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FCC TEST REPORT

FCC 47 CFR Part 15C
Industry Canada RSS-210

Frequency hopping systems operating within the 2400 – 2483.5 MHz band

Report Reference No. ..... :	G0M-1211-2443-TFC247B-V02
Testing Laboratory ..... :	Eurofins Product Service GmbH
Address ..... :	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation ..... :	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
Applicant's name ..... :	lesswire AG
Address ..... :	Rudower Chaussee 30 12489 Berlin Deutschland
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	WLAN/Bluetooth module
Model No.	WiBear11n-SF1
Hardware version	C4
Firmware / Software version	Module does not contain software
	FCC-ID: PV7-WIBEAR11N-SF1 IC: 7738A-WB11NSF1
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 ..... :	2012-11-27	
Date (s) of performance of tests ..... :	2012-11-29 – 2012-12-03	
Compiled by ..... :	Antje Bartusch	
Tested by (+ signature)..... : (Testing Manager)	Burkhard Pudell	B. Pudell .....
Approved by (+ signature) ..... : (Test Lab Manager)	Jens Zimmermann	.....
Date of issue ..... :	2013-02-13	
Total number of pages ..... :	156	

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:

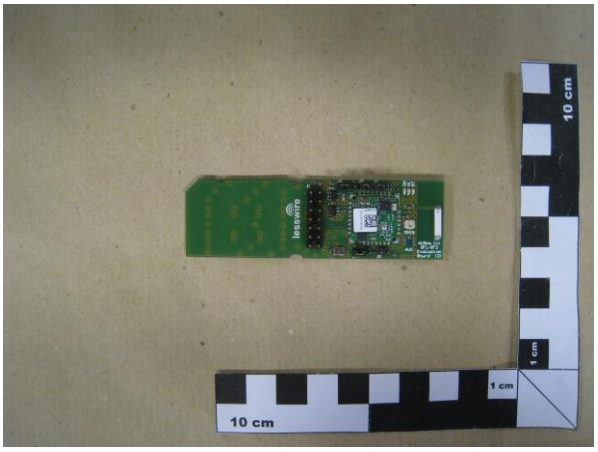
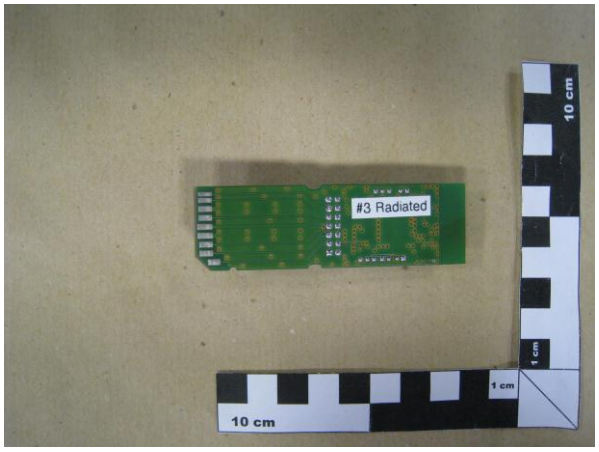
REPORT INDEX

1	**EQUIPMENT (TEST ITEM) DESCRIPTION:**	**4**
1.2	Photos – Equipment external	5
1.3	Photos – Equipment internal	6
1.4	Photos – Test setup	7
1.5	Supporting Equipment Used During Testing	8
1.6	Test Modes	9
1.7	Test Equipment Used During Testing	11
1.8	Sample emission level calculation	12
2	**RESULT SUMMARY**	**13**
3	**TEST CONDITIONS AND RESULTS**	**14**
3.1	Test Conditions and Results – Occupied Bandwidth	14
3.2	Test Conditions and Results – 20 dB Bandwidth	21
3.3	Test Conditions and Results – Number of hopping frequencies	31
3.4	Test Conditions and Results – Frequency hopping channel separation	36
3.5	Test Conditions and Results – Time of occupancy (Dwell Time)	38
3.6	Test Conditions and Results – Maximum peak conducted power	40
3.7	Test Conditions and Results – AC power line conducted emissions	42
3.8	Test Conditions and Results – Band edge compliance	45
3.9	Test Conditions and Results – Conducted spurious emissions	59
3.10	Test Conditions and Results – Transmitter radiated emissions	72
3.11	Test Conditions and Results – Receiver radiated emissions	74
ANNEX A	Transmitter radiated spurious emissions	76
ANNEX B	Receiver radiated spurious emissions	145

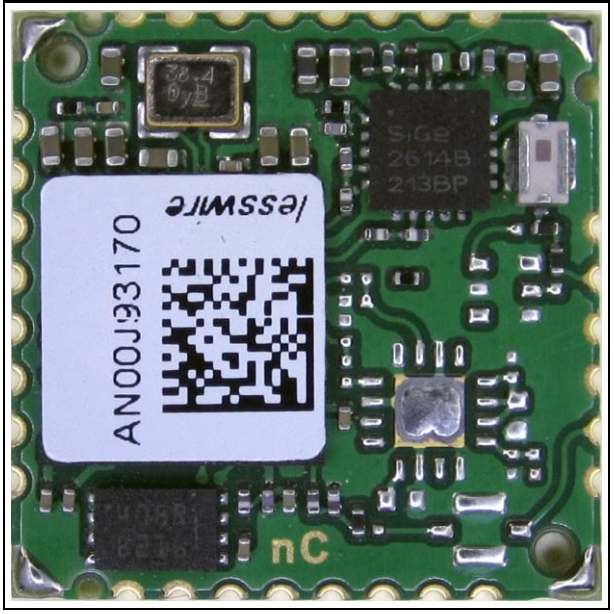
1 Equipment (Test item) Description:

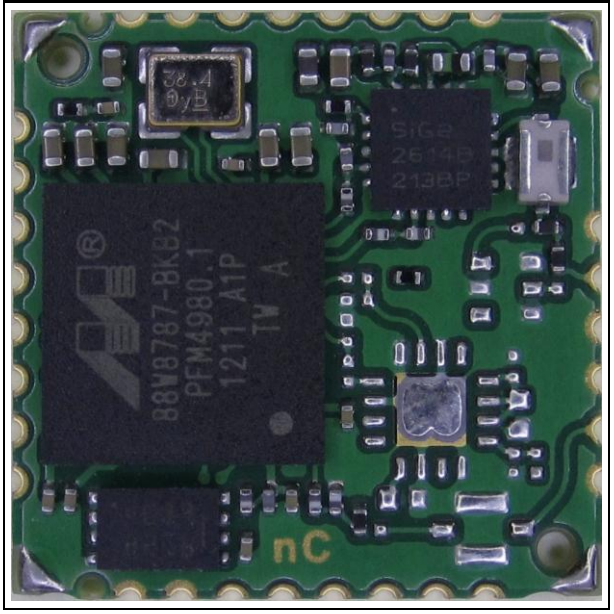
Description	WLAN/Bluetooth module	
Model	WiBear11n-SF1	
Serial number	None	
Hardware version	C4	
Software / Firmware version	Module does not contain software	
FCC-ID	PV7-WIBEAR11N-SF1	
IC	7738A-WB11NSF1	
Equipment type	Radio module	
Radio type	Transceiver	
Radio technology	Bluetooth 3.0	
Operating frequency range	2402 - 2480 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F_{LOW}	2402 MHz
	F_{MID}	2441 MHz
	F_{HIGH}	2480 MHz
Spreading	FHSS	
Modulations	GFSK, PI/4-DQPSK, 8-PSK	
Number of channels	79 hopping channels at all	
Channel spacing	1 MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	2450AT45A100
	Manufacturer	Johanson
	Gain	3 dBi
Manufacturer	PRETTL Electronics AG Robert-Bosch-Str. 10 01424 Radeberg Germany	
Power supply	V_{NOM}	3.3 VDC
	V_{MIN}	3.0 VDC
	V_{MIN}	3.6 VDC
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

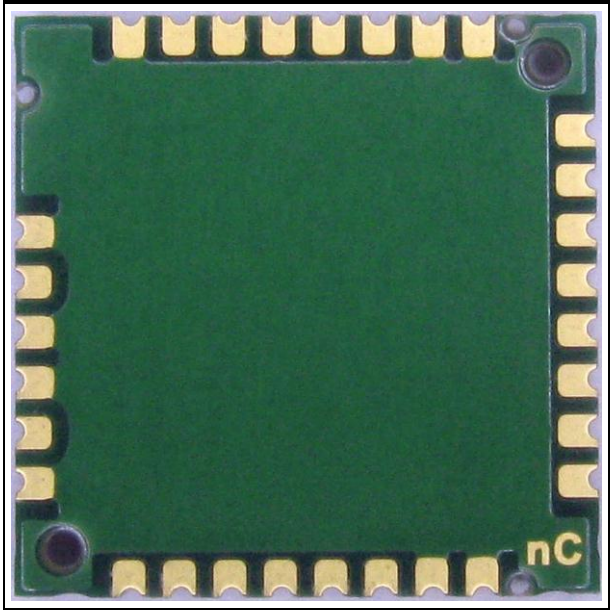
1.2 Photos – Equipment external

EUT ON EVALUATION BOARD TOP	EUT ON EVALUATION BOARD BOTTOM
	

1.3 Photos – Equipment internal

EUT TOP WITH LABEL


EUT TOP WITHOUT LABEL


EUT BOTTOM


1.4 Photos – Test setup

TESTSETUP RADIATED MEASUREMENTS

TESTSETUP CONDUCTED MEASUREMENTS

1.5 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
None				

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.6 Test Modes

Mode #	Description	
DH5-Sngl	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = GFSK Packet type = DH5 Data rate = 1 Mbps Duty cycle = 46 % Power level = Maximum
2DH5-Sngl	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = π/4-DQPSK Packet type = 2DH5 Data rate = 2 Mbps Duty cycle = 46 % Power level = Maximum
3DH5-Sngl	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = 8-DPSK Packet type = 3DH5 Data rate = 3 Mbps Duty cycle = 46 % Power level = Maximum
DH5-Hop	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Modulation = GFSK Packet type = DH5 Data rate = 1 Mbps Duty cycle = 46 % Power level = Maximum

2DH5-Hop	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Modulation = π/4-DQPSK Packet type = 2DH5 Data rate = 2 Mbps Duty cycle = 43 % Power level = Maximum
3DH5-Hop	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Modulation = 8-DPSK Packet type = 3DH5 Data rate = 3 Mbps Duty cycle = 46 % Power level = Maximum
Receive	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone receive Spreading = Hopping
AC-Powerline	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Power level = Maximum

1.7 Test Equipment Used During Testing

20dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 3	EF00412	2012-03	2014-03

Number of hopping frequencies					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 3	EF00412	2012-03	2014-03

Time of occupancy					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 3	EF00412	2012-03	2014-03

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 3	EF00412	2012-03	2014-03

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSU 3	EF00412	2012-03	2014-03

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ26	EF00242	2012-05	2013-05

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 5	EF00395	-	-
Spectrum Analyzer	R&S	FSIQ26	EF00242	2012-05	2013-05
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	ESH3-Z5	EF00036	2012-11	2014-11
EMI Test Receiver	R&S	ESCS 30	EF00295	2012-08	2013-08

1.8 Sample emission level calculation

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

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

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

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

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-210				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
RSS-Gen 4.6.1	Occupied Bandwidth	RSS-Gen 4.6.1	N/R	Informational only
FCC § 15.247(a)(1) IC RSS-210 § A8.1	20 dB Bandwidth	Public notice DA 00-705	PASS	
FCC § 15.247(a)(1)(iii) IC RSS-210 § A8.1	Number of hopping frequencies	Public notice DA 00-705	PASS	
FCC § 15.247(a)(1) IC RSS-210 § A8.1	Frequency hopping channel separation	Public notice DA 00-705	PASS	
FCC § 15.247(a)(1)(iii) IC RSS-210 § A8.1	Time of occupancy (Dwell time)	Public notice DA 00-705	PASS	
FCC § 15.247(b)(1) IC RSS-210 § A8.4	Maximum peak conducted power	Public notice DA 00-705	PASS	
47 CFR 15.207 RSS-Gen 7.2.4	AC power line conducted emissions	ANSI C63.4	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Band edge compliance	Public notice DA 00-705	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Conducted spurious emissions	Public notice DA 00-705	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	Public notice DA 00-705 / 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

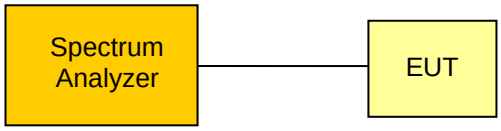
3.1 Test Conditions and Results – Occupied Bandwidth

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



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Resolution bandwidth set to 1 % of span
4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function

Test results

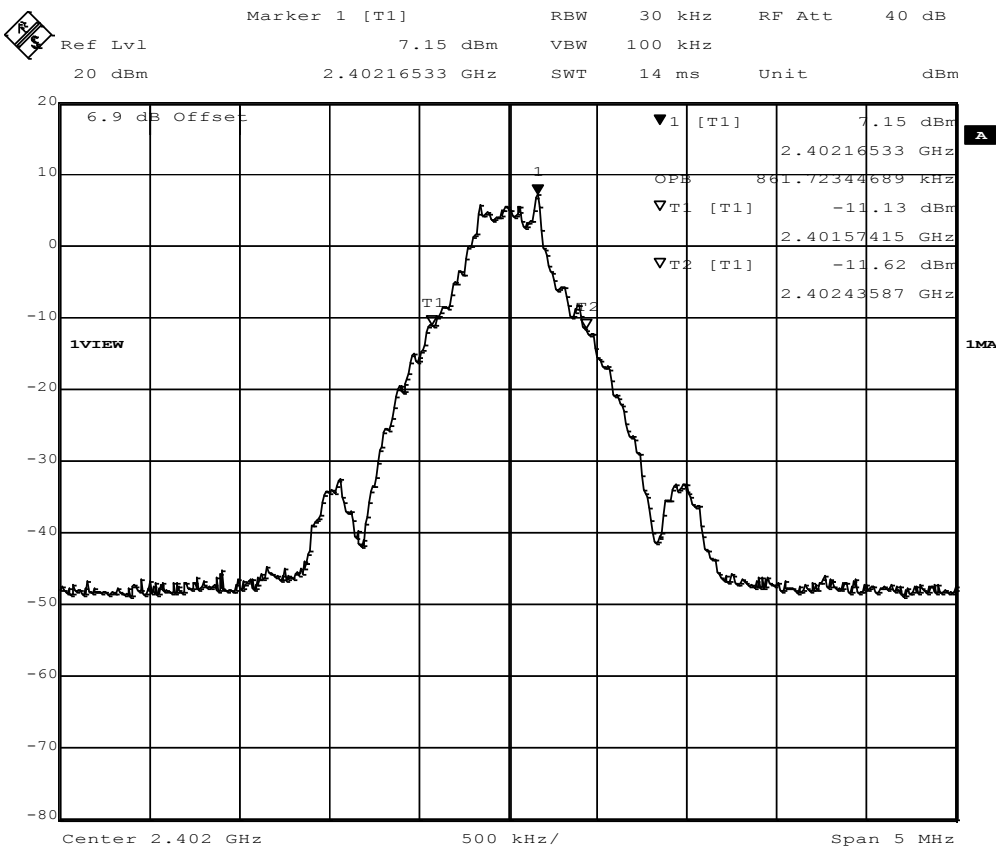
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	2402	DH5-Sngl	861.723
F_{MID}	2441	DH5-Sngl	871.745
F_{HIGH}	2480	DH5-Sngl	871.743
F_{LOW}	2402	3DH5-Sngl	1182.364
F_{MID}	2441	3DH5-Sngl	1172.344
F_{HIGH}	2480	3DH5-Sngl	1172.344

Comments:

Occupied Bandwidth – DH5-Sngl F_{LOW}

RSS Gen
Occupied Bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 0 / 2402 MHz / GFSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	Packet type: DH5

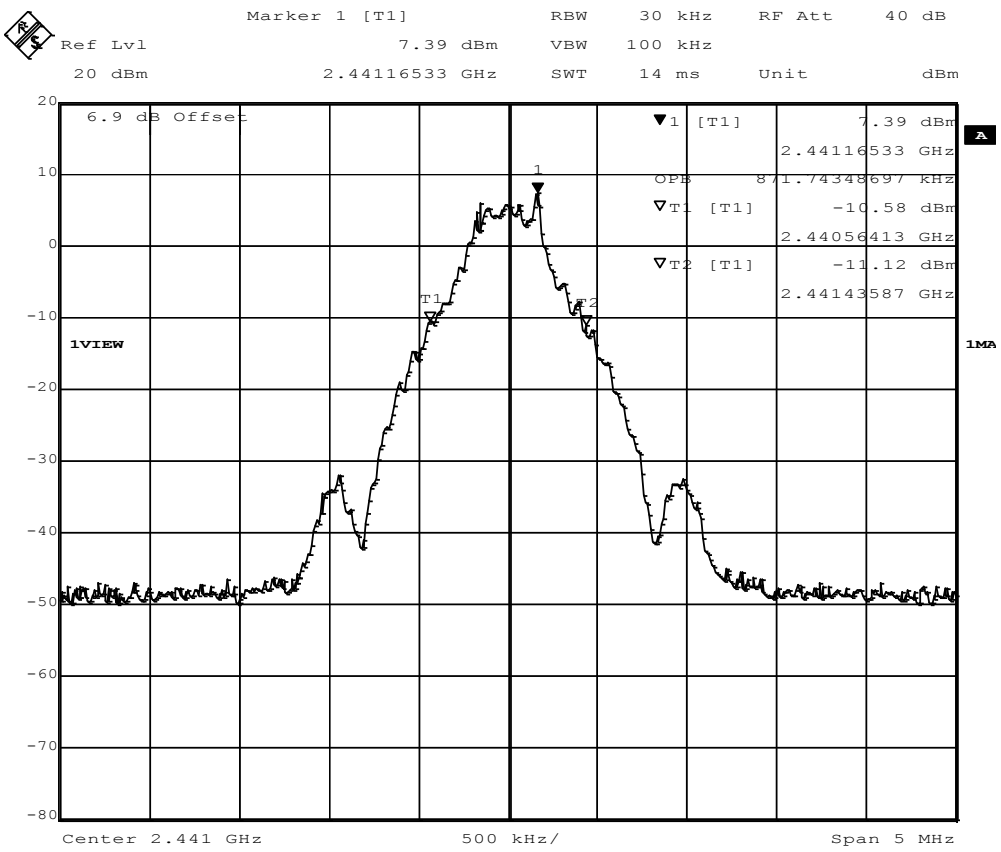


Comment A: Occupied bandwidth: 861.7 KHz
Date: 30.NOV.2012 15:40:08

Occupied Bandwidth – DH5-Sngl F_{MID}

RSS Gen
Occupied Bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 39 / 2441 MHz / GFSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	Packet type: DH5

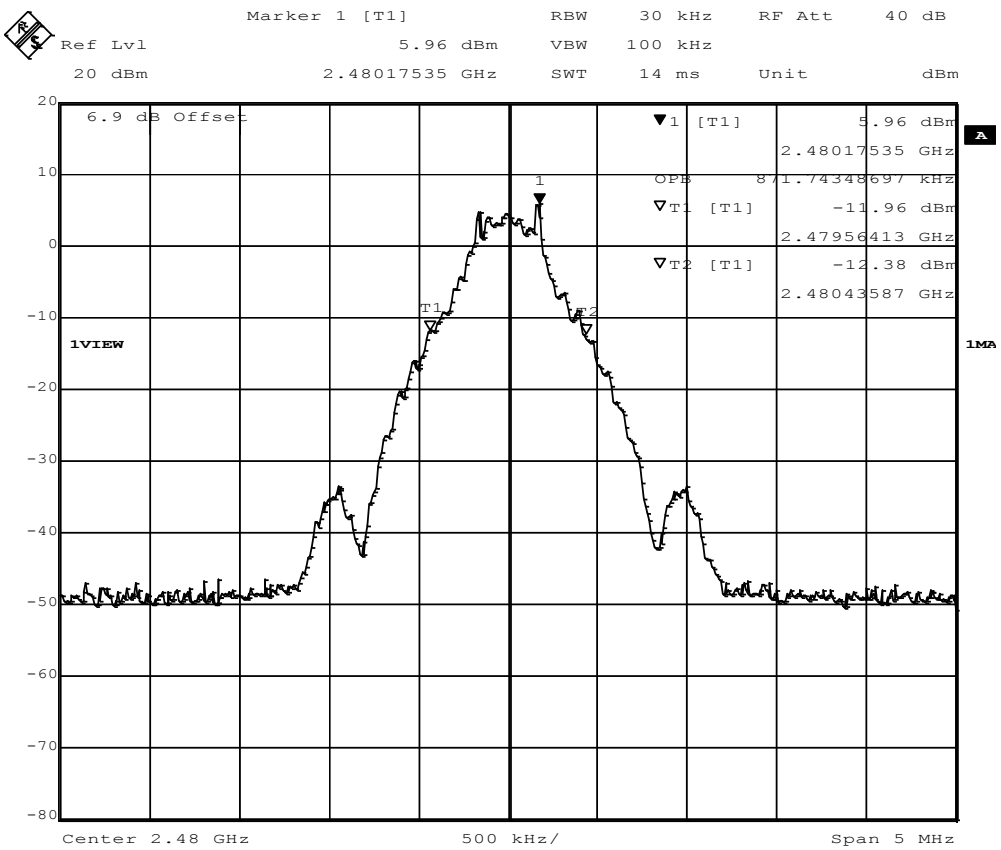


Comment A: Occupied bandwidth: 871.7 KHz
Date: 30.NOV.2012 15:44:19

Occupied Bandwidth – DH5-Sngl F_{HIGH}

RSS Gen
Occupied Bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 78 / 2480 MHz / GFSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	Packet type: DH5

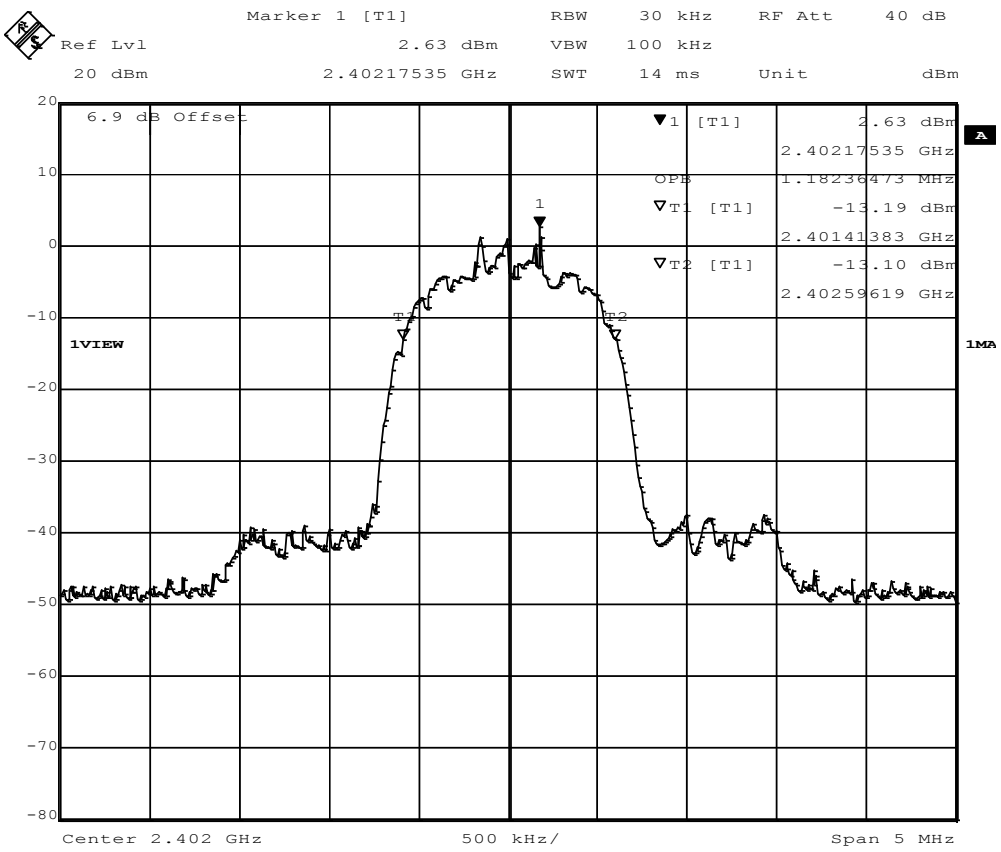


Comment A: Occupied bandwidth: 871.7 KHz
Date: 30.NOV.2012 15:46:07

Occupied Bandwidth – 3-DH5-Sngl F_{LOW}

RSS Gen
Occupied Bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 0 / 2402 MHz / 8DPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	Packet type: 3-DH5

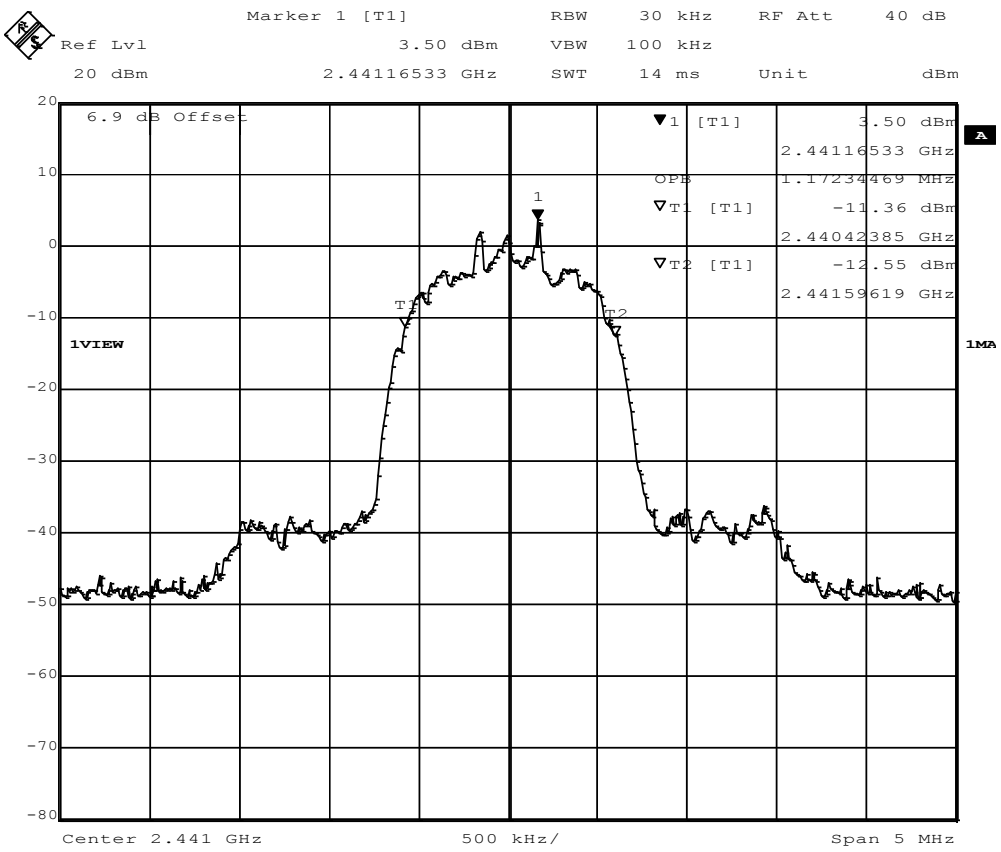


Comment A: Occupied bandwidth: 1182.4 KHz
Date: 30.NOV.2012 15:55:46

Occupied Bandwidth – 3-DH5-Sngl F_{MID}

RSS Gen
Occupied Bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 39 / 2441 MHz / 8DPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	Packet type: 3-DH5

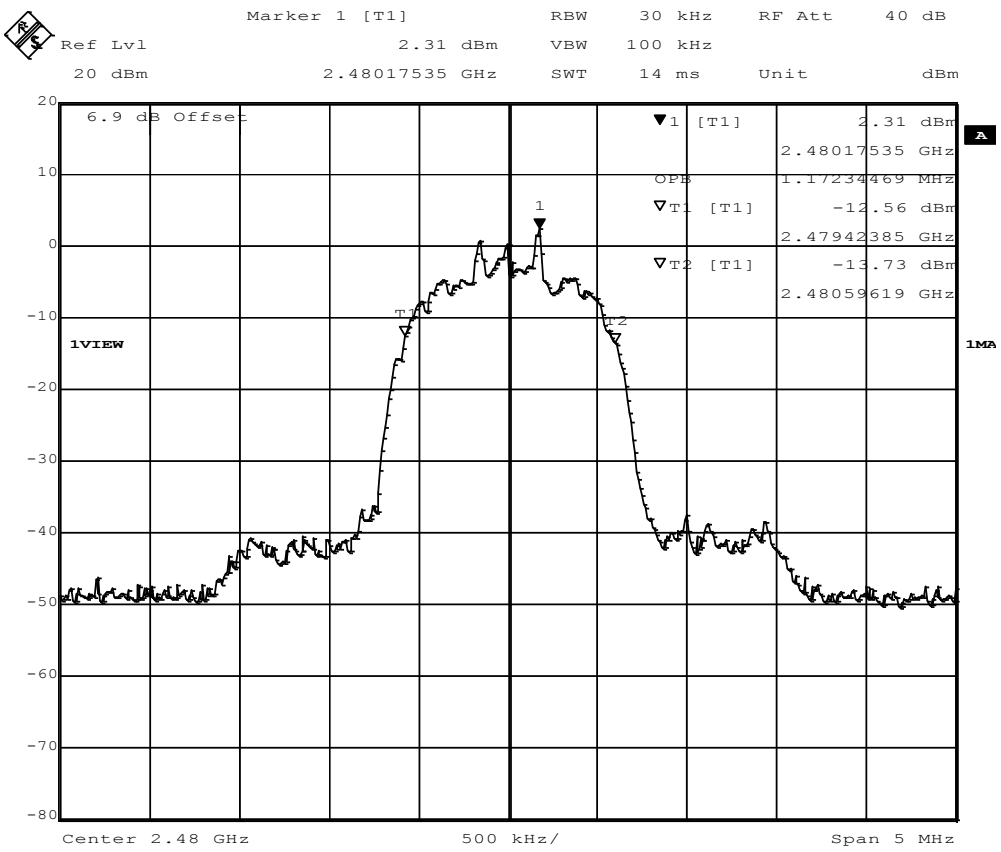


Comment A: Occupied bandwidth: 1172.3 KHz
Date: 30.NOV.2012 15:54:20

Occupied Bandwidth – 3-DH5-Sngl F_{HIGH}

RSS Gen
Occupied Bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 78 / 2480 MHz / 8DPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	Packet type: 3-DH5



Comment A: Occupied bandwidth: 1172.3 KHz
Date: 30.NOV.2012 15:52:28

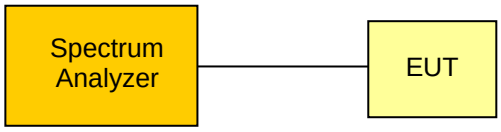
3.2 Test Conditions and Results – 20 dB Bandwidth

20 dB Bandwidth acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(a)(1) / IC RSS-210 A8.1
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}

Limits

Limit	Condition
1.5 · Carrier spacing	Output power ≤ 125 mW / 21 dBm
1.0 · Carrier spacing	125 mW / 21 dBm < Output power ≤ 1 W / 30 dBm

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Detector set to peak and max hold
4. Envelope peak value of emission spectrum is selected
5. Marker on envelope of spectrum is set to level of -20 dB to the left of the peak
6. Marker on envelope of spectrum is set to level of -20 dB to the right of the peak
7. 20dB Bandwidth is determined by marker frequency separation

Test results

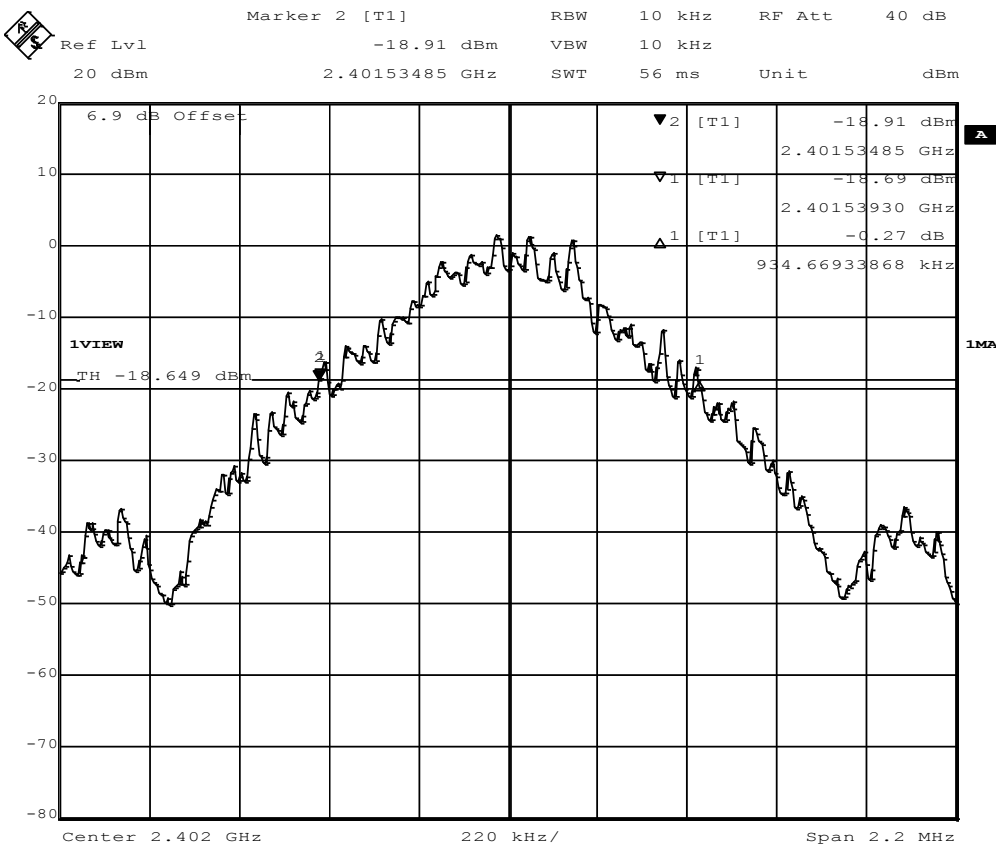
Channel	Frequency [MHz]	Mode	20 dB Bandwidth [MHz]	Limit [MHz]	Result
F_{LOW}	2402	DH5-Sngl	934.669	1.5	PASS
F_{MID}	2441	DH5-Sngl	934.669	1.5	PASS
F_{HIGH}	2480	DH5-Sngl	934.669	1.5	PASS
F_{LOW}	2402	2DH5-Sngl	1327.054	1.5	PASS
F_{MID}	2441	2DH5-Sngl	1327.054	1.5	PASS
F_{HIGH}	2480	2DH5-Sngl	1327.054	1.5	PASS
F_{LOW}	2402	3DH5-Sngl	1287.374	1.5	PASS
F_{MID}	2441	3DH5-Sngl	1287.374	1.5	PASS
F_{HIGH}	2480	3DH5-Sngl	1296.192	1.5	PASS

Comments:

20 dB Bandwidth – DH5-Sngl F_{LOW}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 0 / 2402 MHz / GFSK
Comment 3	Pass

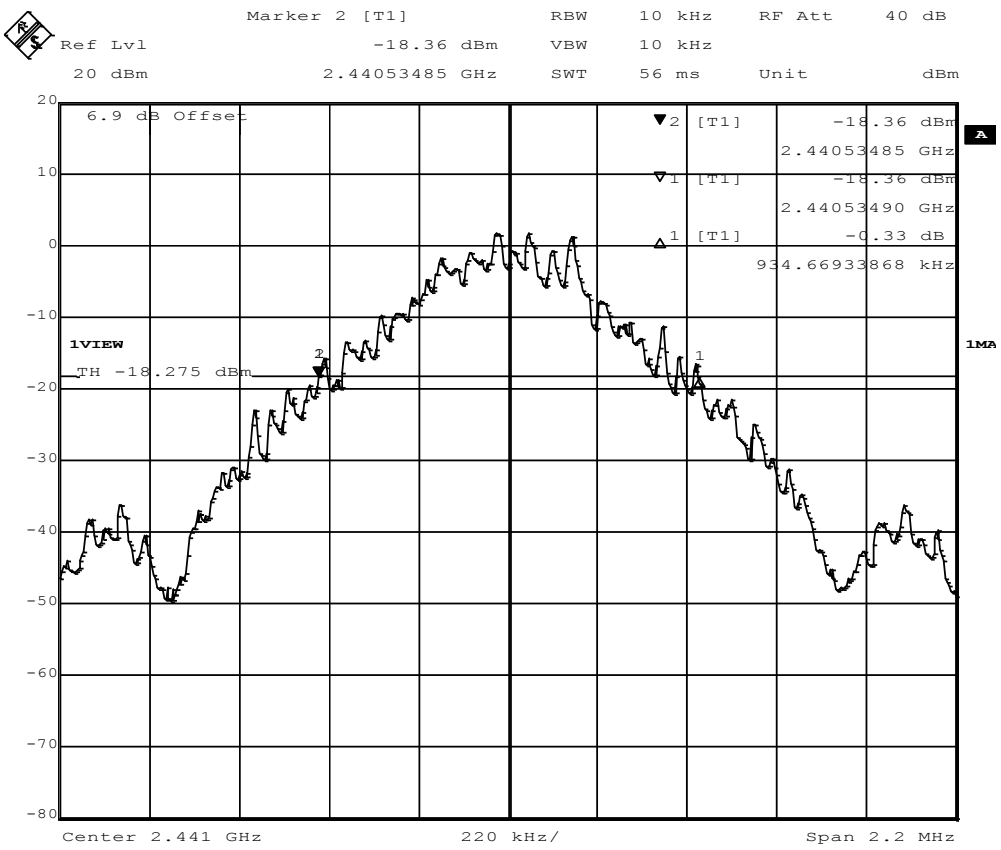


Comment A: 20 dB bandwidth: 934.7 KHz
Date: 30.NOV.2012 13:17:50

20 dB Bandwidth – DH5-Sngl F_{MID}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 39 / 2441 MHz / GFSK
Comment 3	Pass

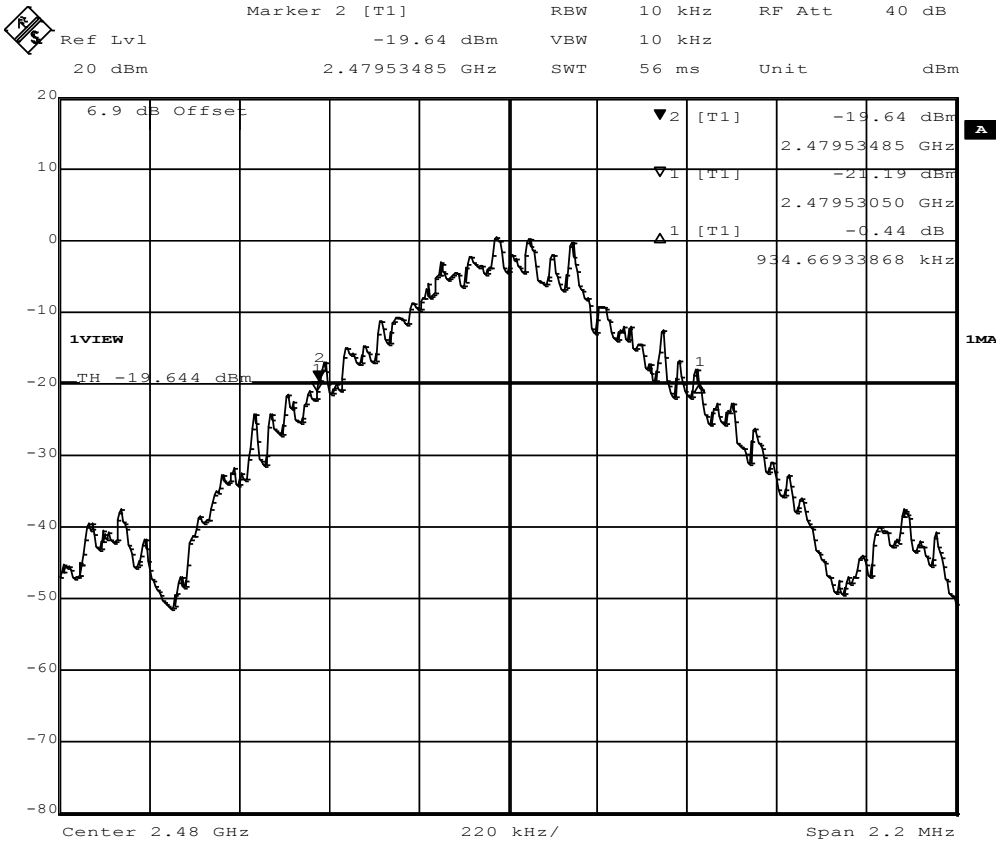


Comment A: 20 dB bandwidth: 934.7 KHz
Date: 30.NOV.2012 13:21:31

20 dB Bandwidth – DH5-Sngl F_{HIGH}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / GFSK
Comment 3	Pass

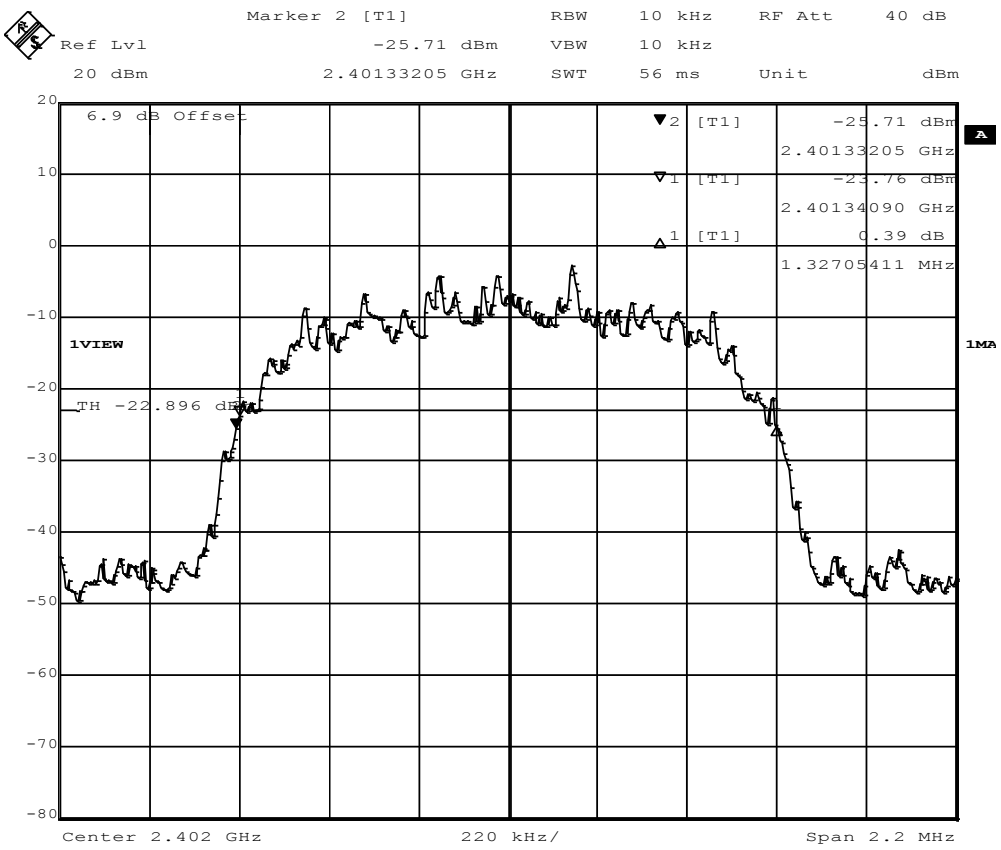


Comment A: 20 dB bandwidth: 934.7 KHz
Date: 30.NOV.2012 13:24:25

20 dB Bandwidth – 2-DH5-Sngl F_{LOW}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 0 / 2402 MHz / π/4-DQPSK
Comment 3	Pass

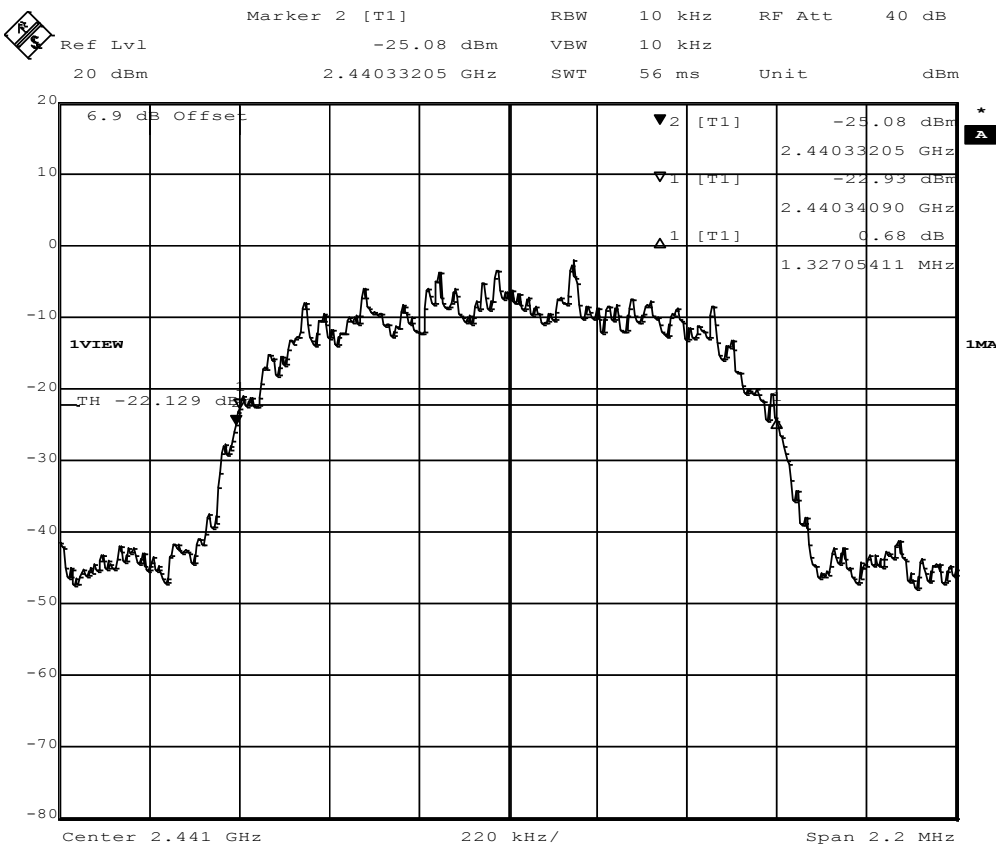


Comment A: 20 dB bandwidth: 1327.1 KHz
Date: 30.NOV.2012 12:51:36

20 dB Bandwidth – 2-DH5-Sngl F_{MID}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 39 / 2441 MHz / π/4-DQPSK
Comment 3	Pass

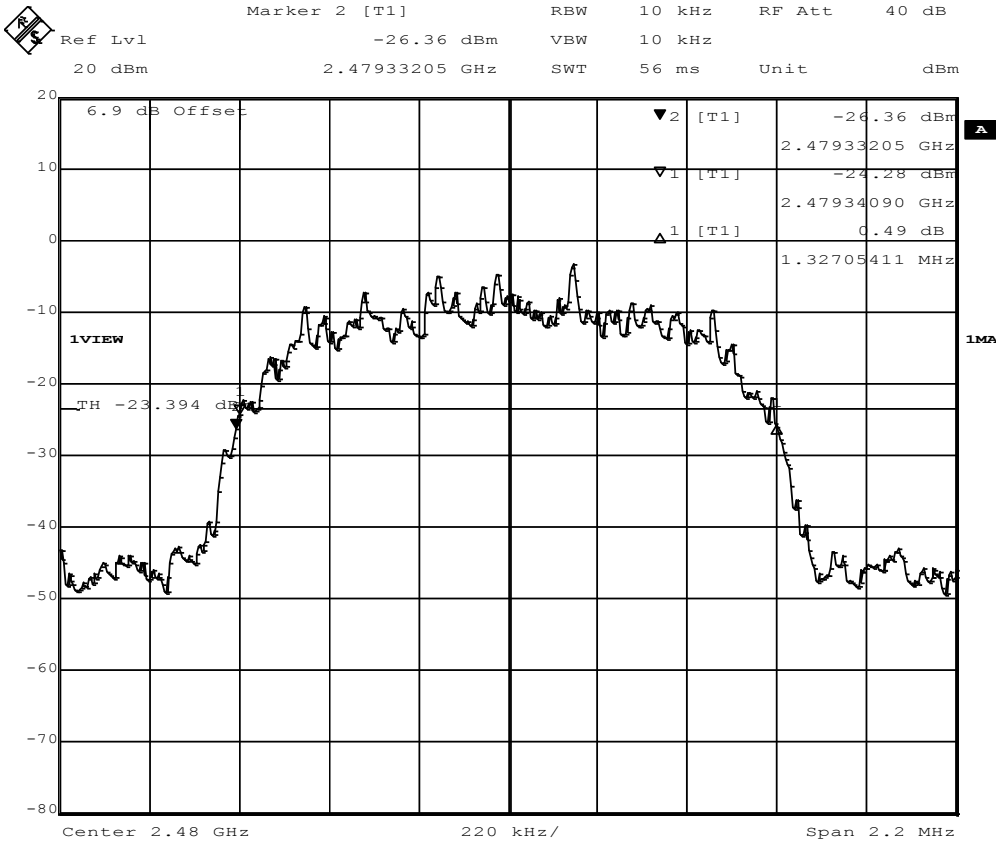


Comment A: 20 dB bandwidth: 1327.1 KHz
Date: 30.NOV.2012 12:46:26

20 dB Bandwidth – 2-DH5-Sngl F_{HIGH}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / π/4-DQPSK
Comment 3	Pass

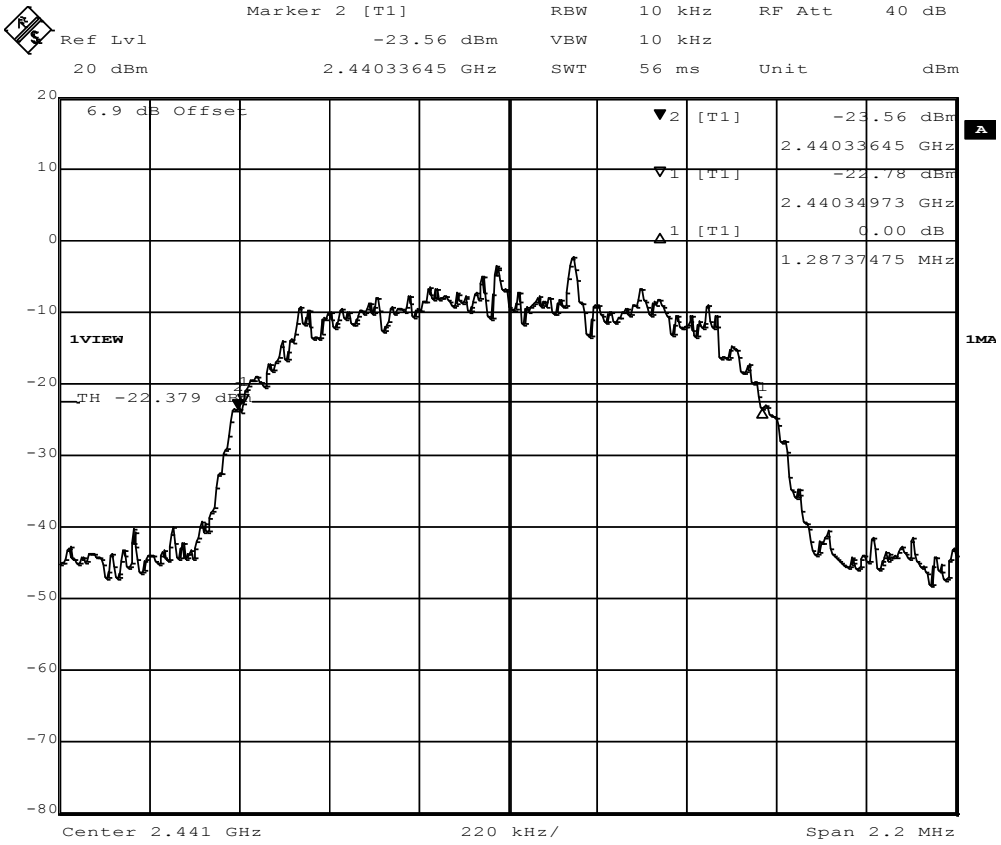


Comment A: 20 dB bandwidth: 1327.1 KHz
Date: 30.NOV.2012 13:02:13

20 dB Bandwidth – 3-DH5-Sngl F_{LOW}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 0 / 2402 MHz / 8DPSK
Comment 3	Pass

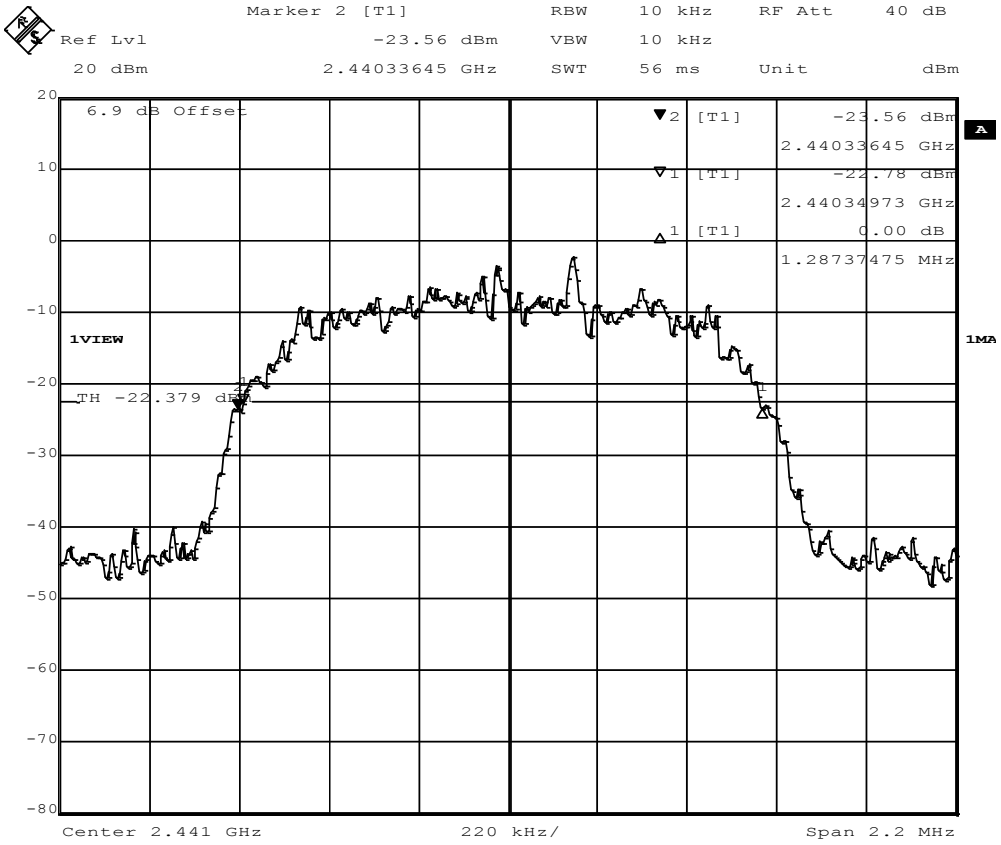


Comment A: 20 dB bandwidth: 1287.4 KHz
Date: 30.NOV.2012 13:10:17

20 dB Bandwidth – 3-DH5-Sngl F_{MID}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 39 / 2441 MHz / 8DPSK
Comment 3	Pass

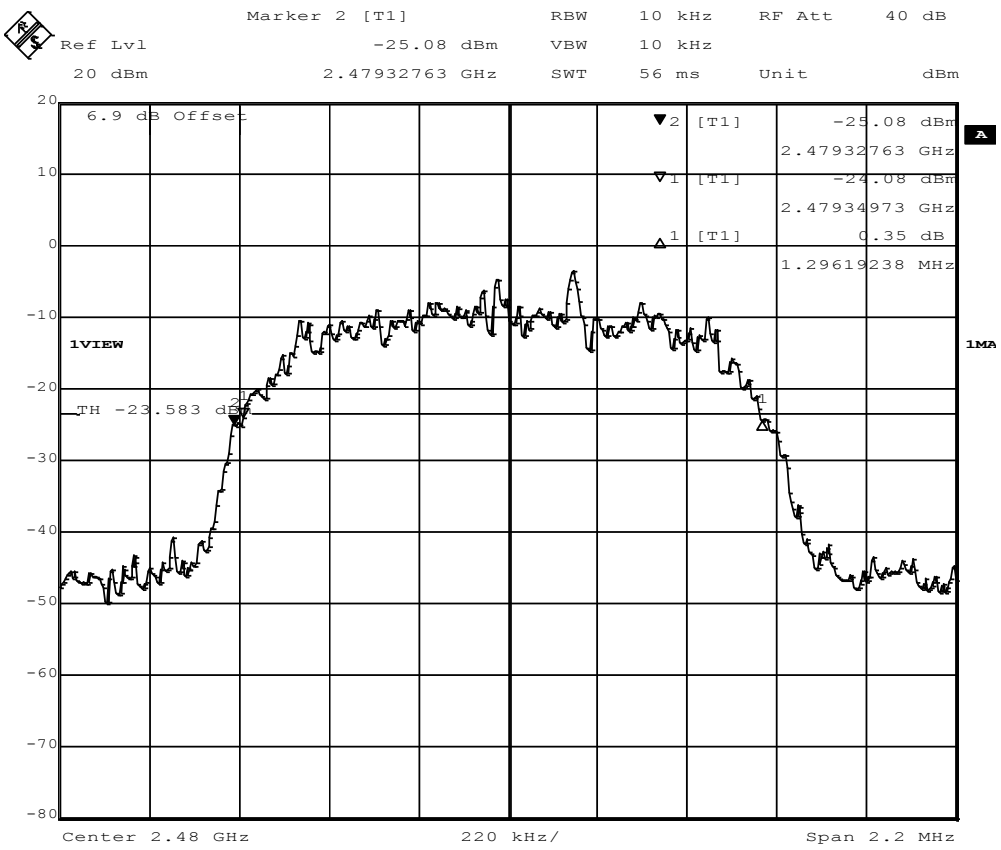


Comment A: 20 dB bandwidth: 1287.4 KHz
Date: 30.NOV.2012 13:10:17

20 dB Bandwidth – 3-DH5-Sngl F_{HIGH}

FCC part 15.247
20 dB bandwidth

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / 8DPSK
Comment 3	Pass



Comment A: 20 dB bandwidth: 1296.2 KHz
Date: 30.NOV.2012 13:06:07

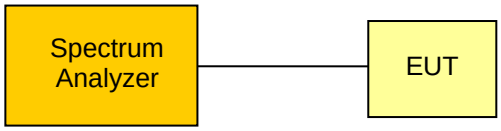
3.3 Test Conditions and Results – Number of hopping frequencies

Number of hopping frequencies acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(a)(1)(iii) / IC RSS-210 A8.1
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	F_{LOW} - F_{HIGH}
EUT test mode	DH5-Hop

Limits

Limit	Condition
Number of hopping channels ≥ 15	Output power ≤ 125 mW / 21 dBm
Number of hopping channels ≥ 75	125 mW / 21 dBm < Output power ≤ 1 W / 30 dBm

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to measurement frequency range
3. Detector set to peak and max hold
4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra
5. The number of peaks is counted to determine number of hopping frequencies

Test results

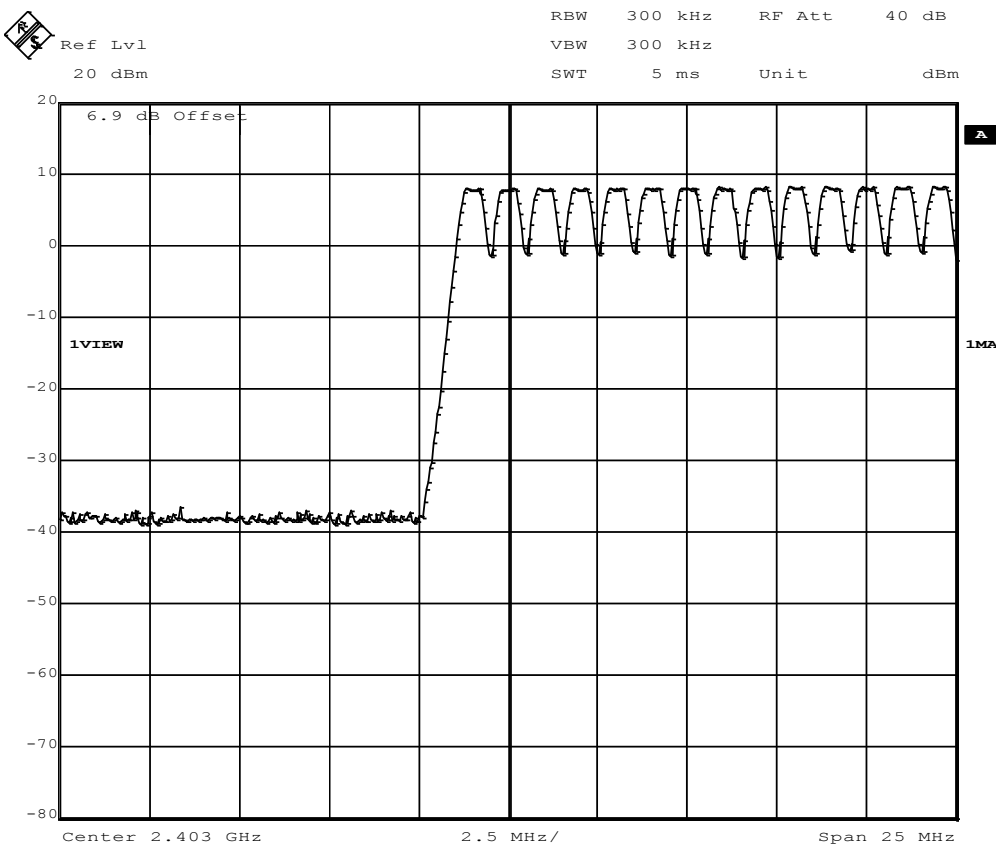
Number of hopping frequencies	Limit	Result
79	≥ 15	PASS

Comments:

Number of hopping frequencies - Range A

FCC part 15.247
Number of hopping frequencies

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.: 0-13
Comment 3	Pass

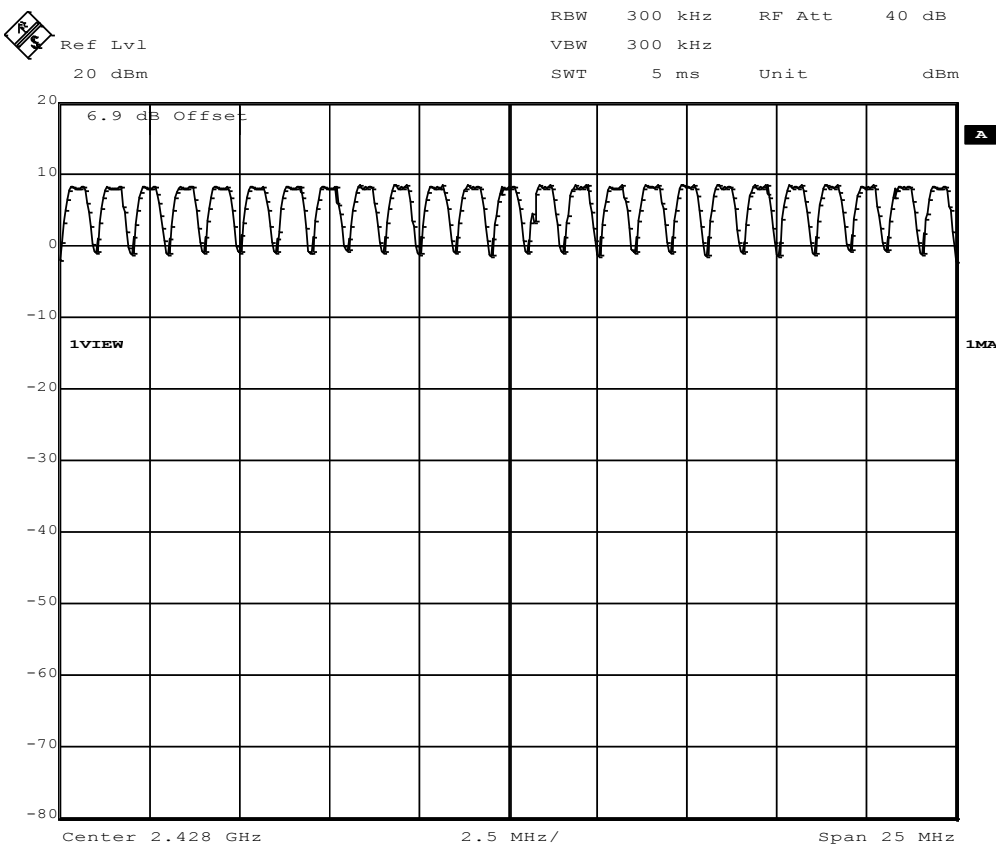


Comment A: Number of hopping frequencies
Date: 30.NOV.2012 14:53:16

Number of hopping frequencies - Range B

FCC part 15.247
Number of hopping frequencies

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.: 14-38
Comment 3	Pass

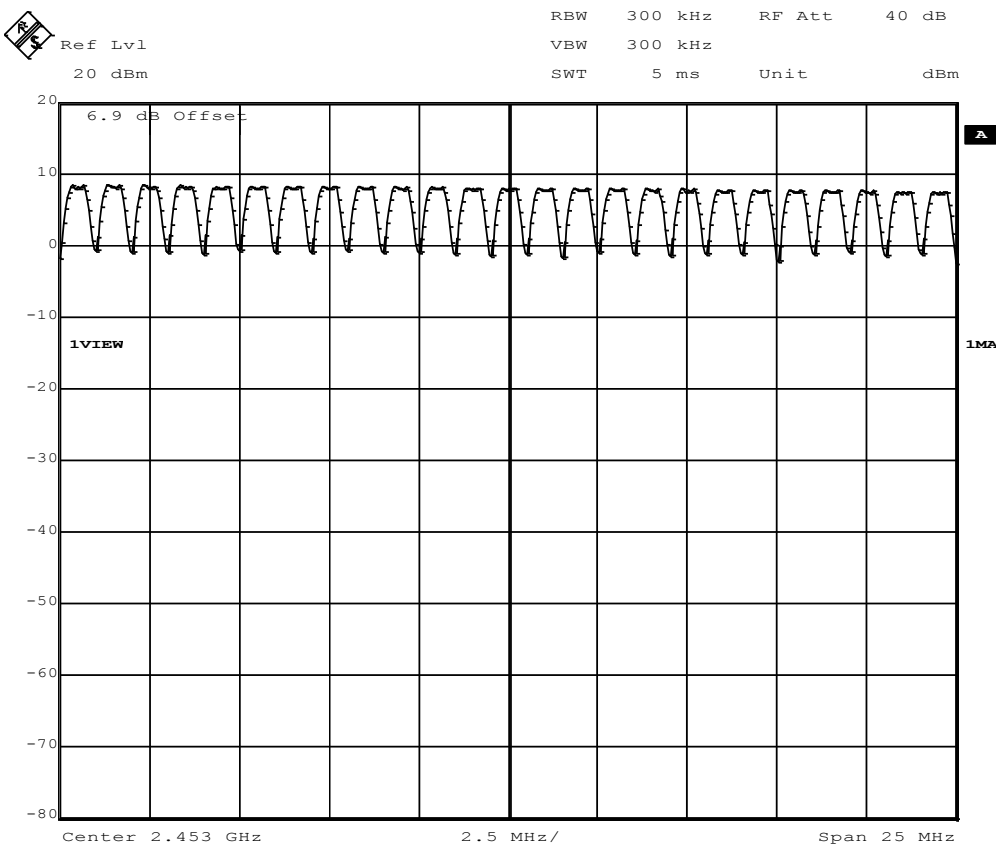


Comment A: Number of hopping frequencies
Date: 30.NOV.2012 14:55:27

Number of hopping frequencies - Range C

FCC part 15.247
Number of hopping frequencies

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.:39-63
Comment 3	Pass

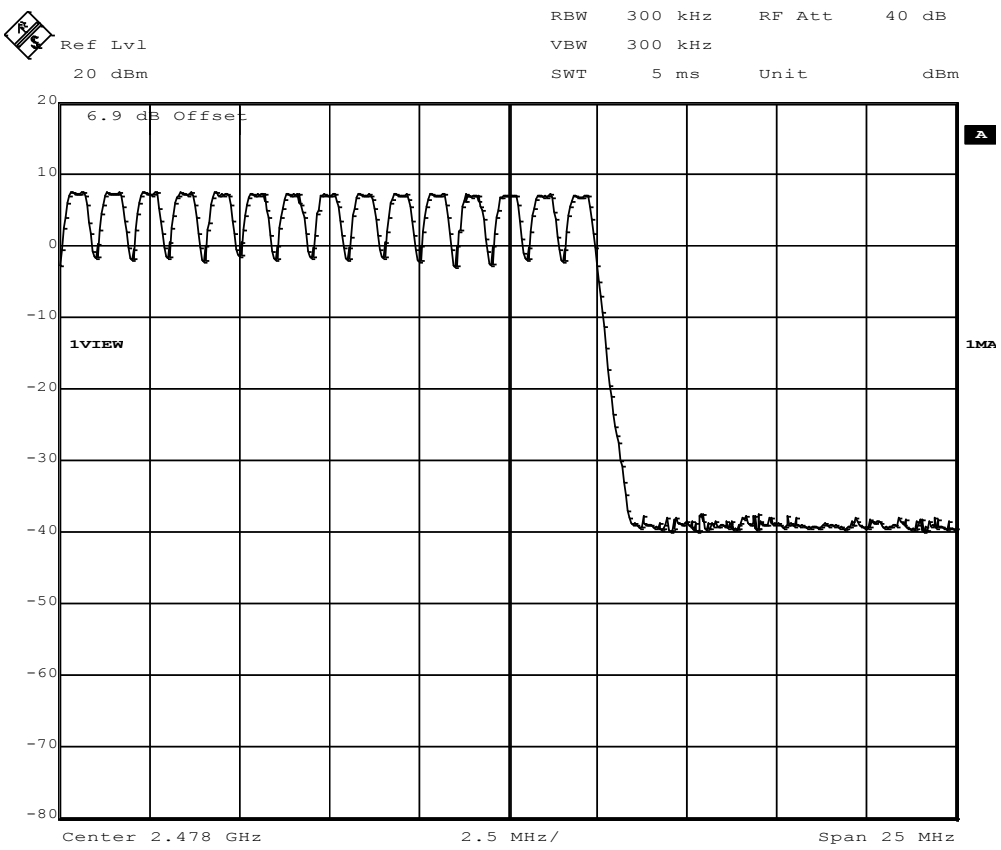


Comment A: Number of hopping frequencies
Date: 30.NOV.2012 15:01:04

Number of hopping frequencies - Range D

FCC part 15.247
Number of hopping frequencies

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.: 64-78
Comment 3	Pass



Comment A: Number of hopping frequencies
Date: 30.NOV.2012 15:03:46

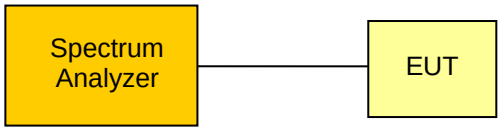
3.4 Test Conditions and Results – Frequency hopping channel separation

Frequency hopping channel separation acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(a)(1) / IC RSS-210 A8.1
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	2441 & 2442 MHz
EUT test mode	DH5-Hop

Limits

Limit	Condition
≥ 25 kHz or ⅔ of 20 dB bandwidth	Output power ≤ 125 mW / 21 dBm
≥ 25 kHz or 20 dB bandwidth	125 mW / 21 dBm < Output power ≤ 1 W / 30 dBm

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to measurement frequency range
3. Detector set to peak and max hold
4. Resolution bandwidth is set small enough to resolve hopping channel emission spectra
5. The two adjacent channel peaks are marked
6. Channel separation is determined from frequency separation of markers

Test results

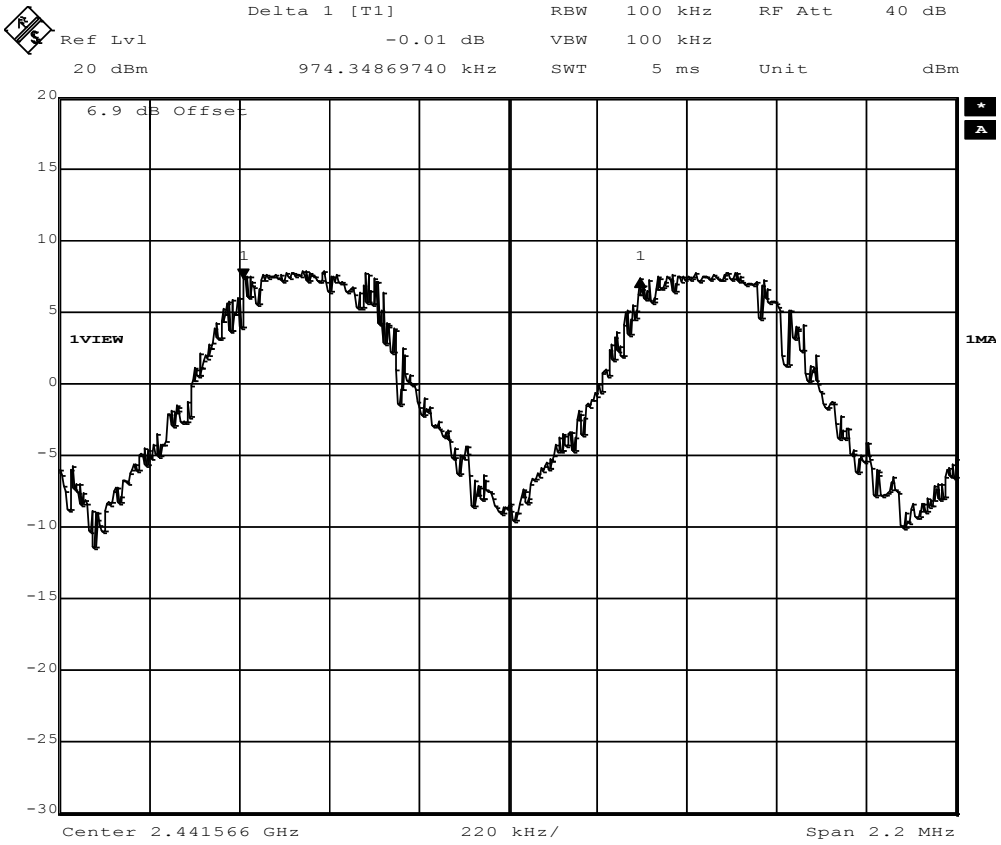
Channel separation [kHz]	Limit [kHz]	Result
974.348	≥ ⅔ · 934.67 = 623.11	PASS

Comments:

Frequency hopping channel separation

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / GFSK
Comment 3	Hopping mode



Comment A: Limit: > two-thirds of the 20 dB bandwidth ; Result: Pass
Date: 30.NOV.2012 14:49:01

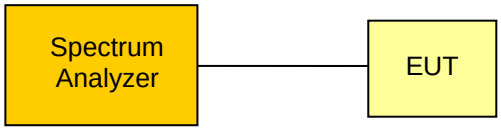
3.5 Test Conditions and Results – Time of occupancy (Dwell Time)

Time of occupancy (Dwell time) acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(a)(1)(iii) / IC RSS-210 A8.1
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	2441 MHz
EUT test mode	DH5-Hop

Limits

Limit
Time of occupancy ≤ 0.4 s within 0.4 s · Number of hopping channels

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Center frequency set to test channel center frequency
3. Span set to zero span and detector to peak and max hold
4. Resolution bandwidth is set to 100kHz and sweep time to observation period
5. Time of occupancy determined from number of peaks multiplied by single hop dwell time

Test results

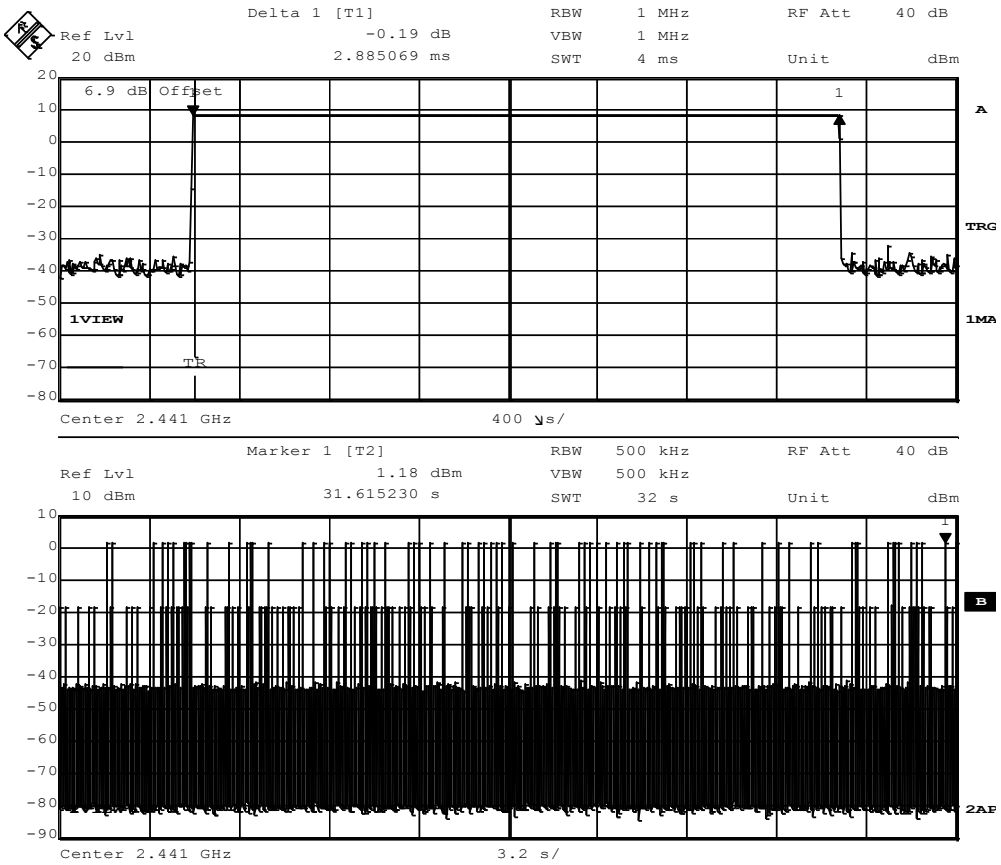
Observation period [s]	No. of hops	Dwell time/hop [s]	Time of occupancy [s]	Limit [s]	Result
31.6	66	0.002	0.190	≤ 0.4	PASS

Comments:

Time of occupancy

FCC part 15.247
Time of occupancy inquiry

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(a)
Comment 1	Time of occupancy inquiry
Comment 2	Channel.: 39 / 2441 MHz
Comment 3	66 events * 2.88507 ms Result: 190.41 ms



3.6 Test Conditions and Results – Maximum peak conducted power

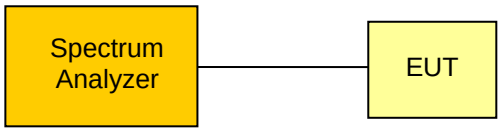
Maximum peak conducted power acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(b)(1) / IC RSS-210 A8.4
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
Measurement mode	Peak
Maximum antenna gain	3 dBi ⇒ Limit correction = 0 dB

Limits

Limit	Condition
1 W (30 dBm)	Number of hopping channels ≥ 75
0.125 W (21 dBm)	75 > Number of hopping channels ≥ 15

The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Center frequency set to test channel center frequency
3. Span set to twice the 20 dB bandwidth and detector to peak and max hold
4. Resolution bandwidth is set to 3 MHz
5. Peak conducted power is determined from peak of spectrum envelope

Test results								
Channel	Frequency [MHz]	Voltage	Mode	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]	Result
F_{LOW}	2402	3.3 VDC	DH5-Sngl	7.46	0.006	30	-22.54	PASS
F_{LOW}	2402	3.0 VDC	DH5-Sngl	7.45	0.006	30	-22.55	PASS
F_{LOW}	2402	3.6 VDC	DH5-Sngl	7.47	0.006	30	-22.53	PASS
F_{MID}	2441	3.3 VDC	DH5-Sngl	8.32	0.007	30	-21.68	PASS
F_{MID}	2441	3.0 VDC	DH5-Sngl	8.30	0.007	30	-21.70	PASS
F_{MID}	2441	3.6 VDC	DH5-Sngl	7.95	0.006	30	-22.05	PASS
F_{HIGH}	2480	3.3 VDC	DH5-Sngl	6.99	0.005	30	-23.01	PASS
F_{HIGH}	2480	3.0 VDC	DH5-Sngl	7.97	0.006	30	-22.03	PASS
F_{HIGH}	2480	3.6 VDC	DH5-Sngl	7.00	0.005	30	-23.00	PASS
F_{LOW}	2402	3.3 VDC	2DH5-Sngl	6.07	0.004	30	-23.93	PASS
F_{LOW}	2402	3.0 VDC	2DH5-Sngl	6.06	0.004	30	-23.94	PASS
F_{LOW}	2402	3.6 VDC	2DH5-Sngl	6.08	0.004	30	-23.92	PASS
F_{MID}	2441	3.3 VDC	2DH5-Sngl	6.59	0.005	30	-23.41	PASS
F_{MID}	2441	3.0 VDC	2DH5-Sngl	6.57	0.005	30	-23.43	PASS
F_{MID}	2441	3.6 VDC	2DH5-Sngl	6.58	0.005	30	-23.42	PASS
F_{HIGH}	2480	3.3 VDC	2DH5-Sngl	5.41	0.003	30	-24.59	PASS
F_{HIGH}	2480	3.0 VDC	2DH5-Sngl	5.38	0.003	30	-24.62	PASS
F_{HIGH}	2480	3.6 VDC	2DH5-Sngl	5.42	0.003	30	-24.58	PASS
F_{LOW}	2402	3.3 VDC	3DH5-Sngl	6.06	0.004	30	-23.94	PASS
F_{LOW}	2402	3.0 VDC	3DH5-Sngl	6.04	0.004	30	-23.96	PASS
F_{LOW}	2402	3.6 VDC	3DH5-Sngl	6.05	0.004	30	-23.95	PASS
F_{MID}	2441	3.3 VDC	3DH5-Sngl	6.57	0.005	30	-23.43	PASS
F_{MID}	2441	3.0 VDC	3DH5-Sngl	6.51	0.004	30	-23.49	PASS
F_{MID}	2441	3.6 VDC	3DH5-Sngl	6.58	0.005	30	-23.42	PASS
F_{HIGH}	2480	3.3 VDC	3DH5-Sngl	5.43	0.003	30	-24.57	PASS
F_{HIGH}	2480	3.0 VDC	3DH5-Sngl	5.41	0.003	30	-24.59	PASS
F_{HIGH}	2480	3.6 VDC	3DH5-Sngl	5.45	0.004	30	-24.55	PASS
Comments:								

3.7 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 [dBµV]	Result	Average [dBµV]	Result
0.15 to 5	66 to 56*	PASS	56 to 46*	PASS
0.5 to 5	56	PASS	46	PASS
5 to 30	60	PASS	50	PASS
Comments: * Limit decreases linearly with the logarithm of the frequency.				

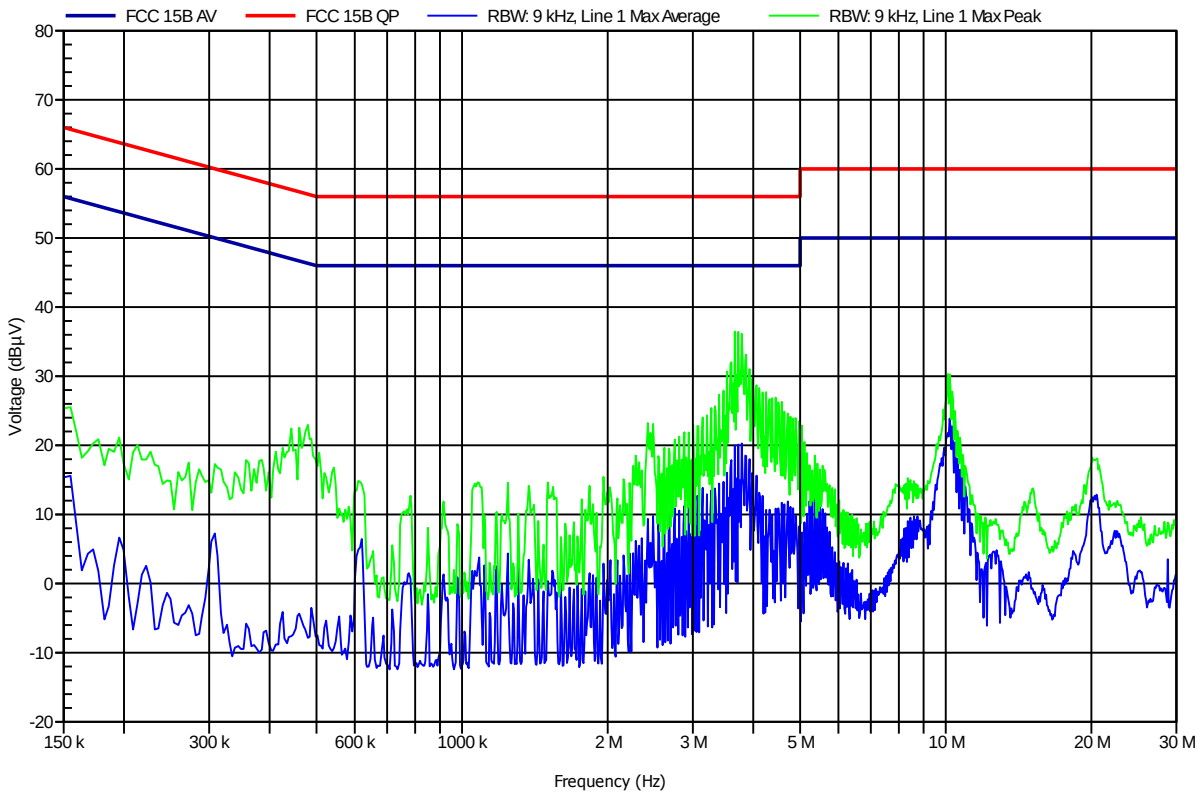
Conducted Emissions

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

Project number: G0M-1211-2443

Manufacturer:	lesswire AG
EUT Name:	WLAN/Bluetooth module
Model:	WiBear11n-SF1
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 3,3 V DC
LISN:	ESH2-Z5 L
Mode:	Bluetooth
Test Date:	2012-12-07
Note:	

Index 16



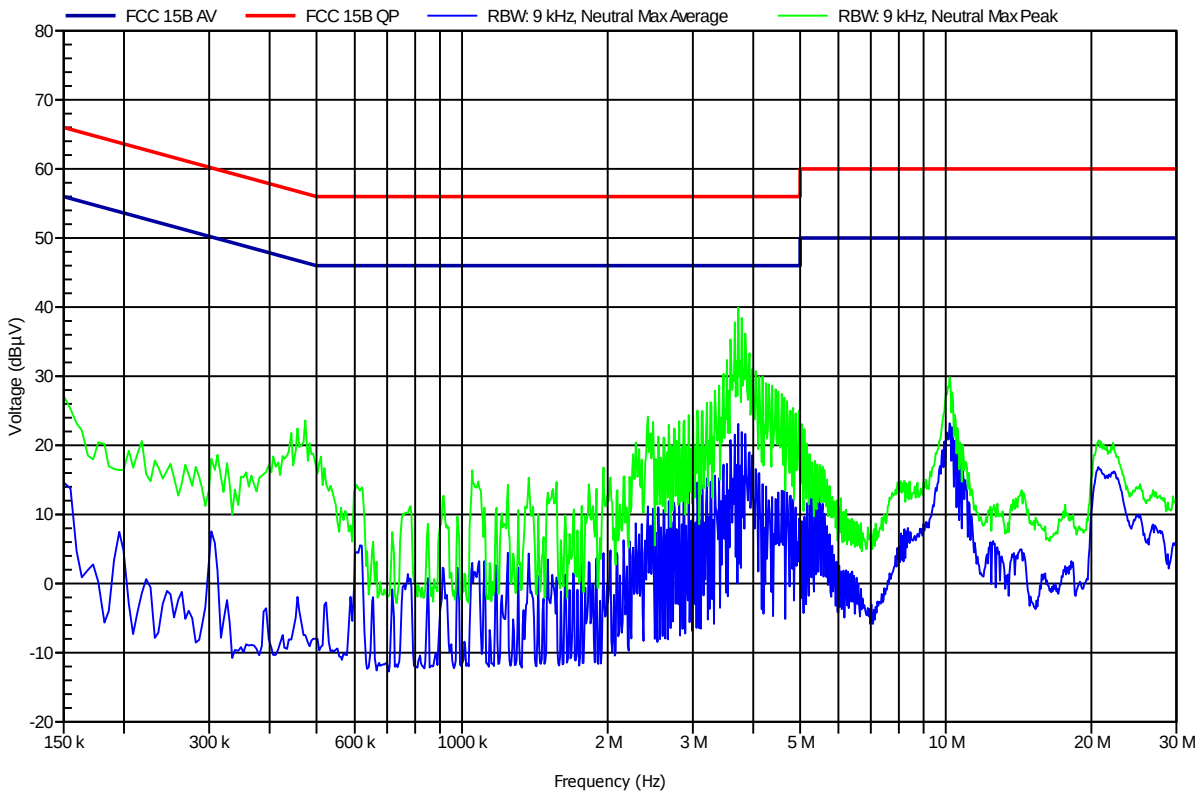
Conducted Emissions

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

Project number: G0M-1211-2443

Manufacturer:	lesswire AG
EUT Name:	WLAN/Bluetooth module
Model:	WiBear11n-SF1
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 3,3 V DC
LISN:	ESH2-Z5 N
Mode:	Bluetooth
Test Date:	2012-12-07
Note:	

Index 15



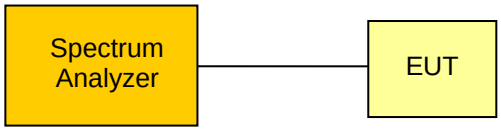
3.8 Test Conditions and Results – Band edge compliance

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 Public Notice DA 00-705
Test frequency range	Tested frequencies
	F_{LOW} / F_{HIGH}
Measurement mode	Peak

Limits

Limit	Condition
≤ -20 dB/100 kHz	Peak power measurement detector = Peak
≤ -30 dB/100 kHz	Peak power measurement detector = RMS

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set around lower band edge and detector is set to peak and max hold
3. Resolution bandwidth is set to 100 kHz
4. Markers are set to peak emission levels within frequency band and outside frequency band
5. Band edge attenuation is determined from level difference

Test results

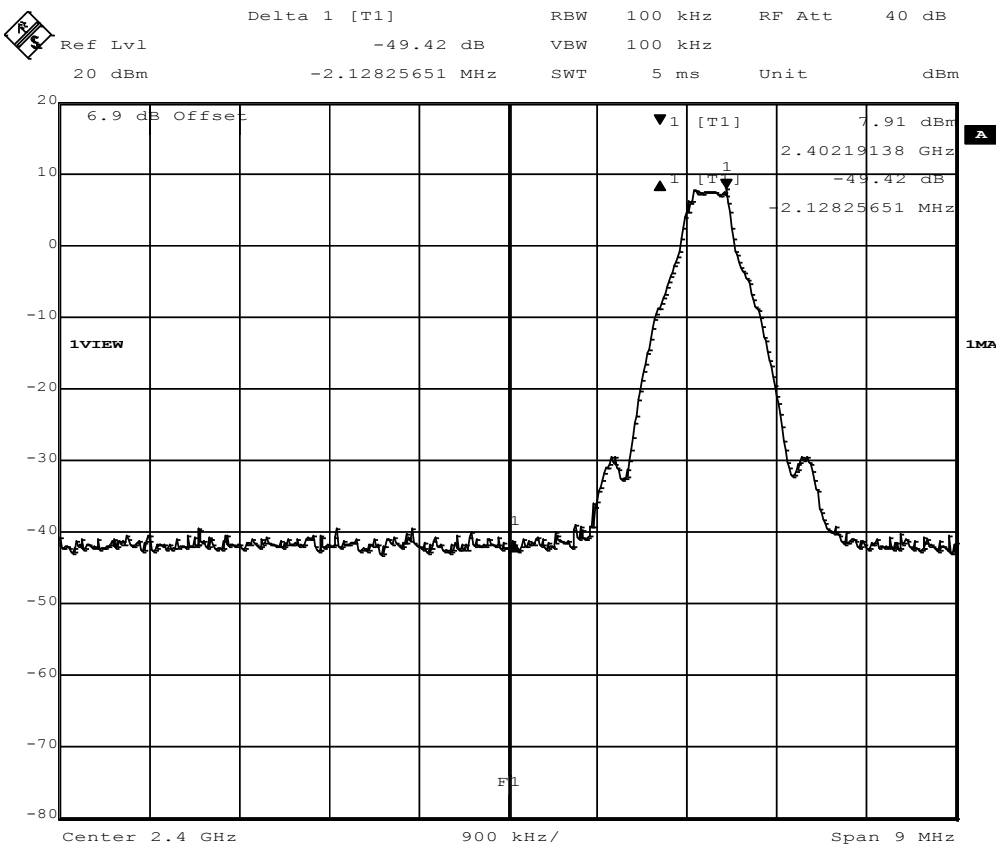
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]	Result
F_{LOW}	2402	DH5-Sngl	-49.42	-20	-29.42	PASS
F_{HIGH}	2480	DH5-Sngl	-48.78	-20	-28.78	PASS
F_{LOW}	2402	DH5-Hop	-48.96	-20	-28.96	PASS
F_{HIGH}	2480	DH5-Hop	-47.76	-20	-27.76	PASS
F_{LOW}	2402	2DH5-Sngl	-44.71	-20	-24.71	PASS
F_{HIGH}	2480	2DH5-Sngl	-45.68	-20	-25.68	PASS
F_{LOW}	2402	2DH5-Hop	-45.47	-20	-25.47	PASS
F_{HIGH}	2480	2DH5-Hop	-45.58	-20	-25.58	PASS

F_{LOW}	2402	3DH5-Sngl	-46.72	-20	-26.72	PASS
F_{HIGH}	2480	3DH5-Sngl	-45.65	-20	-25.65	PASS
F_{LOW}	2402	3DH5-Hop	-45.65	-20	-25.65	PASS
F_{HIGH}	2480	3DH5-Hop	-45.08	-20	-25.08	PASS
Comments:						

Band-edge compliance – DH5-Sngl F_{LOW}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / GFSK
Comment 3	Single frequency mode

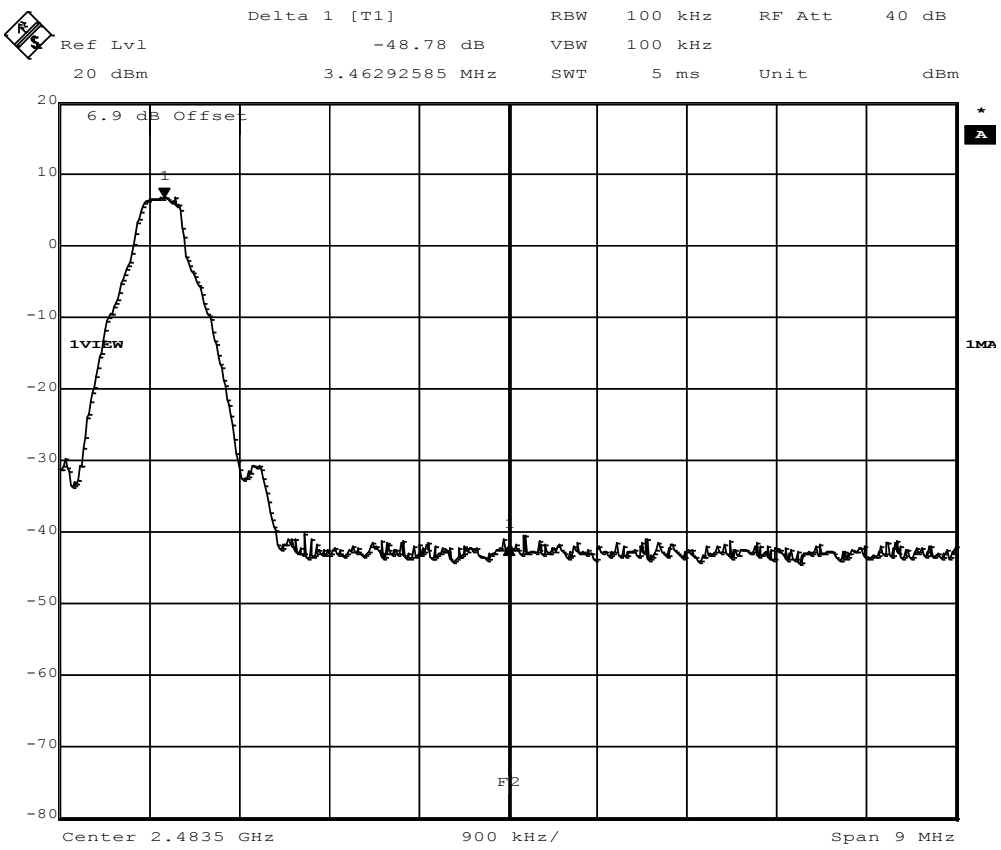


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 13:44:03

Band-edge compliance – DH5-Sngl F_{HIGH}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / GFSK
Comment 3	Single frequency mode

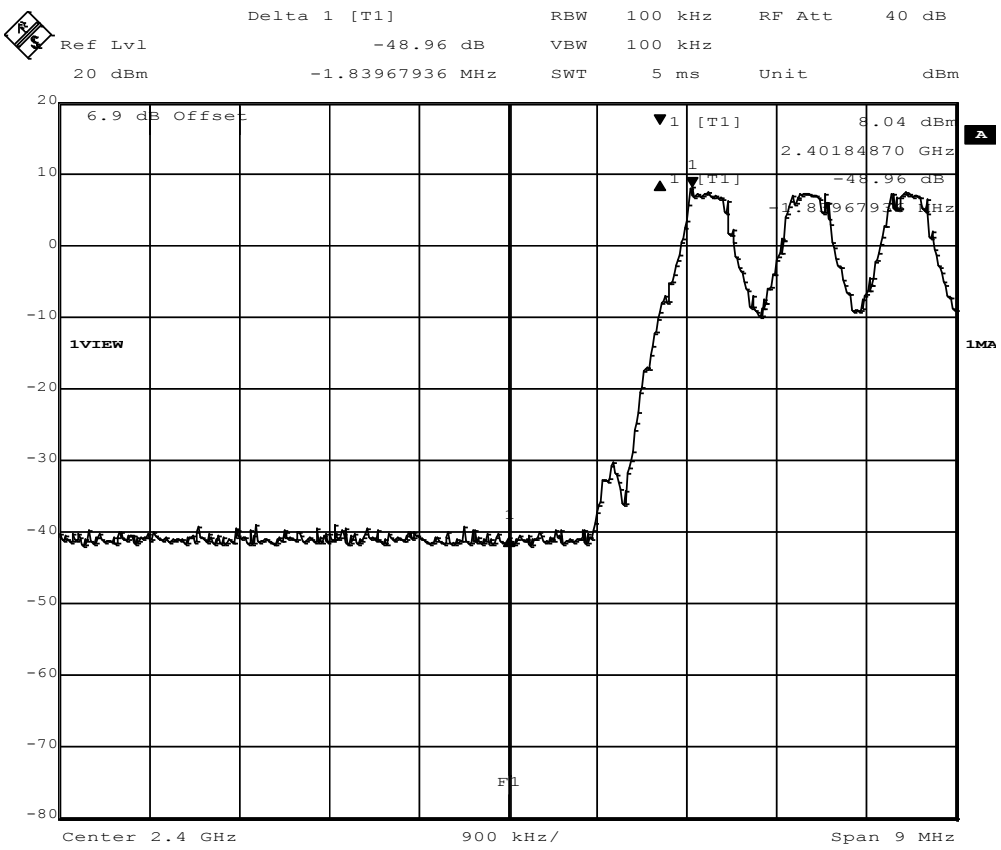


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 13:39:59

Band-edge compliance – DH5-Hop F_{LOW}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / GFSK
Comment 3	Hopping mode

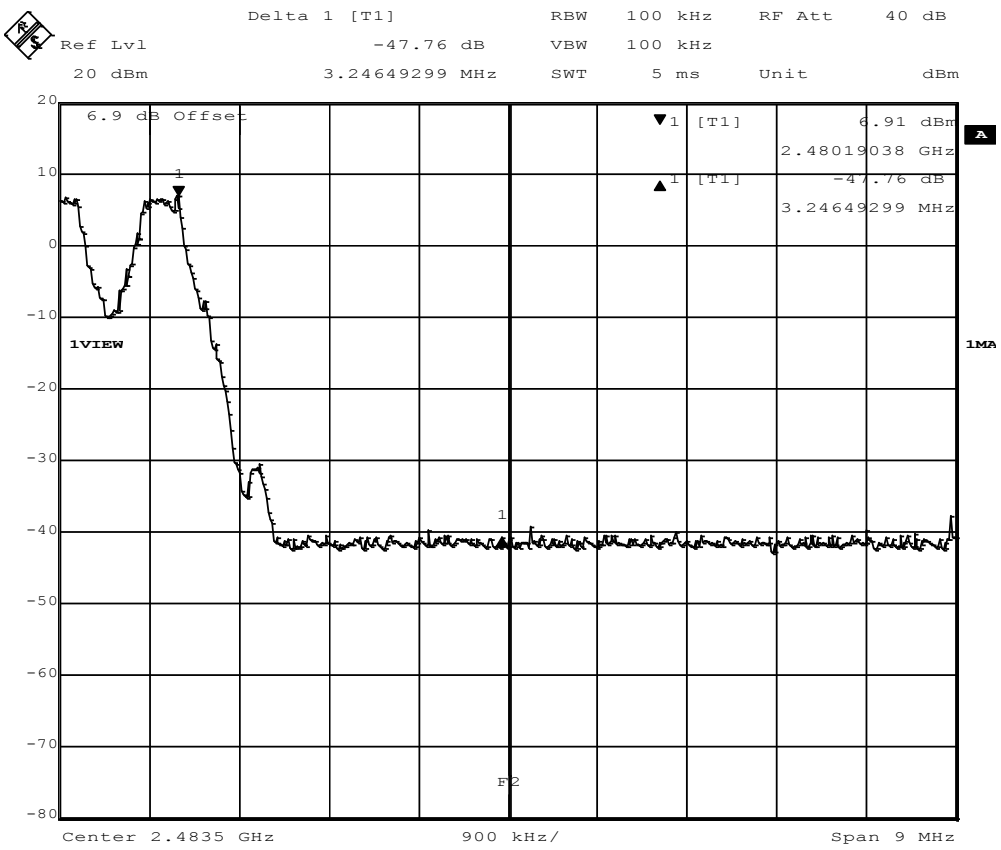


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:39:03

Band-edge compliance – DH5-Hop F_{HIGH}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / GFSK
Comment 3	Hopping mode

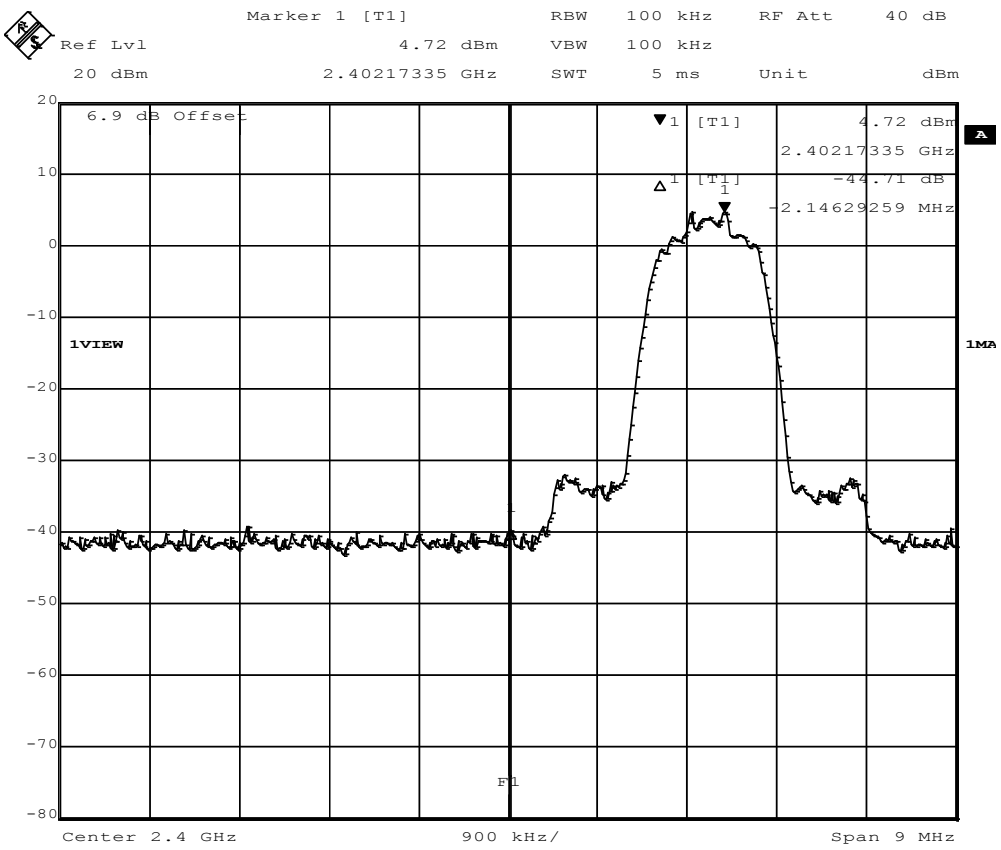


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:35:08

Band-edge compliance – 2-DH5-Sngl F_{LOW}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / π/4-DQPSK
Comment 3	Single frequency mode

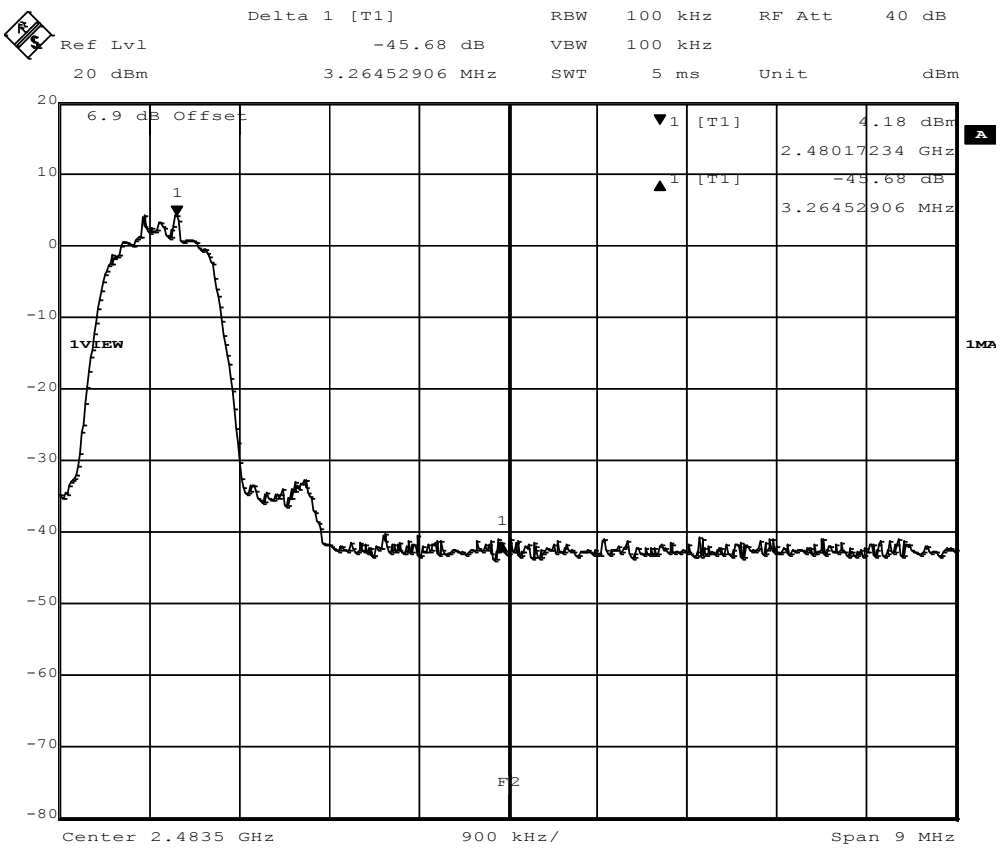


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 13:50:43

Band-edge compliance – 2-DH5-Sngl F_{HIGH}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / π/4-DQPSK
Comment 3	Single frequency mode

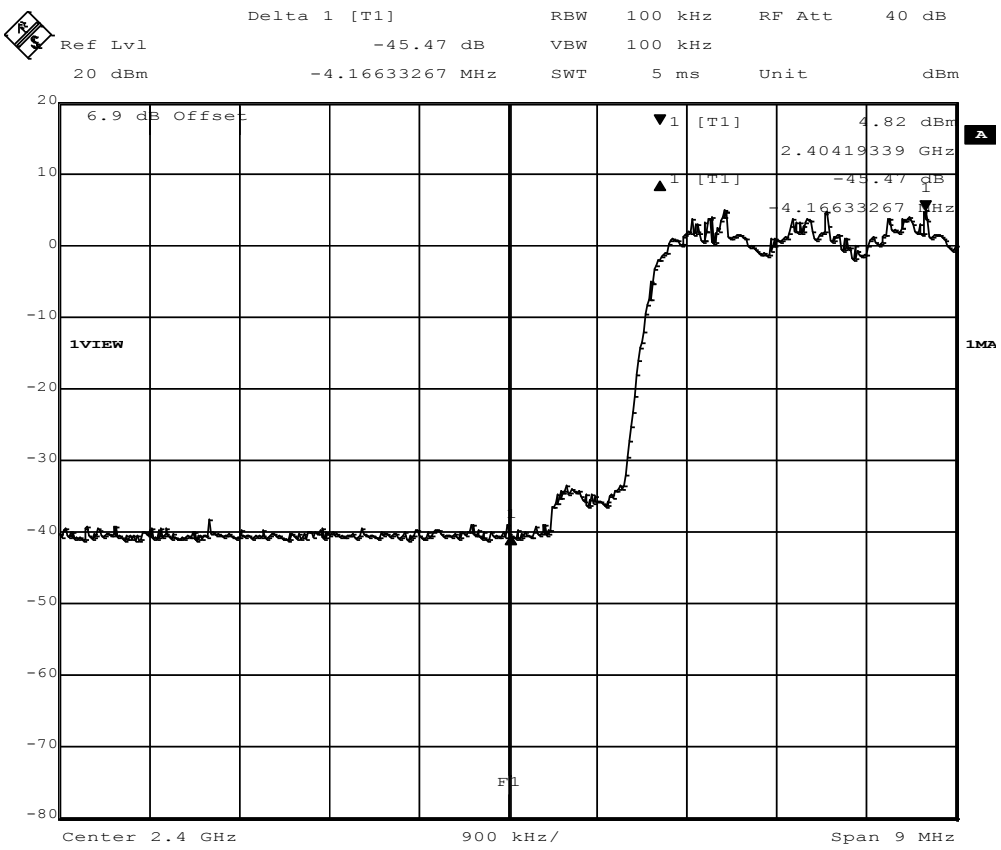


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 13:55:50

Band-edge compliance – 2-DH5-Hop F_{LOW}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / π/4-DQPSK
Comment 3	Hopping mode

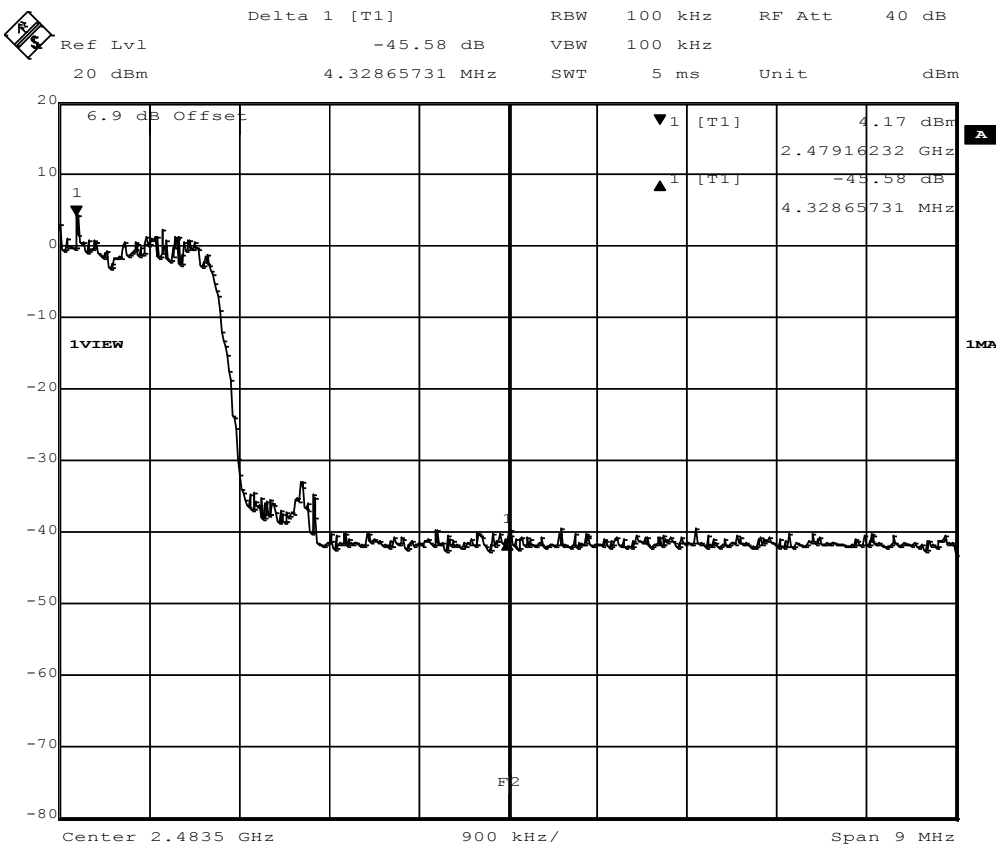


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:24:17

Band-edge compliance – 2-DH5-Hop F_{HIGH}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / π/4-DQPSK
Comment 3	Hopping mode

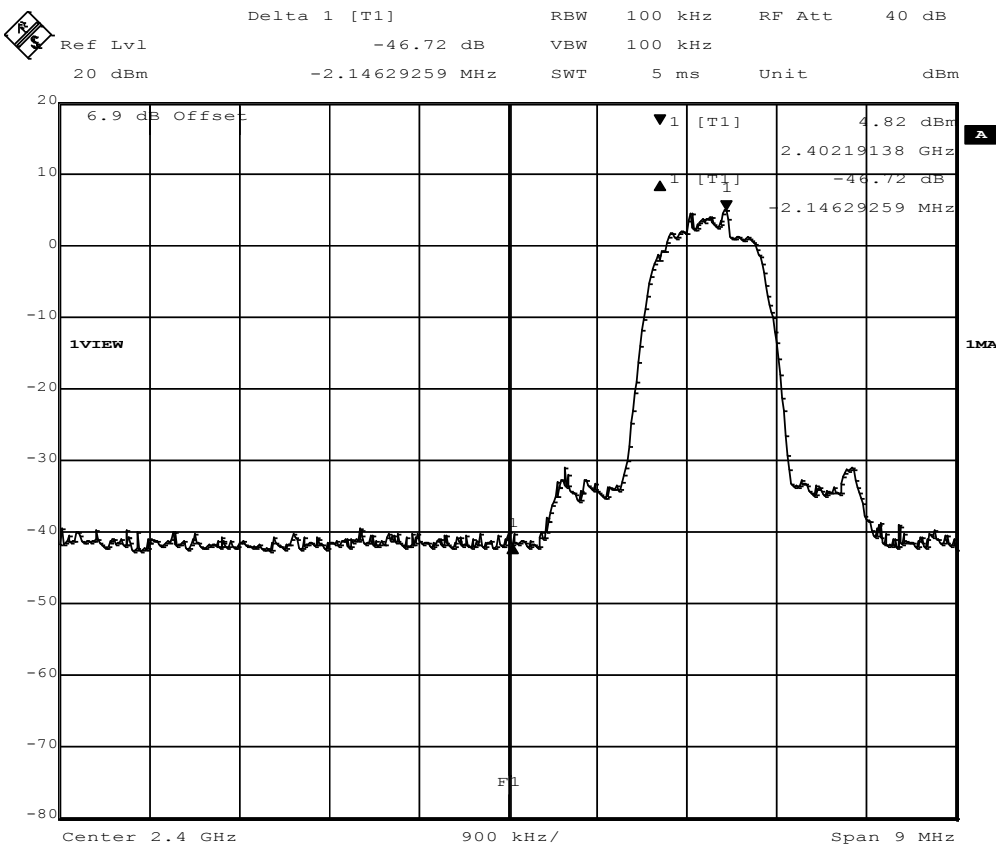


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:29:07

Band-edge compliance – 3-DH5-Sngl F_{LOW}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / 8DPSK
Comment 3	Single frequency mode

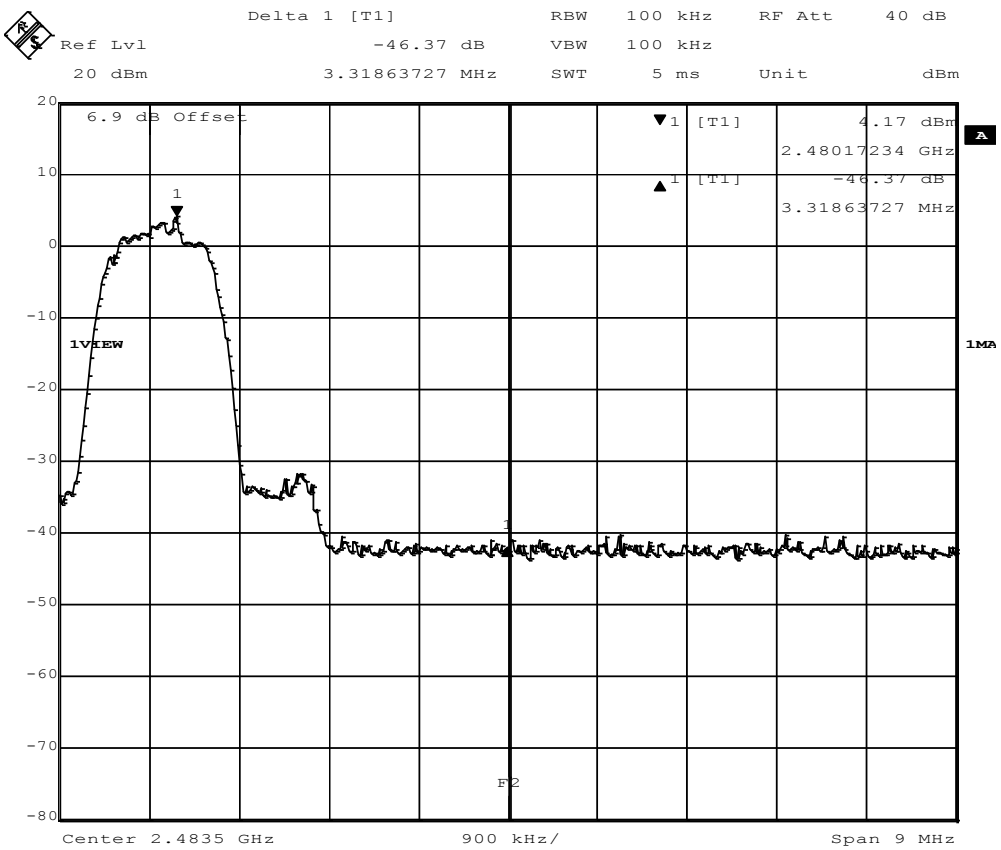


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:01:43

Band-edge compliance – 3-DH5-Sngl F_{HIGH}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / 8DPSK
Comment 3	Single frequency mode

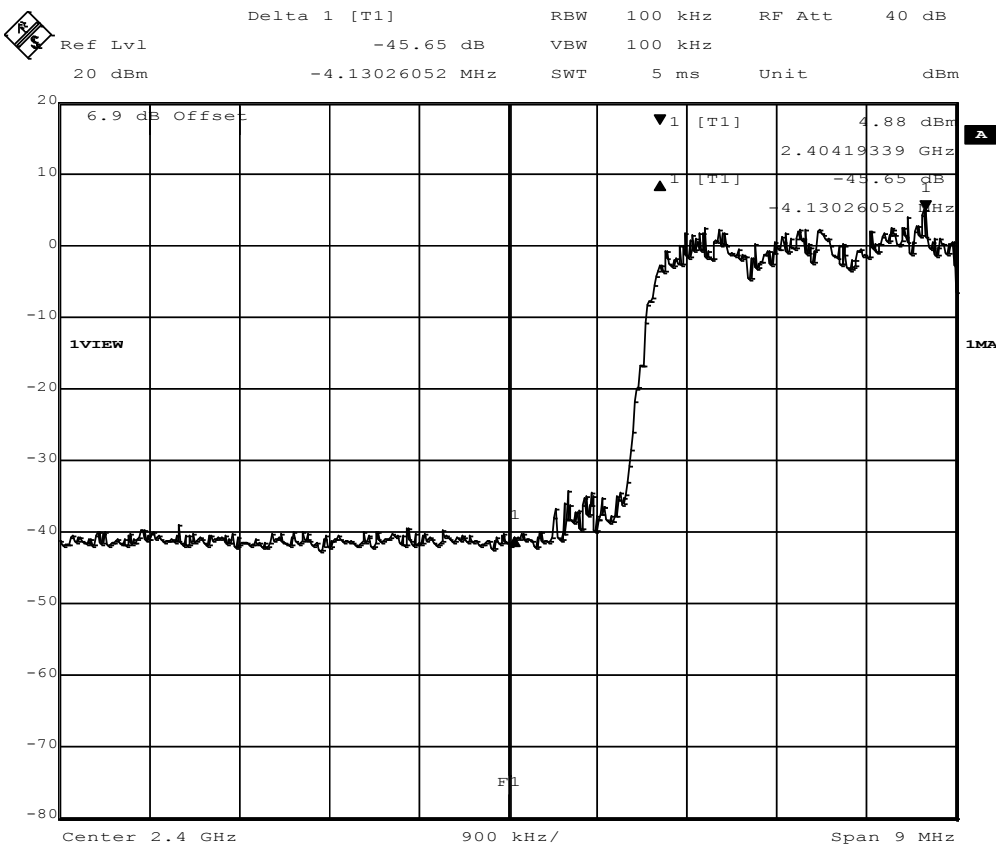


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 13:59:20

Band-edge compliance – 3-DH5-Hop F_{LOW}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / 8DPSK
Comment 3	Hopping mode

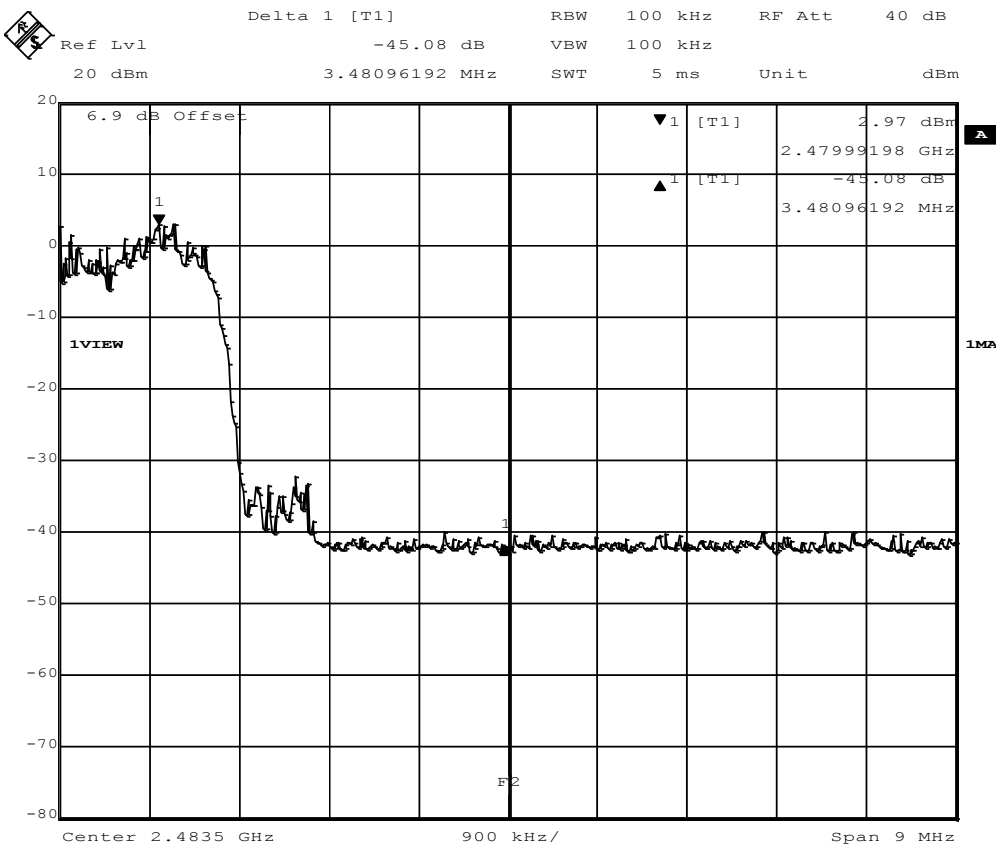


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:11:55

Band-edge compliance – 3-DH5-Hop F_{HIGH}

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / 8DPSK
Comment 3	Hopping mode



Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 30.NOV.2012 14:08:10

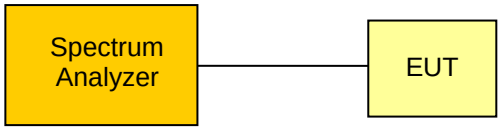
3.9 Test Conditions and Results – Conducted spurious emissions

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 Public Notice DA 00-705
Test frequency range	Tested frequencies
	10 MHz – 10th Harmonic
Measurement mode	Peak

Limits

Limit	Condition
≤ -20 dB/100 kHz	Peak power measurement detector = Peak
≤ -30 dB/100 kHz	Peak power measurement detector = RMS

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span it set according to measurement range
3. Resolution bandwidth is set to 100 kHz and detector to peak and max hold
4. Markers are set to peak emission levels within frequency band
5. Emission level is determined by second marker on emission peak
6. Attenuation is determined from level difference

Test results

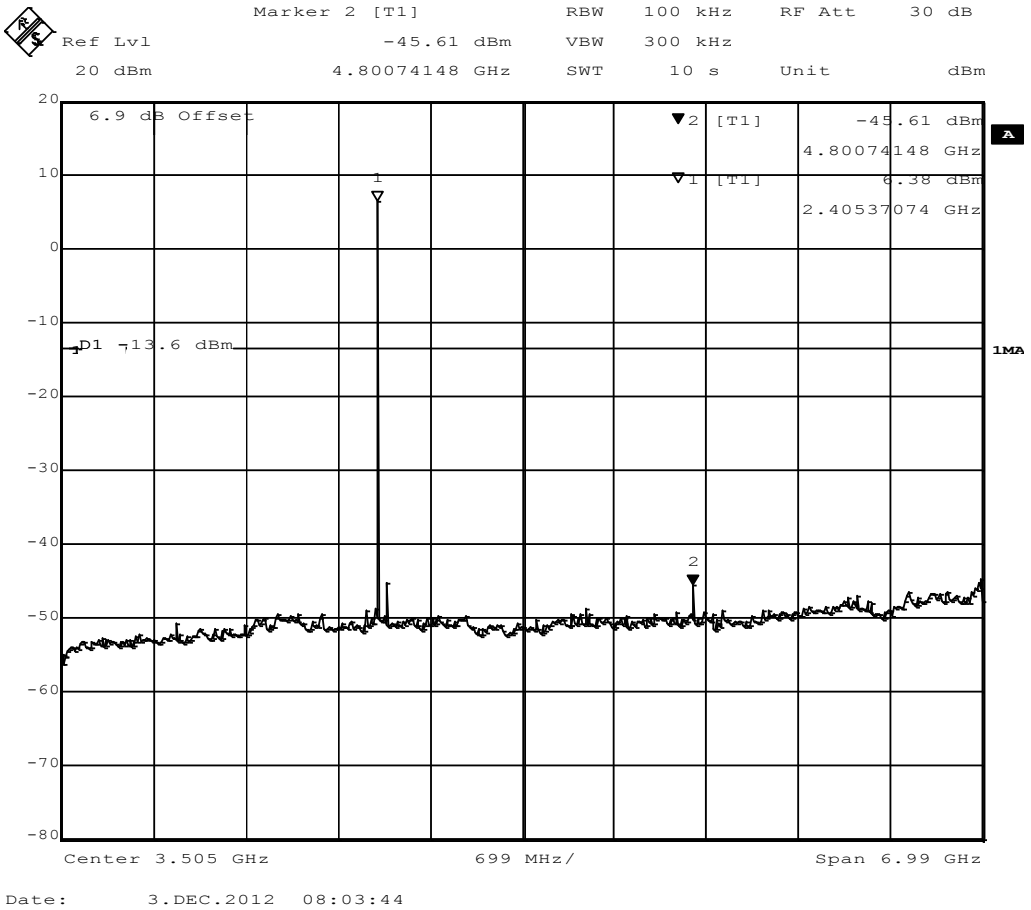
Channel	Frequency [MHz]	Mode	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]	Result
No significant spurious emissions								

Comments:

Conducted spurious emissions – DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

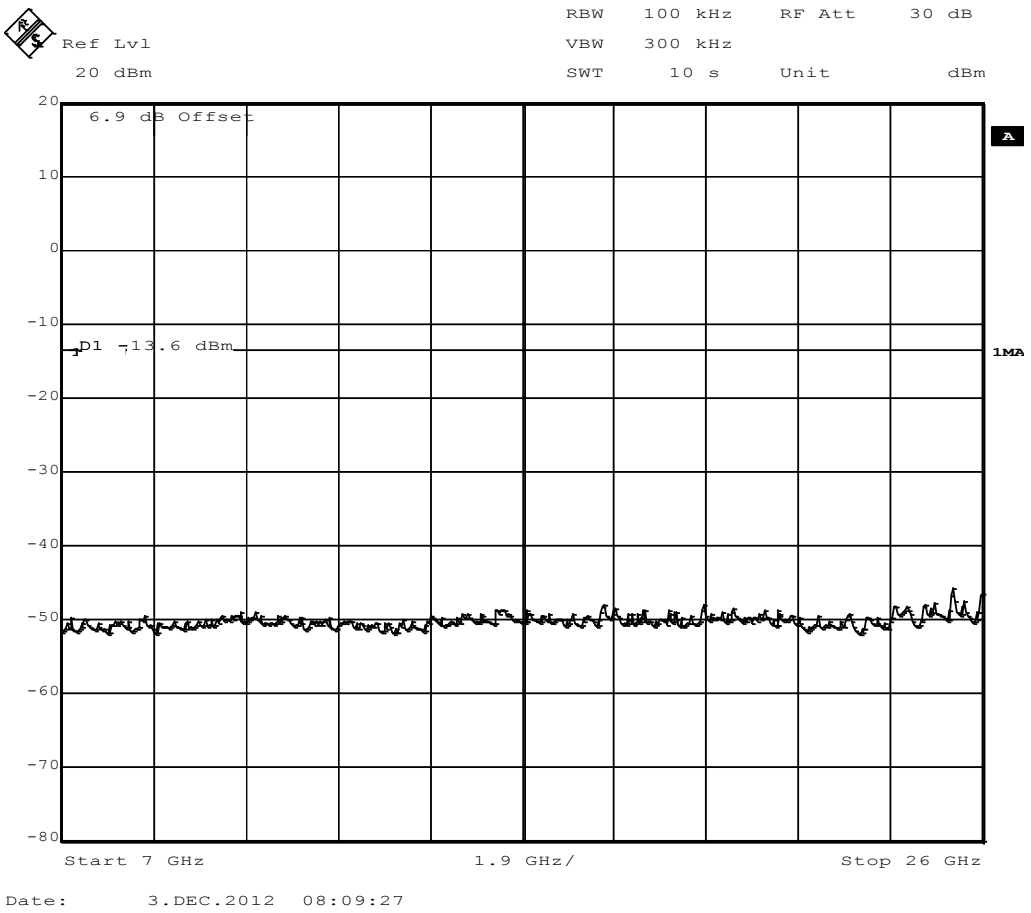
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 0 / 2402 MHz
Comment 3	GFSK / DH5



Conducted spurious emissions – DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

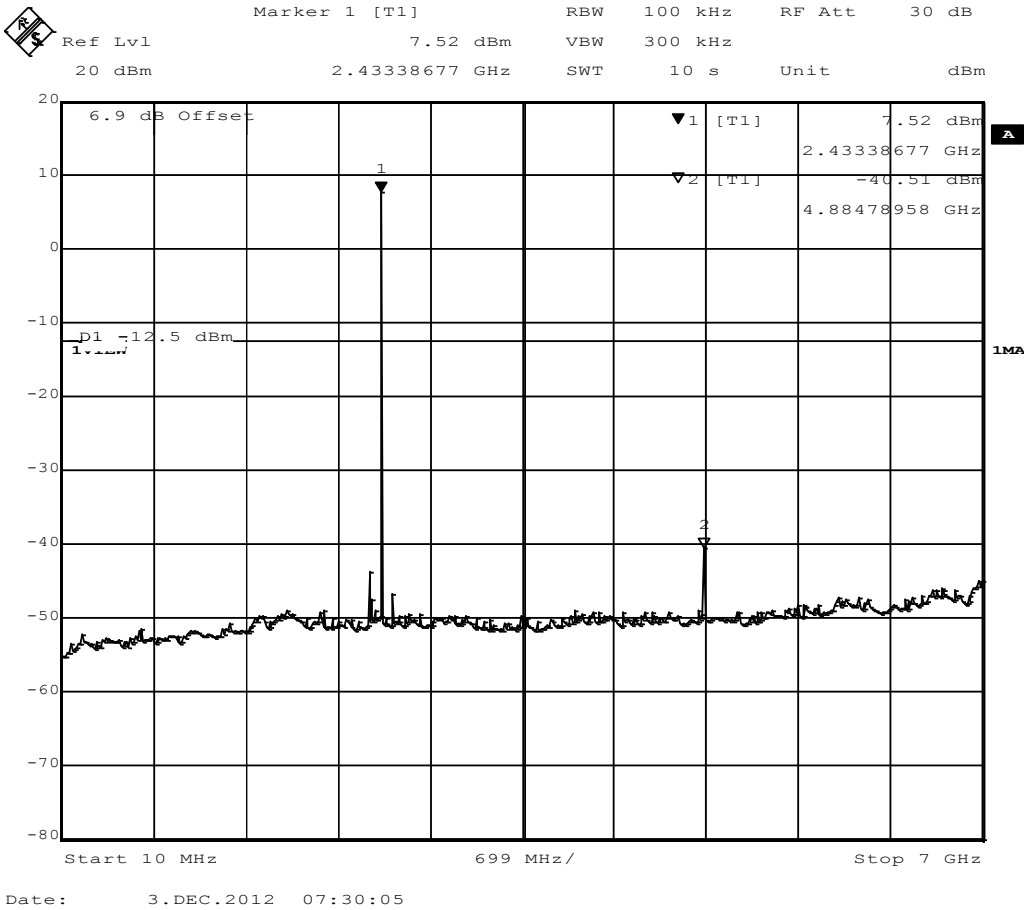
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 0 / 2402 MHz
Comment 3	GFSK / DH5



Conducted spurious emissions – DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

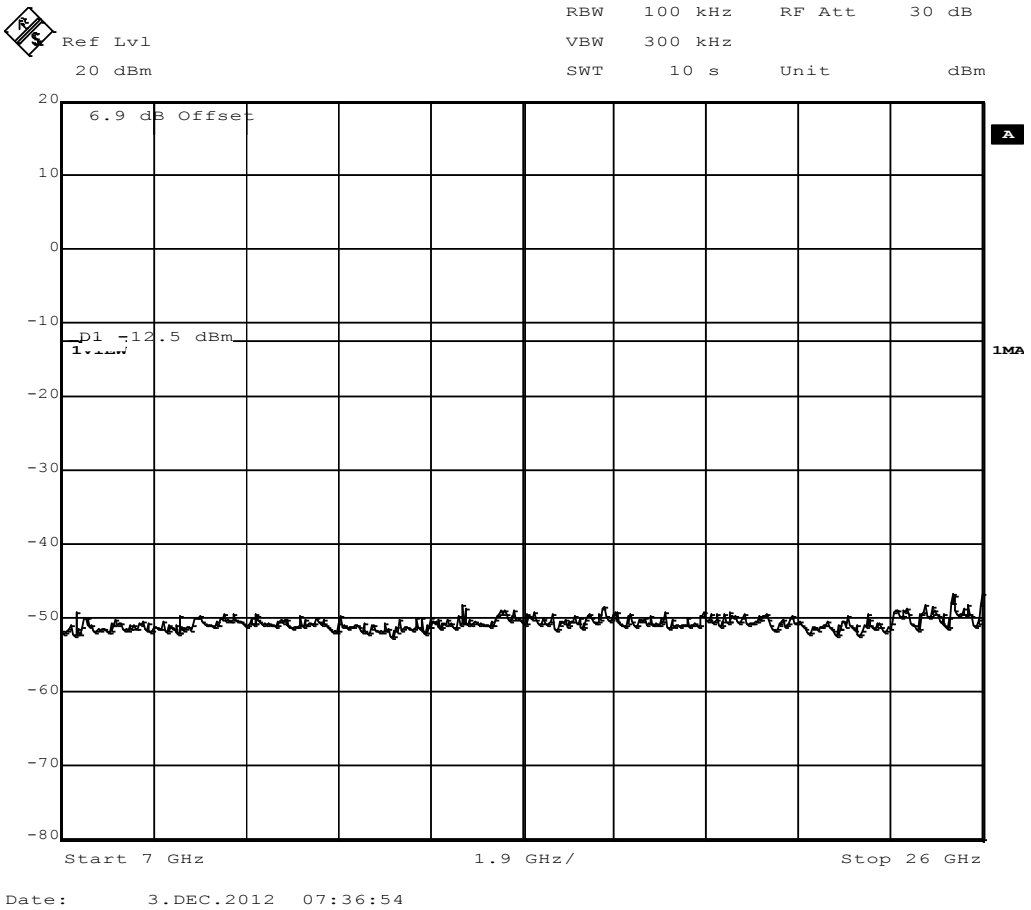
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 39 / 2441 MHz
Comment 3	GFSK / DH5



Conducted spurious emissions – DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

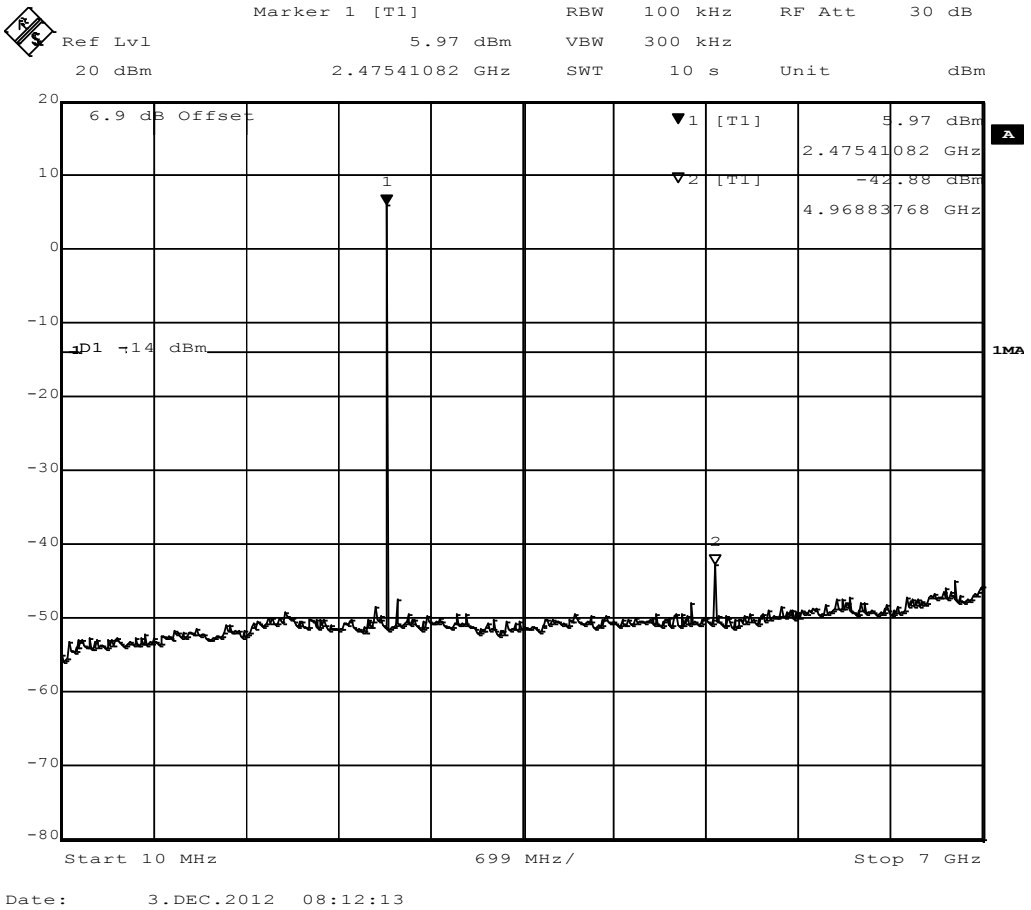
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 39 / 2441 MHz
Comment 3	GFSK / DH5



Conducted spurious emissions – DH5-Sngl F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

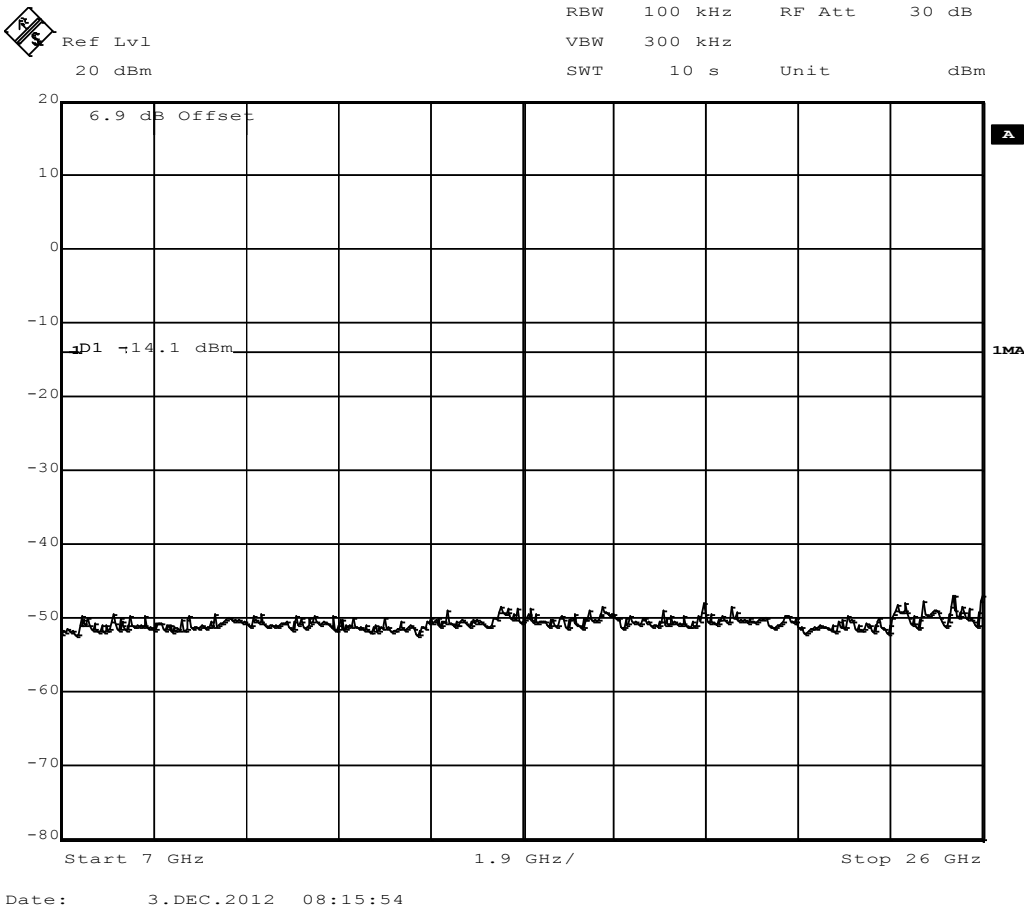
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 78 / 2480 MHz
Comment 3	GFSK / DH5



Conducted spurious emissions – DH5-Sngl F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

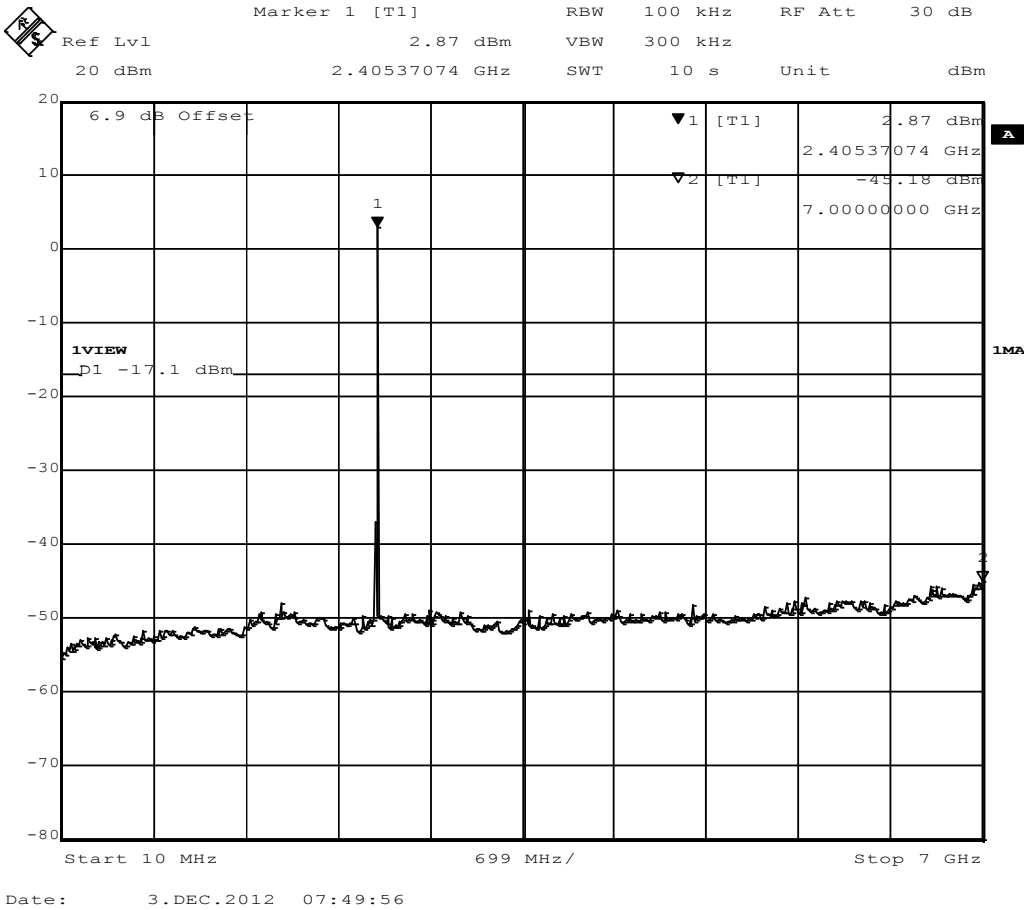
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 78 / 2480 MHz
Comment 3	GFSK / DH5



Conducted spurious emissions – 3-DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

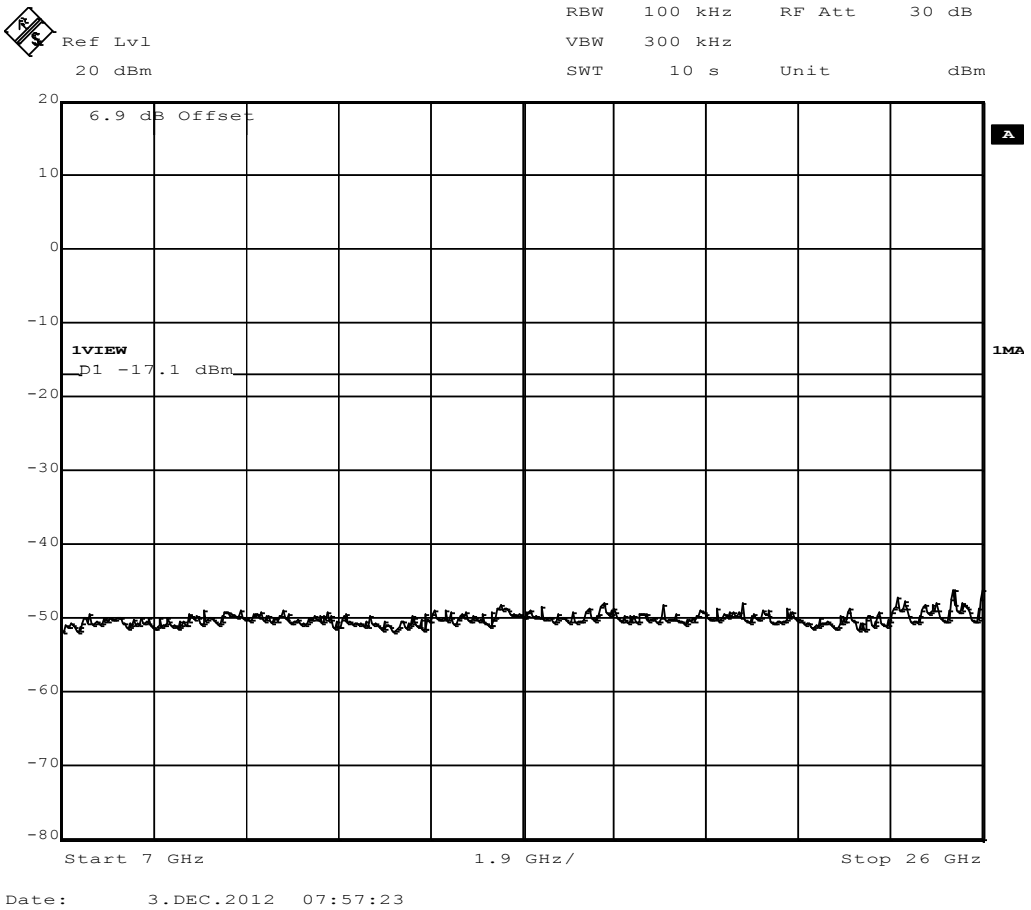
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 0 / 2402 MHz
Comment 3	8DPSK / 3-DH5



Conducted spurious emissions – 3-DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

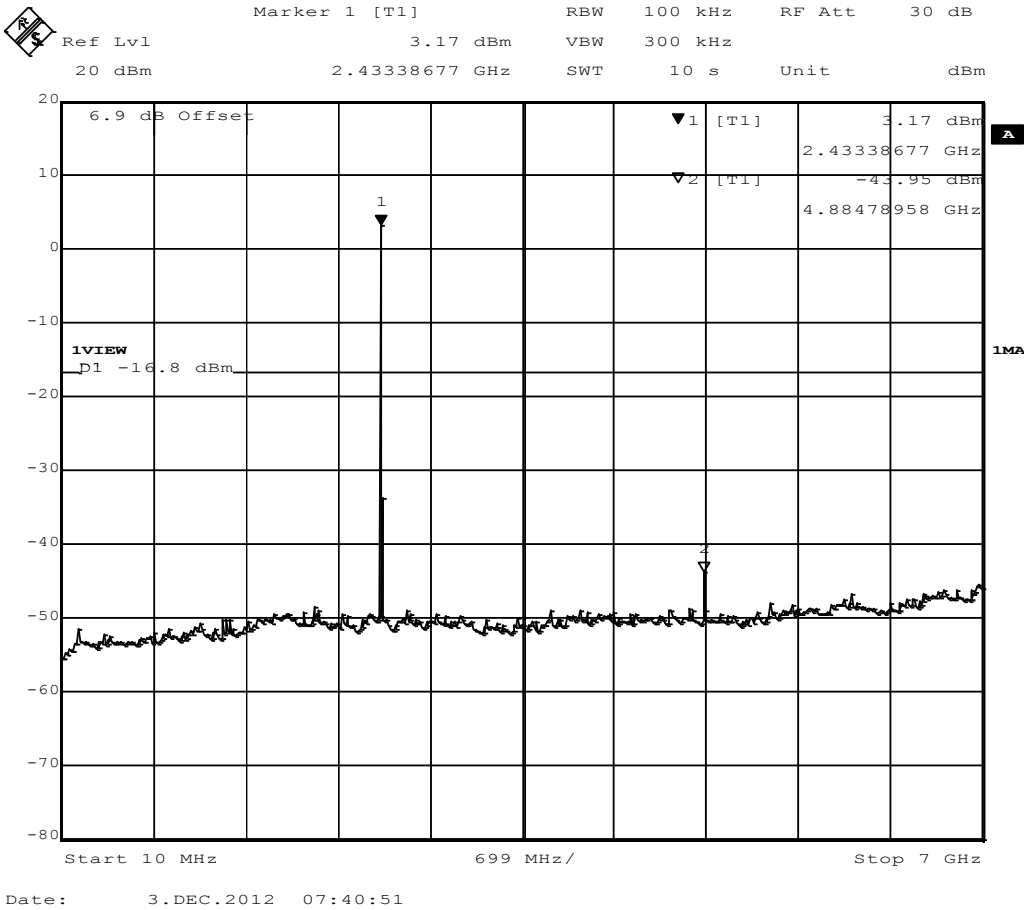
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 0 / 2402 MHz
Comment 3	8DPSK / 3-DH5



Conducted spurious emissions – 3-DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

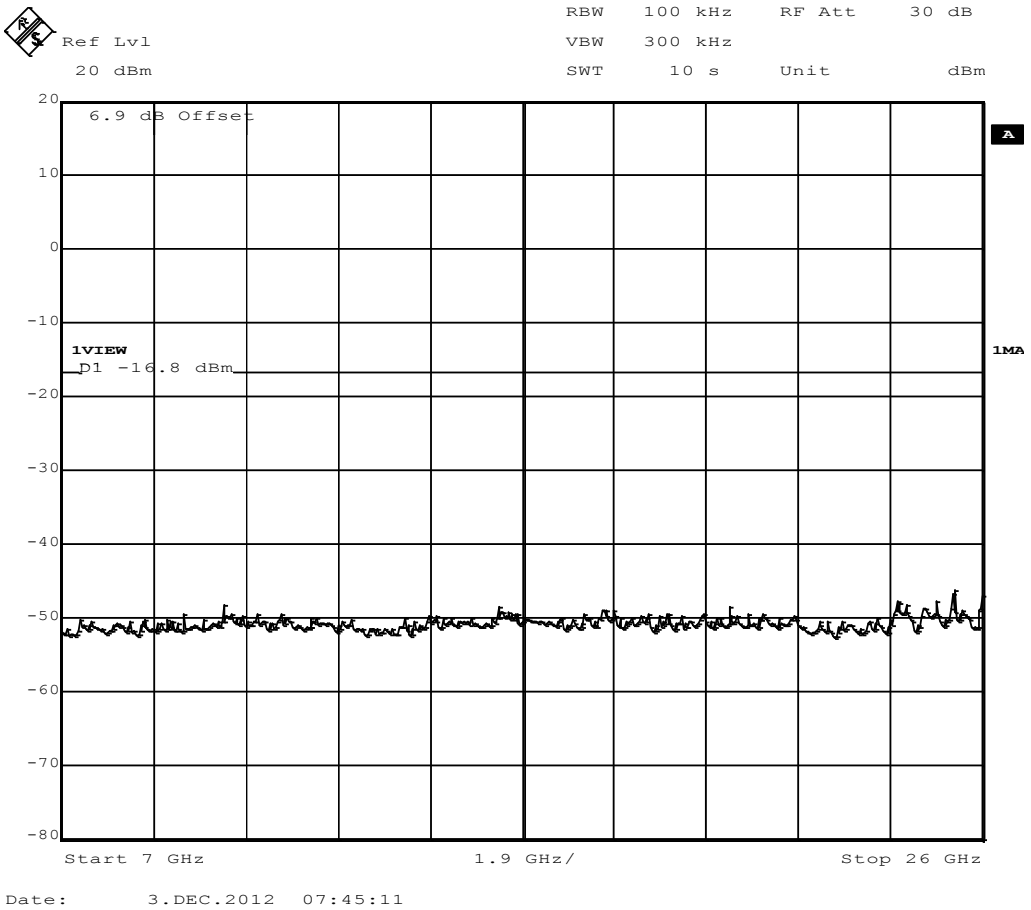
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 39 / 2441 MHz
Comment 3	8DPSK / 3-DH5



Conducted spurious emissions – 3-DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

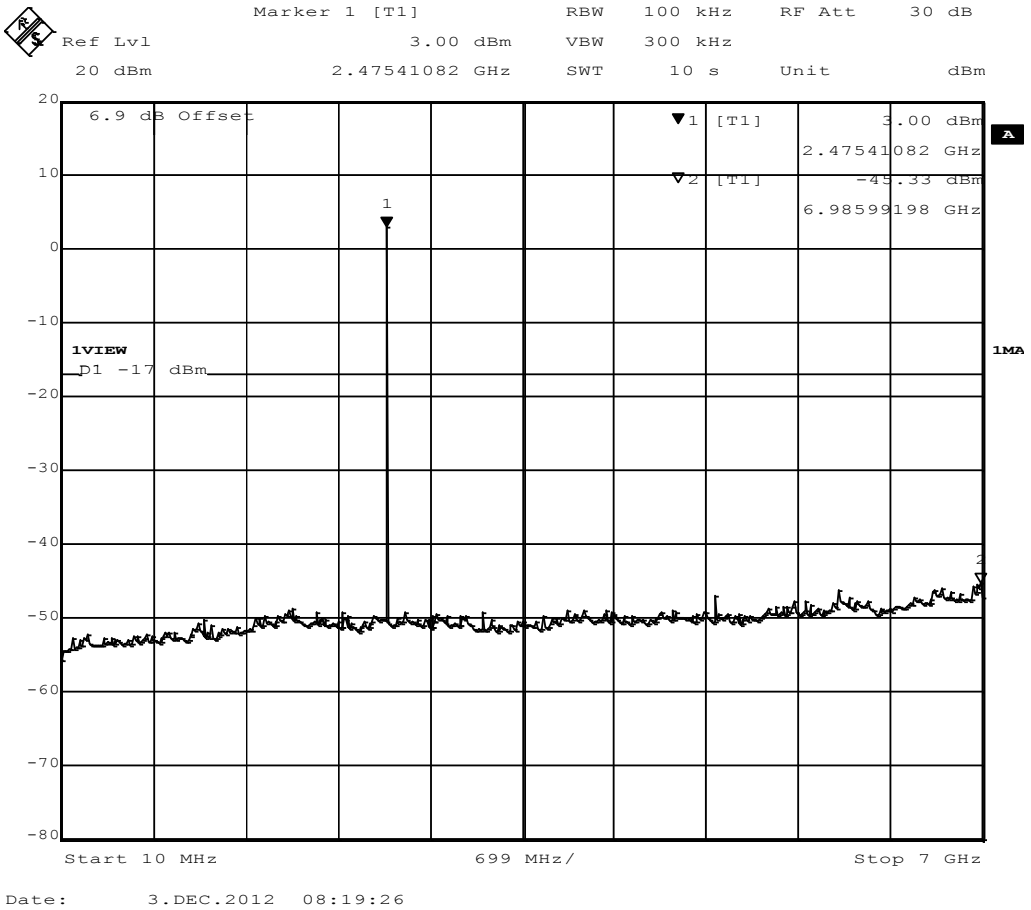
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 39 / 2441 MHz
Comment 3	8DPSK / 3-DH5



Conducted spurious emissions – 3-DH5-Sngl F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

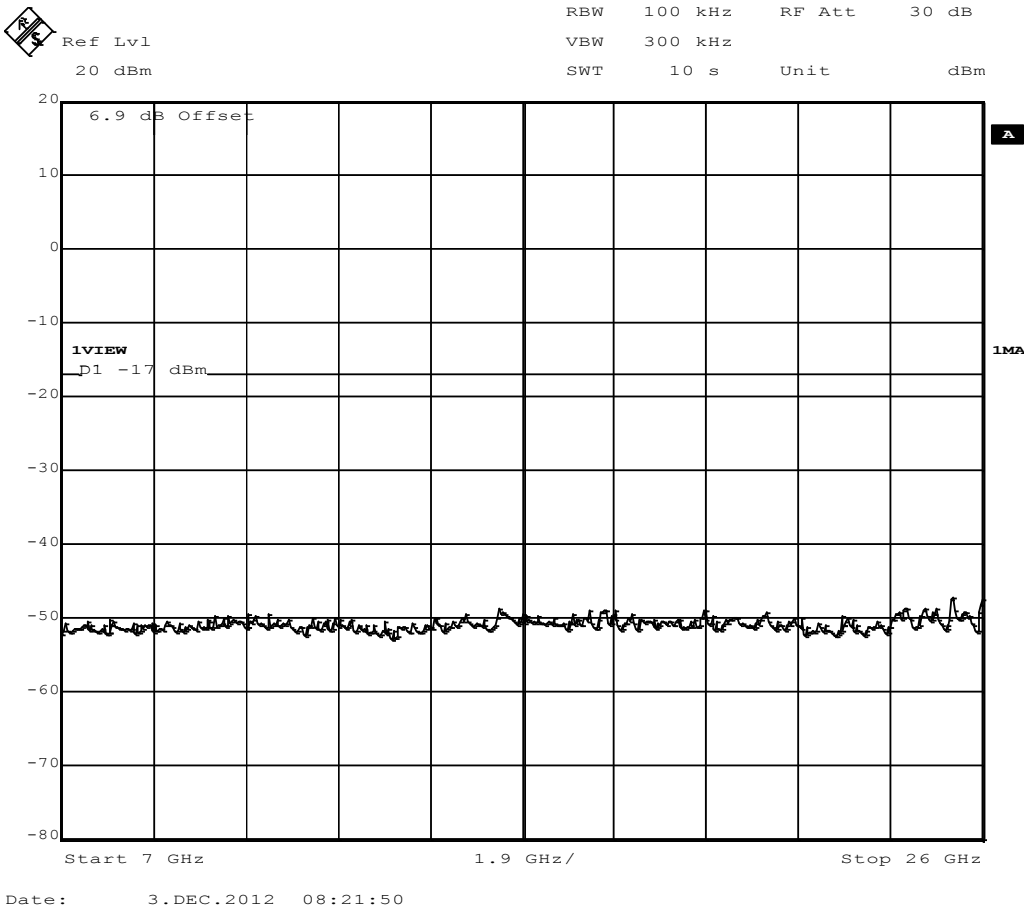
EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 78 / 2480 MHz
Comment 3	8DPSK / 3-DH5



Conducted spurious emissions – 3-DH5-Sngl F_{HIGH}

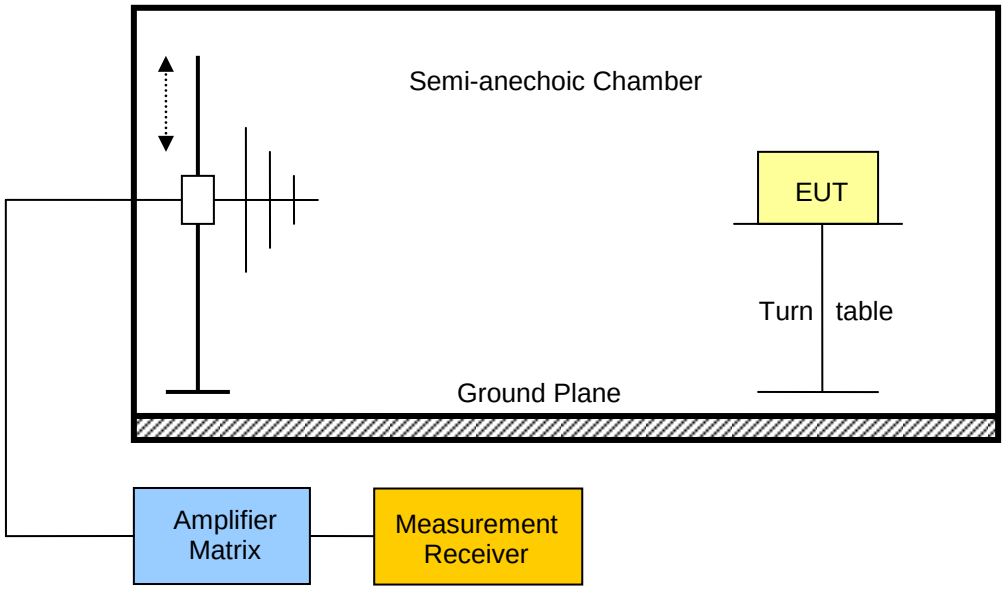
FCC part 15.247 (d)
Spurious Emissions

EUT	WLAN / Bluetooth modul
Model	WiBear11n-SF1
Approval Holder	lesswire AG / G0M-1211-2443
Temperature / Voltage	Tnom: 24°C / Unom: 3.3V DC
Test Site / Operator	Eurofins Product Service GmbH / Mr. Pudell
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 78 / 2480 MHz
Comment 3	8DPSK / 3-DH5



3.10 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 Public Notice DA 00-705 / ANSI C63.4		
Test frequency range		Tested frequencies		
		30 MHz – 10th Harmonic		
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.				
Test setup				



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

Test results – DH5

Channel	Frequency [MHz]	Mode	Emission [GHz]	Level [dbµV/m]	Det.	Pol.	Limit [dbµV/m]	Limit dist. [m]*	Margin [dB]
F_{LOW}	2402	DH5-Sngl	12.010	56.89	pk	ver	74	3	-17.11
F_{LOW}	2402	DH5-Sngl	12.010	49.32	av	ver	54	3	-04.68
F_{LOW}	2402	DH5-Sngl	12.010	57.55	pk	hor	74	3	-16.45
F_{LOW}	2402	DH5-Sngl	12.010	49.87	av	hor	54	3	-04.13
F_{MID}	2441	DH5-Sngl	7.3269	54.81	pk	hor	74	3	-19.19
F_{MID}	2441	DH5-Sngl	7.3269	47.45	Av	hor	54	3	-06.55
F_{MID}	2441	DH5-Sngl	12.204	57.21	pk	hor	74	3	-16.79
F_{MID}	2441	DH5-Sngl	12.204	50.04	av	hor	54	3	-03.96
F_{MID}	2441	DH5-Sngl	12.204	56.02	pk	ver	74	3	-17.98
F_{MID}	2441	DH5-Sngl	12.204	49.35	av	ver	54	3	-04.65
F_{HIGH}	2480	DH5-Sngl	12.397	56.74	pk	ver	74	3	-17.26
F_{HIGH}	2480	DH5-Sngl	12.397	46.14	av	ver	54	3	-07.86
F_{HIGH}	2480	DH5-Sngl	12.397	58.89	pk	hor	74	3	-15.11
F_{HIGH}	2480	DH5-Sngl	12.397	51.14	av	hor	54	3	-02.86
F_{HIGH}	2480	DH5-Sngl	12.397	56.74	pk	ver	74	3	-17.26

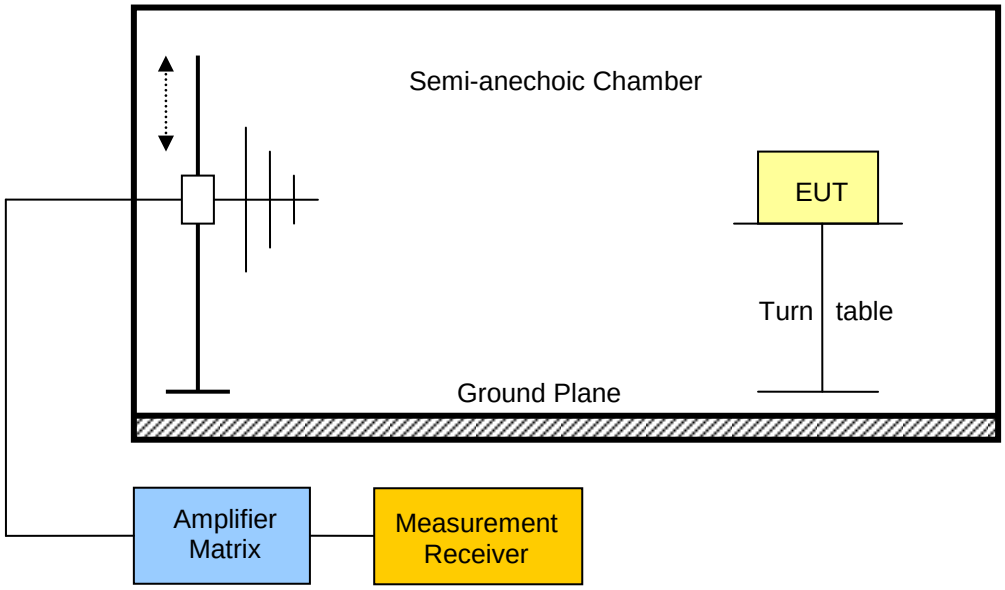
Test results – 3DH5

Channel	Frequency [MHz]	Mode	Emission [GHz]	Level [dbµV/m]	Det.	Pol.	Limit [dbµV/m]	Limit dist. [m]*	Margin [dB]
F_{LOW}	2402	3DH5-Sngl	12.397	54.25	pk	ver	74	3	-19.75
F_{LOW}	2402	3DH5-Sngl	12.397	45.02	av	ver	54	3	-08.98

Comments: * Physical distance between EUT and measurement antenna.

3.11 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 – 3th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



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

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbµV/m]	Emission Level [µV/m]	Det.	Limit [µV/m]	Margin [µV/m]
F_{MID}	2441	183.647	31.93	39.49	pk	150	-110.51
F_{MID}	2441	198.297	32.12	40.36	pk	150	-109.64
F_{MID}	2441	520.641	22.96	14.06	pk	200	-185.94
F_{MID}	2441	400.401	27.08	22.59	pk	500	-477.41
F_{MID}	2441	3760.000	38.36	82.79	pk	500	-417.21
F_{MID}	2441	3892.000	37.98	79.25	pk	500	-420.75
F_{MID}	2441	7719.000	41.30	116.14	pk	500	-383.86
F_{MID}	2441	7719.000	41.39	117.35	pk	500	-382.65
F_{MID}	2441	11928.000	44.09	160.14	pk	500	-339.86
F_{MID}	2441	11904.00	45.56	189.67	pk	500	-310.33

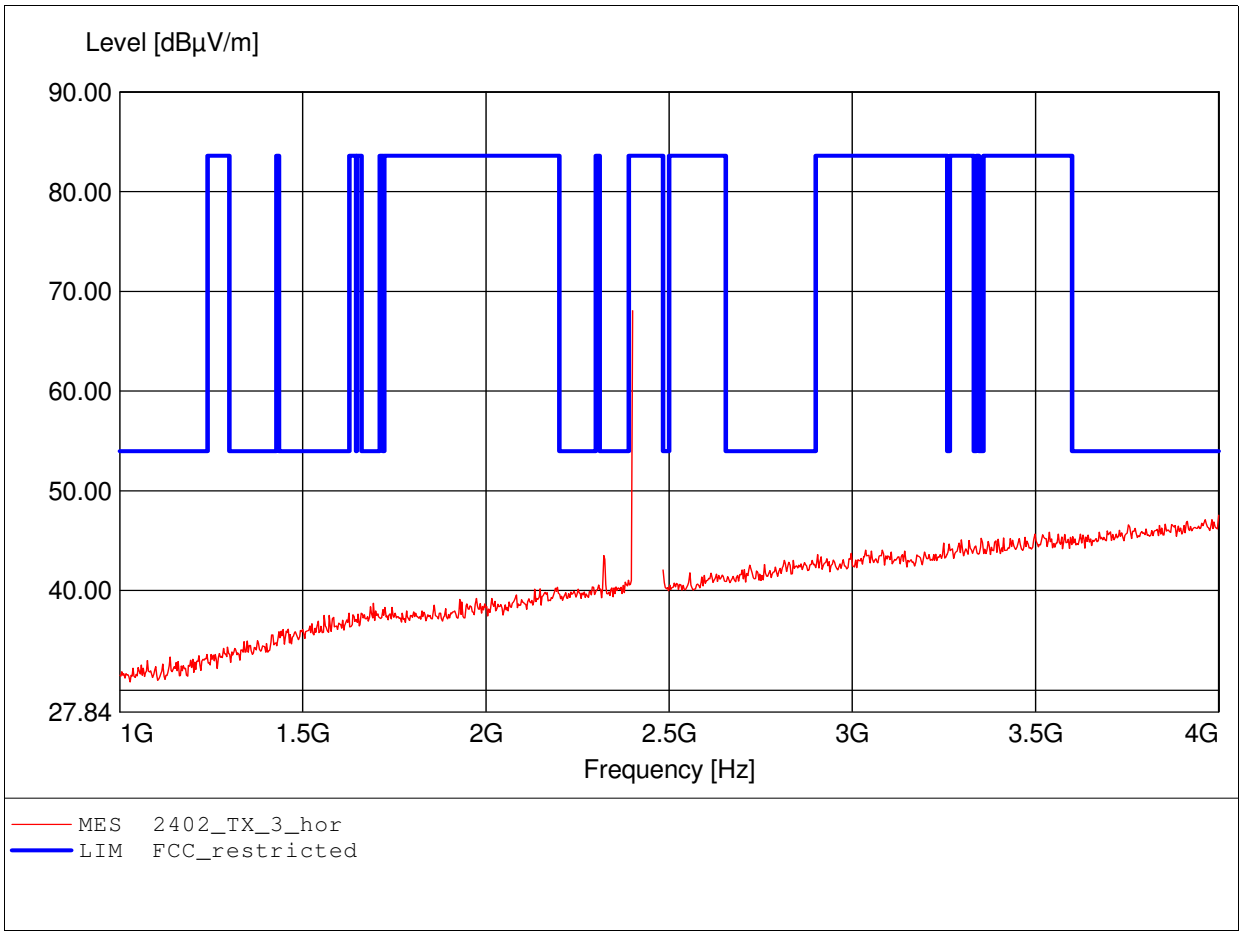
Comments:
* Physical distance between EUT and measurement antenna.
** Emission level corresponds to ambient noise floor

ANNEX A Transmitter radiated spurious emissions

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

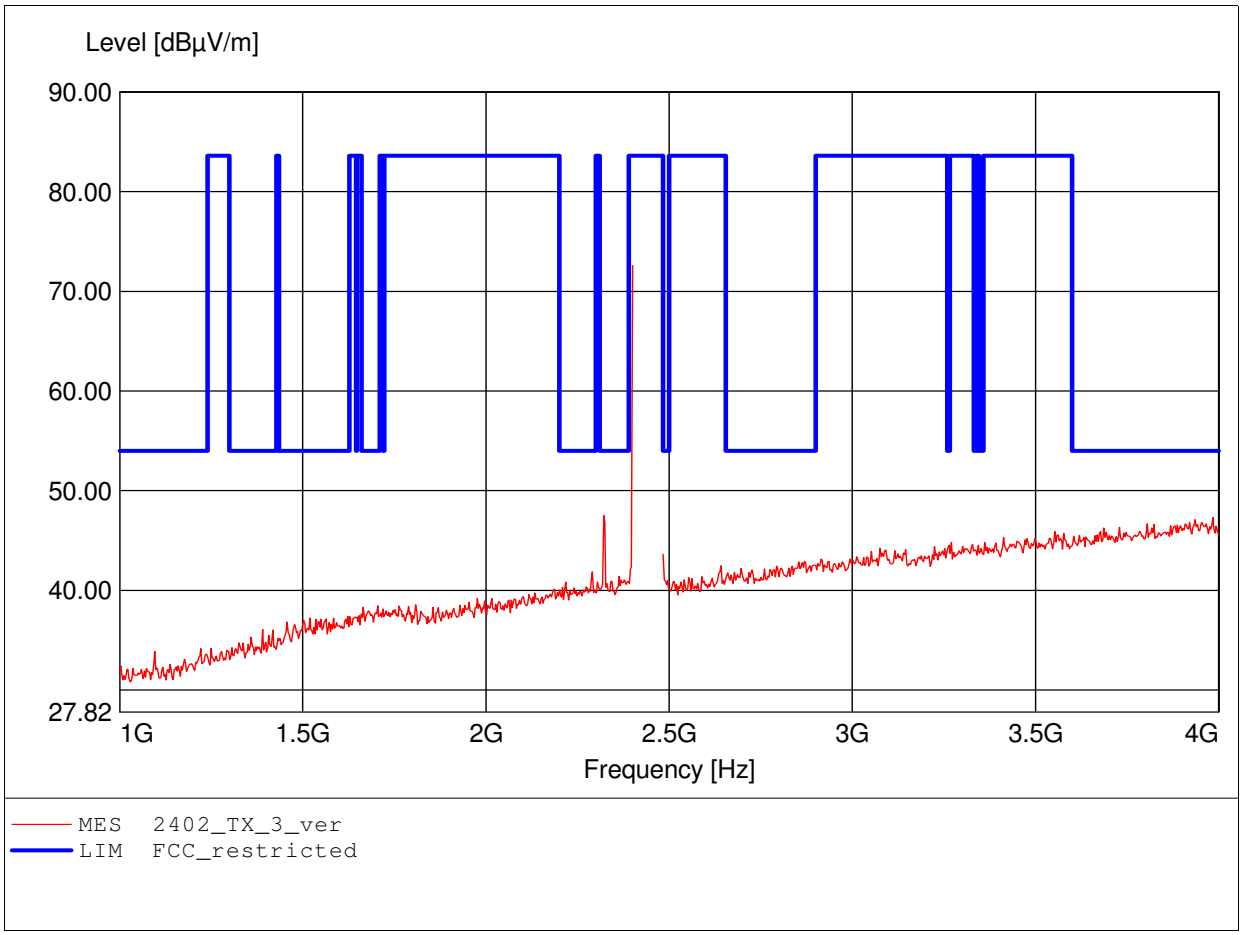
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 2.400GHz, Emax: 68.07dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 2.400GHz, Emax: 72.59dBµV/m, RBW: 1MHz	

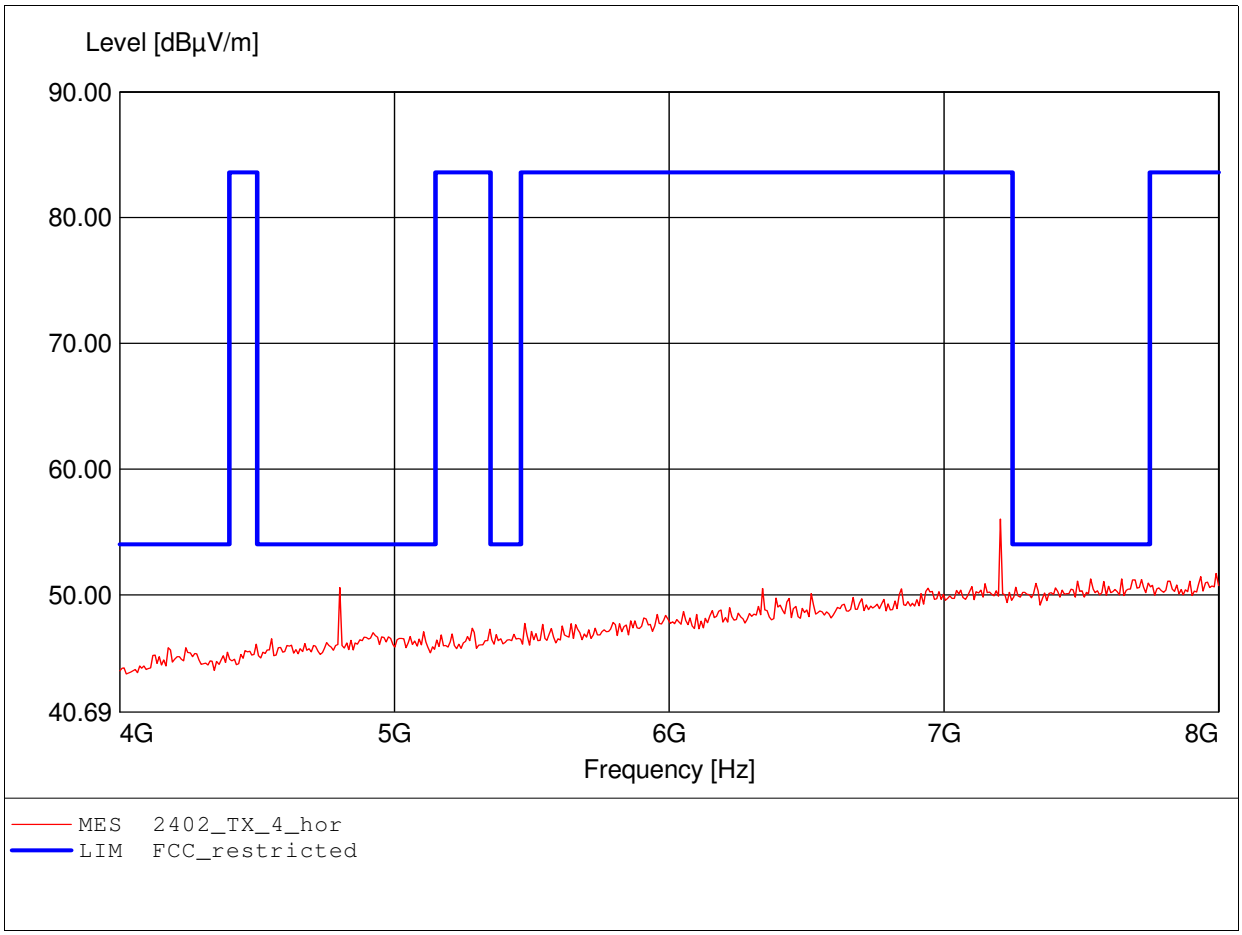


Page 1/1 29.11.2012 08:23 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.206GHz, Emax: 56.02dBµV/m, RBW: 1MHz	

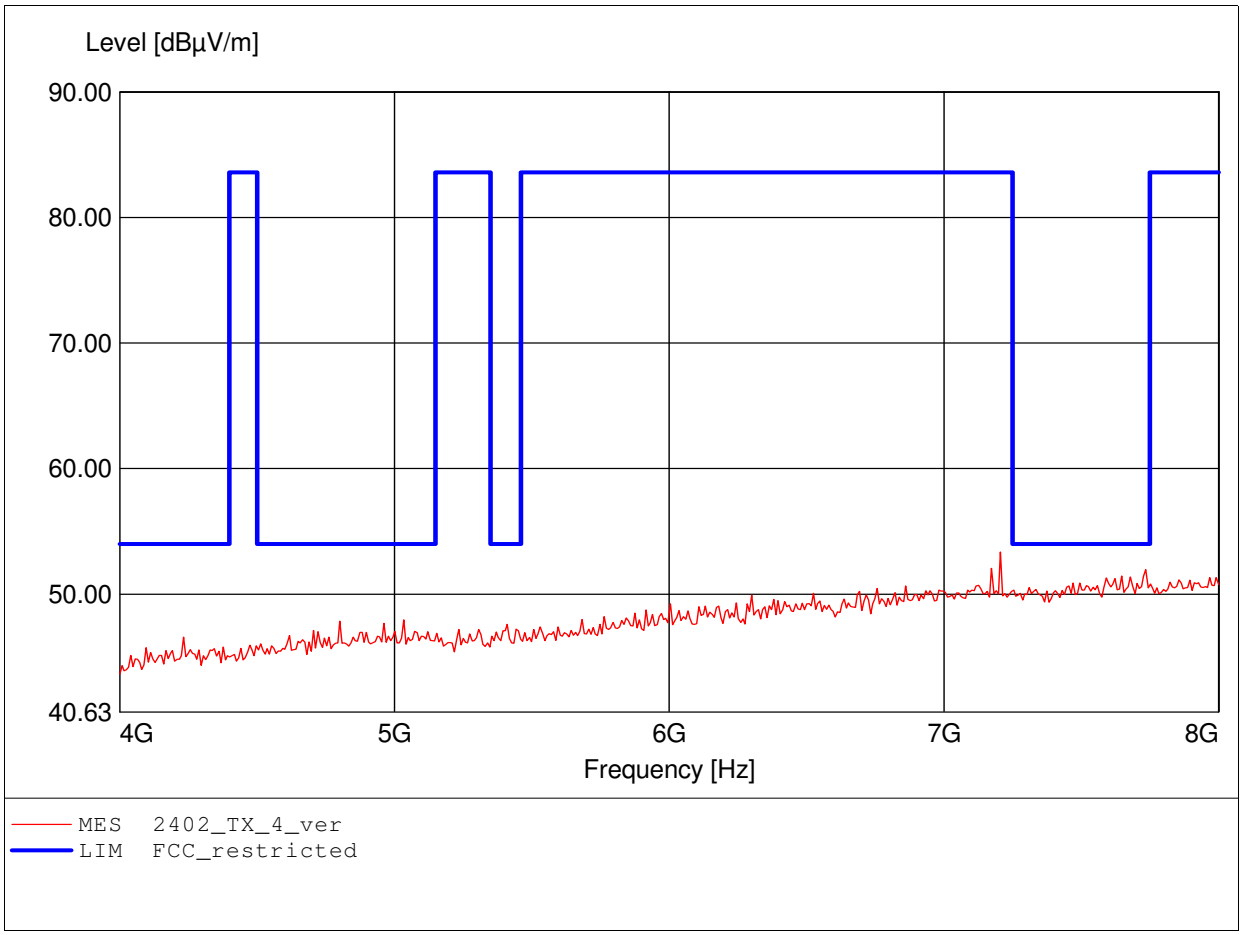


Page 1/1 29.11.2012 09:18 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.206GHz, Emax: 53.37dBµV/m, RBW: 1MHz	

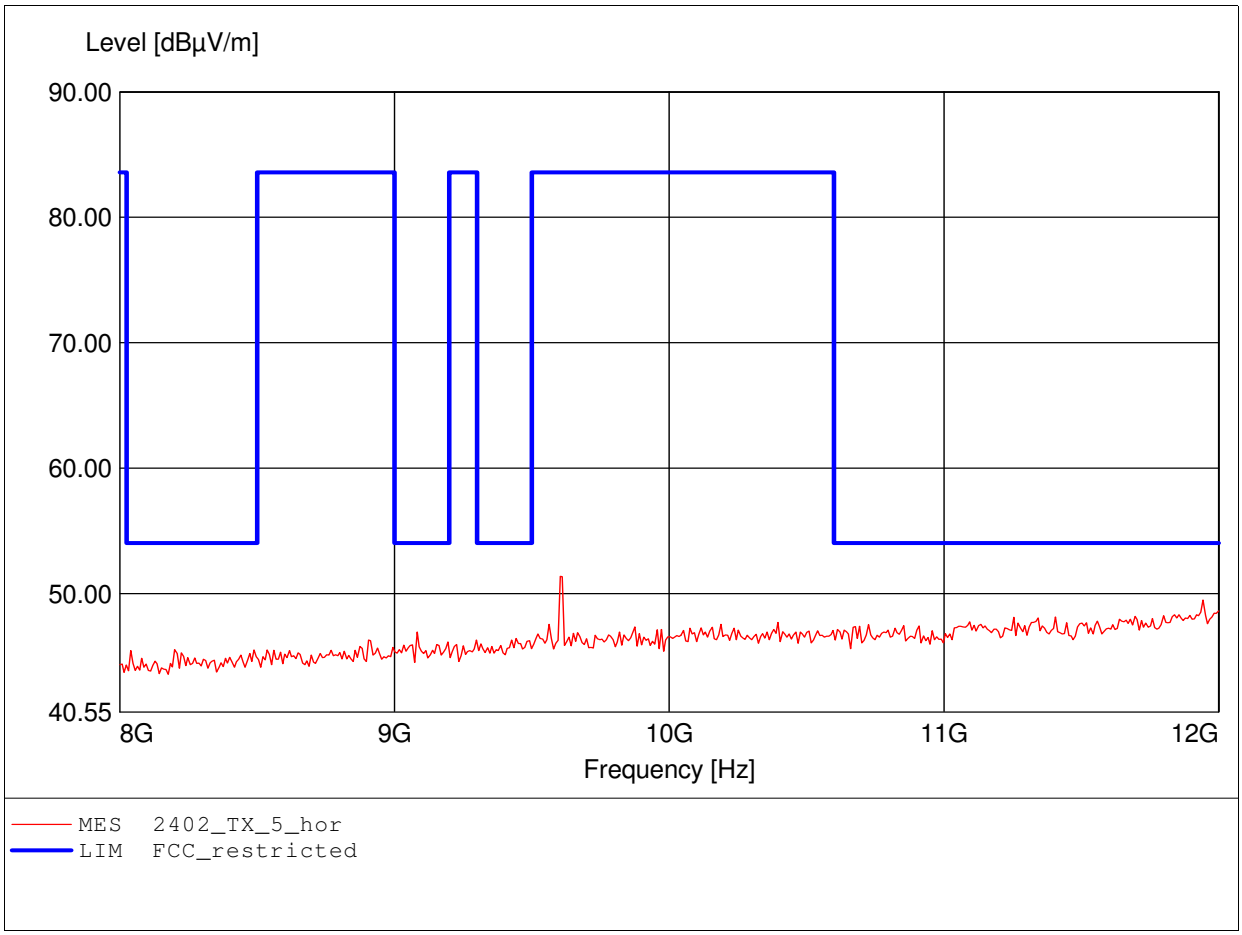


Page 1/1 29.11.2012 08:25 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 9.603GHz, Emax: 51.35dBµV/m, RBW: 1MHz	

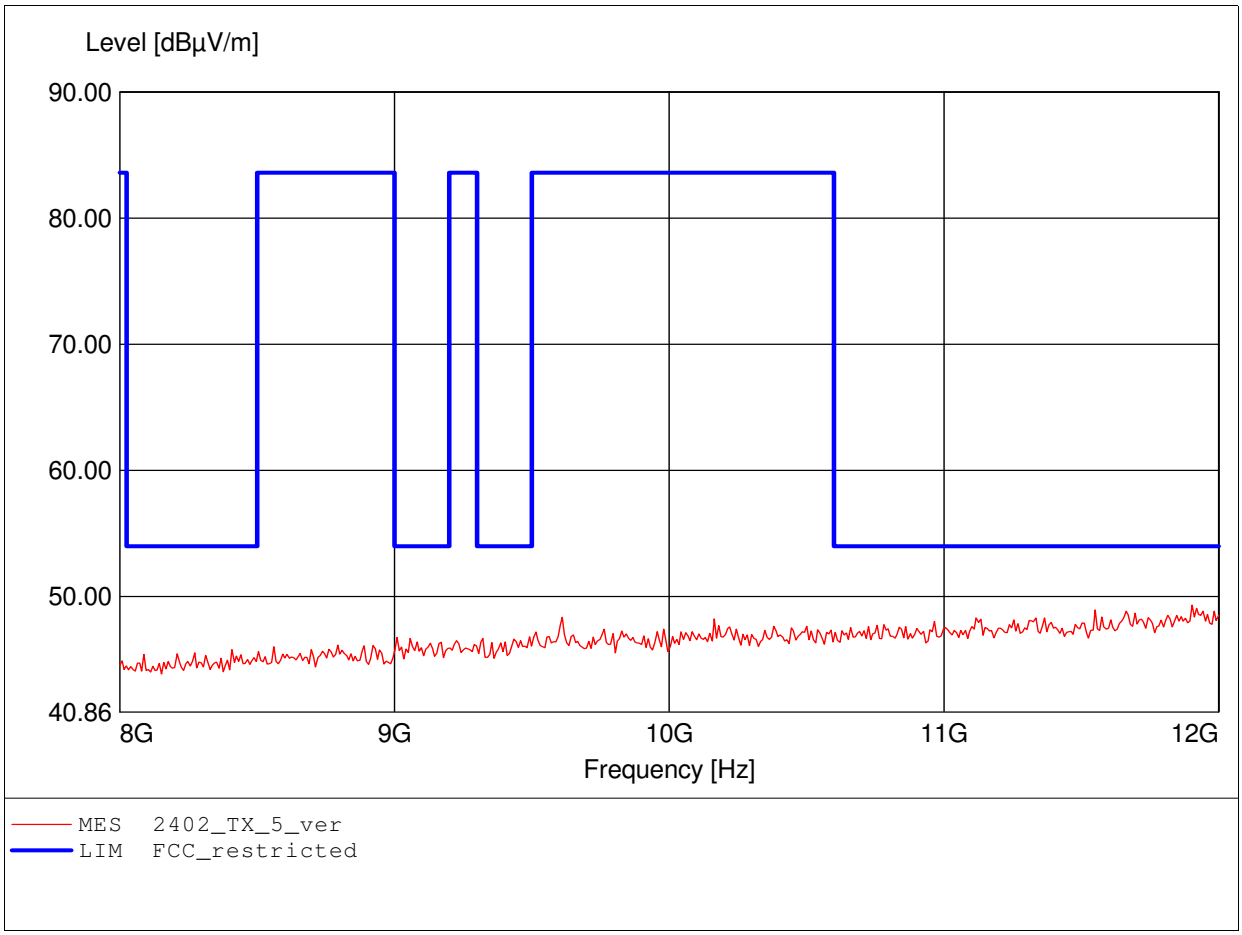


Page 1/1 29.11.2012 09:16 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.904GHz, Emax: 49.33dBµV/m, RBW: 1MHz	

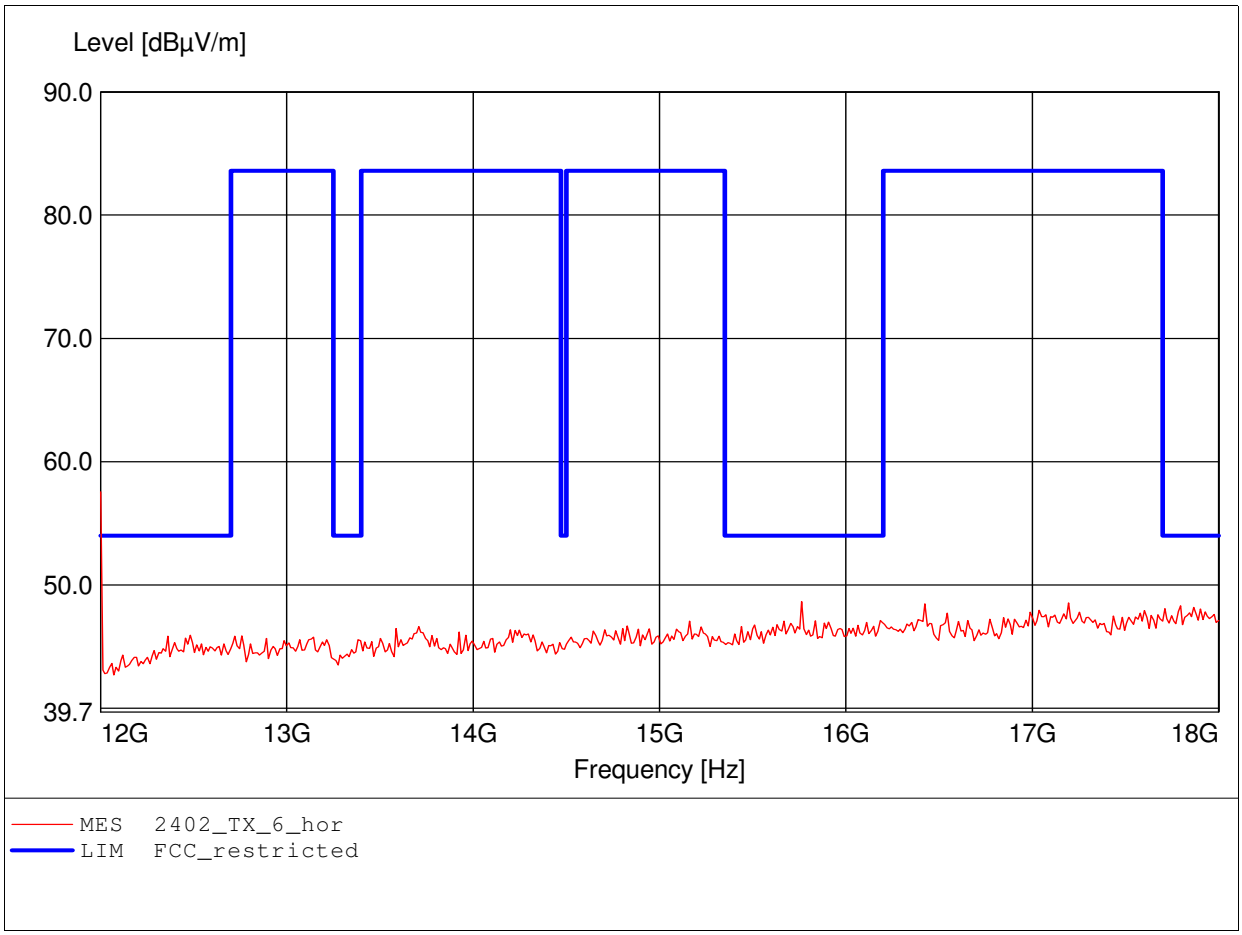


Page 1/1 29.11.2012 08:44 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.000GHz, Emax: 57.55dBµV/m, RBW: 1MHz	

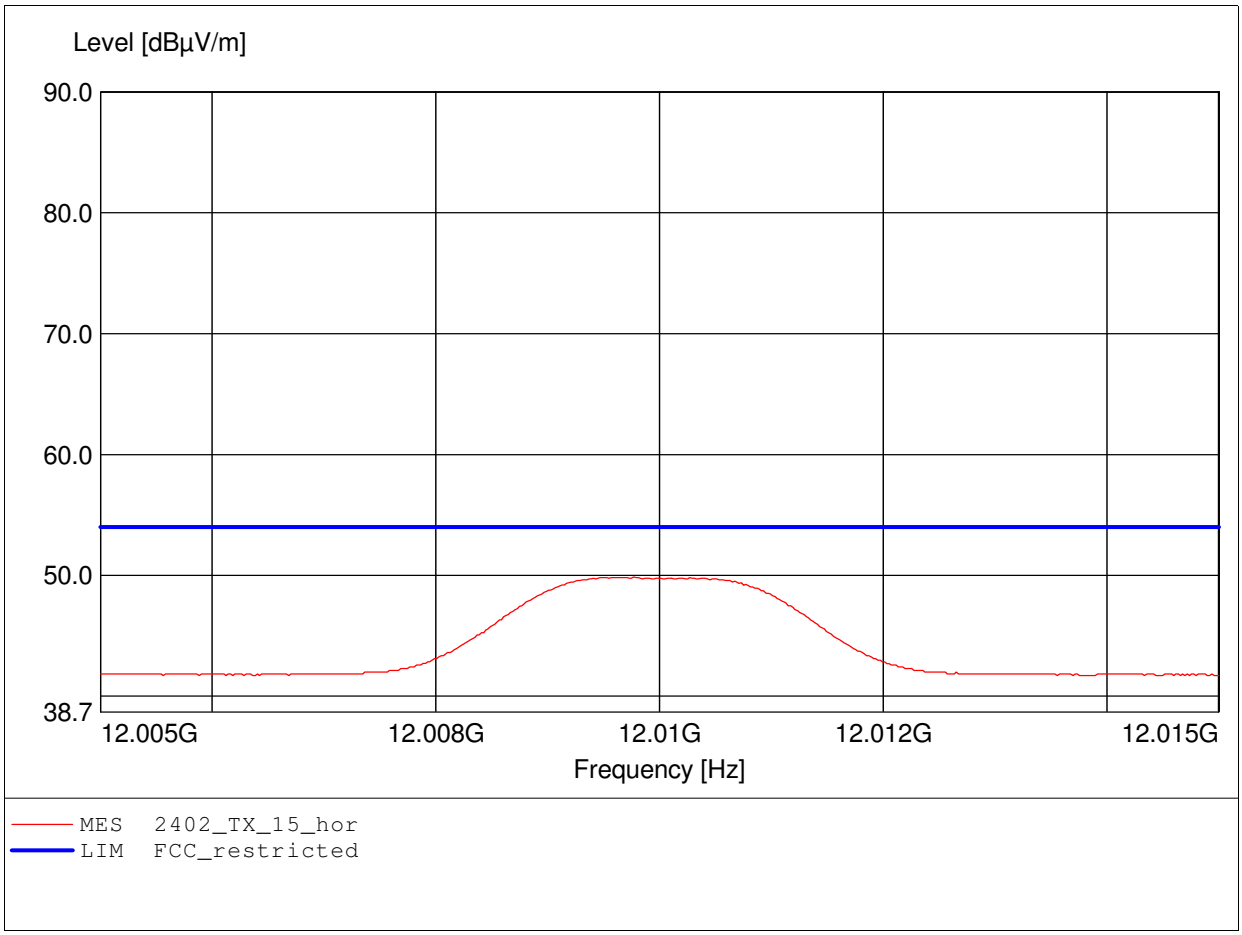


Page 1/1 29.11.2012 09:07 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.010GHz, Emax: 49.87dBµV/m, RBW: 1MHz	

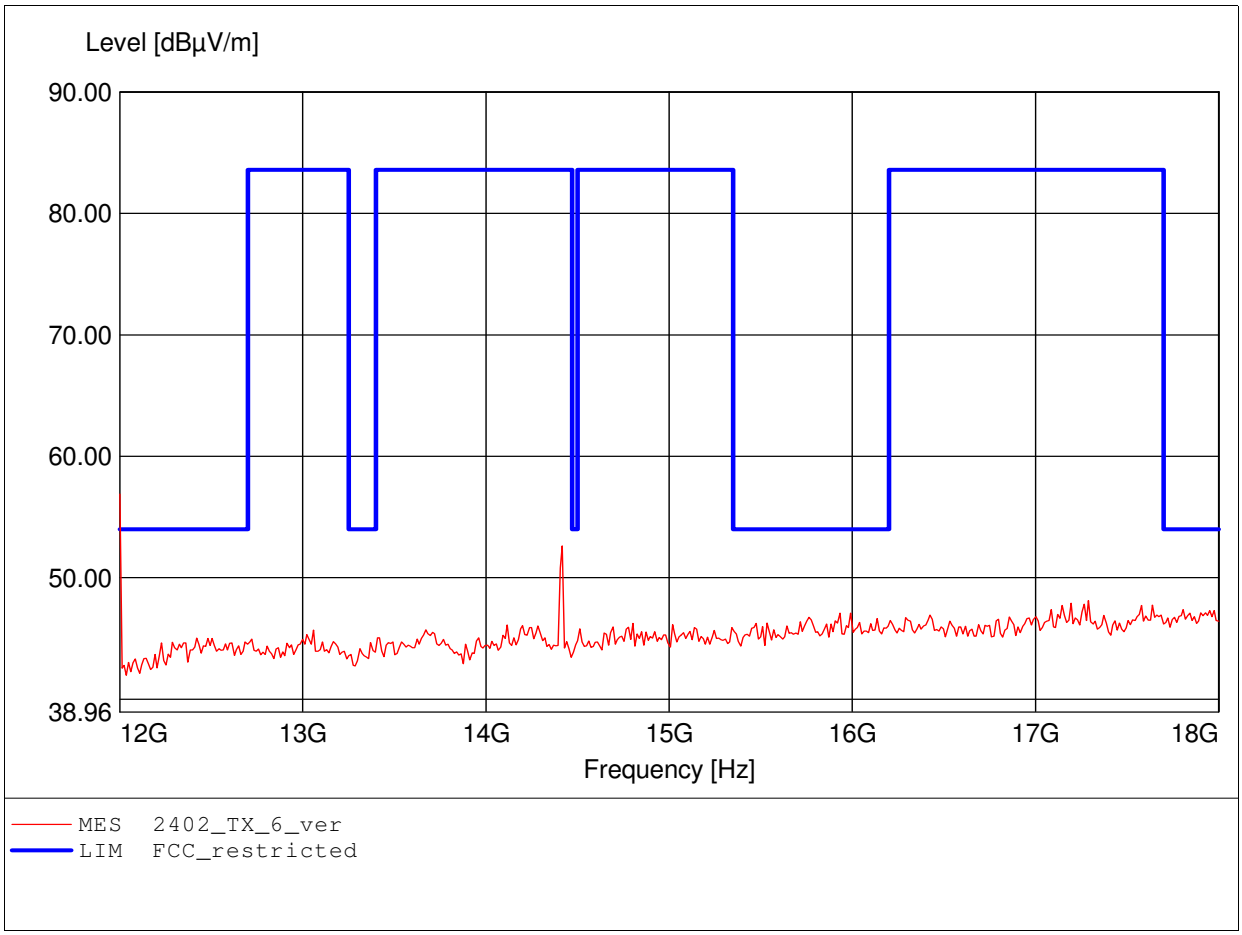


Page 1/1 29.11.2012 14:35 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

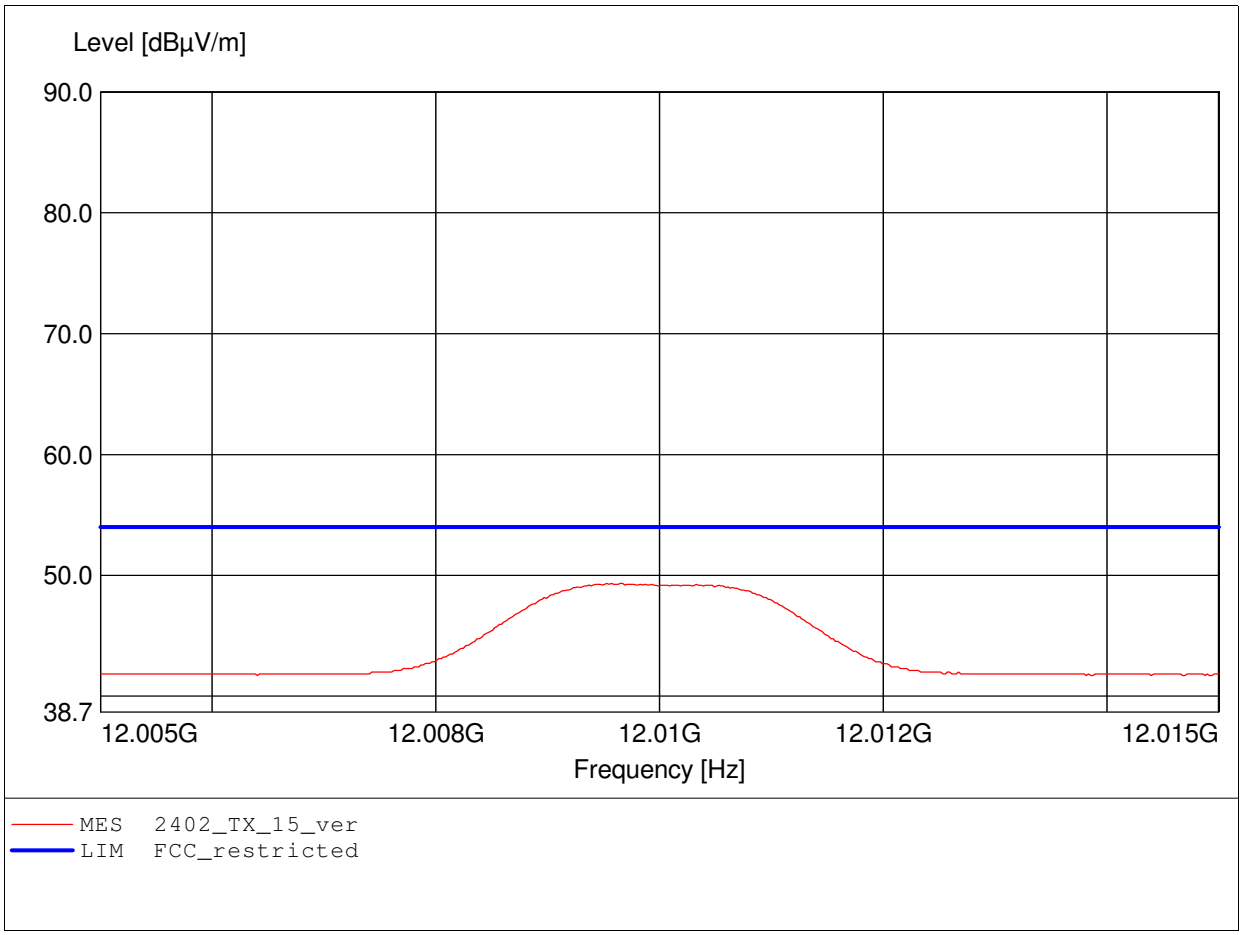
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.000GHz, Emax: 56.89dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

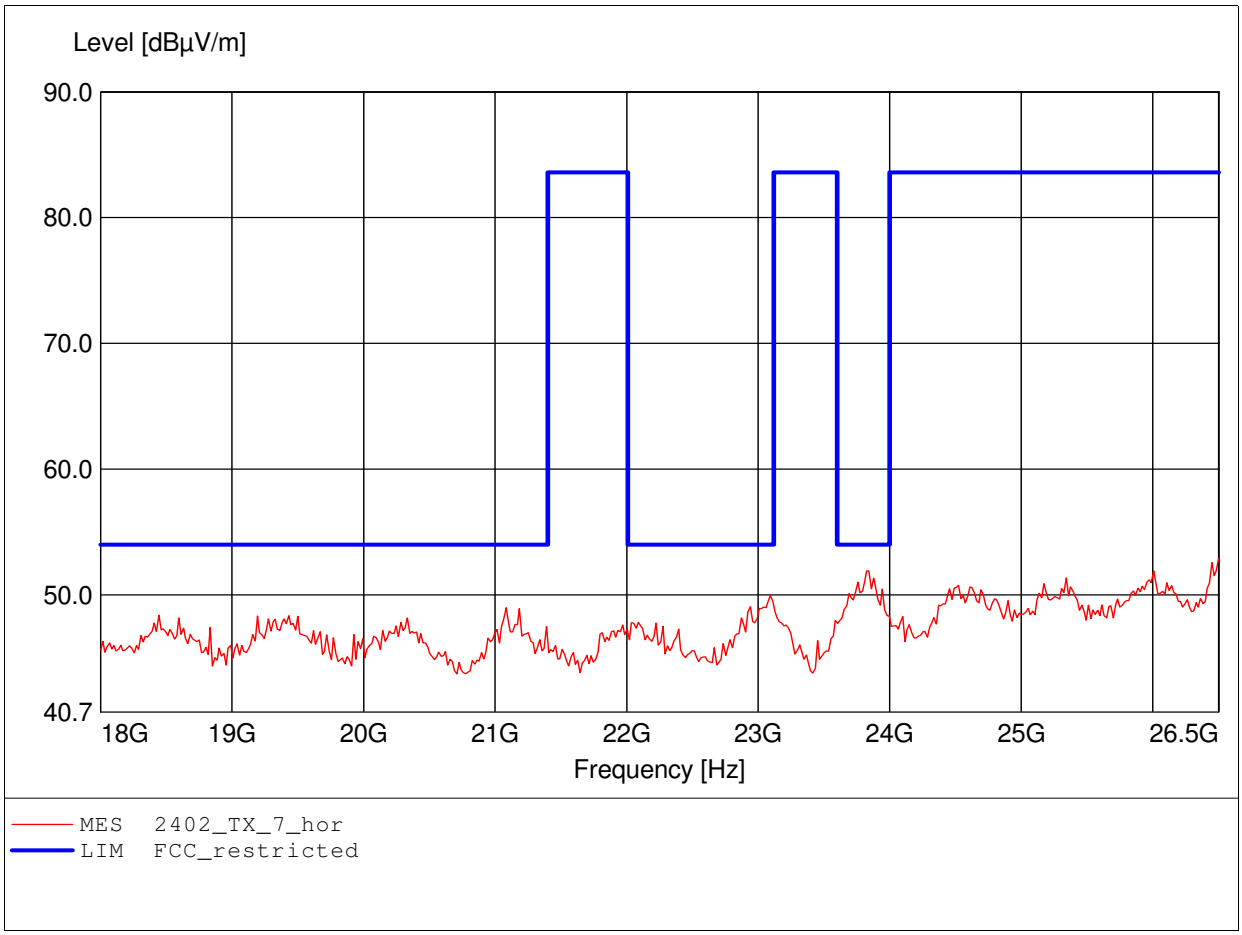
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.010GHz, Emax: 49.32dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 26.500GHz, Emax: 52.90dBµV/m, RBW: 1MHz	

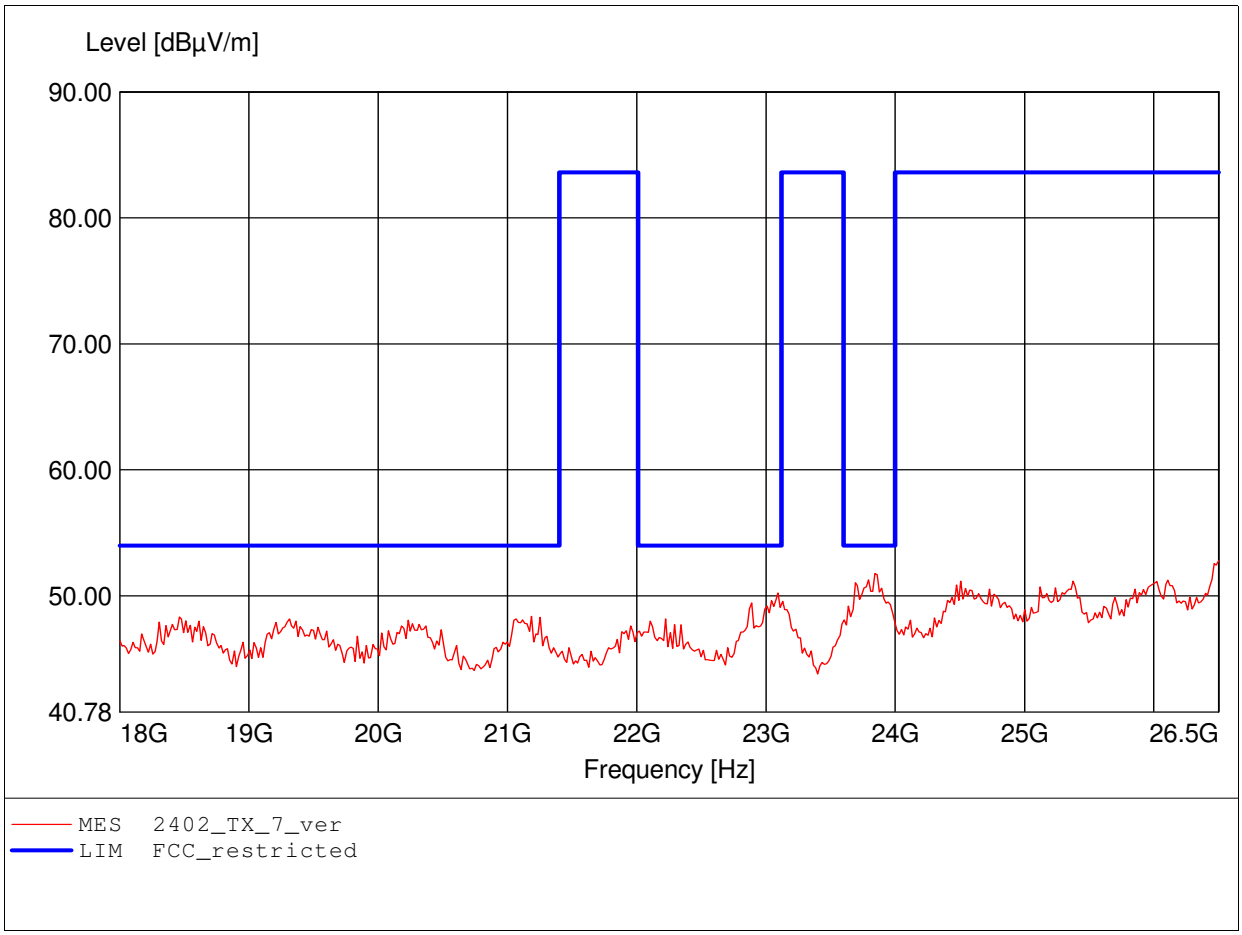


Page 1/1 29.11.2012 08:59 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

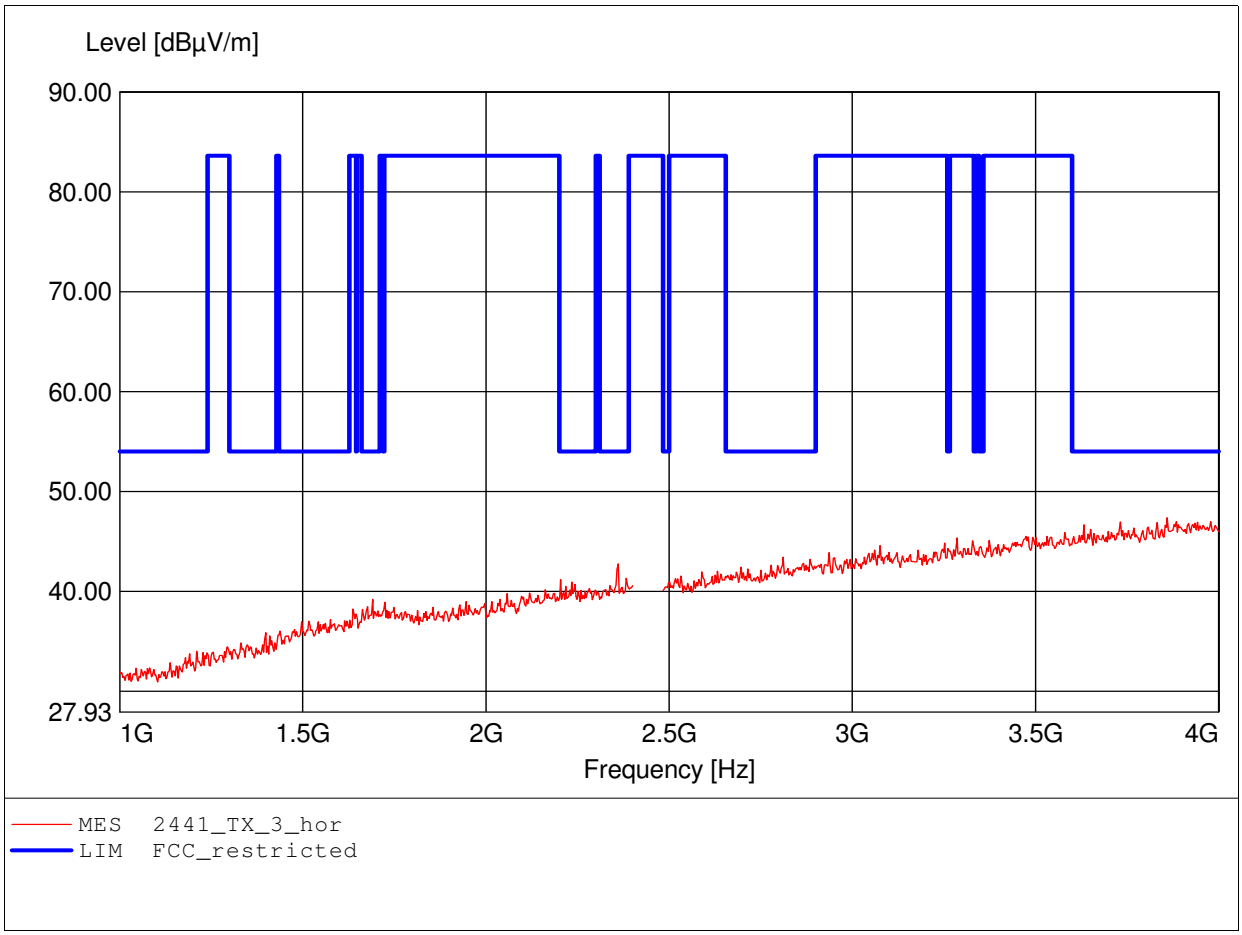
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 0 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 26.500GHz, Emax: 52.79dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.860GHz, Emax: 47.37dBµV/m, RBW: 1MHz	

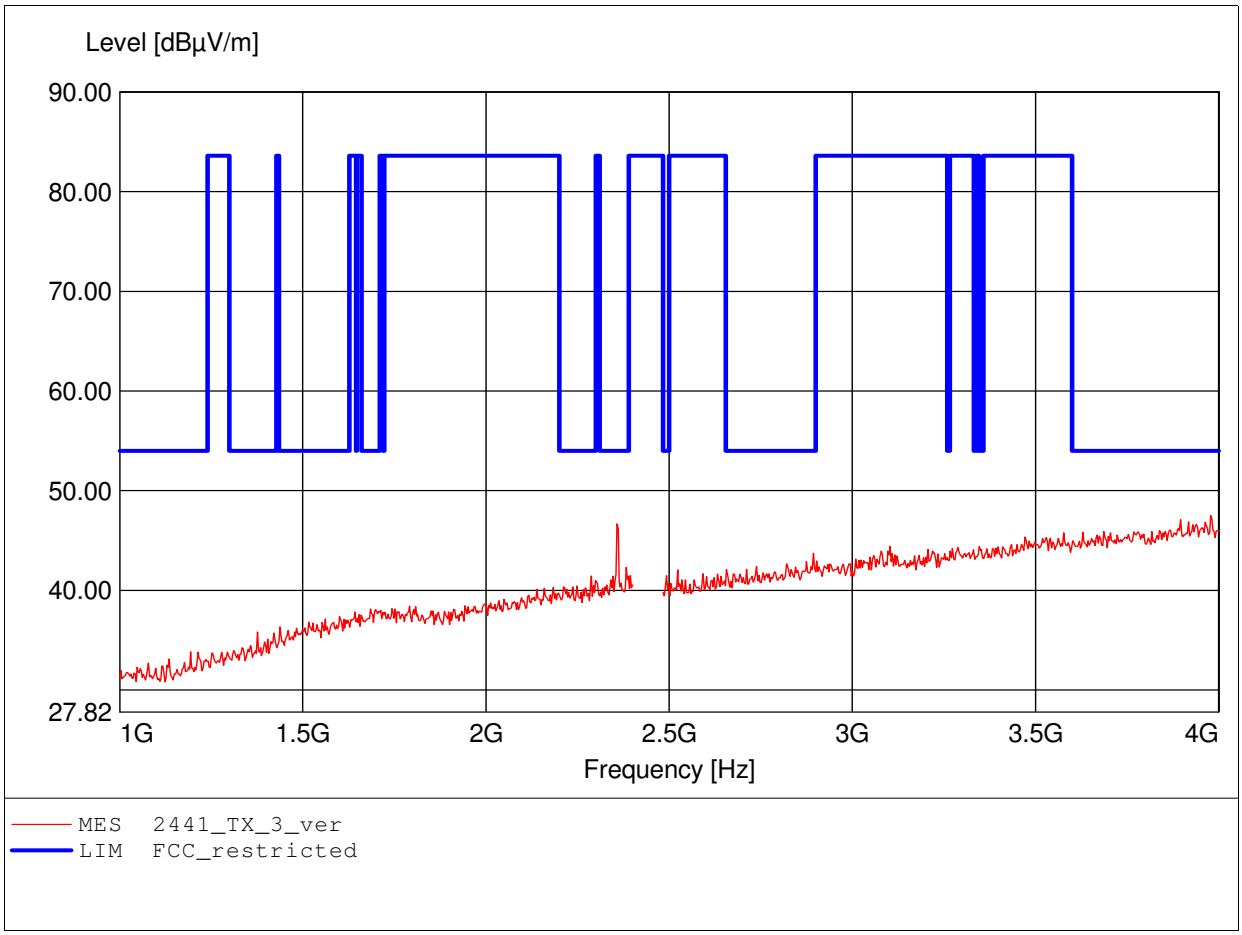


Page 1/1 29.11.2012 09:28 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.979GHz, Emax: 47.52dBµV/m, RBW: 1MHz	

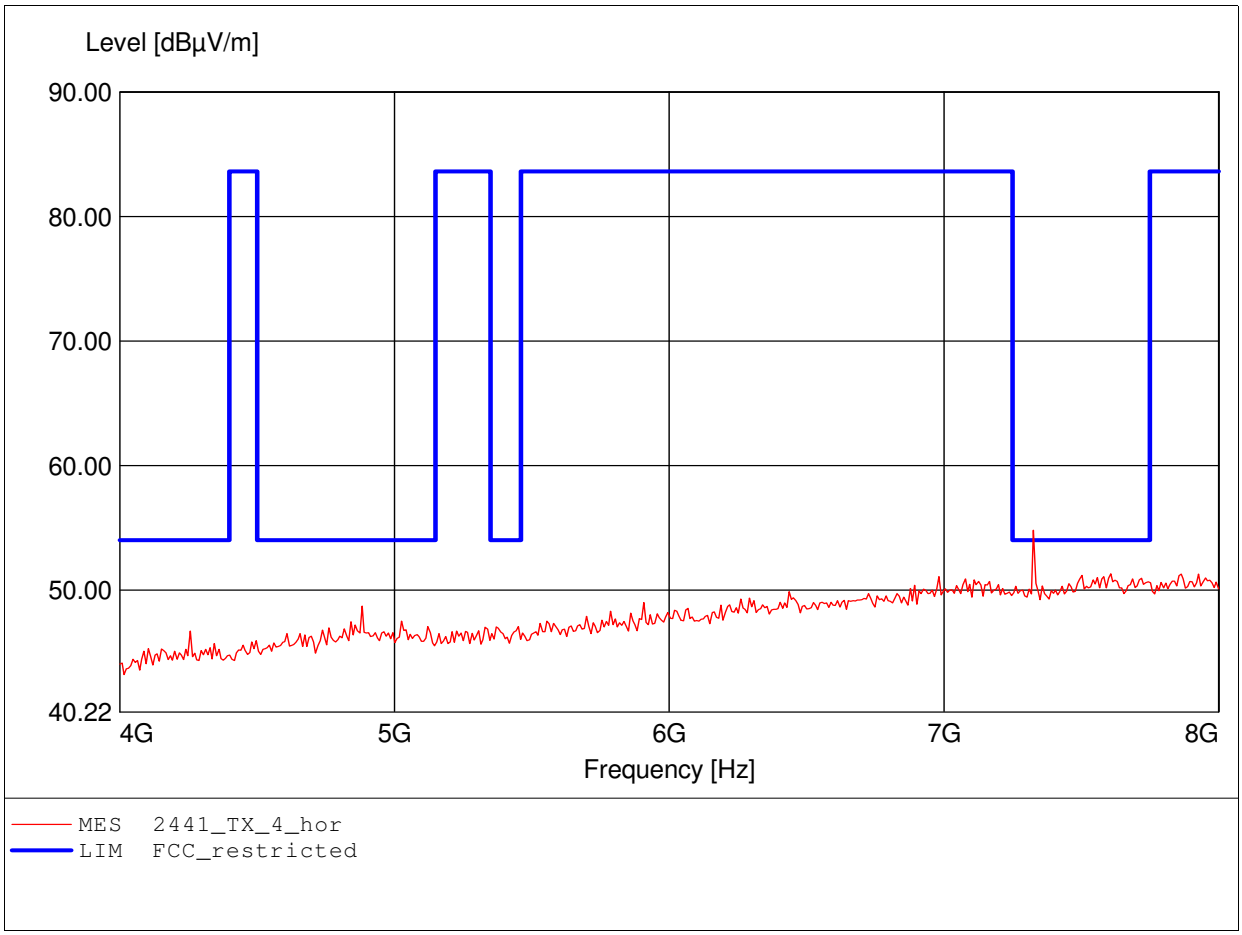


Page 1/1 29.11.2012 09:48 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

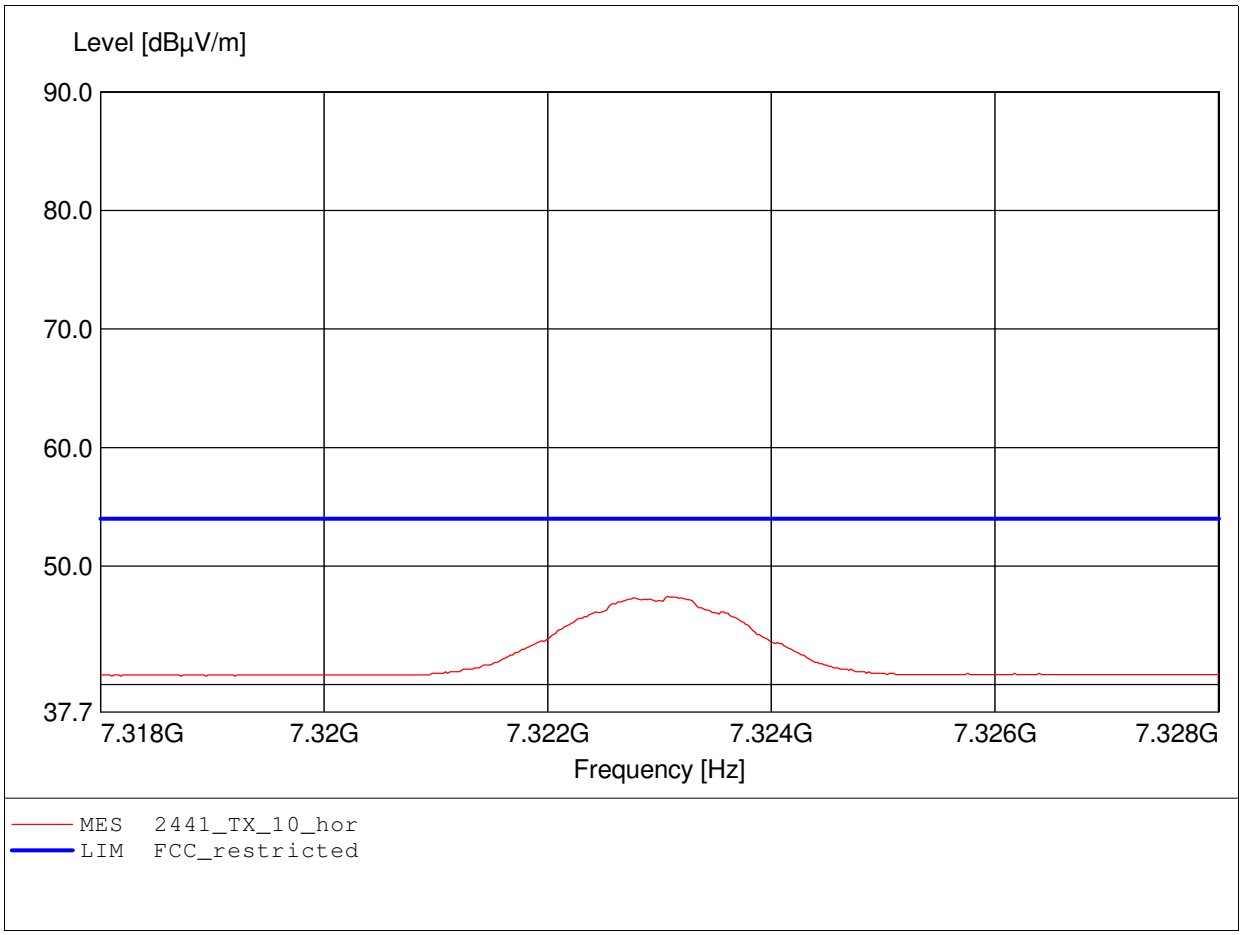
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.327GHz, Emax: 54.81dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 7.323GHz, Pmax: 47.45dBµV/m, RBW: 1MHz	

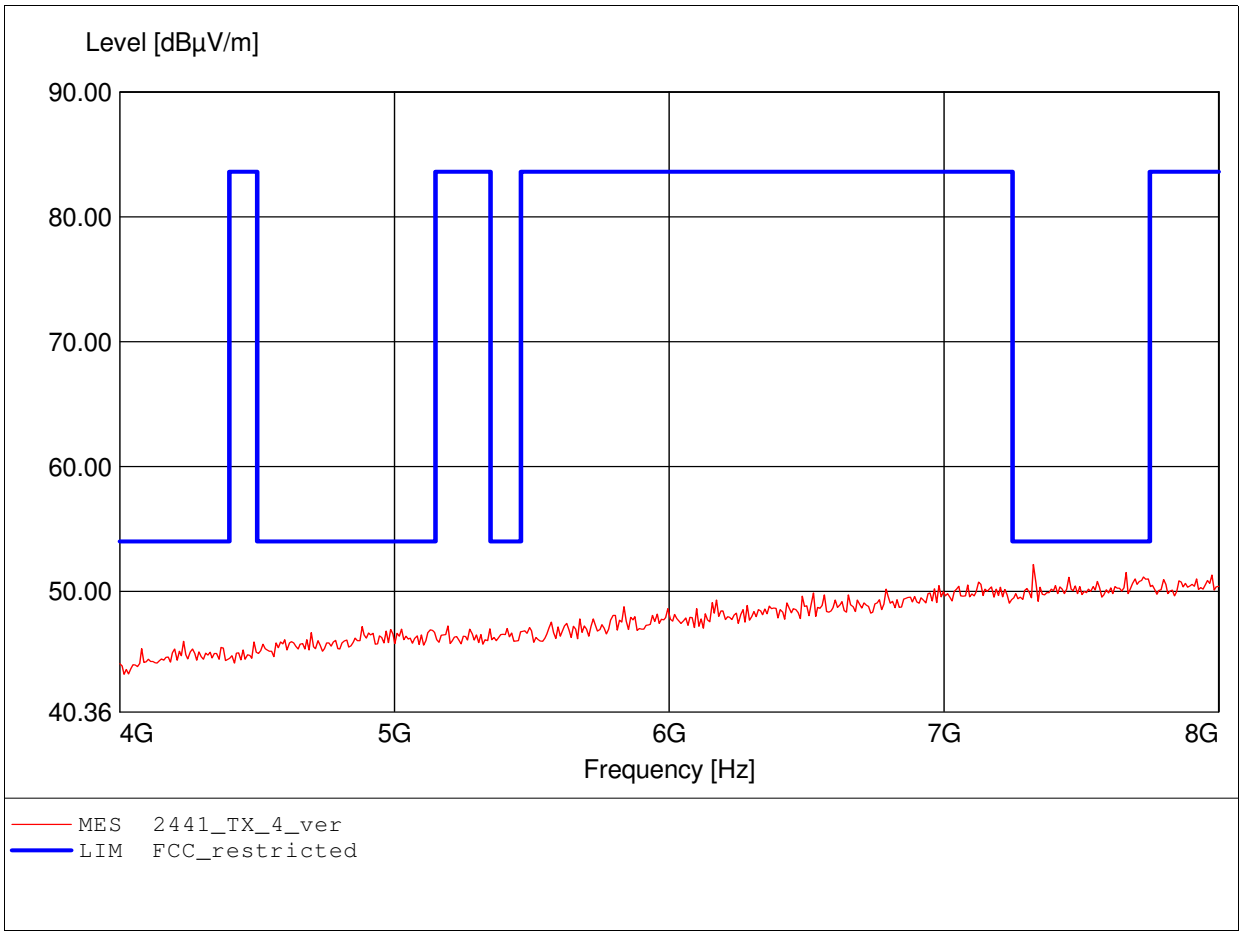


Page 1/1 29.11.2012 14:12 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.327GHz, Emax: 52.16dBµV/m, RBW: 1MHz	

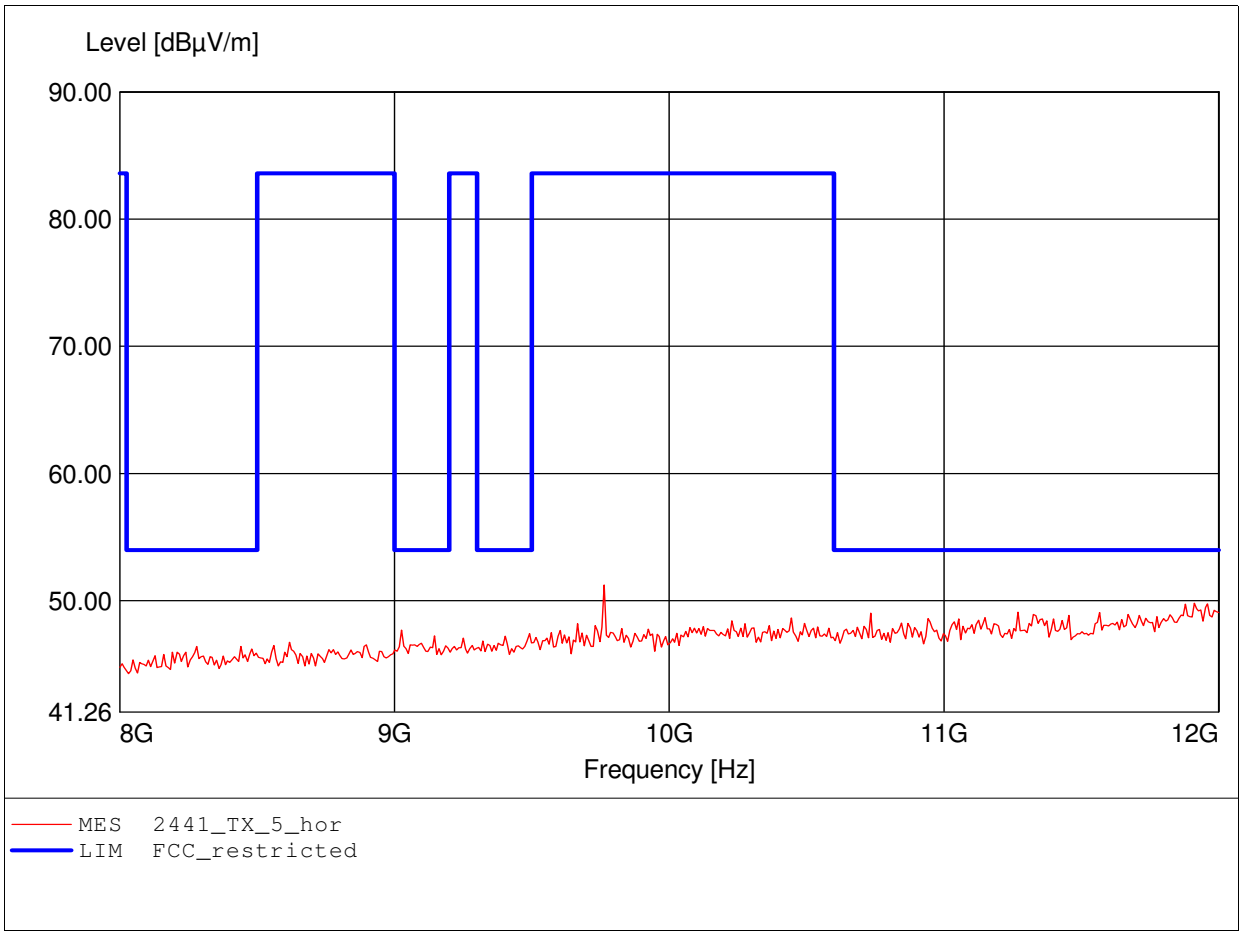


Page 1/1 29.11.2012 09:45 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 9.764GHz, Emax: 51.24dBµV/m, RBW: 1MHz	

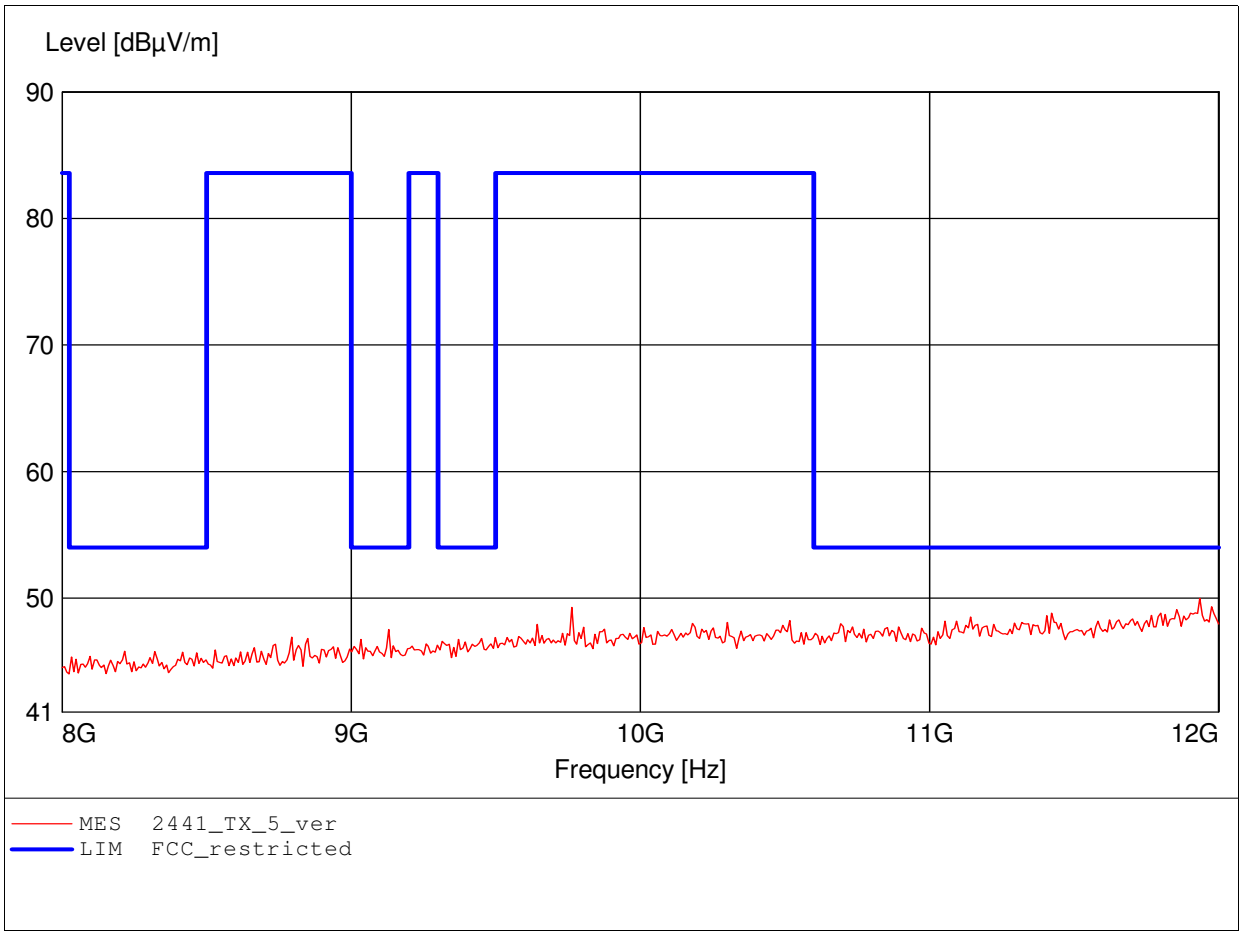


Page 1/1 29.11.2012 09:32 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.936GHz, Emax: 49.96dBµV/m, RBW: 1MHz	

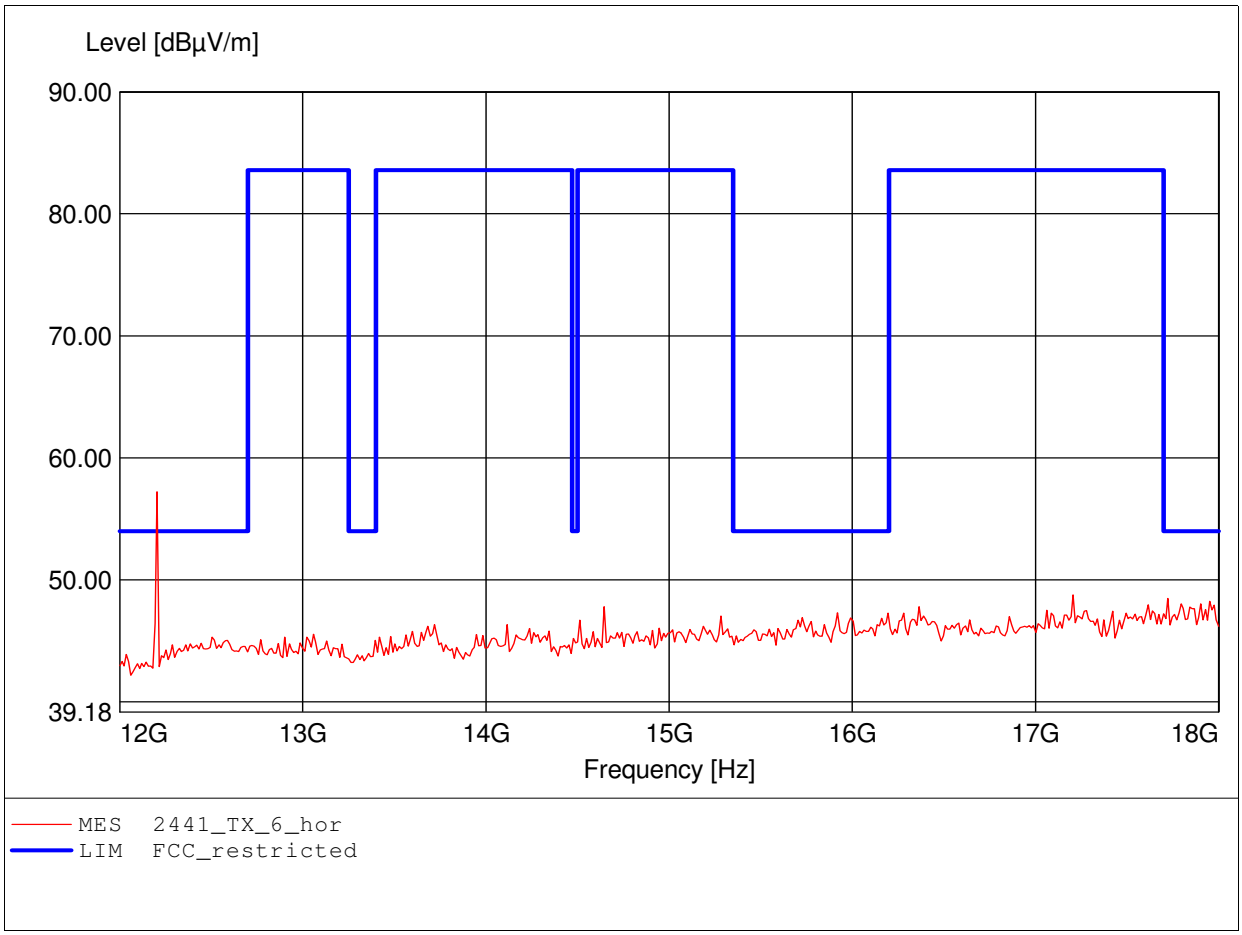


Page 1/1 29.11.2012 09:43 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.204GHz, Emax: 57.21dBµV/m, RBW: 1MHz	

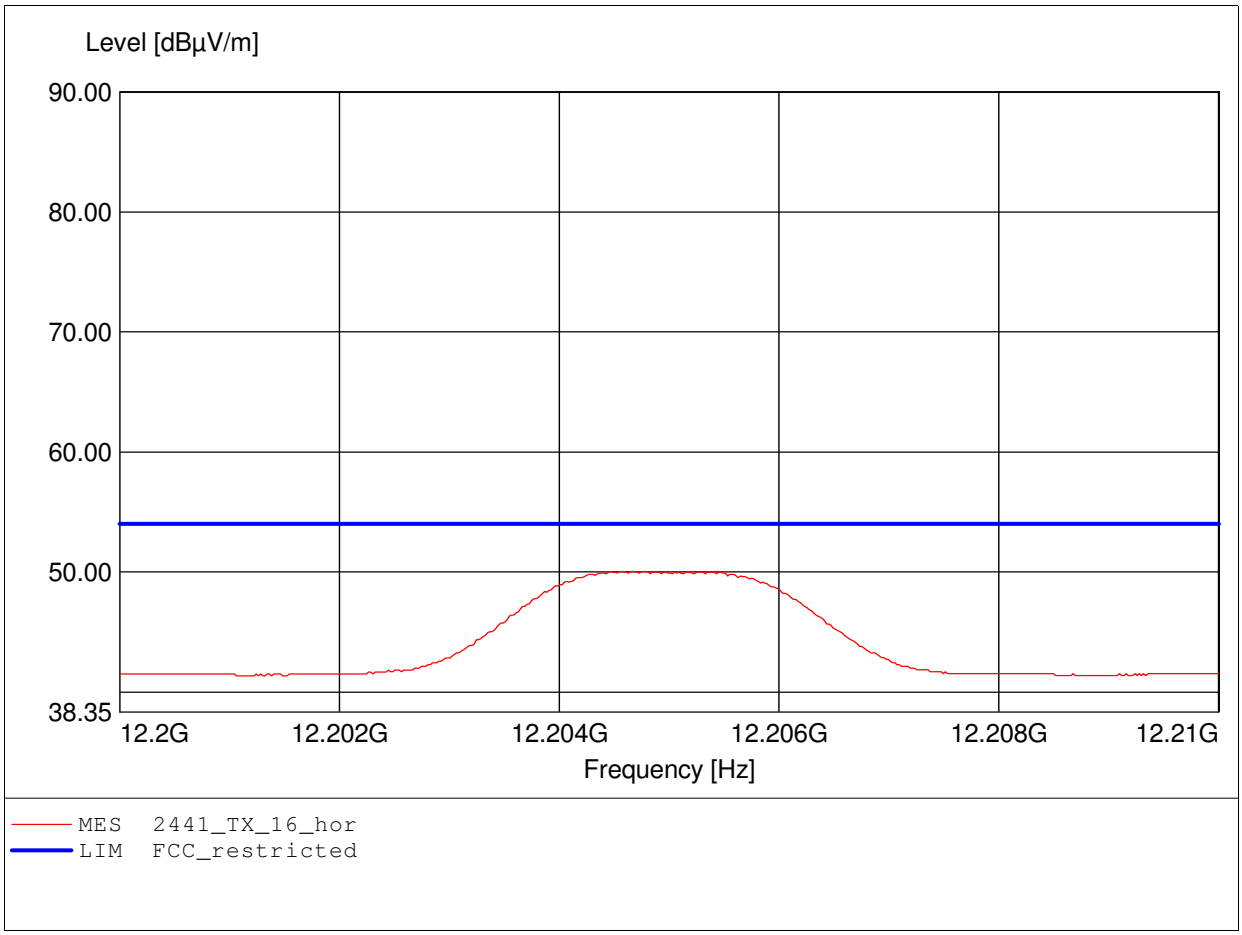


Page 1/1 29.11.2012 09:34 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.205GHz, Emax: 50.04dBµV/m, RBW: 1MHz	

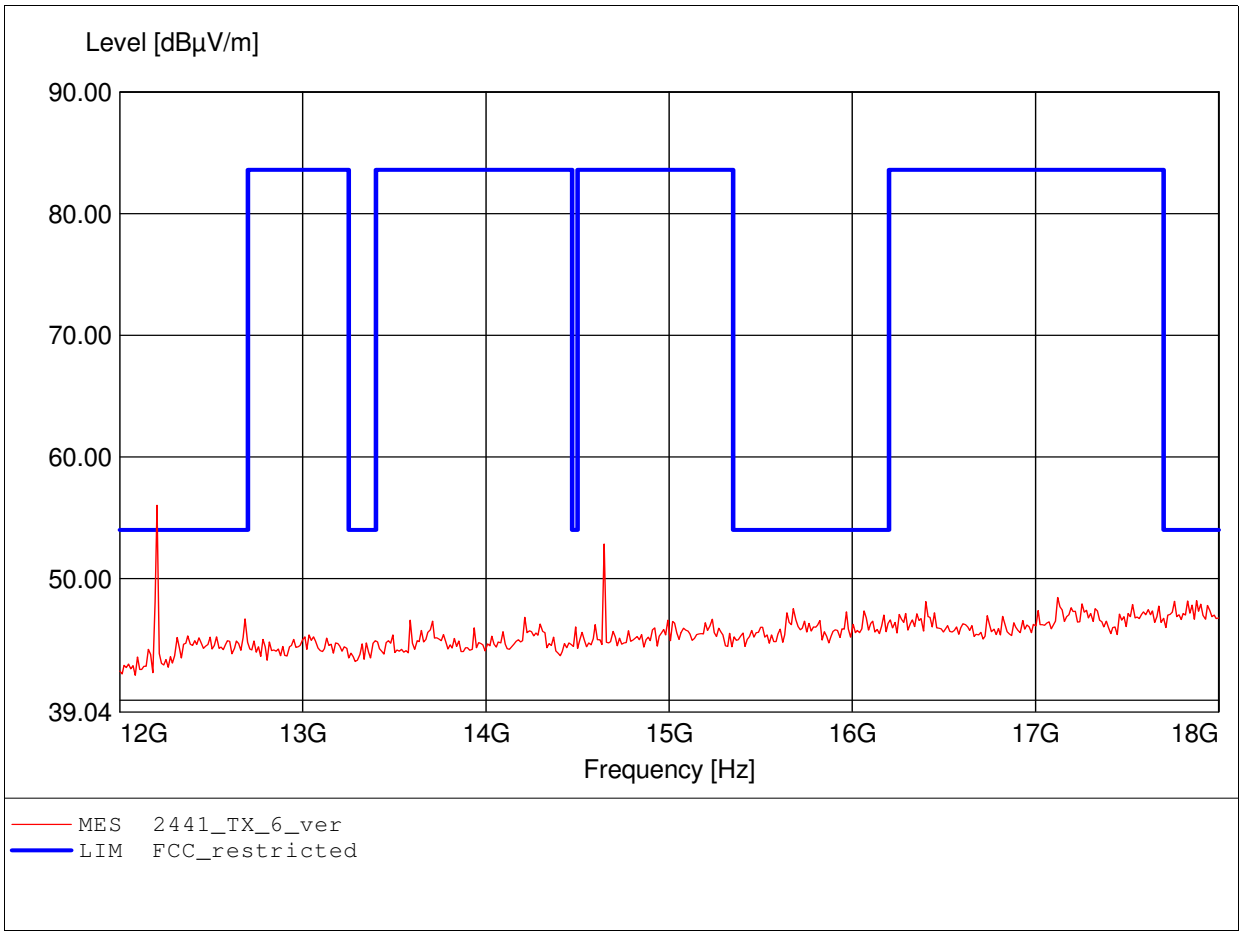


Page 1/1 29.11.2012 14:06 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

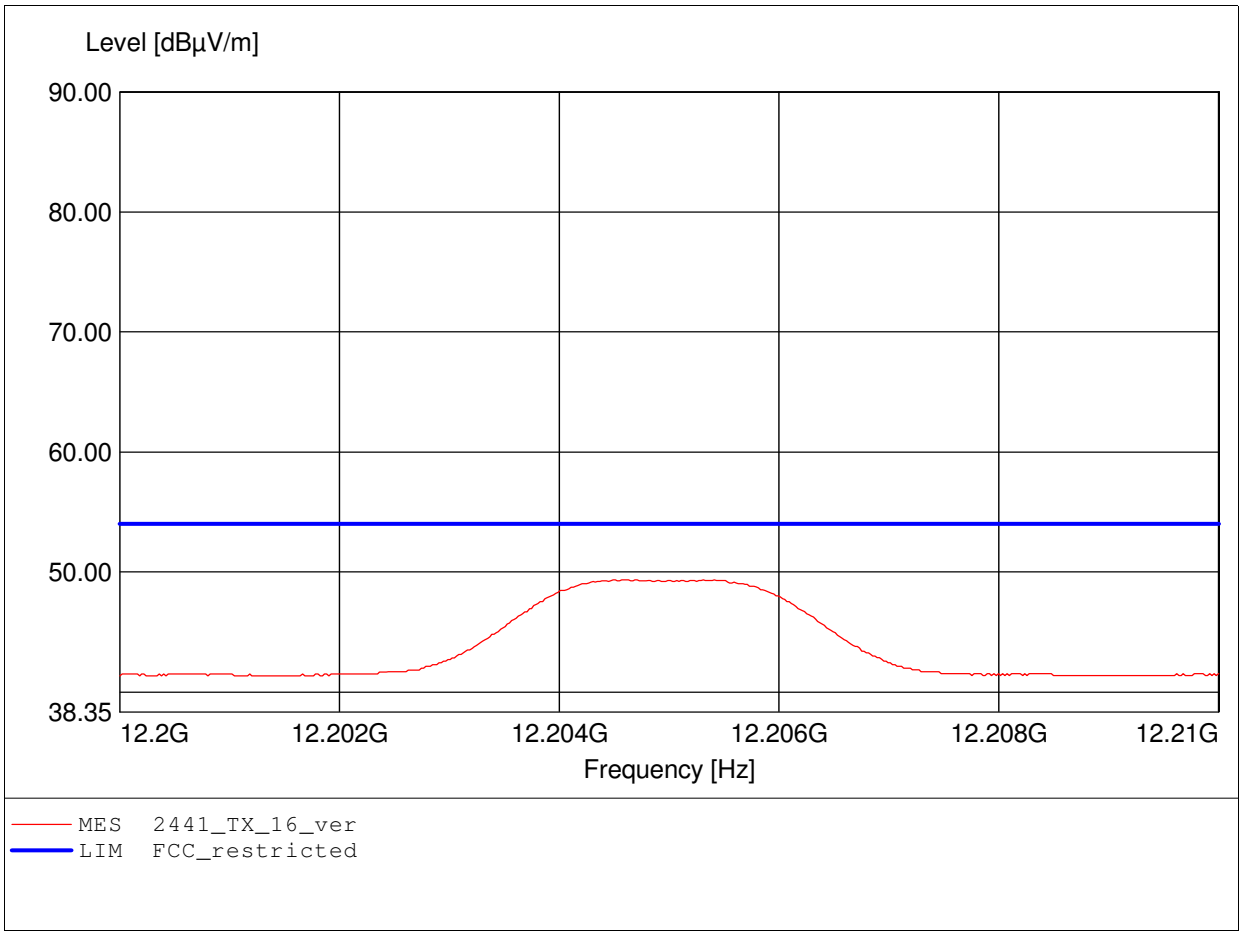
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.204GHz, Emax: 56.02dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.205GHz, Emax: 49.35dBµV/m, RBW: 1MHz	

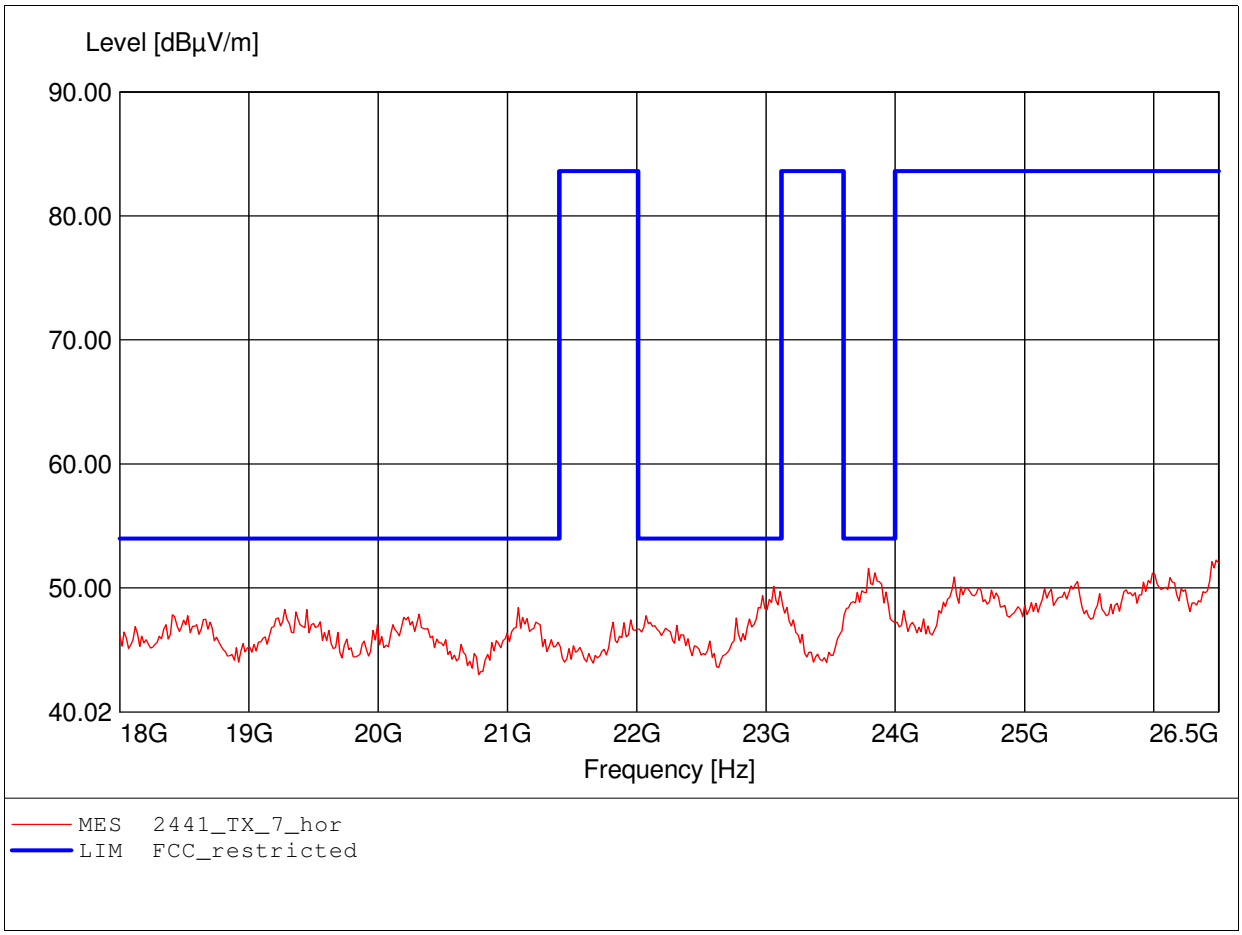


Page 1/1 29.11.2012 14:22 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 26.483GHz, Emax: 52.27dBµV/m, RBW: 1MHz	

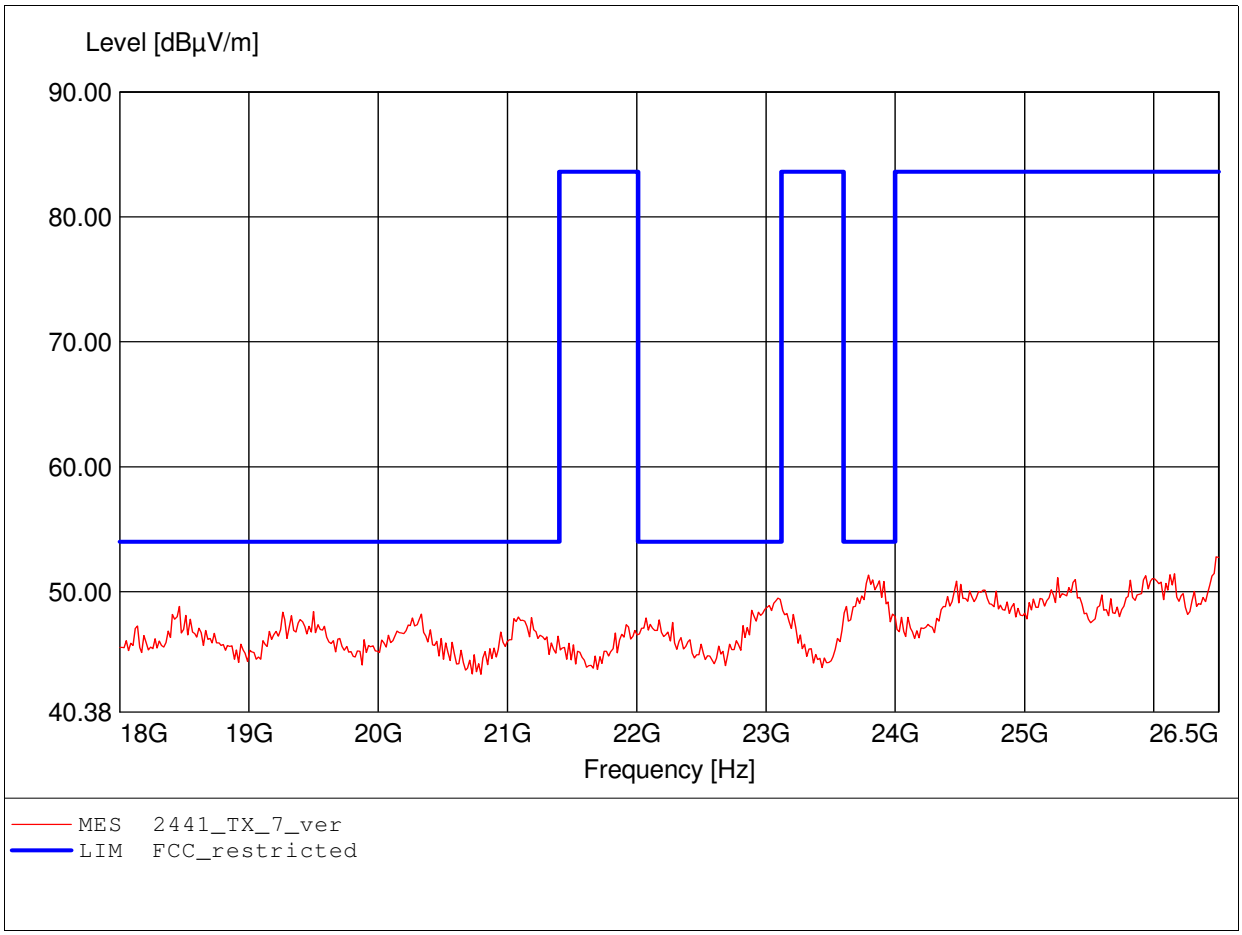


Page 1/1 29.11.2012 09:36 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 39 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 26.483GHz, Emax: 52.81dBµV/m, RBW: 1MHz	

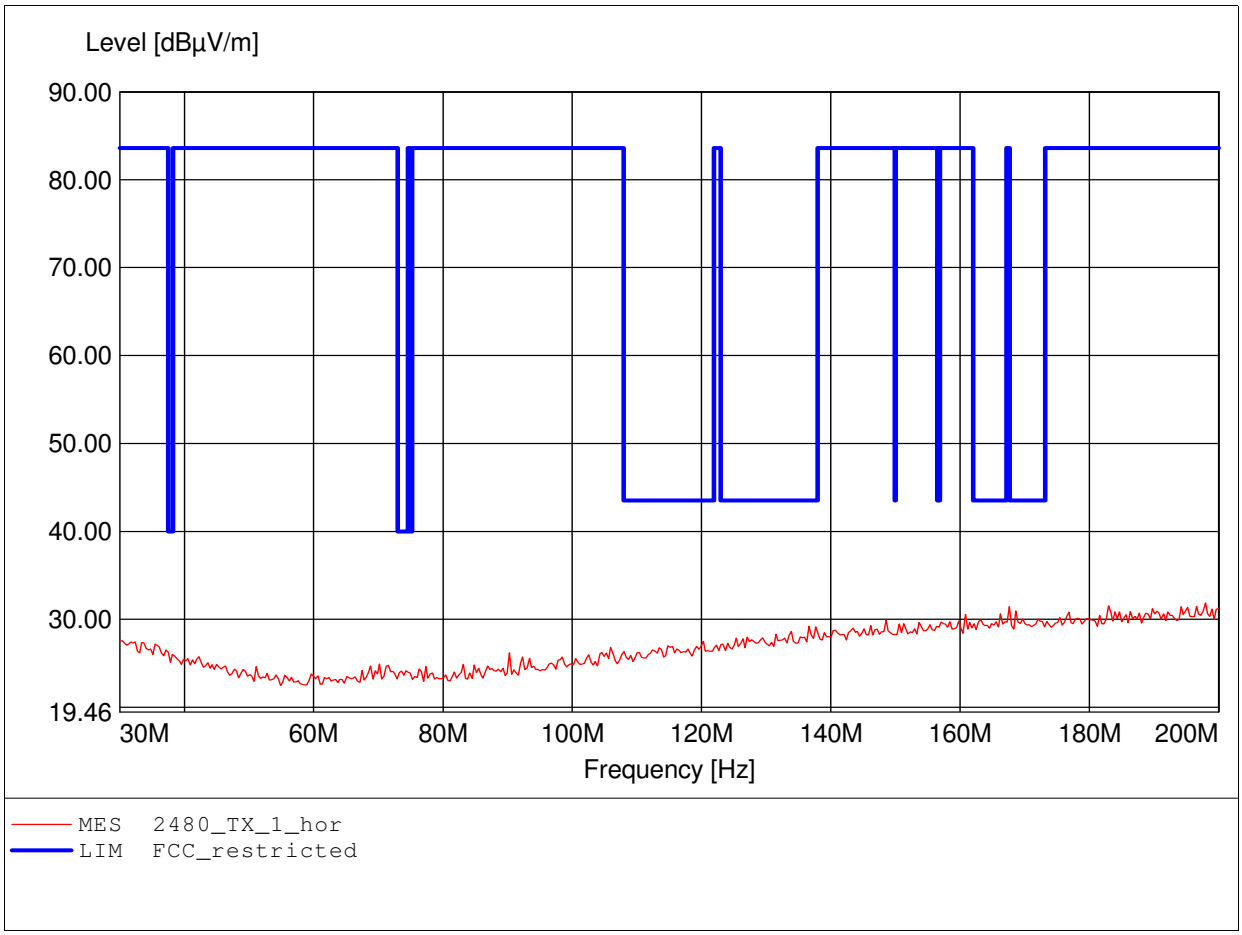


Page 1/1 29.11.2012 09:39 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	/ worst case
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HK 116	
Comment 2:	Freq: 197.956MHz, Emax: 31.85dBµV/m, RBW: 100kHz	

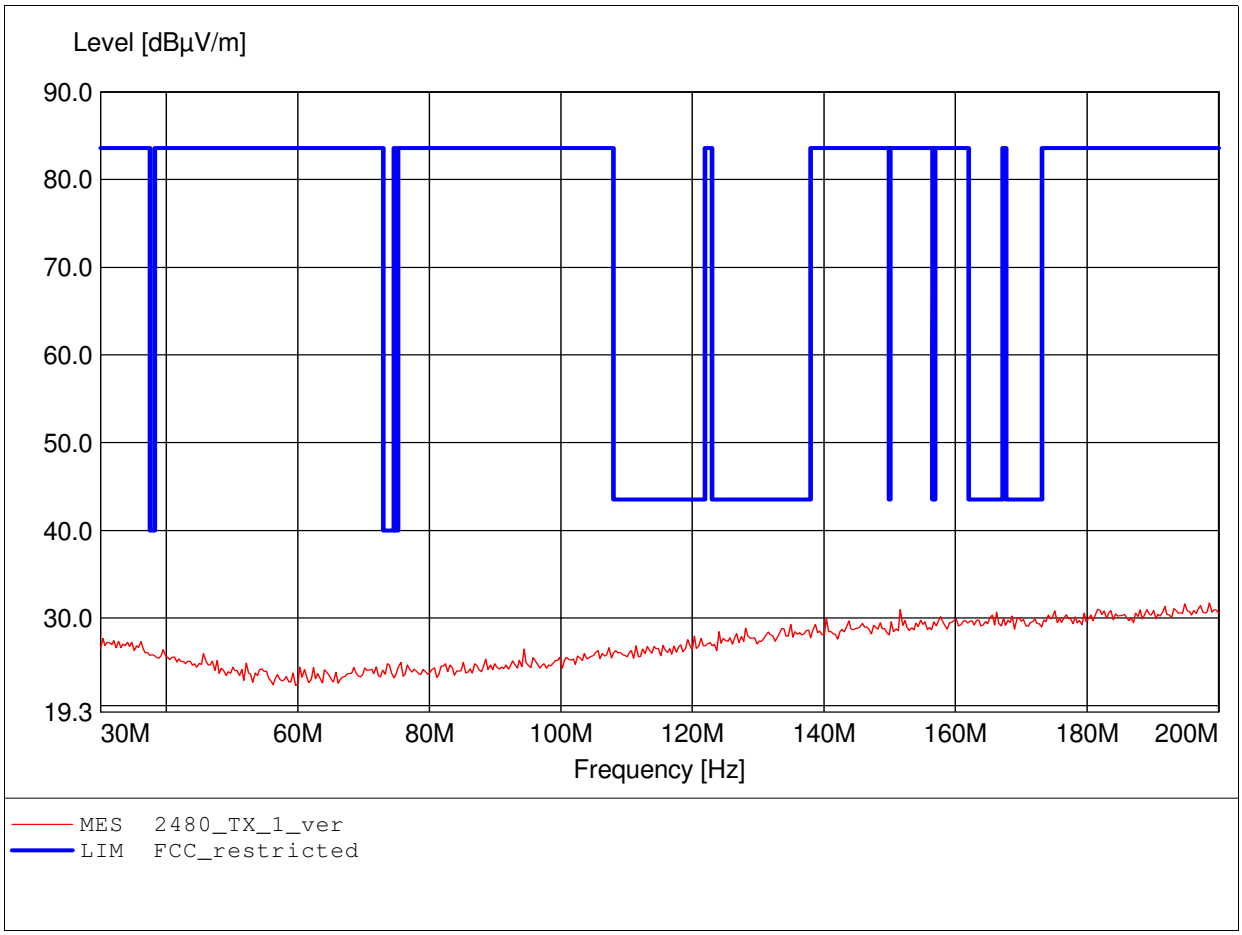


Page 1/1 29.11.2012 15:10 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	/ worst case
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HK 116	
Comment 2:	Freq: 198.637MHz, Emax: 31.71dBµV/m, RBW: 100kHz	

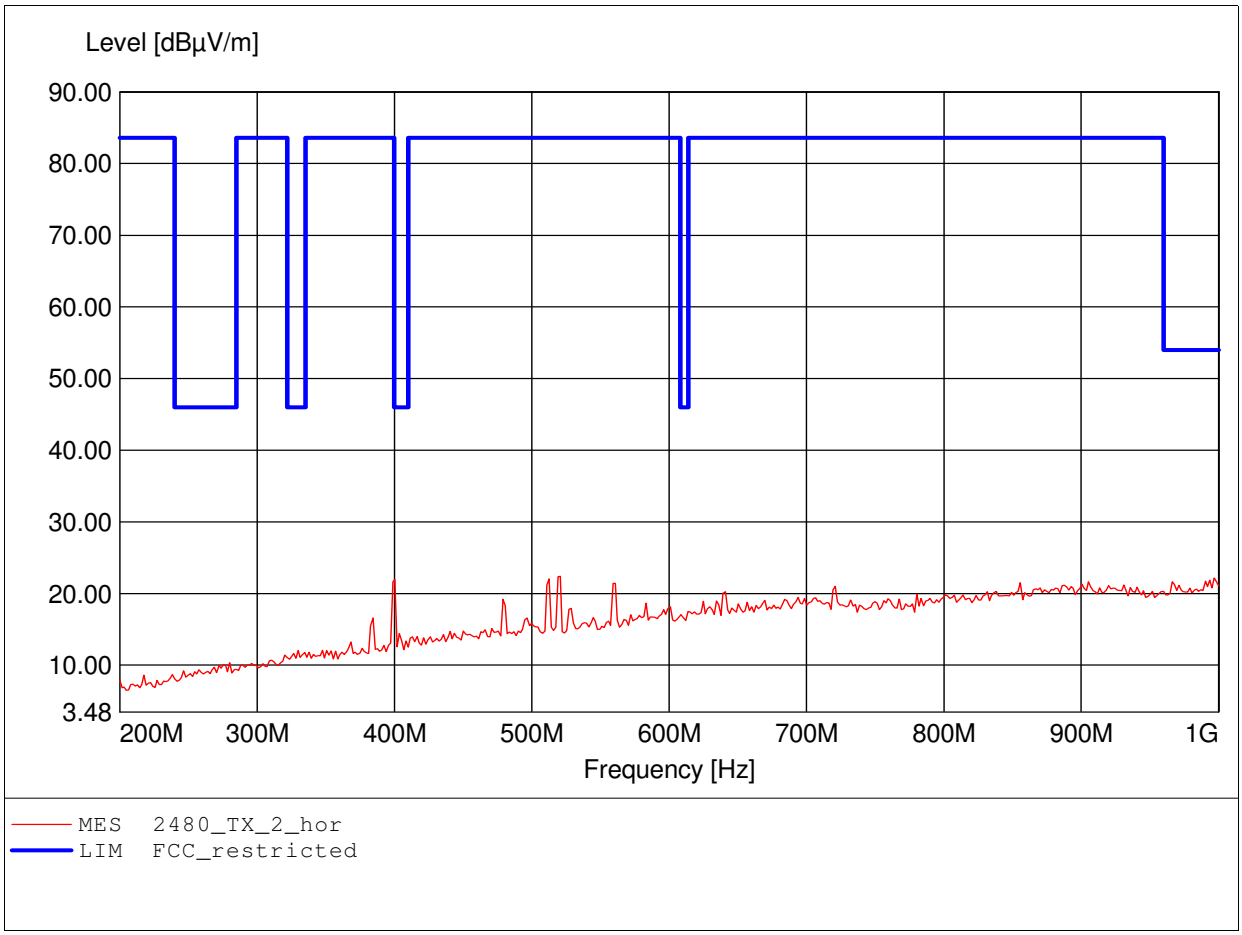


Page 1/1 29.11.2012 15:08 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	/ worst case
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.	
Comment 2:	Freq: 520.641MHz, Emax: 22.39dBµV/m, RBW: 100kHz	

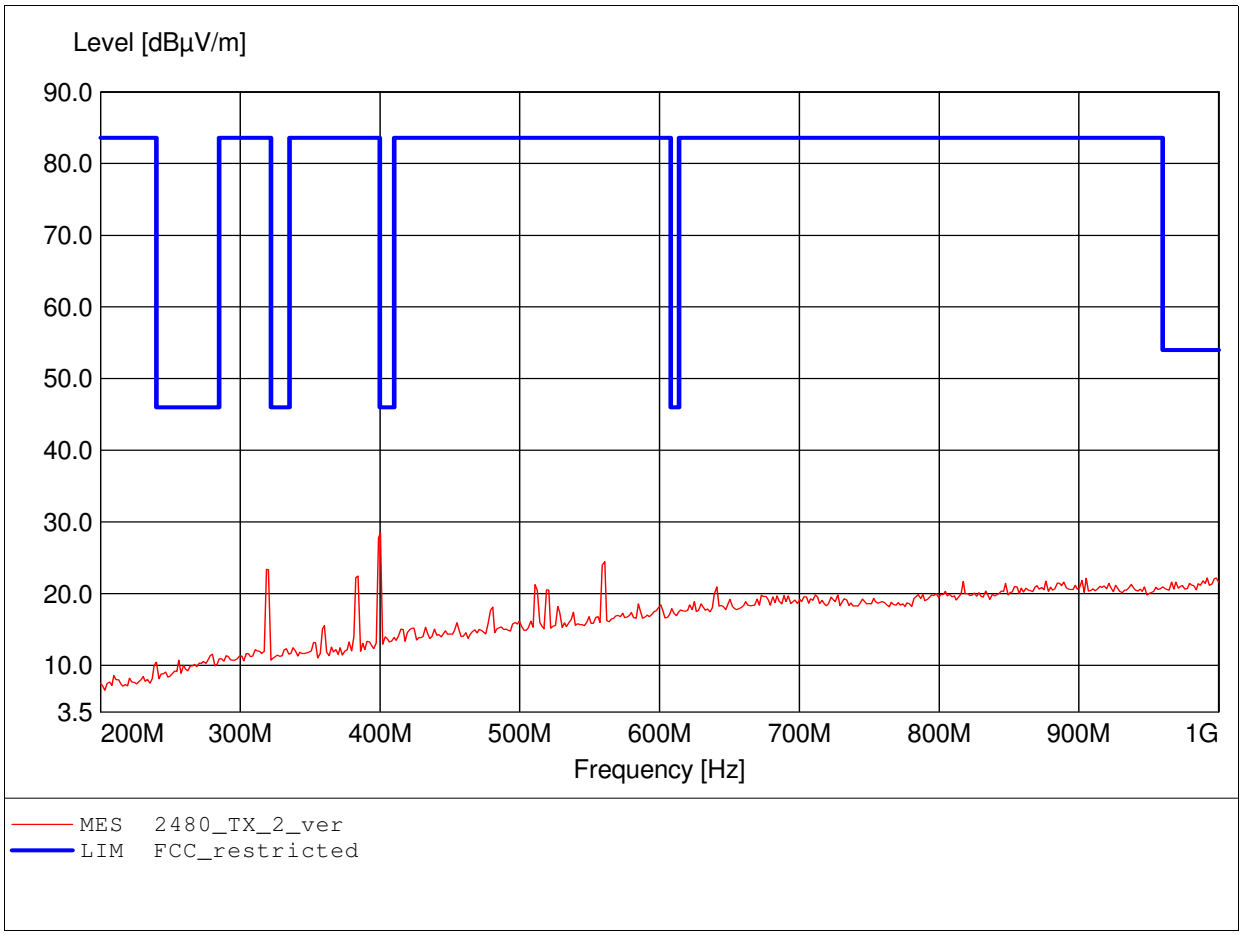


Page 1/1 29.11.2012 15:03 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	/ worst case
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.	
Comment 2:	Freq: 400.401MHz, Emax: 28.51dBµV/m, RBW: 100kHz	

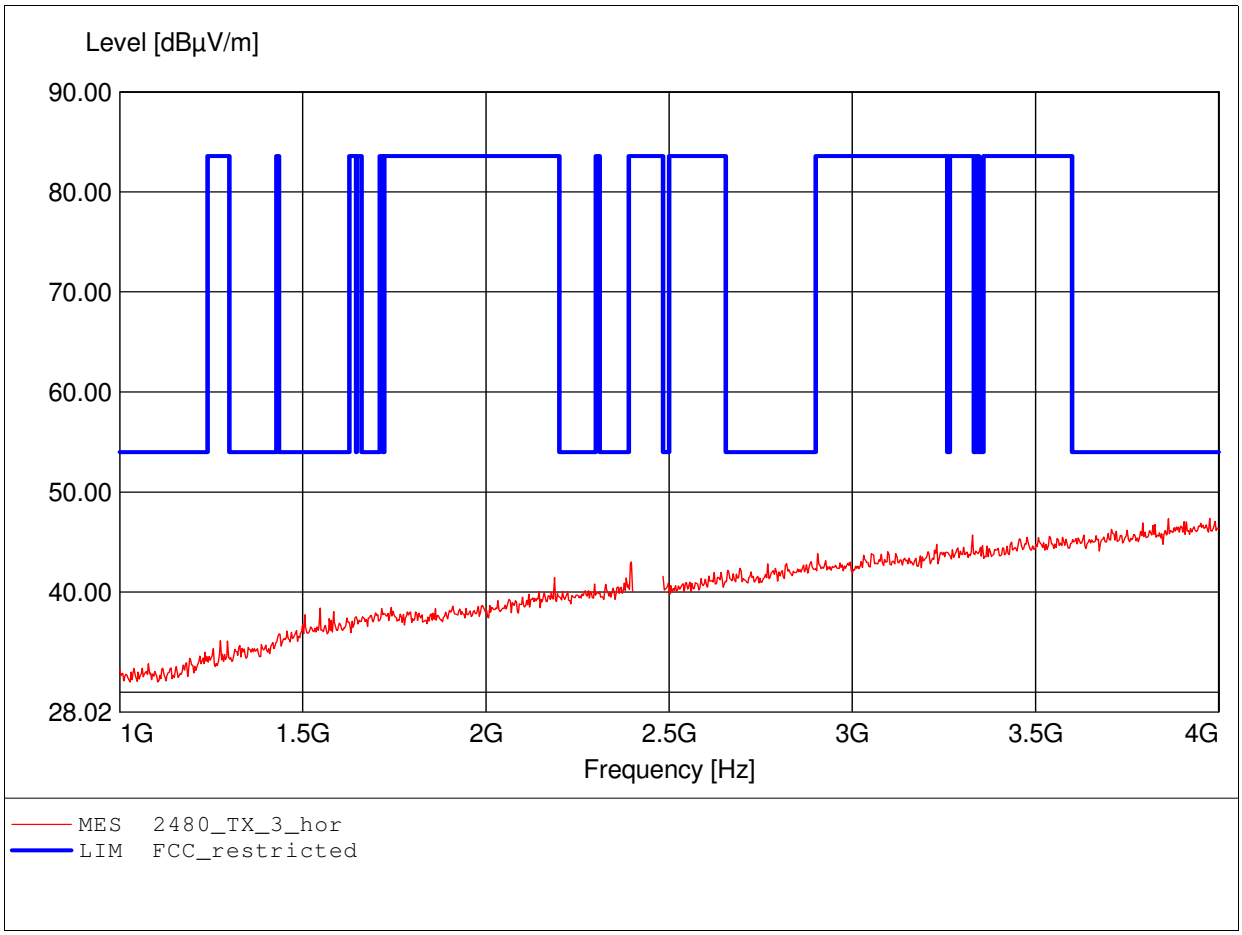


Page 1/1 29.11.2012 14:47 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.976GHz, Emax: 47.36dBµV/m, RBW: 1MHz	

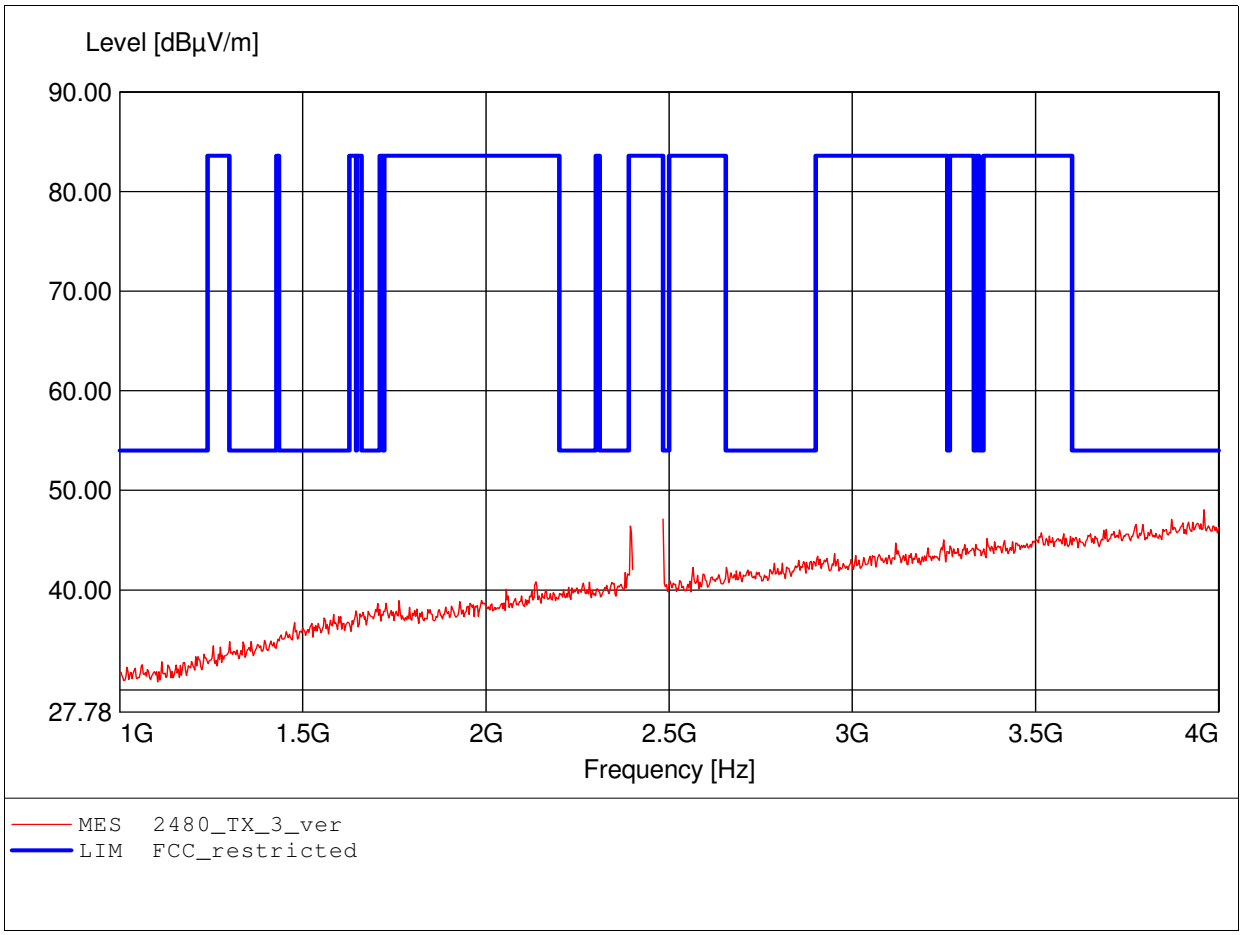


Page 1/1 29.11.2012 10:15 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

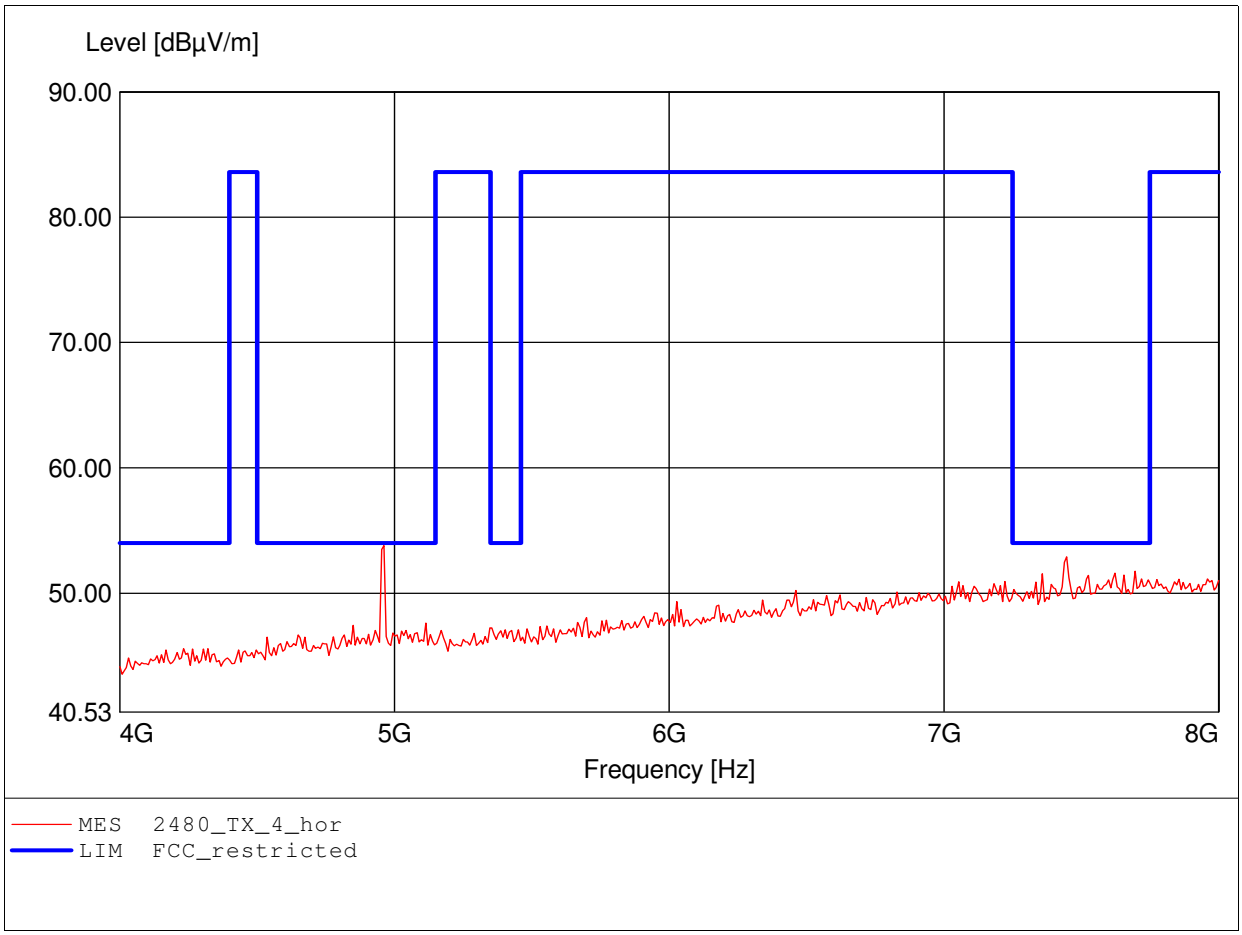
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.960GHz, Emax: 48.04dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 4.962GHz, Emax: 53.80dBµV/m, RBW: 1MHz	

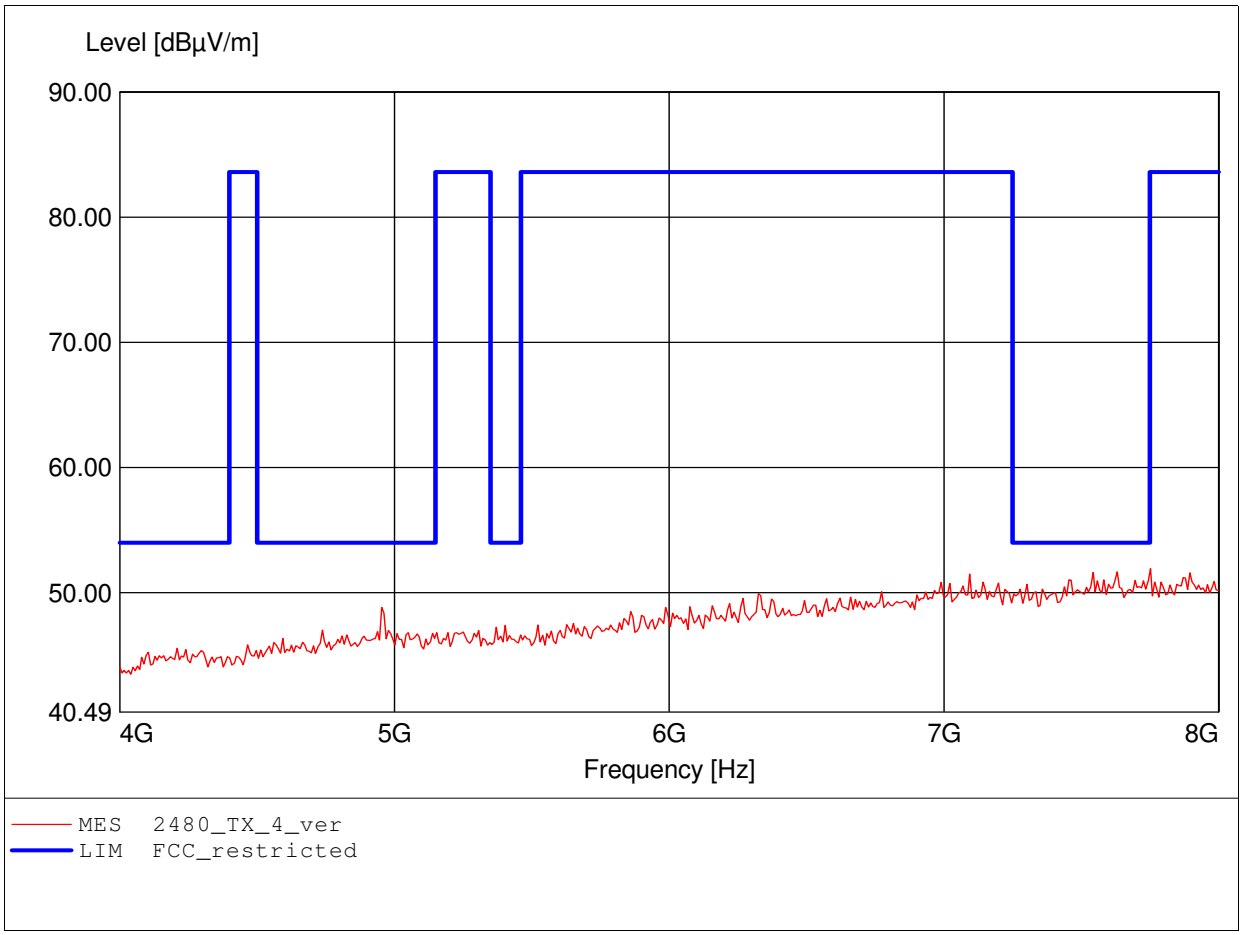


Page 1/1 29.11.2012 10:10 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.752GHz, Emax: 51.93dBµV/m, RBW: 1MHz	

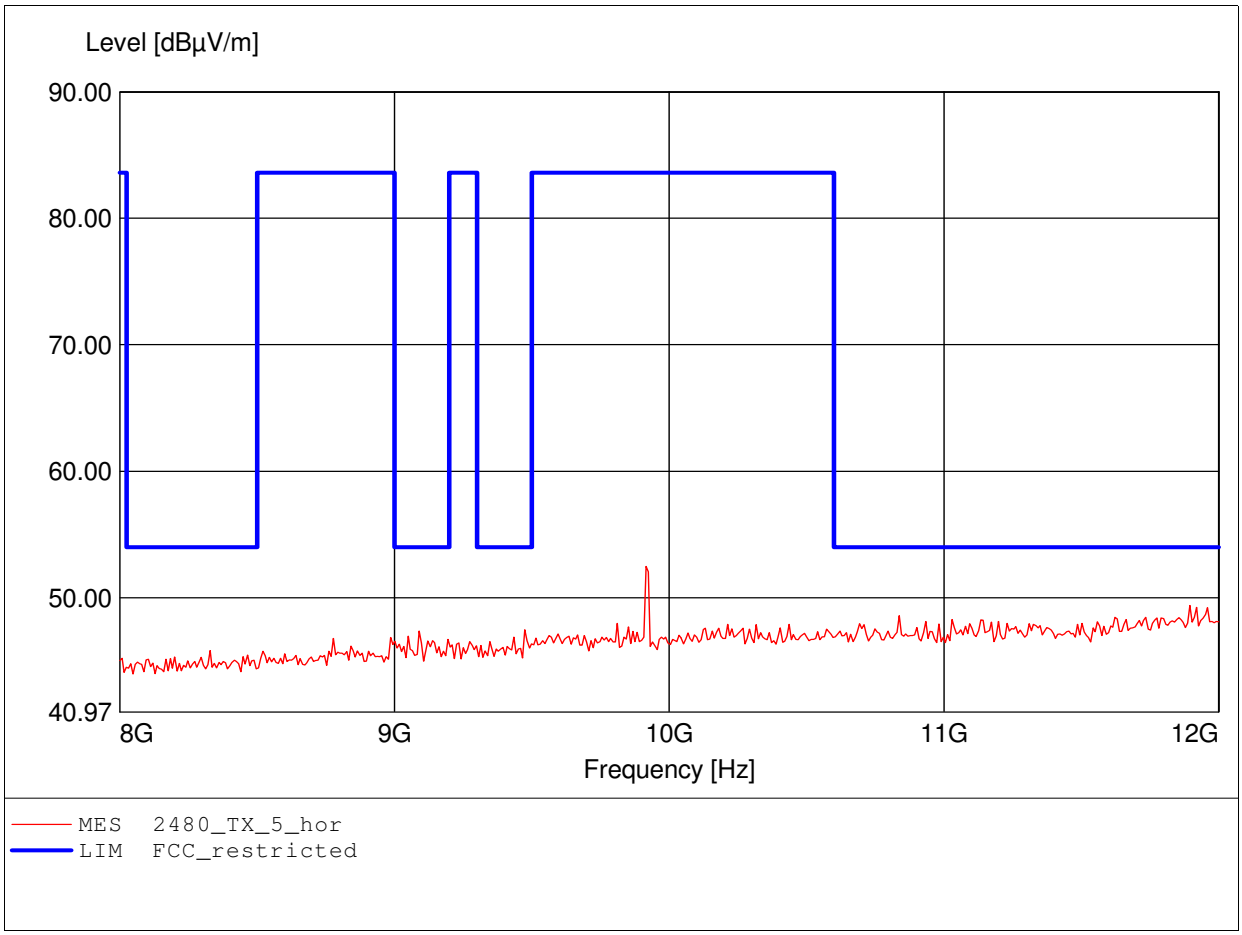


Page 1/1 29.11.2012 09:54 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 9.916GHz, Emax: 52.47dBµV/m, RBW: 1MHz	

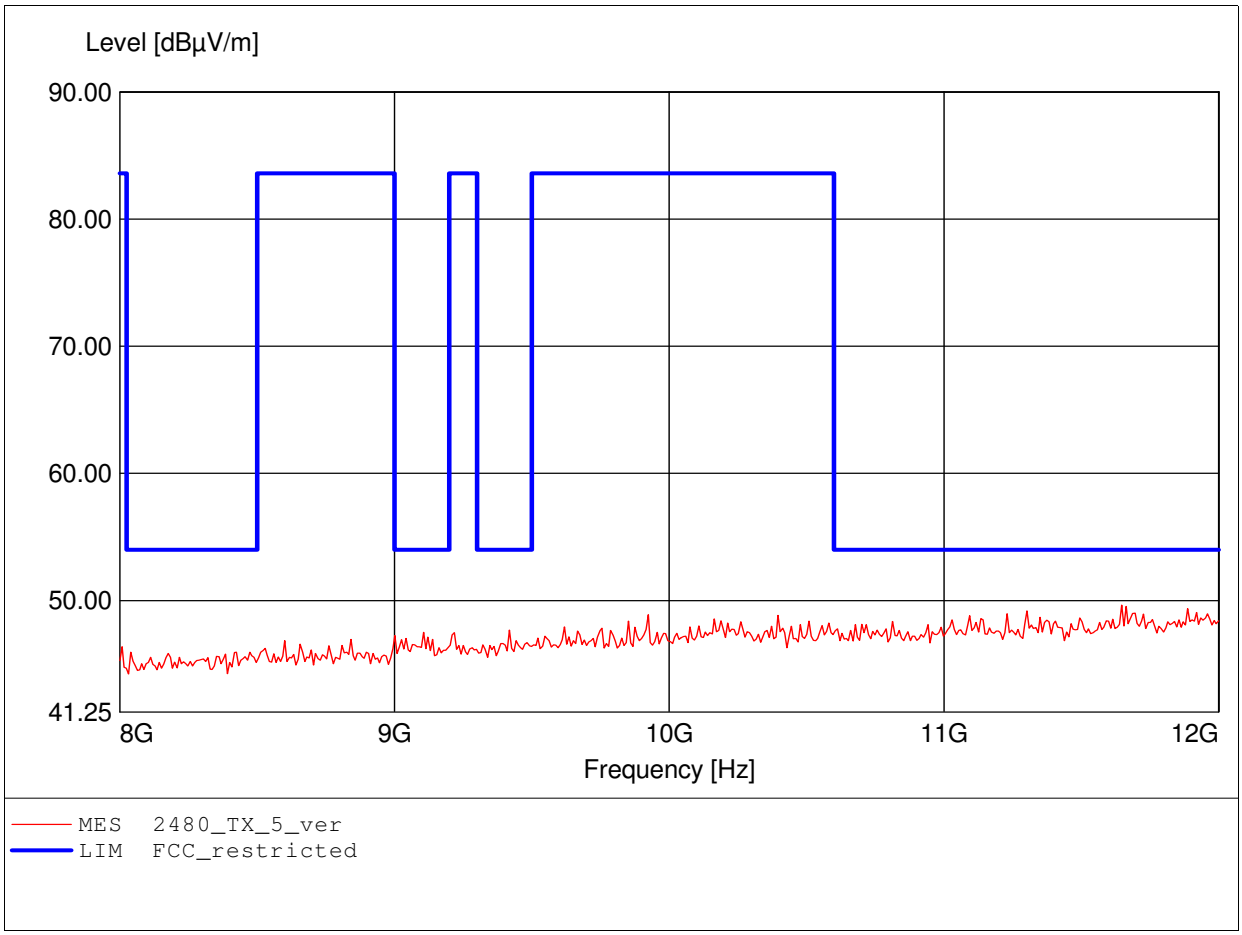


Page 1/1 29.11.2012 10:08 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.647GHz, Emax: 49.66dBµV/m, RBW: 1MHz	

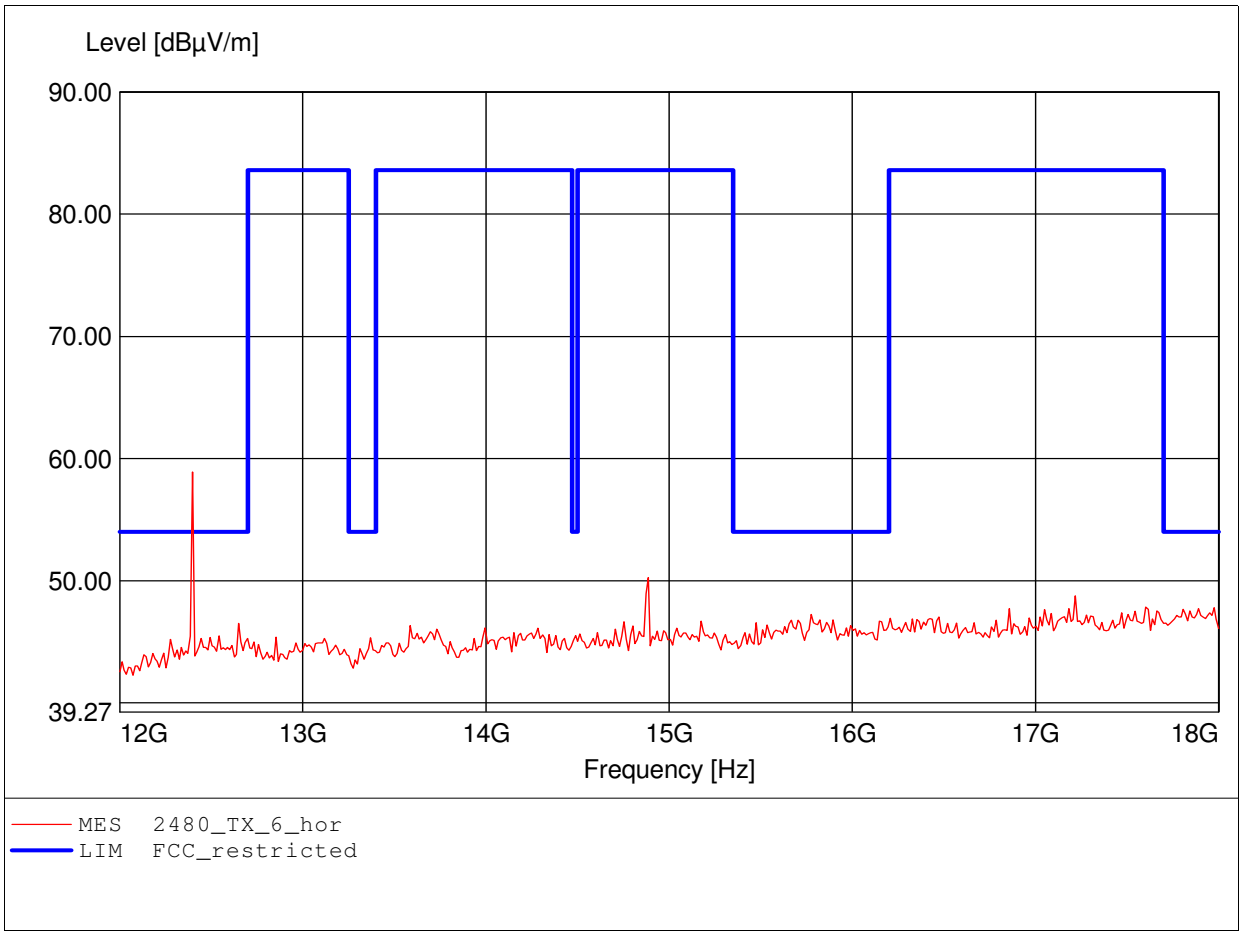


Page 1/1 29.11.2012 09:56 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.397GHz, Emax: 58.89dBµV/m, RBW: 1MHz	

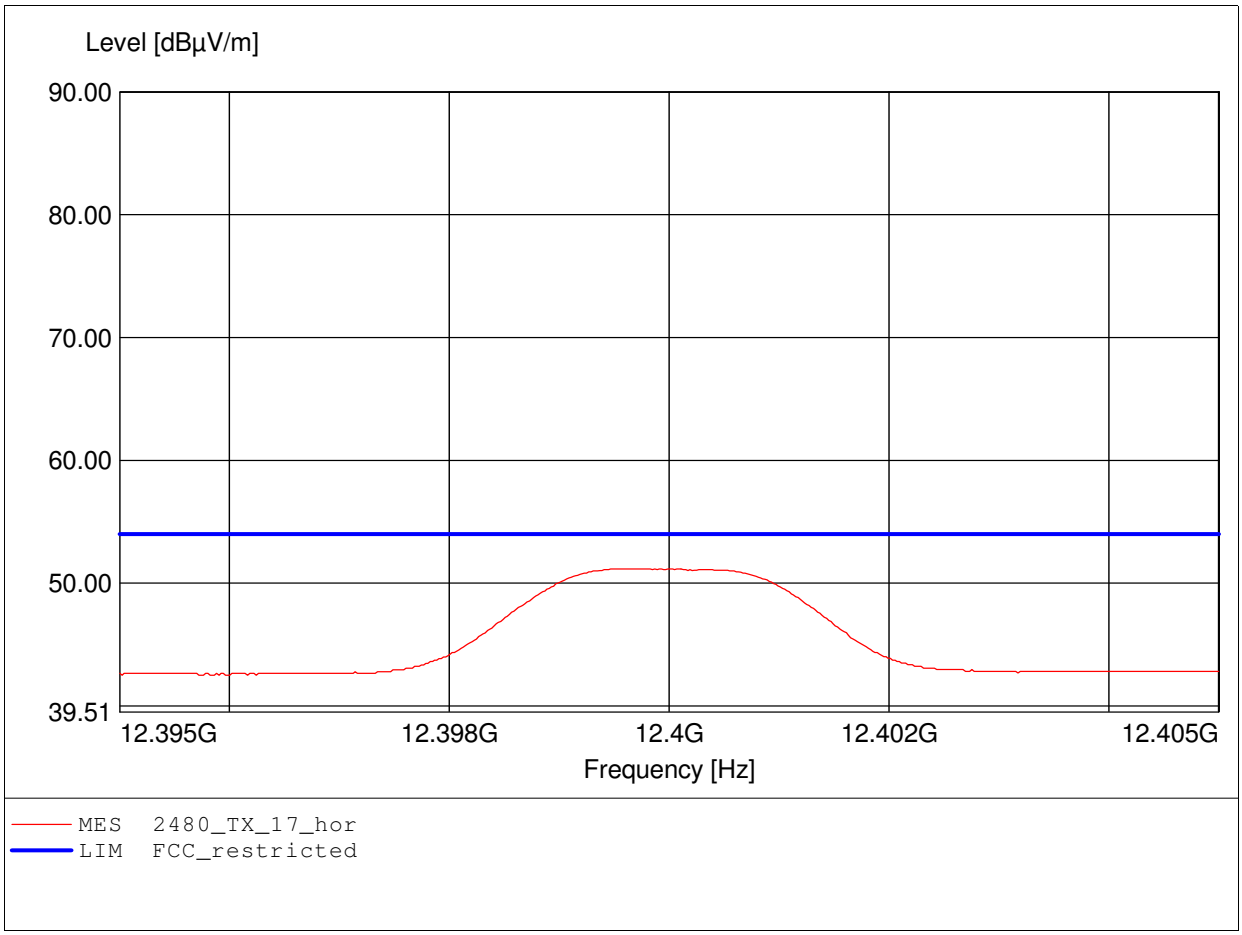


Page 1/1 29.11.2012 10:06 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.400GHz, Emax: 51.14dBµV/m, RBW: 1MHz	

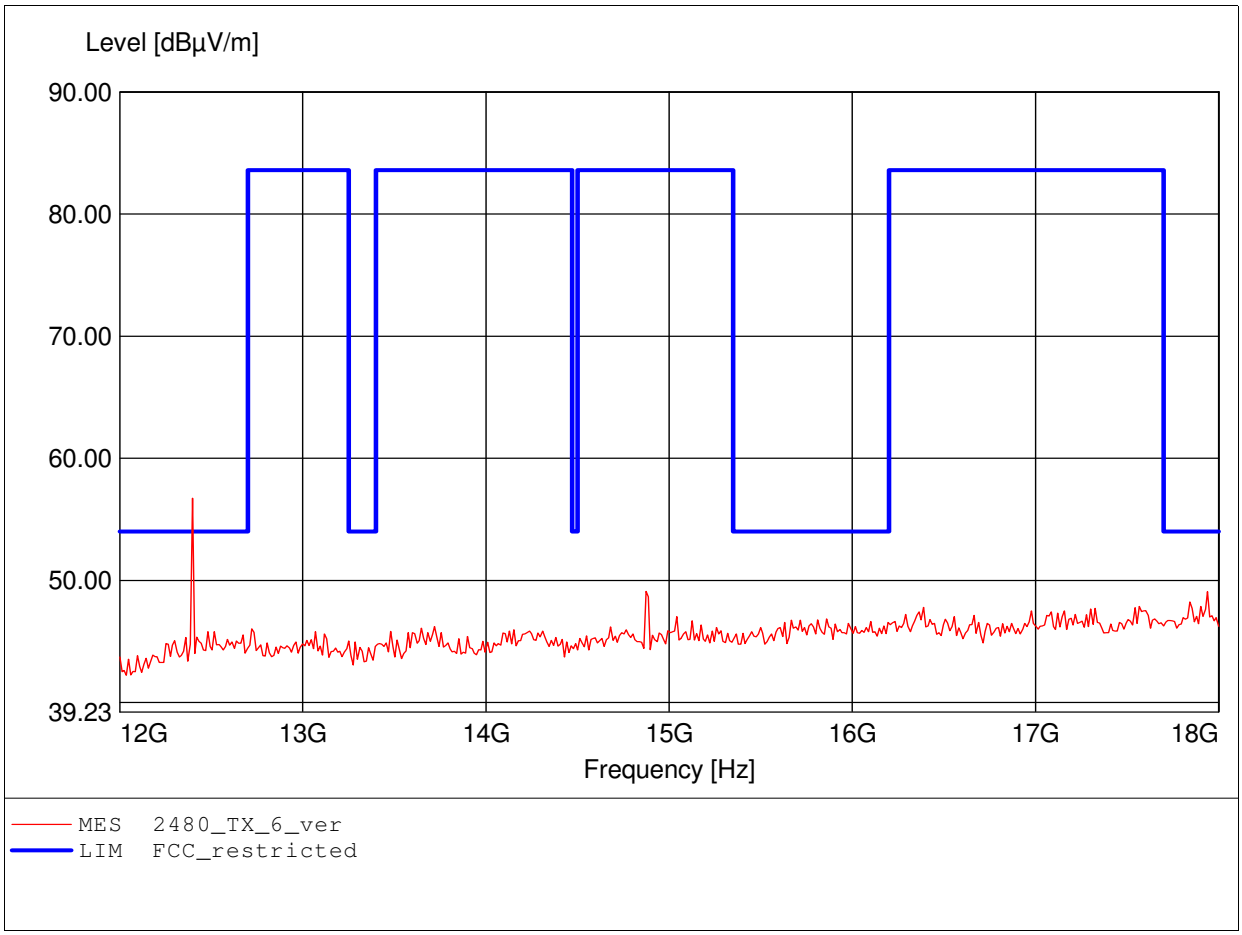


Page 1/1 29.11.2012 13:40 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.397GHz, Emax: 56.74dBµV/m, RBW: 1MHz	

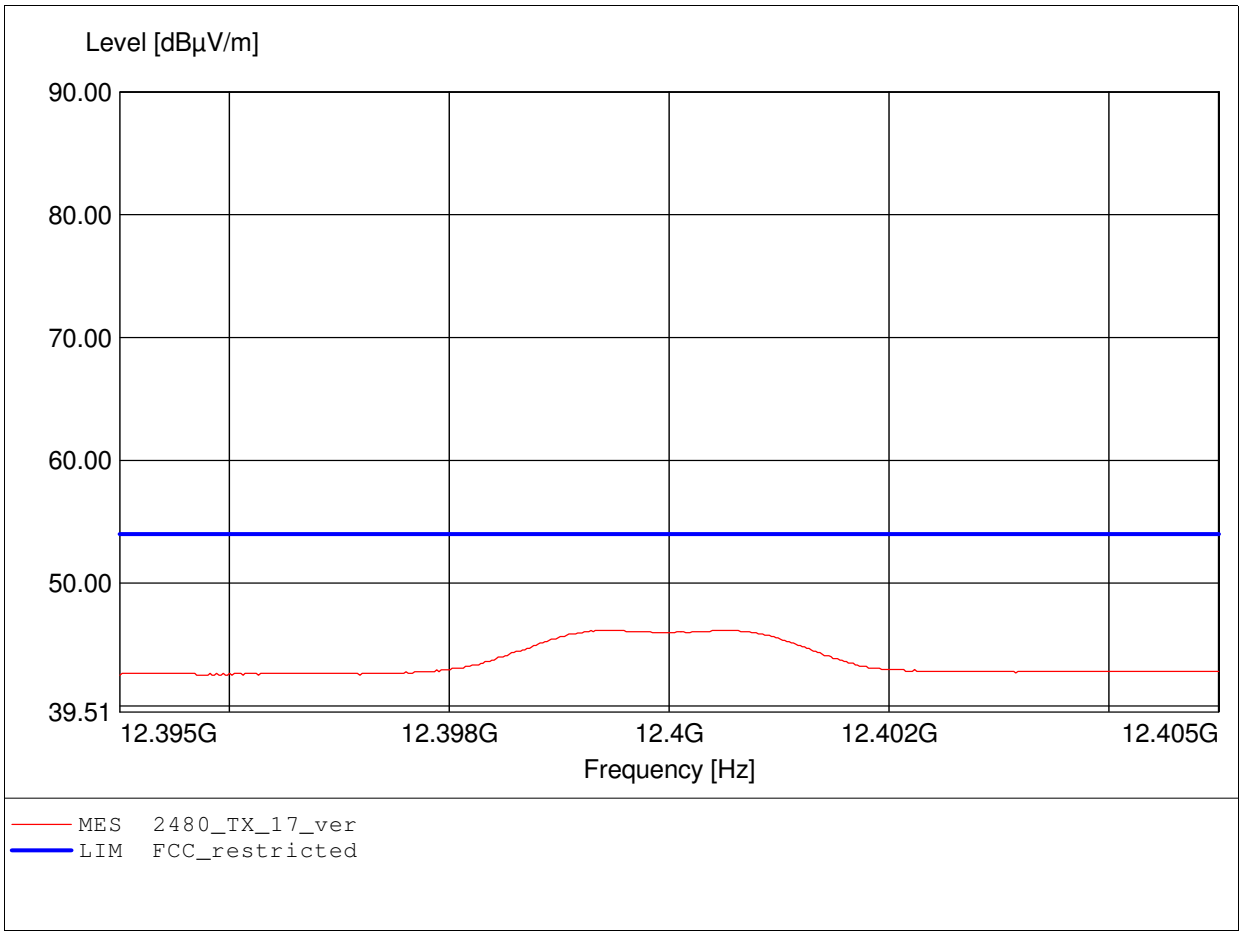


Page 1/1 29.11.2012 09:58 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

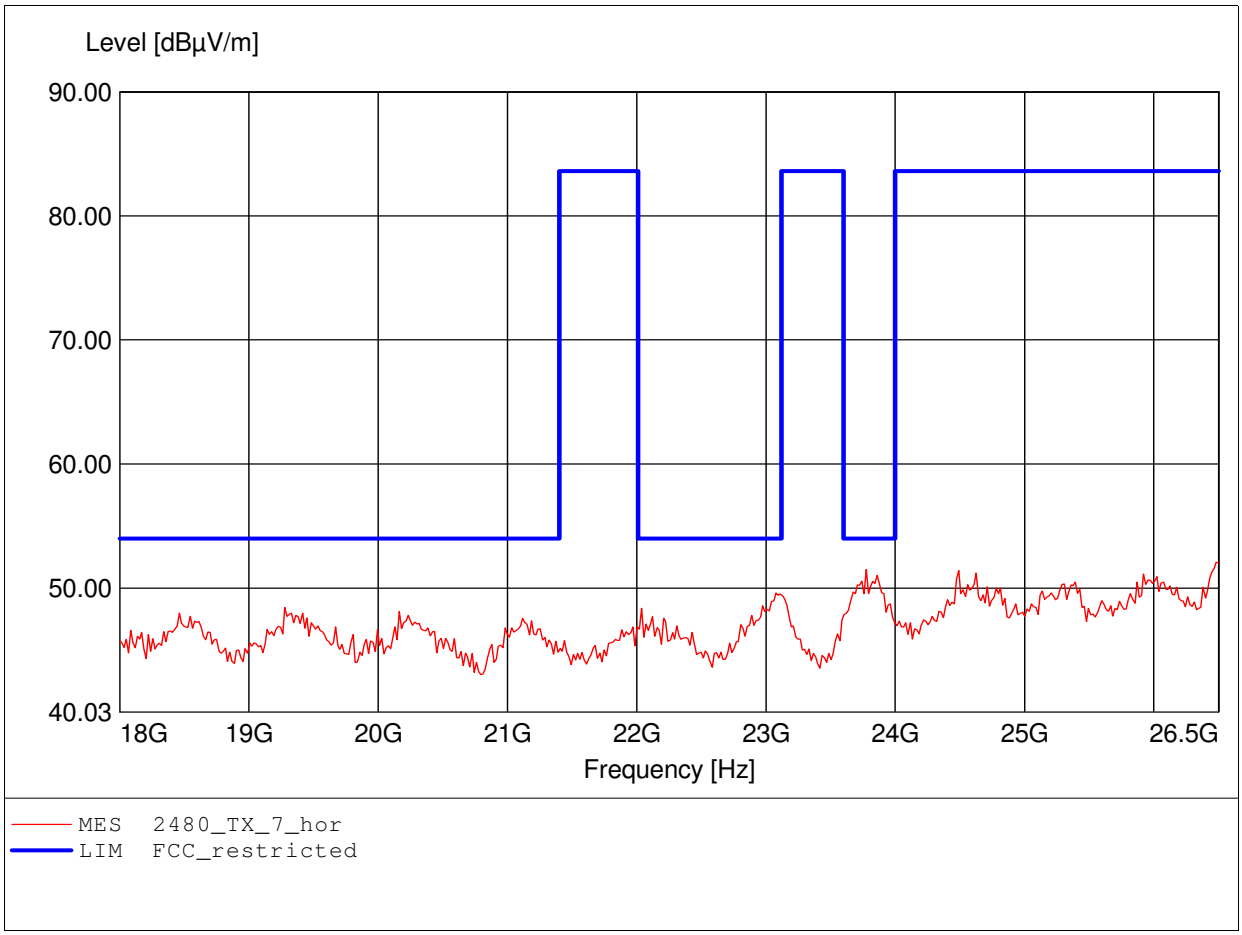
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.401GHz, Emax: 46.14dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 26.483GHz, Emax: 52.10dBµV/m, RBW: 1MHz	

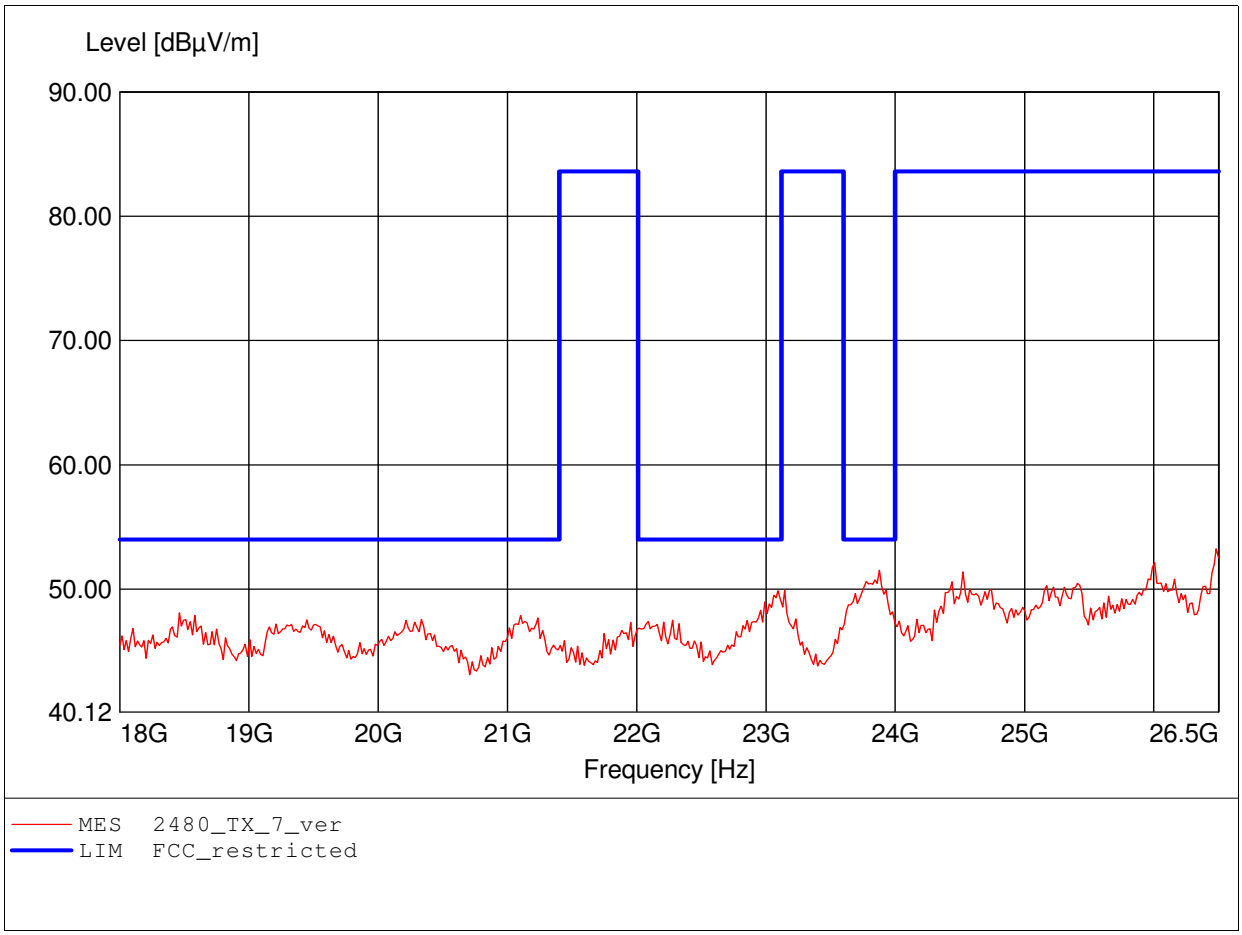


Page 1/1 29.11.2012 10:04 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

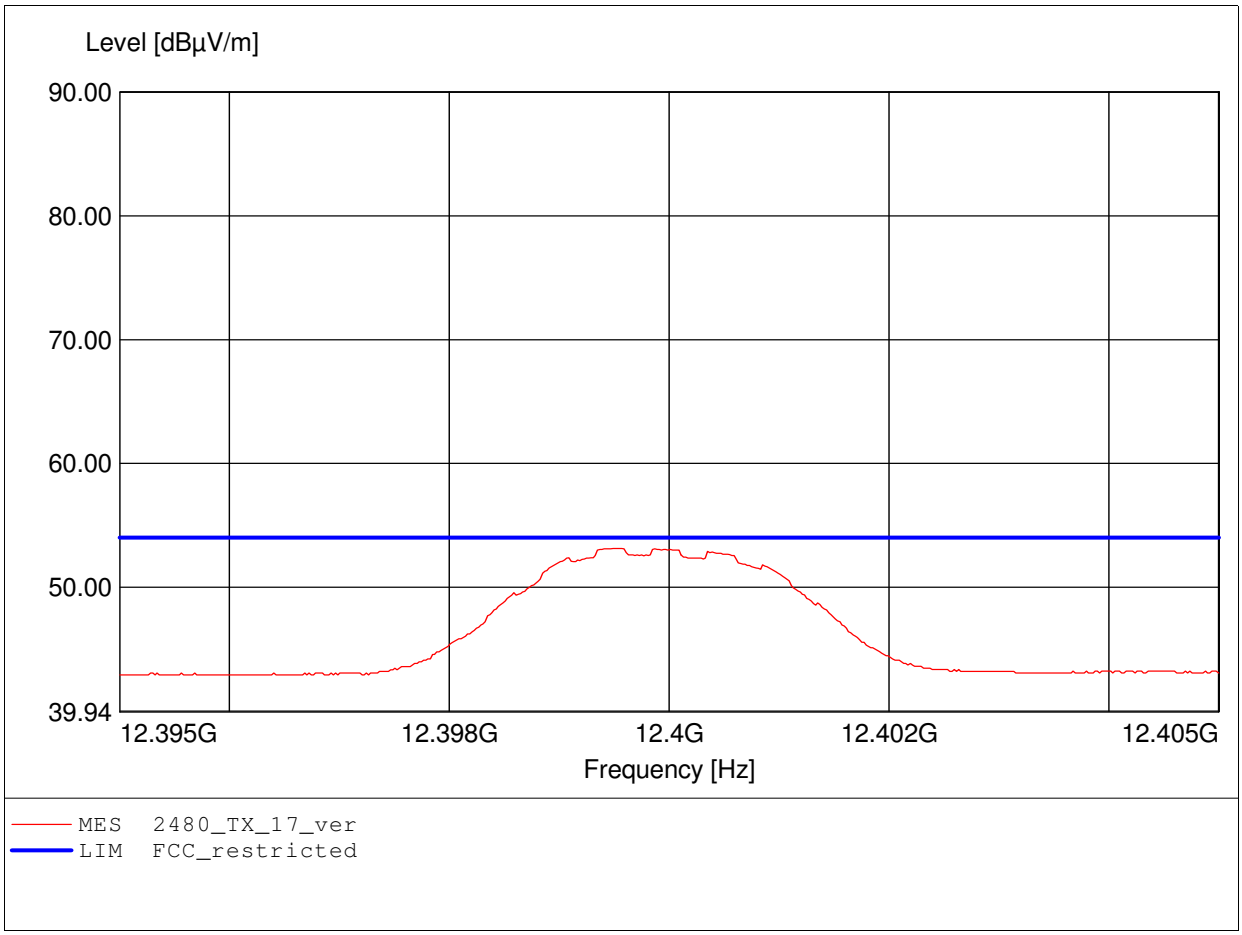
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 26.483GHz, Emax: 53.25dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

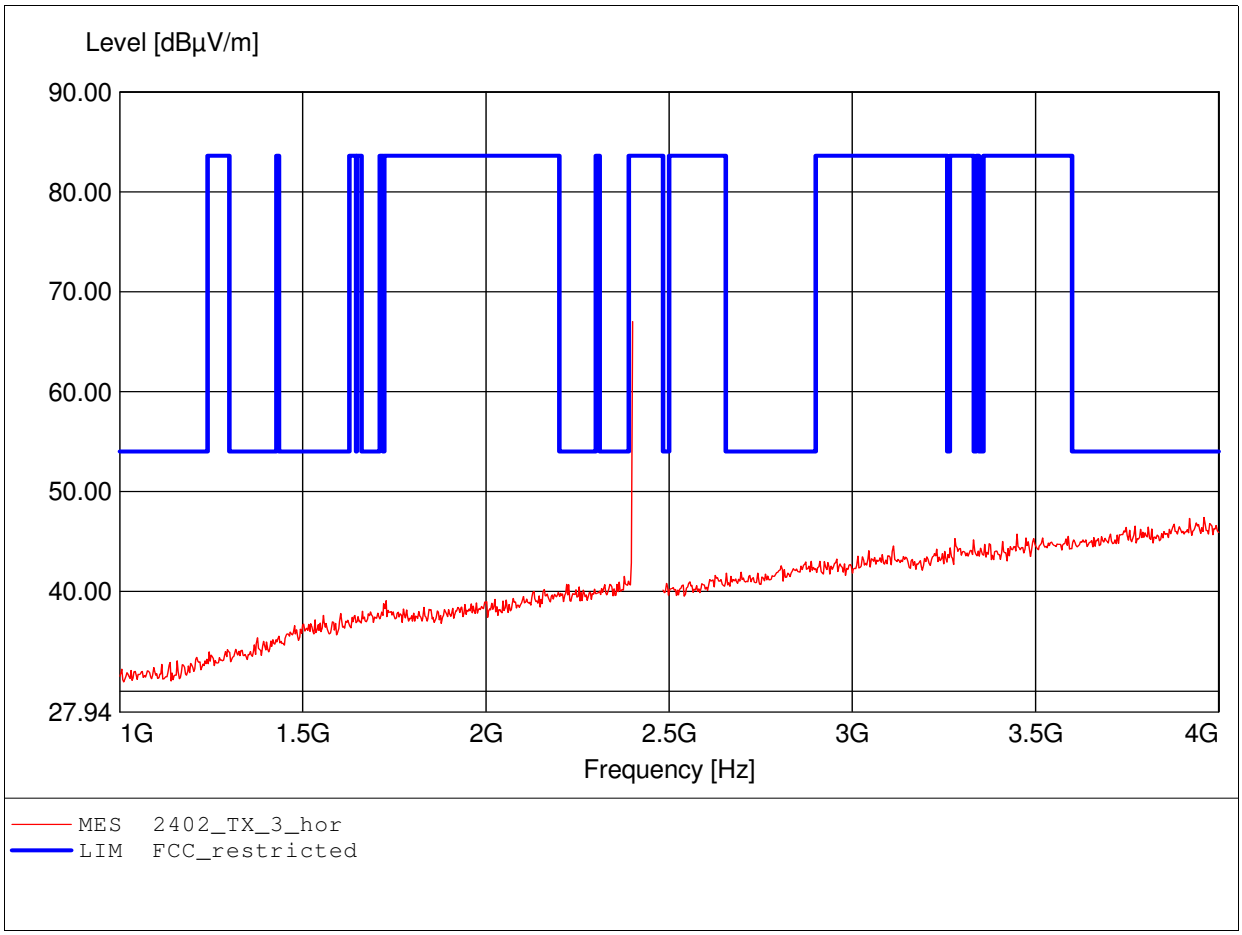
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-BR / CH: 78 / DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.400GHz, Emax: 53.15dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 2.400GHz, Emax: 67.02dBµV/m, RBW: 1MHz	

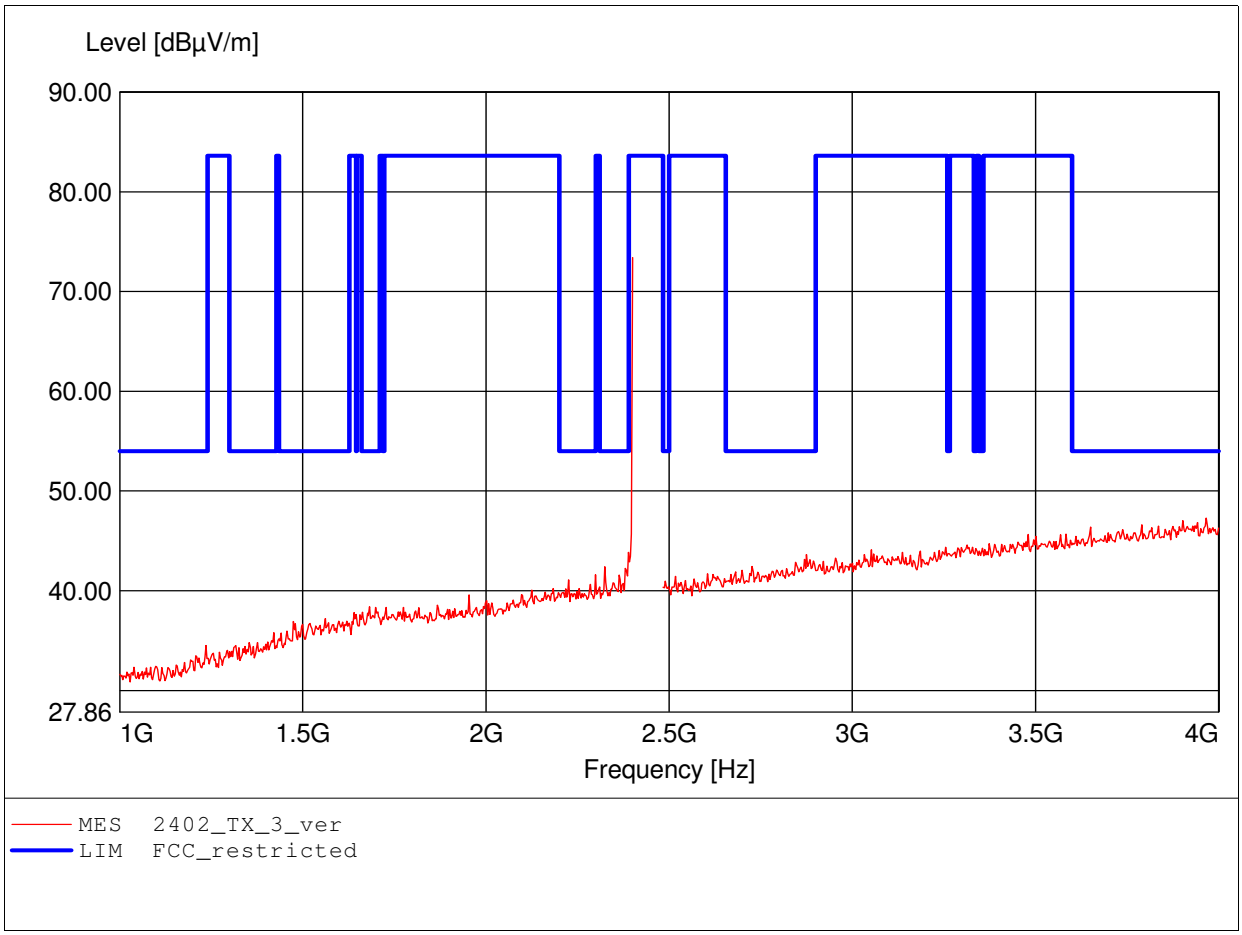


Page 1/1 29.11.2012 11:38 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

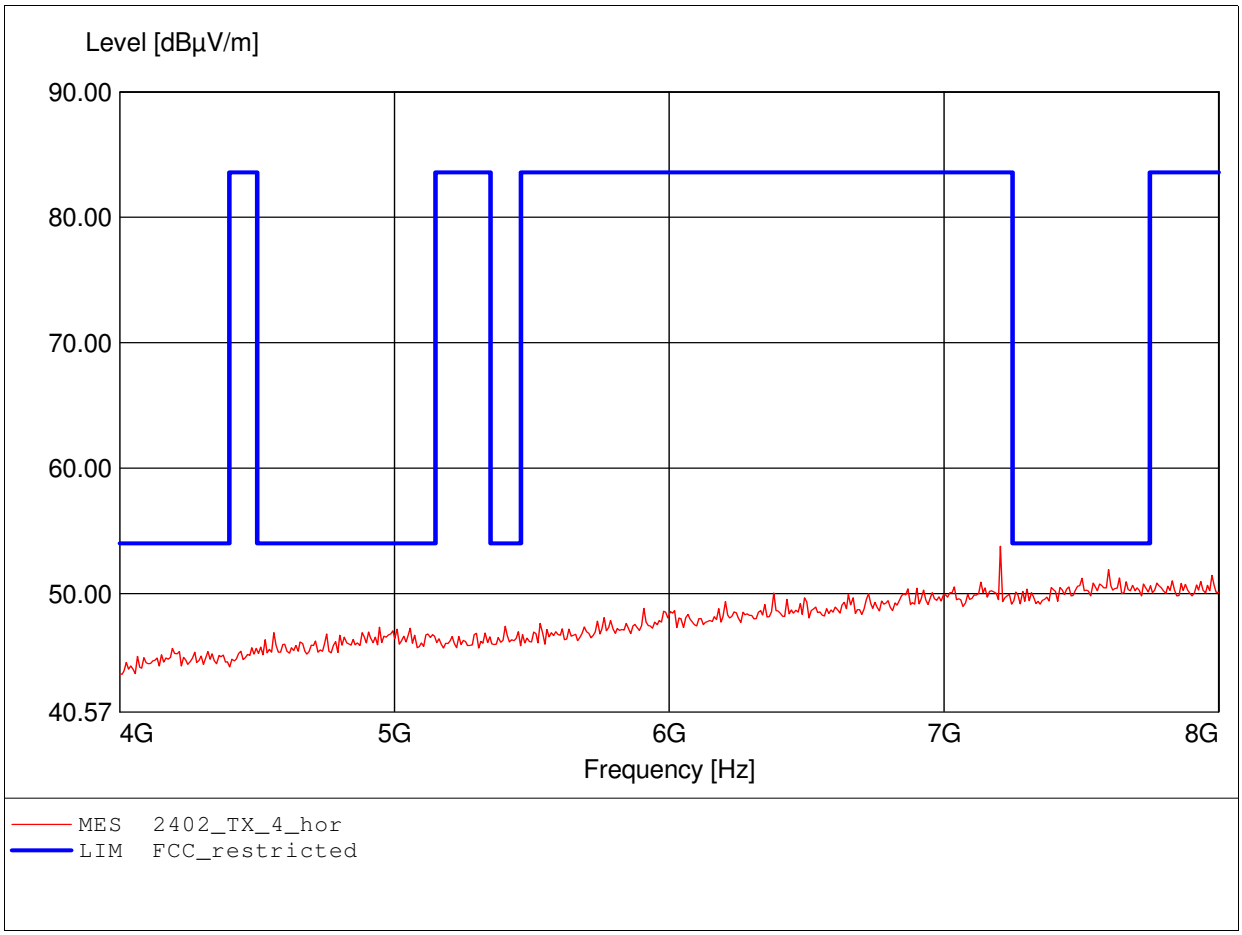
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 2.400GHz, Emax: 73.40dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.206GHz, Emax: 53.77dBµV/m, RBW: 1MHz	

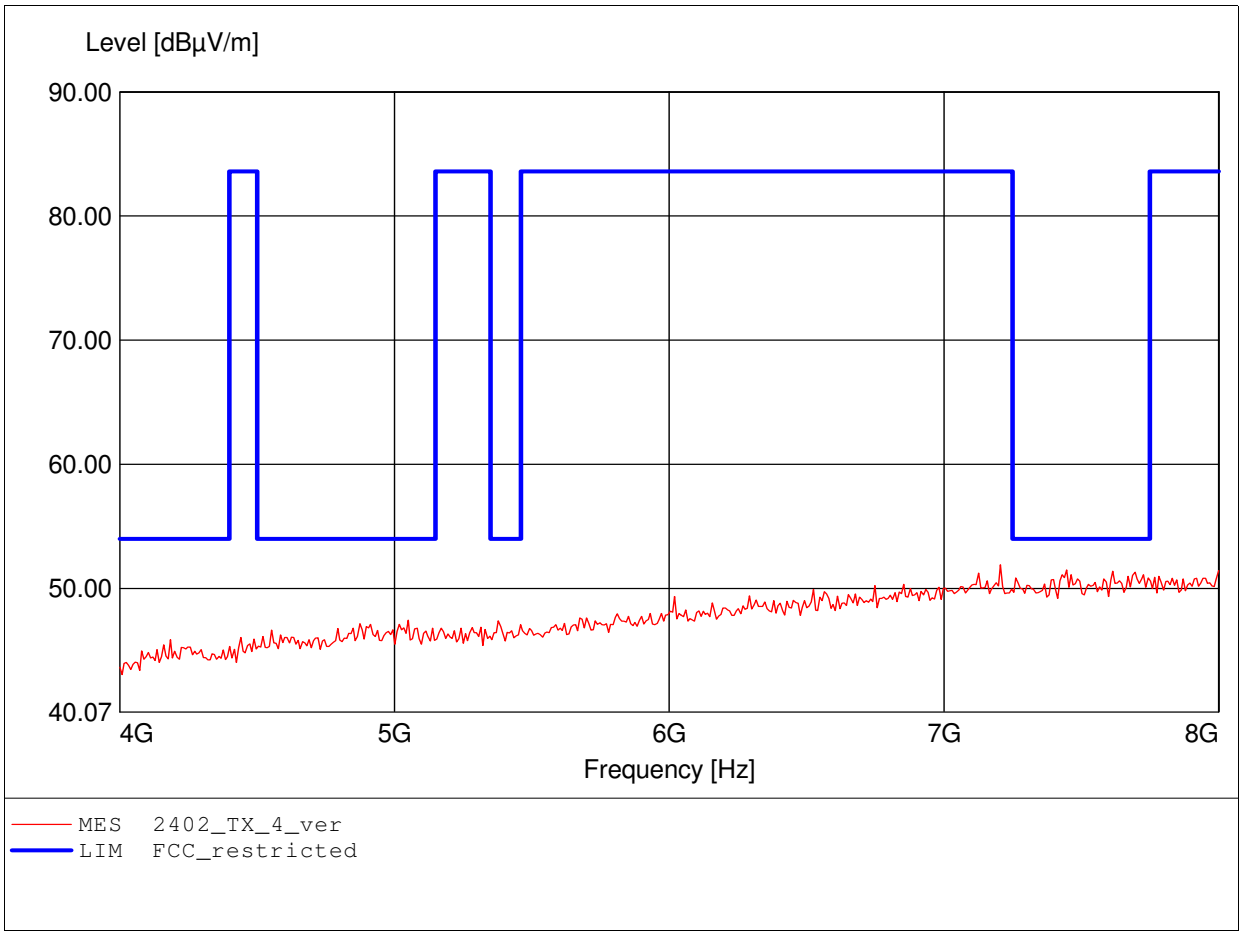


Page 1/1 29.11.2012 11:40 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.206GHz, Emax: 51.93dBµV/m, RBW: 1MHz	

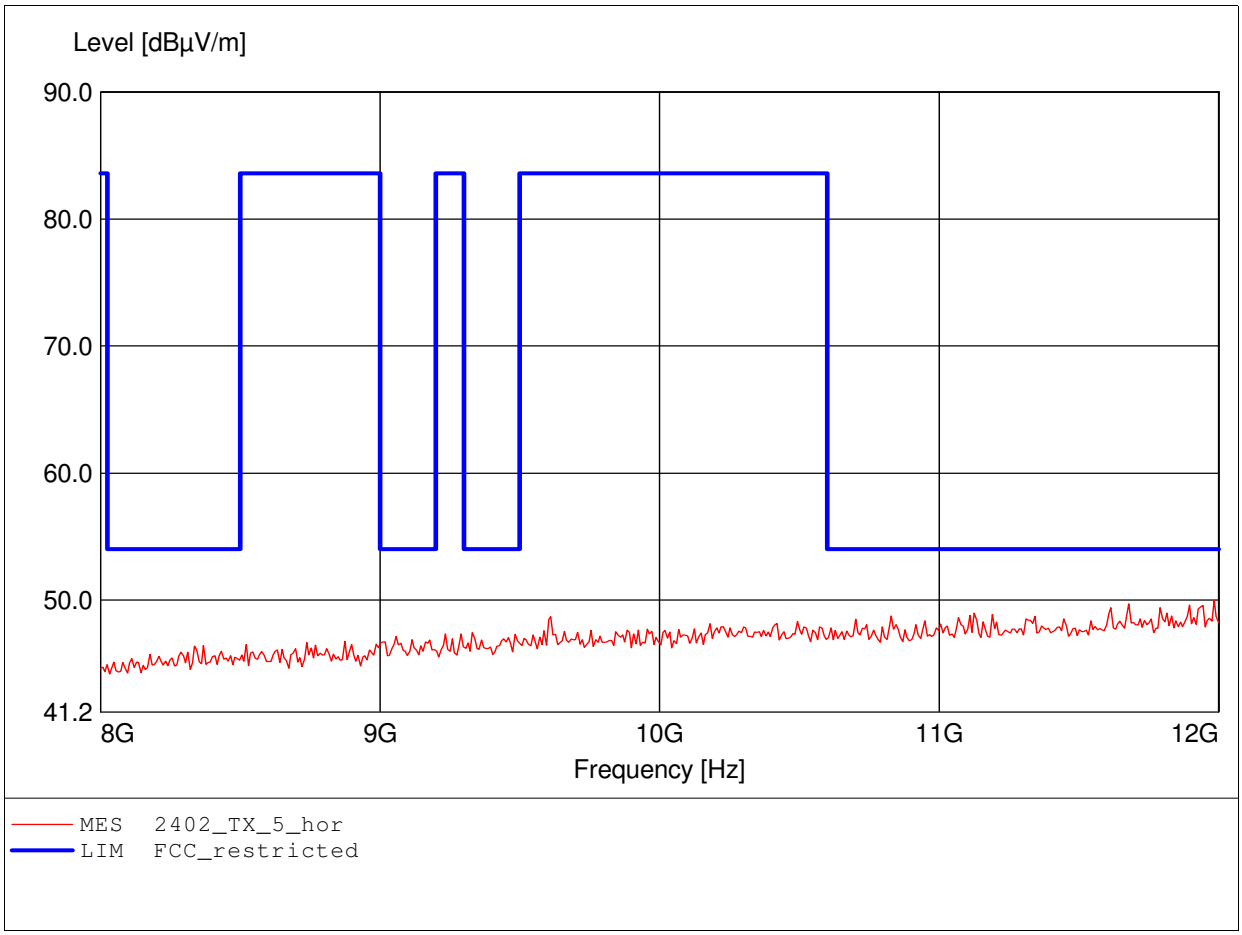


Page 1/1 29.11.2012 11:32 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.984GHz, Emax: 49.98dBµV/m, RBW: 1MHz	

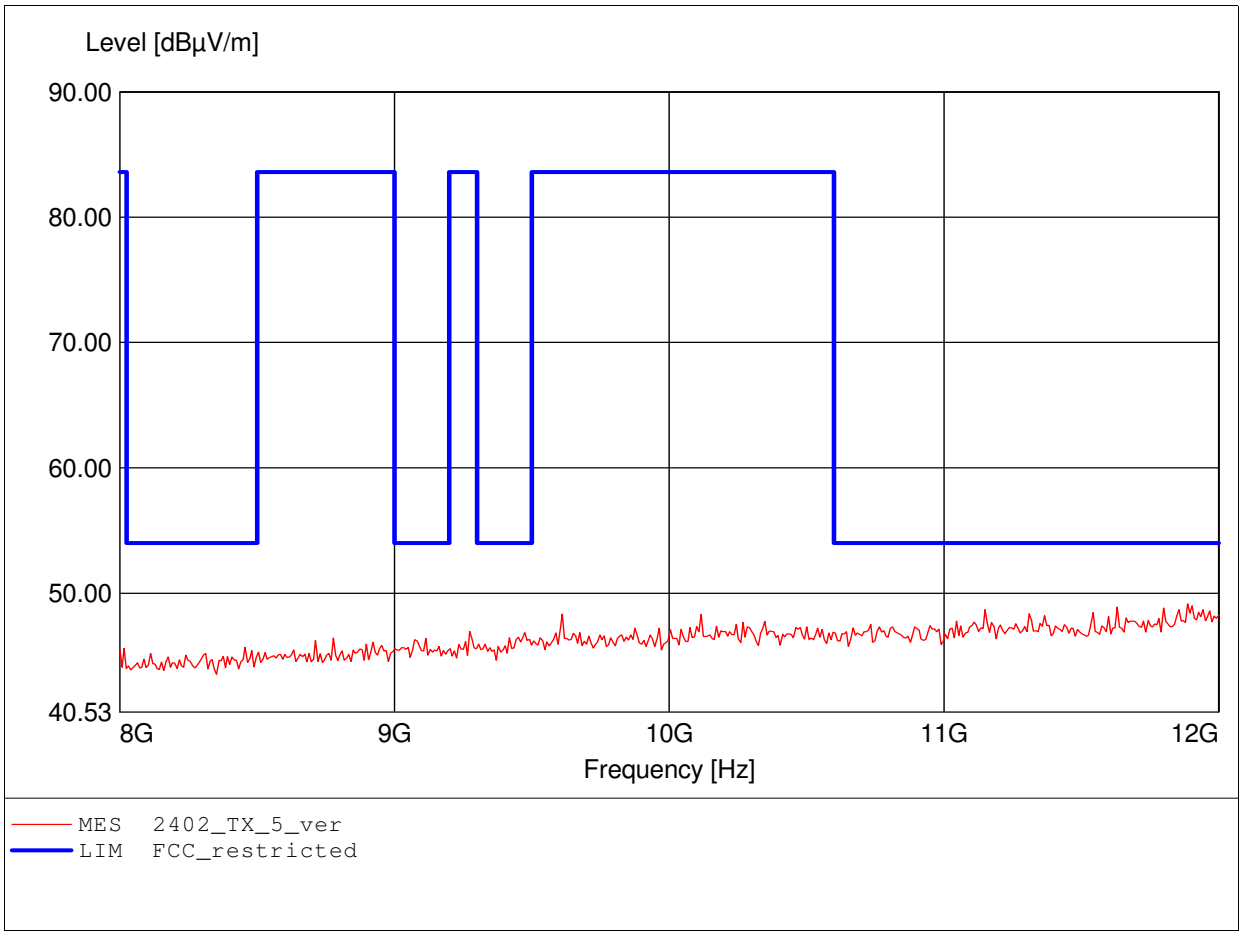


Page 1/1 29.11.2012 11:42 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

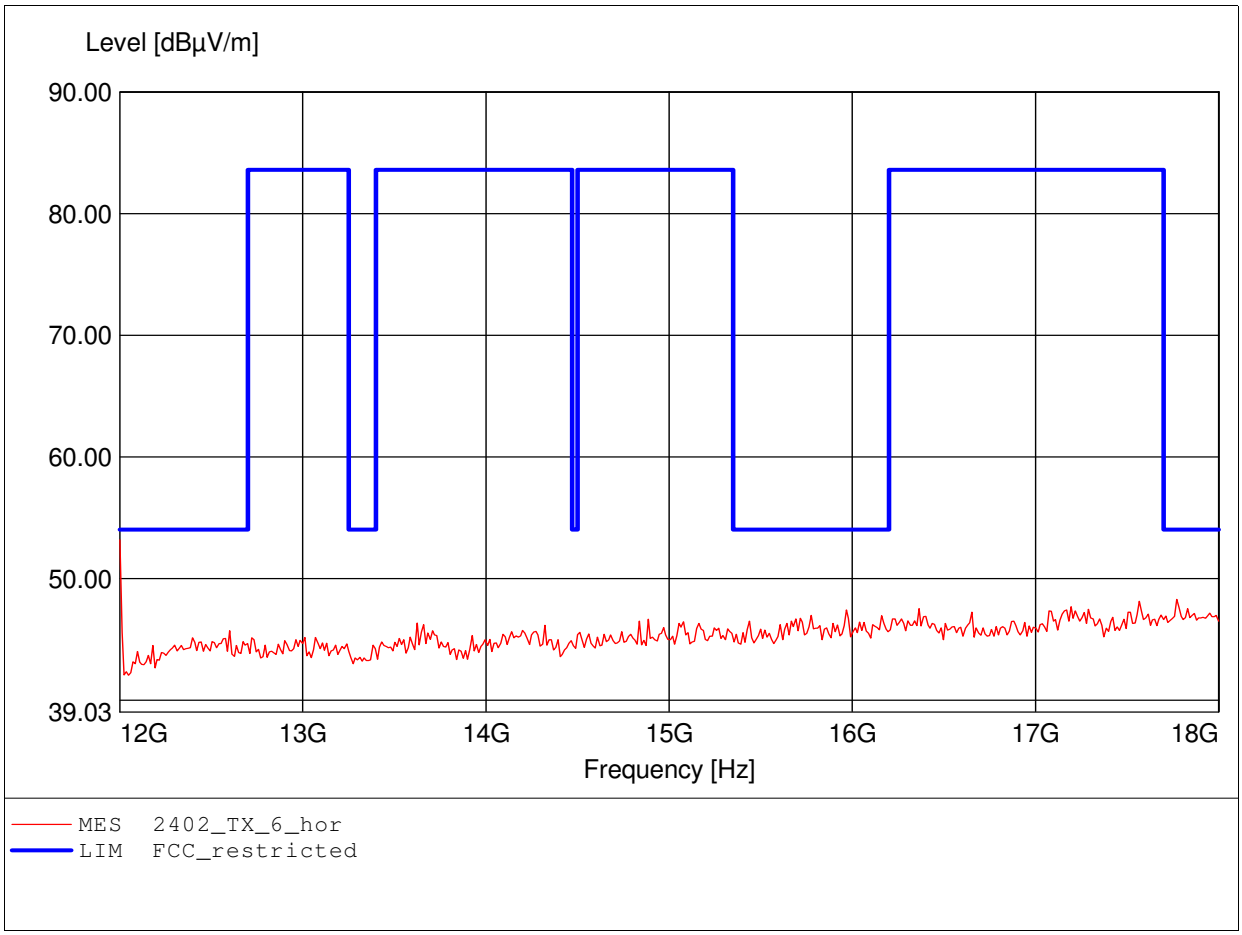
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.888GHz, Emax: 49.15dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.000GHz, Emax: 53.17dBµV/m, RBW: 1MHz	

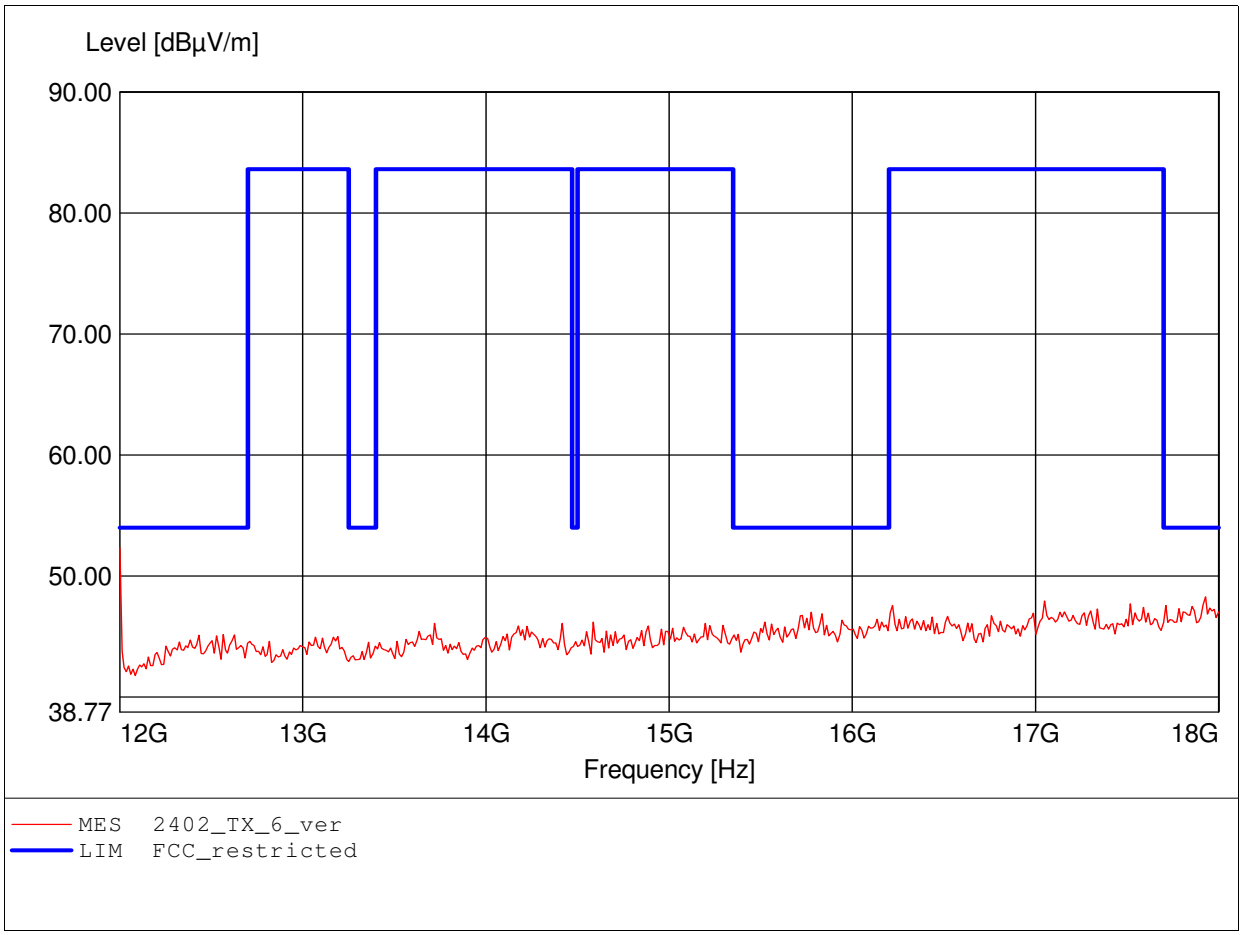


Page 1/1 29.11.2012 11:44 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

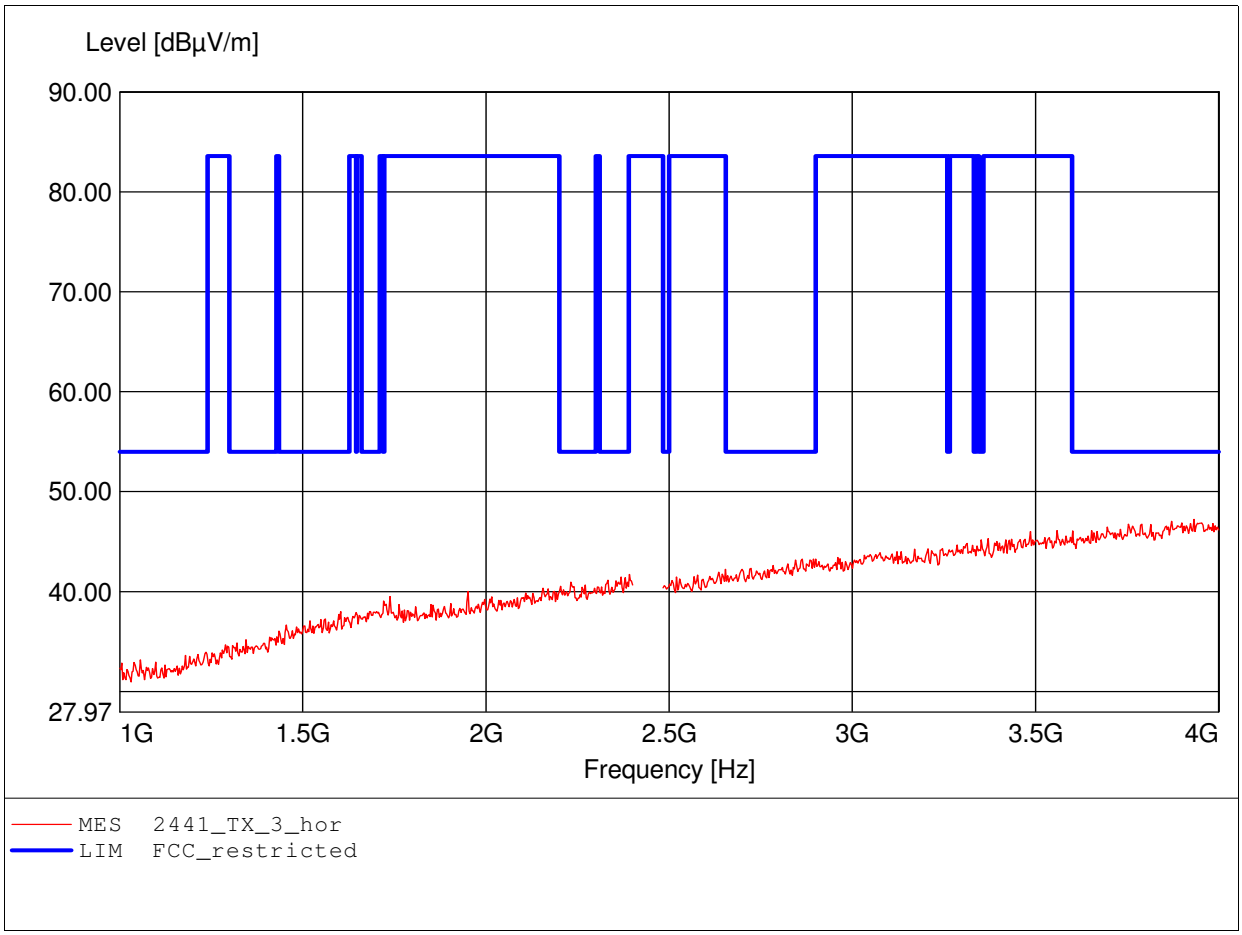
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 0 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2402	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.000GHz, Emax: 52.31dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.933GHz, Emax: 47.22dBµV/m, RBW: 1MHz	

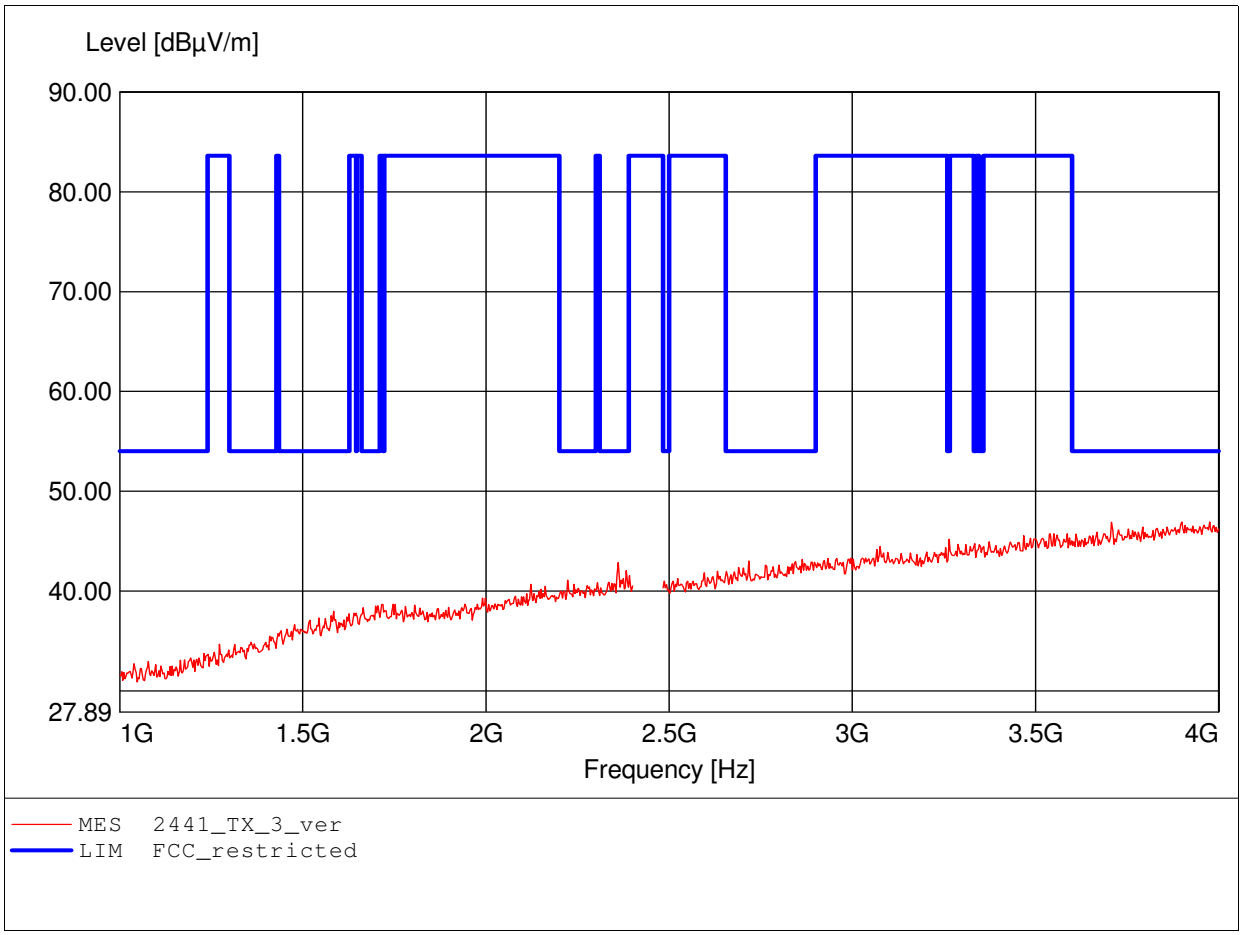


Page 1/1 29.11.2012 10:43 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

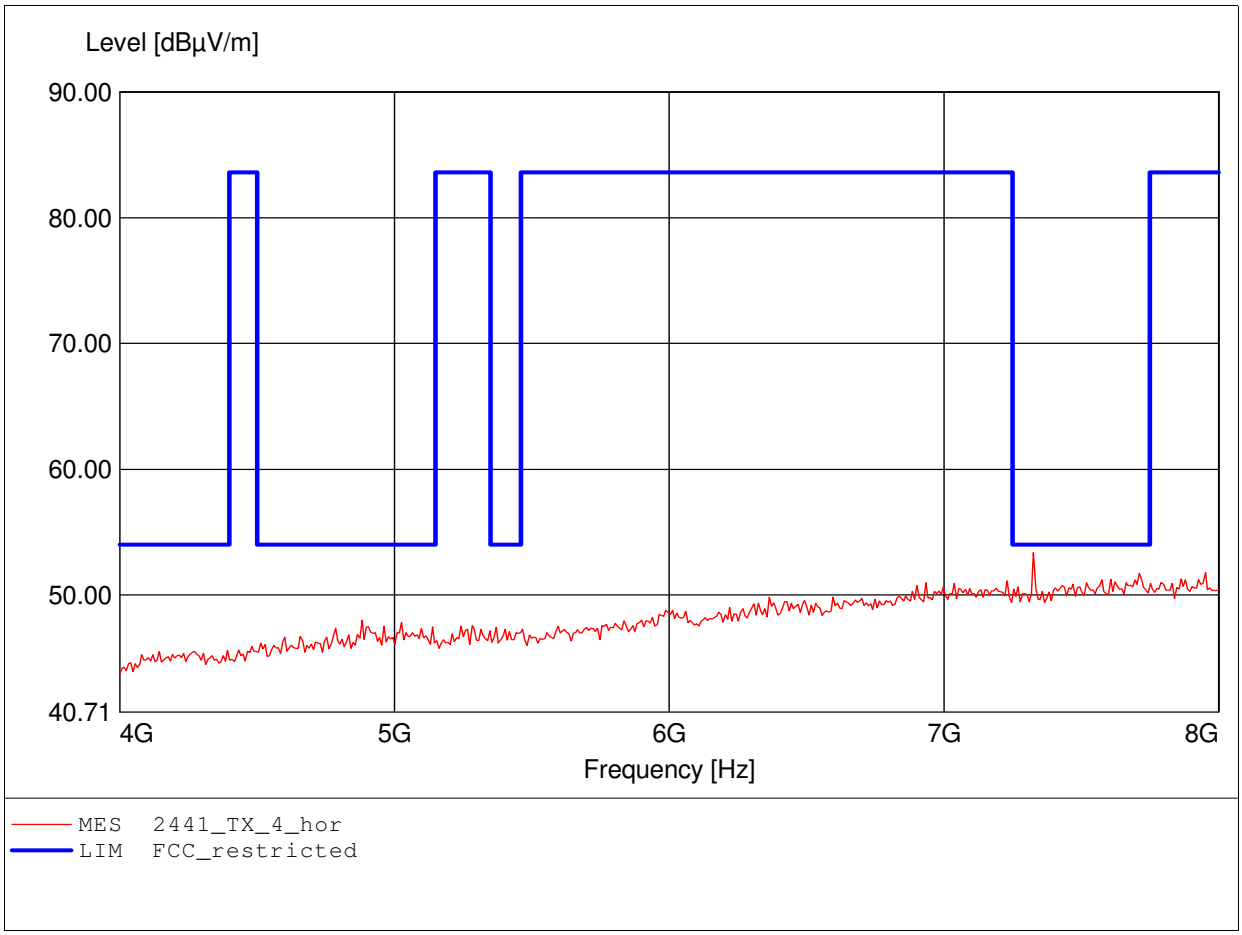
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.900GHz, Emax: 46.93dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.327GHz, Emax: 53.37dBµV/m, RBW: 1MHz	

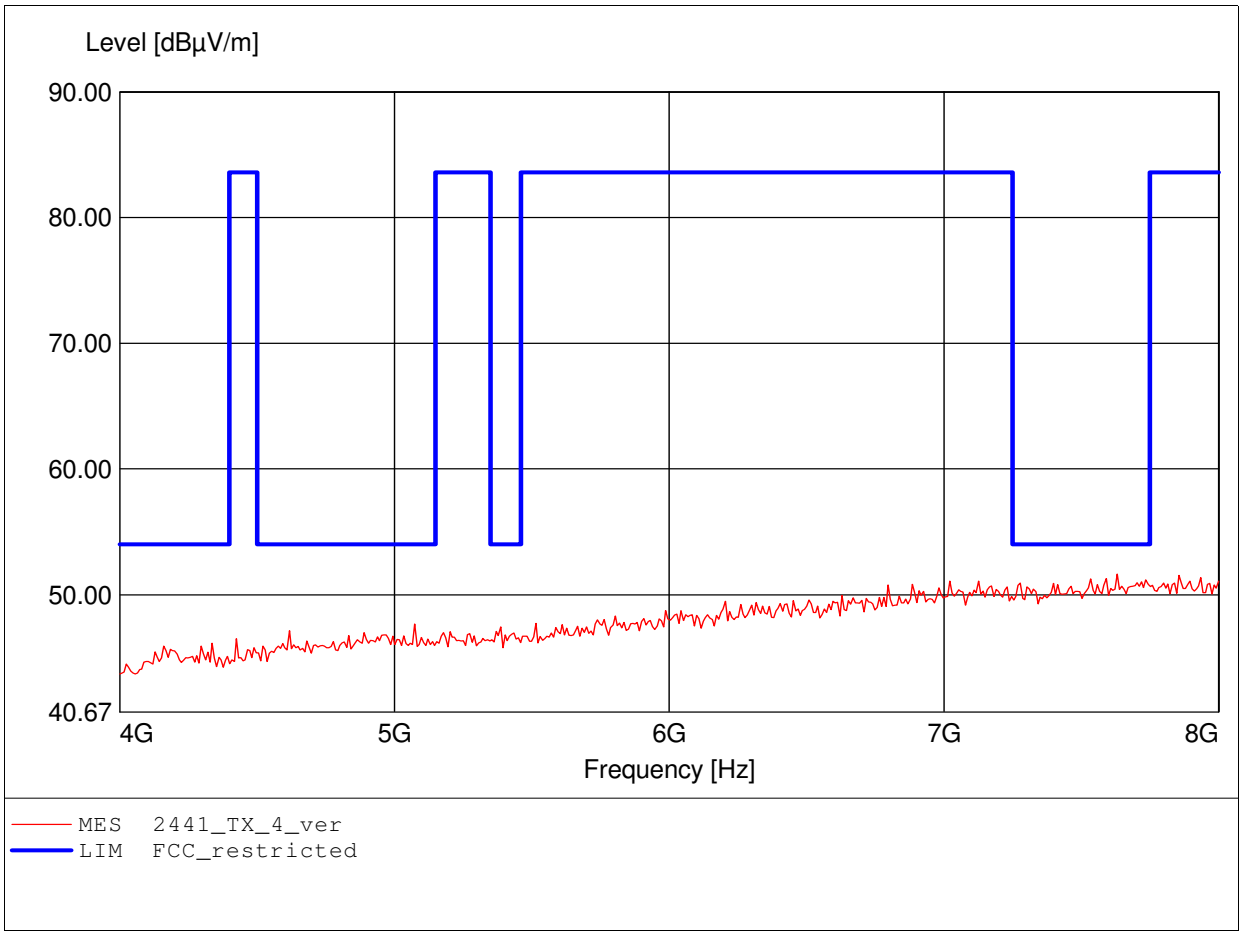


Page 1/1 29.11.2012 10:45 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

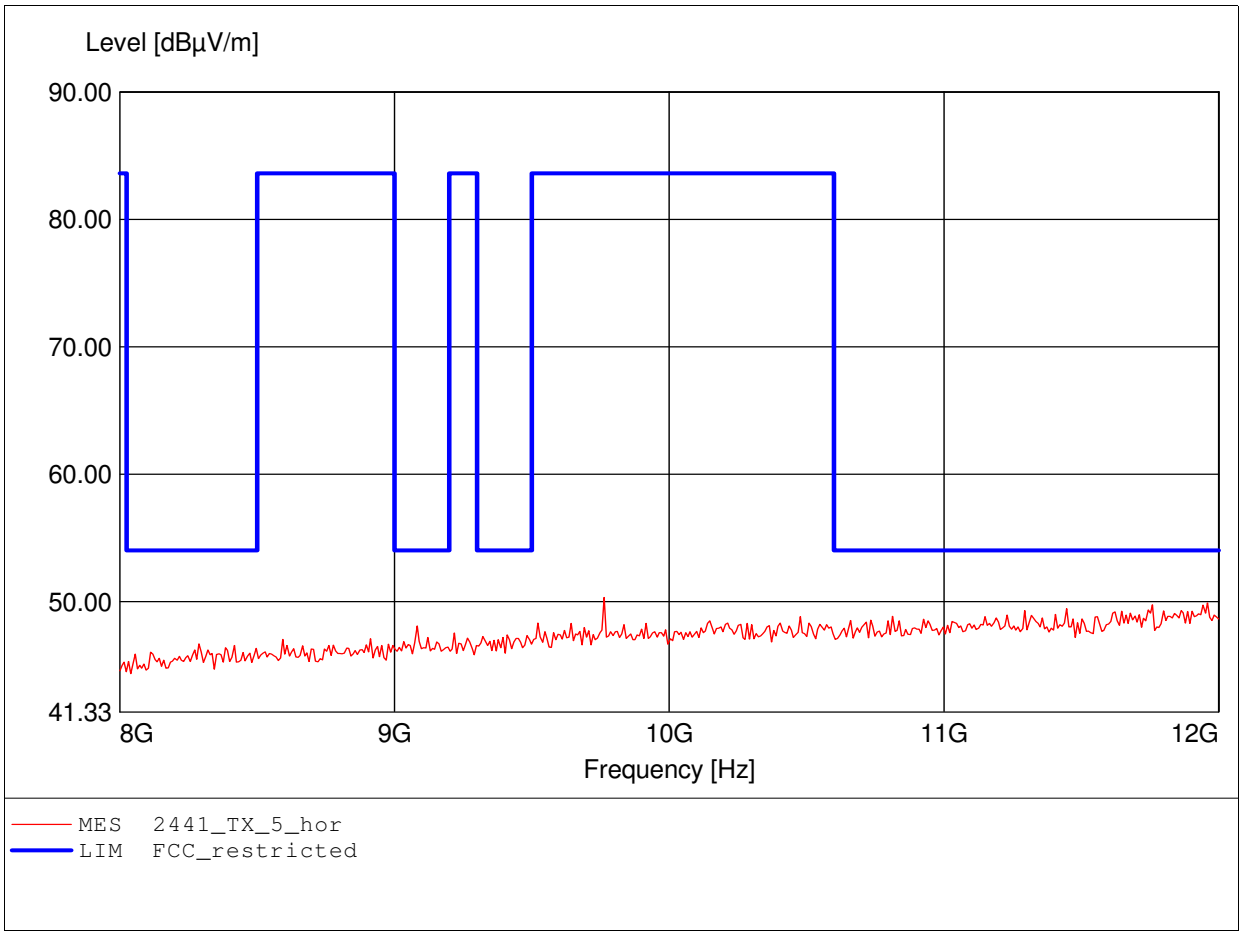
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.631GHz, Emax: 51.62dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 9.764GHz, Emax: 50.31dBµV/m, RBW: 1MHz	

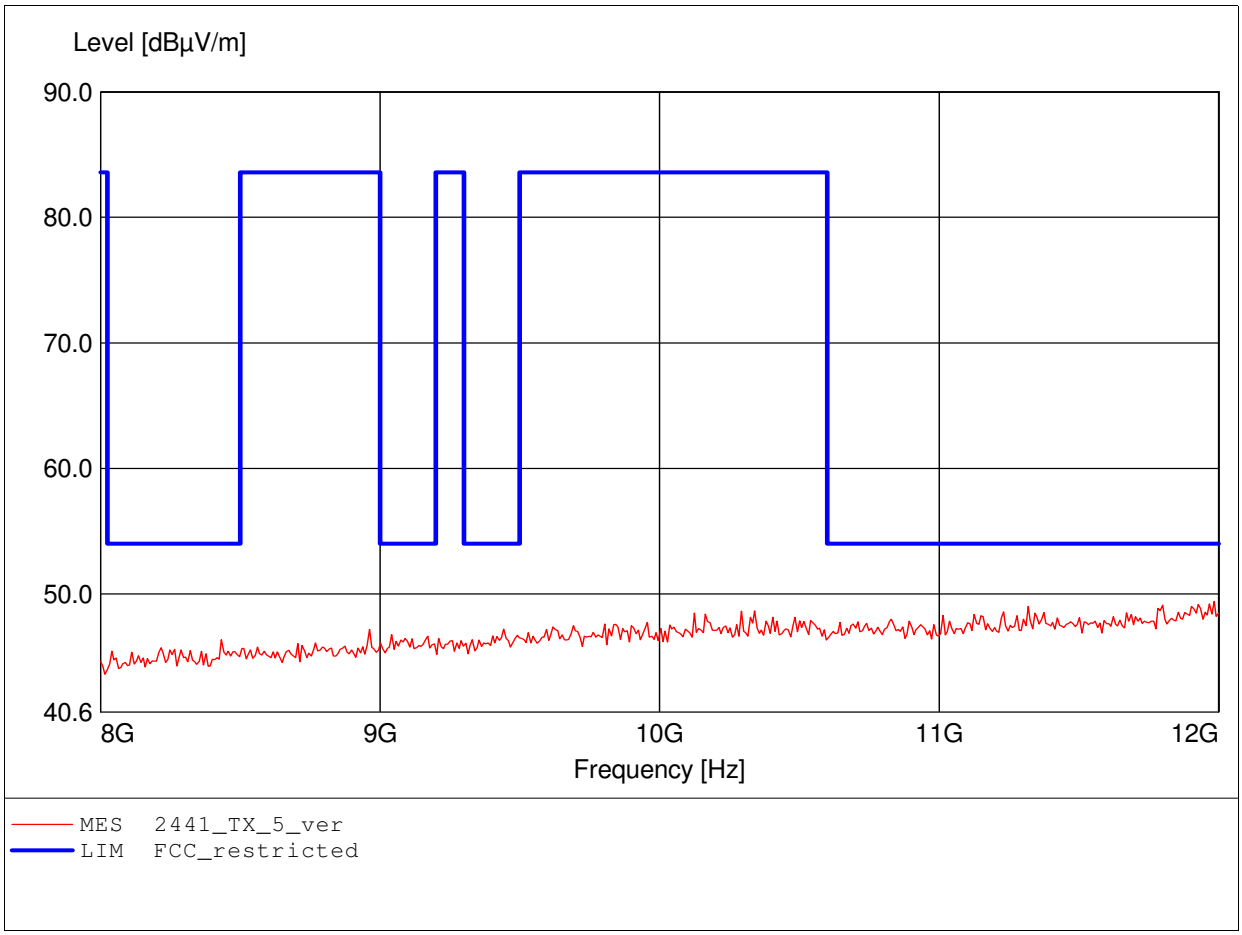


Page 1/1 29.11.2012 10:47 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.984GHz, Emax: 49.41dBµV/m, RBW: 1MHz	

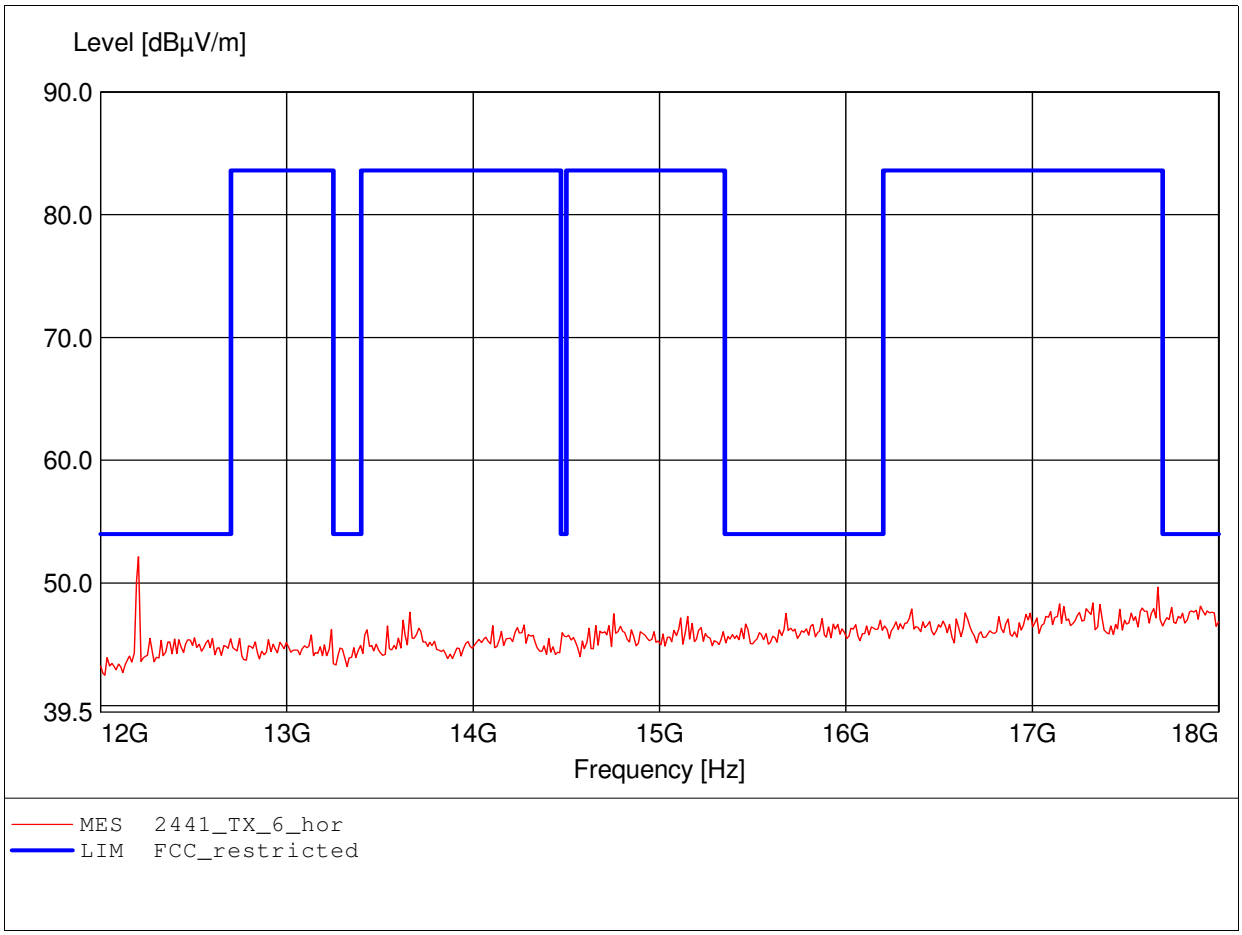


Page 1/1 29.11.2012 10:56 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.204GHz, Emax: 52.11dBµV/m, RBW: 1MHz	

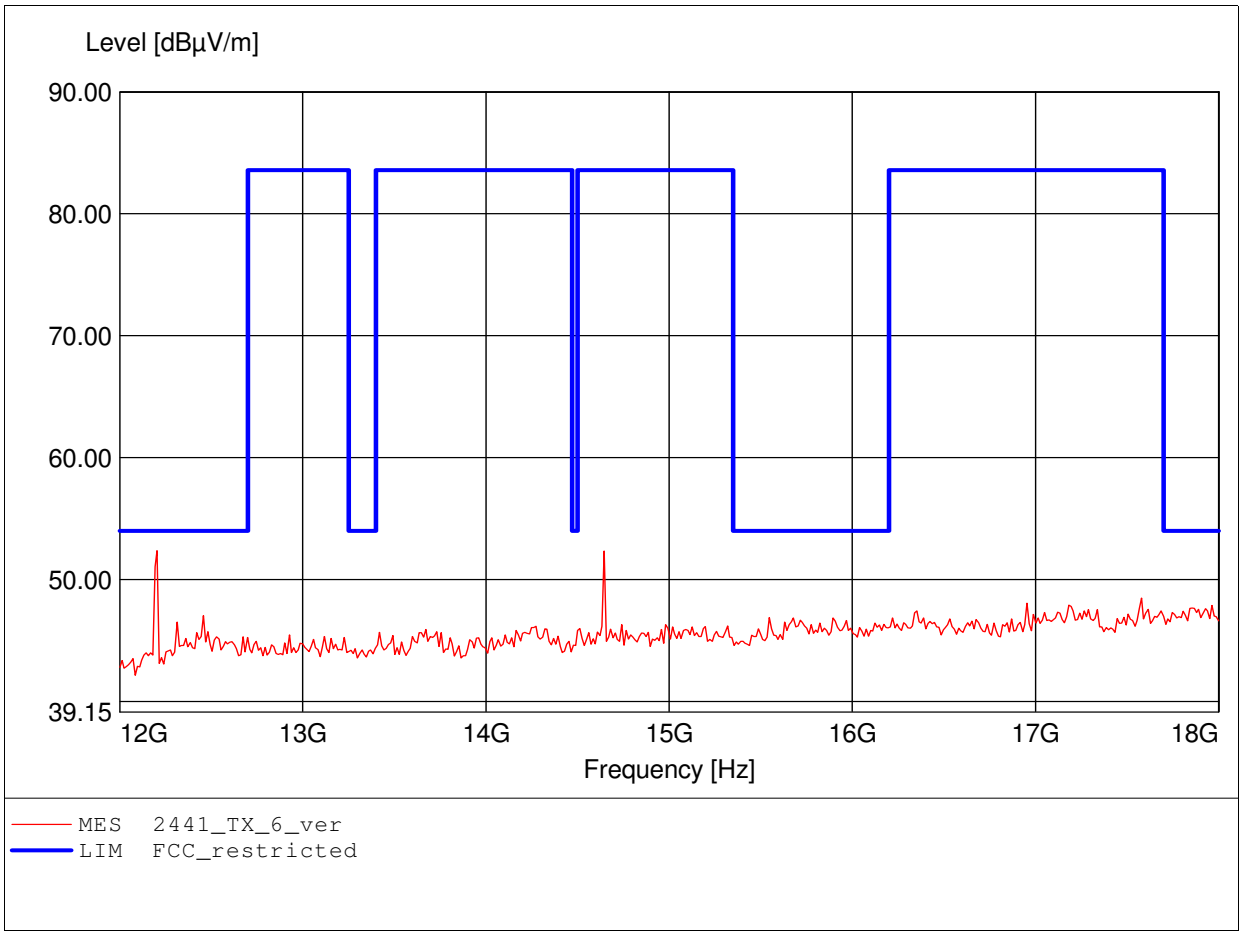


Page 1/1 29.11.2012 10:49 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 39 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.204GHz, Emax: 52.36dBµV/m, RBW: 1MHz	

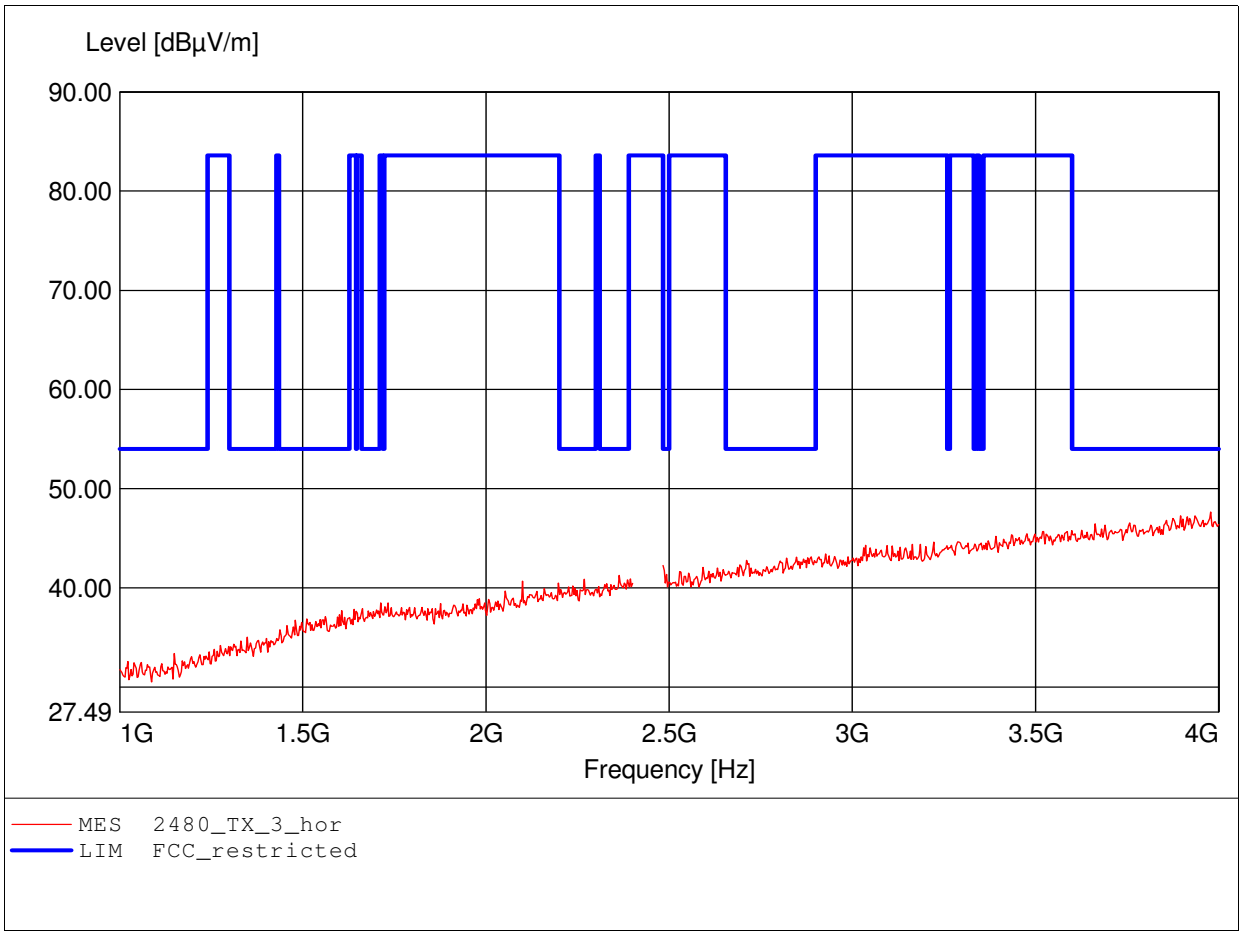


Page 1/1 29.11.2012 10:53 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 3.979GHz, Emax: 47.66dBµV/m, RBW: 1MHz	

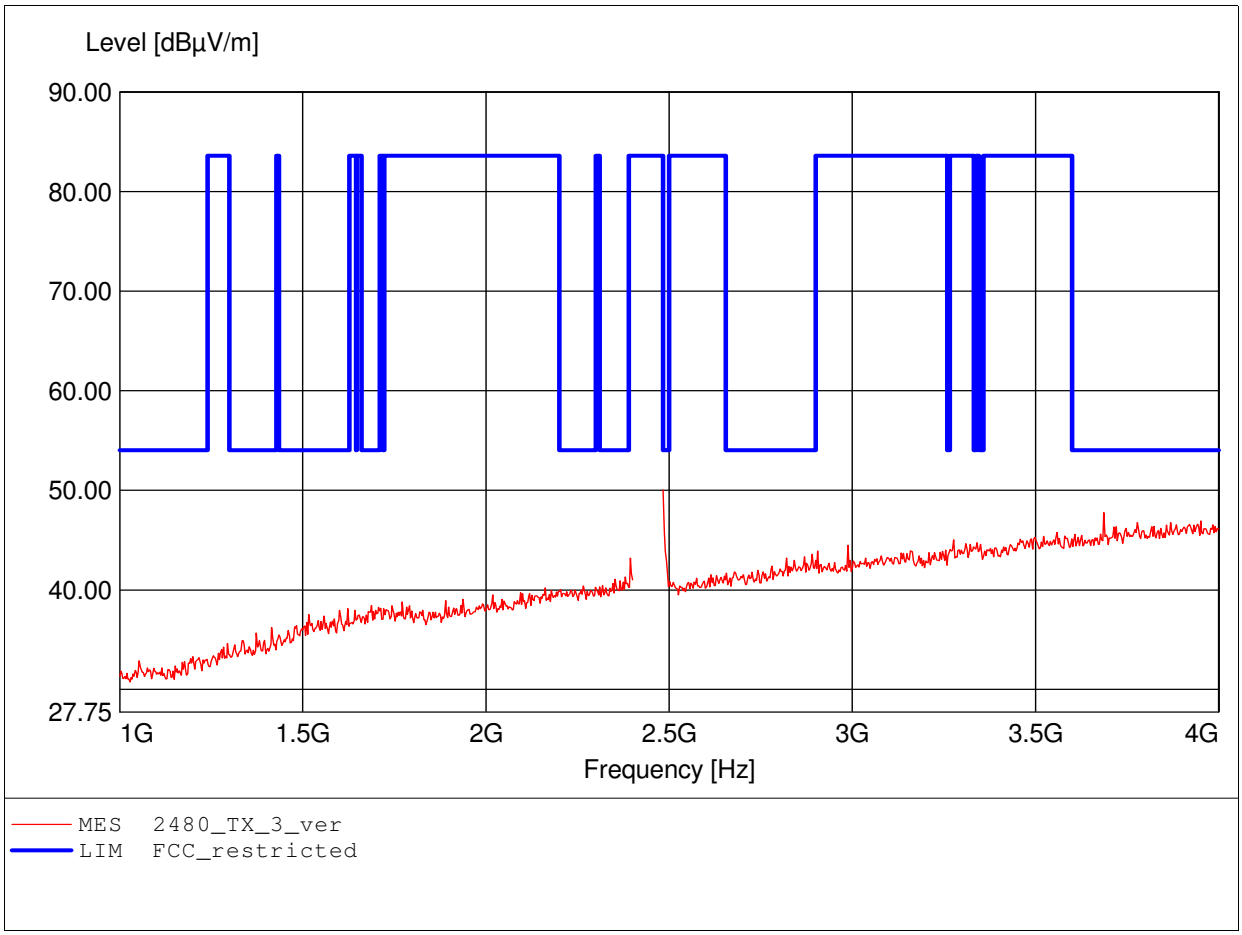


Page 1/1 29.11.2012 12:47 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, amplif.	
Comment 2:	Freq: 2.484GHz, Emax: 50.04dBµV/m, RBW: 1MHz	

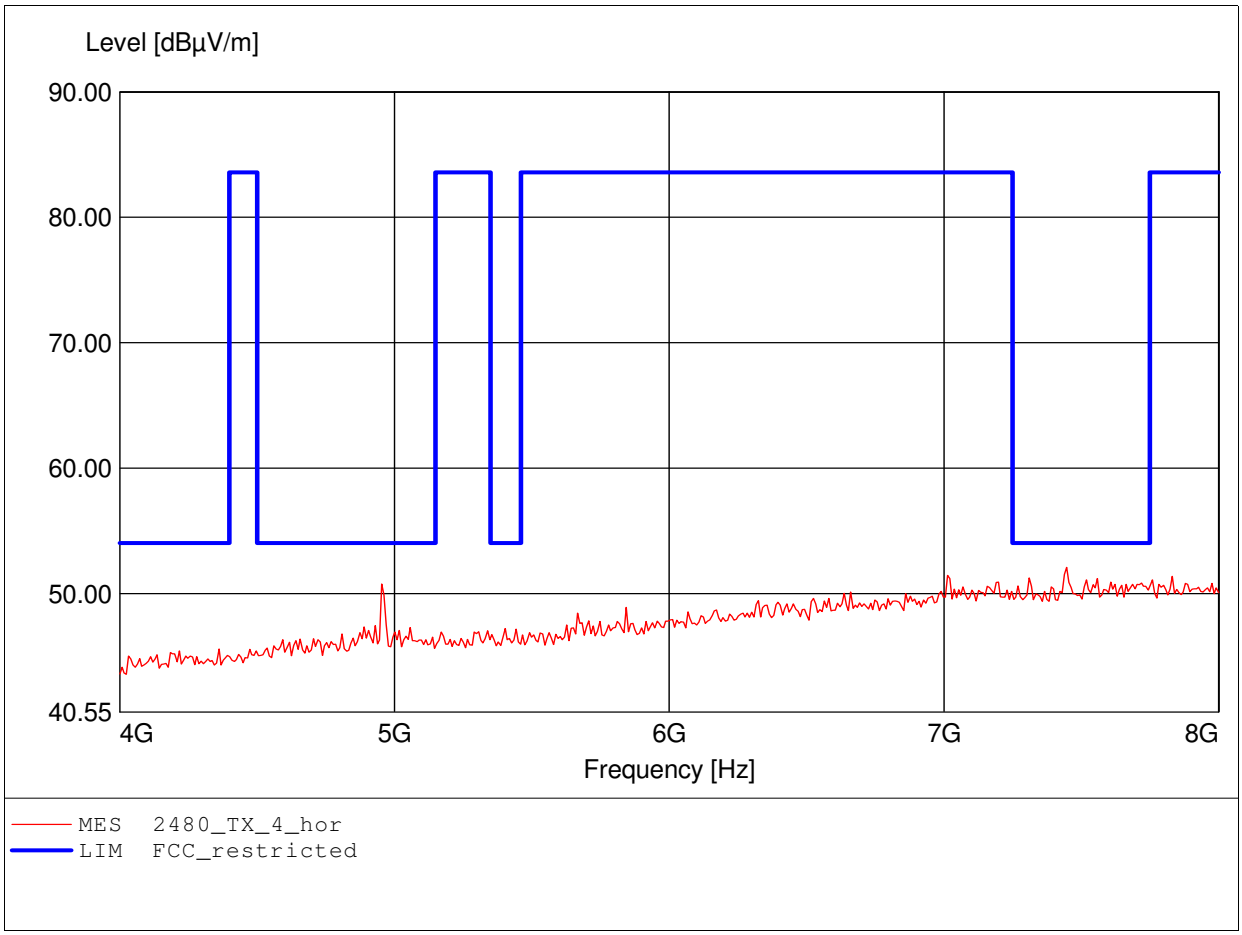


Page 1/1 29.11.2012 11:51 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.447GHz, Emax: 52.07dBµV/m, RBW: 1MHz	

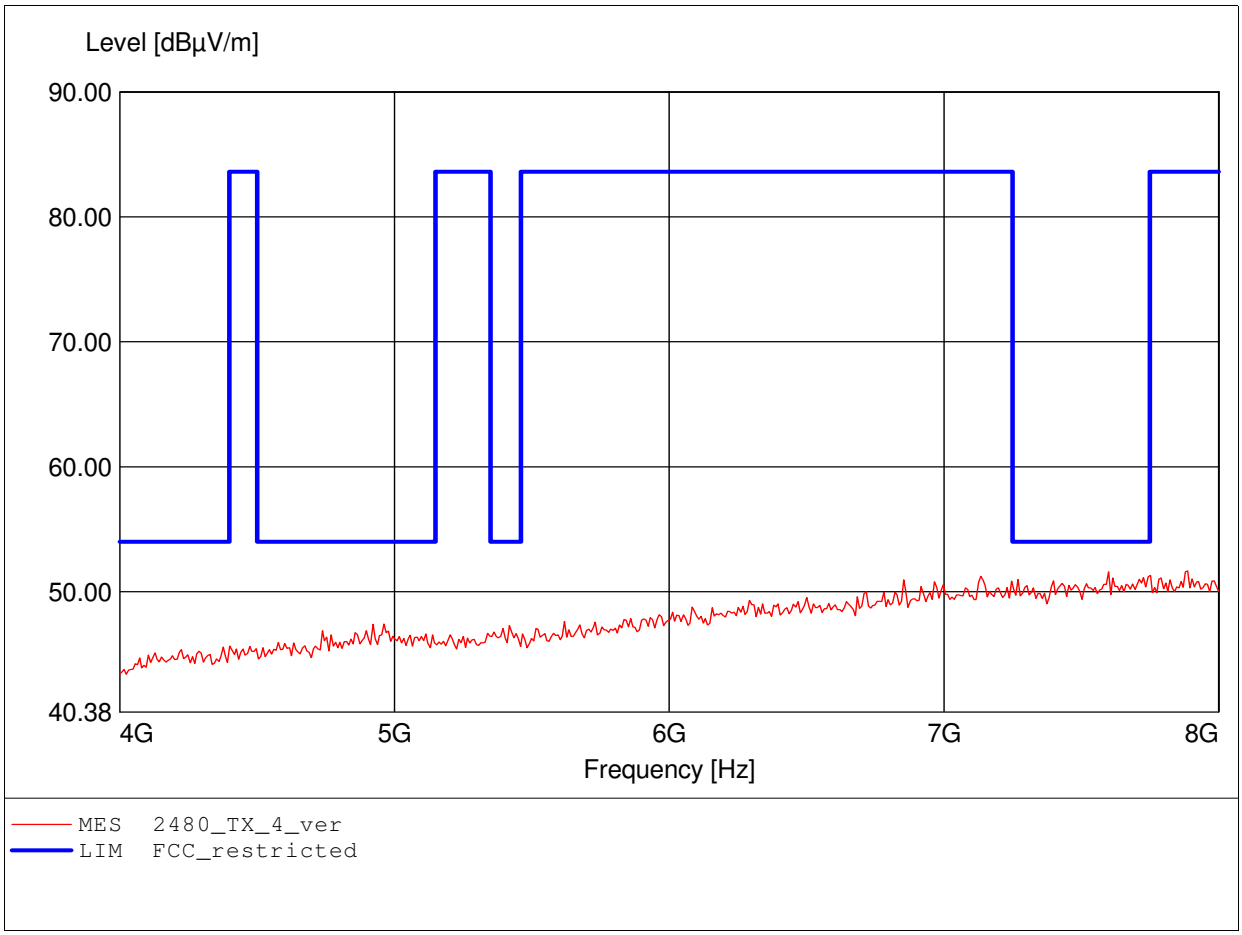


Page 1/1 29.11.2012 12:41 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 7.888GHz, Emax: 51.66dBµV/m, RBW: 1MHz	

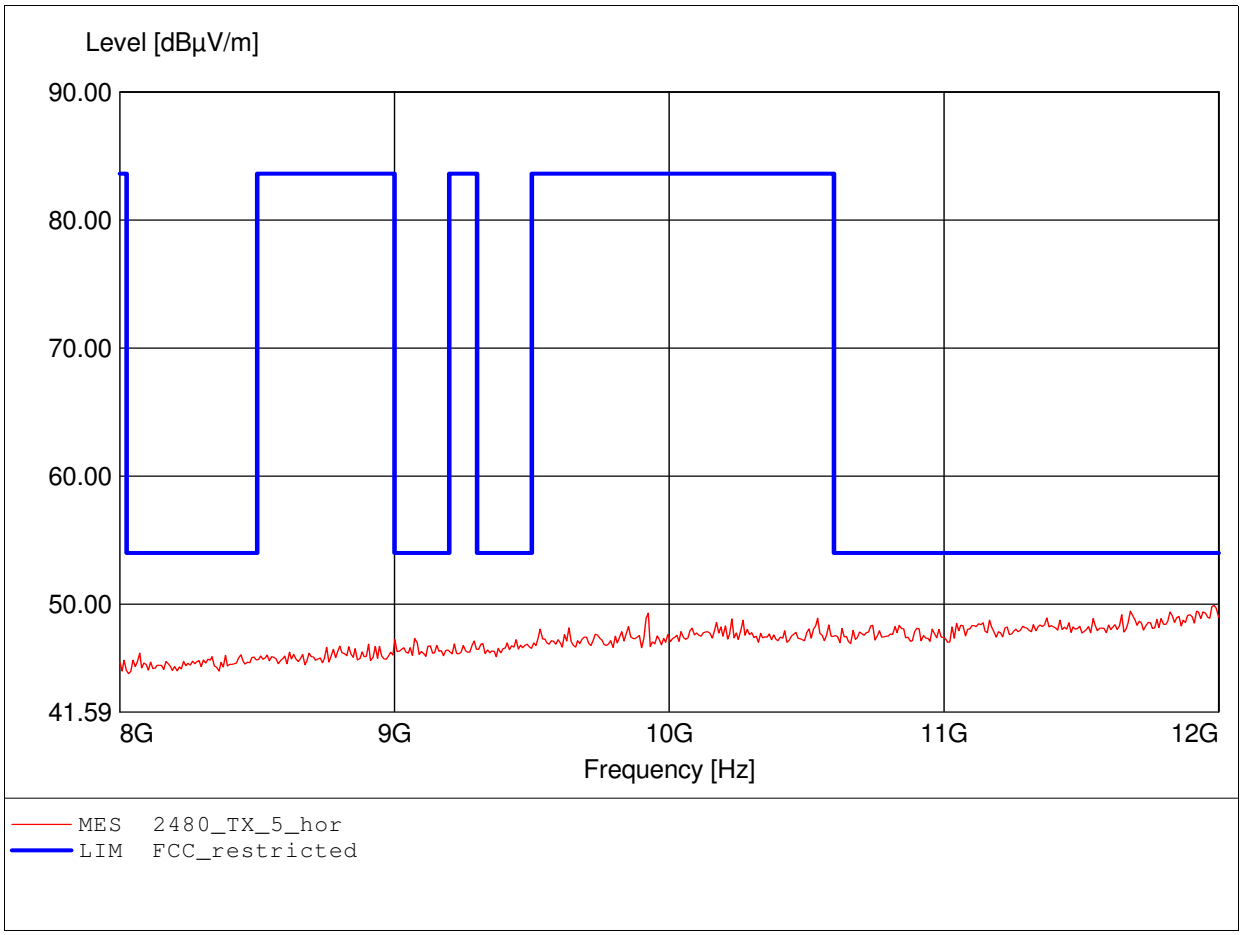


Page 1/1 29.11.2012 11:52 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.984GHz, Emax: 49.89dBµV/m, RBW: 1MHz	

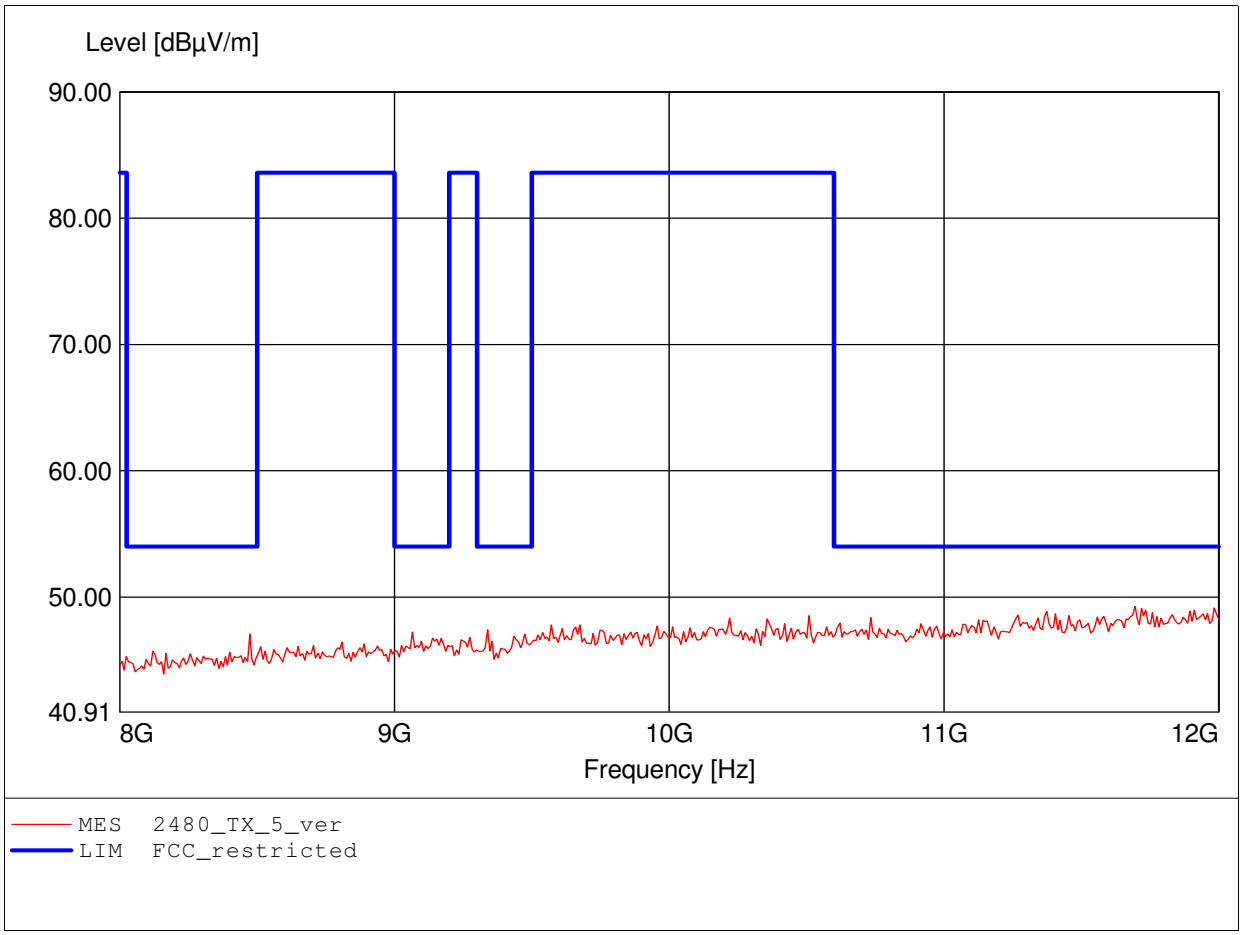


Page 1/1 29.11.2012 12:39 / Antenna horizontal G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 11.695GHz, Emax: 49.26dBµV/m, RBW: 1MHz	

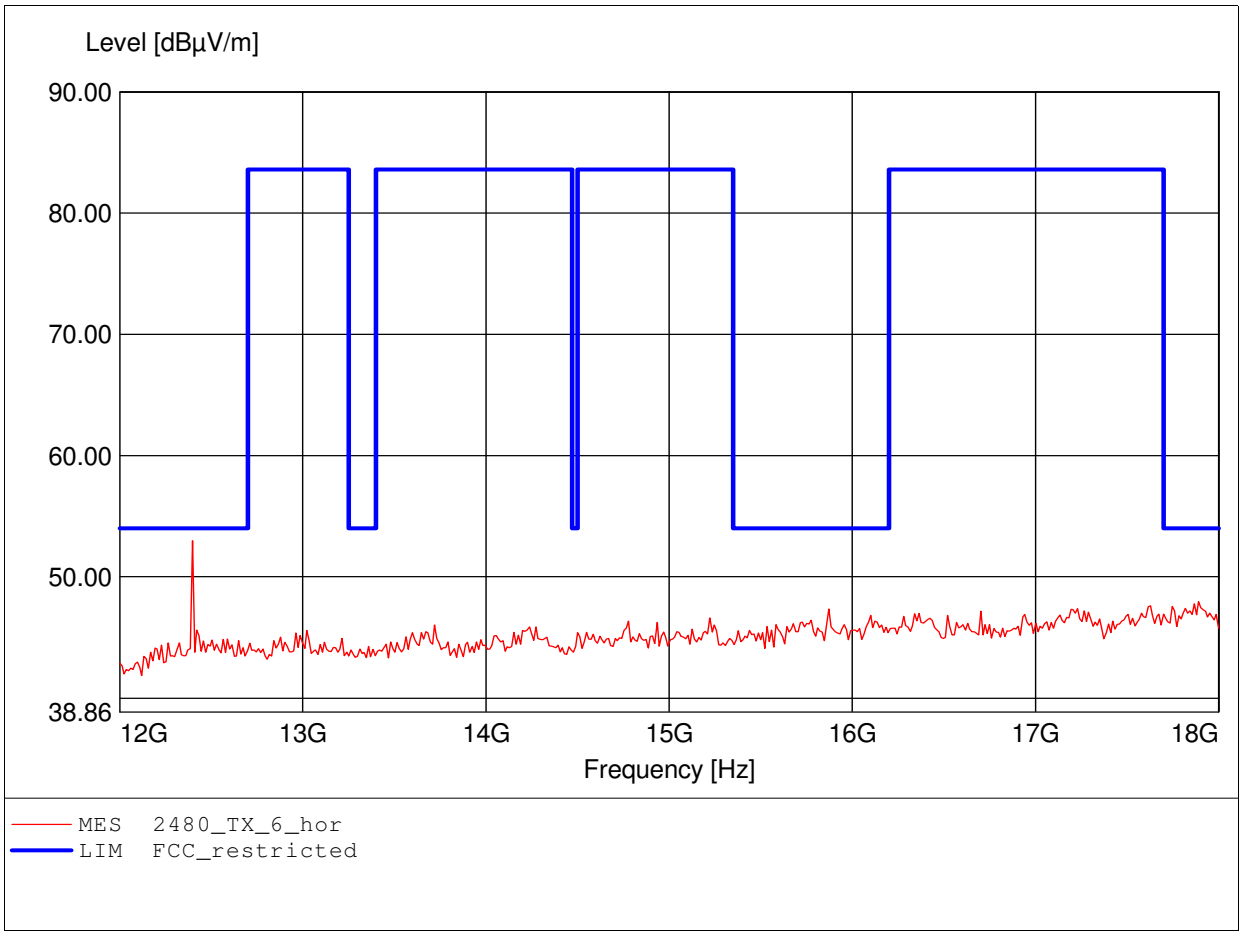


Page 1/1 29.11.2012 11:54 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

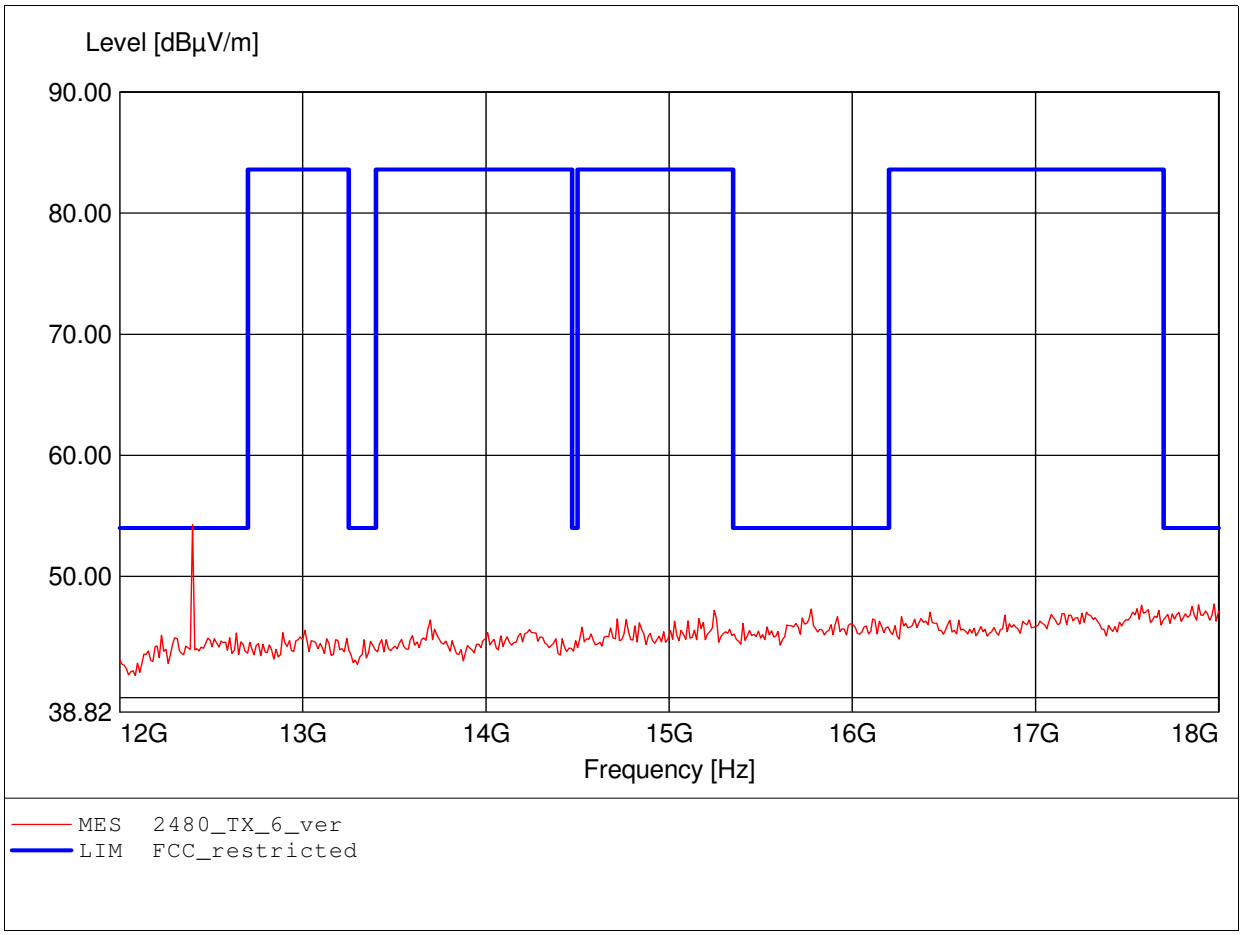
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.397GHz, Emax: 52.97dBµV/m, RBW: 1MHz	



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.+HP.	
Comment 2:	Freq: 12.397GHz, Emax: 54.25dBµV/m, RBW: 1MHz	

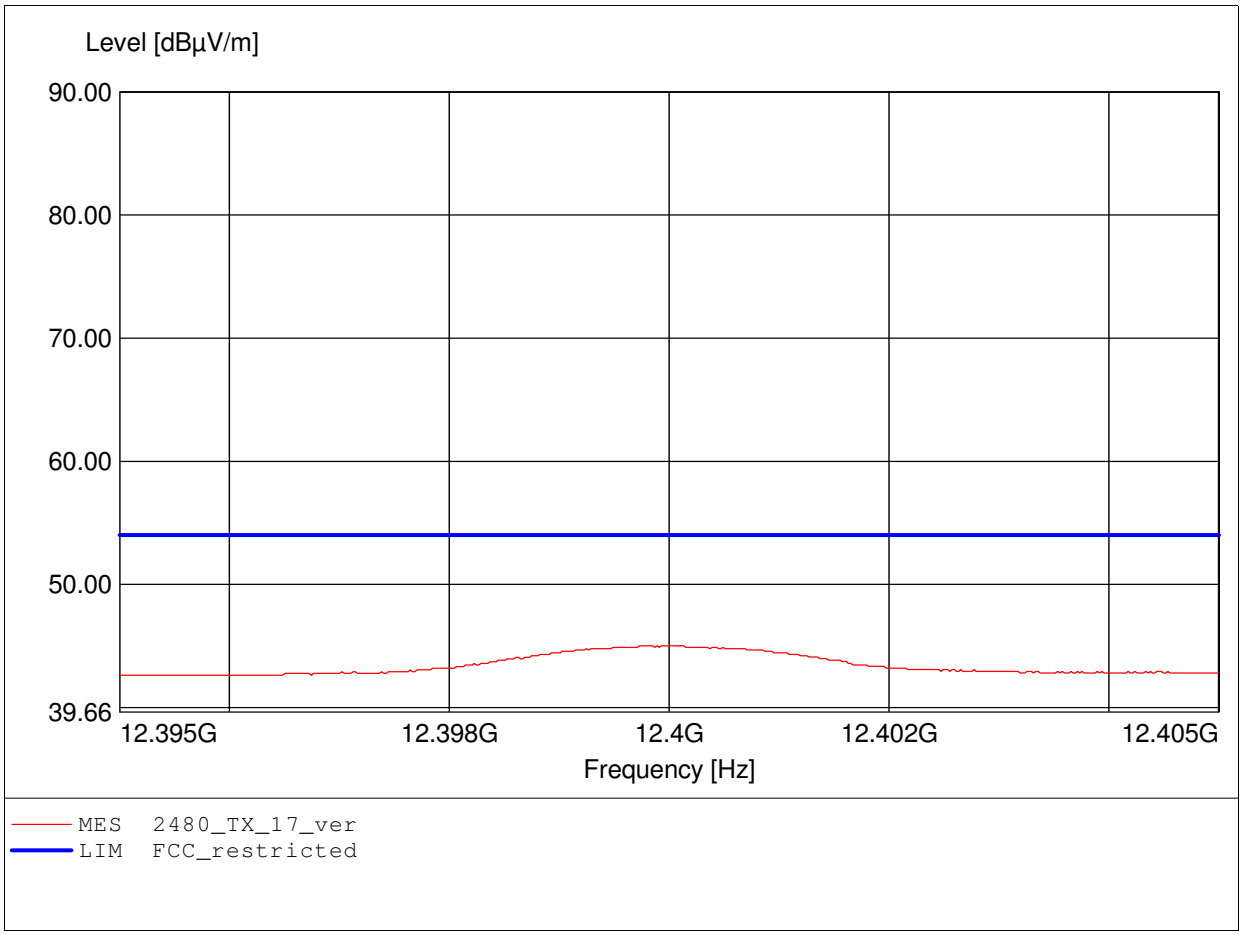


Page 1/1 29.11.2012 11:56 / Antenna vertical G0M-1211-2443

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	BT-EDR / CH: 78 / 3-DH5 / Pmax / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2480	
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.	
Comment 2:	Freq: 12.400GHz, Emax: 45.02dBµV/m, RBW: 1MHz	

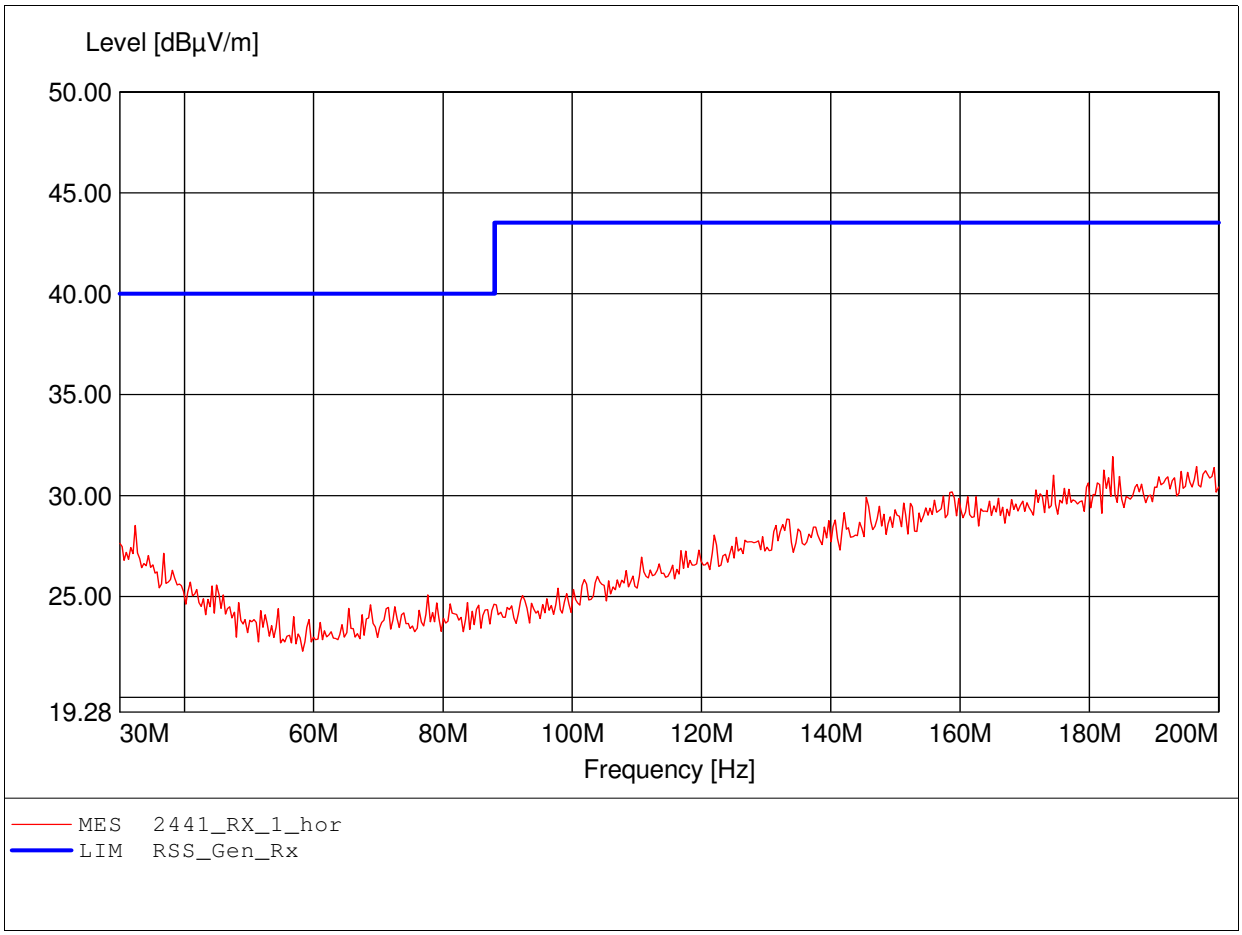


ANNEX B Receiver radiated spurious emissions

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HK 116	
Comment 2:	Freq:183.647MHz Emax:31.93dBµV/m RBW: 100 kHz	

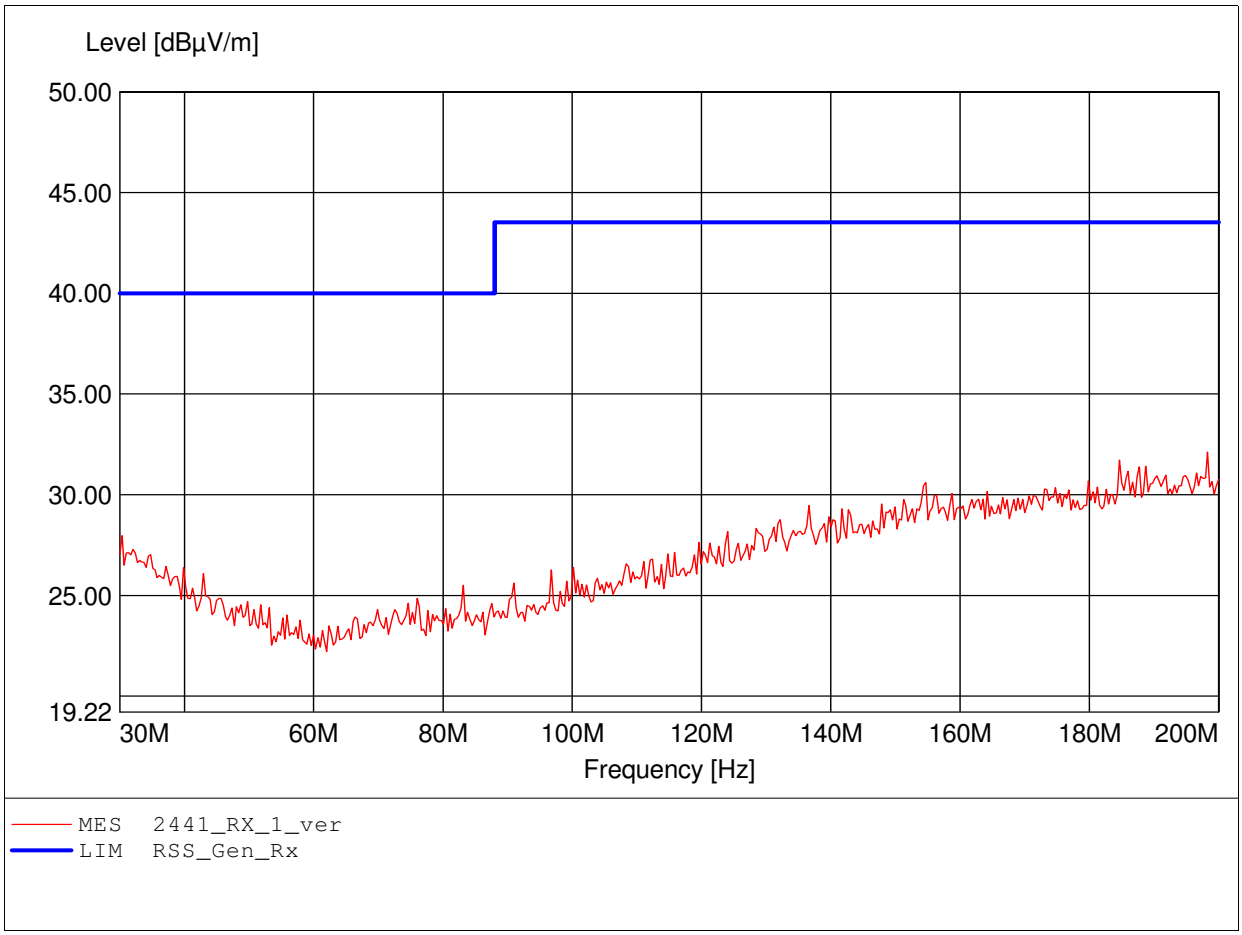


Page 1/1 29.11.2012 15:17 / Antenna horizontal G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

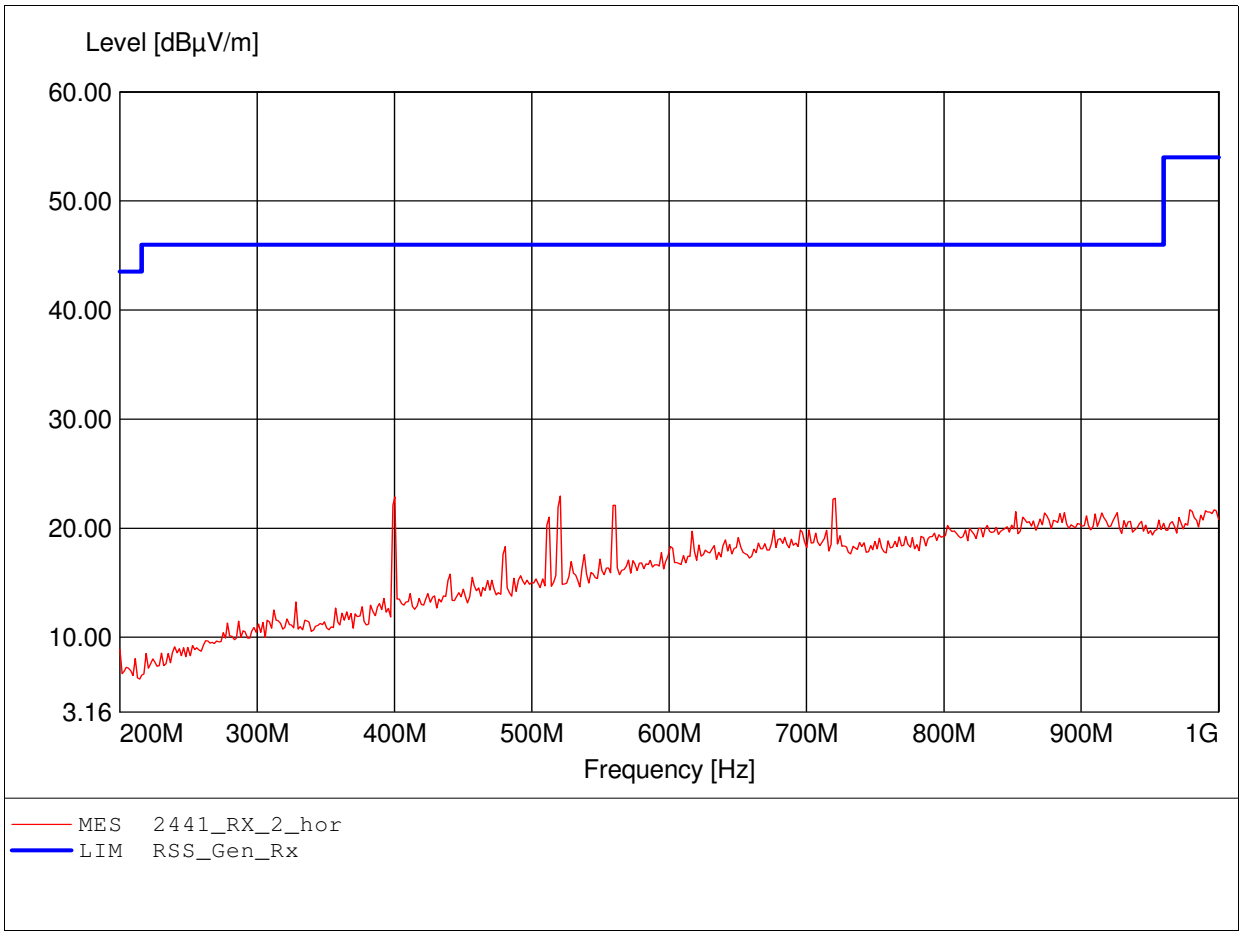
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HK 116	
Comment 2:	Freq:198.297MHz Emax:32.12dBµV/m RBW: 100 kHz	



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 223, ampl.	
Comment 2:	Freq:520.641MHz Emax:22.96dBµV/m RBW: 100 kHz	

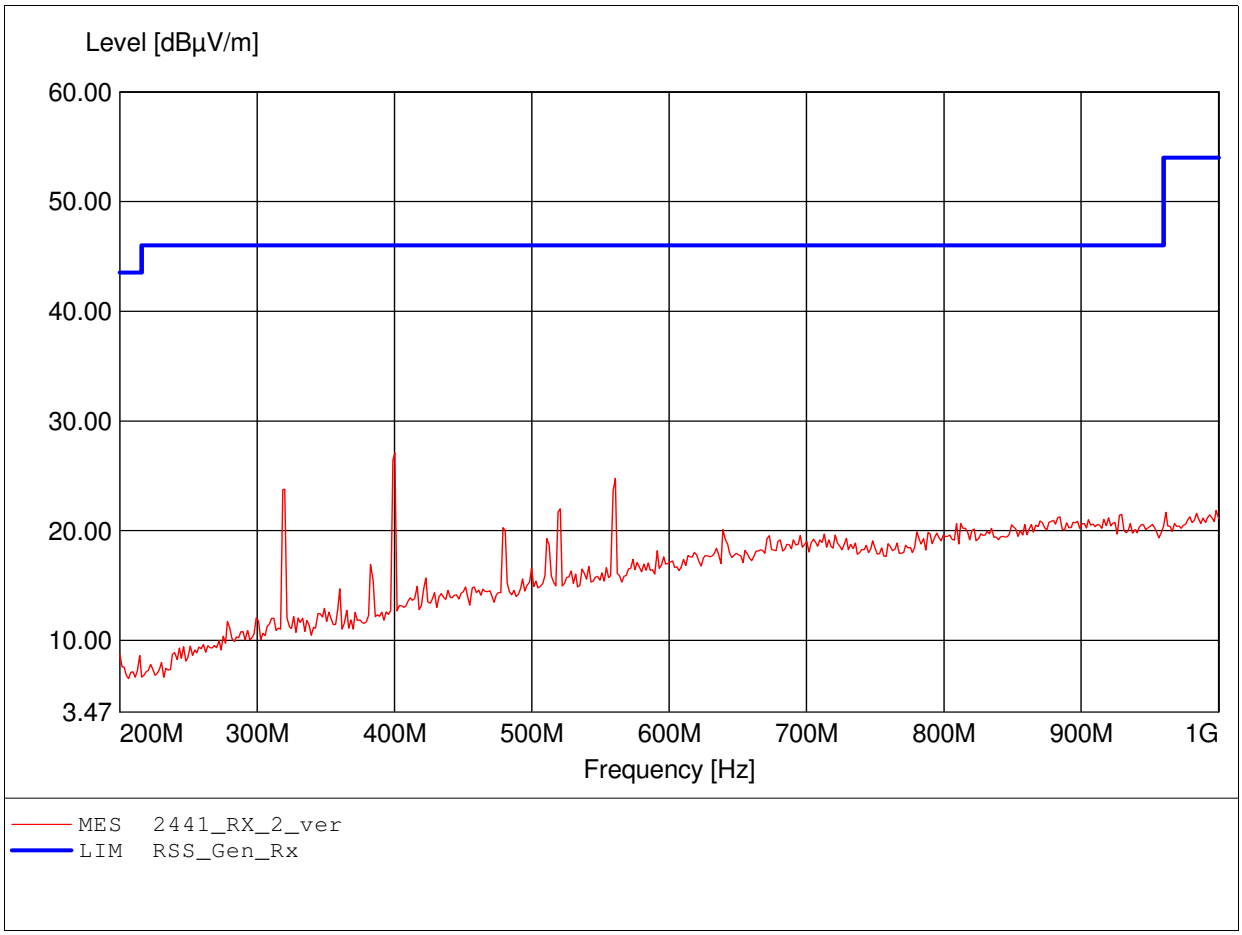


Page 1/1 29.11.2012 15:24 / Antenna horizontal G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

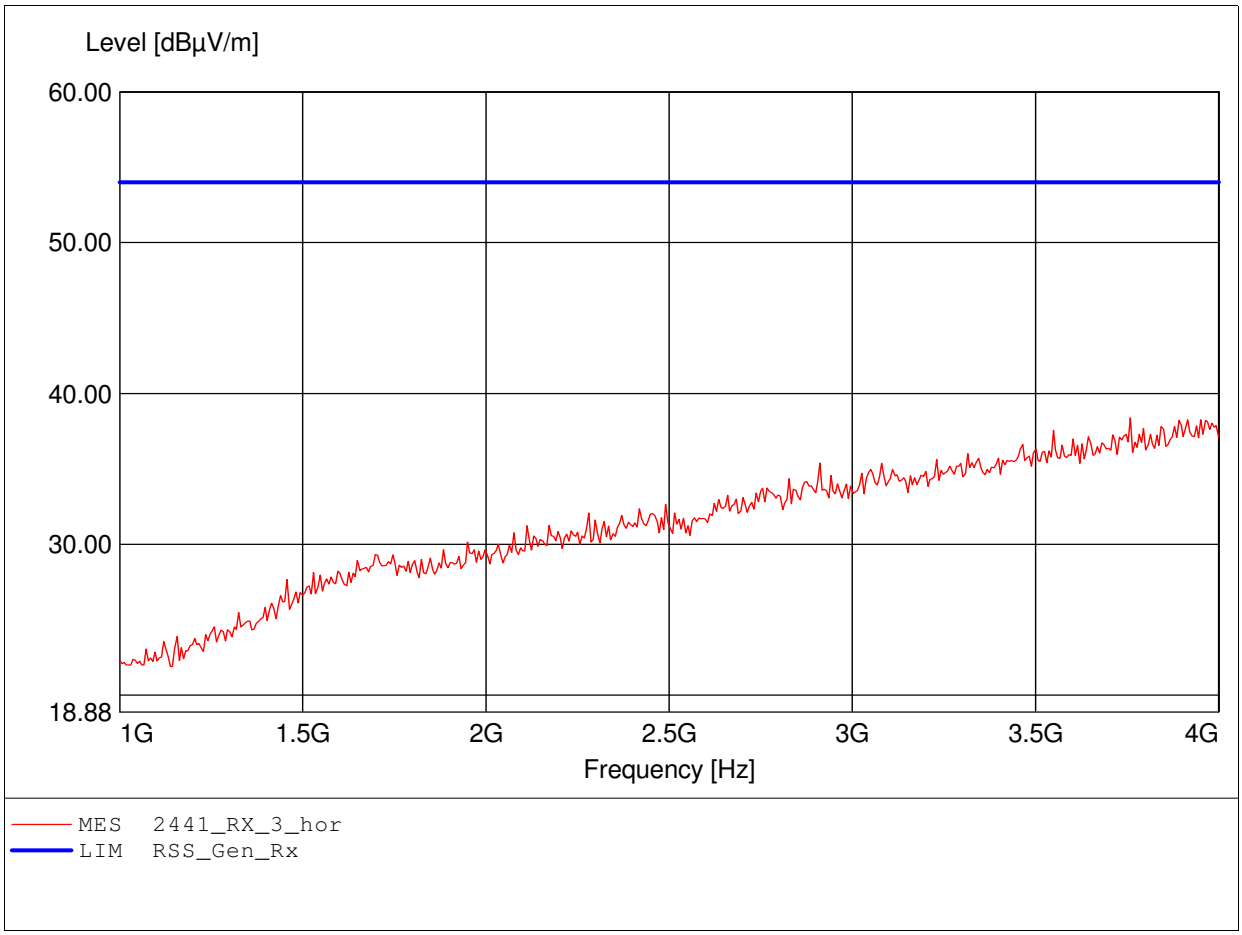
Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 223, ampl.	
Comment 2:	Freq:400.401MHz Emax:27.08dBµV/m RBW: 100 kHz	



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.	
Comment 2:	Freq:3.760GHz Emax:38.36dBµV/m RBW: 1 MHz	

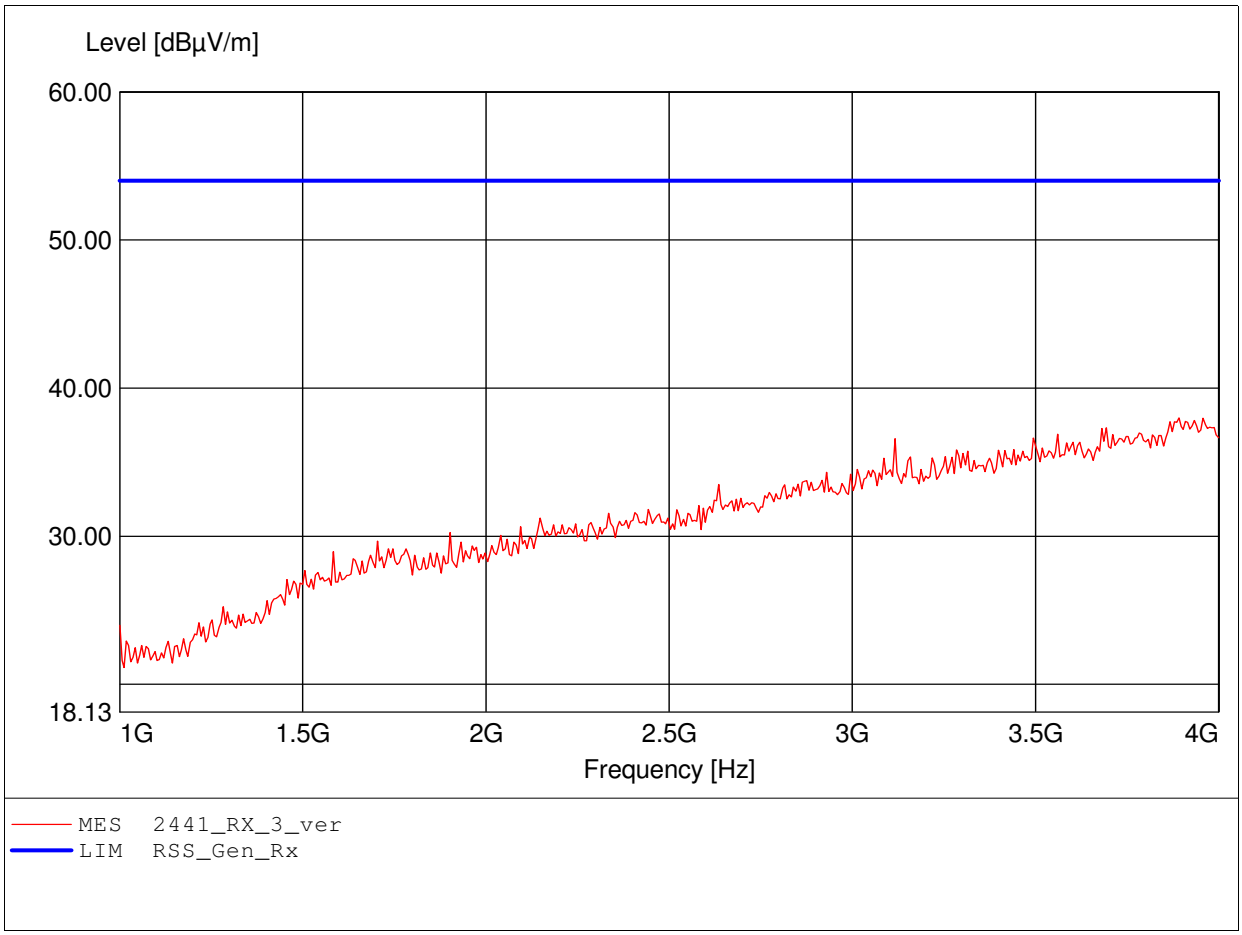


Page 1/1 29.11.2012 15:48 / Antenna horizontal G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.	
Comment 2:	Freq:3.892GHz Emax:37.98dBµV/m RBW: 1 MHz	

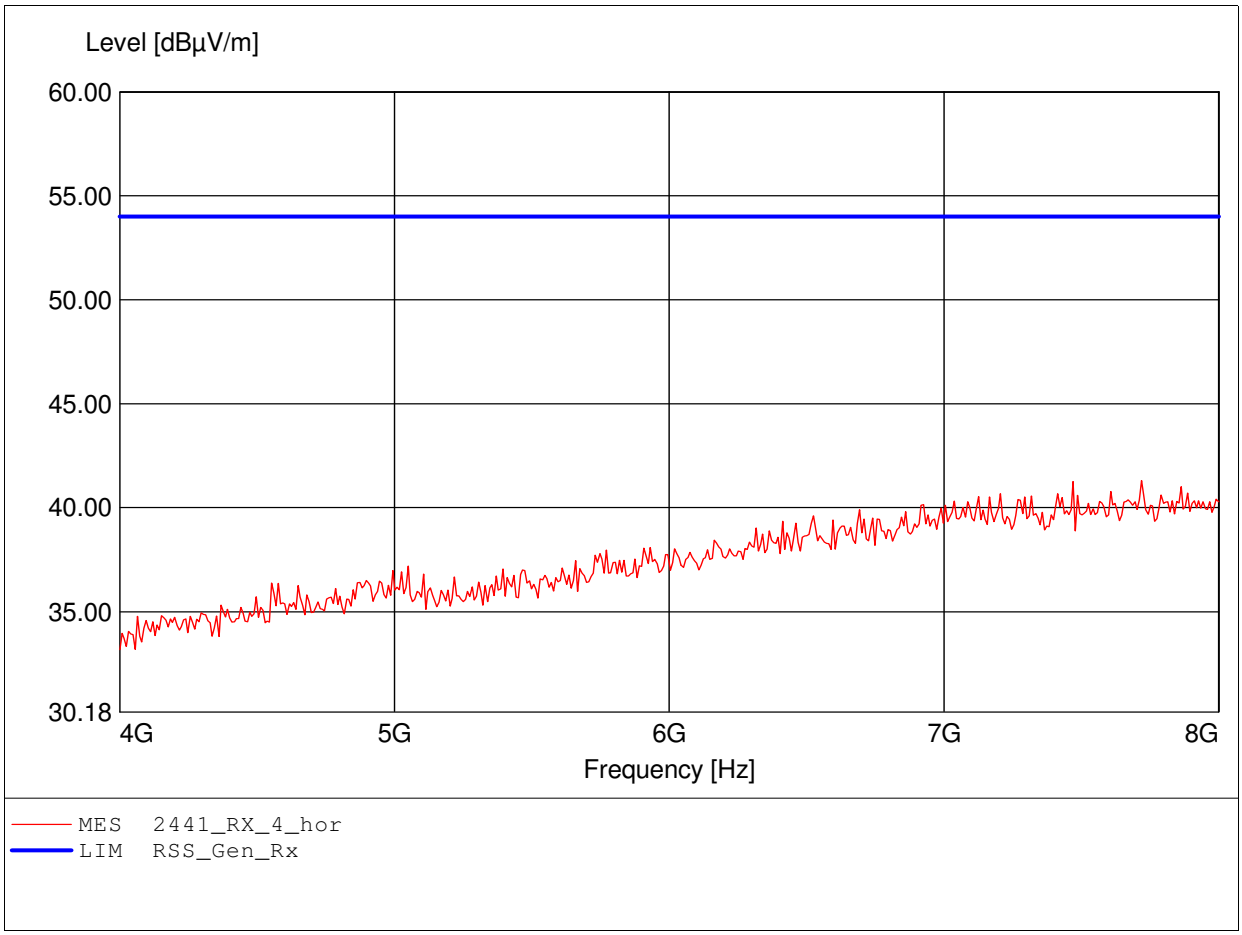


Page 1/1 29.11.2012 15:30 / Antenna vertical G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.	
Comment 2:	Freq:7.719GHz Emax:41.30dBµV/m RBW: 1 MHz	

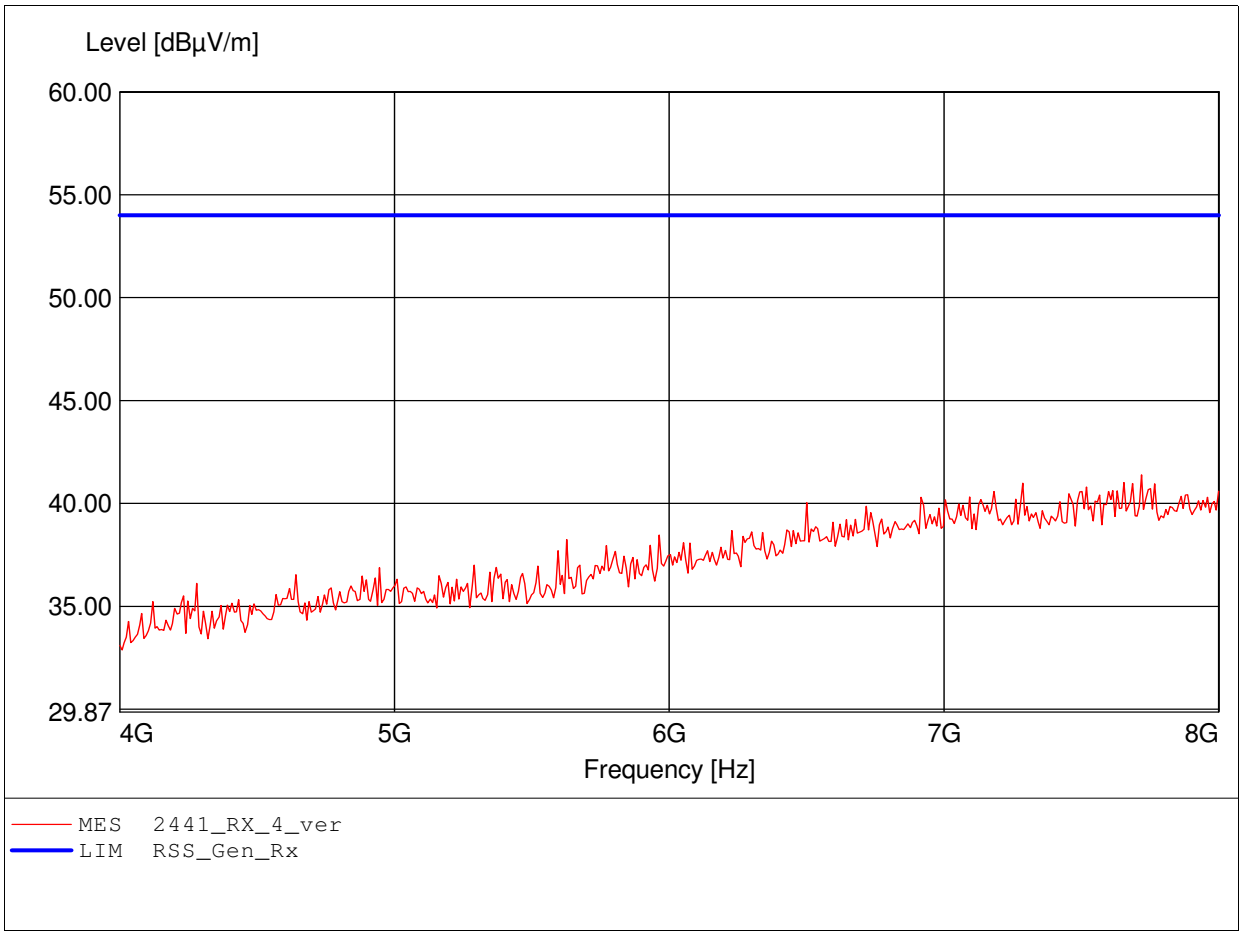


Page 1/1 29.11.2012 15:44 / Antenna horizontal G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.	
Comment 2:	Freq:7.719GHz Emax:41.39dBµV/m RBW: 1 MHz	

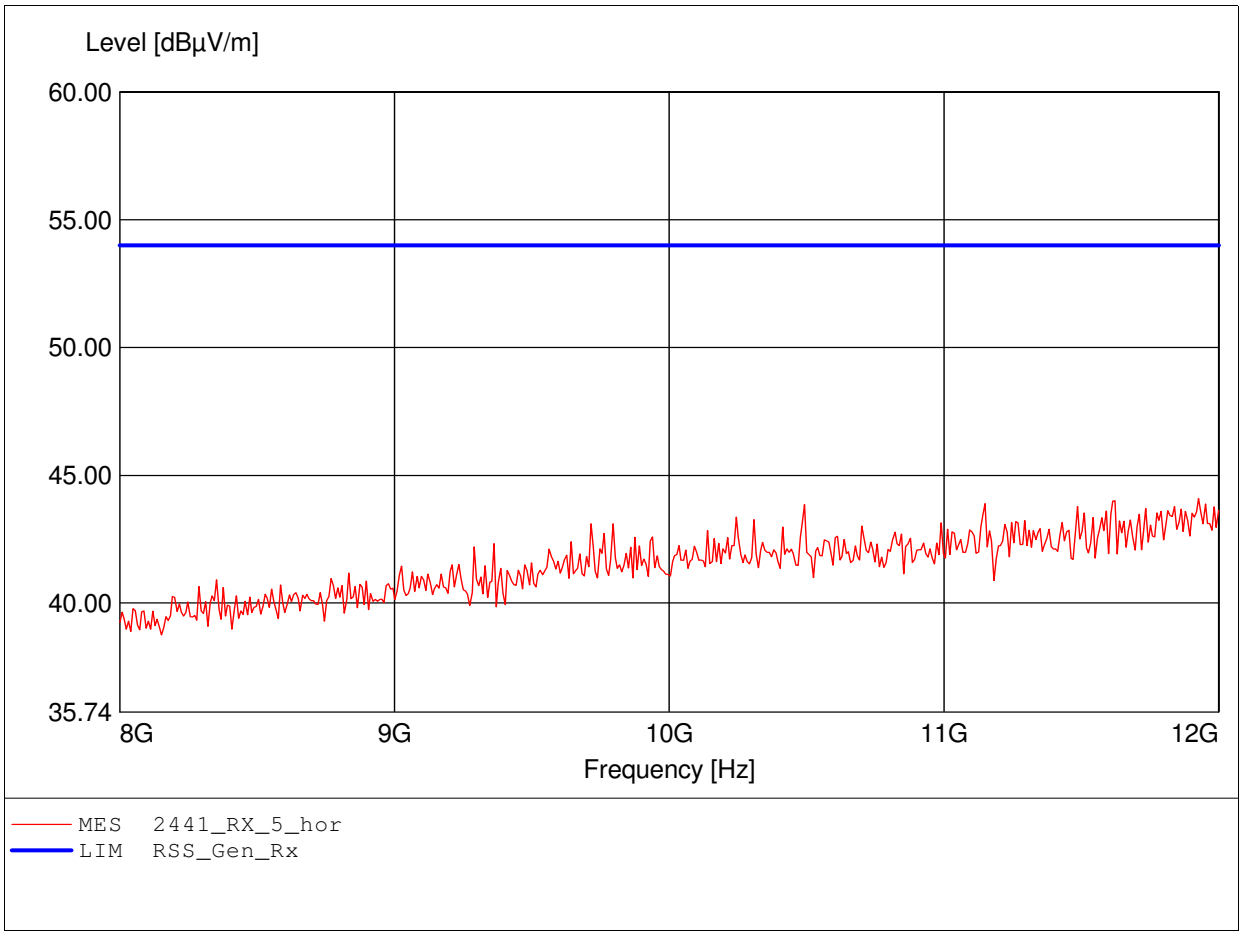


Page 1/1 29.11.2012 15:32 / Antenna vertical G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.	
Comment 2:	Freq:11.928GHz Emax:44.09dBµV/m RBW: 1 MHz	

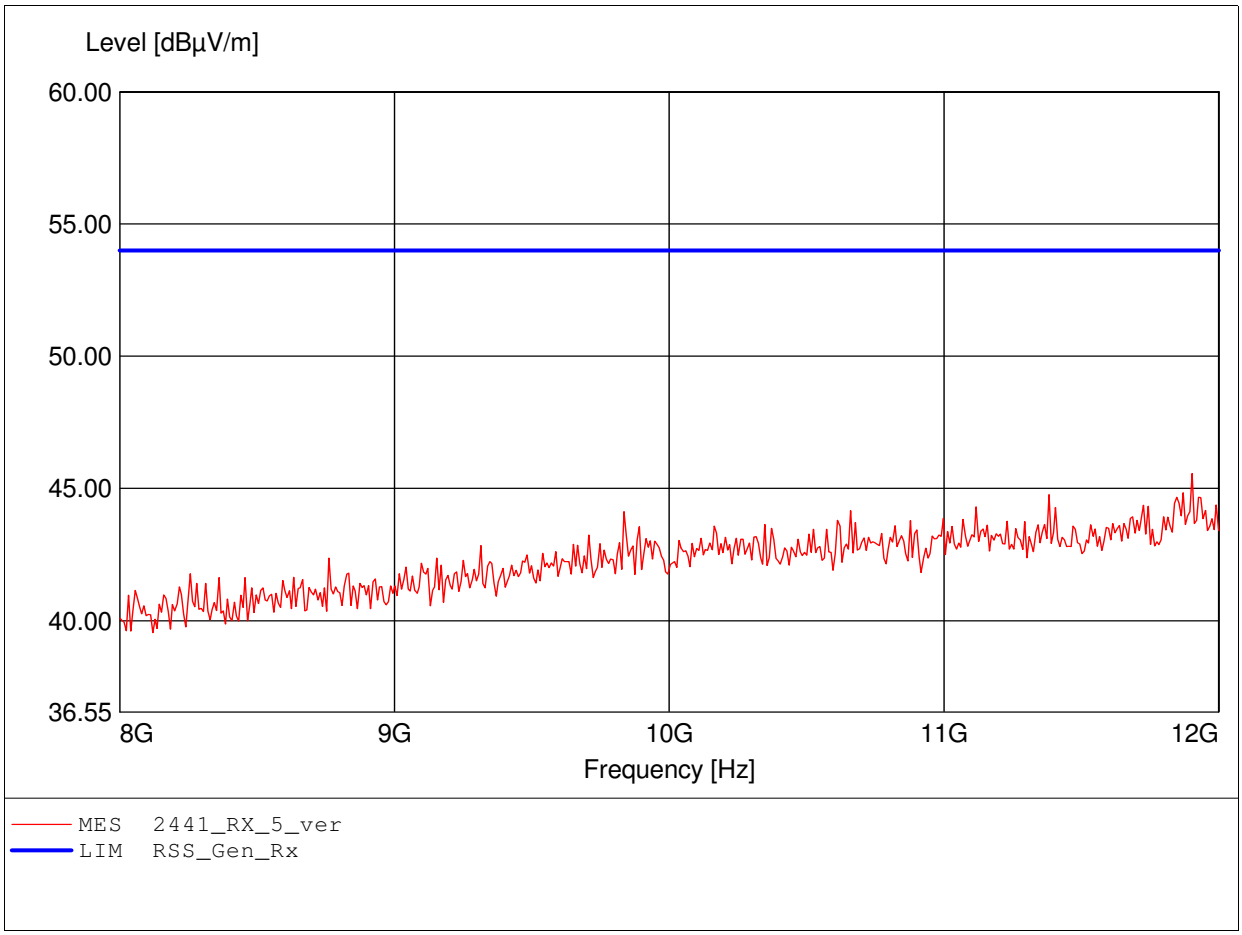


Page 1/1 29.11.2012 15:38 / Antenna horizontal G0M-1211-2443

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	lesswire AG	/ G0M-1211-2443
EUT / Model:	WLAN / Bluetooth modul	/ WiBear11n-SF1
Setup:	Bluetooth / CH: 39 / RX_Idle / Ant: internal / vertical	
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell	
Test Condition:	Tnom: 24°C / Vnom.: 3.3V DC	
Test Specification:	Freq. / CH: 2441	
Comment 1:	Dist.: 3m, Ant.: HL 025, ampl.	
Comment 2:	Freq:11.904GHz Emax:45.56dBµV/m RBW: 1 MHz	



Version History

Version	Issue Date	Remarks		Revised by
01	2013-01-22	Initial Release		
02	2013-02-13	Replaced document: Replaced by: Reason: • Page 1 & 4: FCC-ID corrected	G0M-1211-2443-TFC247B-V01 G0M-1211-2443-TFC247B-V02	C. Weber