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FCC TEST REPORT

FCC 47 CFR Part 15C
Industry Canada RSS-210

Digital transmission systems operating within the 2400 – 2483.5 MHz band

Report Reference No. ..... :	G0M-1204-1920-TFC247W-V01
Testing Laboratory ..... :	Eurofins Product Service GmbH
Address ..... :	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation ..... :	 A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 FCC Filed Test Laboratory, Reg.-No.: 96970 IC OATS Filing assigned code: 3470A
Applicant's name ..... :	Panasonic Industrial Devices Europe GmbH
Address ..... :	Zeppelinstr. 19 21337 Lüneburg GERMANY
Test specification:	
Standard..... :	47 CFR Part 15C KDB Publication No. 558074 RSS-210, Issue 8, 2010-12 RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009
Equipment under test (EUT):	
Product description	Bluetooth Low Energy Module
Model No.	ENW898xxAxKF
Hardware version	0x
Firmware / Software version	0x
	FCC-ID: T7VPAN17 IC: 216Q-PAN17
Test result	**Passed**

Possible test case verdicts:	
- neither assessed nor tested ..... :	N/N
- required by standard but not appl. to test object..... :	N/A
- required by standard but not tested..... :	N/T
- not required by standard for the test object ..... :	N/R
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)

Testing:

Date of receipt of test item ..... :	2012-05-02	
Date (s) of performance of tests ..... :	2012-05-03 – 2012-05-09	
Compiled by..... :	Antje Bartusch	
Tested by (+ signature)..... : (Testing Manager)	Wilfried Treffke	.....
Approved by (+ signature) ..... : (Test Lab Manager)	Jens Zimmermann	.....
Date of issue..... :	2012-06-21	
Total number of pages..... :	95	

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

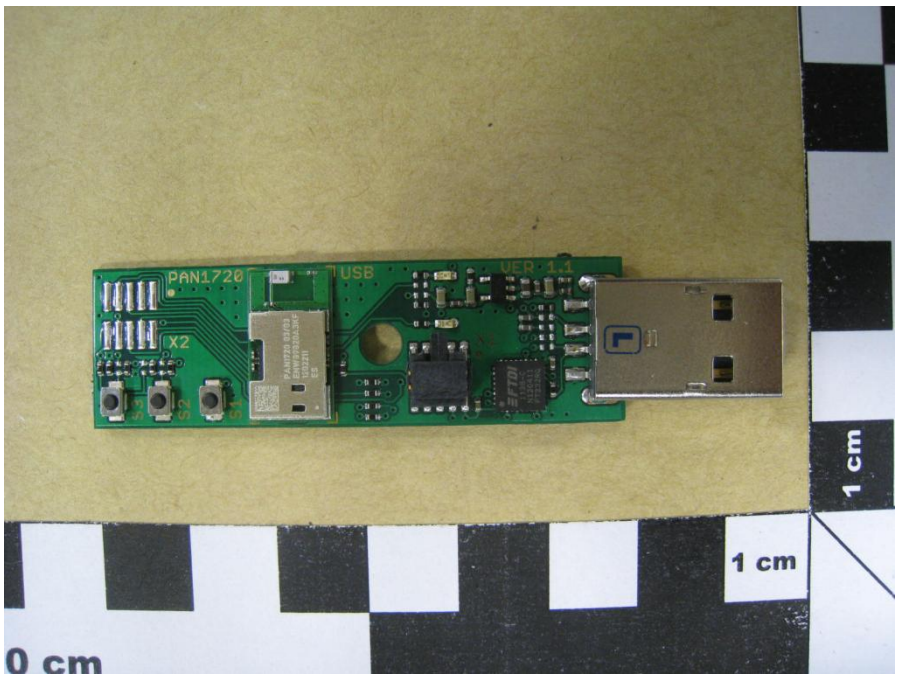
Additional comments:

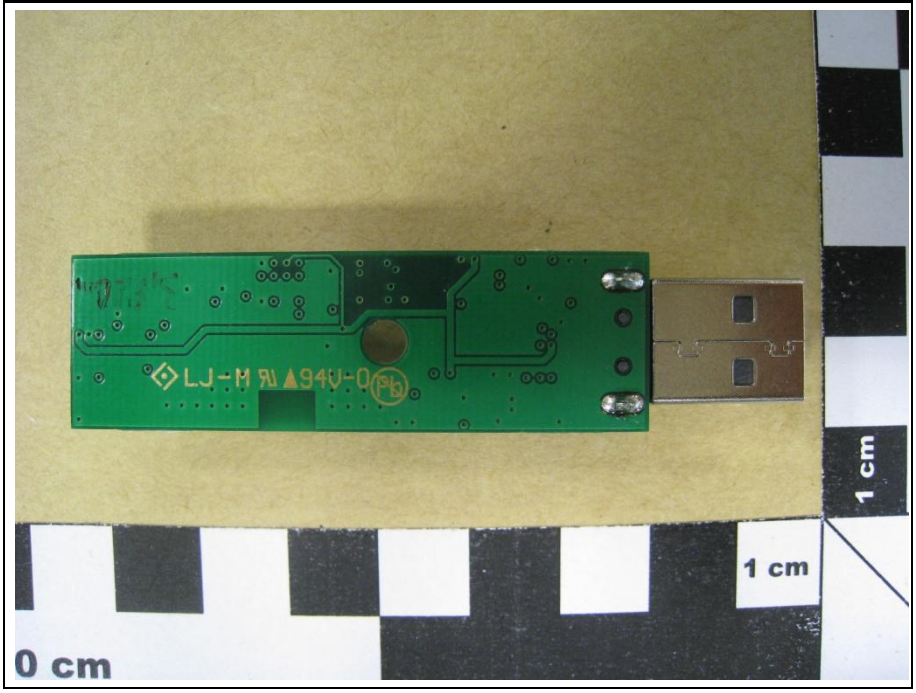
REPORT INDEX

1 Equipment (Test item) Description:

Description	Bluetooth Low Energy Module	
Model	ENW898xxAxKF	
Serial number	None	
Hardware version	0x	
Software / Firmware version	0x	
FCC-ID	T7VPAN17	
IC	216Q-PAN17	
Equipment type	Radio module	
Radio type	Transceiver	
Radio technology	Bluetooth 4.0 Low Energy	
Operating frequency range	2402 - 2480 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F_{LOW}	2402 MHz
	F_{MID}	2442 MHz
	F_{HIGH}	2480 MHz
Spreading	Frequency Hopping	
Modulations	GFSK	
Number of channels	40	
Channel spacing	2MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	LDA21K 7488930245
	Manufacturer	Murata
	Gain	+0.9 dBi (manufacturer declaration)
Manufacturer	Panasonic Industrial Devices Europe GmbH Zeppelinstr. 19 21337 Lüneburg GERMANY	
Power supply	V_{NOM}	3.3VDC
	V_{MIN}	2.0VDC
	V_{MAX}	3.6VDC
AC/DC-Adaptor	none	

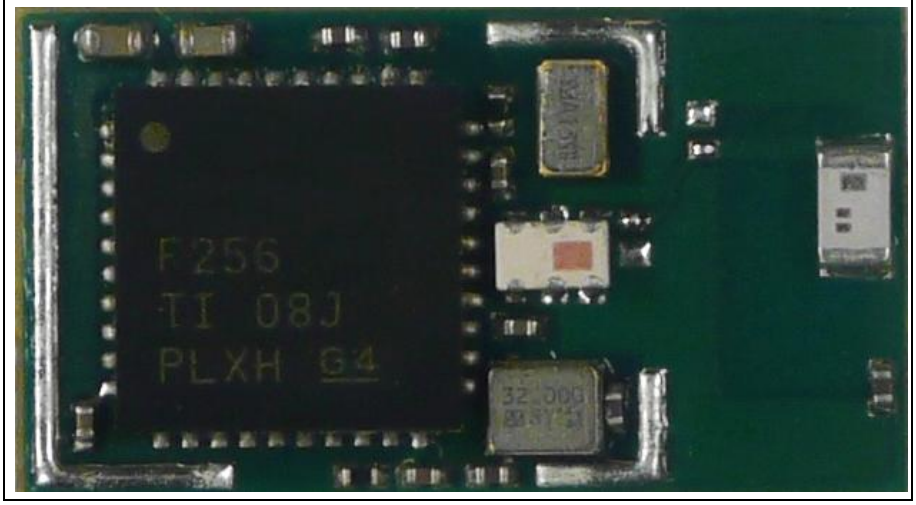
1.1 Photos – Equipment External

EUT WITH EVALUATION BOARD TOP


EUT WITH EVALUATION BOARD BOTTOM


1.2 Photos – Equipment internal

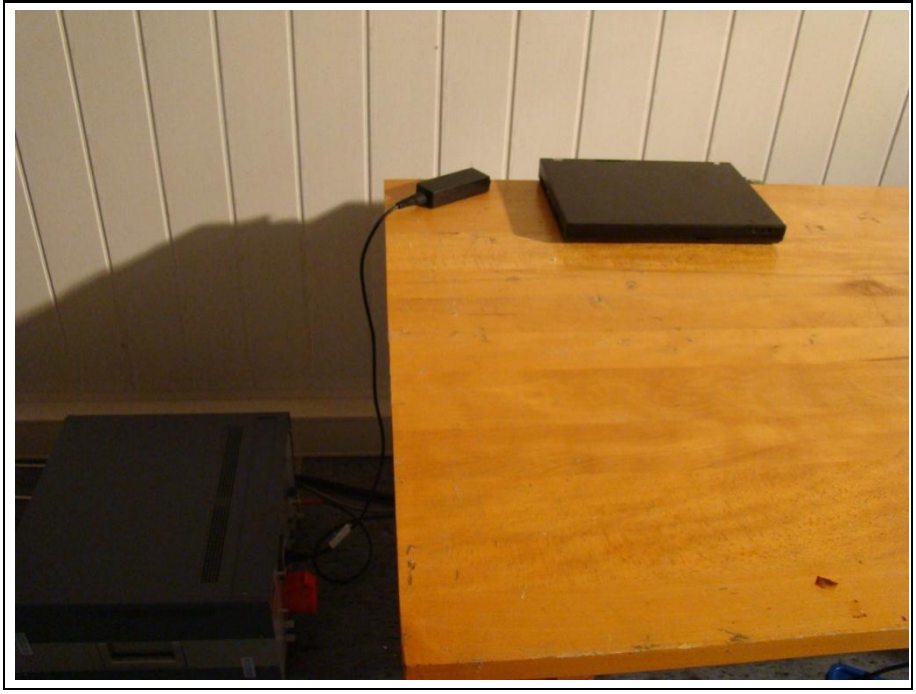
EUT WITH SHIELDING


EUT WITHOUT SHIELDING


1.3 Photos – Test setup

TEST SETUP RADIATED MEASUREMENTS

TEST SETUP CONDUCTED MEASUREMENTS



1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
AE	Laptop	Lenovo	R61	

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description	
Transmit	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = GFSK Data rate = 1 Mbps Bandwidth = 2 MHz Duty cycle = 100 % Power level = Maximum
Receive	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone receive (scan mode) Spreading = On Modulation = GFSK
AC-Powerline	General conditions:	EUT powered by commercial Laptop
	Radio conditions:	Mode = Transmit Spreading = On

1.6 Test Equipment Used During Testing

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

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

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

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

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

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

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 5	EF00395	-	-
Spectrum Analyzer	R&S	FSIQ26	EF00242	2012-05	2013-05
Biconical Antenna	R&S	HK 116	EF00012	2010-01	2013-01
LPD Antenna	R&S	HL 223	EF00187	2011-02	2014-02
LPD Antenna	R&S	HL 025	EF00327	2010-02	2013-02

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

1.7 Sample emission level calculation

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

Reading:

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

A.F.:

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

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

Net:

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

Limit:

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

Limit (dBµV/m) = 20*log (µV/m)

Margin:

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

Example only:

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

2 Result Summary

FCC 47 CFR Part 15C, IC RSS-210				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
RSS-Gen 4.6.1	Occupied Bandwidth	RSS-Gen 4.6.1	N/R	Informational only
FCC § 15.247(a)(2) IC RSS-210 § A8.2	6dB Bandwidth	KDB Publication No. 558074	PASS	
FCC § 15.247(b)(3) IC RSS-210 § A8.4	Maximum peak conducted power	KDB Publication No. 558074	PASS	
FCC § 15.247(e) IC RSS-210 § A8.2	Power spectral density	KDB Publication No. 558074	PASS	
47 CFR 15.207 RSS-Gen 7.2.4	AC power line conducted emissions	KDB Publication No. 558074 / ANSI C63.4	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Band edge compliance	KDB Publication No. 558074	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Conducted spurious emissions	KDB Publication No. 558074	PASS	
FCC § 15.247(d) FCC § 15.209 IC RSS-210 A8.5 IC RSS-Gen 4.9 IC RSS-Gen 7.2.5	Transmitter radiated spurious emissions	KDB Publication No. 558074 / ANSI C 63.4	PASS	
IC RSS-Gen 4.10 IC RSS-Gen 6.1	Receiver radiated spurious emissions	ANSI C 63.4	PASS	
Remarks:				

3 Test Conditions and Results

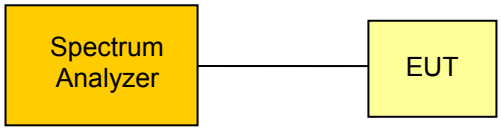
3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. IC RSS-Gen	**Verdict: PASS**
Test according to measurement reference	Reference Method
	RSS-Gen 4.6.1
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}

Limits

None (Informational only)

Test setup



Test procedure

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

Test results

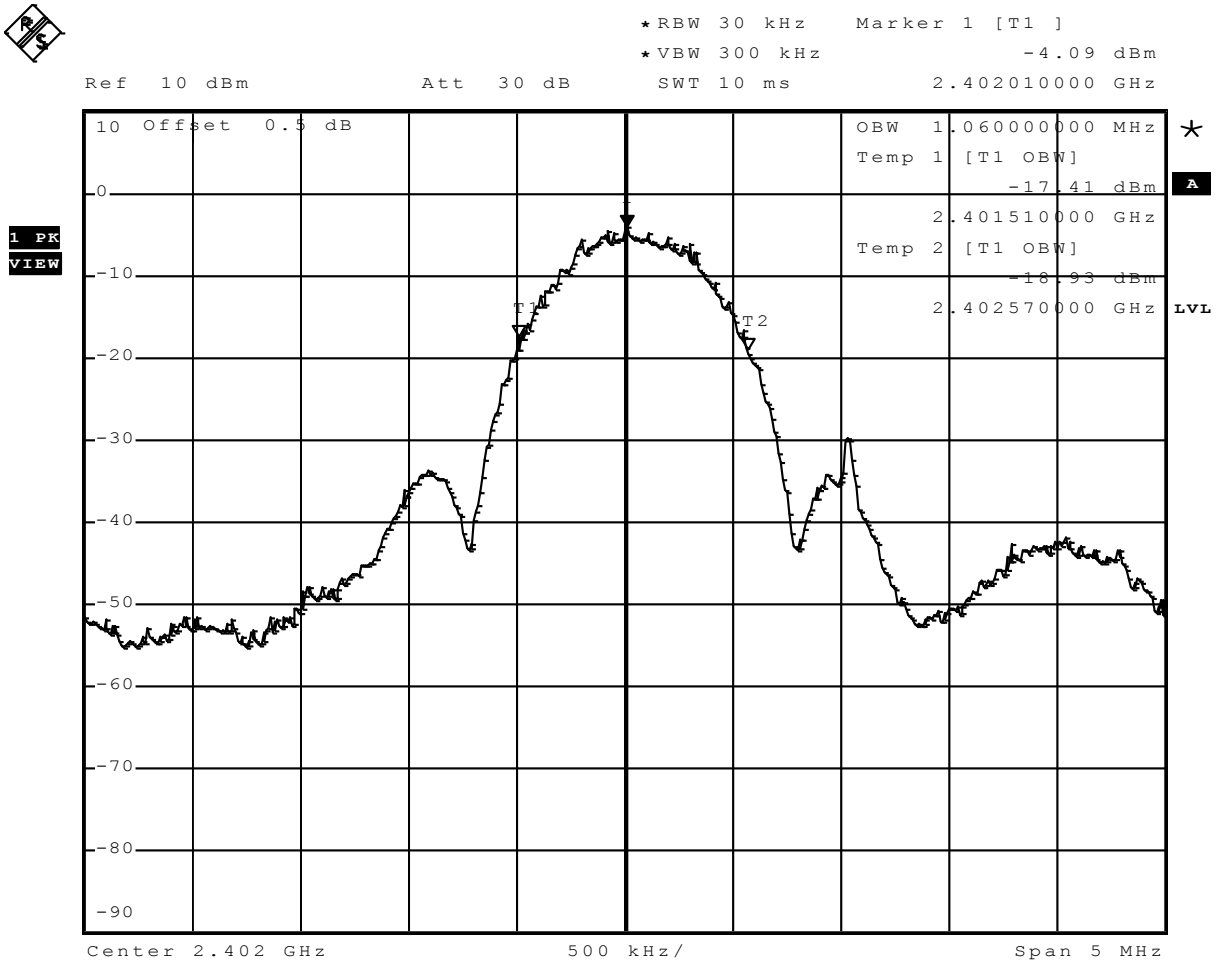
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	2402	Transmit	1060.0
F_{MID}	2442	Transmit	1060.0
F_{HIGH}	2480	Transmit	1060.0

Comments:

Occupied Bandwidth – F_{LOW}

RSS Gen
Occupied Bandwidth

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 0, 2402 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	GFSK

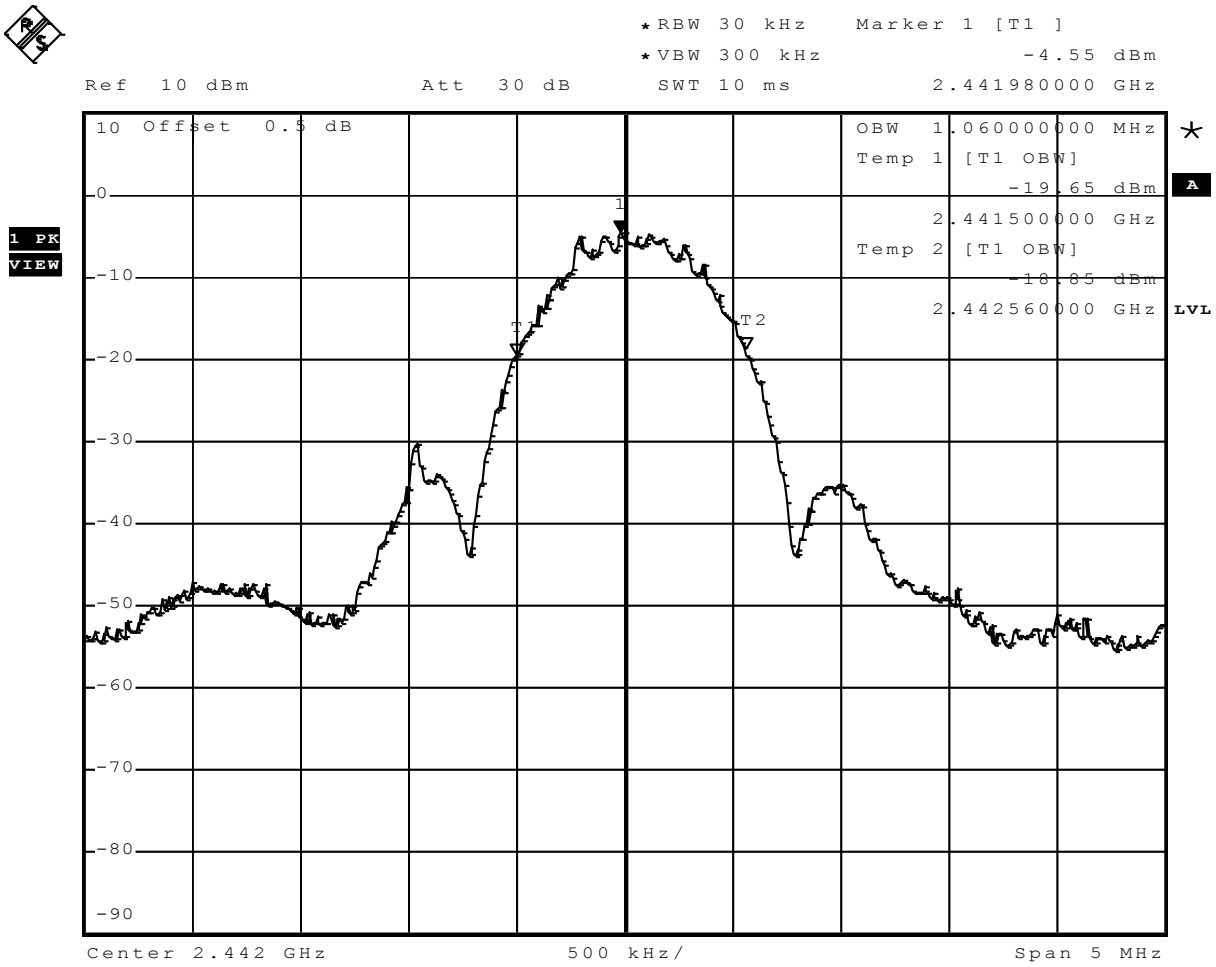


Comment: Occupied bandwidth: 1060 KHz
Date: 3.MAY.2012 10:39:34

Occupied Bandwidth – F_{MID}

RSS Gen
Occupied Bandwidth

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 20, 2442 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	GFSK

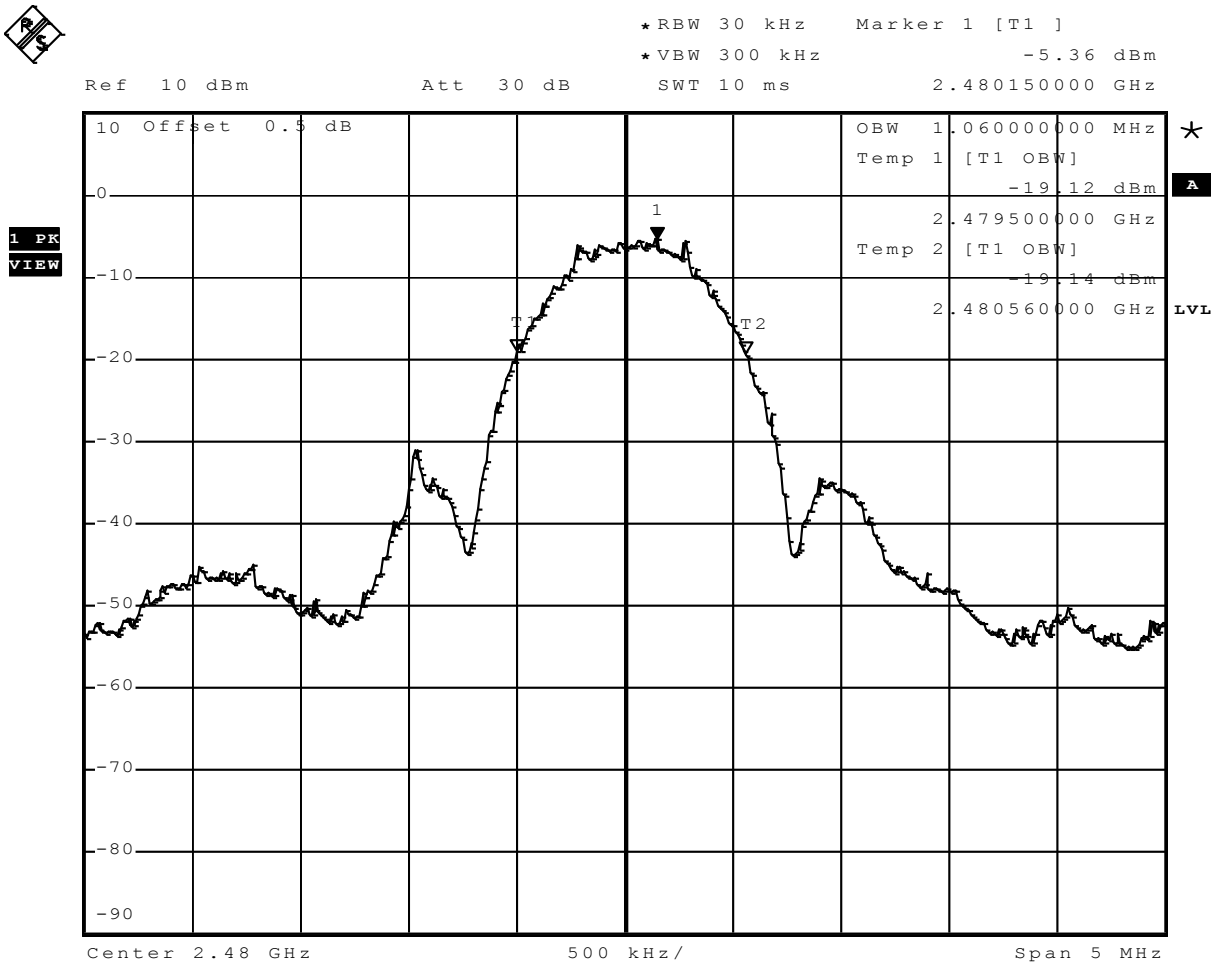


Comment: Occupied bandwidth: 1060 KHz
Date: 3.MAY.2012 10:41:26

Occupied Bandwidth – F_{HIGH}

RSS Gen
Occupied Bandwidth

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 39, 2480 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	GFSK



Comment: Occupied bandwidth: 1060 KHz
Date: 3.MAY.2012 10:43:05

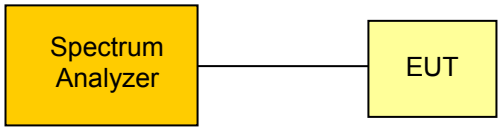
3.2 Test Conditions and Results – 6 dB Bandwidth

6dB Bandwidth acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(a)(2) / IC RSS-210 A8.2
Test according to measurement reference	Reference Method
	FCC KDB Publication No. 558074
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}

Limits

Limit
≥ 500kHz

Test setup



Test procedure

1. EUT set to test mode
2. Span set to at least twice the emission spectrum
3. Detector set to peak and max hold and RBW is set to 100 kHz
4. Envelope peak value of emission spectrum is selected
5. Marker on envelope of spectrum is set to level of -6 dB to the left of the peak
6. Marker on envelope of spectrum is set to level of -6 dB to the right of the peak
7. 6 dB Bandwidth is determined by marker frequency separation

Test results

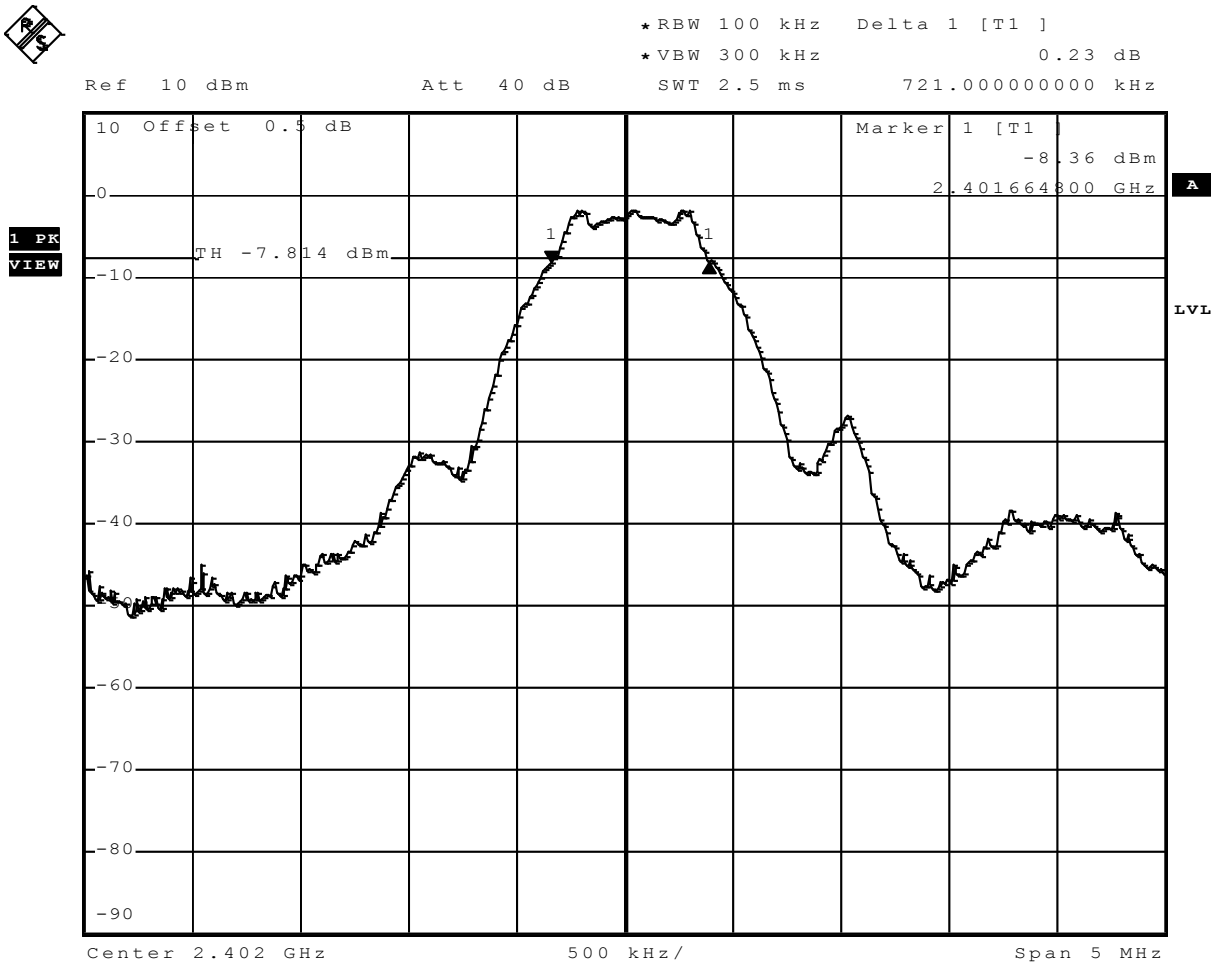
Channel	Frequency [MHz]	Mode	6 dB Bandwidth [kHz]	Limit [kHz]	Result
F_{LOW}	2402	Transmit	721.0	500	PASS
F_{MID}	2442	Transmit	721.2	500	PASS
F_{HIGH}	2480	Transmit	712.8	500	PASS

Comments:

6 dB Bandwidth – F_{LOW}

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 0, 2402 MHz
Comment 3	GFSK

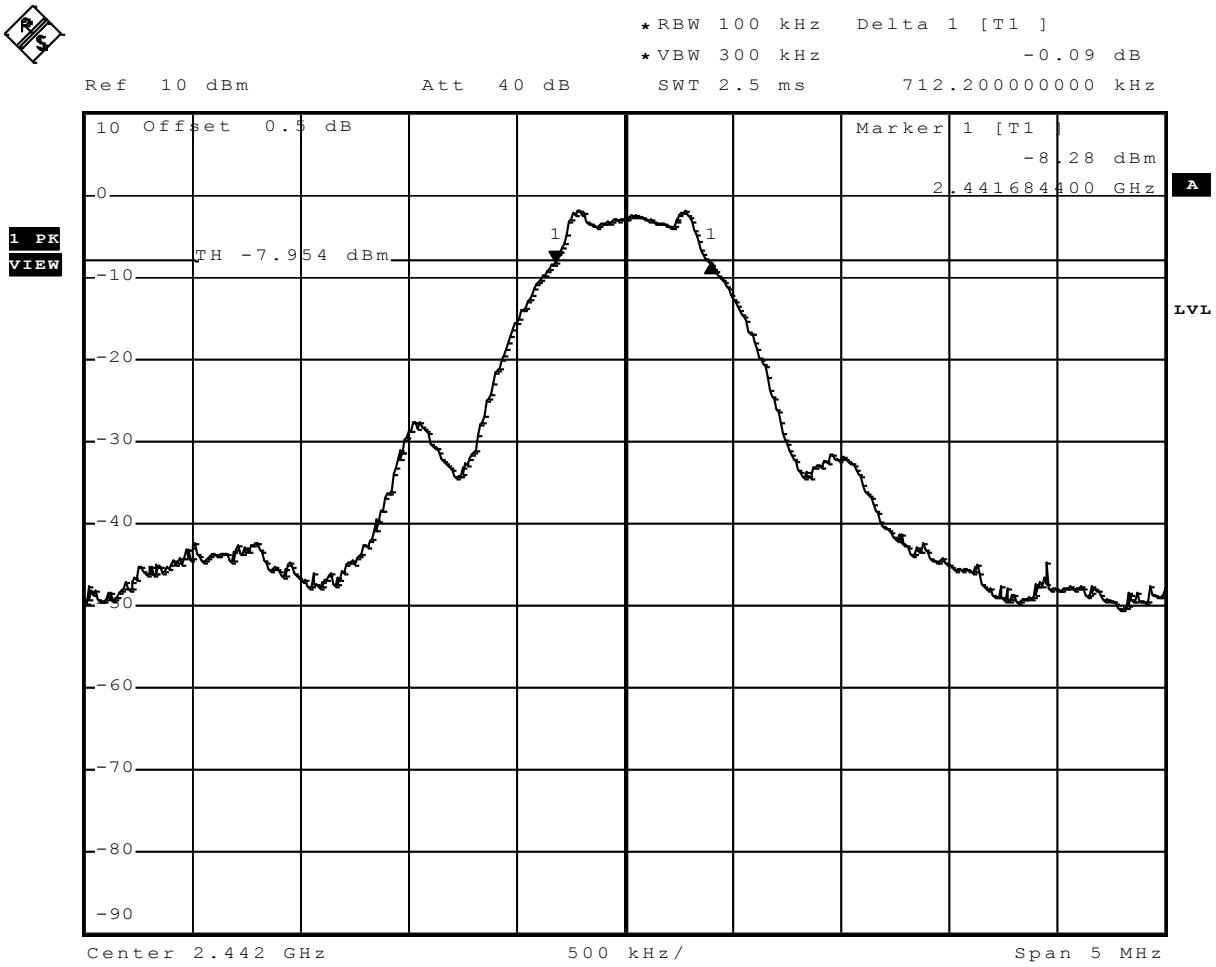


Comment: 6 dB bandwidth: 721 KHz > 500 KHz; verdict: PASS
Date: 3.MAY.2012 09:44:04

6 dB Bandwidth – F_{MID}

FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 20, 2442 MHz
Comment 3	GFSK

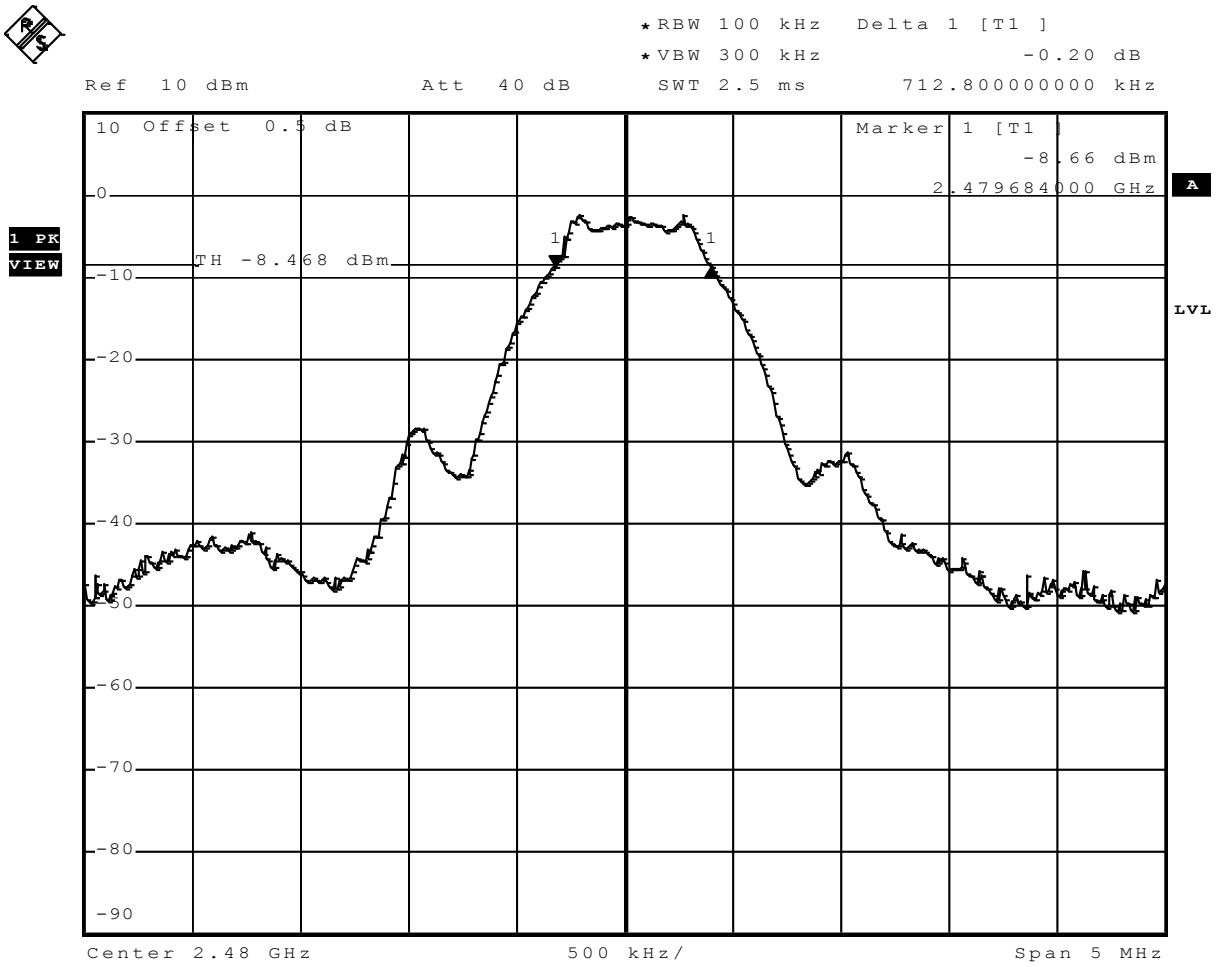


Comment: 6 dB bandwidth: 712.2 KHz > 500 KHz; verdict: PASS
Date: 3.MAY.2012 09:42:17

6 dB Bandwidth – F_{HIGH}

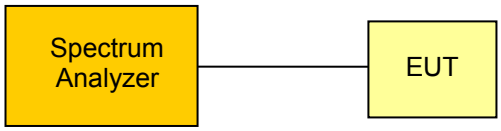
FCC part 15.247 (a)2
Minimum 6 dB Bandwidth

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (a)2
Comment 1	Minimum 6 dB Bandwidth
Comment 2	Channel : 39, 2480 MHz
Comment 3	GFSK



Comment: 6 dB bandwidth: 712.8 KHz > 500 KHz; verdict: PASS
Date: 3.MAY.2012 09:40:23

3.3 Test Conditions and Results – Maximum peak conducted power

Maximum peak conducted power acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(b)(3) / IC RSS-210 A8.4
Test according to measurement reference	Reference Method
	FCC KDB Publication No. 558074
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
Measurement mode	Peak
Maximum antenna gain	0.9 dBi ⇒ Limit correction = 0 dB
Limits	
Limit	
1 W (30 dBm)	
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
Test setup	
	
Test procedure	
1. EUT set to test mode (Communication tester is used if needed) 2. Center frequency set to test channel center frequency 3. Span set to twice the 20 dB bandwidth and detector to peak and max hold 4. Resolution bandwidth is set to 3 MHz 5. Peak conducted power is determined from peak of spectrum envelope	

Test results							
Channel	Frequency [MHz]	Voltage	Mode	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]
F_{LOW}	2402	V_{nom} = 3.3V	Transmit	-0.5	0.001	30	-30.50
F_{MID}	2442	V_{nom} = 3.3V	Transmit	-1.0	0.001	30	-31.00
F_{HIGH}	2480	V_{nom} = 3.3V	Transmit	-1.5	0.001	30	-31.50
F_{LOW}	2402	V_{min} = 2.0V	Transmit	-0.6	0.001	30	-30.60
F_{MID}	2442	V_{min} = 2.0V	Transmit	-1.0	0.001	30	-31.00
F_{HIGH}	2480	V_{min} = 2.0V	Transmit	-1.5	0.001	30	-31.50
F_{LOW}	2402	V_{max} = 3.6V	Transmit	-0.5	0.001	30	-30.50
F_{MID}	2442	V_{max} = 3.6V	Transmit	-1.0	0.001	30	-31.00
F_{HIGH}	2480	V_{max} = 3.6V	Transmit	-1.5	0.001	30	-31.50
Comment:							

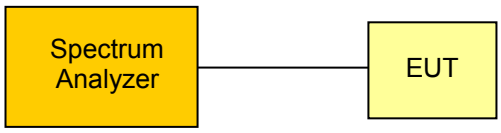
3.4 Test Conditions and Results – Power spectral density

Power spectral density acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(e) / IC RSS-210 A8.2
Test according to measurement reference	Reference Method
	FCC KDB Publication No. 558074
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
Measurement mode	Peak

Limits

8 dBm / 3 kHz

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Center frequency set to test channel center frequency
3. Span is set large enough to capture maximum emissions in passband, RBW is set to 3kHz
4. Peak power density is determined from peak emission of envelope

Test results

Channel	Frequency [MHz]	Test mode	Peak frequency [MHz]	Peak power density [dBm]	Limit [dBm/3kHz]	Margin [dB]
F_{LOW}	2402	Transmit	2402.038	-13.27	8.0	-21.27
F_{MID}	2442	Transmit	2442.118	-13.44	8.0	-21.44
F_{HIGH}	2480	Transmit	2480.014	-14.02	8.0	-22.02

Comments:

3.5 Test Conditions and Results – AC power line conducted emissions

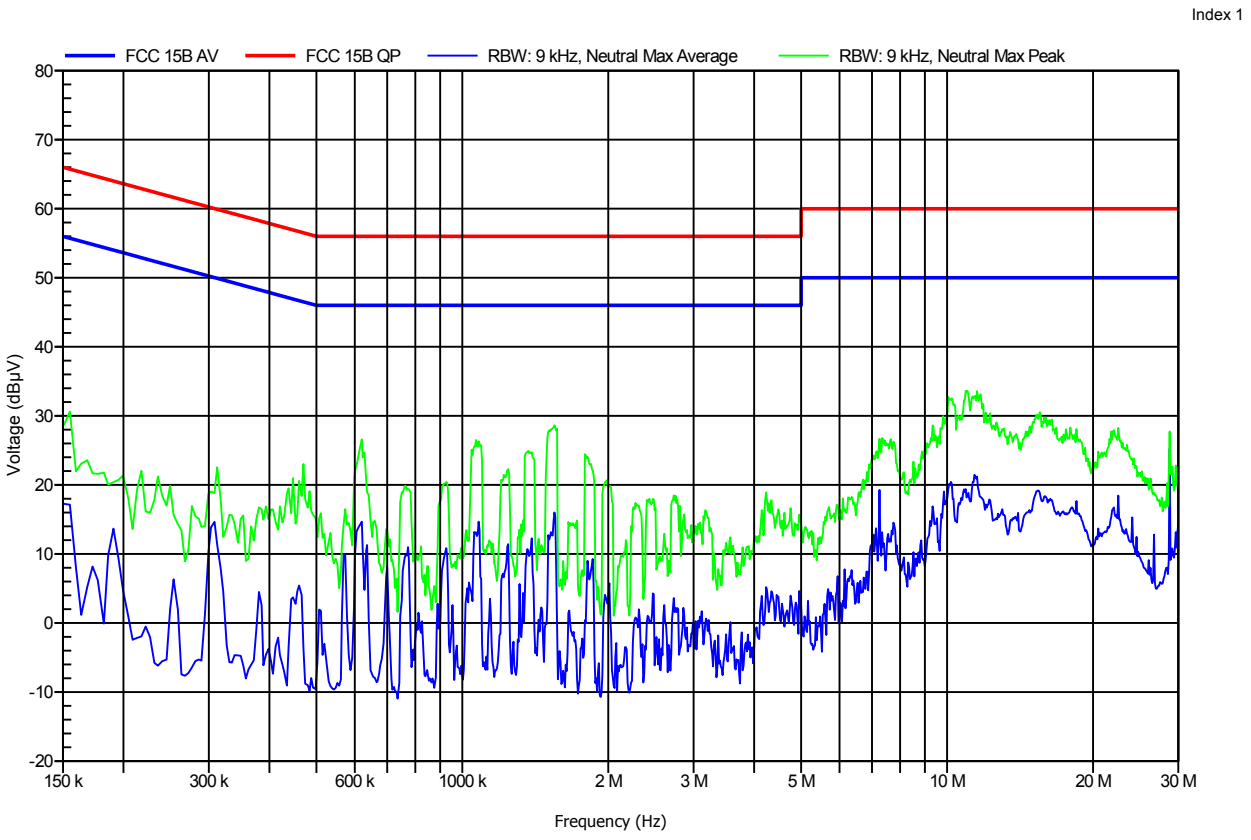
Power line conducted emissions acc. FCC 47 CFR 15.207 / IC RSS-Gen				**Verdict: PASS**
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Points of Application	Application Interface			
AC Mains	LISN			
EUT test mode	AC power line			
Limits and results				
Frequency [MHz]	Quasi-Peak [dBµV]	Result	Average [dBµV]	Result
0.15 to 5	66 to 56*	PASS	56 to 46*	PASS
0.5 to 5	56	PASS	46	PASS
5 to 30	60	PASS	50	PASS
Comments: * Limit decreases linearly with the logarithm of the frequency.				

Conducted Emissions

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

Project number: G0M-1204-1920

Manufacturer:	Panasonic Industrial Devices Europe GmbH
EUT Name:	Bluetooth Low Energy Module
Model:	ENW898xxAxKF
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
LISN:	ESH2-Z5 N
Mode:	Bluetooth Low Energy active
Test Date:	09.05.2012
Note:	

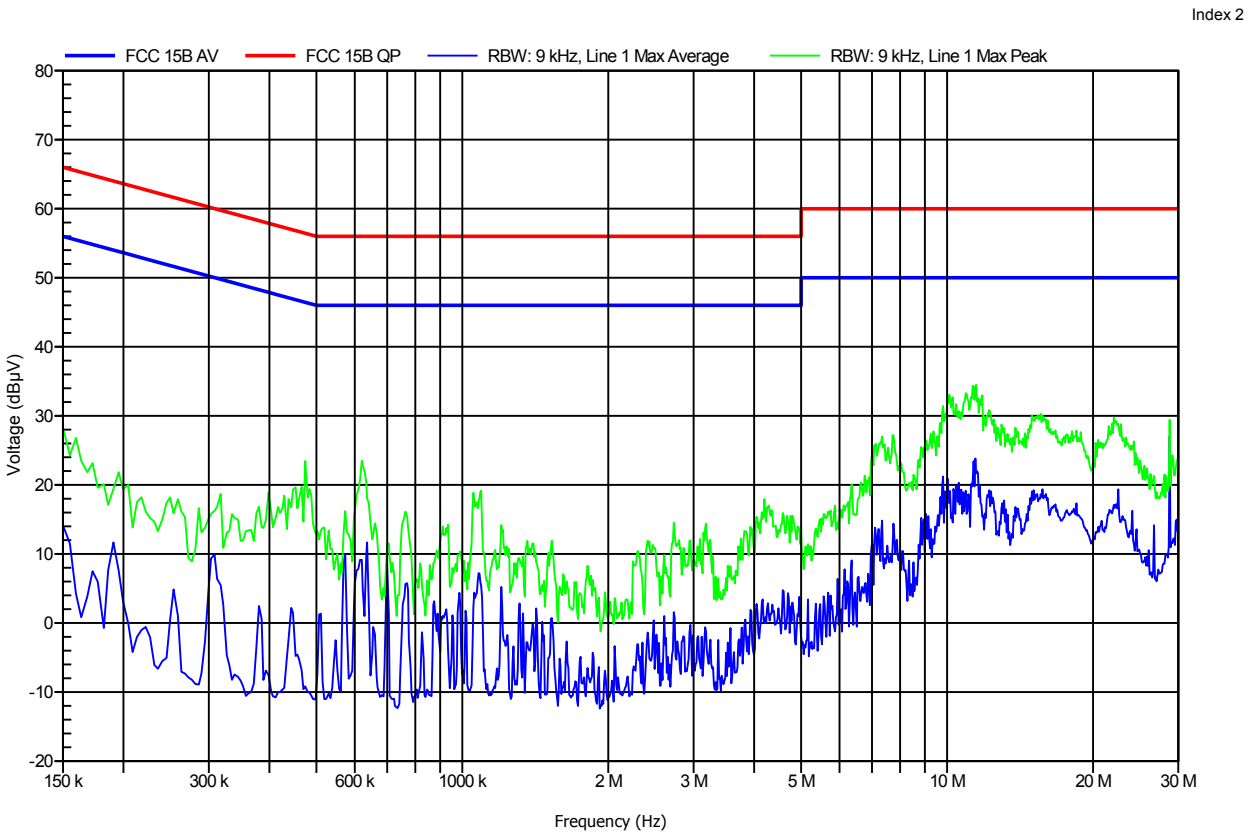


Conducted Emissions

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

Project number: G0M-1204-1920

Manufacturer:	Panasonic Industrial Devices Europe GmbH
EUT Name:	Bluetooth Low Energy Module
Model:	ENW898xxAxKF
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Handrik
Test Conditions:	Tnom: 22°C, Unom: 120 V AC
LISN:	ESH2-Z5 N
Mode:	Bluetooth Low Energy active
Test Date:	09.05.2012
Note:	



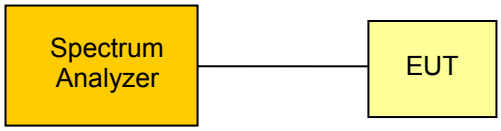
3.6 Test Conditions and Results – Band edge compliance

Band-edge compliance acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(d) / IC RSS-210 A8.5
Test according to measurement reference	Reference Method
	FCC KDB Publication No. 558074
Test frequency range	Tested frequencies
	F_{LOW} / F_{HIGH}
Measurement mode	Peak

Limits

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

Test setup



Test procedure

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

Test results

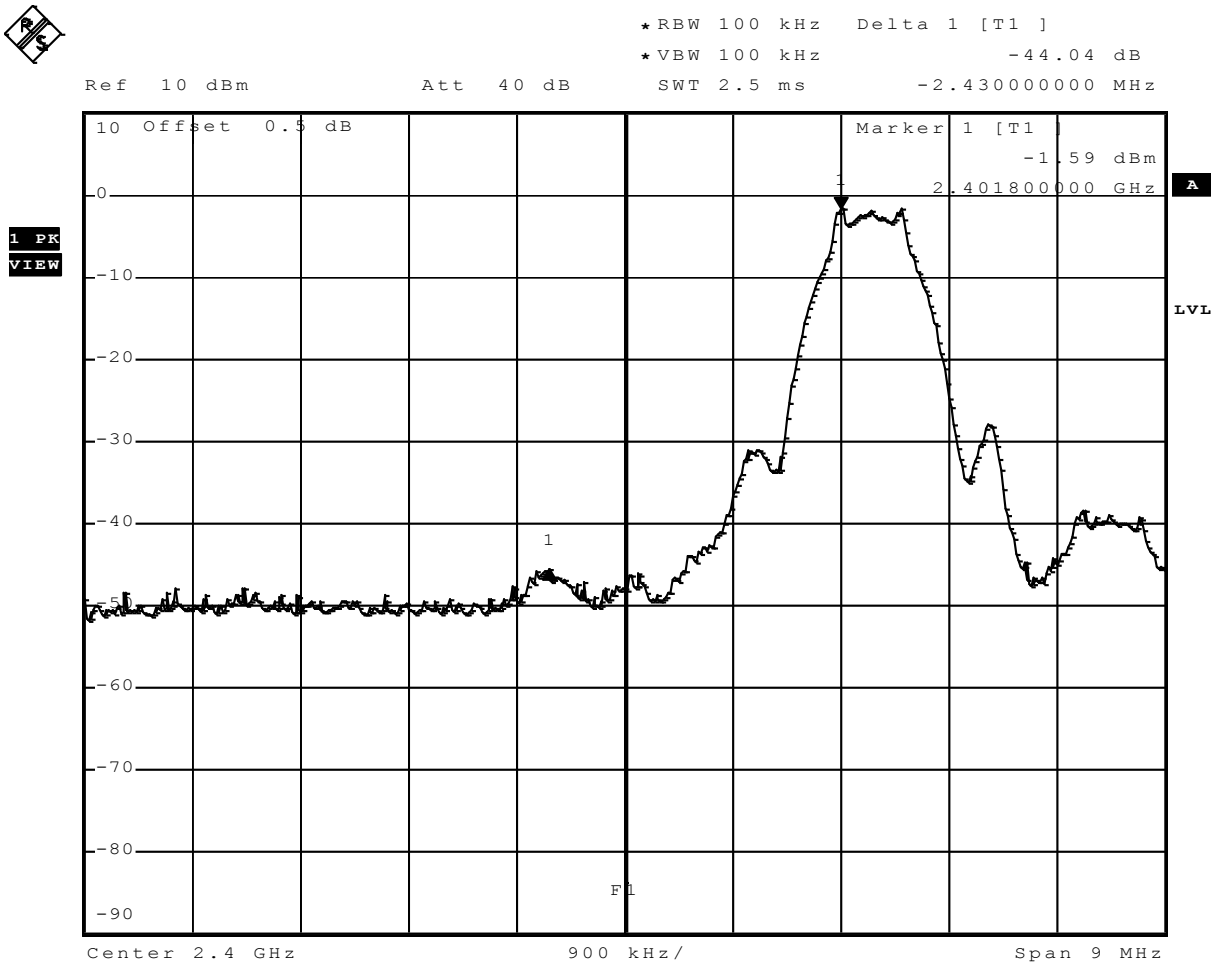
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]
F_{LOW}	2402	Transmit	-44.04	-20	-24.04
F_{HIGH}	2480	Transmit	-46.84	-20	-26.84

Comments:

Band-edge compliance

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 2402 MHz
Comment 3	GFSK

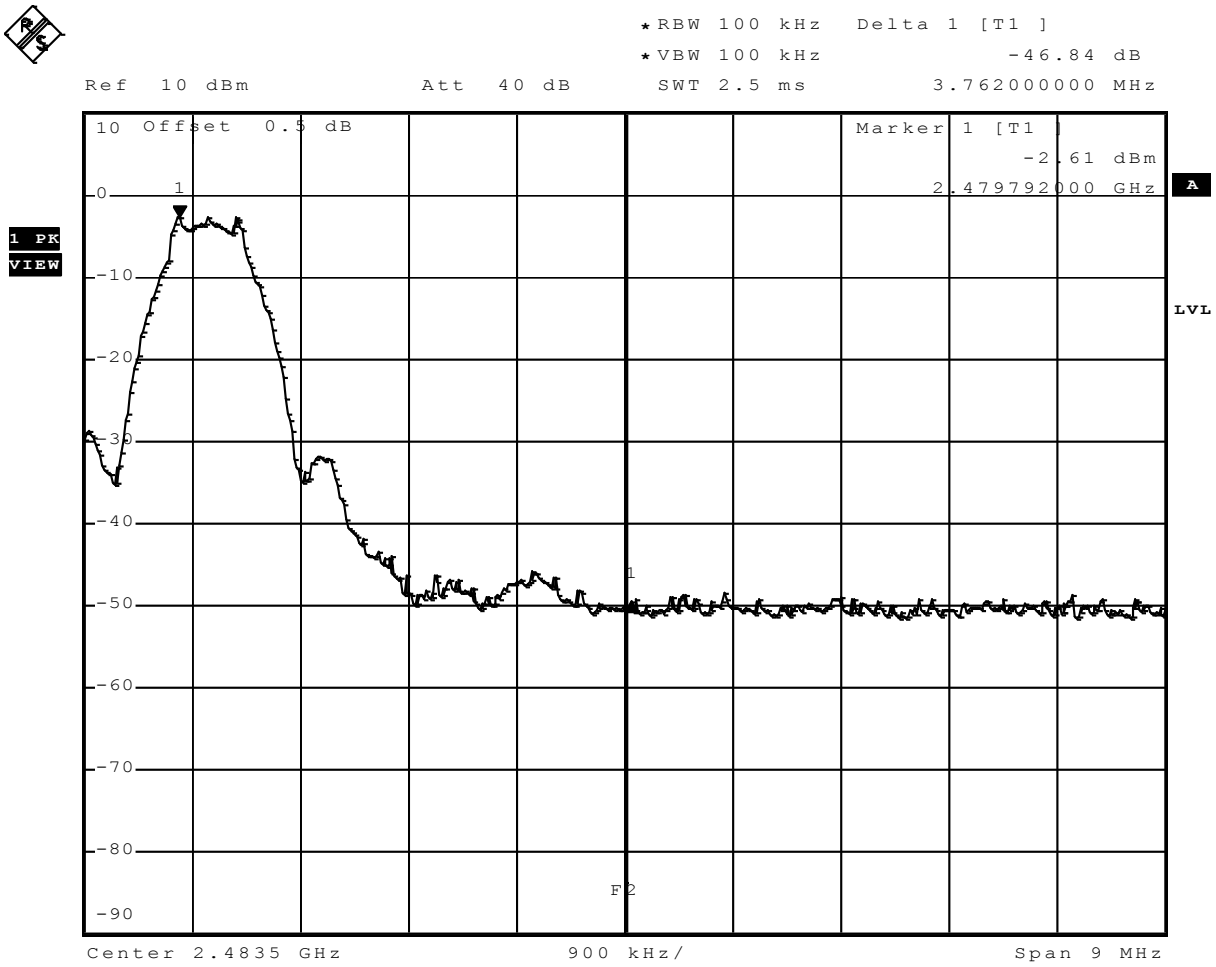


Comment: Limit: Marker Delta value >20 dB; Result: PASS
Date: 3.MAY.2012 10:49:18

Band-edge compliance

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 39 2480 MHz
Comment 3	GFSK



Comment: Limit: Marker Delta value >20 dB; Result: PASS
Date: 3.MAY.2012 10:45:34

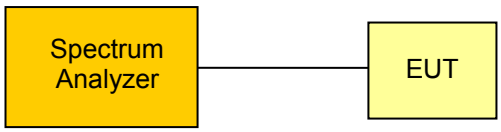
3.7 Test Conditions and Results – Conducted spurious emissions

Conducted spurious emissions acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(d) / IC RSS-210 A8.5
Test according to measurement reference	Reference Method
	FCC KDB Publication No. 558074
Test frequency range	Tested frequencies
	10 MHz – 10th Harmonic
Measurement mode	Peak

Limits

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

Test setup



Test procedure

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

Test results

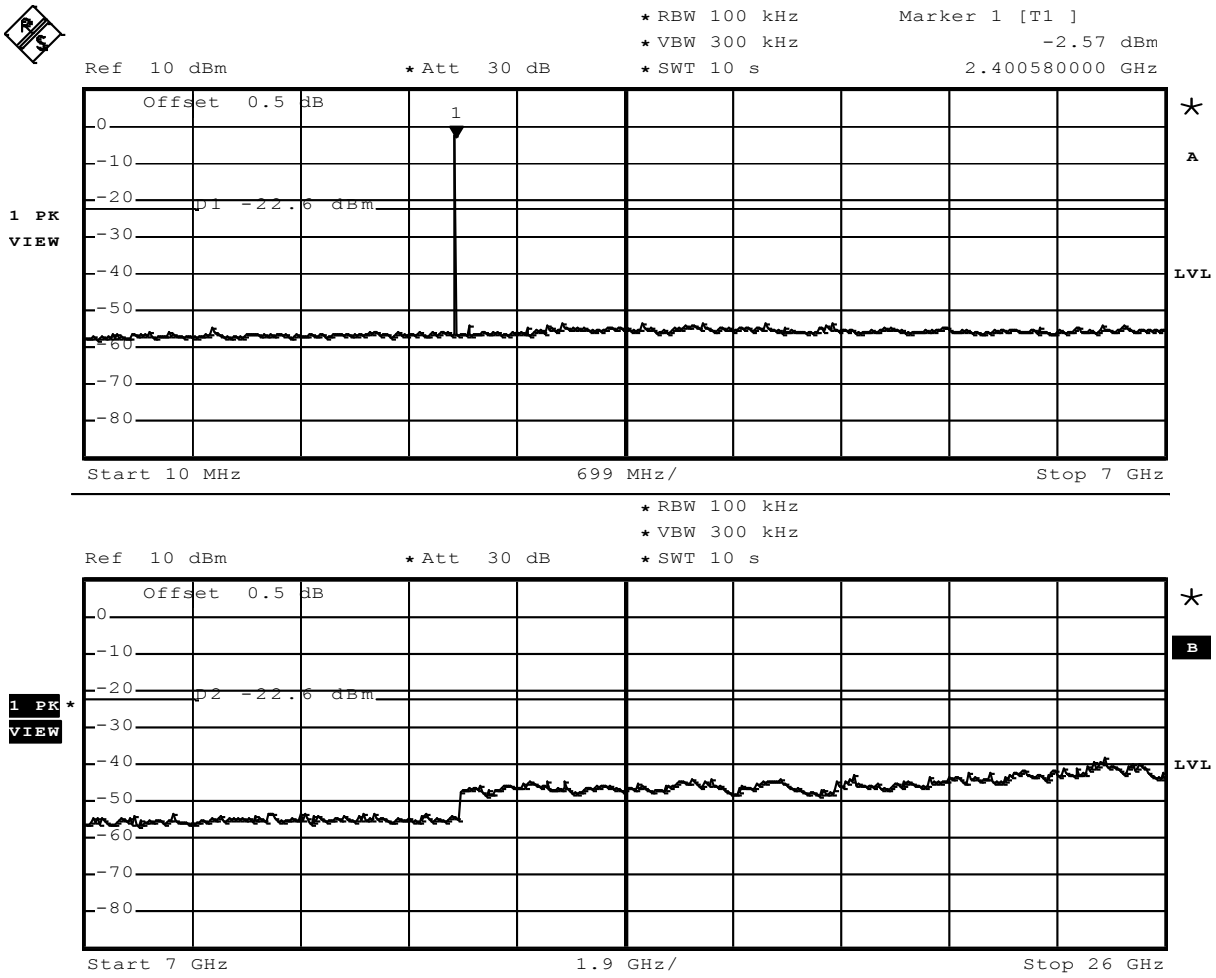
Channel	Frequency [MHz]	Mode	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]
F_{LOW}	2402	no significant spurious emissions					
F_{MID}	2442	no significant spurious emissions					
F_{HIGH}	2480	no significant spurious emissions					

Comments:

Conducted spurious emissions – F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

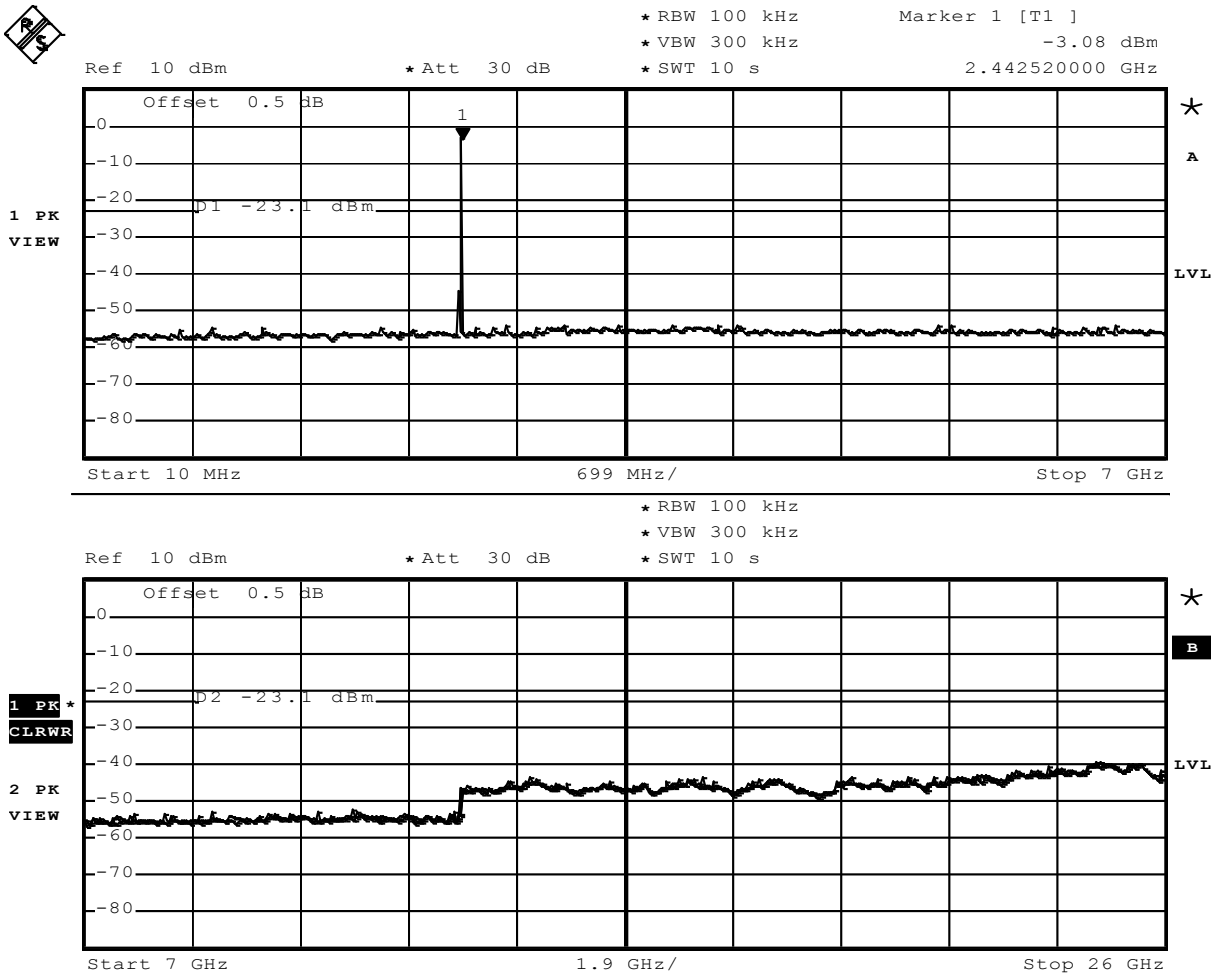
EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 0, 2402 MHz
Comment 3	GFSK



Conducted spurious emissions – F_{MID}

FCC part 15.247 (d)
Spurious Emissions

EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 20, 2442 MHz
Comment 3	GFSK

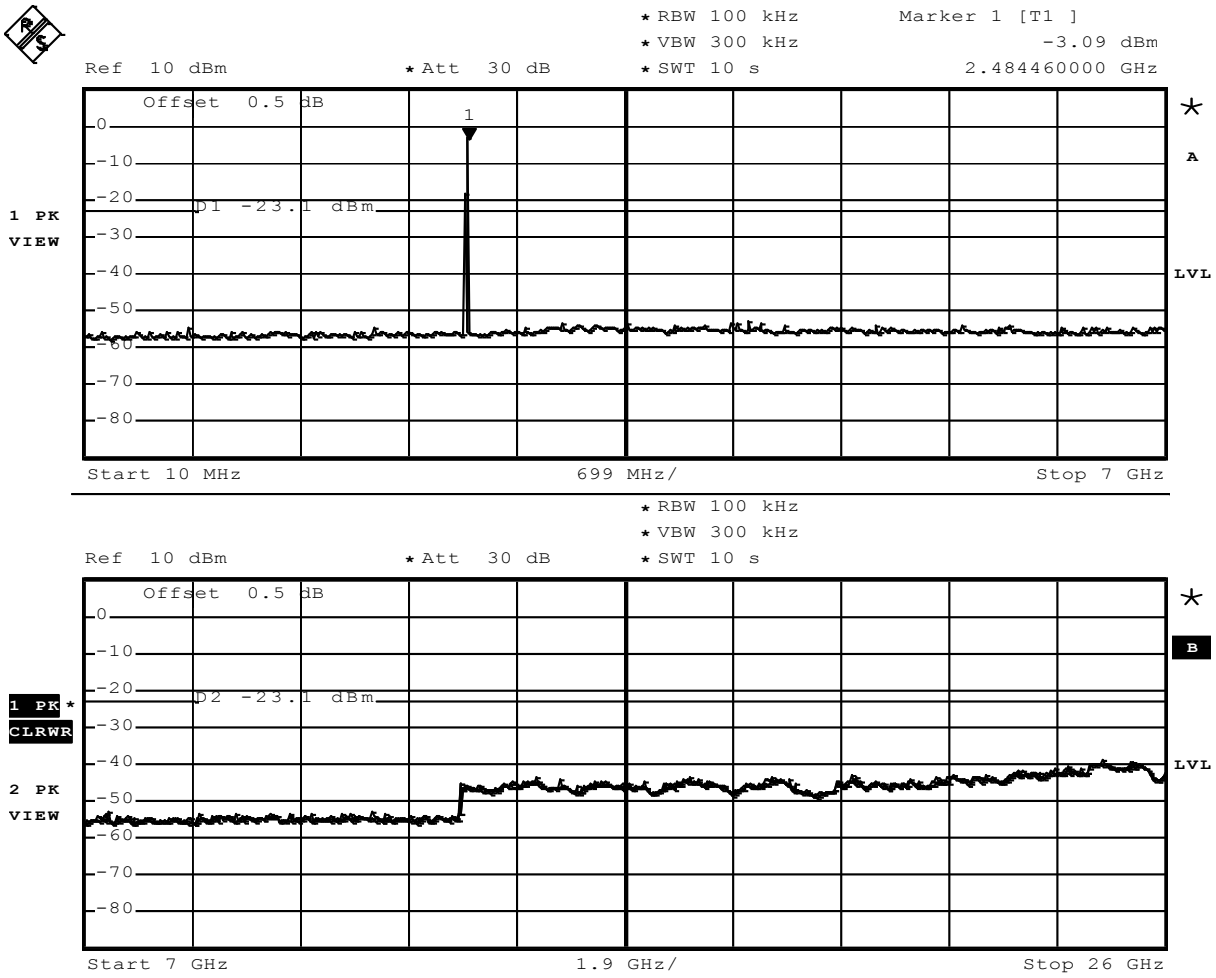


Date: 3.MAY.2012 10:27:44

Conducted spurious emissions – F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

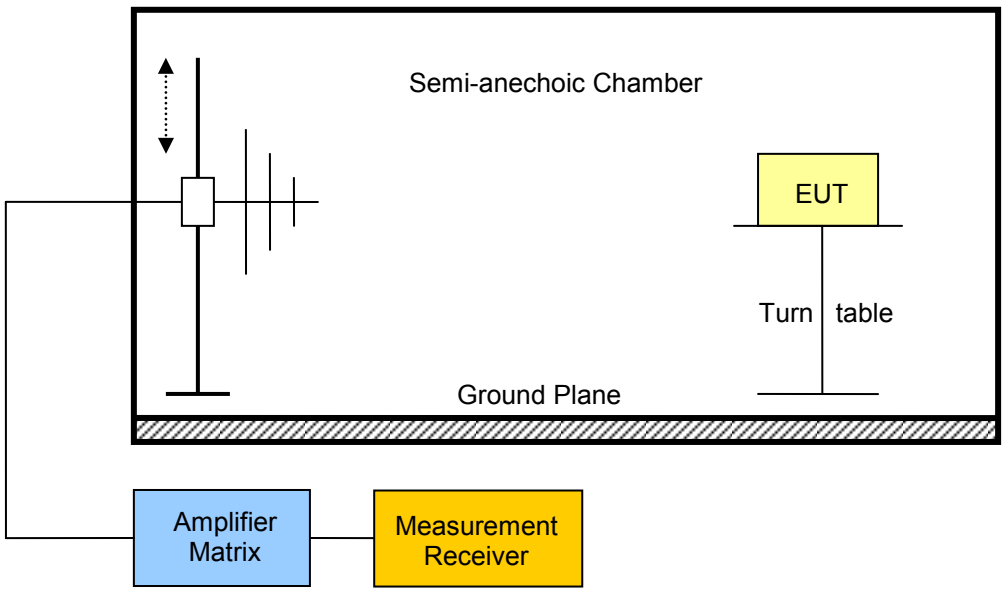
EUT	Bluetooth smart module
Model	BT1720
Approval Holder	Panasonic Industrial Devices Europe GmbH / Ord.: G0M-1204-1920
Temperature / Voltage	24°C, Vnom
Test Site / Operator	Eurofins Product Service GmbH, Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 39, 2480 MHz
Comment 3	GFSK



Date: 3.MAY.2012 10:31:07

3.8 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. FCC 47 CFR 15.247 / IC RSS-210				**Verdict: PASS**
Test according referenced standards		Reference Method		
		FCC 15.247(d) / IC RSS-210 A8.5		
Test according to measurement reference		Reference Method		
		FCC KDB Publication No. 558074 / ANSI C63.4		
Test frequency range		Tested frequencies		
		30 MHz – 10th Harmonic		
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.				
Test setup				



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

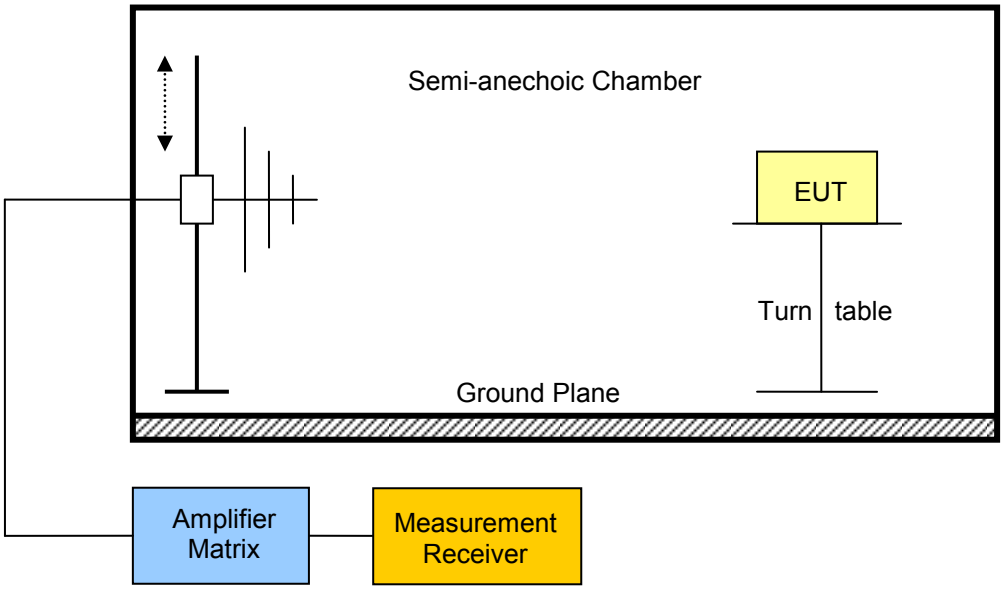
Test results

Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbµV/m]	Det.	Pol.	Limit [dbµV/m]	Limit dist. [m]*	Margin [dB]
F_{LOW}	2402	Transmit	2400	62.15	pk	ver	71.68	3	-09.53
F_{LOW}	2402	Transmit	2400	64.16	pk	hor	71.68	3	-07.52
F_{MID}	2442	Transmit	7415	50.32	avg	ver	54	3	-3.68
F_{HIGH}	2480	Transmit	No significant spurious emissions						

Comments: * Physical distance between EUT and measurement antenna.

3.9 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. IC RSS-210				**Verdict: PASS**
Test according referenced standards	Reference Method			
	IC RSS-210 A8.5			
Test according to measurement reference	Reference Method			
	ANSI C63.4			
Test frequency range	Tested frequencies			
	30 MHz – 3th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



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

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbµV/m]	Emission Level [µV/m]	Det.	Limit [µV/m]	Margin [µV/m]
F_{MID}	2442	185.010	33.19	45.66	pk	150.00	-104.34
F_{MID}	2442	187.054	33.39	46.72	pk	150.00	-103.28
F_{MID}	2442	996.794	22.86	13.90	pk	500.00	-486.10
F_{MID}	2442	988.778	22.74	13.71	pk	500.00	-486.29
F_{MID}	2442	3952.000	44.01	158.67	pk	500.00	-341.33
F_{MID}	2442	3940.000	43.46	148.94	pk	500.00	-351.06
F_{MID}	2442	7992.000	49.24	289.73	pk	500.00	-210.27
F_{MID}	2442	7984.000	50.00	316.23	pk	500.00	-183.77
F_{MID}	2442	10501.00	42.91	139.80	pk	500.00	-360.20
F_{MID}	2442	10766.00	42.87	139.16	pk	500.00	-360.84

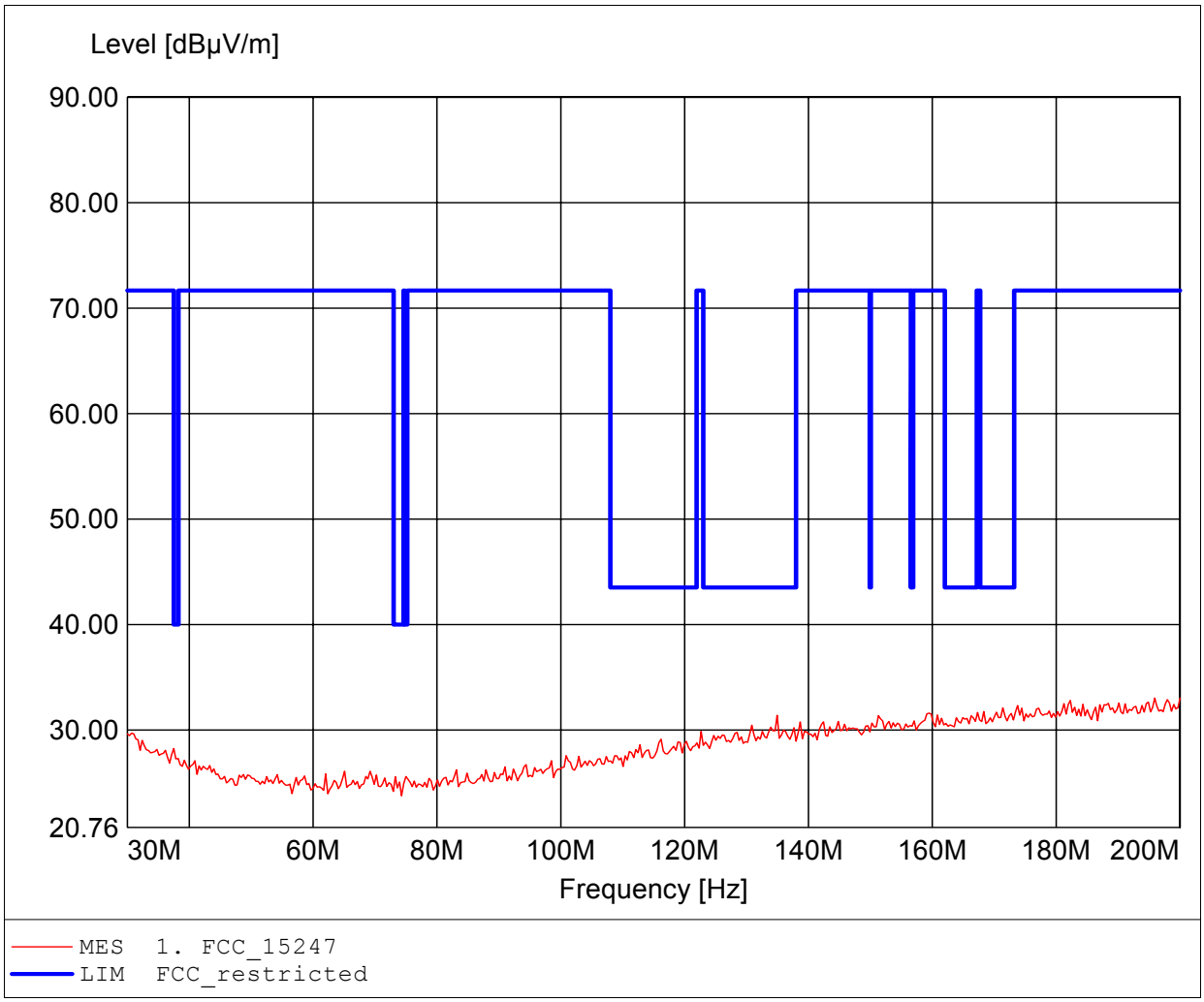
Comments:
* Physical distance between EUT and measurement antenna.
** Emission level corresponds to ambient noise floor

ANNEX A Transmitter radiated spurious emissions

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

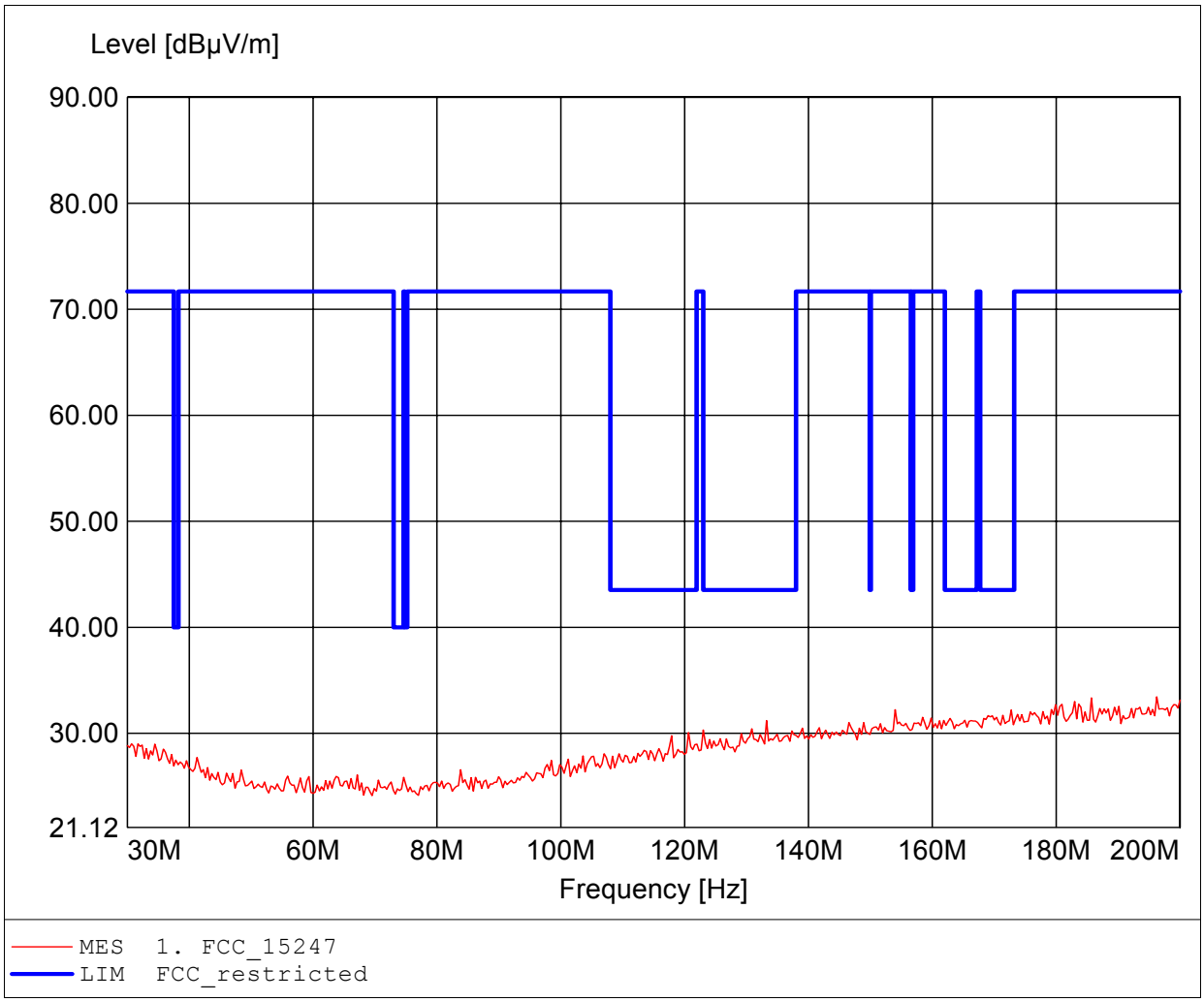
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 200.000MHz, Emax: 33.03dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

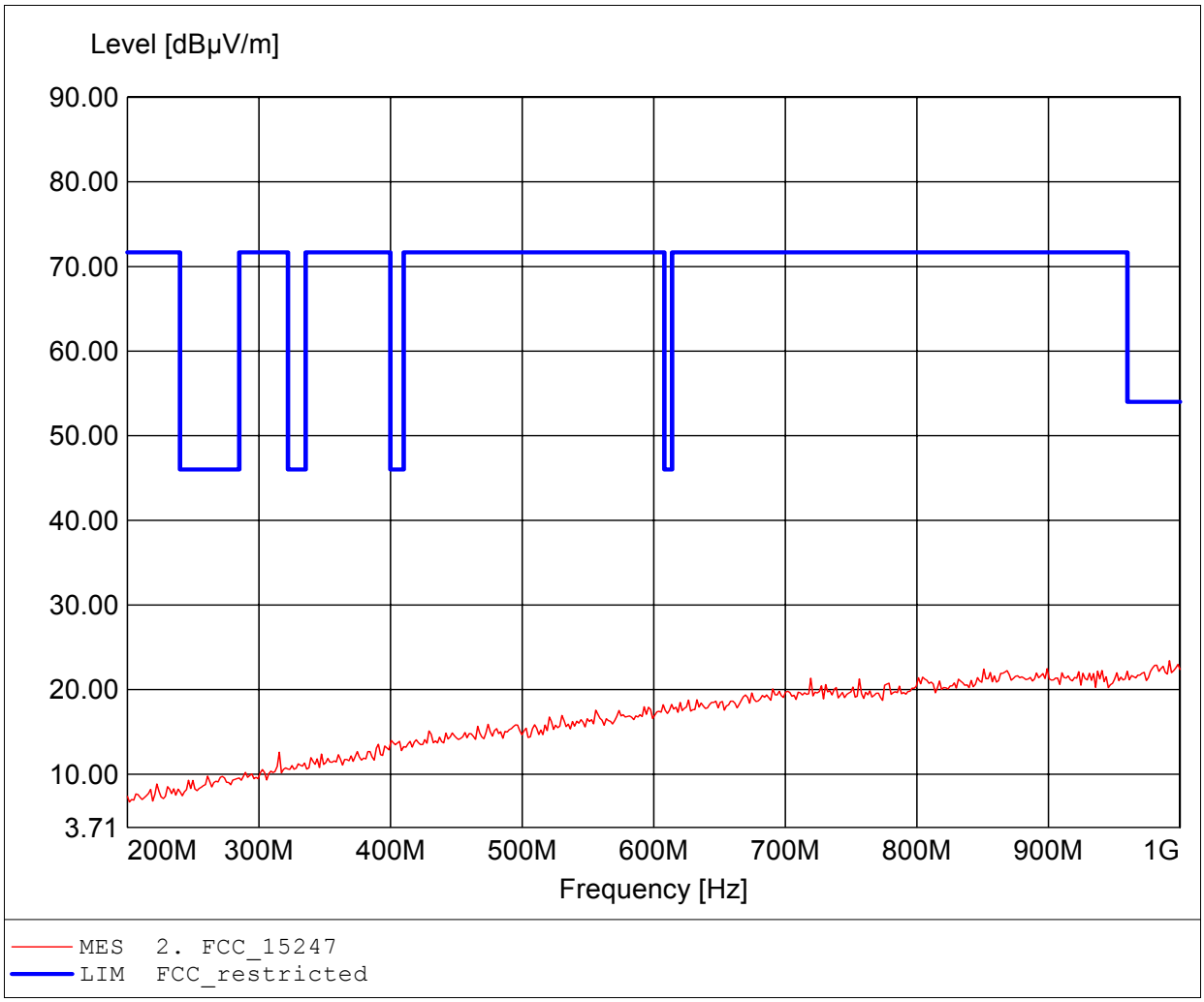
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 196.253MHz, Emax: 33.43dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

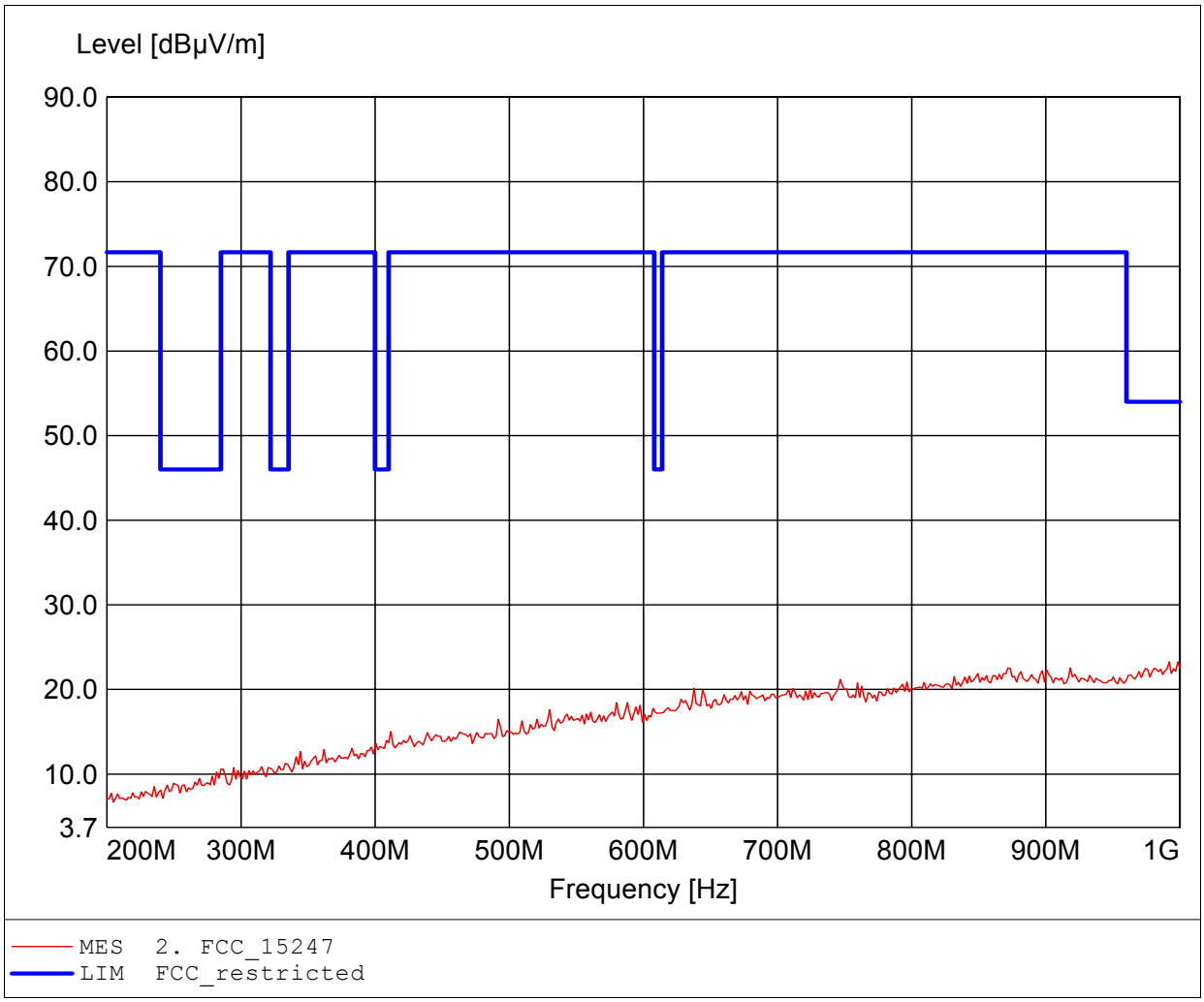
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 991.984MHz, Emax: 23.41dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

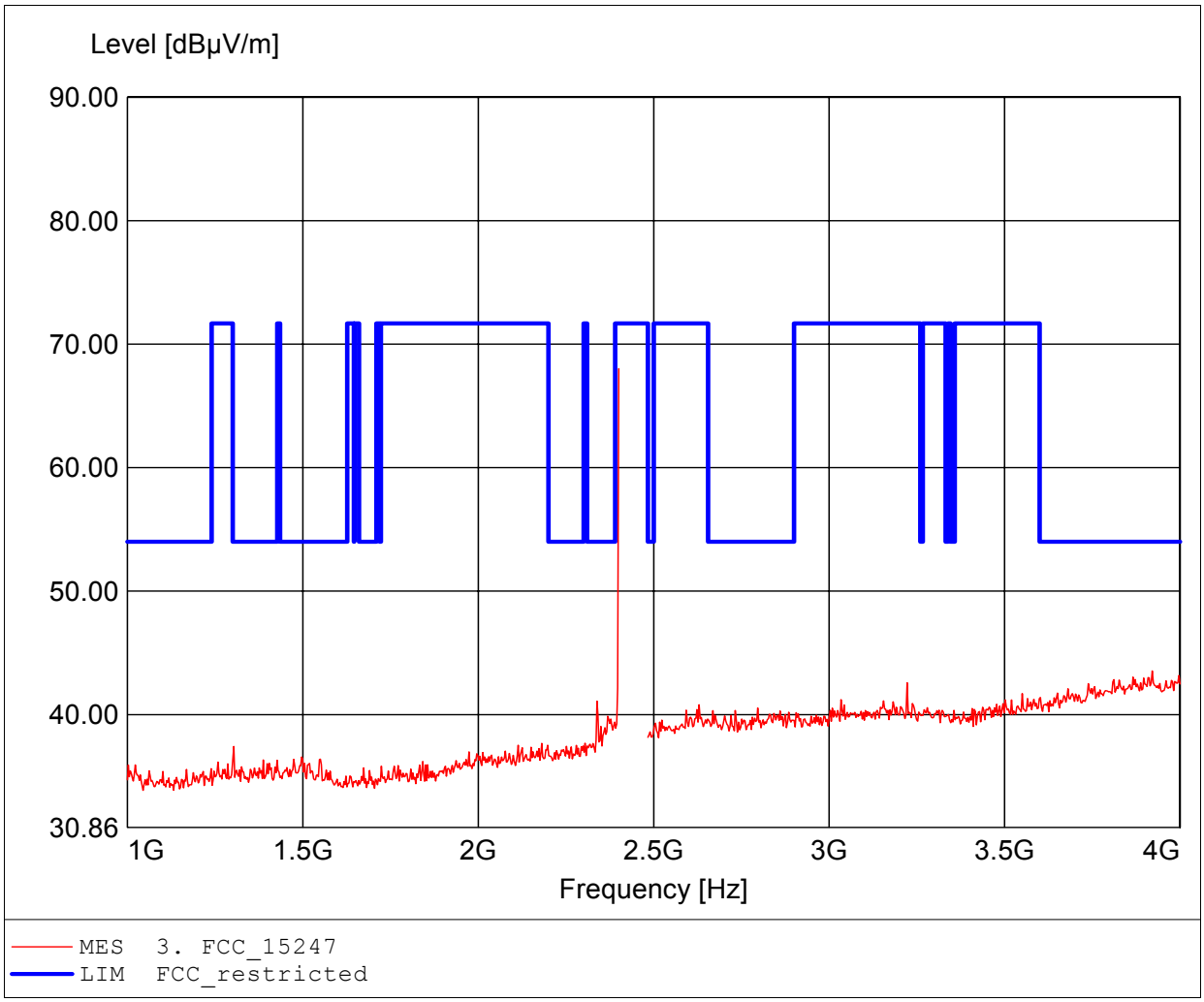
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 991.984MHz, Emax: 23.28dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

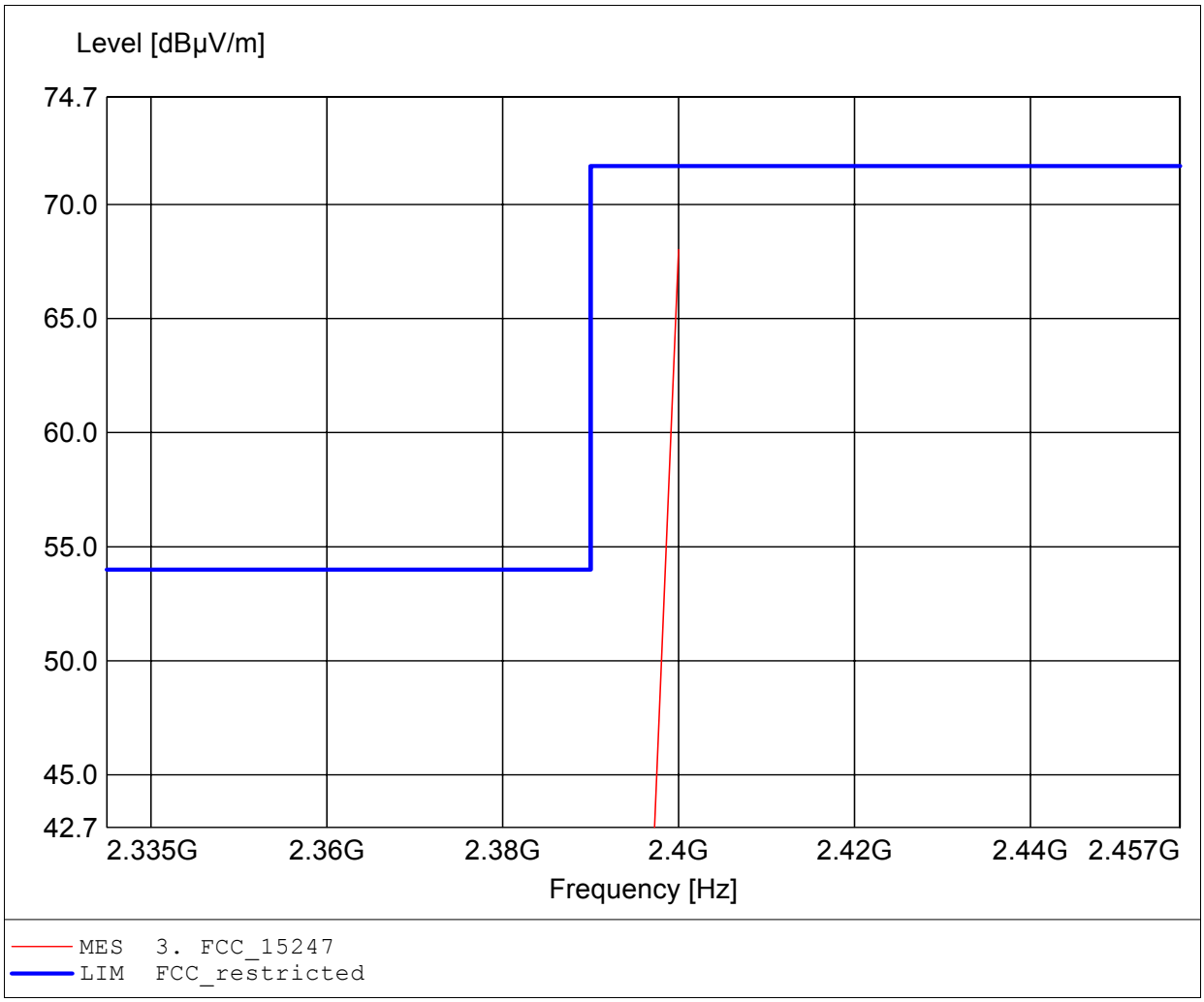
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 68.02dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

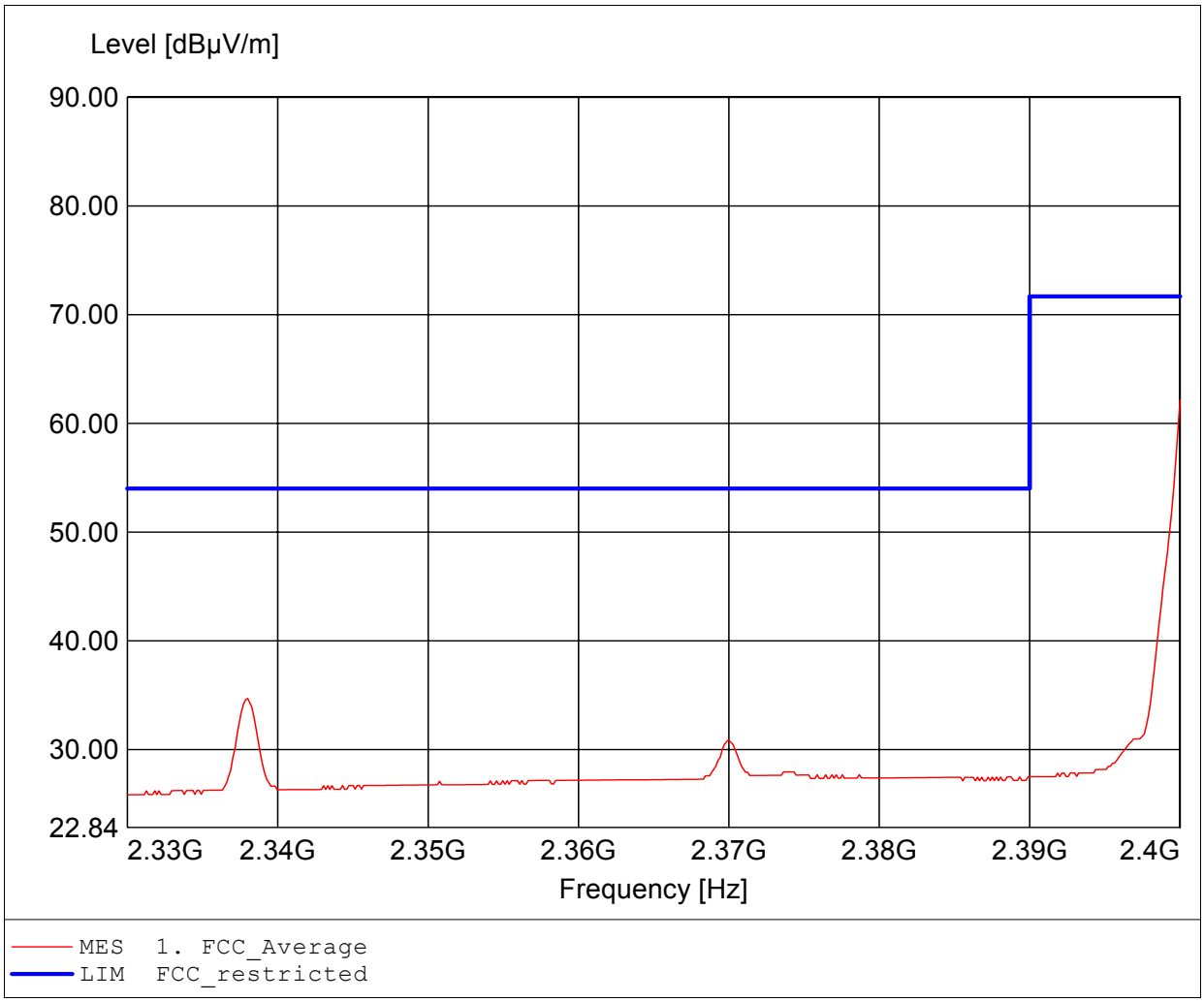
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 68.02dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

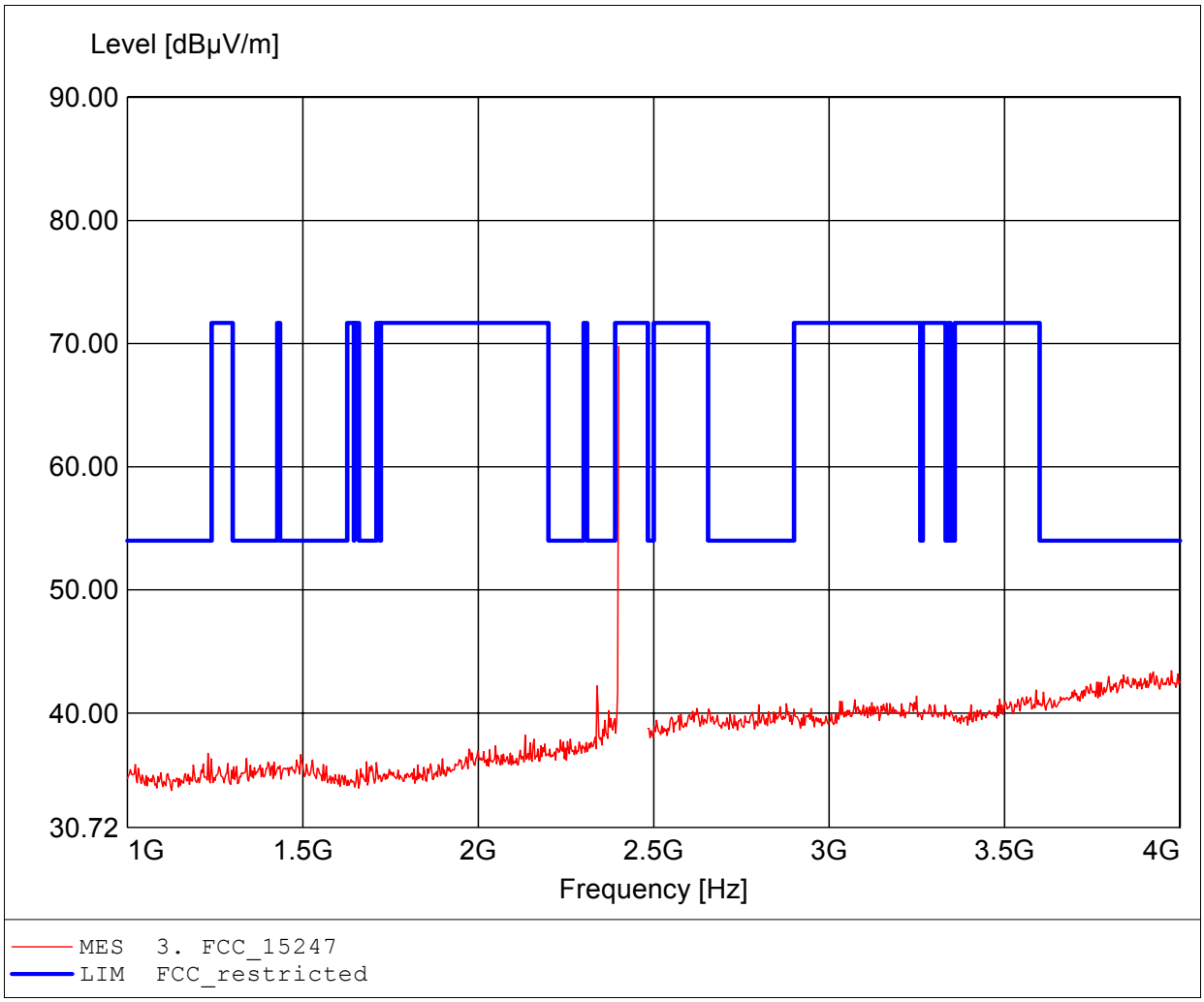
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 62.15dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

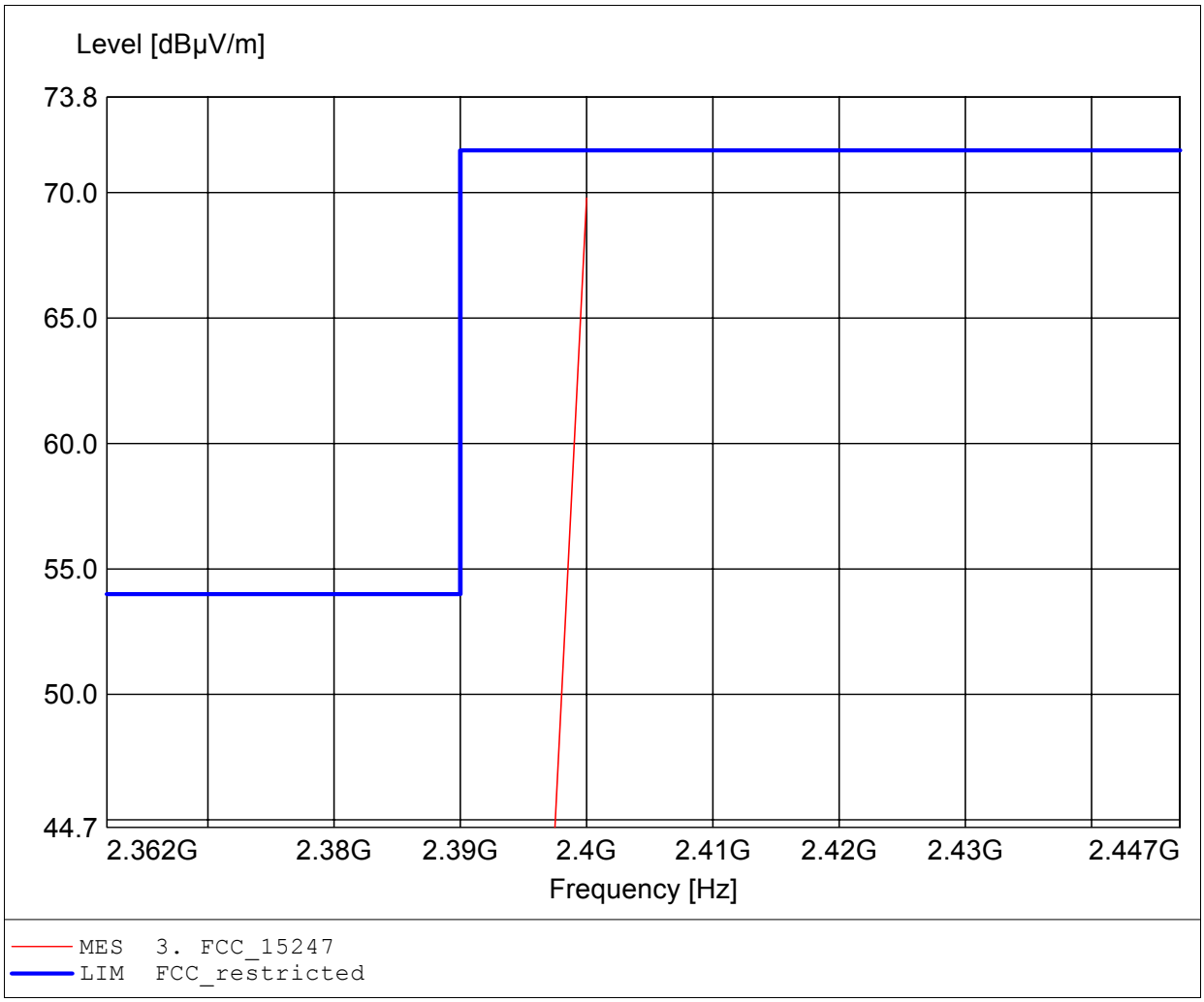
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 69.78dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

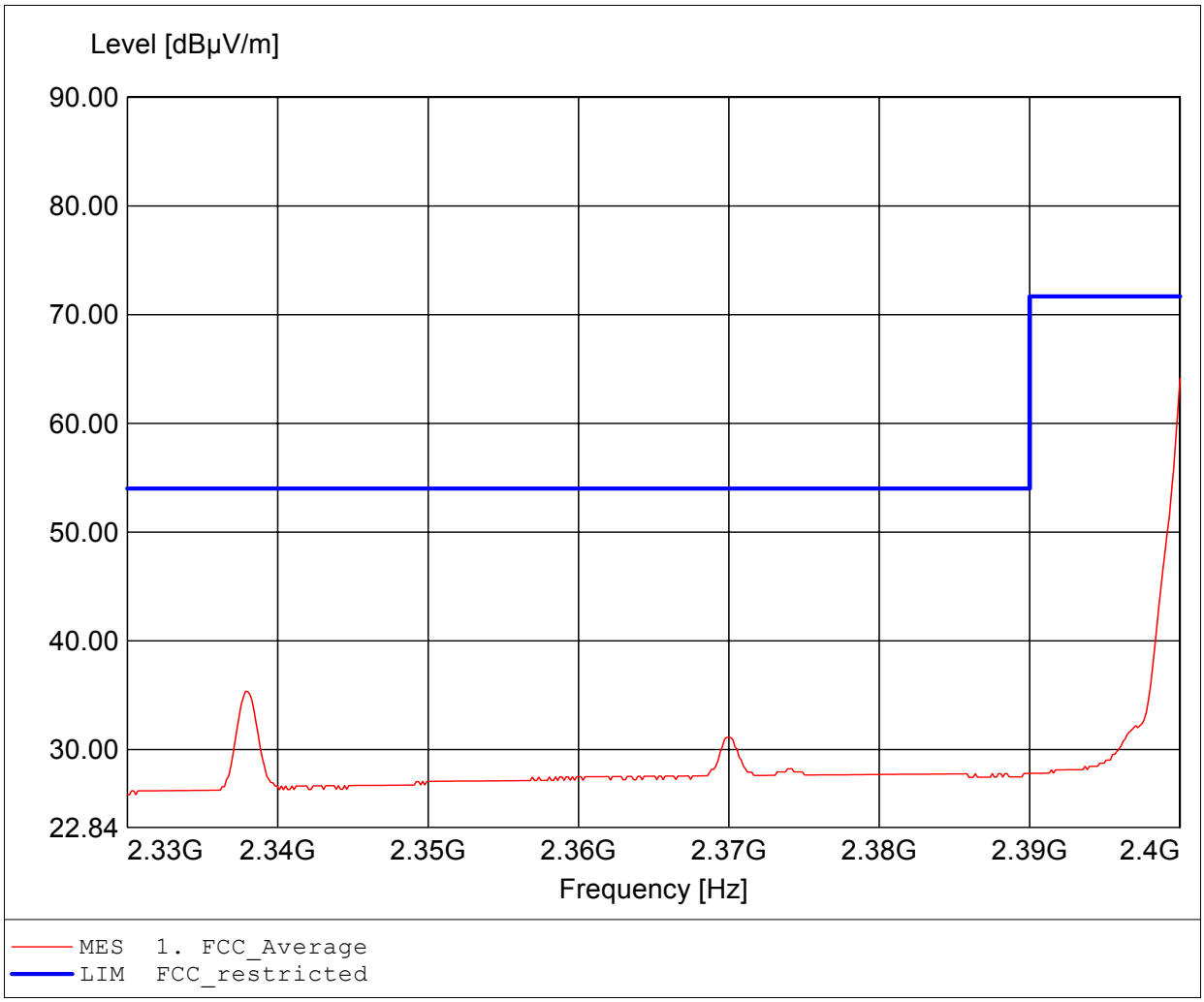
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 69.78dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

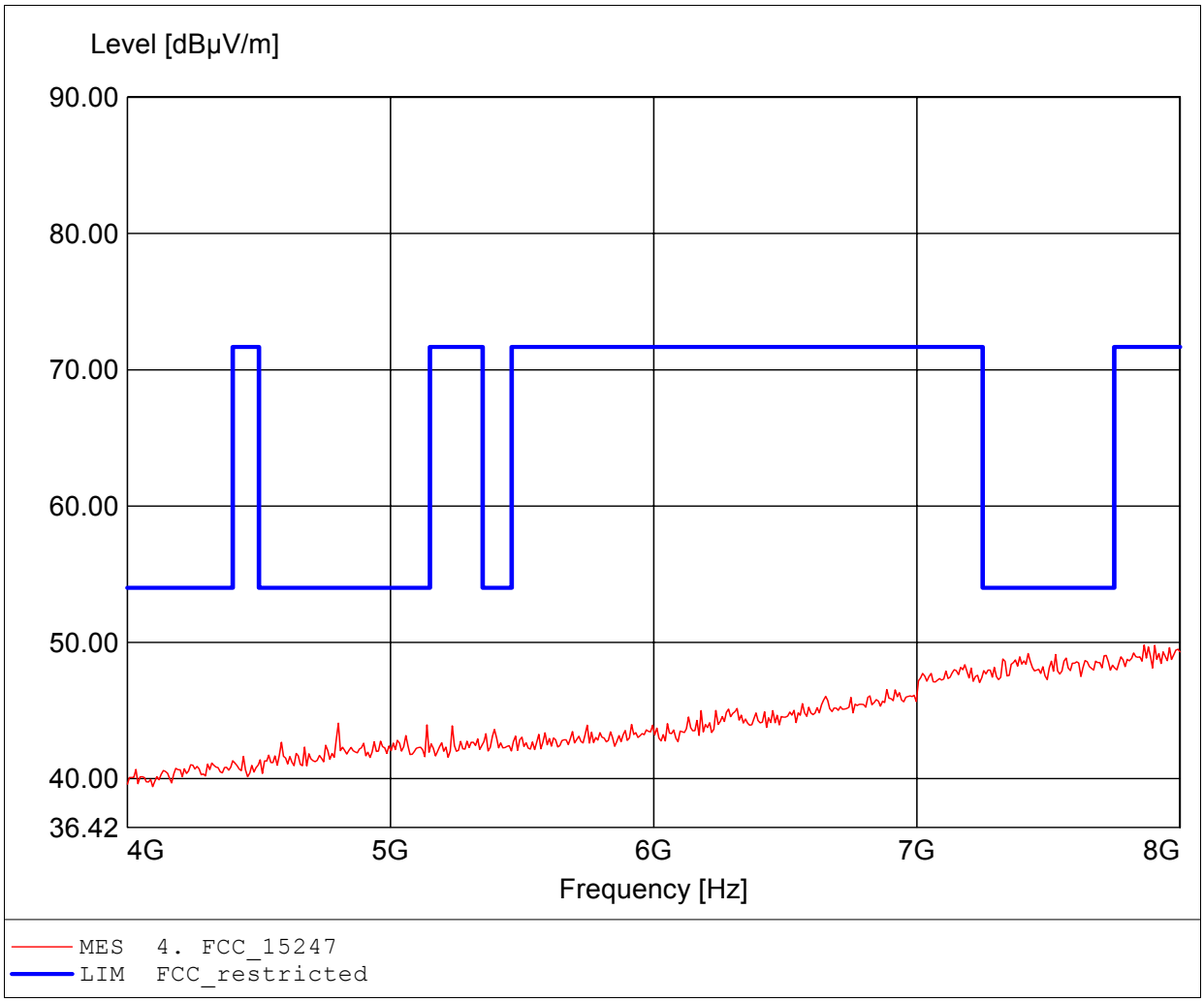
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.400GHz, Emax: 64.16dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

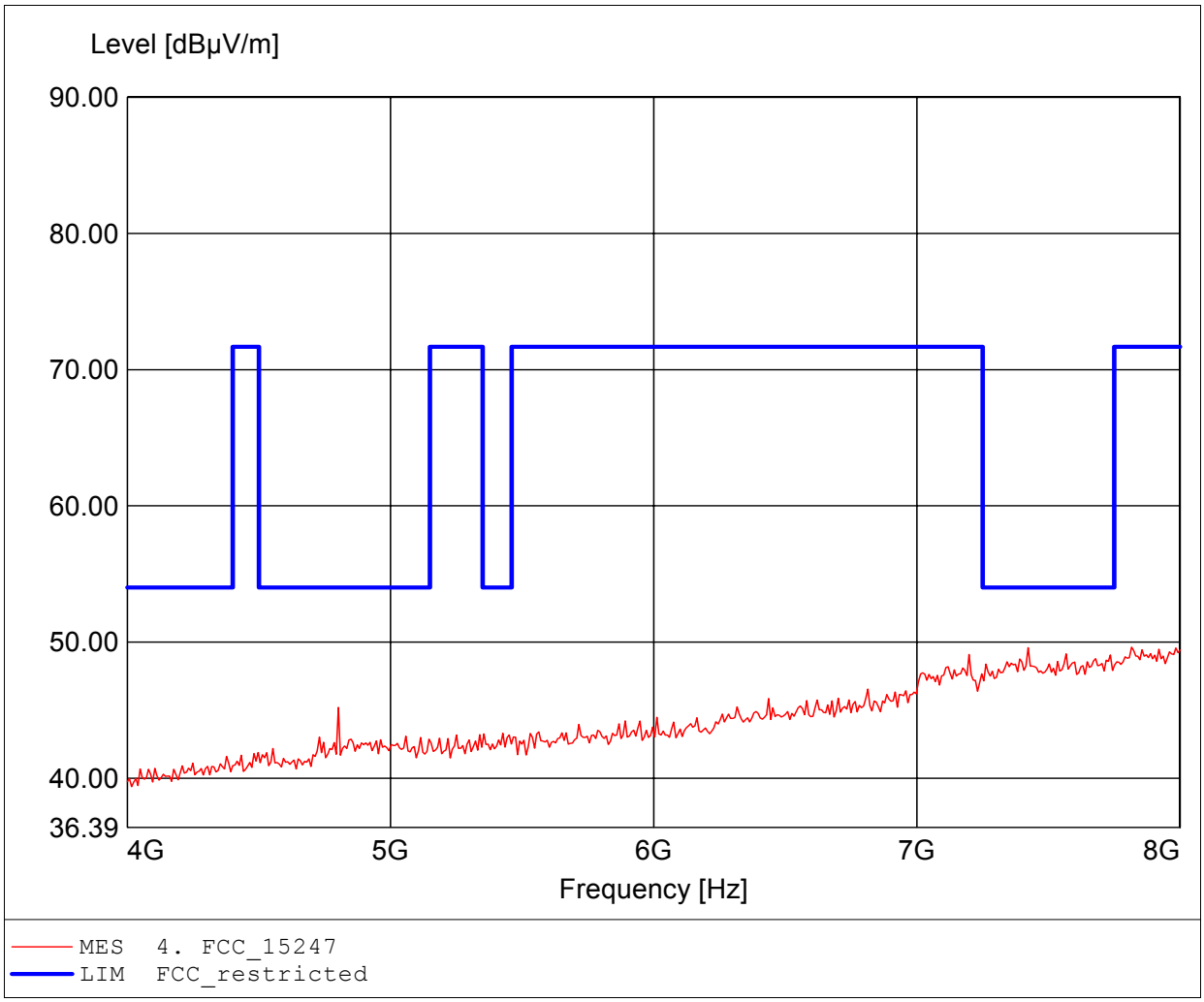
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.864GHz, Emax: 49.81dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

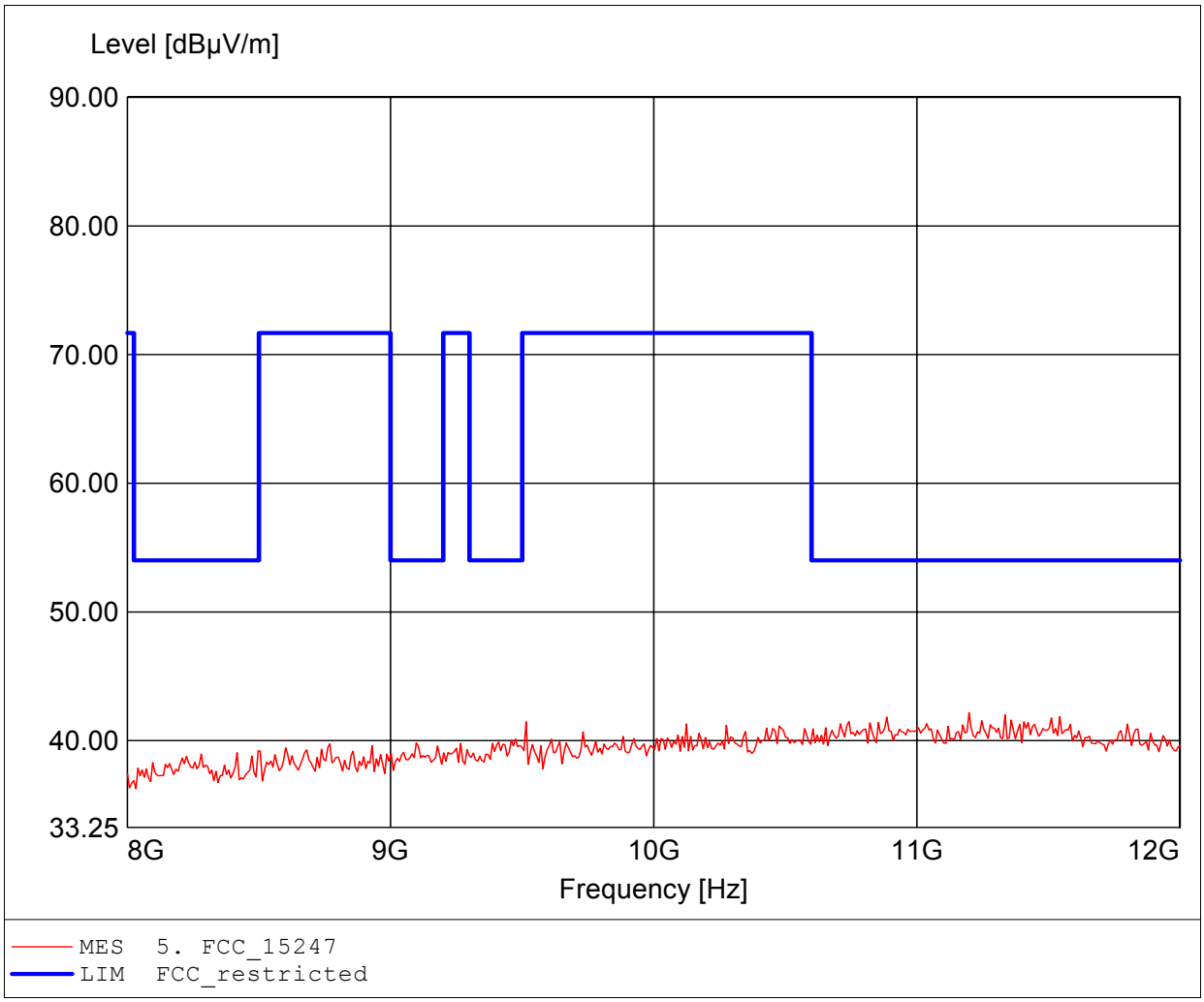
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.816GHz, Emax: 49.62dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

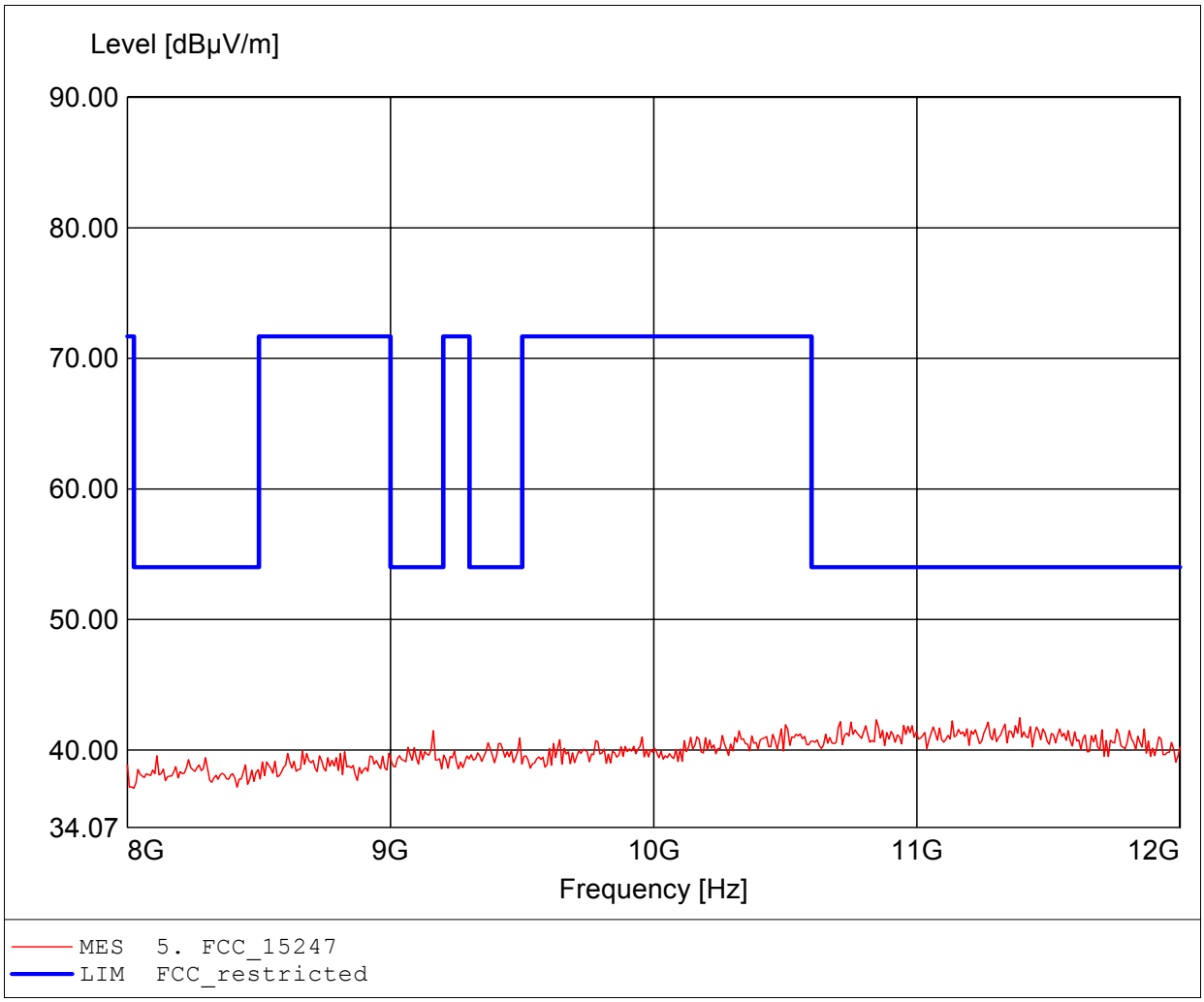
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.198GHz, Emax: 42.17dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

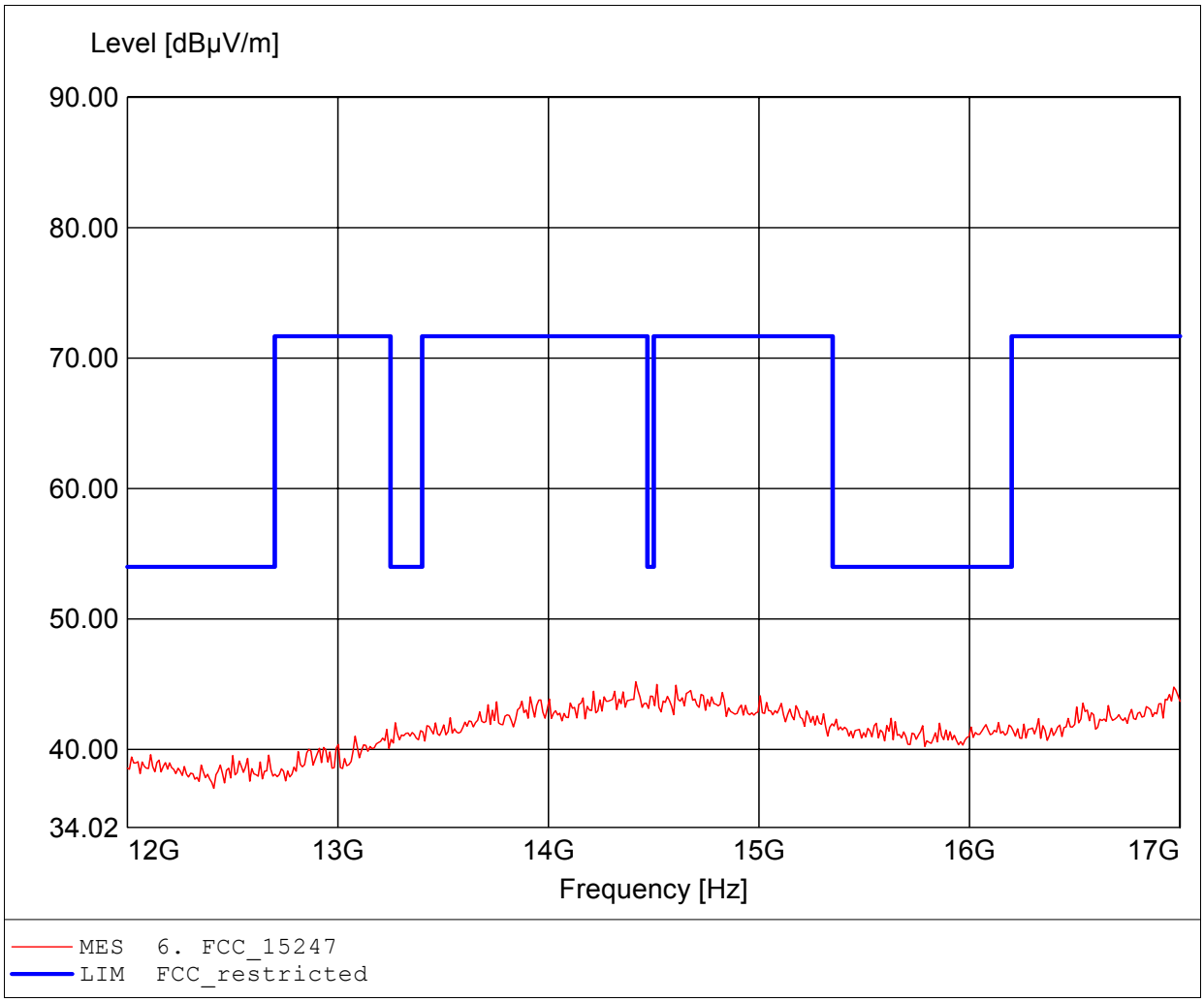
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.391GHz, Emax: 42.48dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

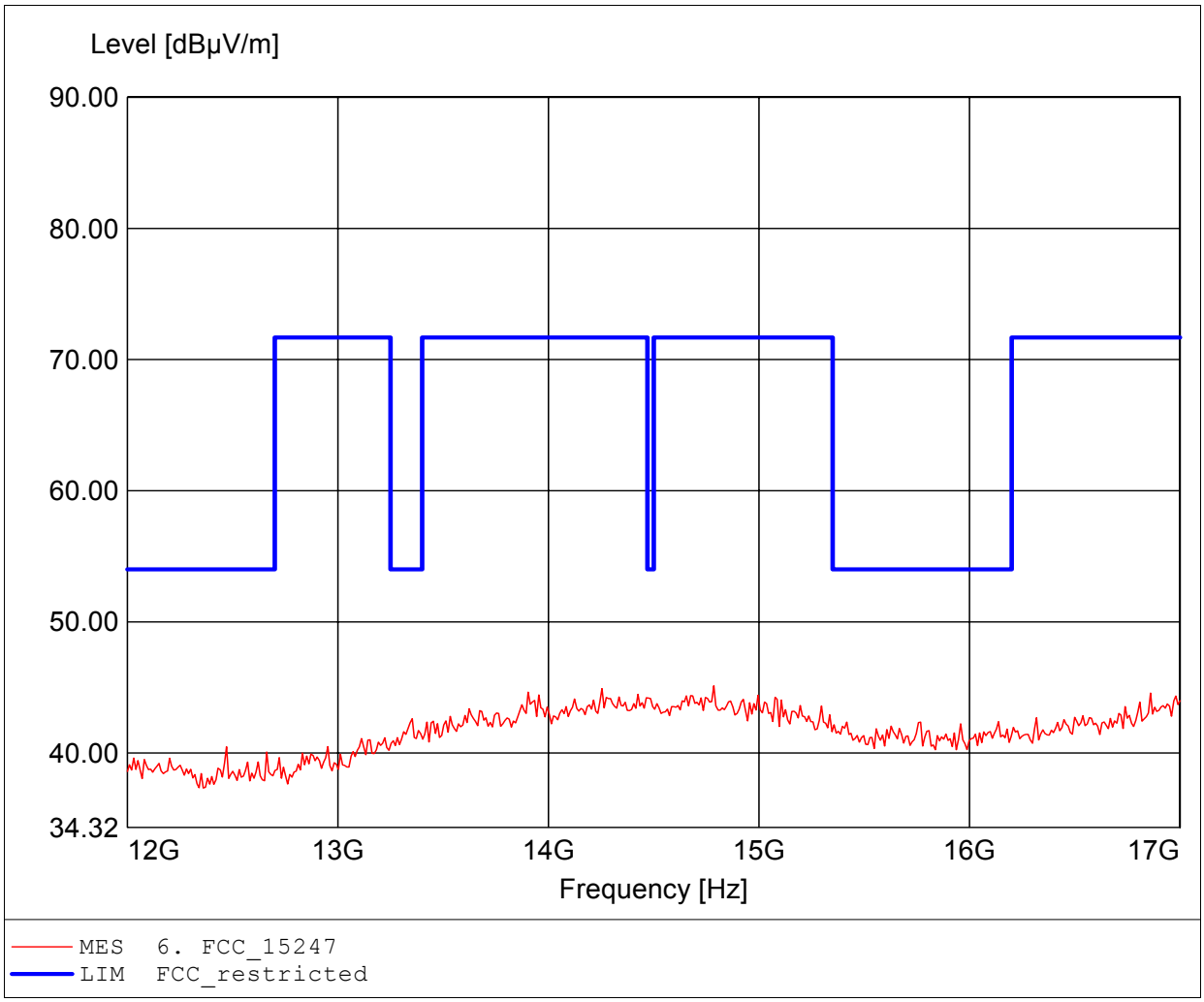
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.415GHz, Emax: 45.18dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

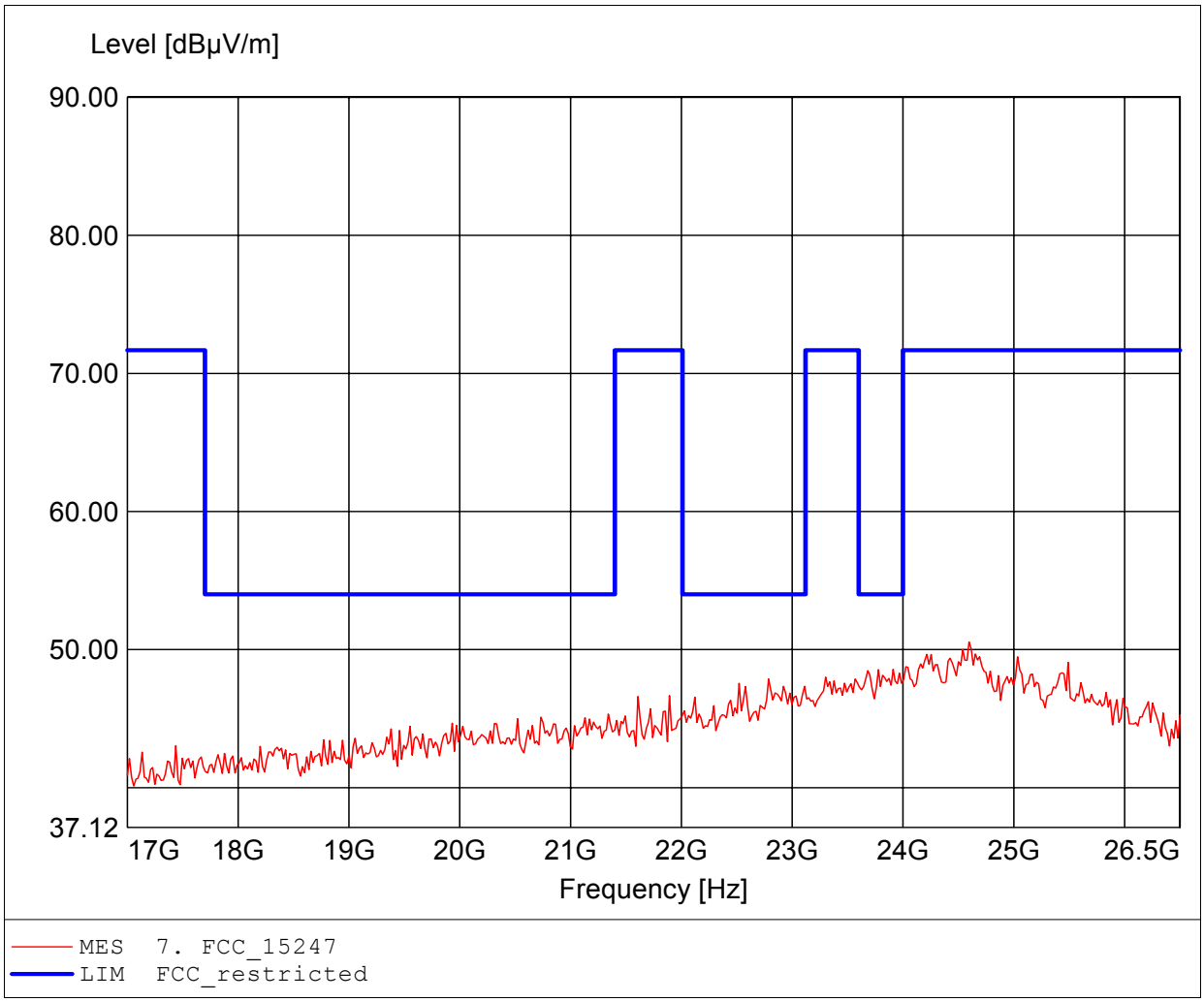
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.786GHz, Emax: 45.11dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

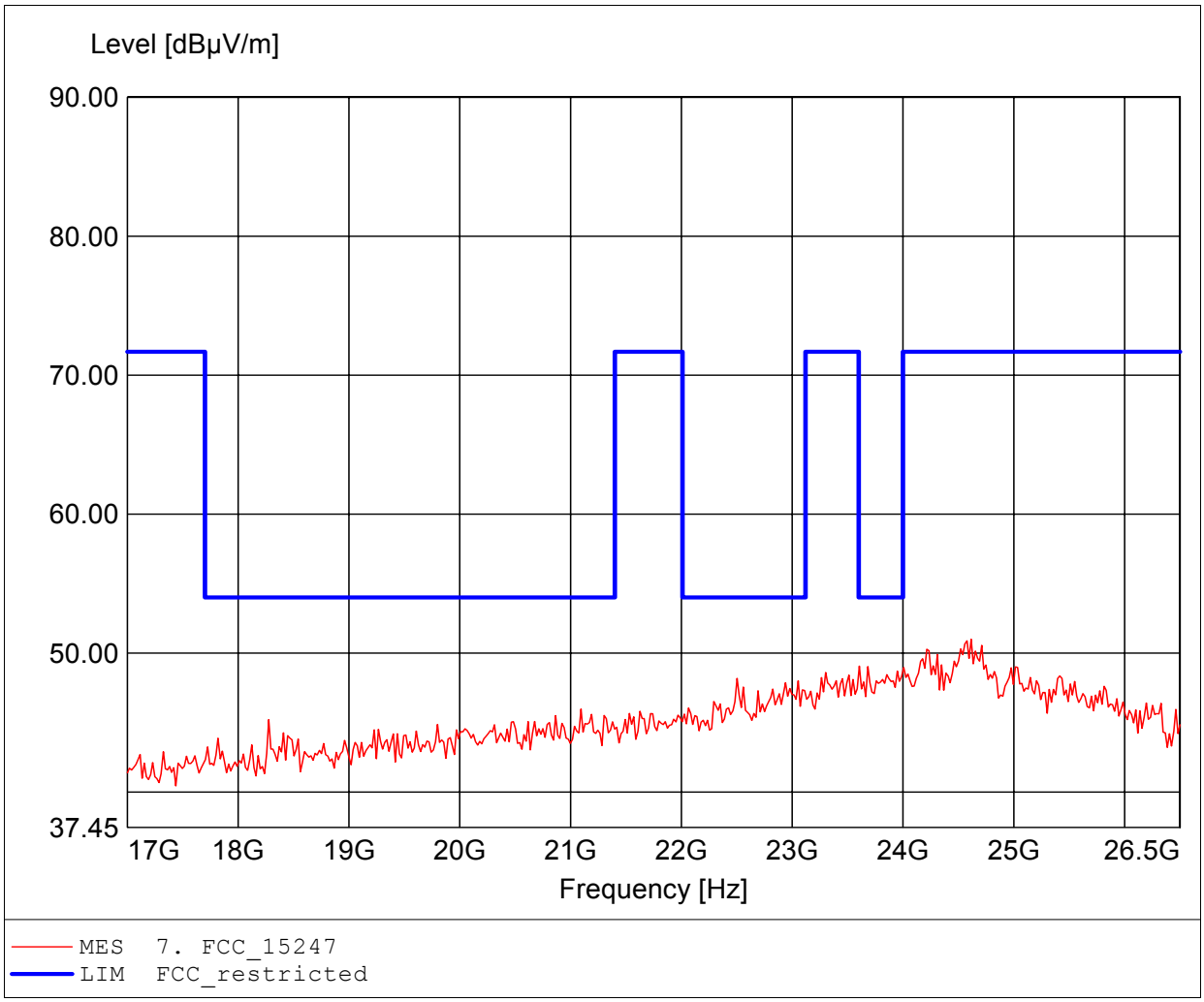
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.596GHz, Emax: 50.55dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

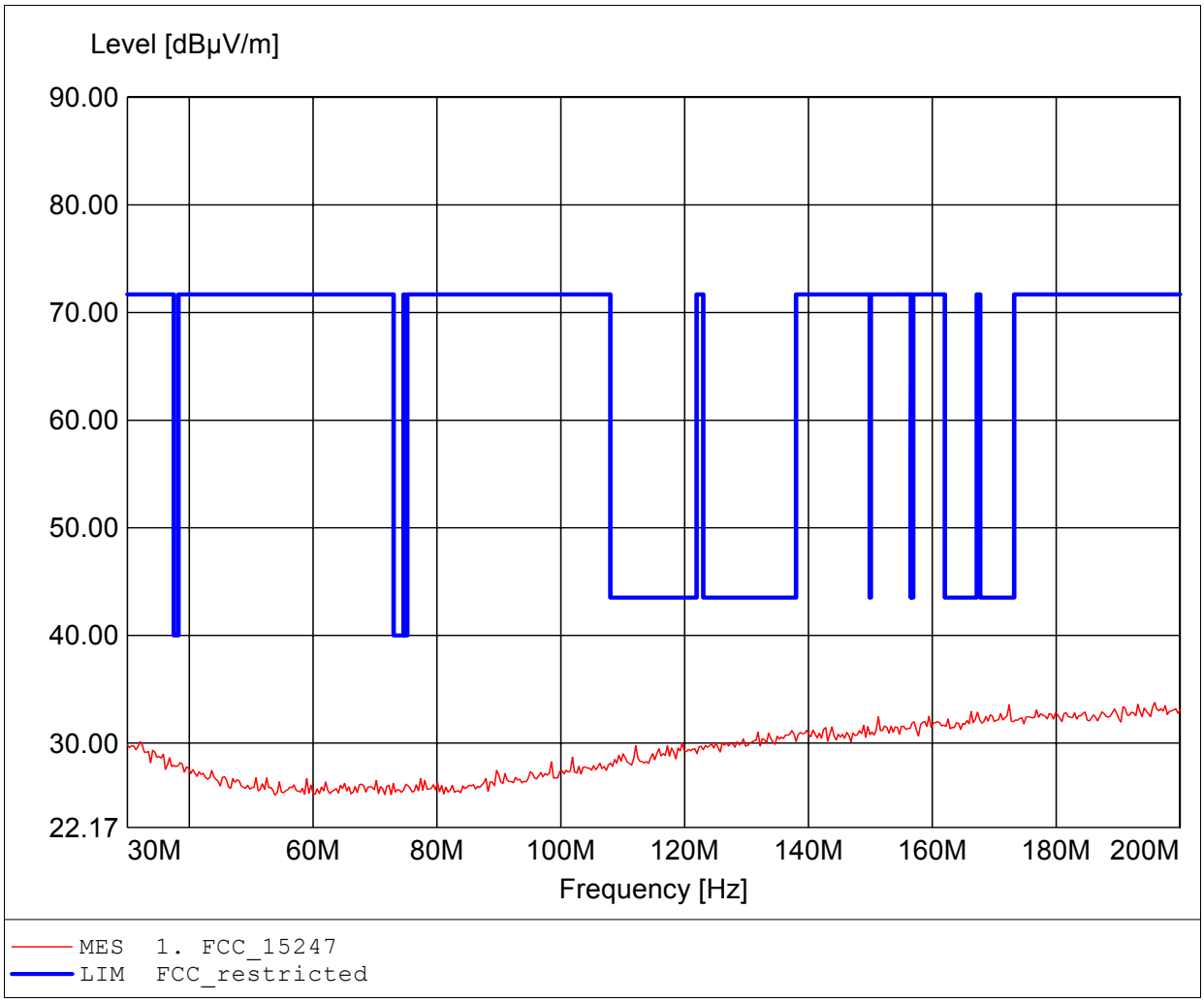
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2402MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.615GHz, Emax: 50.99dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

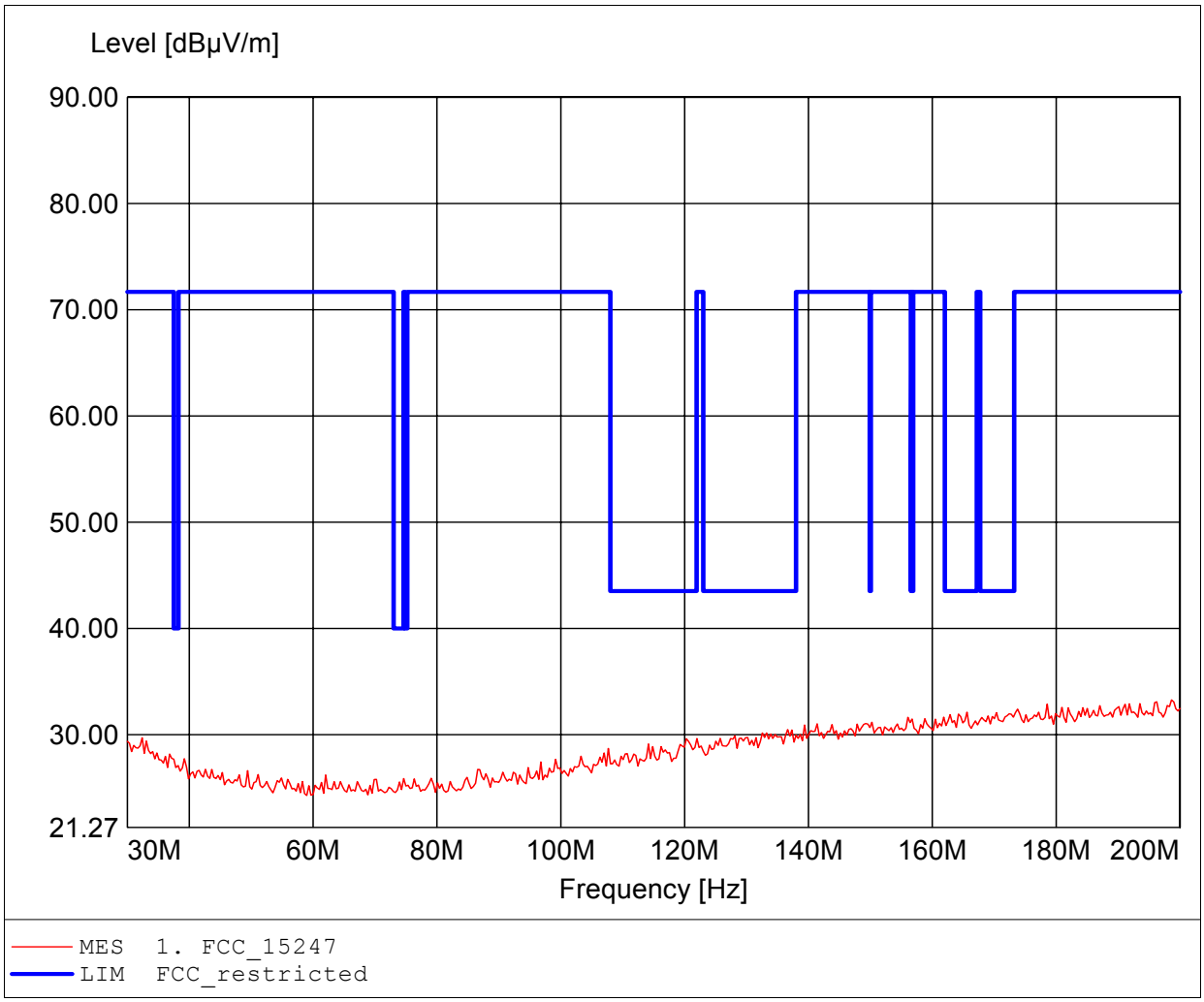
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 195.912MHz, Emax: 33.78dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

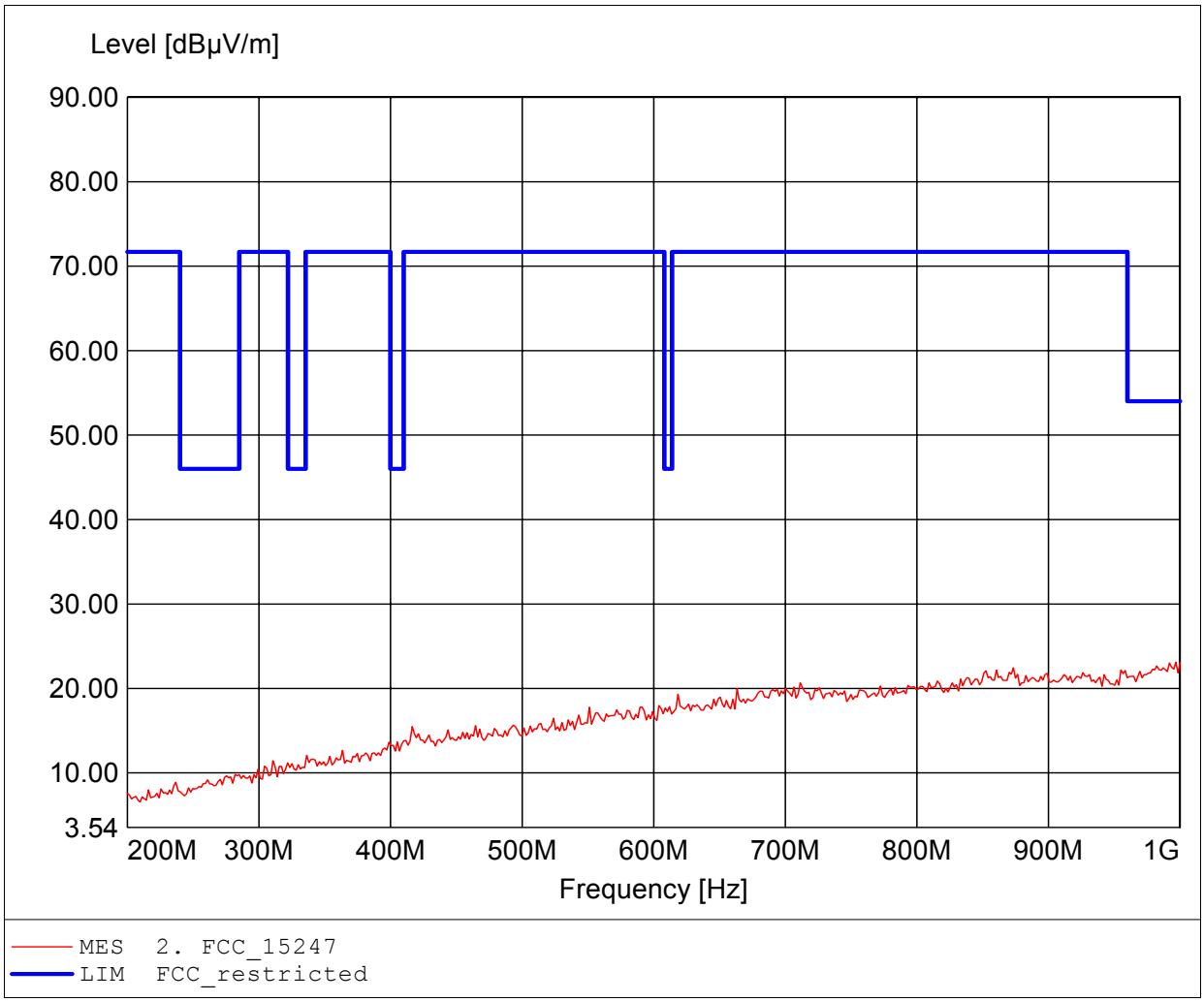
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 198.637MHz, Emax: 33.26dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

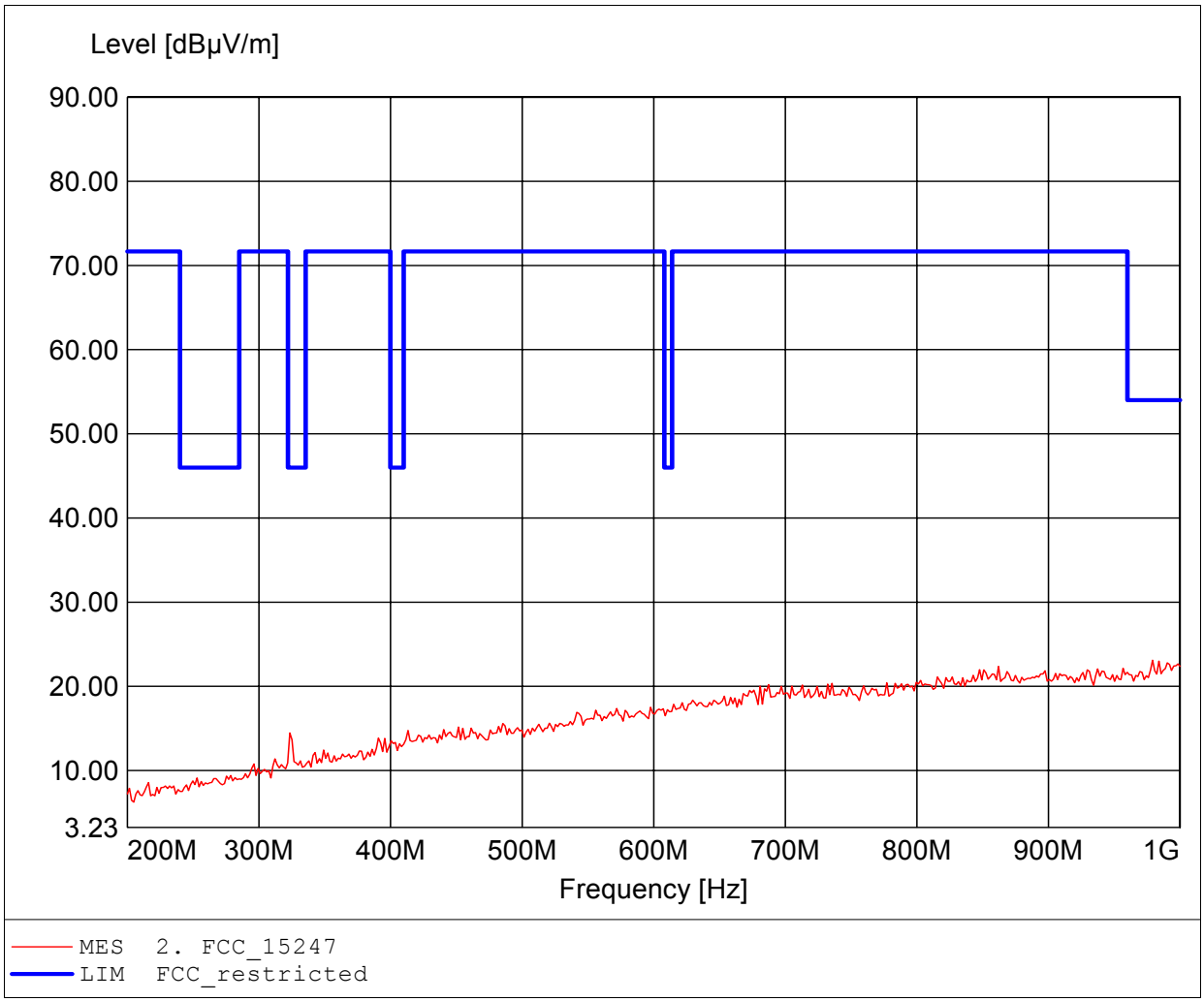
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 996.794MHz, Emax: 23.11dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

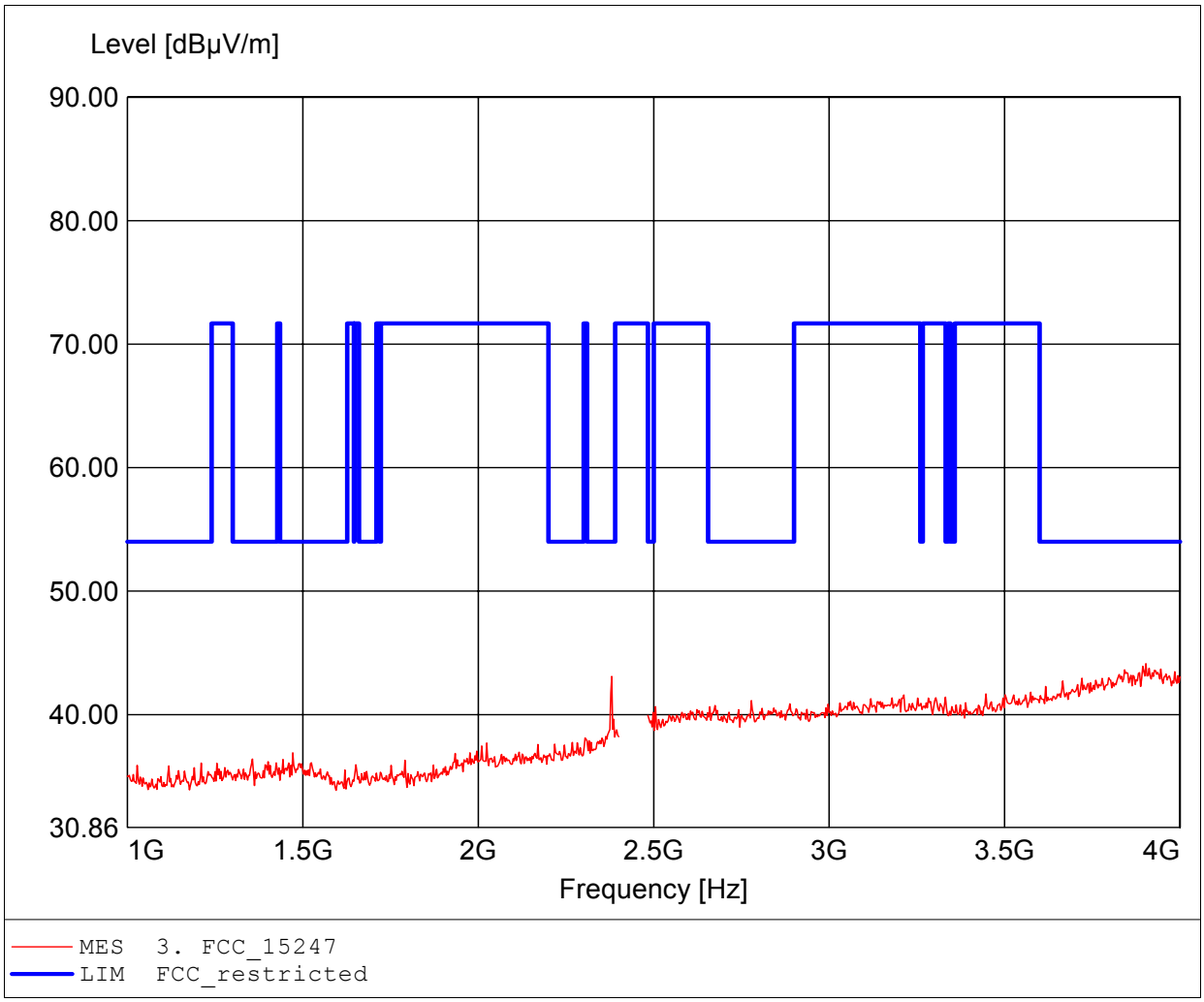
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 979.158MHz, Emax: 23.10dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

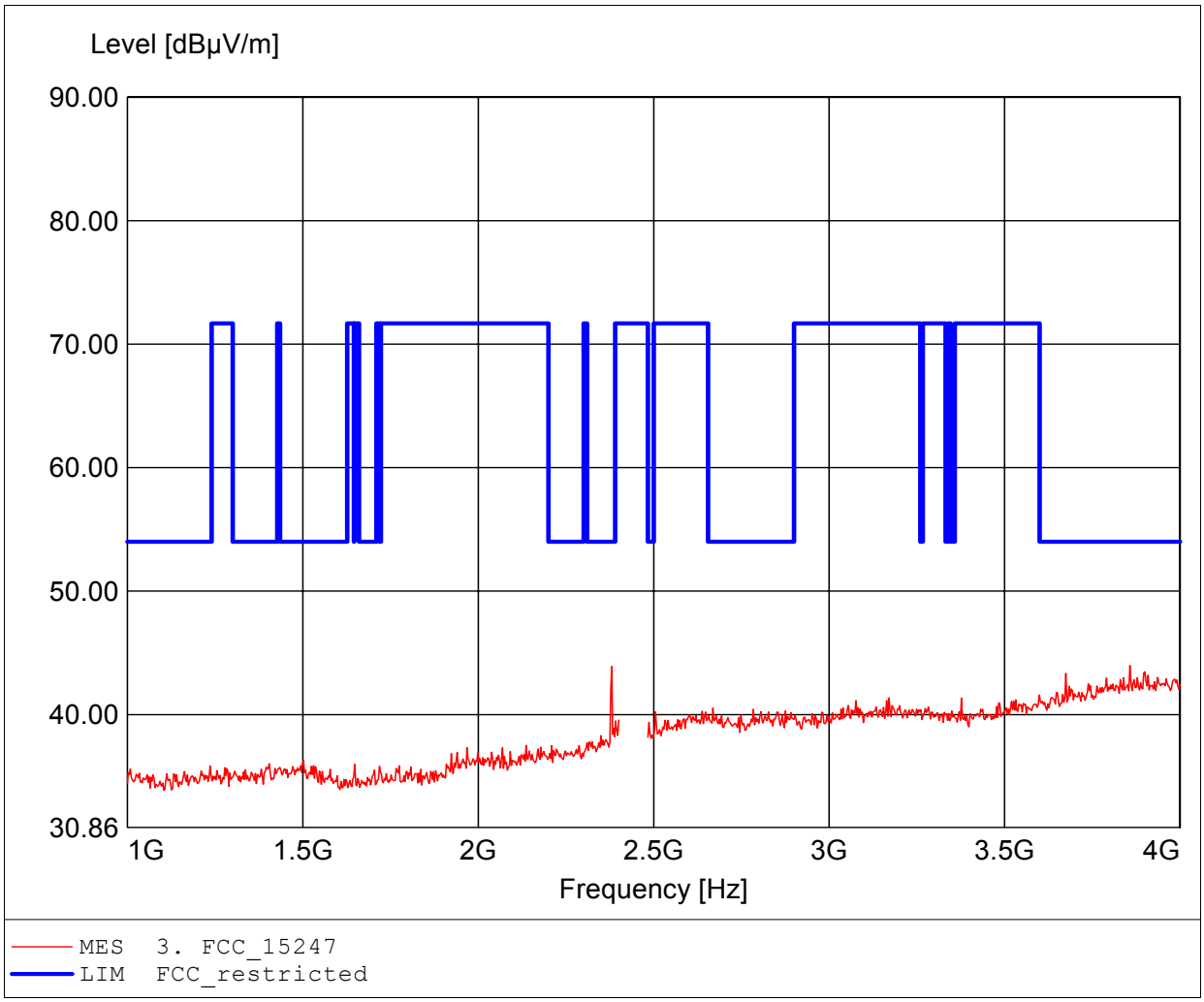
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.903GHz, Emax: 44.13dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

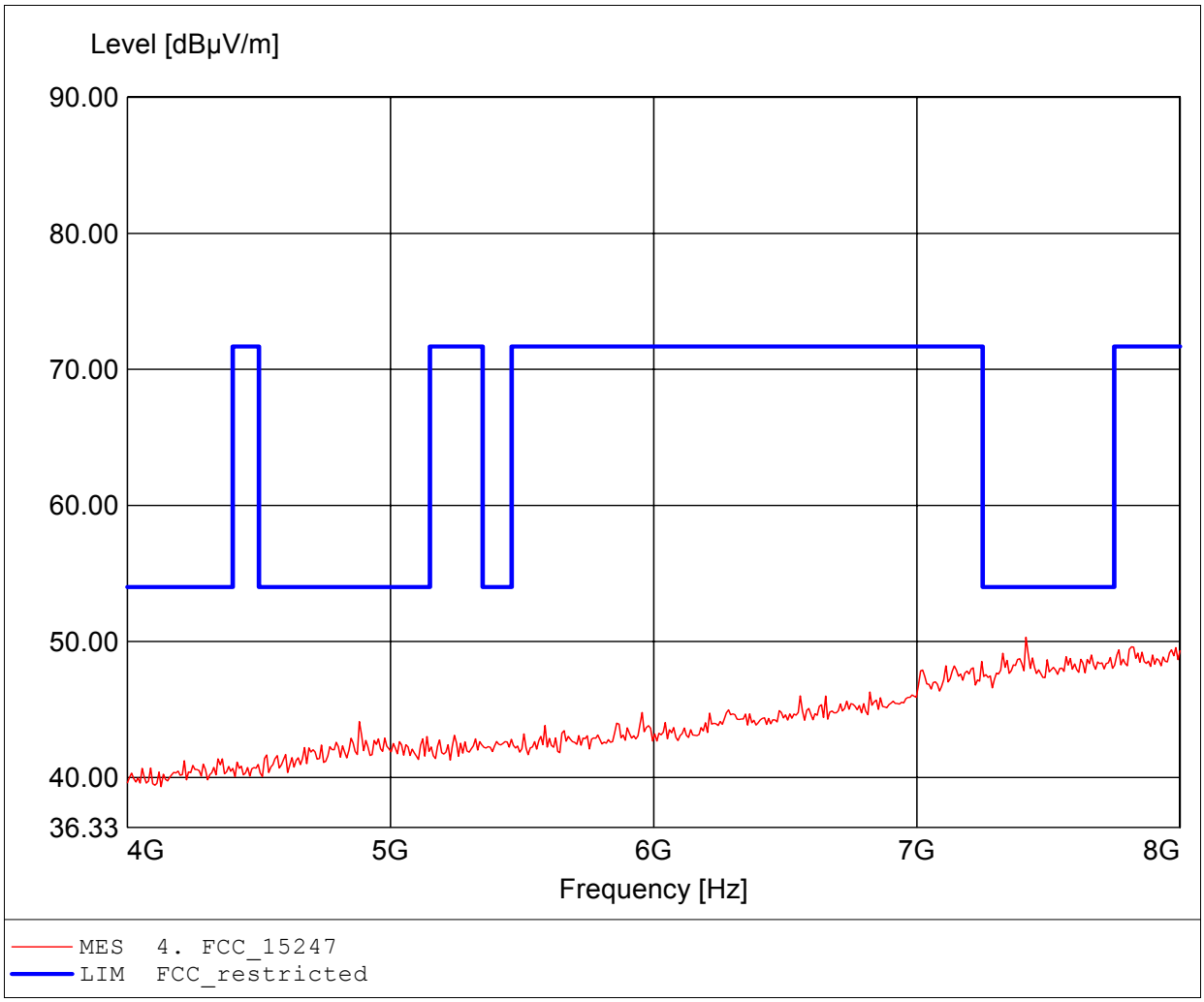
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.857GHz, Emax: 43.97dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

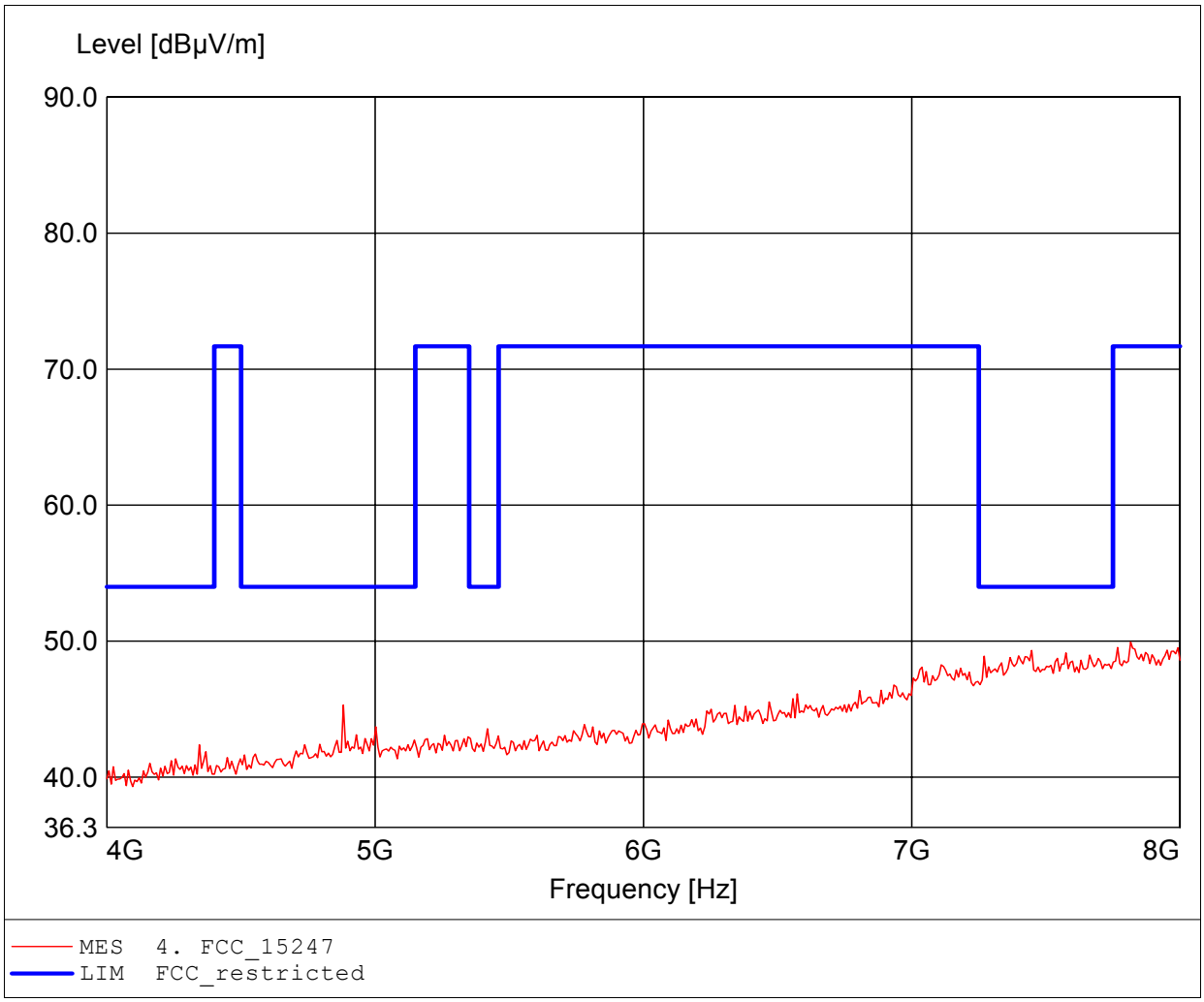
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.415GHz, Emax: 50.32dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

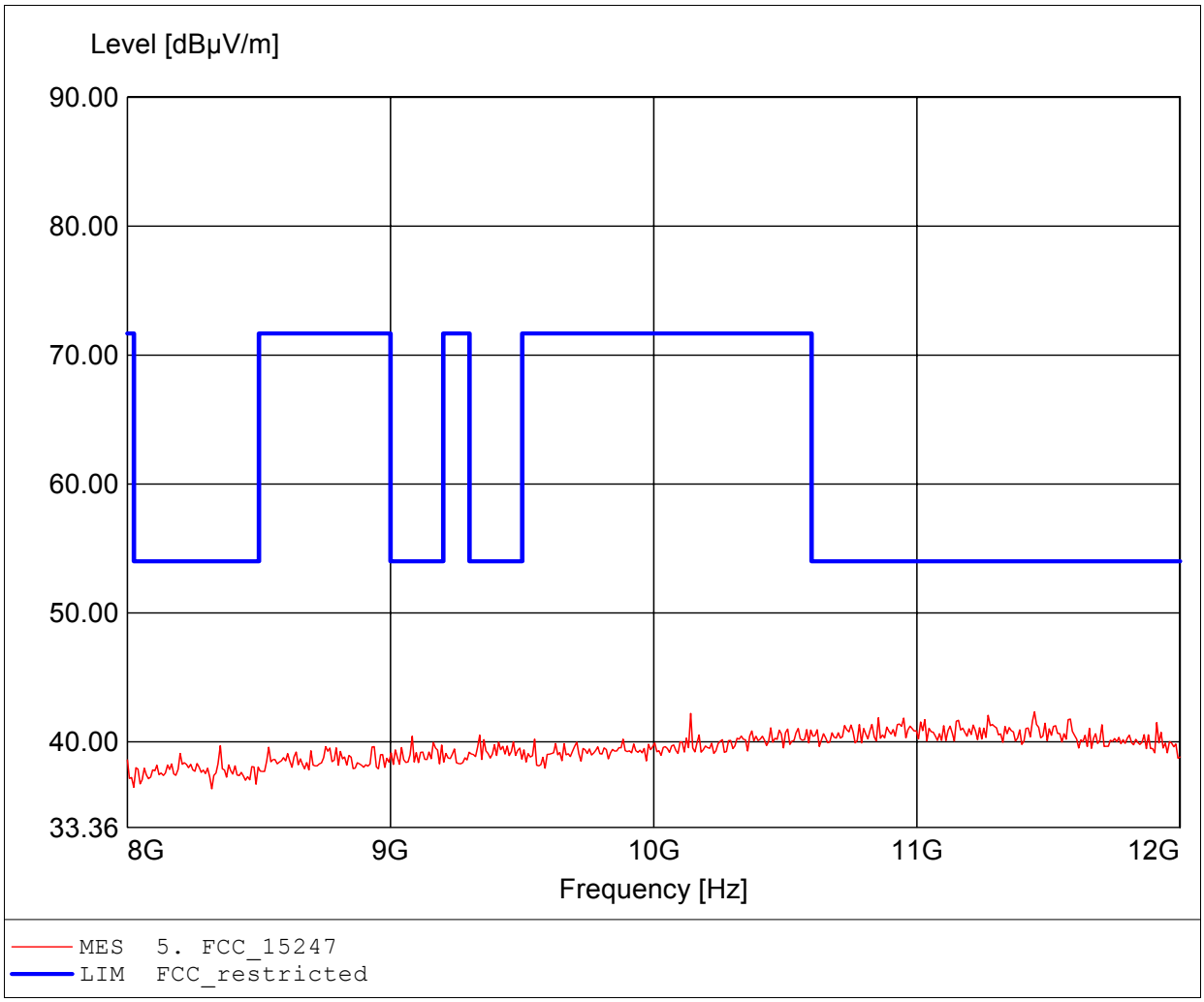
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.816GHz, Emax: 49.93dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

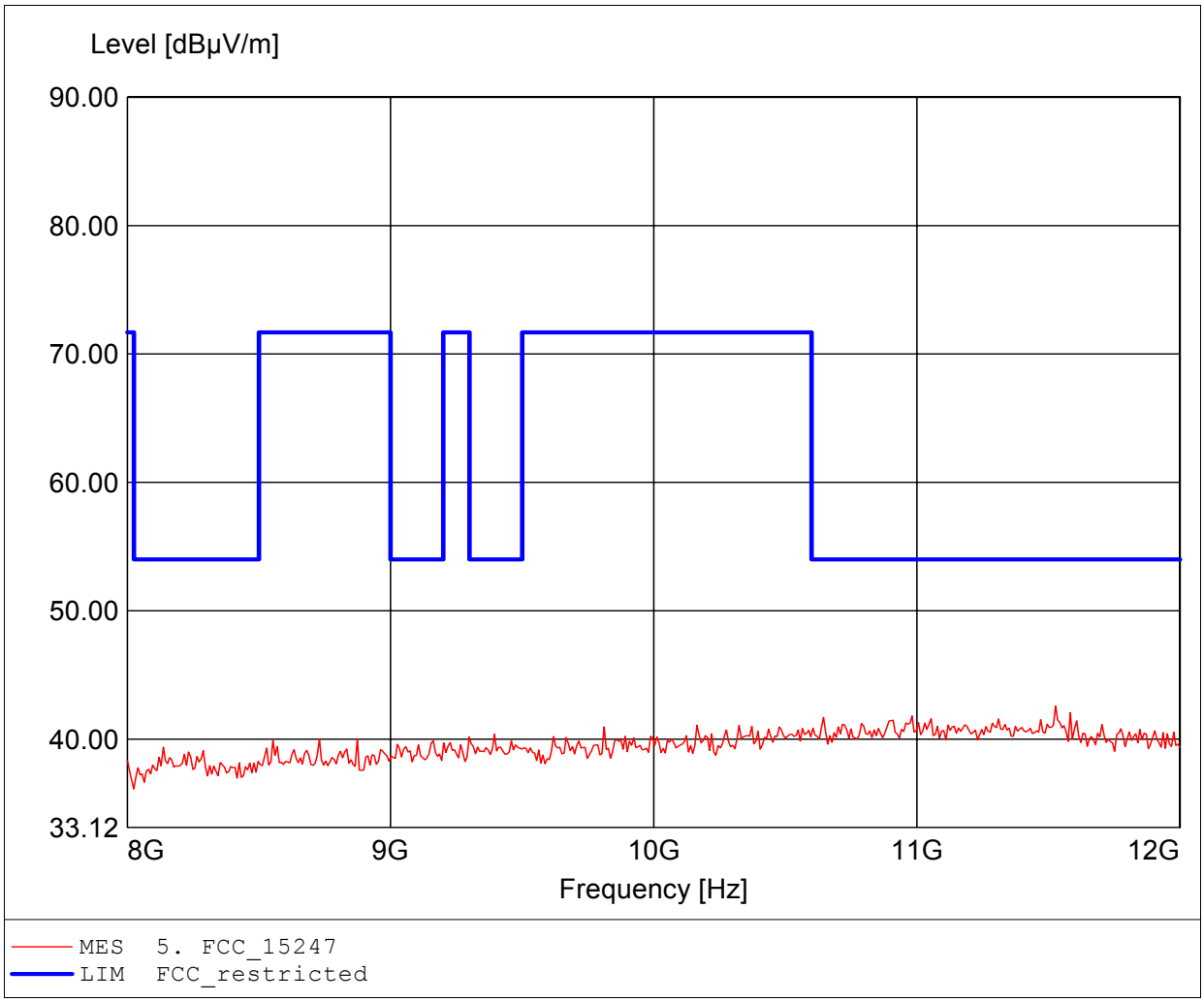
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.447GHz, Emax: 42.32dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

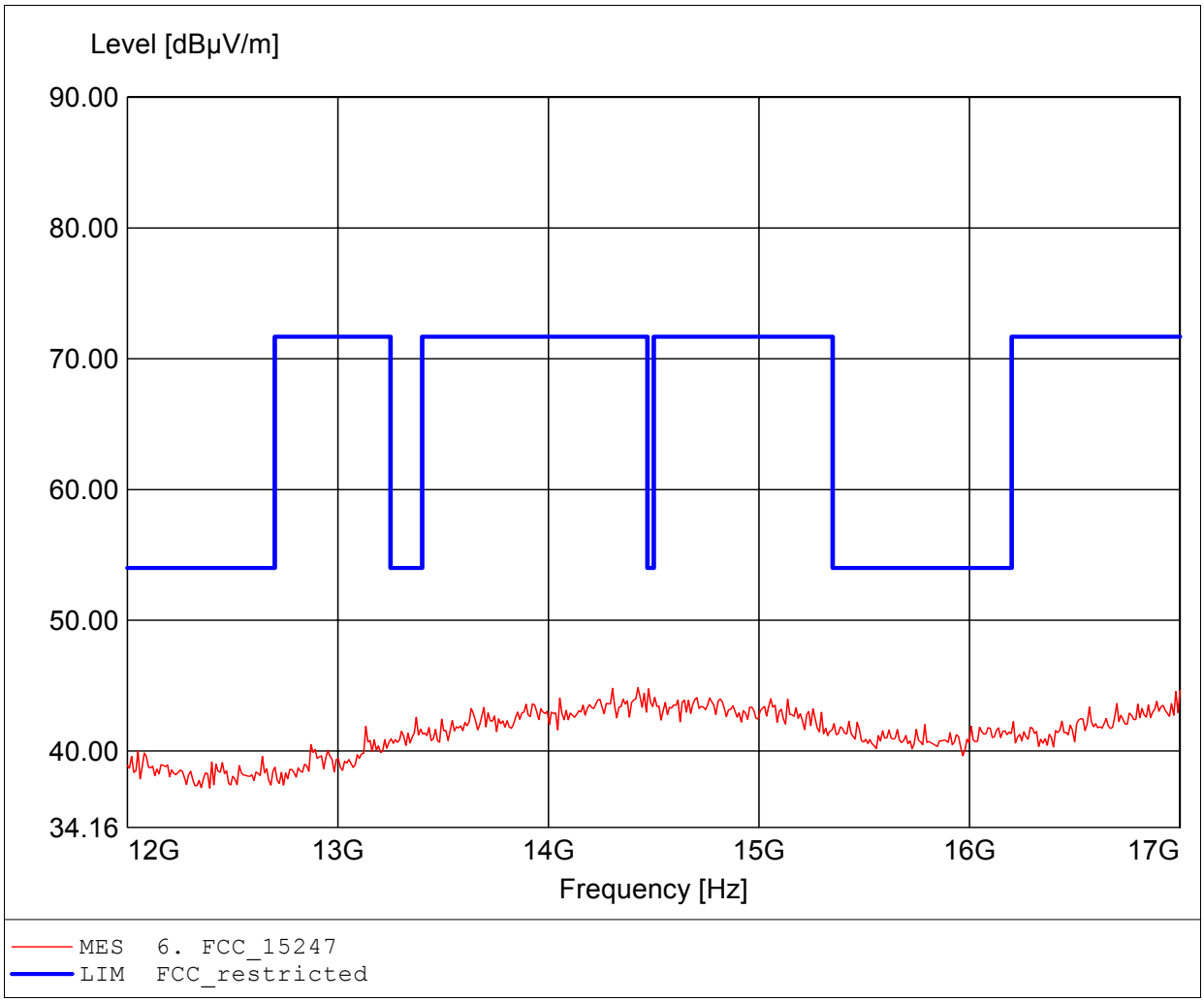
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.527GHz, Emax: 42.58dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

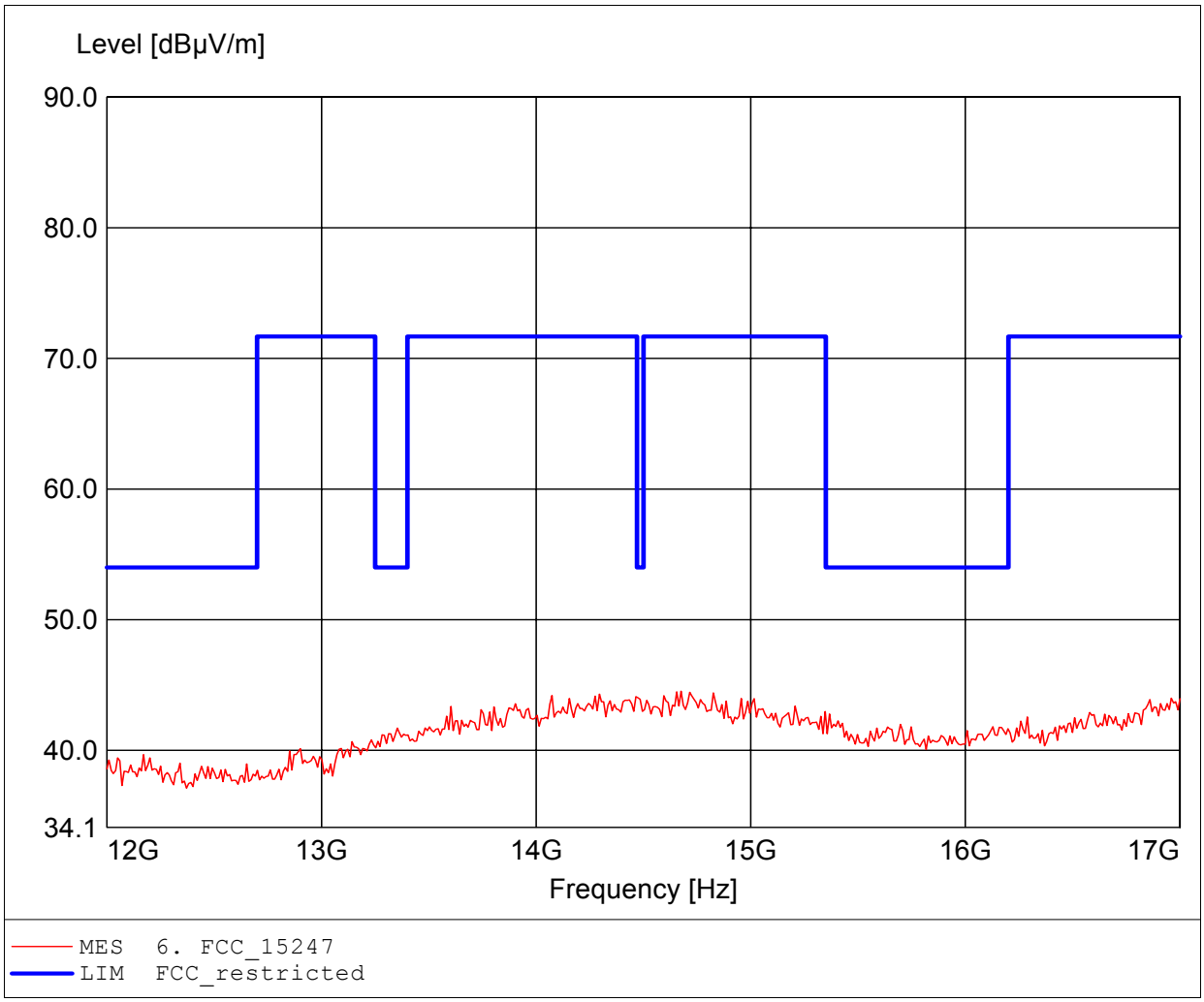
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.425GHz, Emax: 44.85dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

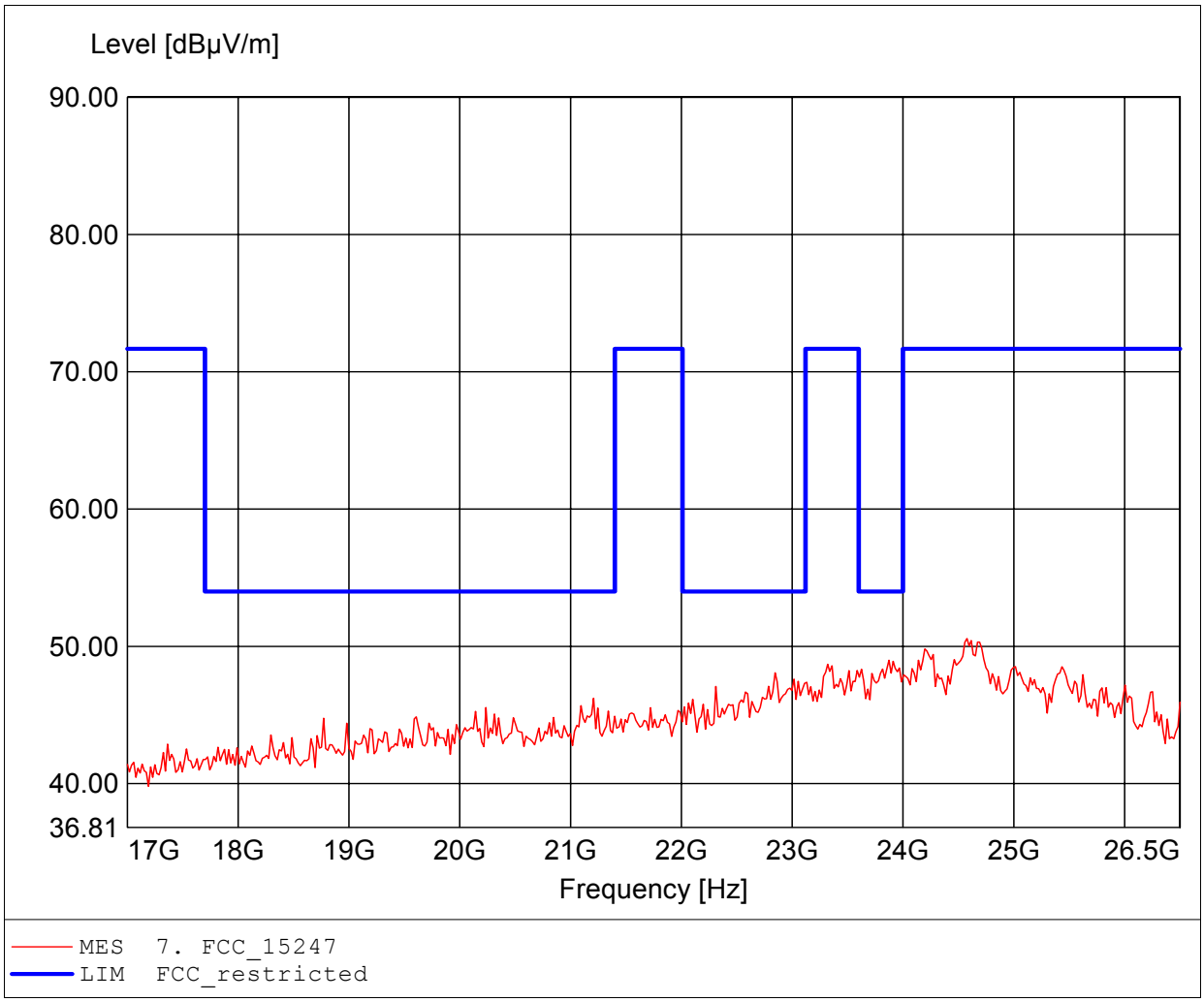
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.675GHz, Emax: 44.52dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

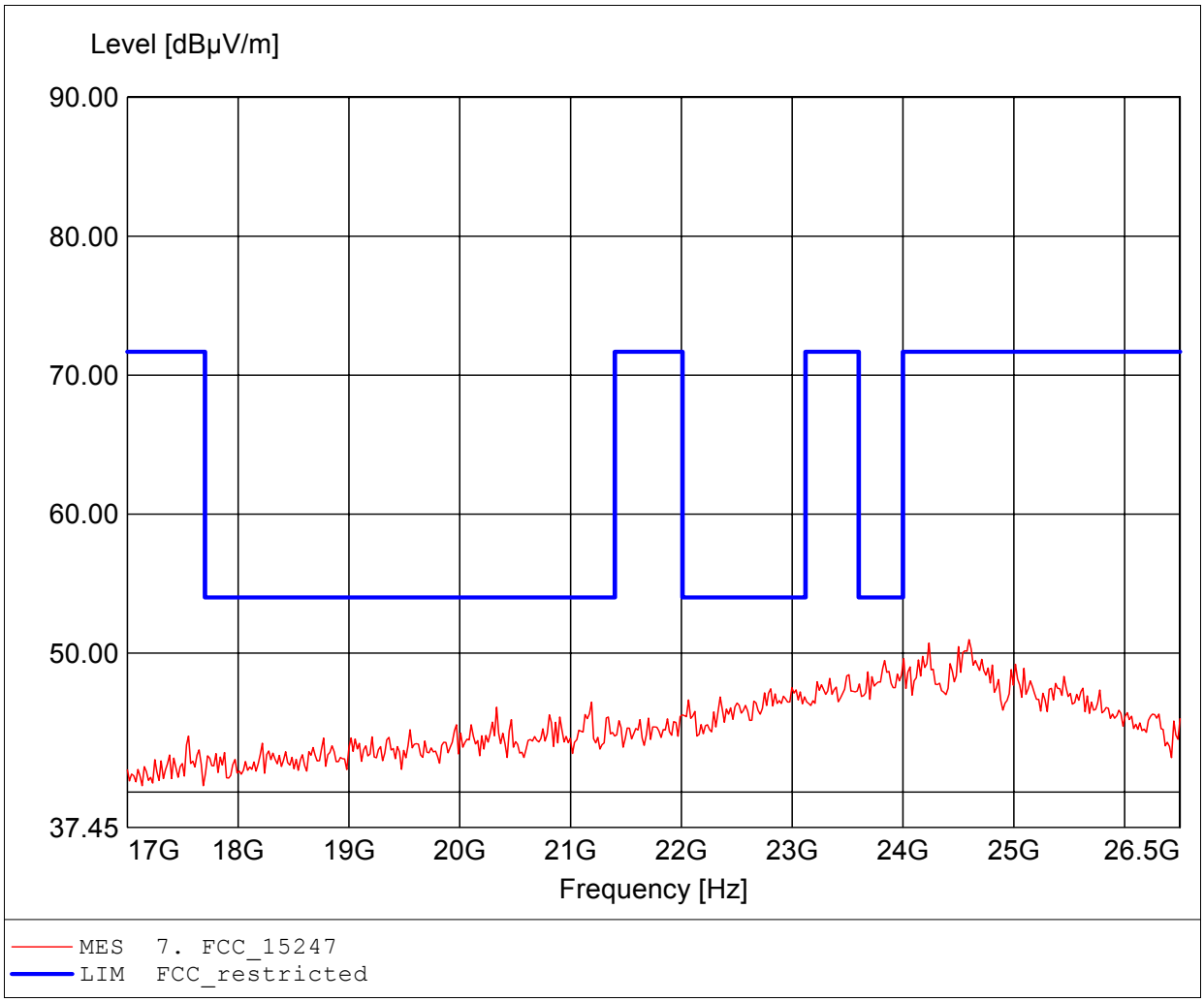
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.577GHz, Emax: 50.58dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

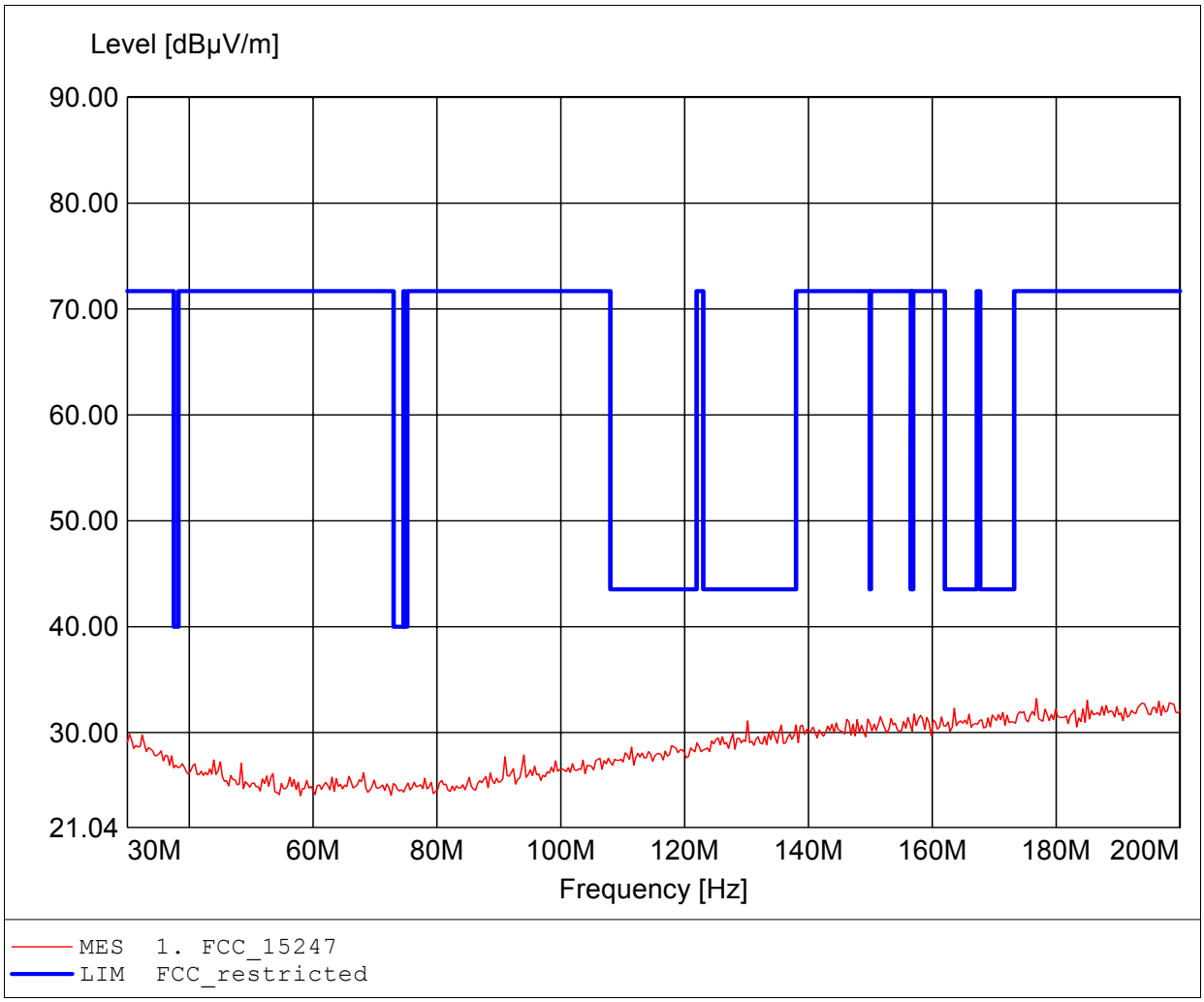
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.596GHz, Emax: 50.97dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

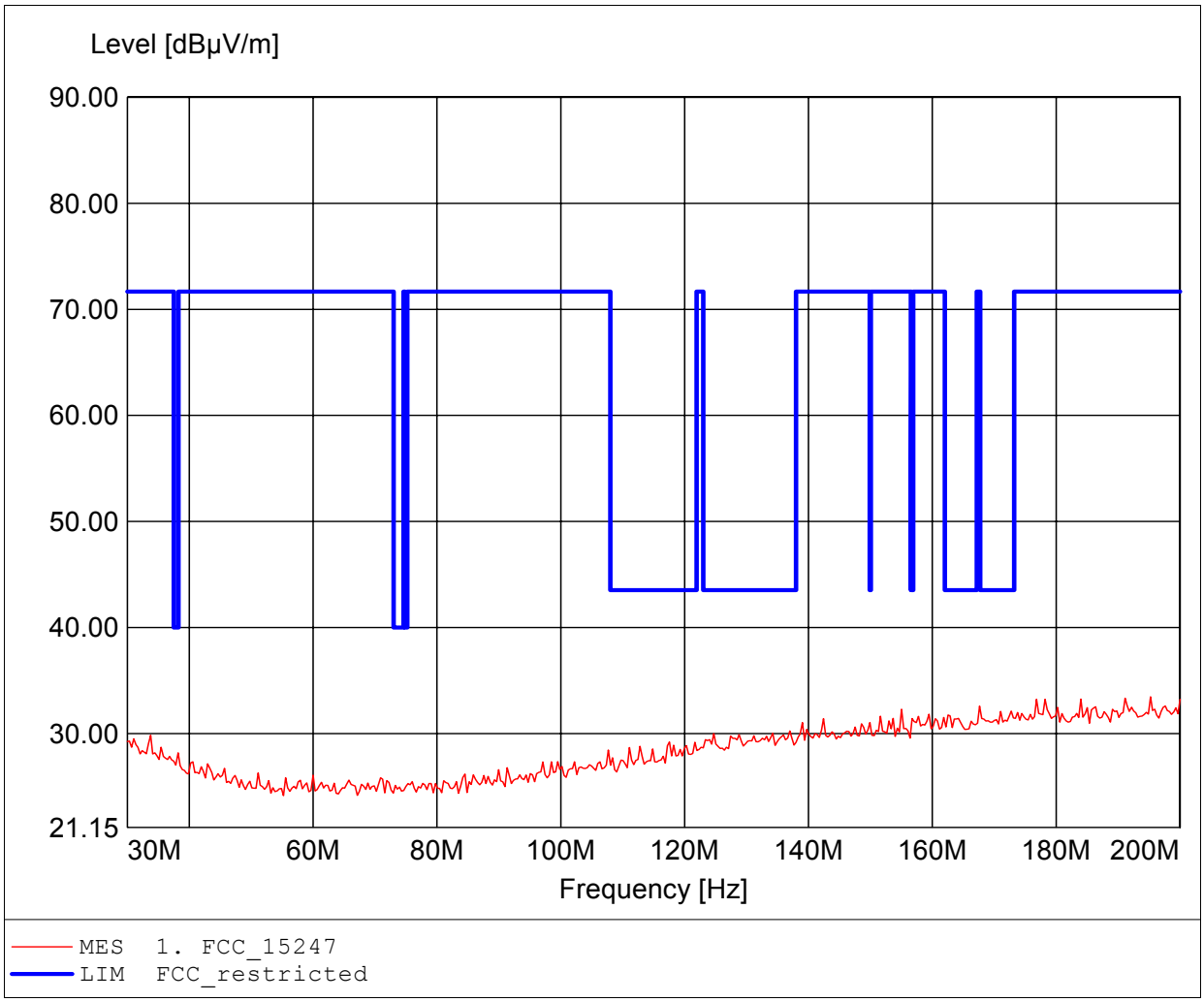
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 176.834MHz, Emax: 33.21dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

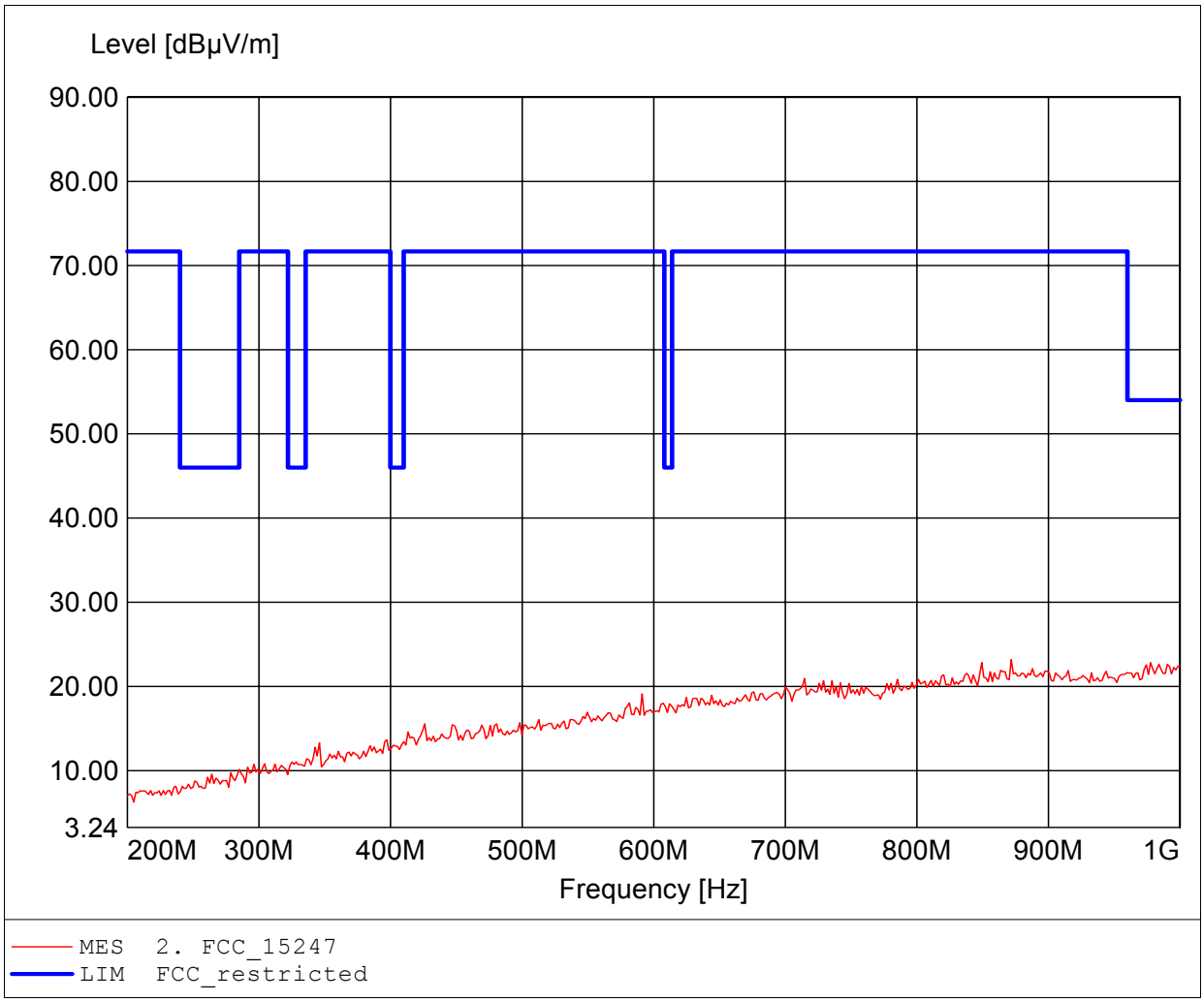
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq: 195.230MHz, Emax: 33.47dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

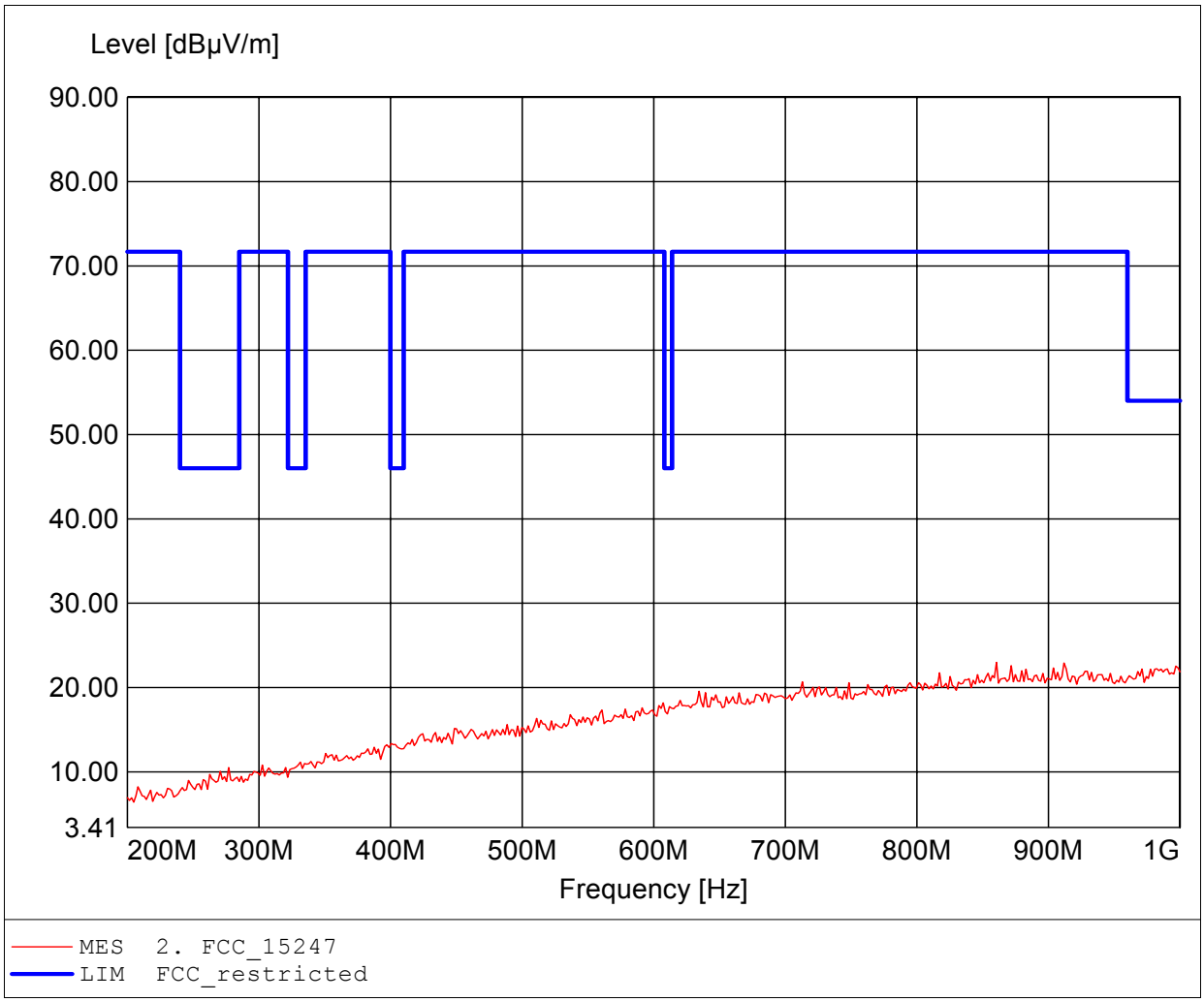
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 871.743MHz, Emax: 23.18dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

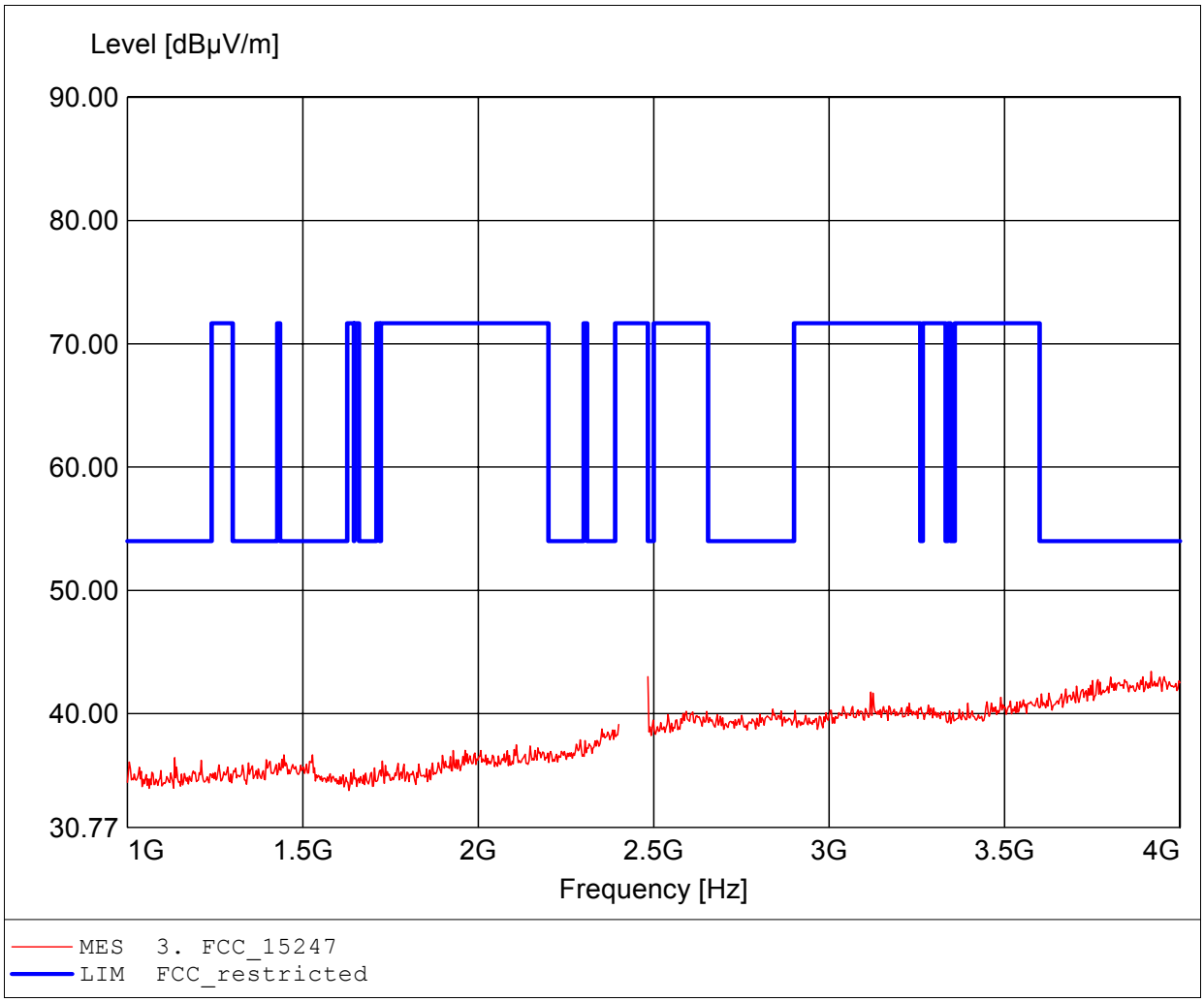
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247
Comment 1:	Dist.: 3m, Ant.: HL 223, amplif.
Comment 2:	Freq: 860.521MHz, Emax: 22.98dBµV/m, RBW: 100kHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

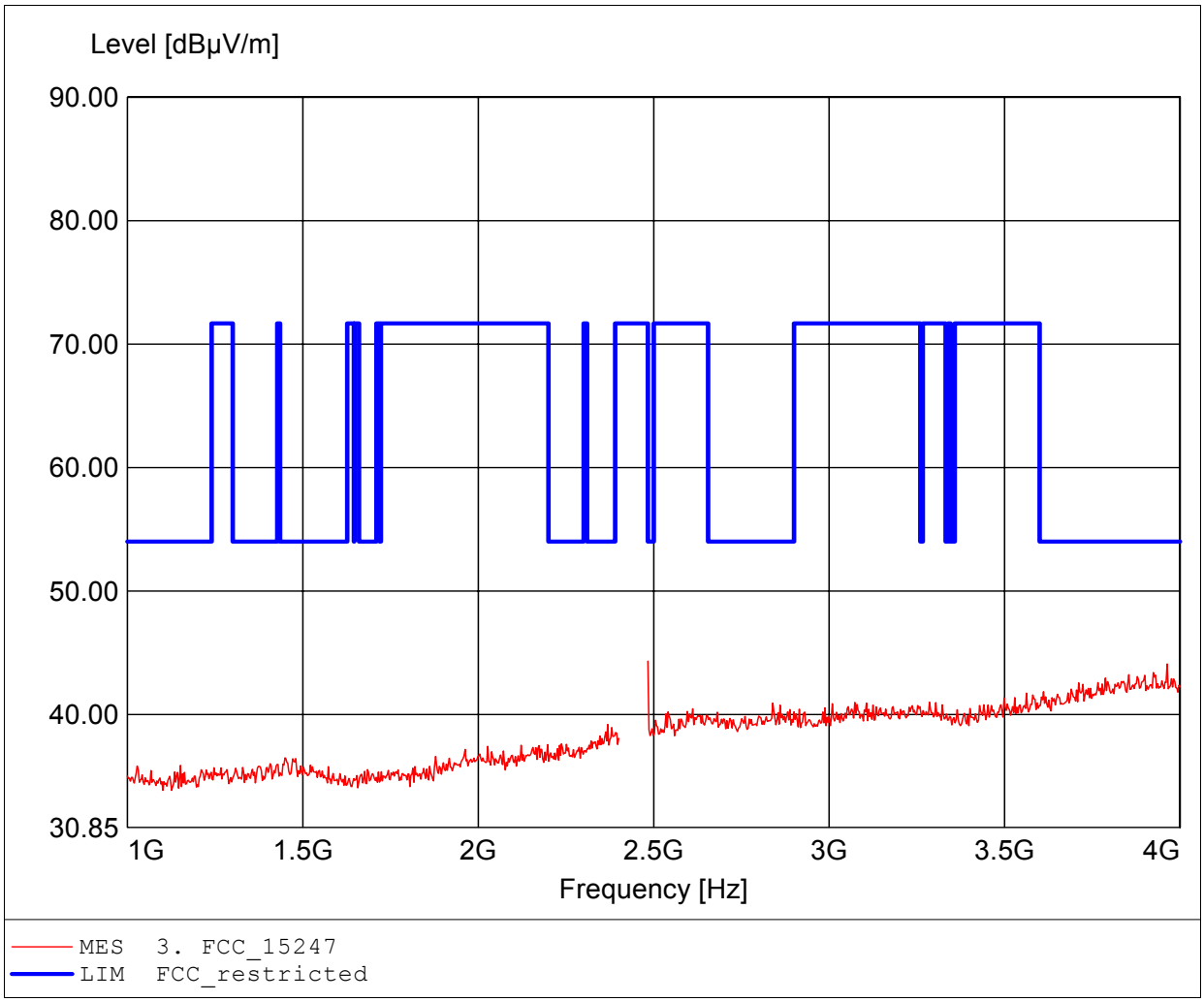
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 3.918GHz, Emax: 43.43dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

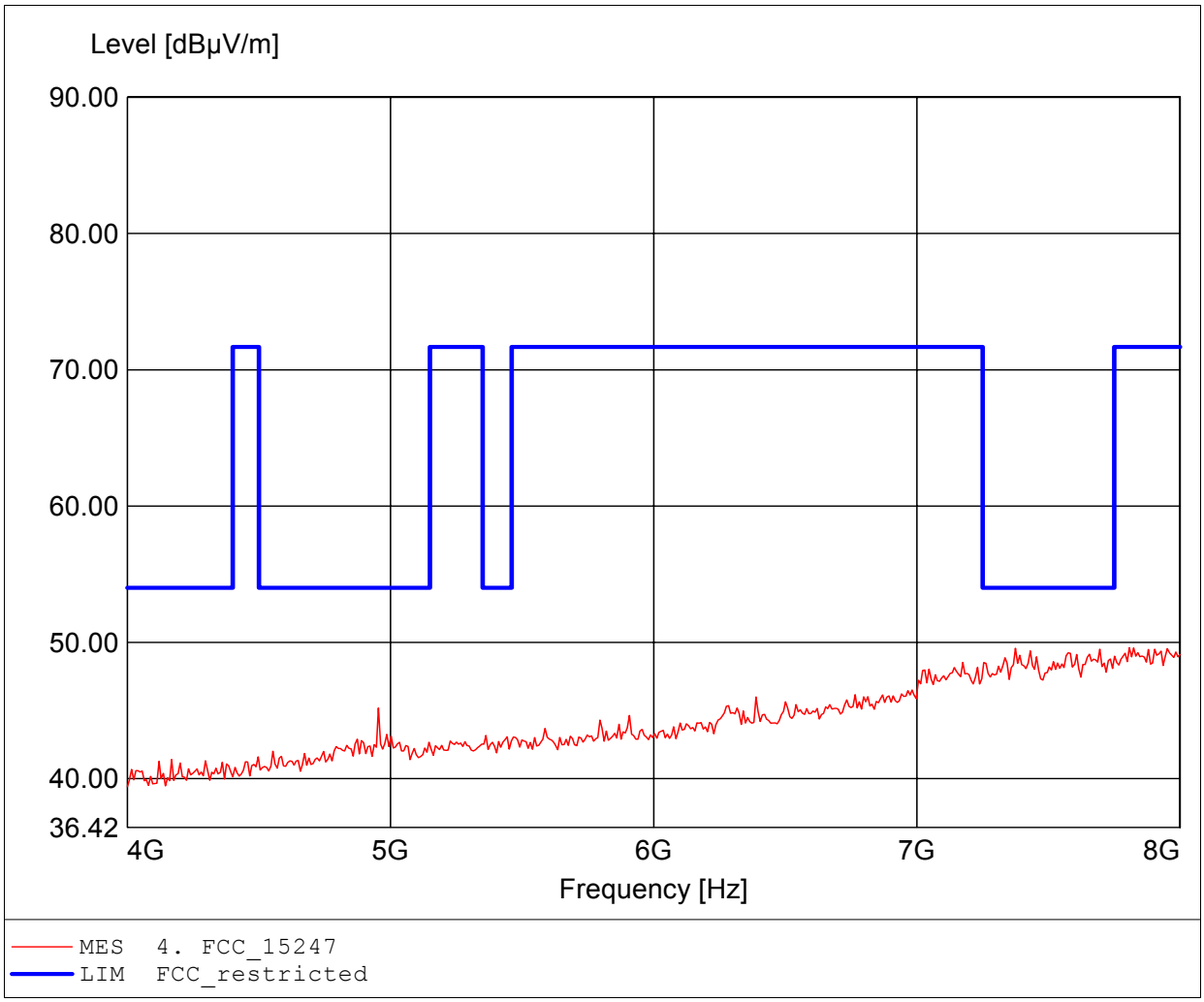
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.484GHz, Emax: 44.31dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

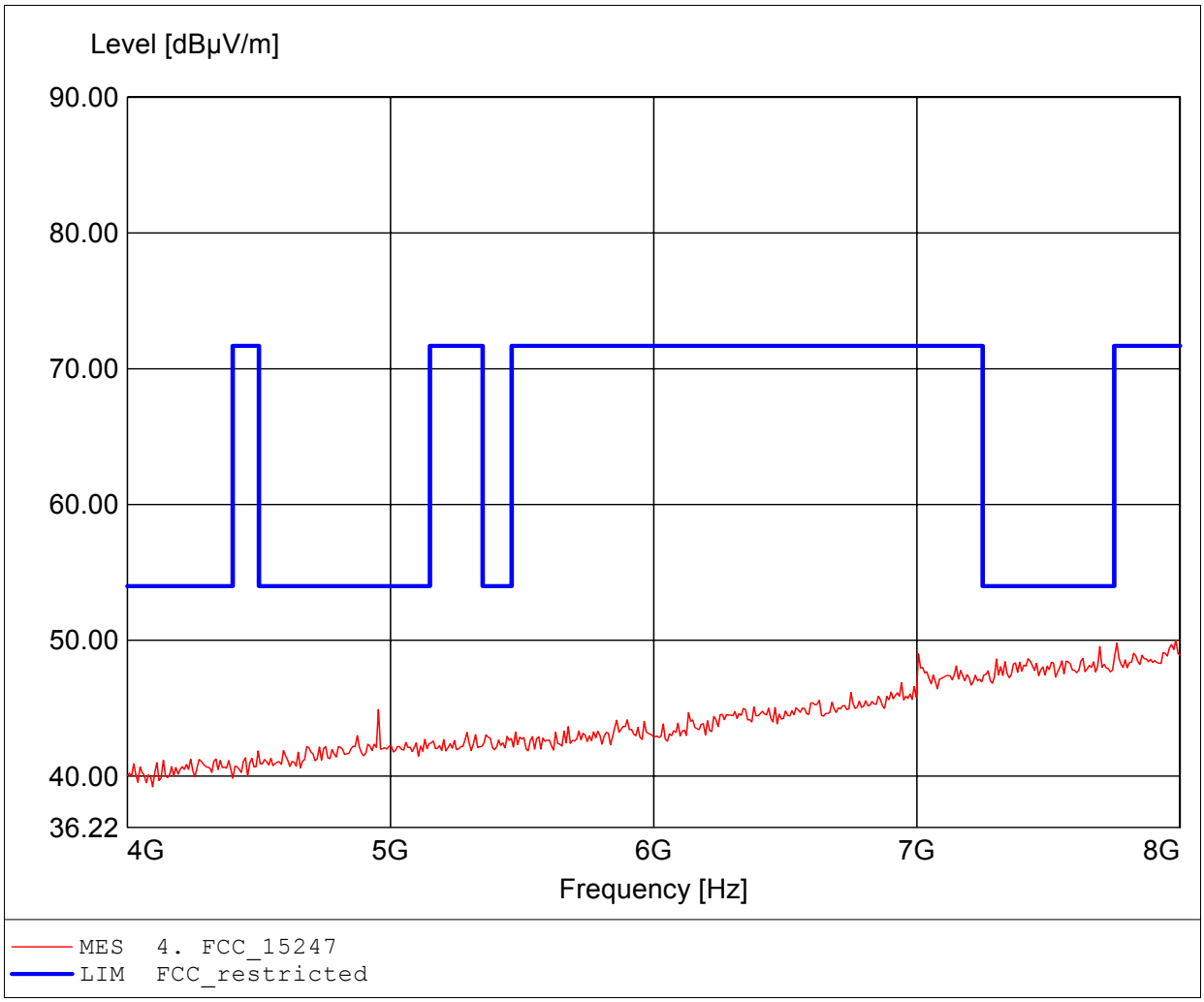
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.808GHz, Emax: 49.60dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

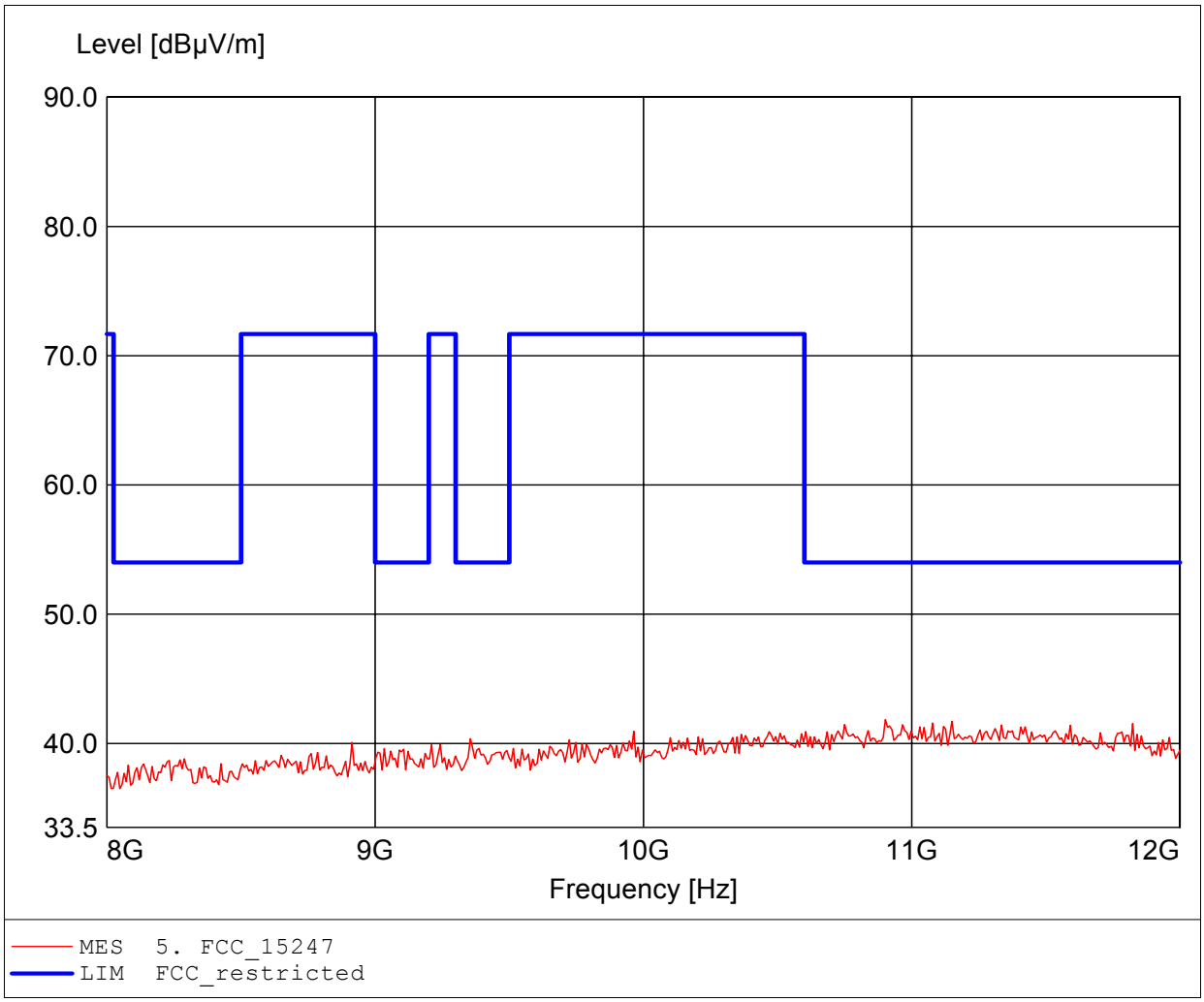
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.984GHz, Emax: 50.04dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

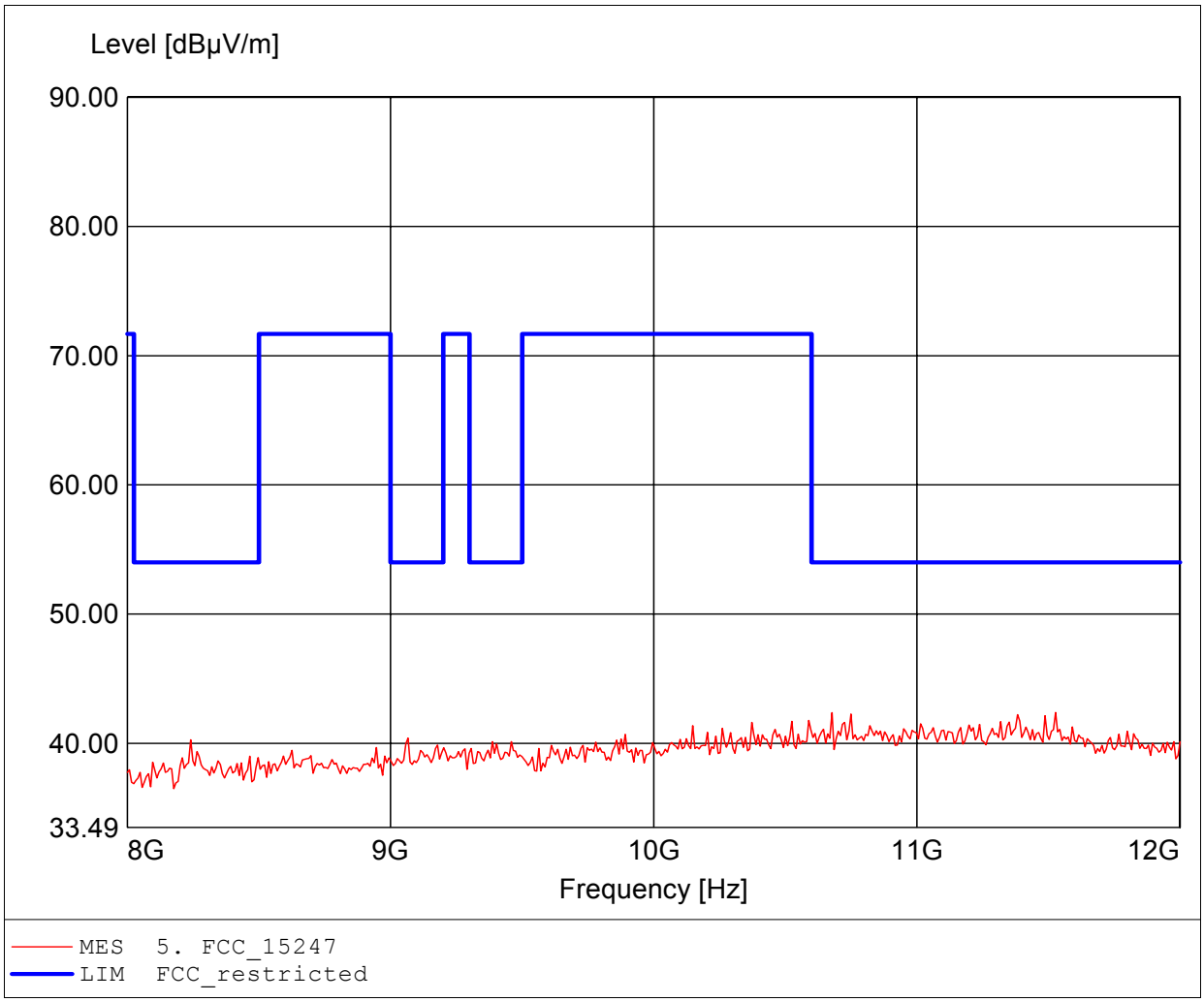
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 10.902GHz, Emax: 41.83dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

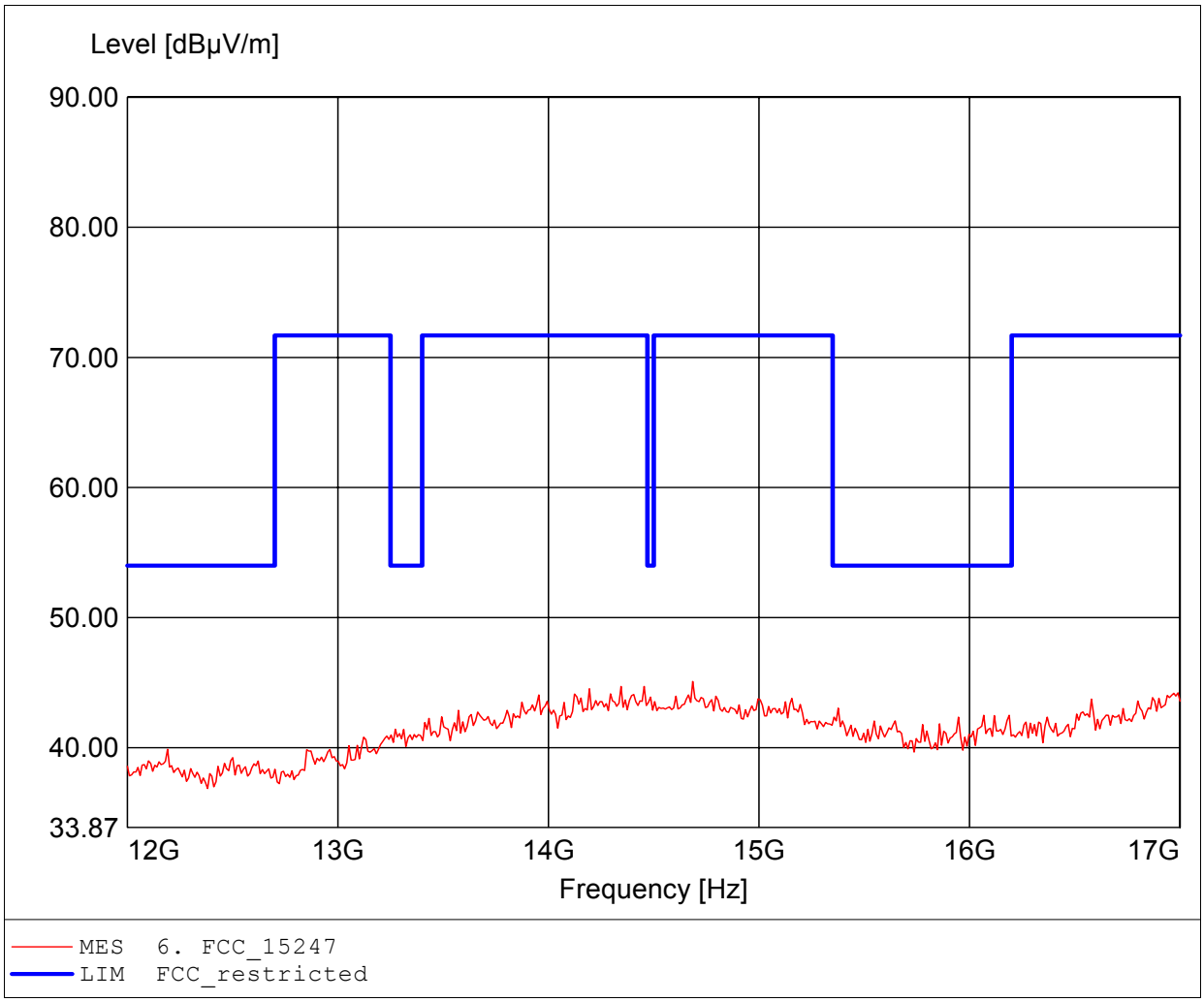
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 11.527GHz, Emax: 42.38dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

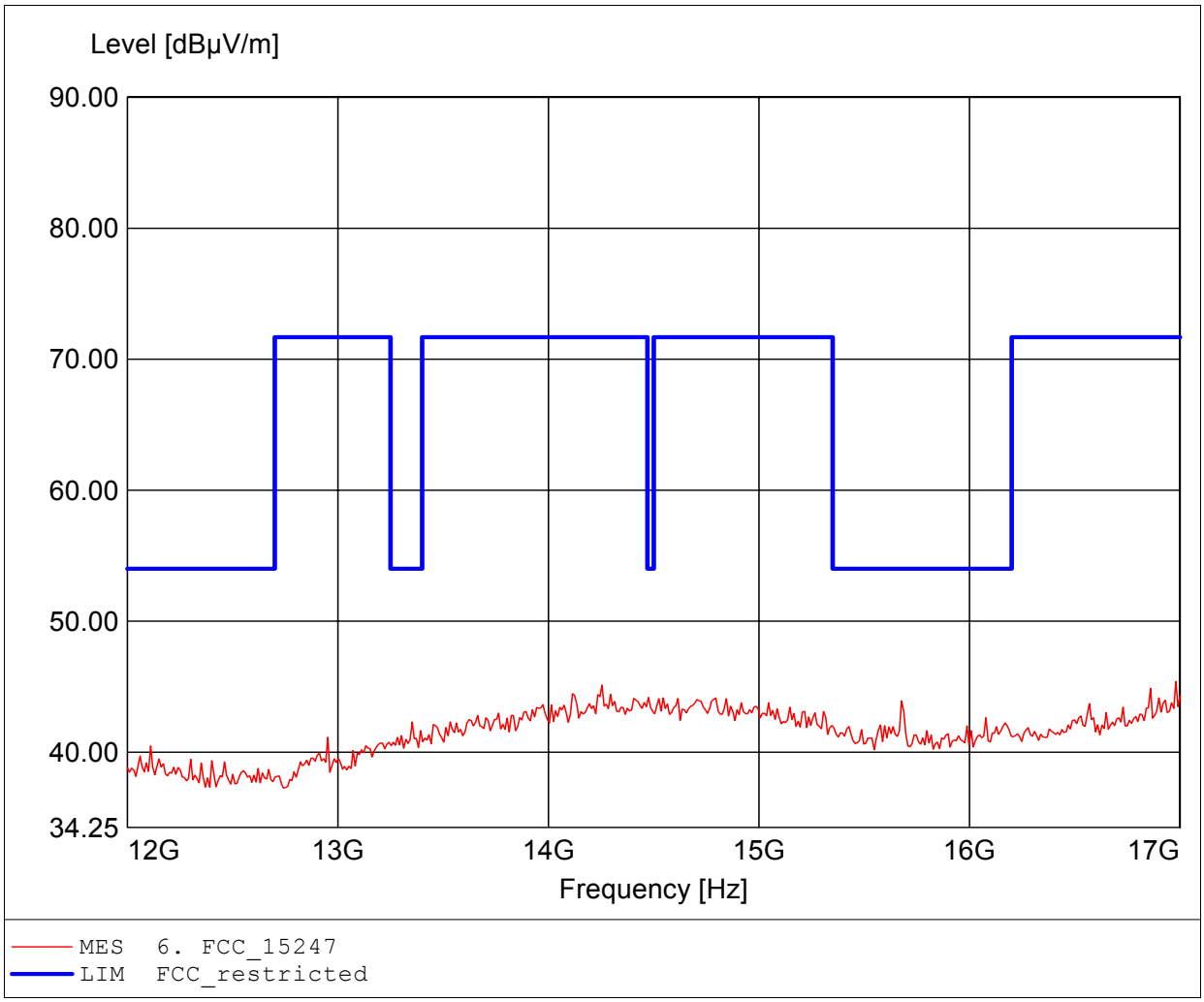
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.685GHz, Emax: 45.09dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

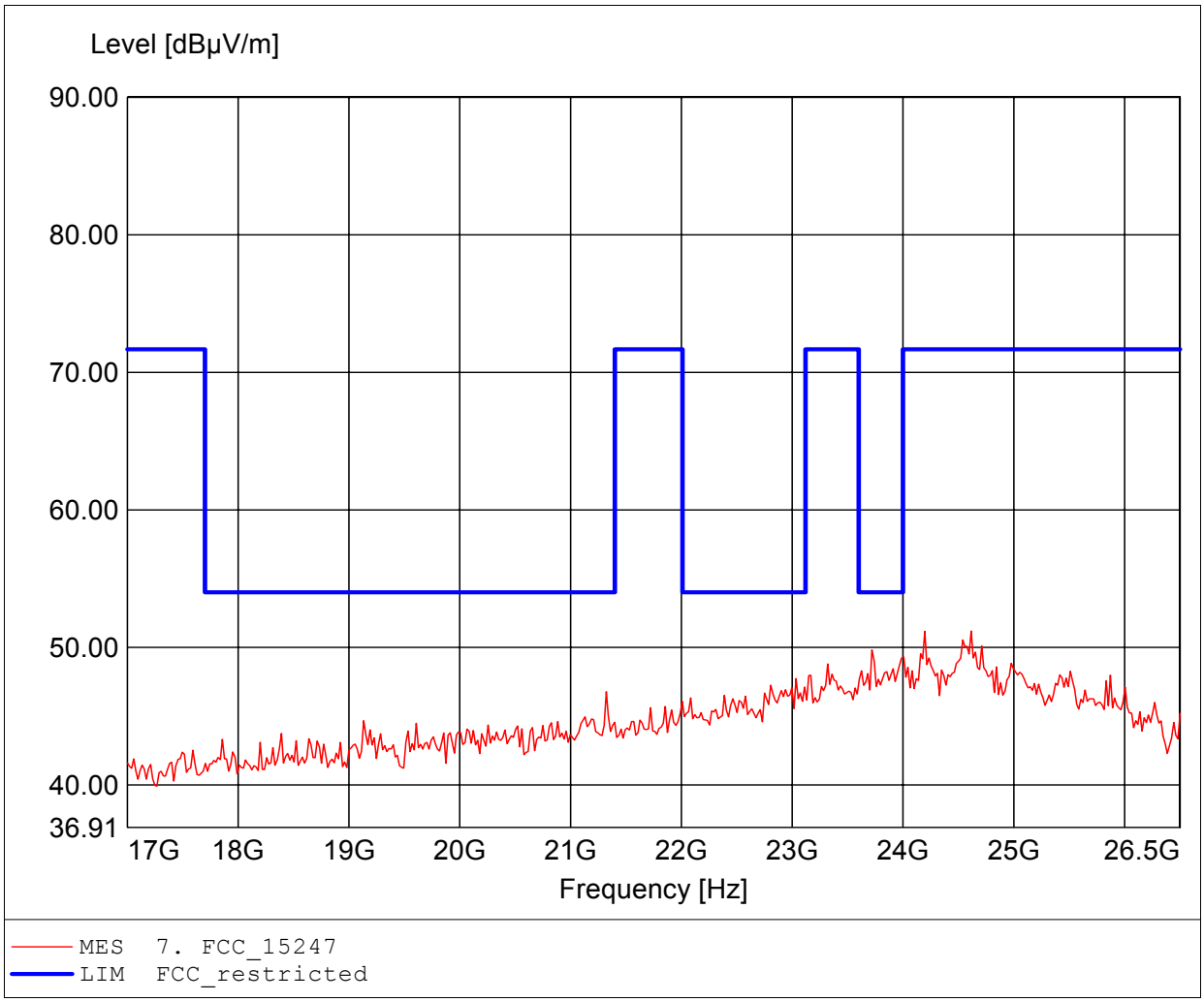
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 16.980GHz, Emax: 45.40dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

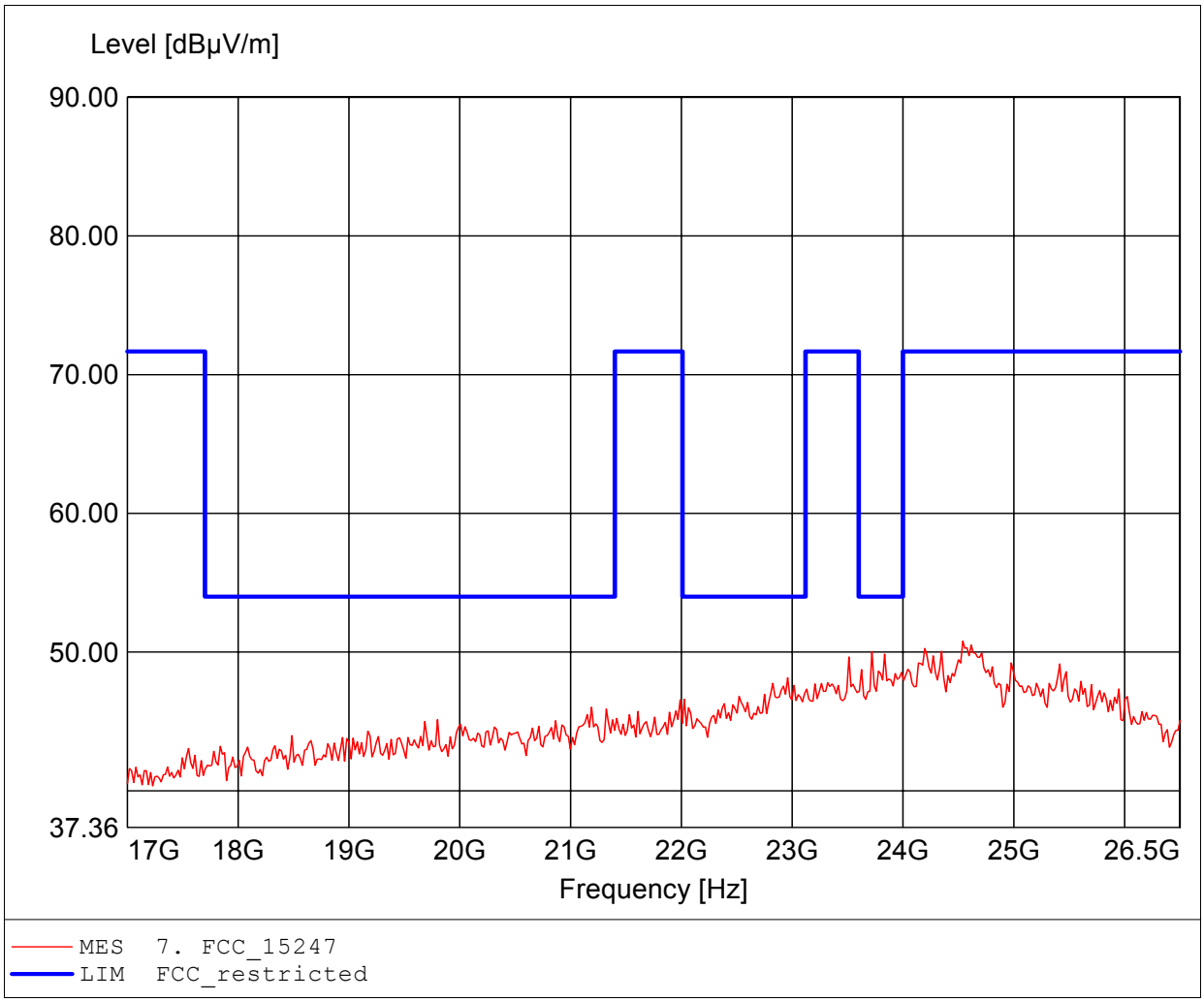
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.615GHz, Emax: 51.19dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2480MHz / GFSK / Pmax / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: HL025, amplif.
Comment 2:	Freq: 24.539GHz, Emax: 50.79dBµV/m, RBW: 1MHz

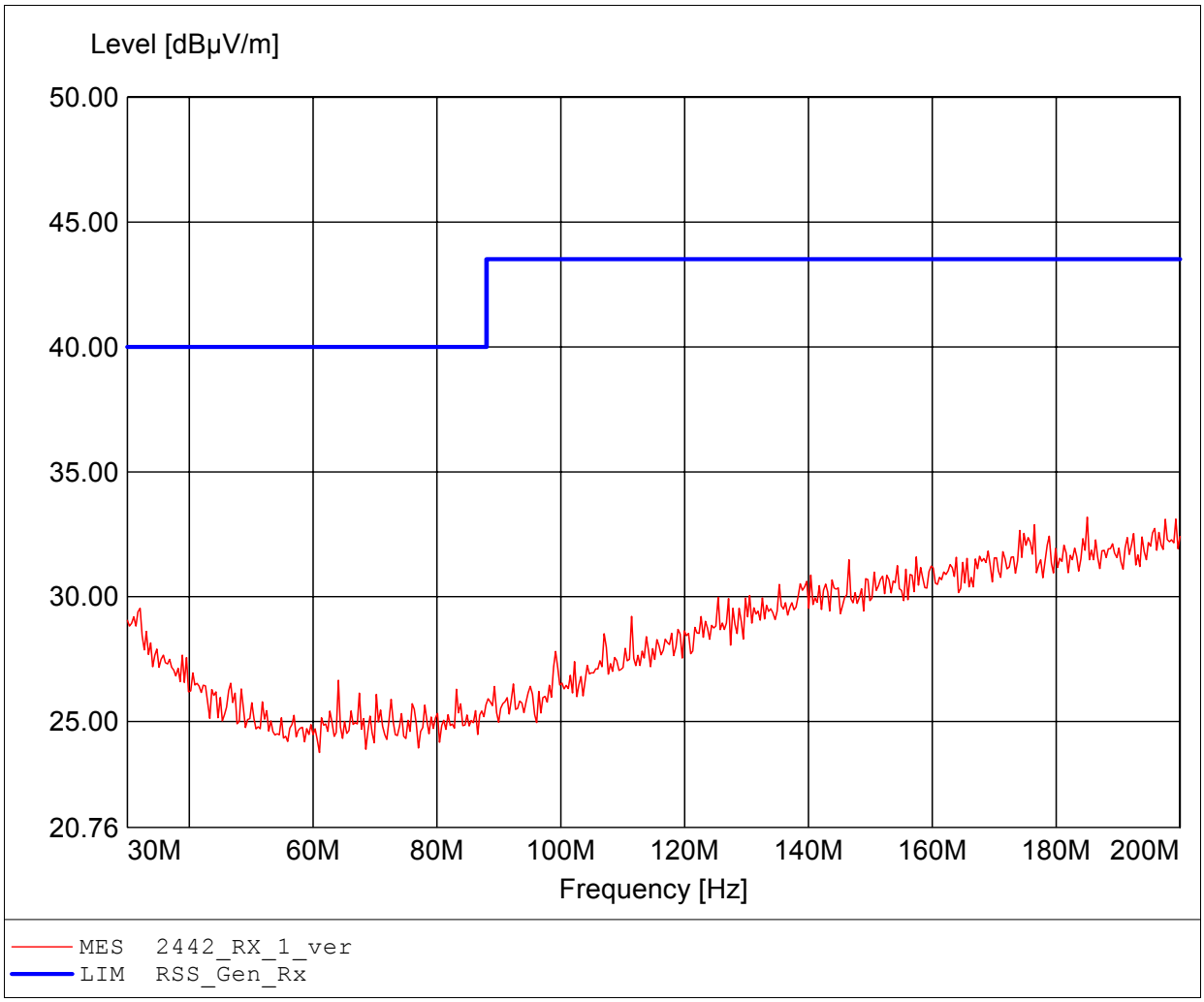


ANNEX B Receiver radiated spurious emissions

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

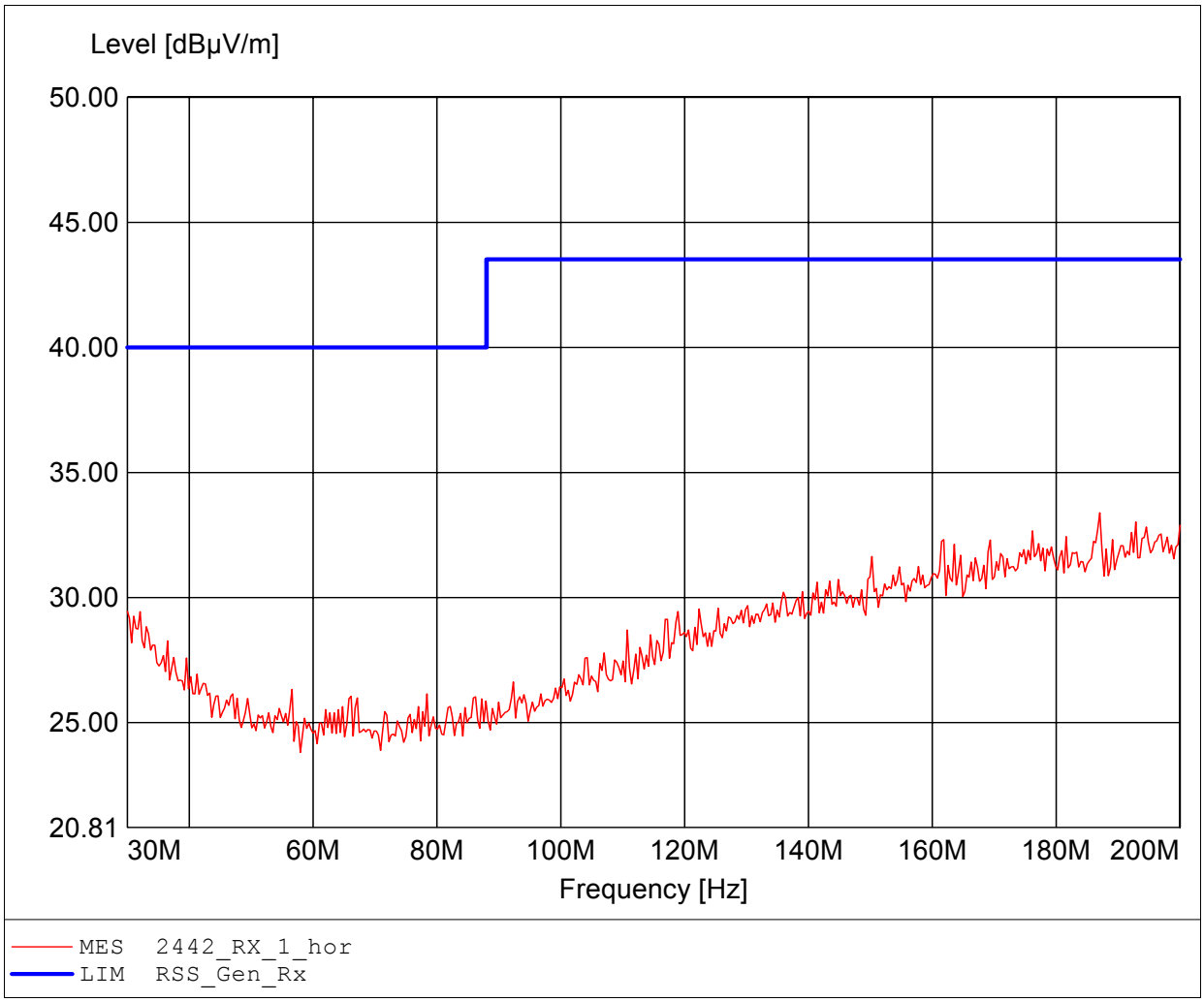
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq:185.010MHz Emax:33.19dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

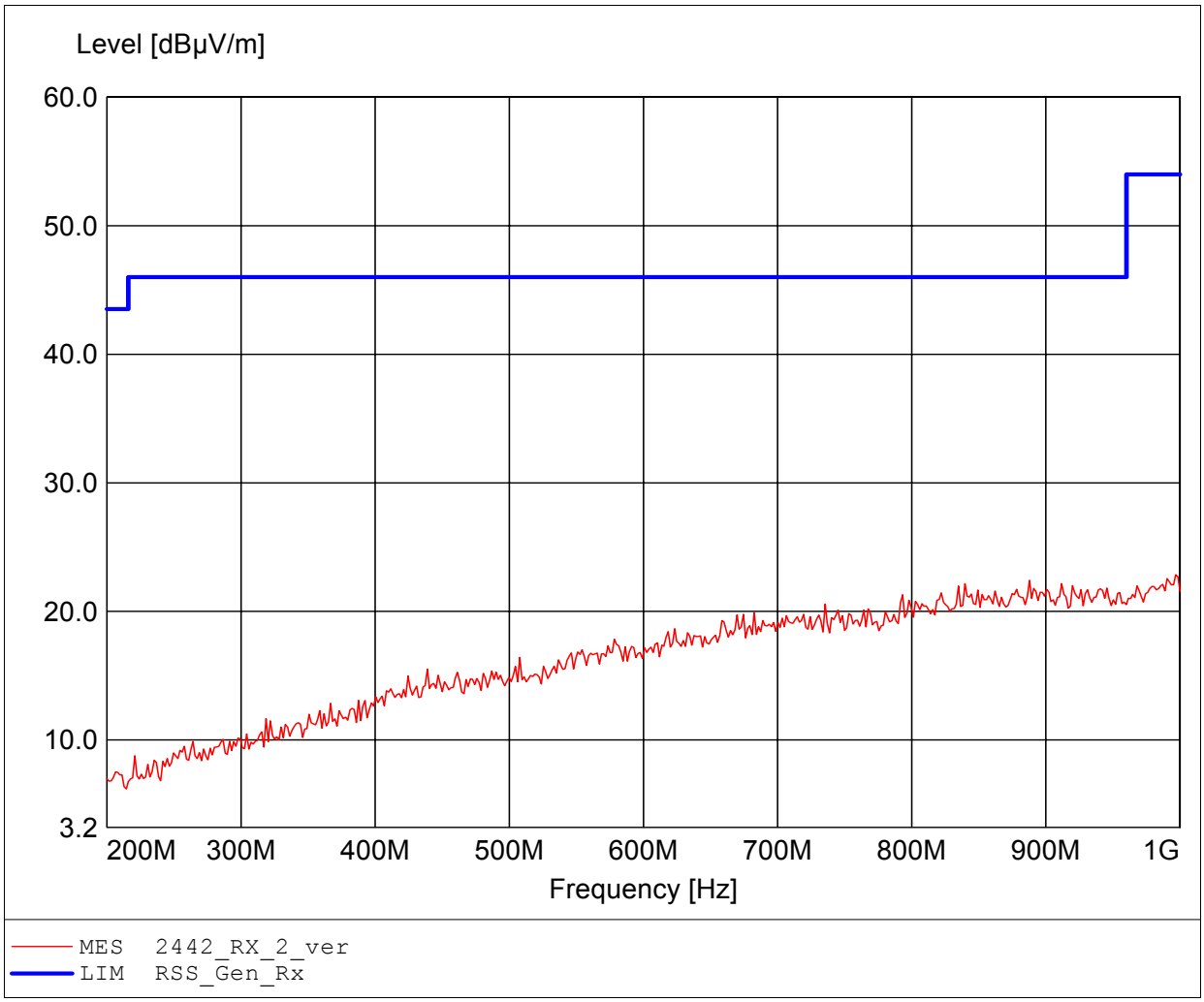
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HK 116
Comment 2:	Freq:187.054MHz Emax:33.39dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

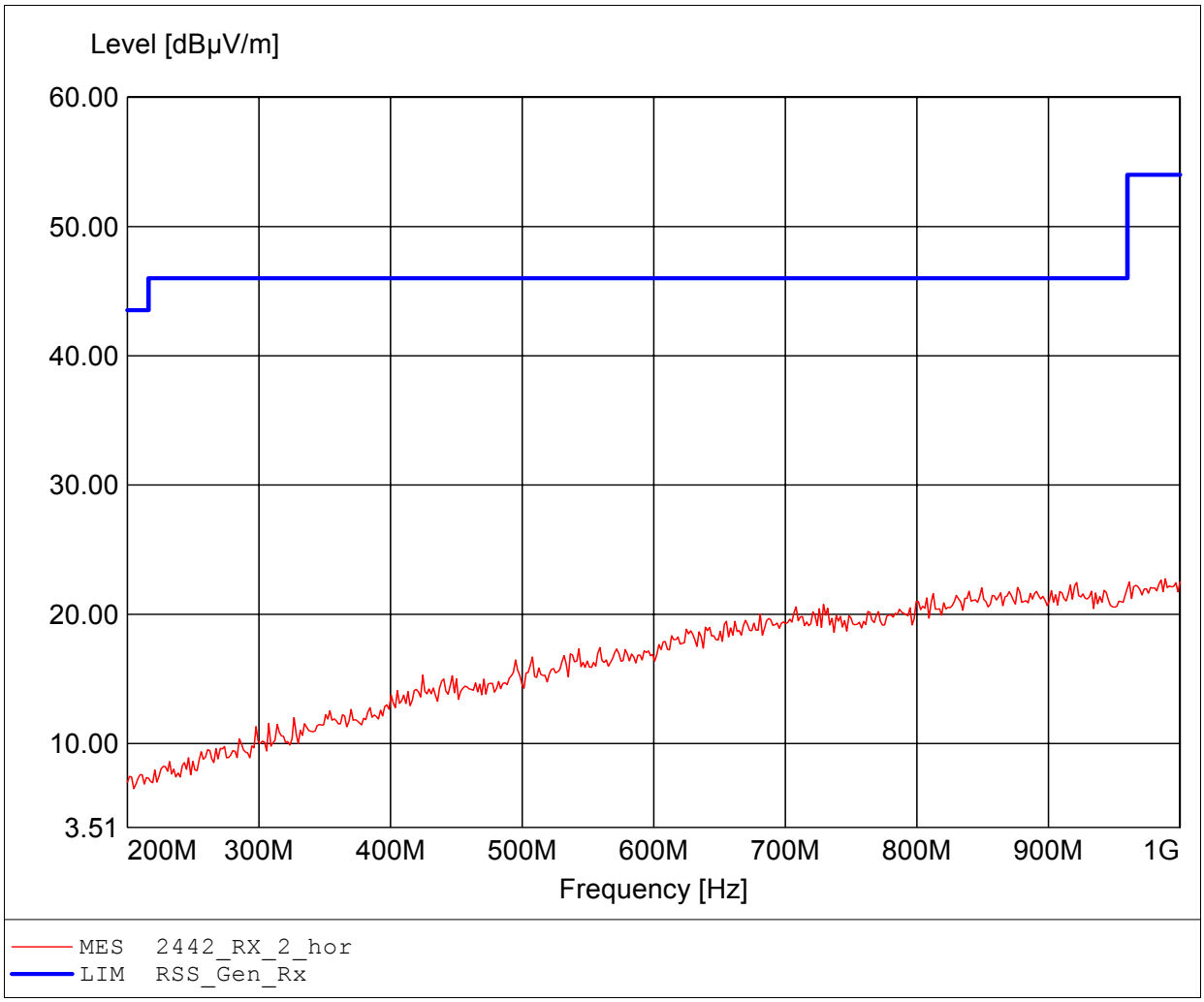
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL 223, ampl.
Comment 2:	Freq:996.794MHz Emax:22.86dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

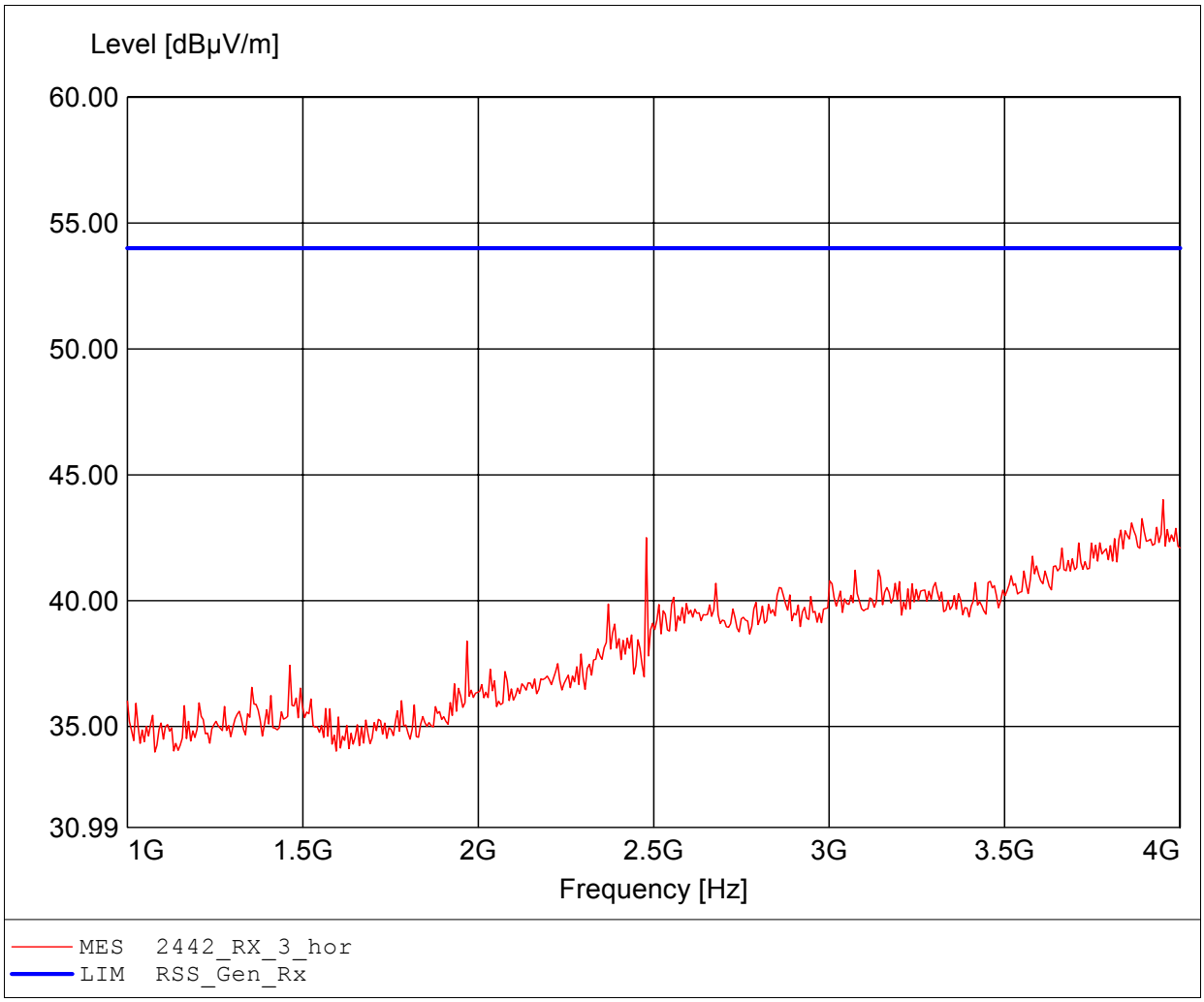
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL 223, ampl.
Comment 2:	Freq:988.778MHz Emax:22.74dBµV/m RBW: 100 kHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

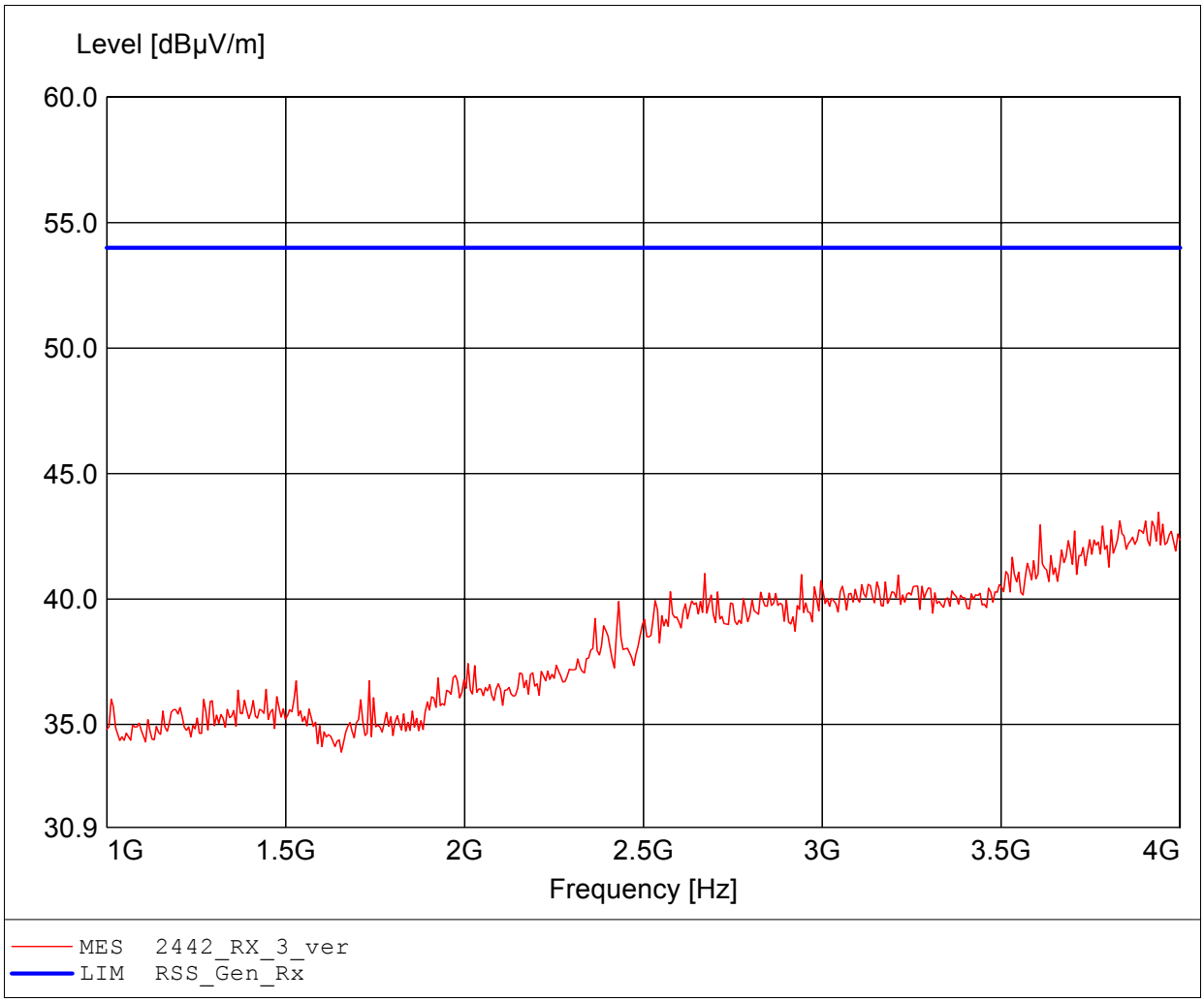
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:3.952GHz Emax:44.01dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

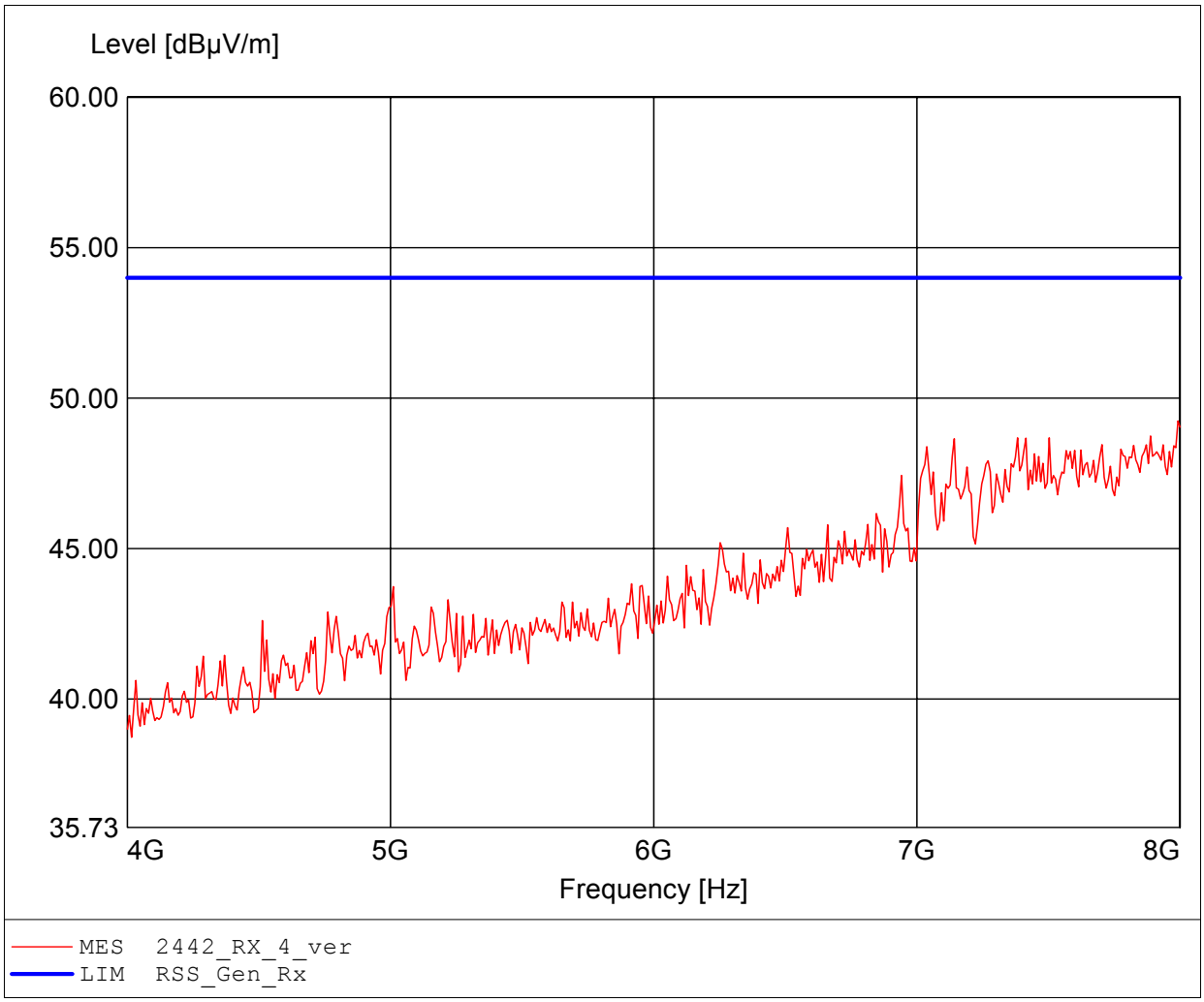
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:3.940GHz Emax:43.46dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

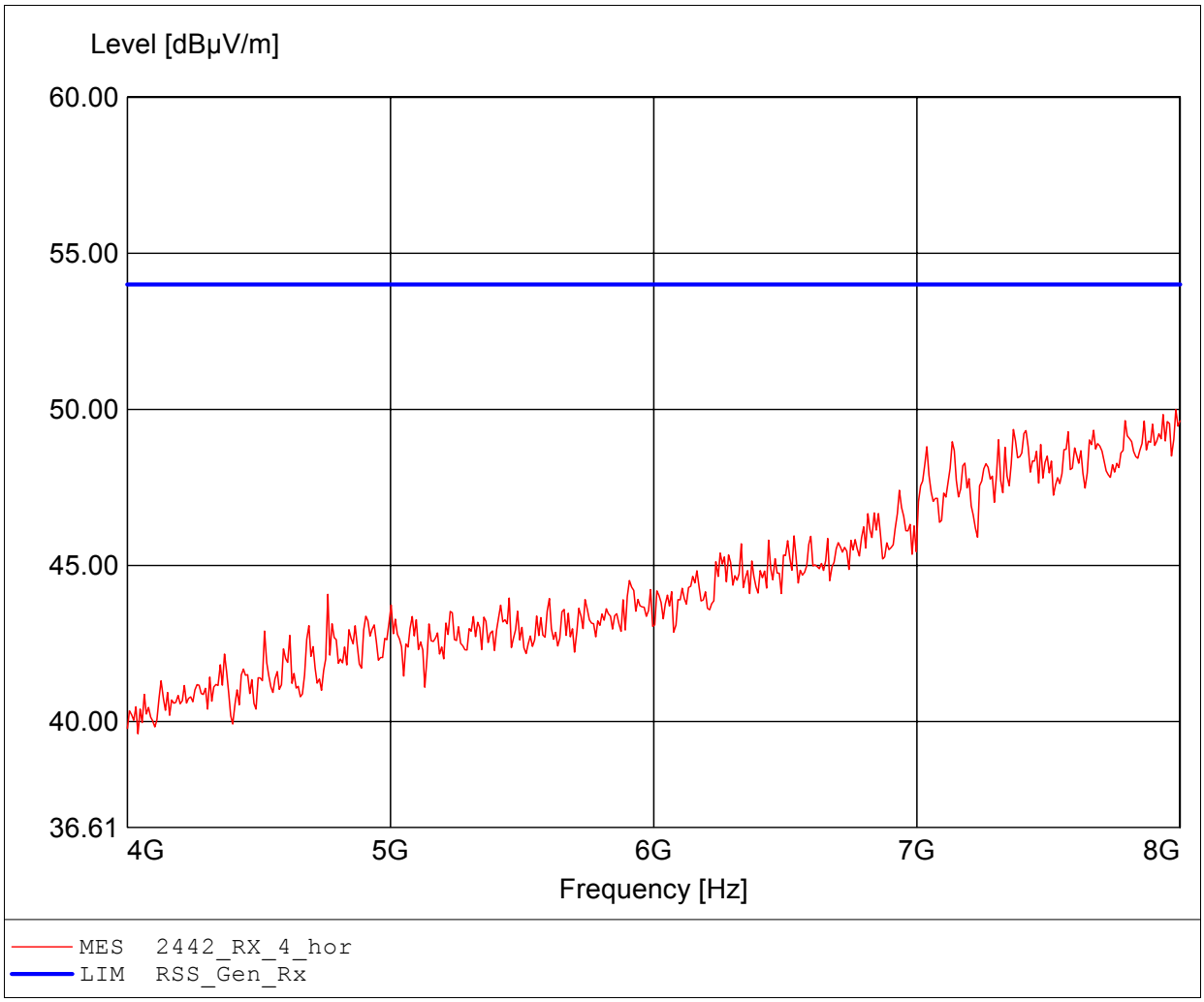
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:7.992GHz Emax:49.24dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

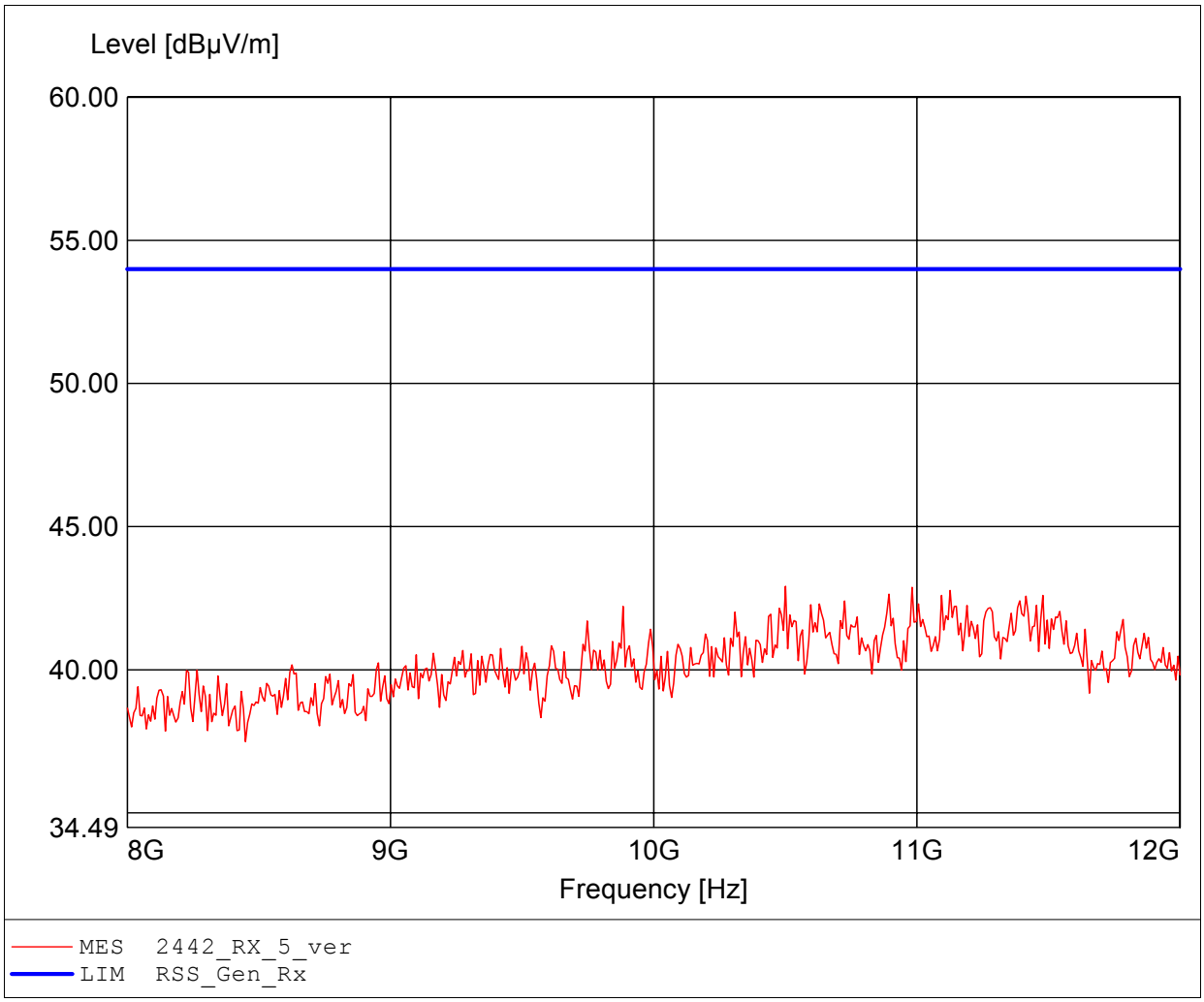
Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:7.984GHz Emax:50.00dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:10.501GHz Emax:42.91dBµV/m RBW: 1 MHz



Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Applicant:	Panasonic Industrial Devices Europe GmbH / G0M-1204-1920
EUT / Model:	Bluetooth smart module / BT1720
Mode:	BT-LE / 2442MHz / RX-Mode / vertical
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Pudell
Test Condition:	Tnom: 24°C / Vnom.: 5.0V DC (USB port)
Test Specification:	Freq. / CH: 2442
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:10.766GHz Emax:42.87dBµV/m RBW: 1 MHz