eurofins | Product Service

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-1406-3917-TFC247BL-V01
Testing Laboratory.....:	Eurofins Product Service GmbH
Address.....:	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation.....:	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
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 3.75G
Additional Model(s)	CS20 3.75G GNSS, CS20 3.75G Disto, CS20 3.75G Disto GNSS
Brand Name(s)	Leica Geosystems
Hardware version	V5.0
Firmware / Software version	1.0
	FCC-ID: RFD-CSNGF IC: 3177A-CSNGF
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 ..... :	2014-08-07 – 2015-01-26	
Compiled by ..... :	Christian Weber	
Tested by (+ signature)..... : (Responsible for Test)	Christian Weber	C. Weber .....
Approved by (+ signature) ..... :	Toralf Jahn	T. J .....
Date of issue ..... :	2015-04-22	
Total number of pages ..... :	88	

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:

CS20 3.75G was tested as the worst case configuration which incorporates all the radio technologies also used in CS20 3.75G GNSS, CS20 3.75G Disto, CS20 3.75G Disto GNSS

Version History

Version	Issue Date	Remarks	Revised by
01	2015-04-22	Initial Release	

REPORT INDEX

1 Equipment (Test item) Description

Description	Field Controller Win EC7	
Model	CS20 3.75G	
Additional Model(s)	CS20 3.75G GNSS, CS20 3.75G Disto, CS20 3.75G Disto GNSS	
Brand Name(s)	Leica Geosystems	
Serial number	None	
Hardware version	V5.0	
Software / Firmware version	1.0	
FCC-ID	RFD-CSNGF	
IC	3177A-CSNGF	
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}	2442 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 (customer declaration)
Manufacturer	Leica Geosystems AG Heinrich Wild Strasse 9435 Heerbrugg SWITZERLAND	
Power supply	V_{NOM}	11.1 VDC
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

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description	
Transmit	General conditions:	EUT powered by battery / AC/DC adaptor.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = GFSK Data rate = 1 Mbps Bandwidth = 2 MHz Duty cycle = 100 %
Receive	General conditions:	EUT powered by battery / AC/DC adaptor.
	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	FSP 30	EF00312	2014-02	2015-02

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	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00187	2014-03	2017-03
LPD Antenna	R&S	HL 025	EF00327	2013-02	2016-02

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 dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

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

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, 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 8.8	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 4.9 IC RSS-Gen 7.2.5	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

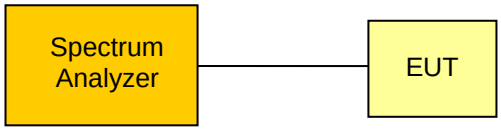
3.1 Test Conditions and Results – Occupied Bandwidth

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

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	1023
F_{MID}	2442	Transmit	1053
F_{HIGH}	2480	Transmit	1043

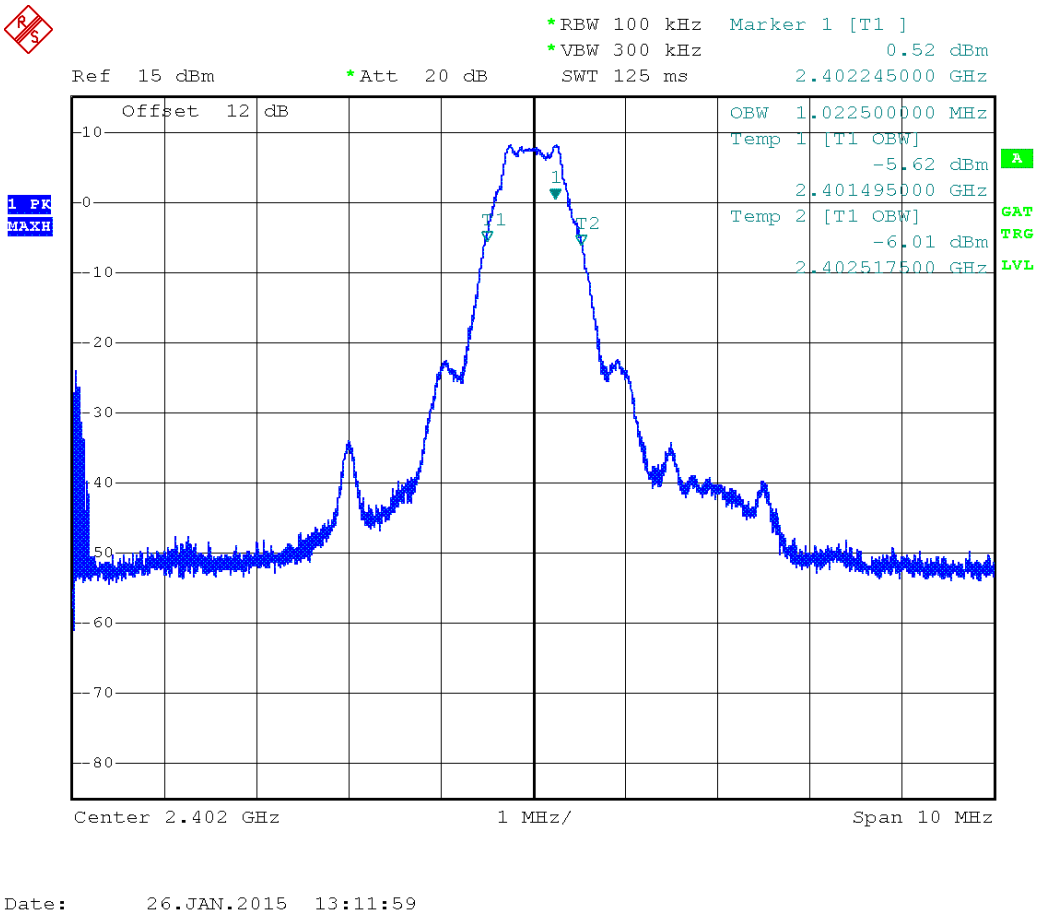
Comments:

Occupied Bandwidth – F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
Test Site:	Eurofins Product Service GmbH
Operator:	Christian Weber
Test Conditions:	Tnom / Vnom
Mode:	Tx, BT-LE, 2402 MHz, modulated
Test Date:	2015-01-26
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	conducted measurement

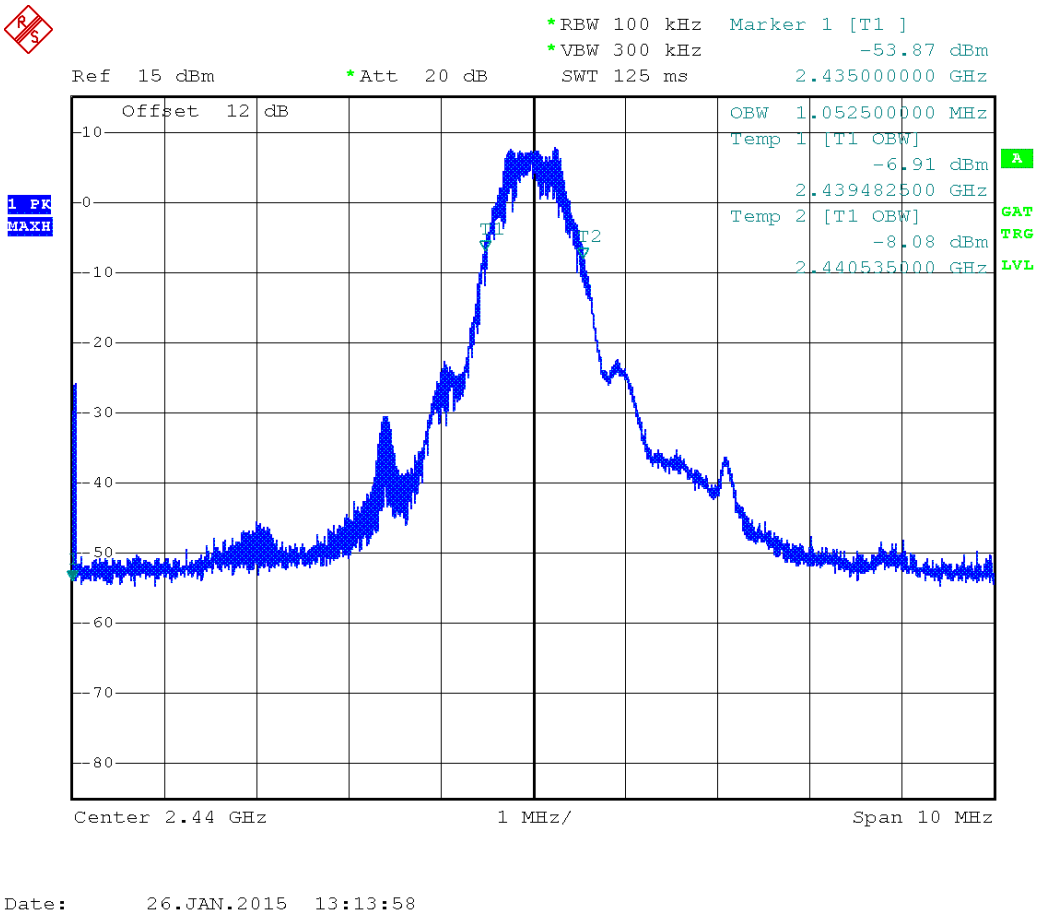


Occupied Bandwidth – F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
Test Site:	Eurofins Product Service GmbH
Operator:	Christian Weber
Test Conditions:	Tnom / Vnom
Mode:	Tx, BT-LE, 2440 MHz, modulated
Test Date:	2015-01-26
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	conducted measurement

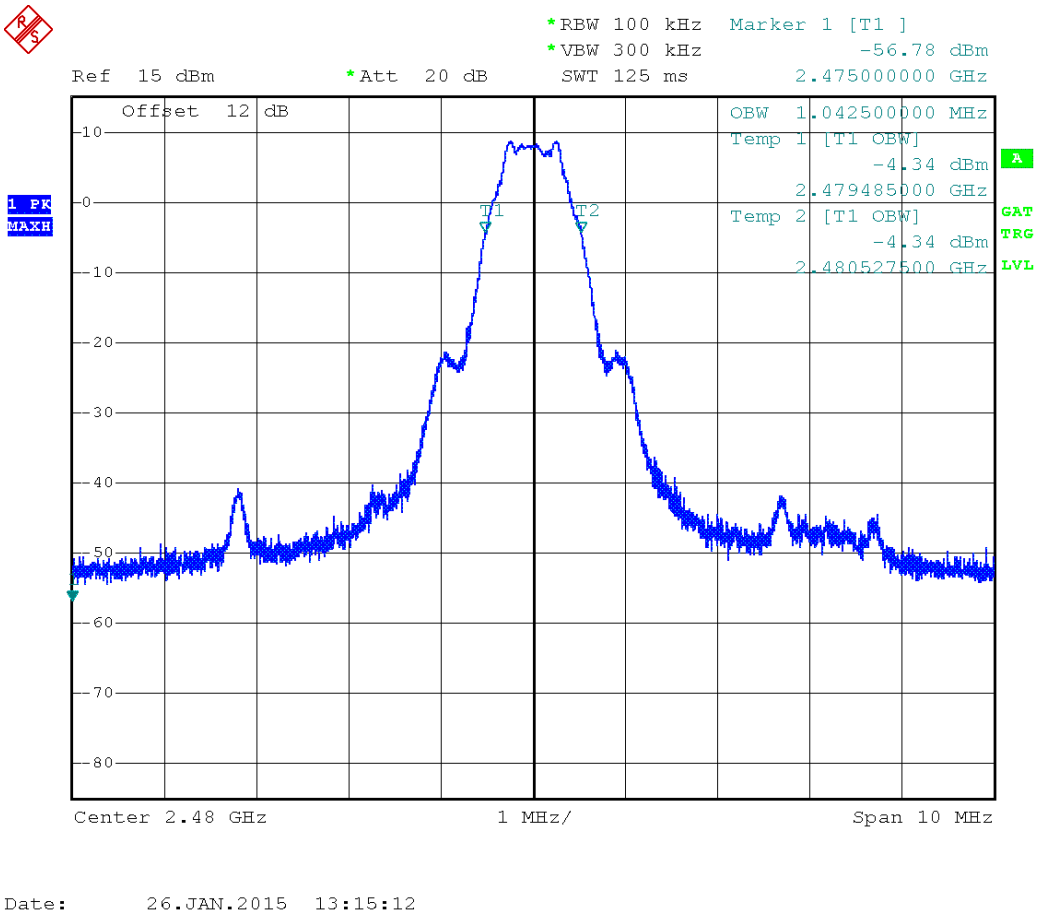


Occupied Bandwidth – F_{HIGH}

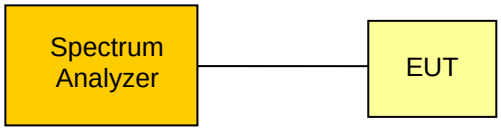
Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
Test Site:	Eurofins Product Service GmbH
Operator:	Christian Weber
Test Conditions:	Tnom / Vnom
Mode:	Tx, BT-LE, 2480 MHz, modulated
Test Date:	2015-01-26
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	conducted measurement



3.2 Test Conditions and Results – 6 dB Bandwidth

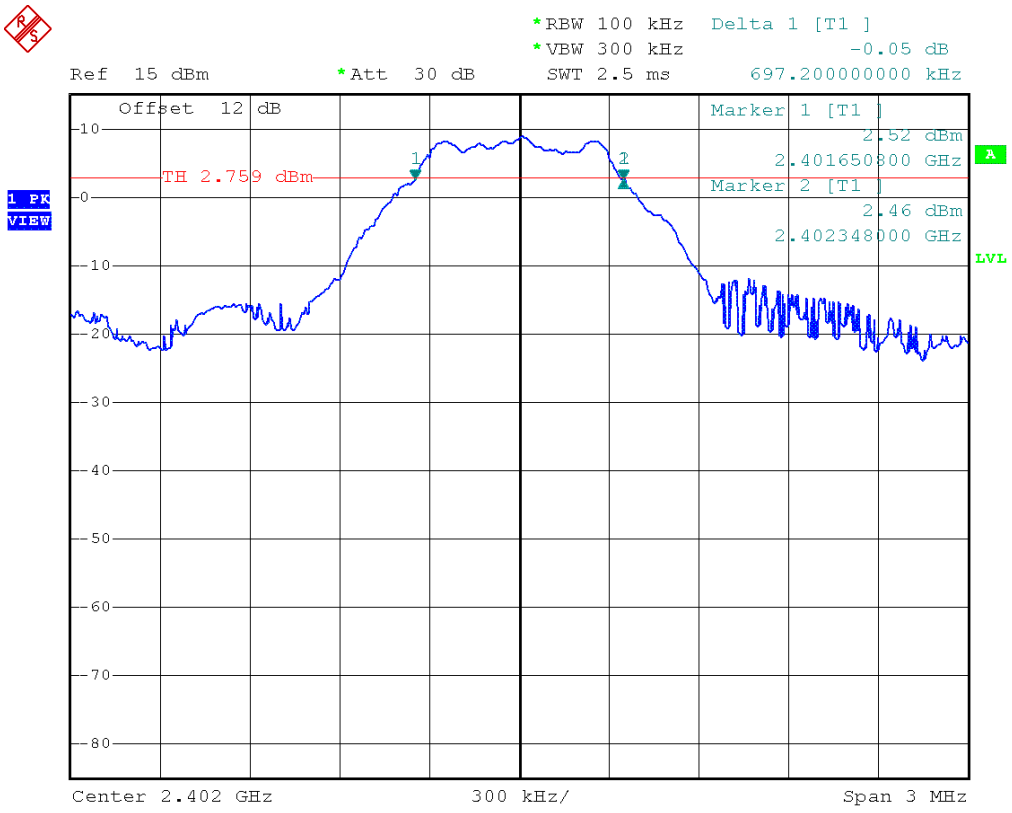
6dB Bandwidth acc. to FCC 15.247 / IC RSS-210					Verdict: PASS
EUT requirement rule parts and clause	Reference				
	FCC 15.247(a)(2) / IC RSS-210 A8.2				
Test according to measurement reference	Reference Method				
	FCC KDB Publication No. 558074				
Test frequency range	Tested frequencies				
	F_{LOW} / F_{MID} / F_{HIGH}				
Limits					
Limit					
≥ 500kHz					
Test setup					
					
Test procedure					
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-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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



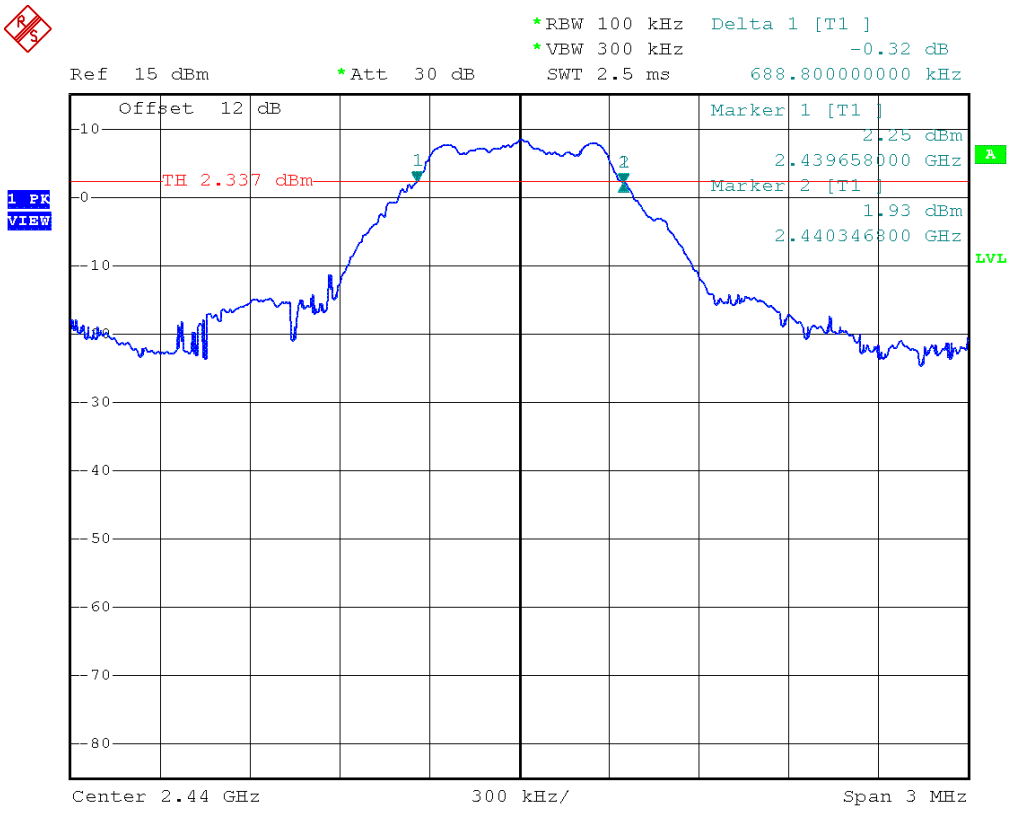
Comment: 6 dB bandwidth: 697.2 KHz > 500 KHz; verdict: PASS
Date: 26.JAN.2015 13:17:30

6 dB Bandwidth – F_{MID}

Minimum 6 dB Bandwidth acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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



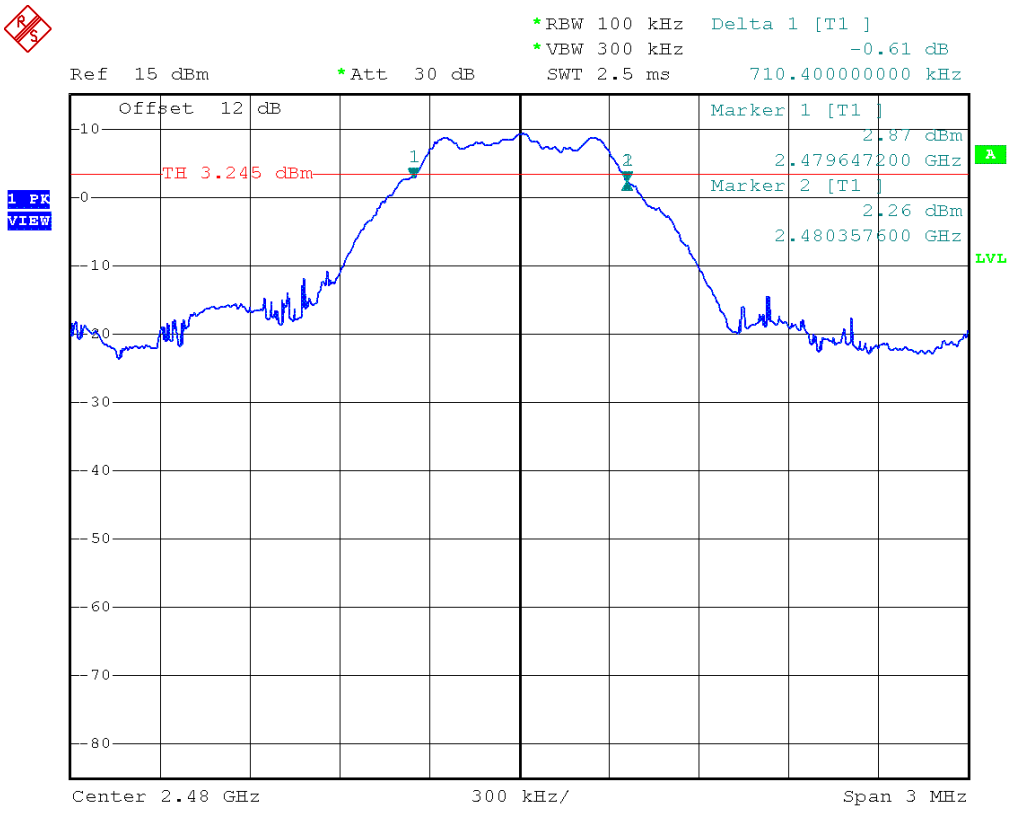
Comment: 6 dB bandwidth: 688.8 KHz > 500 KHz; verdict: PASS
Date: 26.JAN.2015 13:18:41

6 dB Bandwidth – F_{HIGH}

Minimum 6 dB Bandwidth acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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

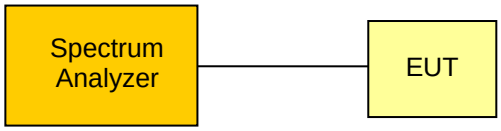
Maximum peak conducted power acc. to FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(b)(3) / IC RSS-210 A8.4
Test according to measurement reference	Reference Method
	FCC KDB Publication No. 558074
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
Measurement mode	Peak
Maximum antenna gain	2.2 dBi ⇒ 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:

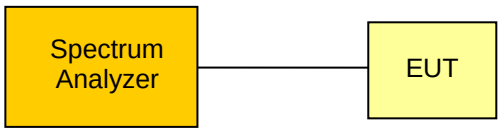
3.4 Test Conditions and Results – Power spectral density

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

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. 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 [dBµV]	Result	Average [dBµV]	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-1406-3917

Manufacturer:	Leica Geosystems AG
EUT Name:	Feld Controller
Model:	CS20 3.75G
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:	Full Disto+ME, charging, WLAN link to AP, BT link to Laptop, GSM900 link to CMU, LR-BT link to TS15 with RH16
Test Date:	2014-08-07
Note:	

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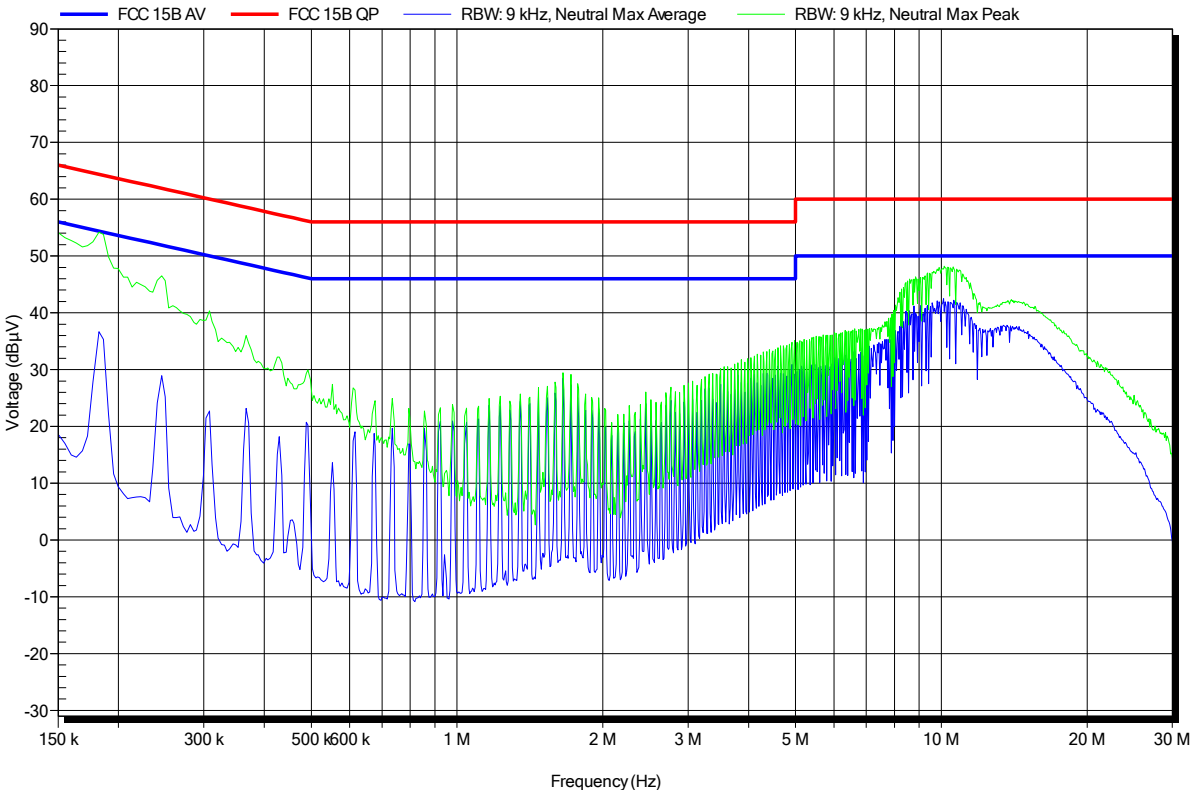

Conducted Emissions

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

Project number: G0M-1406-3917

Manufacturer:	Leica Geosystems AG
EUT Name:	Feld Controller
Model:	CS20 3.75G
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:	Full Disto+ME, charging, WLAN link to AP, BT link to Laptop, GSM900 link to CMU, LR-BT link to TS15 with RH16
Test Date:	2014-08-07
Note:	

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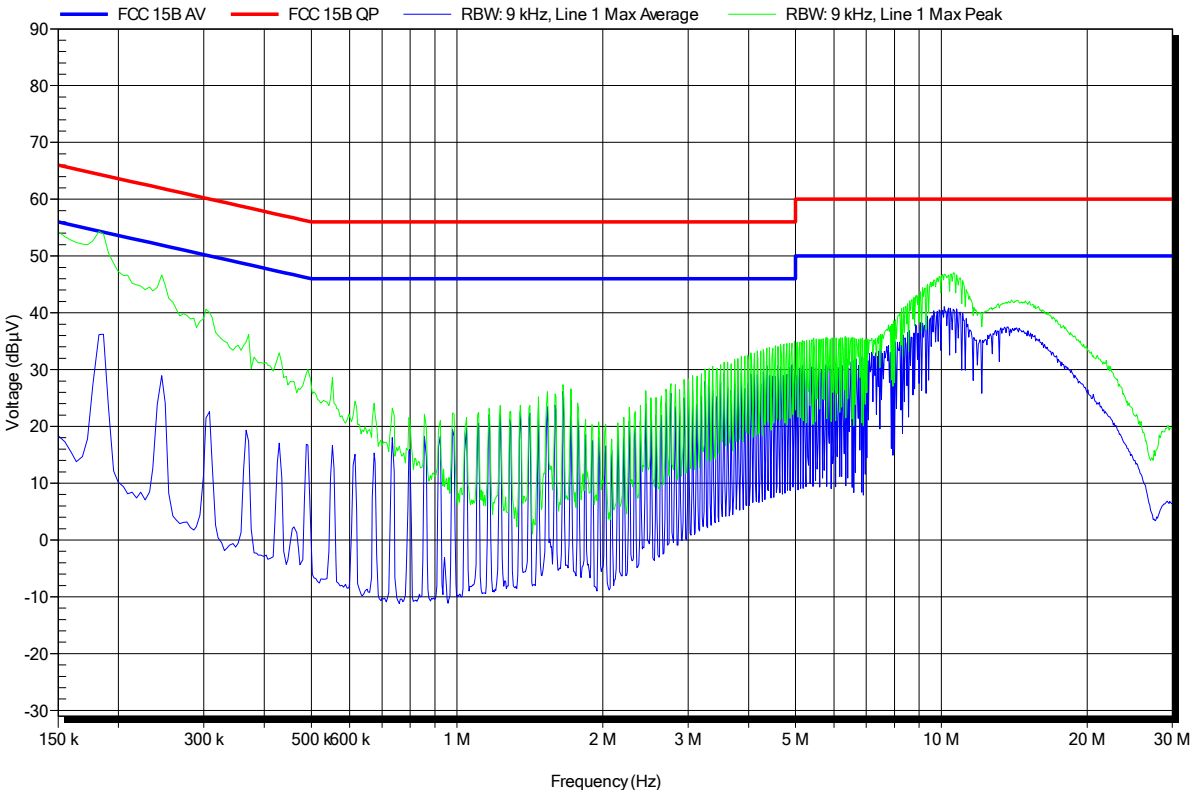


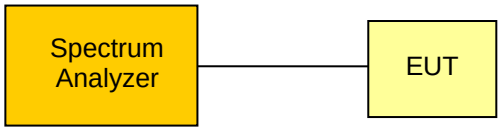
3.6 Test Conditions and Results – Band edge compliance

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

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

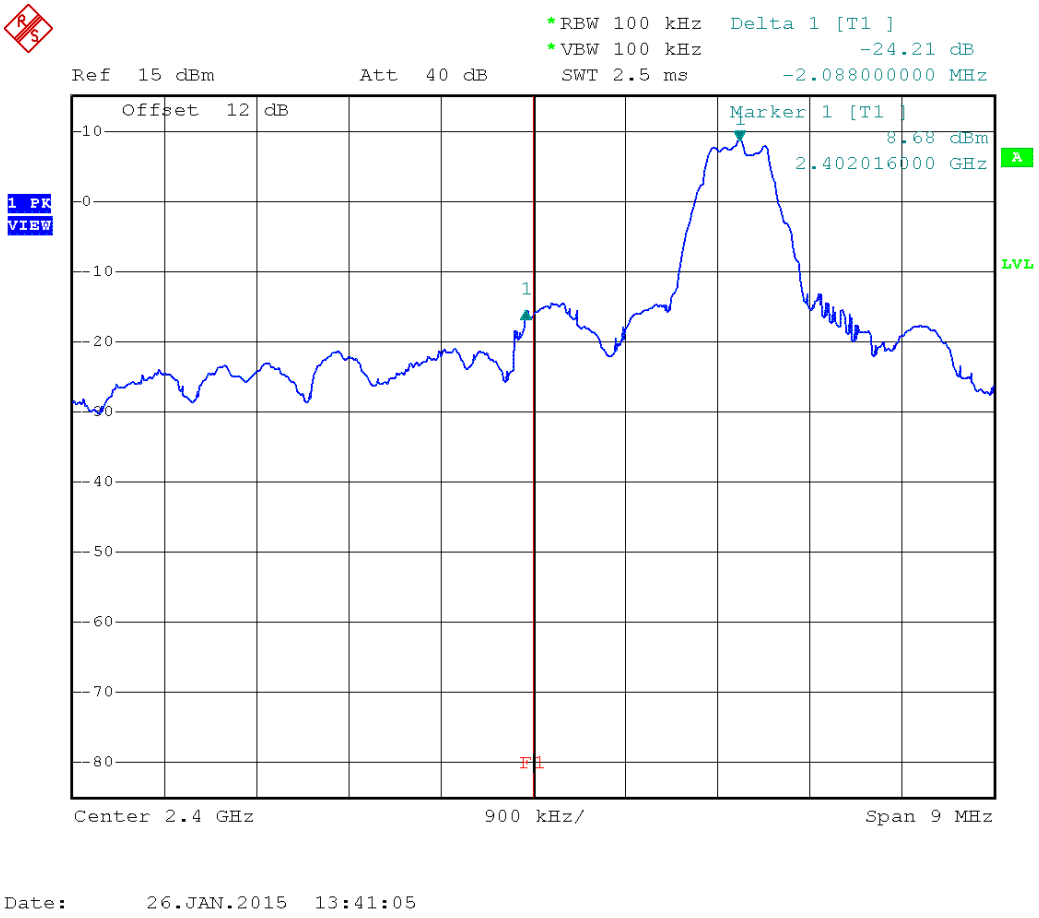
Comments:

Band-edge compliance - F_{LOW}

Band-edge compliance acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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

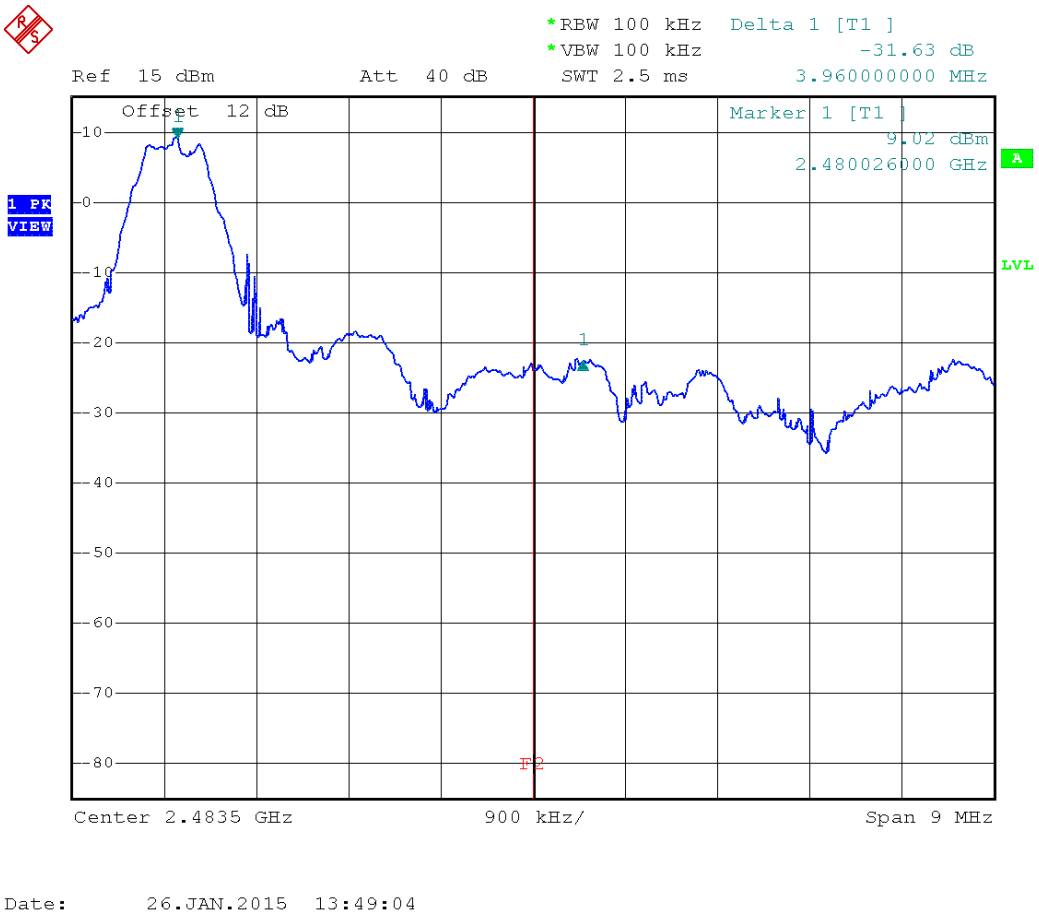


Band-edge compliance – F_{HIGH}

Band-edge compliance acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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



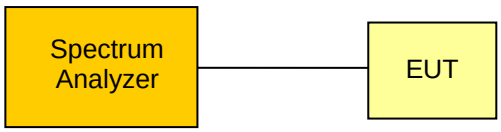
3.7 Test Conditions and Results – Conducted spurious emissions

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 – 10th 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

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

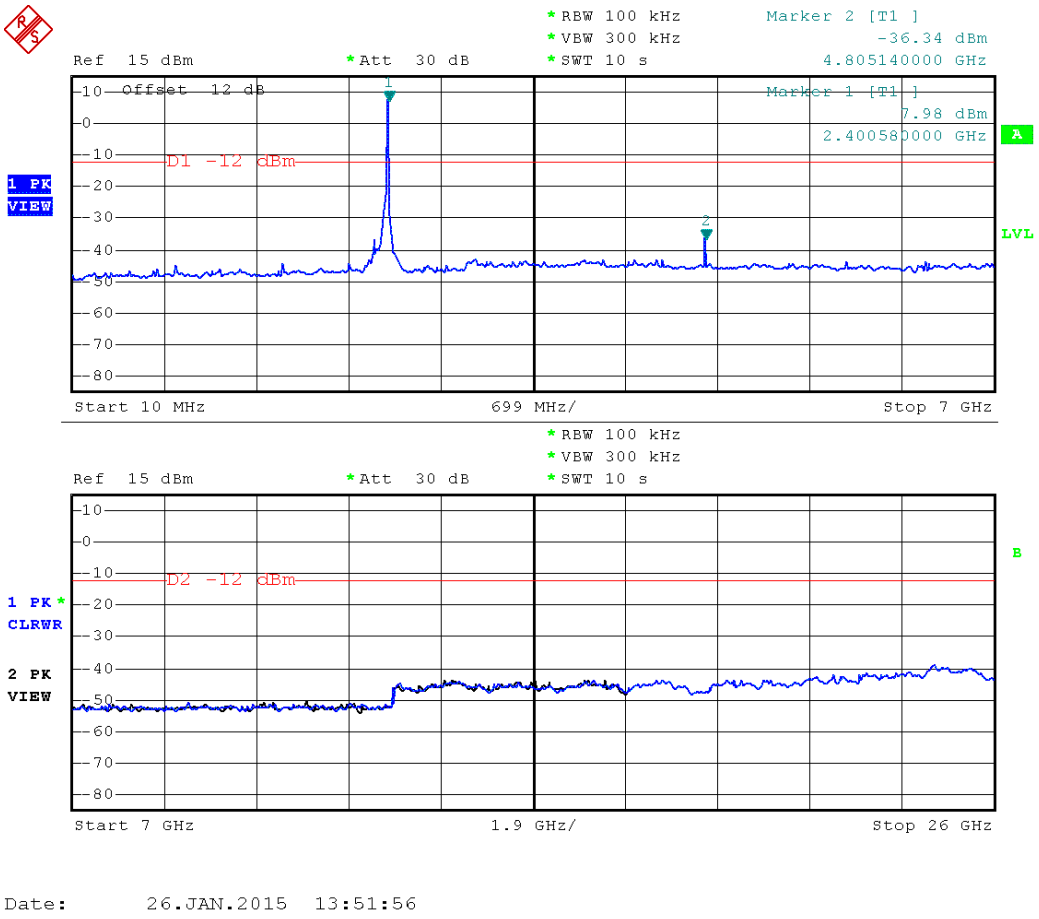
Comments:

Conducted spurious emissions – F_{LOW}

Spurious Emissions acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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

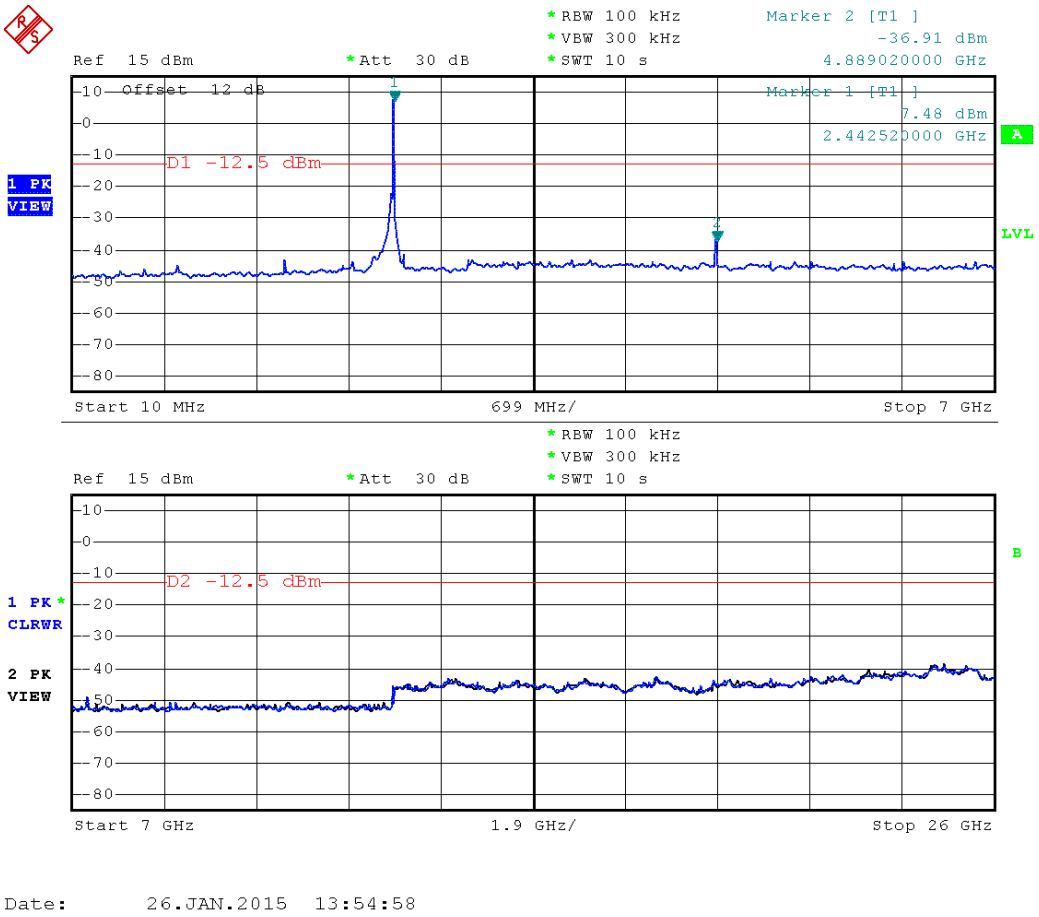


Conducted spurious emissions – F_{MID}

Spurious Emissions acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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:	Spurious in non-restricted frequency bands (558074 D01 Meas Guidance)
Note 2:	conducted measurement

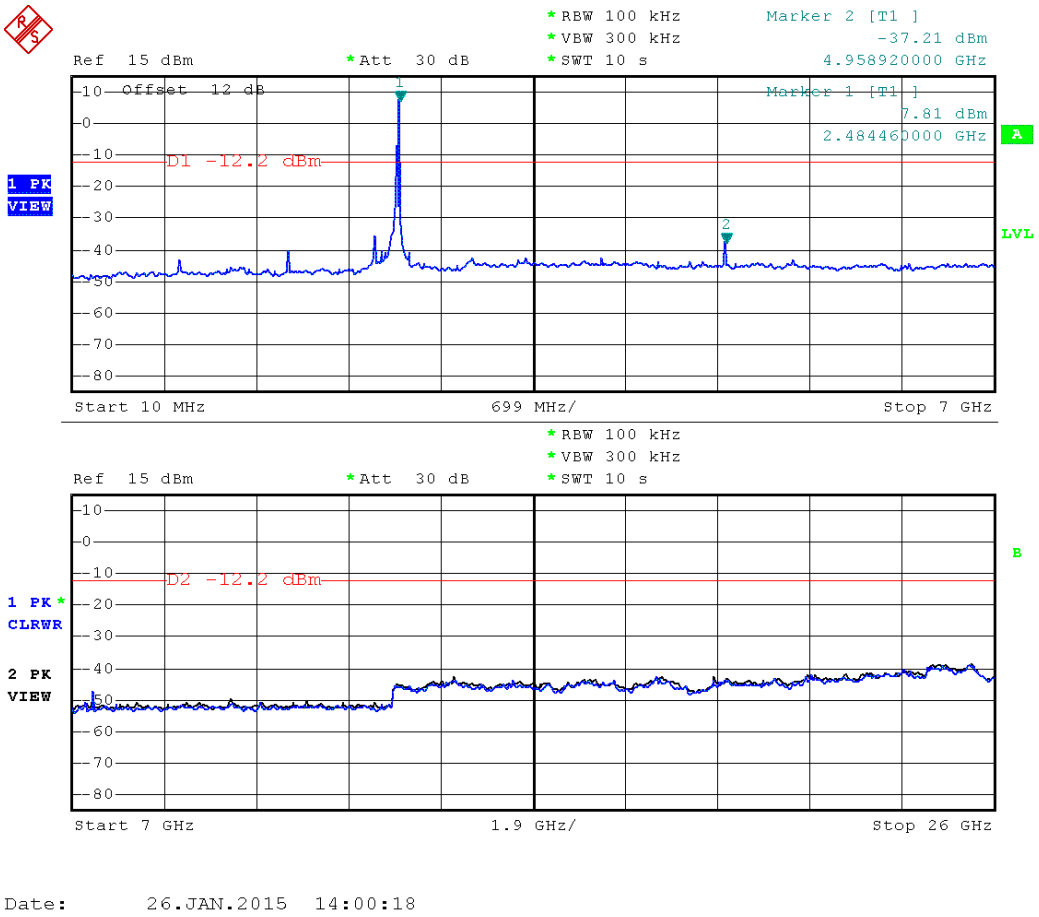


Conducted spurious emissions – F_{HIGH}

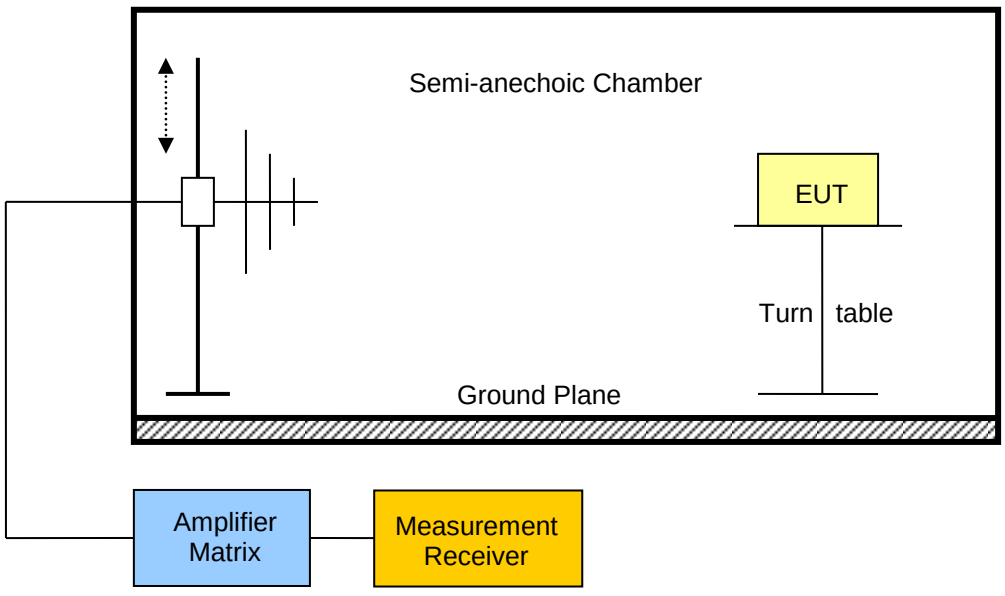
Spurious Emissions acc. to FCC 15.247

Project Number: G0M-1406-3917

Applicant:	Leica Geosystems AG
EUT Name:	Field Controller Win EC7
Model:	CS20 3.75G
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



3.8 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 – 10th Harmonic		
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/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
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)). 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.				
Test setup				
				

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

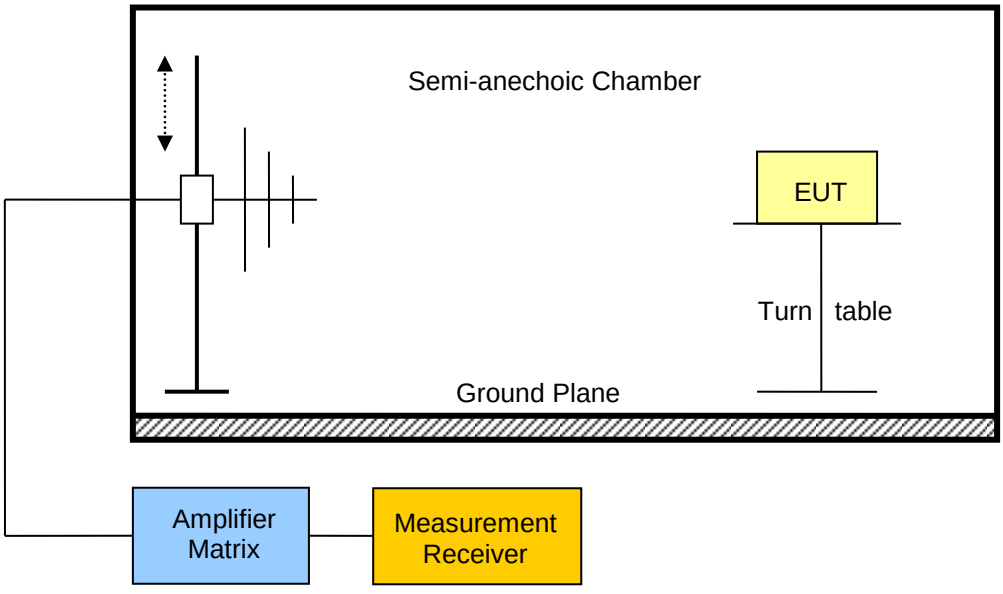
Test results

Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbµV/m]	Det.	Pol.	Limit [dbµV/m]	Limit dist. [m]*	Margin [dB]
F_{LOW}	2402	Transmit	608	28.37	pk	ver	46.00	3	-17.63
F_{LOW}	2402	Transmit	608	26.75	pk	hor	46.00	3	-19.25
F_{LOW}	2402	Transmit	2377	56.48	pk	hor	74.00	3	-17.52
F_{LOW}	2402	Transmit	2377	32.77	RMS	hor	54.00	3	-21.23
F_{LOW}	2402	Transmit	2385	53.74	pk	ver	74.00	3	-20.26
F_{LOW}	2402	Transmit	2385	34.41	RMS	ver	54.00	3	-19.59
F_{LOW}	2402	Transmit	2385	57.12	pk	hor	74.00	3	-16.88
F_{LOW}	2402	Transmit	2385	37.34	RMS	hor	54.00	3	-16.66
F_{LOW}	2402	Transmit	2400	78.49	pk	ver	95.00	3	-16.51
F_{LOW}	2402	Transmit	2400	79.54	pk	hor	95.00	3	-15.46
F_{LOW}	2402	Transmit	4800	48.02	pk	ver	74.00	3	-25.98
F_{MID}	2440	Transmit	2384	55.41	pk	ver	74.00	3	-18.59
F_{MID}	2440	Transmit	2384	34.94	RMS	ver	54.00	3	-19.06
F_{MID}	2440	Transmit	2384	54.71	pk	hor	74.00	3	-19.29
F_{MID}	2440	Transmit	2384	34.41	RMS	hor	54.00	3	-19.59
F_{MID}	2440	Transmit	2490.7	49.47	pk	hor	74.00	3	-24.53
F_{MID}	2440	Transmit	2490.7	29.24	RMS	hor	54.00	3	-24.76
F_{MID}	2440	Transmit	2490.8	50.85	pk	ver	74.00	3	-23.15
F_{MID}	2440	Transmit	2490.8	29.47	RMS	ver	54.00	3	-24.53
F_{HIGH}	2480	Transmit	2384	54.17	pk	ver	74.00	3	-19.83
F_{HIGH}	2480	Transmit	2384	33.50	RMS	ver	54.00	3	-20.50
F_{HIGH}	2480	Transmit	2384	55.67	pk	hor	74.00	3	-18.33
F_{HIGH}	2480	Transmit	2384	35.17	RMS	hor	54.00	3	-18.83
F_{HIGH}	2480	Transmit	2483.5	57.70	pk	ver	74.00	3	-16.30
F_{HIGH}	2480	Transmit	2483.5	50.24	RMS	ver	54.00	3	-03.76
F_{HIGH}	2480	Transmit	2483.5	56.51	pk	hor	74.00	3	-17.49
F_{HIGH}	2480	Transmit	2483.5	47.43	RMS	hor	54.00	3	-06.57
F_{HIGH}	2480	Transmit	2483.8	54.39	pk	ver	74.00	3	-19.61
F_{HIGH}	2480	Transmit	2483.8	45.88	RMS	ver	54.00	3	-08.12

F_{HIGH}	2480	Transmit	2483.9	54.82	pk	hor	74.00	3	-19.18
F_{HIGH}	2480	Transmit	2483.9	41.56	RMS	hor	54.00	3	-12.44
F_{HIGH}	2480	Transmit	2484.2	53.76	pk	hor	74.00	3	-20.24
F_{HIGH}	2480	Transmit	2484.2	37.91	RMS	hor	54.00	3	-16.09
F_{HIGH}	2480	Transmit	2503	55.88	pk	ver	95.00	3	-39.12
F_{HIGH}	2480	Transmit	2503	55.34	pk	hor	95.00	3	-39.66
Comments: * Physical distance between EUT and measurement antenna.									

3.9 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 – 3th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/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				



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 [dbµV/m]	Det.	Limit [dBµV/m]	Margin [dB]
F_{MID}	2440	176.54	34.66	pk	43.5	-8.84
F_{MID}	2440	416	36.03	pk	46	-9.97
F_{MID}	2440	768	35.22	pk	46	-10.78

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-1406-3917

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:	2014-11-26
Note:	EUT vertical; worst case

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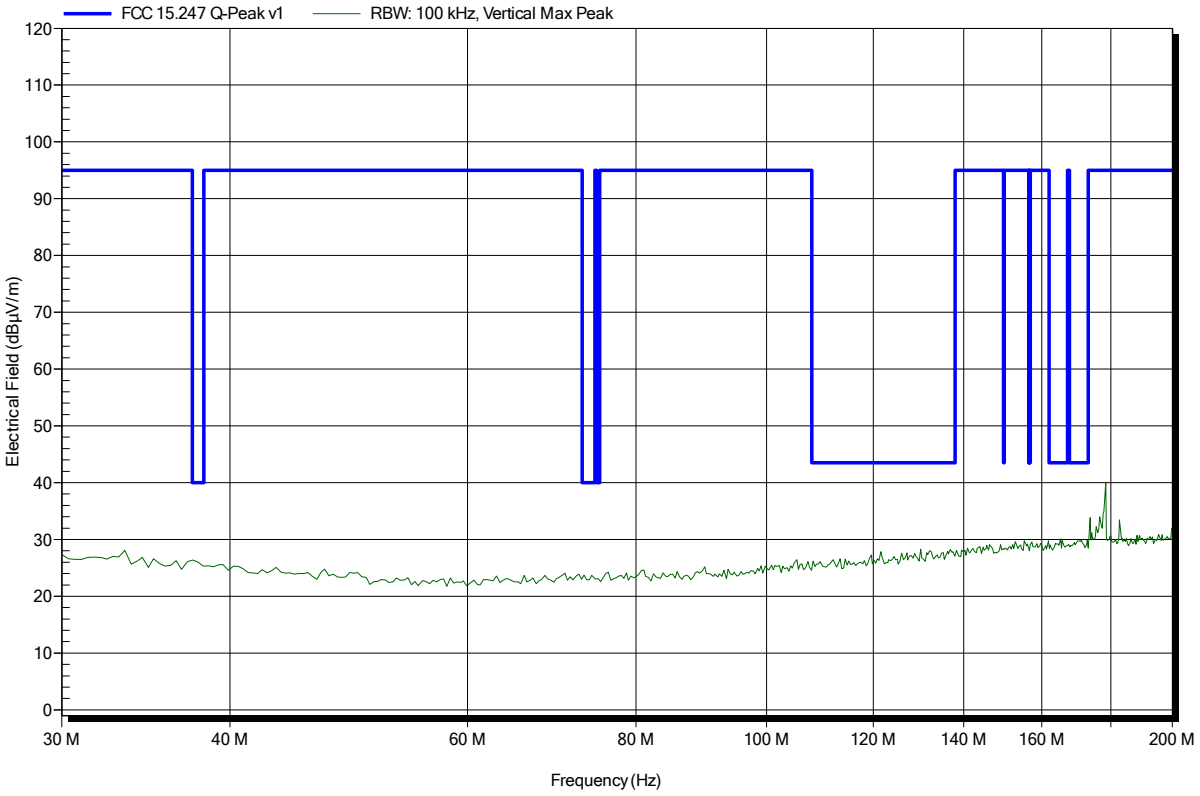

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical; worst case

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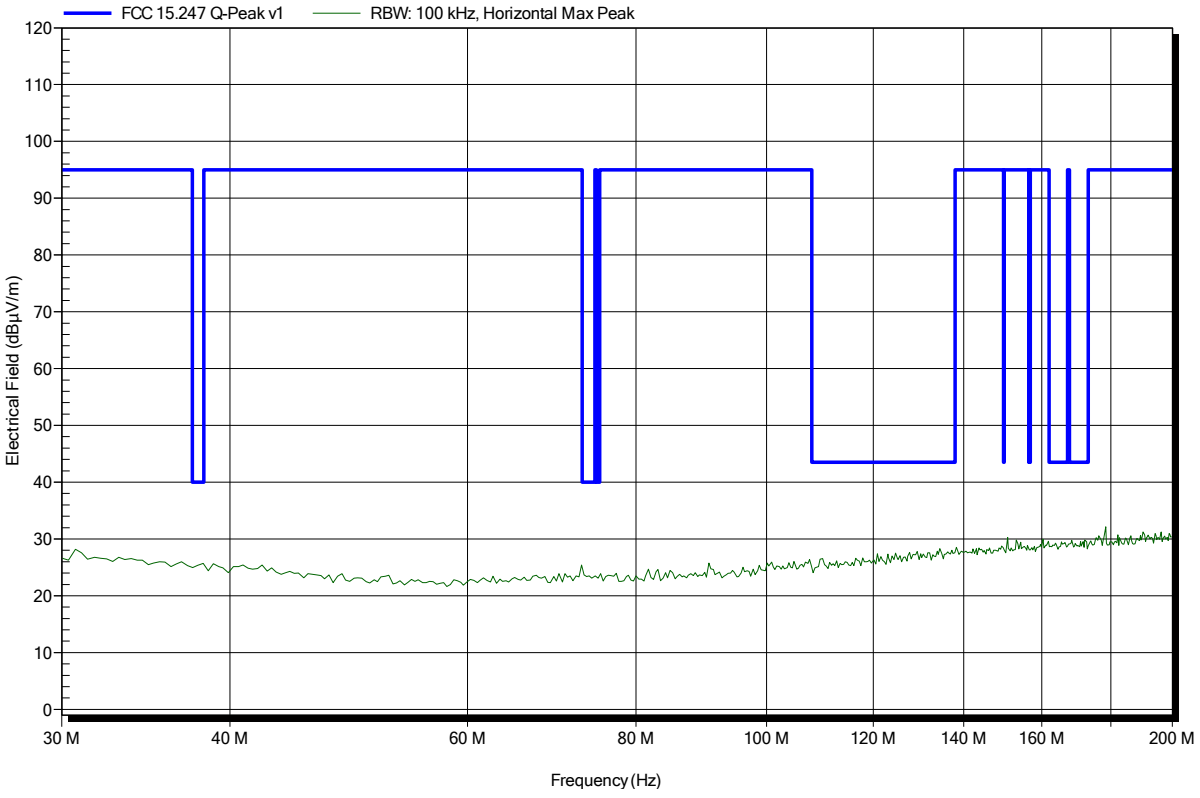

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical; worst case

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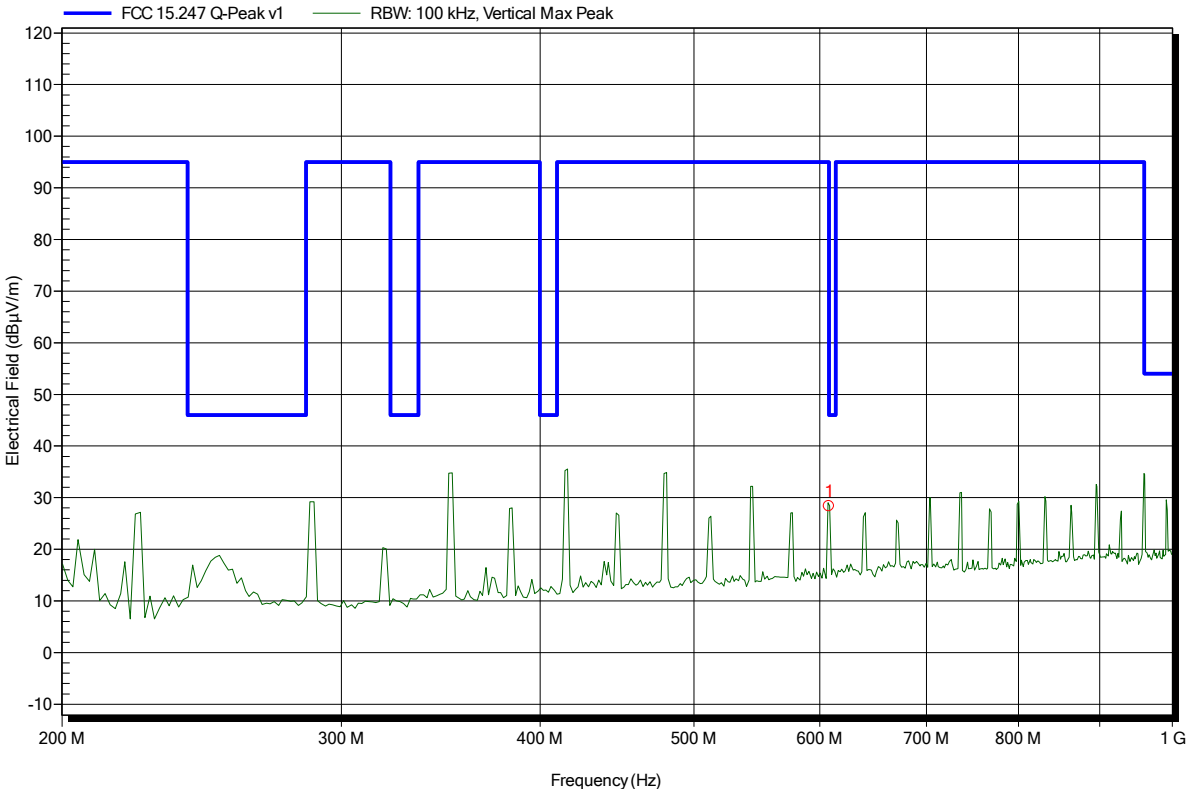

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
608 MHz	28.37 dBµV/m	46 dBµV/m	-17.63 dB	Pass

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

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical; worst case

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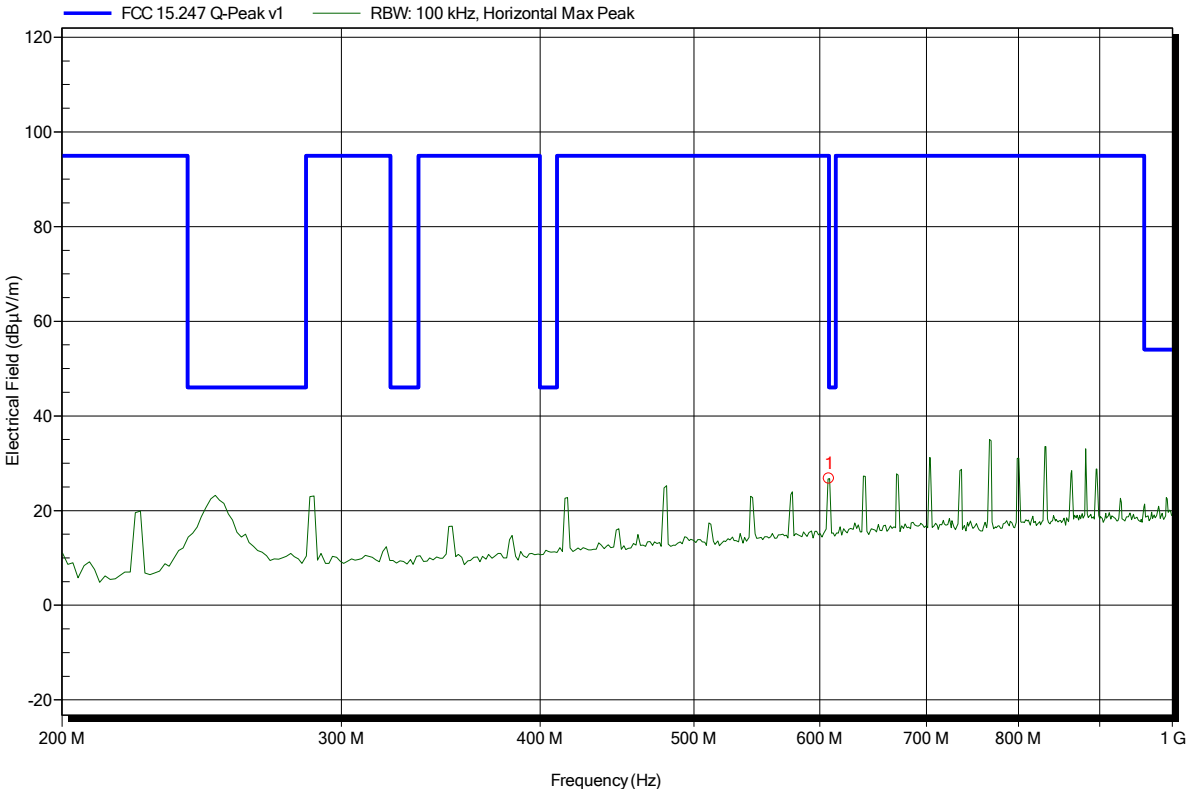

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
608 MHz	26.75 dBµV/m	46 dBµV/m	-19.25 dB	Pass

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

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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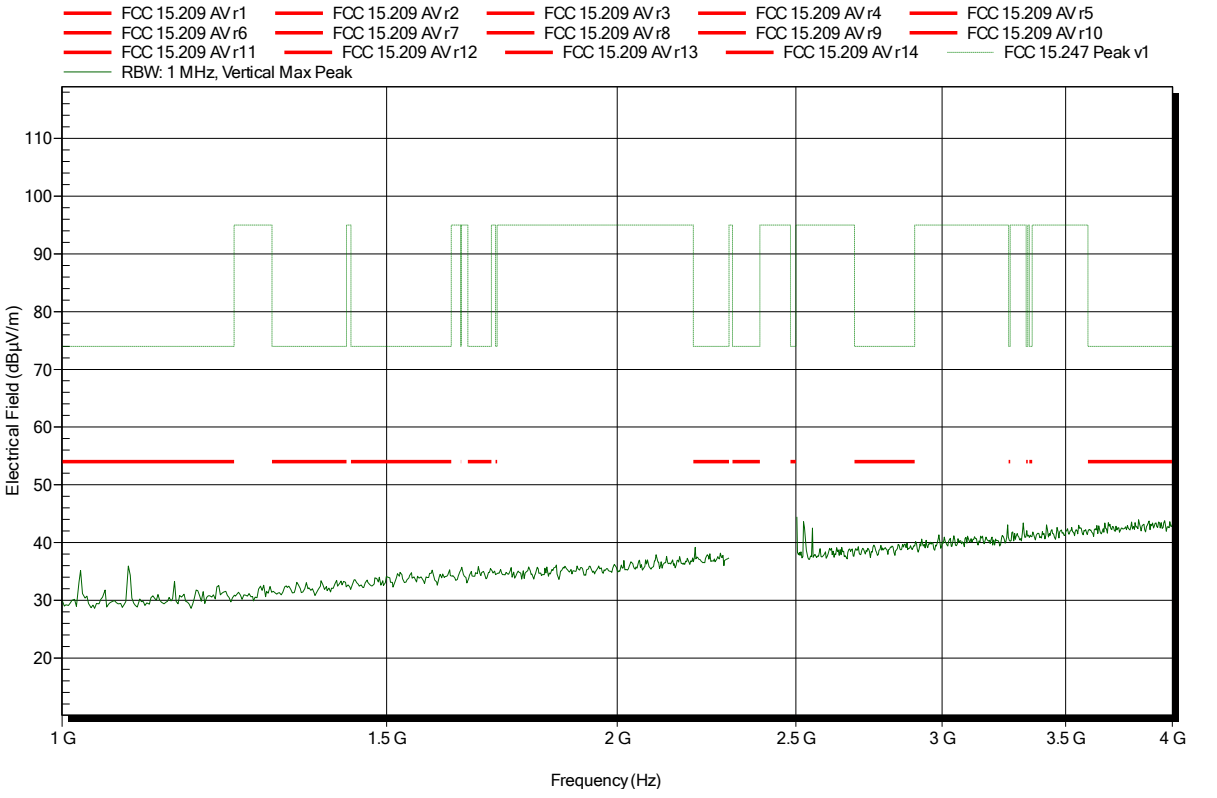

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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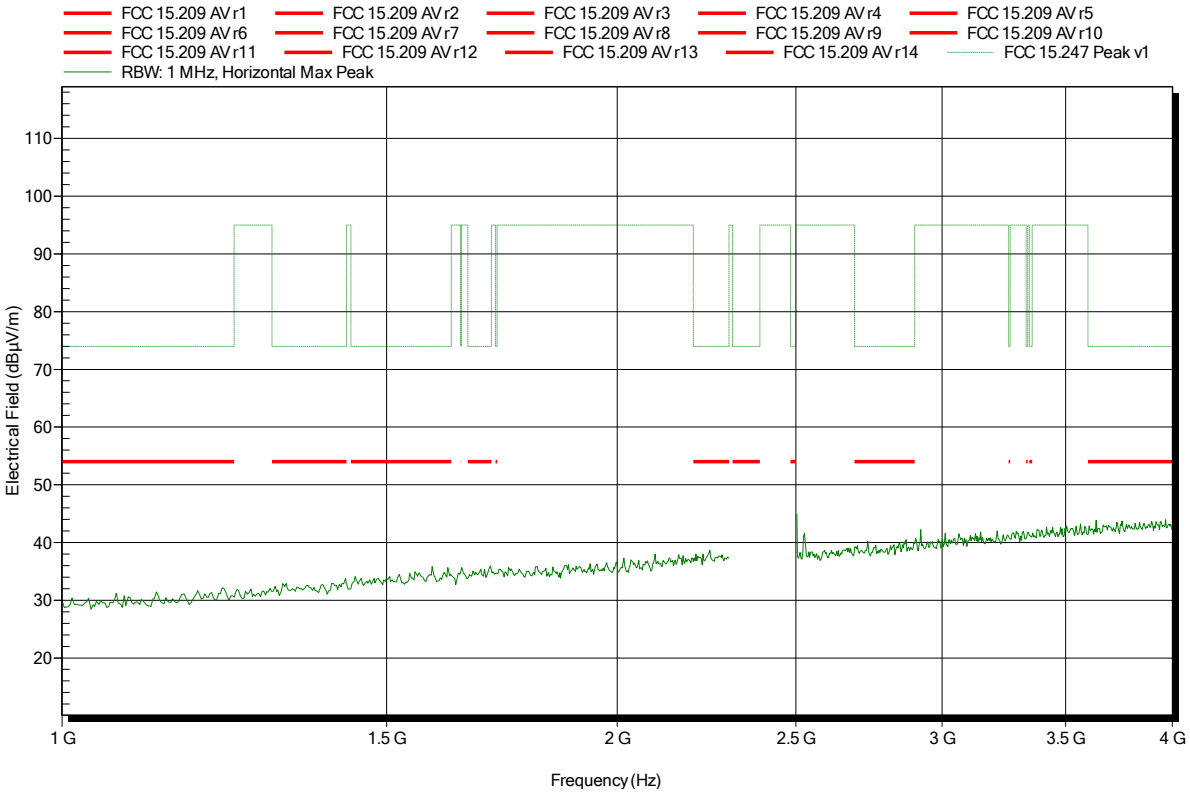

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; lower bandedge

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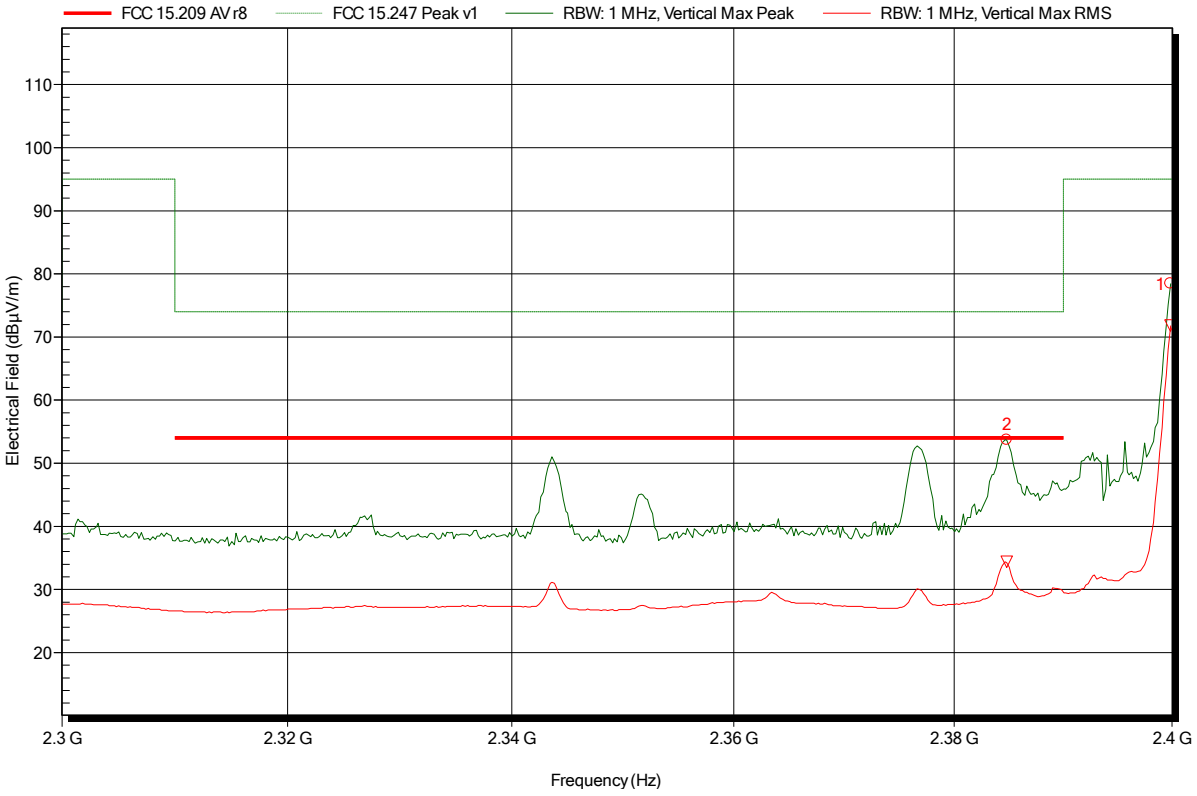

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.385 GHz	53.74 dBµV/m	74 dBµV/m	-20.26 dB	Pass
2.4 GHz	78.49 dBµV/m	95 dBµV/m	-16.51 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.385 GHz	34.41 dBµV/m	54 dBµV/m	-19.59 dB	Pass
2.4 GHz	71.82 dBµV/m			

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; lower bandedge

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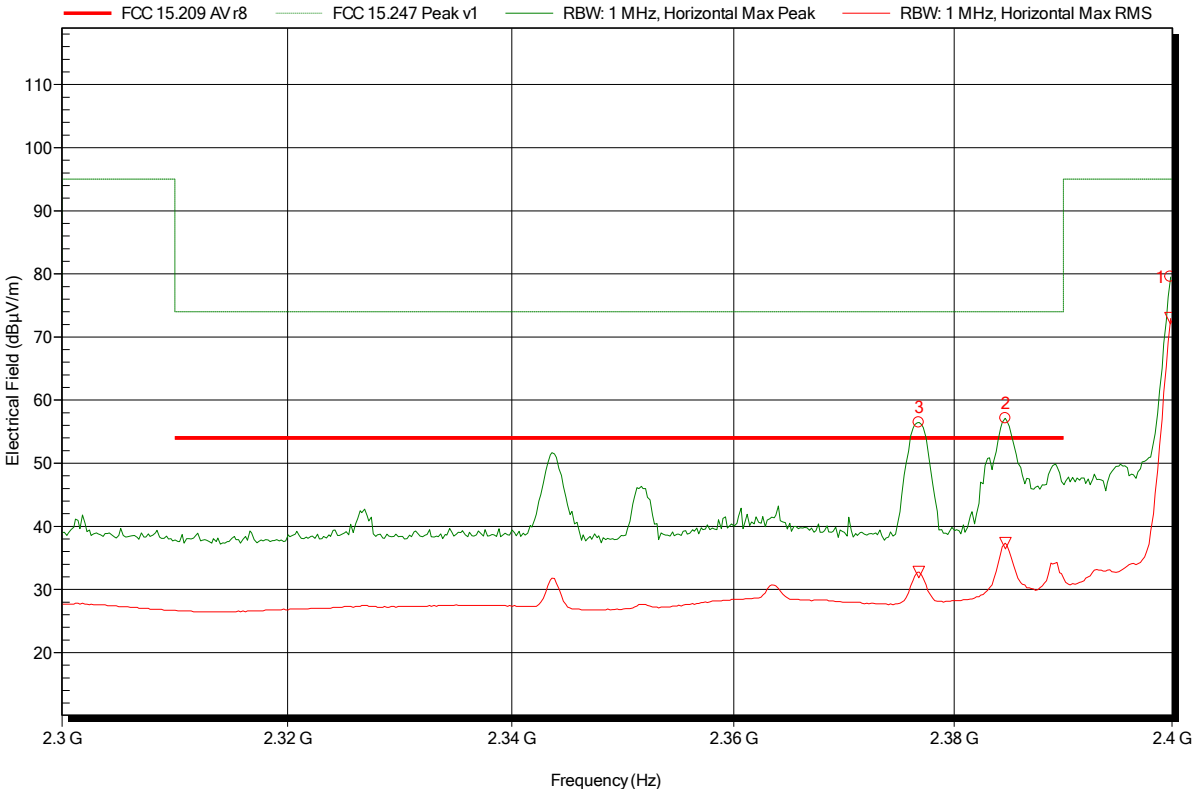

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.377 GHz	56.48 dBµV/m	74 dBµV/m	-17.52 dB	Pass
2.385 GHz	57.12 dBµV/m	74 dBµV/m	-16.88 dB	Pass
2.4 GHz	79.54 dBµV/m	95 dBµV/m	-15.46 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.377 GHz	32.77 dBµV/m	54 dBµV/m	-21.23 dB	Pass
2.385 GHz	37.34 dBµV/m	54 dBµV/m	-16.66 dB	Pass
2.4 GHz	73.01 dBµV/m			

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; upper bandedge

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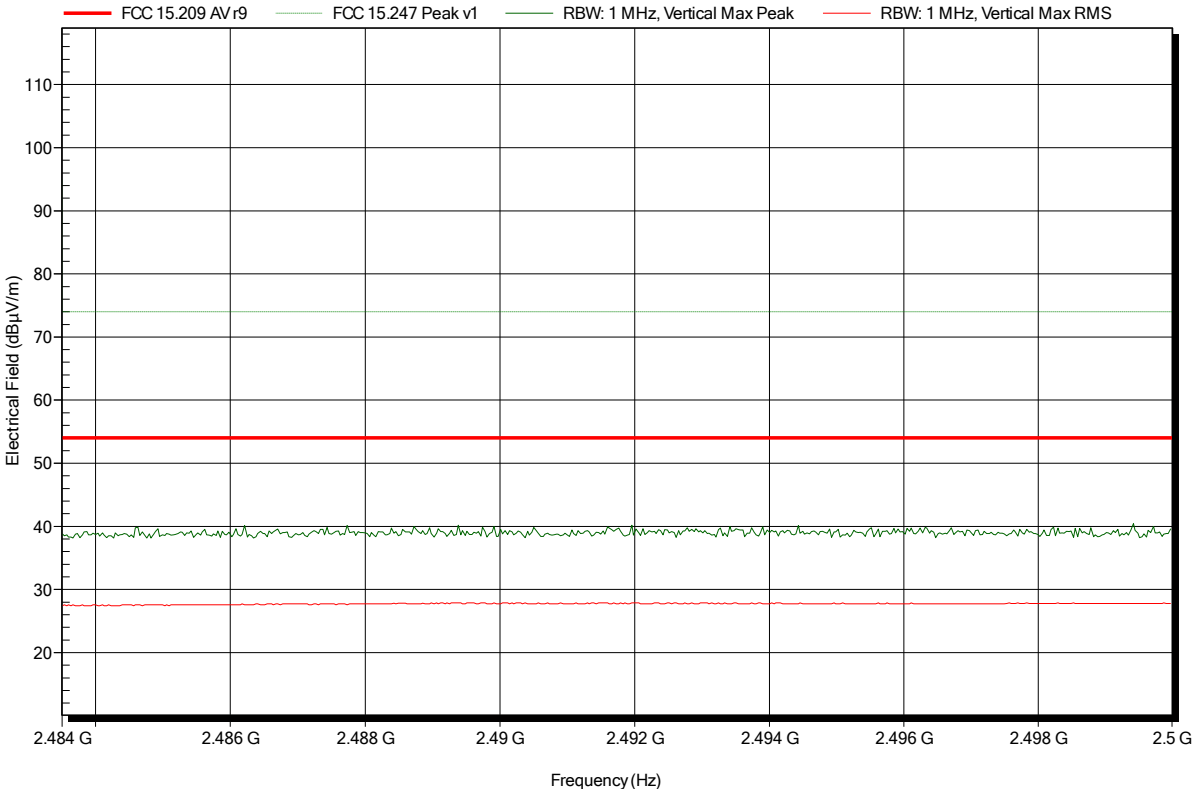

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 0; 2402 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; upper bandedge

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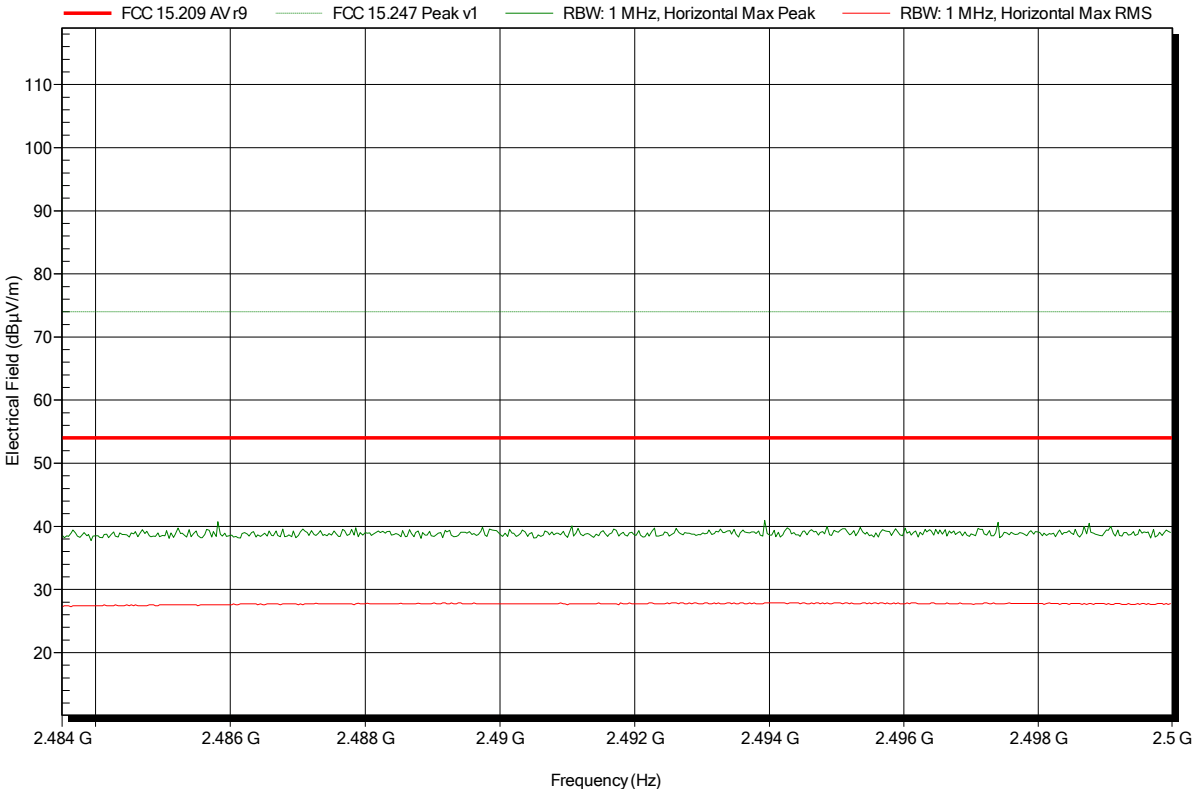

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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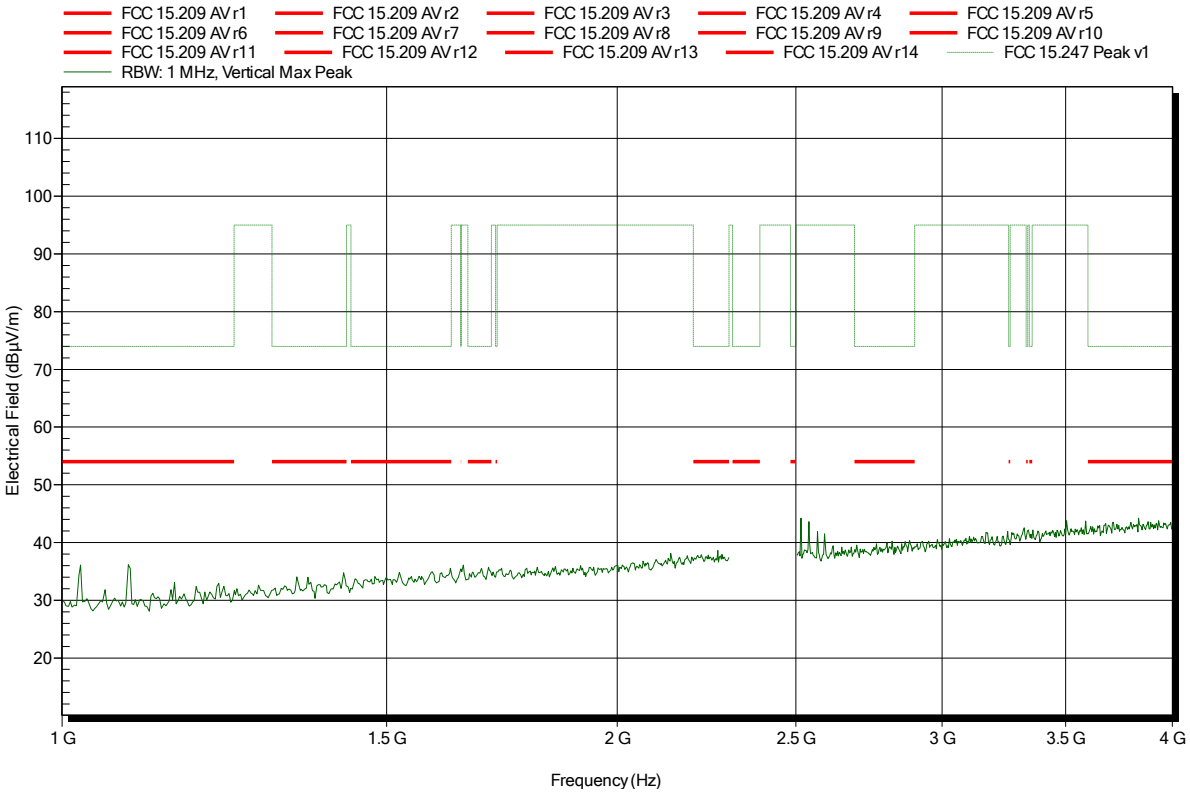

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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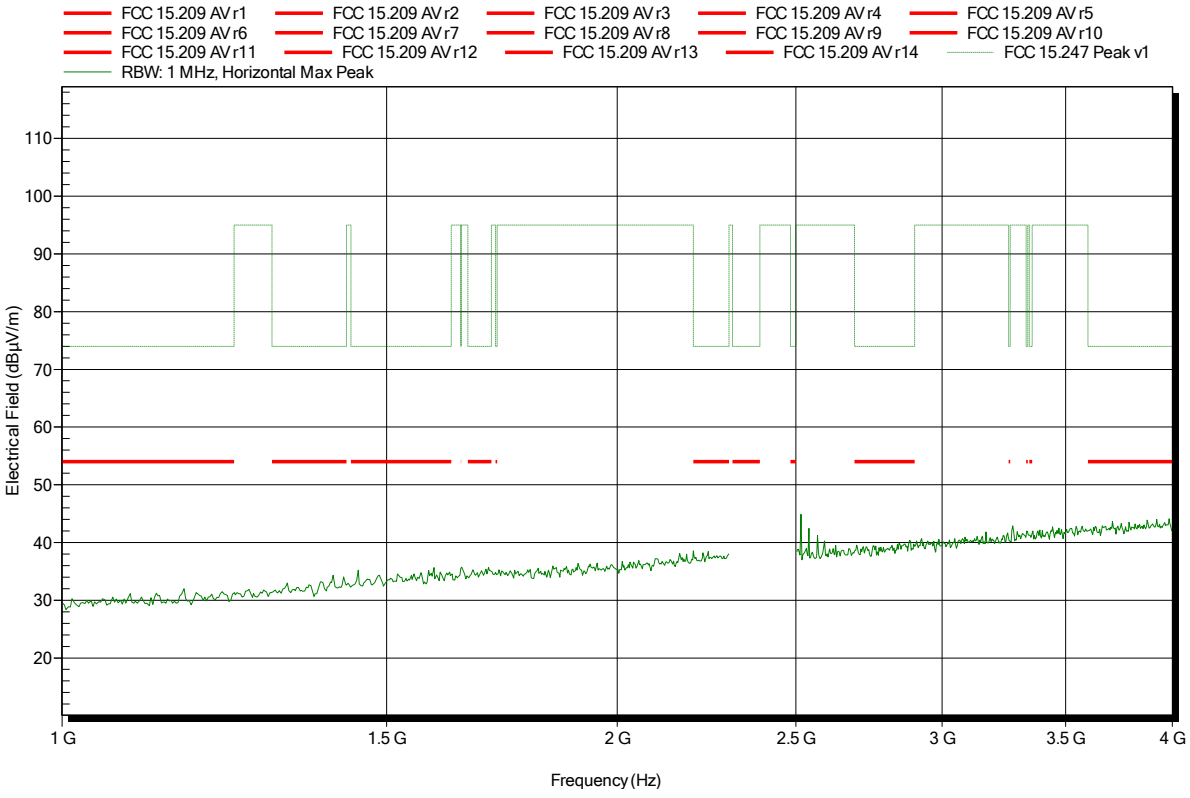

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; lower bandedge

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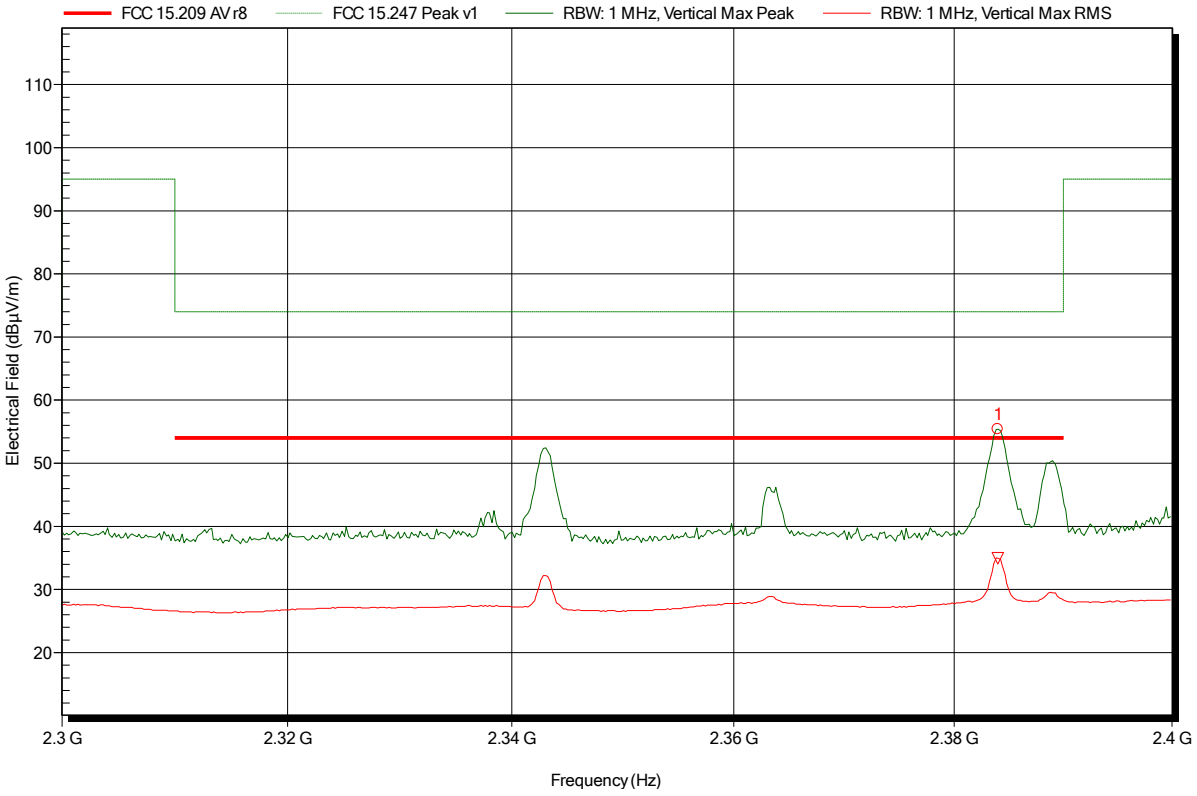

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.384 GHz	55.41 dBµV/m	74 dBµV/m	-18.59 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.384 GHz	34.94 dBµV/m	54 dBµV/m	-19.06 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; lower bandedge

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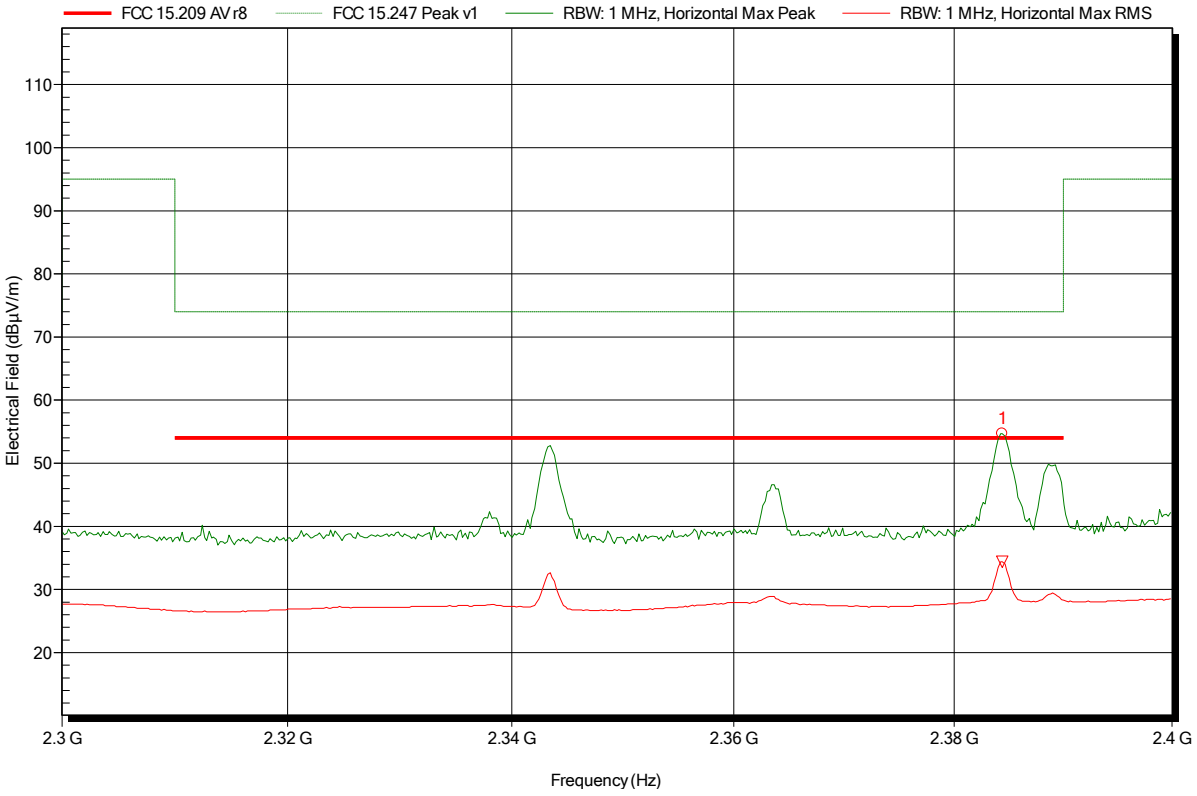

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.384 GHz	54.71 dBµV/m	74 dBµV/m	-19.29 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.384 GHz	34.41 dBµV/m	54 dBµV/m	-19.59 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; upper bandedge

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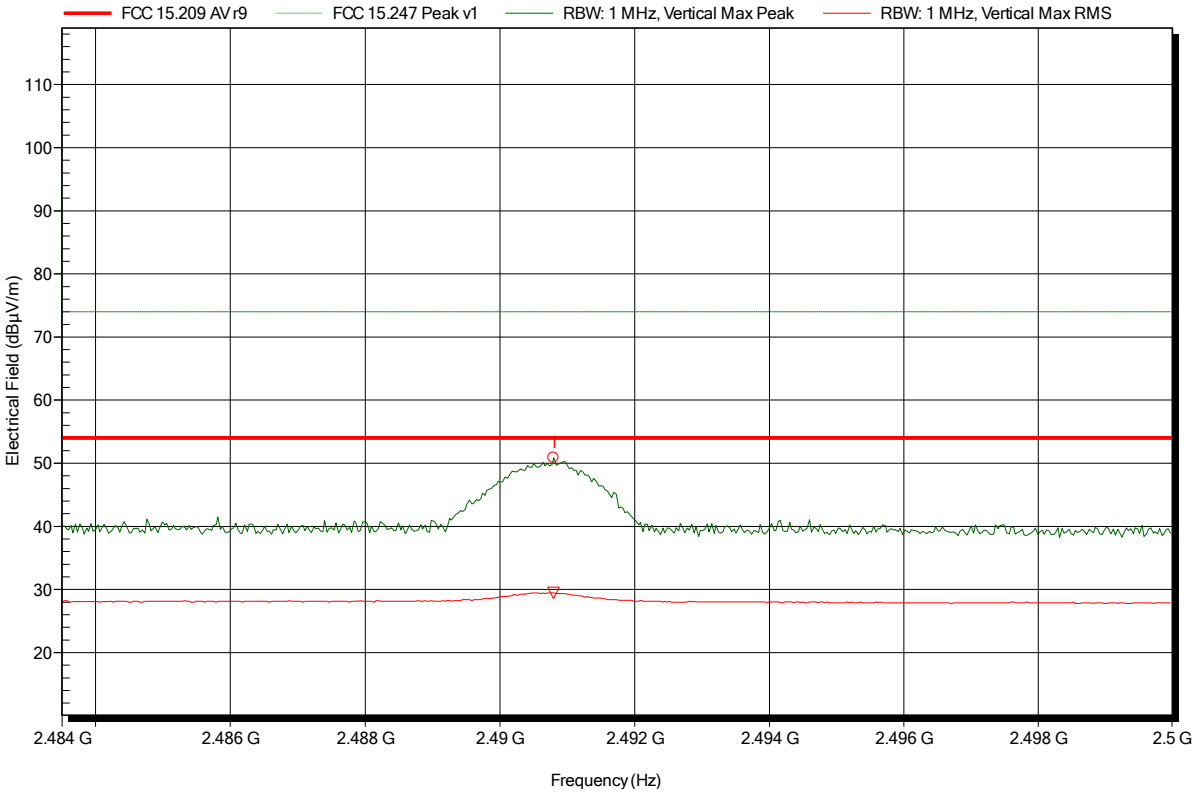

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4908 GHz	50.85 dBµV/m	74 dBµV/m	-23.15 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4908 GHz	29.47 dBµV/m	54 dBµV/m	-24.53 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 19; 2440 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; upper bandedge

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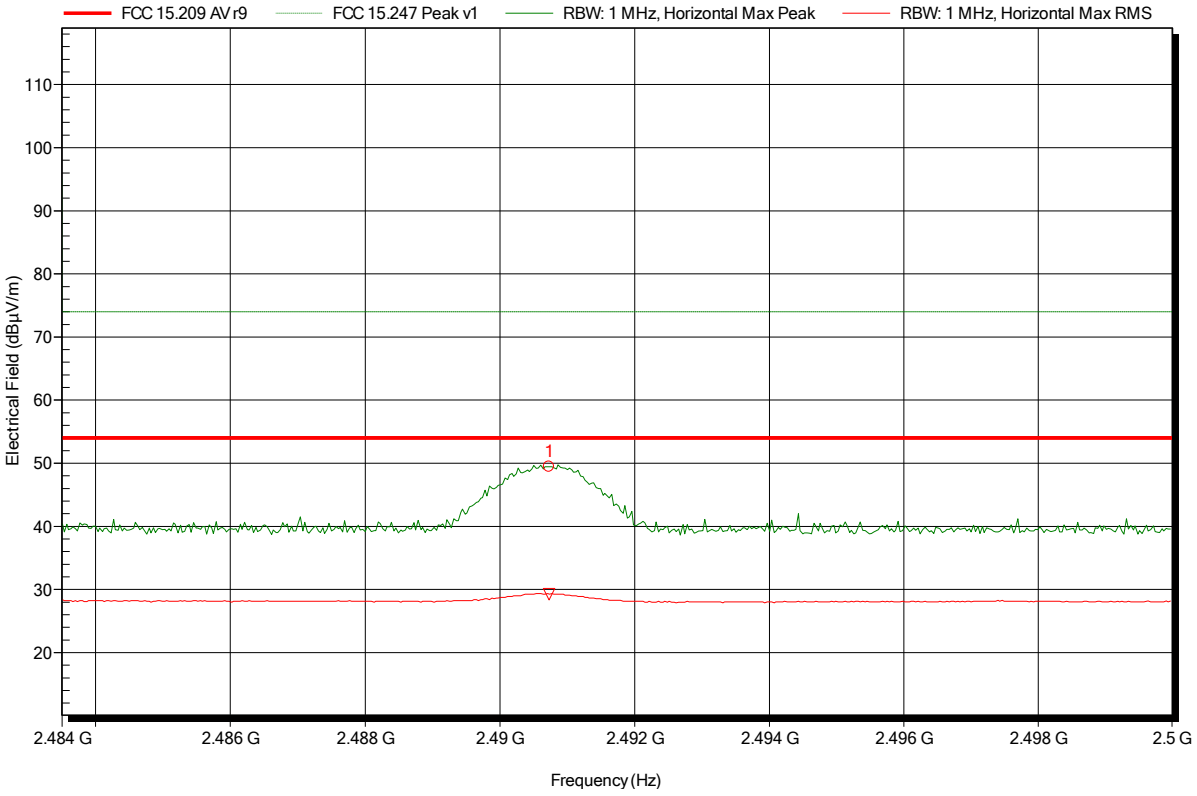

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4907 GHz	49.47 dBµV/m	74 dBµV/m	-24.53 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4907 GHz	29.24 dBµV/m	54 dBµV/m	-24.76 dB	Pass

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

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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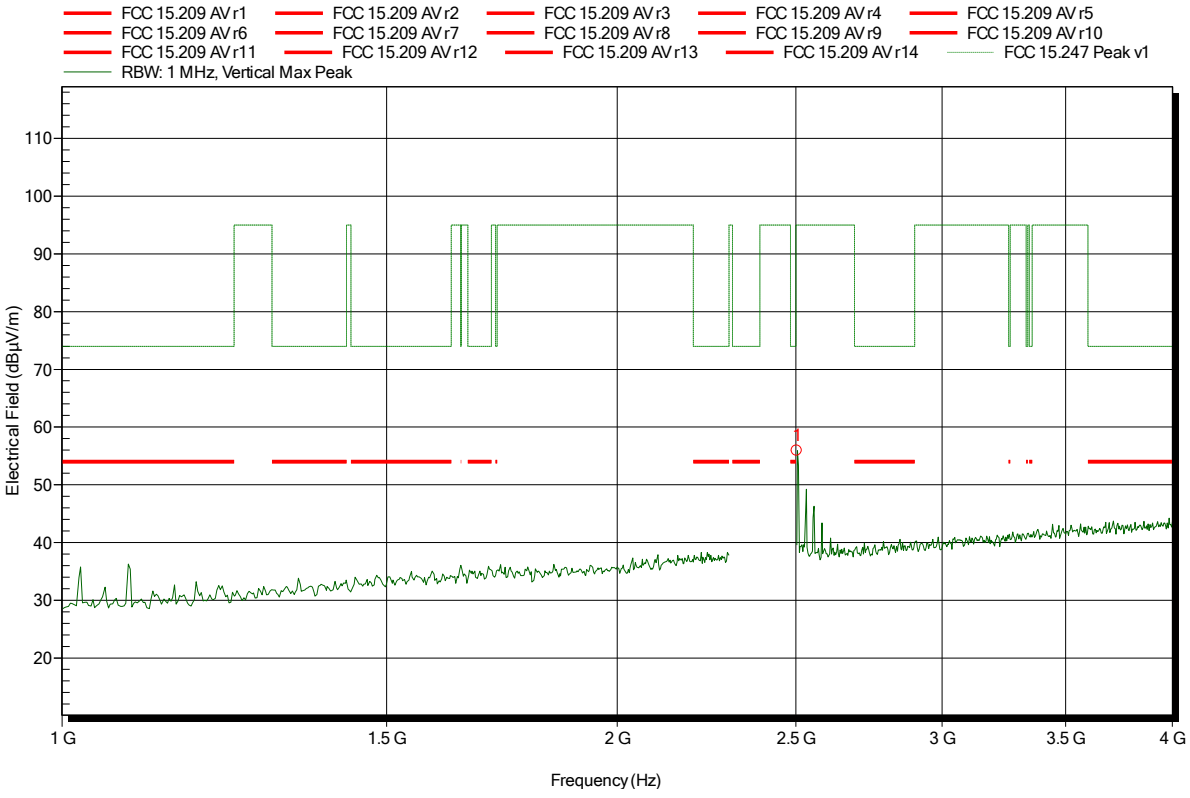

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.503 GHz	55.88 dBµV/m	95 dBµV/m	-39.12 dB	Pass

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

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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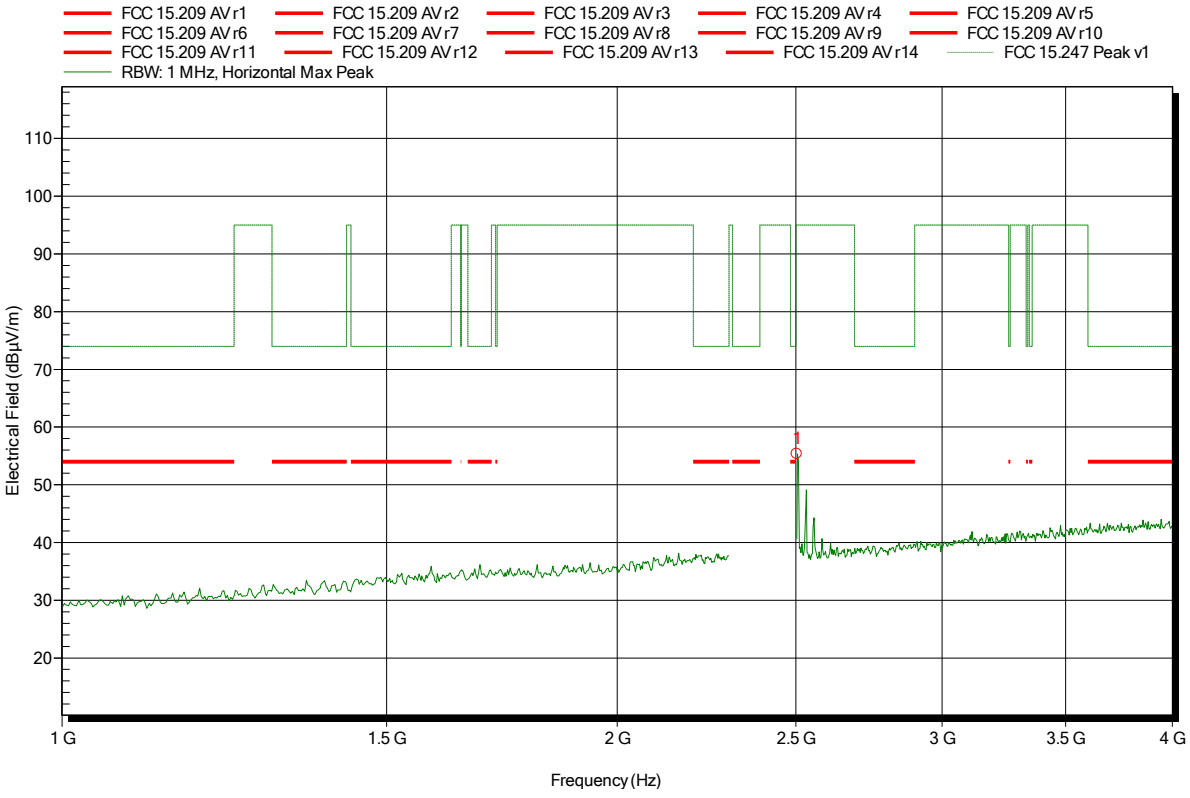

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.503 GHz	55.34 dBµV/m	95 dBµV/m	-39.66 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; lower bandedge

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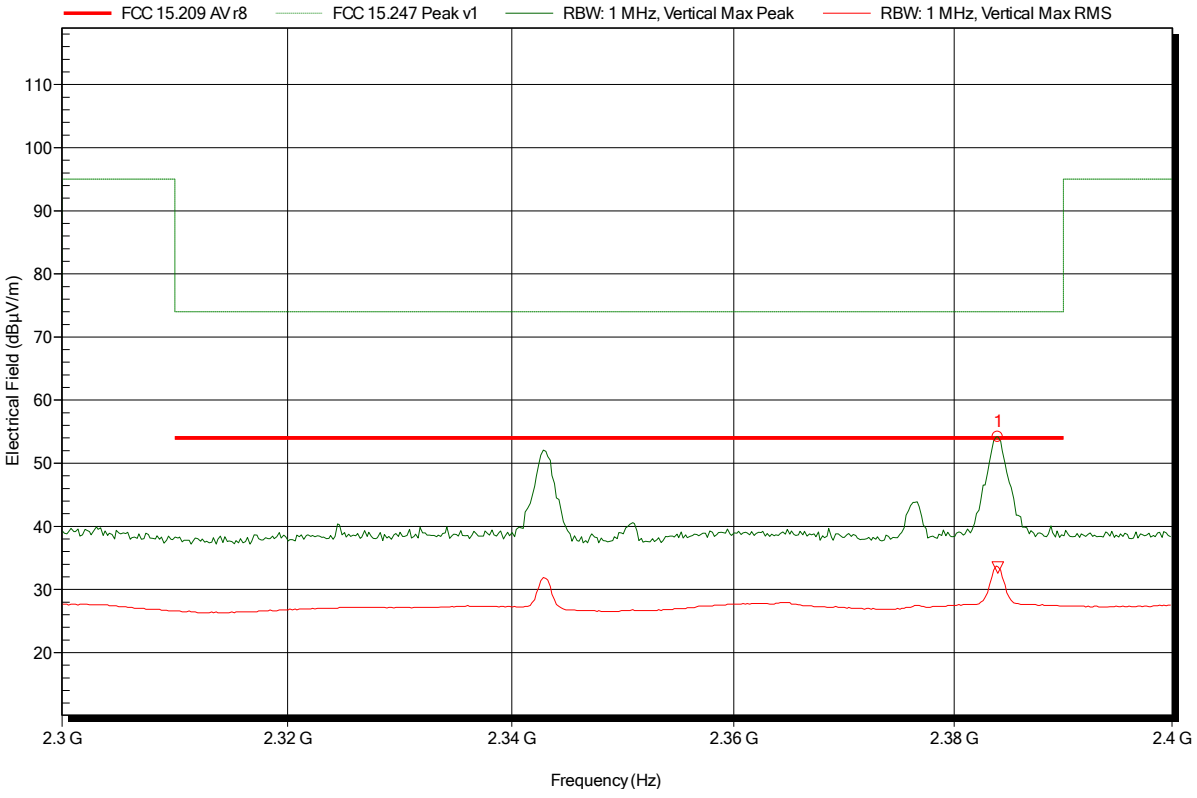

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.384 GHz	54.17 dBµV/m	74 dBµV/m	-19.83 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.384 GHz	33.5 dBµV/m	54 dBµV/m	-20.5 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; lower bandedge

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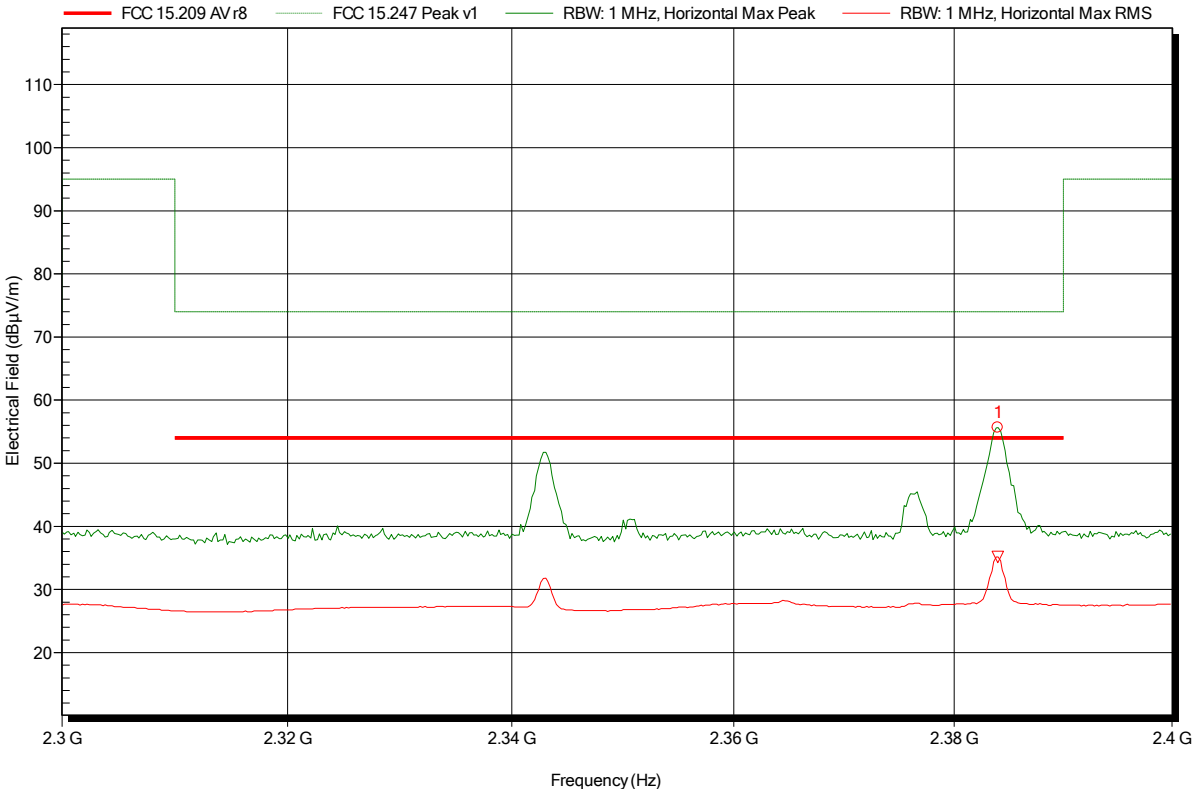

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.384 GHz	55.67 dBµV/m	74 dBµV/m	-18.33 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.384 GHz	35.17 dBµV/m	54 dBµV/m	-18.83 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; upper bandedge

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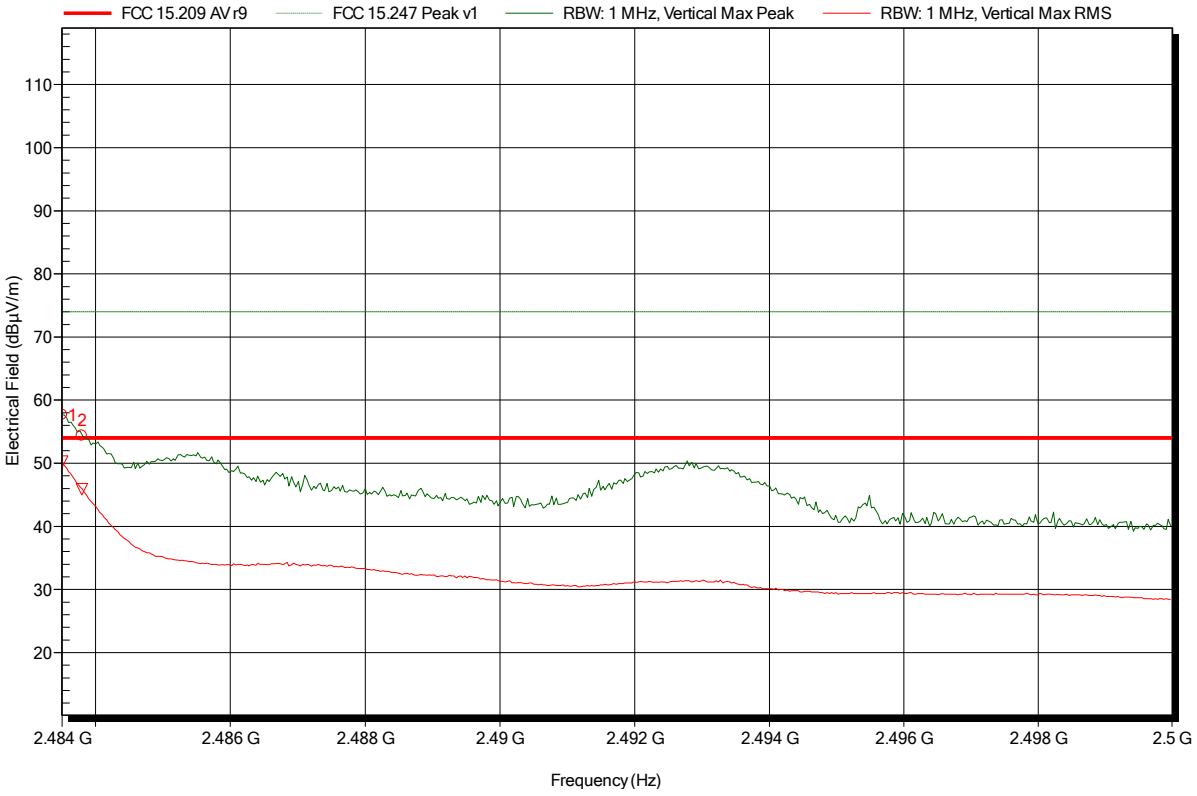

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	57.7 dBµV/m	74 dBµV/m	-16.3 dB	Pass
2.4838 GHz	54.39 dBµV/m	74 dBµV/m	-19.61 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	50.24 dBµV/m	54 dBµV/m	-3.76 dB	Pass
2.4838 GHz	45.88 dBµV/m	54 dBµV/m	-8.12 dB	Pass

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

Project number: G0M-1406-3917

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 converted to 3m
Mode:	TX; BT-BLE; CH: 39; 2480 MHz; TX-Testmode; GFSK
Test Date:	2014-11-26
Note:	EUT vertical; upper bandedge

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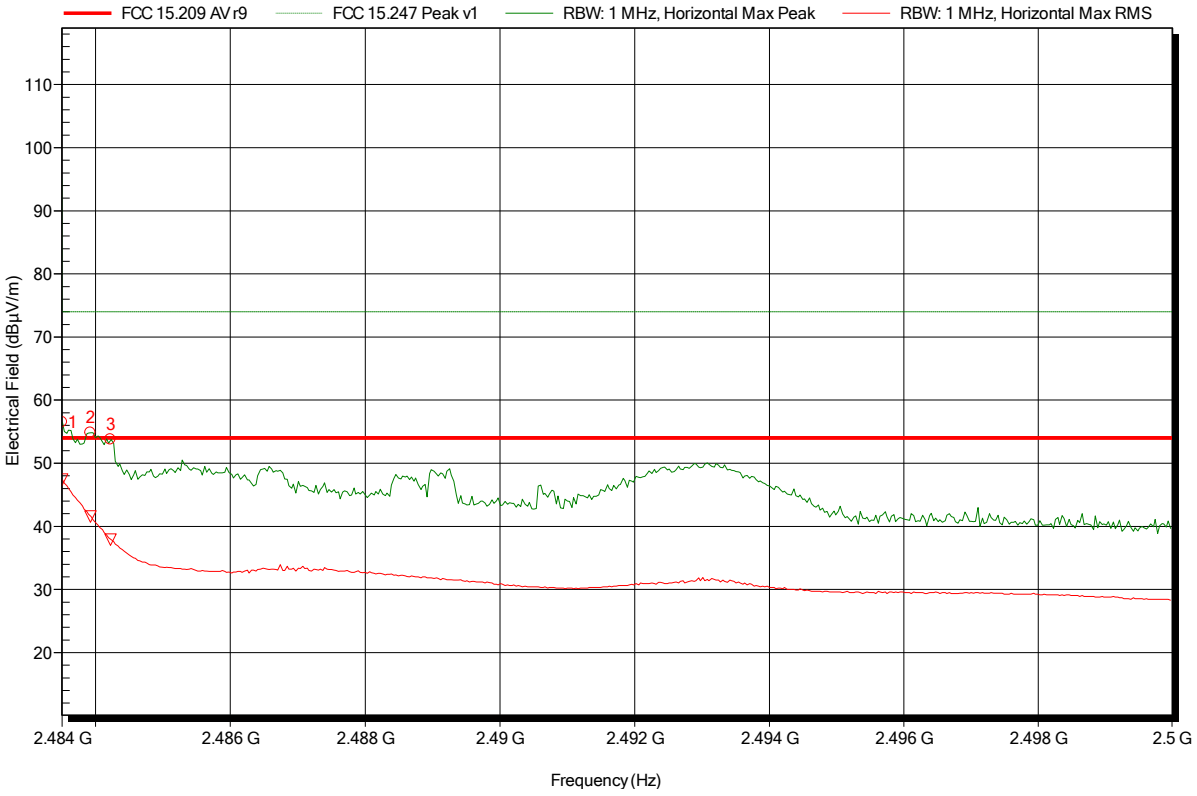

Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	56.51 dBµV/m	74 dBµV/m	-17.49 dB	Pass
2.4839 GHz	54.82 dBµV/m	74 dBµV/m	-19.18 dB	Pass
2.4842 GHz	53.76 dBµV/m	74 dBµV/m	-20.24 dB	Pass

Frequency	RMS	RMS Limit	RMS Difference	RMS Status
2.4835 GHz	47.43 dBµV/m	54 dBµV/m	-6.57 dB	Pass
2.4839 GHz	41.56 dBµV/m	54 dBµV/m	-12.44 dB	Pass
2.4842 GHz	37.91 dBµV/m	54 dBµV/m	-16.09 dB	Pass

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

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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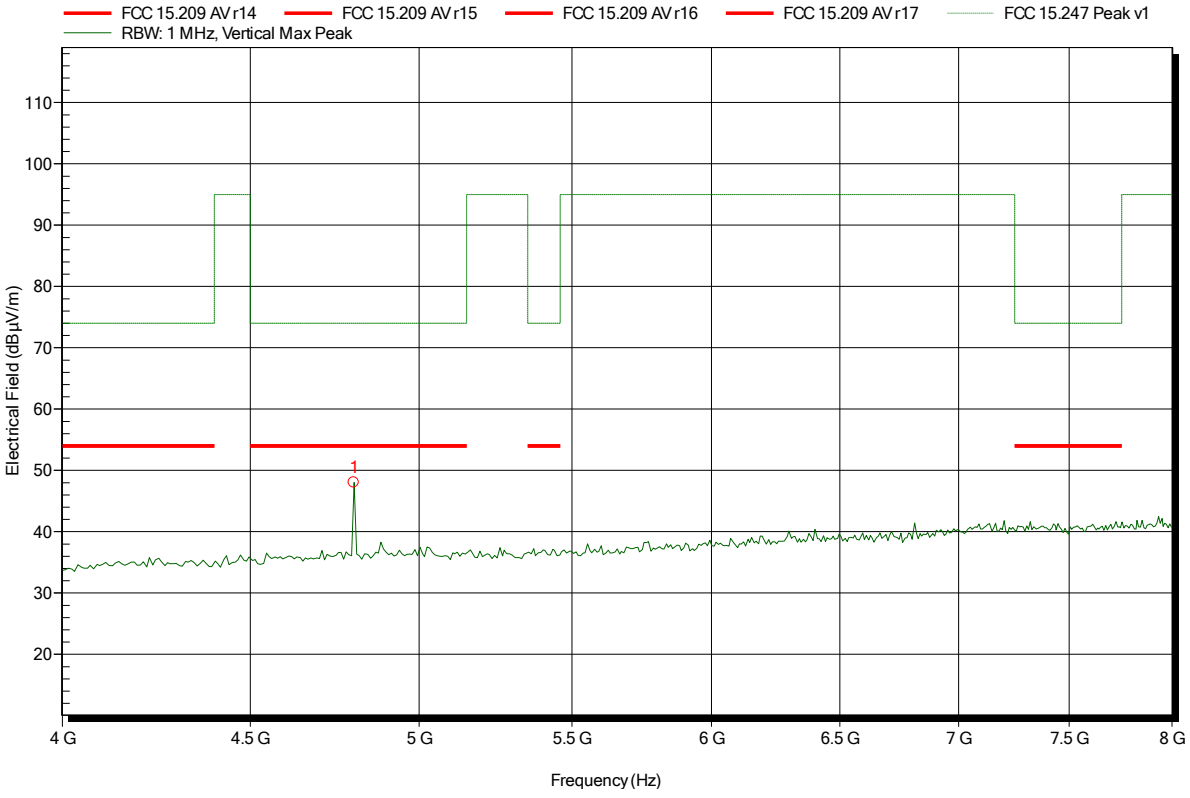

Frequency	Peak	Peak Limit	Peak Difference	Status
4.8 GHz	48.02 dBµV/m	74 dBµV/m	-25.98 dB	Pass

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

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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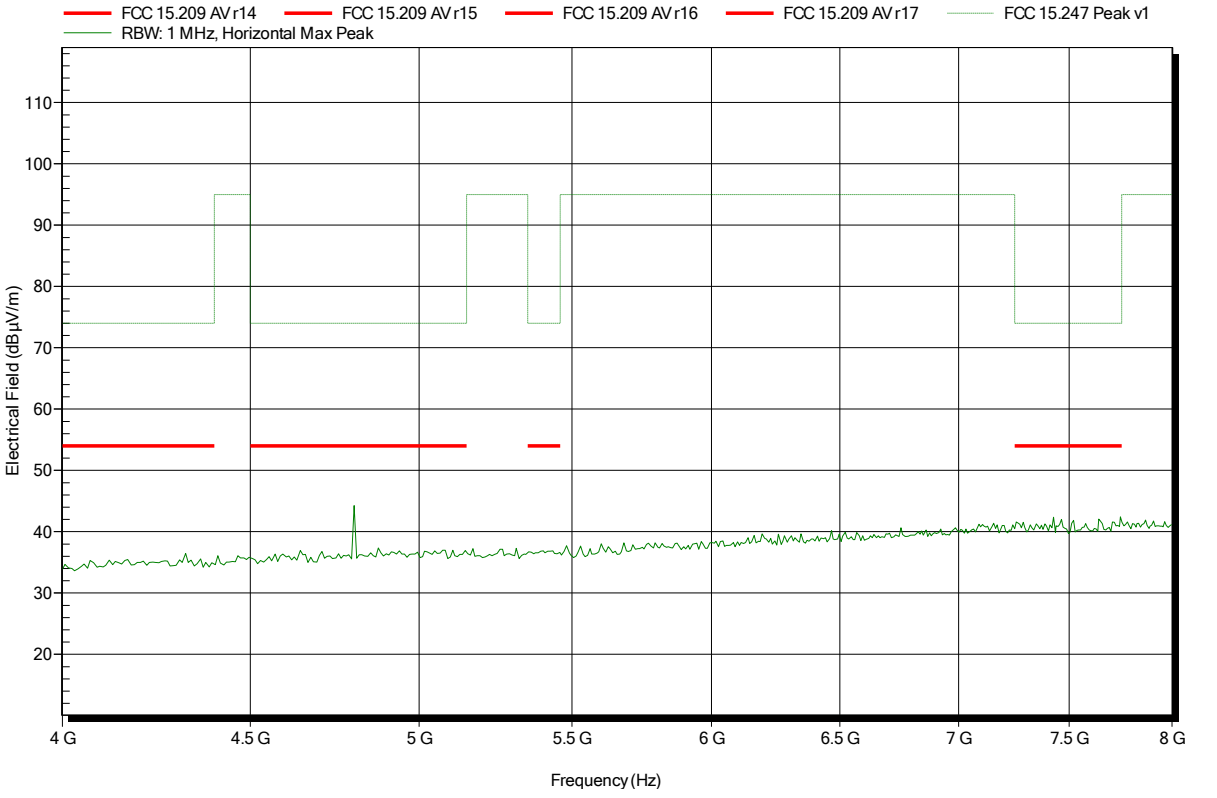

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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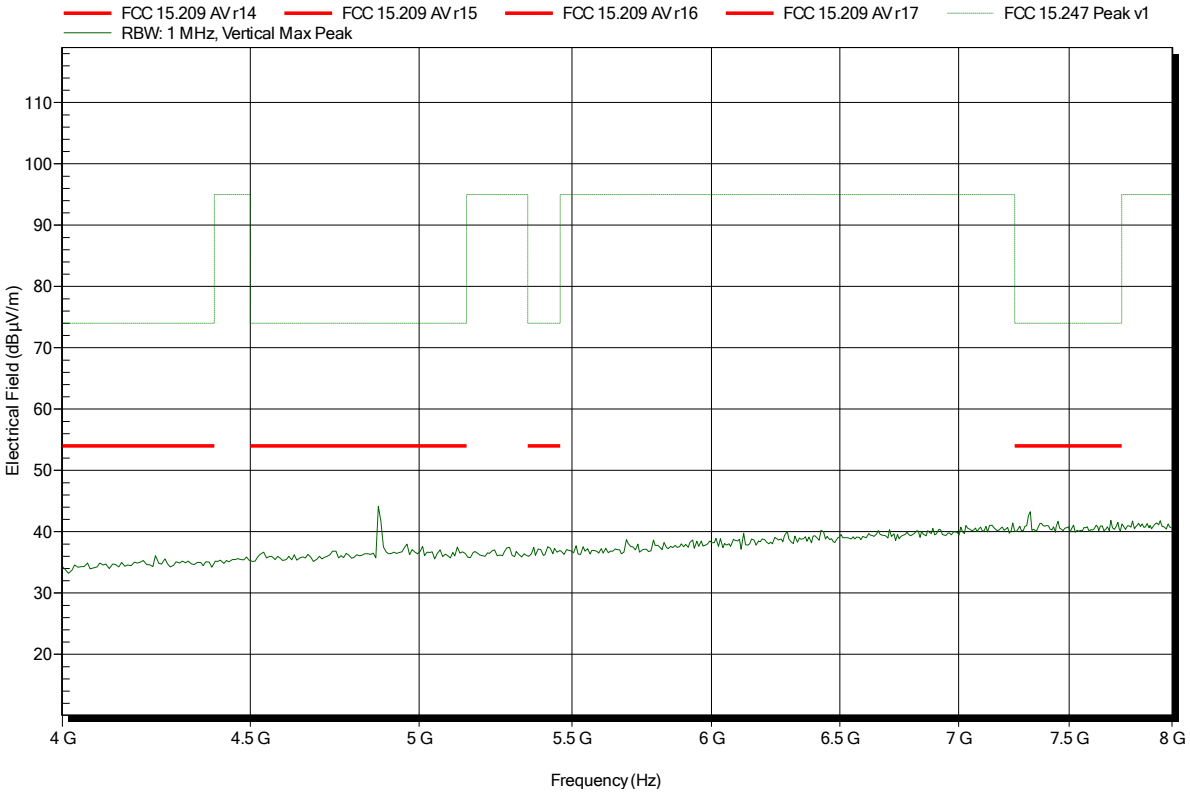

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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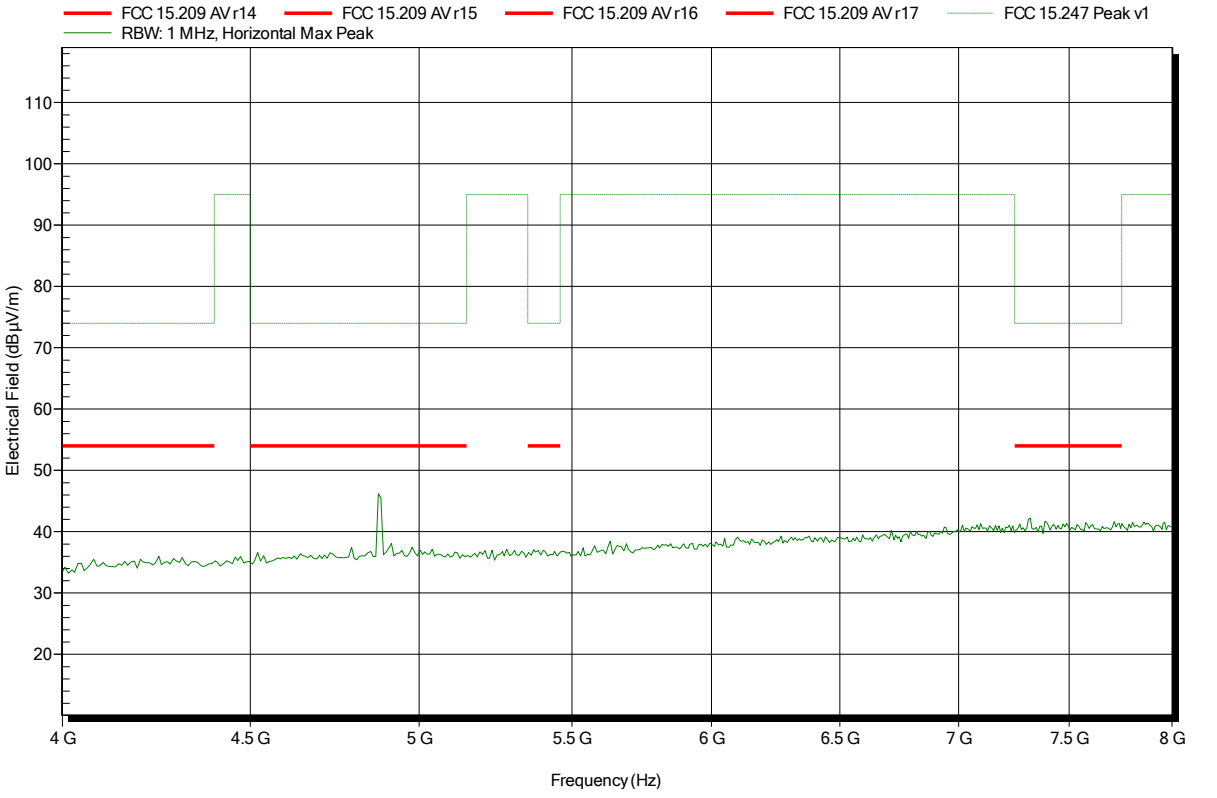

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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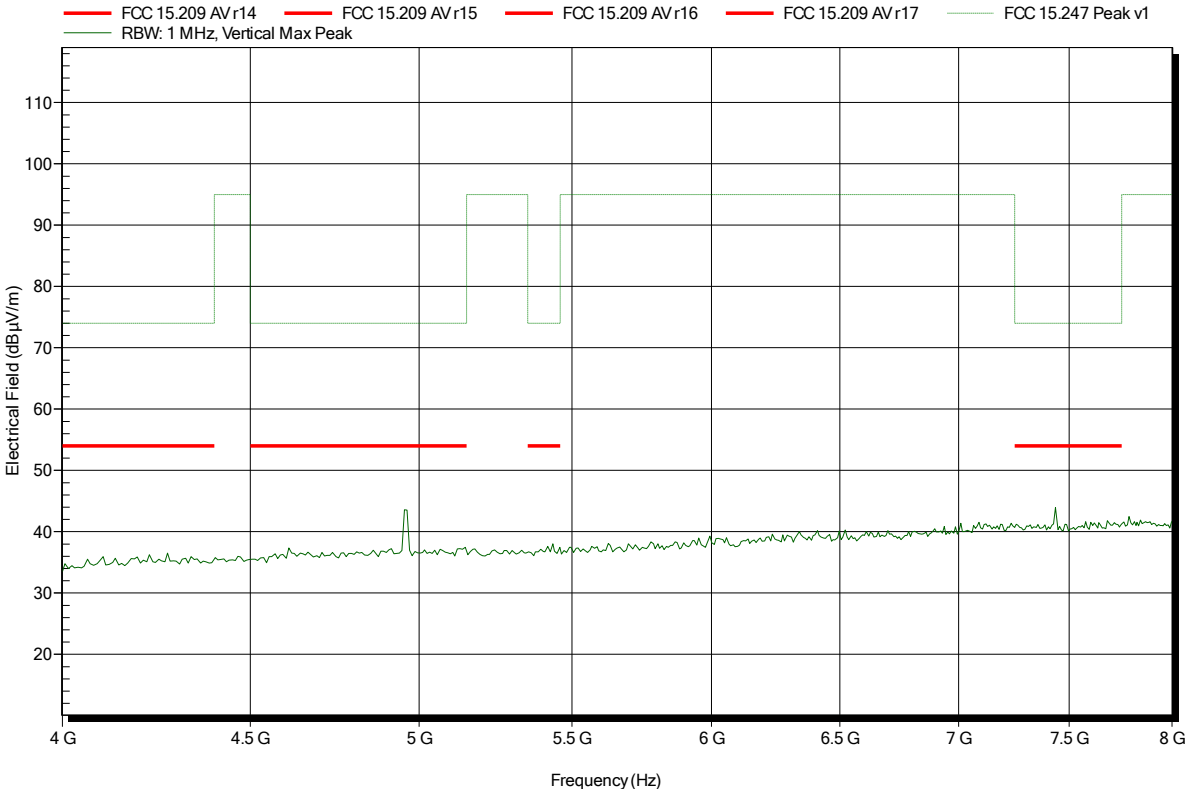

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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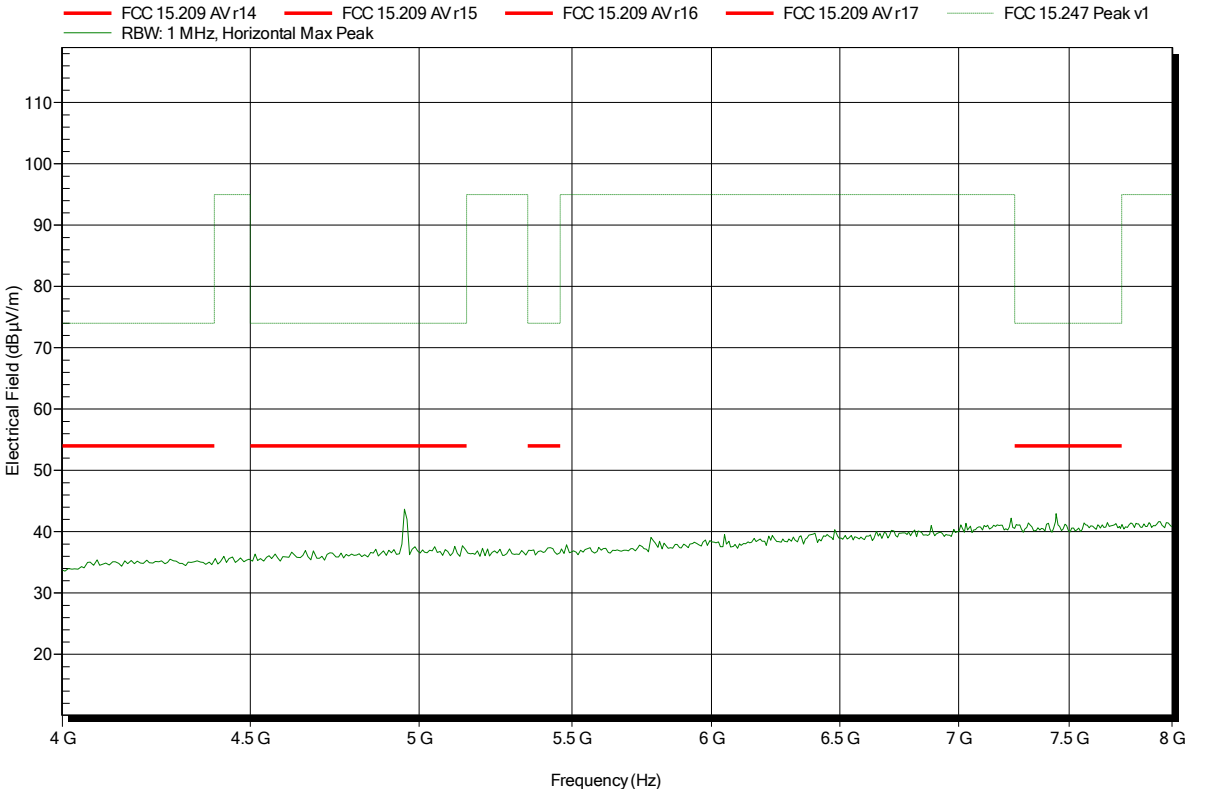

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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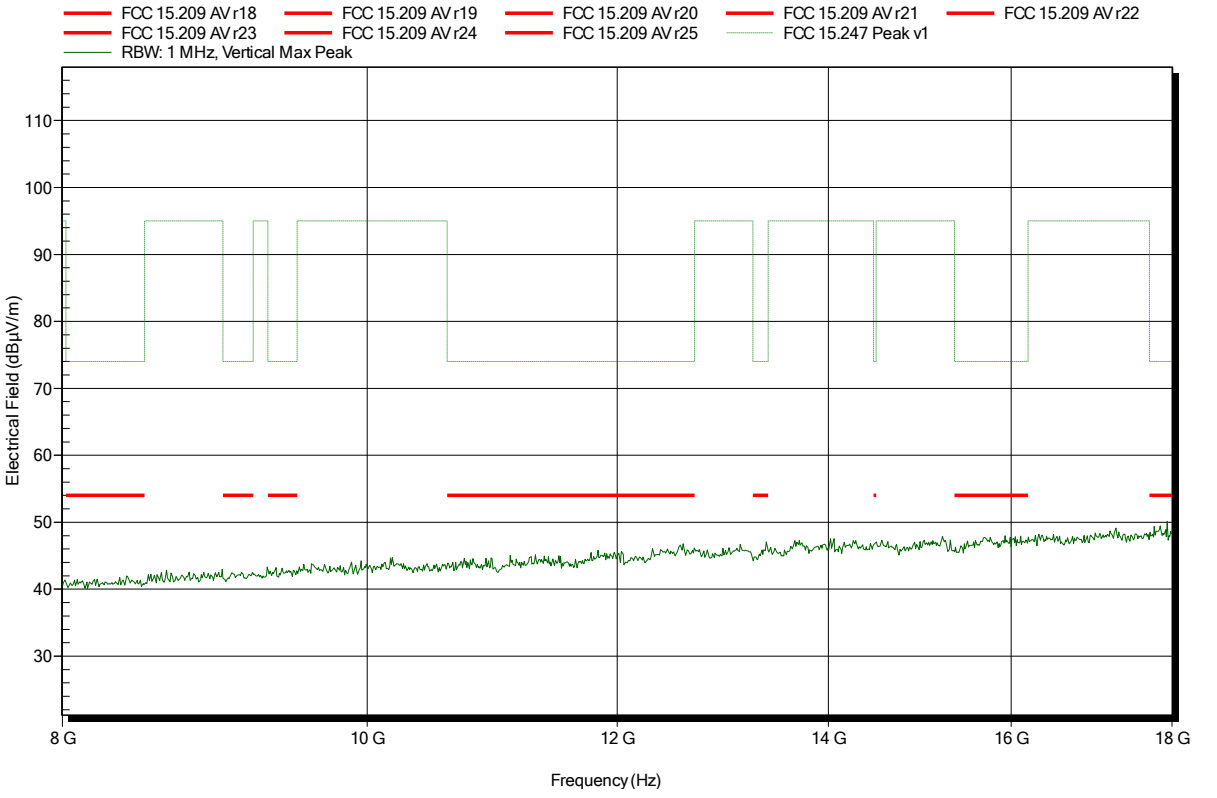

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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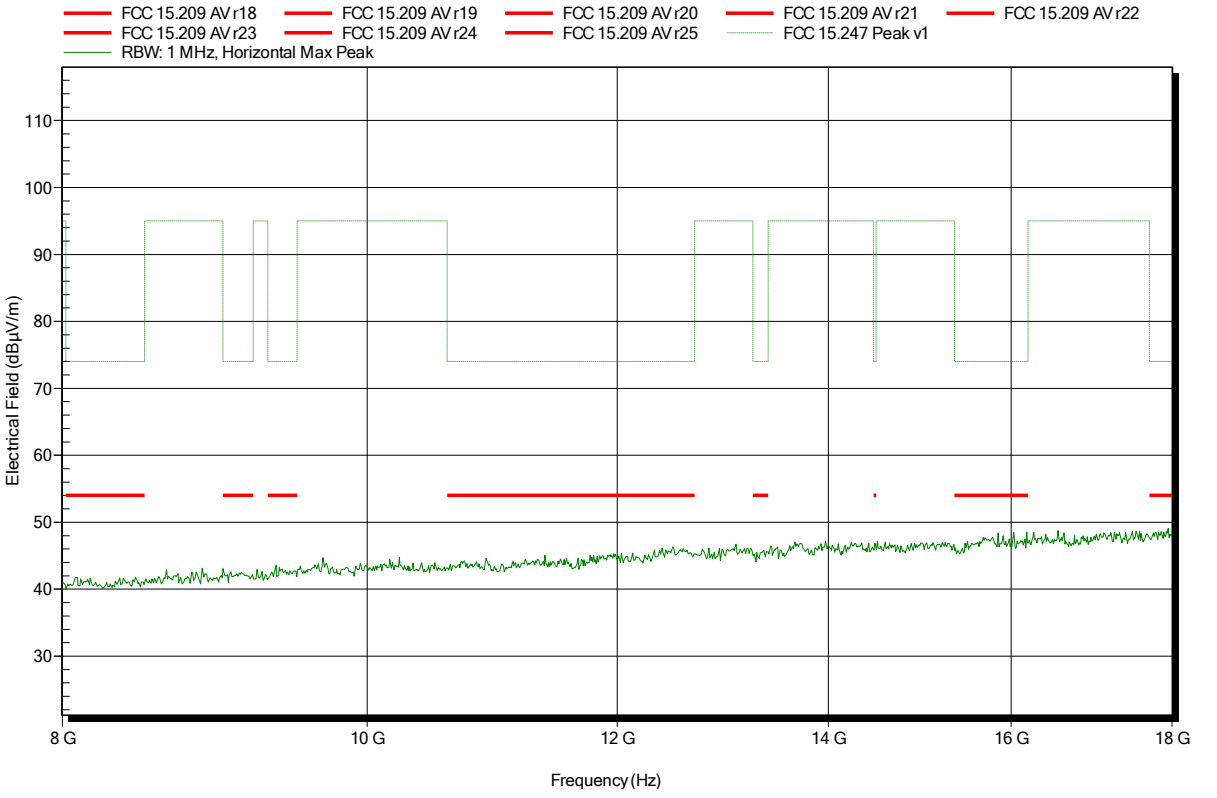

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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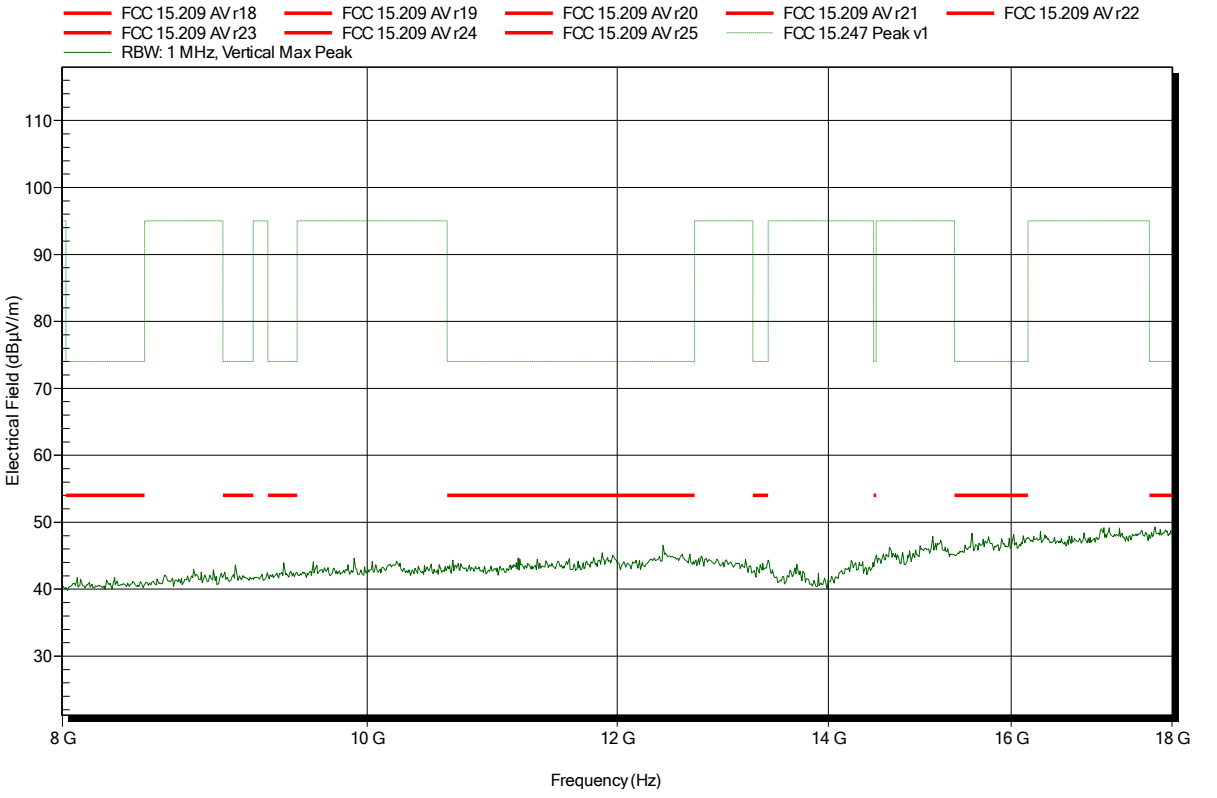

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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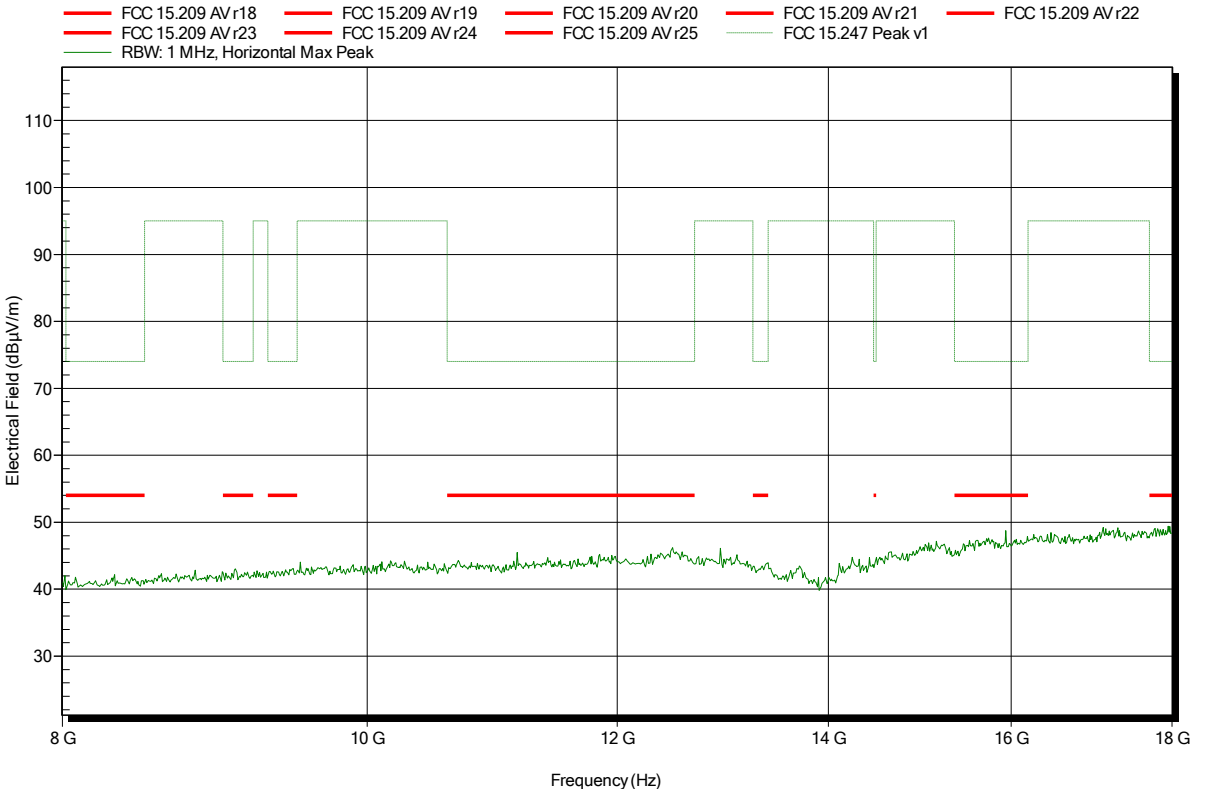

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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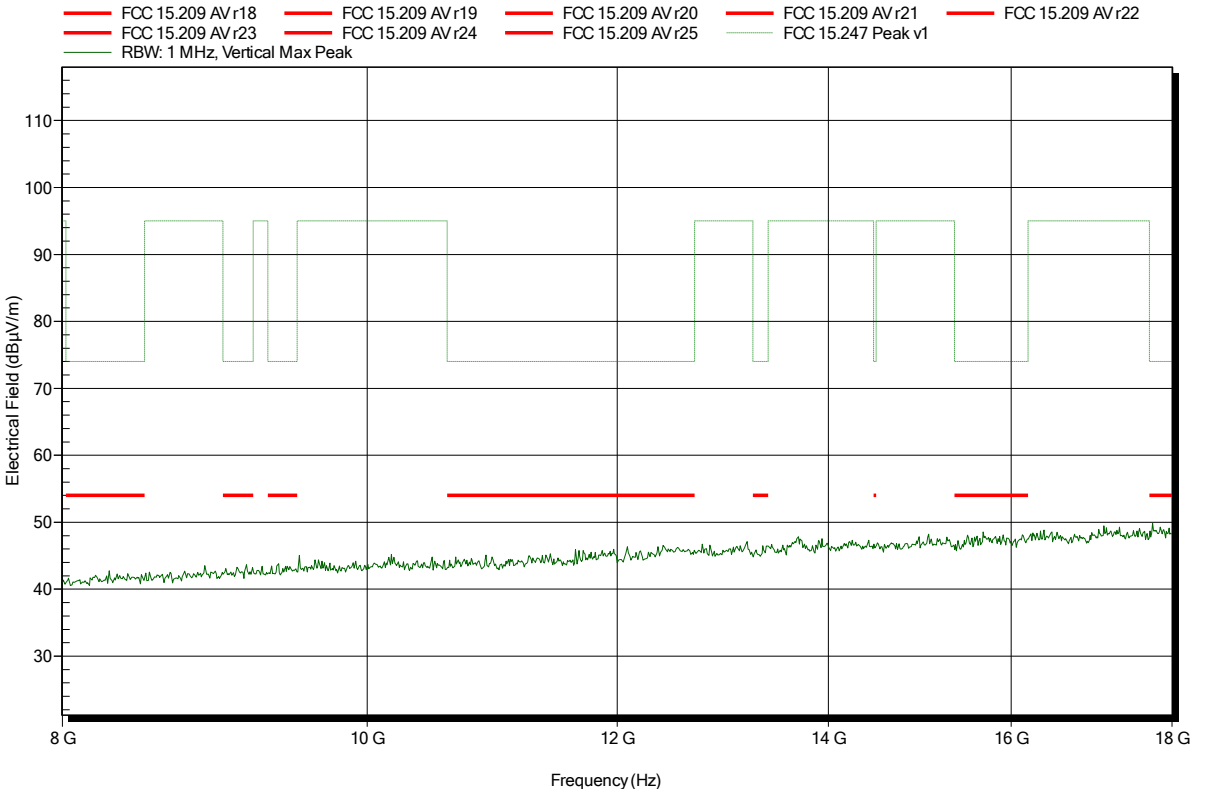

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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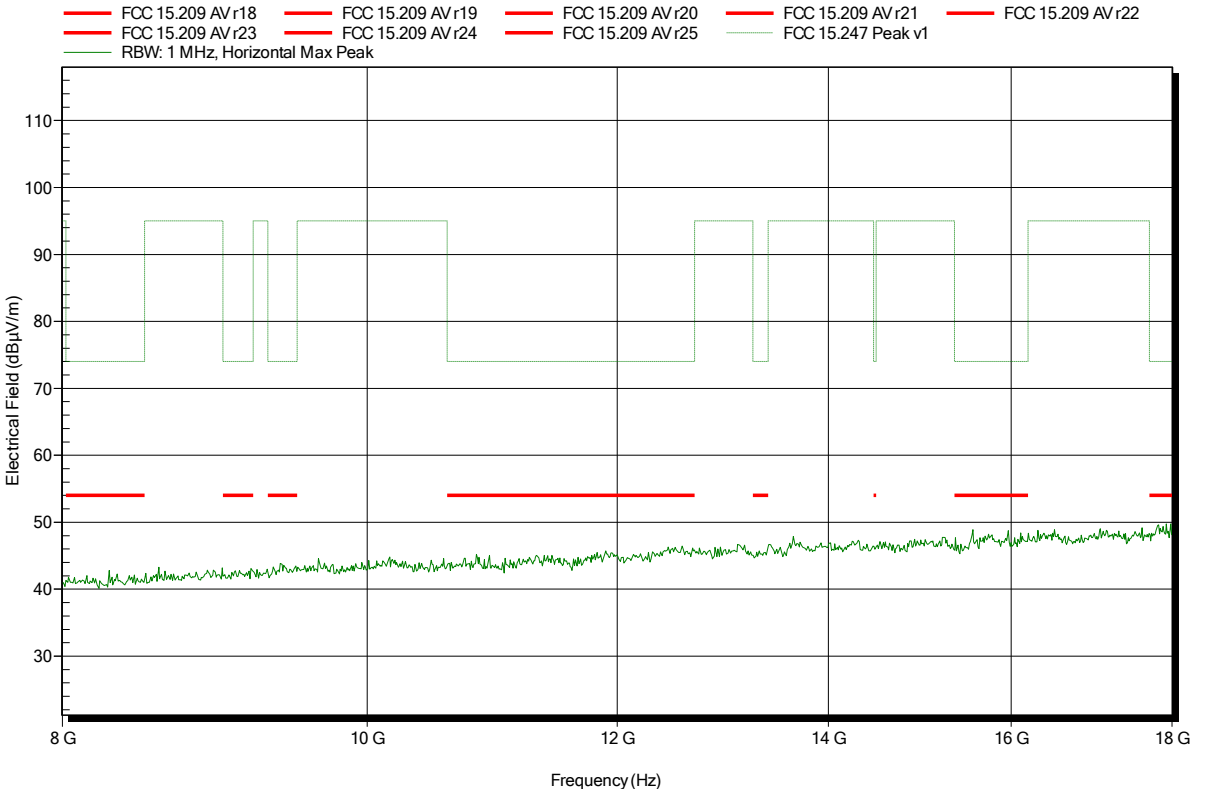

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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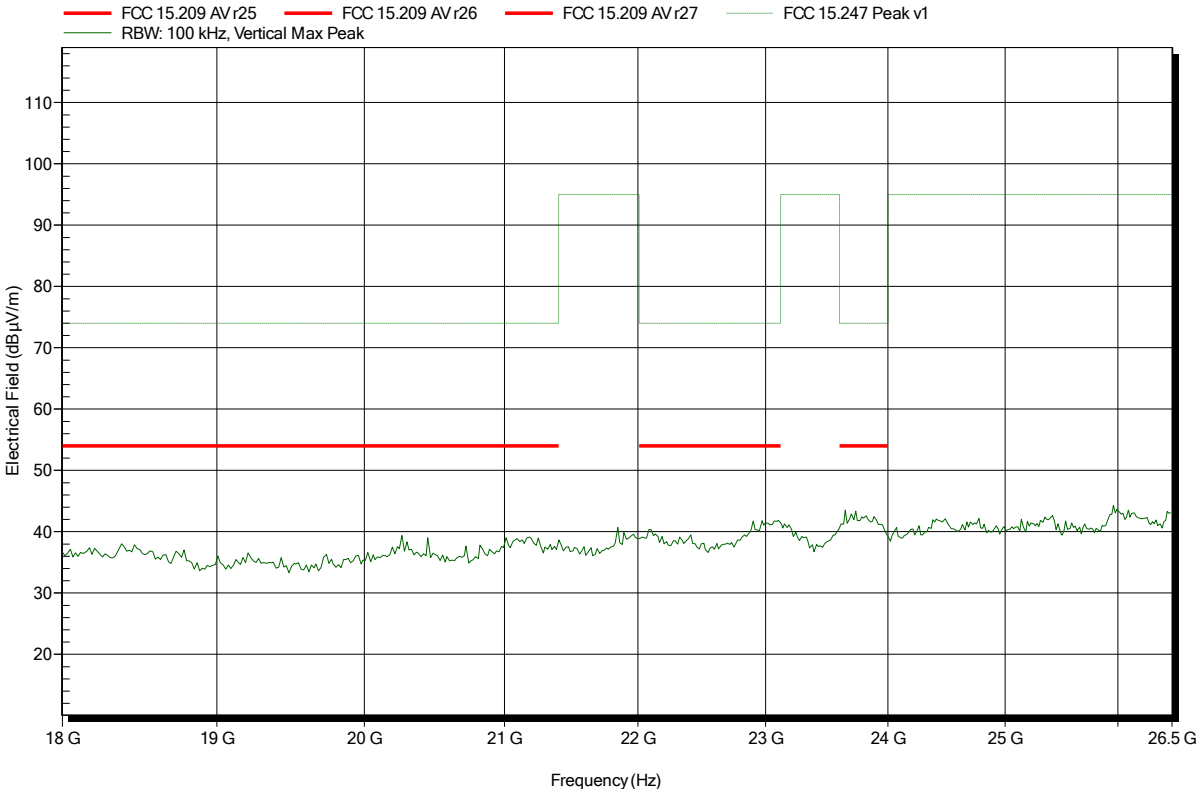

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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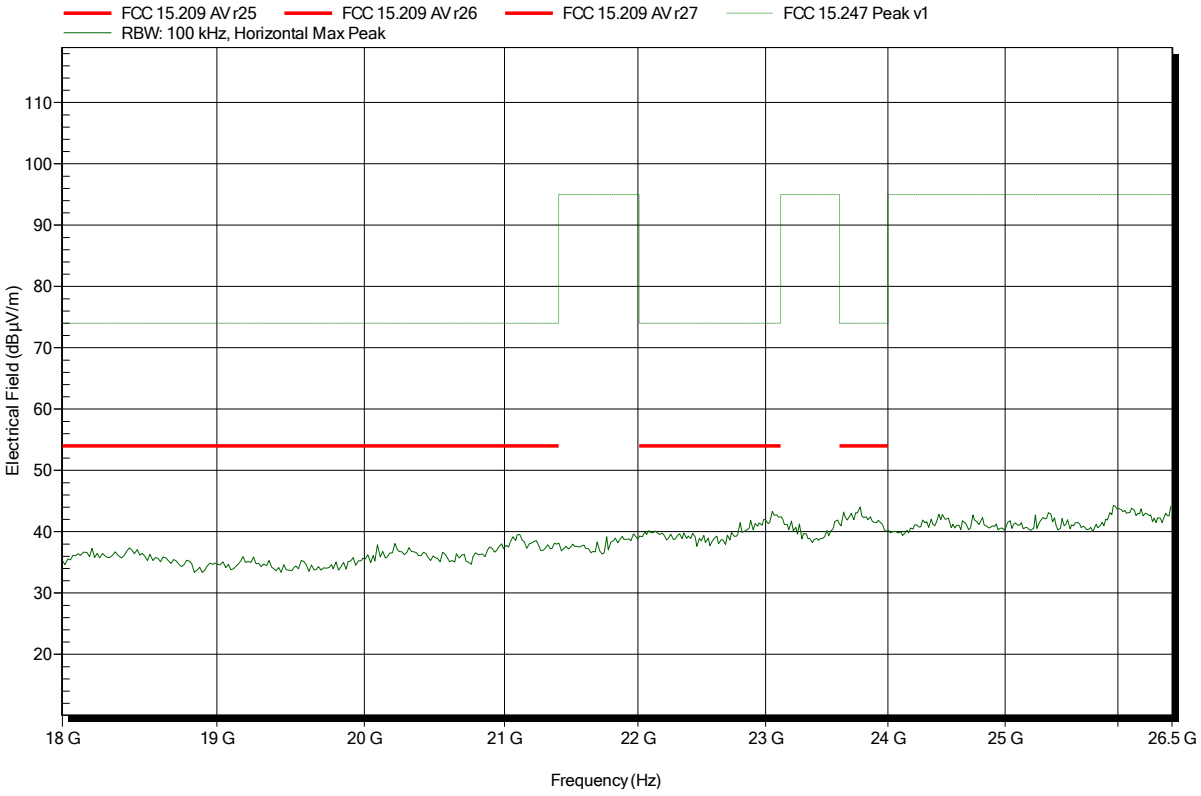

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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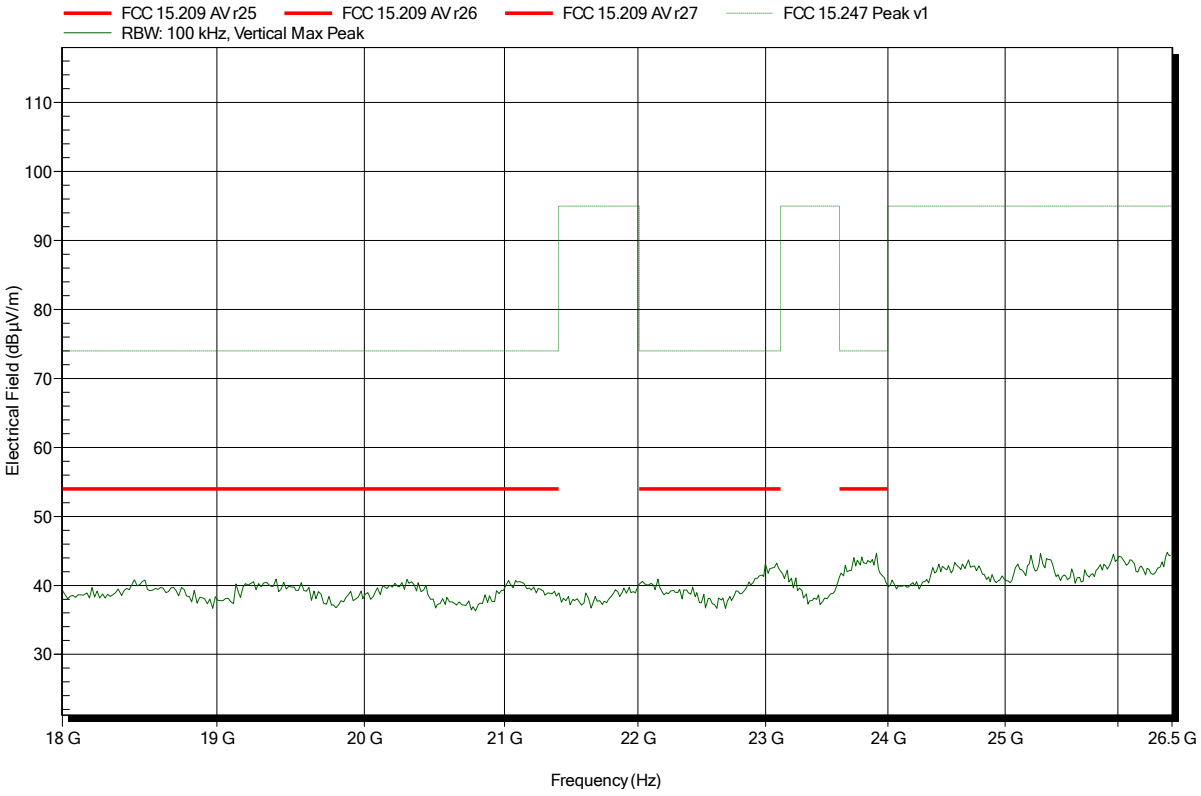

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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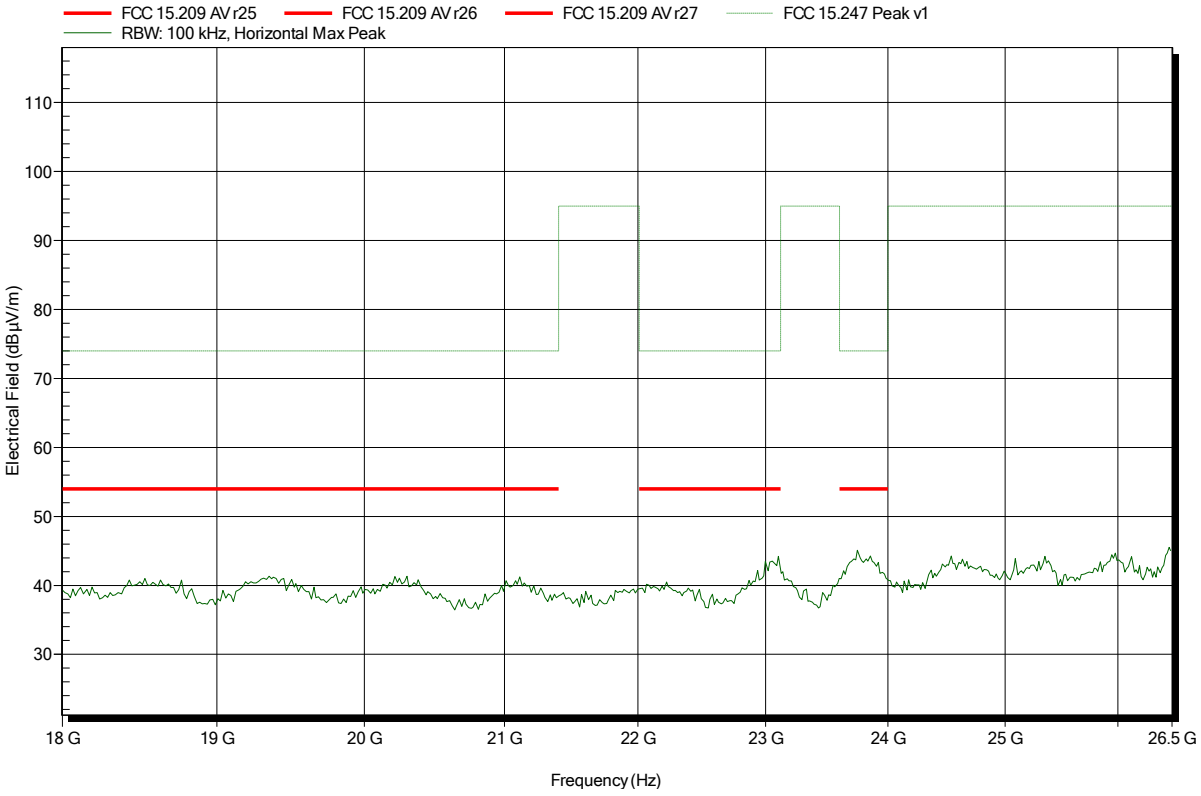

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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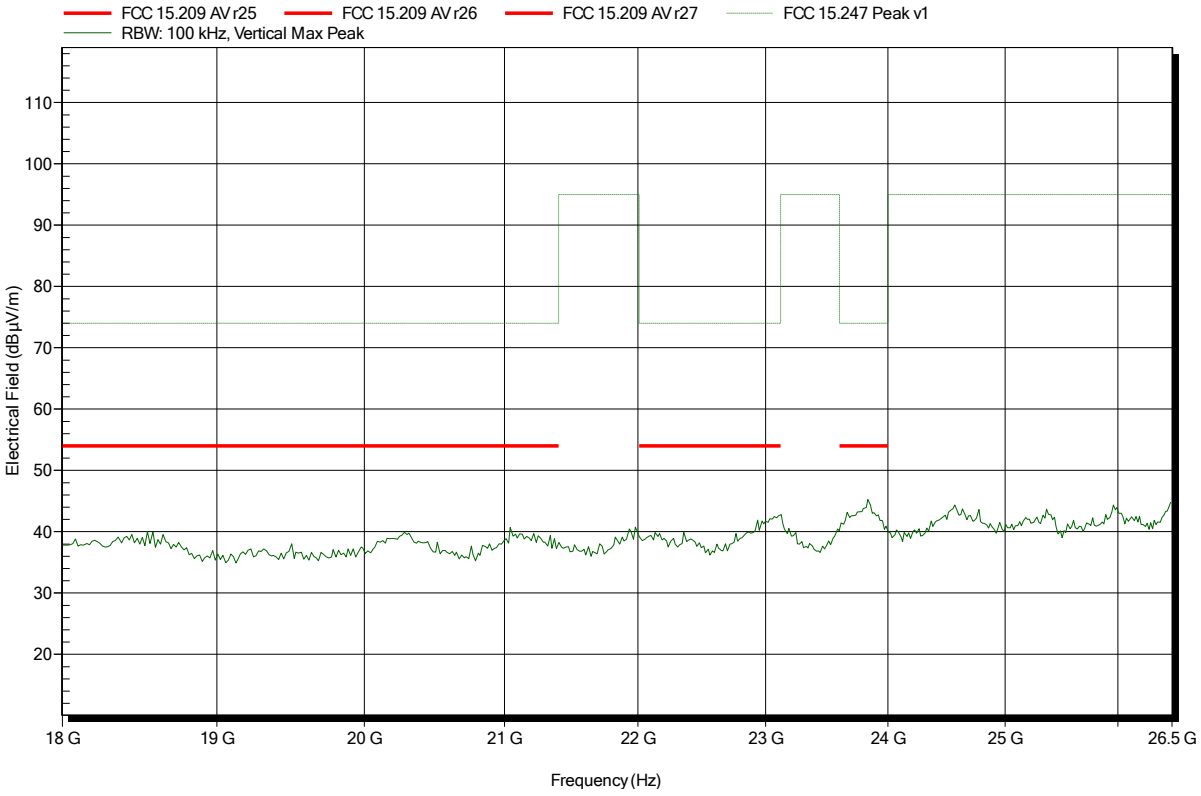

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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:	2014-11-26
Note:	EUT vertical

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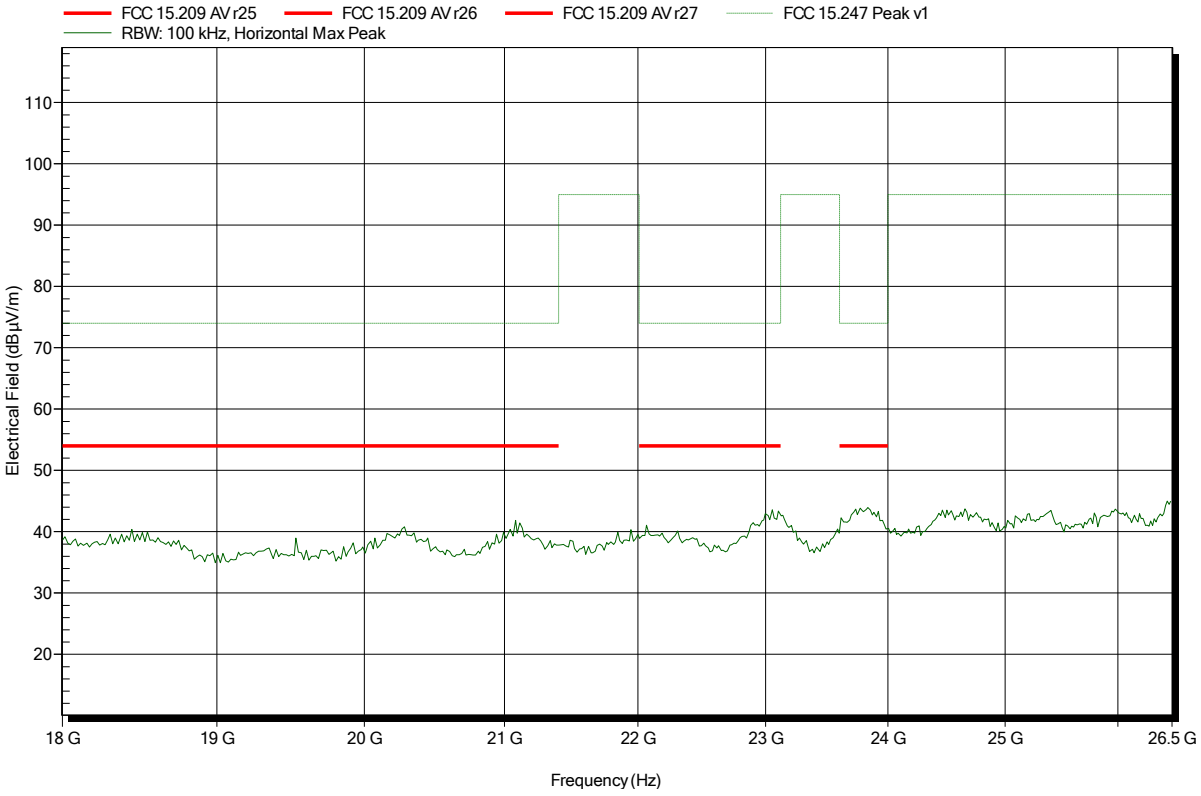

ANNEX B Receiver radiated spurious emissions

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

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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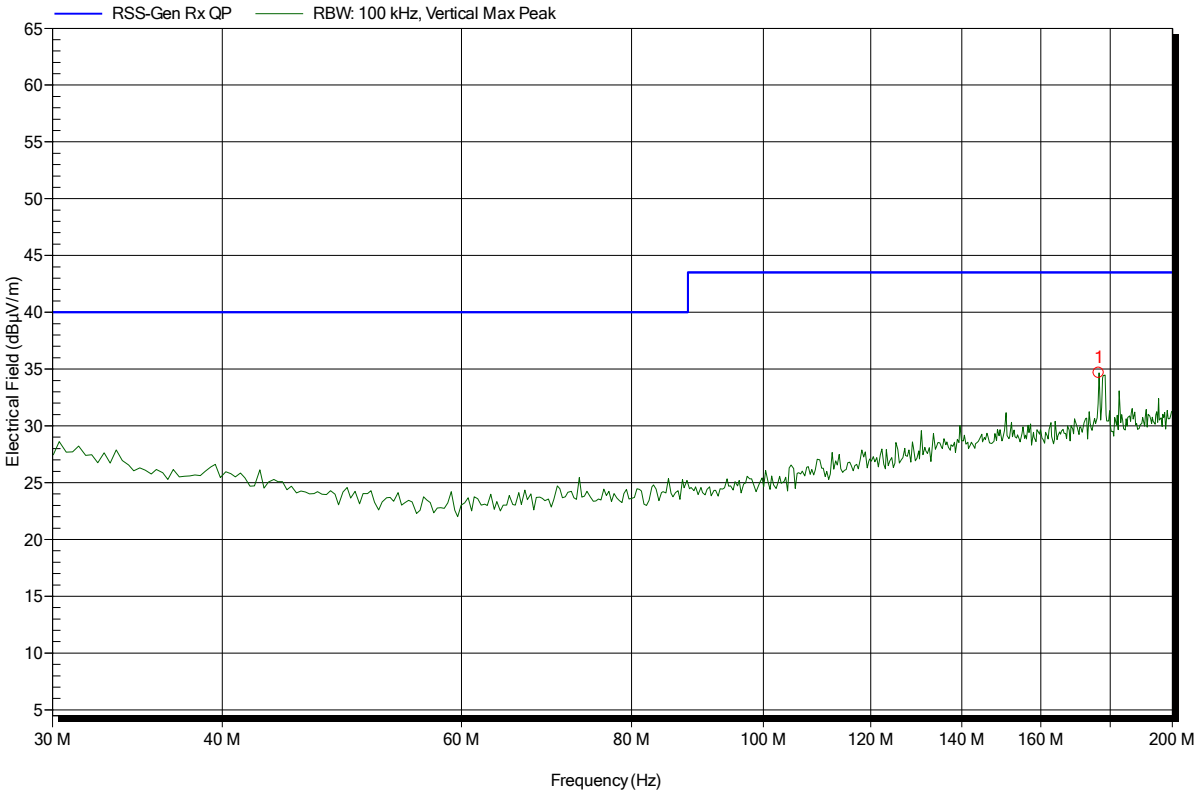

Frequency	Peak	Peak Limit	Peak Difference	Status
176.54 MHz	34.66 dBµV/m	43.5 dBµV/m	-8.84 dB	Pass

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

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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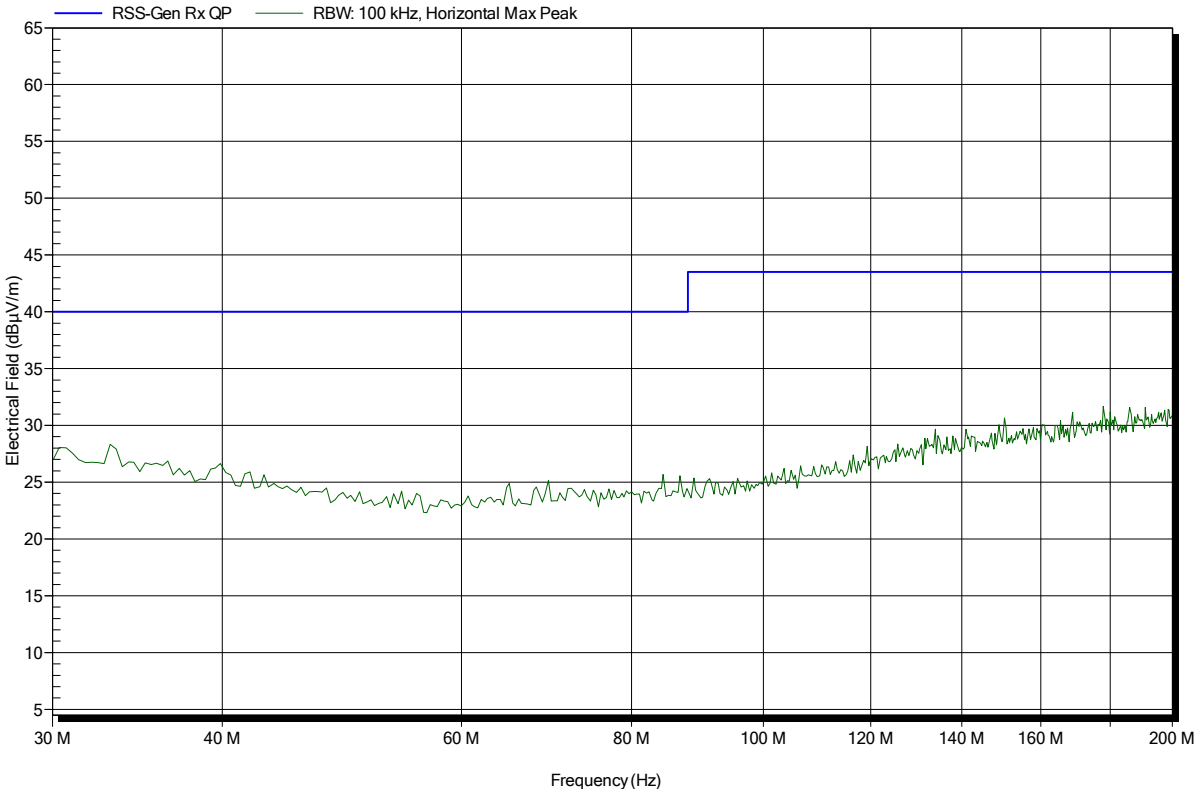

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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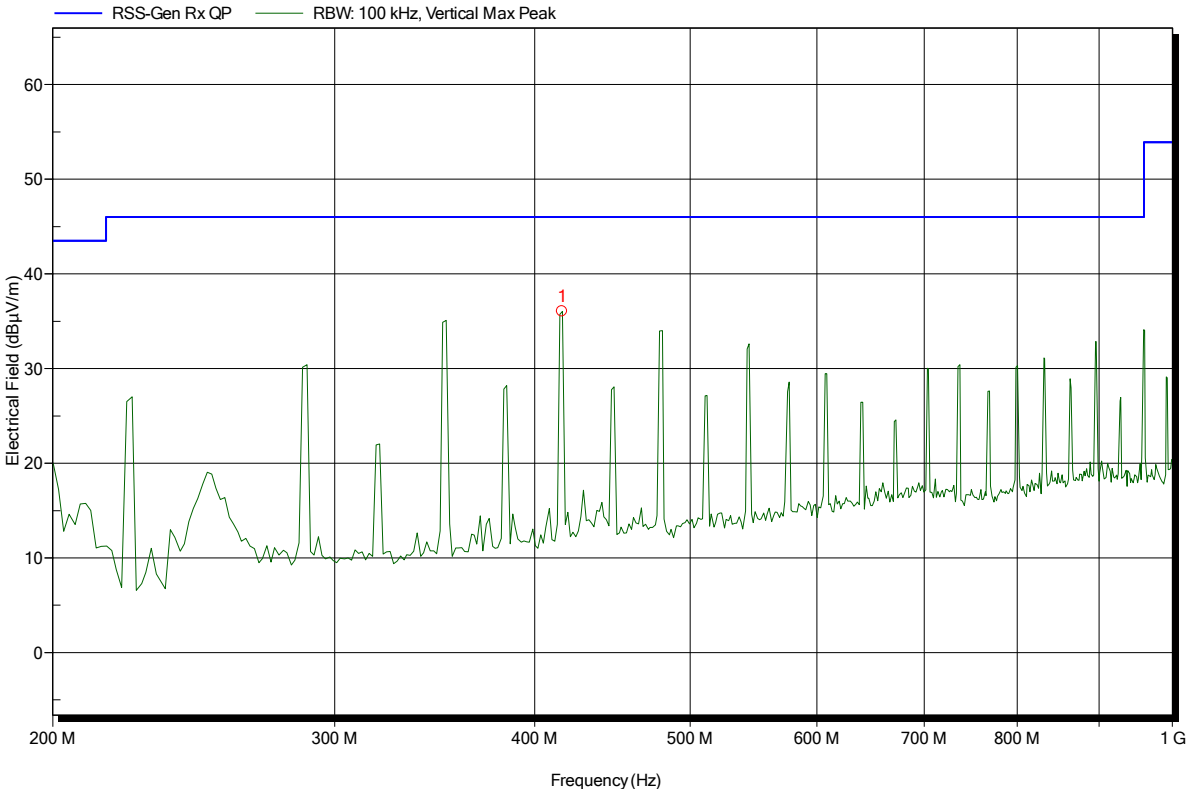

Frequency	Peak	Peak Limit	Peak Difference	Status
416 MHz	36.03 dBµV/m	46 dBµV/m	-9.97 dB	Pass

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

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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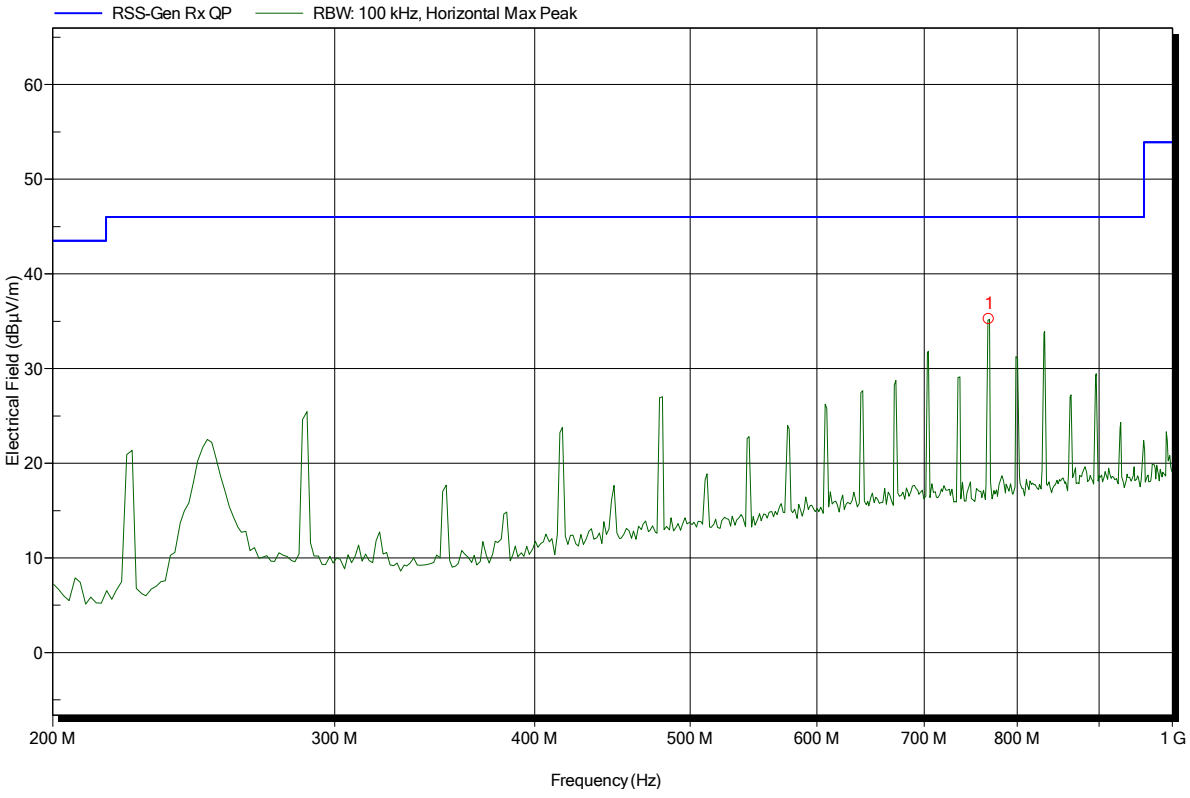

Frequency	Peak	Peak Limit	Peak Difference	Status
768 MHz	35.22 dBµV/m	46 dBµV/m	-10.78 dB	Pass

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

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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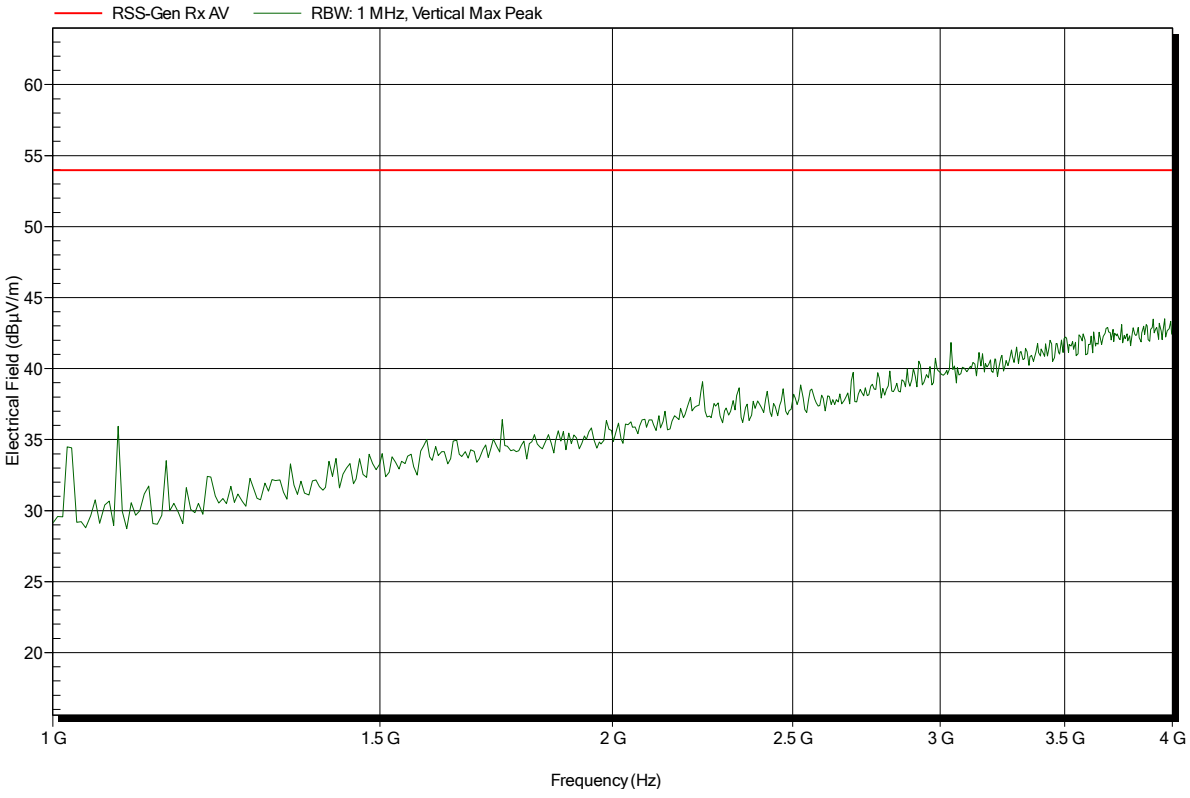

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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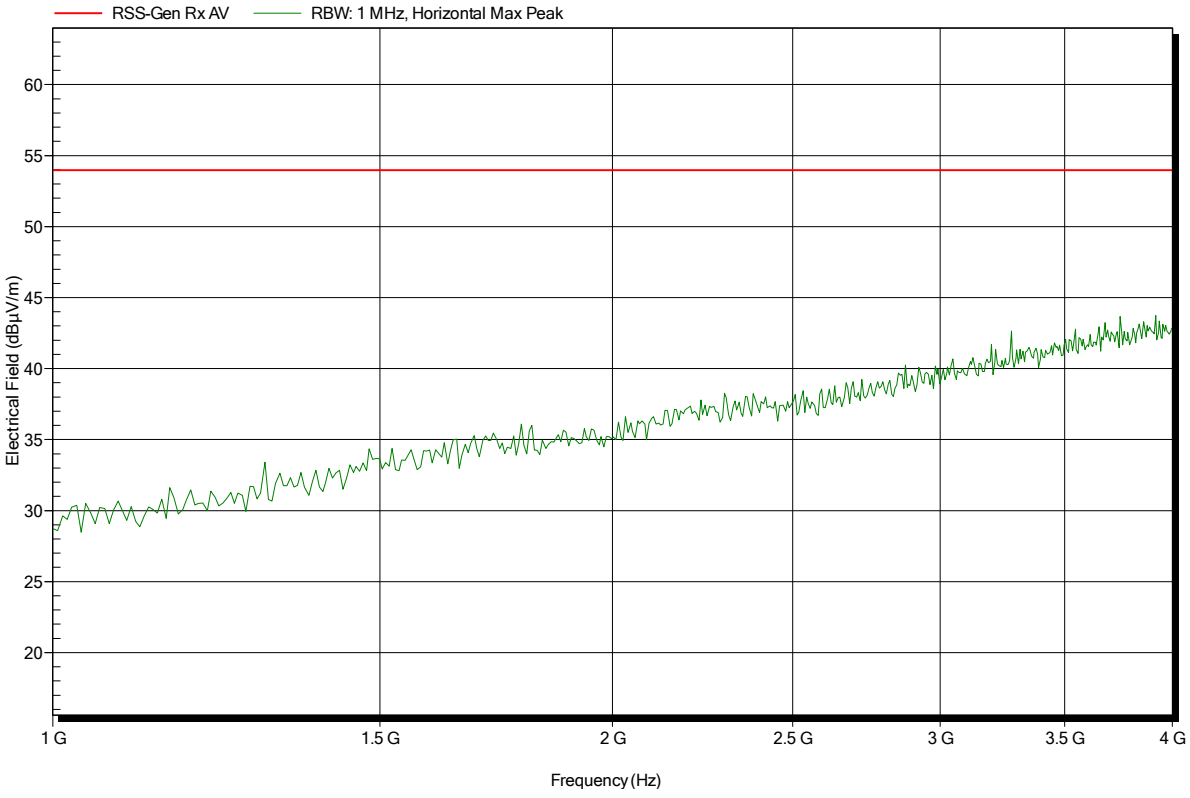

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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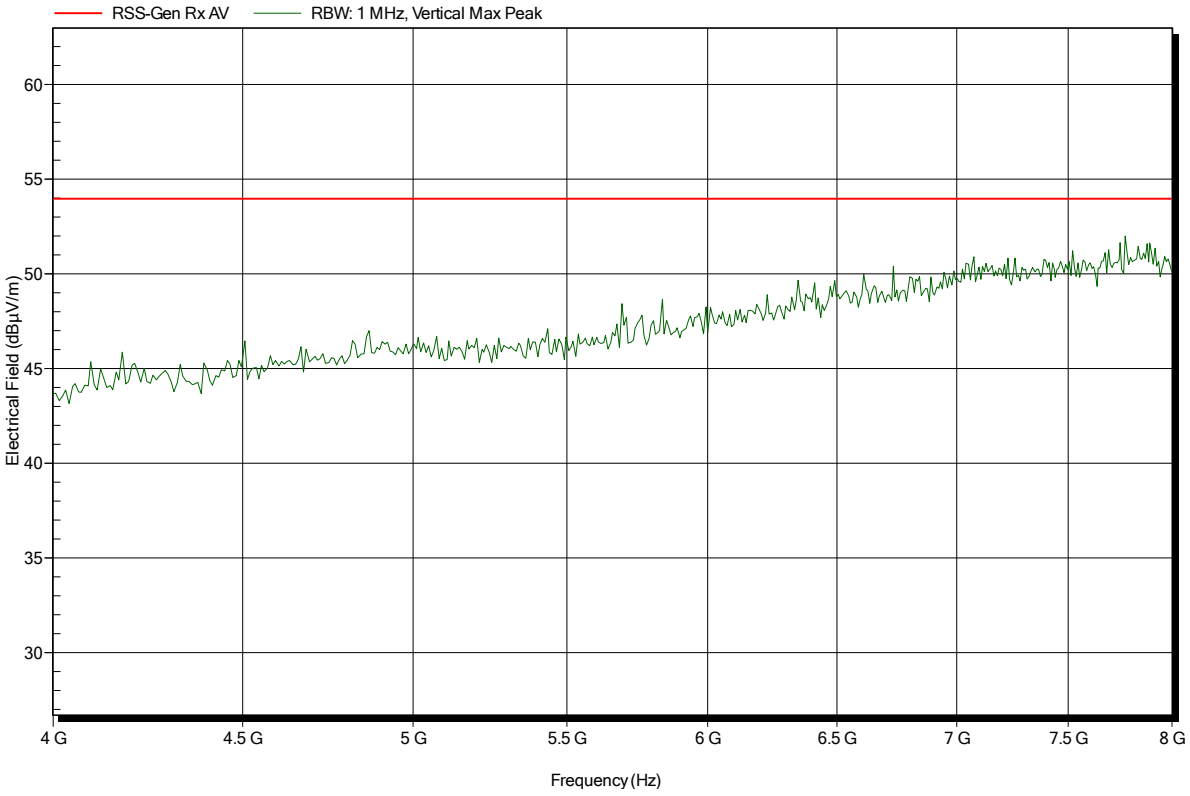

Spurious emissions according to FCC part 15 Subpart C § 15.247, IC RSS-210

Project number: G0M-1406-3917

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: 11.1V DC
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	3 m
Mode:	RX; BT-BLE; CH: 19; RX -Test-Mode
Test Date:	2014-11-25
Note:	EUT vertical

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