



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-1212-2480-TFC247Z-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	<div style="display: flex; justify-content: center; align-items: center;">   </div> <p style="text-align: center; margin-top: 5px;"> 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	Alcon GPS - WaveLight GmbH
Address	Rheinstr. 8 14513 Teltow GERMANY
Test specification:	
Standard.....	47 CFR Part 15C KDB Publication No. 558074 RSS-210, Issue 8, 2010-12 RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009
Equipment under test (EUT):	
Product description	VERION Digital Marker
Model No.	X-SPM, X-SPL (2 Variants)
Hardware version	2.0
Firmware / Software version	1.7.6.2
FCC-ID	RI7XE61
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:


Date of receipt of test item: 2013-02-12

Date (s) of performance of tests: 2013-03-15 – 2013-05-07

Compiled by: Antje Bartusch

Tested by (+ signature).....: Wilfried Treffke 

(Testing Manager)

Approved by (+ signature): Christian Weber 

(Test Lab Manager)

Date of issue: 2013-09-20

Total number of pages: 68

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	2013-09-20	Initial Release	

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1 Equipment (Test item) Description:

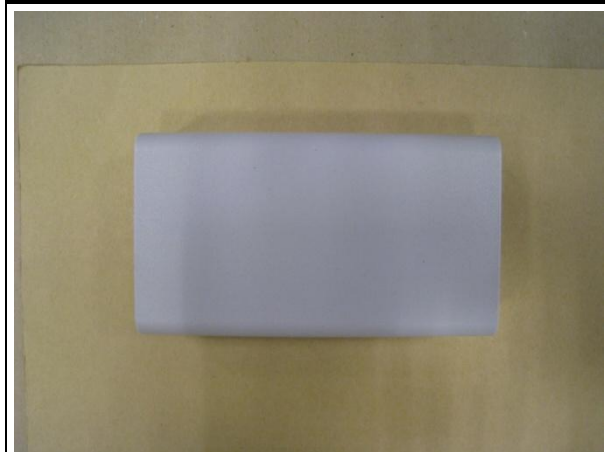
Description	VERION Digital Marker	
Model	X-SPM, X-SPL (2 Variants)	
Serial number	SN Panel PC: 00923, SN MID: 10102	
Hardware version	2.0	
Software / Firmware version	1.7.6.2	
FCC-ID	RI7XE61	
Equipment type	Radio module	
Radio type	Transceiver	
Radio technology	IEEE 802.15.4 (Zigbee)	
Operating frequency range	2405 - 2475 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F _{LOW}	2405 MHz
	F _{MID}	2445 MHz
	F _{HIGH}	2480 MHz
Spreading	DSSS	
Modulations	O-QPSK	
Number of channels	15 (11-25)	
Channel spacing	5MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	86136
	Manufacturer	DELOCK
	Gain	3.0 dBi (manufacturer declaration)
Manufacturer	Alcon GPS - WaveLight GmbH Rheinstr. 8 14513 Teltow GERMANY	
Power supply	V _{NOM}	3.15 VDC
	V _{MIN}	3.0 VDC
	V _{MAX}	3.3 VDC
AC/DC-Adaptor 1	Model : AHM100PS19 Manufacturer : XP Power Input : 100 – 240 VAC 1.2 A Output : 19 VDC 5.26 A	
AC/DC-Adaptor 2	Model : PMP120-13-2-B15 Manufacturer : Protek Power Input : 100 – 240 VAC 1.4 A Output : 19 VDC 6.32 A	

1.1 Photos – Equipment External



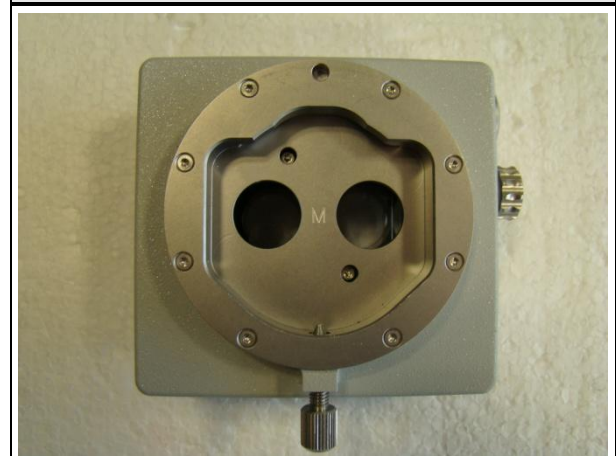
X-SPM, X-SPL RADIO PART

X-SPM, X-SPL RADIO PART



X-MD5

X-MD5



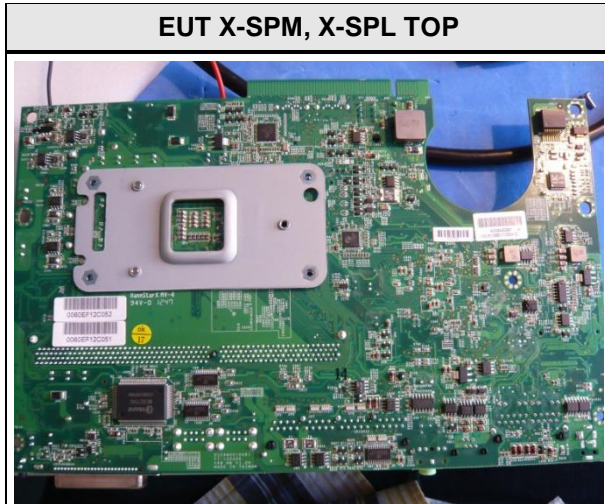
Power Supply 1



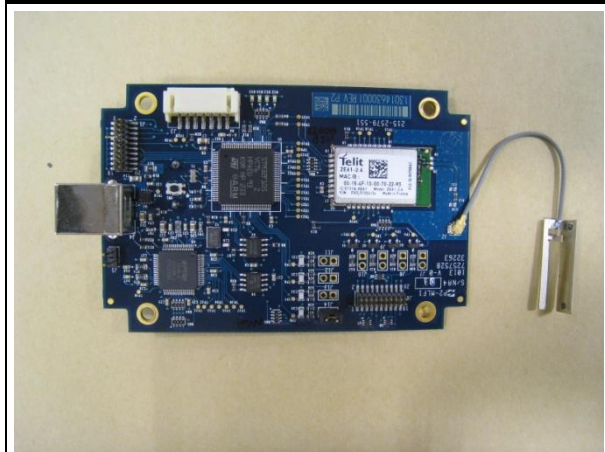
Power Supply 2



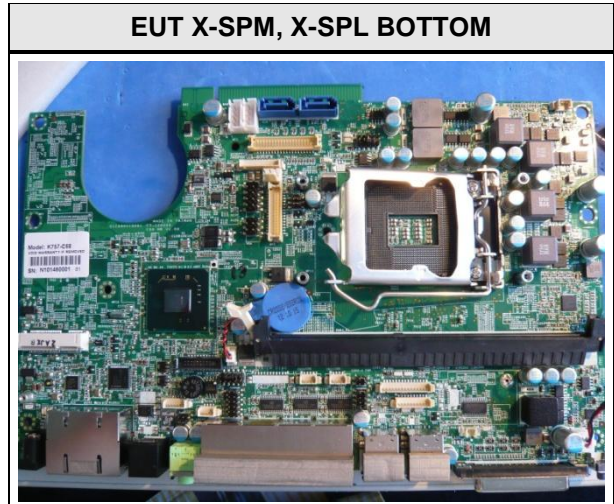
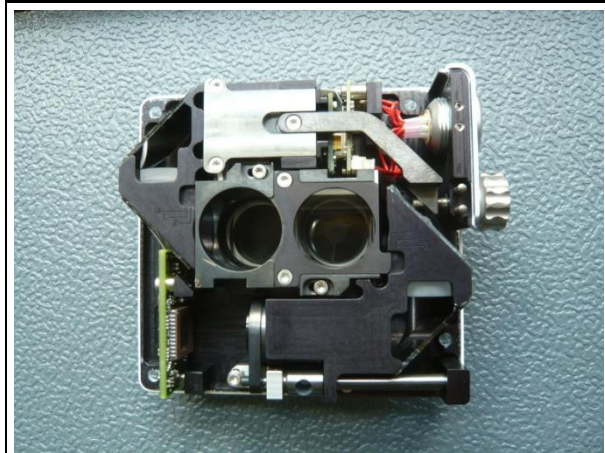
1.2 Photos – Equipment internal



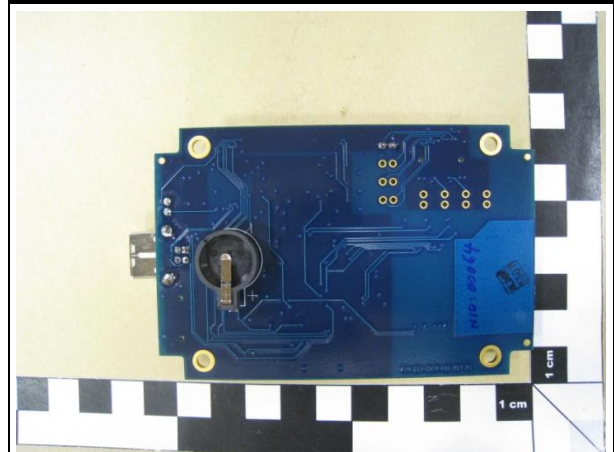
EUT X-SPM, X-SPL RADIO PART TOP



EUT X-MD5 OPEN



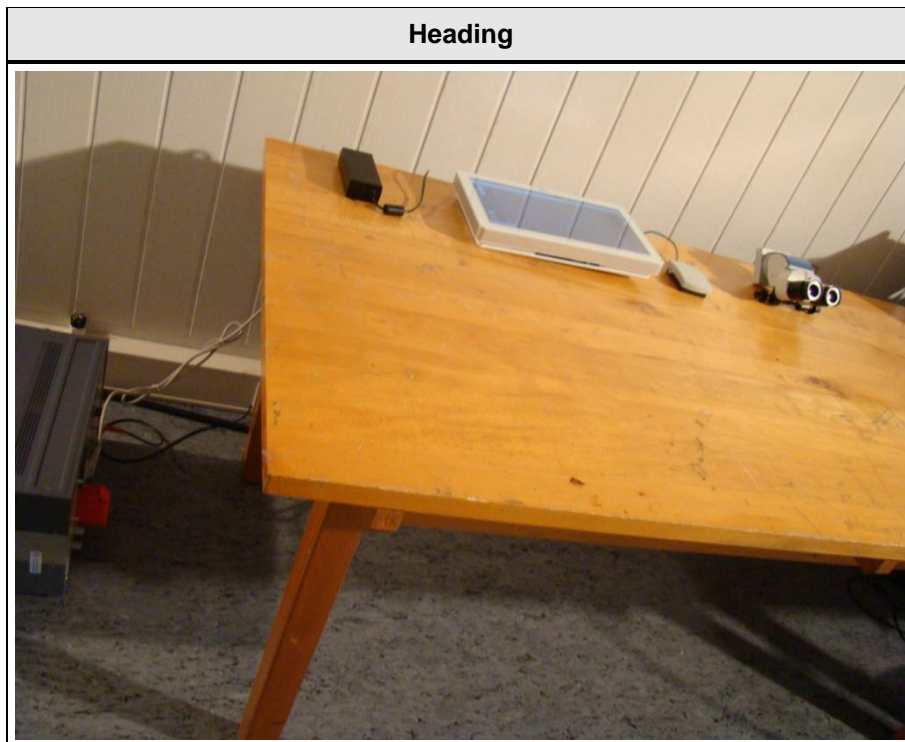
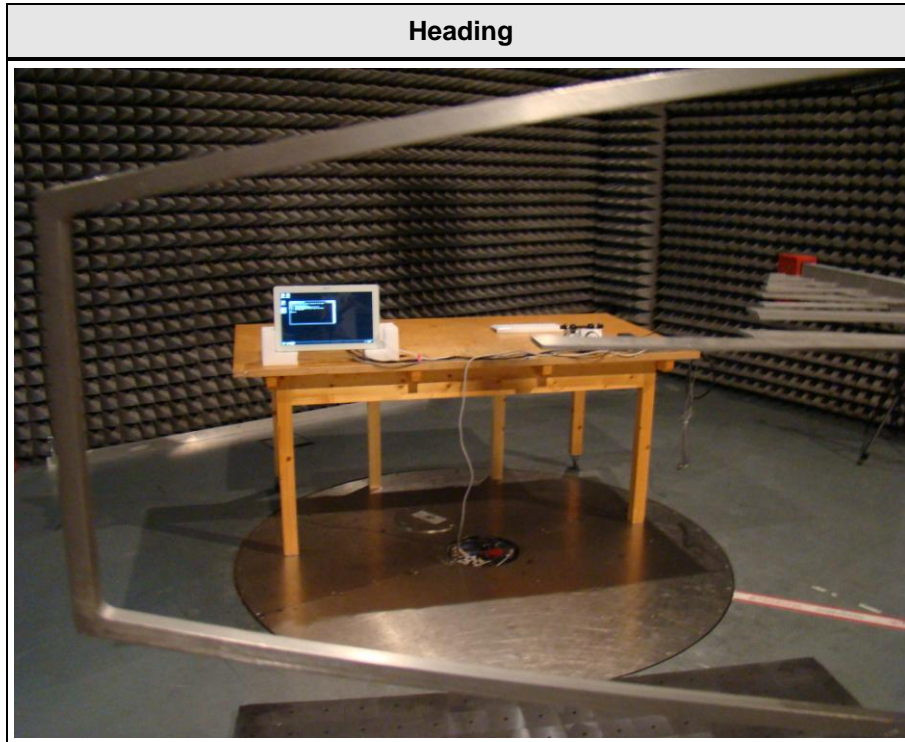
EUT X-SPM, X-SPL RADIO PART BOTTOM



PCB X-MD5 TOP



1.3 Photos – Test setup



1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
None				
<p>*Note: Use the following abbreviations:</p> <p style="padding-left: 40px;">AE : Auxiliary/Associated Equipment, or</p> <p style="padding-left: 40px;">SIM : Simulator (Not Subjected to Test)</p> <p style="padding-left: 40px;">CABL : Connecting cables</p>				

1.5 Test Modes

Mode #	Description	
ZIGBEE	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = DSSS Modulation = 0-QPSK Data rate = 250 kbps Duty cycle = 7.08 % Power level = Maximum
Receive	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone receive Spreading = DSSS
AC-Powerline	General conditions:	EUT powered by commercial AC/DC-Adapter
	Radio conditions:	Mode = standalone transmit Spreading = DSSS Power level = Maximum

1.6 Test Equipment Used During Testing

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2013-01	2014-01

6dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2013-01	2014-01

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2013-01	2014-01

Power spectral density					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2013-01	2014-01

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2013-01	2014-01

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2013-01	2014-01

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 5	EF00395	calibration	calibration
Spectrum Analyzer	R&S	FSIQ26	EF00151	2012-12	2013-12
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00187	2011-02	2014-02
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	2012-10	2014-10
AMN	R&S	ESH3-Z5	EF00036	2012-11	2014-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2012-08	2013-08

 Test Report No.: G0M-1212-2480-TFC247Z-V01

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:

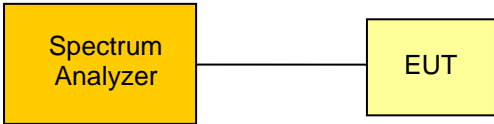
$$\begin{array}{rclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{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

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-210				
Product Specific Standard Section	Requirement – Test	Reference Method	Result	Remarks
RSS-Gen 4.6.1	Occupied Bandwidth	RSS-Gen 4.6.1	N/R	
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 4.9 IC RSS-Gen 7.2.5	Transmitter radiated spurious emissions	KDB Publication No. 558074 / ANSI C 63.4	PASS	
IC RSS-Gen 4.10 IC RSS-Gen 6.1	Receiver radiated spurious emissions	ANSI C 63.4	N/R	
Remarks:				

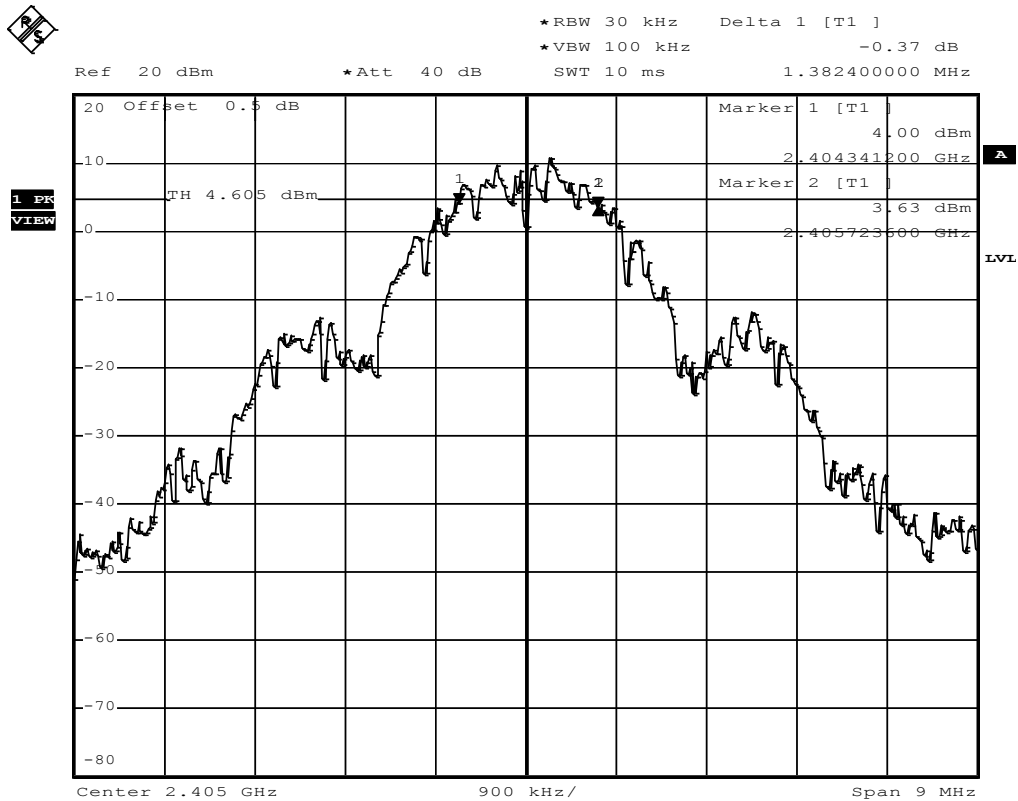
3 Test Conditions and Results

3.1 Test Conditions and Results – 6 dB Bandwidth

6dB Bandwidth acc. 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					
≥ 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}	2405	ZIGBEE	1382.4	500	PASS
F_{MID}	2440	ZIGBEE	1519.2	500	PASS
F_{HIGH}	2475	ZIGBEE	1749.6	500	PASS
Comments:					

6 dB Bandwidth – ZIGBEE F_{LOW}
**FCC part 15.247 (a)2
Minimum 6 dB Bandwidth**

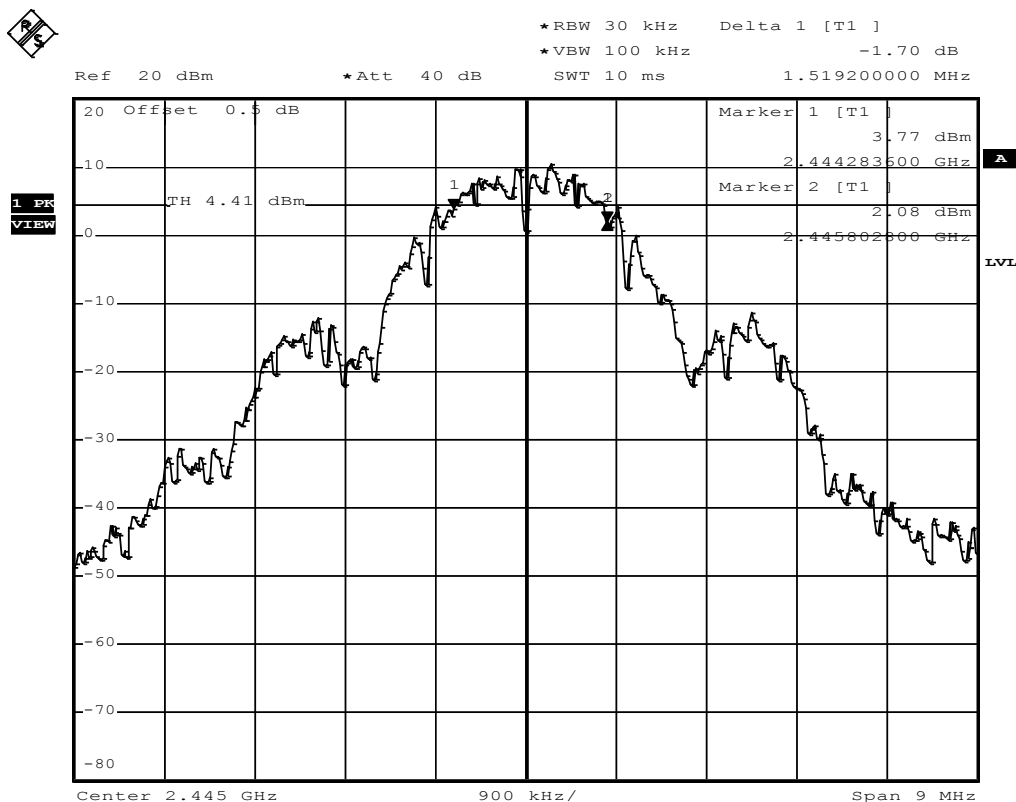
EUT	VERION Digital Marker
Model	X-SPM, X-SPL (2 VARIANTS)
Approval Holder	Alcon GPS Wave Light GmbH / G0M-1212-2480
Temperature / Voltage	tnom, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Emission BW, procedure 8.1 (558074 D01 DTS)
Comment 2	2405 MHz
Comment 3	power level attn. 1



Comment: 6 dB bandwidth: 1382.4 KHz > 500 KHz; verdict: PASS
 Date: 3.MAY.2013 15:47:48

6 dB Bandwidth – ZIGBEE F_{MID}
**FCC part 15.247 (a)2
Minimum 6 dB Bandwidth**

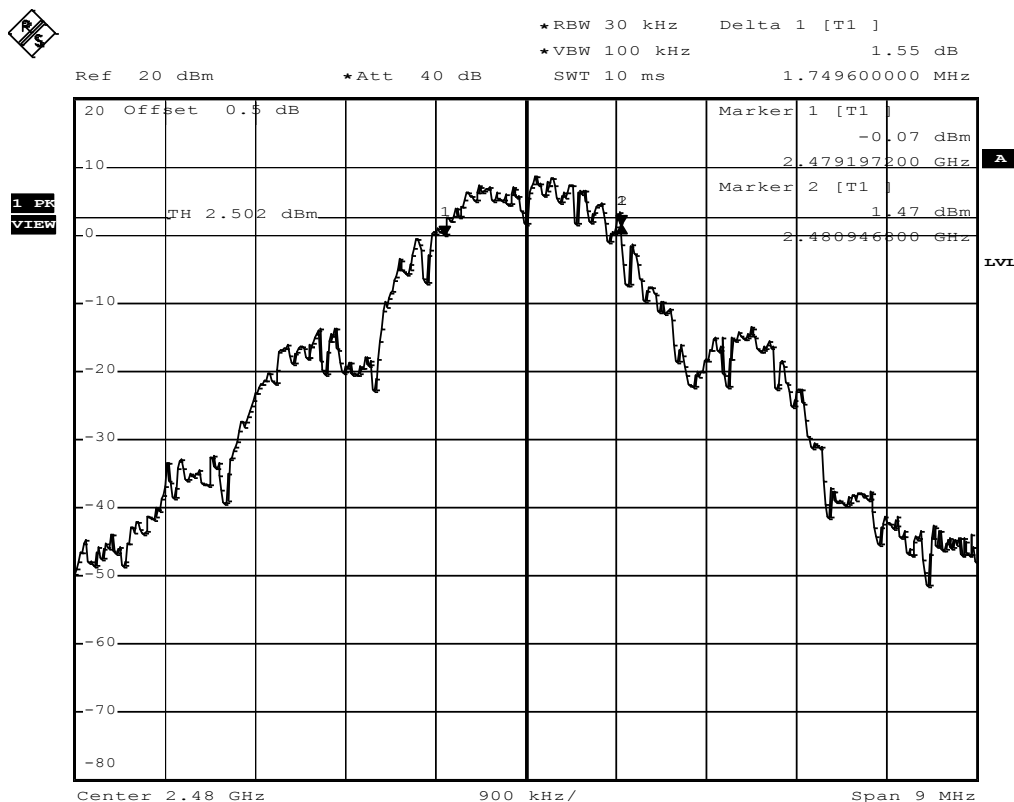
EUT	VERION Digital Marker
Model	X-SPM, X-SPL (2 VARIANTS)
Approval Holder	Alcon GPS Wave Light GmbH / G0M-1212-2480
Temperature / Voltage	tnom, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Emission BW, procedure 8.1 (558074 D01 DTS)
Comment 2	2445 MHz
Comment 3	power level attn. 1



Comment: 6 dB bandwidth: 1519.2 KHz > 500 KHz; verdict: PASS
 Date: 3.MAY.2013 15:52:35

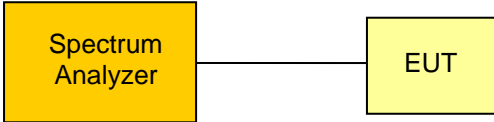
6 dB Bandwidth – ZIGBEE F_{HIGH}
**FCC part 15.247 (a)2
Minimum 6 dB Bandwidth**

EUT	VERION Digital Marker
Model	X-SPM, X-SPL (2 VARIANTS)
Approval Holder	Alcon GPS Wave Light GmbH / G0M-1212-2480
Temperature / Voltage	tnom, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Emission BW, procedure 8.1 (558074 D01 DTS)
Comment 2	2480 MHz
Comment 3	power level attn. 1




Comment: 6 dB bandwidth: 1767.6 KHz > 500 KHz; verdict: PASS
 Date: 3.MAY.2013 15:59:07

3.2 Test Conditions and Results – Maximum peak conducted power

Maximum peak conducted power acc. 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	3dBi \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		
 <pre> graph LR SA[Spectrum Analyzer] --- EUT[EUT] </pre>		
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 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 [VDC]	Mode	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]
F _{LOW}	2405	V _{NOM} = 3.15	ZIGBEE	18.3	0.067	30	-11.70
F _{LOW}	2405	V _{MIN} = 3.0	ZIGBEE	18.3	0.067	30	-11.70
F _{LOW}	2405	V _{MAX} =3.3	ZIGBEE	18.3	0.067	30	-11.70
F _{MID}	2445	V _{NOM} = 3.15	ZIGBEE	18.2	0.066	30	-11.80
F _{MID}	2445	V _{MIN} = 3.0	ZIGBEE	18.2	0.066	30	-11.80
F _{MID}	2445	V _{MAX} =3.3	ZIGBEE	18.2	0.066	30	-11.80
F _{HIGH}	2480	V _{NOM} = 3.15	ZIGBEE	17.3	0.053	30	-12.70
F _{HIGH}	2480	V _{MIN} = 3.0	ZIGBEE	17.3	0.053	30	-12.70
F _{HIGH}	2480	V _{MAX} =3.3	ZIGBEE	17.3	0.053	30	-12.70
Comments:							

3.3 Test Conditions and Results – Power spectral density

Power spectral density acc. 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}	2405	ZIGBEE	2.40524	-1.1	8.0	-09.10
F_{MID}	2445	ZIGBEE	2.44552	-1.7	8.0	-09.70
F_{HIGH}	2480	ZIGBEE	2.48030	-2,1	8.0	-29.00
Comments:						

3.4 Test Conditions and Results – AC power line conducted emissions

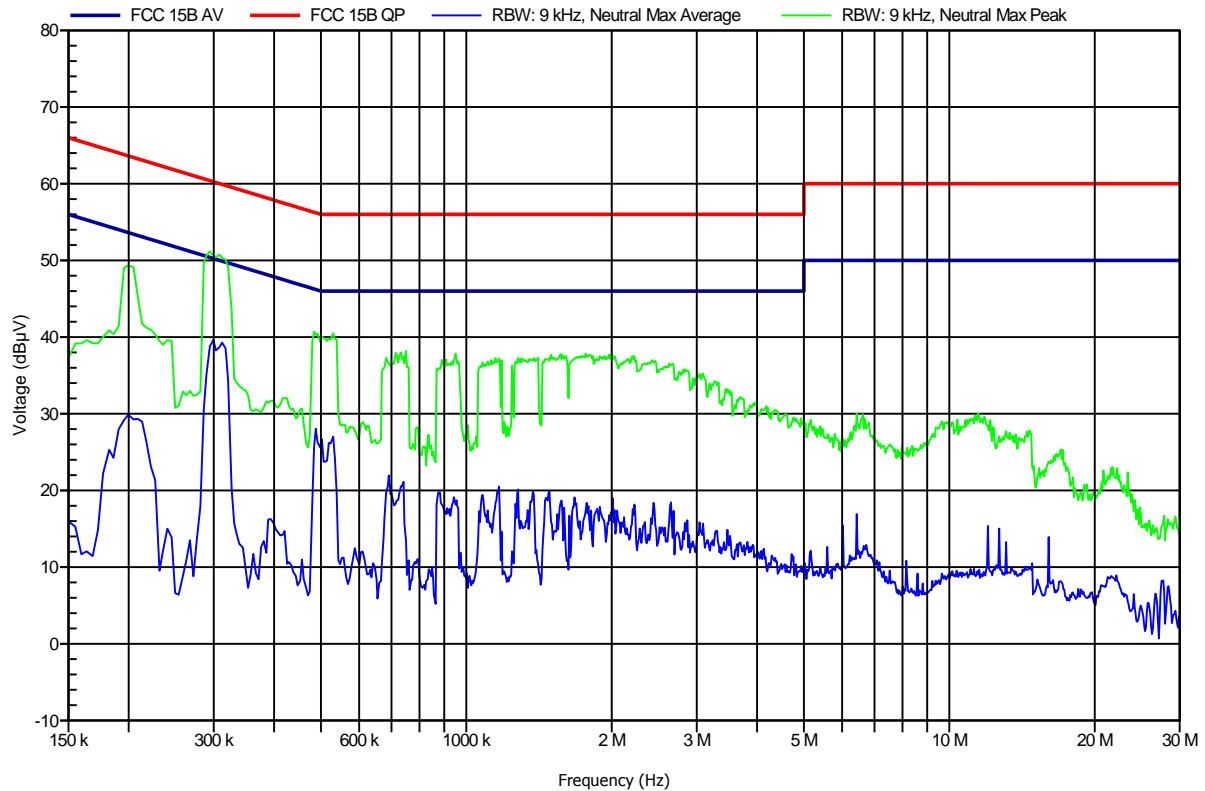
Power line conducted emissions acc. FCC 47 CFR 15.207 / IC RSS-Gen		Verdict: PASS		
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Points of Application	Application Interface			
AC Mains	LISN			
EUT test mode	AC-Powerline			
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-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 Variants)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 23°C, Unom: 120 VAC(AC/DC-adapter 1)
LISN:	ESH2-Z5 N
Mode:	active; on
Test Date:	2013-02-07
Note:	Adapter: AHM100PS19

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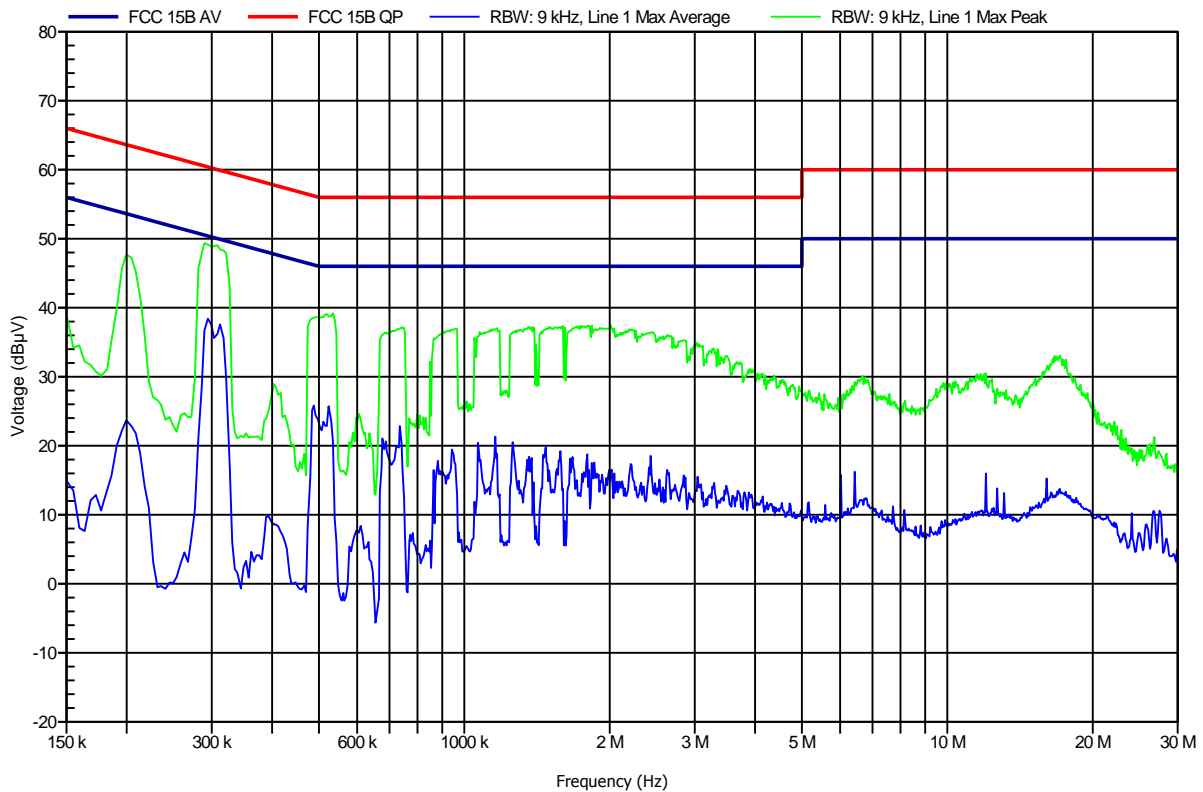


Conducted Emissions
EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 Variants)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 23°C, Unom: 120 VAC(AC/DC-adapter 1)
LISN:	ESH2-Z5 L
Mode:	active; on
Test Date:	2013-02-07
Note:	Adapter: AHM100PS19

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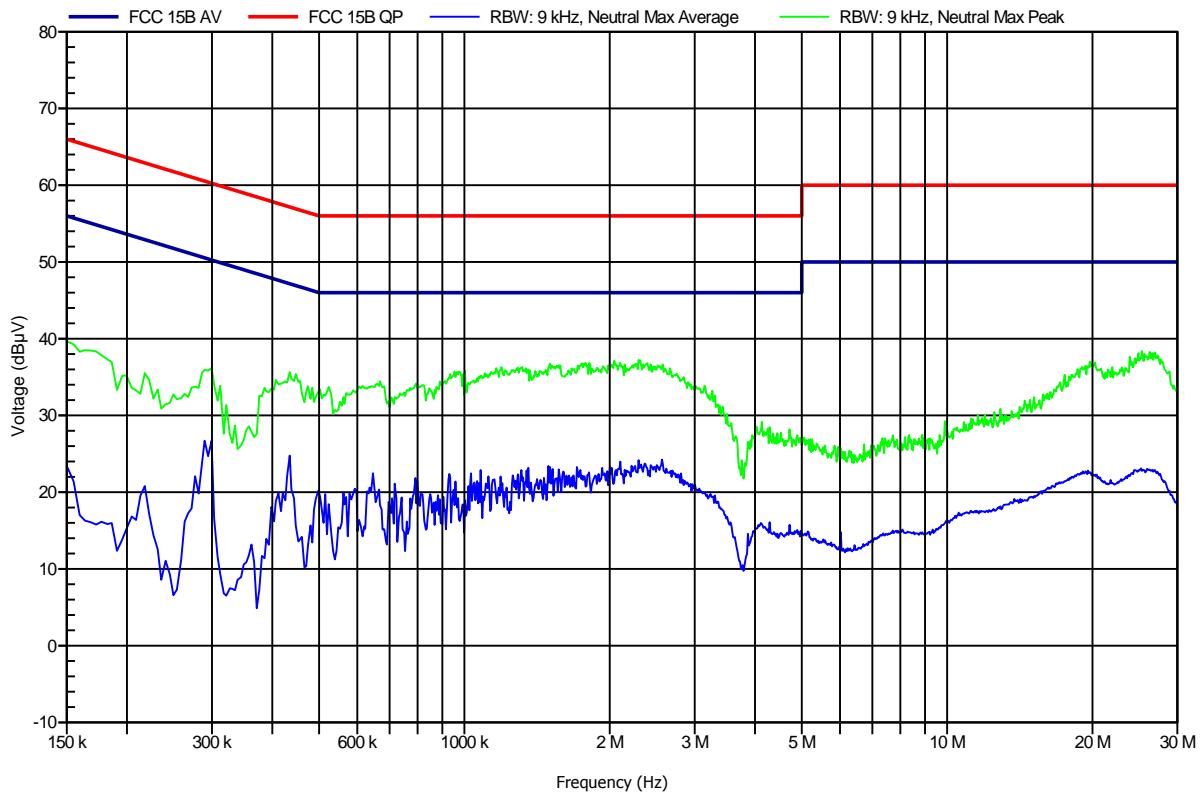


Conducted Emissions
EMI voltage test in the ac-mains according to FCC part 15B

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 Variants)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 23°C, Unom: 120 VAC(AC/DC-adapter 2)
 LISN: ESH2-Z5 N
 Mode: active
 Test Date: 2013-02-26
 Note:

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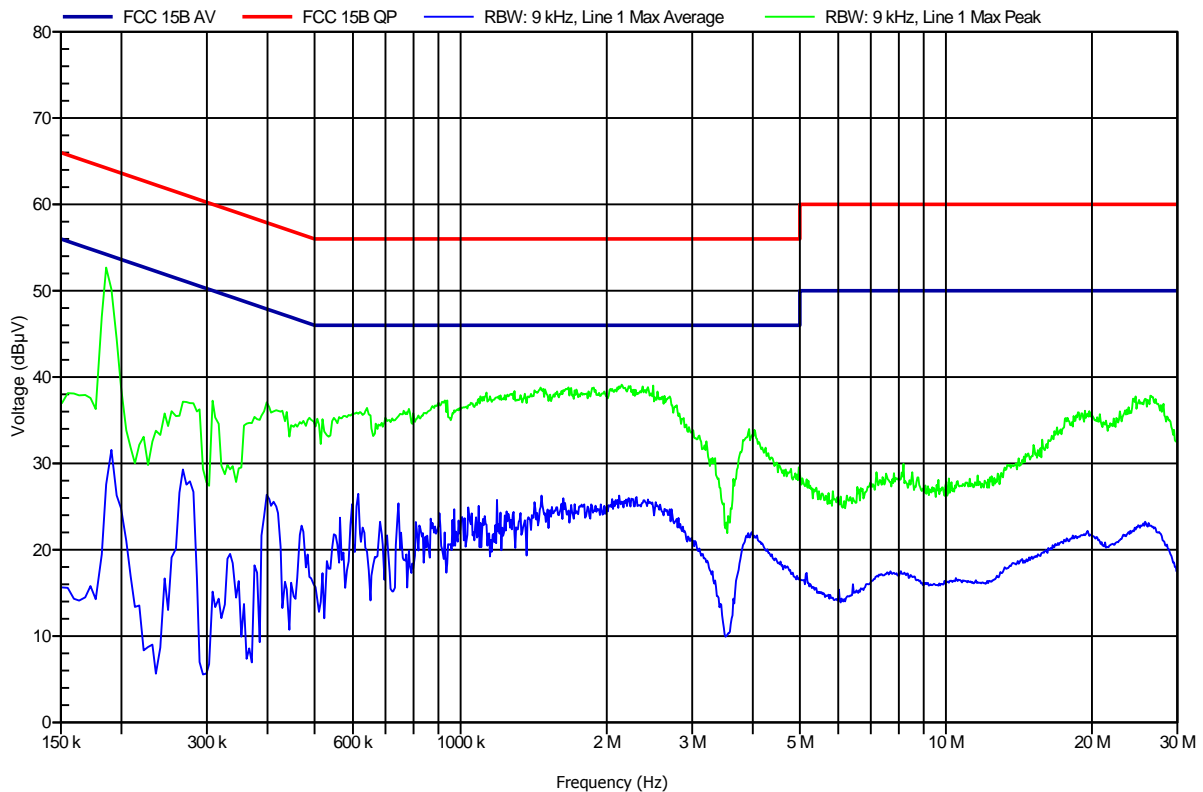


Conducted Emissions
EMI voltage test in the ac-mains according to FCC part 15B

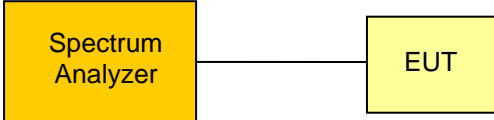
Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 Variants)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Handrik
 Test Conditions: Tnom: 23°C, Unom: 120 VAC(AC/DC-adapter 2)
 LISN: ESH2-Z5 L
 Mode: active
 Test Date: 2013-02-26
 Note:

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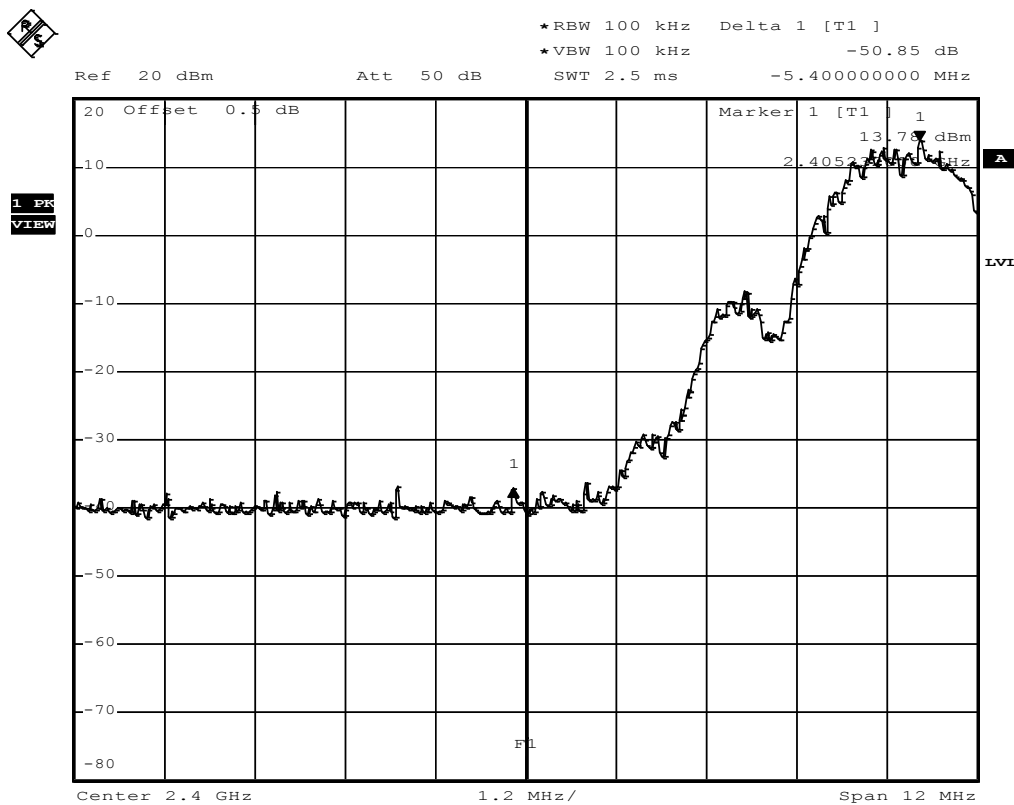


3.5 Test Conditions and Results – Band edge compliance

Band-edge compliance acc. 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					
 <pre> graph LR SA[Spectrum Analyzer] --- EUT[EUT] </pre>					
Test procedure					
<ol style="list-style-type: none"> EUT set to test mode (Communication tester is used if needed) Span set around lower band edge and detector is set to peak and max hold Resolution bandwidth is set to 100 kHz Markers are set to peak emission levels within frequency band and outside frequency band Band edge attenuation is determined from level difference 					
Test results					
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]
F_{LOW}	2405	ZIGBEE	-50.85	-20	-30.85
F_{HIGH}	2475	ZIGBEE	-46.25	-20	-26.25
Comments:					

Band-edge compliance – ZIGBEE F_{Low}
FCC part 15.247
Band-edge compliance of RF conducted emissions

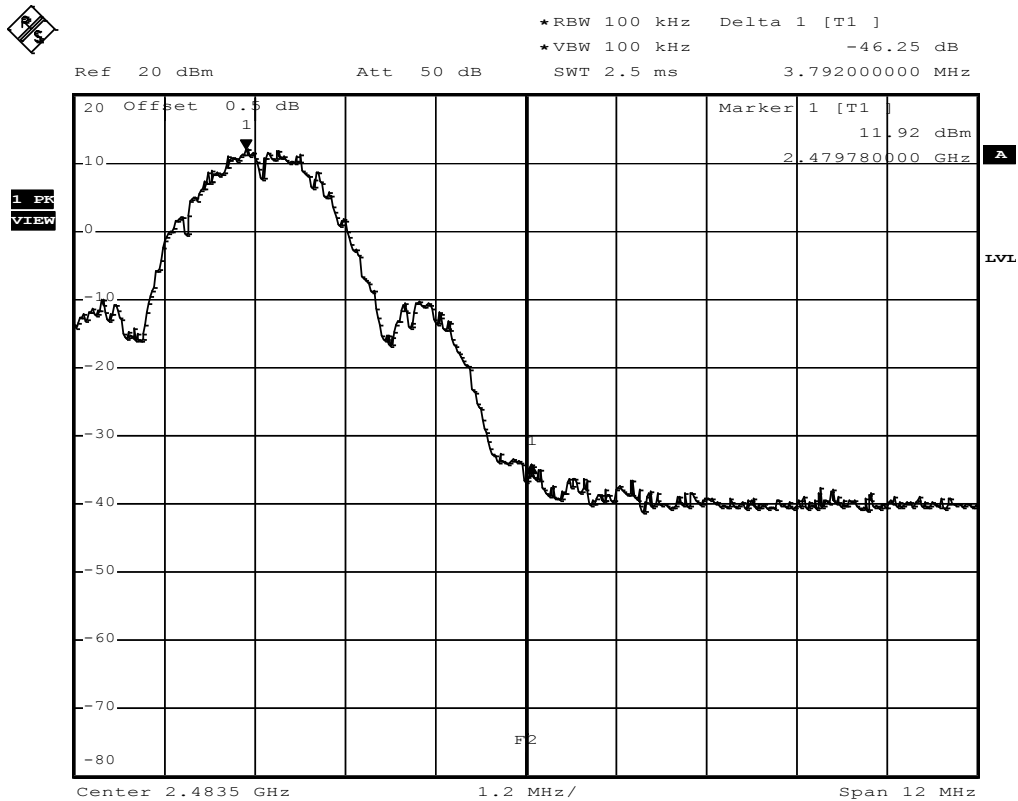
EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 Variants)
 Approval Holder: Alcon GPS Wave Light GmbH / G0M-1212-2480
 Temperature / Voltage: tnom, Vnom
 Test Site / Operator: Eurofins Product Service GmbH, Mr. Treffke
 Test Specification: FCC part 15 section 247(c)
 Comment 1: Band-edge compliance
 Comment 2: Channel.: 2405 MHz
 Comment 3: pass



Comment: Limit: Marker Delta value >20 dB; Result: PASS
 Date: 7.MAY.2013 15:42:58


Band-edge compliance – ZIGBEE F_{HIGH}
FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 Variants)
 Approval Holder: Alcon GPS Wave Light GmbH / G0M-1212-2480
 Temperature / Voltage: tnom, Vnom
 Test Site / Operator: Eurofins Product Service GmbH, Mr. Treffke
 Test Specification: FCC part 15 section 247(c)
 Comment 1: Band-edge compliance
 Comment 2: Channel.: 2480 MHz
 Comment 3: pass



Comment: Limit: Marker Delta value >20 dB; Result: PASS
 Date: 7.MAY.2013 15:46:57

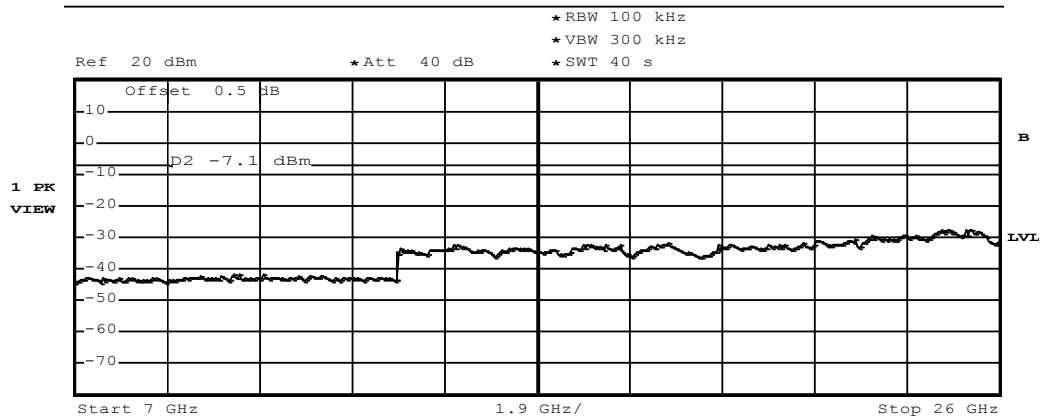
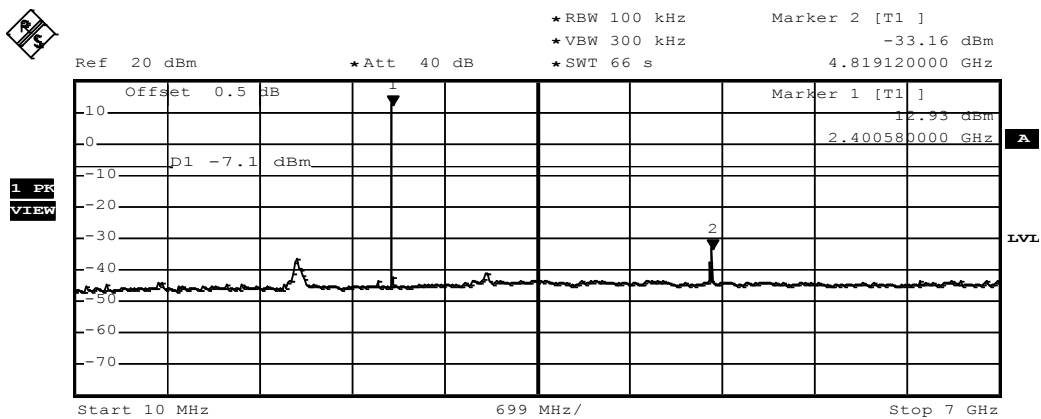
3.6 Test Conditions and Results – Conducted spurious emissions

Conducted spurious emissions acc. 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}	2405	ZIGBEE	4819	-33.16	12.93	-7.1	-26.06
F _{MID}	2440	ZIGBEE	4889	-35.74	12.94	-7.1	-28.64
F _{HIGH}	2475	ZIGBEE	1701	-32.63	11.94	-8.1	-24.53
Comments:							

Conducted spurious emissions – ZIGBEE F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 Variants)
 Approval Holder: Alcon GPS Wave Light GmbH / G0M-1212-2480
 Temperature / Voltage: tnom, Vnom
 Test Site / Operator: Eurofins Product Service GmbH, Mr. Treffke
 Test Specification: FCC part 15.247 (d)
 Comment 1: Spurious Emissions conducted
 Comment 2: 2405 MHz
 Comment 3: pass

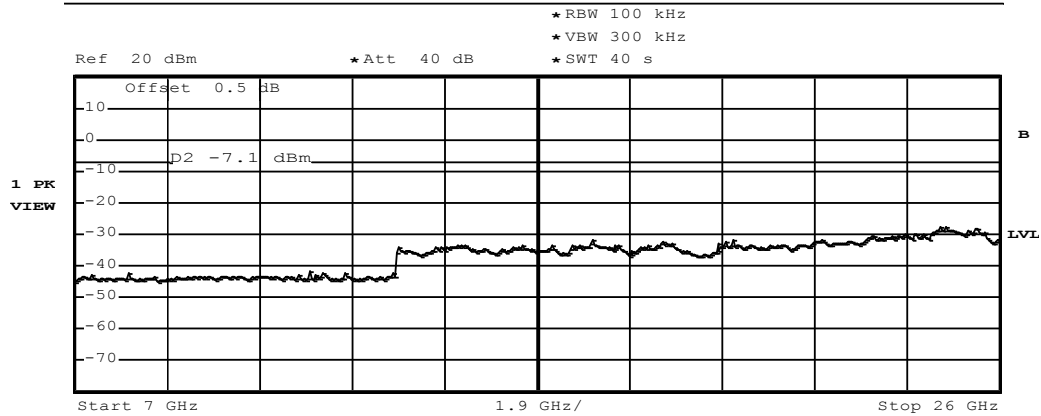
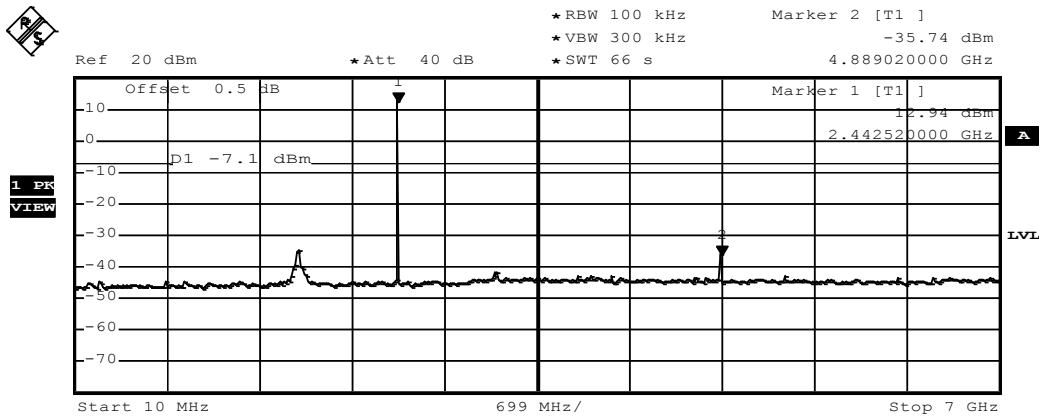


Date: 7.MAY.2013 12:36:42

Conducted spurious emissions – ZIGBEE F_{MID}

**FCC part 15.247 (d)
Spurious Emissions**

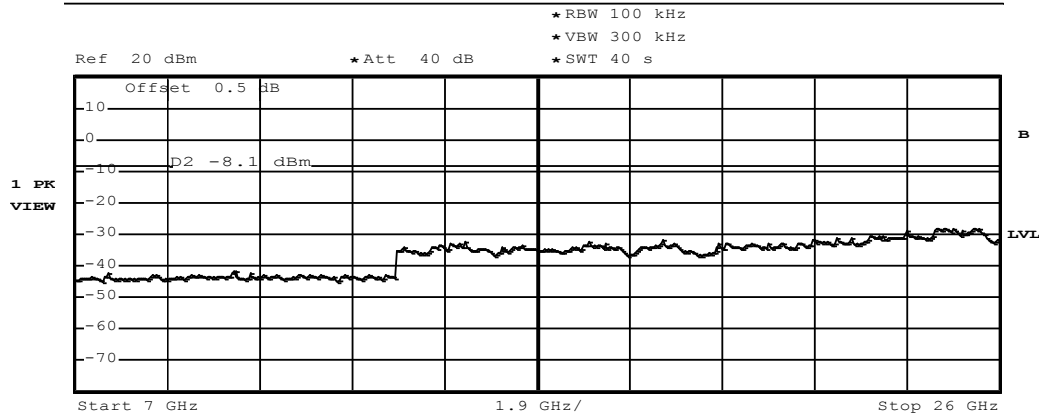
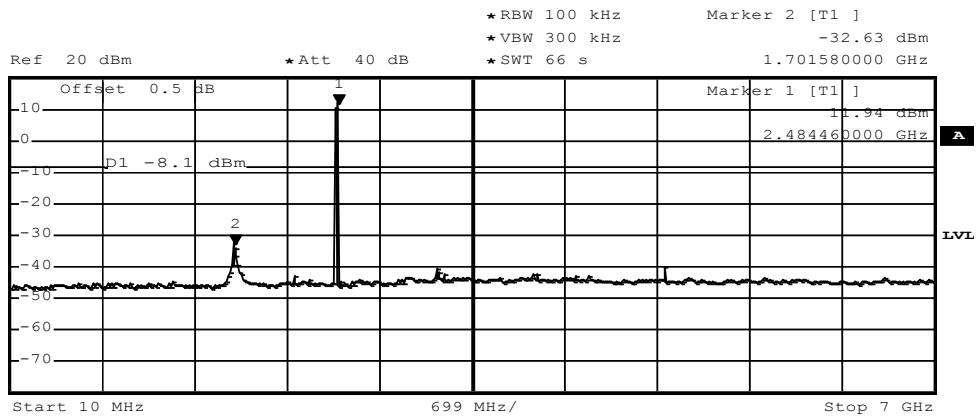
EUT	VERION Digital Marker
Model	X-SPM, X-SPL (2 Variants)
Approval Holder	Alcon GPS Wave Light GmbH / G0M-1212-2480
Temperature / Voltage	tnom, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	2445 MHz
Comment 3	pass



Date: 7.MAY.2013 15:05:52

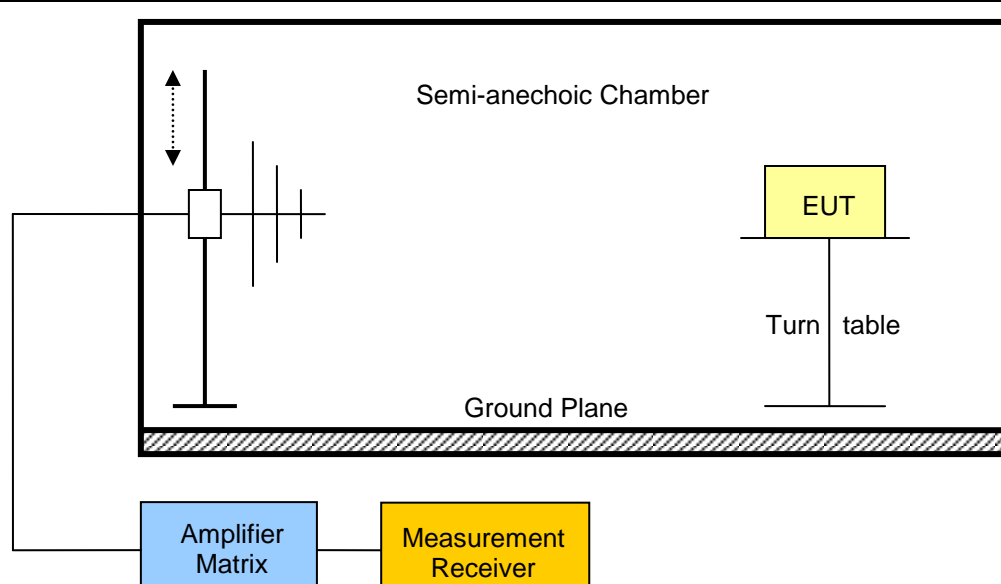
Conducted spurious emissions – ZIGBEE F_{HIGH}
**FCC part 15.247 (d)
Spurious Emissions**

EUT	VERION Digital Marker
Model	X-SPM, X-SPL (2 Variants)
Approval Holder	Alcon GPS Wave Light GmbH / G0M-1212-2480
Temperature / Voltage	tnom, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	2480 MHz
Comment 3	pass



Date: 7.MAY.2013 15:20:12

3.7 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. 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. On the left, an Amplifier Matrix is connected to a Measurement Receiver. The Equipment Under Test (EUT) is placed on a Turn table inside the chamber. A vertical antenna is positioned to the left of the EUT, with a dashed arrow indicating its vertical movement.</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 – Internal Antenna

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}	2405	ZIGBEE	1721	58.41	pk	hor	74.00	3	-15.59
F _{LOW}	2405	ZIGBEE	1721	36.34	avg	hor	54.00	3	-17.66
F _{LOW}	2405	ZIGBEE	2389	56.87	pk	hor	74.00	3	-17.13
F _{LOW}	2405	ZIGBEE	2389	36.77	avg	hor	54.00	3	-17.23
F _{LOW}	2405	ZIGBEE	2389	49.55	pk	ver	74.00	3	-24.45
F _{LOW}	2405	ZIGBEE	2389	26.59	avg	ver	54.00	3	-27.41
F _{LOW}	2405	ZIGBEE	4809	65.67	pk	hor	74.00	3	-08.33
F _{LOW}	2405	ZIGBEE	4809	42.74	avg	hor	54.00	3	-11.26
F _{LOW}	2405	ZIGBEE	4809	60.96	pk	ver	74.00	3	-13.04
F _{LOW}	2405	ZIGBEE	4809	38.87	avg	ver	54.00	3	-15.13
F _{LOW}	2405	ZIGBEE	12022	60.34	pk	ver	74.00	3	-13.66
F _{LOW}	2405	ZIGBEE	12022	35.81	avg	ver	54.00	3	-18.19
F _{LOW}	2405	ZIGBEE	12023	58.53	pk	hor	74.00	3	-15.47
F _{LOW}	2405	ZIGBEE	12023	36.05	avg	hor	54.00	3	-17.95
F _{MID}	2445	ZIGBEE	1705	56.00	pk	hor	74.00	3	-18.00
F _{MID}	2445	ZIGBEE	1705	34.55	avg	hor	54.00	3	-19.45
F _{MID}	2445	ZIGBEE	1720	57.68	pk	hor	74.00	3	-16.32
F _{MID}	2445	ZIGBEE	1720	36.17	avg	hor	54.00	3	-17.83
F _{MID}	2445	ZIGBEE	4889	58.75	pk	hor	74.00	3	-15.25
F _{MID}	2445	ZIGBEE	4889	37.95	avg	hor	54.00	3	-16.05
F _{MID}	2445	ZIGBEE	4889	53.50	pk	ver	74.00	3	-20.50
F _{MID}	2445	ZIGBEE	4889	34.36	avg	ver	54.00	3	-19.64
F _{MID}	2445	ZIGBEE	7336	65.00	pk	hor	74.00	3	-09.00
F _{MID}	2445	ZIGBEE	7336	43.80	avg	hor	54.00	3	-10.20
F _{MID}	2445	ZIGBEE	7336	65.93	pk	ver	74.00	3	-08.07
F _{MID}	2445	ZIGBEE	7336	44.50	avg	ver	54.00	3	-09.50
F _{MID}	2445	ZIGBEE	12222	57.87	pk	hor	74.00	3	-16.13
F _{MID}	2445	ZIGBEE	12222	35.45	avg	hor	54.00	3	-18.55

F _{MID}	2445	ZIGBEE	12223	57.10	pk	ver	74.00	3	-16.90
F _{MID}	2445	ZIGBEE	12223	35.00	avg	ver	54.00	3	-19.00
F _{HIGH}	2480	ZIGBEE	1708	57.27	pk	hor	74.00	3	-16.73
F _{HIGH}	2480	ZIGBEE	1708	29.27	avg	hor	54.00	3	-24.73
F _{HIGH}	2480	ZIGBEE	1721	59.41	pk	hor	74.00	3	-14.59
F _{HIGH}	2480	ZIGBEE	1721	31.28	avg	hor	54.00	3	-22.72
F _{HIGH}	2480	ZIGBEE	2483.5	70.53	pk	hor	74.00	3	-03.47
F _{HIGH}	2480	ZIGBEE	2483.5	43.64	avg	hor	54.00	3	-10.36
F _{HIGH}	2480	ZIGBEE	2483.5	68.63	pk	ver	74.00	3	-05.37
F _{HIGH}	2480	ZIGBEE	2483.5	42.08	avg	ver	54.00	3	-11.92
F _{HIGH}	2480	ZIGBEE	4959	58.36	pk	hor	74.00	3	-15.64
F _{HIGH}	2480	ZIGBEE	4959	37.78	avg	hor	54.00	3	-16.22
F _{HIGH}	2480	ZIGBEE	4961	53.82	pk	ver	74.00	3	-20.18
F _{HIGH}	2480	ZIGBEE	4961	35.58	avg	ver	54.00	3	-18.42
F _{HIGH}	2480	ZIGBEE	7438	63.91	pk	ver	74.00	3	-10.09
F _{HIGH}	2480	ZIGBEE	7438	41.62	avg	ver	54.00	3	-12.38
F _{HIGH}	2480	ZIGBEE	7441	62.03	pk	hor	74.00	3	-11.97
F _{HIGH}	2480	ZIGBEE	7441	41.59	avg	hor	54.00	3	-12.41
F _{HIGH}	2480	ZIGBEE	12397	53.36	pk	hor	74.00	3	-20.64
F _{HIGH}	2480	ZIGBEE	12397	32.96	avg	hor	54.00	3	-21.04
F _{HIGH}	2480	ZIGBEE	12397	55.83	pk	ver	74.00	3	-18.17
F _{HIGH}	2480	ZIGBEE	12397	34.03	avg	ver	54.00	3	-19.97
Comments: * Physical distance between EUT and measurement antenna.									

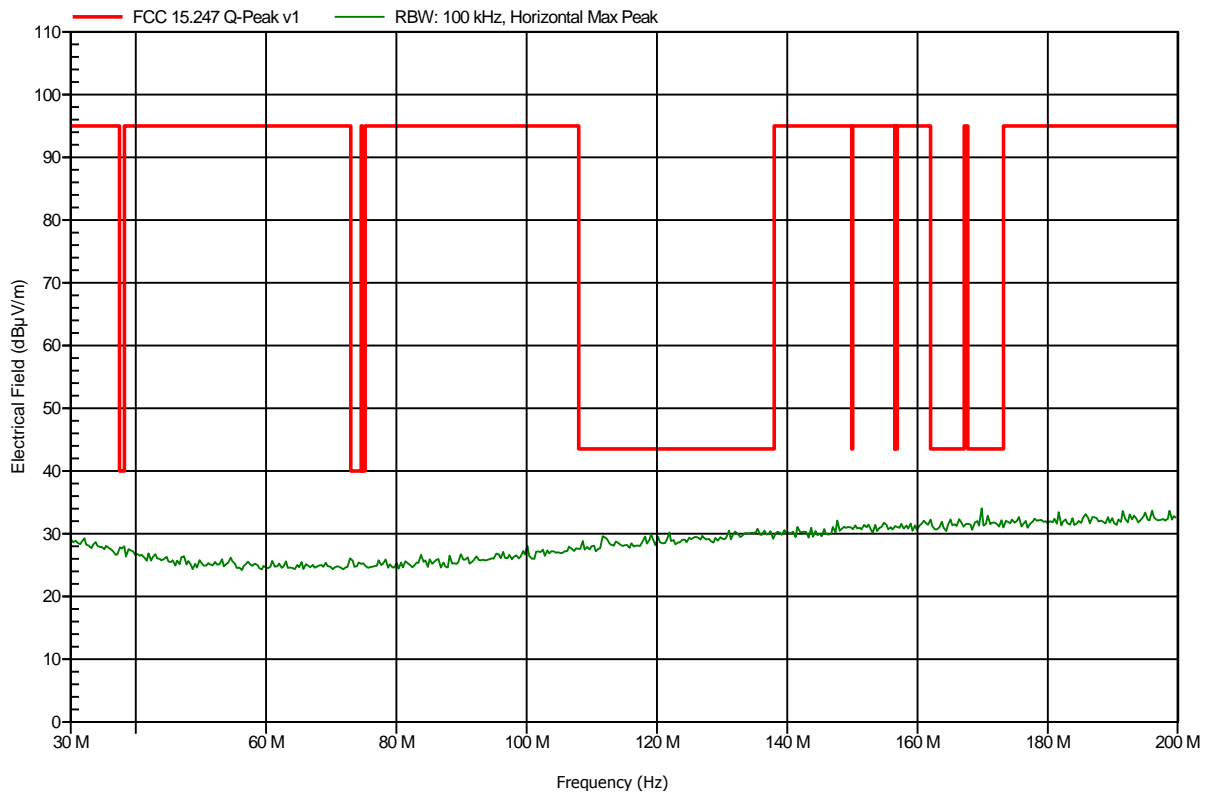
ANNEX A Transmitter radiated spurious emissions

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 Variants)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Horizontal
Measurement distance:	3 m
Mode:	TX; channel 11
Test Date:	2013-03-15
Note:	

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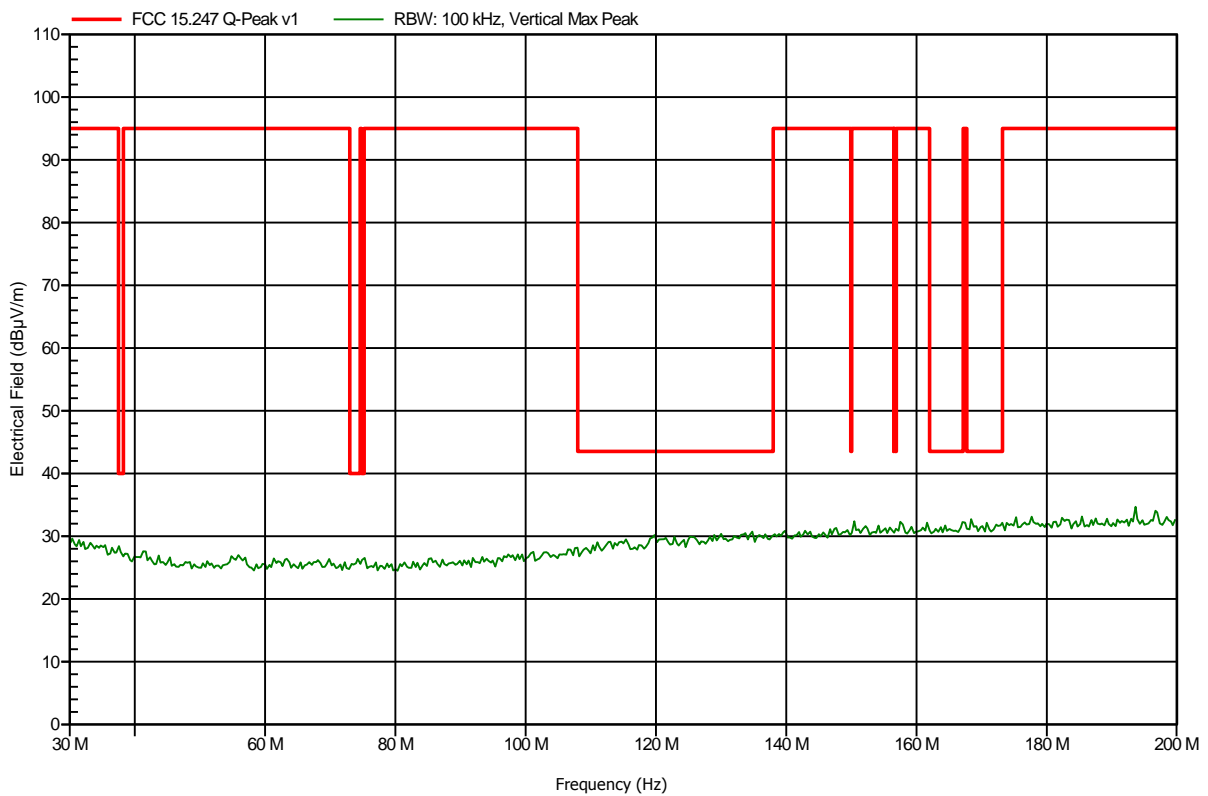


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HK 116, Vertical
Measurement distance:	3 m
Mode:	TX; channel 11
Test Date:	2013-03-15
Note:	

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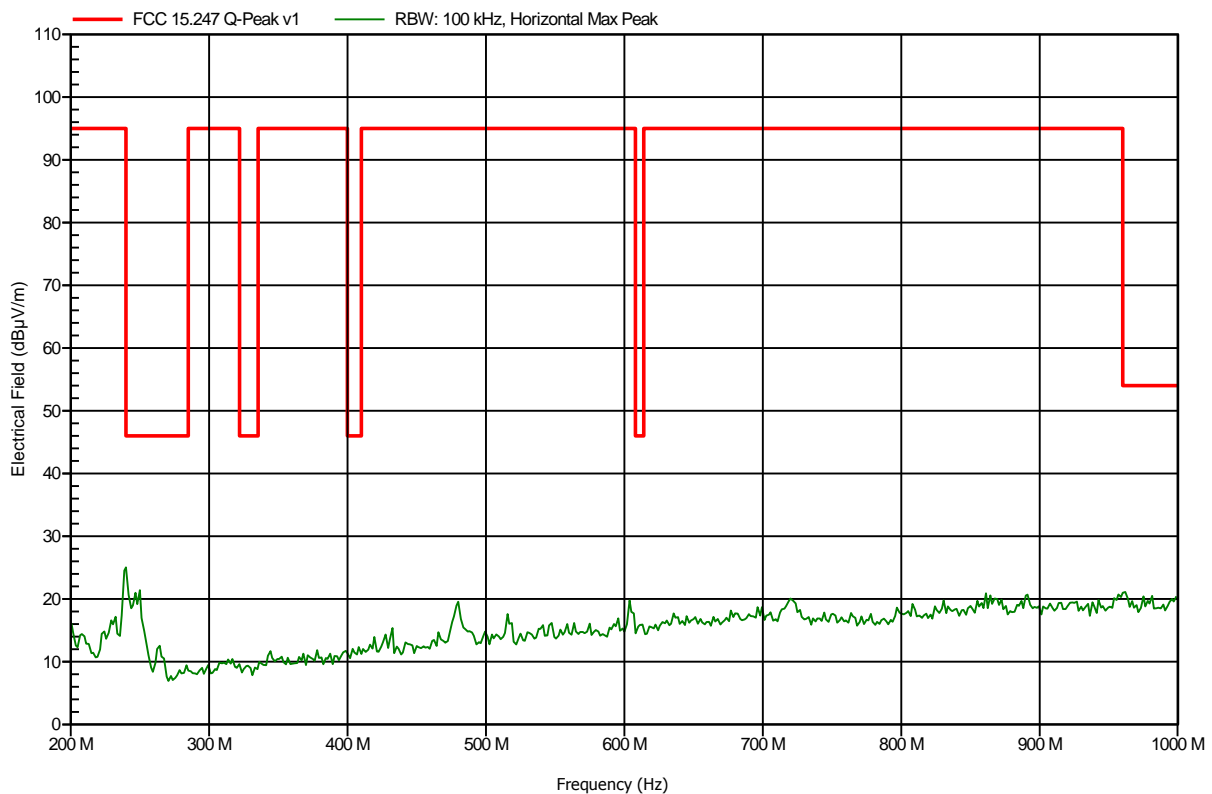


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Horizontal
Measurement distance:	3 m
Mode:	TX; channel 11
Test Date:	2013-03-15
Note:	

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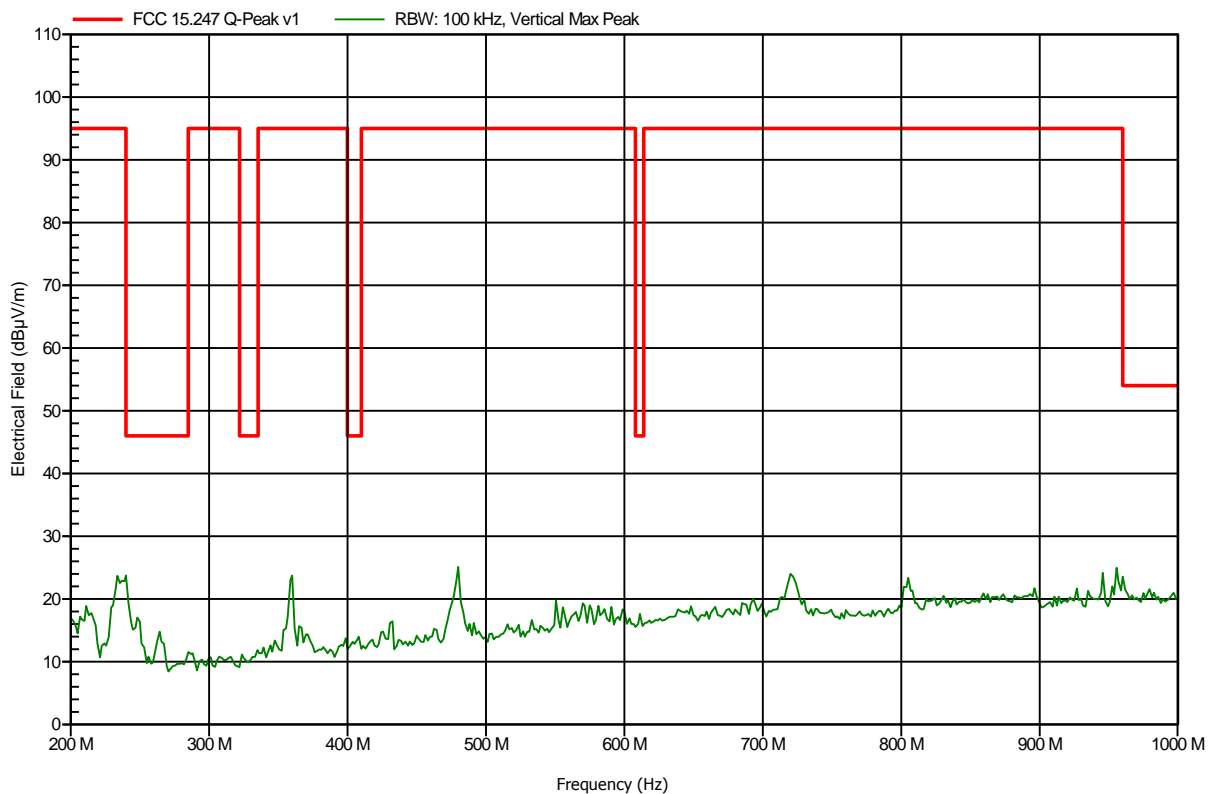


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HL 223, Vertical
Measurement distance:	3 m
Mode:	TX; channel 11
Test Date:	2013-03-15
Note:	

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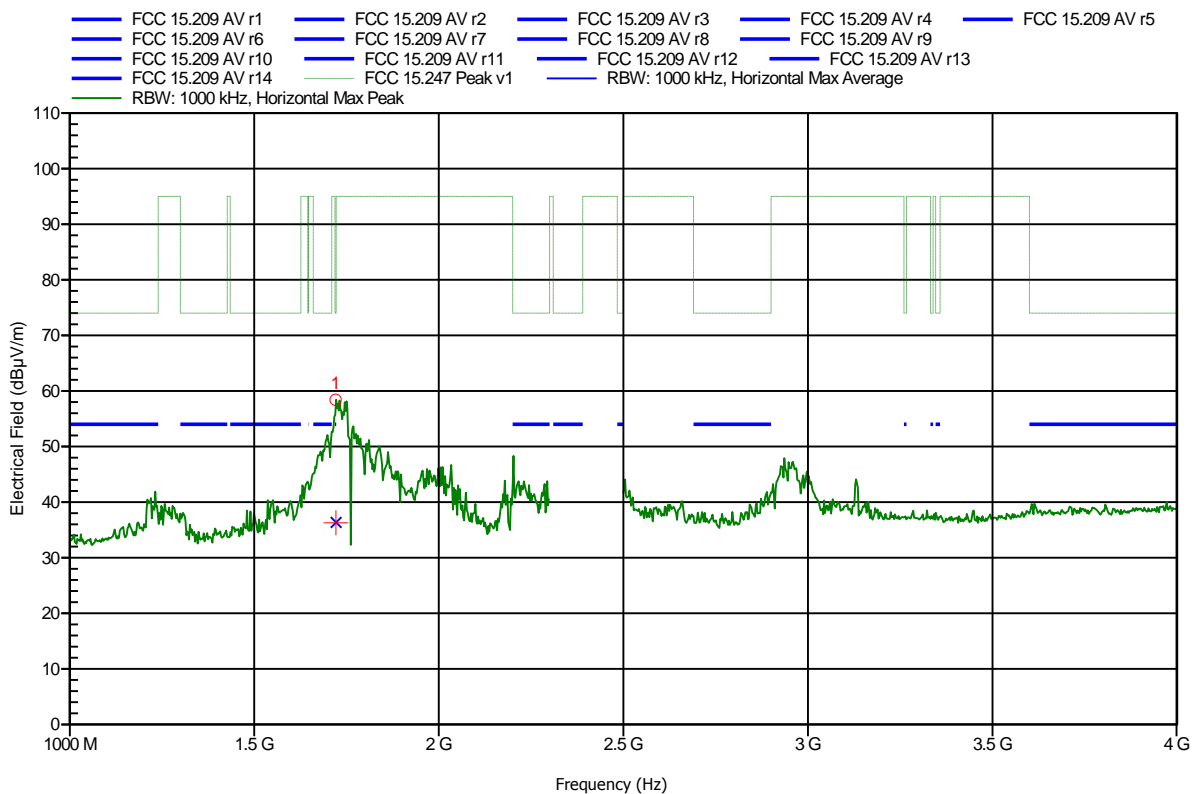


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 11
 Test Date: 2013-03-13
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.721 GHz	58.41 dBµV/m	74 dBµV/m	-15.59 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
1.721 GHz	36.34 dBµV/m	54 dBµV/m	-17.66 dB	Pass

Test Report No.: G0M-1212-2480-TFC247Z-V01

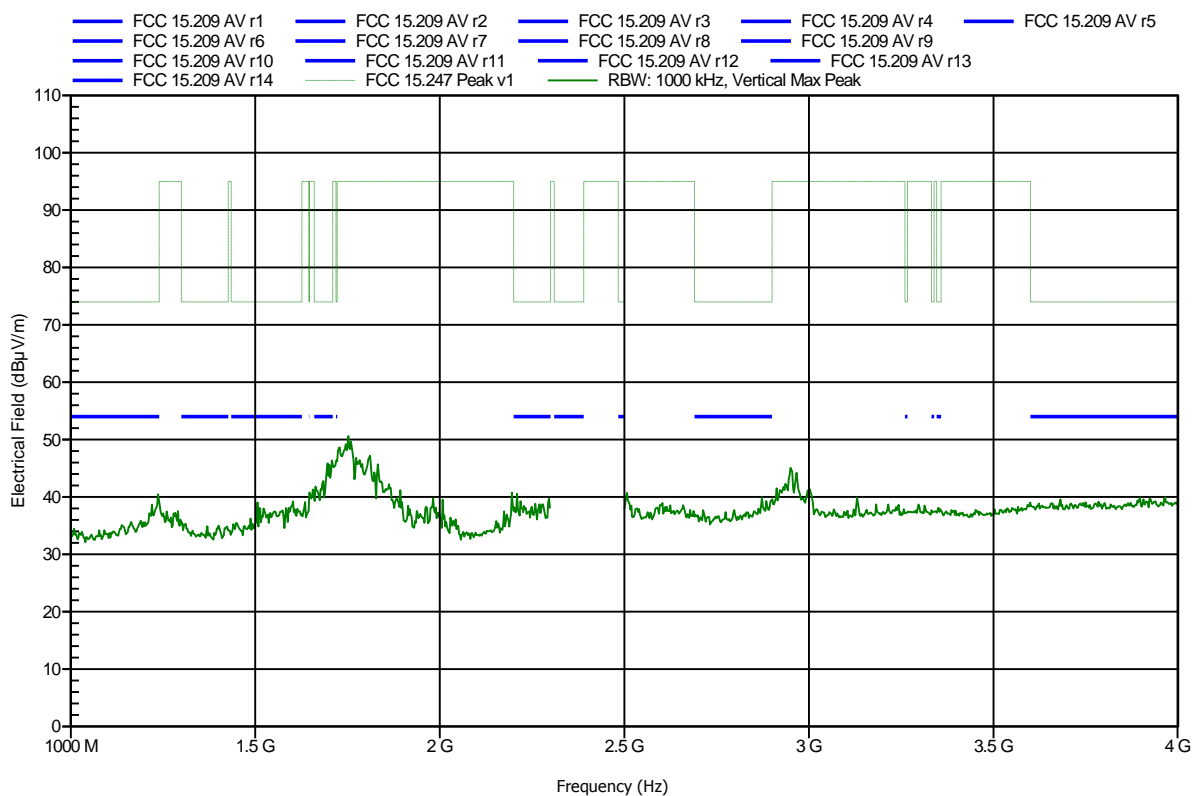
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 11
 Test Date: 2013-03-14
 Note:

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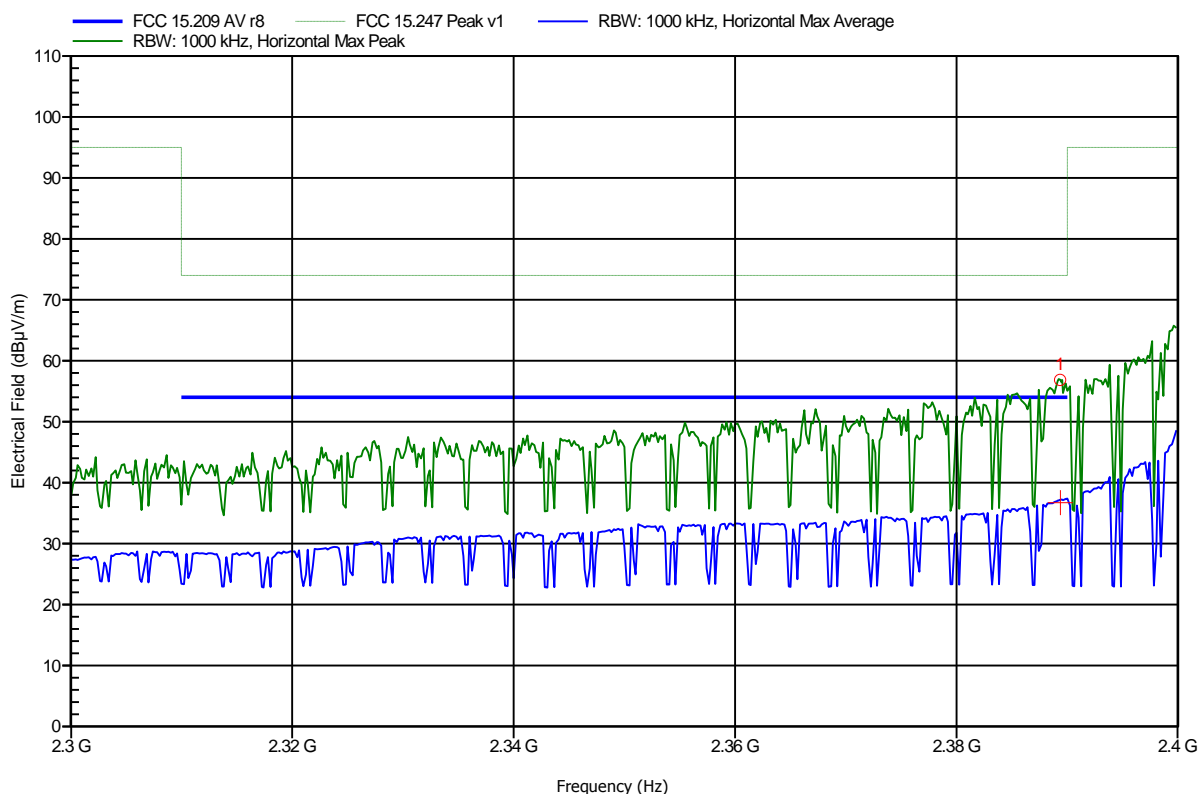


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 11
 Test Date: 2013-03-13
 Note: lower bandedge

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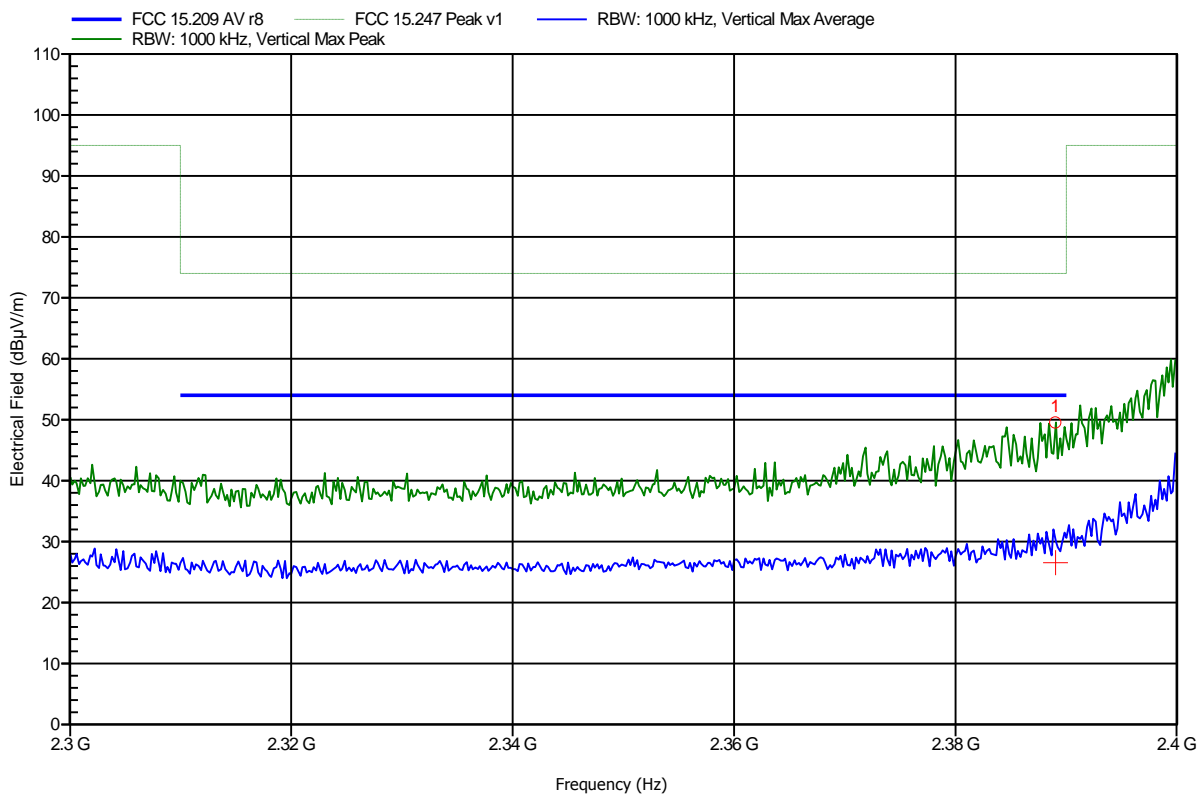
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.389 GHz	56.87 dBµV/m	74 dBµV/m	-17.13 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.389 GHz	36.77 dBµV/m	54 dBµV/m	-17.23 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 11
 Test Date: 2013-03-14
 Note: lower bandedge

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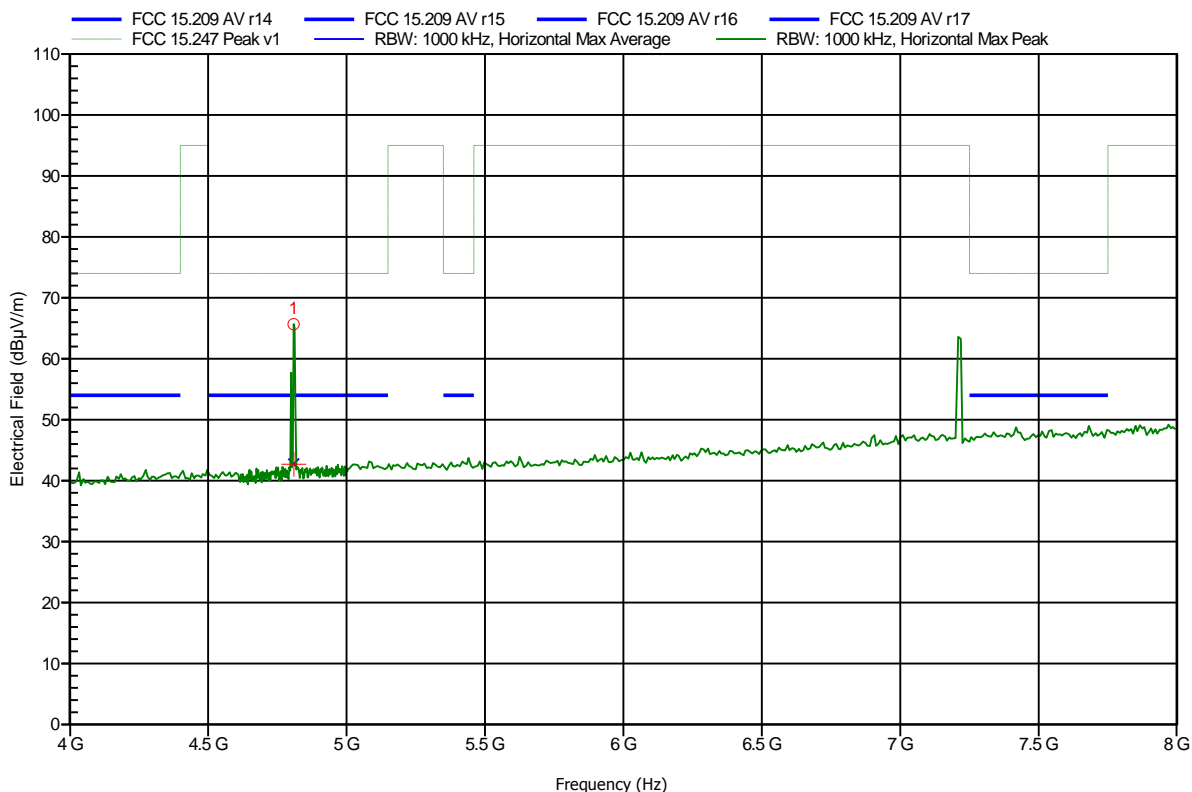
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.389 GHz	49.55 dBµV/m	74 dBµV/m	-24.45 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.389 GHz	26.59 dBµV/m	54 dBµV/m	-27.41 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 11
 Test Date: 2013-03-14
 Note:

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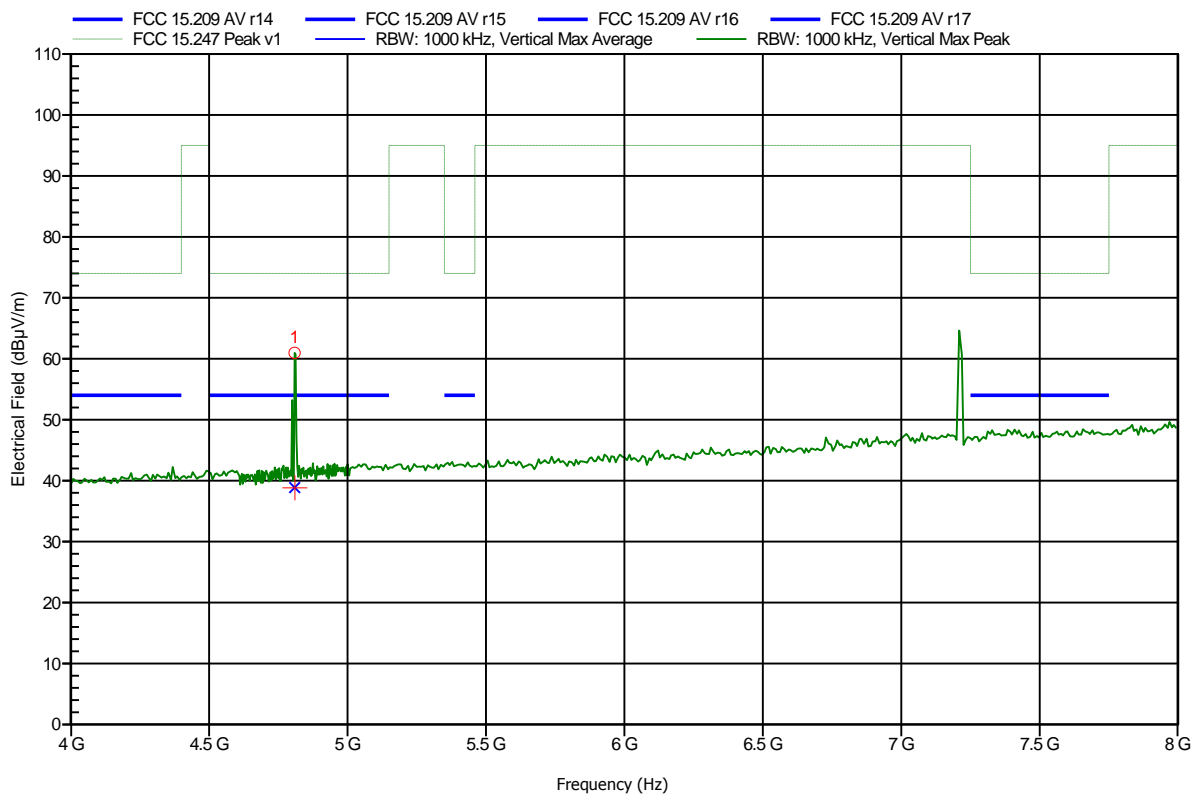
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.809 GHz	65.67 dBµV/m	74 dBµV/m	-8.33 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
4.809 GHz	42.74 dBµV/m	54 dBµV/m	-11.26 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 11
 Test Date: 2013-03-14
 Note:

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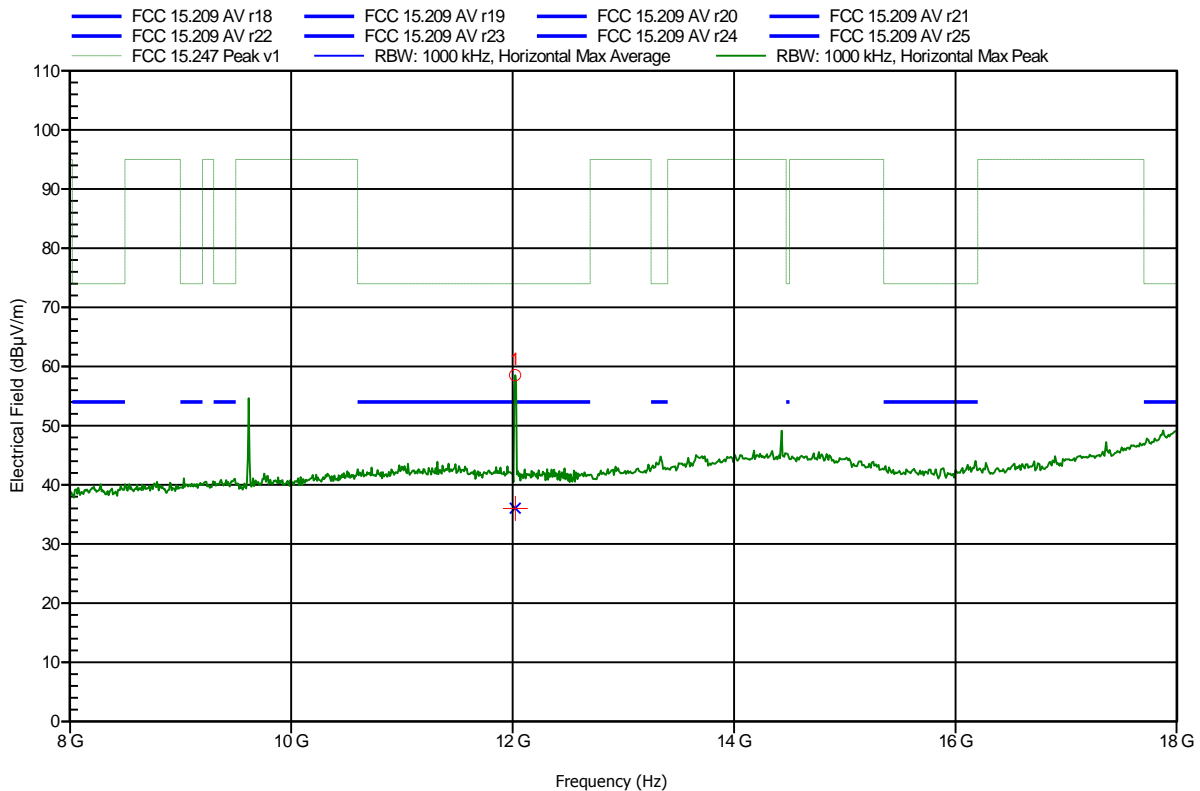
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.809 GHz	60.96 dBµV/m	74 dBµV/m	-13.04 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
4.809 GHz	38.87 dBµV/m	54 dBµV/m	-15.13 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 100 cm converted to 3m
 Mode: TX; channel 11
 Test Date: 2013-03-15
 Note:

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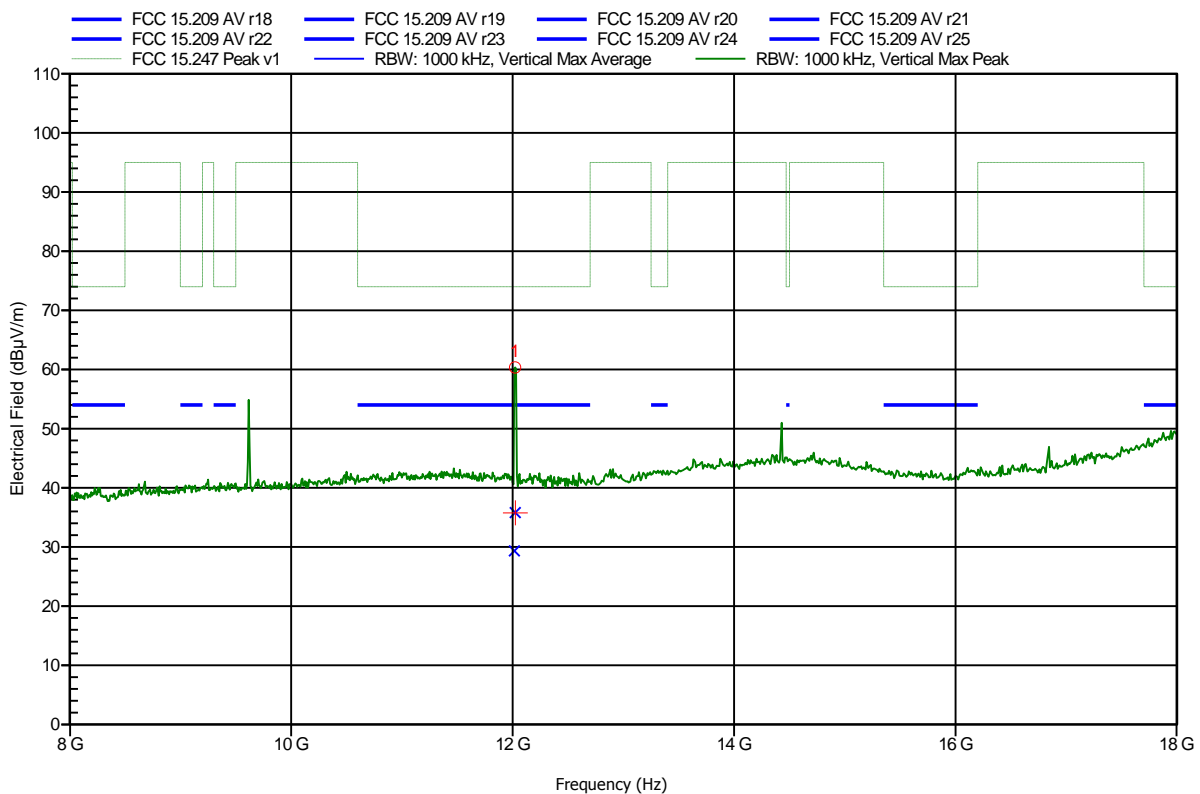
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.023 GHz	58.53 dBµV/m	74 dBµV/m	-15.47 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
12.023 GHz	36.05 dBµV/m	54 dBµV/m	-17.95 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 100 cm converted to 3m
 Mode: TX; channel 11
 Test Date: 2013-03-15
 Note:

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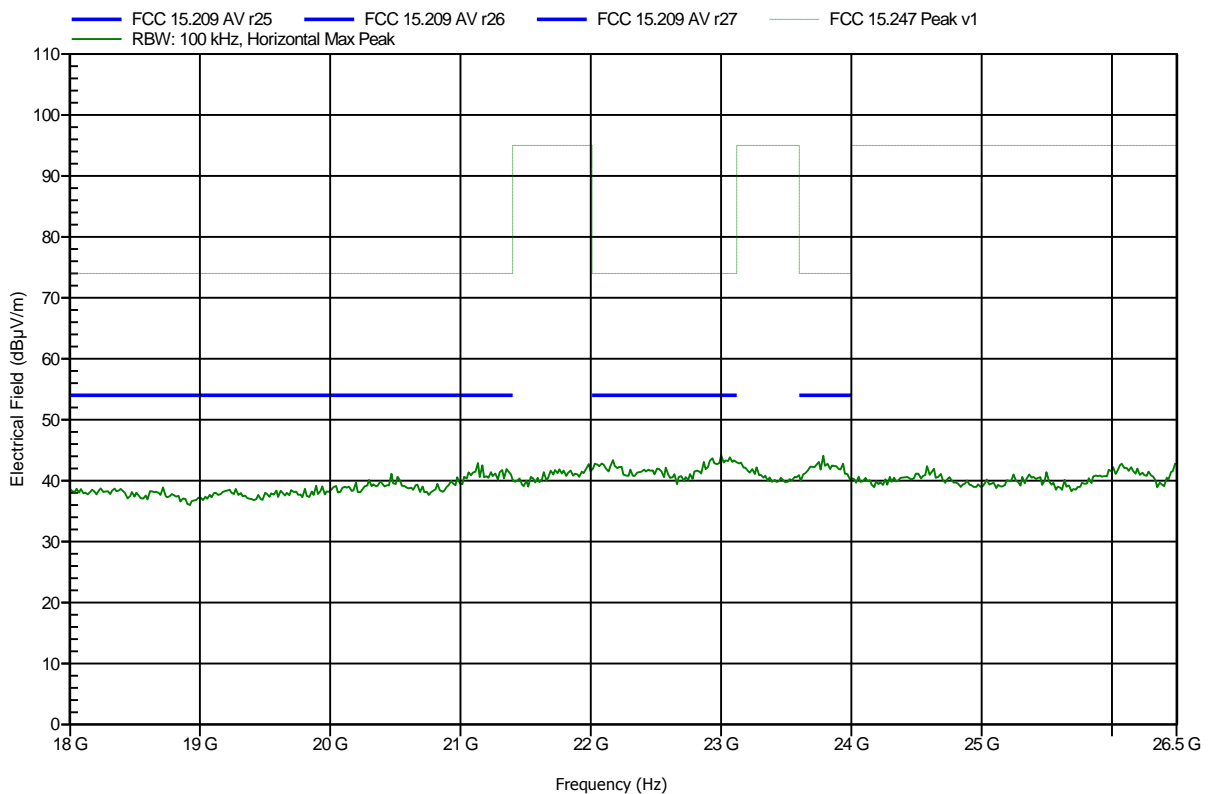
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.022 GHz	60.34 dBµV/m	74 dBµV/m	-13.66 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
12.022 GHz	35.81 dBµV/m	54 dBµV/m	-18.19 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 100 cm
 Mode: TX; channel 11
 Test Date: 2013-03-15
 Note:

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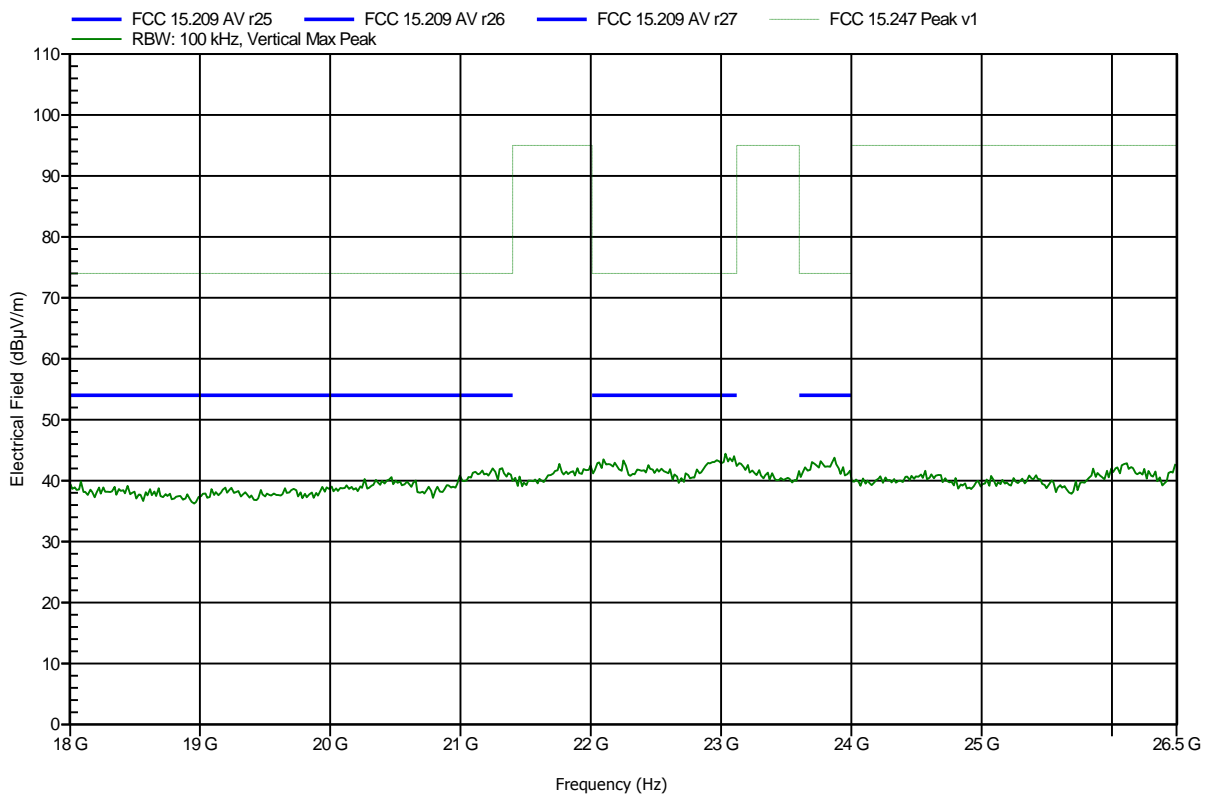


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	100 cm
Mode:	TX; channel 11
Test Date:	2013-03-15
Note:	

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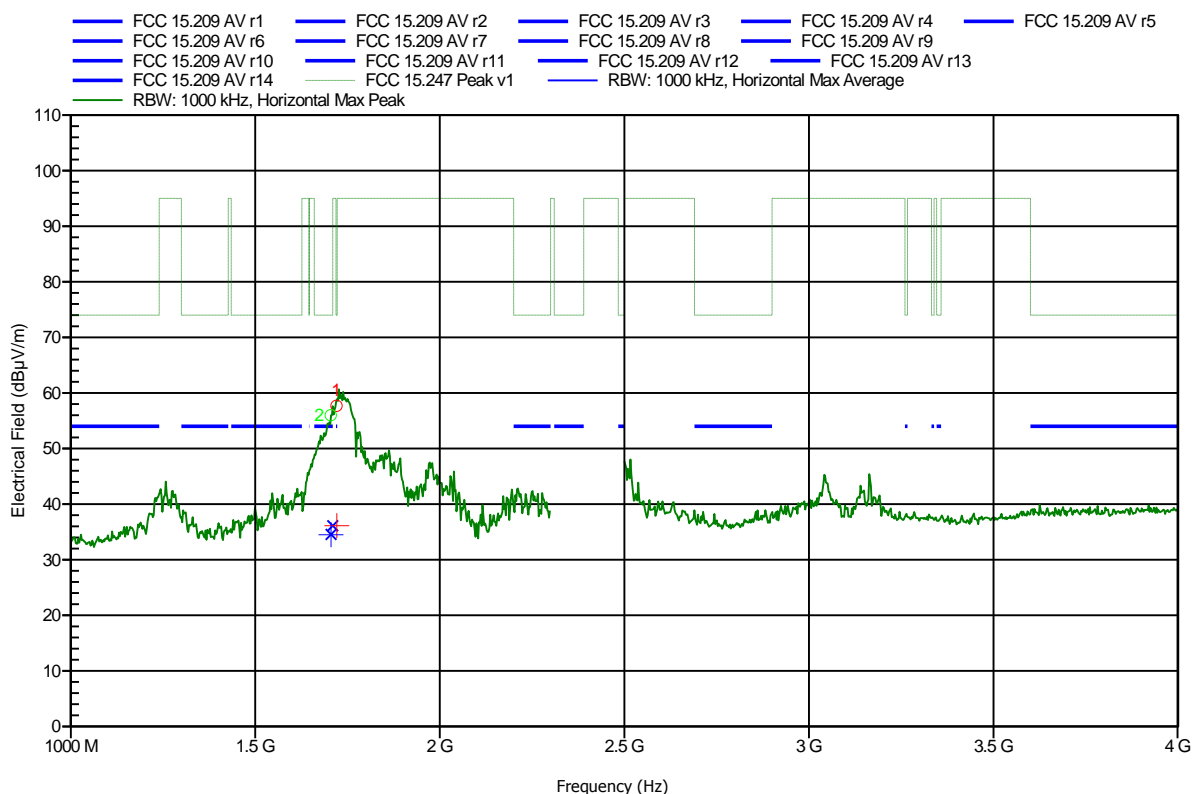


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 19
 Test Date: 2013-03-14
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.705 GHz	56 dBµV/m	74 dBµV/m	-18 dB	Pass
1.72 GHz	57.68 dBµV/m	74 dBµV/m	-16.32 dB	Pass

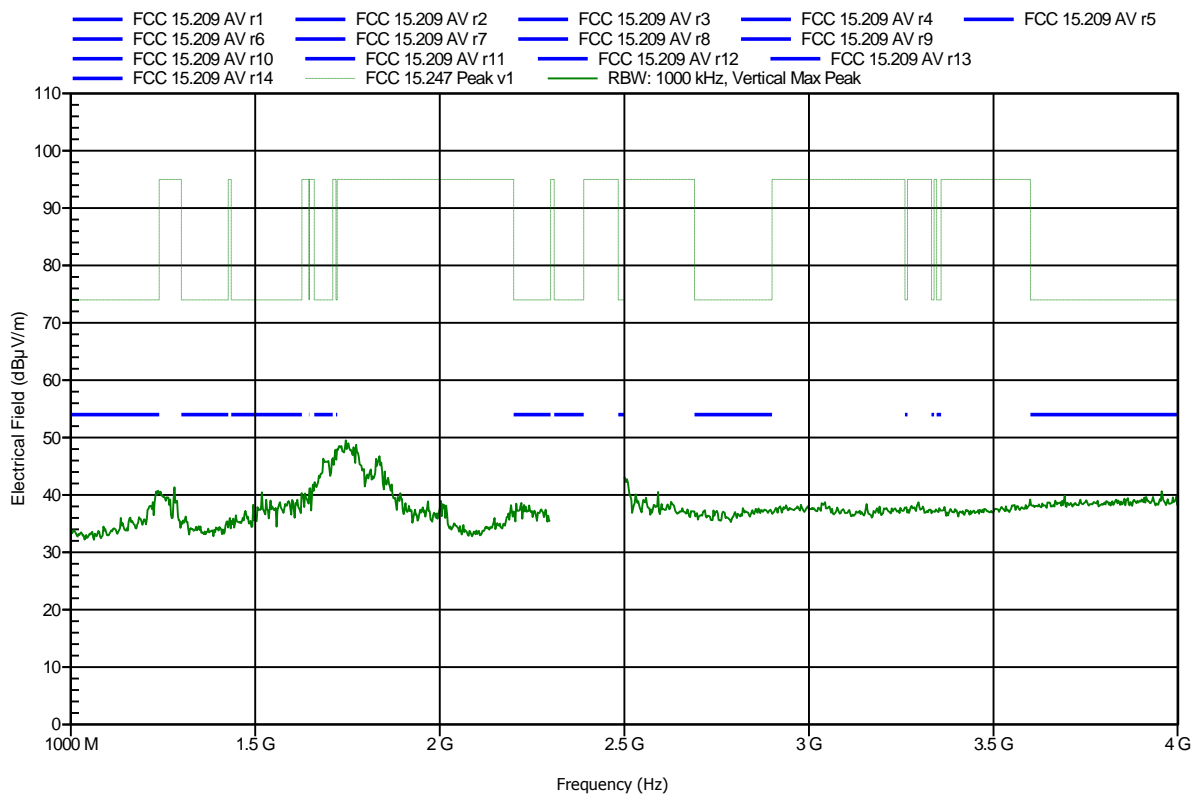
Frequency	Average	Average Limit	Average Difference	Average Status
1.705 GHz	34.55 dBµV/m	54 dBµV/m	-19.45 dB	Pass
1.72 GHz	36.17 dBµV/m	54 dBµV/m	-17.83 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 19
 Test Date: 2013-03-14
 Note:

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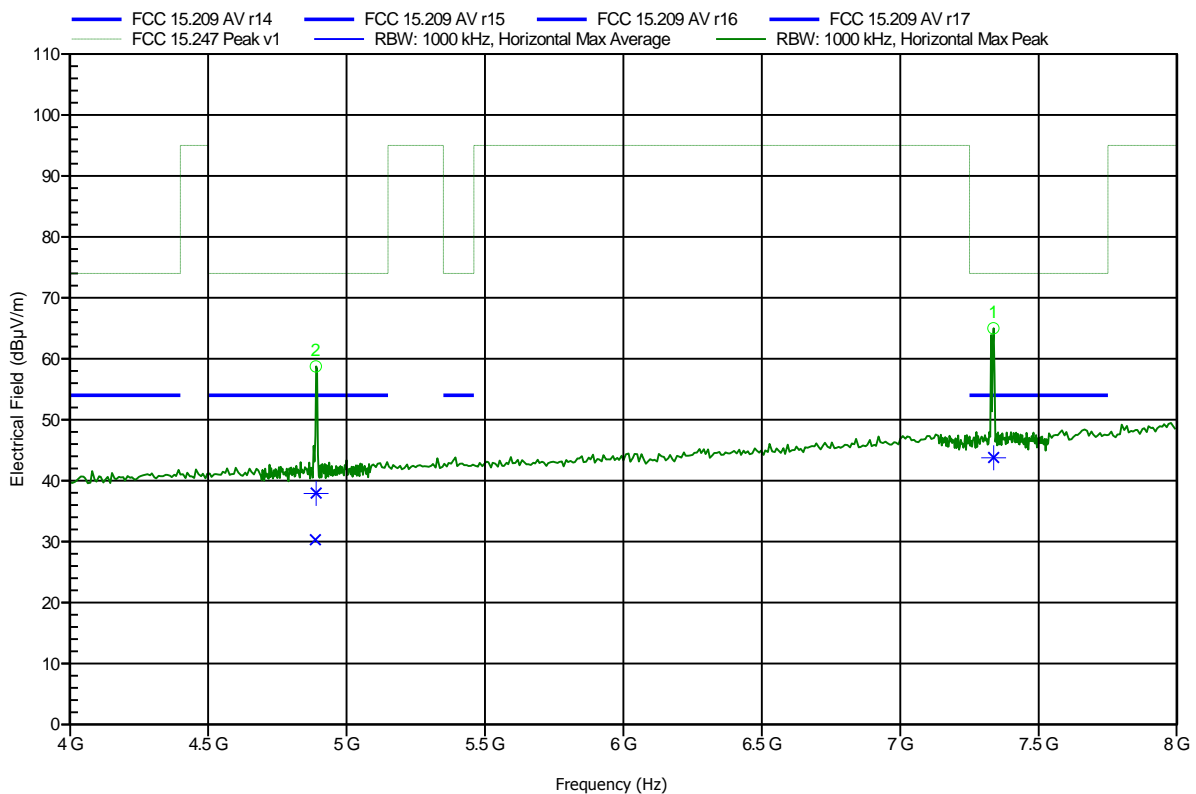


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 19
 Test Date: 2013-03-14
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.889 GHz	58.75 dBµV/m	74 dBµV/m	-15.25 dB	Pass
7.336 GHz	65 dBµV/m	74 dBµV/m	-9 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
4.889 GHz	37.95 dBµV/m	54 dBµV/m	-16.05 dB	Pass
7.336 GHz	43.8 dBµV/m	54 dBµV/m	-10.2 dB	Pass

Test Report No.: G0M-1212-2480-TFC247Z-V01

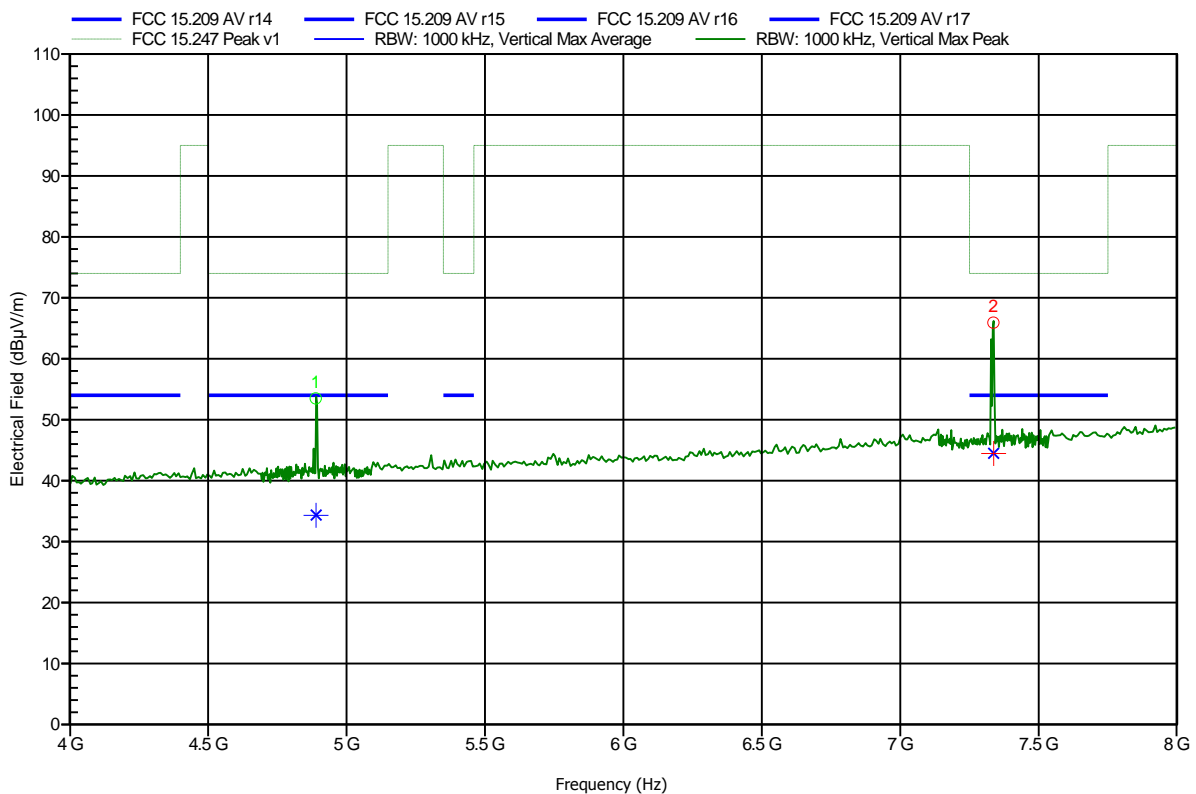
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 19
 Test Date: 2013-03-14
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.889 GHz	53.5 dBµV/m	74 dBµV/m	-20.5 dB	Pass
7.336 GHz	65.93 dBµV/m	74 dBµV/m	-8.07 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
4.889 GHz	34.36 dBµV/m	54 dBµV/m	-19.64 dB	Pass
7.336 GHz	44.5 dBµV/m	54 dBµV/m	-9.5 dB	Pass

Test Report No.: G0M-1212-2480-TFC247Z-V01

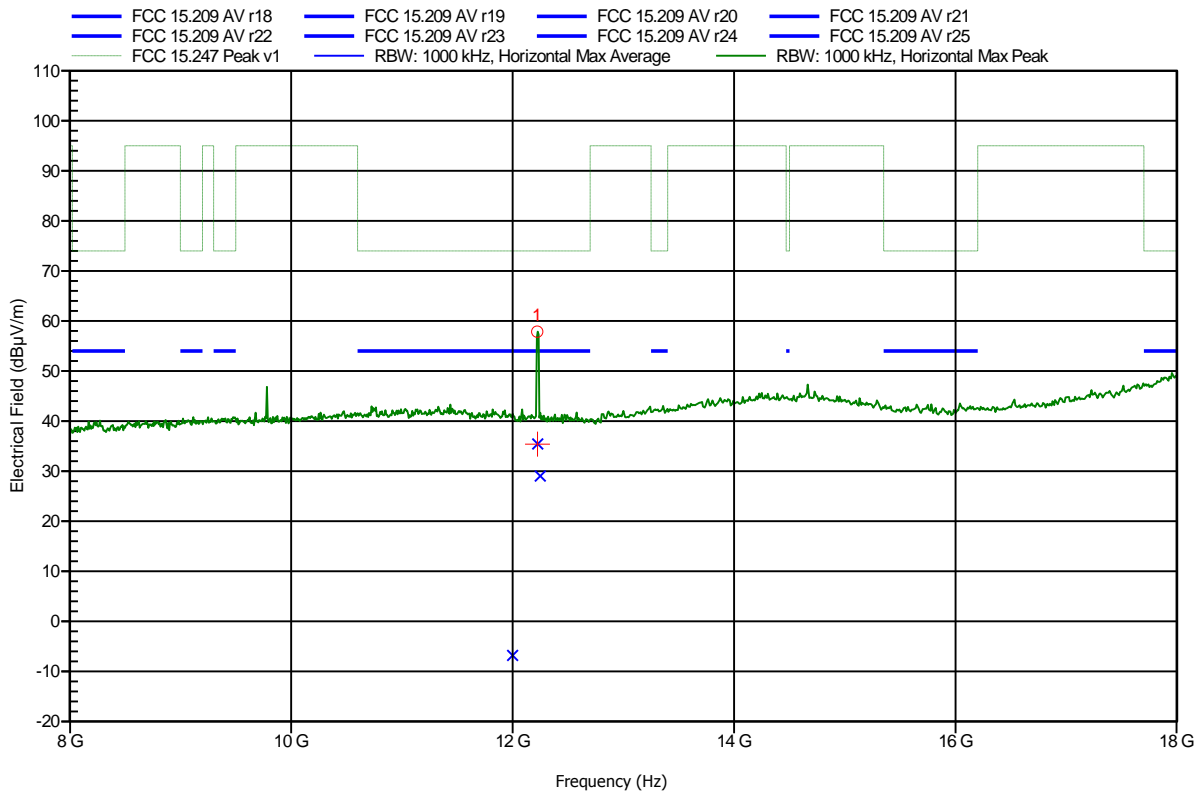
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 100 cm converted to 3m
 Mode: TX; channel 19
 Test Date: 2013-03-15
 Note:

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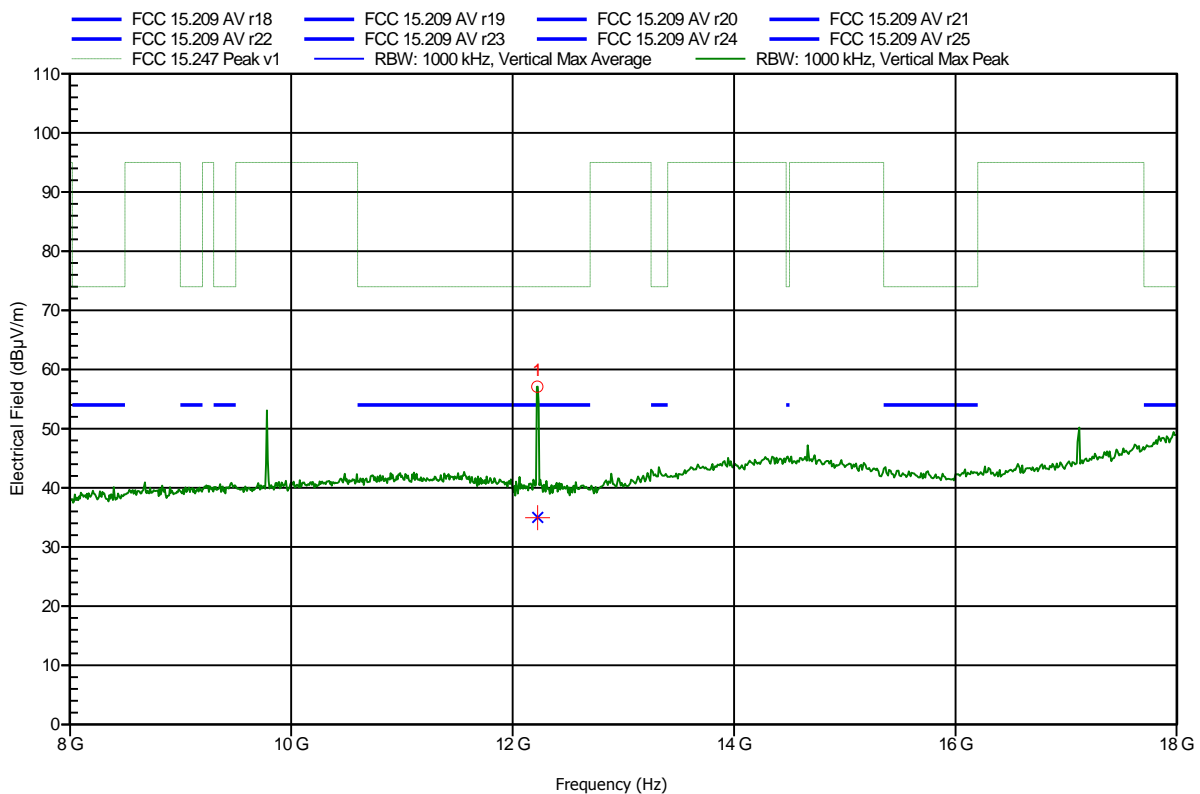
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.222 GHz	57.87 dBµV/m	74 dBµV/m	-16.13 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
12.222 GHz	35.45 dBµV/m	54 dBµV/m	-18.55 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 100 cm converted to 3m
 Mode: TX; channel 19
 Test Date: 2013-03-15
 Note:

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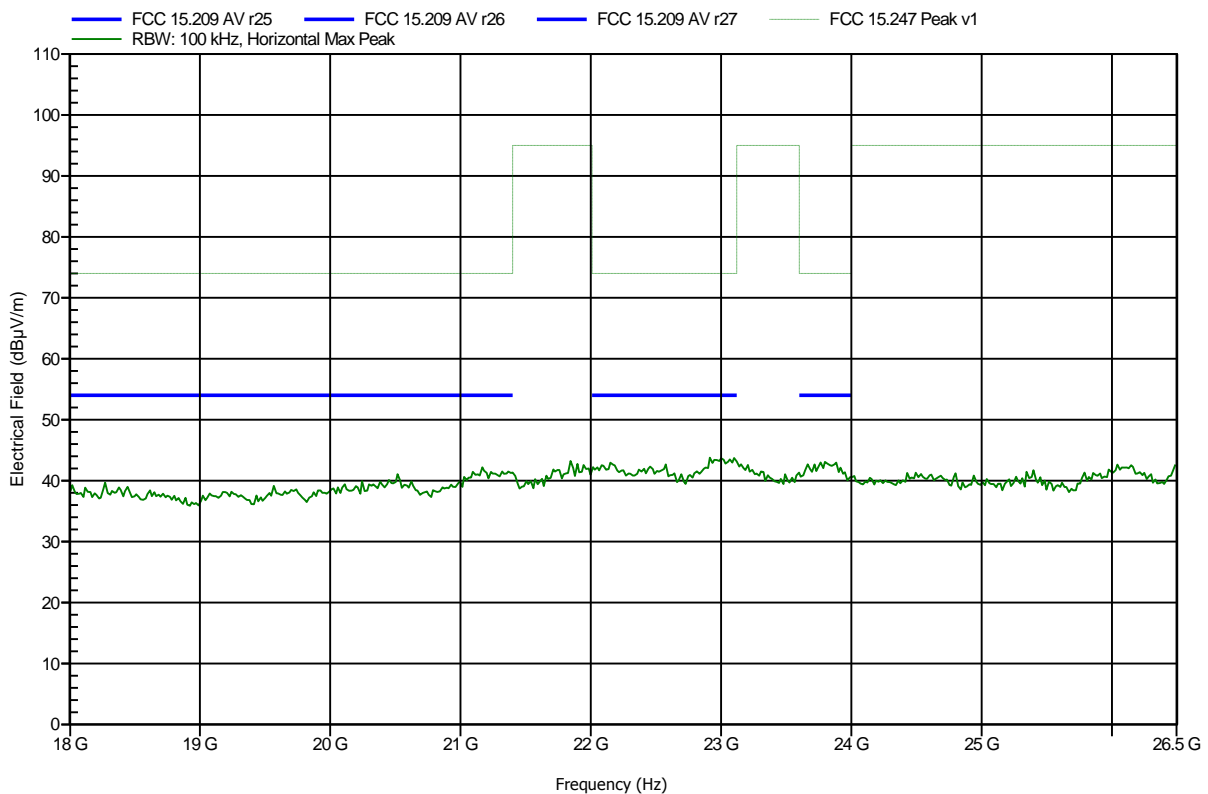
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.223 GHz	57.1 dBµV/m	74 dBµV/m	-16.9 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
12.223 GHz	35 dBµV/m	54 dBµV/m	-19 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Rohde & Schwarz HL 025, Horizontal
 Measurement distance: 100 cm
 Mode: TX; channel 19
 Test Date: 2013-03-15
 Note:

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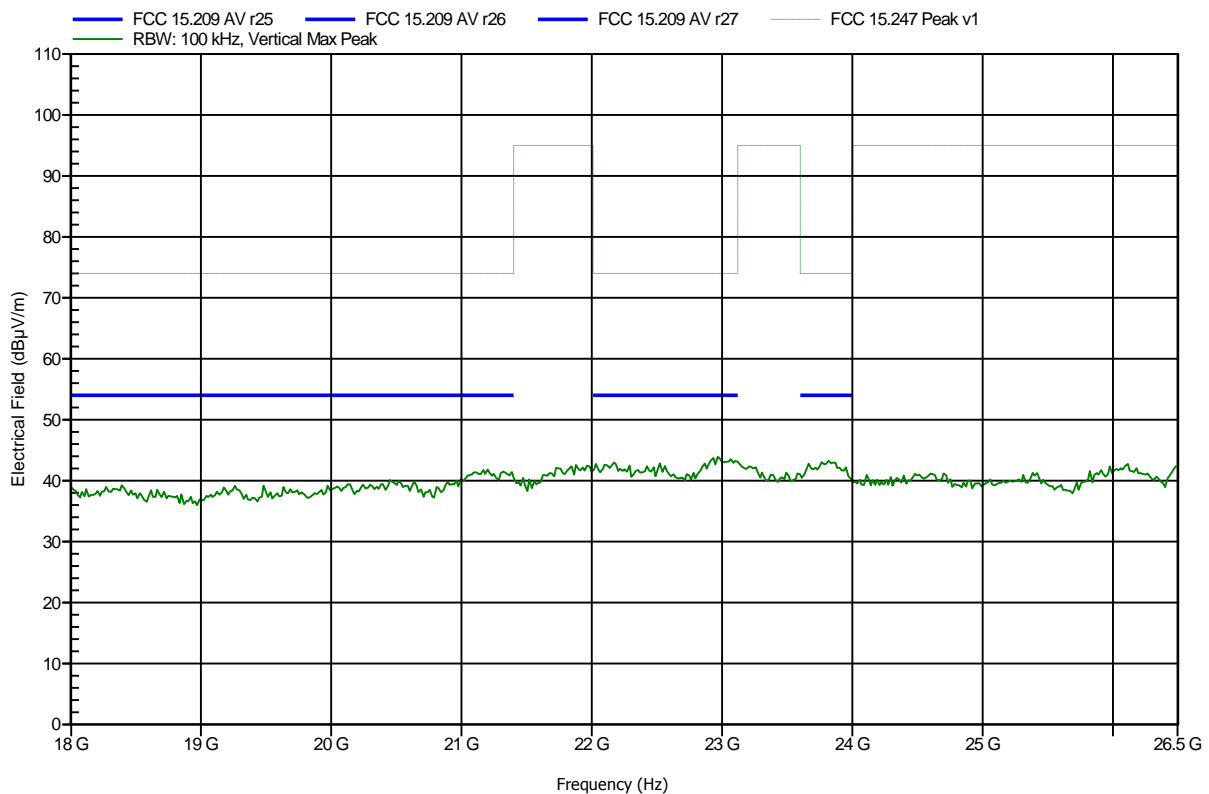


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HL 025, Vertical
Measurement distance:	100 cm
Mode:	TX; channel 19
Test Date:	2013-03-15
Note:	

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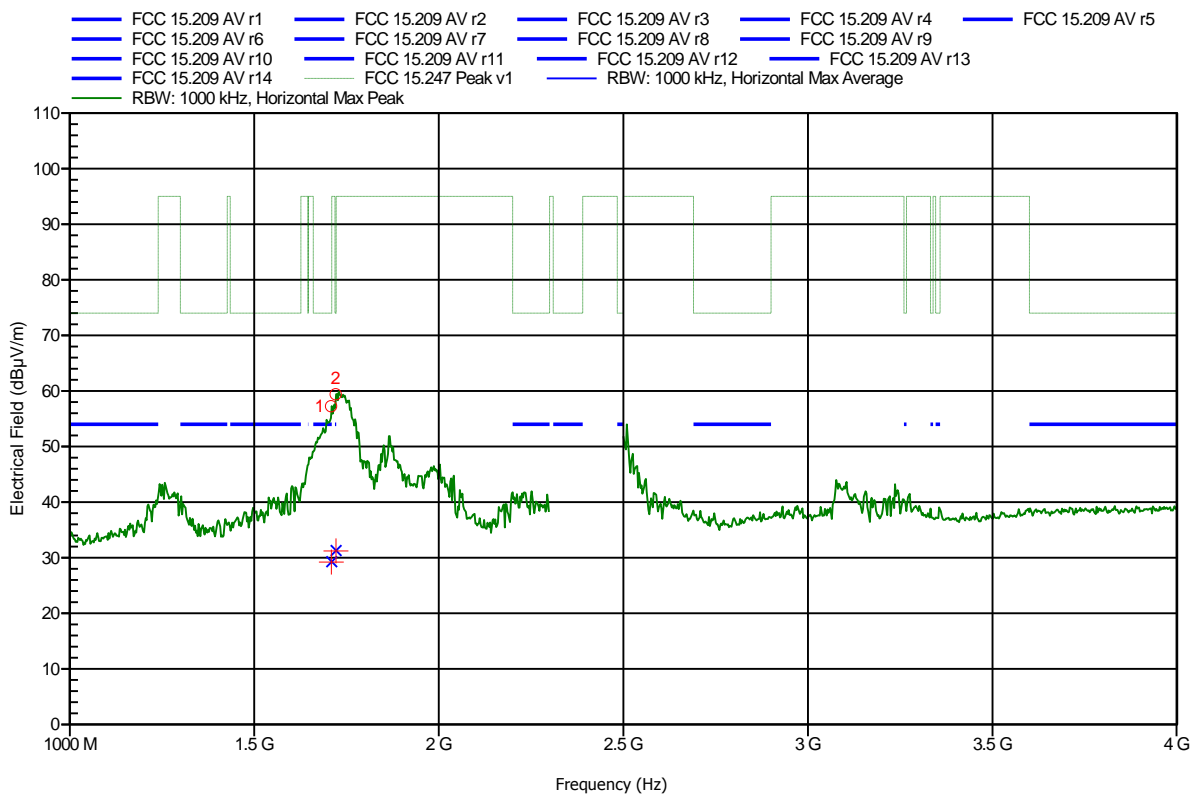


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 26
 Test Date: 2013-03-14
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
1.708 GHz	57.27 dBµV/m	74 dBµV/m	-16.73 dB	Pass
1.721 GHz	59.41 dBµV/m	74 dBµV/m	-14.59 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
1.708 GHz	29.27 dBµV/m	54 dBµV/m	-24.73 dB	Pass
1.721 GHz	31.28 dBµV/m	54 dBµV/m	-22.72 dB	Pass

Test Report No.: G0M-1212-2480-TFC247Z-V01

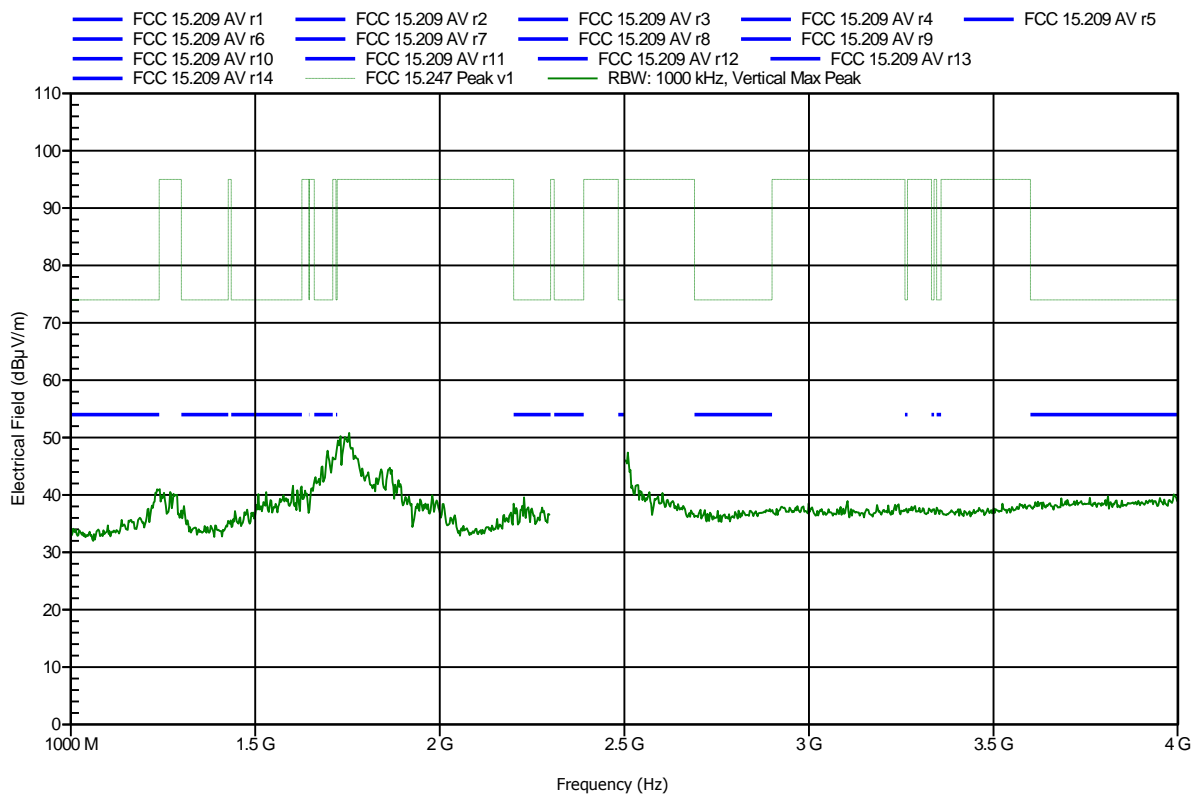
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 26
 Test Date: 2013-03-14
 Note:

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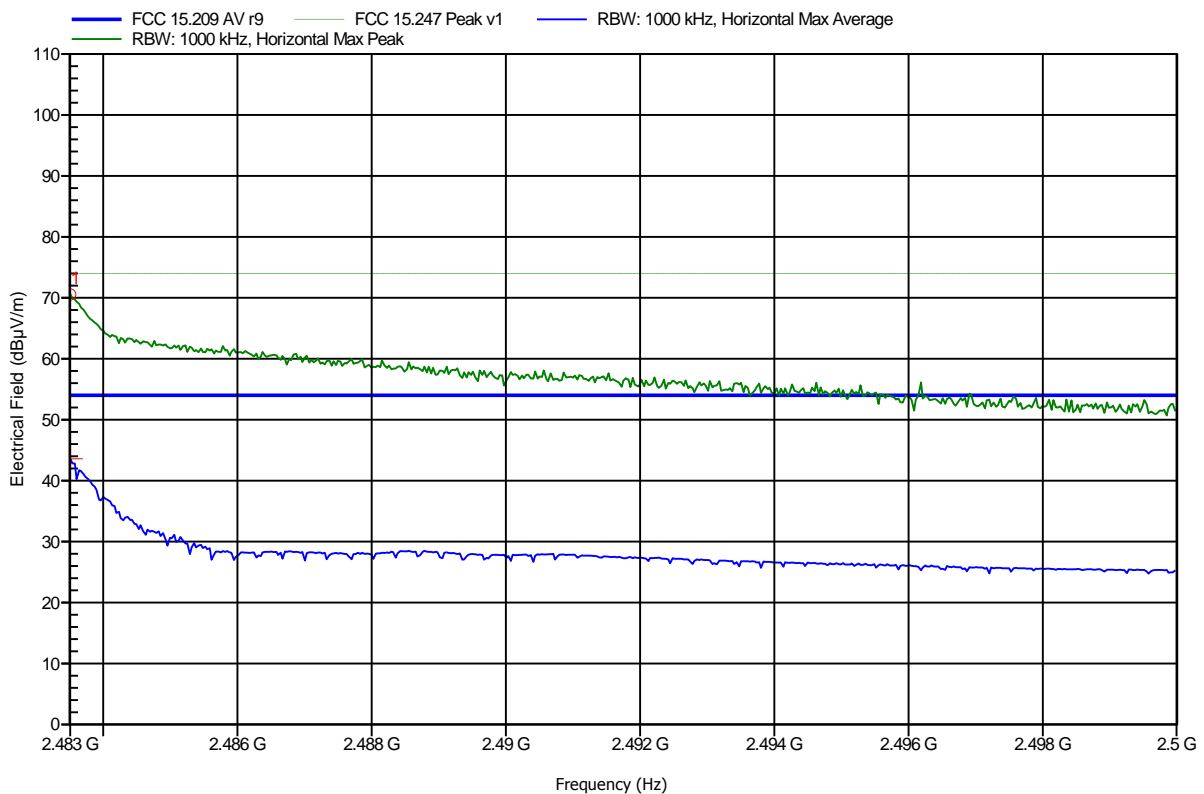


Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 26
 Test Date: 2013-03-14
 Note: upper bandedge

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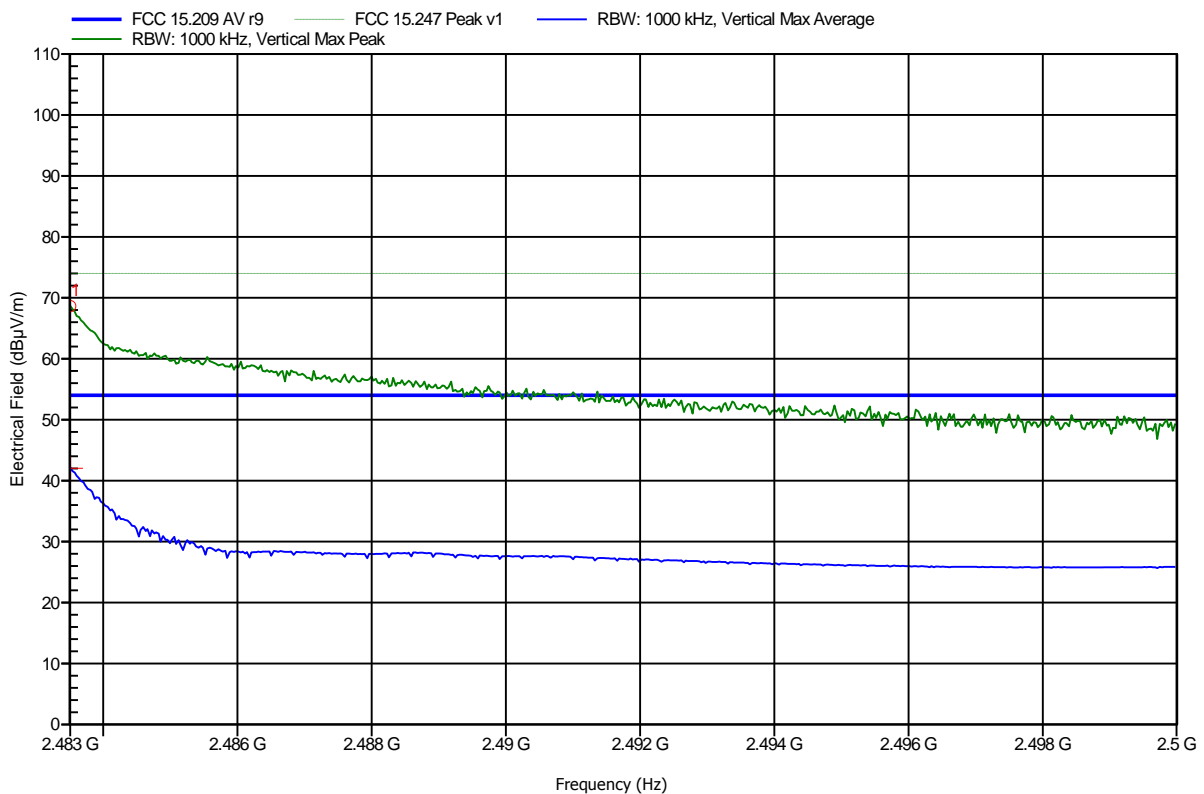
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	70.53 dBµV/m	74 dBµV/m	-3.47 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.4835 GHz	43.64 dBµV/m	54 dBµV/m	-10.36 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 26
 Test Date: 2013-03-14
 Note: upper bandedge

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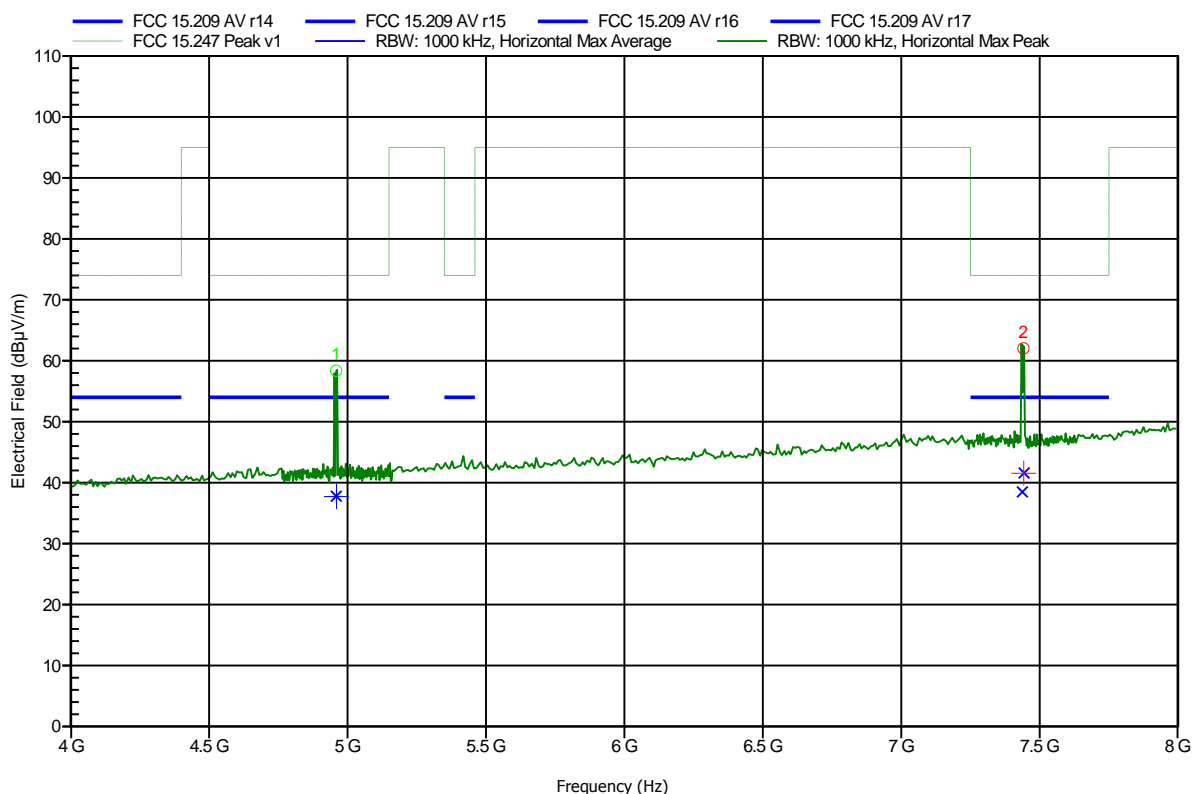
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
2.4835 GHz	68.63 dBµV/m	74 dBµV/m	-5.37 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
2.4835 GHz	42.08 dBµV/m	54 dBµV/m	-11.92 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 3 m
 Mode: TX; channel 26
 Test Date: 2013-03-14
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.959 GHz	58.36 dBµV/m	74 dBµV/m	-15.64 dB	Pass
7.441 GHz	62.03 dBµV/m	74 dBµV/m	-11.97 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
4.959 GHz	37.78 dBµV/m	54 dBµV/m	-16.22 dB	Pass
7.441 GHz	41.59 dBµV/m	54 dBµV/m	-12.41 dB	Pass

Test Report No.: G0M-1212-2480-TFC247Z-V01

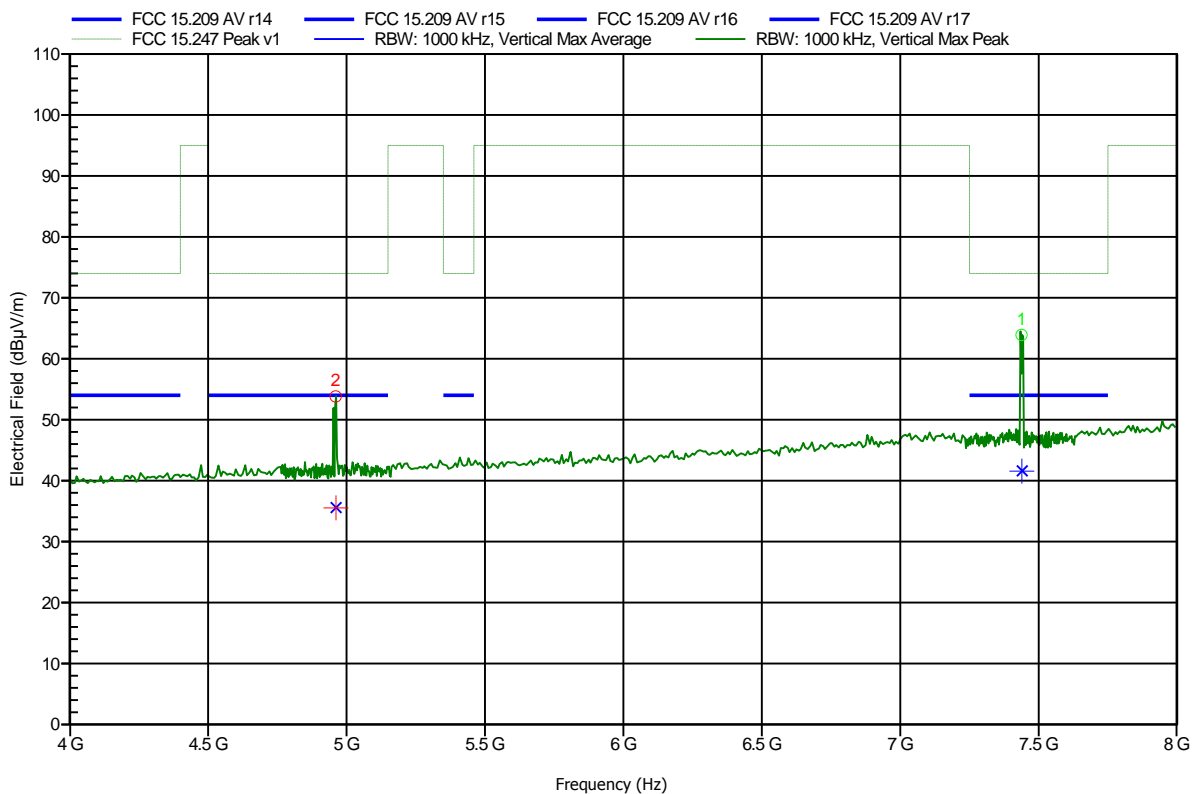
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 3 m
 Mode: TX; channel 26
 Test Date: 2013-03-14
 Note:

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Frequency	Peak	Peak Limit	Peak Difference	Peak Status
4.961 GHz	53.82 dBµV/m	74 dBµV/m	-20.18 dB	Pass
7.438 GHz	63.91 dBµV/m	74 dBµV/m	-10.09 dB	Pass

Frequency	Average	Average Limit	Average Difference	Average Status
4.961 GHz	35.58 dBµV/m	54 dBµV/m	-18.42 dB	Pass
7.438 GHz	41.62 dBµV/m	54 dBµV/m	-12.38 dB	Pass

Test Report No.: G0M-1212-2480-TFC247Z-V01

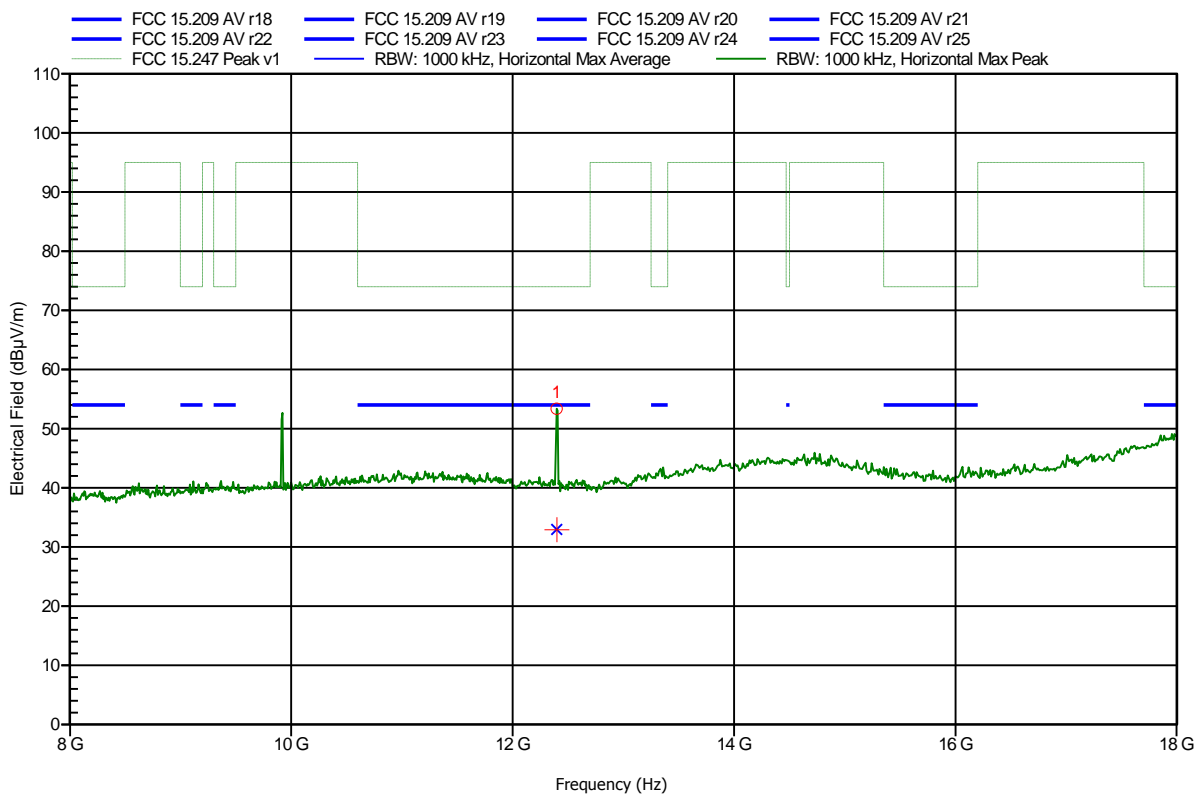
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Horizontal
 Measurement distance: 100 cm converted to 3m
 Mode: TX; channel 26
 Test Date: 2013-03-15
 Note:

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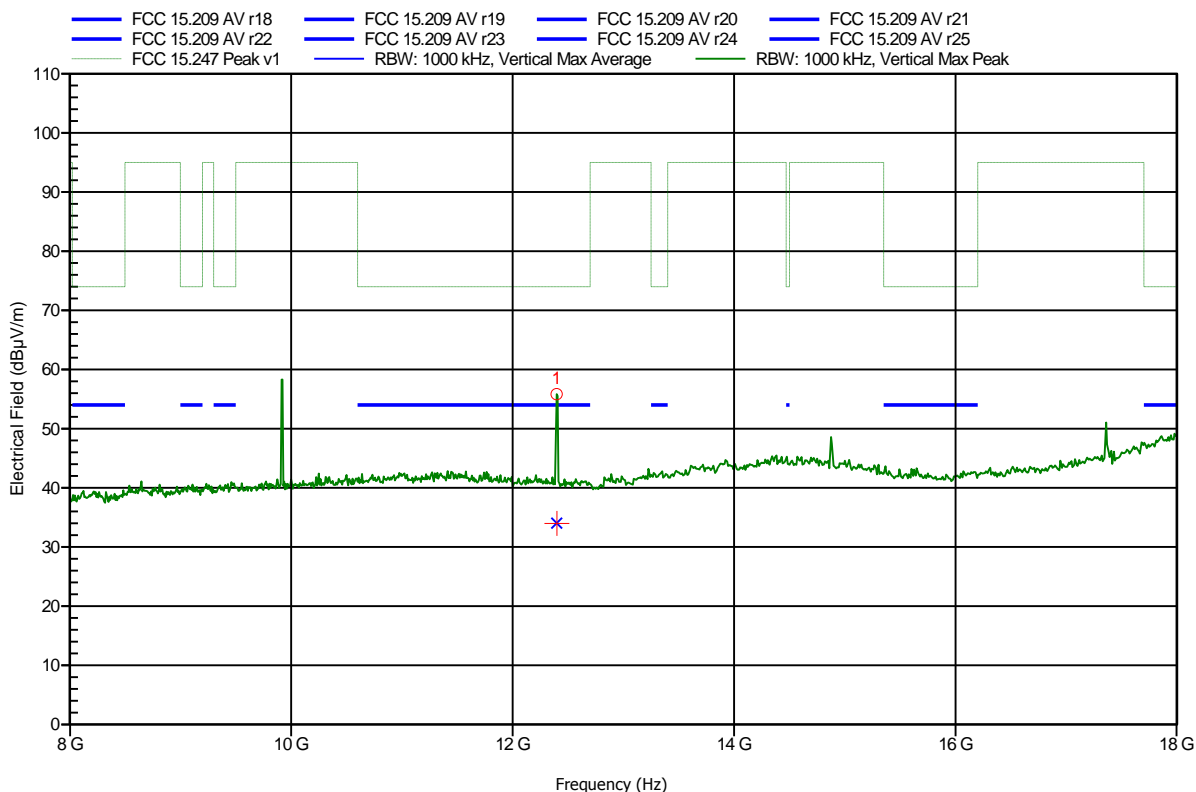
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.397 GHz	53.36 dBµV/m	74 dBµV/m	-20.64 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
12.397 GHz	32.96 dBµV/m	54 dBµV/m	-21.04 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer: WaveLight GmbH
 EUT Name: VERION Digital Marker
 Model: X-SPM, X-SPL (2 VARIANTS)
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Treffke
 Test Conditions: Tnom: 23°C, Vnom: 5 V DC (USB powered)
 Antenna: Schwarzbeck BBHA 9120D, Vertical
 Measurement distance: 100 cm converted to 3m
 Mode: TX; channel 26
 Test Date: 2013-03-15
 Note:

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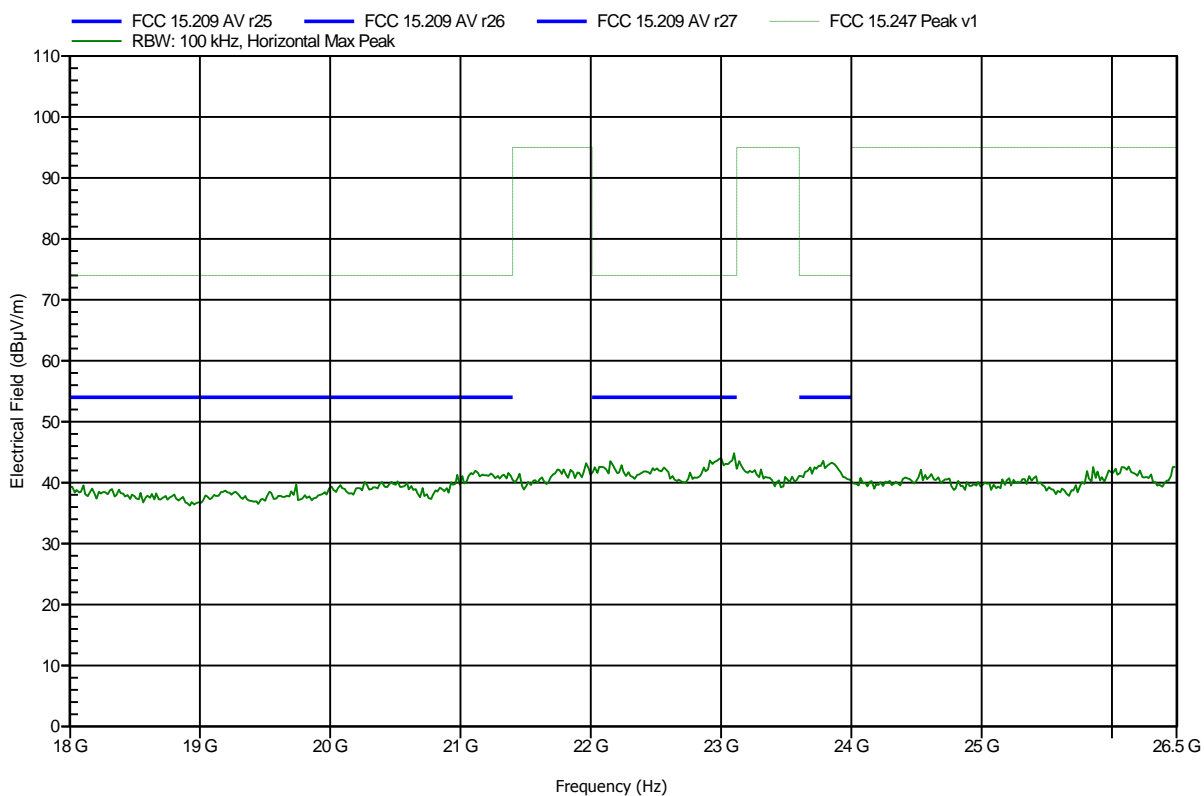
Frequency	Peak	Peak Limit	Peak Difference	Peak Status
12.397 GHz	55.83 dBµV/m	74 dBµV/m	-18.17 dB	Pass
Frequency	Average	Average Limit	Average Difference	Average Status
12.397 GHz	34.03 dBµV/m	54 dBµV/m	-19.97 dB	Pass

Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HL 025, Horizontal
Measurement distance:	100 cm
Mode:	TX; channel 26
Test Date:	2013-03-15
Note:	

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Spurious emissions according to FCC 15.247

Project number: G0M-1212-2480

Manufacturer:	WaveLight GmbH
EUT Name:	VERION Digital Marker
Model:	X-SPM, X-SPL (2 VARIANTS)
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Treffke
Test Conditions:	Tnom: 23°C, Vnom: 5 V DC (USB powered)
Antenna:	Rohde & Schwarz HL 025, Vertikal
Measurement distance:	100 cm
Mode:	TX; channel 26
Test Date:	2013-03-15
Note:	

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