FCC TEST REPORT

FCC 47 CFR Part 15C
Industry Canada RSS-210

Frequency hopping systems operating within the 2400 – 2483.5 MHz band

Report Reference No. ..... :	G0M-1303-2693-TFC247B-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 RSS-210, Issue 8, 2010-12 RSS-Gen, Issue 3, 2010-12 ANSI C63.4:2009
Equipment under test (EUT):	
Product description	Bluetooth Module
Model No.	ENW89823C2KF/ENW89823A2KF
Hardware version	4x
Firmware / Software version	0x
	FCC-ID: T7V1316 IC: 216Q-1316
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 ..... :	2013-04-02	
Date (s) of performance of tests ..... :	2010-08-31 - 2010-09-02 & 2013-04-05	
Compiled by ..... :	Christian Weber	
Tested by (+ signature)..... : (Testing Manager)	Wilfried Treffke	.....
Approved by (+ signature) ..... : (Test Lab Manager)	Jens Zimmermann	.....
Date of issue ..... :	2013-04-18	
Total number of pages ..... :	121	

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:

According to manufacturer declaration the two modules ENW89823C2KF/ENW89823A2KF (PAN1316/PAN1326) are technical identical to the two modules PAN1315/PAN1325 with the 0.9dBi antenna. The only difference is that the PAN1316/PAN1326 modules not only support Bluetooth 4.0 BR+EDR but also the Bluetooth 4.0 Low Energy mode.

It has been verified by measurements that the radio performance of the PAN1315/PAN1325 and PAN1316/PAN1326 modules is identical. Therefore the Bluetooth BR+EDR measurement results obtained for the PAN1315/1325 modules are supposed to be applicable to the PAN1316/PAN1326 modules and given in this test report.

Version History

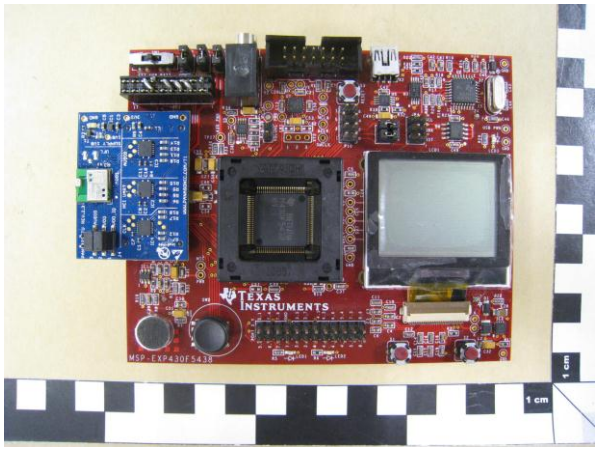
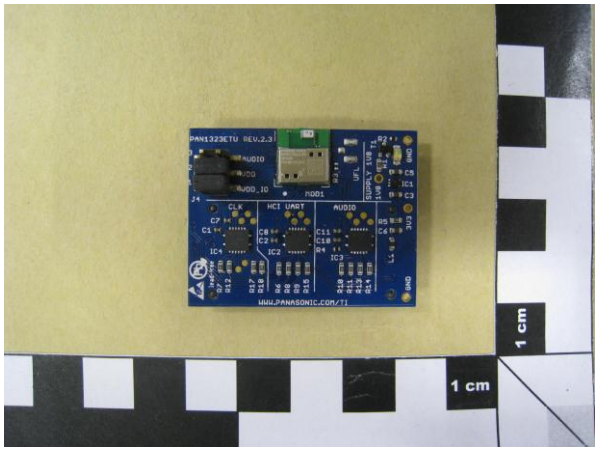
Version	Issue Date	Remarks	Revised by
01	2013-04-15	Initial Release	

REPORT INDEX

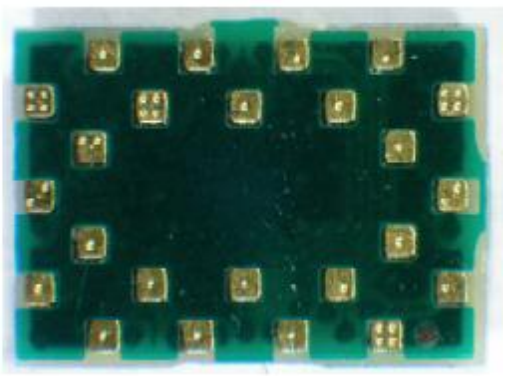
1 Equipment (Test item) Description

Description	Bluetooth Module	
Model	ENW89823C2KF/ENW89823A2KF	
Serial number	None	
Hardware version	4x	
Software / Firmware version	0x	
FCC-ID	T7V1316	
IC	216Q-1316	
Equipment type	Radio module	
Radio type	Transceiver	
Radio technology	Bluetooth	
Operating frequency range	2402 - 2480 MHz	
Assigned frequency band	2400 - 2483.5 MHz	
Main test frequencies	F_{LOW}	2402 MHz
	F_{MID}	2441 MHz
	F_{HIGH}	2480 MHz
Spreading	FHSS	
Modulations	GFSK, PI/4-DQPSK, 8-PSK	
Number of channels	79 hopping channels at all	
Channel spacing	1 MHz	
Number of antennas	1	
Antenna	Type	integrated
	Model	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}	3.0 VDC
	V_{MIN}	2.55 VDC
	V_{MIN}	3.45 VDC
AC/DC-Adaptor	None	

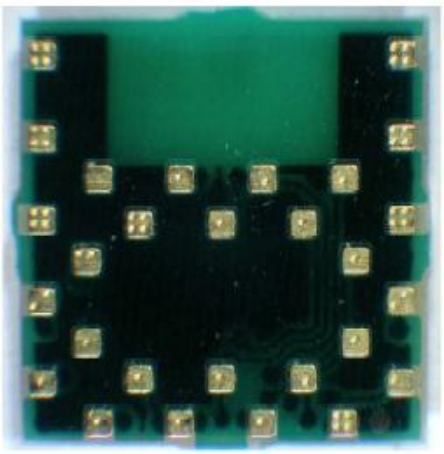
1.1 Photos – Equipment External

EUT ON EVALUATION BOARD	EUT TOP ON BOARD
	

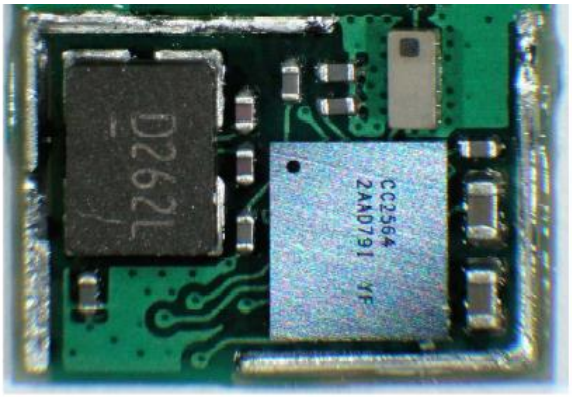
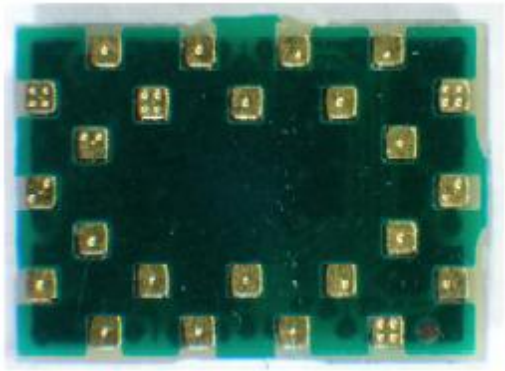
EUT PAN 1316

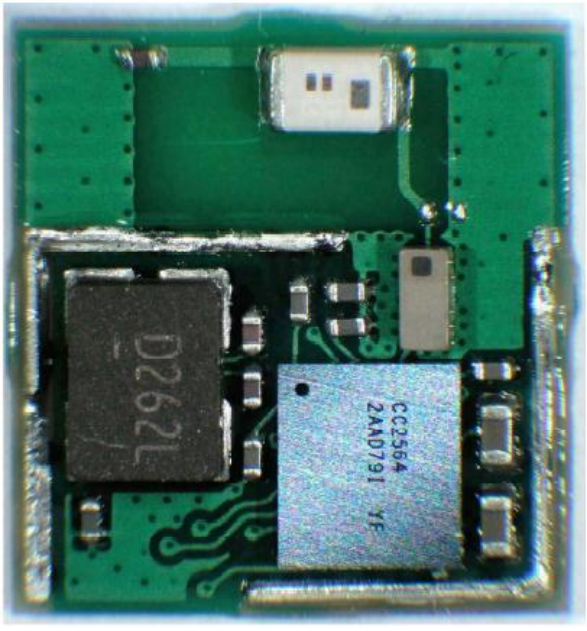
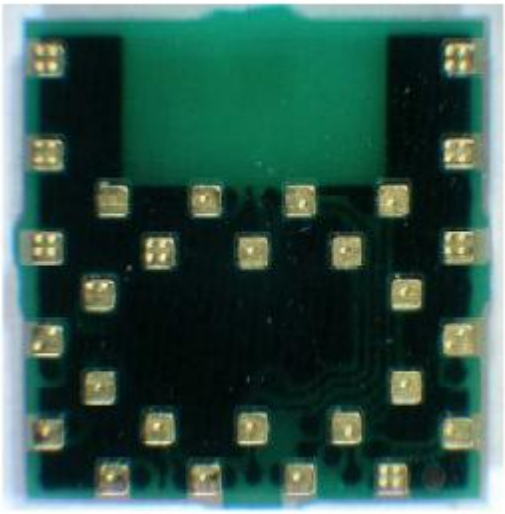


EUT PAN 1326



1.2 Photos – Equipment internal

EUT PAN 1316 TOP	EUT PAN 1316 BOTTOM
	

EUT PAN 1326 TOP	EUT PAN 1326 BOTTOM
	

1.3 Photos – Test setup

TEST SETUP: RADIATED EMISSIONS

TEST SETUP: CONDUCTED EMISSIONS

1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
None				

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

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description	
DH5-Sngl	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = GFSK Packet type = DH5 Data rate = 1 Mbps Duty cycle = 47 % Power level = Maximum
2DH5-Sngl	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = π/4-DQPSK Packet type = 2DH5 Data rate = 2 Mbps Duty cycle = 47 % Power level = Maximum
3DH5-Sngl	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping stopped (single hopping channel) Modulation = 8-DPSK Packet type = 3DH5 Data rate = 3 Mbps Duty cycle = 47 % Power level = Maximum
DH5-Hop	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Modulation = GFSK Packet type = DH5 Data rate = 1 Mbps Duty cycle = 47 % Power level = Maximum

2DH5-Hop	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Modulation = π/4-DQPSK Packet type = 2DH5 Data rate = 2 Mbps Duty cycle = 47 % Power level = Maximum
3DH5-Hop	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Modulation = 8-DPSK Packet type = 3DH5 Data rate = 3 Mbps Duty cycle = 47 % Power level = Maximum
Receive	General conditions:	EUT powered by laboratory power supply.
	Radio conditions:	Mode = standalone receive Spreading = Hopping
AC-Powerline	General conditions:	EUT powered by commercial AC/DC-Adapter
	Radio conditions:	Mode = standalone transmit Spreading = Hopping Power level = Maximum

1.6 Test Equipment Used During Testing

20dB Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2010-08	2011-08

Number of hopping frequencies					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2010-08	2011-08

Time of occupancy					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2010-08	2011-08

Maximum peak conducted power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2010-08	2011-08

Band edge compliance					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2010-08	2011-08

Conducted spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2010-08	2011-08

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	-	-
Spectrum Analyzer	R&S	FSEK30	EF00168	2009-03	2011-03
Biconical Antenna	R&S	HK 116	EF00012	2010-01	2011-01
LPD Antenna	R&S	HL 223	EF00187	2010-01	2011-01
LPD Antenna	R&S	BBHA 9120D	EF00019	2010-08	2011-08

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

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)(1) IC RSS-210 § A8.1	20 dB Bandwidth	Public notice DA 00-705	PASS	
FCC § 15.247(a)(1)(iii) IC RSS-210 § A8.1	Number of hopping frequencies	Public notice DA 00-705	PASS	
FCC § 15.247(a)(1) IC RSS-210 § A8.1	Frequency hopping channel separation	Public notice DA 00-705	PASS	
FCC § 15.247(a)(1)(iii) IC RSS-210 § A8.1	Time of occupancy (Dwell time)	Public notice DA 00-705	PASS	
FCC § 15.247(b)(1) IC RSS-210 § A8.4	Maximum peak conducted power	Public notice DA 00-705	PASS	
47 CFR 15.207 RSS-Gen 7.2.4	AC power line conducted emissions	ANSI C63.4	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Band edge compliance	Public notice DA 00-705	PASS	
FCC § 15.247(d) IC RSS-210 § A8.5	Conducted spurious emissions	Public notice DA 00-705	PASS	
FCC § 15.247(d) FCC § 15.209 IC RSS-210 A8.5 IC RSS-Gen 4.9 IC RSS-Gen 7.2.5	Transmitter radiated spurious emissions	Public notice DA 00-705 / ANSI C 63.4	PASS	
IC RSS-Gen 4.10 IC RSS-Gen 6.1	Receiver radiated spurious emissions	ANSI C 63.4	PASS	
Remarks:				

3 Test Conditions and Results

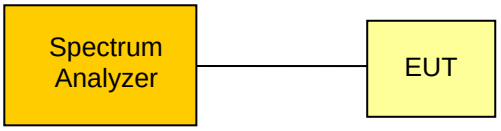
3.1 Test Conditions and Results – Occupied Bandwidth

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

Limits

None (Informational only)

Test setup



Test procedure

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

Test results

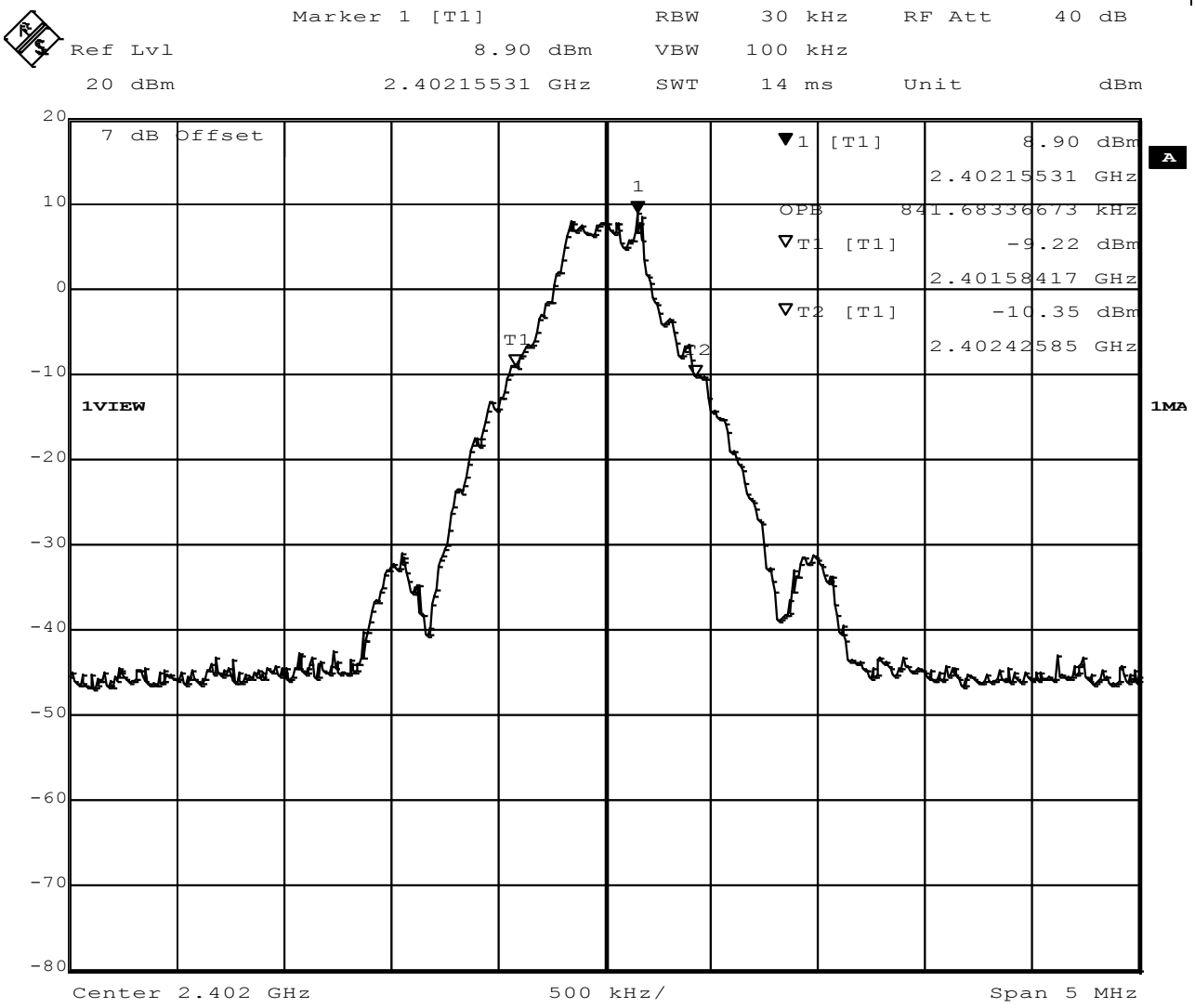
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	2402	DH5-Sngl	0.842
F_{MID}	2441	DH5-Sngl	0.832
F_{HIGH}	2480	DH5-Sngl	0.852
F_{LOW}	2402	3DH5-Sngl	1.192
F_{MID}	2441	3DH5-Sngl	1.212
F_{HIGH}	2480	3DH5-Sngl	1.192

Comments:

Occupied Bandwidth – DH5-Sngl F_{LOW}

RSS Gen
Occupied Bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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

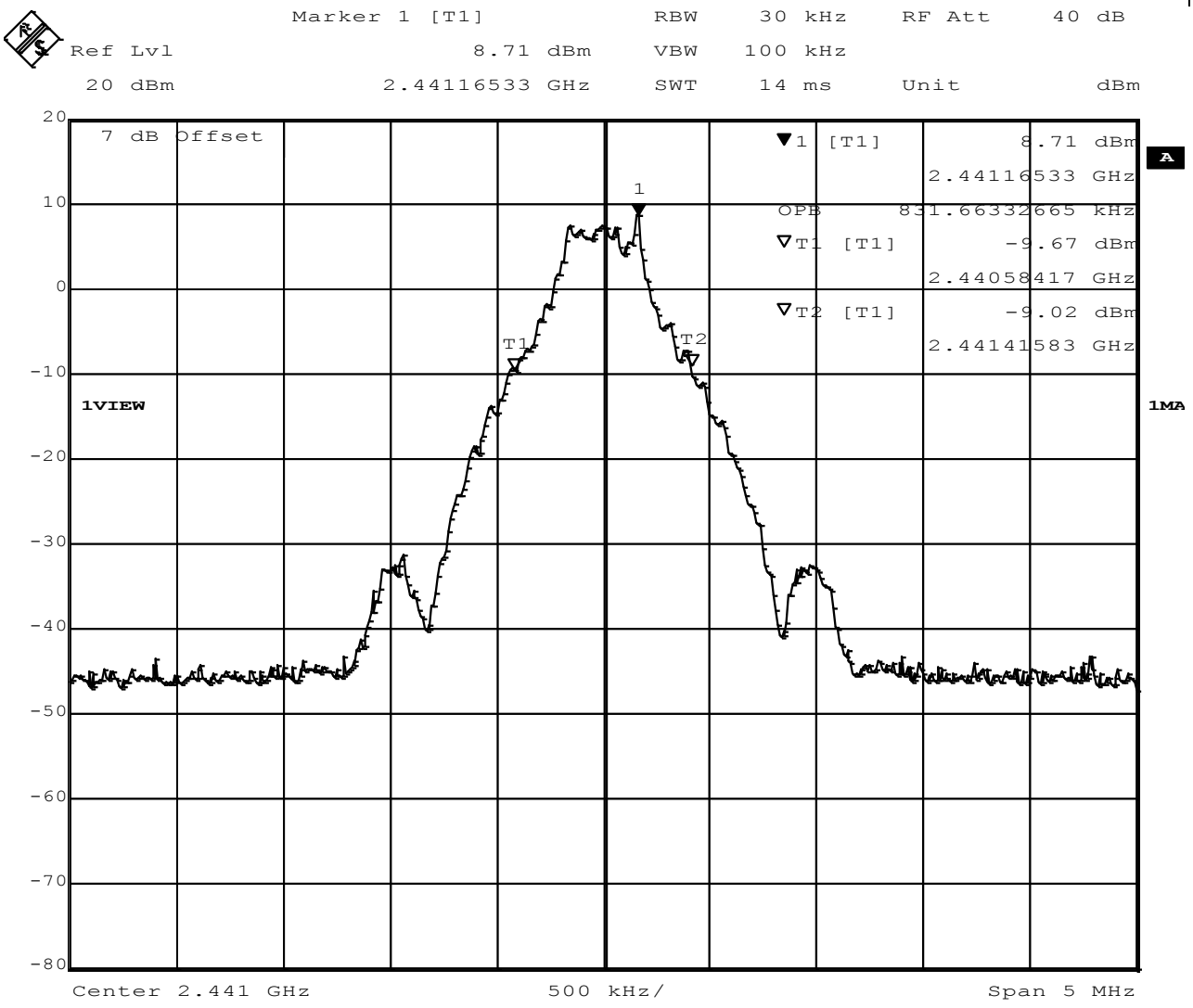


Comment A: Occupied bandwidth: 841.7 KHz
Date: 31.AUG.2010 14:10:39

Occupied Bandwidth – DH5-Sngl F_{MID}

RSS Gen
Occupied Bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 39 / 2441 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	GFSK

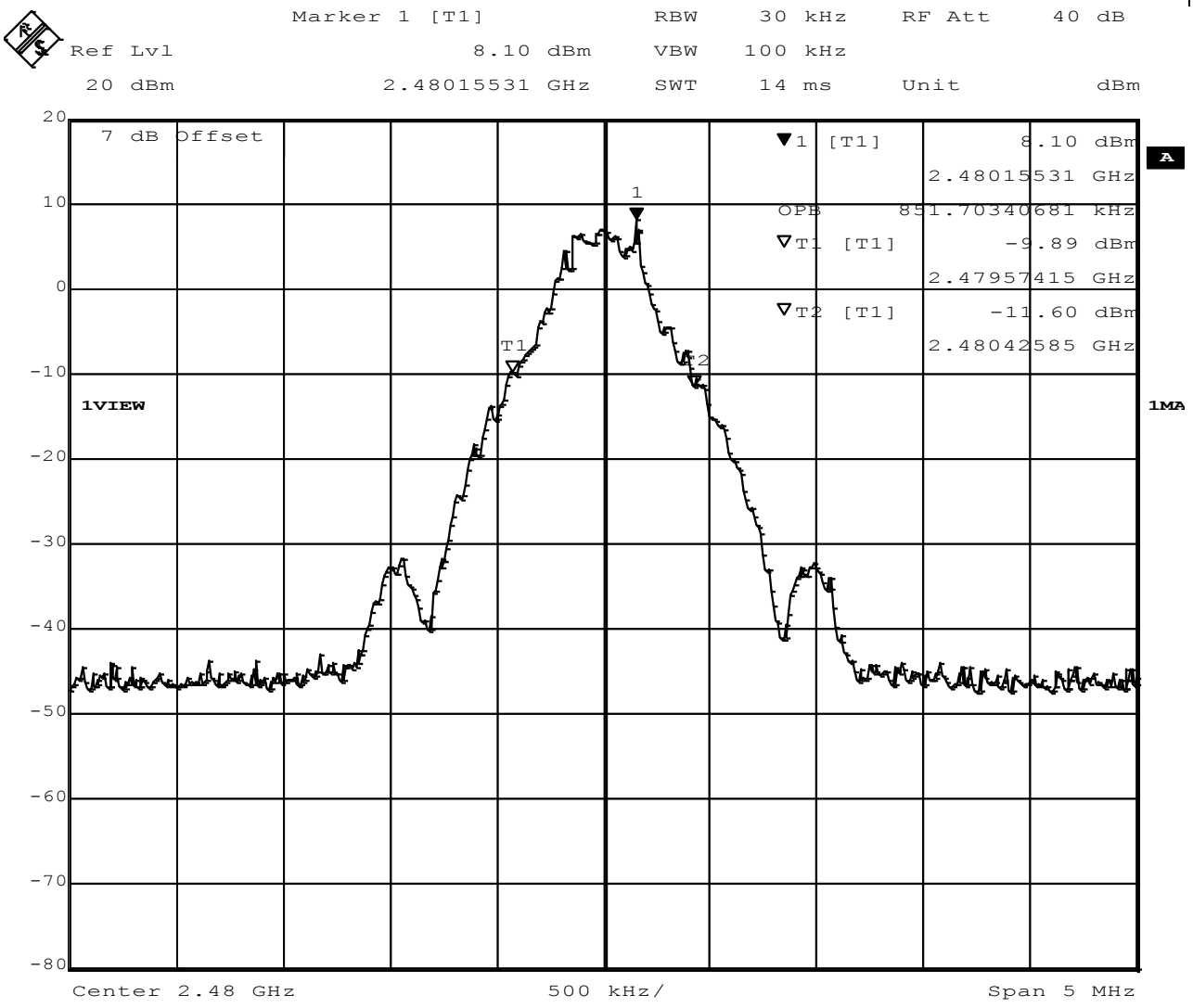


Comment A: Occupied bandwidth: 831.7 KHz
Date: 31.AUG.2010 14:33:44

Occupied Bandwidth – DH5-Sngl F_{HIGH}

RSS Gen
Occupied Bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 78 / 2480 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	GFSK

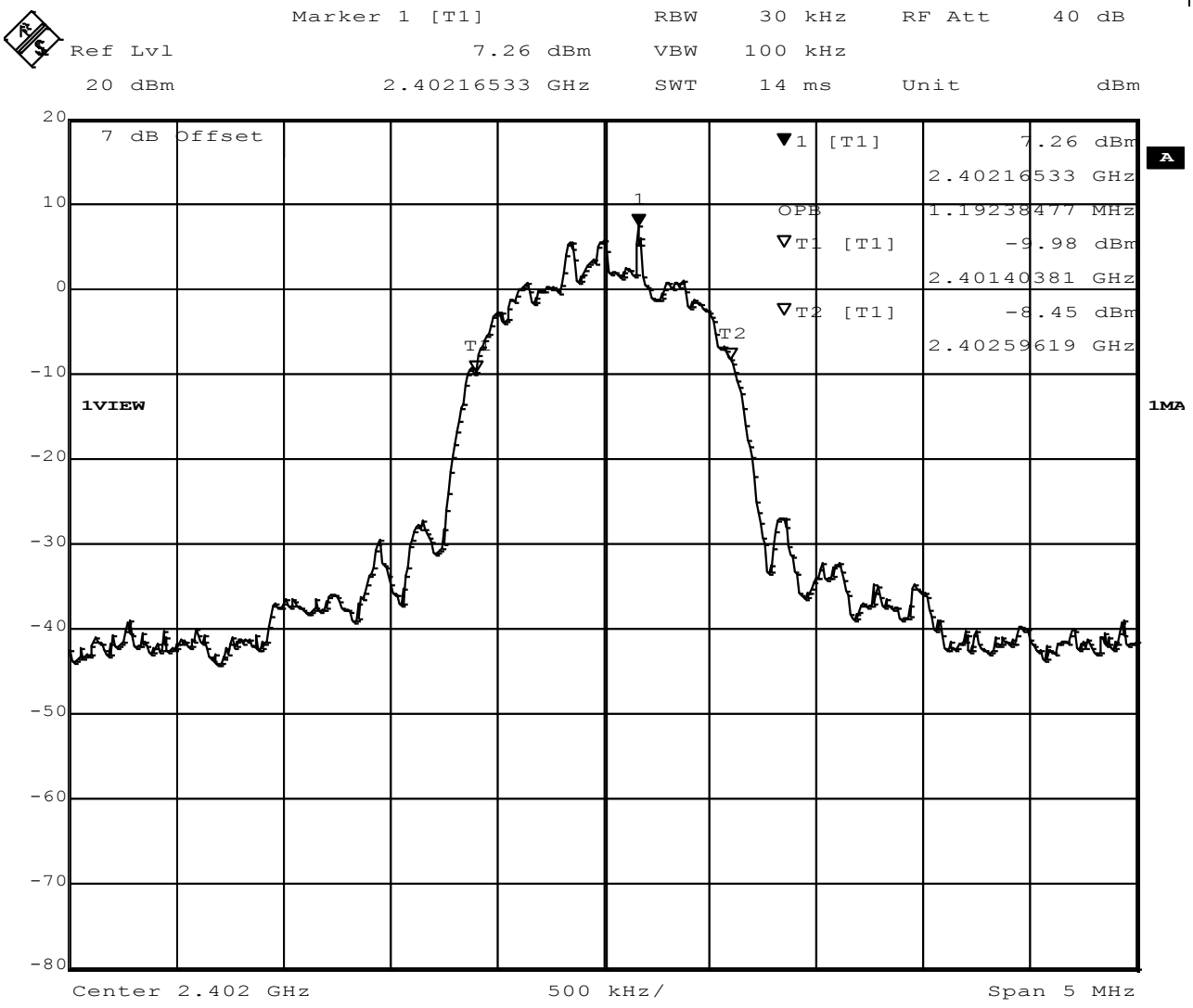


Comment A: Occupied bandwidth: 851.7 KHz
Date: 31.AUG.2010 14:36:56

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

RSS Gen
Occupied Bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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	8DPSK

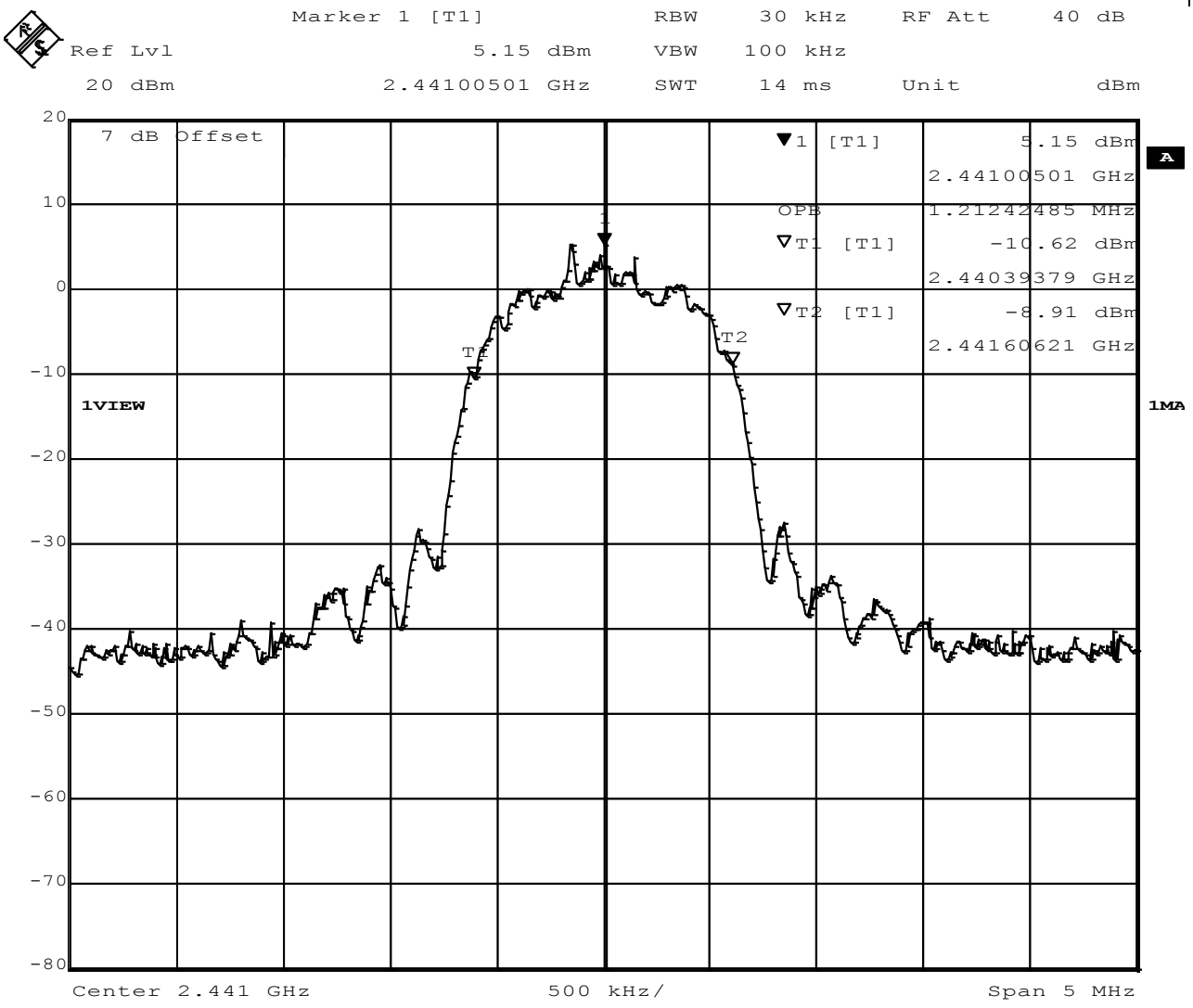


Comment A: Occupied bandwidth: 1192.4 KHz
Date: 31.AUG.2010 14:28:22

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

RSS Gen
Occupied Bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 39 / 2441 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	8DPSK

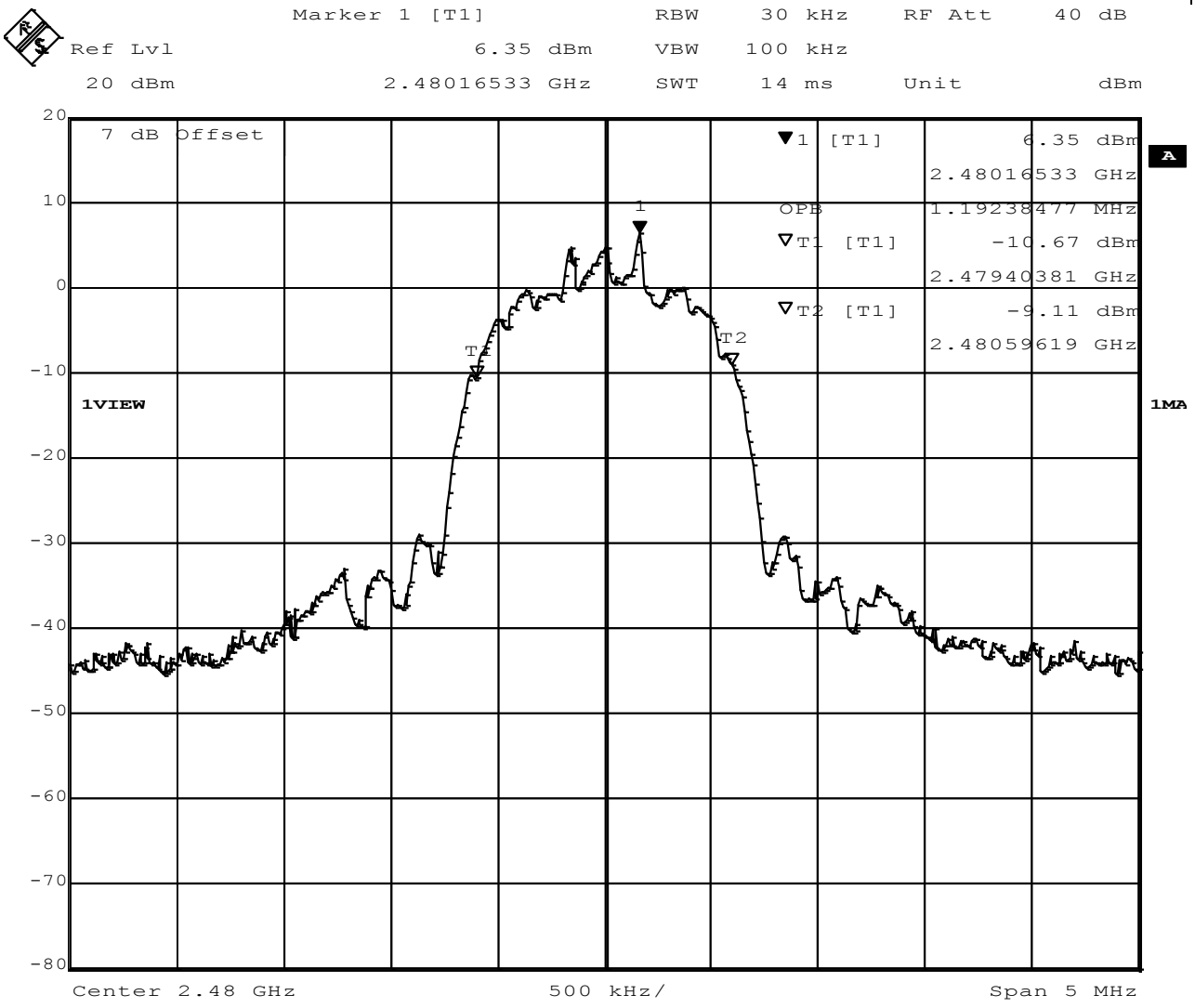


Comment A: Occupied bandwidth: 1212.4 KHz
Date: 31.AUG.2010 14:31:23

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

RSS Gen
Occupied Bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	4.4.1 Occupied Bandwidth
Comment 1	Channel.: 78 / 2480 MHz
Comment 2	A spectrum analyzer with an integrated 99% power bandwidth function is used
Comment 3	8DPSK



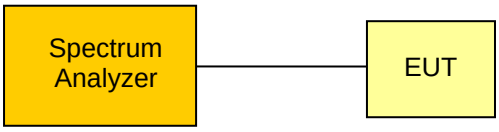
Comment A: Occupied bandwidth: 1192.4 KHz
Date: 31.AUG.2010 14:40:20

3.2 Test Conditions and Results – 20 dB Bandwidth

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

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

Test setup



Test procedure

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

Test results

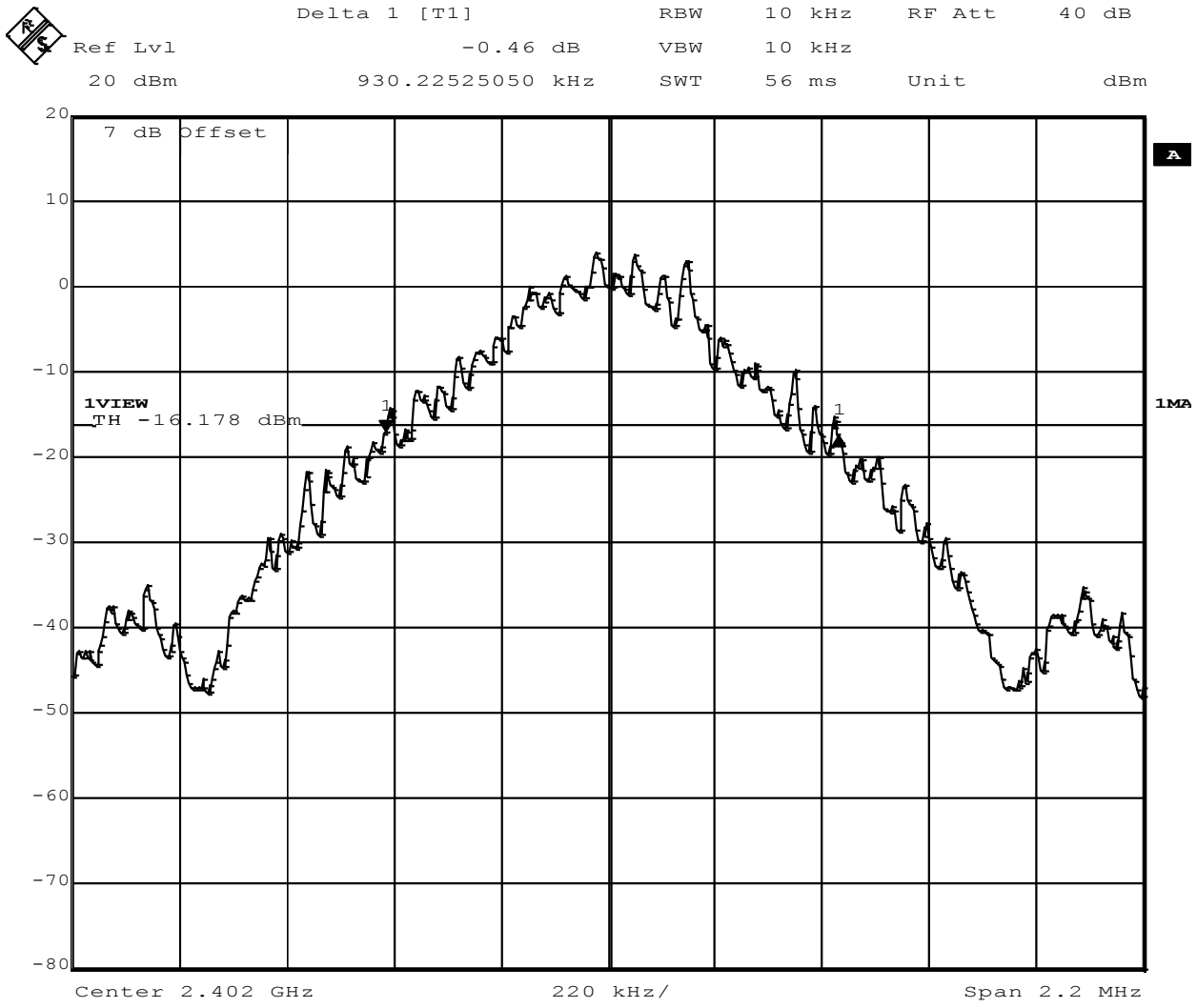
Channel	Frequency [MHz]	Mode	20 dB Bandwidth [MHz]	Limit [MHz]	Result
F_{LOW}	2402	DH5-Sngl	0.930	1.5	PASS
F_{MID}	2441	DH5-Sngl	0.930	1.5	PASS
F_{HIGH}	2480	DH5-Sngl	0.930	1.5	PASS
F_{LOW}	2402	2DH5-Sngl	1.327	1.5	PASS
F_{MID}	2441	2DH5-Sngl	1.327	1.5	PASS
F_{HIGH}	2480	2DH5-Sngl	1.327	1.5	PASS
F_{LOW}	2402	3DH5-Sngl	1.327	1.5	PASS
F_{MID}	2441	3DH5-Sngl	1.327	1.5	PASS
F_{HIGH}	2480	3DH5-Sngl	1.327	1.5	PASS

Comments:

20 dB Bandwidth – DH5-Sngl F_{LOW}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 0 / 2402 MHz / GFSK
Comment 3	

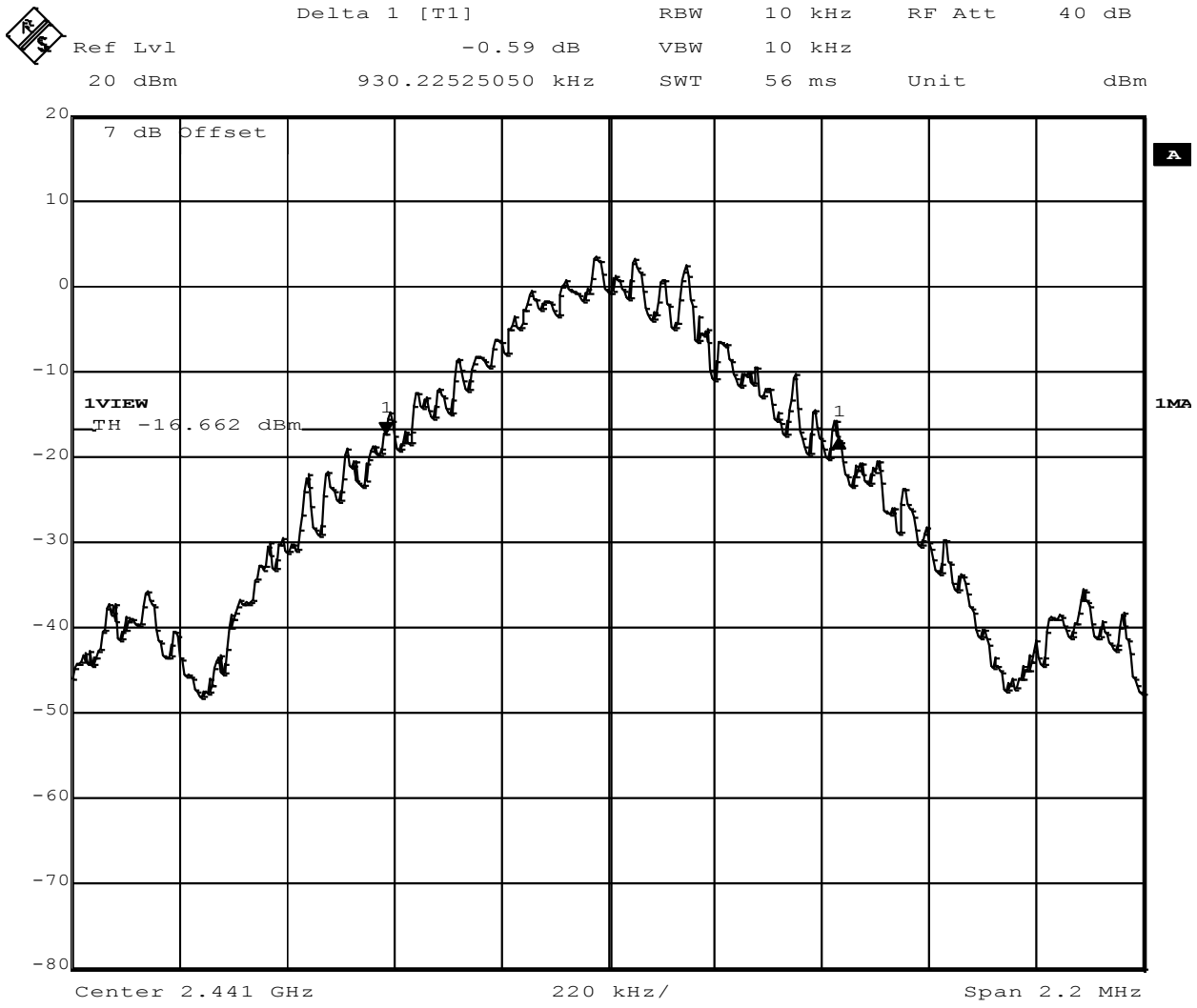


Comment A: 20 dB bandwidth: 930.2 KHz
Date: 31.AUG.2010 11:00:59

20 dB Bandwidth – DH5-Sngl F_{MID}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 39 / 2441 MHz / GFSK
Comment 3	

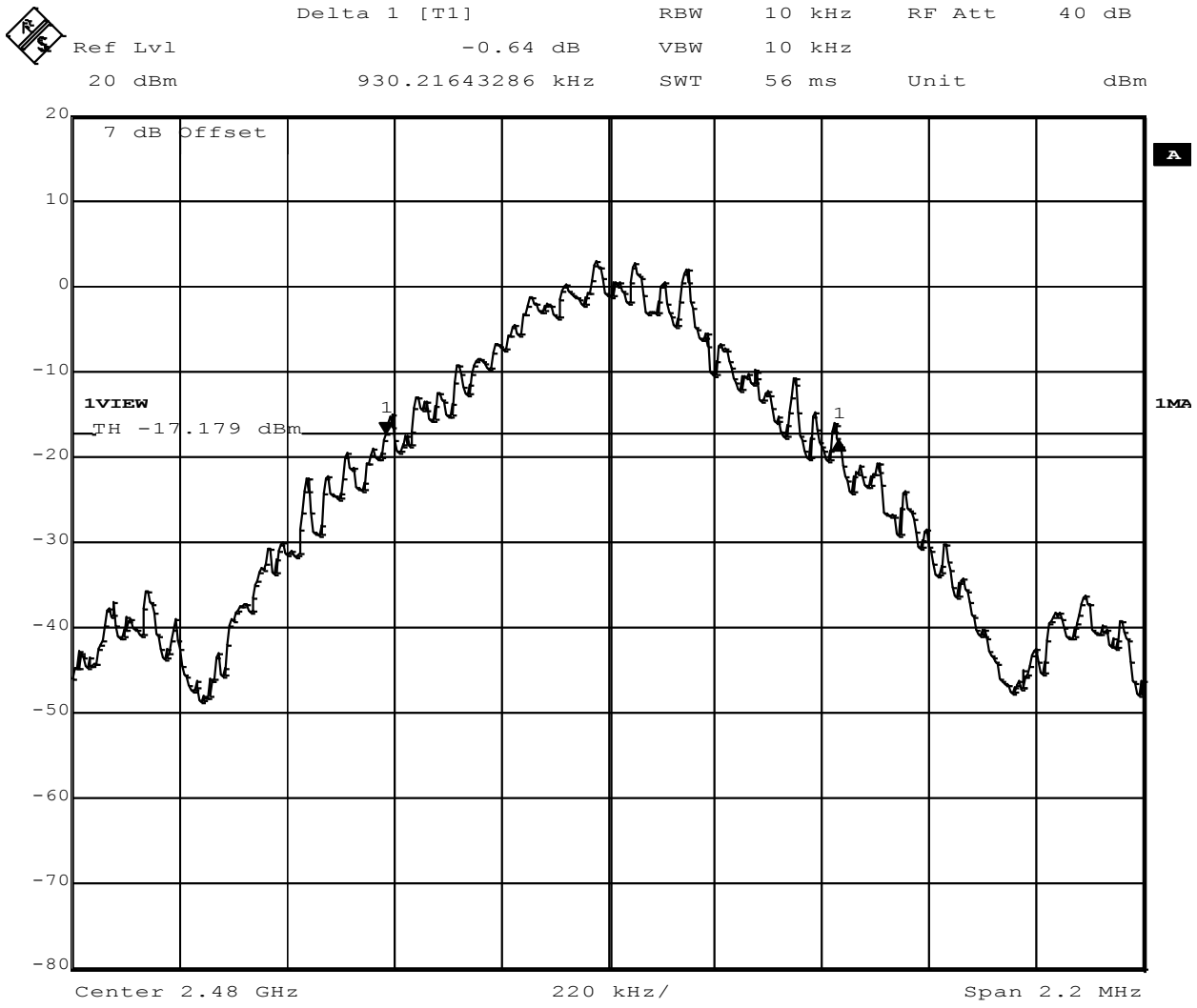


Comment A: 20 dB bandwidth: 930.2 KHz
Date: 31.AUG.2010 11:11:58

20 dB Bandwidth – DH5-Sngl F_{HIGH}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / GFSK
Comment 3	

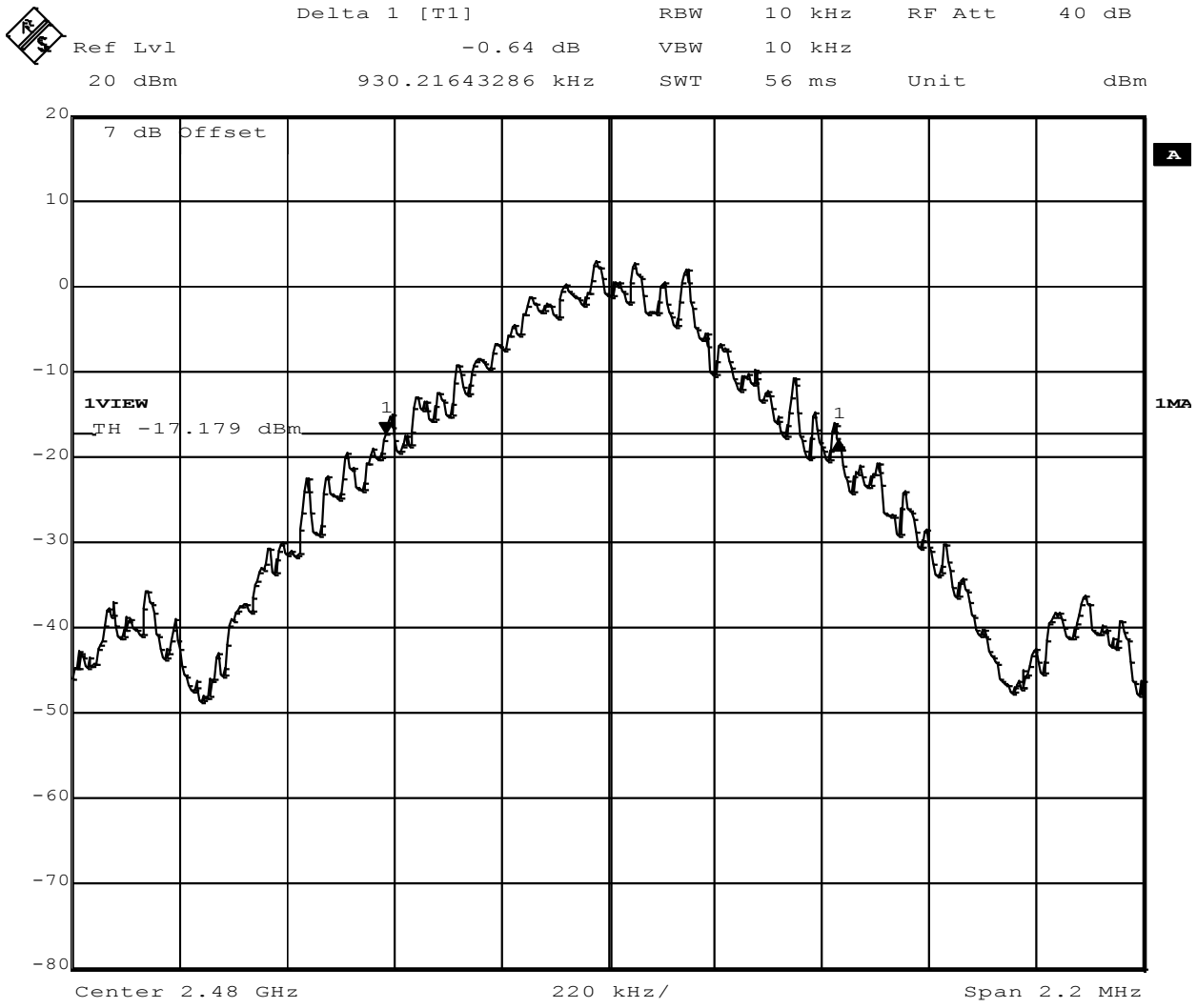


Comment A: 20 dB bandwidth: 930.2 KHz
Date: 31.AUG.2010 11:27:31

20 dB Bandwidth – 2-DH5-Sngl F_{LOW}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / GFSK
Comment 3	

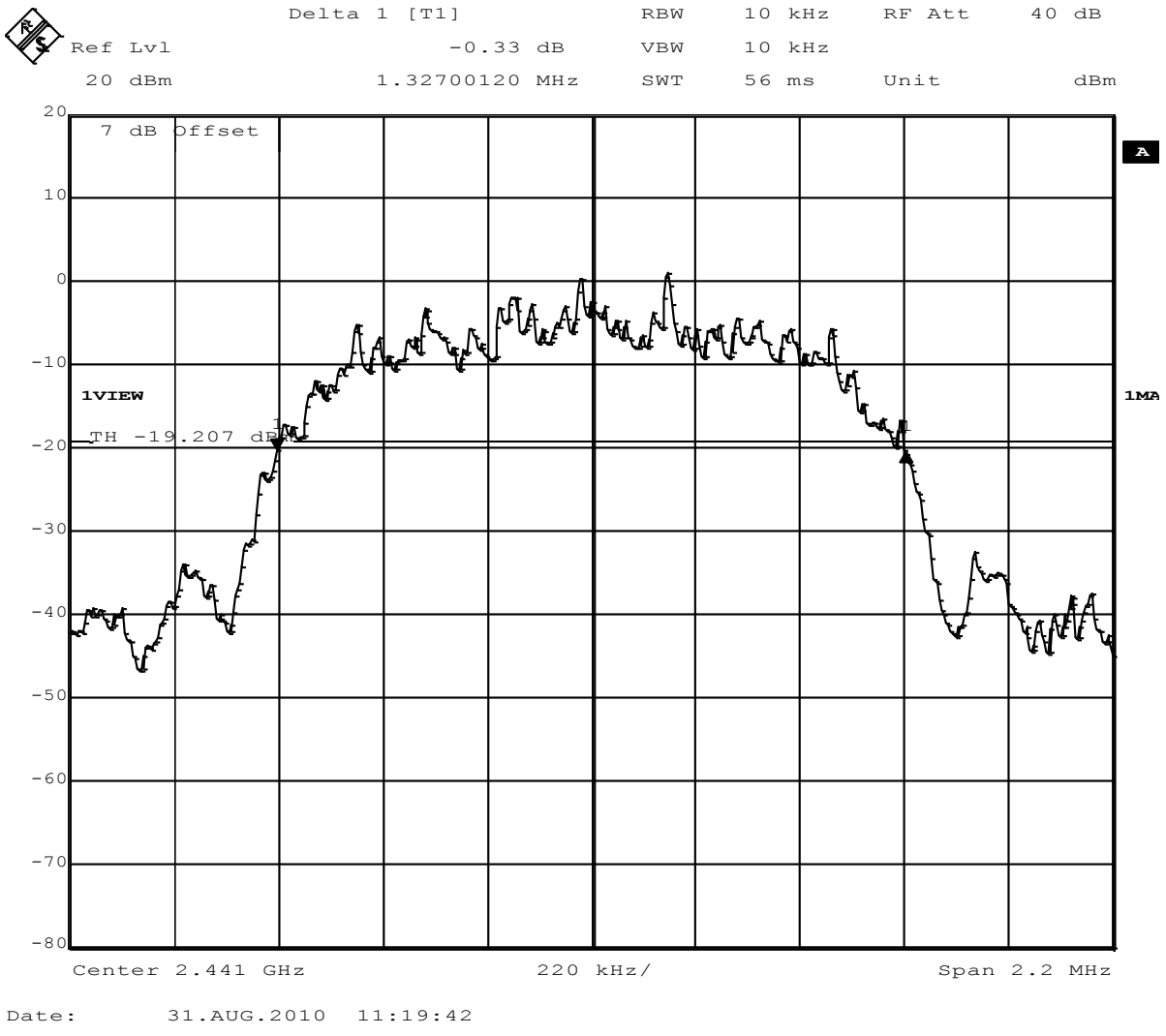


Comment A: 20 dB bandwidth: 930.2 KHz
Date: 31.AUG.2010 11:27:31

20 dB Bandwidth – 2-DH5-Sngl F_{MID}

FCC part 15.247
20 dB bandwidth

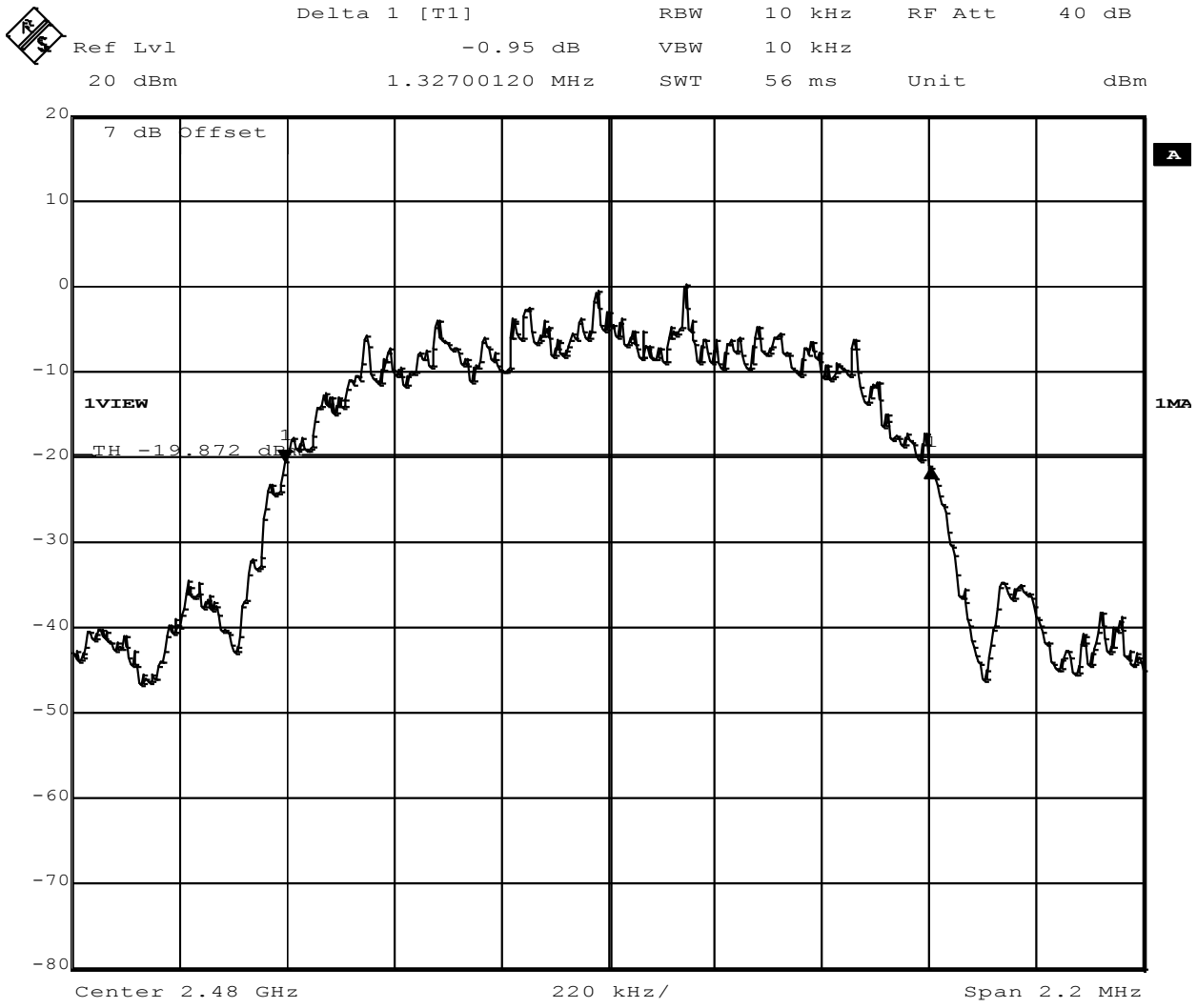
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 39 / 2441 MHz / DQPSK
Comment 3	



20 dB Bandwidth – 2-DH5-Sngl F_{HIGH}

FCC part 15.247
20 dB bandwidth

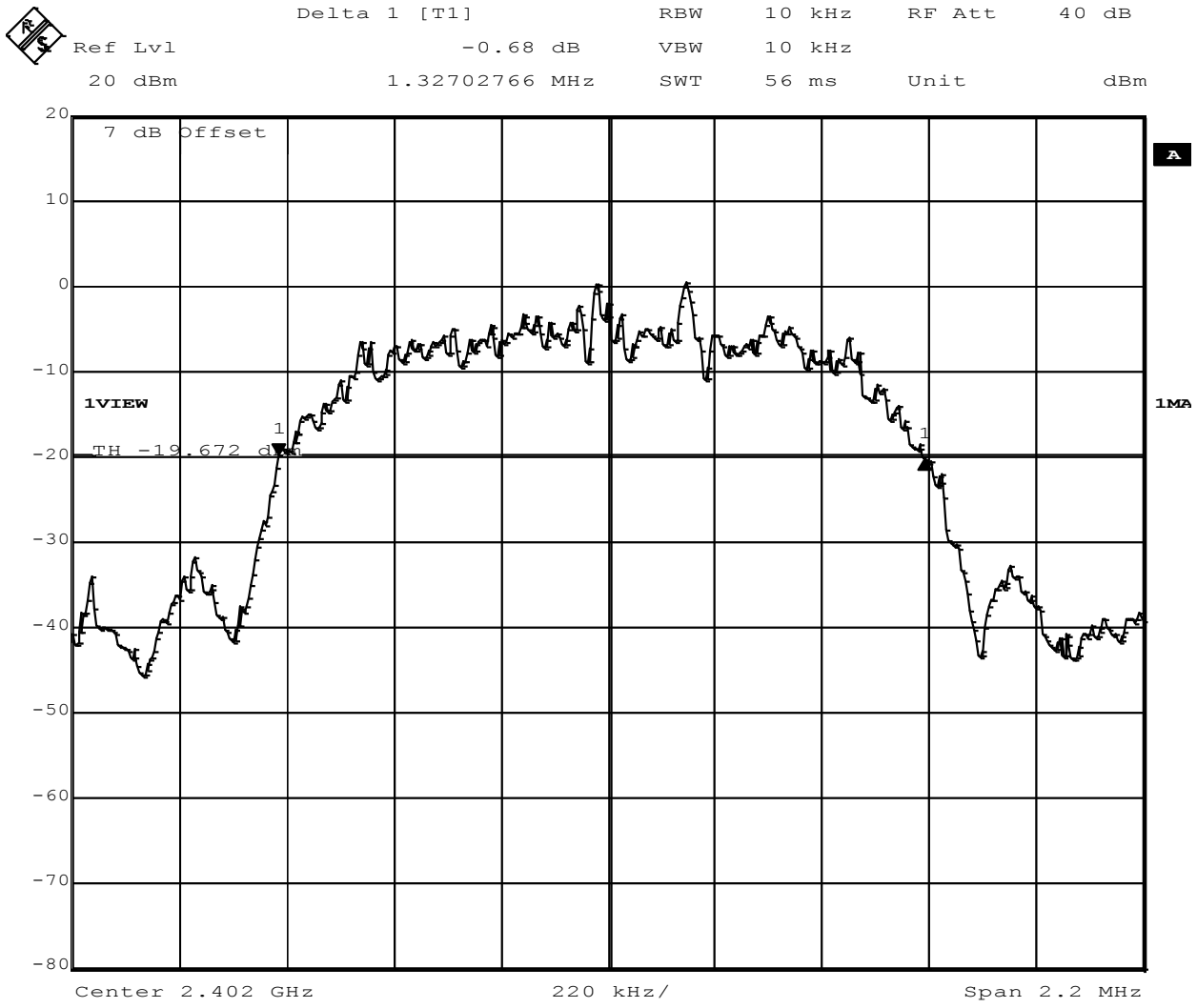
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / DQPSK
Comment 3	



20 dB Bandwidth – 3-DH5-Sngl F_{LOW}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 0 / 2402 MHz / 8DPSK
Comment 3	

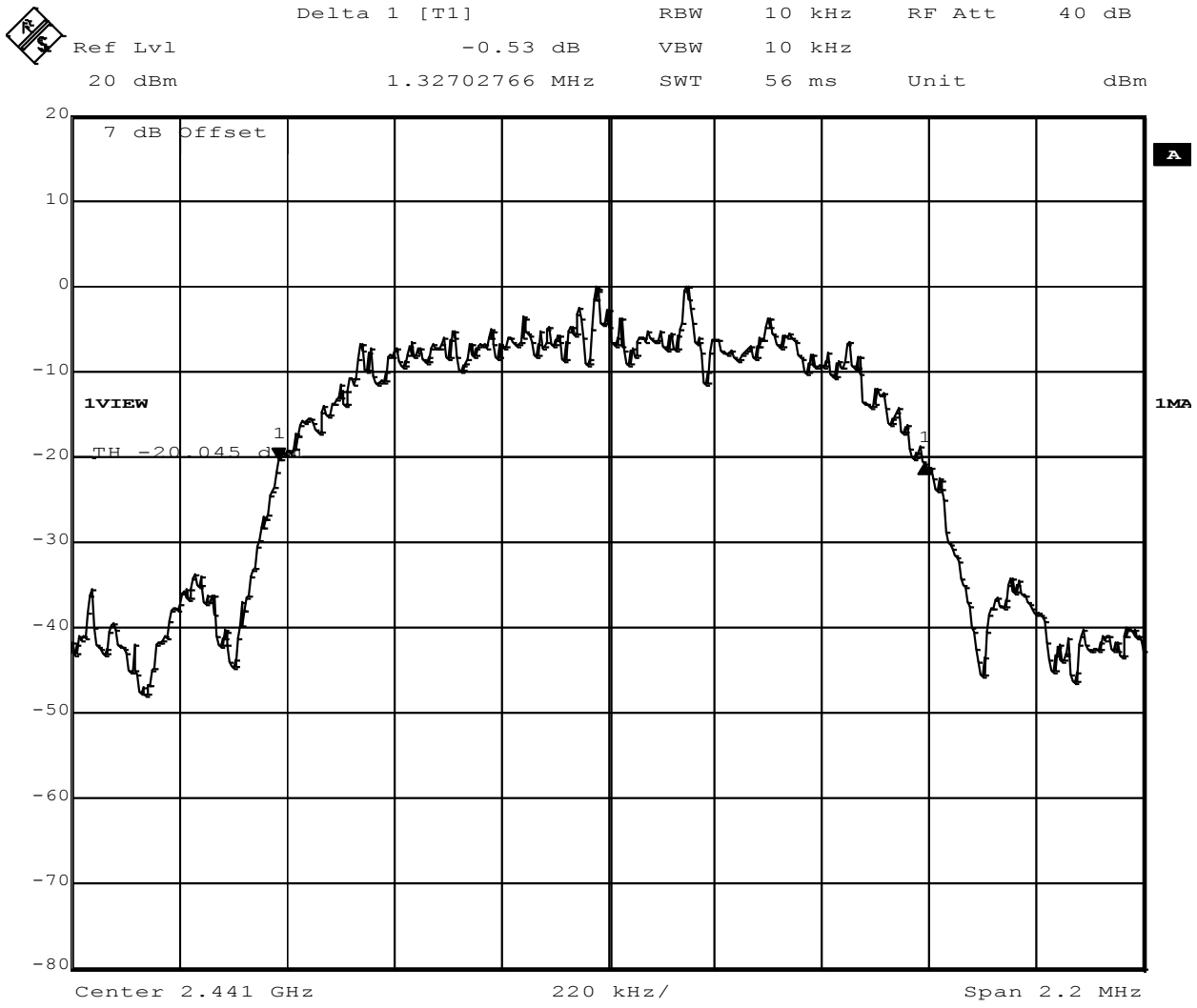


Comment A: 20 dB bandwidth: 1327 KHz
Date: 31.AUG.2010 11:10:08

20 dB Bandwidth – 3-DH5-Sngl F_{MID}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 39 / 2441 MHz / 8DPSK
Comment 3	

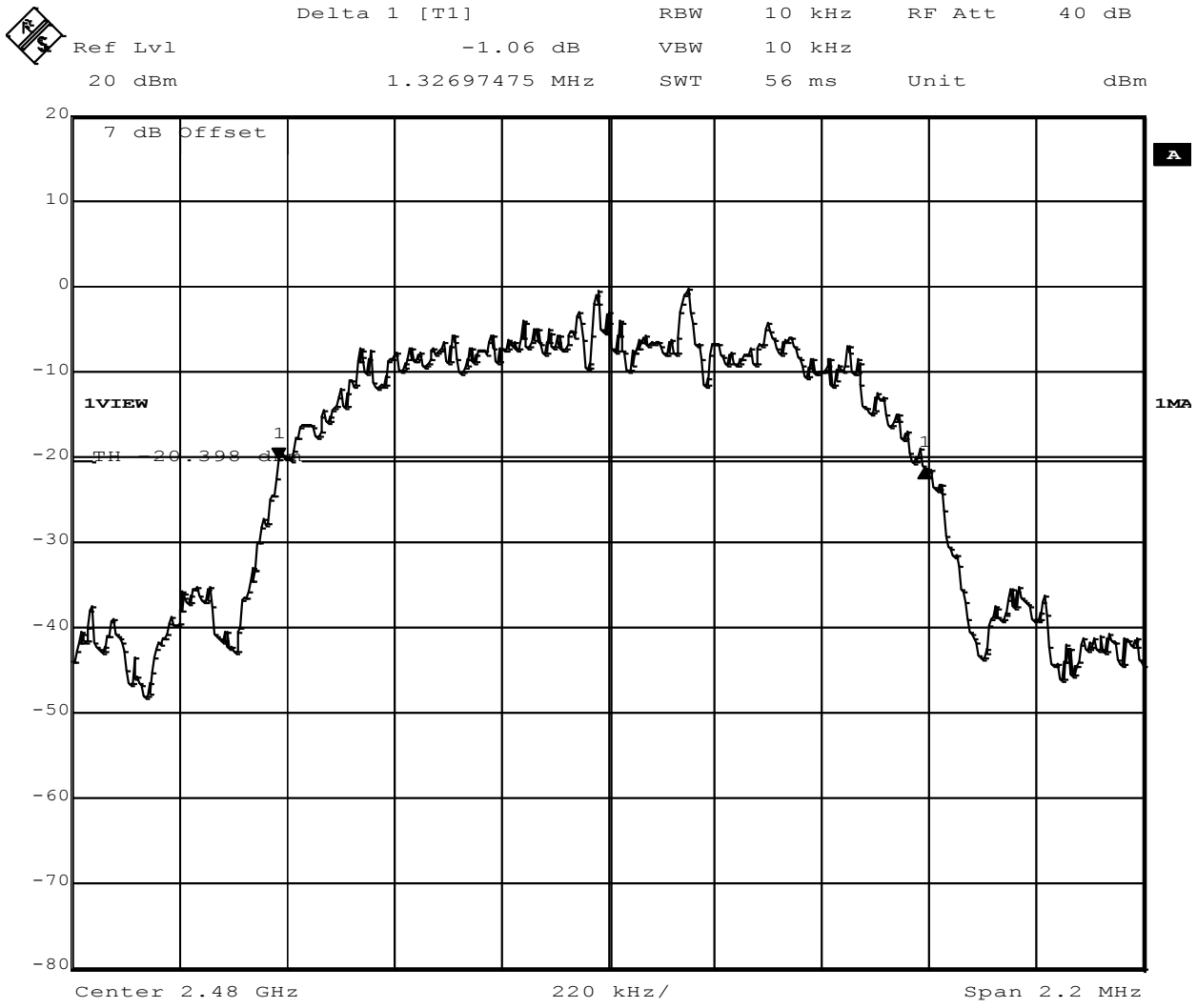


Comment A: 20 dB bandwidth: 1327 KHz
Date: 31.AUG.2010 11:22:51

20 dB Bandwidth – 3-DH5-Sngl F_{HIGH}

FCC part 15.247
20 dB bandwidth

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	20 dB bandwidth
Comment 2	Channel.: 78 / 2480 MHz / 8DPSK
Comment 3	



Comment A: 20 dB bandwidth: 1353.4 KHz
Date: 31.AUG.2010 11:34:18

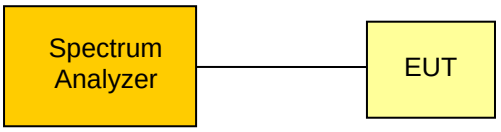
3.3 Test Conditions and Results – Number of hopping frequencies

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

Limits

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

Test setup



Test procedure

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

Test results

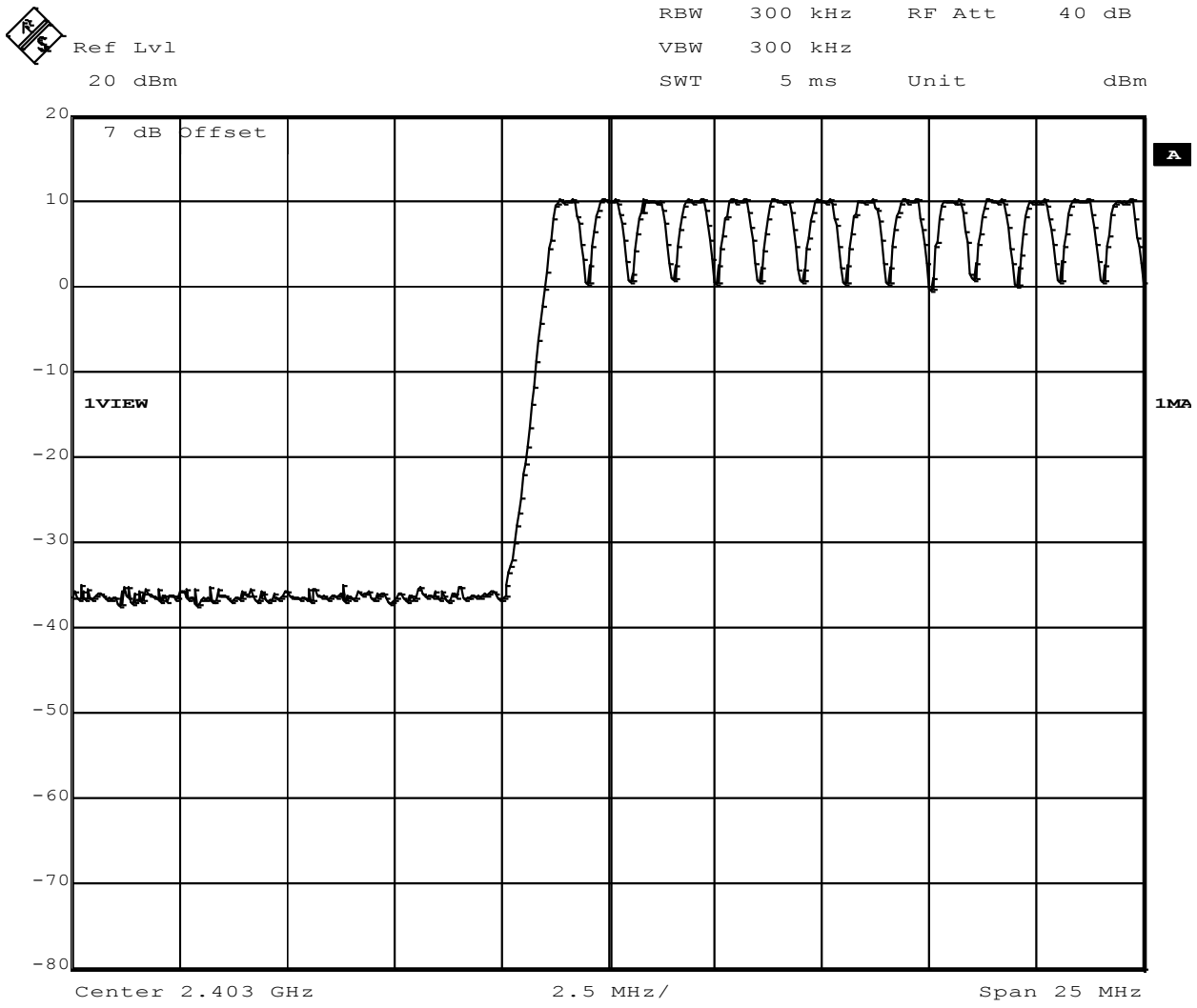
Number of hopping frequencies	Limit	Result
79	≥ 15	PASS

Comments:

Number of hopping frequencies - Range A

FCC part 15.247
Number of hopping frequencies

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.: 0-13
Comment 3	

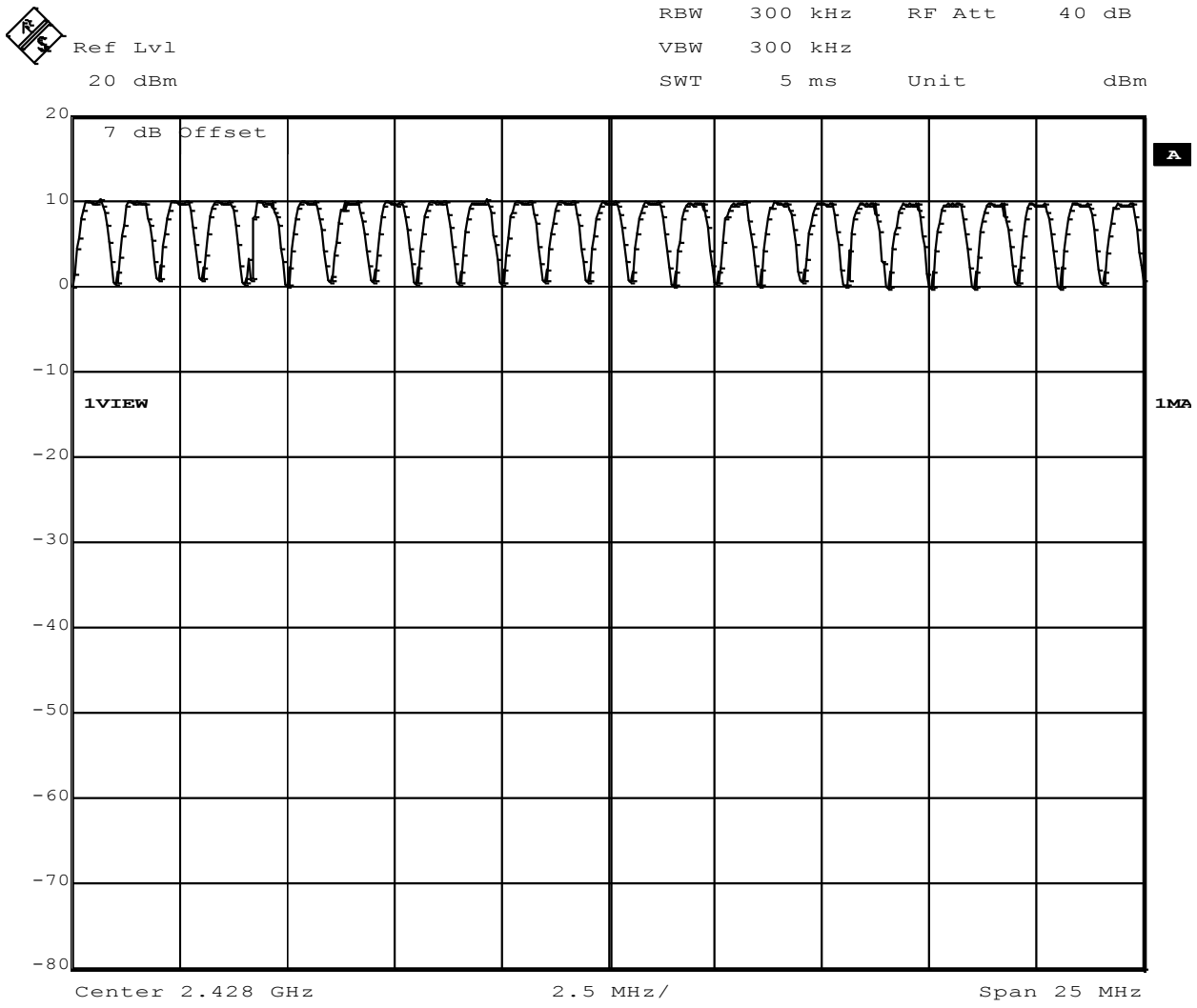


Comment A: Number of hopping frequencies
Date: 31.AUG.2010 13:59:59

Number of hopping frequencies - Range B

FCC part 15.247
Number of hopping frequencies

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.: 14-38
Comment 3	

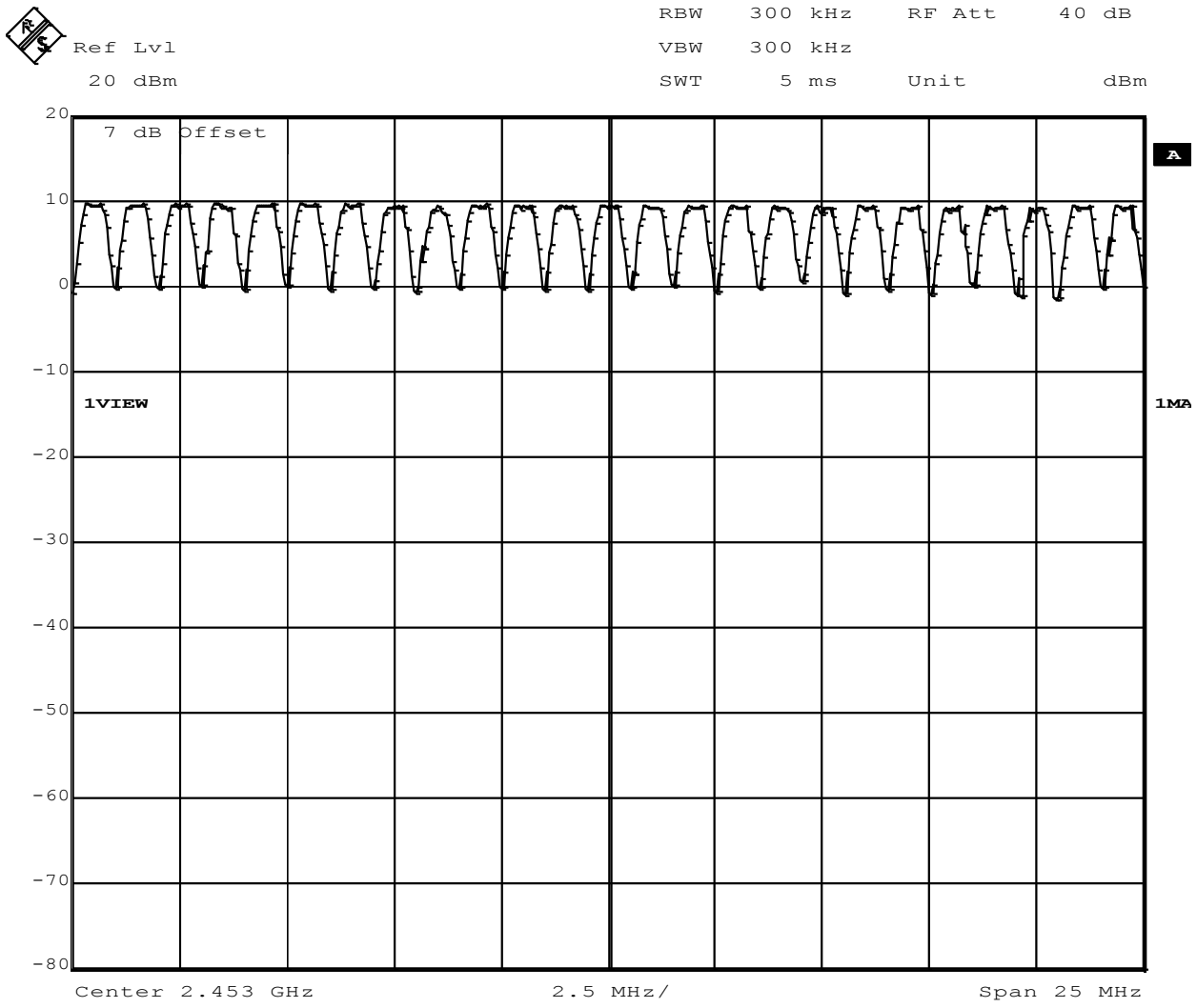


Comment A: Number of hopping frequencies
Date: 31.AUG.2010 14:02:30

Number of hopping frequencies - Range C

FCC part 15.247
Number of hopping frequencies

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.:39-63
Comment 3	

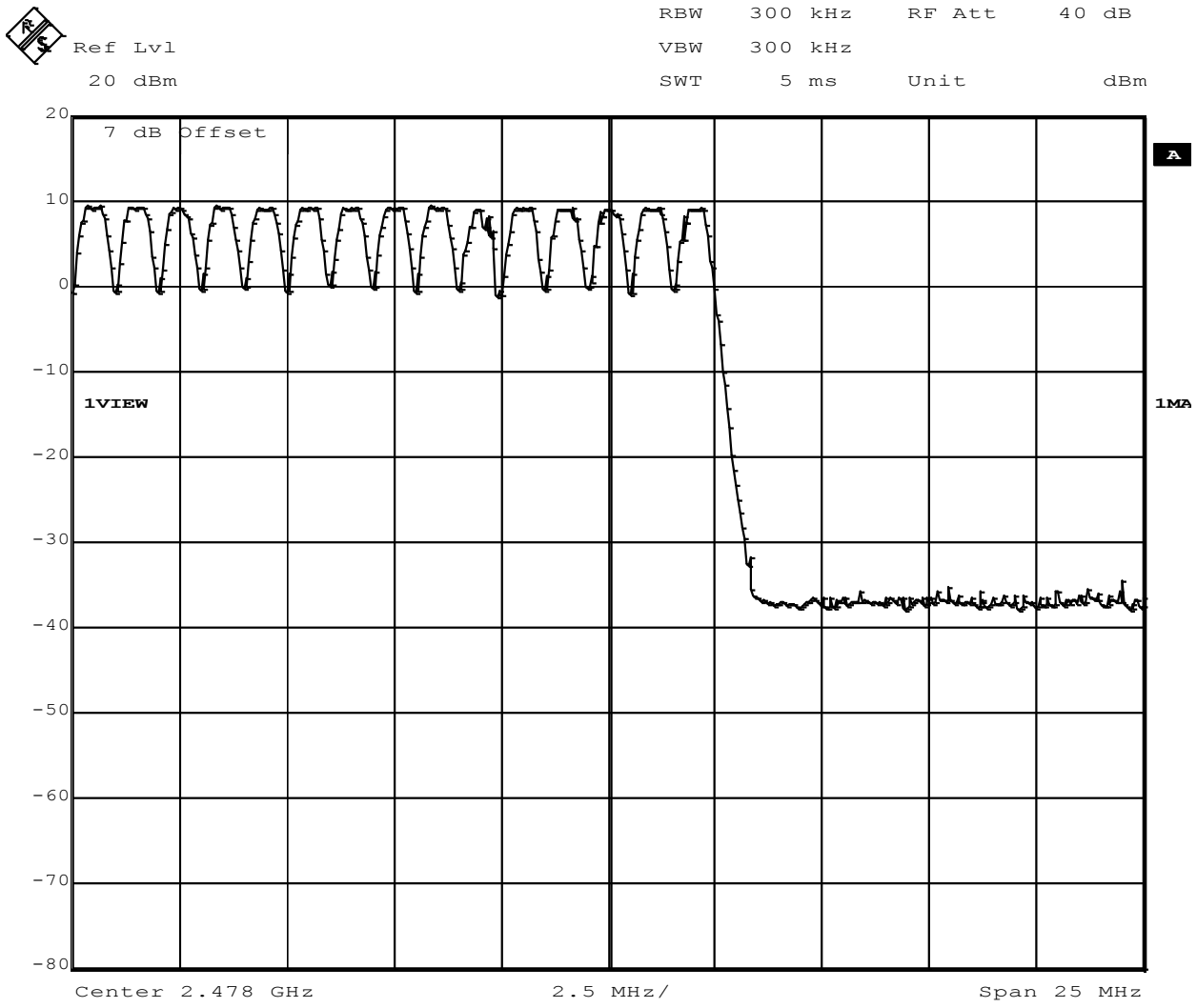


Comment A: Number of hopping frequencies
Date: 31.AUG.2010 14:03:41

Number of hopping frequencies - Range D

FCC part 15.247
Number of hopping frequencies

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)
Comment 1	Number of hopping frequencies
Comment 2	Channel.: 64-78
Comment 3	



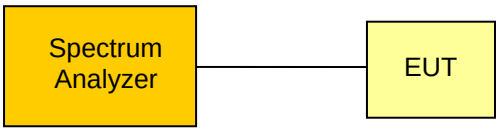
Comment A: Number of hopping frequencies
Date: 31.AUG.2010 14:05:04

3.4 Test Conditions and Results – Frequency hopping channel separation

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

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

Test setup



Test procedure

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

Test results

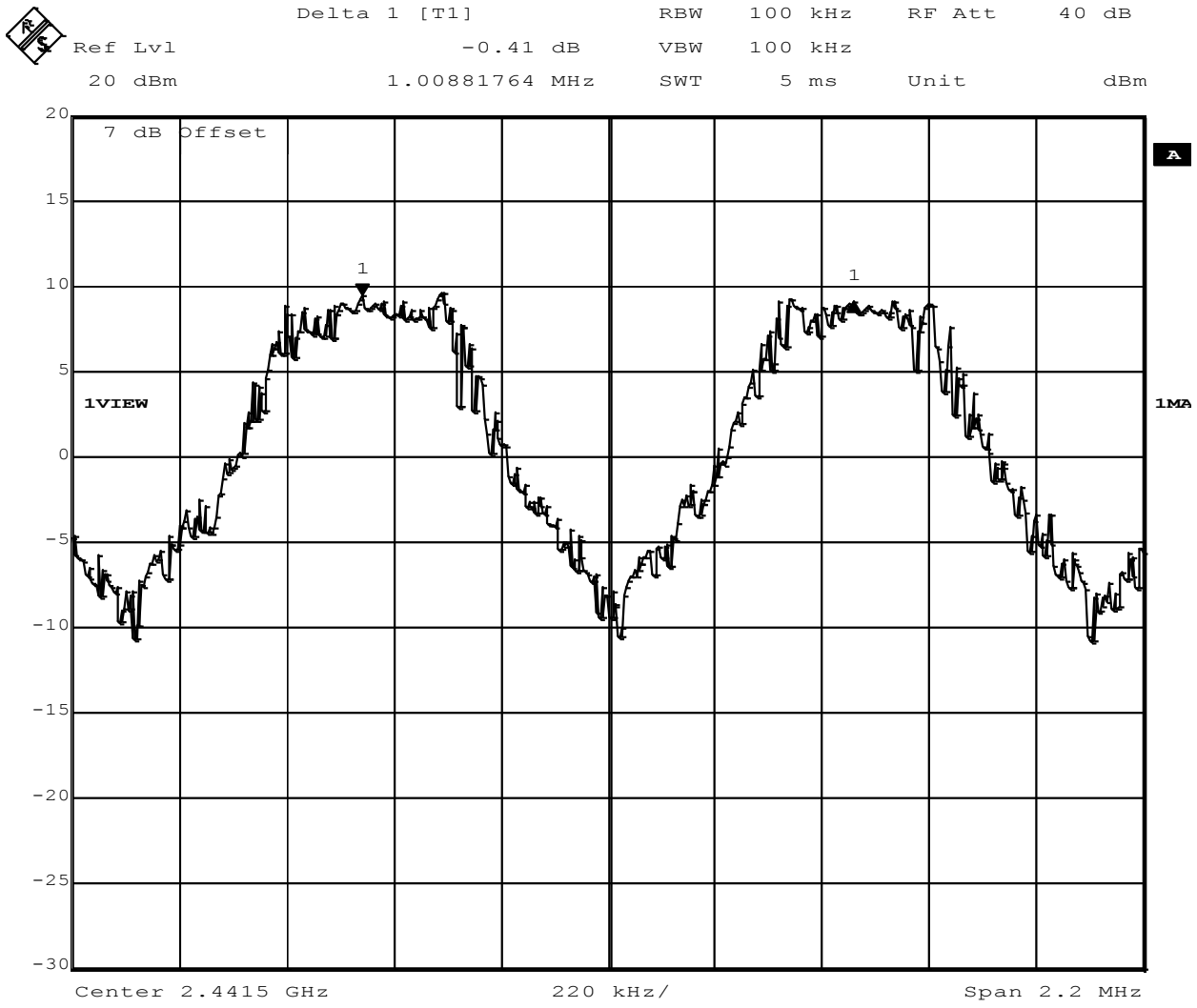
Channel separation [kHz]	Limit [kHz]	Result
1008.8	≥ ⅔ · 930 = 620	PASS

Comments:

Frequency hopping channel separation

FCC part 15.247
Carrier frequency separation

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)(1)
Comment 1	Carrier frequency separation
Comment 2	Channel.: 39/40 / 2441/2442 MHz
Comment 3	Hopping mode



Comment A: Limit: > two-thirds of the 20 dB bandwidth ; Result: Pass
Date: 31.AUG.2010 13:47:26

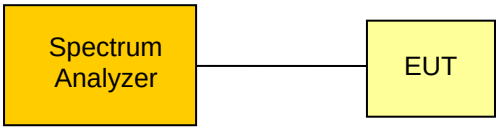
3.5 Test Conditions and Results – Time of occupancy (Dwell Time)

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

Limits

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

Test setup



Test procedure

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

Test results

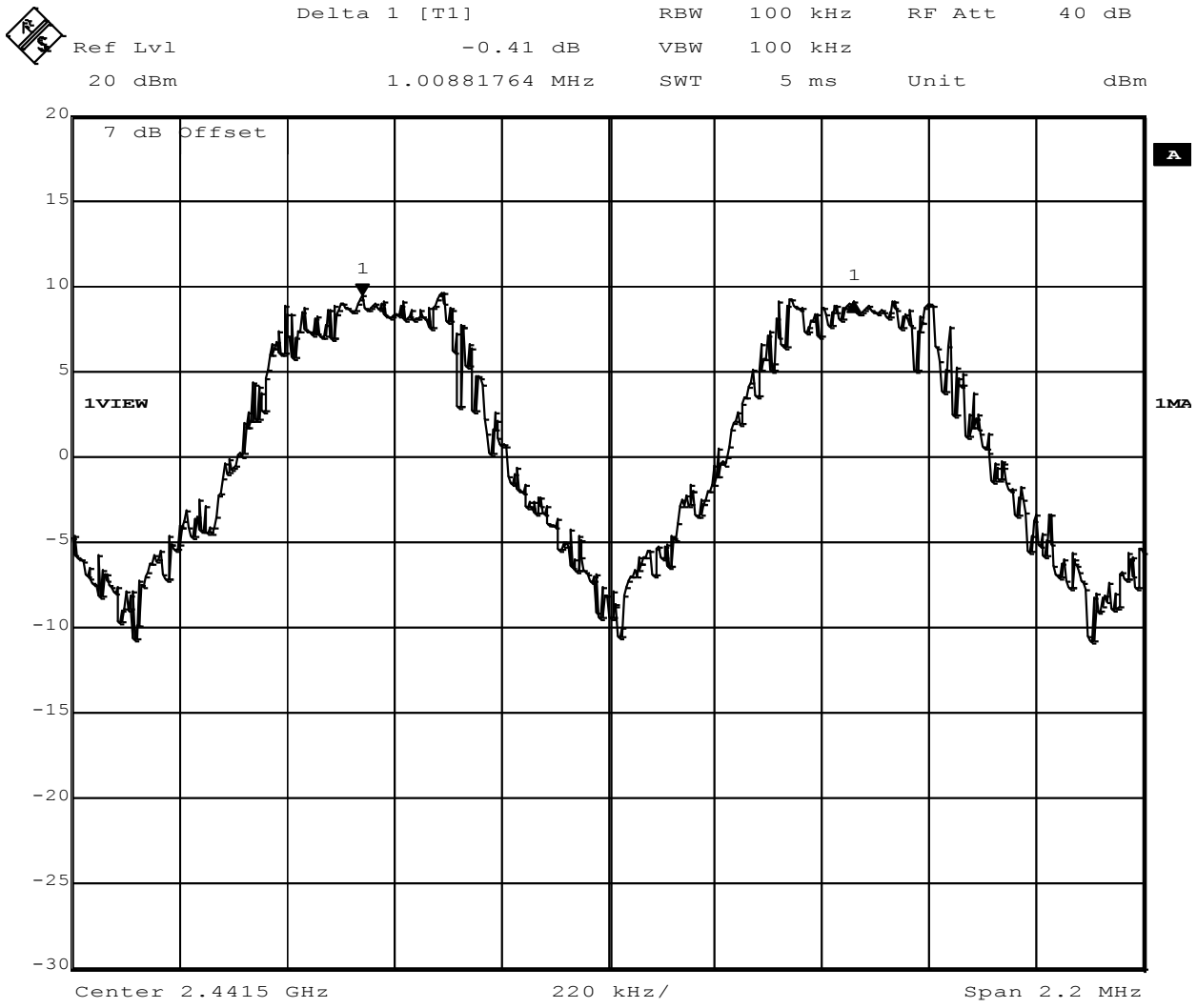
Observation period [s]	No. of hops	Dwell time/hop [s]	Time of occupancy [s]	Limit [s]	Result
31.6	63	0.2903	0.183	≤ 0.4	PASS

Comments:

Time of occupancy

FCC part 15.247
Carrier frequency separation

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(a)(1)
Comment 1	Carrier frequency separation
Comment 2	Channel.: 39/40 / 2441/2442 MHz
Comment 3	Hopping mode



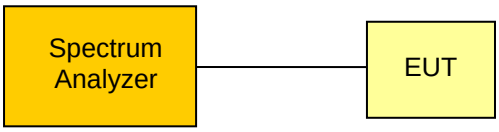
Comment A: Limit: > two-thirds of the 20 dB bandwidth ; Result: Pass
Date: 31.AUG.2010 13:47:26

3.6 Test Conditions and Results – Maximum peak conducted power

Maximum peak conducted power acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(b)(1) / IC RSS-210 A8.4
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}
Measurement mode	Peak
Maximum antenna gain	0.9 dBi ⇒ Limit correction = 0 dB

Limits	
Limit	Condition
1 W (30 dBm)	Number of hopping channels ≥ 75
0.125 W (21 dBm)	75 > Number of hopping channels ≥ 15
The conducted output power limit specified above is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in the table, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	

Test setup



Test procedure

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

Test results								
Channel	Frequency [MHz]	Voltage	Mode	Peak power [dbm]	Peak power [W]	Limit [dBm]	Margin [dB]	Result
F_{LOW}	2402	3.0 VDC	DH5-Sngl	10.2	0.011	30	-19.80	PASS
F_{MID}	2441	3.0 VDC	DH5-Sngl	9.7	0.009	30	-20.30	PASS
F_{HIGH}	2480	3.0 VDC	DH5-Sngl	9.2	0.008	30	-20.80	PASS
F_{LOW}	2402	3.0 VDC	2DH5-Sngl	9.7	0.009	30	-20.30	PASS
F_{MID}	2441	3.0 VDC	2DH5-Sngl	9.2	0.008	30	-20.80	PASS
F_{HIGH}	2480	3.0 VDC	2DH5-Sngl	8.8	0.007	30	-21.20	PASS
F_{LOW}	2402	3.0 VDC	3DH5-Sngl	10.1	0.010	30	-19.90	PASS
F_{MID}	2441	3.0 VDC	3DH5-Sngl	9.6	0.009	30	-20.40	PASS
F_{HIGH}	2480	3.0 VDC	3DH5-Sngl	9.1	0.008	30	-20.90	PASS
Comments:								

3.7 Test Conditions and Results – AC power line conducted emissions

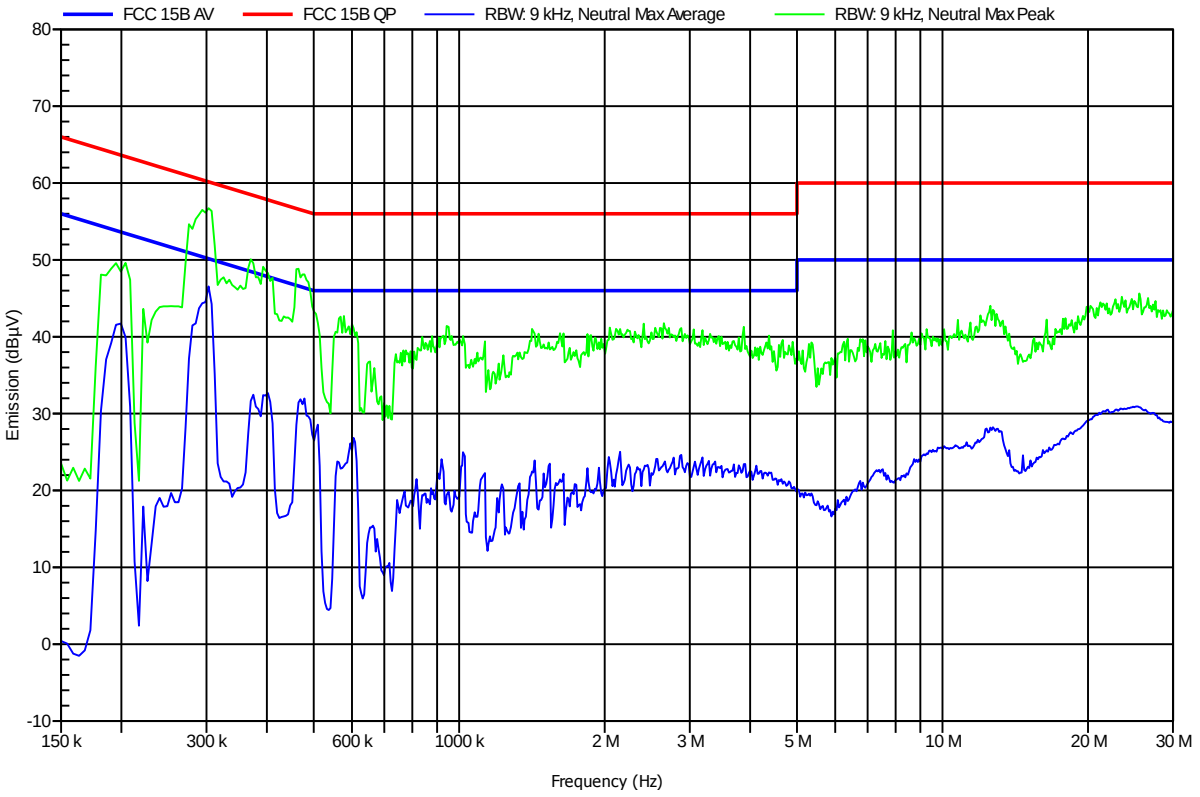
Power line conducted emissions acc. FCC 47 CFR 15.207 / IC RSS-Gen				**Verdict: PASS**
Test according referenced standards	Reference Method			
	ANSI C63.4			
Fully configured sample scanned over the following frequency range	Frequency range			
	0.15 MHz to 30 MHz			
Points of Application	Application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

Conducted Emissions

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

Order number: G0M21008-3623

Manufacturer:	Panasonic Electronic Devices Europe GmbH
EUT Name:	Bluetooth module
Model:	ENW89818C2JF
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Marquardt
Test Conditions:	Tnom: 23°C, Unom: 5VDC (USB via Notebook Lenovo R61)
LISN:	ESH2-Z5 N
Mode:	active
Test Date:	22.09.2010
Note:	

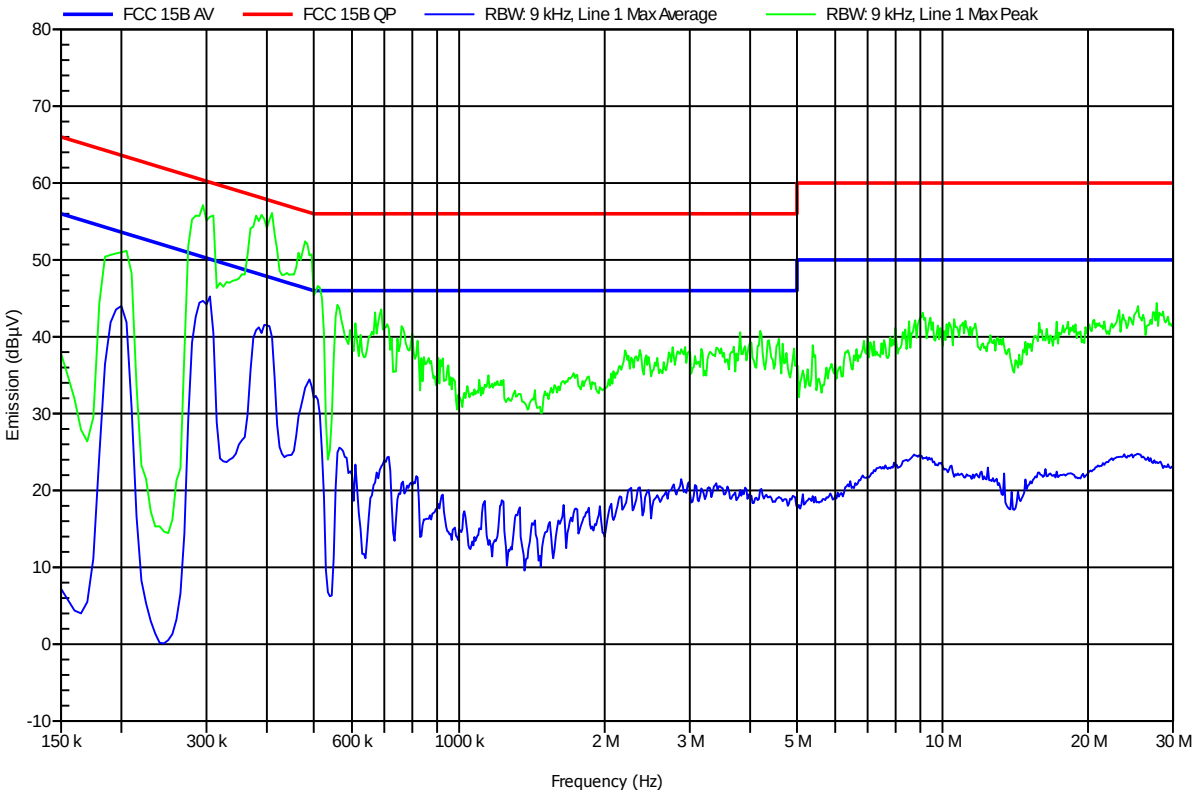


Conducted Emissions

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

Order number: G0M21008-3623

Manufacturer:	Panasonic Electronic Devices Europe GmbH
EUT Name:	Bluetooth module
Model:	ENW89818C2JF
Test Site:	Eurofins Product Service GmbH
Operator:	Mr. Marquardt
Test Conditions:	Tnom: 23°C, Unom: 5VDC (USB via Notebook Lenovo R61)
LISN:	ESH2-Z5 L
Mode:	active
Test Date:	22.09.2010
Note:	



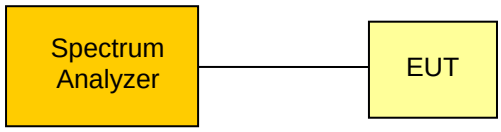
3.8 Test Conditions and Results – Band edge compliance

Band-edge compliance acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(d) / IC RSS-210 A8.5
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	F_{LOW} / F_{HIGH}
Measurement mode	Peak

Limits

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

Test setup



Test procedure

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

Test results

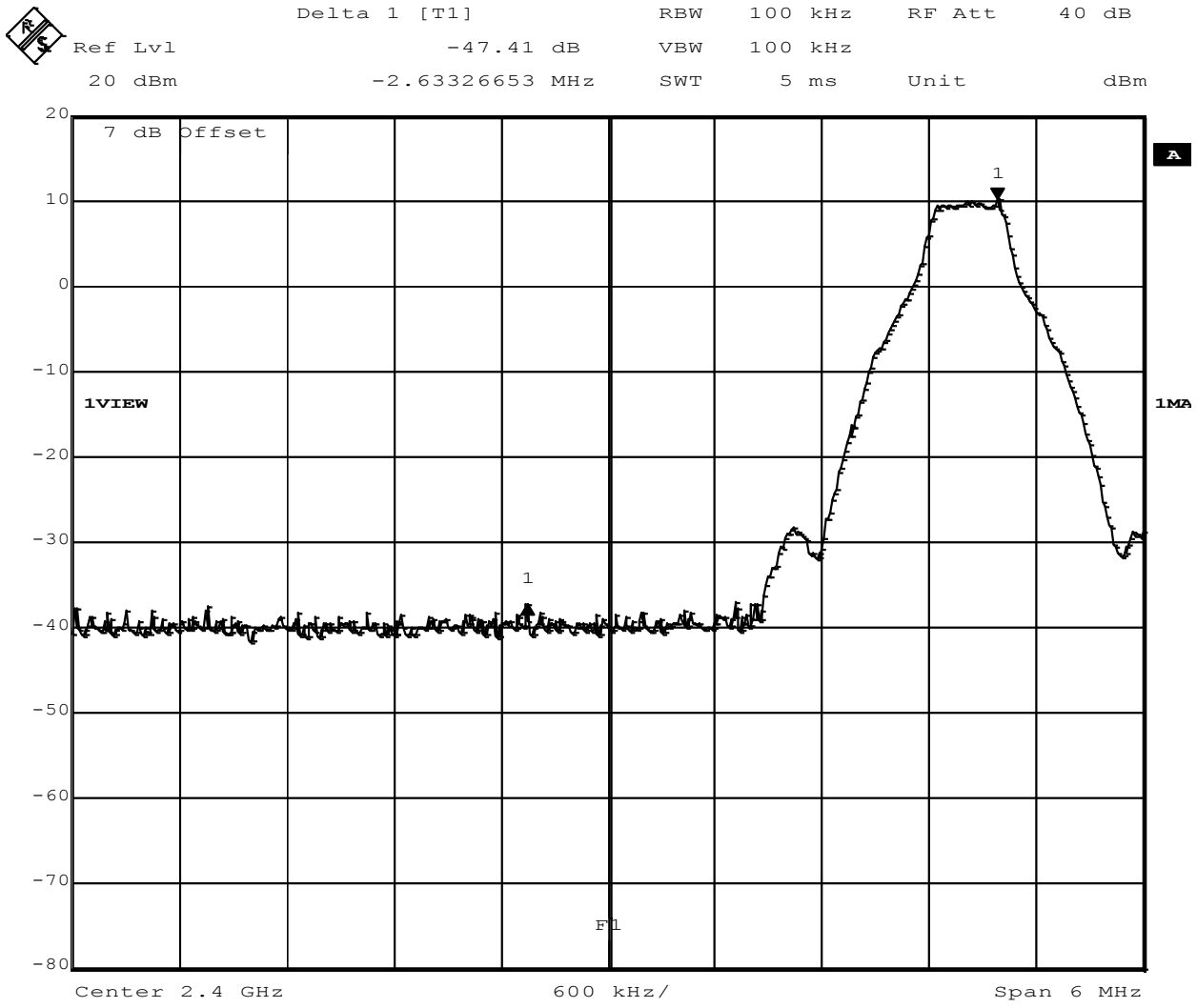
Channel	Frequency [MHz]	Mode	Level [dBc]	Limit [dBc]	Margin [dB]	Result
F_{LOW}	2402	DH5-Sngl	-47.41	-20	-27.41	PASS
F_{HIGH}	2480	DH5-Sngl	-42.96	-20	-22.96	PASS
F_{LOW}	2402	DH5-Hop	-46.92	-20	-26.92	PASS
F_{HIGH}	2480	DH5-Hop	-46.10	-20	-26.10	PASS
F_{LOW}	2402	2DH5-Sngl	-42.96	-20	-22.96	PASS
F_{HIGH}	2480	2DH5-Sngl	-45.33	-20	-25.33	PASS
F_{LOW}	2402	2DH5-Hop	-42.89	-20	-22.89	PASS
F_{HIGH}	2480	2DH5-Hop	-43.11	-20	-23.11	PASS

F_{LOW}	2402	3DH5-Sngl	-42.96	-20	-22.96	PASS
F_{HIGH}	2480	3DH5-Sngl	-44.52	-20	-24.52	PASS
F_{LOW}	2402	3DH5-Hop	-42.73	-20	-22.73	PASS
F_{HIGH}	2480	3DH5-Hop	-42.68	-20	-22.68	PASS
Comments:						

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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 / GFSK
Comment 3	Single frequency mode

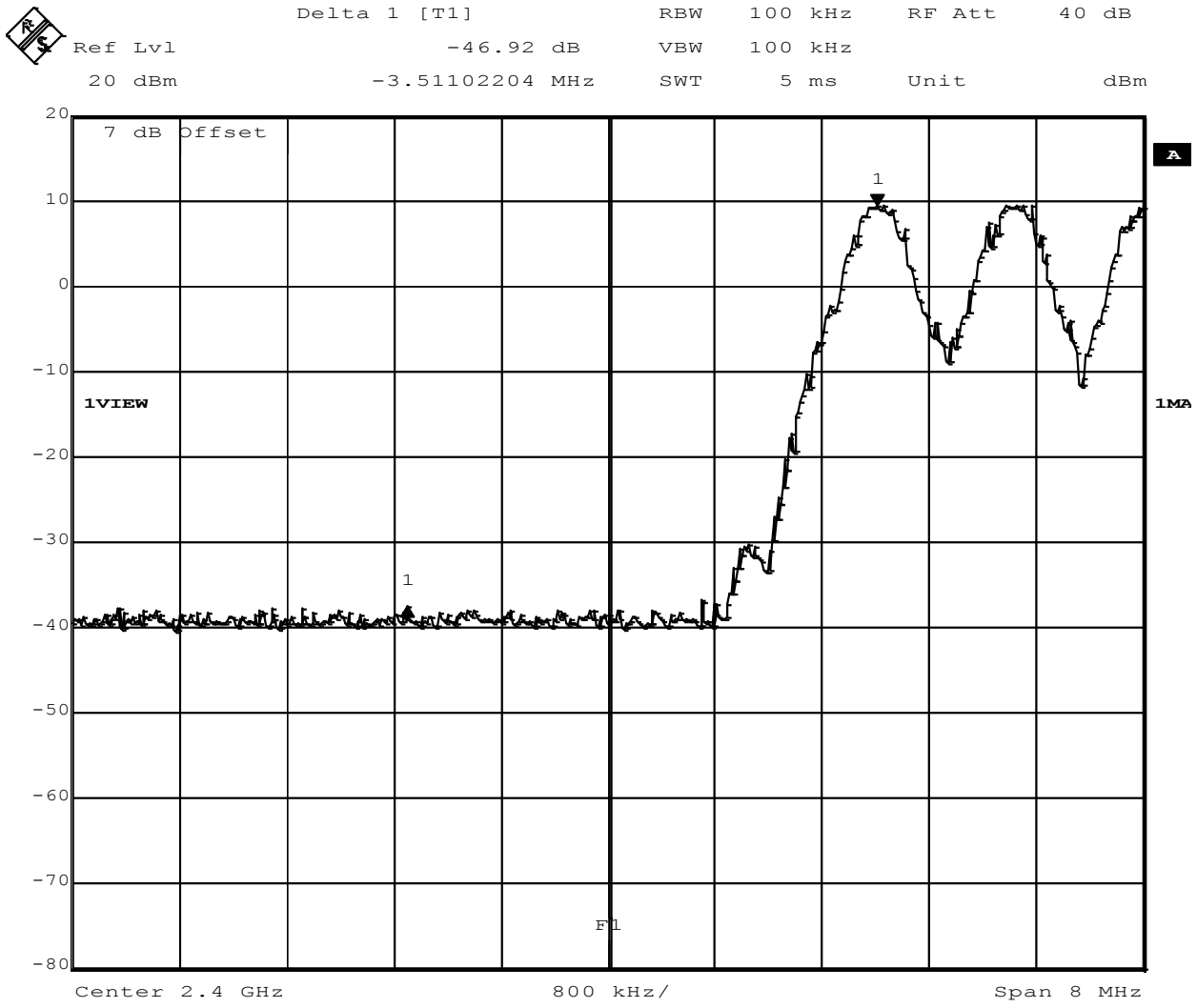


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 12:09:49

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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 /GFSK
Comment 3	Hopping mode

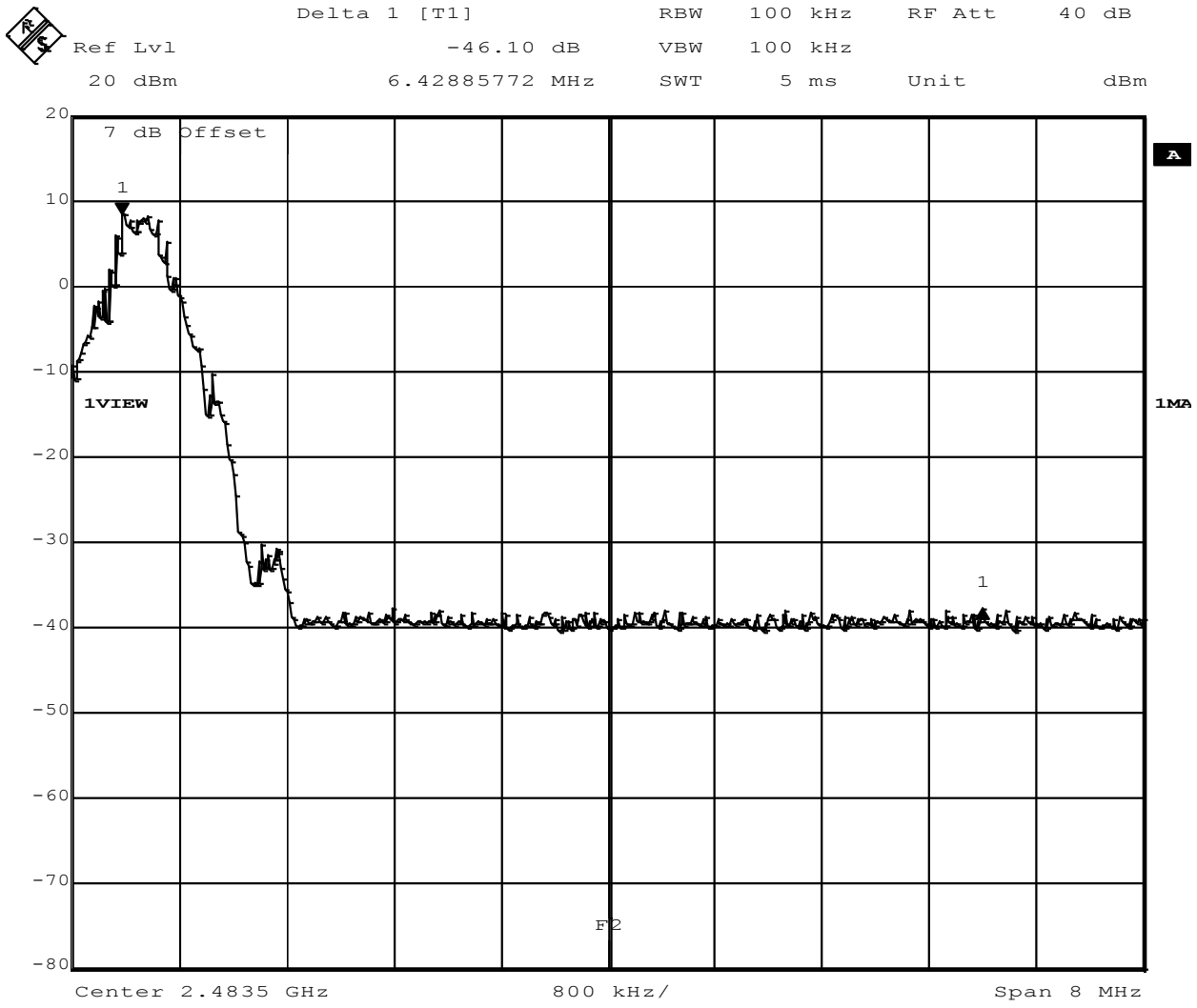


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 13:20:42

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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.: 78 / 2480 MHz / GFSK
Comment 3	Hopping mode

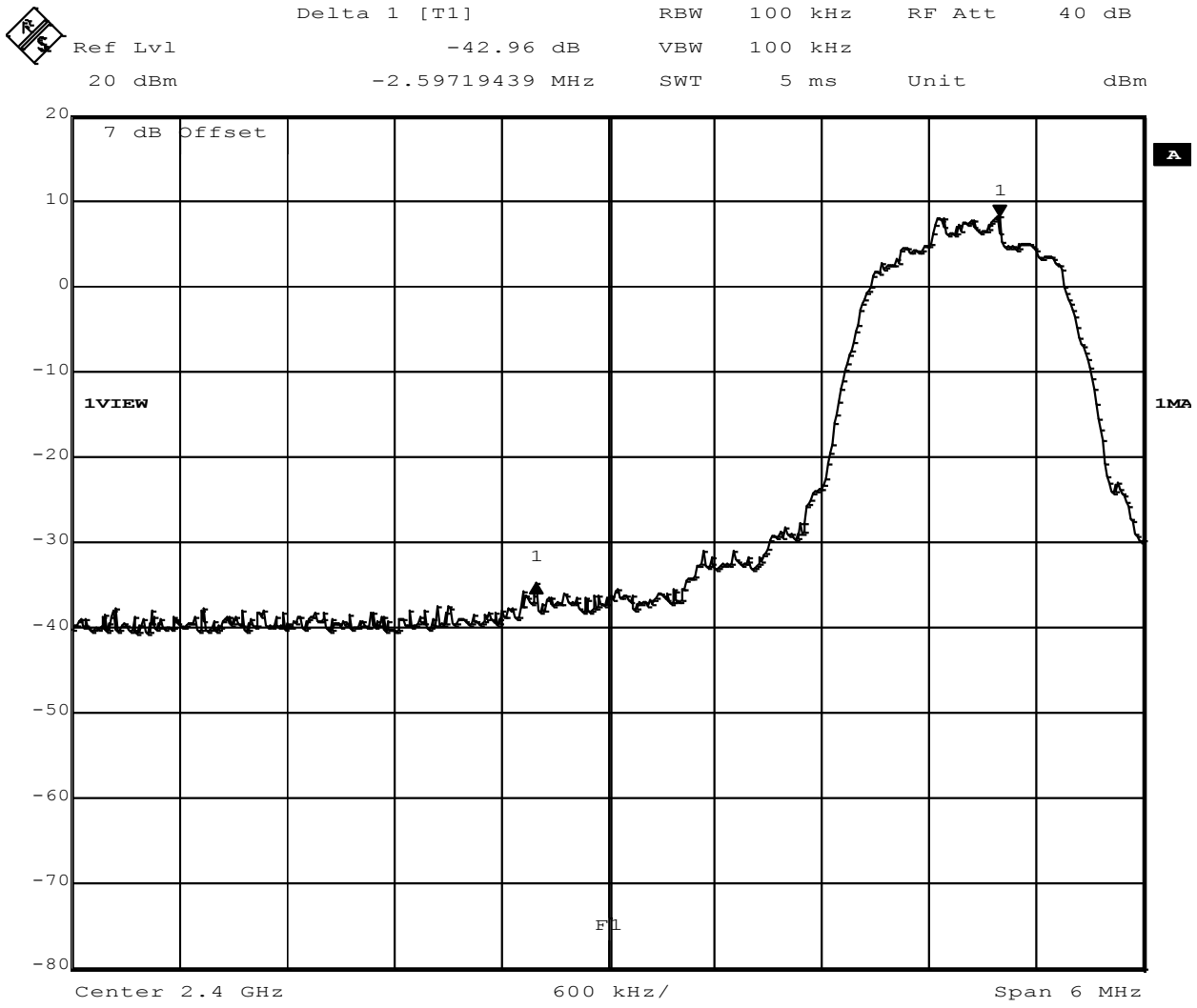


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 13:39:32

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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 / DQPSK
Comment 3	Single frequency mode

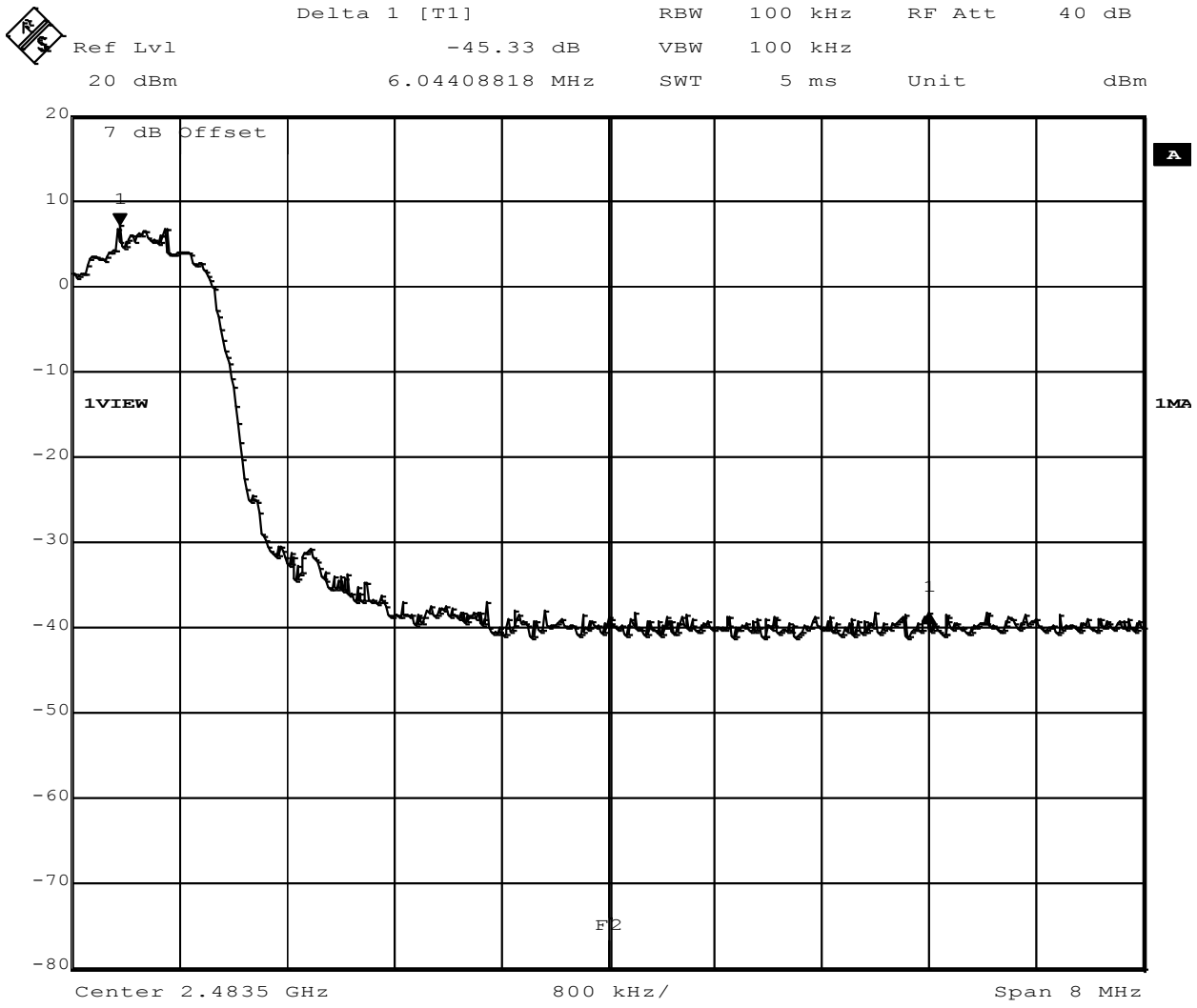


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 12:13:14

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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.: 78 / 2480 MHz / DQPSK
Comment 3	Single frequency mode

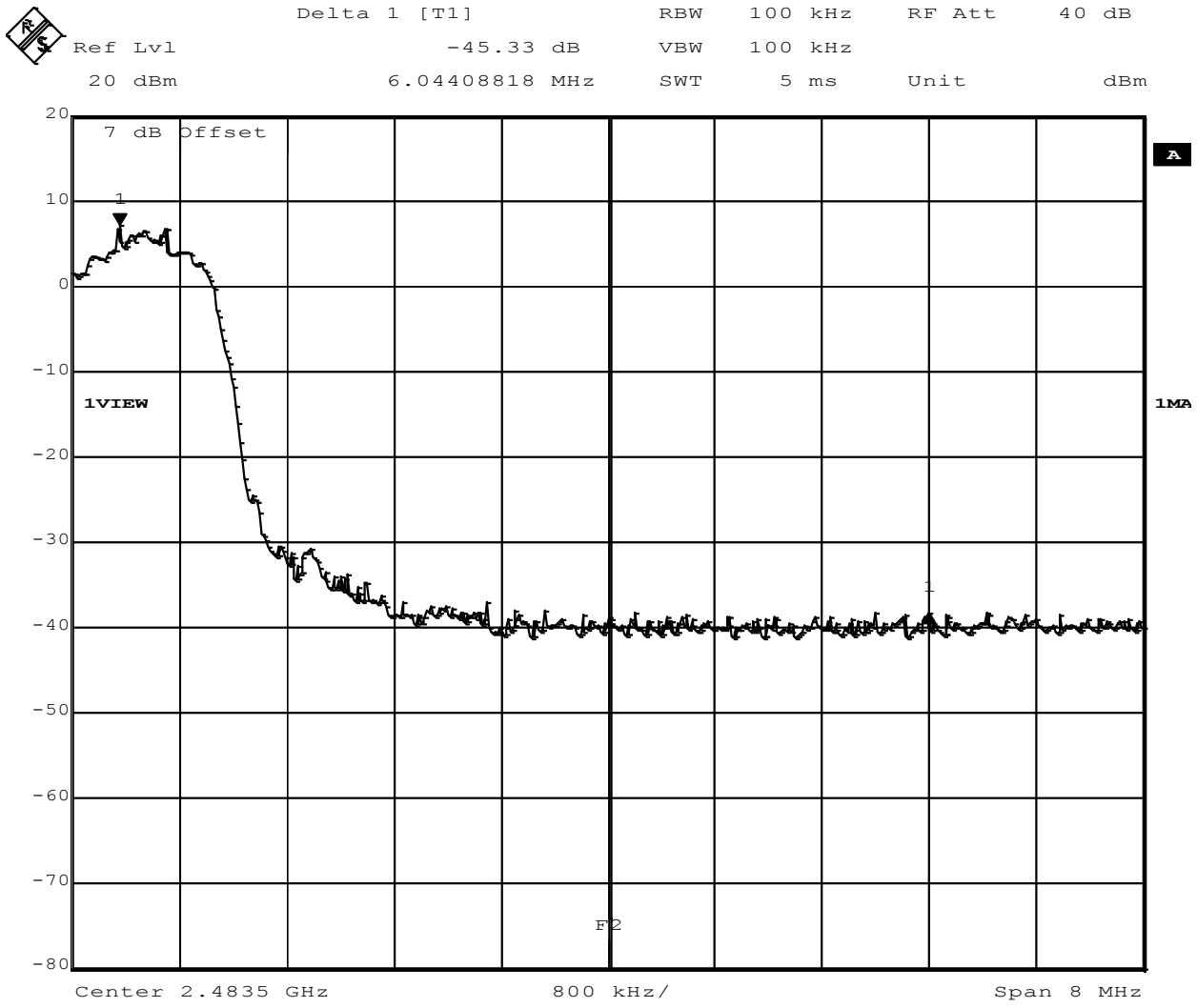


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 13:07:00

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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.: 78 / 2480 MHz / DQPSK
Comment 3	Single frequency mode

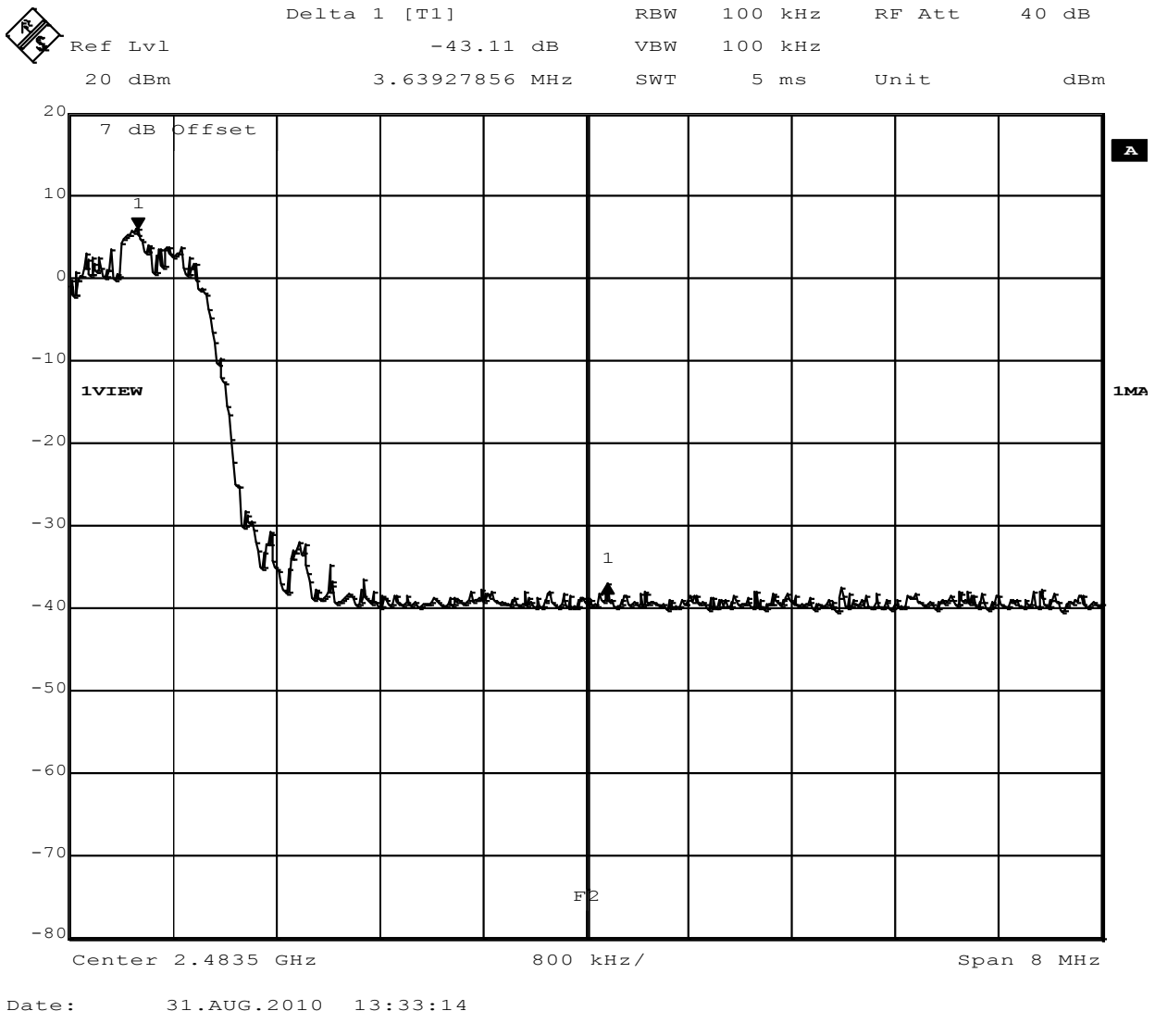


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 13:07:00

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

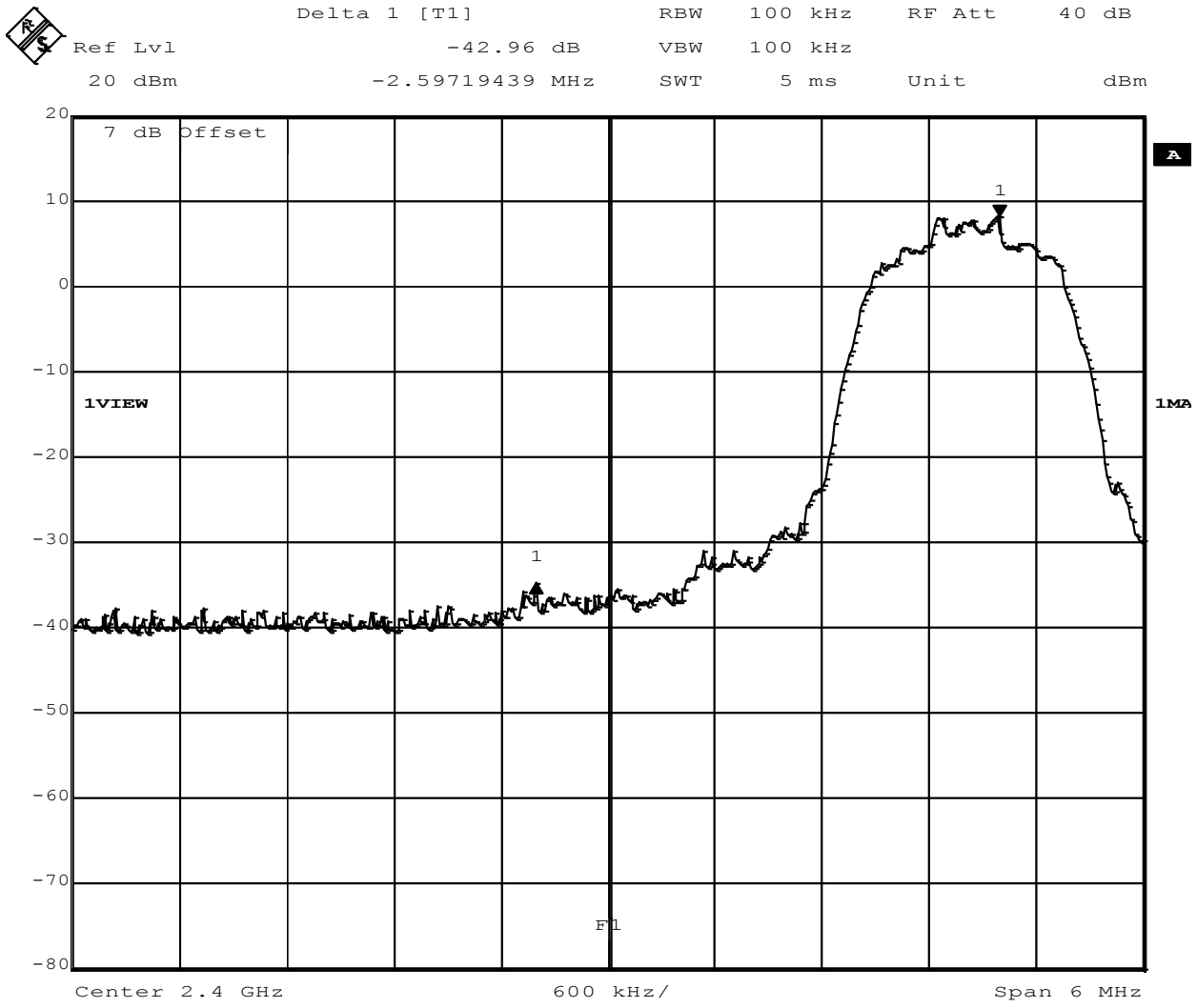
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 78 / 2480 MHz / DQPSK
Comment 3	Hopping mode



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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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 / 8DPSK
Comment 3	Single frequency mode

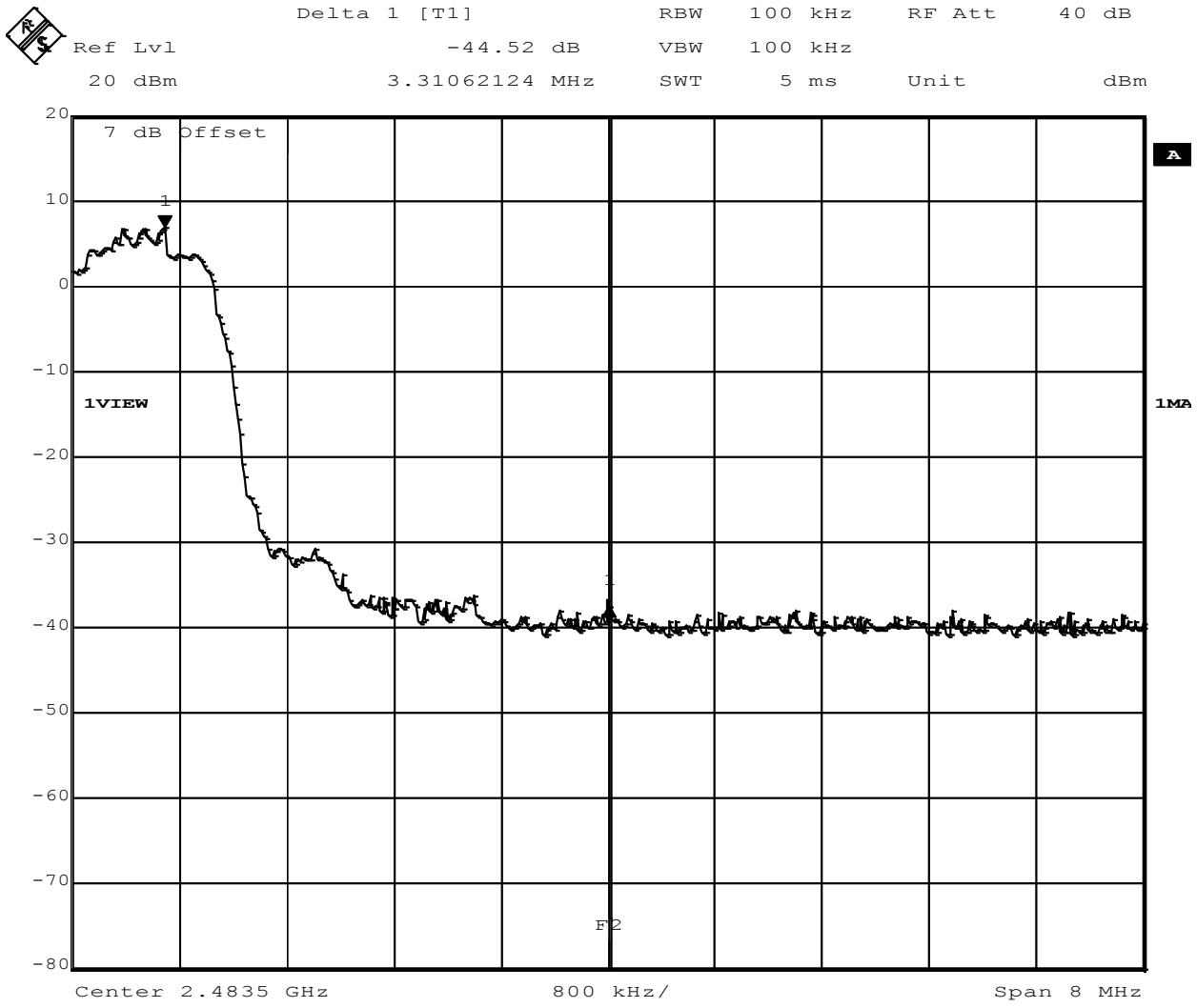


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 12:57:05

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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.: 78 / 2480 MHz / 8DPSK
Comment 3	Single frequency mode

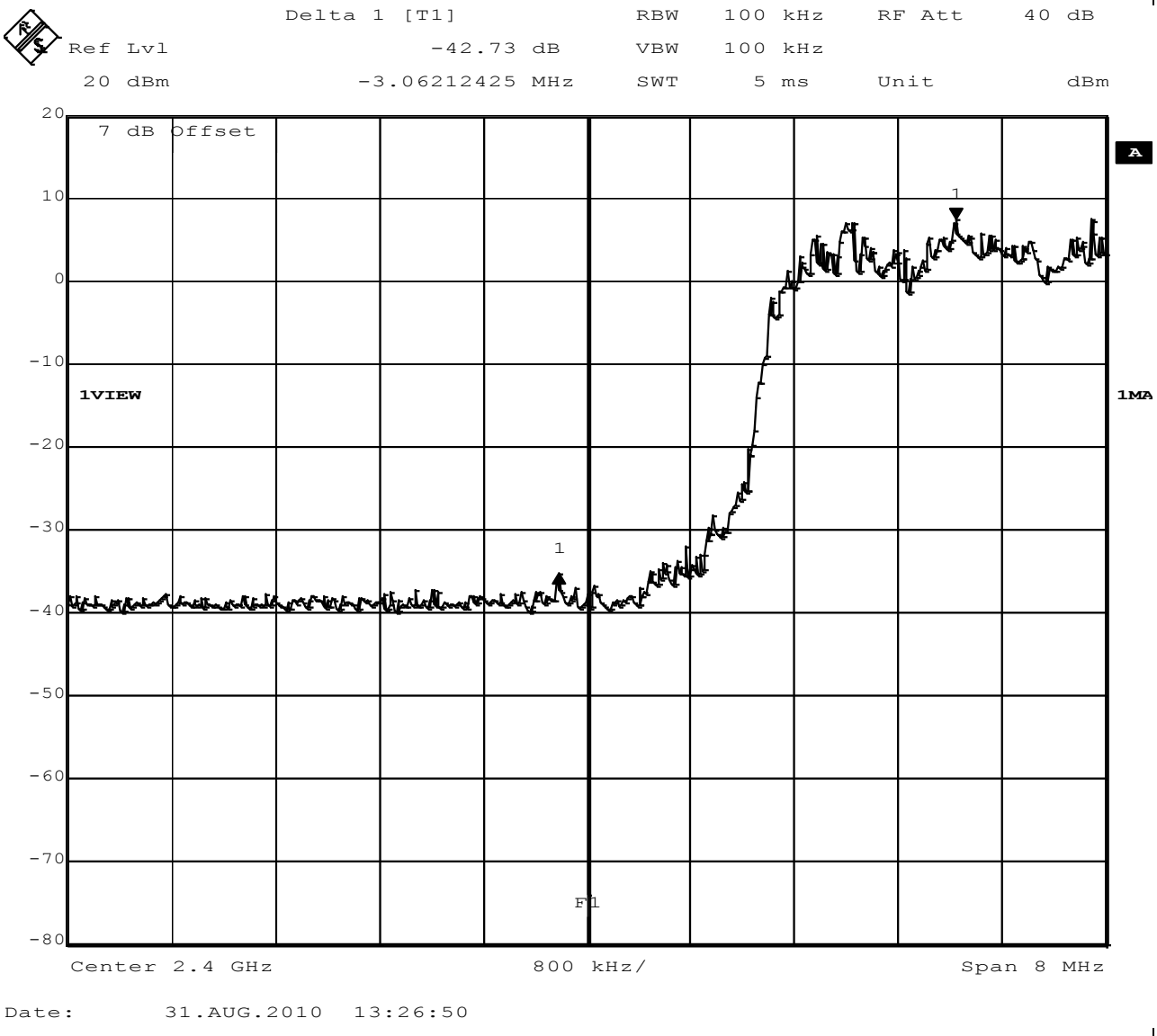


Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 13:09:27

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

FCC part 15.247
Band-edge compliance of RF conducted emissions

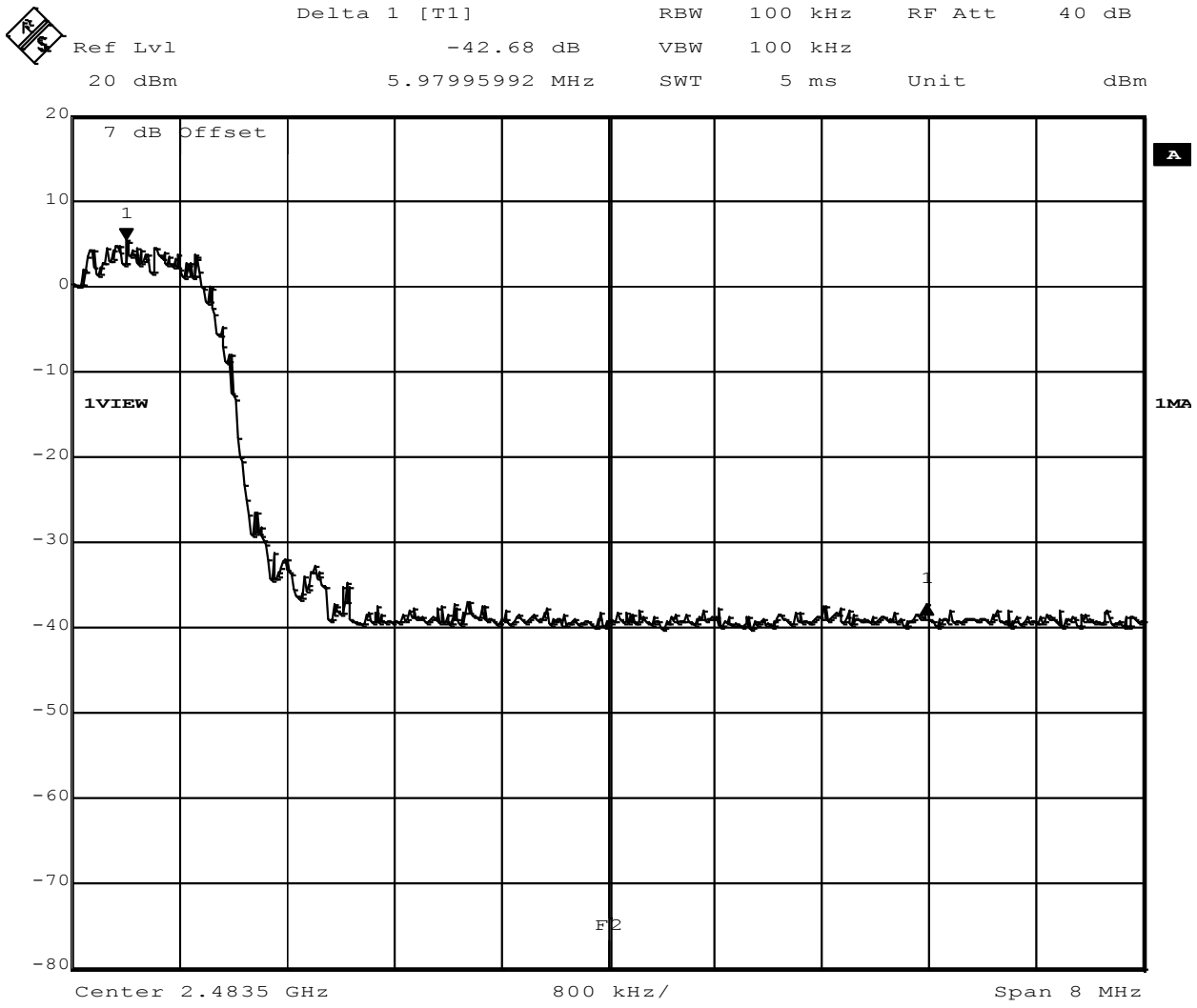
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15 section 247(c)
Comment 1	Band-edge compliance
Comment 2	Channel.: 0 / 2402 MHz / 8DPSK
Comment 3	Hopping mode



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

FCC part 15.247
Band-edge compliance of RF conducted emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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.: 78 / 2480 MHz / 8DPSK
Comment 3	Hopping mode



Comment A: Limit: Marker Delta value >20 dB; Result: PASS
Date: 31.AUG.2010 13:29:47

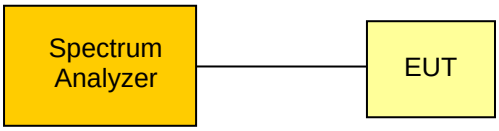
3.9 Test Conditions and Results – Conducted spurious emissions

Conducted spurious emissions acc. FCC 15.247 / IC RSS-210	**Verdict: PASS**
EUT requirement rule parts and clause	Reference
	FCC 15.247(d) / IC RSS-210 A8.5
Test according to measurement reference	Reference Method
	FCC Public Notice DA 00-705
Test frequency range	Tested frequencies
	10 MHz – 10th Harmonic
Measurement mode	Peak

Limits

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

Test setup



Test procedure

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

Test results

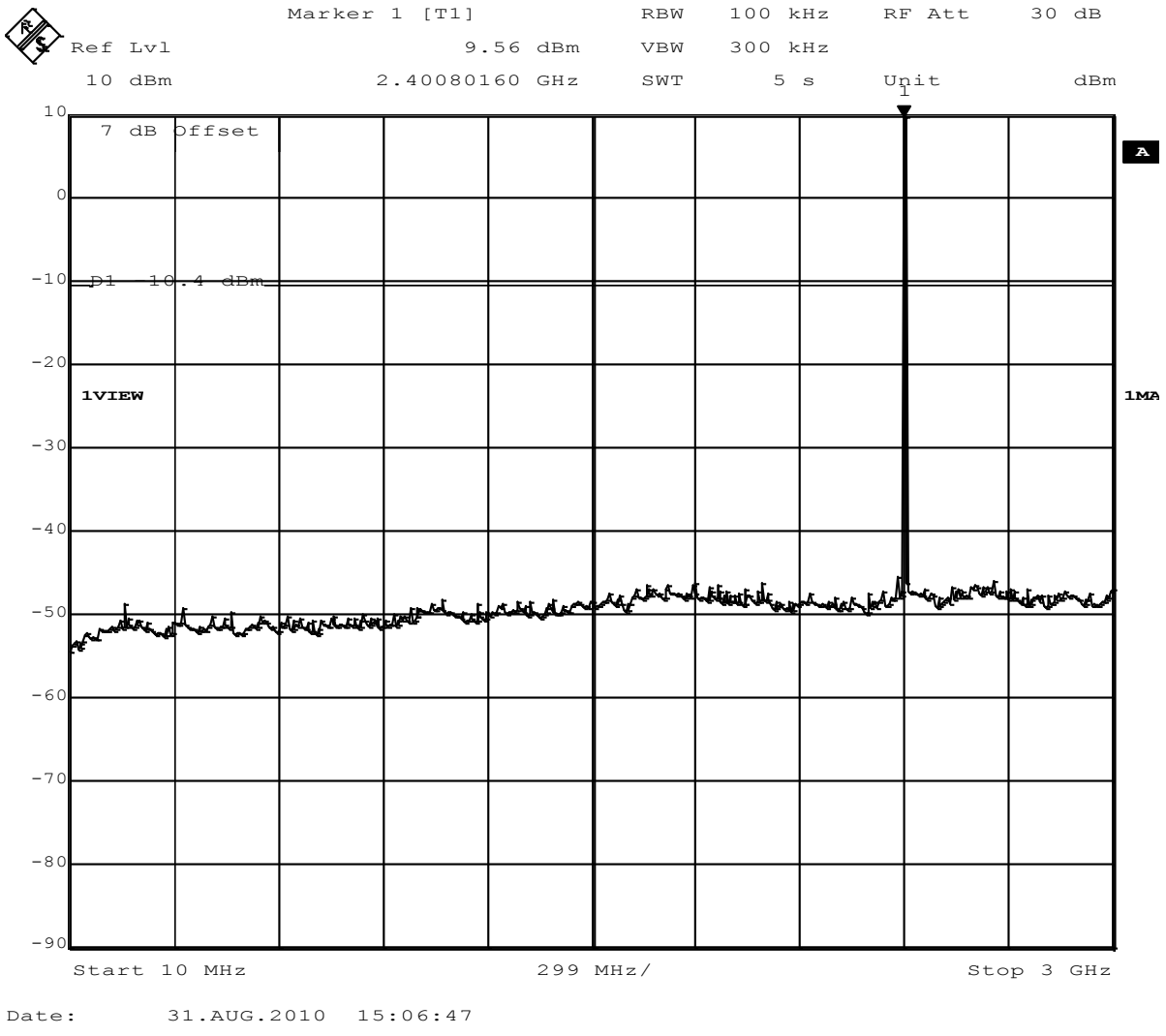
Channel	Frequency [MHz]	Mode	Emission [MHz]	Emission Level [dbm]	Peak power [dBm]	Limit [dBm]	Margin [dB]	Result
F_{LOW}	2402	DH5-Sngl	13511	-27.01	9.56	-10.44	-16.57	PASS
F_{MID}	2441	DH5-Sngl	13773	-26.45	9.24	-10.76	-15.69	PASS
F_{HIGH}	2480	DH5-Sngl	14005	-29.82	8.70	-11.30	-18.52	PASS
F_{LOW}	2402	3DH5-Sngl	13511	-32.23	5.84	-14.16	-18.07	PASS
F_{MID}	2441	3DH5-Sngl	13744	-33.49	6.43	-13.57	-19.92	PASS
F_{HIGH}	2480	3DH5-Sngl	14005	-33.41	5.57	-14.43	-18.98	PASS

Comments:

Conducted spurious emissions – DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

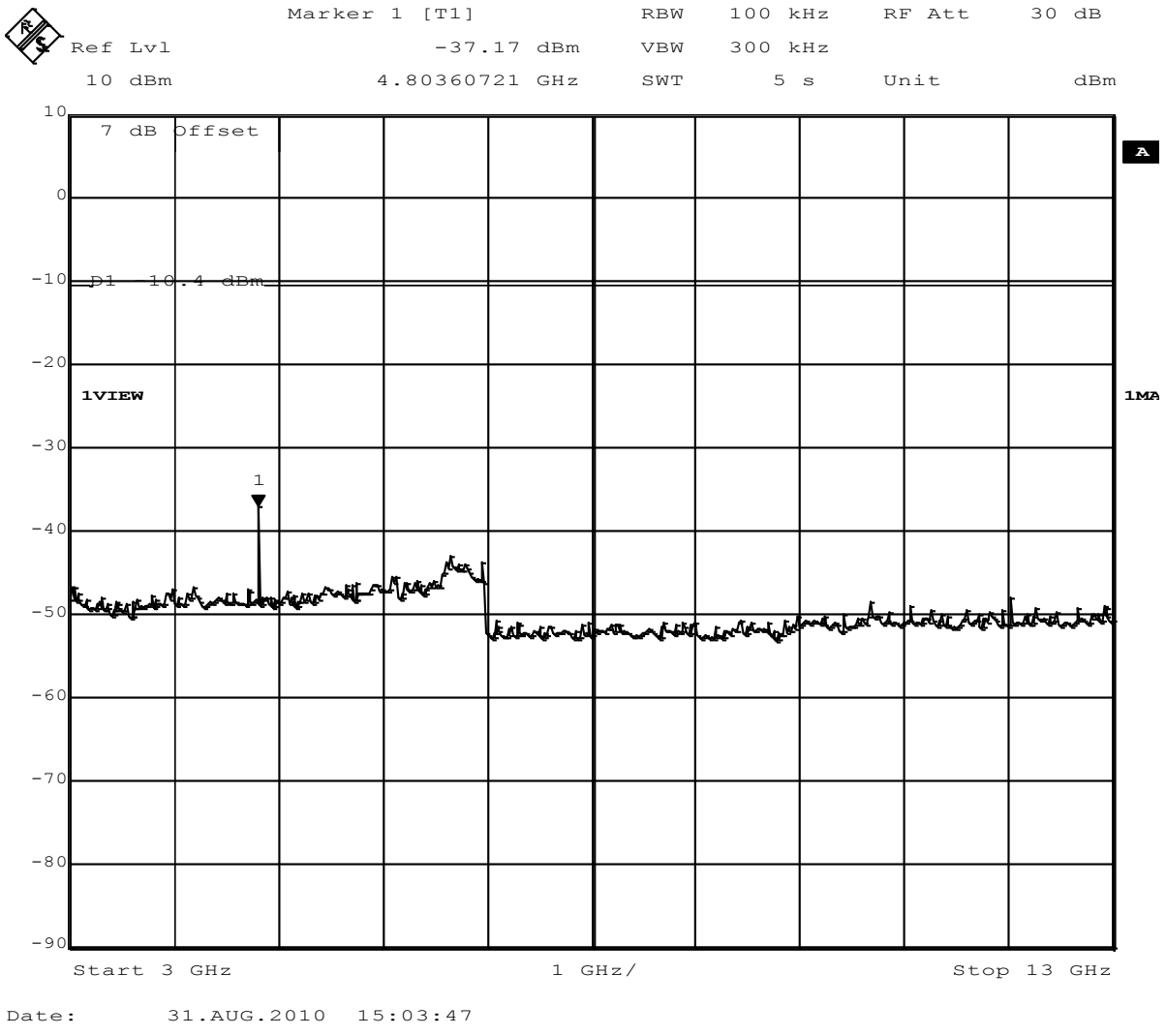
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2402 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

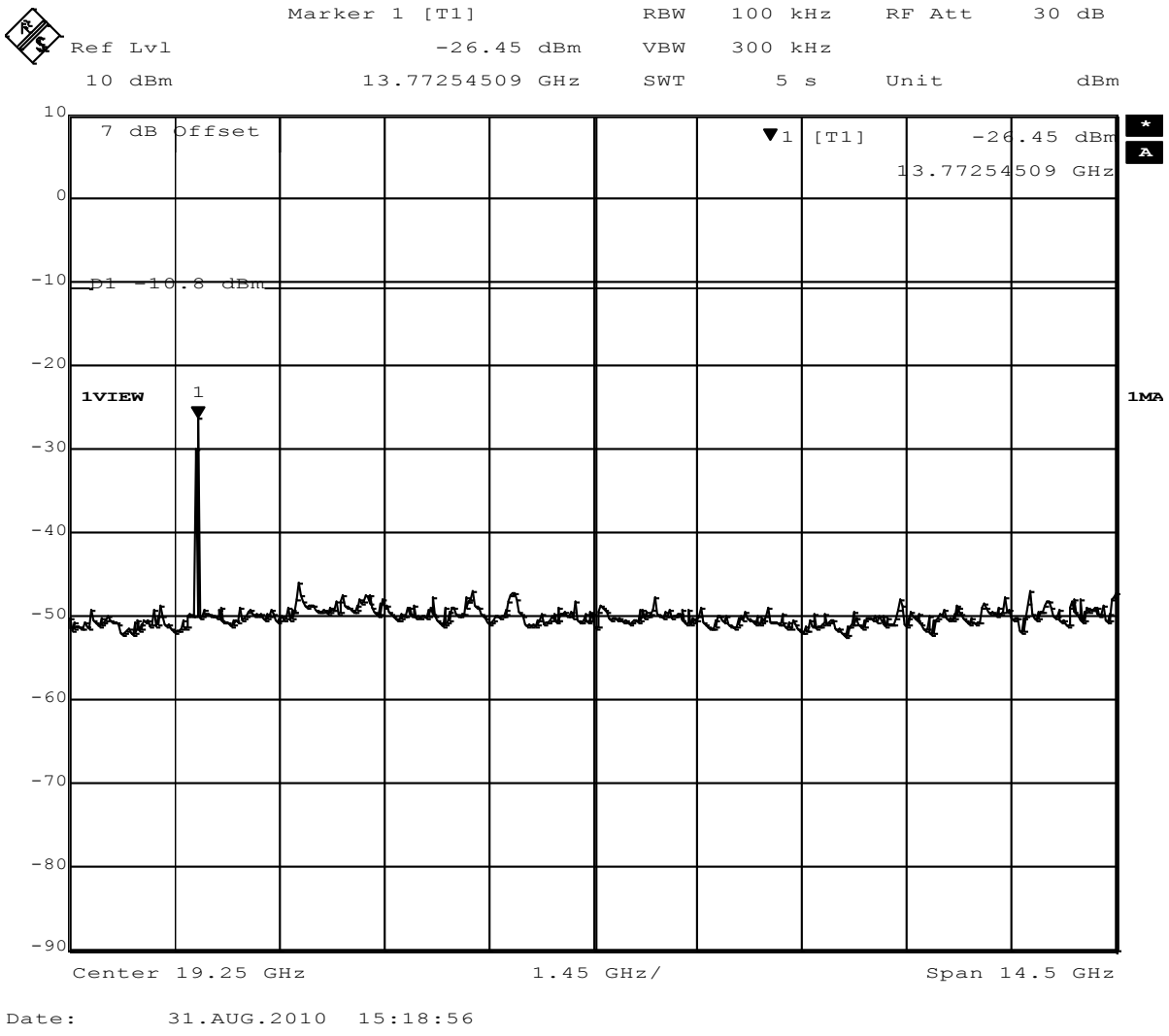
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2402 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{LOW}

FCC part 15.247 (d)
Spurious Emissions

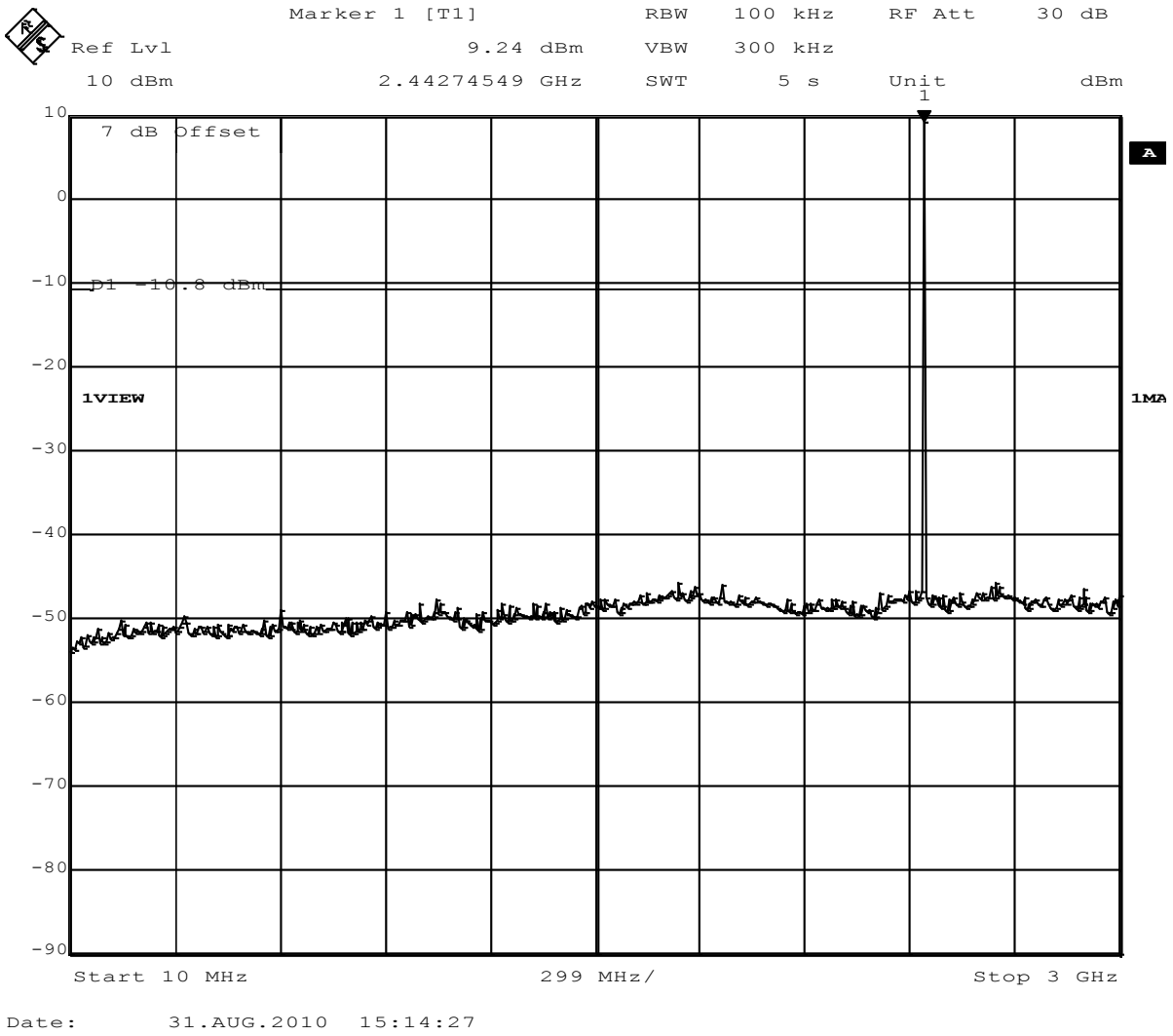
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

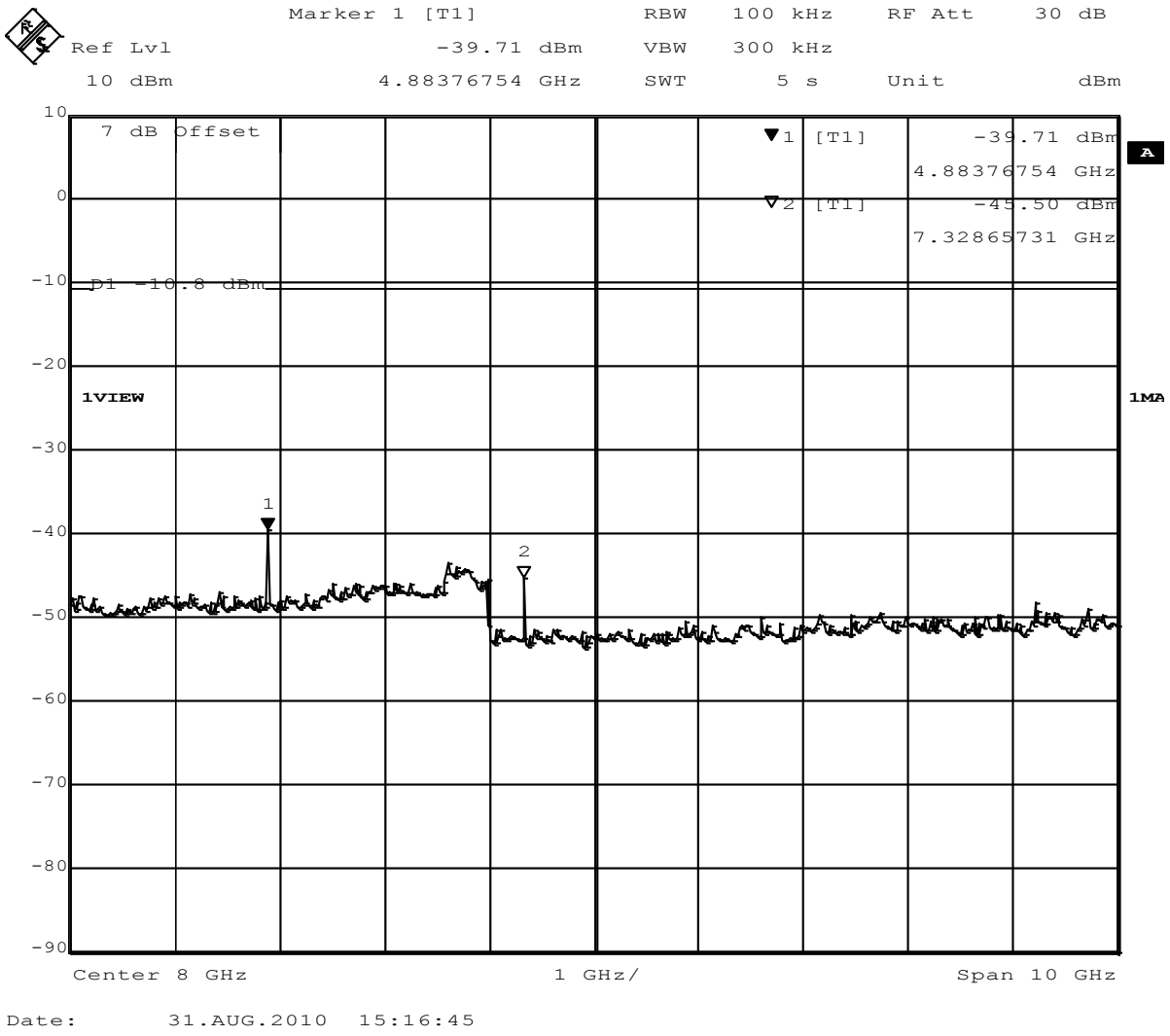
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

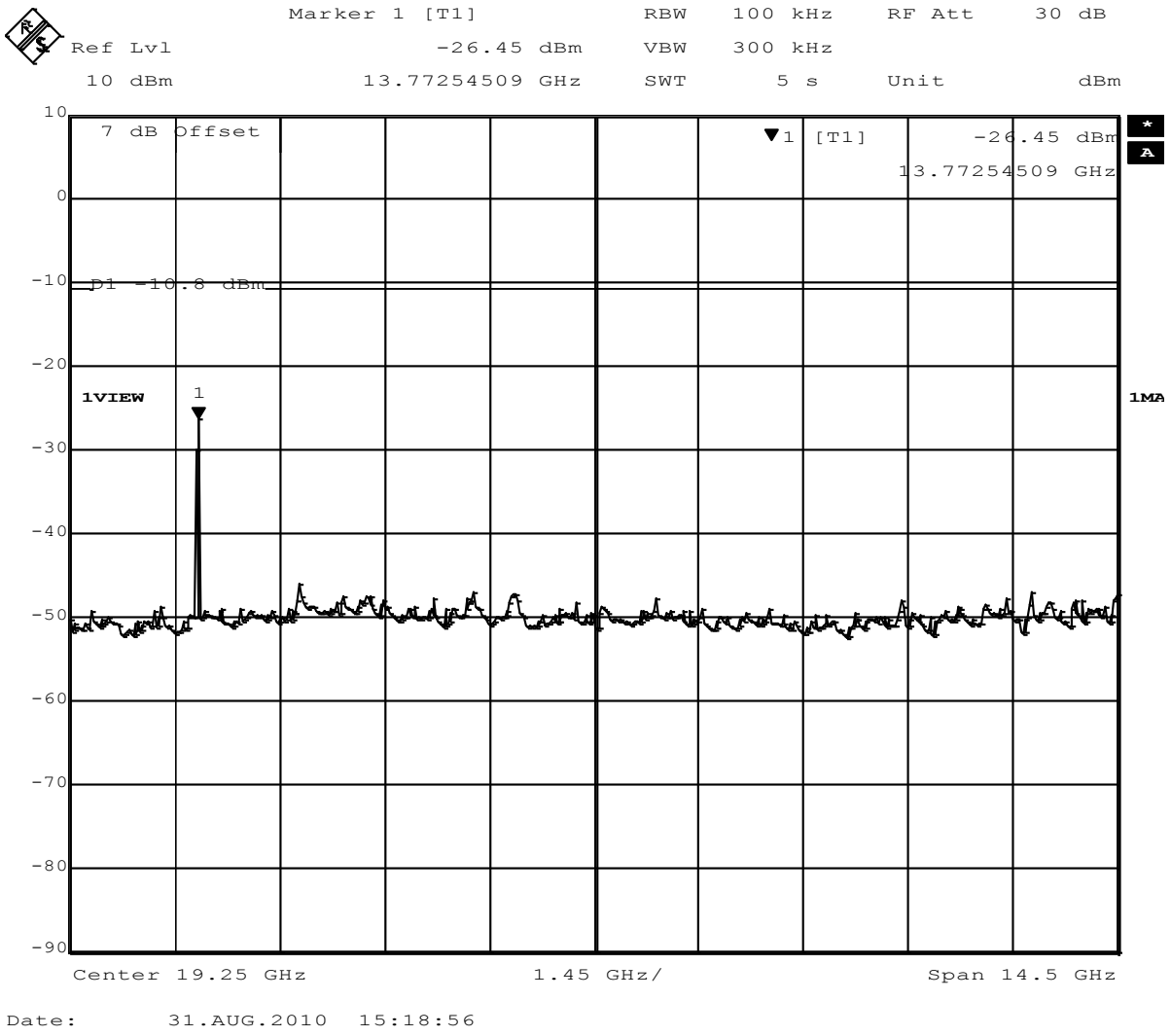
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{MID}

FCC part 15.247 (d)
Spurious Emissions

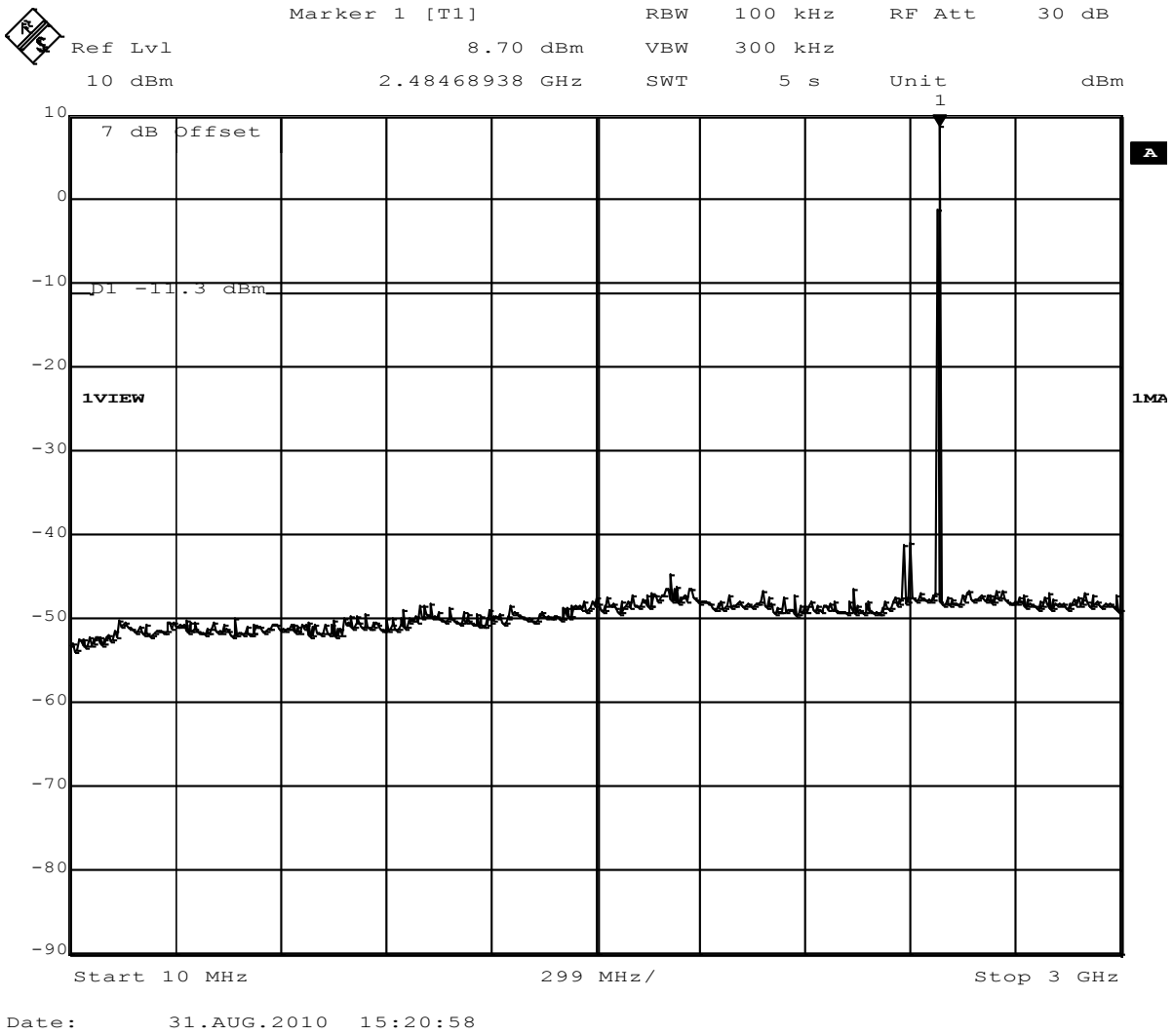
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

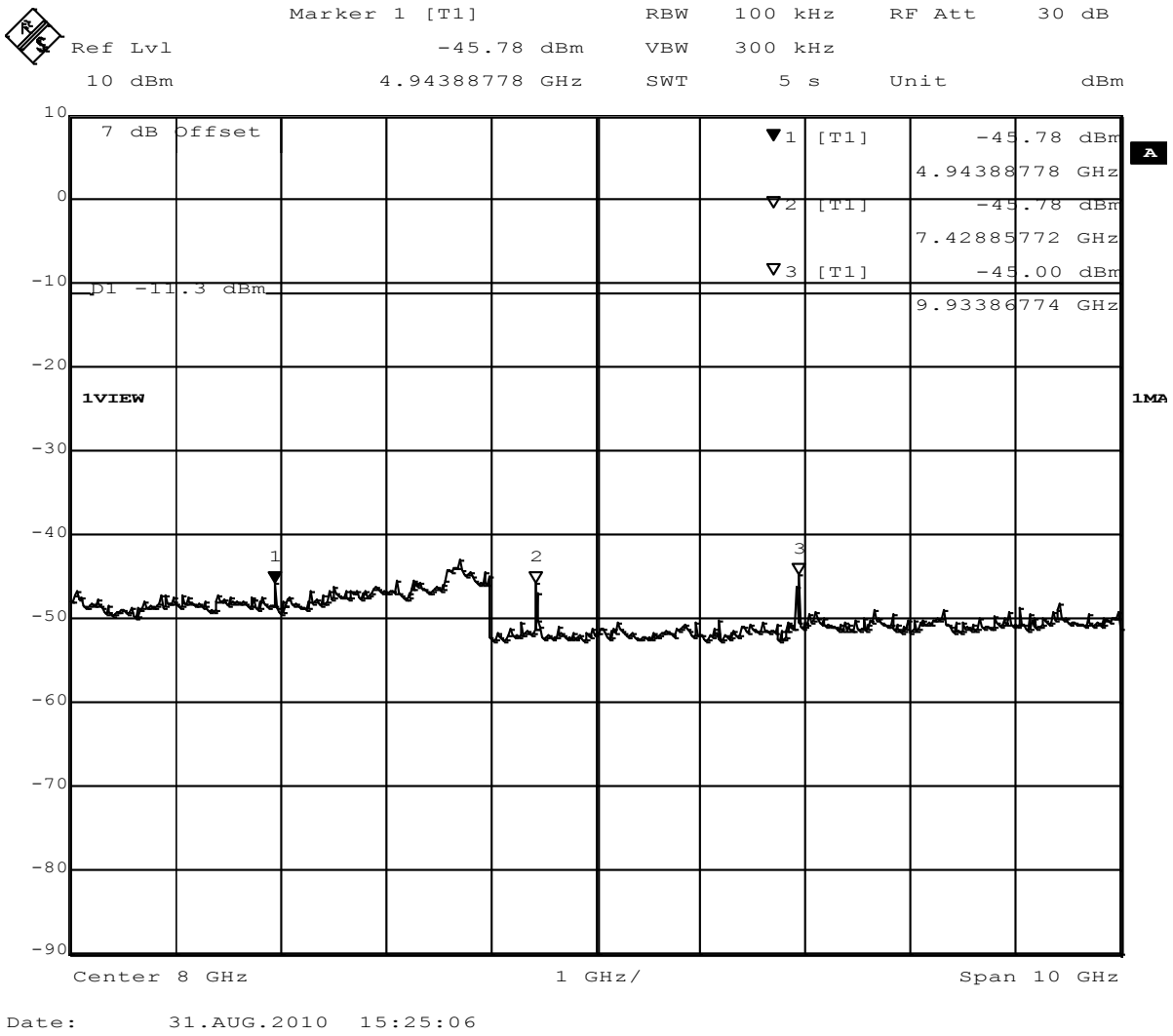
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2480 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

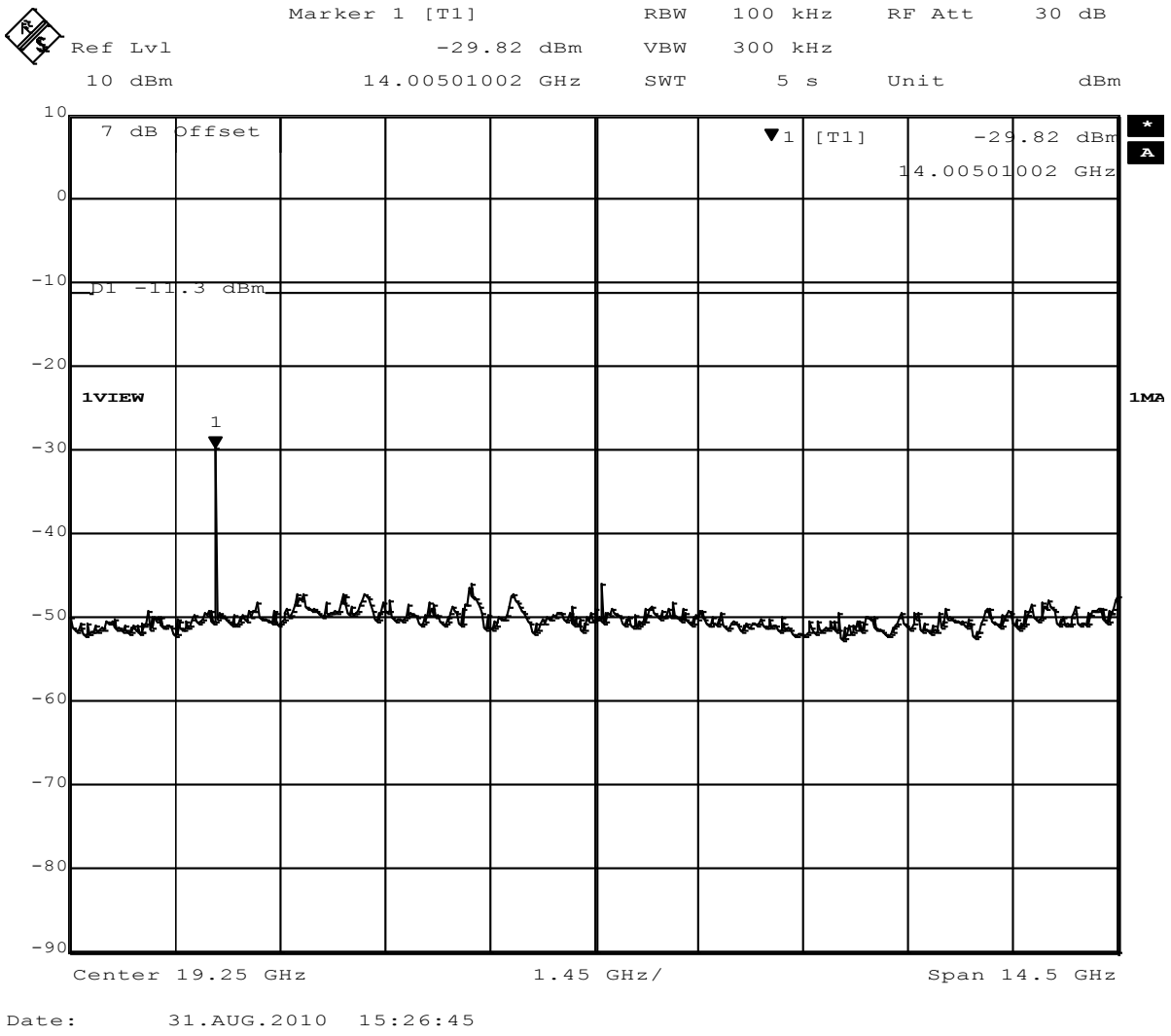
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2480 MHz
Comment 3	GFSK



Conducted spurious emissions – DH5-Sngl F_{HIGH}

FCC part 15.247 (d)
Spurious Emissions

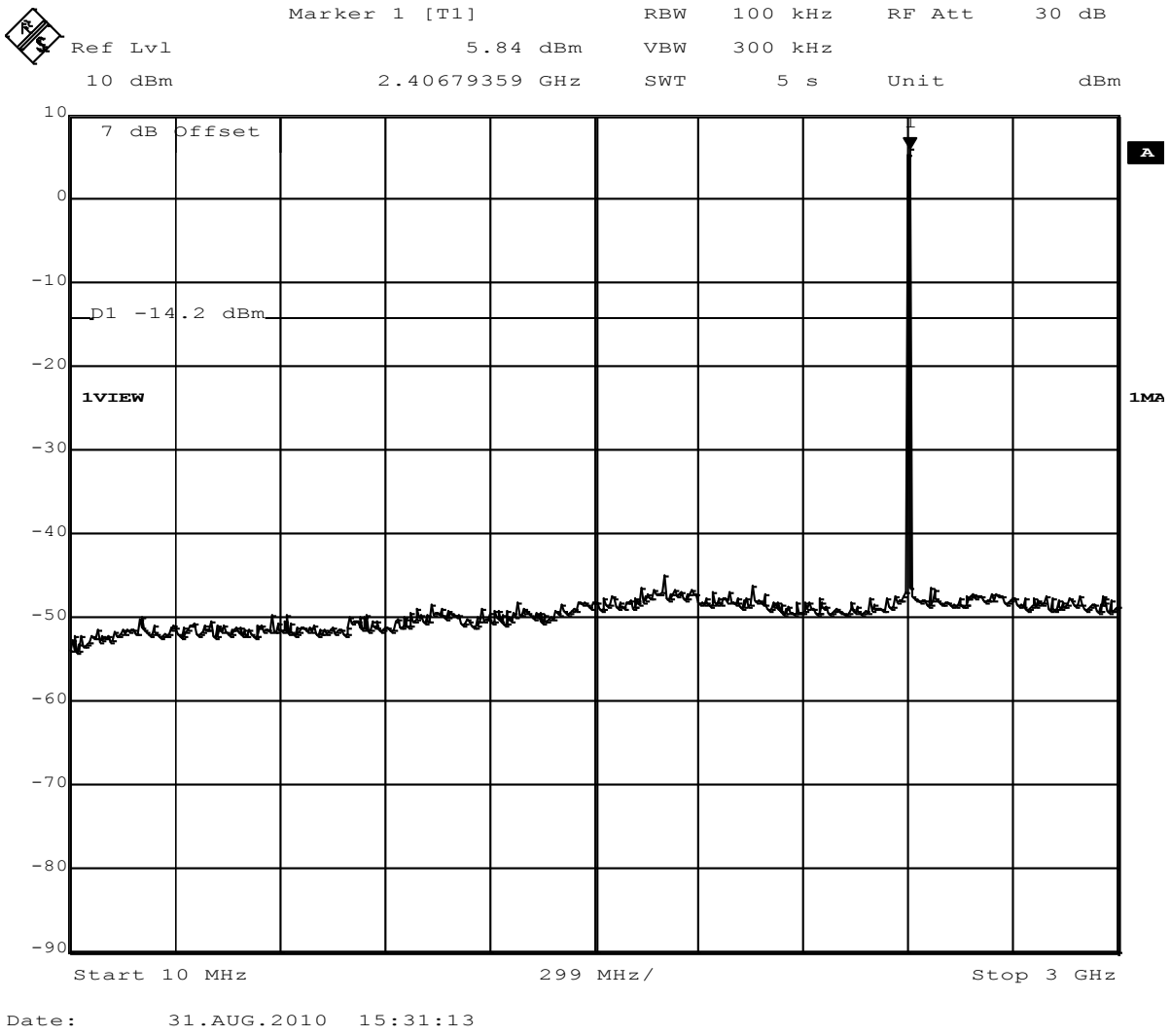
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2480 MHz
Comment 3	GFSK



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

FCC part 15.247 (d)
Spurious Emissions

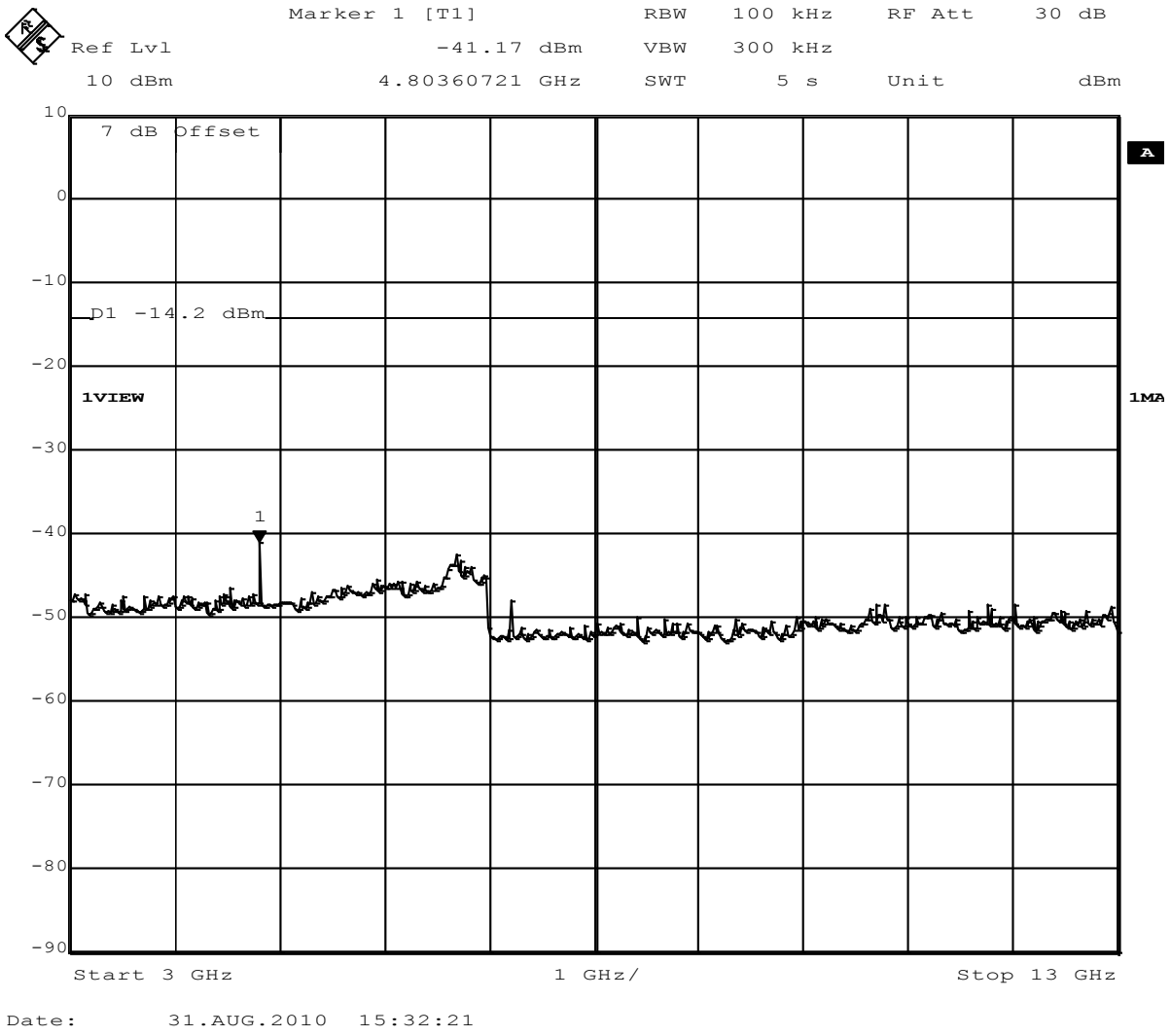
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2402 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

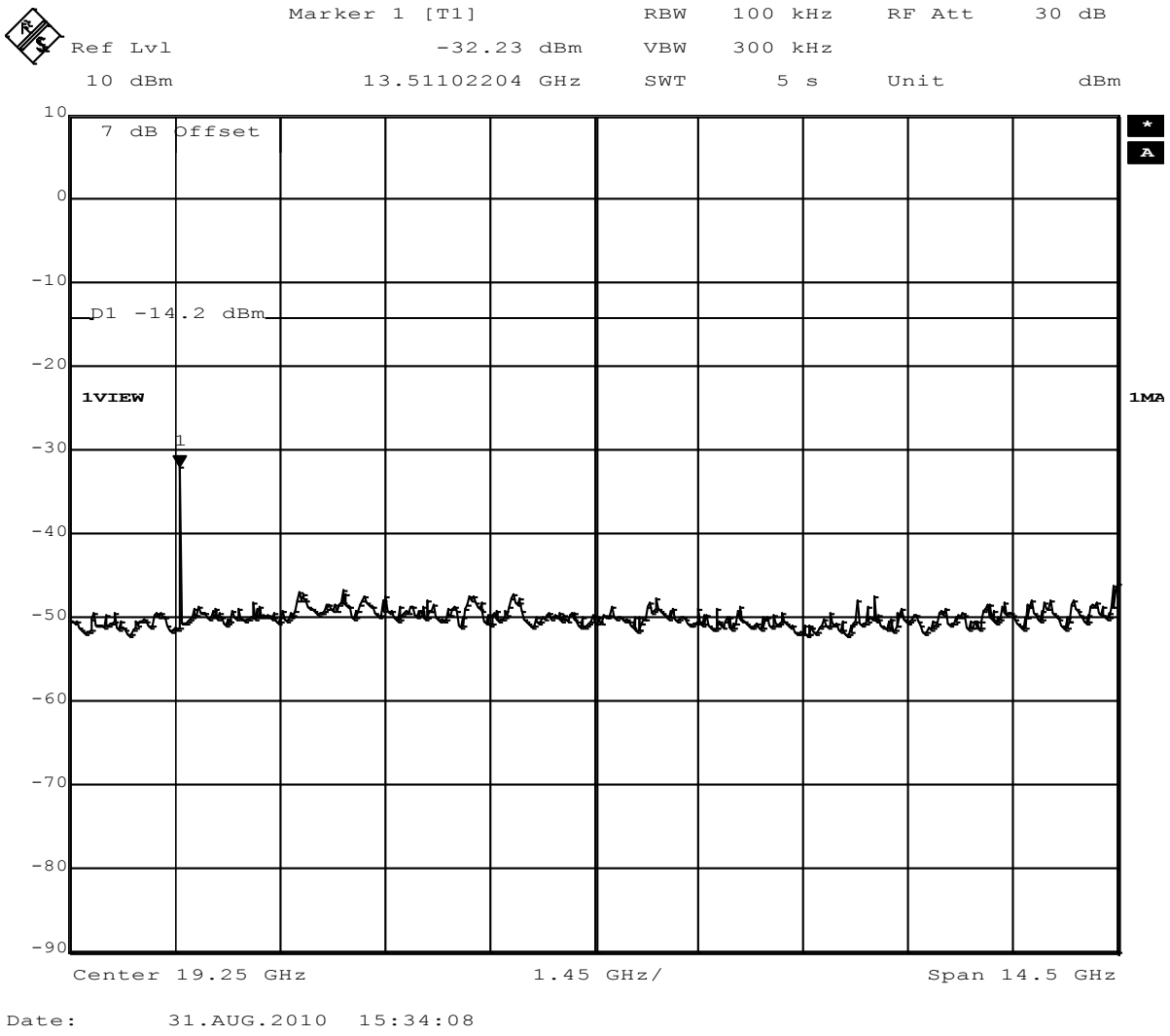
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2402 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

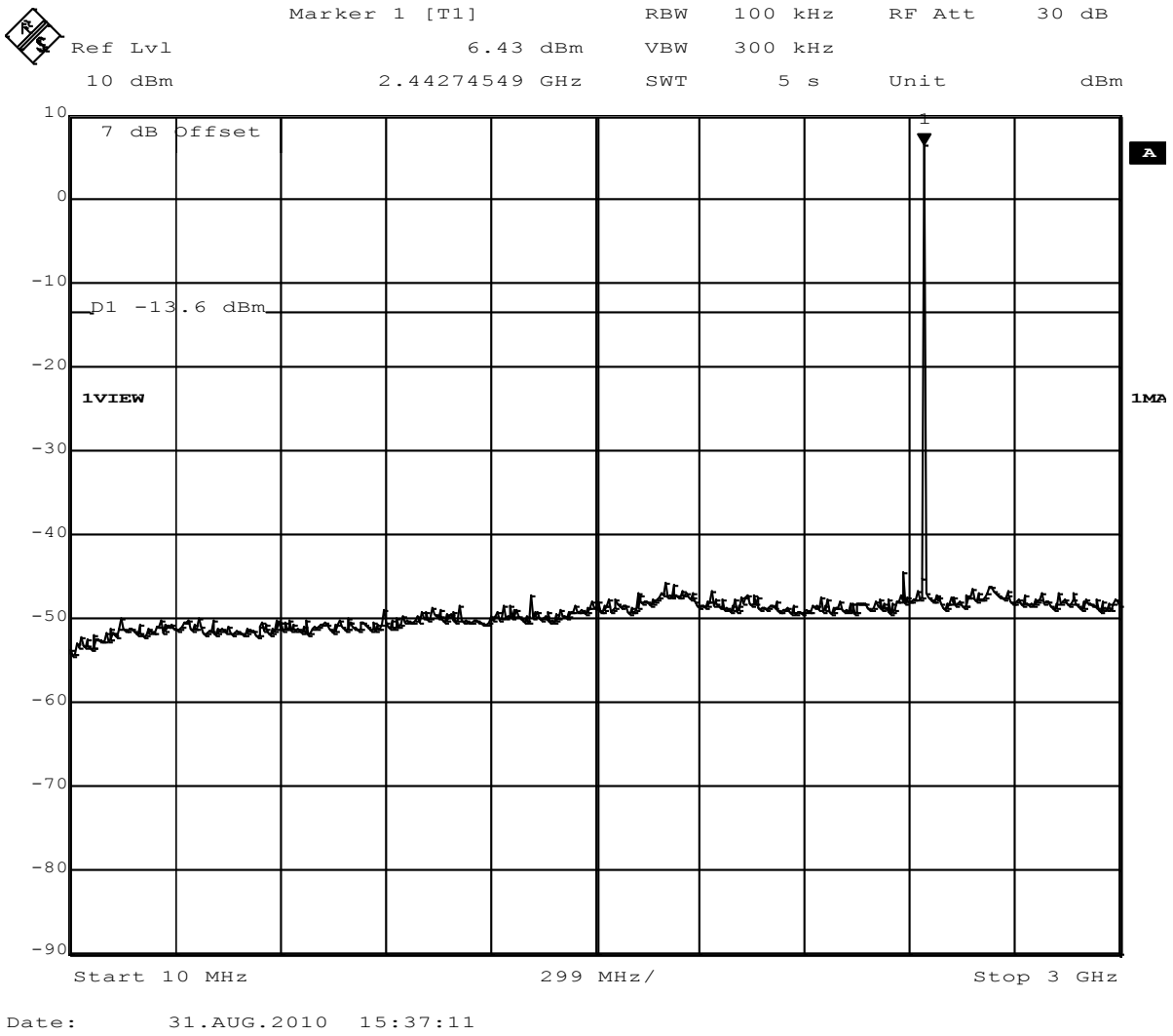
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2402 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

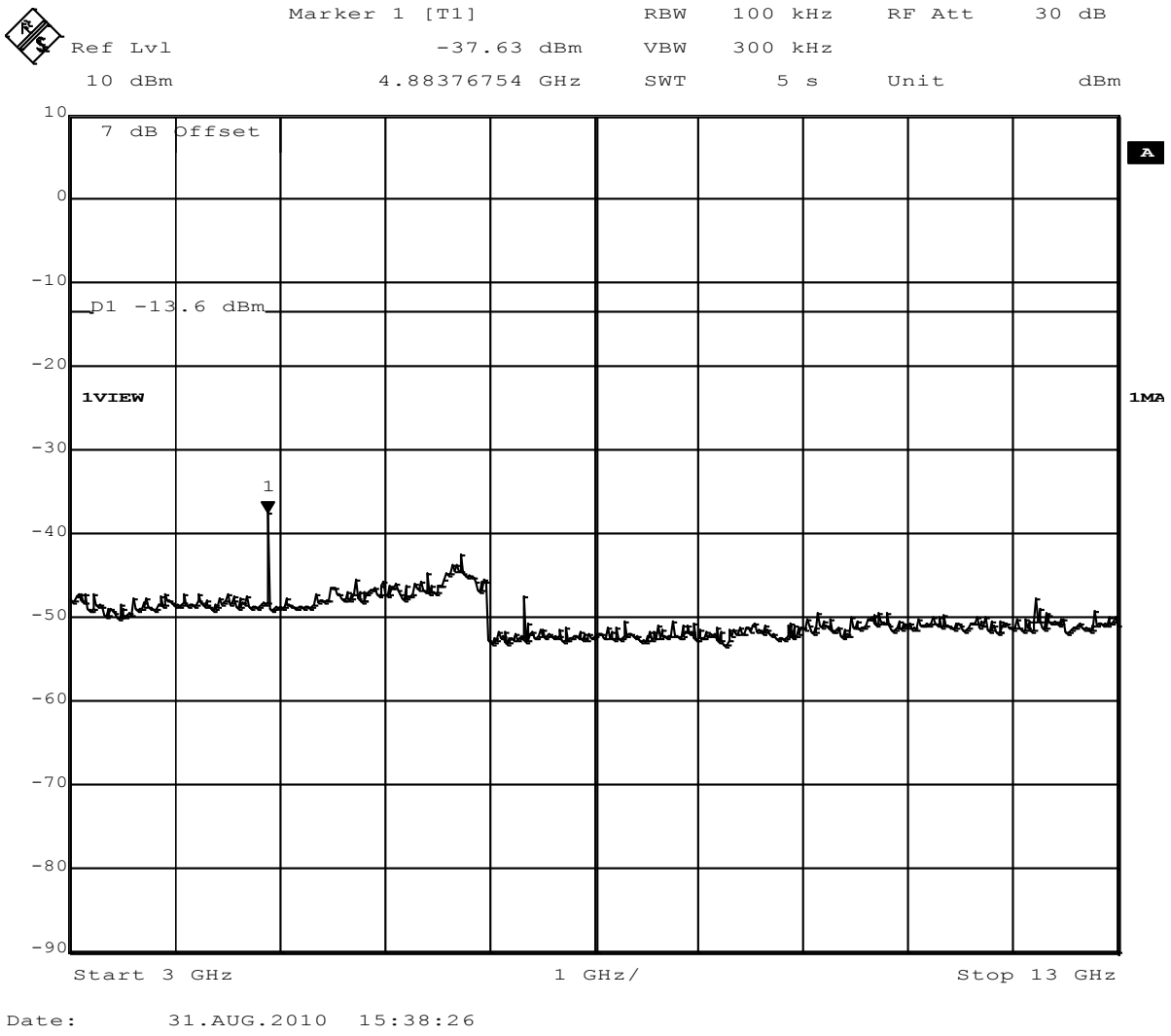
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

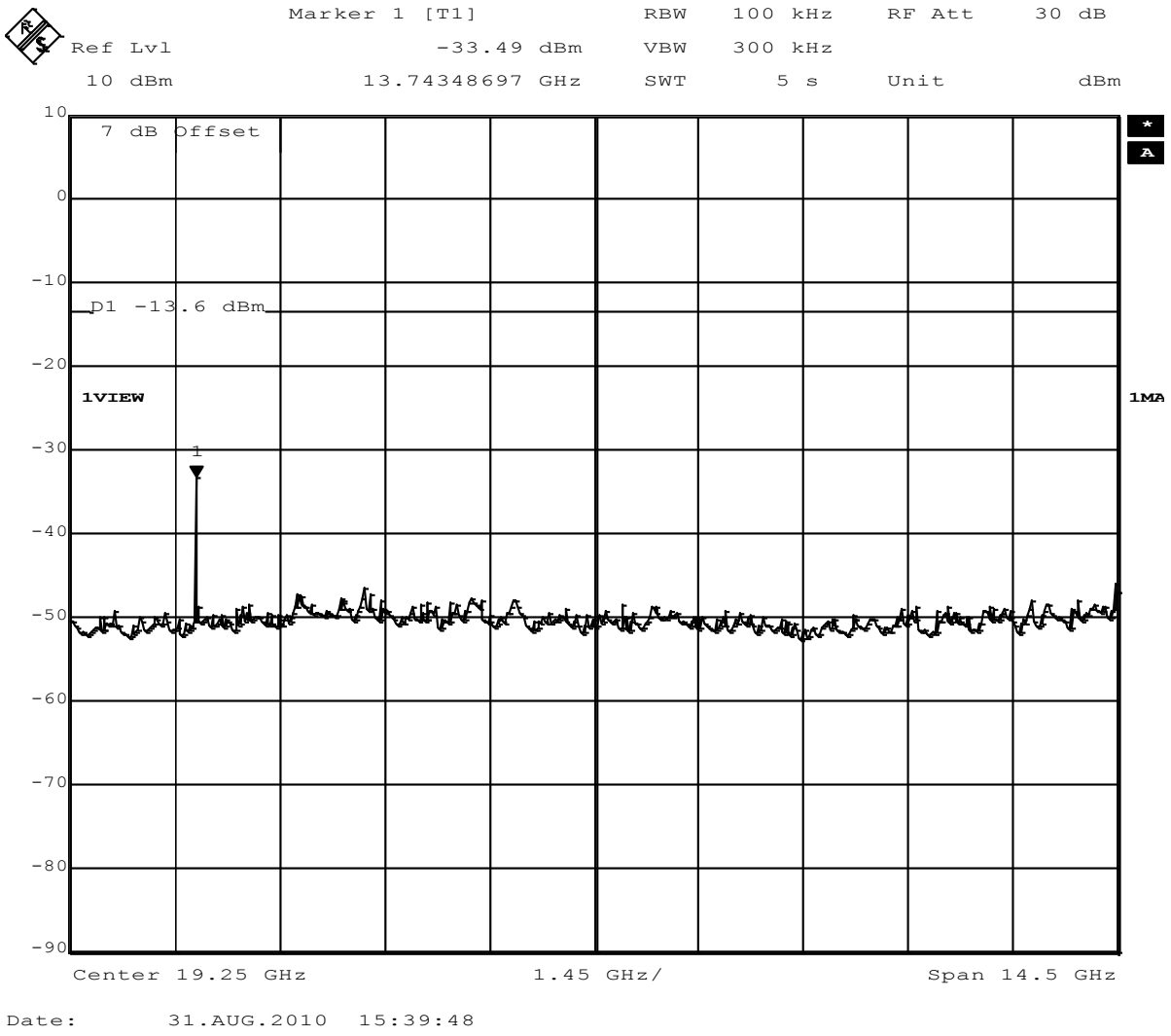
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

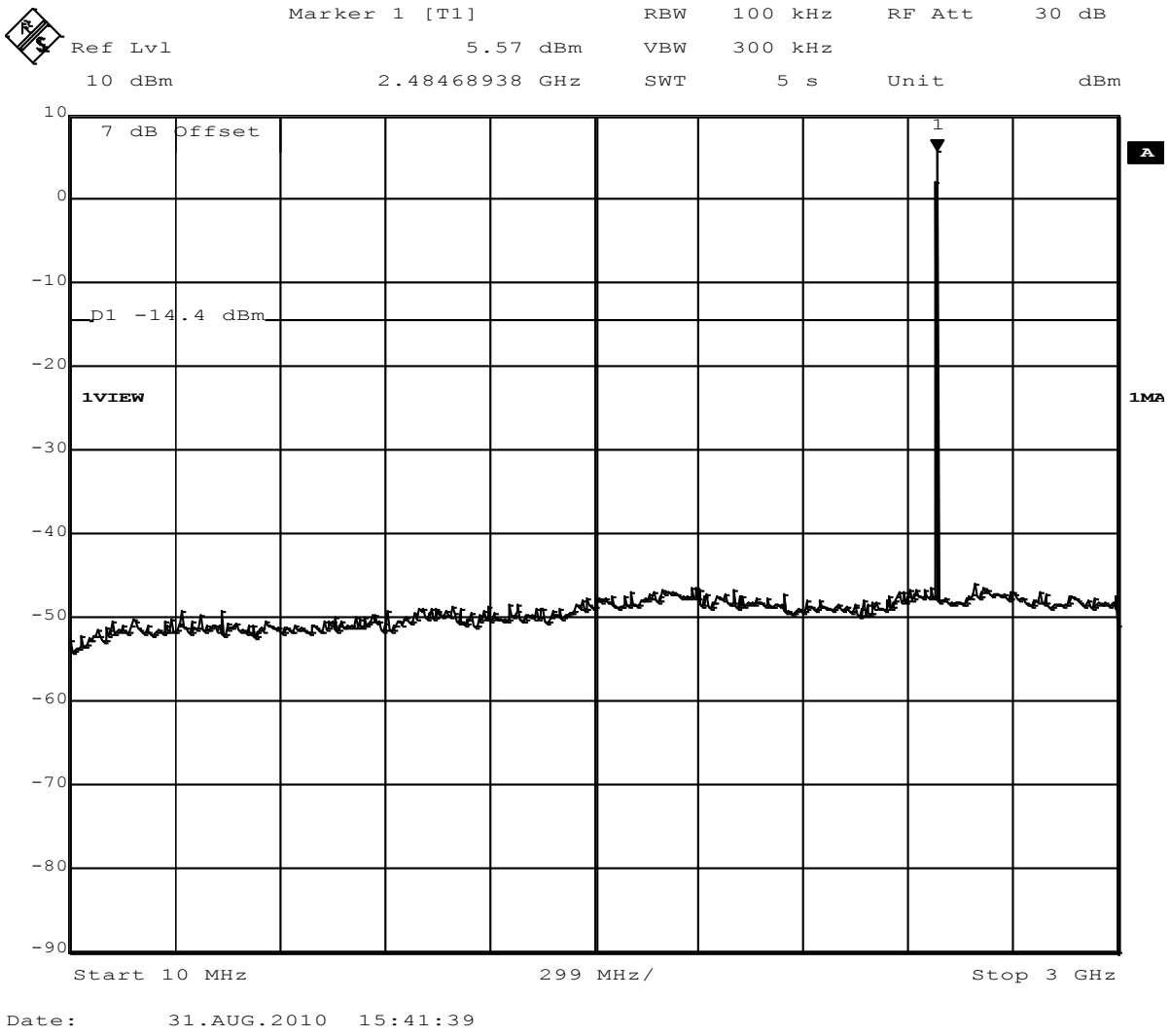
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2441 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

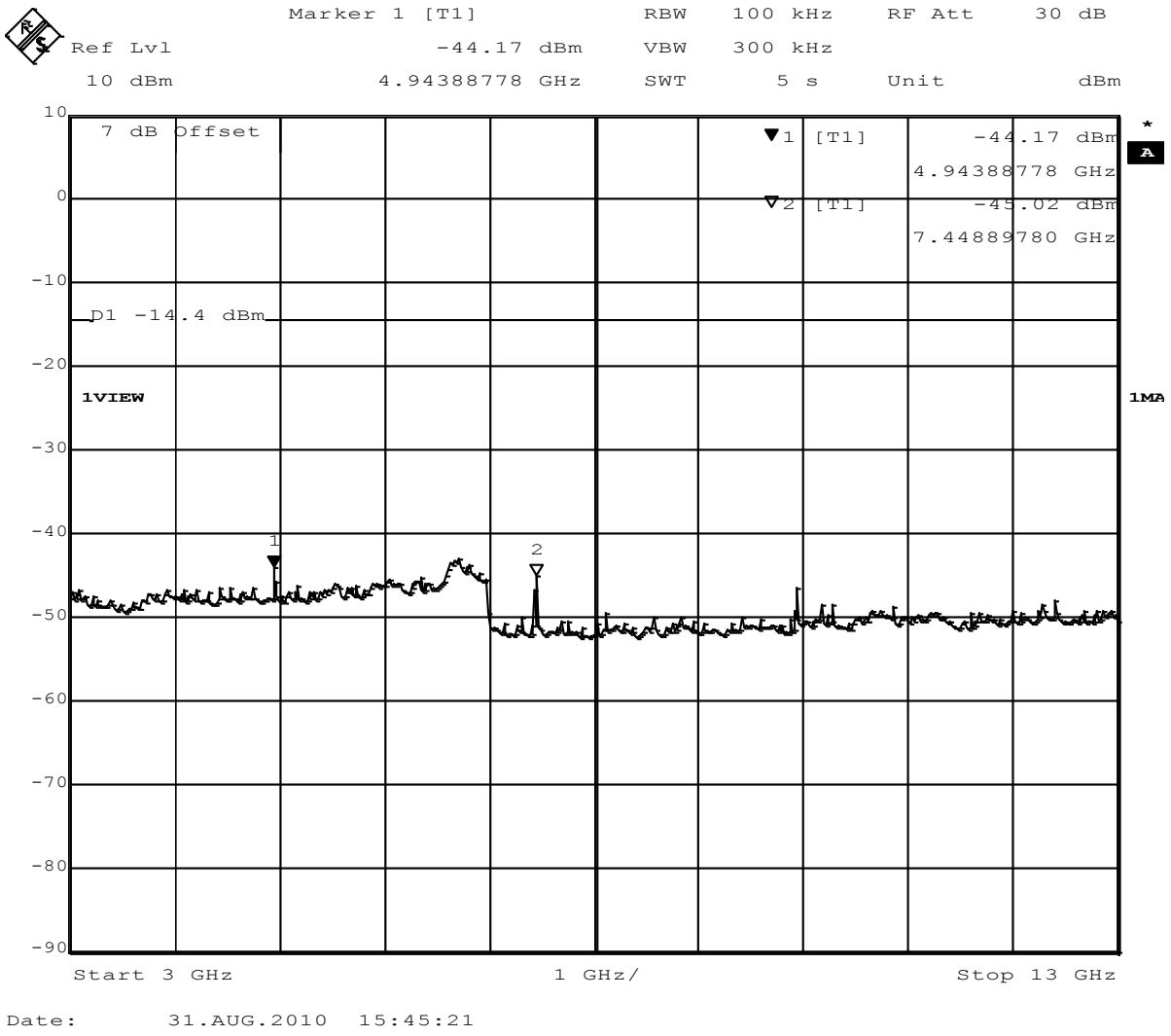
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2480 MHz
Comment 3	8DPSK



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

FCC part 15.247 (d)
Spurious Emissions

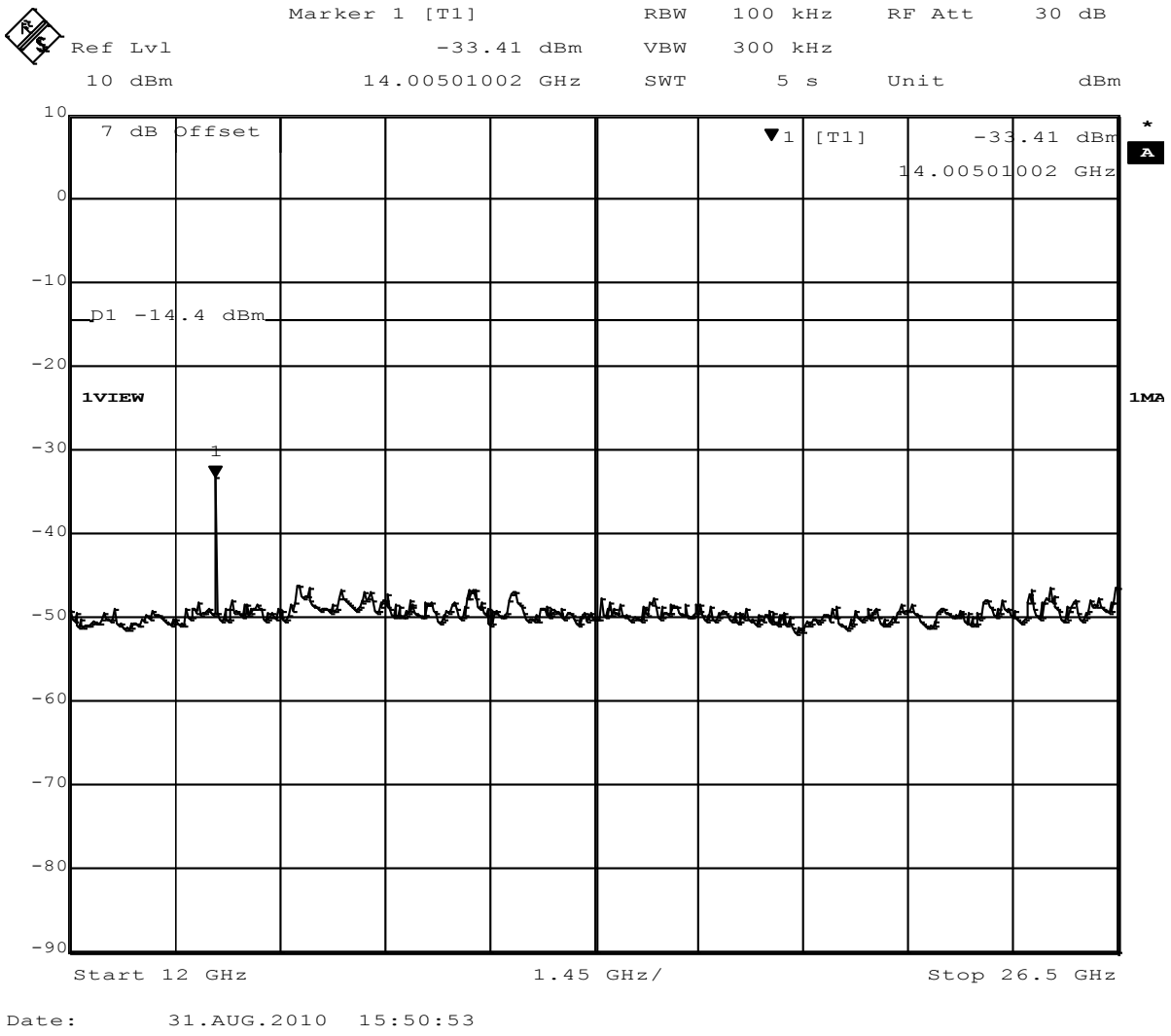
EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°C / Vnom
Test Site / Operator	Eurofins Product Service GmbH / Mr. Treffke
Test Specification	FCC part 15.247 (d)
Comment 1	Spurious Emissions conducted
Comment 2	Channel : 2480 MHz
Comment 3	8DPSK



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

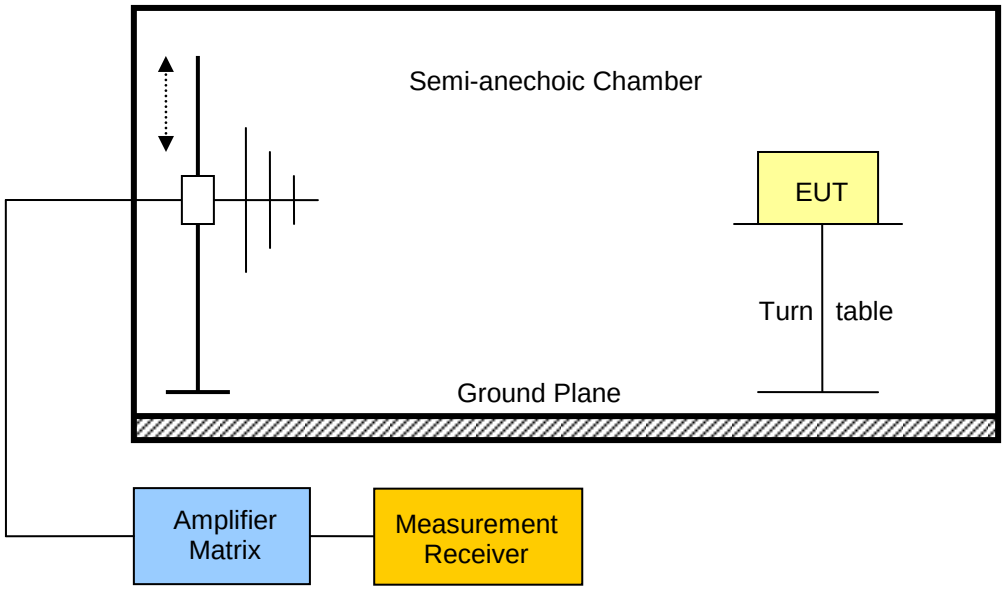
FCC part 15.247 (d)
Spurious Emissions

EUT	Bluetooth Module
Model	ENW89818C2JF / ENW89818A2JF
Approval Holder	Panasonic Electronic Devices Europe GmbH / Ord.: G0M21008-3623
Temperature / Voltage	23°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 : 2480 MHz
Comment 3	8DPSK



3.10 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated emissions acc. FCC 47 CFR 15.247 / IC RSS-210				**Verdict: PASS**
Test according referenced standards		Reference Method		
		FCC 15.247(d) / IC RSS-210 A8.5		
Test according to measurement reference		Reference Method		
		FCC Public Notice DA 00-705 / ANSI C63.4		
Test frequency range		Tested frequencies		
		30 MHz – 10th Harmonic		
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)). When average radiated emission measurements are specified, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.				
Test setup				



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

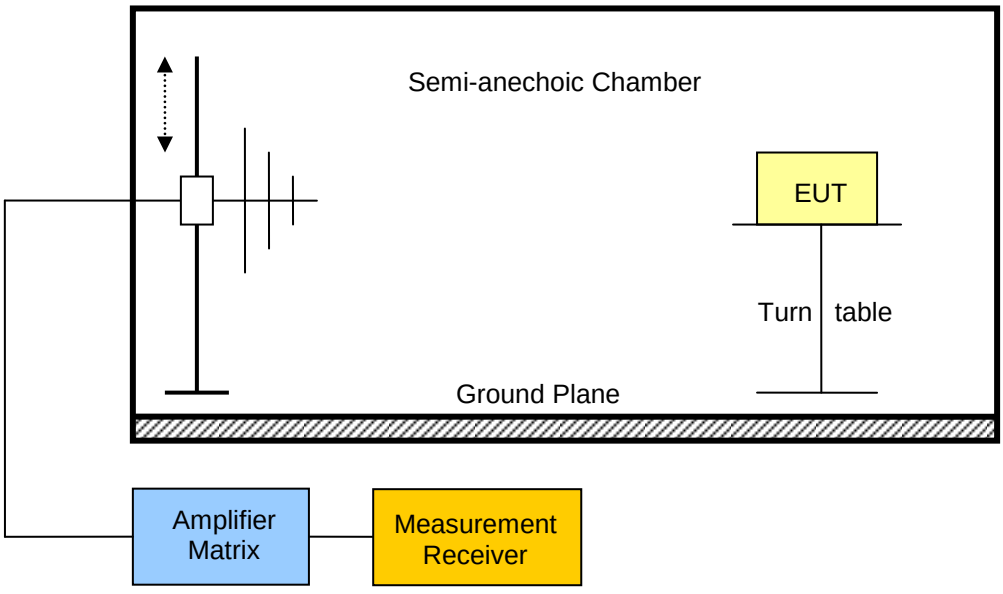
Test results

Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbµV/m]	Det.	Pol.	Limit [dbµV/m]	Limit dist. [m]*	Margin [dB]
F_{LOW}	2402	DH5-Sngl	2377	56.9	pk	hor	74	3	-17.1
F_{LOW}	2402	DH5-Sngl	2390	39.8	avg	hor	54	3	-14.2
F_{LOW}	2402	DH5-Sngl	4802	55.9	pk	hor	74	3	-18.2
F_{LOW}	2402	DH5-Sngl	4804	29.7	avg	hor	54	3	-24.3
F_{MID}	2441	DH5-Sngl	7327	55.3	pk	hor	74	3	-18.7
F_{MID}	2441	DH5-Sngl	7323	46.7	avg	hor	54	3	-7.3
F_{HIGH}	2480	DH5-Sngl	7439	55.3	pk	hor	74	3	-18.7
F_{HIGH}	2480	DH5-Sngl	7440	43.1	avg	hor	54	3	-10.9
F_{LOW}	2402	3-DH5-Sngl	No significant spurious emissions						
F_{MID}	2441	3-DH5-Sngl	4882	54.8	pk	ver	74	3	-19.2
F_{MID}	2441	3-DH5-Sngl	4881	45.7	avg	ver	54	3	-8.3
F_{MID}	2441	3-DH5-Sngl	4882	55.6	pk	hor	74	3	-18.4
F_{MID}	2441	3-DH5-Sngl	4881	47.9	avg	hor	54	3	-6.1
F_{HIGH}	2480	3-DH5-Sngl	No significant spurious emissions						

Comments: * Physical distance between EUT and measurement antenna.

3.11 Test Conditions and Results – Receiver radiated emissions

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



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

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbµV/m]	Emission Level [µV/m]	Det.	Limit [µV/m]	Margin [µV/m]
F_{MID}	2441	7816	50.8	346.7	pk	500	-153.30

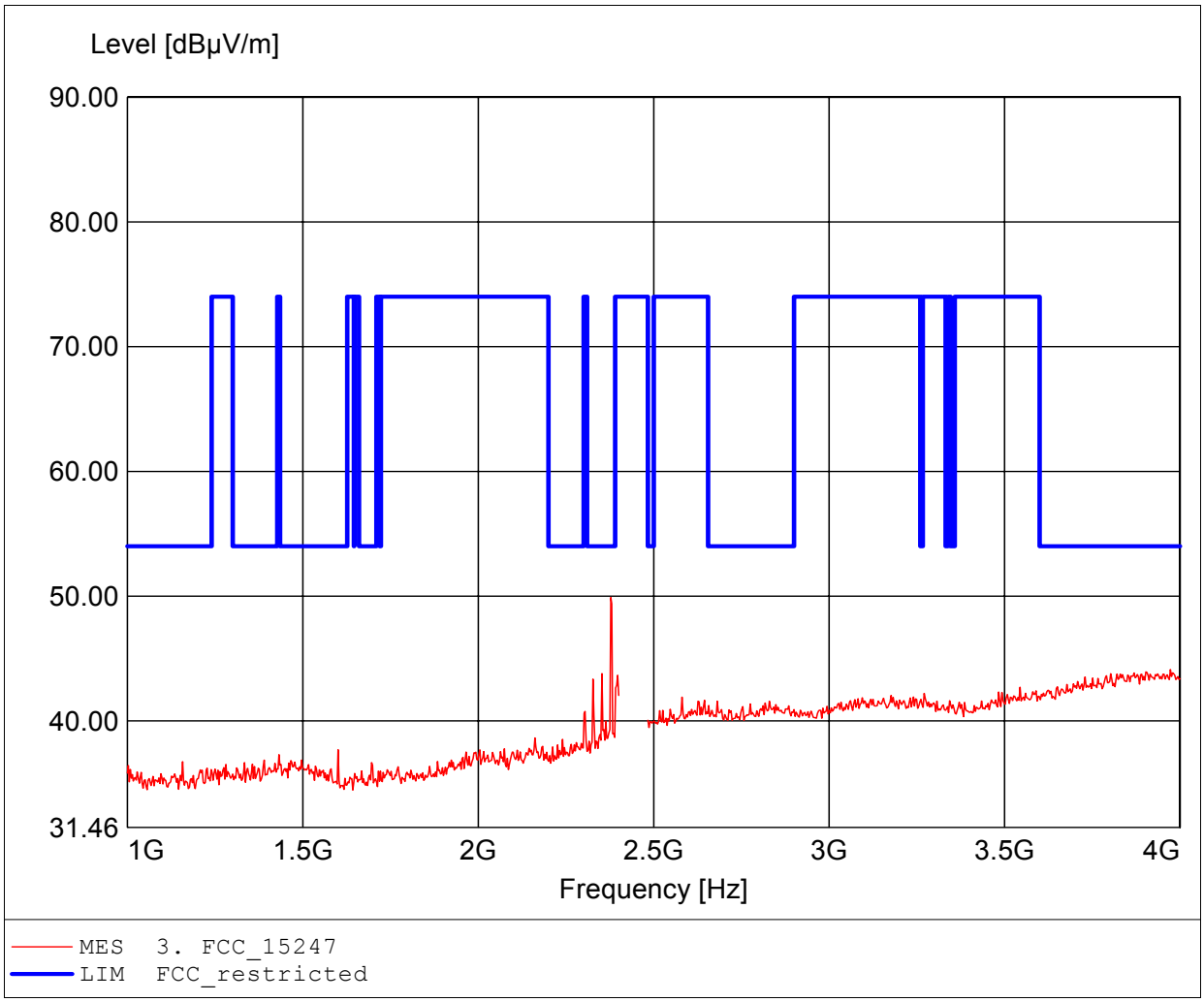
Comments:
* Physical distance between EUT and measurement antenna.

ANNEX A Transmitter radiated spurious emissions

Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

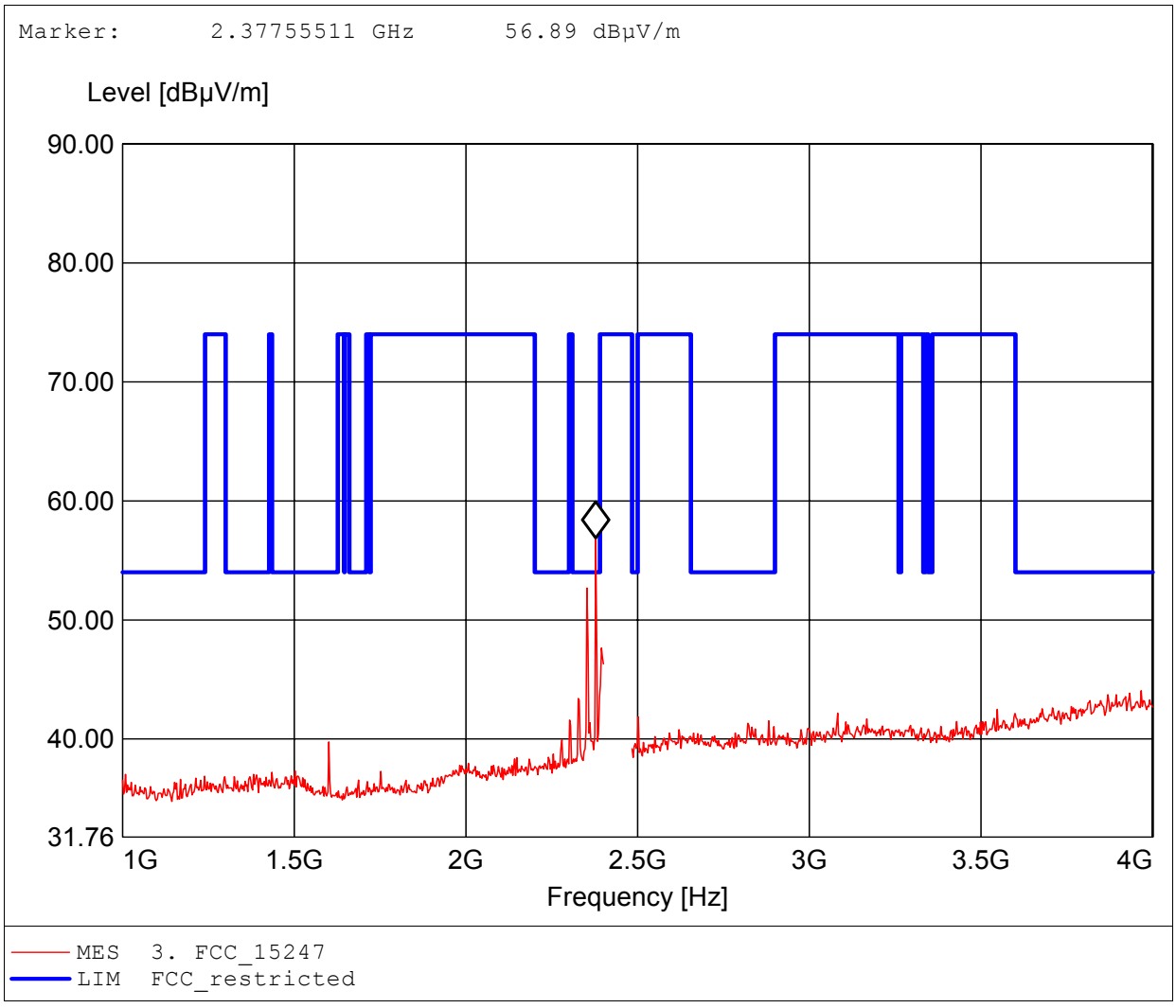
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.378GHz, Emax: 49.89dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

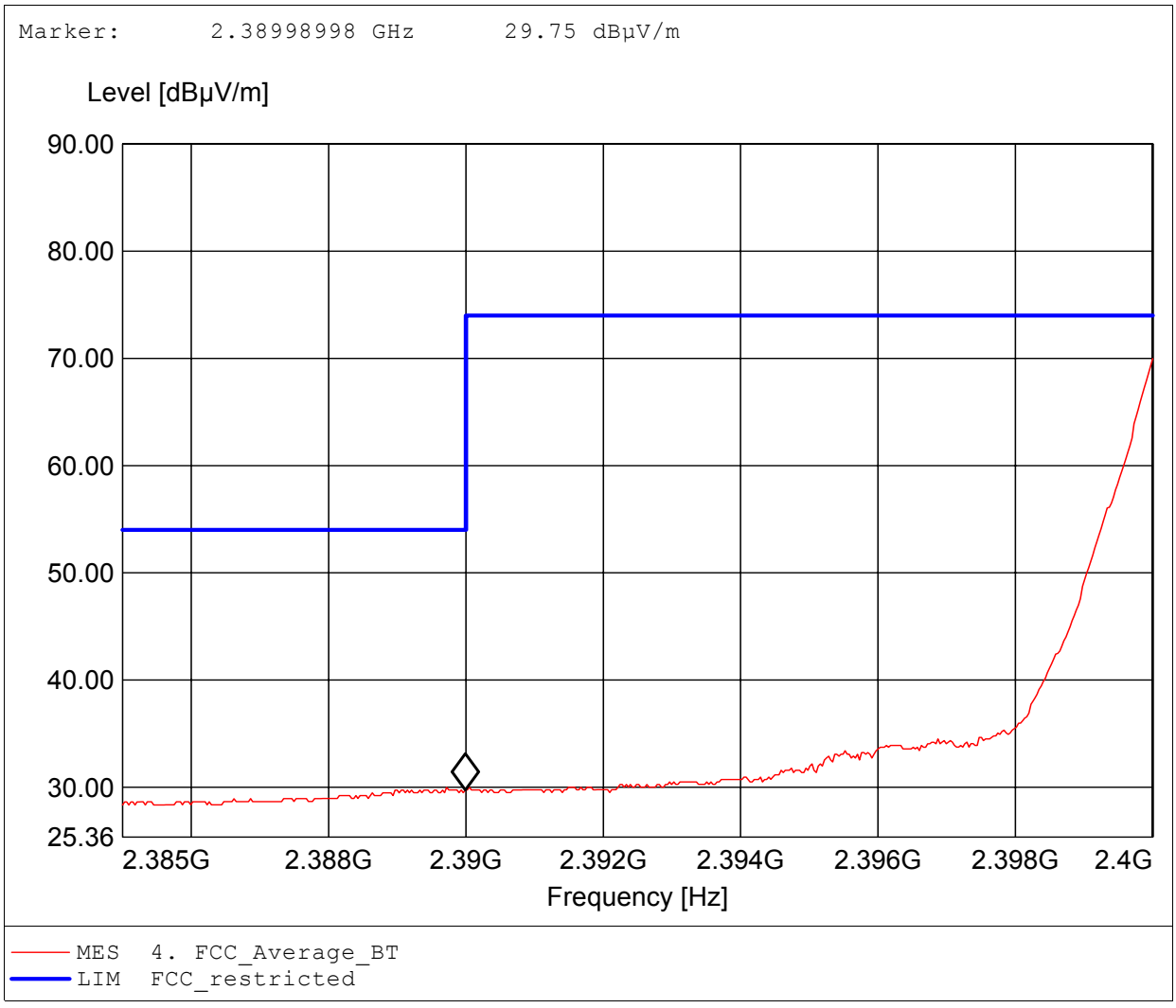
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.378GHz, Emax: 56.89dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

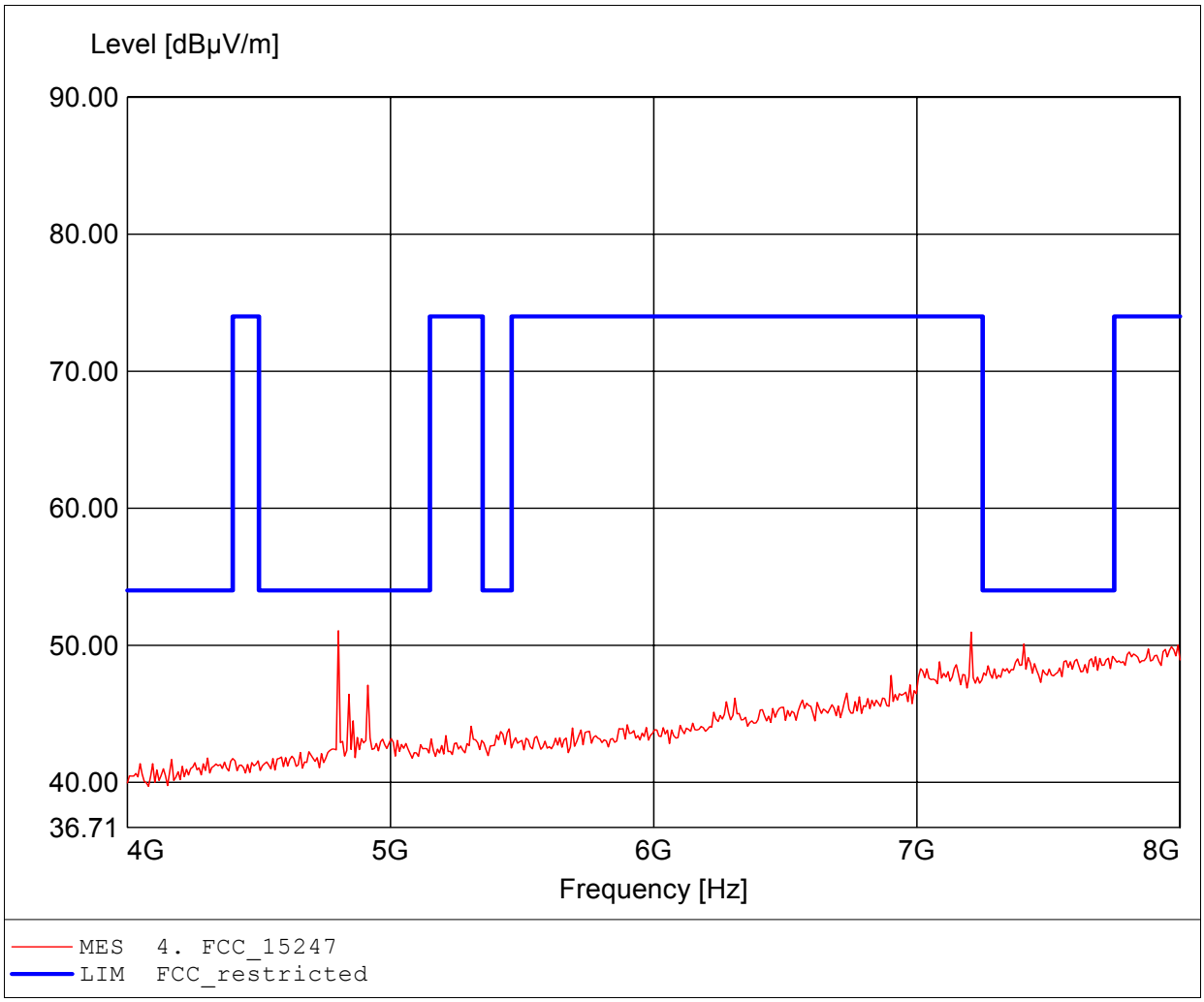
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 2.400GHz, Emax: 69.98dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

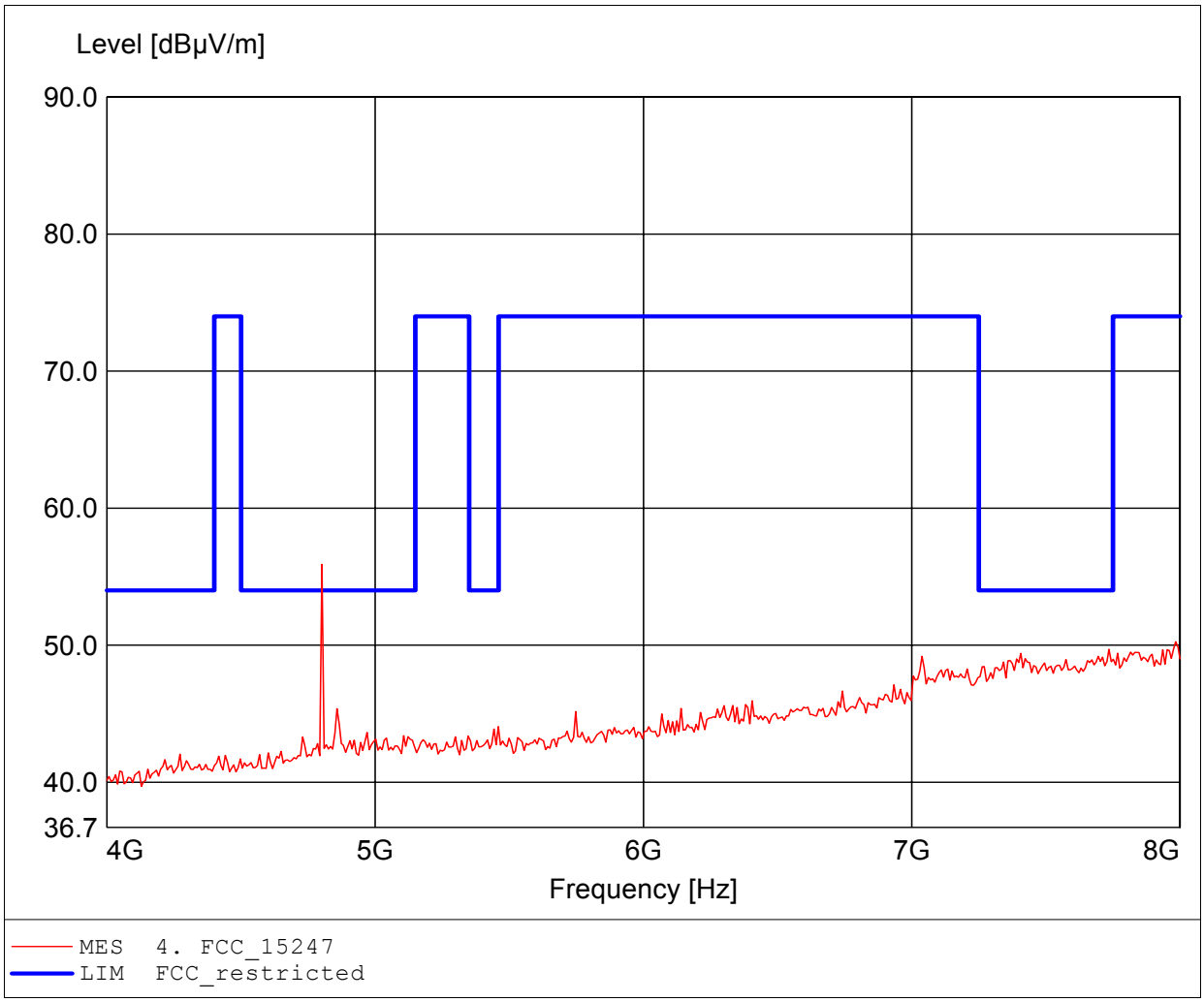
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.802GHz, Emax: 51.06dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

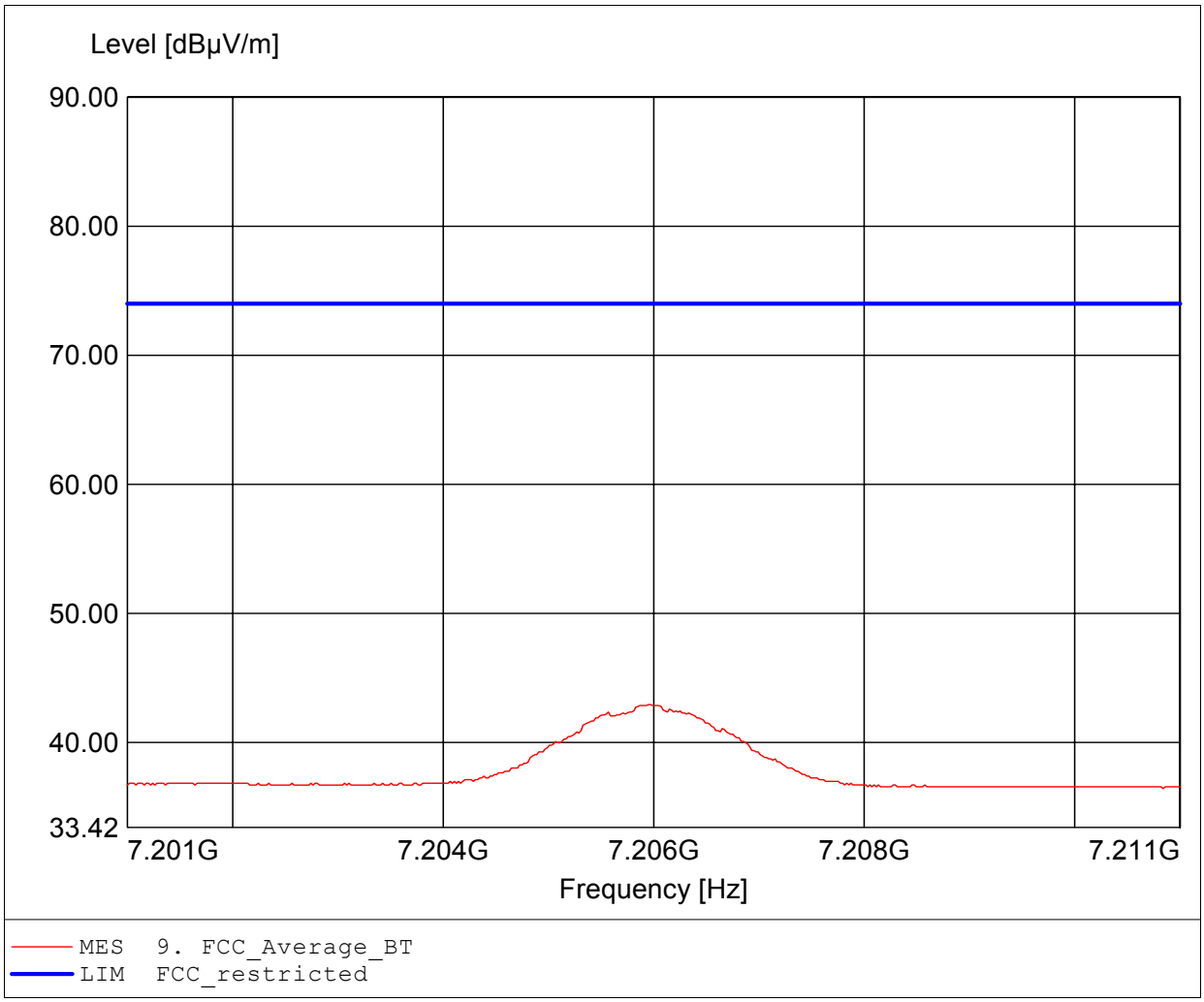
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.802GHz, Emax: 55.90dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

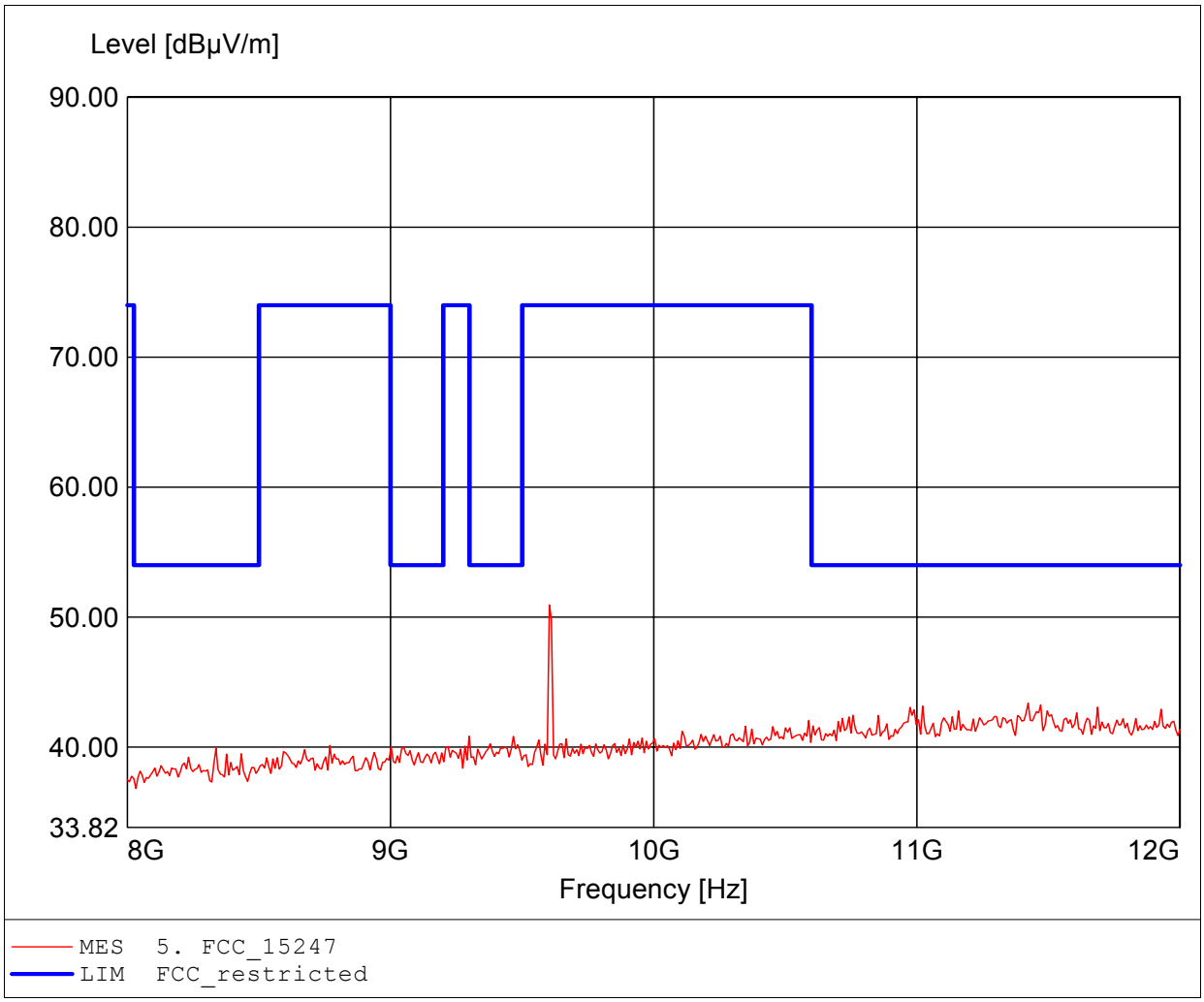
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 7.206GHz, Pmax: 42.94dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

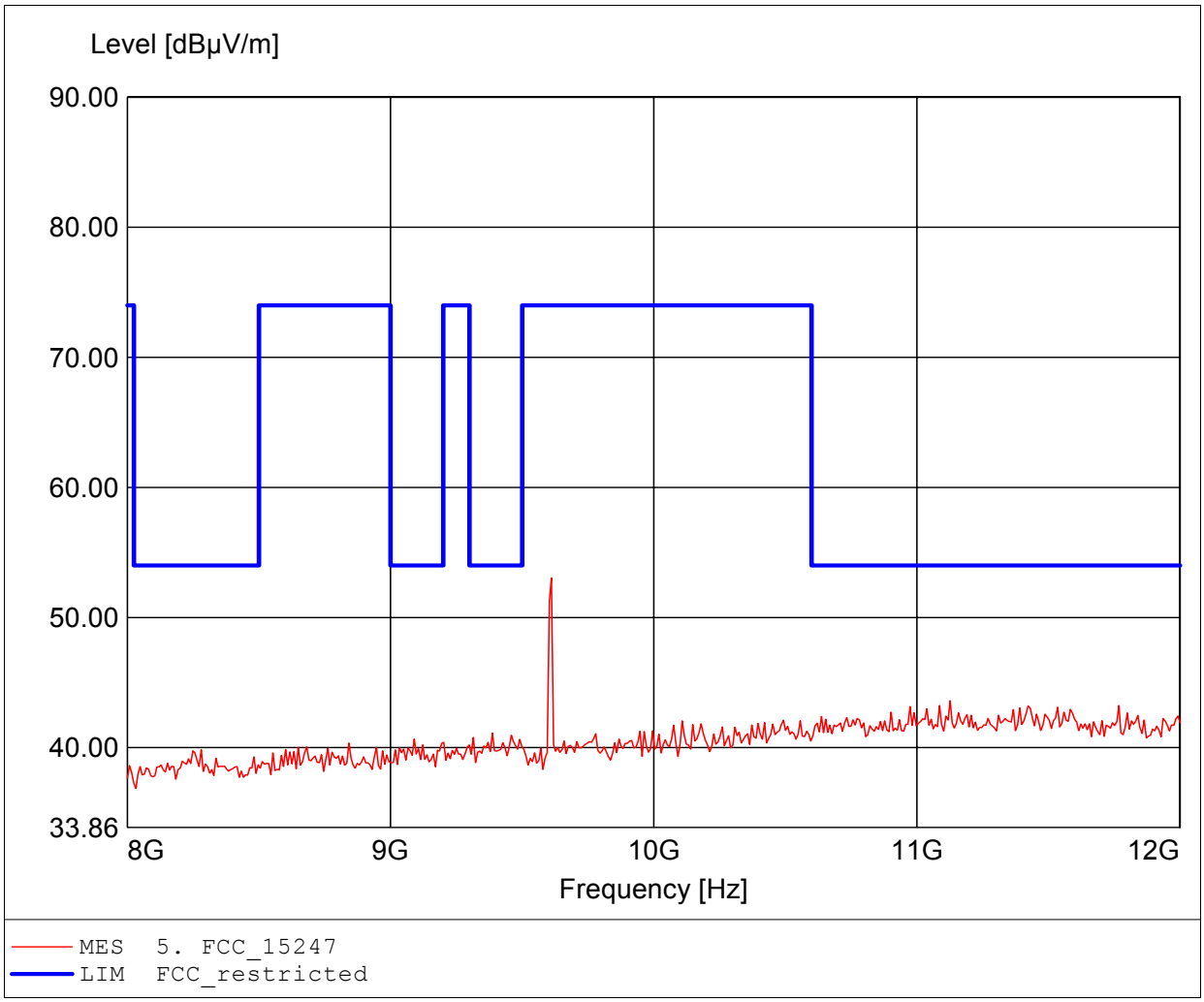
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 9.603GHz, Emax: 50.95dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

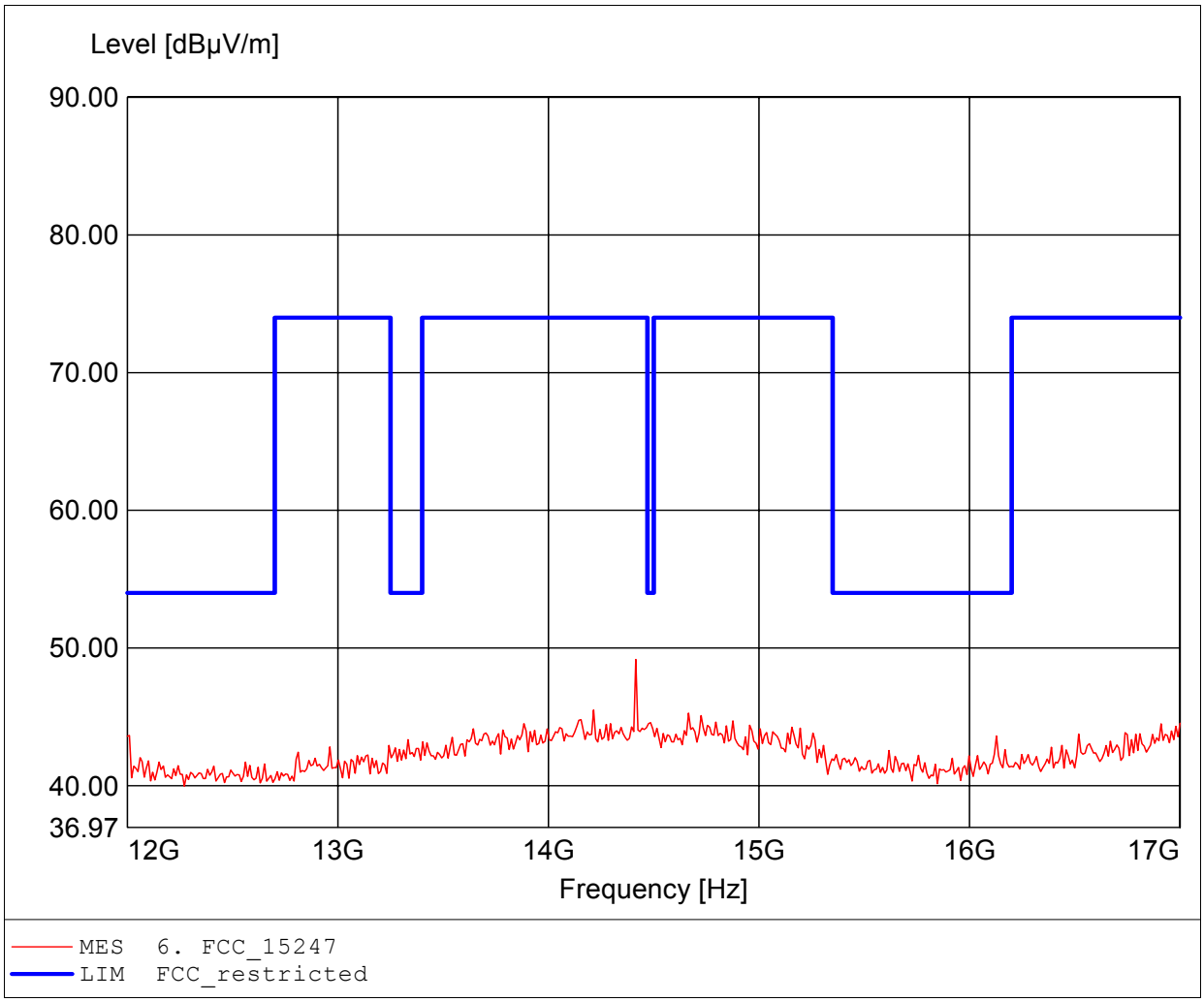
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 9.611GHz, Emax: 53.05dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

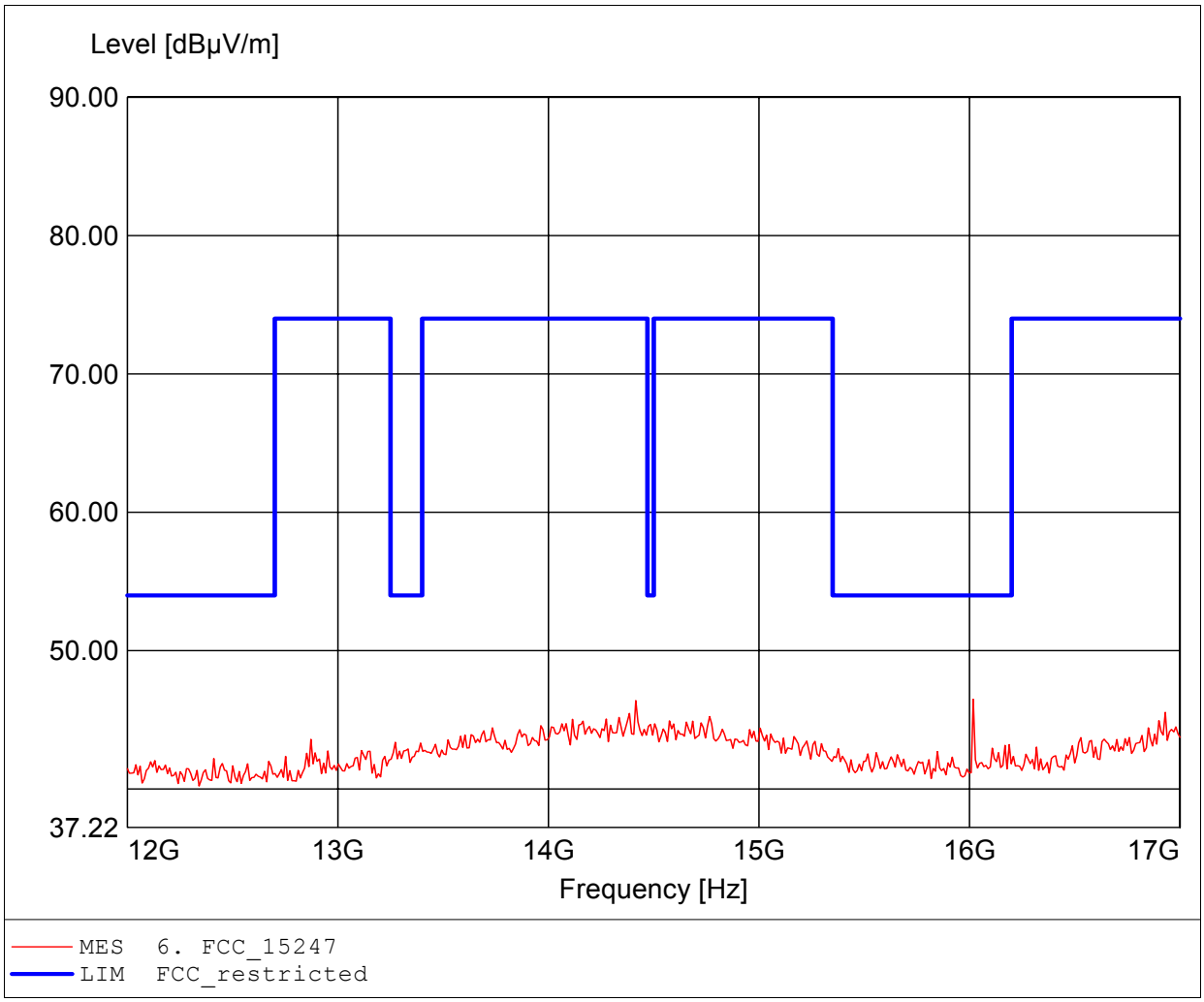
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.415GHz, Emax: 49.17dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

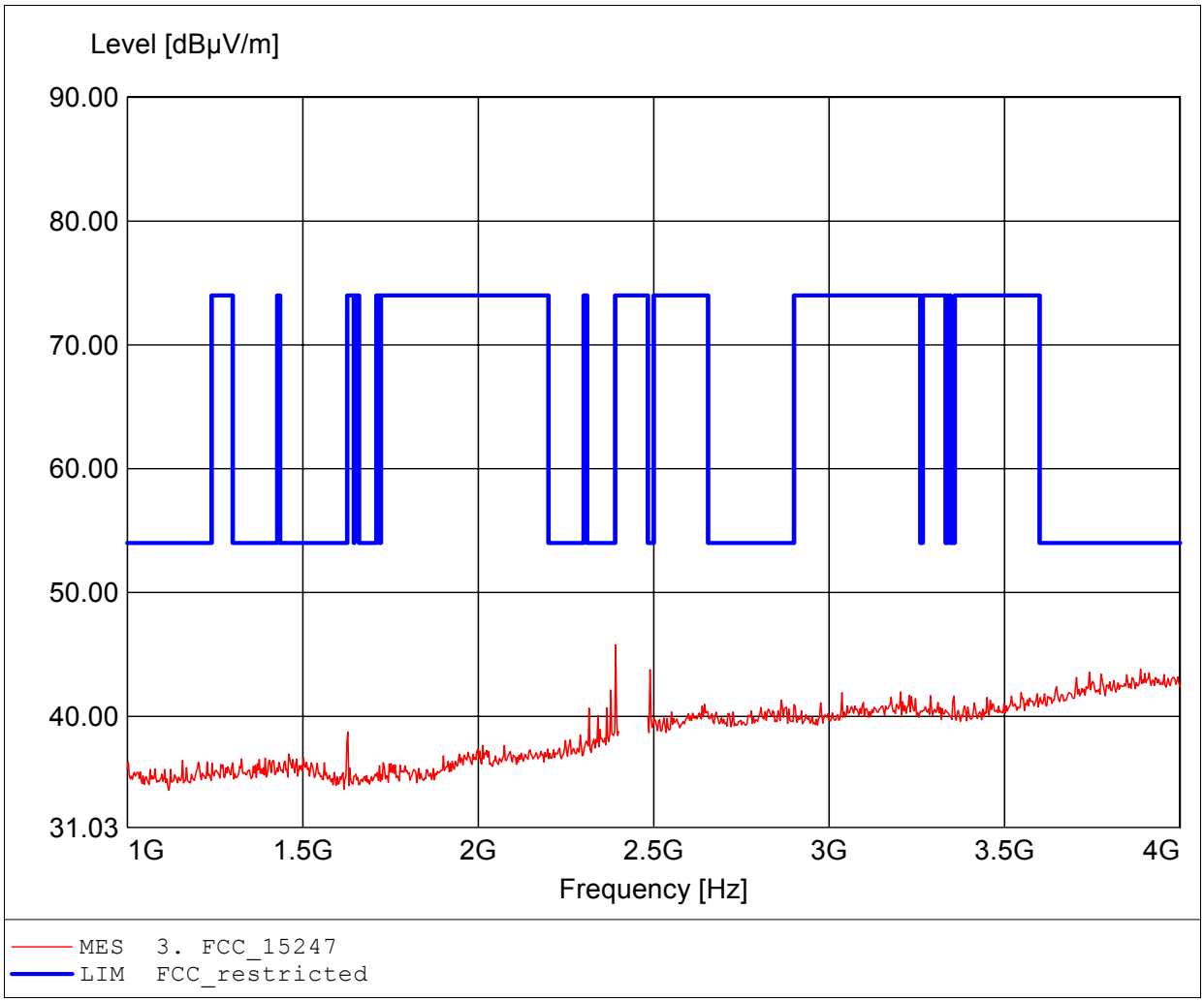
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 16.018GHz, Emax: 46.48dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

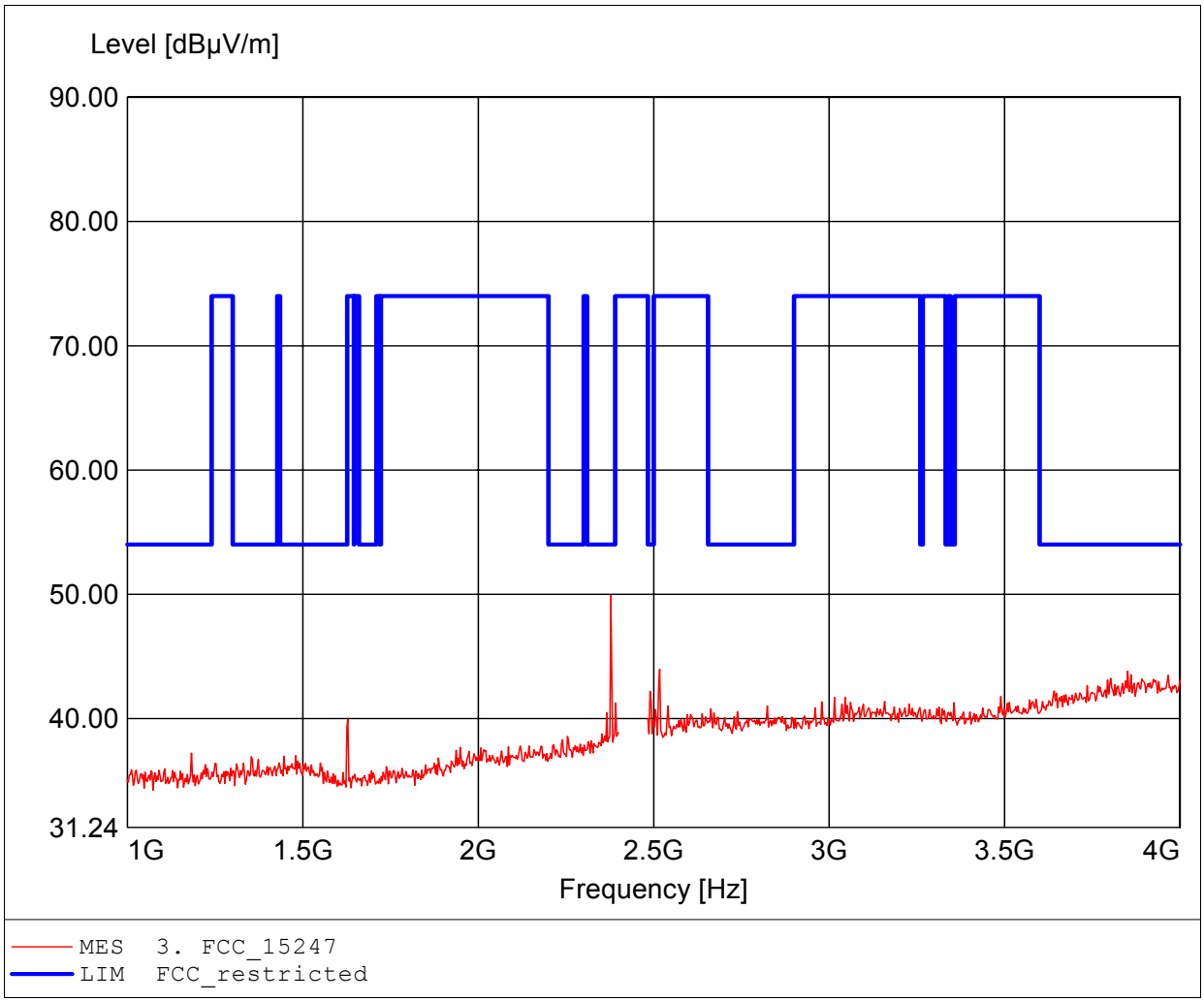
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.392GHz, Emax: 45.77dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

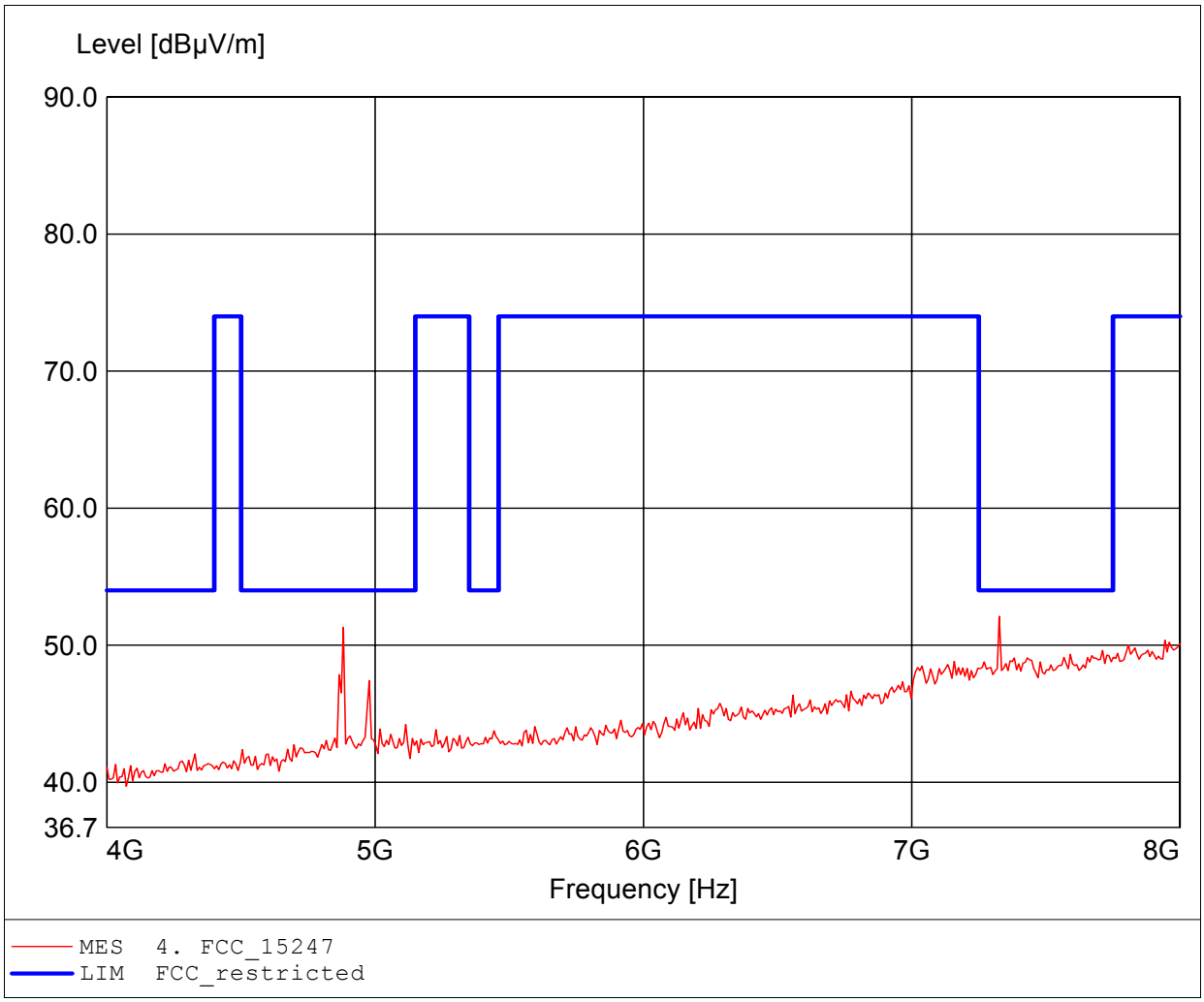
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.378GHz, Emax: 49.91dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

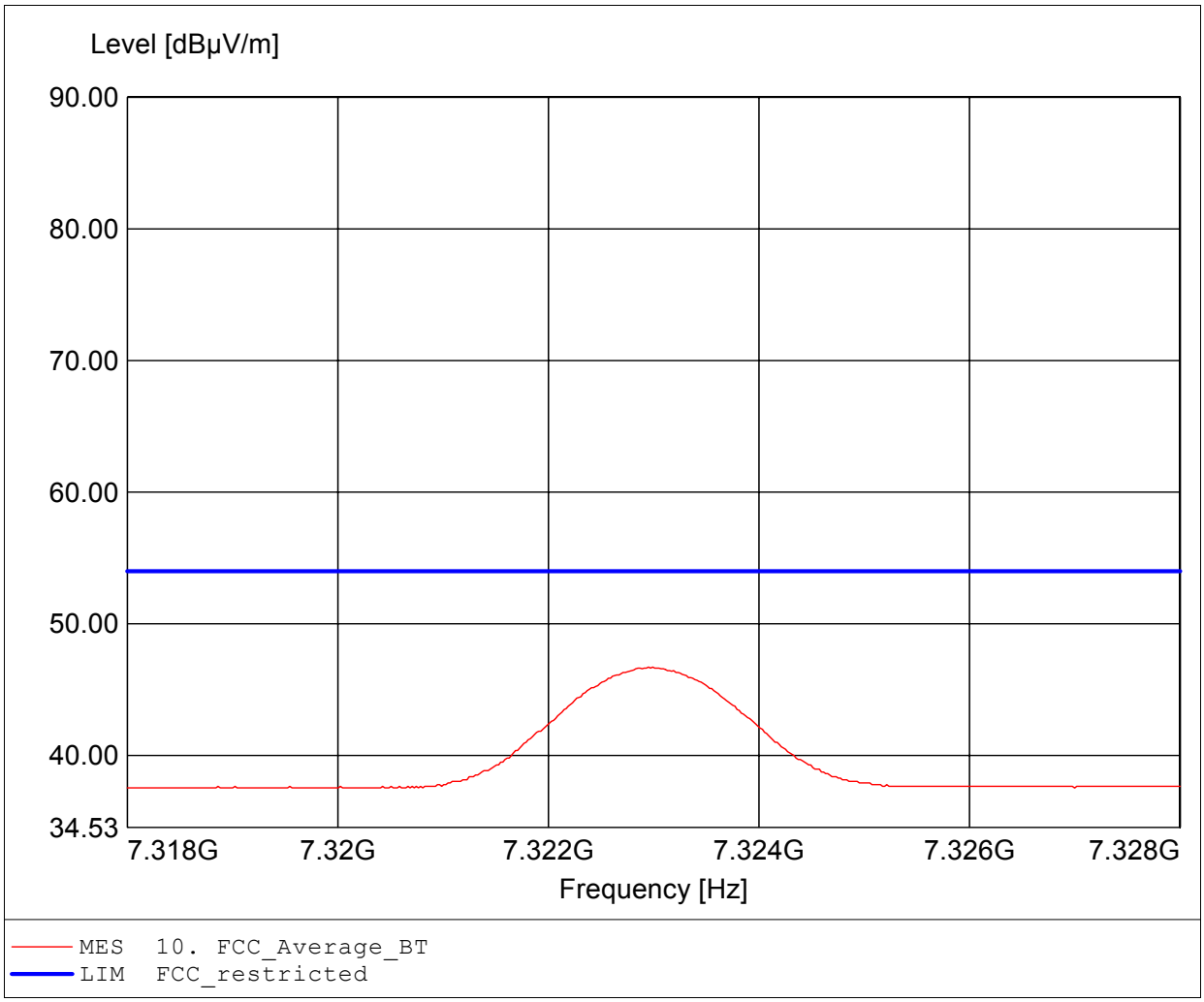
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.327GHz, Emax: 52.10dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

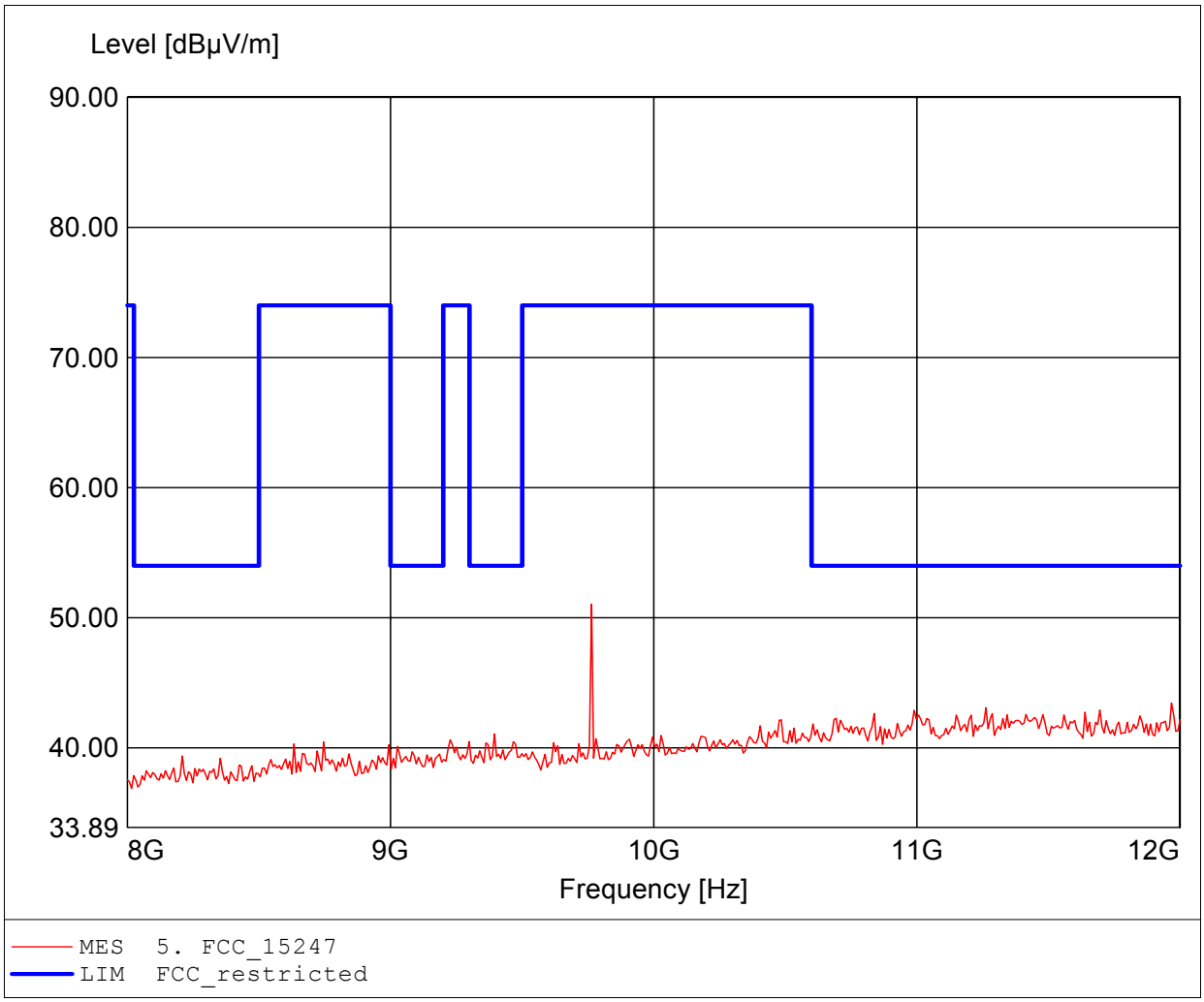
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 7.323GHz, Pmax: 46.72dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

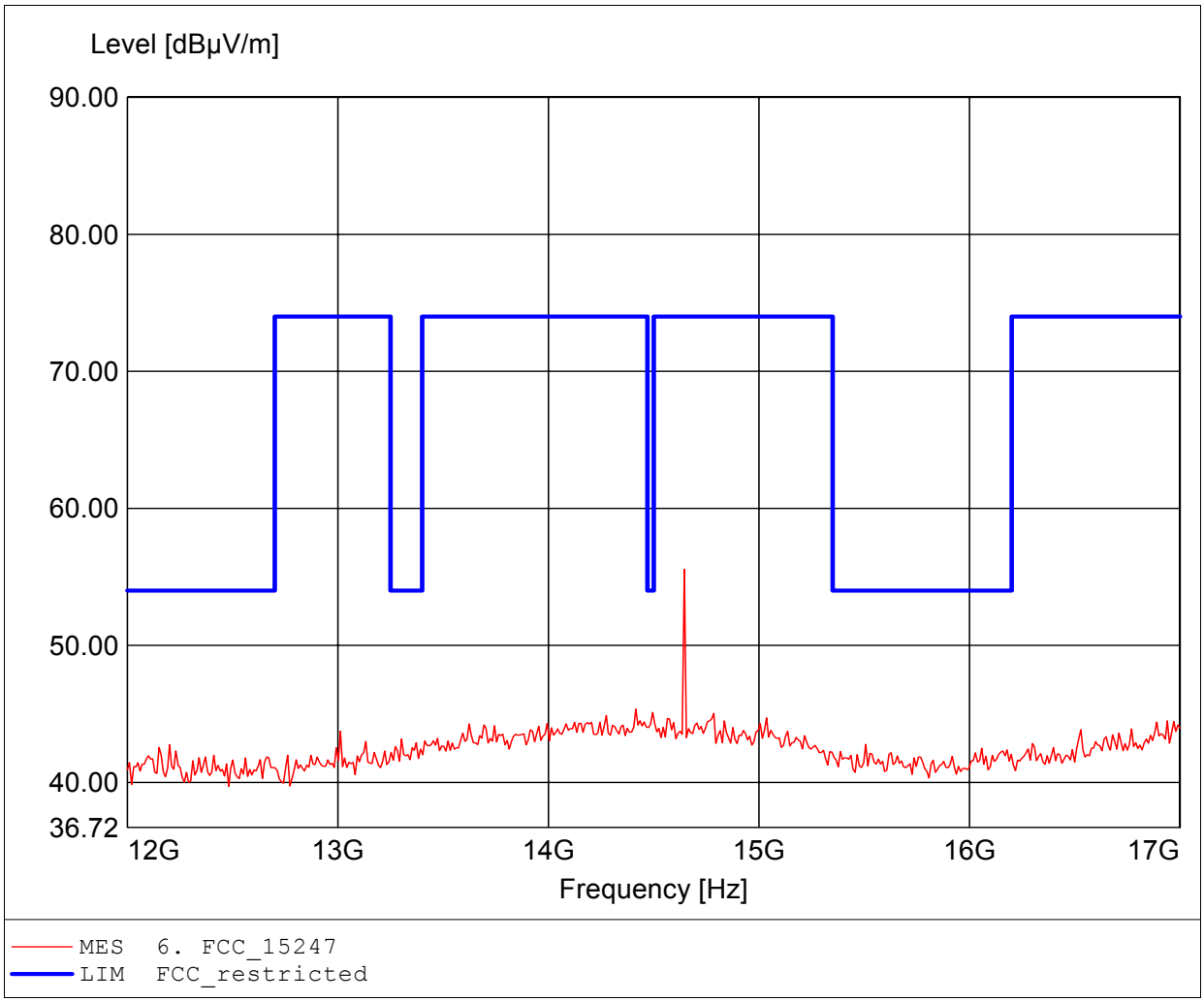
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 9.764GHz, Emax: 51.05dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

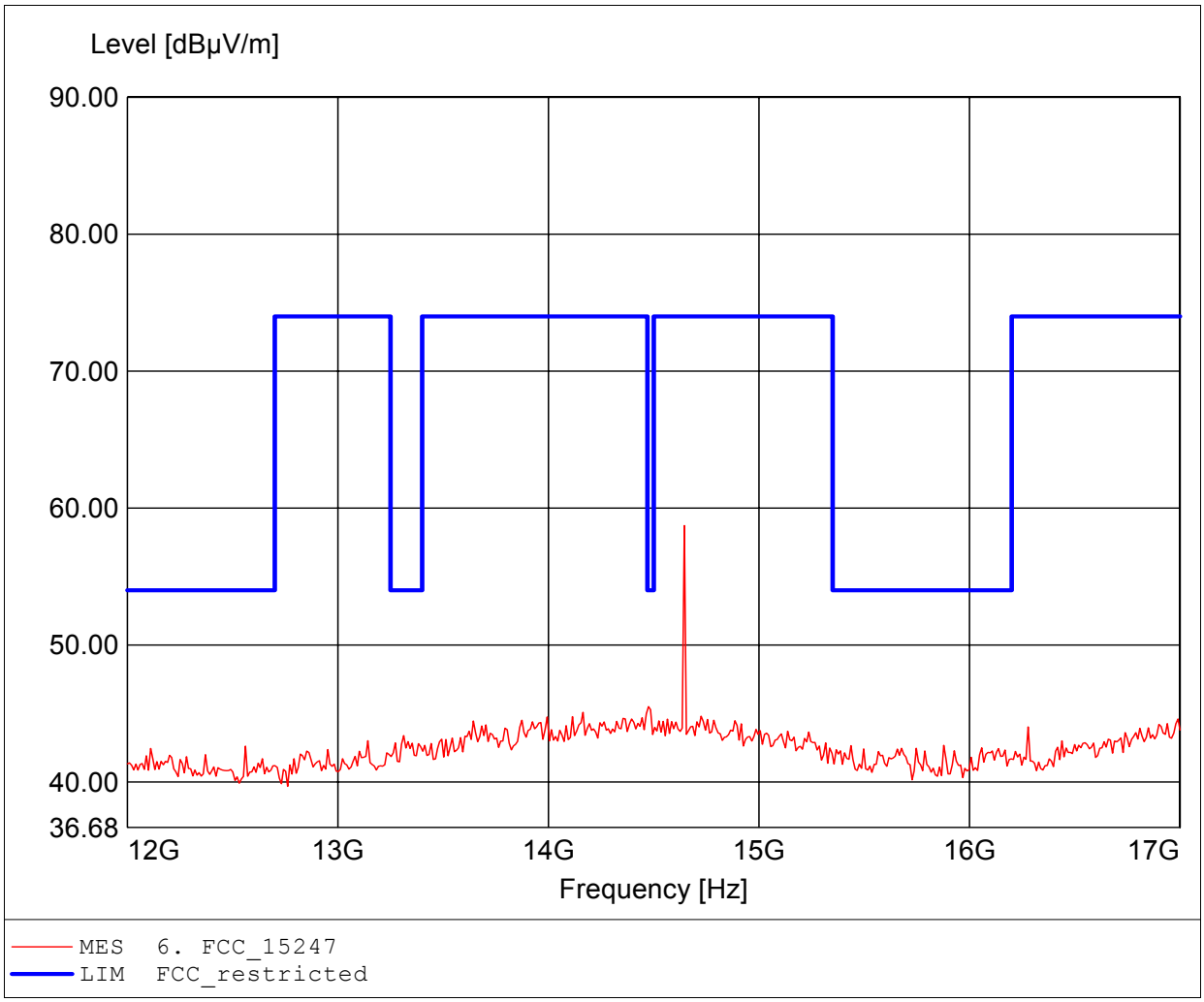
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.645GHz, Emax: 55.55dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

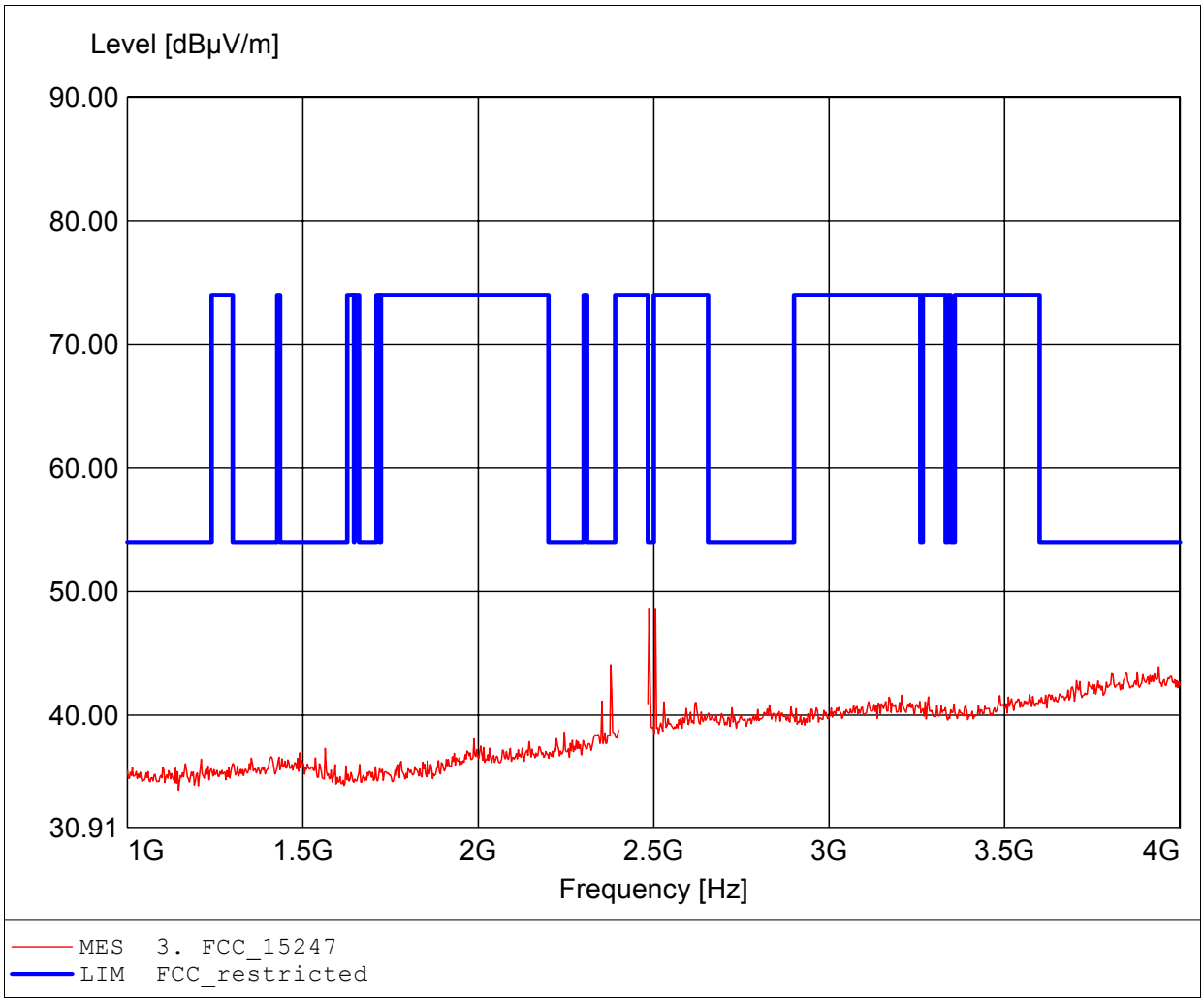
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.645GHz, Emax: 58.72dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

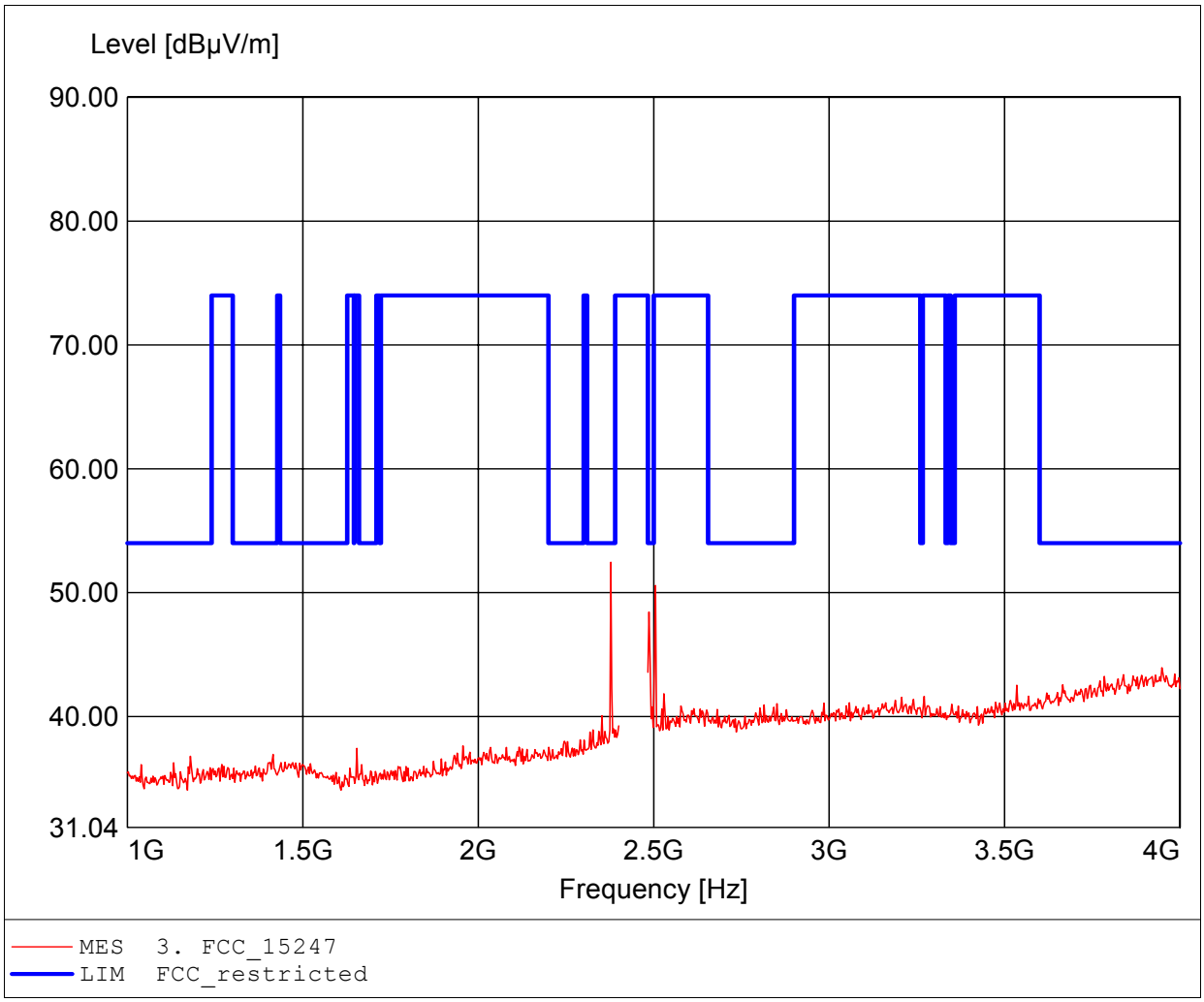
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.487GHz, Emax: 48.66dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

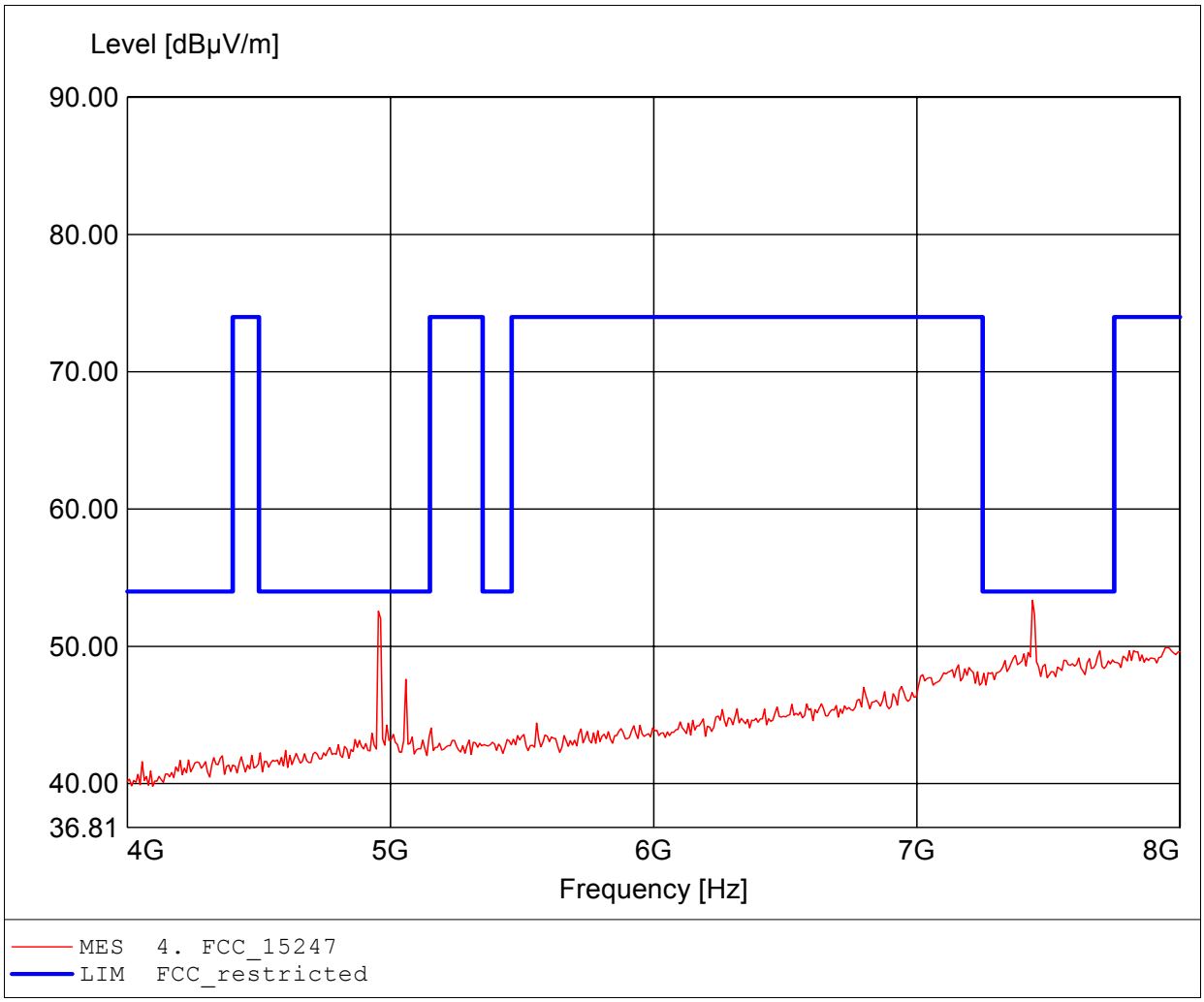
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 2.378GHz, Emax: 52.46dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

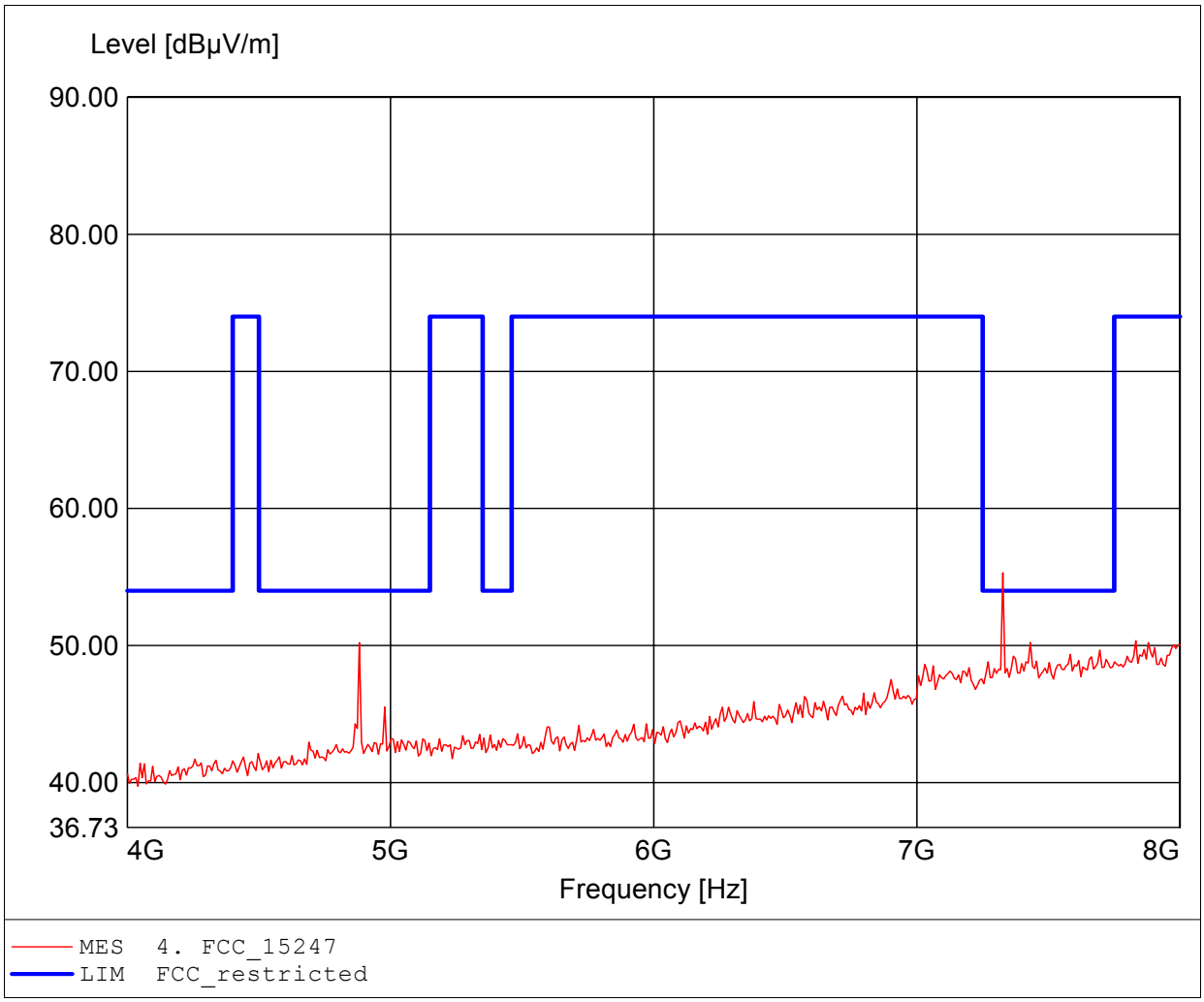
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.439GHz, Emax: 53.35dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

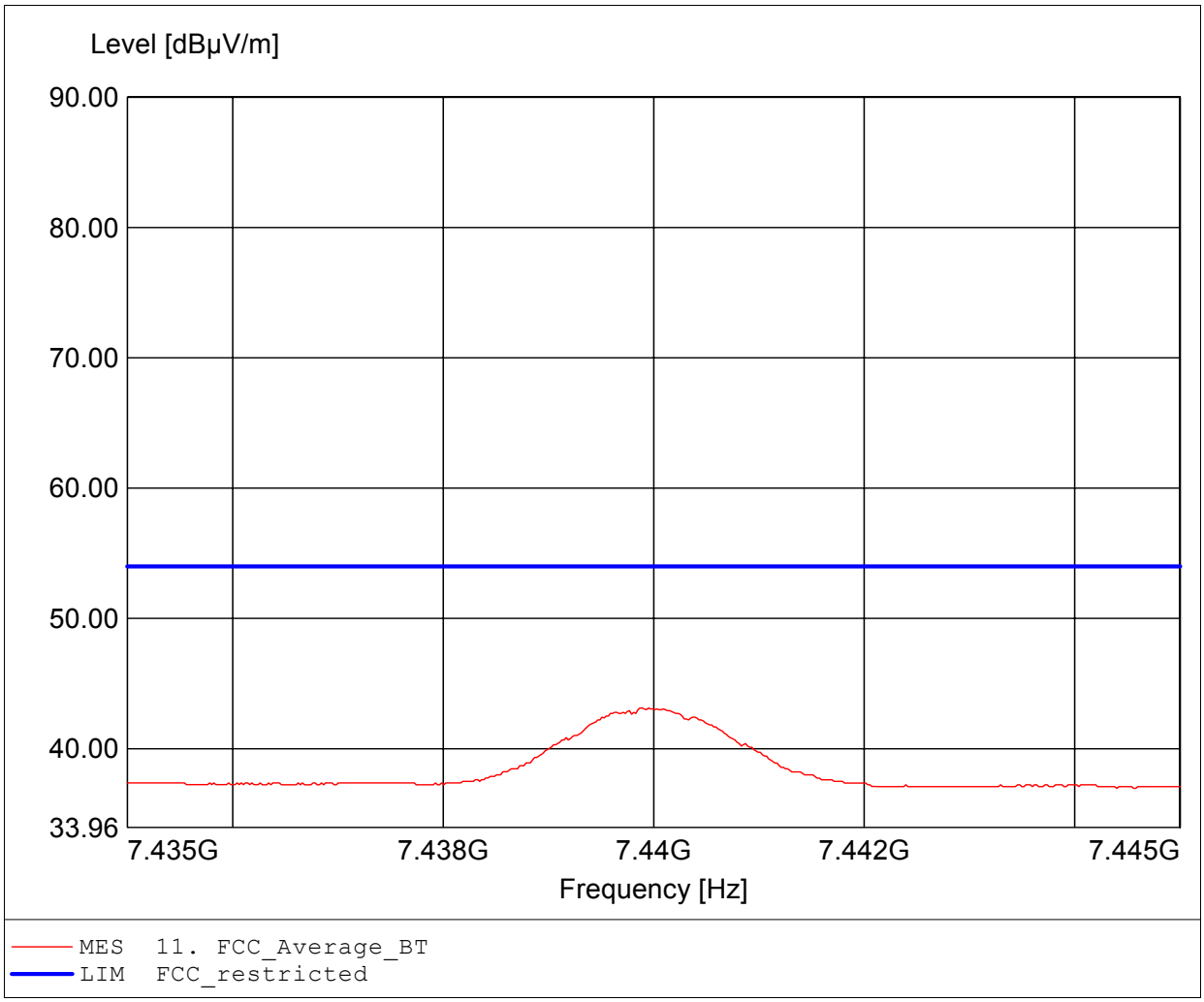
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.327GHz, Emax: 55.31dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

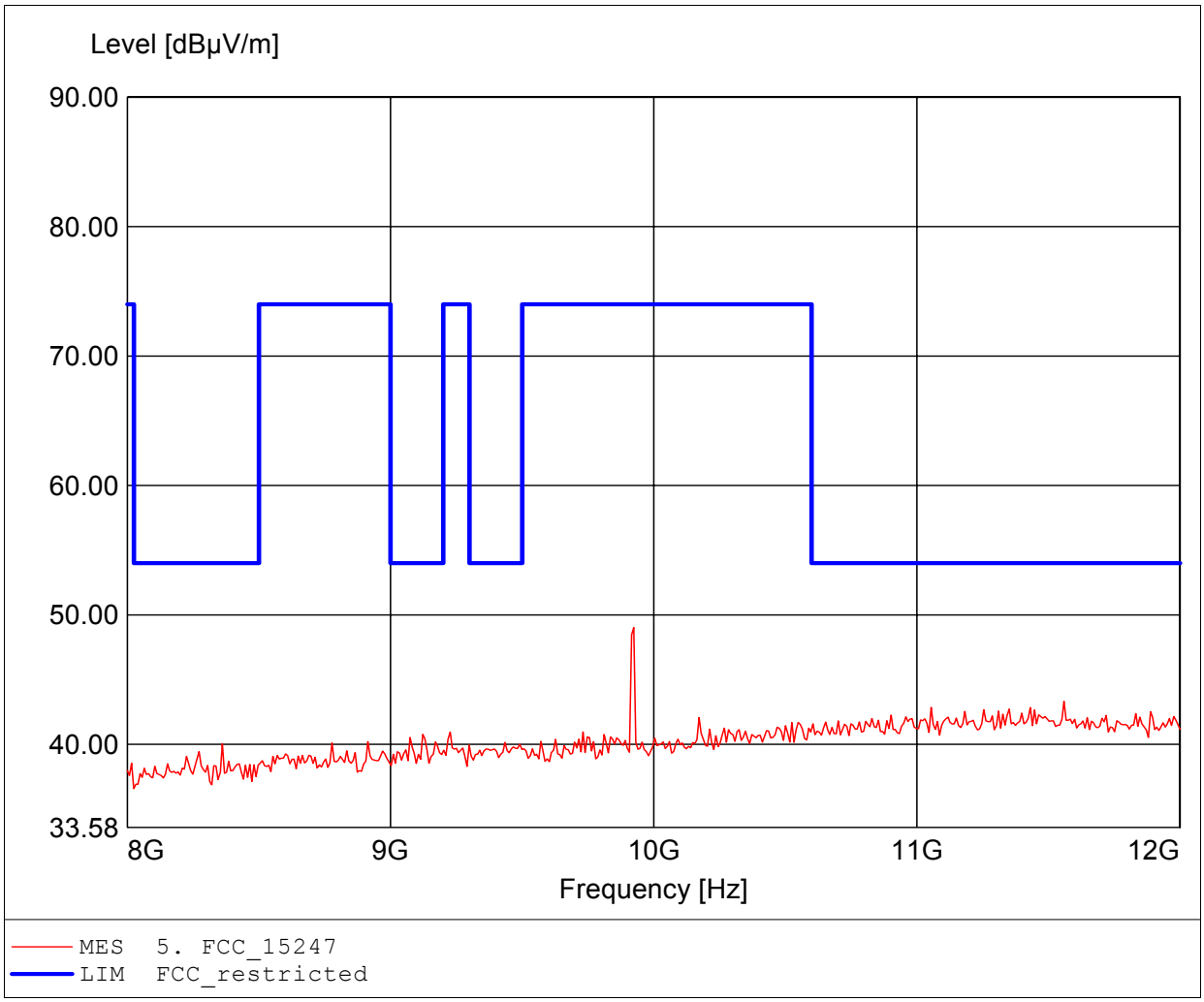
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 7.440GHz, Pmax: 43.13dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

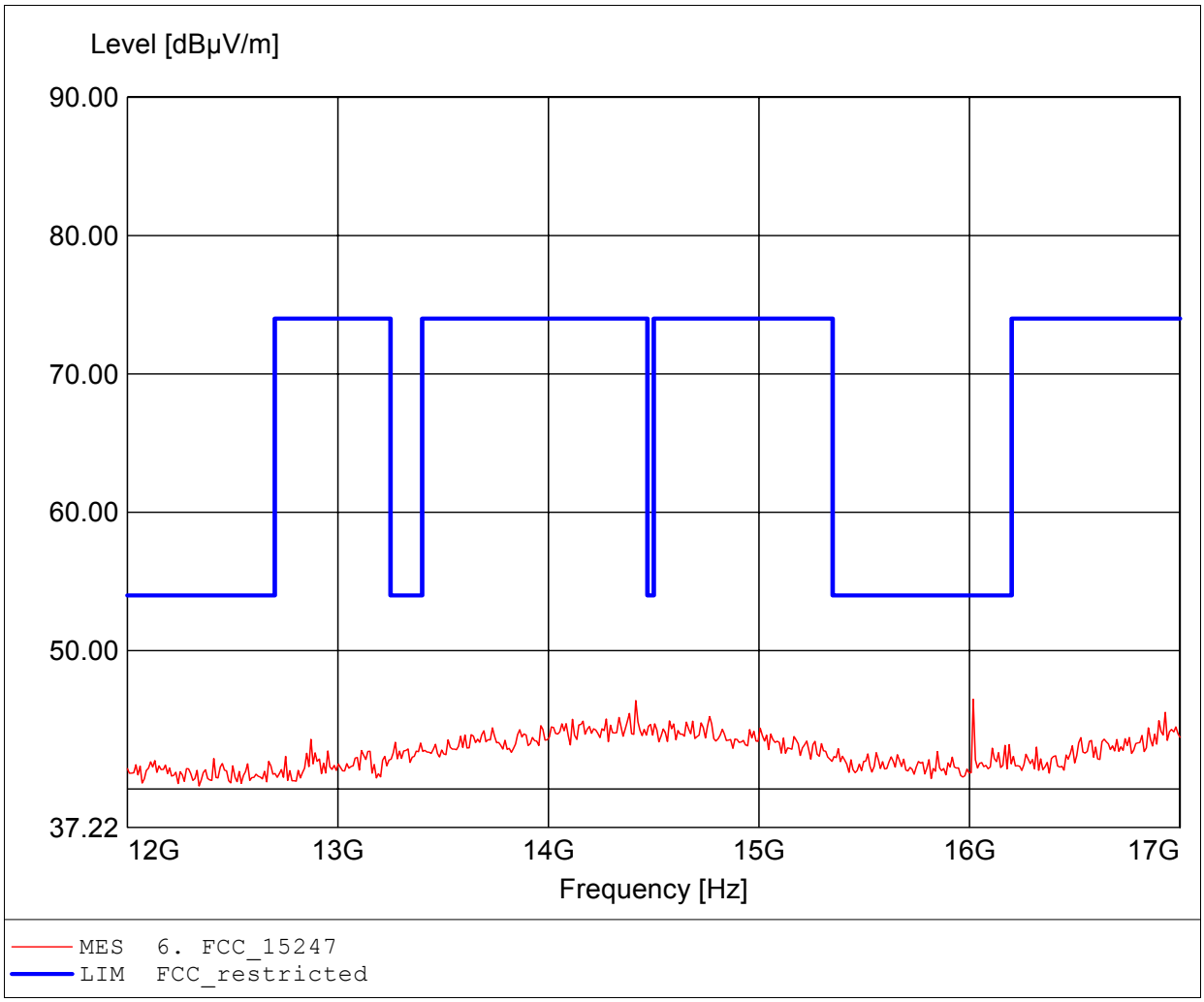
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 9.924GHz, Emax: 49.03dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

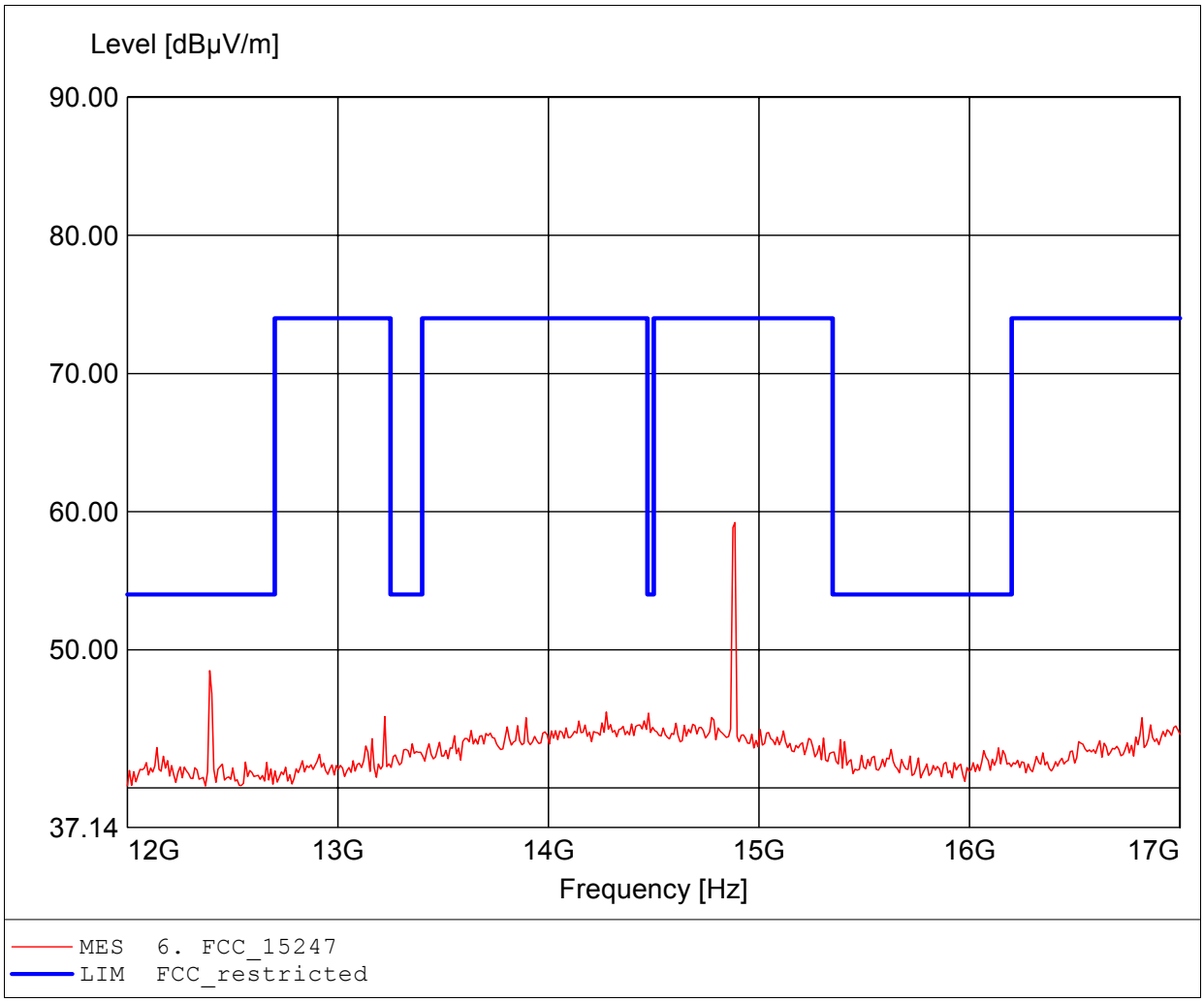
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 16.018GHz, Emax: 46.48dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

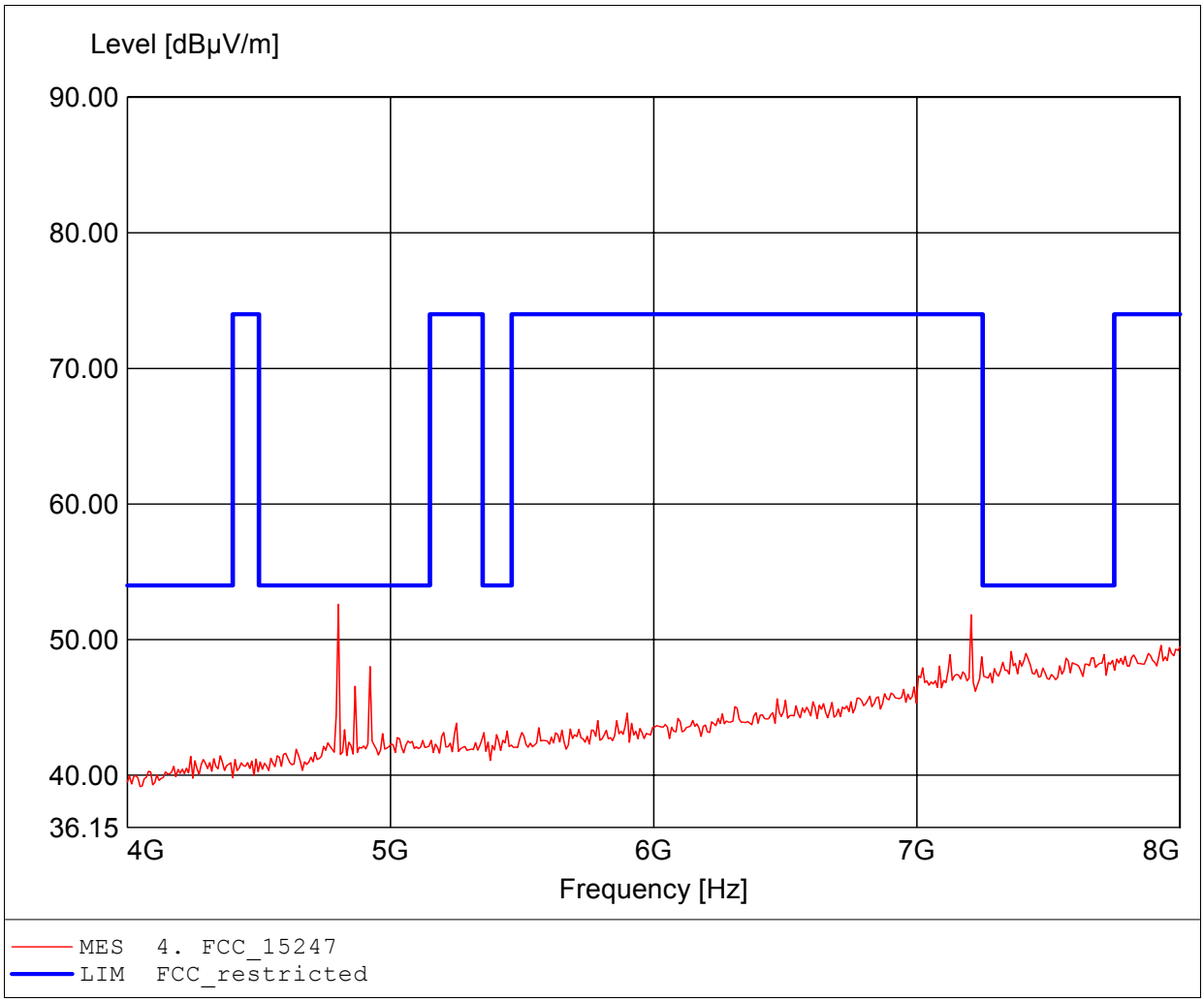
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.886GHz, Emax: 59.21dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

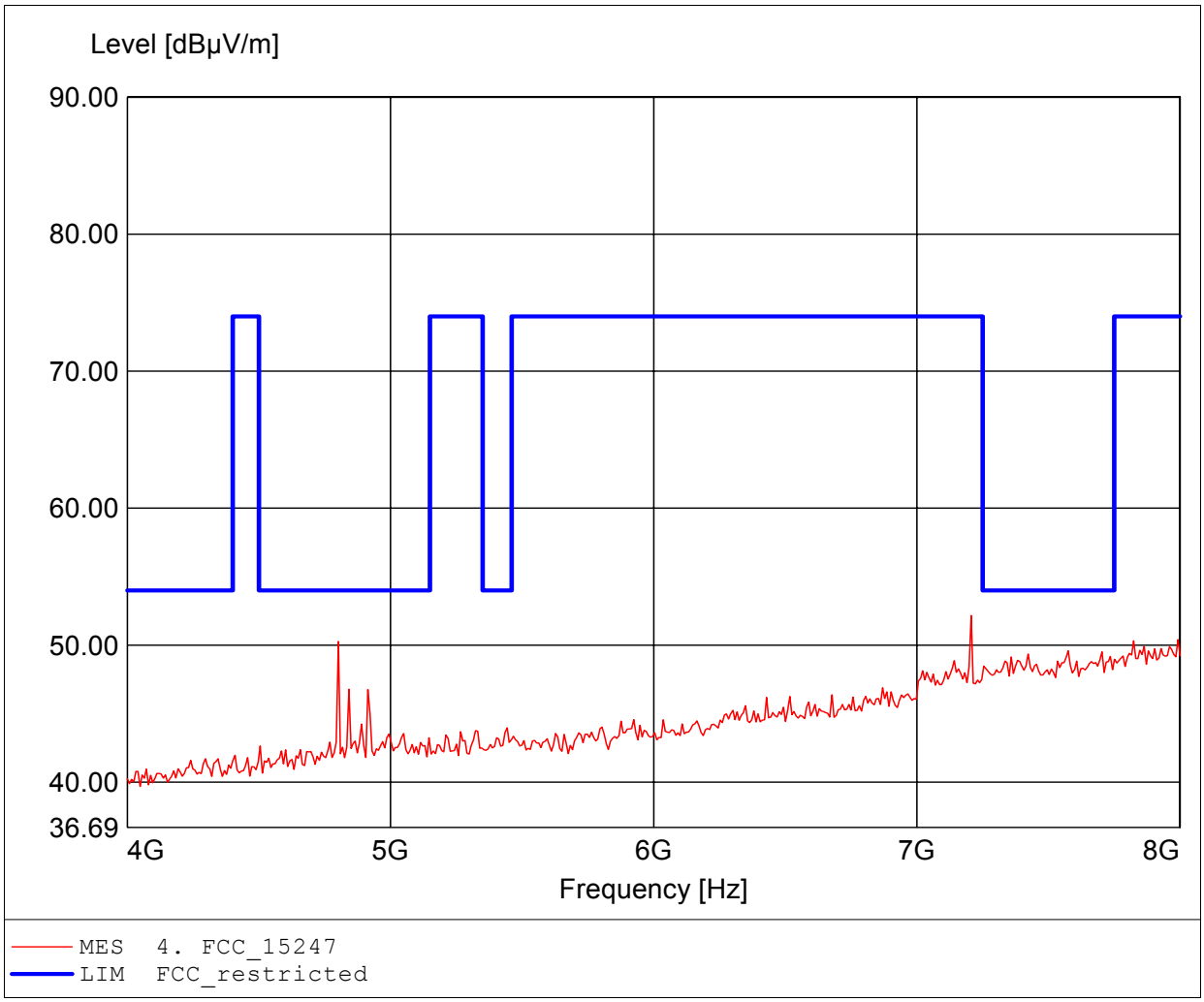
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.802GHz, Emax: 52.60dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

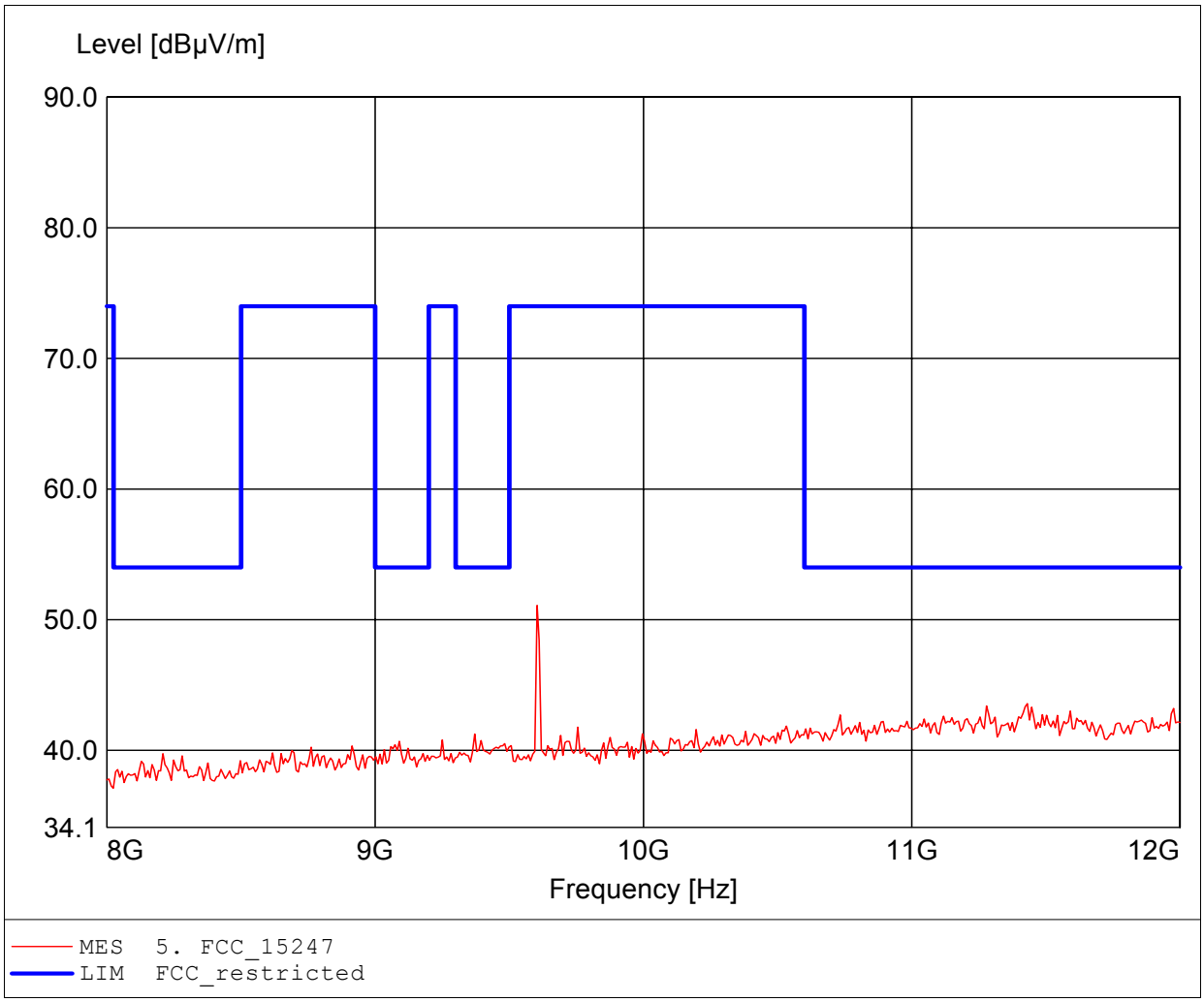
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.206GHz, Emax: 52.16dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

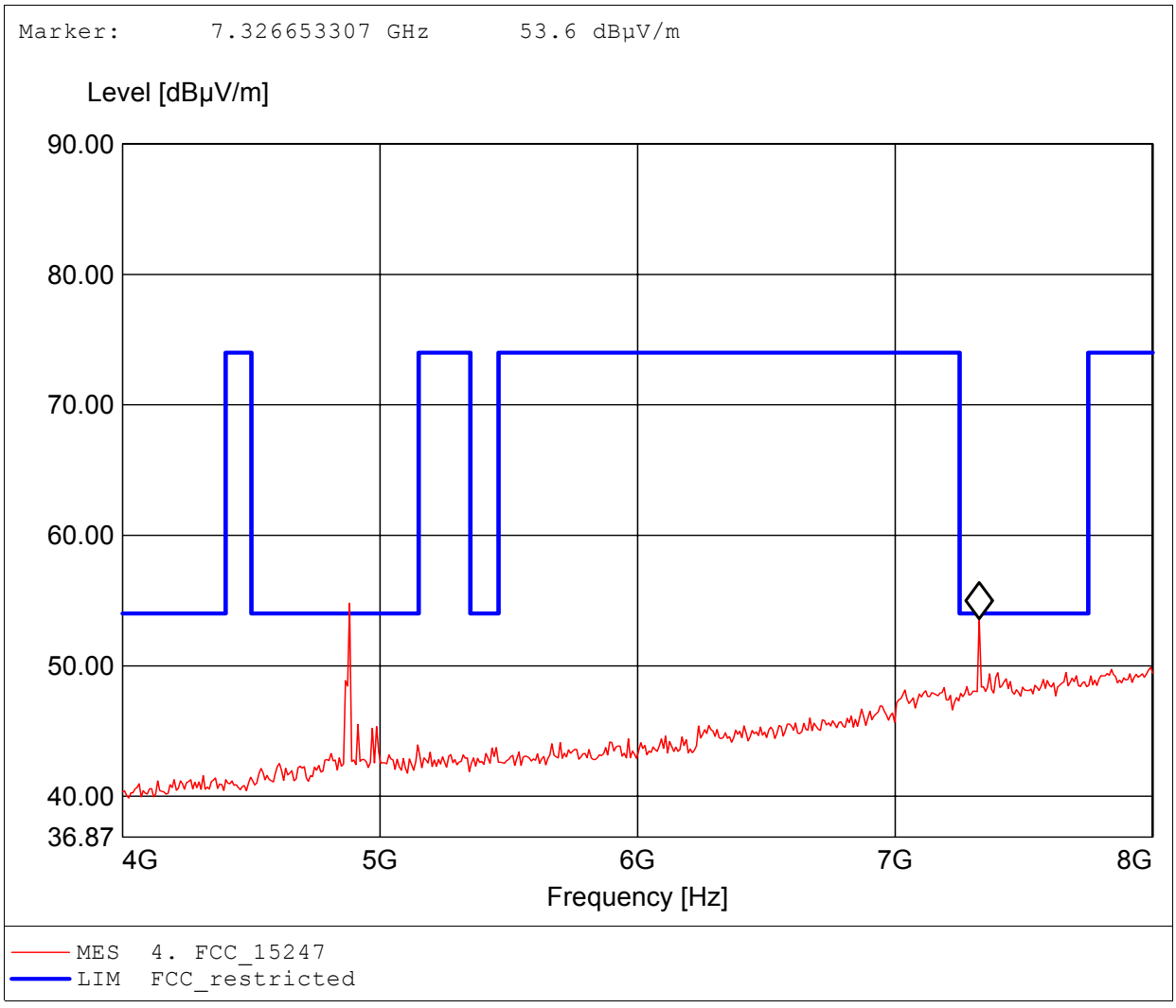
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2402 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 9.603GHz, Emax: 51.09dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

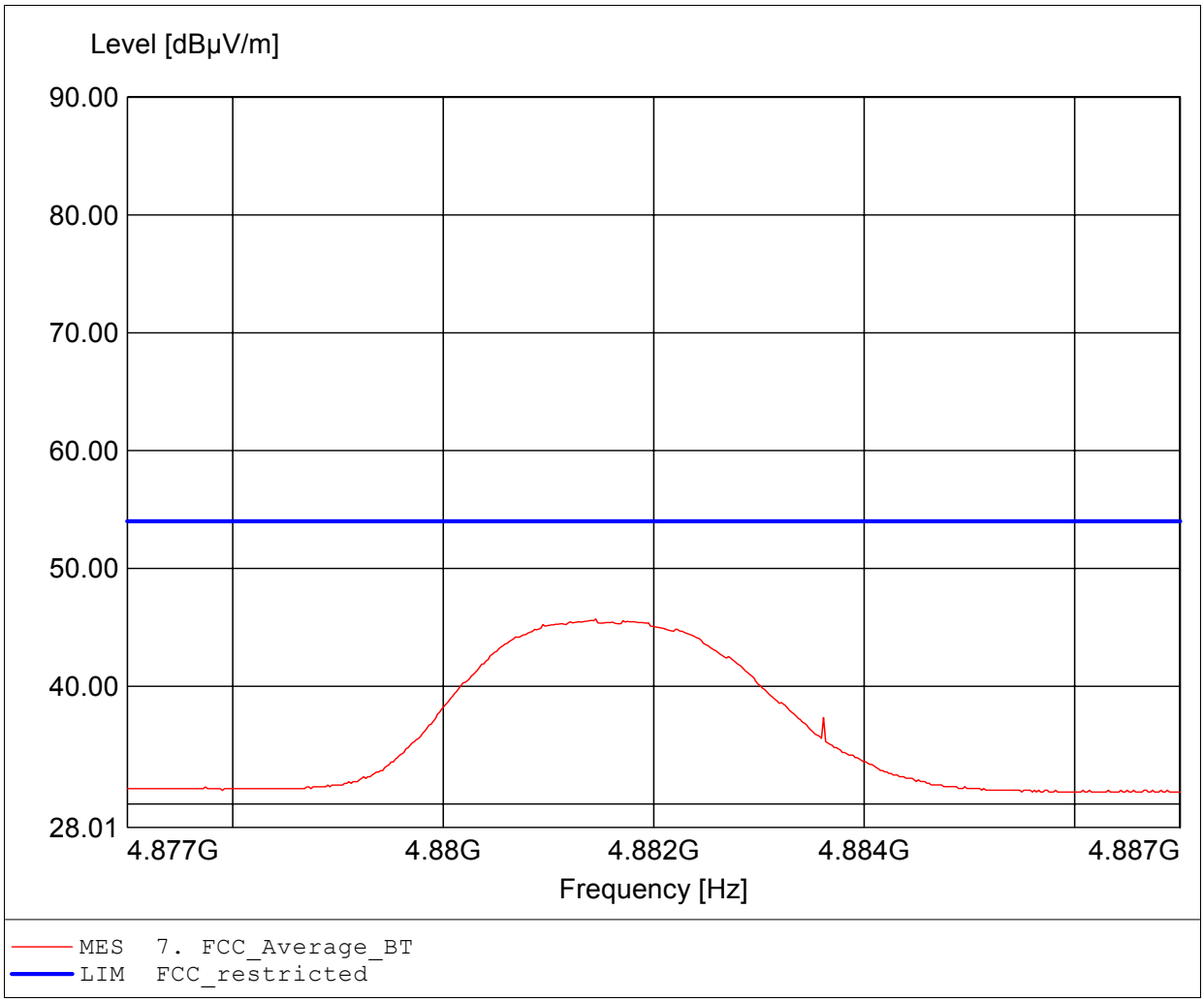
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.882GHz, Emax: 54.80dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

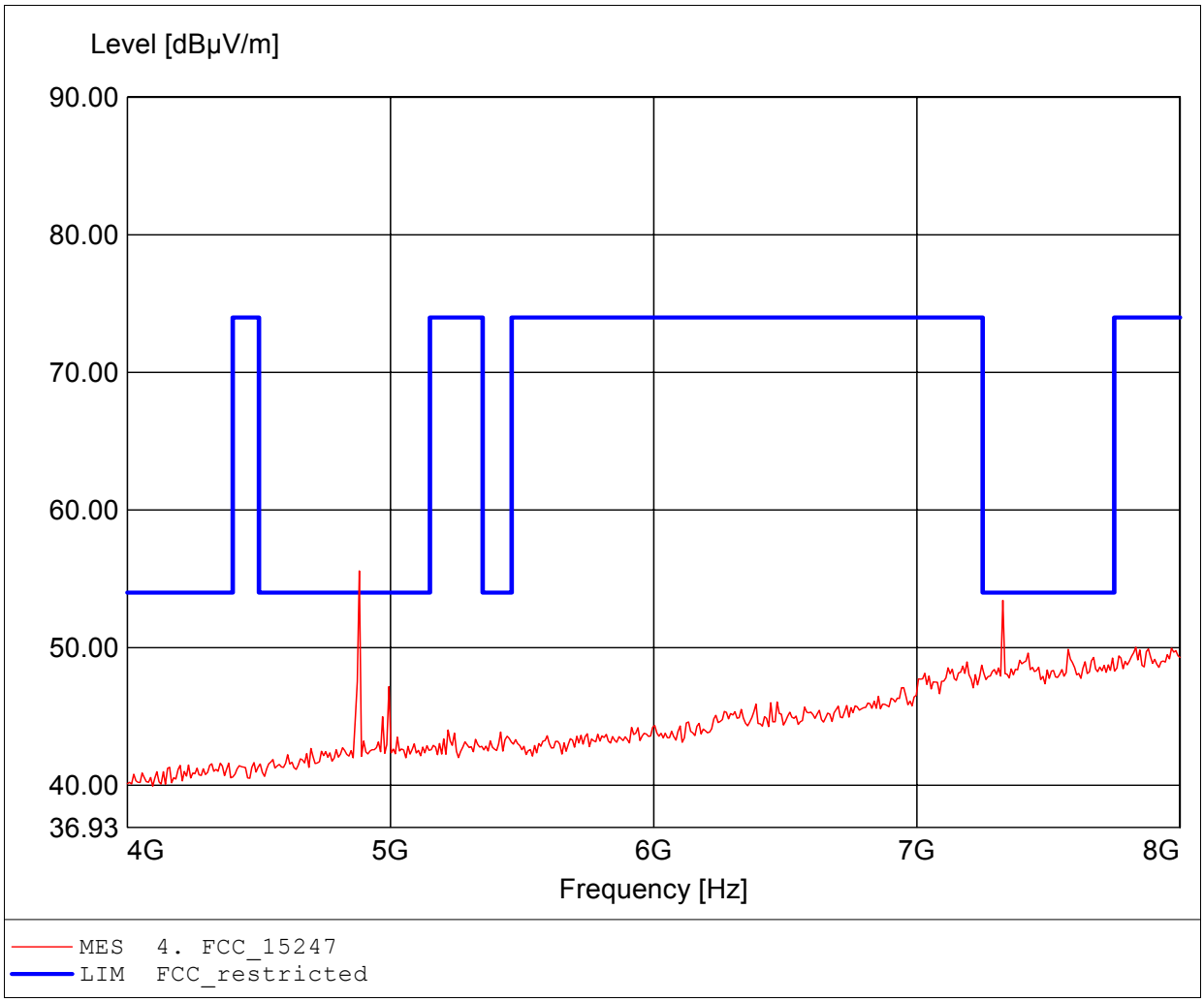
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 4.881GHz, Emax: 45.71dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

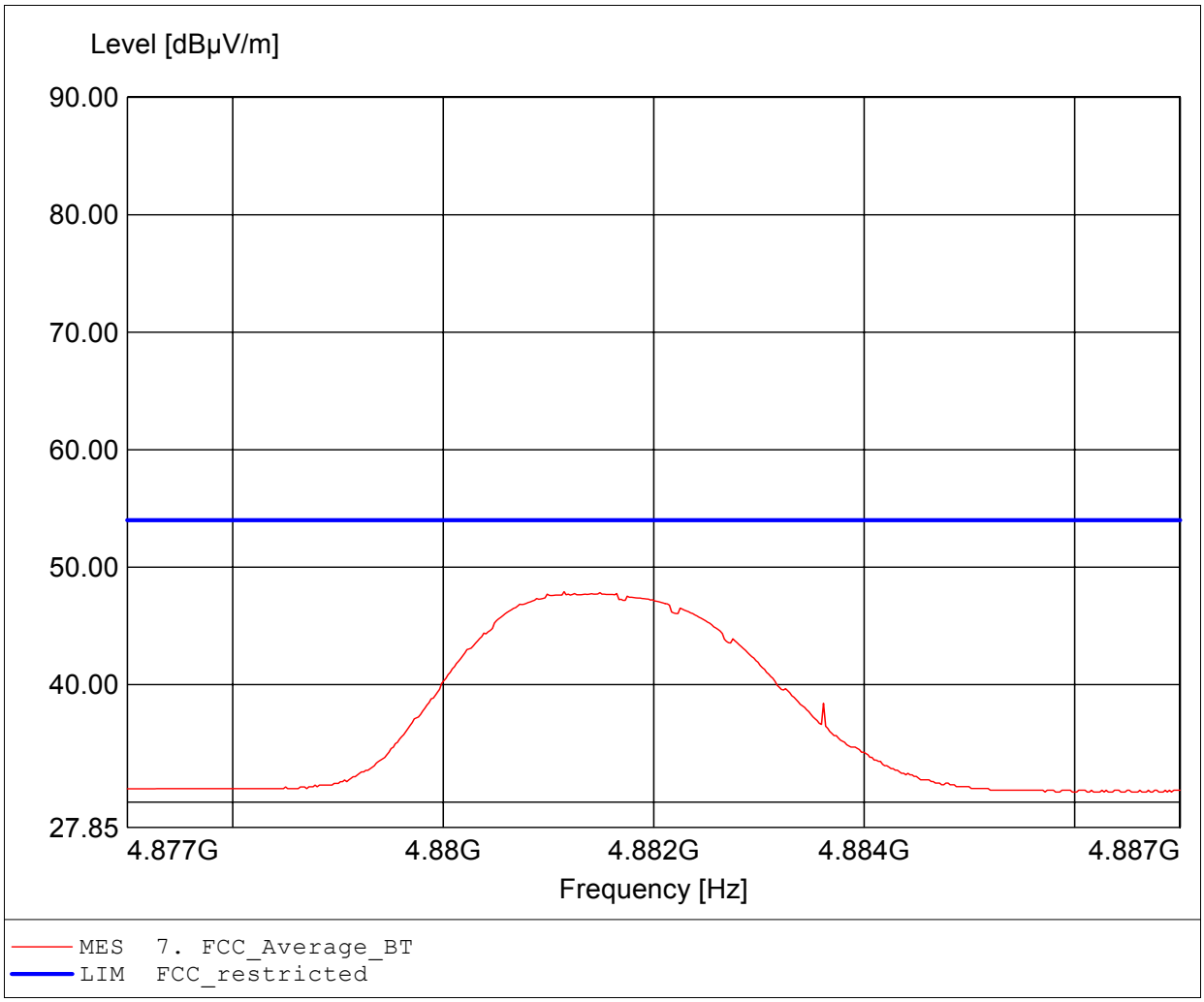
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.882GHz, Emax: 55.57dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

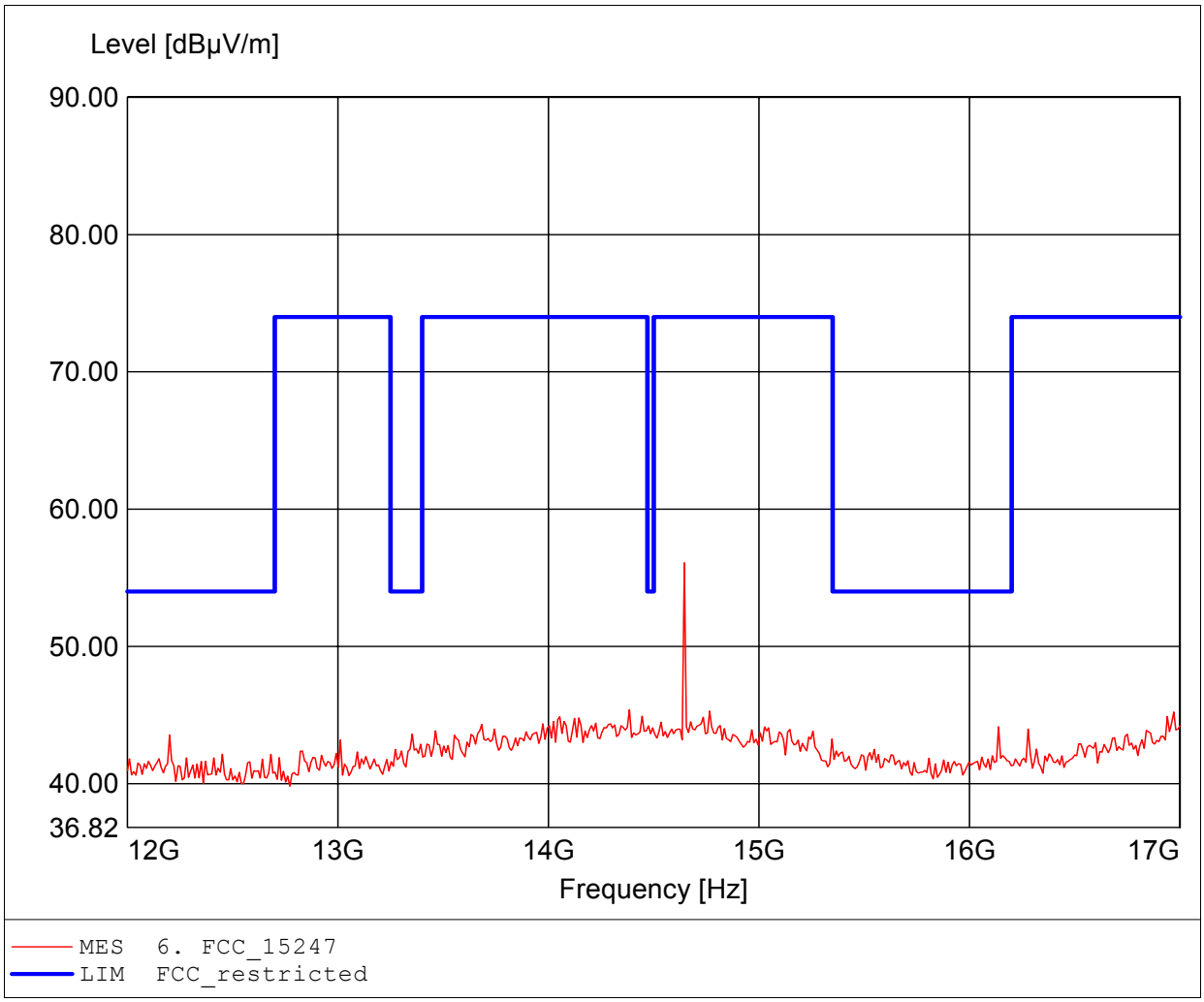
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, average detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, amplif.
Comment 2:	Freq: 4.881GHz, Emax: 47.92dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

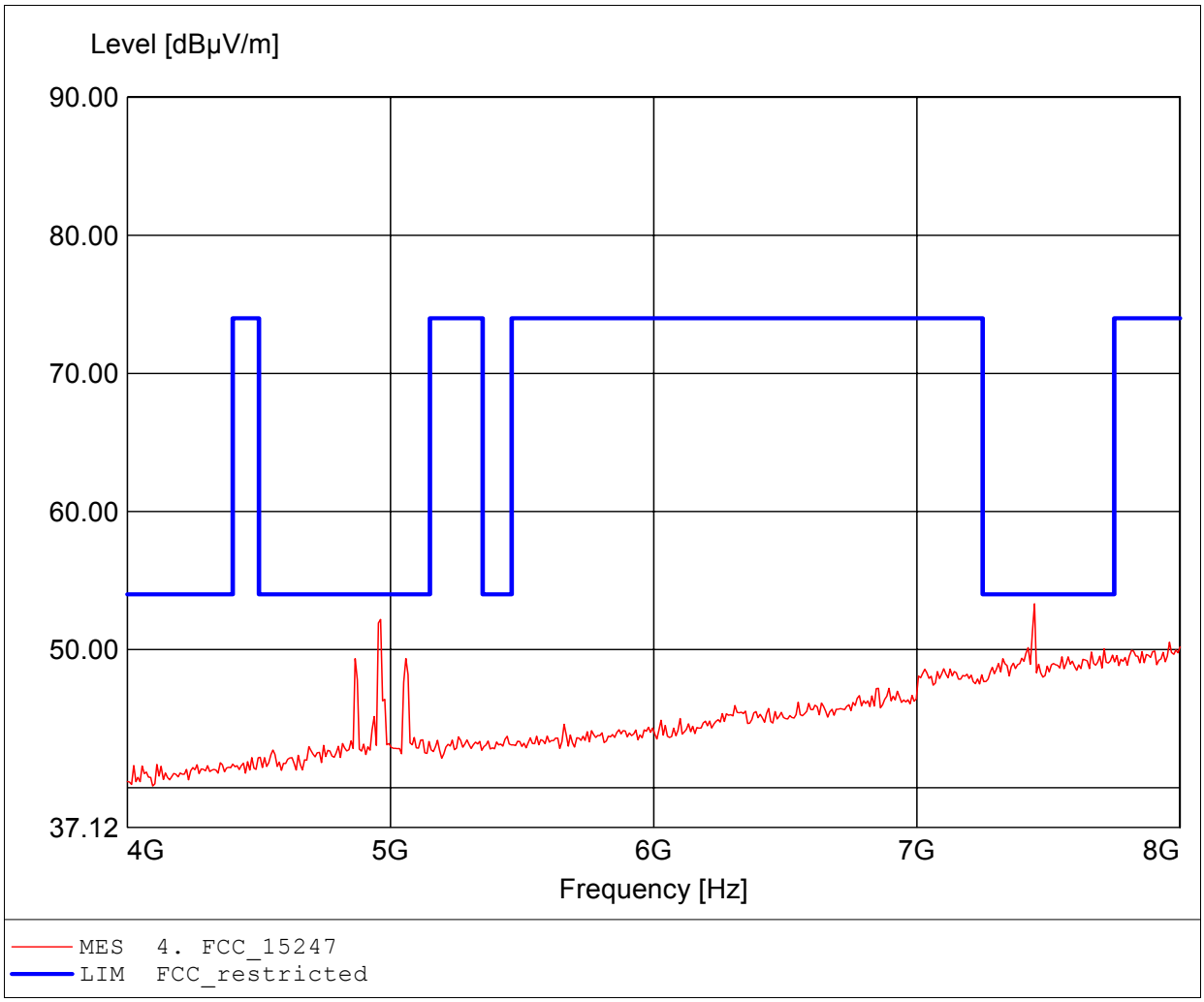
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.645GHz, Emax: 56.09dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

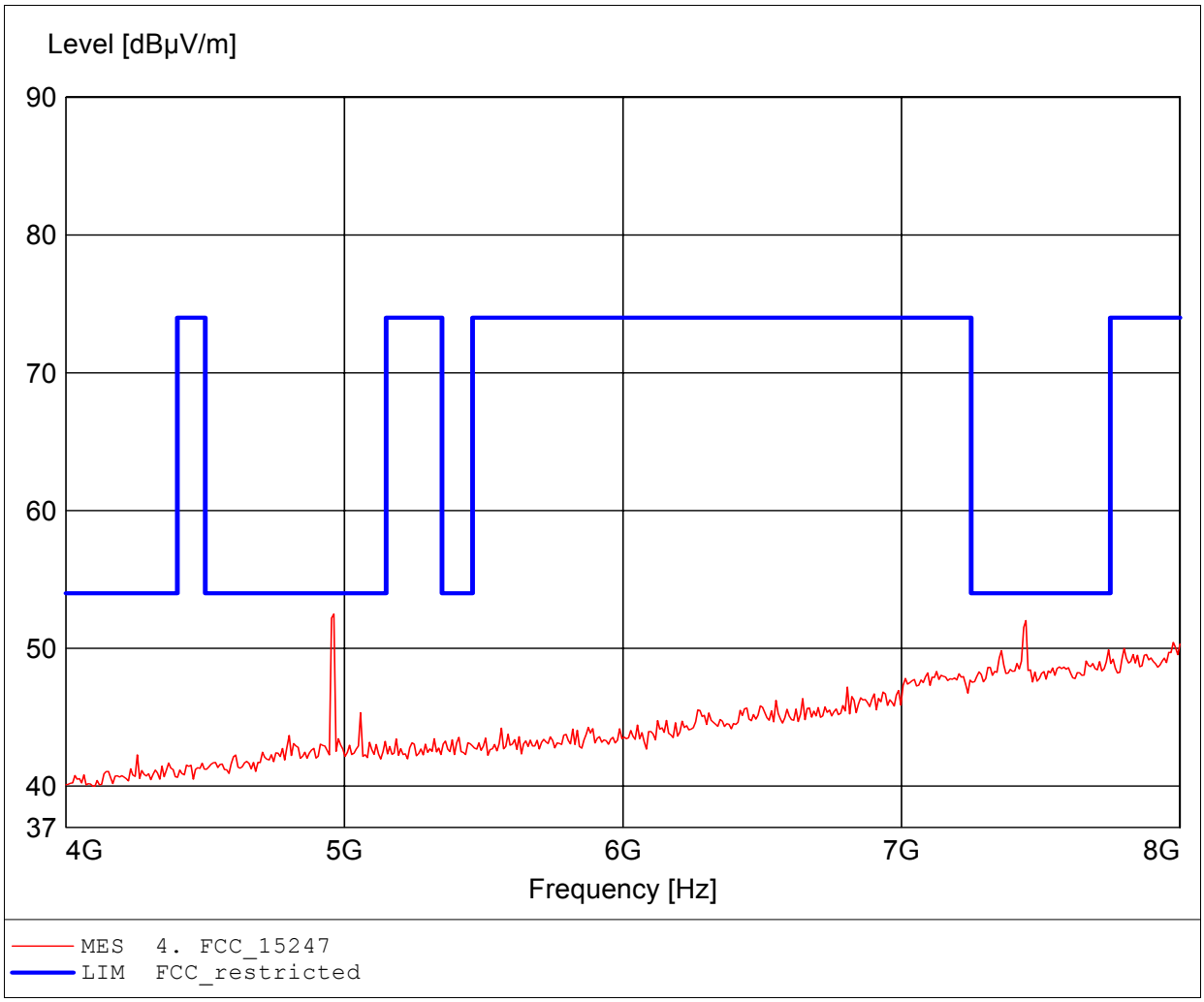
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 7.447GHz, Emax: 53.32dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

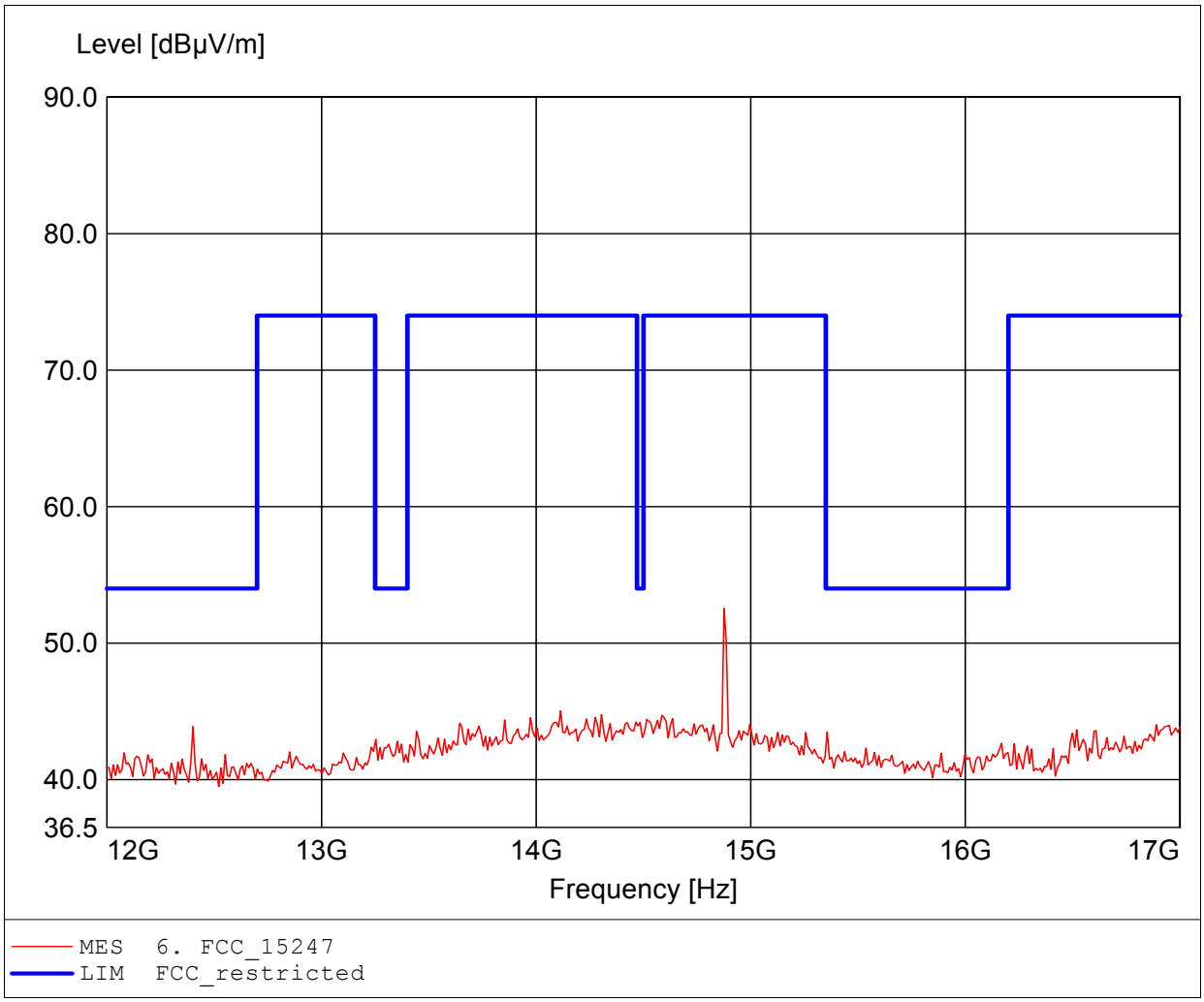
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 4.962GHz, Emax: 52.49dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

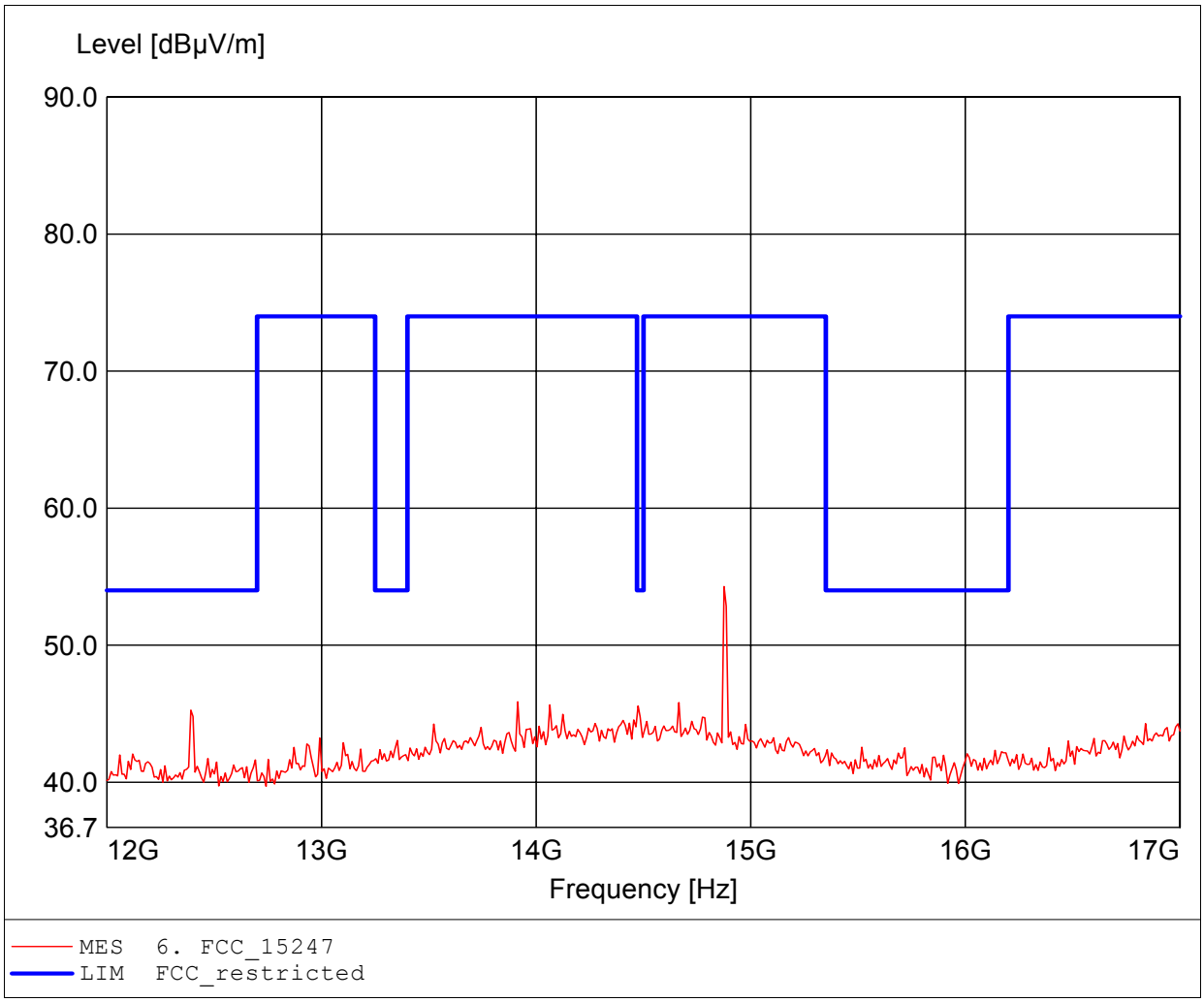
Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.876GHz, Emax: 52.54dBµV/m, RBW: 1MHz



Spurious emissions Field Strength

FCC RULES PART 15, SUBPART C

Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup: EDR, 2480 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	according to §15.247, peak detector
Comment 1:	Dist.: 3m, Ant.: BBHA9120D, ampl.+HP.
Comment 2:	Freq: 14.876GHz, Emax: 54.29dBµV/m, RBW: 1MHz



ANNEX B Receiver radiated spurious emissions

Field Strength under normal conditions

Standards Industry Canada, RSS-GEN

Approval Holder:	Panasonic Electronic Devices Europe GmbH / G0M21008-3623
EUT:	Bluetooth Module
Model:	ENW89818C2JF / ENW89818A2JF / setup basic, 2441 MHz
Test Site / Operator:	Eurofins Product Service GmbH / Mr. Treffke
Test Condition:	Temp.: 22°C / Unom.: 3.3 V DC
Test Specification:	Freq. / CH:
Comment 1:	Dist.: 3m, Ant.: HL025, ampl.
Comment 2:	Freq:7.816GHz Emax:50.83dBµV/m RBW: 1 MHz