



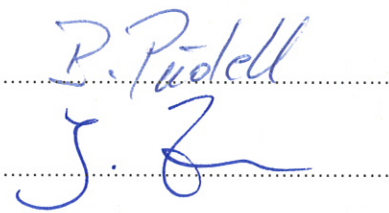
FCC TEST REPORT FCC 47 CFR Part 15C Industry Canada RSS-210 Digital transmission systems operating within the 2400 – 2483.5 MHz band	
Report Reference No.	G0M-1201-1704-TFC247Z-V01
Testing Laboratory	Eurofins Product Service GmbH
Address	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation	<div style="text-align: center;">   </div> <p>A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A</p>
Applicant's name	Leica Geosystems AG
Address	Heinrich Wild Strasse 1 9435 Heerbrugg SWITZERLAND
Test specification:	
Standard	47 CFR Part 15C RSS-210, Issue 8, 2010-12 RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009
Equipment under test (EUT):	
Product description	VIPER Radio Modul 100m
Model No.	785749
Hardware version	v2
Firmware / Software version	R
	FCC-ID: RFD-CT100 IC: 3177A-CT100
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 : 2012-02-16
 Date (s) of performance of tests : 2012-03-14 - 2012-03-15
 Compiled by : Christian Weber
 Tested by (+ signature) : Burkhard Pudell
 (Testing Manager)
 Approved by (+ signature) : Jens Zimmermann
 (Test Lab Manager)
 Date of issue : 2012-07-05
 Total number of pages : 93



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.**

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Additional comments:

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1 Equipment (Test item) Description:

Description	VIPER Radio Modul 100m	
Model	785749	
Serial number	None	
Hardware version	v2	
Software / Firmware version	R	
FCC-ID	RFD-CT100	
IC	3177A-CT100	
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}	2440 MHz
	F _{HIGH}	2475 MHz
Spreading	DSSS	
Modulations	O-QPSK	
Number of channels	15 (11-25)	
Channel spacing	5MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	2450AT45A100
	Manufacturer	Johanson Technologies, Inc.
	Gain	3.0 dBi
Manufacturer	Leica Geosystems AG Heinrich Wild Strasse 1 9435 Heerbrugg SWITZERLAND	
Power supply	V _{NOM}	3.15 VDC
	V _{MIN}	3.0 VDC
	V _{MAX}	3.3 VDC
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

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 = O-QPSK Data rate = 250 kbps Duty cycle = 100 % 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	2011-12	2012-12

6dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2011-12	2012-12

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2011-12	2012-12

Power spectral density					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2011-12	2012-12

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2011-12	2012-12

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2011-12	2012-12

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 5	EF00395	-	-
Spectrum Analyzer	R&S	FSIQ26	EF00151	2011-11	2012-11
Biconical Antenna	R&S	HK 116	EF00012	2010-01	2013-01
LPD Antenna	R&S	HL 223	EF00187	2011-02	2014-02
LPD Antenna	R&S	HL 025	EF00327	2010-02	2013-02

AC powerline conducted emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
AMN	R&S	ESH2-Z5	EF00182	2010-09	2012-09
AMN	R&S	ESH3-Z5	EF00036	2010-11	2012-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2011-06	2012-06

 Test Report No.: G0M-1201-1704-TFC247Z-V01

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

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:

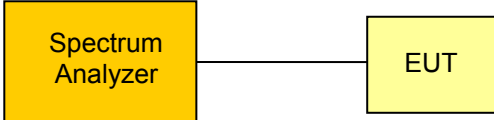
$$\begin{array}{rclcl} \text{Reading} & + & \text{AF} & = & \text{Net Reading} & : & \text{Net reading - FCC limit} & = & \text{Margin} \\ 21.5 \text{ dB}\mu\text{V} & + & 26 \text{ dB} & = & 47.5 \text{ dB}\mu\text{V/m} & : & 47.5 \text{ dB}\mu\text{V/m} - 57.0 \text{ dB}\mu\text{V/m} & = & -9.5 \text{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

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	Informational only
FCC § 15.247(a)(2) IC RSS-210 § A8.2	6dB Bandwidth	KDB Publication No. 558074	PASS	
FCC § 15.247(b)(3) IC RSS-210 § A8.4	Maximum peak conducted power	KDB Publication No. 558074	PASS	
FCC § 15.247(e) IC RSS-210 § A8.2	Power spectral density	KDB Publication No. 558074	PASS	
47 CFR 15.207 RSS-Gen 7.2.4	AC power line conducted emissions	KDB Publication No. 558074 / ANSI C63.4	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Band edge compliance	KDB Publication No. 558074	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Conducted spurious emissions	KDB Publication No. 558074	PASS	
FCC § 15.247(d) FCC § 15.209 IC RSS-210 A8.5 IC RSS-Gen 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	PASS	
Remarks:				

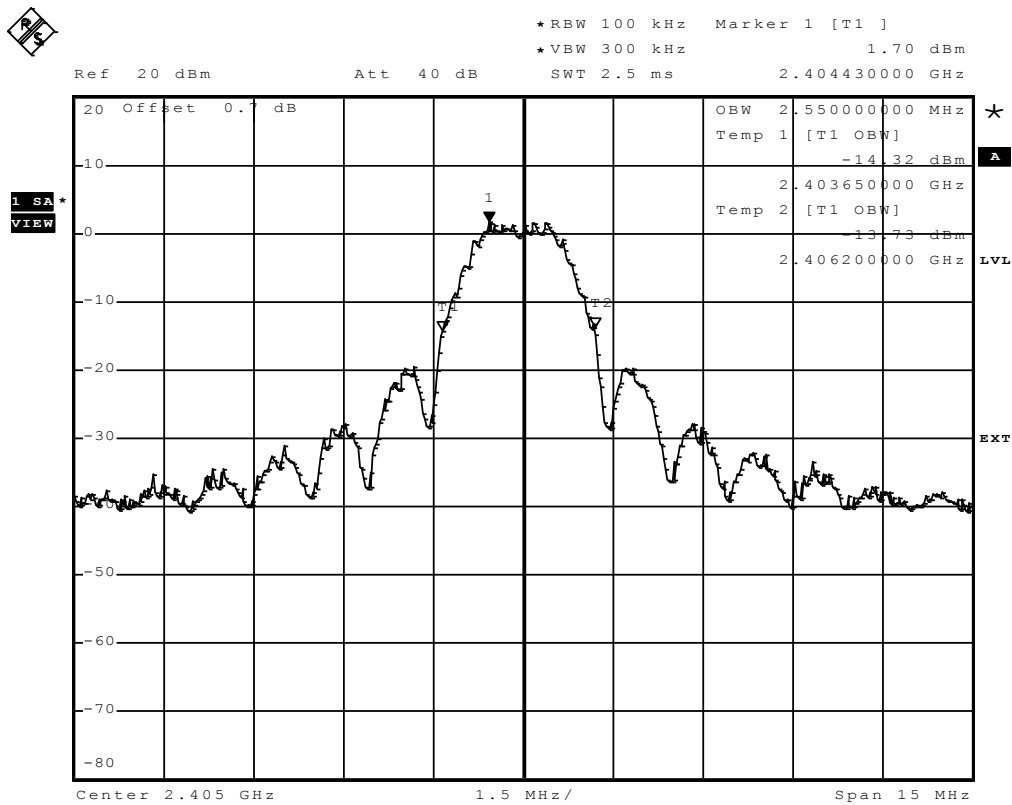
3 Test Conditions and Results

3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. IC RSS-Gen		Verdict: PASS	
Test according to measurement reference	Reference Method		
	RSS-Gen 4.6.1		
Test frequency range	Tested frequencies		
	$F_{LOW} / F_{MID} / F_{HIGH}$		
Limits			
None (Informational only)			
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. 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 [MHz]
F_{LOW}	2405	ZIGBEE	2.550
F_{MID}	2440	ZIGBEE	2.490
F_{HIGH}	2475	ZIGBEE	2.490
Comments:			

Occupied Bandwidth – ZIGBEE F_{LOW}
**RSS Gen
Occupied Bandwidth**

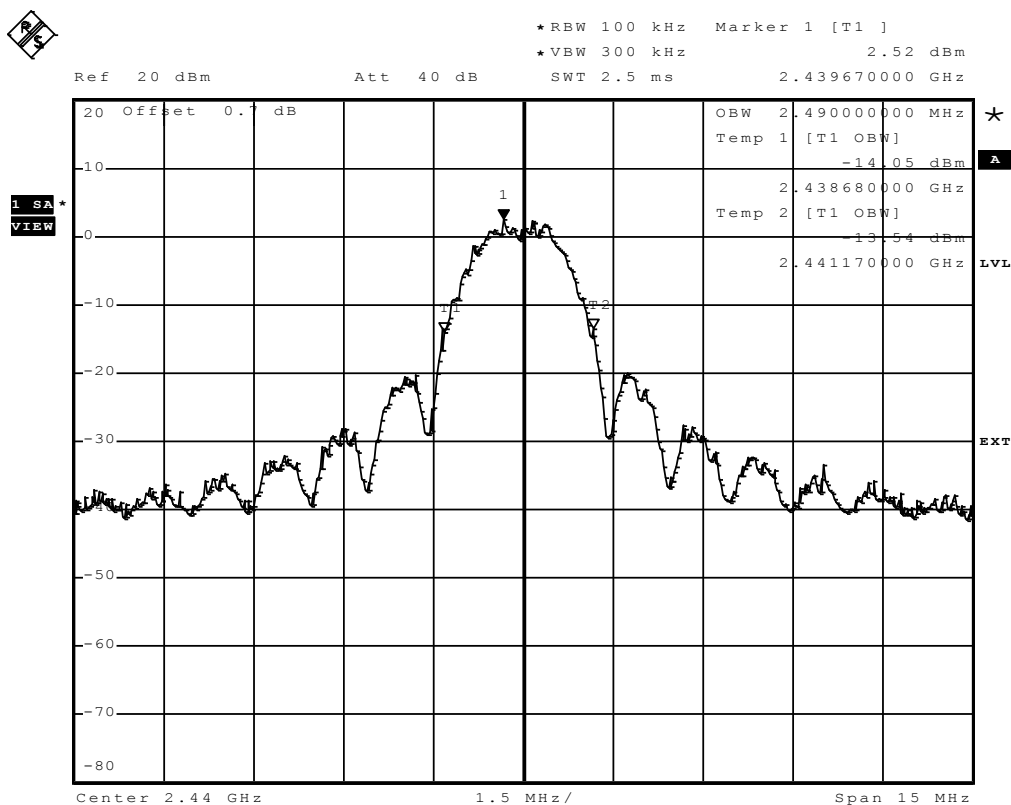
EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 2405 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	power level 8



Comment: Occupied bandwidth: 2550 KHz
 Date: 15.MAR.2012 13:12:42

Occupied Bandwidth – ZIGBEE F_{MID}
**RSS Gen
Occupied Bandwidth**

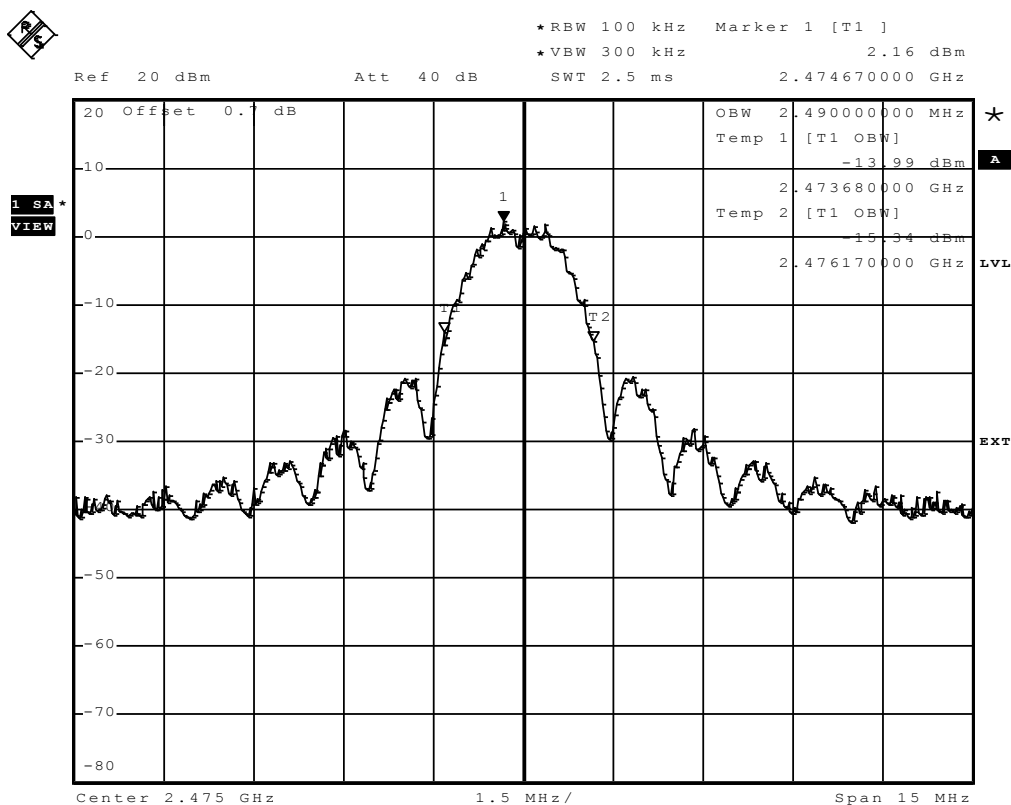
EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 2440 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	power level 8



Comment: Occupied bandwidth: 2490 KHz
 Date: 15.MAR.2012 13:10:21


Occupied Bandwidth – ZIGBEE F_{HIGH}
**RSS Gen
Occupied Bandwidth**

EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 2475 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	power level 8



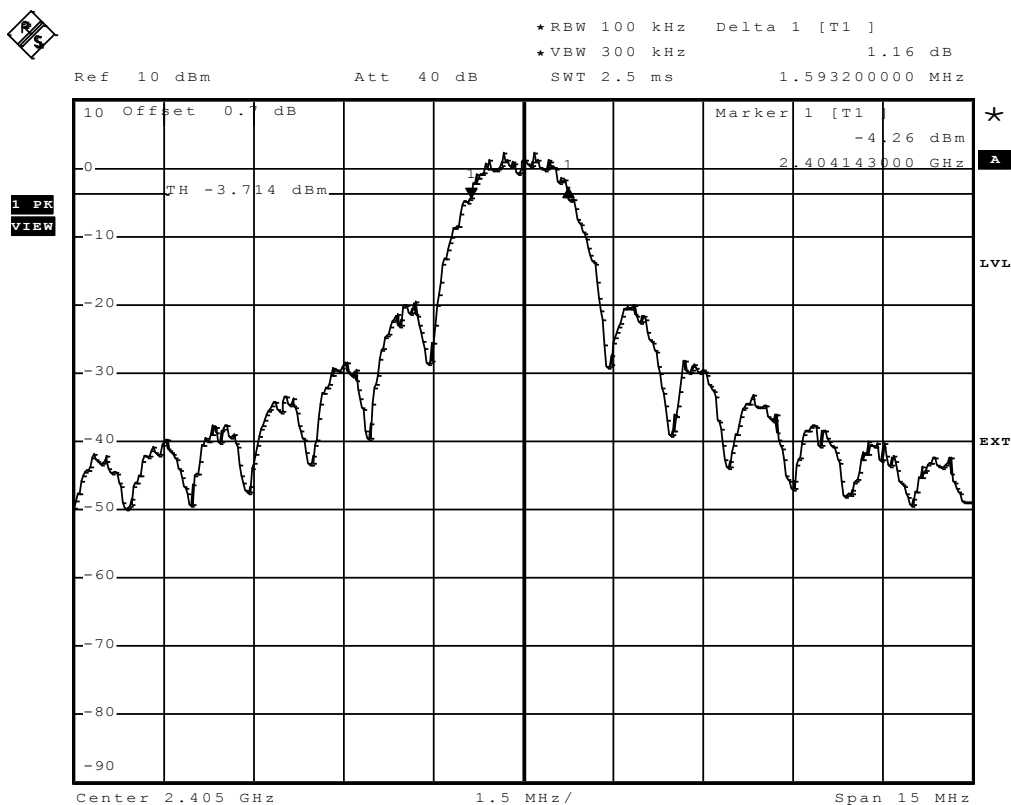
Comment: Occupied bandwidth: 2490 KHz
Date: 15.MAR.2012 13:07:00

3.2 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	1593.2	500	PASS
F_{MID}	2440	ZIGBEE	1651.4	500	PASS
F_{HIGH}	2475	ZIGBEE	1622.6	500	PASS
Comments:					

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

EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 2405 MHz
Comment 3	power level 8



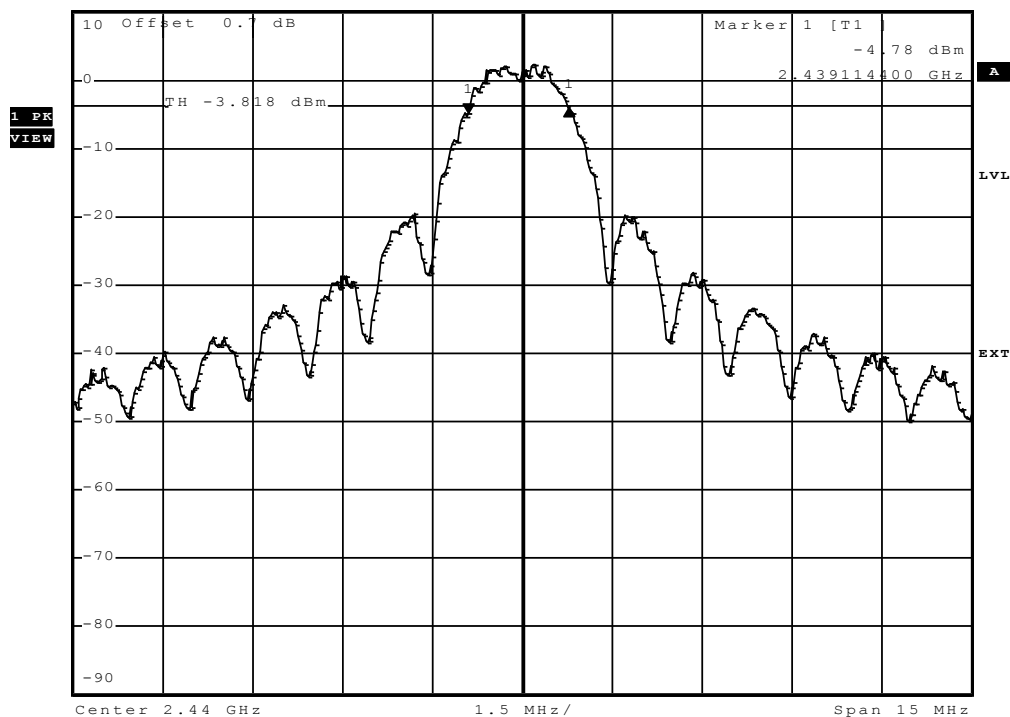
Comment: 6 dB bandwidth: 1593.2 KHz > 500 KHz; verdict: PASS
 Date: 15.MAR.2012 12:52:03

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

EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 2440 MHz
Comment 3	power level 8



*RBW 100 kHz Delta 1 [T1]
 *VBW 300 kHz 0.83 dB
 Ref 10 dBm Att 40 dB SWT 2.5 ms 1.651400000 MHz



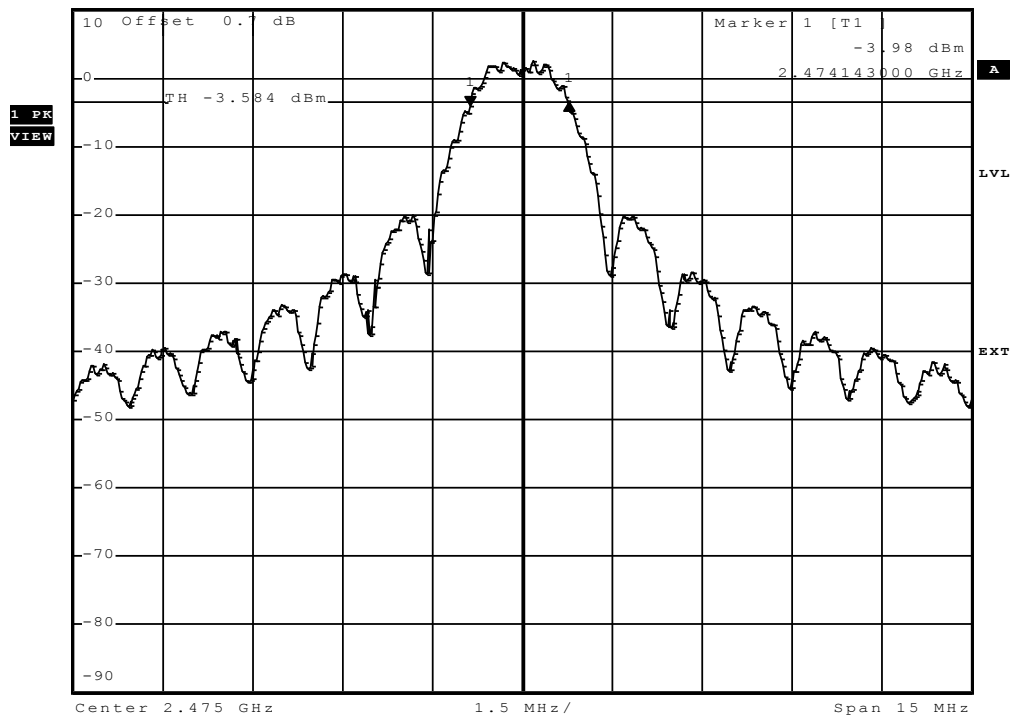
Comment: 6 dB bandwidth: 1651.4 KHz > 500 KHz; verdict: PASS
 Date: 15.MAR.2012 12:56:05

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

EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 2475 MHz
Comment 3	power level 8

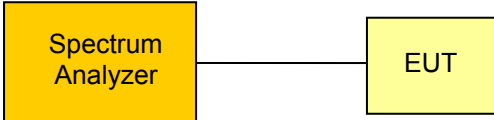


*RBW 100 kHz Delta 1 [T1]
 *VBW 300 kHz 0.38 dB
 Ref 10 dBm Att 40 dB SWT 2.5 ms 1.622600000 MHz




Comment: 6 dB bandwidth: 1622.6 KHz > 500 KHz; verdict: PASS
 Date: 15.MAR.2012 13:02:05

3.3 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	
	$F_{LOW} / F_{MID} / F_{HIGH}$	
Measurement mode	Peak	
Maximum antenna gain	3 dBi \Rightarrow Limit correction = 0 dB	
Limits		
1 W (30 dBm)		
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.		
Test setup		
 <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	6.0	0.0039	30	-24.00
F _{LOW}	2405	V _{MIN} = 3.0	ZIGBEE	6.0	0.0039	30	-24.00
F _{LOW}	2405	V _{MAX} =3.3	ZIGBEE	6.0	0.0039	30	-24.00
F _{MID}	2440	V _{NOM} = 3.15	ZIGBEE	6.0	0.0039	30	-24.00
F _{MID}	2440	V _{MIN} = 3.0	ZIGBEE	6.0	0.0039	30	-24.00
F _{MID}	2440	V _{MAX} =3.3	ZIGBEE	6.0	0.0039	30	-24.00
F _{HIGH}	2475	V _{NOM} = 3.15	ZIGBEE	5.8	0.0038	30	-24.20
F _{HIGH}	2475	V _{MIN} = 3.0	ZIGBEE	5.8	0.0038	30	-24.20
F _{HIGH}	2475	V _{MAX} =3.3	ZIGBEE	5.8	0.0038	30	-24.20
Comments:							

3.4 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	2404.498	-8.89	8.0	-16.89
F_{MID}	2440	ZIGBEE	2439.499	-9.22	8.0	-17.22
F_{HIGH}	2475	ZIGBEE	2475.086	-9.44	8.0	-17.44
Comments:						

3.5 Test Conditions and Results – AC power line conducted emissions

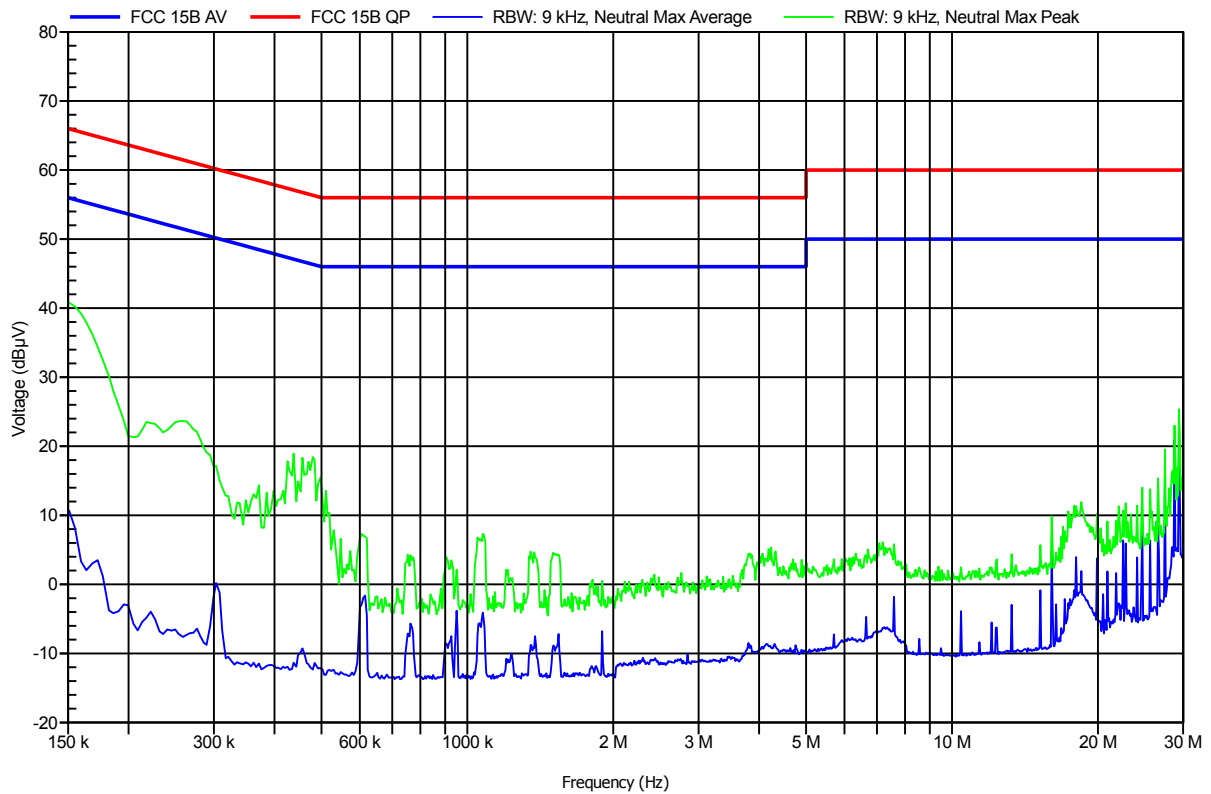
Power line conducted emissions acc. FCC 47 CFR 15.207 / IC RSS-Gen		Verdict: PASS		
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Points of Application	Application Interface			
AC Mains	LISN			
EUT test mode	AC-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 15B

Project number: G0M-1201-1704

Manufacturer: Leica Geosystems AG
 EUT Name: VIPER Radio Modul 100m
 Model: 785749
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Marquardt
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC/DC adapter)
 LISN: ESH2-Z5 N
 Mode: Rx/Tx
 Test Date: 24.04.2012
 Note:

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Test Report No.: G0M-1201-1704-TFC247Z-V01

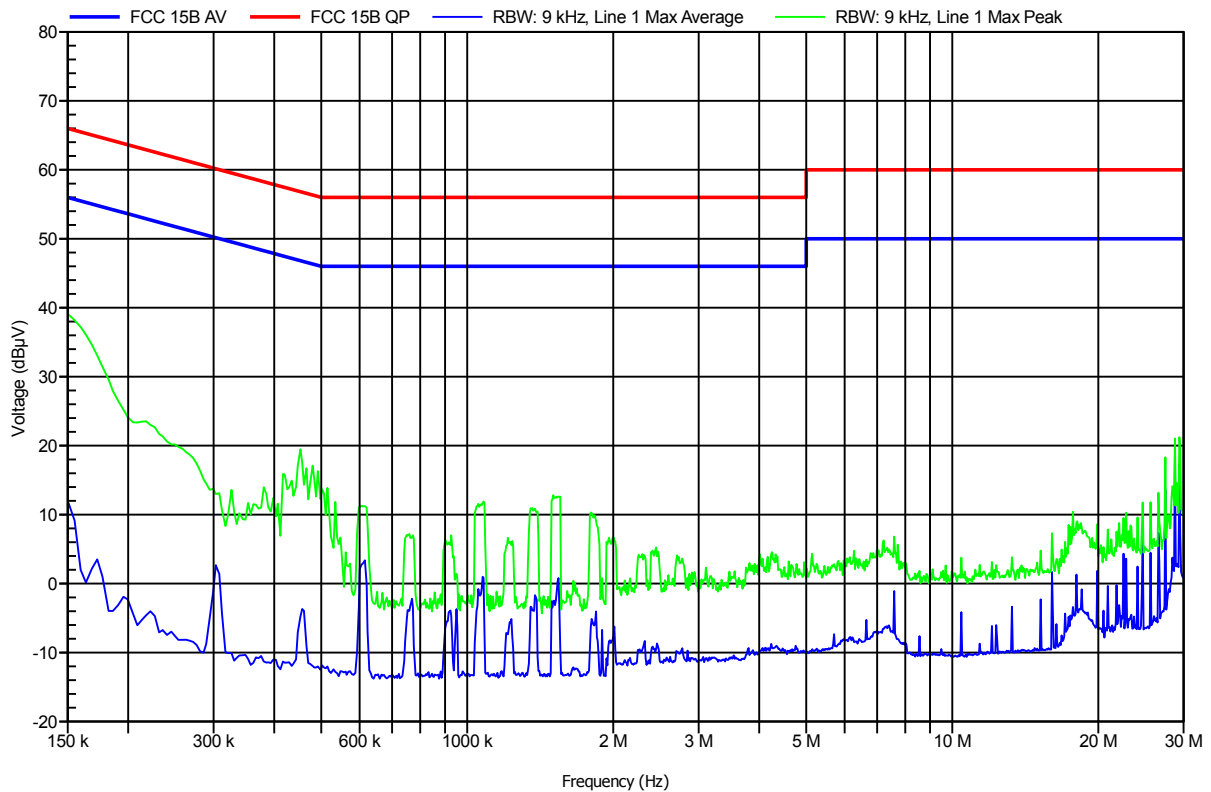
 Eurofins Product Service GmbH
 Storkower Str. 38c, D-15526 Reichenwalde, Germany

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

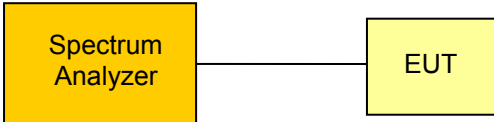
Project number: G0M-1201-1704

Manufacturer: Leica Geosystems AG
 EUT Name: VIPER Radio Modul 100m
 Model: 785749
 Test Site: Eurofins Product Service GmbH
 Operator: Mr. Marquardt
 Test Conditions: Tnom: 23°C, Unom: 120 VAC (AC/DC adapter)
 LISN: ESH2-Z5 L
 Mode: Rx/Tx
 Test Date: 24.04.2012
 Note:

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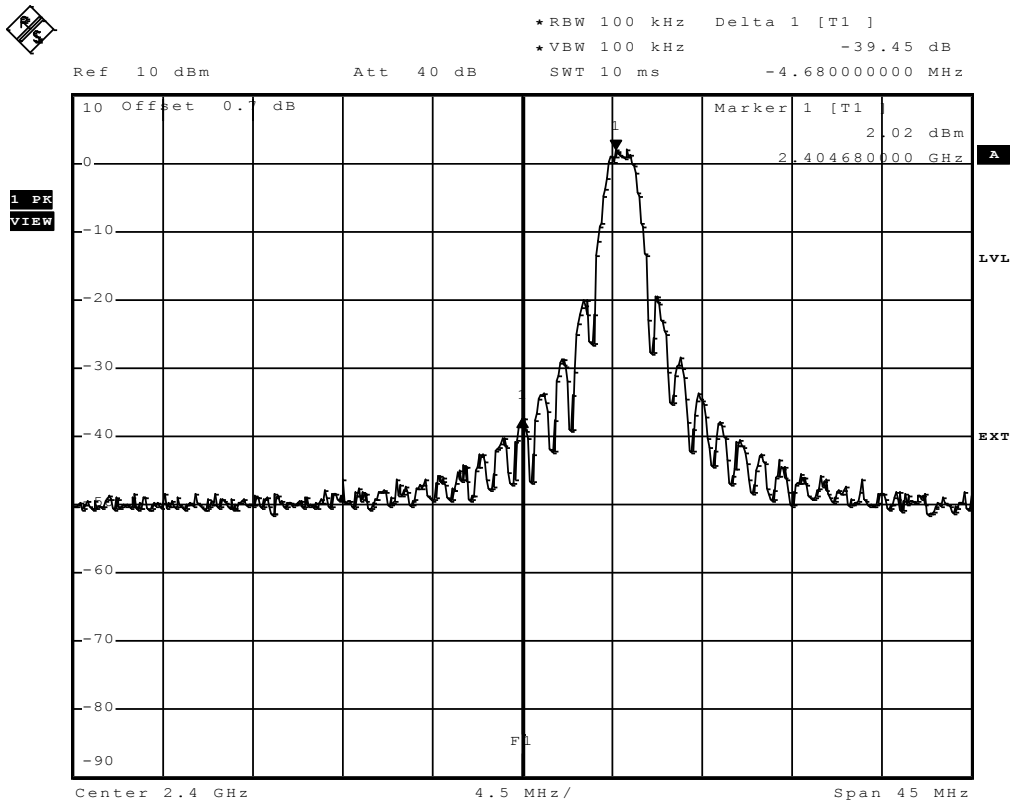


3.6 Test Conditions and Results – Band edge compliance

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	-39.45	-20	-19.45
F_{HIGH}	2475	ZIGBEE	-47.40	-20	-27.40
Comments:					

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

EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, 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	power level 8



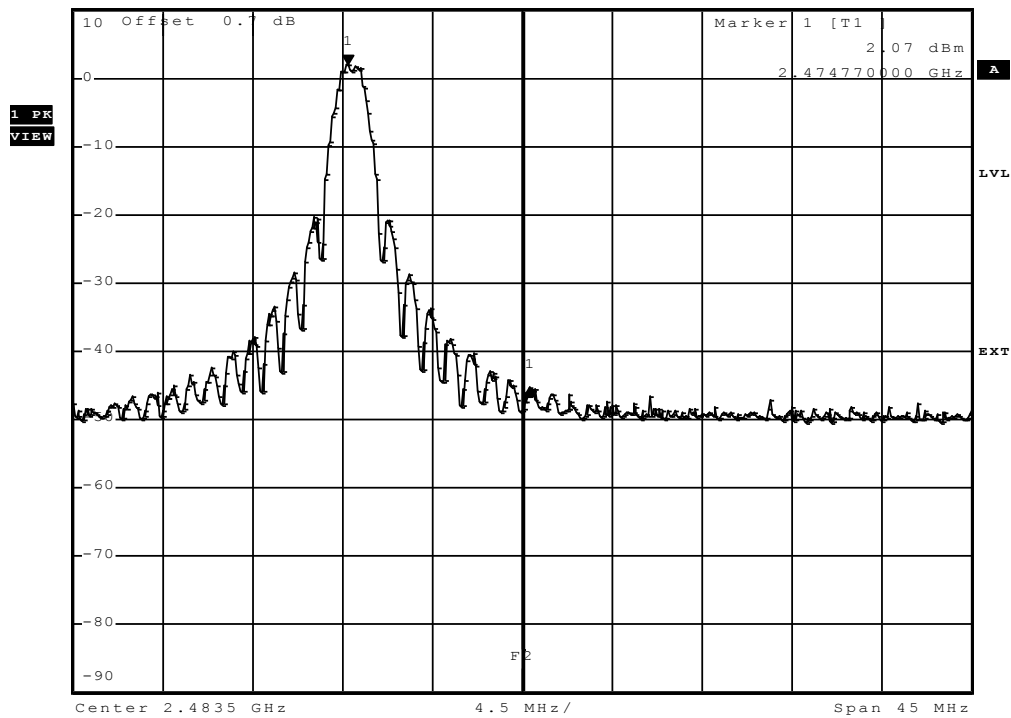
Comment: Limit: Marker Delta value >20 dB; Result: PASS
 Date: 15.MAR.2012 13:15:09

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

EUT	VIPER Radio Module 100m
Model	785749
Approval Holder	Leica Geosystems AG / Ord.: G0M-1201-1704
Temperature / Voltage	24°C, 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.: 2475 MHz
Comment 3	power level 8




*RBW 100 kHz Delta 1 [T1]
 *VBW 100 kHz -47.40 dB
 Ref 10 dBm Att 40 dB SWT 10 ms 9.090000000 MHz



Comment: Limit: Marker Delta value >20 dB; Result: PASS
 Date: 15.MAR.2012 13:17:48

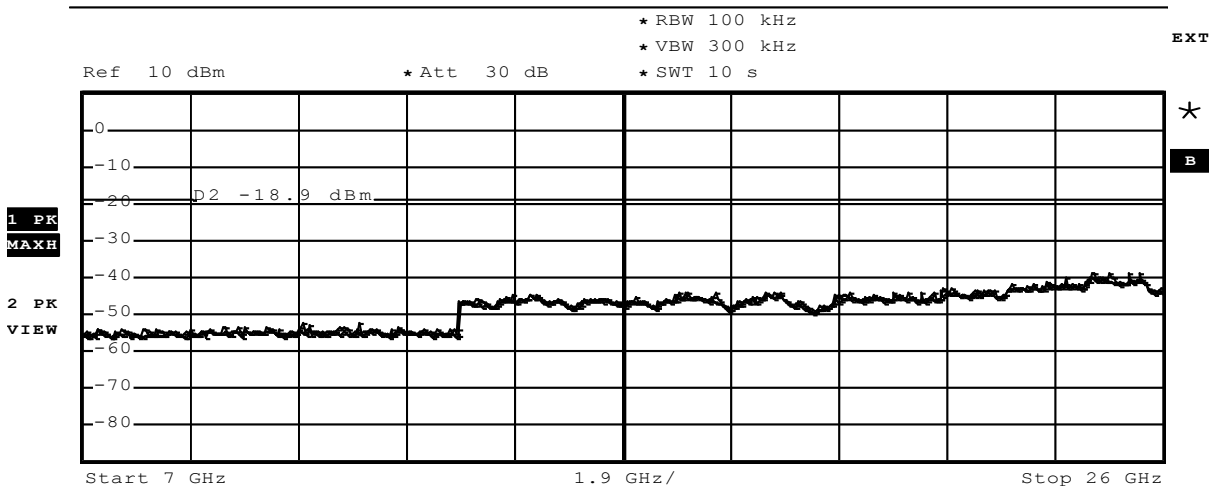
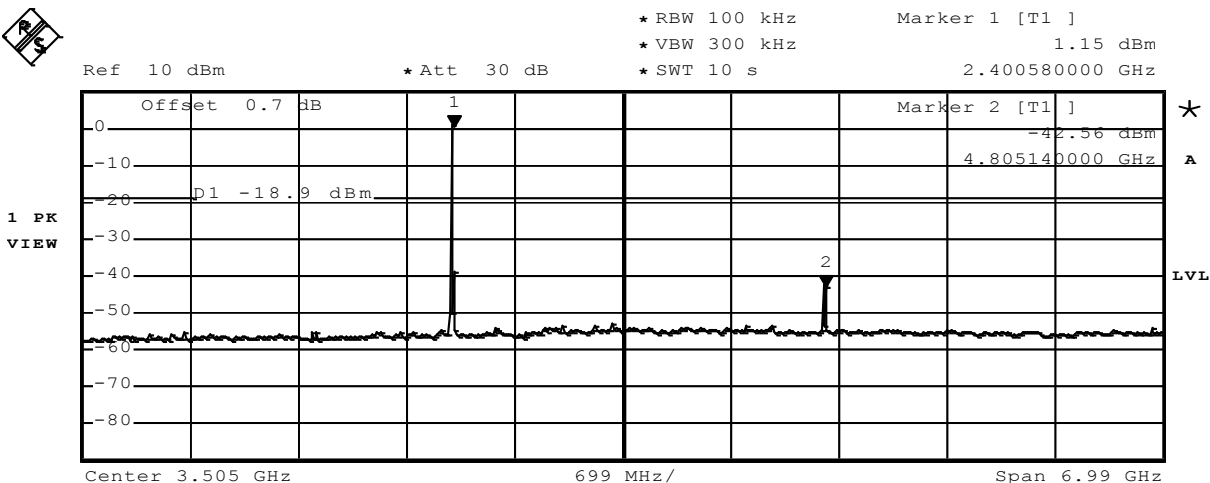
3.7 Test Conditions and Results – Conducted spurious emissions

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	4805	-42.56	1.15	-18.85	-23.71
F _{MID}	2440	ZIGBEE	4875	-42.61	1.51	-18.49	-24.12
F _{HIGH}	2475	ZIGBEE	4959	-43.46	2.52	-17.48	-25.98
Comments:							

Conducted spurious emissions – ZIGBEE F_{LOW}

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

EUT VIPER Radio Module 100m
 Model 785749
 Approval Holder Leica Geosystems AG / Ord.: G0M-1201-1704
 Temperature / Voltage 24°C, V_{nom}
 Test Site / Operator Eurofins Product Service GmbH, Mr. Treffke
 Test Specification FCC part 15.247 (d)
 Comment 1 Spurious Emissions conducted
 Comment 2 Channel : 2405 MHz
 Comment 3 power level 8

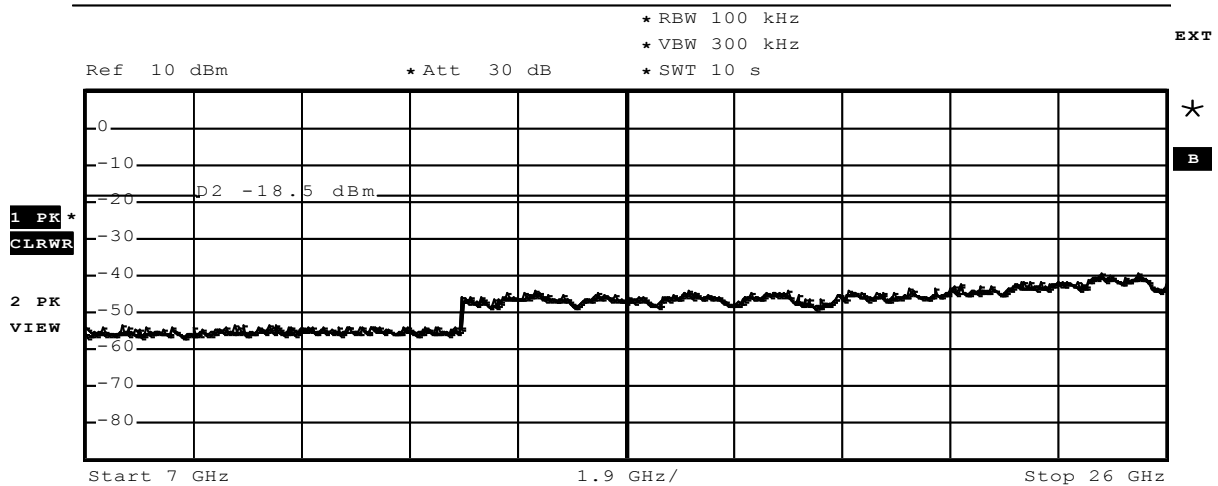
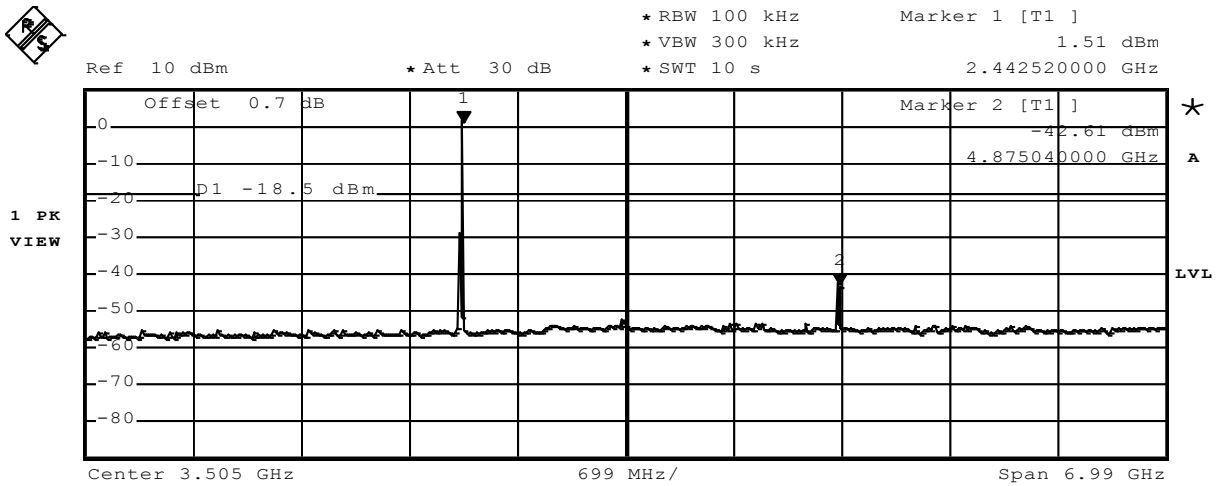


Date: 15.MAR.2012 13:30:58

Conducted spurious emissions – ZIGBEE F_{MID}

FCC part 15.247 (d)
Spurious Emissions

EUT VIPER Radio Module 100m
 Model 785749
 Approval Holder Leica Geosystems AG / Ord.: G0M-1201-1704
 Temperature / Voltage 24°C, Vnom
 Test Site / Operator Eurofins Product Service GmbH, Mr. Treffke
 Test Specification FCC part 15.247 (d)
 Comment 1 Spurious Emissions conducted
 Comment 2 Channel : 2440 MHz
 Comment 3 power level 8

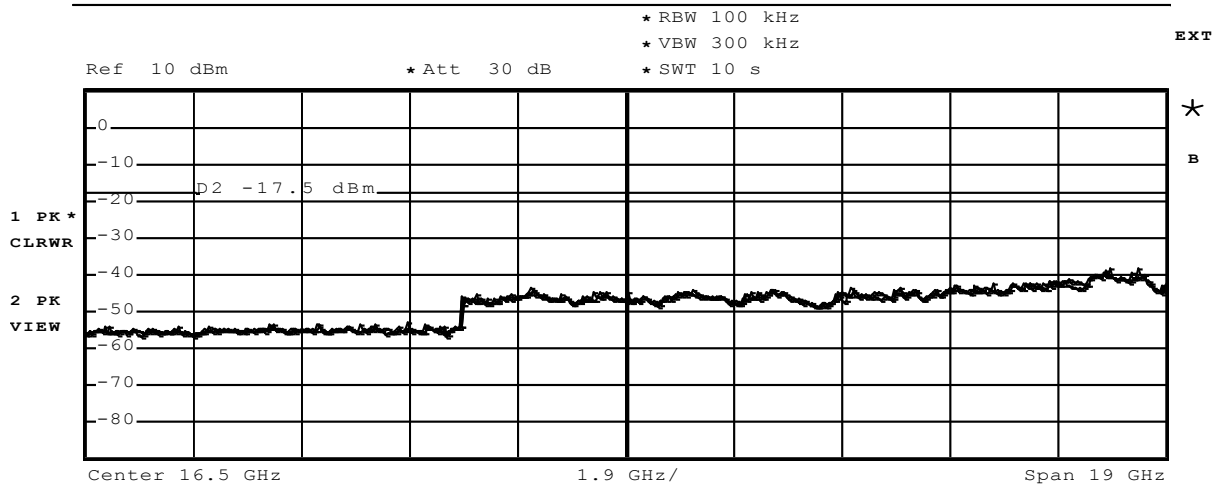
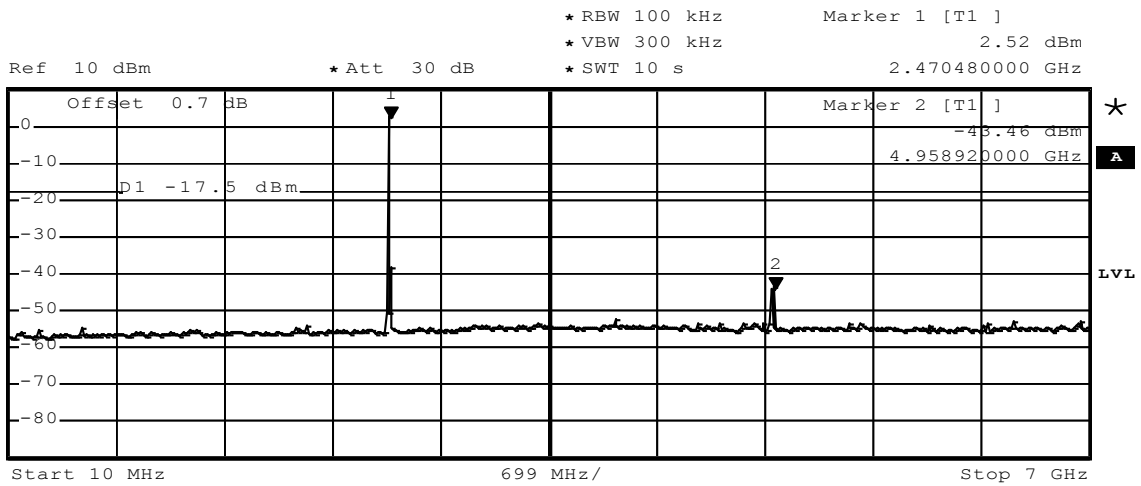


Date: 15.MAR.2012 13:27:09

Conducted spurious emissions – ZIGBEE F_{HIGH}

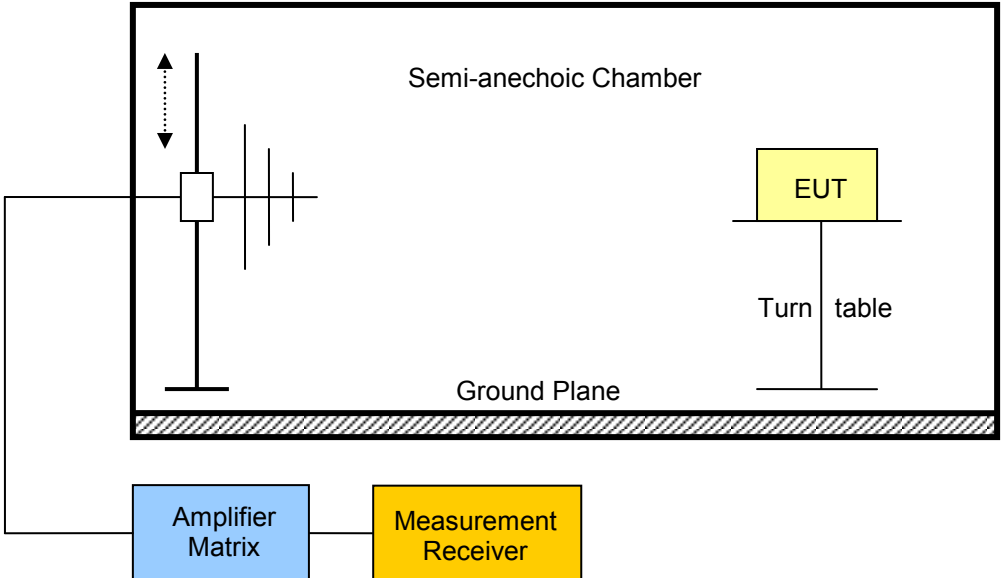
FCC part 15.247 (d)
Spurious Emissions

EUT VIPER Radio Module 100m
 Model 785749
 Approval Holder Leica Geosystems AG / Ord.: G0M-1201-1704
 Temperature / Voltage 24°C, Vnom
 Test Site / Operator Eurofins Product Service GmbH, Mr. Treffke
 Test Specification FCC part 15.247 (d)
 Comment 1 Spurious Emissions conducted
 Comment 2 Channel : 2475 MHz
 Comment 3 power level 8



Date: 15.MAR.2012 13:23:01

3.8 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. An Amplifier Matrix is connected to the chamber. A Measurement Receiver is connected to the Amplifier Matrix. The Equipment Under Test (EUT) is placed on a Turn table inside the chamber. A vertical antenna is positioned to the left of the chamber, with a dashed arrow indicating its height adjustment.</p>					

Test procedure

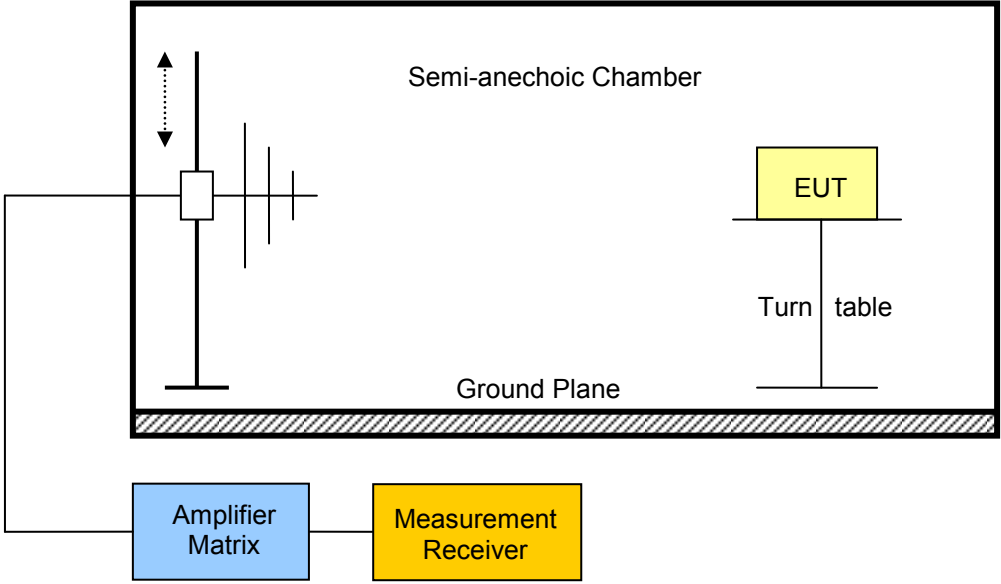
1. EUT set to test mode (Communication tester is used if needed)
2. Span it set according to measurement range
3. Resolution bandwidth below 1 GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1 MHz with peak/average detector is used above 1 GHz
4. Markers are set to peak emission 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	4810	55.57	pk	hor	74	3	-18.43
F _{LOW}	2405	ZIGBEE	4810	51.98	av	hor	54	3	-2.02
F _{LOW}	2405	ZIGBEE	4810	55.82	pk	ver	74	3	-18.18
F _{LOW}	2405	ZIGBEE	4810	41.19	av	ver	54	3	-12.81
F _{MID}	2440	ZIGBEE	4882	55.28	pk	hor	74	3	-18.72
F _{MID}	2440	ZIGBEE	4881	51.56	av	hor	54	3	-2.44
F _{MID}	2440	ZIGBEE	4882	56.08	pk	ver	74	3	-17.92
F _{MID}	2440	ZIGBEE	4879	43.14	av	ver	54	3	-10.86
F _{HIGH}	2475	ZIGBEE	2484	57.04	pk	hor	74	3	-16.96
F _{HIGH}	2475	ZIGBEE	2484	48.08	av	hor	54	3	-5.92
F _{HIGH}	2475	ZIGBEE	4946	53.73	pk	hor	74	3	-20.27
F _{HIGH}	2475	ZIGBEE	4949	47.39	av	hor	54	3	-6.61
F _{HIGH}	2475	ZIGBEE	4946	53.81	pk	ver	74	3	-20.19
F _{HIGH}	2475	ZIGBEE	4949	43.16	av	ver	54	3	-10.84

Comments: * Physical distance between EUT and measurement antenna.

3.9 Test Conditions and Results – Receiver radiated emissions

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

Test procedure

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

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [db μ V/m]	Emission Level [μ V/m]	Det.	Limit [μ V/m]	Margin [μ V/m]
All	Scan	309	25.91	19.75	pk	200.00	-180.25

Comments:

* Physical distance between EUT and measurement antenna.

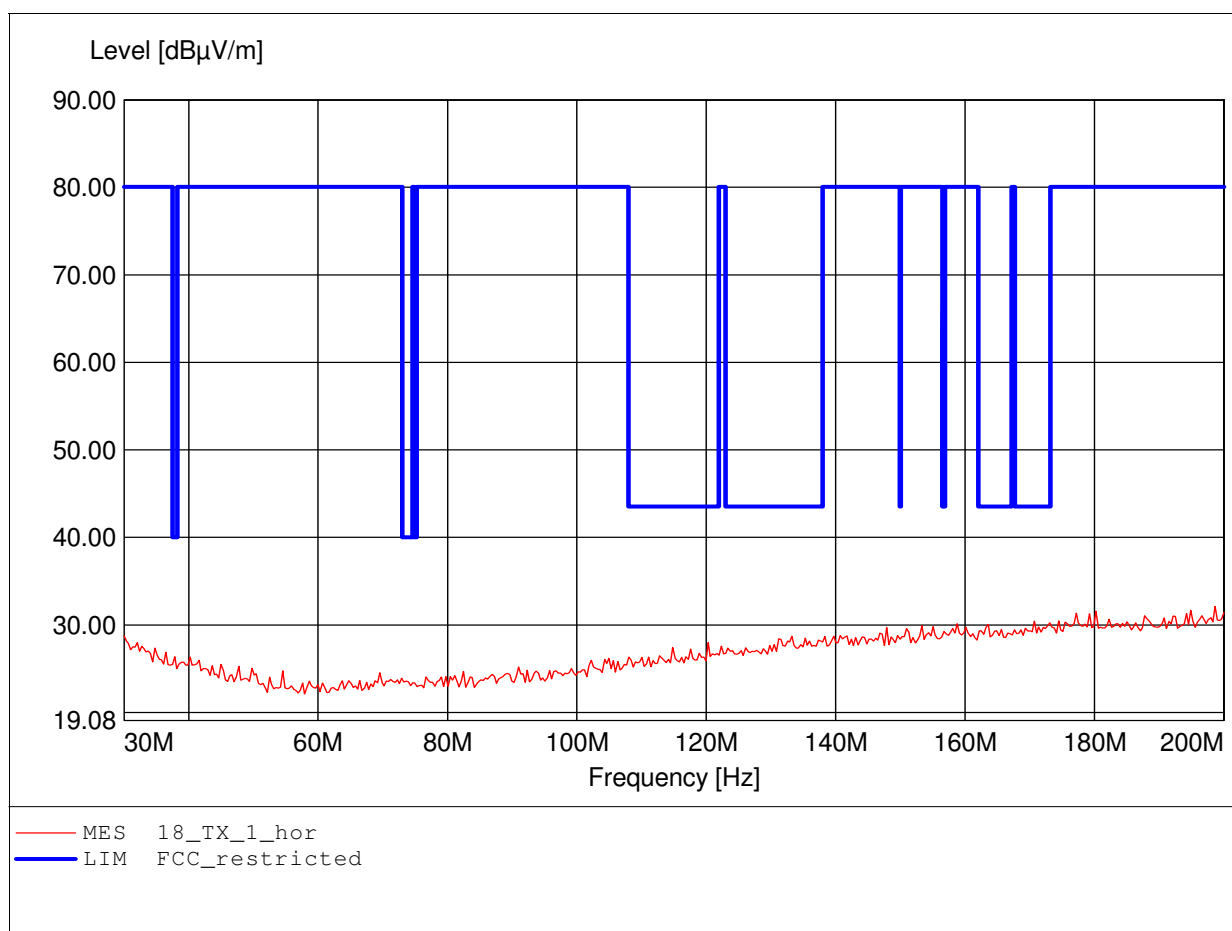
** Emission level corresponds to ambient noise floor

ANNEX A Transmitter radiated spurious emissions

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

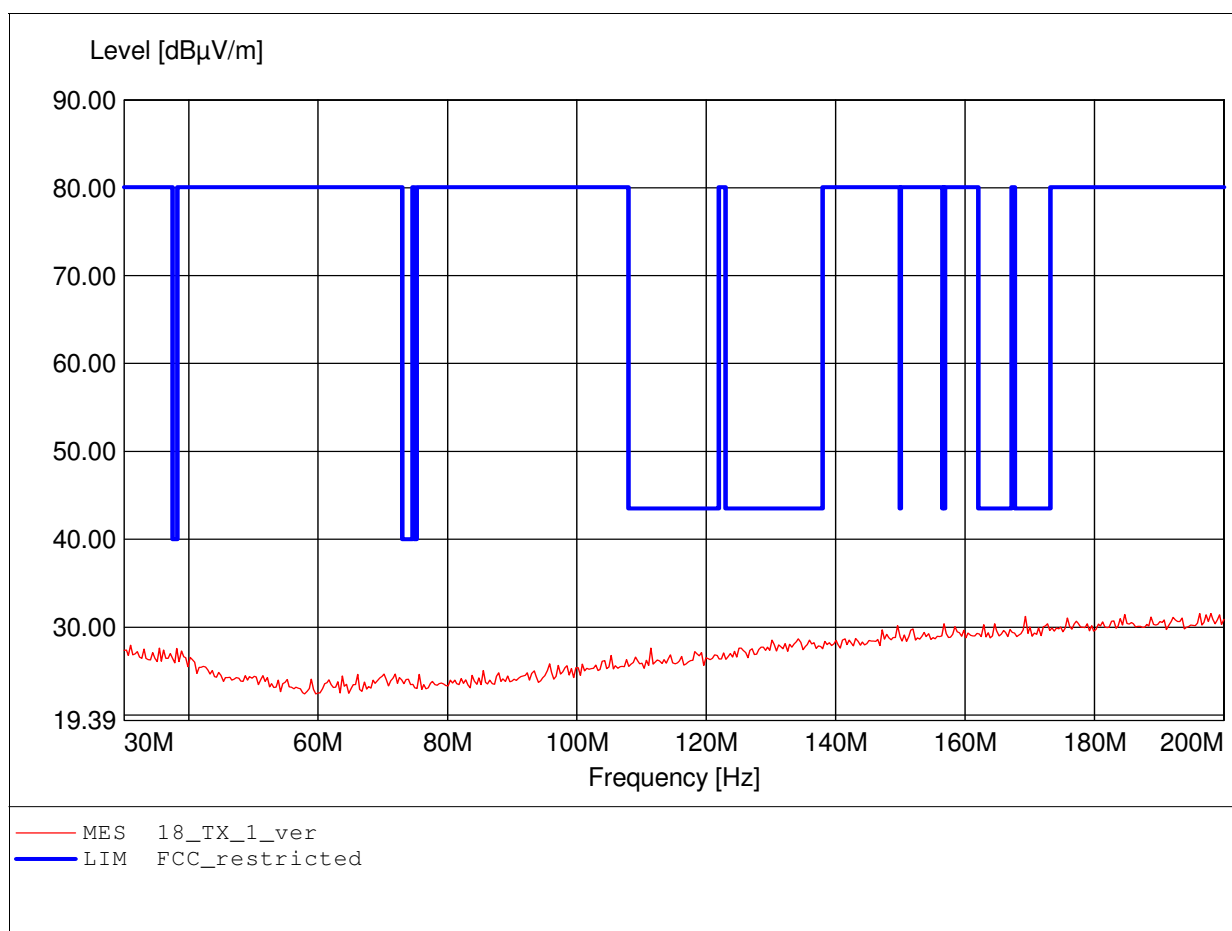
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq: 198.637MHz, Emax: 32.09dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

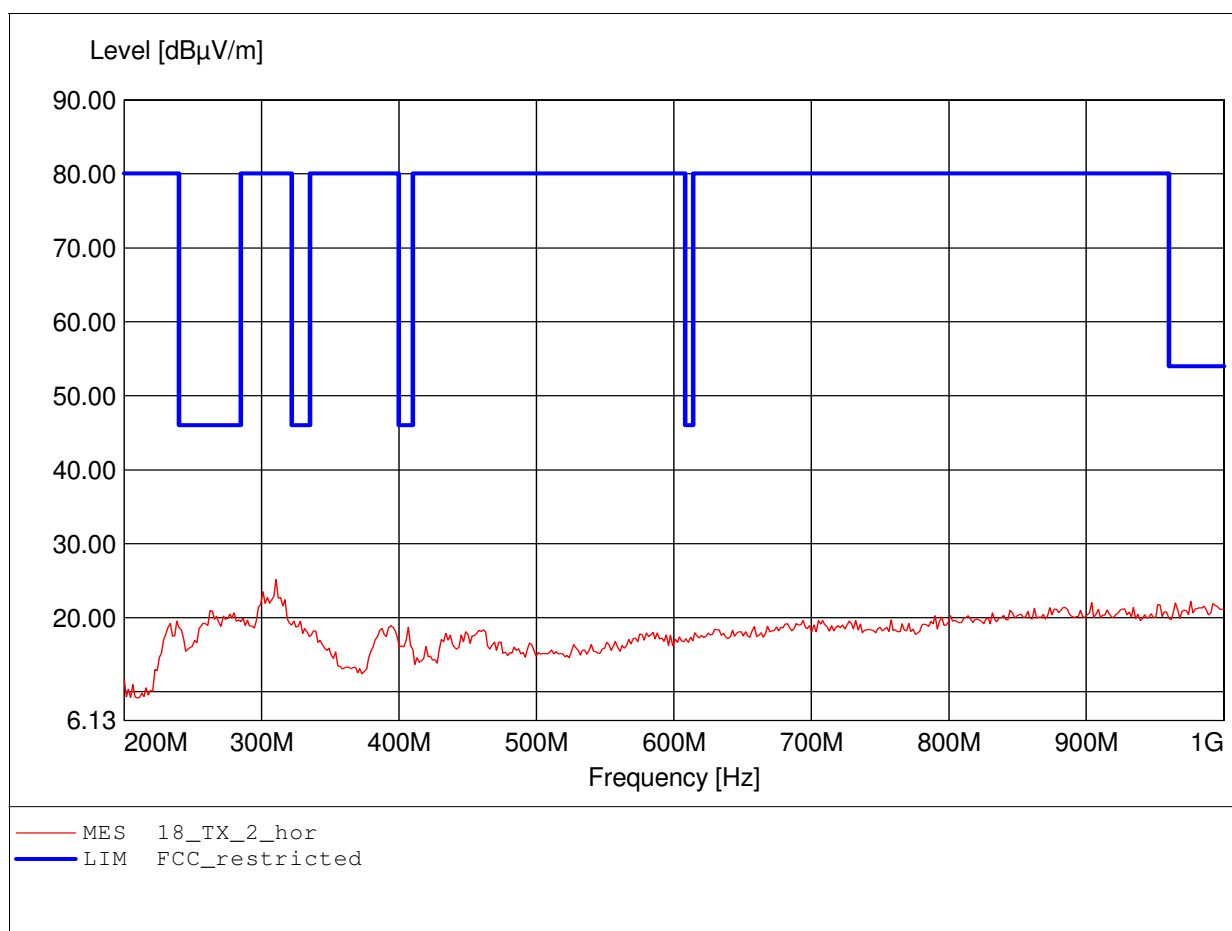
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq: 196.253MHz, Emax: 31.57dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

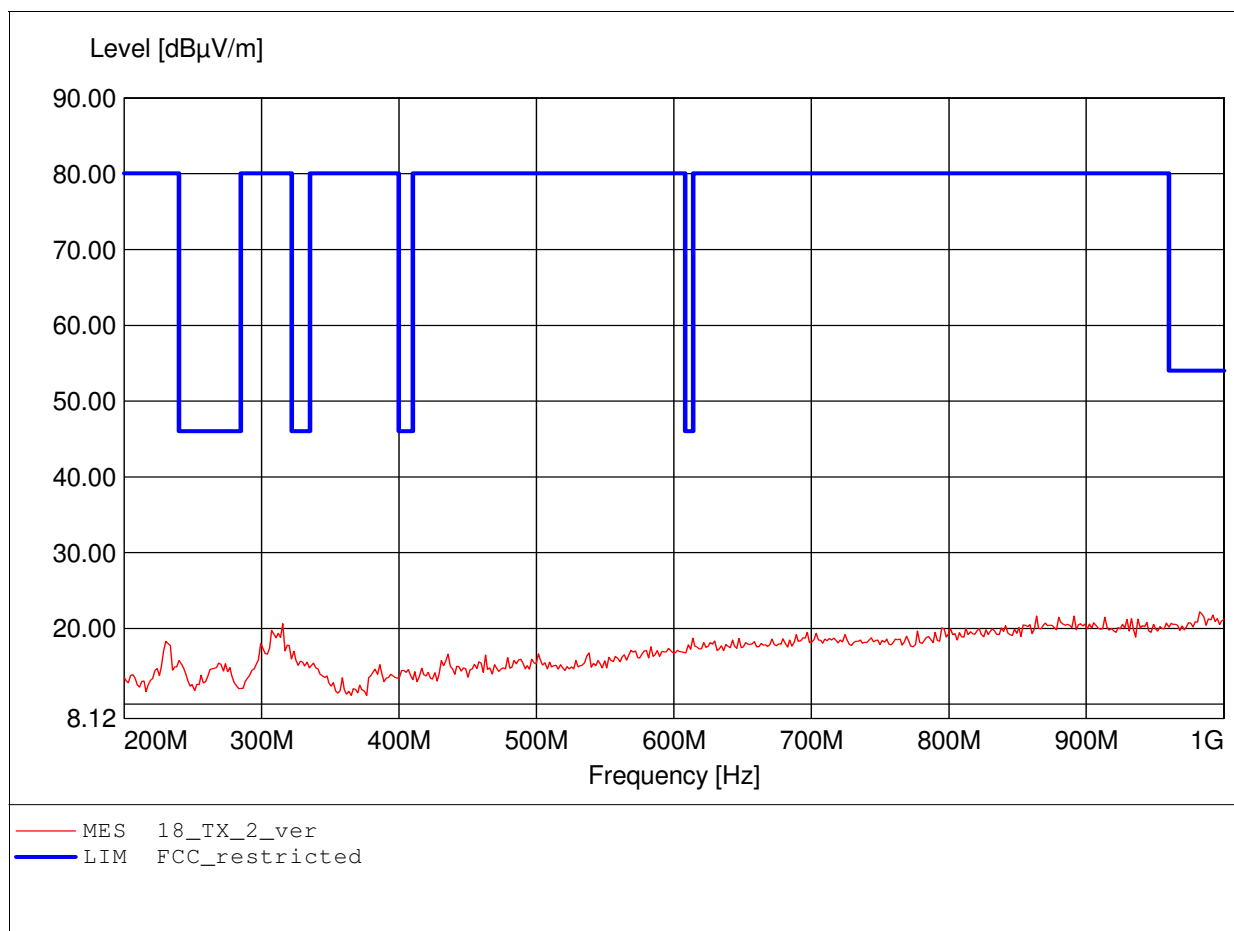
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 310.621MHz, Emax: 25.15dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

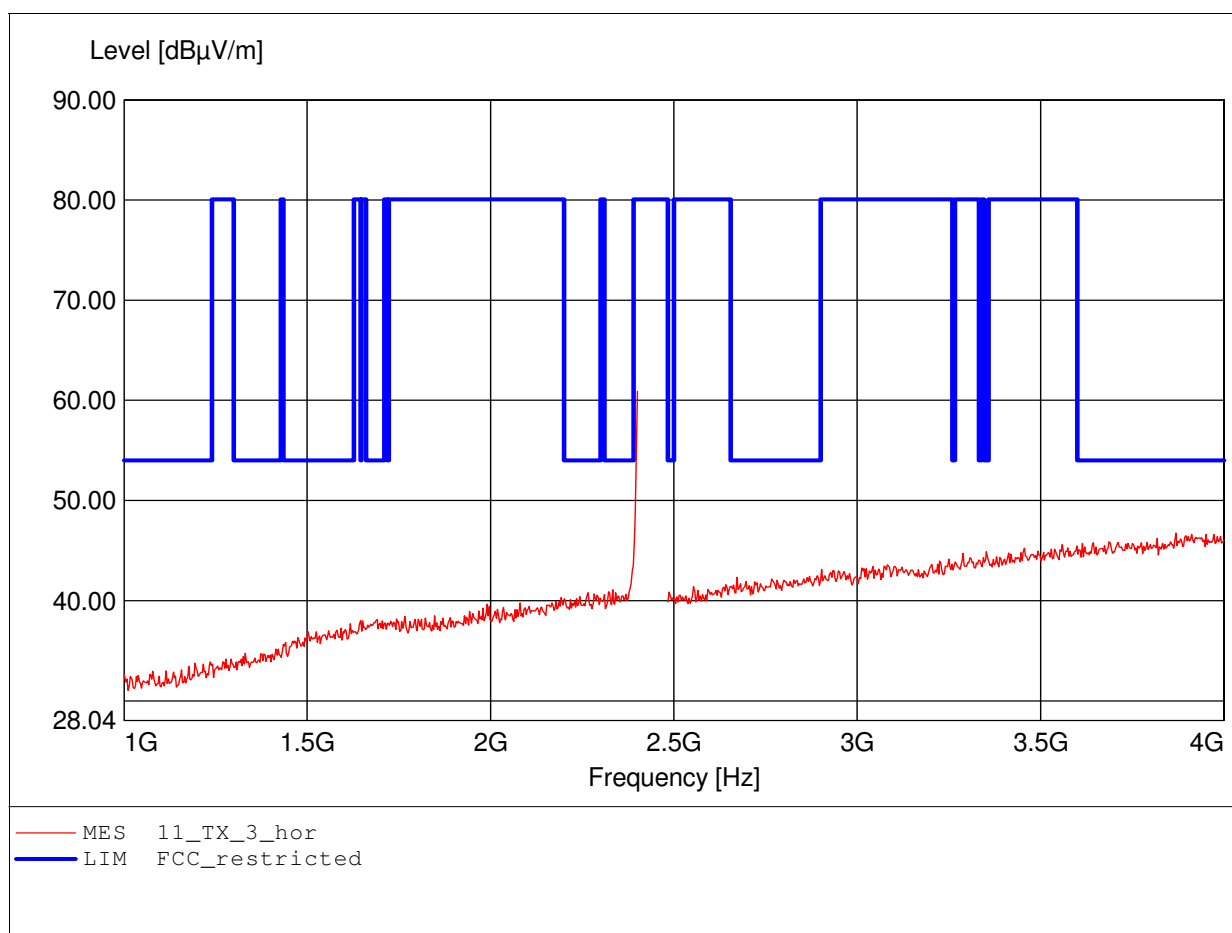
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 223, amplif.
Comment 2: Freq: 982.365MHz, Emax: 22.18dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

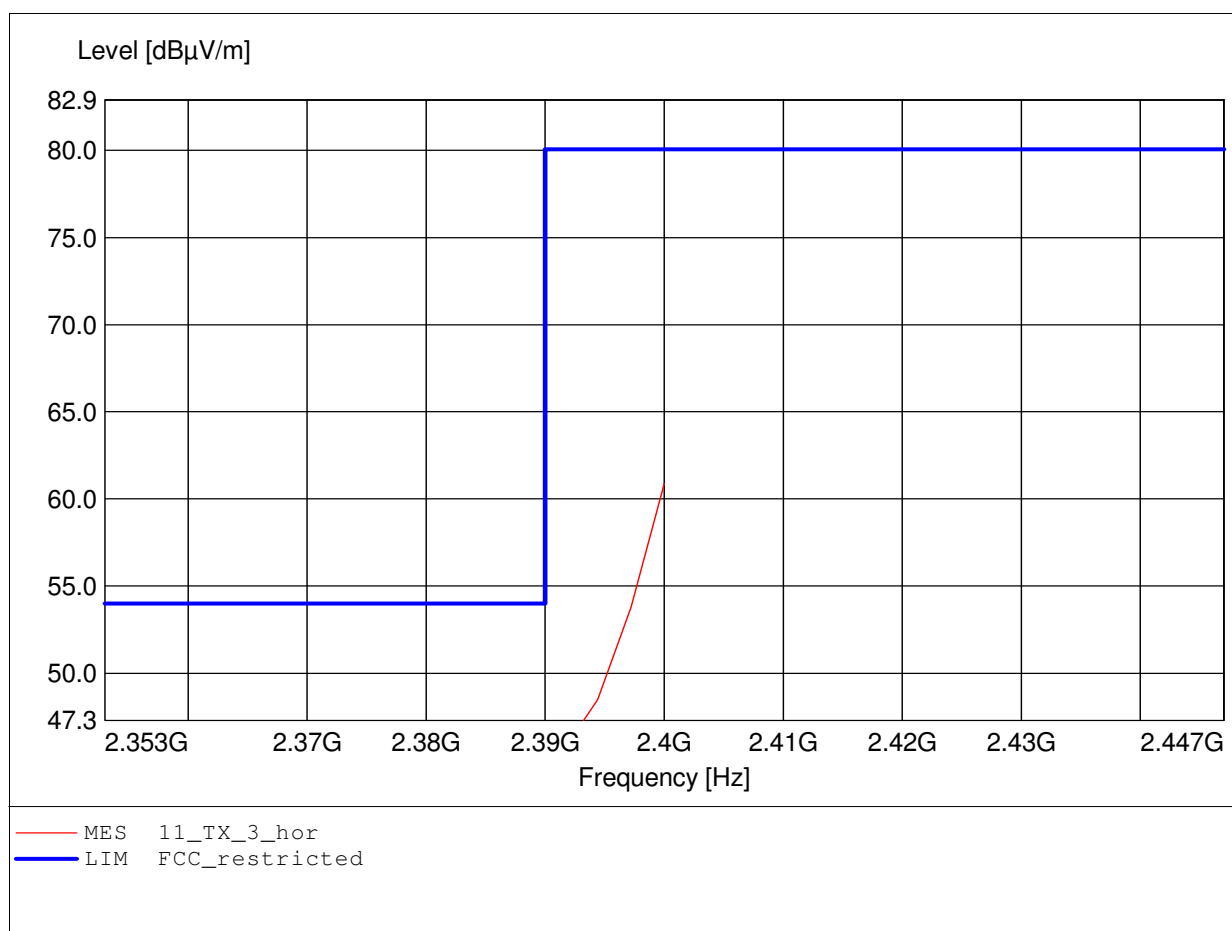
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 2.400GHz, Emax: 60.90dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

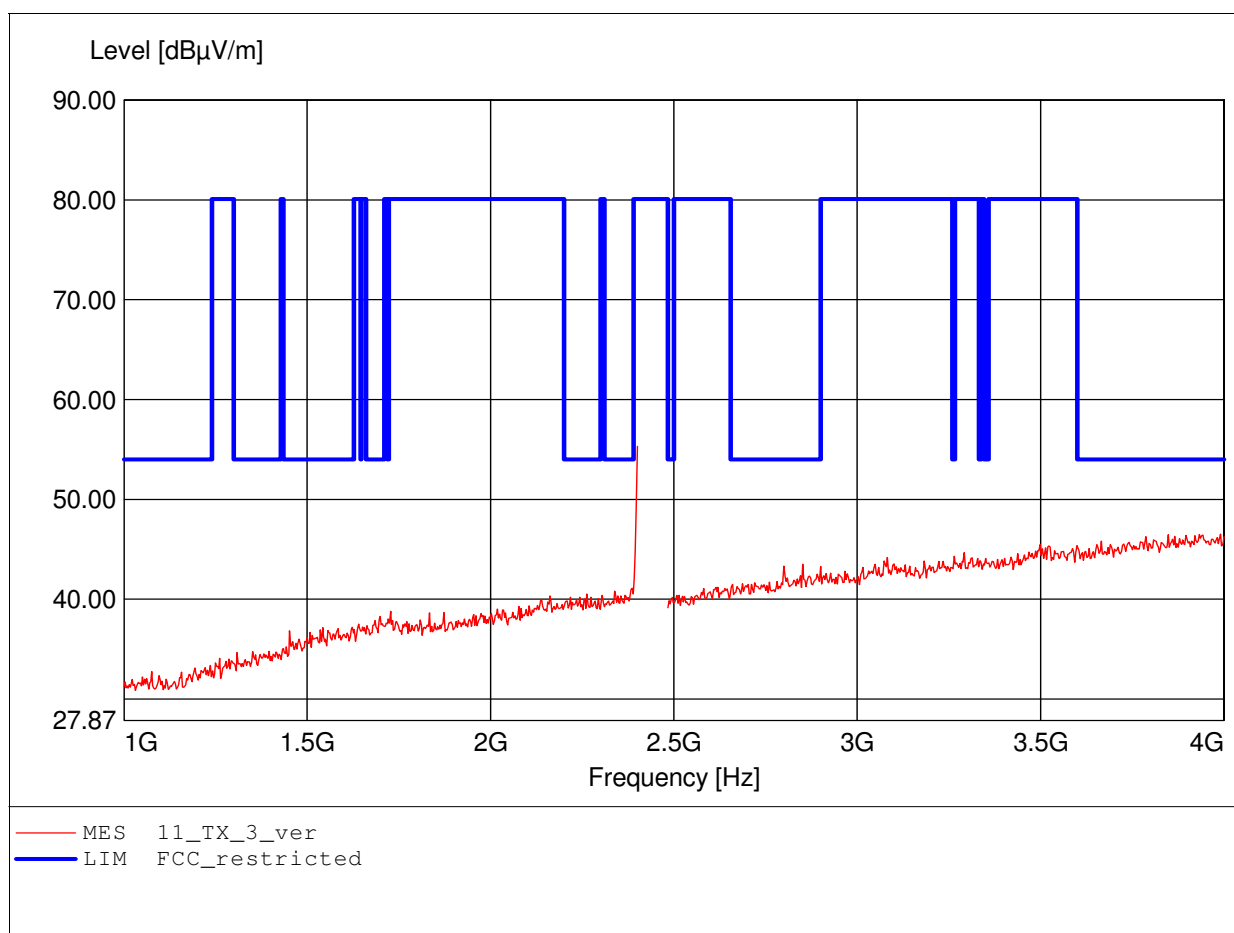
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 2.400GHz, Emax: 60.90dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

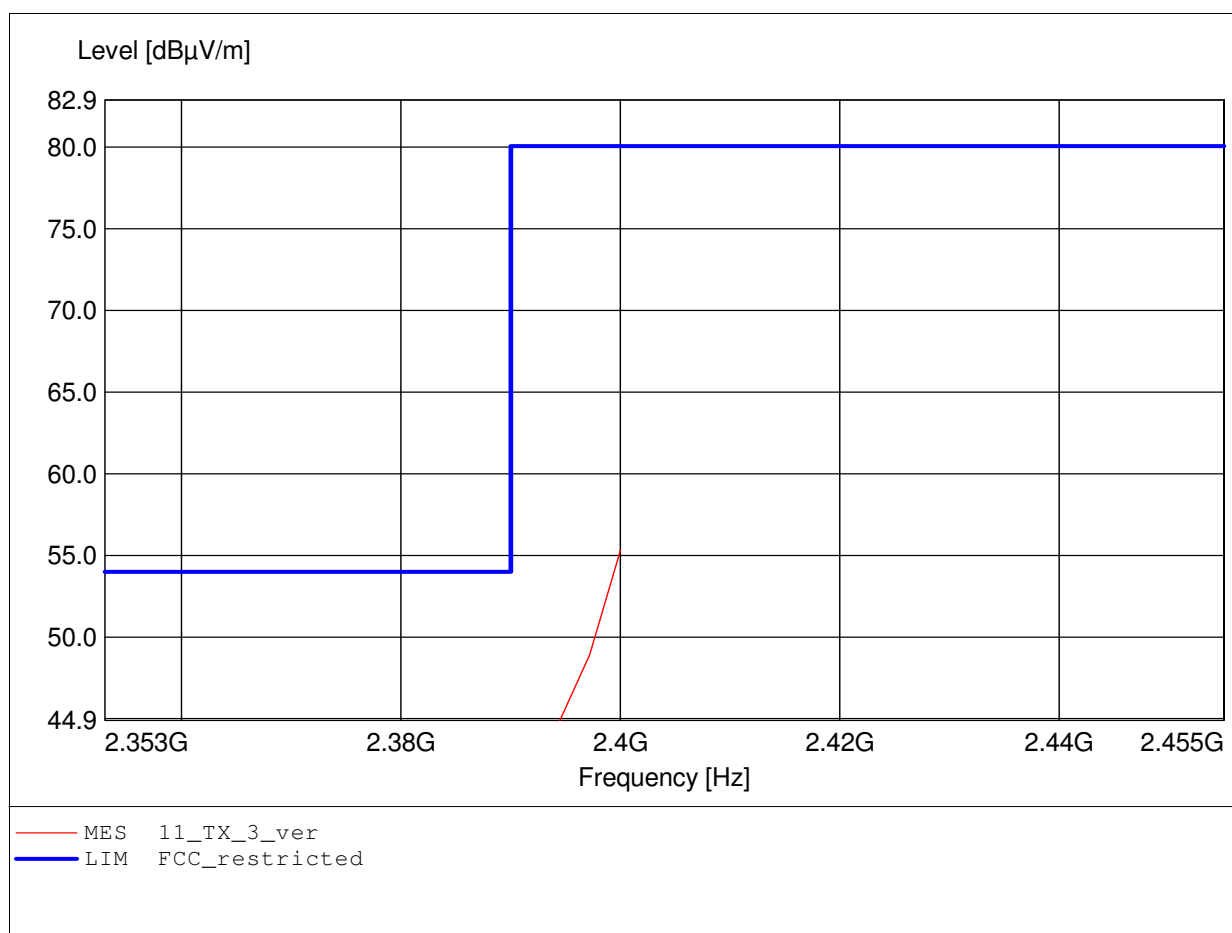
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 2.400GHz, Emax: 55.31dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

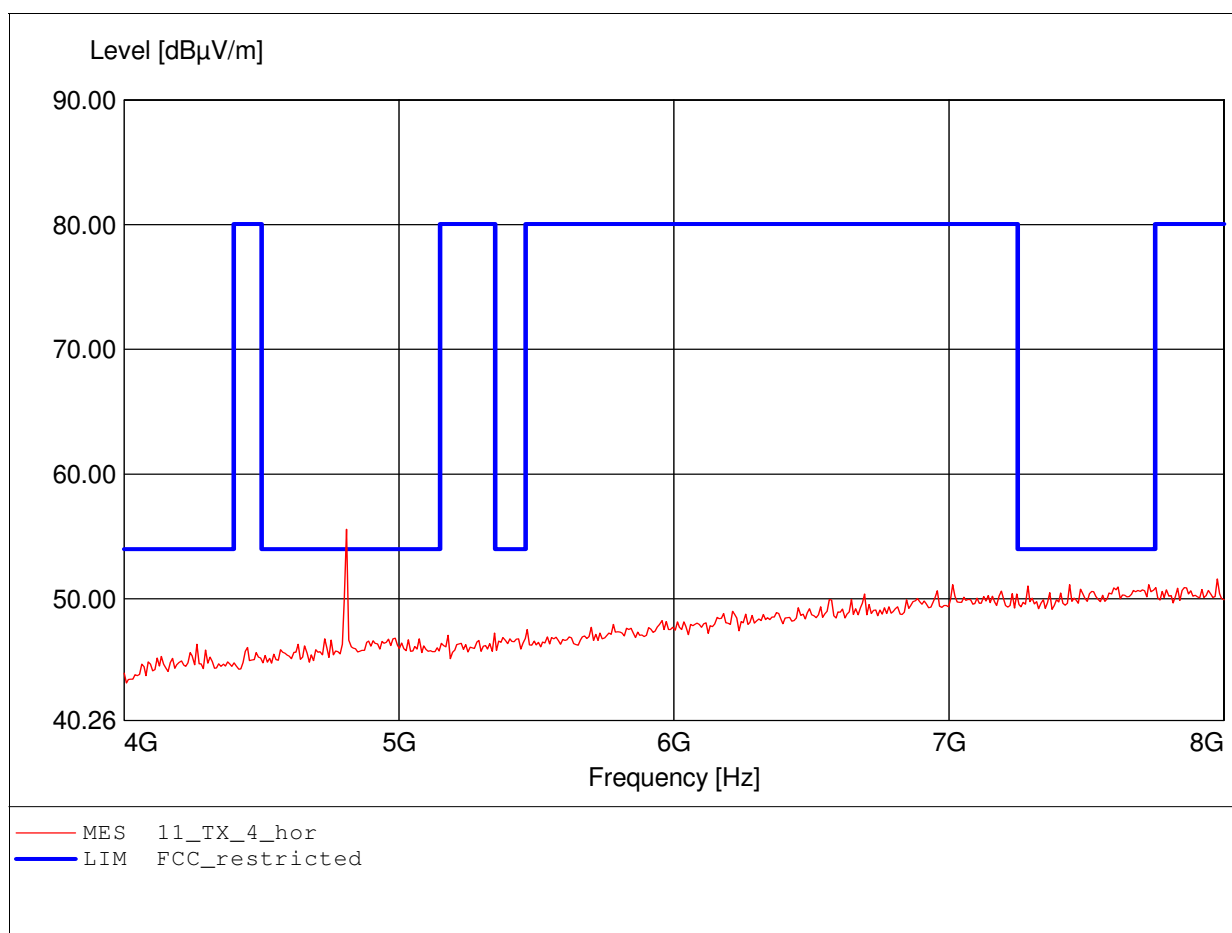
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 2.400GHz, Emax: 55.31dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

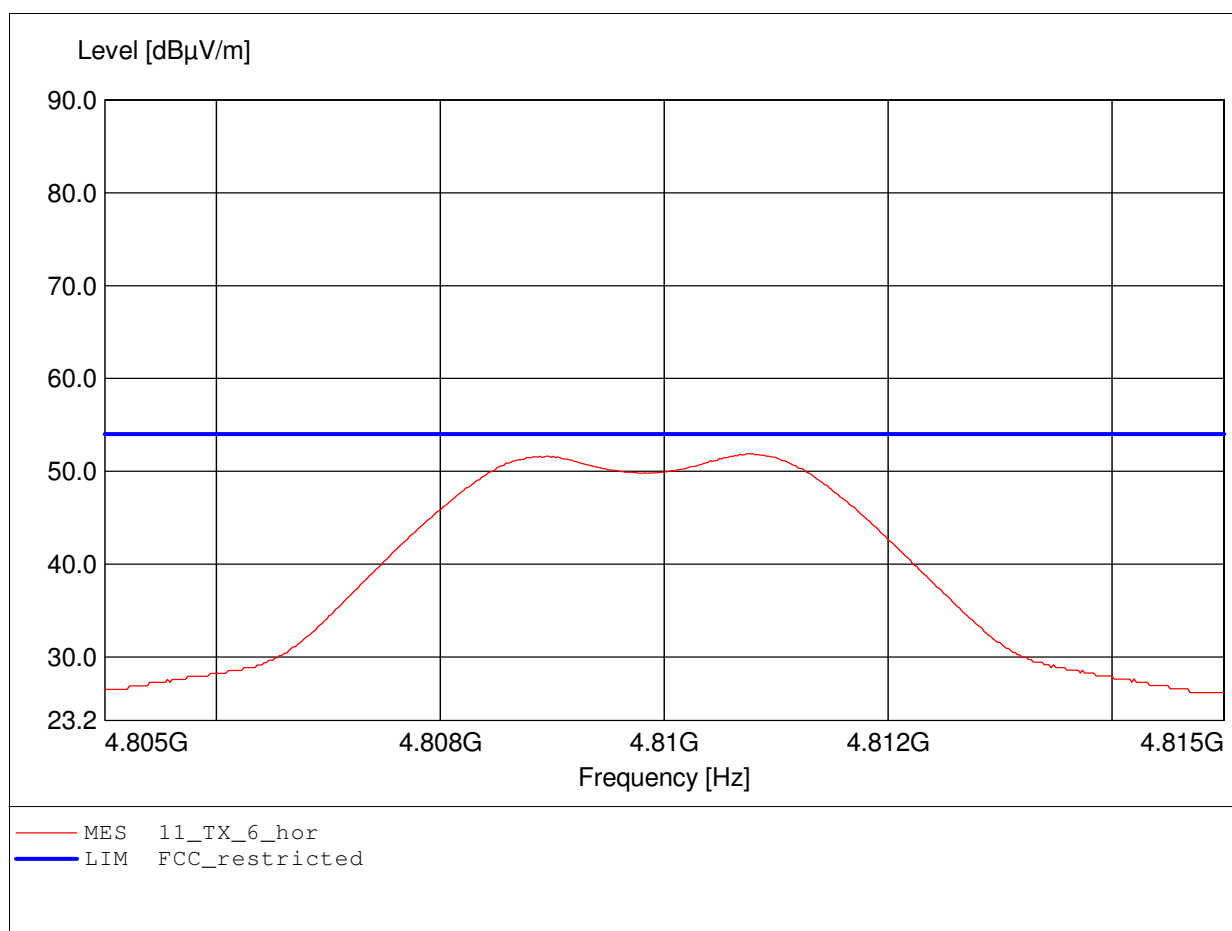
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 4.810GHz, Emax: 55.57dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

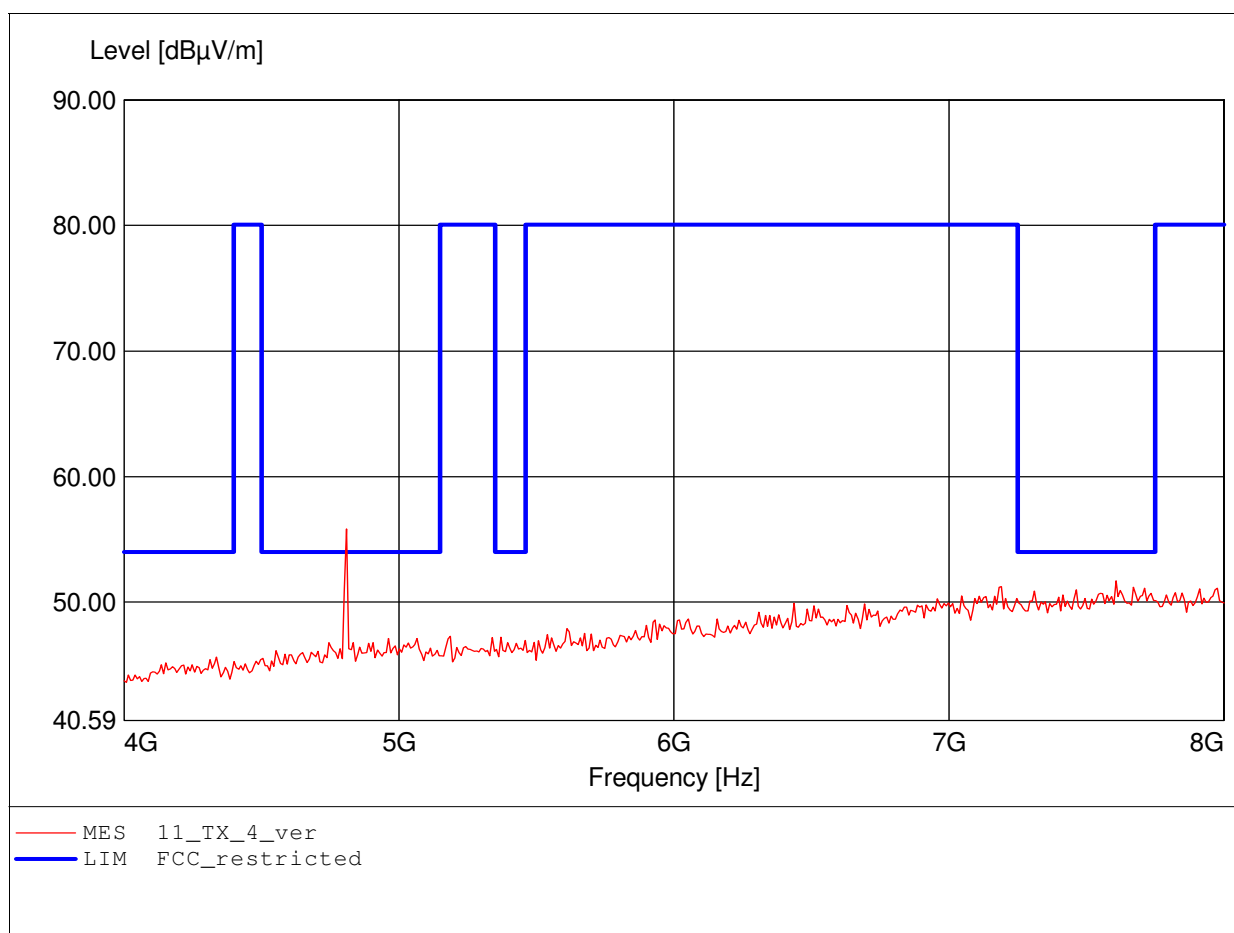
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL025, ampl.+HP.
Comment 2: Freq: 4.811GHz, Emax: 51.90dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

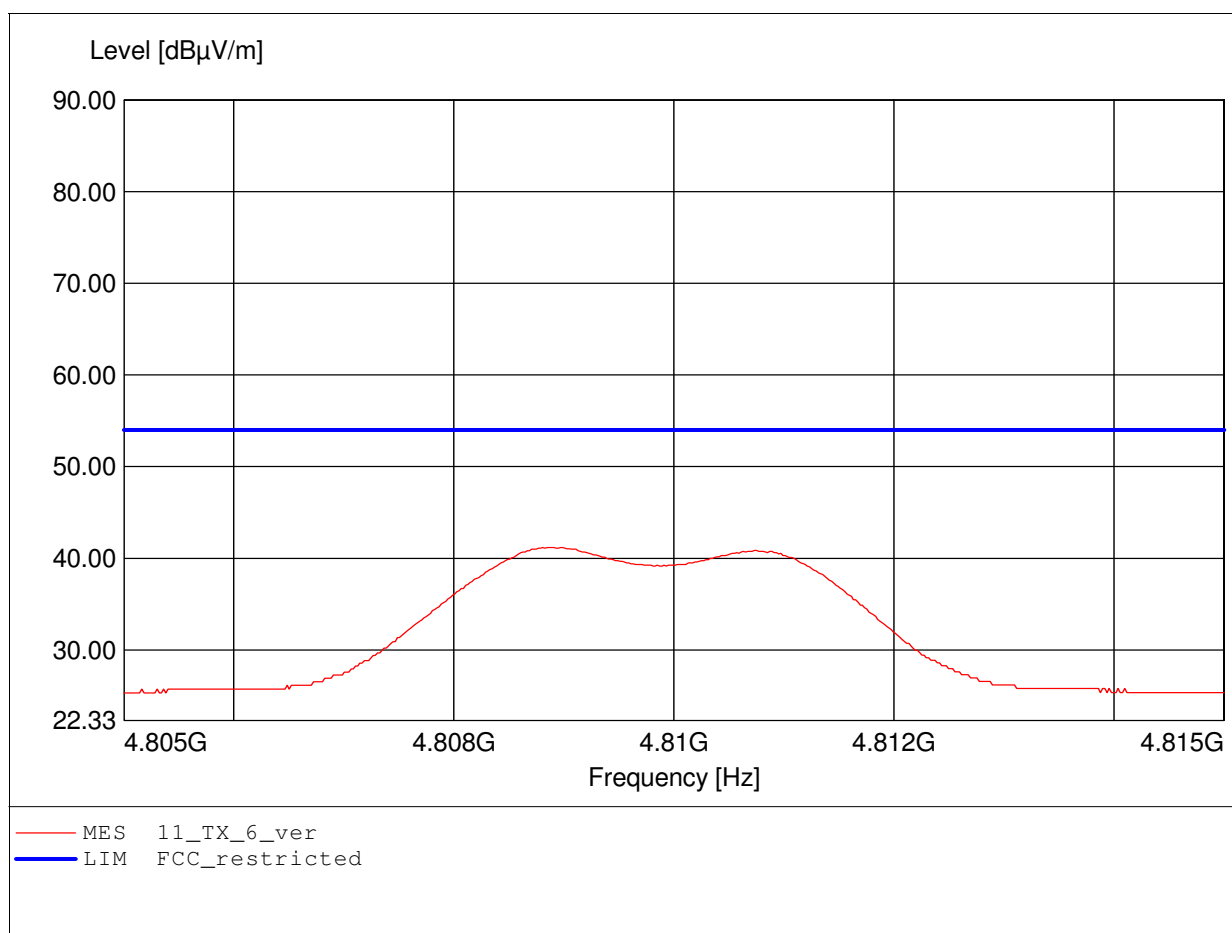
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 4.810GHz, Emax: 55.82dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

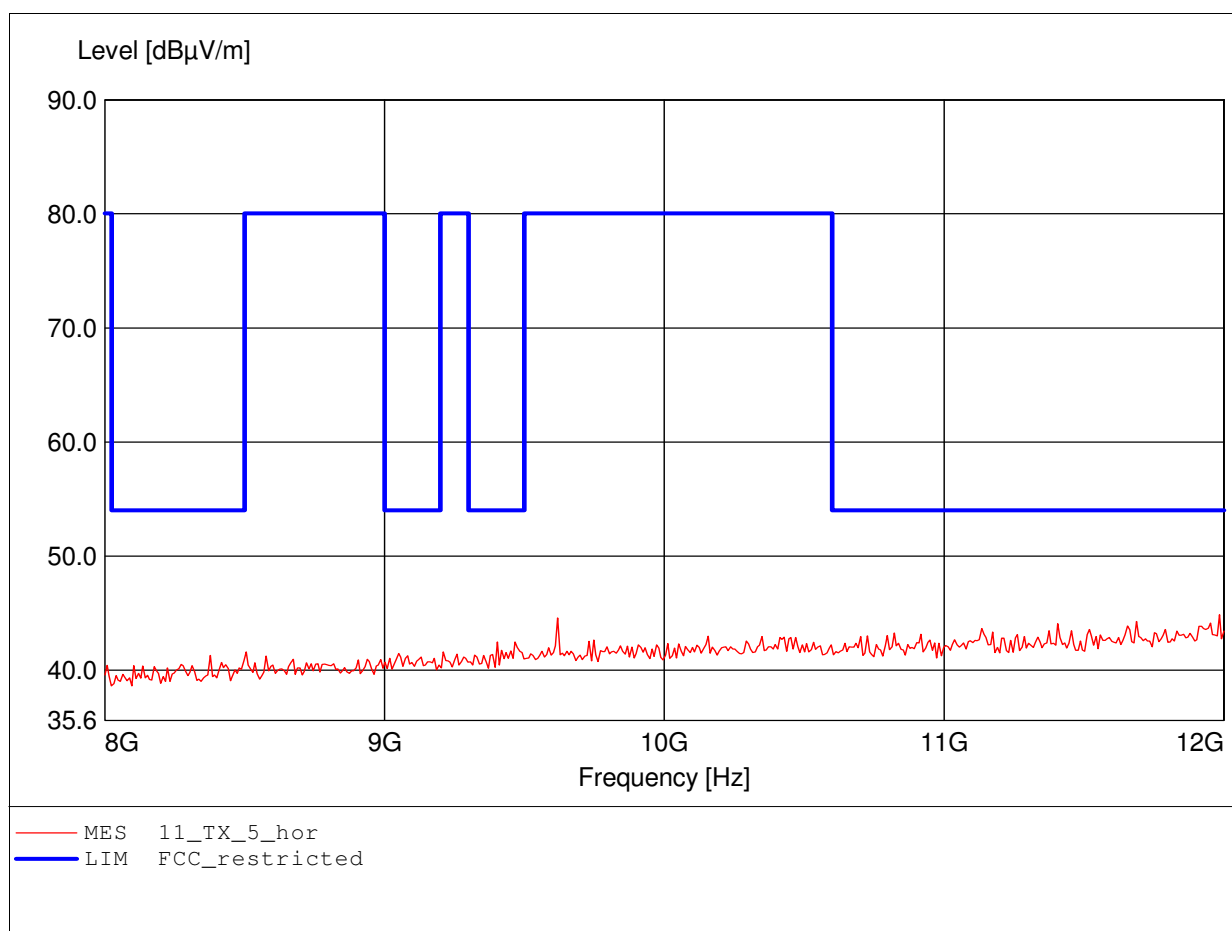
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL025, ampl.+HP.
Comment 2: Freq: 4.809GHz, Emax: 41.19dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

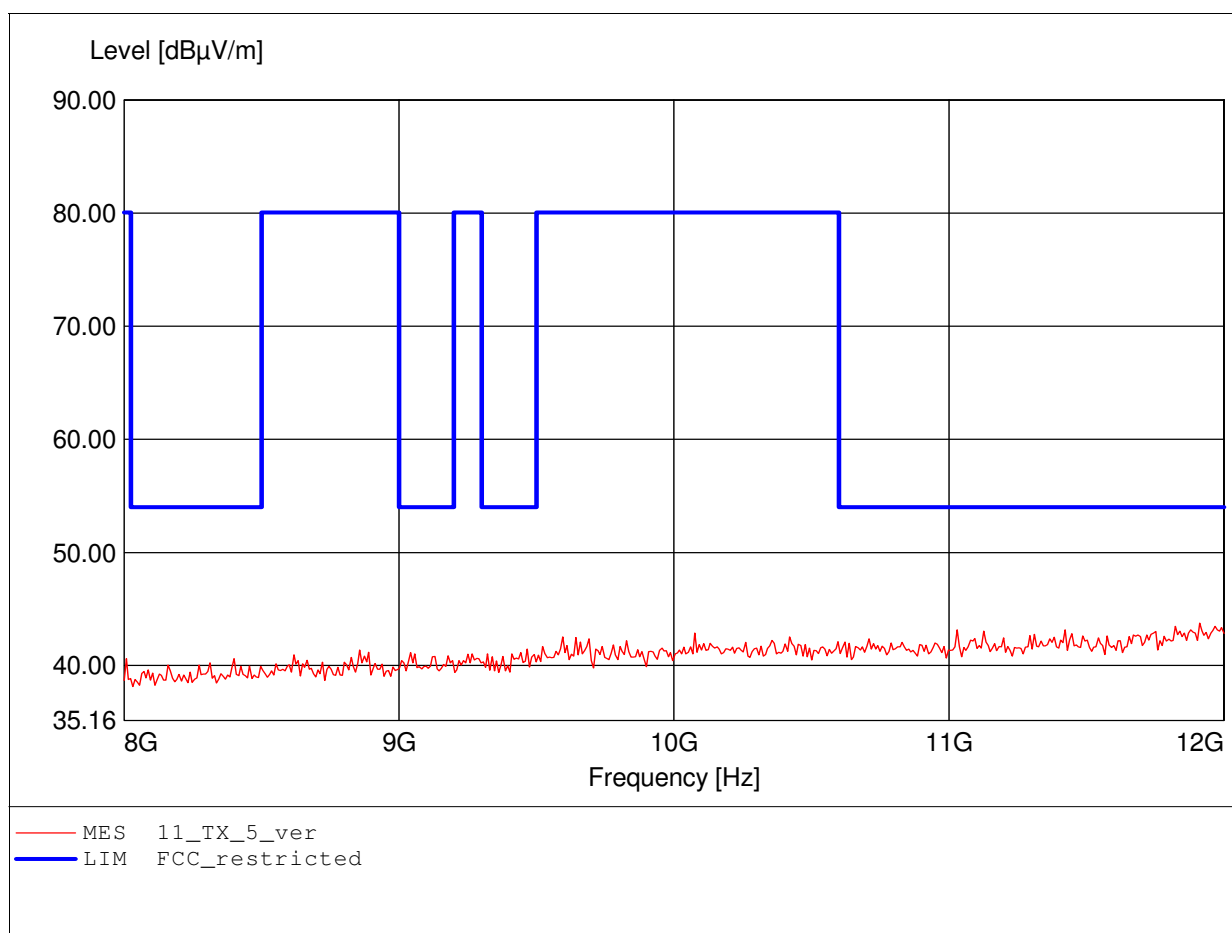
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 11.984GHz, Emax: 44.86dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

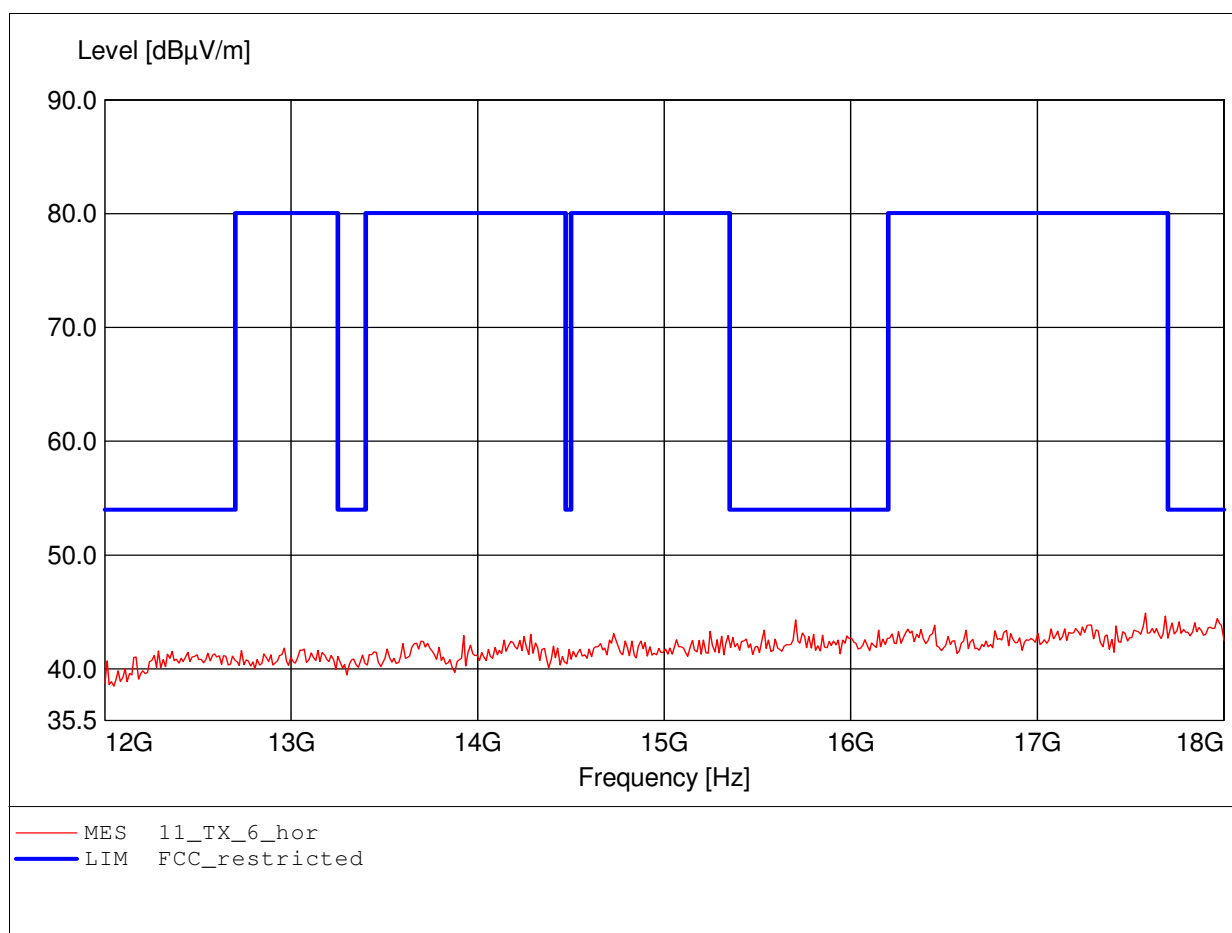
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 11.912GHz, Emax: 43.75dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

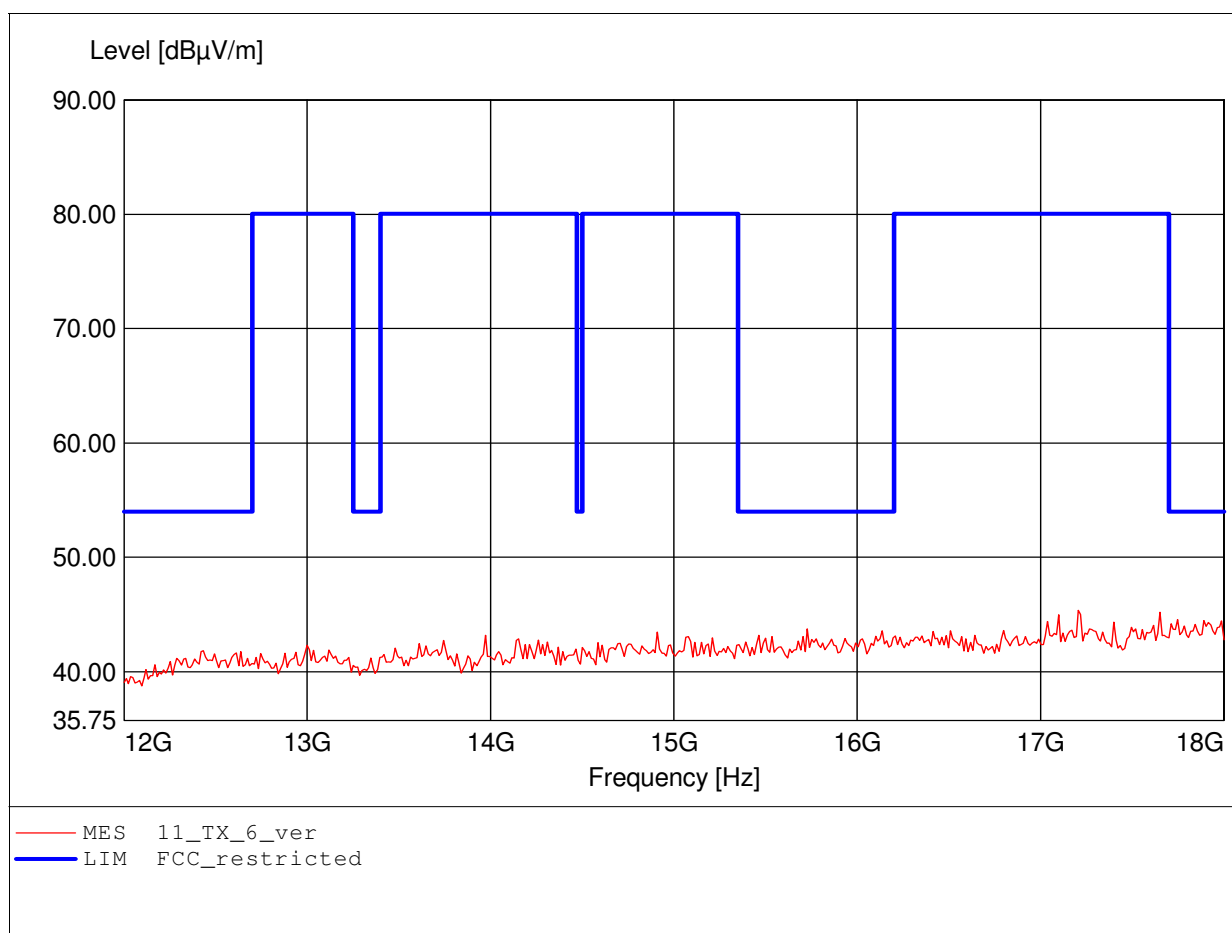
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 17.579GHz, Emax: 44.91dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

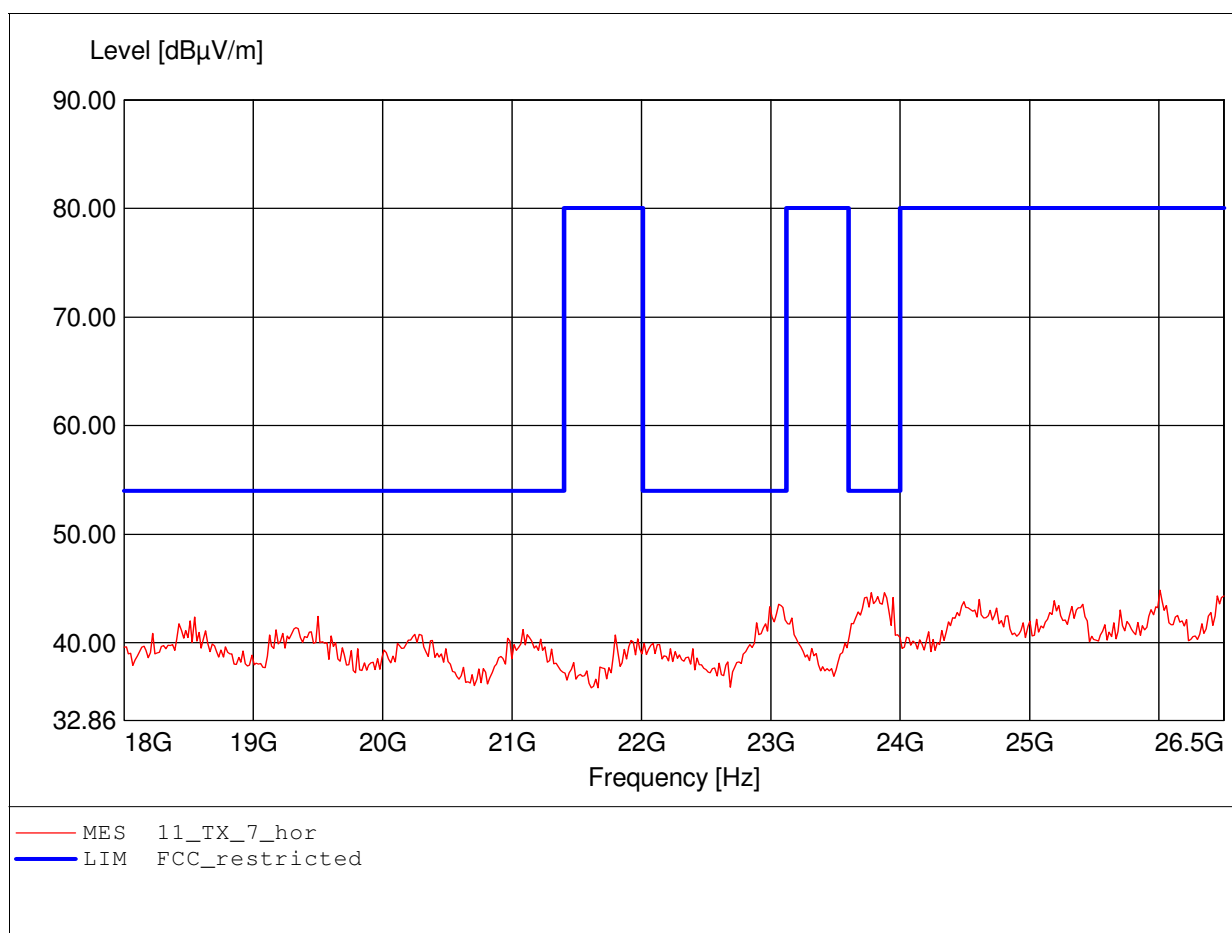
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 17.206GHz, Emax: 45.37dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

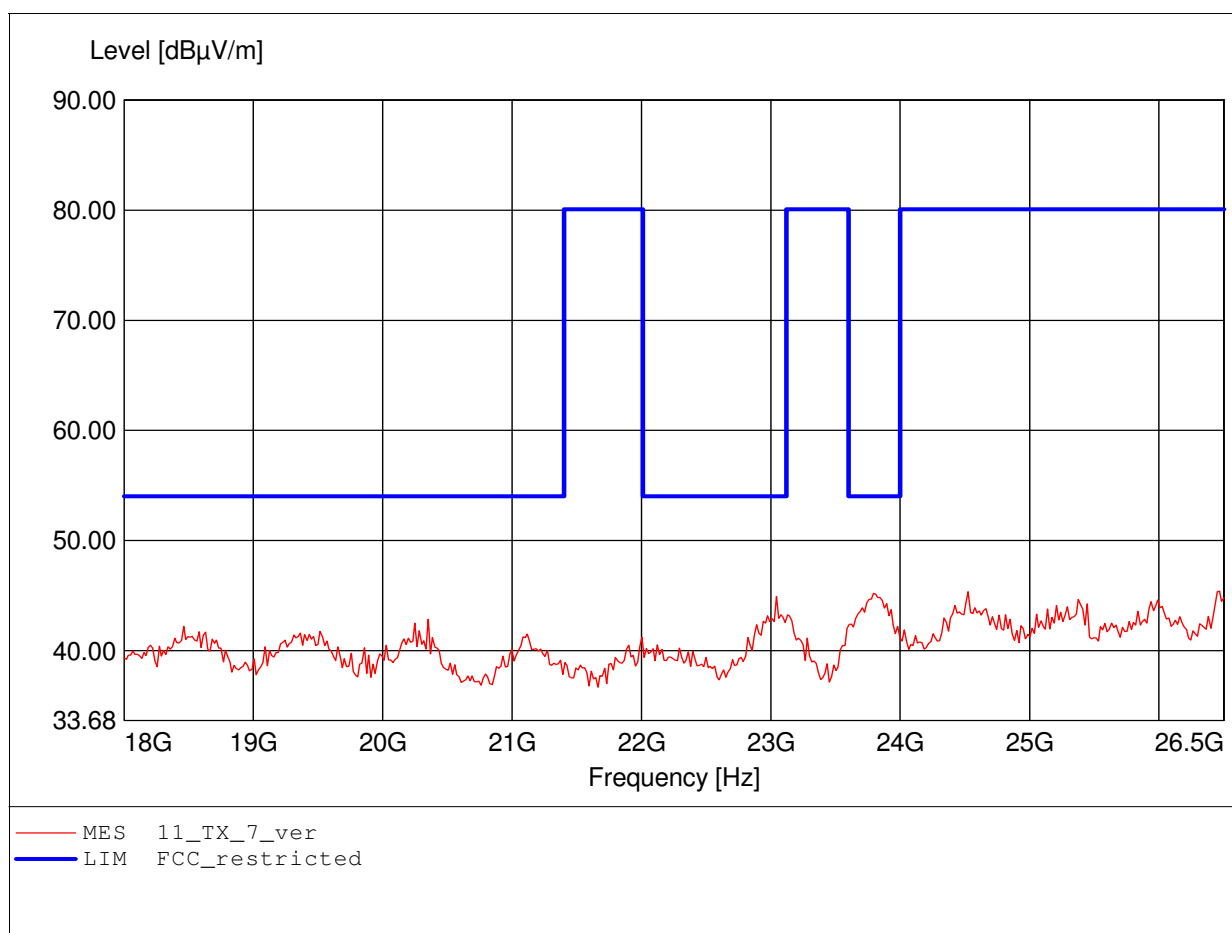
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 26.006GHz, Emax: 44.86dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

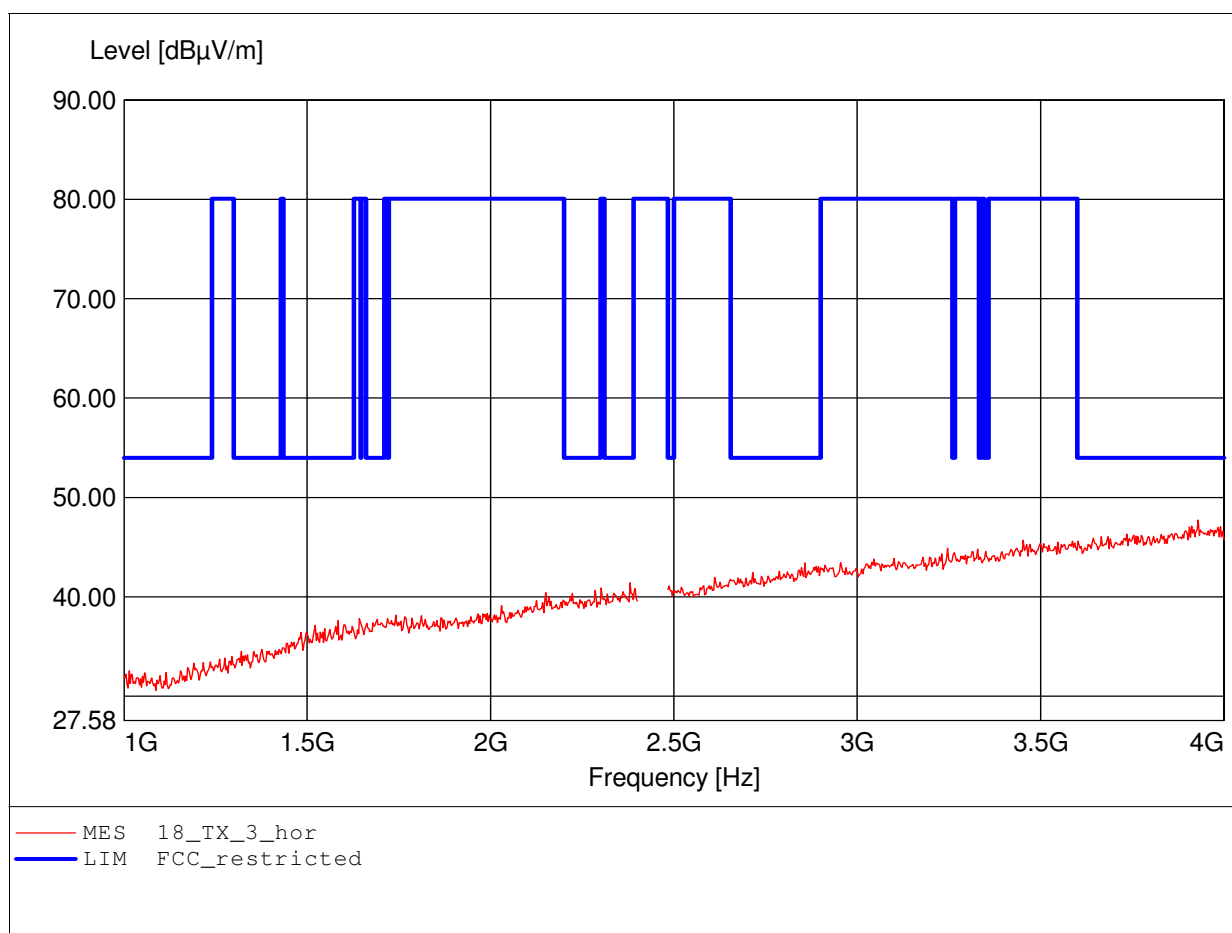
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 11
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 26.466GHz, Emax: 45.41dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

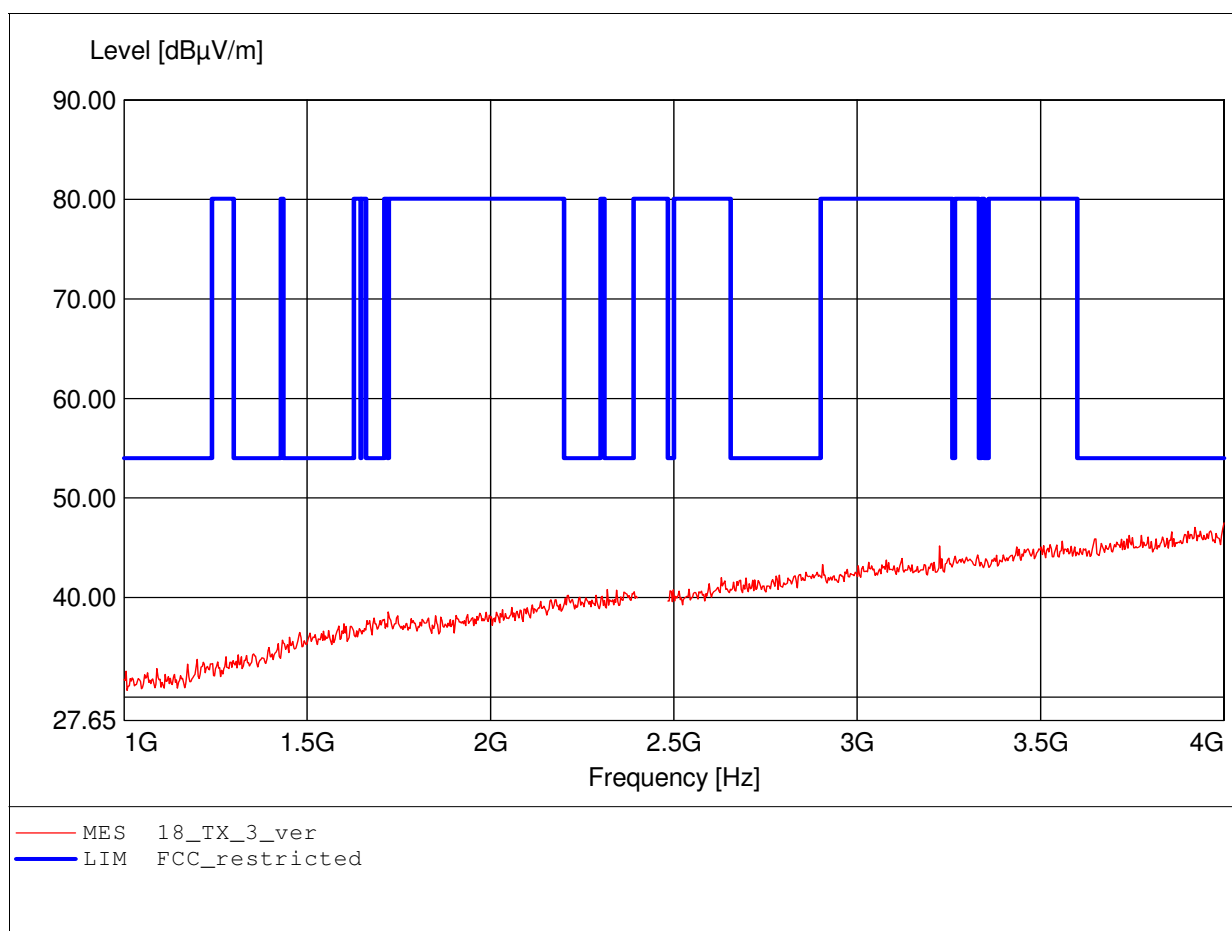
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 3.930GHz, Emax: 47.74dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

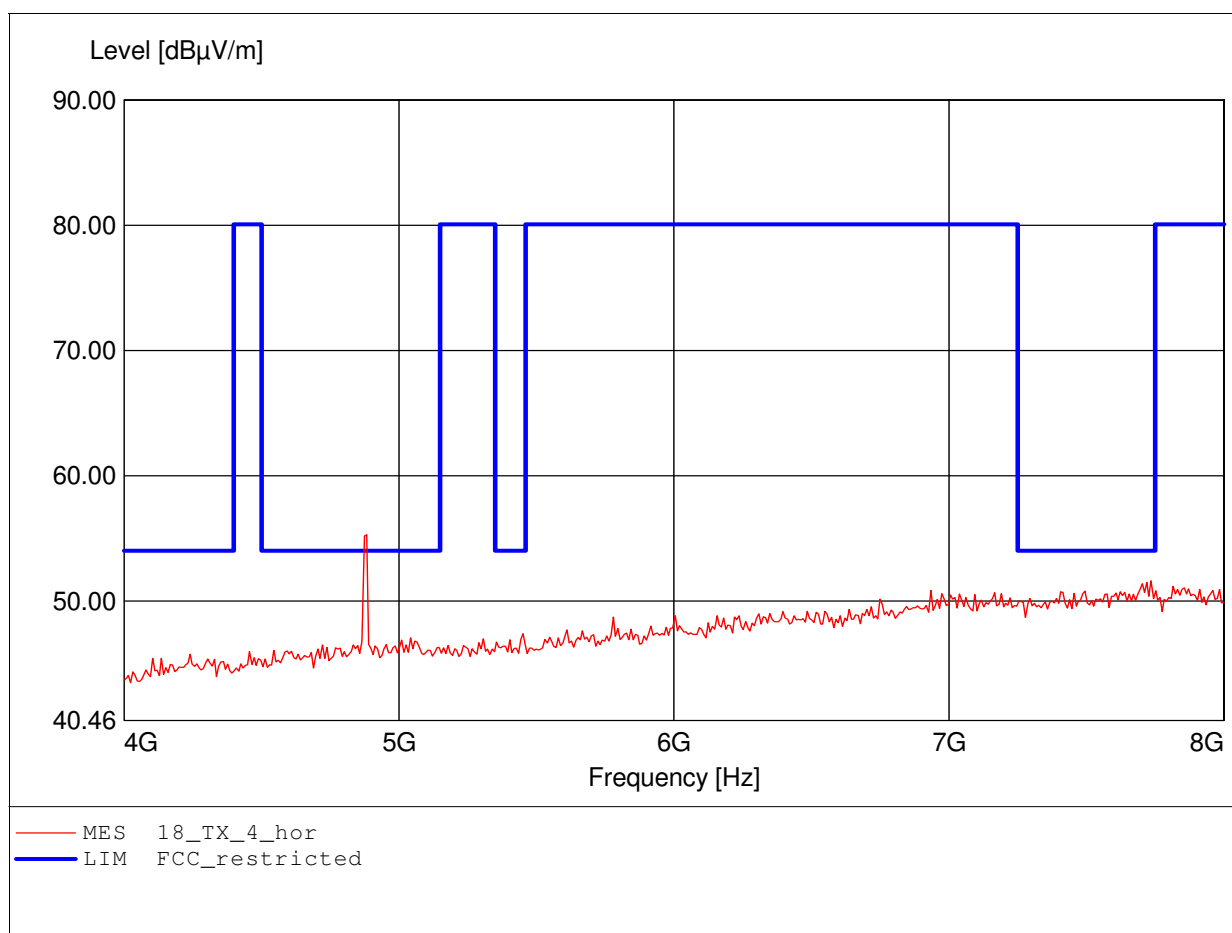
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 4.000GHz, Emax: 47.52dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

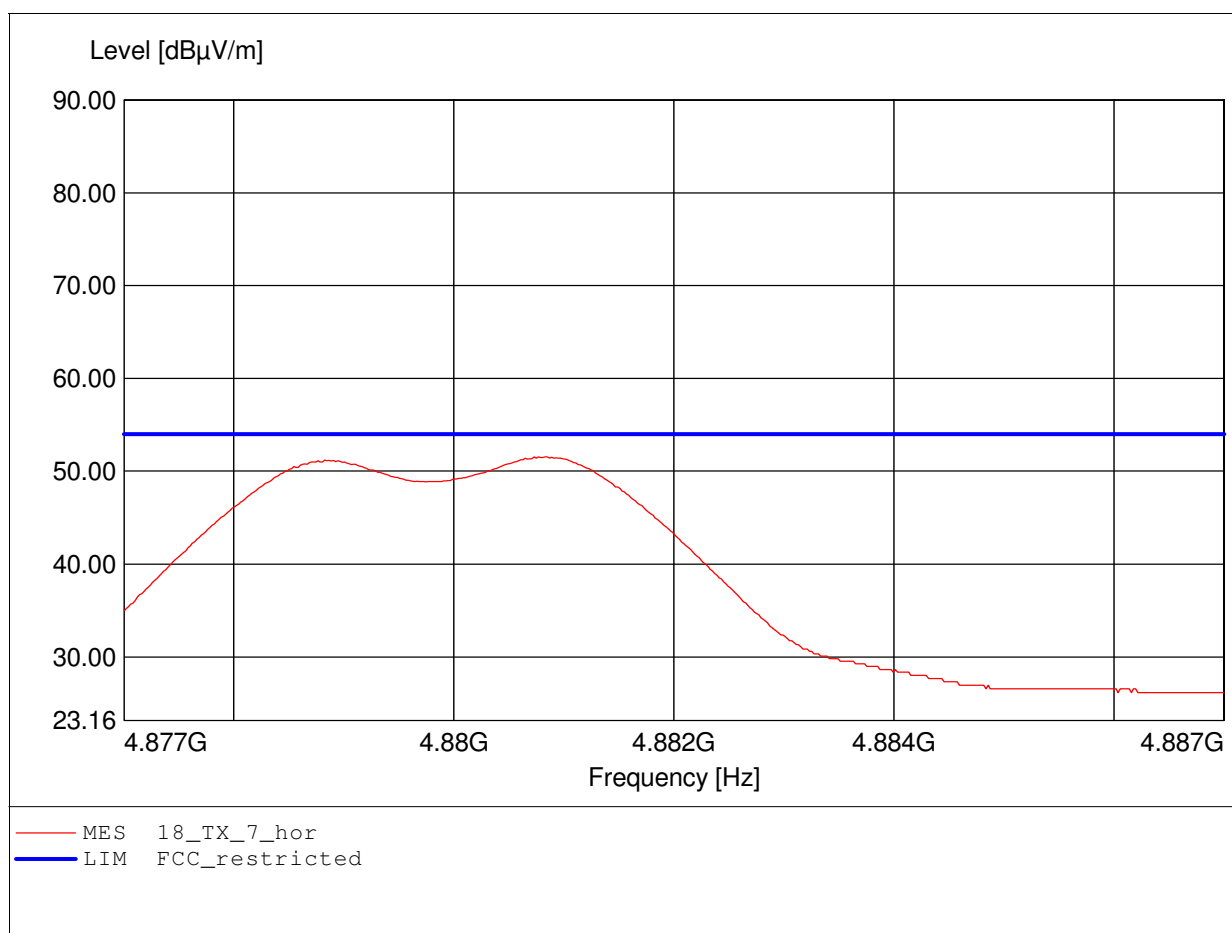
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 4.882GHz, Emax: 55.28dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

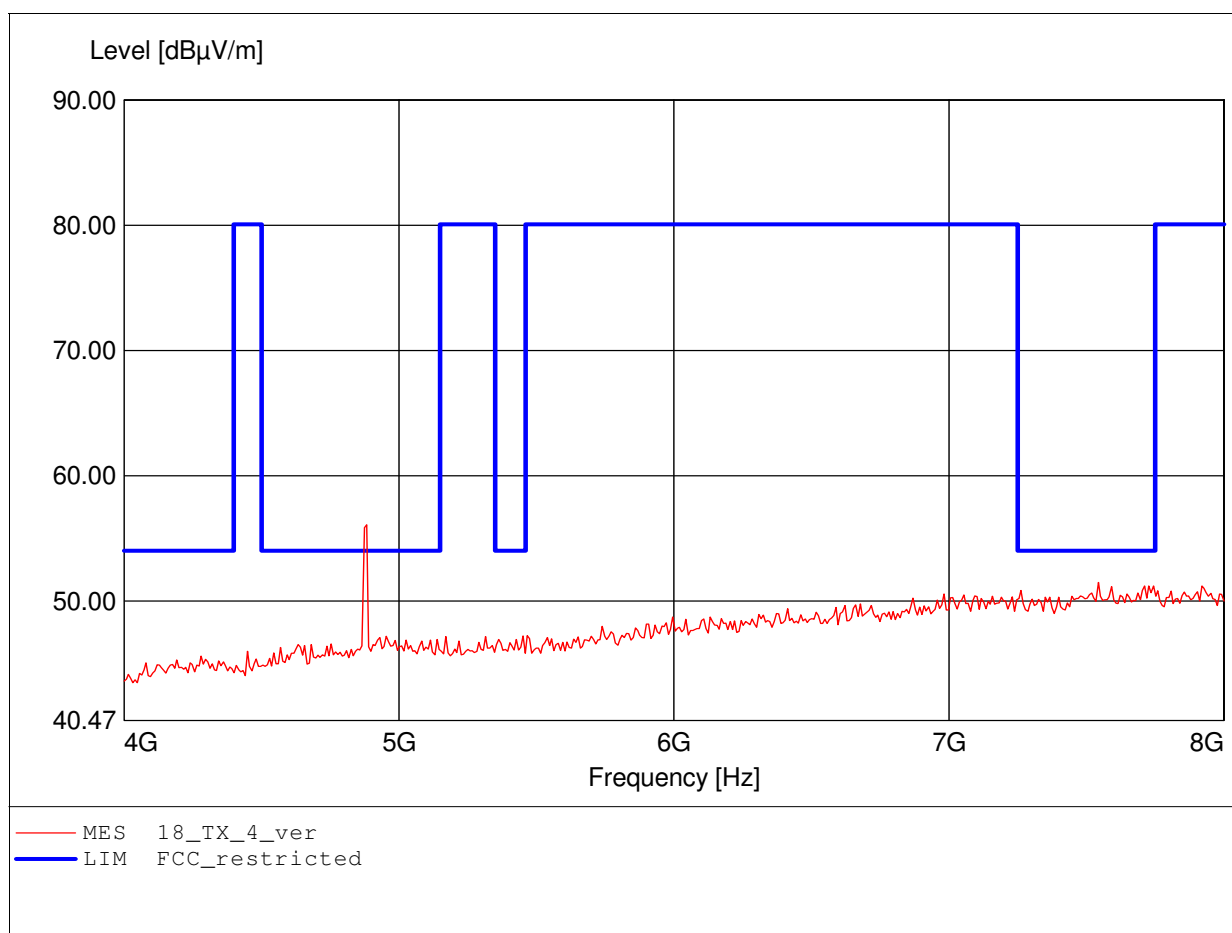
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 4.881GHz, Emax: 51.56dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

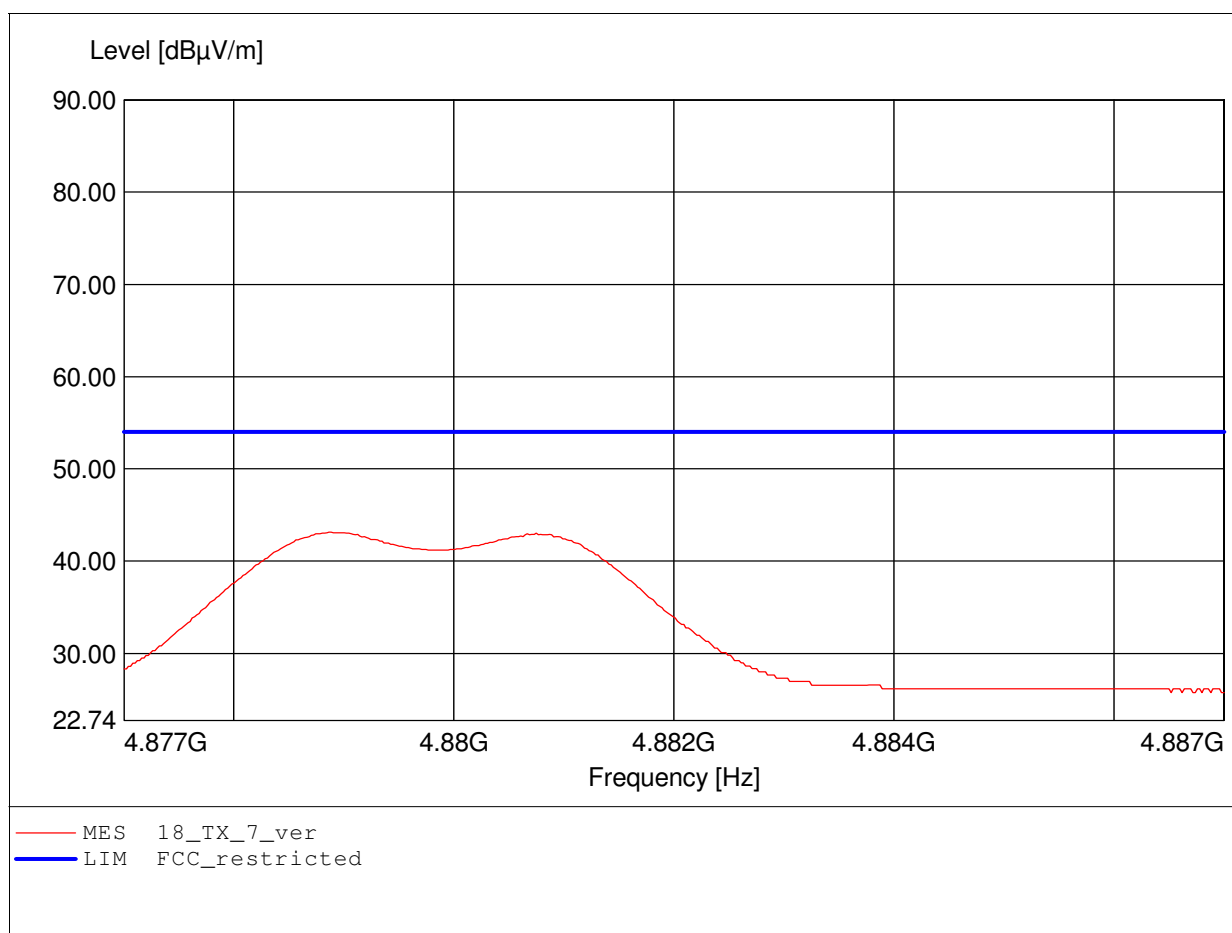
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 4.882GHz, Emax: 56.08dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

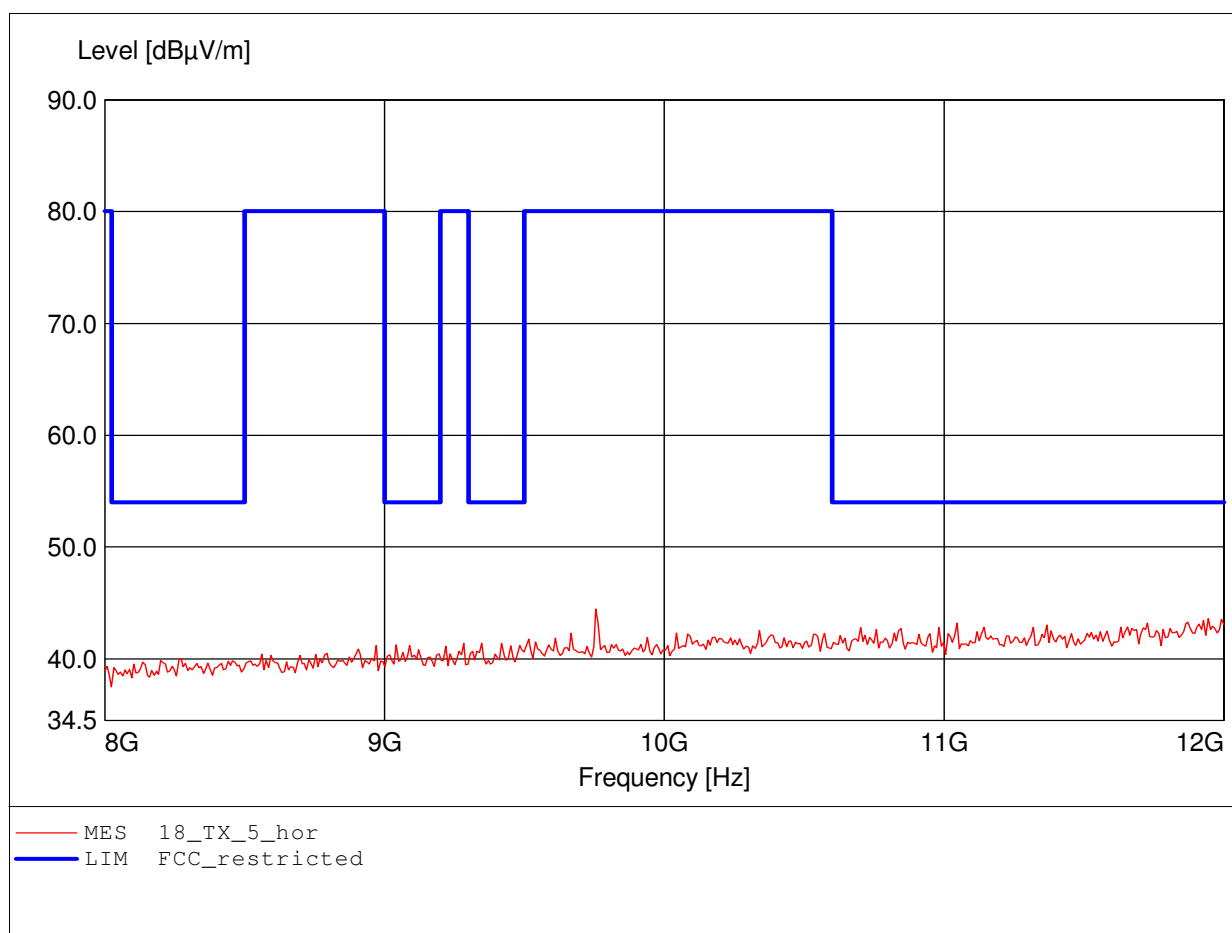
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 4.879GHz, Emax: 43.14dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

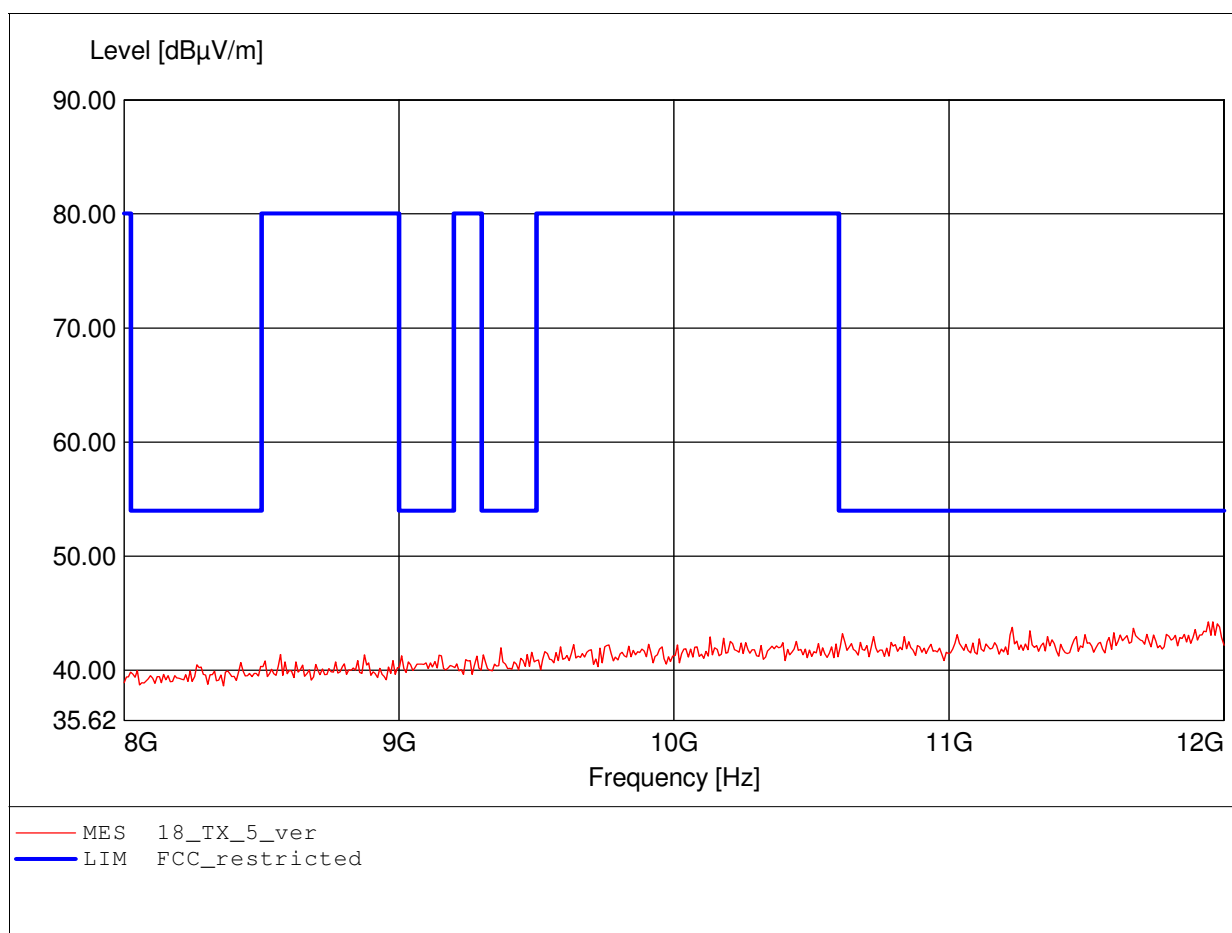
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 9.756GHz, Emax: 44.46dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

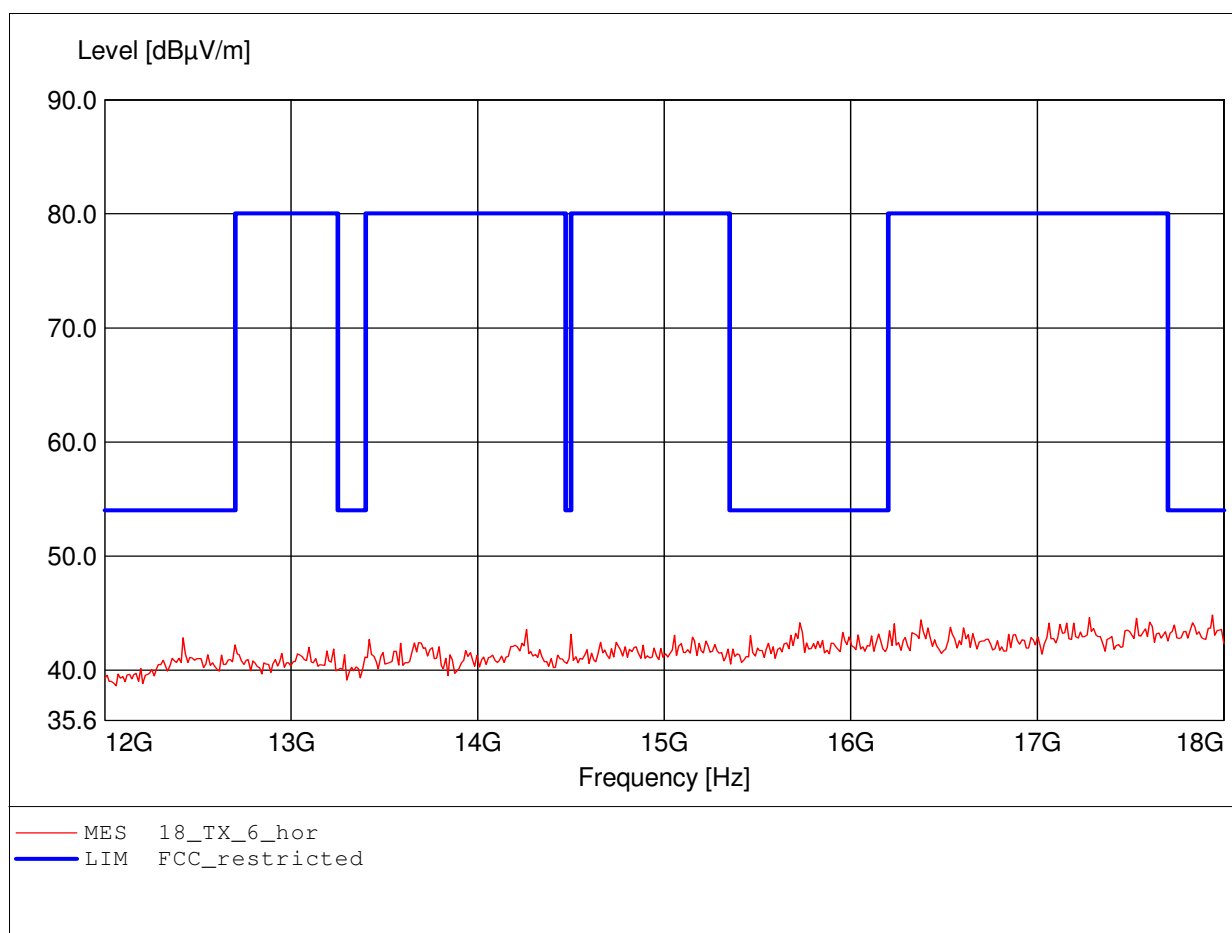
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 11.944GHz, Emax: 44.25dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

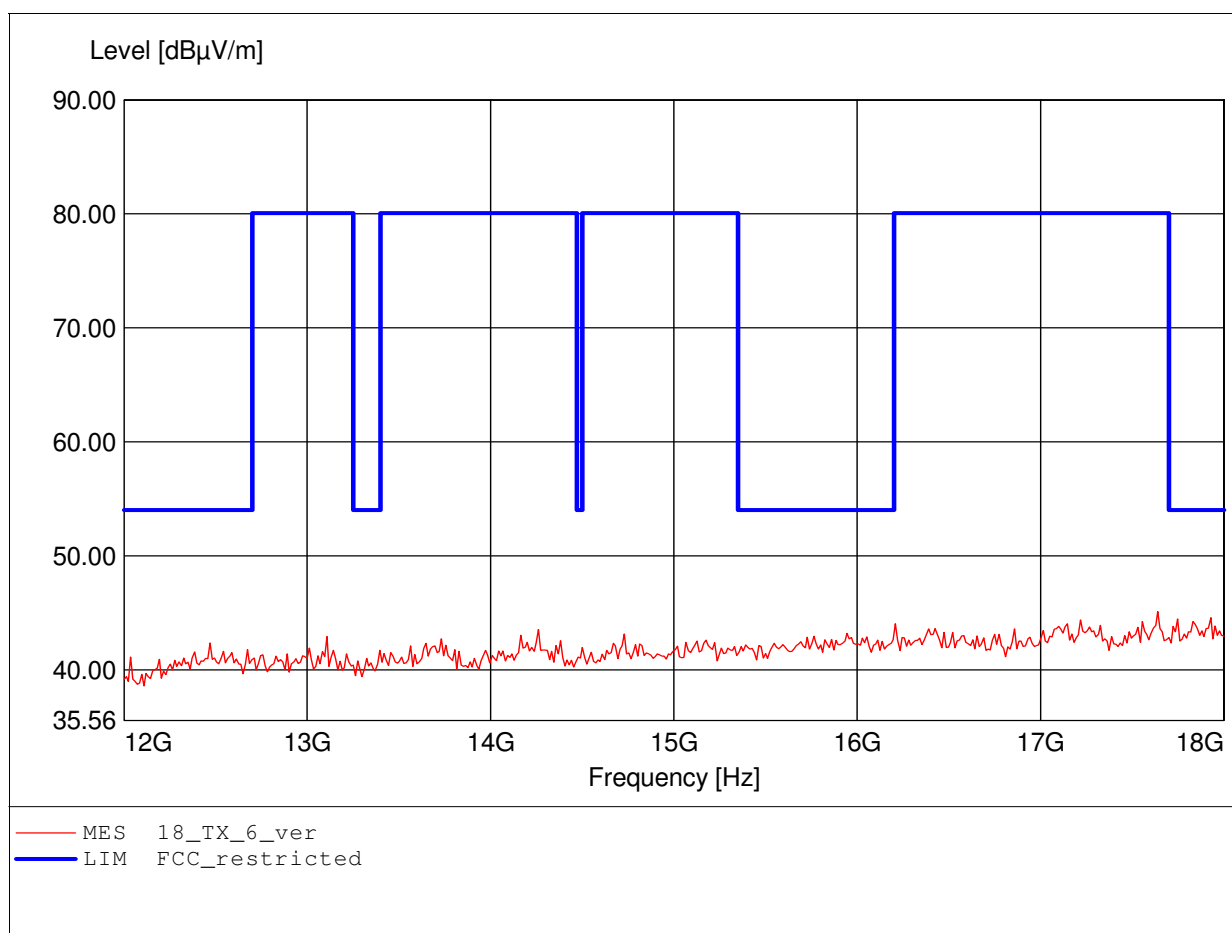
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 17.940GHz, Emax: 44.82dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

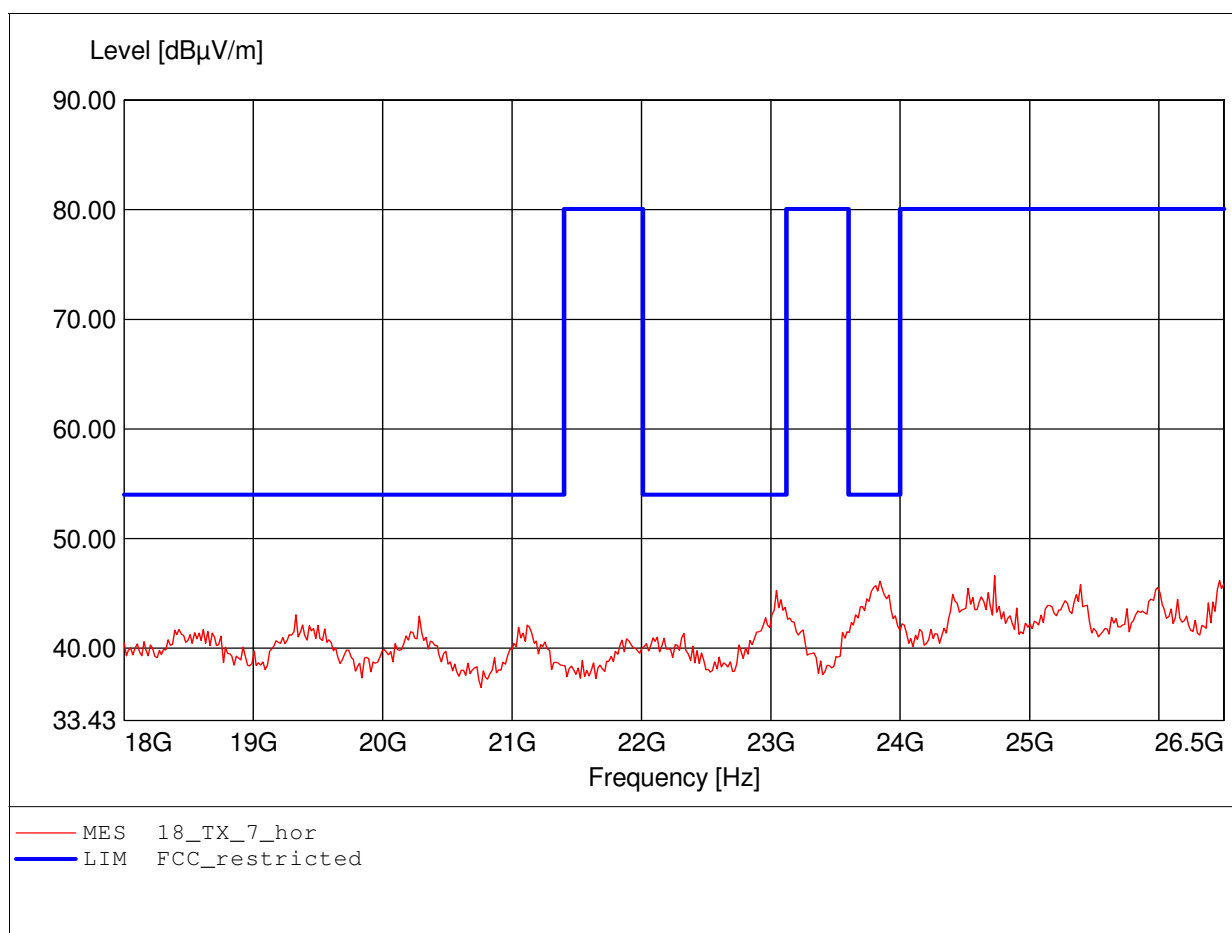
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 17.639GHz, Emax: 45.09dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

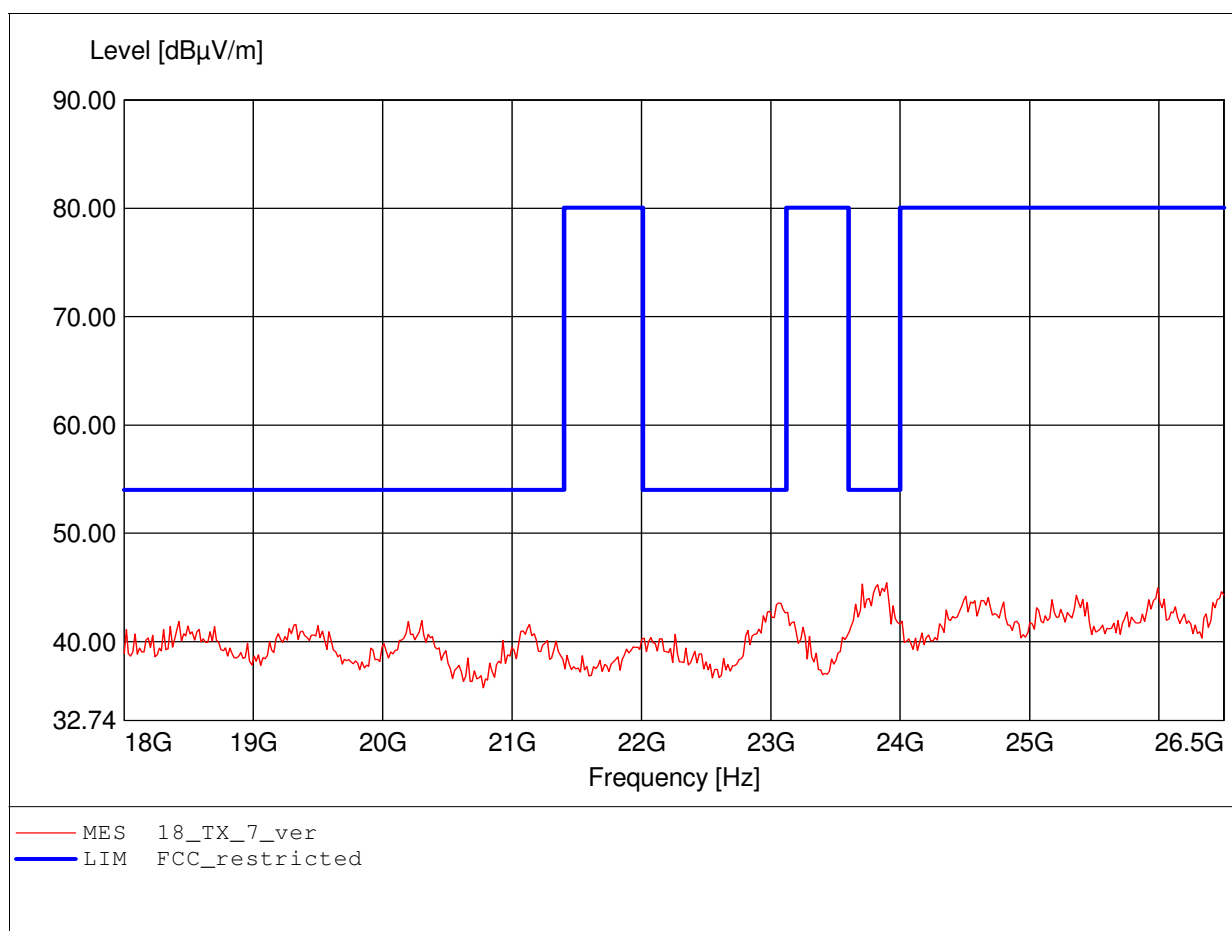
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 24.728GHz, Emax: 46.61dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

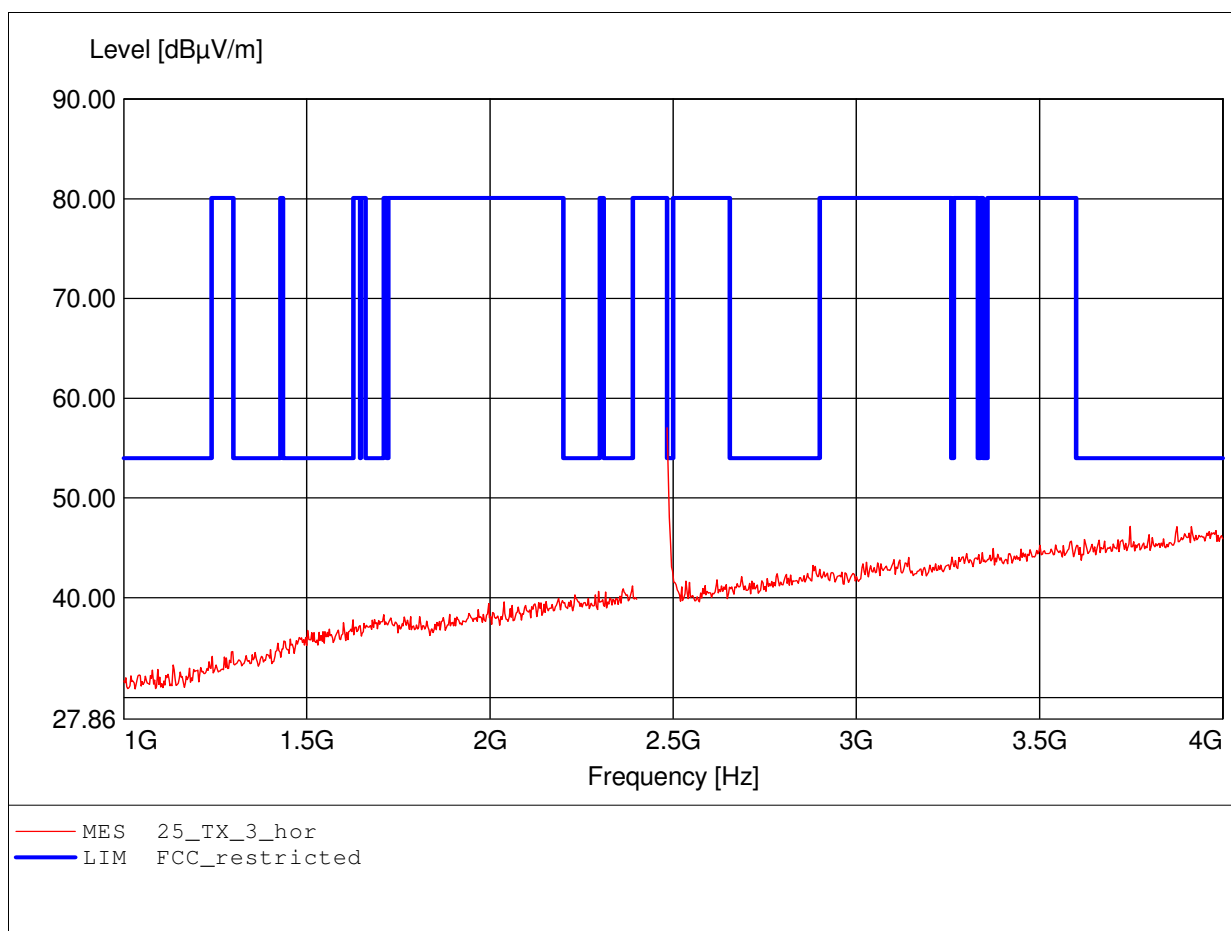
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 23.894GHz, Emax: 45.44dBμV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

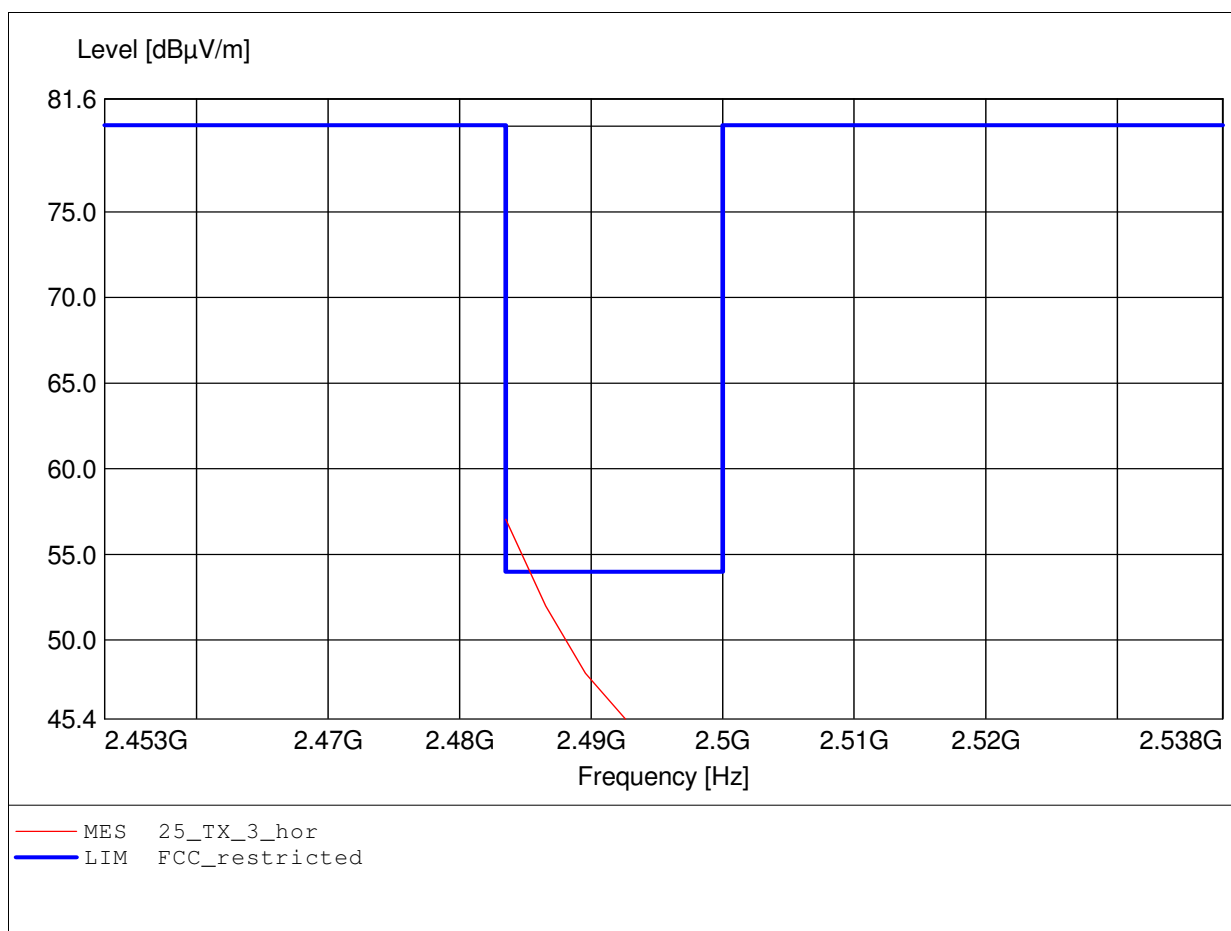
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 2.484GHz, Emax: 57.04dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

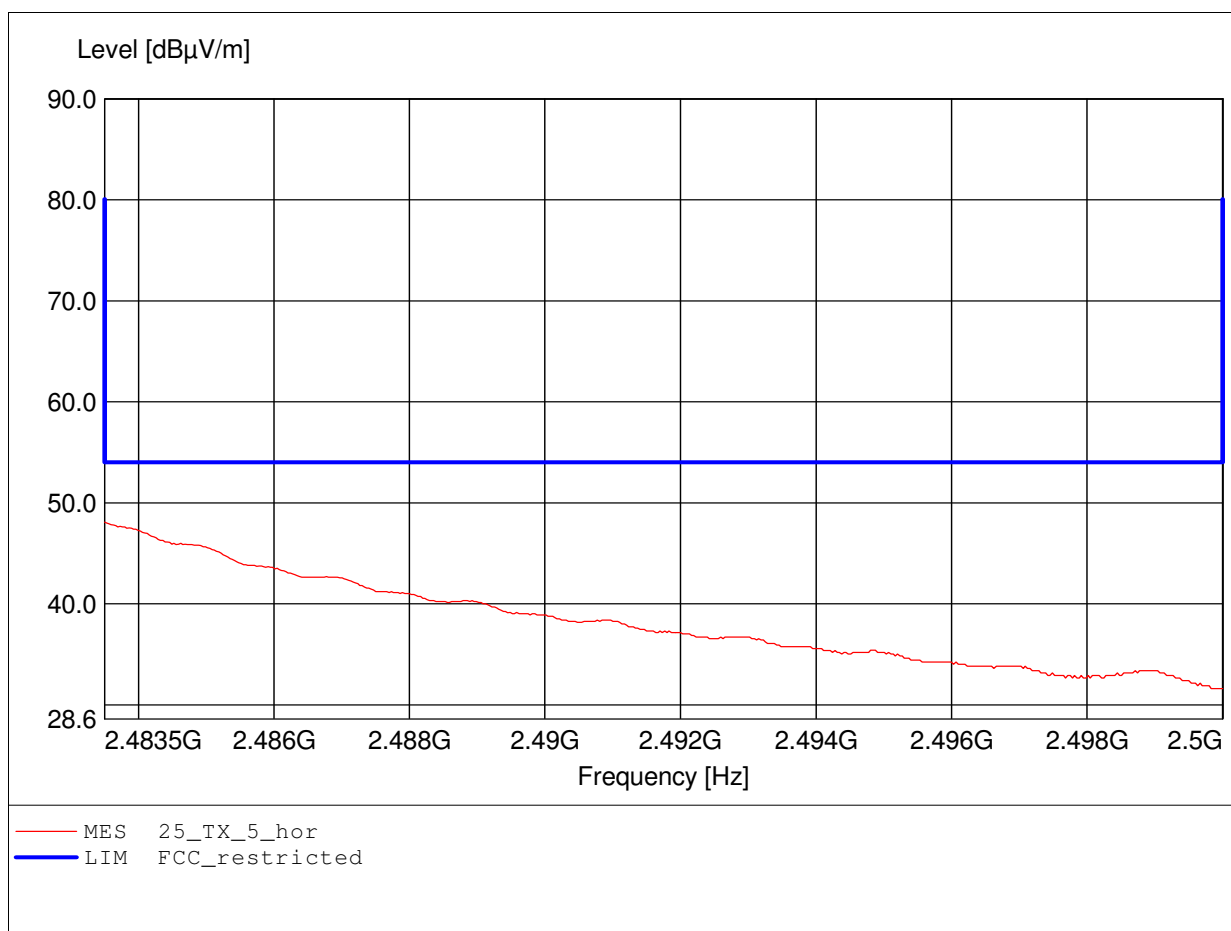
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 2.484GHz, Emax: 57.04dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

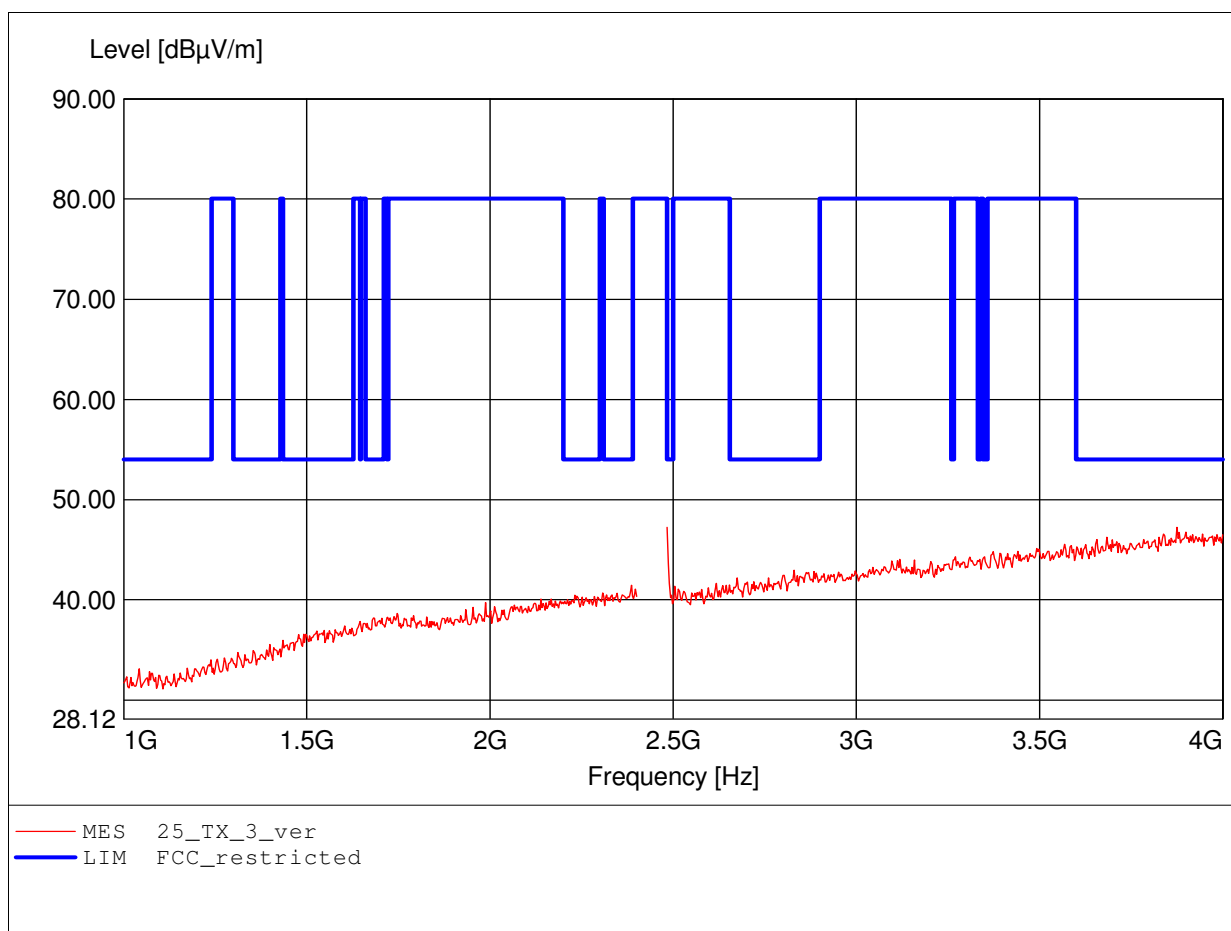
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL025, ampl.+HP., Average Detector
Comment 2: Freq: 2.484GHz, Emax: 48.08dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

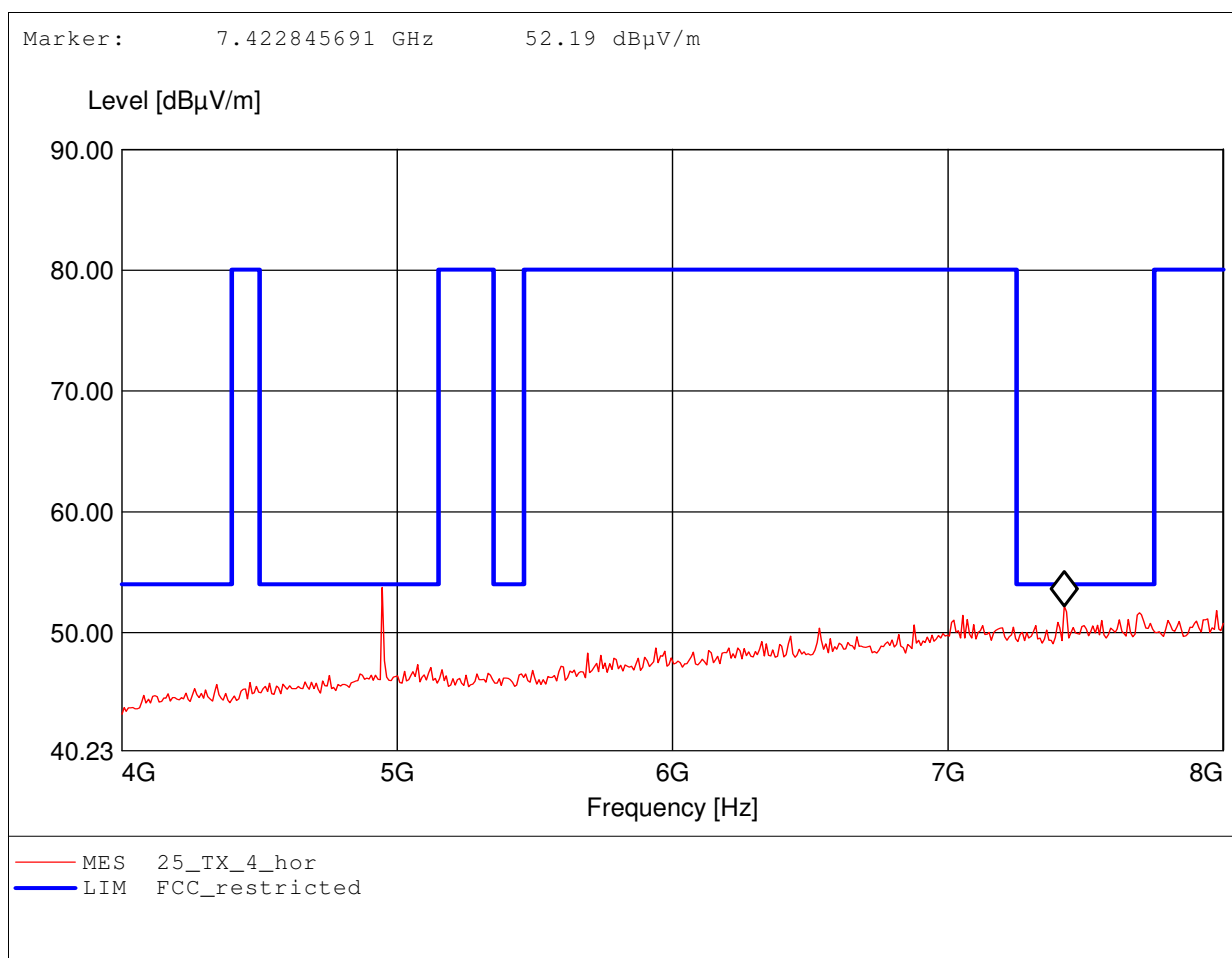
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, amplif.
Comment 2: Freq: 3.875GHz, Emax: 47.25dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

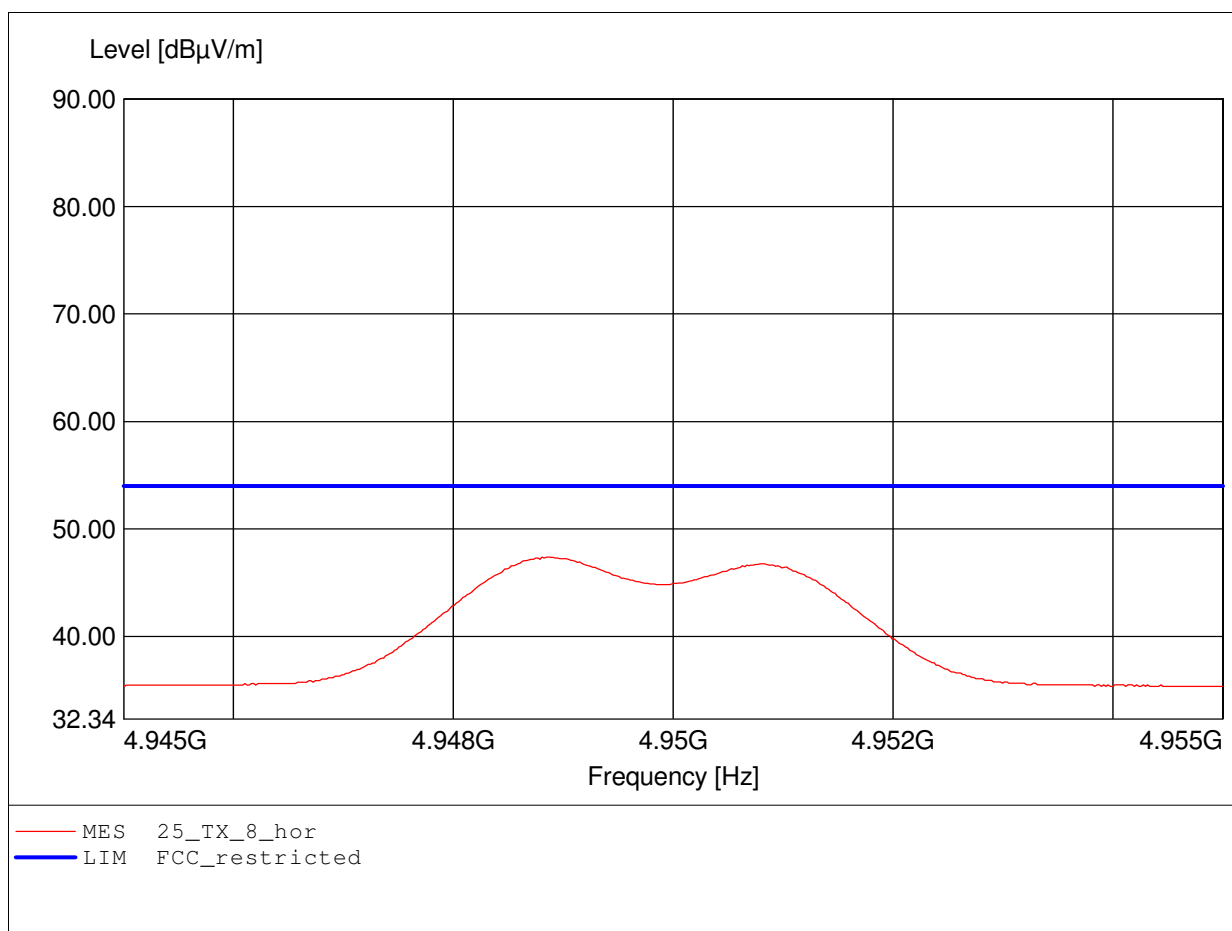
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 4.946GHz, Emax: 53.73dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

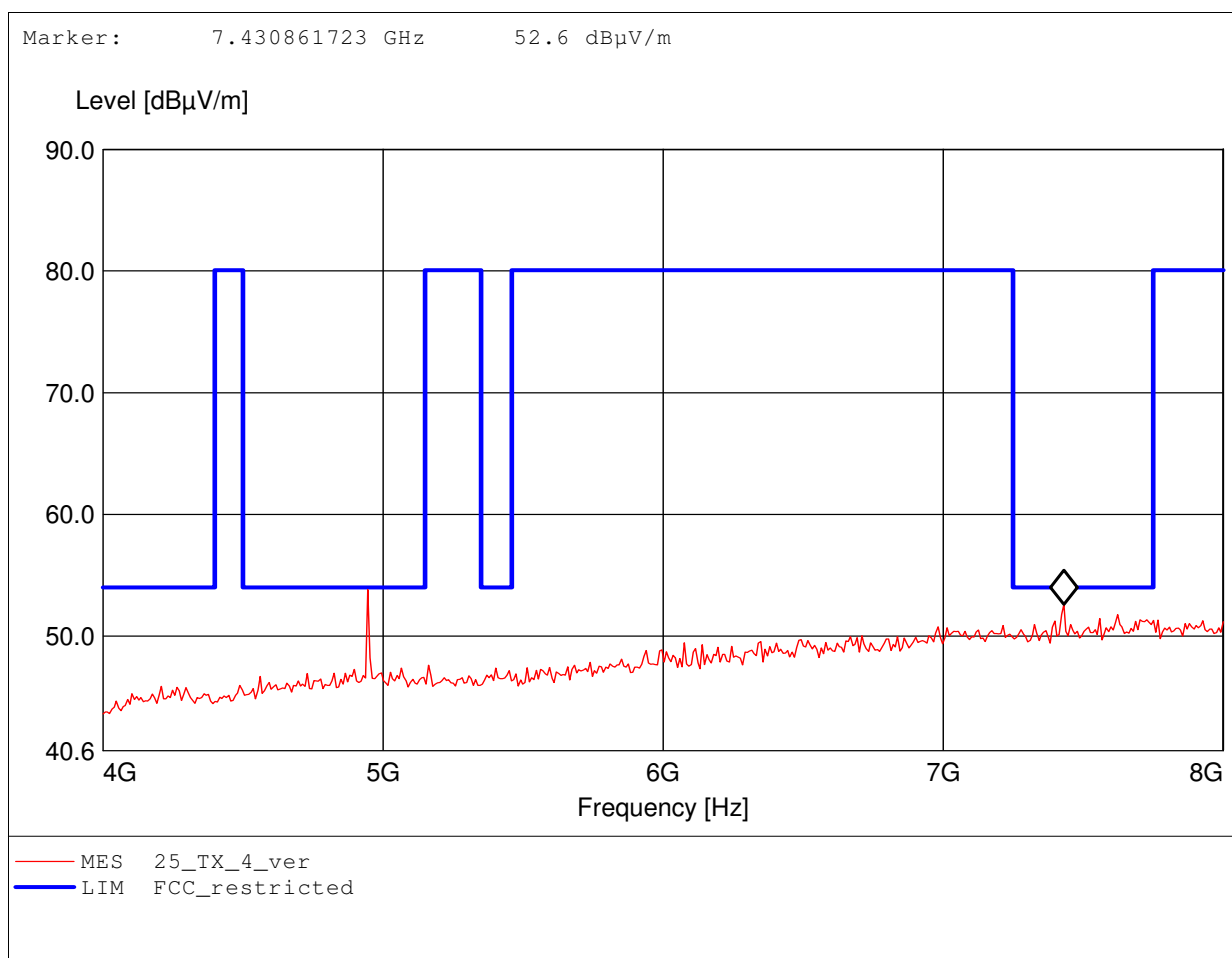
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 4.949GHz, Emax: 47.39dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

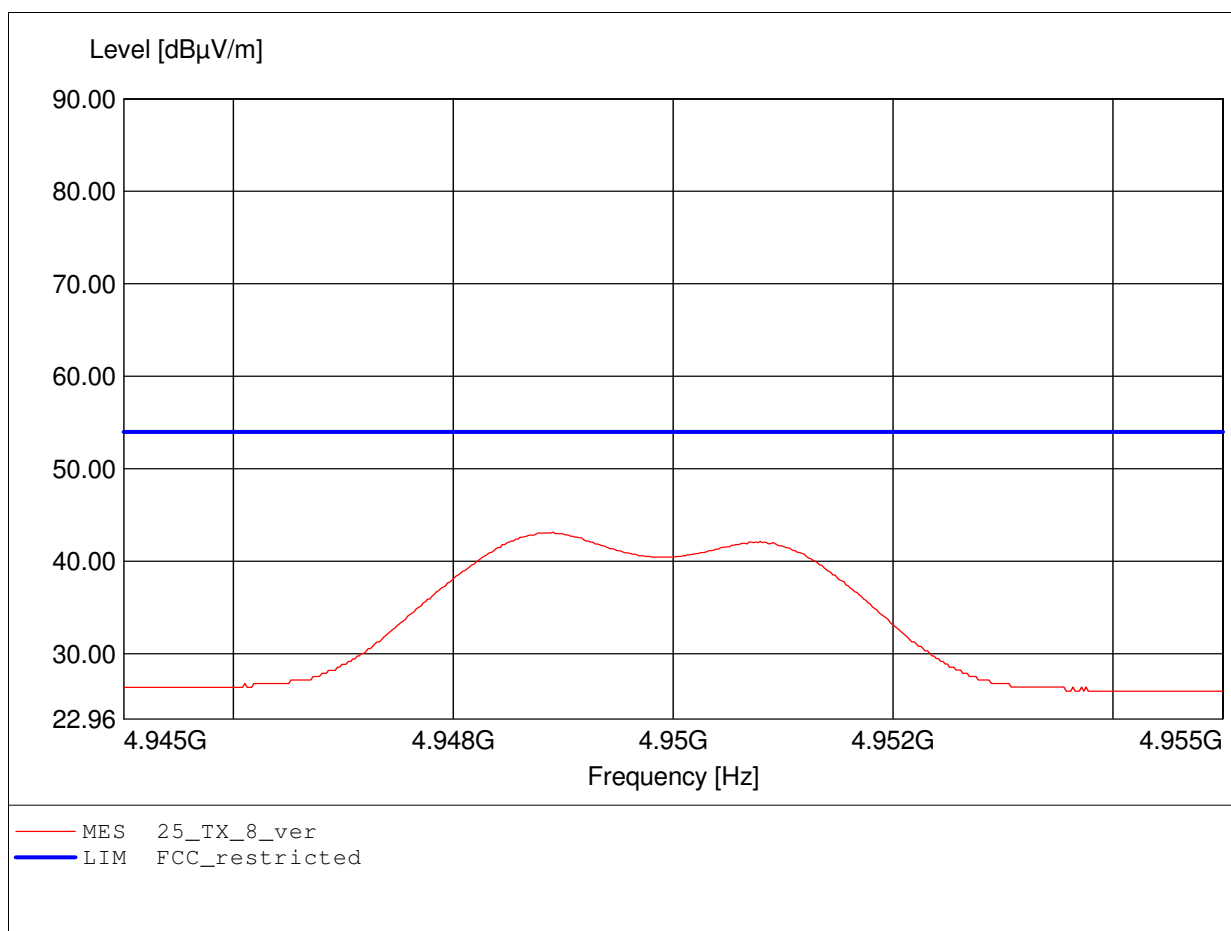
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 4.946GHz, Emax: 53.81dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

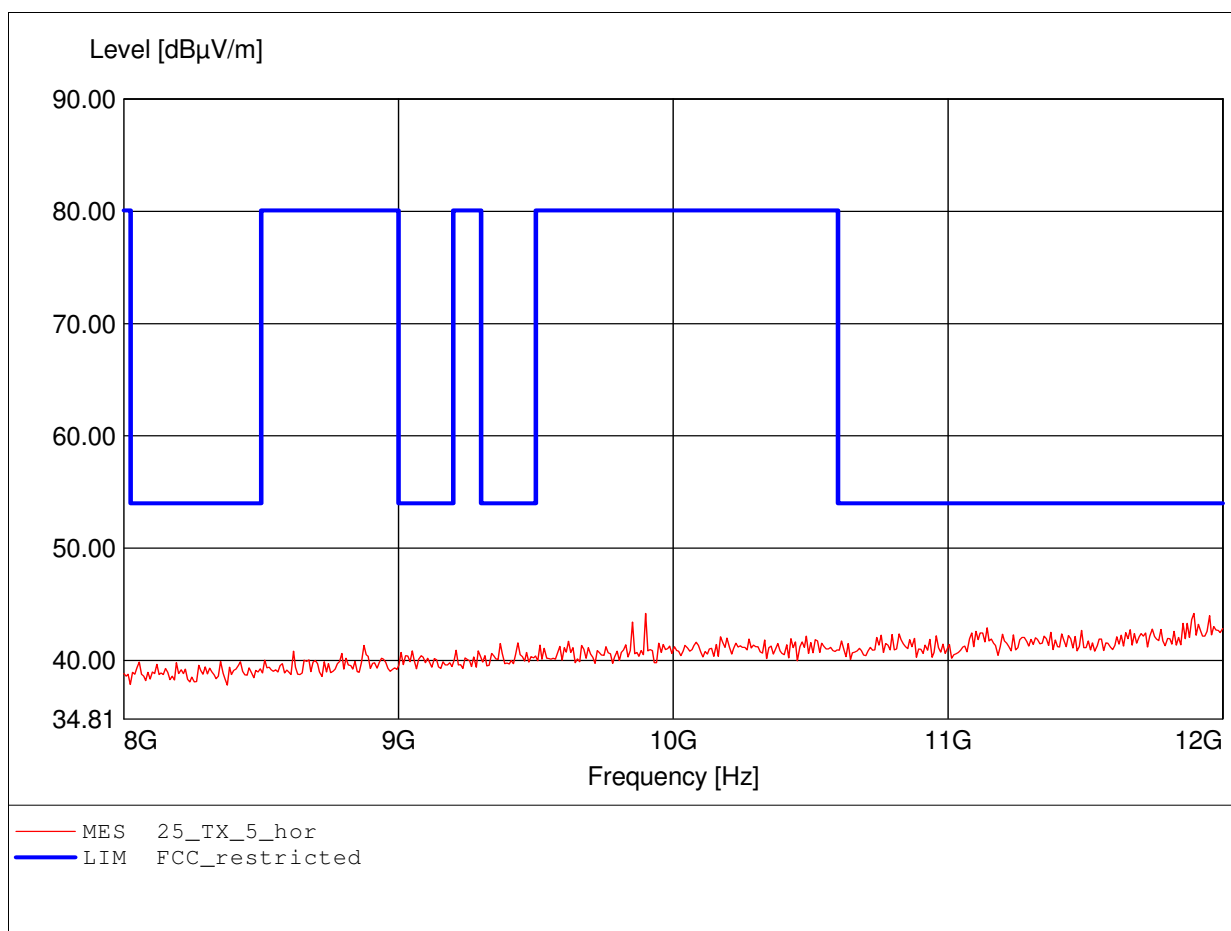
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 4.949GHz, Emax: 43.16dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

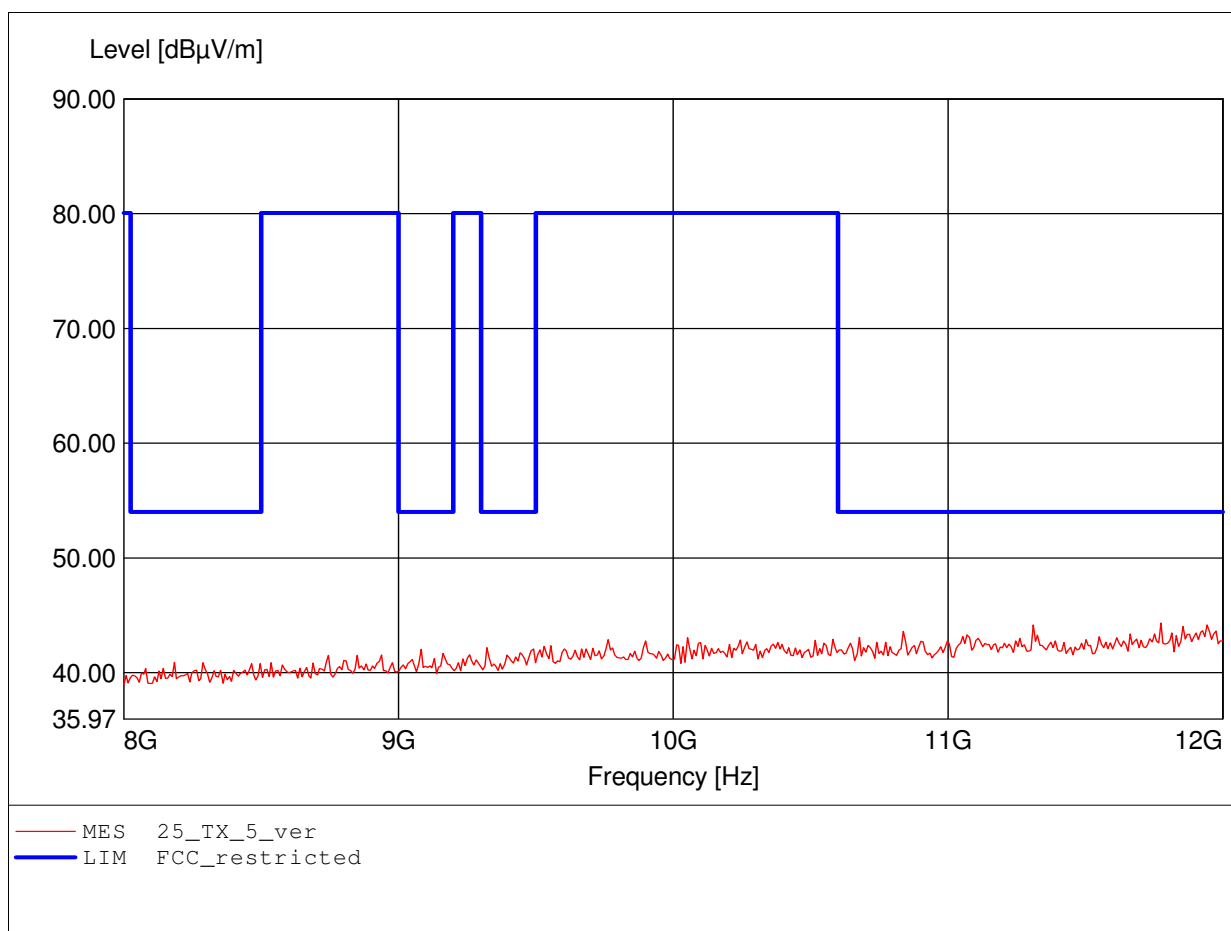
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 11.896GHz, Emax: 44.21dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

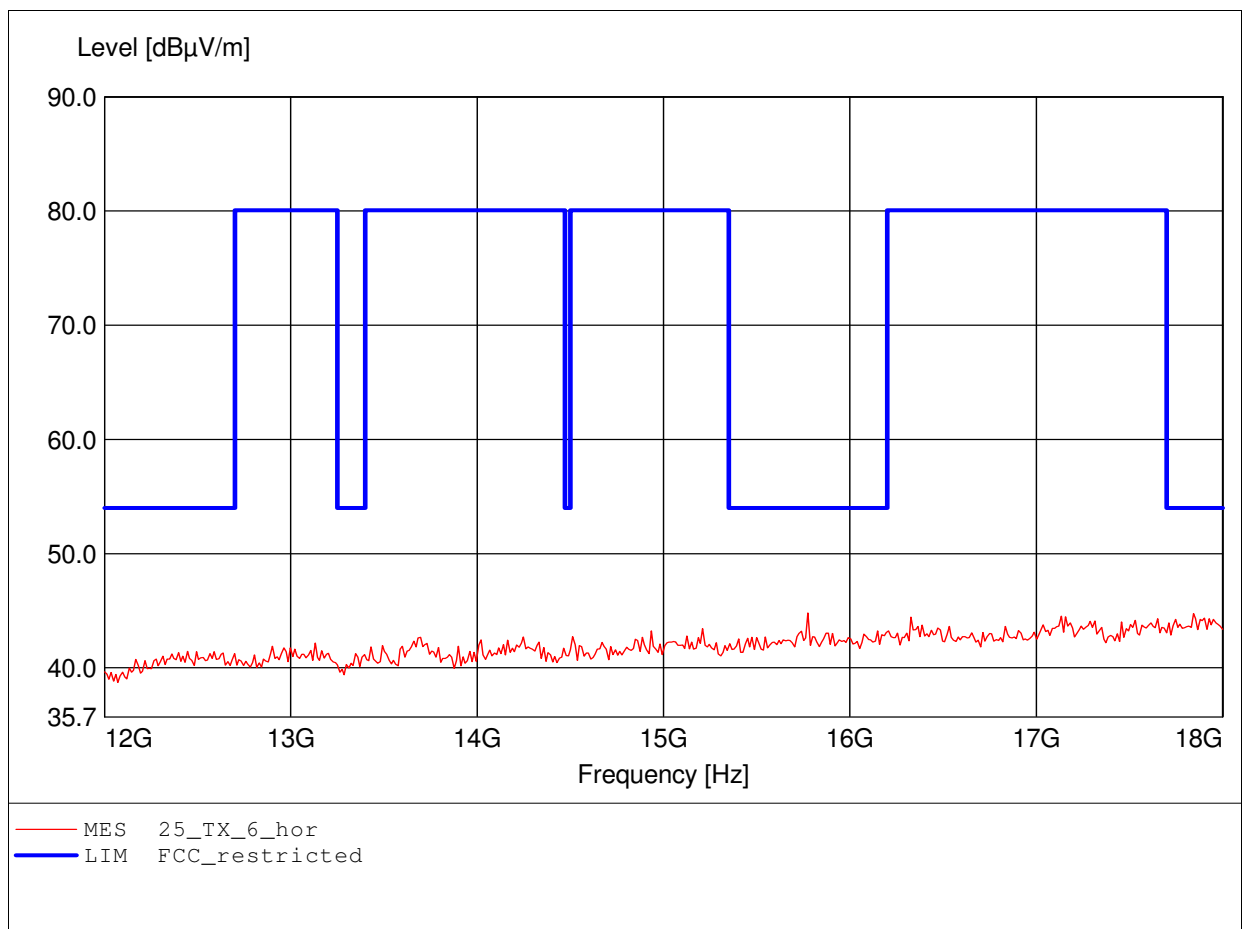
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 11.776GHz, Emax: 44.32dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

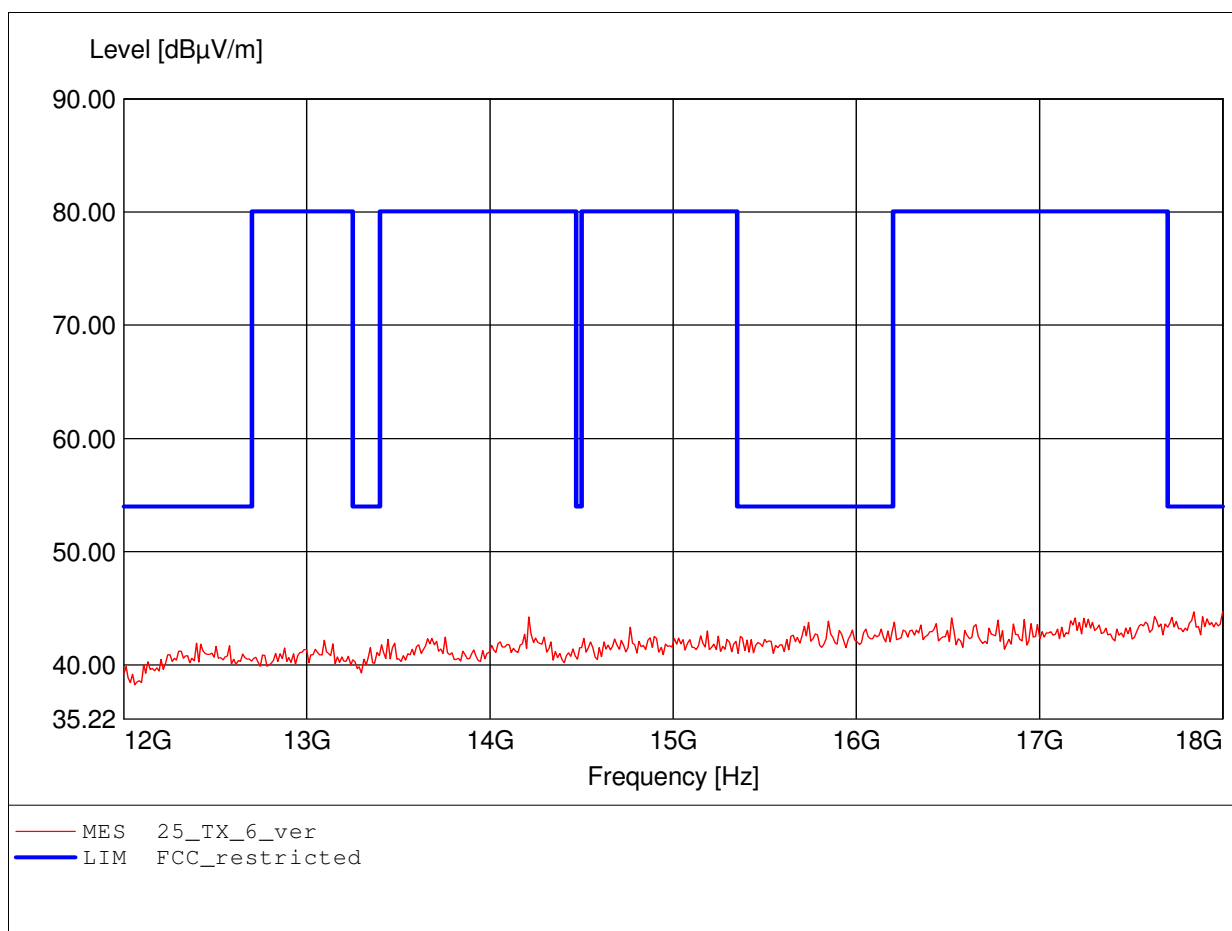
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 15.776GHz, Emax: 44.79dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

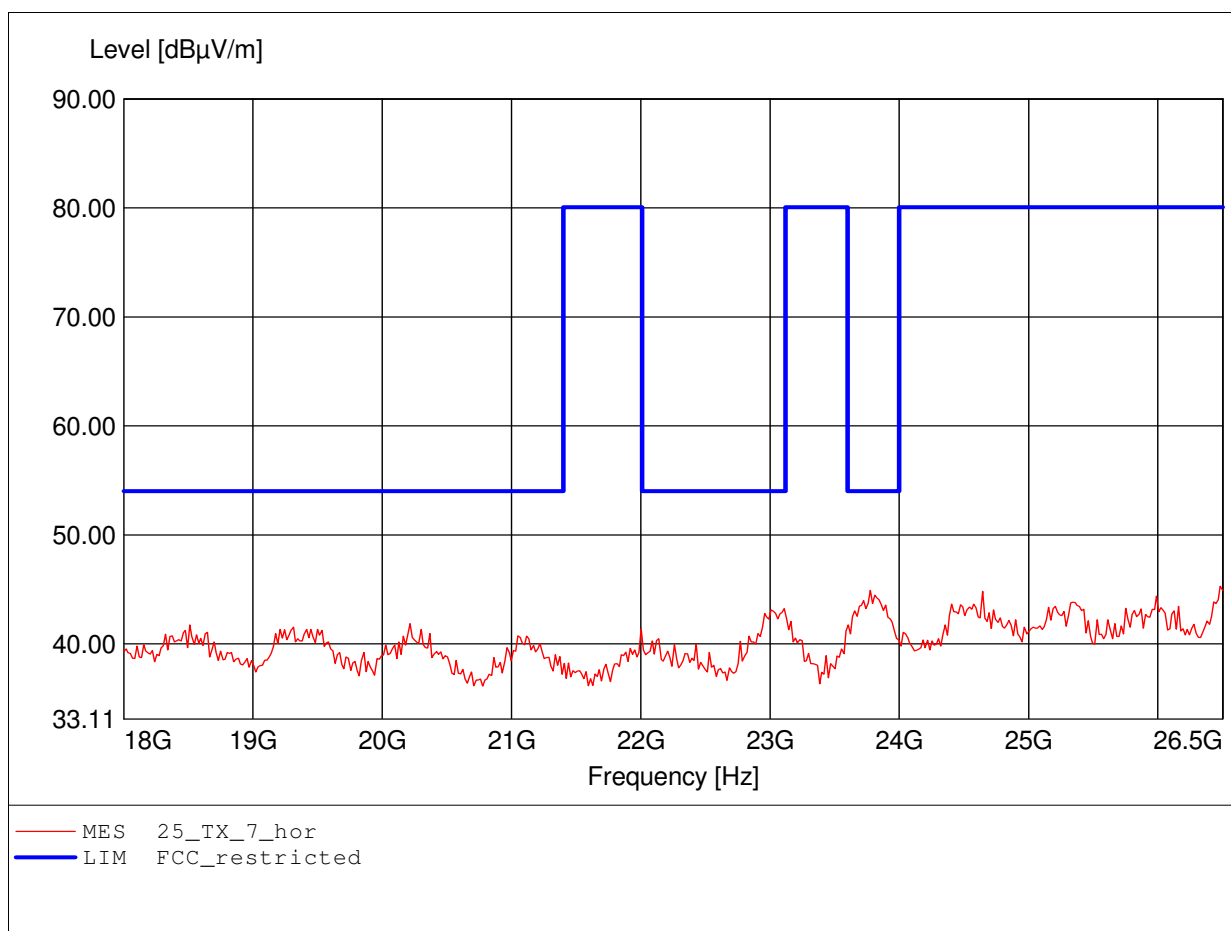
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.+HP.
Comment 2: Freq: 18.000GHz, Emax: 44.70dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

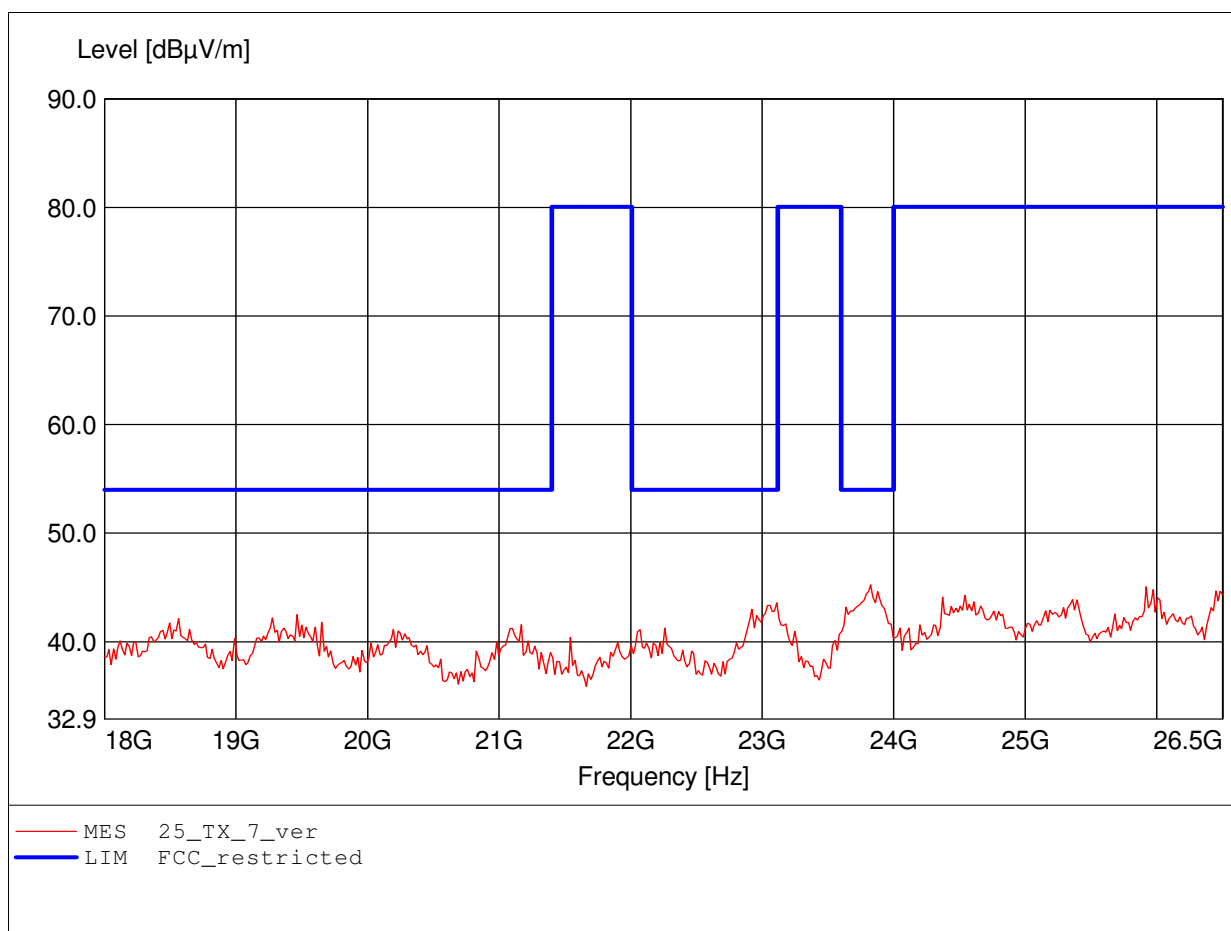
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 26.483GHz, Emax: 45.29dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / Pmax 8 dBm / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 25
Comment 1: Dist.: 3m, Ant.: HL025, amplif.
Comment 2: Freq: 23.826GHz, Emax: 45.23dBµV/m, RBW: 1MHz

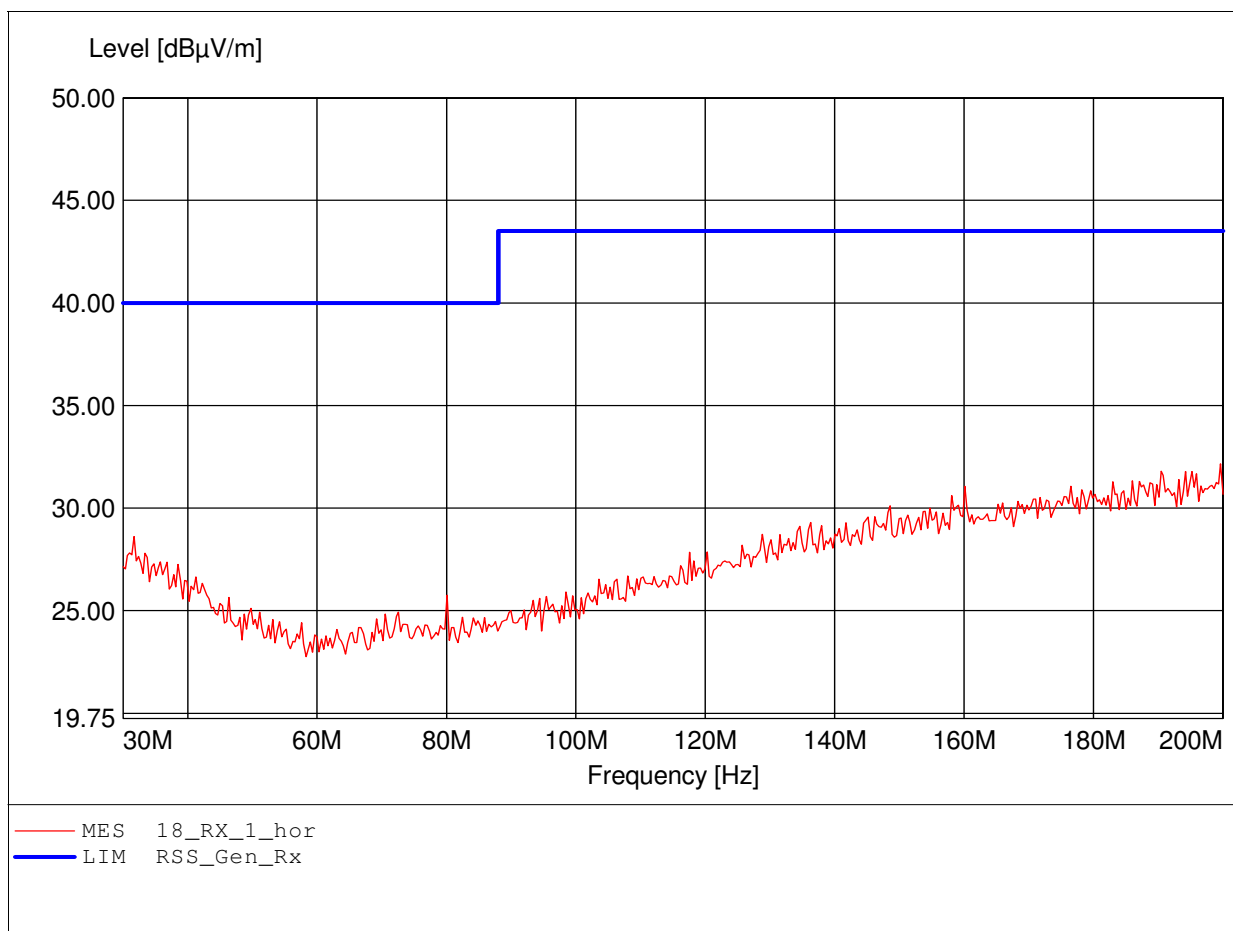


ANNEX B Receiver radiated spurious emissions

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

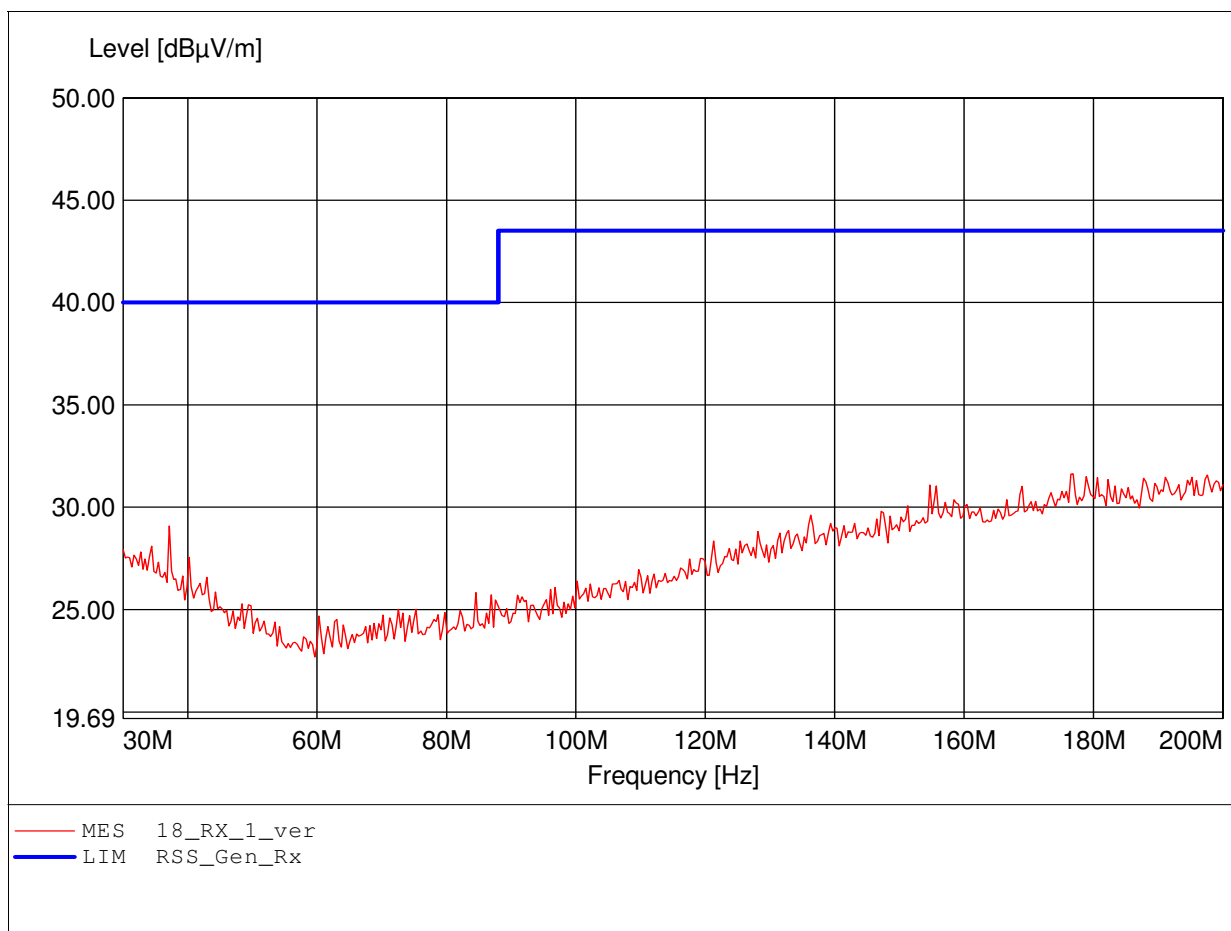
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq:199.659MHz Emax:32.16dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

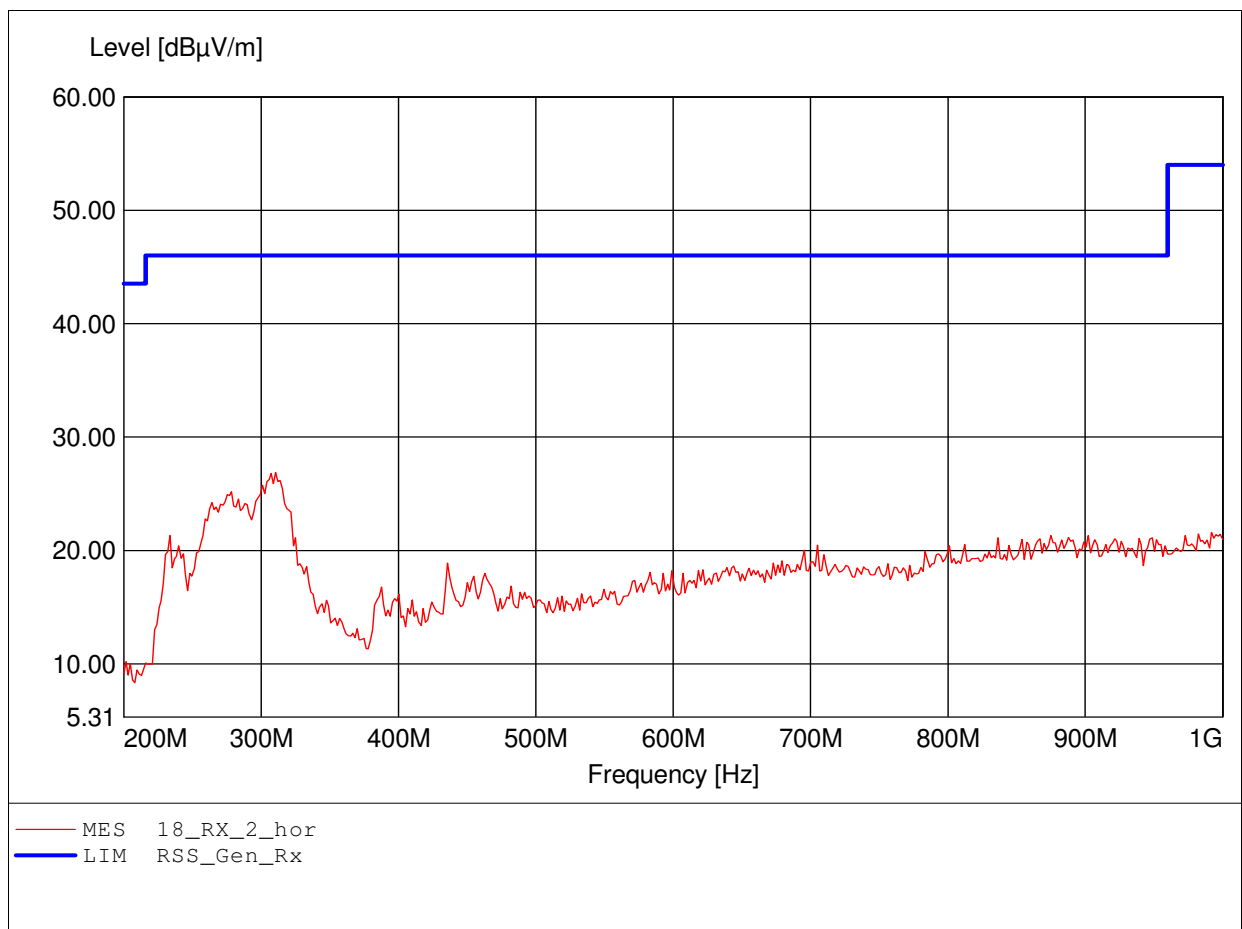
Approval Holder: Leica Geosystems AG / GOM-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HK 116
Comment 2: Freq:176.834MHz Emax:31.64dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

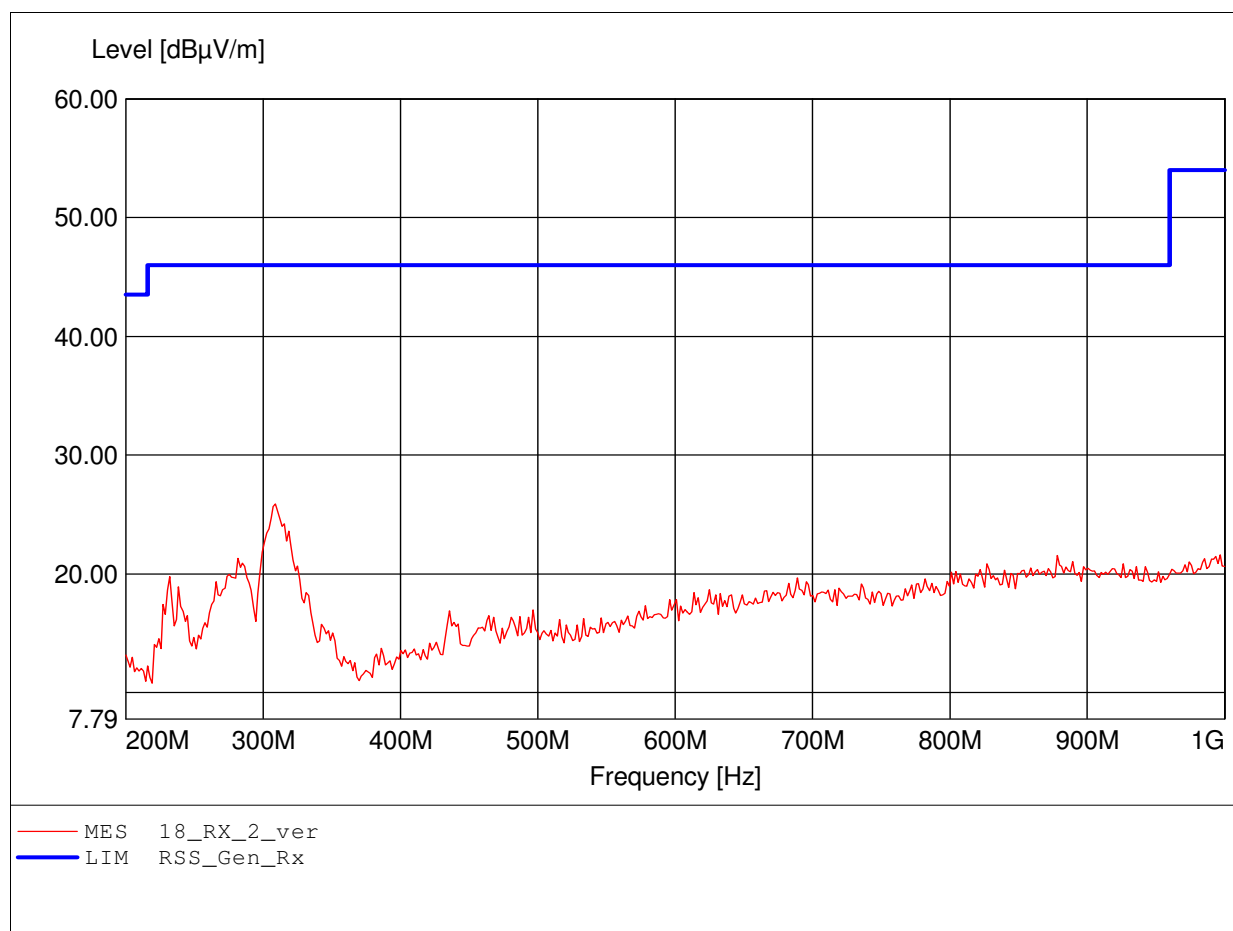
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 223, ampl.
Comment 2: Freq:310.621MHz Emax:26.89dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

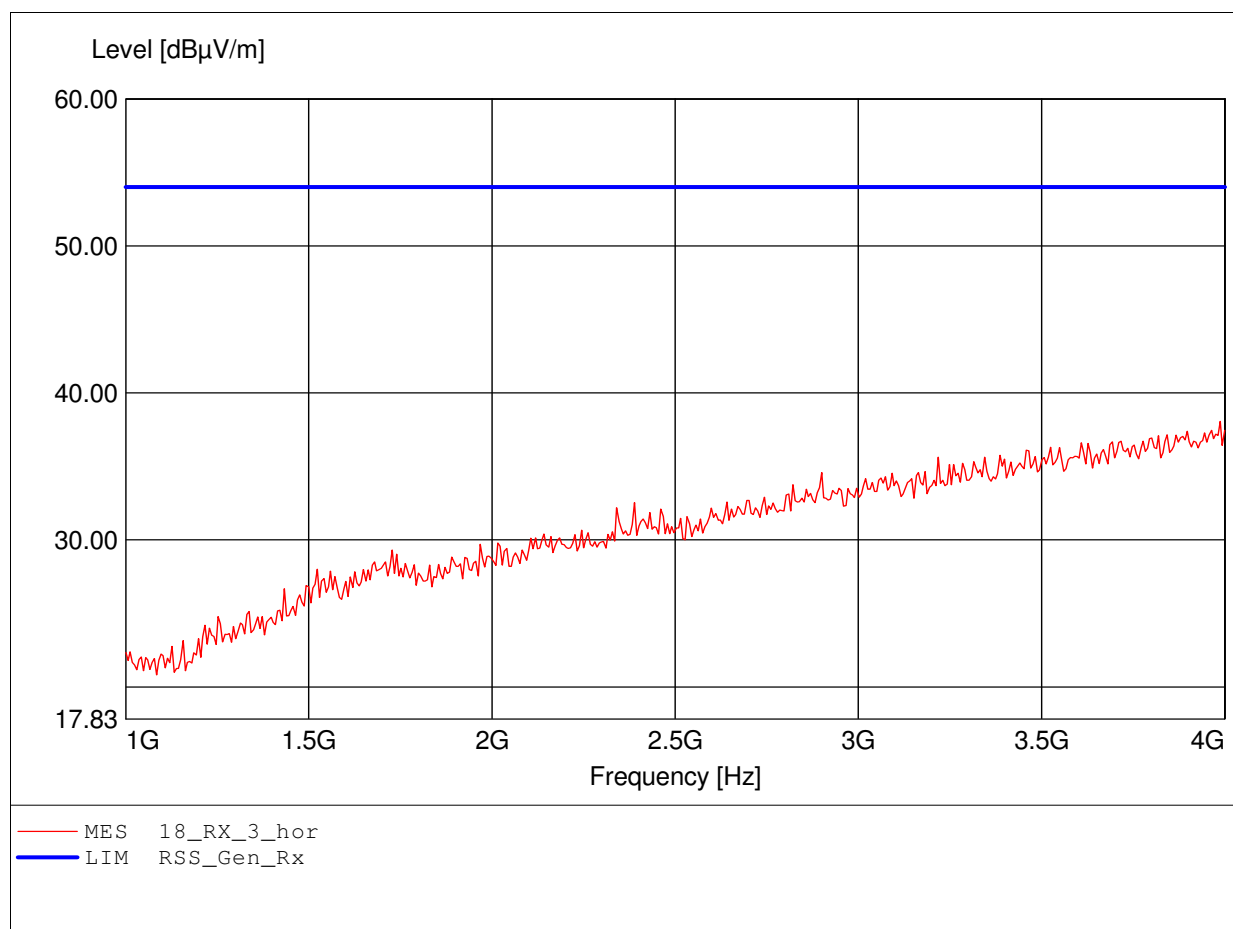
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 223, ampl.
Comment 2: Freq:309.018MHz Emax:25.91dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

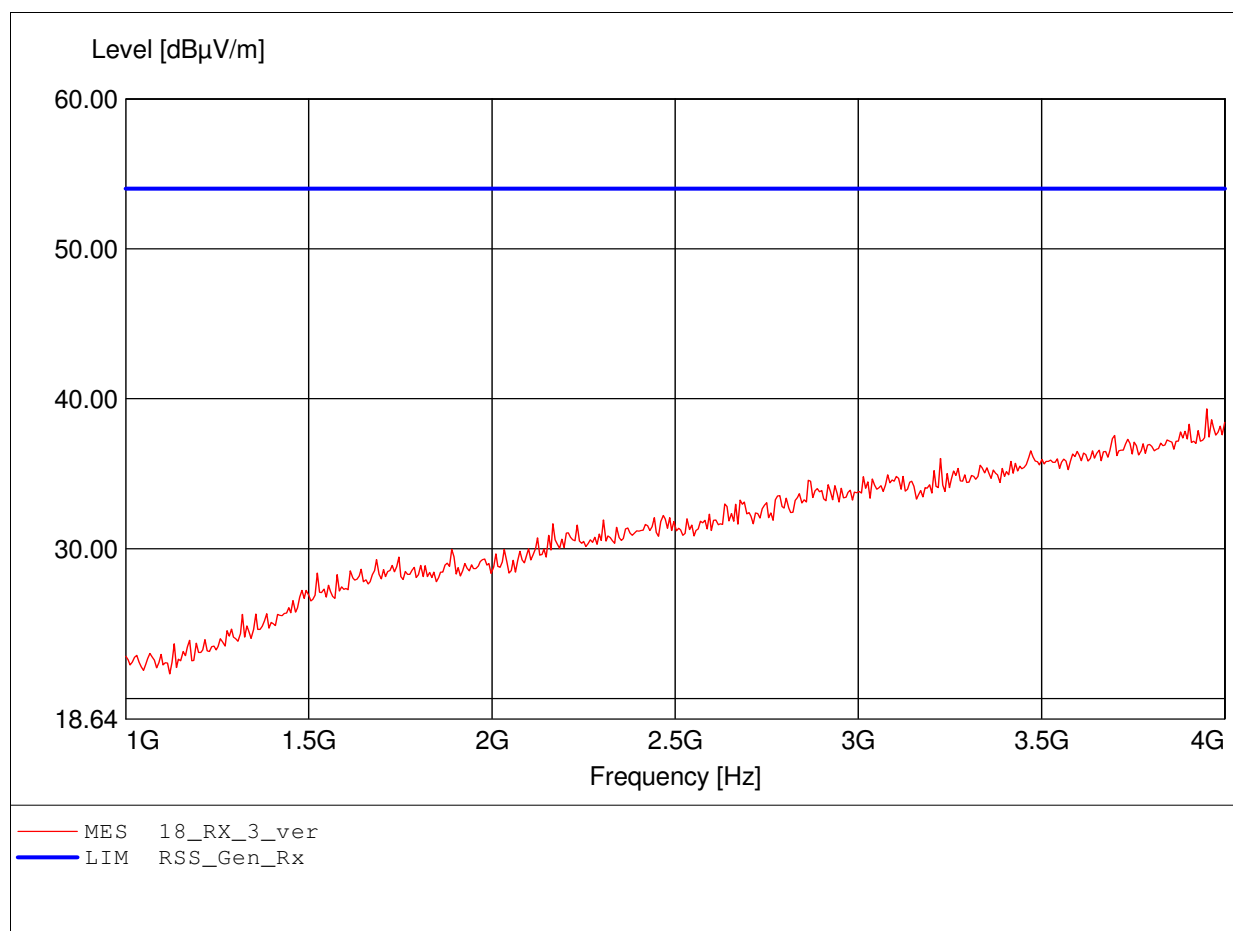
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.
Comment 2: Freq:3.988GHz Emax:38.07dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

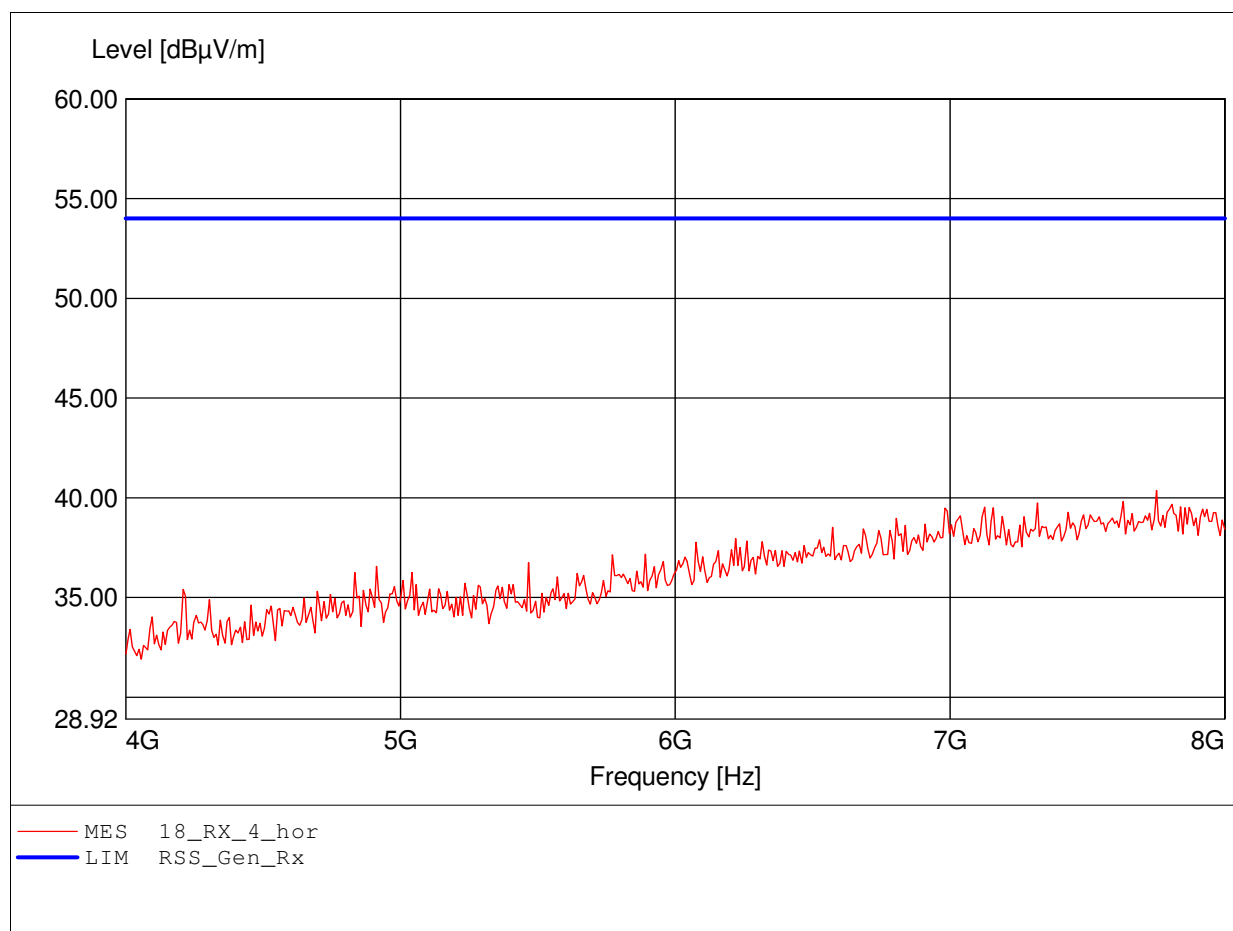
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.
Comment 2: Freq:3.952GHz Emax:39.32dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

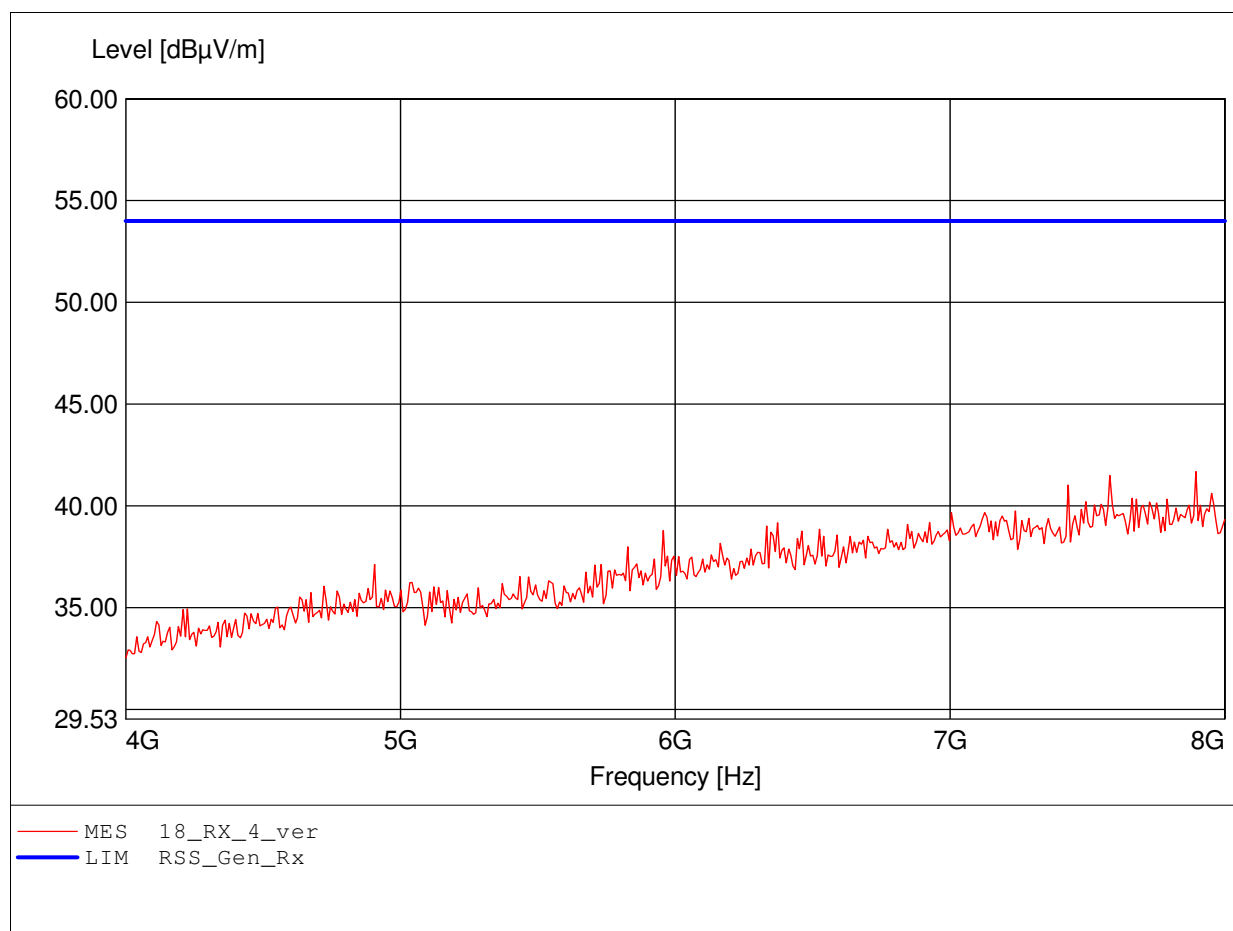
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.
Comment 2: Freq: 7.752GHz Emax: 40.37dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

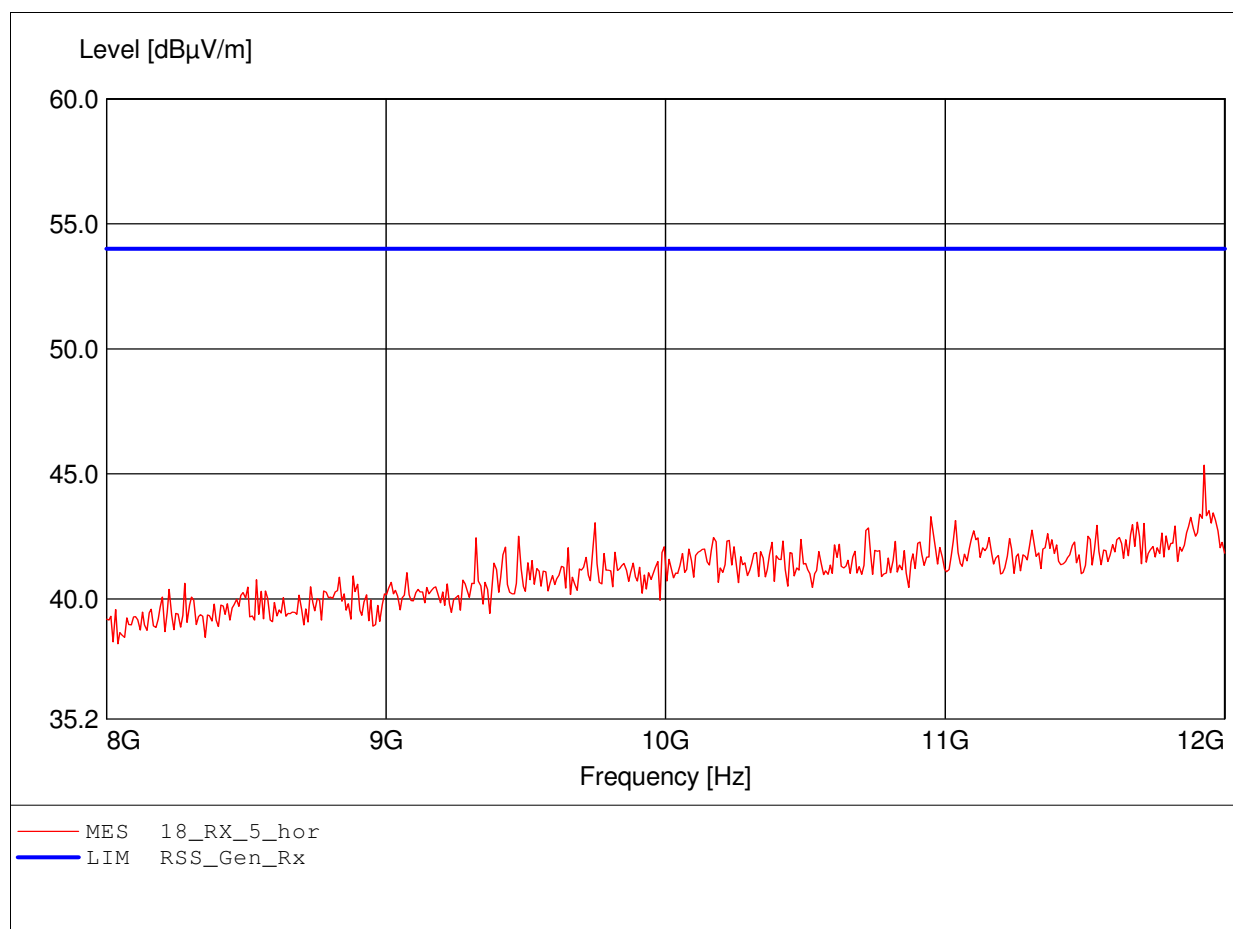
Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.
Comment 2: Freq: 7.896GHz Emax: 41.68dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.
Comment 2: Freq:11.928GHz Emax:45.35dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder: Leica Geosystems AG / G0M-1201-1704
EUT / Model: VIPER Radio Modul 100m / 785749
Setup: ZigBee / CH: 11, 18, 25 / RX_mode / horizontal
Test Site / Operator: Eurofins Product Service GmbH / Mr. Pudell
Test Condition: Tnom: 24°C / Vnom.: 3.15 V DC
Test Specification: Freq. / CH: 18
Comment 1: Dist.: 3m, Ant.: HL 025, ampl.
Comment 2: Freq:11.038GHz Emax:44.17dBµV/m RBW: 1 MHz

