


FCC TEST REPORT FCC 47 CFR Part 15C Industry Canada RSS-210 Digital transmission systems operating within the 2400 – 2483.5 MHz band	
Report Reference No.	G0M-1406-3919-TFC247BL-V01
Testing Laboratory	Eurofins Product Service GmbH
Address.....	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	<div style="text-align: center;">   </div> <p style="text-align: center;"> A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A </p>
Applicant's name	Leica Geosystems AG
Address.....	Heinrich Wild Strasse 9435 Heerbrugg SWITZERLAND
Test specification:	
Standard	47 CFR Part 15C KDB Publication No. 558074 RSS-210, Issue 8, 2010-12 RSS-Gen, Issue 4, 2014-11 ANSI C63.4:2009
Test scope.....	complete Radio compliance test
Equipment under test (EUT):	
Product description	Field Controller Win EC7
Model No.	CS20
Additional Model(s)	None
Brand Name(s)	Leica Geosystems
Hardware version	V5.0
Firmware / Software version	None
	FCC-ID: RFD-CSNGB IC: 3177A-CSNGB
Test result	Passed

Possible test case verdicts:

- neither assessed nor tested: N/N
- required by standard but not appl. to test object.....: N/A
- required by standard but not tested.....: N/T
- not required by standard for the test object: N/R
- test object does meet the requirement.....: P (Pass)
- test object does not meet the requirement.....: F (Fail)

Testing:

Test Lab Temperature.....: 20 – 23 °C

Test Lab Humidity: 32 – 38 %

Date of receipt of test item: 2014-08-04

Date (s) of performance of tests: 2014-08-06 – 2015-02-27

Compiled by: Burkhard Pudell

Tested by (+ signature).....: Burkhard Pudell
B. Pudell

(Responsible for Test)

Approved by (+ signature): Christian Weber
C. Weber

Date of issue: 2015-04-29

Total number of pages: 87

General remarks:

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

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

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

Additional comments:

Version History

Version	Issue Date	Remarks	Revised by
01	2015-04-29	Initial Release	

REPORT INDEX

1	EQUIPMENT (TEST ITEM) DESCRIPTION	5
1.1	Photos – Equipment External	6
1.2	Photos – Equipment internal	7
1.3	Photos – Test setup	9
1.4	Supporting Equipment Used During Testing	10
1.5	Test Modes	11
1.6	Test Equipment Used During Testing	12
1.7	Sample emission level calculation	14
2	RESULT SUMMARY	15
3	TEST CONDITIONS AND RESULTS	16
3.1	Test Conditions and Results – Occupied Bandwidth	16
3.2	Test Conditions and Results – 6 dB Bandwidth	20
3.3	Test Conditions and Results – Maximum peak conducted power	24
3.4	Test Conditions and Results – Power spectral density	25
3.5	Test Conditions and Results – AC power line conducted emissions	26
3.6	Test Conditions and Results – Band edge compliance	29
3.7	Test Conditions and Results – Conducted spurious emissions	32
3.9	Test Conditions and Results – Transmitter radiated emissions	36
3.10	Test Conditions and Results – Receiver radiated emissions	38
ANNEX A	Transmitter radiated spurious emissions	40
ANNEX B	Receiver radiated spurious emissions	80

1 Equipment (Test item) Description

Description	Field Controller Win EC7	
Model	CS20	
Additional Model(s)	None	
Brand Name(s)	Leica Geosystems	
Serial number	None	
Hardware version	V5.0	
Software / Firmware version	None	
FCC-ID	RFD-CSNGB	
IC	3177A-CSNGB	
Equipment type	End product	
Radio type	Transceiver	
Radio technology	Bluetooth 4.0 Low Energy	
Operating frequency range	2402 - 2480 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F _{LOW}	2402 MHz
	F _{MID}	2440 MHz
	F _{HIGH}	2480 MHz
Spreading	Frequency Hopping	
Modulations	GFSK	
Number of channels	40	
Channel spacing	2MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	W3008C
	Manufacturer	Pulse
	Gain	+2.2 dBi (manufacturer declaration)
Manufacturer	Leica Geosystems AG Heinrich Wild Strasse 9435 Heerbrugg SWITZERLAND	
Power supply	V _{NOM}	11.1V DC
	V _{MIN}	N/R
	V _{MAX}	N/R
AC/DC-Adaptor	Model	AEL40US15
	Vendor	XP Power
	Input	100 - 240 V AC
	Output	15 V DC

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	Laptop	Lenovo	T540p	Test mode software
<p>*Note: Use the following abbreviations:</p> <p>AE : Auxiliary/Associated Equipment, or</p> <p>SIM : Simulator (Not Subjected to Test)</p> <p>CABL : Connecting cables</p>				

1.5 Test Modes

Mode #	Description	
Transmit	General conditions:	EUT powered by internal battery
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = GFSK Data rate = 1 Mbps Bandwidth = 2 MHz Duty cycle = 100 % Power level = Maximum
Receive	General conditions:	EUT powered by internal battery
	Radio conditions:	Mode = standalone receive (scan mode) Spreading = On Modulation = GFSK
AC-Powerline	General conditions:	EUT powered by dedicated AC/DC adaptor
	Radio conditions:	Mode = Transmit Spreading = On

1.6 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2014.1.15

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ26	EF00242	2014-03	2015-03

6dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2014-02	2015-02

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2014-02	2015-02

Power spectral density					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2014-02	2015-02

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2014-02	2015-02

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2014-02	2015-02

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	-	-
Spectrum Analyzer	R&S	FSIQ26	EF00242	2014-03	2015-03
Biconical Antenna	R&S	HK 116	EF00186	2014-02	2016-02
LPD Antenna	R&S	HL 223	EF00202	2014-02	2016-02
LPD Antenna	R&S	HL 025	EF00014	2014-01	2016-01

AC powerline conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2014-11	2016-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2014-10	2015-10

1.7 Sample emission level calculation

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

Reading:

This is the reading obtained on the spectrum analyzer in dB μ V. 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 dB μ V/m). The FCC limits are given in units of μ V/m. The following formula is used to convert the units of μ V/m to dB μ V/m:

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

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:


$$\begin{array}{rclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{ dB} \end{array}$$

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-210				
Product Specific Standard Section	Requirement – Test	Reference Method	Result	Remarks
RSS-Gen 6.6	Occupied Bandwidth	RSS-Gen 6.6	N/R	Informational only
FCC § 15.247(a)(2) IC RSS-210 § A8.2	6dB Bandwidth	KDB Publication No. 558074	PASS	
FCC § 15.247(b)(3) IC RSS-210 § A8.4	Maximum peak conducted power	KDB Publication No. 558074	PASS	
FCC § 15.247(e) IC RSS-210 § A8.2	Power spectral density	KDB Publication No. 558074	PASS	
47 CFR 15.207 RSS-Gen 7.2.4	AC power line conducted emissions	KDB Publication No. 558074 / ANSI C63.4	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Band edge compliance	KDB Publication No. 558074	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Conducted spurious emissions	KDB Publication No. 558074	PASS	
FCC § 15.247(d) FCC § 15.209 IC RSS-210 A8.5 IC RSS-Gen 6.13	Transmitter radiated spurious emissions	KDB Publication No. 558074 / ANSI C 63.4	PASS	
IC RSS-Gen 7.1	Receiver radiated spurious emissions	ANSI C 63.4	PASS	
Remarks:				

3 Test Conditions and Results

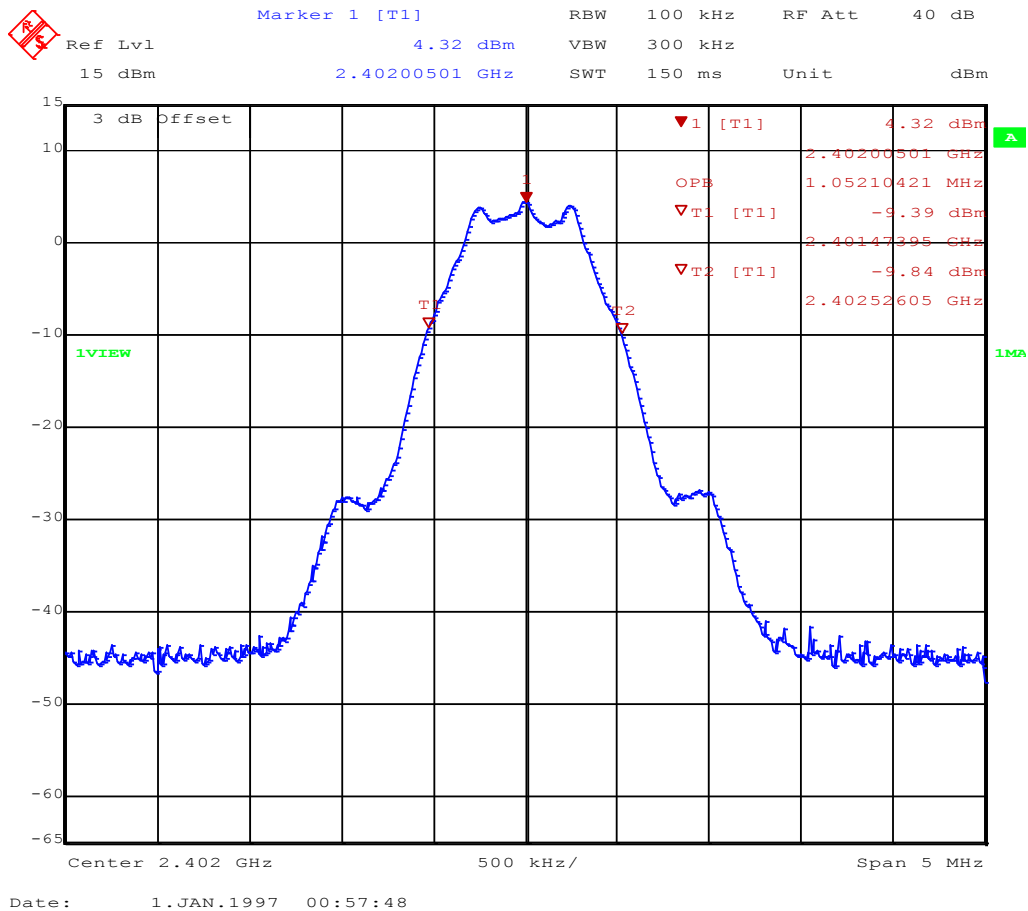
3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to IC RSS-Gen		Verdict: PASS	
Test according to measurement reference	Reference Method		
	RSS-Gen 6.6		
Test frequency range	Tested frequencies		
	$F_{LOW} / F_{MID} / F_{HIGH}$		
Limits			
None (Informational only)			
Test setup			
			
Test procedure			
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set to at least twice the emission spectrum 3. Resolution bandwidth set to 1 % of span 4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function 			
Test results			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	2402	Transmit	1052
F_{MID}	2440	Transmit	1062
F_{HIGH}	2480	Transmit	1062
Comments:			

Occupied Bandwidth – F_{Low}
Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1406-3919

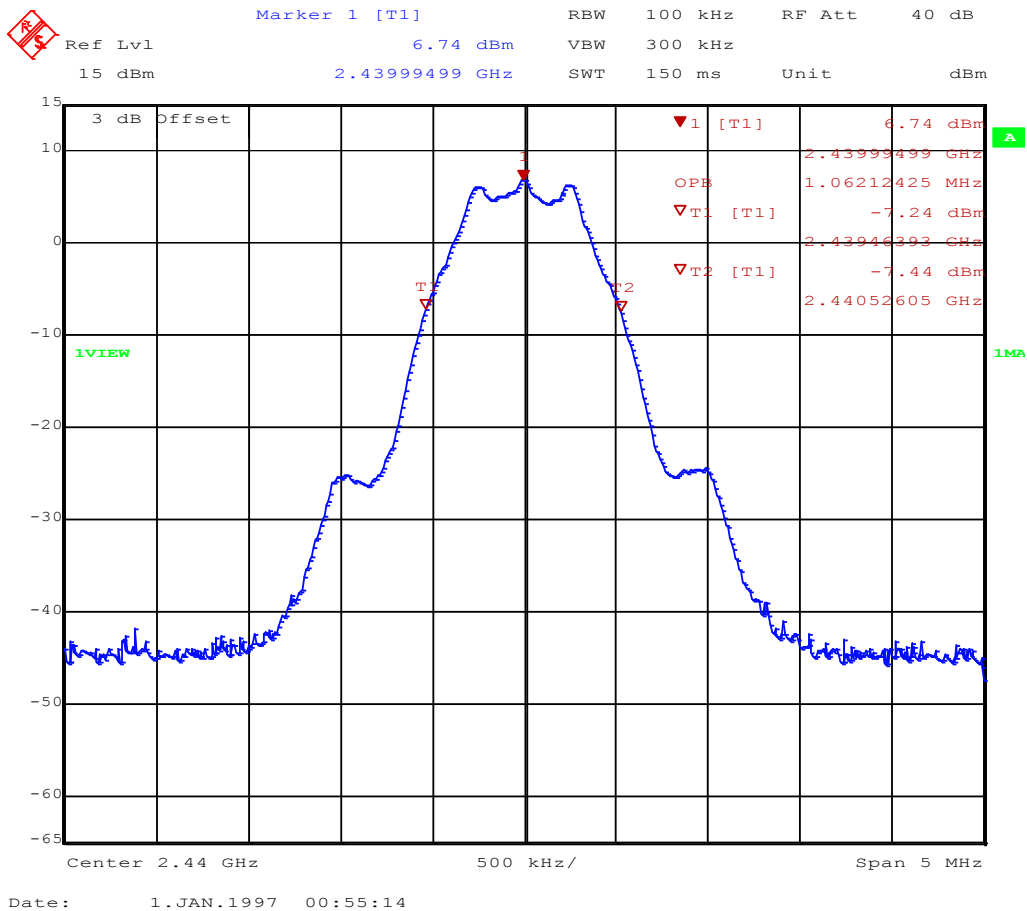
Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom / Vnom
 Mode: Tx, BT-BLE, CH: 0, 2402 MHz, GFSK
 Test Date: 2015-02-27
 Verdict: NONE (INFORMATION ONLY)
 Note 1: A spectrum analyzer with an integrated 99% power bandwidth function is used
 Note 2: OBW= 1.052 MHz



Occupied Bandwidth – F_{MID}
Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1406-3919

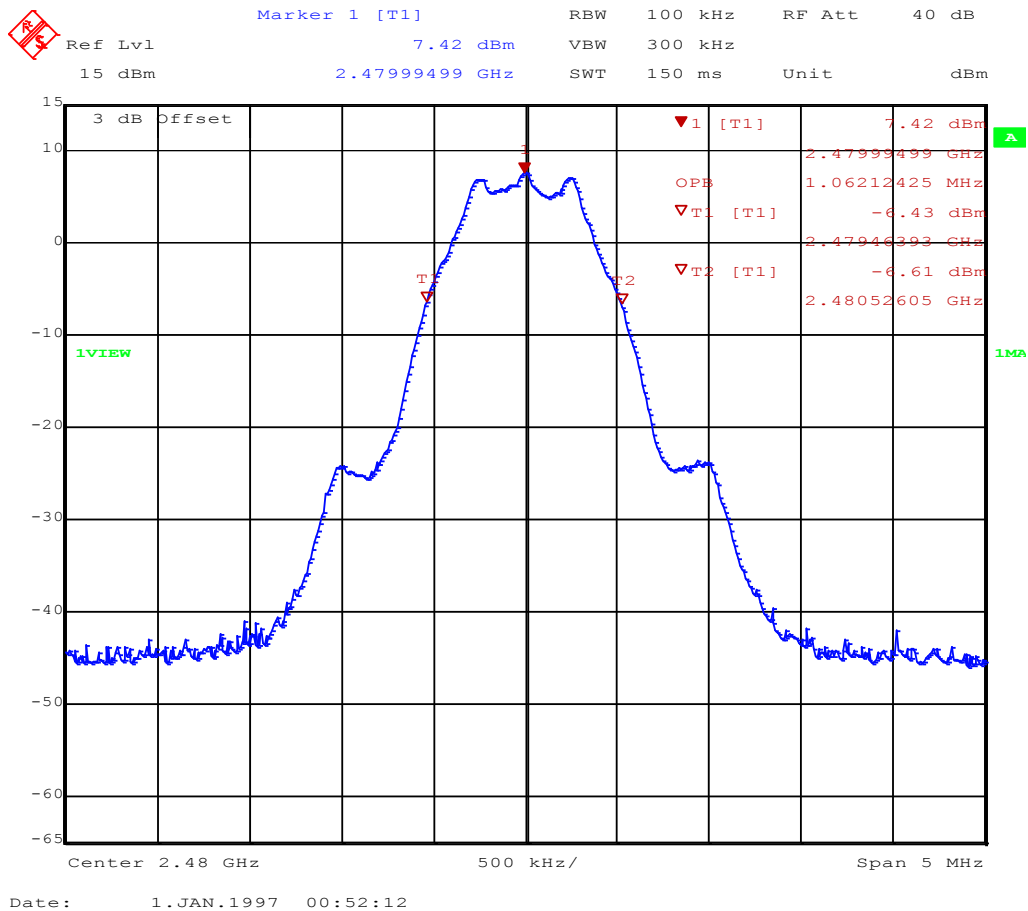
Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom / Vnom
 Mode: Tx, BT-BLE, CH: 19, 2440 MHz, GFSK
 Test Date: 2015-02-27
 Verdict: NONE (INFORMATION ONLY)
 Note 1: A spectrum analyzer with an integrated 99% power bandwidth function is used
 Note 2: OBW= 1.062 MHz




Occupied Bandwidth – F_{HIGH}
Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Burkhard Pudell
 Test Conditions: Tnom / Vnom
 Mode: Tx, BT-BLE, CH: 39, 2480 MHz, GFSK
 Test Date: 2015-02-27
 Verdict: NONE (INFORMATION ONLY)
 Note 1: A spectrum analyzer with an integrated 99% power bandwidth function is used
 Note 2: OBW= 1.062 MHz



3.2 Test Conditions and Results – 6 dB Bandwidth

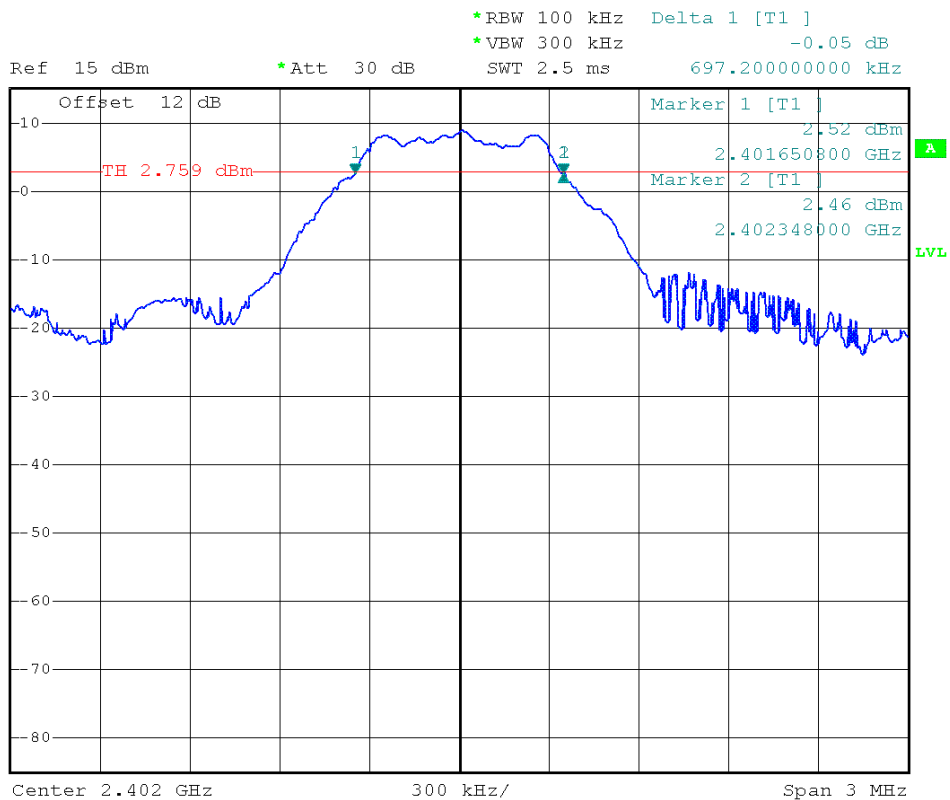
6dB Bandwidth acc. to FCC 15.247 / IC RSS-210				Verdict: PASS	
EUT requirement rule parts and clause	Reference				
	FCC 15.247(a)(2) / IC RSS-210 A8.2				
Test according to measurement reference	Reference Method				
	FCC KDB Publication No. 558074				
Test frequency range	Tested frequencies				
	$F_{LOW} / F_{MID} / F_{HIGH}$				
Limits					
Limit					
≥ 500kHz					
Test setup					
					
Test procedure					
<ol style="list-style-type: none"> 1. EUT set to test mode 2. Span set to at least twice the emission spectrum 3. Detector set to peak and max hold and RBW is set to 100 kHz 4. Envelope peak value of emission spectrum is selected 5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak 6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak 7. 6 dB Bandwidth is determined by marker frequency separation 					
Test results					
Channel	Frequency [MHz]	Mode	6 dB Bandwidth [kHz]	Limit [kHz]	Result
F_{LOW}	2402	Transmit	697.2	500	PASS
F_{MID}	2442	Transmit	688.8	500	PASS
F_{HIGH}	2480	Transmit	710.4	500	PASS
Comments:					

6 dB Bandwidth – F_{Low}

Minimum 6 dB Bandwidth acc. to FCC 15.247

Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, 2402 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: Procedure 8.1 DTS (558074 D01 Meas Guidance)
 Note 2: Minimum 6 dB Bandwidth conducted

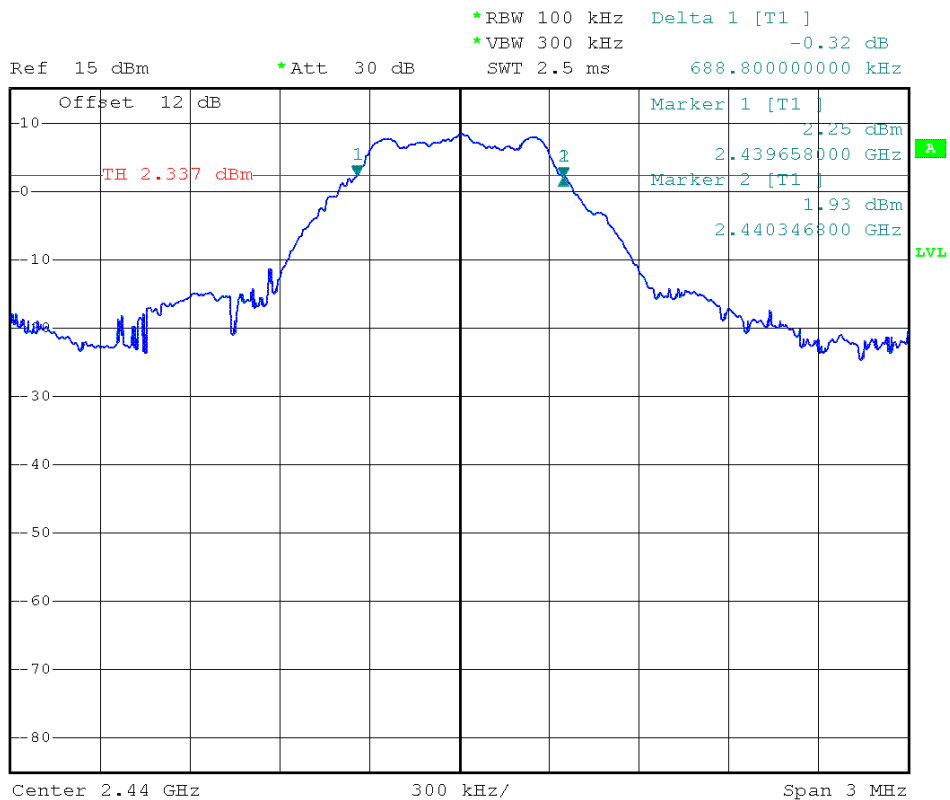


Comment: 6 dB bandwidth: 697.2 KHz > 500 KHz; verdict: PASS
 Date: 26.JAN.2015 13:17:30

6 dB Bandwidth – F_{MID}
Minimum 6 dB Bandwidth acc. to FCC 15.247

Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, 2440 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: Procedure 8.1 DTS (558074 D01 Meas Guidance)
 Note 2: Minimum 6 dB Bandwidth conducted

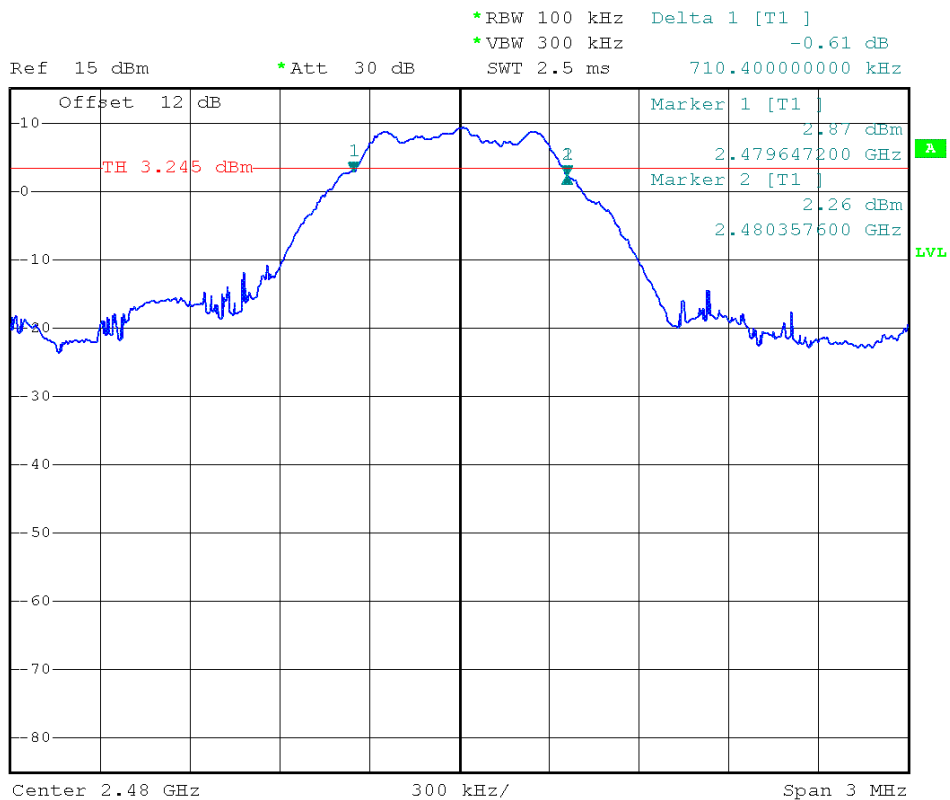


Comment: 6 dB bandwidth: 688.8 KHz > 500 KHz; verdict: PASS
 Date: 26.JAN.2015 13:18:41

6 dB Bandwidth – F_{HIGH}
Minimum 6 dB Bandwidth acc. to FCC 15.247


Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, 2480 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: Procedure 8.1 DTS (558074 D01 Meas Guidance)
 Note 2: Minimum 6 dB Bandwidth conducted




Comment: 6 dB bandwidth: 710.4 KHz > 500 KHz; verdict: PASS
 Date: 26.JAN.2015 13:19:52

3.3 Test Conditions and Results – Maximum peak conducted power

Maximum peak conducted power acc. to FCC 15.247 / IC RSS-210						Verdict: PASS	
EUT requirement rule parts and clause			Reference				
			FCC 15.247(b)(3) / IC RSS-210 A8.4				
Test according to measurement reference			Reference Method				
			FCC KDB Publication No. 558074				
Test frequency range			Tested frequencies				
			$F_{\text{LOW}} / F_{\text{MID}} / F_{\text{HIGH}}$				
Measurement mode			Peak				
Maximum antenna gain			2.2 dBi \Rightarrow Limit correction = 0 dB				
Limits							
1 W (30 dBm)							
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.							
Test setup							
							
Test procedure							
1. EUT set to test mode (Communication tester is used if needed) 2. Center frequency set to test channel center frequency 3. Span set to twice the 20 dB bandwidth and detector to peak and max hold 4. Resolution bandwidth is set to 3 MHz 5. Peak conducted power is determined from peak of spectrum envelope							
Test results							
Channel	Frequency [MHz]	Voltage	Mode	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]
F_{LOW}	2402	V_{nom}	Transmit	9.3	0.009	30	-20.70
F_{MID}	2442	V_{nom}	Transmit	8.7	0.007	30	-21.30
F_{HIGH}	2480	V_{nom}	Transmit	9.5	0.009	30	-20.50
Comment:							

3.4 Test Conditions and Results – Power spectral density

Power spectral density acc. to FCC 15.247 / IC RSS-210				Verdict: PASS		
EUT requirement rule parts and clause	Reference					
	FCC 15.247(e) / IC RSS-210 A8.2					
Test according to measurement reference	Reference Method					
	FCC KDB Publication No. 558074					
Test frequency range	Tested frequencies					
	$F_{LOW} / F_{MID} / F_{HIGH}$					
Measurement mode	Peak					
Limits						
8 dBm / 3 kHz						
Test setup						
						
Test procedure						
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Center frequency set to test channel center frequency 3. Span is set large enough to capture maximum emissions in passband, RBW is set to 3kHz 4. Peak power density is determined from peak emission of envelope 						
Test results						
Channel	Frequency [MHz]	Test mode	Peak frequency [MHz]	Peak power density [dBm]	Limit [dBm/3kHz]	Margin [dB]
F_{LOW}	2402	Transmit	2401.97	-0.86	8.0	-08.86
F_{MID}	2442	Transmit	2440.00	-0.93	8.0	-08.93
F_{HIGH}	2480	Transmit	2479.90	-0.55	8.0	-08.55
Comments: Measurement was performed with RBW = 10 kHz						

3.5 Test Conditions and Results – AC power line conducted emissions

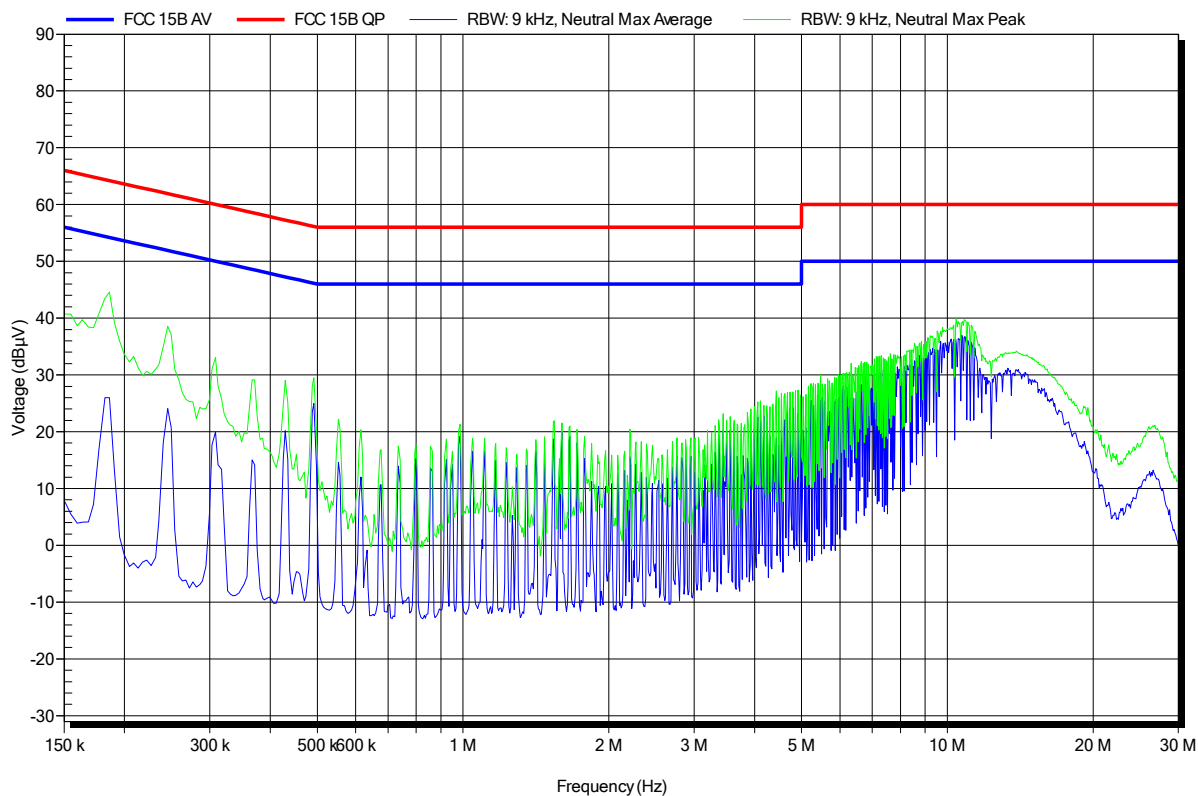
Power line conducted emissions acc. to FCC 47 CFR 15.207 / IC RSS-Gen		Verdict: PASS		
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Points of Application	Application Interface			
AC Mains	LISN			
EUT test mode	AC power line			
Limits and results				
Frequency [MHz]	Quasi-Peak [dB μ V]	Result	Average [dB μ V]	Result
0.15 to 5	66 to 56*	PASS	56 to 46*	PASS
0.5 to 5	56	PASS	46	PASS
5 to 30	60	PASS	50	PASS
Comments: * Limit decreases linearly with the logarithm of the frequency.				

Conducted Emissions
EMI voltage test in the ac-mains according to FCC Part 15b

Project number: G0M-1406-3919

Manufacturer: Leica Geosystems AG
 EUT Name: Feld- Controller
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 10.8VDC via AC/DC Adapter
 LISN: ESH2-Z5 N
 Mode: Basic, with power supply, WLAN link to AP, BT link to GPS Antenna
 Test Date: 2014-08-06
 Note:

Index 13

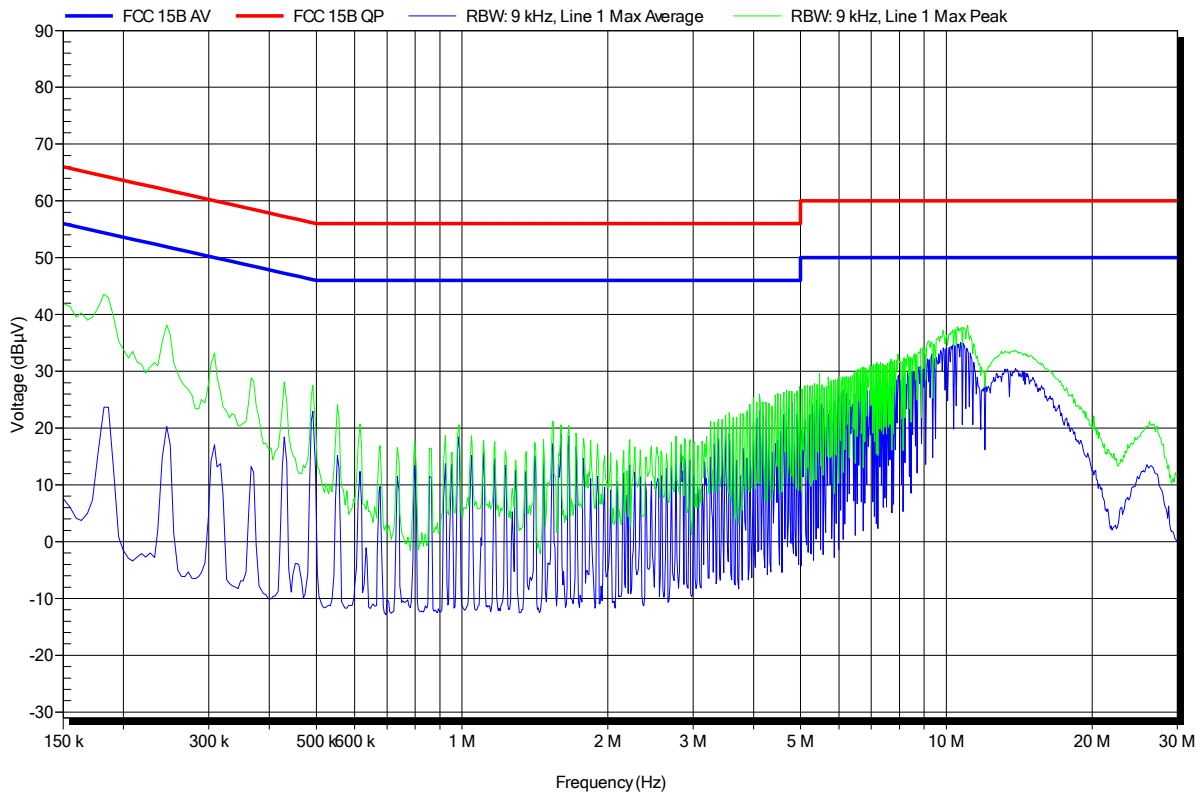


Conducted Emissions
EMI voltage test in the ac-mains according to FCC Part 15b


Project number: G0M-1406-3919

Manufacturer: Leica Geosystems AG
 EUT Name: Feld- Controller
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Zunke
 Test Conditions: Tnom: 25°C, Unom: 10.8VDC via AC/DC Adapter
 LISN: ESH2-Z5 L
 Mode: Basic, with power supply, WLAN link to AP, BT link to GPS Antenna
 Test Date: 2014-08-06
 Note:

Index 14



3.6 Test Conditions and Results – Band edge compliance

Band-edge compliance acc. to FCC 15.247 / IC RSS-210				Verdict: PASS	
EUT requirement rule parts and clause	Reference				
	FCC 15.247(d) / IC RSS-210 A8.5				
Test according to measurement reference	Reference Method				
	FCC KDB Publication No. 558074				
Test frequency range	Tested frequencies				
	F_{LOW} / F_{HIGH}				
Measurement mode	Peak				
Limits					
Limit			Condition		
≤ -20 dB / 100 kHz			Peak power measurement detector = Peak		
≤ -30 dB / 100 kHz			Peak power measurement detector = RMS		
Test setup					
					
Test procedure					
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span set around lower band edge and detector is set to peak and max hold 3. Resolution bandwidth is set to 100 kHz 4. Markers are set to peak emission levels within frequency band and outside frequency band 5. Band edge attenuation is determined from level difference 					
Test results					
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]
F_{LOW}	2402	Transmit	-24.21	-20	-04.21
F_{HIGH}	2480	Transmit	-31.63	-20	-11.63
Comments:					

Band-edge compliance - F_{LOW}

Band-edge compliance acc. to FCC 15.247

Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, GFSK, 2402 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: 20 dB down method (558074 D01 Meas Guidance)
 Note 2: lower Band-edge, conducted measurement



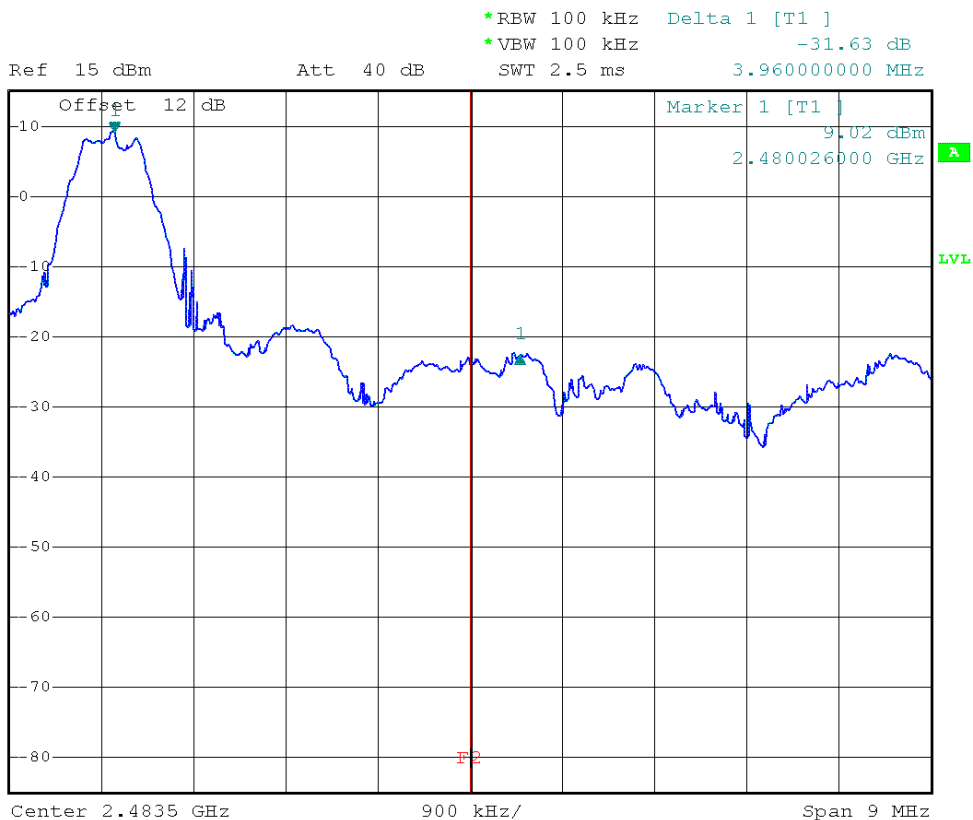
Date: 26.JAN.2015 13:41:05

Band-edge compliance – F_{HIGH}

Band-edge compliance acc. to FCC 15.247


Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, GFSK, 2480 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: 20 dB down method (558074 D01 Meas Guidance)
 Note 2: upper Band-edge, conducted measurement



Date: 26.JAN.2015 13:49:04

3.7 Test Conditions and Results – Conducted spurious emissions

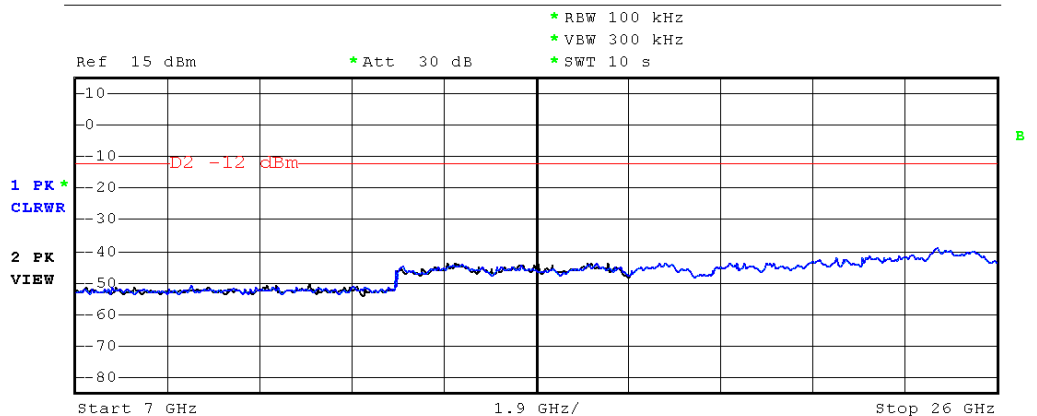
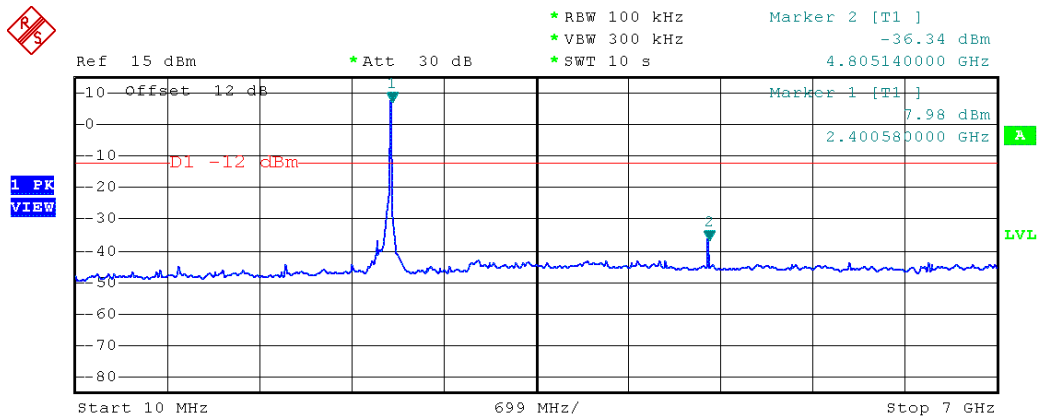
Conducted spurious emissions acc. to FCC 15.247 / IC RSS-210						Verdict: PASS	
EUT requirement rule parts and clause			Reference				
			FCC 15.247(d) / IC RSS-210 A8.5				
Test according to measurement reference			Reference Method				
			FCC KDB Publication No. 558074				
Test frequency range			Tested frequencies				
			10 MHz – 10 th Harmonic				
Measurement mode			Peak				
Limits							
Limit				Condition			
≤ -20 dB / 100 kHz				Peak power measurement detector = Peak			
≤ -30 dB /100 kHz				Peak power measurement detector = RMS			
Test setup							
							
Test procedure							
<ol style="list-style-type: none"> 1. EUT set to test mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth is set to 100 kHz and detector to peak and max hold 4. Markers are set to peak emission levels within frequency band 5. Emission level is determined by second marker on emission peak 6. Attenuation is determined from level difference 							
Test results							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]
F _{LOW}	2402	Transmit	4805	-36.34	8.0	-12.0	-24.34
F _{MID}	2440	Transmit	4889	-36.91	7.5	-12.5	-24.41
F _{HIGH}	2480	Transmit	4959	-37.21	7.8	-12.2	-25.01
Comments:							

Conducted spurious emissions – F_{Low}

Spurious Emissions acc. to FCC 15.247

Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, 2402 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: Spurious in non-restricted frequency bands (558074 D01 Meas Guidance)
 Note 2: conducted measurement



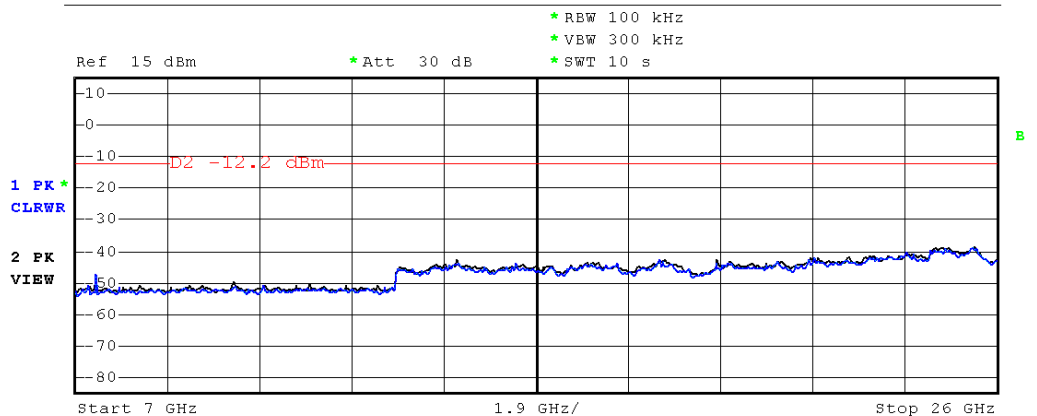
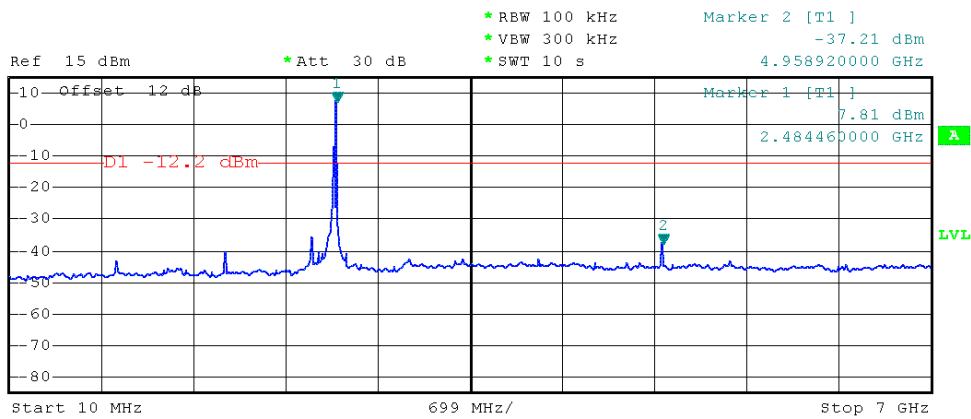
Date: 26.JAN.2015 13:51:56

Conducted spurious emissions – F_{HIGH}

Spurious Emissions acc. to FCC 15.247

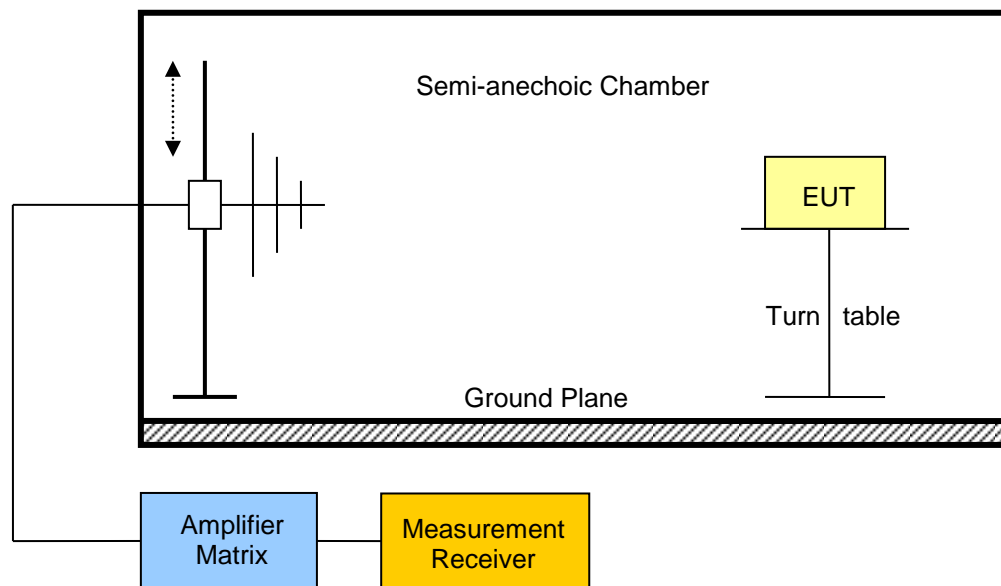
Project Number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Christian Weber
 Test Conditions: Tnom / Vnom
 Mode: Tx, BTLE, 2480 MHz, modulated
 Test Date: 2015-01-26
 Verdict: NONE (INFORMATION ONLY)
 Note 1: Spurious in non-restricted frequency bands (558074 D01 Meas Guidance)
 Note 2: conducted measurement



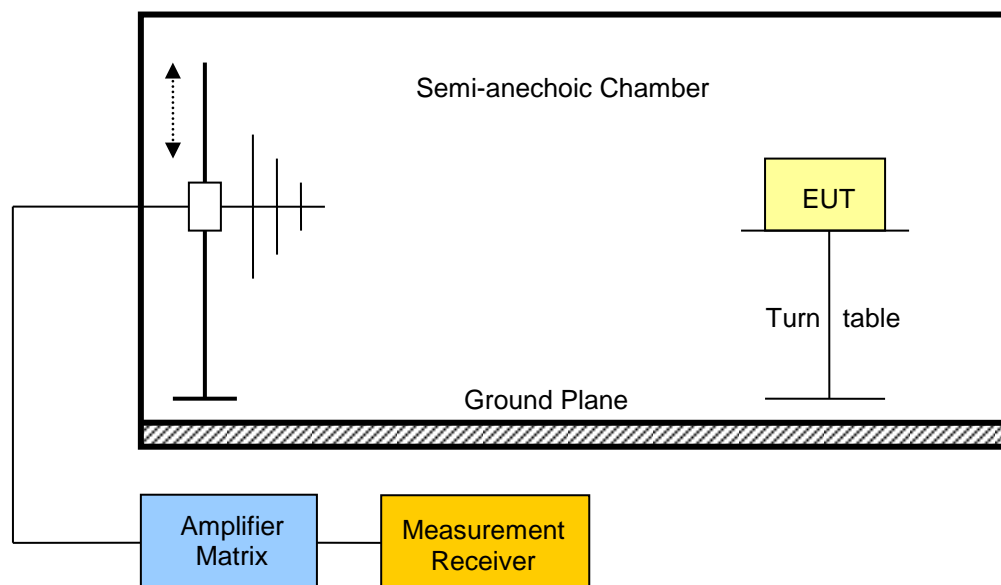
Date: 26.JAN.2015 14:00:18

3.9 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. to FCC 47 CFR 15.247 / IC RSS-210				Verdict: PASS	
Test according referenced standards		Reference Method			
		FCC 15.247(d) / IC RSS-210 A8.5			
Test according to measurement reference		Reference Method			
		FCC KDB Publication No. 558074 / ANSI C63.4			
Test frequency range		Tested frequencies			
		30 MHz – 10 th Harmonic			
Limits					
Frequency range [MHz]	Detector	Limit [μ V/m]	Limit [dB μ V/m]	Limit Distance [m]	
30 – 88	Quasi-Peak	100	40	3	
88 – 216	Quasi-Peak	150	43.5	3	
216 – 960	Quasi-Peak	200	46	3	
960 – 1000	Quasi-Peak	500	54	3	
> 1000	Average	500	54	3	
<p>Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).</p> <p>When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.</p>					
Test setup					
 <p>The diagram illustrates the test setup within a Semi-anechoic Chamber. A Ground Plane is located at the bottom of the chamber. On the left side, an Amplifier Matrix is connected to a Measurement Receiver. The EUT (Equipment Under Test) is placed on a Turn table. A vertical antenna is positioned to the left of the chamber, connected to the Amplifier Matrix. The chamber is labeled 'Semi-anechoic Chamber' and 'Ground Plane'.</p>					

Test procedure									
1. EUT set to test mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz 4. Markers are set to peak emission levels within restricted bands									
Test results									
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dB μ V/m]	Det.	Pol.	Limit [dB μ V/m]	Limit dist. [m]*	Margin [dB]
F _{LOW}	2402	Transmit	No significant spurious emissions						
F _{MID}	2442	Transmit	No significant spurious emissions						
F _{HIGH}	2480	Transmit	2484	55.87	pk	ver	74.00	3	-18.13
F _{HIGH}	2480	Transmit	2484	48.42	RMS	ver	54.00	3	-05.58
F _{HIGH}	2480	Transmit	2484	56.30	pk	hor	74.00	3	-17.70
F _{HIGH}	2480	Transmit	2484	48.02	RMS	hor	54.00	3	-05.98
F _{HIGH}	2480	Transmit	2487	52.22	pk	ver	74.00	3	-21.78
F _{HIGH}	2480	Transmit	2487	34.95	RMS	ver	54.00	3	-19.05
F _{HIGH}	2480	Transmit	2487	52.45	pk	hor	74.00	3	-21.55
F _{HIGH}	2480	Transmit	2487	34.77	RMS	hor	54.00	3	-19.23
F _{HIGH}	2480	Transmit	2503	55.50	pk	hor	95.00	3	-39.50
F _{HIGH}	2480	Transmit	2504	54.53	pk	ver	95.00	3	-40.47
Comments: * Physical distance between EUT and measurement antenna.									

3.10 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. to IC RSS-210			Verdict: PASS	
Test according referenced standards	Reference Method			
	IC RSS-210 A8.5			
Test according to measurement reference	Reference Method			
	ANSI C63.4			
Test frequency range	Tested frequencies			
	30 MHz – 3 th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [μ V/m]	Limit [dB μ V/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				
 <p>The diagram illustrates the test setup within a Semi-anechoic Chamber. The chamber sits on a Ground Plane. An EUT (Equipment Under Test) is placed on a Turn table. A probe antenna is positioned above the chamber, connected to an Amplifier Matrix and a Measurement Receiver outside the chamber.</p>				

Test procedure

1. EUT set to receive mode (Communication tester is used if needed)
2. Span it set according to measurement range
3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz
4. Markers are set to peak emission levels

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dB μ V/m]	Polarisation	Det.	Limit [dB μ V/m]	Margin [dB]
F _{MID}	2440	141.884	34.24	ver	pk	43.50	-9.26
F _{MID}	2440	416	36.06	ver	pk	46.00	-9.94

Comments:

* Physical distance between EUT and measurement antenna.

** Emission level corresponds to ambient noise floor

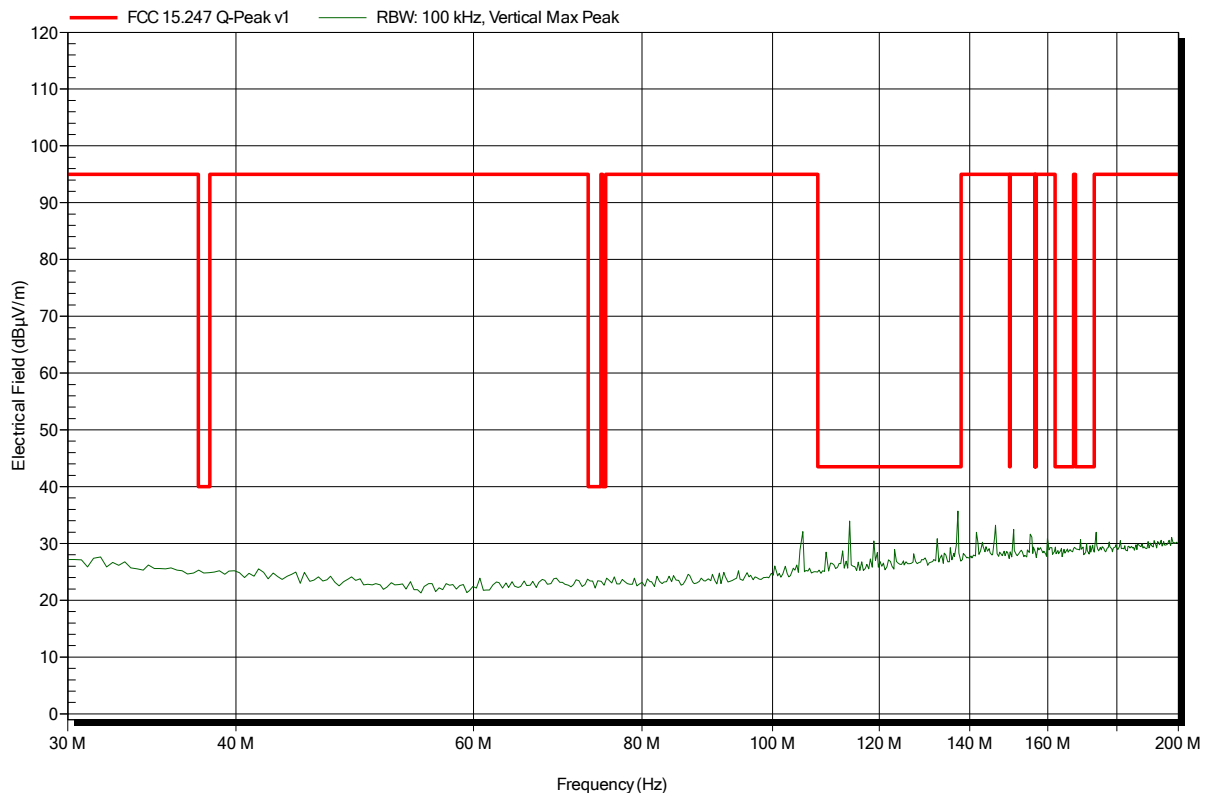
ANNEX A Transmitter radiated spurious emissions

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 48

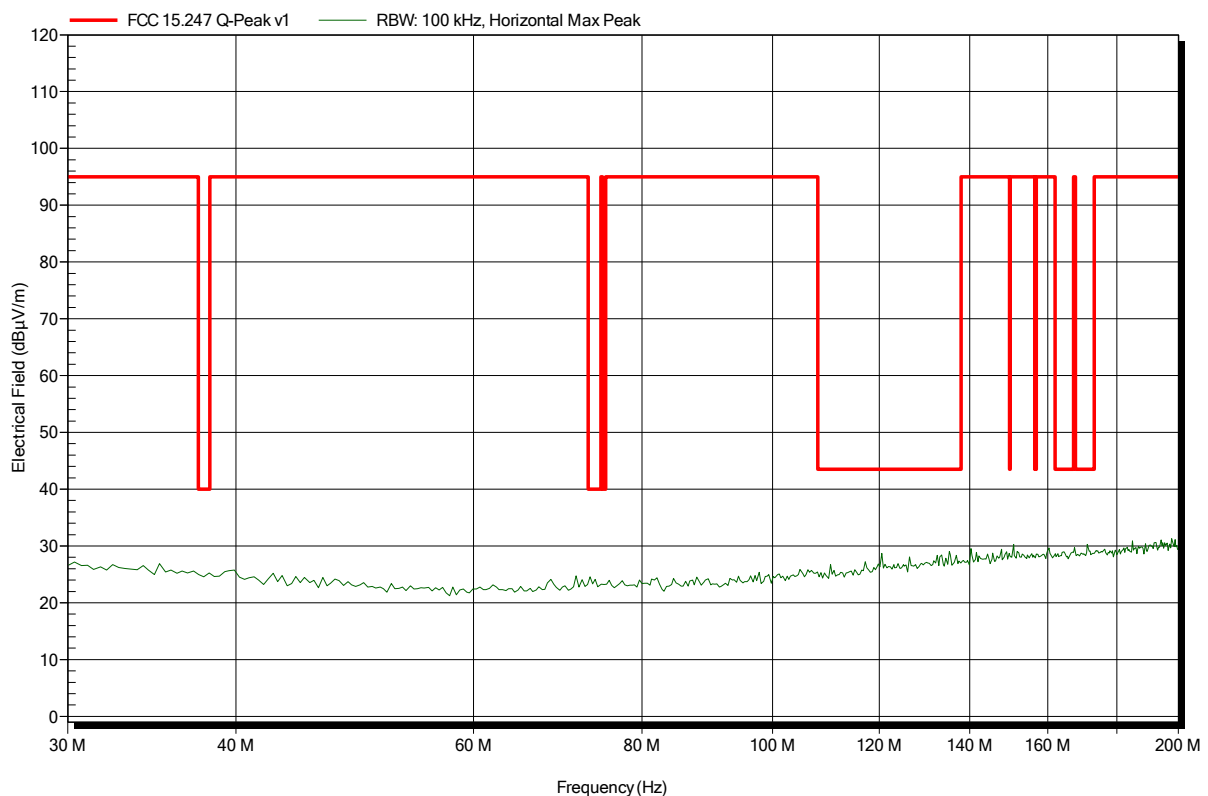


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 51

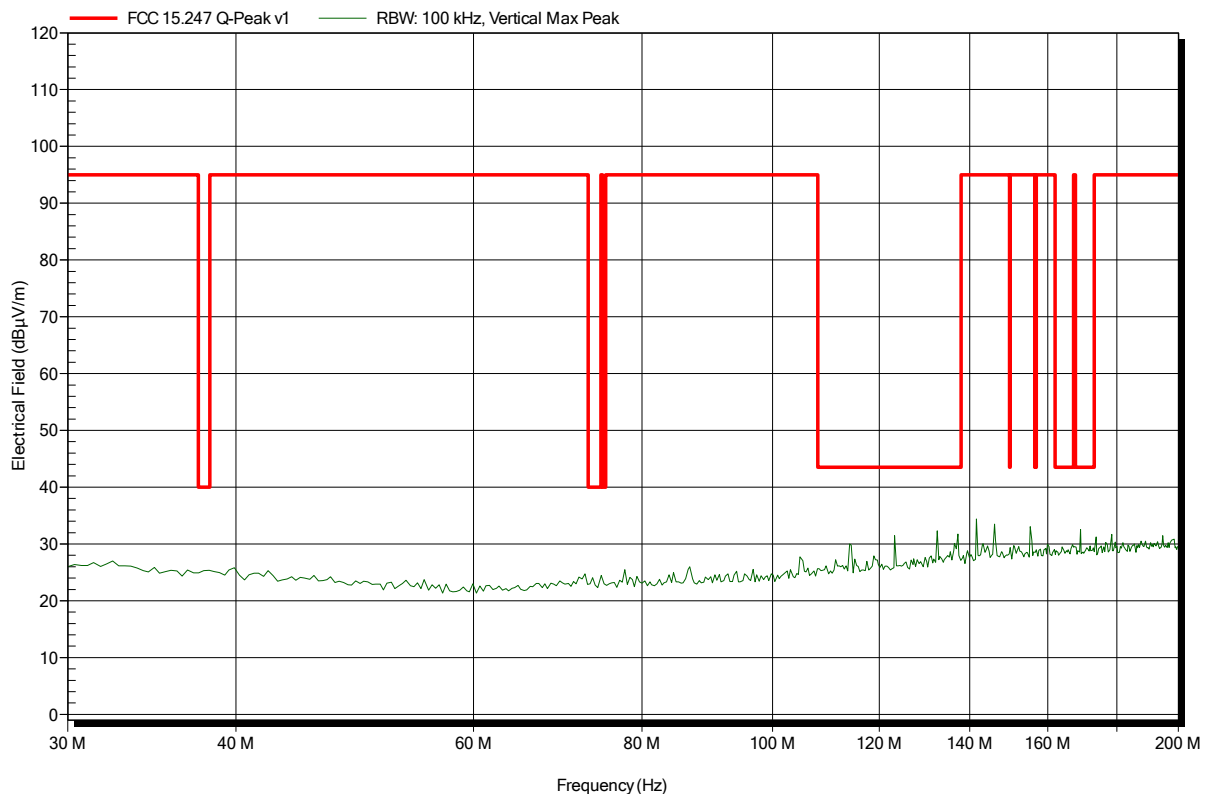


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 49

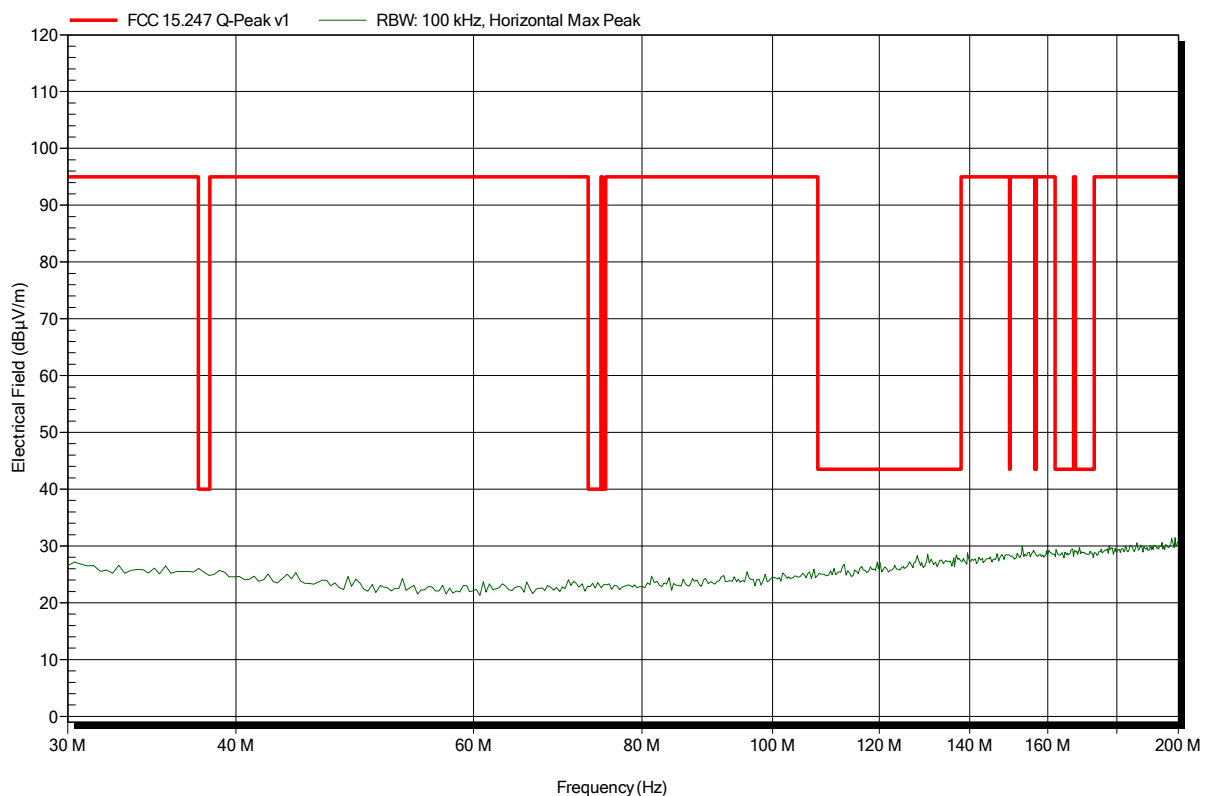


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 52

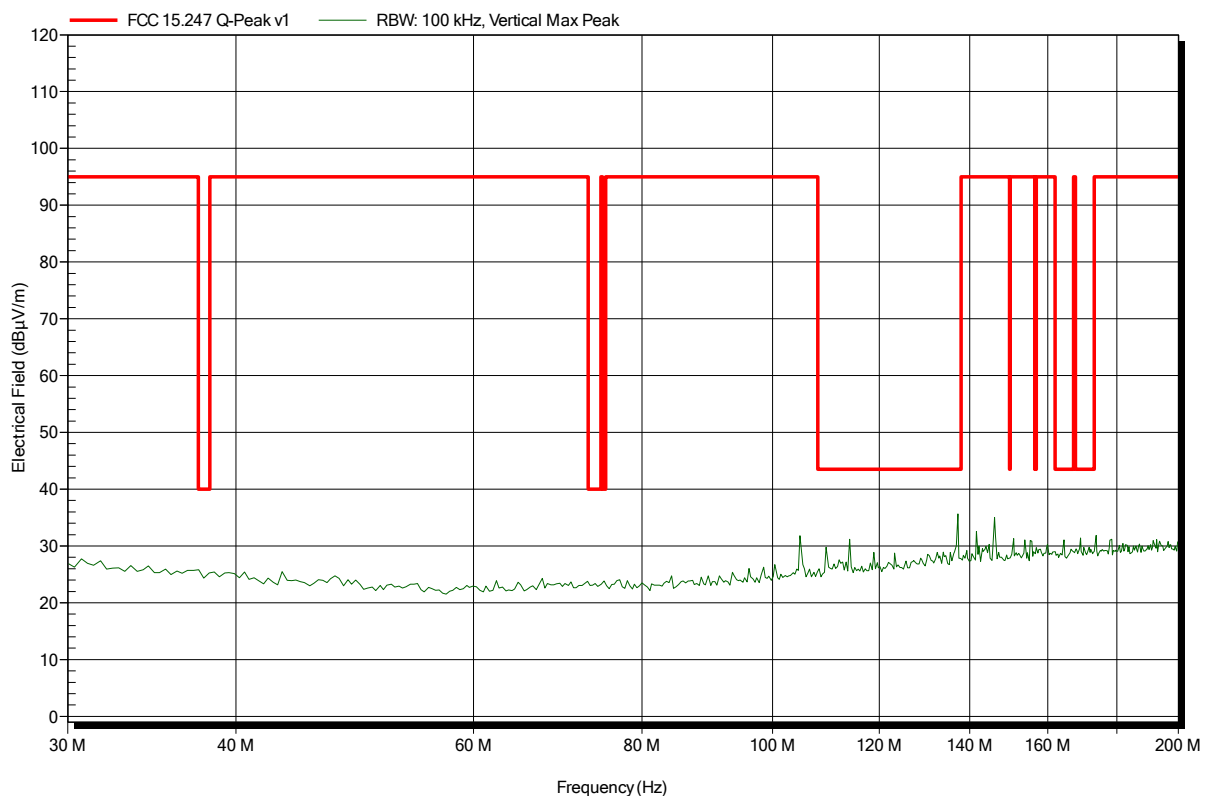


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 50

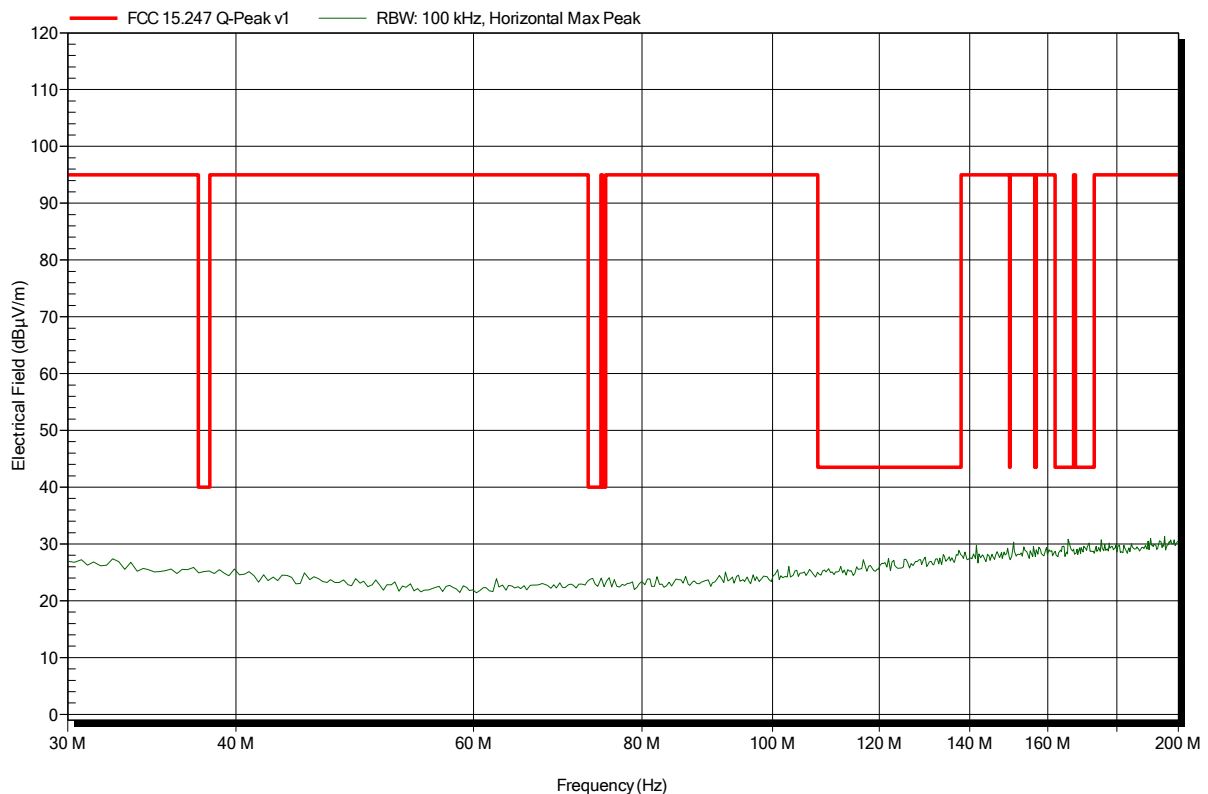


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 53

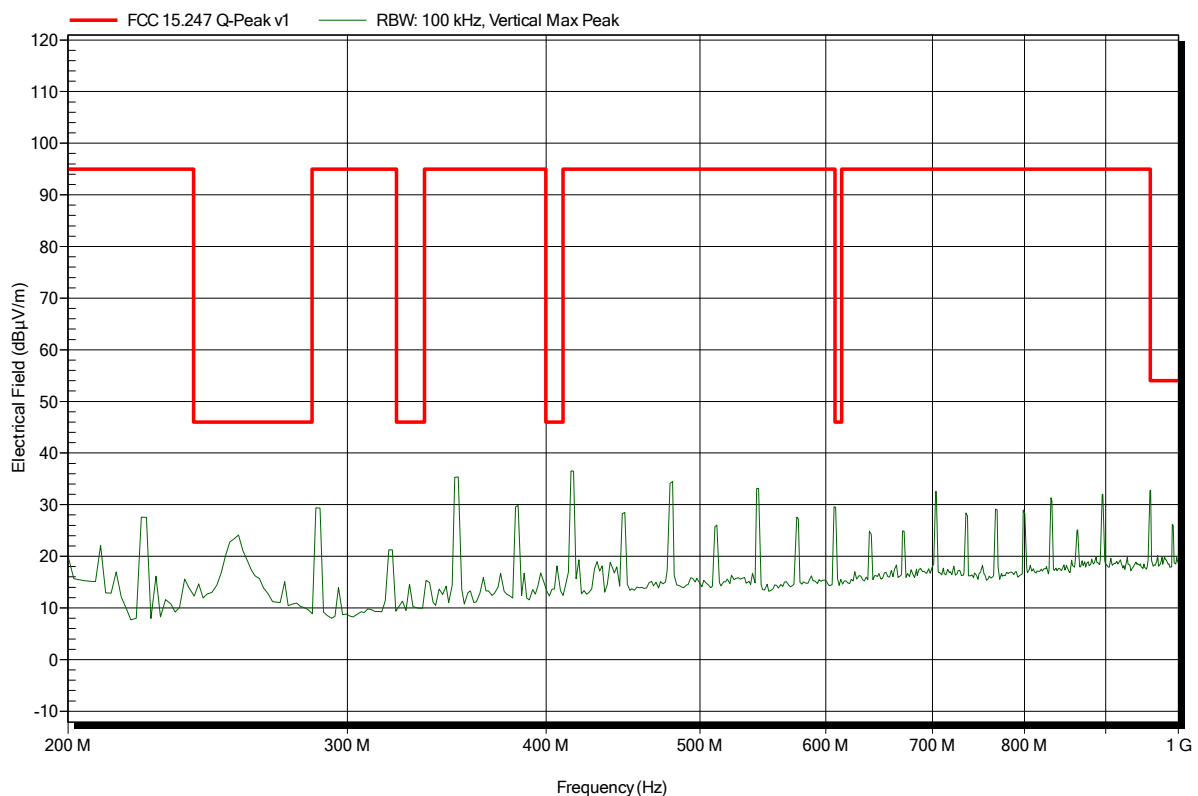


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 54

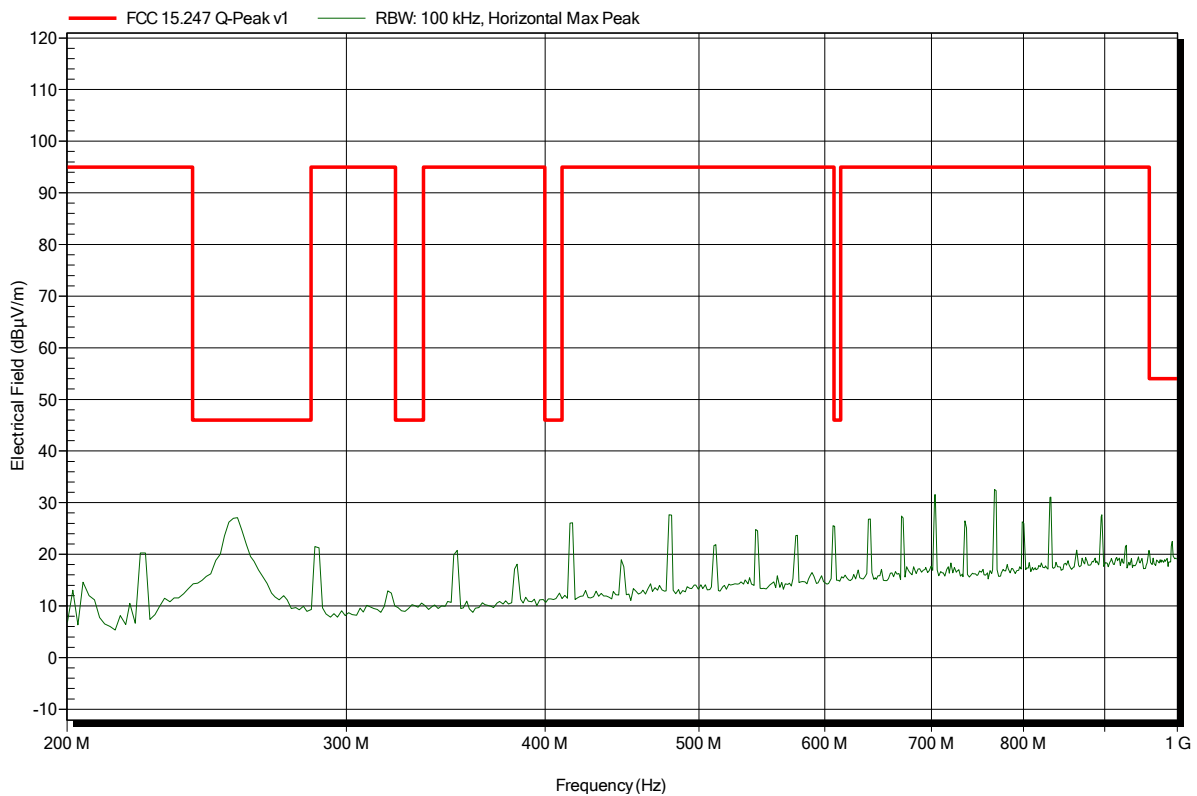


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 57

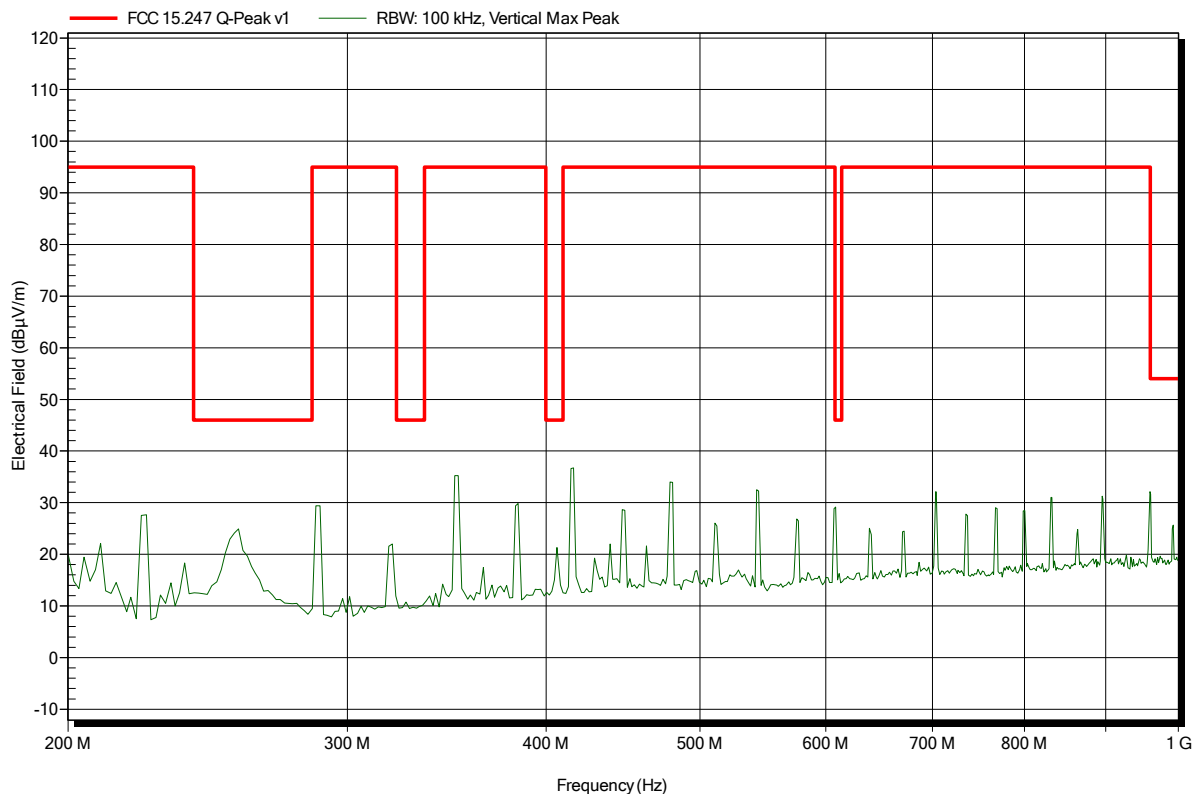


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 55

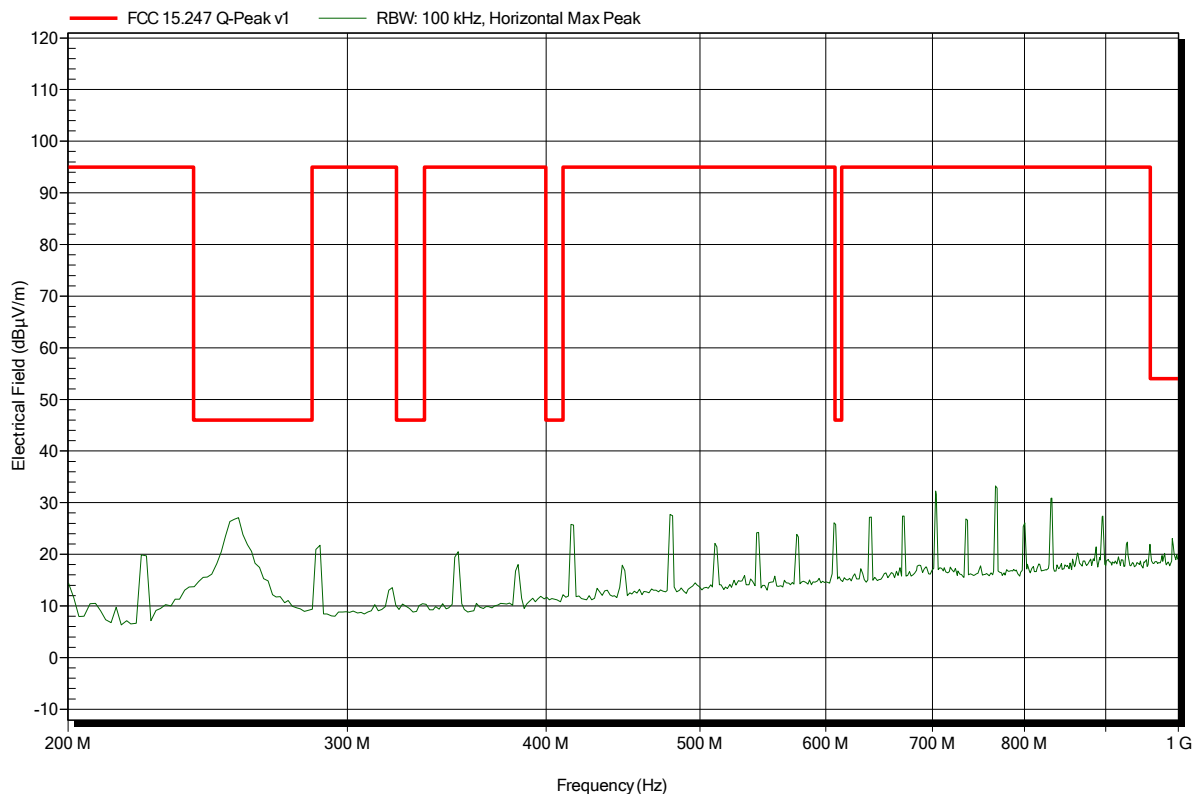


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 58

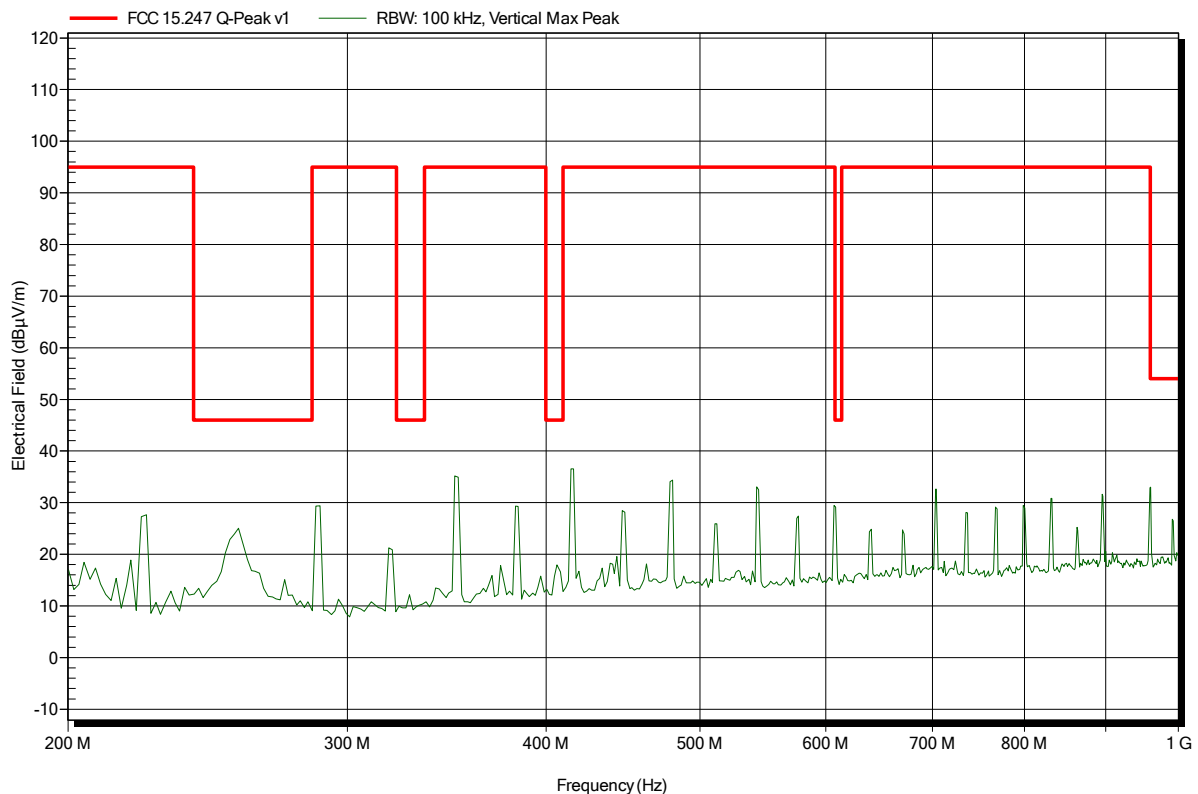


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 56

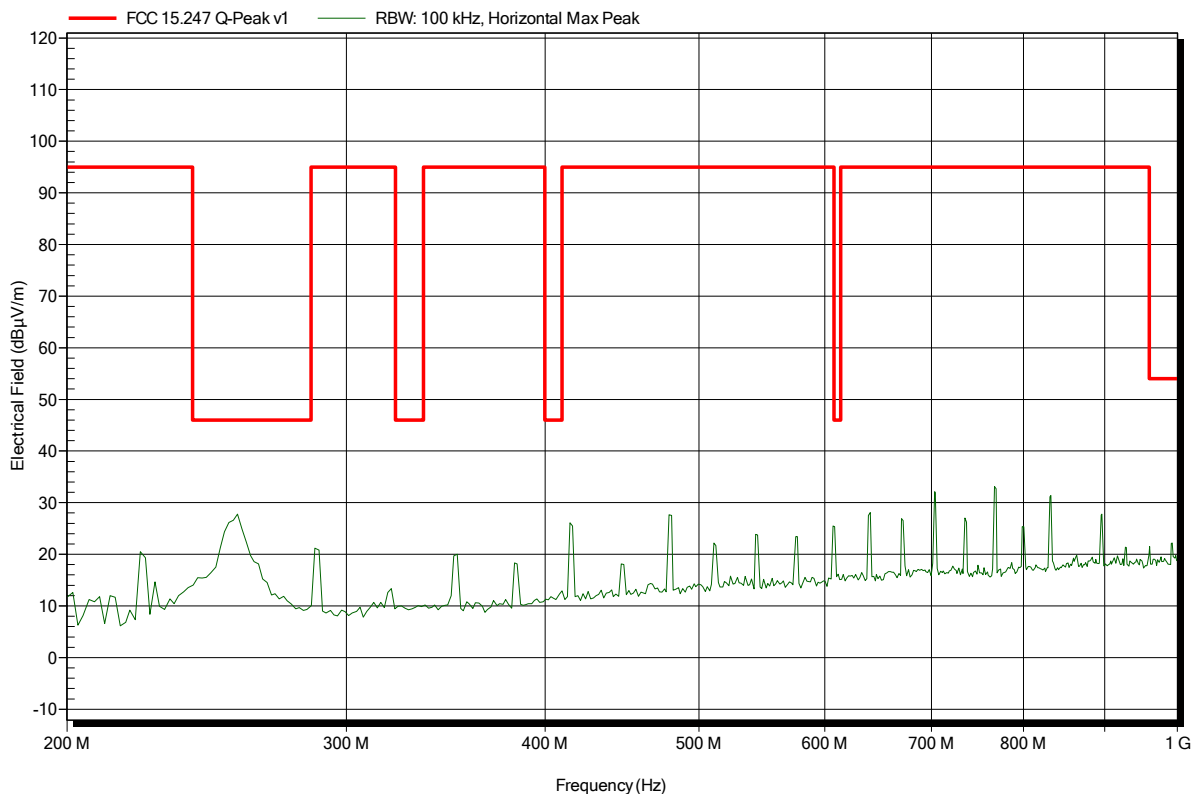


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 59

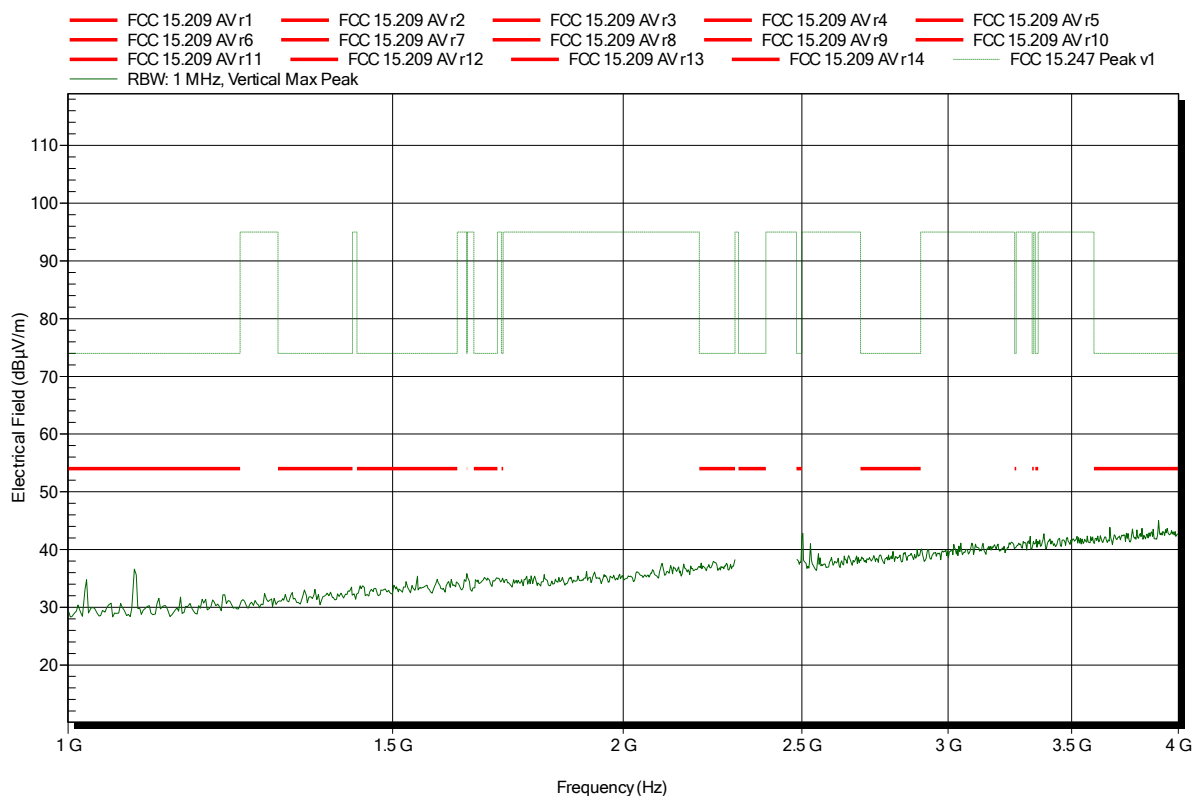


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical

Index 62

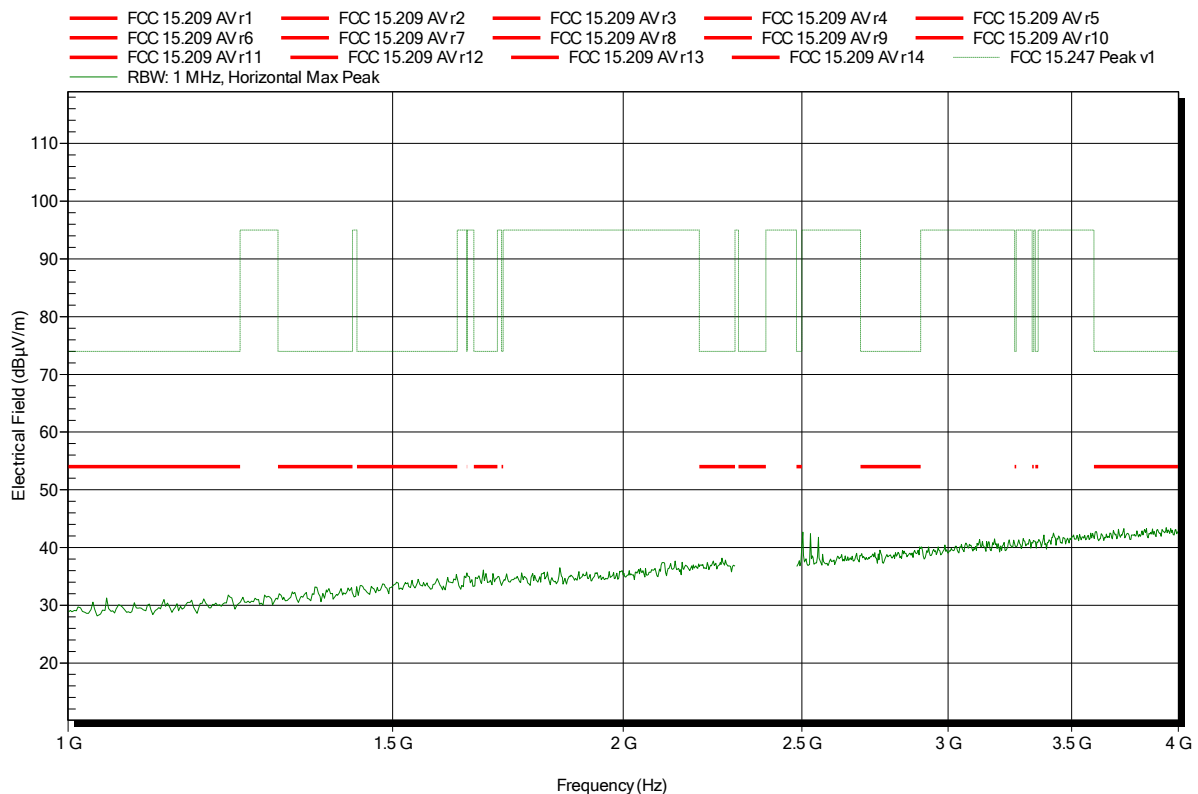


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical

Index 64

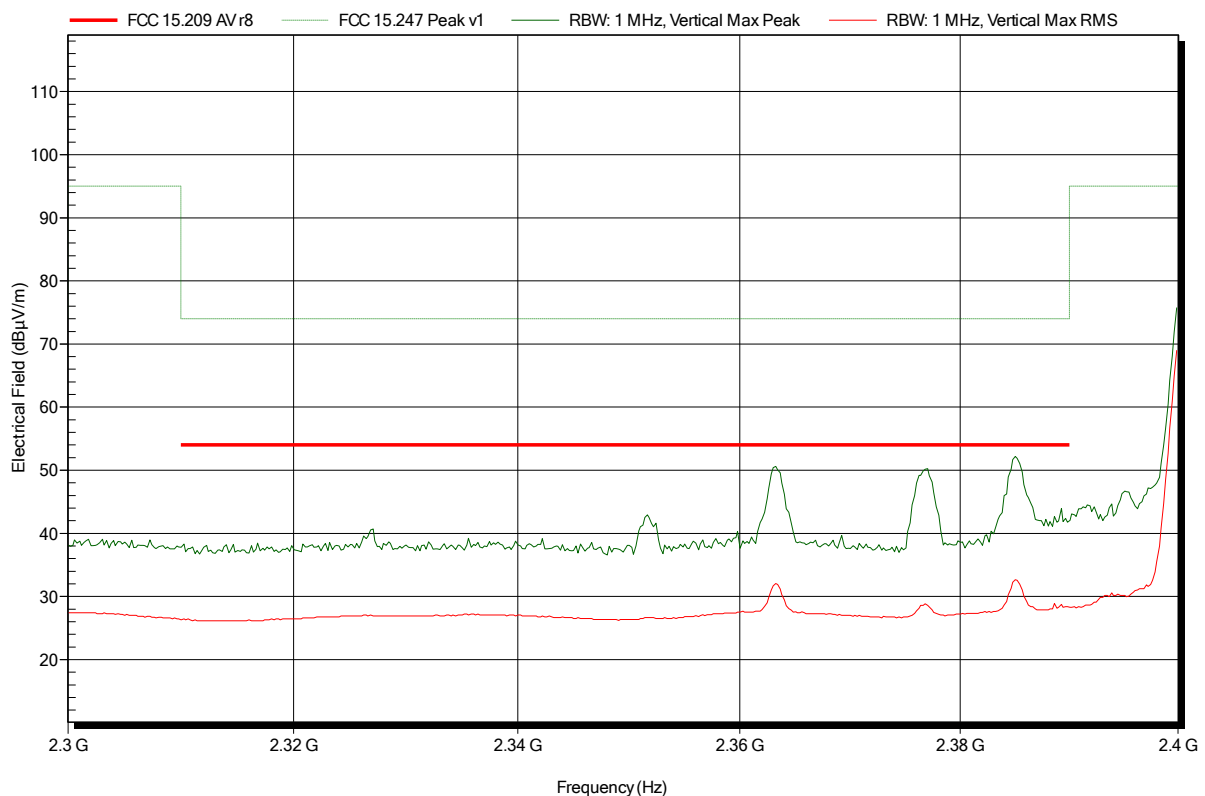


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical; lower bandedge

Index 63

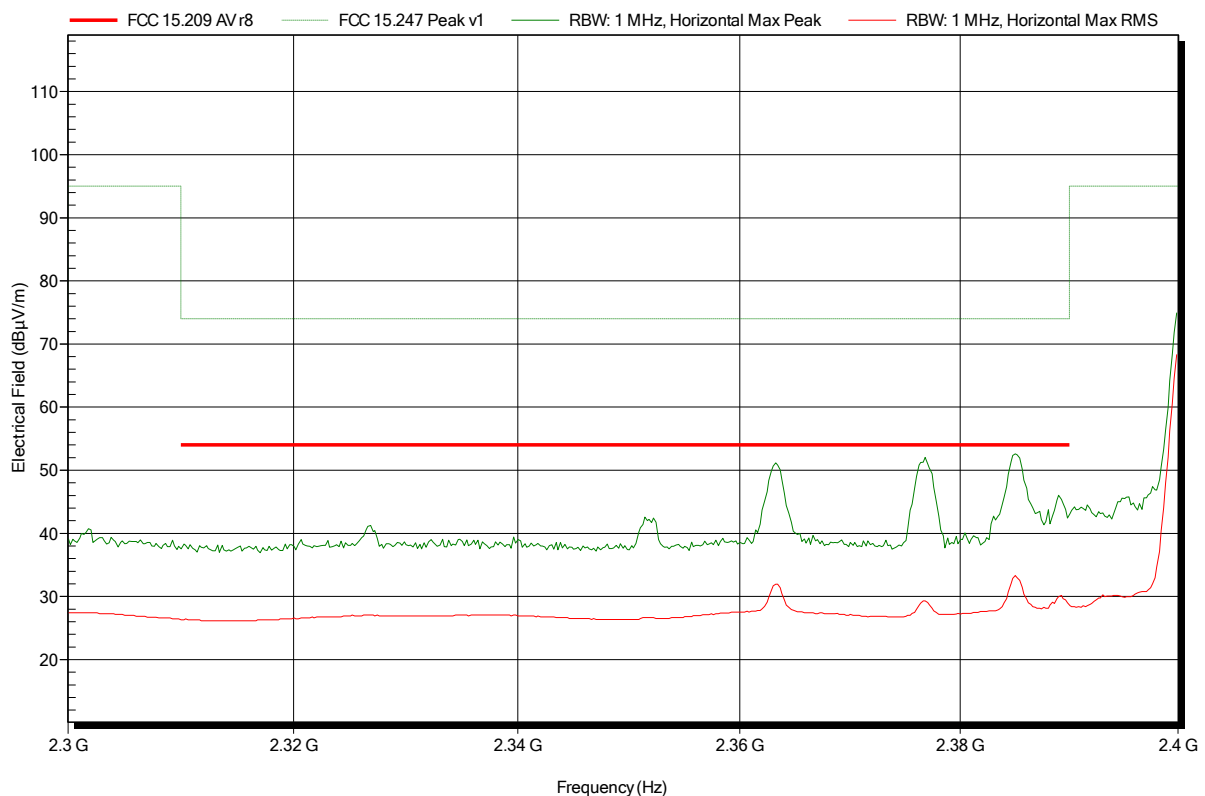


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3 m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical; lower bandedge

Index 65

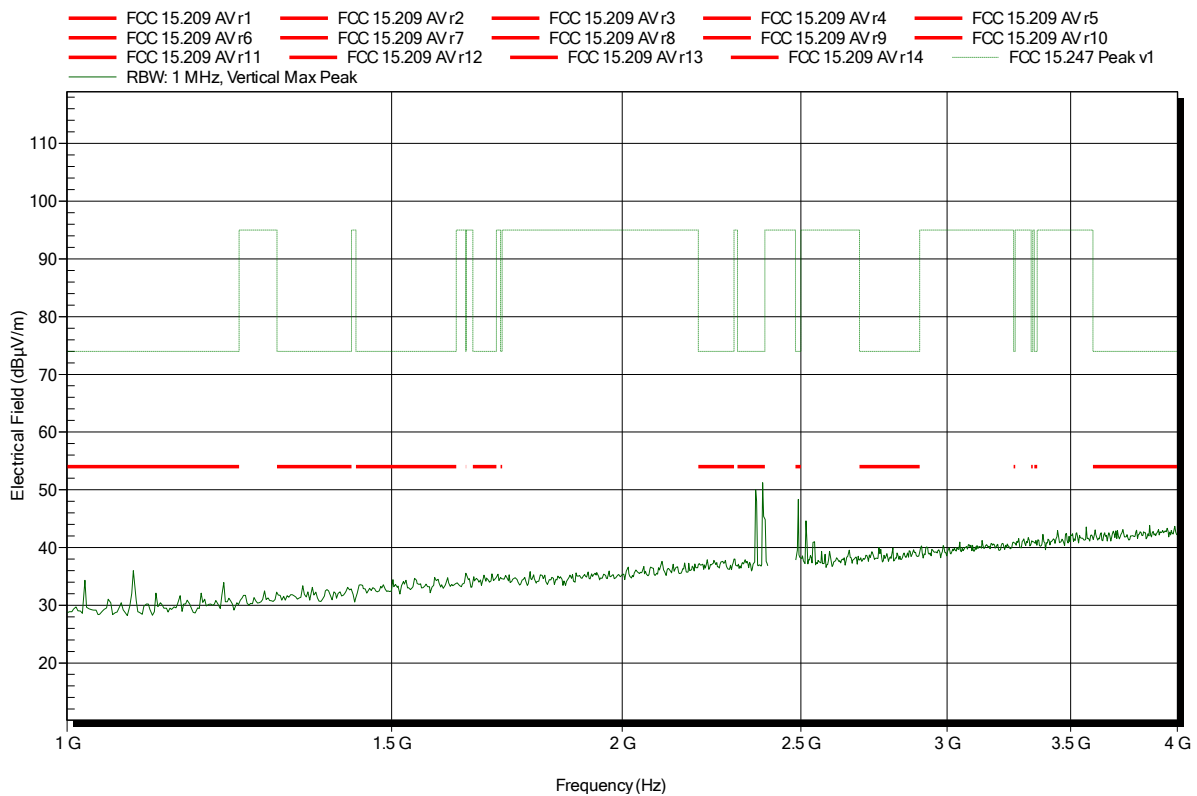


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: GOM-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical

Index 60

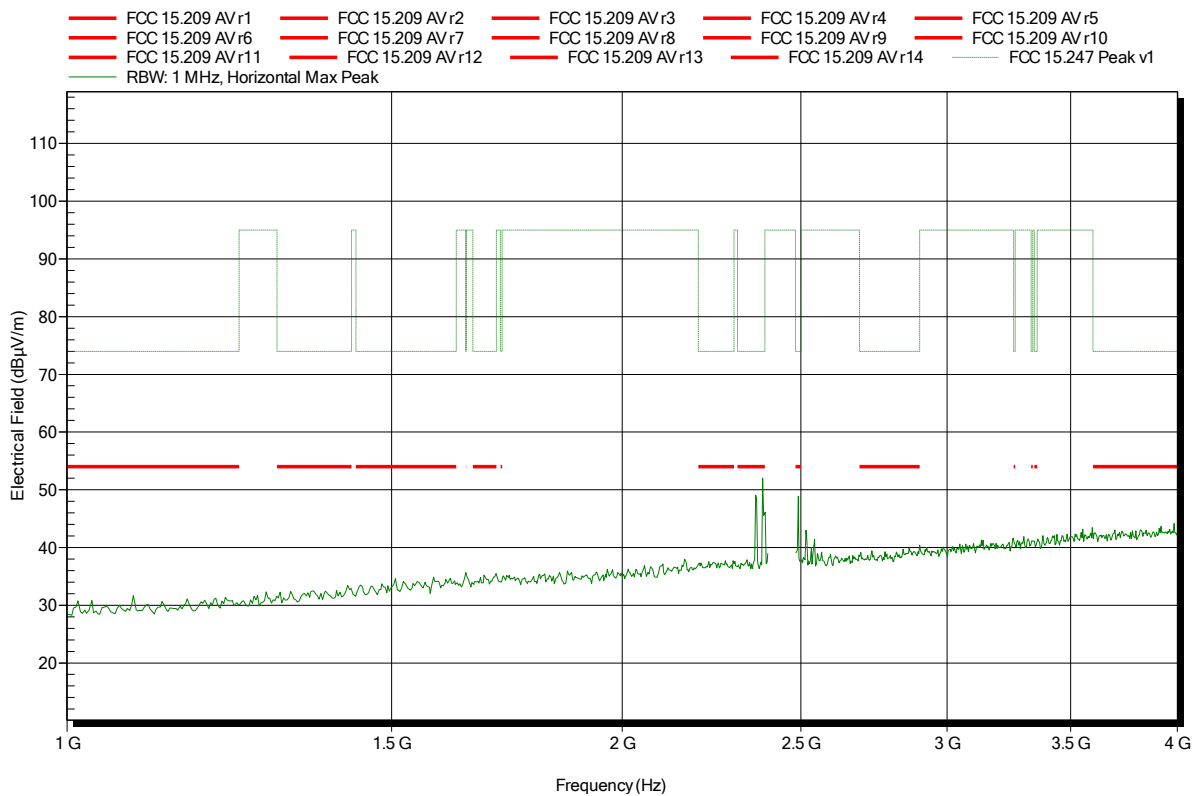


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical

Index 61

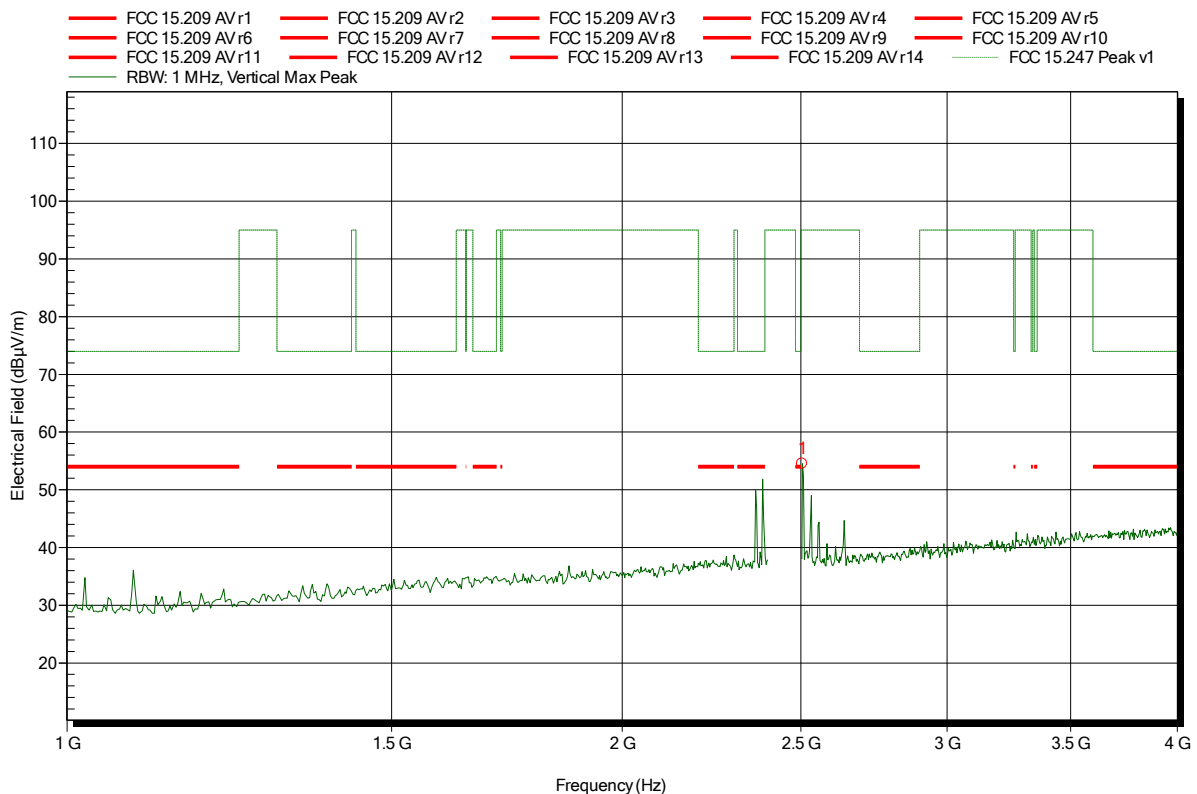


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical

Index 66



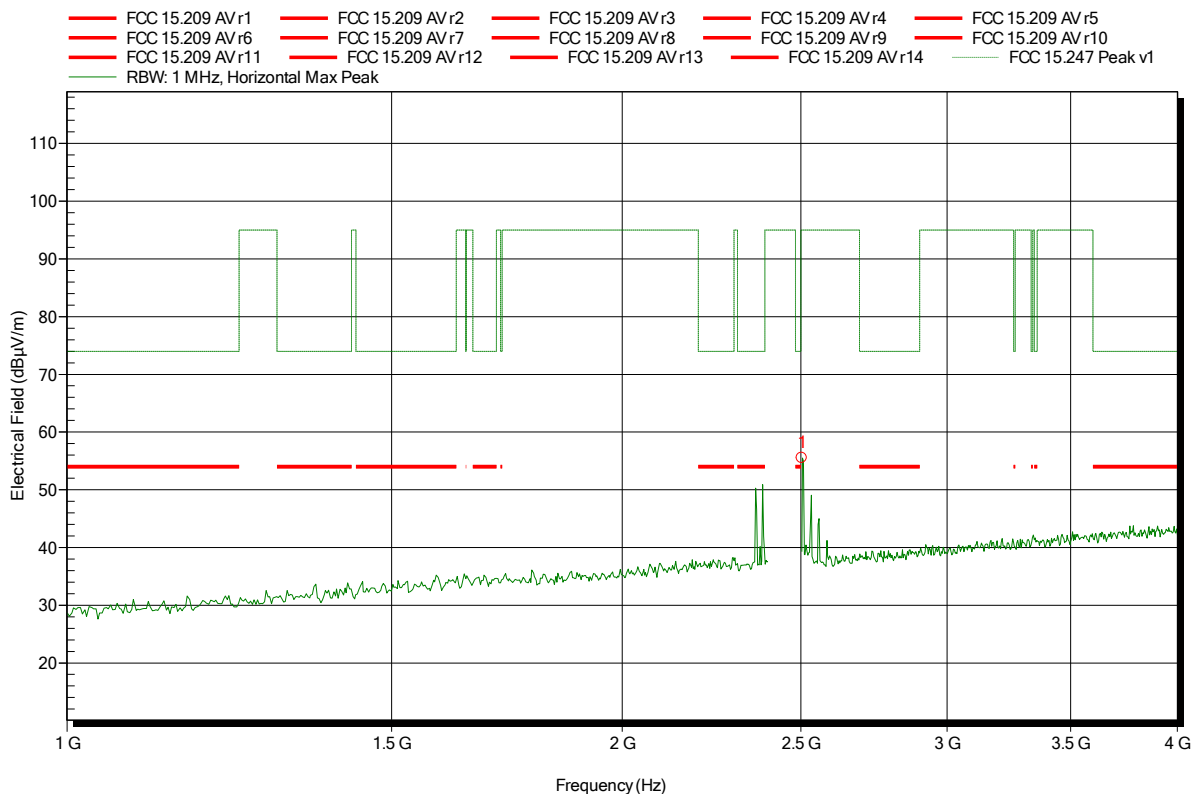
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.504 GHz	54.53 dBµV/m	95 dBµV/m	-40.47 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical

Index 68



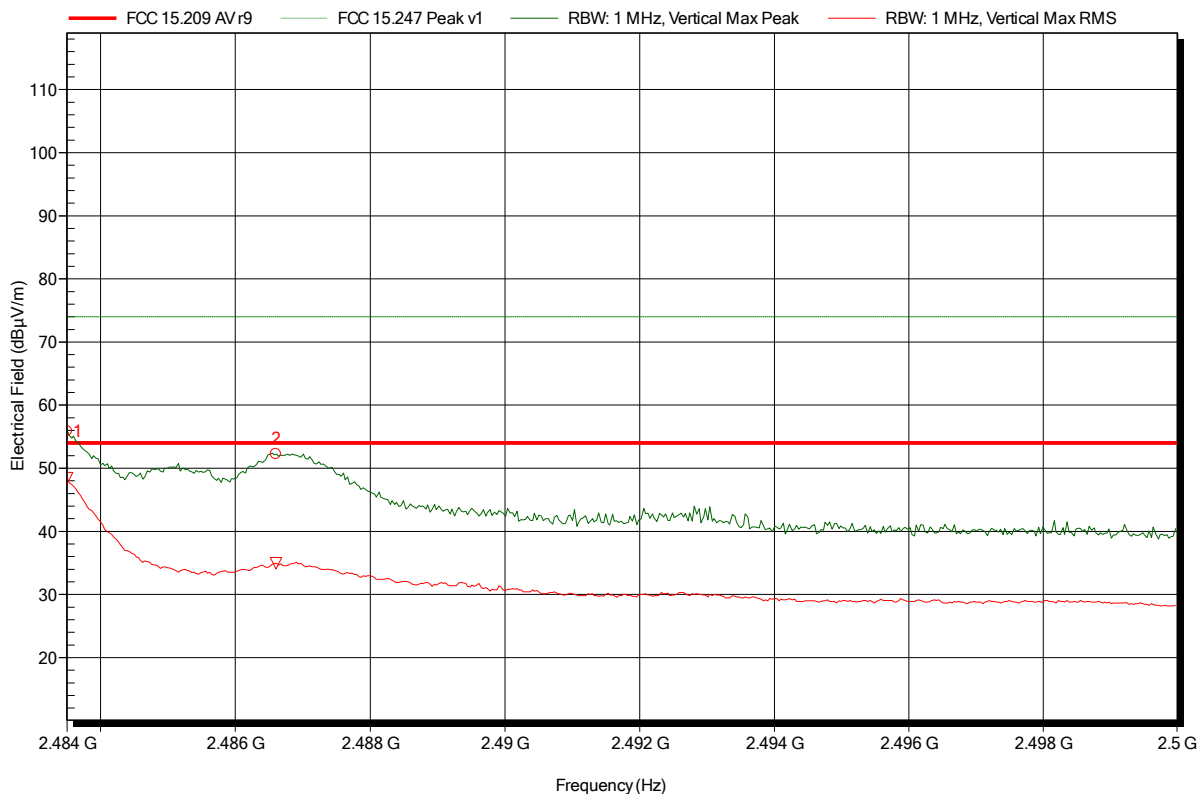
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.503 GHz	55.5 dBµV/m	95 dBµV/m	-39.5 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Vertical
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical; higher bandedge

Index 67



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.484 GHz	55.87 dBµV/m	74 dBµV/m	-18.13 dB	Pass
2.487 GHz	52.22 dBµV/m	74 dBµV/m	-21.78 dB	Pass

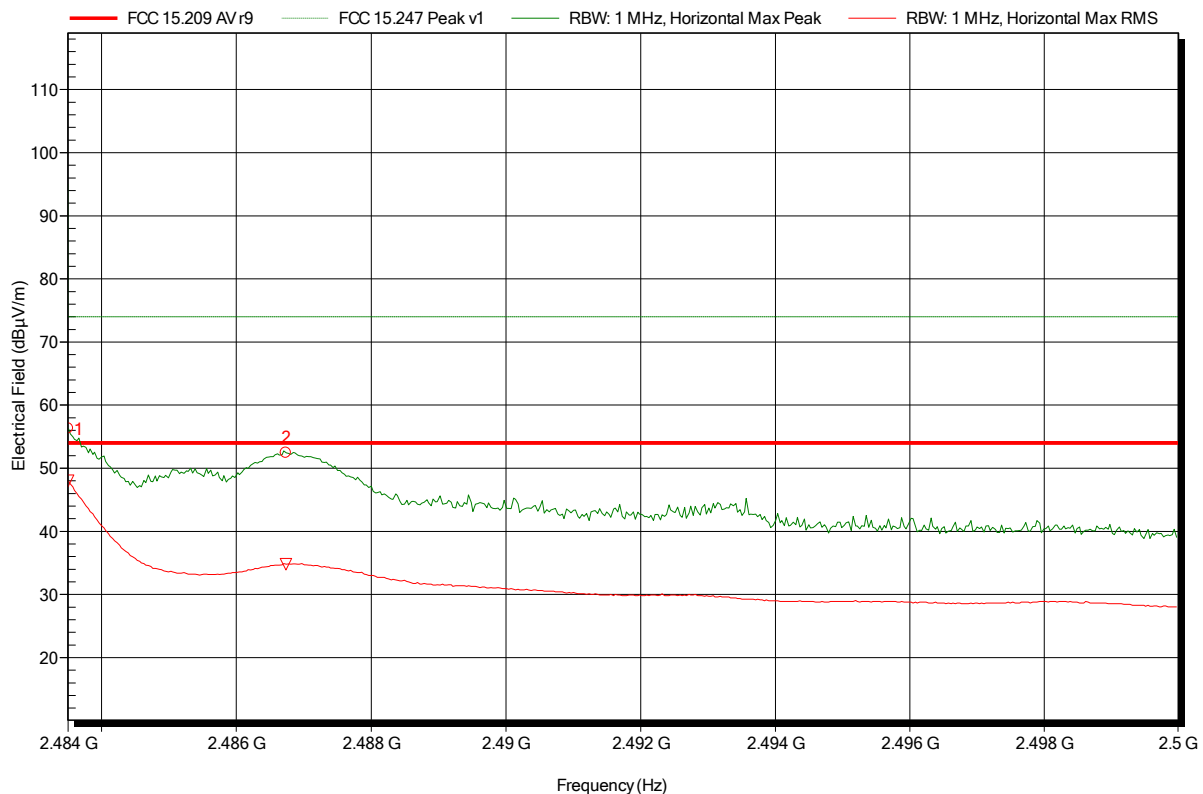
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.484 GHz	48.42 dBµV/m	54 dBµV/m	-5.58 dB	Pass
2.487 GHz	34.95 dBµV/m	54 dBµV/m	-19.05 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1 V DC
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 3 m
 Mode: TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
 Test Date: 2015-02-26
 Note: EUT vertical; higher bandedge

Index 69



Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.484 GHz	56.3 dBµV/m	74 dBµV/m	-17.7 dB	Pass
2.487 GHz	52.45 dBµV/m	74 dBµV/m	-21.55 dB	Pass

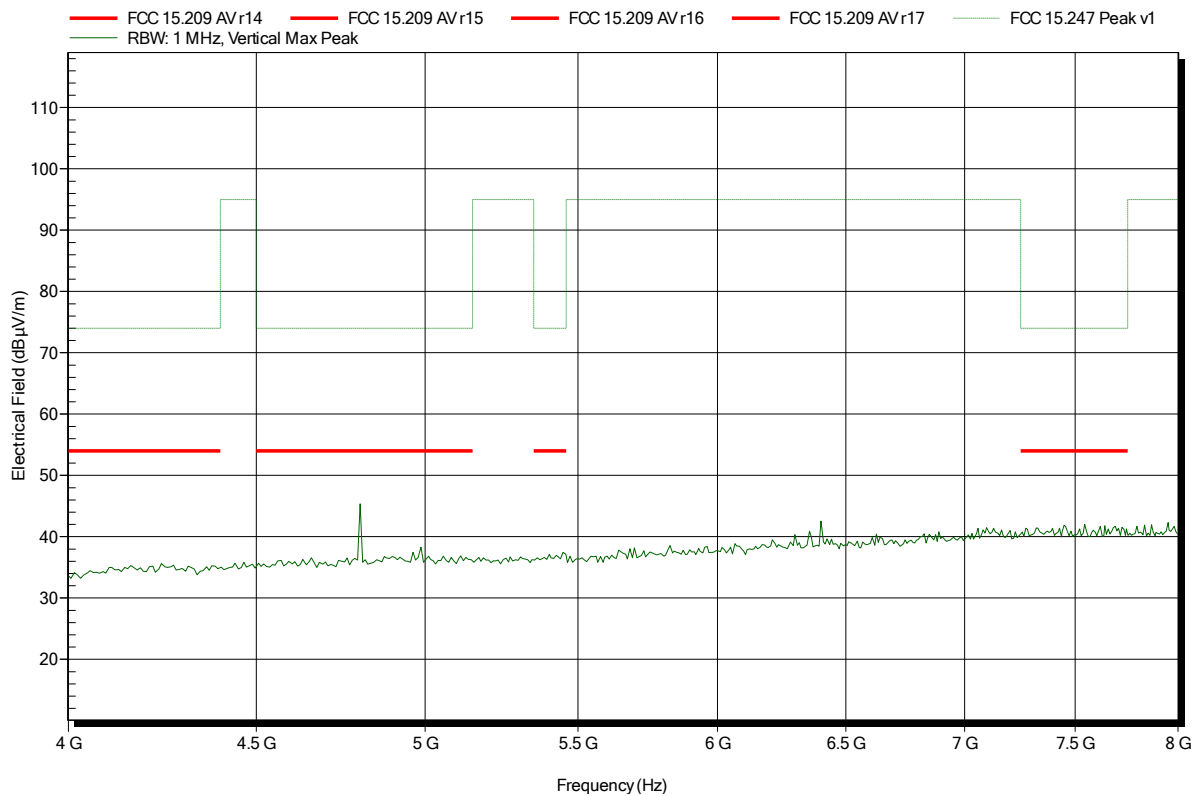
Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.484 GHz	48.02 dBµV/m	54 dBµV/m	-5.98 dB	Pass
2.487 GHz	34.77 dBµV/m	54 dBµV/m	-19.23 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 83

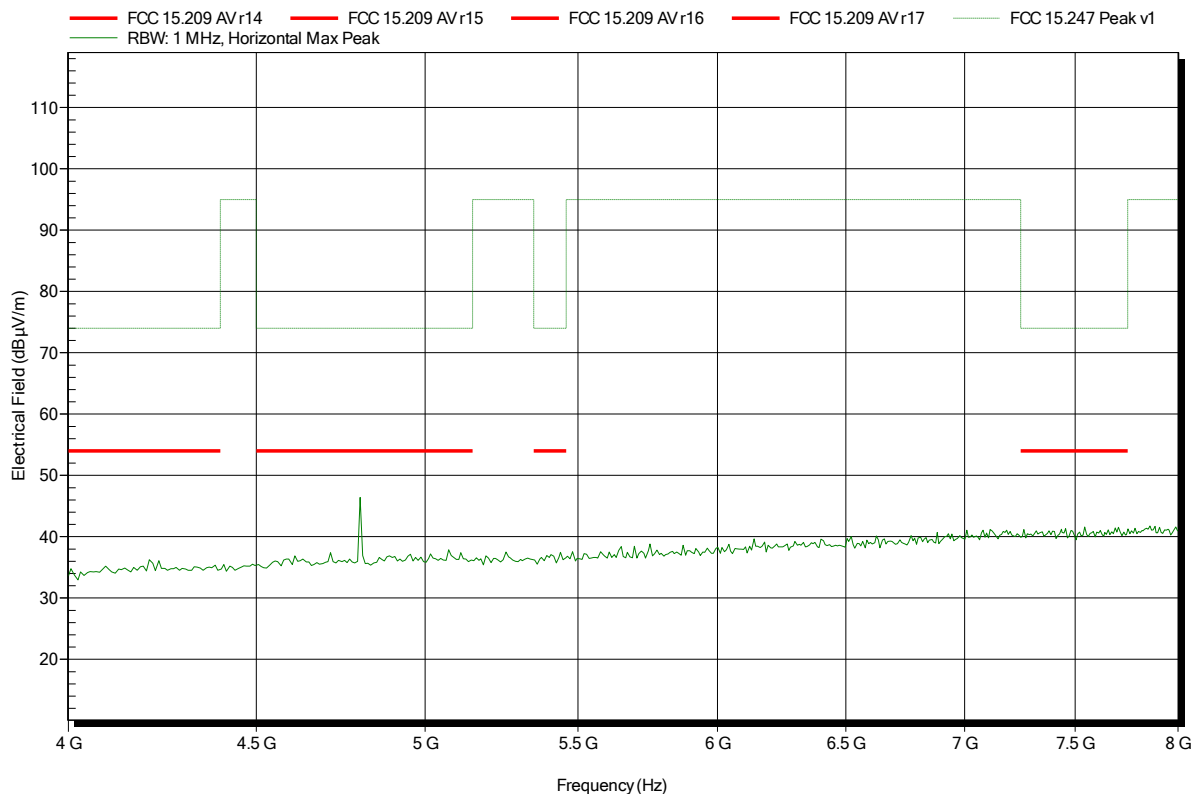


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 88

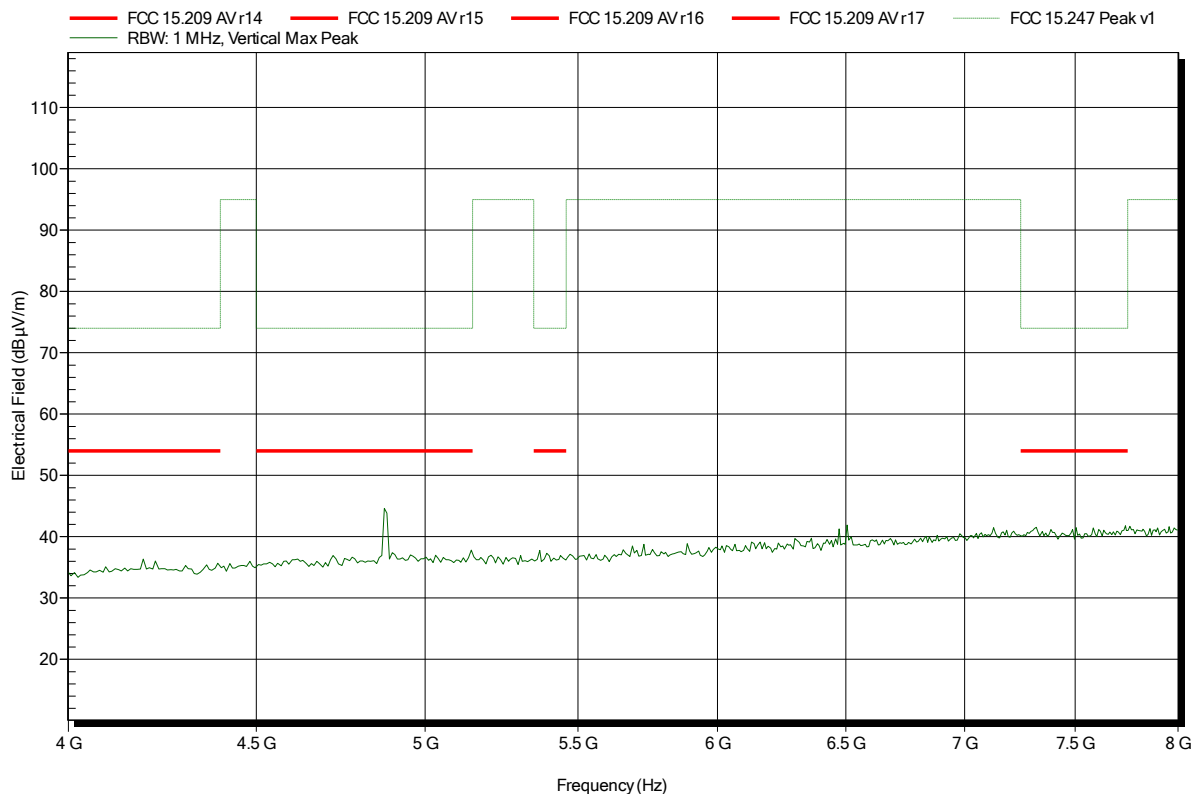


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 82

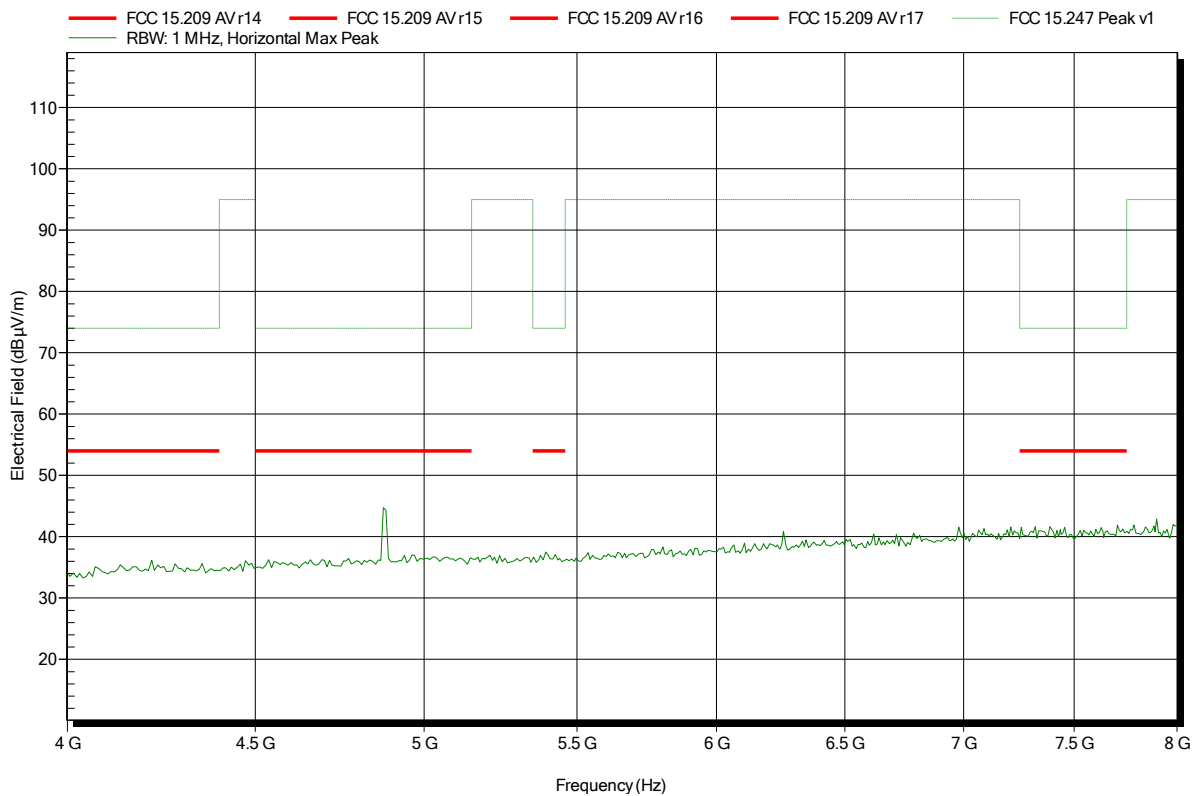


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 77

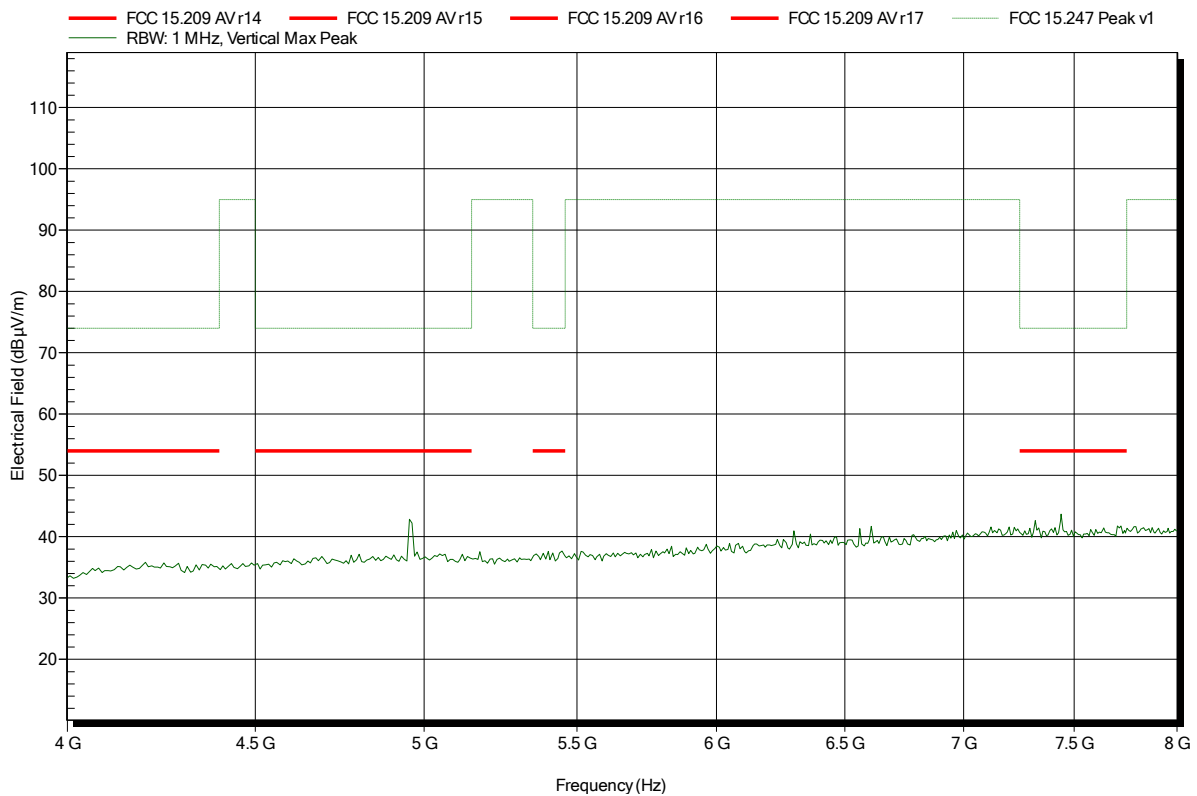


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 70

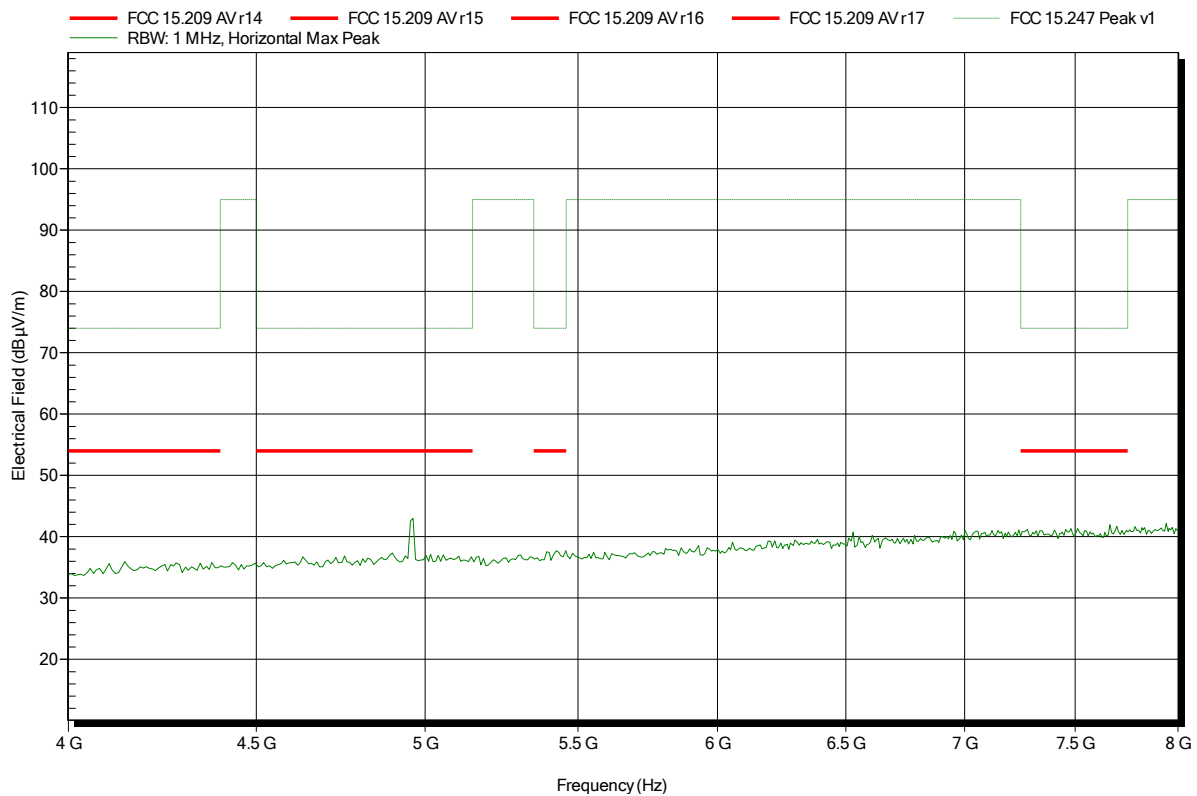


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 75

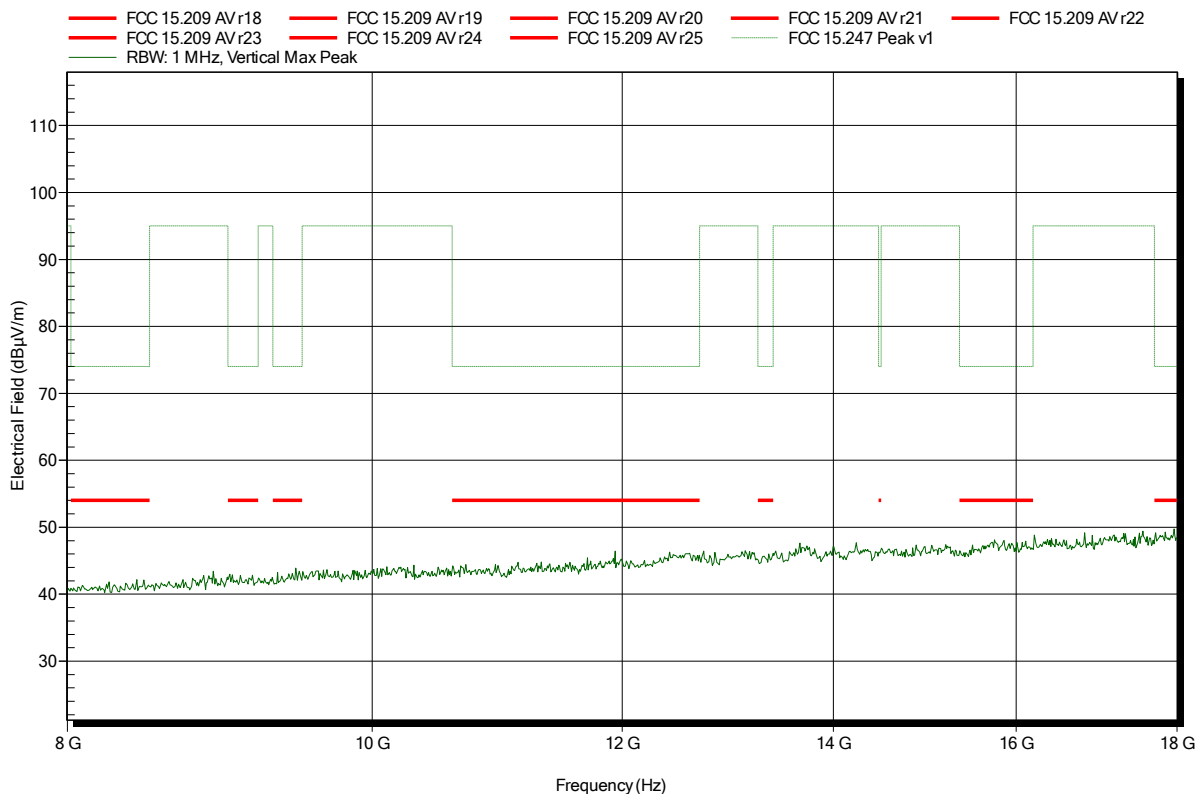


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: GOM-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 84

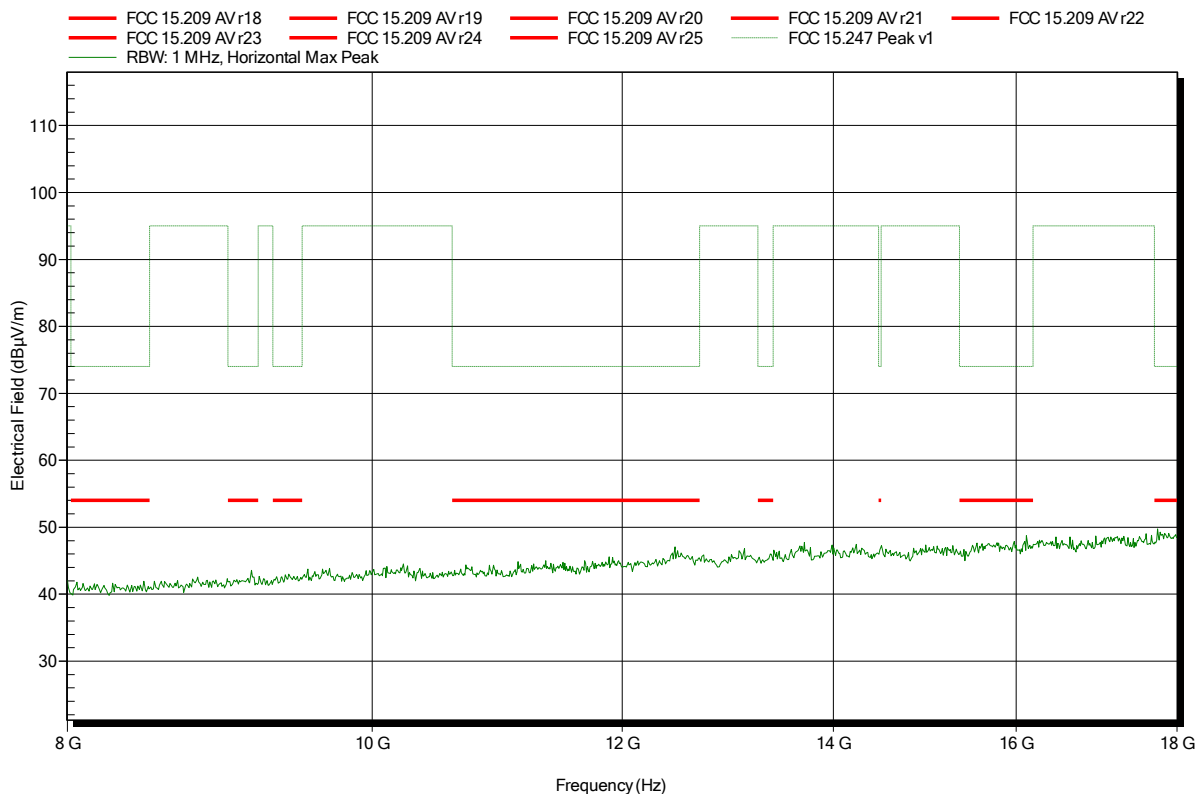


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 87

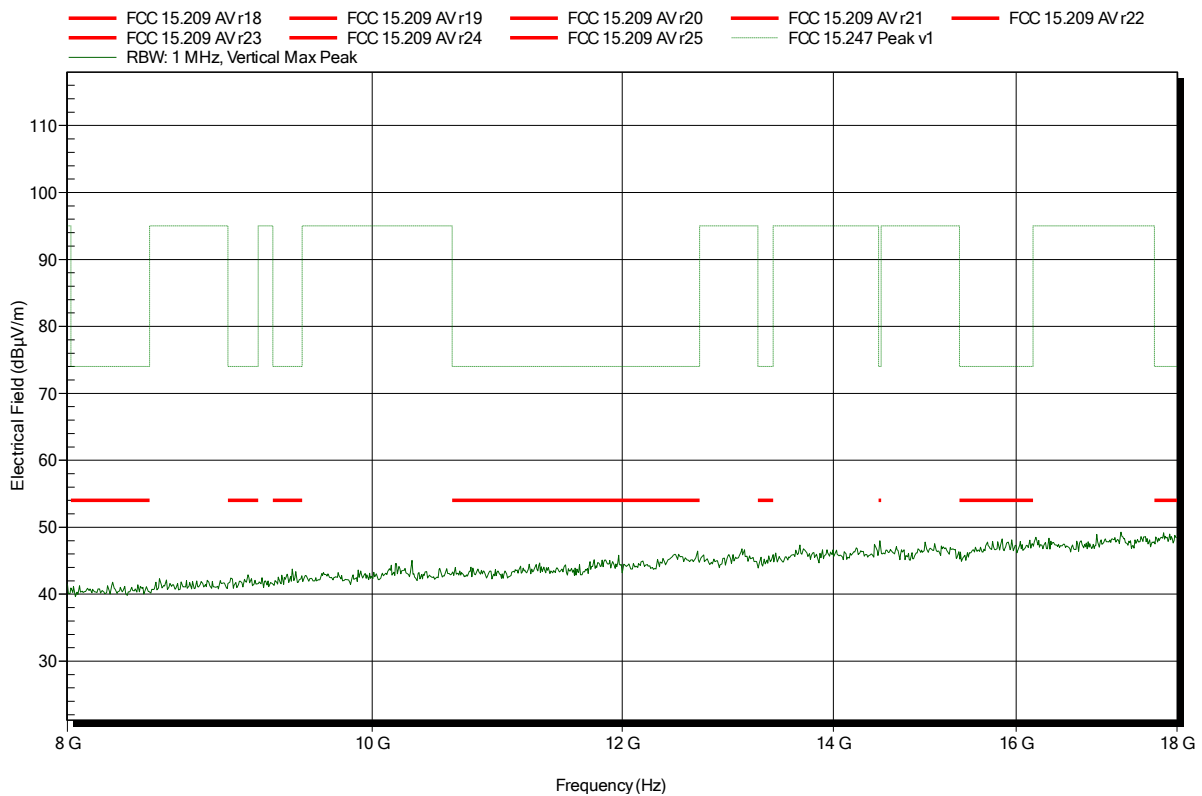


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: GOM-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 81

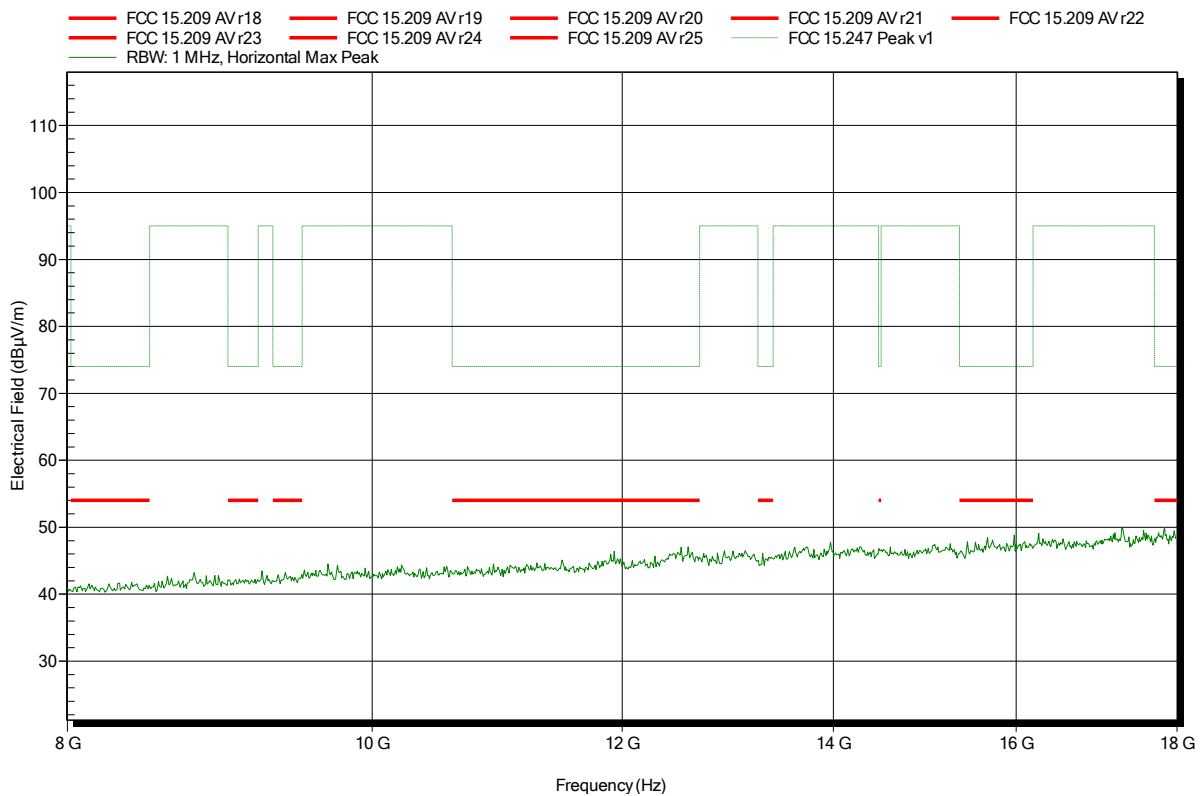


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: GOM-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 78

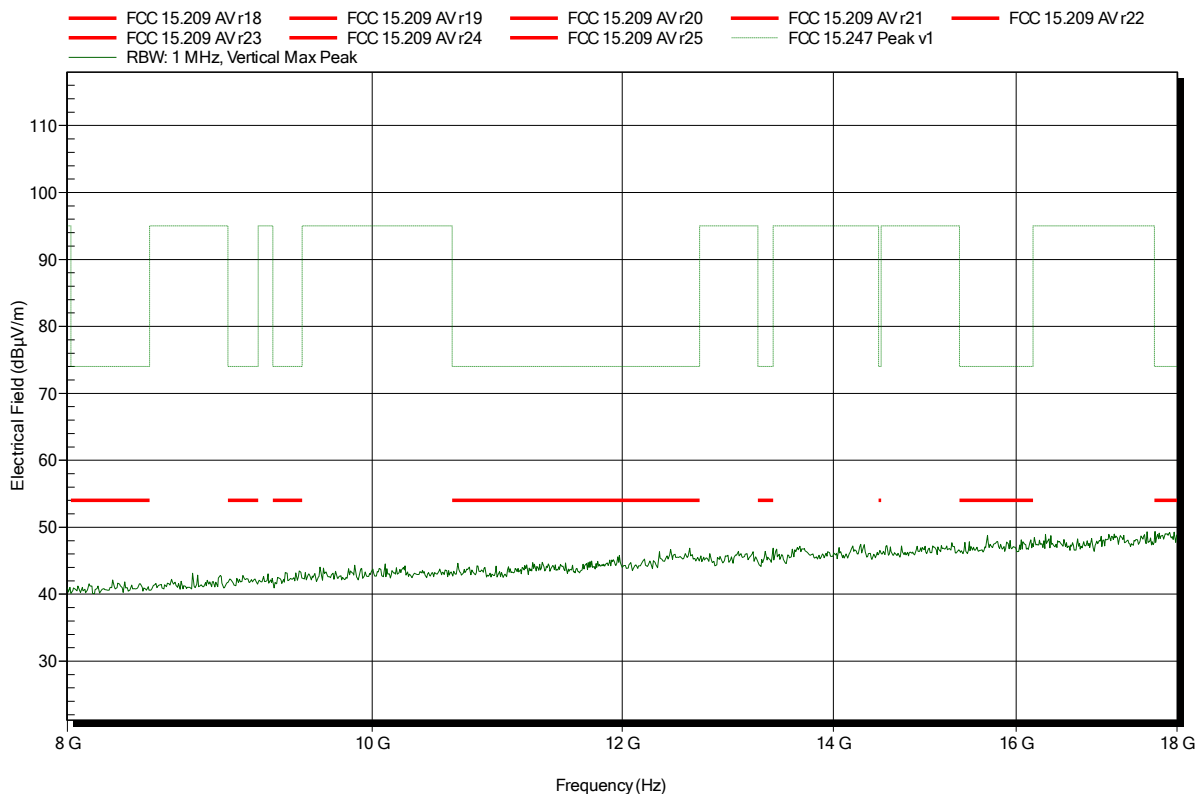


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: GOM-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 71

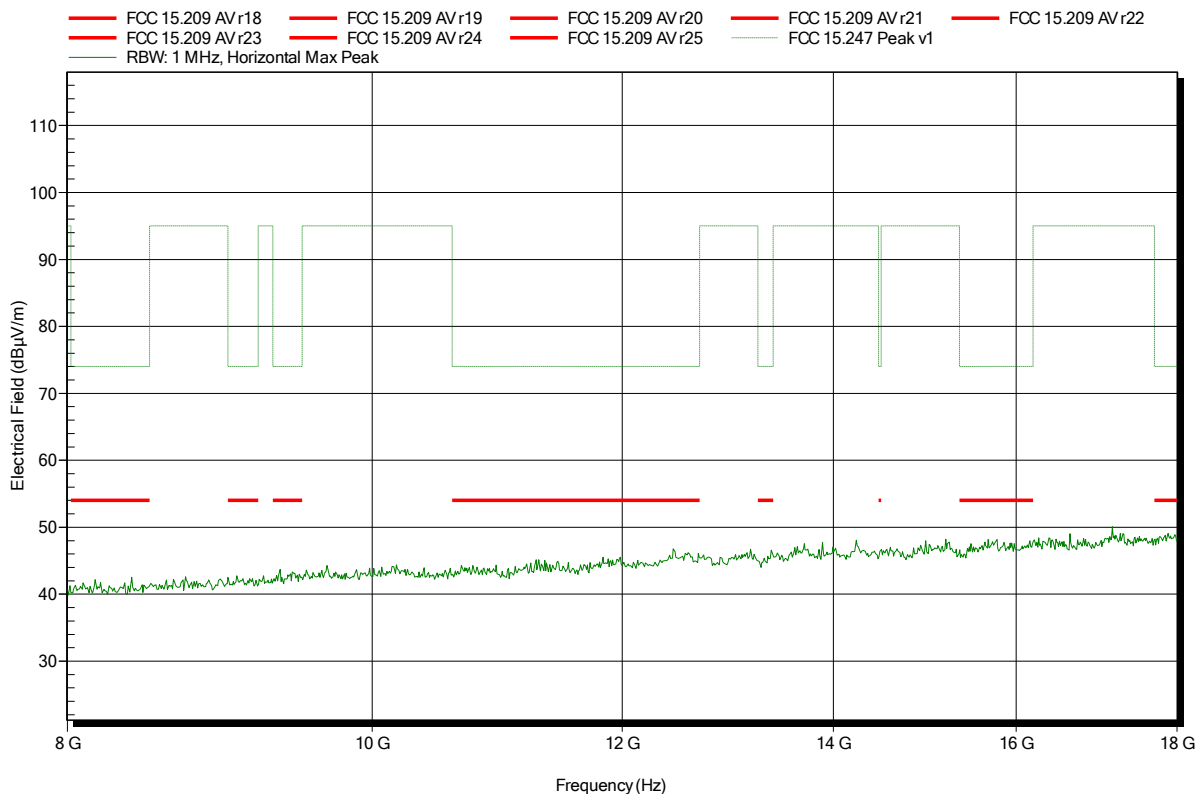


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 74

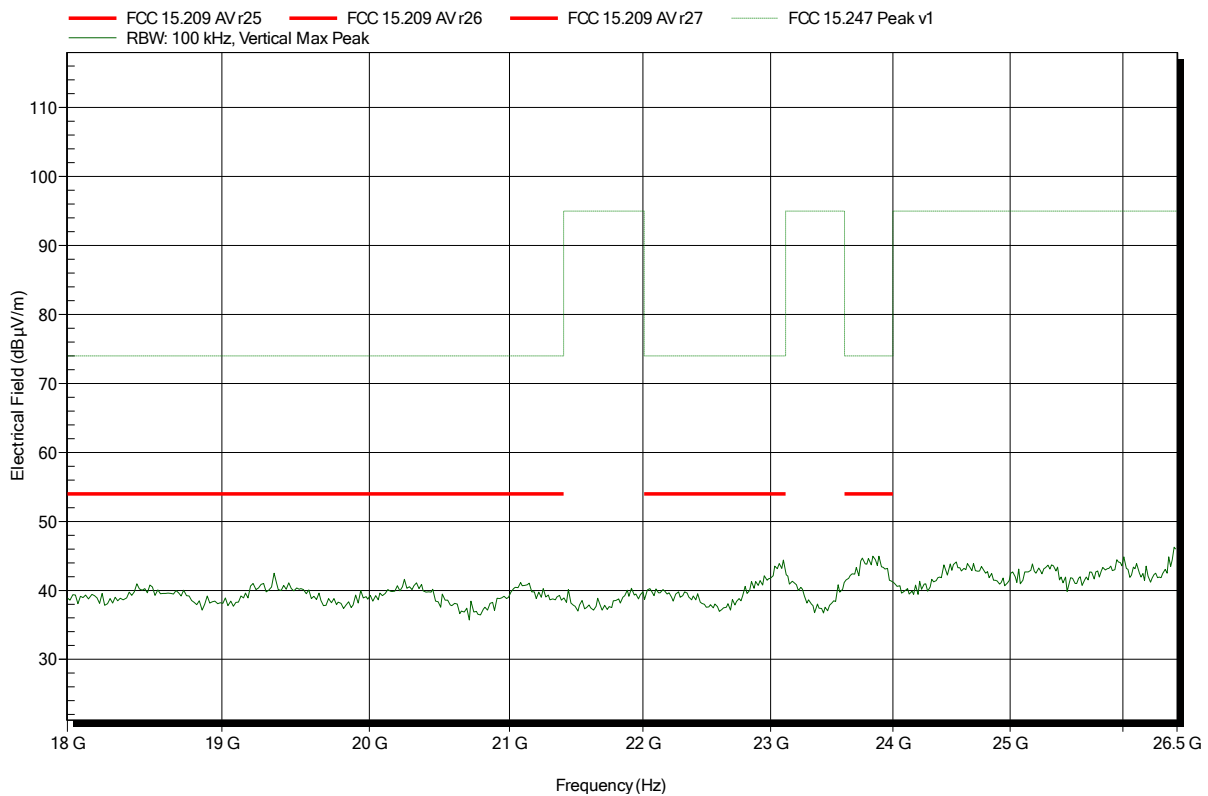


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 85

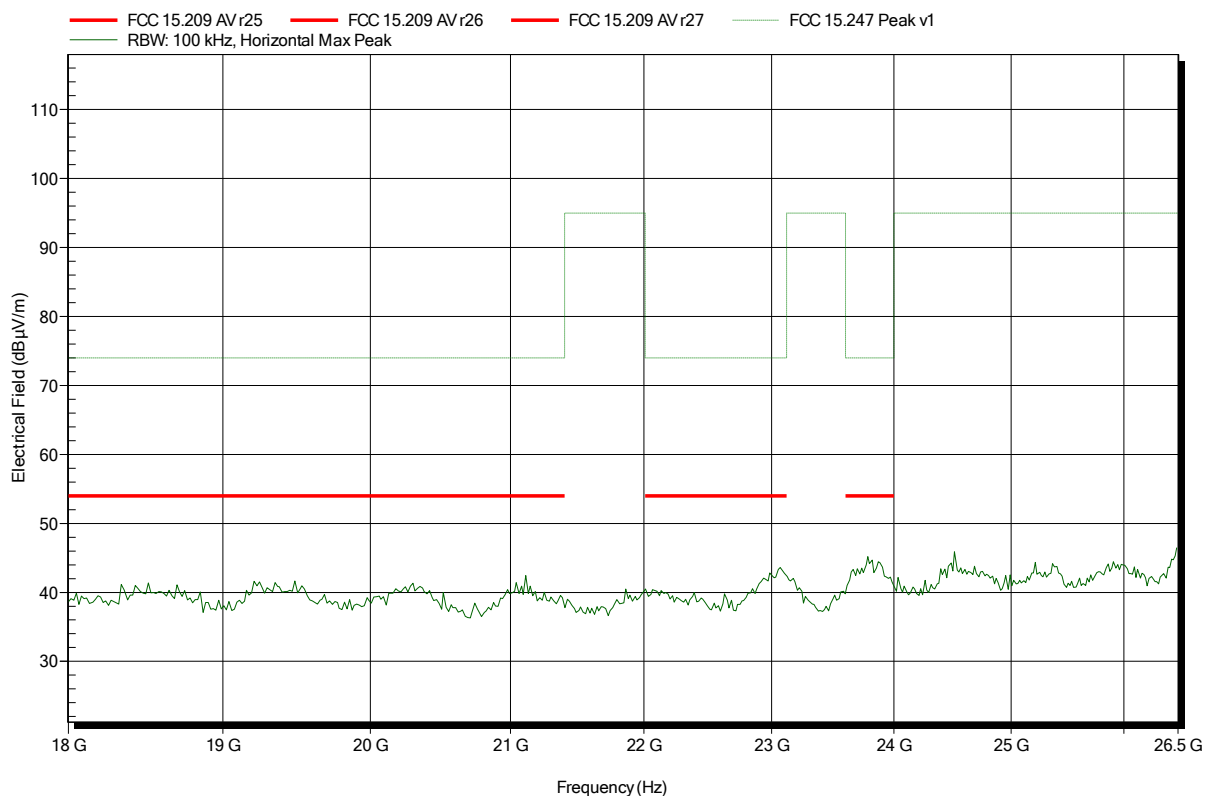


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 86

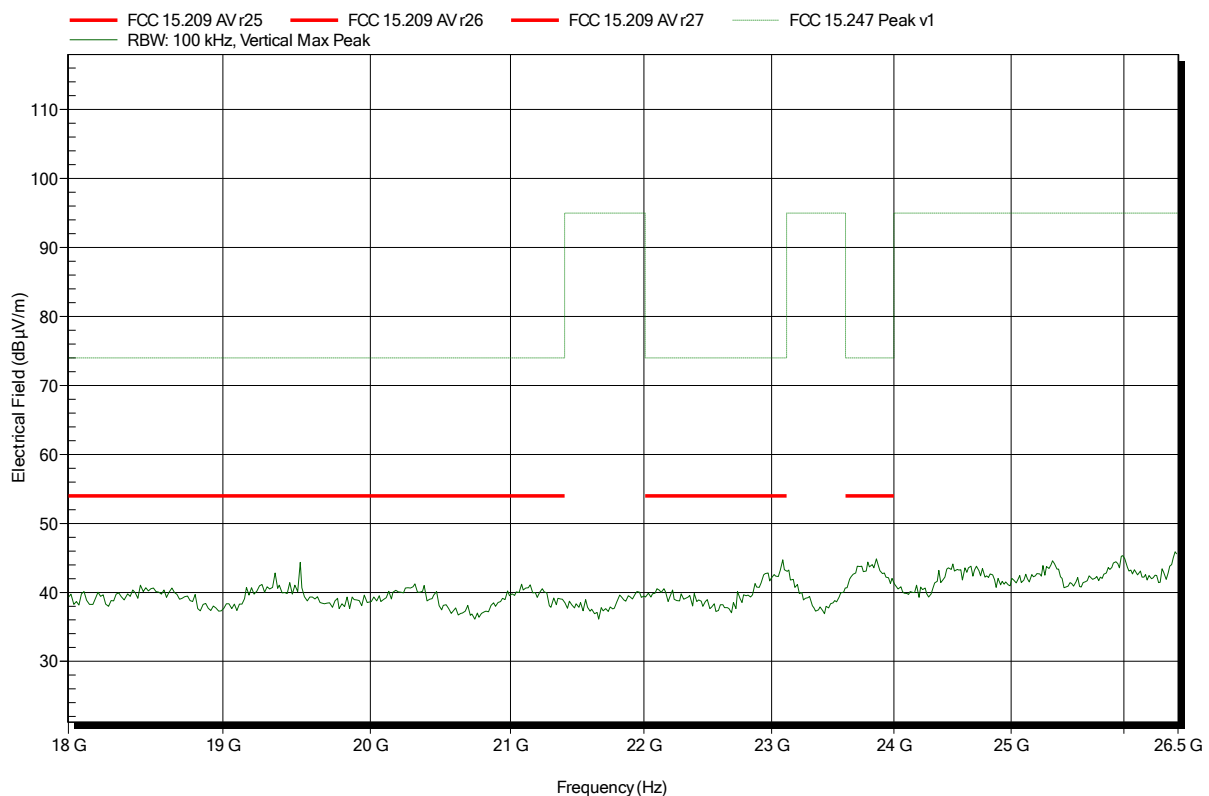


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 80

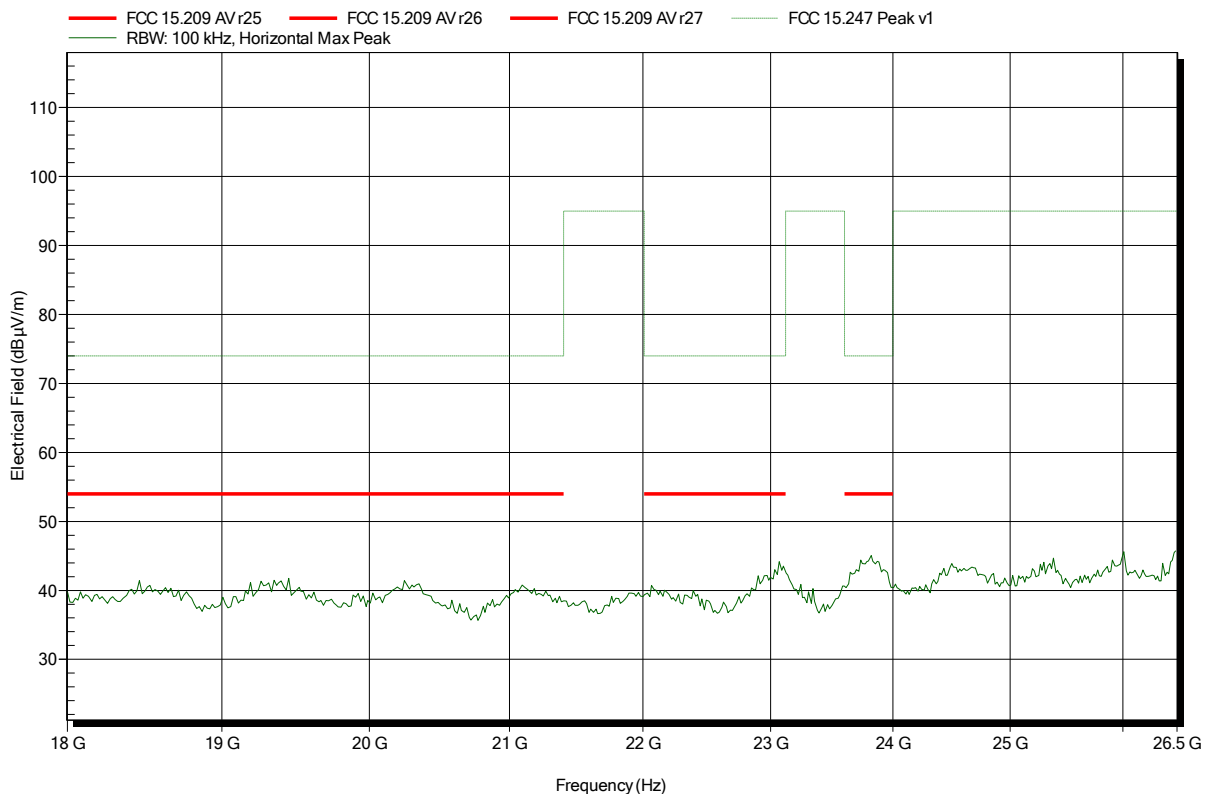


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 79

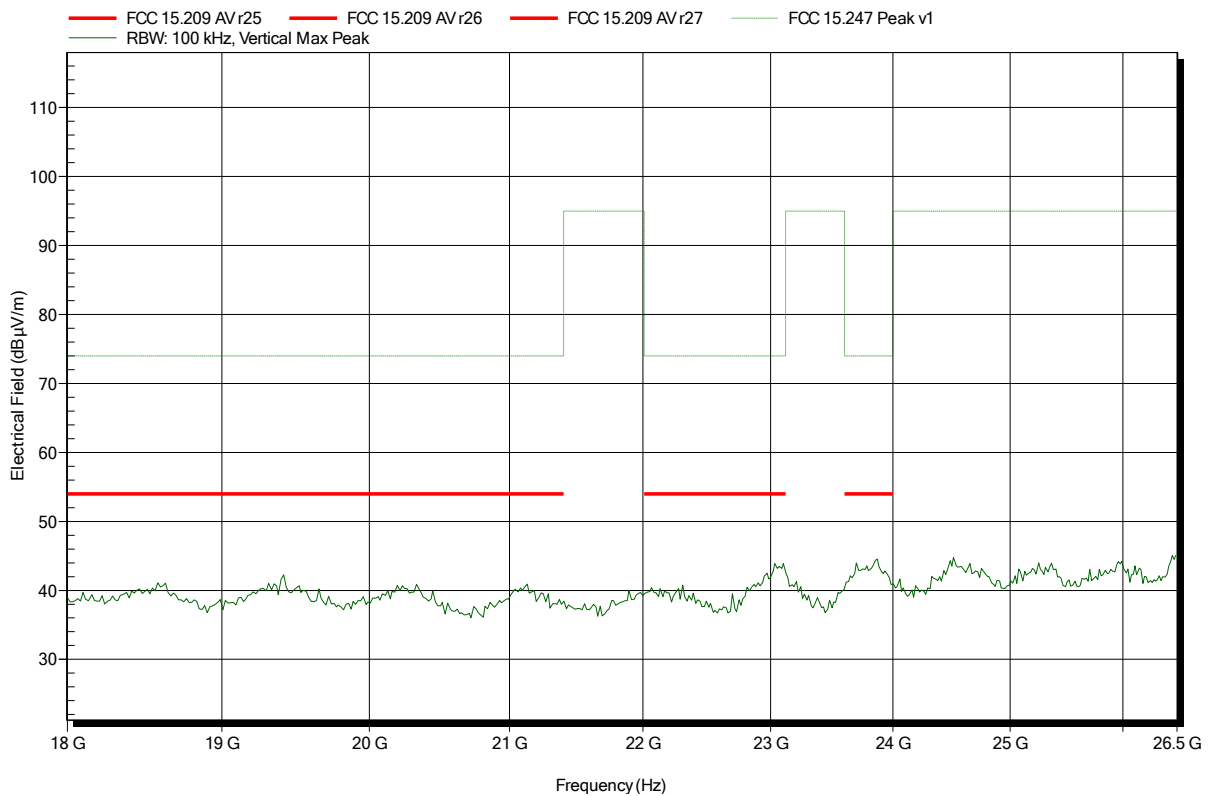


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 72

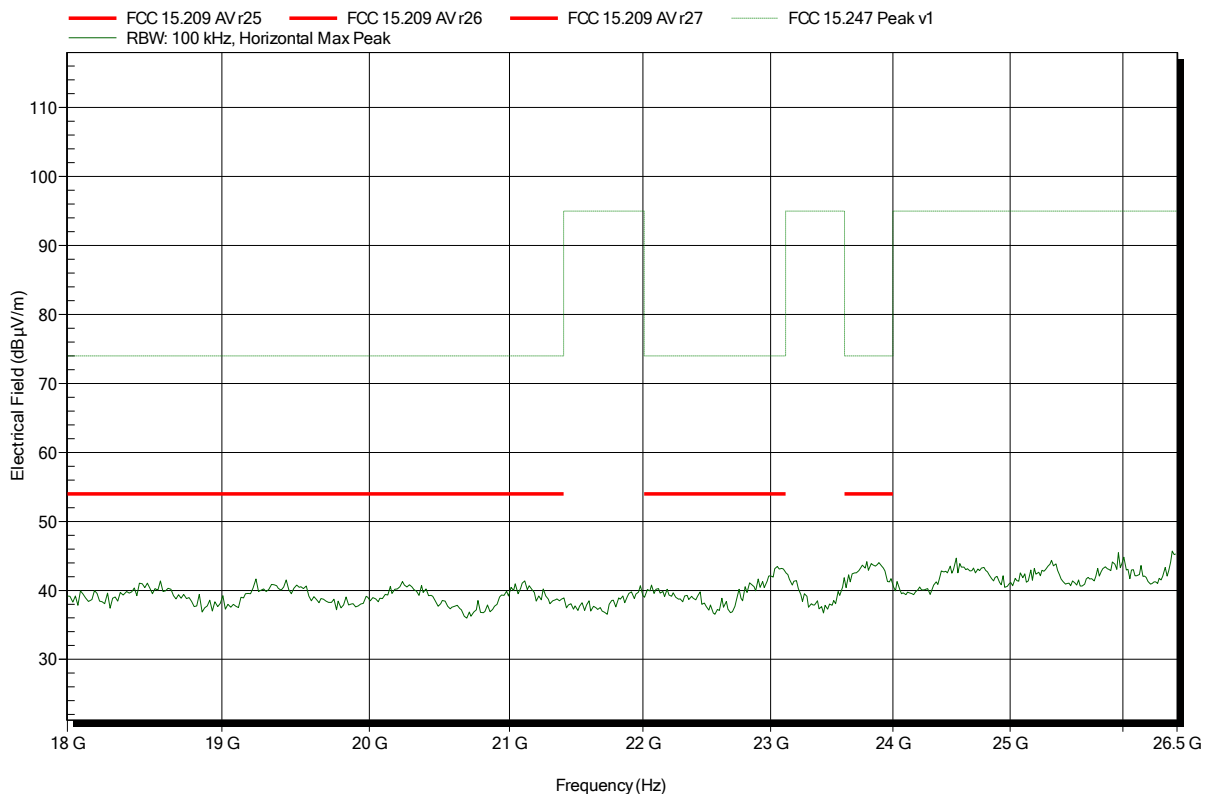


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1 V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	1 m converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2015-02-26
Note:	EUT vertical

Index 73



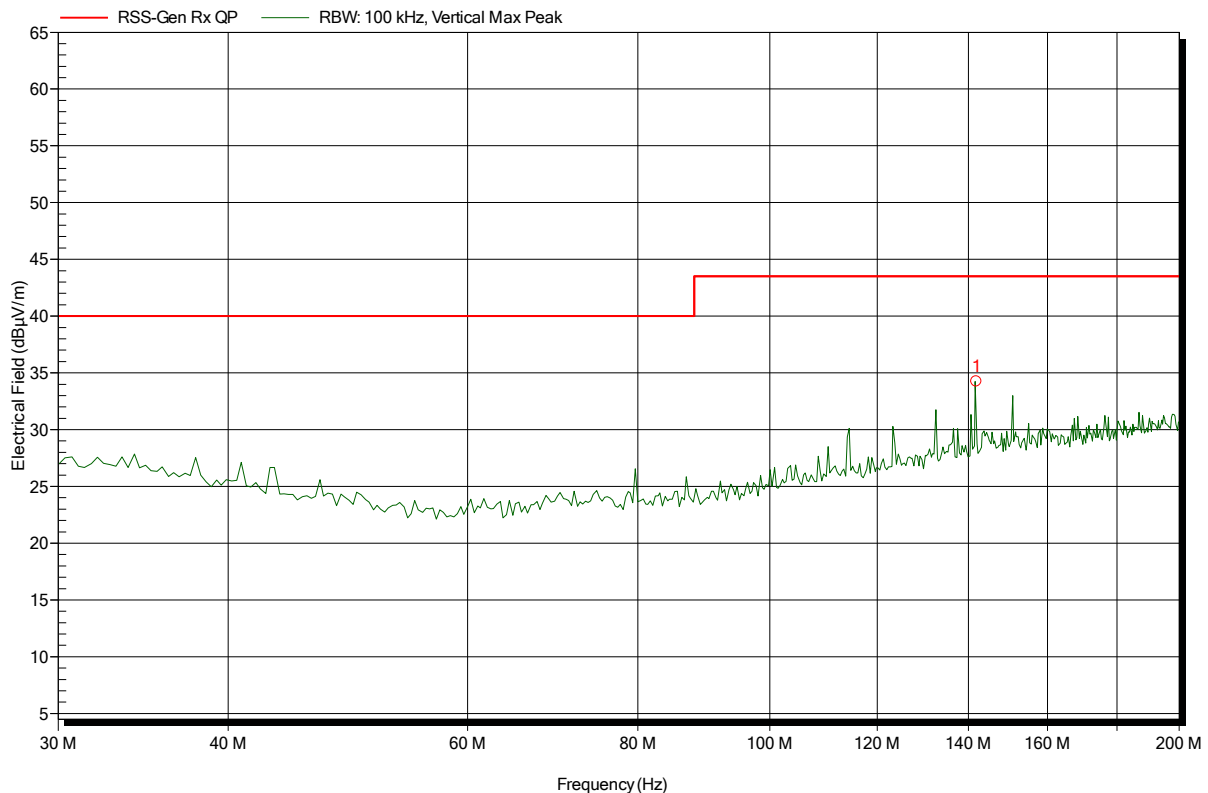
ANNEX B Receiver radiated spurious emissions

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1VDC
 Antenna: Rohde & Schwarz HK 116, Vertical
 Measurement distance: 3 m
 Mode: RX; BT-BLE; CH: 19; RX -Test-Mode
 Test Date: 2015-02-27
 Note: EUT vertical

Index 87



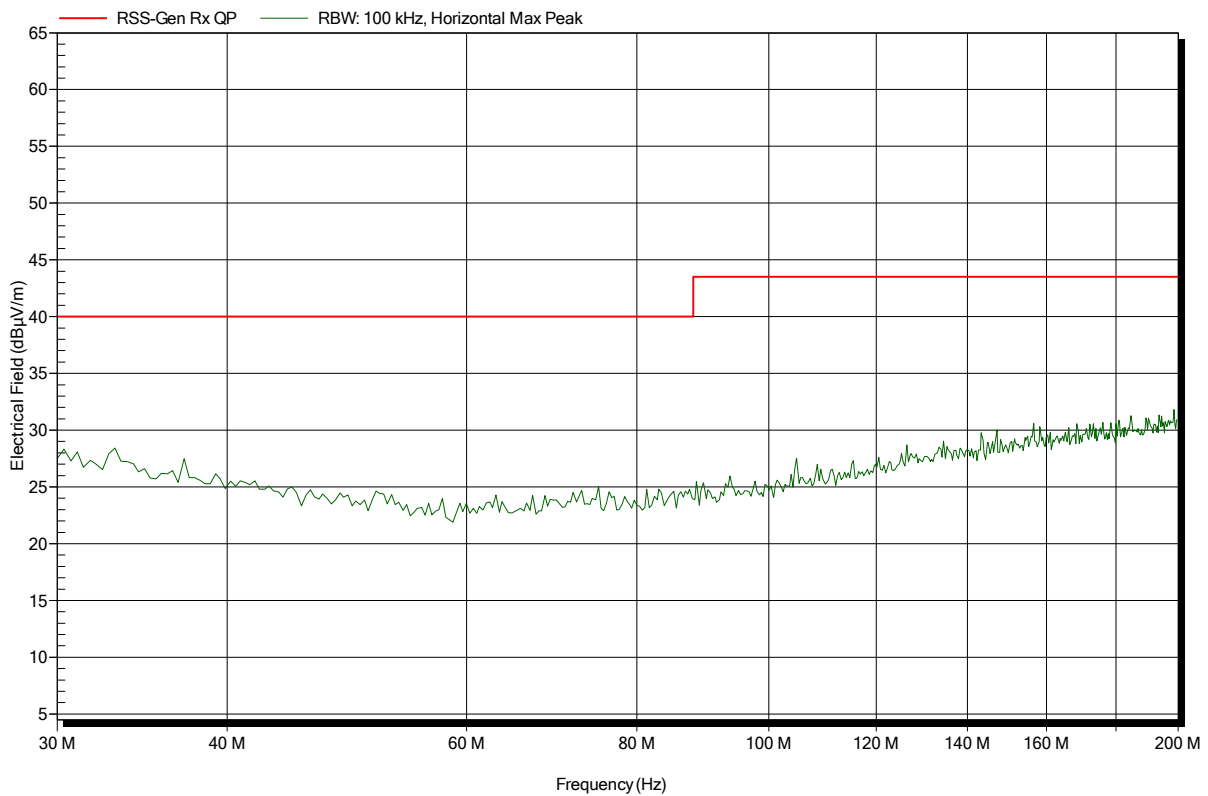
Frequency	Peak	Peak Limit	Peak Difference	Status
141.884 MHz	34.24 dBµV/m	43.5 dBµV/m	-9.26 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1VDC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2015-02-27
Note:	EUT vertical

Index 92

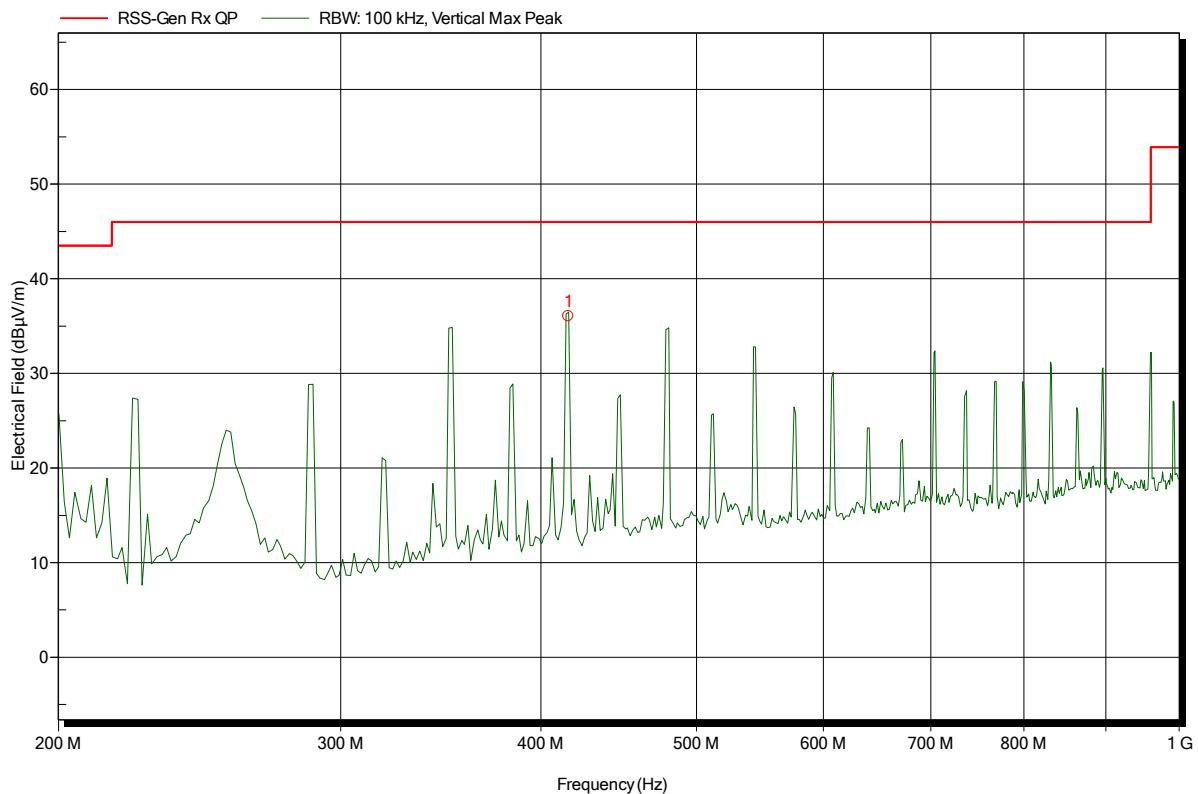


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant: Leica Geosystems AG
 EUT Name: Field Controller Win EC7
 Model: CS20
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Pudell
 Test Conditions: Tnom: 24°C, Vnom: 11.1VDC
 Antenna: Rohde & Schwarz HL 223, Vertical
 Measurement distance: 3 m
 Mode: RX; BT-BLE; CH: 19; RX -Test-Mode
 Test Date: 2015-02-27
 Note: EUT vertical

Index 81



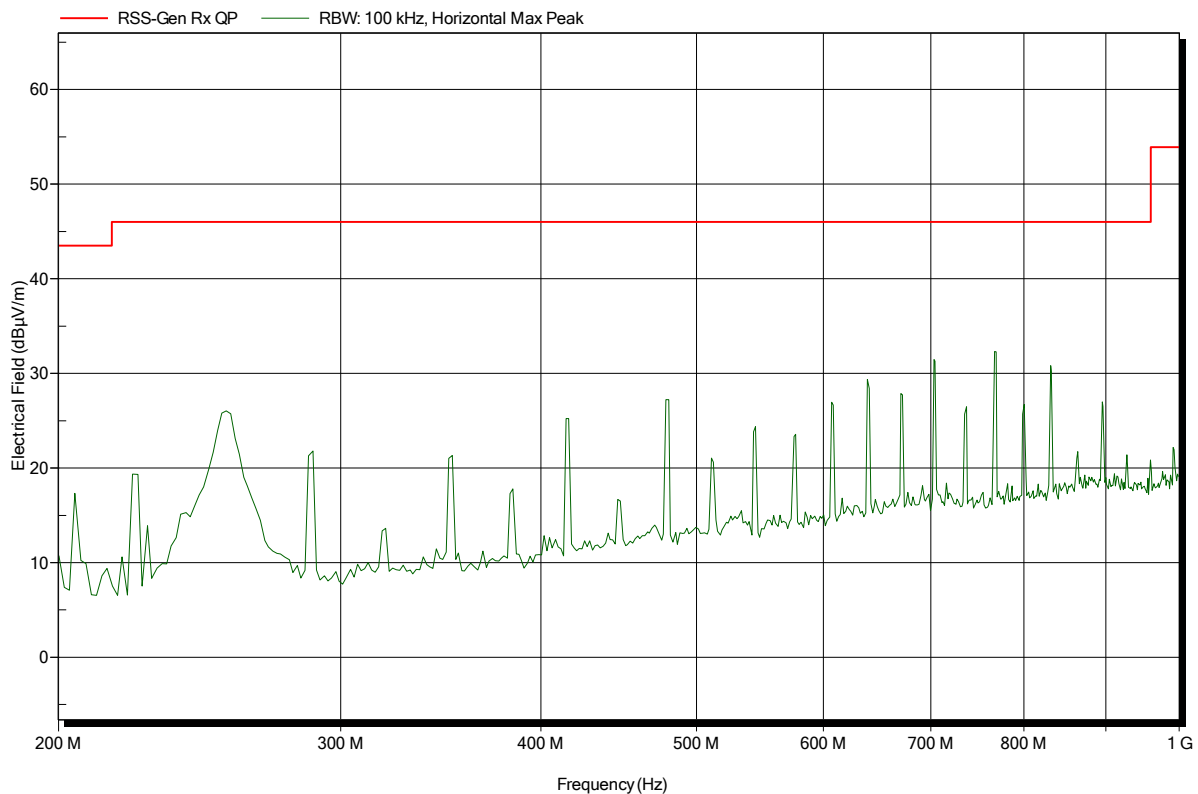
Frequency	Peak	Peak Limit	Peak Difference	Status
416 MHz	36.06 dBµV/m	46 dBµV/m	-9.94 dB	Pass

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1VDC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2015-02-27
Note:	EUT vertical

Index 86

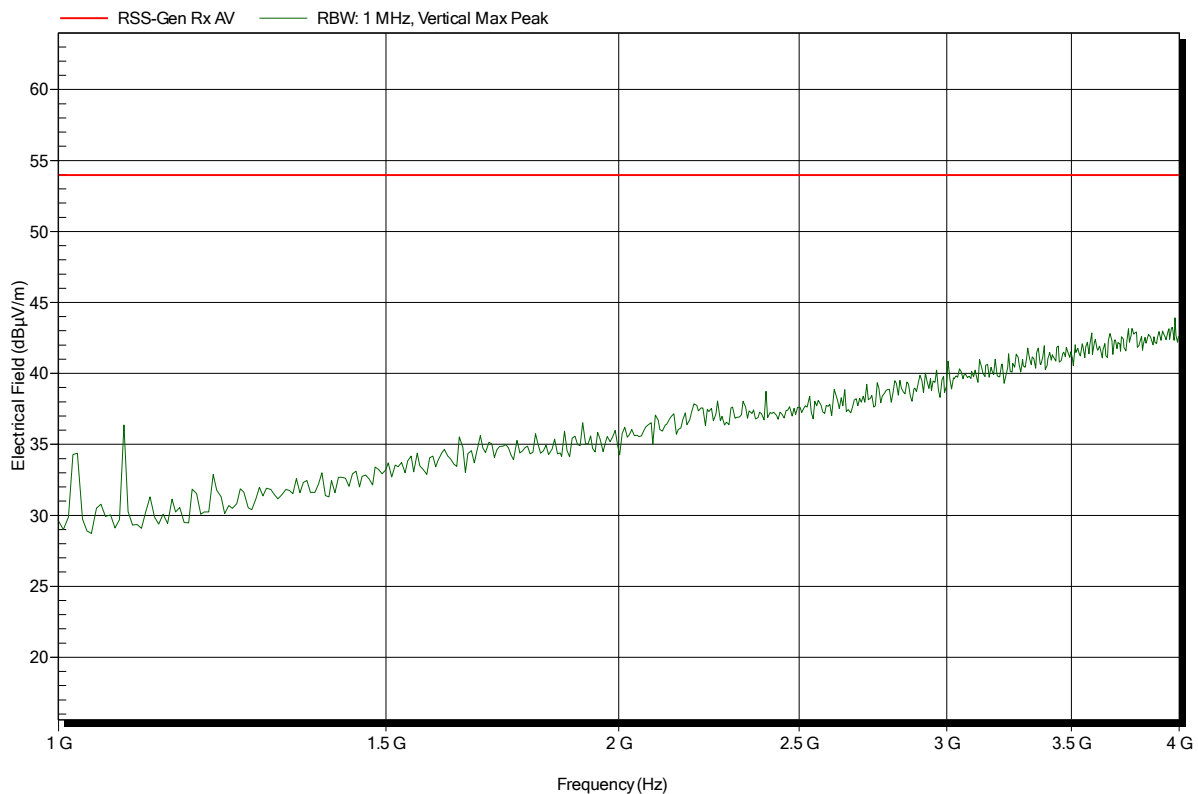


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1VDC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2015-02-27
Note:	EUT vertical

Index 69

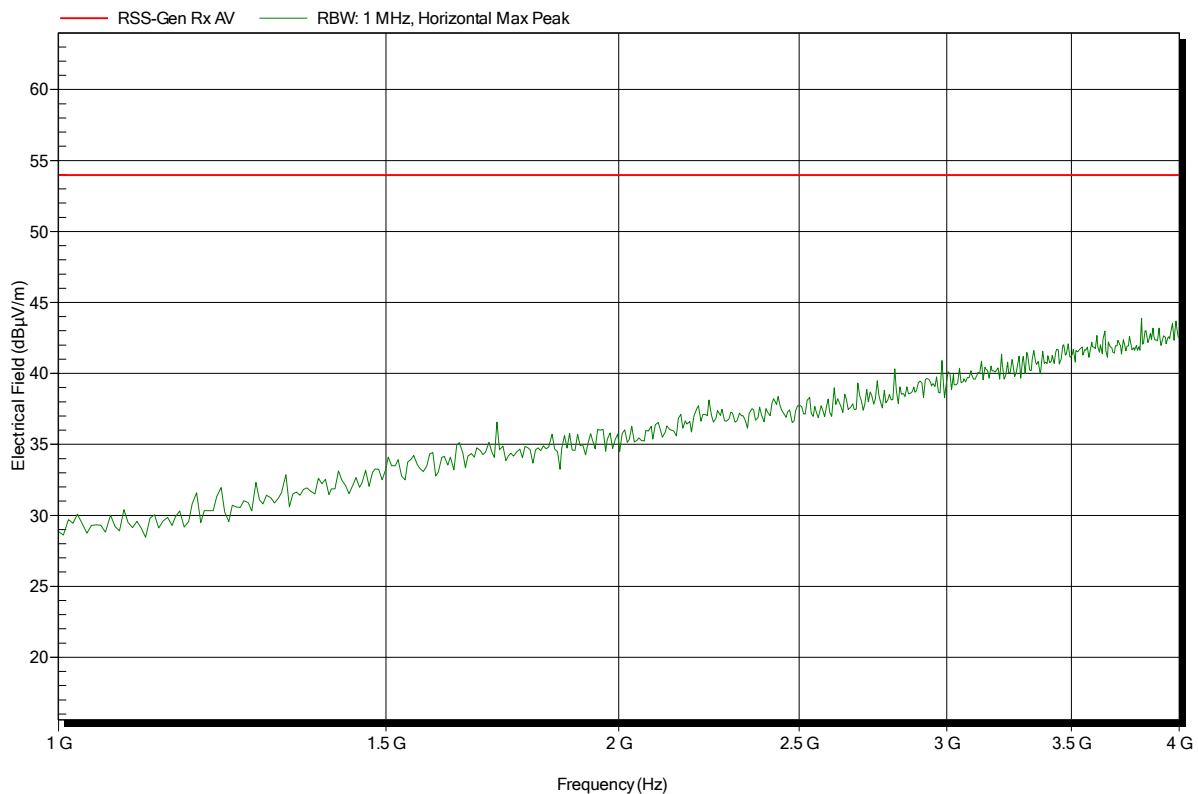


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1VDC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2015-02-27
Note:	EUT vertical

Index 79

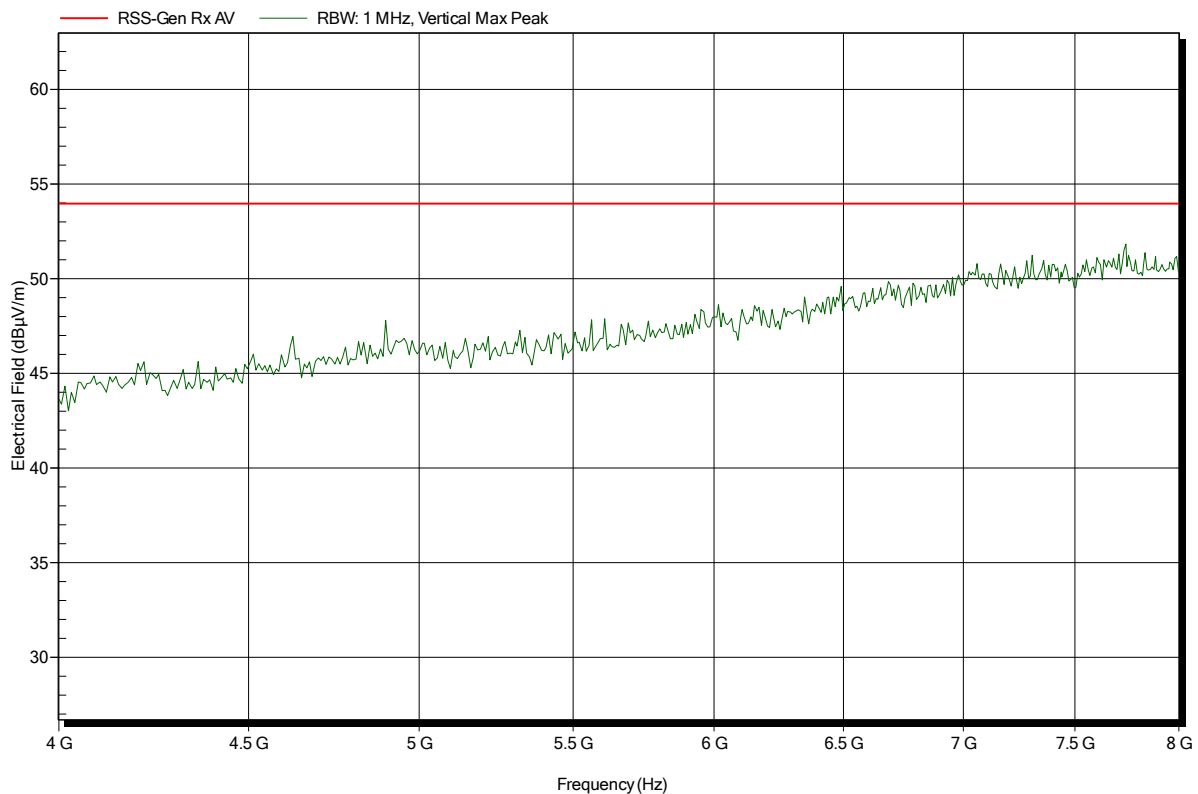


Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1VDC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2015-02-27
Note:	EUT vertical

Index 70



Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3919

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Pudell
Test Conditions:	Tnom: 24°C, Vnom: 11.1VDC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2015-02-27
Note:	EUT vertical

Index 80

