Class II Permissive Change

Test Report

FCC Part 15.247 and RSS-210, Issue 7 for DTS systems

for the

802.11g Wireless LAN PCI-E

Model Number: BCM94312MCG

FCC ID: QDS-BRCM1028

IC-ID: 4324A-BRCM1028

TEST REPORT #:EMC_CROSS_042_07001_BCM94312MCG_DTS
DATE: September 14, 2007

ilac-MRA ACCREDITED Certificate # 2135.01

Bluetooth

Bluetooth Qualification Test Facility (BQTF)

CTIA Authorized Test Lab
LAB CODE 20020328-00

FCC listed# A2LA Certified

IC recognized # 3462B

***CETECOM* Inc.**
411 Dixon Landing Road ◆ Milpitas, CA 95035 ◆ U.S.A.
Phone: + 1 (408) 586 6200 ◆ Fax: + 1 (408) 586 6299 ◆ E-mail: info@cetecomusa.com ◆ http://www.cetecom.com
CETECOM Inc. is a Delaware Corporation with Corporation number: 2113686
Board of Directors: Dr. Harald Ansorge, Dr. Klaus Matkey, Hans Peter May

Test Report Cover Sheet/Performance Test Data

TEST REPORT NUMBER: EMC_CROSS_042_07001_BCM94312MCG_DTS

EQUIPMENT MODEL NUMBER: BCM94312MCG

CERTIFICATION NO: 4324A-BRCM1028

MANUFACTURER: 4324A

RADIO STANDARD SPECIFICATION NO. : RSS 210, Issue 7

OPEN AREA TEST SITE INDUSTRY CANADA NUMBER: 3462B-1

FREQUENCY RANGE (or fixed frequency): 2412MHz to 2462MHz

R.F. POWER IN WATTS: 0.179 W conducted

OCCUPIED BANDWIDTH (99% BW): 16.3 MHz

TYPE OF MODULATION: CCK & OFDM

EMISSION DESIGNATOR (TRC-43): **16M3G1D**

ANTENNA INFORMATION: Hitachi (Model: HMT05/HFT17-DL07, Main (1.5dBi), Aux (3.9dBi)

TRANSMITTER SPURIOUS (worst case): 135.55 uV/m @ 280.76 MHz

RECEIVER SPURIOUS (worst case): 236.59 uV/m @ 17.52 GHz

ATTESTATION:
DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Signature:
Juan Martinez
Project Engineer
CETECOM Inc.
411 Dixon Landing Road
Milpitas, CA 95035

Date: 2007-09-14

TABLE OF CONTENTS

1 Assessment

The following is in compliance with the applicable criteria specified in FCC rules Part 15.247 of the Code of Federal Regulations and IC RSS-210, Issue 7 Standards.

Company	Description	Model #
Broadcom, Inc.	**Wireless LAN**	**BCM94312MCG**

Technical responsibility for area of testing:

Date	Section	Name	Signature
September 14, 2007	**EMC & Radio**	Lothar Schmidt **(Test Lab Manager)**	

Responsible for test report and project leader:

Date	Section	Name	Signature
September 14, 2007	**EMC & Radio**	Juan Martinez **(Project Engineer)**	Juan Martinez I am the author of this document

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Radio Assessment Report

Company Name:	CETECOM, Inc.
Department:	EMC
Address:	411 Dixon Landing Road Milpitas, CA 95035 U.S.A.
Telephone:	+1 (408) 586 6200
Fax:	+1 (408) 586 6299
Project Leader:	Juan Martinez
Responsible Test Lab Manager:	Lothar Schmidt

2.2 Identification of the Client

Applicant's Name:	Broadcom, Inc.
Address:	190 Mathilda Place Sunnyvale, CA 94086 , USA
Contact Person:	Daniel Lawless
Phone No.	408 965-3346
Fax:	408 324-4840
e-mail:	dlawless@broadcom.com

2.3 Identification of the Manufacturer

Manufacturer's Name:	Broadcom, Inc.
Manufacturer's Address:	190 Mathilda Place, Sunnyvale, USA

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Product Type	Wireless LAN
Marketing Name:	802.11g Wireless LAN PCI-E
Model No:	BCM94312MCG
FCC-ID:	QDS-BRCM1028
IC:	4324A-BRCM1028
Frequency Range:	2412 – 2462 MHz
Number of Channels	11
Type(s) of Modulation:	CCK & OFDM
Antenna Type:	Hitachi (Model: HMT05/HFT17-DL07, Main (1.5dBi), Aux (3.9dBi)
MAIN Output Power:	23.29dBm (0.213W), 802.11b EIRP 23.32dBm (0.215W), 802.11b EIRP 23.44dBm (0.221W), 802.11b EIRP 23.27dBm (0.212W), 802.11g EIRP 24.03dBm (0.253W), 802.11g EIRP 21.98dBm (0.158W), 802.11g EIRP
AUX Output Power:	25.69dBm (0.371W), 802.11b EIRP 25.72dBm (0.373W), 802.11b EIRP 25.84dBm (0.384W), 802.11b EIRP 25.67dBm (0.369W), 802.11g EIRP 26.43dBm (0.439W), 802.11g EIRP 24.38dBm (0.274W), 802.11g EIRP

3.2 Support equipment

AE #	TYPE	MANF.	MODEL	SERIAL #
1	Laptop	Dell	N/A	N/A

Subject Of Investigation

Data, presented in this report, was collected for a Class II permissive change to add the BCM94312MCG low cost version (FCC ID: QDS-BRCM1028) with minor changes to the module (Refer to Class II change letter for more details on the changes).

The objective of the measurements done by Cetecom Inc. was to measure the performance of the EUT as specified by requirements listed in FCC rules Part 15.247 of Title 47 of the Code of Federal Regulations and to Industry Canada RSS-210, Issue 7. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

4 Measurements

5 EIRP POWER

5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (b) (3) & RSS-210 (A8.4)(4)

Measured with a Peak Power Meter

TEST CONDITIONS (802.11b)		CONDUCTED MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
		Conducted	Conducted	Conducted
T_{nom}(23)°C	V_{nom}	21.55	21.73	21.85
Measurement uncertainty		±0.5dBm		

TEST CONDITIONS (802.11g)		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
		Conducted	Conducted	Conducted
T_{nom}(23)°C	V_{nom}	21.87	22.33	20.83
Measurement uncertainty		±0.5dBm		

EIRP calculated values are based from the measured antenna port peak conducted power in dBm and antenna gain in dBi.

TEST CONDITIONS (802.11b) Main Antenna (1.5dBi)		**MAXIMUM PEAK OUTPUT POWER (dBm)**					
Frequency (MHz)		**2412**		**2437**		**2462**	
		Conducted	**EIRP**	**Conducted**	**EIRP**	**Conducted**	**EIRP**
T_{nom}(23)°C	**V_{nom}**	**21.79**	**23.29**	**21.82**	**23.32**	**21.94**	**23.44**
Measurement uncertainty		**±0.5dBm**					

TEST CONDITIONS (802.11g), Main Antenna (1.5dBi)		**MAXIMUM PEAK OUTPUT POWER (dBm)**					
Frequency (MHz)		**2412**		**2437**		**2462**	
		Conducted	**EIRP**	**Conducted**	**EIRP**	**Conducted**	**EIRP**
T_{nom}(23)°C	**V_{nom}**	**21.77**	**23.27**	**22.53**	**24.03**	**20.48**	**21.98**
Measurement uncertainty		**±0.5dBm**					

TEST CONDITIONS (802.11b) Aux Antenna (3.9dBi)		**MAXIMUM PEAK OUTPUT POWER (dBm)**					
Frequency (MHz)		**2412**		**2437**		**2462**	
		Conducted	**EIRP**	**Conducted**	**EIRP**	**Conducted**	**EIRP**
T_{nom}(23)°C	**V_{nom}**	**21.79**	**25.69**	**21.82**	**25.72**	**21.94**	**25.84**
Measurement uncertainty		**±0.5dBm**					

TEST CONDITIONS (802.11g), Aux Antenna (3.9dBi)		**MAXIMUM PEAK OUTPUT POWER (dBm)**					
Frequency (MHz)		**2412**		**2437**		**2462**	
		Conducted	**EIRP**	**Conducted**	**EIRP**	**Conducted**	**EIRP**
T_{nom}(23)°C	**V_{nom}**	**21.77**	**25.67**	**22.53**	**26.43**	**20.48**	**24.38**
Measurement uncertainty		**±0.5dBm**					

LIMIT **SUBCLAUSE § 15.247 (b) (3) & RSS-210 (A8.4)(4)**

Frequency range	**RF power output**
2400-2483.5 MHz	**30dBm on Conducted**

Note 1: Power was set to maximum previously approved power levels.
Note 2: Both vertical and horizontal receive antenna were tested. Worst case polarization reported.

6 RADIATED EMISSIONS MEASUREMENTS

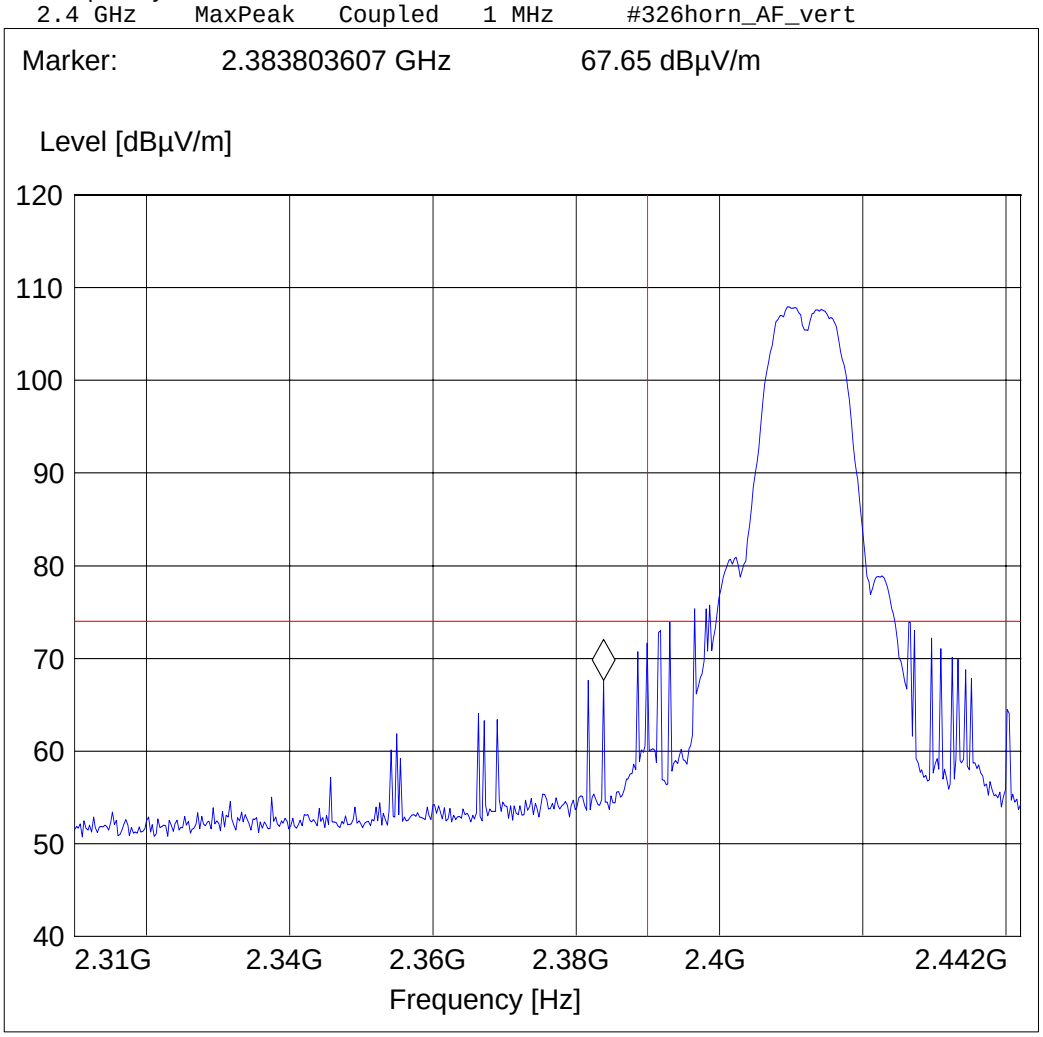
6.1 BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5) 802.11b

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Main antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11b

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
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ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```
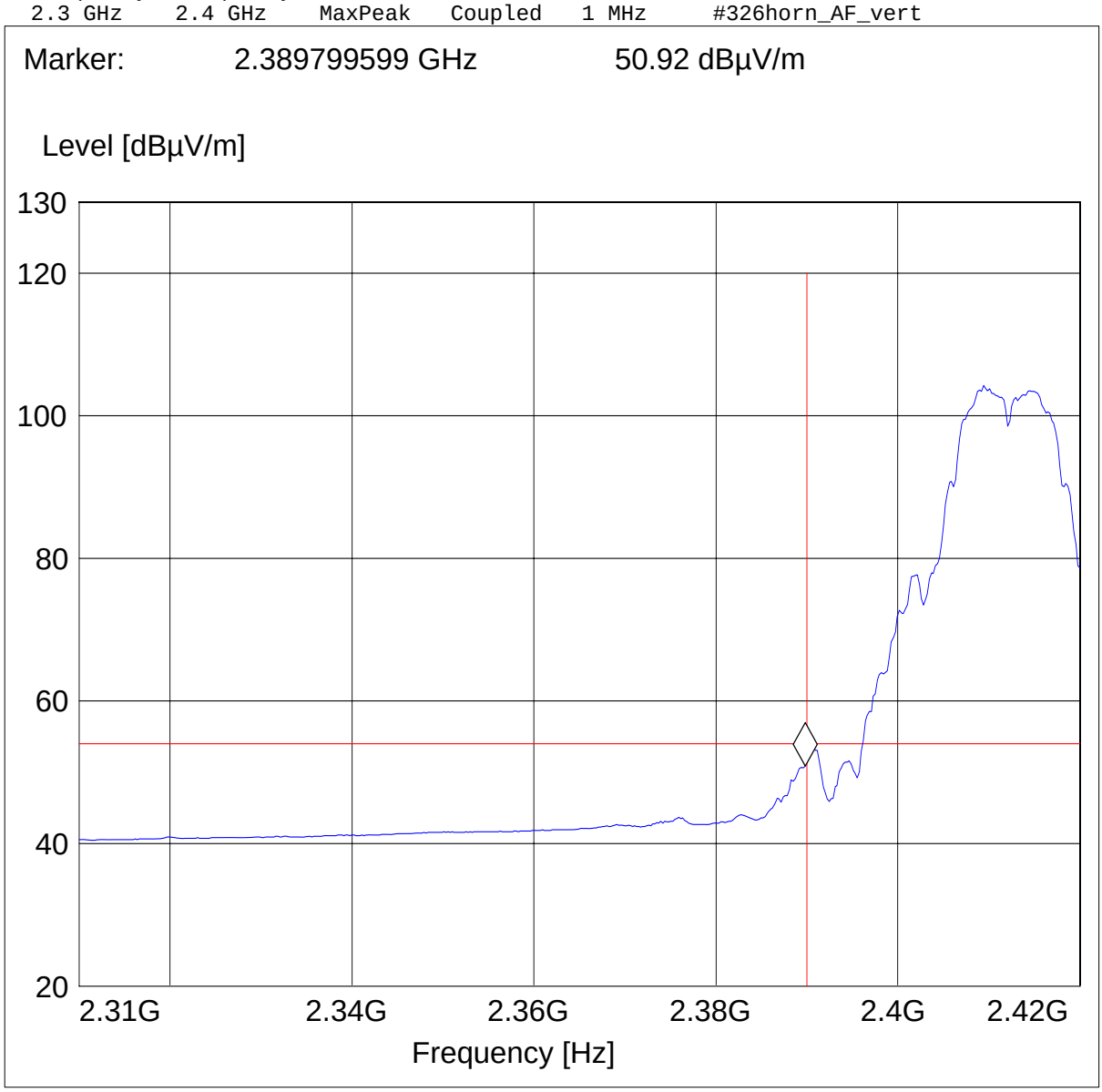

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

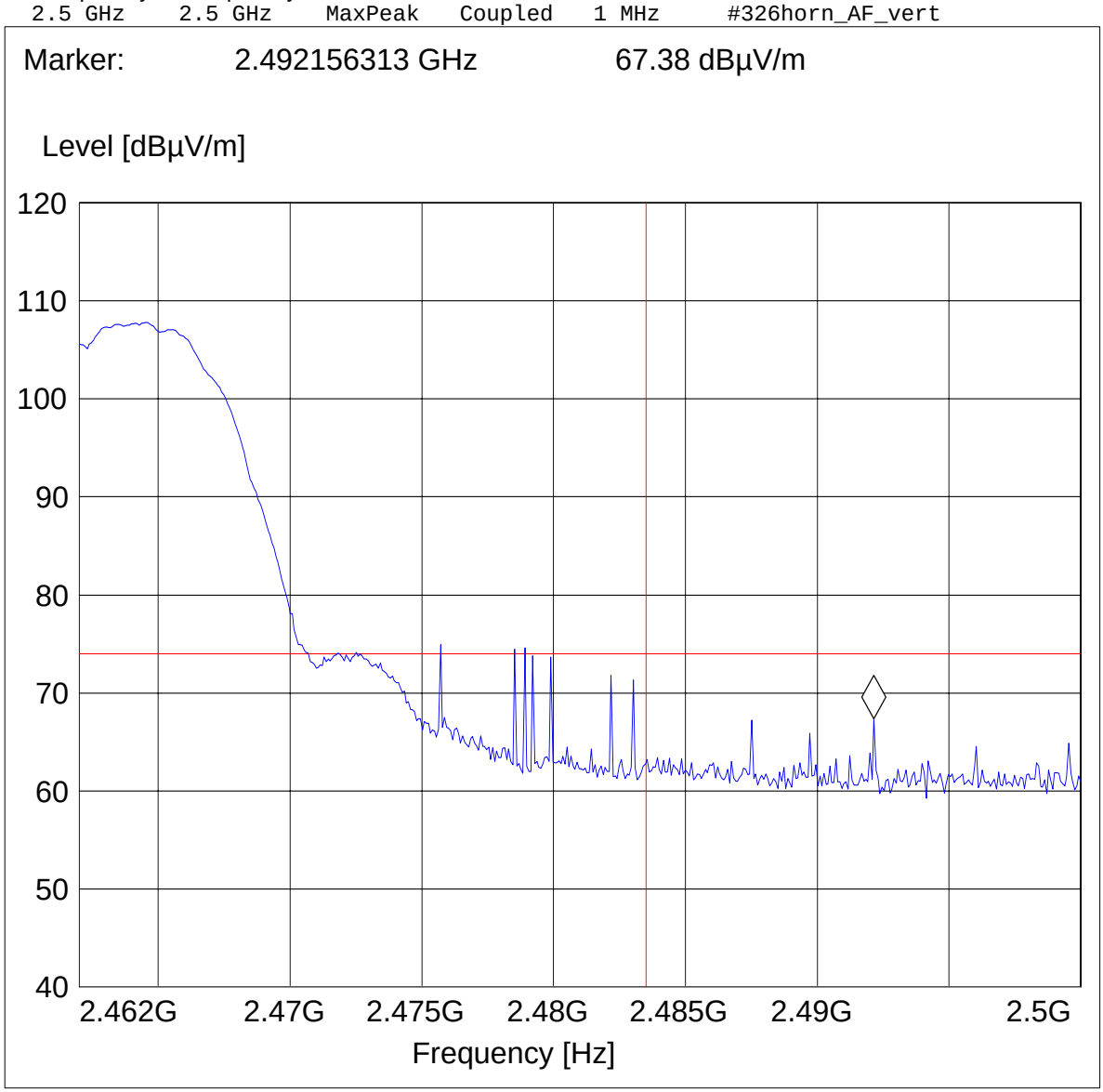
802.11b

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Main antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

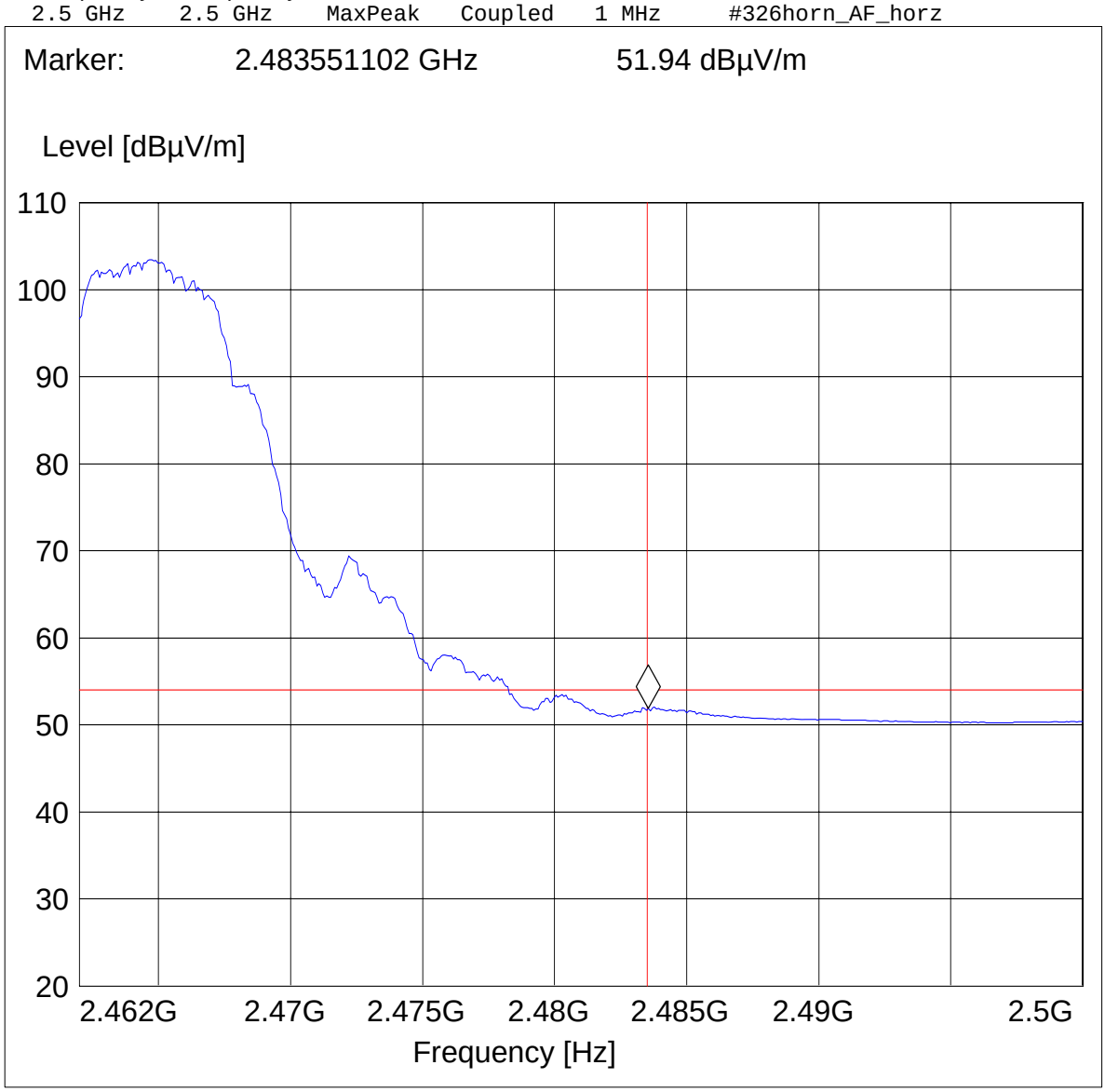
802.11b

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Main antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

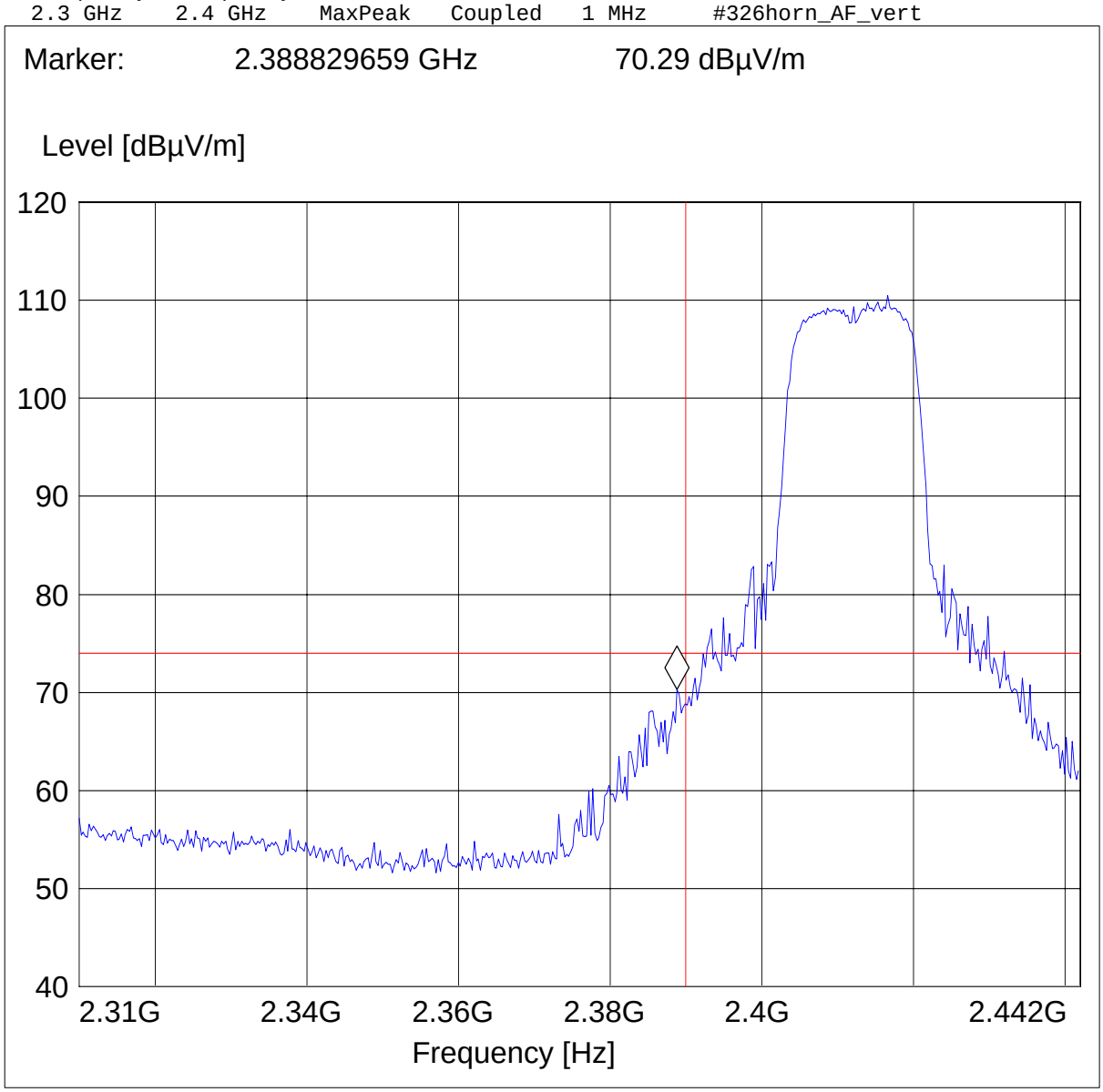
802.11g

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Tx mode (802.11g), Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

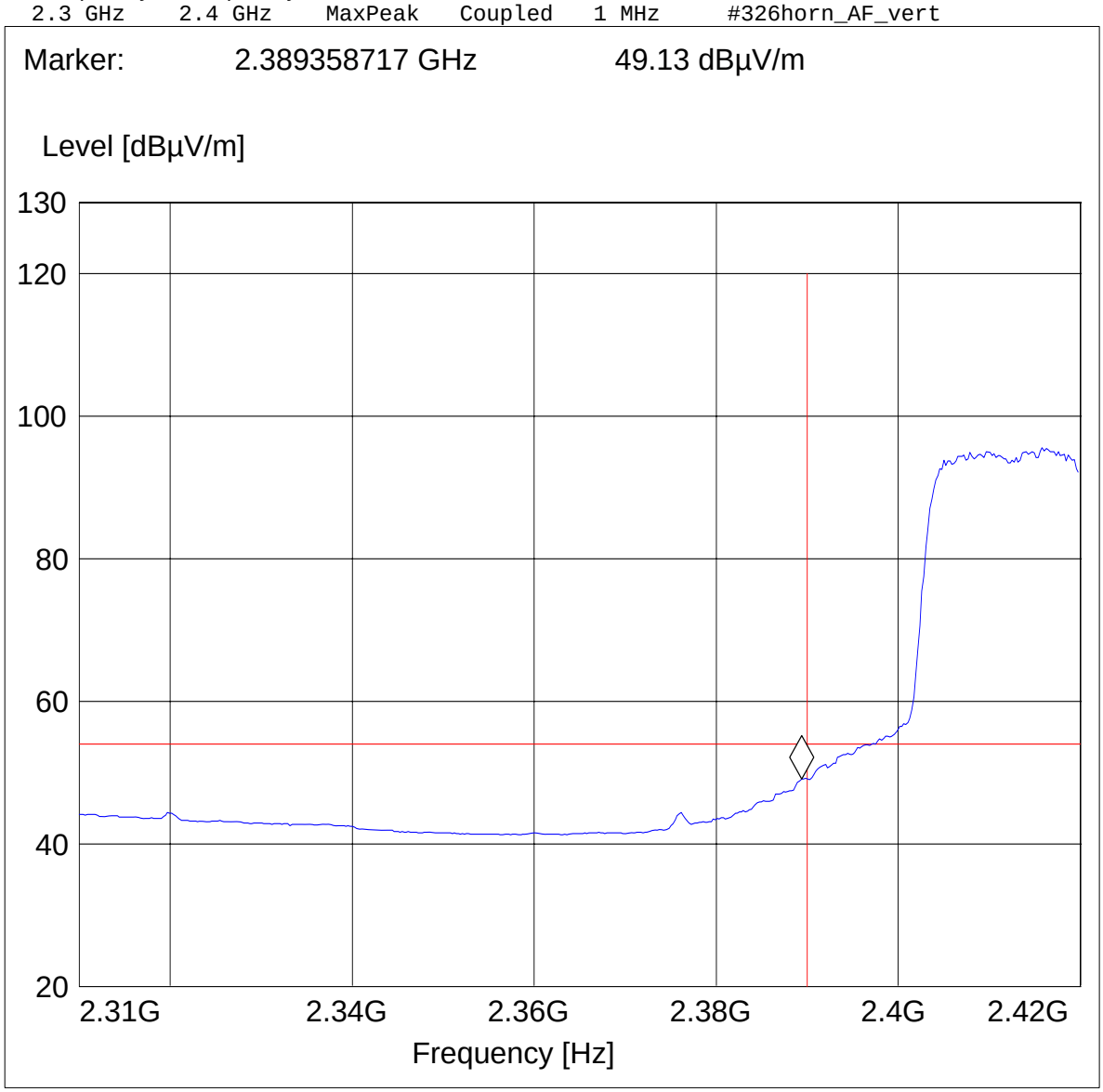
802.11g

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Tx mode (802.11g) Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

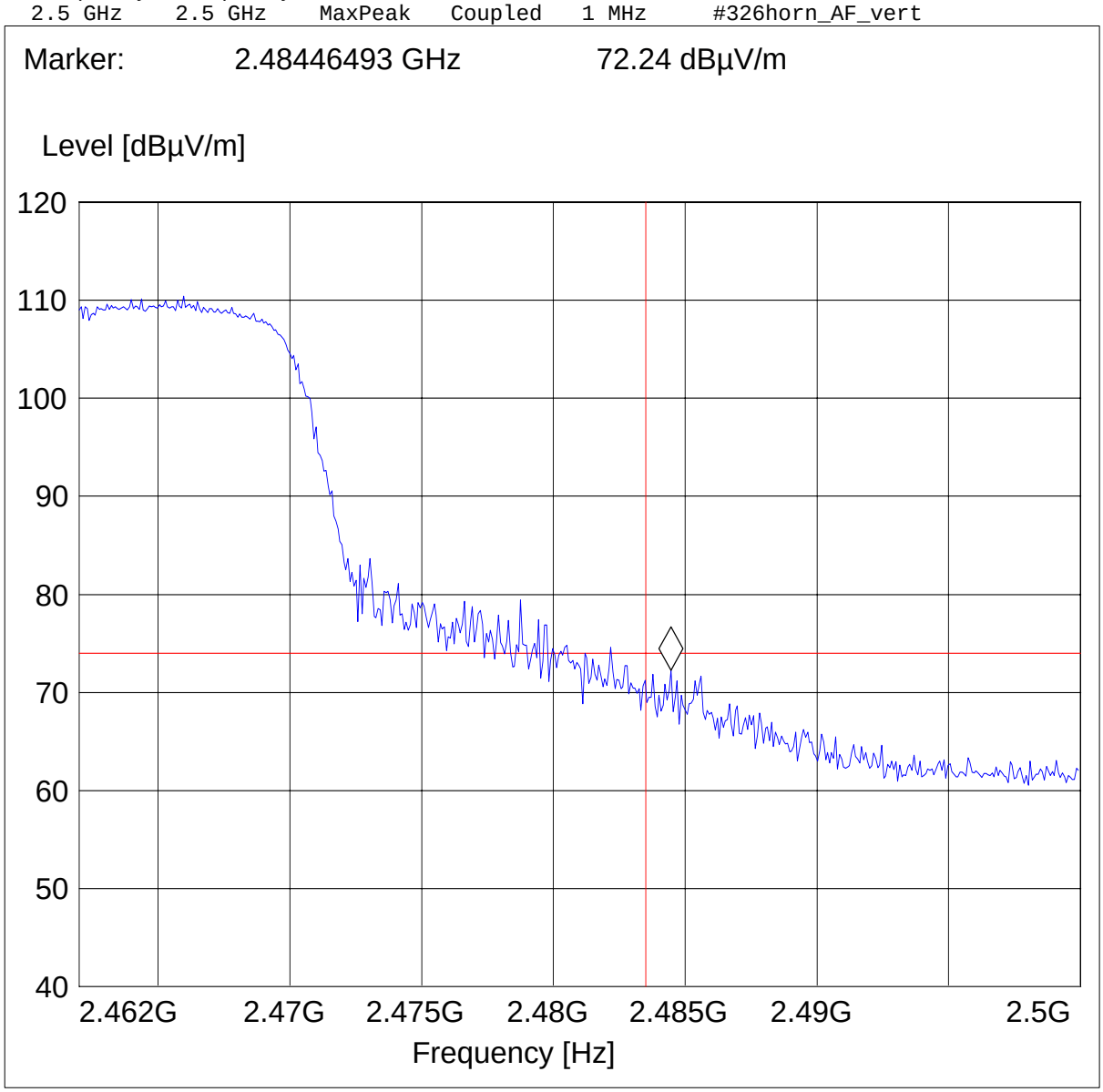
802.11 g

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Tx mode (802.11g) Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

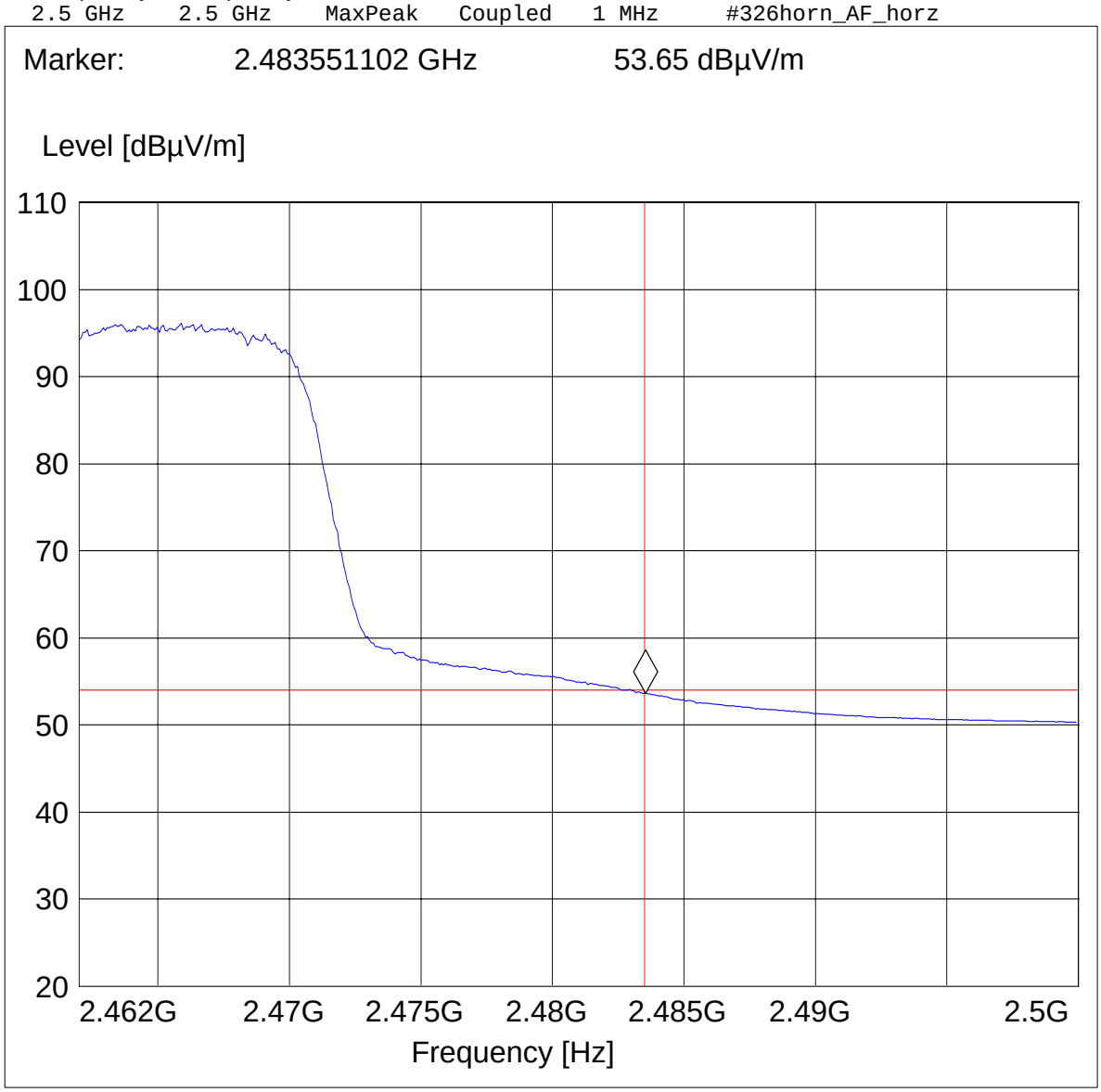
802.11 g

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Tx mode (802.11g) Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

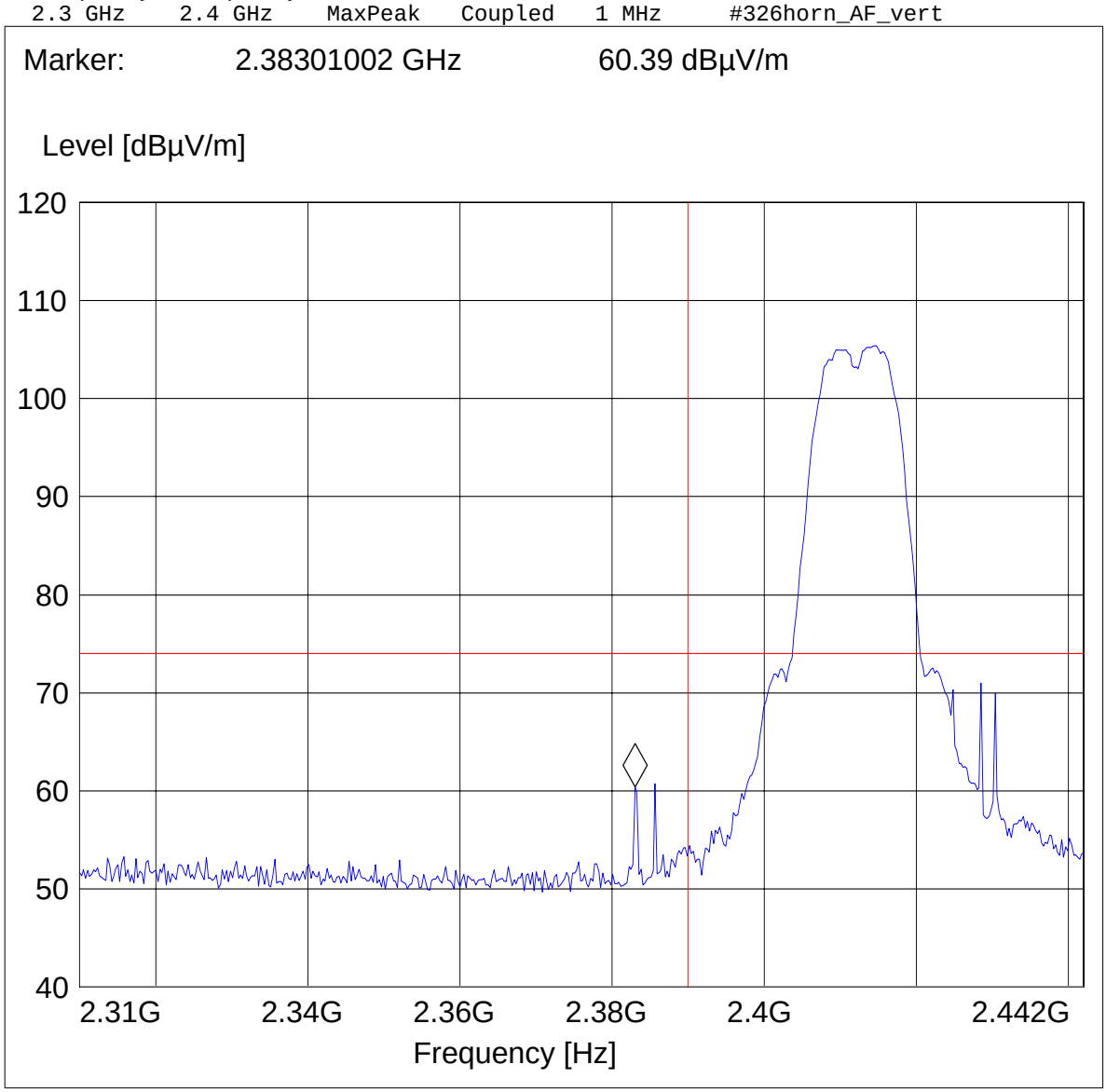
802.11b

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Aux antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

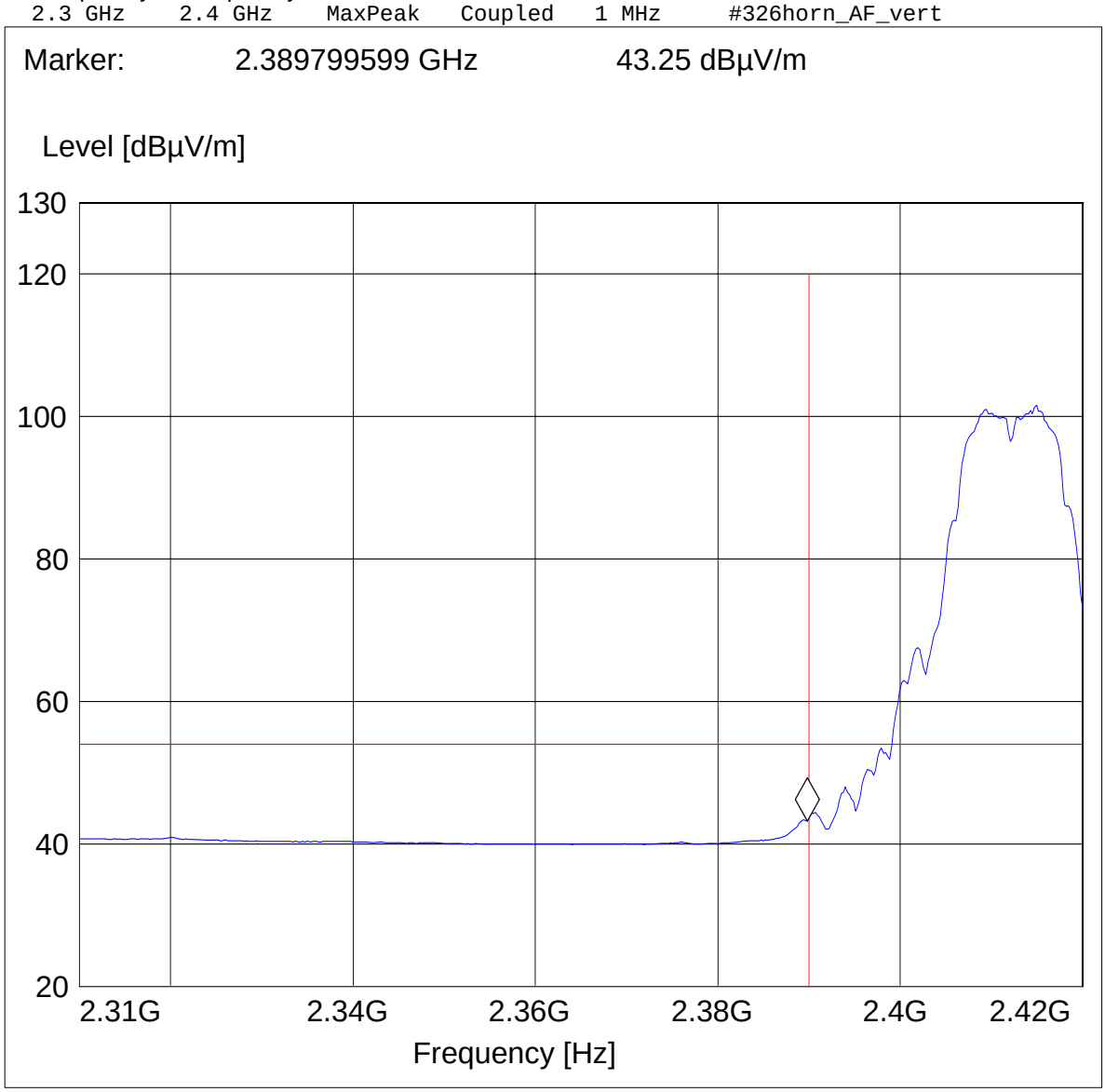
802.11b

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Aux antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

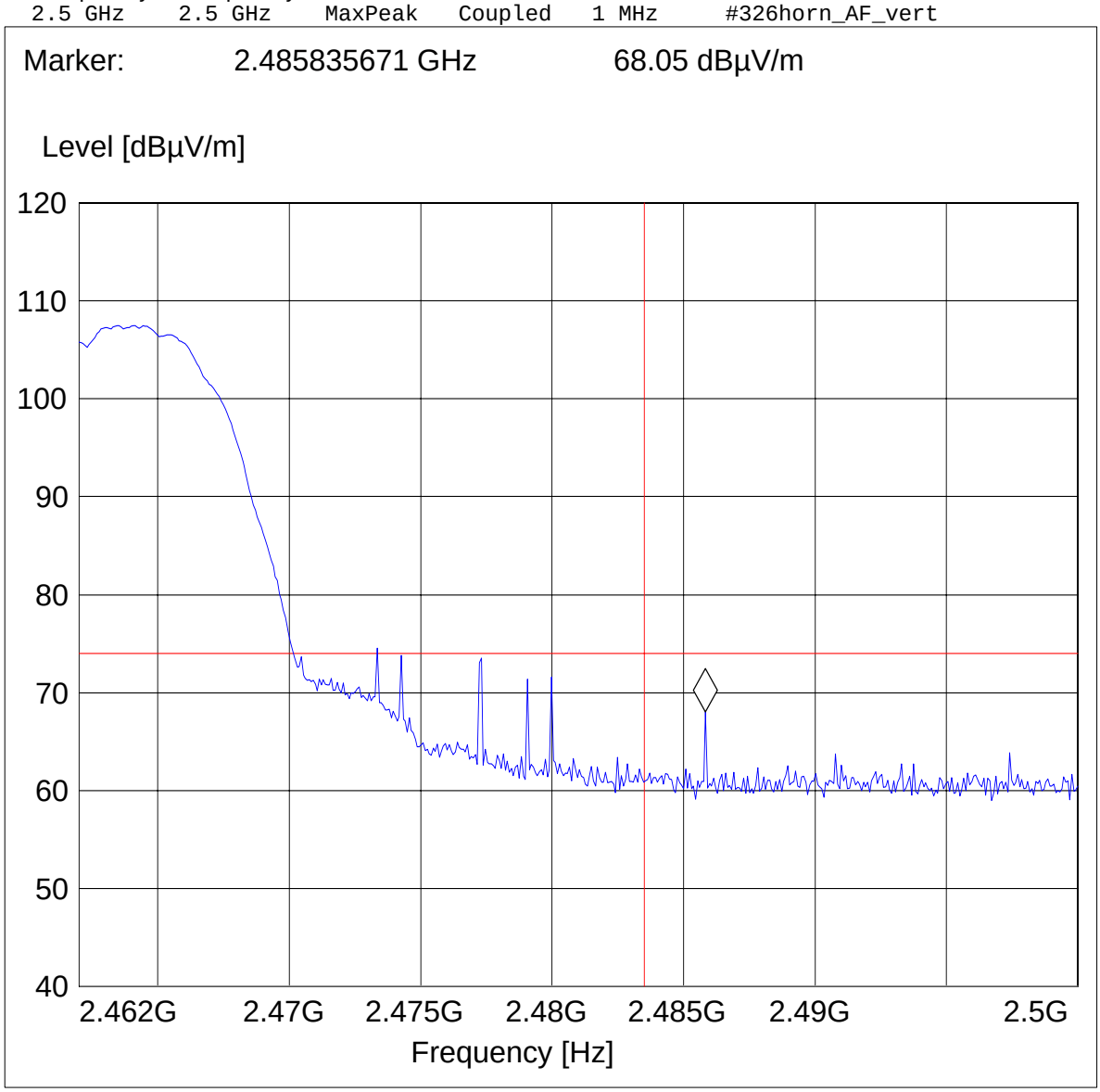
802.11 b

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Aux antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

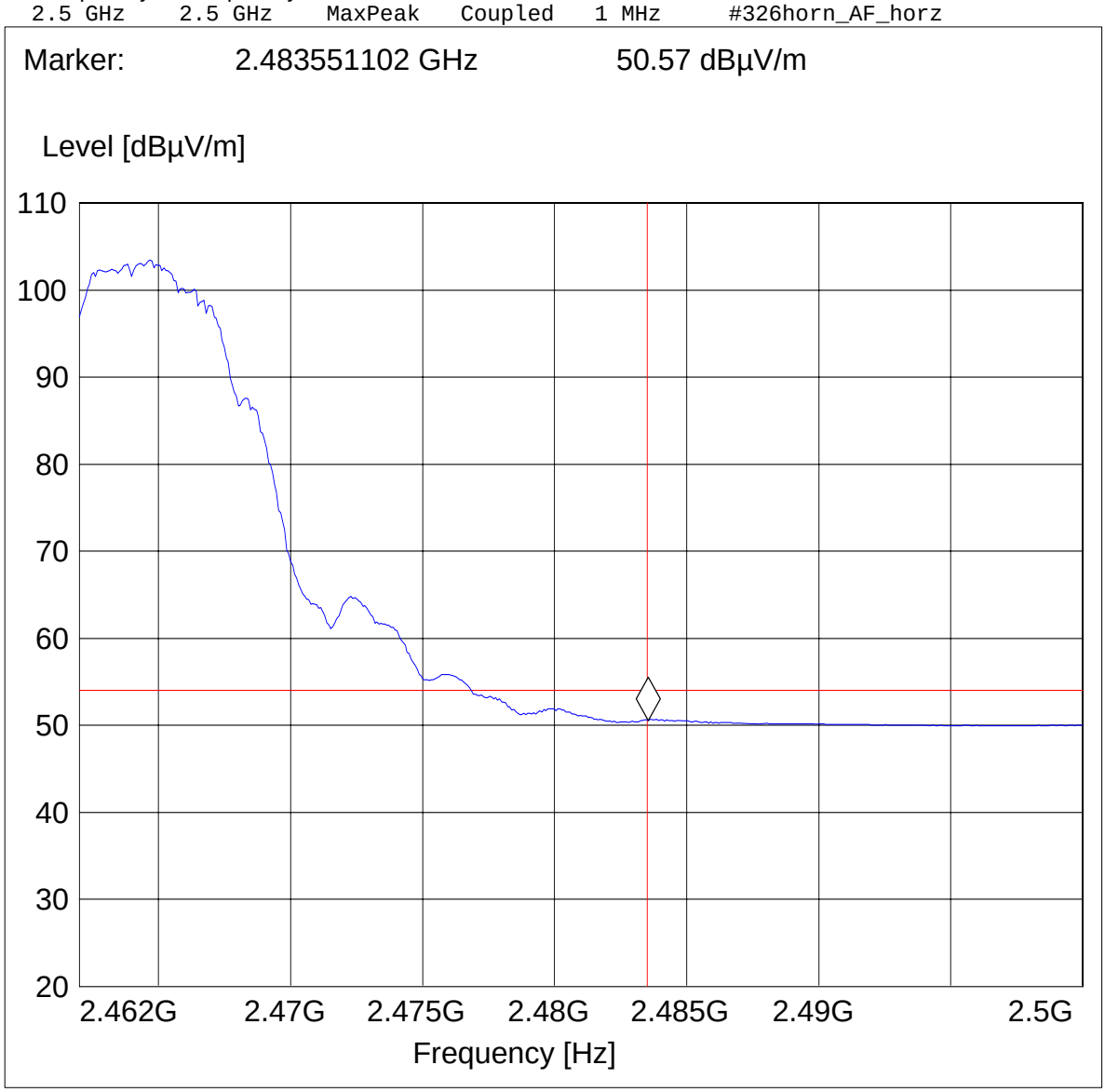
802.11 b

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Aux antenna
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

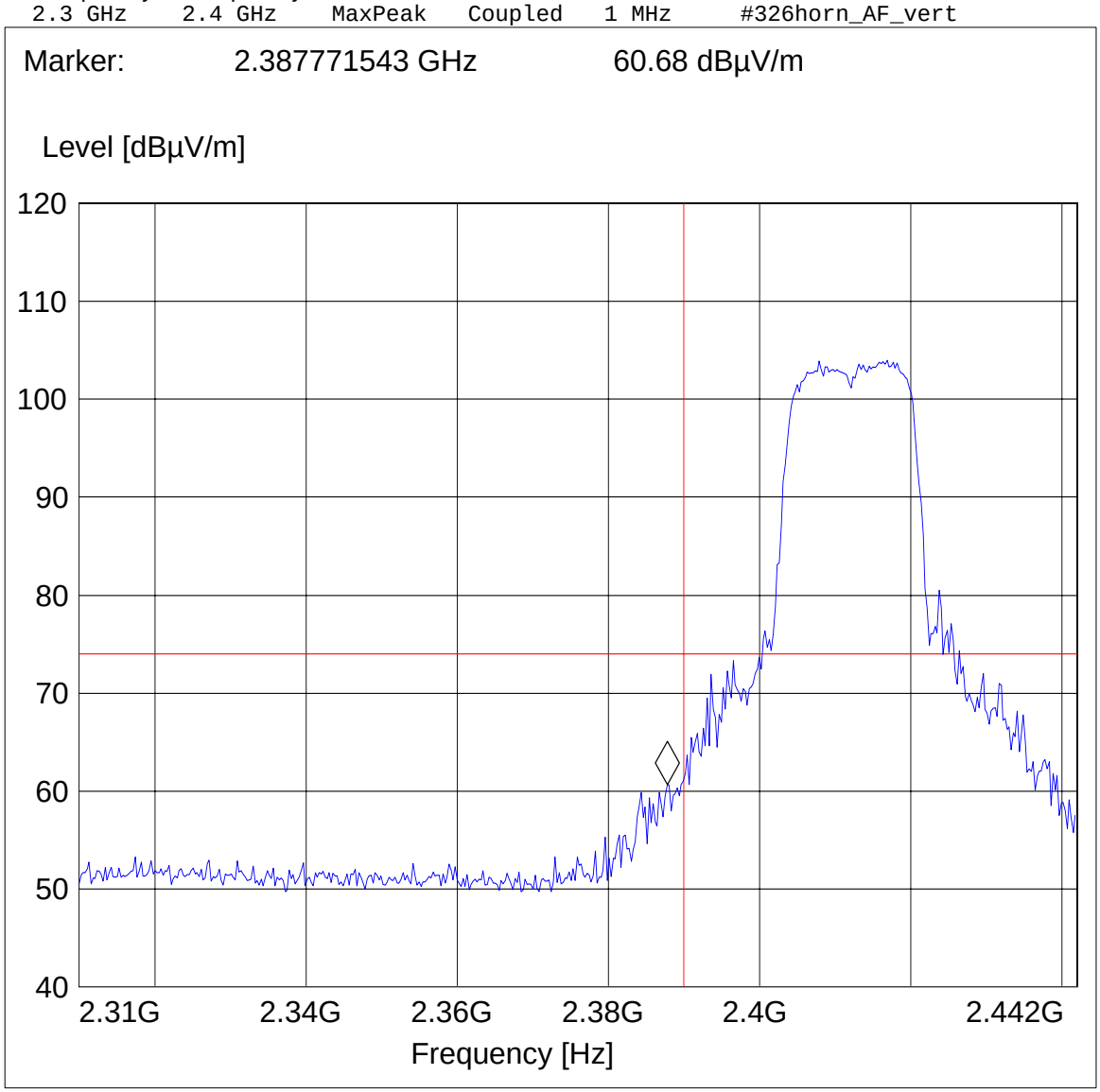
802.11g

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Tx mode (802.11g) Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 LBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

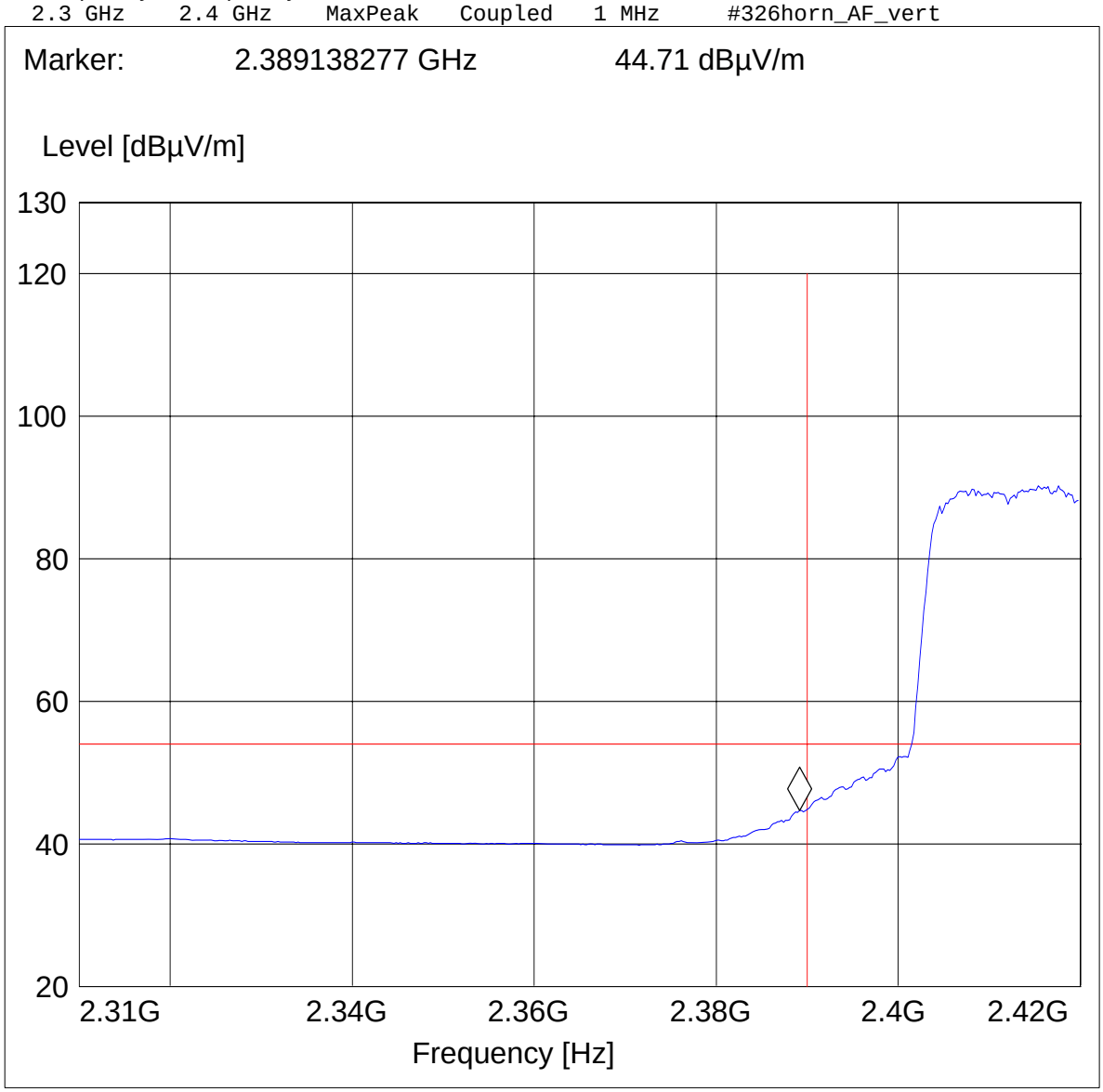
802.11g

Low frequency section (spurious in the restricted band 2310 – 2390 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 1, Tx mode (802.11g) Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 LBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.3 GHz	2.4 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

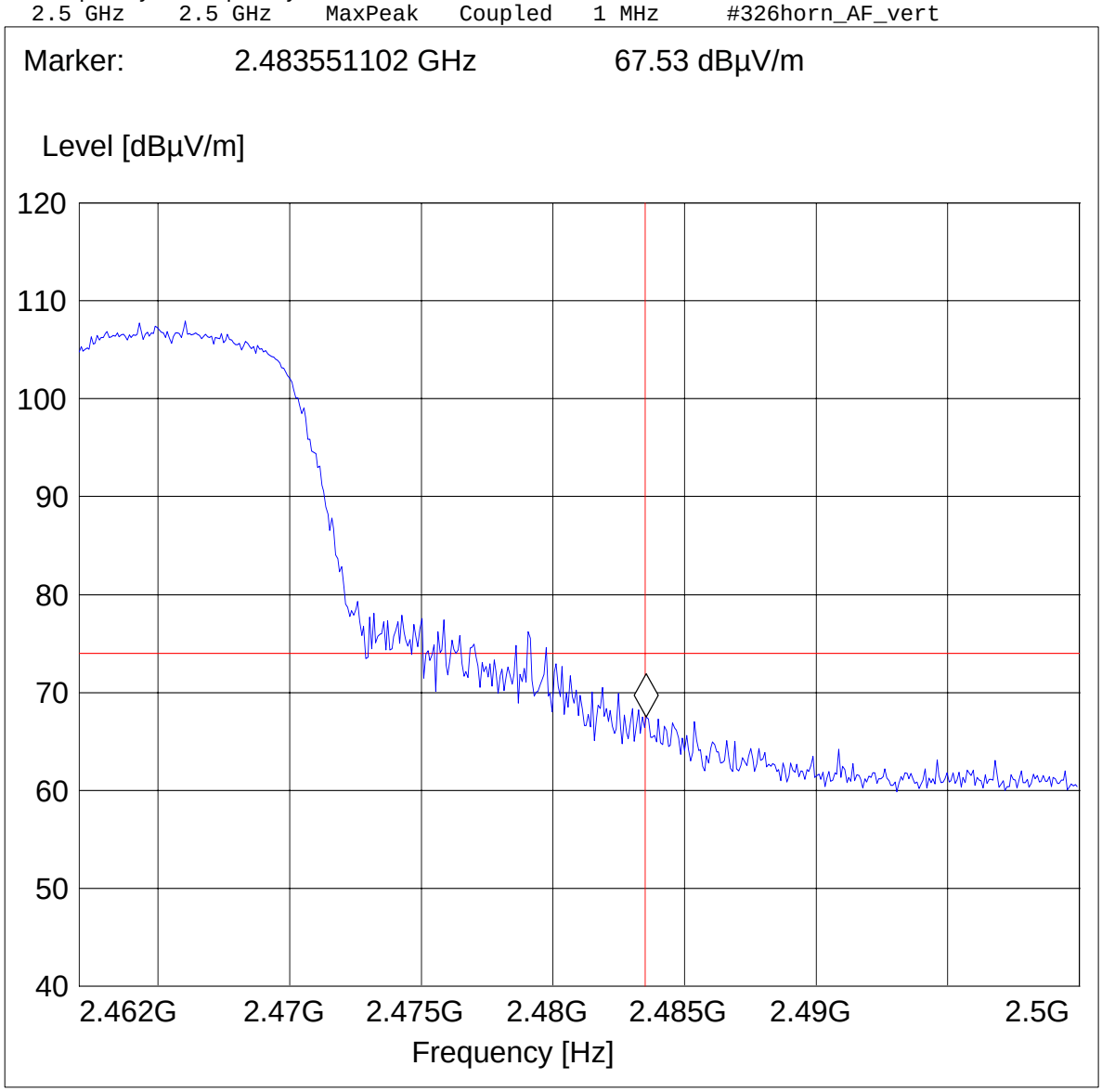
802.11 g

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       Ch. 11, Tx mode (802.11g) Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan M.
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247 HBE_PK"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.5 GHz	2.5 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11 g

High frequency section (spurious in the restricted band 2483.5 – 2500 MHz)

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ANT Orientation:  H
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Power Supply:     AC Adapter
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SWEEP TABLE: "FCC15.247 HBE_AVG"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
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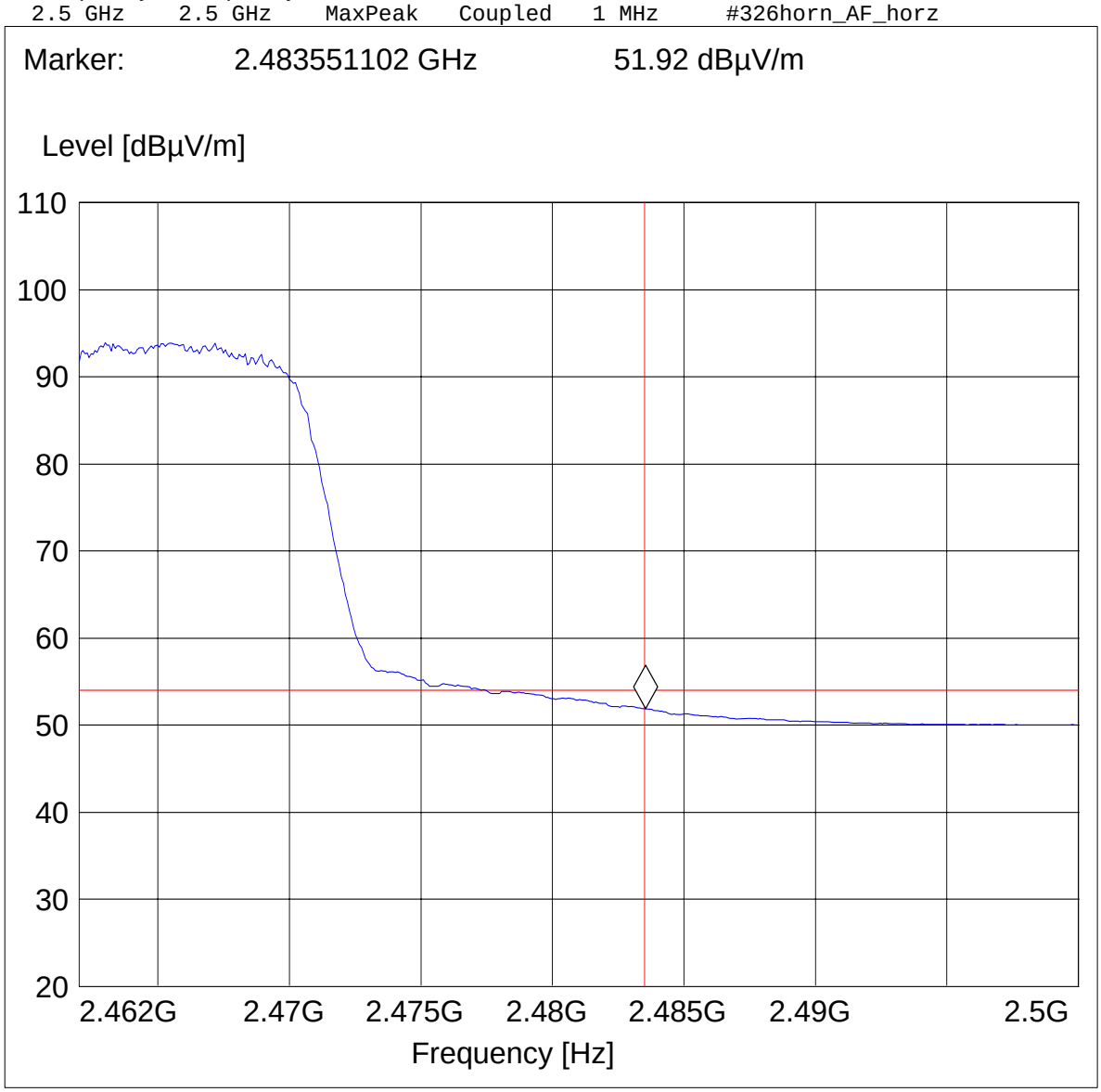


6.2 EMISSION LIMITATIONS – Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

LIMITS

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions, which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

NOTEs:
1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3 and 26.5 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode unless specified with the plots.

3. Laptops were setup to transmit in low, middle, and high channels for both 802.11b and 802.11g mode.

Results for the radiated measurements below 30MHz according § 15.33

Frequency	Measured values	Remarks
9KHz – 30MHz	No emissions found, caused by the EUT	This is valid for all the tested channels

EMISSION LIMITATIONS - Radiated (Transmitter)

§15.247 (d) & RSS-210(A8.5):

(802.11b)

Transmit at Lowest channel Frequency 2412MHz			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			
Transmit at Middle channel Frequency 2437MHz			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			
Transmit at Highest channel Frequency 2462MHz			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

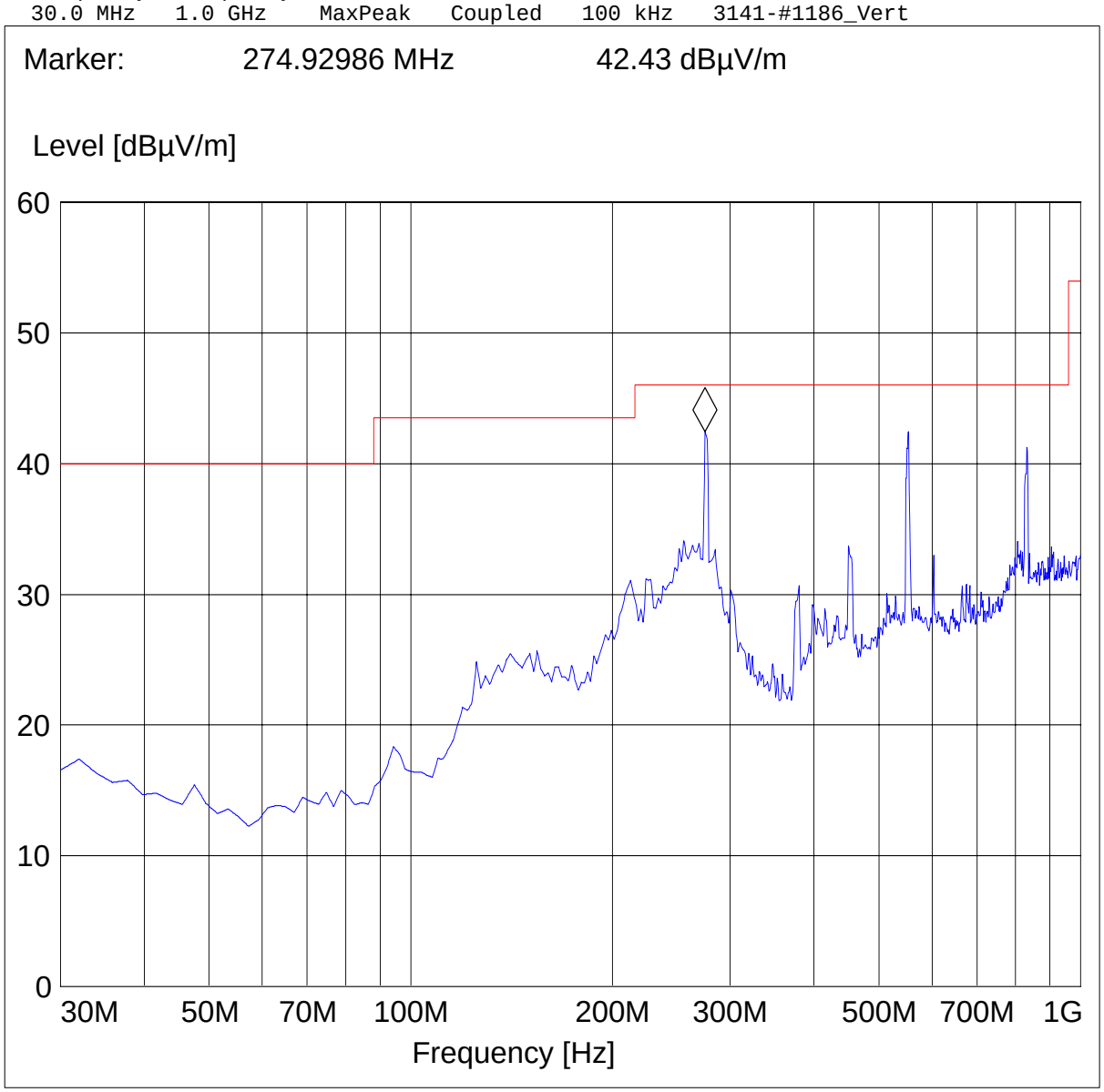
Lowest Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       802.11b, ch 1, Main
ANT Orientation: V
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

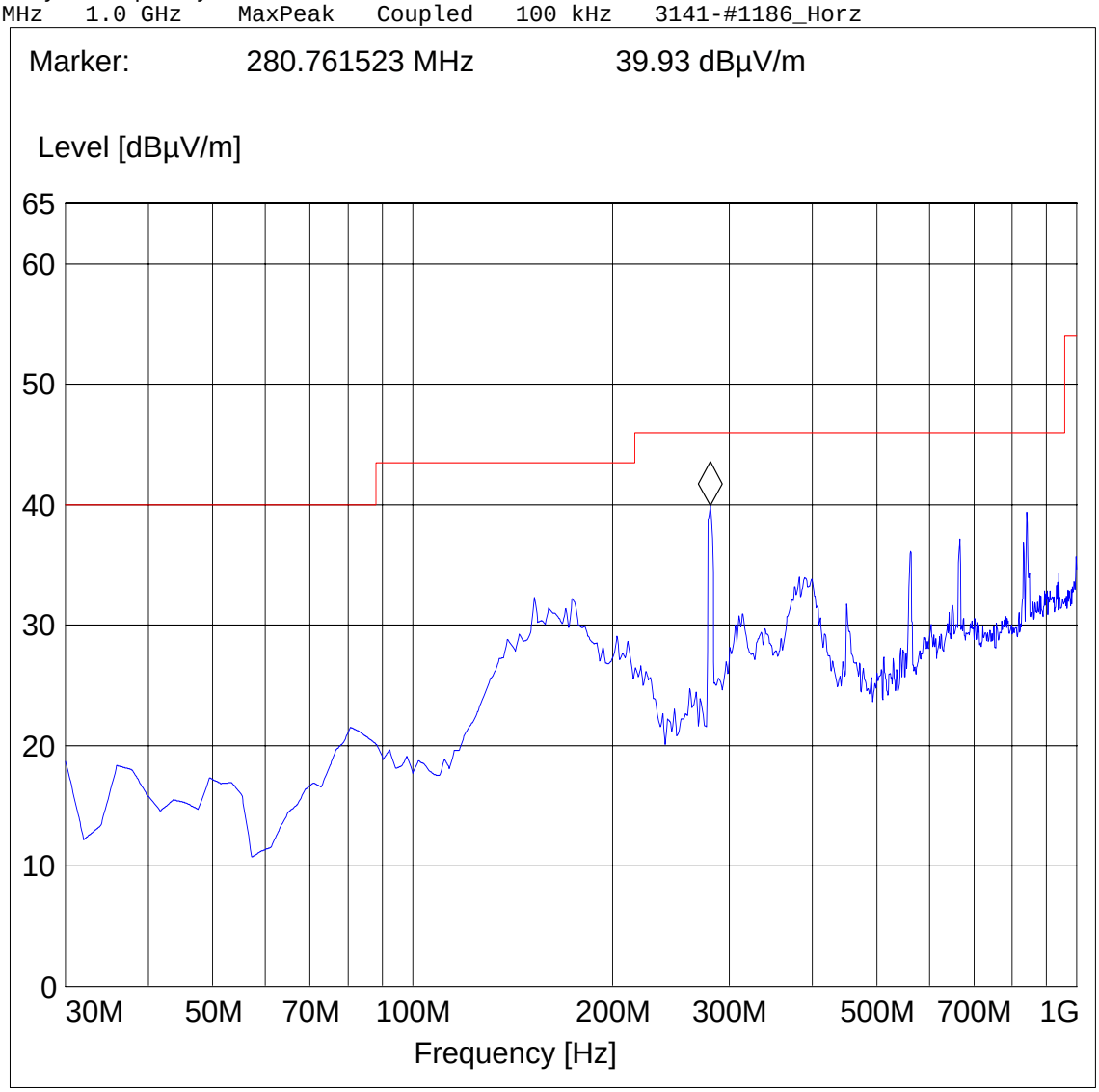
Lowest Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       802.11b, ch 1, Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz

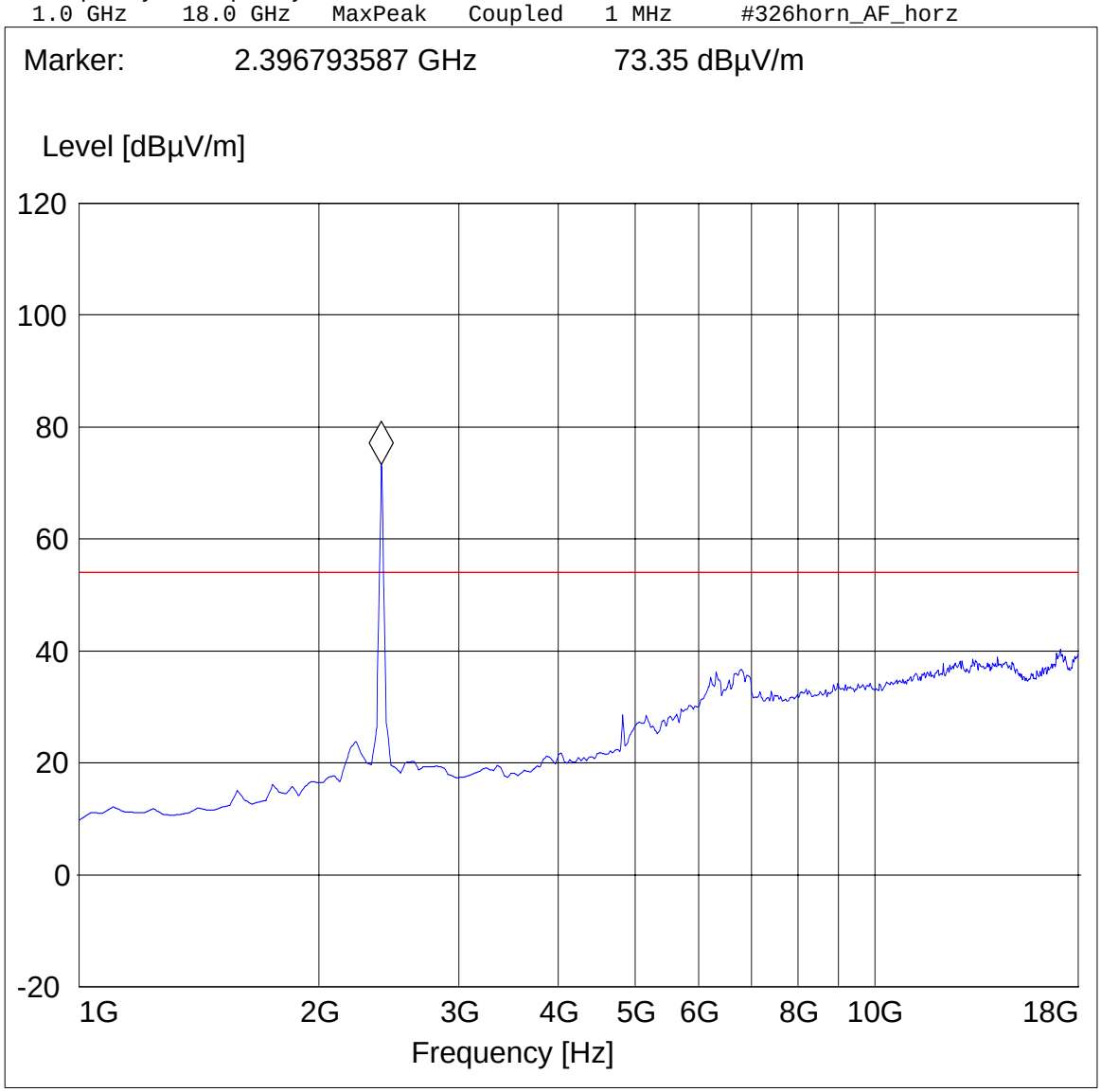


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 1GHz – 18GHz
Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 b; Ch 1, Main Antenna
ANT Orientation:   V & H
EUT Orientation:   H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



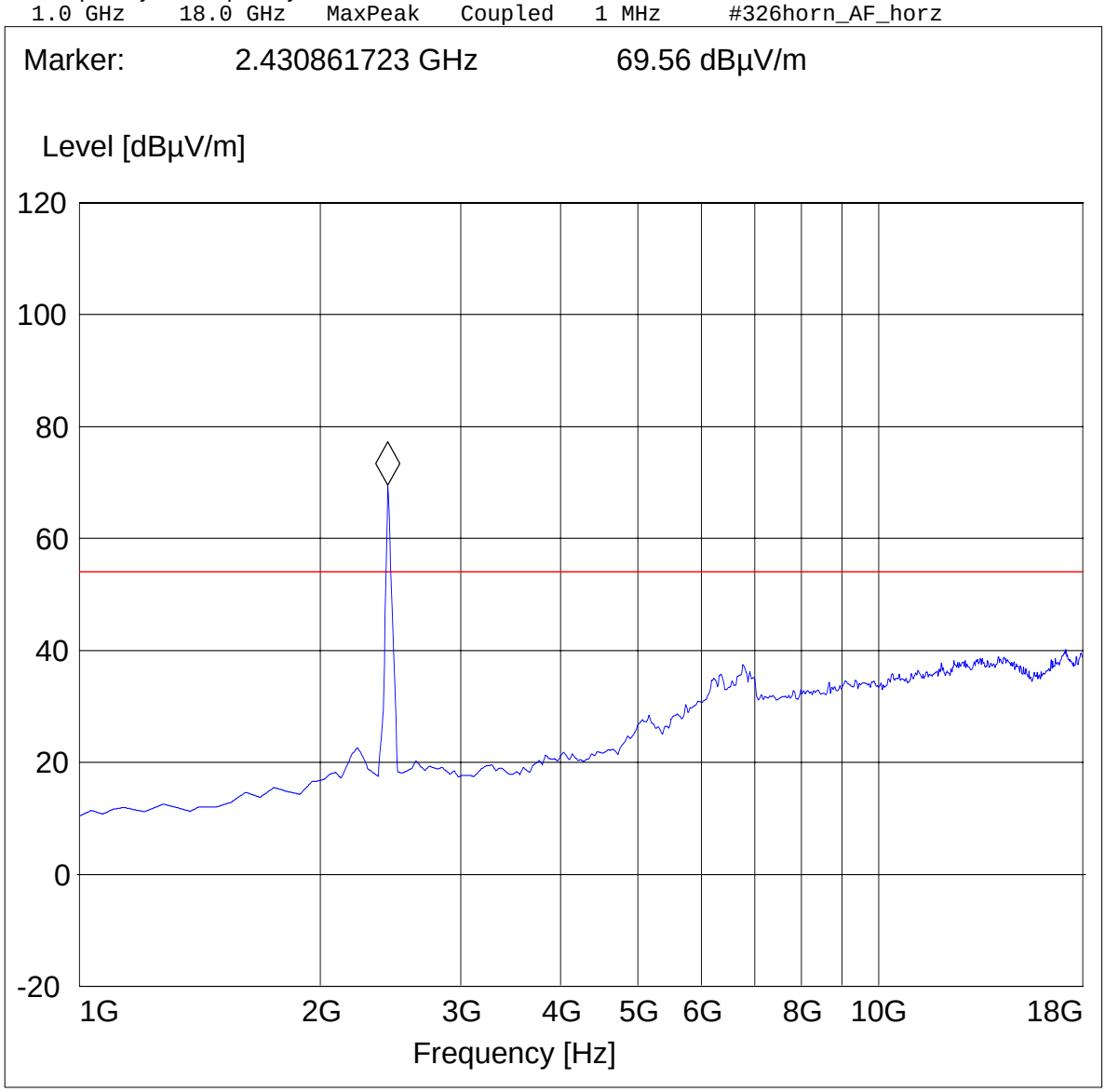
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM94312MCGSG (Card# 13)
Manufacturer:      Broadcom
Test mode:         Ch. 6, Tx mode (802.11b) Main Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC adaptor
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



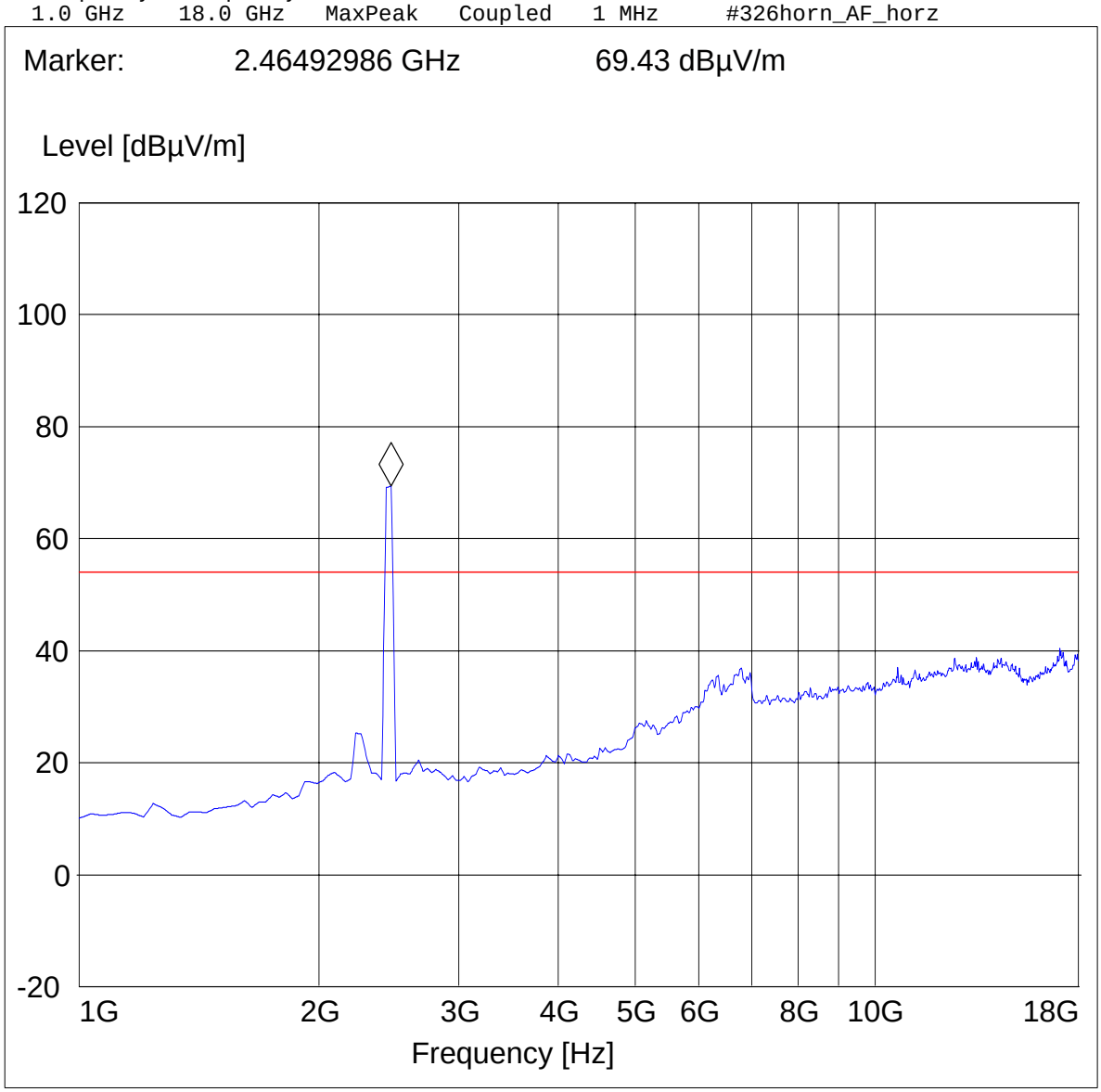
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 b; ch 11, Main Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

18GHz – 26.5GHz for low, middle, and high channels

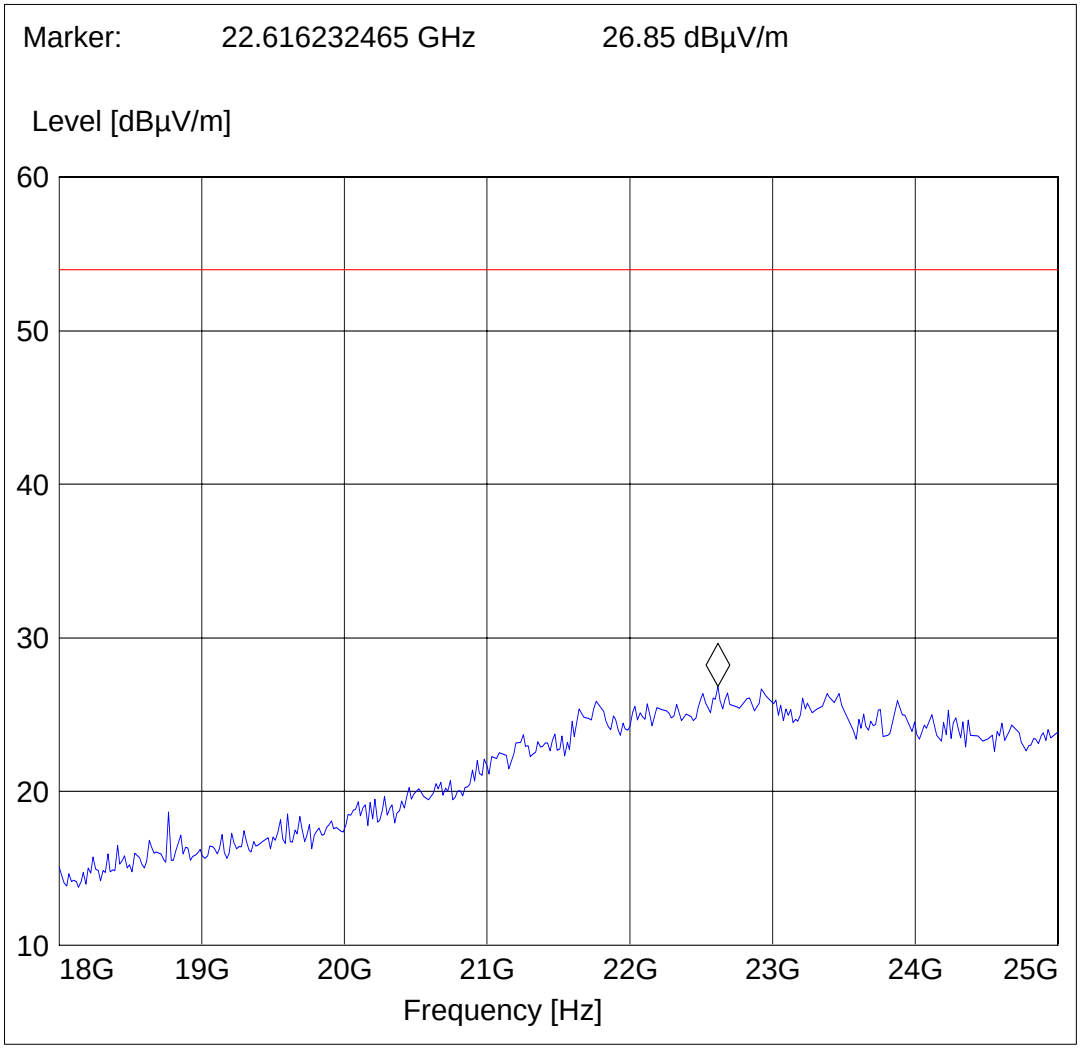
Note: This plot is valid for low, mid, high channels (worst-case plot)

CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 b ; Low, Middle, and High;  Main antenna
ANT Orientation:   V & H
EUT Orientation:   H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#572 horn AF



EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

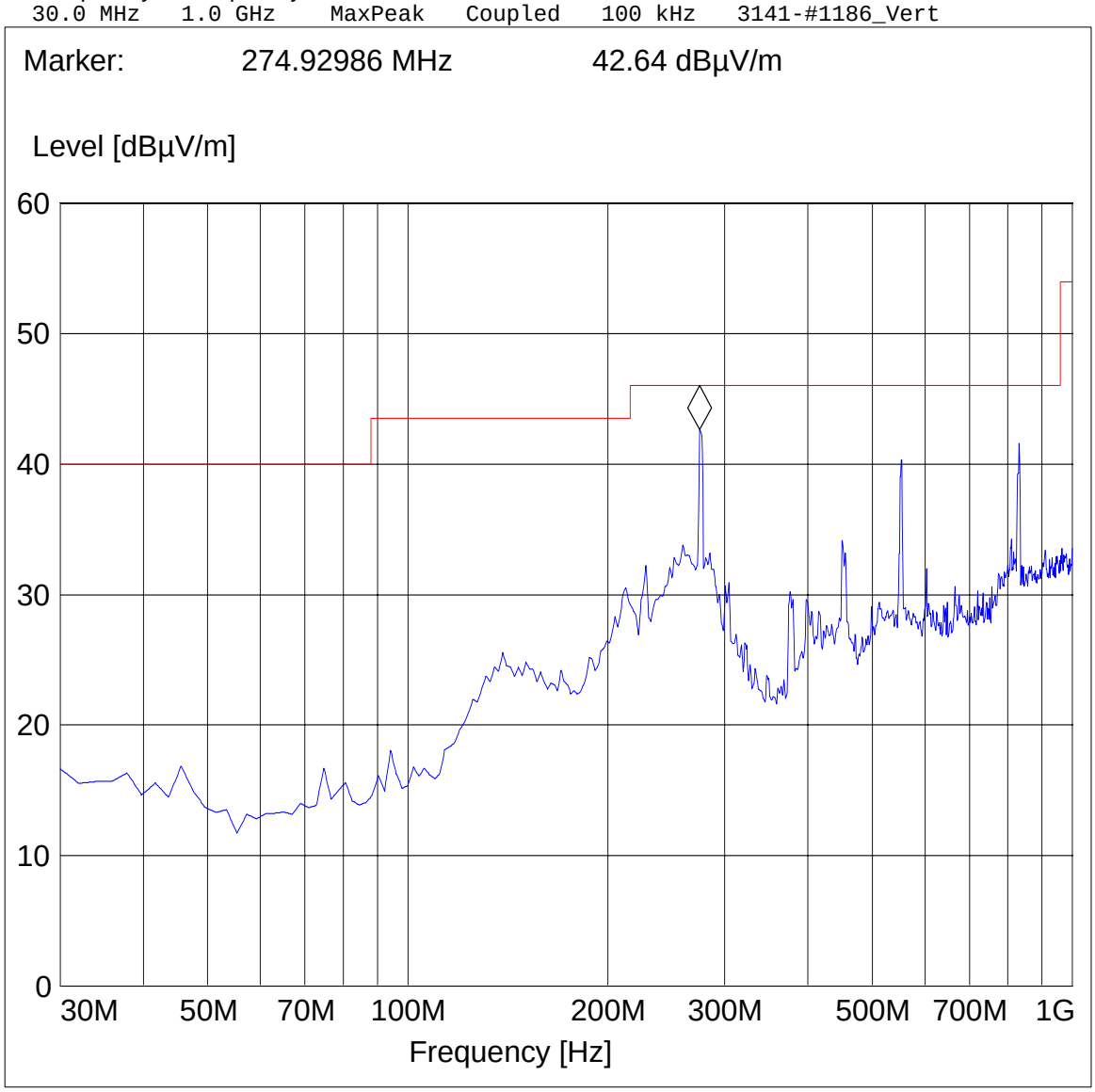
Lowest Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:              BCM43912MCG card #13
Customer:         Broadcom
Test Mode:        802.11b, Ch. 1, Aux
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Juan
Power Supply:     AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

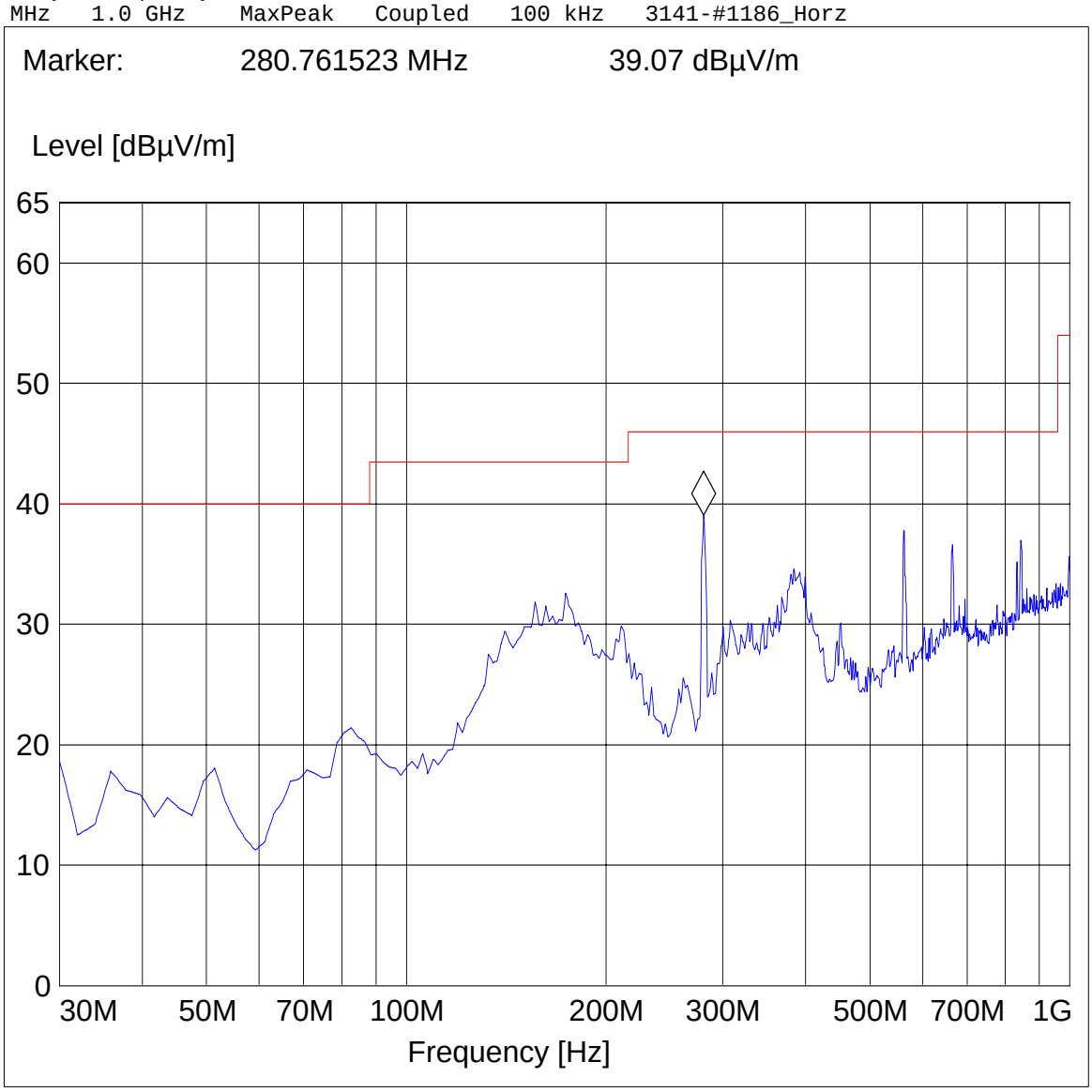
Lowest Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:             BCM43912MCG card #13
Customer:        Broadcom
Test Mode:       802.11b, ch 1, Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



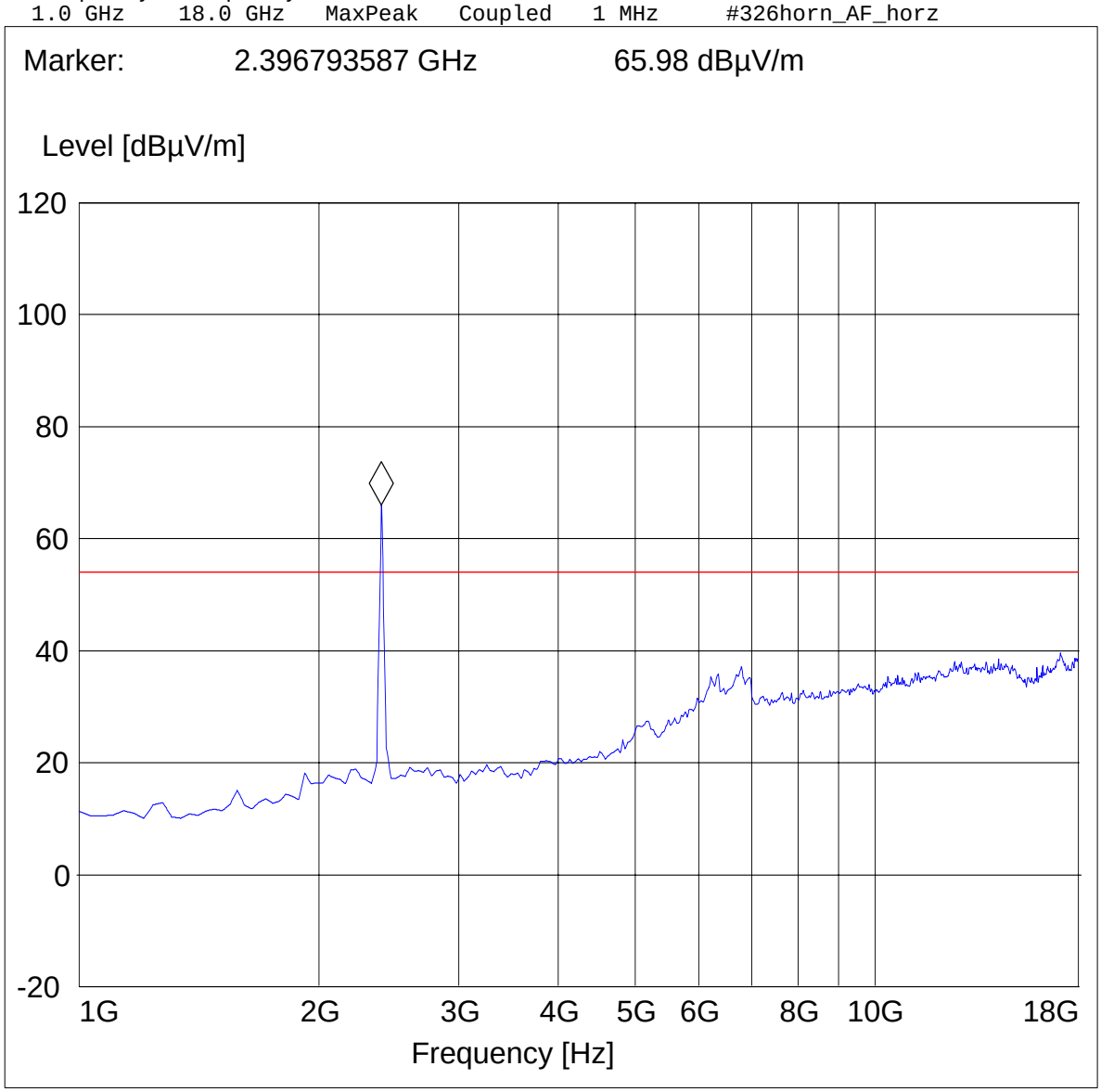
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 b; ch 1, Aux Antenna
ANT Orientation:   V & H
EUT Orientation:   H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

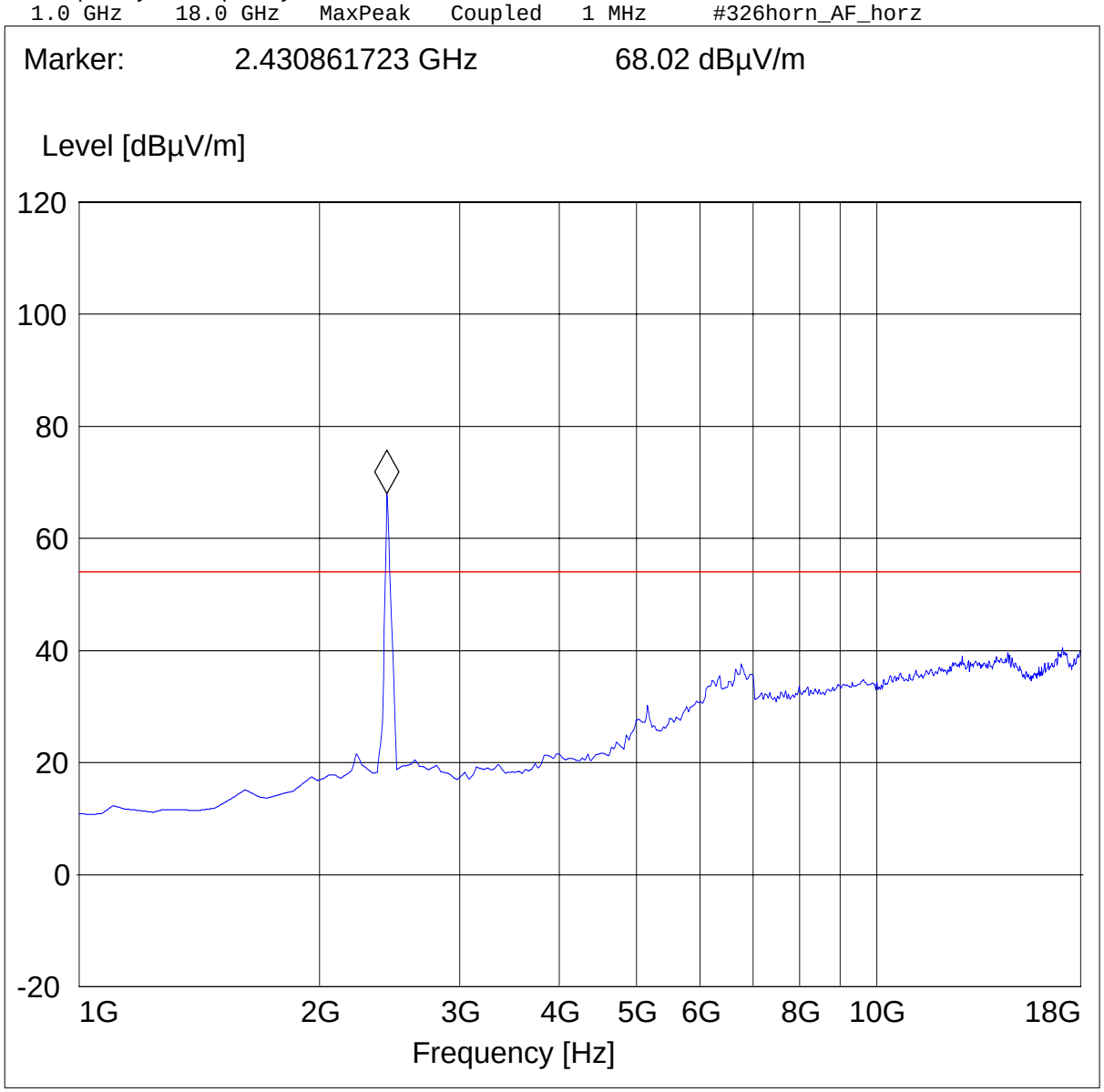


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 1GHz – 18GHz
Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM94312MCGSG (Card# 13)
Manufacturer:      Broadcom
Test mode:         Ch. 6, Tx mode (802.11b), Aux
ANT Orientation:   V & H
EUT Orientation:   H
Test Engineer:     Juan M.
Voltage:           AC adaptor
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

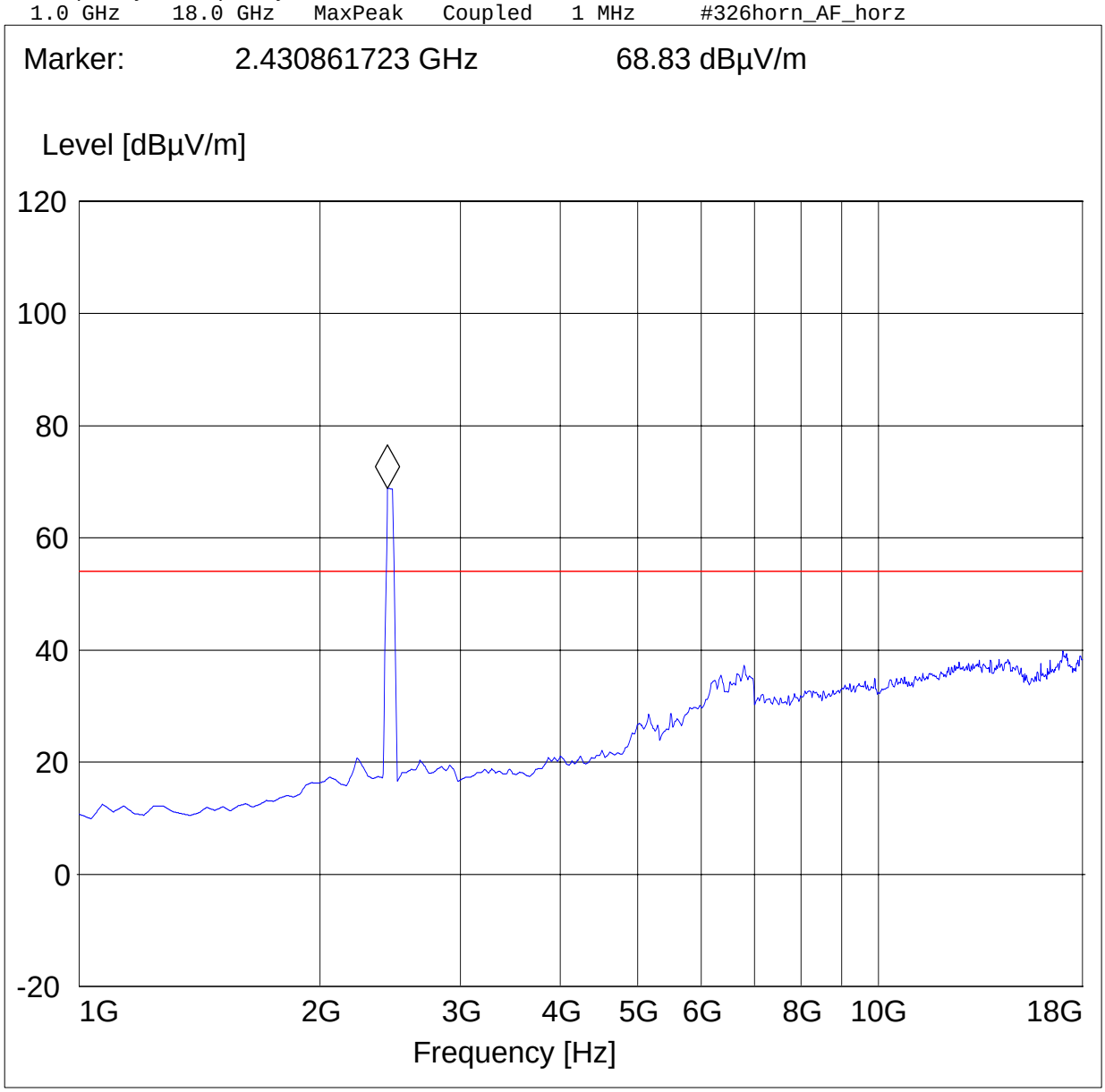


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 1GHz – 18GHz

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 b; ch 11, Aux Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



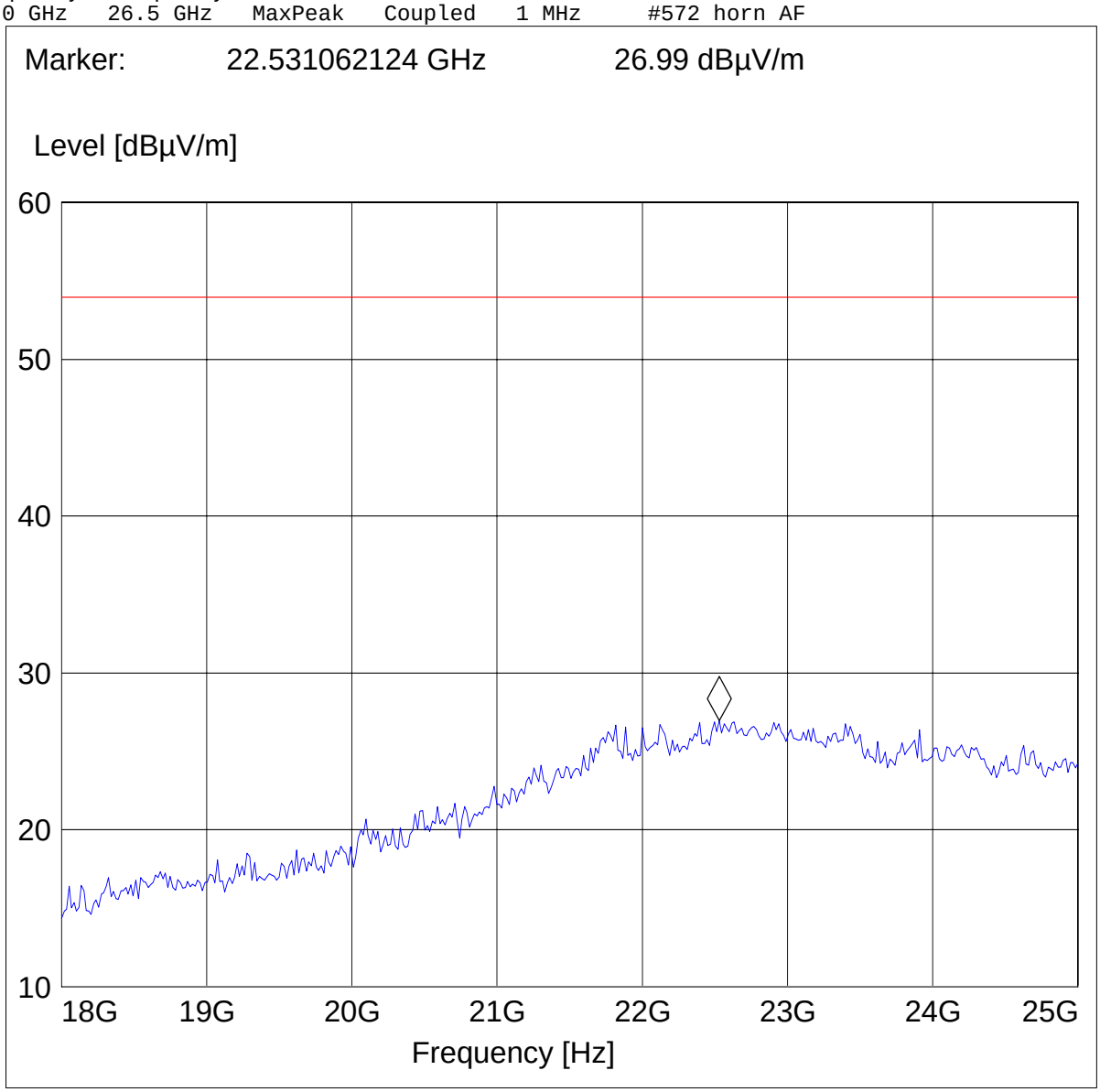
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5) 18GHz – 26.5GHz for low, middle, and high channels

Note: This plot is valid for low, mid, high channels (worst-case plot)

```
EUT:             BCM43912MCG card #13
Customer:        Broadcom
Test Mode:       802.11b, Low, Middle, and high, Aux Antenna
ANT Orientation: V & H
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adaptor
```

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#572 horn AF



(802.11g)

Transmit at Lowest channel Frequency 2412MHz			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			
Transmit at Middle channel Frequency 2437MHz			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			
Transmit at Highest channel Frequency 2462MHz			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

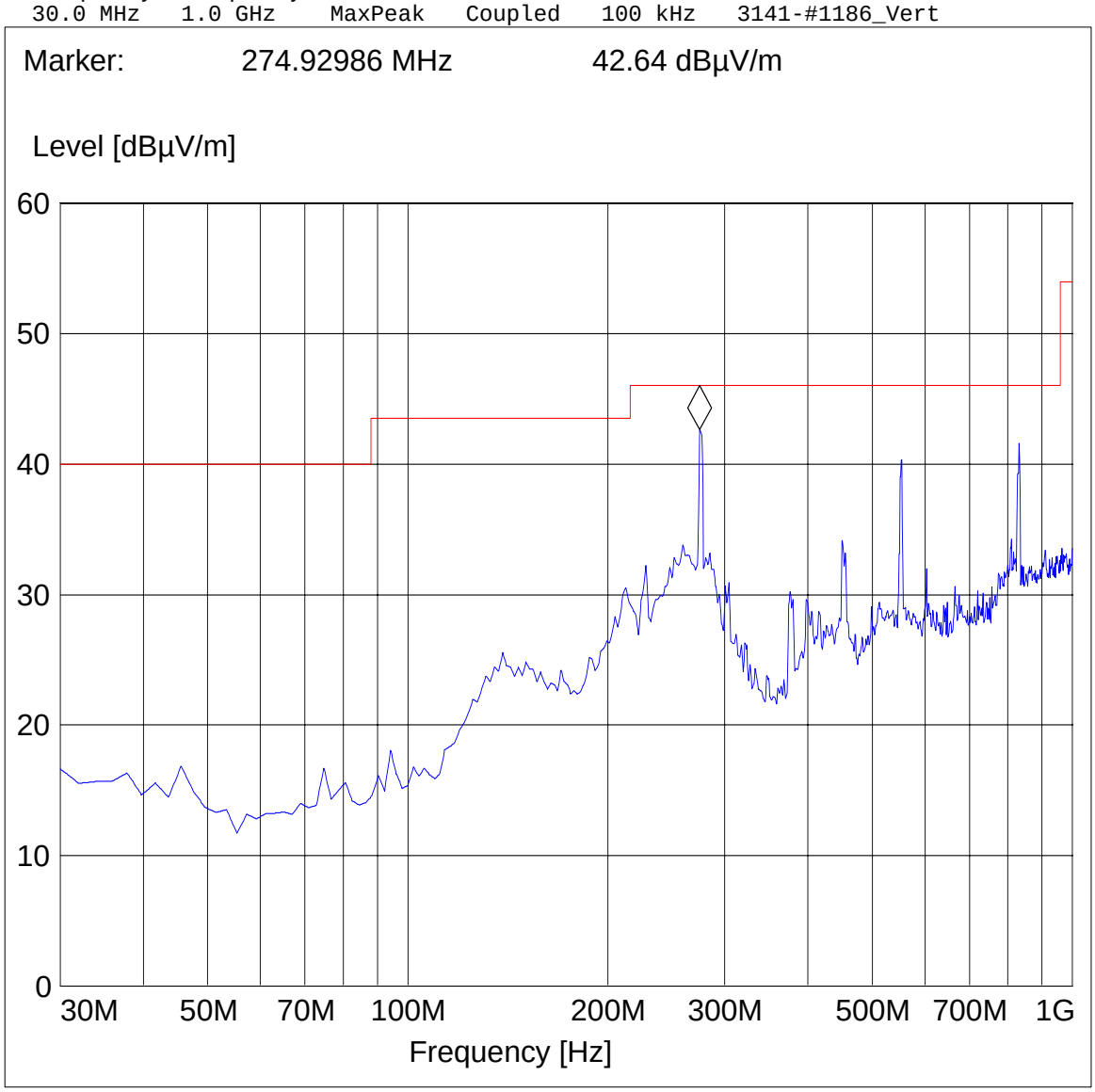
Lowest Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:              BCM43912MCG card #13
Customer:         Broadcom
Test Mode:        802.11g, Ch. 1, Main
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Juan
Power Supply:     AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



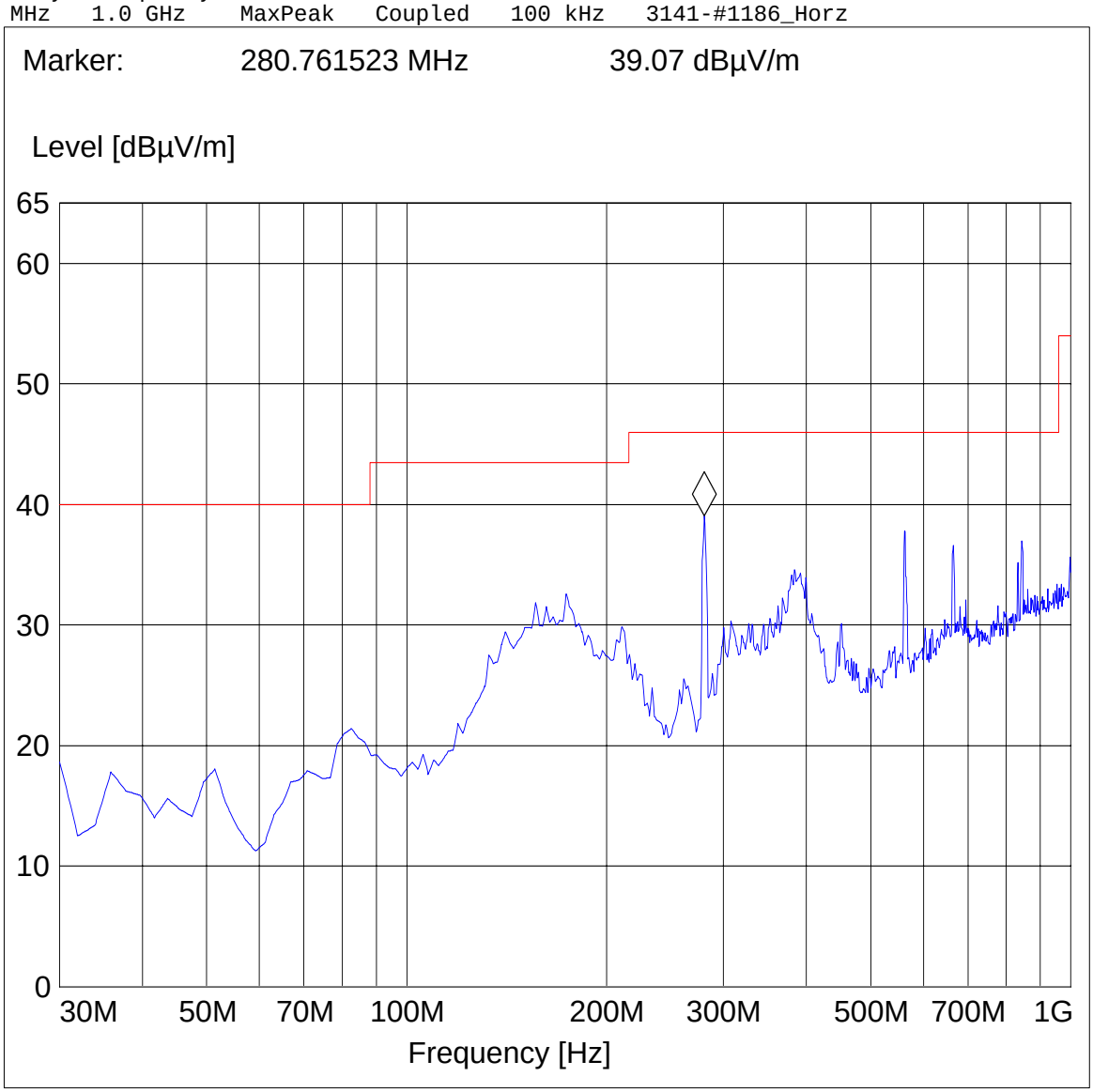
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Lowest Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:              BCM43912MCG card #13
Customer:         Broadcom
Test Mode:        802.11g, ch 1, Main
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Juan
Power Supply:     AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

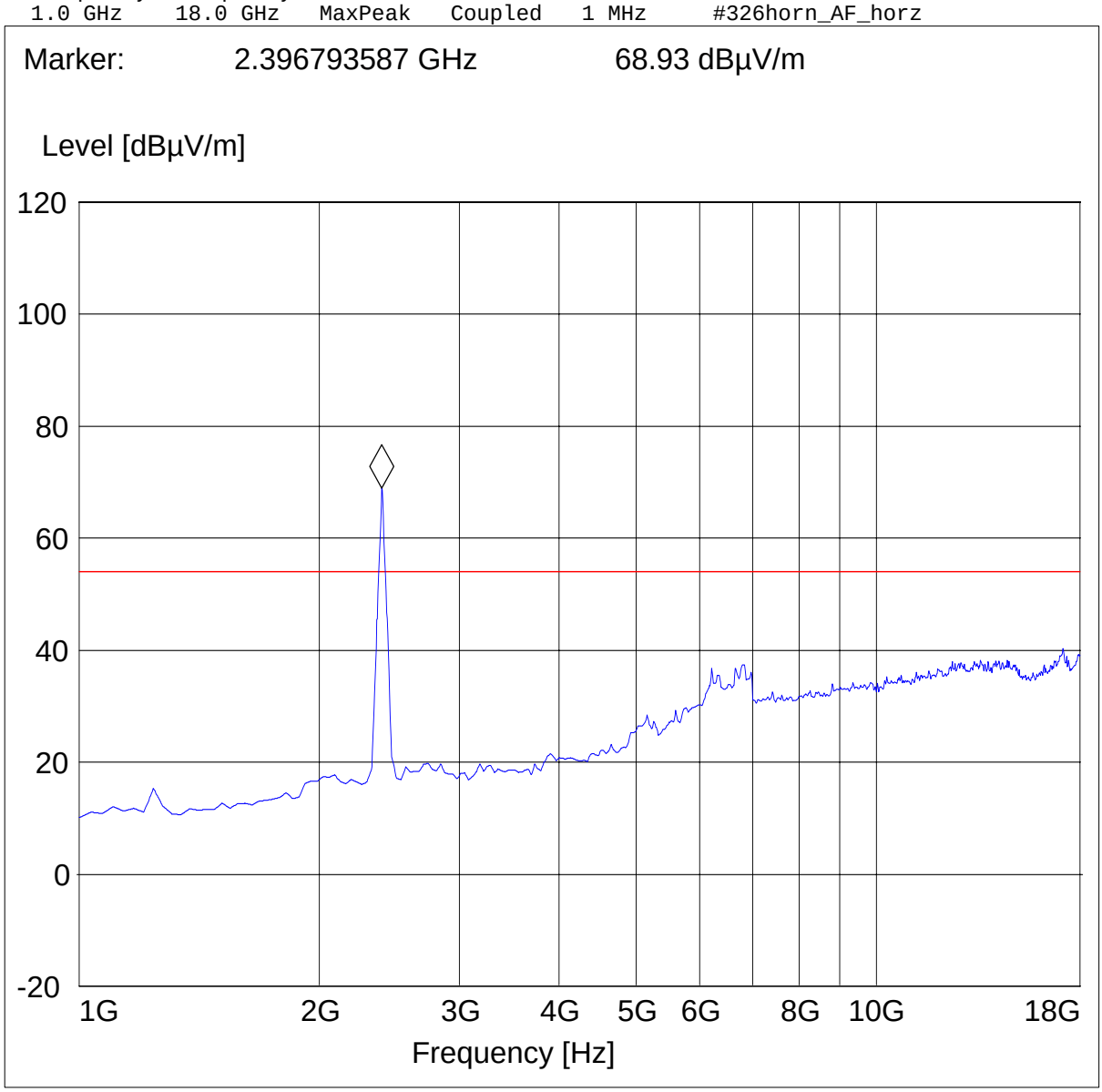
2412 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG # 13
Manufacturer:      Broadcom
Test mode:         802.11g; ch 1, Main Antenna
ANT Orientation: : V
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

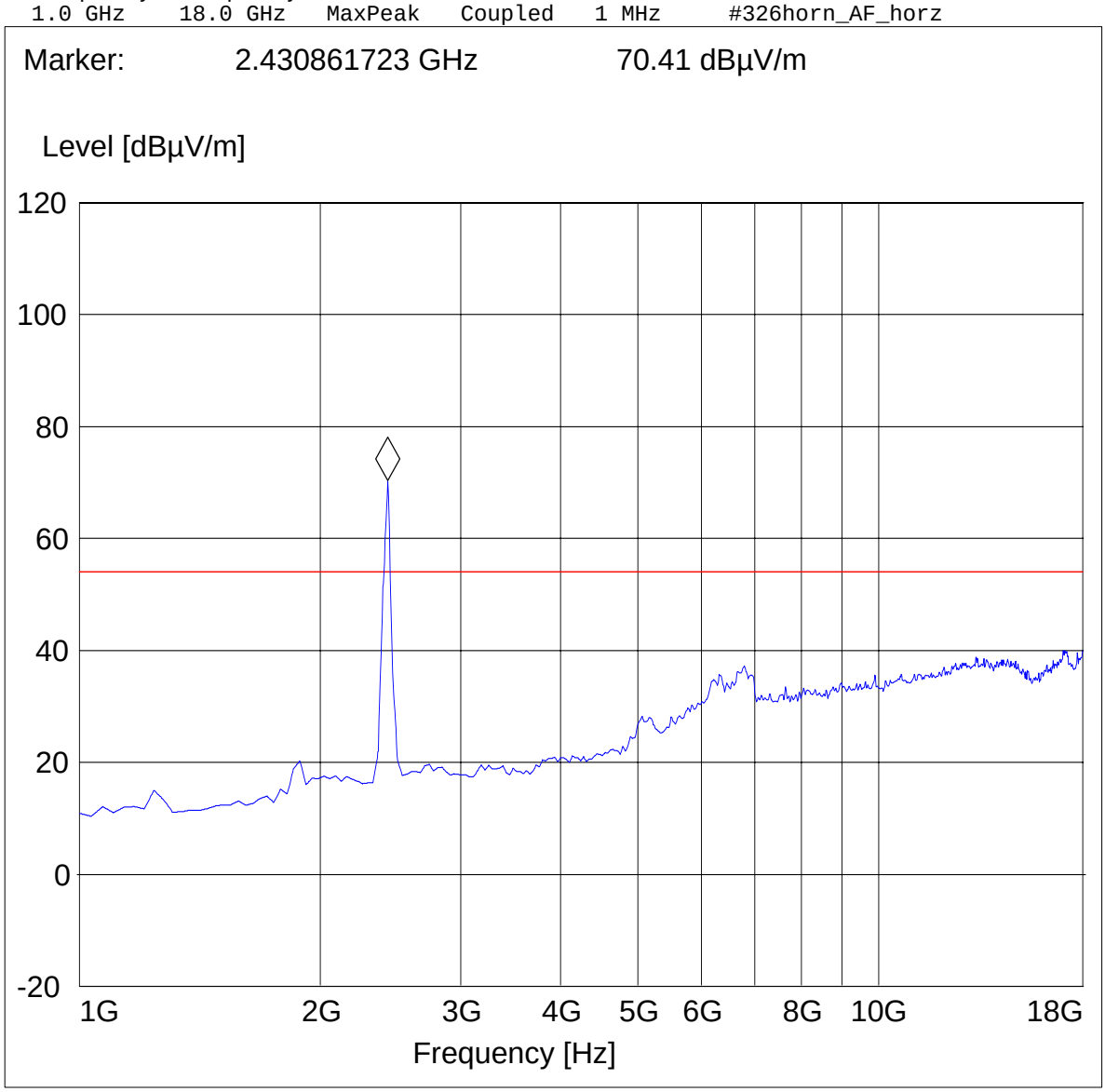


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 1GHz – 18GHz
Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG # 13
Manufacturer:      Broadcom
Test mode:         802.11 g; ch 6, Main Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



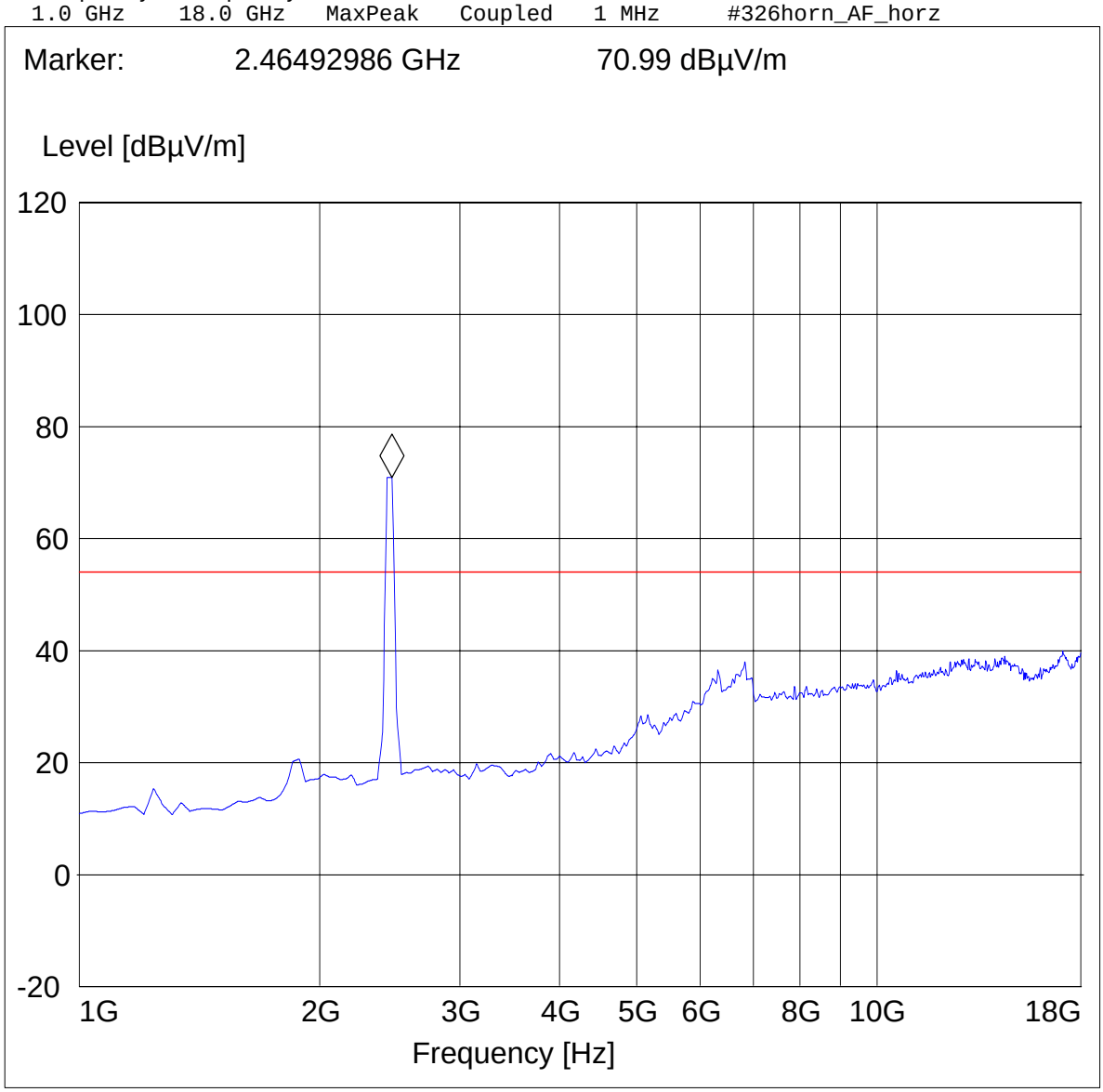
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG # 13
Manufacturer:      Broadcom
Test mode:         802.11 g; ch 11, Main Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



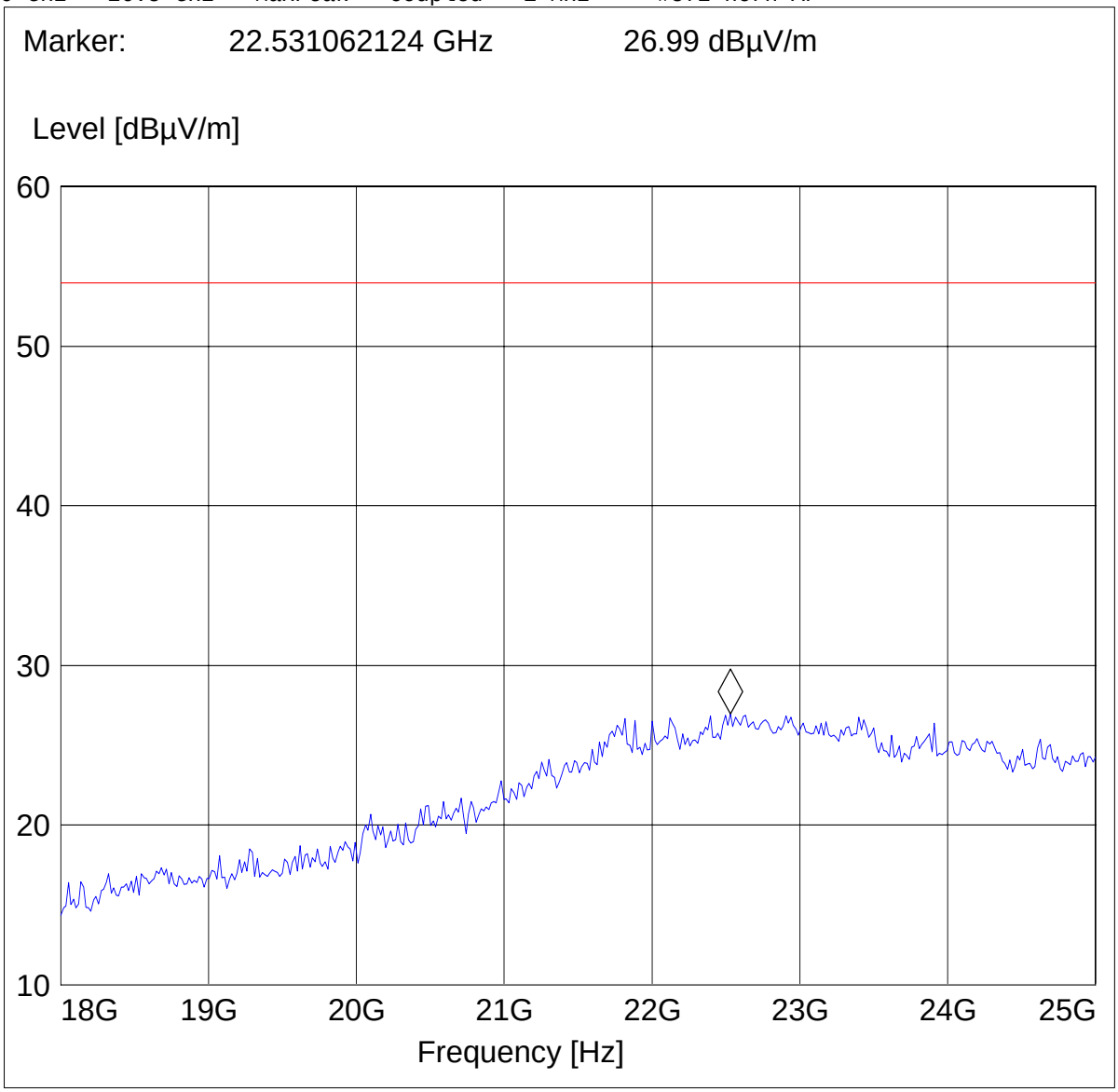
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5) 18GHz – 26.5GHz for low, middle, and high channels

Note: This plot is valid for low, mid, high channels (worst-case plot)

```
EUT:              BCM43912MCG # 13
Customer:         Broadcom
Test Mode:        802.11g, Low, Middle, and high, Aux Antenna
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Juan
Power Supply:     AC Adaptor
```

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#572 horn AF



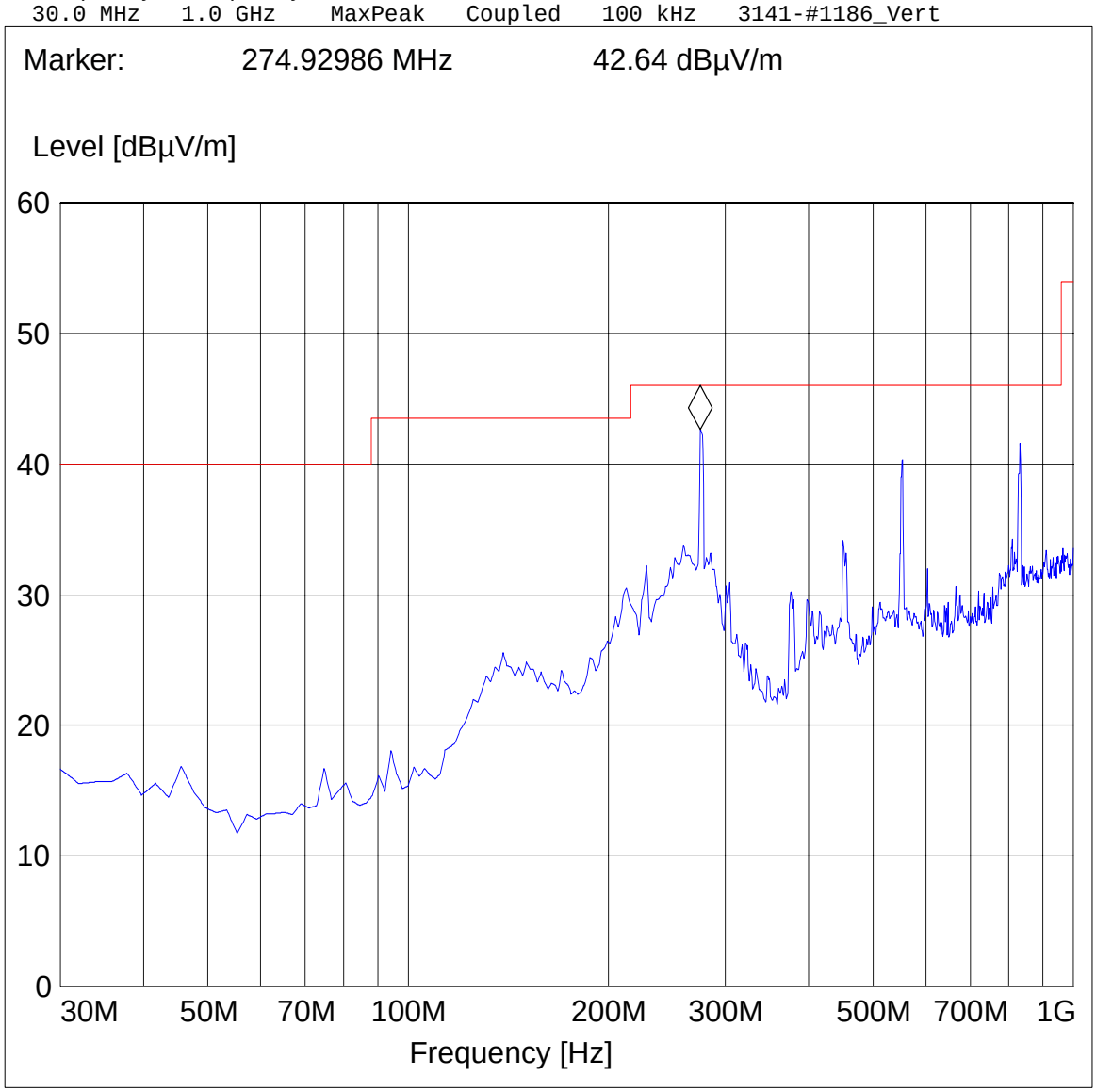
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

LowChannel (2412MHz): 30MHz – 1GHz

```
EUT:             BCM43912MCG # 13
Customer:        Broadcom
Test Mode:       802.11g, ch 1, Aux
ANT Orientation: V
EUT Orientation: H
Test Engineer:   Juan
Power Supply:    AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Ver"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Vert



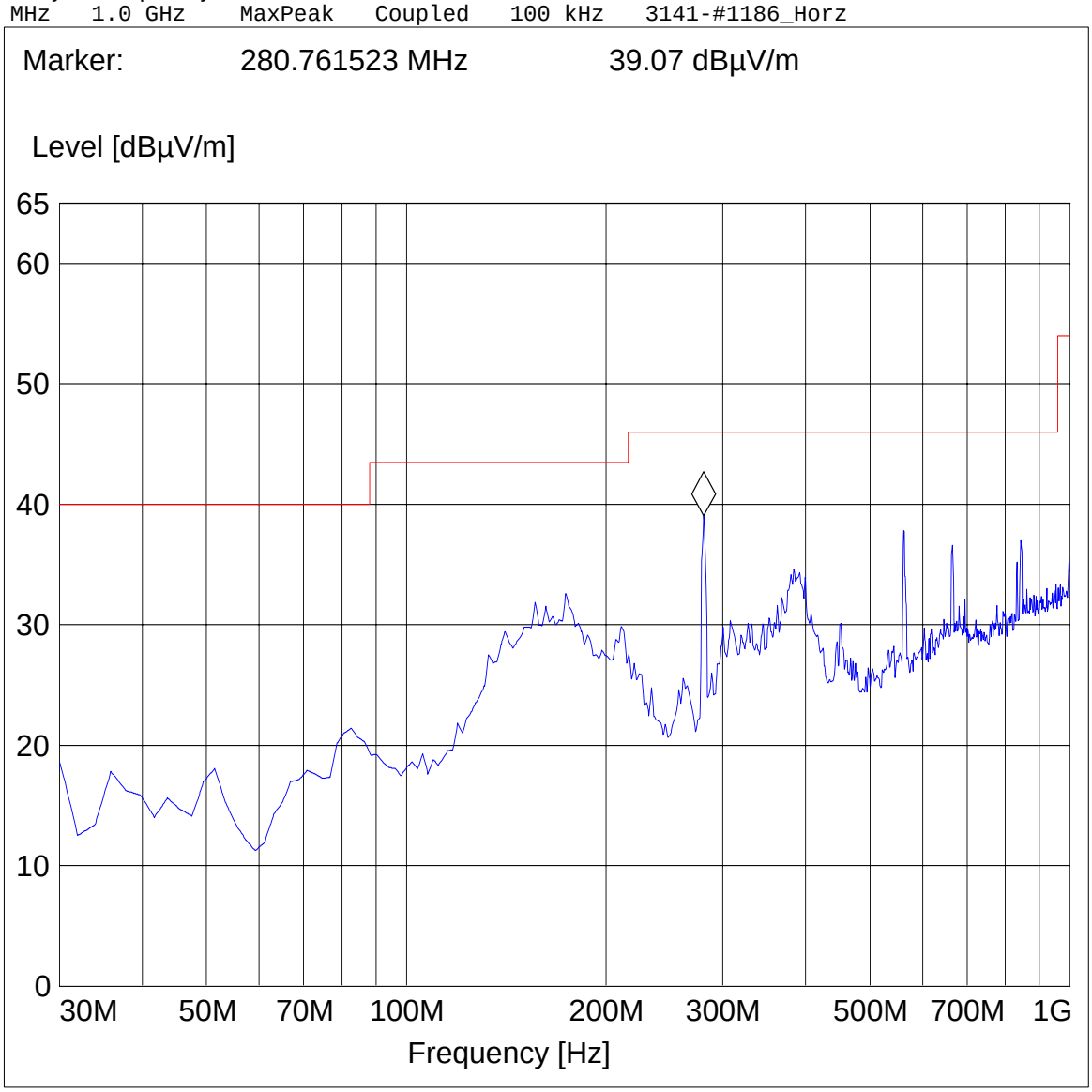
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Low Channel (2412MHz): 30MHz – 1GHz

Note: This plot is valid for low, mid, high channels

```
EUT:              BCM43912MCG # 13
Customer:         Broadcom
Test Mode:        802.11g, ch 1, Aux
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Juan
Power Supply:     AC Adapter
```

SWEEP TABLE: "FCC15.247_30M-1G_Hor"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	100 kHz	3141-#1186_Horz



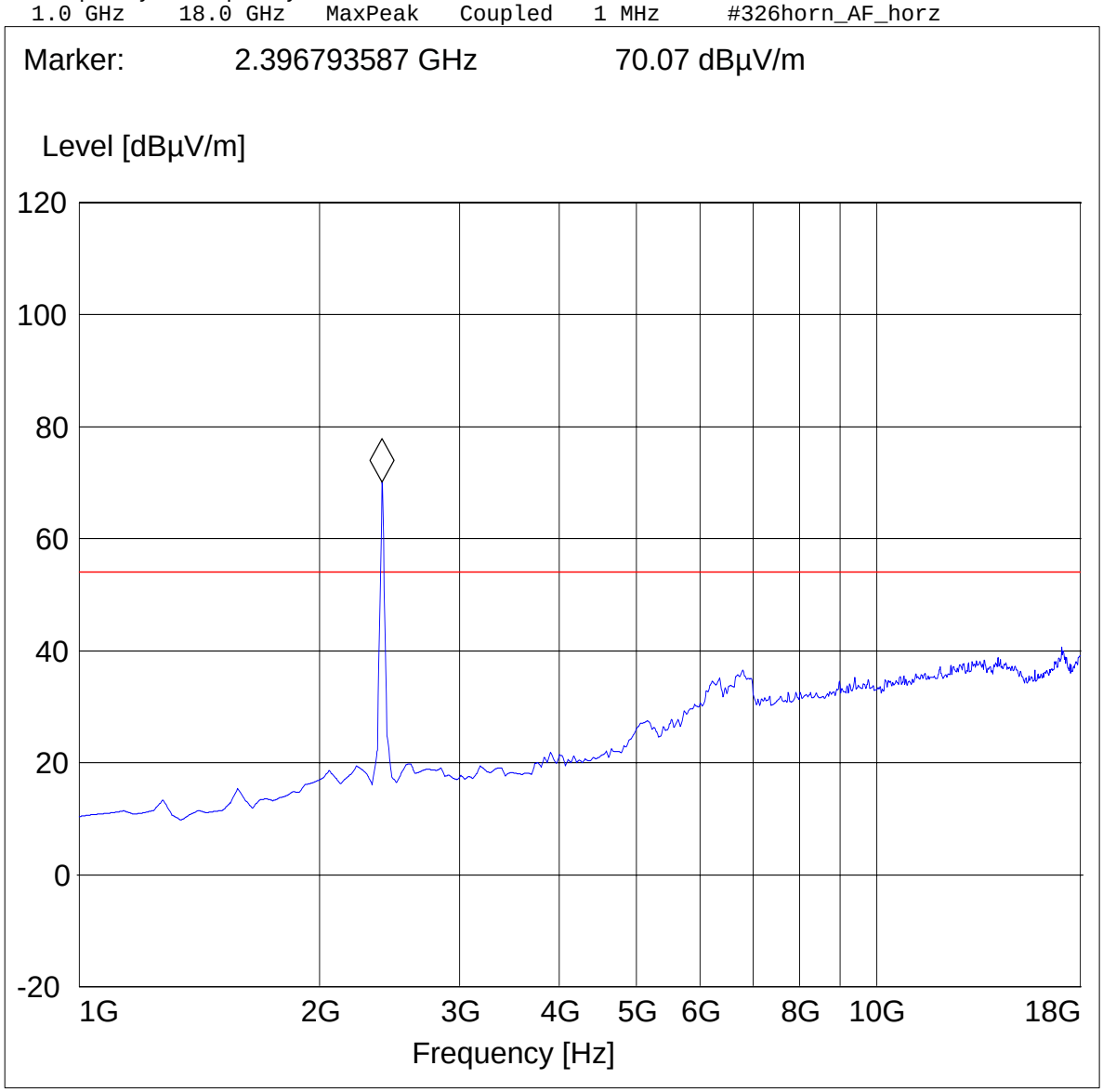
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 g; ch 1, Aux Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



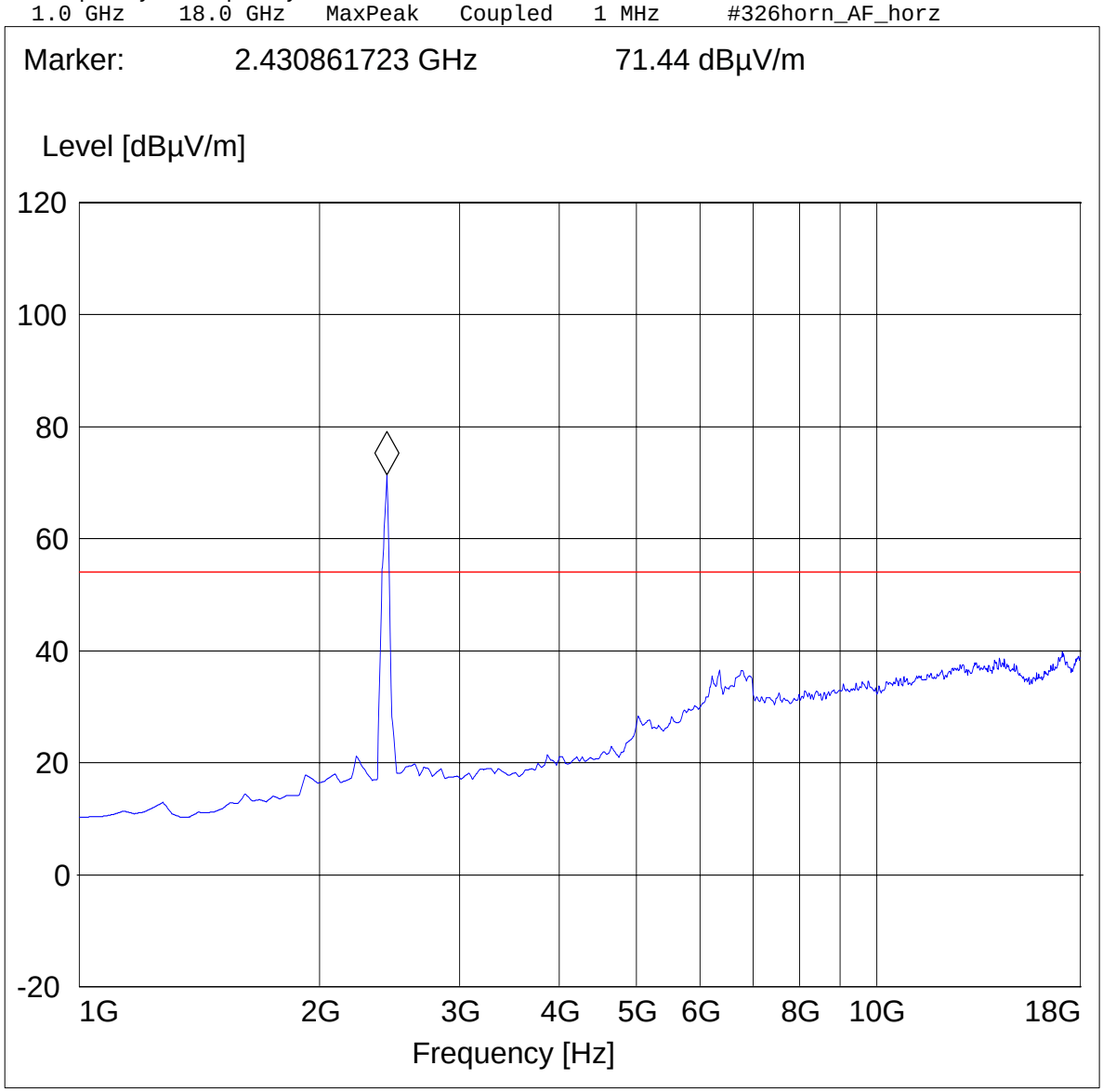
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 1GHz – 18GHz

Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 g; ch 6, Aux Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz

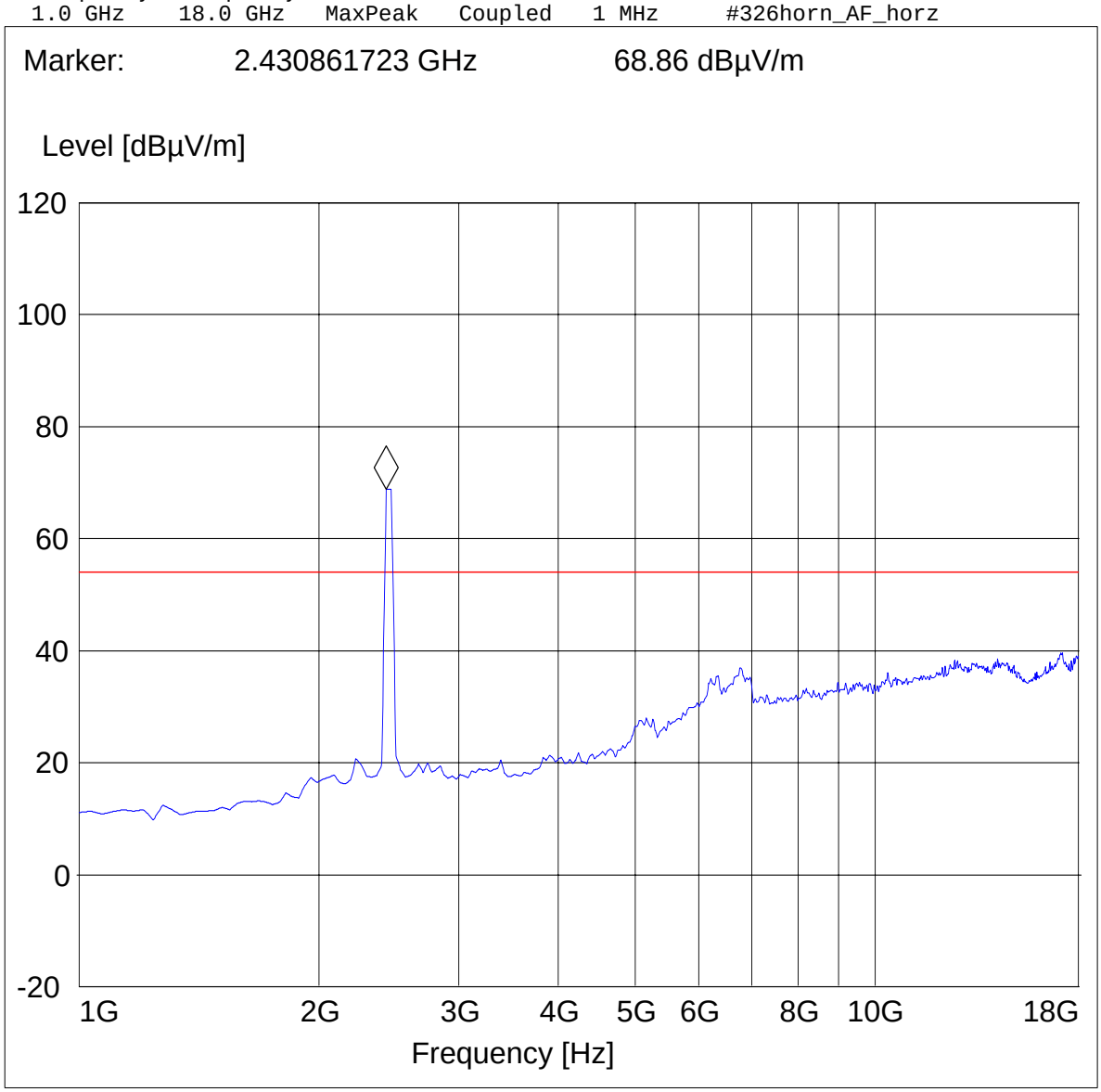


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 1GHz – 18GHz
Note: Peak above the limit line is the carrier freq.

```
EUT / Description: BCM43912MCG card #13
Manufacturer:      Broadcom
Test mode:         802.11 g; ch 11, Aux Antenna
ANT Orientation: : V & H
EUT Orientation::  H
Test Engineer:     Juan M.
Voltage:           AC Power Supply
```

SWEEP TABLE: "FCC15.247_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_horz



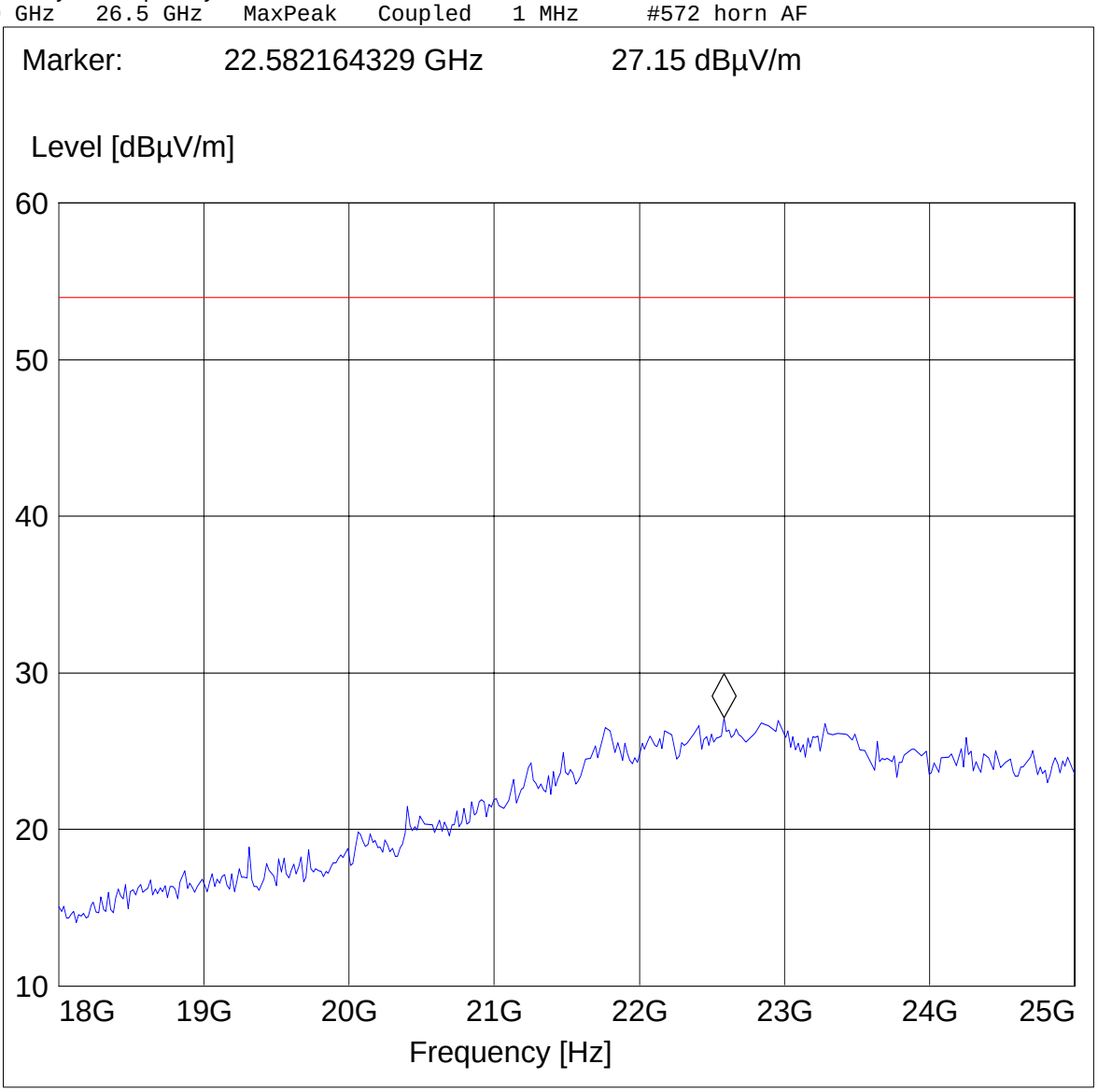
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5) 18GHz – 26.5GHz for low, middle, and high channels

Note: This plot is valid for low, mid, high channels (worst-case plot)

```
EUT / Description: BCM43912MCG card #13
Customer:         Broadcom
Test Mode:        802.11g, low, middle, and high, Aux
ANT Orientation: V & H
EUT Orientation: H
Test Engineer:    Juan
Power Supply:     AC Adapter
```

SWEEP TABLE: "FCC15.247_18-26.5G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
18.0 GHz	26.5 GHz	MaxPeak	Coupled	1 MHz	#572 horn AF



6.3 EMISSION LIMITATIONS – Radiated (Receiver) RSS-GEN (4.10) & (6):

Limits RSS-GEN (4.10) & (6):

Frequency (MHz)	Field strength (µV/m)	Field strength (dBµV/m)
0.009 - 0.490	2400/F(kHz)	
0.490 - 1.705	24000/F(kHz)	
1.705 - 30.0	**30**	**29.54**
30 - 88	**100**	**40.00**
88 - 216	**150**	**43.52**
216 - 960	**200**	**46.02**
above 960	**500**	**53.97**

Table 1. Limits are based on a 3 meter distance

RSS-GEN (4.10) peak measurements above 1GHz are taken with a RBW=VBW= 1MHz and average measurements above 1GHz with a RBW=1MHz, VBW=10Hz or an average detector. Set the radio to receive at the middle of the operating band.

EUT in Rx/Standby mode, test setup as per ANSI C63.4 (page 32)

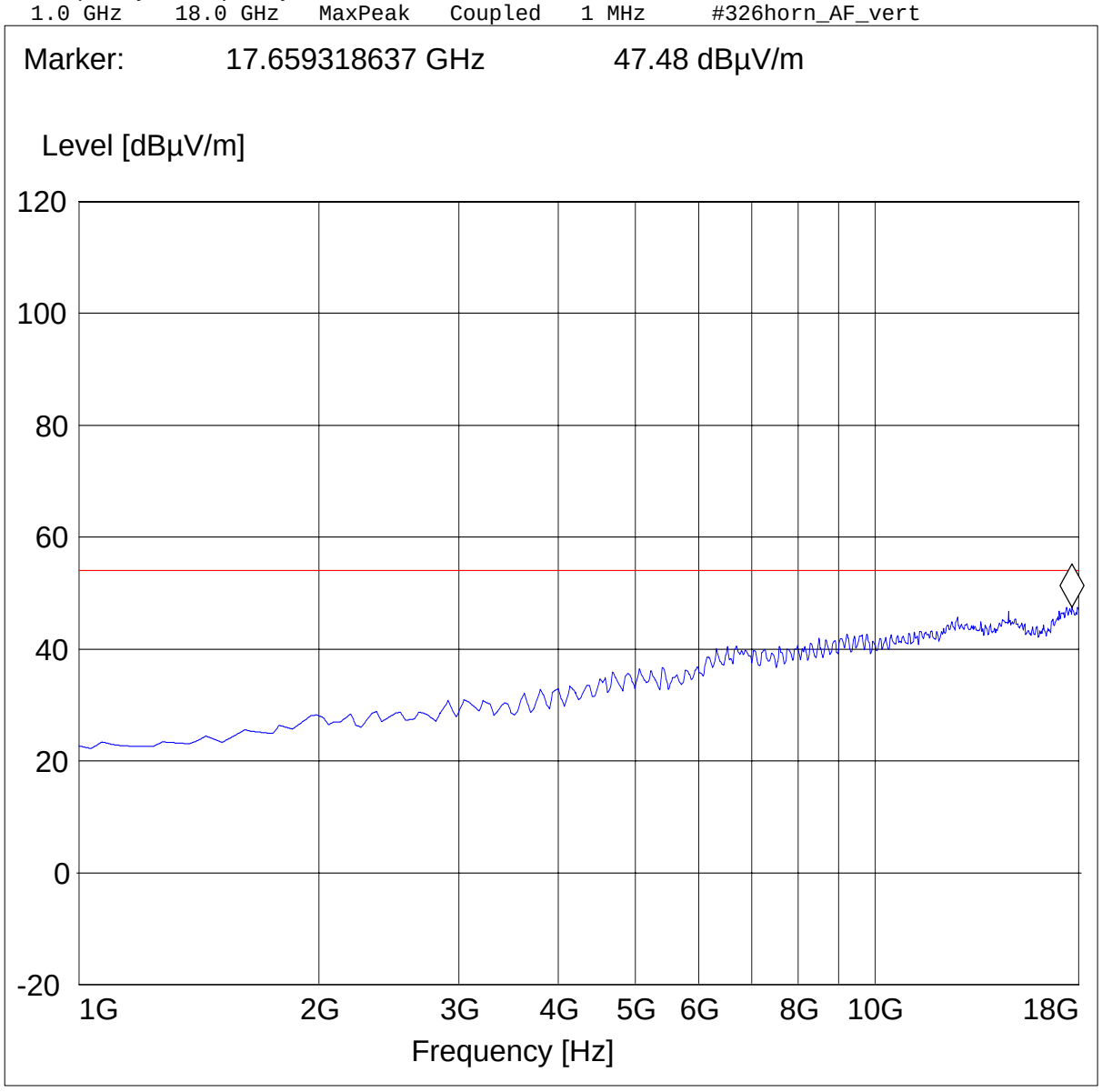
Frequency Range	Sweep used	Filter / Amp used
1GHz – 18GHz	CANADA_1-18G	

EMISSION LIMITATIONS - Radiated (Receiver) RSS-210(4.10) & (6)
2437 MHz: 1GHz – 18GHz

```
EUT / Description: BCM94312MCG #13
Manufacturer:      Broadcom
Test mode:         802.11b, CH.6, (Rx Mode)
ANT Orientation: : V
EUT Orientation::  H
Test Engineer:     Juan
Voltage:           AC ADAPTER
```

SWEEP TABLE: "CANADA RE_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

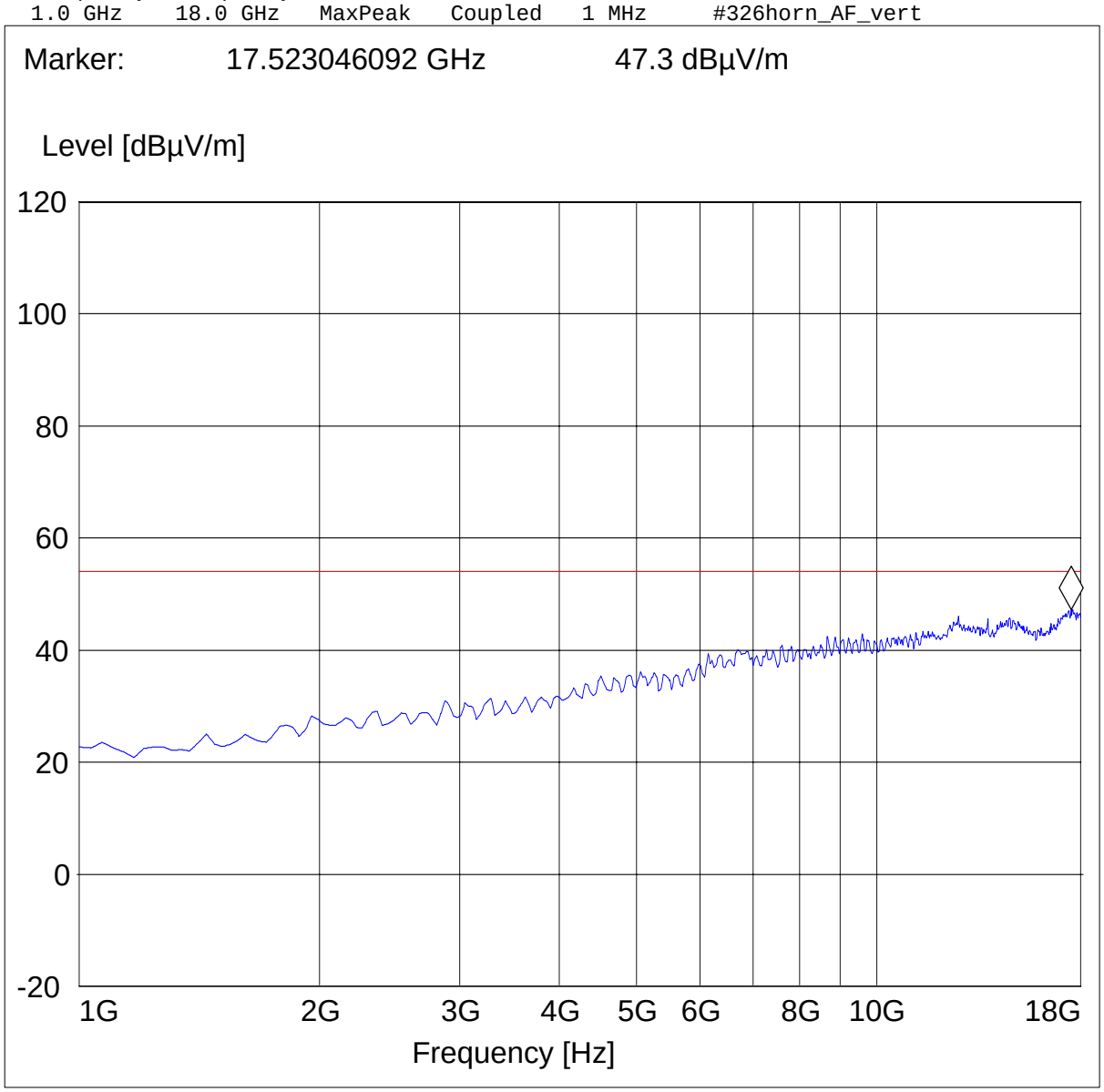


EMISSION LIMITATIONS - Radiated (Receiver) RSS-210(4.10) & (6)
2437 MHz: 1GHz – 18GHz

```
EUT / Description: BCM94312MCG #13
Manufacturer:      Broadcom
Test mode:         802.11b, CH.6, (Rx Mode)
ANT Orientation:   H
EUT Orientation:   H
Test Engineer:     Juan
Voltage:           AC ADAPTER
```

SWEEP TABLE: "CANADA RE_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

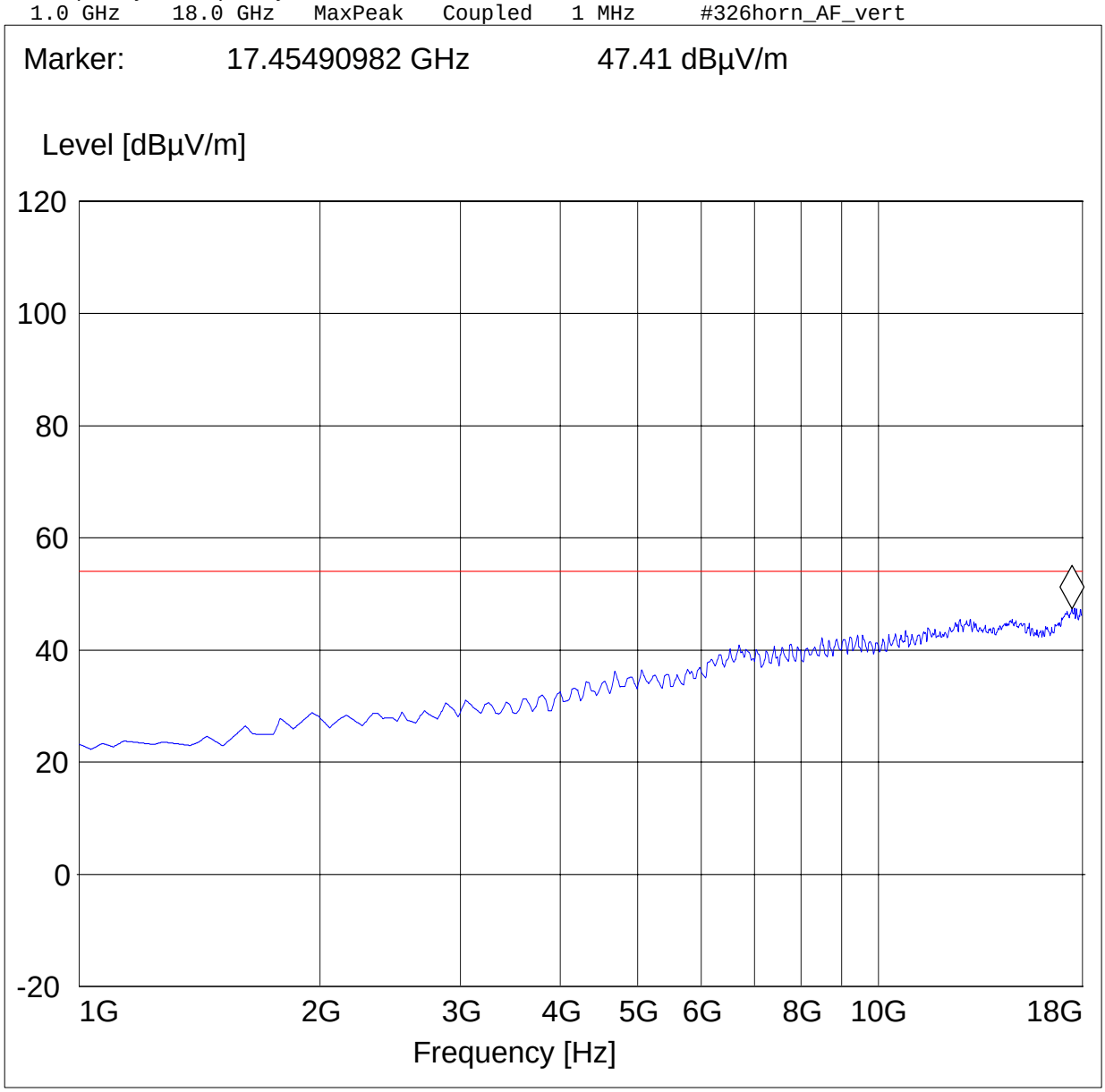


EMISSION LIMITATIONS - Radiated (Receiver) RSS-210(4.10) & (6)
2437 MHz: 1GHz – 18GHz

```
EUT / Description: BCM94312MCG #13
Manufacturer:      Broadcom
Test mode:         802.11g, CH.6, (Rx Mode)
ANT Orientation: : V
EUT Orientation::  H
Test Engineer:     Juan
Voltage:           AC ADAPTER
```

SWEEP TABLE: "CANADA RE_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

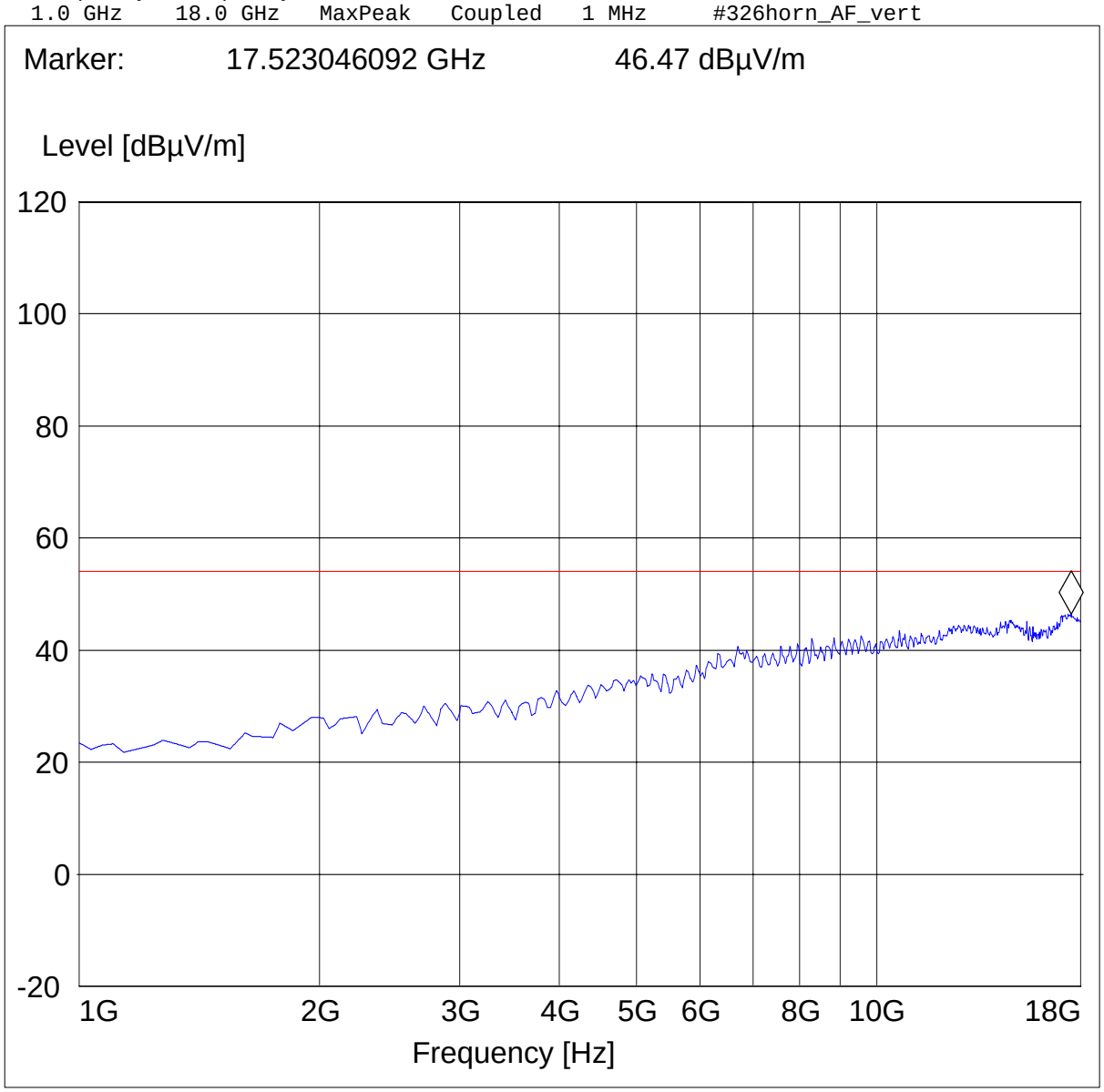


EMISSION LIMITATIONS - Radiated (Receiver) RSS-210(4.10) & (6)
2437 MHz: 1GHz – 18GHz

```
EUT / Description: BCM94312MCG # 13
Manufacturer:      Broadcom
Test mode:         802.11g, CH.6, (Rx Mode)
ANT Orientation: : H
EUT Orientation::  H
Test Engineer:     Juan
Voltage:           AC ADAPTER
```

SWEEP TABLE: "CANADA RE_1-18G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert



7 AC POWER LINE CONDUCTED EMISSIONS § 15.207 & RSS-GEN (7.2.2)

LIMITS
Technical specification: 15.207 (Revised as of August 20, 2002)

§15.107 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

OPERATING MODE
Conducted AC emissions testing were performed with 110 VAC @ 60 Hz with the EUT in Transmit and Receiver mode.

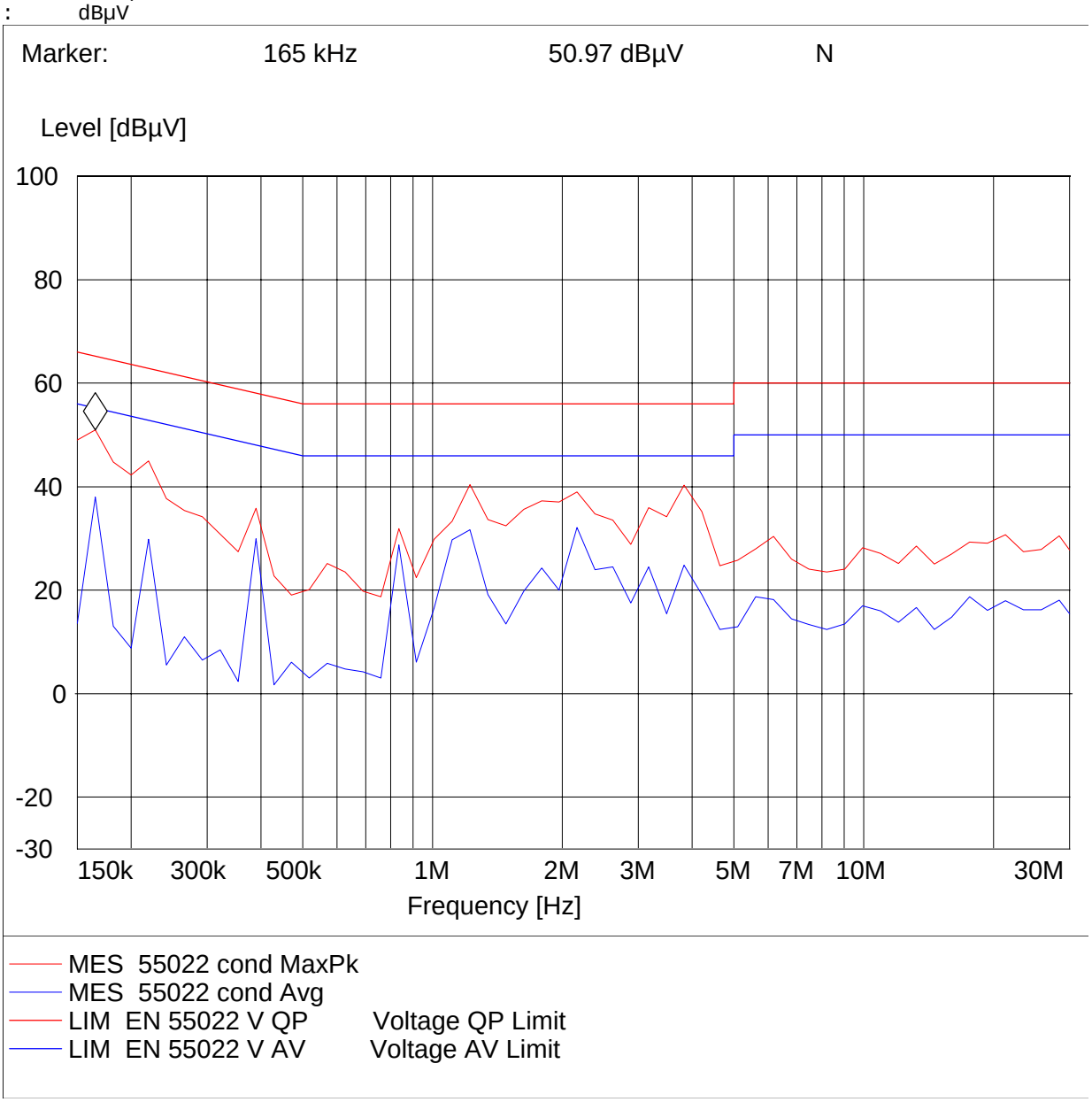
Note: Both transmit and receiver AC conducted emissions investigated. Pre-scan results showed that transmit mode was worst case. So, only transmit ac conducted emissions results reported.

Voltage Mains Test (Line), Transmit

```
EUT:                  BCM94312MCG # 13
Manufacturer:         Broadcom
Operating Condition:  Tx Mode
ANT Orientation::     CONDUCTED
EUT Orientation::     H
Test Engineer::       Juan M.
Power Supply: :       AC Adaptor
Comments:             120V,60Hz (Line)
```

SWEEP TABLE: "55022 cond"

```
  Short Description:            EN 55022 for 150KHz-30MHz
Unit:     dBµV
```

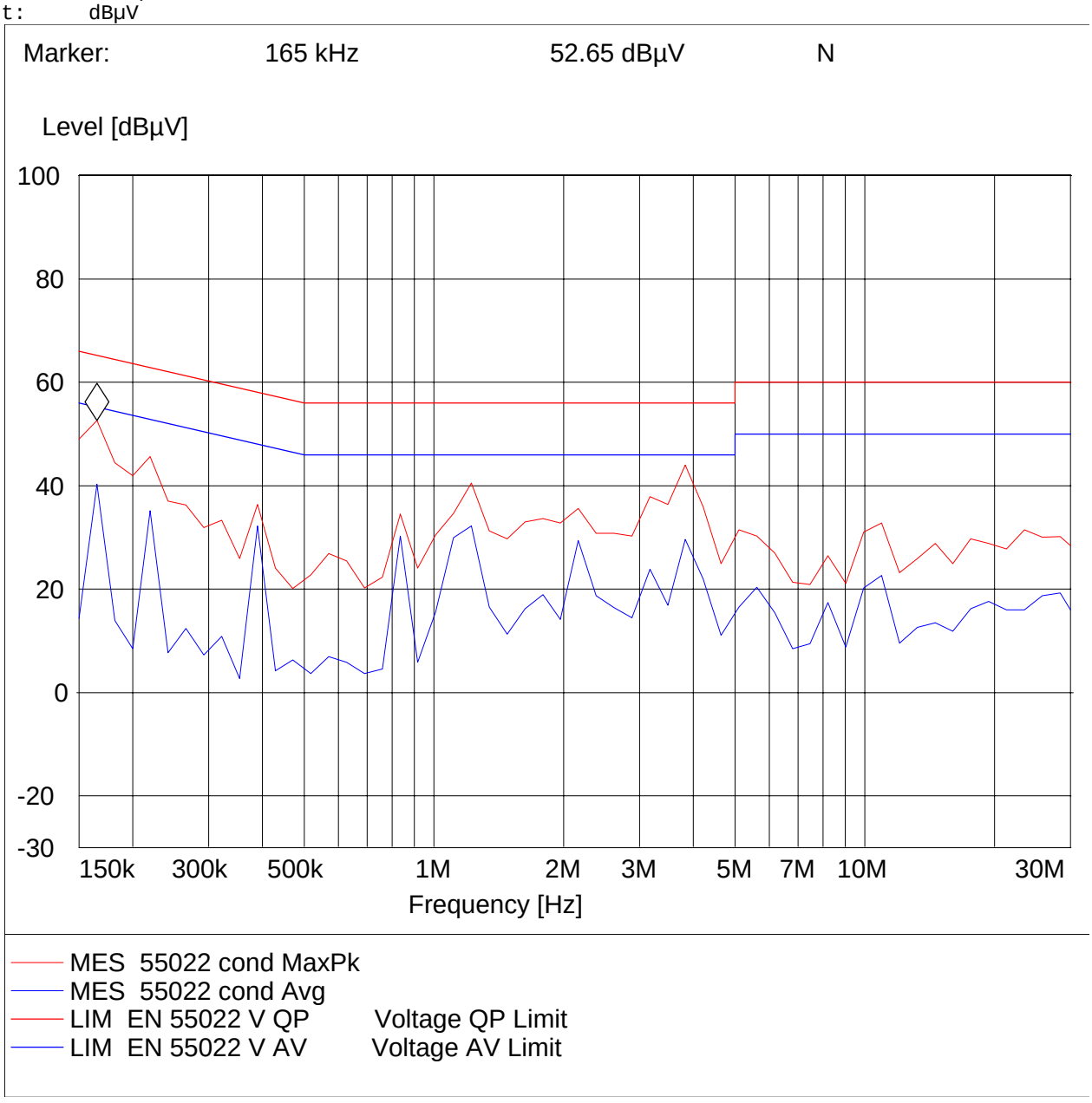


Voltage Mains Test (Neutral), Transmit

```
EUT:                  BCM94312MCG # 13
Manufacturer:         Broadcom
Operating Condition:  Tx Mode
ANT Orientation::     CONDUCTED
EUT Orientation::     H
Test Engineer::       Juan M.
Power Supply: :       AC Adaptor
Comments:             120V,60Hz (Neutral)
```

SWEEP TABLE: "55022 cond"

```
  Short Description:            EN 55022 for 150KHz-30MHz
Unit:     dBµV
```



8 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2008	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2008	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2008	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2008	1 year
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2008	1 year

9 BLOCK DIAGRAMS

9.1 Radiated Testing