



卓時檢測
TIMEWAY TESTING LABORATORY



ISO/IEC17025 Accredited Lab.

Report No:

FCC TW1006311

File reference No:

2010-07-27

Applicant:

Hong Kong Metadex Electronic Technology Limited

Product:

Metadex M-WA2413

Model No:

M-WA2413

Trademark:

Metadex

Test Standards:

FCC Part 15 Subpart C, Paragraph 15.247

Test result:

It is herewith confirmed and found to comply with the requirements set up by ANSI C63.4/FCC Part 15 Subpart C, Paragraph 15.247 regulations for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung
Manager

Dated:

July 27, 2010

Results appearing herein relate only to the sample tested

The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District,
Shenzhen,CHINA.

Tel (755) 83448688

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Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 899988.

IC- Registration No.: IC5205A-01

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-01.

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1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD
Address: 5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen,CHINA.
Telephone: (755) 83448688
Fax: (755) 83442996
Site on File with the Federal Communications Commission – United States
Registration Number: 899988
For 3m & 10 m OATS
Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC: 5205A-01
For 3m & 10 m OATS

1.2 Applicant Details

Applicant: Hong Kong Metadex Electronic Technology Limited
Address: Unit 31,21/F,Metro Center 2,No.21 Lam Hing Street, Kowloon Bay, Kowloon, Hong Kong
Telephone: 18603051088
Fax: 0755-83212846

1.3 Description of EUT

Product:	Metadex M-WA2413
Manufacturer:	Hong Kong Metadex Electronic Technology Limited
Brand Name:	Metadex
Model Number:	M-WA2413
Power Source Adapter	N/A
Type of Modulation	IEEE 802.11b : DSSS (CCK, QPSK, BPSK) IEEE 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK)
Frequency range	IEEE 802.11b/g: 2412-2462MHz
Channel Spacing	IEEE 802.11b/g: 5MHz
Air Data Rate	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11g : 54, 48, 24, 18, 12, 9, 6 Mbps
Frequency Selection	By software
Channel Number	IEEE 802.11b/g : 11 Channels

1.4 Submitted Sample:

1 Sample

1.5 Test Duration

2010-06-24 to 2010-07-27

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1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

Terry Tang

The sample tested by _____

Print Name: Terry Tang

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2.0 Test Equipments					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2009-12-05	2010-12-04
Absorbing Clamp	ROHDE&SCHWARZ	MDS-21	100126	2009-12-05	2010-12-04
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2009-12-05	2010-12-04
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2009-12-05	2010-12-04
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2009-12-05	2010-12-04
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2010-03-29	2011-03-28
4-WIRE ISN	ROHDE&SCHWARZ	ENY 41	830663/044	2010-02-17	2011-02-16
GG ENY22 Double 2-Wire ISN	ROHDE&SCHWARZ	ENY22	83066/016	2010-02-17	2011-02-16
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2010-02-17	2011-02-16
System Controller	CT	SC100	-	2010-02-17	2011-02-16
Printer	EPSON	PHOTO EX3	CFNH234850	2010-02-17	2011-02-16
FM-AM Signal Generator	JUNGJIN	SG-150M	389911177	2010-02-17	2011-02-16
Color TV Pattern Generator	PHILIPS	PM5418	LO621747	2010-02-17	2011-02-16
Computer	IBM	8434	1S8434KCE99 BLXLO*	-	-
Oscillator	KENWOOD	AG-203D	3070002	2010-02-17	2011-02-16
Power meter	Anritsu	ML2487A	6K00003613	2010-02-17	2011-02-16
Power sensor	Anritsu	MA2491A	32263	2010-02-17	2011-02-16
Spectrum Analyzer	HAMEG	HM5012	-	-	-
Power Supply	LW	APS1502	-	-	-
5K VA AC Power Source	California Instruments	5001iX	56060	2010-02-17	2011-02-16
CDN	EM TEST	CDN M2/M3	-	2010-02-17	2011-02-16
Attenuation	EM TEST	ATT6/75	-	2010-02-17	2011-02-16
Resistance	EM TEST	R100	-	2010-02-17	2011-02-16
Electromagnetic Injection Clamp	LITTHI	EM101	35708	2010-02-17	2011-02-16

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Inductive Components	EM TEST	MC2630	-	2010-02-17	2011-02-16
Antenna	EM TEST	MS100	-	2010-02-17	2011-02-16
Signal Generator	ROHDE&SCHWARZ	SMT03	100029	2010-02-17	2011-02-16
Power Amplifier	AR	150W1000	300999	2010-02-17	2011-02-16
Field probe	Holaday	HI-6005	105152	2010-02-17	2011-02-16
Bilog Antenna	Chase	CBL6111C	2576	2010-02-17	2011-02-16
Loop Antenna	EMCO	6502	00042960	2010-02-17	2011-02-16
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2010-02-17	2011-02-16
3m OATS	--	--	N/A	2010-02-17	2011-02-16
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2009-08-15	2010-08-14
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2010-07-03	2011-07-02
LISN	AFJ	LS16C	10010947251	2010-5-14	2011-05-13
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2010-5-14	2011-05-13
9*6*6 Anechoic	--	--	N/A	2010-5-14	2011-05-13

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3. DESCRIPTION OF TEST MODES

IEEE 802.11b, 802.11g mode

The EUT had been tested under operating condition. There are three channels have been tested as following:

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode : 1Mbps data rate (worst case) were chosen for full testing. IEEE 802.11g mode : 6Mbps data rate (worst case) were chosen for full testing.

The worst-case data rates are determined according to the description above, based on the investigations by measuring the PSD and average power across all the data rates, bandwidths, modulations and spatial stream modes.

The worst-case channel is determined as the channel with the highest output power. The highest measured output power was at 2412 MHz.

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3.0 Technical Details

3.1 Summary of test results

The EUT has been tested according to the following specifications:			
Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.107 & 15.207	Conducted Emission Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	PASS	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	PASS	Complies
FCC Part 15, Paragraph 15.109,15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	PASS	Complies
FCC Part 15, Paragraph 15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Complies
FCC Part 15, Paragraph 15.247(c)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	PASS	Complies

3.2 Test Standards

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 EUT Modification

No modification by Shenzhen Timeway Technology Consulting Co.,Ltd

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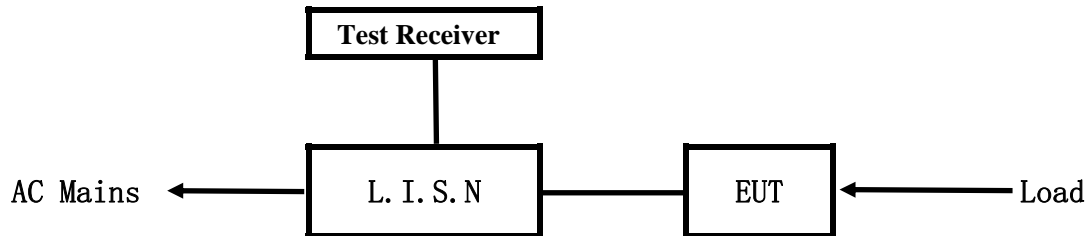
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5. Power Line Conducted Emission Test

5.1 Schematics of the test



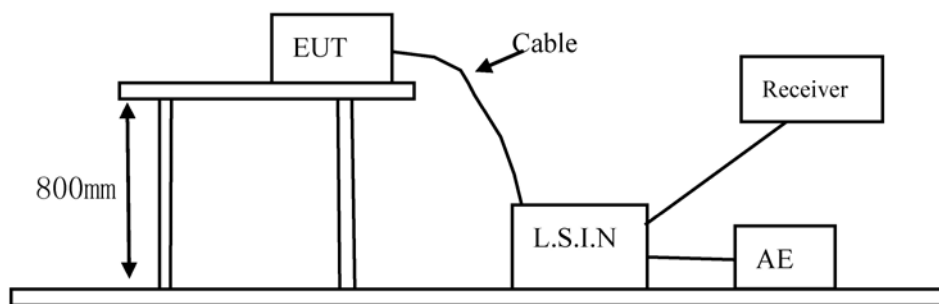
EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.4-2003. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003.

Test Voltage: 120V~, 60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID
Metadex M-WA2413	Hong Kong Metadex Electronic Technology Limited	M-WA2413	YLRMWA2413001

B. Internal Device

Device	Manufacturer	Model	FCC ID/DOC
N/A			

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C. Peripherals

Device	Manufacturer	Model	FCC ID/DOC	Cable
Power supply	Bothhand Enterprise Inc.	SA06L48-V	--	DC output cable with length of 1.75m
Base Unit	D-link	EBU101-T2	--	--

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

A Setup the EUT and simulators as shown on follow

B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207 and 15.107

Frequency (MHz)	Class A Limits (dB μ V)		Class B Limits (dB μ V)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	79.0	66.0	66.0~56.0*	56.0~46.0*
0.50 ~ 5.00	73.0	60.0	56.0	46.0
5.00 ~ 30.00	73.0	60.0	60.0	50.0

- Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz. PK detected used when scanning.

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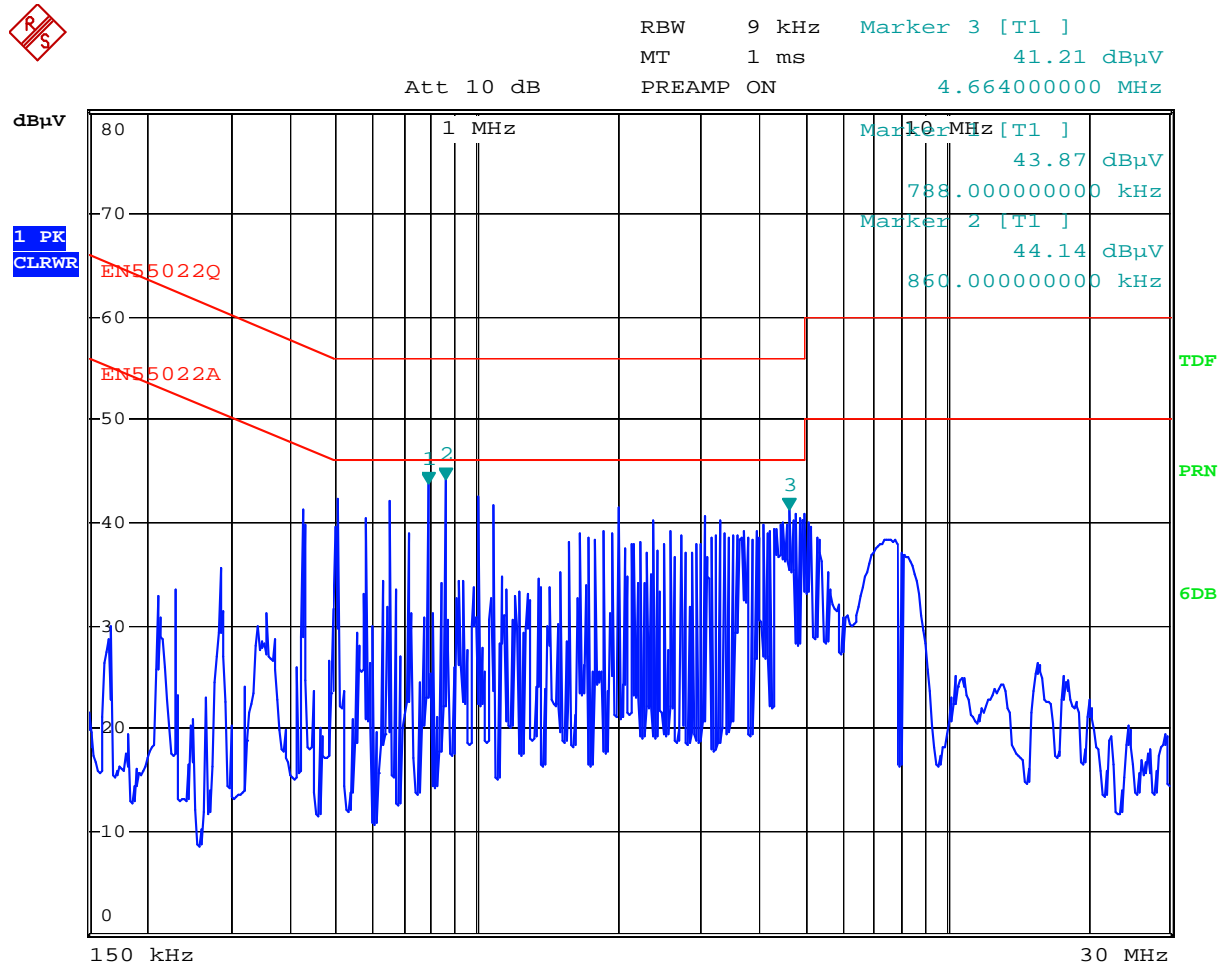


A Conducted Emission on Line Terminal of the power line (150kHz to 30MHz)

EUT set Condition: Wi-Fi working

Results: N/A

Please refer to following diagram for individual



Date: 27.JUL.2010 09:39:13

Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Line		Neutral		Quasi-peak	Average
	Quasi-peak	Average	Quasi-peak	Average		
0.860	42.56	39.26	--	--	56.00	46.00
0.788	40.24	36.29	--	--	56.00	46.00
4.664	38.36	33.19	--	--	56.00	46.00

PK detected used when scanning

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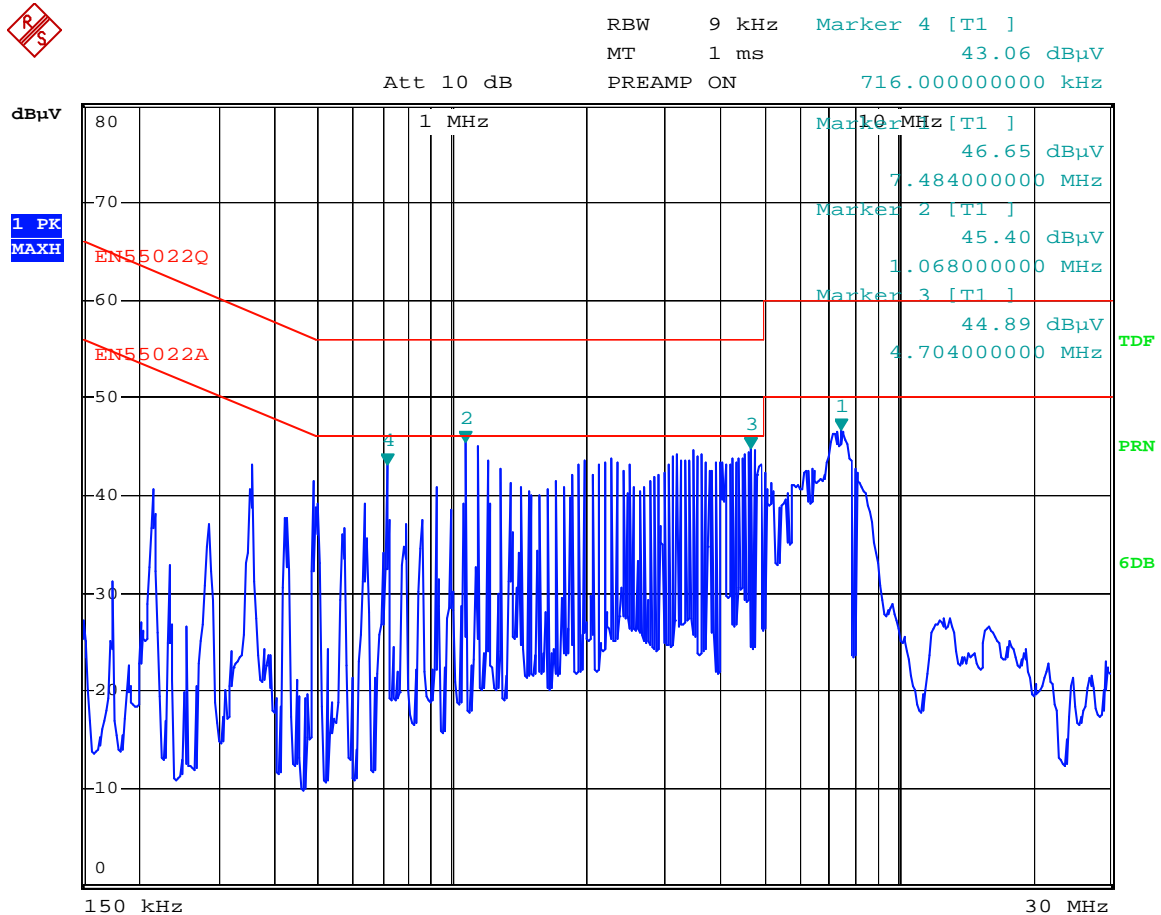


B Conducted Emission on Neutral Terminal of the power line (150kHz to 30MHz)

EUT set Condition: Wi-Fi working

Results: N/A

Please refer to following diagram for individual



Date: 27.JUL.2010 18:03:27

Frequency (MHz)	Reading(dB μ V)				Limit (dB μ V)	
	Live		Neutral			
	Quasi-peak	Average	Quasi-peak	Average		
0.716	--	--	40.89	35.89	56.00	46.00
1.068	--	--	42.12	38.91	56.00	46.00
4.704	--	--	41.56	37.86	56.00	46.00
7.484	--	--	42.79	38.20	60.00	50.00

PK detected used when scanning

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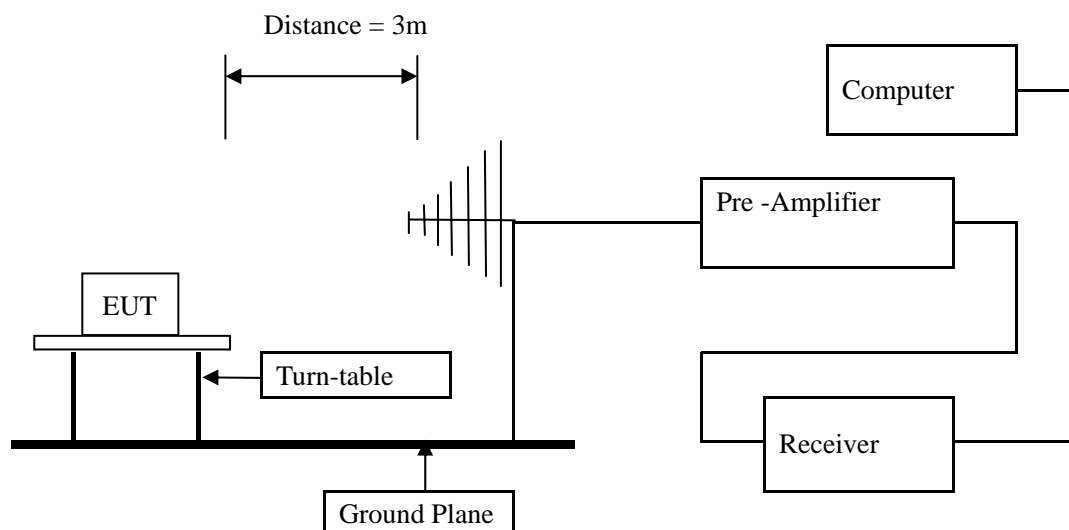


6 Radiated Emission Test

6.1 Test Method and test Procedure:

- (1) The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
- (3) The frequency spectrum from 30 MHz to 25 GHz was investigated. All readings from 30 MHz to 1 GHz are Quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.

Block diagram of Test setup



6.2 Configuration of The EUT

Same as section 5.3 of this report

6.3 EUT Operating Condition

Same as section 5.4 of this report.

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6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109

Frequency Range (MHz)	Distance (m)	Field strength (dB μ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

- Note:
1. RF Voltage (dBuV) = 20 log RF Voltage (μ V)
 2. In the Above Table, the higher limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

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Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Normal Operation

Results: Pass

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
40.06	16.65	H	40
54.45	20.19	H	40
101.47	19.56	H	43.5
221.57	20.86	H	46
672.62	28.19	H	46
512.57	24.33	H	46
39.71	22.10	V	40
54.25	16.24	V	40
100.32	16.46	V	43.5
146.40	20.38	V	43.5
250.67	17.82	V	46

The report refers only to the sample tested and does not apply to the bulk.

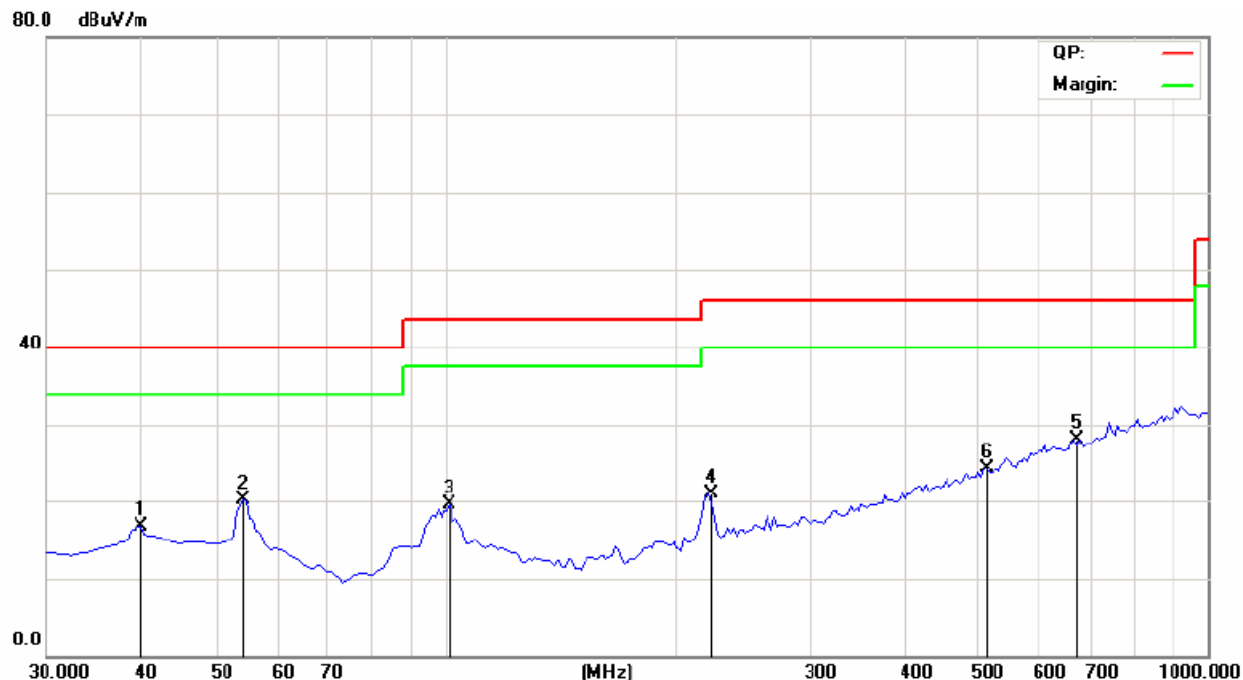
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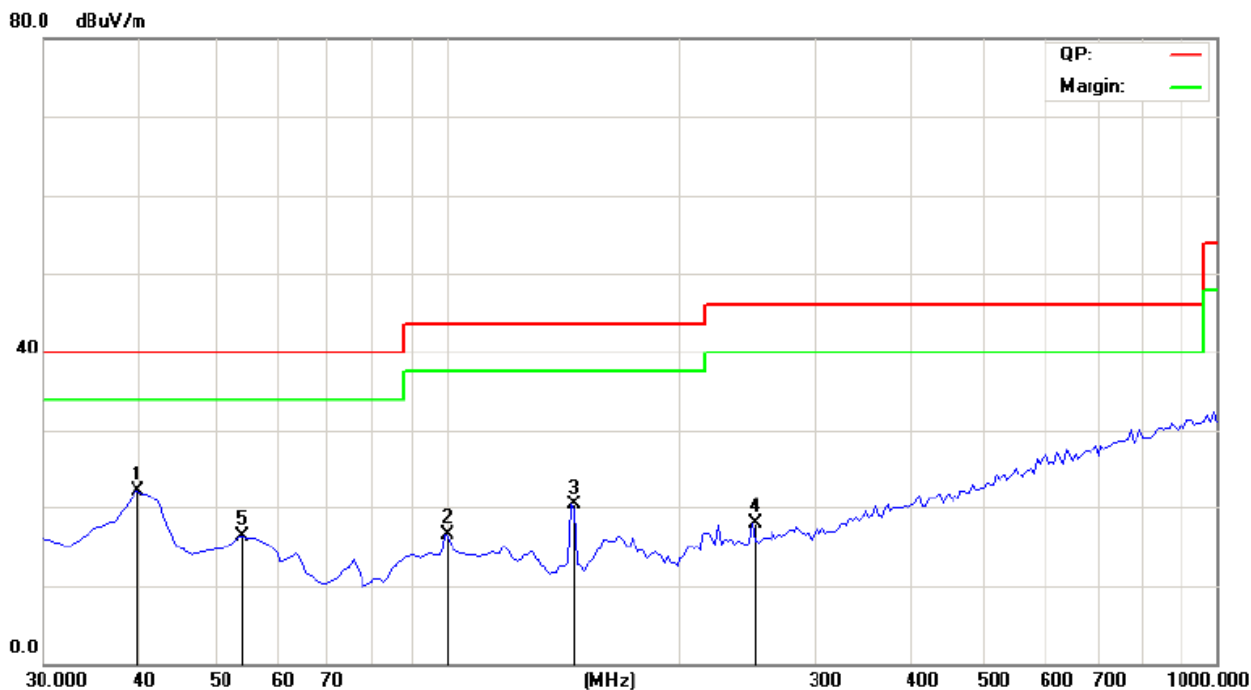


Test Figure:

H



V



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Operation Mode: Transmitting & Receiving under CH01 at 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2412.00	102.20 (PK) /86.39 (AV)	H	Fundamental Frequency
2412.00	96.48(PK) /82.18 (AV)	V	
4824.00	--	H	74(Peak)/ 54(AV)
4824.00	--	V	74(Peak)/ 54(AV)
7236.00	--	H/V	74(Peak)/ 54(AV)
9648.00	--	H/V	74(Peak)/ 54(AV)
12060	--	H/V	74(Peak)/ 54(AV)
14472	--	H/V	74(Peak)/ 54(AV)
16684	--	H/V	74(Peak)/ 54(AV)
19296	--	H/V	74(Peak)/ 54(AV)
21708	--	H/V	74(Peak)/ 54(AV)
24120	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

3. For 802.11g mode 6Mbps

4. Test results are for the worst case condition

Operation Mode: Transmitting & Receiving under CH06 at 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2437.00	102.29 (PK) /85.94 (AV)	H	Fundamental Frequency
2437.00	95.13 (PK) /80.46 (AV)	V	
4874.00	--	H	74(Peak)/ 54(AV)
4874.00	--	V	74(Peak)/ 54(AV)
7311.00	--	H/V	74(Peak)/ 54(AV)
9748.00	--	H/V	74(Peak)/ 54(AV)
12185	--	H/V	74(Peak)/ 54(AV)
14622	--	H/V	74(Peak)/ 54(AV)
17059	--	H/V	74(Peak)/ 54(AV)
19496	--	H/V	74(Peak)/ 54(AV)
21933	--	H/V	74(Peak)/ 54(AV)
24370	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

3. For 802.11g mode 6Mbps

4. Test results are for the worst case condition

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Operation Mode: Transmitting & Receiving under CH11 at 6Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2462.00	101.47 (PK) /84.07 (AV)	H	Fundamental Frequency
2462.00	94.58 (PK) /79.16 (AV)	V	
4924	--	H	74(Peak)/ 54(AV)
4924	--	V	74(Peak)/ 54(AV)
7368	--	H/V	74(Peak)/ 54(AV)
9848	--	H/V	74(Peak)/ 54(AV)
12310	--	H/V	74(Peak)/ 54(AV)
14772	--	H/V	74(Peak)/ 54(AV)
17234	--	H/V	74(Peak)/ 54(AV)
19696	--	H/V	74(Peak)/ 54(AV)
22158	--	H/V	74(Peak)/ 54(AV)
24620	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

3. For 802.11g mode at 6Mbps

4. Test results are for the worst case condition

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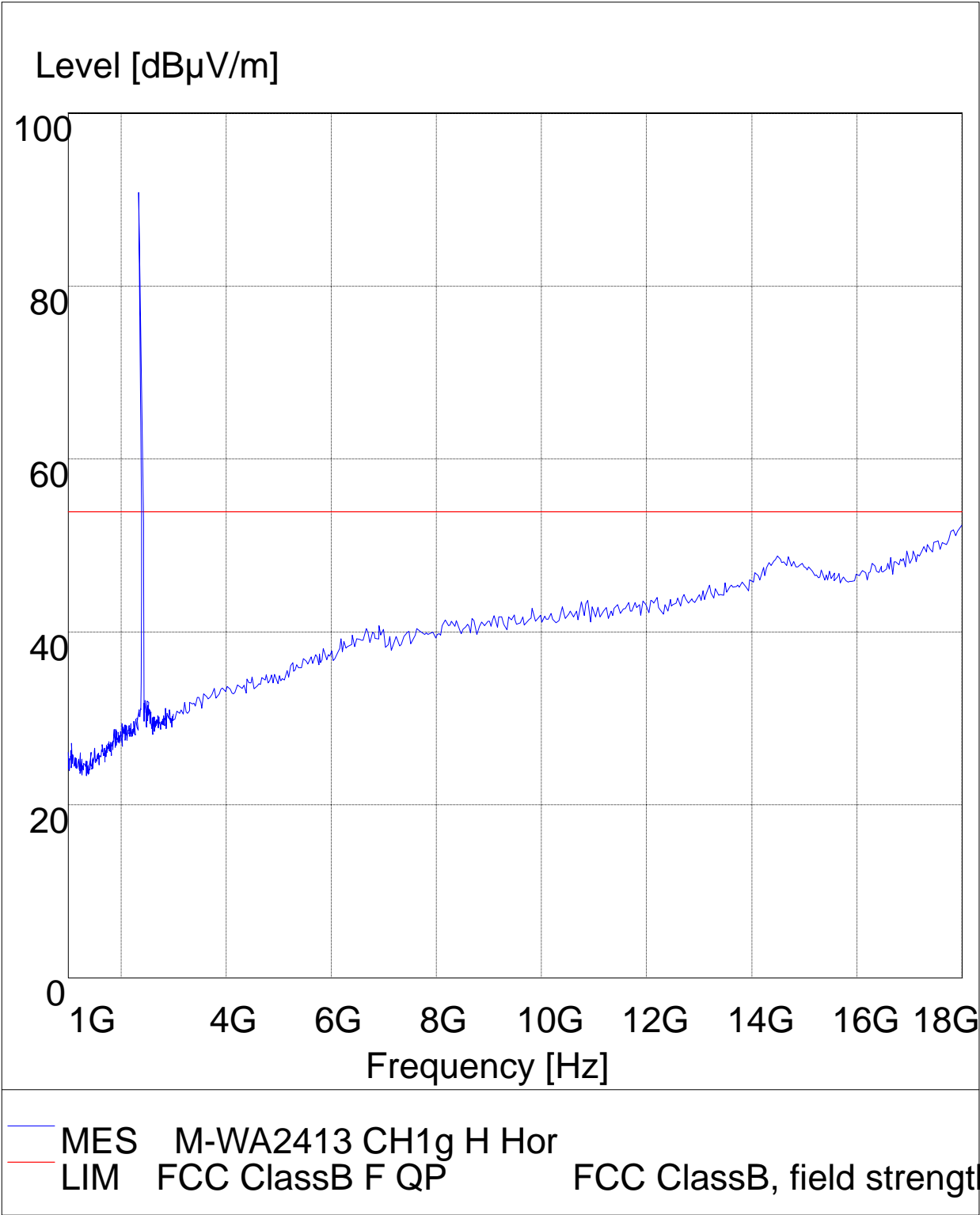
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Please refer to the following test plots for details:

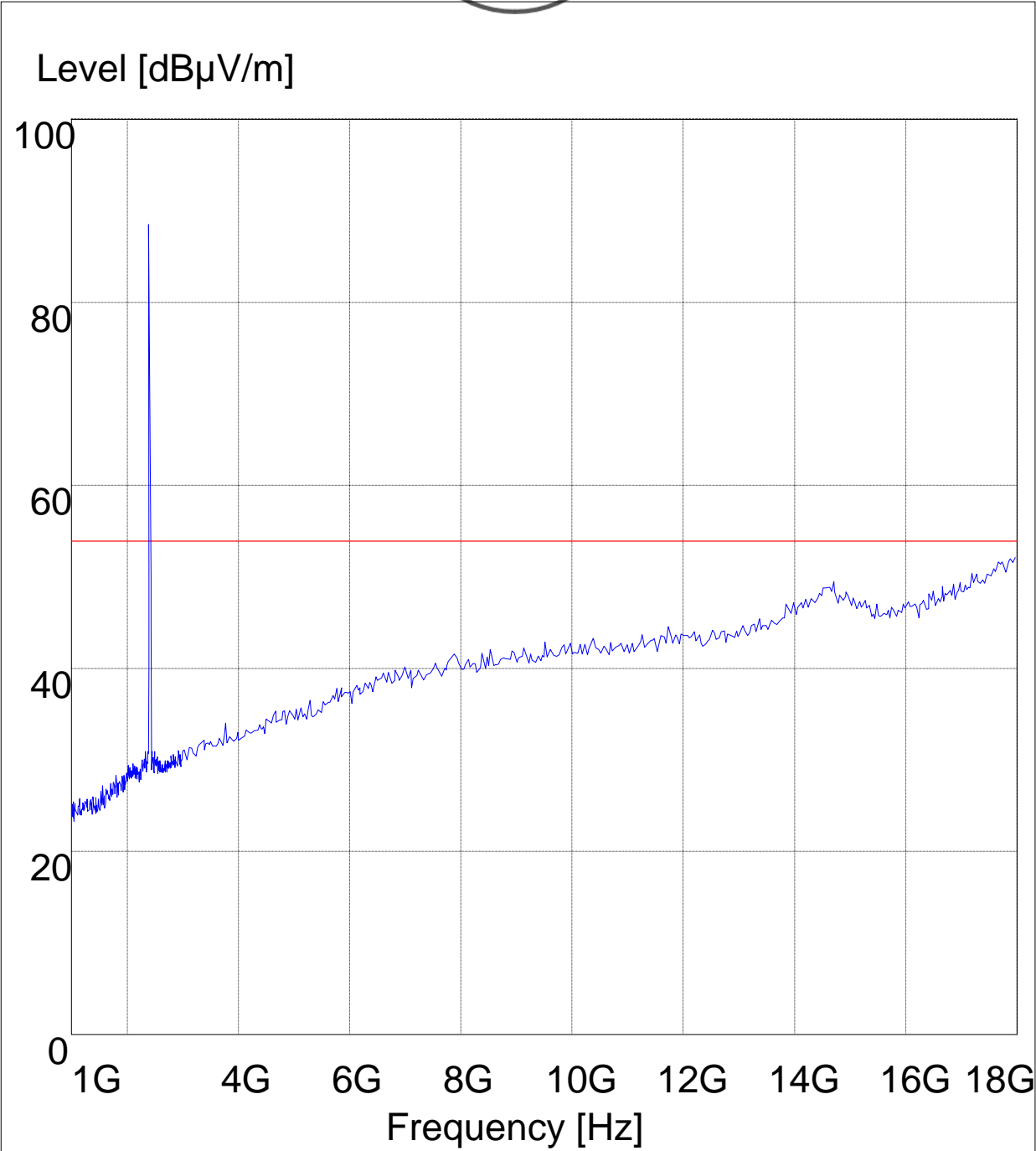
CH01 at 6Mbps: Horizontal



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CH01 at 6Mbps: Vertical

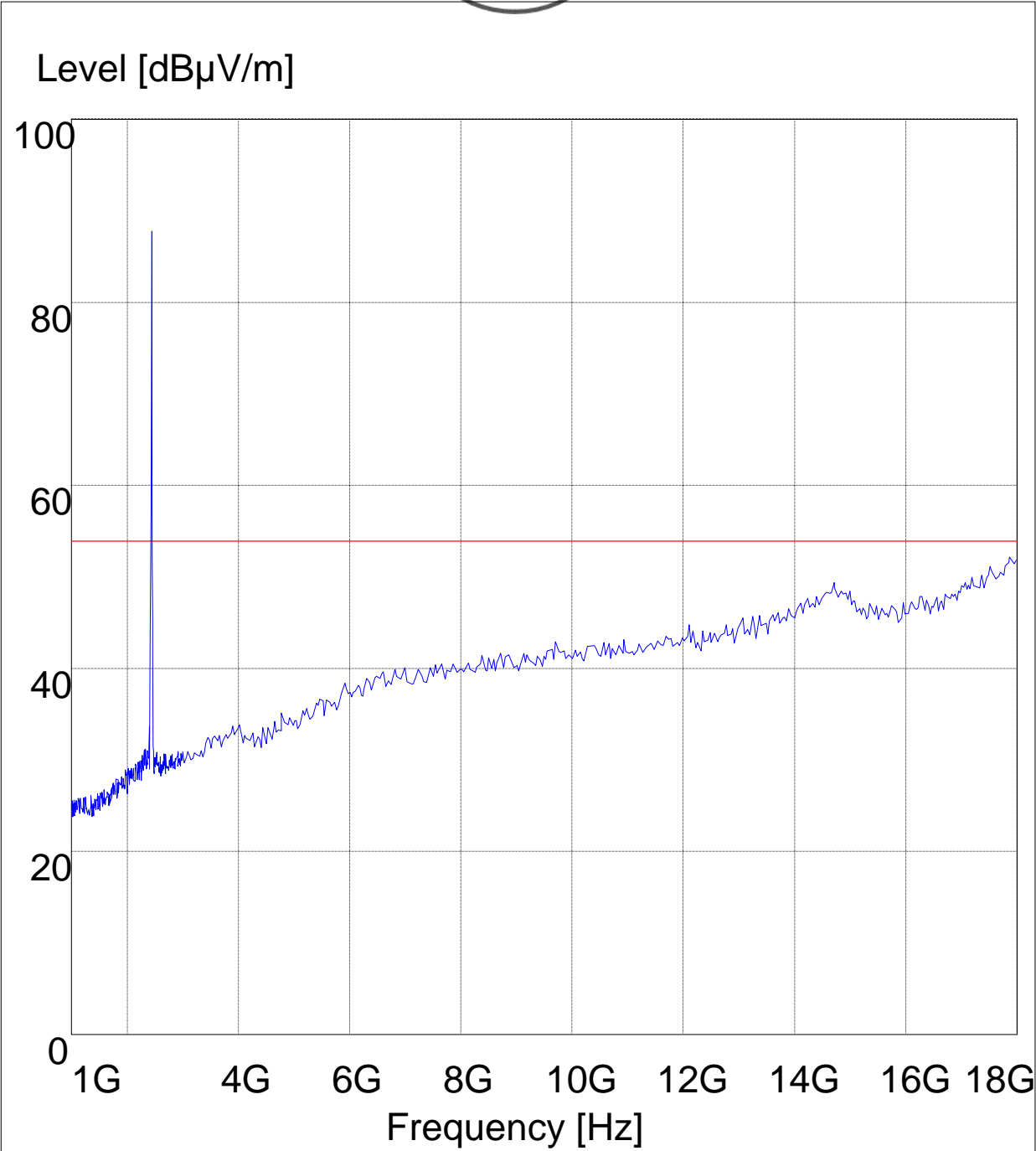


MES M-WA2413 CH1g H Ver
LIM FCC ClassB F QP FCC ClassB, field strength

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CH06 at 6Mbps: Vertical

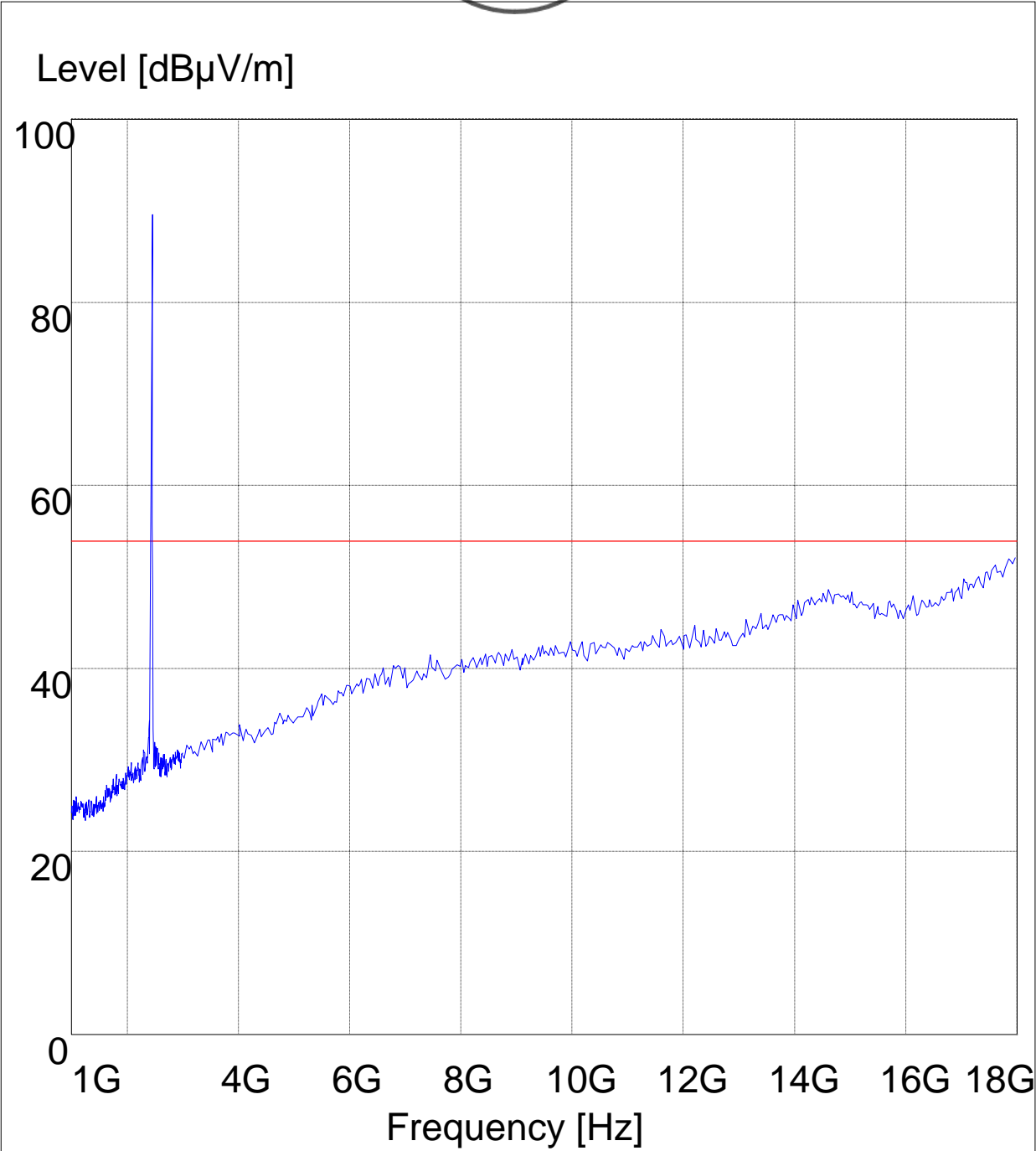


MES M-WA2413 CH6g H Ver
LIM FCC ClassB F QP FCC ClassB, field strength

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CH06 at 6Mbps: Horizontal

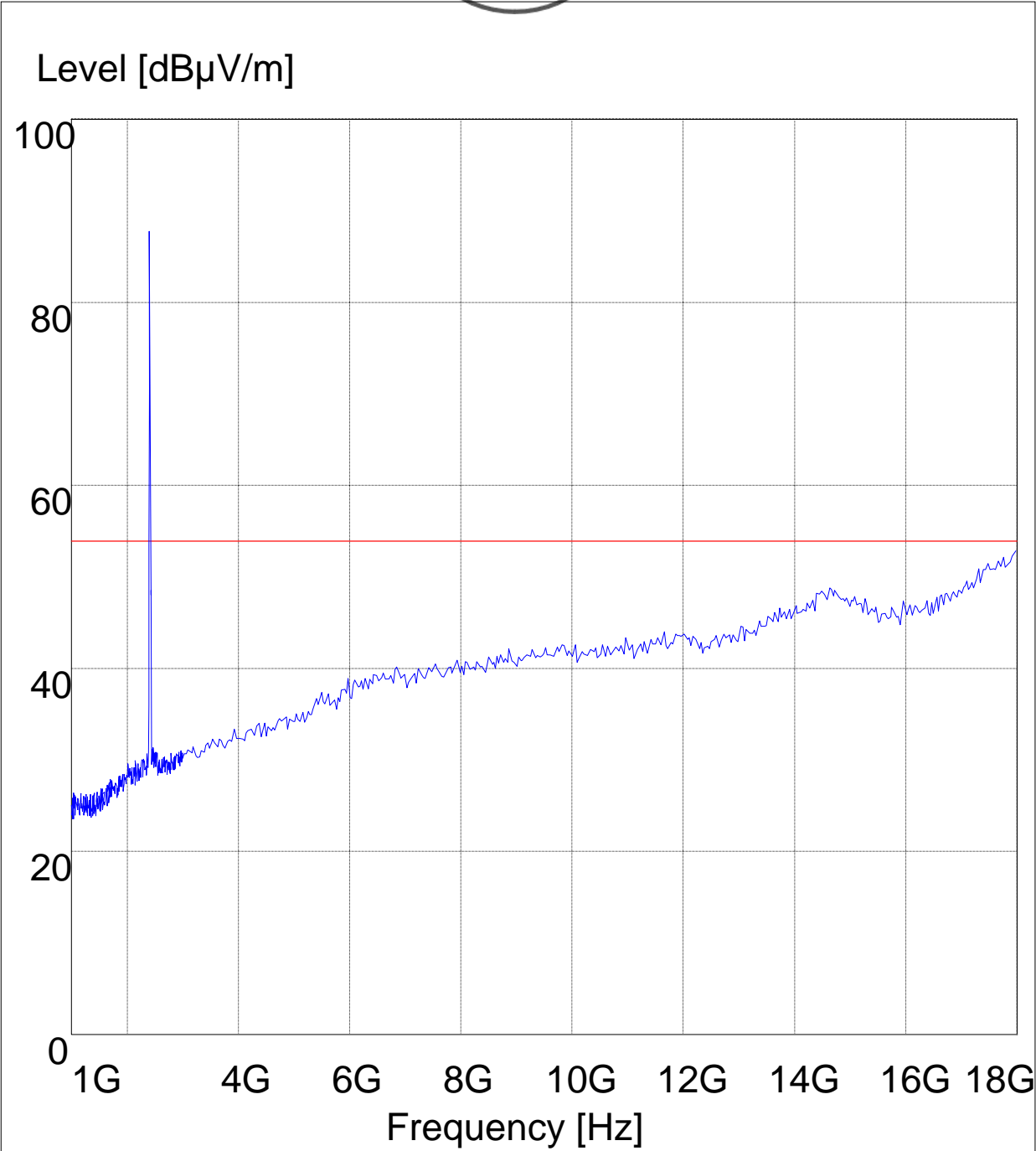


MES M-WA2413 CH6g H Hor
LIM FCC ClassB F QP FCC ClassB, field strength

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CH11 at 6Mbps: Vertical

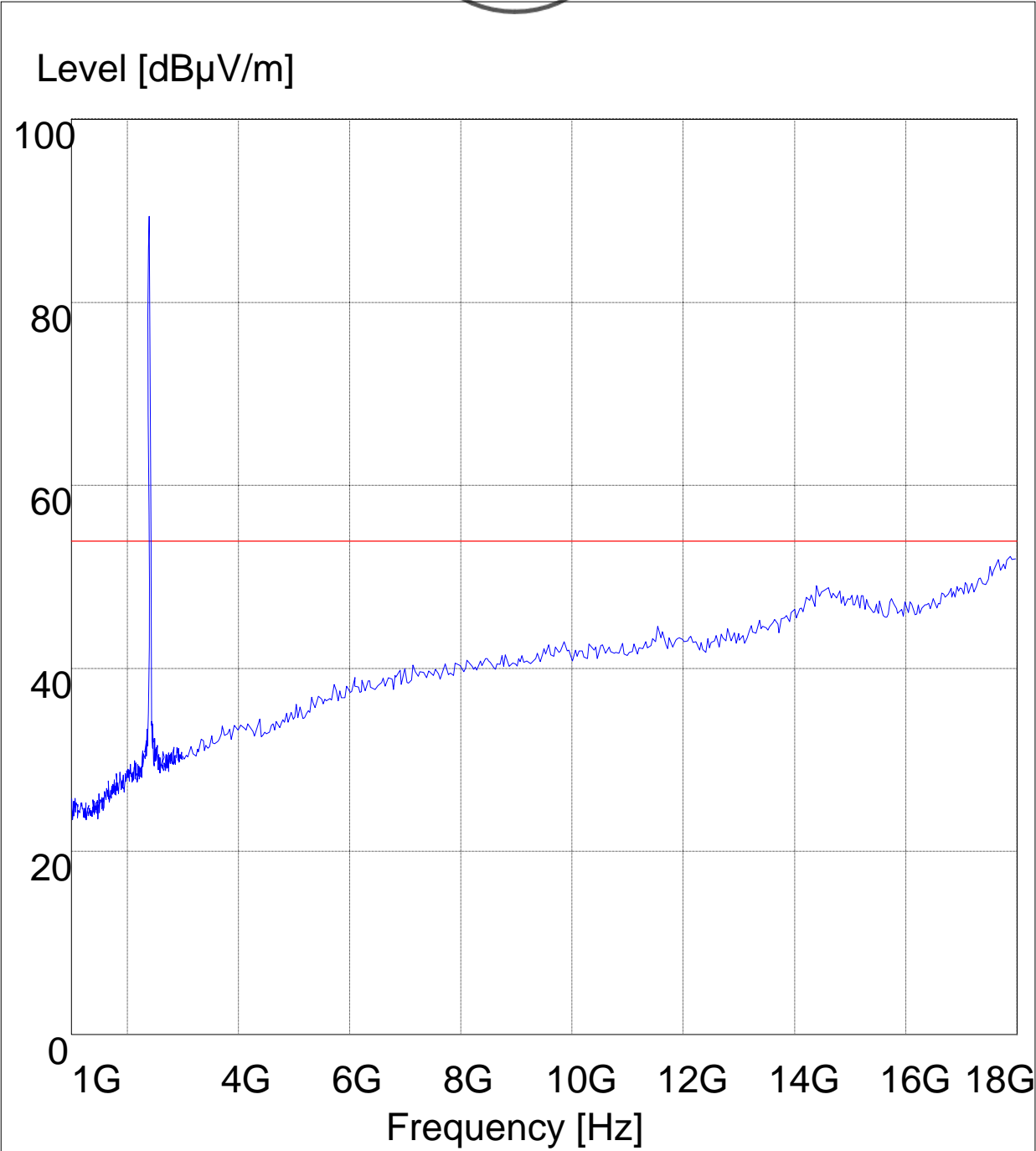


MES M-WA2413 CH11g H Ver
LIM FCC ClassB F QP FCC ClassB, field strength

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CH11at 6Mbps: Horizontal

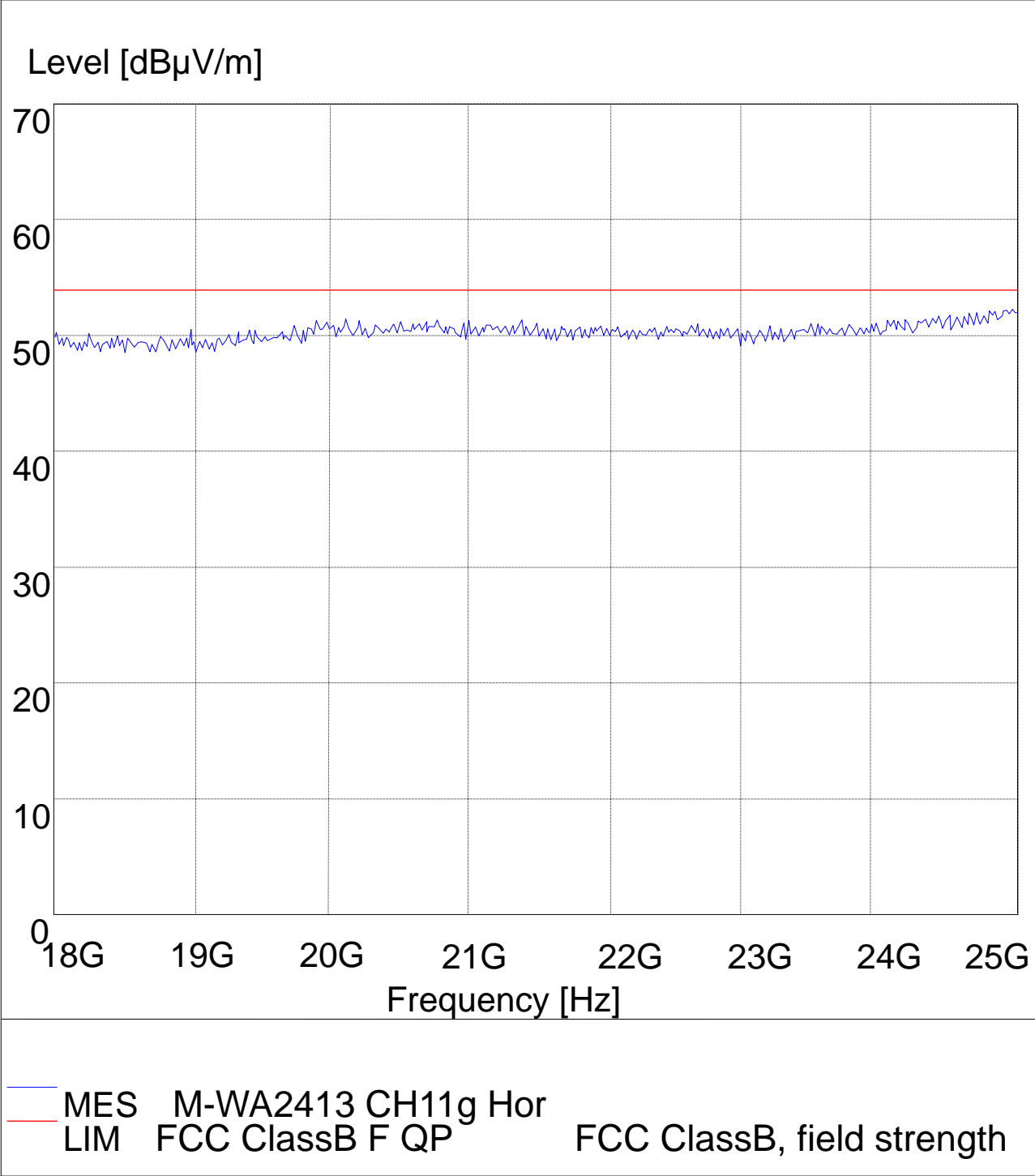


MES M-WA2413 CH11g H Hor
LIM FCC ClassB F QP FCC ClassB, field strength

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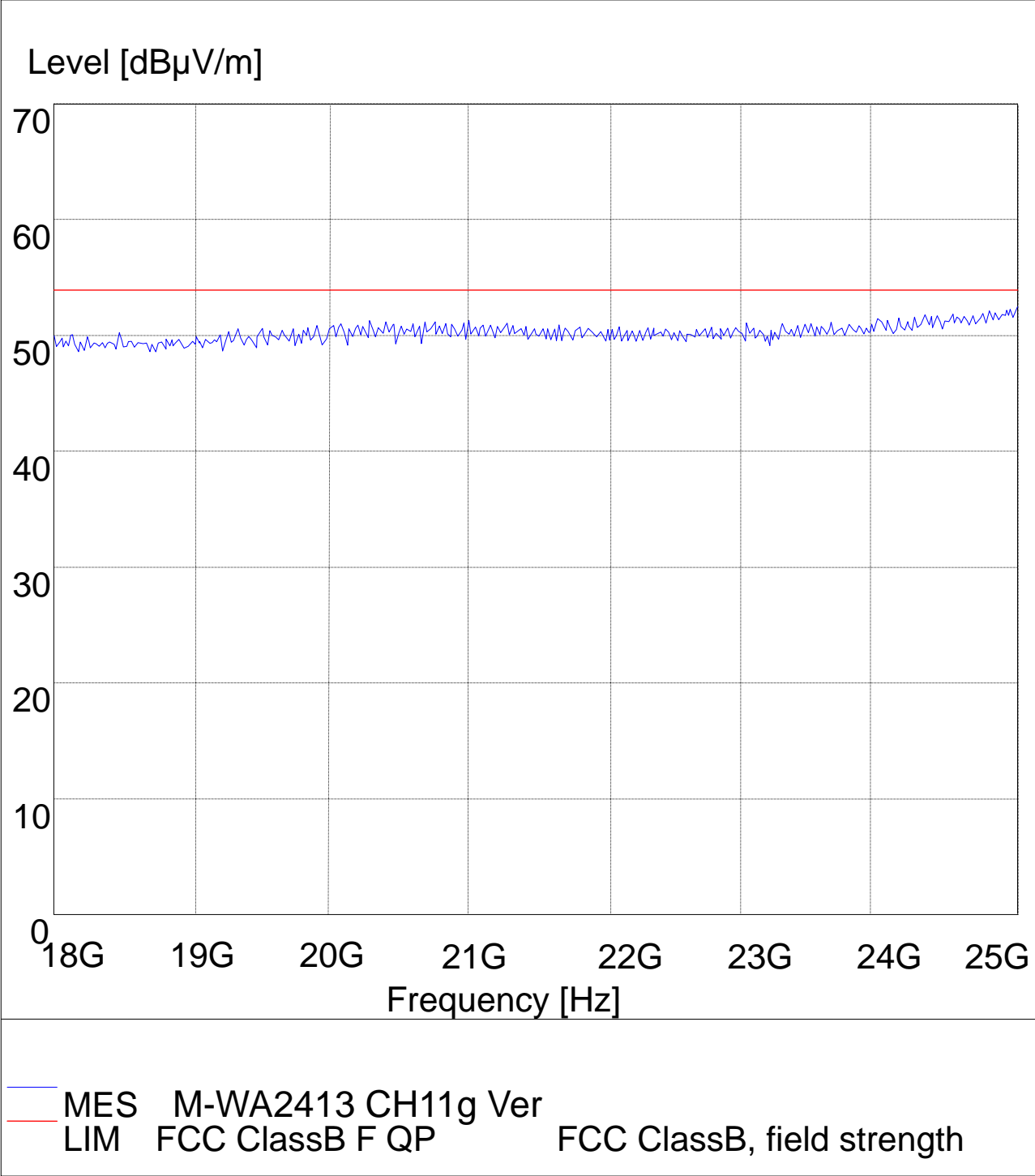
18-25G
CH11 6M Horizontal



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18-25G
CH11 6M Vertical



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Operation Mode: Transmitting & Receiving under CH01 at 1Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2412.00	103.94(PK)/ 87.34(AV)	H	Fundamental Frequency
2412.00	98.17(PK)/83.05 (AV)	V	
4824.00	57.95(PK)/ 41.28(AV)/	H	74(Peak)/ 54(AV)
4824.00	52.66(PK)/ 37.18(AV)/	V	74(Peak)/ 54(AV)
7236.00	--	H/V	74(Peak)/ 54(AV)
9648.00	--	H/V	74(Peak)/ 54(AV)
12060	--	H/V	74(Peak)/ 54(AV)
14472	--	H/V	74(Peak)/ 54(AV)
16684	--	H/V	74(Peak)/ 54(AV)
19296	--	H/V	74(Peak)/ 54(AV)
21708	--	H/V	74(Peak)/ 54(AV)
24120	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

3. For 802.11b mode 1Mbps

4. Test results are for the worst case condition

Operation Mode: Transmitting & Receiving under CH06 at 1Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2437.00	103.79(PK)/ 88.03(AV)	H	Fundamental Frequency
2437.00	97.38(PK)/82.83 (AV)	V	
4874.00	--	H/V	74(Peak)/ 54(AV)
7311.00	--	H/V	74(Peak)/ 54(AV)
9748.00	--	H/V	74(Peak)/ 54(AV)
12185	--	H/V	74(Peak)/ 54(AV)
14622	--	H/V	74(Peak)/ 54(AV)
17059	--	H/V	74(Peak)/ 54(AV)
19496	--	H/V	74(Peak)/ 54(AV)
21933	--	H/V	74(Peak)/ 54(AV)
24370	--	H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

3. For 802.11b mode 1Mbps

4. test results are for the worst case condition

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Operation Mode: Transmitting & Receiving under CH11 at 1Mbps

Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB μ V/m)
2462.00	102.29 (PK)/86.58(AV)	H	Fundamental Frequency
2462.00	96.31 (PK)/81.38(AV)	V	
4924	--	H/V	74(Peak)/ 54(AV)
7368	--	H/V	74(Peak)/ 54(AV)
9848	--	H/V	74(Peak)/ 54(AV)
12310	--	H/V	74(Peak)/ 54(AV)
14772	--	H/V	74(Peak)/ 54(AV)
17234	--	H/V	74(Peak)/ 54(AV)
19696	--	H/V	74(Peak)/ 54(AV)
22158	--	H/V	74(Peak)/ 54(AV)
24620	--	H/V	74(Peak)/ 54(AV)

- Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
2. Remark "---" means that the emissions level is too low to be measured
3. For 802.11b mode at 1Mbps
4. Test results are for the worst case condition

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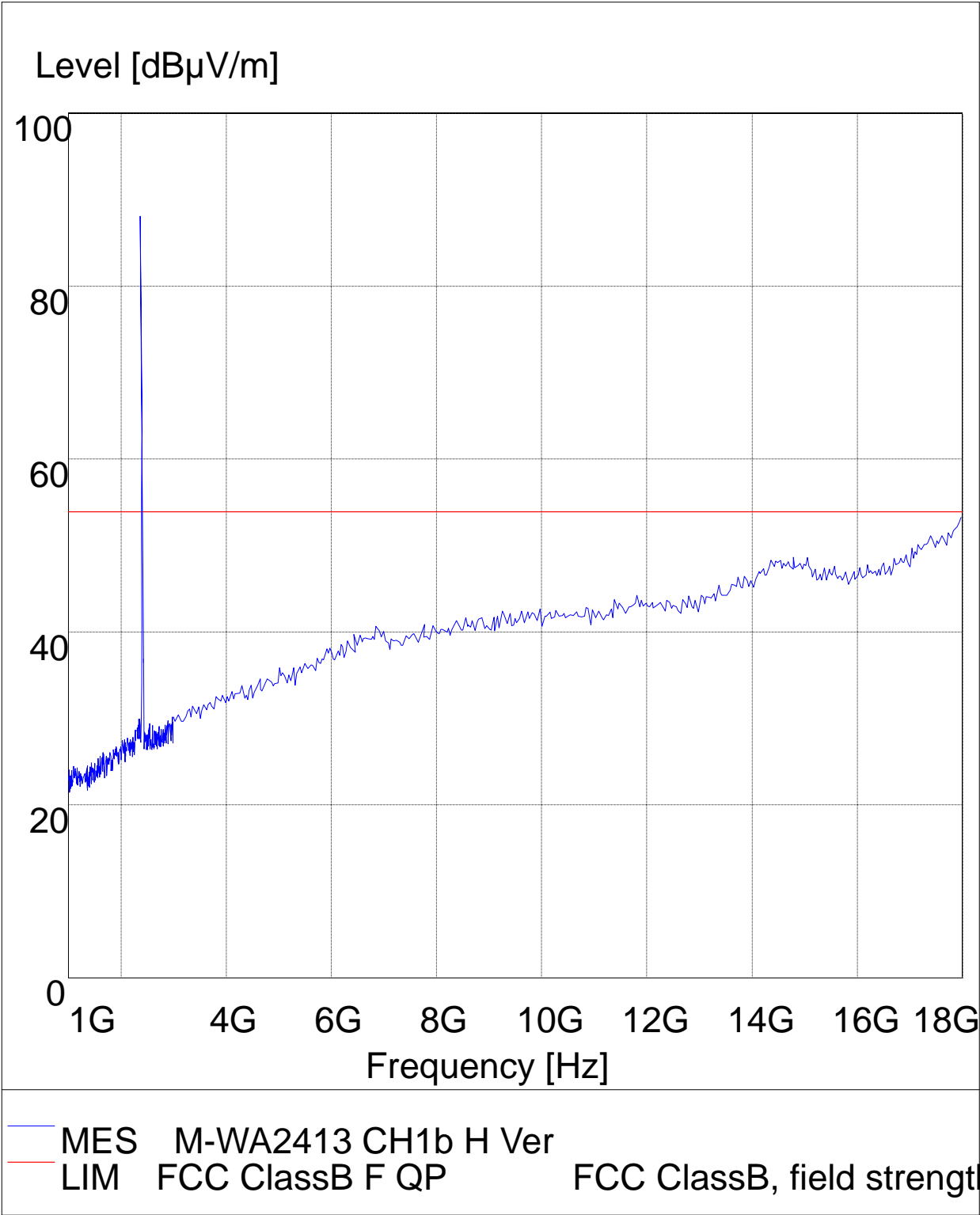
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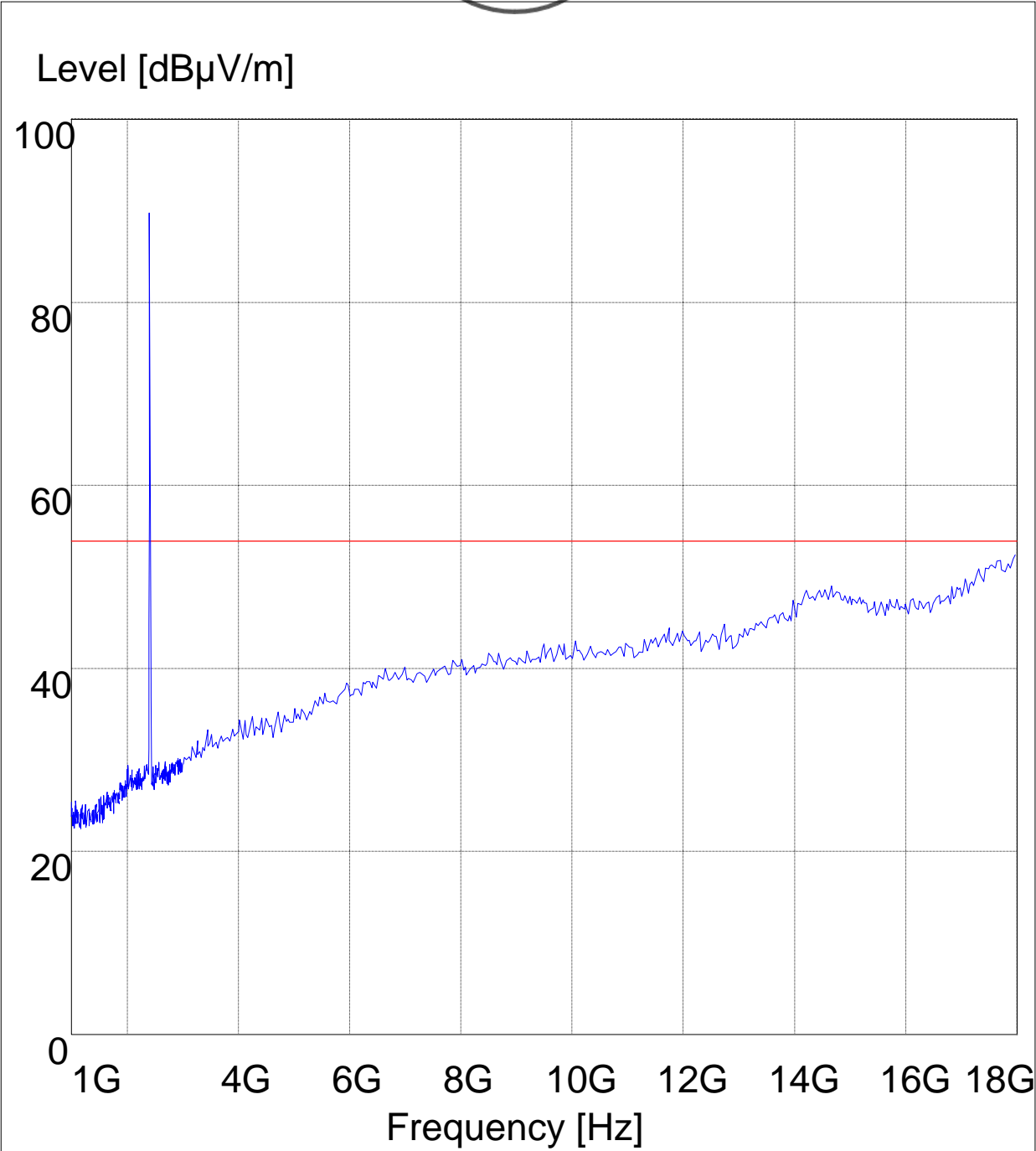
CH01 at 11Mbps: Vertical



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CH01 at 11Mbps: Horizontal

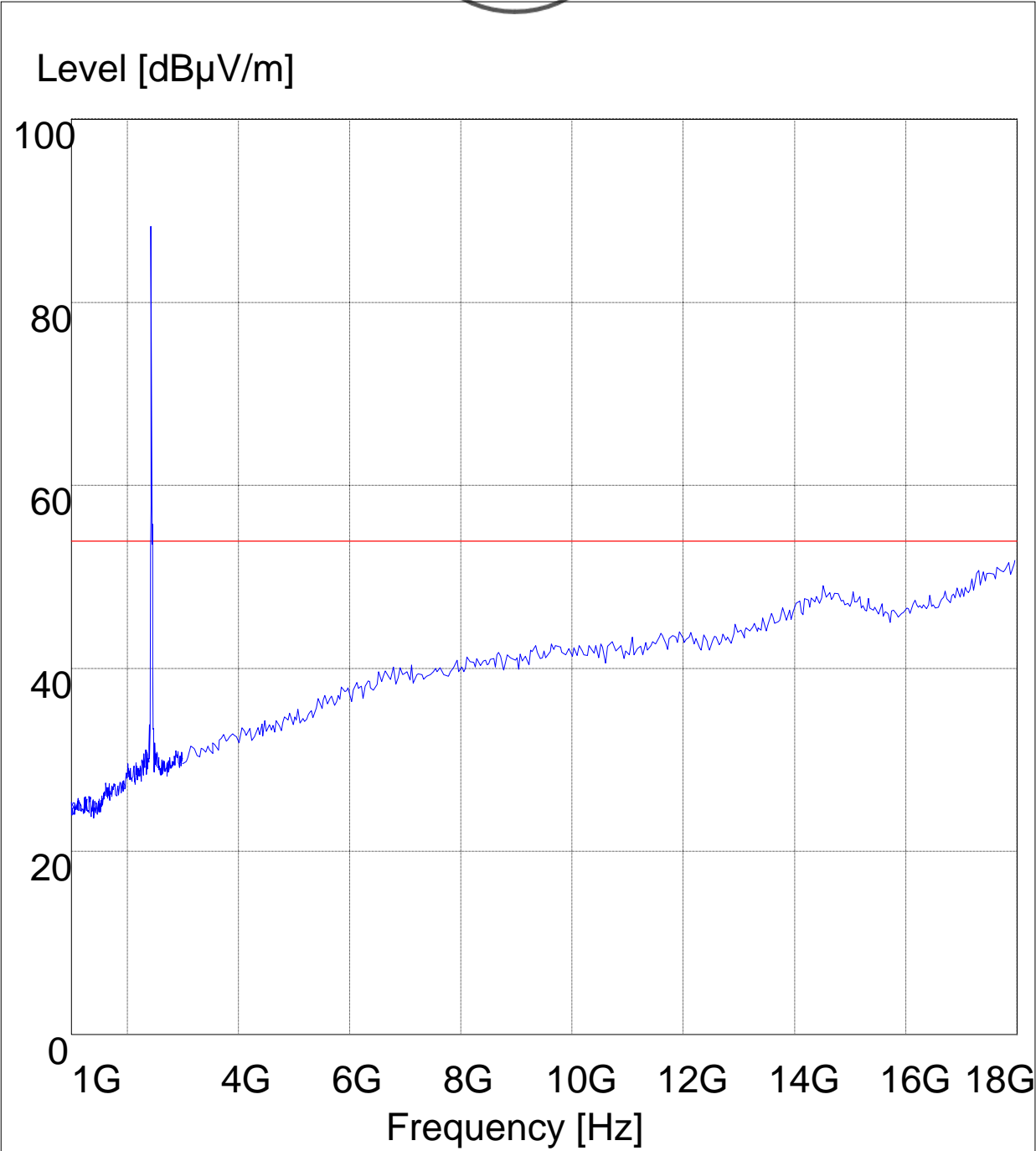


MES M-WA2413 CH1b H Hor
LIM FCC ClassB F QP FCC ClassB, field strength

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CH06 at 11Mbps: Vertical

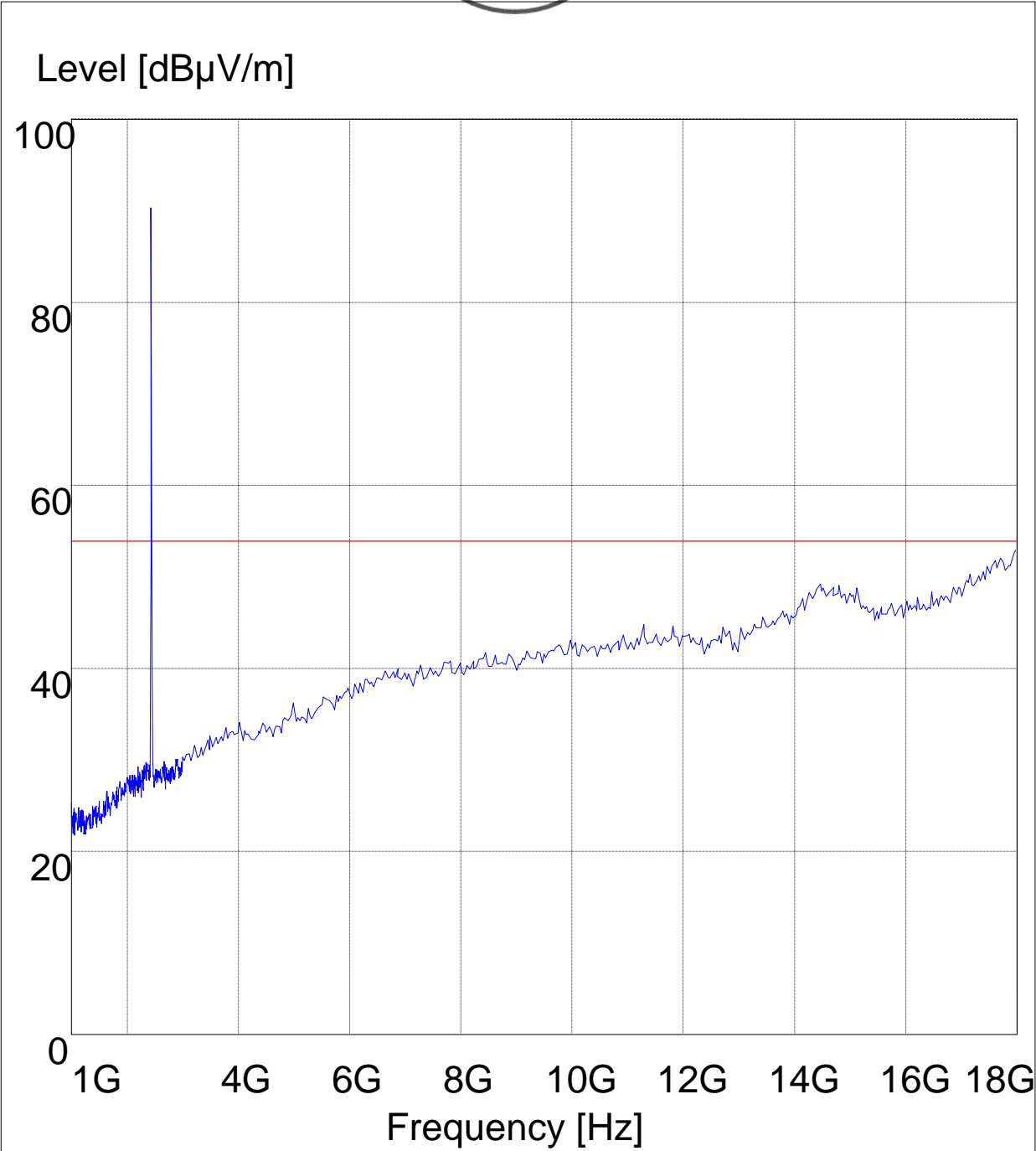


MES	M-WA2413 CH6b H Ver	
LIM	FCC ClassB F QP	FCC ClassB, field strength

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CH06 at 11Mbps: Horizontal

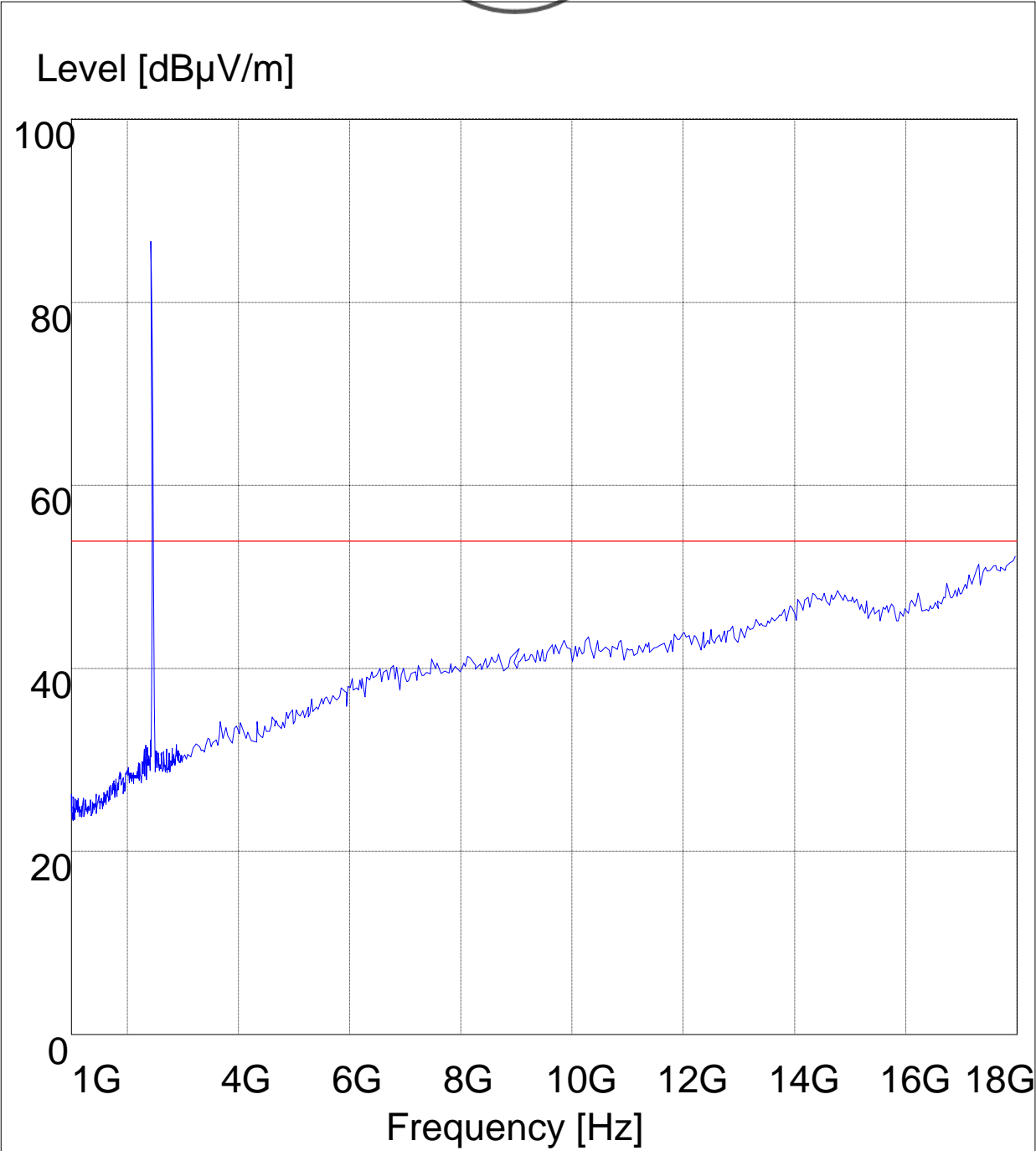


MES M-WA2413 CH6b H Hor
LIM FCC ClassB F QP FCC ClassB, field strength

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CH11 at 11Mbps: Vertical

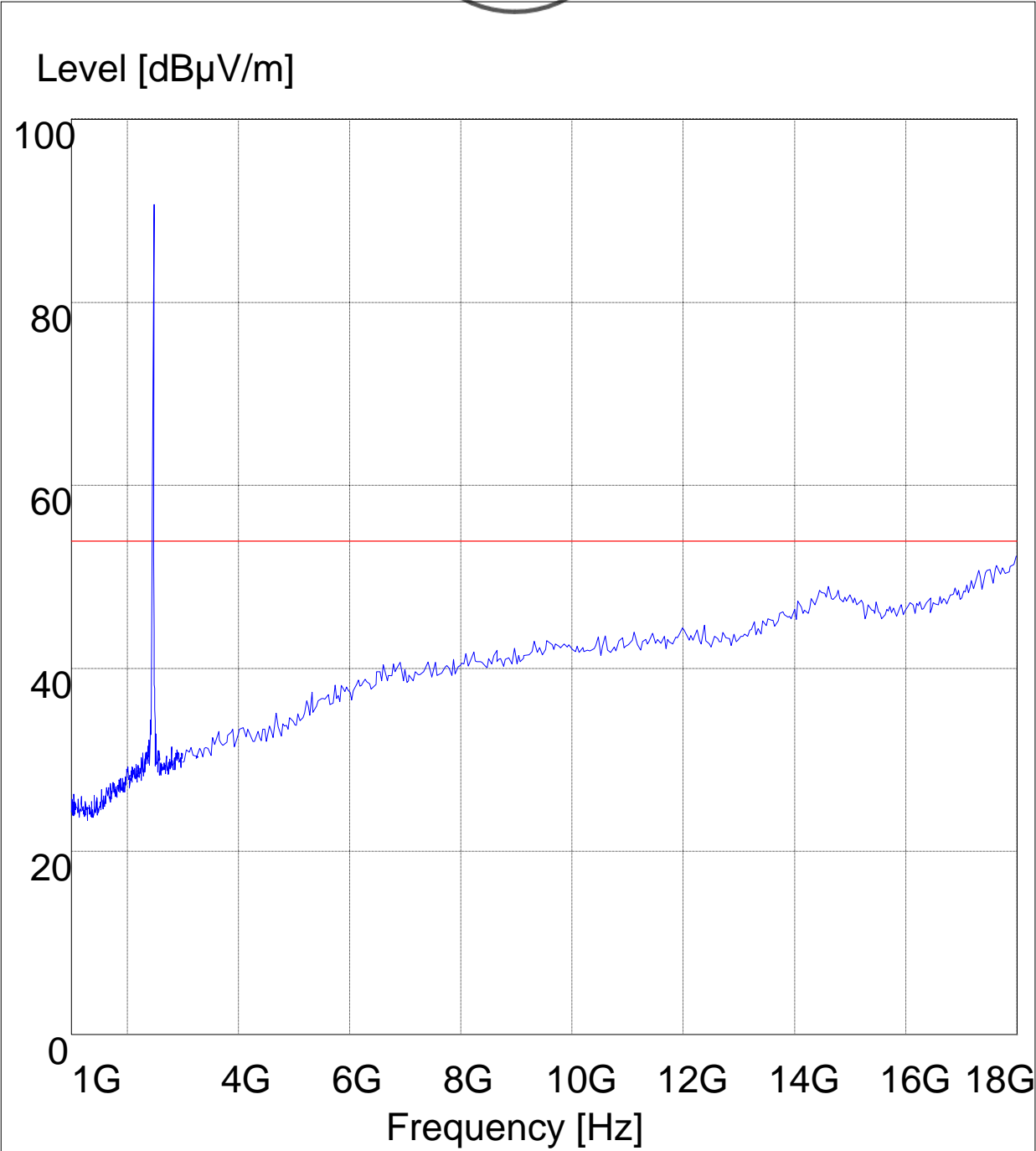


MES M-WA2413 CH11b H Ver
LIM FCC ClassB F QP FCC ClassB, field strength

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CH11 at 11Mbps: Horizontal

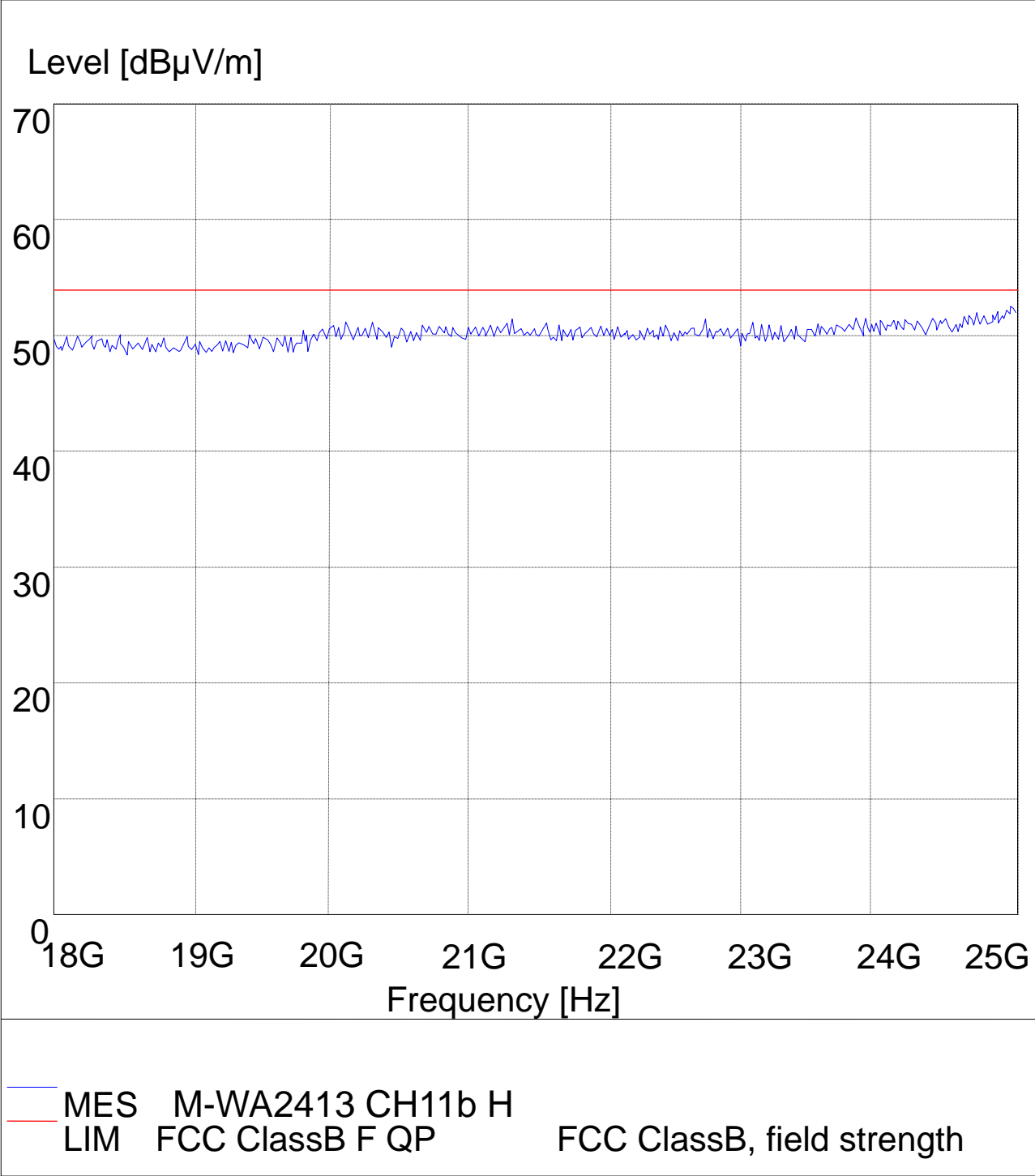


MES M-WA2413 CH11b H Hor
LIM FCC ClassB F QP FCC ClassB, field strength

The report refers only to the sample tested and does not apply to the bulk.
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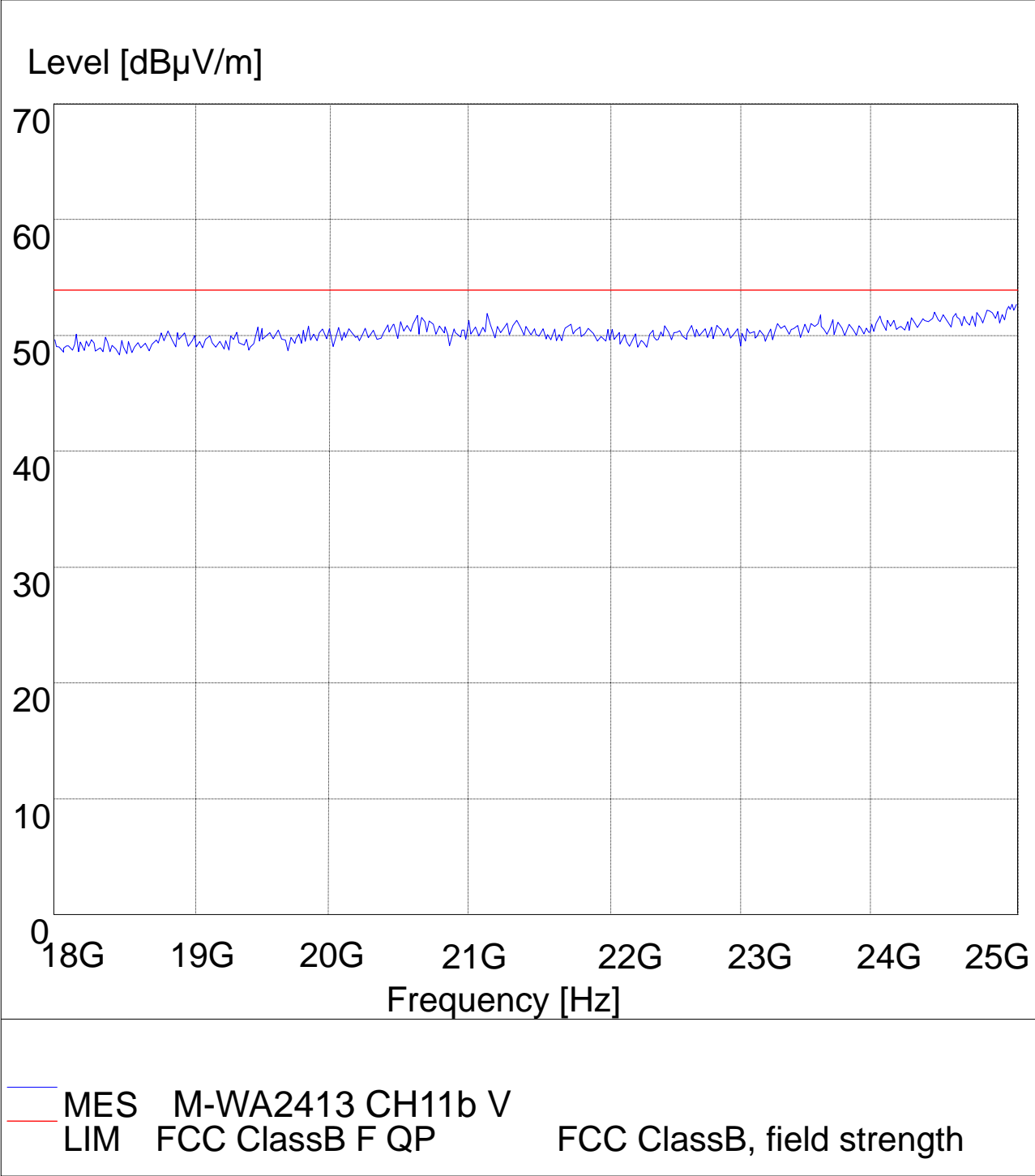
18-25G
CH11 11M Horizontal



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18-25G
CH11 11M Vertical

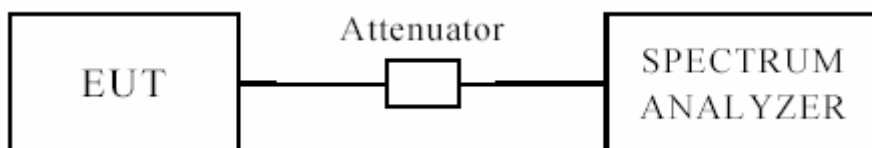


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7.0 6dB Bandwidth Measurement

7.1 Test Setup



7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500kHz

7.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator.

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW for 802.11b/g mode; The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

7.4 Test Result

The report refers only to the sample tested and does not apply to the bulk.

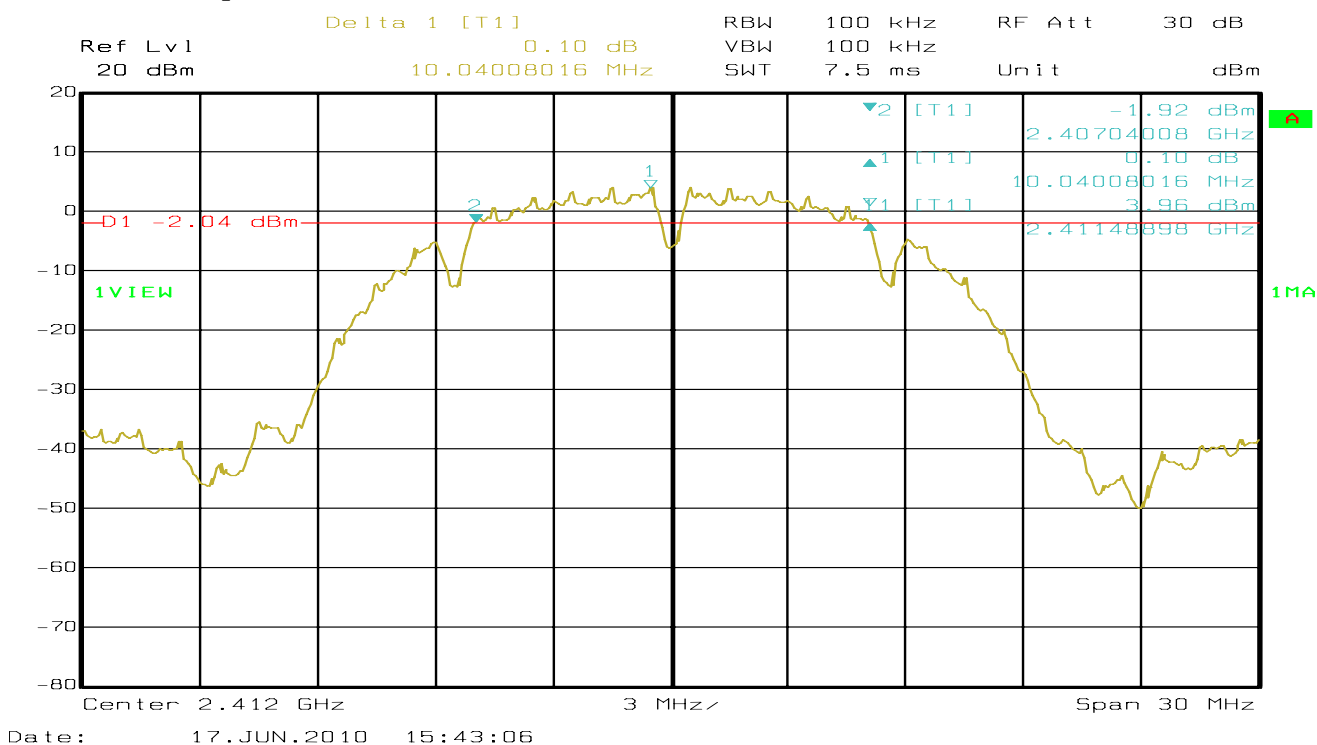
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EUT	Metadex-M-WA2413		Model	M-WA2413	
Mode	802.11b		Input Voltage	48V	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	1	10.04	0.5	Pass
6	2437	1	9.74	0.5	Pass
11	2462	1	10.10	0.5	Pass

1. 802.11b at 1Mbps of CH01



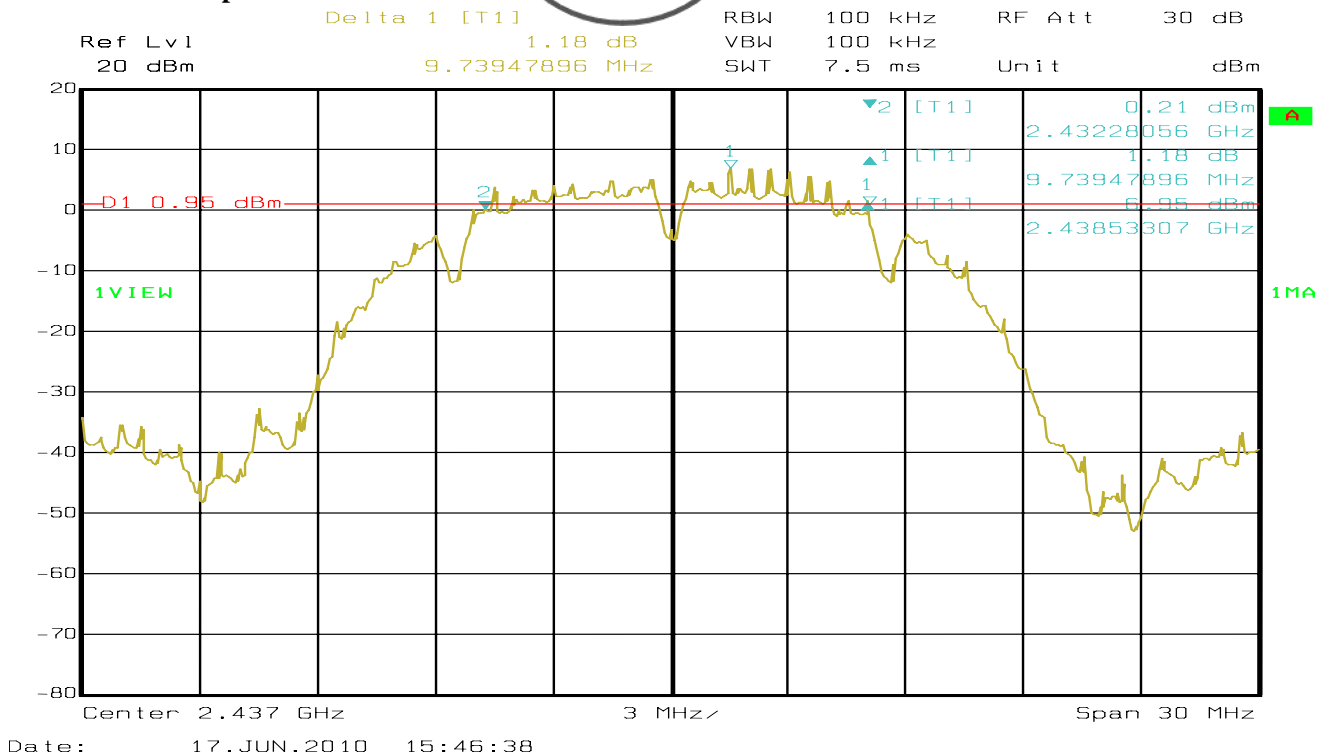
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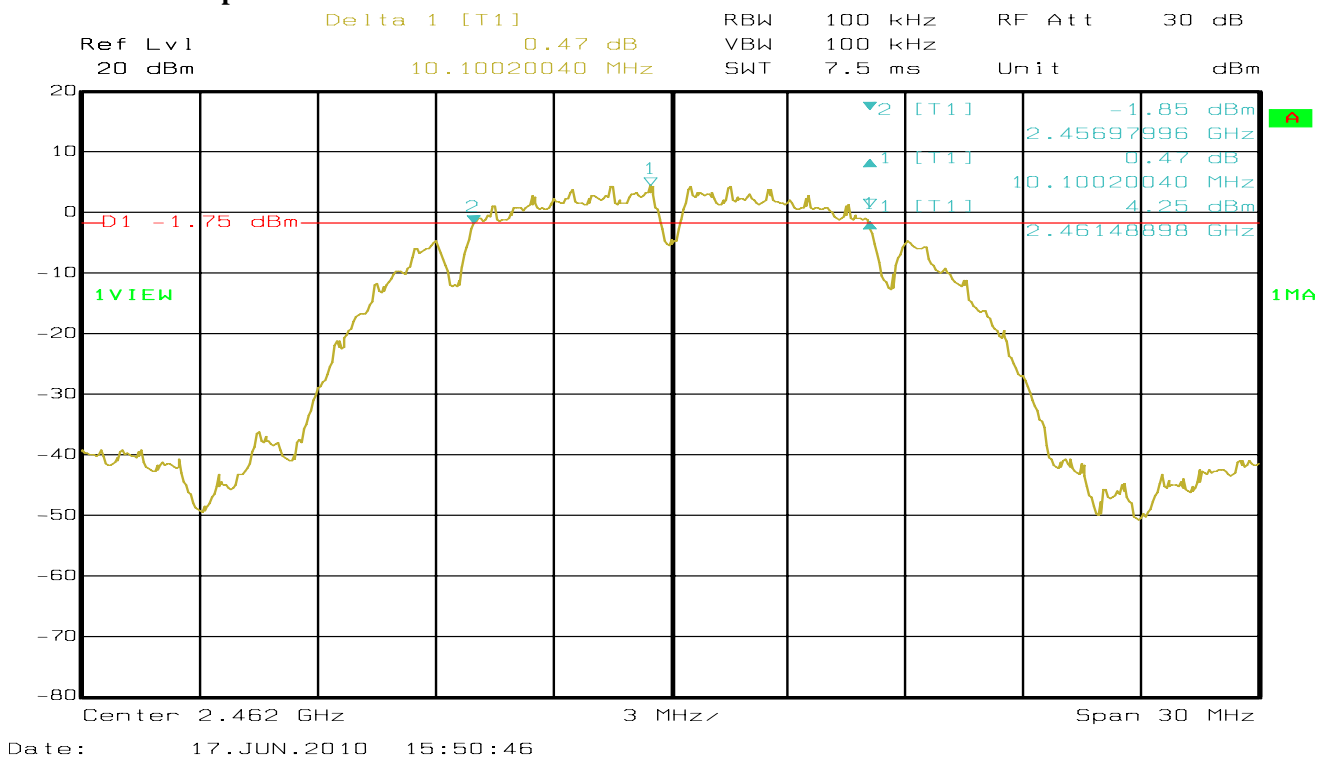
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2. 802.11b at 1Mbps of CH06



3. 802.11b at 1Mbps of CH11



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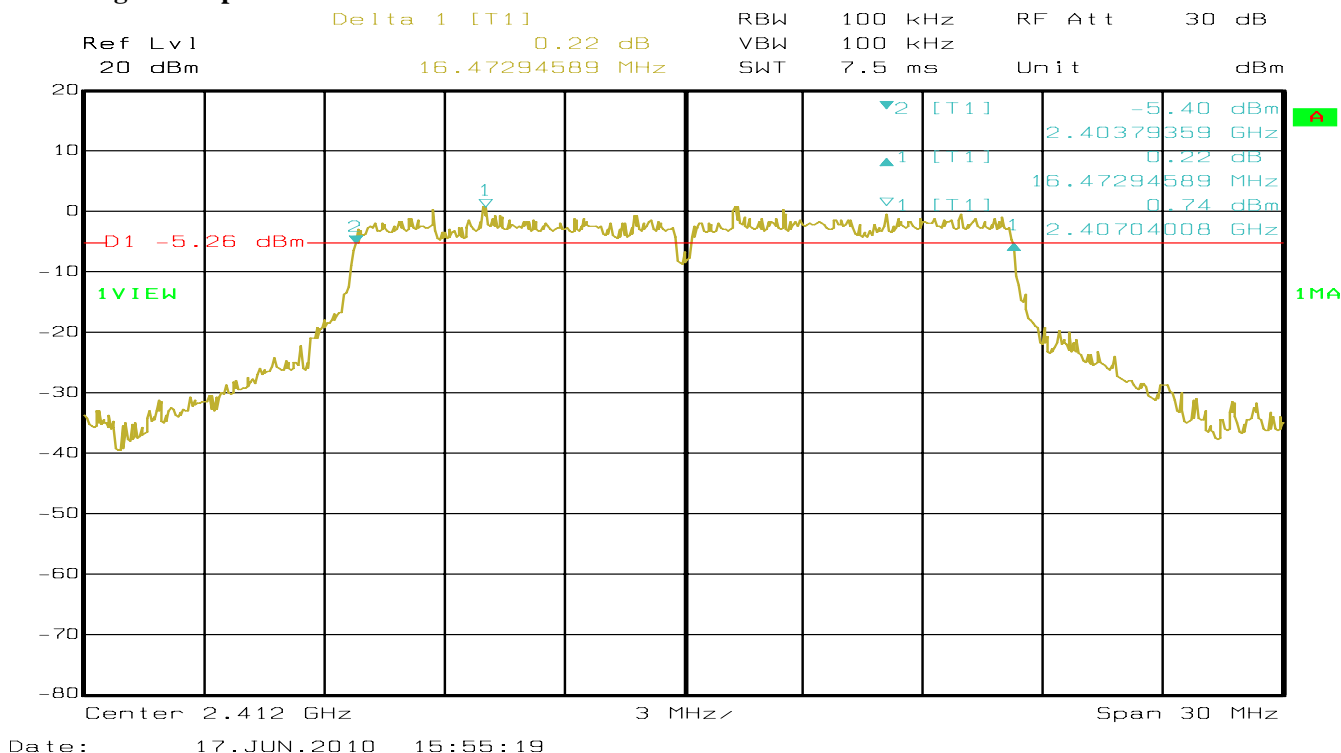
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EUT	Metadex-M-WA2413		Model	M-WA2413	
Mode	802.11g		Input Voltage	48V	
Temperature	24 deg. C,		Humidity	56% RH	
Channel	Channel Frequency (MHz)	Data Transfer Rate (Mbps)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass/Fail
1	2412	6	16.47	0.5	Pass
6	2437	6	16.47	0.5	Pass
11	2462	6	16.53	0.5	Pass

Test Plots:

1. 802.11g at 6Mbps of CH01



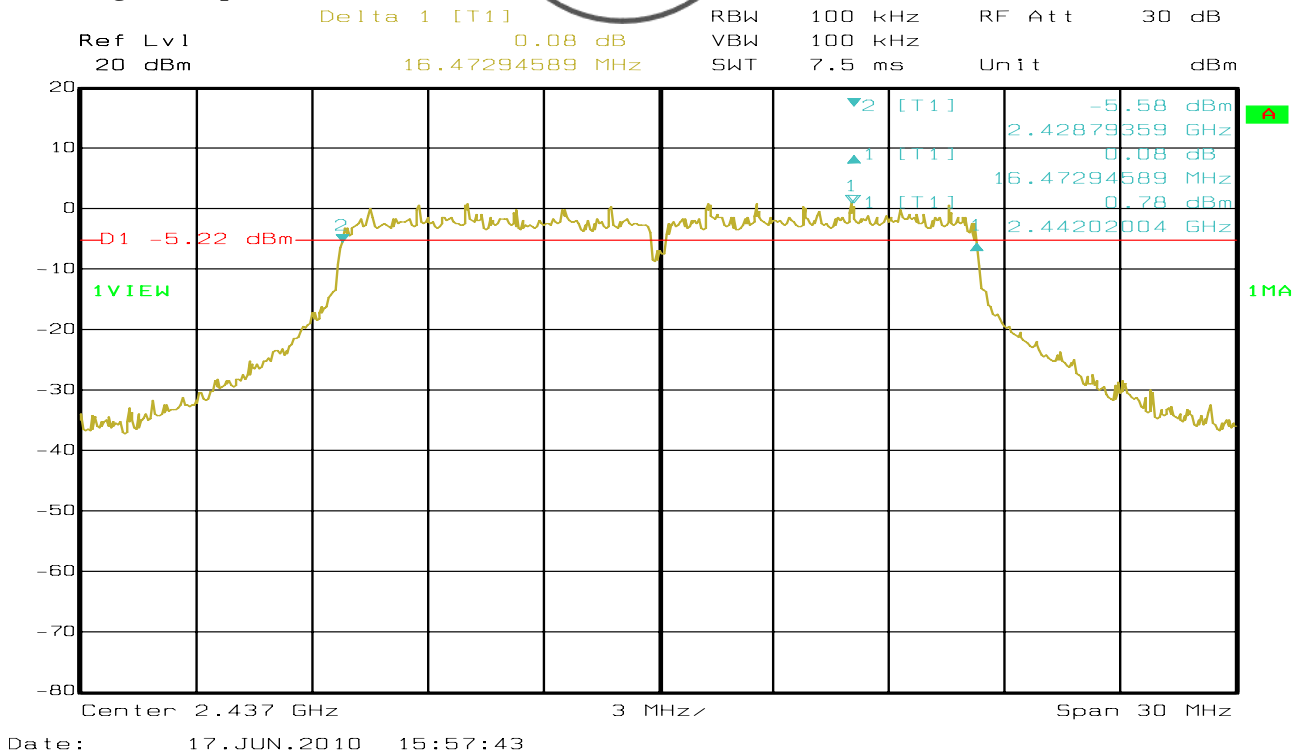
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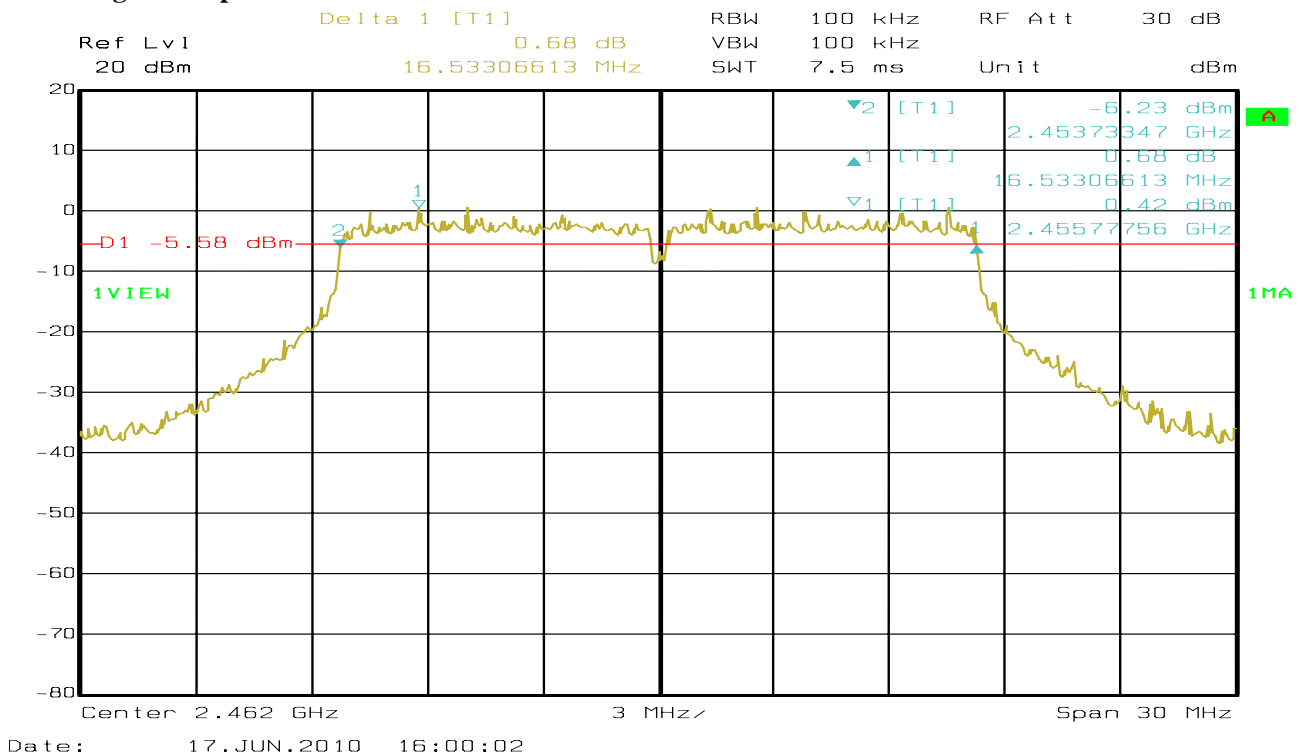
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2. 802.11g at 6Mbps of CH06



3. 802.11g at 6Mbps of CH11



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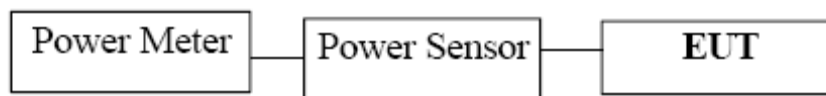
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8. Maximum Peak Output Power

8.1 Test Setup



8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

8.3 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the peak power was measured

8.4 Test Results

EUT		Metadex-M-WA2413		Model		M-WA2413	
Mode		802.11b		Input Voltage		48V	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Channel Frequency (MHz)		Peak Power Output (dBm)		Peak Power Limit (dBm)		Pass/ Fail
1	2412		13.94		30		Pass
6	2437		13.54		30		Pass
11	2462		13.10		30		Pass

Note: 1. At final test to get the worst-case emission at 1Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

3. The tests also conducted with the supply voltage varied between 85% and 115% of the nominal rated supply. And the recorded data were the worse case.

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EUT	Metadex-M-WA2413		Model	M-WA2413
Mode	802.11g		Input Voltage	48V
Temperature	24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass/ Fail
1	2412	13.62	30	Pass
6	2437	12.96	30	Pass
11	2462	12.30	30	Pass

Note: 1. At final test to get the worst-case emission at 6Mbps for CH01, CH06 and CH11

2. The result basic equation calculation as follow:

$$\text{Peak Power Output} = \text{Peak Power Reading} + \text{Cable loss} + \text{Attenuator}$$

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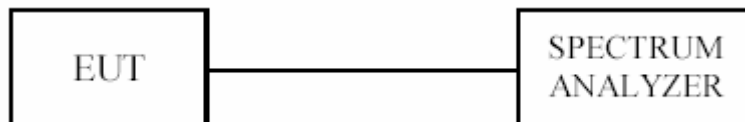
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9. Power Spectral Density Measurement

9.1 Test Setup



9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm.

9.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3KHz RBW and 10kHz VBW, set sweep time=100s, **PK detector**.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

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9.4 Test Result

EUT		Metadex-M-WA2413		Model		M-WA2413	
Mode		802.11b		Input Voltage		48V	
Temperature		24 deg. C,		Humidity		56% RH	
Channel	Channel Frequency (MHz)		Final RF Power Level in 3kHz BW (dBm)		Maximum Limit (dBm)		Pass/ Fail
1	2412		-19.44		8		Pass
6	2437		-18.31		8		Pass
11	2462		-18.35		8		Pass

Note: For 802.11b mode at final test to get the worst-case emission at 1Mbps for CH11, CH06 and CH01

EUT		Metadex-M-WA2413		Model	M-WA2413
Mode		802.11g		Input Voltage	48V
Temperature		24 deg. C,		Humidity	56% RH
Channel	Channel Frequency (MHz)		Final RF Power Level in 3kHz BW (dBm)	Maximum Limit (dBm)	Pass/ Fail
1	2412		-14.72	8	Pass
6	2437		-15.43	8	Pass
11	2462		-14.24	8	Pass

Note: For 802.11g mode at final test to get the worst-case emission at 6Mbps for CH11, CH06 and CH01

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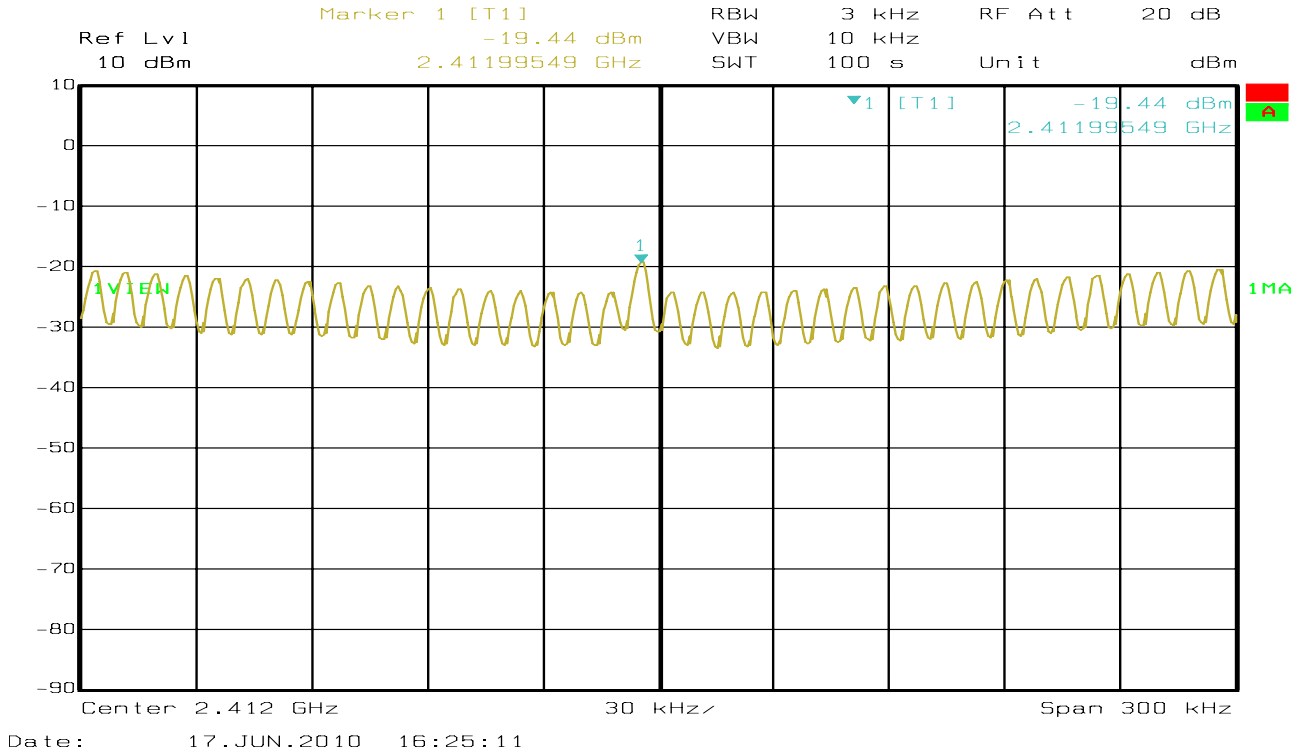
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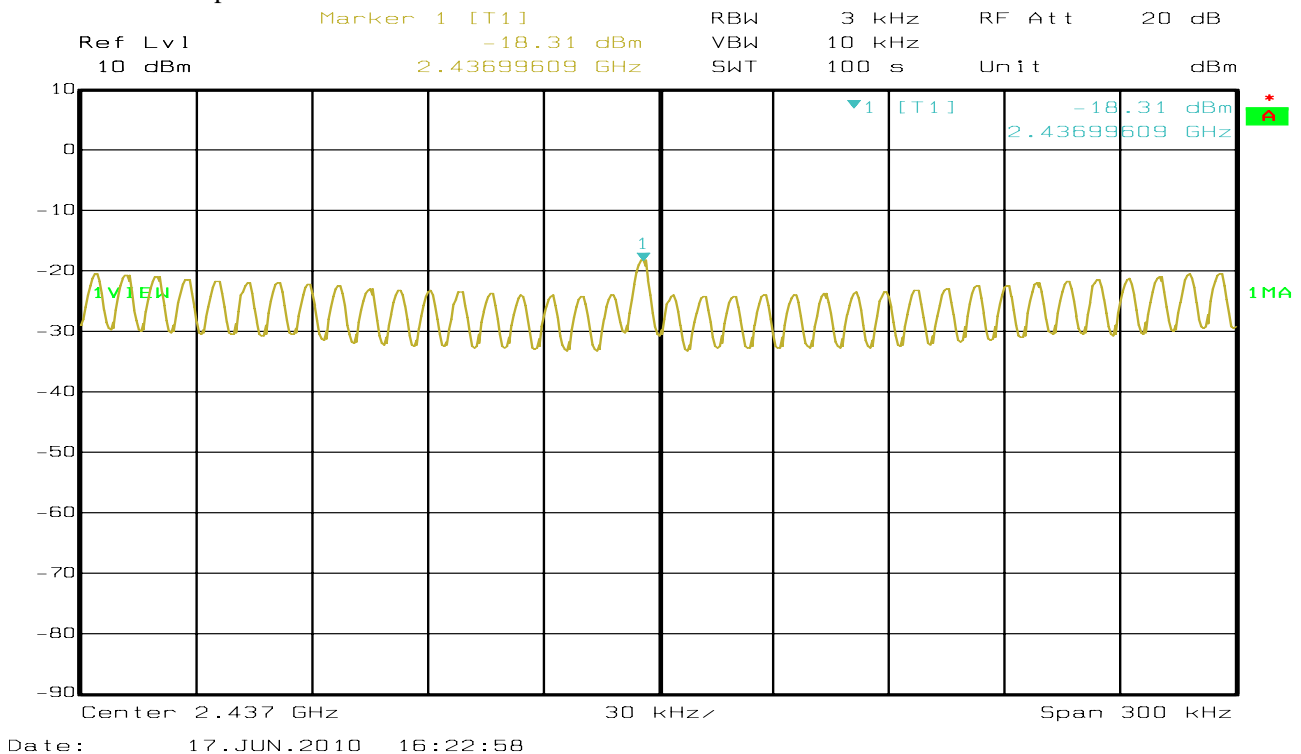


9.5 Photo of Power Spectral Density Measurement

1.802.11b at 1Mbps of CH01



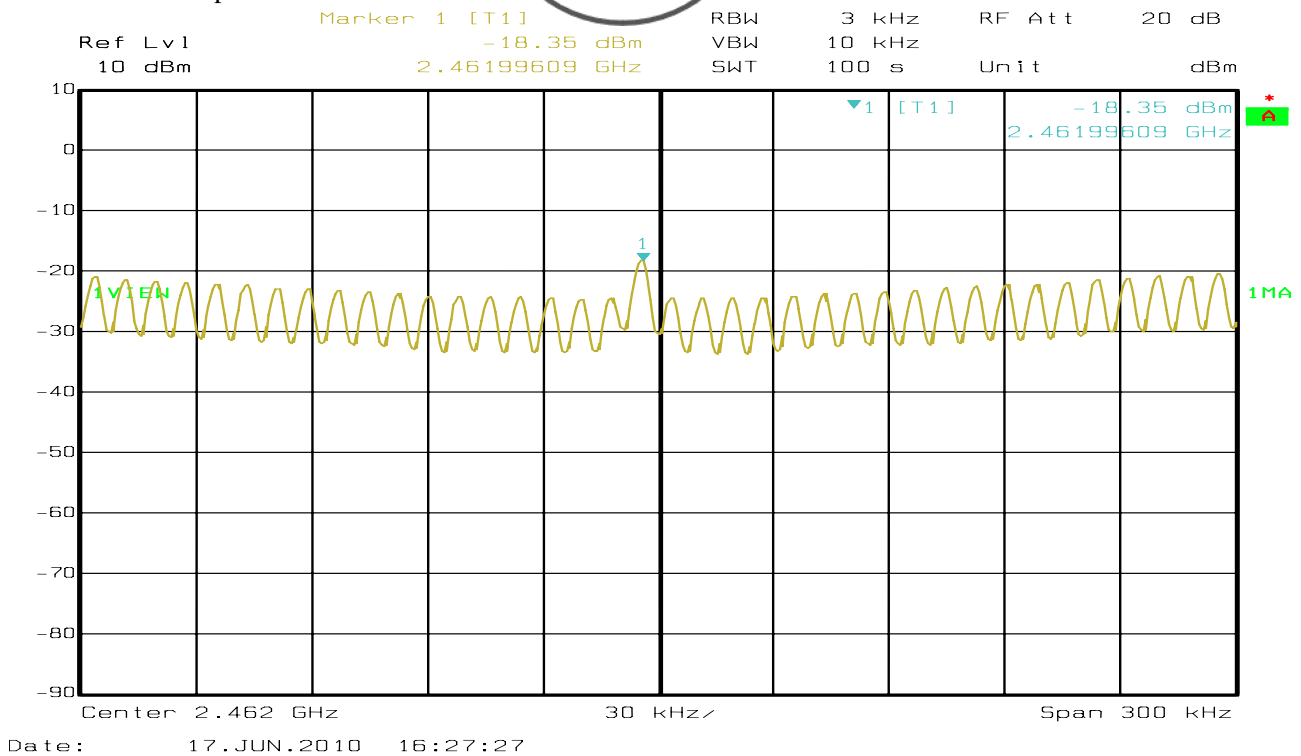
2. 802.11b at 1Mbps at CH06



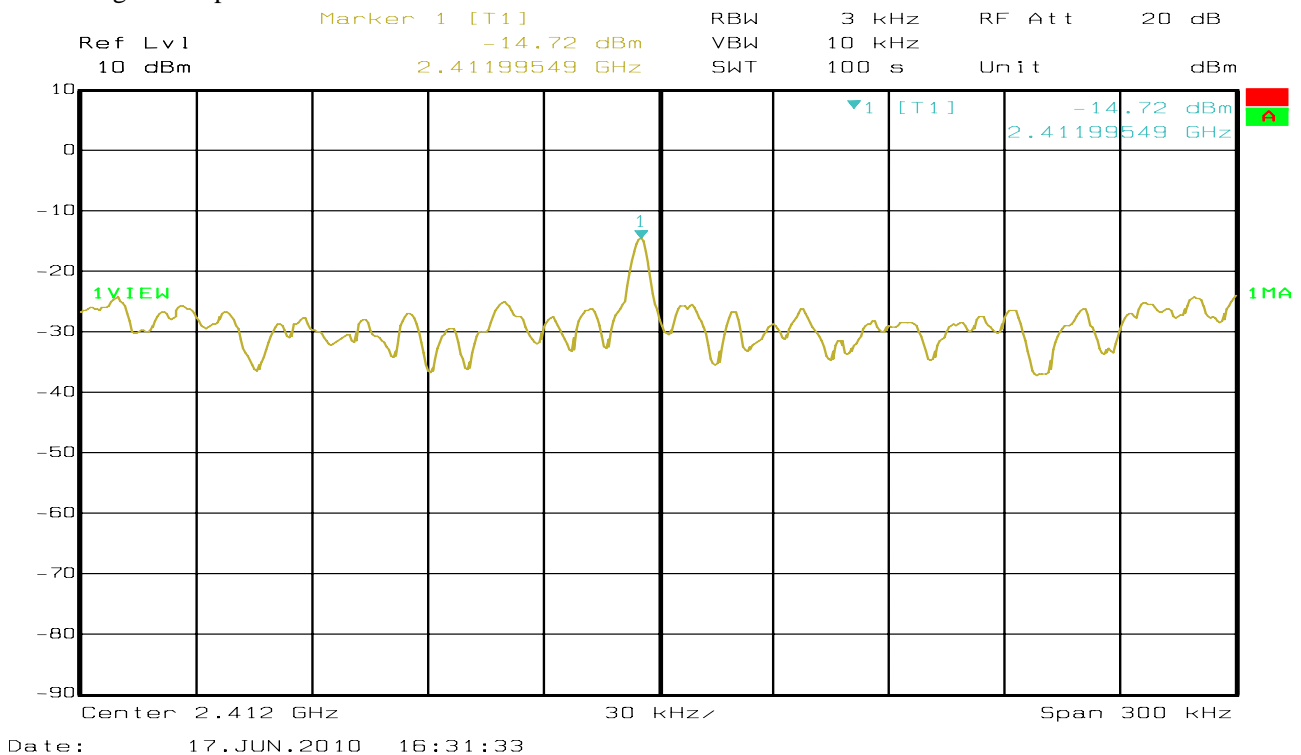
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3. 802.11b at 1Mbps of CH11



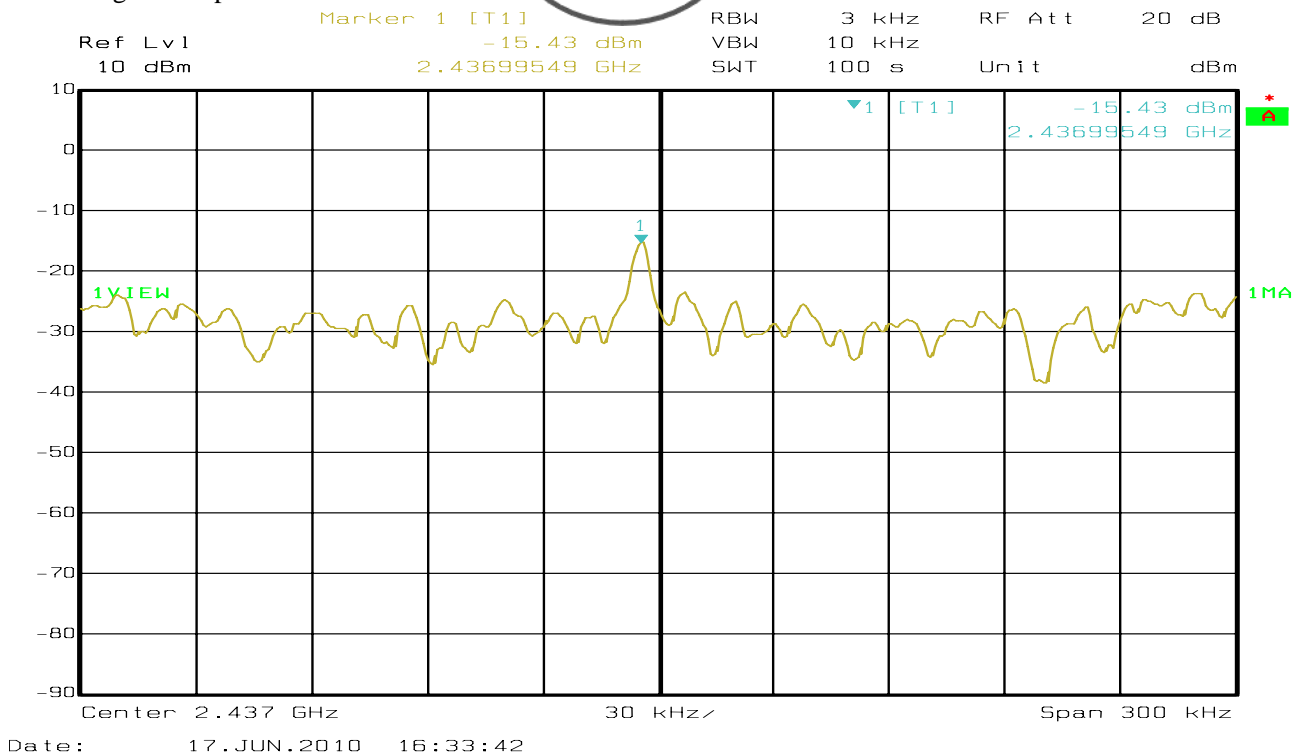
4. 802.11g at 6Mbps of CH01



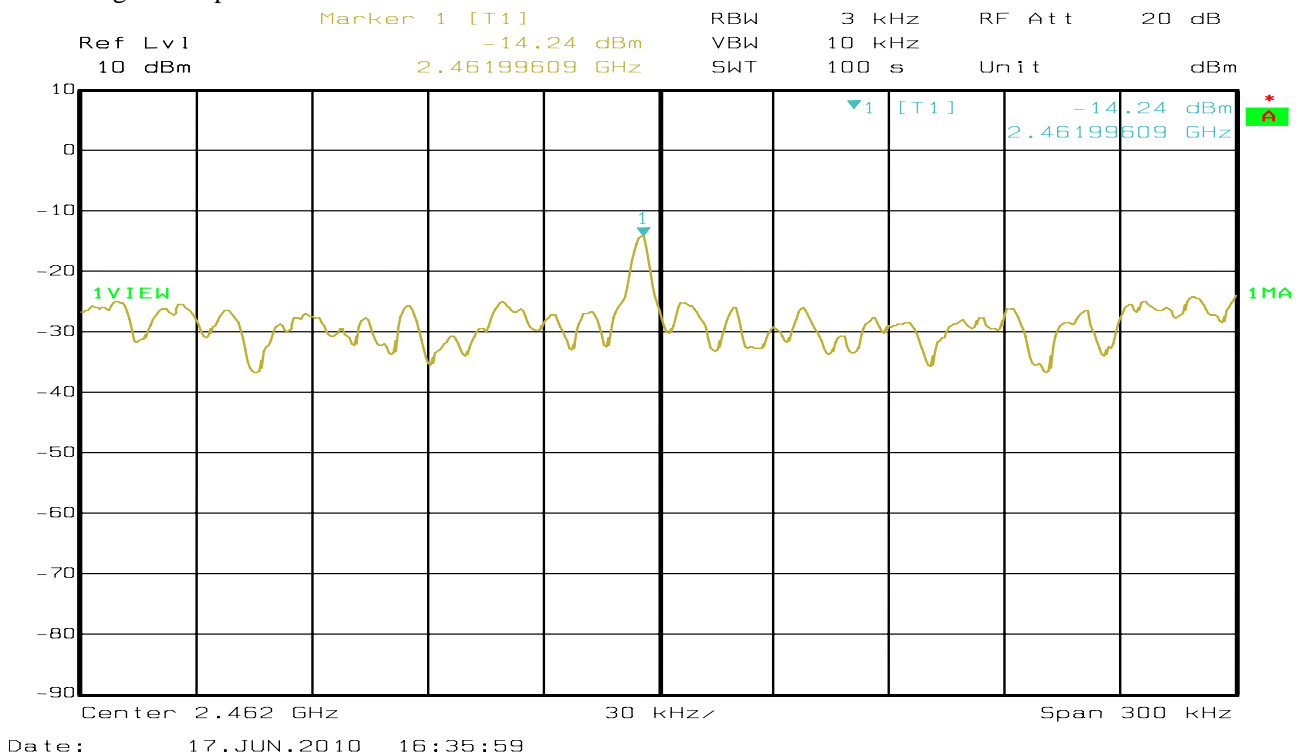
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5. 802.11g at 6Mbps of CH06



6. 802.11g at 6Mbps of CH11

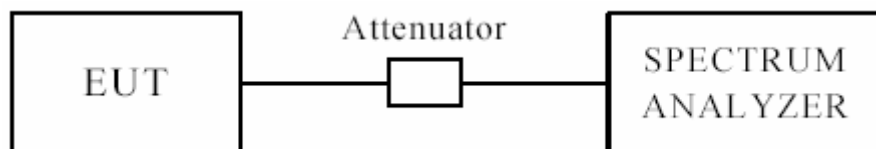


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10 Out of Band Measurement

10.1 Test Setup for band edge



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

10.2 Limits of Out of Band Emissions Measurement

1. Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

10.3 Test Procedure

For signals in the restricted bands above and below the $2.4\text{--}2.483\text{GHz}$ allocated band a measurement was made of radiated emission test. PK setting: $\text{RBW}=\text{VBW}=1\text{MHz}$; AV setting: $\text{RBW}=1\text{MHz}$, $\text{VBW}=10\text{Hz}$

For bandage test, the spectrum set as follows: $\text{RBW}=\text{VBW}=100\text{ kHz}$. A conducted measurement used

10.4 Test Result

Please see next pages

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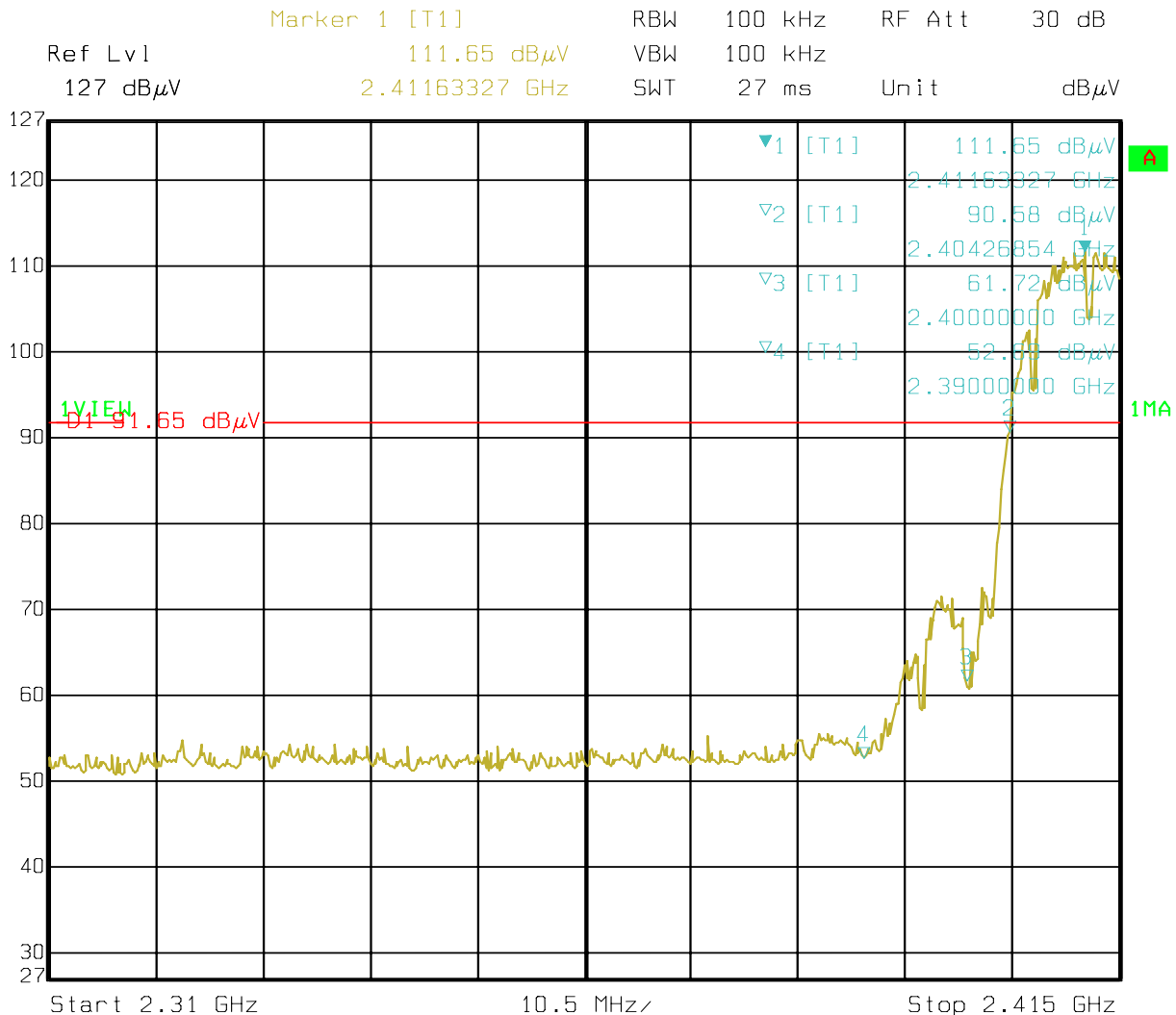
For 802.11b mode

CH01 at 1Mbps

10.4 Restricted band and bandedge Measurement

Product:	Metadex M-WA2413		Test Mode:	CH1
Mode	Keeping Transmitting		Input Voltage	48V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2386.2MHz	PK (dBμV/m)	53.26(V)/49.53(H)	Limit	74(dBμV/m)
	AV (dBμV/m)	39.27(V)/38.16(H)		54(dBμV/m)

Test Figure:



Date: 23.JUN.2010 16:13:12

Note: The Max. FS in Restrict Band are measured in conventional method.

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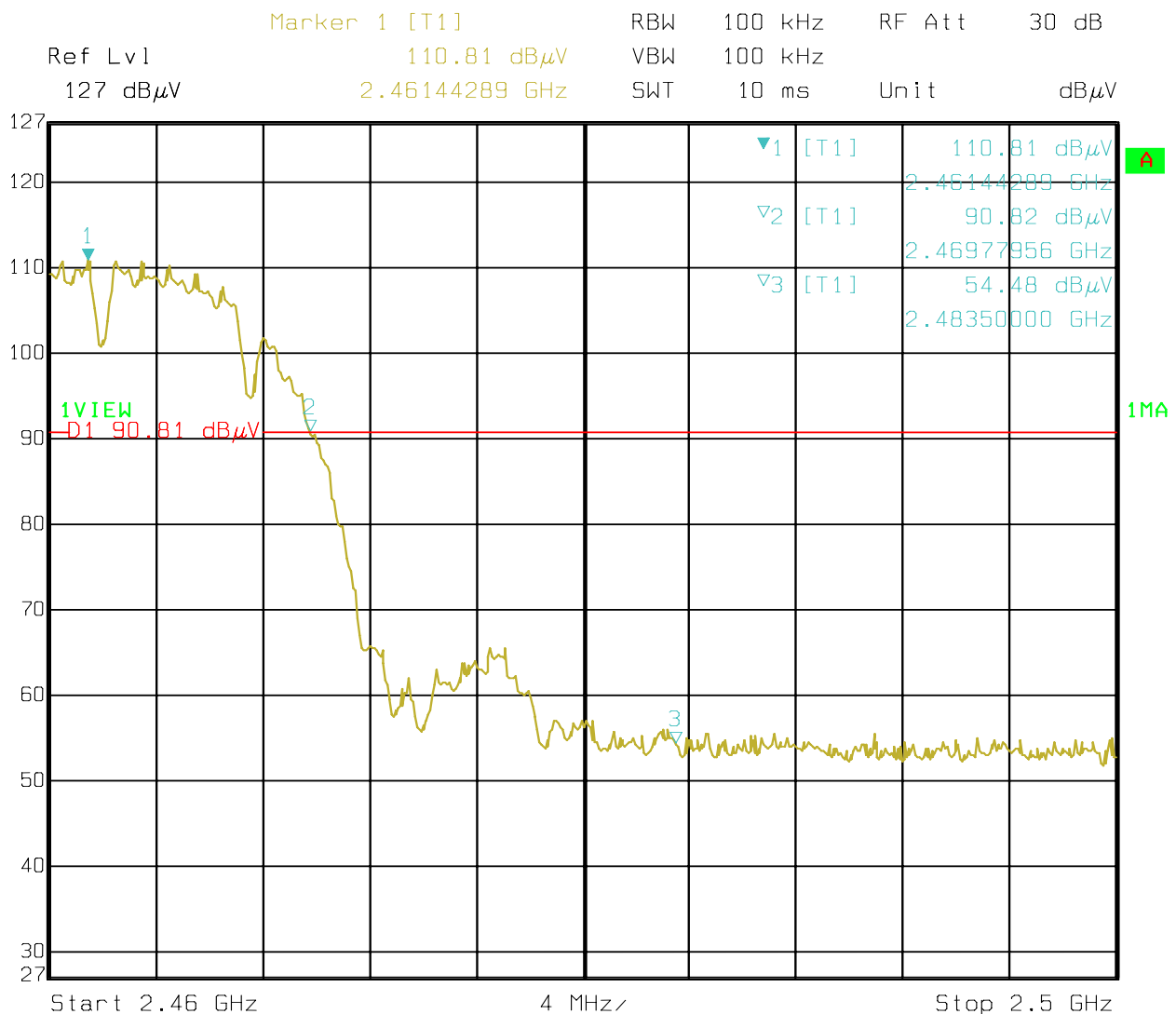


CH11 at 1Mbps

10.4 Restricted band and bandedge Measurement

Product:	Metadex M-WA2413		Test Mode:	CH11
Mode	Keeping Transmitting		Input Voltage	48V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2483.5MHz	PK (dBμV/m)	54.76(V)/51.88(H)	Limit	74(dBμV/m)
	AV (dBμV/m)	40.95(V)/39.28(H)		54(dBμV/m)

Test Figure:



Date: 23.JUN.2010 16:16:10

Note: The Max. FS in Restrict Band are measured in conventional method.

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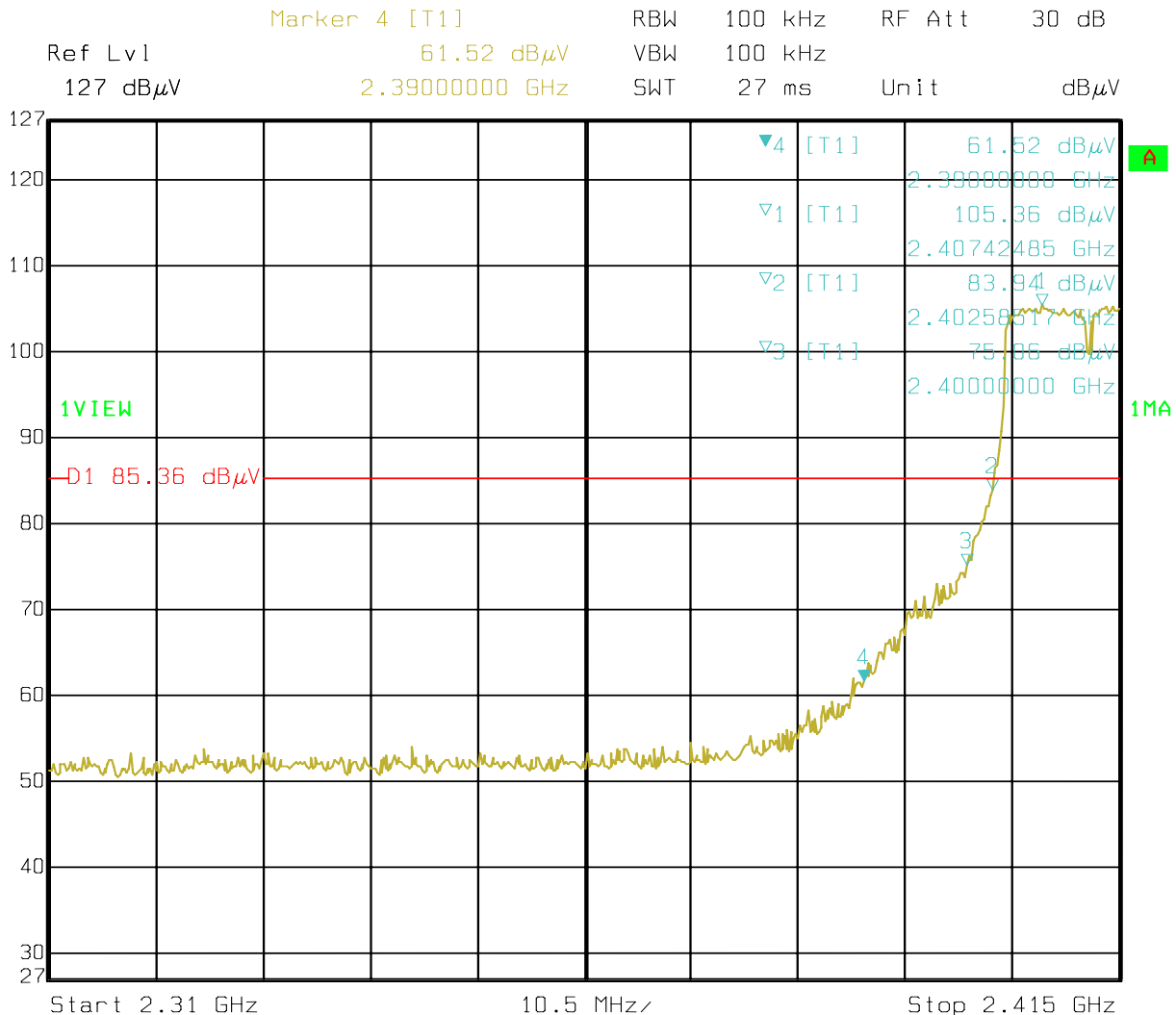
For 802.11g mode

CH01 at 6Mbps

10.4 Restricted band and bandedge Measurement

Product:	Metadex M-WA2413		Test Mode:	CH1
Mode	Keeping Transmitting		Input Voltage	48V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2390MHz	PK (dBμV/m)	61.43(V)/60.01(H)	Limit	74(dBμV/m)
	AV (dBμV/m)	46.45(V)/45.28(H)		54(dBμV/m)

Test Figure:



Date: 23.JUN.2010 16:20:10

Note: The Max. FS in Restrict Band are measured in conventional method.

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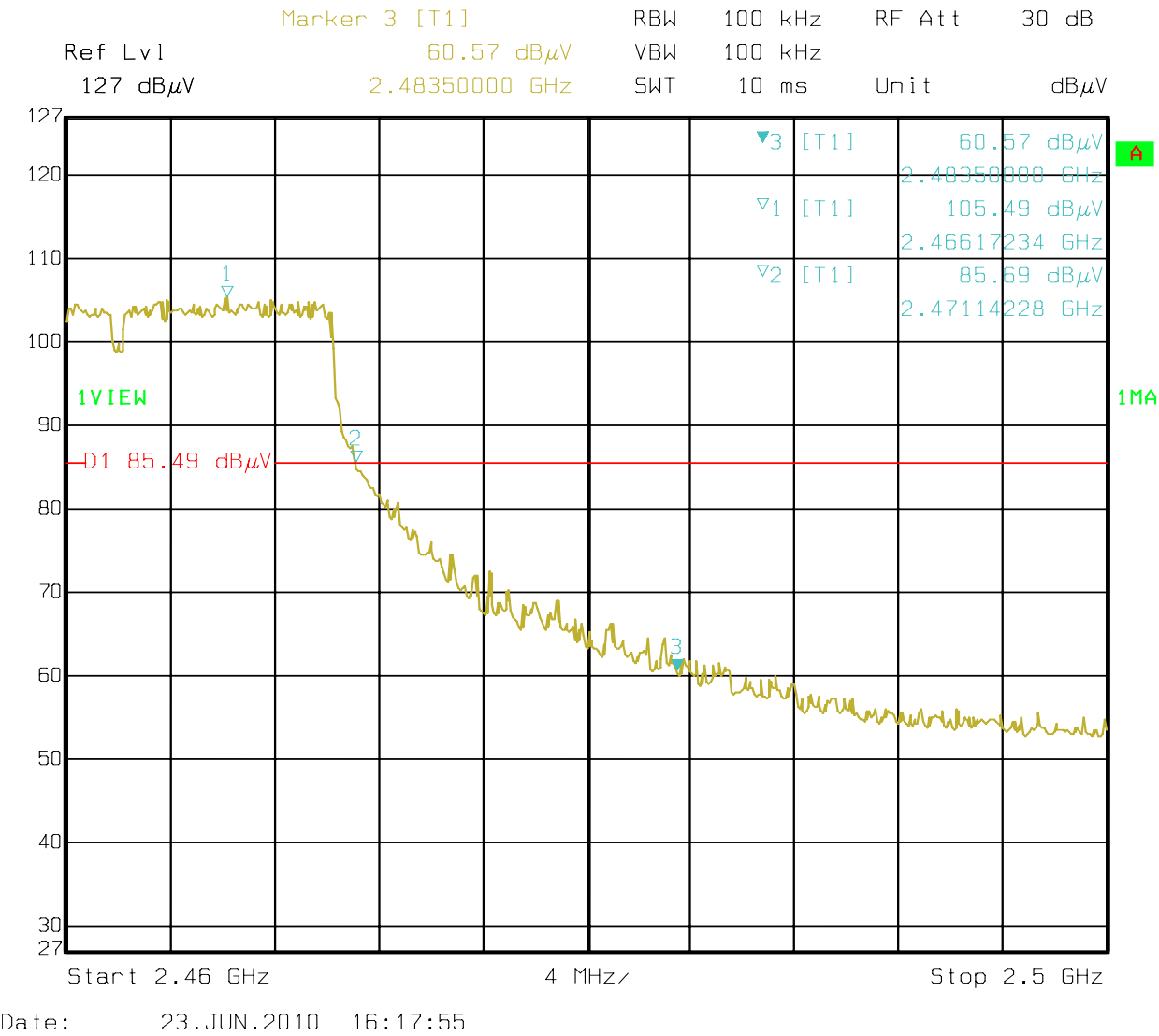


CH11 at 6Mbps

10.4 Restricted band and bandedge Measurement

Product:	Metadex M-WA2413		Test Mode:	CH11
Mode	Keeping Transmitting		Input Voltage	48V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	PK
The Max. FS in Restrict Band 2483.5MHz	PK (dBμV/m)	61.23(V)/59.86(H)	Limit	74(dBμV/m)
	AV (dBμV/m)	45.35(V)/44.87(H)		54(dBμV/m)

Test Figure:



Note: The Max. FS in Restrict Band are measured in conventional method.

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11.0 Antenna Requirement

11.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.2 Antenna Connected construction

Two Chip Dielectric antennas used. A main antenna for transmitting and receiving, the other antenna for receiving. The maximum Gain of the antennas is 2.07dBi.

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12.0 Maximum Permissible Exposure

Applicable Standard

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2m normally can be maintained between the user and the device.

(a) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100000			5	6

(b) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Times E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100000			1.0	30

Note: f=frequency in MHz; *Plane-wave equivalent power density

MPE Calculation Method

$$E \text{ (V/m)} = (30 \cdot P \cdot G)^{0.5} / d \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = E^2 / 377$$

E = Electric Field (V/m)

P = Peak RF output Power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = (30 \cdot P \cdot G) / (377 \cdot d^2)$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

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Calculated Result and Limit

802.11b Mode

Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
1.61	13.94	24.77	0.0079	1	Compiles

802.11g Mode

Antenna Gain (Numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)	Test Result
1.61	13.62	23.01	0.0074	1	Compiles

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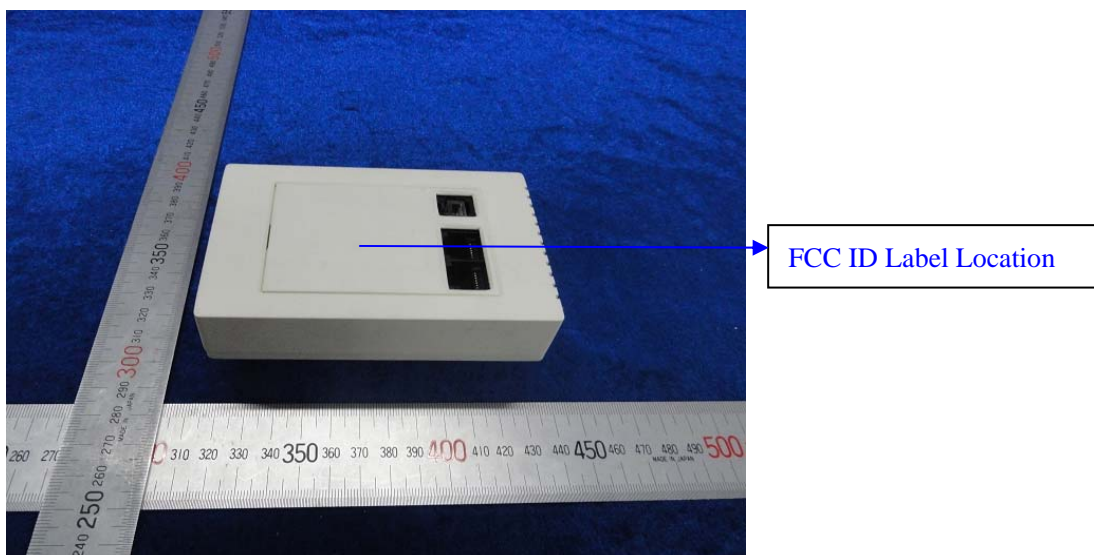
13.0 FCC ID Label

FCC ID: YLRMWA2413001

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



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14.0 Photo of testing Radiated Emissions



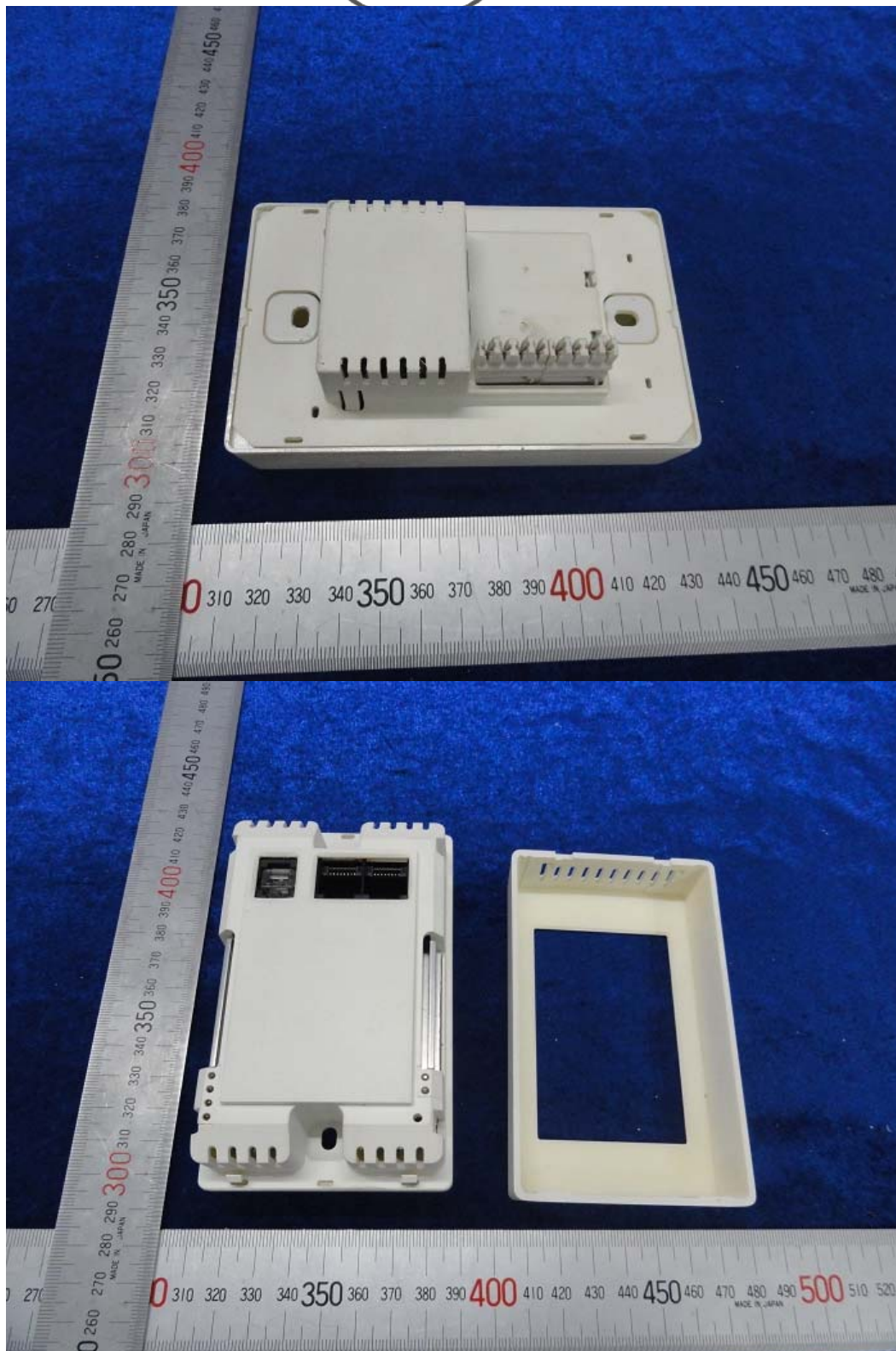
Conducted Emissions



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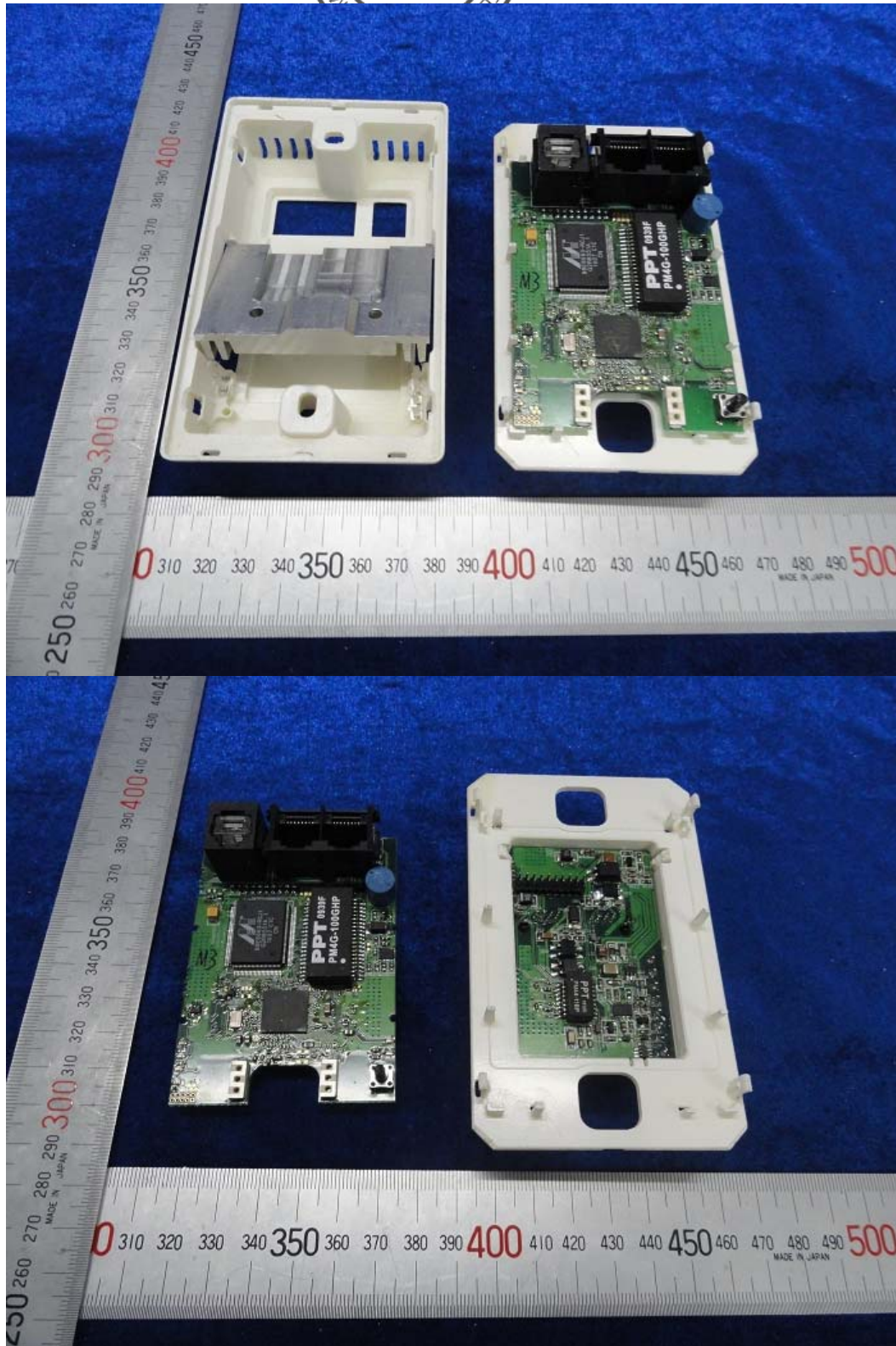
14.3 Photo for the EUT



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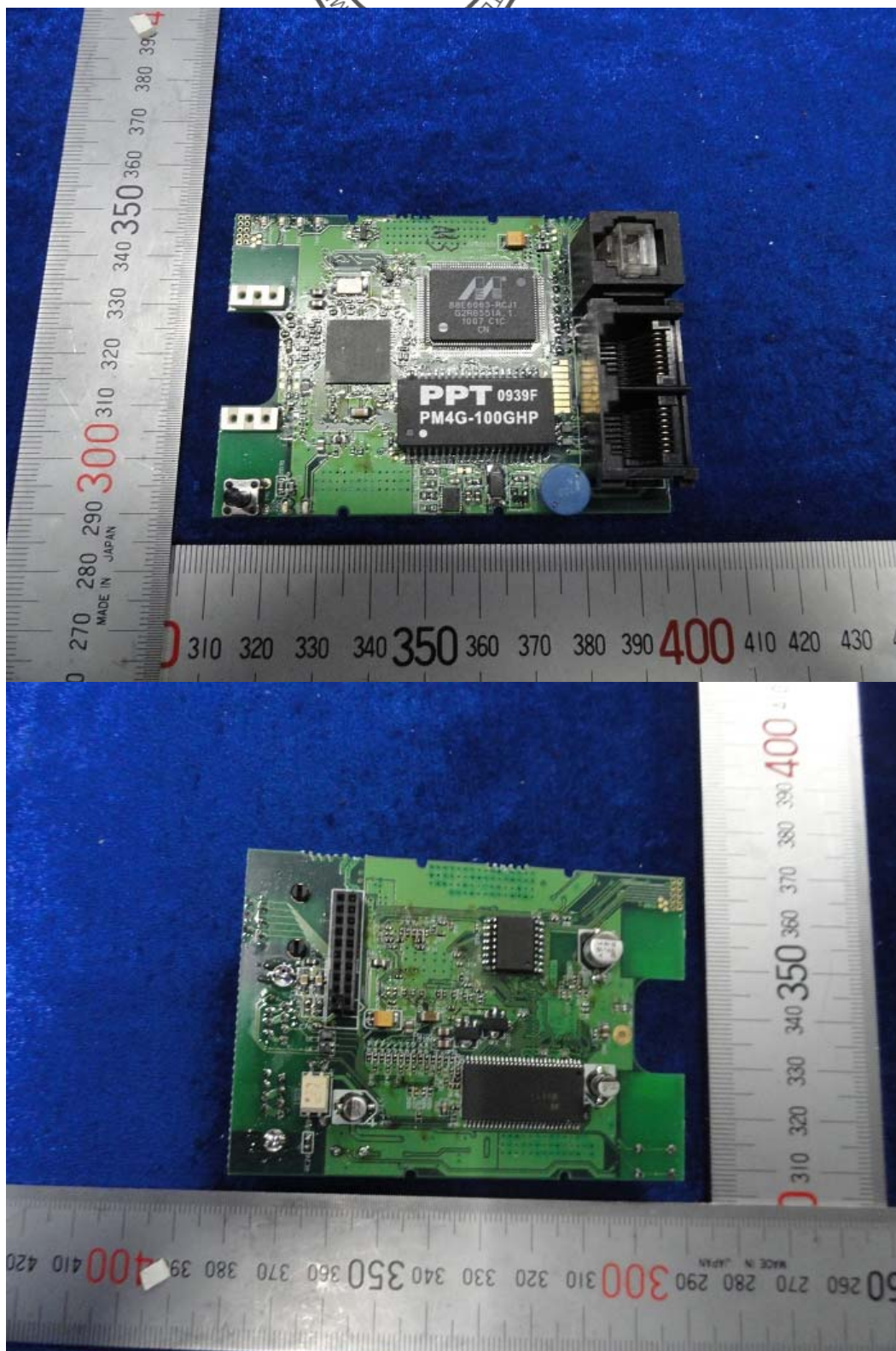
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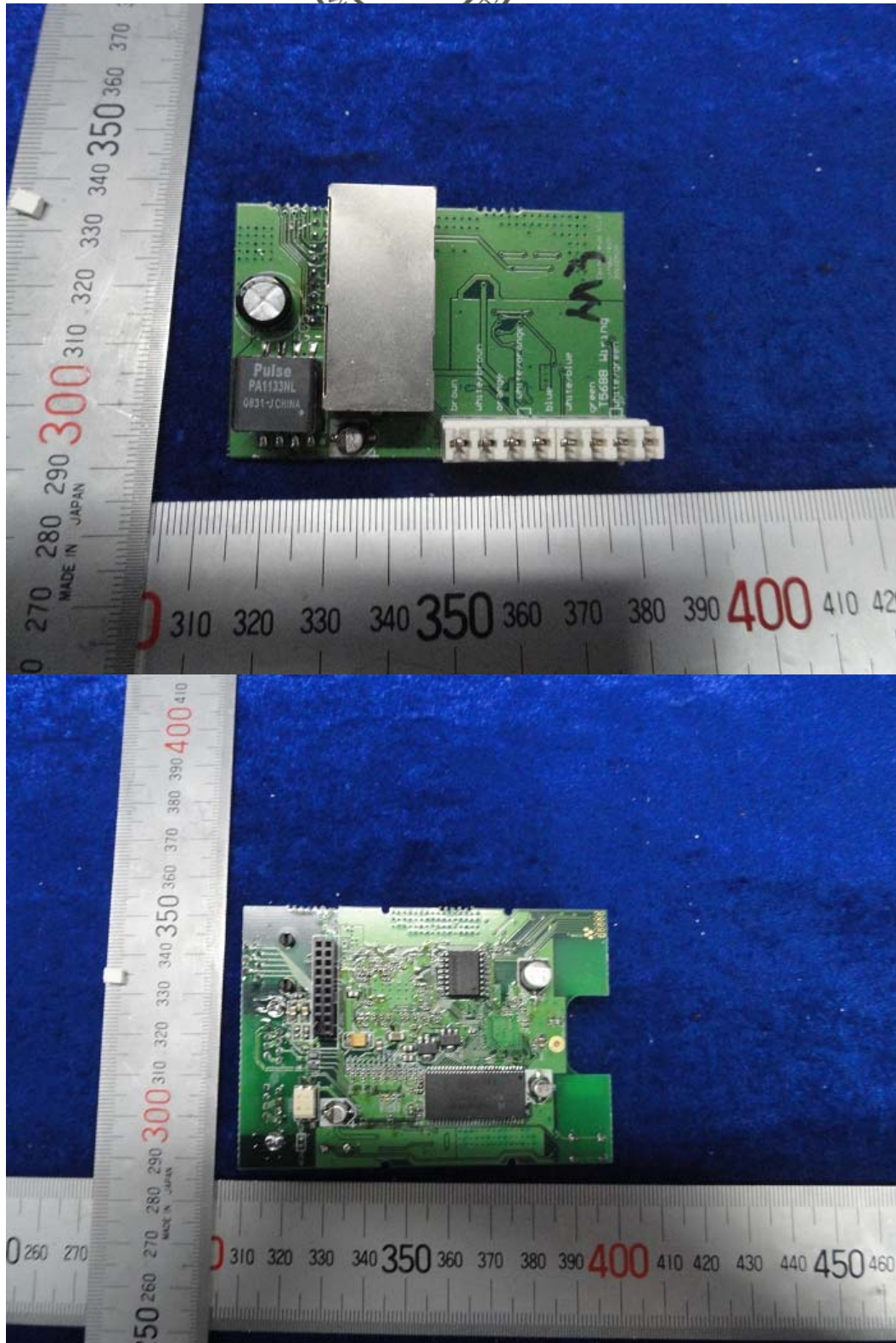
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End of the report

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