




<b>RADIO REPORT</b> <b>FCC 47 CFR Part 22H, FCC 47 CFR Part 24E, FCC 47 CFR Part 27</b> <b>ISED Canada RSS-132 Issue 3, ISED RSS-133, Issue 6 Amendment 1, ISED Canada RSS-139, Issue 3,</b> <b>ISED Canada RSS-130, Issue 2</b>	
<b>Report Reference No</b>	G0M-2002-8805-TFCMOCORSE-V02
<b>Testing Laboratory</b>	Eurofins Product Service GmbH
<b>Address</b>	Storkower Str. 38c 15526 Reichenwalde Germany
<b>Accreditation</b>	 <p>DAkkS - Registration number : D-PL-12092-01-03 (ISED)                      ISED Testing Laboratory site: 3470A-2                      DAkkS - Registration number : D-PL-12092-01-04 (FCC)                      FCC Filed Test Laboratory, Reg.-No.: 96970</p>
<b>Applicant</b>	Laird Connectivity Inc
<b>Address</b>	50 South Main Street 44308 Akron, OH United States of America
<b>Test Specification</b>	47 CFR Part 22H 47 CFR Part 24E 47 CFR Part 27 ISED RSS-132, Issue 3: 2013-01 ISED RSS-133, Issue 6+A1: 2018-01 ISED RSS-139, Issue 3: 2015-07 ISED RSS-130, Issue 2: 2019-02
<b>Non-Standard Test Method</b>	None
<b>Equipment under Test (EUT):</b>	
<b>Product Description</b>	915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants
<b>Model(s)</b>	RG191+LTE Series
<b>Additional Model(s)</b>	None
<b>Brand Name(s)</b>	Laird Connectivity
<b>Hardware Version(s)</b>	v750.03.224
<b>Software Version(s)</b>	v93.9.5.1
<b>FCC-ID</b>	SQG-RG191NALTE
<b>IC</b>	3147A-RG191NALTE
<b>Test Result</b>	<b>PASSED</b>

Test Report No.: G0M-2002-8805-TFCMOCORSE-V02

 Eurofins Product Service GmbH  
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Possible test case verdicts:		
Required by standard but not tested	N/T	
Not required by standard	N/R	
Not applicable to EUT	N/A	
Test object does meet the requirement	P(PASS)	
Test object does not meet the requirement	F(FAIL)	
Testing:		
Test Lab Temperature	20 °C – 23 °C	
Test Lab Humidity	32 % – 38 %	
Date of receipt of test item	2020-04-28	
Report:		
Compiled by	Toralf Jahn	
Tested by (+ signature) (Responsible for Test)	Toralf Jahn	 .....
Approved by (+ signature) (Head of Lab)	Christian Weber	 .....
Date of Issue	2020-08-27	
Total number of pages	85	
General Remarks:		
<p>The test results presented in this report relate only to the object tested.</p> <p>The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.</p> <p>This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.</p>		
Additional Comments:		

**VERSION HISTORY**

Version History			
Version	Issue Date	Remarks	Revised By
01	2020-06-29	Initial Release	
02	2020-08-27	Replaced document: G0M-2002-8805-TFCMOCORSE-V01 Replaced by: G0M-2002-8805-TFCMOCORSE-V02  Reason: Page 24 typo corrected	T. Jahn

**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 <sub>NOM</sub>	Nominal supply voltage

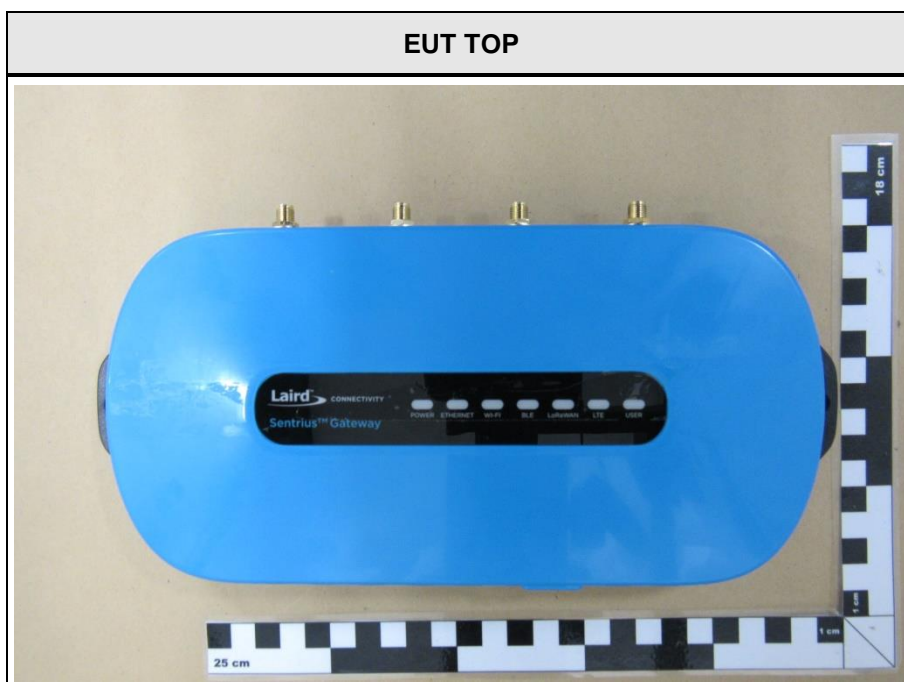
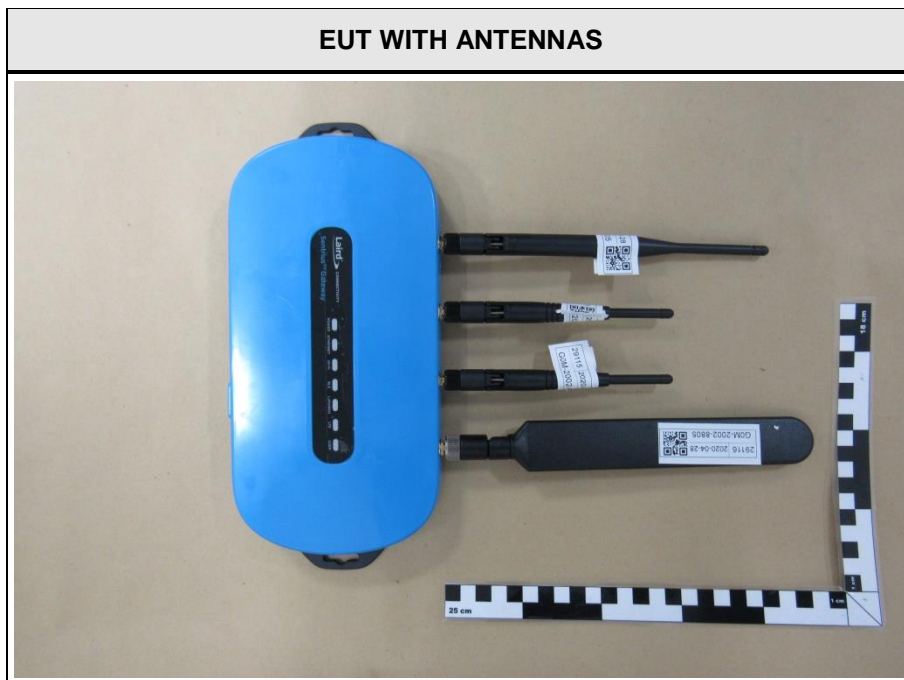
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## 1 Equipment (Test Item) Under Test

Description	915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants	
Model	RG191+LTE Series	
Additional Model(s)	None	
Brand Name(s)	Laird Connectivity	
Serial Number(s)	IMEI 866258040553981; Sample ID 29113	
Hardware Version(s)	v750.03.224	
Software Version(s)	v93.9.5.1	
PMN	RG191+LTE Series	
HVIN	RG191+LTE	
FVIN	v93.9.5.1	
HMN	N/A	
IC	3147A-RG191NALTE	
FCC-ID	SQG-RG191NALTE	
Equipment type	End Product	
Radio type	Transceiver	
Radio technologies	LTE	
LTE frequency bands	LTE FDD2 = UL = 1850 - 1910 MHz, DL = 1930 - 1990 MHz LTE FDD4 = UL = 1710 - 1755 MHz, DL = 2110 - 2155 MHz LTE FDD5 = UL = 824 - 849 MHz, DL = 869 - 894 MHz LTE FDD12 = UL = 699 - 716 MHz, DL = 729 - 746 MHz LTE FDD13 = UL = 777 - 787 MHz, DL = 746 - 756 MHz	
LTE Modulations	QPSK, 16-QAM	
Number of modules	1	
Radio Module	Type	UMTS, LTE
	Model	EG91-NA
	Manufacturer	Quectel Wireless Solutions Co., Ltd
	HW Version	R1.0
	SW Version	EG91NAFBR05A07M4G SVN 7
	FCC-ID	XMR201807EG91NA
	IC	10224A-2018EG91NA
Antenna	Type	External
	Model	DBA697C1
	Manufacturer	Laird
	Gain	2.2 dBi
Supply Voltage	V <sub>NOM</sub>	12 VDC
AC/DC-Adaptor	Model	GST25U12-P1J
	Vendor	Meanwell
	Input	115 VAC
	Output	12 VDC
Manufacturer	Laird Connectivity Inc 50 South Main Street 44308 Akron, OH United States of America	

1.1 Photos – Equipment External



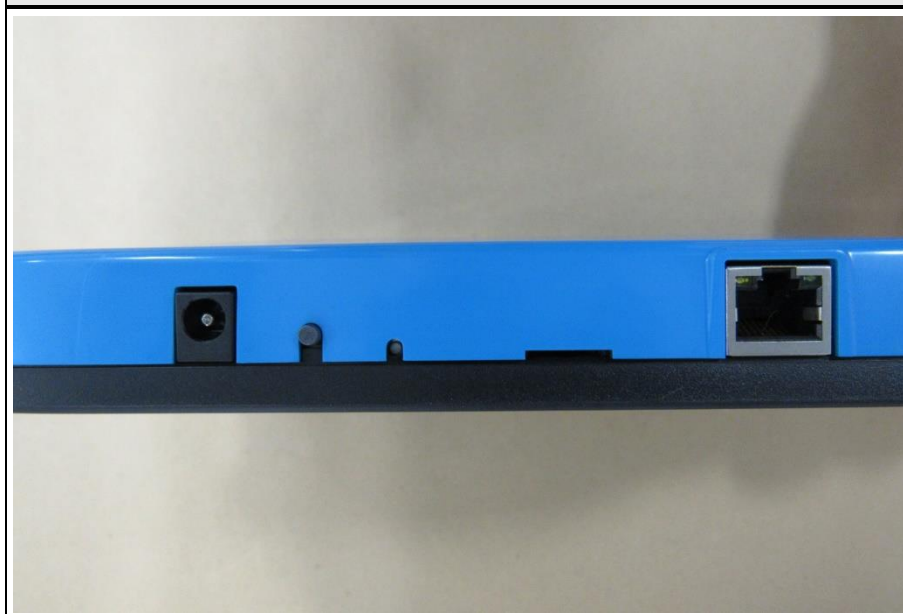




**EUT ANTENNA CONNECTORS**



**EUT DC AND ETHERNET CONNECTOR**



LTE ANTENNA



LoRa ANTENNA



WiFi ANTENNAS



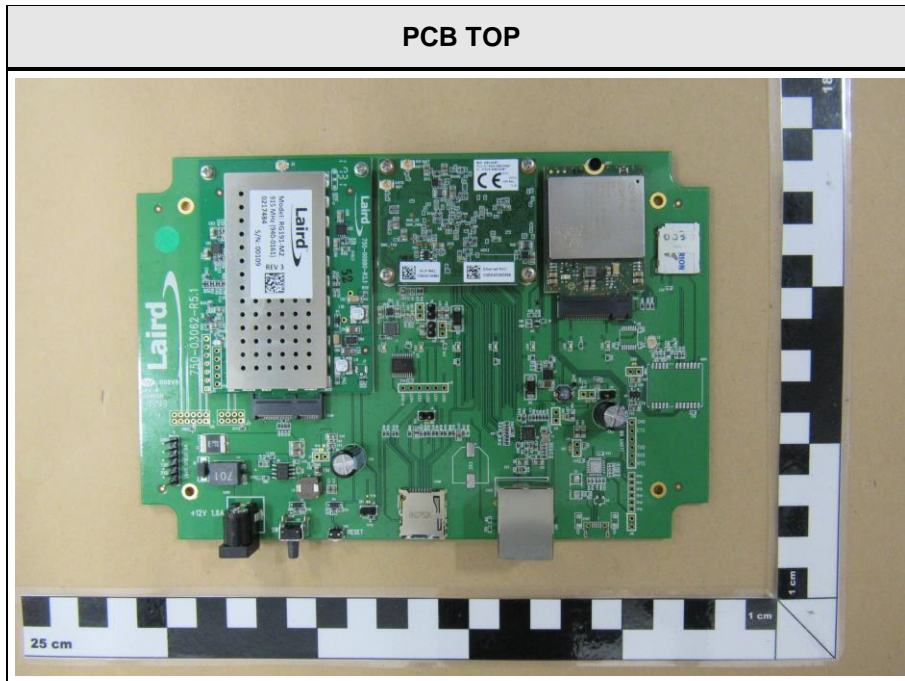
AC/DC-ADAPTOR



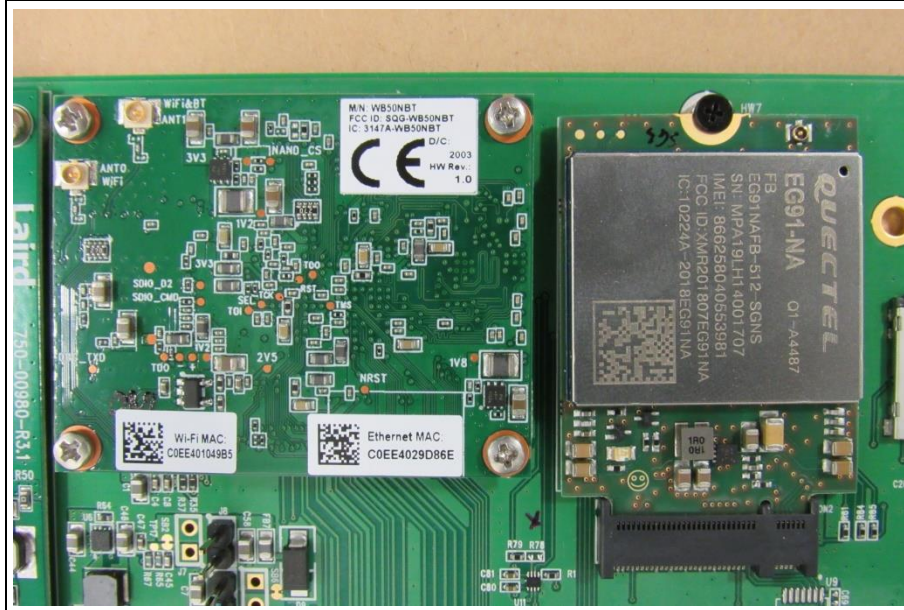
AC/DC-ADAPTOR



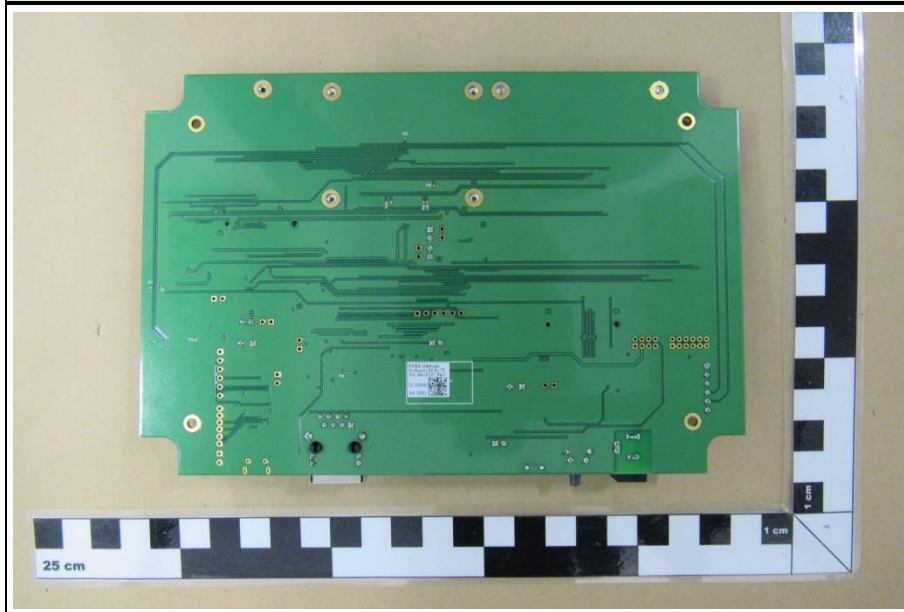
1.2 Photos – Equipment Internal

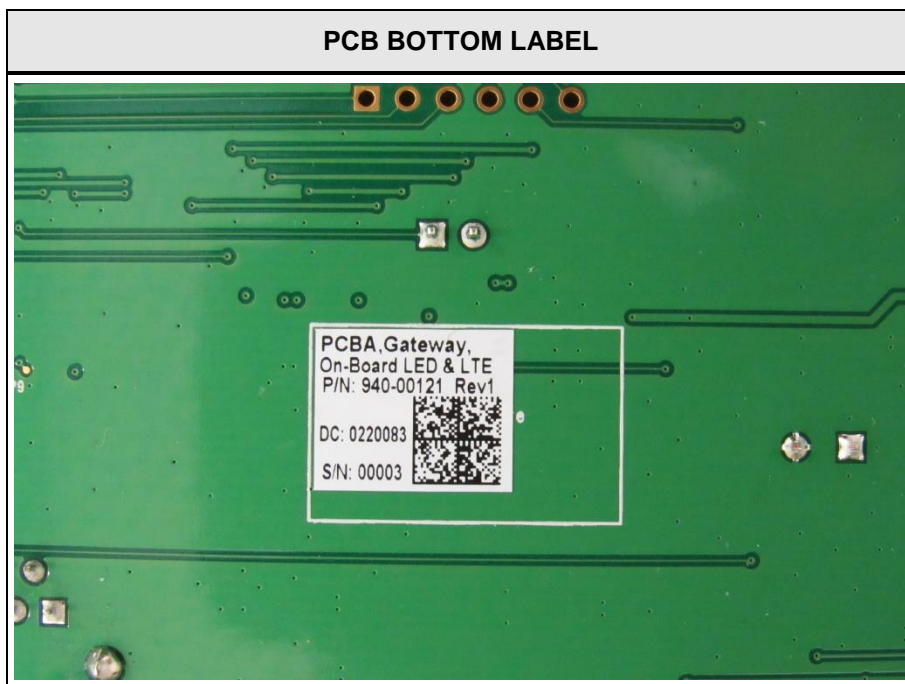


LTE AND WiFi

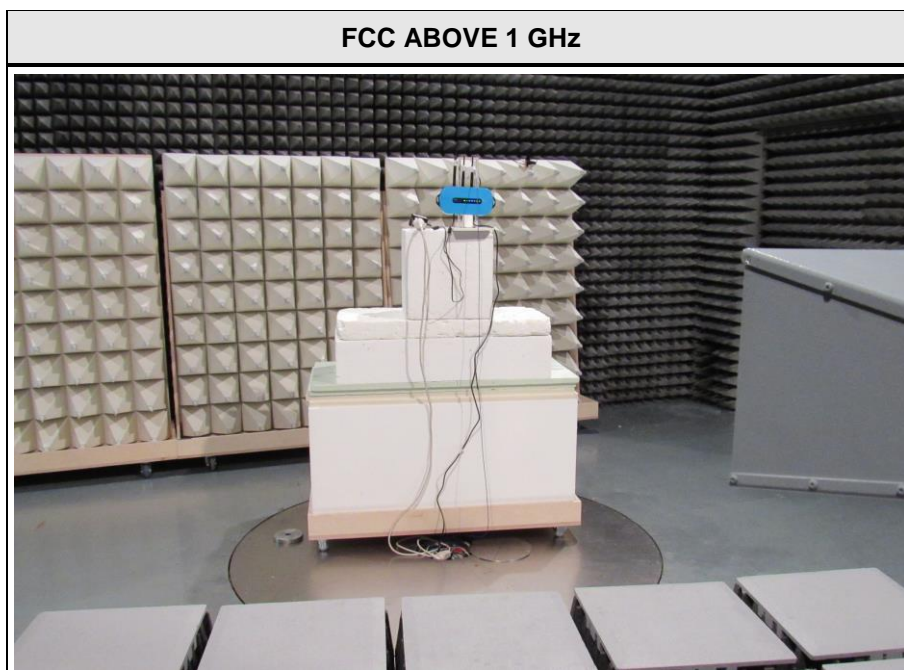
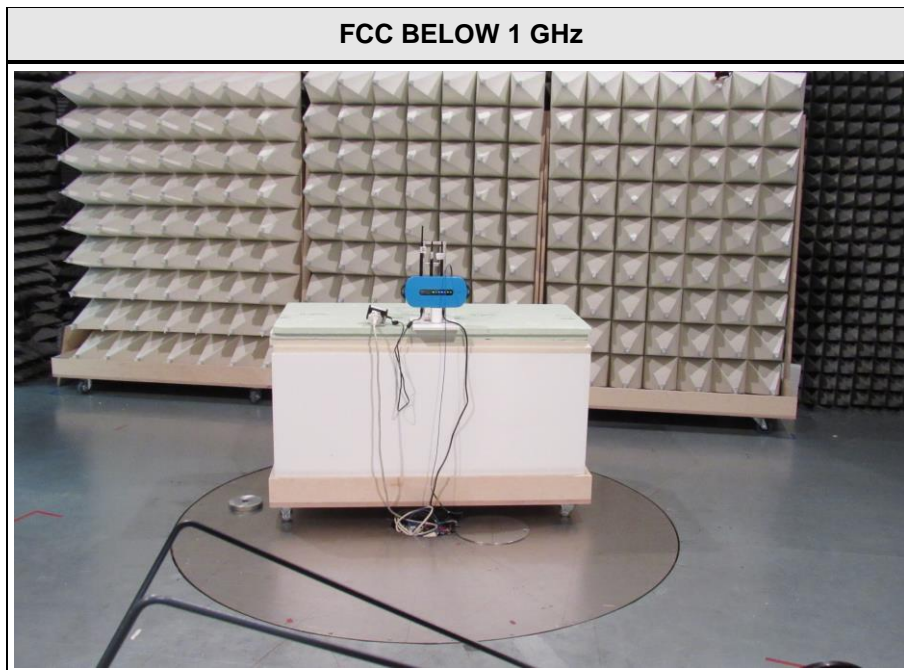


PCB BOTTOM



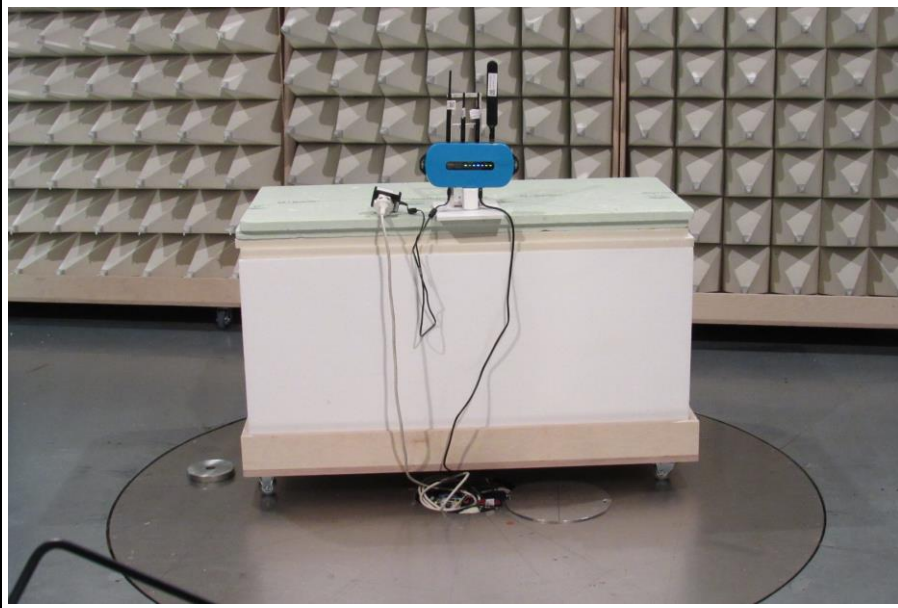


### 1.3 Photos – Test Setup

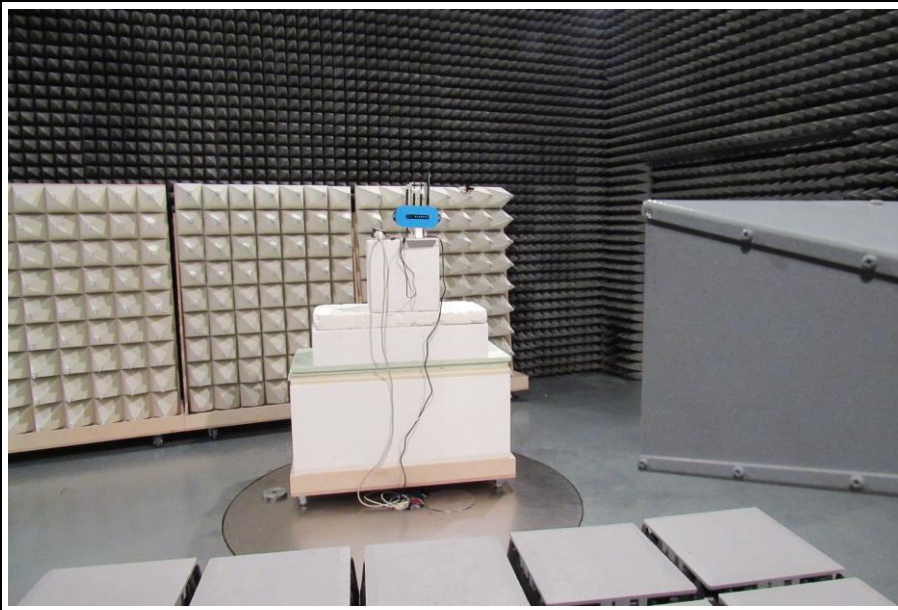




**RSS-GEN BELOW 1 GHz**



**RSS-GEN ABOVE 1 GHz**



#### 1.4 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
SIM	Communication Tester	R&S	CMW500	Base Station Simulator
CBL	Ethernet Cable	Copartner	CAT 5.E	
AE	Ethernet Switch	Netgear	GS108	Termination of Ethernet Cable
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
SFT	Software			
Comment:				

## 1.5 Test Modes

Mode	Description
LTE FDD2 / QPSK	Channel = 1900 MHz Mode = RMC TPC = All 1 Modulation = QPSK Bandwidth = 20 MHz Number of resource blocks = 1 Resource block offset = 20 Duty cycle = 100 %
LTE FDD2 / QAM	Channel = 1900 MHz Mode = RMC TPC = All 1 Modulation = 16-QAM Bandwidth = 20 MHz Number of resource blocks = 1 Resource block offset = 50 Duty cycle = 100 %
LTE FDD2 / PMAX	Channel = 1900 MHz Mode = RMC TPC = All 1 Modulation = QPSK Bandwidth = 10 MHz Number of resource blocks = 1 Resource block offset = 25 Duty cycle = 100 %
LTE FDD4 / QPSK	Channel = 1732.5 MHz Mode = RMC TPC = All 1 Modulation = QPSK Bandwidth = 20 MHz Number of resource blocks = 1 Resource block offset = 50 Duty cycle = 100 %
LTE FDD4 / QAM	Channel = 1745 Mode = RMC TPC = All 1 Modulation = 16-QAM Bandwidth = 20 MHz Number of resource blocks = 1 Resource block offset = 50 Duty cycle = 100 %
LTE FDD4 / PMAX	Channel = 1732.5 MHz Mode = RMC TPC = All 1 Modulation = QPSK Bandwidth = 10 MHz Number of resource blocks = 1 Resource block offset = 25 Duty cycle = 100 %

LTE FDD5 / QPSK	<p>Channel = 829 MHz  Mode = RMC  TPC = All 1  Modulation = QPSK  Bandwidth = 10 MHz  Number of resource blocks = 1  Resource block offset = 25  Duty cycle = 100 %</p>
LTE FDD5 / QAM	<p>Channel = 844 MHz  Mode = RMC  TPC = All 1  Modulation = 16-QAM  Bandwidth = 10 MHz  Number of resource blocks = 1  Resource block offset = 25  Duty cycle = 100 %</p>
LTE FDD5 / PMAX	<p>Channel = 848.3 MHz  Mode = RMC  TPC = All 1  Modulation = QPSK  Bandwidth = 1.4 MHz  Number of resource blocks = 1  Resource block offset = 2  Duty cycle = 100 %</p>
LTE FDD12 / QPSK	<p>Channel = 704 MHz  Mode = RMC  TPC = All 1  Modulation = QPSK  Bandwidth = 10 MHz  Number of resource blocks = 1  Resource block offset = 25  Duty cycle = 100 %</p>
LTE FDD12 / QAM	<p>Channel = 707.5  Mode = RMC  TPC = All 1  Modulation = 16-QAM  Bandwidth = 10 MHz  Number of resource blocks = 1  Resource block offset = 25  Duty cycle = 100 %</p>
LTE FDD12 / PMAX	<p>Channel = 700.5 MHz  Mode = RMC  TPC = All 1  Modulation = QPSK  Bandwidth = 3 MHz  Number of resource blocks = 1  Resource block offset = 7  Duty cycle = 100 %</p>
LTE FDD13 / QPSK	<p>Channel = 782 MHz  Mode = RMC  TPC = All 1  Modulation = QPSK  Bandwidth = 10 MHz  Number of resource blocks = 1  Resource block offset = 25  Duty cycle = 100 %</p>
LTE FDD13 / QAM	<p>Channel = 782  Mode = RMC  TPC = All 1  Modulation = 16-QAM  Bandwidth = 10 MHz  Number of resource blocks = 1  Resource block offset = 25</p>

	Duty cycle = 100 %
LTE FDD13 / PMAX	Channel = 784.5 MHz Mode = RMC TPC = All 1 Modulation = QPSK Bandwidth = 5 MHz Number of resource blocks = 1 Resource block offset = 13 Duty cycle = 100 %
Comment: Above worst case scenarios were found in module test reports: R1805A0250-R1, R1805A0250-R2, R1805A0250-R3 issued by TA Technology (Shanghai) Co., Ltd. on 2018-07-12.	

### 1.6 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

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

Margin:

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

Example only:

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

## 2 Result Summary

Test Summary)				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
47 CFR §22.913 47 CFR §24.232 47 CFR §27.50 ISED RSS-132 §5.4 ISED RSS-133 §6.4 ISED RSS-139 §6.5 ISED RSS-130 §4.6	Radiated power	ANSI C63.26 KDB 971168	PASS	
47 CFR §22.917 47 CFR §24.238 47 CFR §27.53 ISED RSS-132 §5.5 ISED RSS-133 §6.5 ISED RSS-139 §6.6 ISED RSS-130 §4.7	Transmitter conducted emissions	ANSI C63.26 KDB 971168	PASS	
47 CFR §22.917 47 CFR §24.238 47 CFR §27.53 ISED RSS-132 §5.5 ISED RSS-133 §6.5 ISED RSS-139 §6.6 ISED RSS-130 §4.7	Transmitter radiated emissions	ANSI C63.26 KDB 971168	PASS	
ISED RSS-132 §3.1 ISED RSS-133 §3.1 ISED RSS-139 §3.1 ISED RSS-130 §3.3 ISED RSS-Gen §7	Receiver radiated emissions	ANSI C63.26 KDB 971168	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 - Radiated power

##### 3.1.1 Information

Test Information	
Reference	47 CFR §22.913 47 CFR §24.232 47 CFR §27.50 ISED RSS-132 §5.4 ISED RSS-133 §6.4 ISED RSS-139 §6.5 ISED RSS-130 §4.6
Measurement Uncertainty:	N/A
Operator	Toralf Jahn
Date	2020-05-11

##### 3.1.2 Limits

Limits - Portable equipment					
Band	Frequency range [MHz]	Power limit [dBm ERP]	Power limit [W ERP]	Power limit [dBm EIRP]	Power limit [W EIRP]
LTE FDD2	1850 - 1910	30.85	1.22	33	2
LTE FDD4	1710 - 1780	27.85	0.61	30	1
LTE FDD5	824 - 849	38.45	7	40.6	11.5
LTE FDD12	699 - 716	34.77	3	36.92	4.92
LTE FDD13	777 - 787	34.77	3	36.92	4.92

##### 3.1.3 Procedure

Test Procedure
<ol style="list-style-type: none"> <li>1. The highest conducted output power for each radio technology, band, modulation and bandwidth is determined from module test reports: R1805A0250-R1, R1805A0250-R2, R1805A0250-R3 issued by TA Technology (Shanghai) Co., Ltd. on 2018-07-12.</li> <li>2. The antenna gain for the corresponding transmission frequency is added to the conducted output power</li> <li>3. The calculated radiated power is compared to the transmitter output power limit</li> </ol>



## 3.1.4 Results

Test Results - LTE FDD2						
Mode	Power [dBm]	Antenna gain [dBi]	Radiated power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
LTE FDD2 / PMAX	24.44	2.2	26.64	33	-6.36	PASS
LTE FDD2 / QPSK	24.39	2.2	26.59	33	-6.41	PASS
LTE FDD2 / QAM	24.08	2.2	26.28	33	-6.72	PASS

Test Results - LTE FDD4						
Mode	Power [dBm]	Antenna gain [dBi]	Radiated power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
LTE FDD4 / PMAX	24.31	2.2	26.51	30	-3.49	PASS
LTE FDD4 / QPSK	24.26	2.2	26.46	30	-3.54	PASS
LTE FDD4 / QAM	23.67	2.2	25.87	30	-4.13	PASS

Test Results - LTE FDD5						
Mode	Power [dBm]	Antenna gain [dBi]	Radiated power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
LTE FDD5 / PMAX	24.23	2.2	26.43	40.6	-14.17	PASS
LTE FDD5 / QPSK	24.16	2.2	26.36	40.6	-14.24	PASS
LTE FDD5 / QAM	24.03	2.2	26.23	40.6	-14.37	PASS

Test Results - LTE FDD12						
Mode	Power [dBm]	Antenna gain [dBi]	Radiated power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
LTE FDD12 / PMAX	24.23	2.2	26.43	36.92	-10.49	PASS
LTE FDD12 / QPSK	24.20	2.2	26.40	36.92	-10.52	PASS
LTE FDD12 / QAM	23.68	2.2	25.88	36.92	-11.04	PASS

Test Results - LTE FDD13						
Mode	Power [dBm]	Antenna gain [dBi]	Radiated power [dBm EIRP]	Limit [dBm EIRP]	Margin [dB]	Result
LTE FDD13 / PMAX	23.95	2.2	26.15	36.92	-10.77	PASS
LTE FDD13 / QPSK	23.77	2.2	25.97	36.92	-10.95	PASS
LTE FDD13 / QAM	23.33	2.2	25.53	36.92	-11.39	PASS

### 3.2 Test Conditions and Results - Transmitter conducted emissions

#### 3.2.1 Information

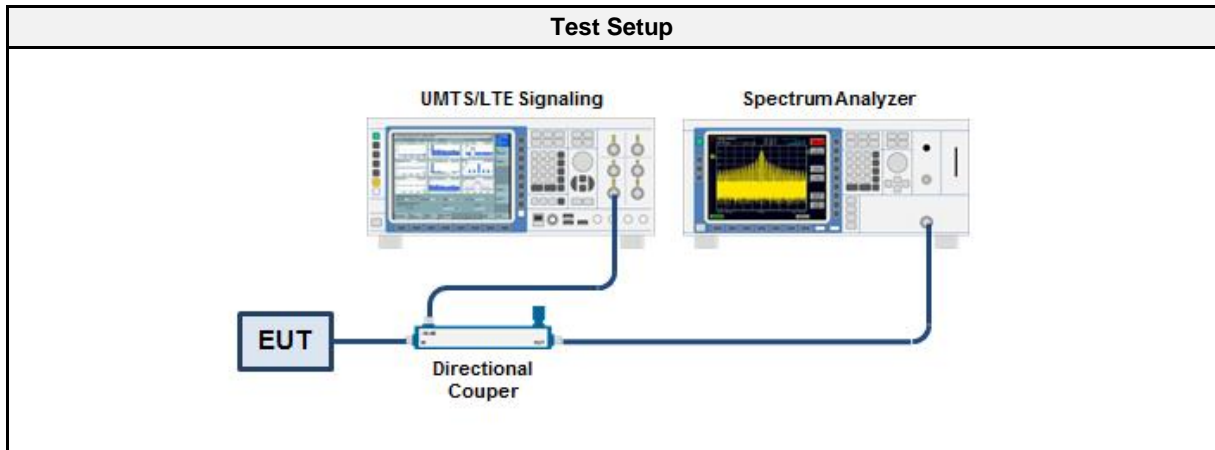
Test Information	
Reference	47 CFR §22.917 47 CFR §24.238 47 CFR §27.53 ISED RSS-132 §5.5 ISED RSS-133 §6.5 ISED RSS-139 §6.6 ISED RSS-130 §4.7
Measurement Method	FCC KDB 971168 D01 Section 6 ANSI C63.26-2015 5.7
Measurement Uncertainty:	± 4.25 dB
Operator	Toralf Jahn
Date	2020-05-07

#### 3.2.2 Limits

Limits FCC			
Band	Bandwidth	Attenuation [dB]	Limit [dBm]
LTE FDD2	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD4	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD5	100 kHz / 1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD12	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD13	100 kHz	43+Log <sub>10</sub> (P[W])	-13

Limits ISED			
Band	Bandwidth	Attenuation [dB]	Limit [dBm]
LTE FDD2	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD4	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD5	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD12	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD13	100 kHz	43+Log <sub>10</sub> (P[W])	-13

## 3.2.3 Setup



## 3.2.4 Equipment

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

## 3.2.5 Procedure

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

## 3.2.6 Results

Test Results - LTE FDD2	
Mode	Result
LTE FDD2 / PMAX	PASS

Test Results - LTE FDD4	
Mode	Result
LTE FDD4 / PMAX	PASS

Test Results - LTE FDD5	
Mode	Result
LTE FDD5 / PMAX	PASS

Test Results - LTE FDD12	
Mode	Result
LTE FDD12 / PMAX	PASS

Test Results - LTE FDD13	
Mode	Result
LTE FDD13 / PMAX	PASS

### 3.3 Test Conditions and Results - Transmitter radiated emissions

#### 3.3.1 Information

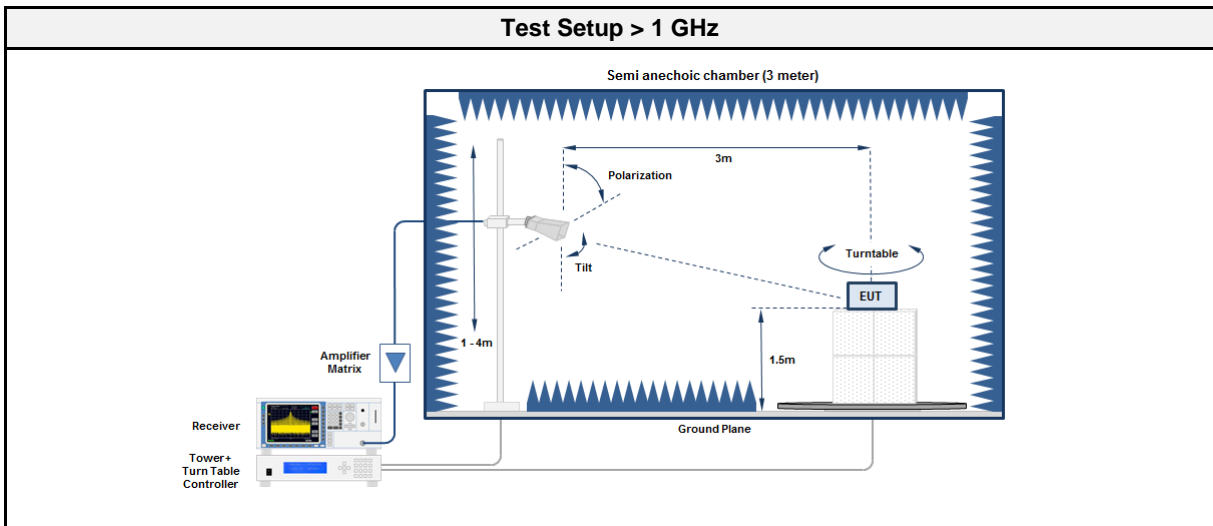
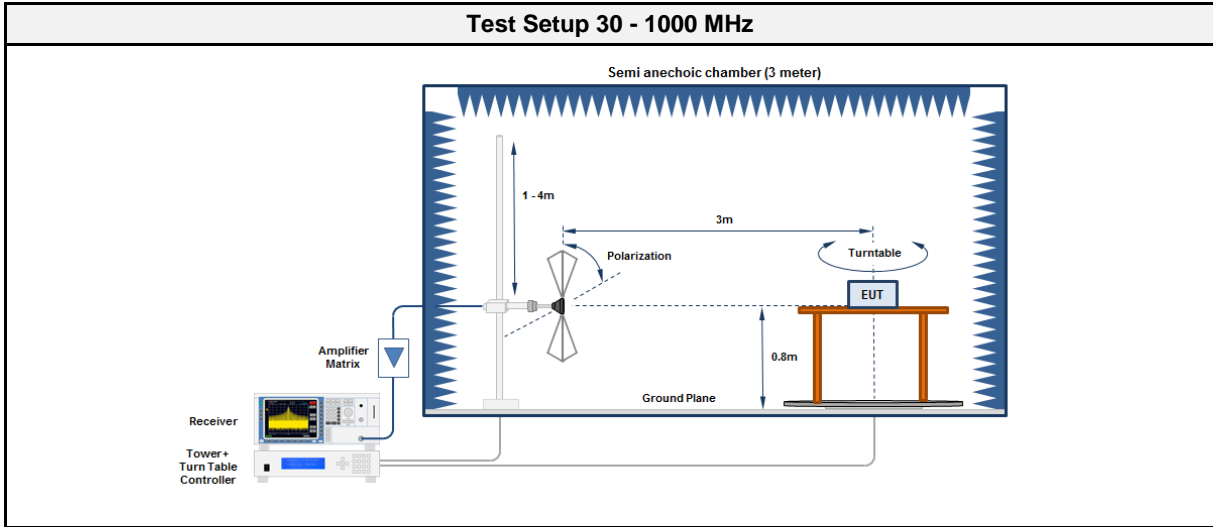
Test Information	
Reference	47 CFR §22.917 47 CFR §24.238 47 CFR §27.53 ISED RSS-132 §5.5 ISED RSS-133 §6.5 ISED RSS-139 §6.6 ISED RSS-130 §4.7
Measurement Method	FCC KDB 971168 D01 Section 7 ANSI C63.26-2015 5.5
Measurement Uncertainty:	± 5.7 dB
Operator	Toralf Jahn
Date	2020-05-07 to 2020-05-11

#### 3.3.2 Limits

Limits FCC				
Band	Frequency range [MHz]	Bandwidth	Attenuation [dB]	Limit [dBm EIRP]
LTE FDD2	-	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD4	-	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD5	-	100 kHz / 1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD12	-	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD13	-	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD13	763-775	6.25 kHz	65+Log <sub>10</sub> (P[W])	-35
LTE FDD13	793-805	6.25 kHz	65+Log <sub>10</sub> (P[W])	-35
LTE FDD13	1559-1610	700 Hz	-	-50
LTE FDD13	1559-1610	1 MHz	-	-40

Limits ISED				
Band	Frequency range [MHz]	Bandwidth	Attenuation [dB]	Limit [dBm EIRP]
LTE FDD2	-	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD4	-	1 MHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD5	-	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD12	-	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD13	-	100 kHz	43+Log <sub>10</sub> (P[W])	-13
LTE FDD13	763-775	6.25 kHz	65+Log <sub>10</sub> (P[W])	-35
LTE FDD13	793-806	6.25 kHz	65+Log <sub>10</sub> (P[W])	-35
LTE FDD13	1559-1610	700 Hz	-	-50
LTE FDD13	1559-1610	1 MHz	-	-40

3.3.3 Setup



3.3.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00212	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10

## 3.3.5 Procedure

<b>Test Procedure 30 - 1000 MHz</b>
<ol style="list-style-type: none"><li>1. EUT is placed on a non conducting support at the center of a turn table 0.8 m above the ground</li><li>2. EUT set to test mode</li><li>3. The receiver is set to peak detection with max hold</li><li>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m</li><li>5. All significant emissions are measured again using the corresponding final detector</li></ol>

<b>Test Procedure &gt; 1 GHz</b>
<ol style="list-style-type: none"><li>1. EUT is placed on a non conducting support at the center of a turn table 1.5 m above the ground</li><li>2. EUT set to test mode</li><li>3. The receiver is set to peak detection with max hold</li><li>4. The EUT is rotated through 360° and the height of the antenna is varied from 1 m to 4 m</li><li>5. All significant emissions are measured again using the corresponding final detector</li></ol>

## 3.3.6 Results

Test Results - LTE FDD2					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
LTE FDD2 / PMAX	3810.0	-32	-13	-19	PASS
LTE FDD2 / PMAX	5715.0	-38	-13	-25	PASS
LTE FDD2 / PMAX	7620.0	-41	-13	-28	PASS

Test Results - LTE FDD4					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
LTE FDD4 / PMAX	3465.0	-32	-13	-19	PASS
LTE FDD4 / PMAX	5197.5	-38	-13	-25	PASS
LTE FDD4 / PMAX	6930.0	-38	-13	-25	PASS

Test Results - LTE FDD5					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
LTE FDD5 / PMAX	1697.0	-46	-13	-33	PASS
LTE FDD5 / PMAX	2545.5	-53	-13	-40	PASS
LTE FDD5 / PMAX	3394.0	-55	-13	-42	PASS

Test Results - LTE FDD12					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
LTE FDD12 / PMAX	1408.0	-47	-13	-34	PASS
LTE FDD12 / PMAX	2112.0	-55	-13	-42	PASS
LTE FDD12 / PMAX	2816.0	-56	-13	-43	PASS

Test Results - LTE FDD13					
Mode	Frequency [MHz]	Level [dBm]	Limit [dBm]	Margin [dB]	Result
LTE FDD13 / PMAX	1569.0	-42	-40	-2	PASS
LTE FDD13 / PMAX	2353.5	-46	-13	-33	PASS
LTE FDD13 / PMAX	3138.0	-54	-13	-41	PASS



### 3.4 Test Conditions and Results - Receiver radiated emissions

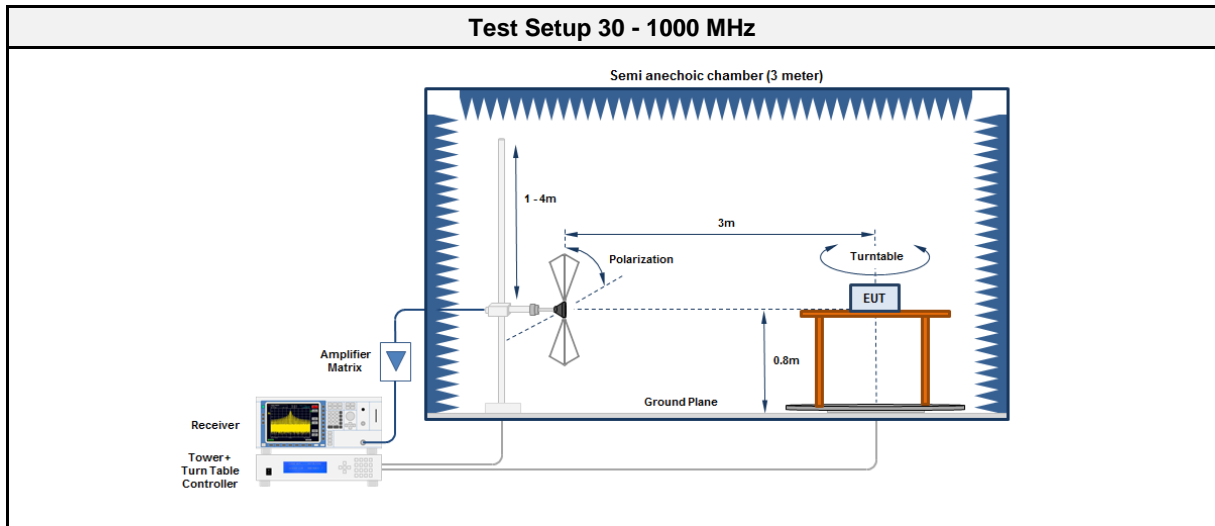
#### 3.4.1 Information

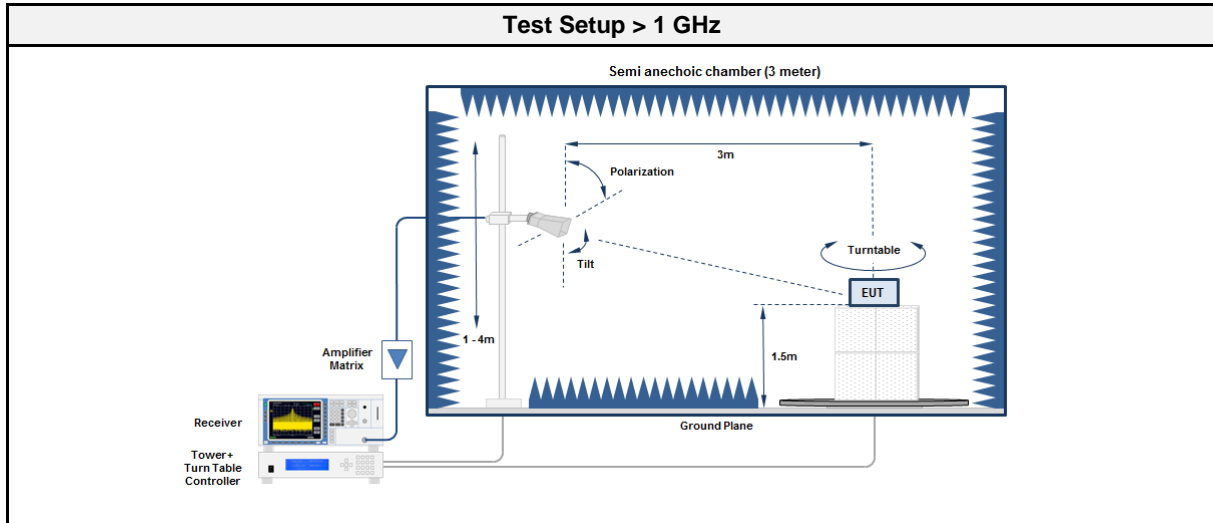
Test Information	
Reference	ISED RSS-132 §3.1 ISED RSS-133 §3.1 ISED RSS-139 §3.1 ISED RSS-130 §3.3 ISED RSS-Gen §7.4
Measurement Method	ANSI C63.10-2013 6.3-6.6
Measurement Uncertainty:	± 5.3 dB
Operator	Toralf Jahn
Date	2020-05-08 to 2020-05-11

#### 3.4.2 Limits

Limits			
Frequency range [MHz]	Bandwidth	Detector	Limit [dBμV/m @ 3 m]
30 - 88	100 kHz	Quasi-peak	40
88 - 216	100 kHz	Quasi-peak	43.5
216 - 960	100 kHz	Quasi-peak	46
960 - 1000	100 kHz	Quasi-peak	54
> 1000	1 MHz	Average	54

#### 3.4.3 Setup





### 3.4.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	R&S	HK 116	EF00030	2019-04	2022-04
Antenna	R&S	HL 223	EF00212	2019-05	2022-05

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	2018-07	2021-07
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2019-09	2020-09
Antenna	Schwarzbeck	BBHA 9120D	EF00018	2019-10	2022-10

### 3.4.5 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

3.4.6 Results

Test Results - LTE FDD2					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	100.7735	27.30	43.50	-16.20	PASS
Receive Mode	264.0048	32.50	46.00	-13.48	PASS
Receive Mode	1423	17.43	53.98	-36.55	PASS
Receive Mode	2660	46.40	53.98	-07.58	PASS
Receive Mode	2926	44.10	53.98	-09.88	PASS

Test Results - LTE FDD4					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	101.699	28.70	43.50	-14.79	PASS
Receive Mode	264.0048	32.90	46.00	-13.12	PASS
Receive Mode	2660	45.96	53.98	-08.02	PASS
Receive Mode	2926	44.00	53.98	-09.98	PASS

Test Results - LTE FDD5					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	101.4588	29.10	43.50	-14.38	PASS
Receive Mode	264.0048	28.20	46.00	-17.78	PASS
Receive Mode	2660	45.97	53.98	-08.01	PASS
Receive Mode	2926	43.91	53.98	-10.07	PASS

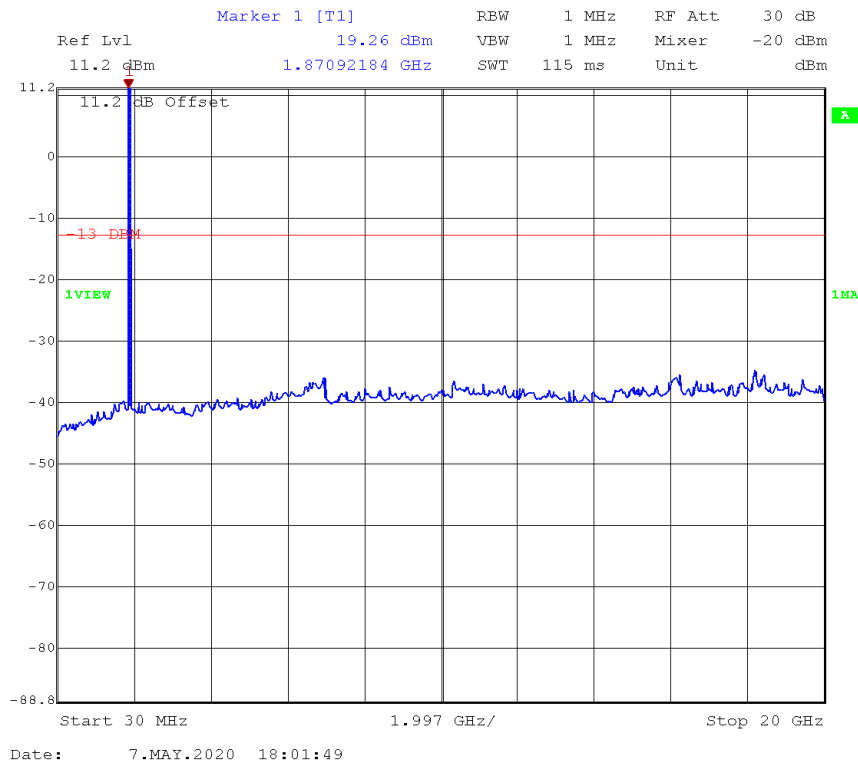
Test Results - LTE FDD12					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	101.639	28.20	43.50	-15.28	PASS
Receive Mode	322.6058	29.30	46.00	-16.67	PASS
Receive Mode	2660	45.96	53.98	-08.02	PASS
Receive Mode	2926	43.68	53.98	-10.30	PASS

Test Results - LTE FDD13					
Mode	Frequency [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Result
Receive Mode	101.639	28.10	43.50	-15.42	PASS
Receive Mode	323.6265	31.90	46.00	-14.08	PASS
Receive Mode	2660	46.67	53.98	-07.31	PASS
Receive Mode	2926	45.65	53.98	-08.33	PASS

## ANNEX A Transmitter conducted emissions

### Conducted spurious emission according to FCC

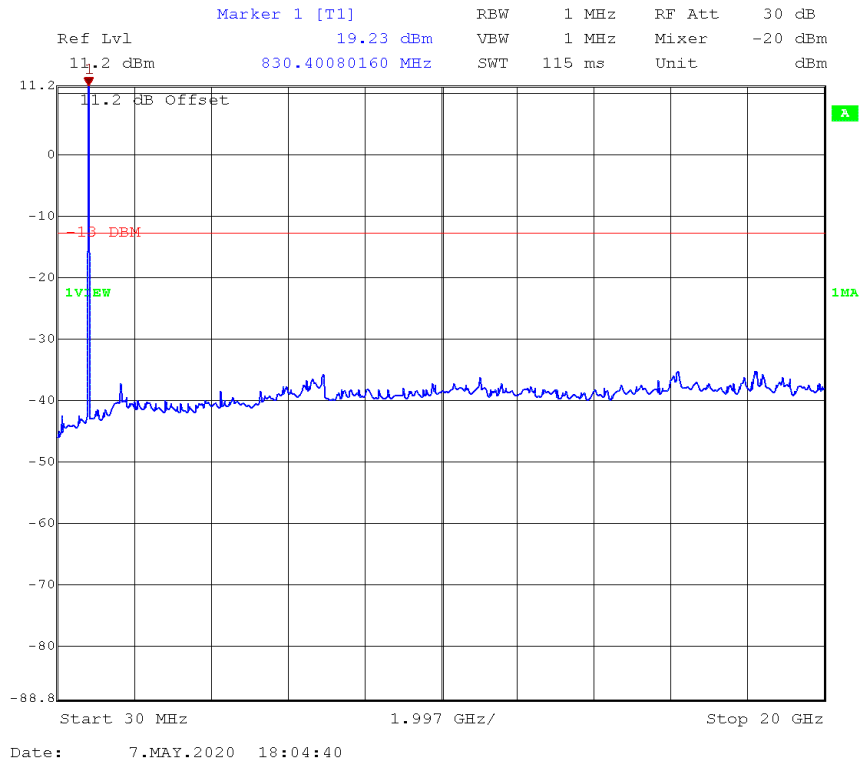
Project Number: G0M-2002-8805  
 Applicant: Laird Connectivity  
 Model Description: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants  
 Model: RG191+LTE Series  
 Test Sample ID: 29113  
 Operator: Toralf Jahn  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2020-05-07  
 Operating Conditions: Tnom/Vnom  
 Mode: LTE Band 2  
 Note 1: 1905 MHz





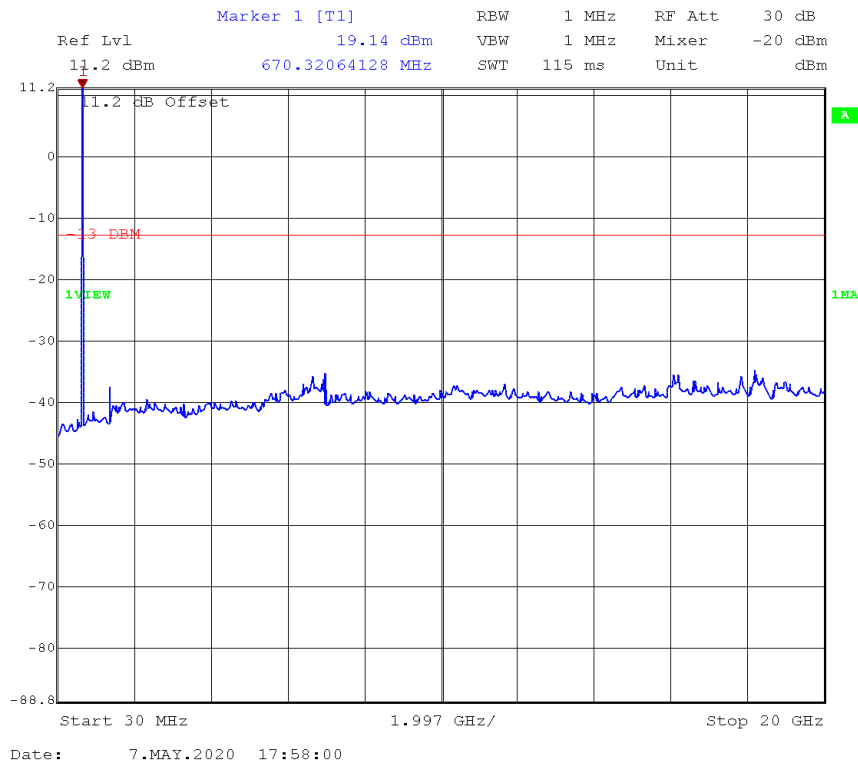
### Conducted spurious emission according to FCC

Project Number: G0M-2002-8805  
 Applicant: Laird Connectivity  
 Model Description: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants  
 Model: RG191+LTE Series  
 Test Sample ID: 29113  
 Operator: Toralf Jahn  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2020-05-07  
 Operating Conditions: Tnom/Vnom  
 Mode: LTE Band 5  
 Note 1: 848.3 MHz



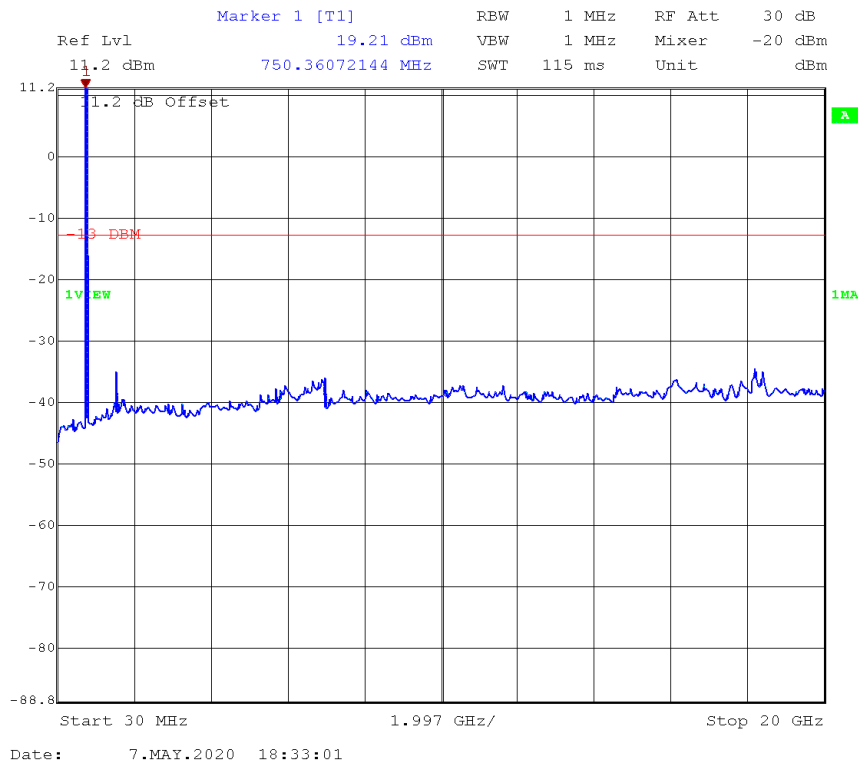
### Conducted spurious emission according to FCC

Project Number: G0M-2002-8805  
 Applicant: Laird Connectivity  
 Model Description: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants  
 Model: RG191+LTE Series  
 Test Sample ID: 29113  
 Operator: Toralf Jahn  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2020-05-07  
 Operating Conditions: Tnom/Vnom  
 Mode: LTE Band 12  
 Note 1: 700.5 MHz



### Conducted spurious emission according to FCC

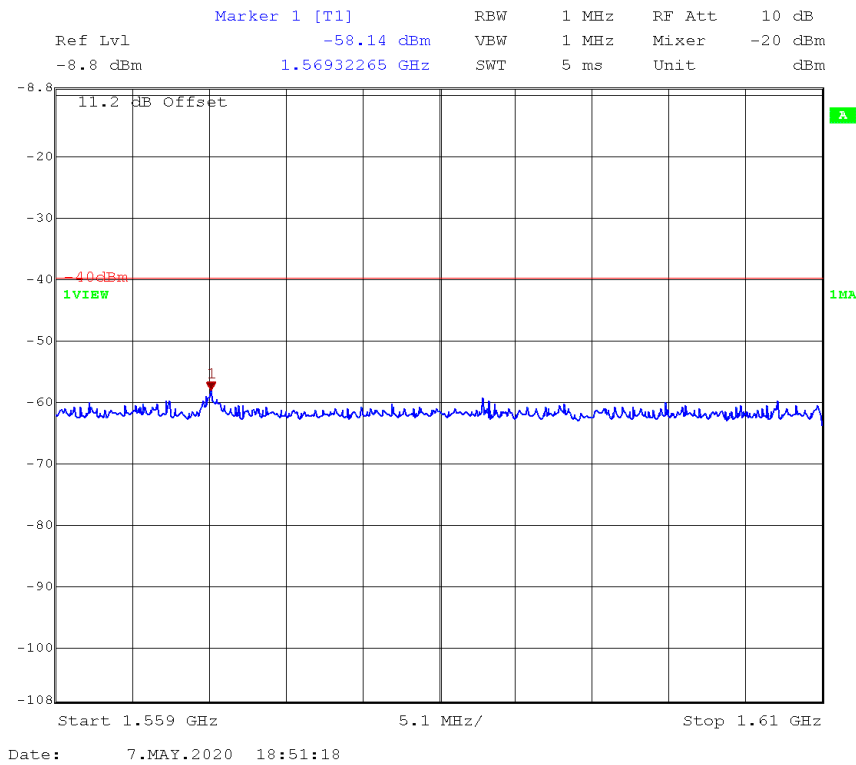
Project Number: G0M-2002-8805  
 Applicant: Laird Connectivity  
 Model Description: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants  
 Model: RG191+LTE Series  
 Test Sample ID: 29113  
 Operator: Toralf Jahn  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2020-05-07  
 Operating Conditions: Tnom/Vnom  
 Mode: LTE Band 13  
 Note 1: 784.5 MHz





### Conducted spurious emission according to FCC

Project Number: G0M-2002-8805  
 Applicant: Laird Connectivity  
 Model Description: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants  
 Model: RG191+LTE Series  
 Test Sample ID: 29113  
 Operator: Toralf Jahn  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2020-05-07  
 Operating Conditions: Tnom/Vnom  
 Mode: LTE Band 13  
 Note 1: 784.5 MHz with 1GHz high pass



## ANNEX B Receiver radiated emissions

### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series

Test Site: Eurofins Product Service Germany

Operator: Mr. Jahn

Measurement software: RadiMation, version 2016.1.10

Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor

Antenna: Rohde & Schwarz HK 116, Horizontal

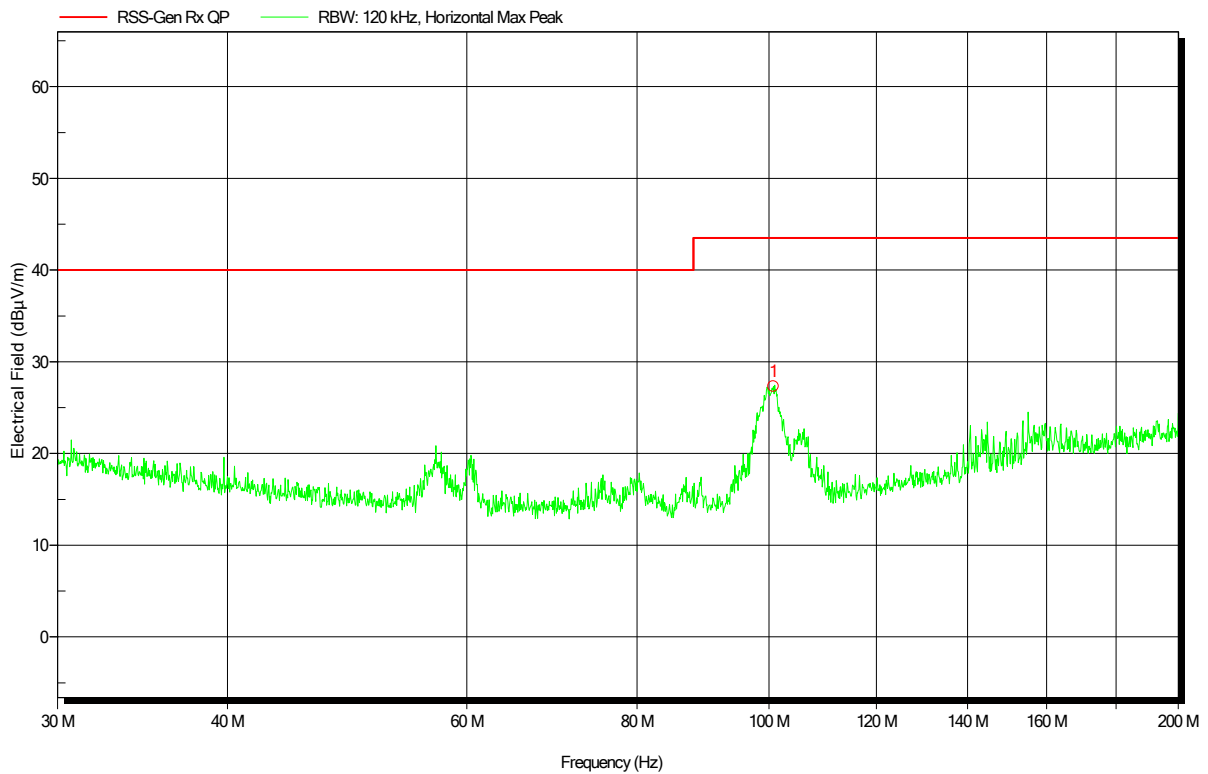
Measurement distance: 3 m

Mode: RX; LTE FDD 2, 1960 MHz

Test Date: 2020-05-08

Note:

Index 1



Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
100.7735 MHz	27.3 dBµV/m	43.5 dBµV/m	-16.2 dB	Pass	108 Degree	2 m

### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series

Test Site: Eurofins Product Service Germany

Operator: Mr. Jahn

Measurement software: RadiMation, version 2016.1.10

Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor

Antenna: Rohde & Schwarz HK 116, Vertical

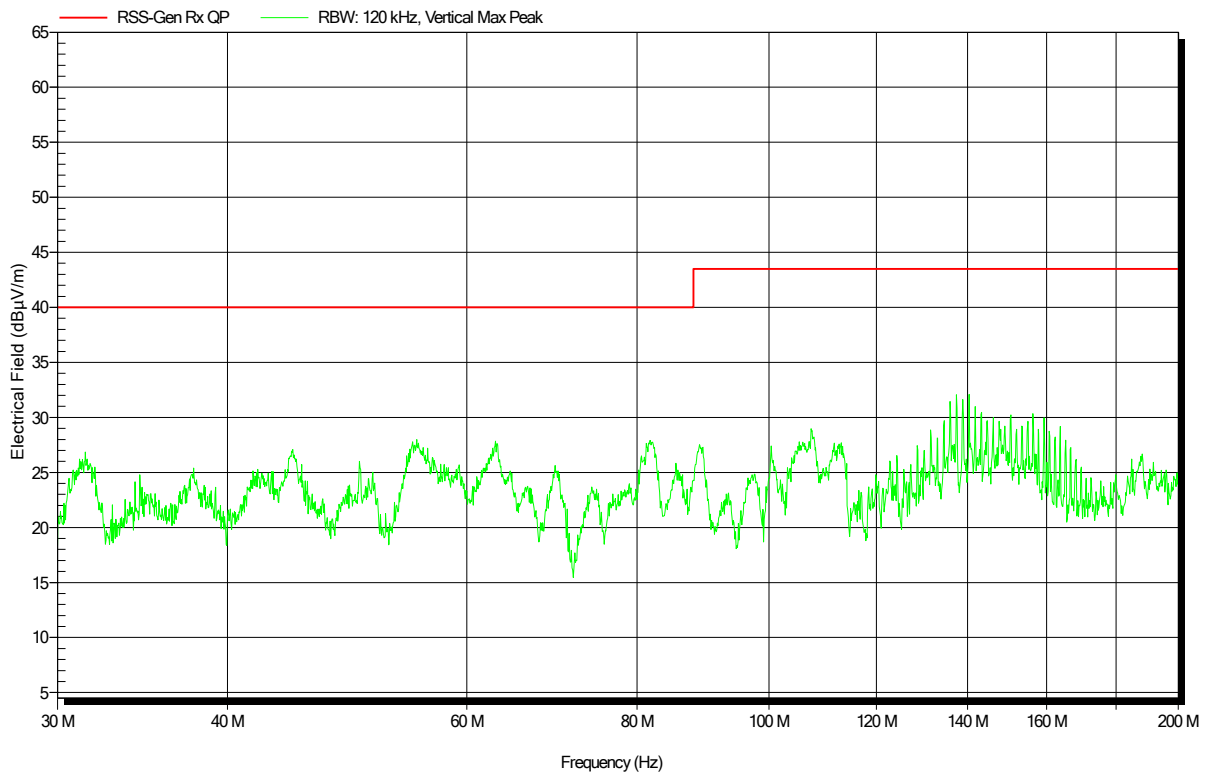
Measurement distance: 3 m

Mode: RX; LTE FDD 2, 1960 MHz

Test Date: 2020-05-08

Note:

Index 2



### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series

Test Site: Eurofins Product Service Germany

Operator: Mr. Jahn

Measurement software: RadiMation, version 2016.1.10

Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor

Antenna: Rohde & Schwarz HL 223, Horizontal

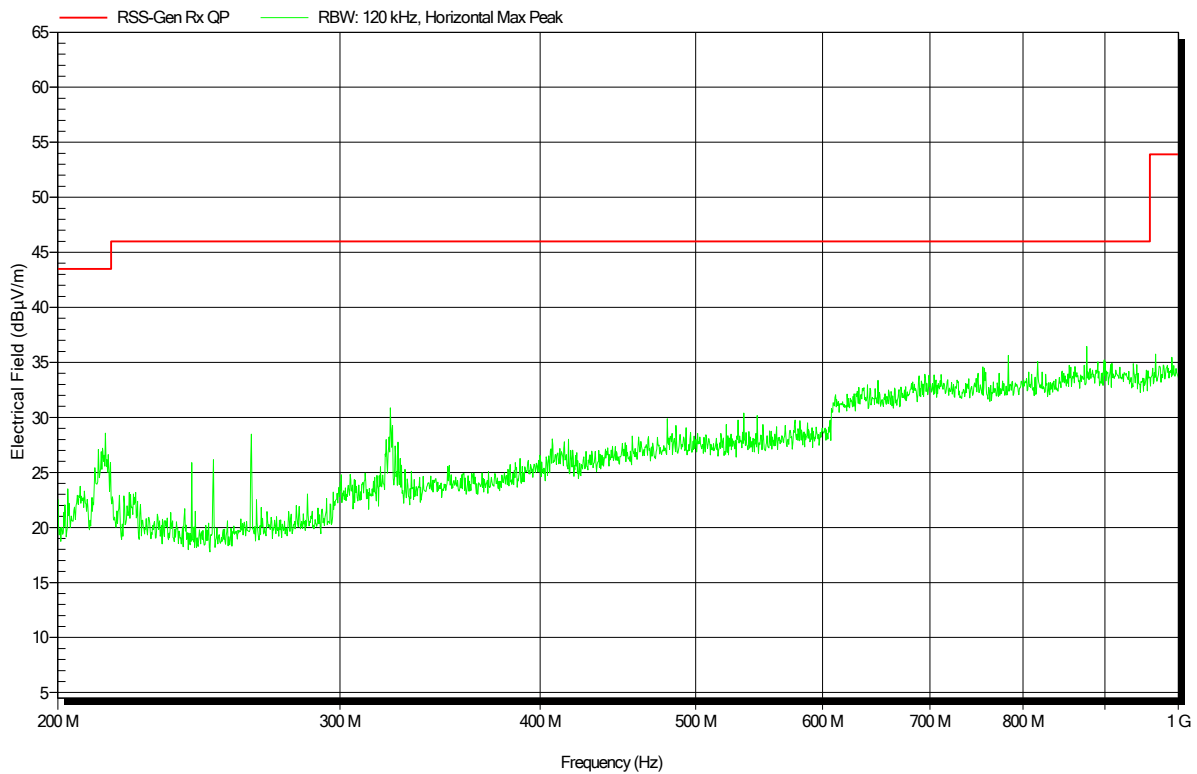
Measurement distance: 3 m

Mode: RX; LTE FDD 2, 1960 MHz

Test Date: 2020-05-08

Note:

Index 3



### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series

Test Site: Eurofins Product Service Germany

Operator: Mr. Jahn

Measurement software: RadiMation, version 2016.1.10

Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor

Antenna: Rohde & Schwarz HL 223, Vertical

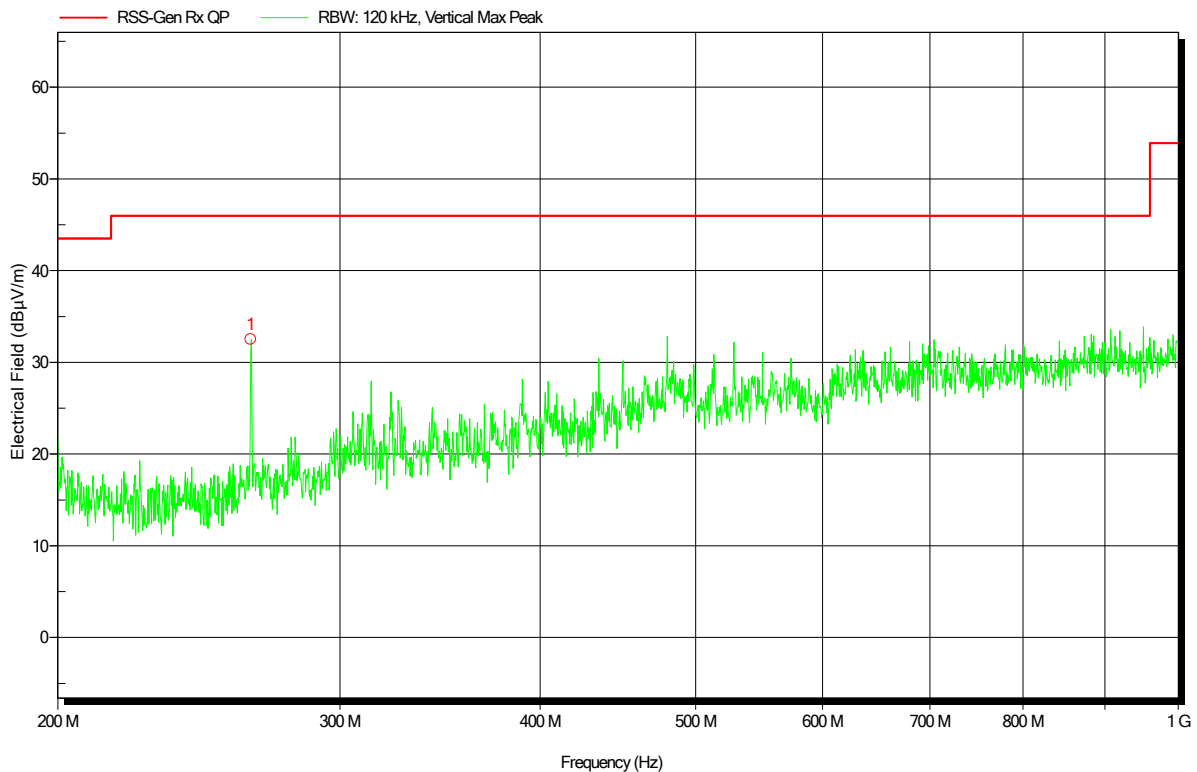
Measurement distance: 3 m

Mode: RX; LTE FDD 2, 1960 MHz

Test Date: 2020-05-08

Note:

Index 5



Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
264.0048 MHz	32.5 dBµV/m	46 dBµV/m	-13.48 dB	Pass	0 Degree	1 m

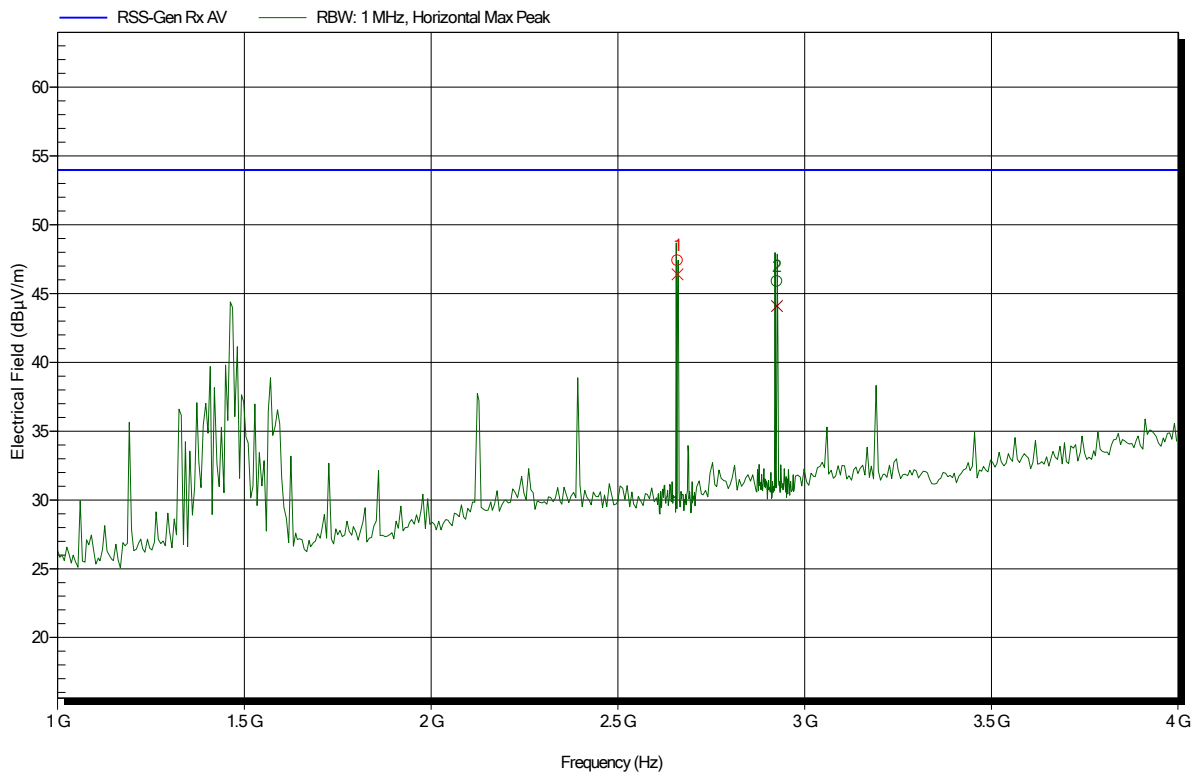
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 2, 1960 MHz  
 Test Date: 2020-05-11  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status
2.66 GHz	47.4 dBµV/m	53.98 dBµV/m	-6.58 dB	Pass
2.926 GHz	45.88 dBµV/m	53.98 dBµV/m	-8.1 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.66 GHz	46.4 dBµV/m	53.98 dBµV/m	-7.58 dB	Pass
2.926 GHz	44.1 dBµV/m	53.98 dBµV/m	-9.88 dB	Pass

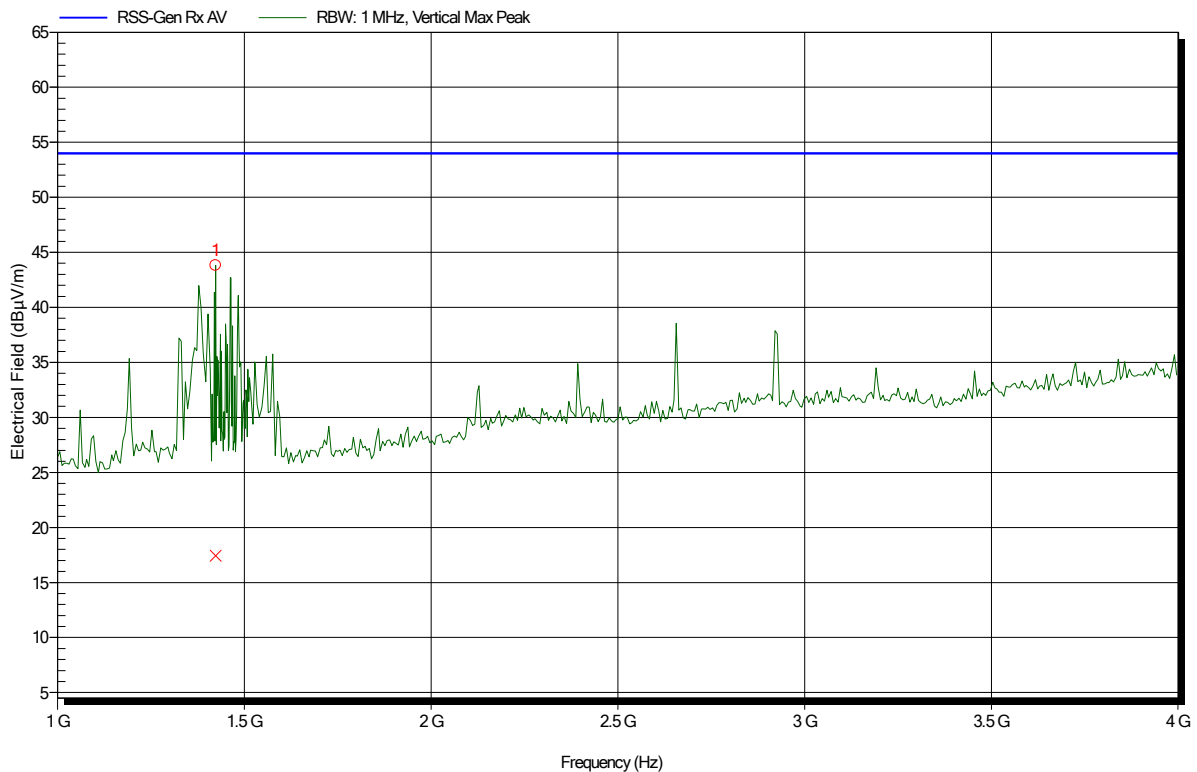
**Spurious emissions according to ISED RSS-Gen**

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 2, 1960 MHz  
 Test Date: 2020-05-11  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status
1.423 GHz	43.82 dBµV/m	53.98 dBµV/m	-10.16 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
1.423 GHz	17.43 dBµV/m	53.98 dBµV/m	-36.55 dB	Pass

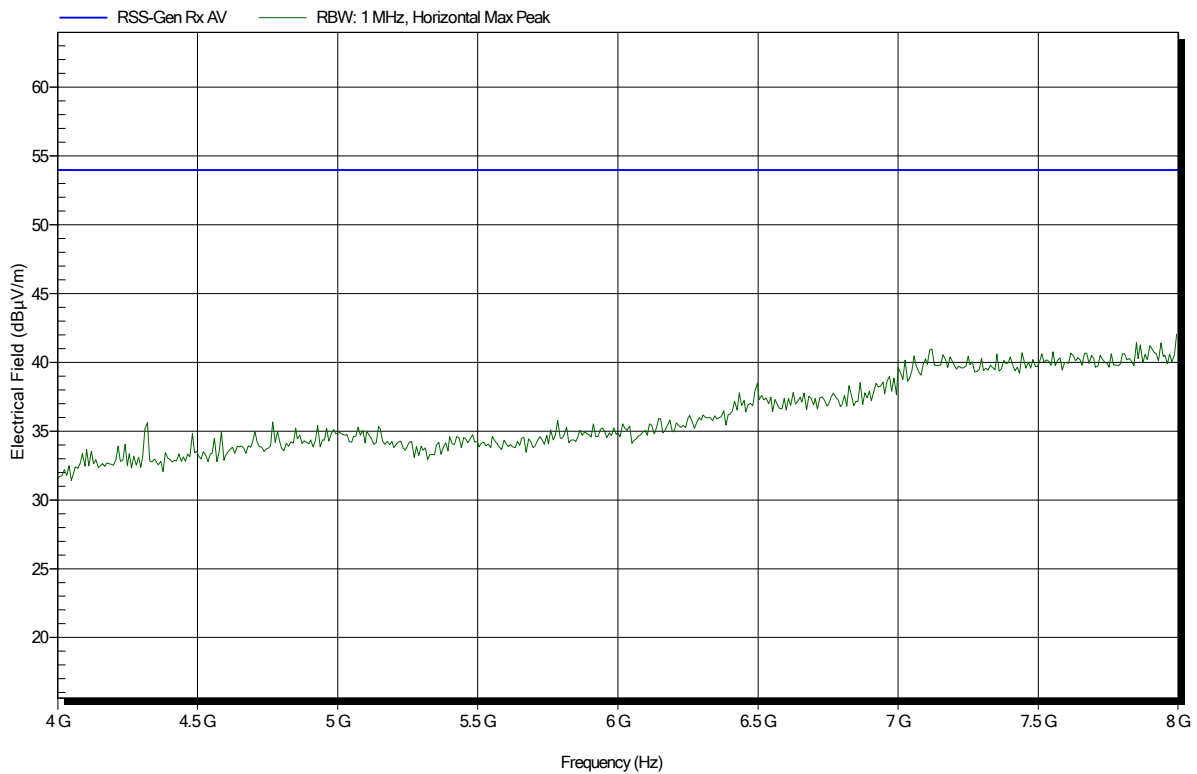
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 2, 1960 MHz  
 Test Date: 2020-05-11  
 Note:

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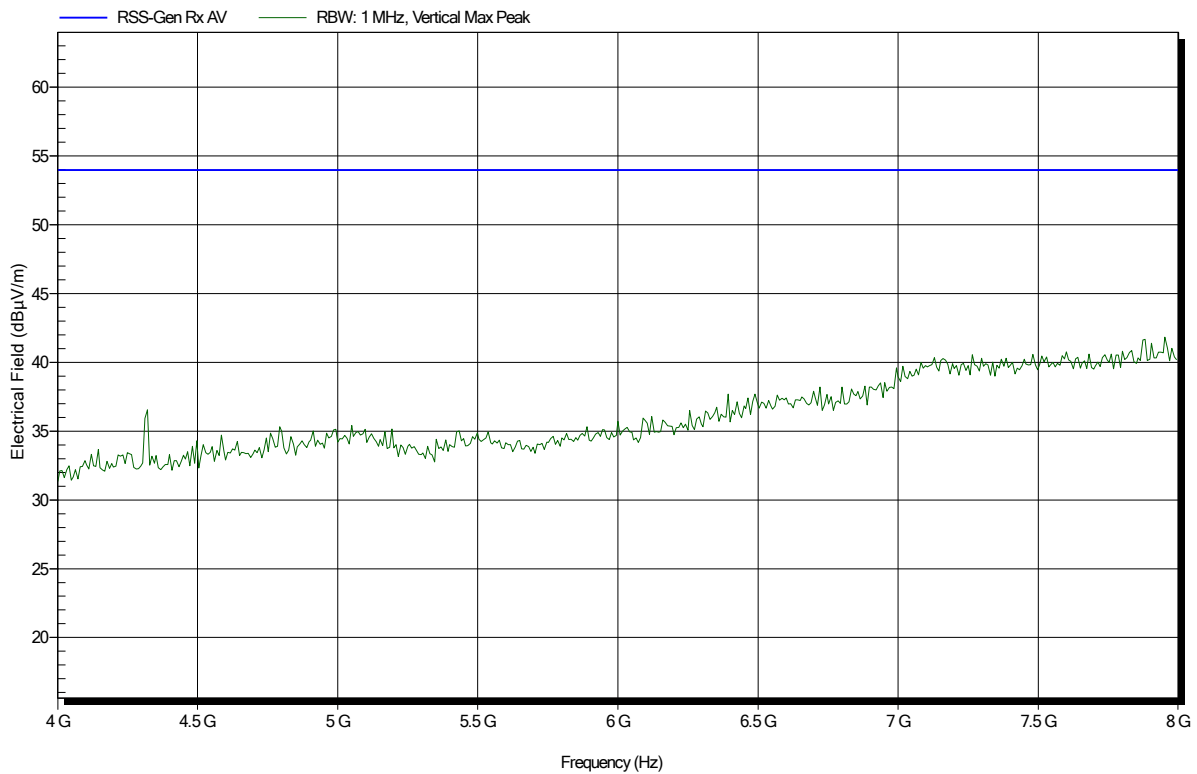
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 2, 1960 MHz  
 Test Date: 2020-05-11  
 Note:

Index 97



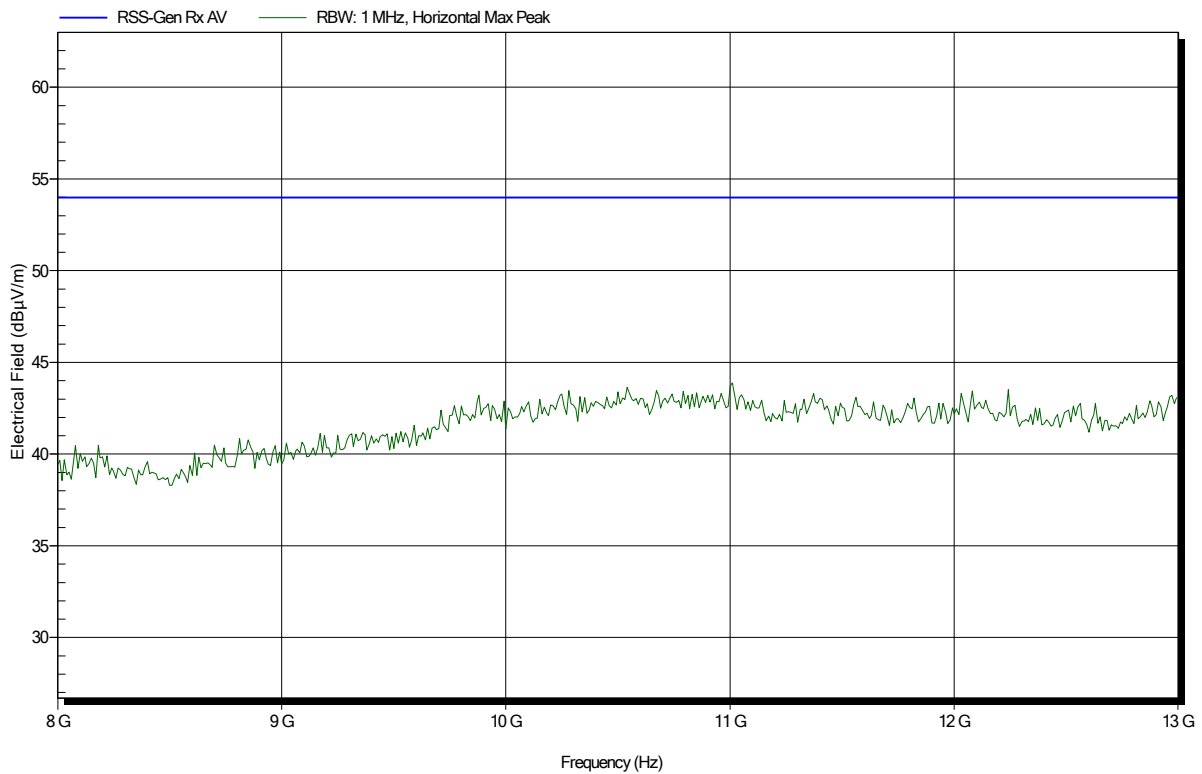
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 2, 1960 MHz  
 Test Date: 2020-05-11  
 Note:

Index 95



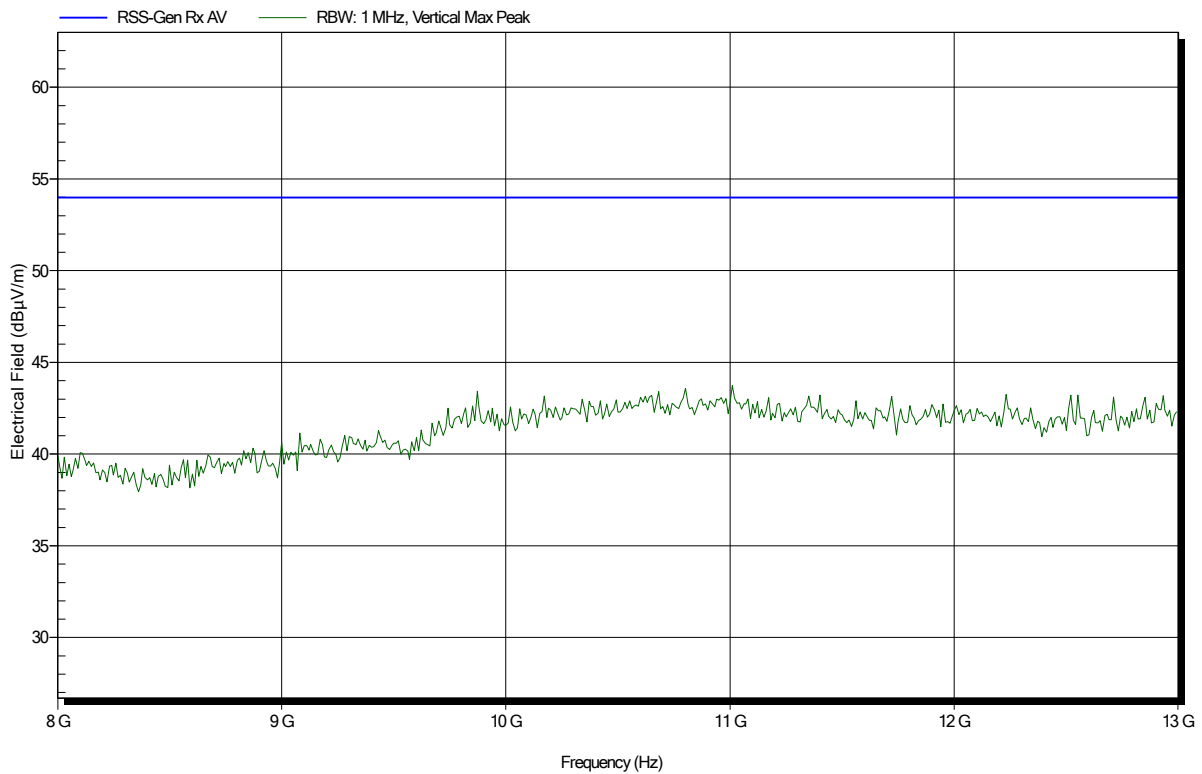
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 2, 1960 MHz  
 Test Date: 2020-05-11  
 Note:

Index 98



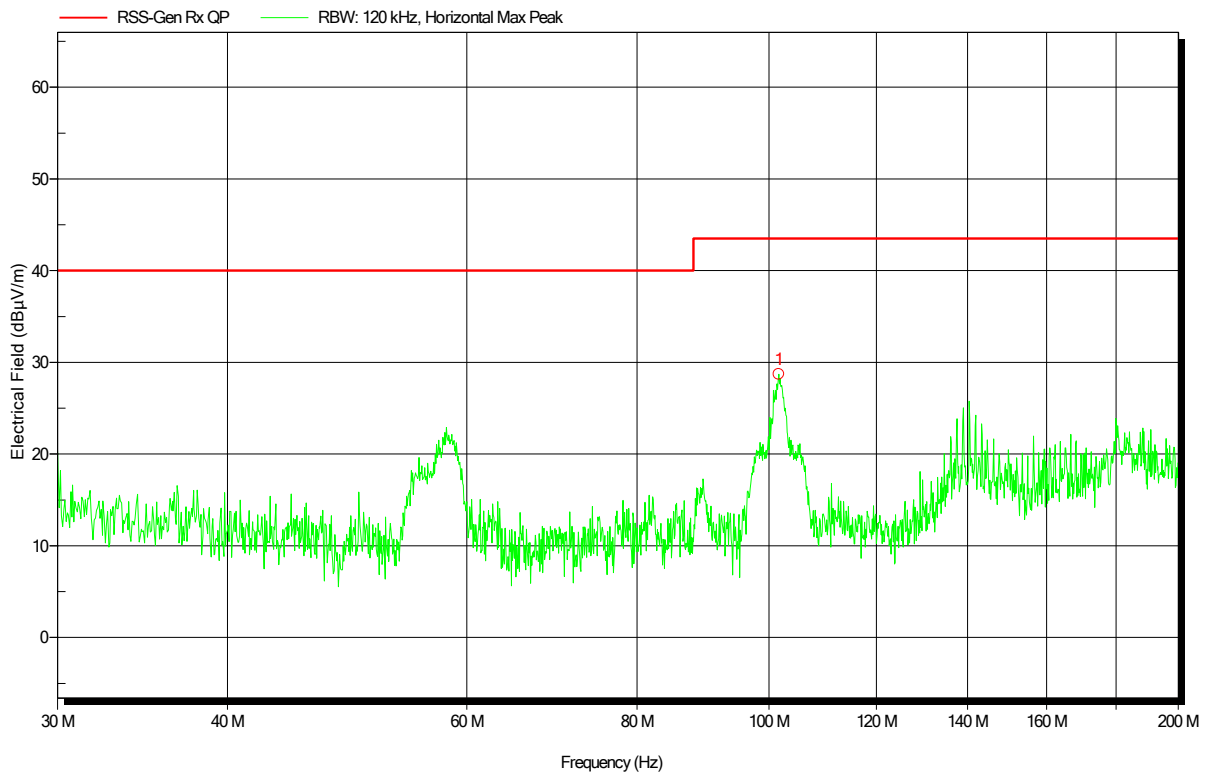
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-08  
 Note:

Index 2



Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
101.699 MHz	28.7 dBµV/m	43.5 dBµV/m	-14.79 dB	Pass	0 Degree	1 m

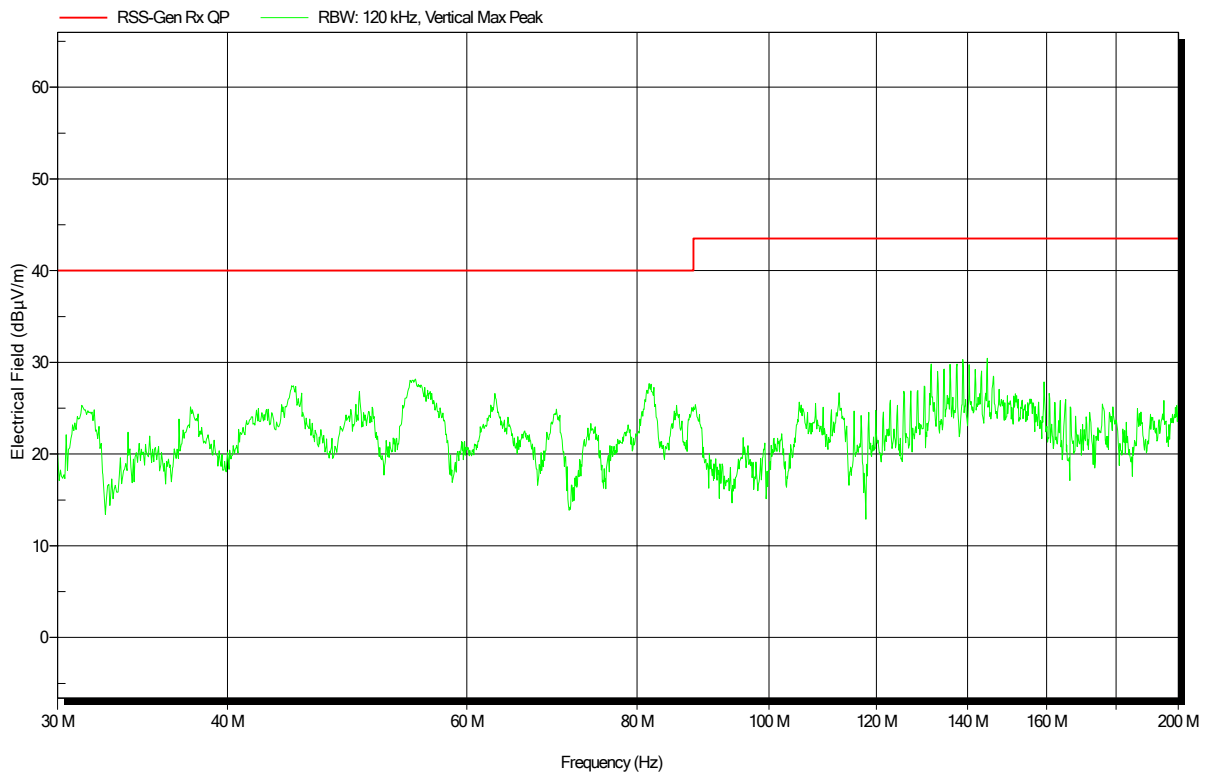
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-08  
 Note:

Index 3



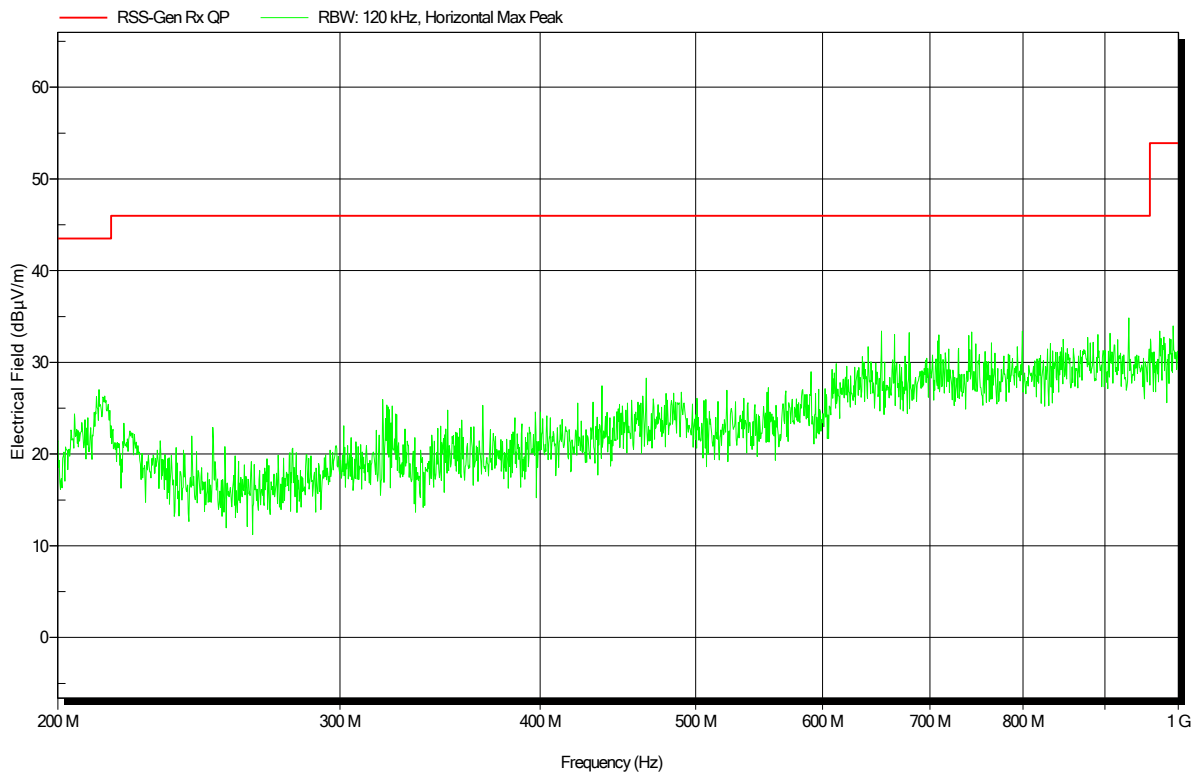
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-08  
 Note:

Index 4



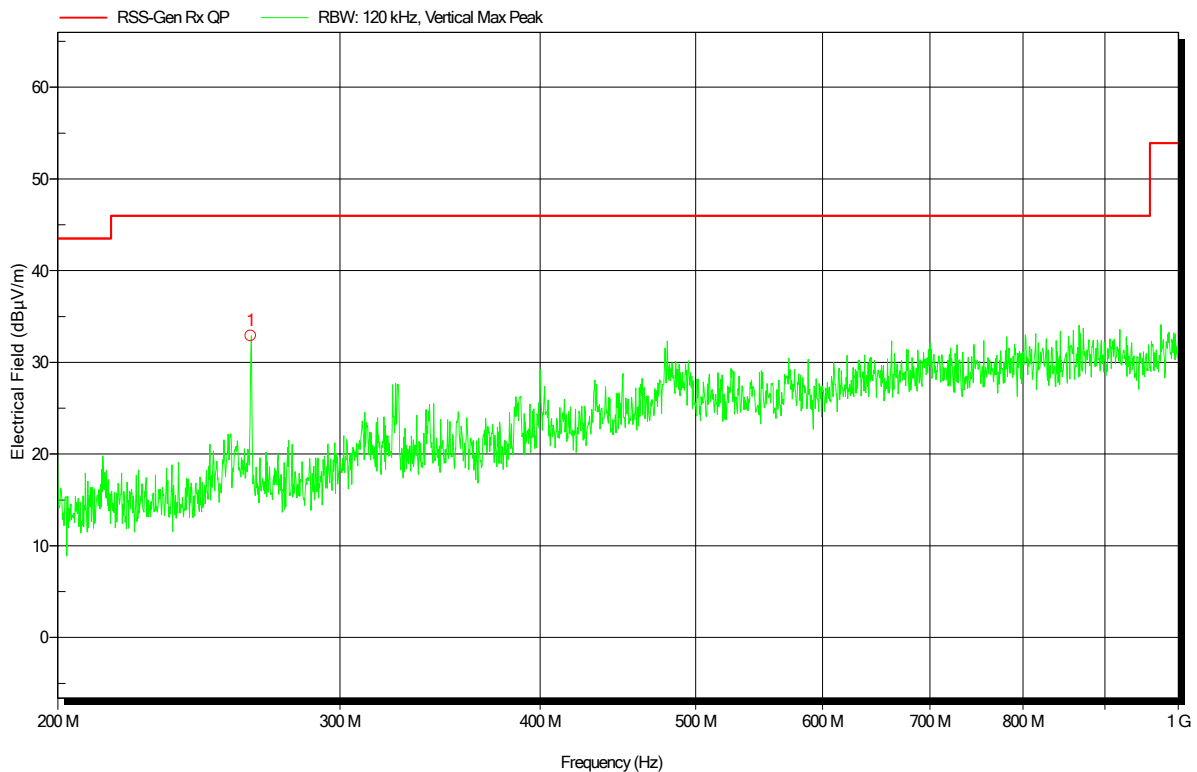
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-08  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
264.0048 MHz	32.9 dBµV/m	46 dBµV/m	-13.12 dB	Pass	0 Degree	1 m

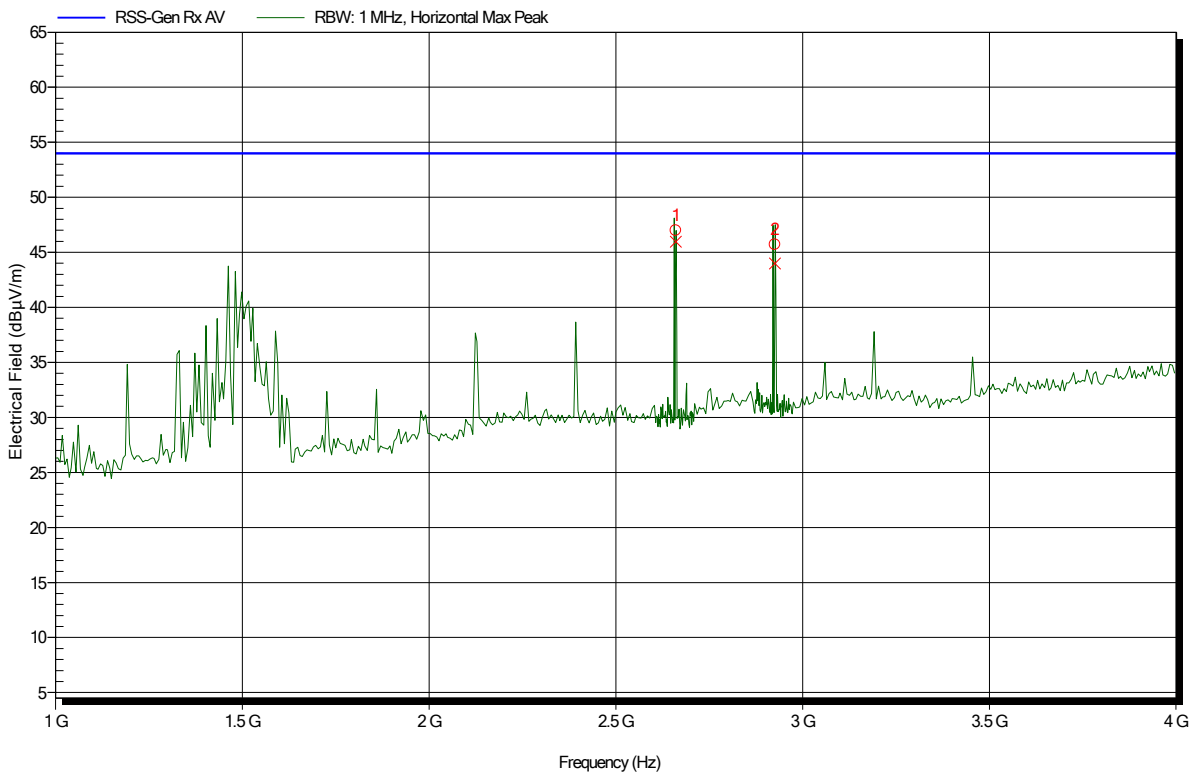
**Spurious emissions according to ISED RSS-Gen**

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-11  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status
2.66 GHz	46.97 dBµV/m	53.98 dBµV/m	-7.01 dB	Pass
2.926 GHz	45.69 dBµV/m	53.98 dBµV/m	-8.29 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.66 GHz	45.96 dBµV/m	53.98 dBµV/m	-8.02 dB	Pass
2.926 GHz	44 dBµV/m	53.98 dBµV/m	-9.98 dB	Pass



### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series

Test Site: Eurofins Product Service GmbH

Measurement software: RadiMation, version 2015.2.4

Operator: Toralf Jahn

Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC

Antenna: Schwarzbeck BBHA 9120D, Vertical

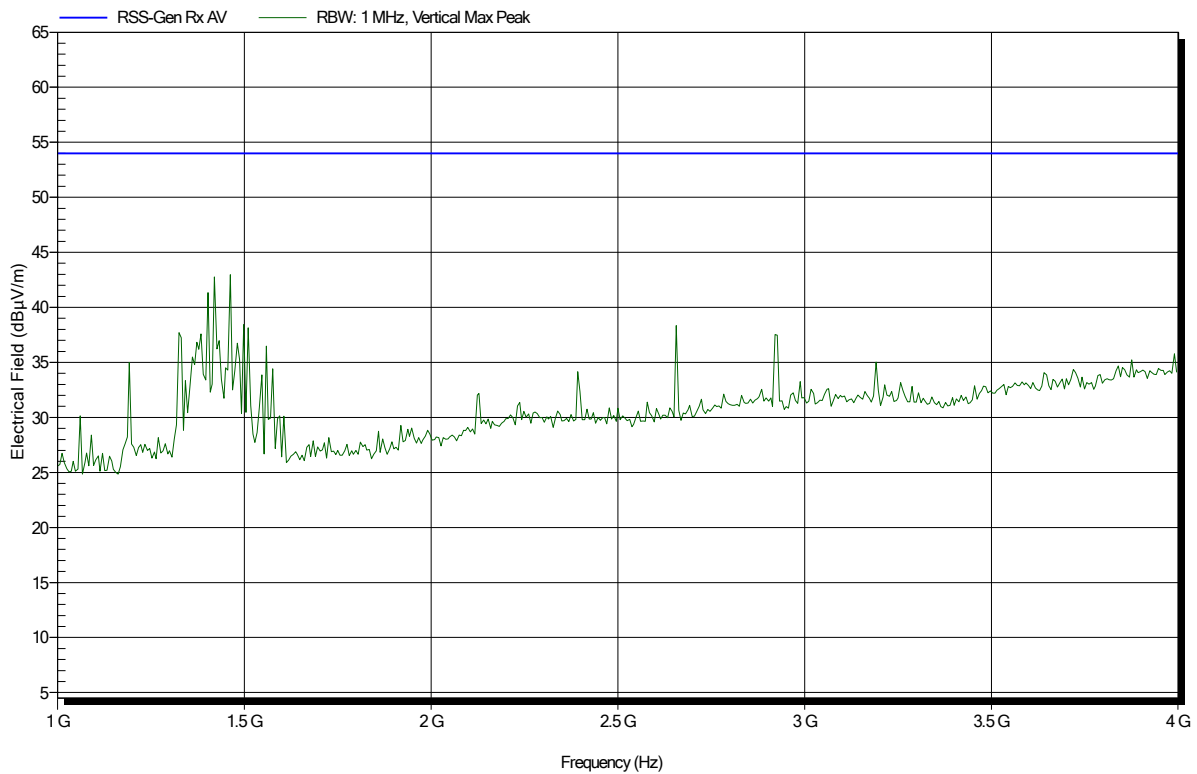
Measurement distance: 1 m converted to 3m

Mode: RX; LTE FDD 4, 2132.5 MHz

Test Date: 2020-05-11

Note:

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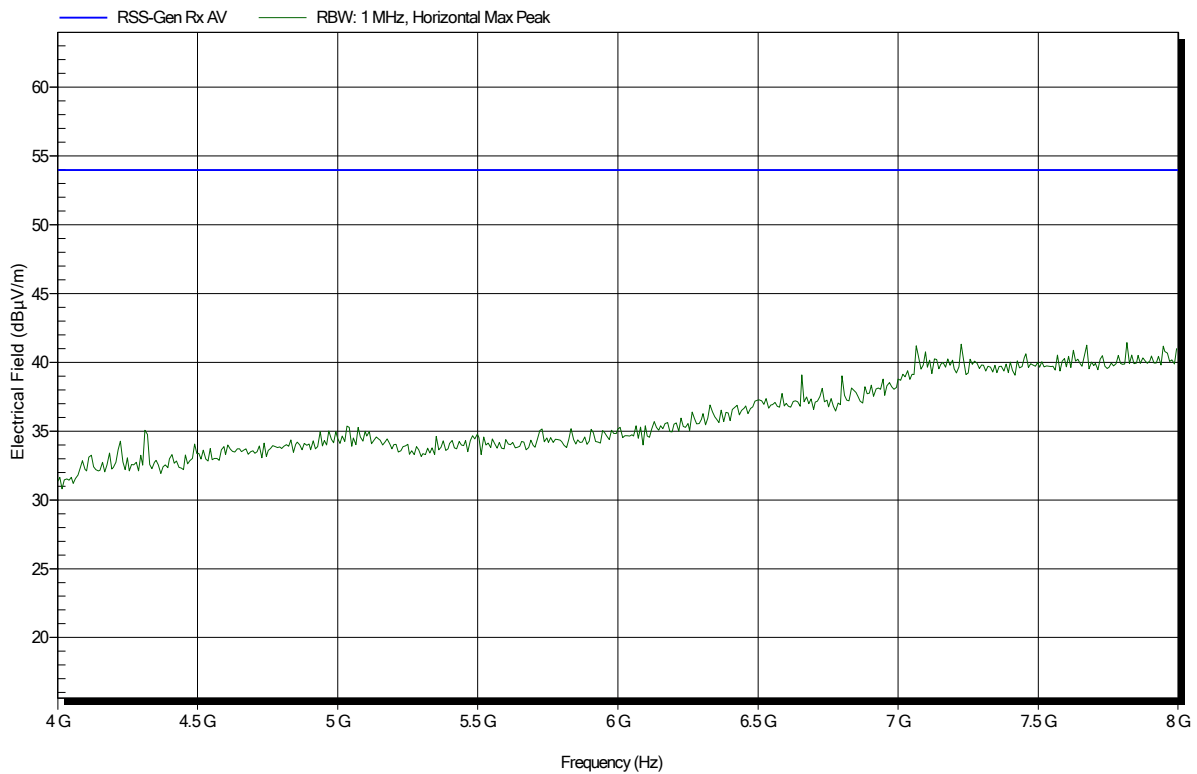
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-11  
 Note:

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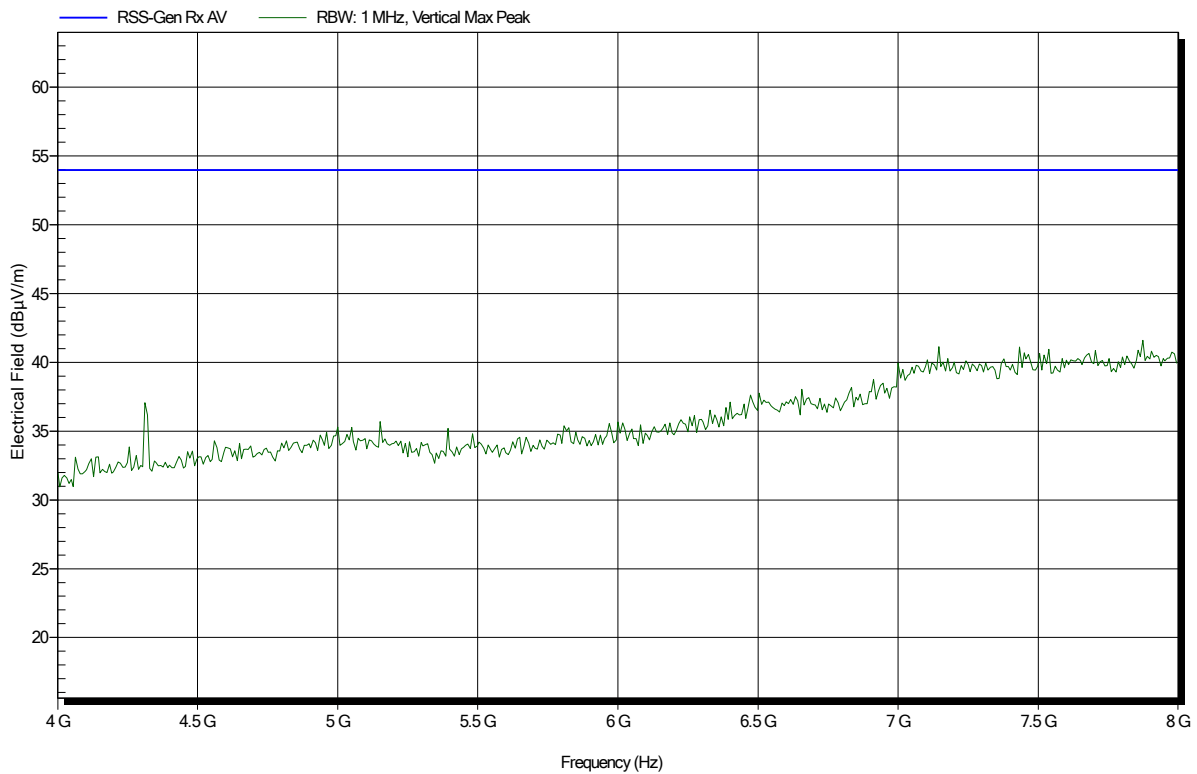
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-11  
 Note:

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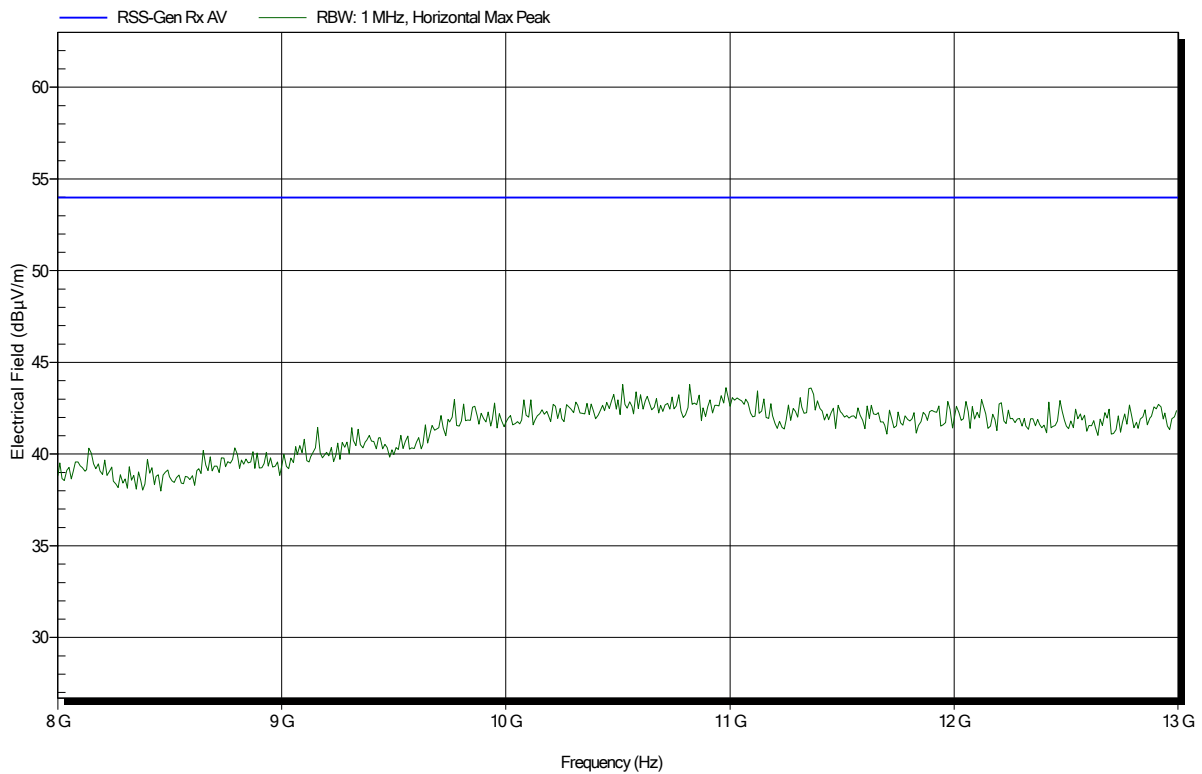
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-11  
 Note:

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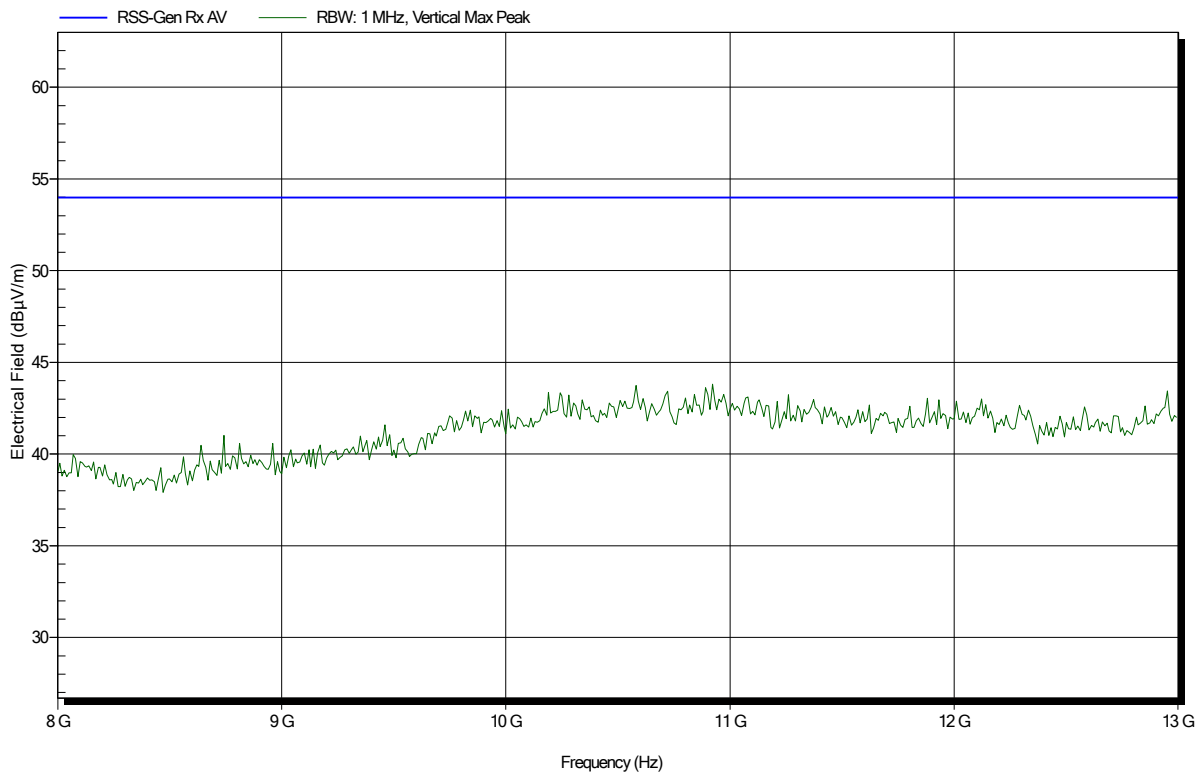
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 4, 2132.5 MHz  
 Test Date: 2020-05-11  
 Note:

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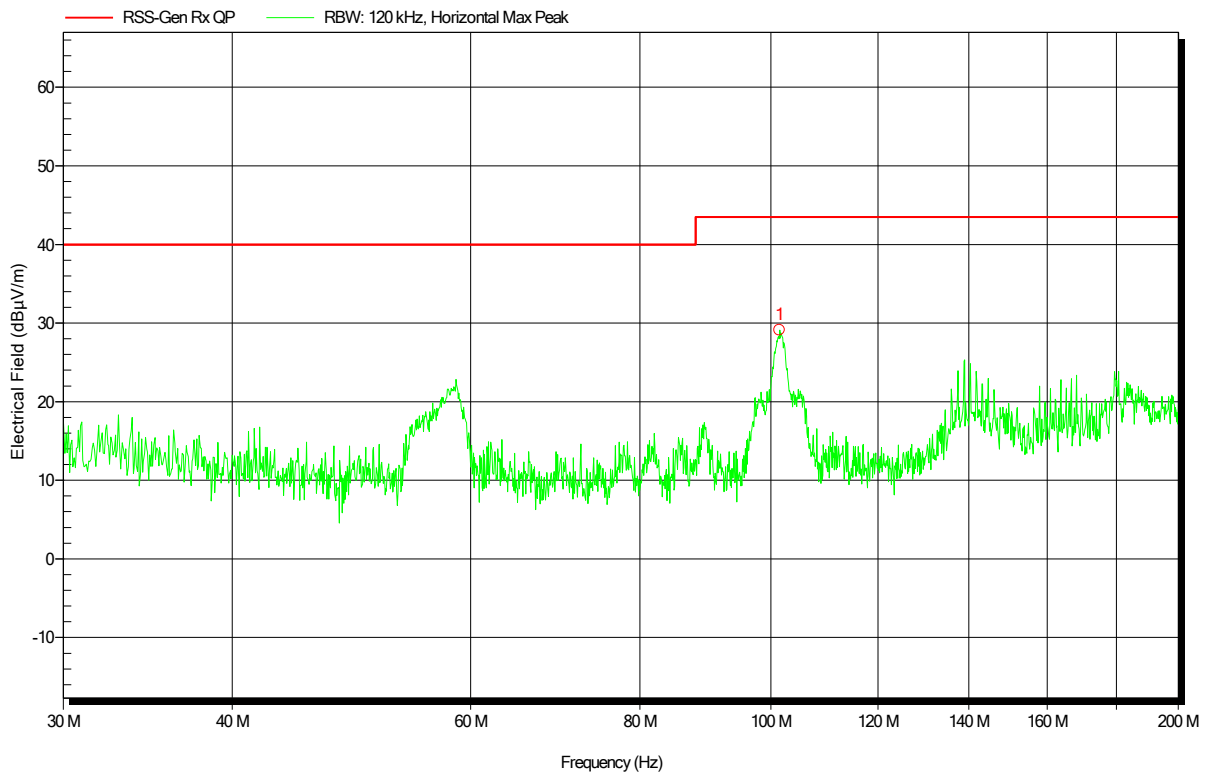
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-08  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
101.4588 MHz	29.1 dBµV/m	43.5 dBµV/m	-14.38 dB	Pass	0 Degree	1 m

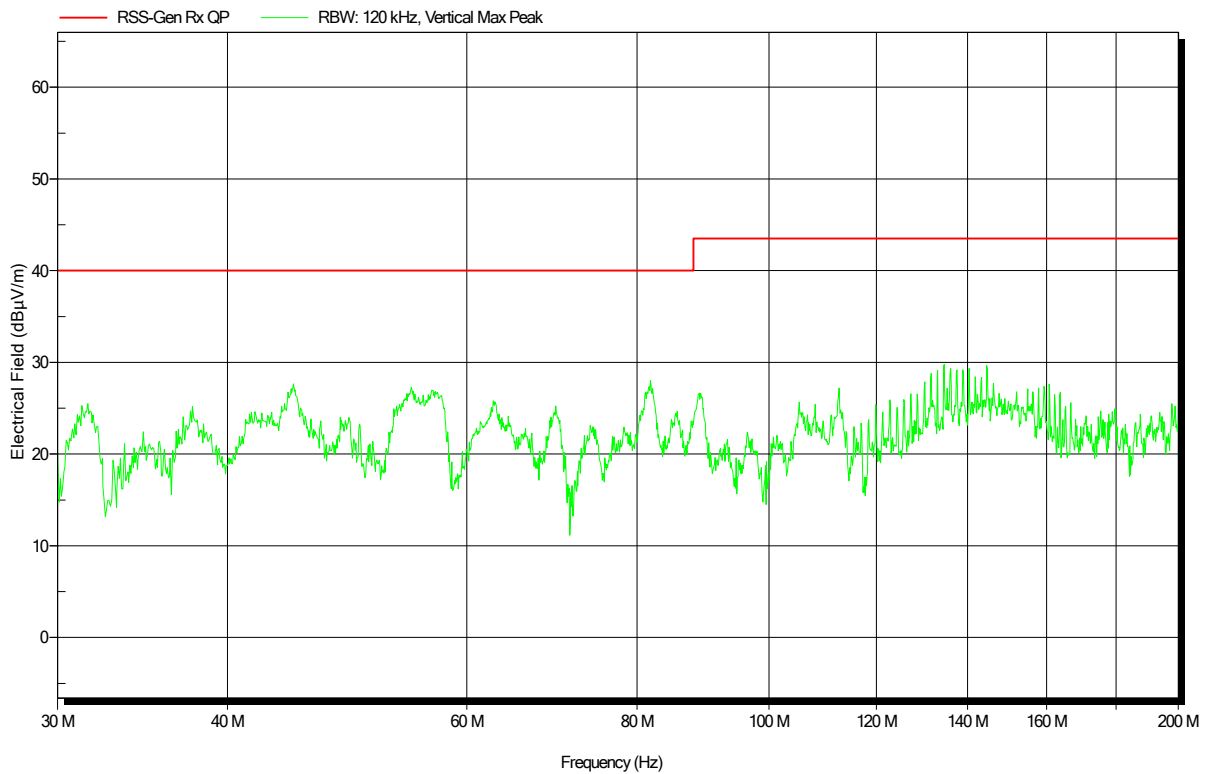
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-08  
 Note:

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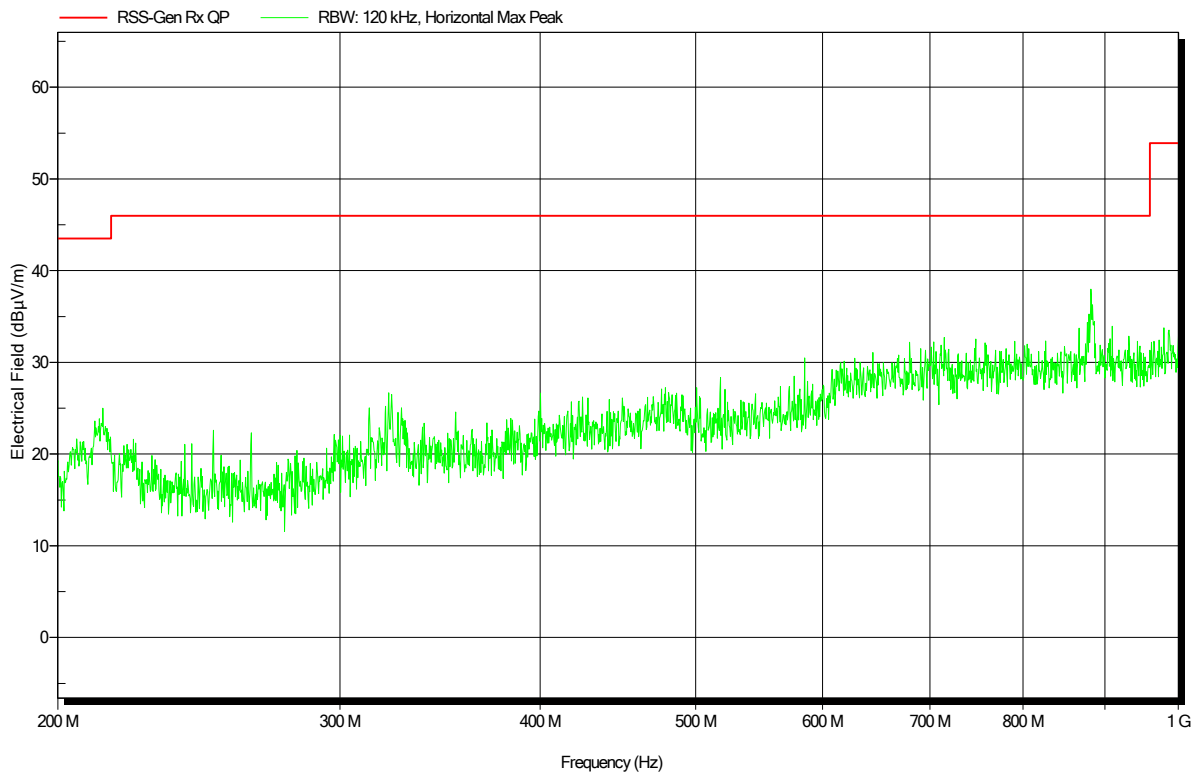
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-08  
 Note:

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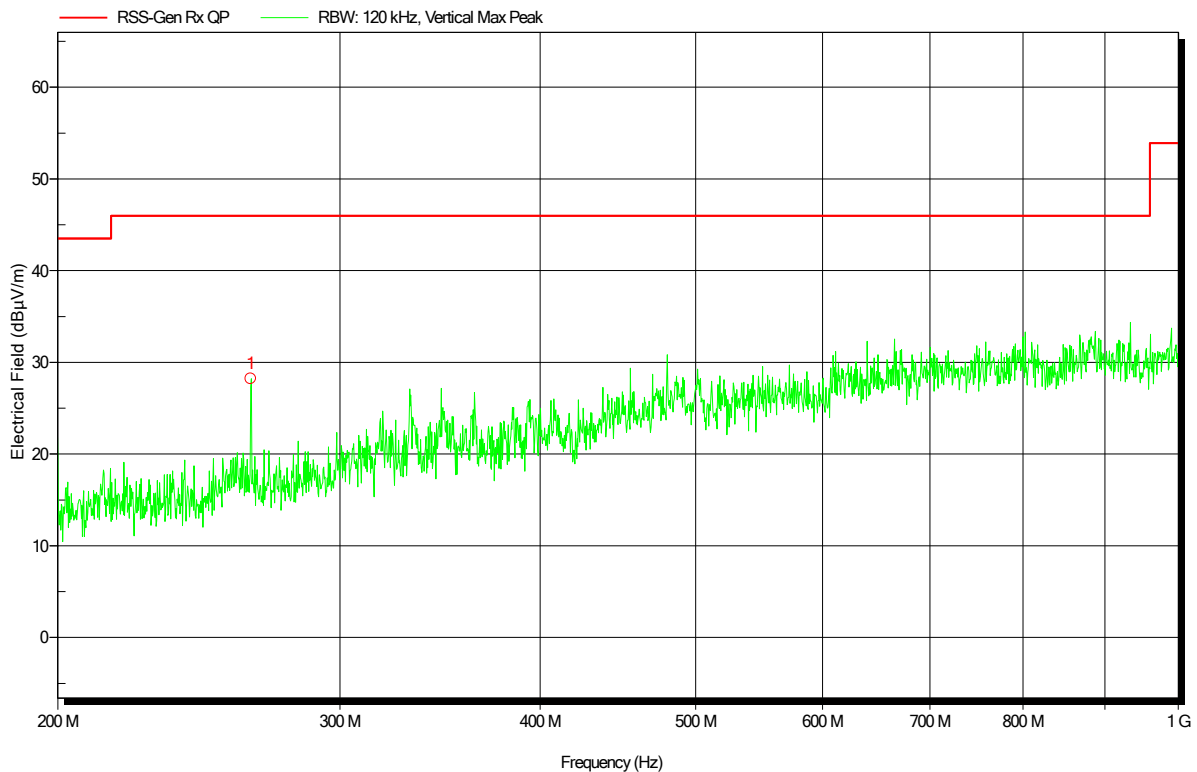
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-08  
 Note:

Index 7



Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
264.0048 MHz	28.2 dBµV/m	46 dBµV/m	-17.78 dB	Pass	0 Degree	1 m

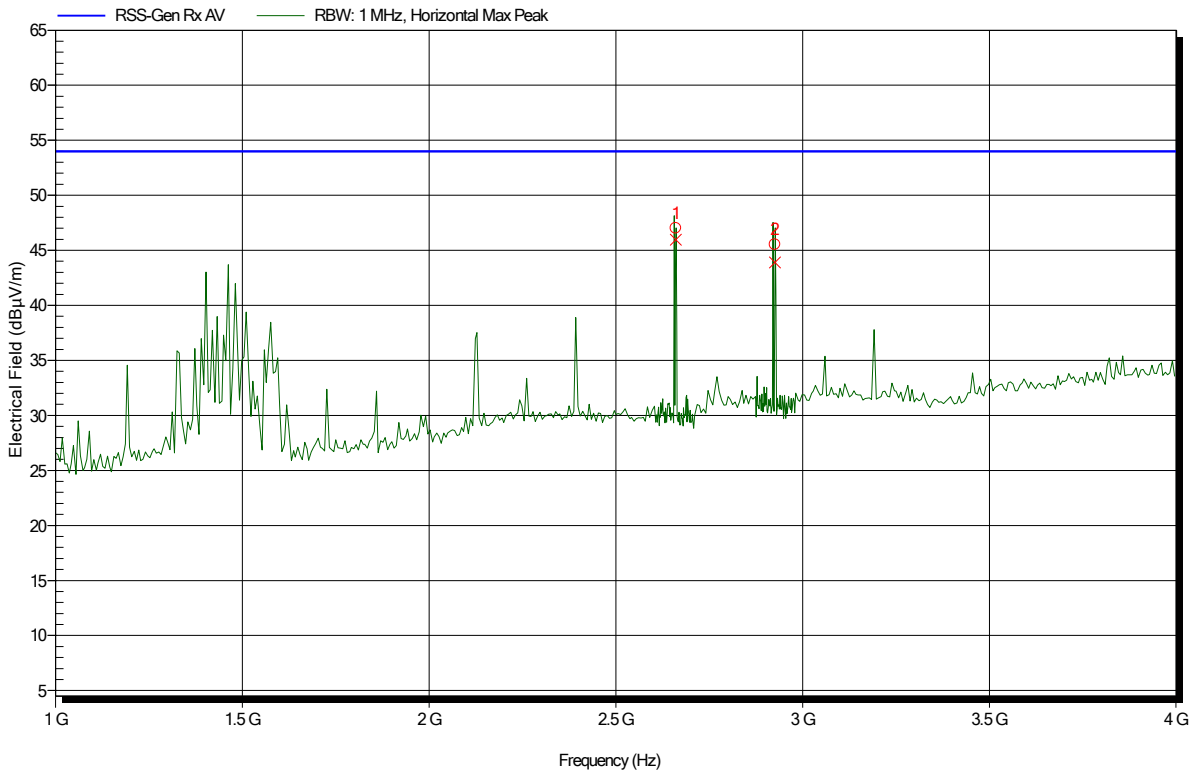
**Spurious emissions according to ISED RSS-Gen**

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-11  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status
2.66 GHz	47.02 dBµV/m	53.98 dBµV/m	-6.96 dB	Pass
2.926 GHz	45.54 dBµV/m	53.98 dBµV/m	-8.44 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.66 GHz	45.97 dBµV/m	53.98 dBµV/m	-8.01 dB	Pass
2.926 GHz	43.91 dBµV/m	53.98 dBµV/m	-10.07 dB	Pass

### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series

Test Site: Eurofins Product Service GmbH

Measurement software: RadiMation, version 2015.2.4

Operator: Toralf Jahn

Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC

Antenna: Schwarzbeck BBHA 9120D, Vertical

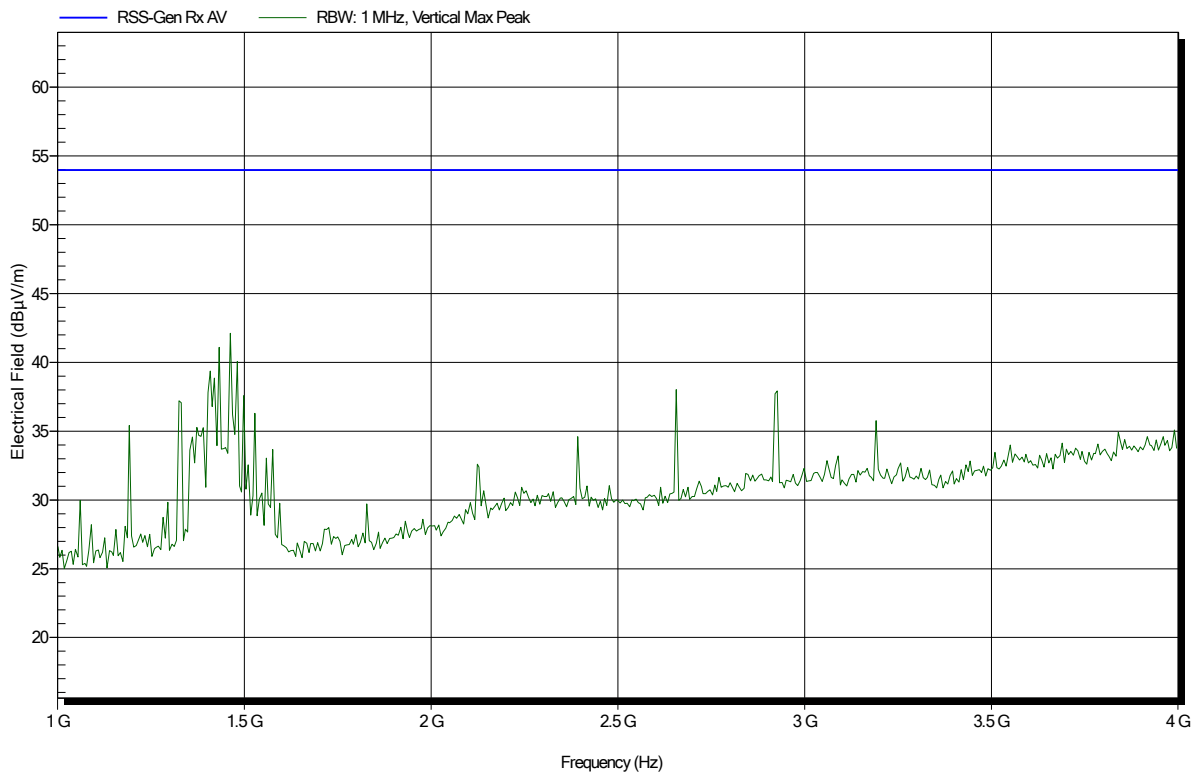
Measurement distance: 1 m converted to 3m

Mode: RX; LTE FDD 5, 881.5 MHz

Test Date: 2020-05-11

Note:

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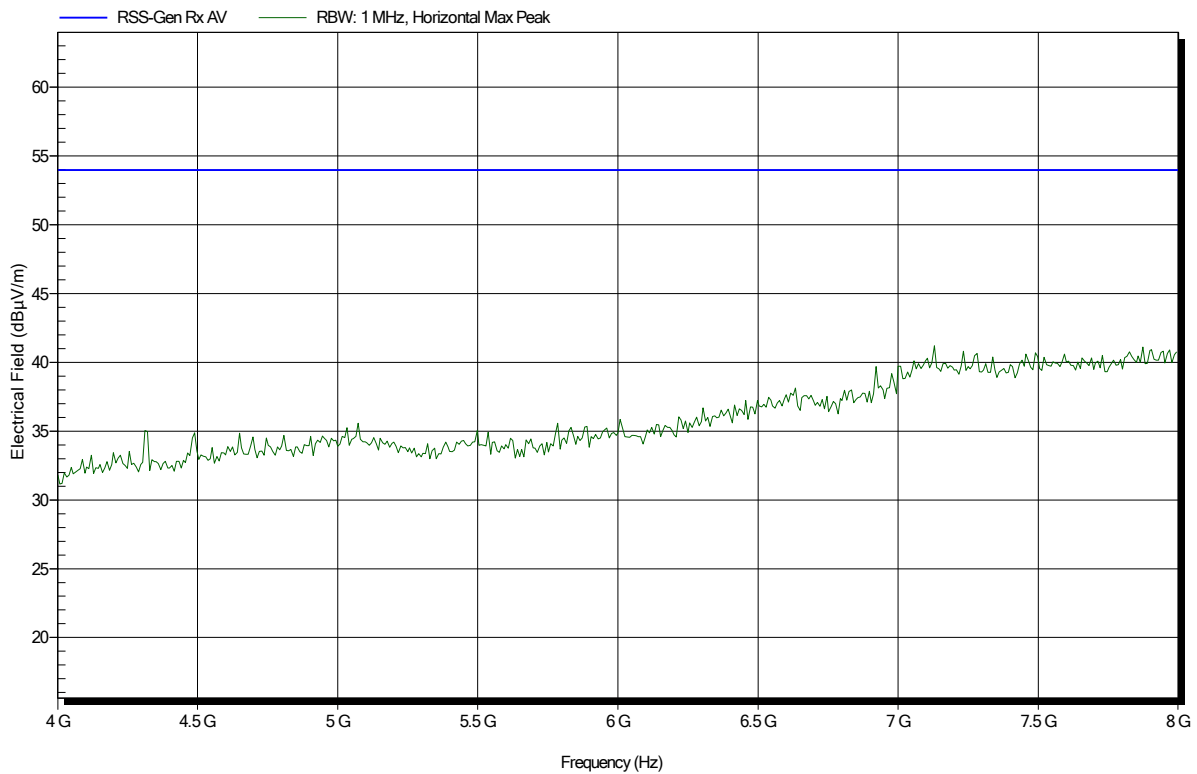
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-11  
 Note:

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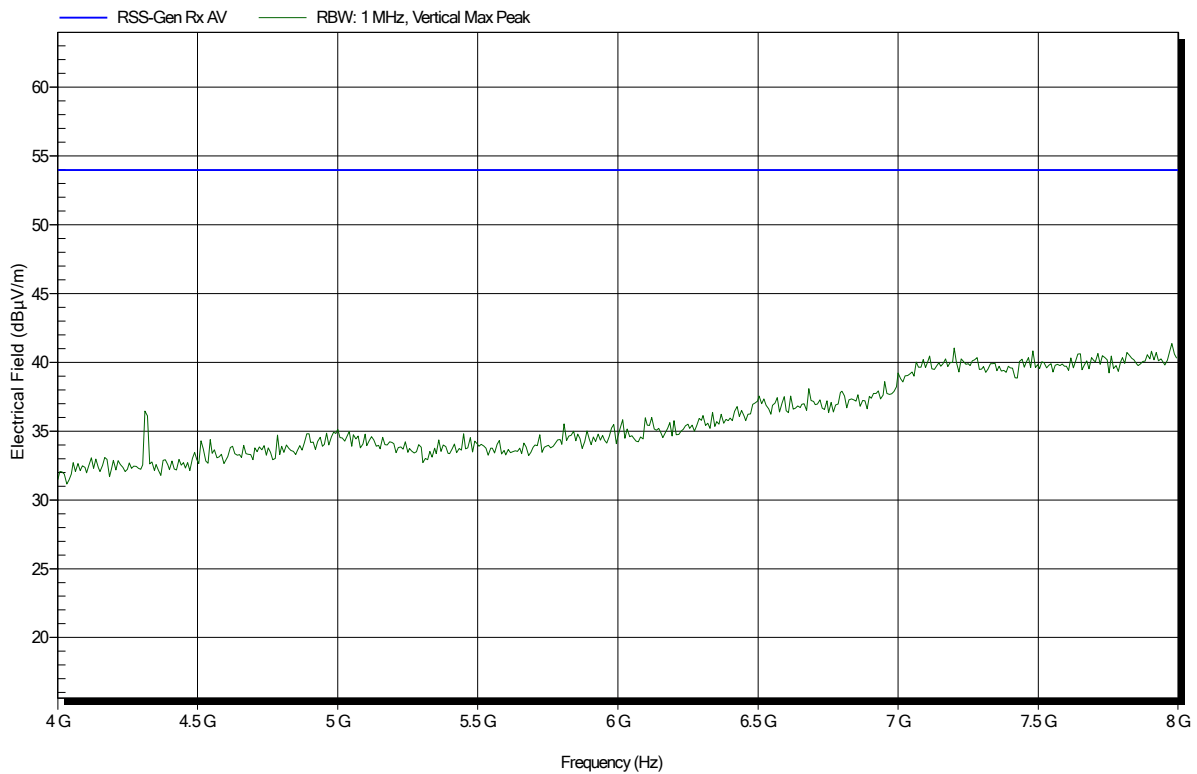
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 5, 881.5 MHz  
 Test Date: 2020-05-11  
 Note:

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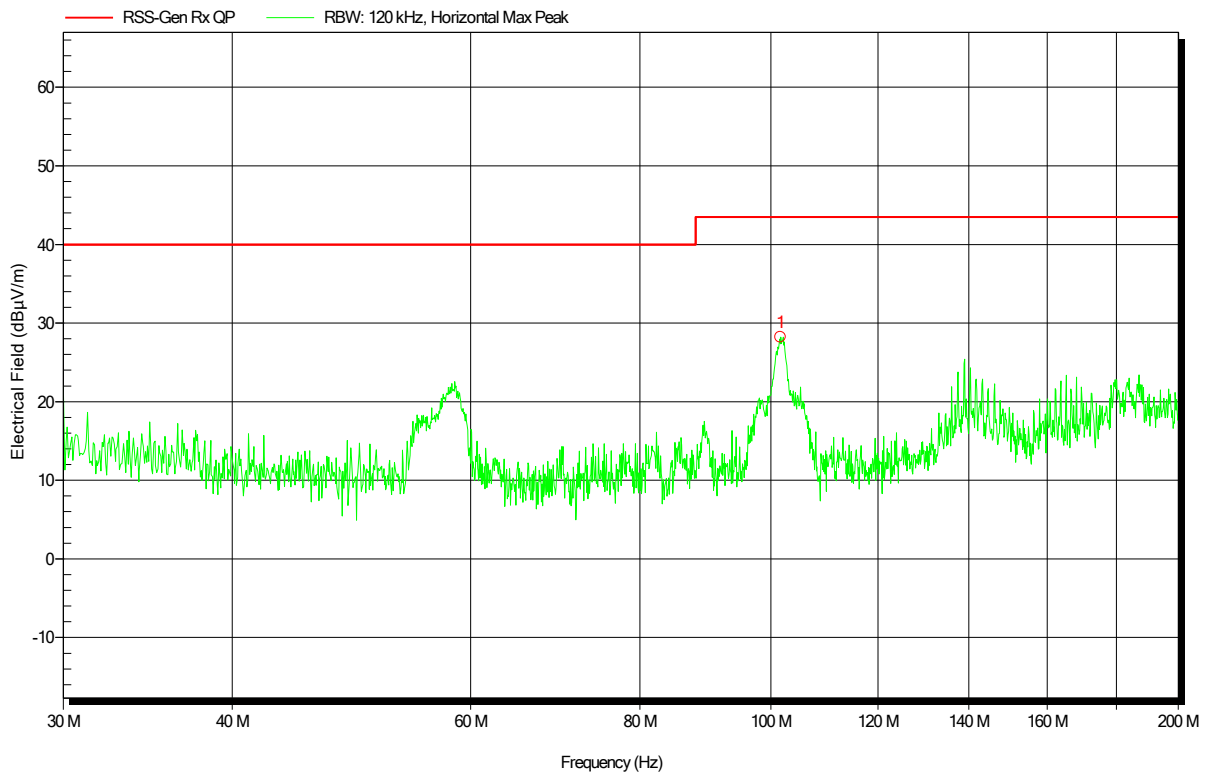
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-08  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
101.639 MHz	28.2 dBµV/m	43.5 dBµV/m	-15.28 dB	Pass	0 Degree	1 m

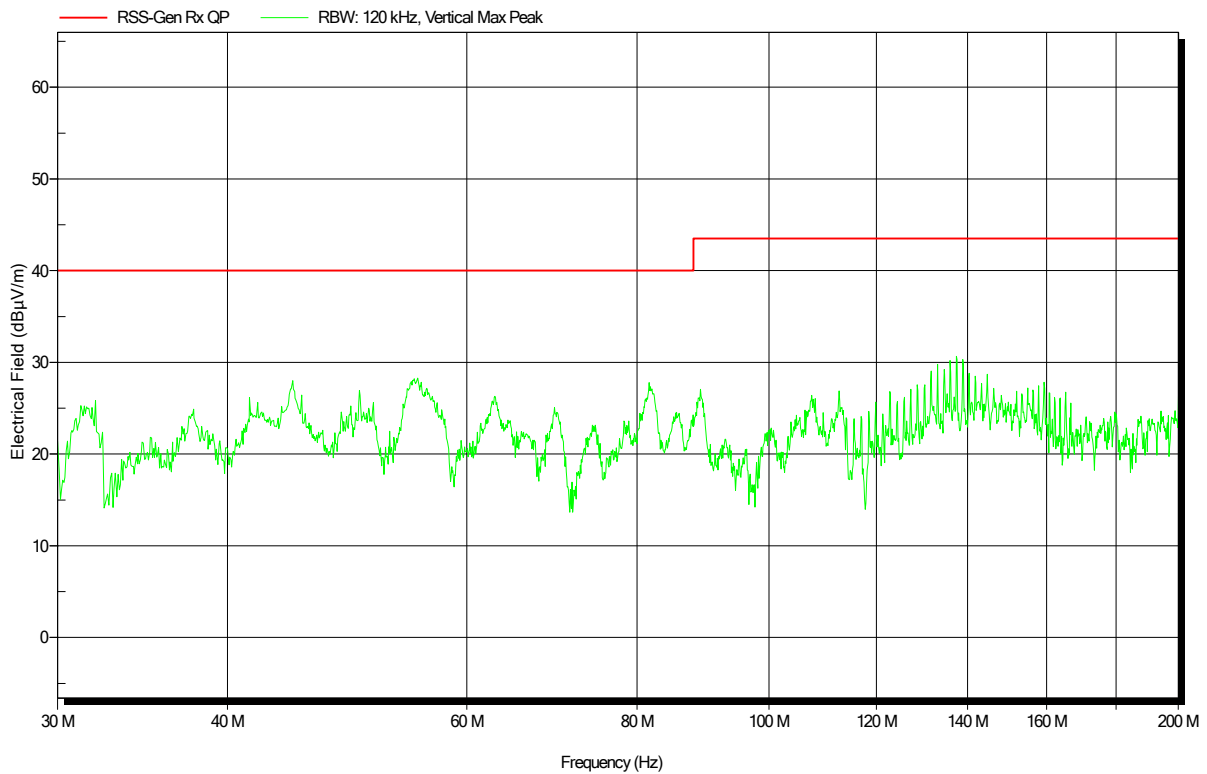
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-08  
 Note:

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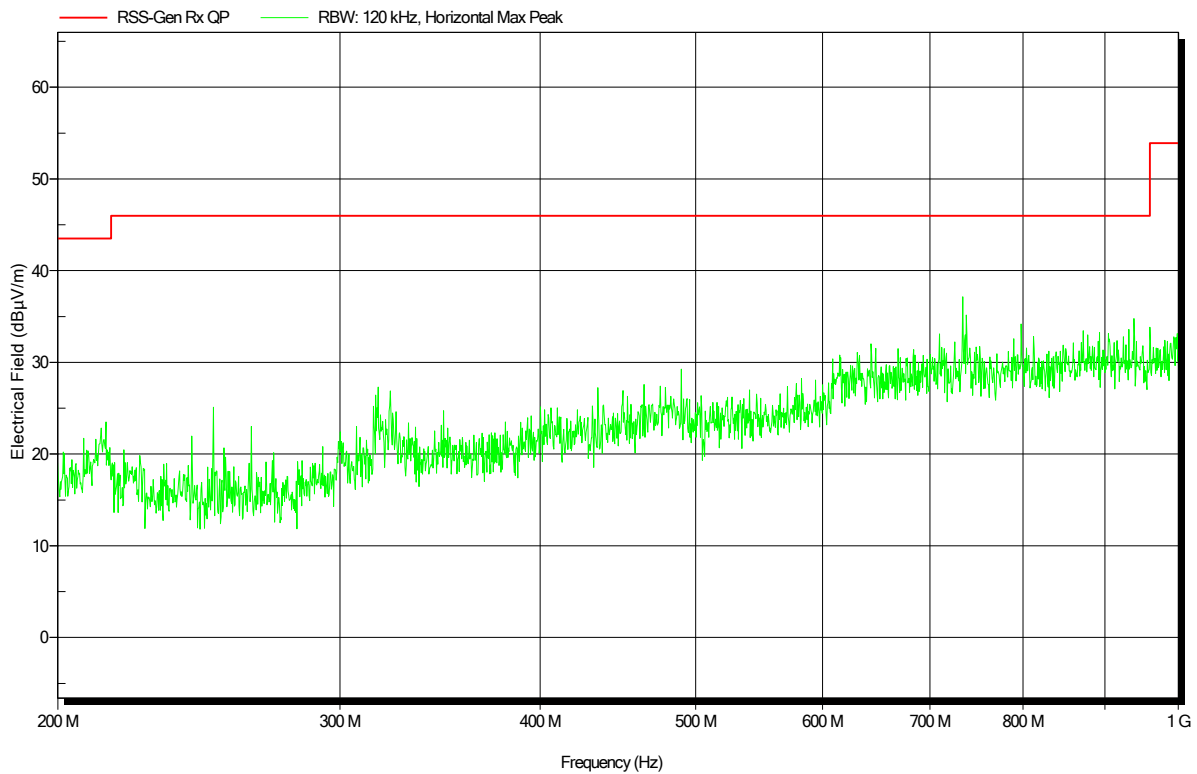
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-08  
 Note:

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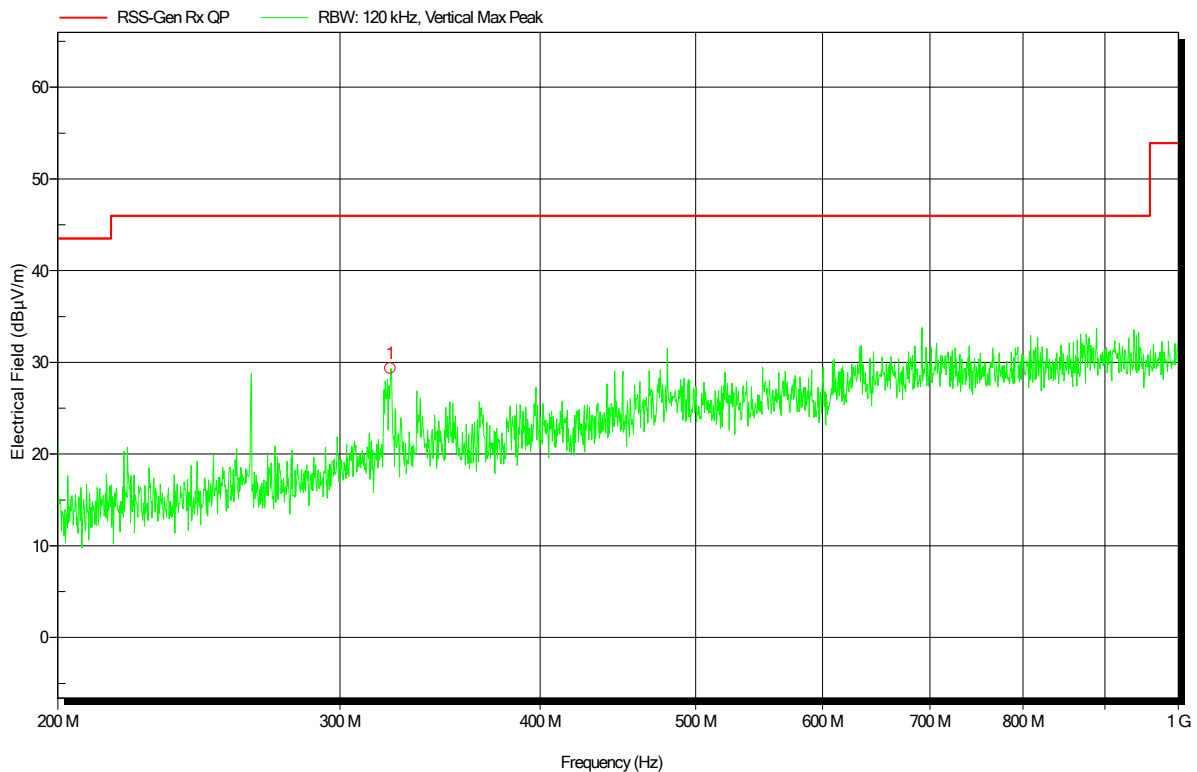
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-08  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
322.6058 MHz	29.3 dBµV/m	46 dBµV/m	-16.67 dB	Pass	0 Degree	1 m

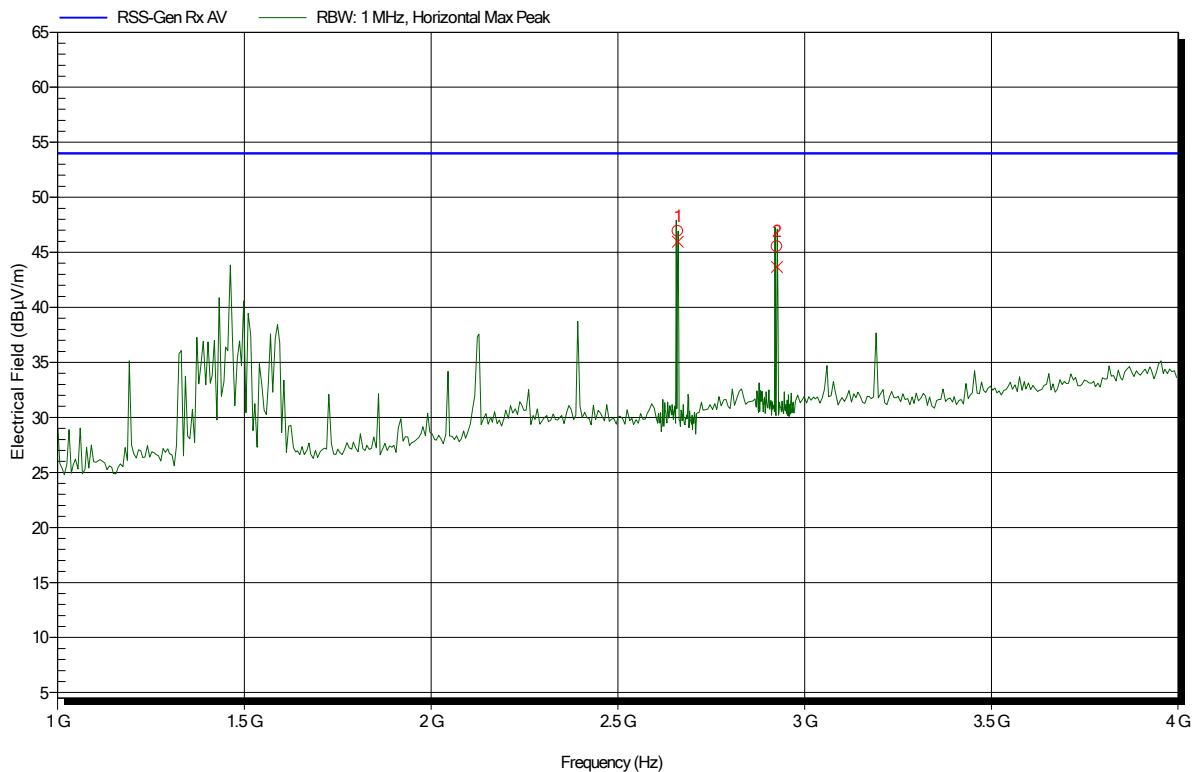
**Spurious emissions according to ISED RSS-Gen**

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-11  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status
2.66 GHz	46.91 dBµV/m	53.98 dBµV/m	-7.07 dB	Pass
2.926 GHz	45.53 dBµV/m	53.98 dBµV/m	-8.45 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.66 GHz	45.96 dBµV/m	53.98 dBµV/m	-8.02 dB	Pass
2.926 GHz	43.68 dBµV/m	53.98 dBµV/m	-10.3 dB	Pass

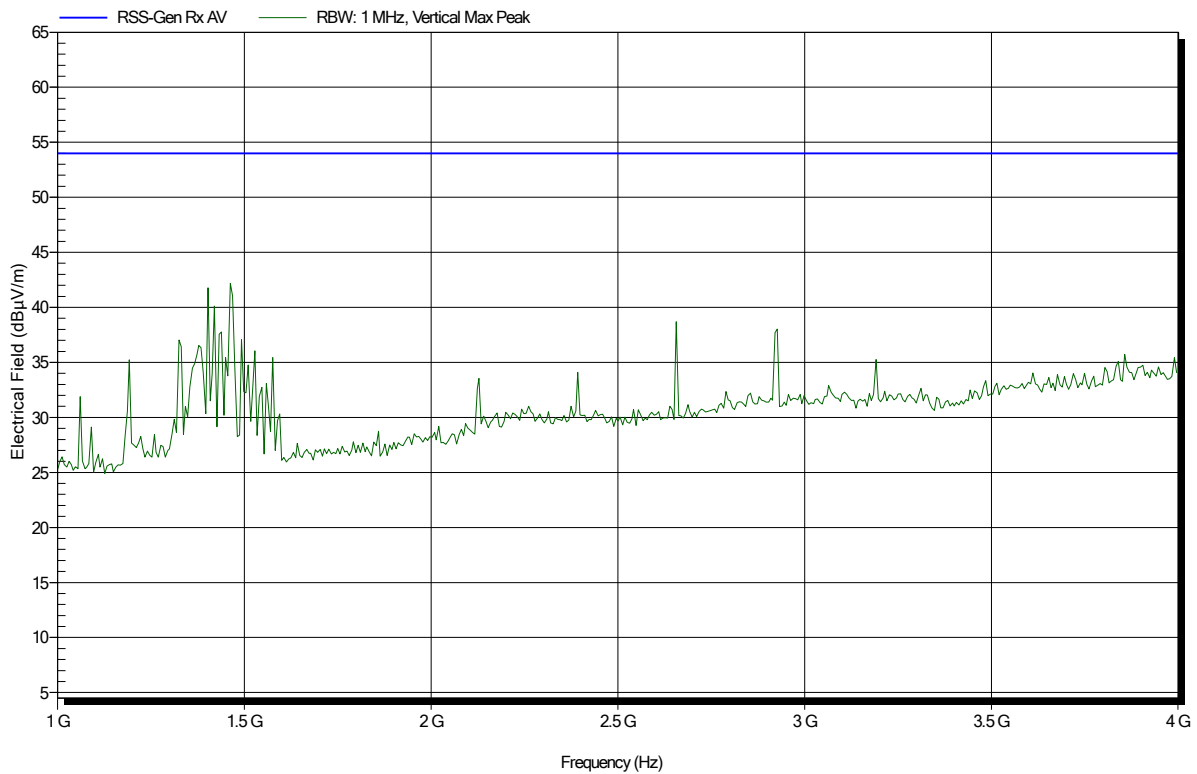
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-11  
 Note:

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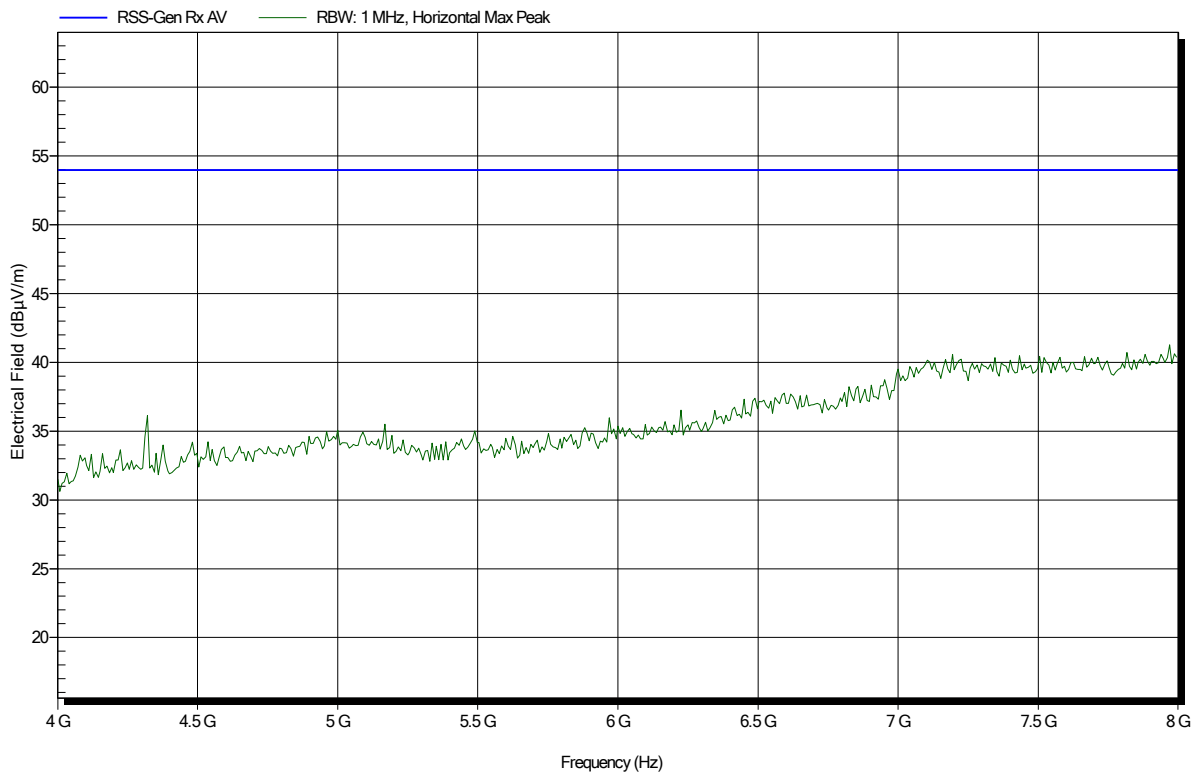
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-11  
 Note:

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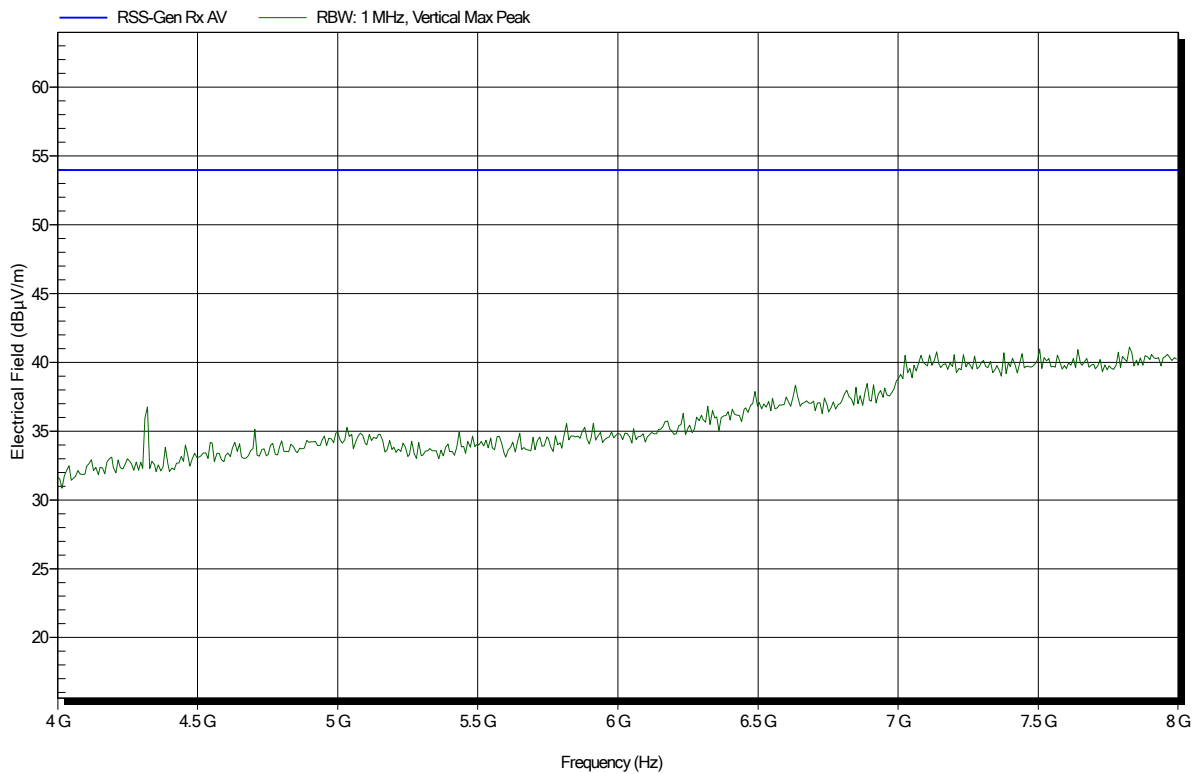
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 12, 737.5 MHz  
 Test Date: 2020-05-11  
 Note:

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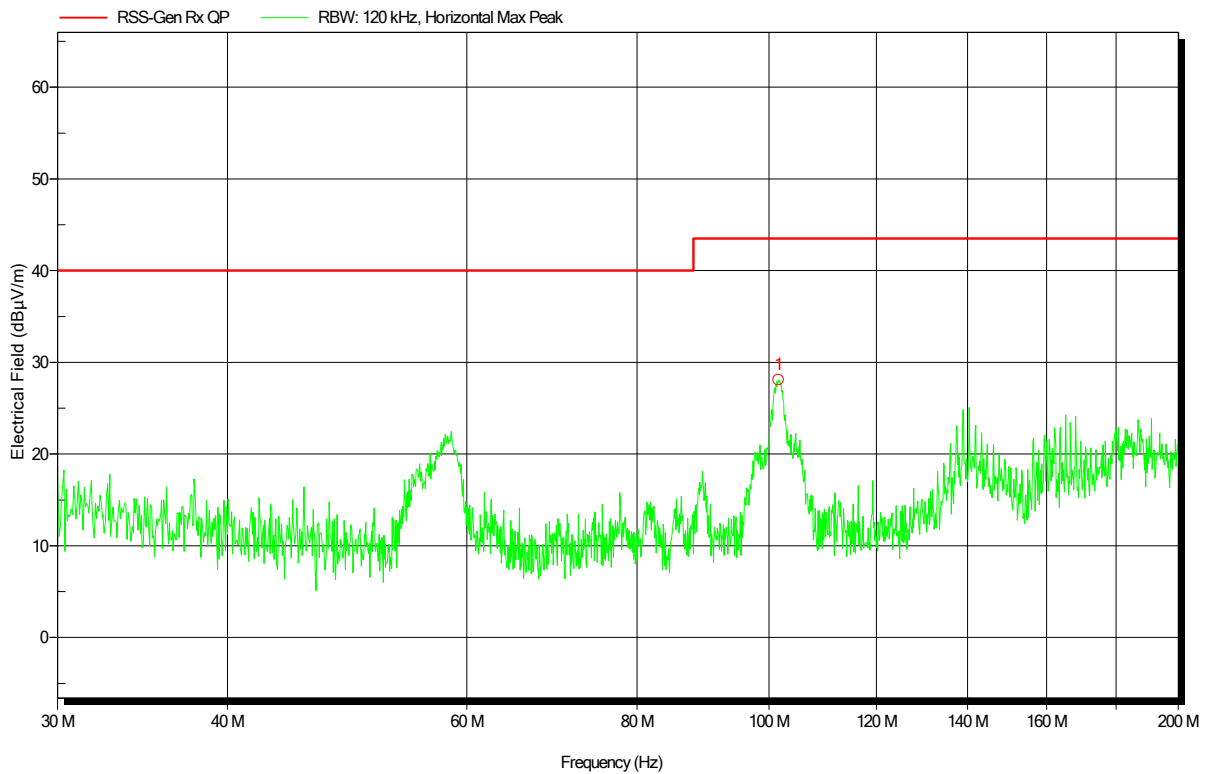
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 13, 751 MHz  
 Test Date: 2020-05-08  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
101.639 MHz	28.1 dBµV/m	43.5 dBµV/m	-15.42 dB	Pass	0 Degree	1 m

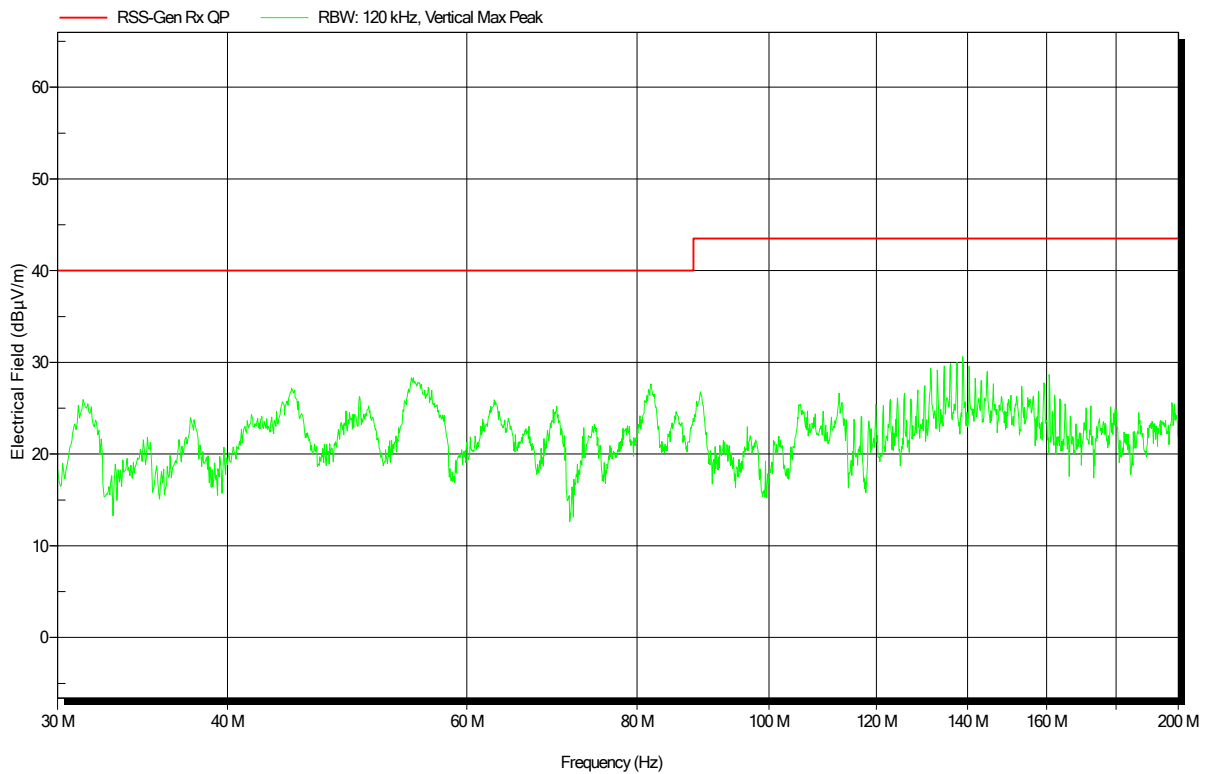
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 13, 751 MHz  
 Test Date: 2020-05-08  
 Note:

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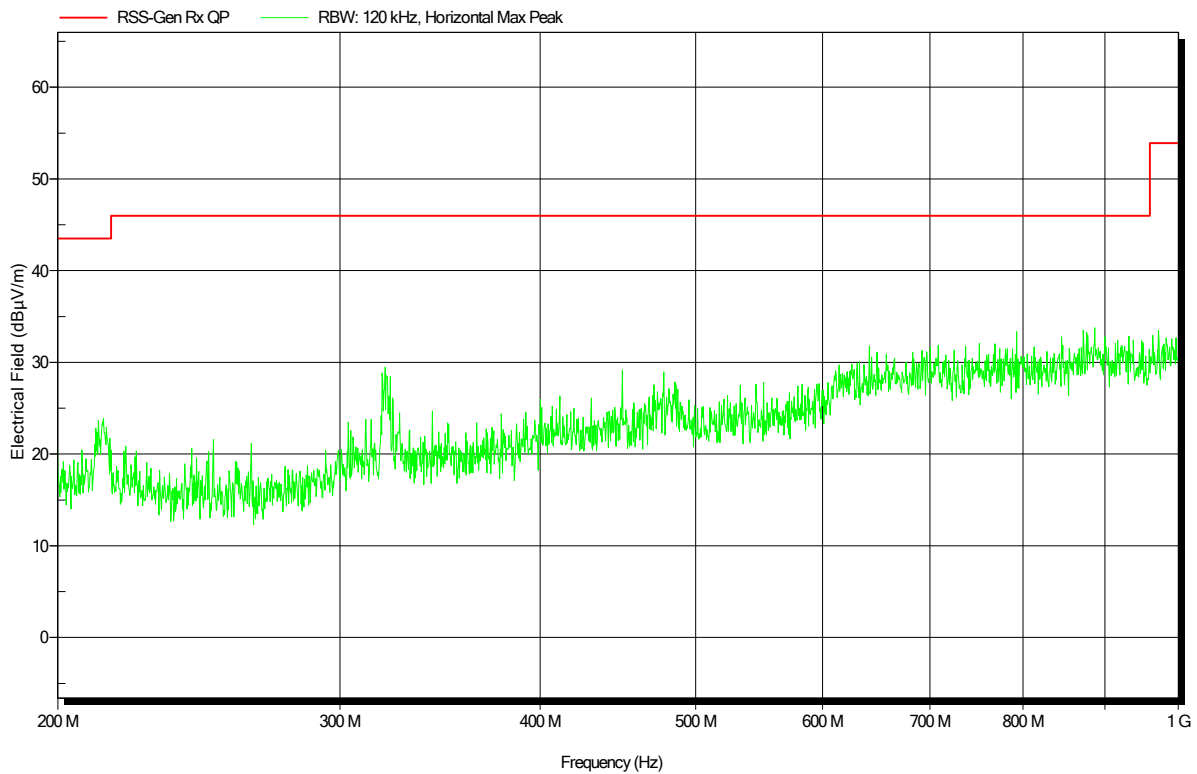
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 13, 751 MHz  
 Test Date: 2020-05-08  
 Note:

Index 8





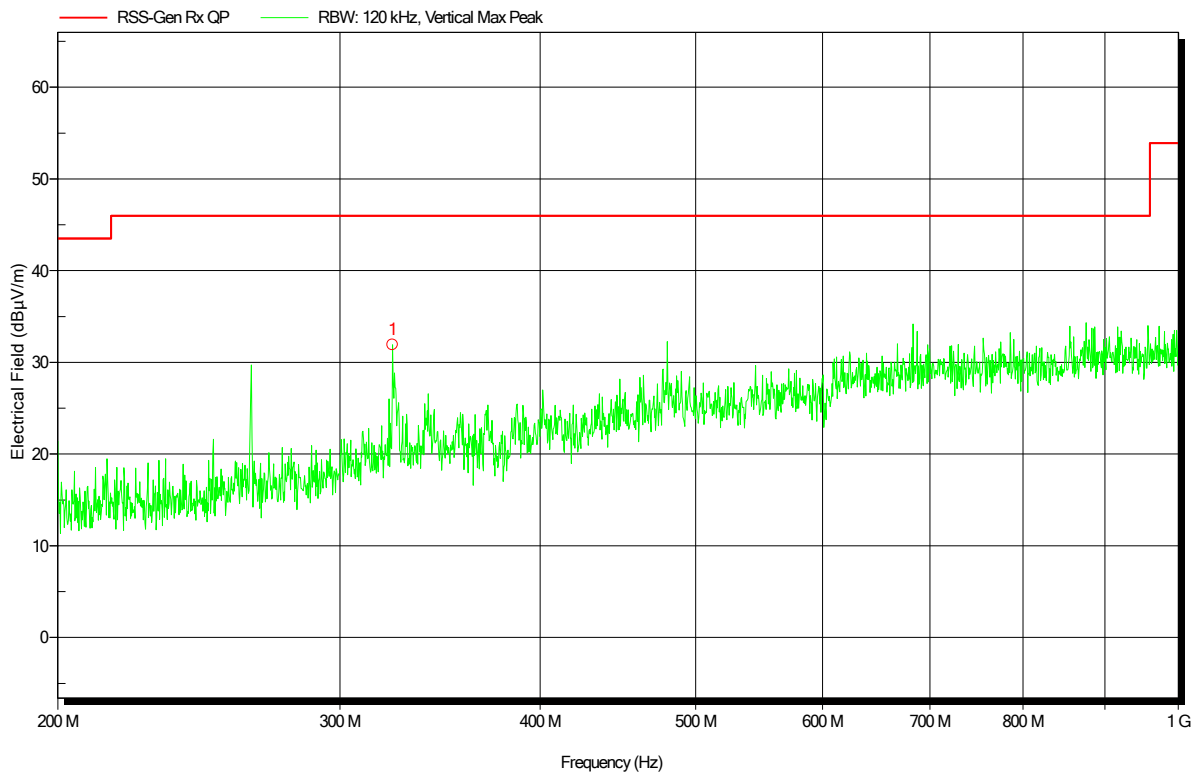
### Spurious emissions according to RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service Germany  
 Operator: Mr. Jahn  
 Measurement software: RadiMation, version 2016.1.10  
 Test Conditions: Tnom: 21°C, Vnom: 12 VDC via AC/DC-Adaptor  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: RX; LTE FDD 13, 751 MHz  
 Test Date: 2020-05-08  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
323.6265 MHz	31.9 dBµV/m	46 dBµV/m	-14.08 dB	Pass	0 Degree	1 m

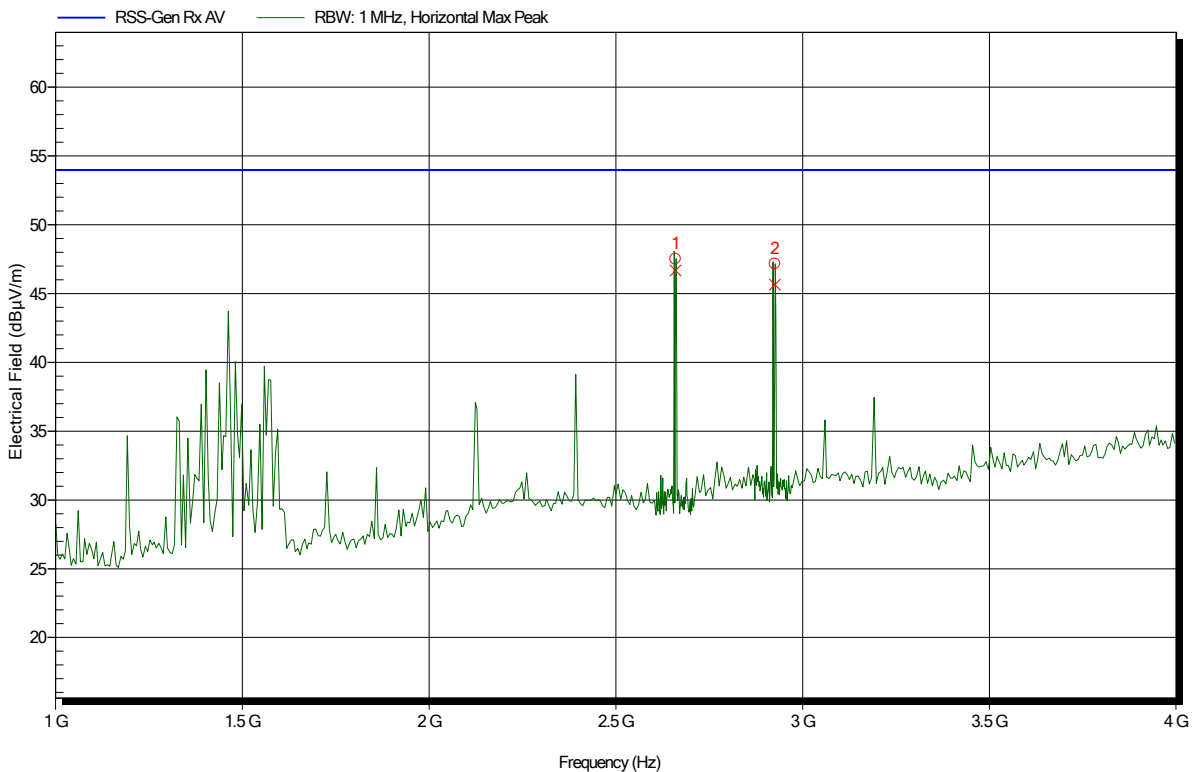
**Spurious emissions according to ISED RSS-Gen**

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 13, 751.0 MHz  
 Test Date: 2020-05-11  
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Status
2.66 GHz	47.52 dBµV/m	53.98 dBµV/m	-6.46 dB	Pass
2.926 GHz	47.17 dBµV/m	53.98 dBµV/m	-6.81 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
2.66 GHz	46.67 dBµV/m	53.98 dBµV/m	-7.31 dB	Pass
2.926 GHz	45.65 dBµV/m	53.98 dBµV/m	-8.33 dB	Pass

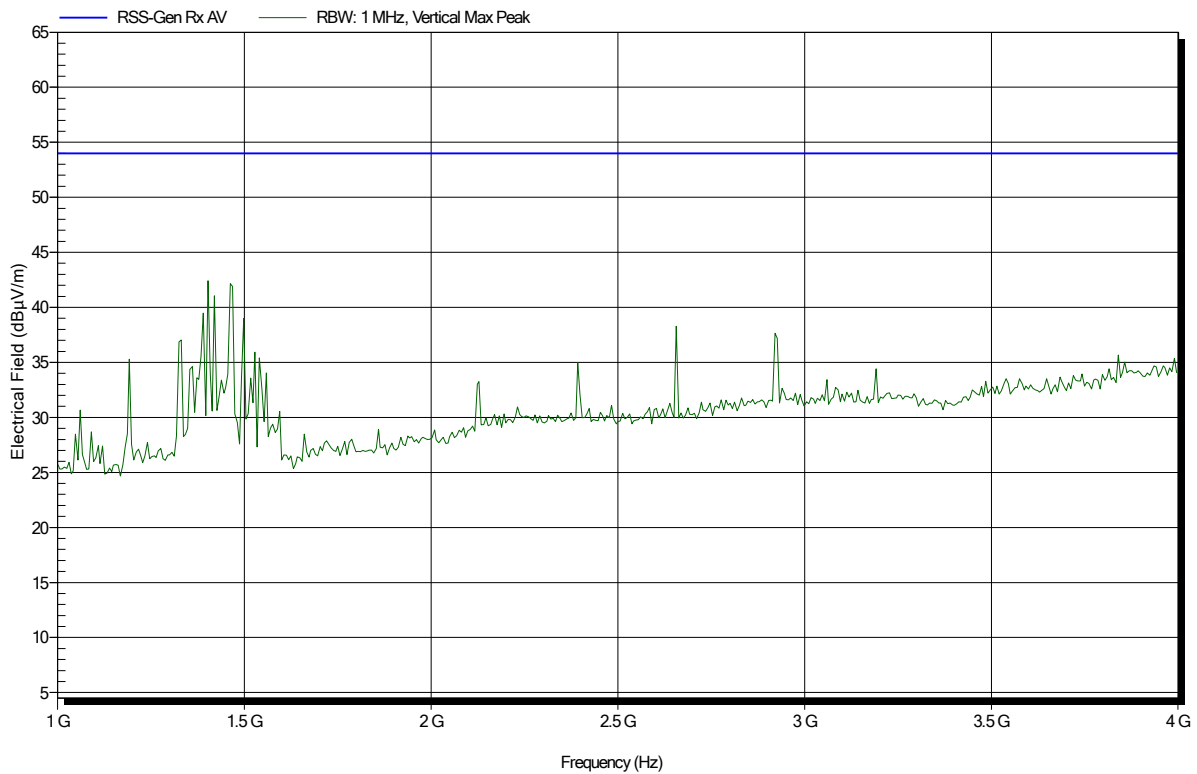
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Measurement software: RadiMation, version 2015.2.4  
 Operator: Toralf Jahn  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; LTE FDD 13, 751.0 MHz  
 Test Date: 2020-05-11  
 Note:

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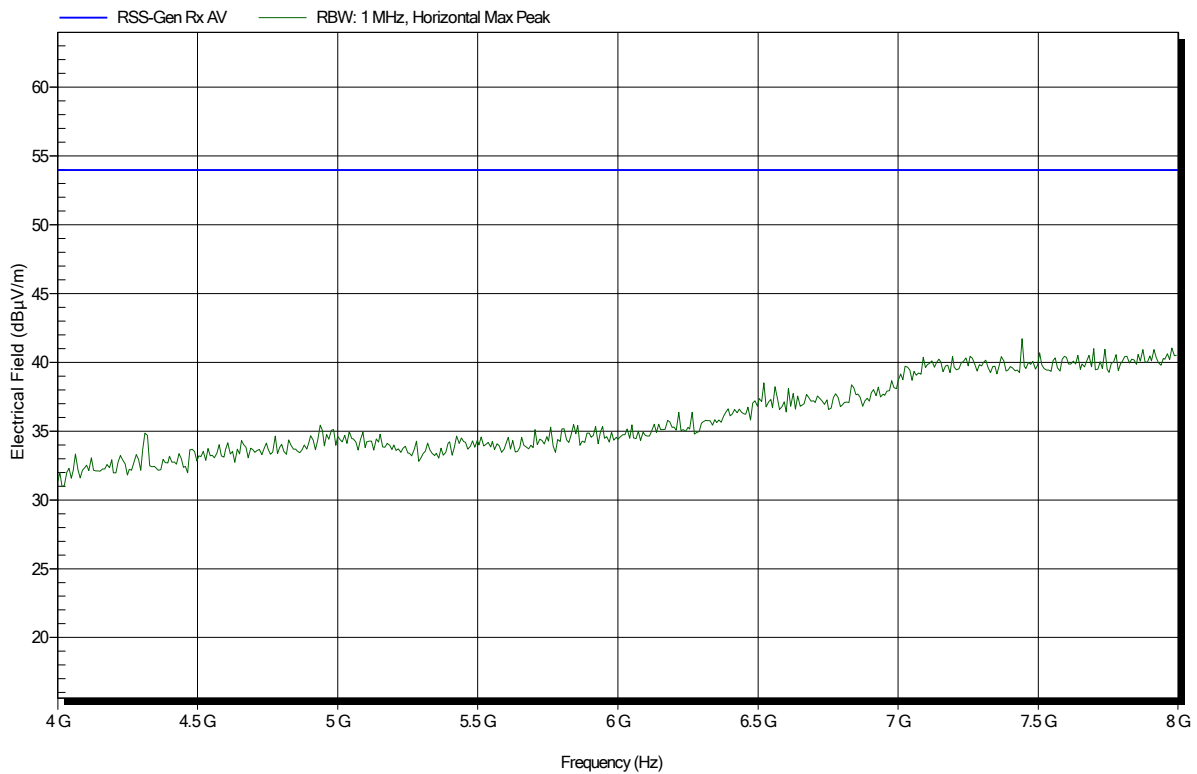
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 13, 751.0 MHz  
 Test Date: 2020-05-11  
 Note:

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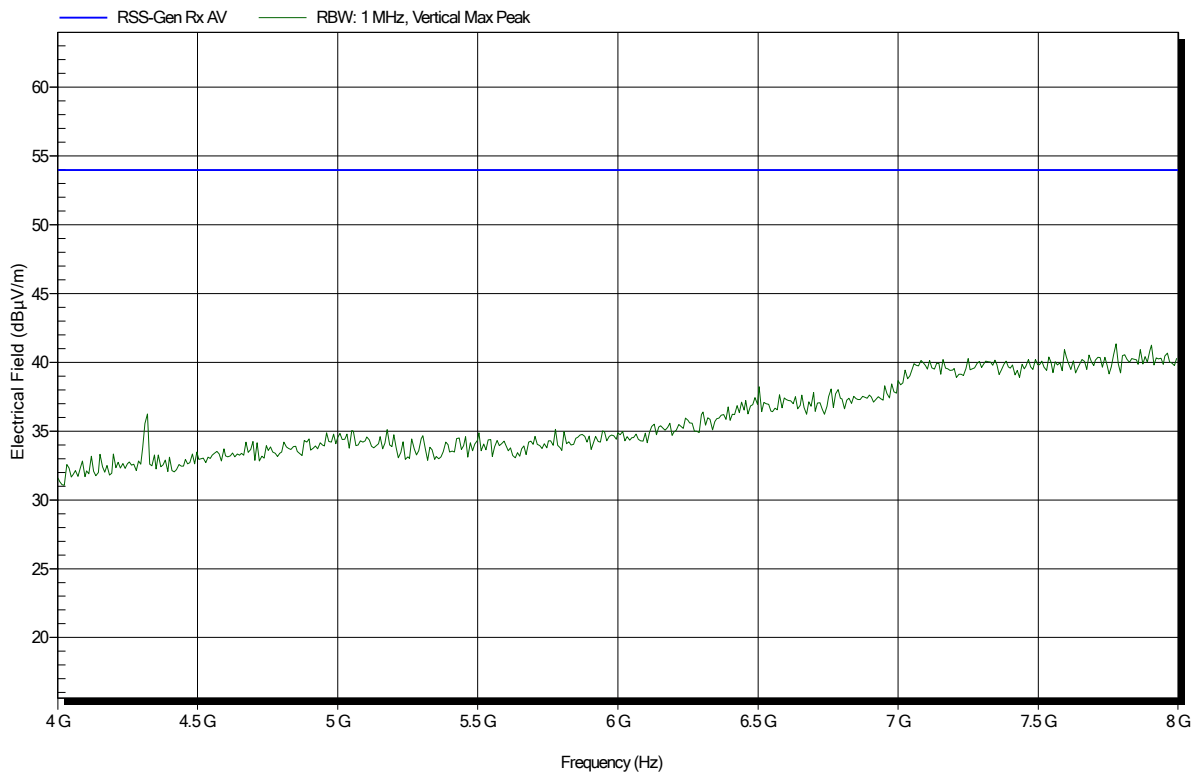
### Spurious emissions according to ISED RSS-Gen

Project number: G0M-2002-8805

Applicant: Laird Connectivity  
 EUT Name: 915MHz LoRaWAN Gateway incl Wi-Fi, Ethernet & LTE - Indoor and IP67 variants

Model: RG191+LTE Series  
 Test Site: Eurofins Product Service GmbH  
 Operator: Toralf Jahn  
 Measurement software: RadiMation, version 2015.2.4  
 Test Conditions: Tnom: 23°C, Vnom: AC/DC-Adapter 12VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m  
 Mode: RX; LTE FDD 13, 751.0 MHz  
 Test Date: 2020-05-11  
 Note:

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=== END OF TEST REPORT ===