturer	IDT Europe GmbH Grenzstr. 28 01109 Dresden GERMANY	

1.1 Photos – Equipment External

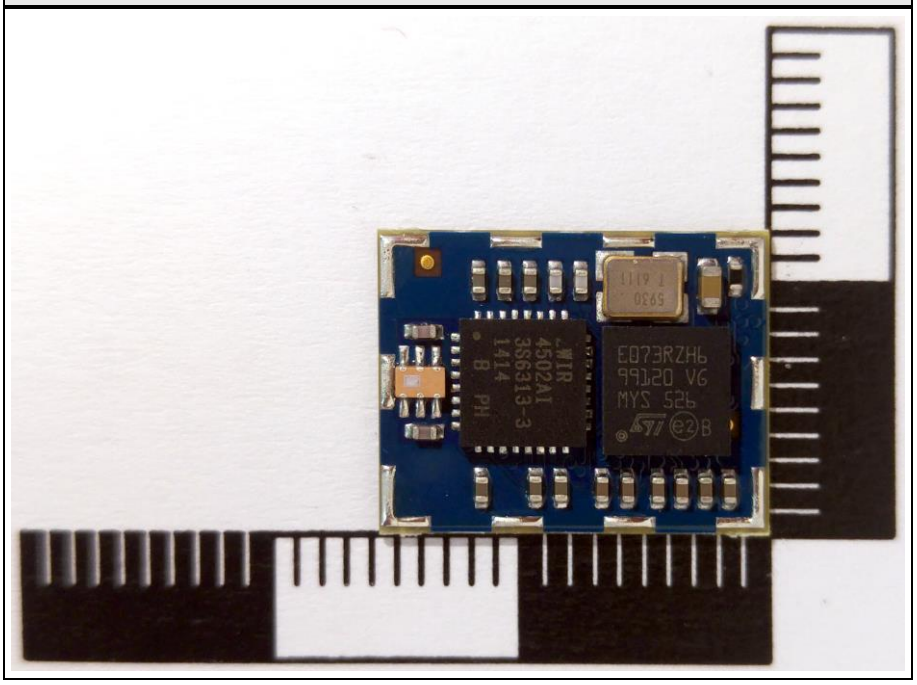
Evaluation Board Top


Evaluation Board Bottom


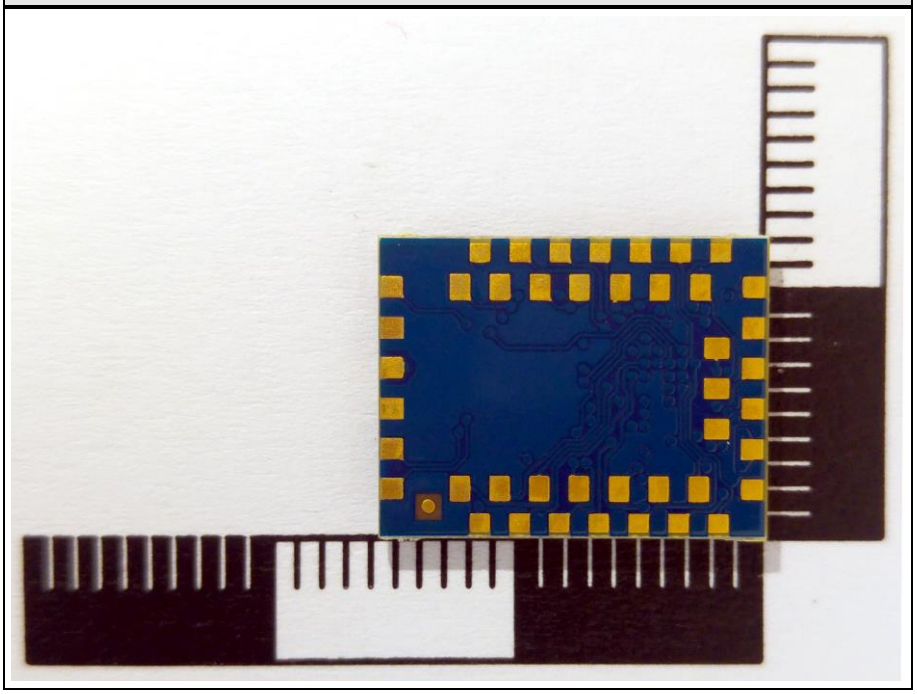
Antenna

1.2 Photos – Equipment Internal

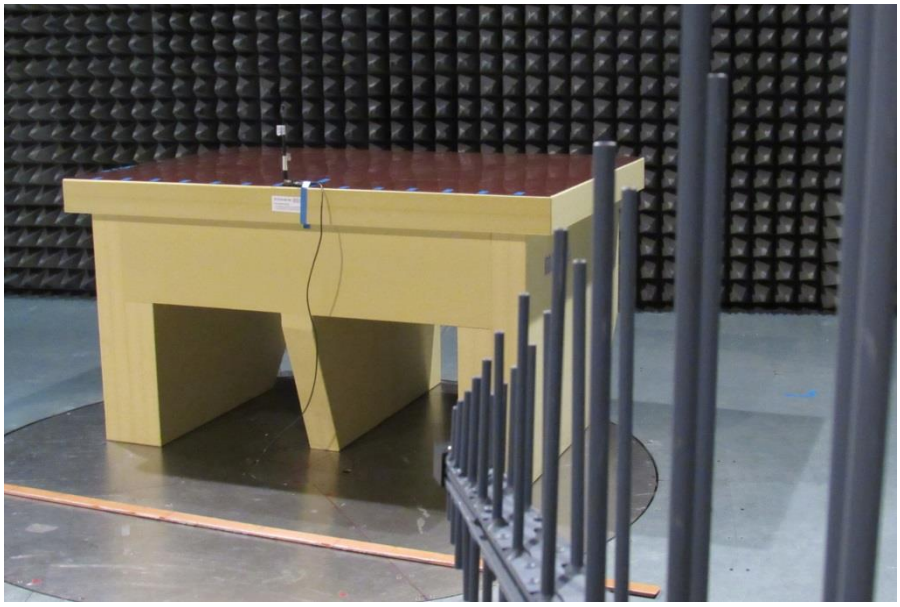
Module ZWIR4532-Top-Scale without shielding



Module ZWIR4532-Bottom-Scale



1.3 Photos – Test Setup

TestSetup Radiated Measurement


TestSetup Conducted Measurement

1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
AE	Laptop	Dell	Latitude E6420	S/N HPJ4R1
AE	Power Supply	Dell	FA65NE0-00	S/N RX929
Description:				
AE	Auxillary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

1.5 Test mode duty cycle

1.5.1 Information

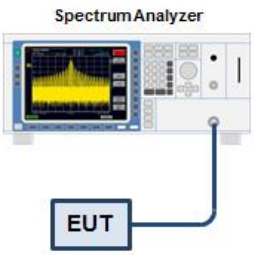
Test Information	
Measurement Method	ANSI C63.10 11.6

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	2017-07	2018-07

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]
Transmit 1	100 %	0
Transmit 2	100 %	0

1.6 Test Modes

Mode	Description
Transmit 1	Mode = Transmit Modulation = BPSK Duty cycle = 100 %
Transmit 2	Mode = Transmit Modulation = QPSK Duty cycle = 100 %
Receive	Mode = Receive
Comment:	

1.7 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	1	906
F2	Tx / Rx	5	914
F3	Tx / Rx	10	924

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/m) = Net field strength (dBµV/m)

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	**Requirement**	**Reference Method**	**Result**	**Remarks**
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

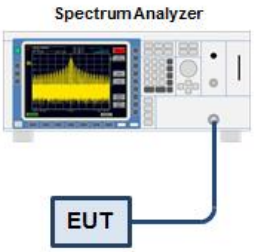
3.1.1 Information

Test Information	
Reference	ISED RSS-Gen 6.6
Measurement Method	ANSI C63.10 6.9.3
Operator	Wilfried Treffke
Date	2017-12-04

3.1.2 Limits

Limits
None (Informational only)

3.1.3 Setup

Test Setup


3.1.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2017-07	2018-07

3.1.5 Procedure

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

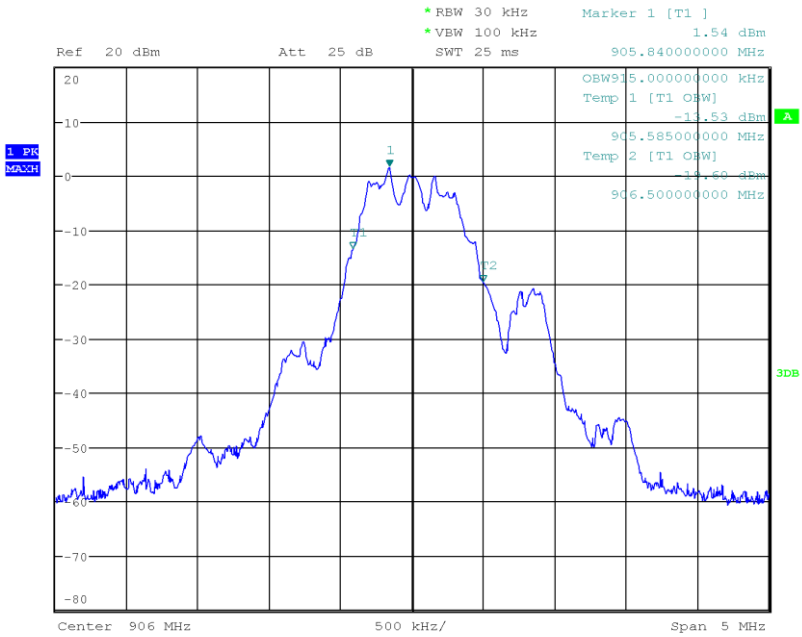
3.1.6 Results

Test Results (BPSK)		
Mode	Frequency [MHz]	Bandwidth [MHz]
Transmit 1	906	0.915
Transmit 1	914	0.875
Transmit 1	924	0.840

Test Results (QPSK)		
Mode	Frequency [MHz]	Bandwidth [MHz]
Transmit 2	906	1.615
Transmit 2	914	1.615
Transmit 2	924	1.565

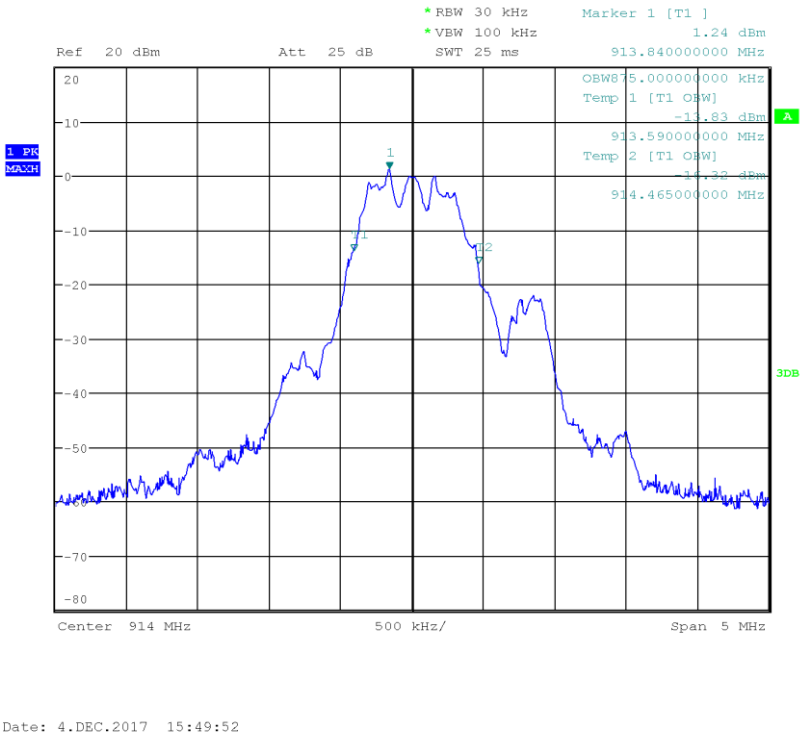
Occupied Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	BPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Occupied Bandwidth [MHz]:	0.915



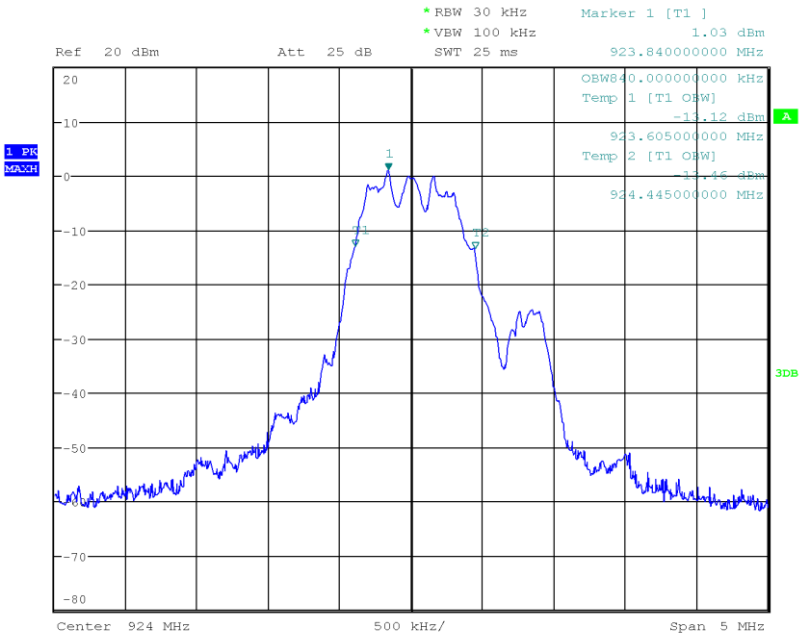
Occupied Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	BPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Occupied Bandwidth [MHz]:	0.875



Occupied Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	BPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Occupied Bandwidth [MHz]:	0.840



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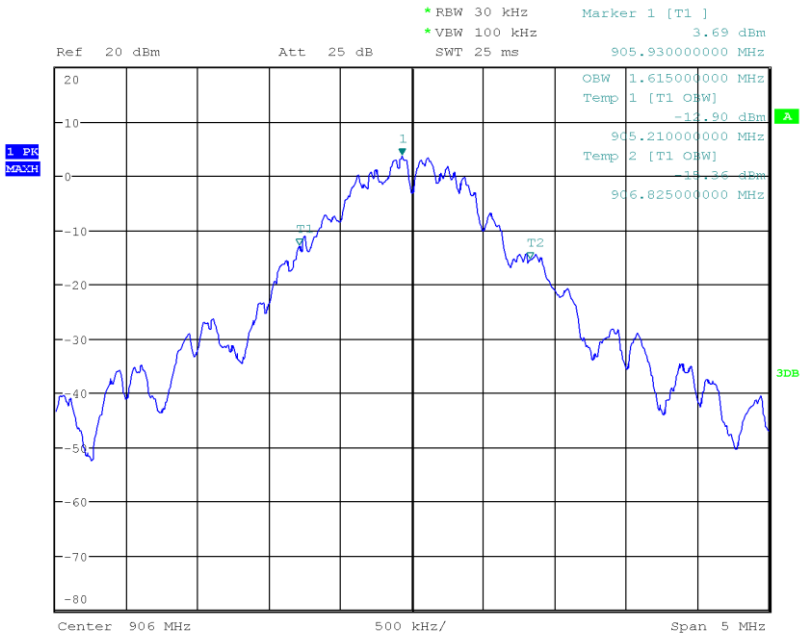
Occupied Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	QPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Occupied Bandwidth [MHz]:	1.615



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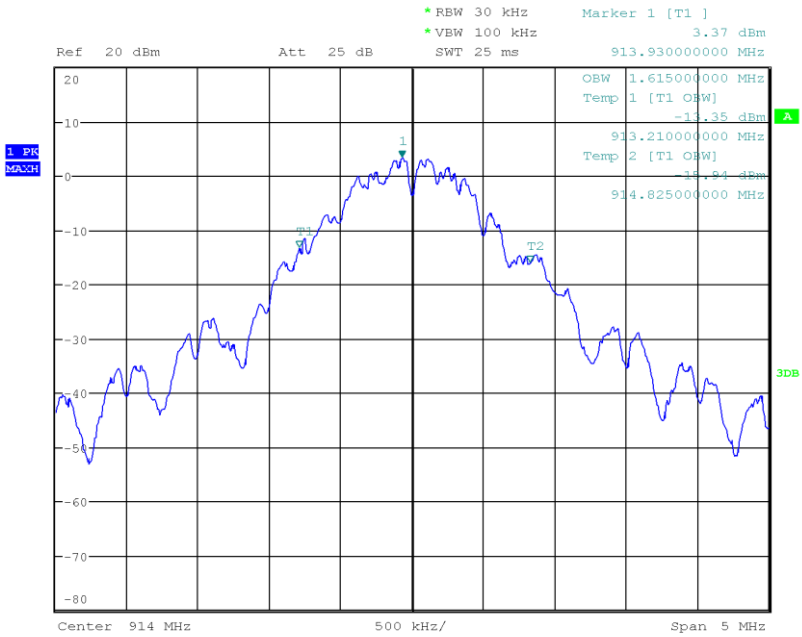
Occupied Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	QPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Occupied Bandwidth [MHz]:	1.615



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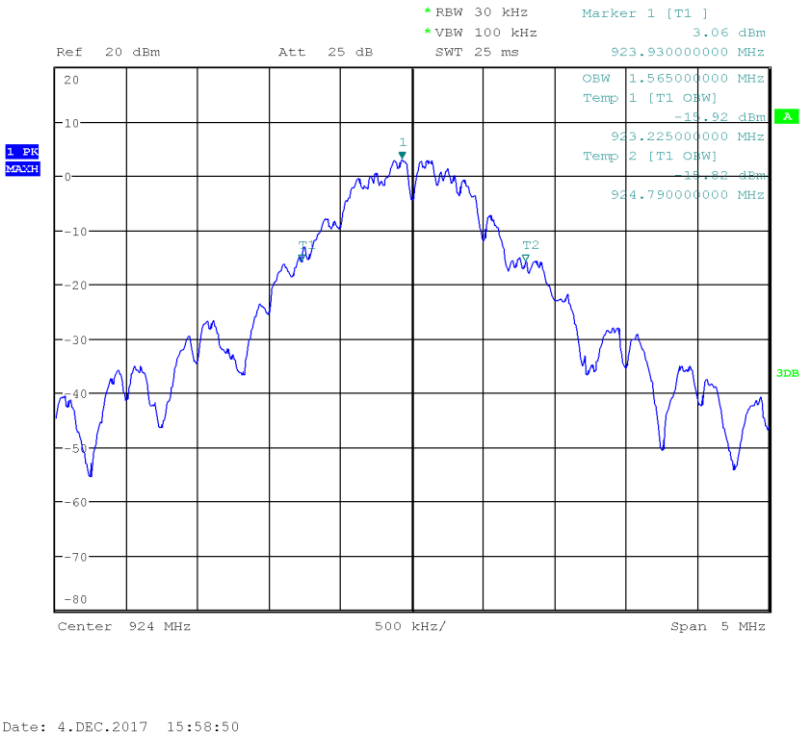
Occupied Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 6.9.3
Operational Mode:	QPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Occupied Bandwidth [MHz]:	1.565



3.2 Test Conditions and Results - 6 dB bandwidth

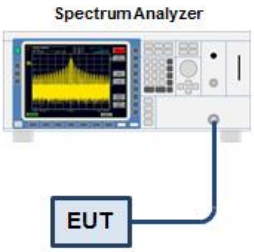
3.2.1 Information

Test Information	
Reference	FCC 15.247(a)(2) / ISED RSS-247 5.2
Measurement Method	ANSI C63.10 11.8
Operator	Wilfried Treffke
Date	2017-12-04

3.2.2 Limits

Limits
≥ 500kHz

3.2.3 Setup

Test Setup


3.2.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2017-07	2018-07

3.2.5 Procedure

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

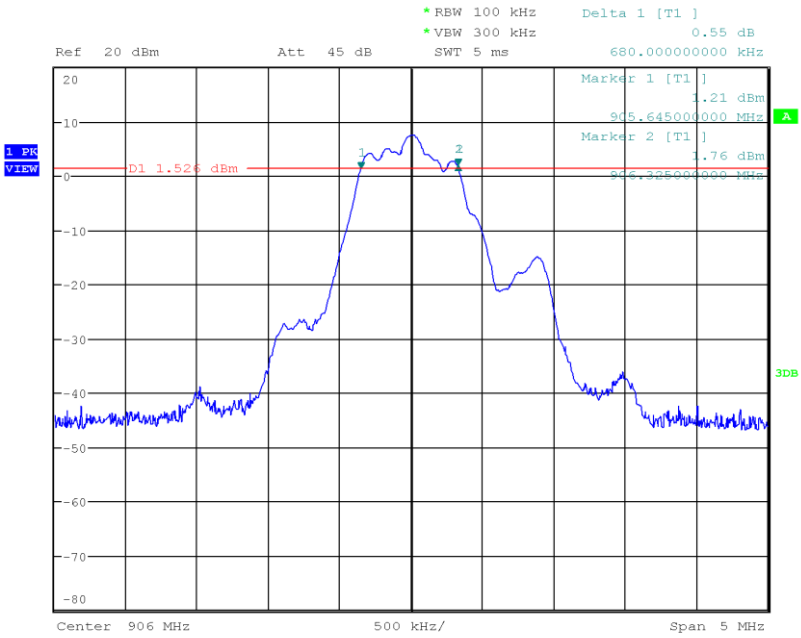
3.2.6 Results

Test Results (BPSK)				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
Transmit 1	906	680	500	Pass
Transmit 1	914	685	500	Pass
Transmit 1	924	680	500	Pass

Test Results (QPSK)				
Mode	Frequency [MHz]	Bandwidth [kHz]	Limit [kHz]	Verdict
Transmit 2	906	815	500	Pass
Transmit 2	914	830	500	Pass
Transmit 2	924	835	500	Pass

DTS (6 dB) Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	BPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Lower Frequency [MHz]:	905.645
Upper Frequency [MHz]:	906.325
6 dB Bandwidth [kHz]:	680



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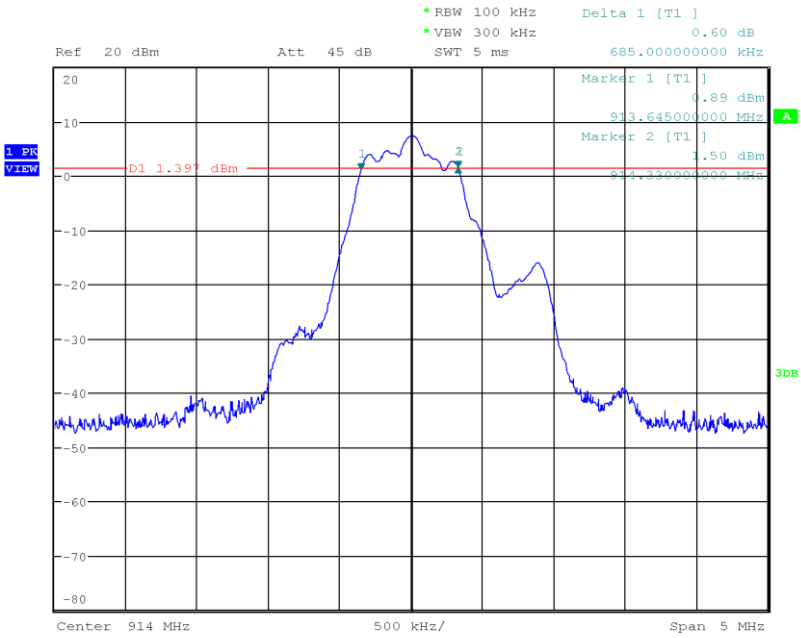
DTS (6 dB) Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	BPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Lower Frequency [MHz]:	913.645
Upper Frequency [MHz]:	914.330
6 dB Bandwidth [kHz]:	685



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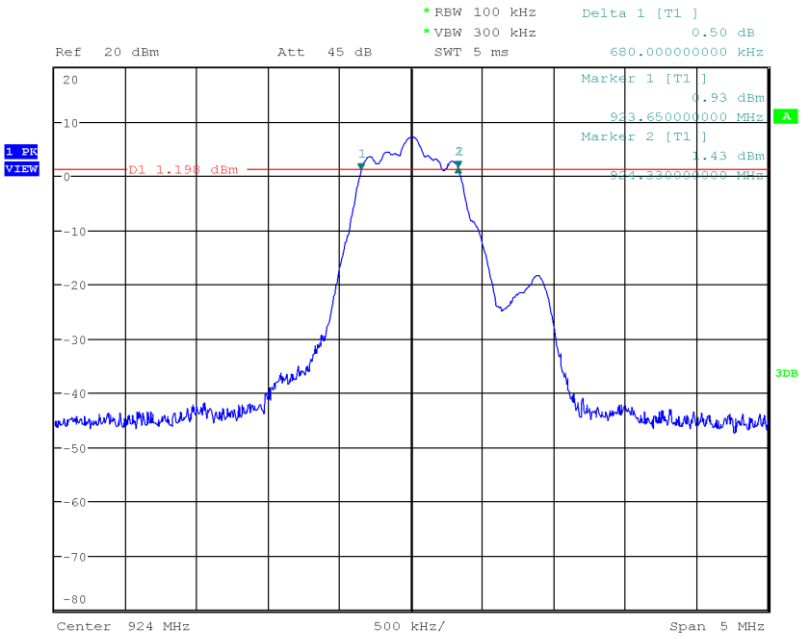
DTS (6 dB) Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	BPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Lower Frequency [MHz]:	923.650
Upper Frequency [MHz]:	924.330
6 dB Bandwidth [kHz]:	680



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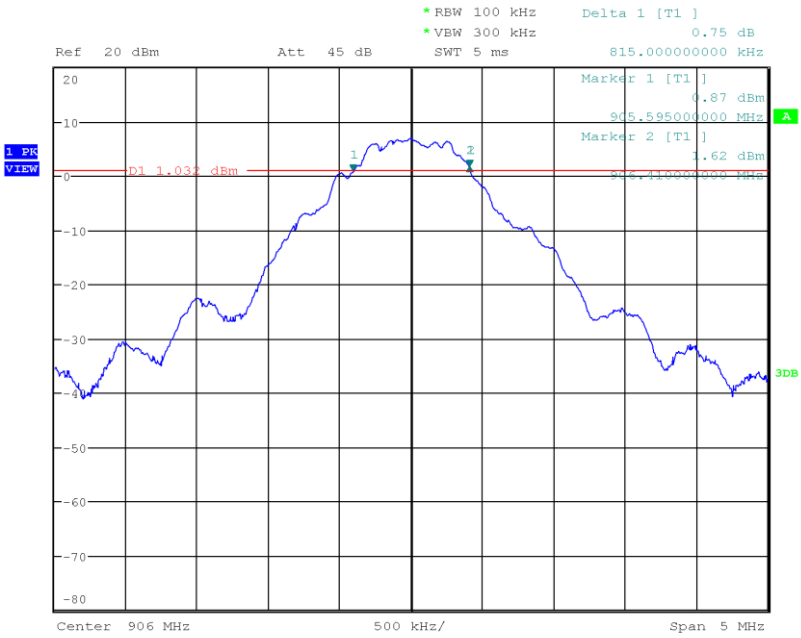
DTS (6 dB) Bandwidth

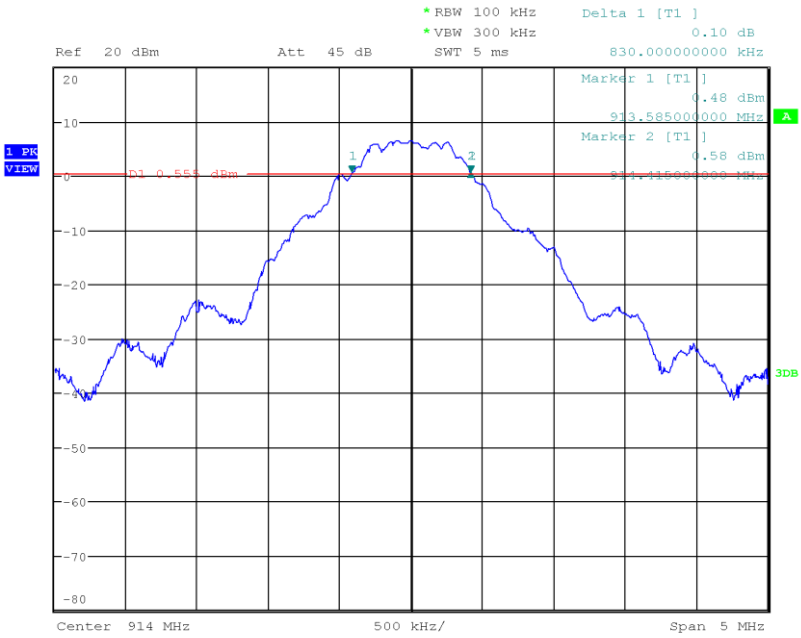
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	QPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Lower Frequency [MHz]:	905.595
Upper Frequency [MHz]:	906.410
6 dB Bandwidth [kHz]:	815



Date: 4.DEC.2017 16:24:46

DTS (6 dB) Bandwidth

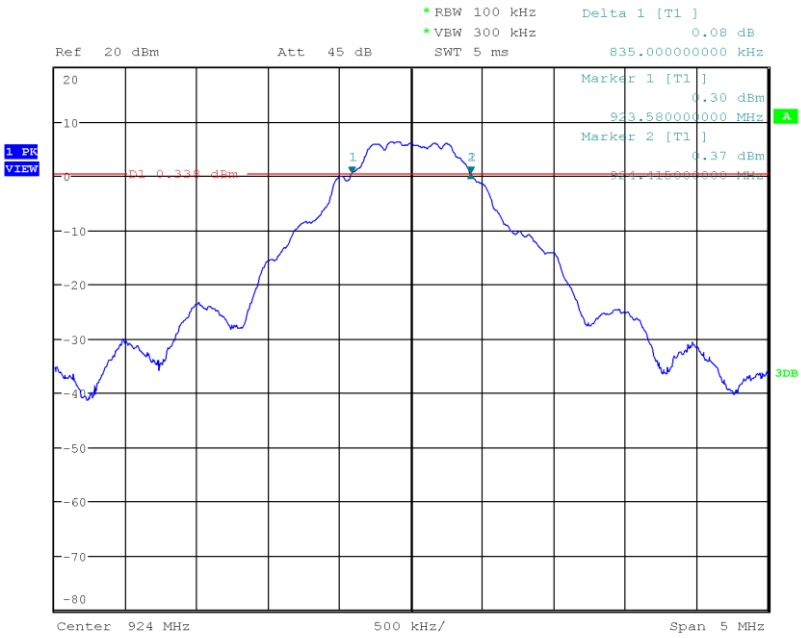
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	QPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Lower Frequency [MHz]:	913.585
Upper Frequency [MHz]:	914.415
6 dB Bandwidth [kHz]:	830



Date: 4.DEC.2017 16:26:03

DTS (6 dB) Bandwidth

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.8.1 Option 1
Operational Mode:	QPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-04
Lower Frequency [MHz]:	923.580
Upper Frequency [MHz]:	924.415
6 dB Bandwidth [kHz]:	835



Date: 4.DEC.2017 16:27:31

3.3 Test Conditions and Results - Maximum peak conducted output power

3.3.1 Information

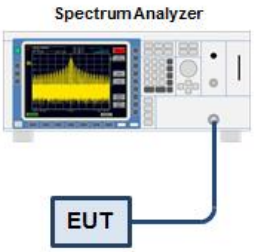
Test Information	
Reference	FCC 15.247(b)(1) / ISED RSS-247 5.4
Measurement Method	ANSI C63.10 11.9.1
Operator	Wilfried Treffke
Date	2017-12-04

3.3.2 Limits

Limits
1 W (30 dBm)
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.3 Setup

Test Setup



3.3.4 Equipment

Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 26	EF01003	2017-07	2018-07

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 (BPSK)				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
906	10.298	0.0107	1.0	PASS
914	10.244	0.0106	1.0	PASS
924	10.041	0.0101	1.0	PASS

Test Results (QPSK)				
Channel [MHz]	Power [dBm]	Power [W]	Limit [W]	Verdict
906	9.653	0.0092	1.0	PASS
914	9.497	0.0089	1.0	PASS
924	9.313	0.0085	1.0	PASS

3.4 Test Conditions and Results - Power spectral density

3.4.1 Information

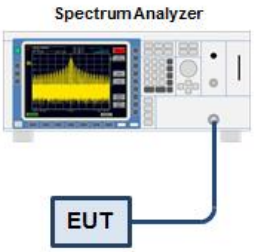
Test Information	
Reference	FCC 15.247(e) / ISED RSS-247 5.2
Measurement Method	ANSI C63.10 11.10.2, 14.3.2
Operator	Wilfried Treffke
Date	2017-12-06

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	2017-07	2018-07

3.4.5 Procedure

Test Procedure

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

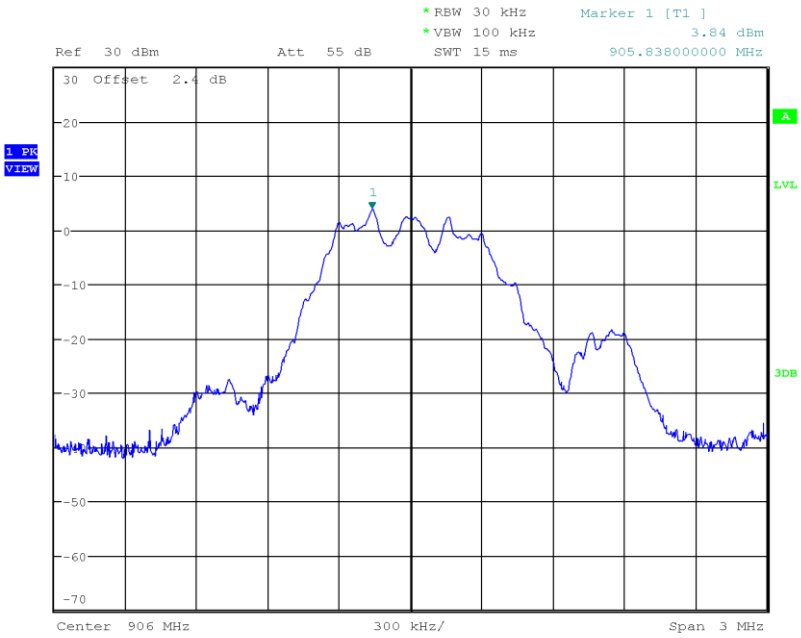
3.4.6 Results

Test Results (BPSK)			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
906	3.841	8.0	PASS
914	3.652	8.0	PASS
924	3.387	8.0	PASS
RBW = 30 kHz			

Test Results (QPSK)			
Channel [MHz]	PSD [dBm/RBW]	Limit [dBm/3kHz]	Verdict
906	6.104	8.0	PASS
914	5.679	8.0	PASS
924	5.436	8.0	PASS
RBW = 30 kHz			

Peak Power Spectral Density

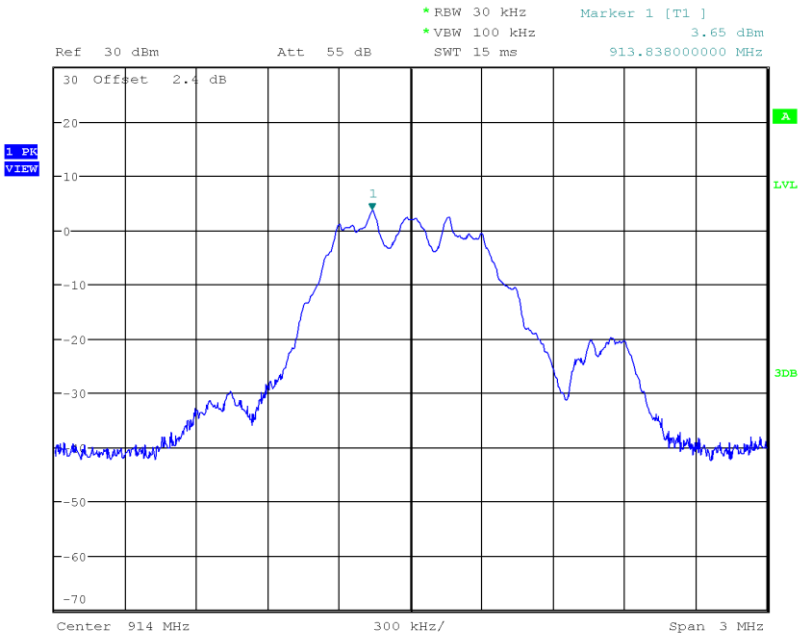
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	BPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Peak Frequency [MHz]:	905.838
Spectral Density [dBm/RBW]:	3.841
Resolution Bandwidth [kHz]:	30 kHz



Date: 6.DEC.2017 08:16:01

Peak Power Spectral Density

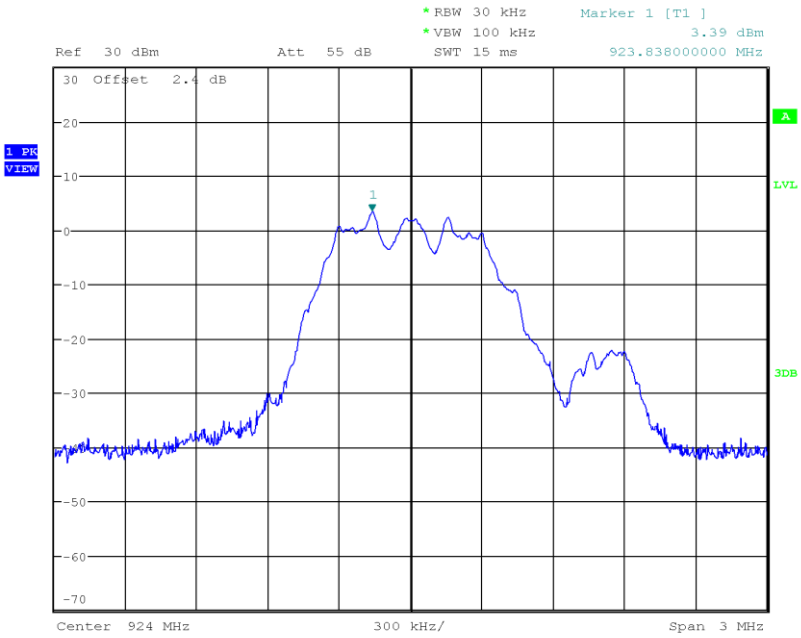
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	BPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Peak Frequency [MHz]:	913.838
Spectral Density [dBm/RBW]:	3.652
Resolution Bandwidth [kHz]:	30 kHz



Date: 6.DEC.2017 08:18:04

Peak Power Spectral Density

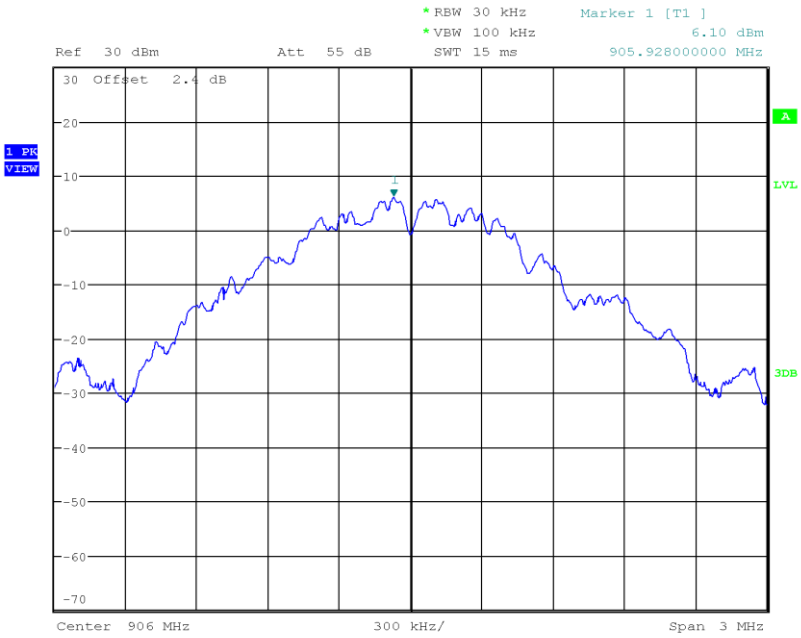
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	BPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Peak Frequency [MHz]:	923.838
Spectral Density [dBm/RBW]:	3.387
Resolution Bandwidth [kHz]:	30 kHz



Date: 6.DEC.2017 08:19:52

Peak Power Spectral Density

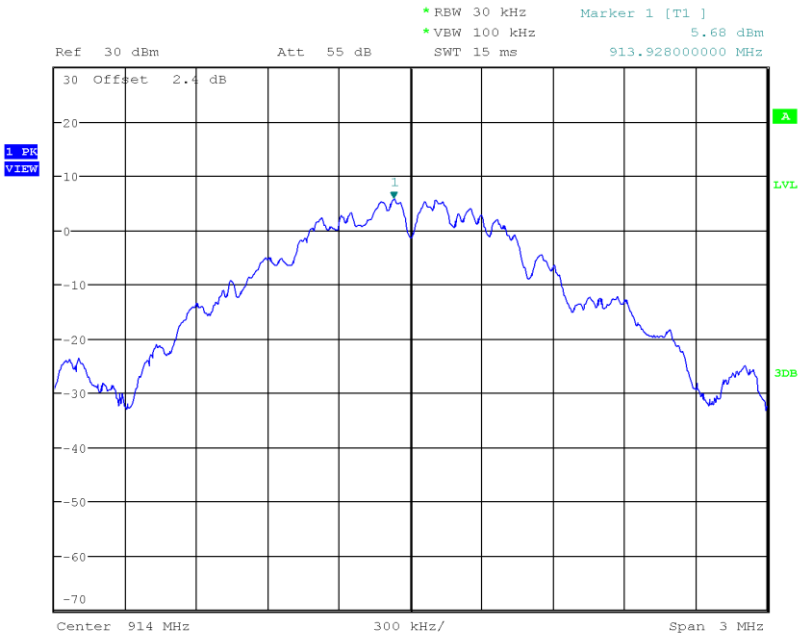
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	QPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Peak Frequency [MHz]:	905.928
Spectral Density [dBm/RBW]:	6.104
Resolution Bandwidth [kHz]:	30 kHz



Date: 6.DEC.2017 08:22:00

Peak Power Spectral Density

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	QPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Peak Frequency [MHz]:	913.928
Spectral Density [dBm/RBW]:	5.679
Resolution Bandwidth [kHz]:	30 kHz



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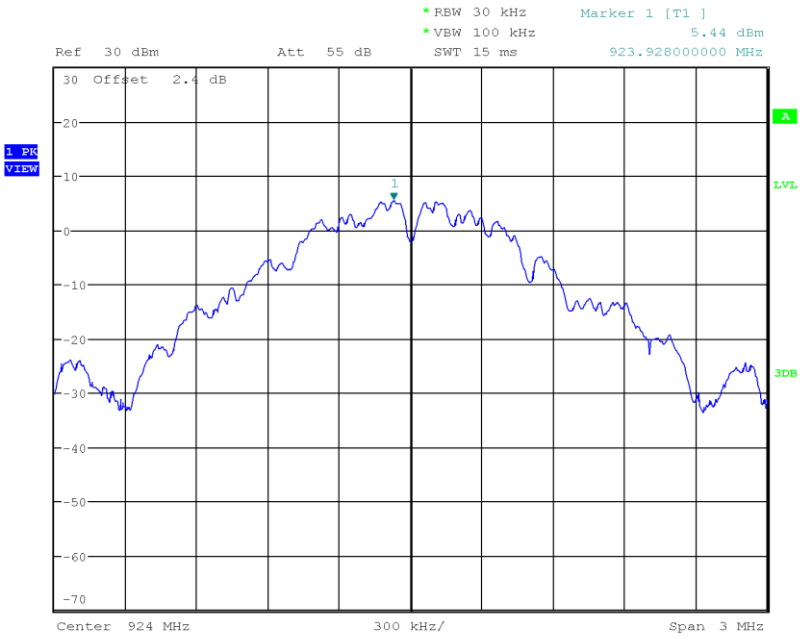
Peak Power Spectral Density

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.10.2
Operational Mode:	QPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Peak Frequency [MHz]:	923.928
Spectral Density [dBm/RBW]:	5.436
Resolution Bandwidth [kHz]:	30 kHz



Date: 6.DEC.2017 08:29:26

3.5 Test Conditions and Results - AC powerline conducted emissions

3.5.1 Information

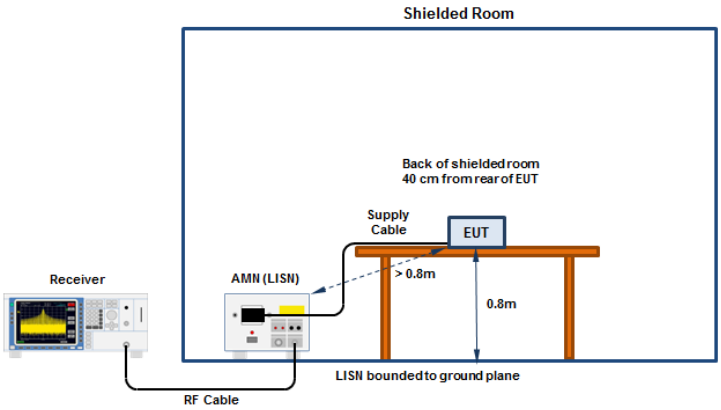
Test Information	
Reference	FCC 15.207
Measurement Method	ANSI C63.10 6.2
Operator	Wilfried Treffke
Date	2017-12-06

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

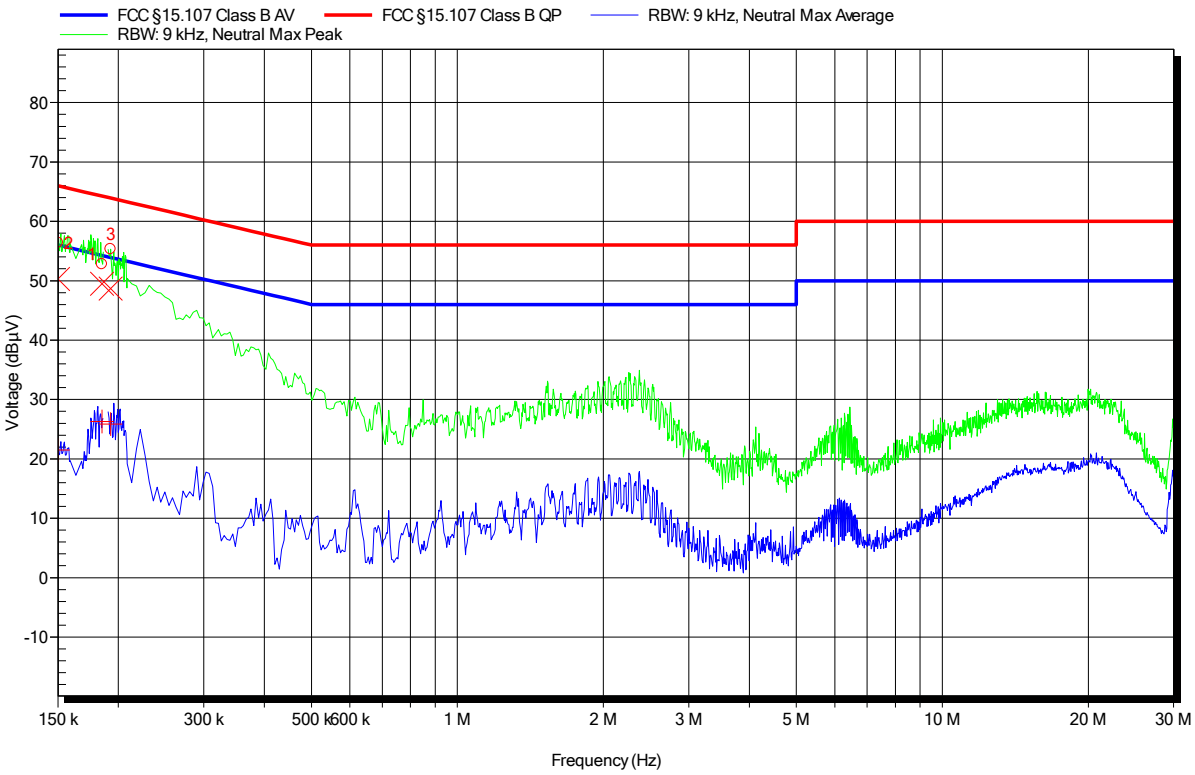
Test Equipment					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Receiver	R&S	ESU 26	EF00241	2017-07	2019-07
LISN	R&S	ESH2-Z5	EF00182	2017-01	2019-01

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

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Unom: 120 VAC
LISN:	ESH2-Z5 N
Mode:	Transmit 914 MHz
Test Date:	2017-12-12
Note:	

Index 1



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	185.1 kHz	49.52 dBµV	64.25 dBµV	-14.74 dB	Pass
2	150 kHz	50.3 dBµV	66 dBµV	-15.7 dB	Pass
3	192.75 kHz	48.67 dBµV	63.92 dBµV	-15.25 dB	Pass

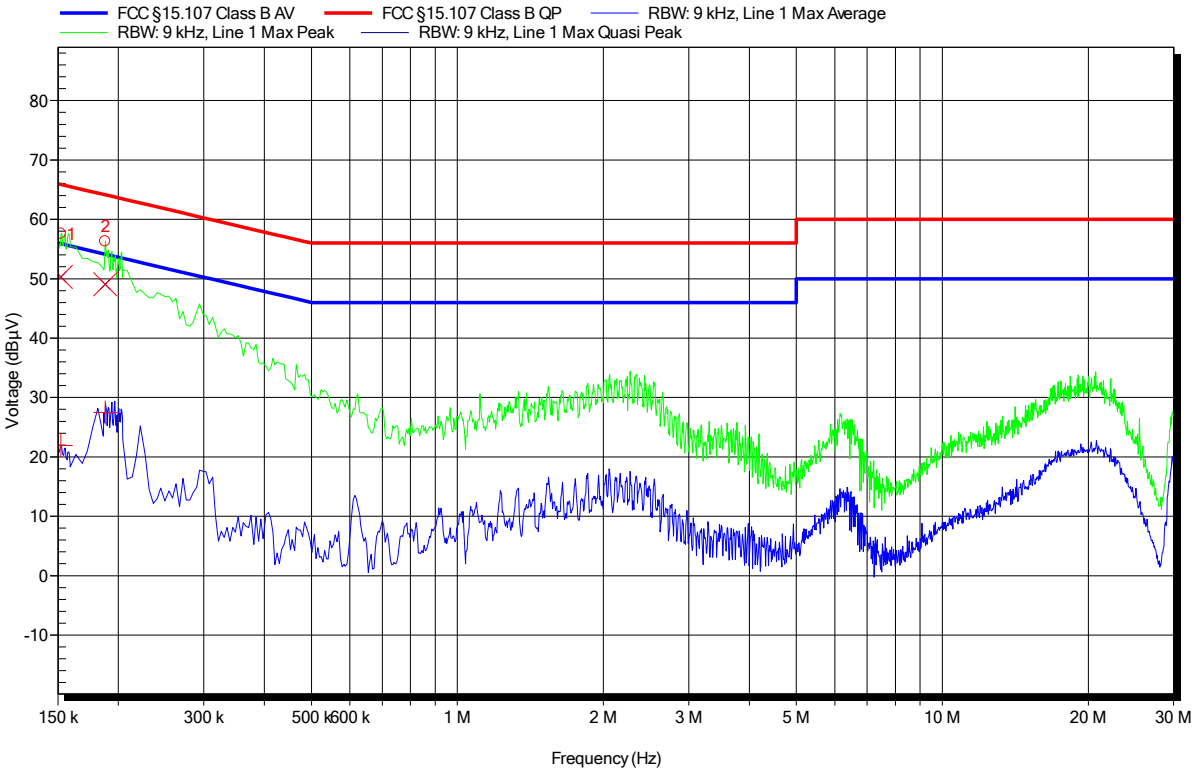
Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	185.1 kHz	26.28 dBµV	54.25 dBµV	-27.98 dB	Pass
2	150 kHz	21.51 dBµV	56 dBµV	-34.49 dB	Pass
3	192.75 kHz	25.87 dBµV	53.92 dBµV	-28.05 dB	Pass

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

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 24°C, Unom: 120 VAC
LISN:	ESH2-Z5 L
Mode:	Transmit¸ 914 MHz
Test Date:	2017-12-12
Note:	

Index 2



Peak Number	Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status
1	152.25 kHz	50.32 dBµV	65.88 dBµV	-15.55 dB	Pass
2	187.8 kHz	49.08 dBµV	64.13 dBµV	-15.05 dB	Pass

Peak Number	Frequency	Average	Average Limit	Average Difference	Average Status
1	152.25 kHz	21.91 dBµV	55.88 dBµV	-33.96 dB	Pass
2	187.8 kHz	27.5 dBµV	54.13 dBµV	-26.63 dB	Pass

3.6 Test Conditions and Results - Band-edge compliance

3.6.1 Information

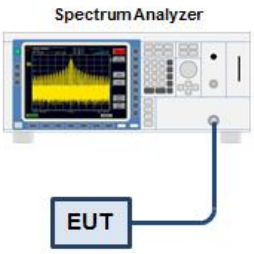
Test Information	
Reference	FCC 15.247(d) / ISED RSS-247 5.5
Measurement Method	ANSI C63.10 11.13
Operator	Wilfried Treffke
Date	2017-12-06

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	2017-07	2018-07

3.6.5 Procedure

Test Procedure

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

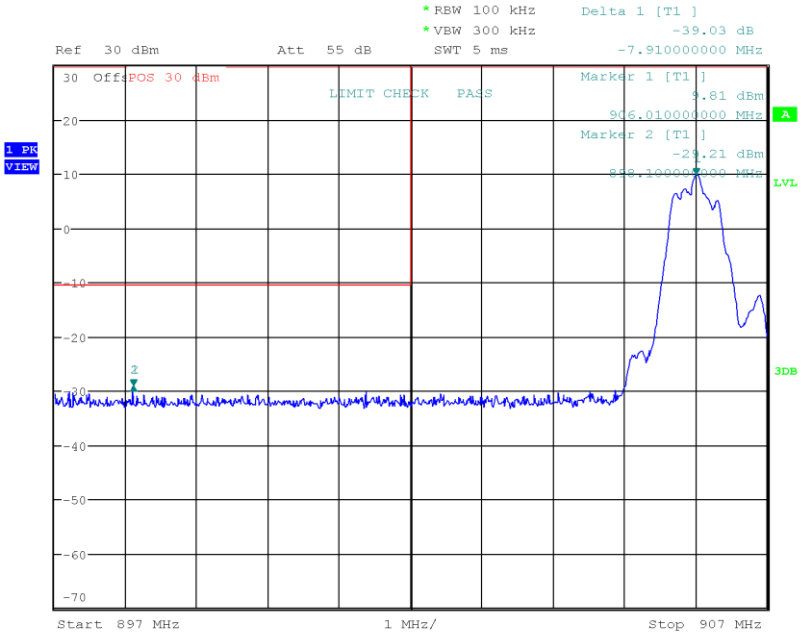
3.6.6 Results

Test Results (BPSK)				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
Transmit 1	906	-39.03	-20	PASS
Transmit 1	924	-39.94	-20	PASS

Test Results (QPSK)				
Mode	Channel [MHz]	Out-of-band Attenuation [dB]	Limit [dB]	Verdict
Transmit 2	906	-39.39	-20	PASS
Transmit 2	924	-38.92	-20	PASS

Band-edge Compliance

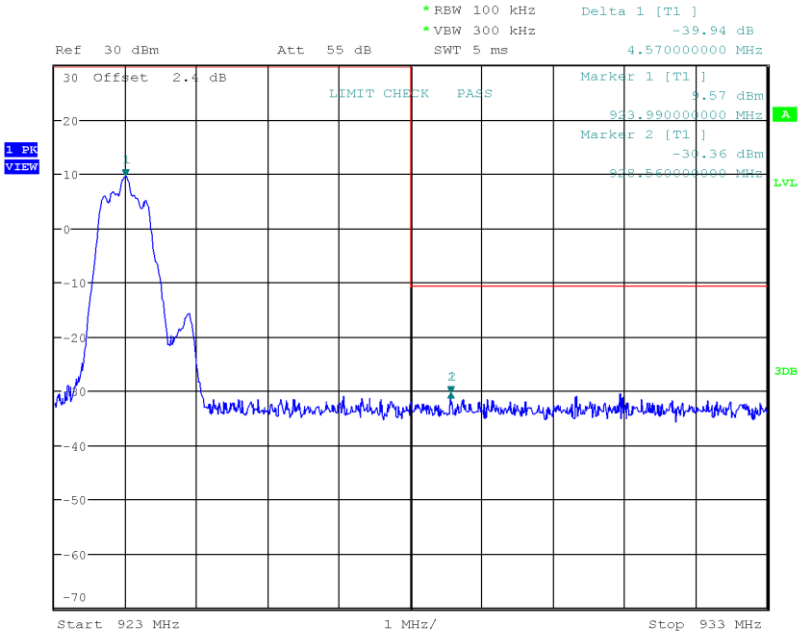
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	BPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Band-edge	Lower
In-band Frequency [MHz]:	906.01
Max. in-band Level [dBm/100 kHz]:	9.814
Out-of-band Frequency [MHz]:	898.1
Max. out-of-band Level [dBm/100 kHz]:	-29.214
Attenuation [dB]:	-39.03



Date: 6.DEC.2017 09:28:12

Band-edge Compliance

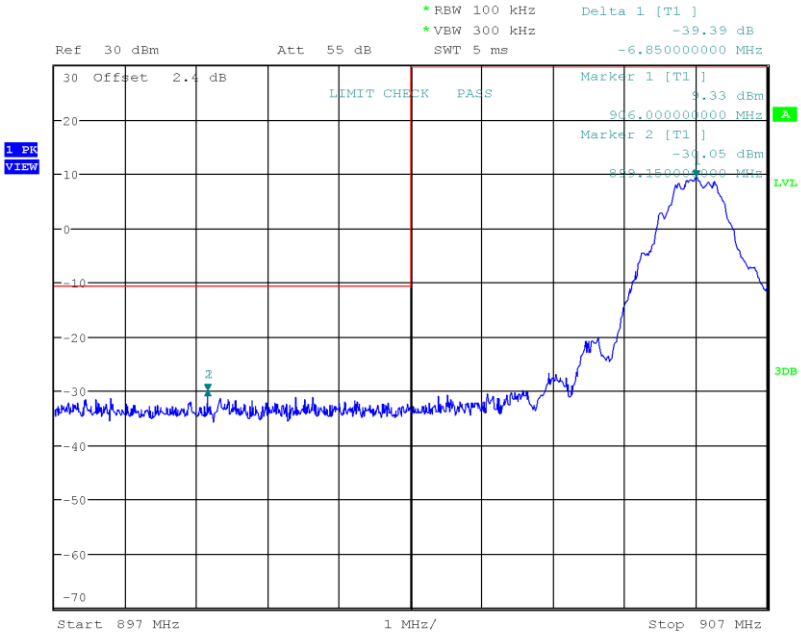
Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	BPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Band-edge	Upper
In-band Frequency [MHz]:	923.99
Max. in-band Level [dBm/100 kHz]:	9.572
Out-of-band Frequency [MHz]:	928.56
Max. out-of-band Level [dBm/100 kHz]:	-30.364
Attenuation [dB]:	-39.94



Date: 6.DEC.2017 09:41:58

Band-edge Compliance

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	QPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Band-edge	Lower
In-band Frequency [MHz]:	906.0
Max. in-band Level [dBm/100 kHz]:	9.333
Out-of-band Frequency [MHz]:	899.15
Max. out-of-band Level [dBm/100 kHz]:	-30.055
Attenuation [dB]:	-39.39



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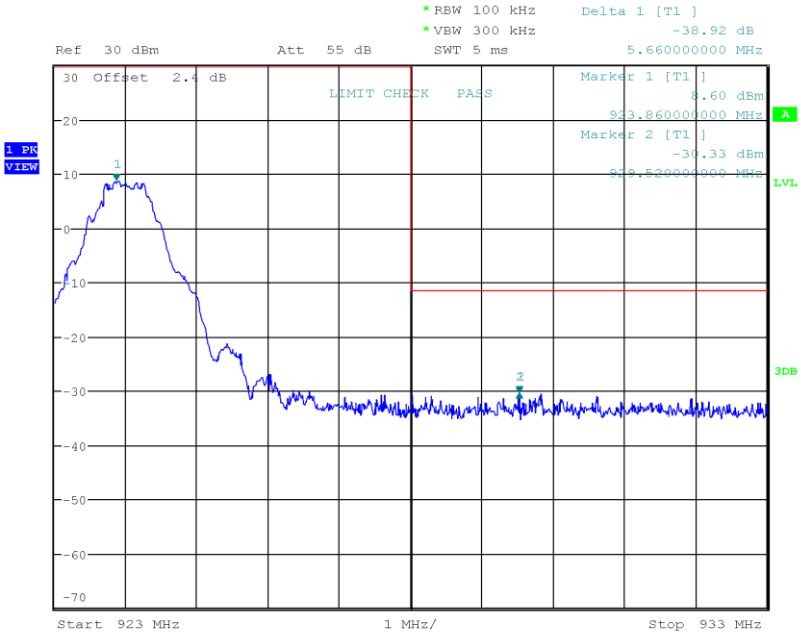
Band-edge Compliance

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	QPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Band-edge	Upper
In-band Frequency [MHz]:	923.86
Max. in-band Level [dBm/100 kHz]:	8.597
Out-of-band Frequency [MHz]:	929.52
Max. out-of-band Level [dBm/100 kHz]:	-30.328
Attenuation [dB]:	-38.92



Date: 6.DEC.2017 10:08:22

3.7 Test Conditions and Results - Conducted spurious emissions

3.7.1 Information

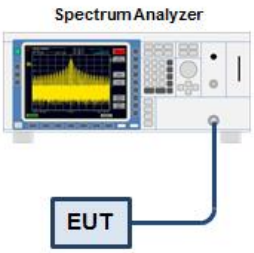
Test Information	
Reference	FCC 15.247(d) / ISED RSS-247 5.5
Measurement Method	ANSI C63.10 11.11
Operator	Wilfried Treffke
Date	2017-12-06

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	2017-07	2018-07

3.7.5 Procedure

Test Procedure

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

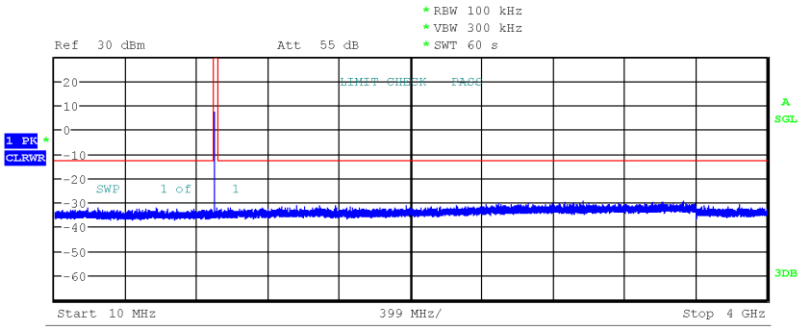
3.7.6 Results

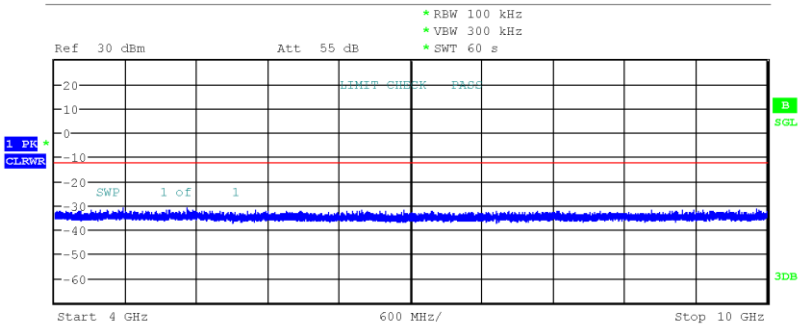
Test Results (BPSK)		
Mode	Channel [MHz]	Verdict
Transmit-1	906	PASS
Transmit-1	914	PASS
Transmit-1	924	PASS

Test Results (QPSK)		
Mode	Channel [MHz]	Verdict
Transmit-2	906	PASS
Transmit-2	914	PASS
Transmit-2	924	PASS

Conducted Spurious Emissions

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	BPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Max. in-band Frequency [MHz]:	906.0
Max. in-band Level [dBm/100 kHz]:	7.5
Out-of-band Limit [dBm/100 kHz]:	-12.5

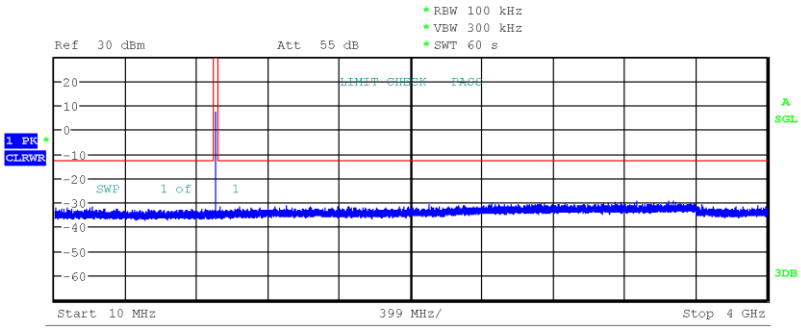


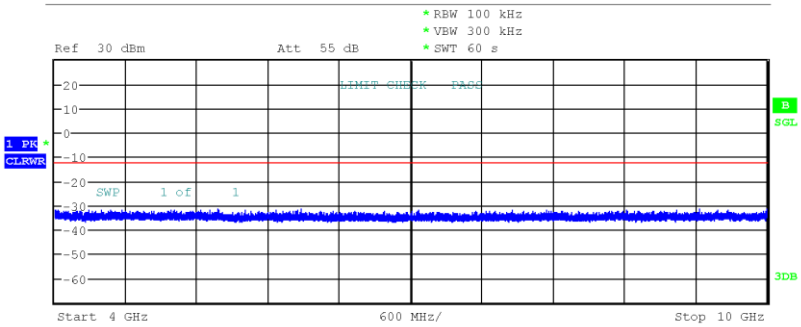


Date: 6.DEC.2017 10:32:49

Conducted Spurious Emissions

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	BPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Max. in-band Frequency [MHz]:	914.0
Max. in-band Level [dBm/100 kHz]:	7.4
Out-of-band Limit [dBm/100 kHz]:	-12.6

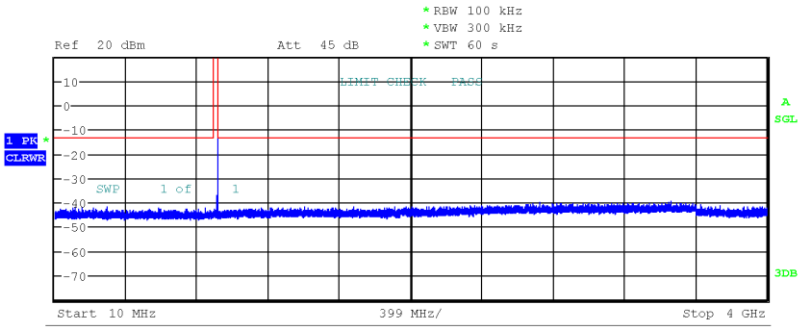


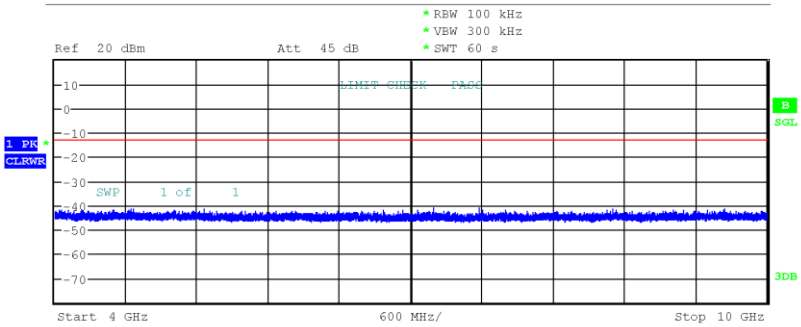


Date: 6.DEC.2017 11:09:20

Conducted Spurious Emissions

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	BPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Max. in-band Frequency [MHz]:	924.0
Max. in-band Level [dBm/100 kHz]:	7.2
Out-of-band Limit [dBm/100 kHz]:	-12.8

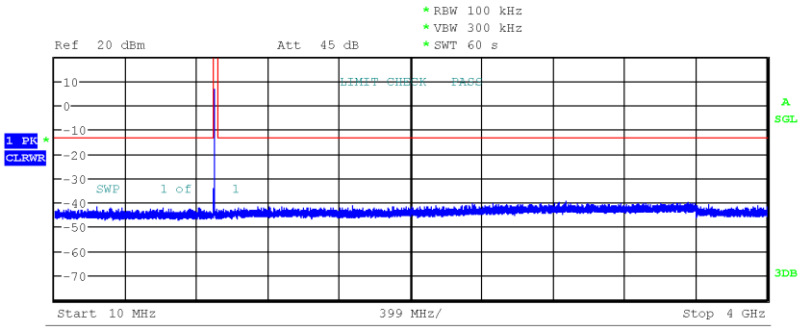


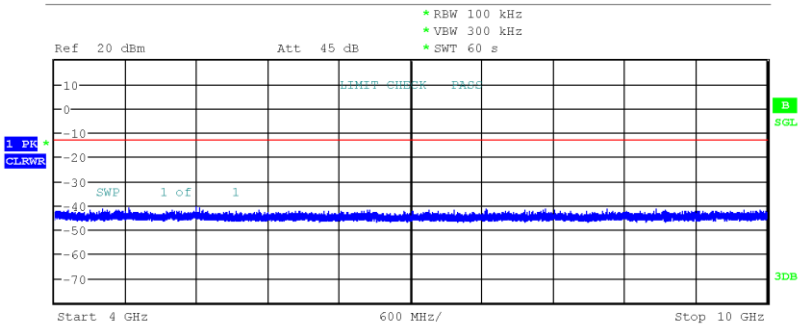


Date: 6.DEC.2017 11:14:44

Conducted Spurious Emissions

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	QPSK, Channel: 1, 906 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Max. in-band Frequency [MHz]:	906.0
Max. in-band Level [dBm/100 kHz]:	7.0
Out-of-band Limit [dBm/100 kHz]:	-13.0

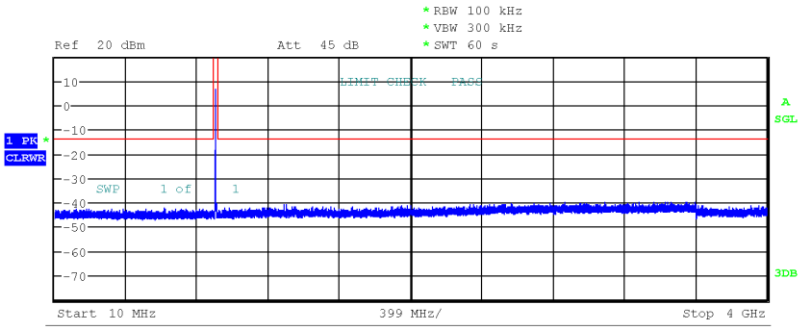


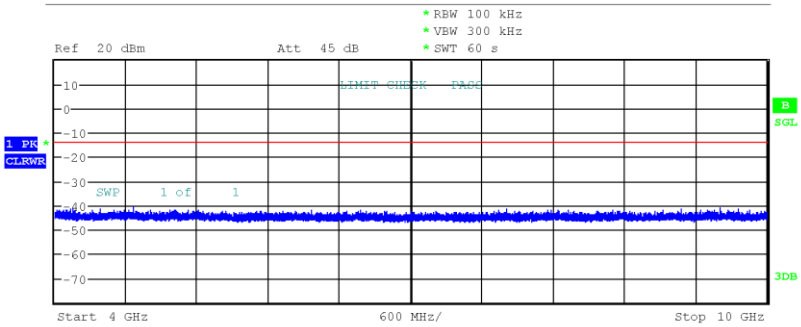


Date: 6.DEC.2017 11:19:35

Conducted Spurious Emissions

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	QPSK, Channel: 5, 914 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Max. in-band Frequency [MHz]:	914.0
Max. in-band Level [dBm/100 kHz]:	6.5
Out-of-band Limit [dBm/100 kHz]:	-13.5

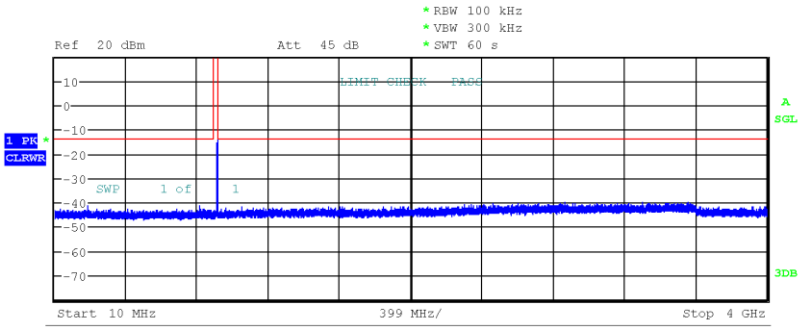


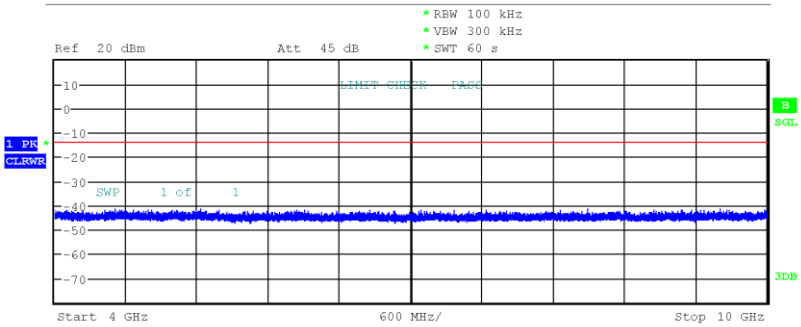


Date: 6.DEC.2017 11:24:08

Conducted Spurious Emissions

Project Number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
Model Description:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Sample ID:	16232
Reference Standards:	FCC 15.247, RSS-247
Reference Method:	ANSI C63.10:2013, Section 11.11
Operational Mode:	QPSK, Channel: 10, 924 MHz
Operating Conditions:	Tnom/Vnom
Operator:	W. Treffke
Test Site:	Eurofins Product Service GmbH
Test Date:	2017-12-12
Max. in-band Frequency [MHz]:	923.9
Max. in-band Level [dBm/100 kHz]:	6.4
Out-of-band Limit [dBm/100 kHz]:	-13.6





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3.8 Test Conditions and Results - Transmitter radiated emissions

3.8.1 Information

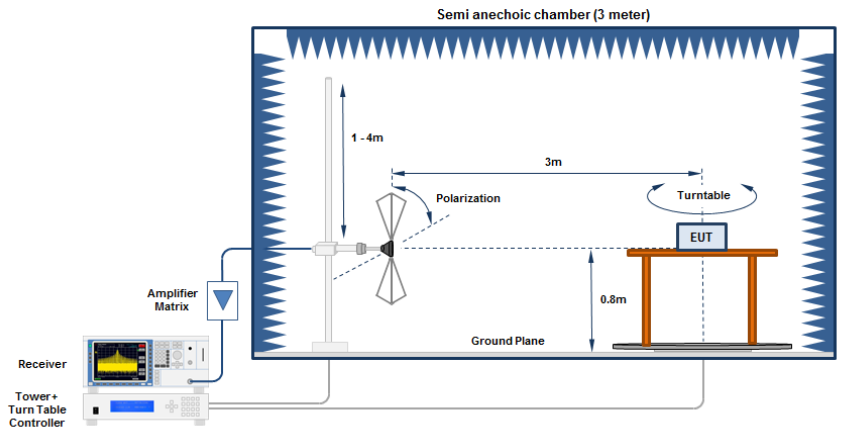
Test Information	
Reference	FCC 15.247(d) / ISED RSS-GEN 8.9
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2017-12-06

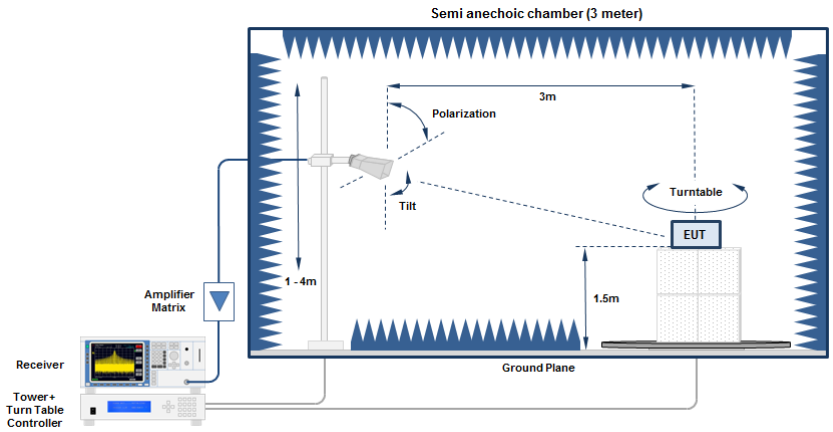
3.8.2 Limits

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	R&S	ESU 26	EF00887	2017-07	2018-07
Antenna	R&S	HK 116	EF00012	2016-05	2019-05
Antenna	R&S	HL 223	EF00187	2016-05	2019-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Measurement Receiver	R&S	ESU 26	EF00887	2017-07	2018-07
Antenna	R&S	BBHA 9120D	EF00018	2016-09	2019-09
Antenna	Amplifier Research	AT4560	EF01152	2017-10	2018-10

3.8.5 Procedure

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

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

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

3.8.6 Results

Test Results (BPSK)						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
906	242.12	33.28	pk	hor	46.00	-12.72
906	3694	41.15	pk	hor	74.00	-32.85
906	4616	37.95	pk	ver	74.00	-36.05
914	242.769	33.41	pk	hor	46.00	-12.59
914	261.776	32.00	pk	hor	46.00	-14.00
914	3652	40.81	pk	hor	74.00	-33.19
914	3652	42.42	pk	ver	74.00	-31.58
924	3694	41.86	pk	hor	74.00	-32.14
924	3694	40.54	pk	ver	74.00	-33.46
Comment:	Test mode selection is based on pre-compliance measurement of all operational modes. The operational modes with BPSK modulation were selected for compliance tests.					

3.9 Test Conditions and Results - Receiver radiated emissions

3.9.1 Information

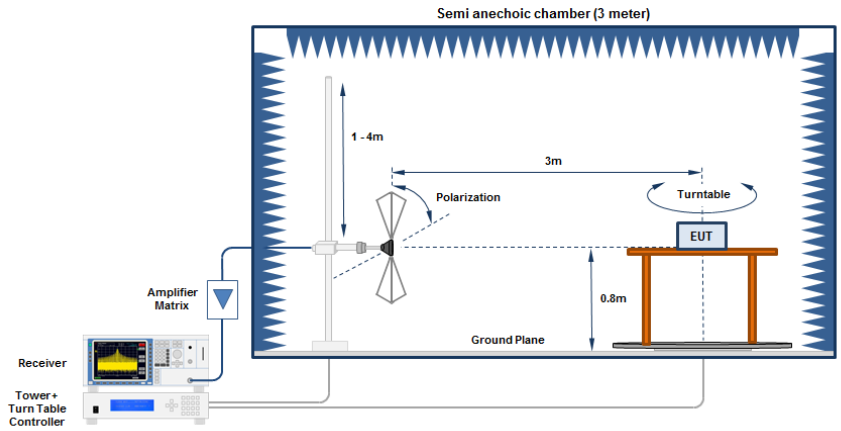
Test Information	
Reference	ISED RSS-247 3.1
Measurement Method	ANSI C63.10 6.5, 6.6, 11.12
Operator	Wilfried Treffke
Date	2017-12-06

3.9.2 Limits

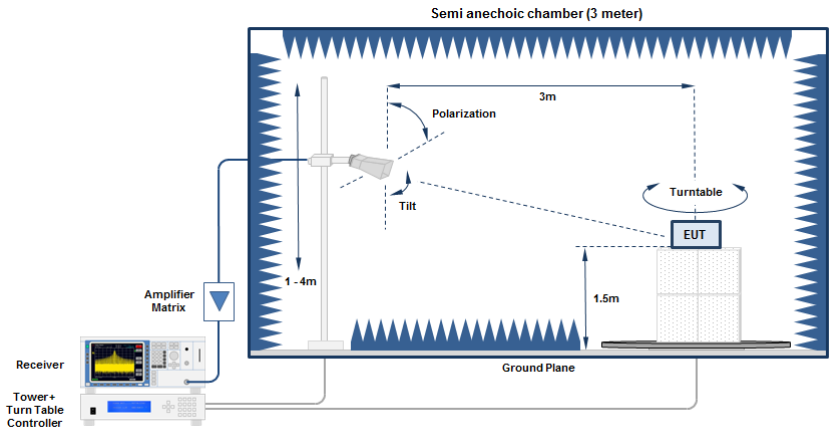
Limits			
Frequency [MHz]	Detector	Field strength [dBµV/m]	Measurement distance [m]
30 - 88	Quasi-Peak	100	3
88 - 216	Quasi-Peak	150	3
216 - 960	Quasi-Peak	200	3
960 - 1000	Quasi-Peak	500	3
>1000	Average	500	3

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	R&S	ESU 26	EF00887	2017-07	2018-07
Antenna	R&S	HK 116	EF00012	2016-05	2019-05
Antenna	R&S	HL 223	EF00187	2016-05	2019-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2017-02	2020-02
Measurement Receiver	R&S	ESU 26	EF00887	2017-07	2018-07
Antenna	R&S	BBHA 9120D	EF00018	2016-09	2019-09
Antenna	Amplifier Research	AT4560	EF01152	2017-10	2018-10

3.9.5 Procedure

Test Procedure 30 - 1000 MHz

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

Test Procedure > 1 GHz

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

3.9.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dBµV/m]	Det.	Pol.	Limit [dBµV/m]	Margin [dB]
914	884.8	32.32	pk	hor	46.00	-13.68

ANNEX A Transmitter radiated emissions

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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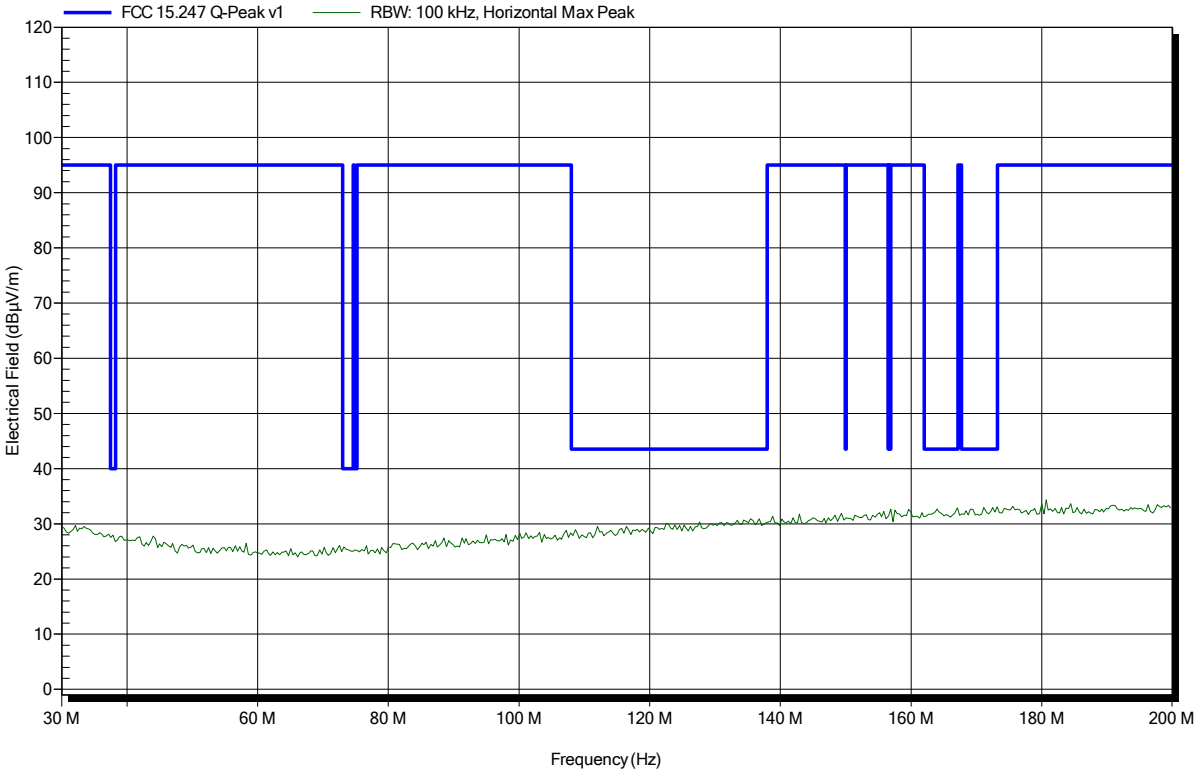

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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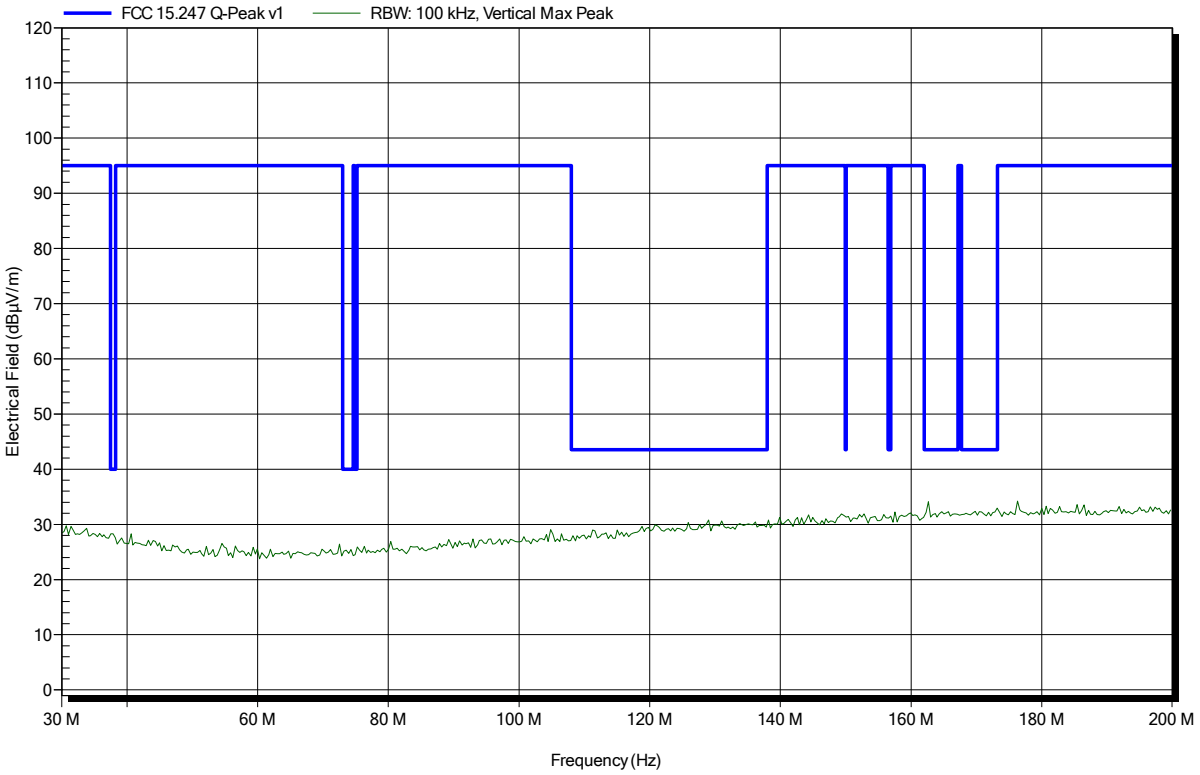

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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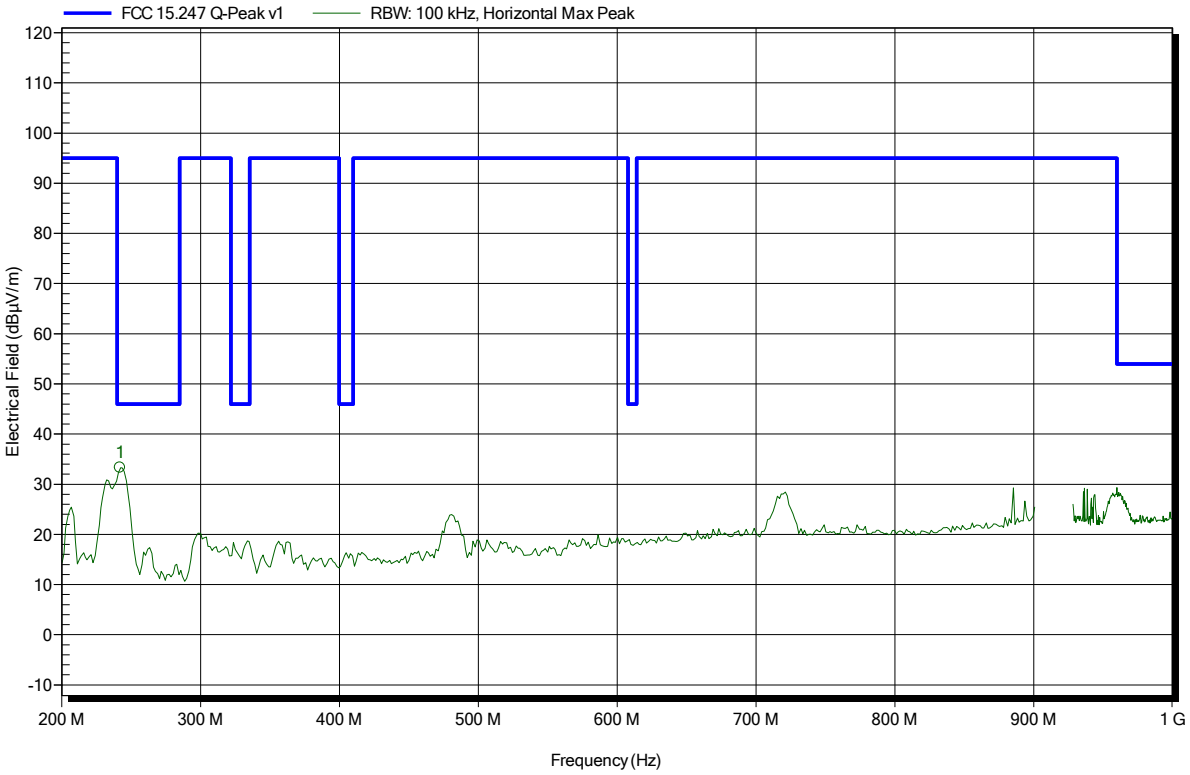

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
242.12 MHz	33.28 dBµV/m	46 dBµV/m	-12.72 dB	Pass

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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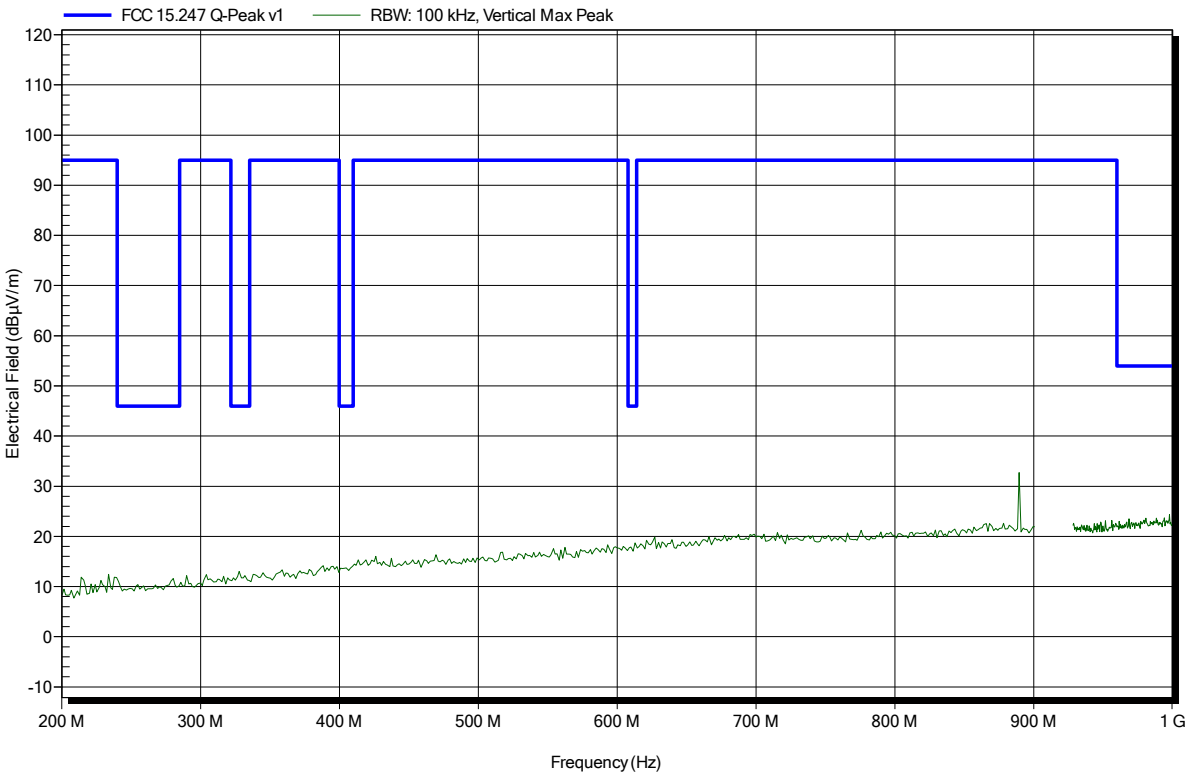

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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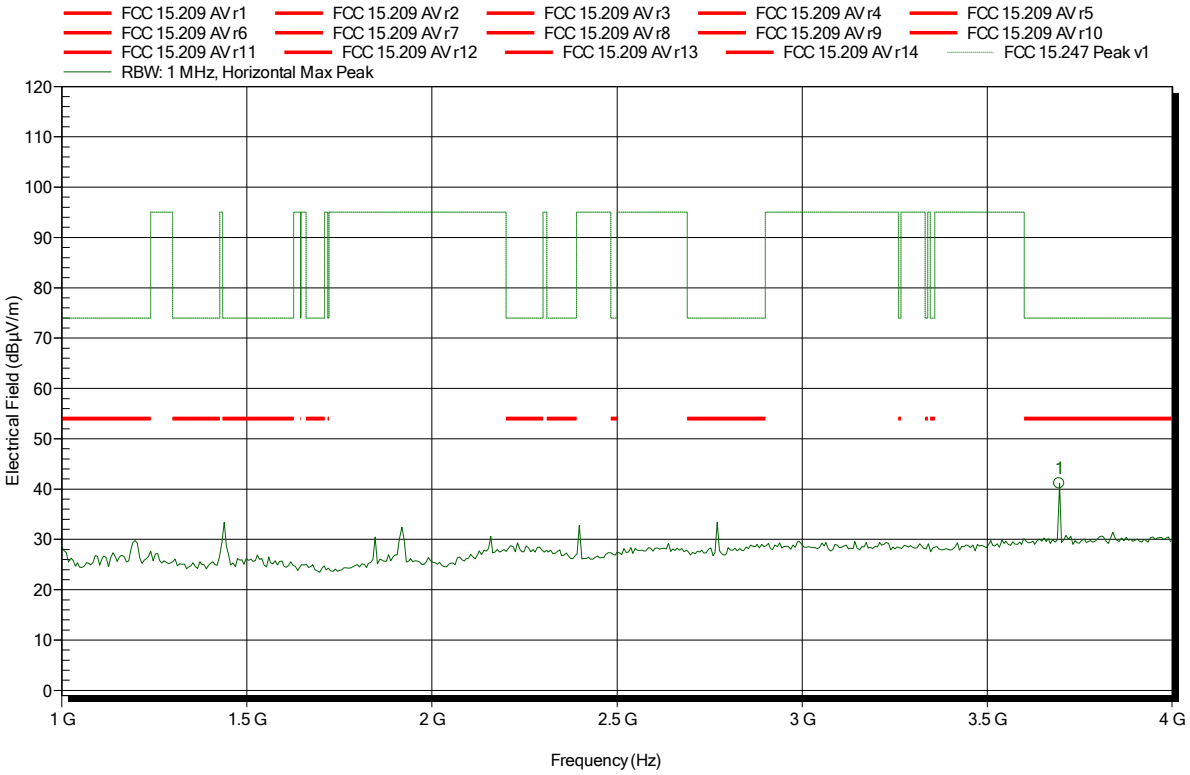

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.694 GHz	41.15 dBµV/m	74 dBµV/m	-32.85 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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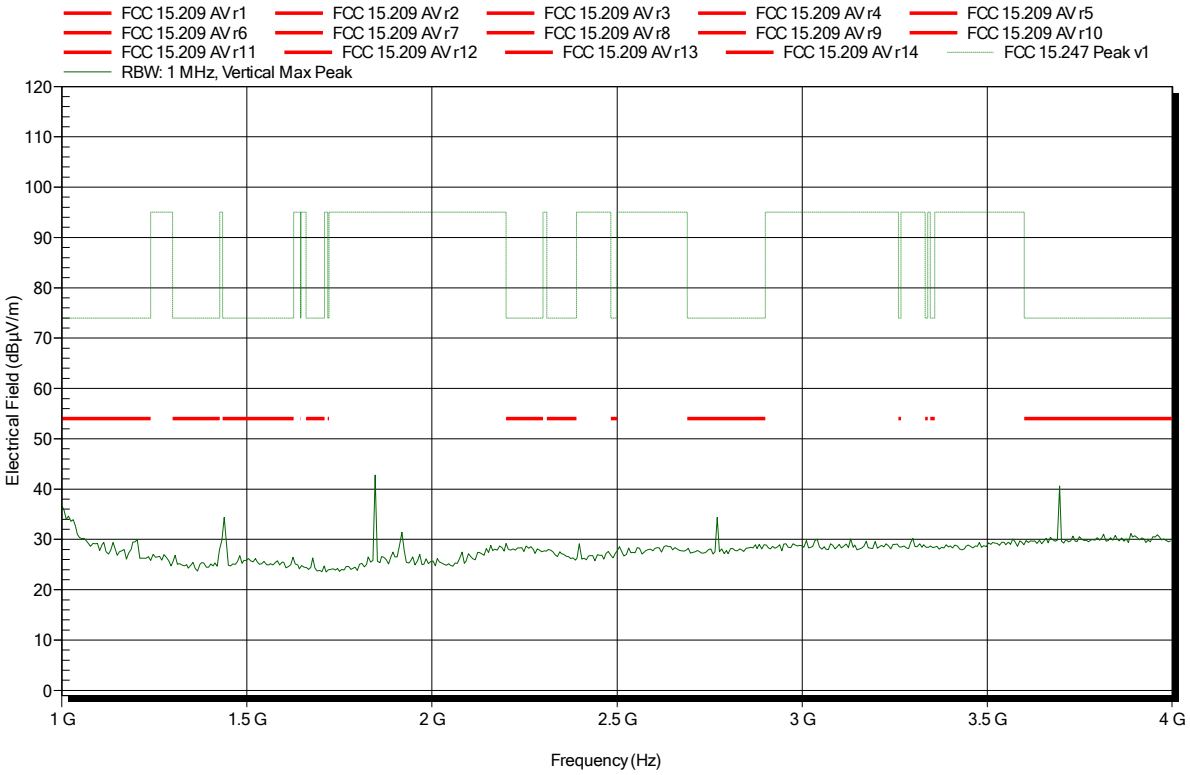

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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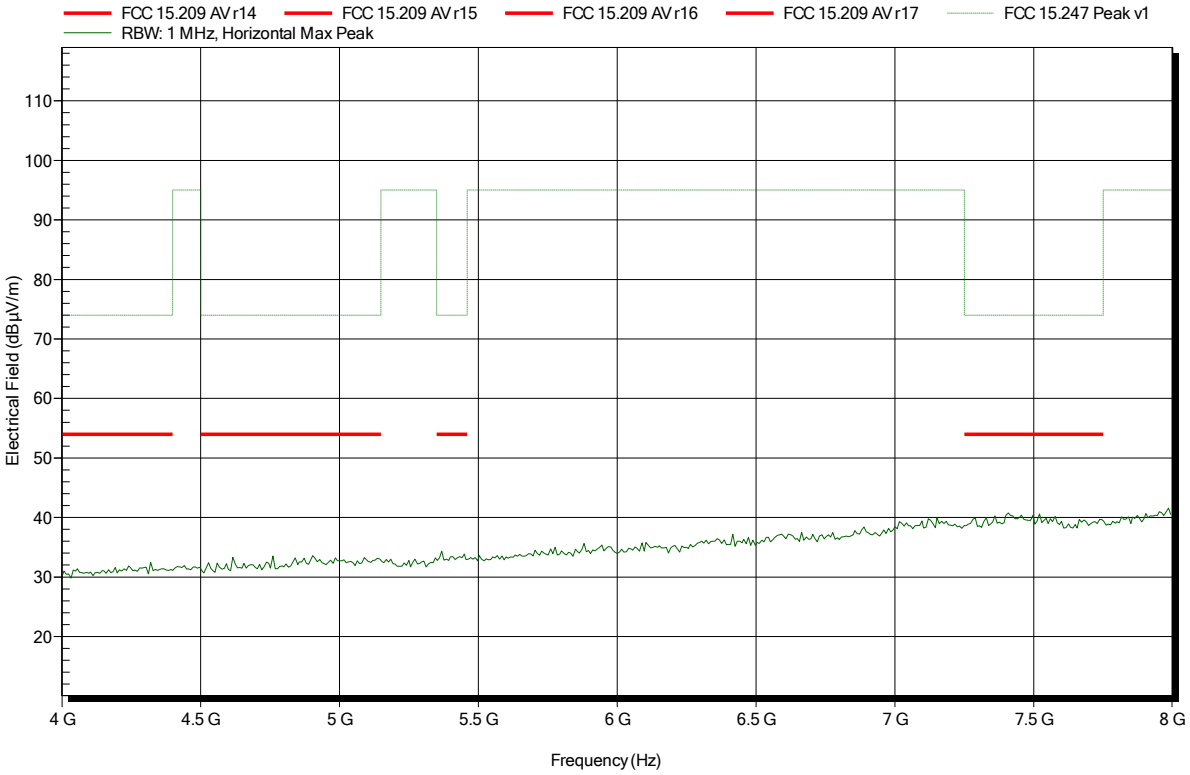

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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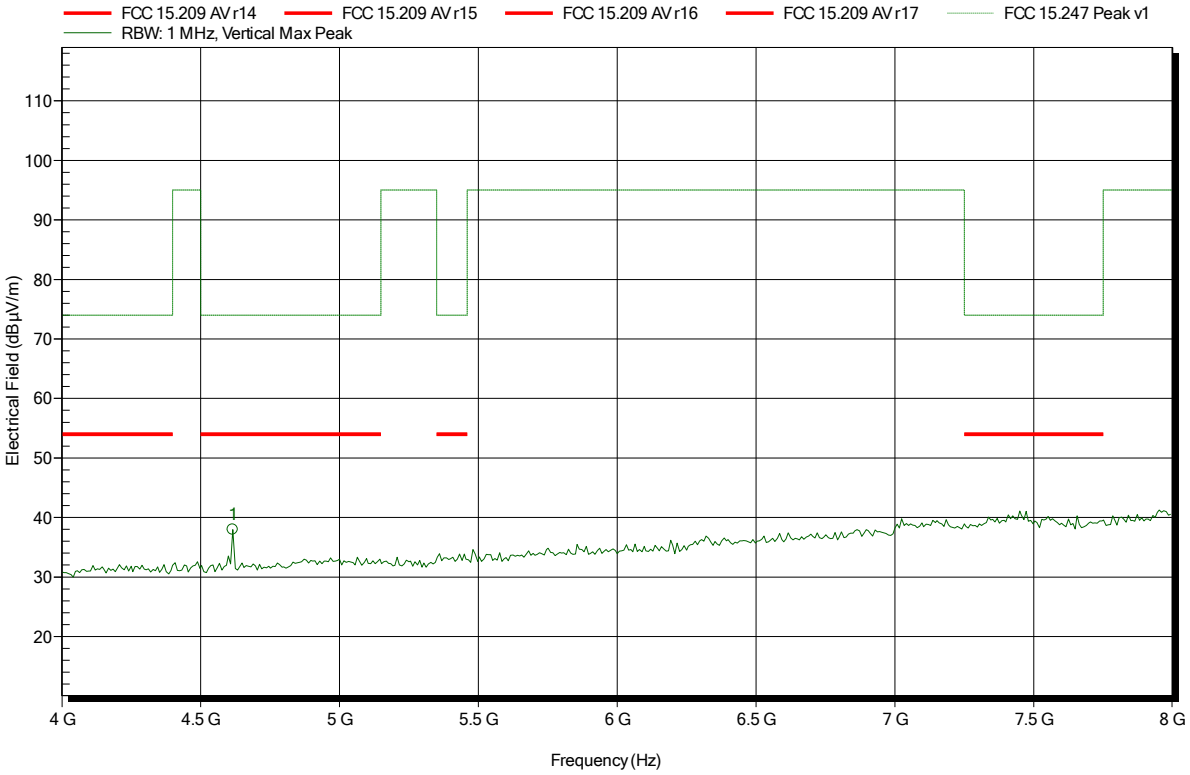

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.616 GHz	37.95 dBµV/m	74 dBµV/m	-36.05 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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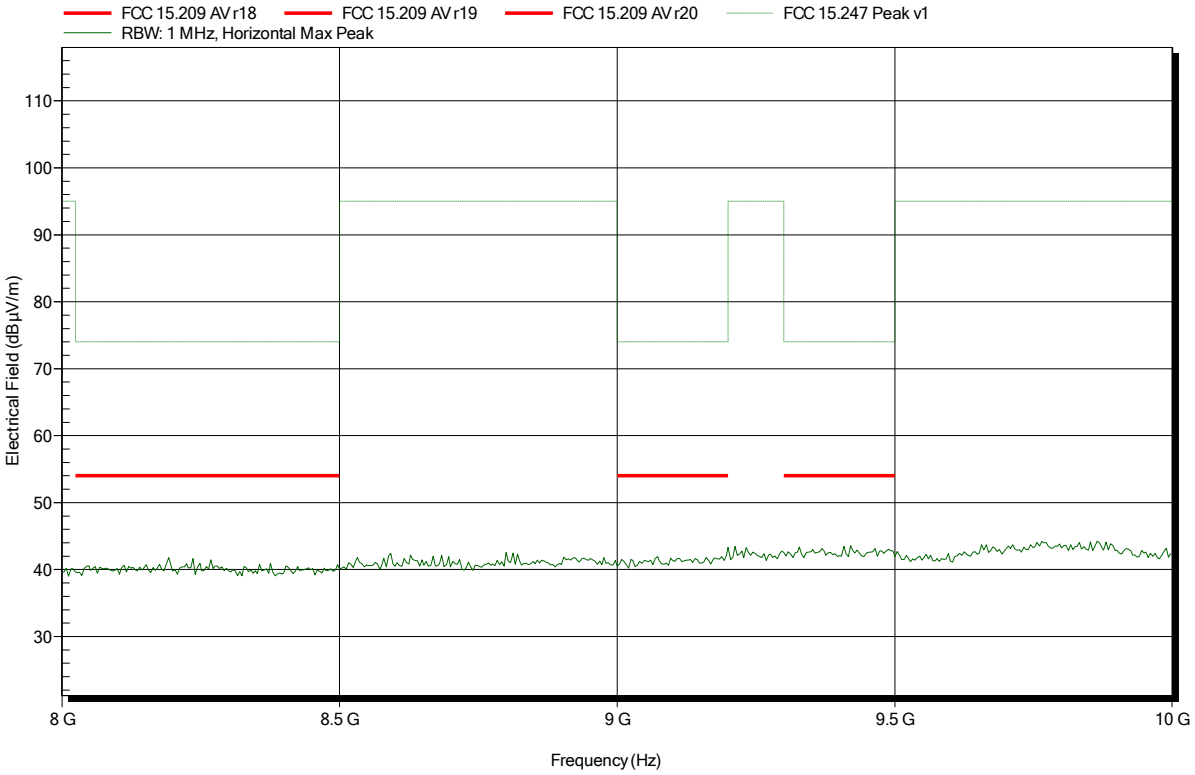

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 906 MHz
Test Date:	2017-12-12
Note:	

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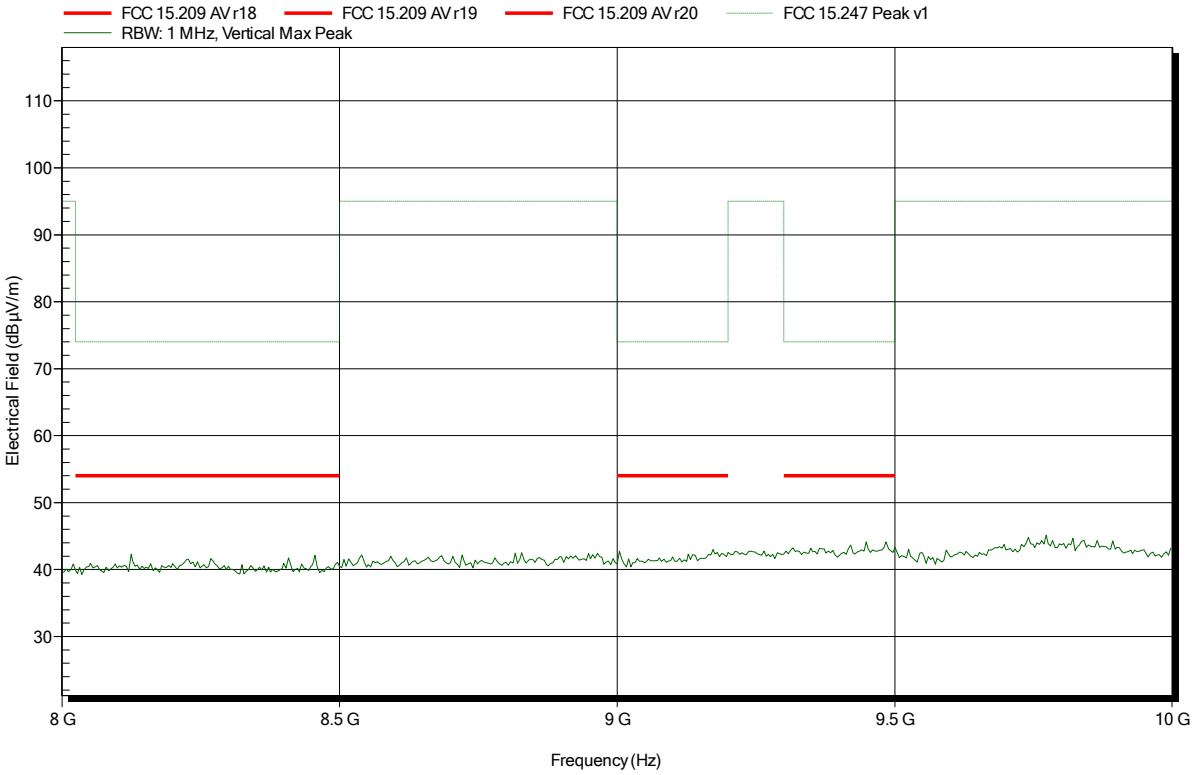

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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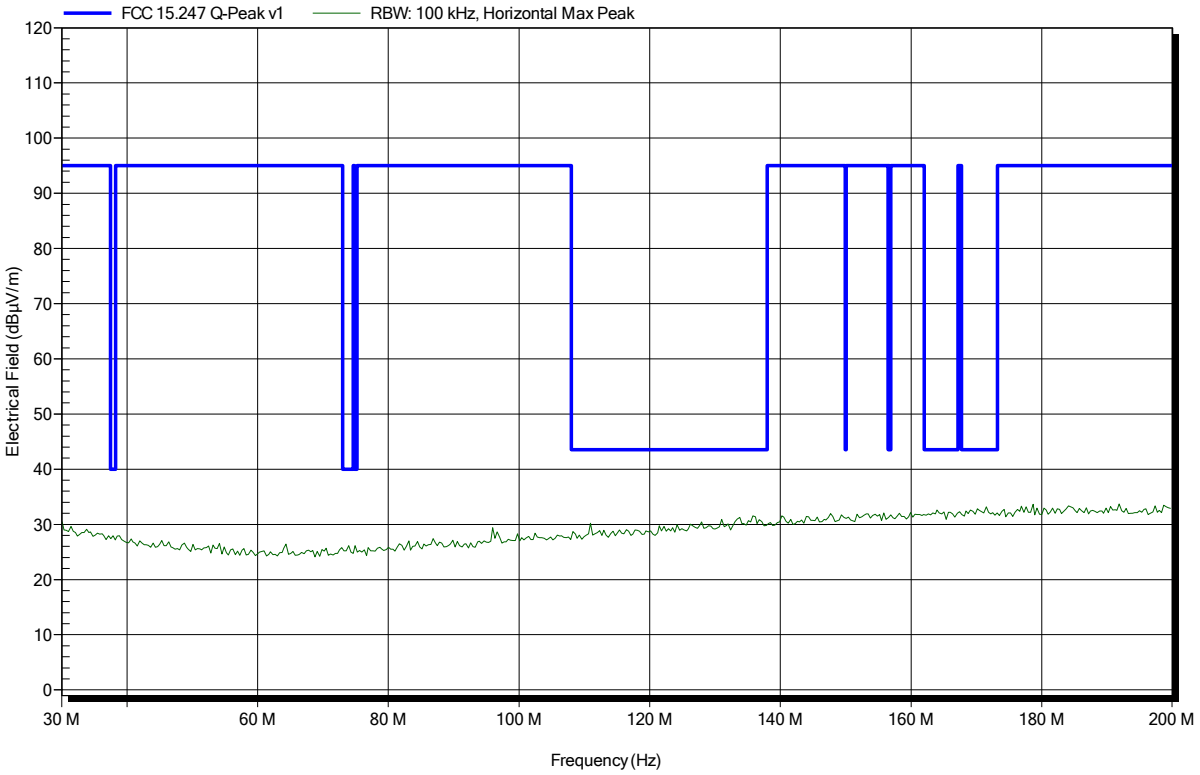

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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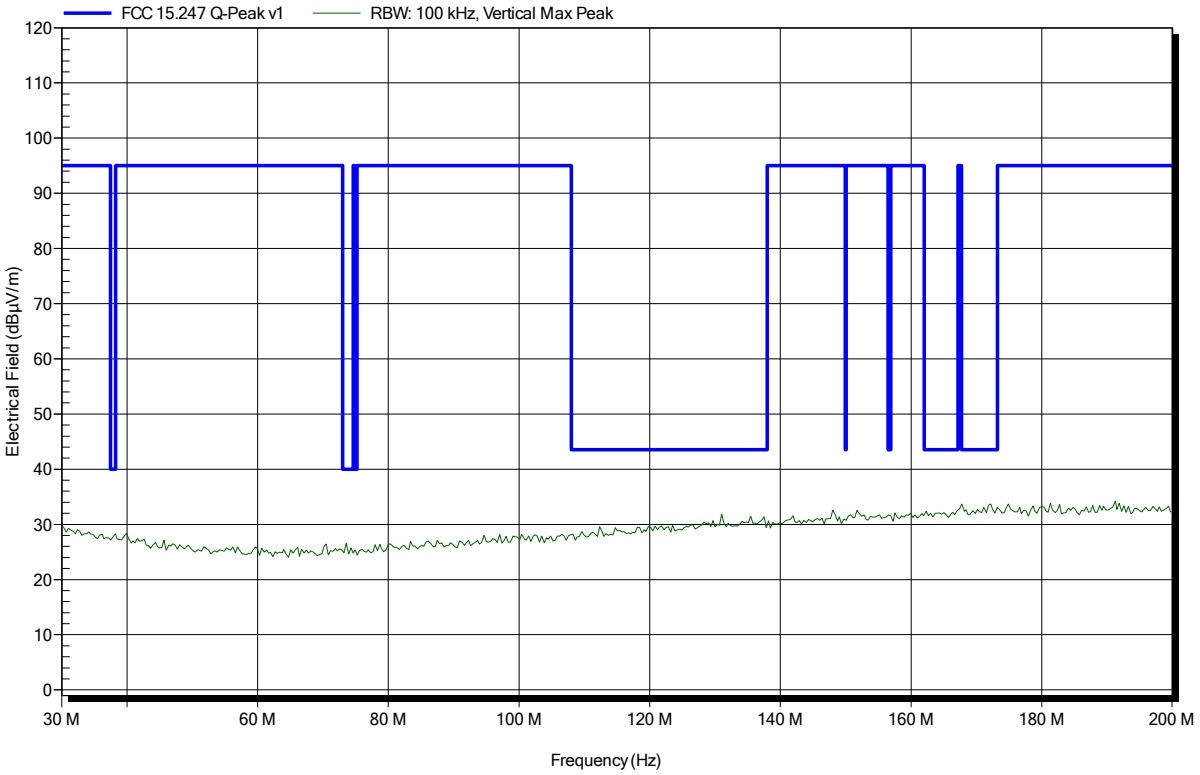

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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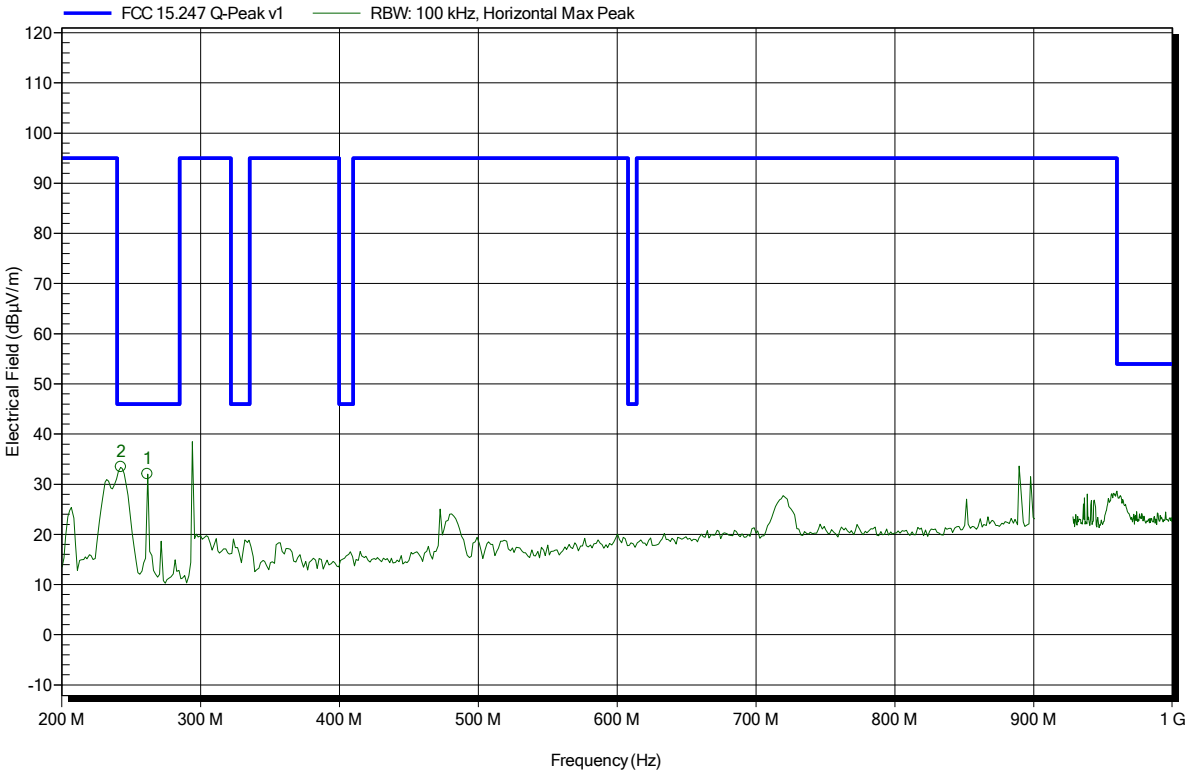

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
242.769 MHz	33.41 dBµV/m	46 dBµV/m	-12.59 dB	Pass
261.776 MHz	32 dBµV/m	46 dBµV/m	-14 dB	Pass

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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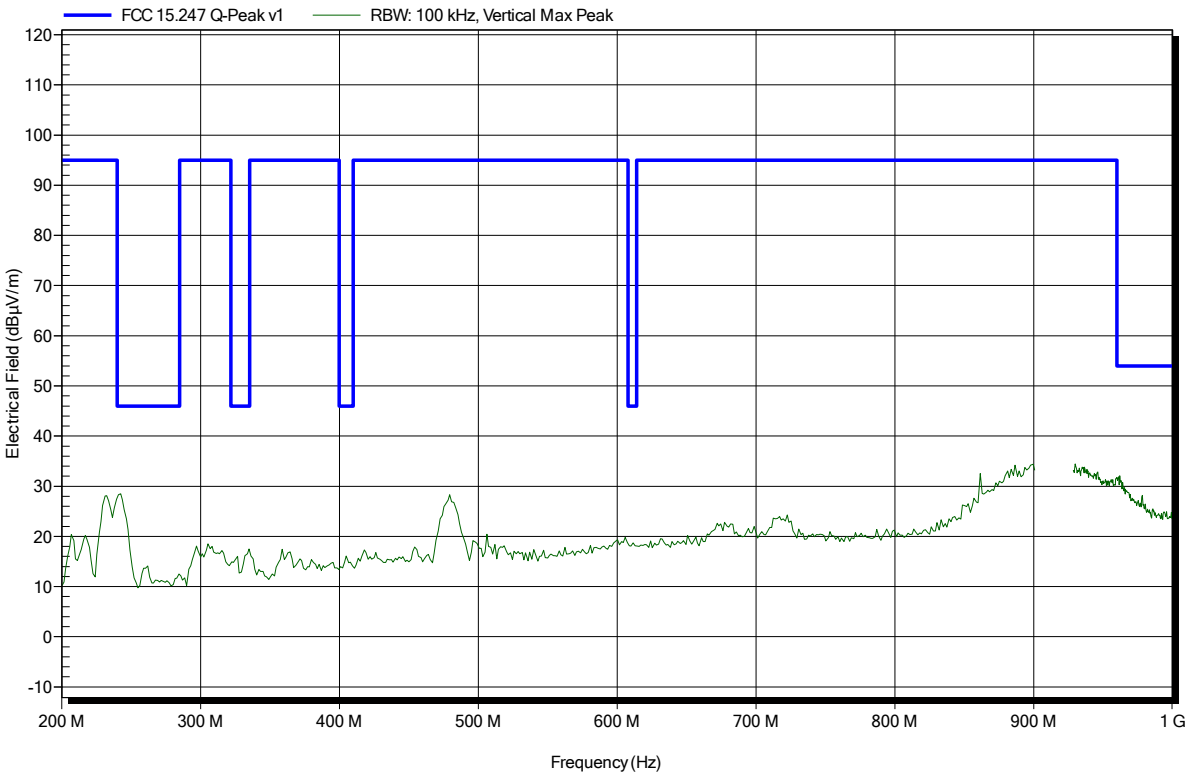

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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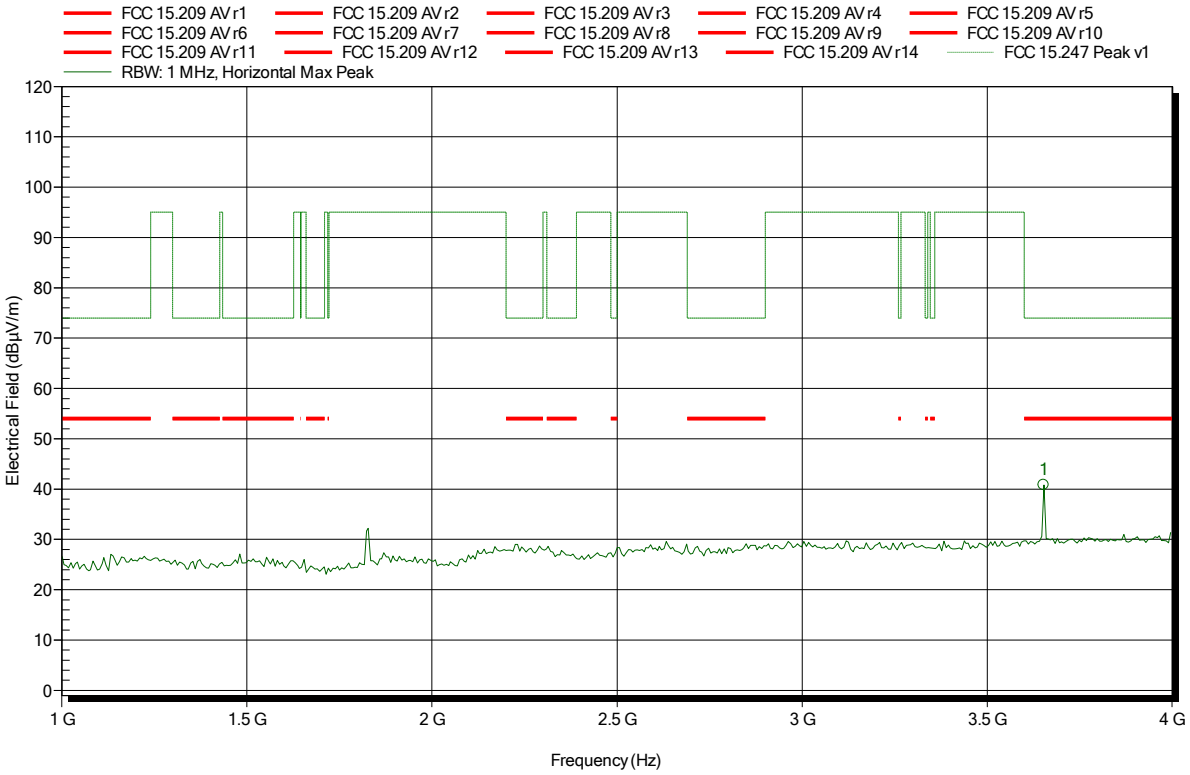

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.652 GHz	40.81 dBµV/m	74 dBµV/m	-33.19 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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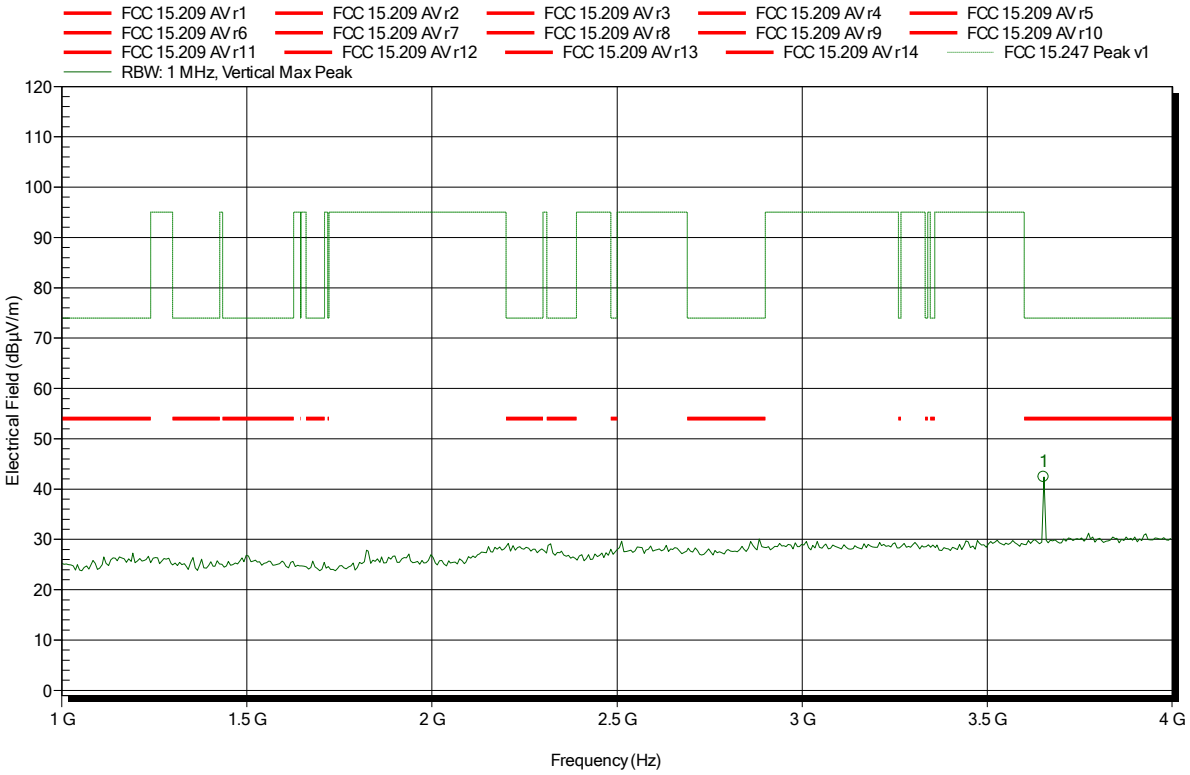

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.652 GHz	42.42 dBµV/m	74 dBµV/m	-31.58 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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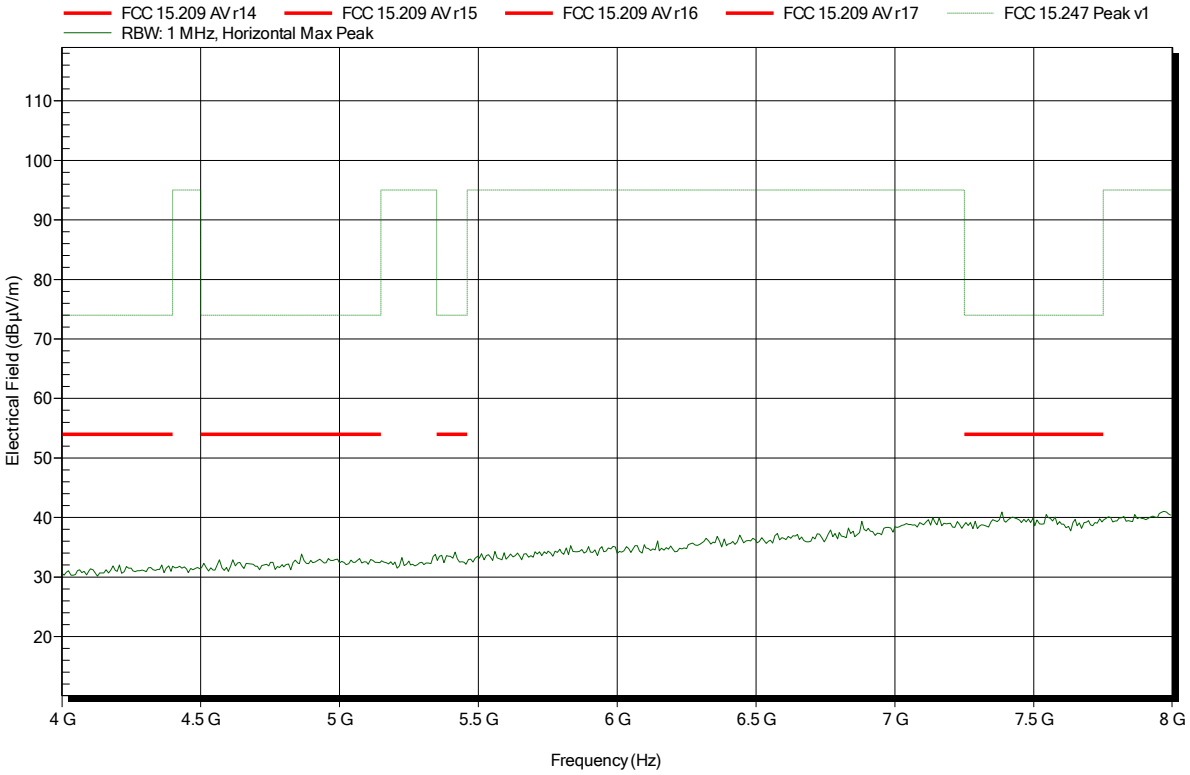

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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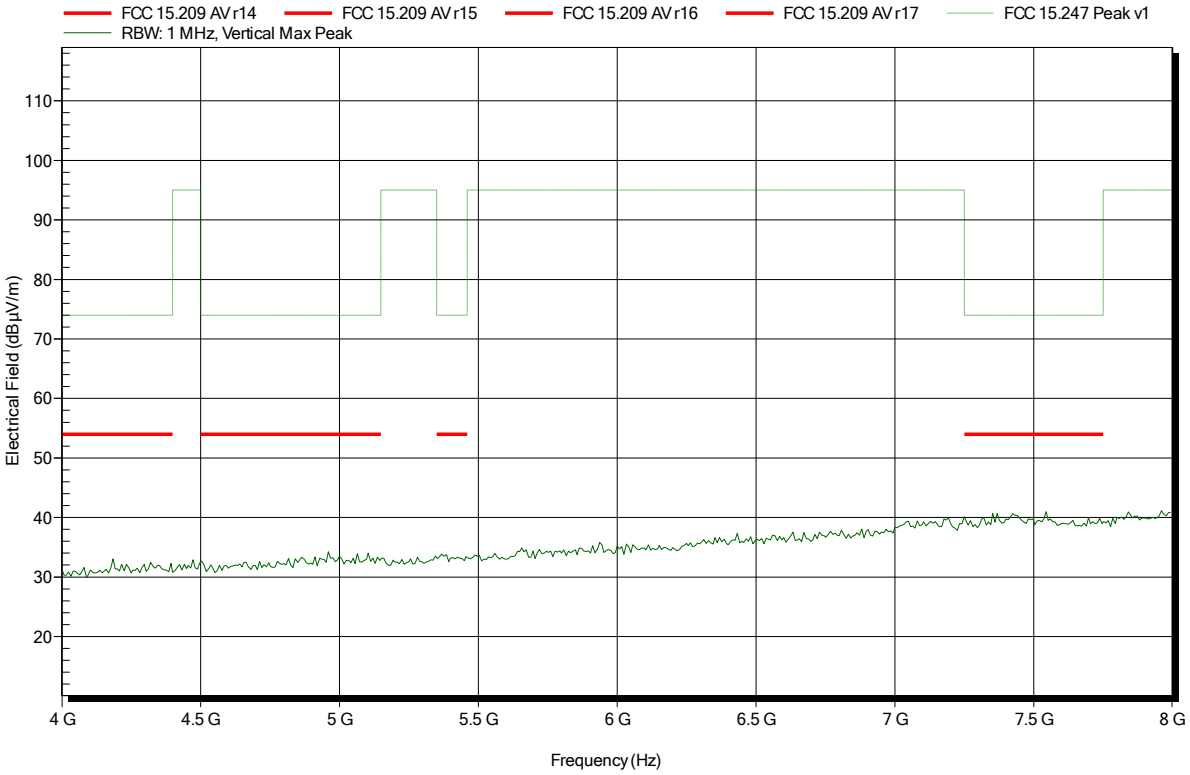

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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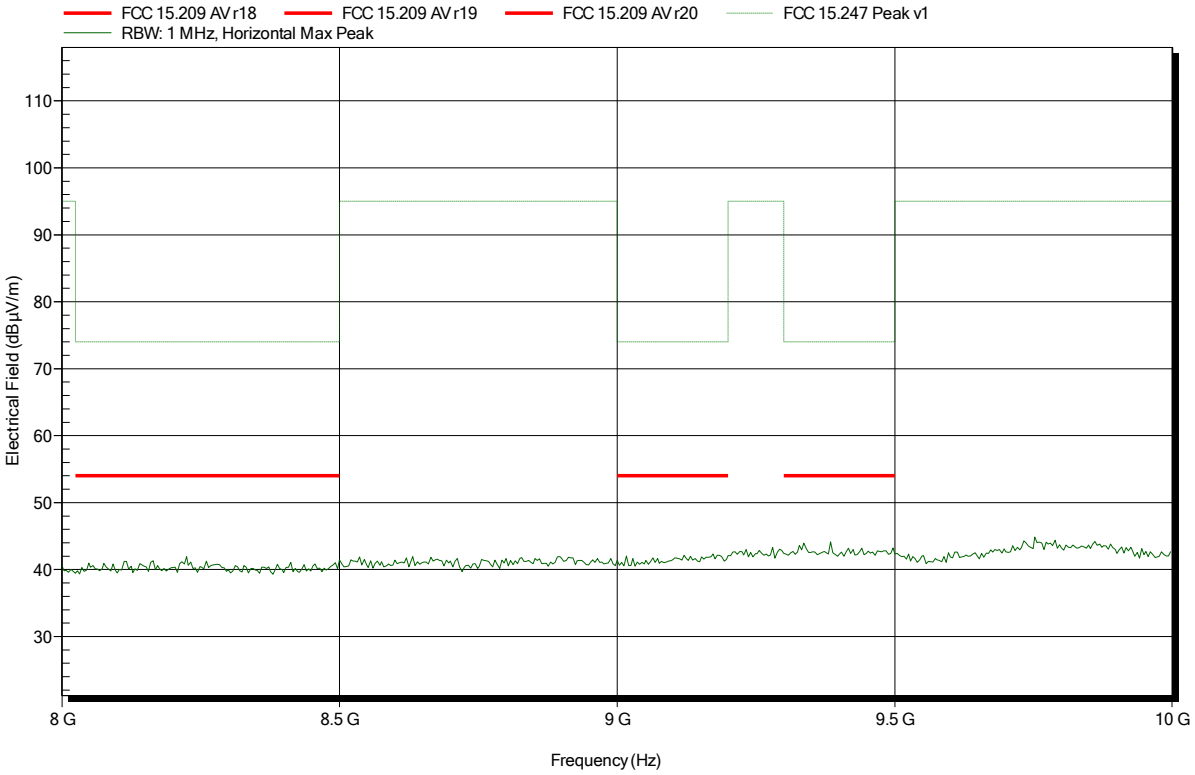

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 914 MHz
Test Date:	2017-12-12
Note:	

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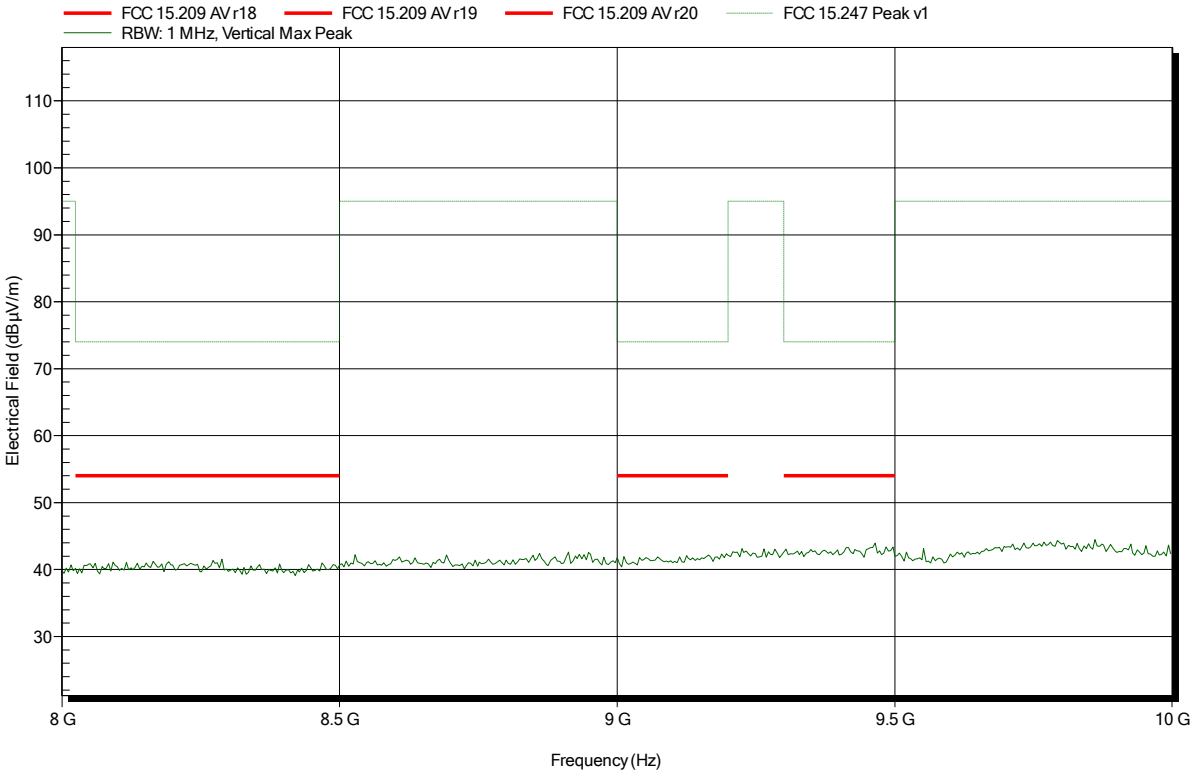

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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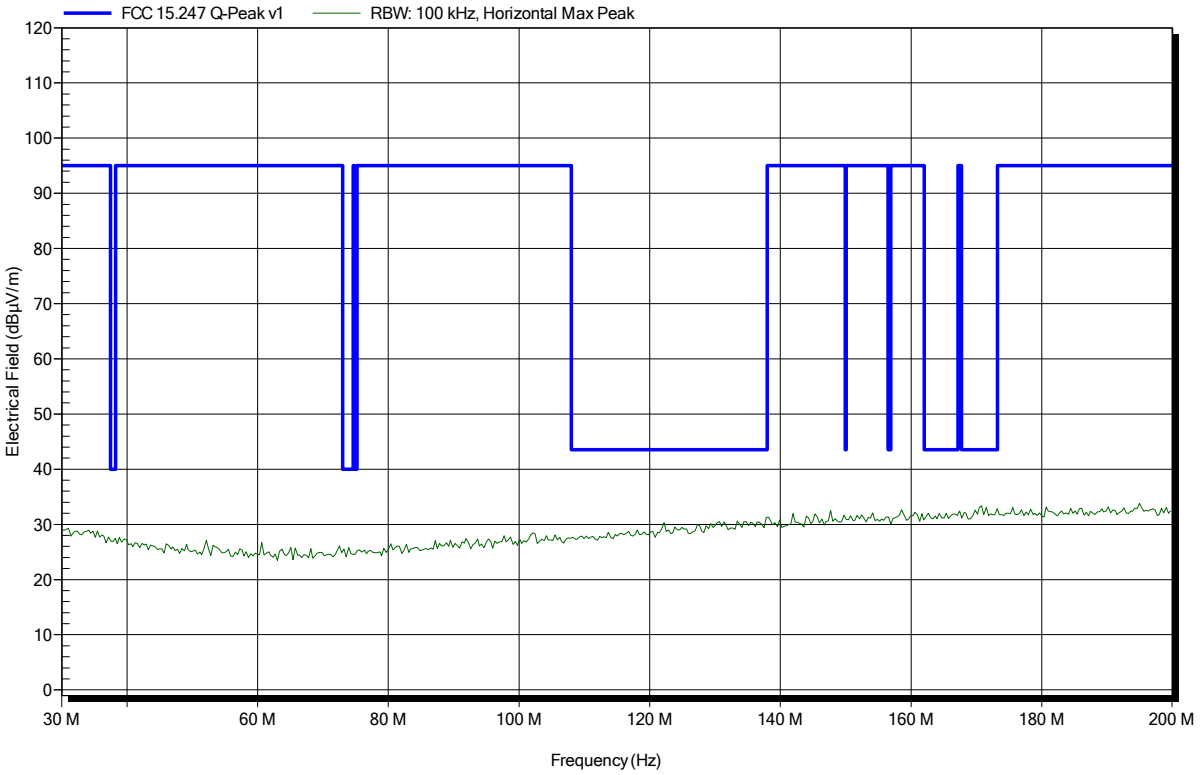

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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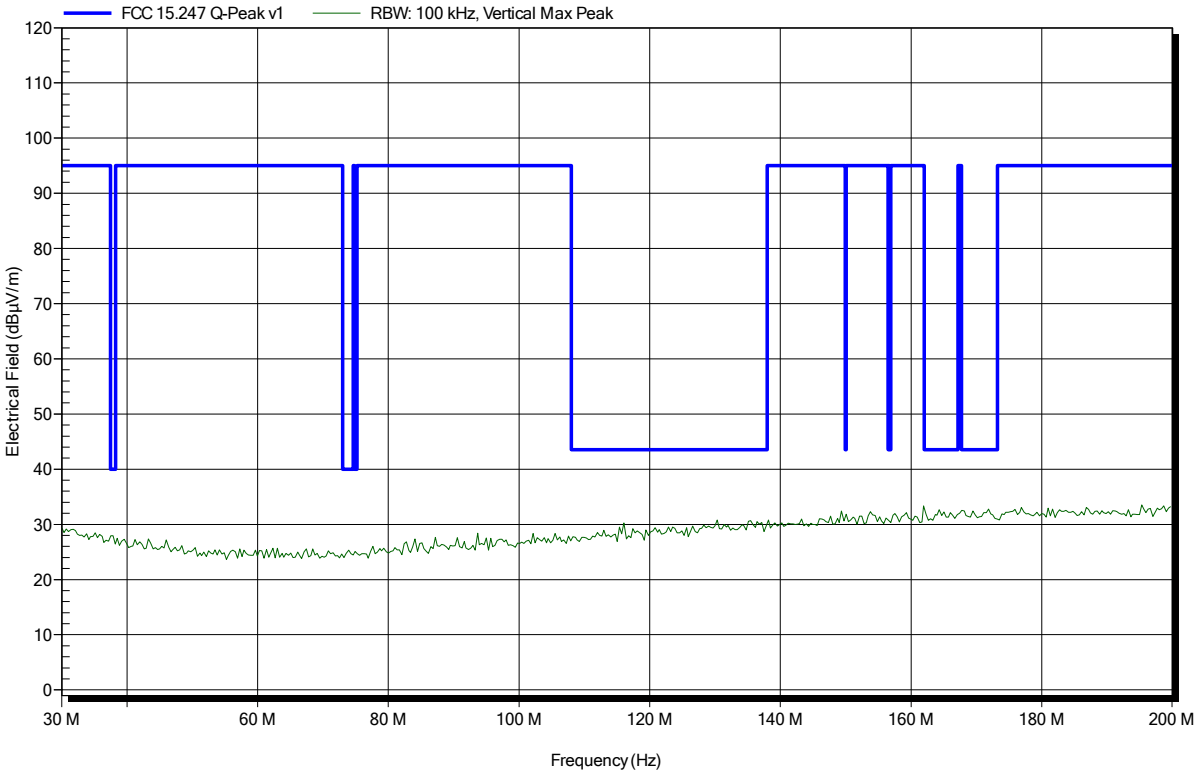

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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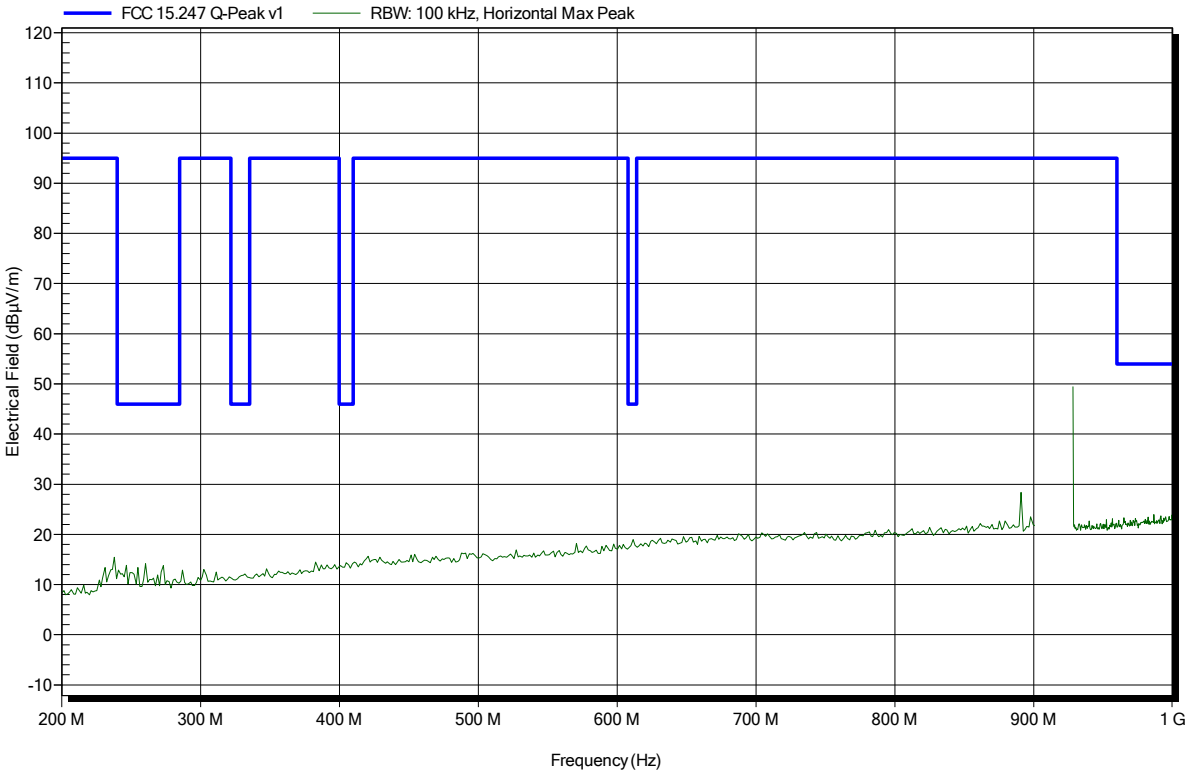

Spurious emissions according to FCC 15.247

Project number:	G0M-1711-7013
Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Abdullah Al Jamal
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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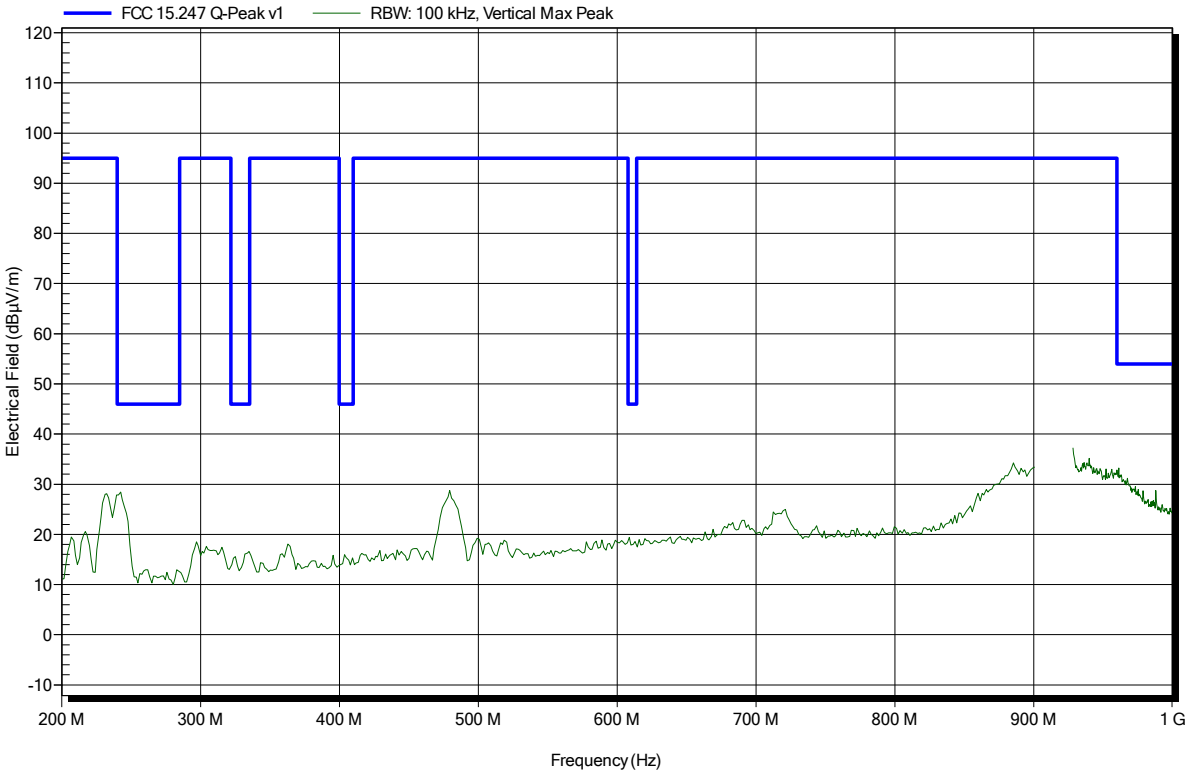

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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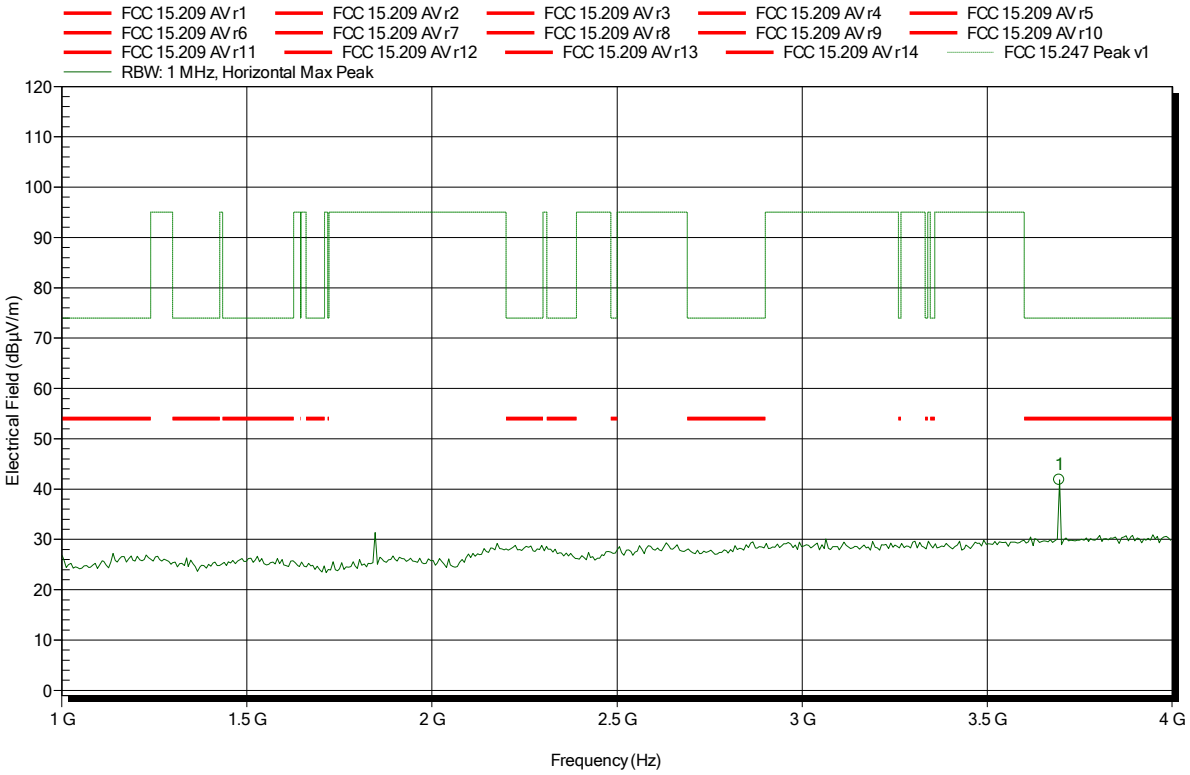

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.694 GHz	41.86 dBµV/m	74 dBµV/m	-32.14 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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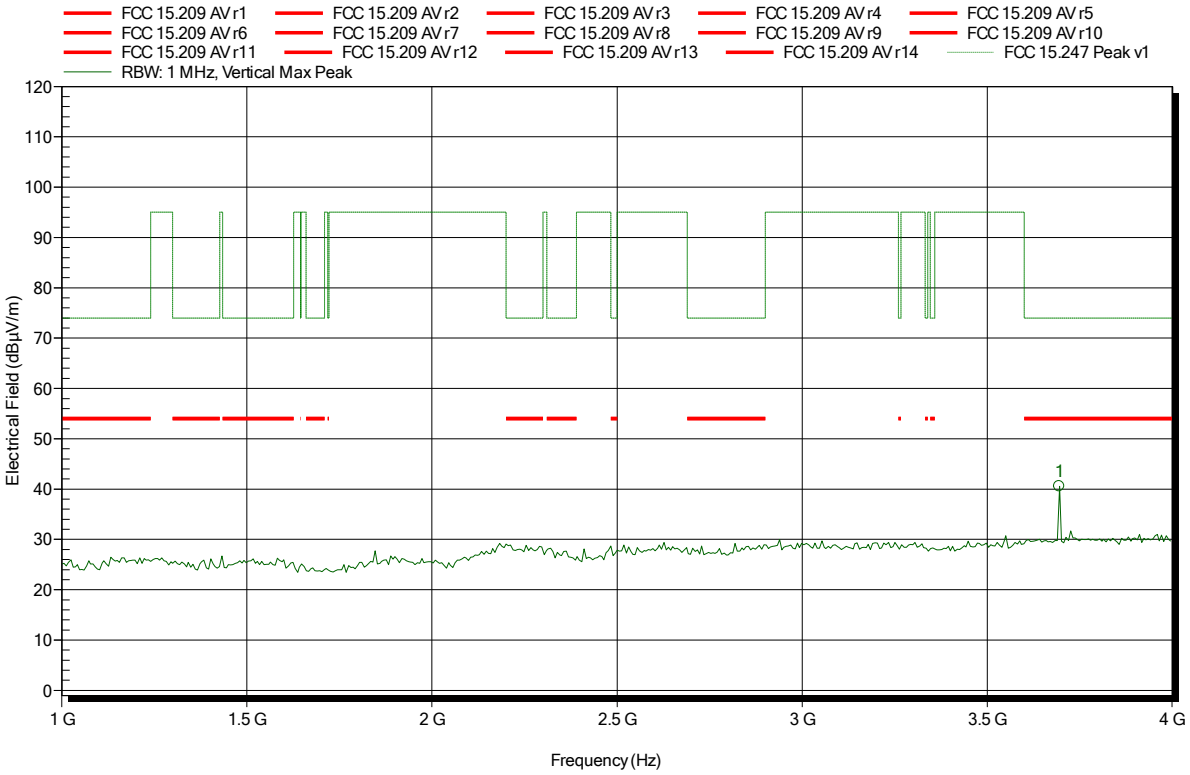

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
3.694 GHz	40.54 dBµV/m	74 dBµV/m	-33.46 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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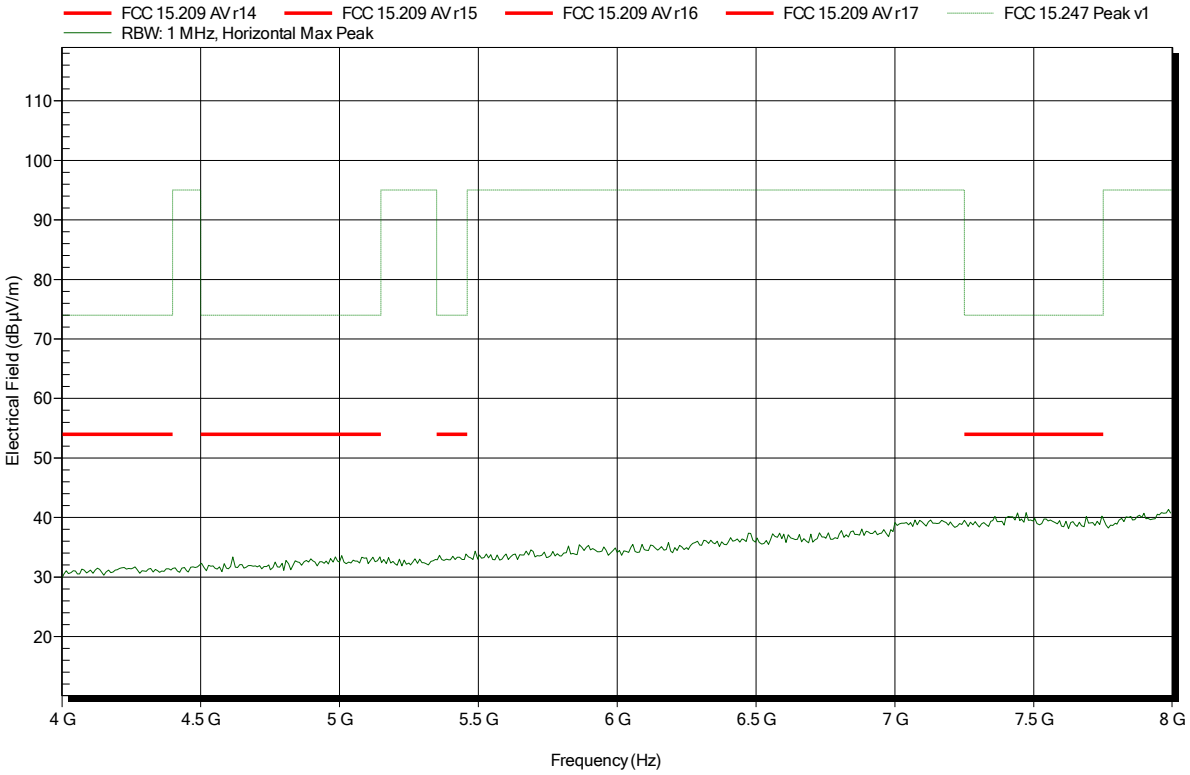

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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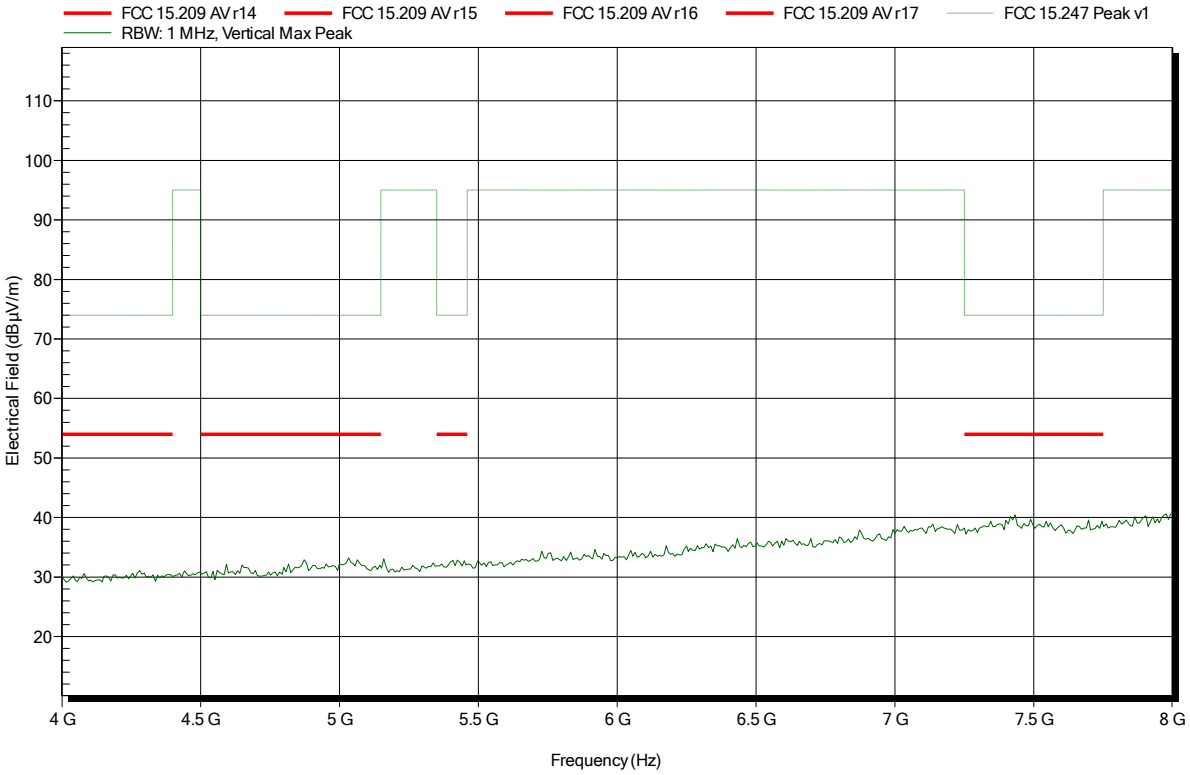

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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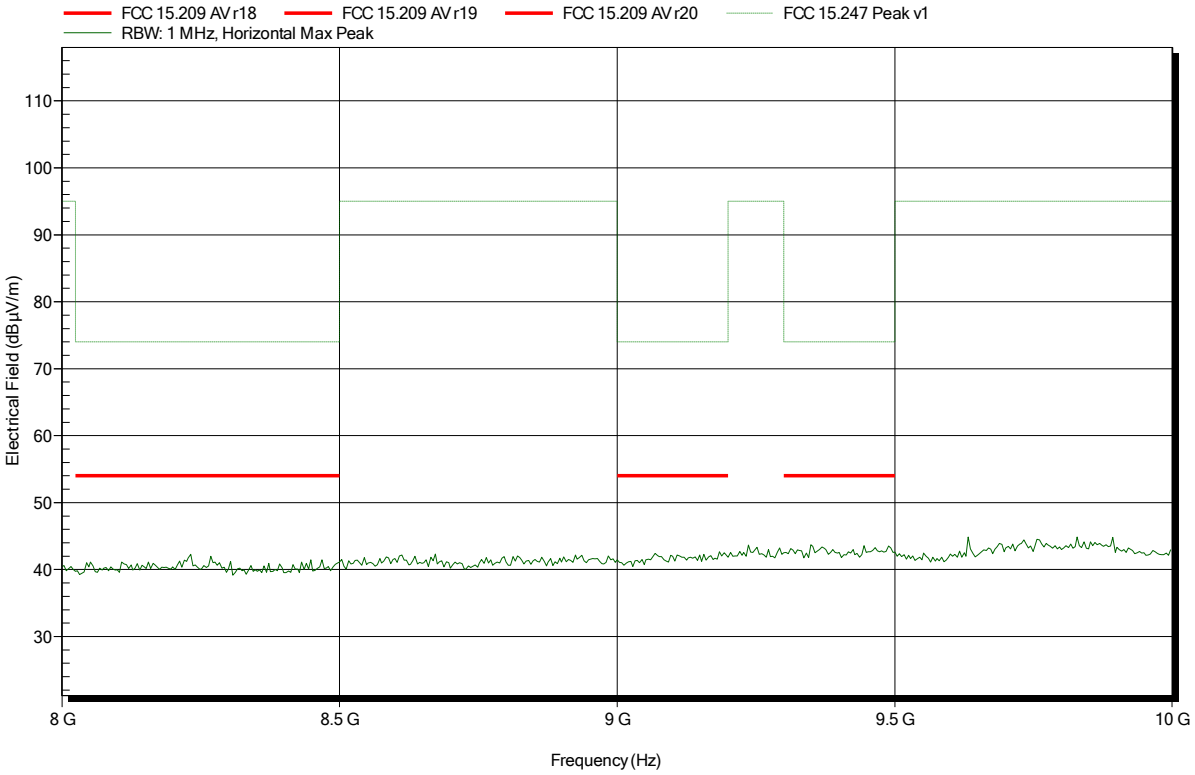

Spurious emissions according to FCC 15.247

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22.6°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BPSK; 924 MHz
Test Date:	2017-12-12
Note:	

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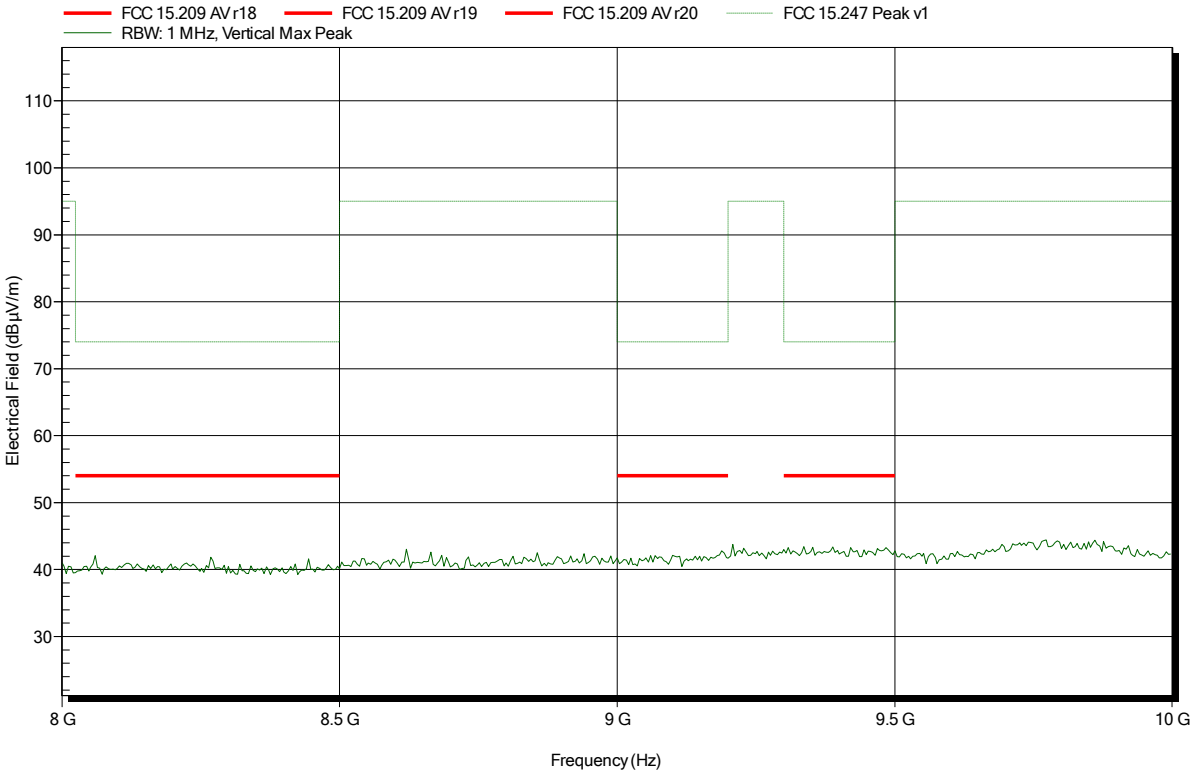

ANNEX B Receiver spurious emissions

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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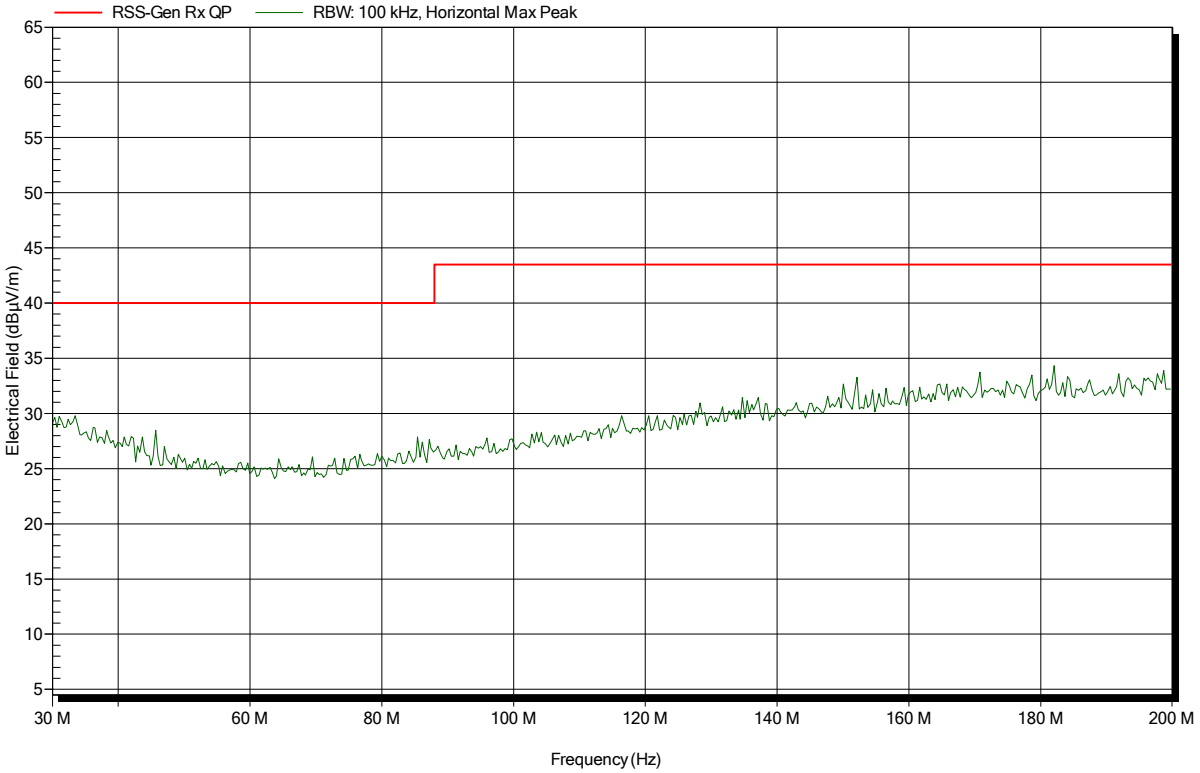

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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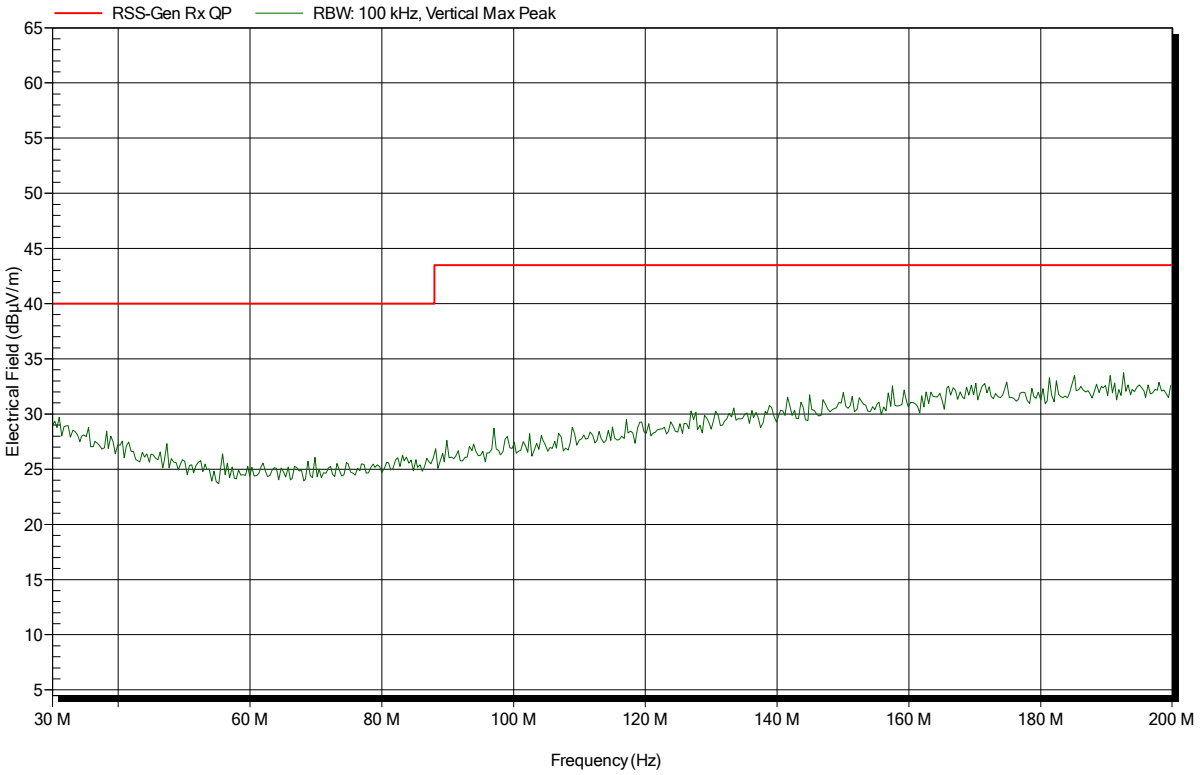

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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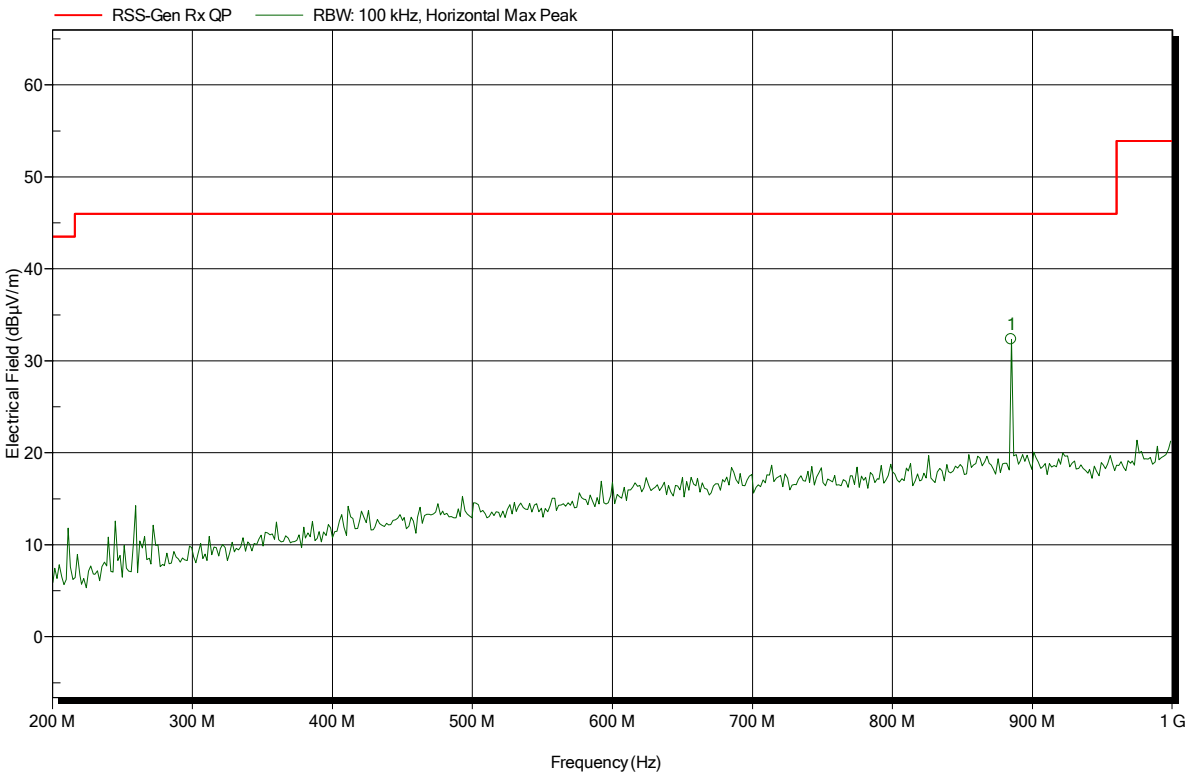

Frequency	Peak	Peak Limit	Peak Difference	Status
884.8 MHz	32.32 dBµV/m	46 dBµV/m	-13.68 dB	Pass

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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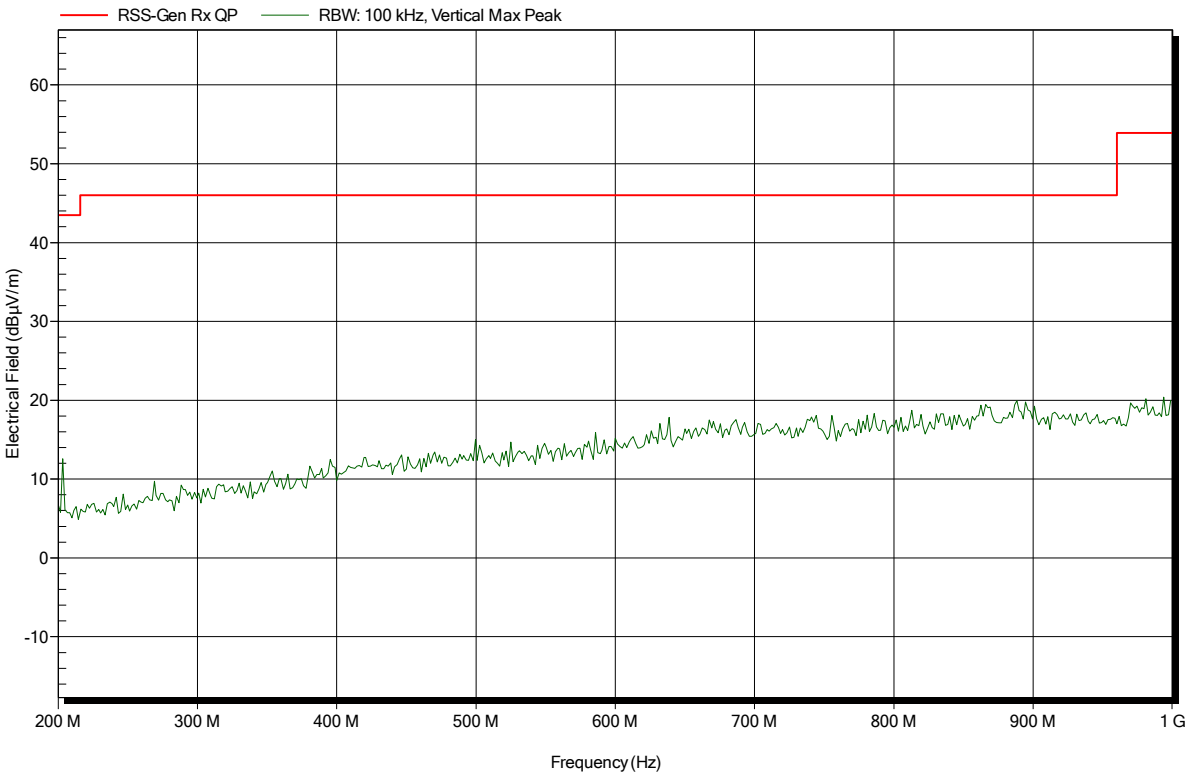

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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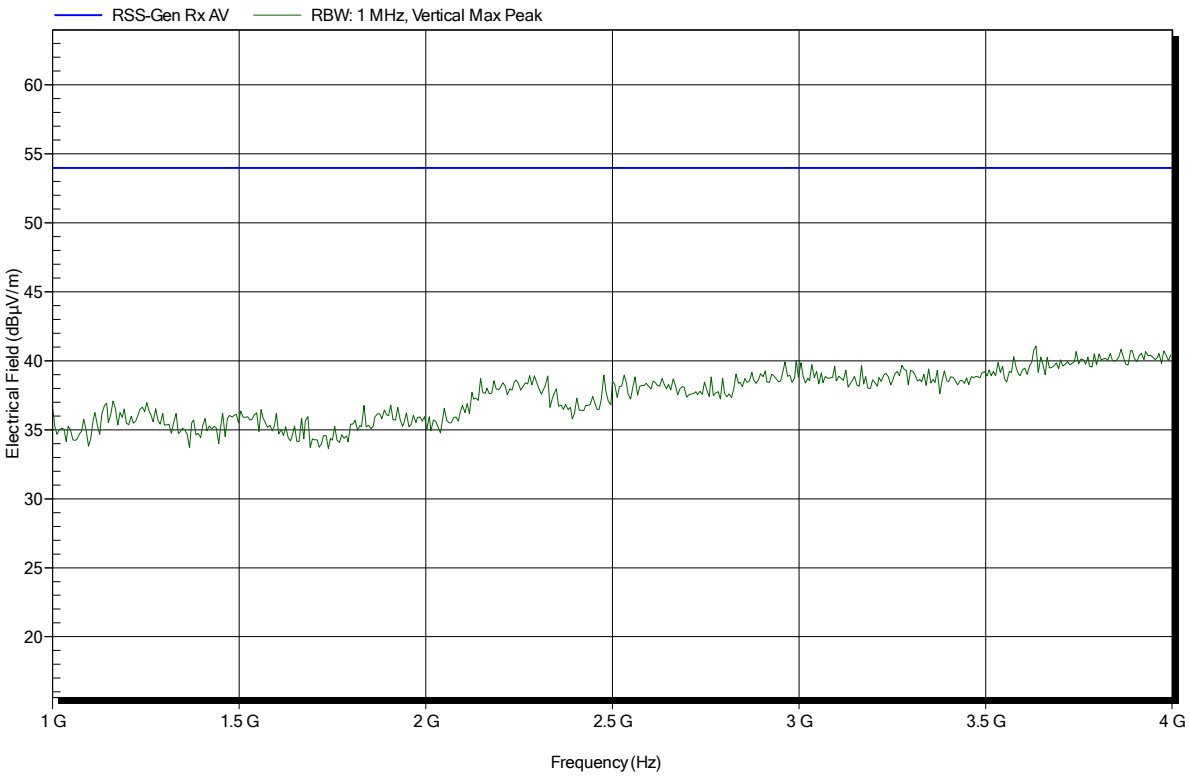

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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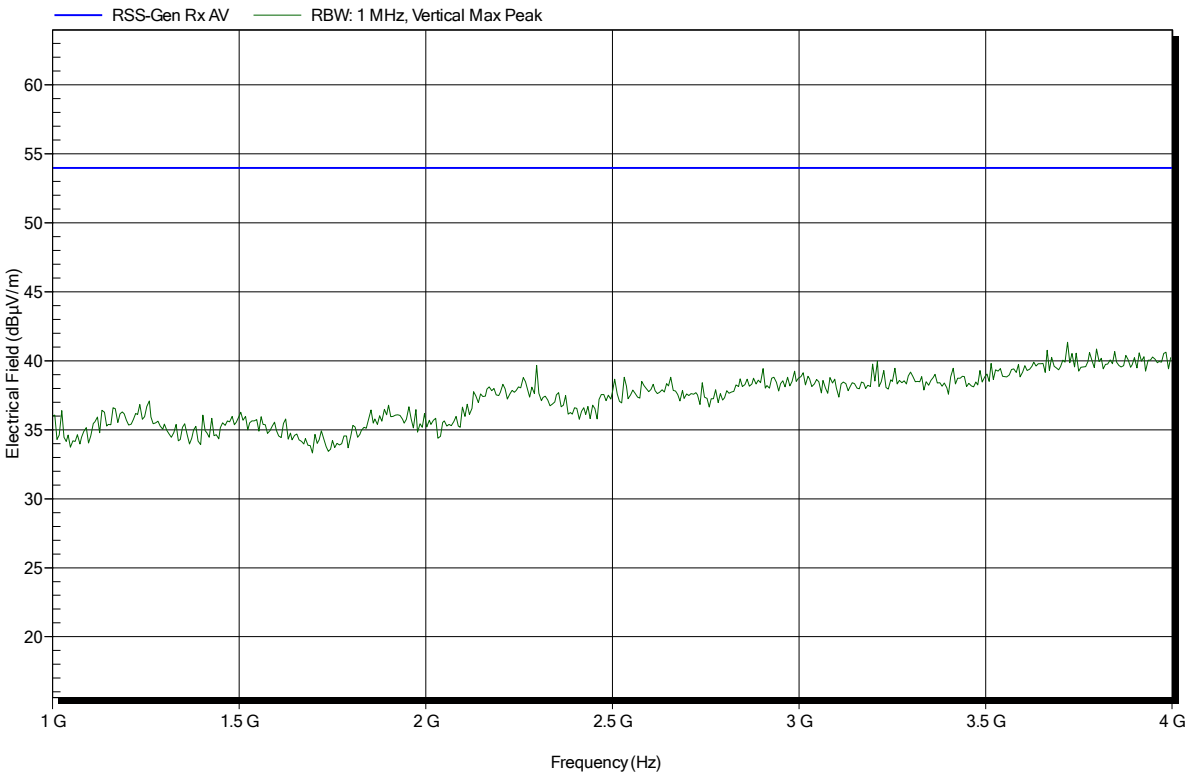

Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Horizontal
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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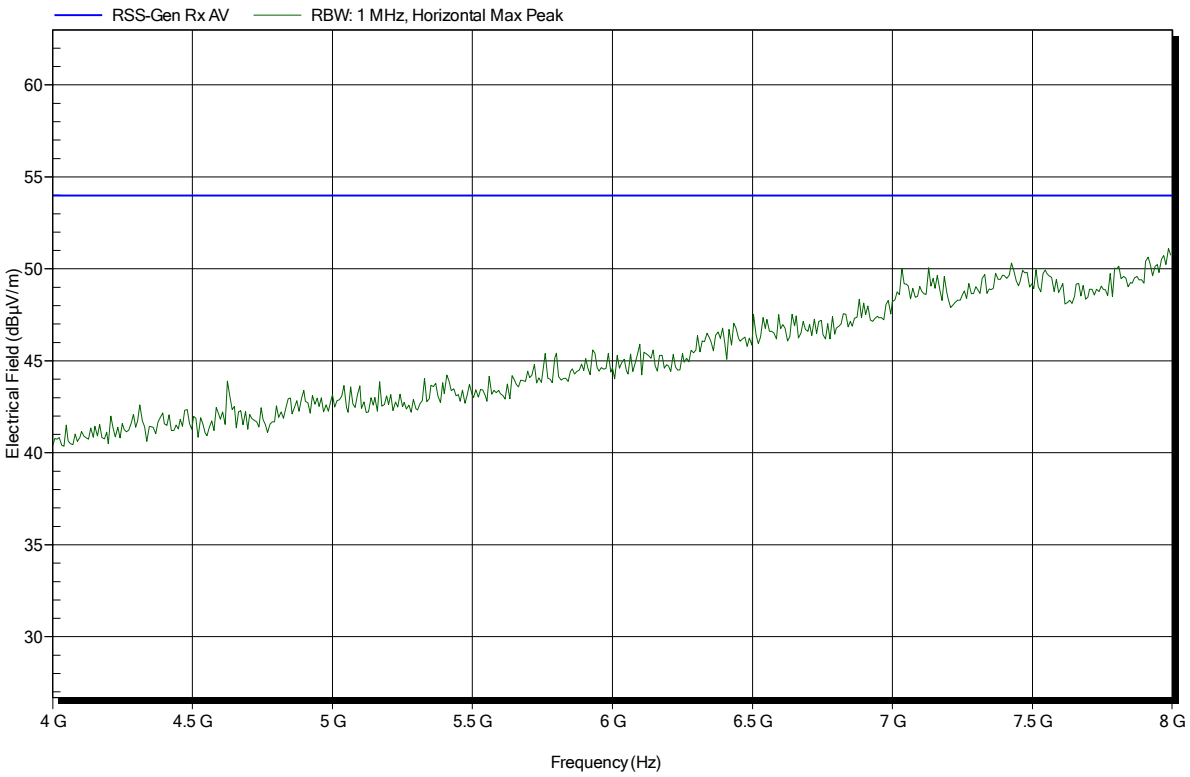
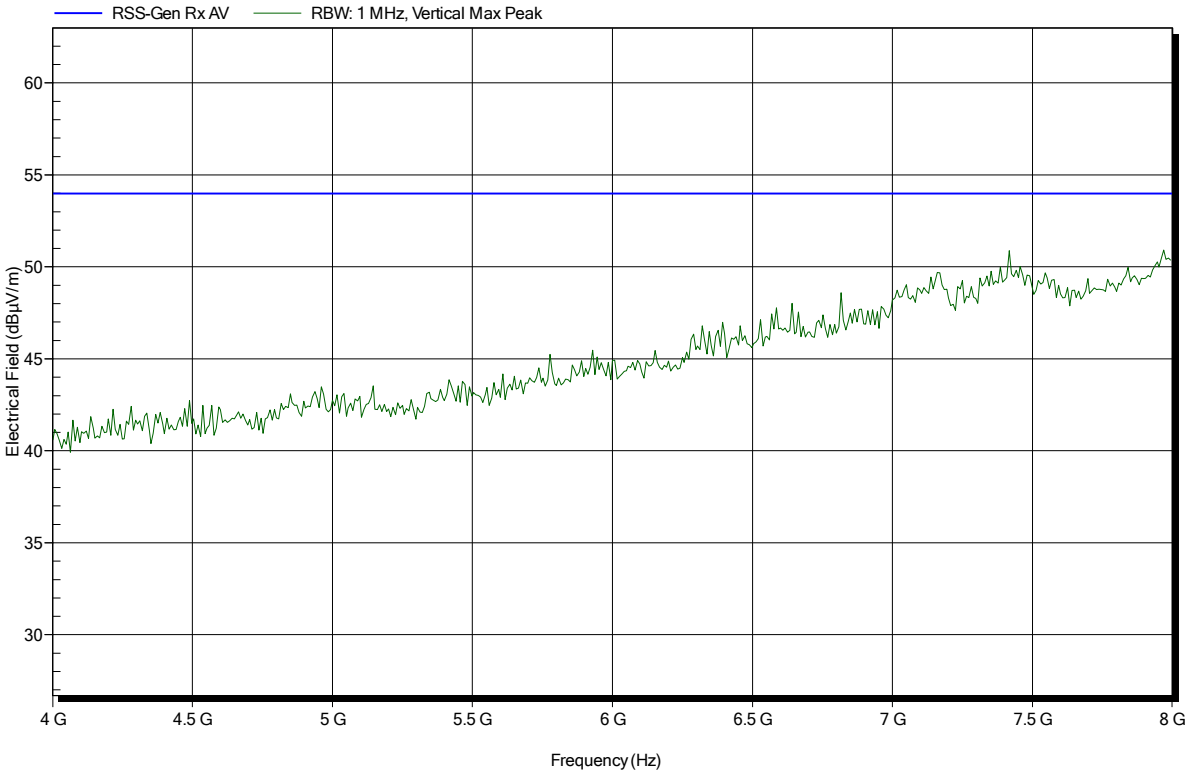


Spurious emissions according to RSS-Gen Issue 4

Project number: G0M-1711-7013

Applicant:	IDT Europe GmbH
EUT Name:	Sub-GHz 6LoWPAN Short Range Device
Model:	ZWIR4532
Test Site:	Eurofins Product Service GmbH
Operator:	Wilfried Treffke
Test Conditions:	Tnom: 22°C, Vnom: 5.0V DC (USB powered)
Antenna:	Schwarzbeck BBHA 9120D, Vertical
Measurement distance:	3 m
Mode:	RX; BPSK; 914 MHz
Test Date:	2017-12-07
Note:	

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