Permissive Class II Change FCC Test Report

FCC Part 15.247 & RSS-210, Issue 7 for Digital Transmission Systems

FOR:

Broadcom, Inc.

802.11b/g Wireless LAN PCI-E Mini Card

Model Number: BCM94312MCG

FCC ID: QDS-BRCM1028

IC UPN: 4324A-BRCM1028

TEST REPORT #:EMC_BROAD_054_08001_DTS
DATE: 2008-04-29

ilac-MRA A2LA 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

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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 in compliance with the applicable criteria specified in Industry Canada rules RSS-210.

Company	Description	Model #
Broadcom, Inc.	**Wireless LAN PCI-E Mini Card**	**BCM94312MCG**

Technical responsibility for area of testing:

Date	Section	Name	Signature
2008-04-29	**EMC & Radio**	**Val Tankov (EMC Project Engineer)**	Ivaylo Tankov I am approving this document

Responsible for test report and project leader:

Date	Section	Name	Signature
2008-04-29	**EMC & Radio**	**Marc Douat (EMC Test Engineer)**	Marc Douat I am the author of this document

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the EMC Test 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:	**Marc Douat**
Responsible Test Lab Manager:	**Val Tankov**

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, CA 94086 USA**

3 Equipment under Test (EUT)

3.1 Specification of the Equipment under Test

Product Type	**Wireless LAN PCI-E Mini Card**
Marketing Name:	**802.11b/g Wireless LAN PCI-E Mini Card**
Model No:	**BCM94312MCG**
FCC-ID:	**QDS-BRCM1028**
IC UPN:	**4324A-BRCM1028**
Frequency Range:	**2412 – 2462 MHz**
Number of Channels	**11**
Type(s) of Modulation:	**CCK & OFDM**
Antenna Type:	**WNC PIFA 2412 – 2462 MHz Main (2.30dBi) & Aux (1.60dBi)**

3.2 Class II permissive change laptops to be added

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	Tablet	HP	HSTNN-W47C	N/A

3.3 Identification of Accessory equipment

TYPE	MANF.	MODEL
AC ADAPTOR	HP	N/A

4 Subject Of Investigation

All testing were performed on the HP HSTNN-W47C laptop with the BCM94312MCG pre-approved module. The data presented in this report was collected for a Class II permissive change to add the host tablet to the BCM94312MCG (FCC ID: QDS-BRCM1028) module application.

During the testing process the EUT was tested in “b” 1Mbps and “g” 6Mbps data rate which yielded the worst case results. All testing was performed on Main and Aux antenna; all data in this report shows the worst case between horizontal and vertical polarization for above 1GHz.

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 Industry Canada rules RSS-210.

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

EIRP:

802.11b

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
Main Antenna				
T_{nom}(23)°C	V_{nom}	22.21	21.58	21.67
Aux Antenna				
T_{nom}(23)°C	V_{nom}	21.06	22.07	21.92
Measurement uncertainty		±0.5dBm		

802.11g

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
Main Antenna				
T_{nom}(23)°C	V_{nom}	24.14	25.03	23.65
Aux Antenna				
T_{nom}(23)°C	V_{nom}	23.29	25.61	23.76
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

Notes:
1. For 802.11b and 802.11g powers were set to transmit at the specified conducted average output power.
2. Both vertical and horizontal were measured. Worst case polarization was horizontal for all modes.

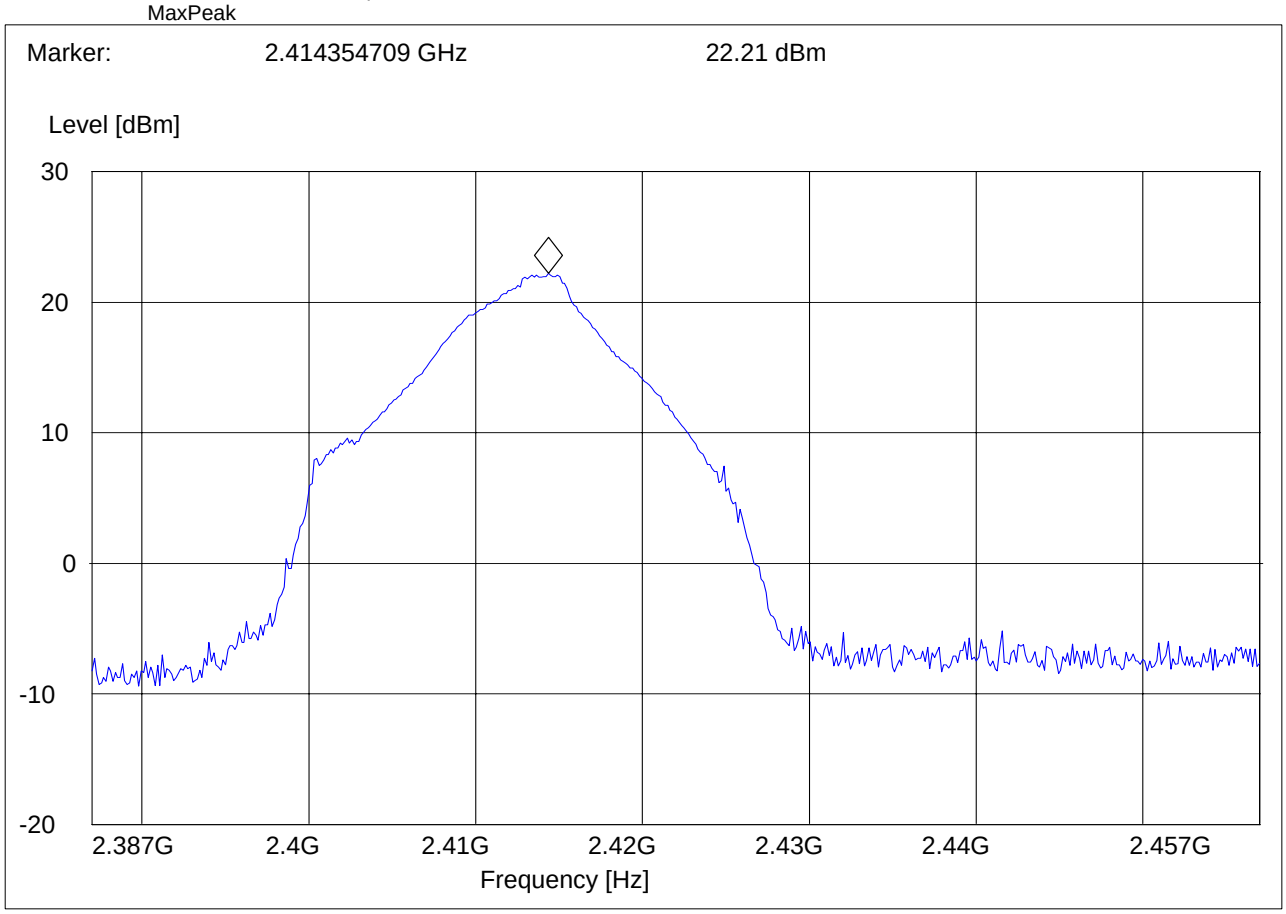
EIRP: 2412 MHz (802.11b) Main

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



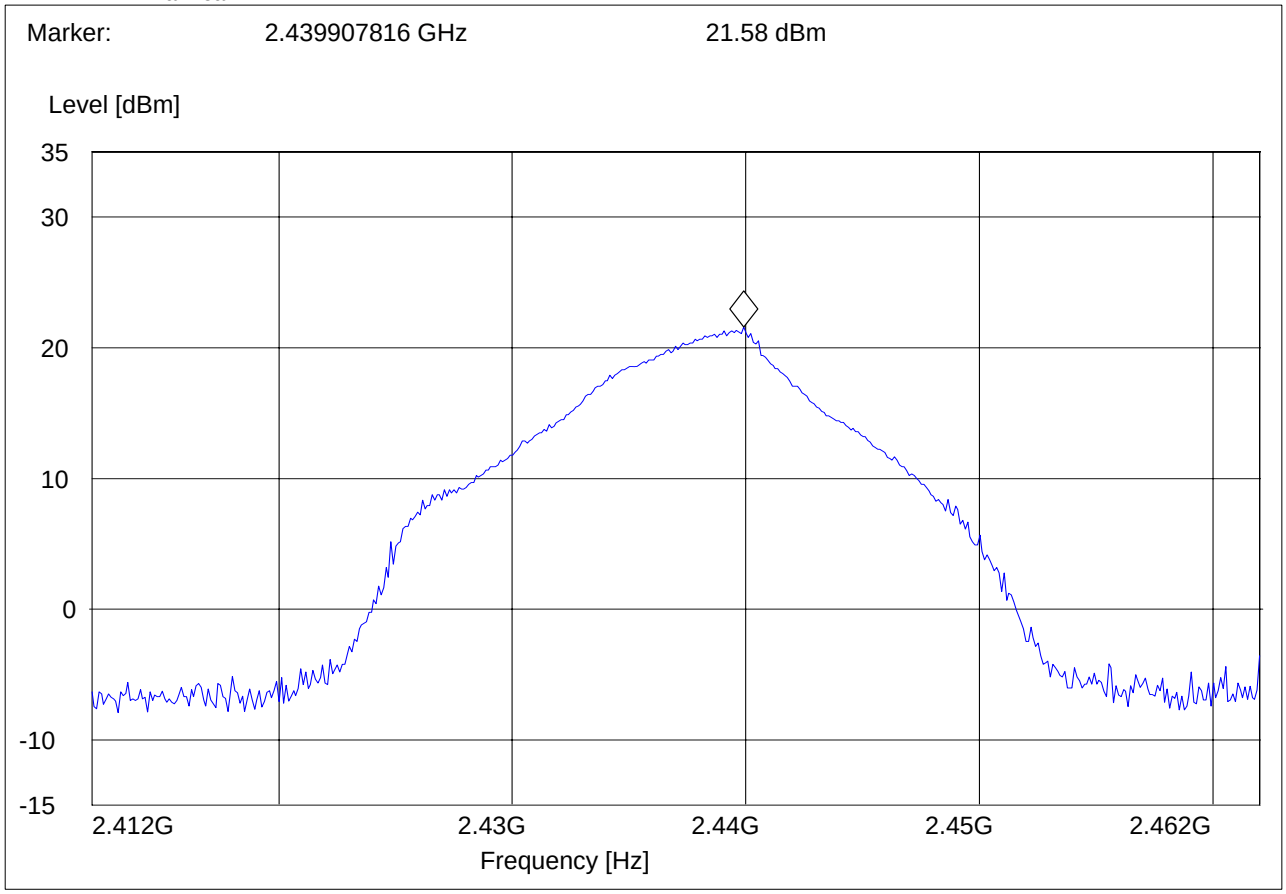
EIRP: 2437 MHz (802.11b) Main

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.6; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH6"

Short Description: EIRP RLAN channel-2437 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM MaxPeak



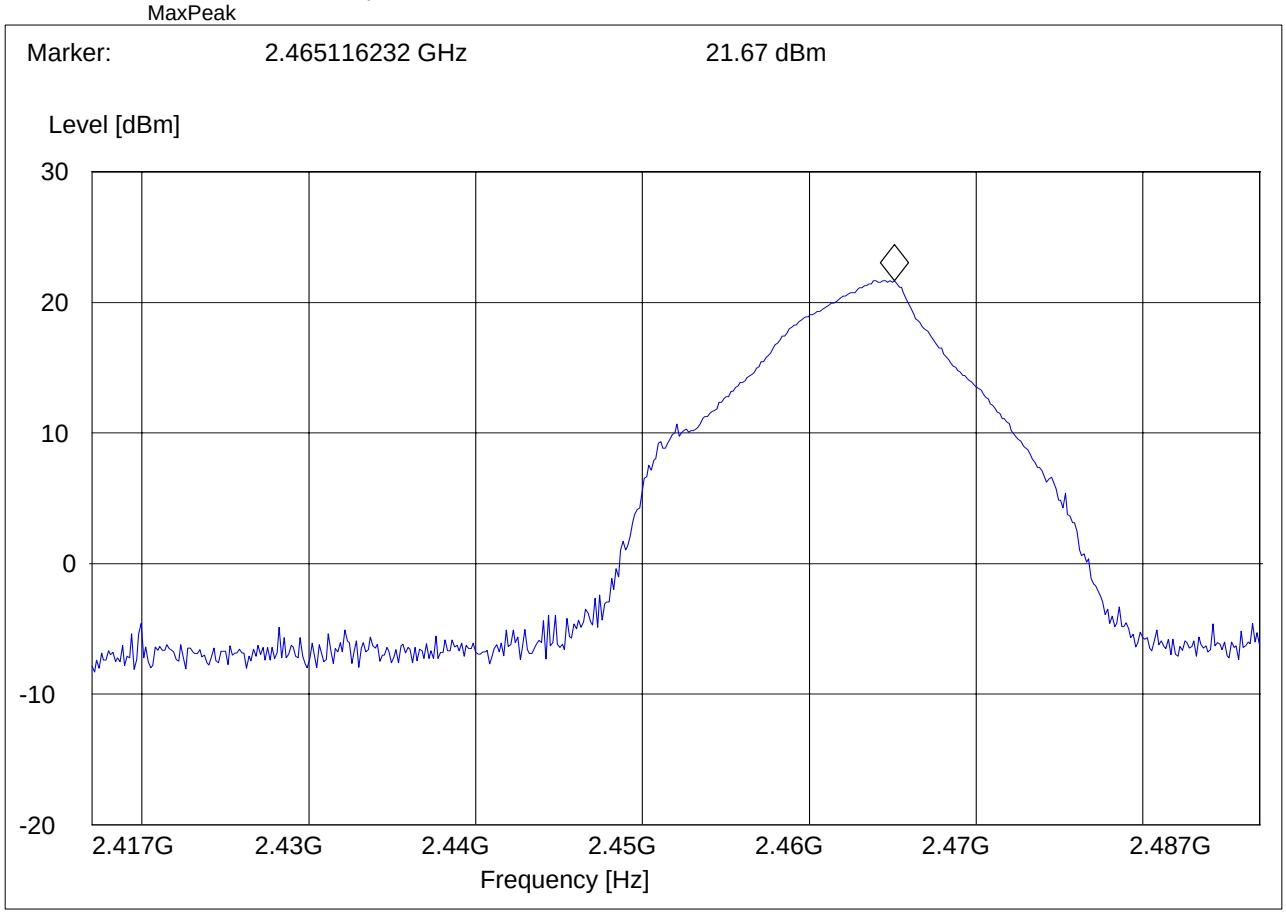
EIRP: 2462 MHz (802.11b) Main

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.11; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH11"

Short Description: EIRP RLAN channel-2462 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



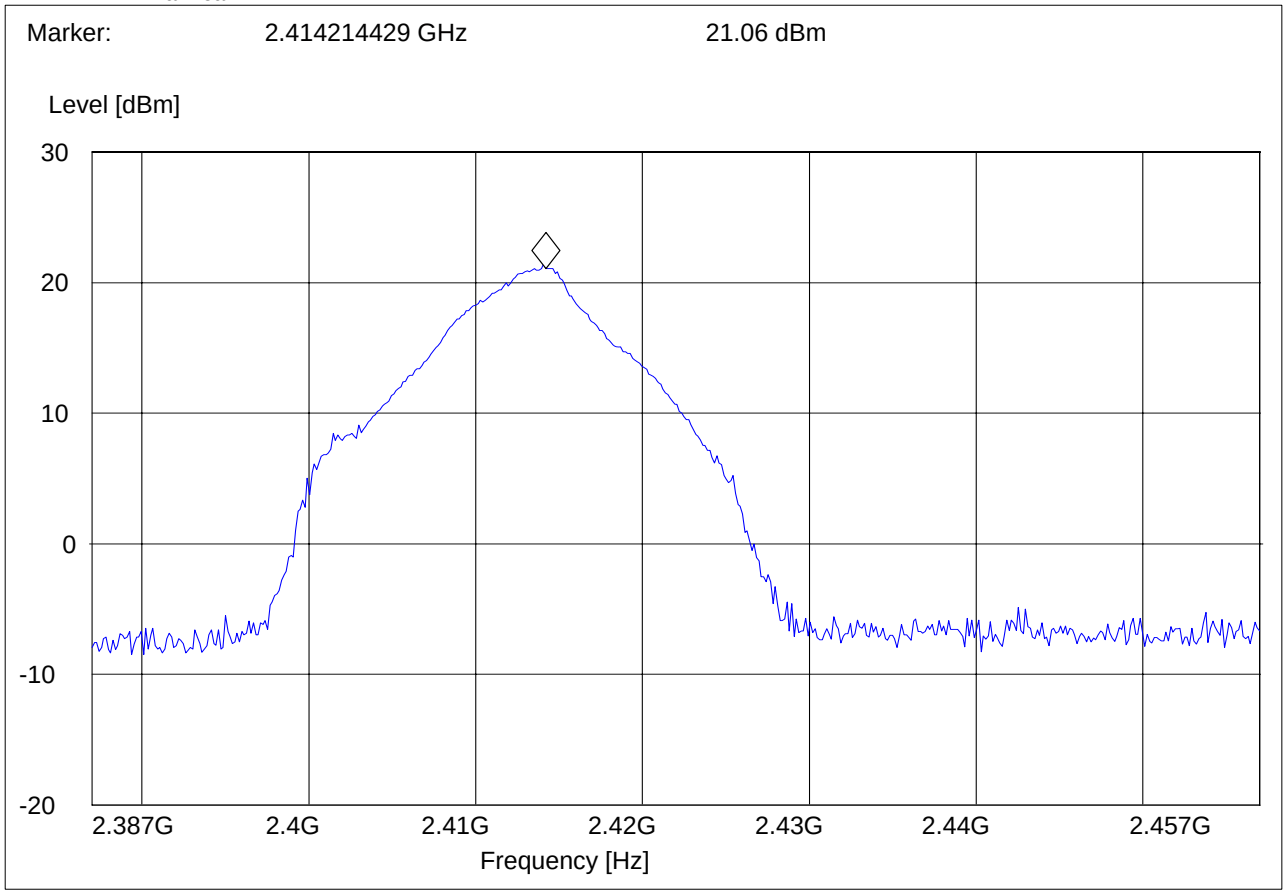
EIRP: 2412 MHz (802.11b) Aux

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.1; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



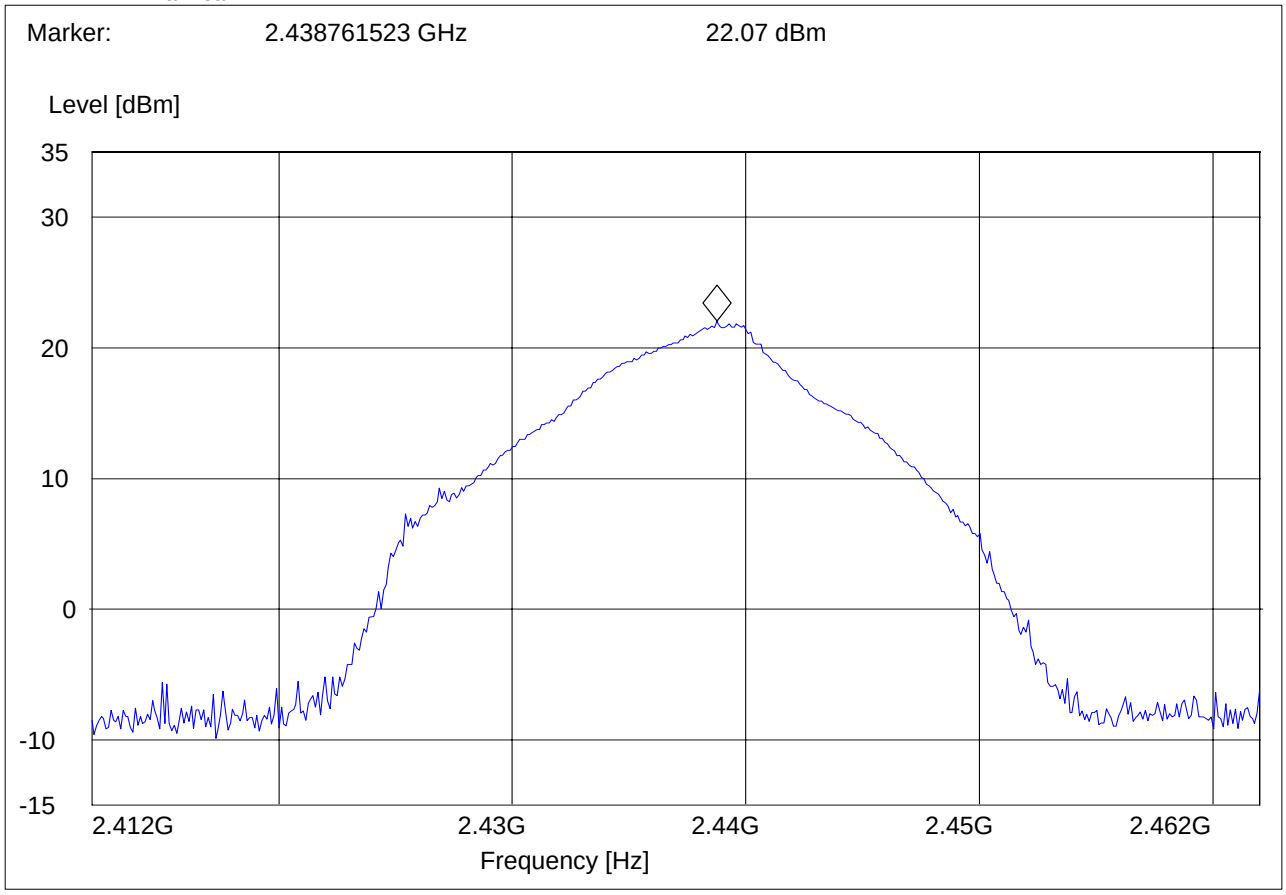
EIRP: 2437 MHz (802.11b) Aux

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.6; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH6"

Short Description: EIRP RLAN channel-2437 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM
		MaxPeak			



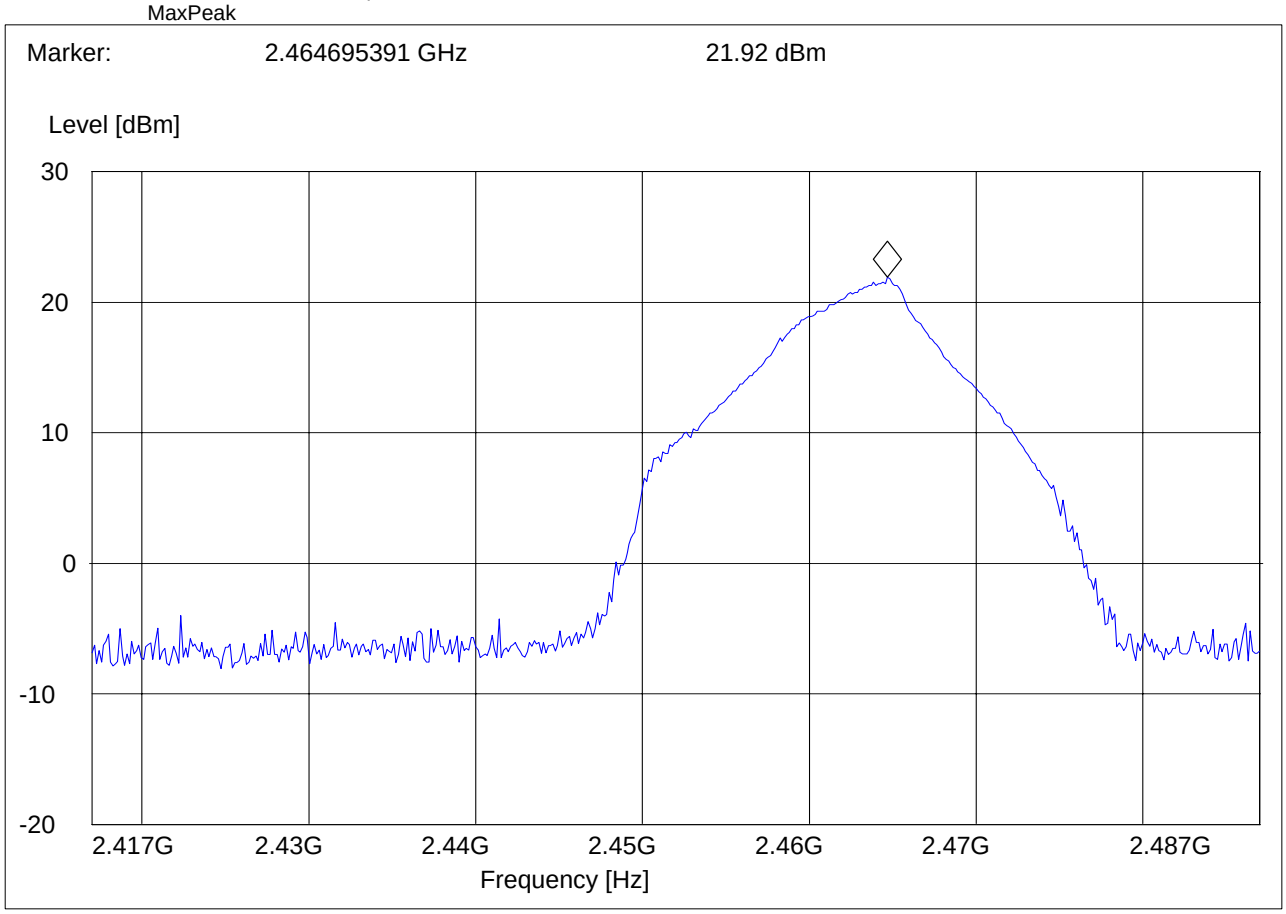
EIRP: 2462 MHz (802.11b) Aux

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.11; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH11"

Short Description: EIRP RLAN channel-2462 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



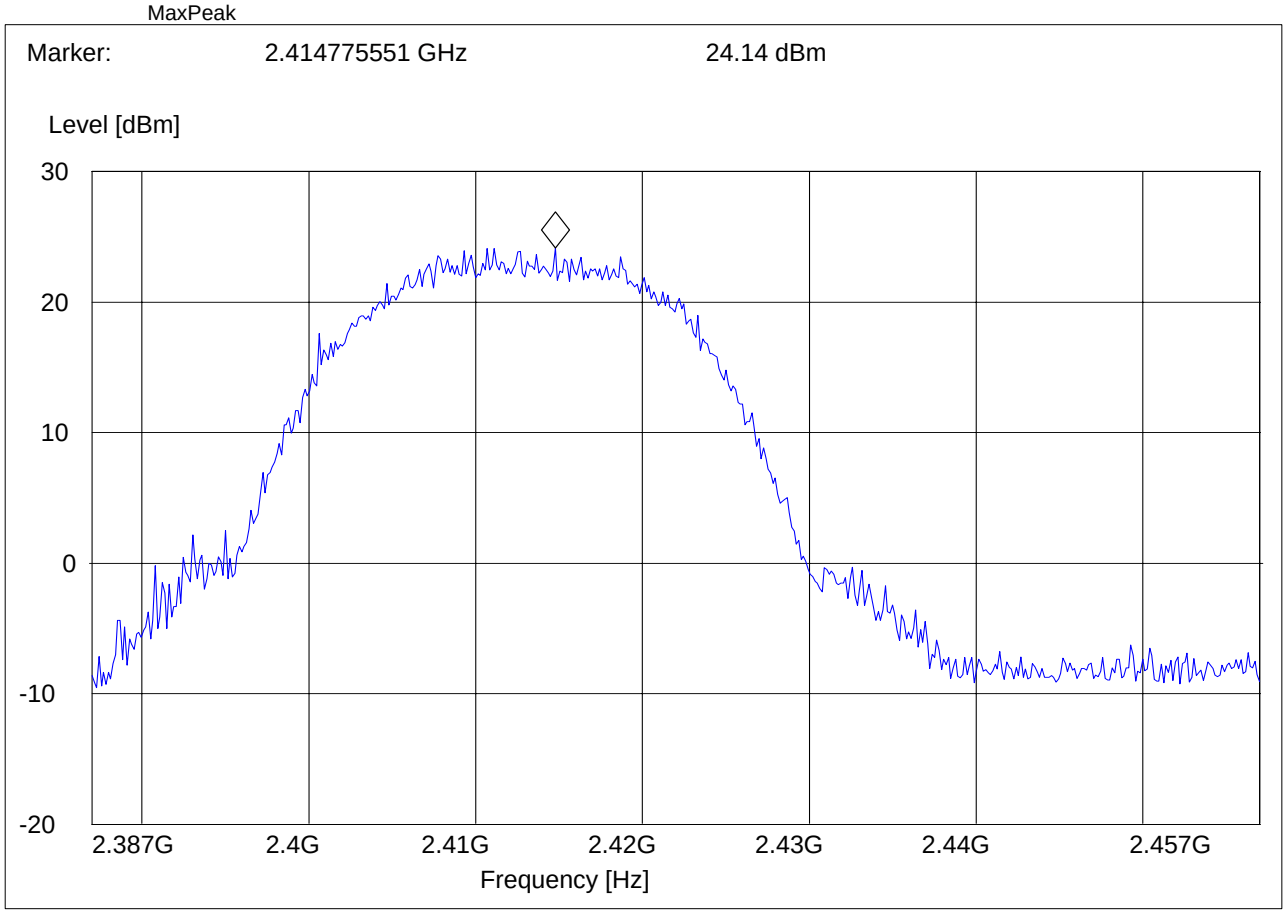
EIRP: 2412 MHz (802.11g) Main

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



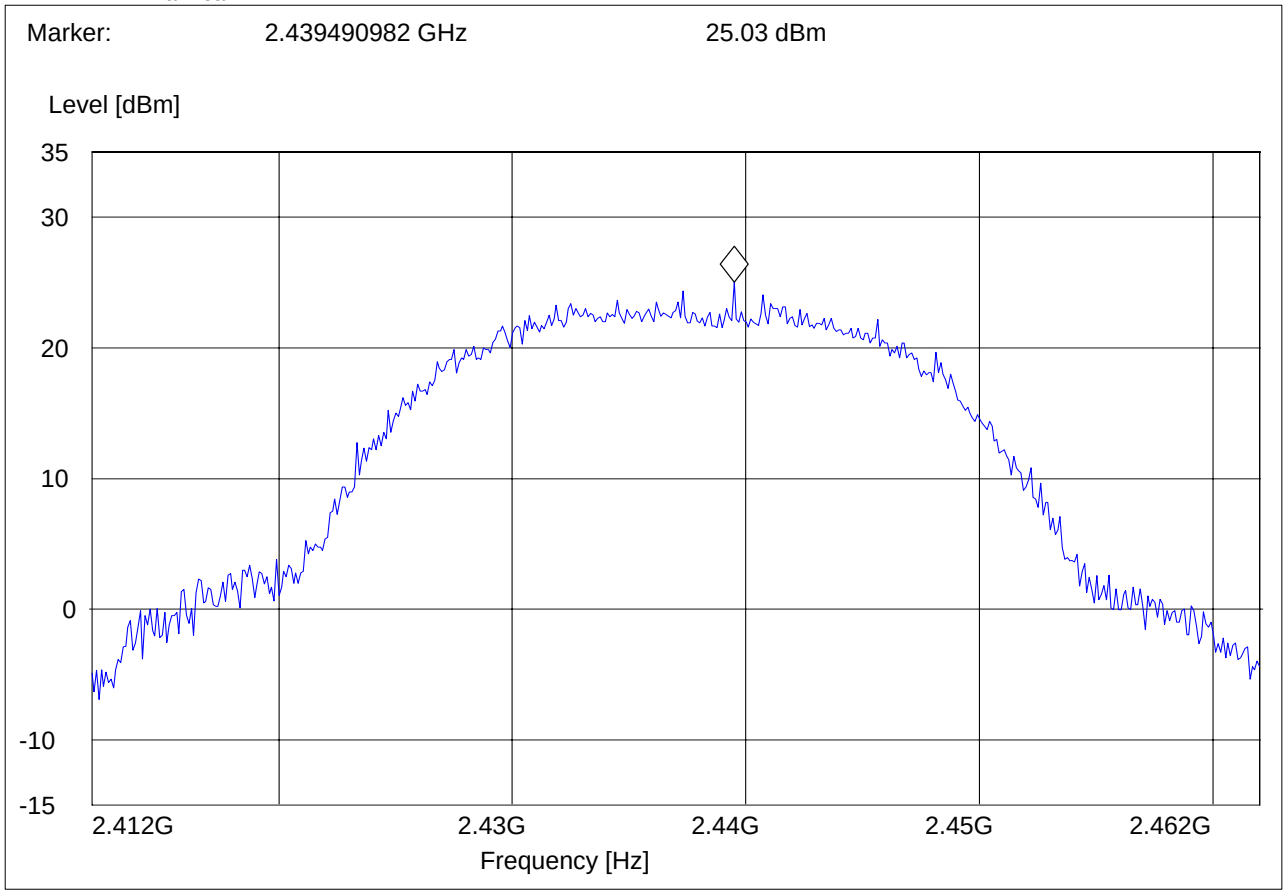
EIRP: 2437 MHz (802.11g) Main

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.6; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH6"

Short Description: EIRP RLAN channel-2437 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM
		MaxPeak			



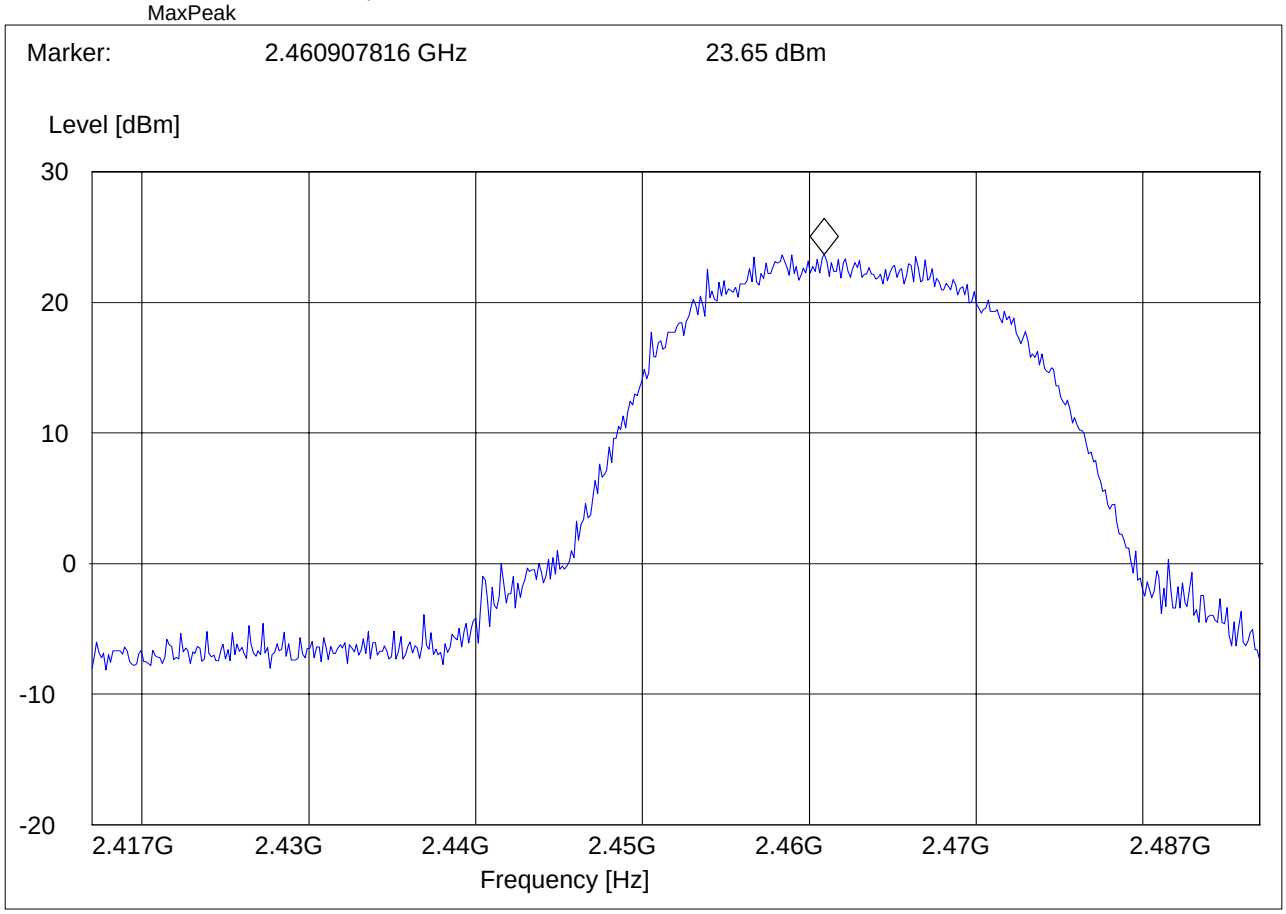
EIRP: 2462 MHz (802.11g) Main

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.11; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH11"

Short Description: EIRP RLAN channel-2462 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



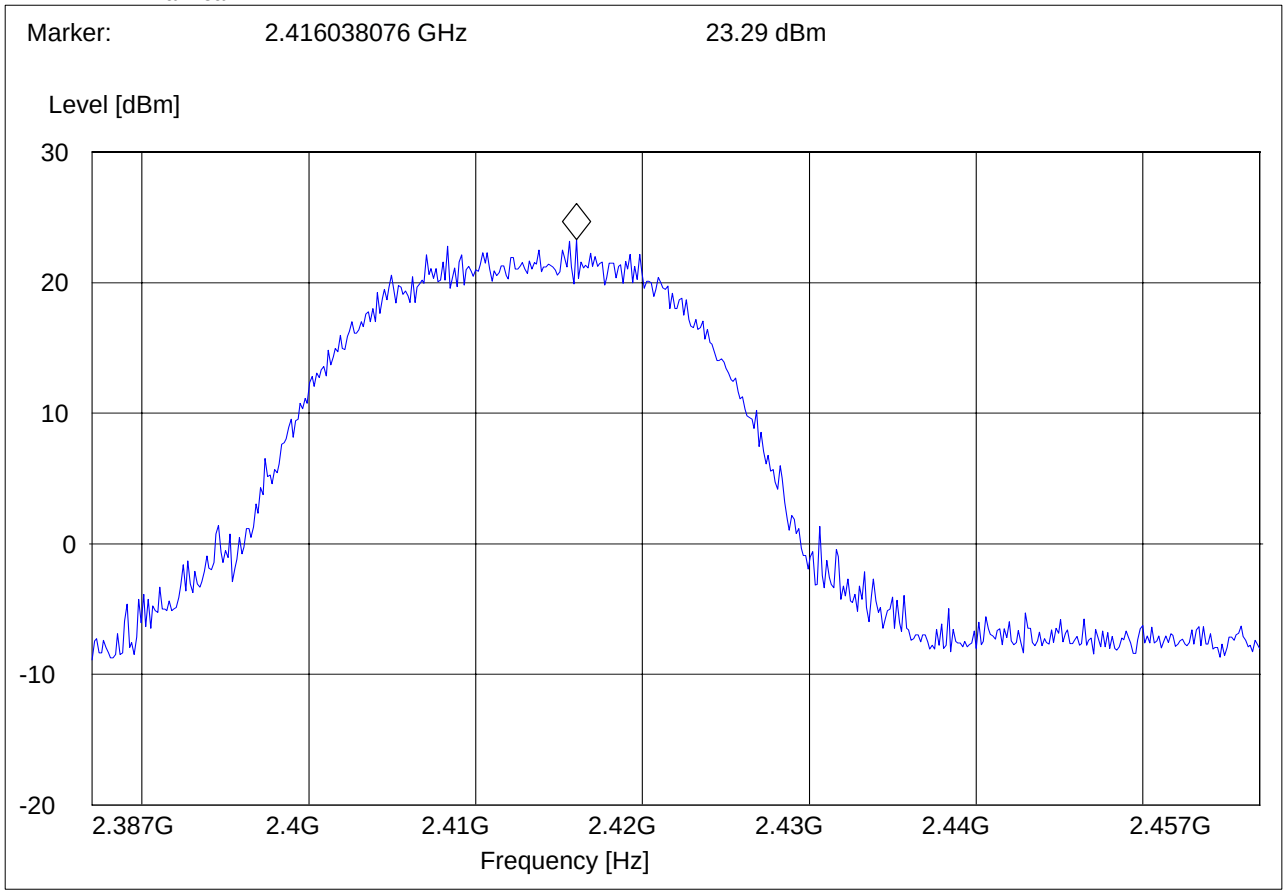
EIRP: 2412 MHz (802.11g) Aux

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.1; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH1"

Short Description: EIRP RLAN channel-2412 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM
		MaxPeak			



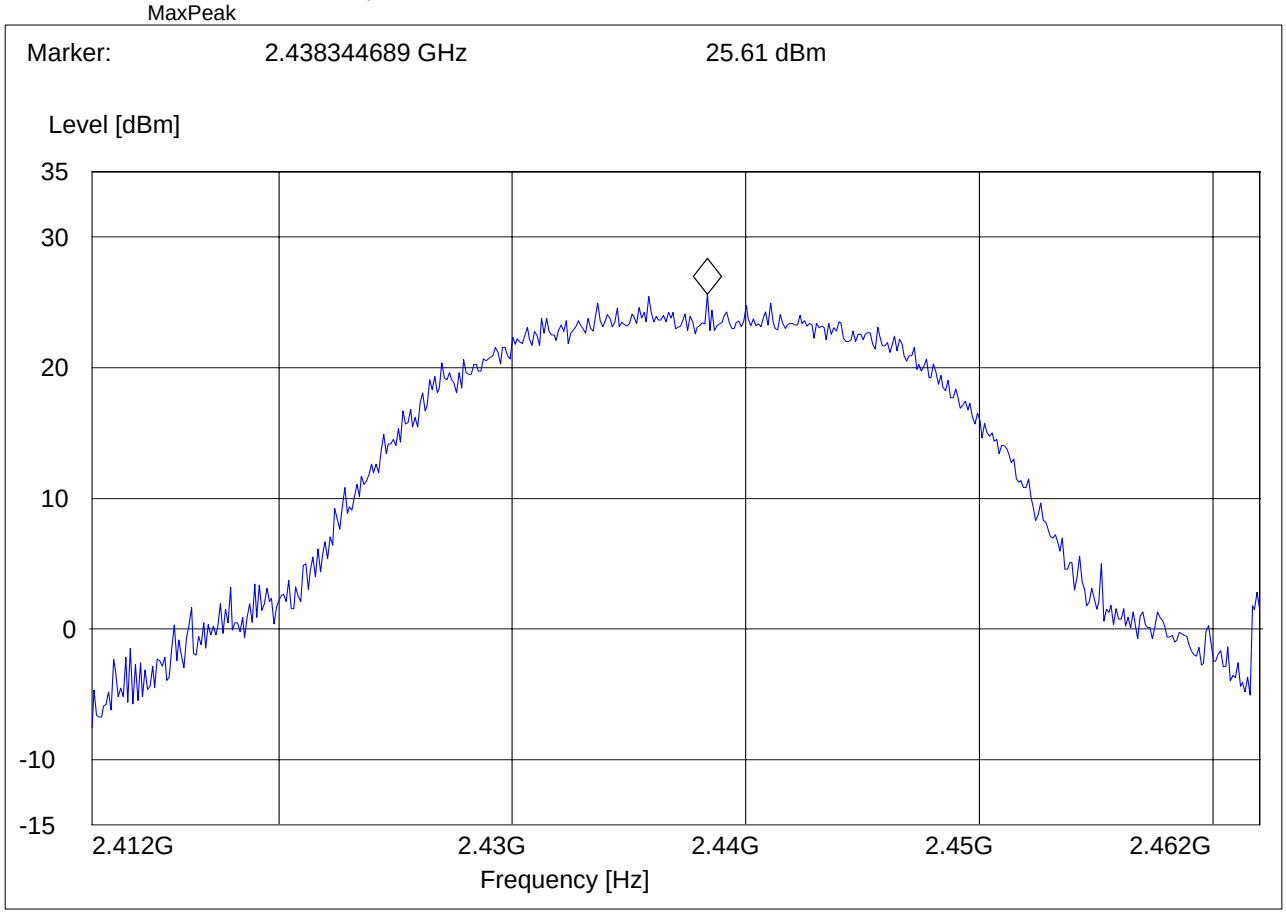
EIRP: 2437 MHz (802.11g) Aux

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.6; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH6"

Short Description: EIRP RLAN channel-2437 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak	Coupled	10 MHz	DUMMY-DBM MaxPeak



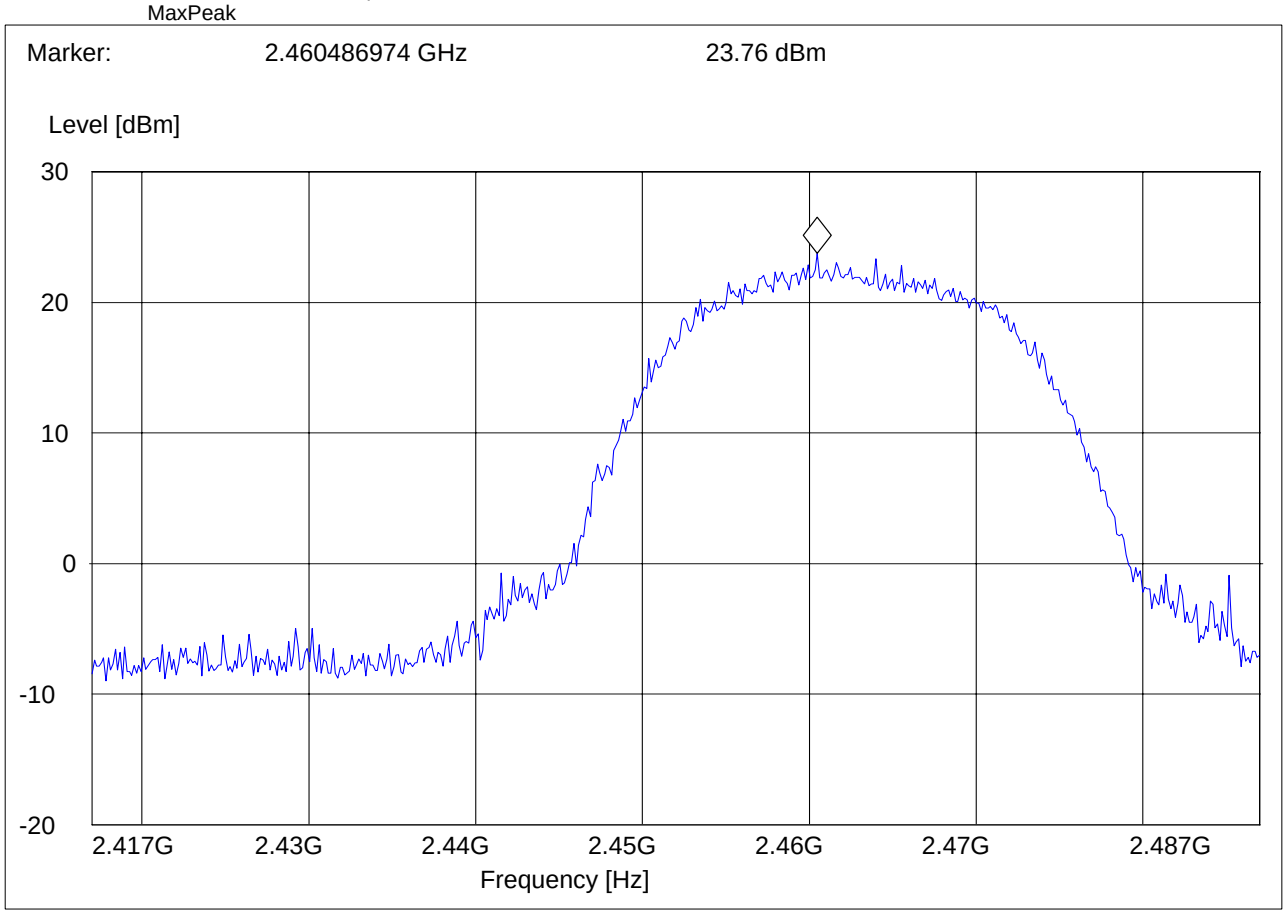
EIRP: 2462 MHz (802.11g) Aux

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.11; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

SWEEP TABLE: "EIRP RLAN CH11"

Short Description: EIRP RLAN channel-2462 MHz

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
2.4 GHz	2.5 GHz	MaxPeak MaxPeak	Coupled	10 MHz	DUMMY-DBM



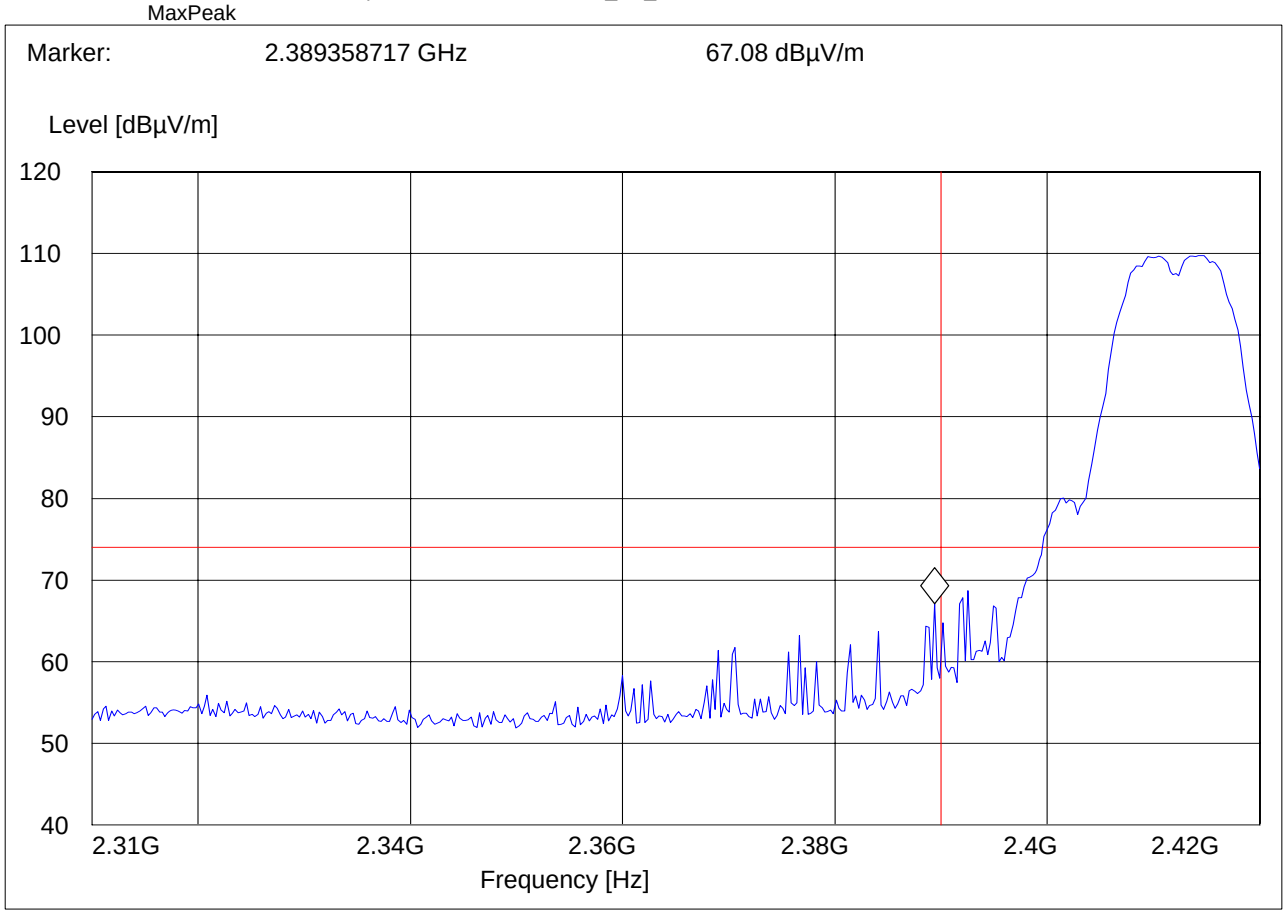
4.2 BAND EDGE COMPLIANCE (802.11b) §15.247 (d) & RSS-210(A8.5)

802.11b Low frequency section (spurious in the restricted band 2310 – 2390 MHz) Peak

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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
		MaxPeak			



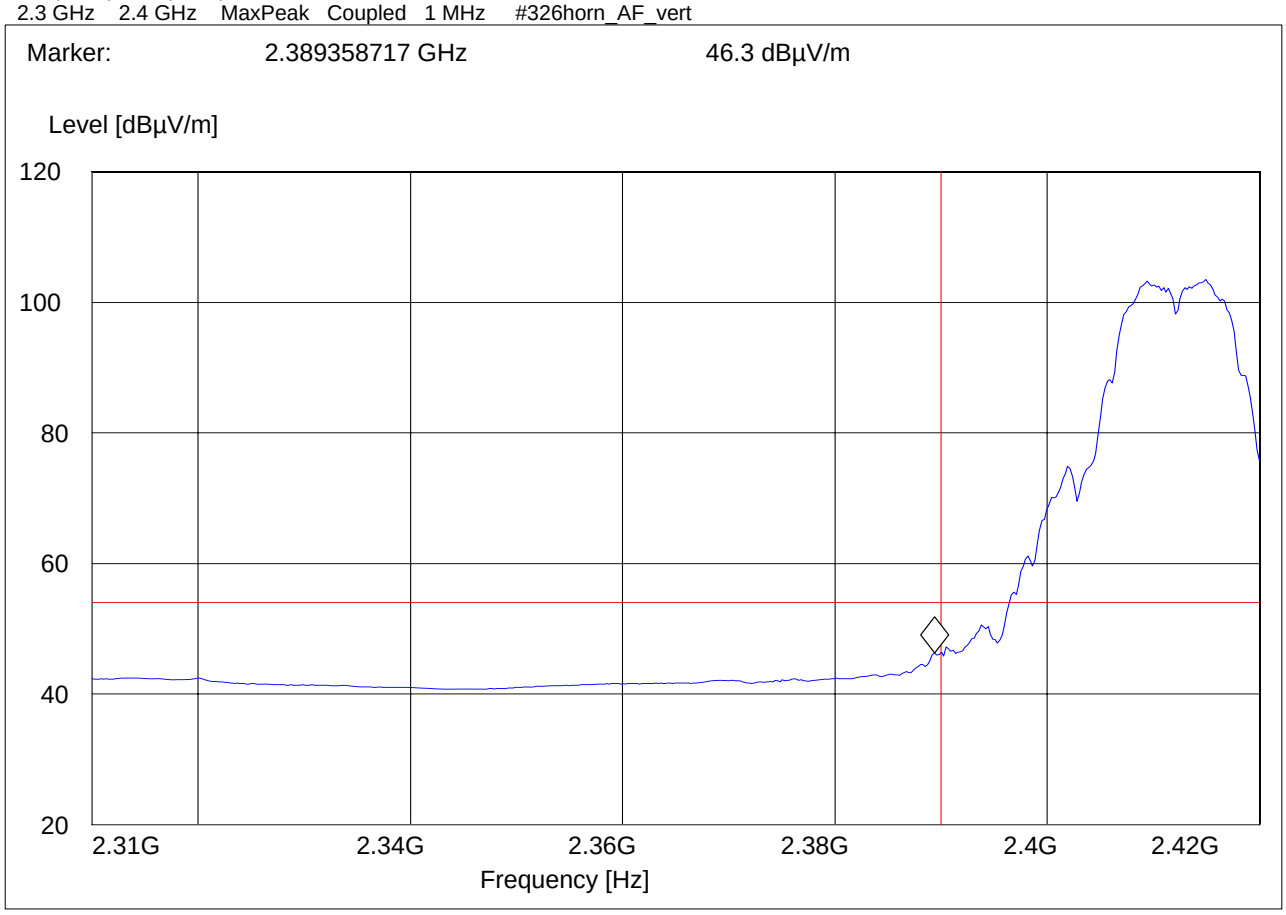
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11b Low frequency section (spurious in the restricted band 2310 – 2390 MHz) AVG

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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



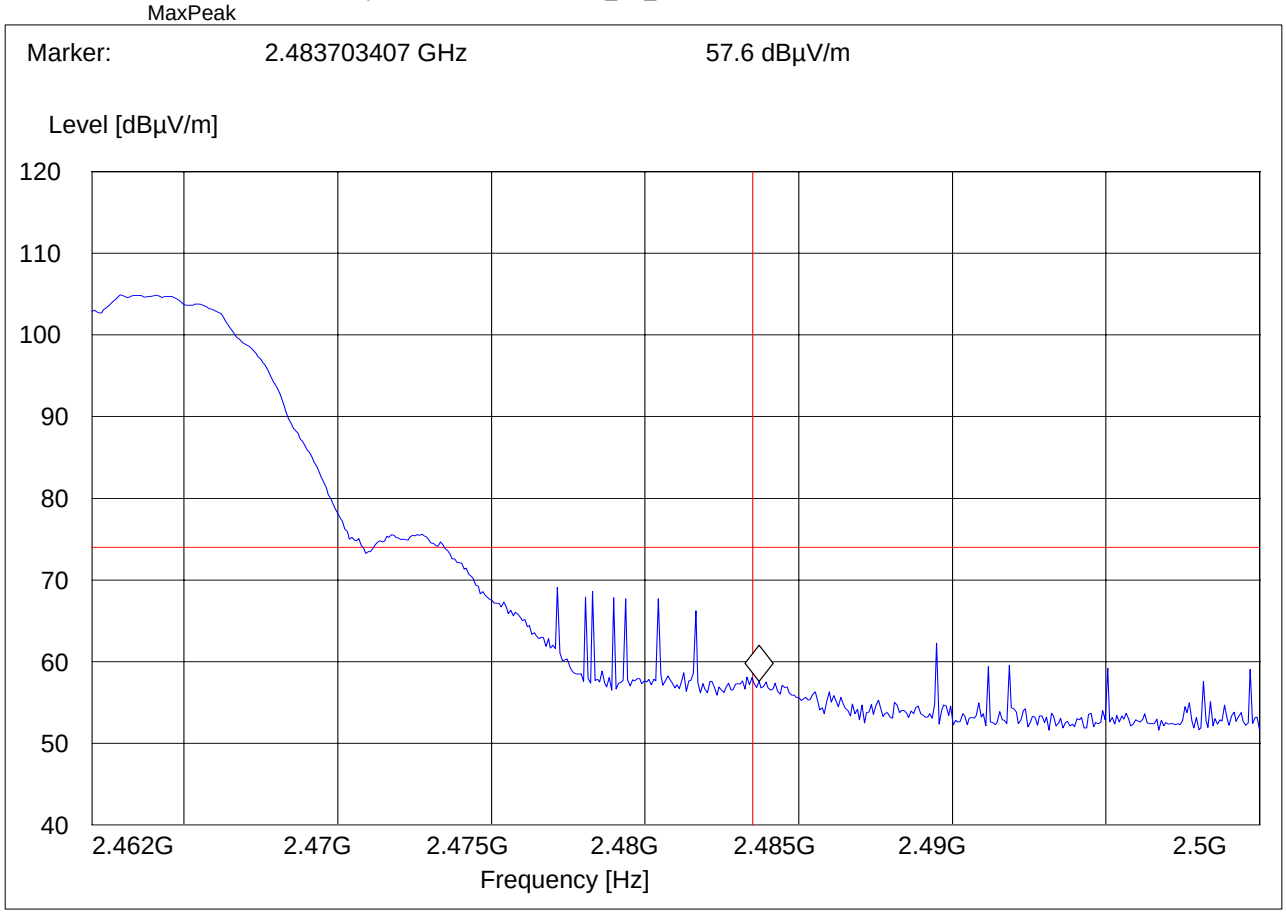
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11b High frequency section (spurious in the restricted band 2483.5 – 2500 MHz) Peak

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.11; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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
		MaxPeak			



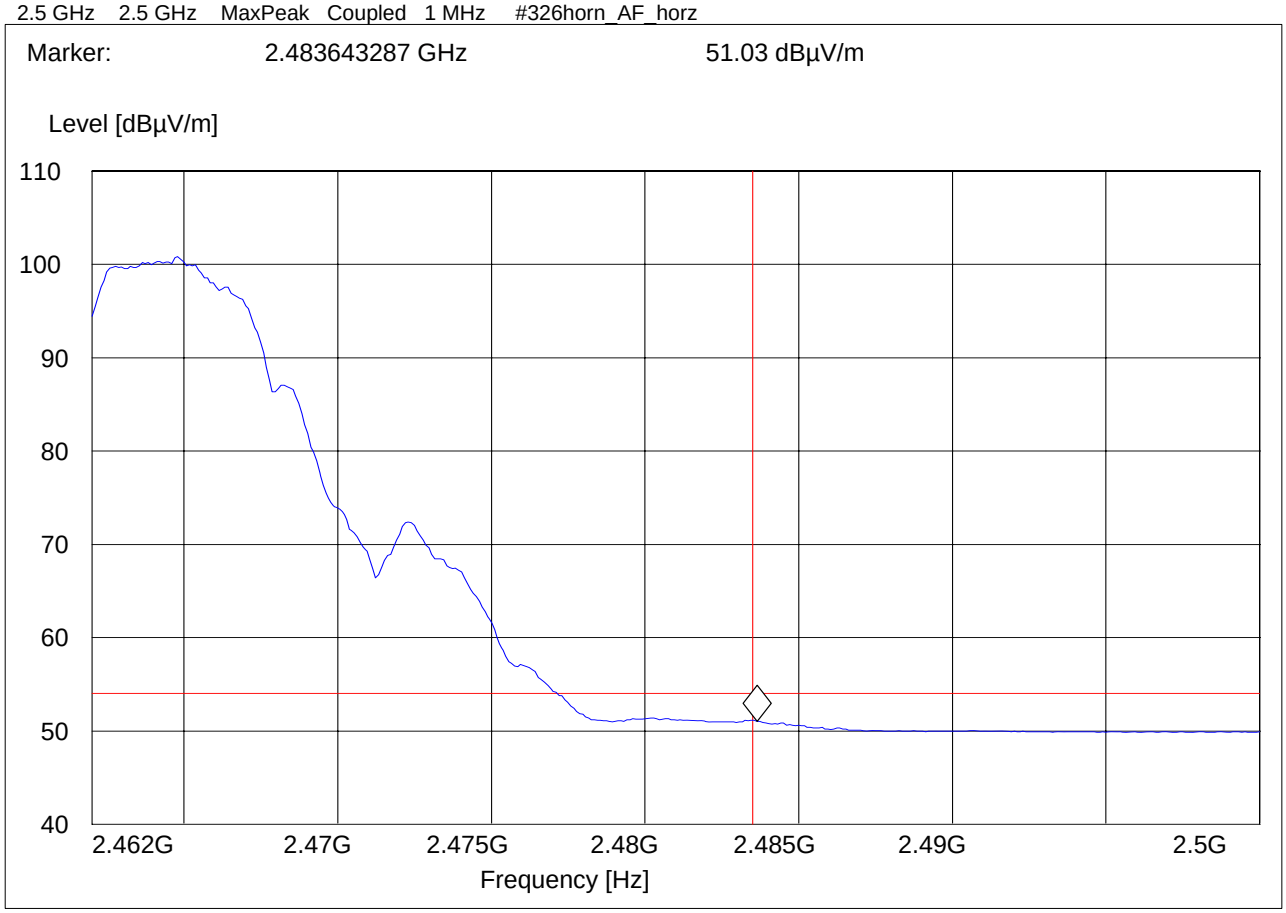
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11b High frequency section (spurious in the restricted band 2483.5 – 2500 MHz) AVG

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: b mode; ch.11; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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



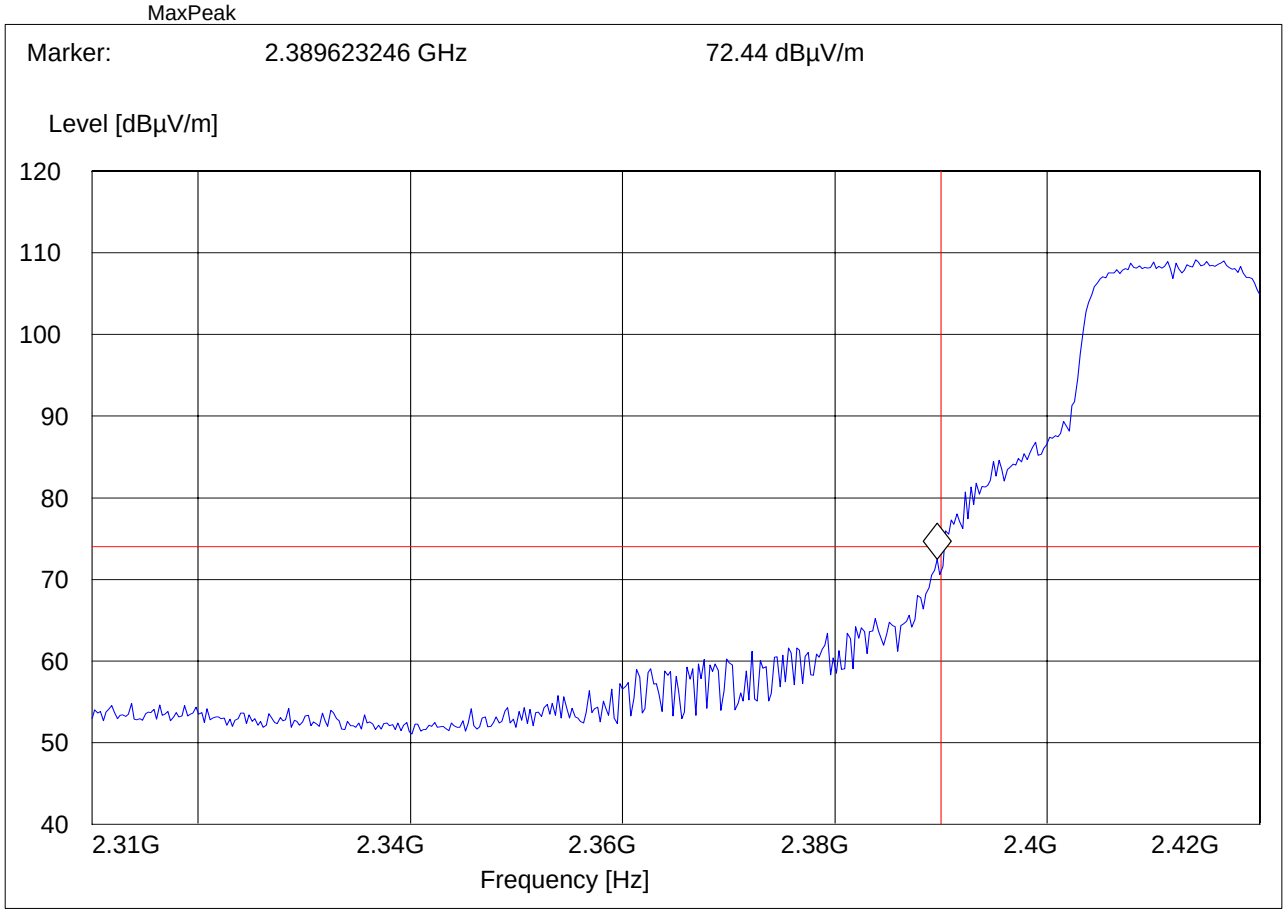
4.3 BAND EDGE COMPLIANCE (802.11g) §15.247 (d) & RSS-210(A8.5)

802.11g Low frequency section (spurious in the restricted band 2310 – 2390 MHz) Peak

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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
		MaxPeak			



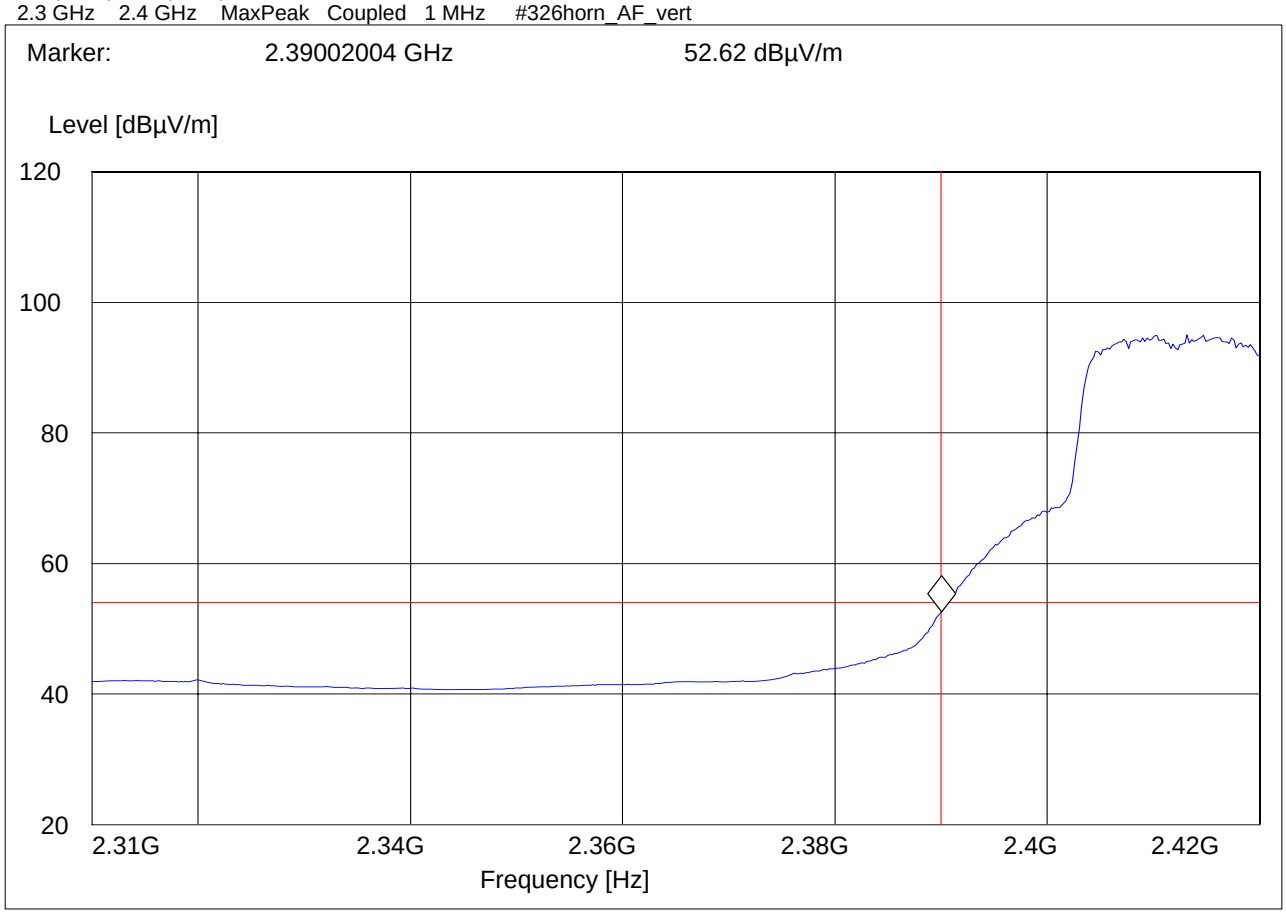
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11g Low frequency section (spurious in the restricted band 2310 – 2390 MHz) AVG

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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



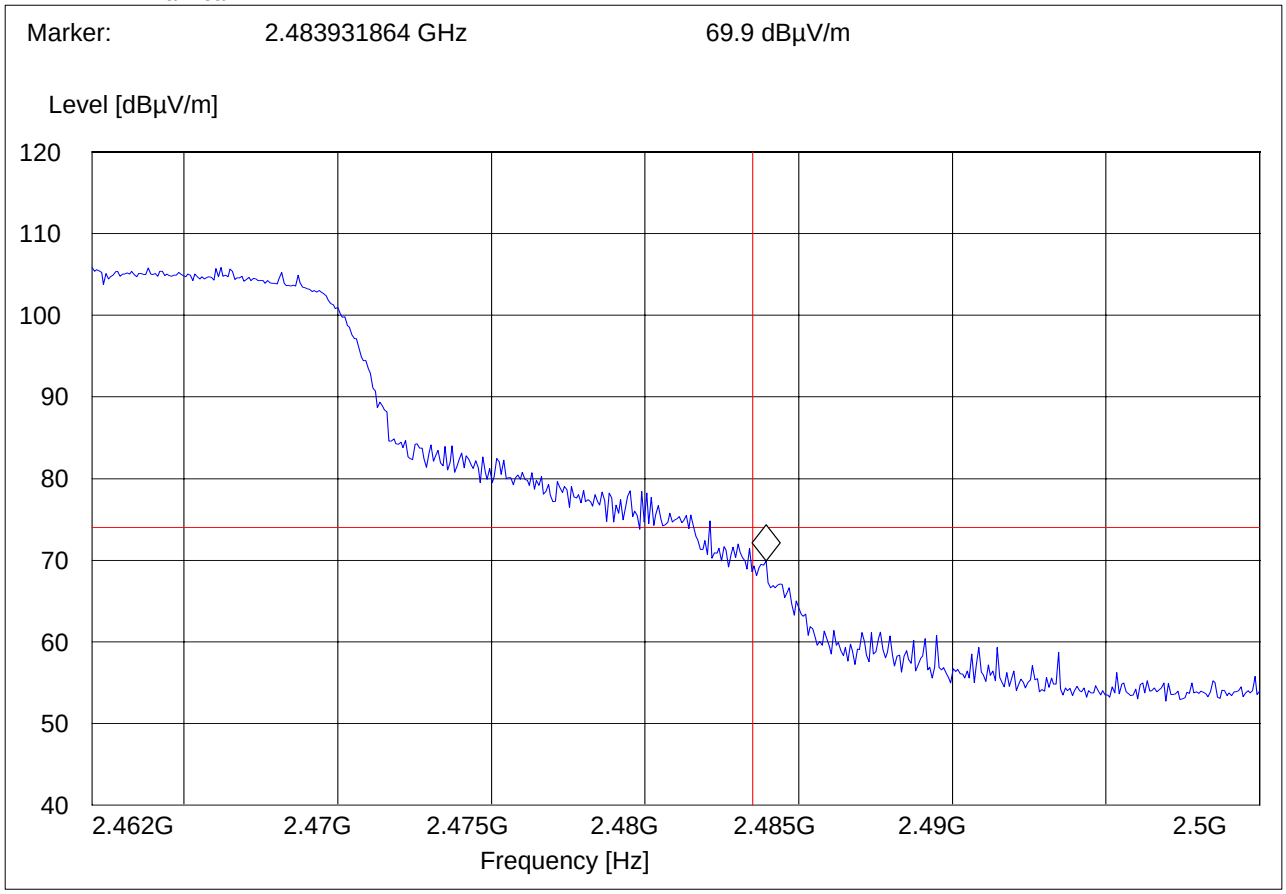
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11g High frequency section (spurious in the restricted band 2483.5 – 2500 MHz) Peak

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.11; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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
		MaxPeak			



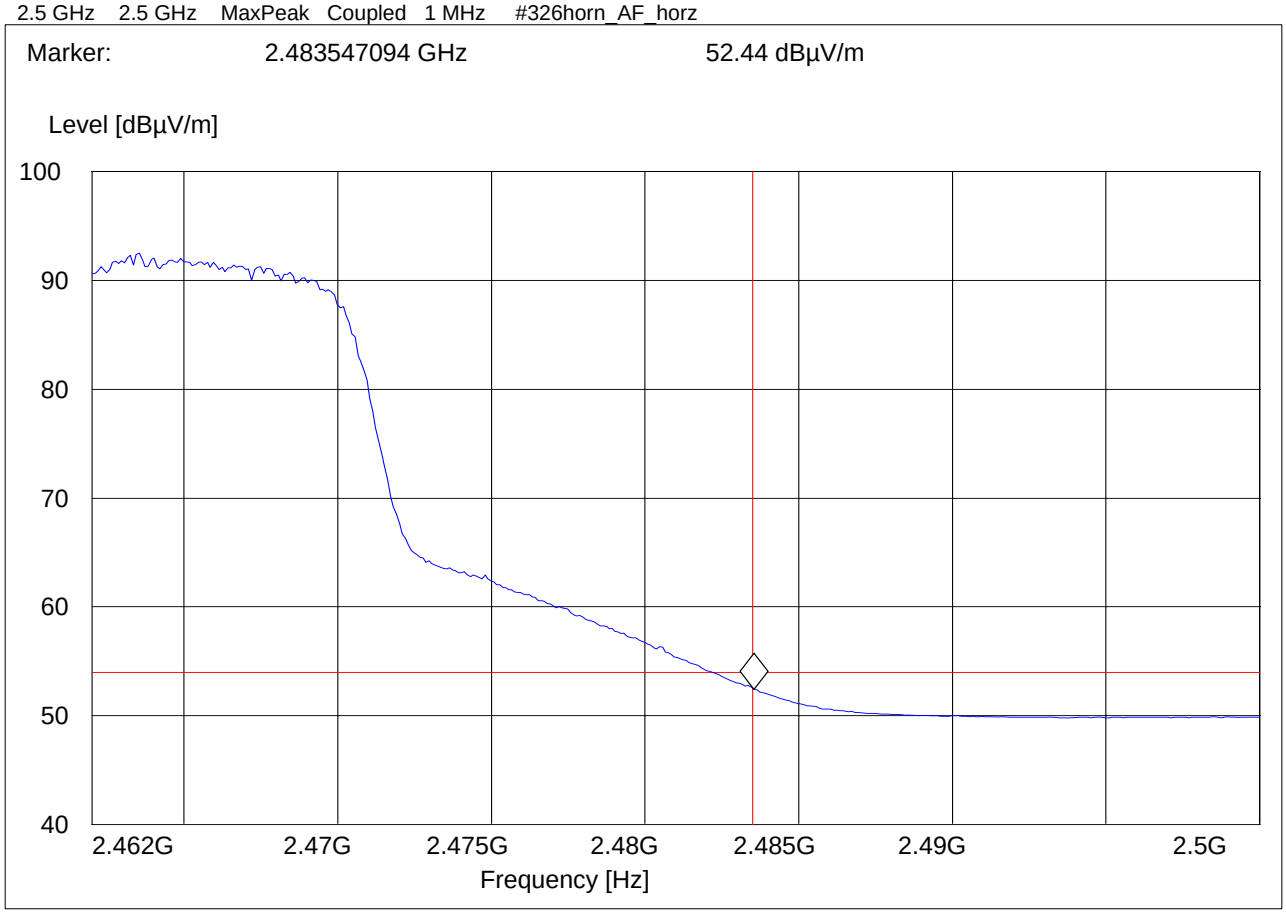
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

802.11g High frequency section (spurious in the restricted band 2483.5 – 2500 MHz) AVG

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: g mode; ch.11; Aux
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments:

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



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

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. Emissions were measured with the device operating in the mode and antenna that produced the highest EIRP

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

4.4.1 EMISSION LIMITATIONS - Radiated (Transmitter)

§15.247 (d) & RSS-210(A8.5):

Transmit at Lowest channel Frequency 2412MHz (802.11b)			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

Transmit at Middle channel Frequency 2437MHz (802.11b)			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

Transmit at Highest channel Frequency 2462MHz (802.11b)			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

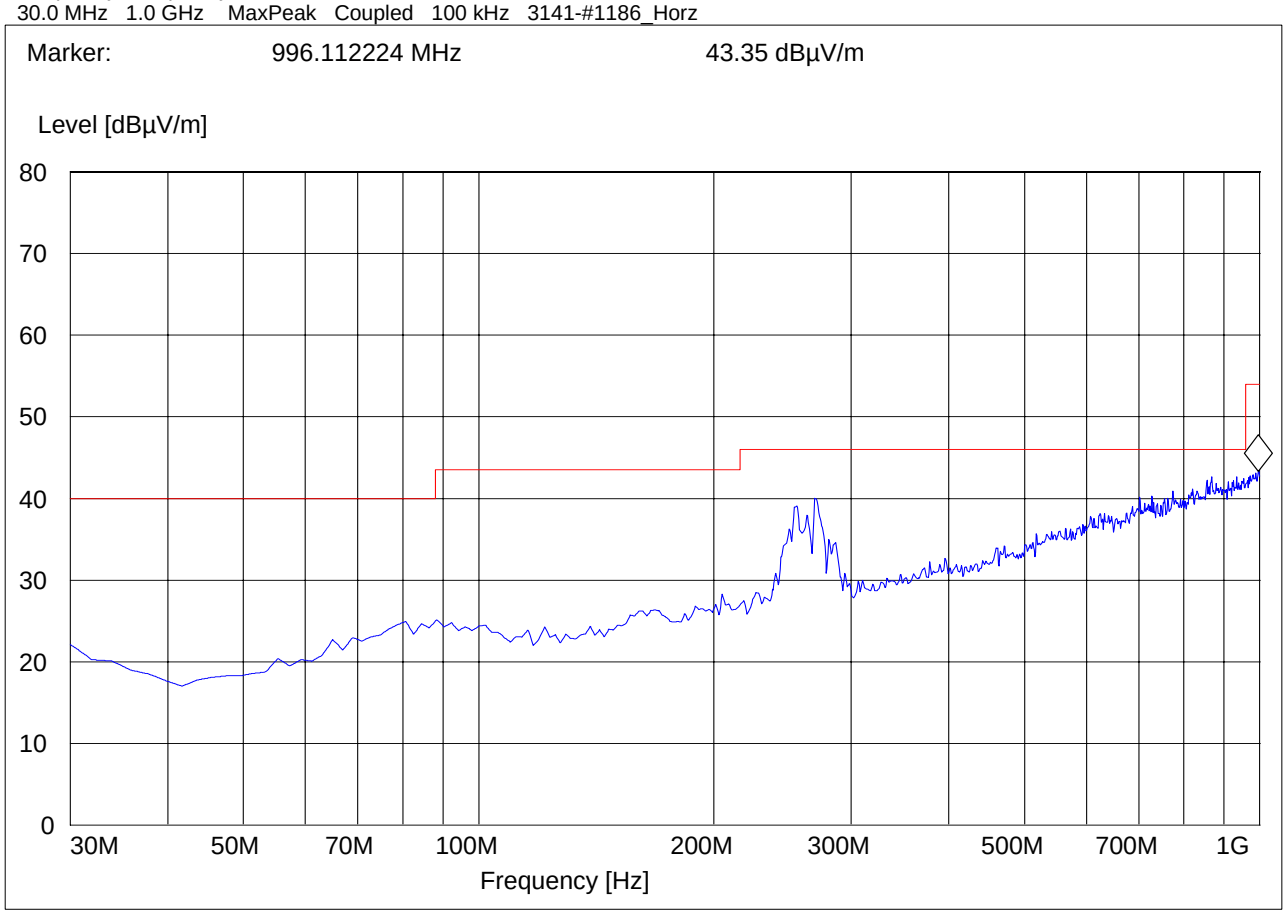
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Horizontal: 30MHz – 1GHz

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

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: G mode; ch.6; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: Without AC Adapter
Comments:

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)

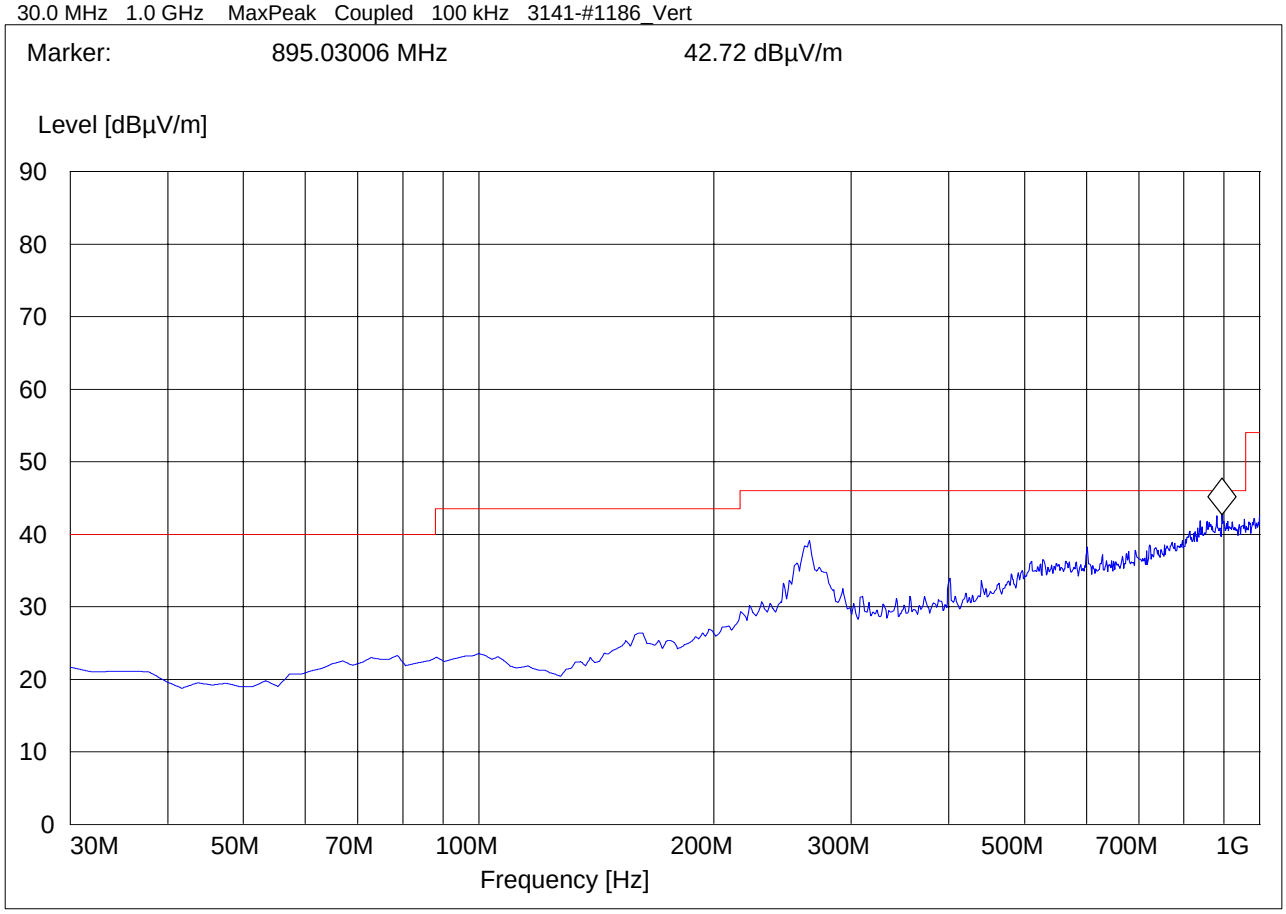
Vertical: 30MHz – 1GHz

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

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: G mode; ch.6; Main
ANT Orientation: V
EUT Orientation: H
Test Engineer: Chris
Voltage: Without AC Adapter
Comments:

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



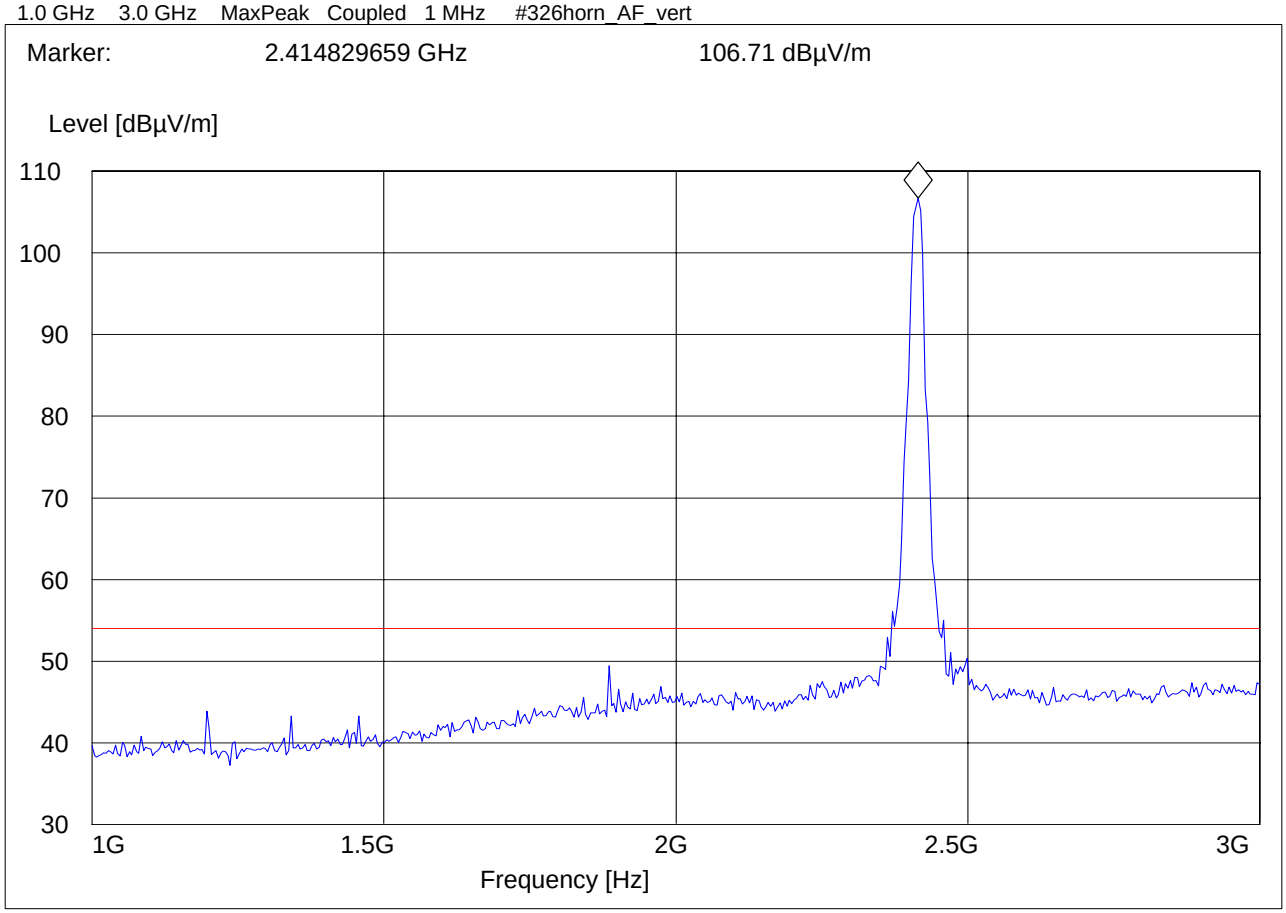
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)

Lowest Channel (2412MHz): 1GHz – 3GHz

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: G mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments: Marker at TX signal

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

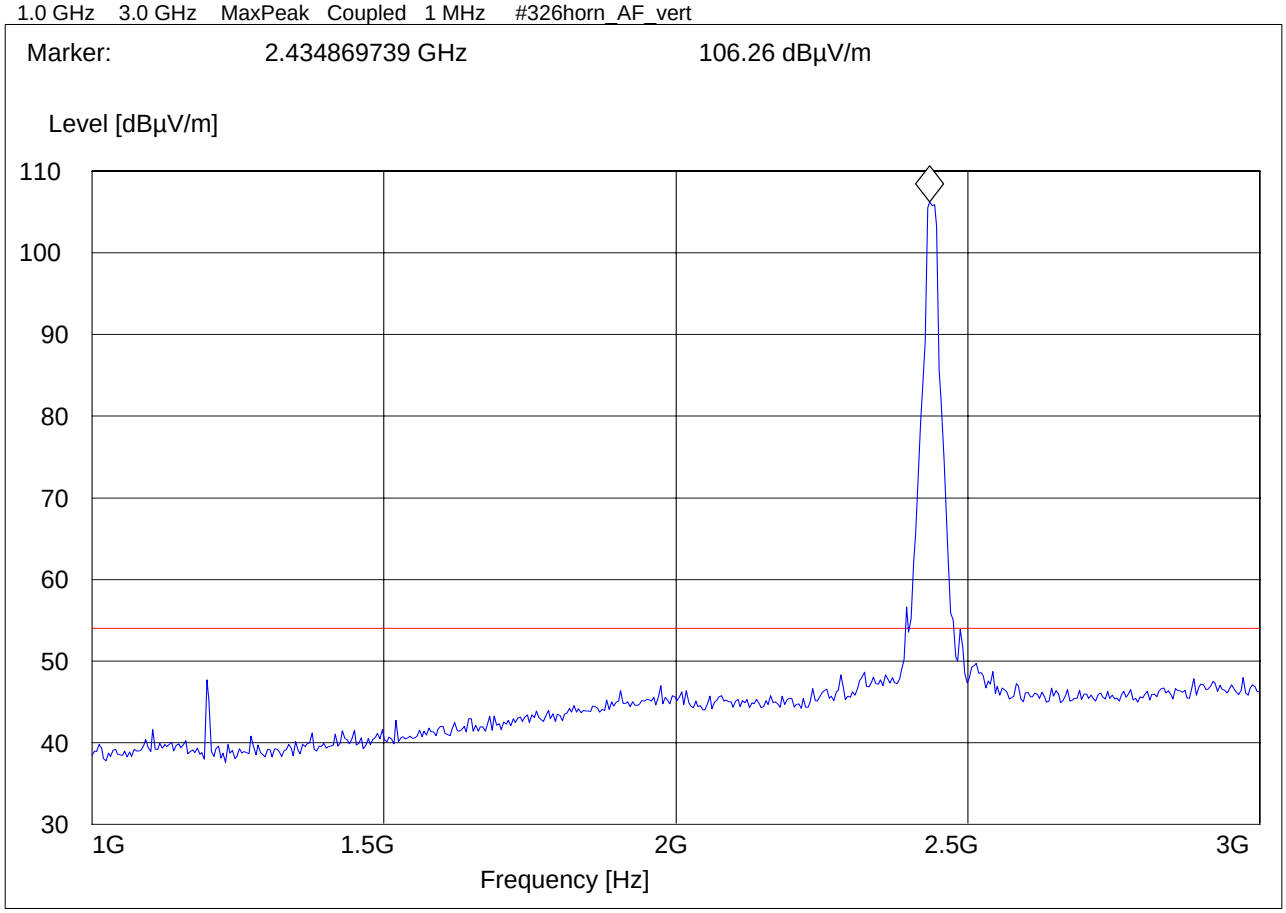


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Mid Channel (2437MHz): 1GHz – 3GHz

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: G mode; ch.6; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments: Marker at TX signal

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

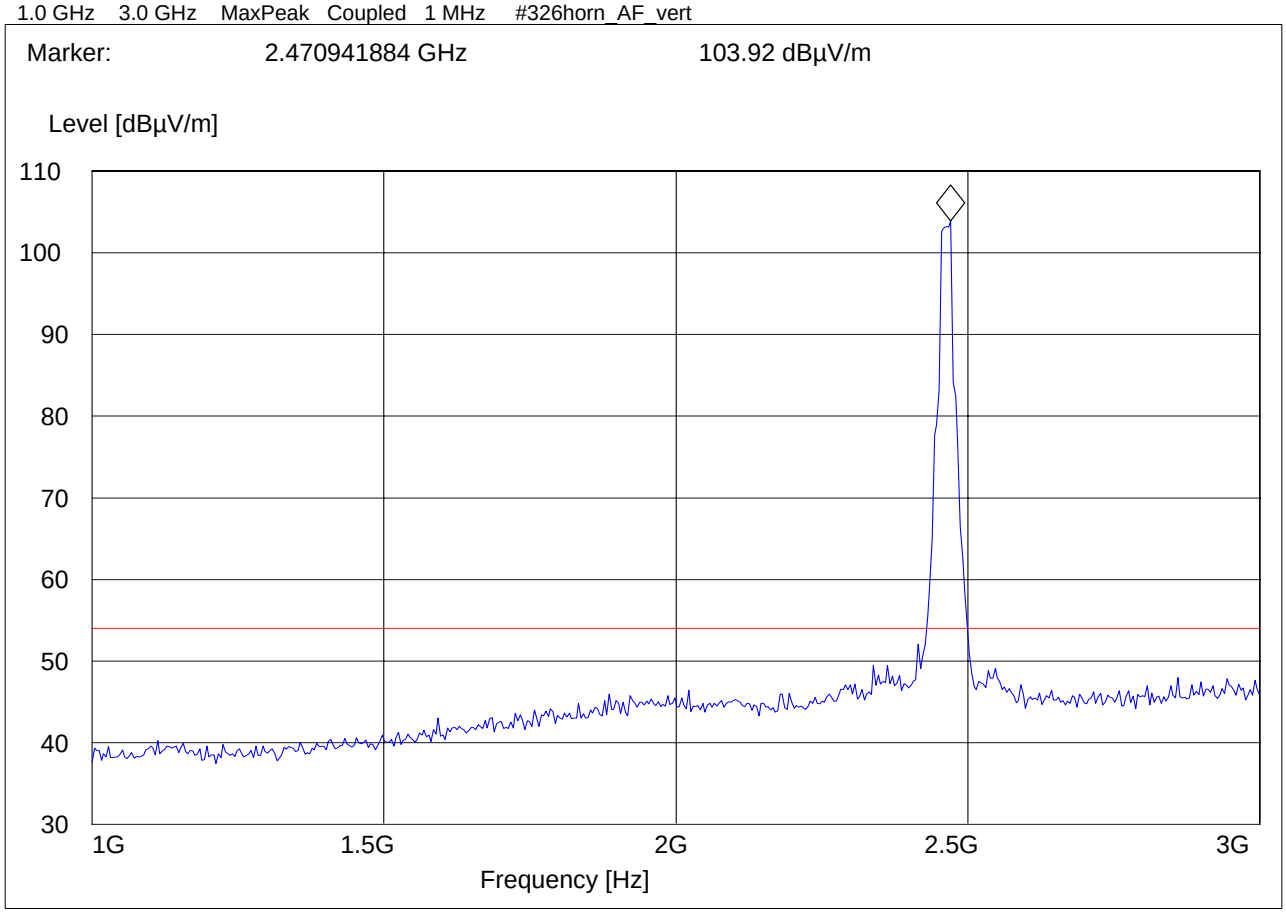


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Highest Channel (2462MHz): 1GHz – 3GHz

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: G mode; ch.11; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments: Marker at TX signal

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

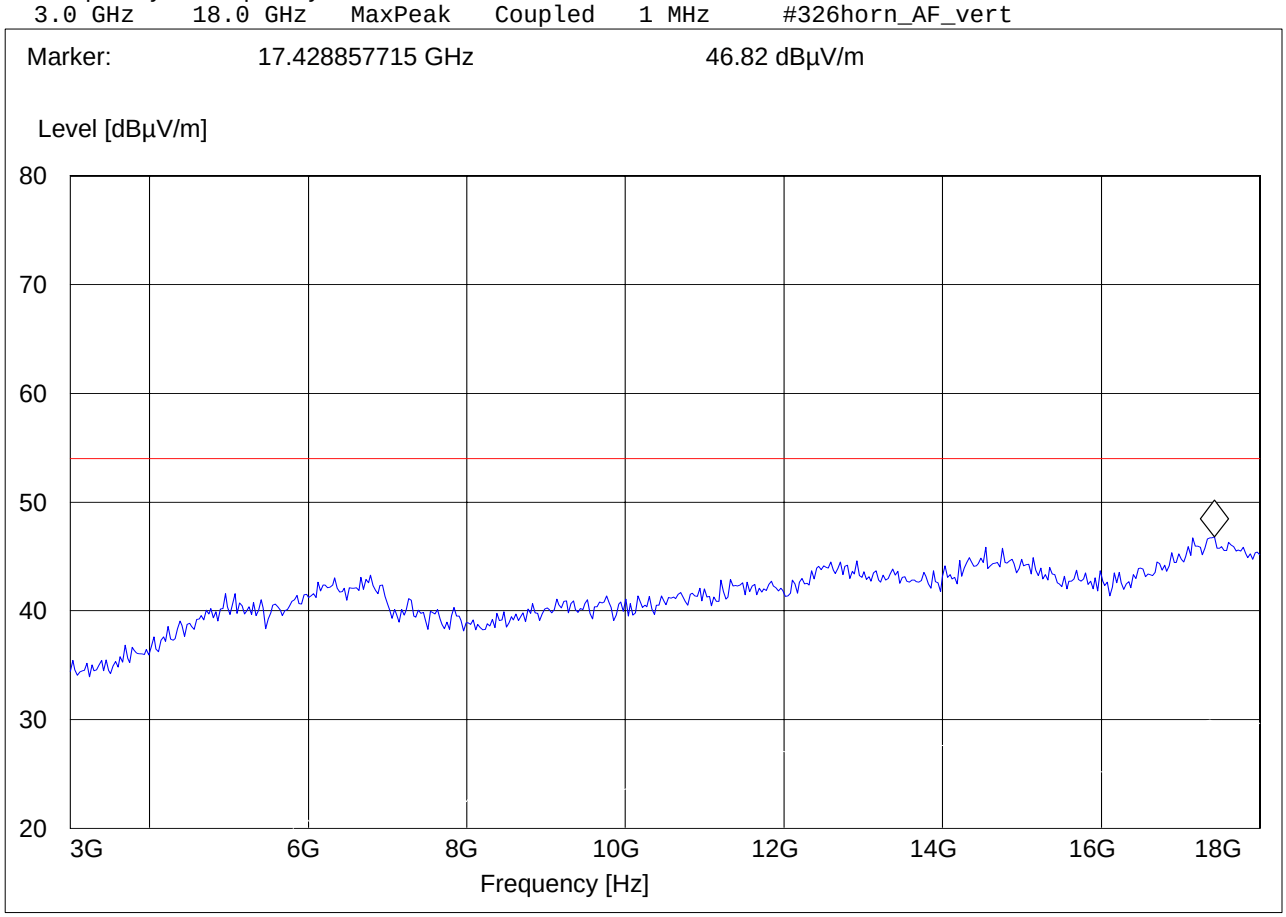


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Lowest Channel (2412MHz): 3GHz – 18GHz

```
EUT:             Olifant w/ BCM94312MCG
Customer::       Broadcom
Test Mode:       G mode; ch.1; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Chris
Voltage:         AC
Comments:        with 2.4 GHz notch filter
```

SWEEP TABLE: "FCC15.247_3-18G"

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

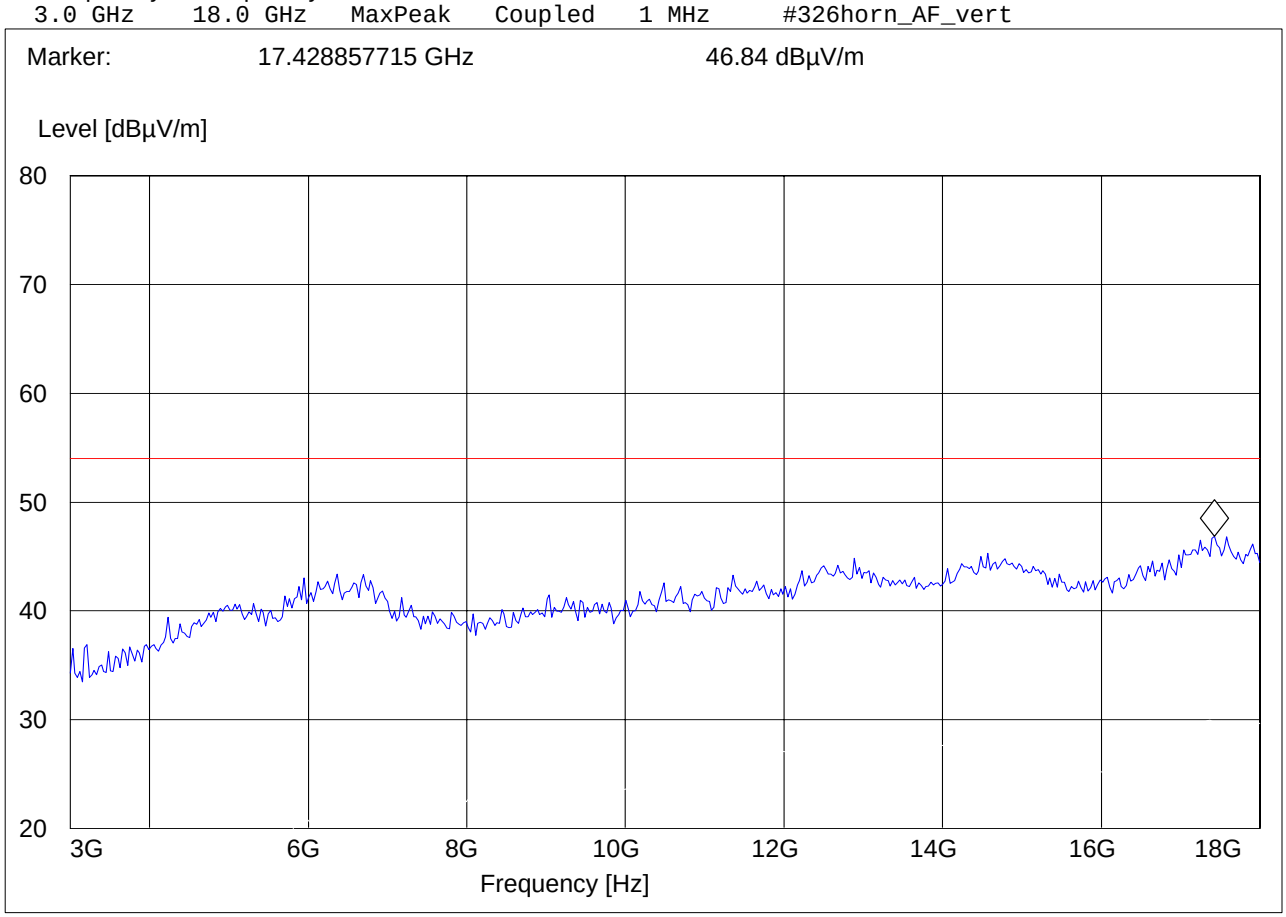


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Mid Channel (2437MHz): 3GHz – 18GHz

```
EUT:              Olifant w/ BCM94312MCG
Customer::        Broadcom
Test Mode:        G mode; ch.6; Main
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC
Comments:         with 2.4 GHz notch filter
```

SWEEP TABLE: "FCC15.247_3-18G"

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

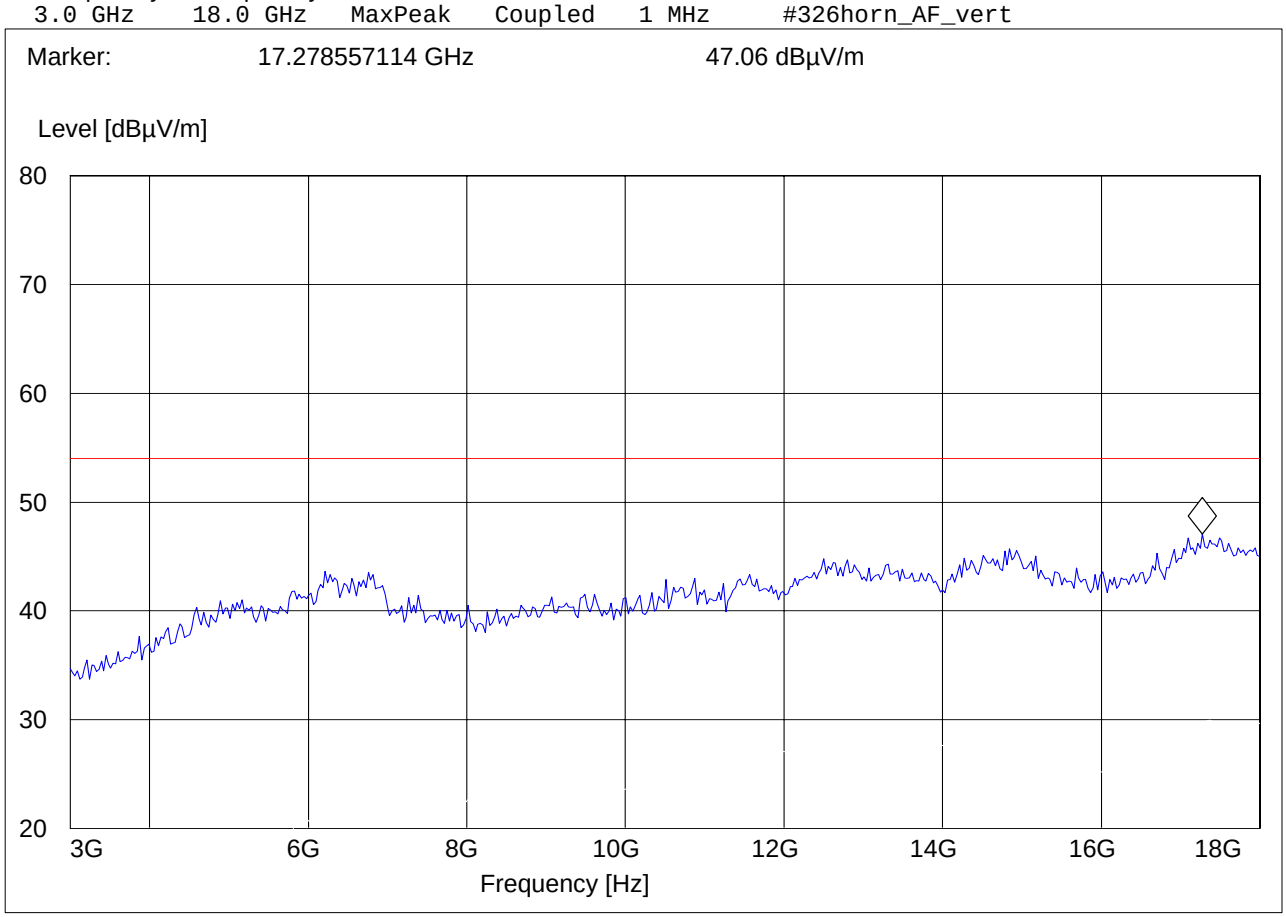


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Highest Channel (2462MHz): 3GHz – 18GHz

```
EUT:             Olifant w/ BCM94312MCG
Customer::       Broadcom
Test Mode:       G mode; ch.11; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer:   Chris
Voltage:         AC
Comments:        with 2.4 GHz notch filter
```

SWEEP TABLE: "FCC15.247_3-18G"

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

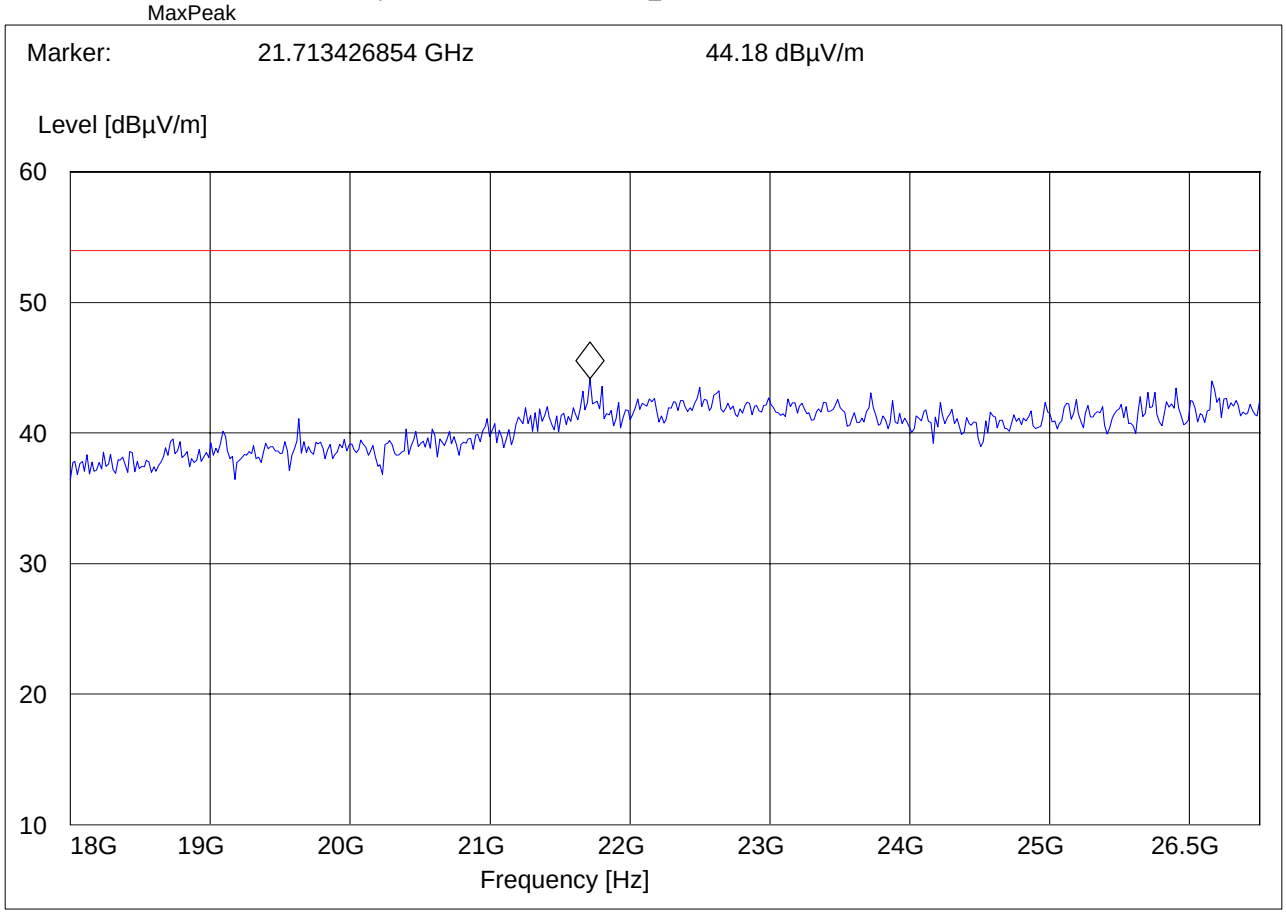


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
18GHz – 26.5GHz for low, middle, and high channels
Note: This plot is valid for low, mid, high channels (worst-case plot)

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: G mode; ch.6; Main
ANT Orientation: H
EUT Orientation: H
Test Engineer: Chris
Voltage: AC
Comments: with 2.4 GHz notch filter

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	100 kHz	Horn # 3116_18-40G MaxPeak



4.4.2 EMISSION LIMITATIONS - Radiated (Receiver)

§15.247 (d) & RSS-210(A8.5):

Transmit at Lowest channel Frequency 2412MHz (802.11g)			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

Transmit at Middle channel Frequency 2437MHz (802.11g)			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

Transmit at Highest channel Frequency 2462MHz (802.11g)			
Frequency (MHz)	**Level (dBµV/m)**		
	Peak	**Quasi-Peak**	**Average**
SEE PLOTS			

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

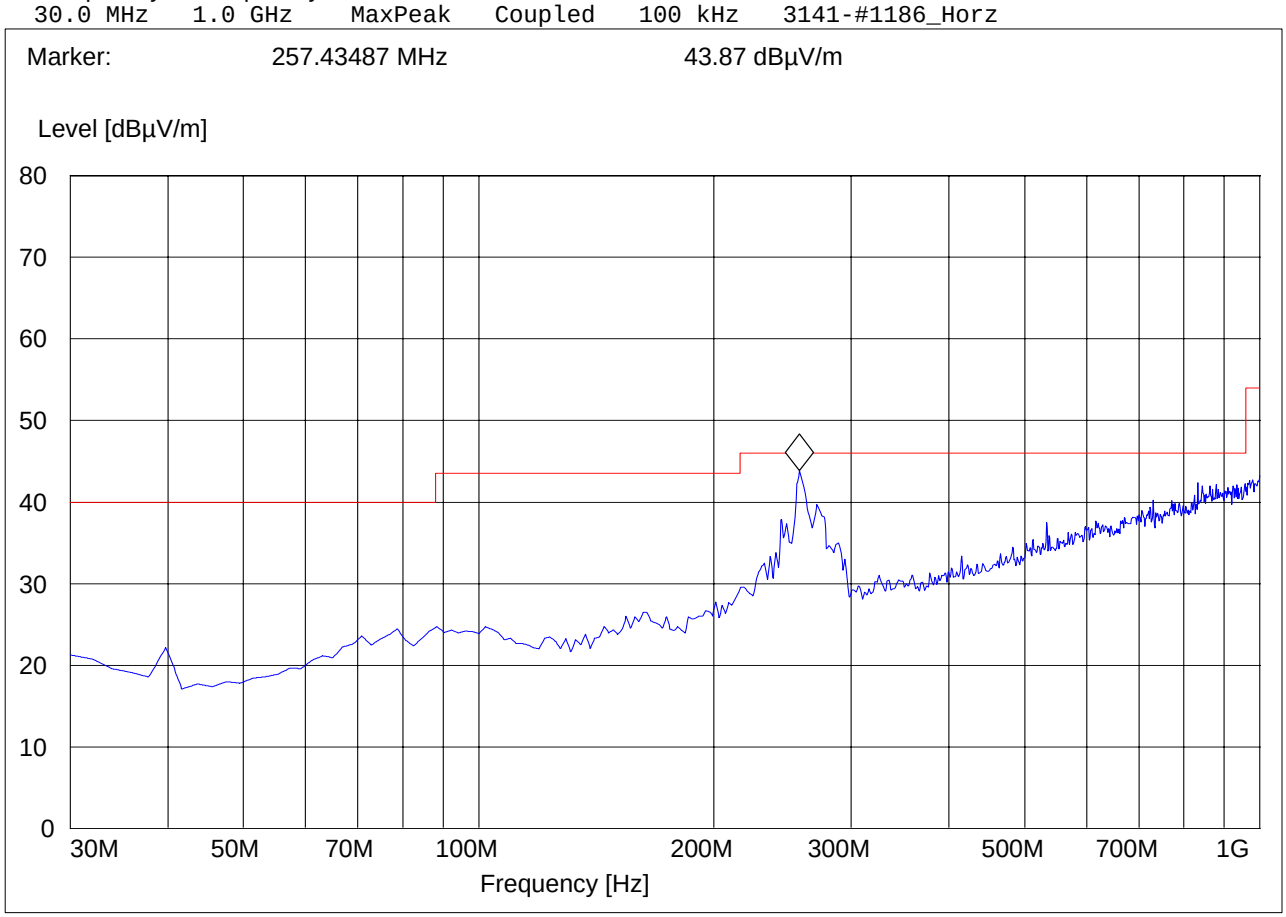
Horizontal: 30MHz – 1GHz

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

```
EUT:              Olifant w/ BCM94312MCG
Customer::        Broadcom
Test Mode:        CH 6; IDLE
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    sam
Voltage:          AC
Comments:
```

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 (Receiver) §15.247 (d) & RSS-210(A8.5)

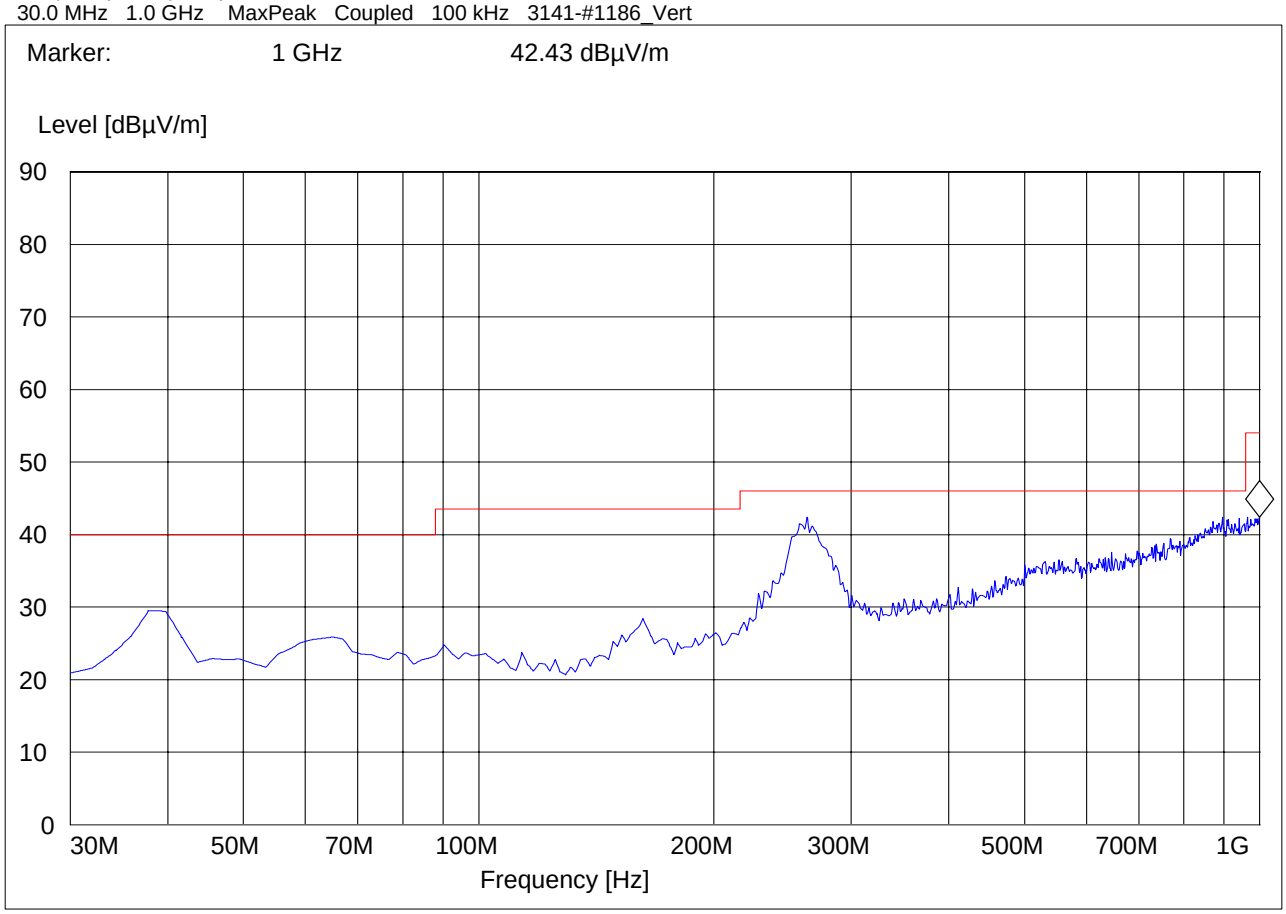
Vertical: 30MHz – 1GHz

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

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: CH 6; IDLE
ANT Orientation: V
EUT Orientation: H
Test Engineer: sam
Voltage: AC
Comments:

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

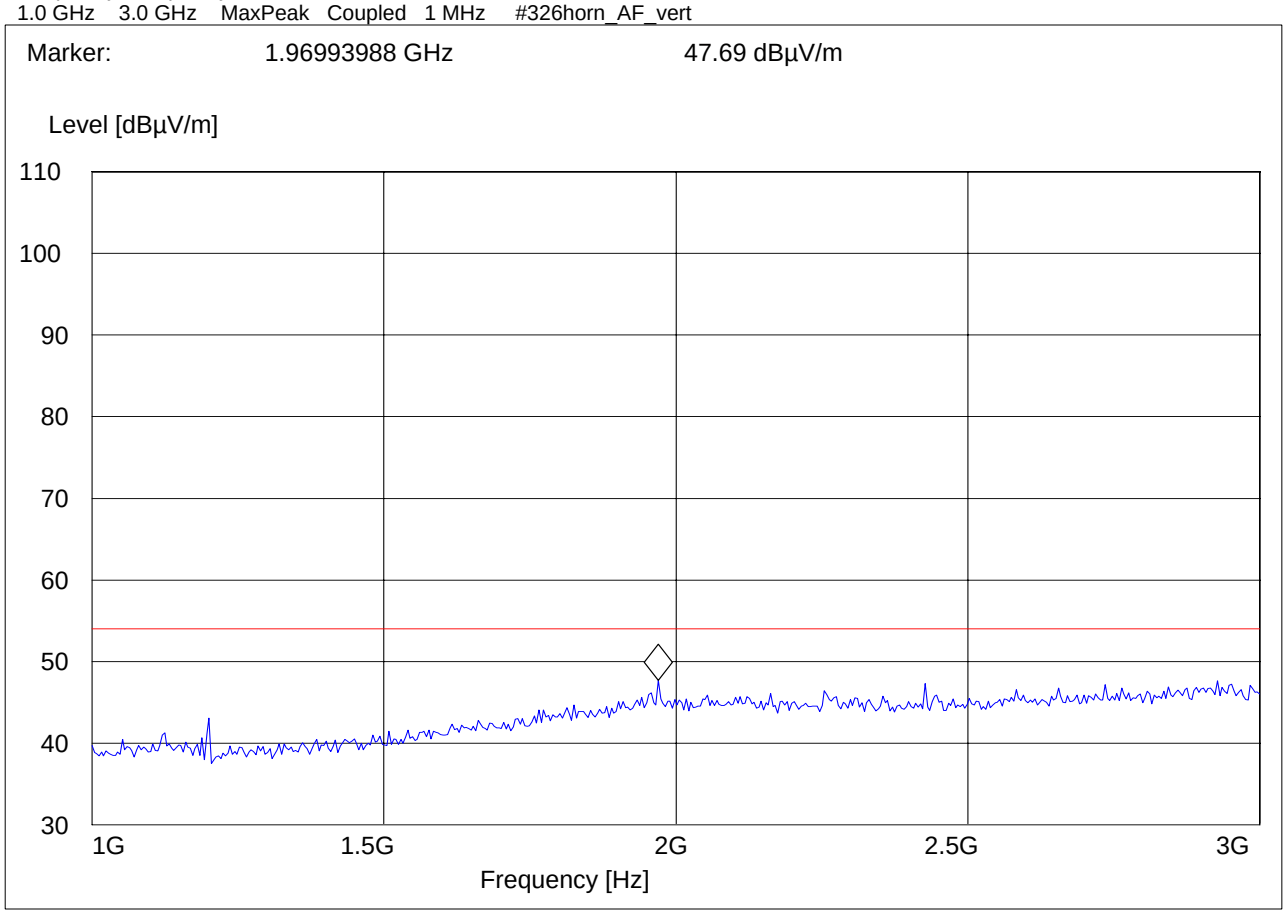


EMISSION LIMITATIONS - Radiated (Receiver) §15.247 (d) & RSS-210(A8.5) 1GHz – 3GHz

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: CH 6; IDLE
ANT Orientation: H
EUT Orientation: H
Test Engineer: sam
Voltage: AC
Comments:

SWEEP TABLE: "FCC15.247_1-3G"

Start Frequency	Stop Frequency	Detector	Meas. Time	IF Bandw.	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	#326horn_AF_vert

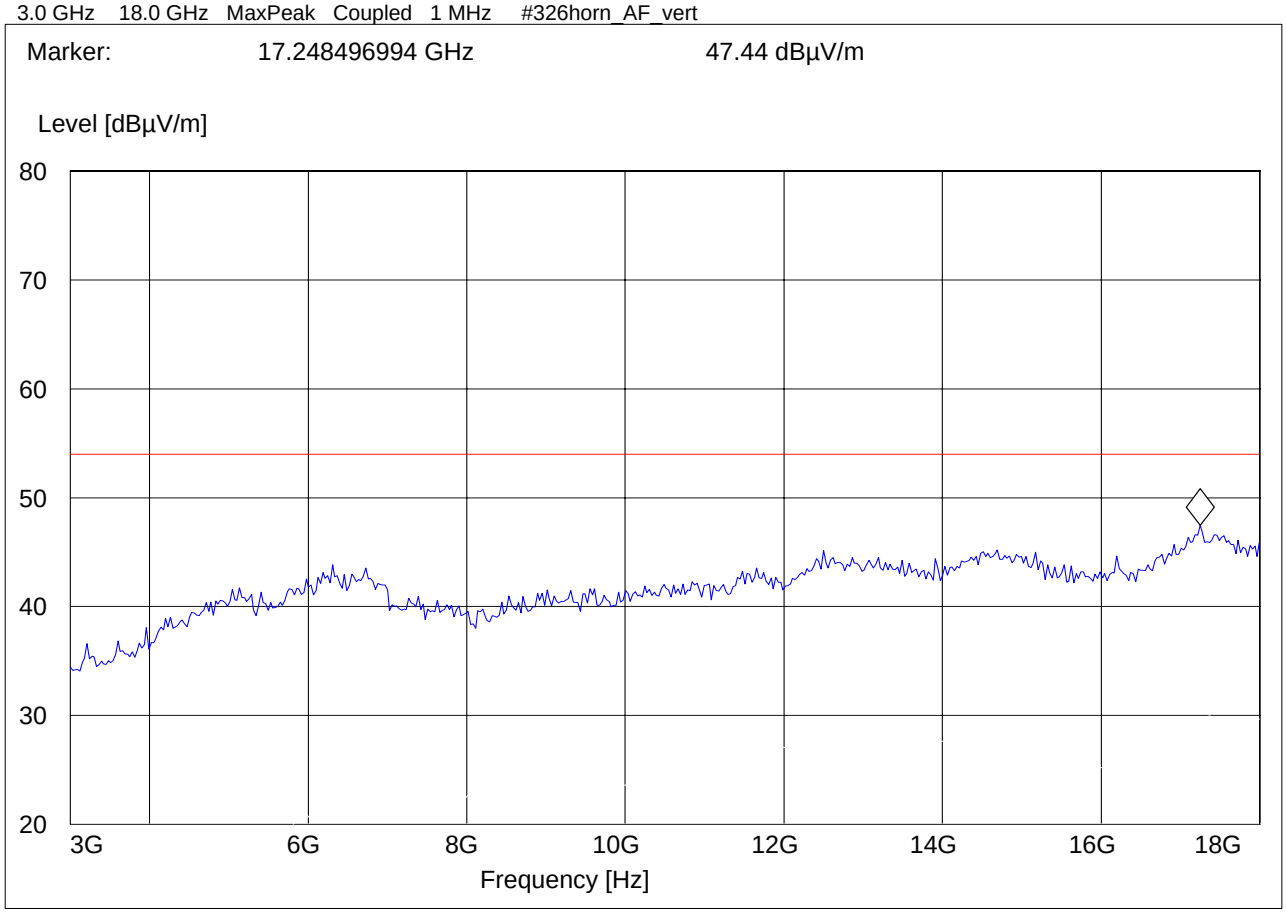


EMISSION LIMITATIONS - Radiated (Receiver) §15.247 (d) & RSS-210(A8.5) 3GHz – 18GHz

EUT: Olifant w/ BCM94312MCG
Customer:: Broadcom
Test Mode: CH 6; IDLE
ANT Orientation: H
EUT Orientation: H
Test Engineer: sam
Voltage: AC
Comments:

SWEEP TABLE: "FCC15.247_3-18G"

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



4.5 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.

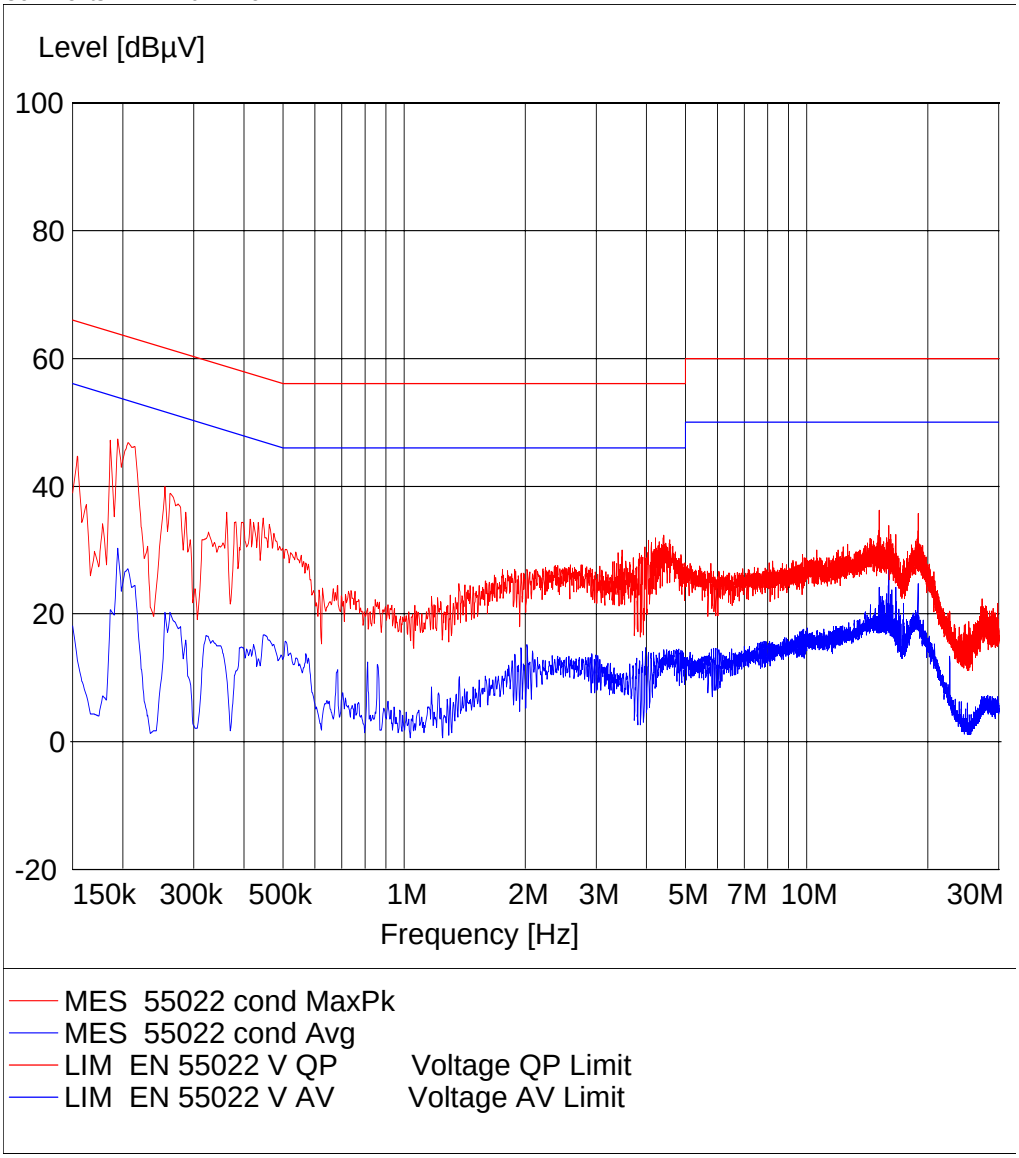
Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz

OPERATING MODE
Conducted AC emissions testing were performed with 120 VAC @ 60 Hz with the EUT in the mode that produced the highest power.

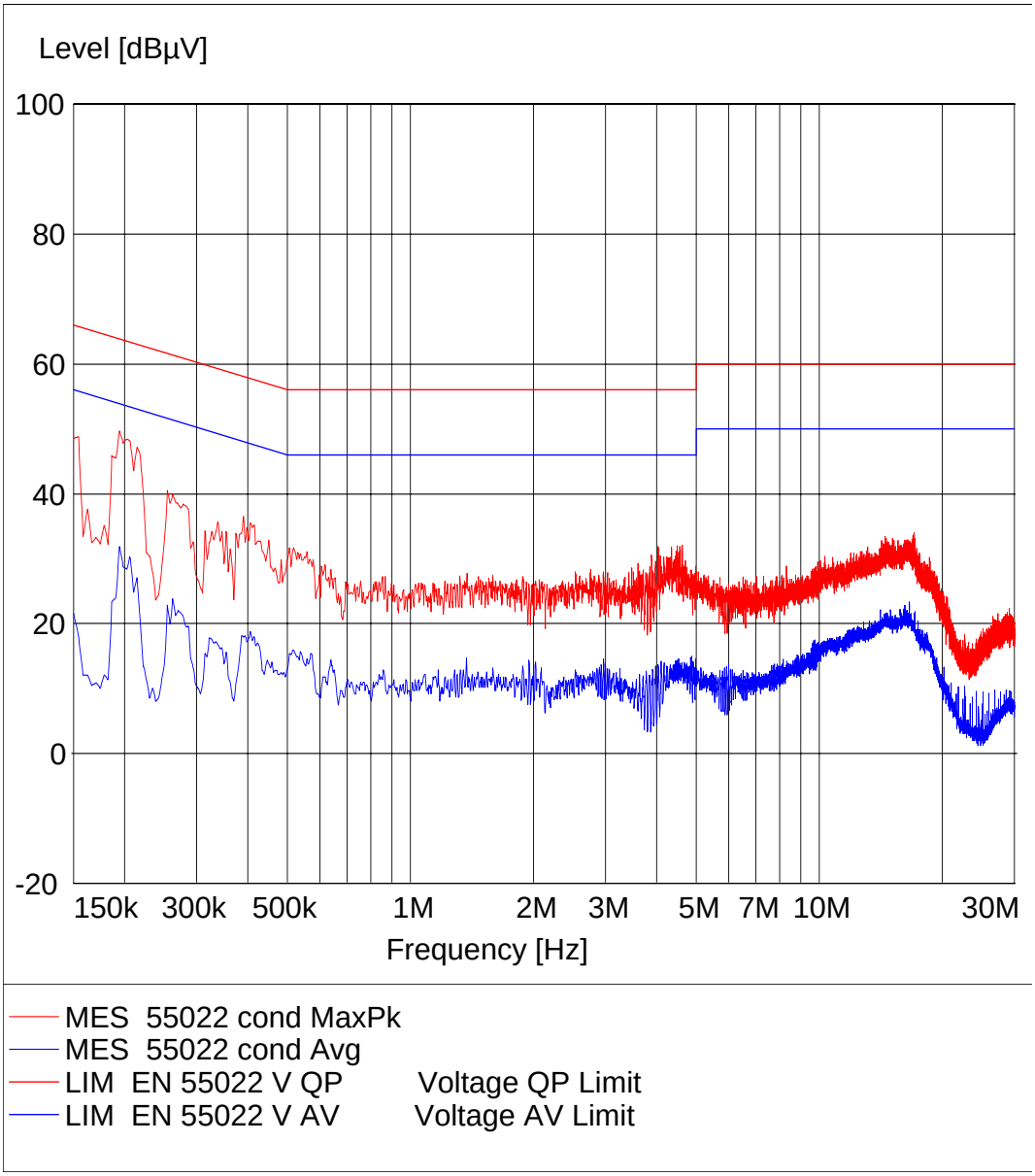
Voltage Mains Test (Line) Tx

EUT: Olifant w/ BCM94312MCG
Manufacturer: Broadcom
Test Mode: G mode; ch.6; Main
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: : 120V Line



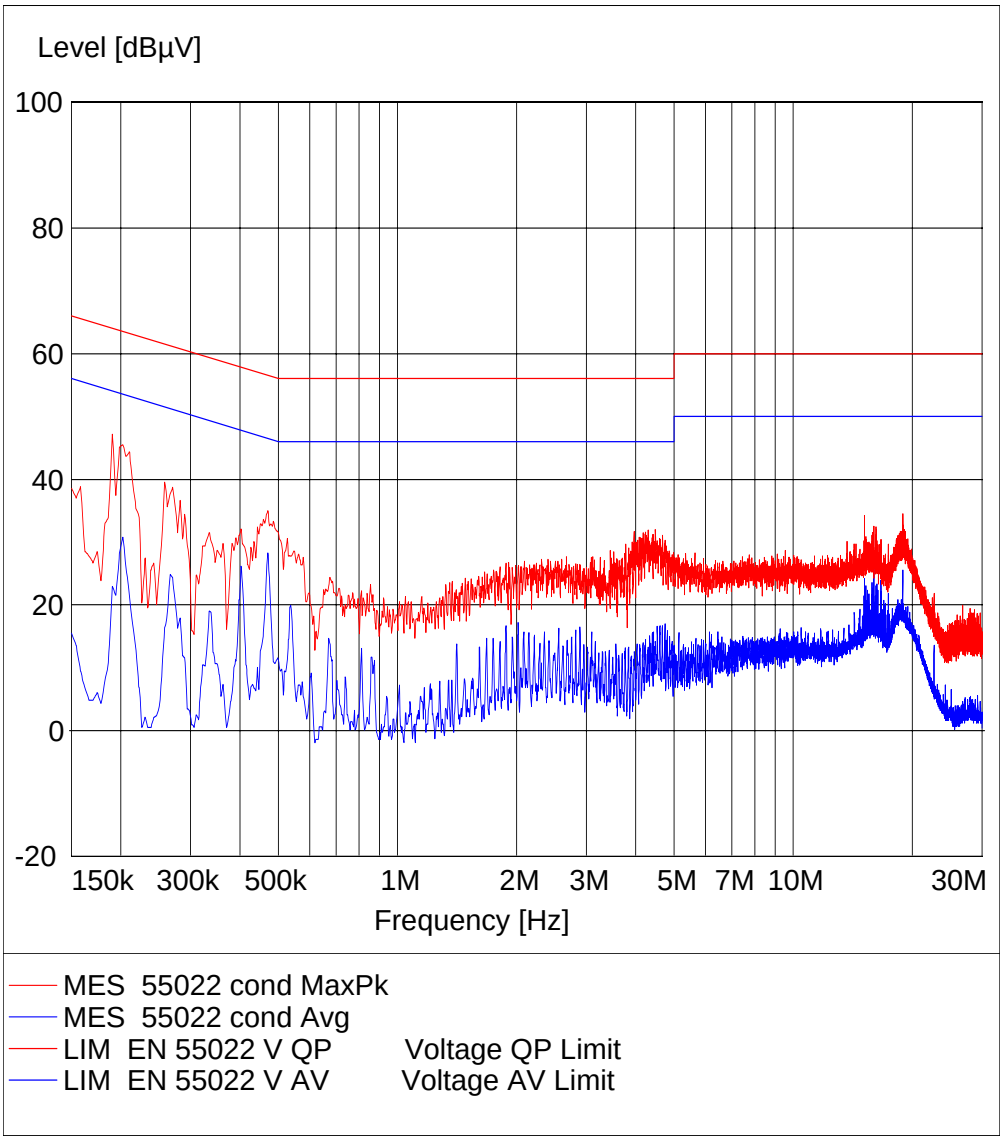
Voltage Mains Test (Neutral) Tx

EUT: Olifant w/ BCM94312MCG
Manufacturer: Broadcom
Test Mode: G mode; ch.6; Main
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: : 120V Neutral



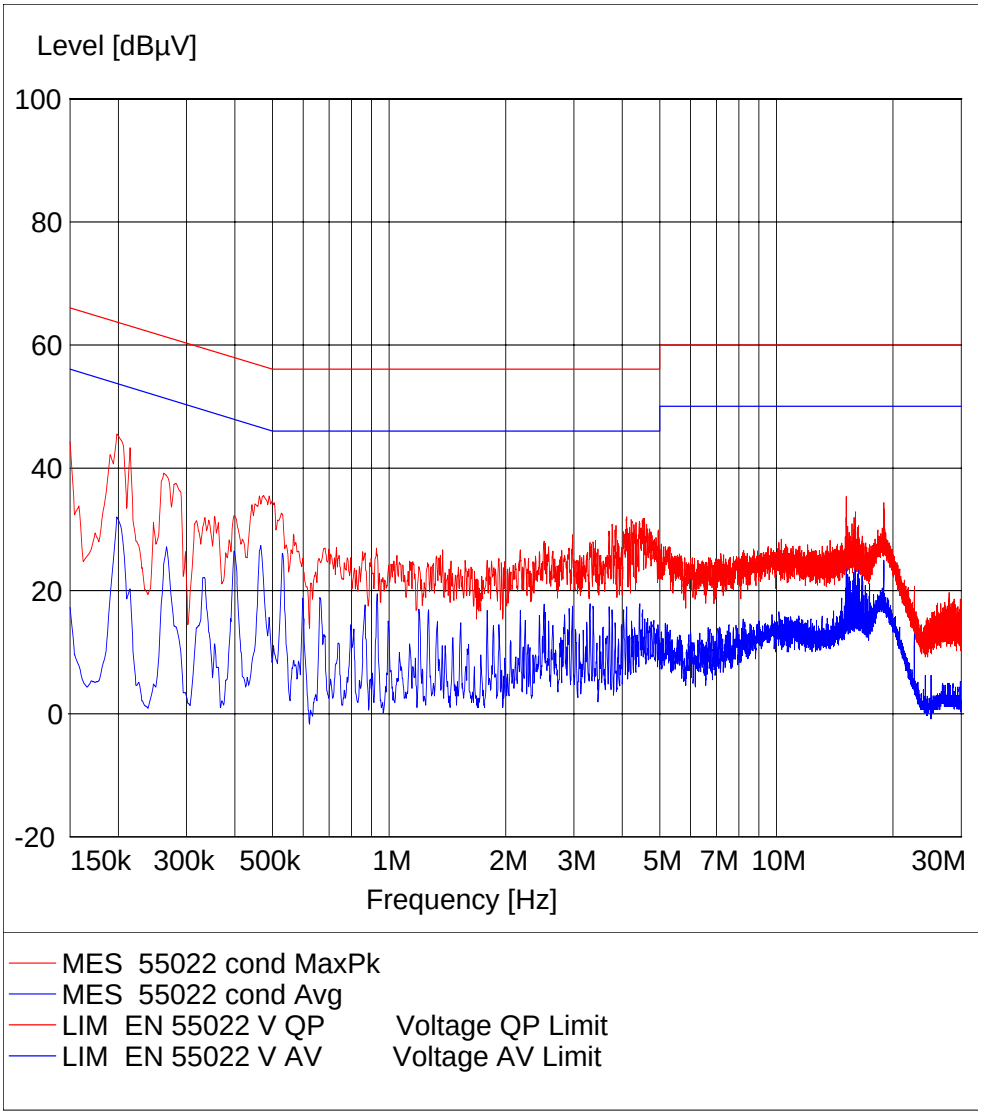
Voltage Mains Test (Line) Rx

EUT: Olifant w/ BCM94312MCG
Manufacturer: Broadcom
Test Mode: G mode; ch.6; Main; Rx
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: : 120V Line



Voltage Mains Test (Neutral) Rx

EUT: Olifant w/ BCM94312MCG
Manufacturer: Broadcom
Test Mode: G mode; ch.6; Main; Rx
ANT Orientation:: Conducted
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: : 120V Neutral



5 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.	Cal Due	Interval
E4	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107	May 2008	1 year
E46	Biconilog Antenna	3141	EMCO	0005-1186	June 2008	1 year
E134	Horn Antenna (1-18GHz)	3115	ETS Lindgren	35114	April 2008	1 year
E169	Horn Antenna (18-40GHz)	3116	ETS-Lindgren	00070497	Nov 2008	1 year
E28	High Pass Filter	5HC2700	Trilithic Inc.	9926013	n/a	n/a
E30	High Pass Filter	4HC1600	Trilithic Inc.	9922307	n/a	n/a
E170	LISN	FCC-LISN-50-25-2-08	Fisher Custom Communication	08014	Feb 2009	1 year

6 BLOCK DIAGRAMS

Radiated Testing