EUROFINS PRODUCT SERVICE GMBH

ACCREDITED
TESTING CERT# 1983.01

TEST-REPORT

FCC PART 15 SUBPART C
IC RSS 210 ISSUE 8

Radio Module
ZWIR4512AC1

FCC ID: COR-ZWIR4512AC1

TEST REPORT NUMBER: G0M-1107-1263-P-15

Eurofins Product Service GmbH
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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.
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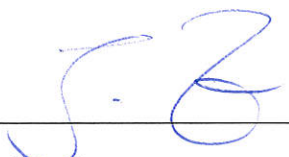
Operator:

Date	Eurofins-Lab.	Name	Signature
04.09.2012		W. Treffke	

Technical responsibility for area of testing:

Date	Eurofins	Name	Signature
04.09.2012		J. Zimmermann	

1.2 Testing laboratory

EUROFINS PRODUCT SERVICE GMBH
Storkower Strasse 38c
D-15526 Reichenwalde b. Berlin
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DAKKS ACCREDITED TESTING LABORATORY
DAKKS-REGISTRATION NUMBER: D-PL-12092-01-01

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	: Zentrum Mikroelektronik Dresden AG
Street	: Grenzstraße 28
Town	: 01109 Dresden
Country	: Germany
Telephone	: +49 351 8822 948
Fax	: +49 351 8822 8948
Contact	: Herr Torsten Limberg
Telephone	: +49 351 8822 948

Manufacturer:
(if applicable)

Name	: Zentrum Mikroelektronik Dresden AG
Street	: Grenzstraße 28
Town	: 01109 Dresden
Country	: Germany

1.4 Application details

Date of receipt of application	: 28.07.2011
Date of receipt of test item	: 28.07.2011
Date of test	: 01. – 15.08.2011

1.5 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
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

1.6 Test standards

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

1.7 Test item

Description of test item	:	Radio Module
Type identification	:	ZWIR4512AC1
Serial number	:	unpecified
Hardware version	:	A
Software version	:	1.0
Equipment type	:	Radio module

Technical data

Radio type	:	Transceiver
Radio technology	:	IEEE 802.15.4
Frequency range	:	906 - 924MHz
Assigned frequency band	:	902 - 928MHz
Tested frequencies	:	F_1 906MHz
		F_2 916MHz
		F_3 924MHz
Spreading	:	DSSS
Modulation(s)	:	BPSK, O-QPSK
Operating mode(s)	:	semi duplex
Number of channels	:	10
Duty cycle(s)	:	95% (Test mode)
Number of antennas	:	1
Antenna type(s)	:	external, dedicated
Antenna model(s)	:	portable rubber duck antenna MEXE902RPSM
Antenna manufacturer(s)	:	PCTEL, Inc.
Antenna gain(s)	:	2.0dBi
Power supply	:	3.3VDC
Device classification	:	Mobile Device (Human Body distance > 20 cm)

1.8 Additional information

None

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 condition parameters:

V_{nom}	:	3.3VDC
V_{min} (V_{nom}-15%)	:	N/A
V_{max} (V_{nom}+15%)	:	N/A
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	09.12.2010	09.12.2012
ETS 0253	Spectrum Analyzer	FSIQ26	Rohde & Schwarz	04.11.2010	04.11.2012
ETS 0030	Biconical Antenna	HK 116	Rohde & Schwarz	10.02.2011	20.02.2012
ETS 0295	LPD Antenna	HL 223	Rohde & Schwarz	09.02.2011	09.02.2012
ETS 0018	Horn Antenna	BBHA 9120D	Schwarzbeck	26.08.2010	26.08.2011
ETS 0432	Amplifier-Matrix			02.06.2010	02.06.2012
ETS 0496	Spectrum Analyzer	FSP30	Rohde & Schwarz	26.08.2010	26.08.2011
ETS 0497	Power Meter	NRVD	Rohde & Schwarz	28.02.2011	28.02.2013
ETS 0278	Power Sensor	NRV-Z31	Rohde & Schwarz	25.11.2010	25.11.2012
ETS 0288	LISN	ESH2-Z5	Rohde & Schwarz	07.09.2010	07.09.2012

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

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	☒	PASS	
Spectral Density	FCC § 15.247(e) IC RSS-210 § A8.2	☒	PASS	
Maximum peak conducted output power	FCC § 15.247(b) IC RSS-210 § A8.4	☒	PASS	
Maximum peak e.i.r.p. output power	FCC § 15.247(b) IC RSS-210 § A8.4	☒	PASS	
Band-edge Compliance	FCC § 15.247(d) IC RSS-210 § A8.5	☒	PASS	
Conducted spurious emissions	FCC § 15.247(d) IC RSS-210 § A8.5	☒	PASS	
Radiated spurious emissions	FCC § 15.247(d) FCC § 15.109 FCC § 15.209 IC RSS-210 A8.5 IC RSS-Gen 4.9 IC RSS-Gen 7.2.5	☒	PASS	
RECEIVER PARAMETERS				
Radiated spurious emissions	FCC § 15.109 IC RSS-Gen 4.10 IC RSS-Gen 6.1	☒	PASS	
POWER LINE PARAMETERS				
AC power line conducted emissions	FCC § 15.107 FCC § 15.207 IC RSS-Gen. 7.2.4	☒	PASS	

3 Informational Transmitter parameters

3.1 Transmitter Modes for conformance testing

The following transmission modes are elected for compliance testing.

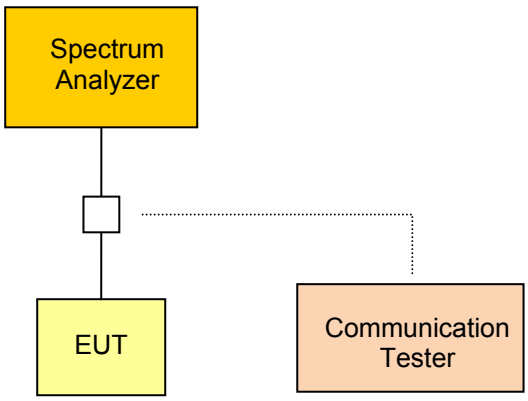
TEST MODE BPSK	
Conditions	
Spread Spectrum	☒ Yes ☐ No
Spreading Technique	DSSS
Modulation	BPSK
Duty Cycle	95%
Power level	Maximum

TEST MODE QPSK	
Conditions	
Spread Spectrum	☒ Yes ☐ No
Spreading Technique	DSSS
Modulation	O-QPSK
Duty Cycle	95%
Power level	Maximum

3.2 Occupied Bandwidth

According RSS-Gen Section 4.6.1 the 99% emission bandwidth occupied by the modulated transmitted signal has to be reported as calculated or measured.

3.2.1 Measurement procedure



The EUT is connected to a spectrum analyzer and set to transmission mode (using a communication tester if needed) with maximum power under normal test conditions. The span of the analyzer is set wide enough to capture all significant emissions of the modulation spectrum. The resolutions bandwidth is set as close as possible to 1% of the selected span without being below 1%. The occupied bandwidth is than measured evaluated by an internal measurement procedure of the analyzer.

3.2.2 Results

Transmitter occupied bandwidth			
Measurement Conditions			
Power occupation		99%	
Channel [MHz]	**Lower edge frequency [MHz]**	**Upper edge frequency [MHz]**	**Occupied Bandwidth [MHz]**
Test mode BPSK			
906	905.604	906.426	0.822
916	915.604	916.416	0.812
924	923.594	924.416	0.822
Test mode QPSK			
906	905.334	906.626	1.293
916	915.354	916.616	1.263
924	923.344	924.626	1.283
See attached diagram in Annex			

4 Transmitter parameters

4.1 6dB Bandwidth

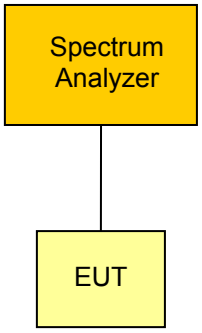
According FCC rules 47 CFR 15.247(a)(2) and RSS-210 Section A8.2 the minimum 6dB Bandwidth has to be validated.

4.1.1 Limits

According FCC and IC rules the minimum 6 dB bandwidth shall be at least 500 kHz.

6dB bandwidth limit
≥ 500kHz

4.1.2 Measurement procedure



The EUT is connected to a spectrum analyzer and set to transmission mode with maximum power under normal test conditions. The resolution bandwidth is set to 100kHz (VBW≥RBW). The center frequency is set to the channel center frequency. The span of the analyzer is set to 2 -3 times the 6dB bandwidth. The bandwidth is determined using markers with peak detector and max hold.

4.1.3 Results

Transmitter 6dB bandwidth	
Channel [MHz]	**6dB Bandwidth [MHz]**
Test mode BPSK	
906	0.687
916	0.688
924	0.688
Test mode QPSK	
906	0.818
916	0.829
924	0.817
See attached diagram in Annex	
Verdict	**PASS**

4.2 Power spectral density

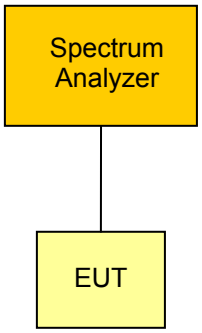
According FCC rules 47 CFR 15.247(e) and RSS-210 Section A8.2 the maximum power density in any 3kHz bandwidth is limited and has to be validated.

4.2.1 Limits

According FCC and IC rules the transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission or over 1.0 second if the transmission exceeds 1.0-second duration.

Spectral density limit
≤ 8dBm/3kHz

4.2.2 Measurement procedure



The EUT is connected to a spectrum analyzer and set to transmission mode with maximum power under normal test conditions. The resolution bandwidth is set to 3kHz (VBW≥RBW). The center frequency is set to the channel center frequency. The span of the analyzer is set to 1.5MHz. The sweep time is set to SPAN/RBW. The spectral density is determined using peak detector and max hold.

According to 47 CFR 15.31 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.

4.2.3 Results

Power spectral density		
Channel [MHz]	**Max. emission frequency [MHz]**	**Spectral density [dBm/3kHz]**
Test mode BPSK		
906	0.906025	1.37
916	0.916026	1.11
924	0.924026	0.99
Test mode QPSK		
906	0.905943	0.56
916	0.915941	-0.08
924	0.923943	0.45
See attached diagram in Annex		
Verdict		**PASS**

4.3 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.

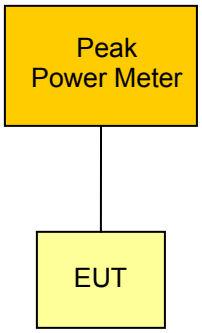
4.3.1 Limits

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.

4.3.2 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.

4.3.3 Results

Maximum peak conducted output power		
Measurement Conditions		
Antenna gain	2.0dBi	
Power correction	0dB	
Channel [MHz]	**Conducted output power [dBm]**	**Power Limit [dBm]**
Test mode BPSK		
906	9.9	30
916	9.8	30
924	9.5	30
Test mode QPSK		
906	8.9	30
916	8.8	30
924	8.5	30
See attached diagrams in Annex		
Measurement uncertainty		4.22dB
Verdict		**PASS**

4.4 Transmitter band-edge compliance

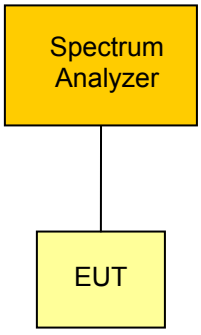
According FCC rules 47 CFR 15.209, 15.247(d) and RSS-210 Section A8.5 the emission level of out-of-band emissions are limited and has to be validated.

4.4.1 Limits

The emission limit of out of band emission in any 100kHz bandwidth outside the frequency band in which the spread spectrum device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits (see "Transmitter spurious emissions"-measurement) is not required.

Transmitter band-edge emission limits	
TX-Power Detector	**Out of band attenuation**
Peak	-20dBc/100kHz
RMS	-30dBc/100kHz

4.4.2 Measurement procedure



The EUT is connected to a spectrum analyzer and set to transmission mode without hopping with maximum power under normal test conditions. The span of the analyzer is set large enough to capture the maximum emission within the emission band as well as any modulation product which fall outside the authorized band of operation. The resolution bandwidth is set to 1% of the span (VBW≥RBW). The

A marker is set on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Using the delta-marker function the highest peak of the in-band emission is measured.

4.4.3 Results

Transmitter band-edge emissions		
Measurement Conditions		
Power mode	Peak	
Test mode	**Lower edge emission [dBc]**	**Upper edge emission [dBc]**
BPSK	-49.10	-49.44
QPSK	-46.39	-44.94
See attached diagram in Annex		
Verdict		**PASS**

4.5 Transmitter conducted spurious emissions

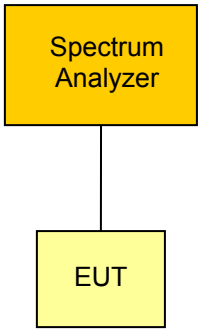
According FCC rules 47 CFR 15.247(d) and RSS-210 Section A8.5 unwanted emissions in the spurious domain are power limited and has to be validated.

4.5.1 Limits

The emission limit of out of band emission in any 100kHz bandwidth outside the frequency band in which the spread spectrum device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits (see "Transmitter radiated spurious emissions"-measurement) is not required.

Transmitter conducted spurious emission limits	
TX-Power Detector	**Out of band attenuation**
Peak	-20dBc/100kHz
RMS	-30dBc/100kHz

4.5.2 Measurement procedure



The EUT is connected to a spectrum analyzer and set to transmission mode with maximum power under normal test conditions. The span of the analyzer is set large enough to capture the maximum emission within the emission band as well as any spurious emission outside the authorized band of operation. The resolution bandwidth is set to 100kHz (VBW≥RBW). The emissions are measured using peak detector and max hold.

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

4.5.3 Results

Transmitter conducted spurious emissions						
Measurement Conditions						
Modulated		☒ Yes ☐ No				
Channel Frequency [MHz]	**Emission Frequency [MHz]**	**Emission Level [dBm]**	**Peak Power [dBm]**	**Limit [dBm]**	**Detector**	**Margin [dB]**
Test mode BPSK						
906	1814	-47.88	9.30	-10.70	pk	-37.18
906	2718	-54.91	9.30	-10.70	pk	-44.21
906	3621	-57.71	9.30	-10.70	pk	-47.01
916	1832	-48.71	9.15	-10.85	pk	-37.86
916	2748	-54.44	9.15	-10.85	pk	-43.59
916	3661	-57.39	9.15	-10.85	pk	-46.54
924	1850	-49.76	8.98	-11.11	pk	-38.65
924	2772	-55.06	8.98	-11.11	pk	-43.95
924	3681	-57.72	8.98	-11.11	pk	-46.61
Test mode QPSK						
906	1814	-51.72	6.55	-13.45	pk	-38.27
906	2718	-57.09	6.55	-13.45	pk	-43.64
906	3621	-58.40	6.55	-13.45	pk	-44.95
916	1832	-52.52	7.32	-12.68	pk	-39.84
916	2748	-59.86	7.32	-12.68	pk	-47.18
916	3661	-57.71	7.32	-12.68	pk	-45.03
924	1850	-54.74	5.77	-14.23	pk	-40.51
924	2772	-58.86	5.77	-14.23	pk	-44.63
924	3681	-57.20	5.77	-14.23	pk	-42.97
See attached diagrams in Annex						
Verdict				**PASS**		

4.6 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.

4.6.1 Limits

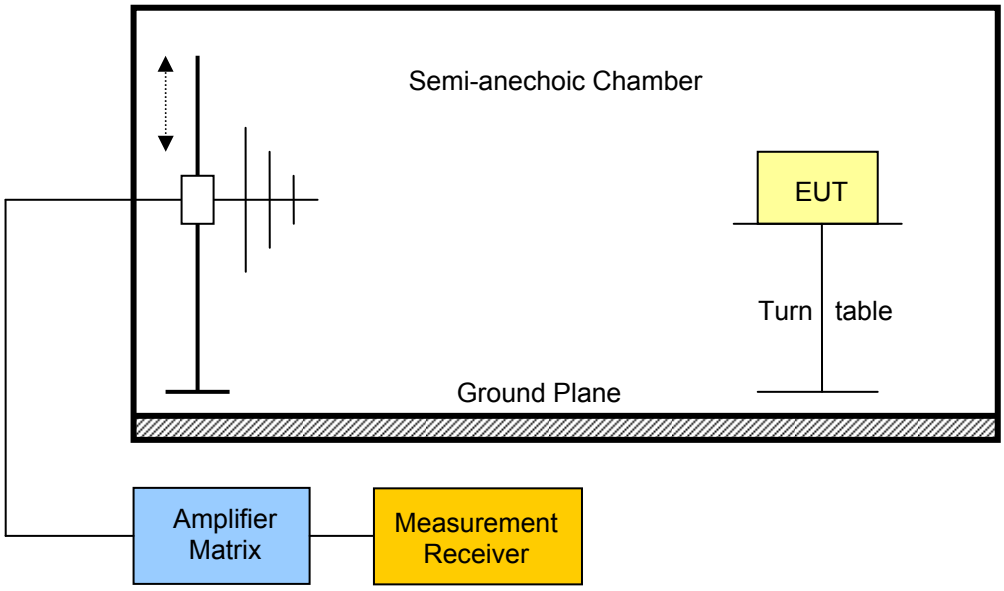
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Transmitter restricted band spurious emission 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

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.

4.6.2 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 rotated through 360°.

Due to practical 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.

4.6.3 Results

Transmitter radiated spurious emissions							
Measurement Conditions							
Measurement distance *		3m					
Modulated		☒ Yes ☐ No					
Channel Frequency [MHz]	**Emission Frequency [MHz]**	**Pol.**	**Measured Field Strength [dBµV/m]**	**Limit [dBµV/m]**	**Limit distance [m]**	**Det.**	**Margin [dB]**
Test mode BPSK							
906	3627	v	53.2	74	3	pk	-20.80
906	3623	v	47.2	54	3	avg	-06.80
916	3669	v	51.68	74	3	pk	-22.32
924	3699	v	51.29	74	3	pk	-22.71
924	3696	v	48.78	54	3	avg	-05.22
Test mode QPSK							
906	3627	v	49.8	74	3	pk	-24.20
916	3663	v	49.8	74	3	pk	-24.20
924	3699	v	50.3	74	3	pk	-23.70
See attached diagrams in Annex							
Verdict						**PASS**	

*** Note:** Physical distance between EUT and measurement antenna.

5 Receiver parameters

5.1 Receiver spurious emissions

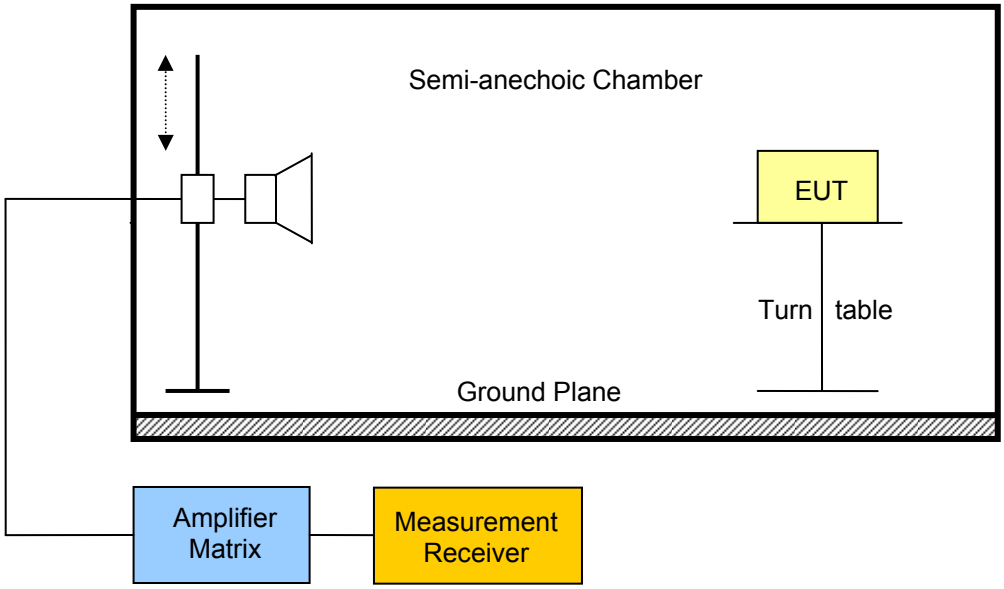
According RSS-Gen Section 4.9 the emissions of unintentional radiators have to comply with limits stated in the rules.

5.1.1 Limits

Receiver spurious emission 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

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 rotated through 360°.

Due to practical 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 distance *		3m					
Channel Frequency [MHz]	**Emission Frequency [MHz]**	**Pol.**	**Measured Field Strength [µV/m]****	**Limit [µV/m]**	**Limit distance [m]**	**Det.**	**Margin [µV/m]**
Scan	3856	h	144.71***	500	3	pk	-355.29
See attached diagrams in Annex							
Verdict						**PASS**	

*** Note:** Physical distance between EUT and measurement antenna.

**** Note:** Due to the fact that the peak emission field-strength is below the average/quasi-peak emission limit, the corresponding average/quasi-peak measurement has been omitted and compliance with the limits is shown for the peak emissions.

***** Note:** Emission level corresponds to ambient noise floor.

6 Power Line parameters

6.1 AC power line conducted emissions

According FCC rules 47 CFR 15.207 and RSS-Gen Section 7.2.2 for any intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits given below.

6.1.1 Limits

AC power line emission limits		
Frequency [MHz]	**Conducted Limit [dBµV]**	
	Quasi-Peak	**Average**
0.15 – 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

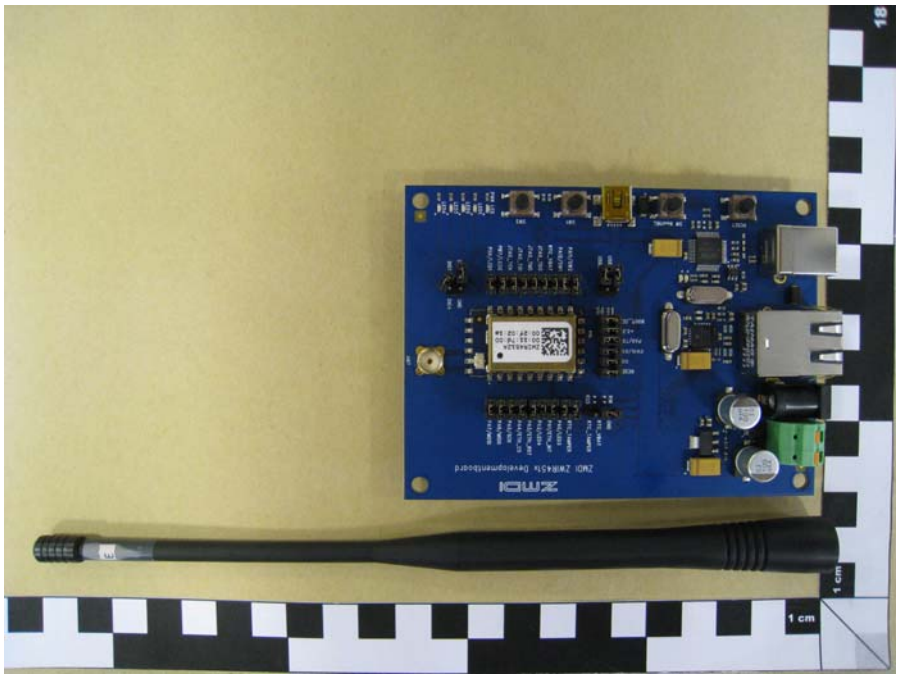
6.1.2 Measurement procedure

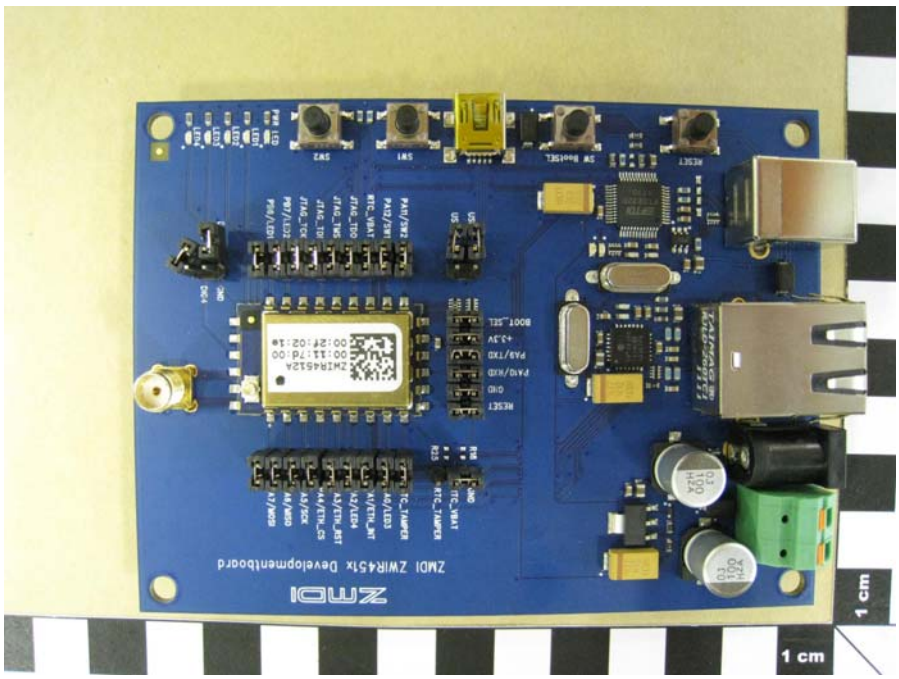
The ac power line emissions are measured using a 50µH / 50Ω line impedance stabilization network (LINS). The radio frequency voltage between each power line and ground at the power terminal is measured.

6.1.3 Results

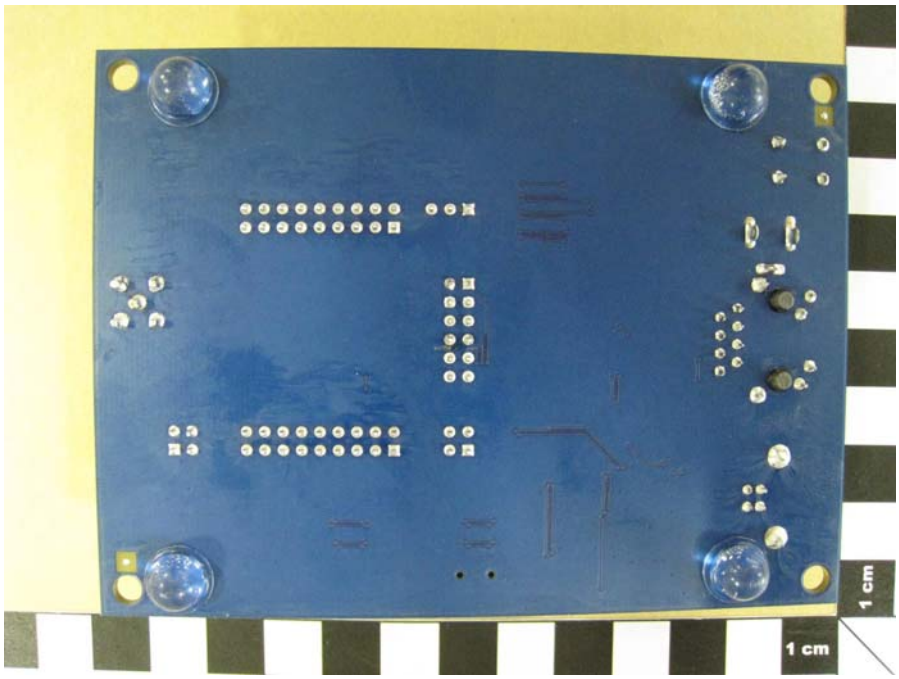
AC power line emissions	
Conducted emission level	
See attached Diagram	
Verdict	**PASS**

Annex A Photos

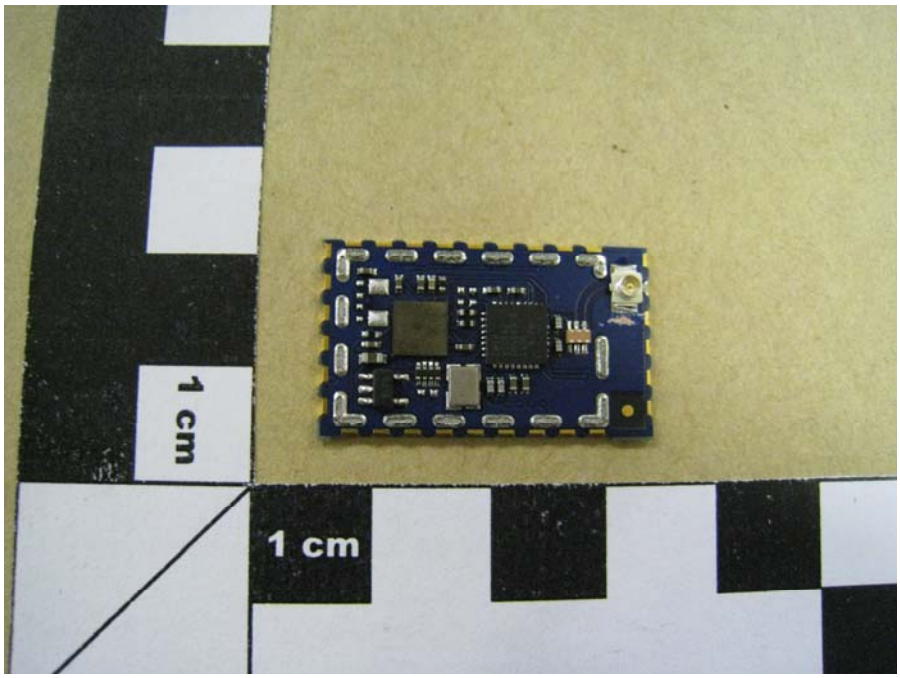
EUT WITH EVALUATION BOARD AND ANTENNA


EUT WITH EVALUATION BOARD TOP


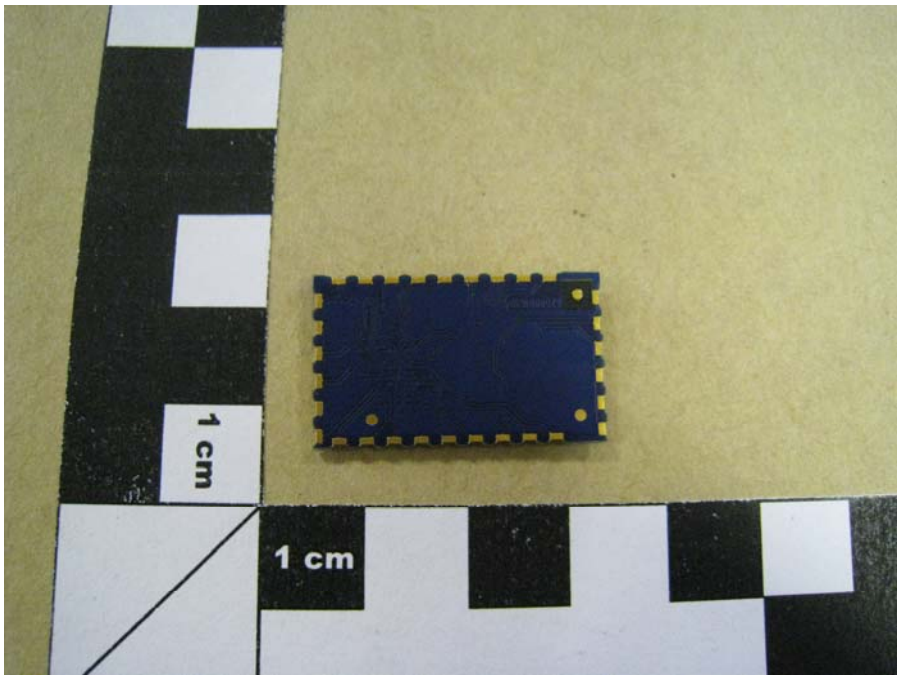
EVALUATION BOARD BOTTOM



EUT TOP



EUT BOTTOM



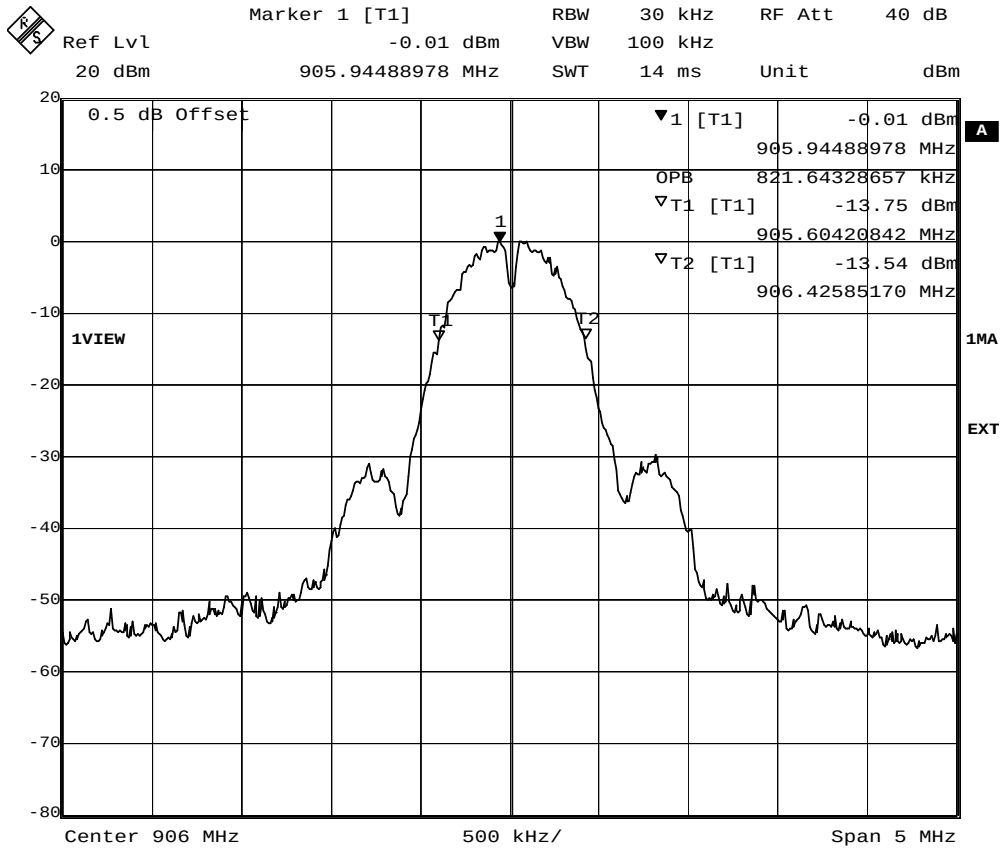
TEST SETUP RADIATED EMISSIONS

TEST SETUP CONDUCTED EMISSIONS

Annex B Transmitter occupied bandwidth

Emission Bandwidth

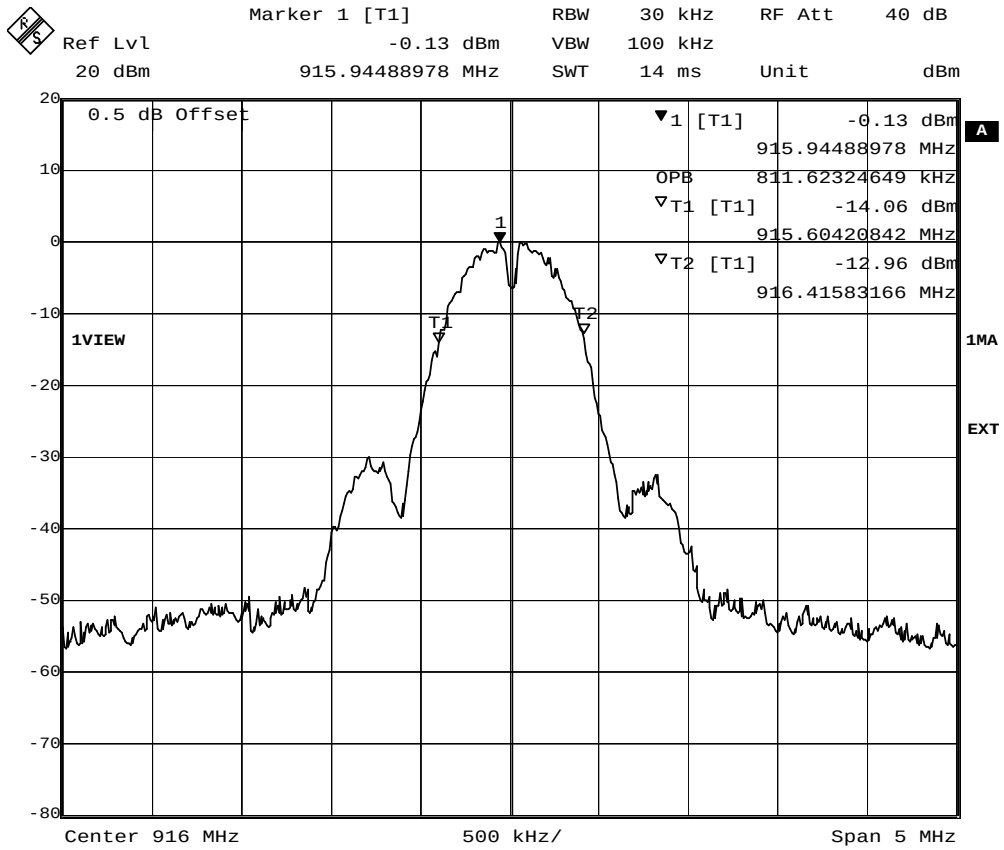
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	8.3 Emission Bandwidth
Comment 1	Channel.: 906 MHz / BPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	pass



Comment A: Occupied bandwidth: 821.6 KHz
Date: 1.AUG.2011 11:56:24

Emission Bandwidth

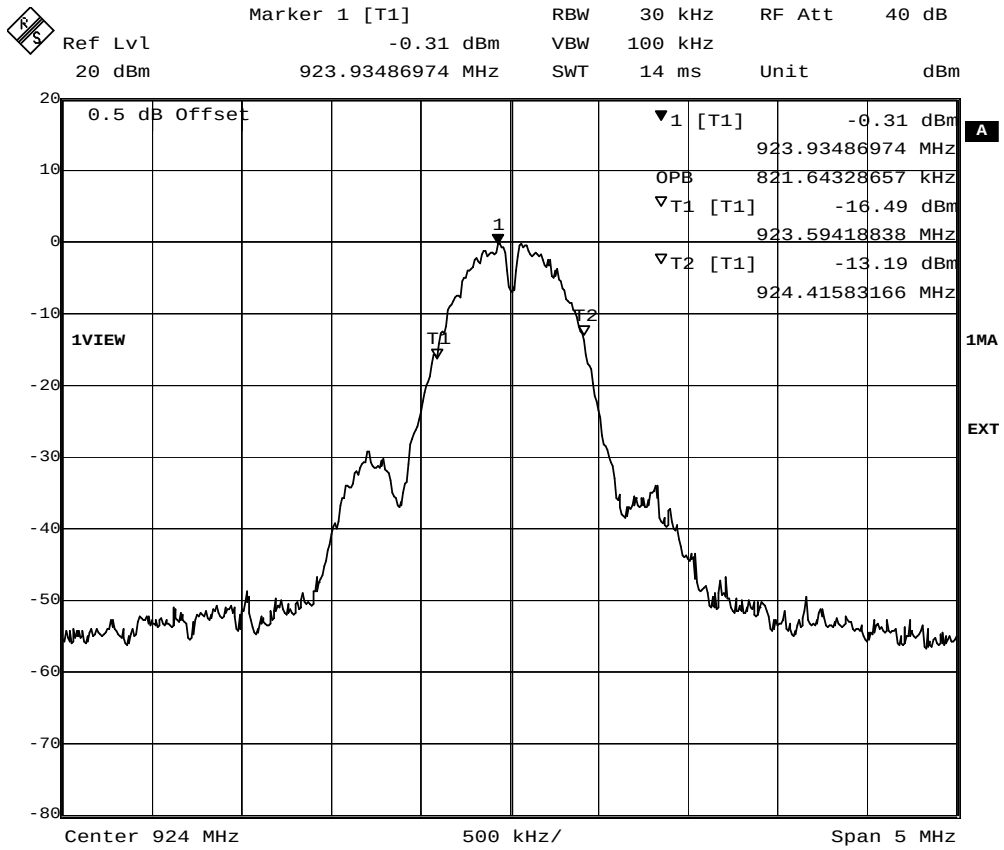
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	8.3 Emission Bandwidth
Comment 1	Channel.: 916 MHz / BPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	pass



Comment A: Occupied bandwidth: 811.6 KHz
Date: 1.AUG.2011 12:57:01

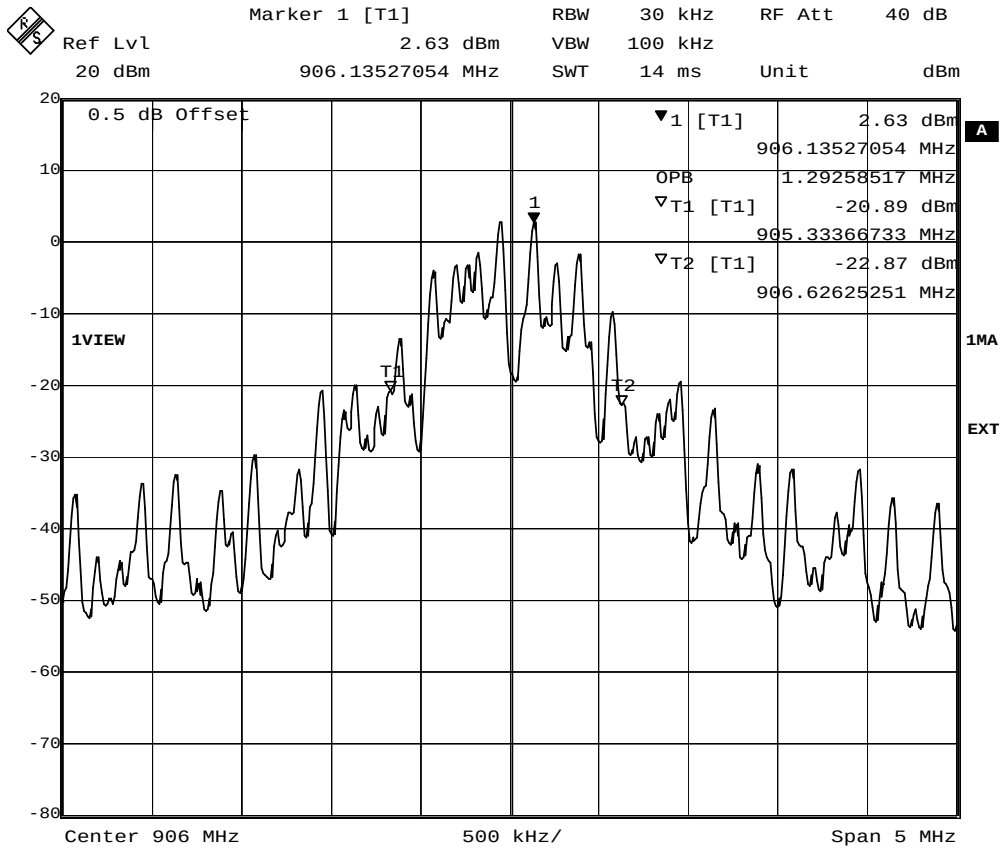
Emission Bandwidth

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	8.3 Emission Bandwidth
Comment 1	Channel.: 924 MHz / BPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	pass



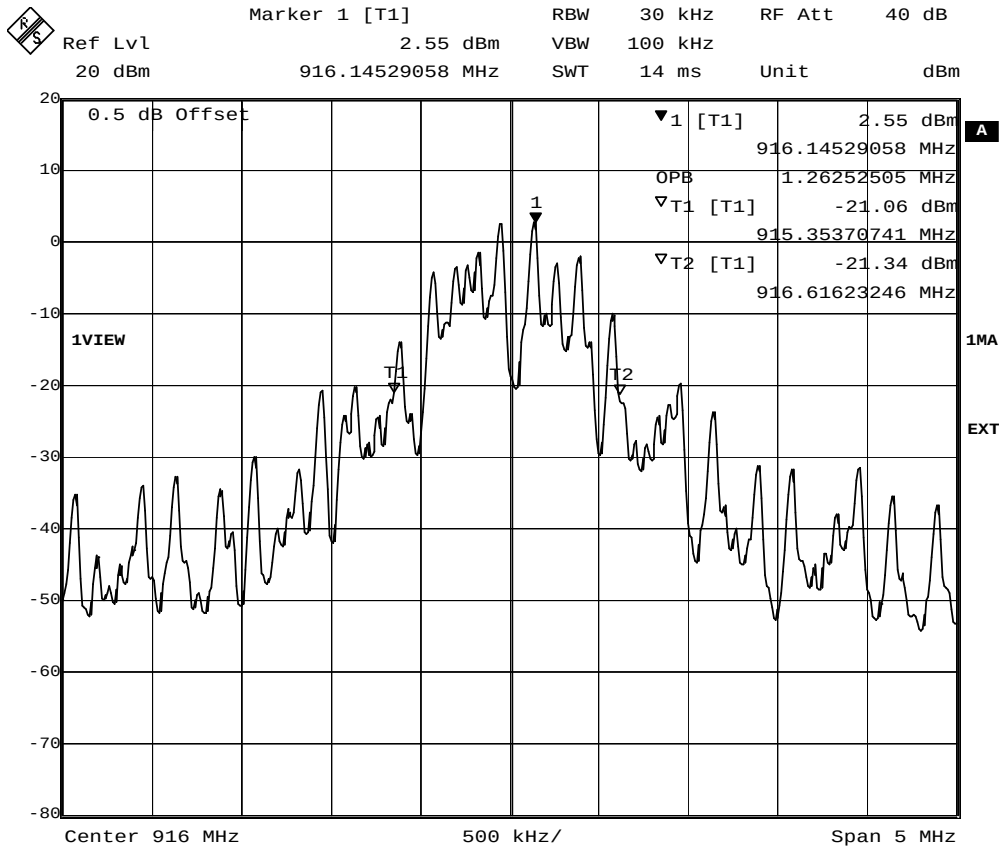
Emission Bandwidth

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	8.3 Emission Bandwidth
Comment 1	Channel.: 906 MHz / 0-QPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	pass



Emission Bandwidth

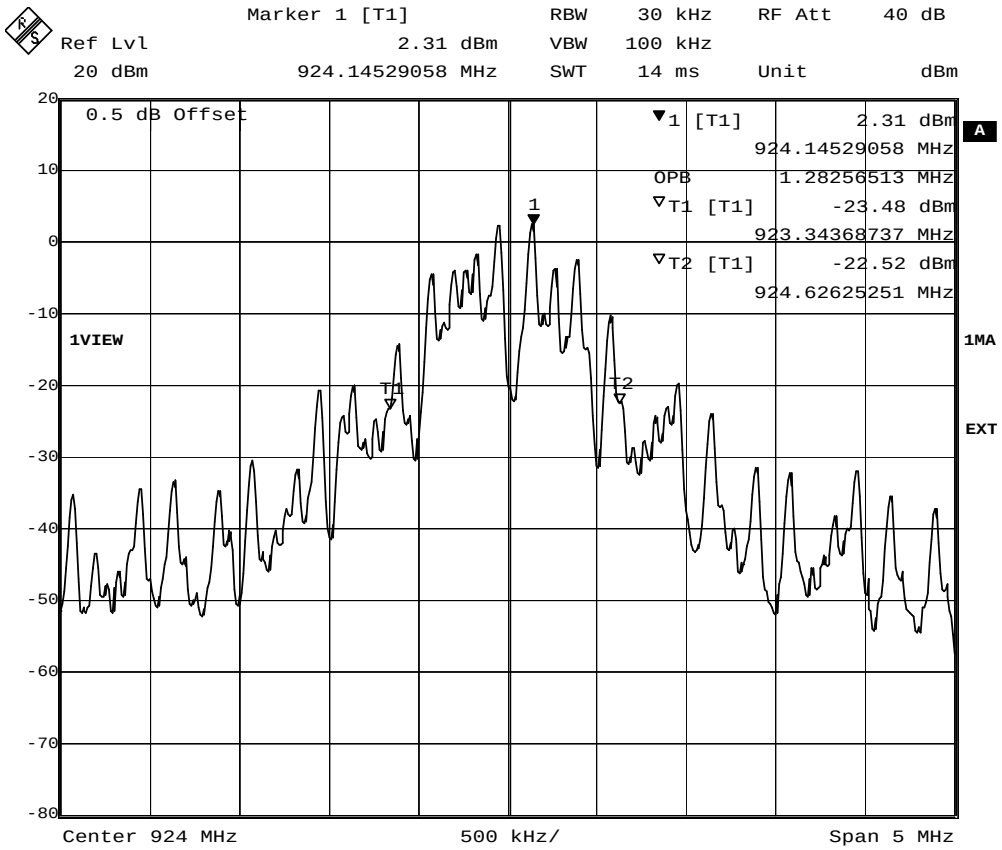
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	8.3 Emission Bandwidth
Comment 1	Channel.: 916 MHz / 0-QPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	pass



Comment A: Occupied bandwidth: 1262.5 KHz
Date: 1.AUG.2011 13:06:28

Emission Bandwidth

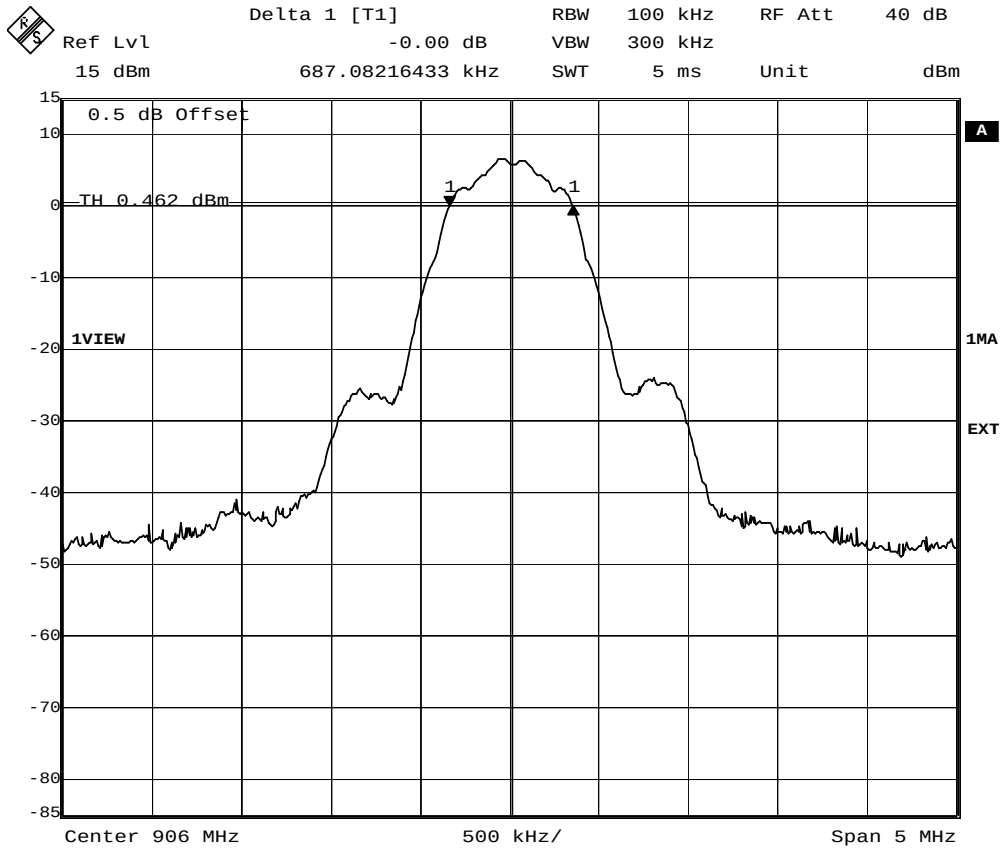
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	8.3 Emission Bandwidth
Comment 1	Channel.: 924 MHz / 0-QPSK
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	pass



Annex C Transmitter 6dB bandwidth

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

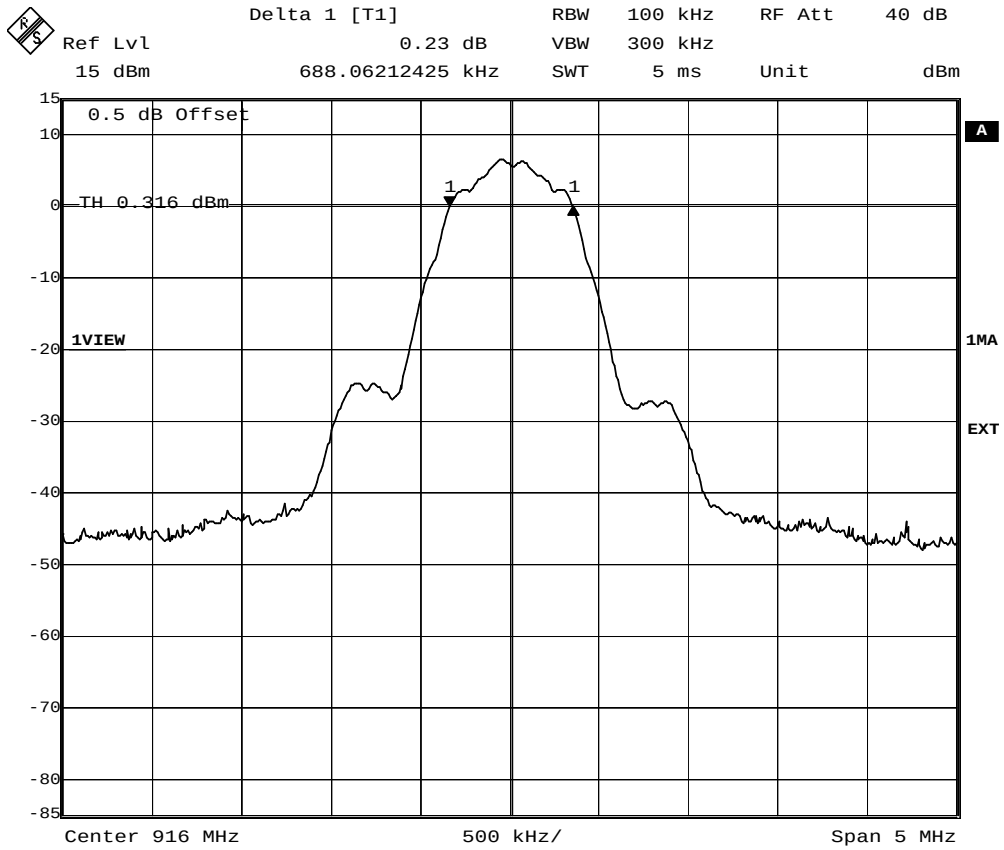
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 906 MHz
Comment 3	BPSK



Comment A: 6 dB bandwidth: 687.1 KHz > 500 KHz; verdict: PASS
Date: 1.AUG.2011 11:33:46

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

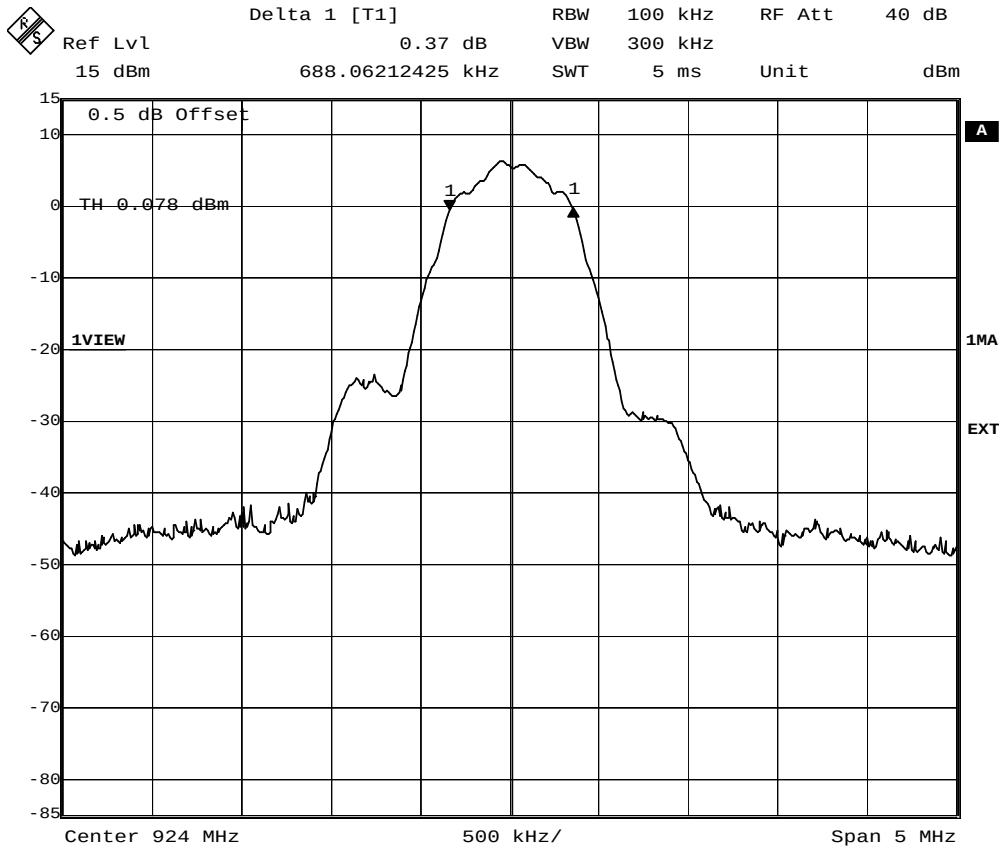
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 916 MHz
Comment 3	BPSK



Comment A: 6 dB bandwidth: 698.1 KHz > 500 KHz; verdict: PASS
Date: 1.AUG.2011 11:39:11

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

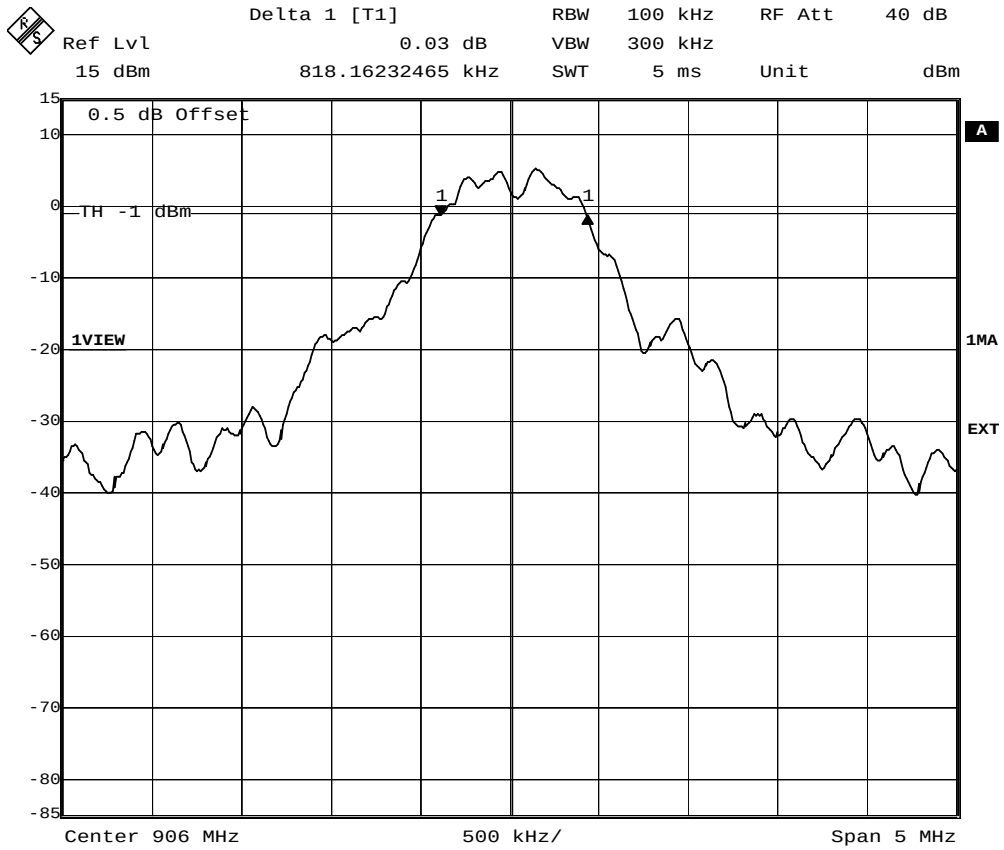
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 924 MHz
Comment 3	BPSK



Comment A: 6 dB bandwidth: 688.1 KHz > 500 KHz; verdict: PASS
Date: 1.AUG.2011 11:42:17

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

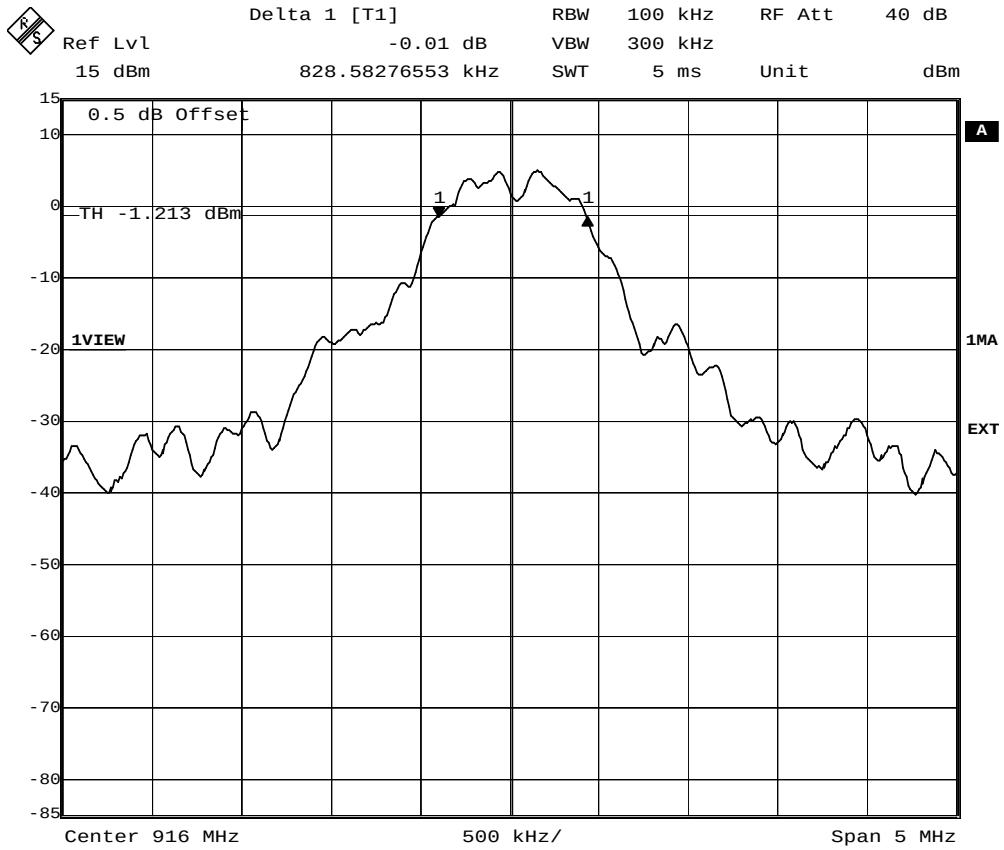
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 906 MHz
Comment 3	0-QPSK



Comment A: 6 dB bandwidth: 818.2 KHz > 500 KHz; verdict: PASS
Date: 1.AUG.2011 11:45:03

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

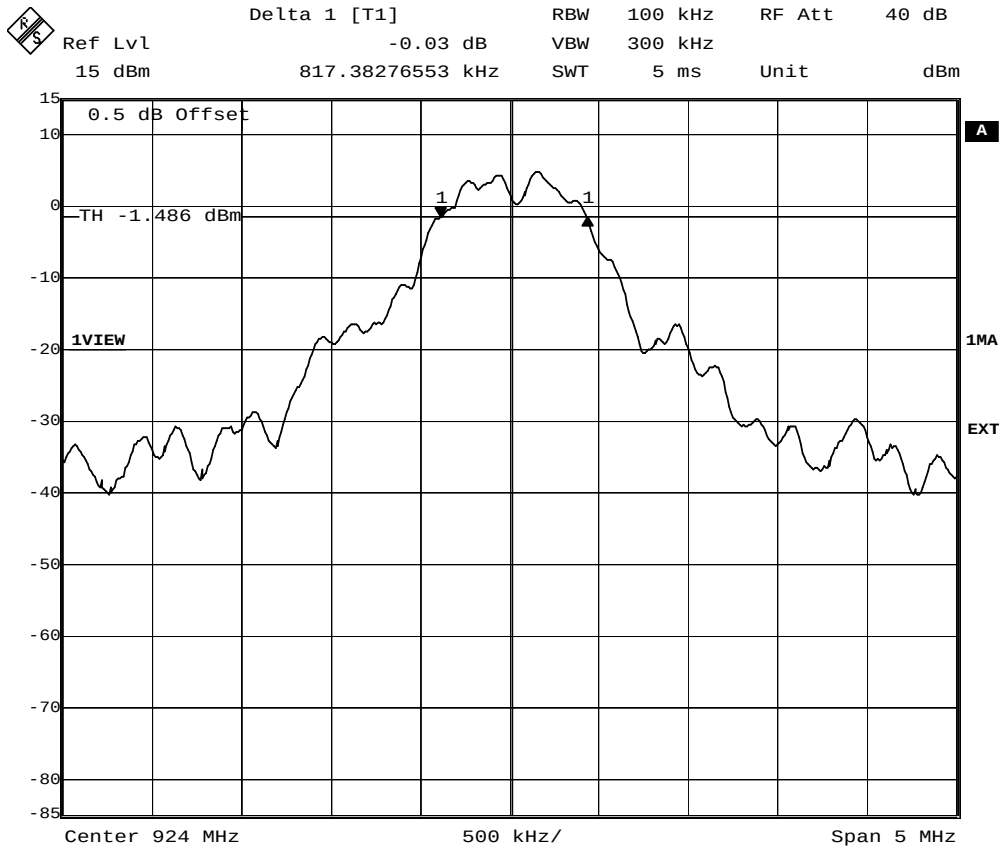
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 916 MHz
Comment 3	0-QPSK



Comment A: 6 dB bandwidth: 828.6 KHz > 500 KHz; verdict: PASS
Date: 1.AUG.2011 11:47:29

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 924 MHz
Comment 3	0-QPSK



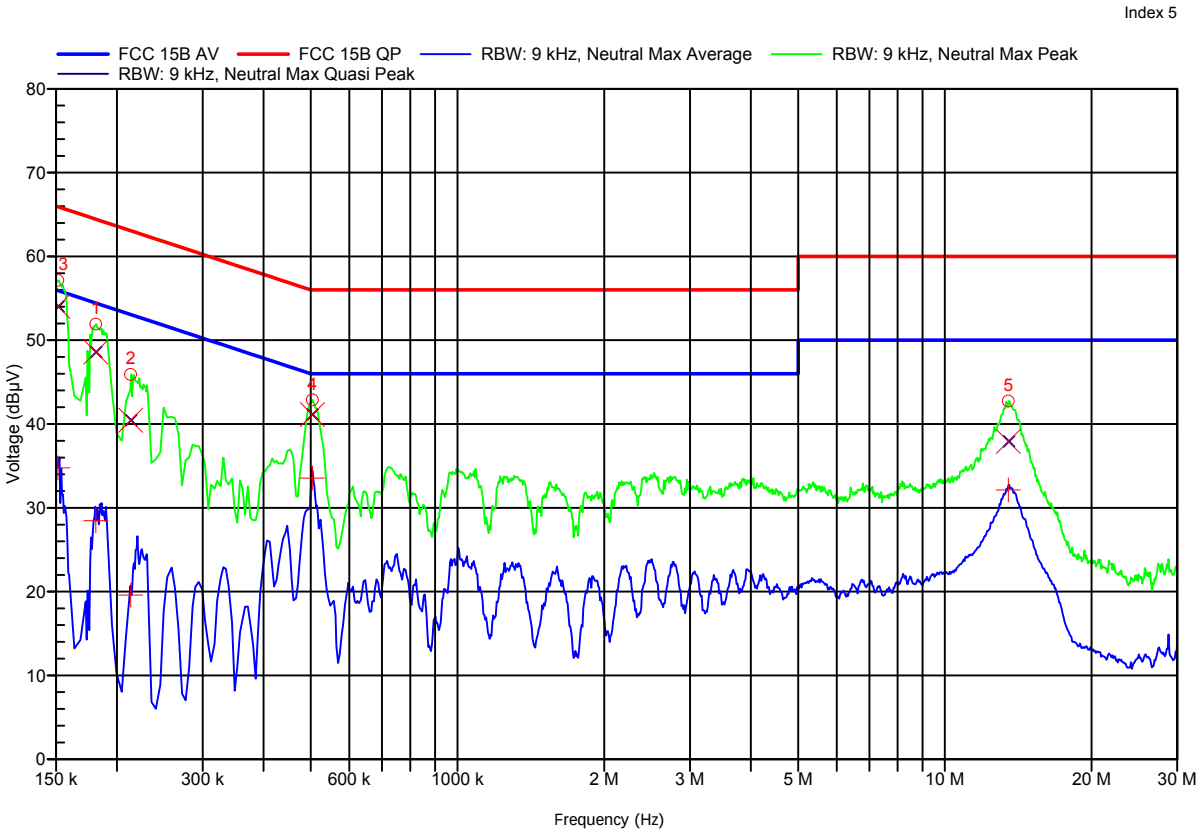
Comment A: 6 dB bandwidth: 817.4 KHz > 500 KHz; verdict: PASS
Date: 1.AUG.2011 11:50:21

Annex D AC Power line Conducted Emissions

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

Order number: G0M-1107-1263

Manufacturer:	Zentrum Mikroelektronik Dresden AG
EUT Name:	RF Modul IEEE 802.15.4
Model:	ZWIR4512
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor) => USB
LISN:	ESH2-Z5 N
Mode:	active
Test Date:	01.09.2011
Note:	PASS



Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
151.35 kHz	54.03 dBµV	65.93 dBµV	-11.89 dB	Pass
181.05 kHz	48.58 dBµV	64.44 dBµV	-15.86 dB	Pass
213.45 kHz	40.45 dBµV	63.07 dBµV	-22.62 dB	Pass
503.7 kHz	41.13 dBµV	56 dBµV	-14.87 dB	Pass
13.499 MHz	37.92 dBµV	60 dBµV	-22.08 dB	Pass

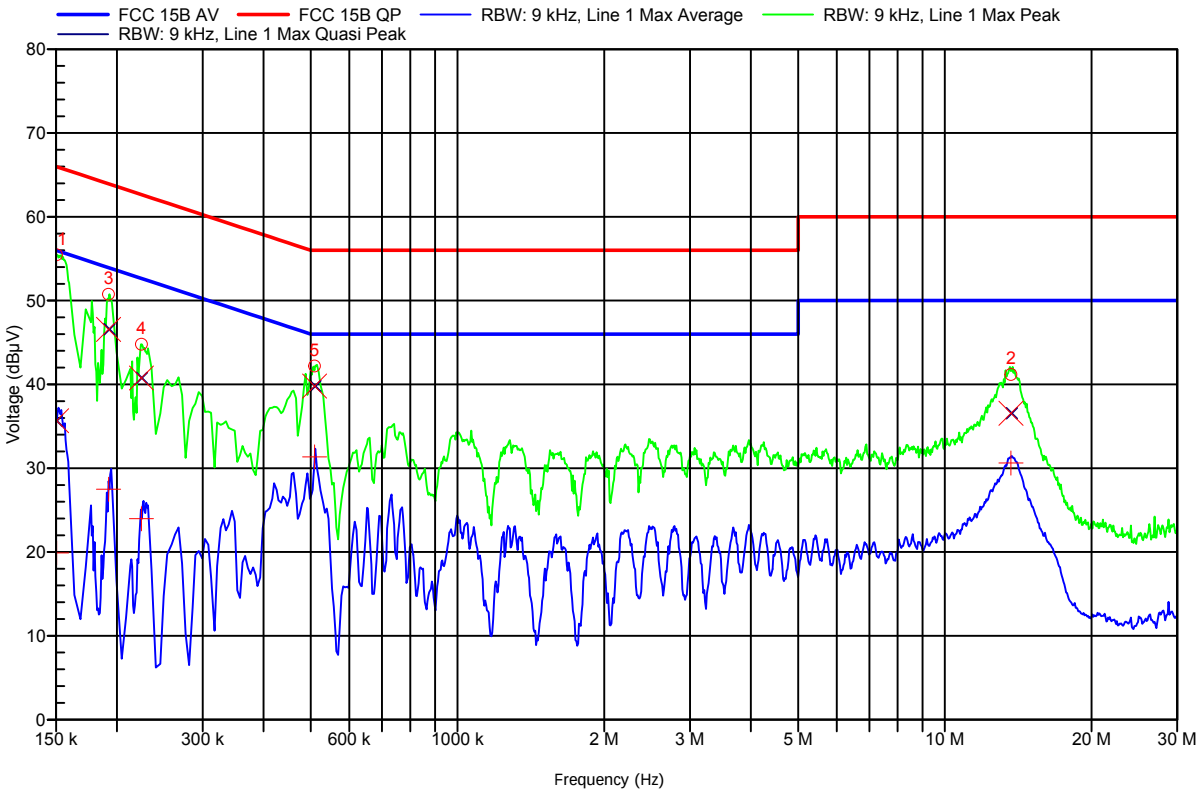
Frequency	Average	Average Limit	Average Difference	Status
151.35 kHz	34.77 dBµV	55.93 dBµV	-21.15 dB	Pass
181.05 kHz	28.47 dBµV	54.44 dBµV	-25.97 dB	Pass
213.45 kHz	19.59 dBµV	53.07 dBµV	-33.48 dB	Pass
503.7 kHz	33.55 dBµV	46 dBµV	-12.45 dB	Pass
13.499 MHz	32.13 dBµV	50 dBµV	-17.87 dB	Pass

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

Order number: G0M-1107-1263

Manufacturer:	Zentrum Mikroelektronik Dresden AG
EUT Name:	RF Modul IEEE 802.15.4
Model:	ZWIR4512
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC (AC/DC adaptor) => USB
LISN:	ESH2-Z5 L
Mode:	active
Test Date:	01.09.2011
Note:	PASS

Index 6



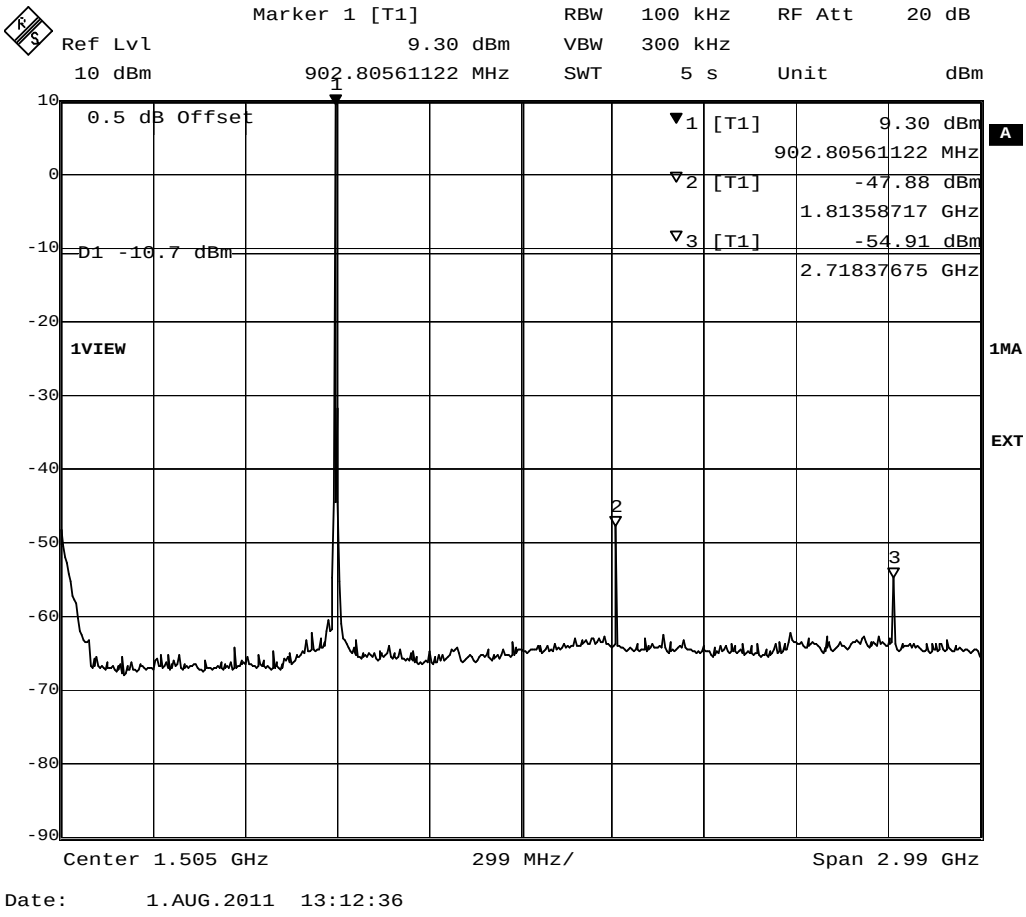
Frequency	Quasi-Peak	Quasi-Peak Limit	Quasi-Peak Difference	Status
150.45 kHz	35.66 dBµV	65.98 dBµV	-30.31 dB	Pass
192.3 kHz	46.57 dBµV	63.94 dBµV	-17.37 dB	Pass
224.7 kHz	40.76 dBµV	62.64 dBµV	-21.88 dB	Pass
509.1 kHz	39.8 dBµV	56 dBµV	-16.2 dB	Pass
13.668 MHz	36.55 dBµV	60 dBµV	-23.45 dB	Pass

Frequency	Average	Average Limit	Average Difference	Status
150.45 kHz	19.89 dBµV	55.98 dBµV	-36.08 dB	Pass
192.3 kHz	27.48 dBµV	53.94 dBµV	-26.46 dB	Pass
224.7 kHz	23.97 dBµV	52.64 dBµV	-28.67 dB	Pass
509.1 kHz	31.35 dBµV	46 dBµV	-14.65 dB	Pass
13.668 MHz	30.62 dBµV	50 dBµV	-19.38 dB	Pass

Annex E Transmitter conducted spurious emissions

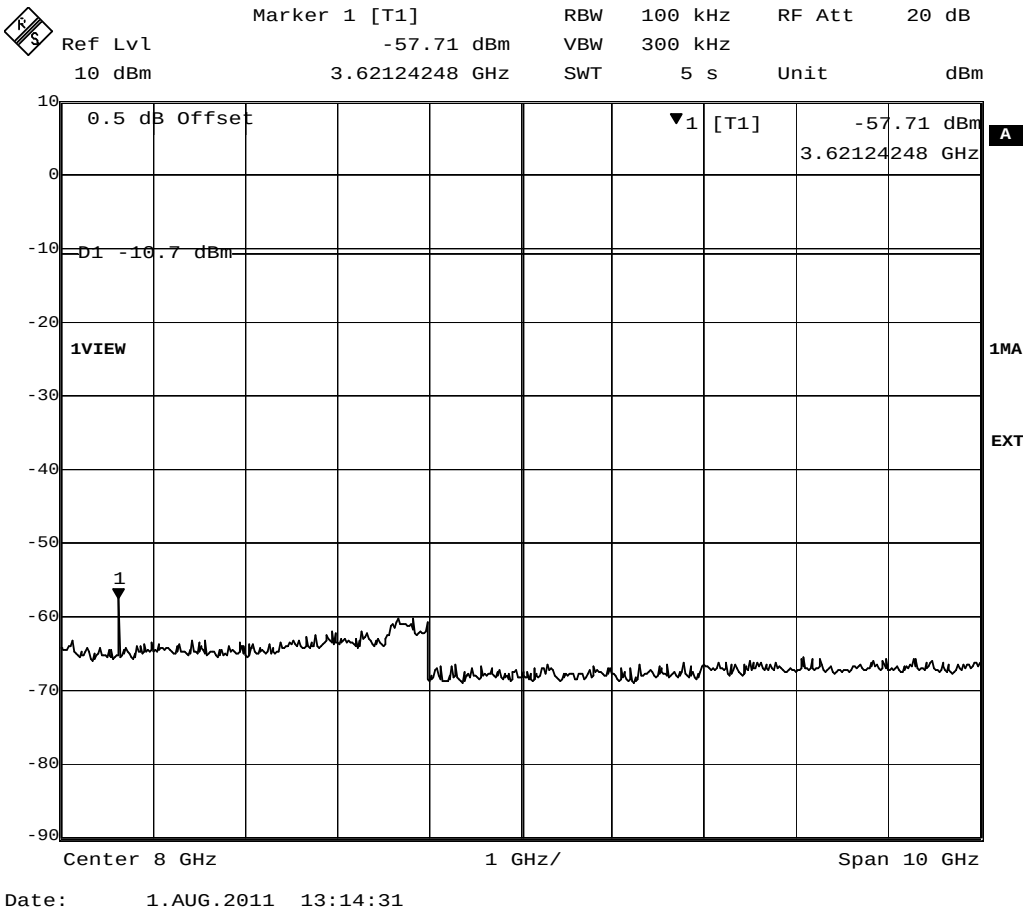
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 906 MHz
Comment 3	BPSK



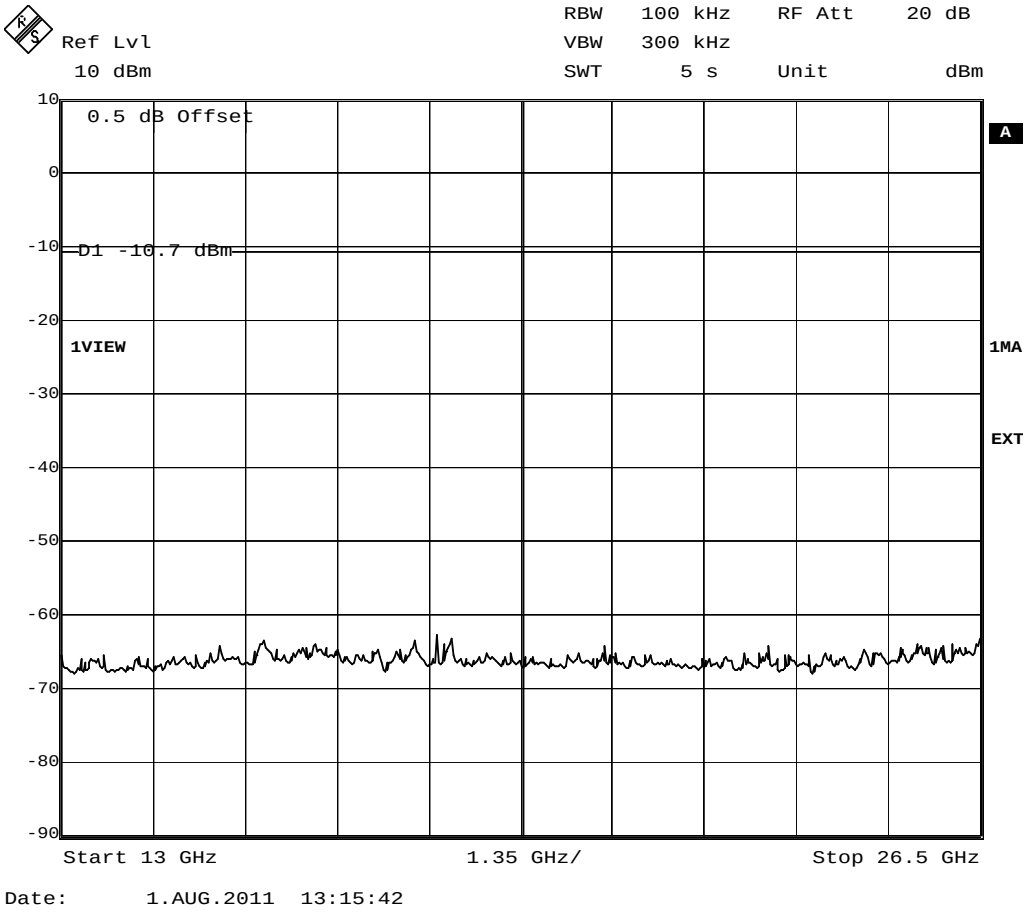
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 906 MHz
Comment 3	BPSK



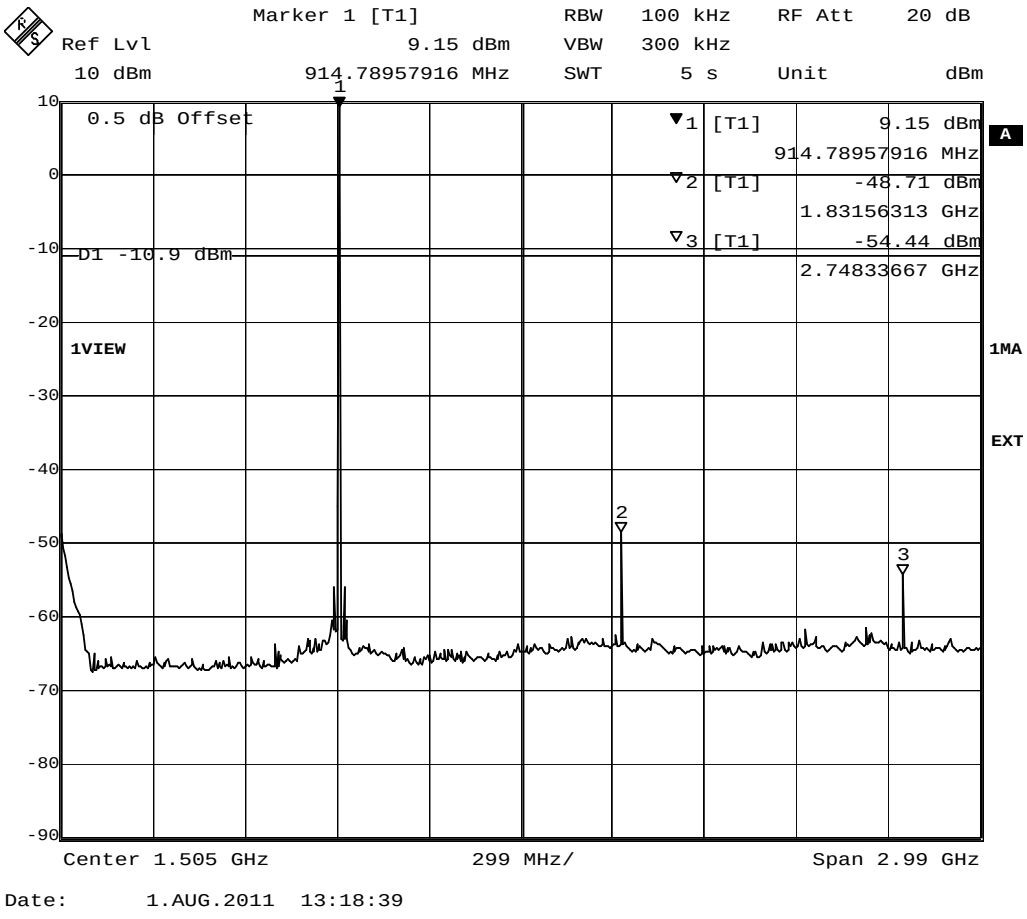
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 906 MHz
Comment 3	BPSK



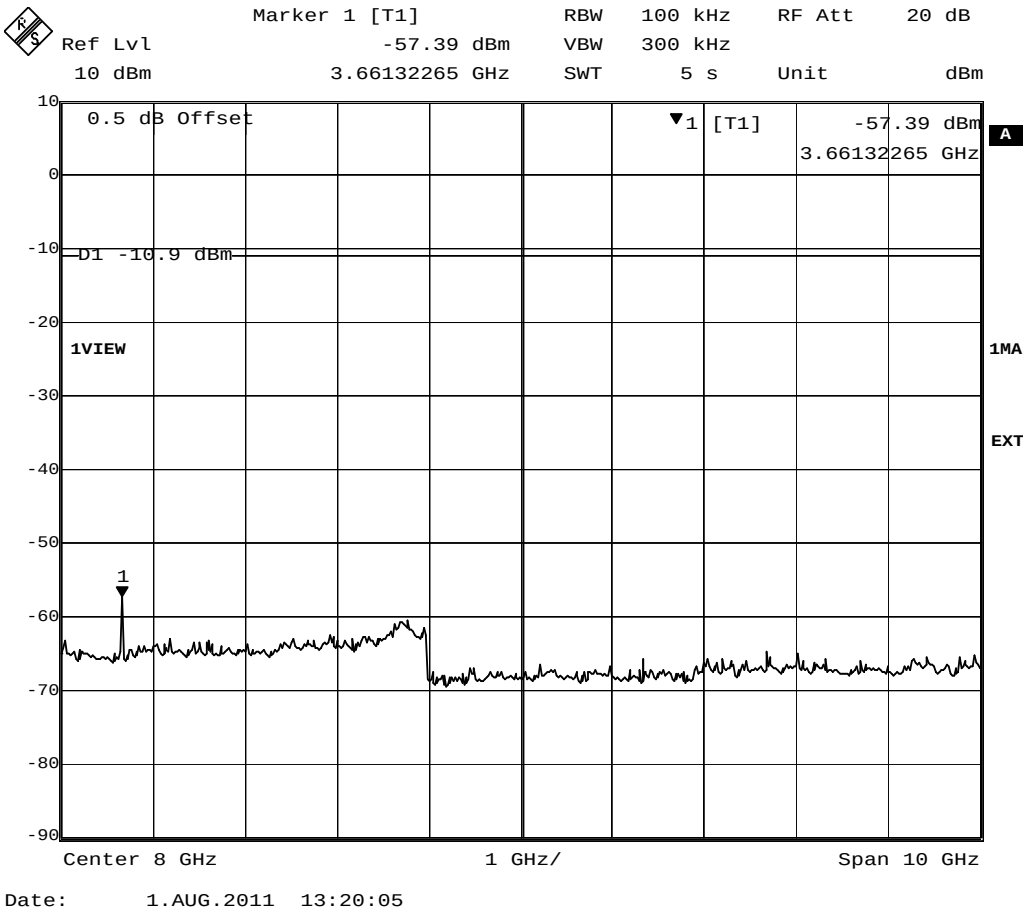
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 916 MHz
Comment 3	BPSK



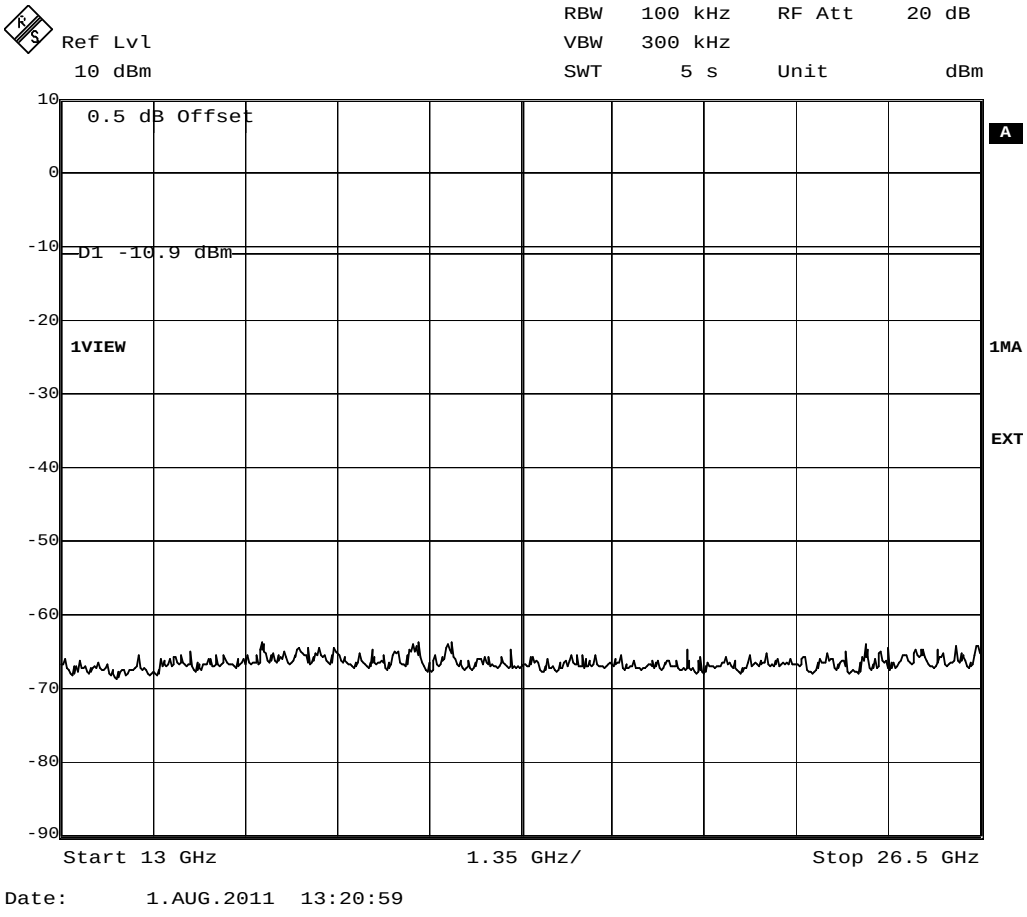
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 916 MHz
Comment 3	BPSK



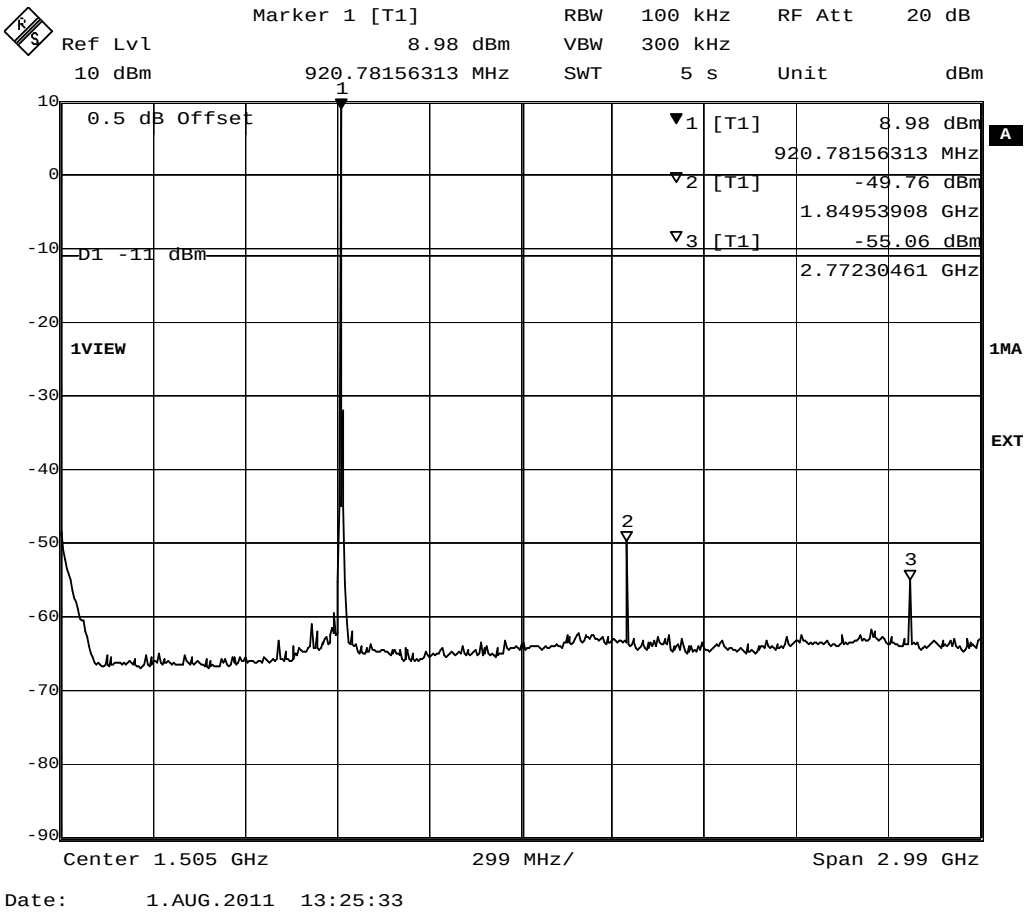
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 916 MHz
Comment 3	BPSK



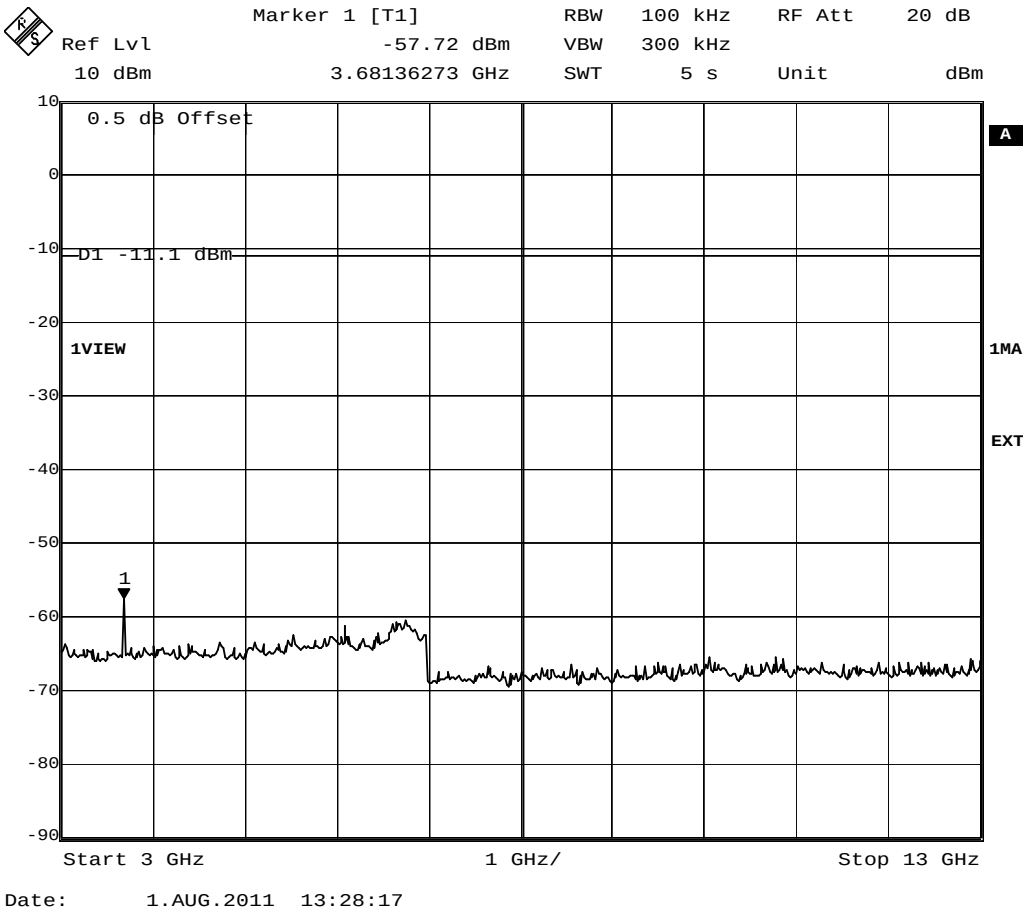
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 924 MHz
Comment 3	BPSK



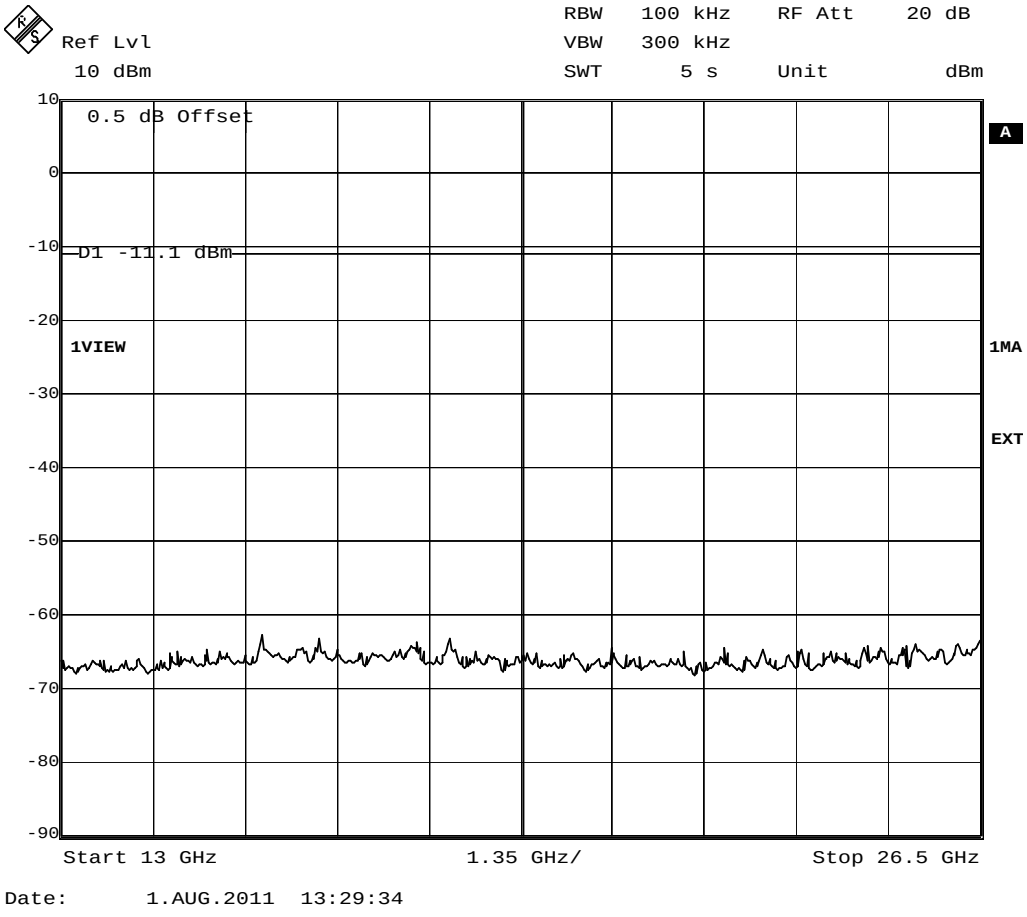
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 924 MHz
Comment 3	BPSK



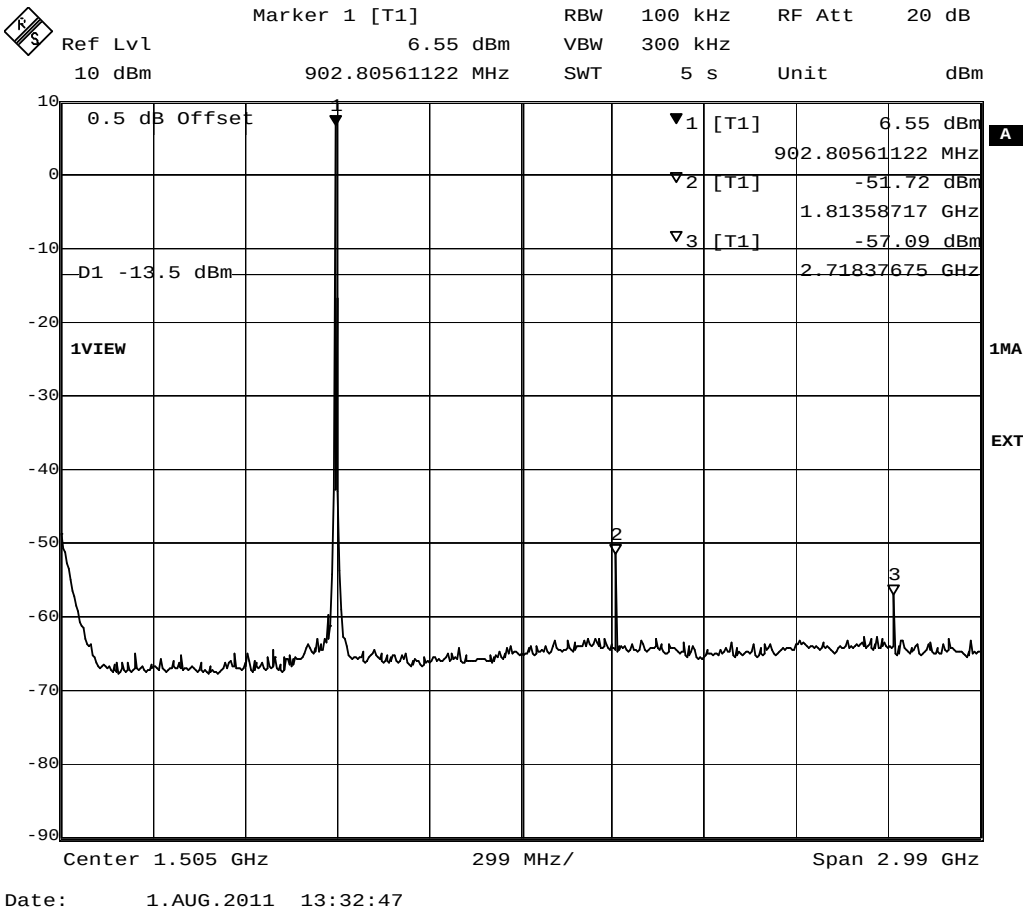
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 924 MHz
Comment 3	BPSK



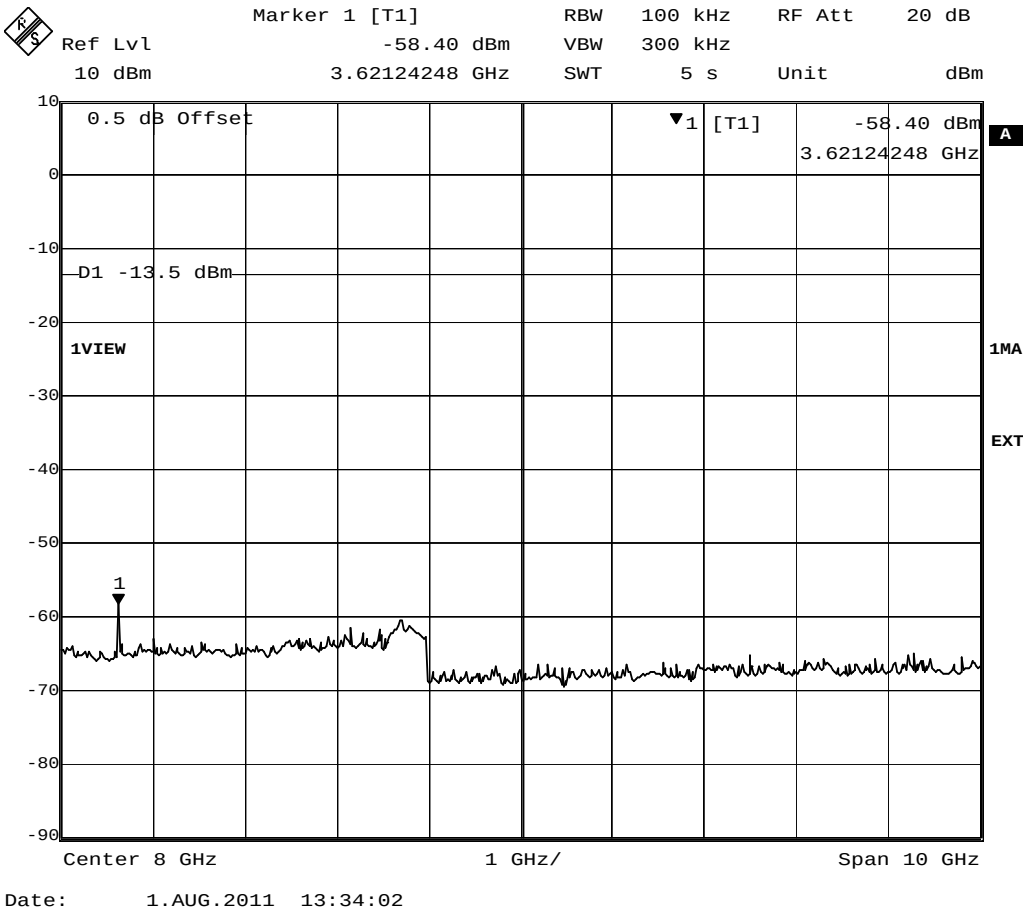
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 906 MHz
Comment 3	0-QPSK



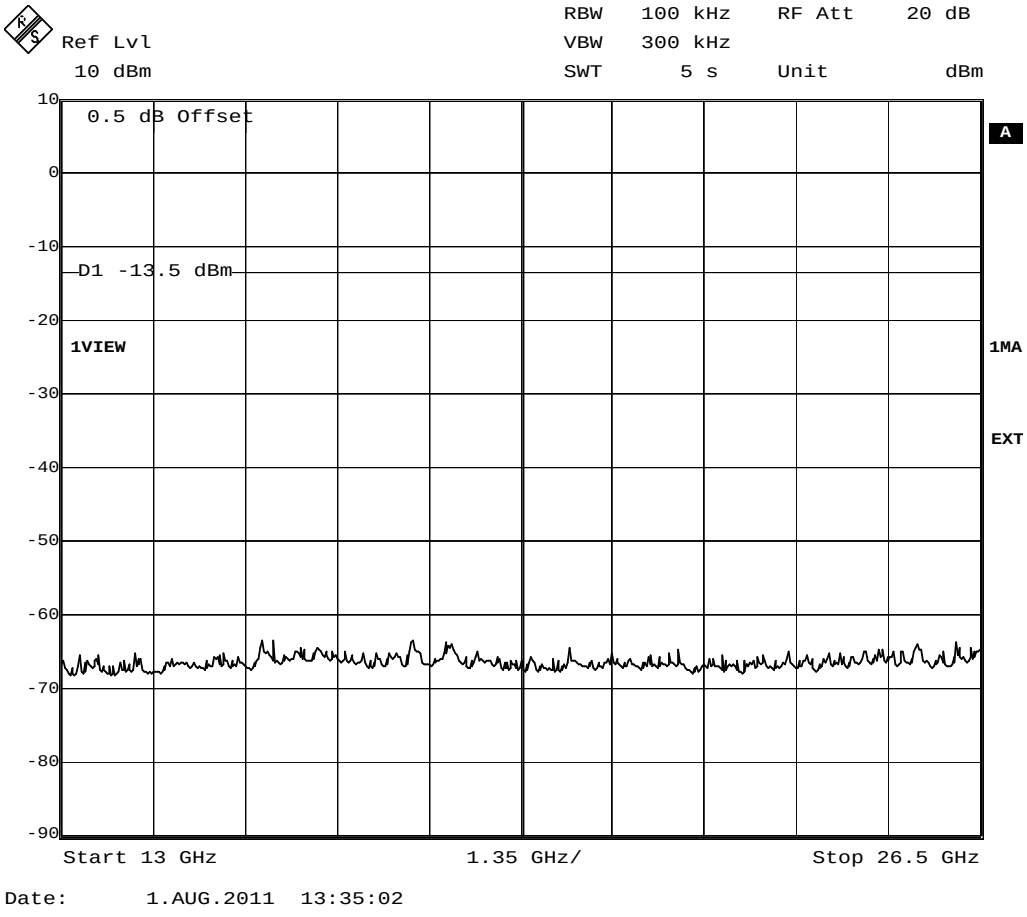
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 906 MHz
Comment 3	0-QPSK



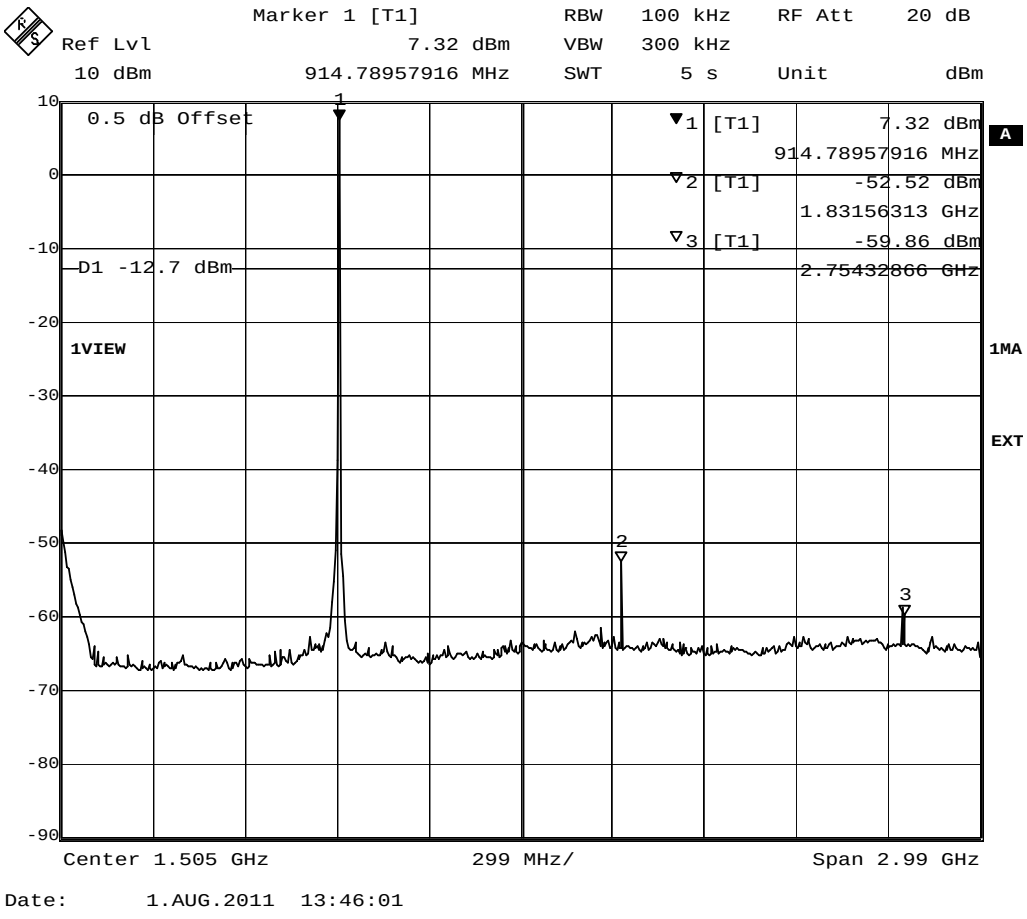
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 906 MHz
Comment 3	0-QPSK



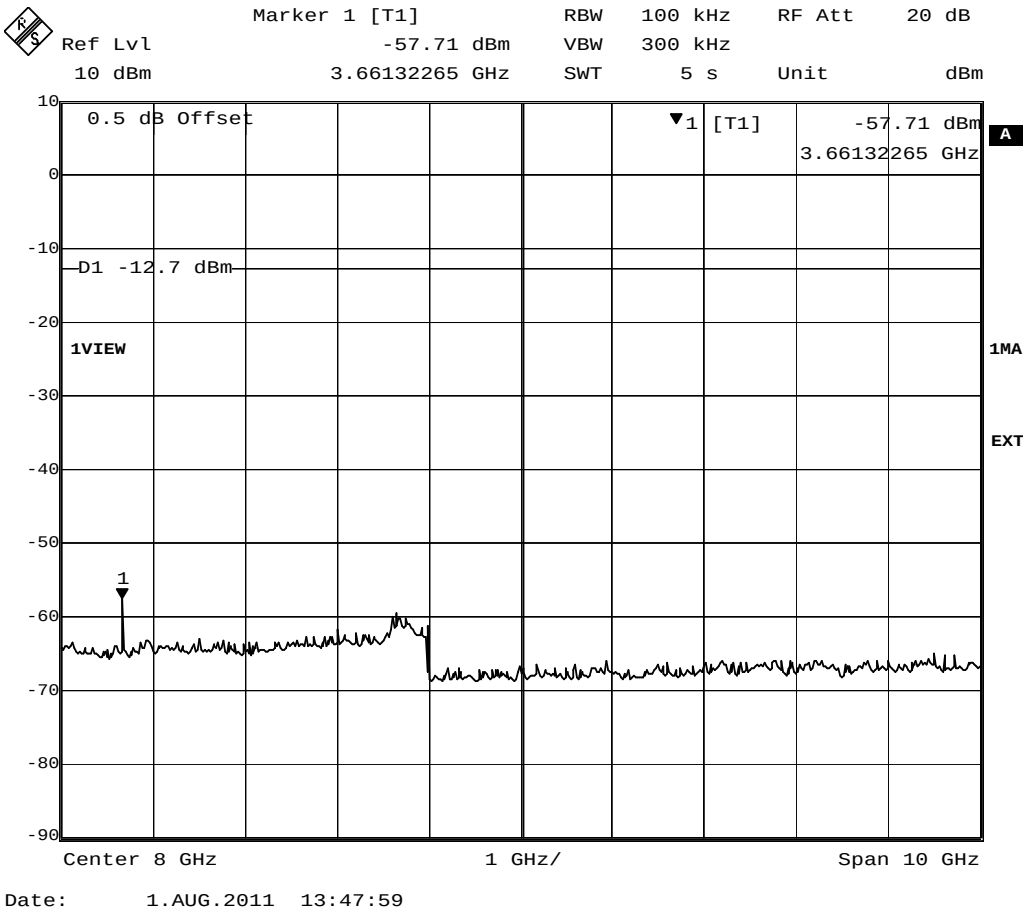
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 916 MHz
Comment 3	0-QPSK



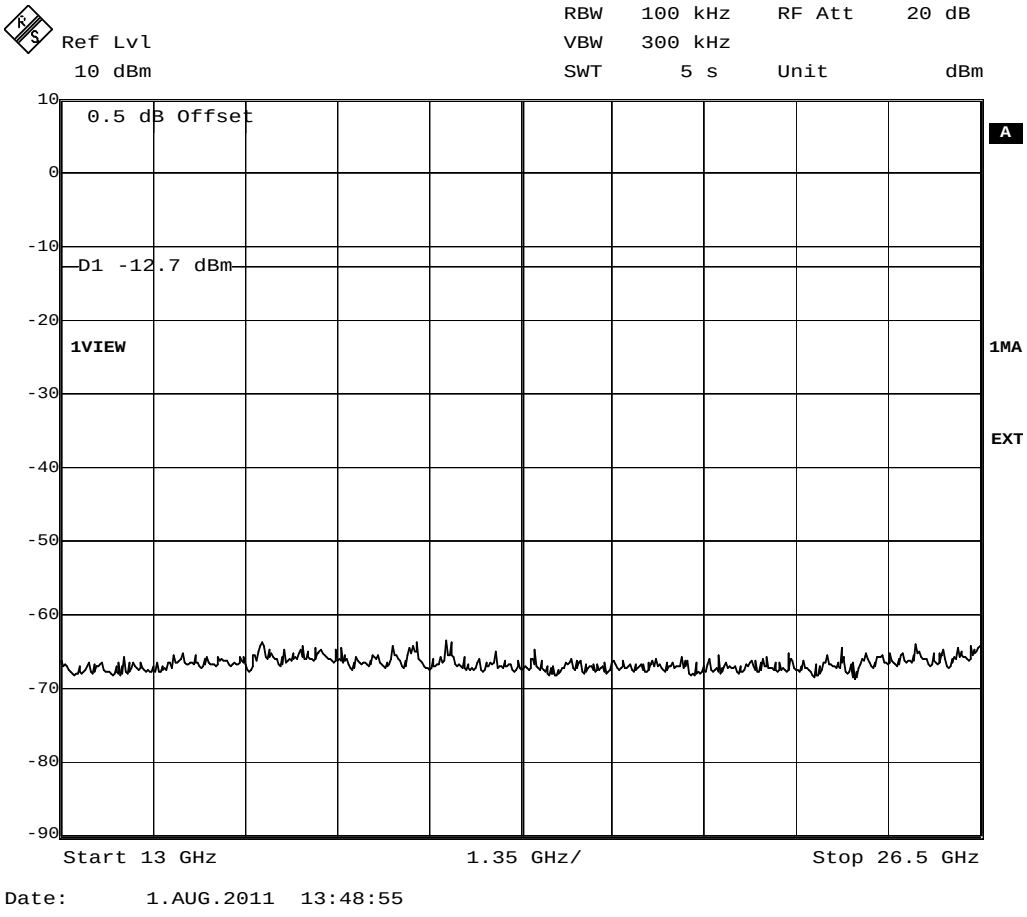
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 916 MHz
Comment 3	0-QPSK



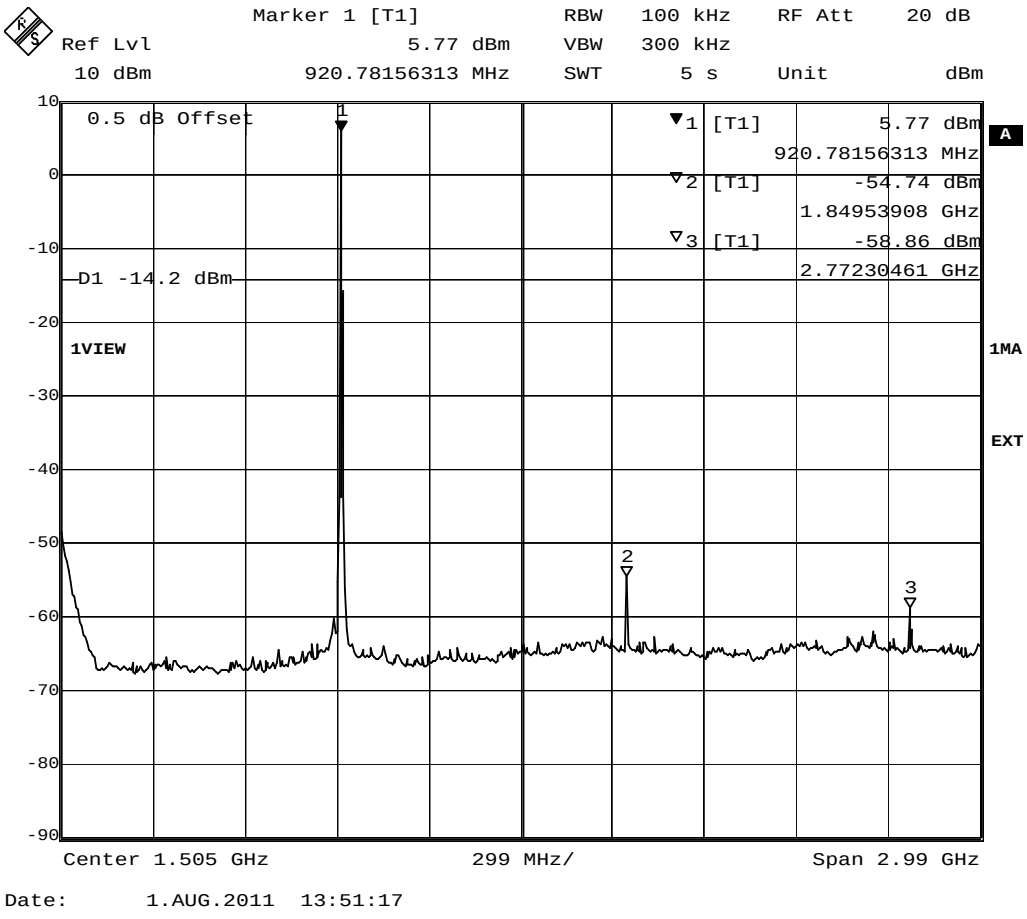
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 916 MHz
Comment 3	0-QPSK



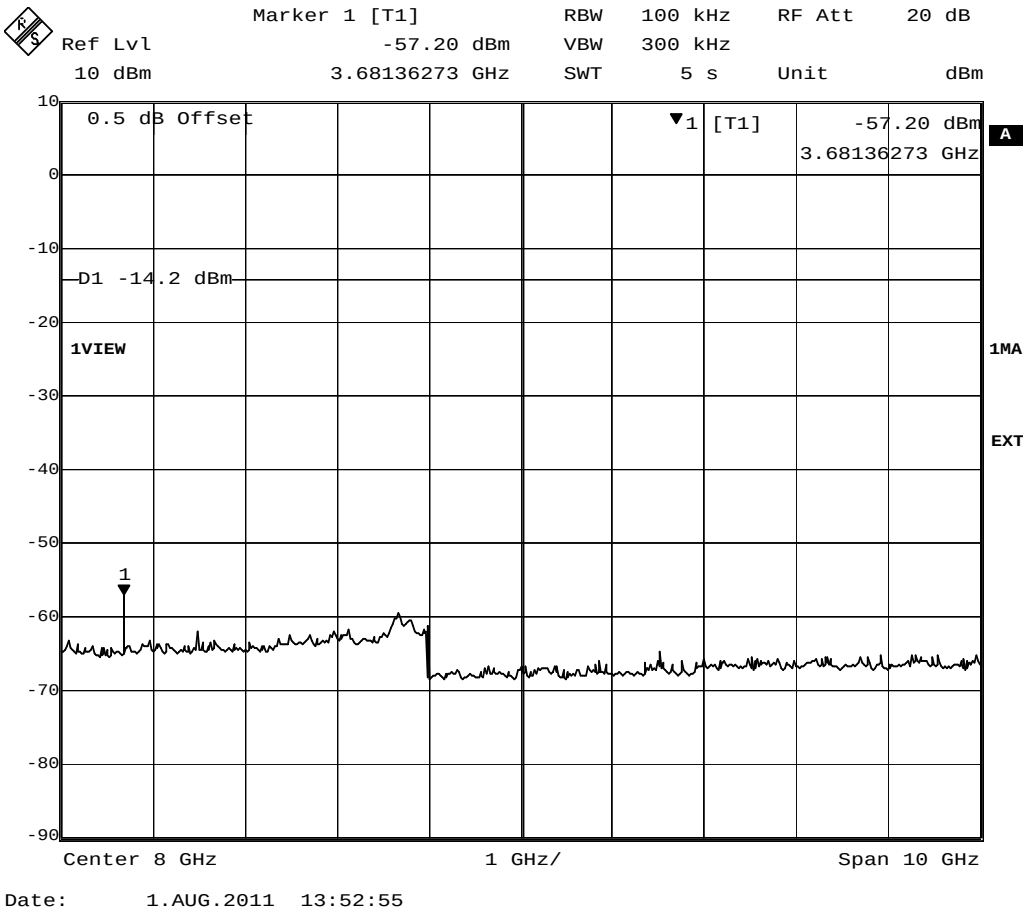
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 924 MHz
Comment 3	0-QPSK



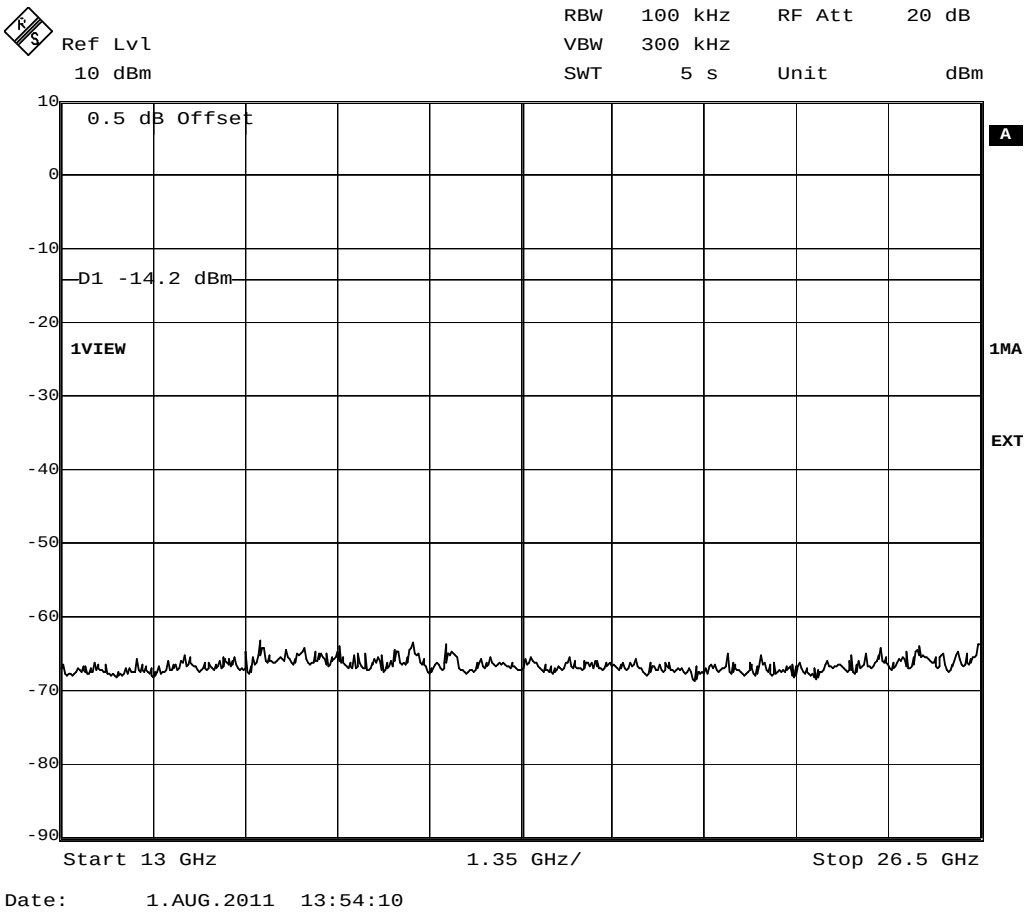
FCC part 15.247 (d)
Spurious Emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 924 MHz
Comment 3	0-QPSK



FCC part 15.247 (d)
Spurious Emissions

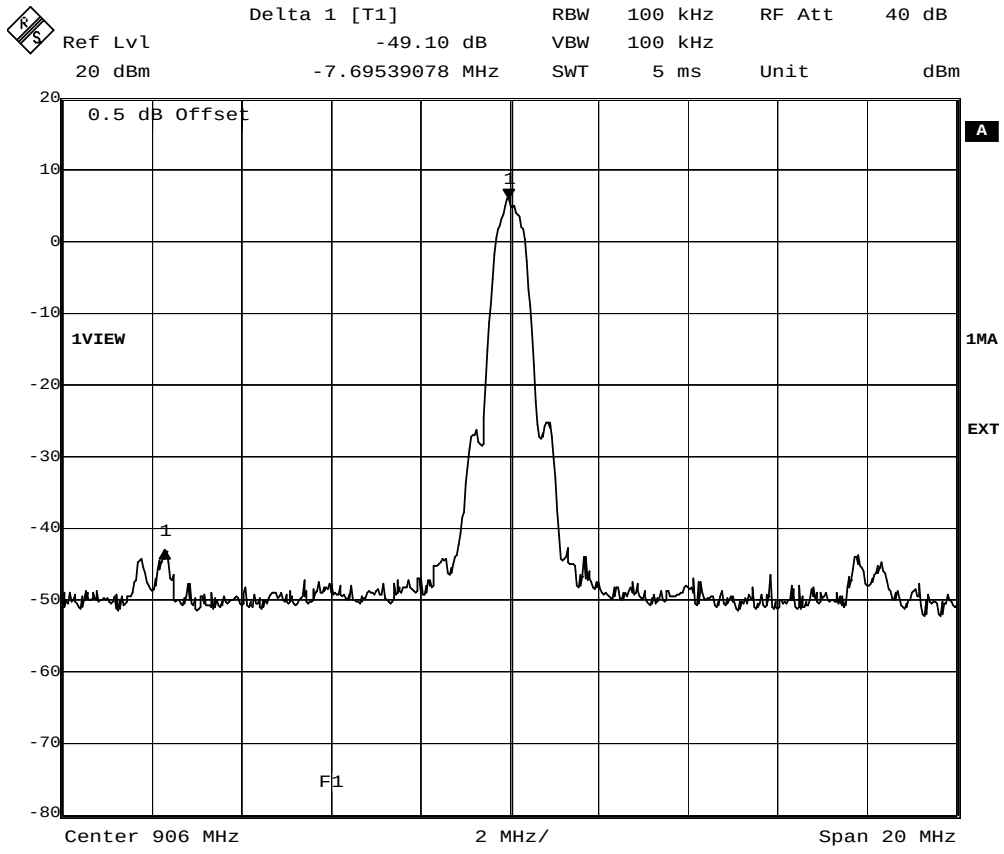
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 924 MHz
Comment 3	0-QPSK



Annex F Band edge compliance

FCC part 15.247
Band-edge compliance of RF conducted emissions

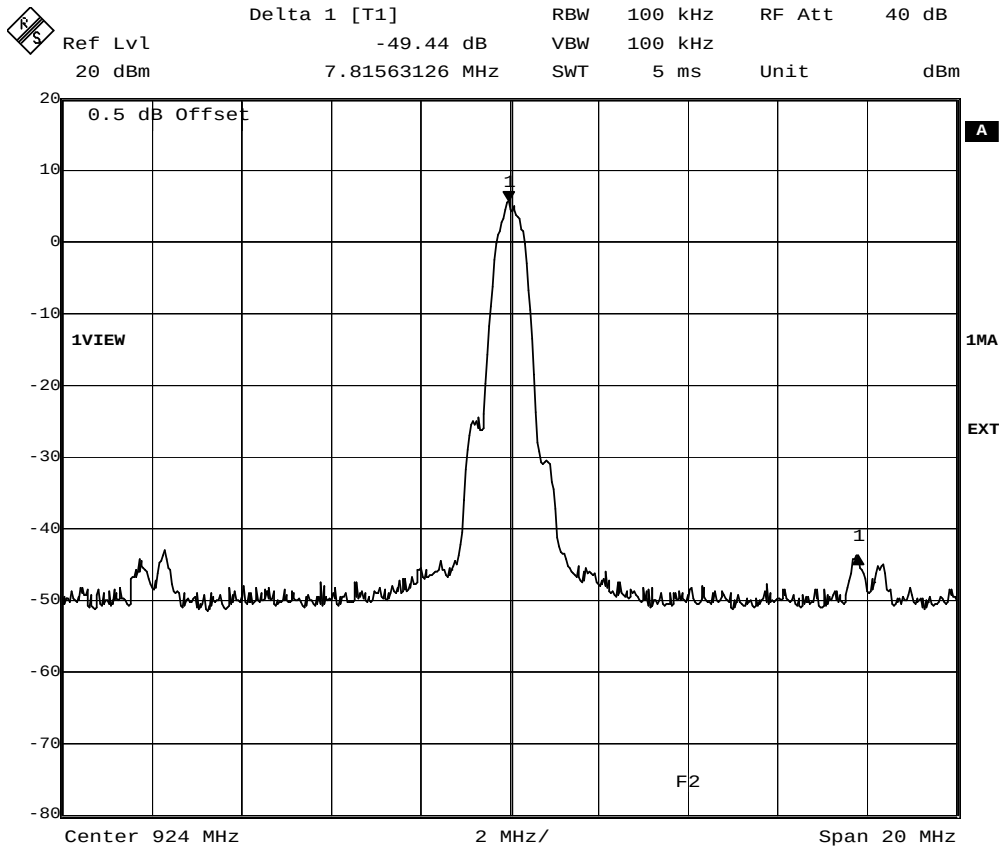
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 906 MHz
Comment 3	BPSK



Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 1.AUG.2011 14:30:19

FCC part 15.247
Band-edge compliance of RF conducted emissions

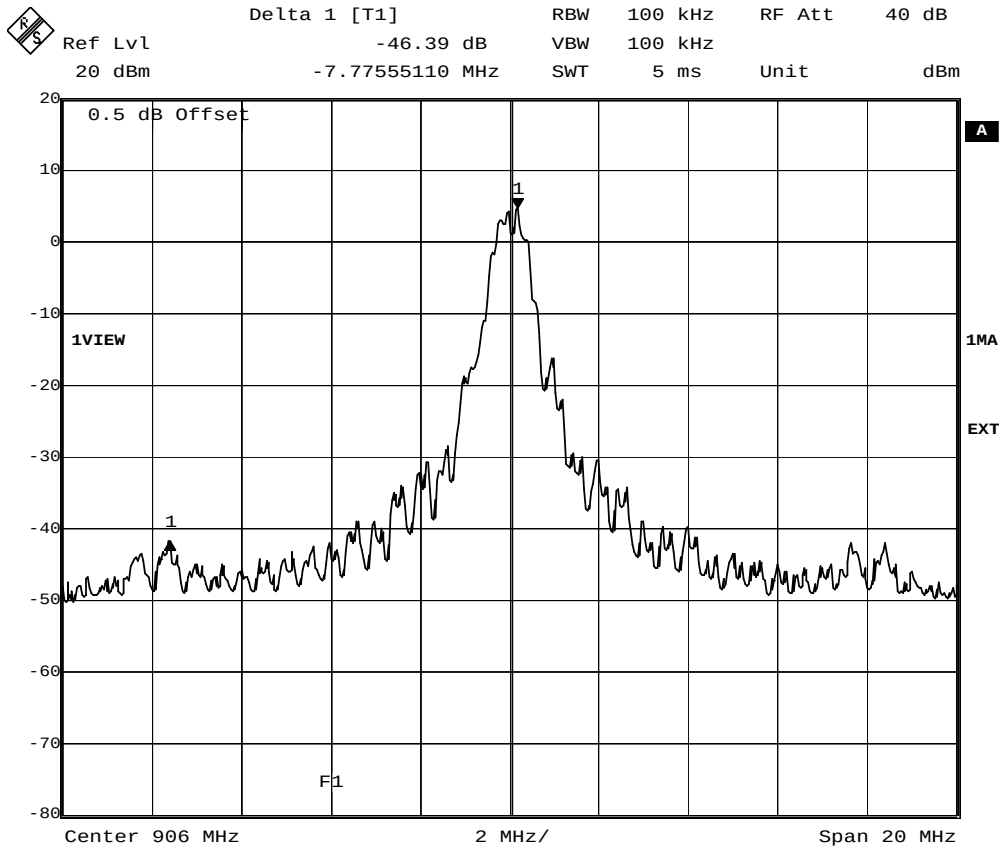
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 924 MHz
Comment 3	BPSK



Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 1.AUG.2011 14:32:21

FCC part 15.247
Band-edge compliance of RF conducted emissions

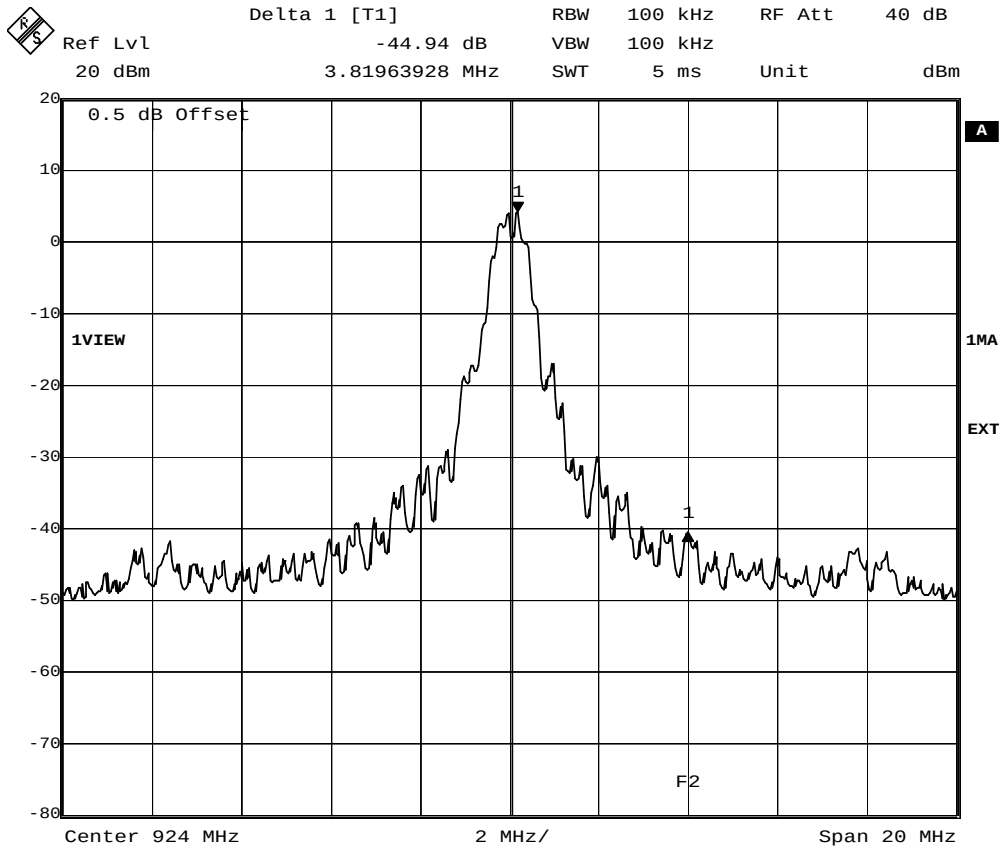
EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 906 MHz
Comment 3	0-QPSK



Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 1.AUG.2011 14:37:00

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Radio Module
Model	ZWIR4512AC1
Approval Holder	Zentrum Mikroelektronik Dresden AG / Ord.: G0M-1107-1263
Temperature / Voltage	25°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 924 MHz
Comment 3	0-QPSK



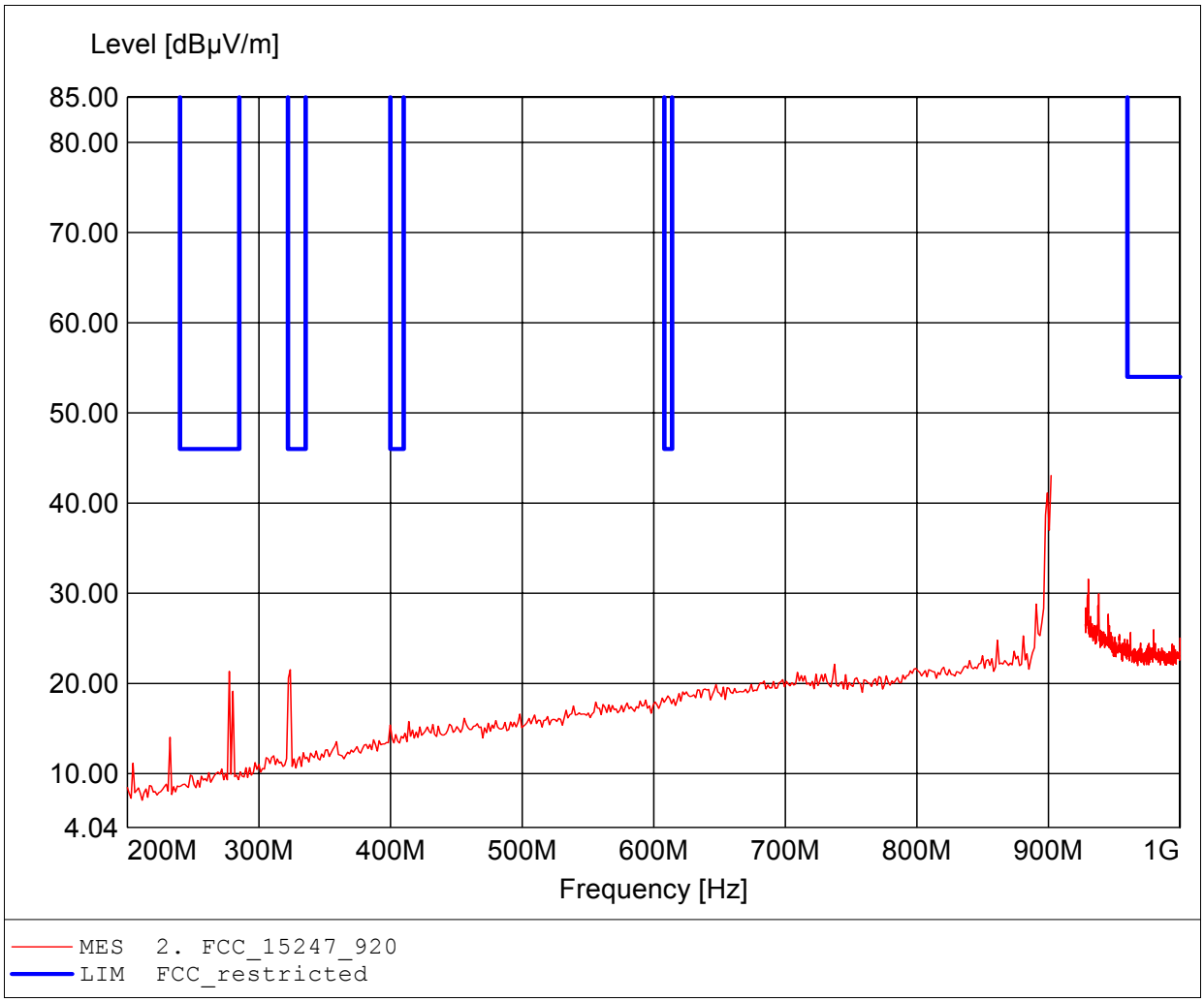
Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 1.AUG.2011 14:34:44

Annex G Transmitter radiated spurious emissions

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

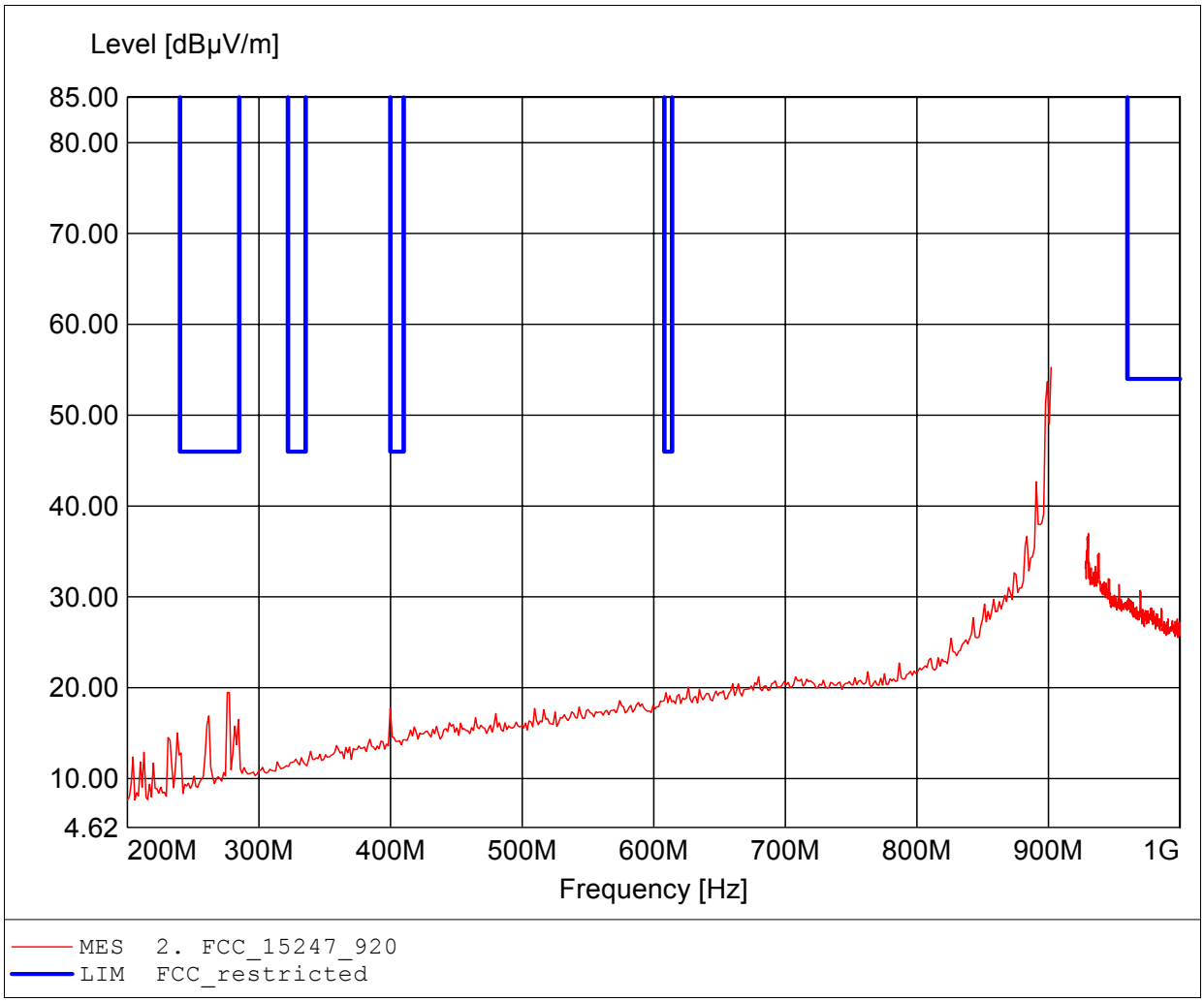
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 902.000MHz, Emax: 43.05dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

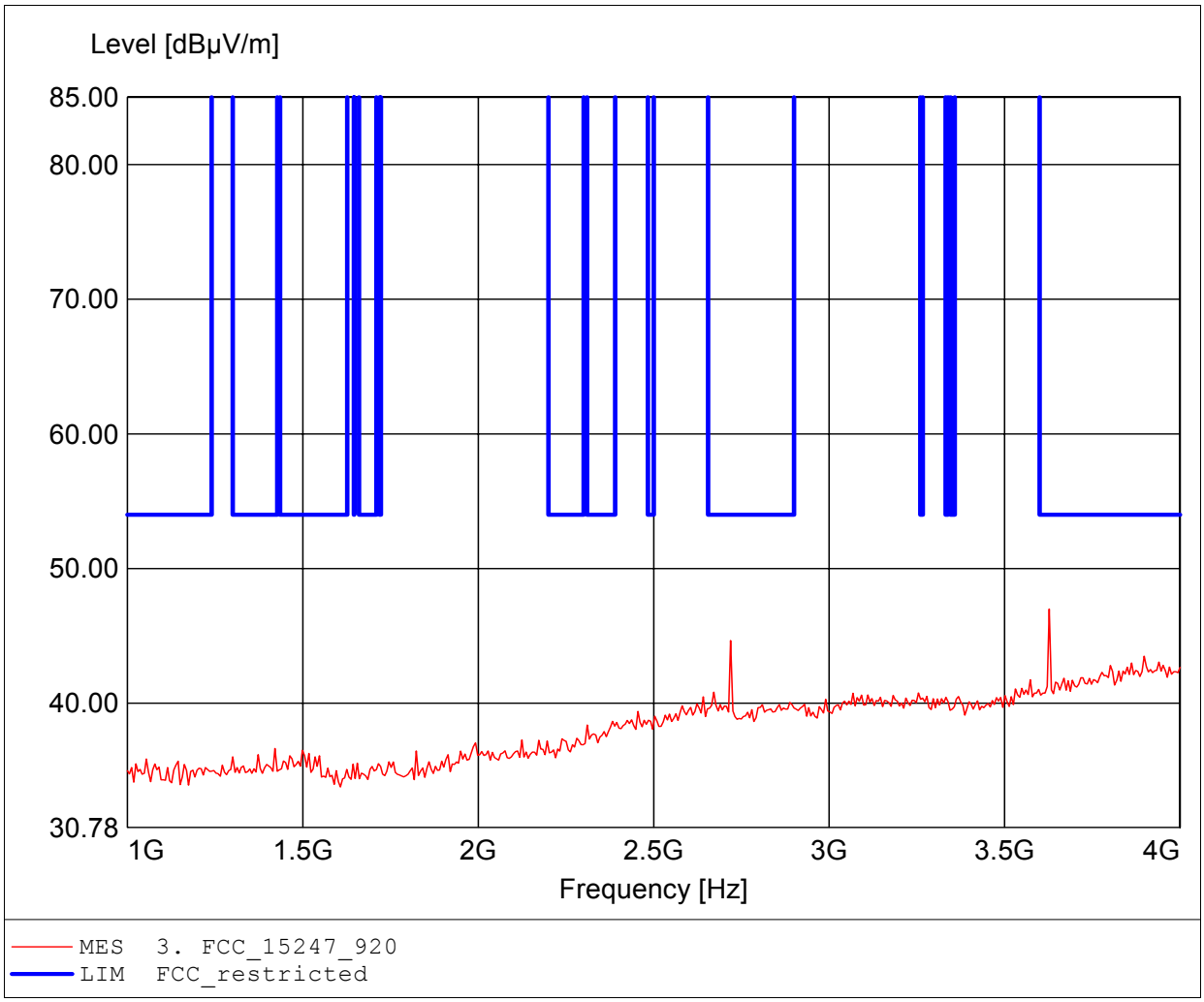
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 902.000MHz, Emax: 55.27dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

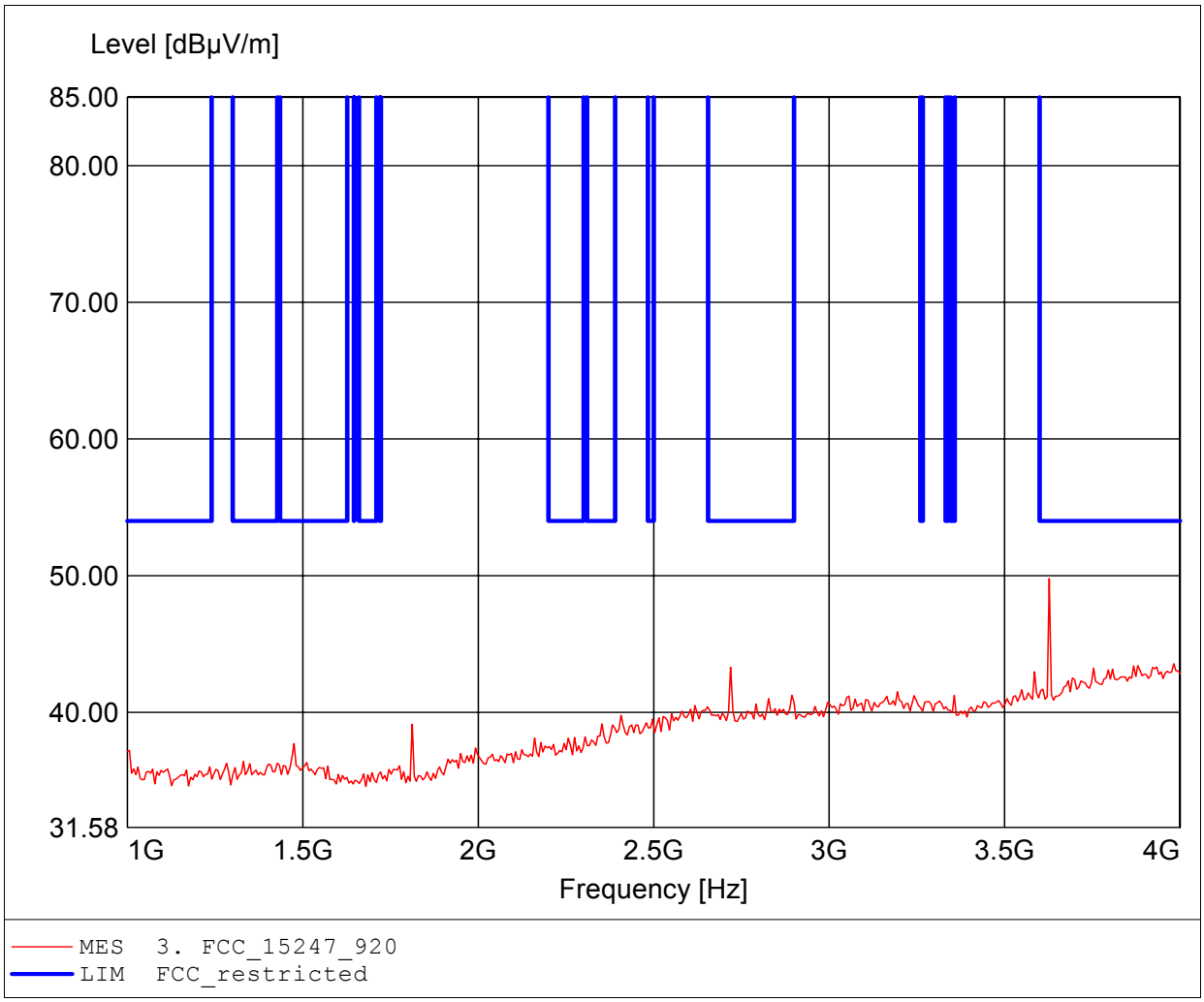
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.627GHz, Emax: 46.99dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

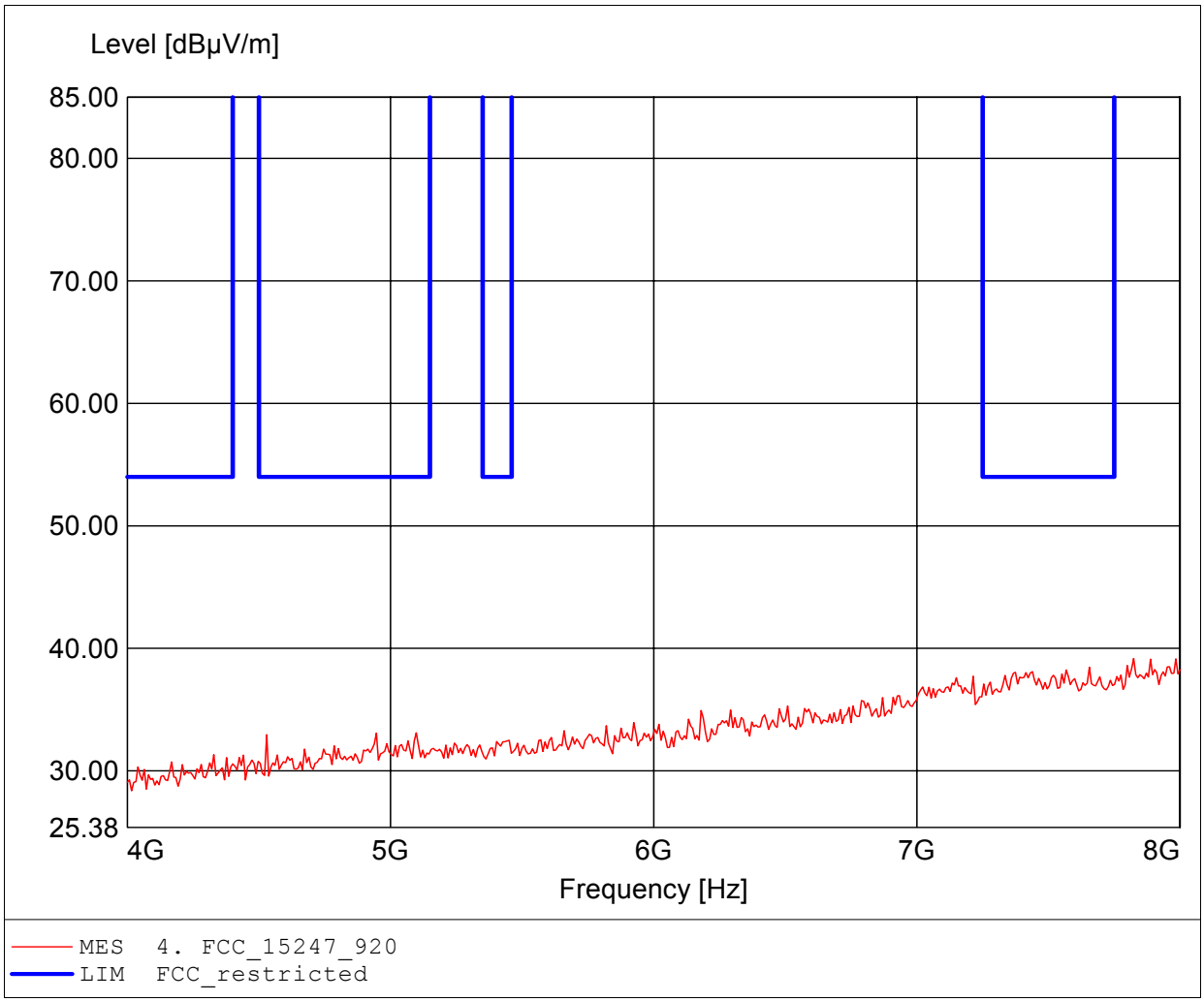
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.627GHz, Emax: 49.79dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

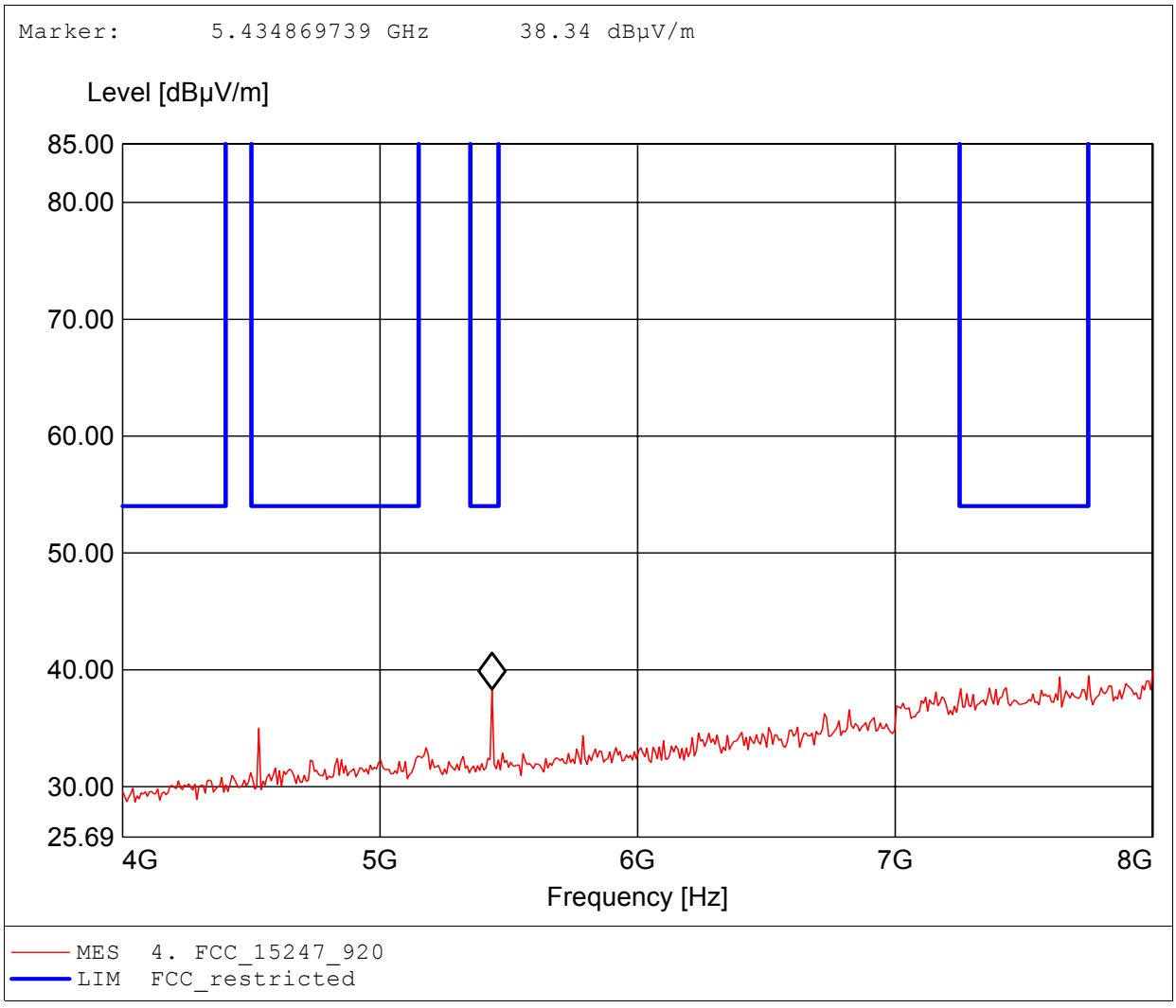
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.824GHz, Emax: 39.17dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

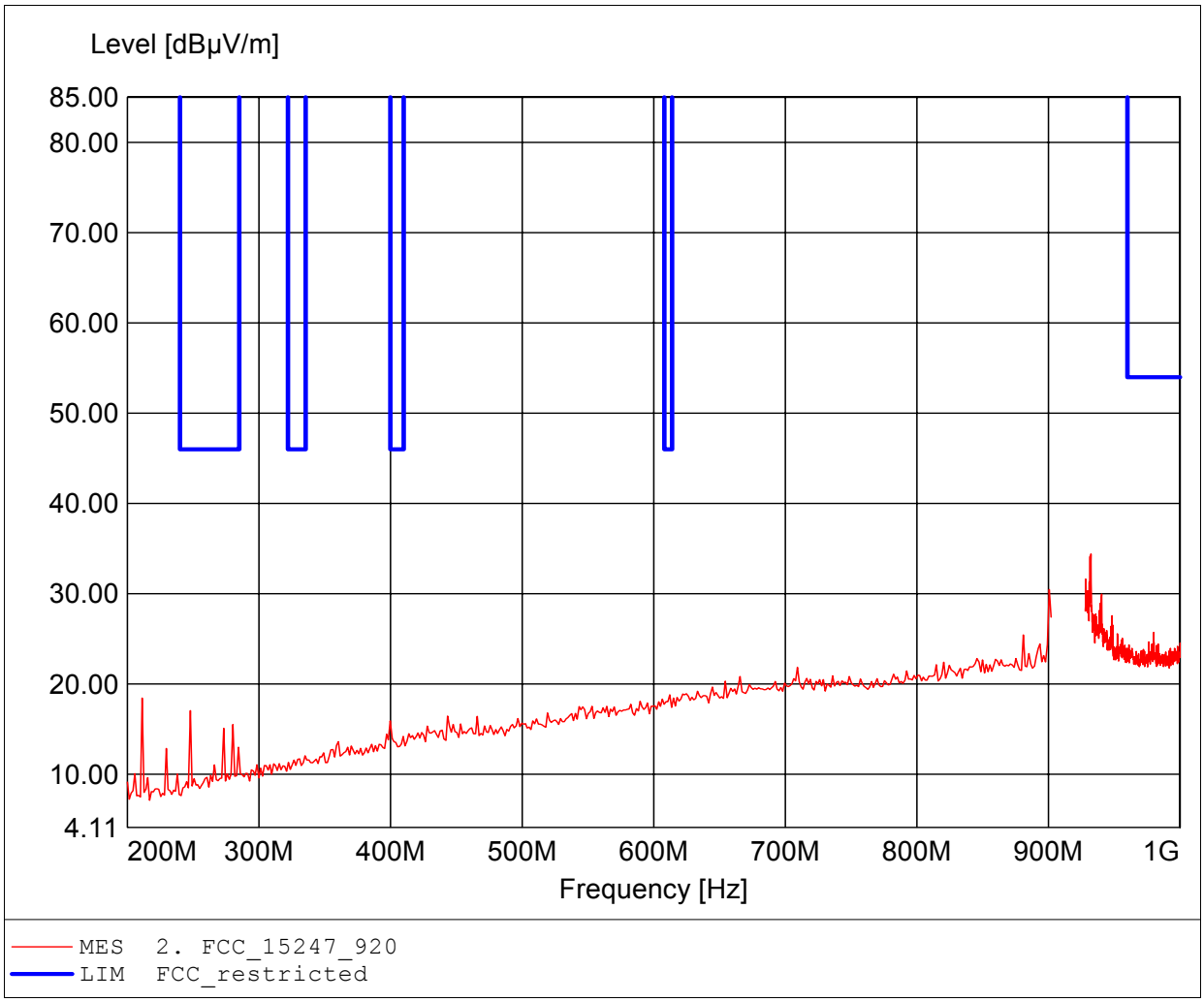
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 8.000GHz, Emax: 39.94dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

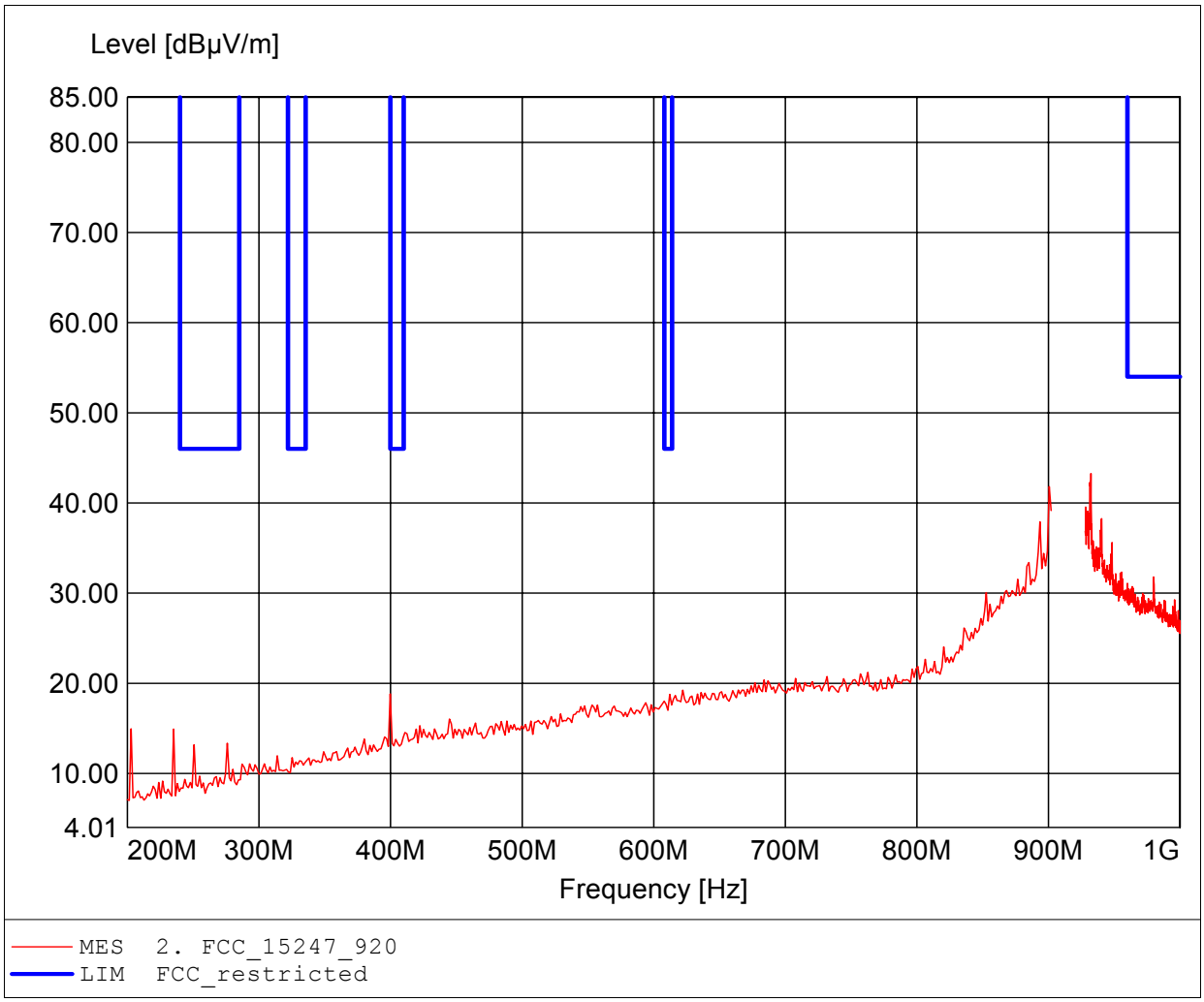
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 932.329MHz, Emax: 34.41dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

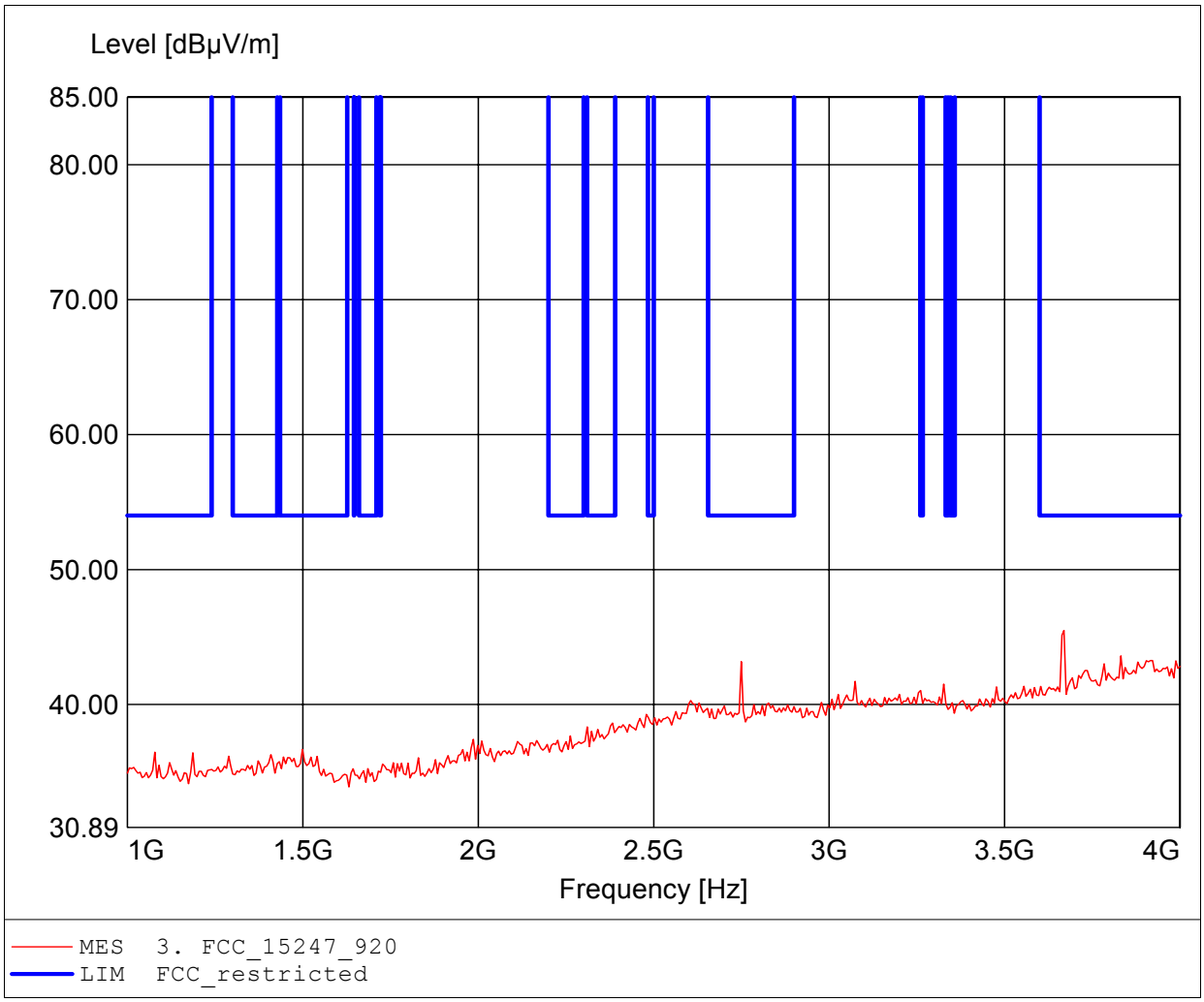
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 932.329MHz, Emax: 43.27dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

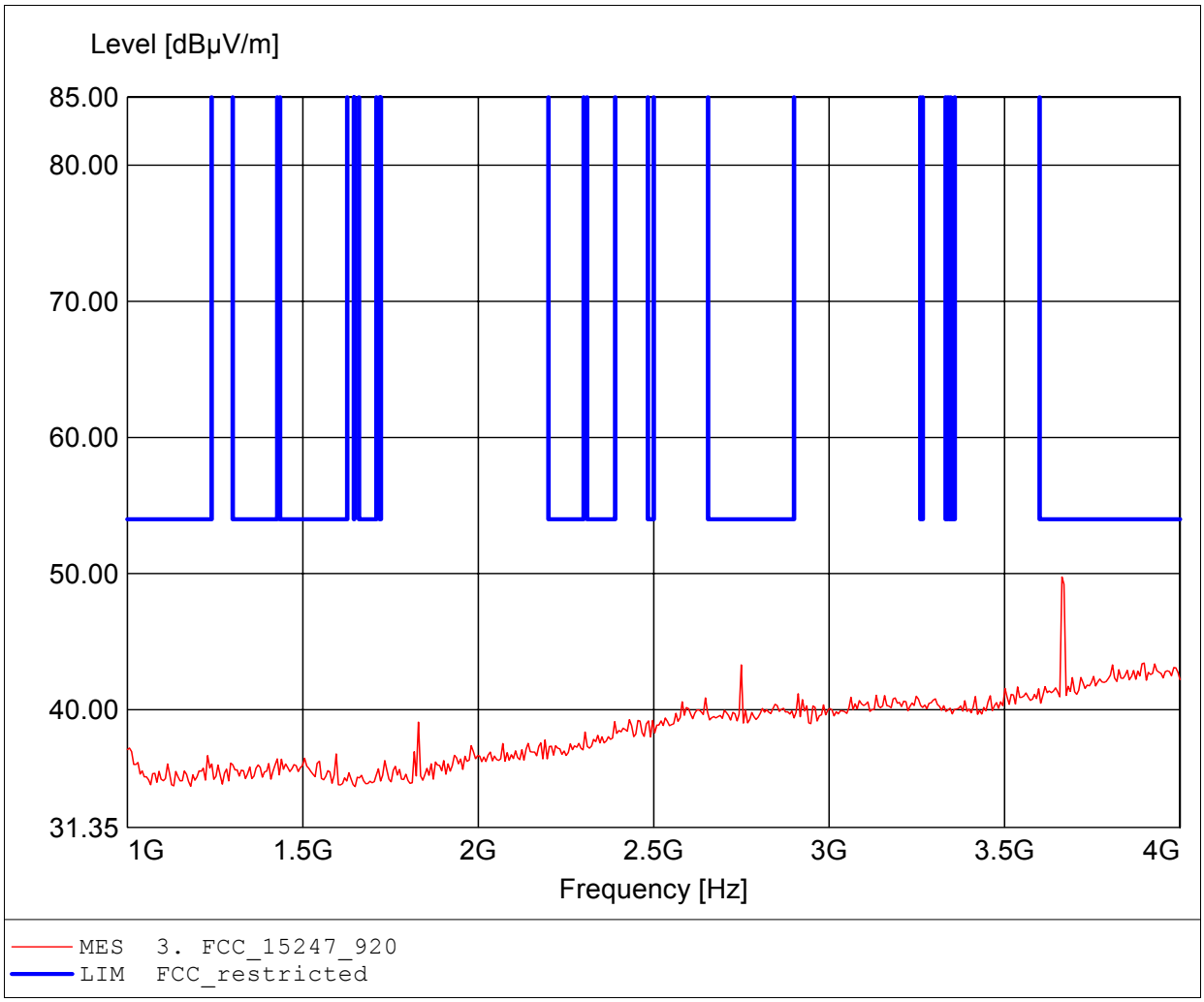
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.669GHz, Emax: 45.48dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

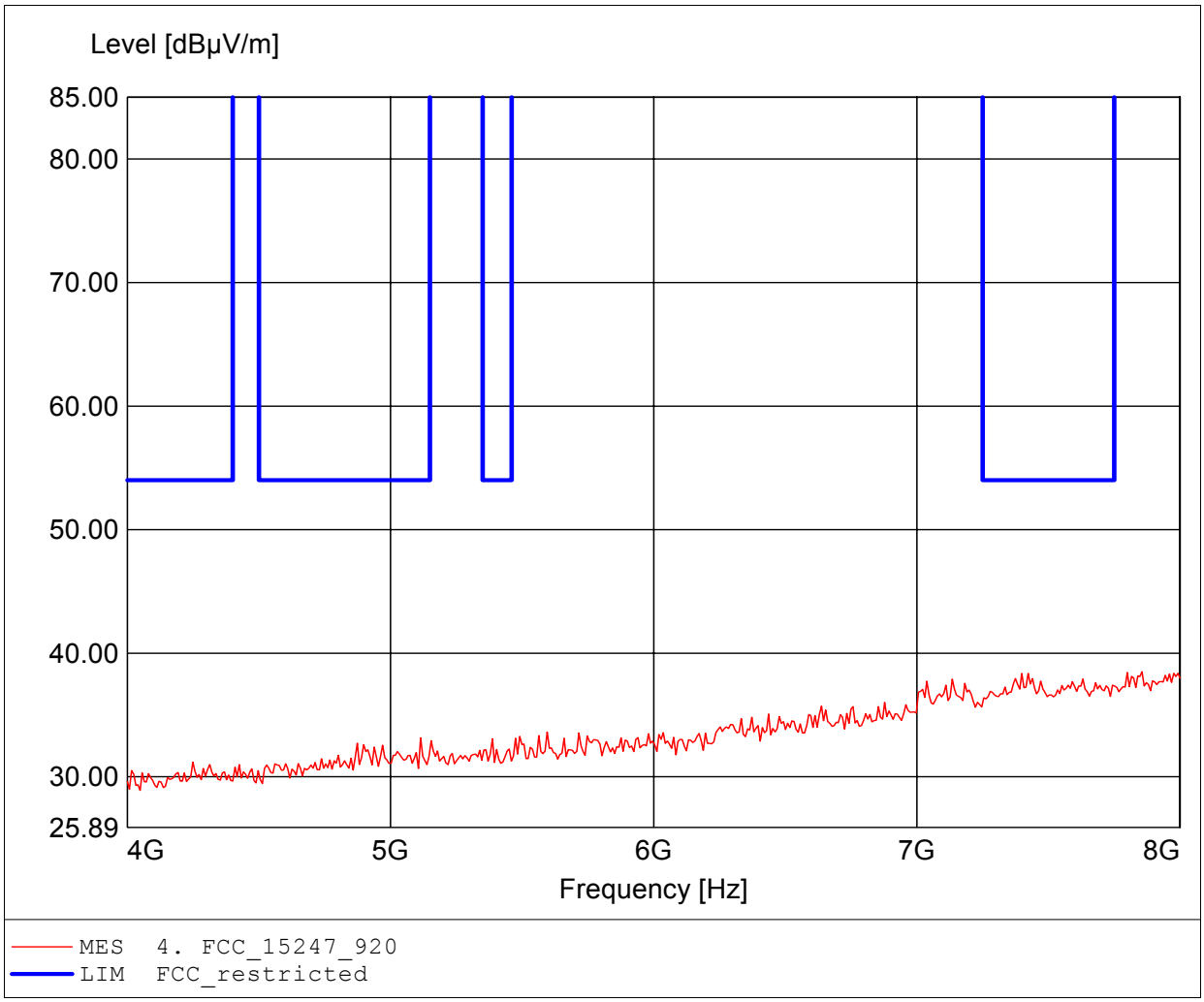
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.663GHz, Emax: 49.76dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

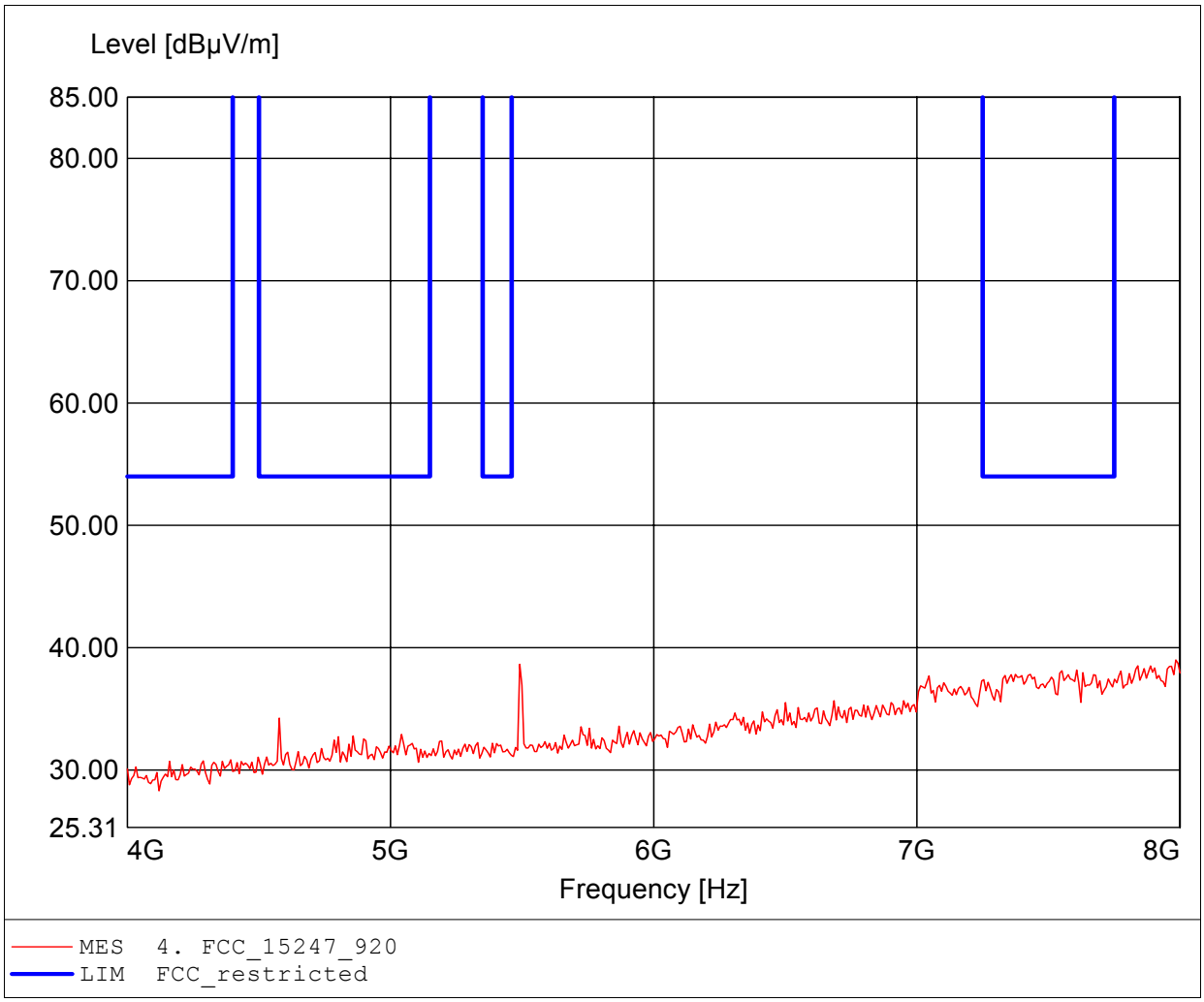
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.856GHz, Emax: 38.49dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

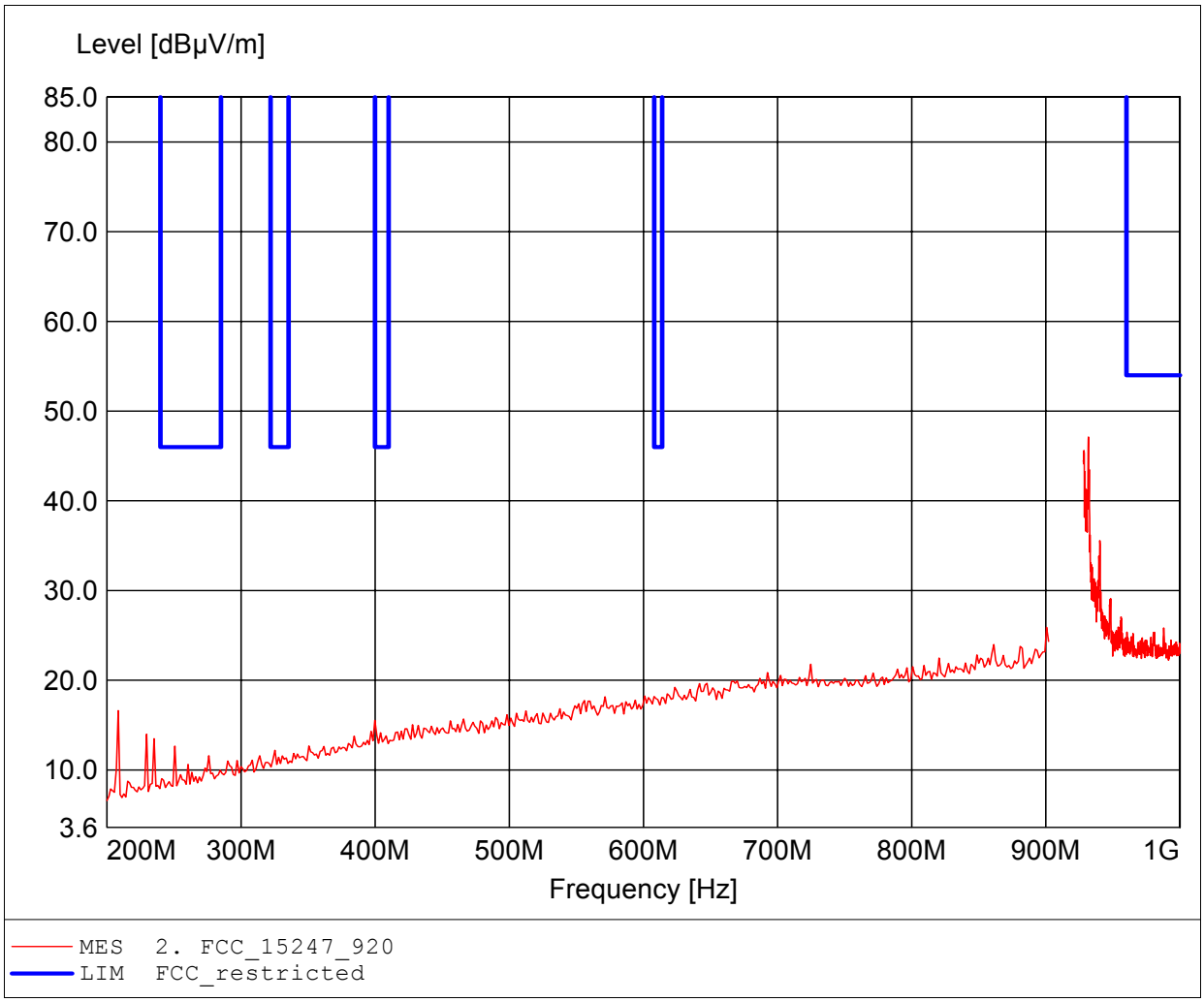
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.984GHz, Emax: 39.01dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

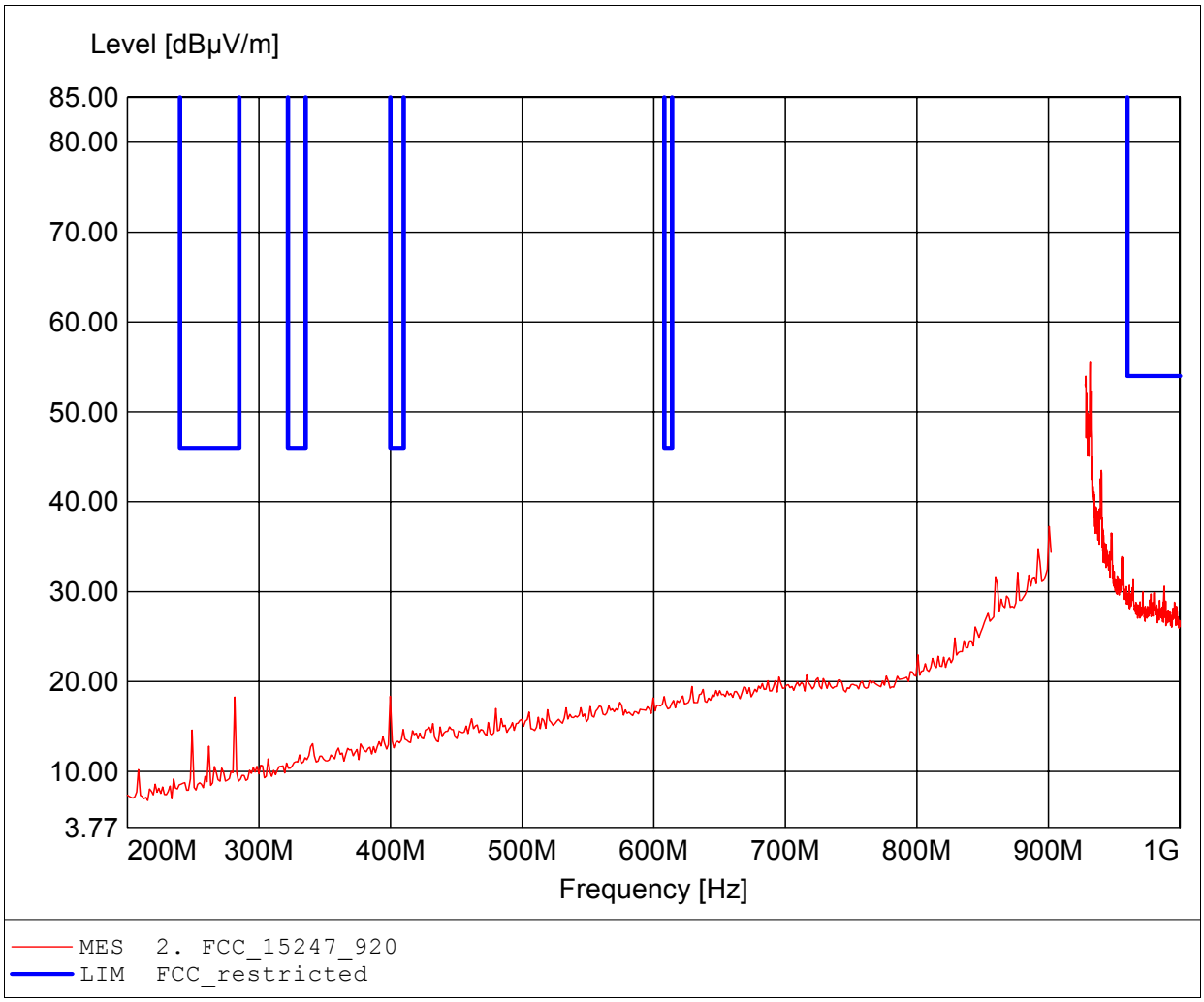
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 931.752MHz, Emax: 47.12dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

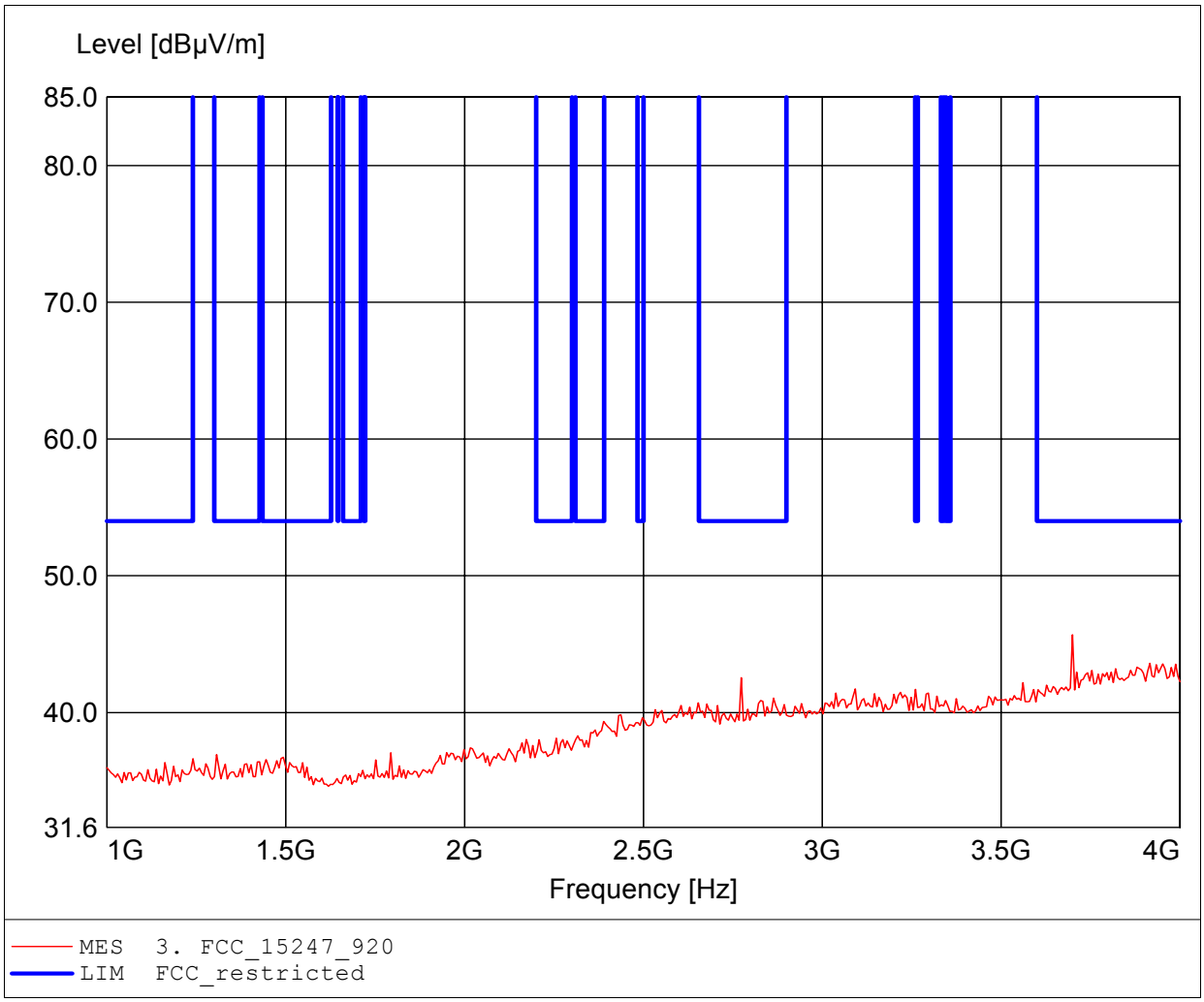
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 931.752MHz, Emax: 55.52dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

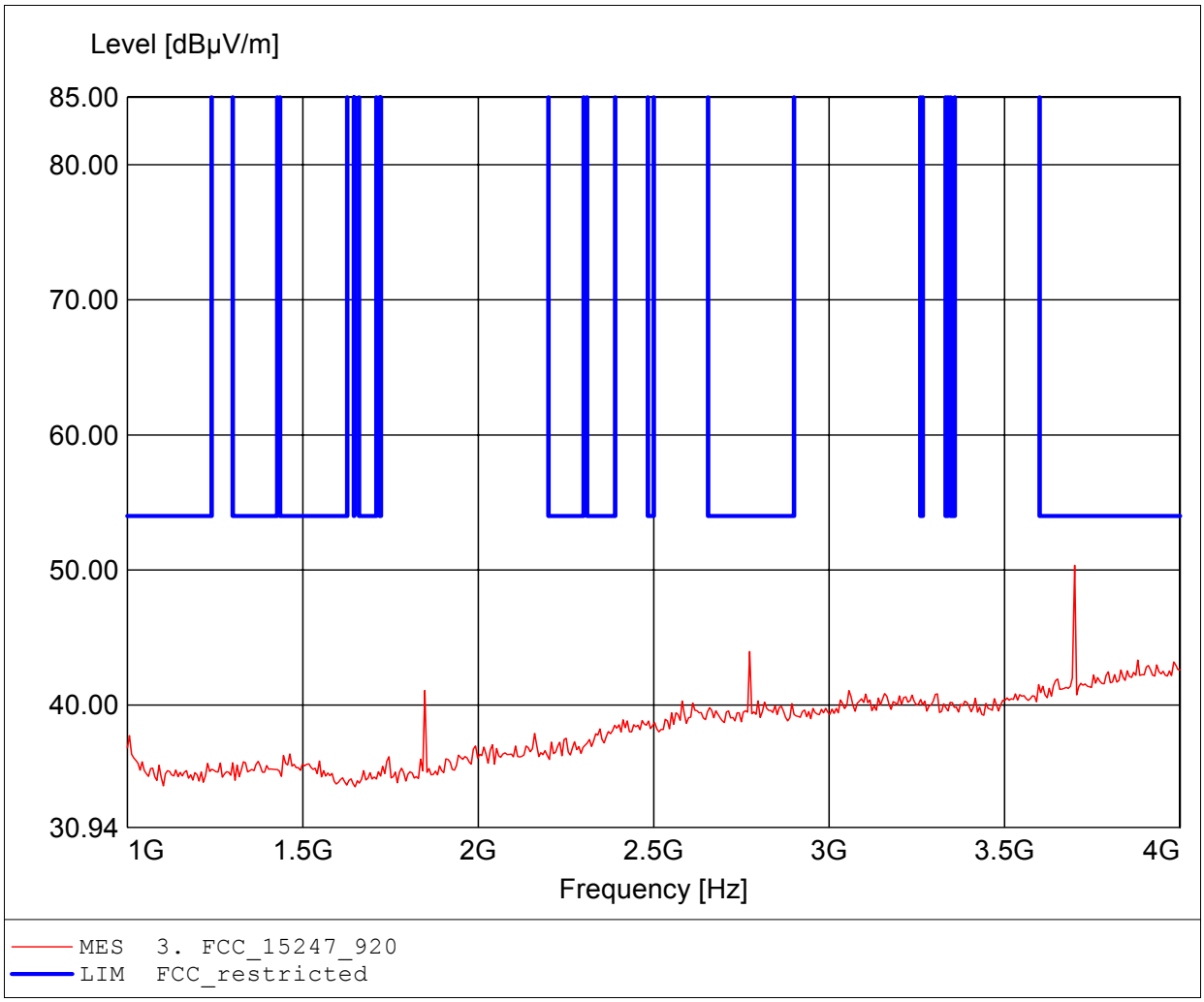
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.699GHz, Emax: 45.69dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

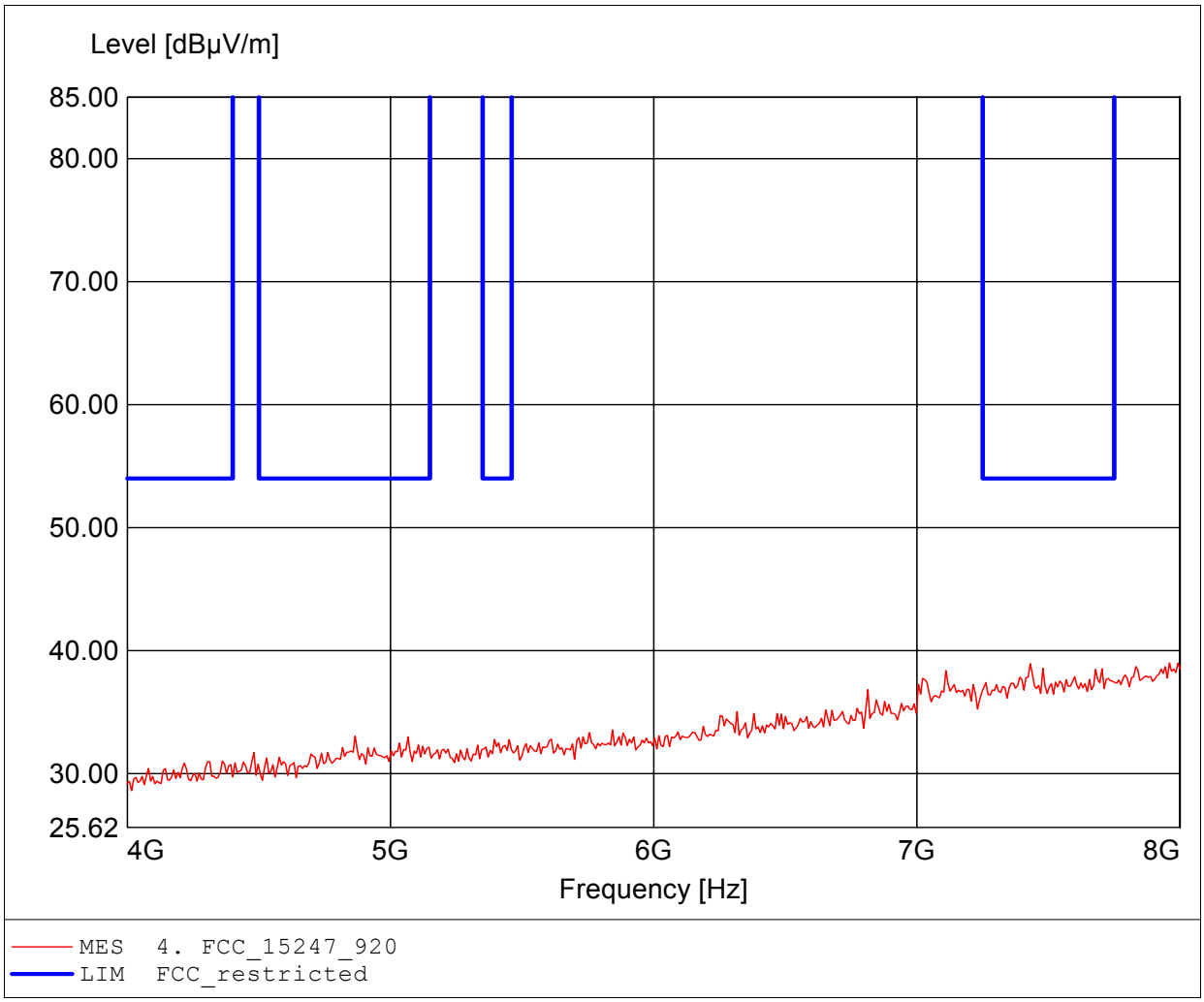
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.699GHz, Emax: 50.34dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

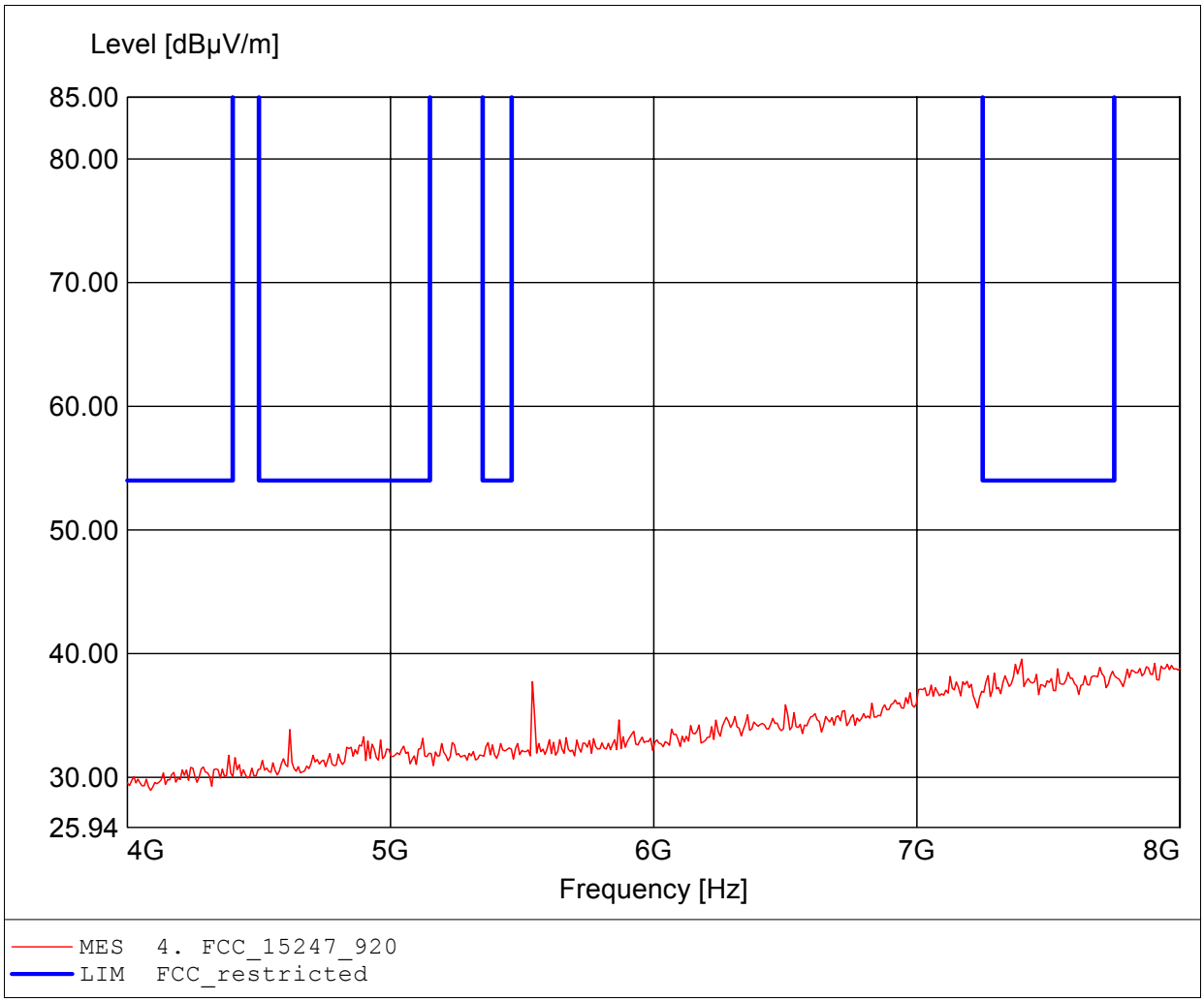
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.960GHz, Emax: 39.00dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

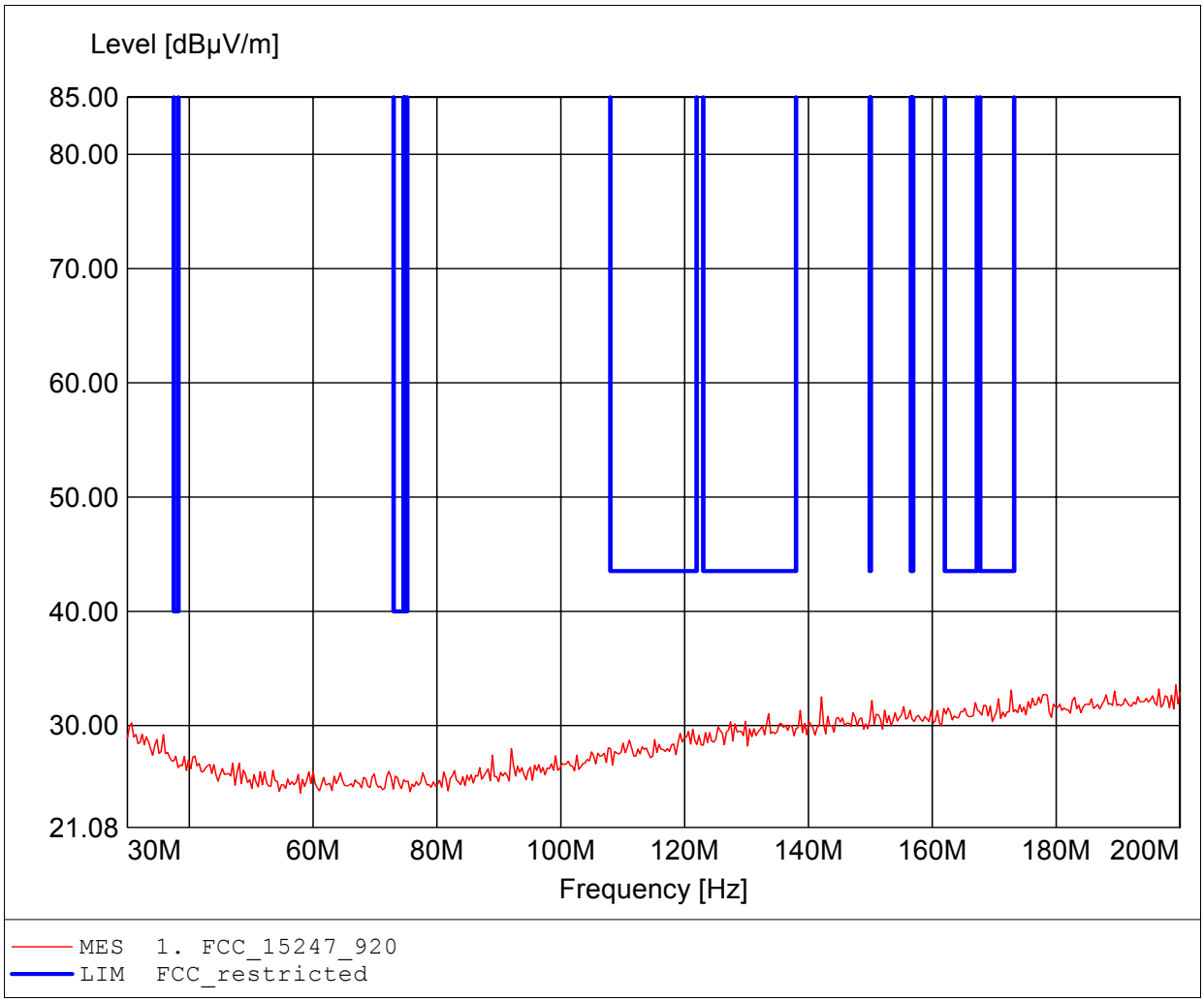
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / 0-QPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.399GHz, Emax: 39.55dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

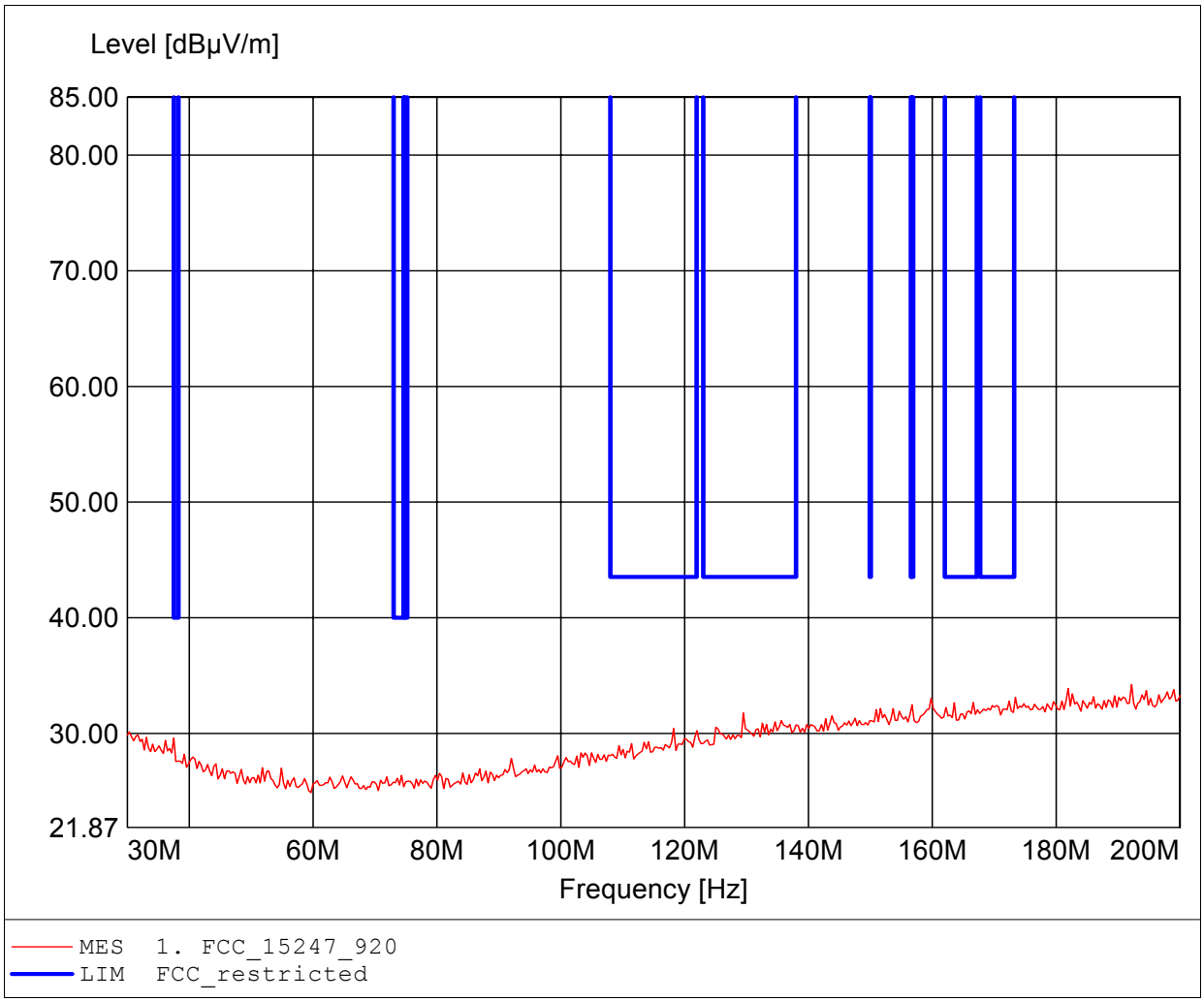
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz (worst case)
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 199.319MHz, Emax: 33.55dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

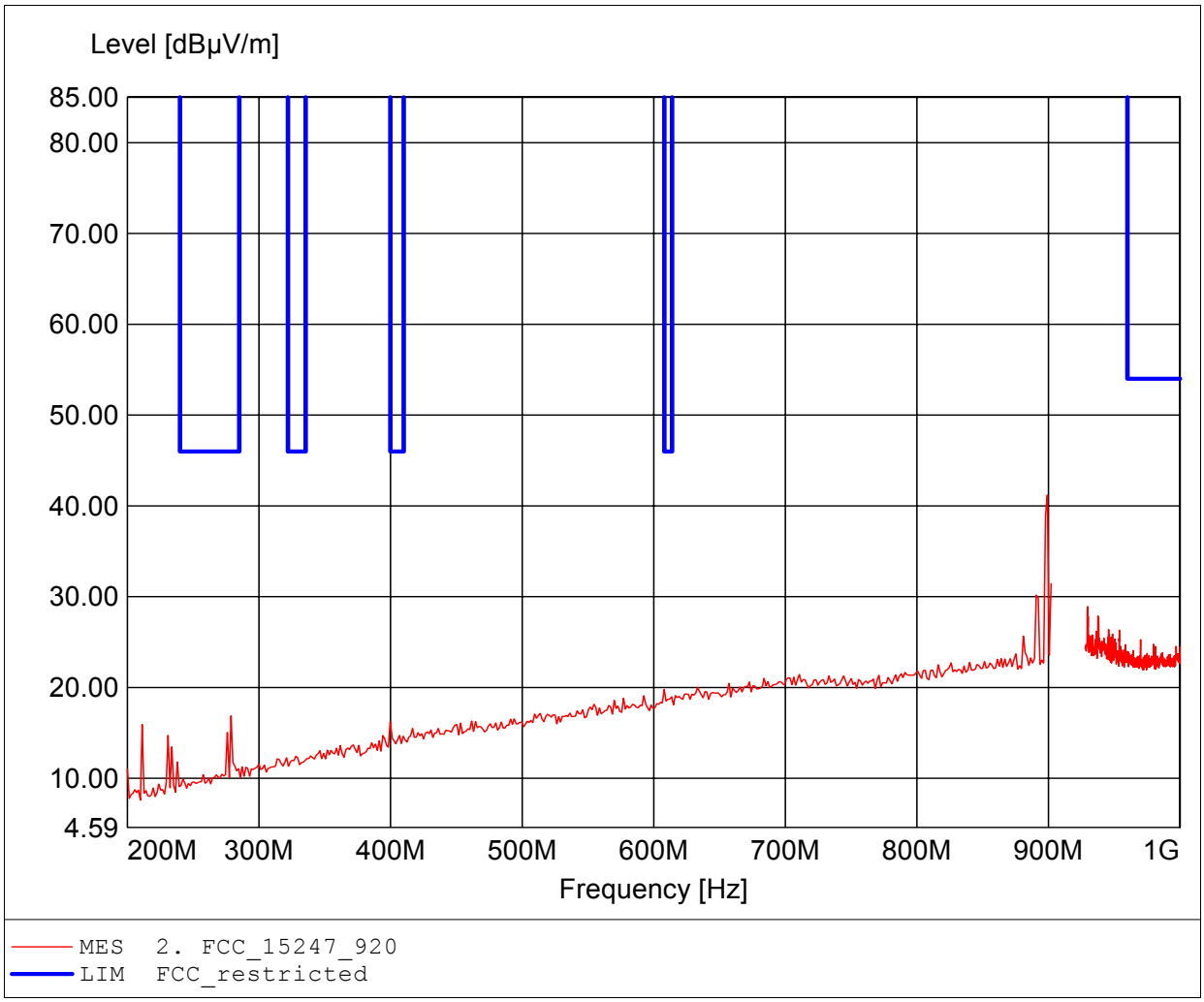
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz (worst case)
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 192.164MHz, Emax: 34.21dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

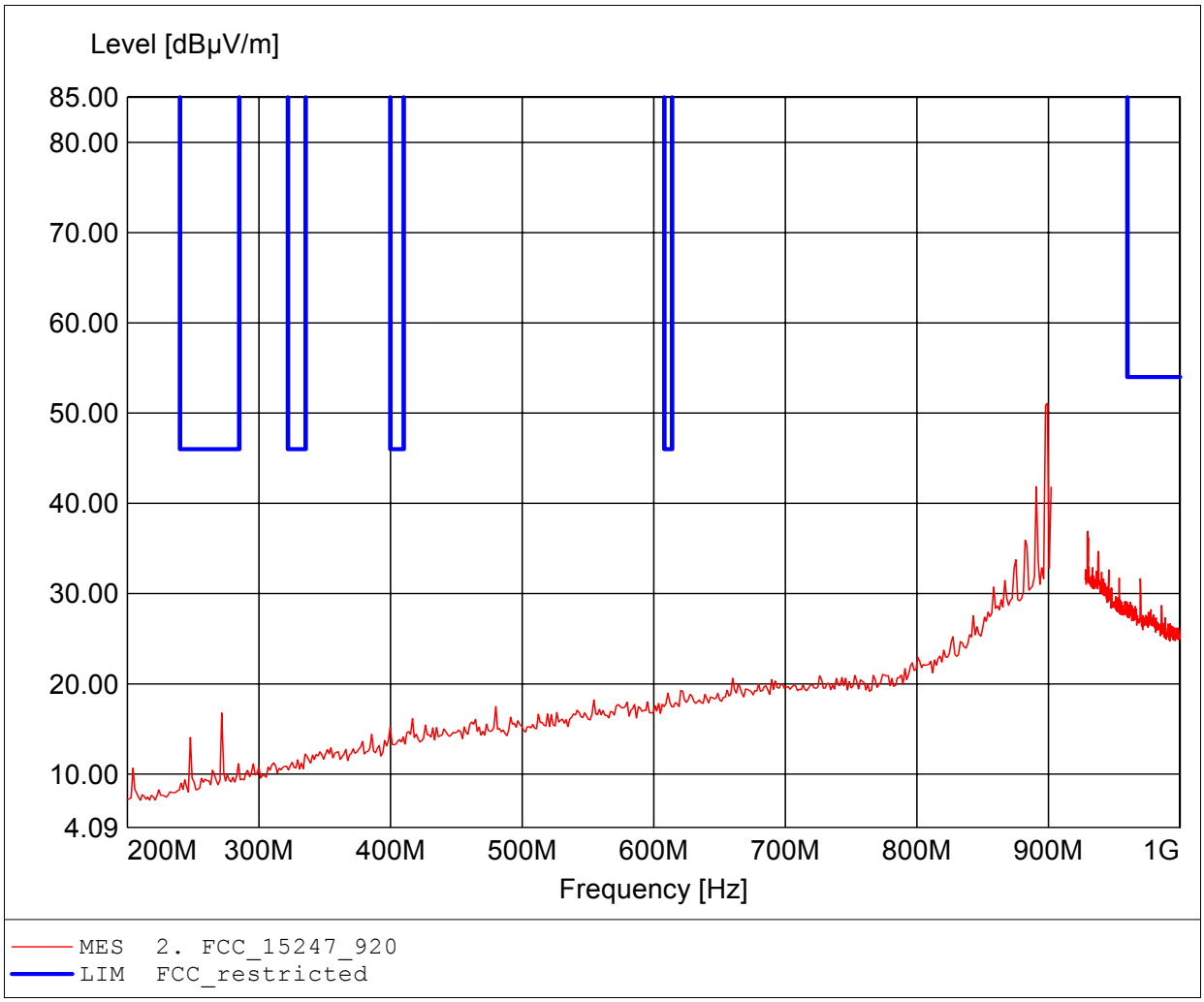
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 899.186MHz, Emax: 41.19dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

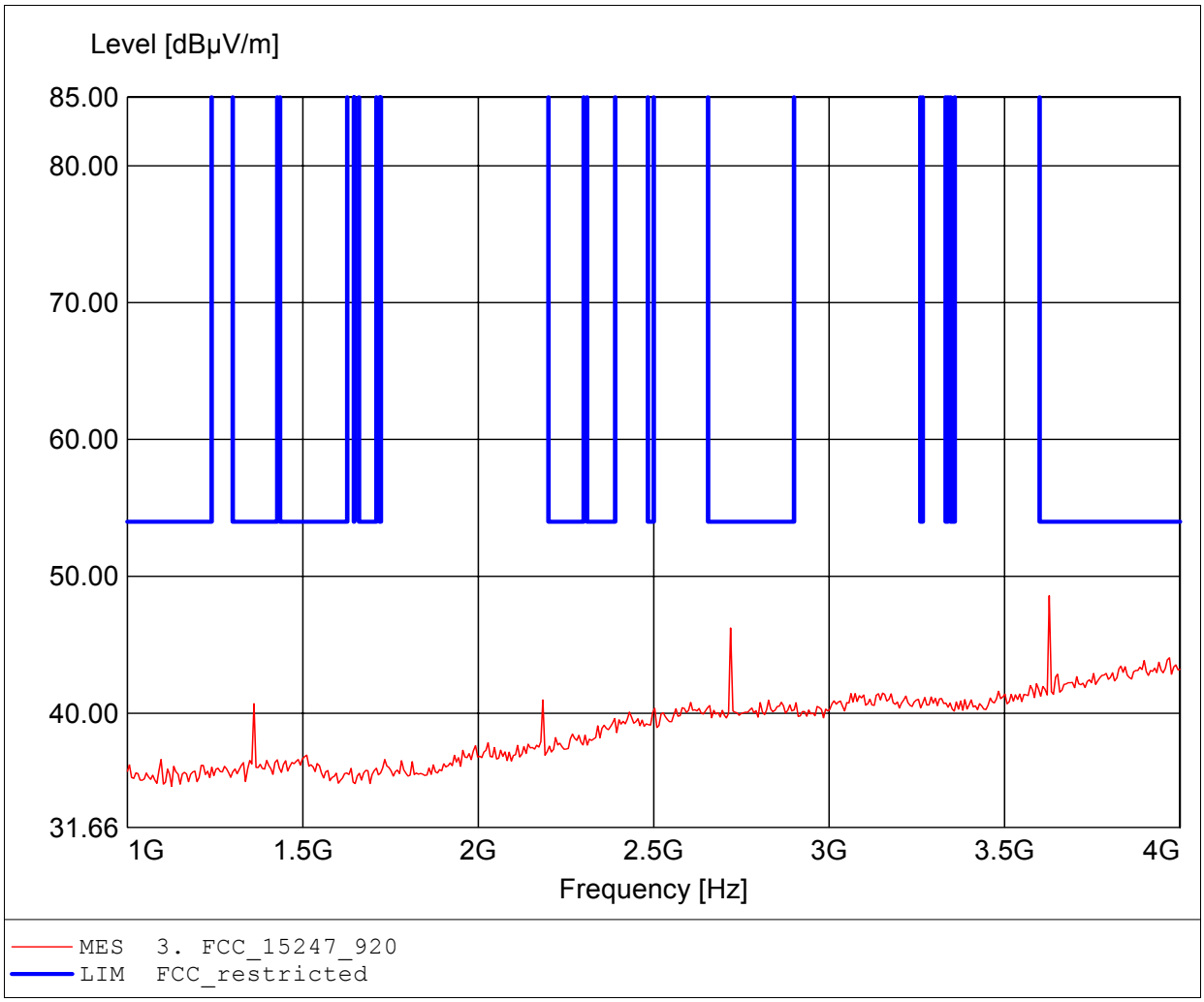
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 899.186MHz, Emax: 51.10dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

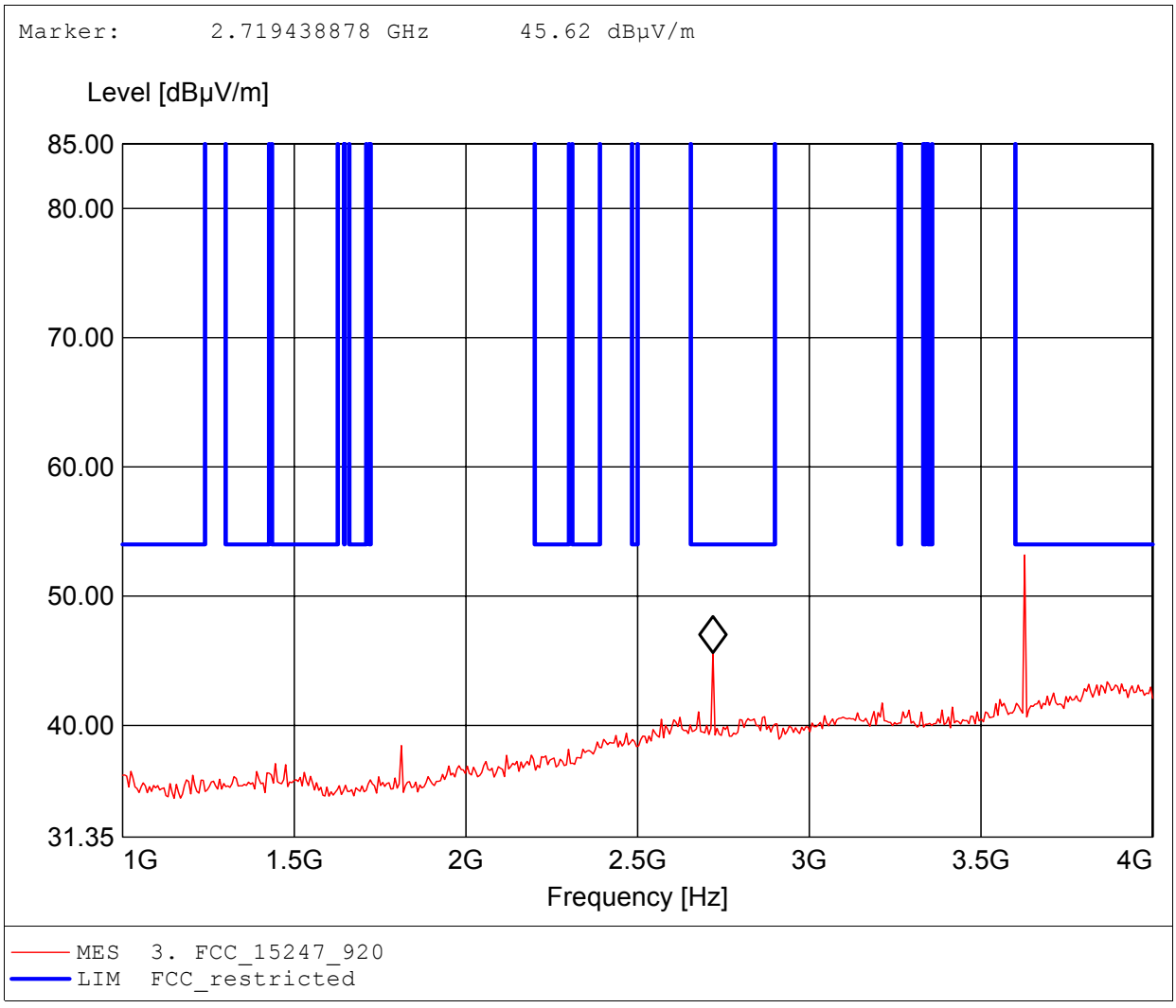
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.627GHz, Emax: 48.59dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

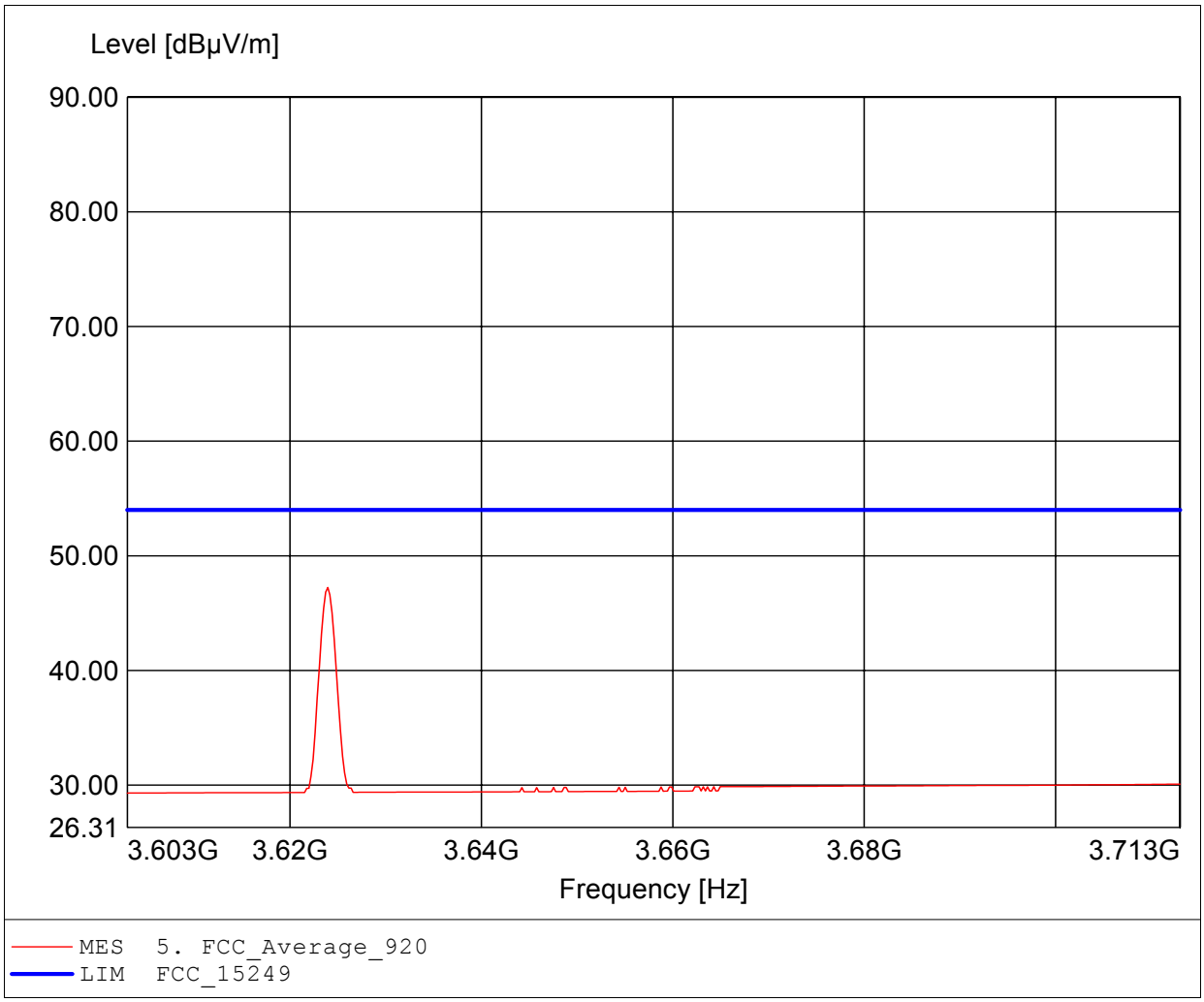
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.627GHz, Emax: 53.19dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

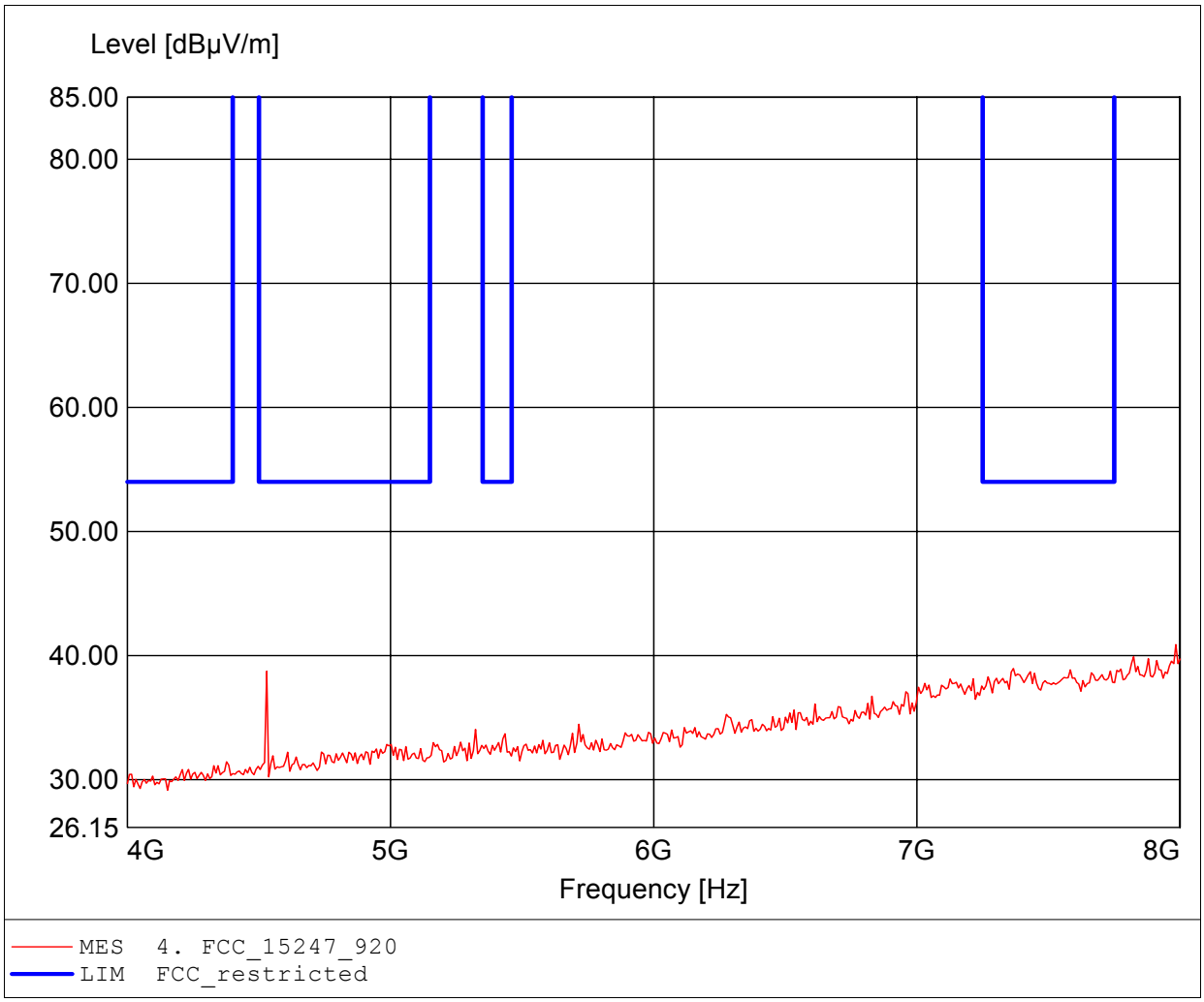
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 3.624GHz, Emax: 47.23dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

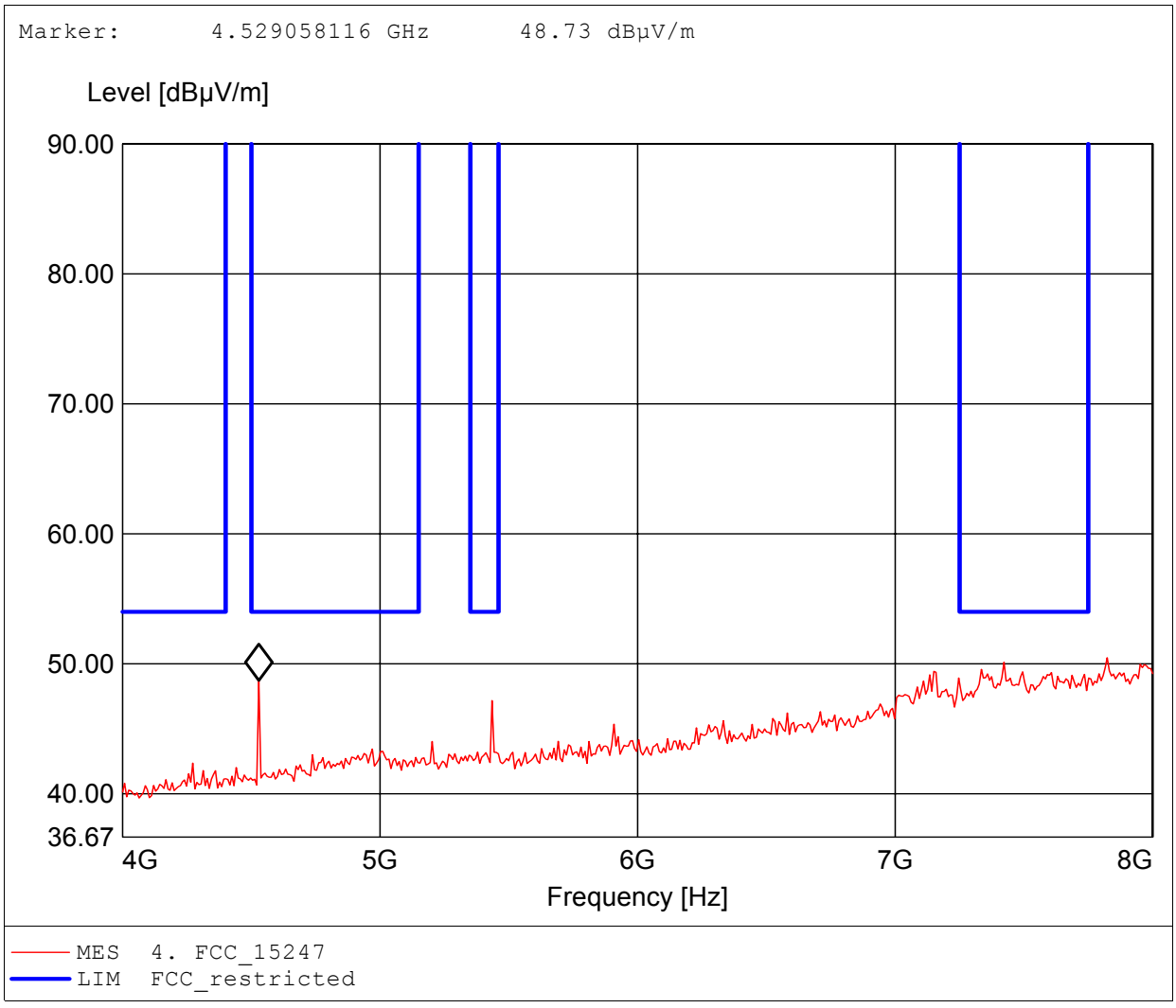
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.984GHz, Emax: 40.88dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

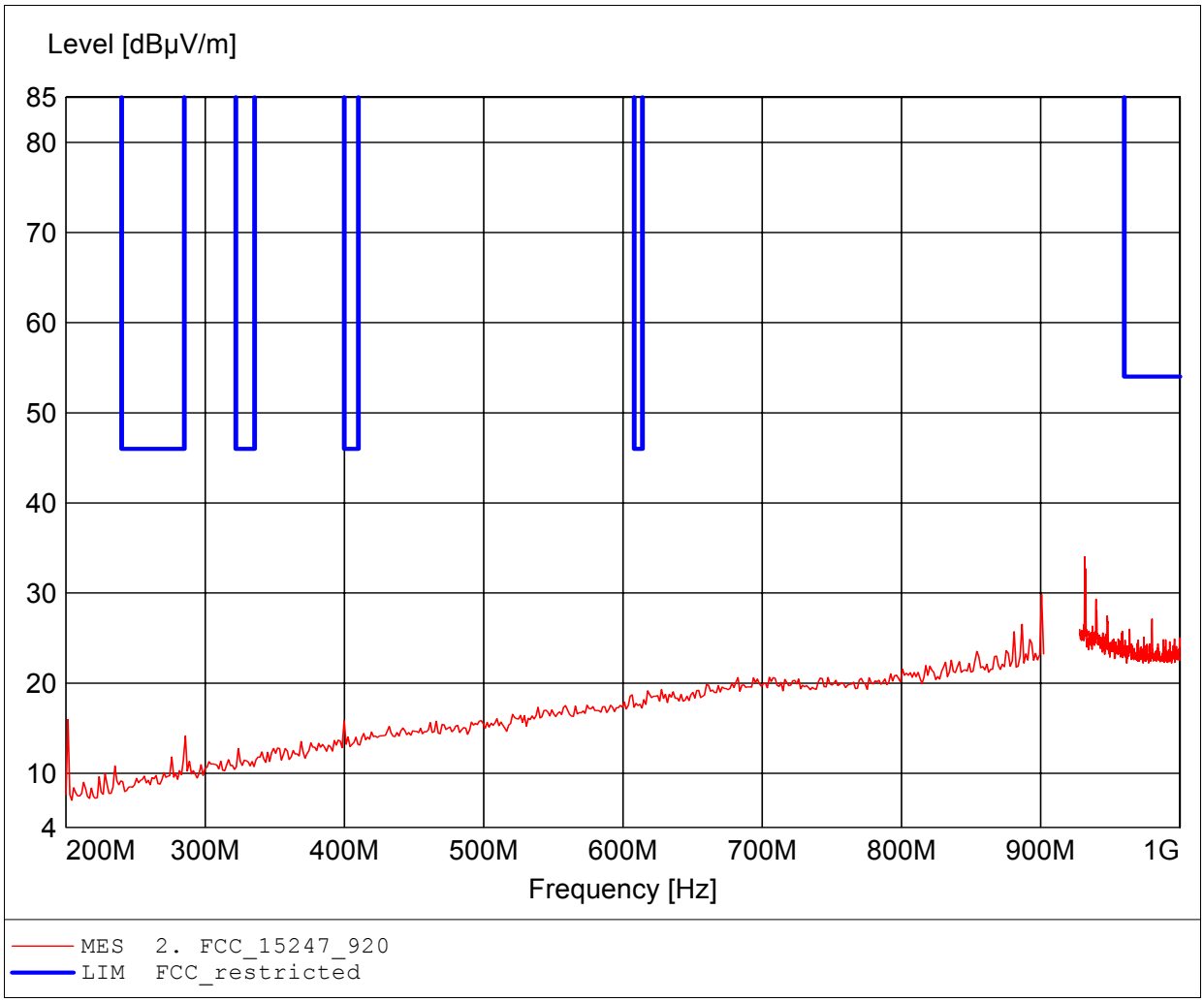
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.824GHz, Emax: 50.46dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

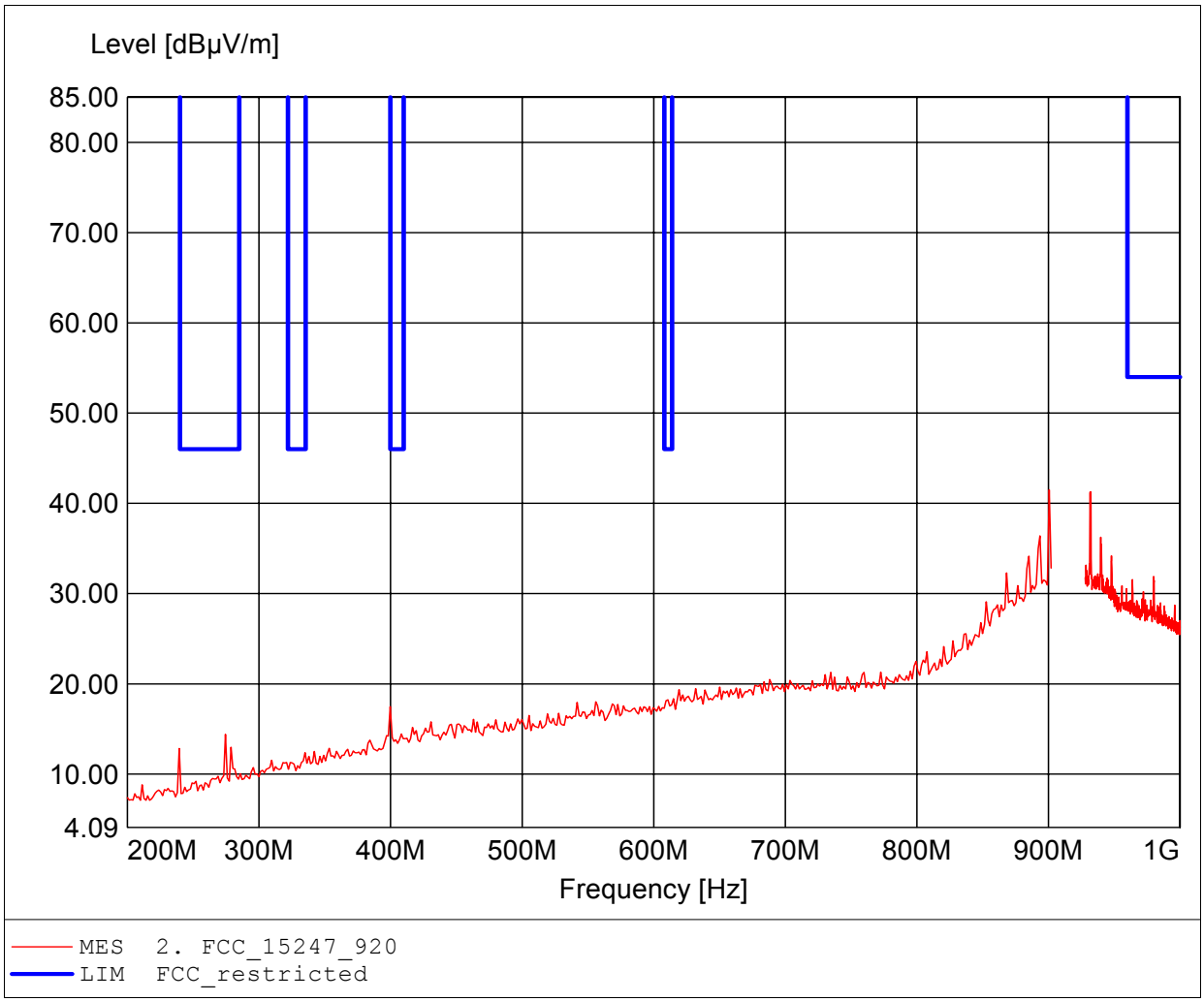
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 931.607MHz, Emax: 34.01dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

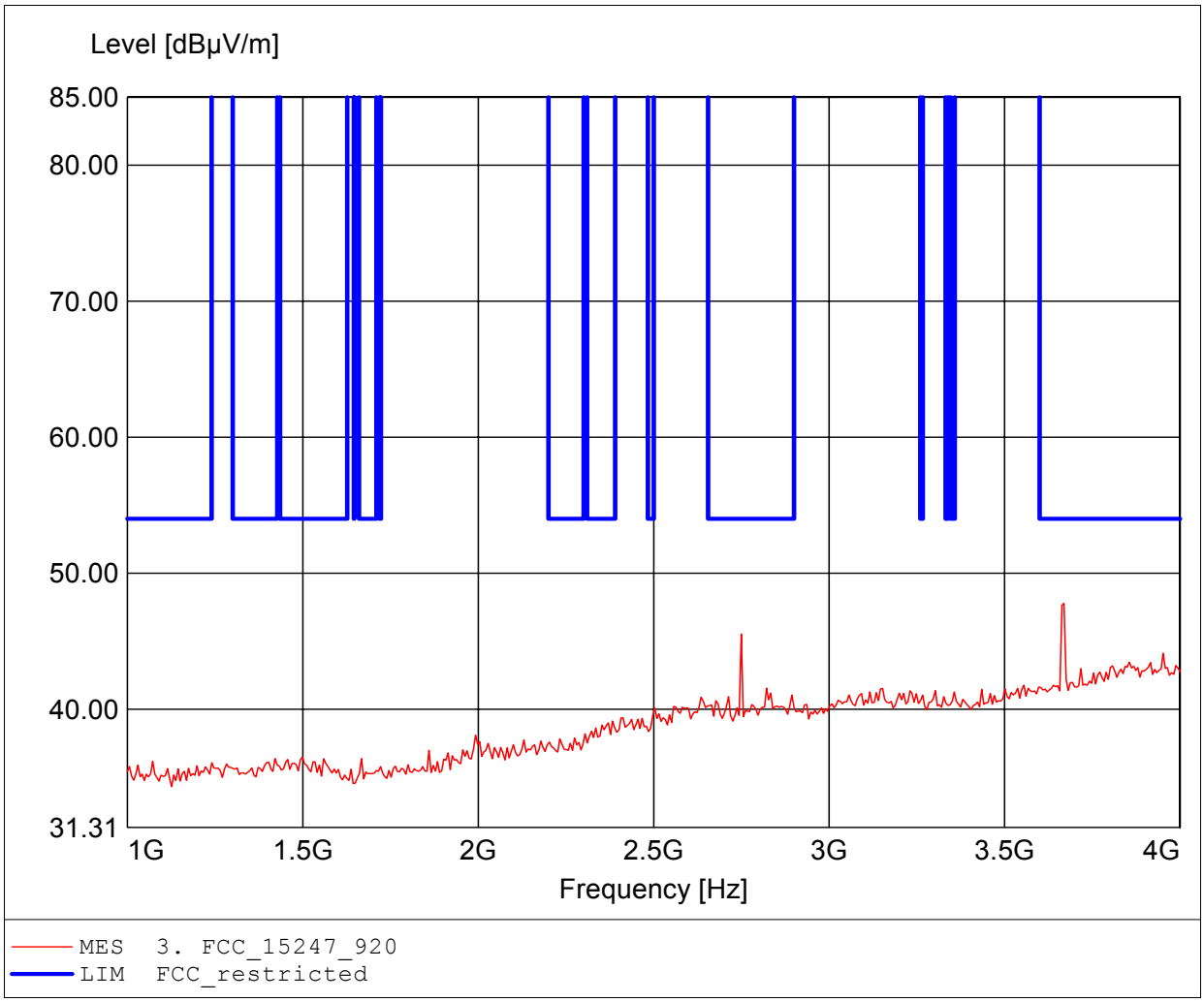
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 900.593MHz, Emax: 41.49dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

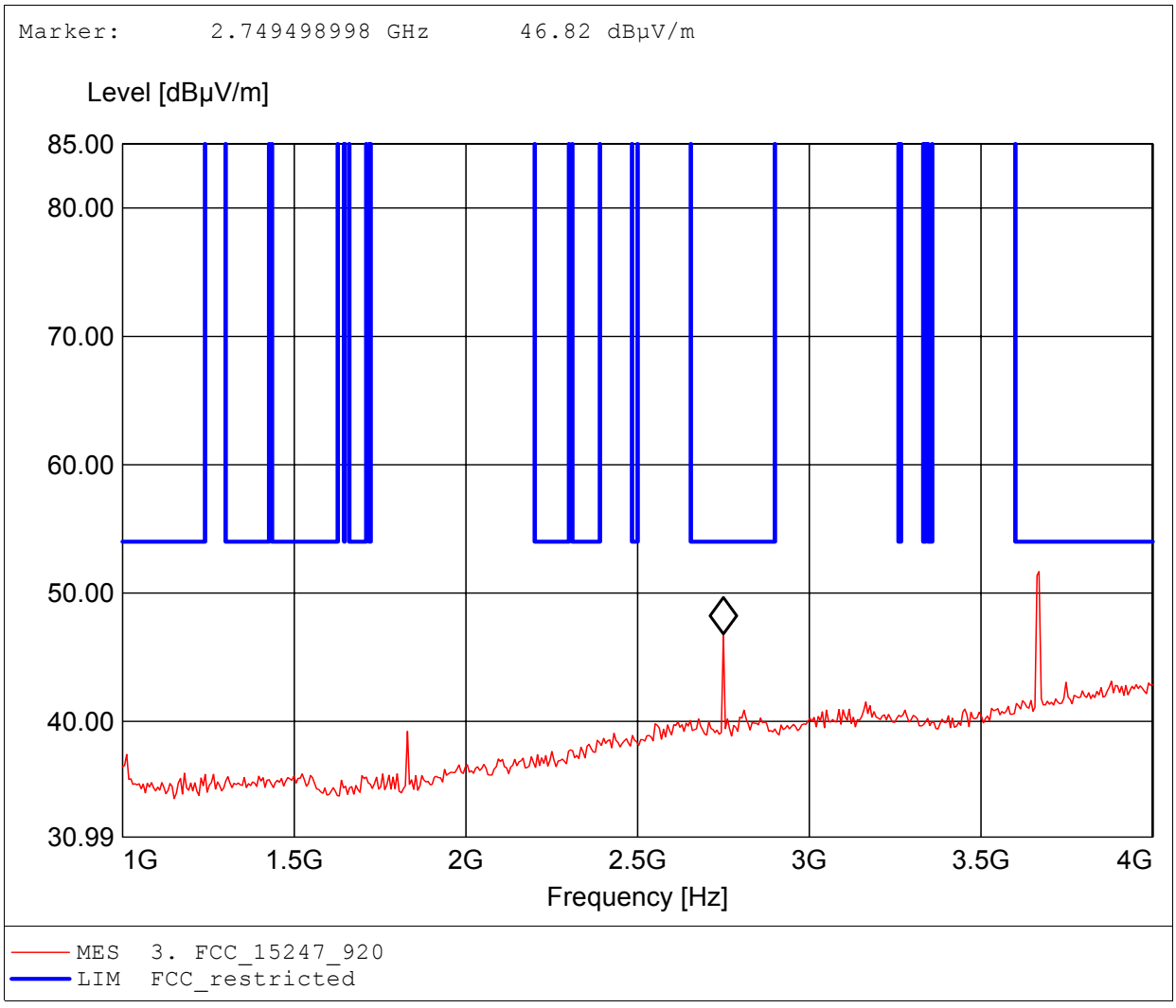
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.669GHz, Emax: 47.79dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

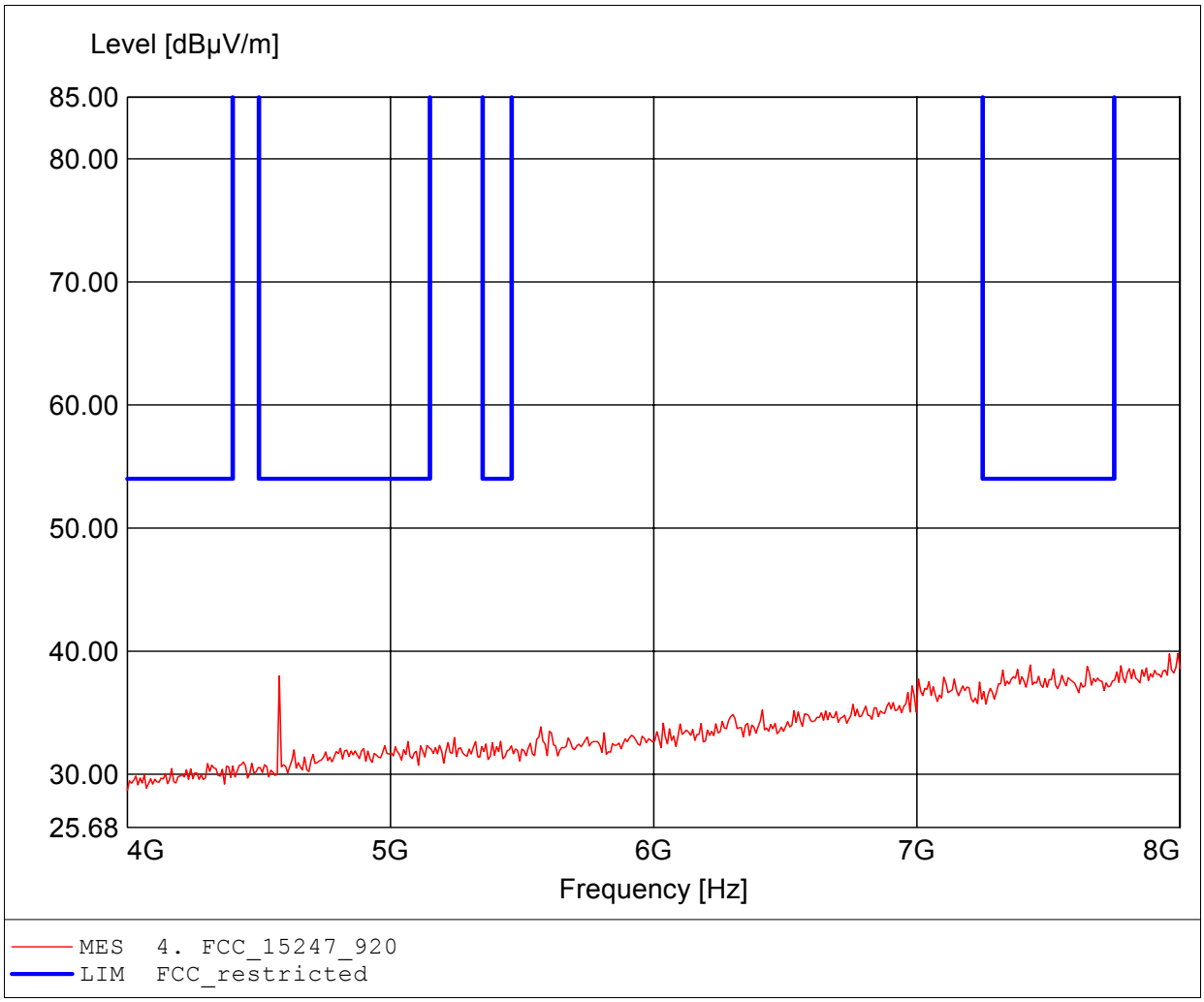
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.669GHz, Emax: 51.68dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

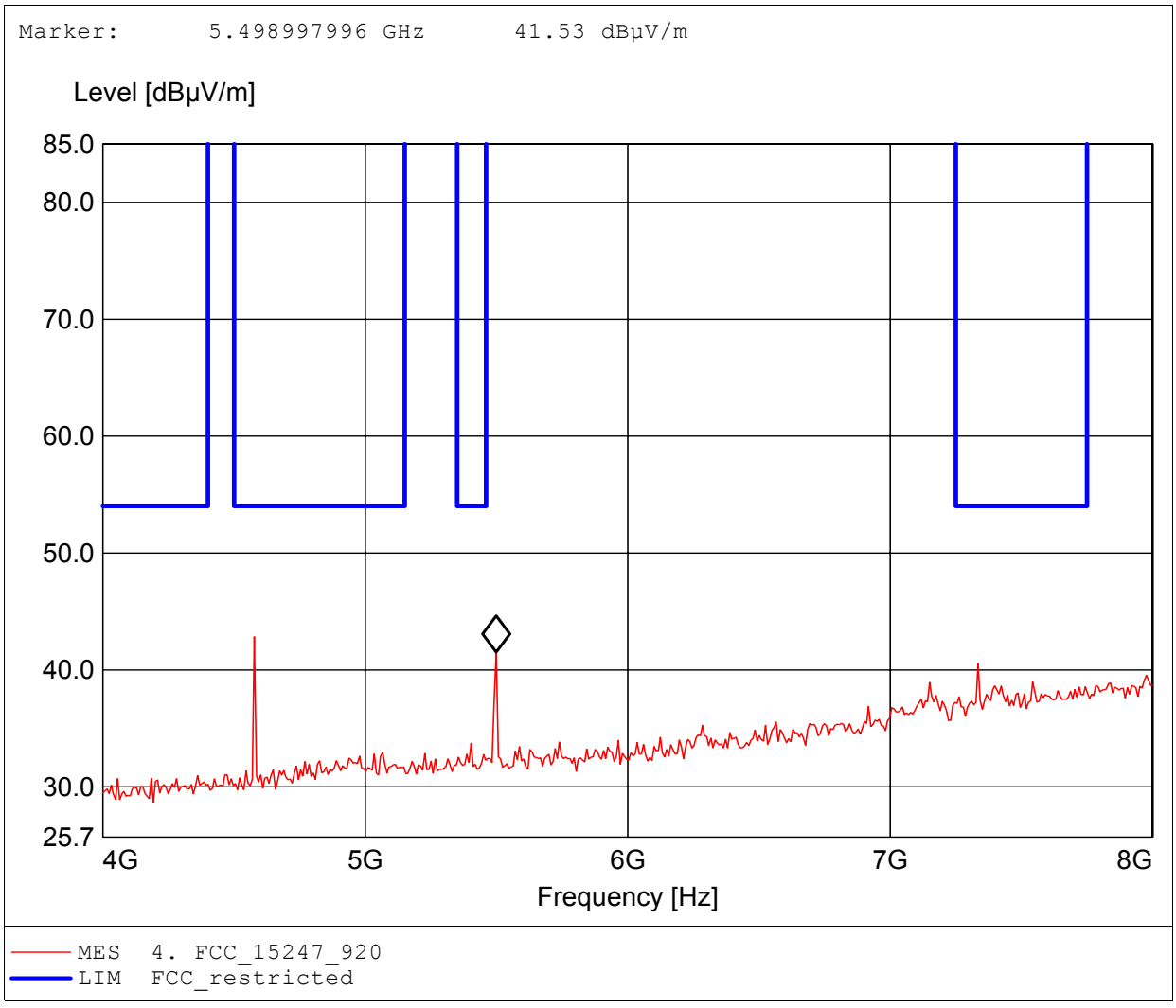
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.992GHz, Emax: 39.82dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

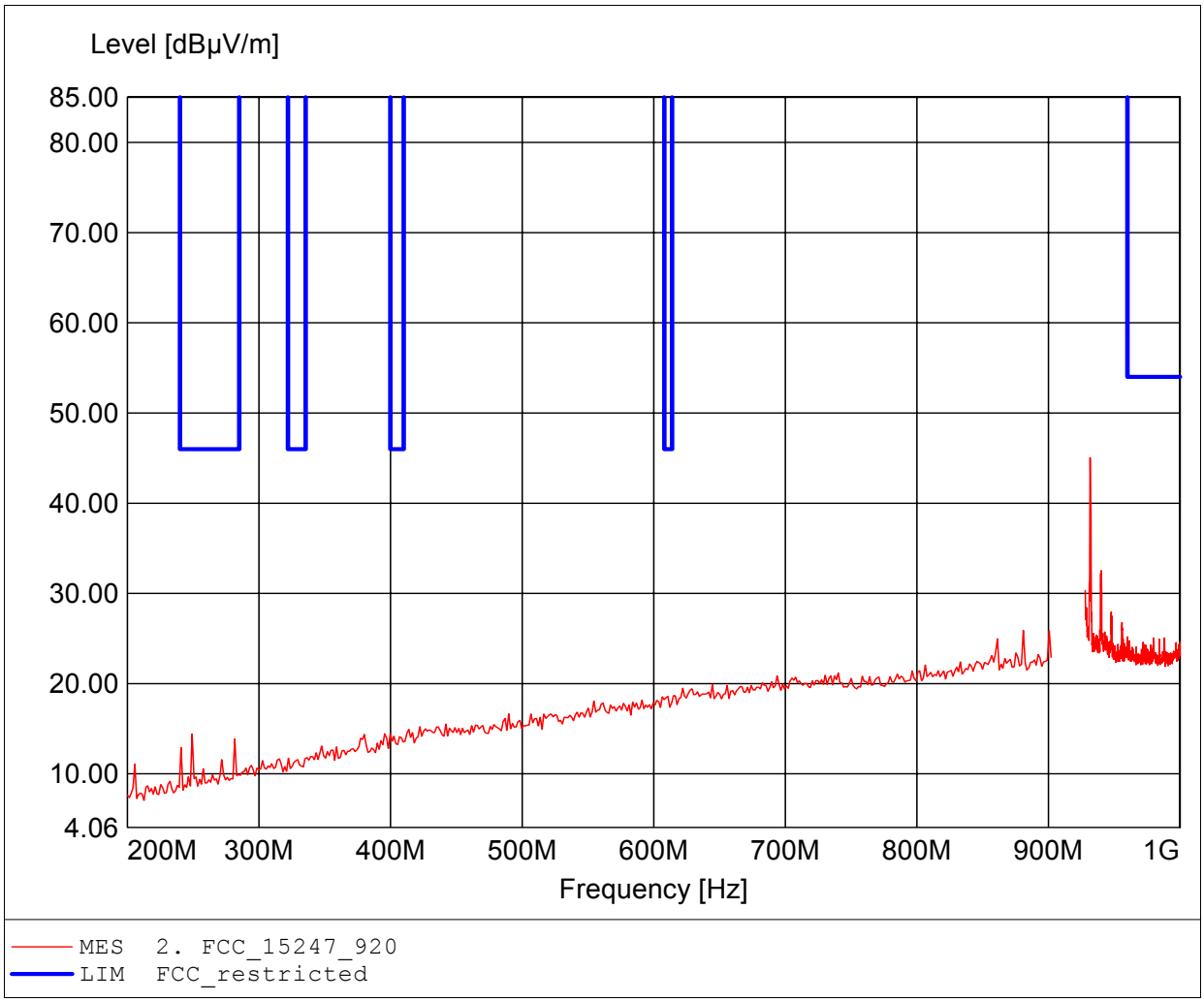
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 916 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.577GHz, Emax: 42.84dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

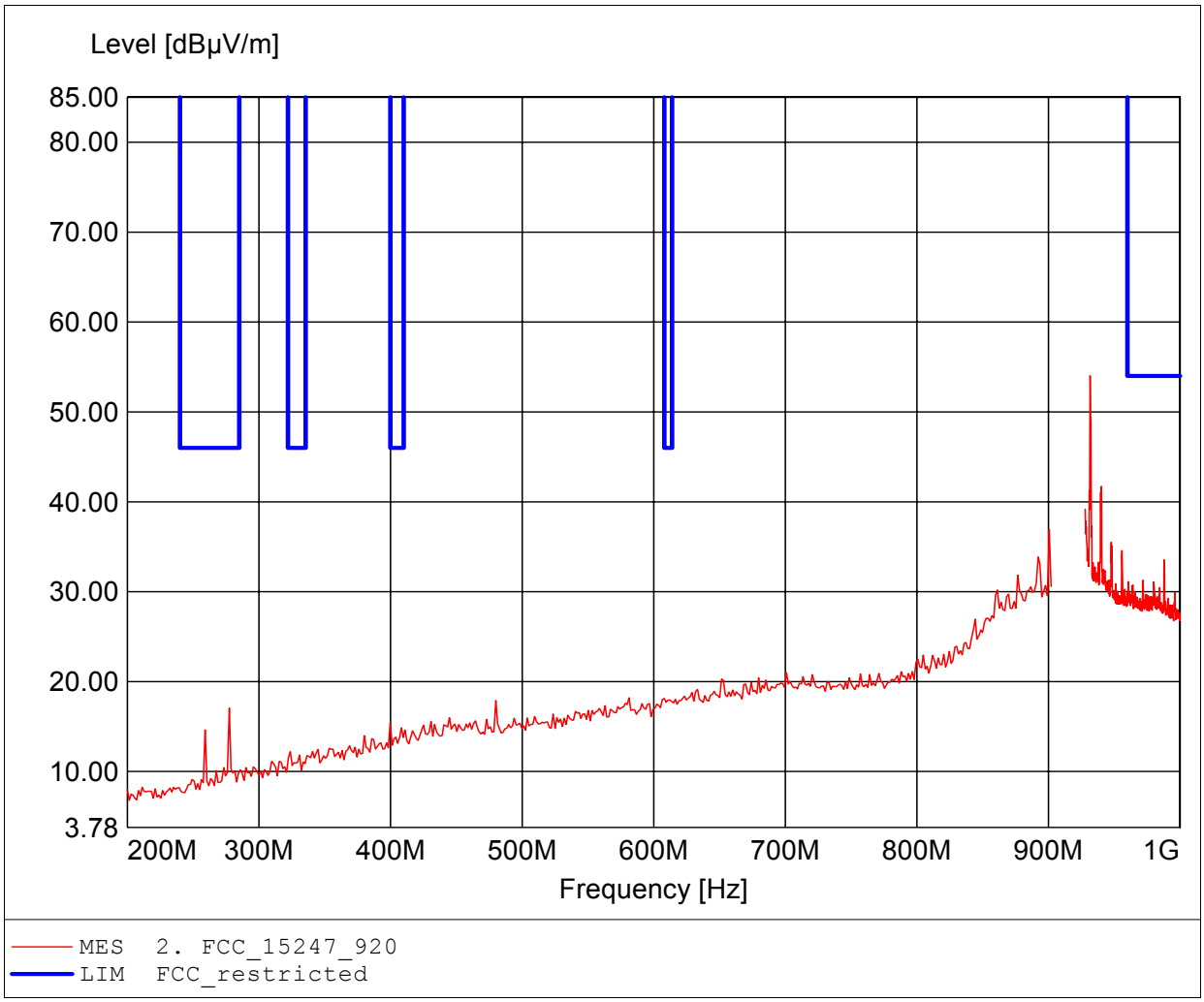
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 931.607MHz, Emax: 45.04dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

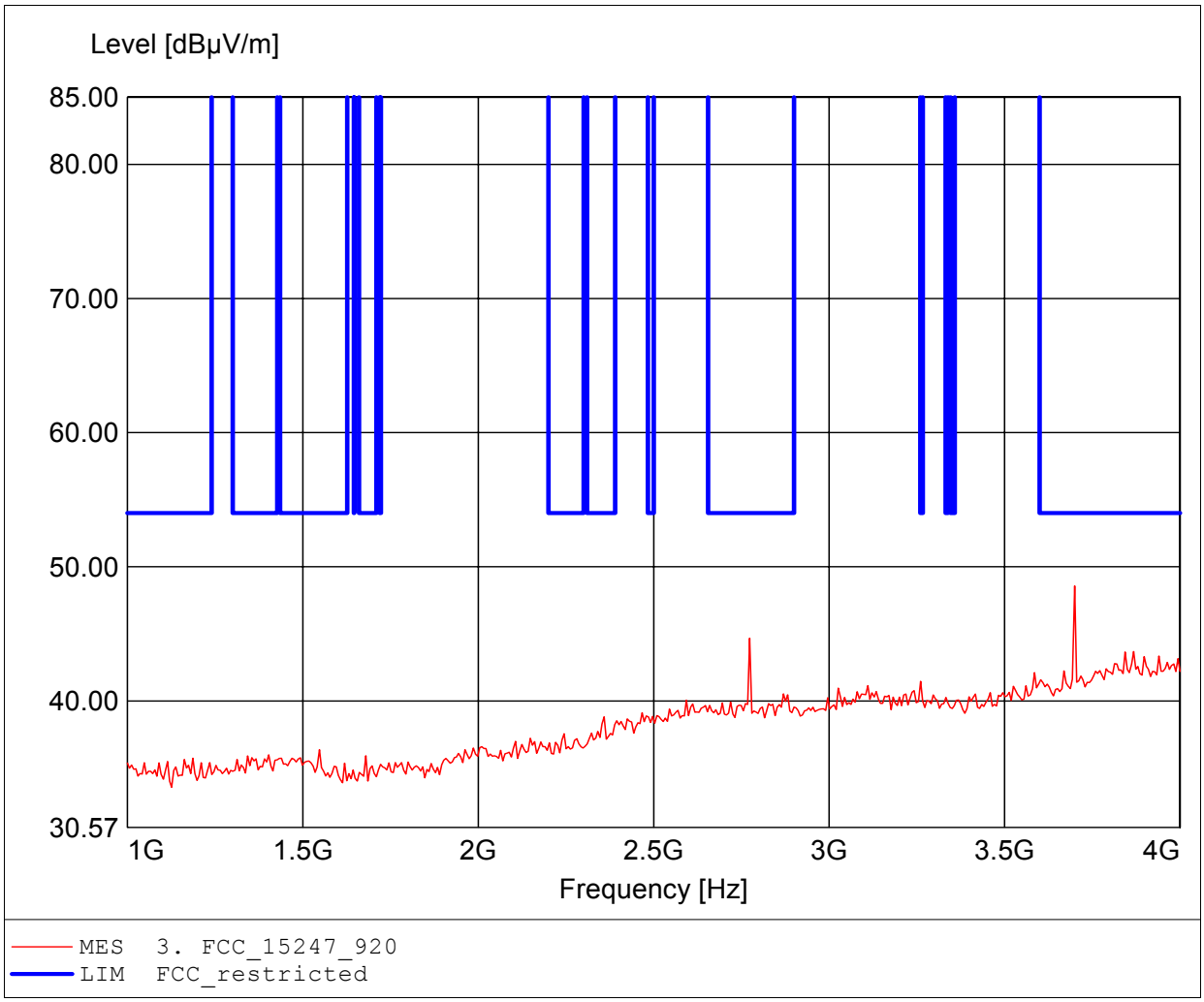
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 931.607MHz, Emax: 54.02dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

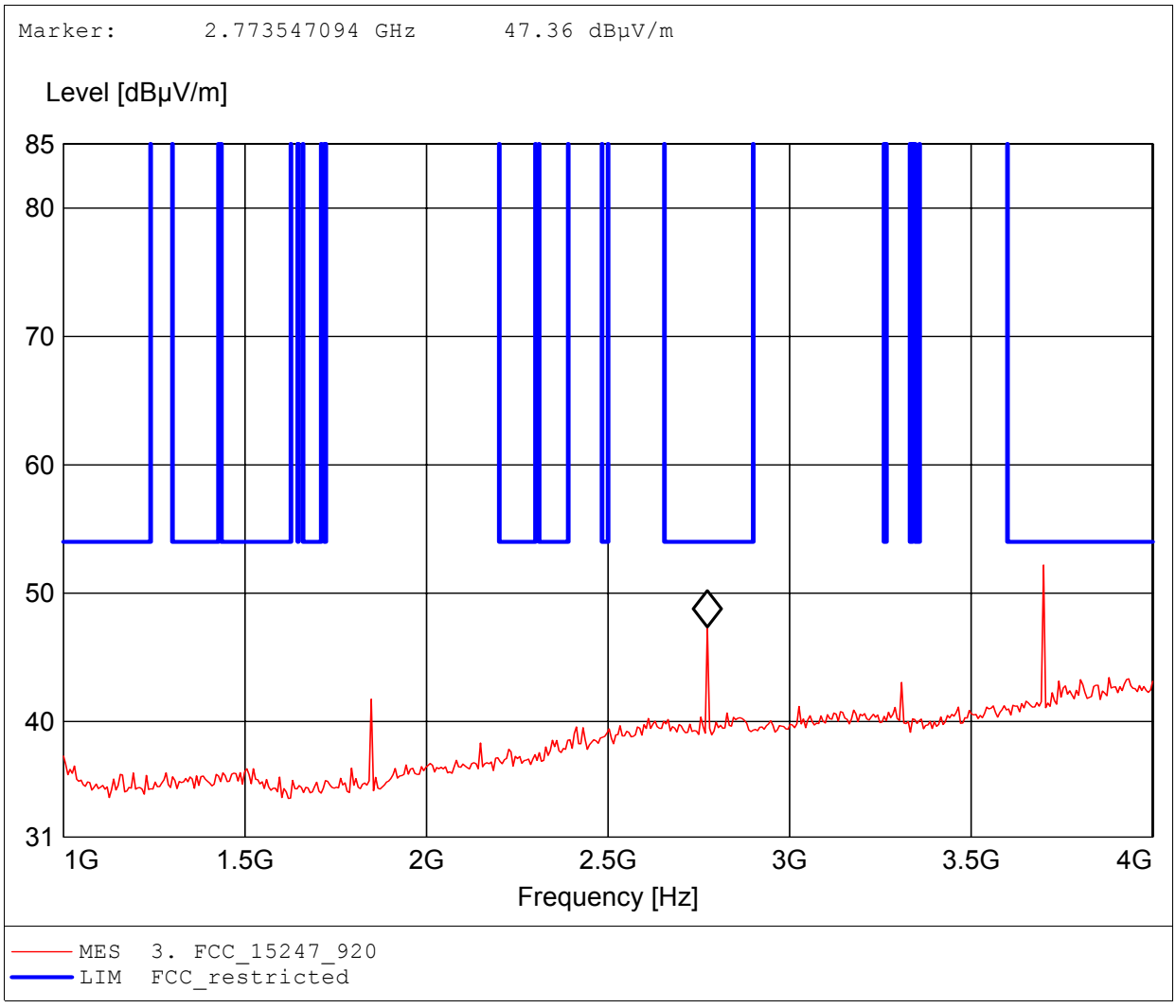
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.699GHz, Emax: 48.57dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

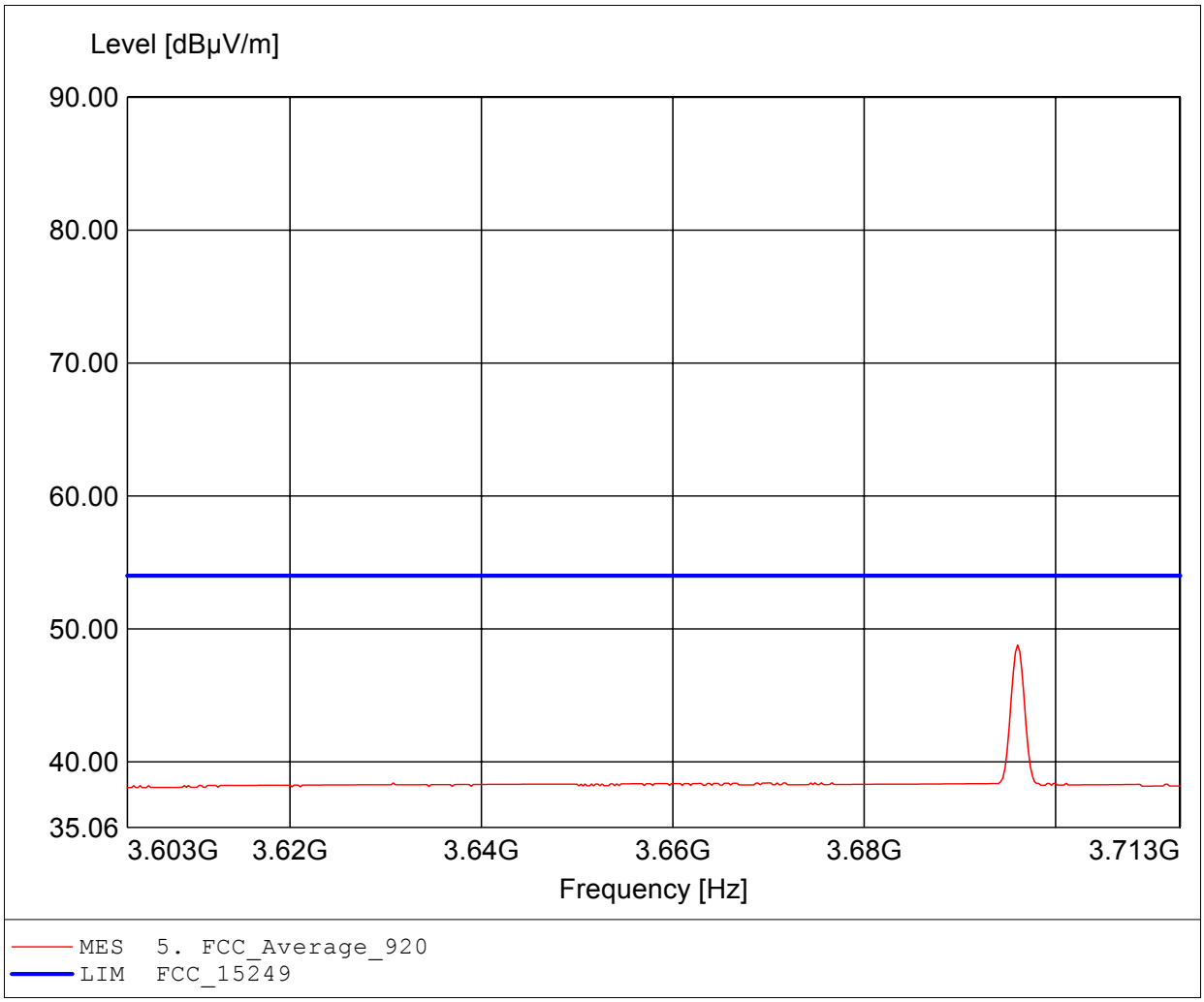
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.699GHz, Emax: 52.19dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

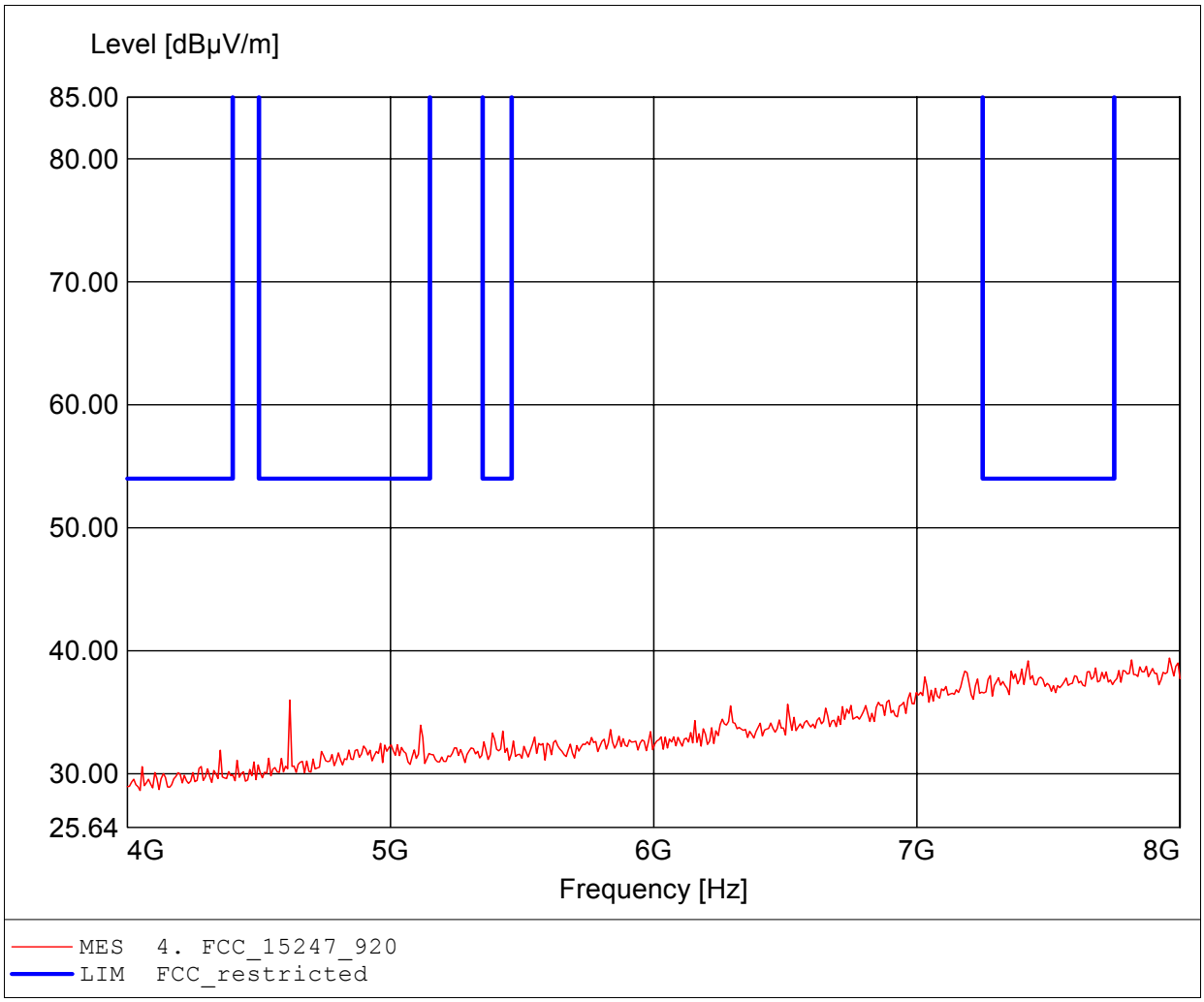
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 3.696GHz, Emax: 48.78dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

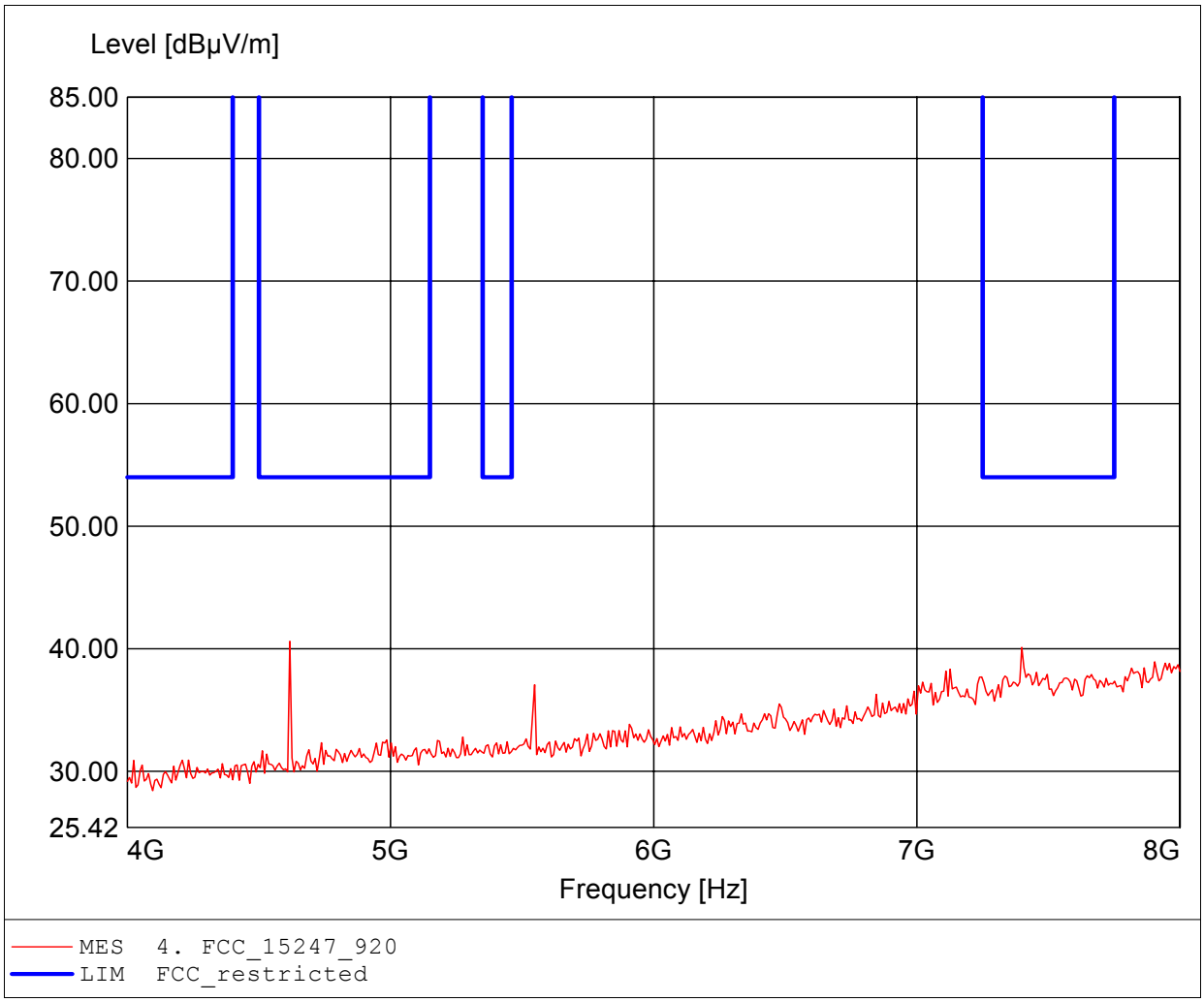
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.960GHz, Emax: 39.41dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

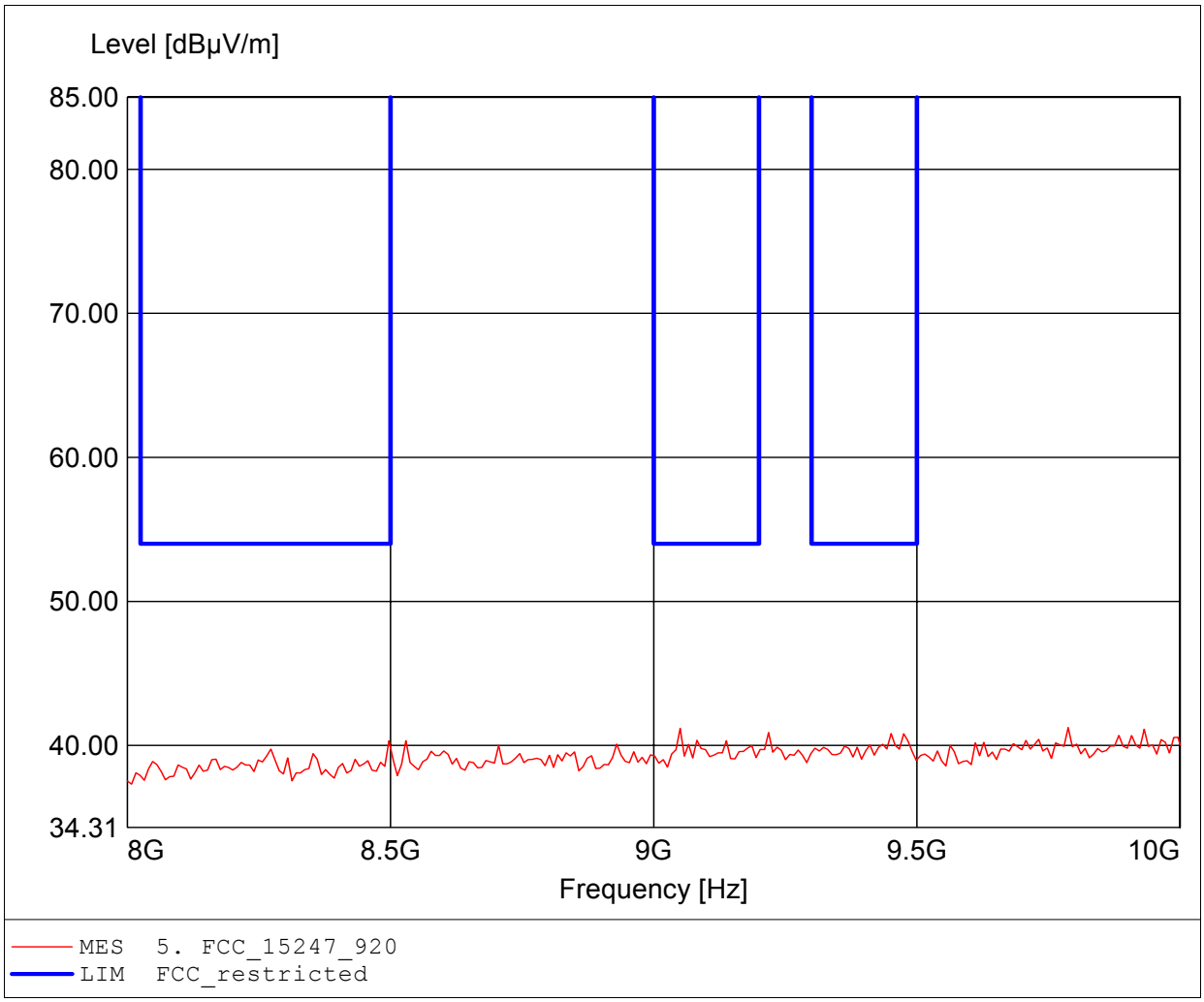
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 924 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.617GHz, Emax: 40.60dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

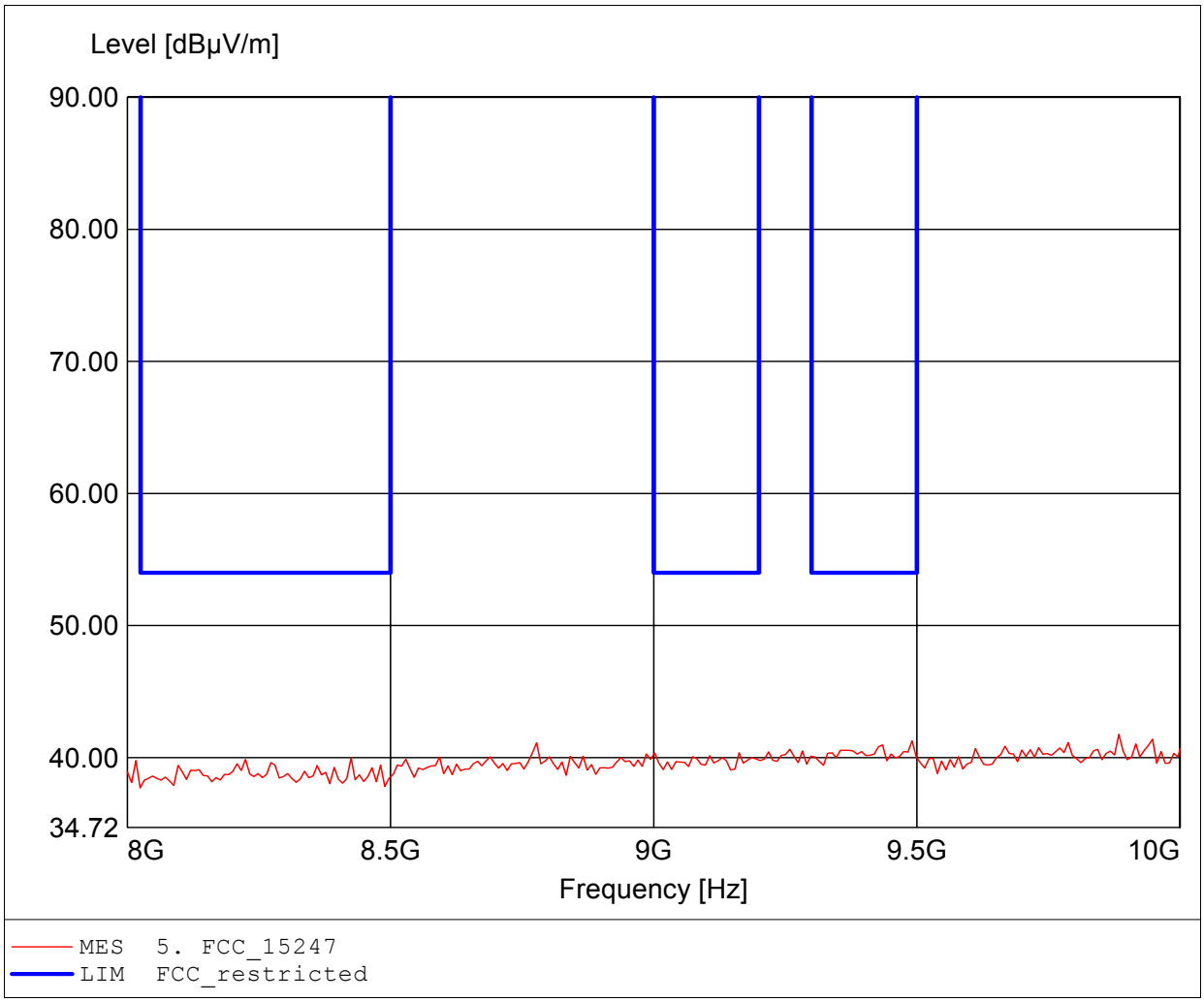
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz (worst case)
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.030GHz, Emax: 43.31dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module
Model:	ZWIR4512AC1 / BPSK Tx 906 MHz (worst case)
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C , Vnom: 3.3 VDC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.455GHz, Emax: 44.19dBµV/m, RBW: 1MHz

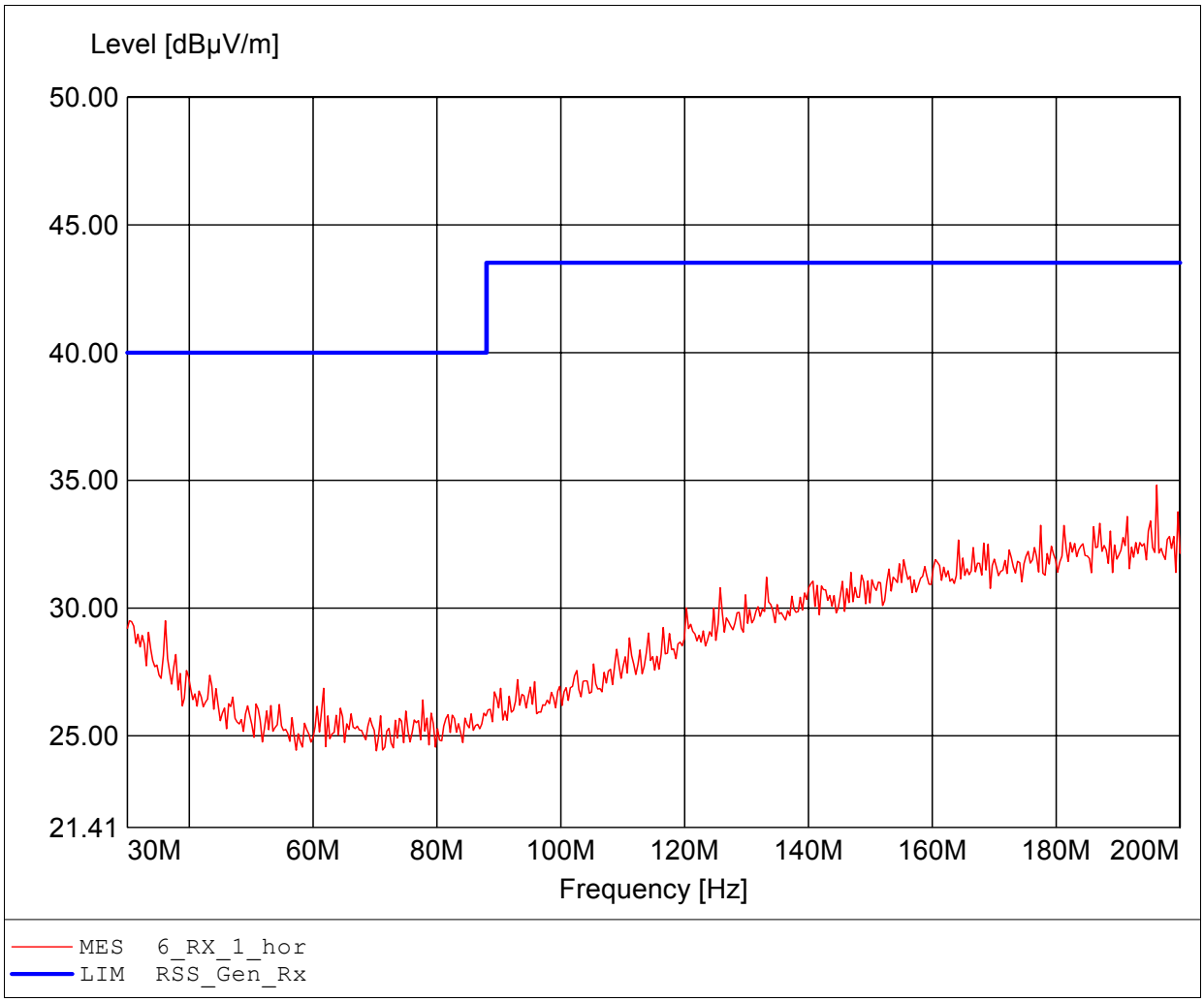


Annex H Receiver radiated spurious emissions

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

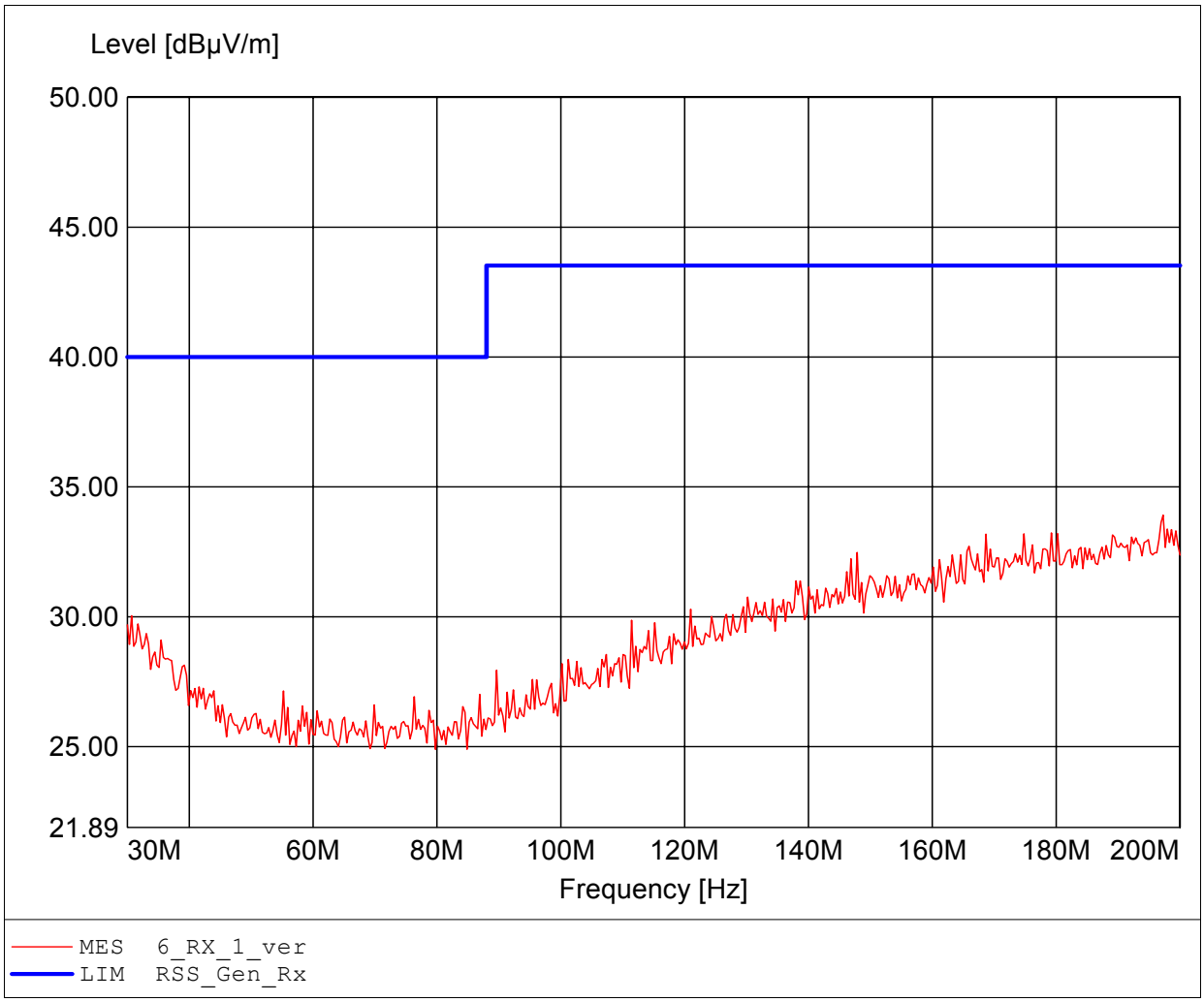
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module / EUT horizontal
Model:	ZWIR4512AC1 / Rx
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C / Unom: 3.3 V DC
Test Specification:	Freq. / CH: 6
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq:196.253MHz Emax:34.81dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

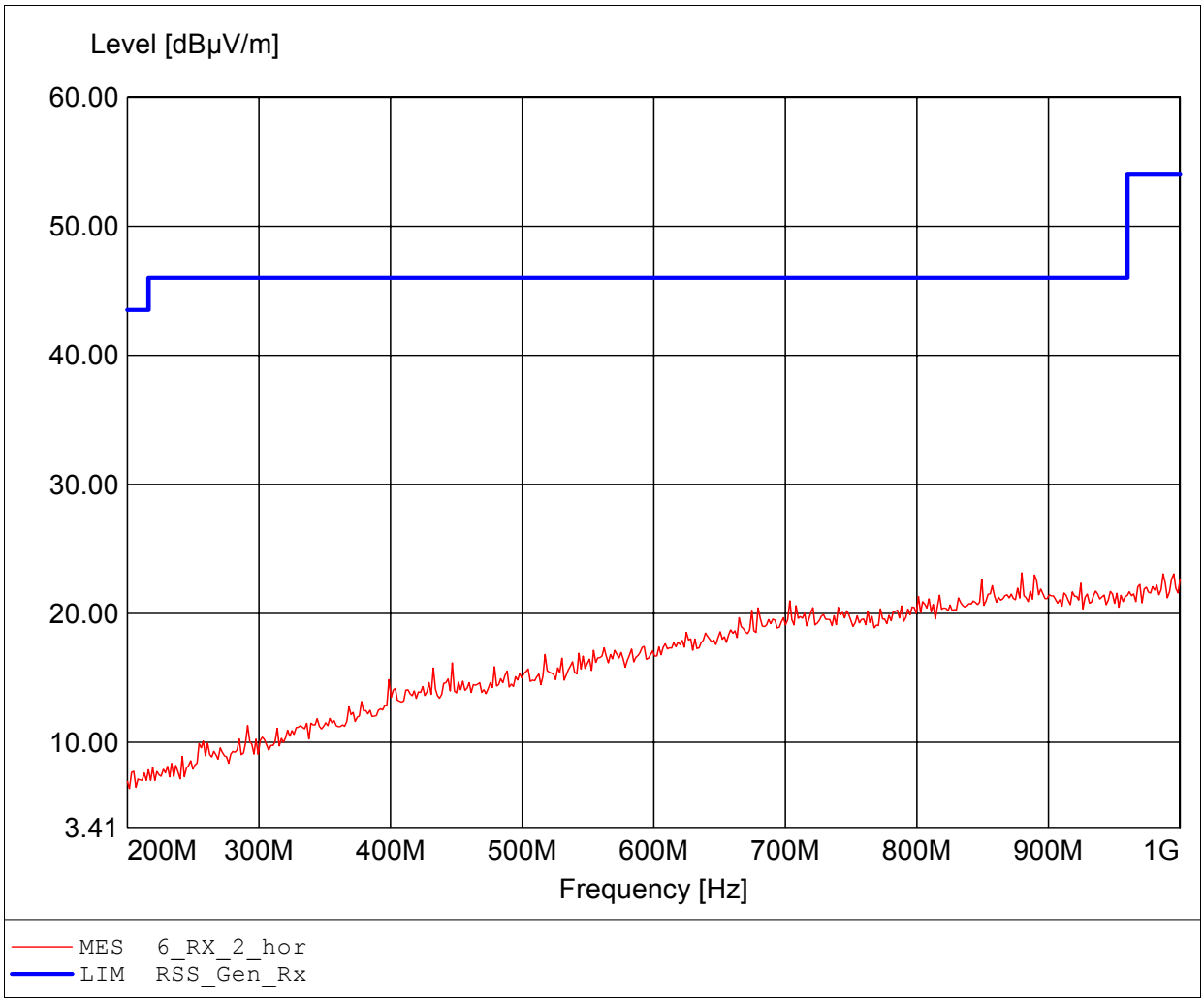
Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module / EUT horizontal
Model:	ZWIR4512AC1 / Rx
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C / Unom: 3.3 V DC
Test Specification:	Freq. / CH: 6
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq:197.275MHz Emax:33.92dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

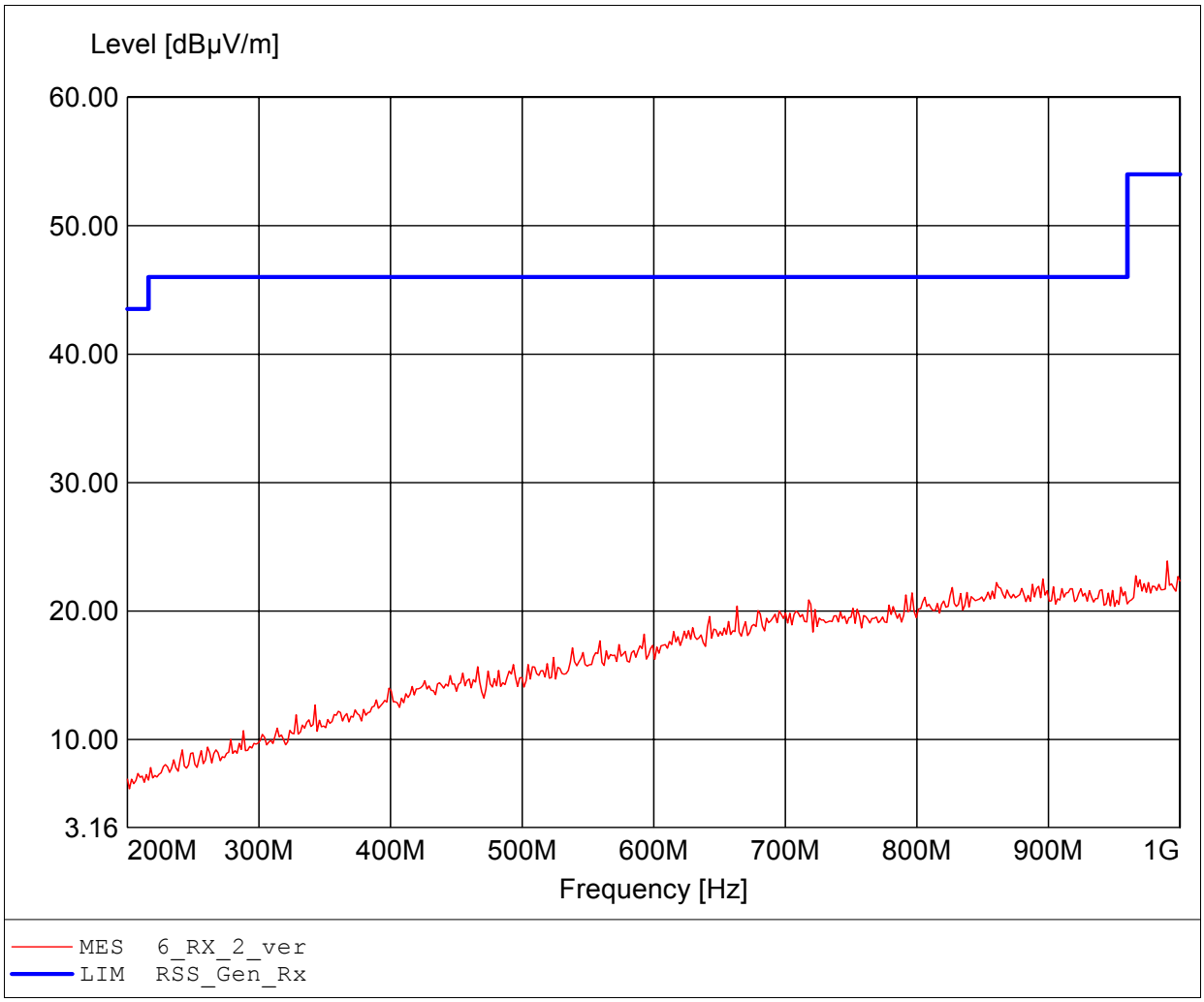
```
Approval Holder:       Zentrum Mikroelektronik Dresden   /    G0M-1107-1263
EUT:                   Radio Module    /  EUT horizontal
Model:                 ZWIR4512AC1    /  Rx
Test Site / Operator:  Eurofins Product Service GmbH  /  Mr. Treffke
Test Condition:        Tnom.: 24°C    /   Unom: 3.3 V DC
Test Specification:    Freq. / CH: 6
Comment 1:             Dist.: 3m, Ant.: HL 223, ampl.
Comment 2:             Freq:879.760MHz Emax:23.14dBµV/m RBW: 100 kHz
```



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

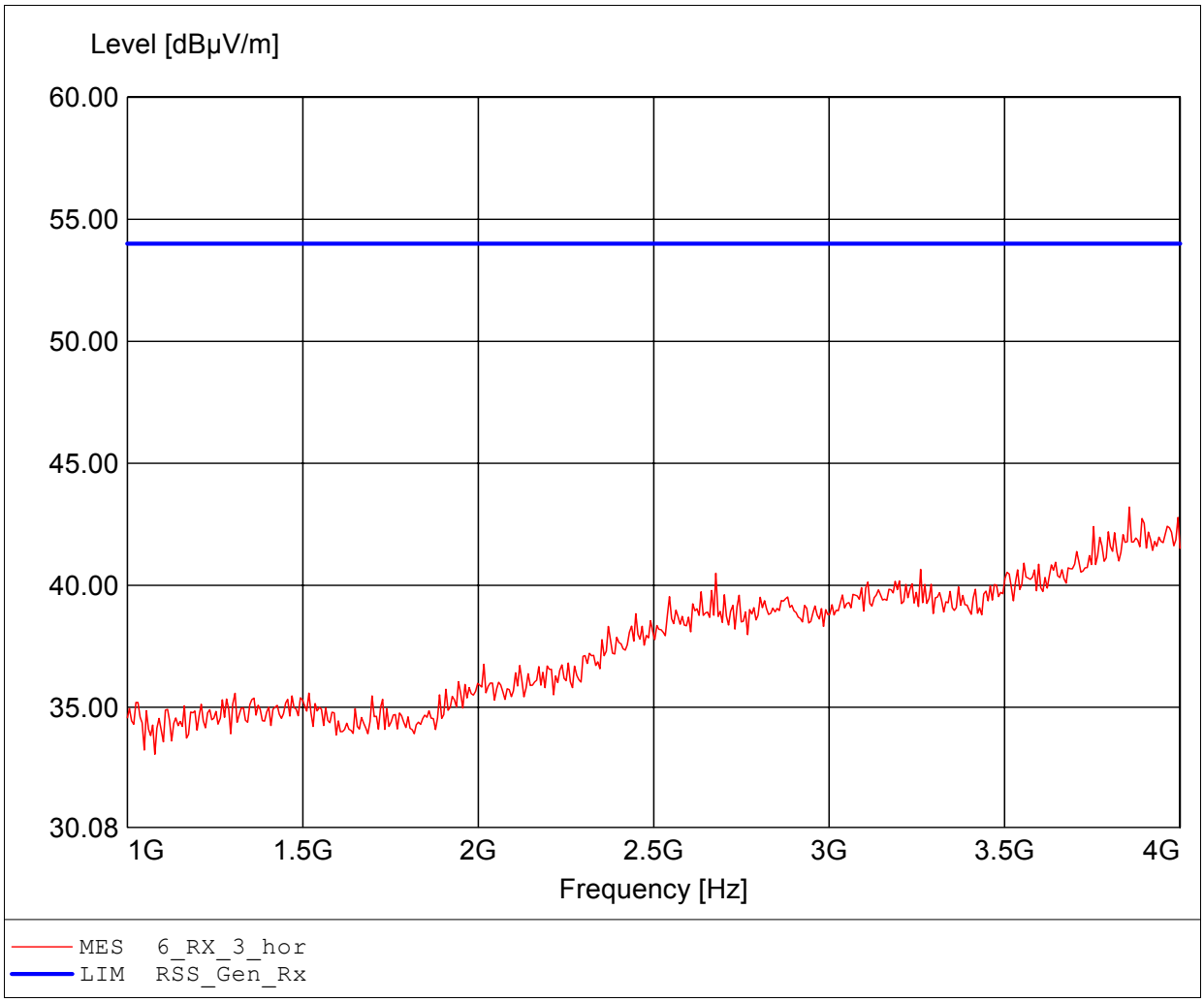
```
Approval Holder:       Zentrum Mikroelektronik Dresden   /    G0M-1107-1263
EUT:                   Radio Module    /  EUT horizontal
Model:                 ZWIR4512AC1    /  Rx
Test Site / Operator:  Eurofins Product Service GmbH  /  Mr. Treffke
Test Condition:        Tnom.: 24°C    /   Unom: 3.3 V DC
Test Specification:    Freq. / CH: 6
Comment 1:             Dist.: 3m, Ant.: HL 223, ampl.
Comment 2:             Freq:990.381MHz Emax:23.90dBµV/m RBW: 100 kHz
```



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module / EUT horizontal
Model:	ZWIR4512AC1 / Rx
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C / Unom: 3.3 V DC
Test Specification:	Freq. / CH: 6
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:3.856GHz Emax:43.21dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	Zentrum Mikroelektronik Dresden / G0M-1107-1263
EUT:	Radio Module / EUT horizontal
Model:	ZWIR4512AC1 / Rx
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Tnom.: 24°C / Unom: 3.3 V DC
Test Specification:	Freq. / CH: 6
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:3.880GHz Emax:42.79dBµV/m RBW: 1 MHz