EUROFINS PRODUCT SERVICE GMBH

Testing Cert #1983.01

RADIO TEST- REPORT

Class II Permissive Change Test Report

FCC PART 15 SUBPART C
IC RSS 210 ISSUE 8

FCC ID: XM5-SM2144N2
IC: 8516A-SM2144N2

Wireless 802.11b/g module

iW-SM2144N2BIO

Wireless LAN radio

TEST REPORT NUMBER: G0M21011-3871-P-15

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

Phone +49-33631-888 0
Fax +49-33631-888 660

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1 General Information

1.1 Notes

The results of this test report relate exclusively to the item tested as specified in chapter "Description of test item" and are not transferable to any other test items.

Eurofins Product Service GmbH is not responsible for any generalisations and conclusions drawn from this report. Any modification of the test item can lead to invalidity of test results and this test report may therefore be not applicable to the modified test item.

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Operator:

Date	Eurofins-Lab.	Name	Signature
03.11.2011		W. Treffke	

Technical responsibility for area of testing:

Date	Eurofins	Name	Signature
03.11.2011		J. Zimmermann	

1.2 Testing laboratory

EUROFINS PRODUCT SERVICE GMBH
Storkower Strasse 38c
D-15526 Reichenwalde b. Berlin
Germany
Telefon : +49 33631 888 00
Telefax : +49 33631 888 660

DAR ACCREDITED TESTING LABORATORY
DAR-REGISTRATION NUMBER: DAT-P-268/08

RECOGNIZED NOTIFIED BODY EMC
REGISTRATION NUMBER: BNetzA-bS EMV-07/61

RECOGNIZED NOTIFIED BODY R&TTE
REGISTRATION NUMBER: BNetzA-bS-02/51-53

FCC FILED TEST LABORATORY
REG.-NO. 96970

A2LA ACCREDITED TESTING LABORATORY
CERTIFICATE NO. 1983.01

BLUETOOTH QUALIFICATION TEST FACILITY (BQTF)
ACCREDITED BY BLUETOOTH QUALIFICATION REVIEW BOARD

INDUSTRY CANADA FILED TEST LABORATORY
REG. NO. IC 3470

Test location, where different:

Name	: ./.
Street	: ./.
Town	: ./.
Country	: ./.
Telephone	: ./.
Fax	: ./.

1.3 Details of approval holder

Name	: Connect One Ltd.
Street	: 20 Atir Yeda Street
Town	: 44643 Kfar Saba
Country	: Israel
Telephone	: +972-9-766-0456
Fax	: +972-9-766-0461
Contact	: Mr. Avi Provizor
Telephone	: +972-9-766-0456

1.4 Application details

Date of receipt of application	: 16.11.2010
Date of receipt of test item	: 16.11.2010
Date of test	: 17. – 18.11.2010

1.5 Test item

Description of test item	: Wireless 802.11b/g module
Type identification	: iW-SM2144N2BIO
Brand Name	: WiReach BK
Serial number	: 14036DCA
Hardware version	: CO2144-D
Software version	: ID807b16
Equipment type	: Radio module

Technical data

Frequency range	: 2400 - 2483.5MHz
Tested frequencies	: F_1 2412MHz
Tested frequencies	: F_2 2437MHz
Tested frequencies	: F_3 2462MHz
Antenna type	: non removable, build into the housing
Number of antennas	: 1
Antenna gain	: 2.68dBi
Power supply	: 3.3VDC
Duty cycle	: CCK, DSSS : 50%, OFDM : 50%
Operating mode	: semi duplex
Spreading technique	: CCK, DSSS, OFDM
Modulations	: DBPSK, DQPSK
Device classification	: Mobile Device (Human Body distance > 20 cm)

Manufacturer:
(if applicable)

Name	:
Street	:
Town	:
Country	:

1.6 Test standards

Technical standard	:	☒ **FCC PART 15 SUBPART C** ☒ **IC RSS 210 ISSUE 8**

1.7 Additional information

Class II permissive change tests are performed to show compliance of the modular transmitter and the stated antenna model with the FCC rules. Due to the fact that a new antenna model doesn't affect conducted measurement results only radiated spurious emission are tested. The conducted ouput power values are additionally measured to compare them to the values reported in the original filling.

1.8 Acronyms and abbreviations

EUT	:	Equipment under Test
TX	:	Transmission
RX	:	Reception
RBW	:	Measurement Resolution Bandwidth
Pol	:	Measurement Polarization
e.i.r.p.	:	Equivalent isotropic radiated power
FHSS	:	Frequency hopping spread spectrum
DSSS	:	Direct Sequence Spread Spectrum
OFDM	:	Orthogonal frequency division multiplexing
CCK	:	Complementary code keying
GFSK	:	Gaussian frequency shift keying
DBPSK	:	Differential binary phase shift keying
DQPSK	:	Differential quadrature phase shift keying
PSK	:	Phase shift keying
T_{nom}	:	Nominal Temperature
T_{min}	:	Minimum Temperature
T_{max}	:	Maximum Temperature
V_{nom}	:	Nominal Supply Voltage
V_{min}	:	Minimum Supply Voltage
V_{max}	:	Maximum Supply Voltage
VDC	:	DC voltage
N/A	:	Not applicable
IC	:	Industry Canada

2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

or

The deviations as specified in 2.4 were ascertained in the course of the tests performed. ☐

2.2 Test environment

Temperature	: 22	...	26°C
Relative humidity content	: 20	...	75%
Air pressure	: 86	...	103kPa

Extreme conditions parameters:

V_{nom}	:	3.3VDC
V_{min} (V_{nom}-15%)	:	-
V_{max} (V_{nom}+15%)	:	-
T_{nom}	:	25°C

Other parameter: None

2.3 Test equipment utilized

Measurement Equipment List					
No.	**Measurement device:**	**Type:**	**Manufacturer:**	**Last Cal.**	**Next Cal.**
ETS 0086	Semi-anechoic chamber	AC1	Frankonia	12.03.2010	12.03.2011
ETS 0271	Spectrum Analyzer	FSEK30	Rohde & Schwarz	19.03.2009	19.03.2011
ETS 0012	Biconical Antenna	HK 116	Rohde & Schwarz	29.01.2010	29.01.2011
ETS 0336	LPD Antenna	HL 223	Rohde & Schwarz	28.01.2010	28.01.2011
ETS 0018	Horn Antenna	BBHA 9120D	Schwarzbeck	26.08.2010	26.08.2011
ETS 0432	Amplifier-Matrix			02.06.2010	02.06.2012
ETS 0259	Power Meter	NRVD	Rohde & Schwarz	26.03.2010	26.03.2011
ETS 0278	Power Sensor	NRV-Z31	Rohde & Schwarz	25.11.2010	25.11.2012
ETS 0496	Spectrum Analyzer	FSP30	Rohde & Schwarz	26.08.2010	26.08.2011
ETS 0086	Semi-anechoic chamber	AC1	Frankonia	12.03.2010	12.03.2011

2.4 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

2.5 Test results

☒ 1st test ☐ test after modification ☐ production test

Test case	Clause	Required	Result	Remarks
INFORMATIONAL TRANSMITTER PARAMETERS				
Occupied Bandwidth	IC RSS-Gen. 4.6.1	☐		
TRANSMITTER PARAMETERS				
6dB Bandwidth	FCC § 15.247(a)(2) IC RSS-210 § A8.2	☐	N/A	Not included in Class II permission change
Spectral Density	FCC § 15.247(e) IC RSS-210 § A8.2	☐	N/A	Not included in Class II permission change
Maximum peak conducted output power	FCC § 15.247(b) IC RSS-210 § A8.4	☒	PASS	To compare with original filling
Band-edge Compliance	FCC § 15.247(d) IC RSS-210 § A8.5	☐	N/A	Not included in Class II permission change
Conducted spurious emissions	FCC § 15.247(d) IC RSS-210 § A8.5	☐	N/A	Not included in Class II permission change
Radiated spurious emissions	FCC § 15.209 IC RSS-Gen § 4.9	☒	PASS	
RECEIVER PARAMETERS				
Radiated spurious emissions	FCC § 15.109 IC RSS-Gen § 4.10 IC RSS-Gen § 7.2.3	☒	PASS	
POWER LINE PARAMETERS				
AC power line conducted emissions	FCC § 15.207 IC RSS-Gen. 7.2.2	☐	N/A	Not included in Class II permission change

3 Informational Transmitter parameters

3.1 Transmitter Modes for conformance testing

The following transmission modes are elected for compliance testing.

TEST MODE DSSS	
Conditions	
Spread Spectrum :	☒ Yes ☐ No
Spreading Technique :	DSSS
Modulation :	DBPSK
Bandwidth :	20MHz
Data rate :	1Mbps
Duty Cycle :	50%

TEST MODE OFDM	
Conditions	
Spread Spectrum :	☒ Yes ☐ No
Spreading Technique :	OFDM
Modulation :	DBPSK
Bandwidth :	20MHz
Data rate :	6Mbps
Duty Cycle :	50%

4 Transmitter parameters

4.1 Maximum peak conducted output power

According FCC rules 47 CFR 15.247(b)(3) and RSS-210 Section A8.4 the maximum peak conducted output power is limited and has be verified.

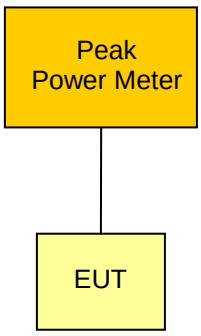
4.1.1 Limits

For systems employing digital modulation techniques operating in the bands 902-928 MHz, 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W.

Maximum peak conducted power limit
1W / 30dBm

*) 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.

4.1.2 Measurement procedure



The eut is connected to a peak power sensor of a power meter and activated with the maximum power level. The peak power is measured and recorded.

According to 47 CFR 15.31(e) battery power equipment is measured using new batteries and equipment using external power supply is measured with 85%, 100% and 115% of the nominal rated supply voltage.

4.1.3 Results

Maximum peak conducted output power			
Measurement Conditions			
Antenna gain :	2.68dBi		
Power correction :	0dB		
Channel [MHz]	**Conducted ouput power [dBm]**	**Original ouput power [dBm]**	**Power Limit [dBm]**
Test mode DSSS			
2412	15.00	14.71	30
2437	14.30	14.77	30
2462	14.00	14.69	30
Test mode OFDM			
2412	11.90	12.24	30
2437	11.70	12.27	30
2462	11.30	12.40	30
Measurement uncertainty			4.22dB
Verdict			**PASS**

4.2 Transmitter radiated spurious emissions

According FCC rules 47 CFR 15.209 unwanted emissions in the spurious domain are power limited and has to be validated.

4.2.1 Limits

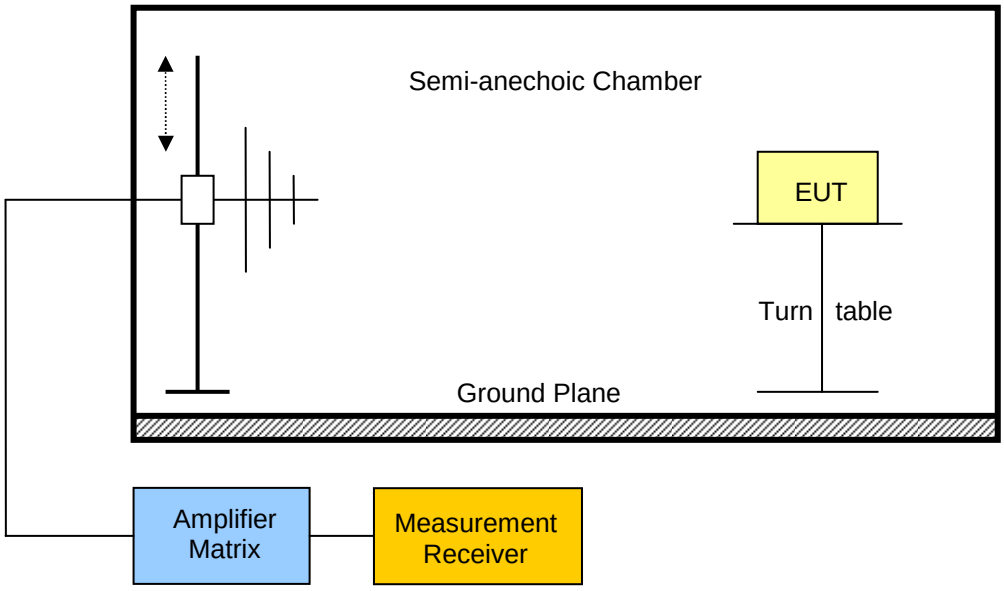
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Tranmitter restricted band spurious emission limits				
Frequency range [MHz]	**Detector**	**Limit [µV/m]**	**Calculated Limit 3m [dBµV/m]**	**Measurement 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

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.

4.2.2 Measurement procedure

The spurious emission measurement is performed on 3m a semi-anechoic test site.



The eut is placed on a non-metallic table. Any emission is received by the measurement antenna and measured via a measurement receiver connected to the antenna. To obtain the maximum emission the eut is rortated through 360°.

Due to pratical reasons the spurious emission level check is first performed with a peak detector and the quasi-peak and average limits.

If any emission is detected that gets close to the emission limit the detector is changed and the quasi-peak or average detector is used. Which detector is used is determined by the emission frequency. If pulsed transmission is used, averaging over the pulse train is used.

The measurement values are also corrected to obtain the field strength values at the defined measurement distances of the emission limits.

The measurement is performed over the frequency range of 30MHz up to the tenth harmonic.

4.2.3 Results

Transmitter radiated spurious emissions						
Measurement Conditions						
Measurement distance :		3m				
Channel Frequency [MHz]	**Emission Frequency [MHz]**	**Polarization**	**Measured Field Strength * [dBµV/m]**	**Limit@3m [dBµV/m]**	**Detector**	**Margin [dB]**
Test mode DSSS						
2412	2386	v	51.0	74	peak	-23.0
2437	2335	h	53.6	74	peak	-20.4
2462	2336	h	38.0	54	average	-16.0
2412	4818	v	54.6	74	peak	-19.4
2412	4818	h	54.6	74	peak	-19.4
2437	4824	h	44.4	54	average	-9.6
Test mode OFDM						
2462	2388	v	60.8	74	peak	-13.2
2412	2389	v	49.2	54	average	-4.8
2412	2388	h	66.3	74	peak	-7.7
2437	2389	h	48.7	54	average	-5.3
See attached diagrams in Annex						
Verdict					**PASS**	

5 Receiver parameters

5.1 Receiver spurious emissions

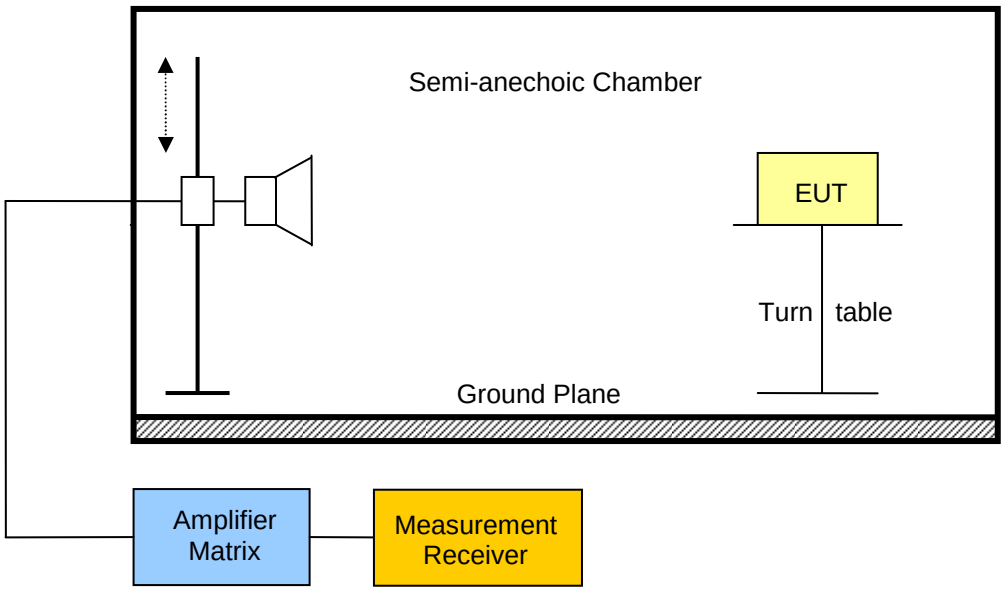
According RSS-Gen Section 4.9 the emission of unintentional radiators have to comply with limits stated in the rules.

5.1.1 Limits

Receiver spurious emission limits @ 3m				
Frequency range [MHz]	**Detector**	**Limit@3m [µV/m]**	**Calculated Limit @ 3m [dBµV/m]**	**Measurement 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

5.1.2 Measurement procedure

The spurious emission measurement is performed on a 3m open area test site.



The eut is placed on a non-metallic table. Any emission is received by a loop antenna and measured via a measurement receiver connected to the loop antenna. To obtain the maximum emission the eut is rortated through 360°.

Due to pratical reasons the spurious emission level check is first performed with a peak detector and the quasi-peak and average limits.

If any emission is detected that gets close to the emission limit the detector is changed and the quasi-peak or average detector is used. Which detector is used is determined by the emission frequency. If pulsed transmission is used, averaging over the pulse train is used.

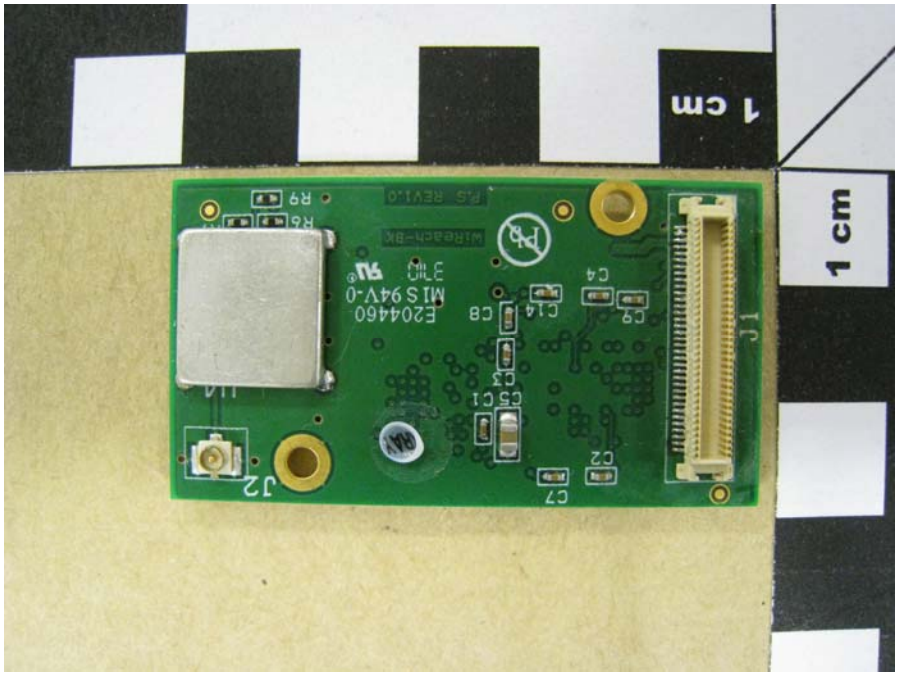
The measurement values are also corrected to obtain the field strength values at the defined measurement distances of the emission limits.

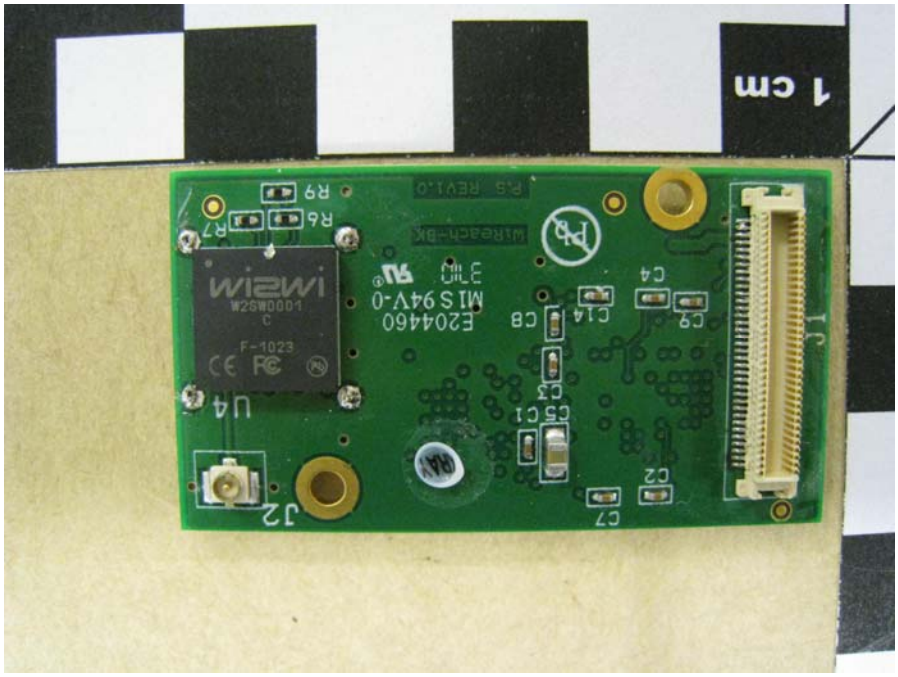
The measurement is performed over the frequency range of 30MHz up to the 3rd harmonic.

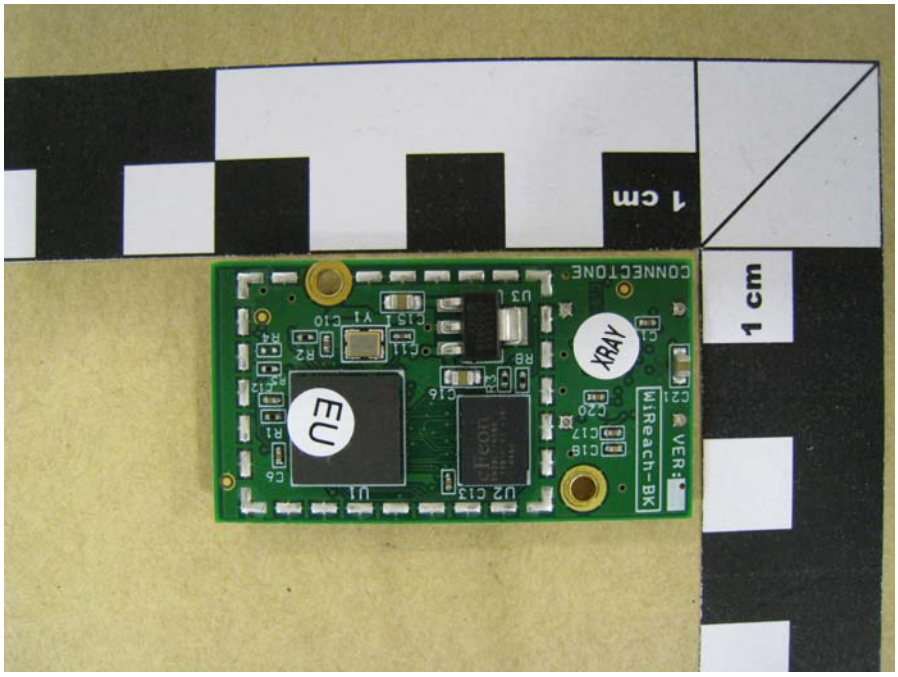
5.1.3 Results

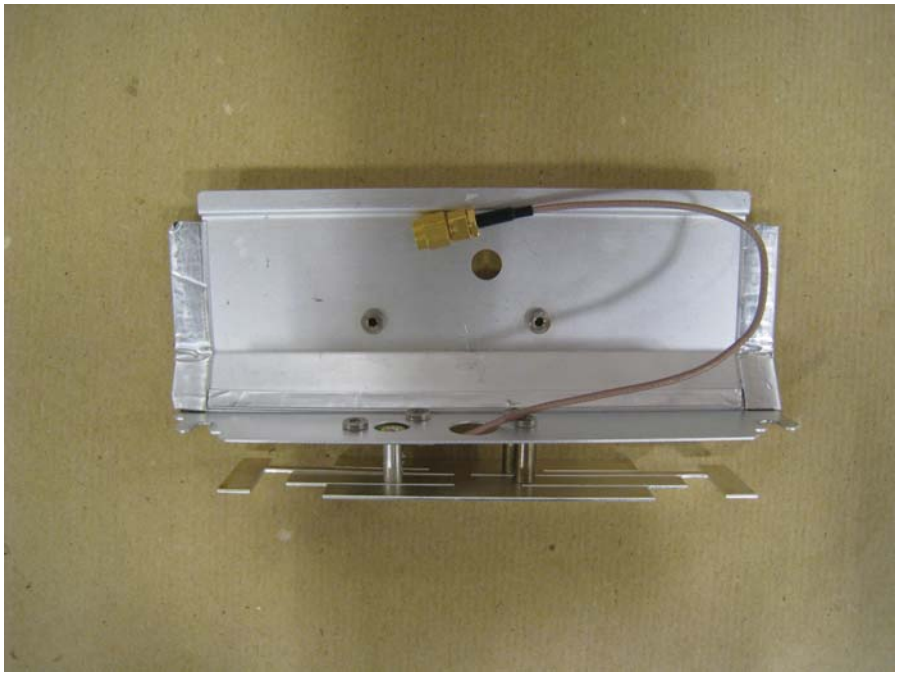
Receiver spurious emissions						
Measurement Conditions						
Measurement dístance :	3m					
Channel Frequency [MHz]	**Emission Frequency [MHz]**	**Polarization**	**Measured Field Strength * [µV/m]**	**Limit@3m [µV/m]**	**Detector**	**Margin [µV/m]**
2437	32	v	64.12	100	peak	-35.88
2437	817	v	42.22	200	peak	-157.78
2437	901	h	77.36	200	peak	-122.64
See attached diagrams in Annex						
Verdict					**PASS**	

Annex A Photos

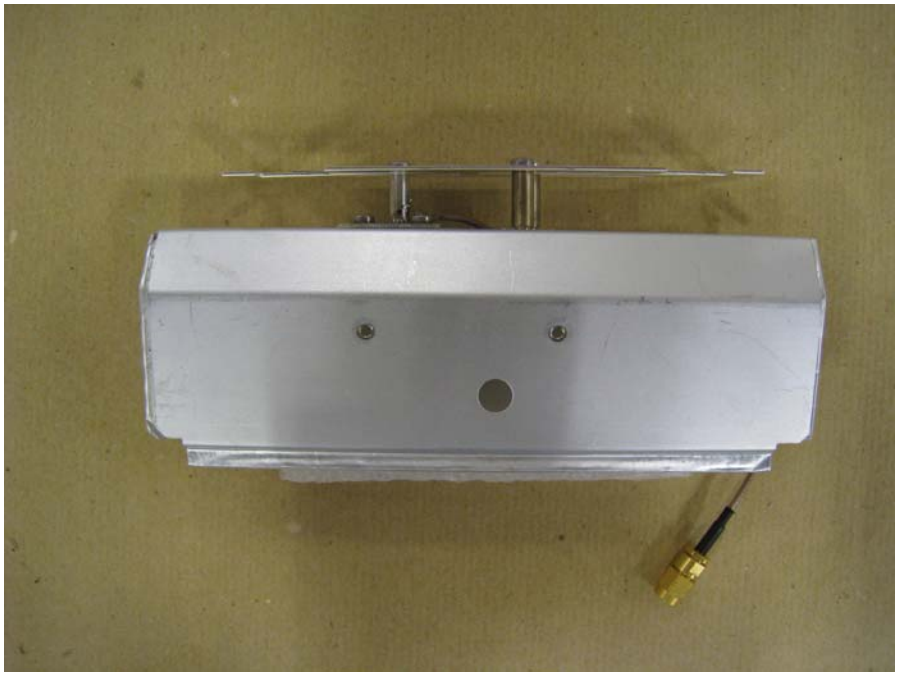
EUT BOTTOM WITH SHIELDING


EUT TOP WITHOUT SHIELDING


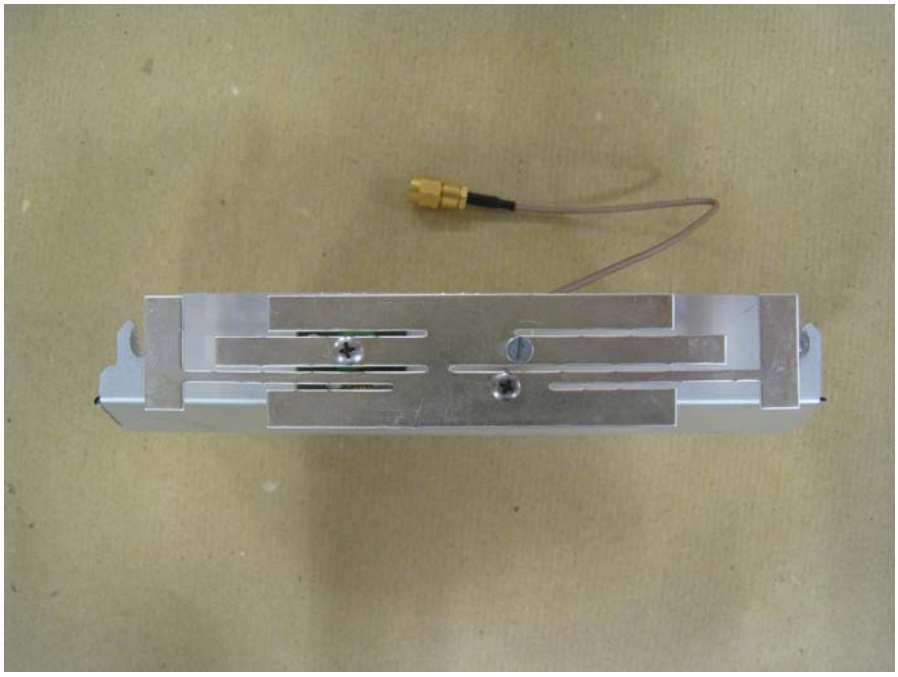
EUT BOTTOM WITHOUT SHIELDING


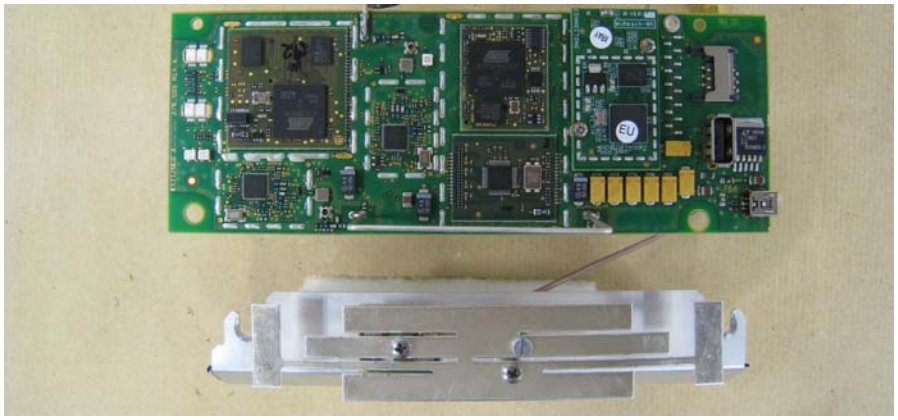
ANTENNA


ANTENNA



ANTENNA



MODULE WITH ANTENNA AND EVALUATION BOARD


Test setup radiated emissions

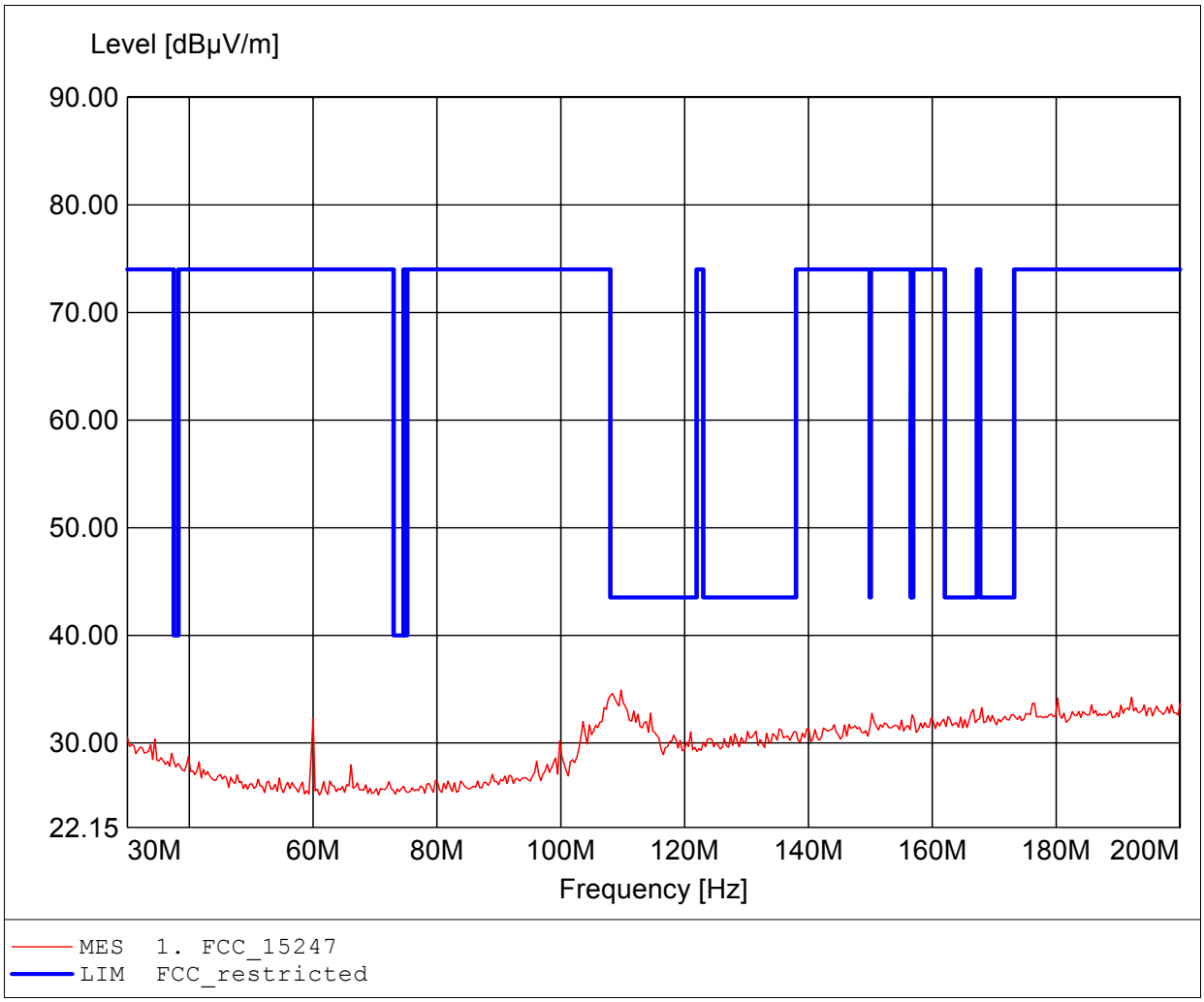

Annex B Transmitter radiated spurious emissions

Only plot containing significant spurious emission are given in this annex.

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

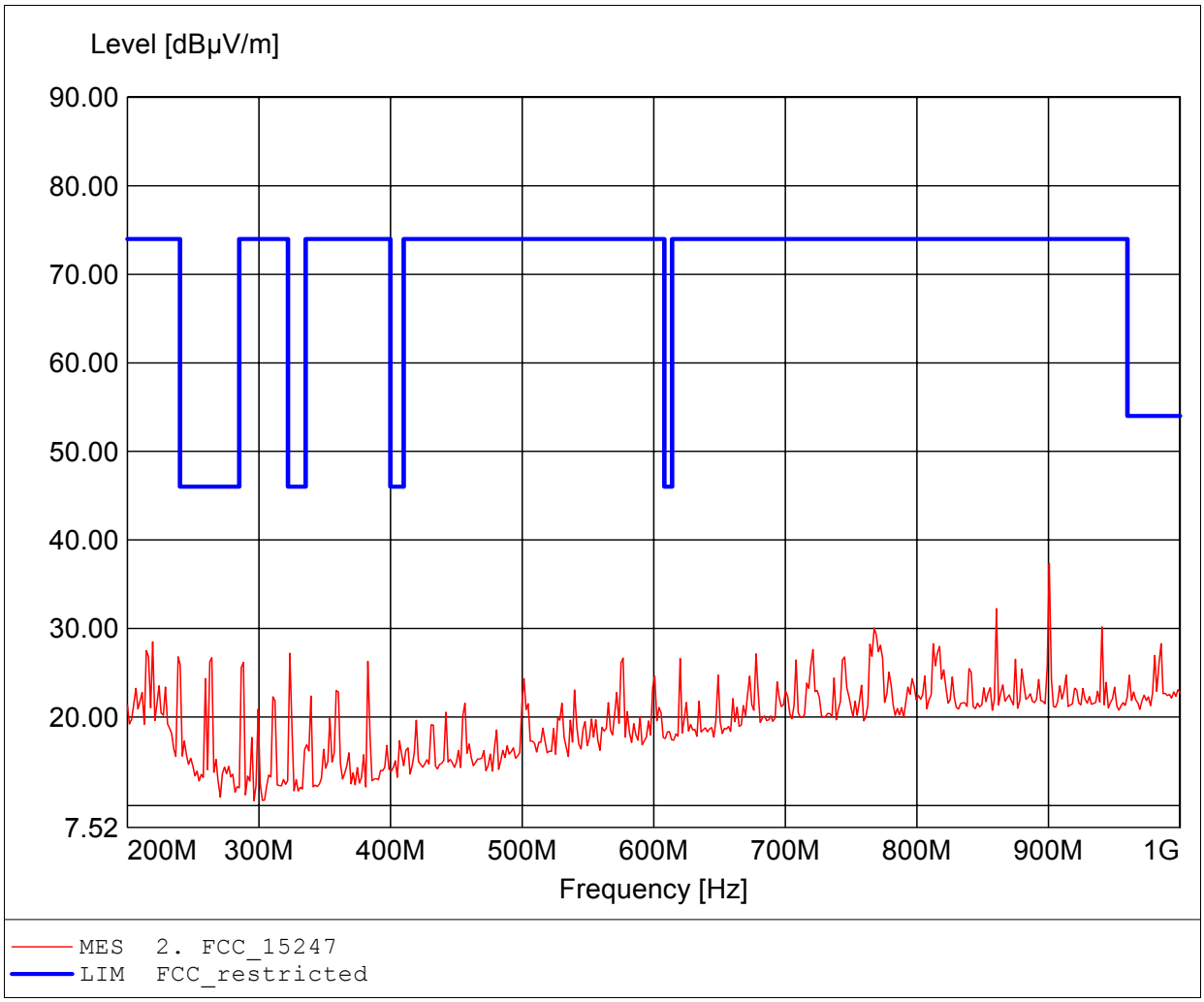
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz worst case
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 109.719MHz, Emax: 34.91dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

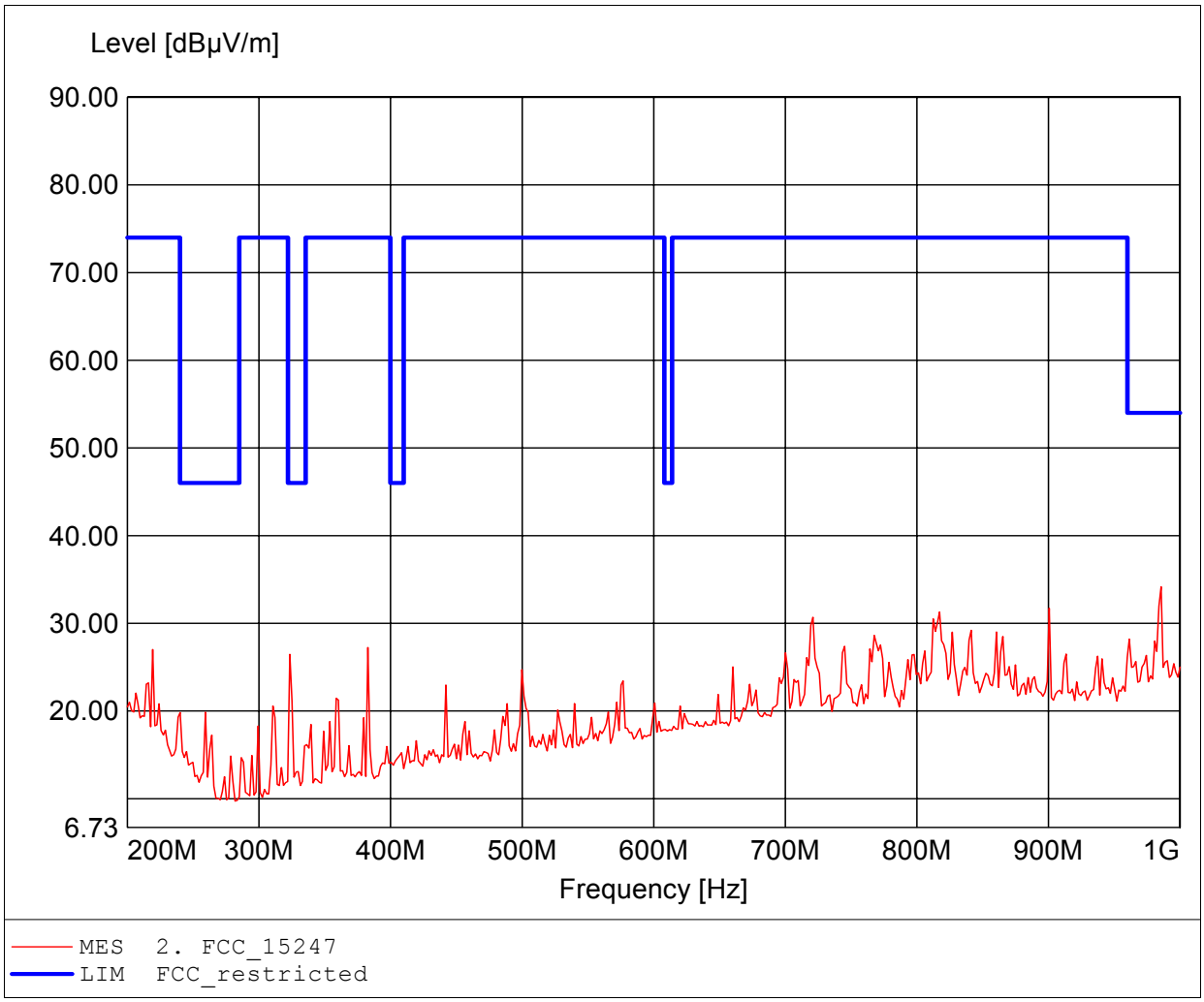
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz worst case
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 900.601MHz, Emax: 37.32dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

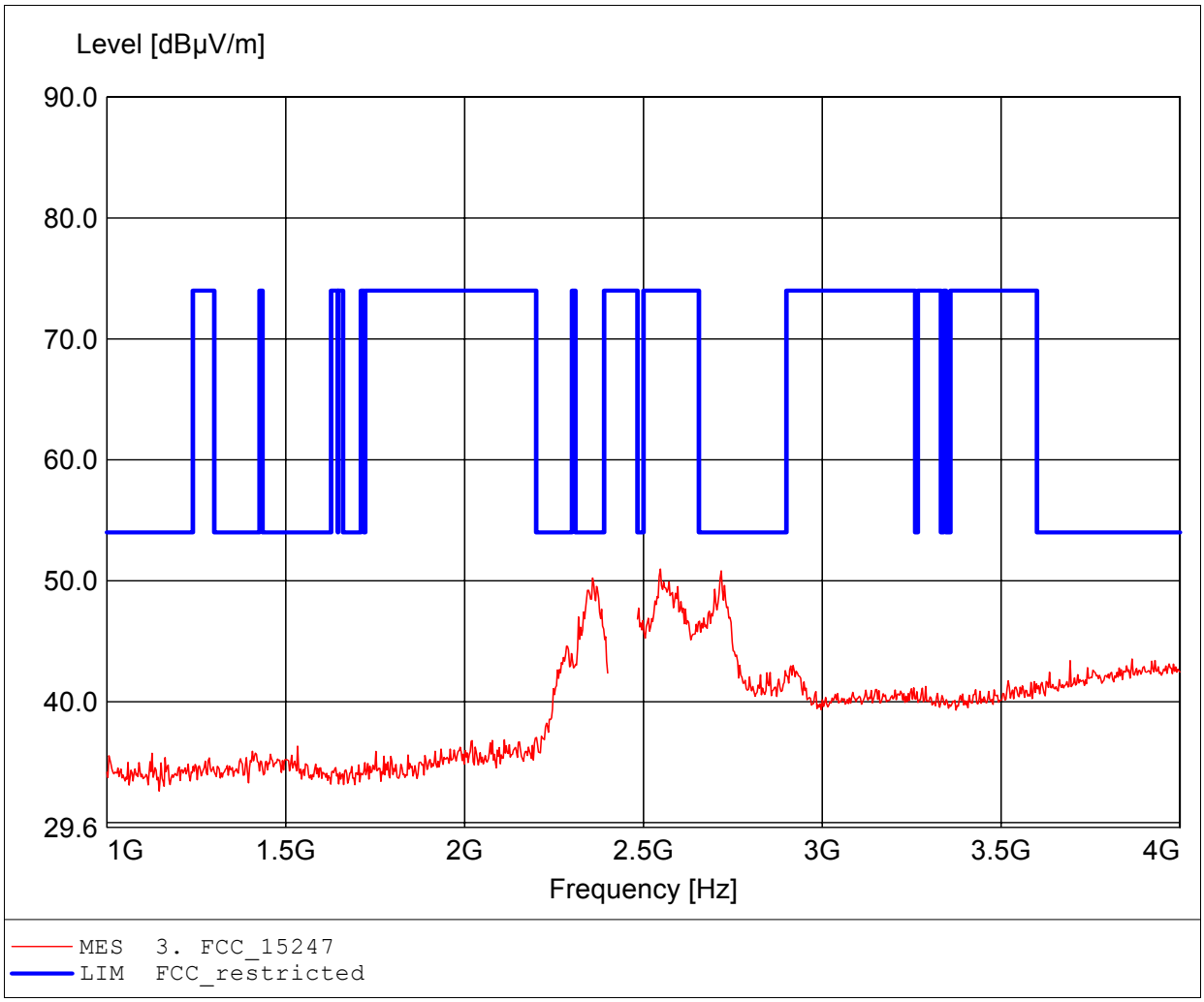
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz worst case
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 985.571MHz, Emax: 34.19dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

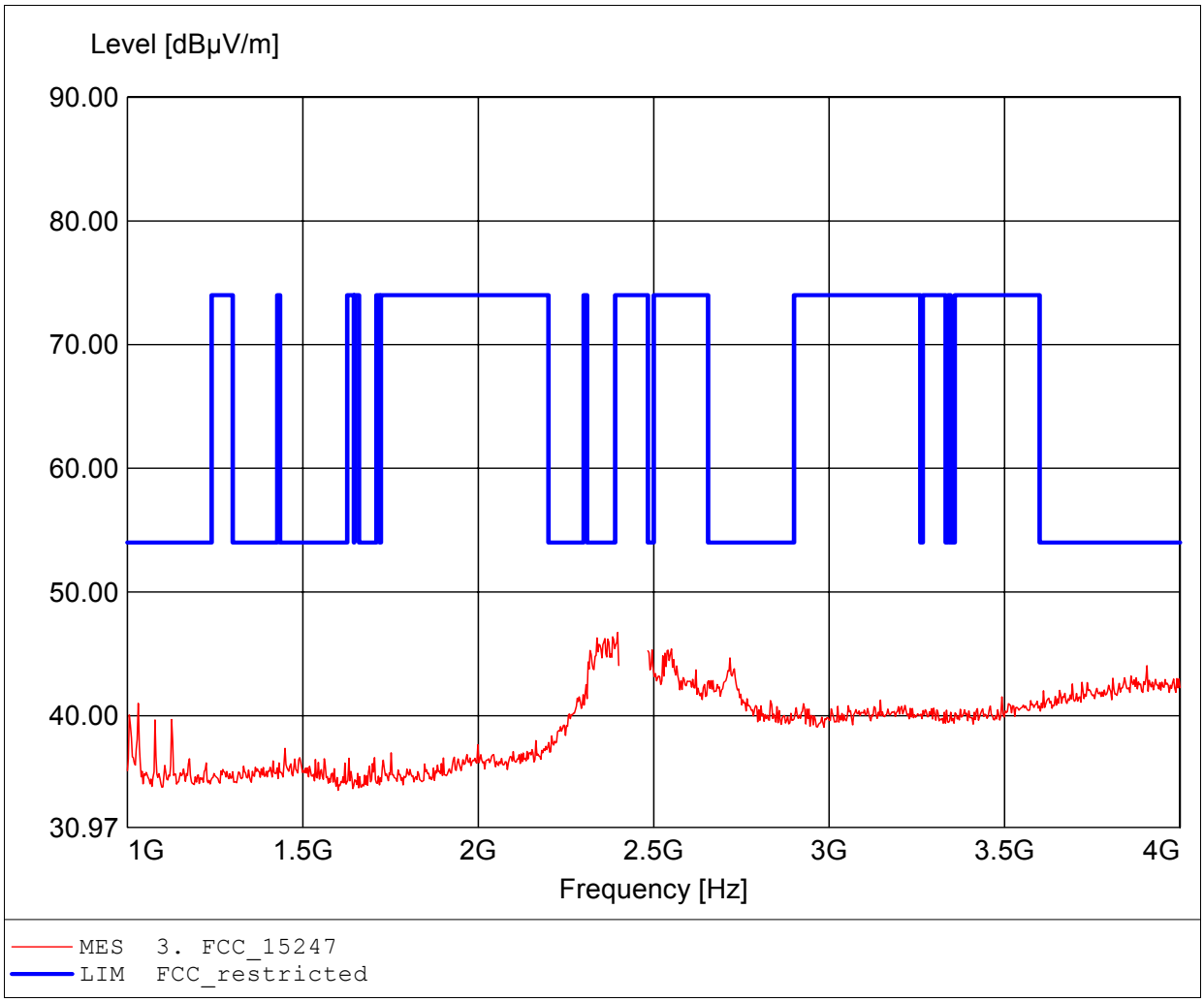
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2462 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.547GHz, Emax: 50.98dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

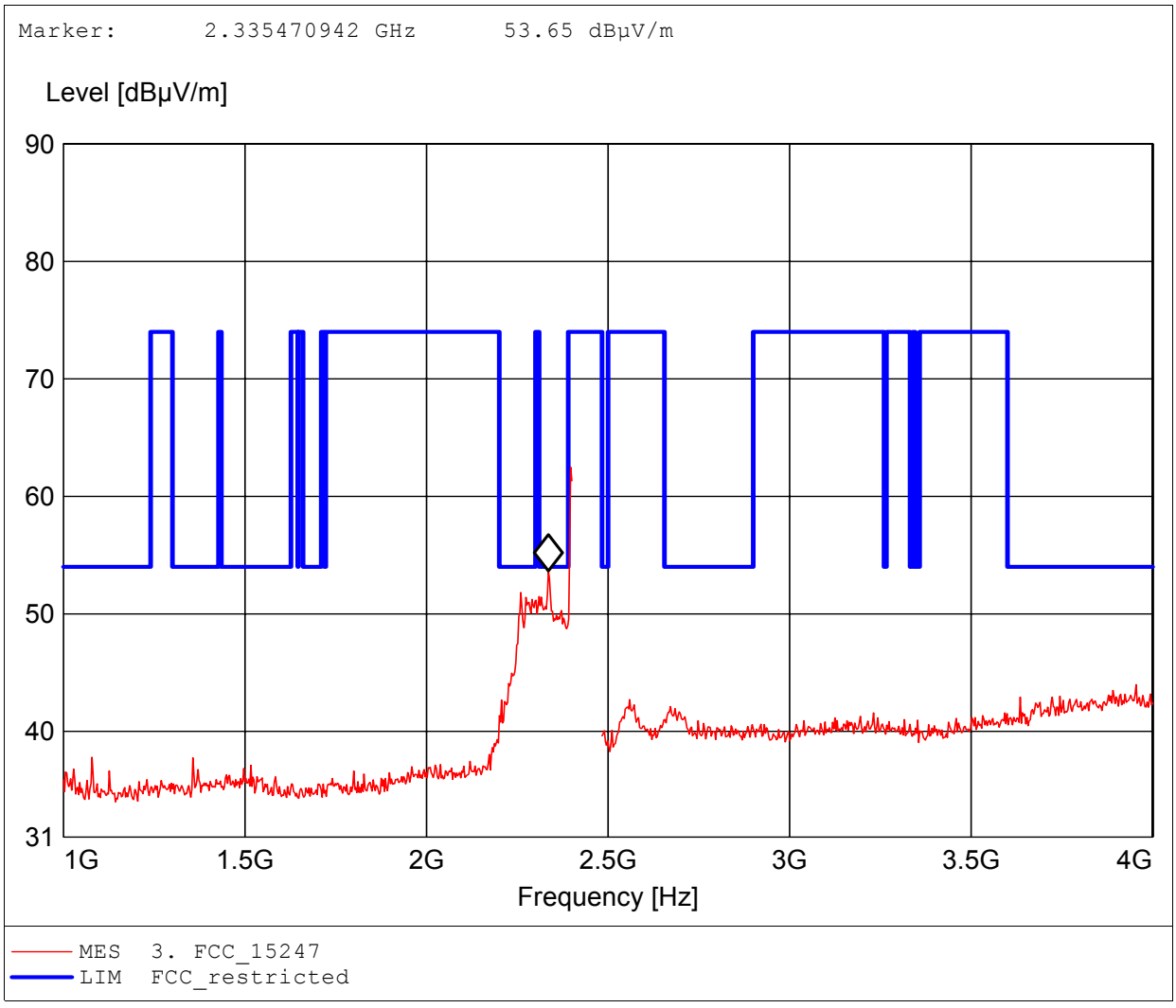
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2462 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 46.73dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

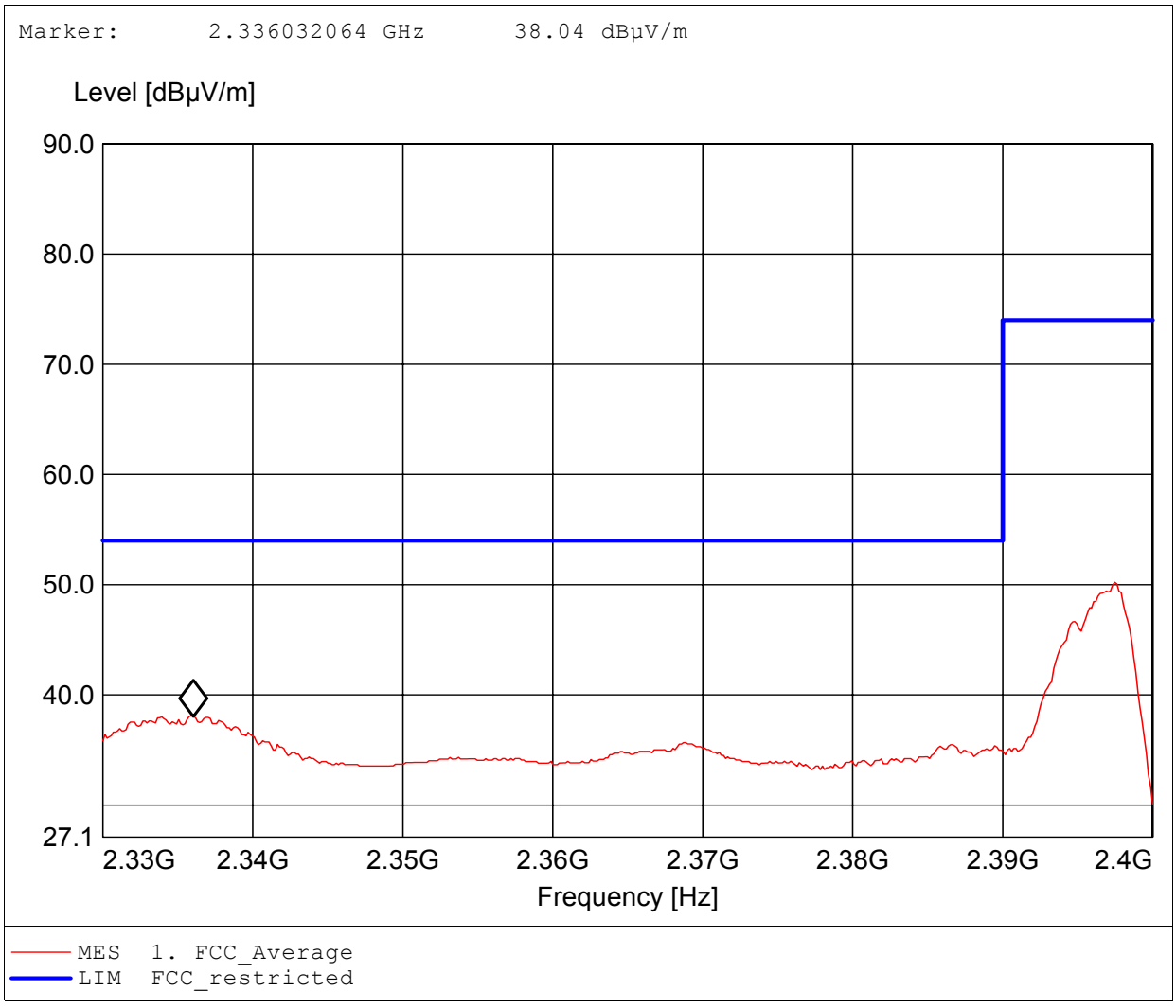
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 62.49dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

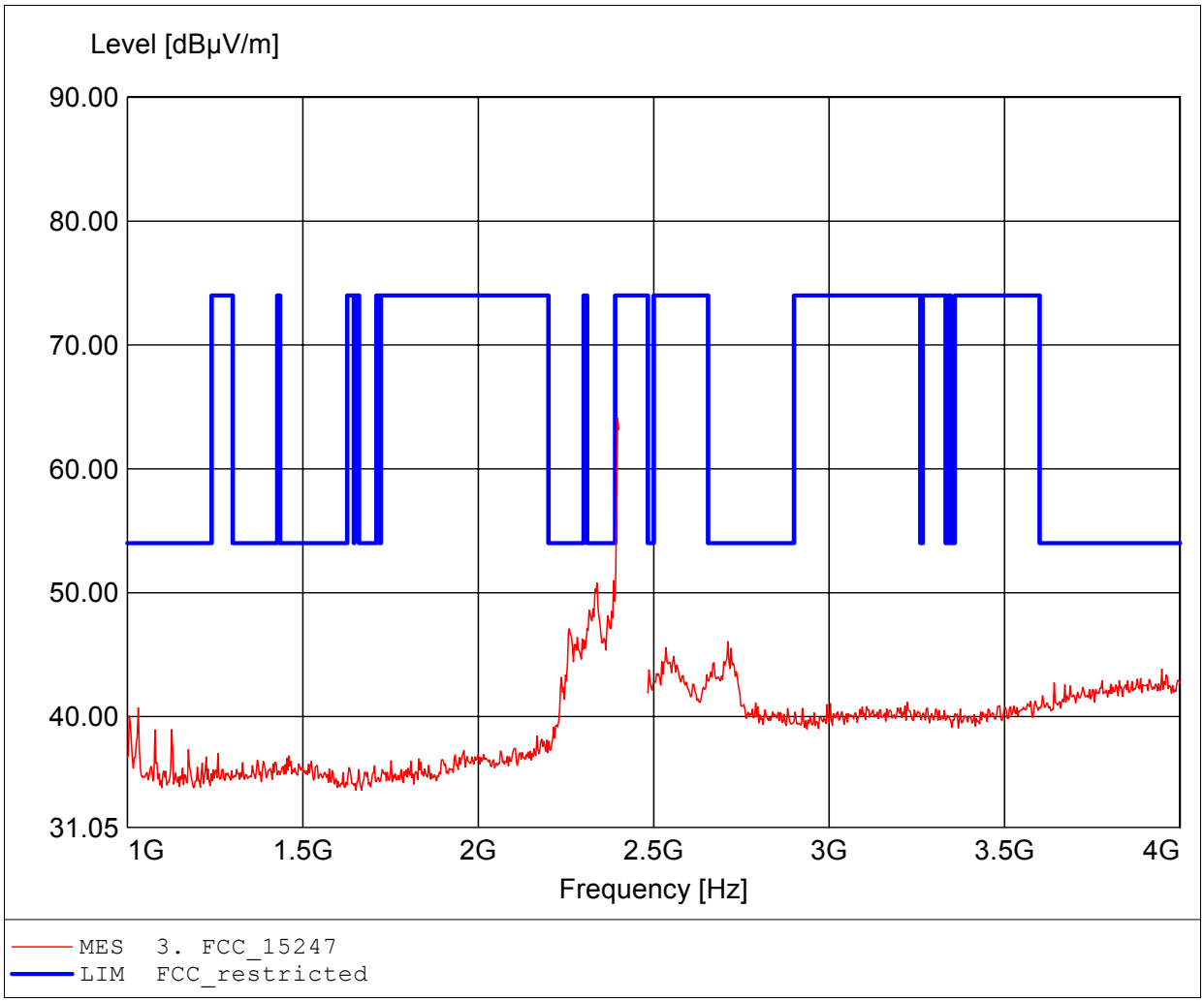
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 50.22dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

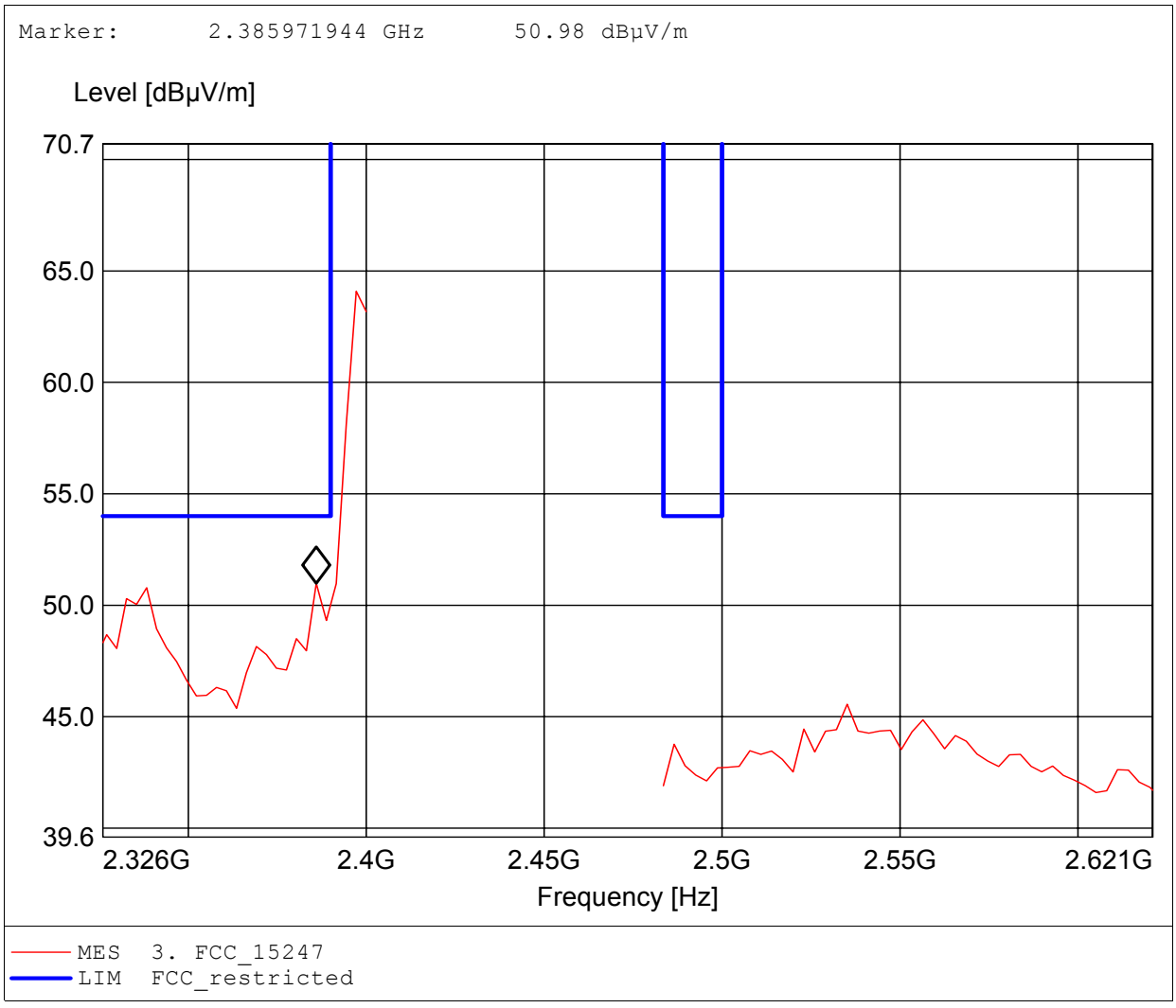
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 64.09dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

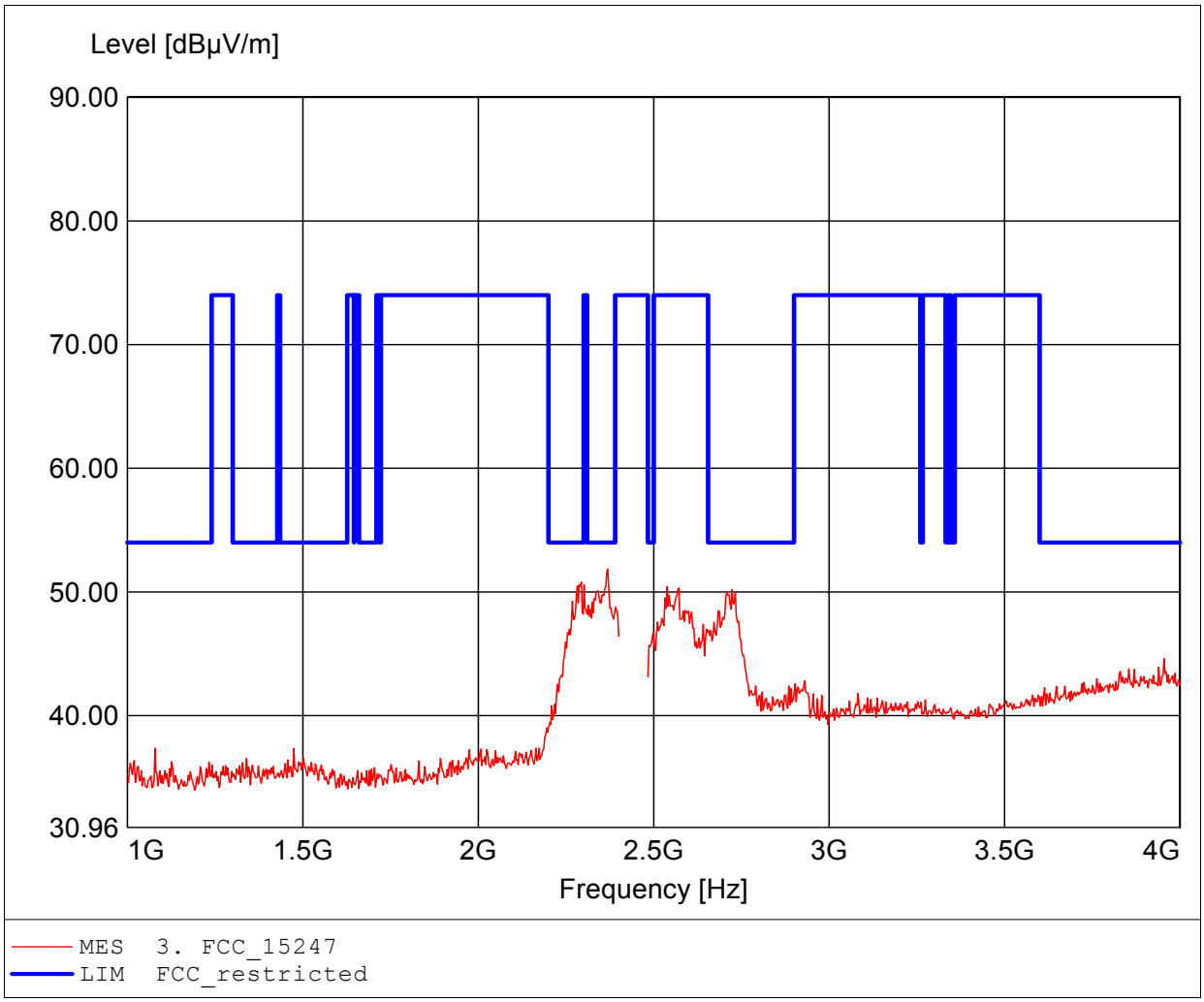
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 64.09dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

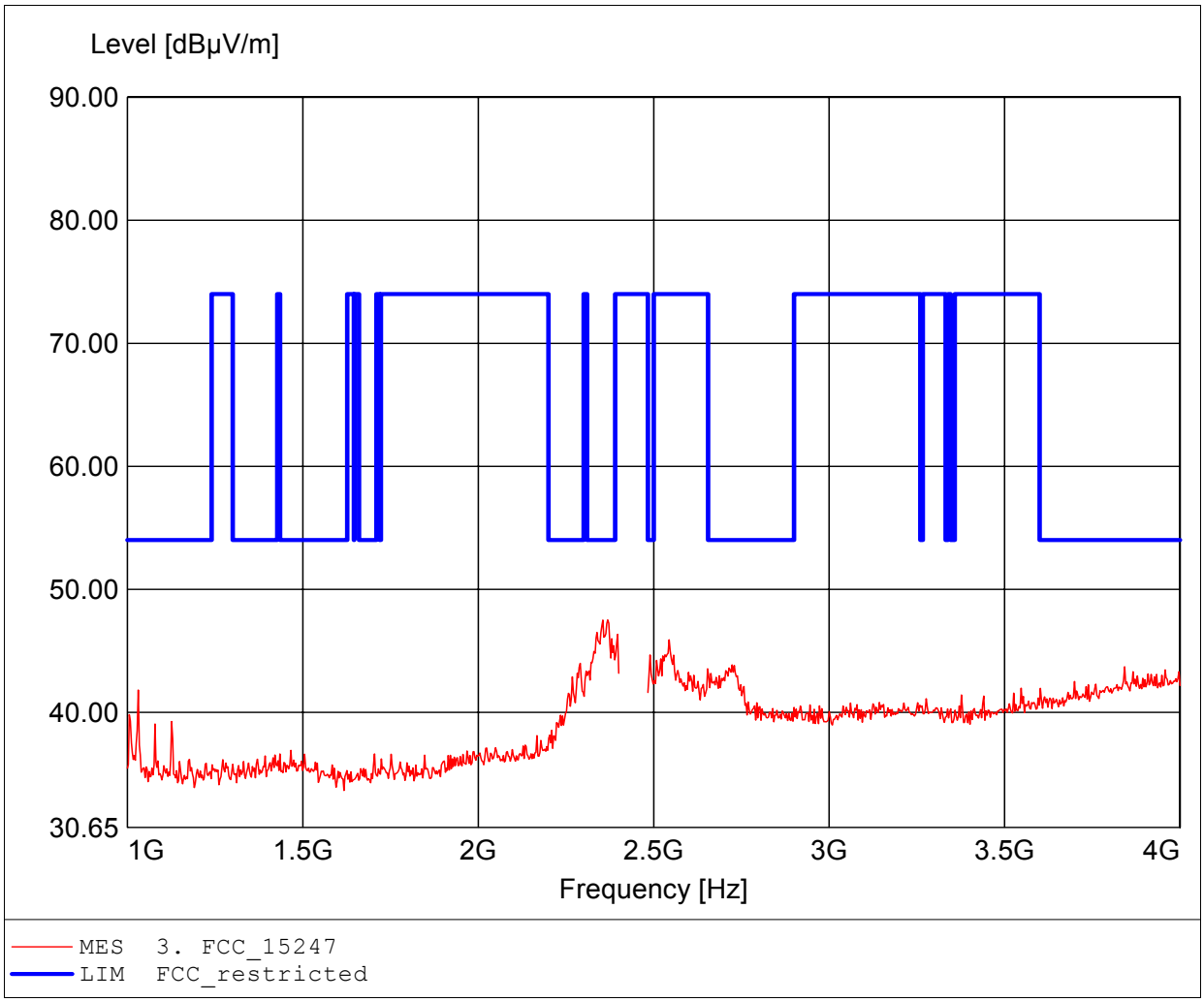
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.369GHz, Emax: 51.84dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

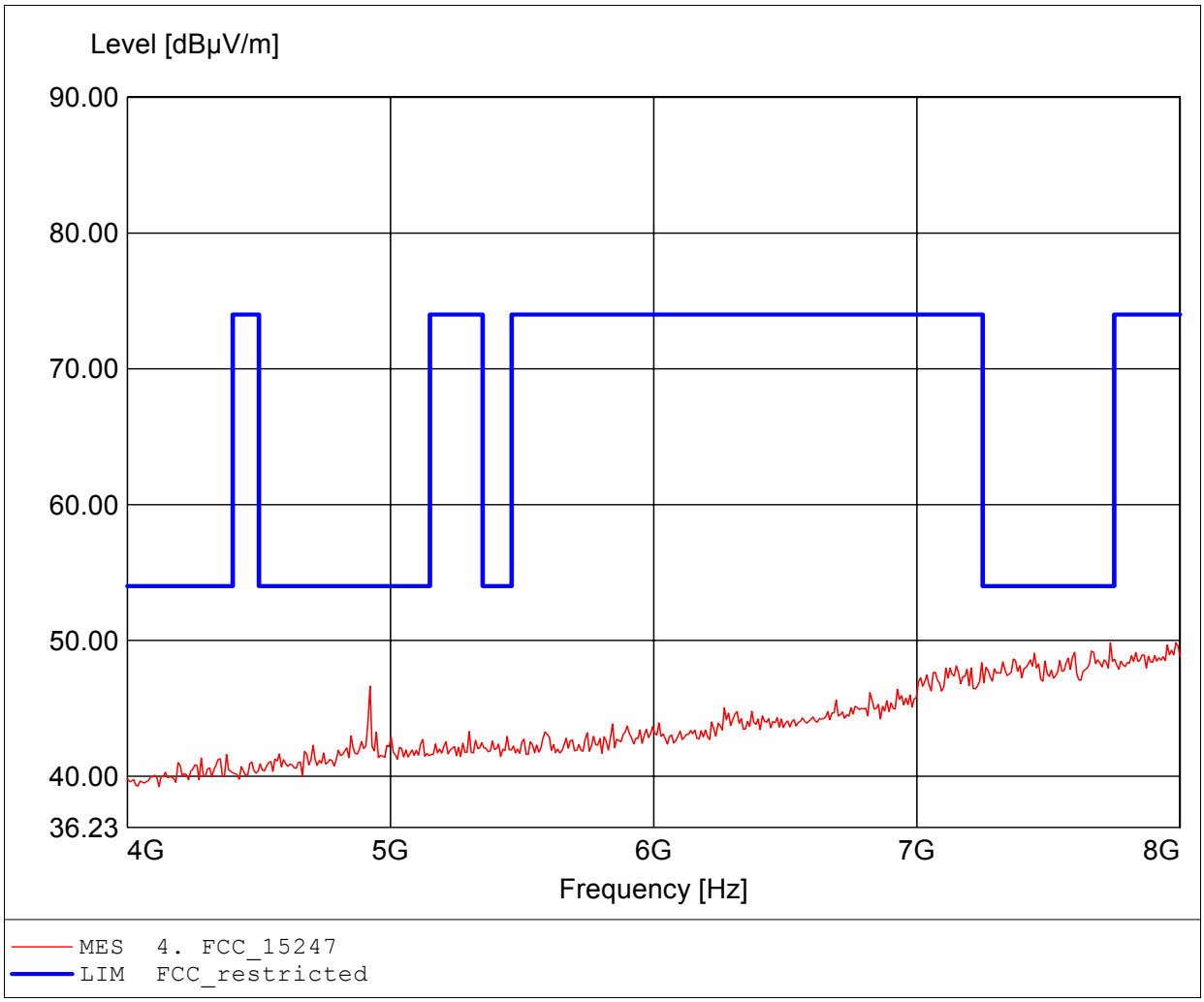
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.369GHz, Emax: 47.52dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

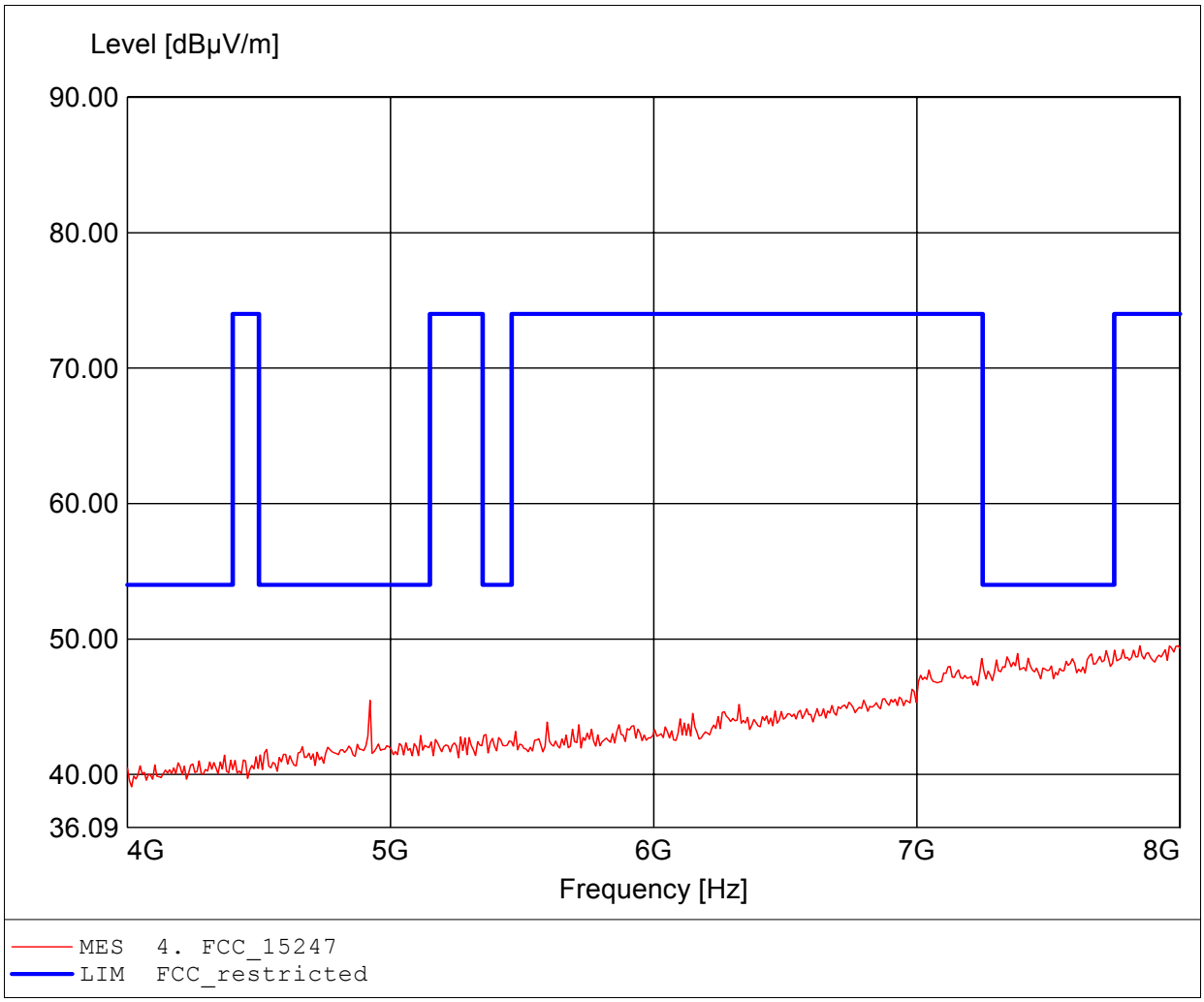
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2462 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.984GHz, Emax: 49.83dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

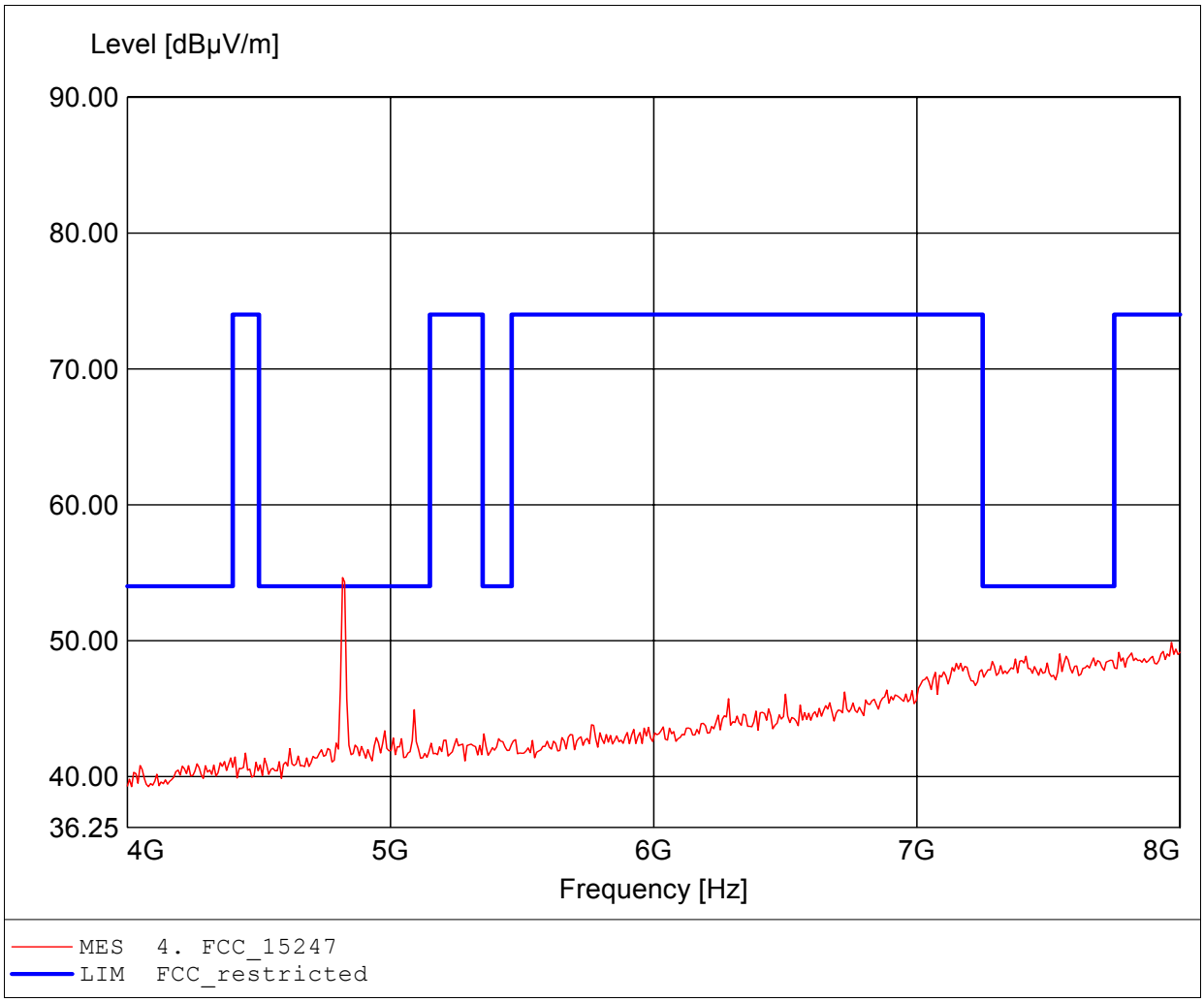
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2462 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.992GHz, Emax: 49.51dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

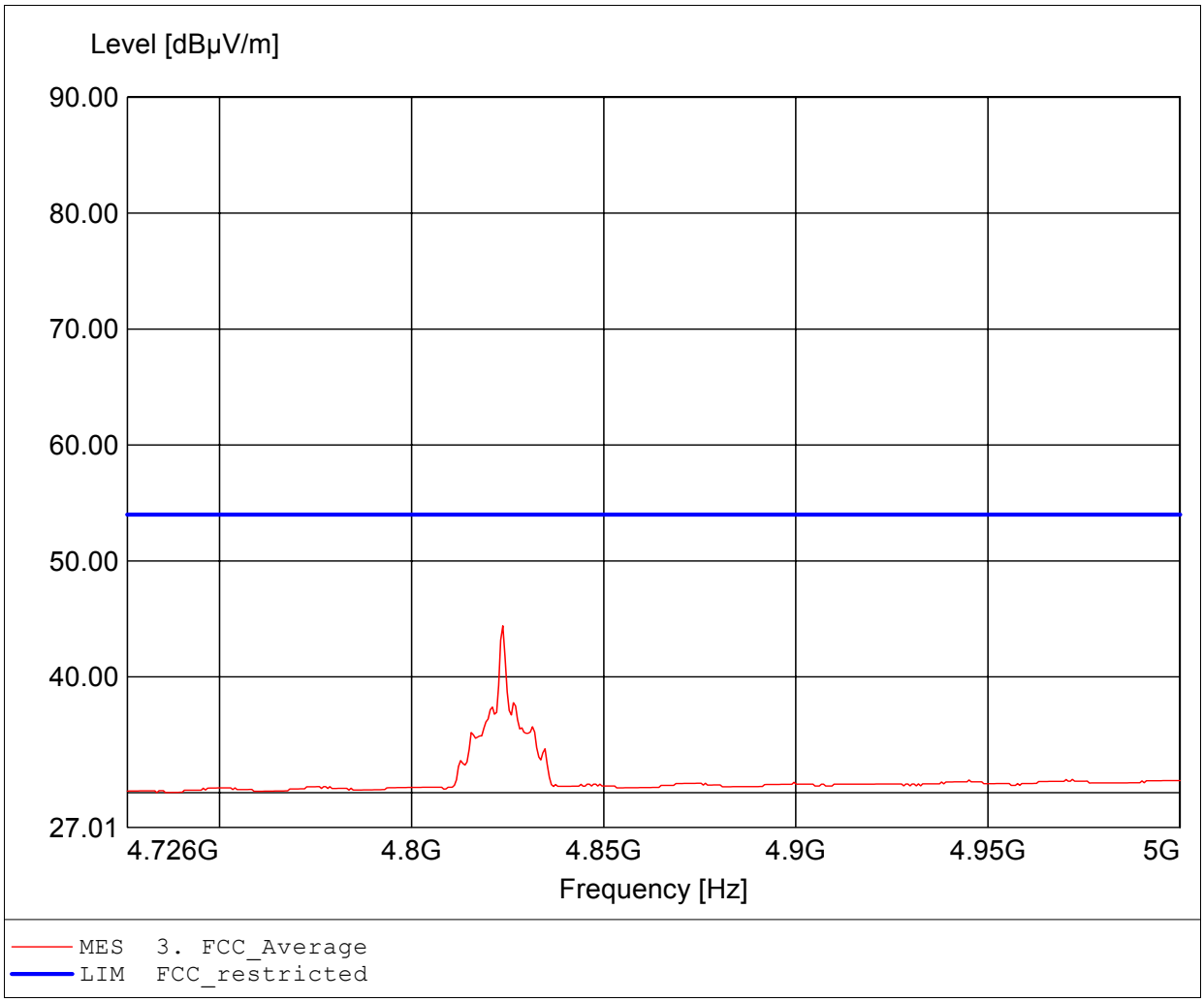
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.818GHz, Emax: 54.64dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

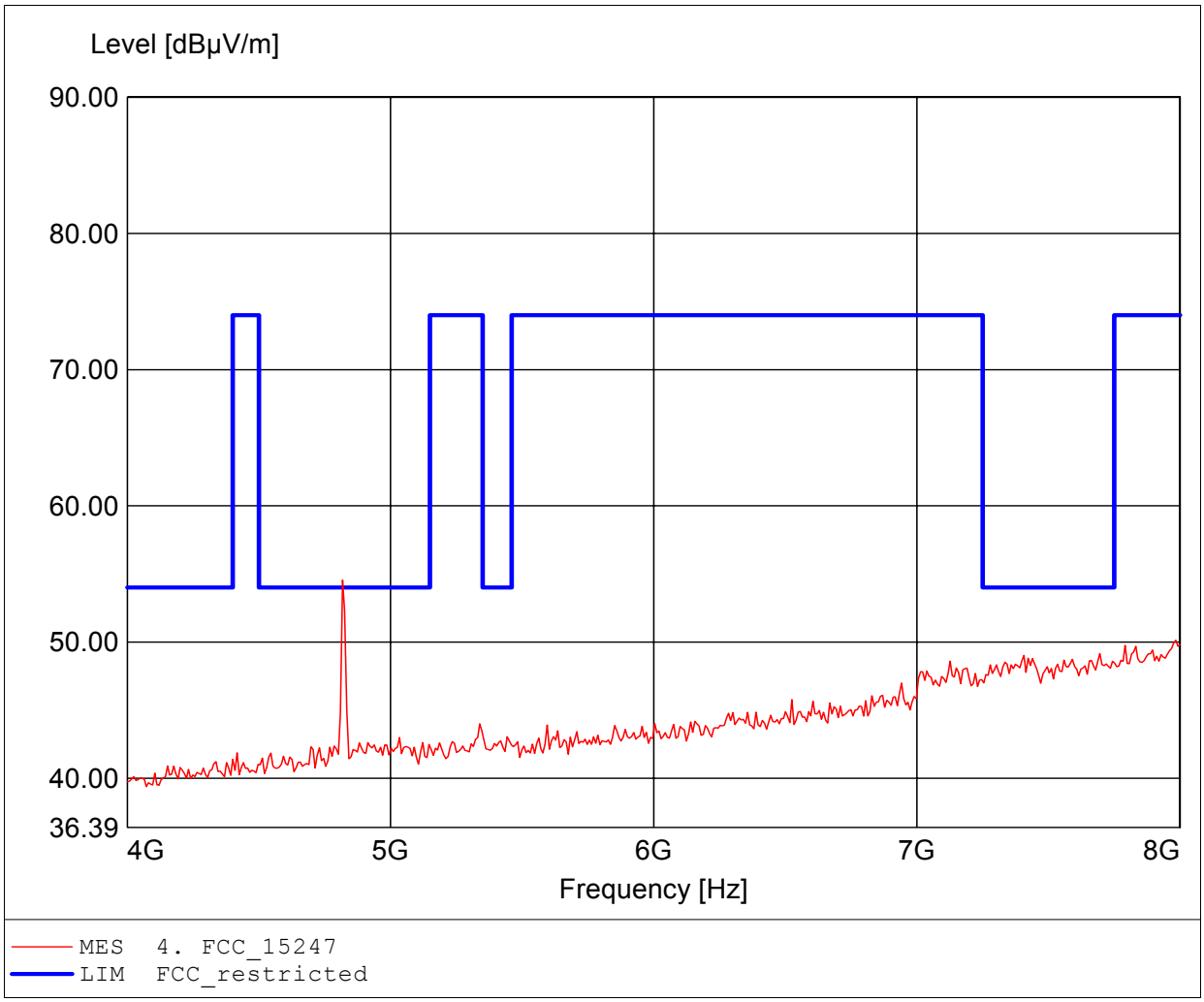
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 4.824GHz, Emax: 44.40dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

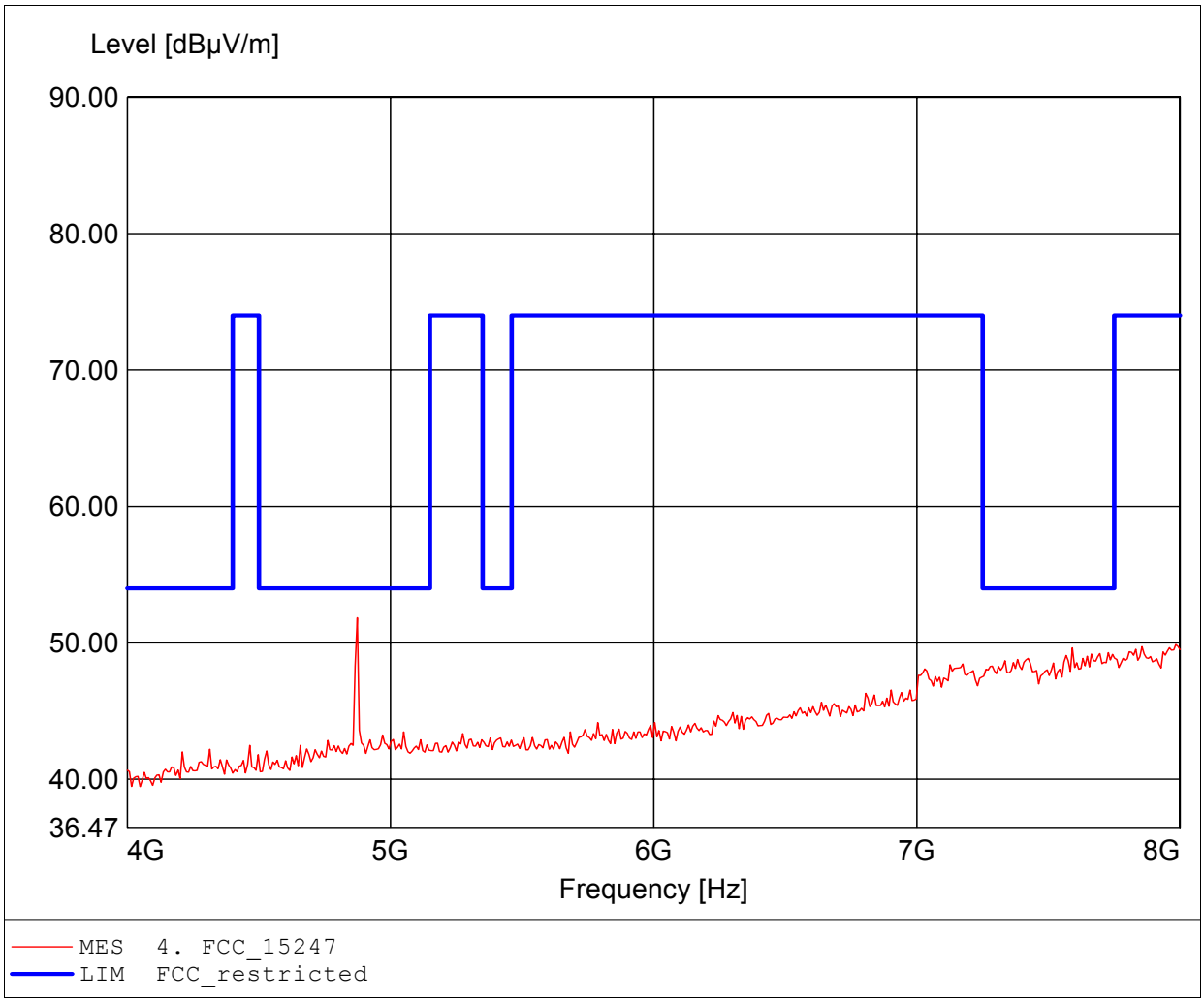
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.818GHz, Emax: 54.56dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

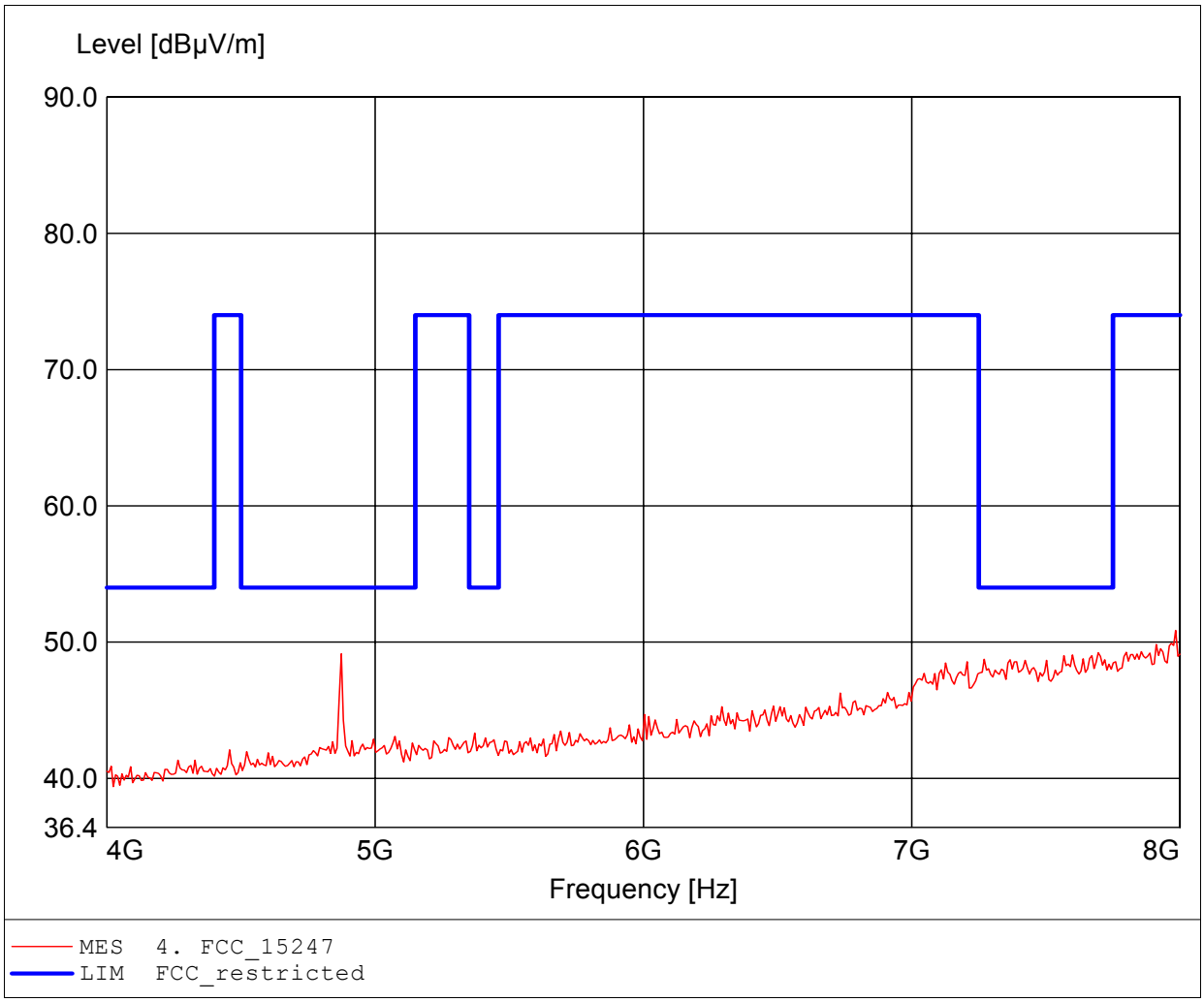
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.874GHz, Emax: 51.84dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

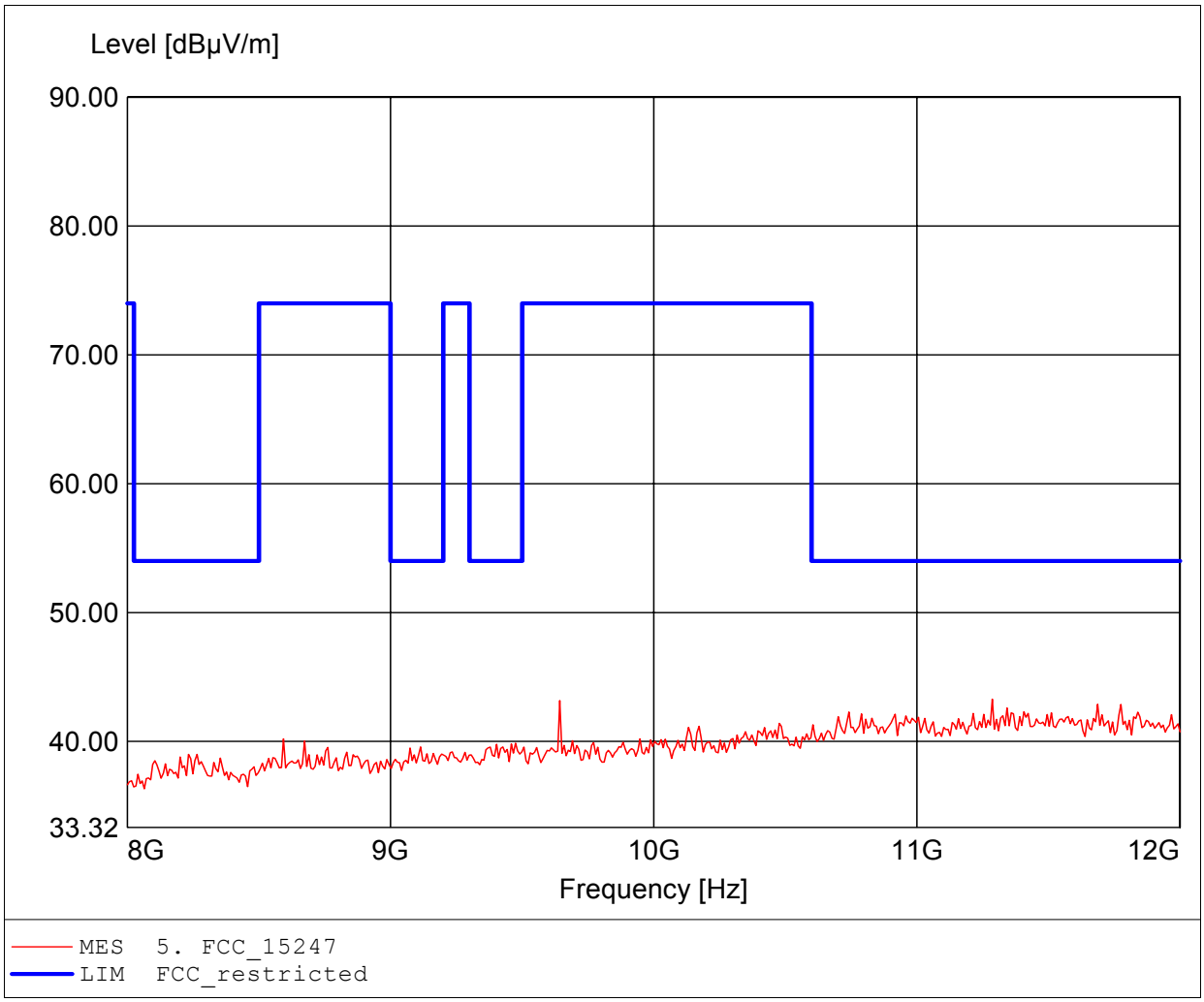
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.984GHz, Emax: 50.86dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

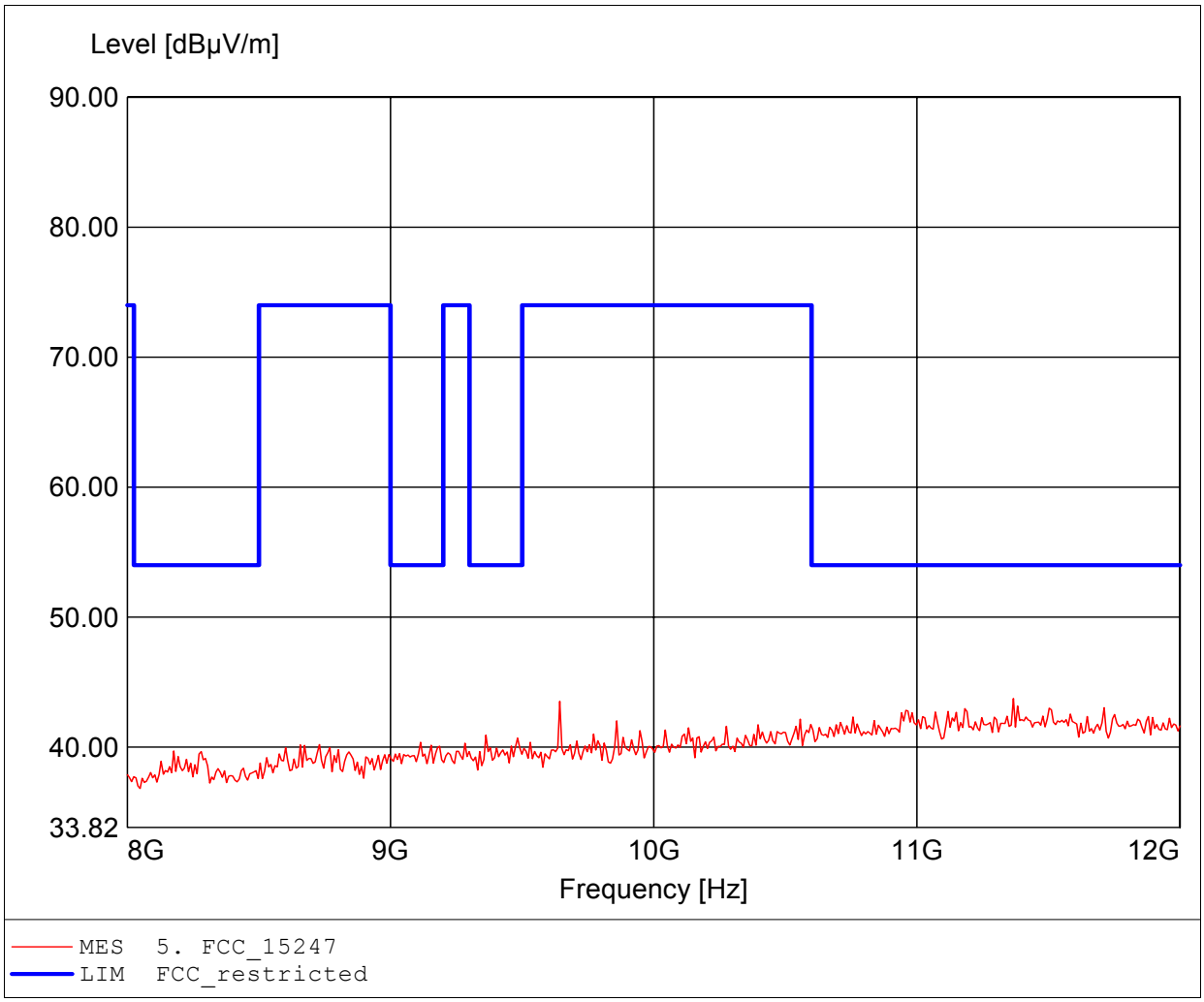
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.287GHz, Emax: 43.28dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

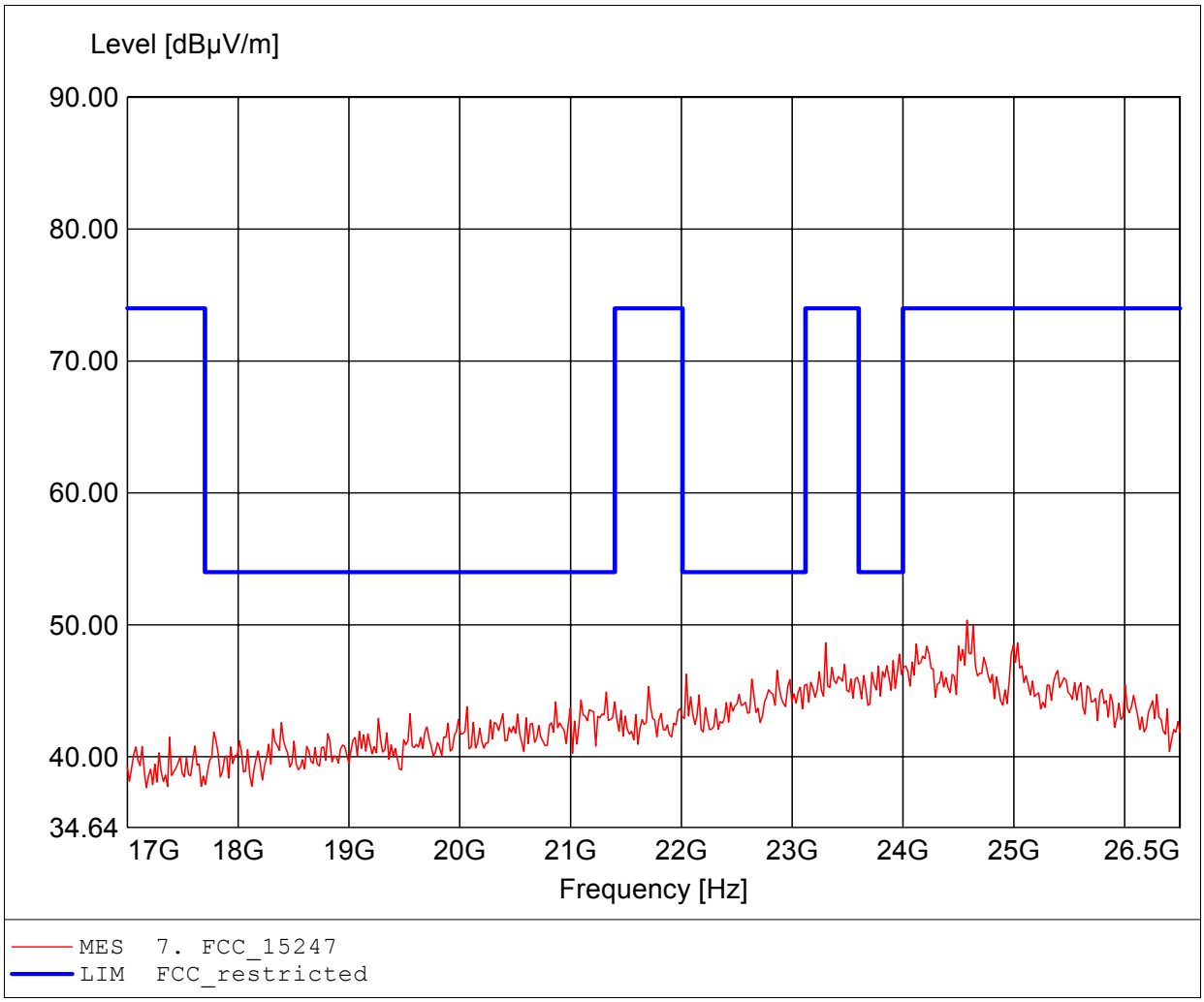
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.367GHz, Emax: 43.74dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

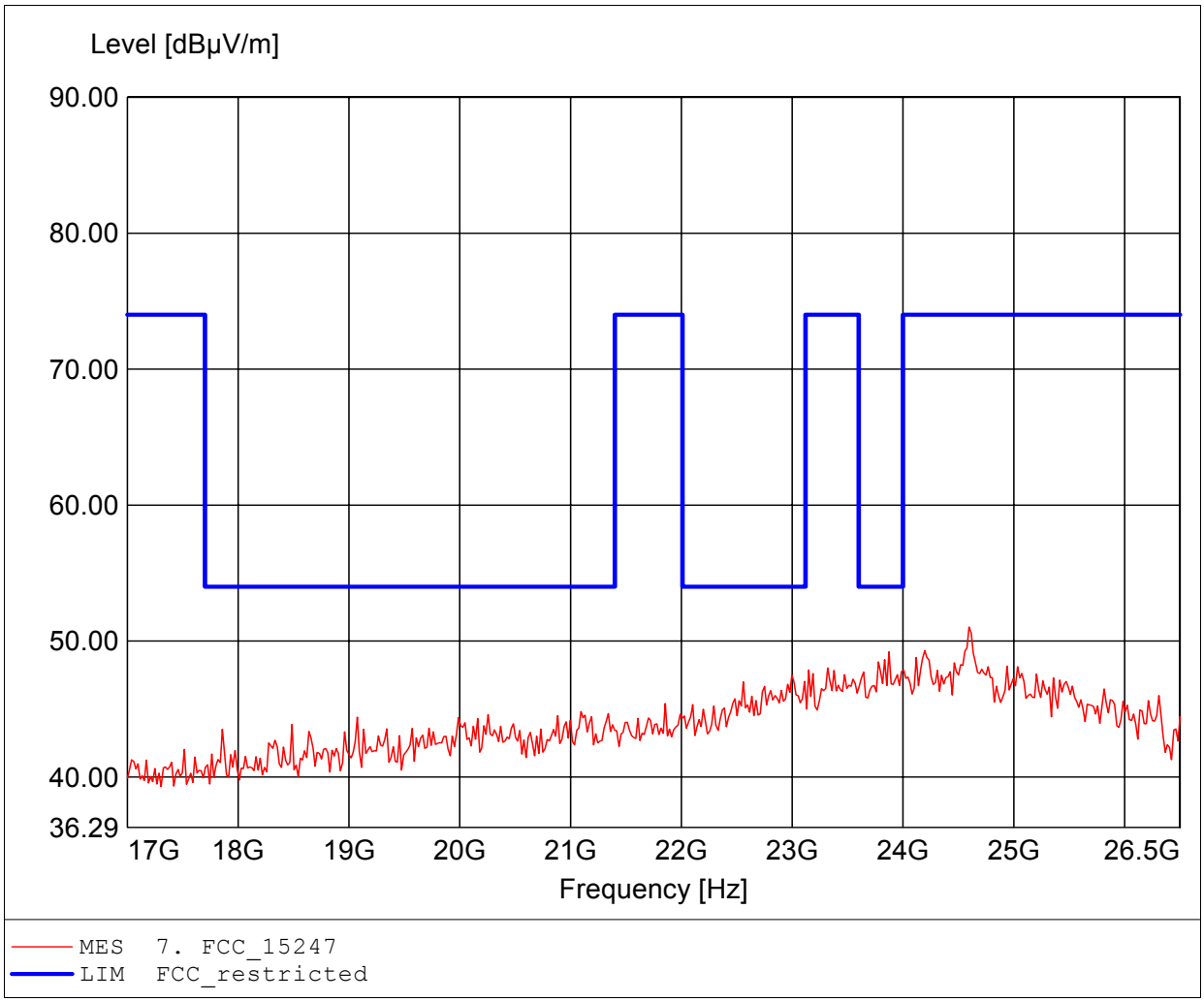
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.577GHz, Emax: 50.35dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

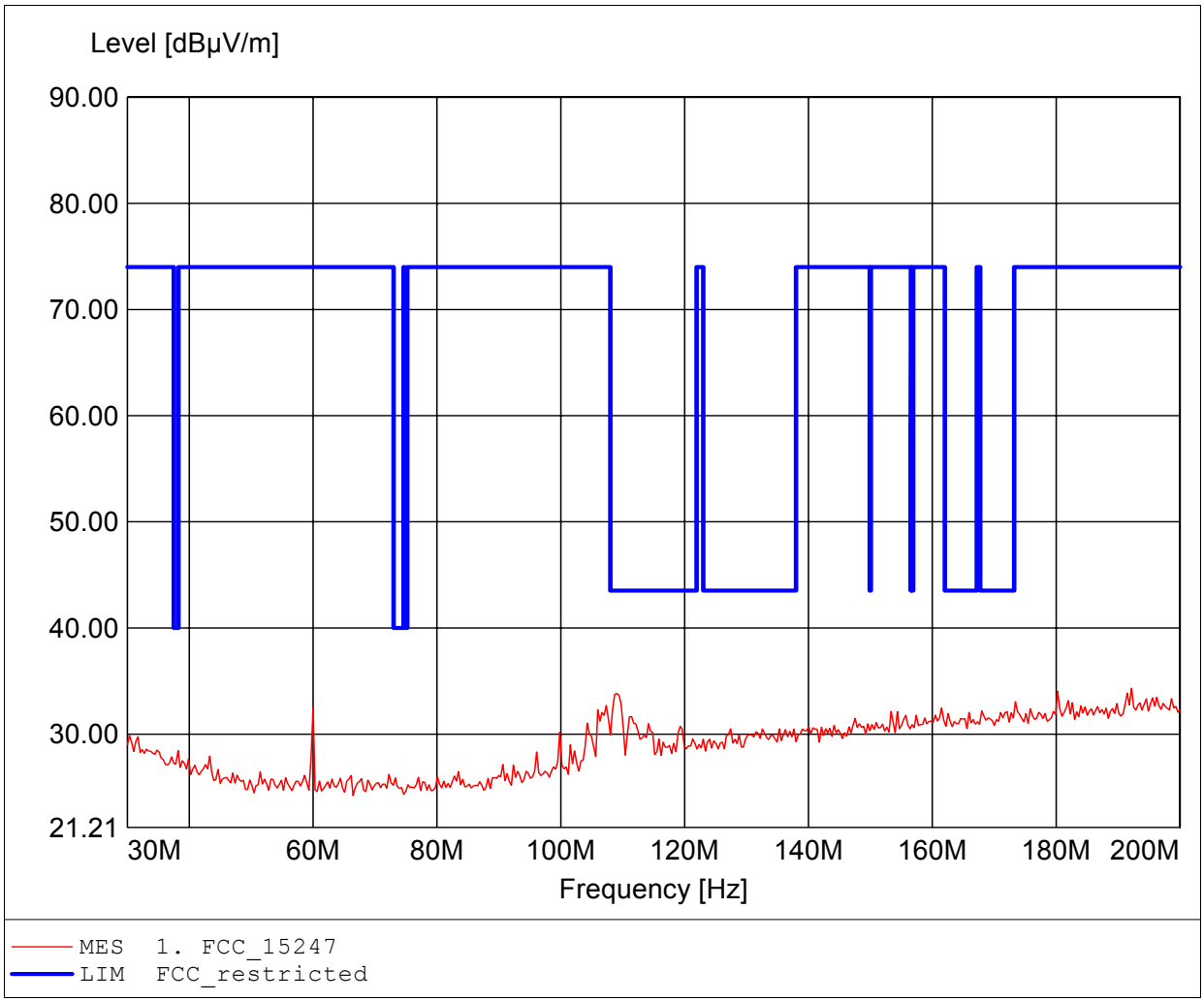
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: DSSS, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.596GHz, Emax: 51.03dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

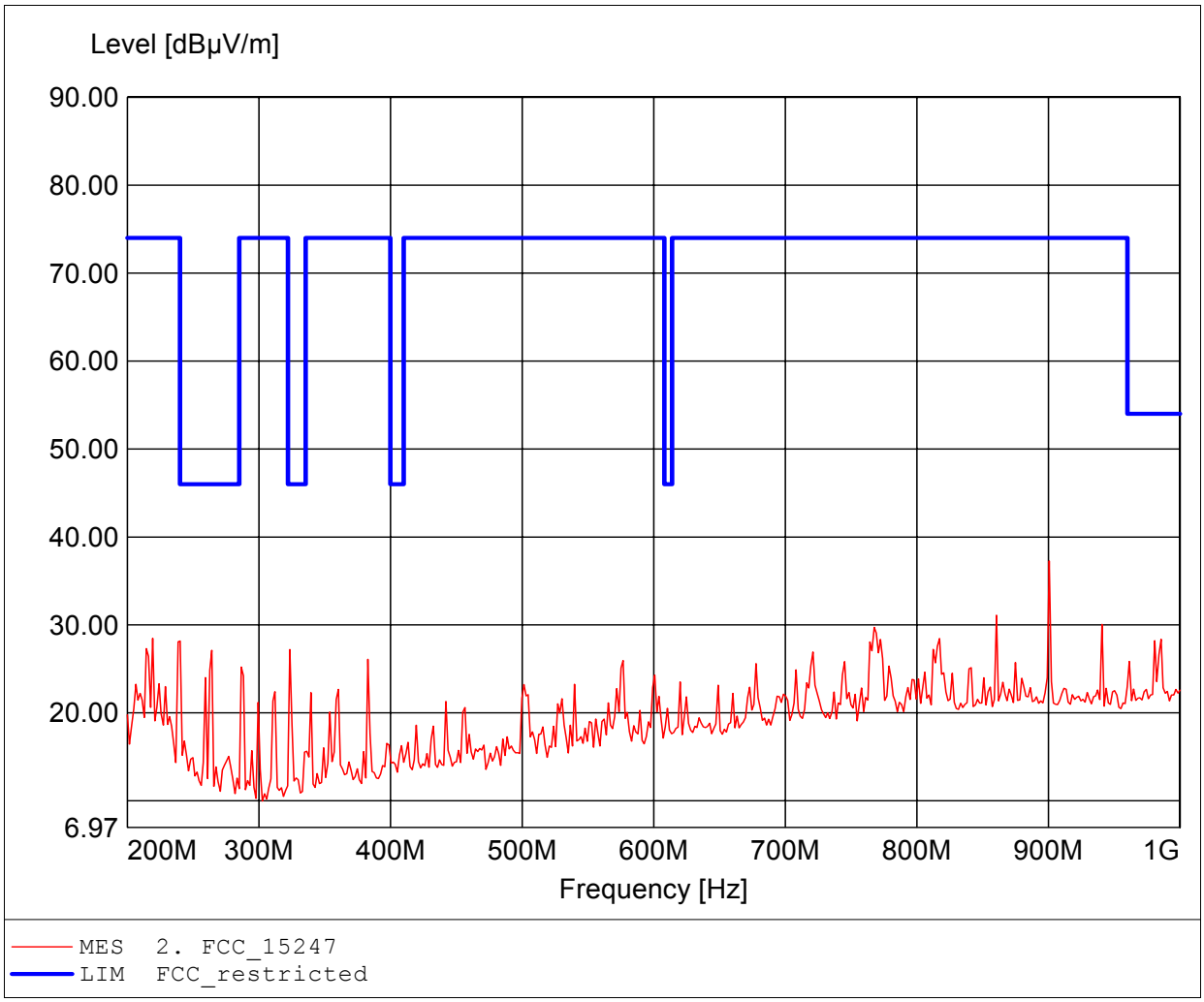
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz worst case
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 192.164MHz, Emax: 34.32dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

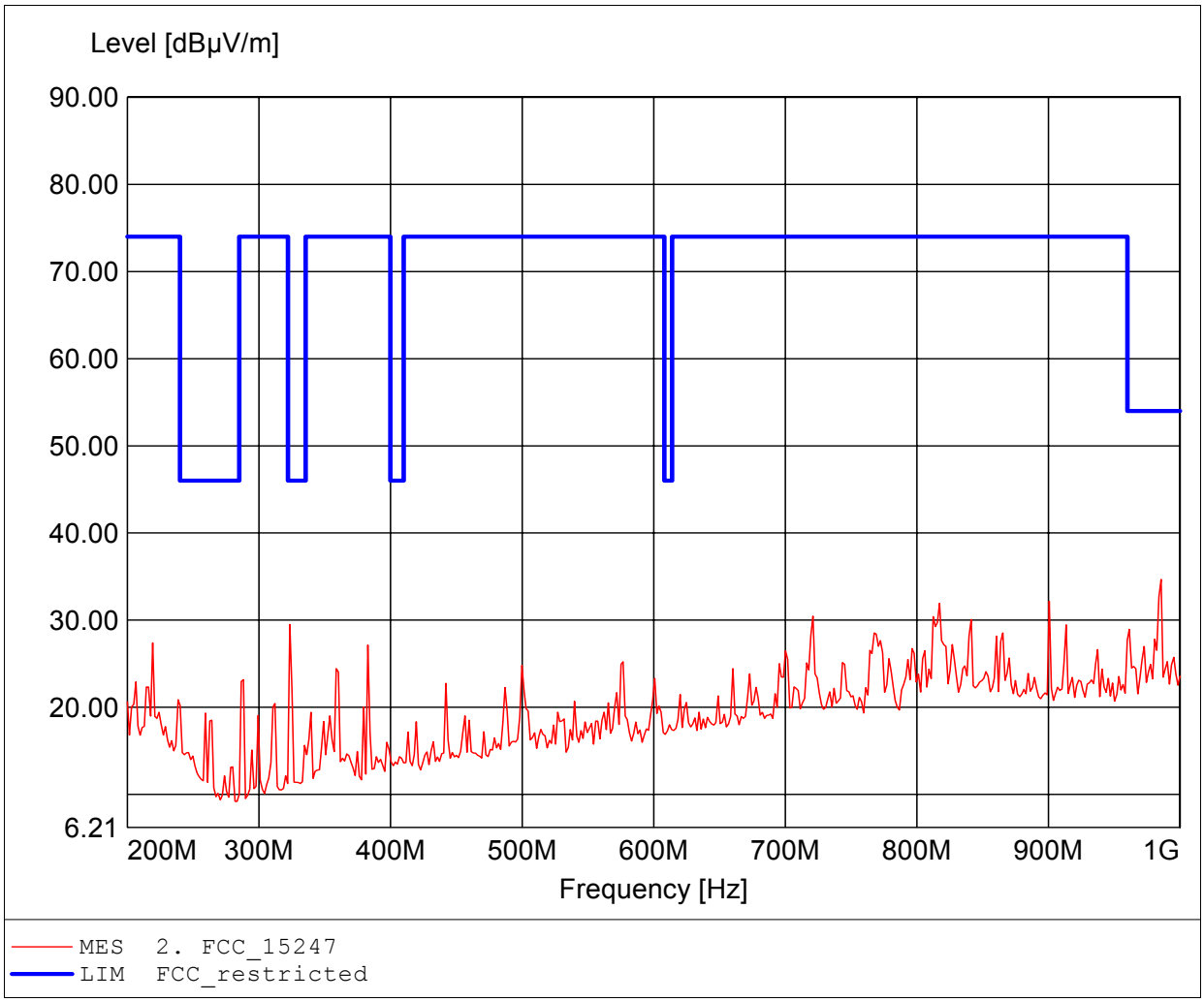
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz worst case
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 900.601MHz, Emax: 37.28dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

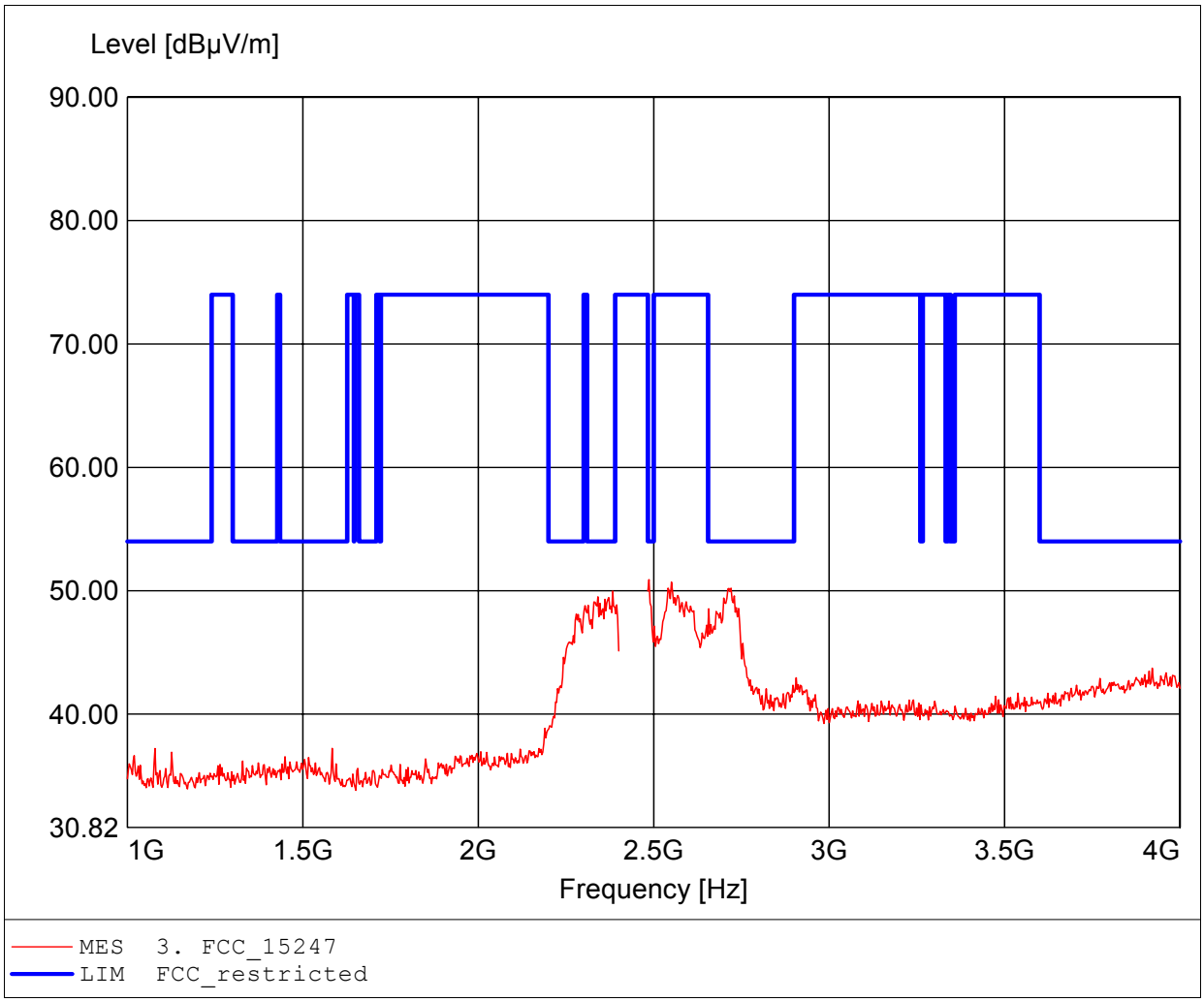
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz worst case
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 985.571MHz, Emax: 34.67dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

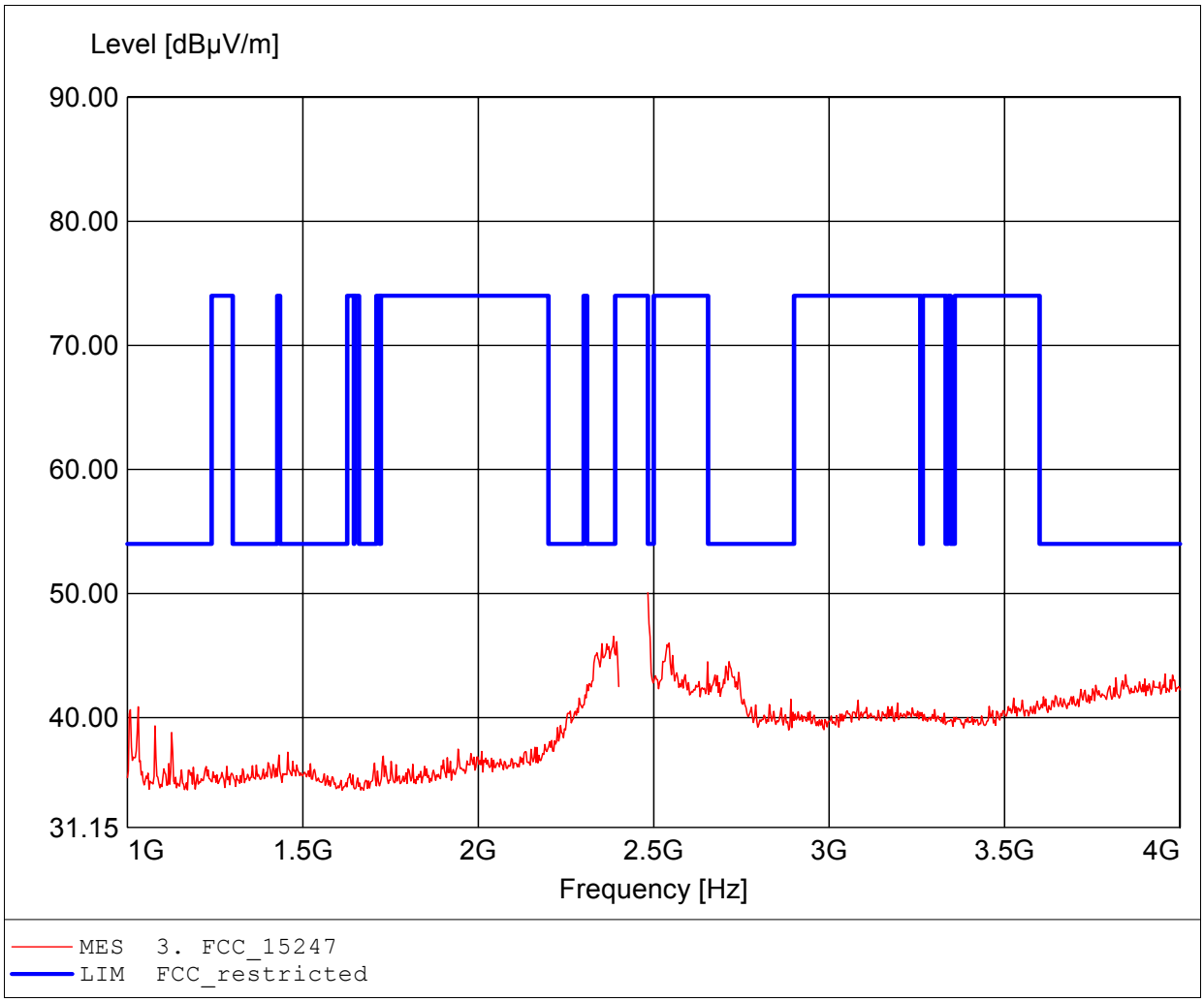
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2462 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.487GHz, Emax: 50.90dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

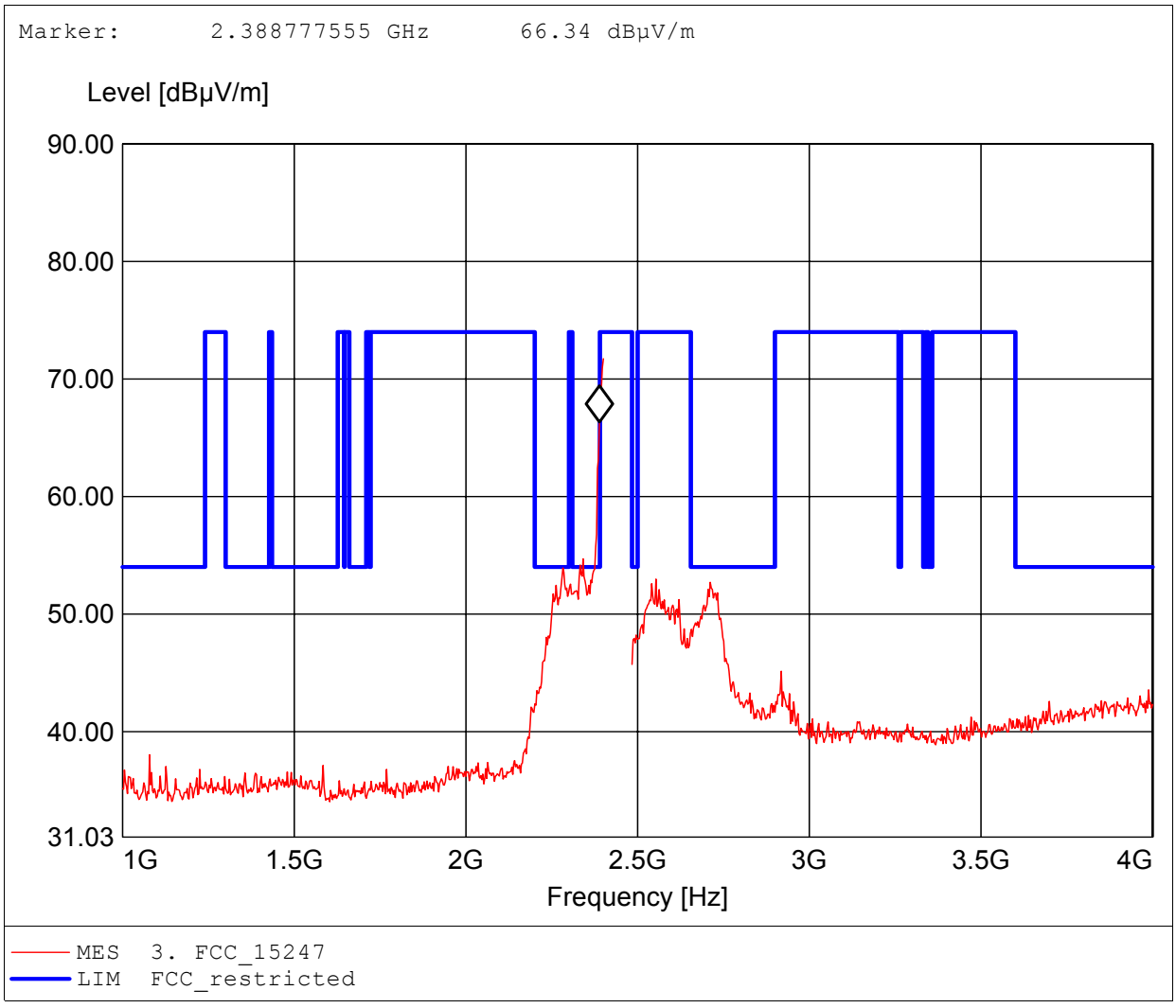
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2462 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.484GHz, Emax: 50.06dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

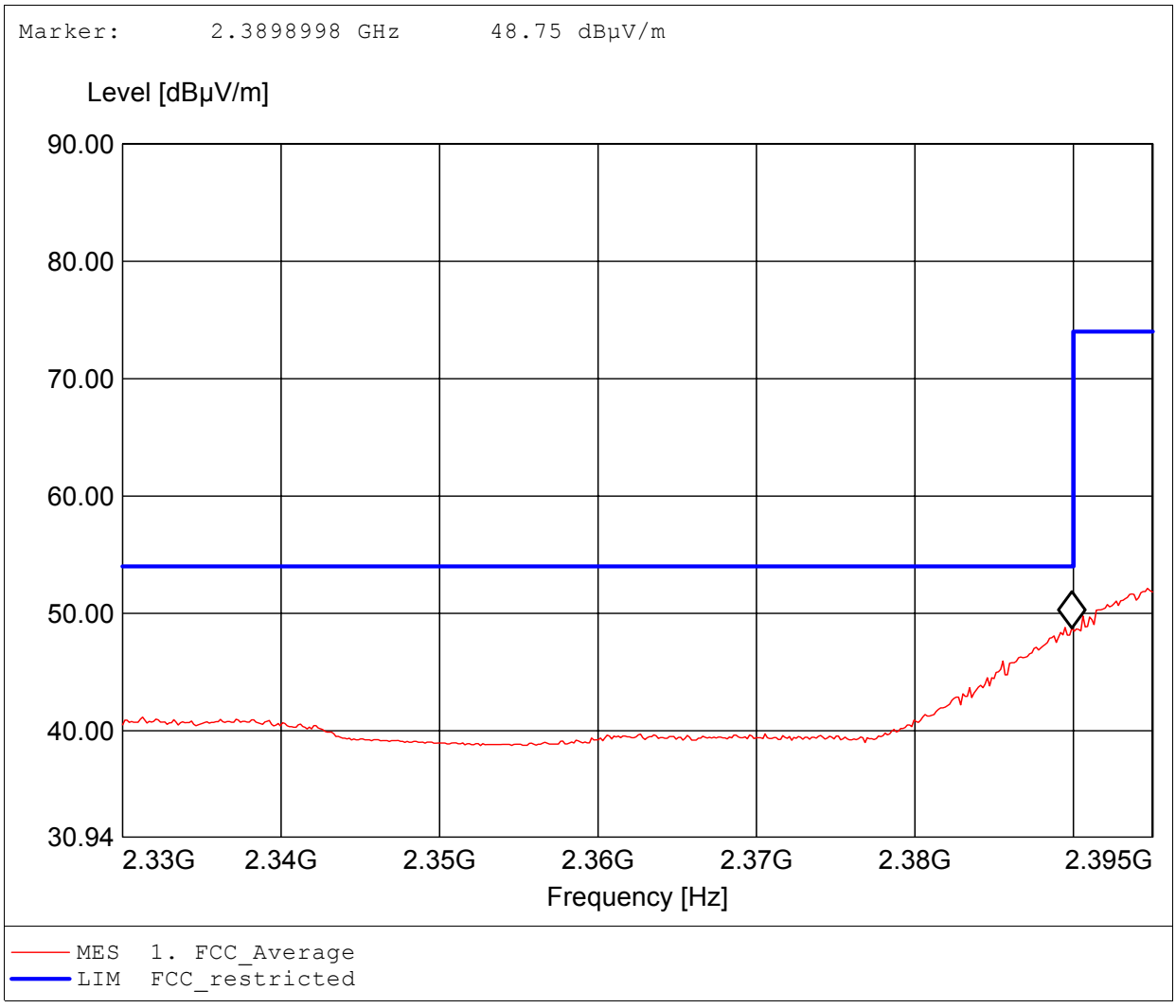
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 71.73dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

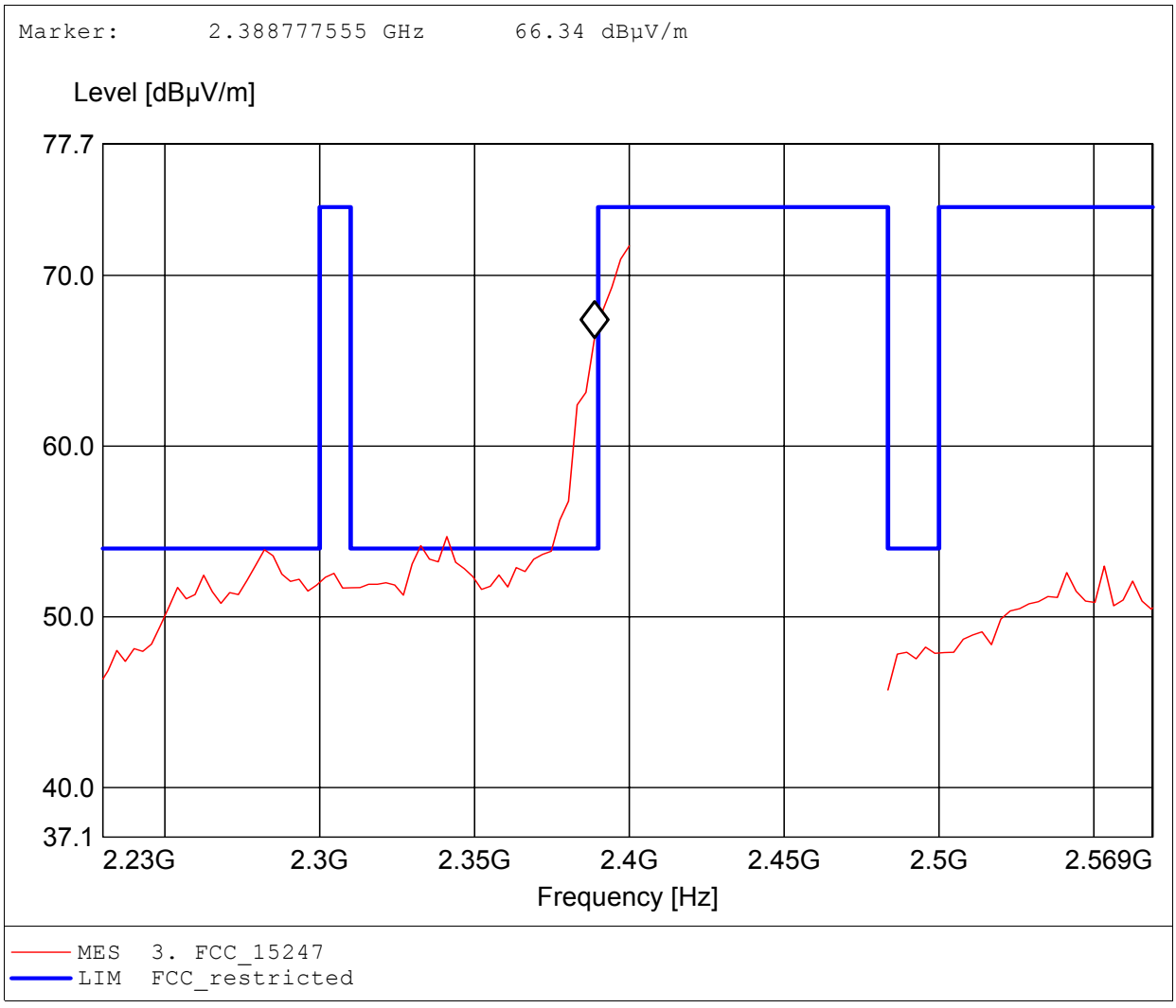
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 53.17dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

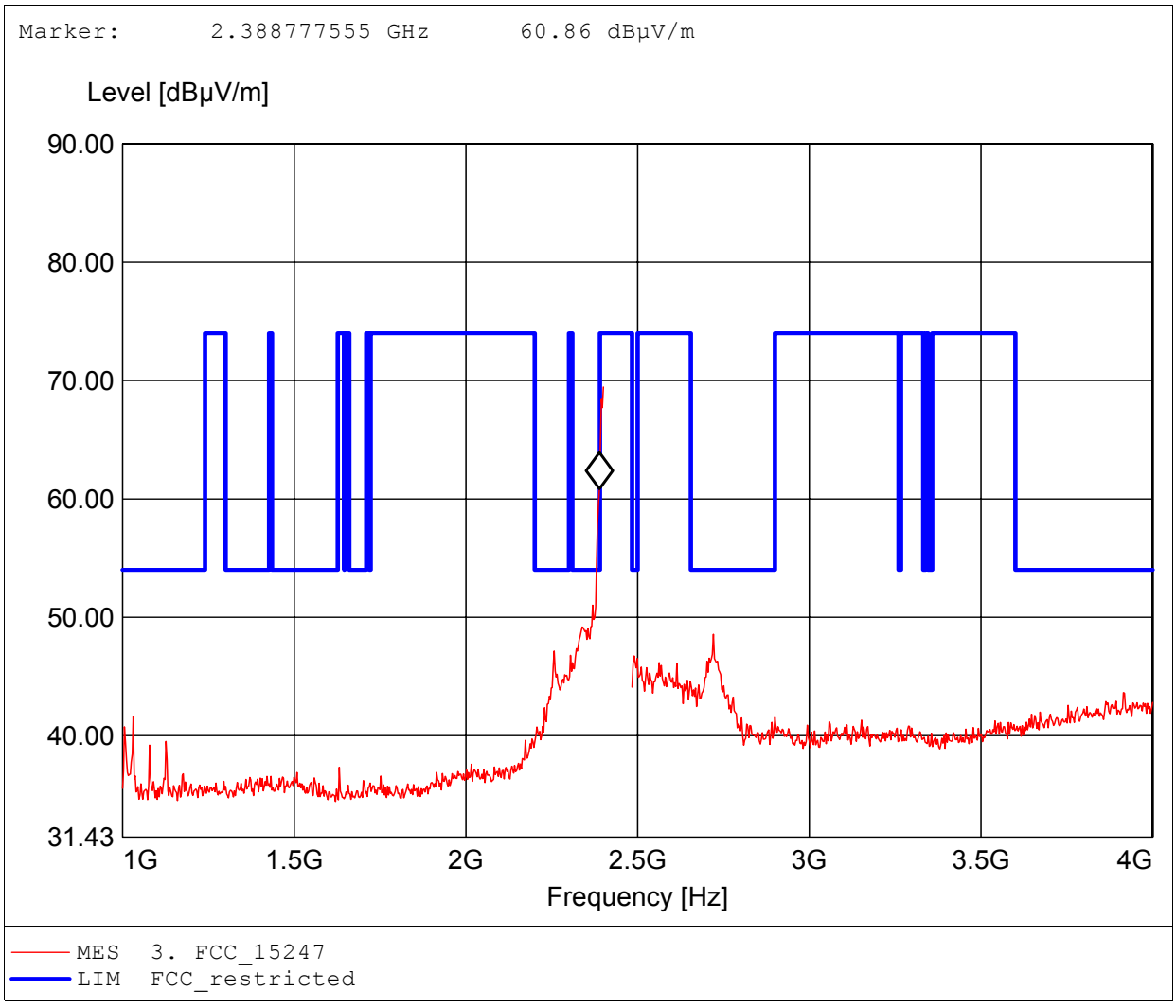
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 71.73dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

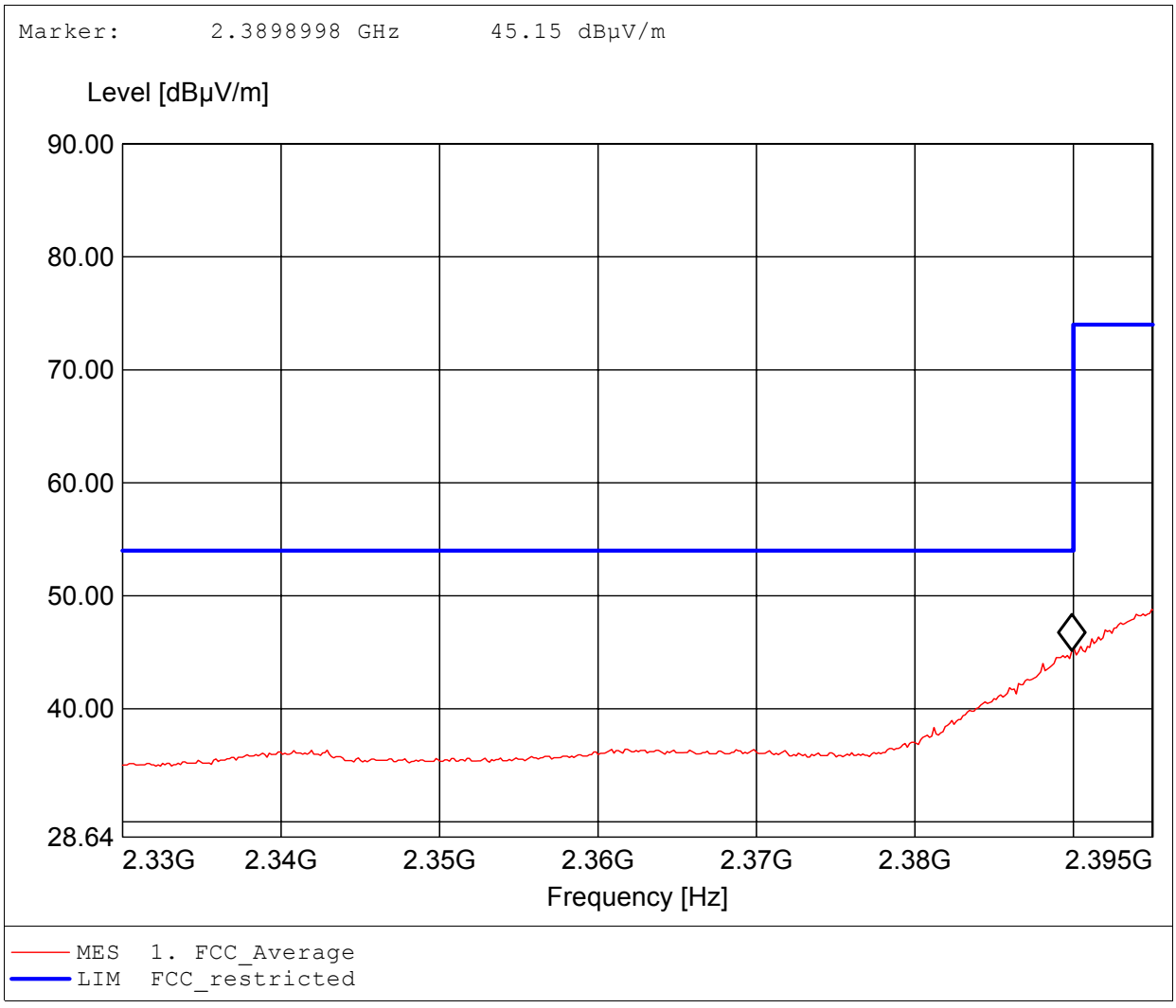
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 69.46dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

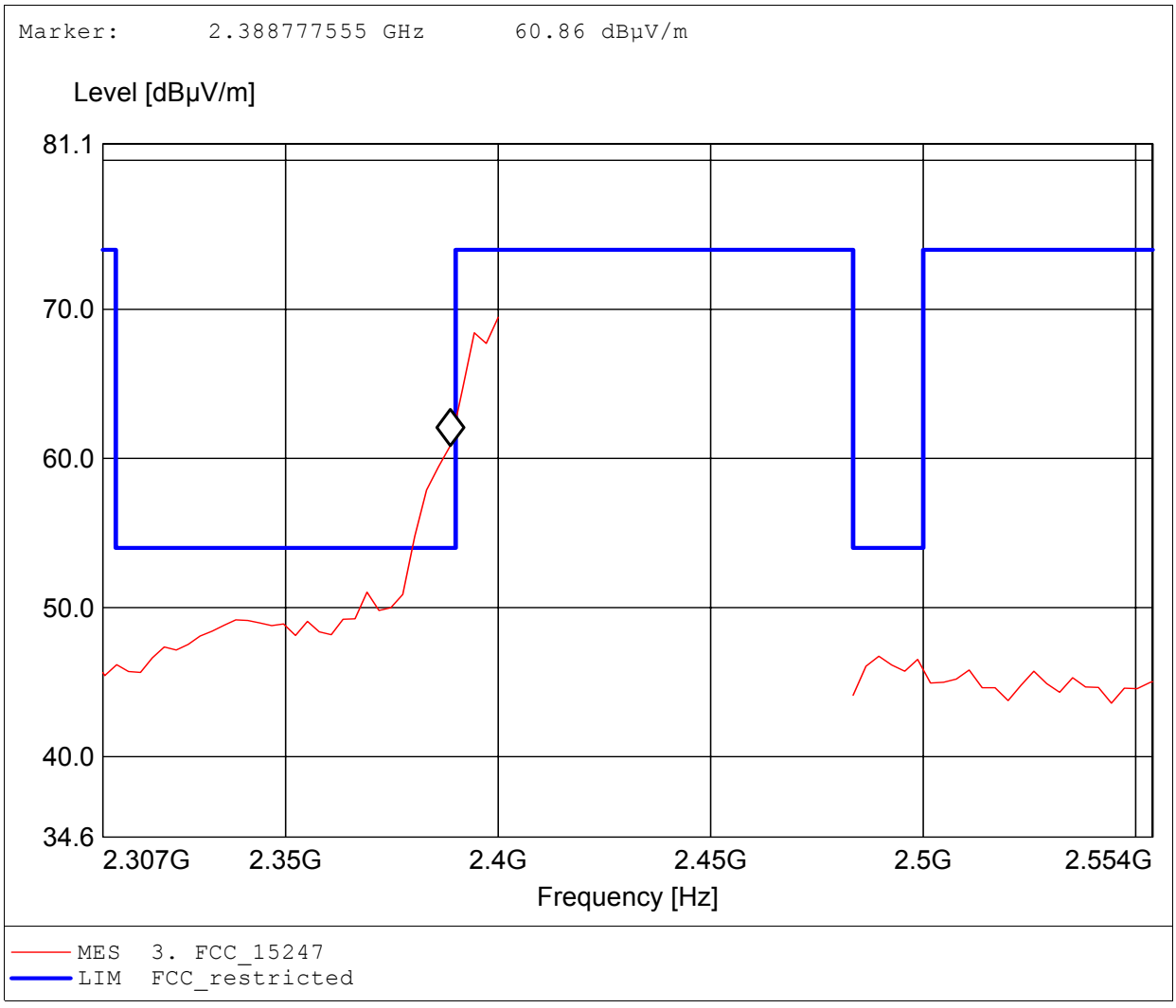
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.397GHz, Emax: 49.42dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

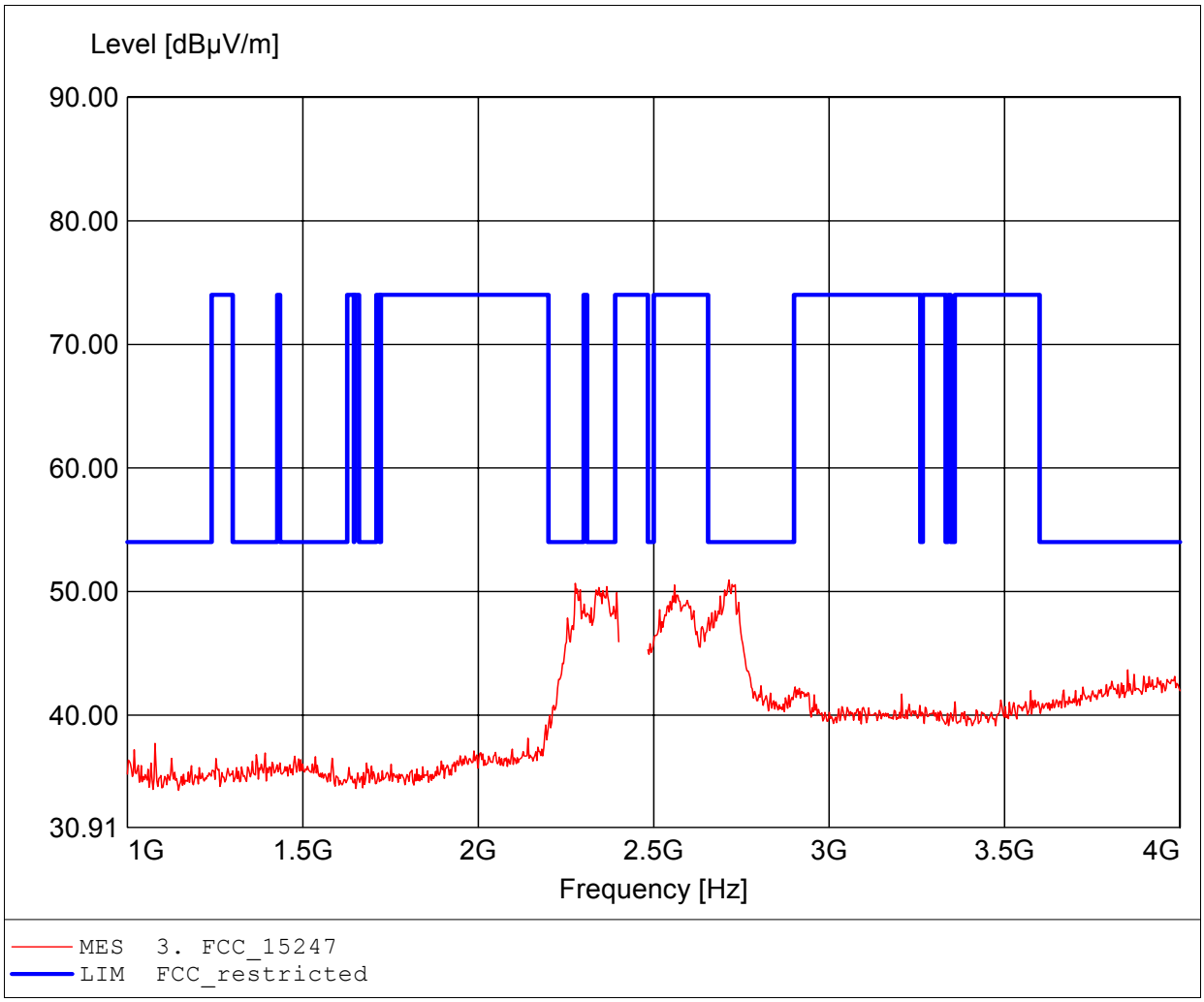
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 69.46dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

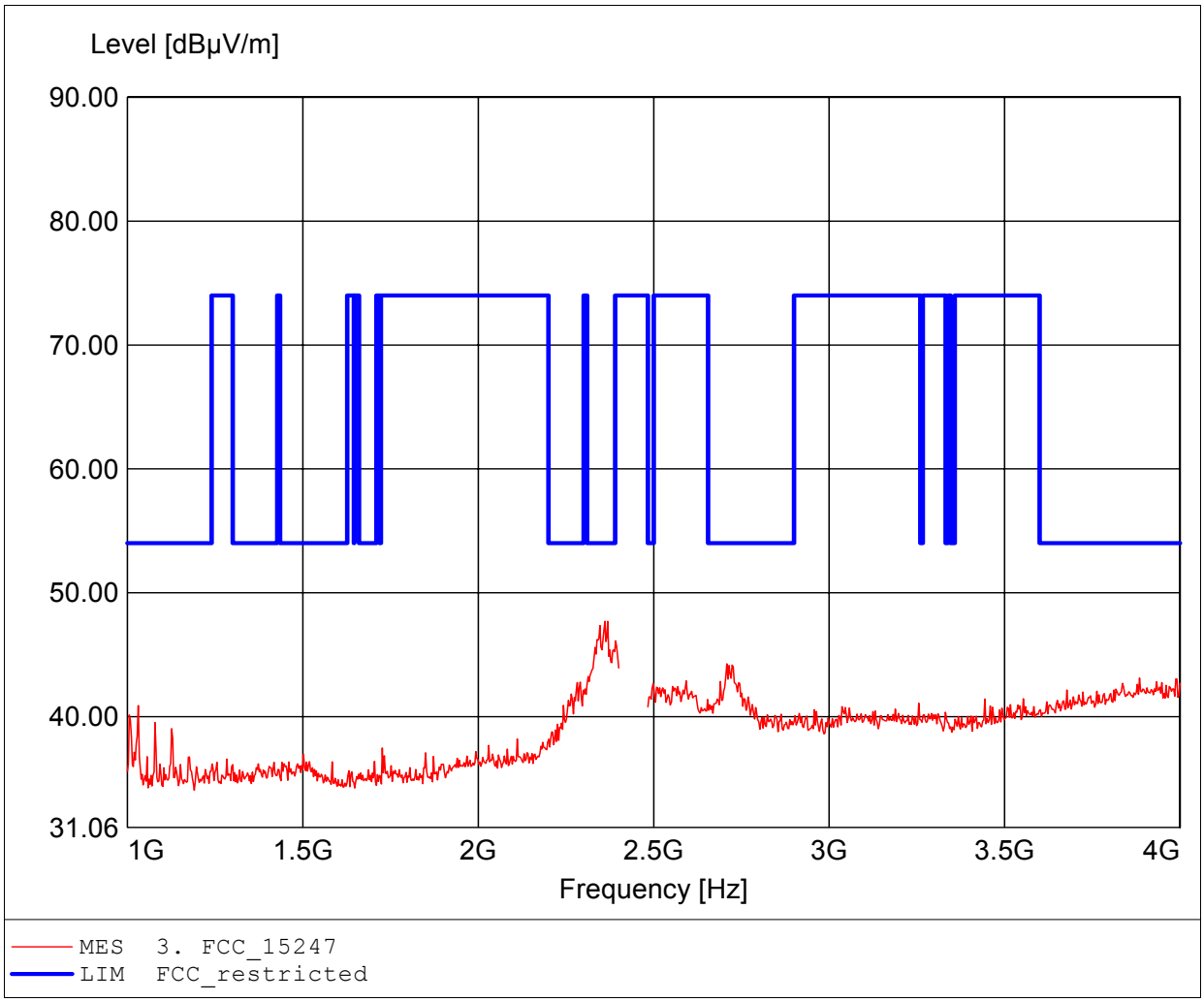
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.714GHz, Emax: 50.92dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

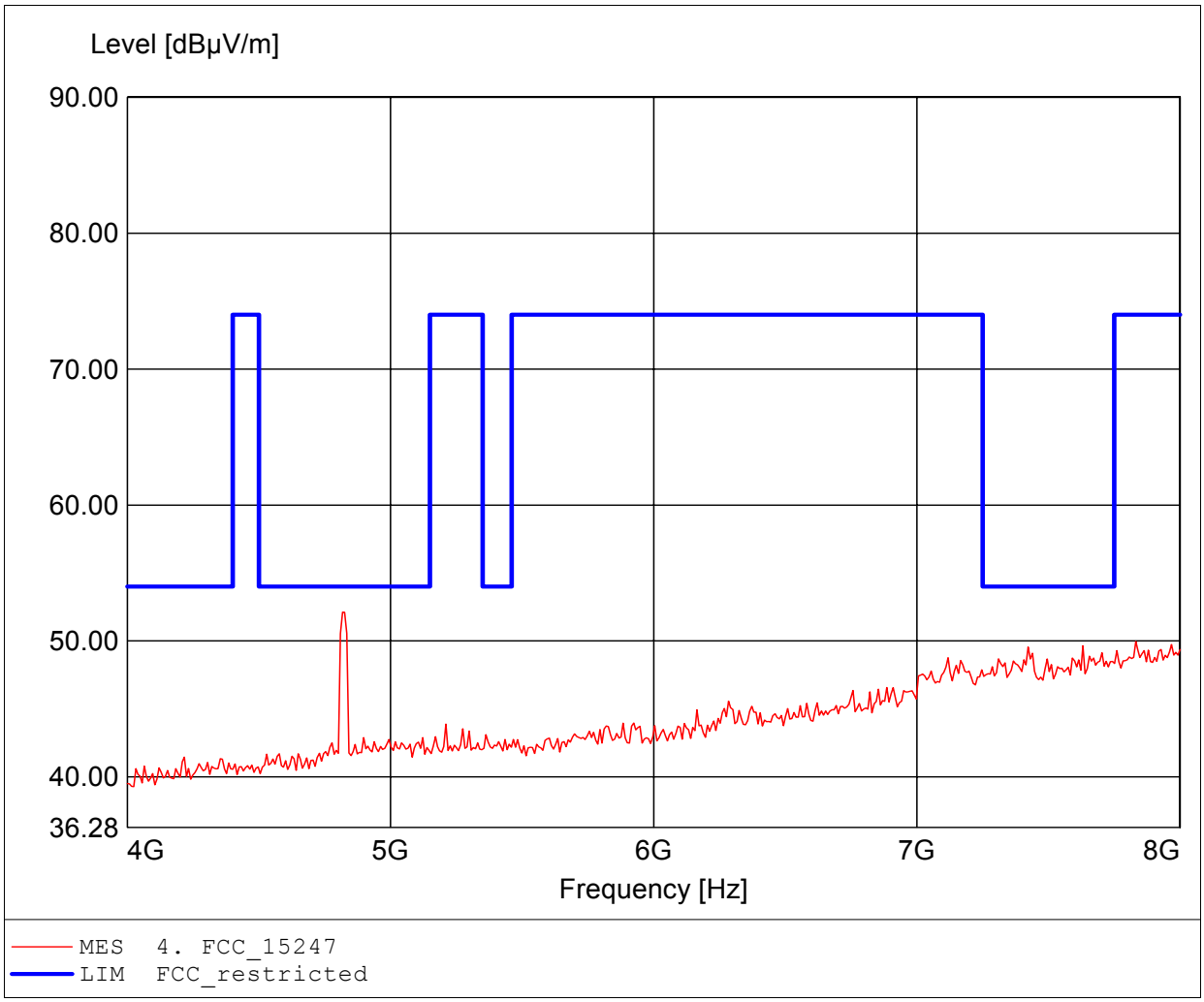
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.361GHz, Emax: 47.71dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

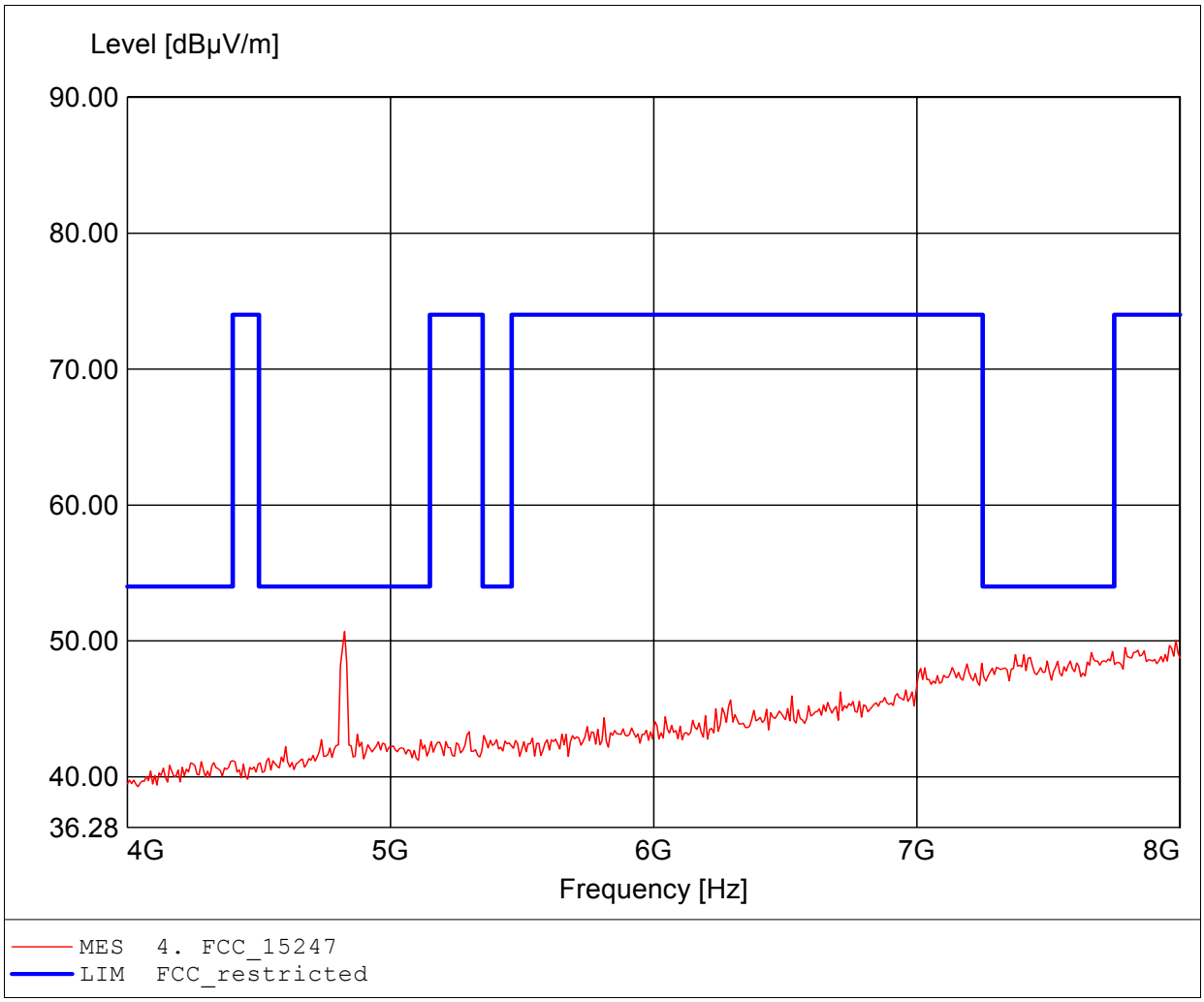
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.818GHz, Emax: 52.12dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

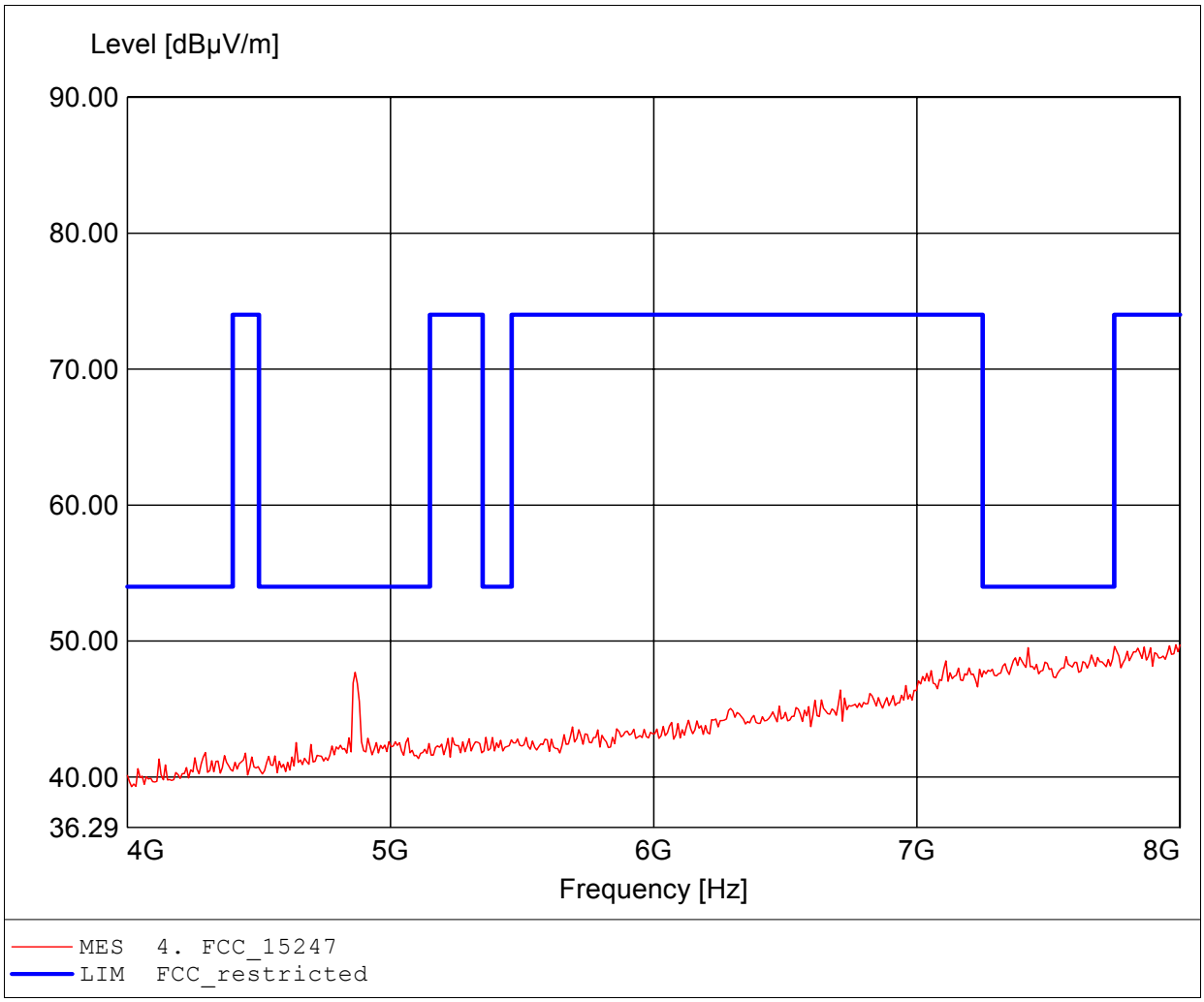
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2412 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.826GHz, Emax: 50.70dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

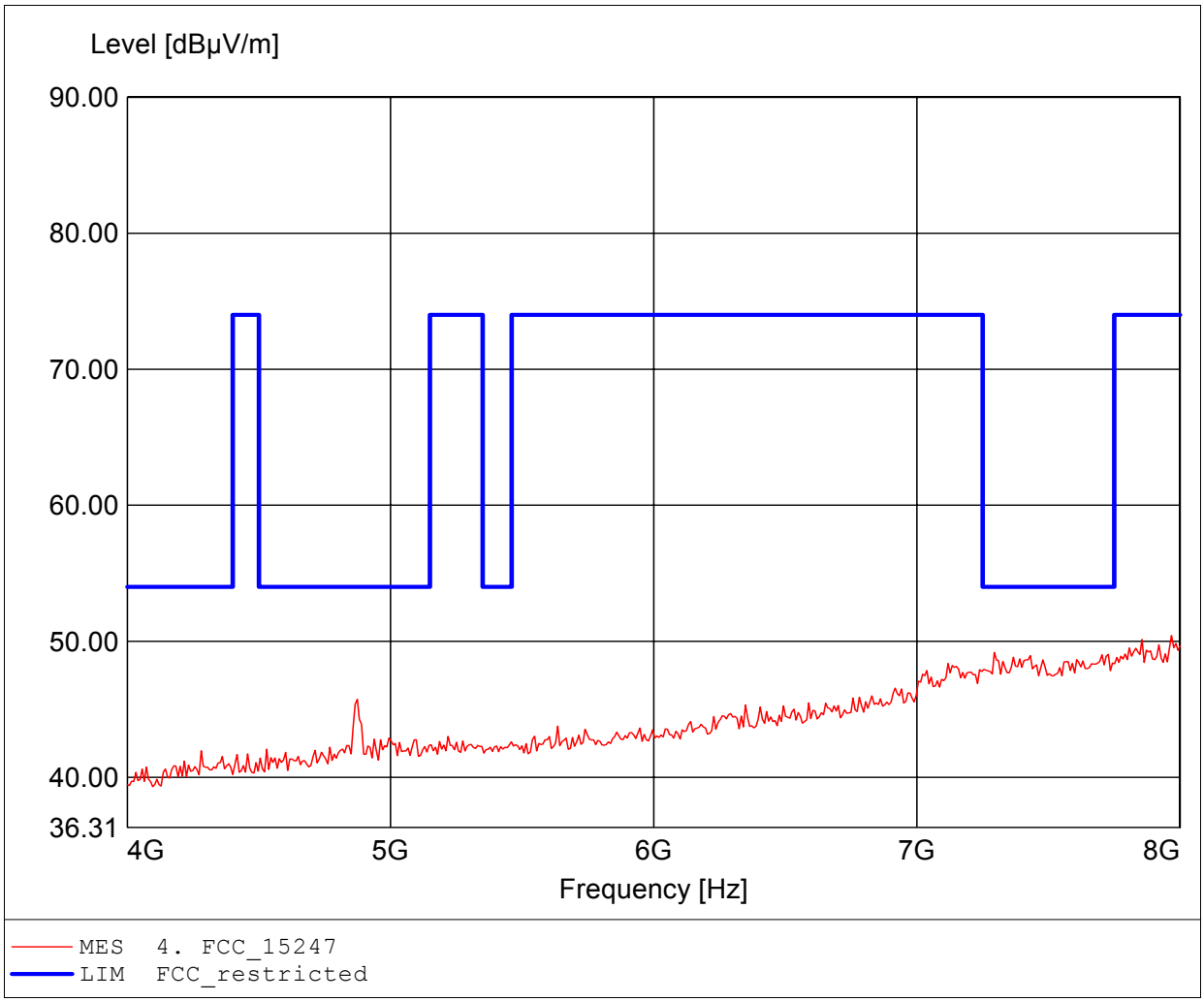
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 8.000GHz, Emax: 49.72dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: OFDM, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.968GHz, Emax: 50.41dBµV/m, RBW: 1MHz



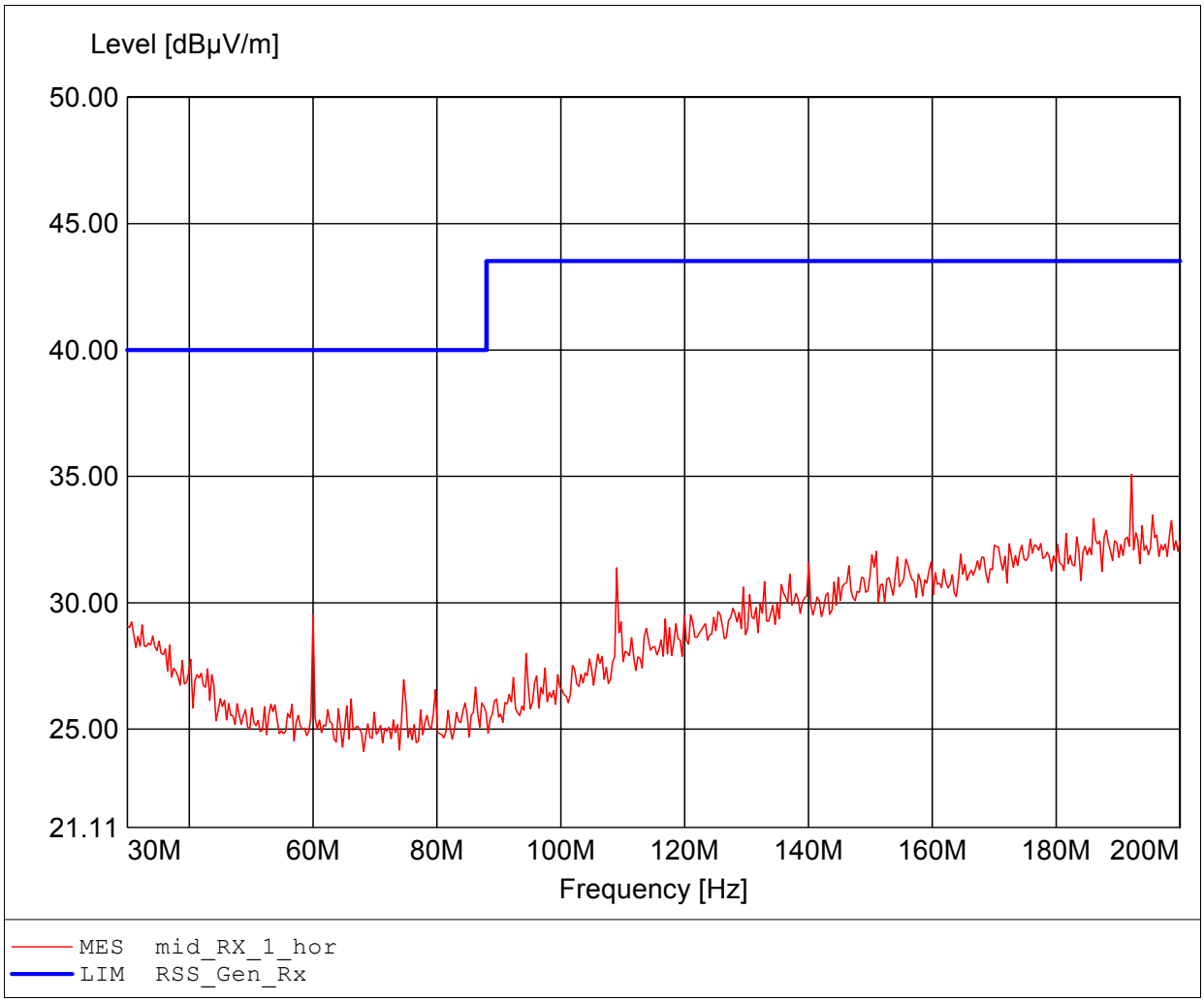
Annex C Receiver radiated spurious emissions

Only plot containing significant spurious emission are given in this annex.

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

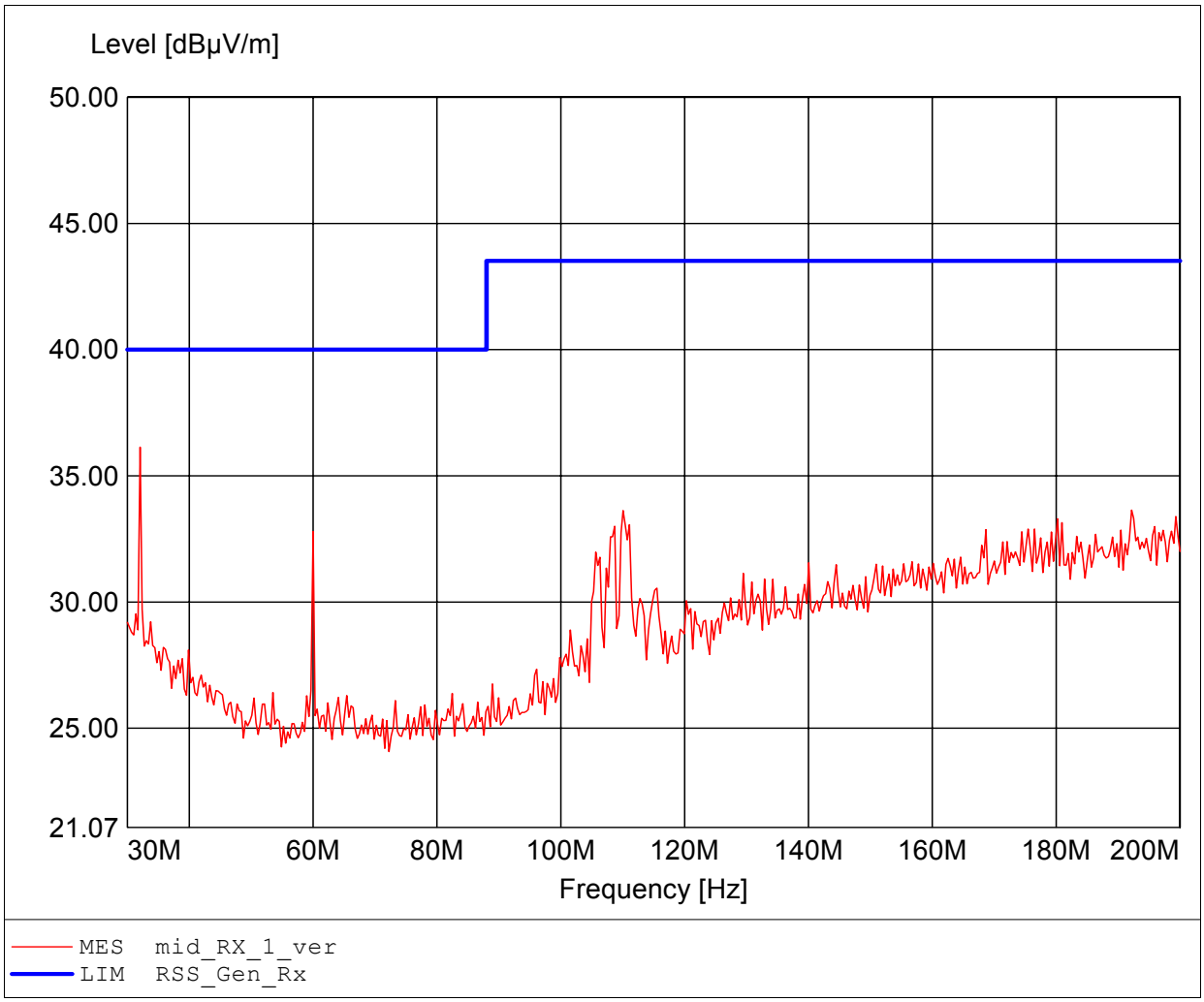
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: Rx, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	Freq. / CH: mid
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq:192.164MHz Emax:35.08dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

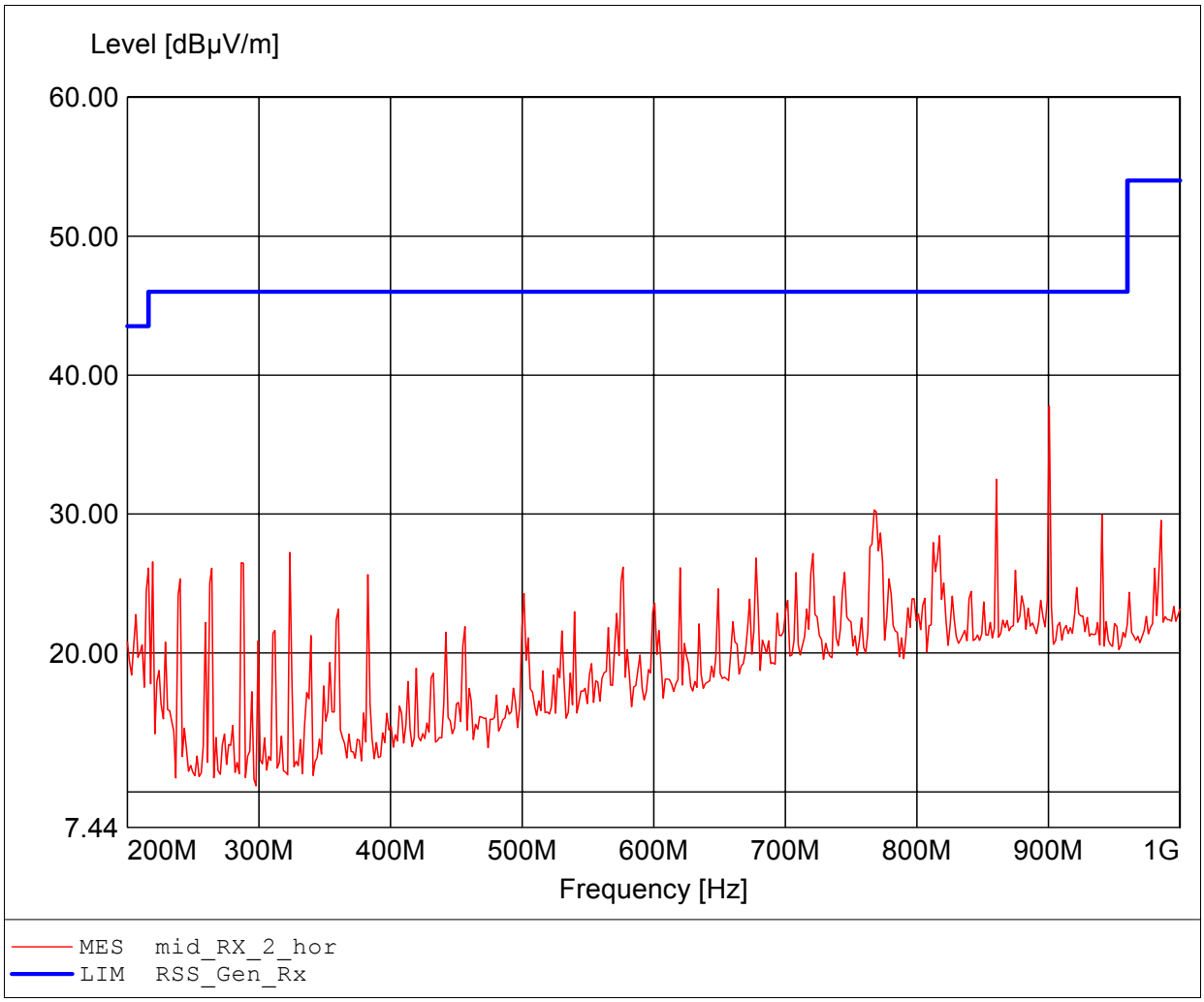
Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: Rx, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	Freq. / CH: mid
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq:32.044MHz Emax:36.14dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: Rx, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	Freq. / CH: mid
Comment 1:	Dist.: 3m, Ant.: HL 223, ampl.
Comment 2:	Freq:900.601MHz Emax:37.77dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	Connect One Ltd. / Ord.: G0M21011-3871
EUT:	WLAN Module
Model:	iW-SM2144N2BIO:FCC cllpc / Setup: Rx, 2437 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 25°C / Unom: 3.6V DC
Test Specification:	Freq. / CH: mid
Comment 1:	Dist.: 3m, Ant.: HL 223, ampl.
Comment 2:	Freq:985.571MHz Emax:35.30dBµV/m RBW: 100 kHz