



<b>RADIO REPORT</b> <b>FCC 47 CFR Part 15C</b> <b>ISED Canada RSS-247</b> <b>Frequency hopping systems operating within the 2400 – 2483.5 MHz band</b>	
<b>Report Reference No</b>	G0M-1807-7540-TFC247BT-V01
<b>Testing Laboratory</b>	Eurofins Product Service GmbH
<b>Address</b>	Storkower Str. 38c 15526 Reichenwalde Germany
<b>Accreditation</b>	 <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Test Firm Designation Number: DE0008 IC Testing Laboratory site: 3470A-2</p>
<b>Applicant</b>	Leica Geosystems AG
<b>Address</b>	Heinrich Wild Strasse 9435 Heerbrugg SWITZERLAND
<b>Test Specification</b>	According to FCC/ISED rules
<b>Standard</b>	47 CFR Part 15C RSS-247, Issue 2, 2017-02
<b>Non-Standard Test Method</b>	None
<b>Test Scope</b>	partial compliance test
<b>Equipment under Test (EUT):</b>	
<b>Product Description</b>	Bluetooth, WLAN and BLE Modul
<b>Model(s)</b>	TiWi-BLE
<b>Additional Model(s)</b>	None
<b>Brand Name(s)</b>	None
<b>Hardware Version(s)</b>	1.0
<b>Software Version(s)</b>	4.0
<b>FCC-ID</b>	RFD-BTWCO
<b>IC</b>	3177A-BTWCO
<b>Test Result</b>	<b>PASSED</b>

<b>Possible test case verdicts:</b>		
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)	
<b>Testing:</b>		
Test Lab Temperature	20 - 23 °C	
Test Lab Humidity	32 – 38 %	
Date of receipt of test item	2018-07-11	
<b>Report:</b>		
Compiled by	Sebastian Suckow	
Tested by (+ signature) (Responsible for Test)	Sebastian Suckow	
Approved by (+ signature) (Deputy Head of Lab)	Toralf Jahn	
Date of Issue	2018-08-14	
Total number of pages	88	
<b>General Remarks:</b>		
<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>		
<b>Additional Comments:</b>		

## VERSION HISTORY

Version History			
Version	Issue Date	Remarks	Revised By
01	2018-08-14	Initial Release	

**ABBREVIATIONS AND ACRONYMS**

Acronyms	
Acronym	Description
BR	Bluetooth Basic Rate mode
EDR	Bluetooth Enhanced Data Rate mode
EUT	Equipment Under Test
FCC	Federal Communications Commission
ISED	Innovation, Science and Economic Development Canada
RBW	Resolution bandwidth
RMS	Root mean square
VBW	Video bandwidth
V <sub>NOM</sub>	Nominal supply voltage

**REPORT INDEX**

<b>1</b>	<b>Equipment (Test Item) Under Test.....</b>	<b>6</b>
1.1	Photos – Equipment Internal .....	7
1.2	Photos – Test Setup.....	9
1.3	Support Equipment.....	10
1.4	Test Modes .....	11
1.5	Test Frequencies.....	12
1.6	Sample emission level calculation.....	13
<b>2</b>	<b>Result Summary.....</b>	<b>14</b>
<b>3</b>	<b>Test Conditions and Results.....</b>	<b>15</b>
3.1	Test Conditions and Results - Occupied bandwidth.....	15
3.2	Test Conditions and Results - AC powerline conducted emissions.....	26
3.3	Test Conditions and Results - Transmitter radiated emissions .....	29
3.4	Test Conditions and Results - Receiver radiated emissions .....	32
ANNEX A	Transmitter spurious emissions .....	35
ANNEX B	Receiver spurious emissions .....	79

## 1 Equipment (Test Item) Under Test

Description	Bluetooth, WLAN and BLE Modul	
Model	TiWi-BLE	
Additional Model(s)	None	
Brand Name(s)	None	
Serial Number(s)	None	
Hardware Version(s)	1.0	
Software Version(s)	4.0	
PMN	Leica Geosystems AG	
HVIN	TIWI	
FVIN	-/-	
HMN	-/-	
FCC-ID	RFD-BTWCO	
IC	3177A-BTWCO	
Equipment type	Radio Module	
Radio type	Transceiver	
Assigned frequency bands	2400 - 2483.5 MHz	
Radio technology	Bluetooth	
Modulation	GFSK, PI/4-DQPSK, 8-DPSK	
Number of antenna ports	1	
Radio Module	Type	BT+EDR / BT LE / WLAN 2.4 GHz Module
	Model	TiWi-BLE
	Manufacturer	LS Research
	HW Version	1.0
	SW Version	4.0
Antenna	Type	External
	Model	853405
	Manufacturer	Leica Geosystems
	Gain	2.66 dBi
Supply Voltage	$V_{NOM}$	7.0 VDC
Operating Temperature	$T_{NOM}$	25 °C
Manufacturer	Leica Geosystems AG Heinrich Wild Strasse 9435 Heerbrugg SWITZERLAND	

### 1.3 Support Equipment

Product Type	Device	Manufacturer	Model	Comment
SIM	Communication Tester	R&S	CBT	Used for signaling
CBL	USB Kabel	Leica	764700	USB Kabel
Description:				
AE	Auxiliary Equipment			
SIM	Simulator			
CBL	Connecting Cable			
Comment:				

**1.4 Test Modes**

Mode	Description
DH5 Single	Mode = Transmit Modulation = GFSK Spreading = None Packet type = DH5 Duty cycle = 78%
2-DH5 Single	Mode = Transmit Modulation = PI/4-DQPSK Spreading = None Packet type = 2-DH5 Duty cycle = 78%
3-DH5 Single	Mode = Transmit Modulation = 8-DPSK Spreading = None Packet type = 3-DH5 Duty cycle = 78%
Receive	Mode = Receive
Comment:	



### 1.5 Test Frequencies

Designator	Mode	Channel	Frequency [MHz]
F1	Tx / Rx	0	2402
F2	Tx / Rx	39	2441
F3	Tx / Rx	78	2480

### 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

FCC 47 CFR Part 15C, ISED RSS-247				
Product Standard Reference	Requirement	Reference Method	Result	Remarks
RSS-Gen 6.6 Issue 4	Occupied Bandwidth	ANSI C63.10-2013	N/R	Informational only
FCC § 15.247(a)(1) ISED RSS-247 § 5.1 Issue 2	20 dB Bandwidth	ANSI C63.10-2013	N/T	
FCC § 15.247(a)(1)(iii) ISED RSS-247 § 5.1 Issue 2	Number of hopping frequencies	ANSI C63.10-2013	N/T	
FCC § 15.247(a)(1) ISED RSS-247 § 5.1 Issue 2	Frequency hopping channel separation	ANSI C63.10-2013	N/T	
FCC § 15.247(a)(1)(iii) ISED RSS-247 § 5.1 Issue 2	Time of occupancy (Dwell time)	ANSI C63.10-2013	N/T	
FCC § 15.247(b)(1) ISED RSS-247 § 5.4 Issue 2	Maximum peak conducted power	ANSI C63.10-2013	N/T	
FCC § 15.207 ISED RSS-247 § 3.1 Issue 2	AC power line conducted emissions	ANSI C63.10-2013	PASS	
FCC § 15.247(d) ISED RSS-247 § 5.5 Issue 2	Band edge compliance	ANSI C63.10-2013	N/T	
FCC § 15.247(d) ISED RSS-247 § 5.5 Issue 2	Conducted spurious emissions	ANSI C63.10-2013	N/T	
FCC § 15.247(d) FCC § 15.209 ISED RSS-GEN § 8.9 Issue 4	Transmitter radiated spurious emissions	ANSI C63.10-2013	PASS	
ISED RSS-247 § 3.1 Issue 2	Receiver radiated spurious emissions	ANSI C63.10-2013	PASS	
Comment:				

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

### 3 Test Conditions and Results

#### 3.1 Test Conditions and Results - Occupied bandwidth

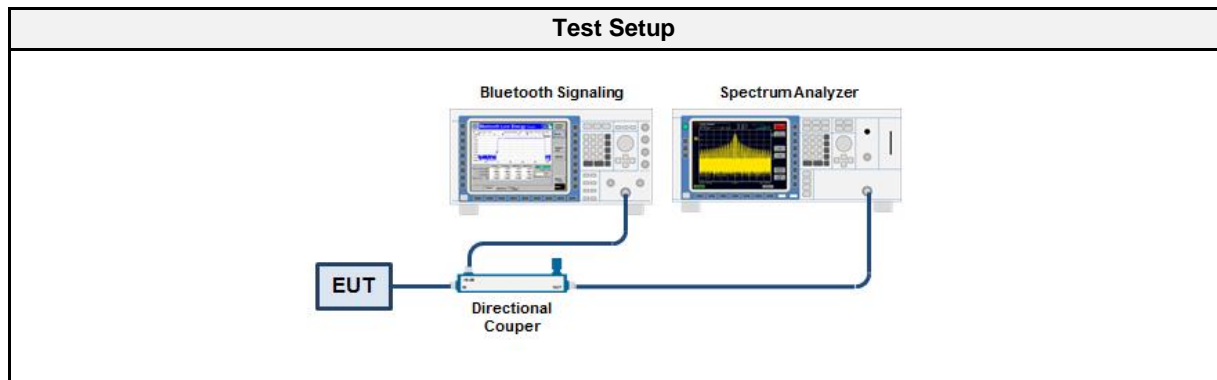
##### 3.1.1 Information

Test Information	
Reference	ISED RSS-Gen 6.6
Measurement Method	ANSI C63.10 6.9.3
Operator	Sebastian Suckow
Date	2018-07-20

##### 3.1.2 Limits

Limits
None (Informational only)

##### 3.1.3 Setup



##### 3.1.4 Equipment

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

##### 3.1.5 Procedure

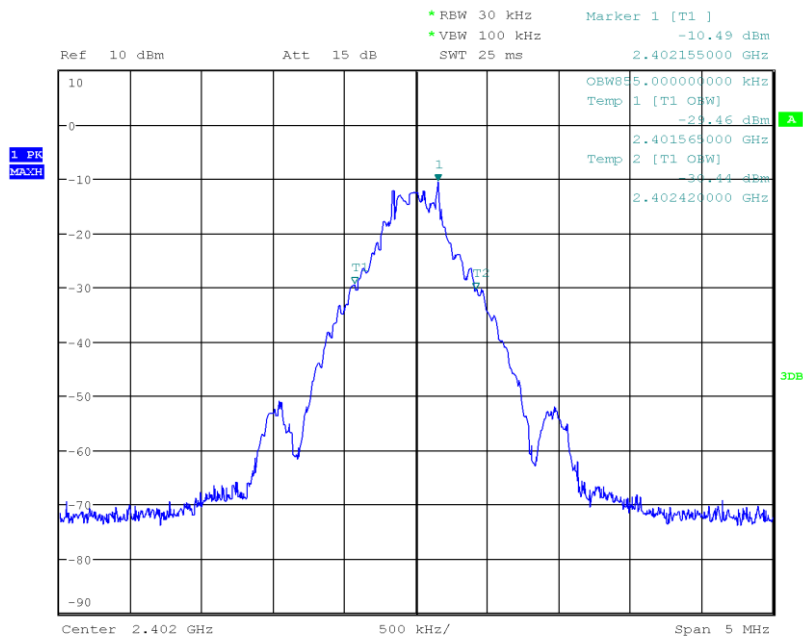
Test Procedure
<ol style="list-style-type: none"> <li>1. EUT transmitter is activated in test mode under normal conditions</li> <li>2. The spectrum analyzer is set to peak detection and maximum hold with a span twice the emission spectrum</li> <li>3. The resolution bandwidth is set to 1 % of the bandwidth</li> <li>4. The occupied bandwidth is measured with the build-in analyzer function</li> </ol>

3.1.6 Results

Test Results		
Mode	Frequency [MHz]	Bandwidth [MHz]
DH5	2402	0.855
DH5	2441	0.855
DH5	2480	0.870
2-DH5	2402	1.200
2-DH5	2441	1.210
2-DH5	2480	1.215
3-DH5	2402	1.200
3-DH5	2441	1.200
3-DH5	2480	1.210

### Occupied Bandwidth

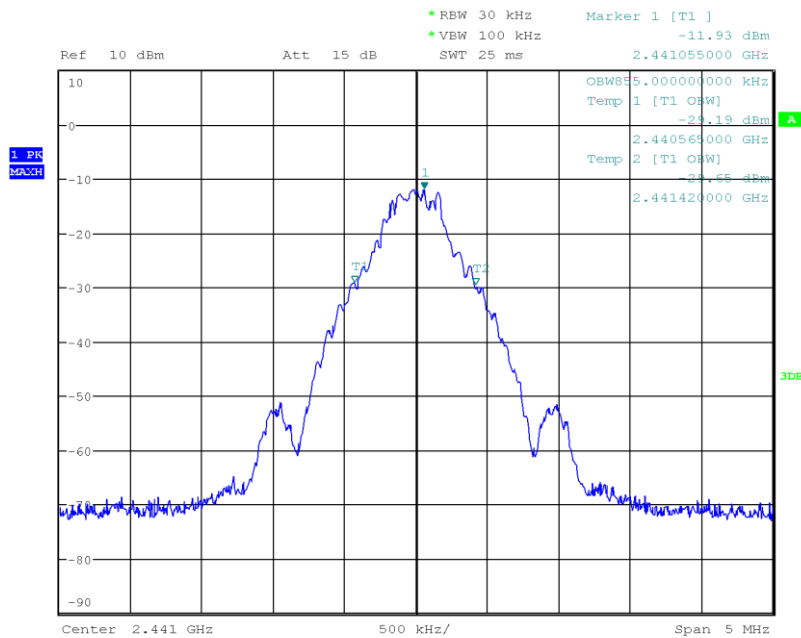
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: DH5, Channel: 0, 2402 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 0.855



Date: 20.JUL.2018 12:54:04

### Occupied Bandwidth

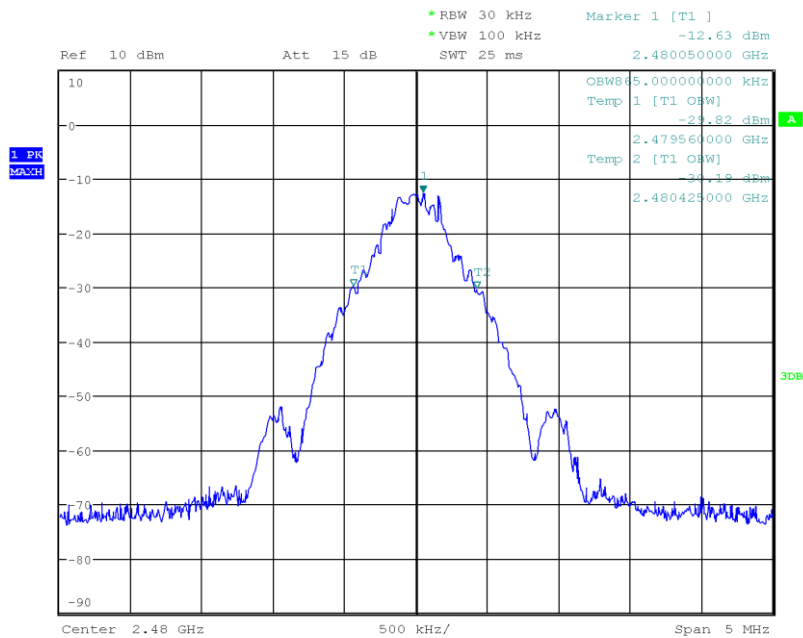
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: DH5, Channel: 39, 2441 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 0.855



Date: 20.JUL.2018 12:54:55

### Occupied Bandwidth

Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: DH5, Channel: 78, 2480 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 0.870

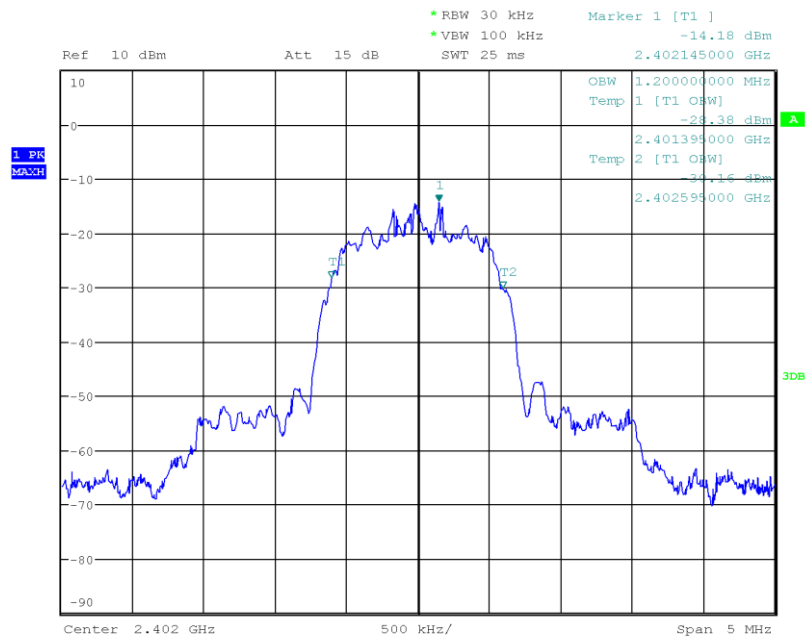


Date: 20.JUL.2018 12:55:38



## Occupied Bandwidth

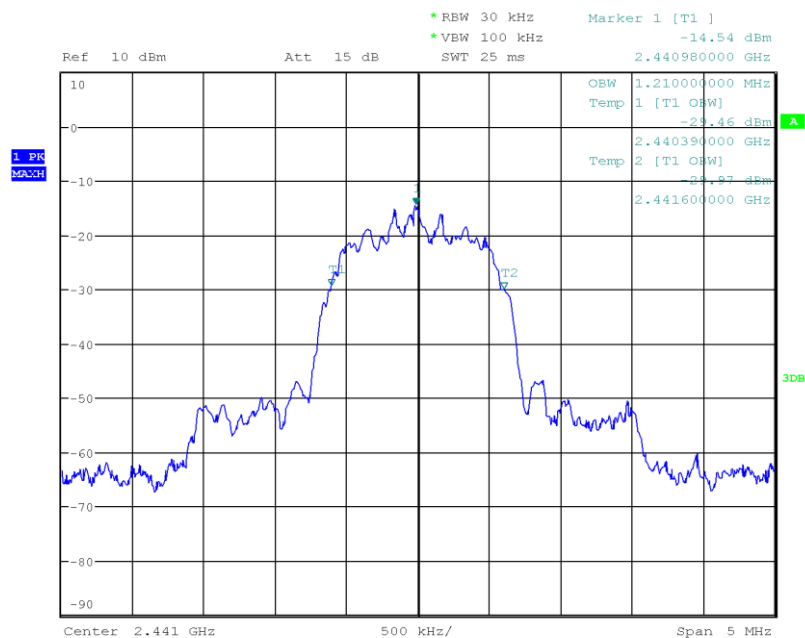
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: 2-DH5, Channel: 0, 2402 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 1.200



Date: 20.JUL.2018 12:56:26

## Occupied Bandwidth

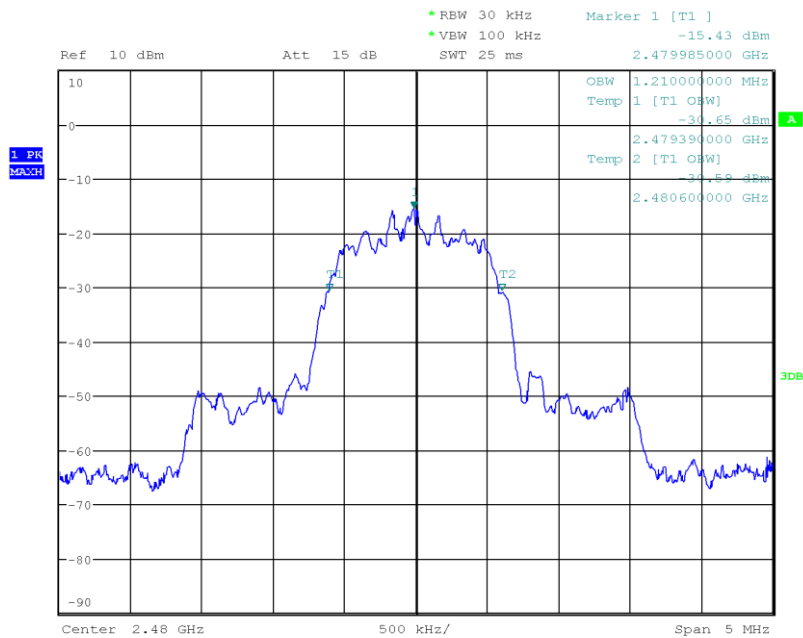
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: 2-DH5, Channel: 39, 2441 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 1.210



Date: 20.JUL.2018 13:05:18

### Occupied Bandwidth

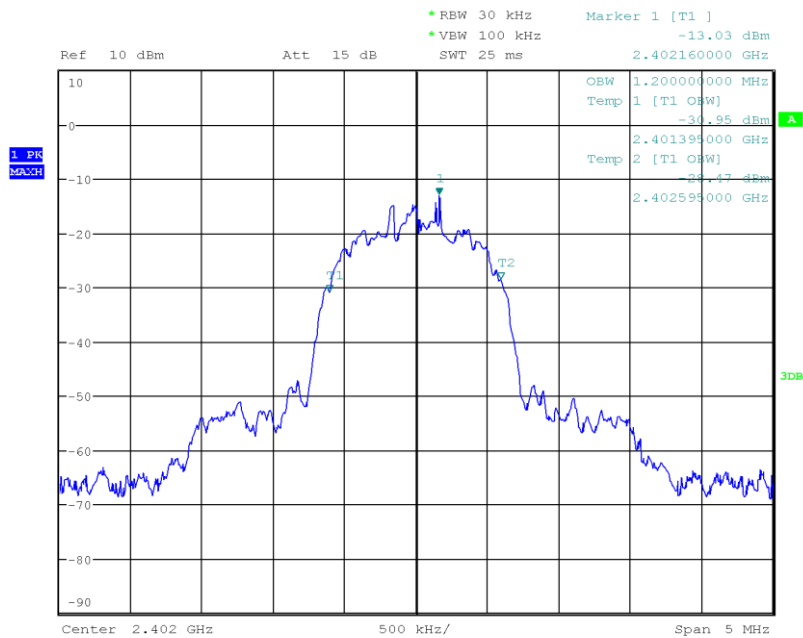
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: 2-DH5, Channel: 78, 2480 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 1.215



Date: 20.JUL.2018 13:06:12

### Occupied Bandwidth

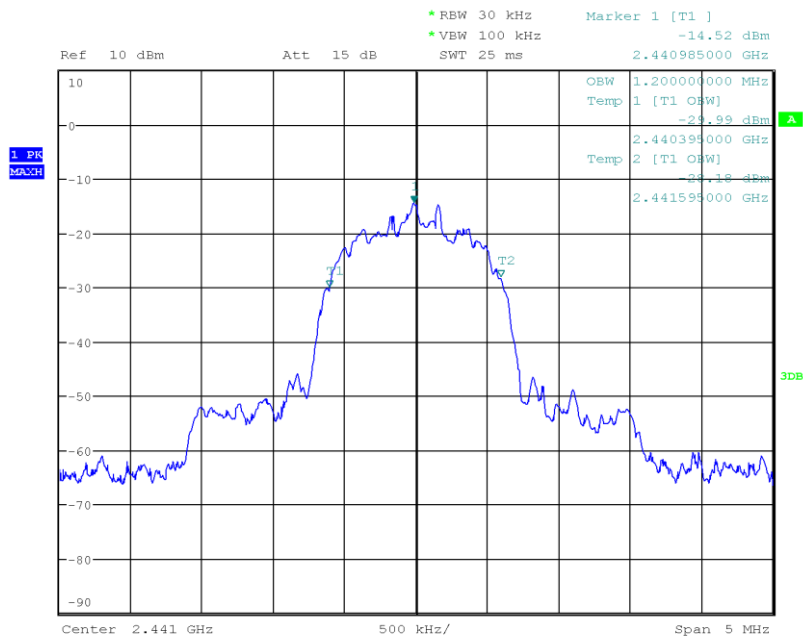
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: 3-DH5, Channel: 0, 2402 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 1.200



Date: 20.JUL.2018 13:07:16

### Occupied Bandwidth

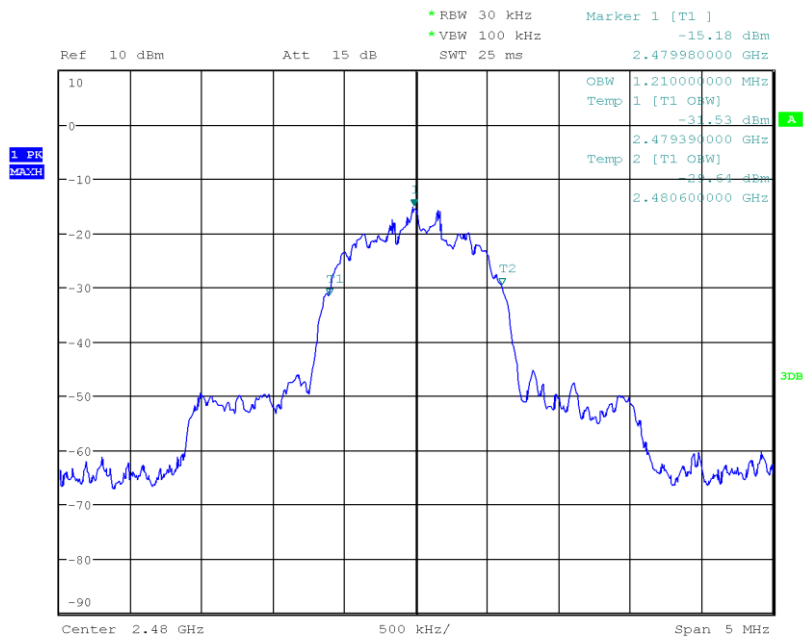
Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: 3-DH5, Channel: 39, 2441 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 1.200



Date: 20.JUL.2018 13:08:00

### Occupied Bandwidth

Project Number: G0M-1807-7540  
 Applicant: Leica Geosystems AG  
 Model Description: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Sample ID: 19294  
 Reference Standards: FCC 15.247, RSS-247  
 Reference Method: ANSI C63.10:2013, Section 6.9.3  
 Operational Mode: 3-DH5, Channel: 78, 2480 MHz  
 Operating Conditions: Tnom/Vnom  
 Operator: Sebastian Suckow  
 Test Site: Eurofins Product Service GmbH  
 Test Date: 2018-07-20  
 Occupied Bandwidth [MHz]: 1.210



Date: 20.JUL.2018 13:08:54

### 3.2 Test Conditions and Results - AC powerline conducted emissions

#### 3.2.1 Information

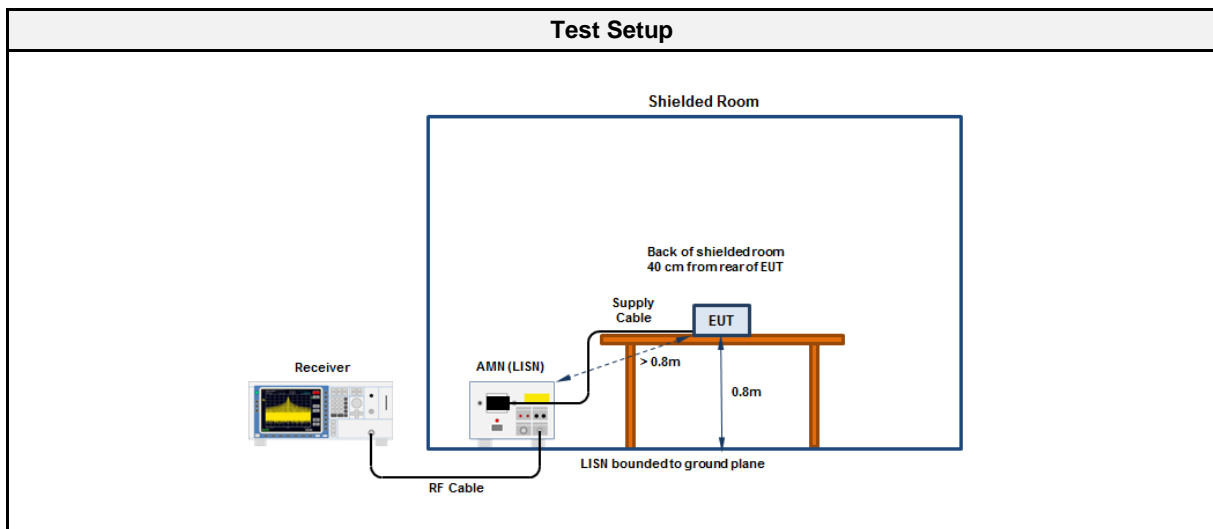
Test Information	
Reference	FCC 15.207
Measurement Method	ANSI C63.10 6.2
Operator	Sebastian Suckow
Date	2018-07-20

#### 3.2.2 Limits

Limits		
Frequency [MHz]	Quasi-Peak [dB $\mu$ V]	Average [dB $\mu$ V]
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

#### 3.2.3 Setup



#### 3.2.4 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

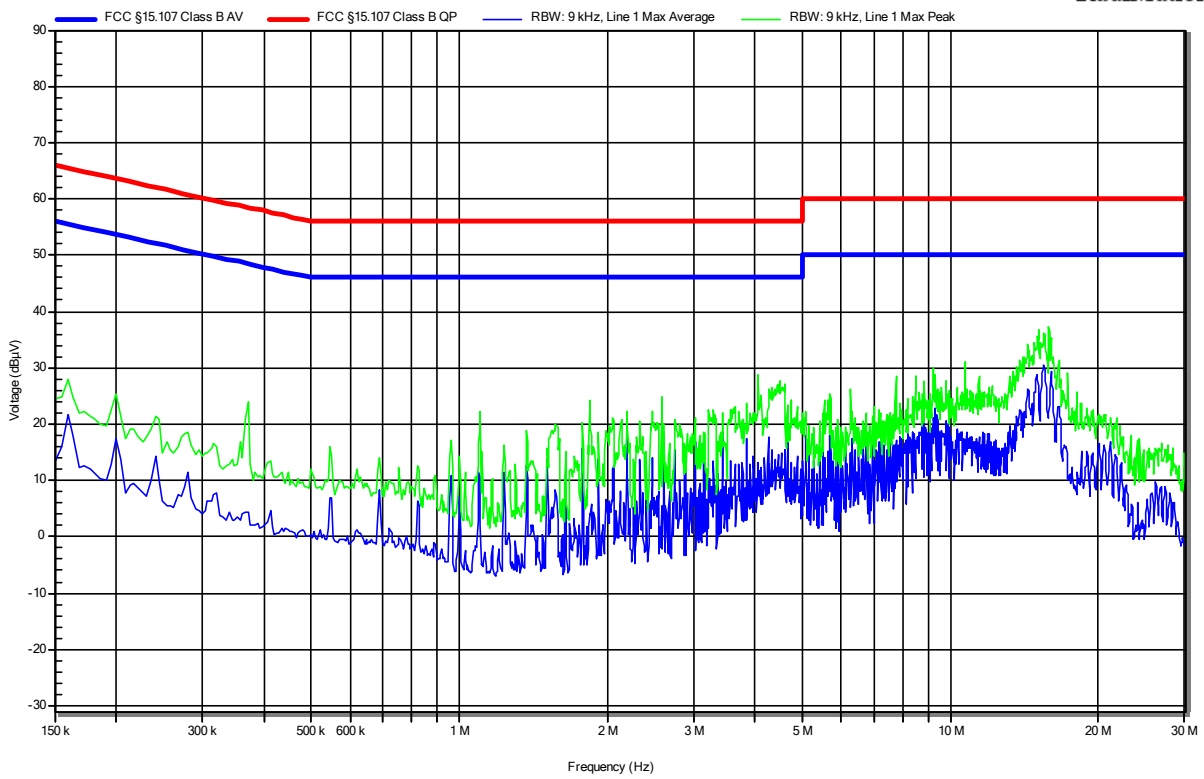
### EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 24°C, Unom: 7.0 VDC  
 LISN: ESH2-Z5 L  
 Mode: BT 3DH5 2441 MHz  
 Test Date: 2018-07-20  
 Note: Plus

Index 6

**RadiMation**





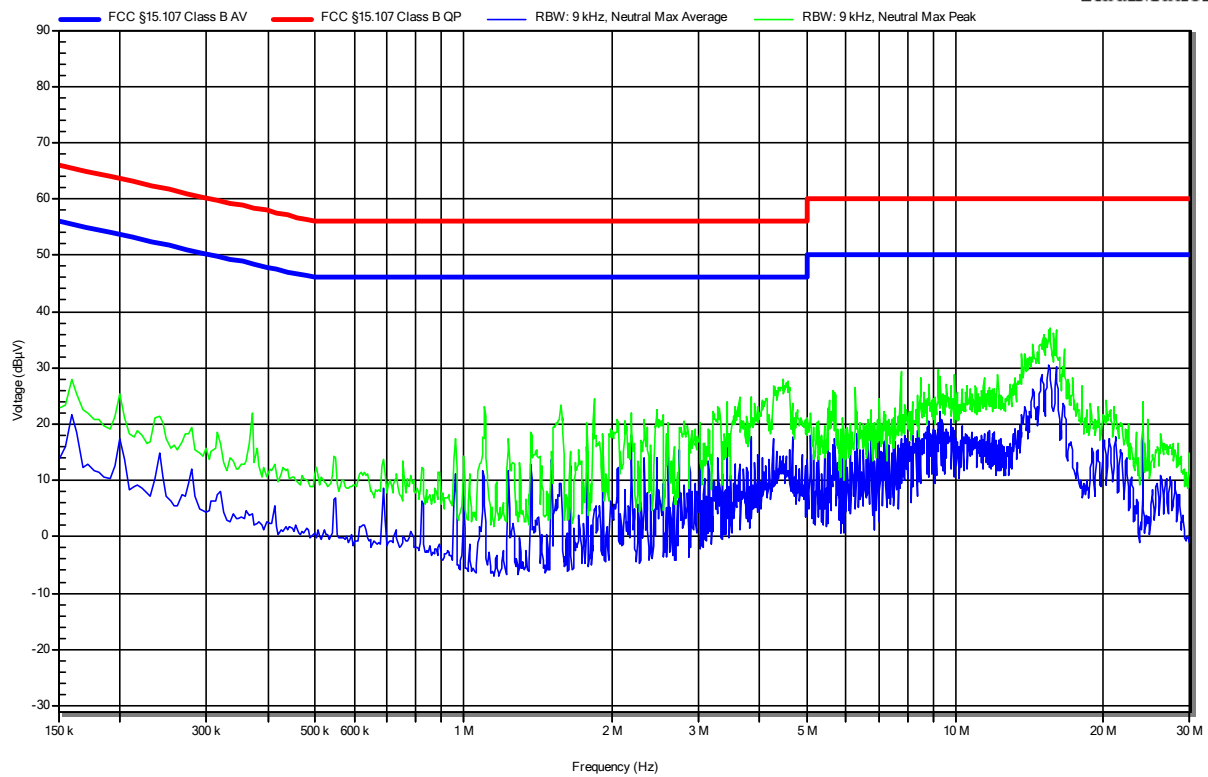
### EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 24°C, Unom: 7.0 VDC  
 LISN: ESH2-Z5 N  
 Mode: BT 3DH5 2441 MHz  
 Test Date: 2018-07-20  
 Note: Minus

Index 5

**RadiMation**



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

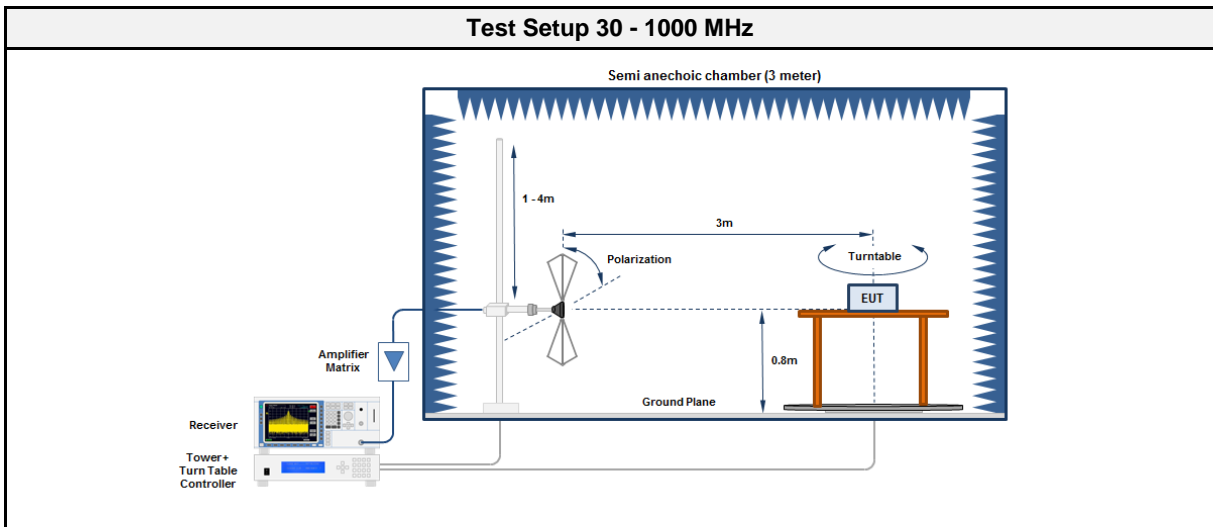
#### 3.3.1 Information

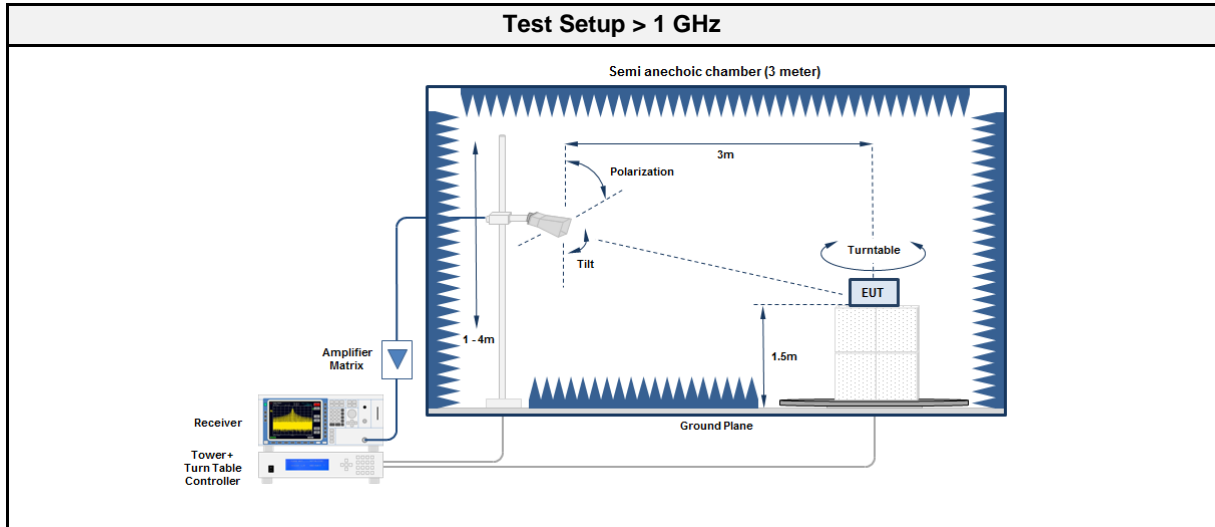
Test Information	
Reference	FCC 15.247(d) / ISED RSS-GEN 8.9
Measurement Method	ANSI C63.10 6.4, 6.5, 6.6
Operator	Sebastian Suckow
Date	2018-07-17 – 2018-07-20

#### 3.3.2 Limits

Limits			
Frequency [MHz]	Detector	Field strength [ $\mu\text{V}/\text{m}$ ]	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

#### 3.3.3 Setup





### 3.3.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	-	-
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2017-08	2018-08
Antenna	R&S	VULB 9162	EF00978	2018-06	2020-06
Antenna	R&S	HK 116	EF00203	2016-04	2019-04
Antenna	R&S	HL 223	EF00212	2017-08	2018-08

Test Equipment > 1 GHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	-	-
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2017-08	2018-08
Antenna	R&S	BBHA 9120D	EF01153	2017-08	2018-08
Antenna	Amplifier Research	AT4560	EF01152	2017-10	2018-10

### 3.3.5 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

## 3.3.6 Results

Test Results - 3-DH5						
Channel [MHz]	Emission [MHz]	Level [dB $\mu$ V/m]	Det.	Pol.	Limit [dB $\mu$ V/m]	Margin [dB]
2402	110.0453	38.90	pk	hor	43.50	-04.65
2402	2399.9	65.83	pk	hor	95.00	-29.17
2402	2399.9	56.57	pk	ver	95.00	-38.43
2402	2494.2	51.32	pk	hor	74.00	-22.68
2402	2499.6	51.37	pk	ver	74.00	-22.63
2402	4803	47.60	pk	hor	74.00	-26.40
2441	110.2255	38.50	pk	hor	43.50	-04.98
2441	4879	44.12	pk	hor	74.00	-29.88
2480	110.9467	38.80	pk	hor	43.50	-04.75
2480	2483.5	54.10	pk	hor	74.00	-19.90
2480	2497.5	52.77	pk	ver	74.00	-21.23
2480	2516	58.07	pk	hor	95.00	-36.93
2480	4959	42.43	pk	hor	74.00	-31.57

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

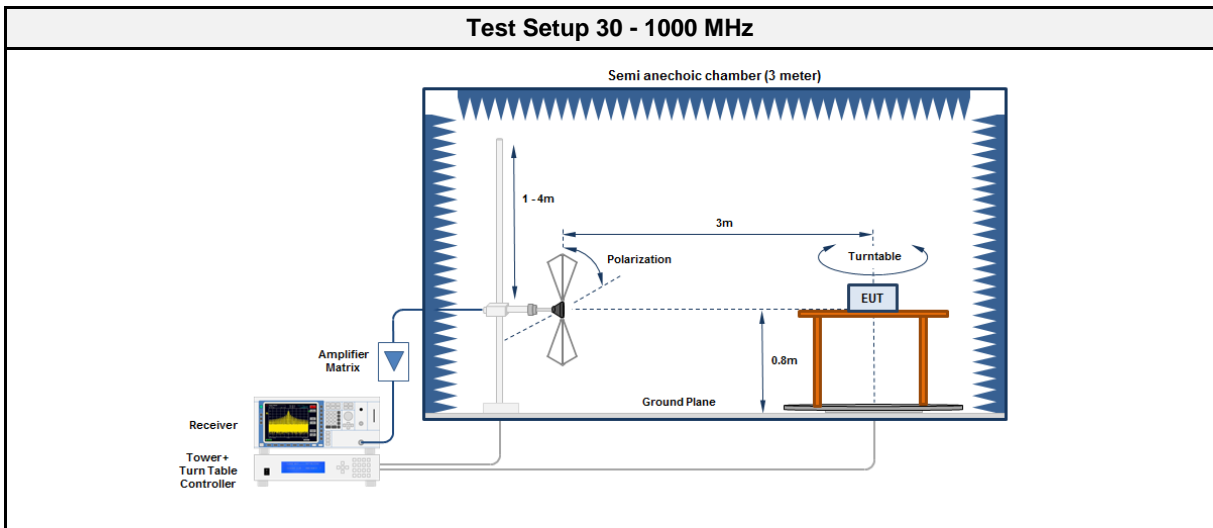
#### 3.4.1 Information

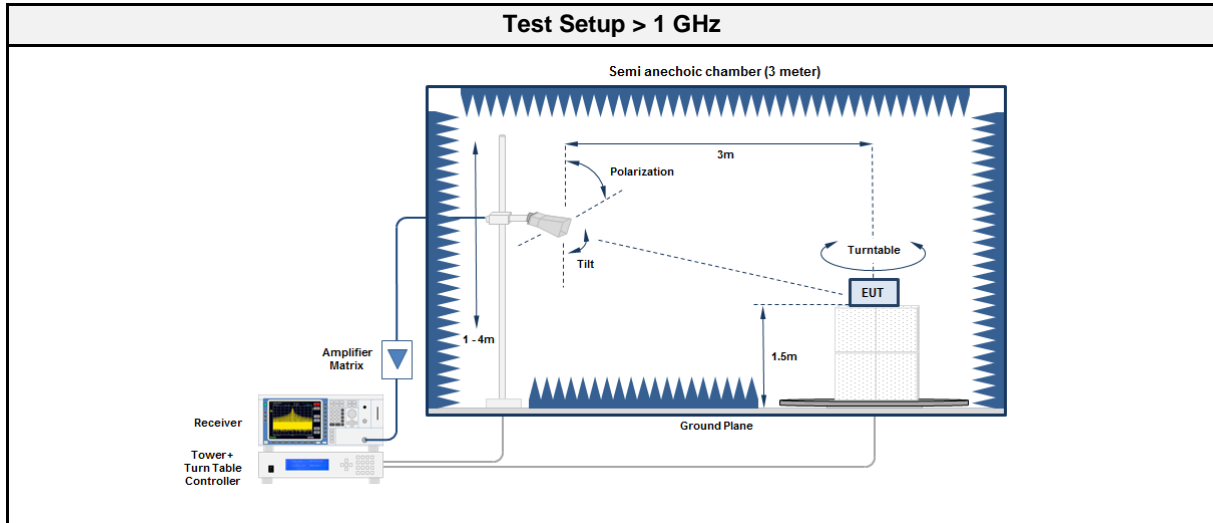
Test Information	
Reference	ISED RSS-247 3.1
Measurement Method	ANSI C63.10 6.5, 6.6
Operator	Sebastian Suckow
Date	2018-07-17 – 2018-07-20

#### 3.4.2 Limits

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

#### 3.4.3 Setup





### 3.4.4 Equipment

Test Equipment 30 - 1000 MHz					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Anechoic Chamber	Frankonia	AC1	EF00062	-	-
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2017-08	2018-08
Antenna	R&S	HK 116	EF00203	2018-06	2020-06
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	-	-
Measurement Receiver	Agilent	N9038A-526/WXP	EF01070	2017-08	2018-08
Antenna	R&S	BBHA 9120D	EF01153	2017-08	2018-08

### 3.4.5 Procedure

Test Procedure 30 - 1000 MHz
<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>

Test Procedure > 1 GHz
<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>

## 3.4.6 Results

Test Results						
Channel [MHz]	Emission [MHz]	Level [dB $\mu$ V/m]	Det.	Pol.	Limit [dB $\mu$ V/m]	Margin [dB]
2441	109.8057	38.90	pk	hor	43.50	-04.60
2441	437.363	38.55	pk	ver	46.00	-07.45

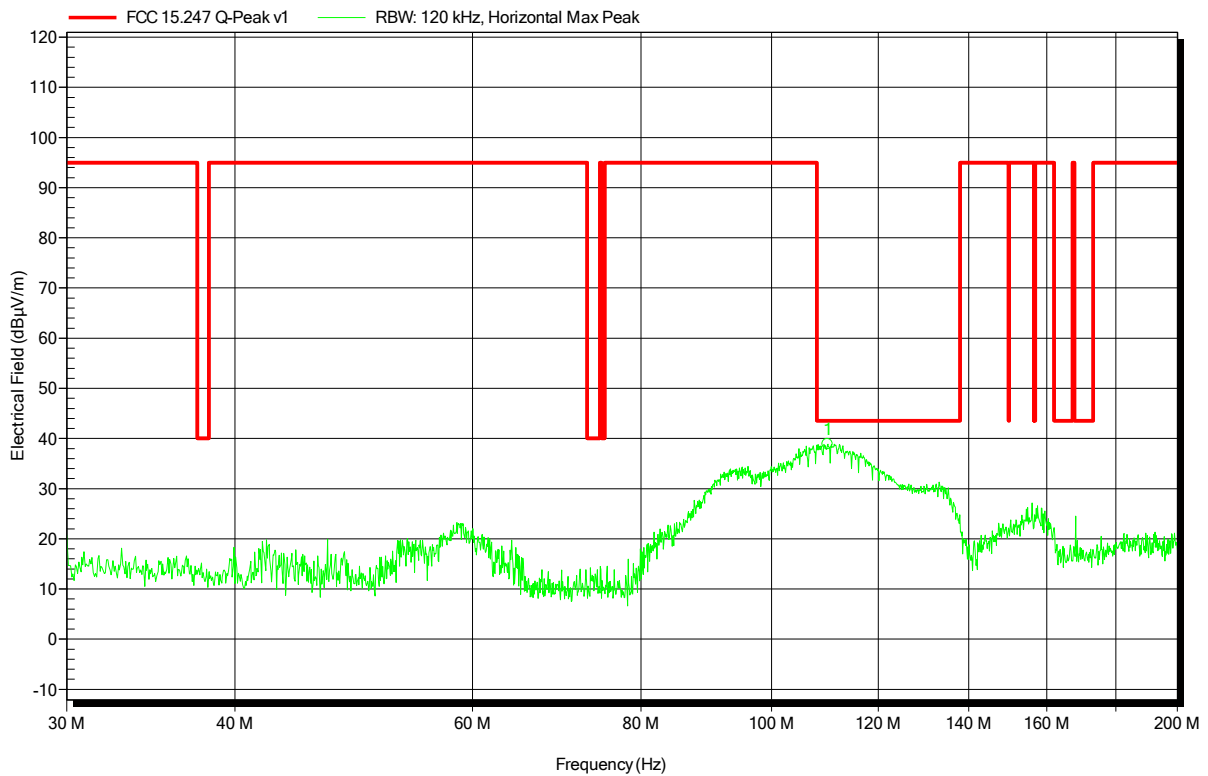
## ANNEX A Transmitter spurious emissions

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-20  
 Note:

Index 20



Frequency	Peak	Peak Limit	Peak Difference	Status
110.0453 MHz	38.9 dBµV/m	43.5 dBµV/m	-4.65 dB	Pass

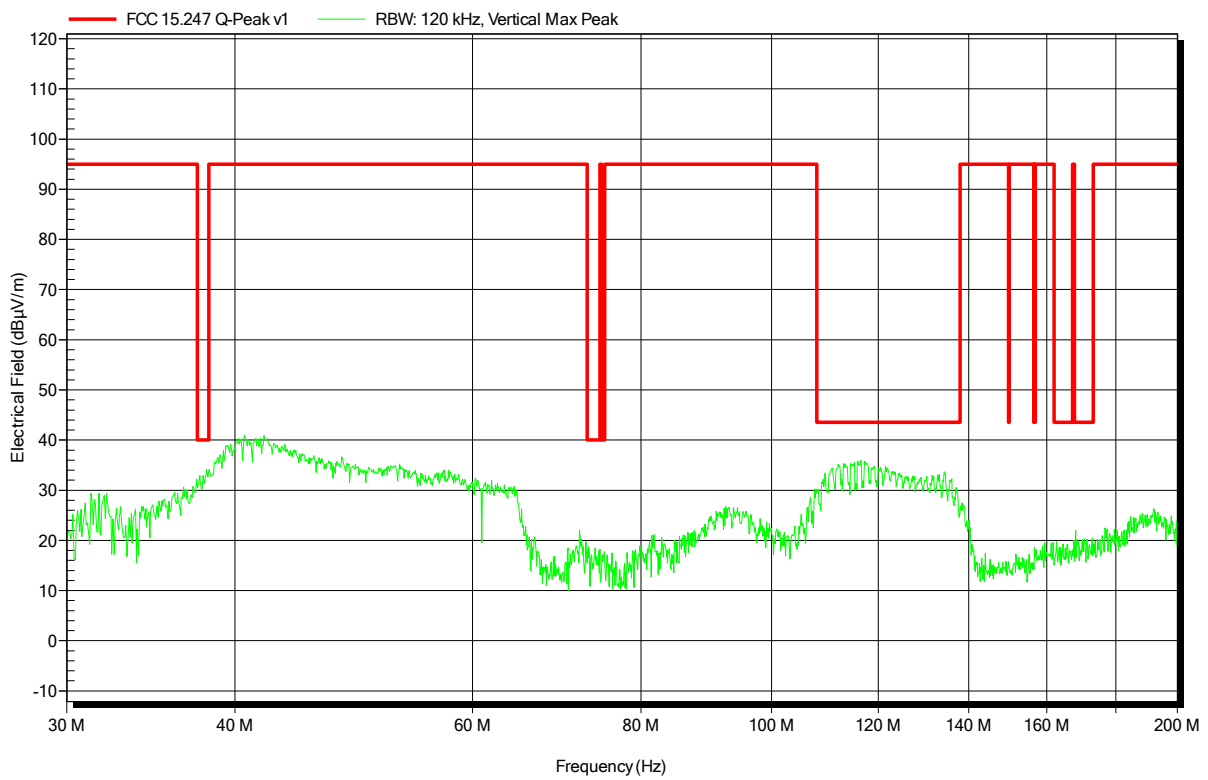


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-20  
 Note:

Index 19

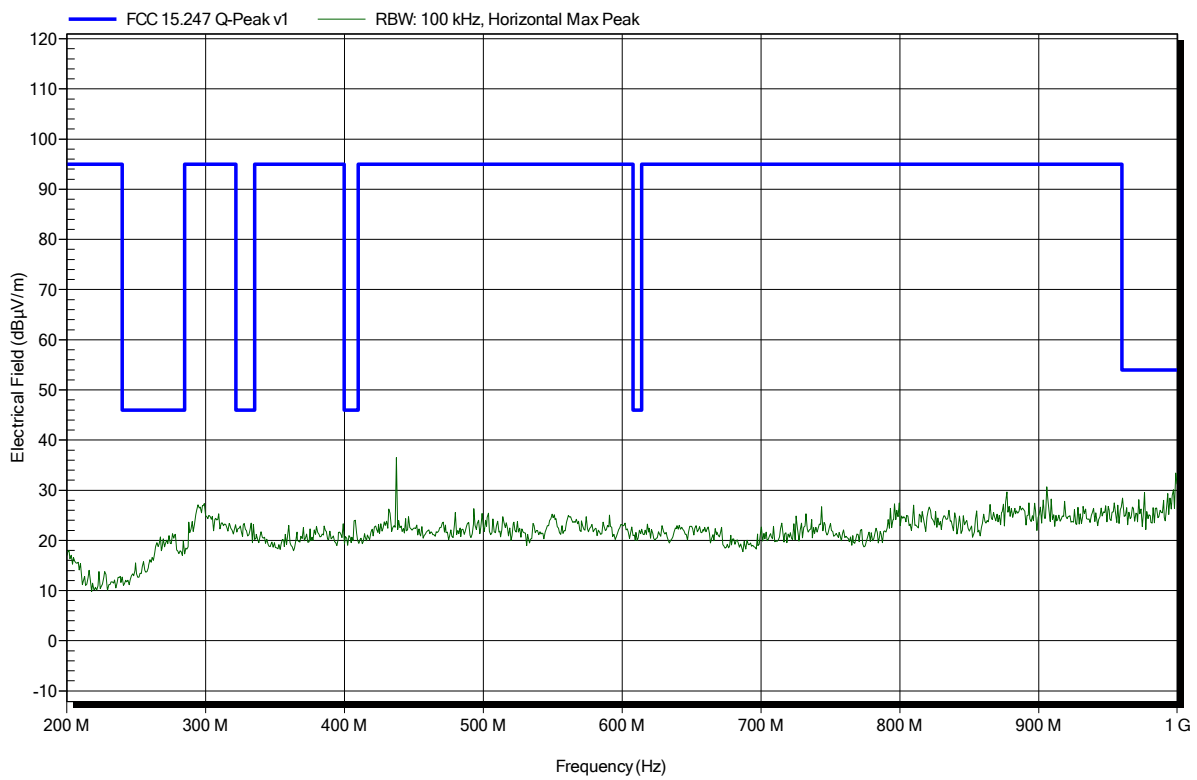


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 41

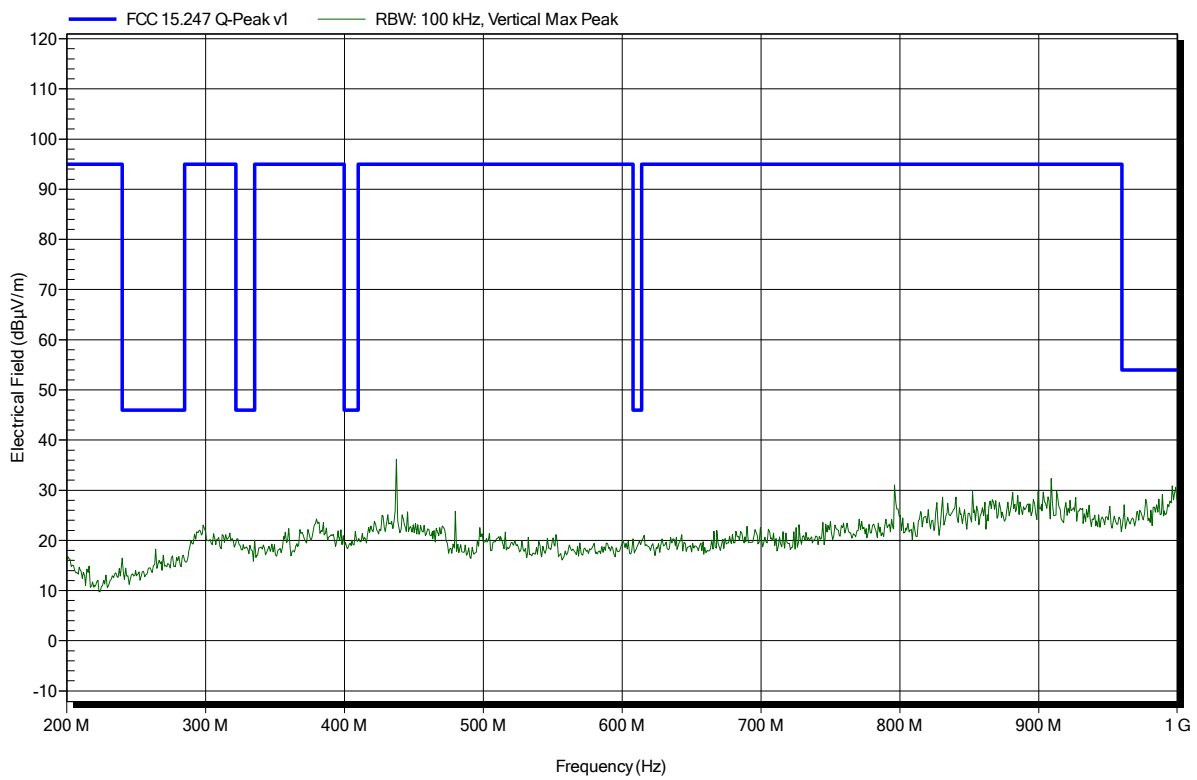


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 40

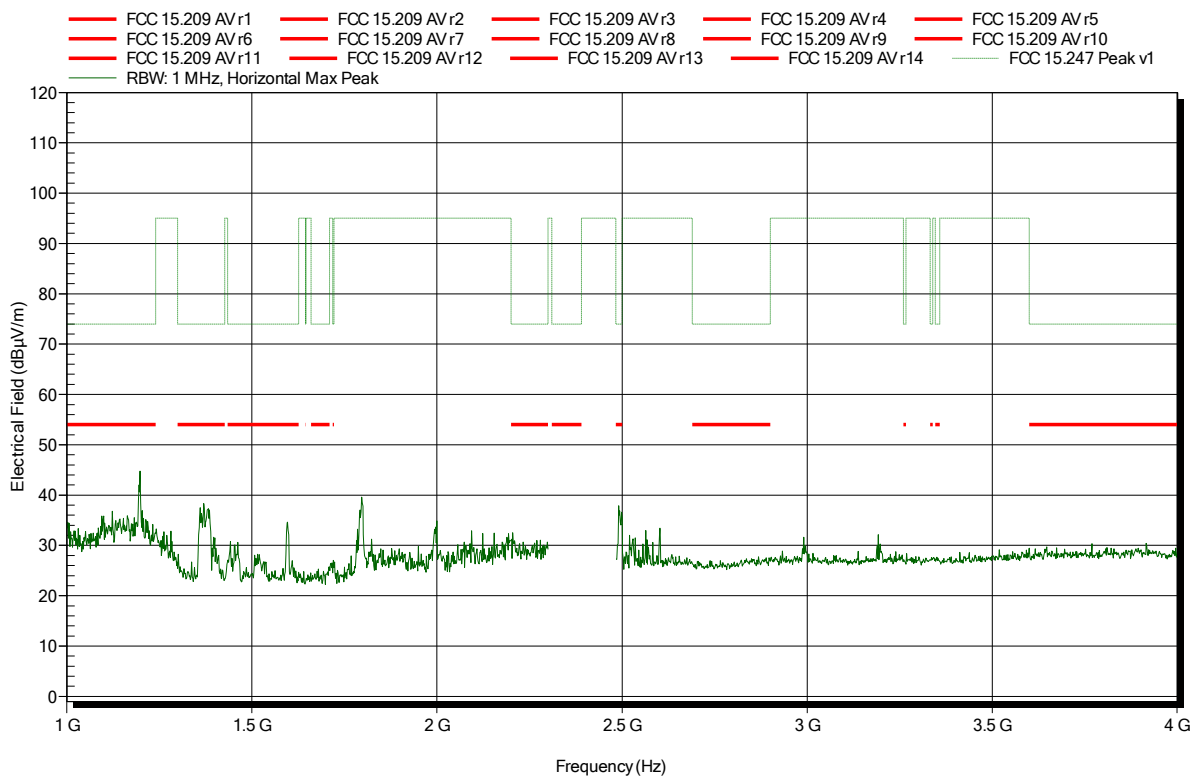


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 7

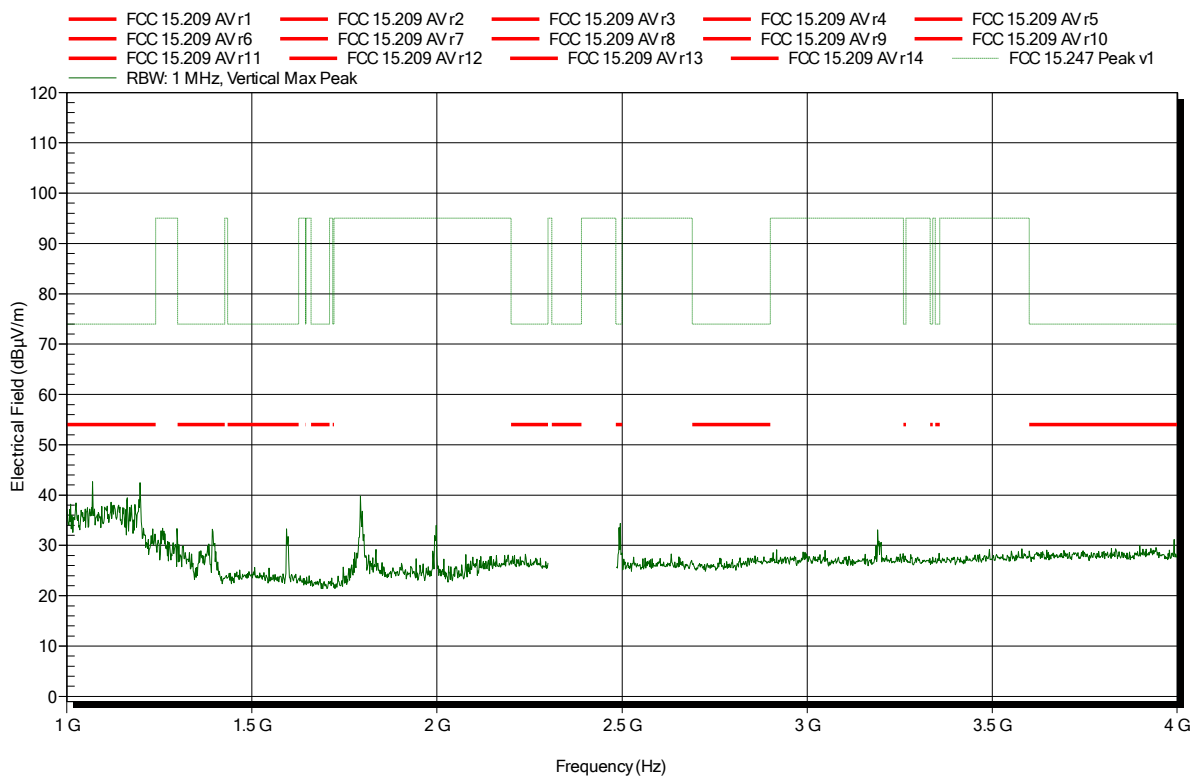


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 14

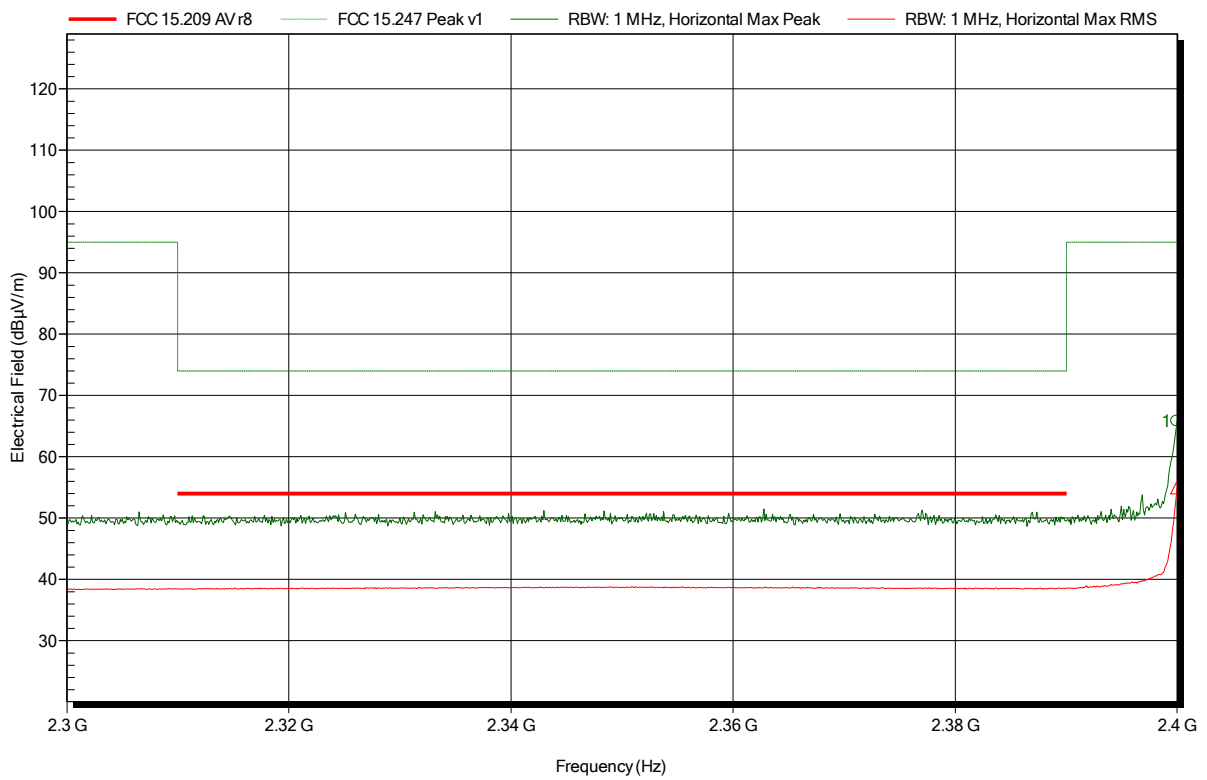


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note: lower bandedge

Index 8



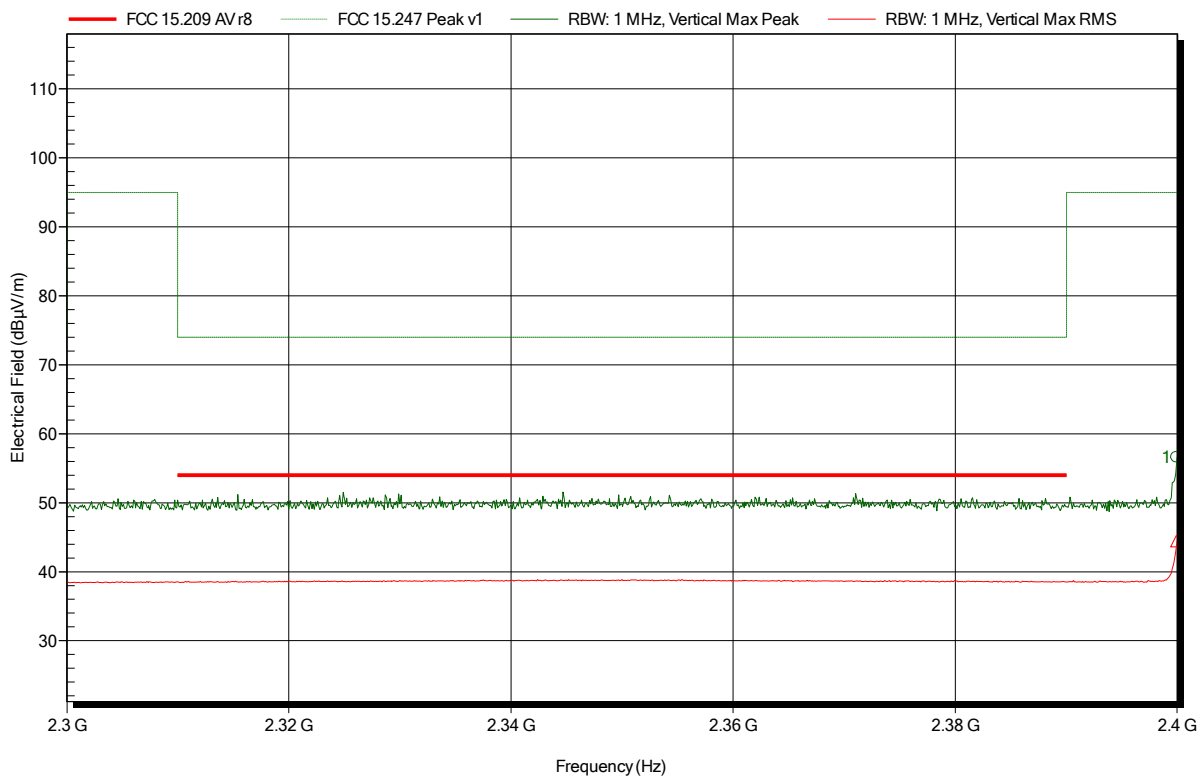
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3999 GHz	65.83 dBµV/m	95 dBµV/m	-29.17 dB	Pass
Frequency	RMS			
2.3999 GHz	54.87 dBµV/m			

**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note: lower bandedge

Index 15



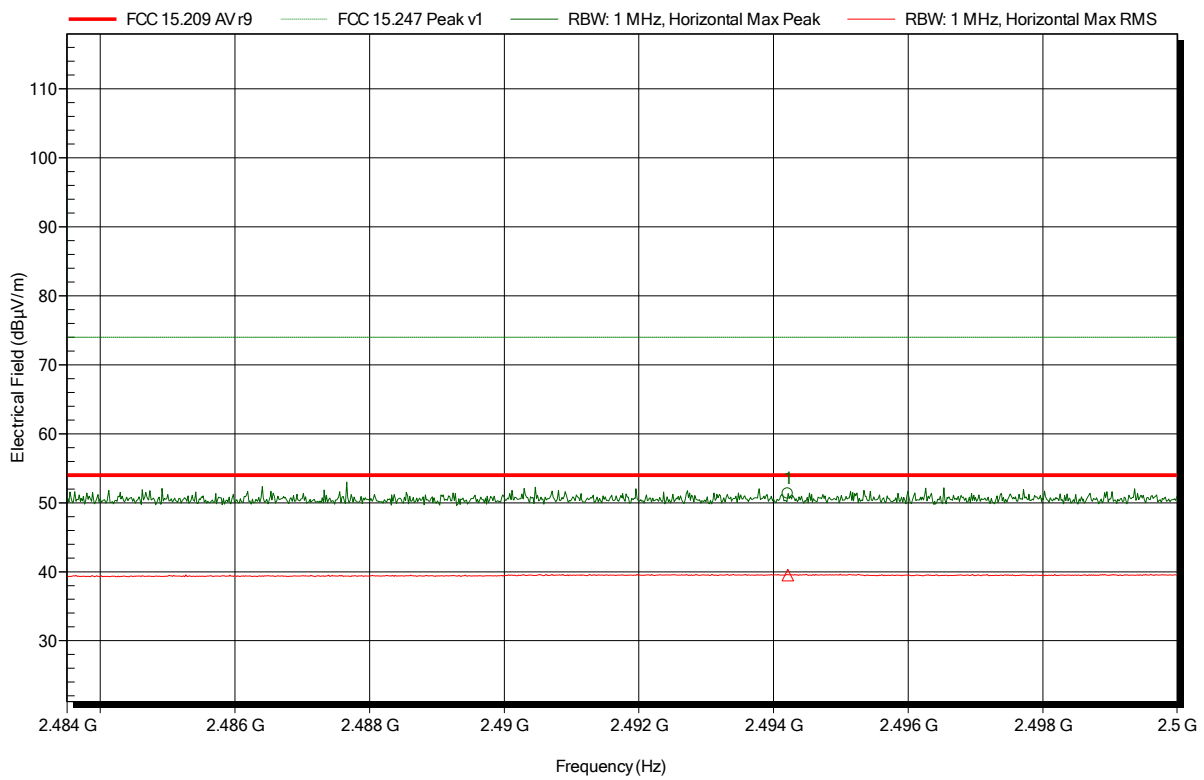
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.3999 GHz	56.57 dBµV/m	95 dBµV/m	-38.43 dB	Pass
Frequency	RMS			
2.3999 GHz	44.43 dBµV/m			

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note: upper bandedge

Index 9



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4942 GHz	51.32 dBµV/m	74 dBµV/m	-22.68 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4942 GHz	39.51 dBµV/m	54 dBµV/m	-14.49 dB	Pass

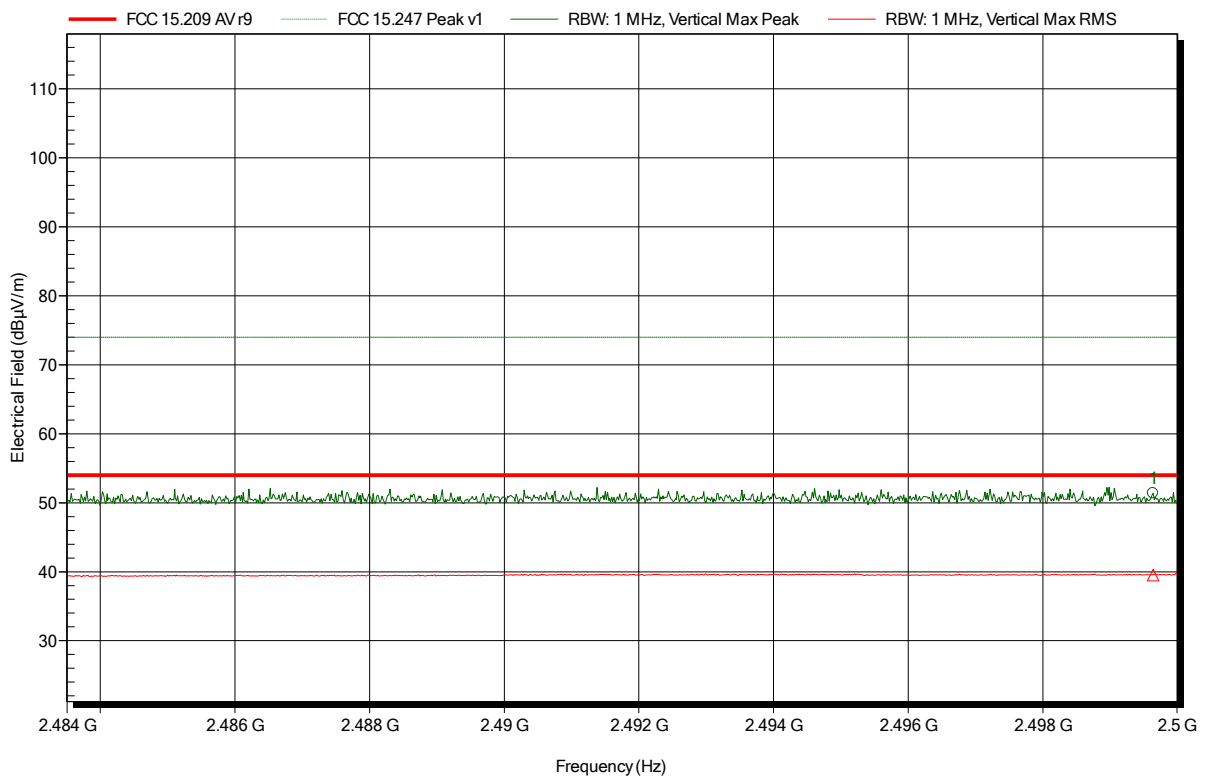


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note: upper bandedge

Index 16



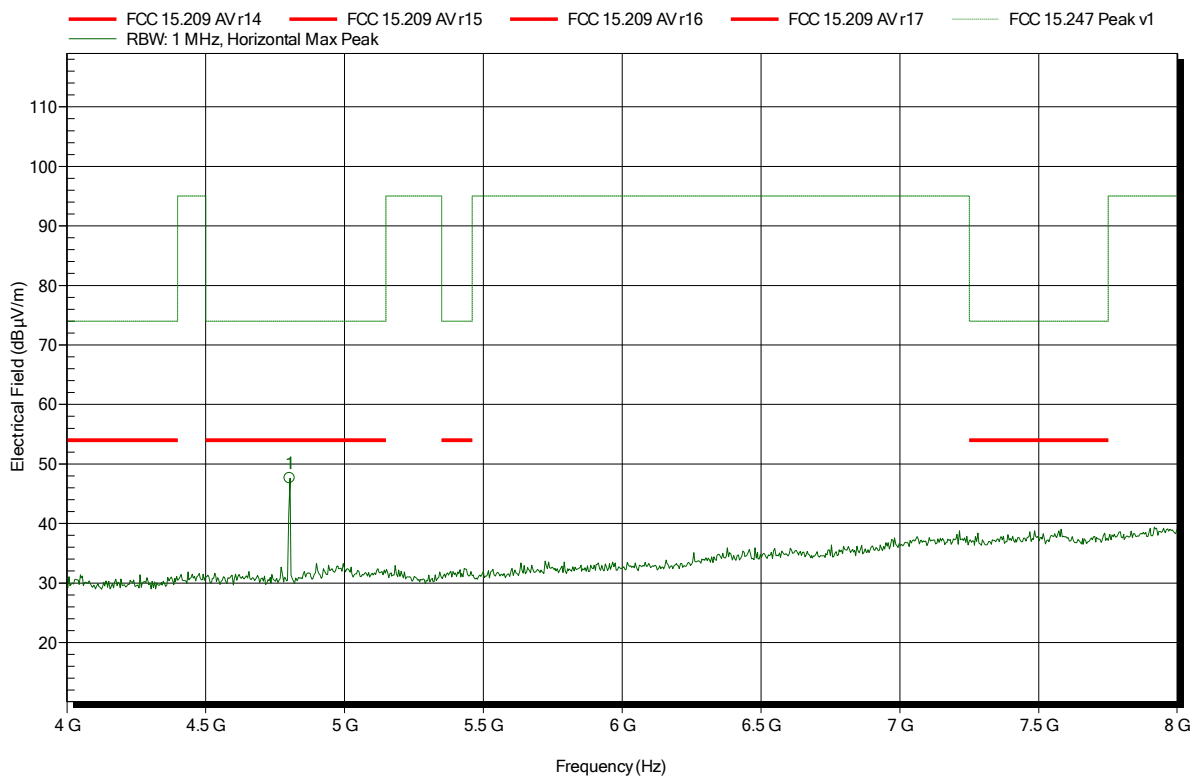
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4996 GHz	51.37 dBµV/m	74 dBµV/m	-22.63 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4996 GHz	39.51 dBµV/m	54 dBµV/m	-14.49 dB	Pass

**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 10



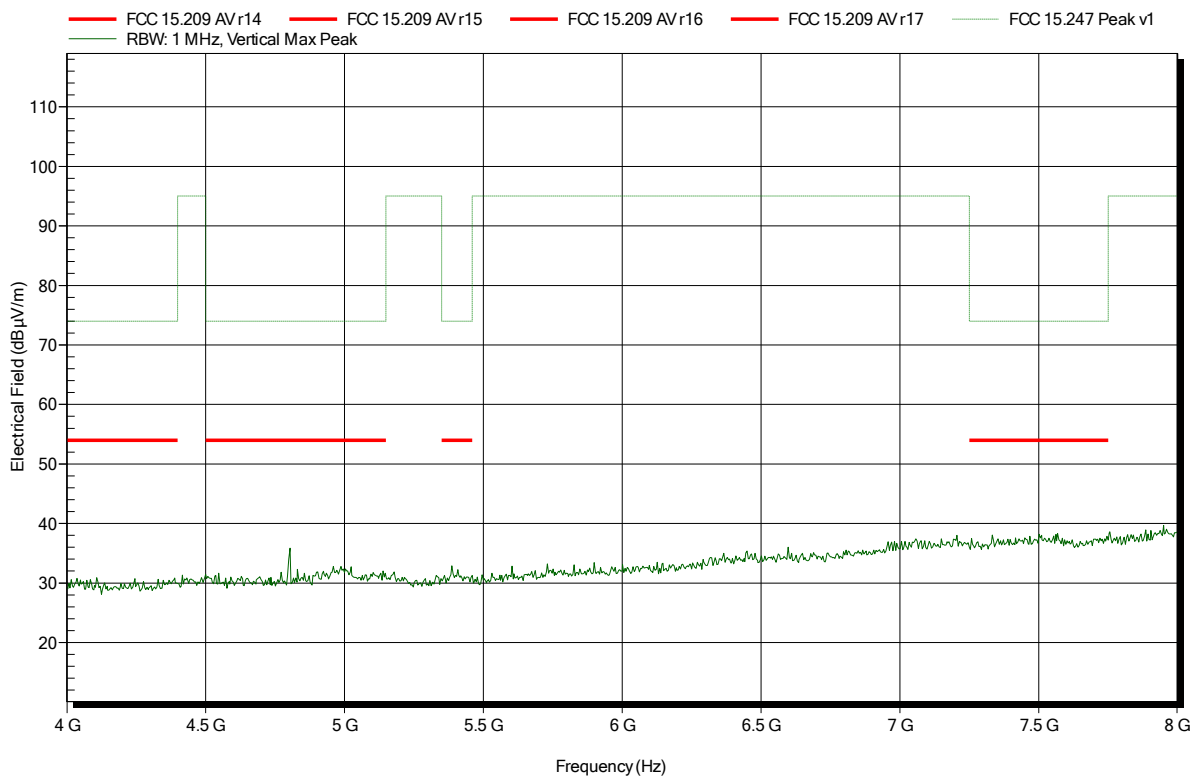
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.803 GHz	47.6 dBµV/m	74 dBµV/m	-26.4 dB	Pass

**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

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 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 13

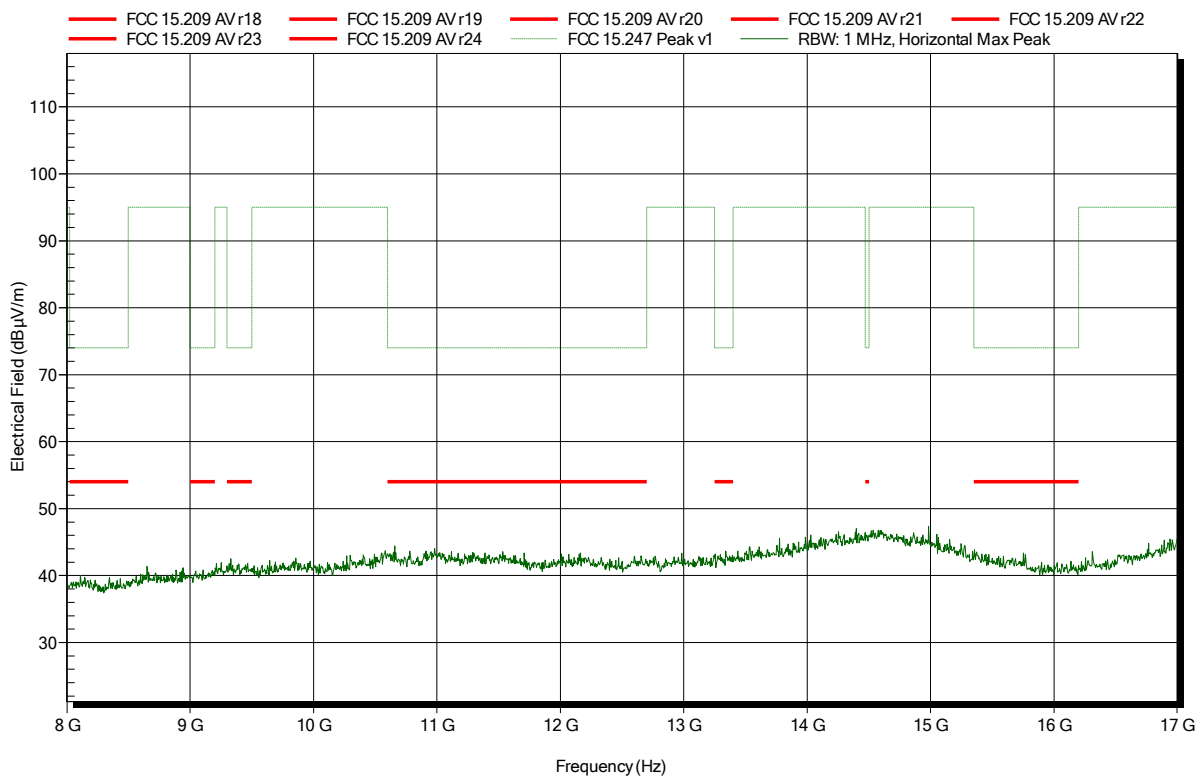


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 11

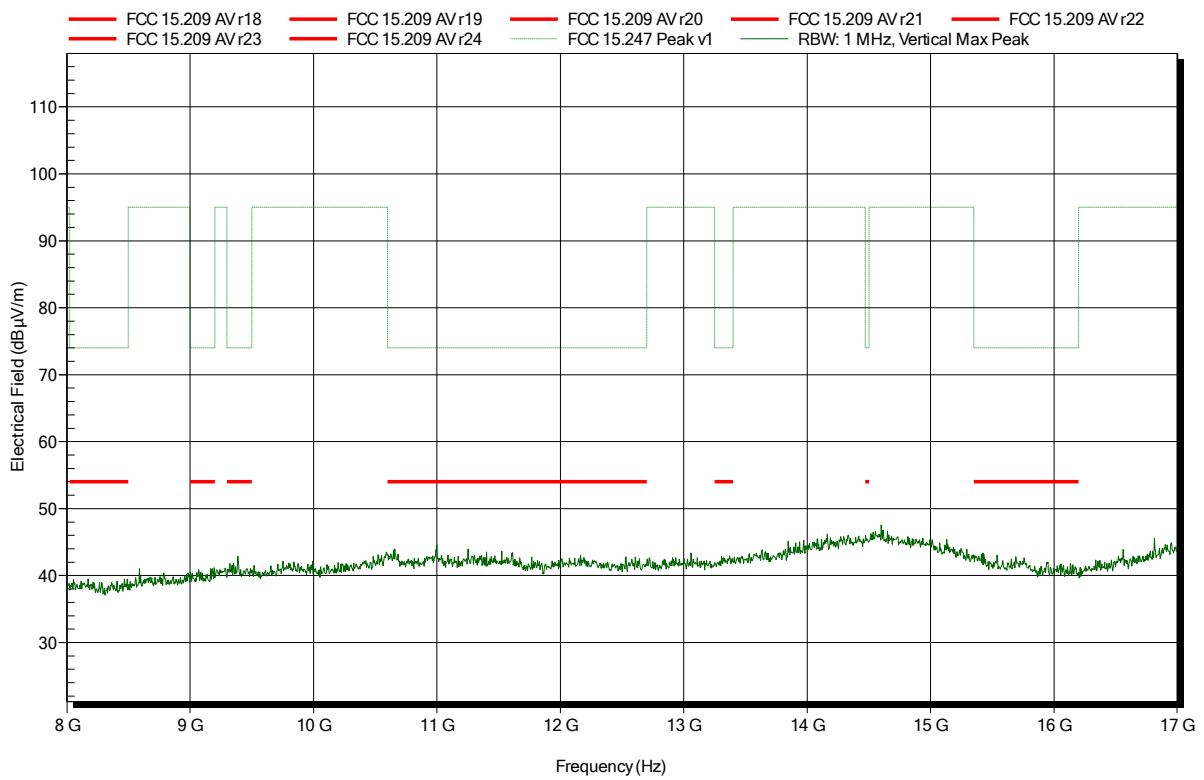


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 12

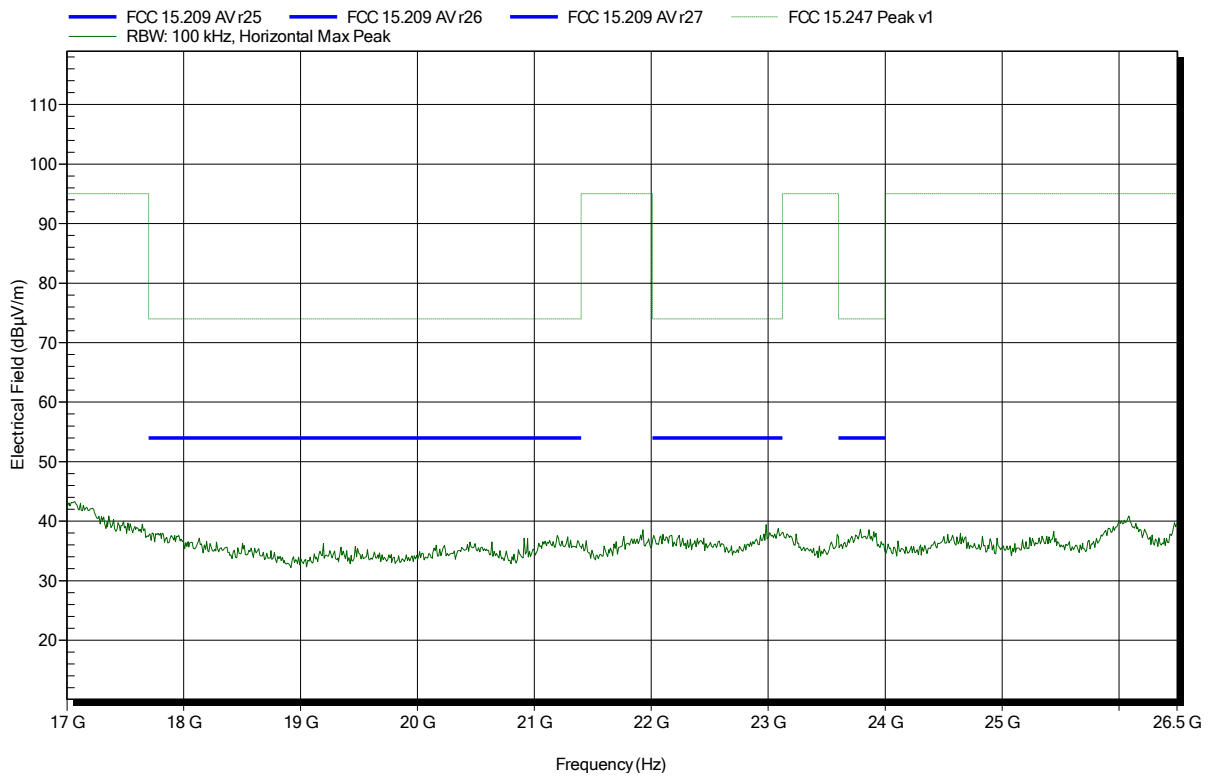


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),  
 Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 39

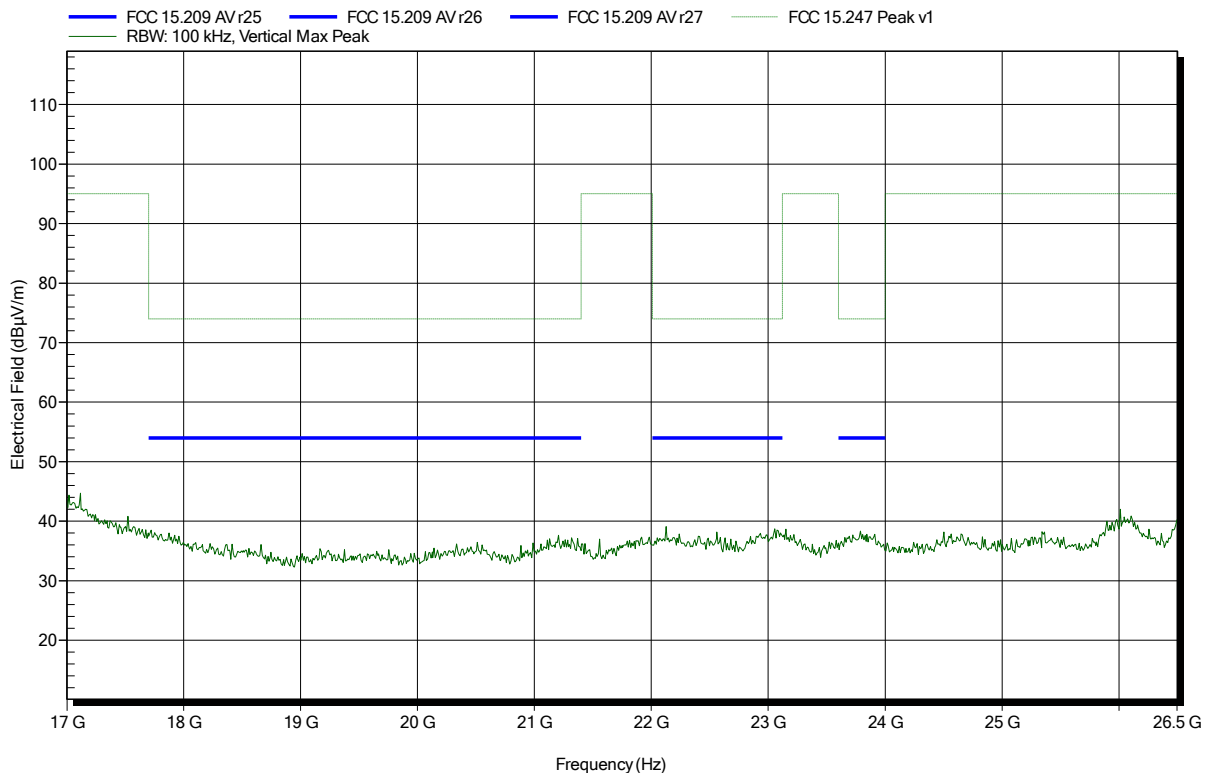


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Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2402 MHz  
 Test Date: 2018-07-17  
 Note:

Index 38

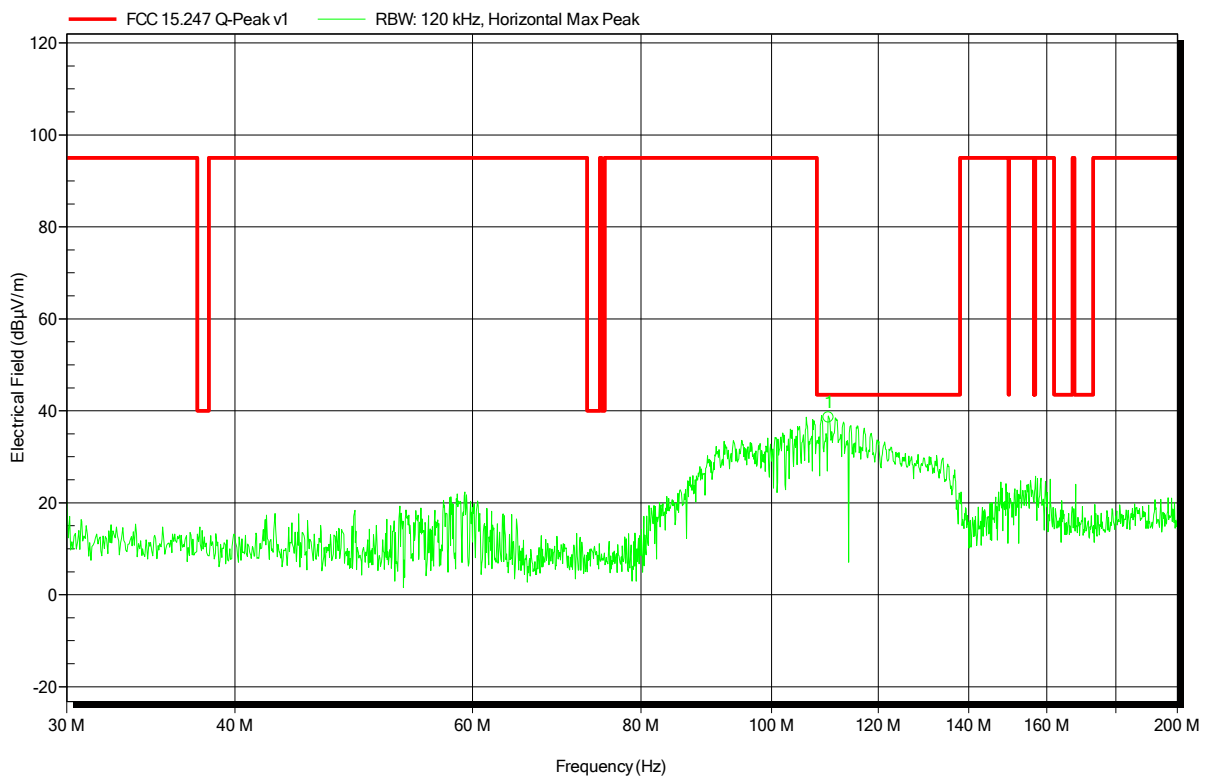


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Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-20  
 Note:

Index 21



Frequency	Peak	Peak Limit	Peak Difference	Status
110.2255 MHz	38.5 dBµV/m	43.5 dBµV/m	-4.98 dB	Pass

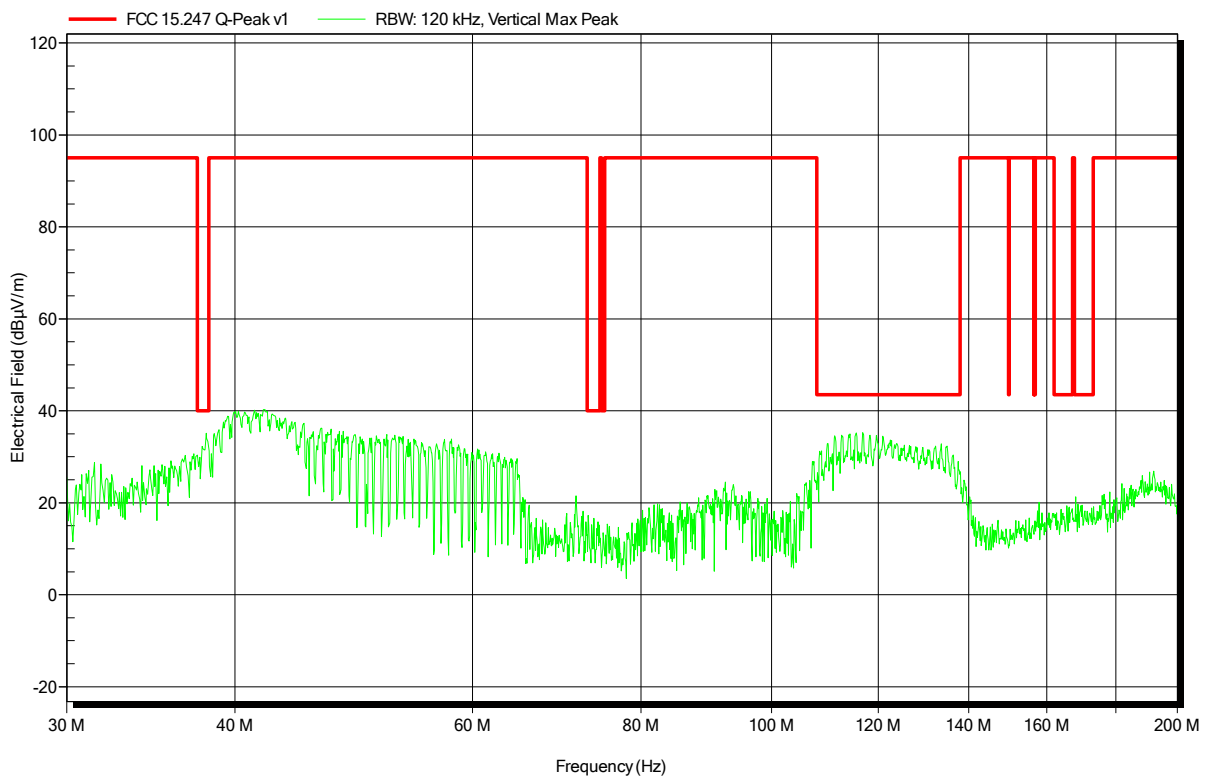


**Spurious emissions according to FCC 15.247**

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 Model: TiWi BT/WLAN Evaluation Board  
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 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-20  
 Note:

Index 22

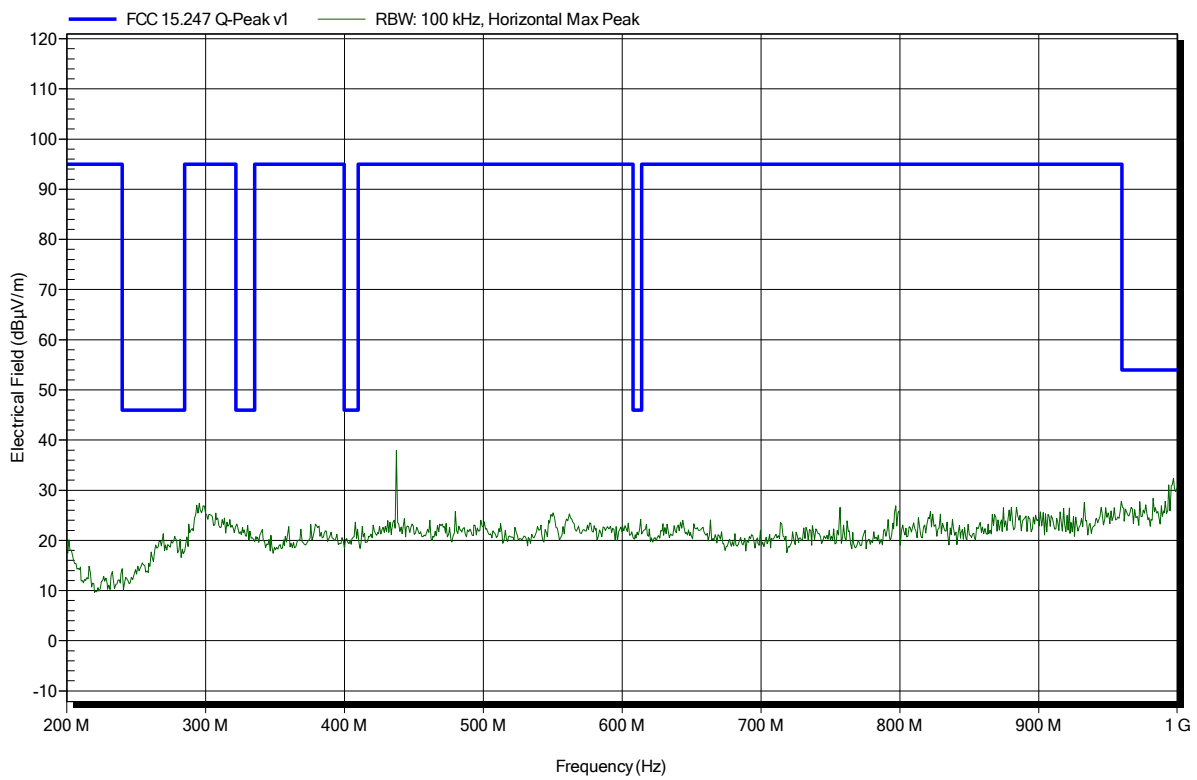


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 42

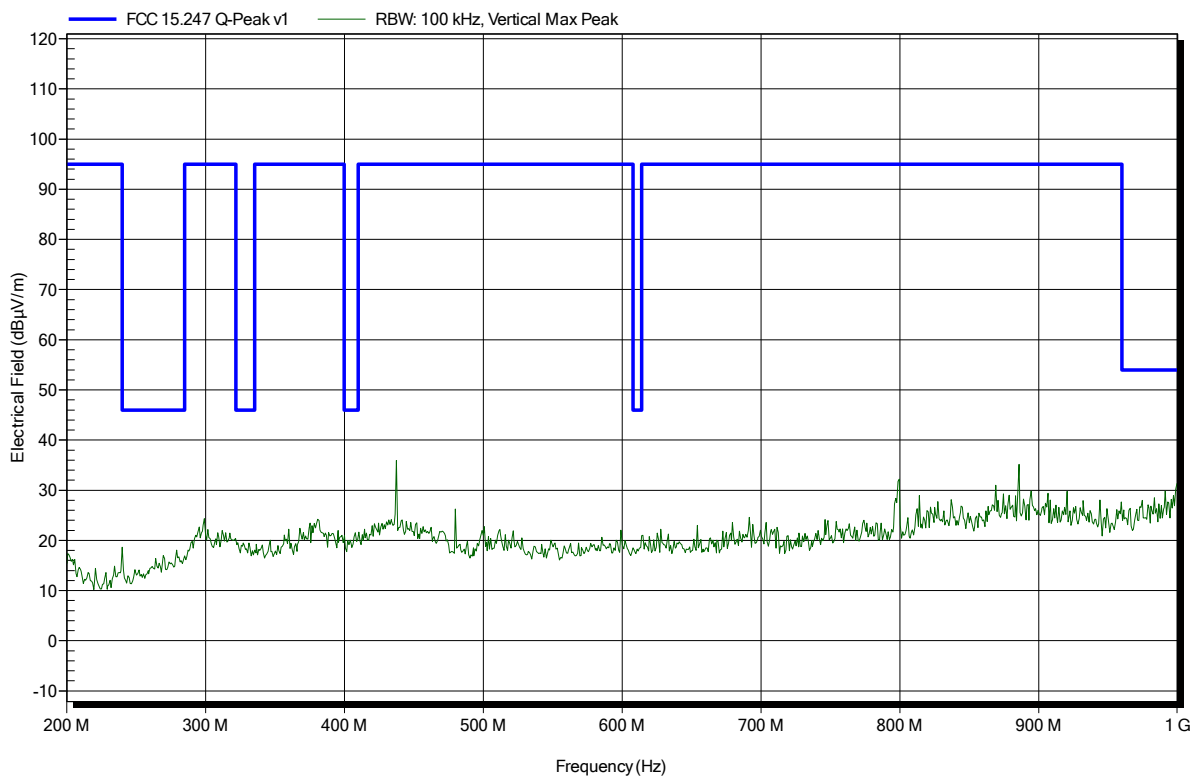


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Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 43

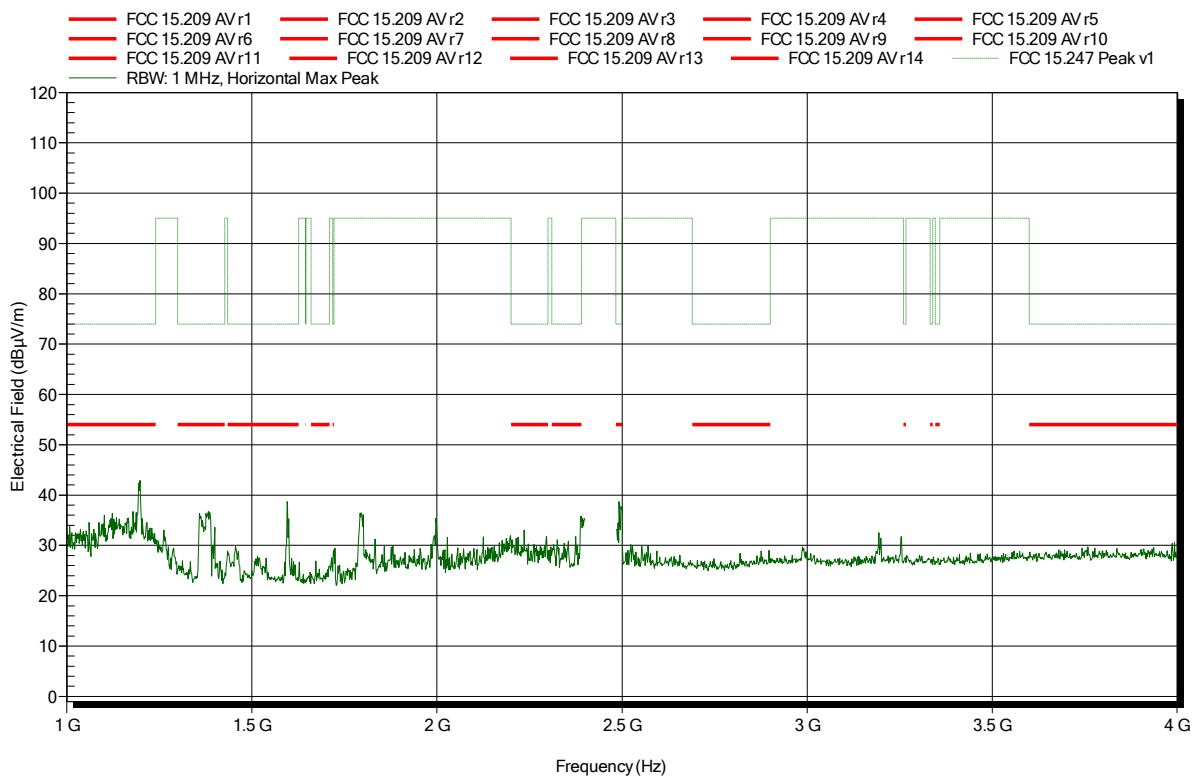


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 22

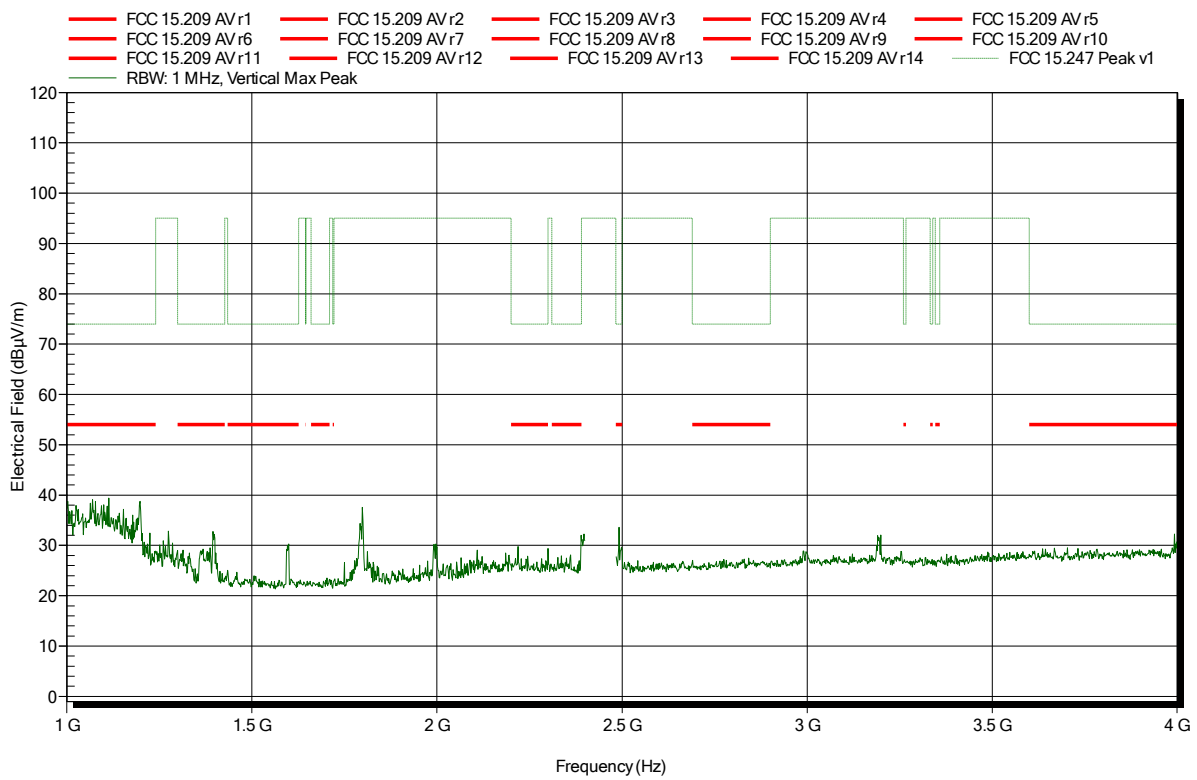


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
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 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 17

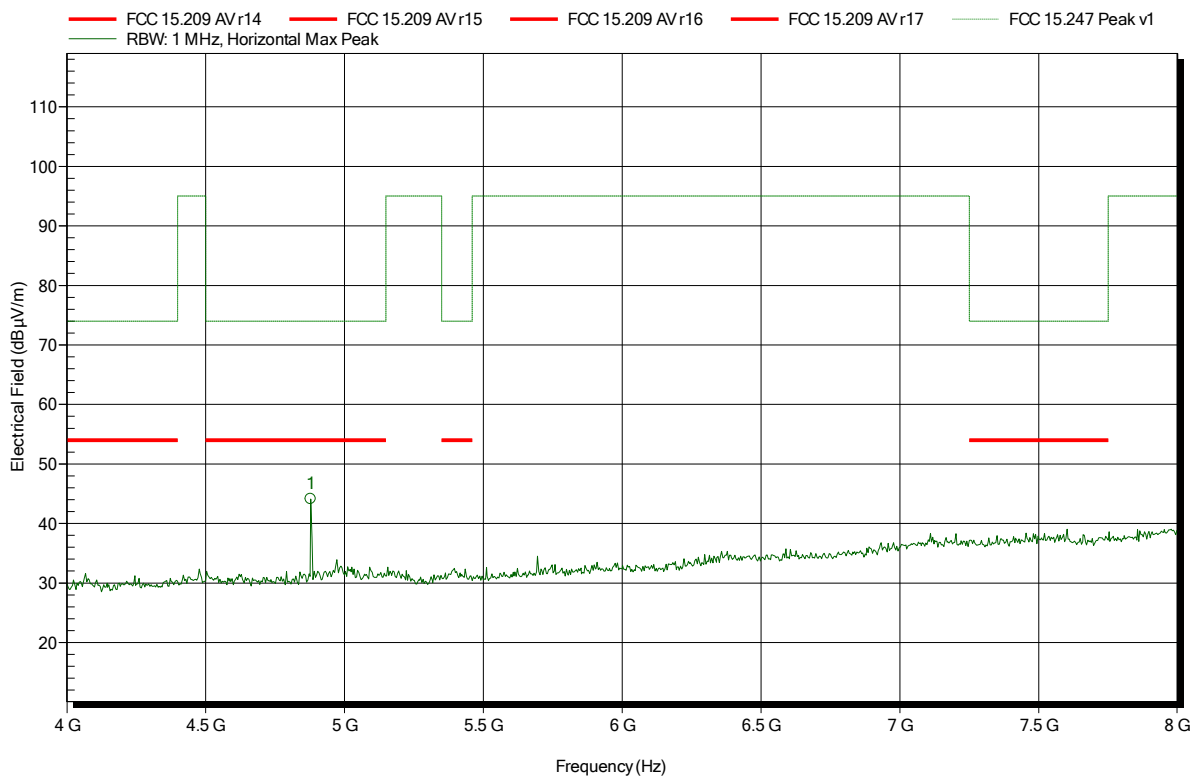


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
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 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 21



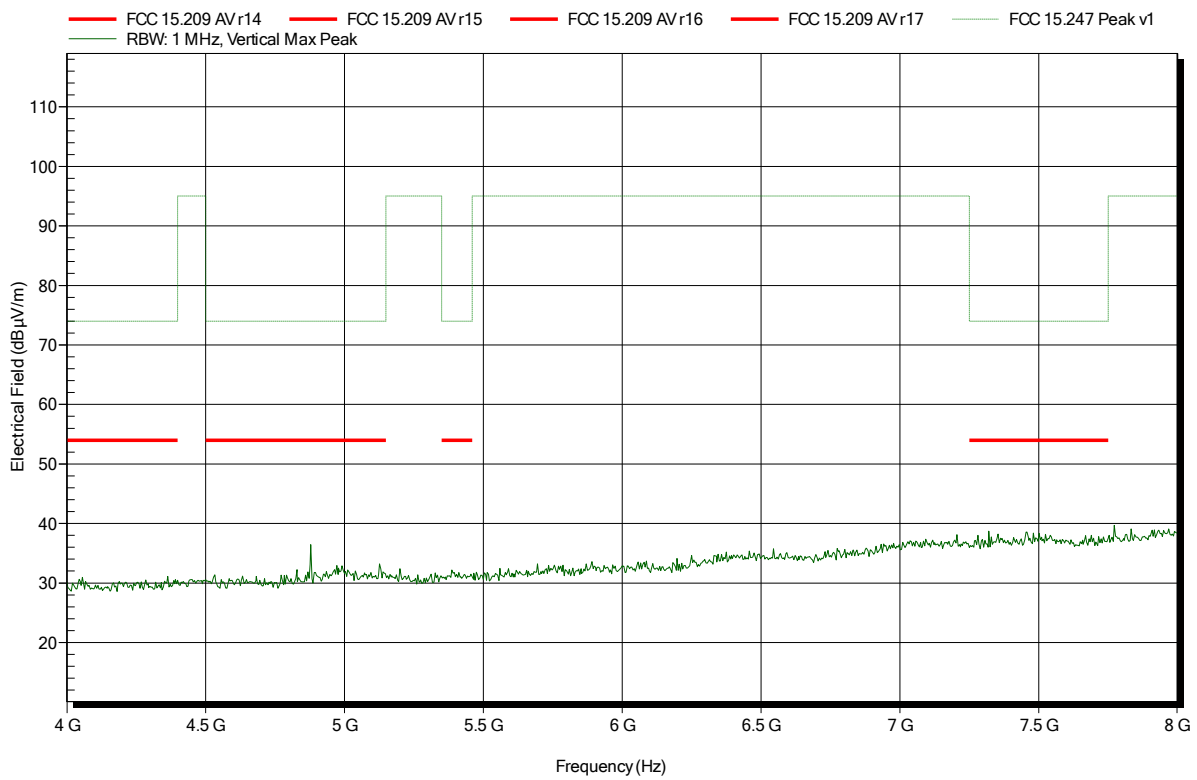
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.879 GHz	44.12 dBµV/m	74 dBµV/m	-29.88 dB	Pass

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

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 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 18

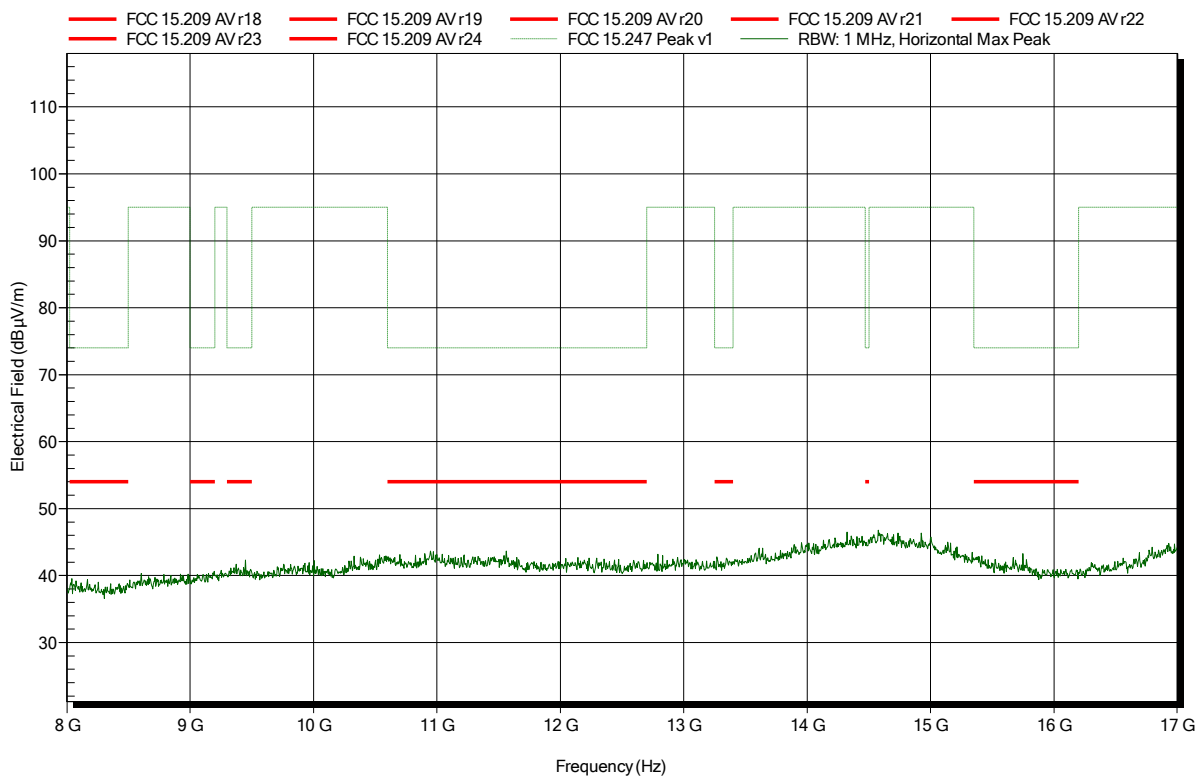


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Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
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 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 20



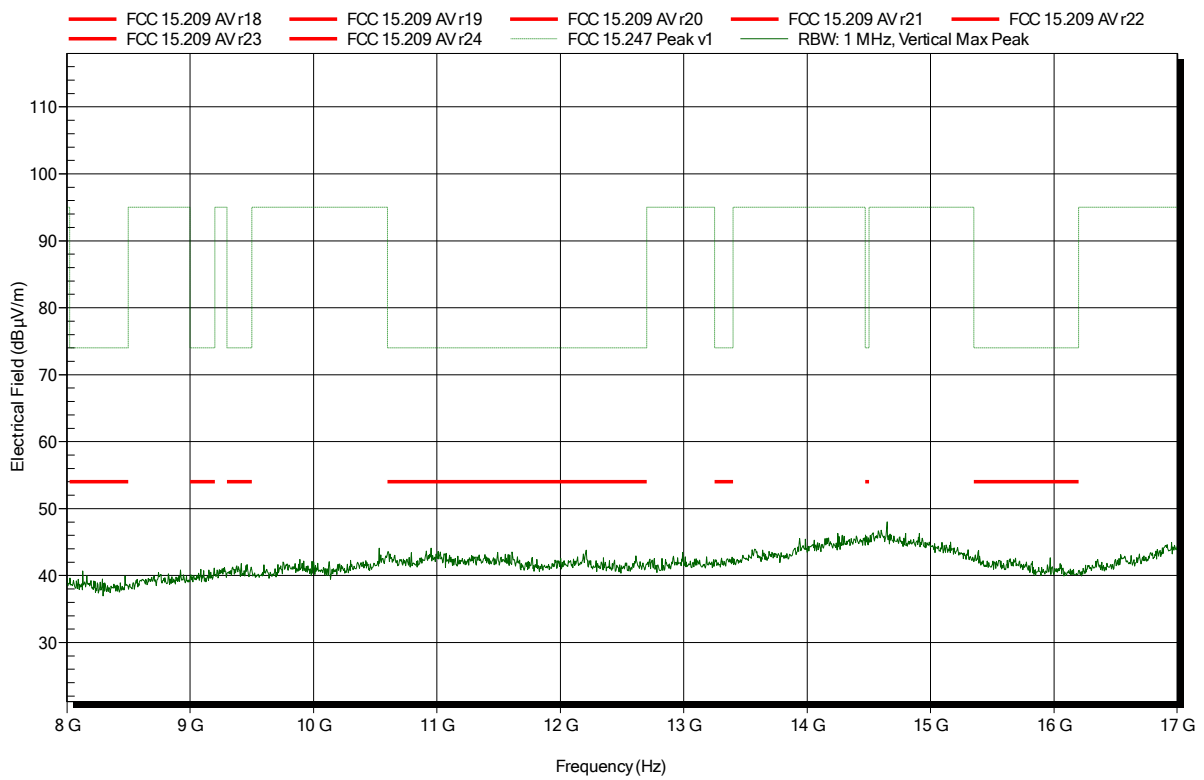


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 19

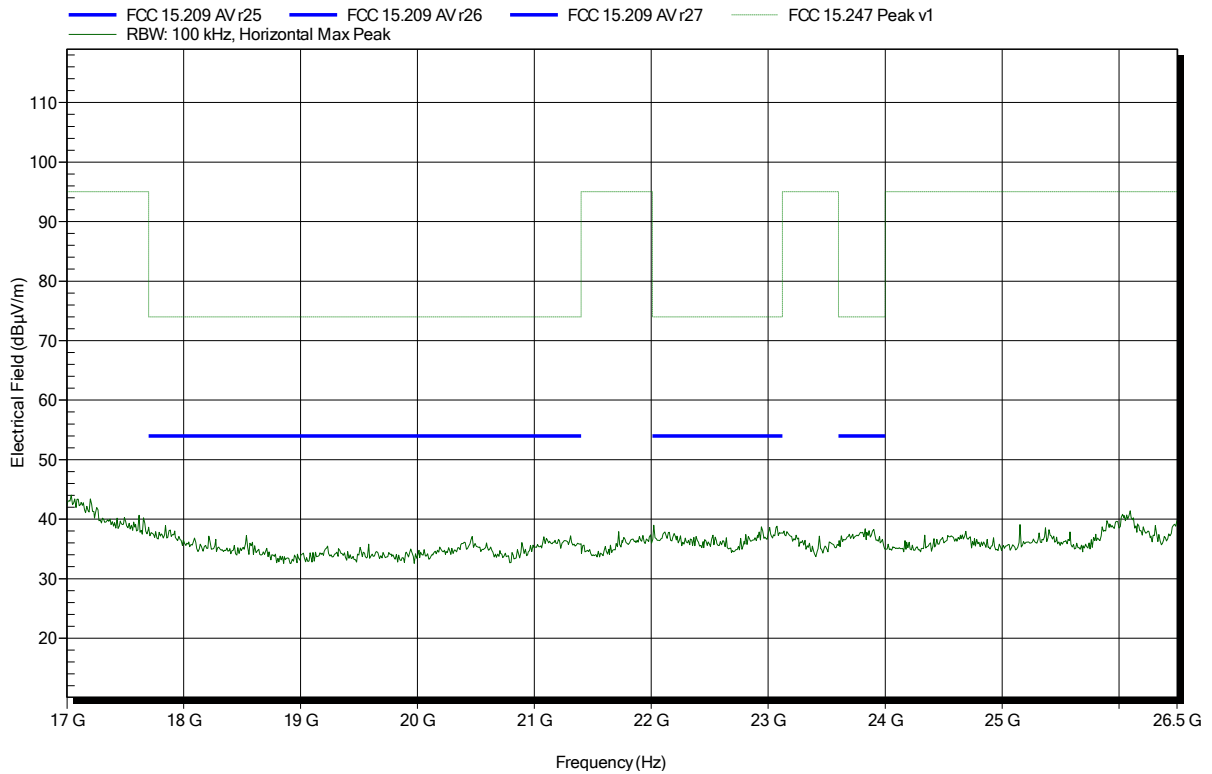


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),  
 Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 36

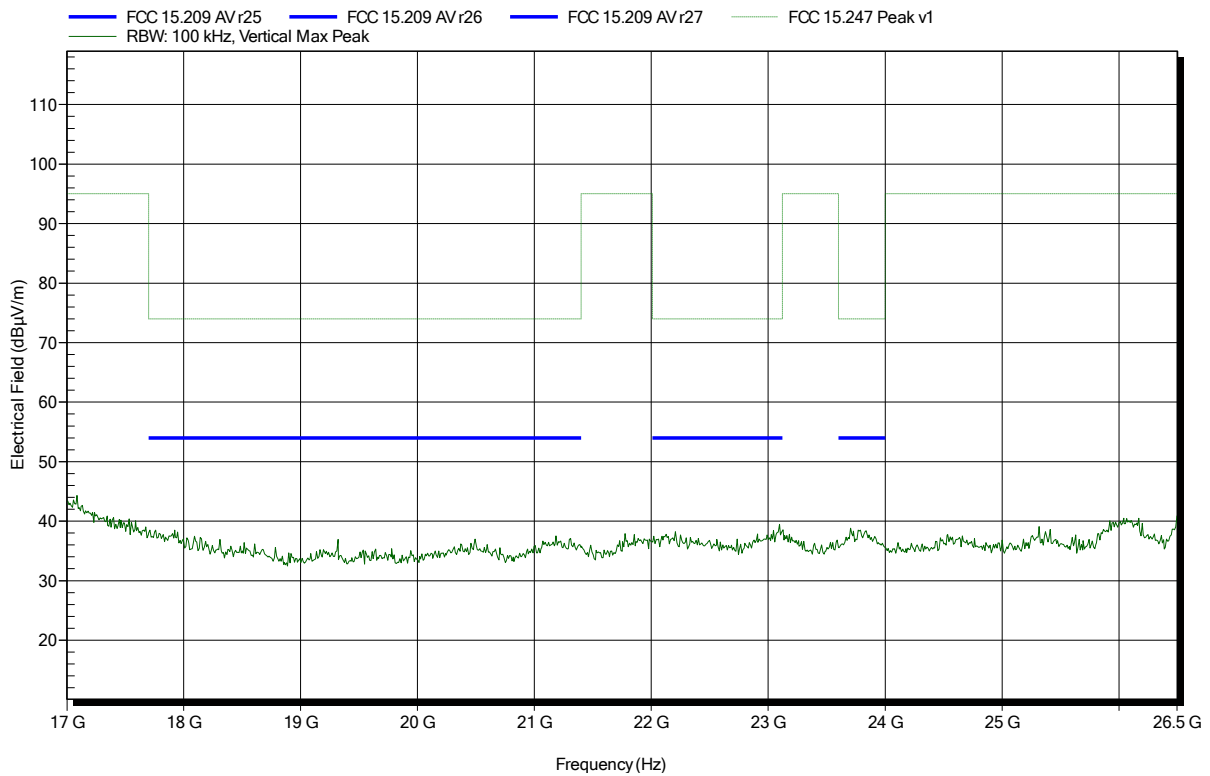


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2441 MHz  
 Test Date: 2018-07-17  
 Note:

Index 35

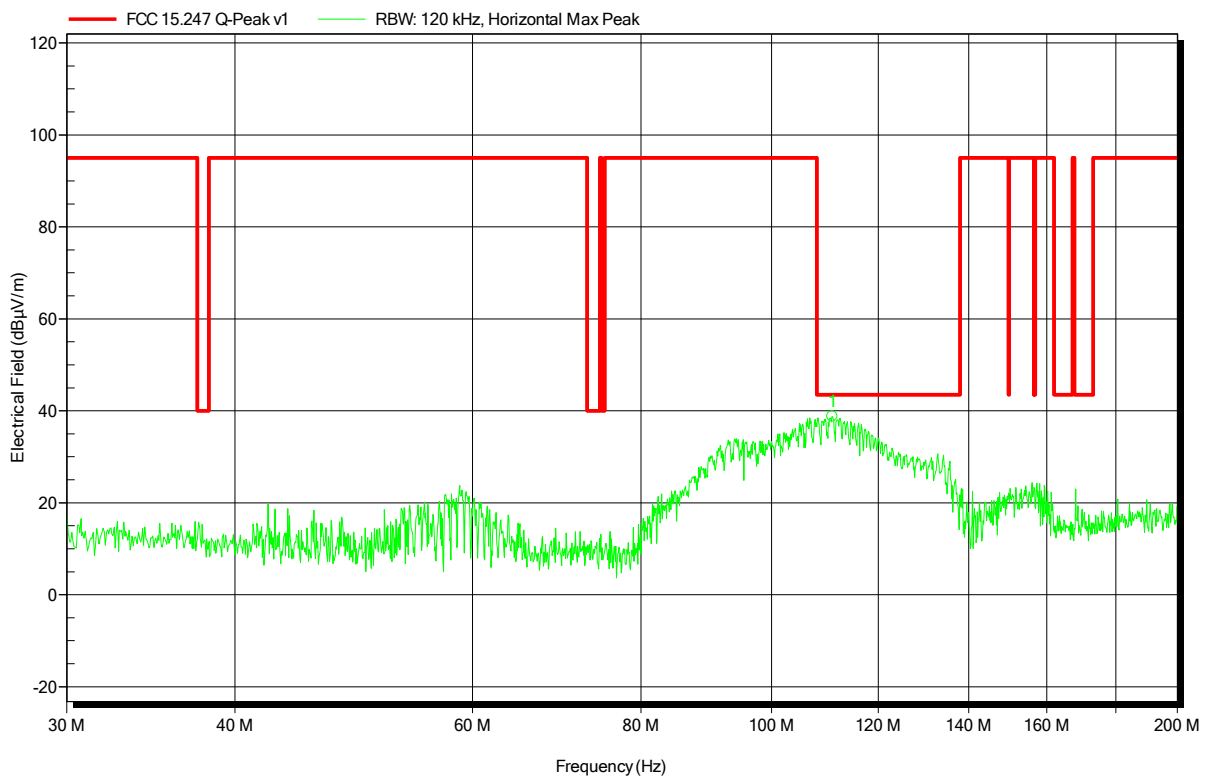


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-20  
 Note:

Index 24



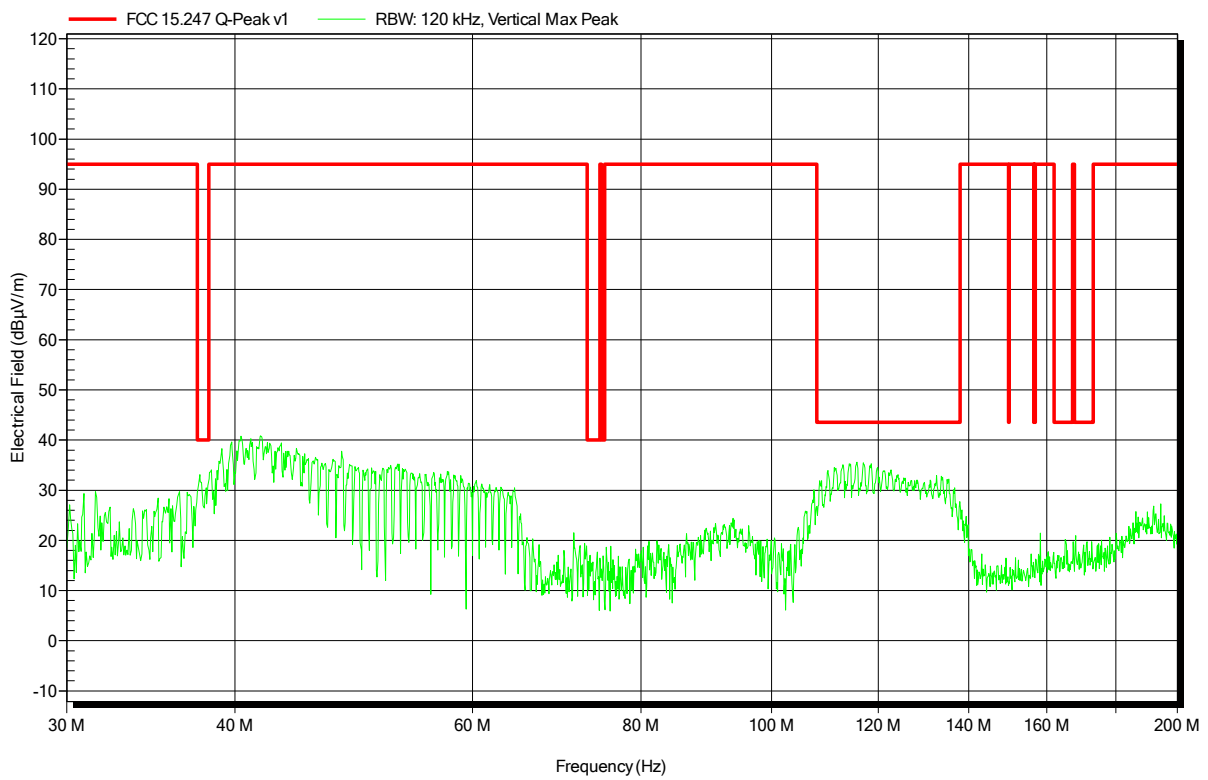
Frequency	Peak	Peak Limit	Peak Difference	Status
110.9467 MHz	38.8 dBµV/m	43.5 dBµV/m	-4.75 dB	Pass

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-20  
 Note:

Index 23

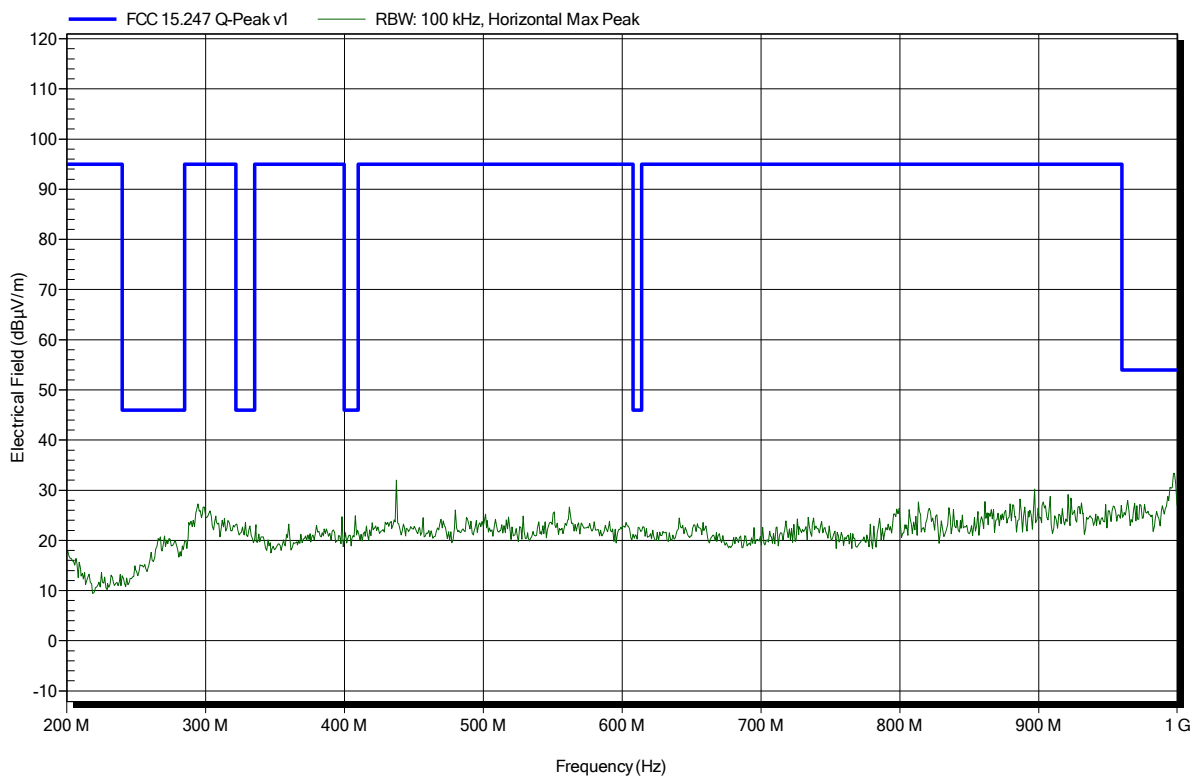


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 45

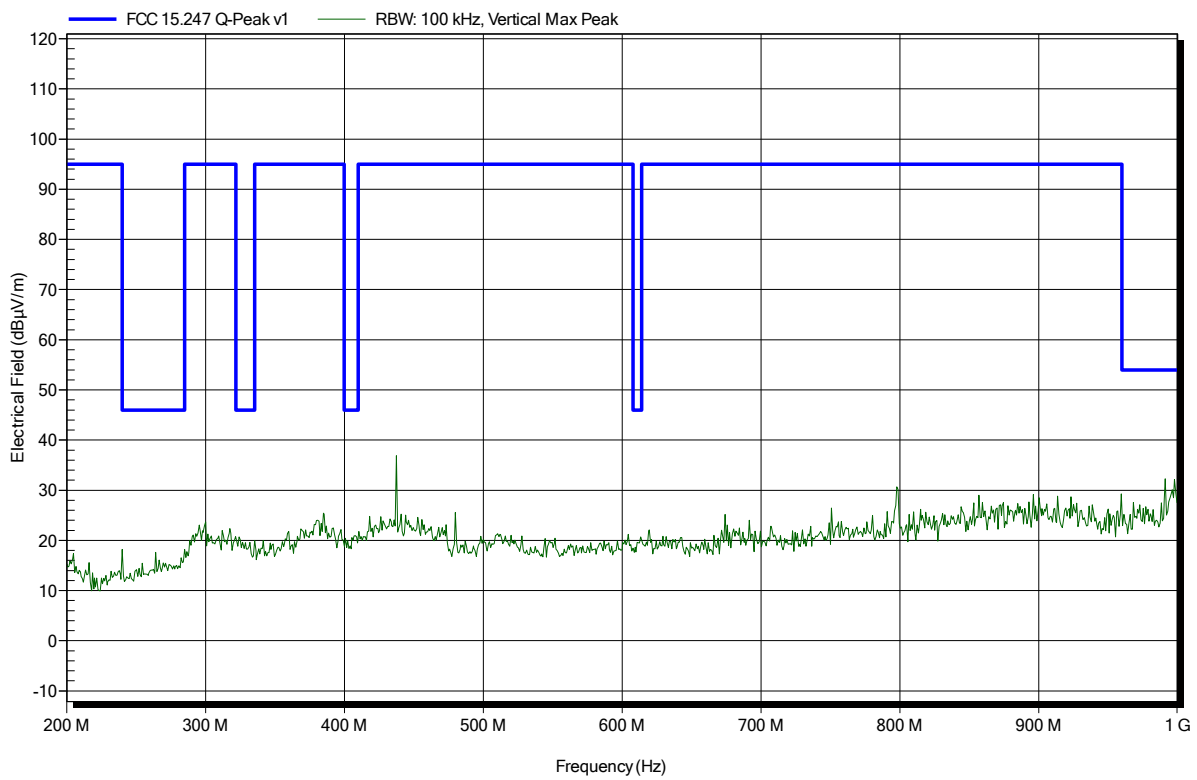


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 44

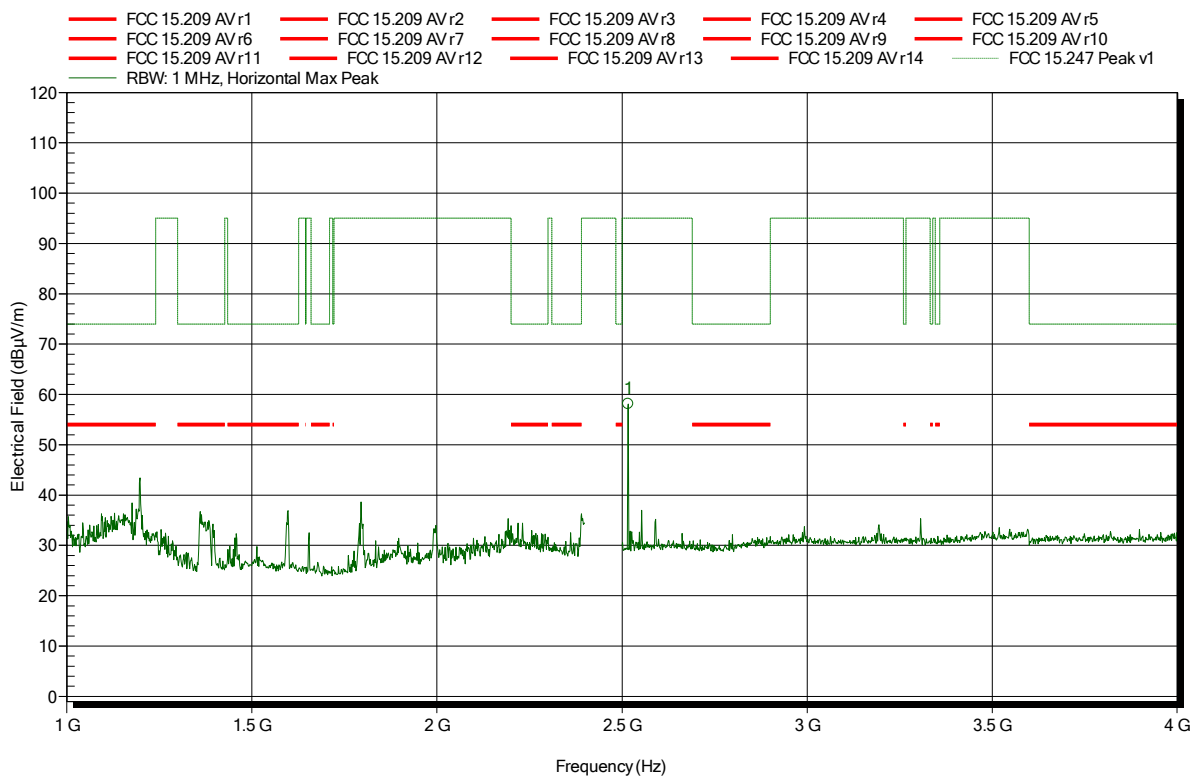


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 23



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.516 GHz	58.07 dBµV/m	95 dBµV/m	-36.93 dB	Pass

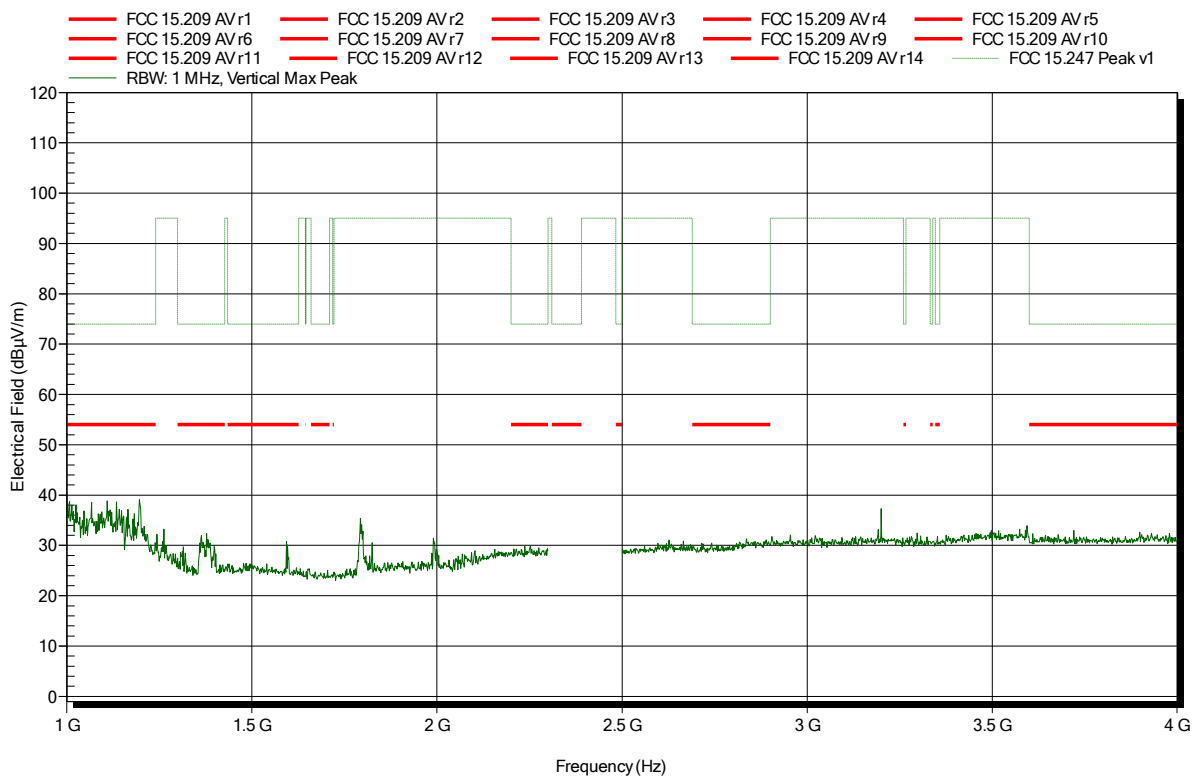


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 30

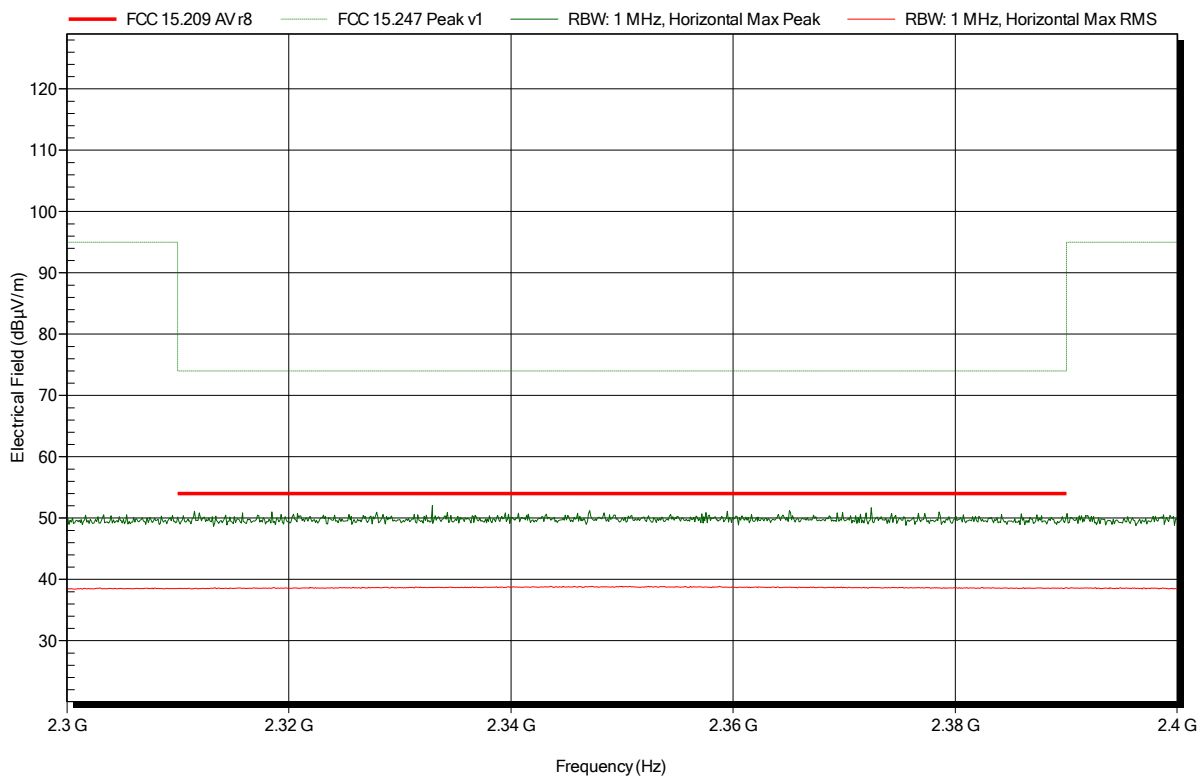


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note: lower bandedge

Index 24

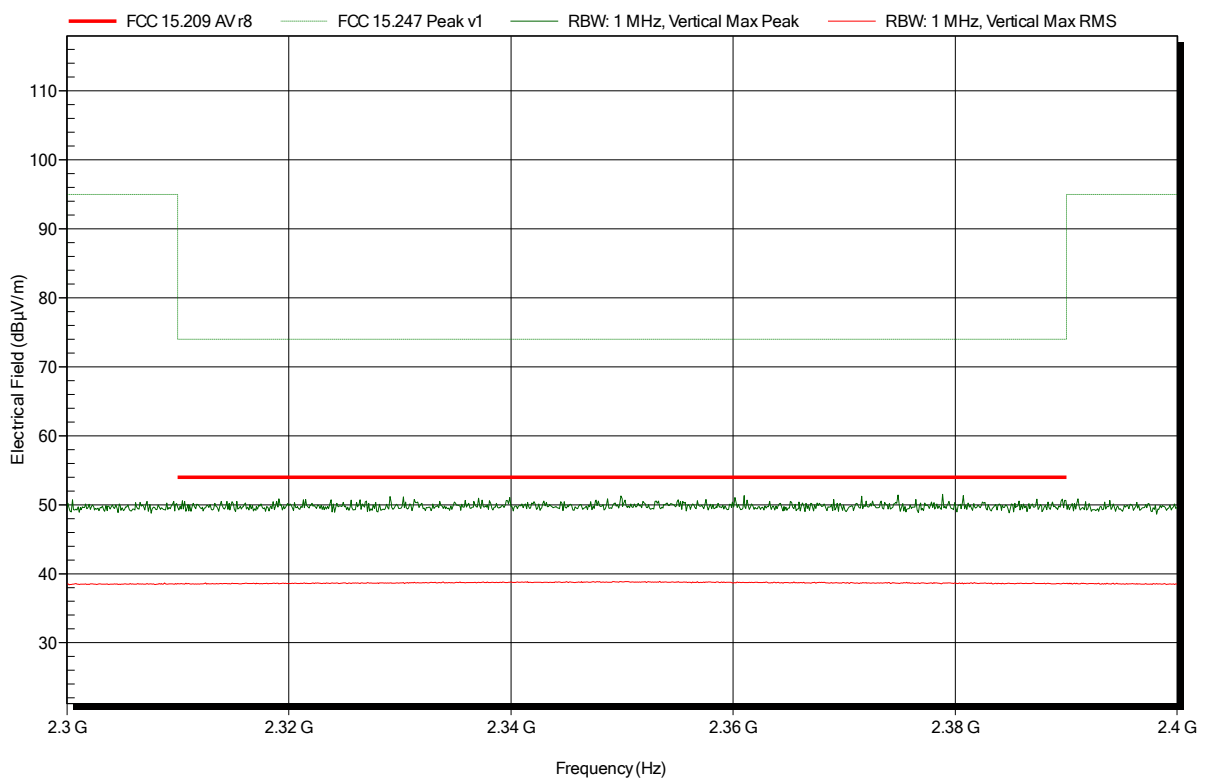


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note: lower bandedge

Index 31

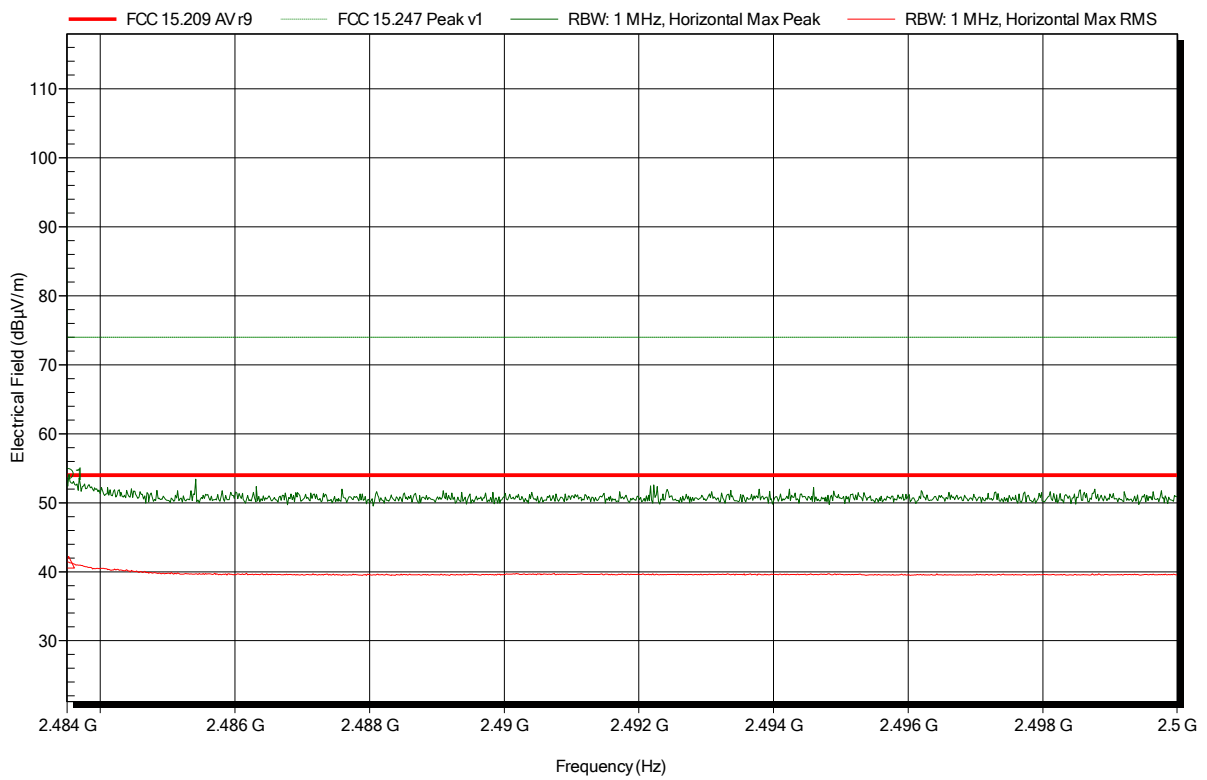


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note: upper bandedge

Index 25



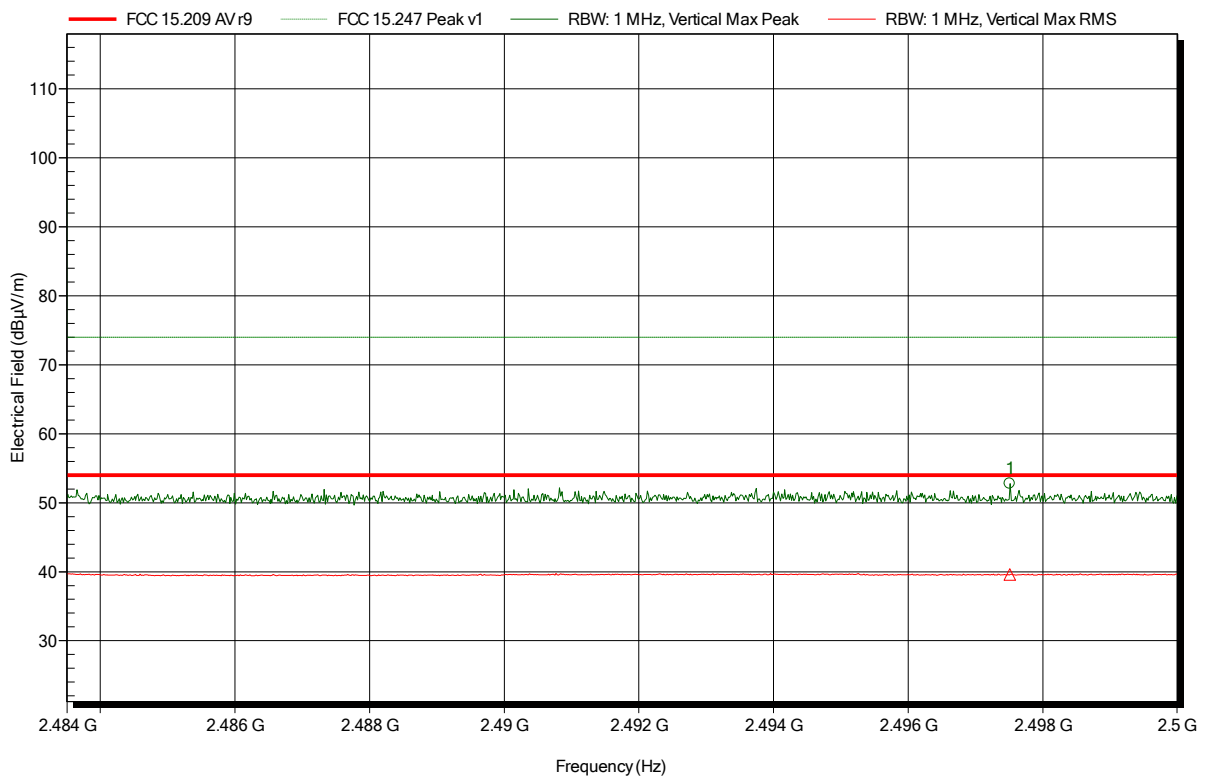
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	54.1 dBµV/m	74 dBµV/m	-19.9 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	41.37 dBµV/m	54 dBµV/m	-12.63 dB	Pass

**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note: upper bandedge

Index 32



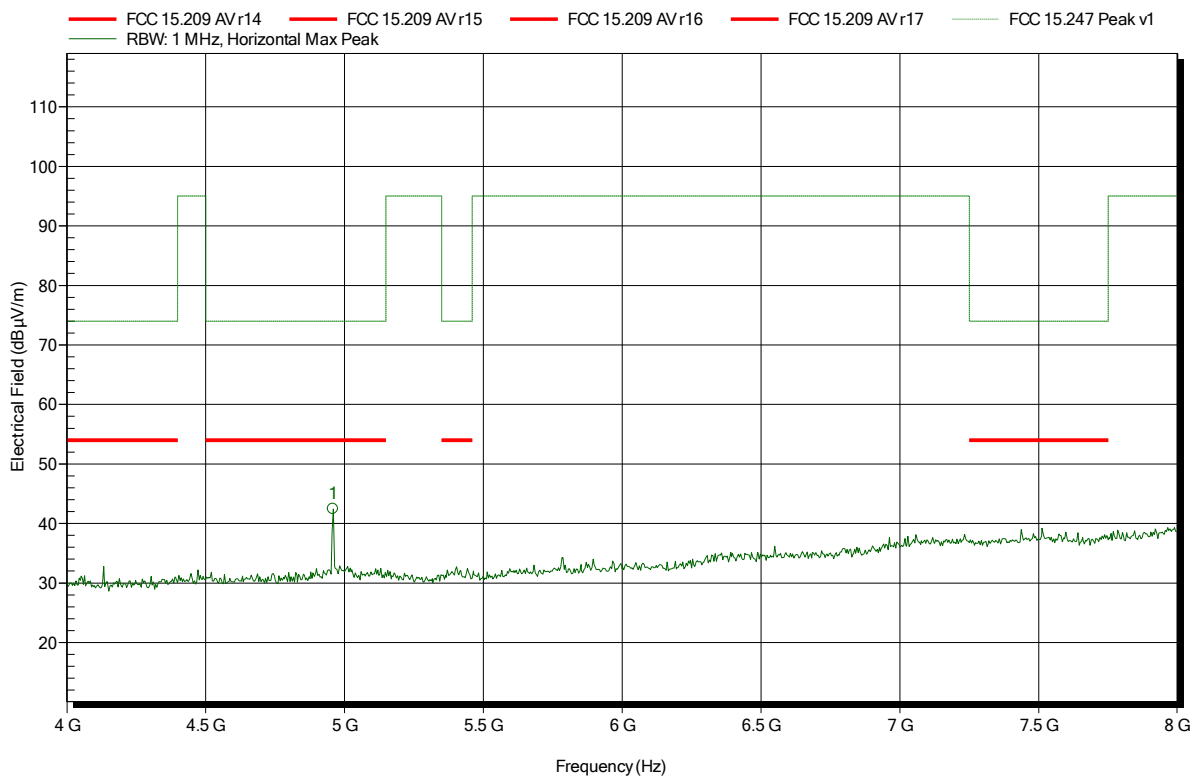
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4975 GHz	52.77 dBµV/m	74 dBµV/m	-21.23 dB	Pass
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4975 GHz	39.6 dBµV/m	54 dBµV/m	-14.4 dB	Pass

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 26



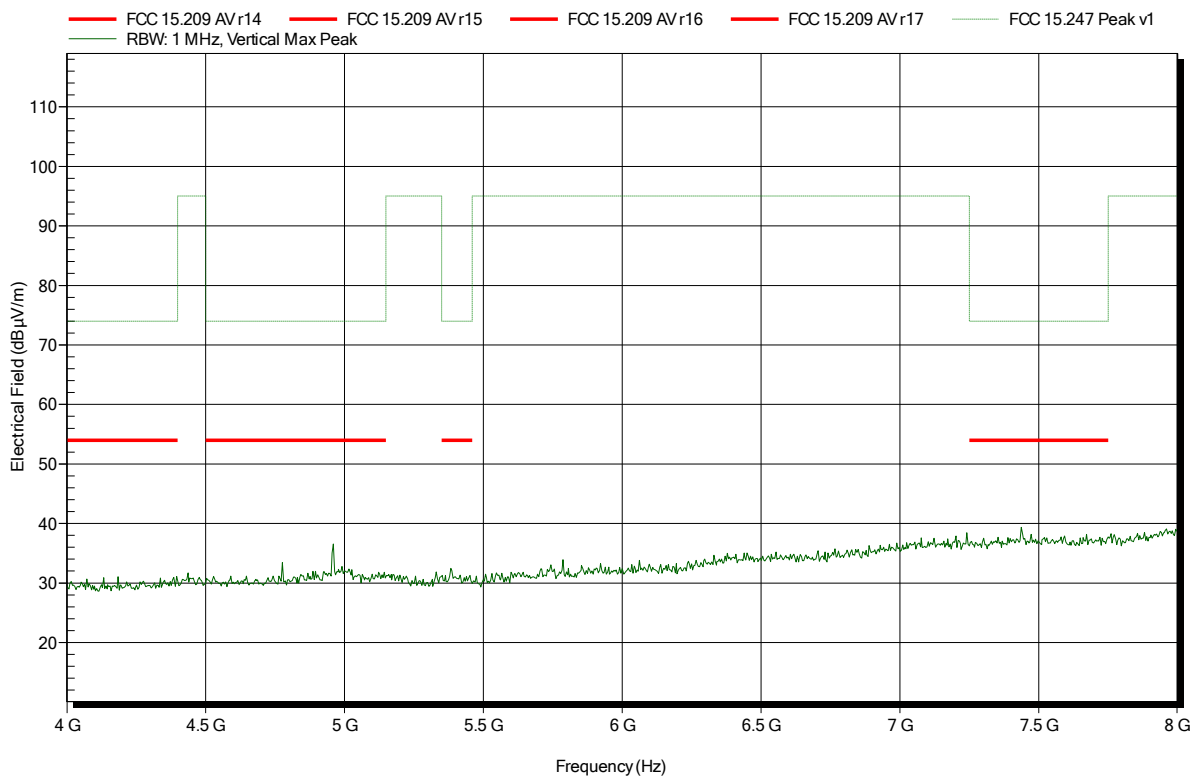
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.959 GHz	42.43 dBµV/m	74 dBµV/m	-31.57 dB	Pass

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 29

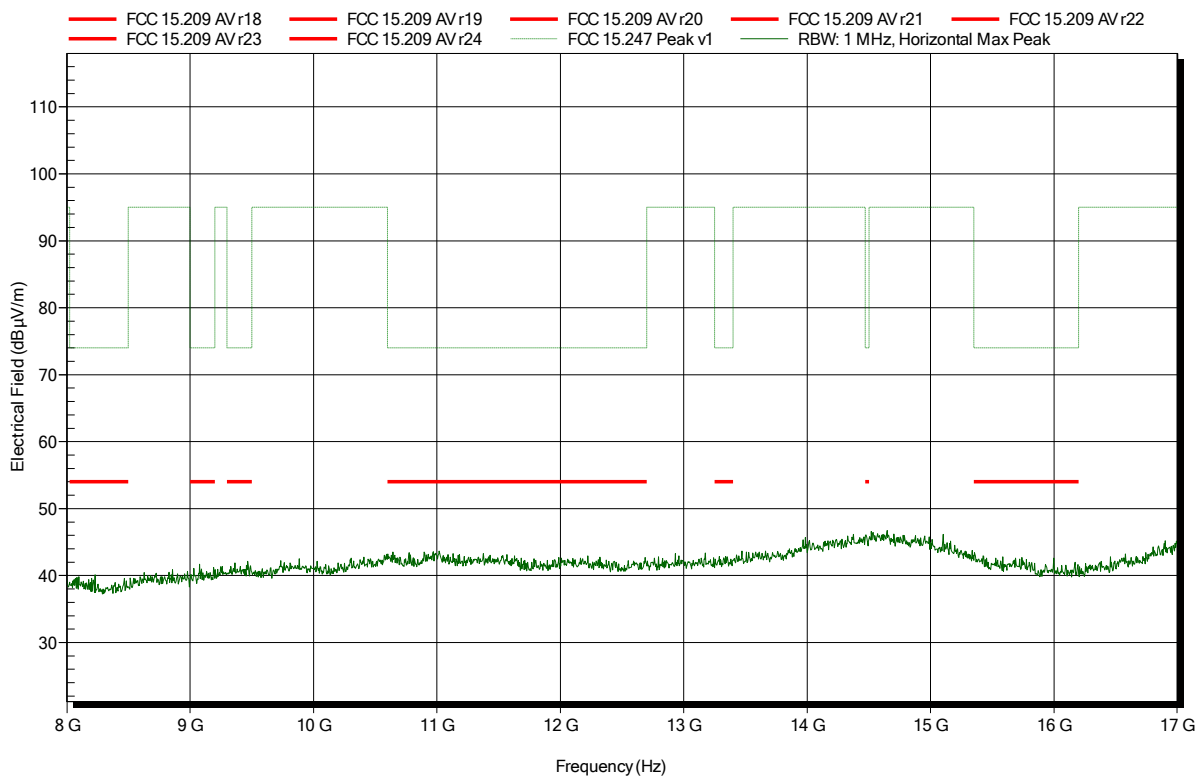


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 27



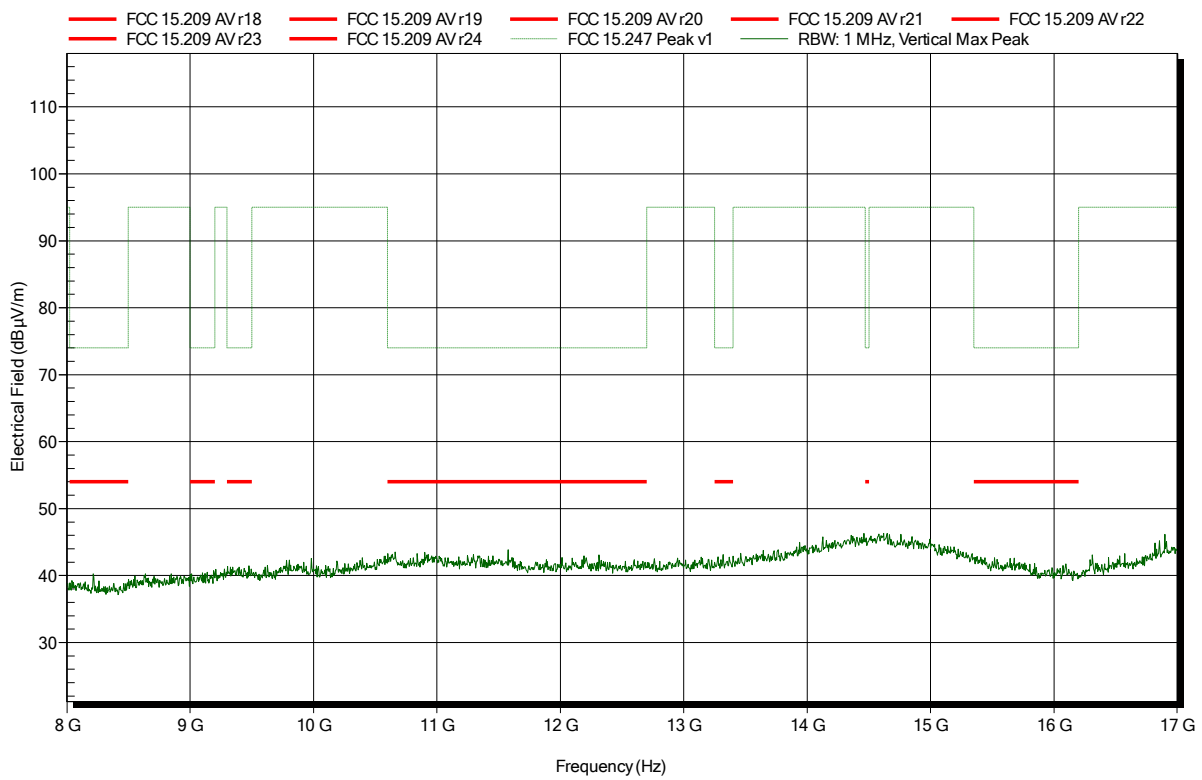


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 28

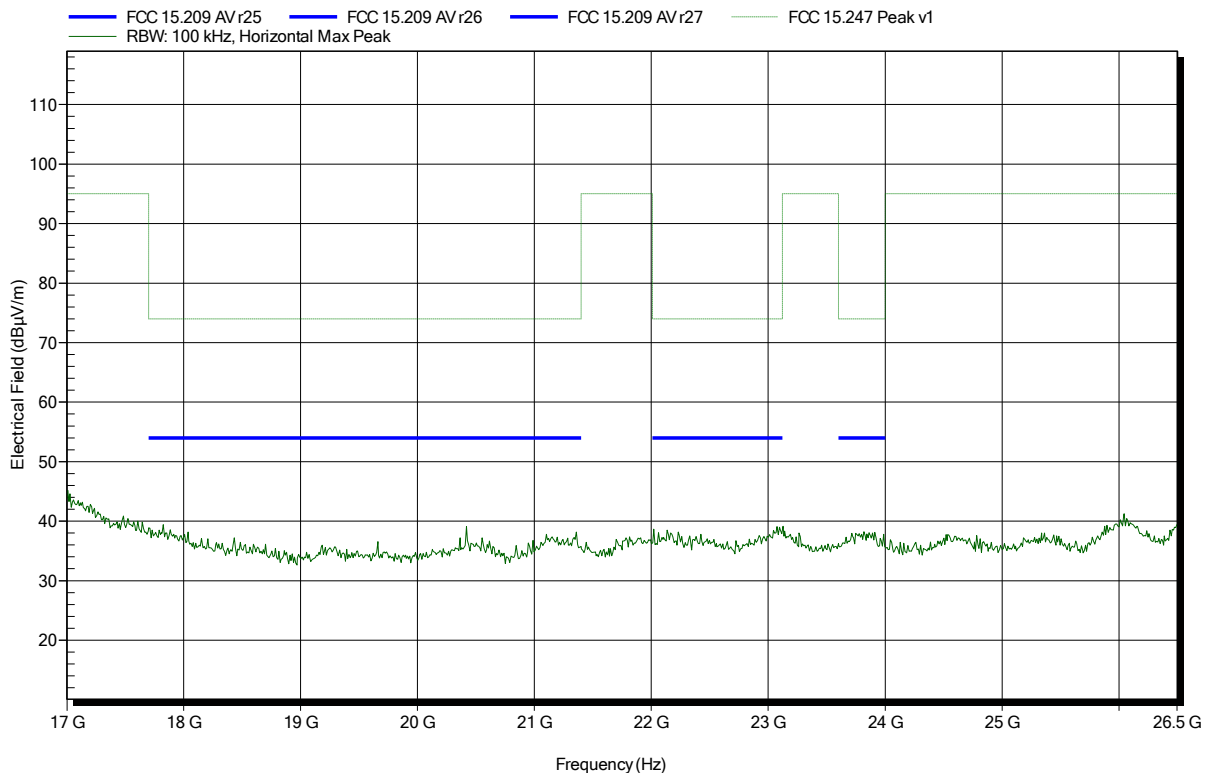


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name),  
 Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 33

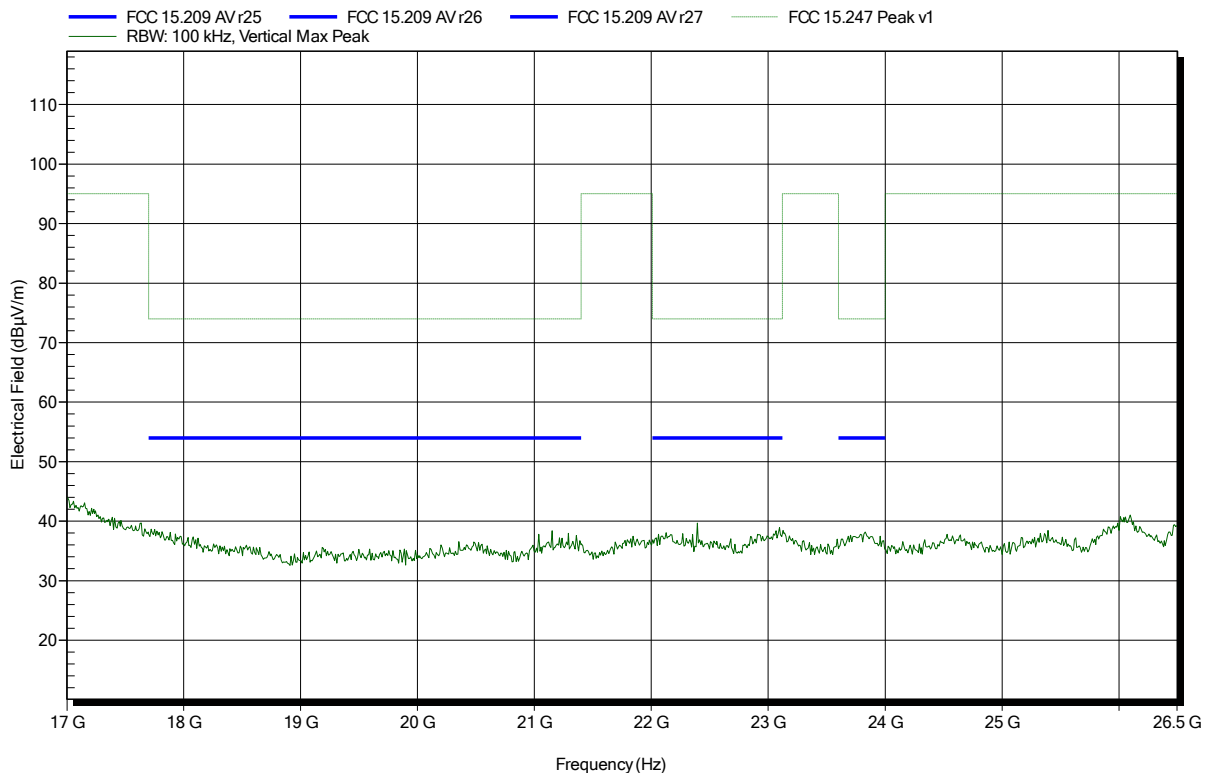


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Amplifier Research AT 4560 (old name) / ATH18G40 (new name), Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: TX; BT 3DH5 2480 MHz  
 Test Date: 2018-07-17  
 Note:

Index 34



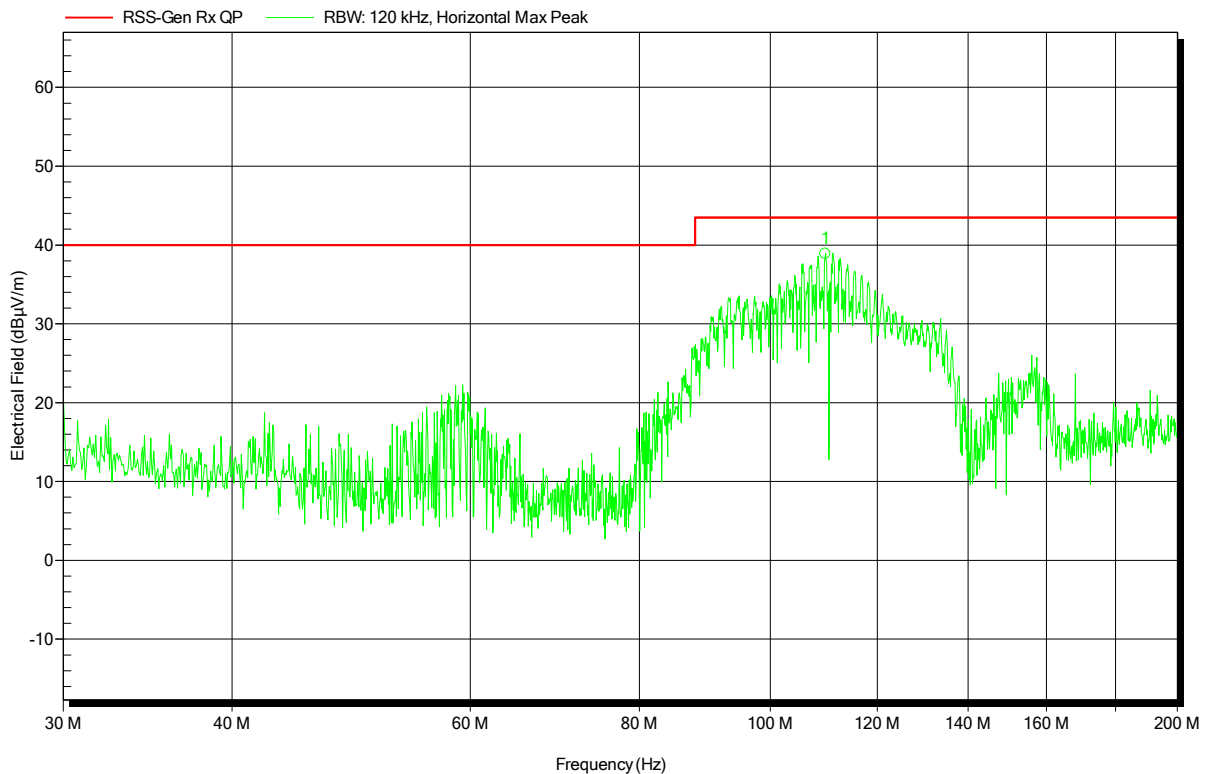
## ANNEX B Receiver spurious emissions

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-20  
 Note: MA182 TT0

Index 25



Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
109.8057 MHz	38.9 dBµV/m	43.5 dBµV/m	-4.6 dB	Pass	0 Degree	1 m

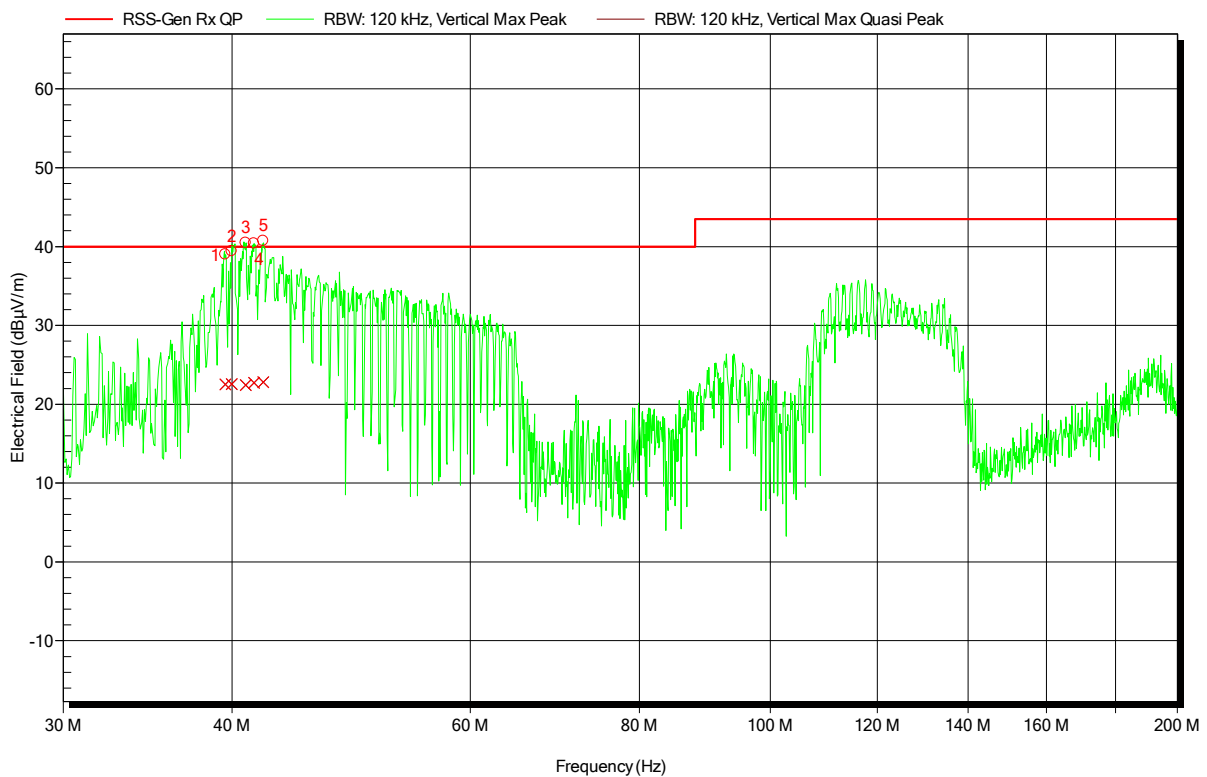
Frequency	Angle	Height
109.8057 MHz	0 Degree	1 m

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Mr. Suckow  
 Test Conditions: Tnom: 22°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HK 116, Vertical  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-20  
 Note: MA100 TT0

Index 26



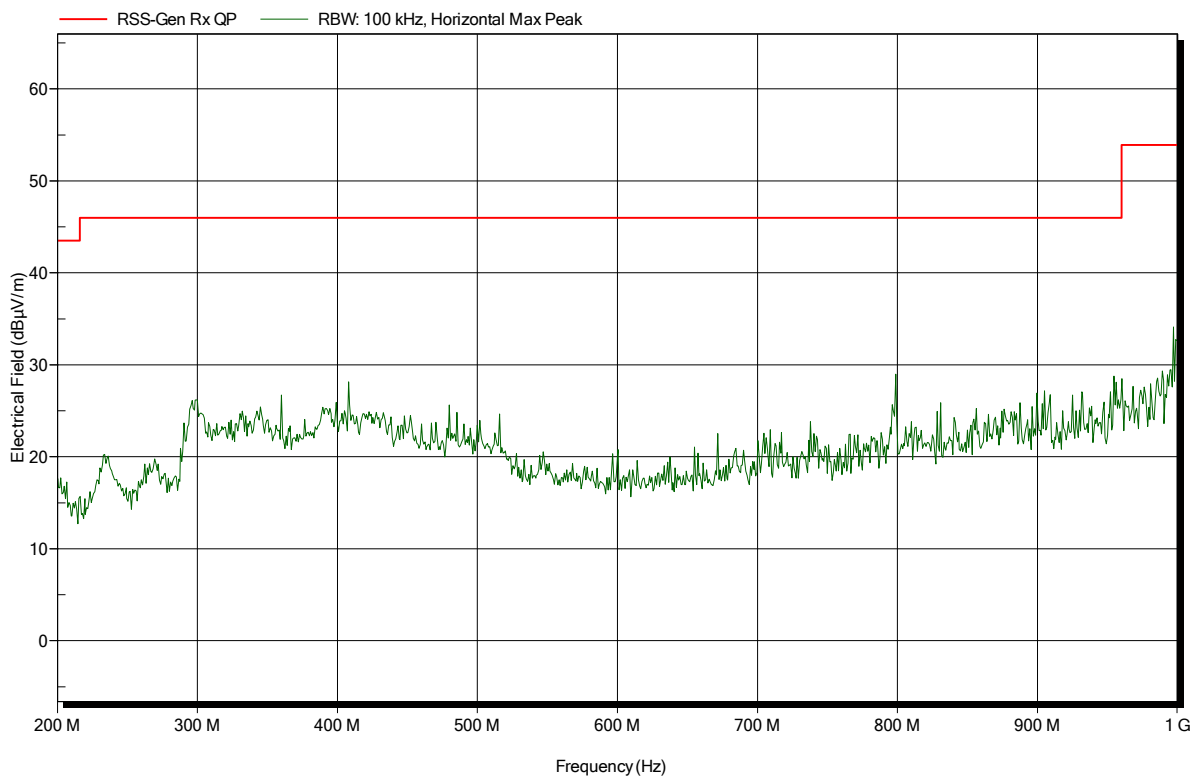
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Quasi-Peak Status	Angle	Height
39.5479 MHz	22.5 dBµV/m	40 dBµV/m	-17.51 dB	Pass	0 Degree	1 m
39.9682 MHz	22.6 dBµV/m	40 dBµV/m	-17.44 dB	Pass	0 Degree	1 m
40.935 MHz	22.4 dBµV/m	40 dBµV/m	-17.56 dB	Pass	0 Degree	1 m
41.5175 MHz	22.7 dBµV/m	40 dBµV/m	-17.29 dB	Pass	0 Degree	1 m
42.19 MHz	22.8 dBµV/m	40 dBµV/m	-17.19 dB	Pass	0 Degree	1 m

**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 46

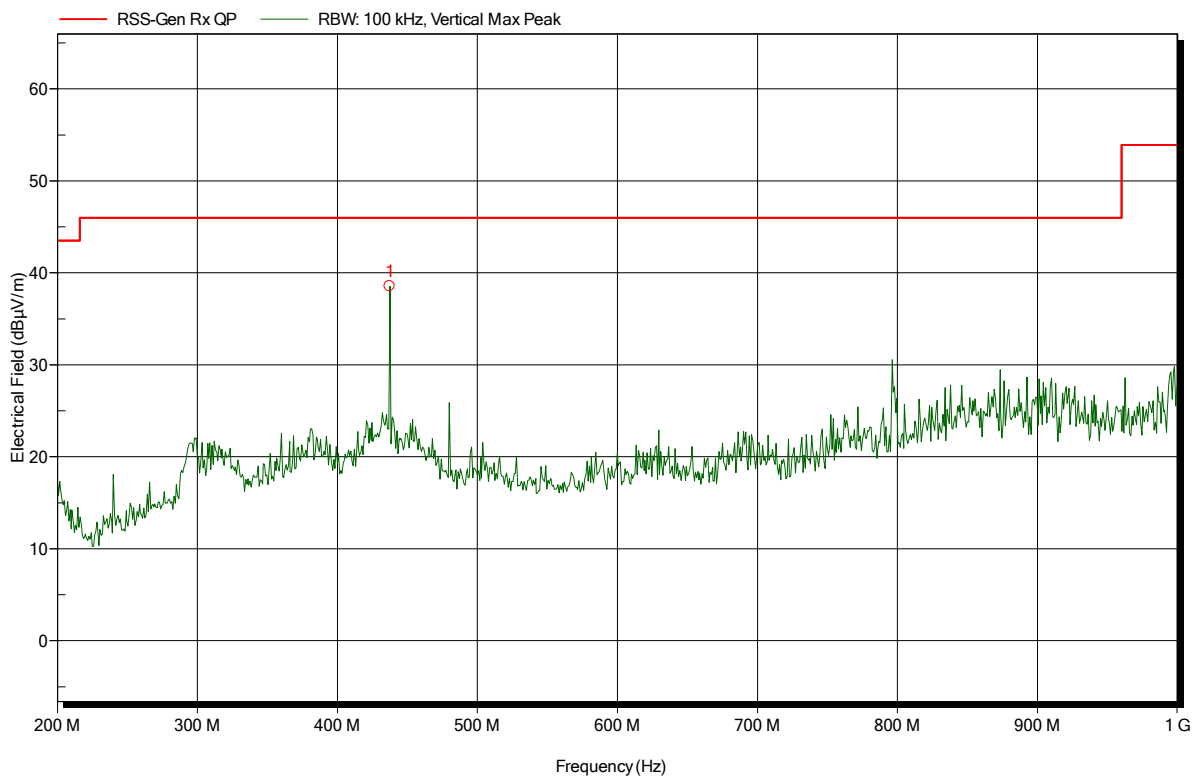


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Rohde & Schwarz HL 223, Vertical  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 47



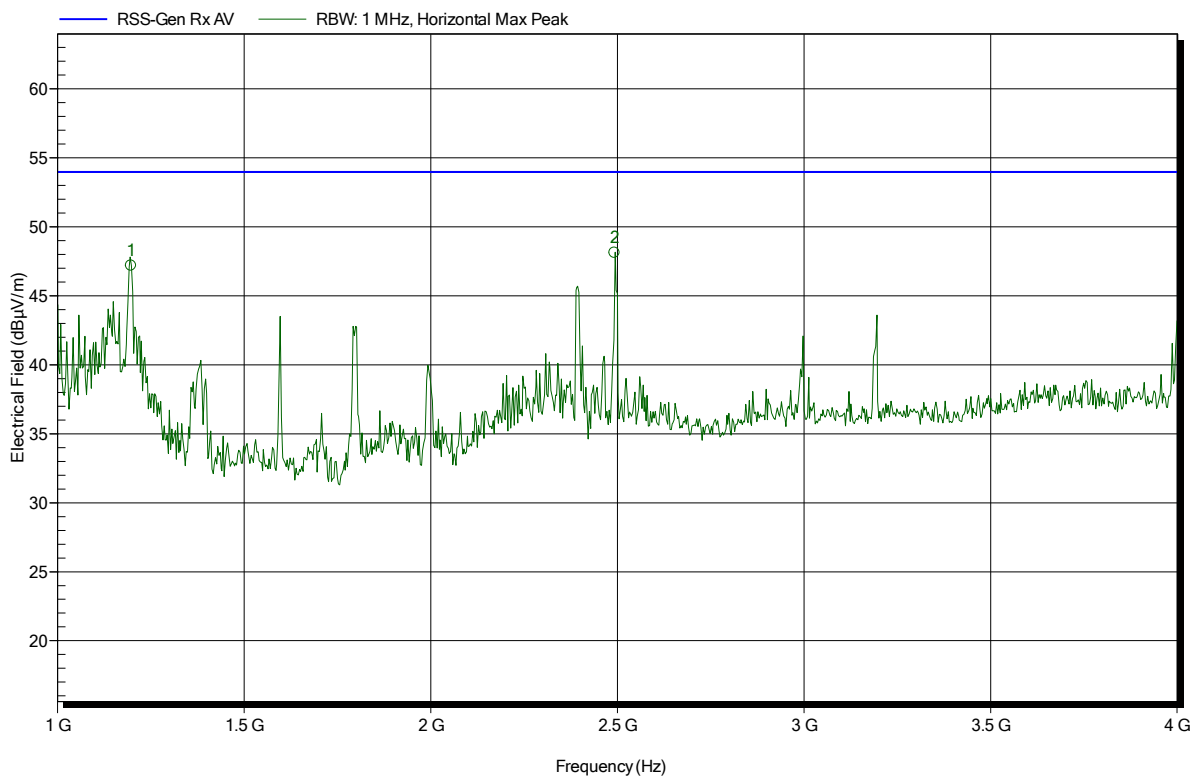
Frequency	Peak	Peak Limit	Peak Difference	Status	Angle	Height
437.363 MHz	38.55 dBµV/m	46 dBµV/m	-7.45 dB	Pass	202 Degree	1.2 m
Frequency		Angle			Height	
437.363 MHz		202 Degree			1.2 m	

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 48



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.198 GHz	47.18 dBµV/m	53.98 dBµV/m	-6.8 dB	Pass
2.493 GHz	48.13 dBµV/m	53.98 dBµV/m	-5.85 dB	Pass

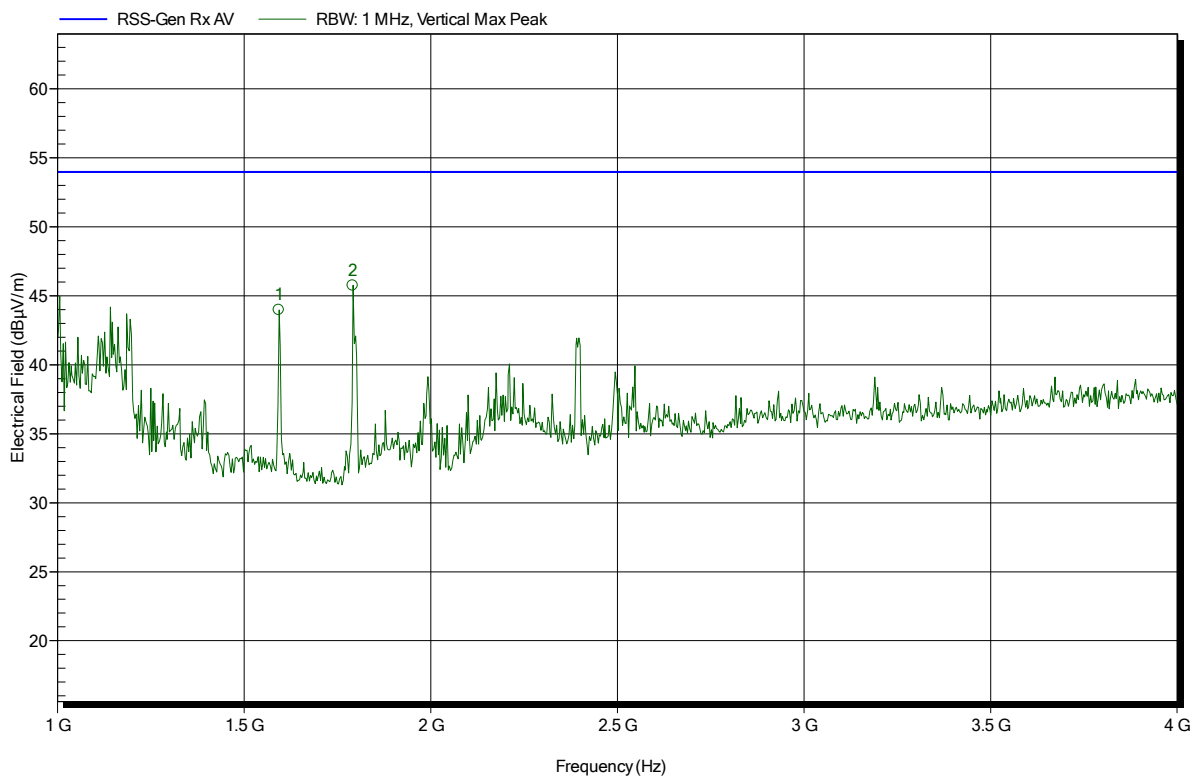


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 51



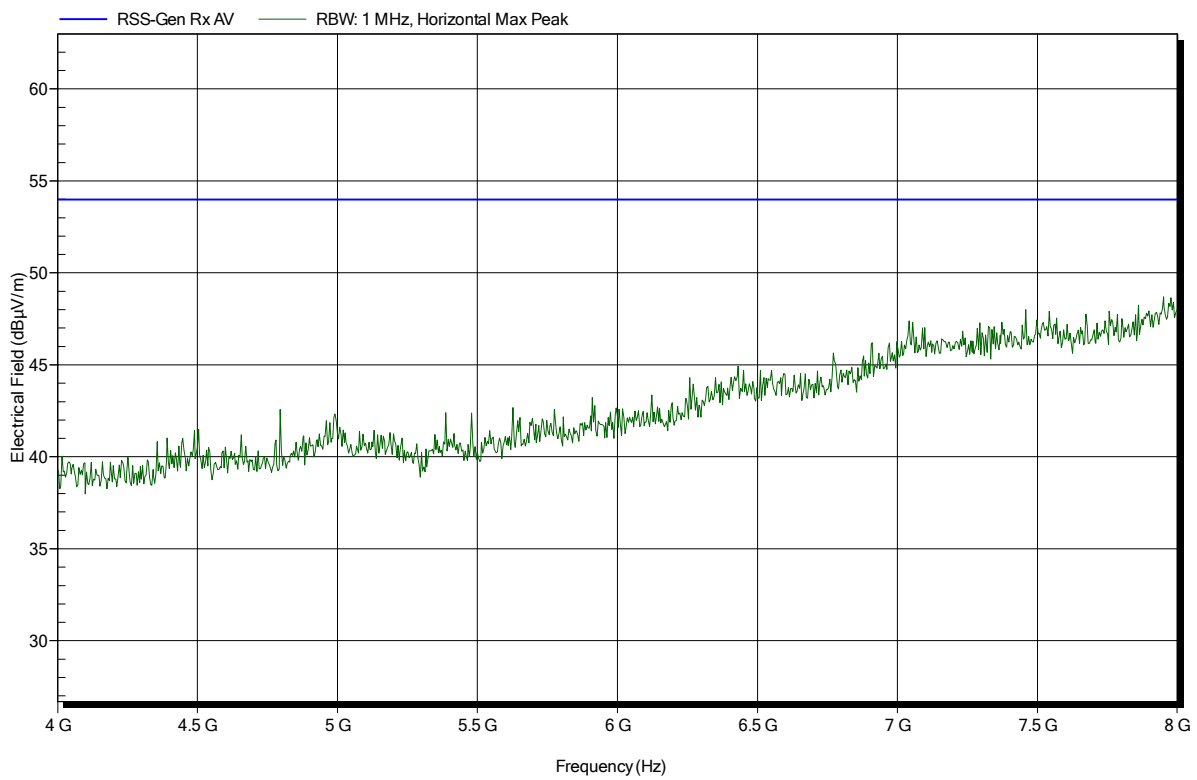
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.593 GHz	43.98 dBµV/m	53.98 dBµV/m	-10 dB	Pass
1.791 GHz	45.75 dBµV/m	53.98 dBµV/m	-8.23 dB	Pass

### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 49

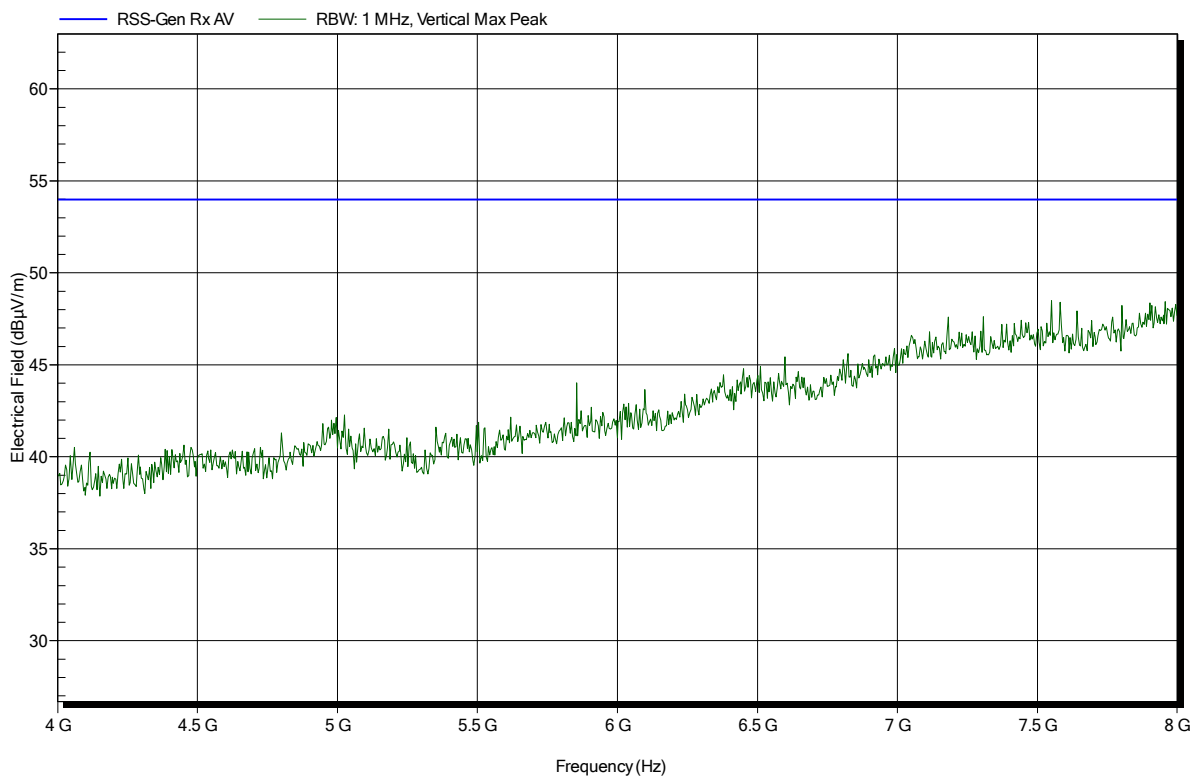


### Spurious emissions according to FCC 15.247

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 3 m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 50

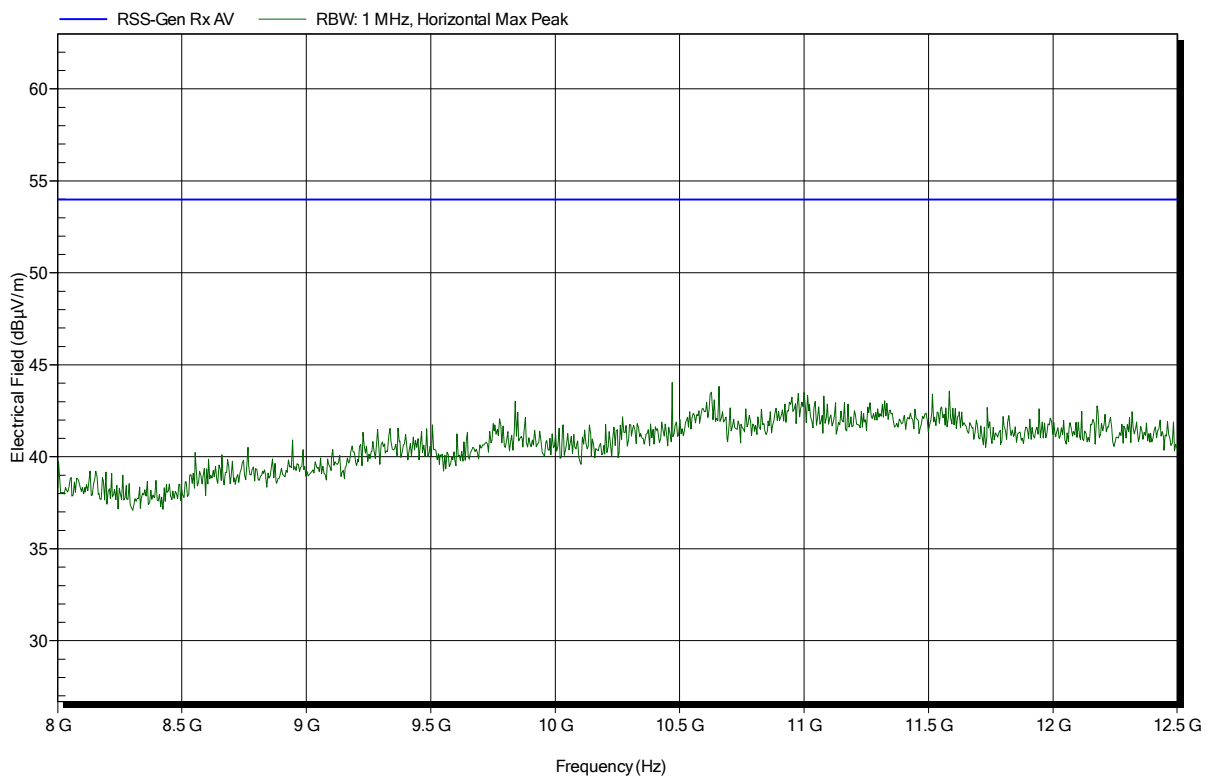


**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Horizontal  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 53



**Spurious emissions according to FCC 15.247**

Project number: G0M-1807-7540

Applicant: Leica Geosystems AG  
 EUT Name: TiWi BT/WLAN Evaluation Board  
 Model: TiWi BT/WLAN Evaluation Board  
 Test Site: Eurofins Product Service GmbH  
 Operator: Sebastian Suckow  
 Test Conditions: Tnom: 24°C, Vnom: 7.0 VDC  
 Antenna: Schwarzbeck BBHA 9120D, Vertical  
 Measurement distance: 1 m converted to 3m  
 Mode: RX; BT Scan Mode  
 Test Date: 2018-07-17  
 Note:

Index 52

