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 UPN: 4324A-BRCM1028

TEST REPORT #:EMC_BROAD_045_07002_IC_FCC_DTS
DATE: December 11, 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

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
December 11, 2007	**EMC & Radio**	Ivaylo Tankov **(Project Engineer)**	

Responsible for test report and project leader:

Date	Section	Name	Signature
December 11, 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:	Ivaylo

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 PCI-E Mini Card
Marketing Name:	802.11g 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:	Foxcon: Main (0.57dBi) and Aux (-0.23dBi)
Max Radiated Output Power:	18.52dBm (0.071W), 802.11b EIRP 19.8dBm (0.095W), 802.11b EIRP 19.9dBm (0.0977W), 802.11b EIRP 24.07dBm (0.255W), 802.11g EIRP 25.21dBm (0.331W), 802.11g EIRP 25.09dBm (0.322W), 802.11g EIRP

3.2 Class II permissive change laptops to be added

AE #	TYPE	MANF.	MODEL	SERIAL #
1	Laptop	HP	HSTNN-Q22C	N/A

Subject Of Investigation

All testing were performed on the HP (Model: HSTNN-Q22C) laptop with the BCM94312MCG pre-approved module. Measurements for HP were performed on the highest gain antenna. Data, presented in this report, was collected for a Class II permissive change to add the laptop to the BCM94312MCG (FCC ID: QDS-BRCM1028) module application.

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 RADIATED POWER

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

TEST CONDITIONS (802.11b) (MAIN antenna)		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23)°C	V_{nom}	16.37	16.59	18.38
Measurement uncertainty		±0.5dBm		

TEST CONDITIONS (802.11b) (AUX Antenna)		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23)°C	V_{nom}	18.52	19.8	19.9
Measurement uncertainty		±0.5dBm		

TEST CONDITIONS (802.11g) (MAIN antenna)		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23)°C	V_{nom}	22.39	22.48	23.16
Measurement uncertainty		±0.5dBm		

TEST CONDITIONS (802.11g) (AUX Antenna)		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2412	2437	2462
T_{nom}(23)°C	V_{nom}	24.07	25.21	25.09
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

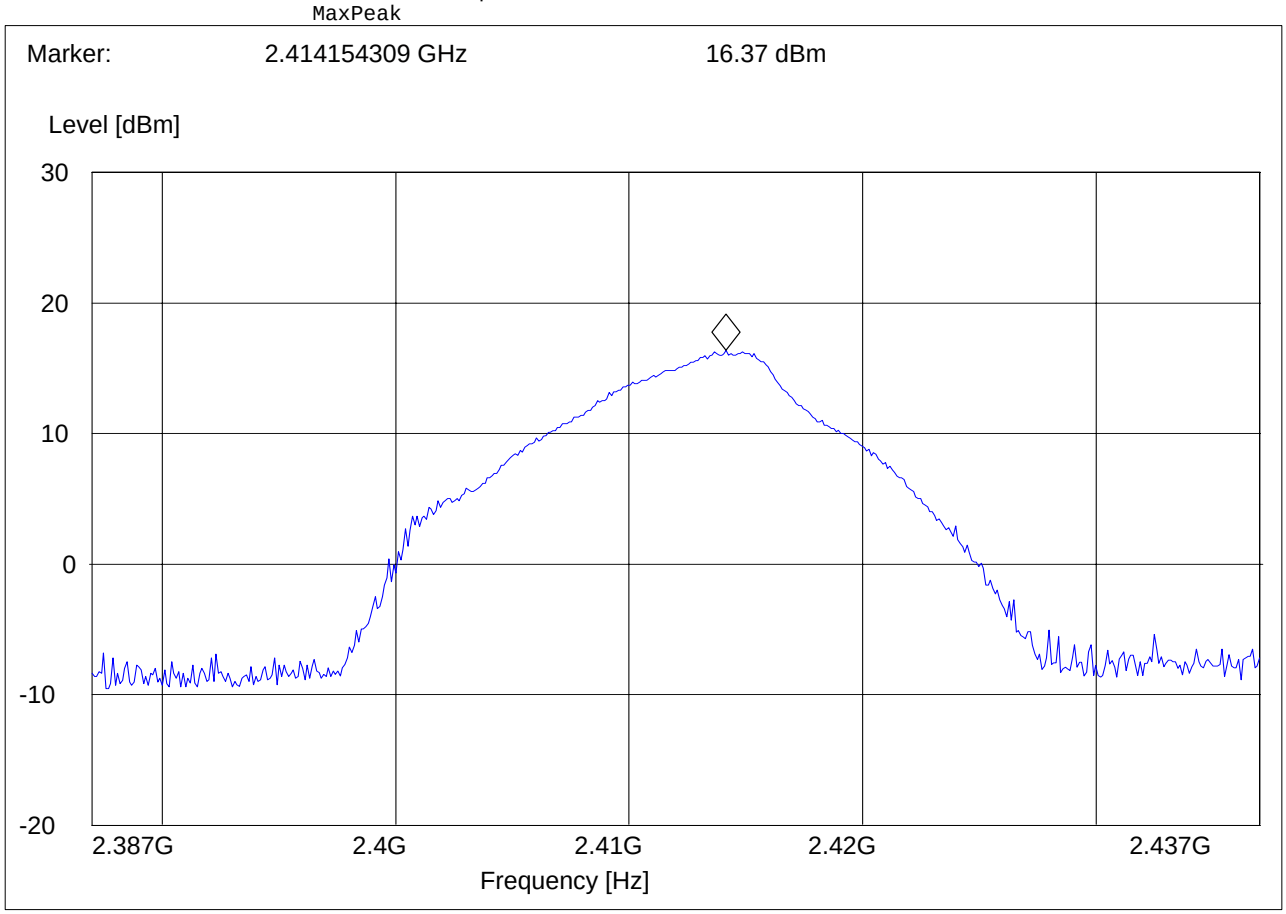
Note 1: Power was set to maximum previously approved power levels.
Note 2: Both vertical and horizontal receive antenna were tested. Only the worst case polarization reported, which was vertical

2412 MHz (802.11b)

```
EUT:              HP SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.1, MAIN
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

SWEEP TABLE: "EIRP RLAN CH1"

```
  Short Description:            EIRP RLAN channel-2412 MHz
  Start      Stop       Detector  Meas.     IF        Transducer
  Frequency  Frequency             Time      Bandw.
  2.4 GHz    2.4 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                        MaxPeak
```

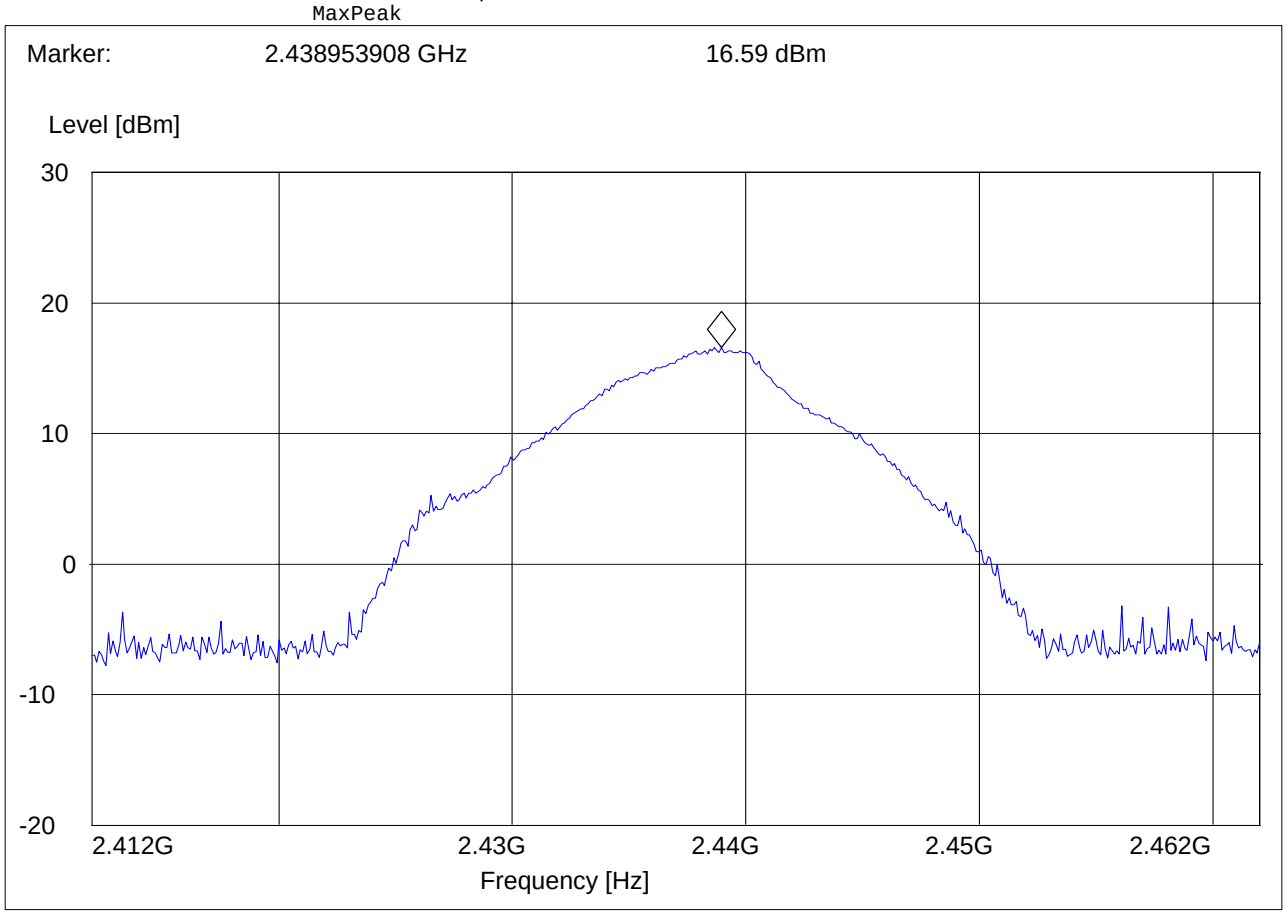


2437 MHz (802.11b)

```
EUT:              HP SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, MAIN
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

SWEEP TABLE: "EIRP RLAN CH6"

```
  Short Description:            EIRP RLAN channel-2437 MHz
  Start      Stop       Detector  Meas.     IF        Transducer
  Frequency  Frequency             Time      Bandw.
  2.4 GHz    2.5 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                        MaxPeak
```

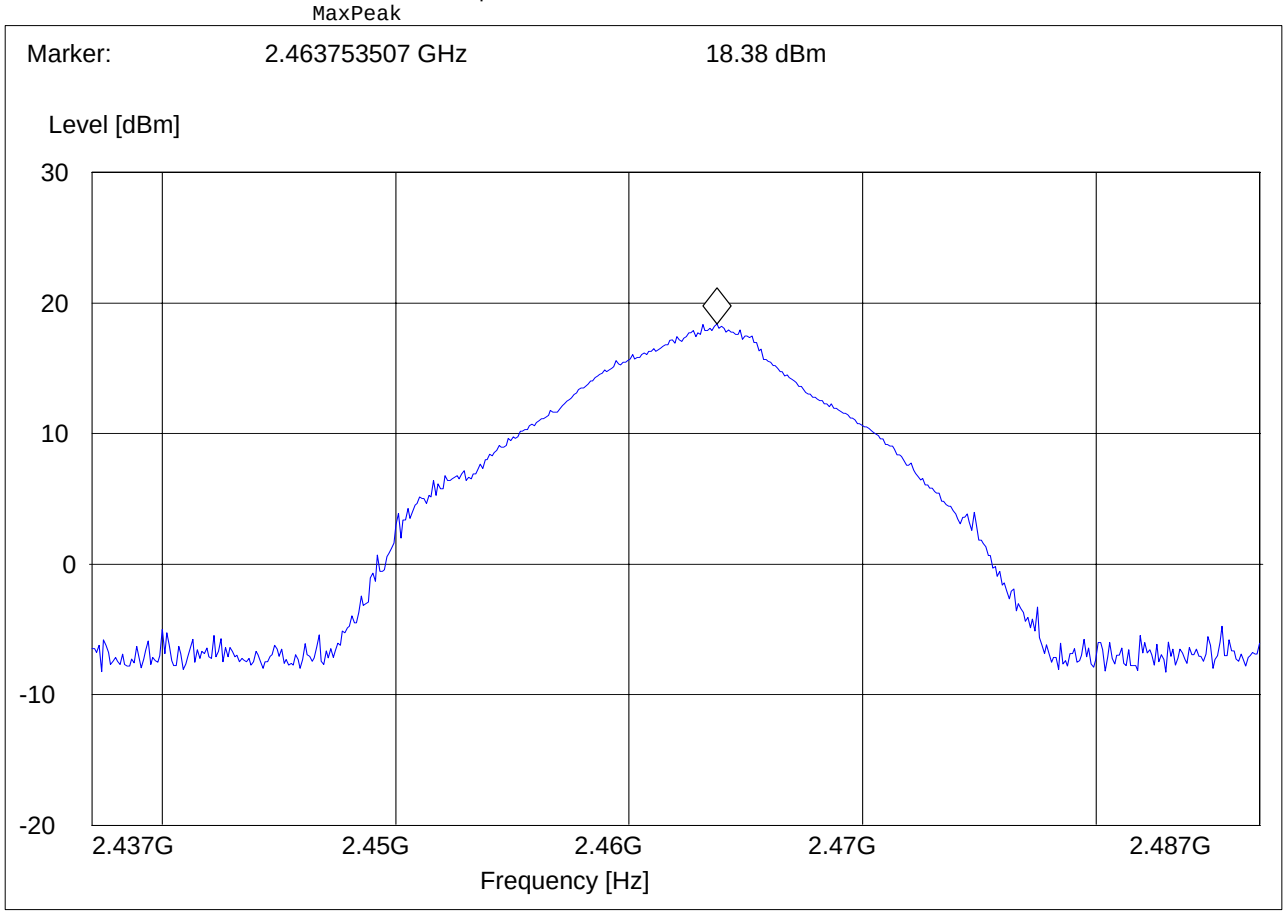


2462 MHz (802.11b)

```
EUT:              HP SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.11, MAIN
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

SWEEP TABLE: "EIRP RLAN CH11"

```
  Short Description:            EIRP RLAN channel-2462 MHz
  Start      Stop       Detector  Meas.     IF        Transducer
  Frequency  Frequency            Time      Bandw.
  2.4 GHz    2.5 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                        MaxPeak
```

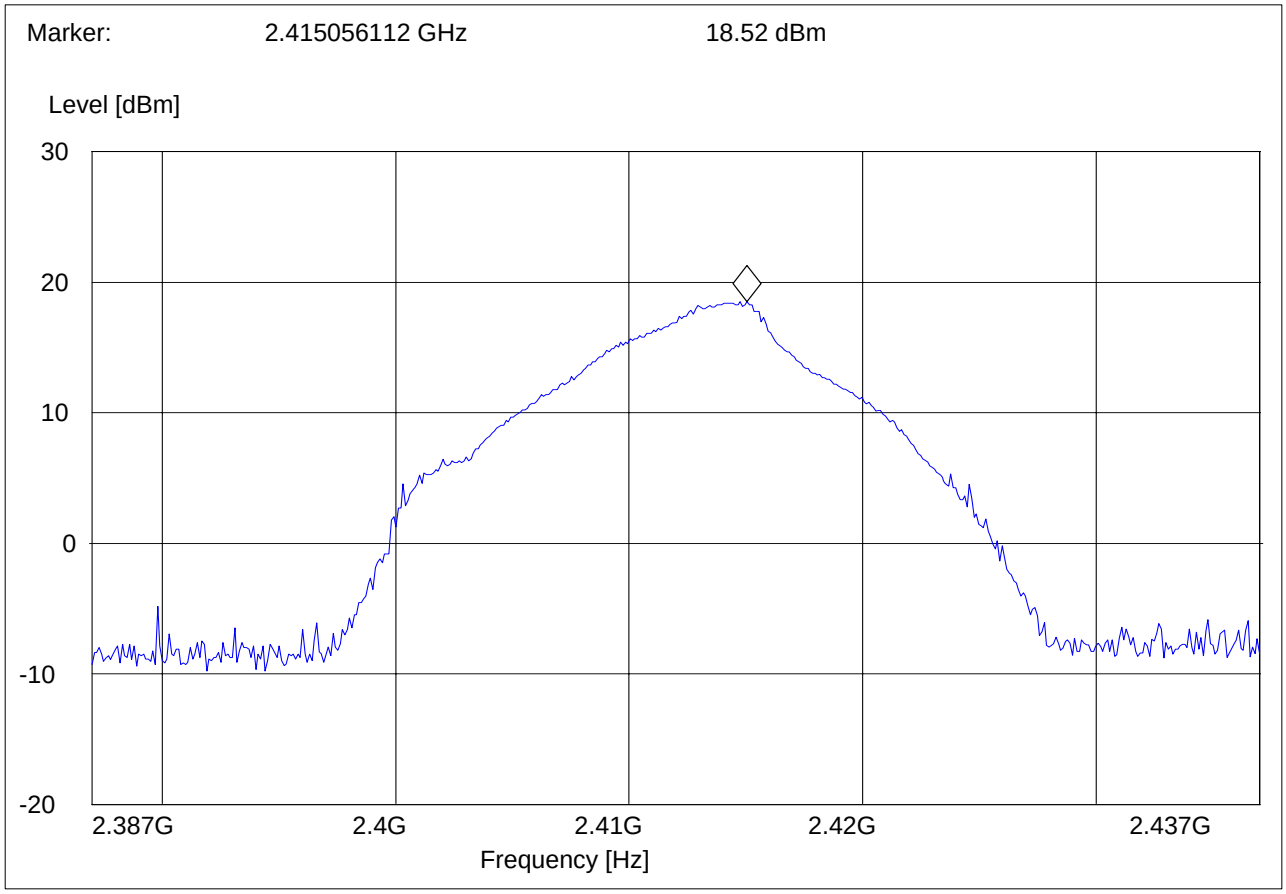


2412 MHz (802.11b)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.1, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

SWEEP TABLE: "EIRP RLAN CH1"

```
Short Description:              EIRP RLAN channel-2412 MHz
Start      Stop       Detector  Meas.     IF        Transducer
Frequency  Frequency             Time      Bandw.
2.4 GHz    2.4 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                      MaxPeak
```



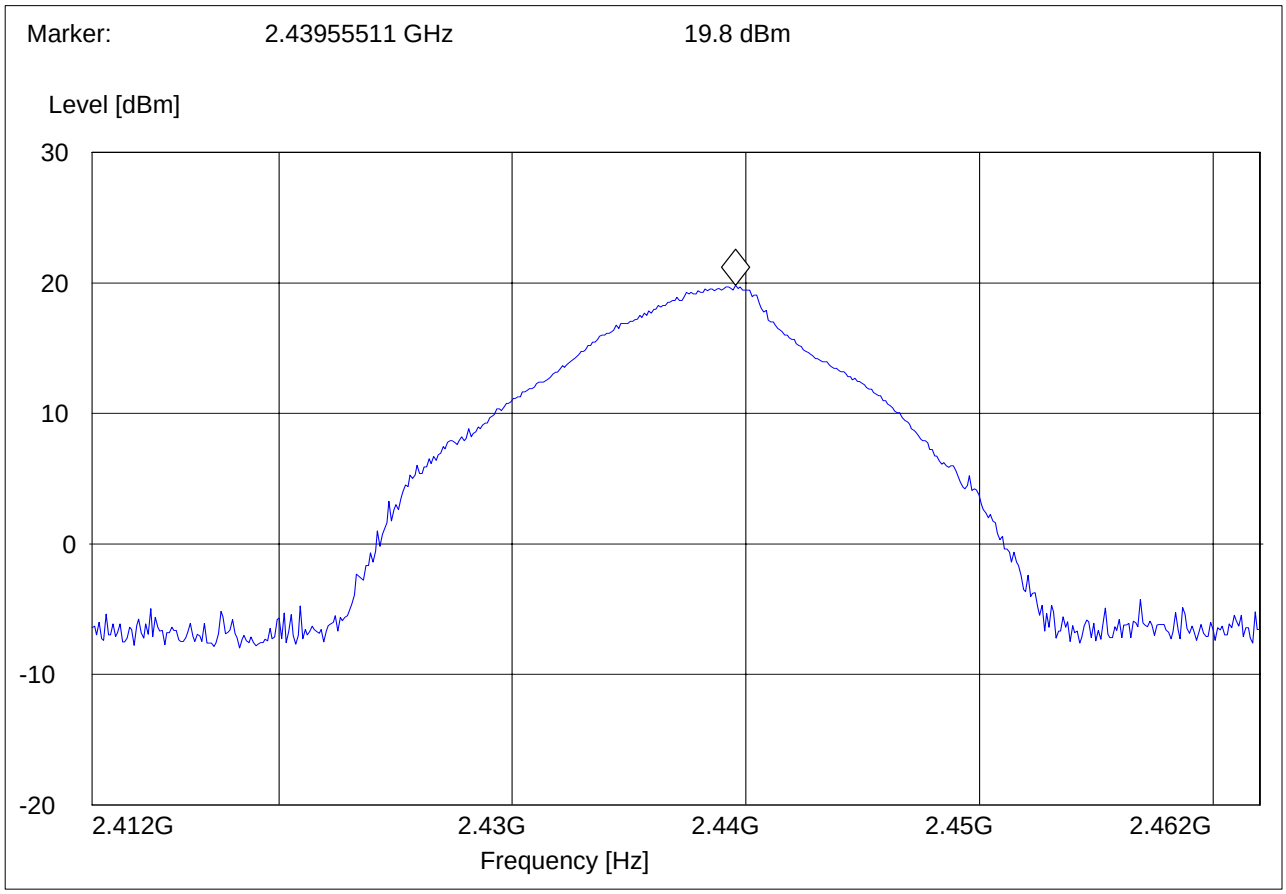
2437 MHz (802.11b)

EUT: SOYUZ
Customer:: Broadcom
Test Mode: 802.11B, CH.6, AUX
ANT Orientation: V
EUT Orientation: H
Test Engineer: Chris
Voltage: AC Adapter

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 MaxPeak	Coupled	10 MHz	DUMMY-DBM

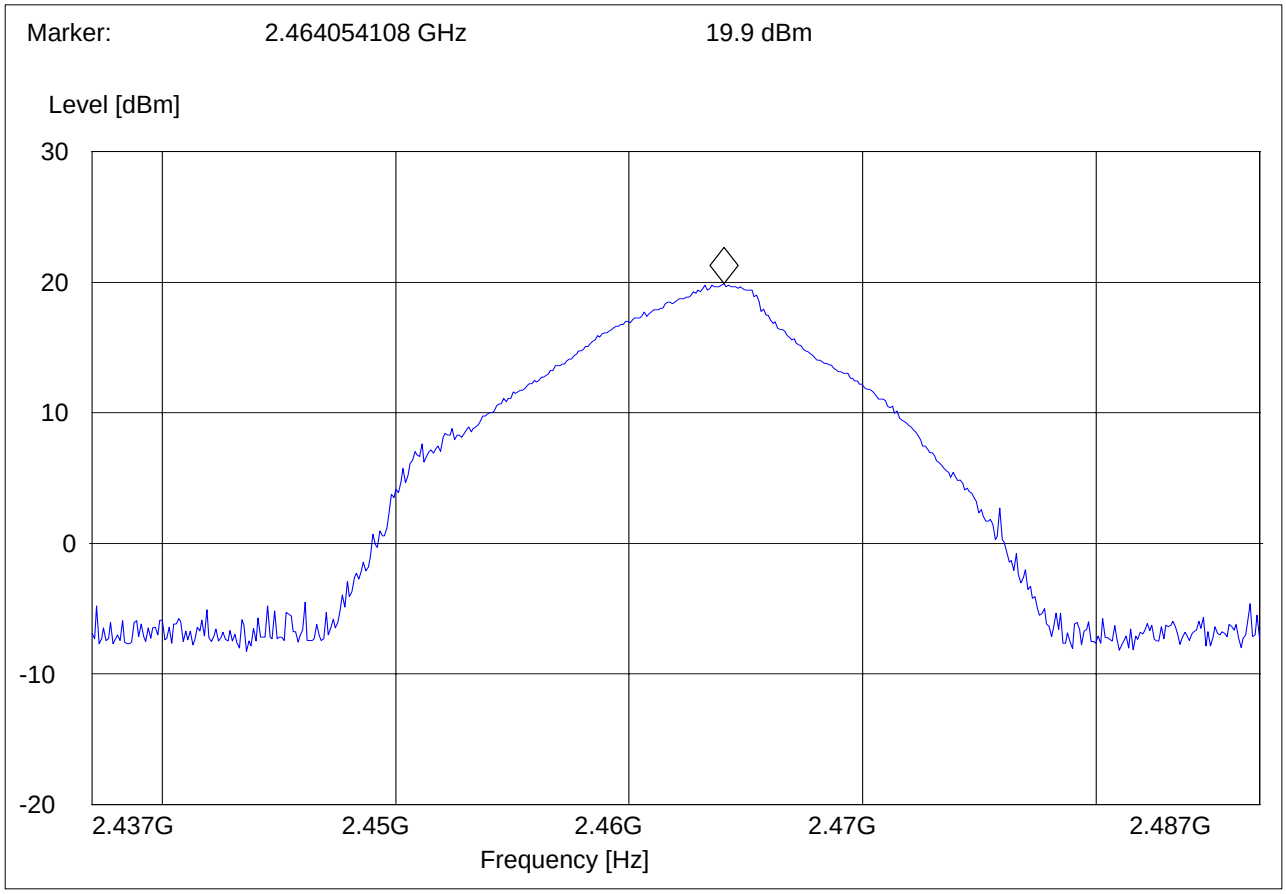


2462 MHz (802.11b)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.11, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

SWEEP TABLE: "EIRP RLAN CH11"

```
Short Description:            EIRP RLAN channel-2462 MHz
Start      Stop       Detector  Meas.     IF        Transducer
Frequency  Frequency            Time      Bandw.
2.4 GHz    2.5 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                      MaxPeak
```

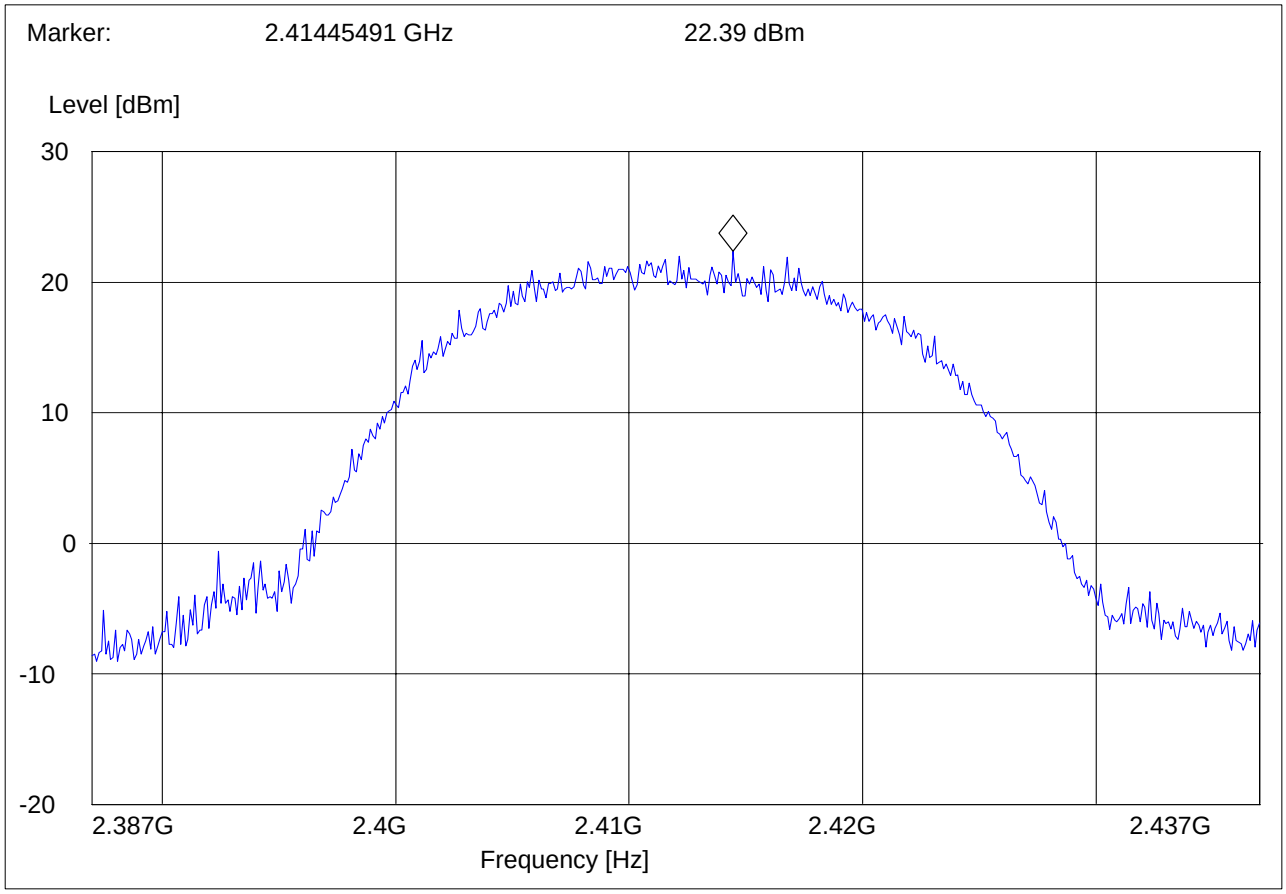


2412 MHz (802.11g)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.1, MAIN
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         TT@224°
```

SWEEP TABLE: "EIRP RLAN CH1"

```
Short Description:              EIRP RLAN channel-2412 MHz
Start       Stop        Detector  Meas.     IF         Transducer
Frequency   Frequency             Time      Bandw.
2.4 GHz     2.4 GHz     MaxPeak   Coupled   10 MHz     DUMMY-DBM
                        MaxPeak
```

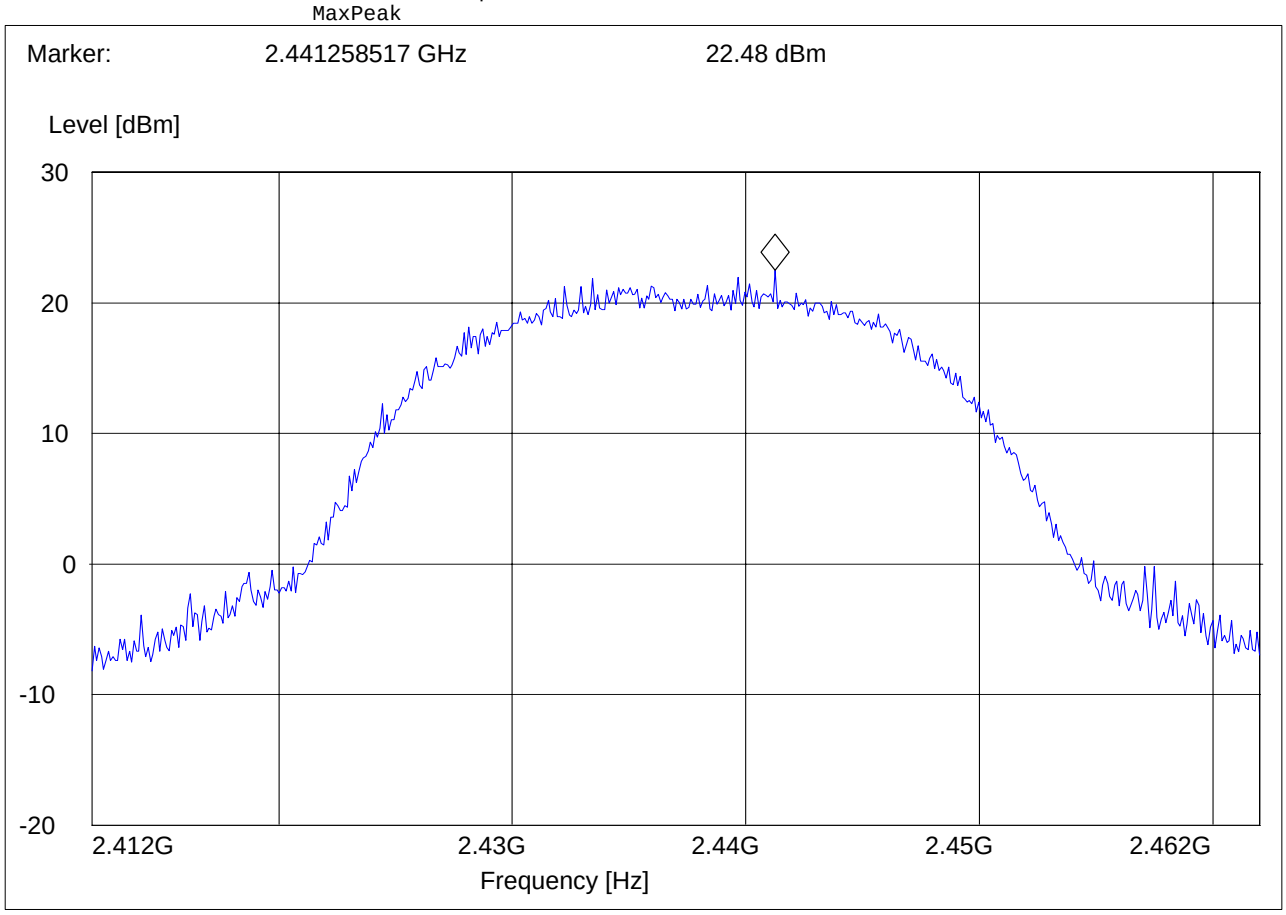


2437 MHz (802.11g)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.6, MAIN
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         TT@224°
```

SWEEP TABLE: "EIRP RLAN CH6"

```
  Short Description:            EIRP RLAN channel-2437 MHz
  Start      Stop       Detector  Meas.     IF        Transducer
  Frequency  Frequency             Time      Bandw.
  2.4 GHz    2.5 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                        MaxPeak
```

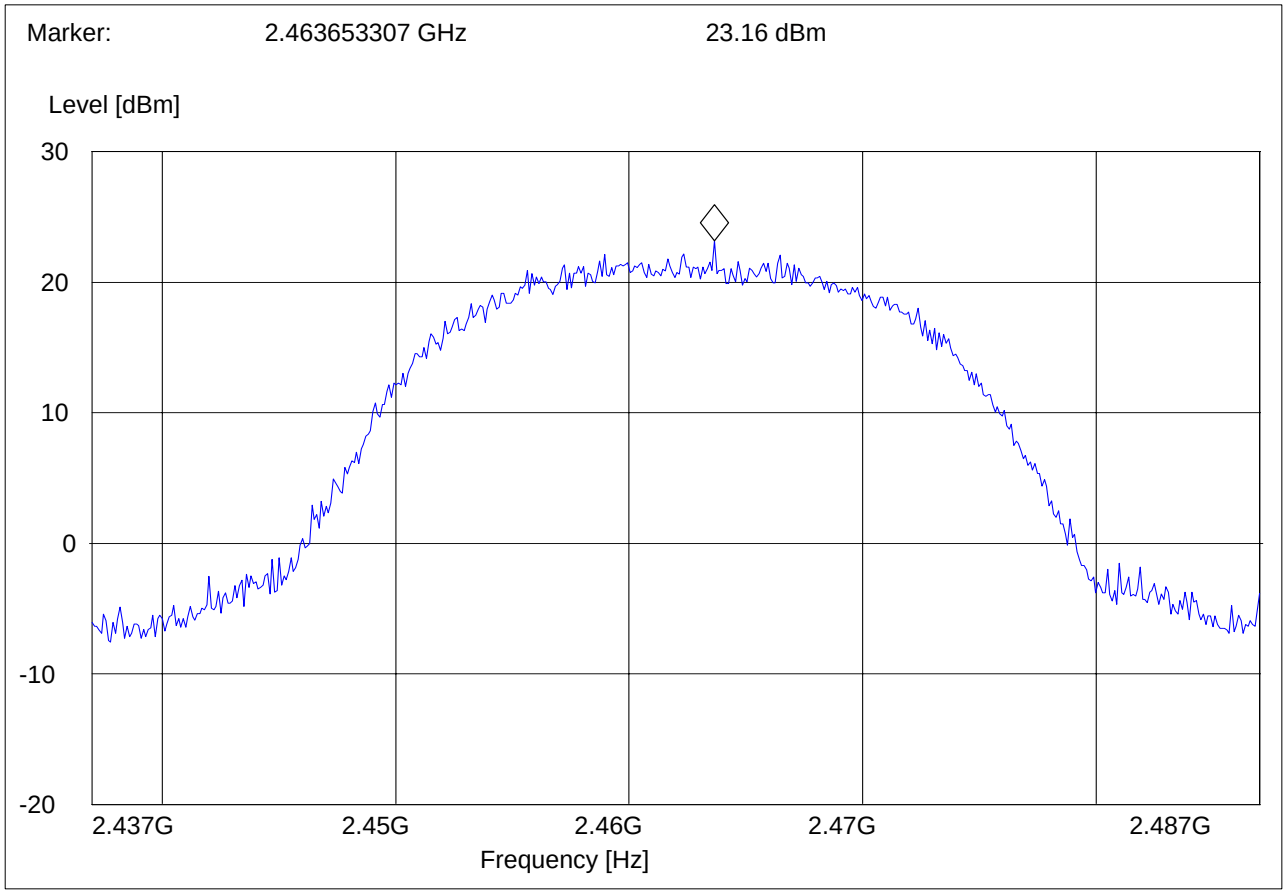


2462 MHz (802.11g)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.11, MAIN
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         TT@224°
```

SWEEP TABLE: "EIRP RLAN CH11"

```
  Short Description:            EIRP RLAN channel-2462 MHz
  Start      Stop       Detector  Meas.     IF        Transducer
  Frequency  Frequency            Time      Bandw.
  2.4 GHz    2.5 GHz    MaxPeak   Coupled   10 MHz    DUMMY-DBM
                        MaxPeak
```

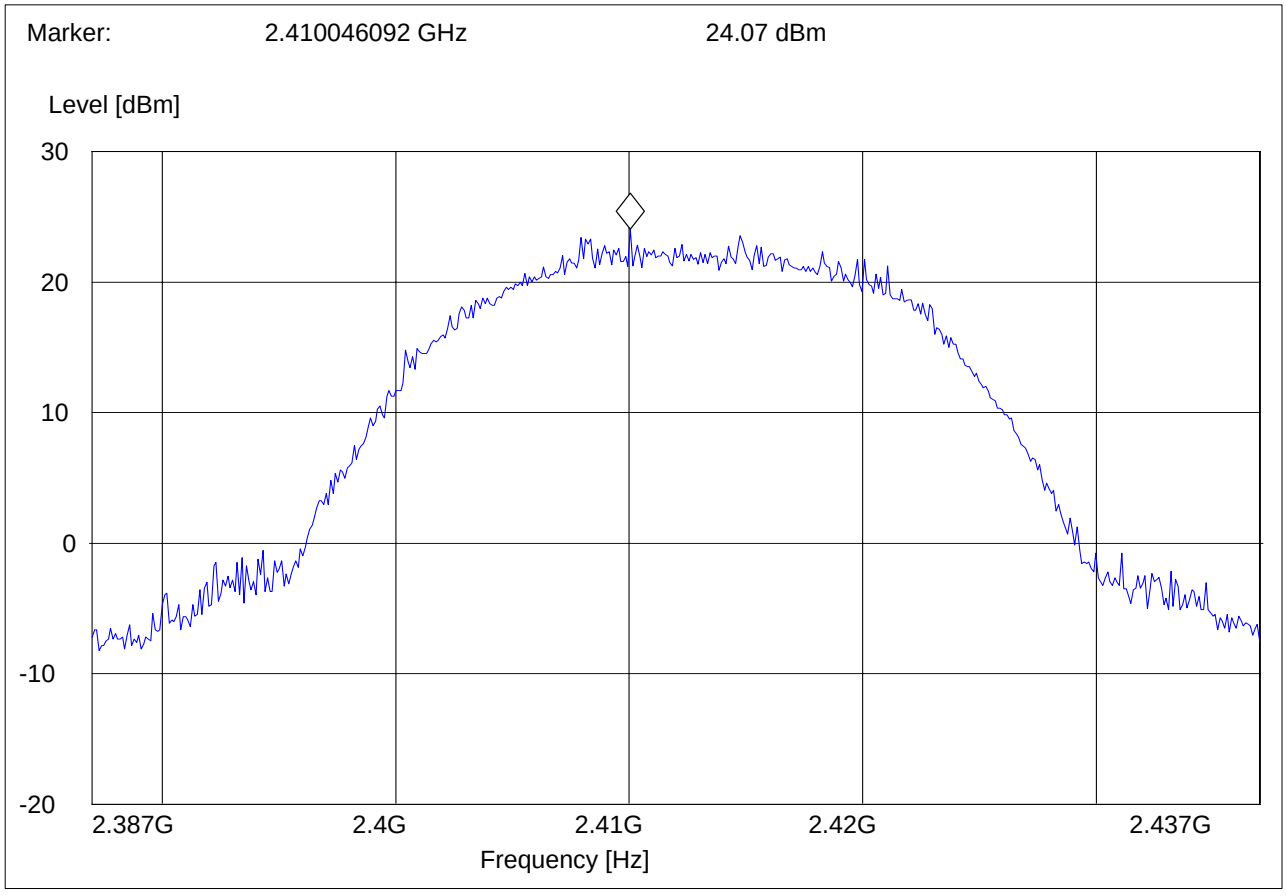


2412 MHz (802.11g)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.1, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         TT@224°
```

SWEEP TABLE: "EIRP RLAN CH1"

```
  Short Description:              EIRP RLAN channel-2412 MHz
  Start       Stop        Detector  Meas.      IF         Transducer
  Frequency   Frequency             Time       Bandw.
  2.4 GHz     2.4 GHz     MaxPeak   Coupled    10 MHz     DUMMY-DBM
                          MaxPeak
```

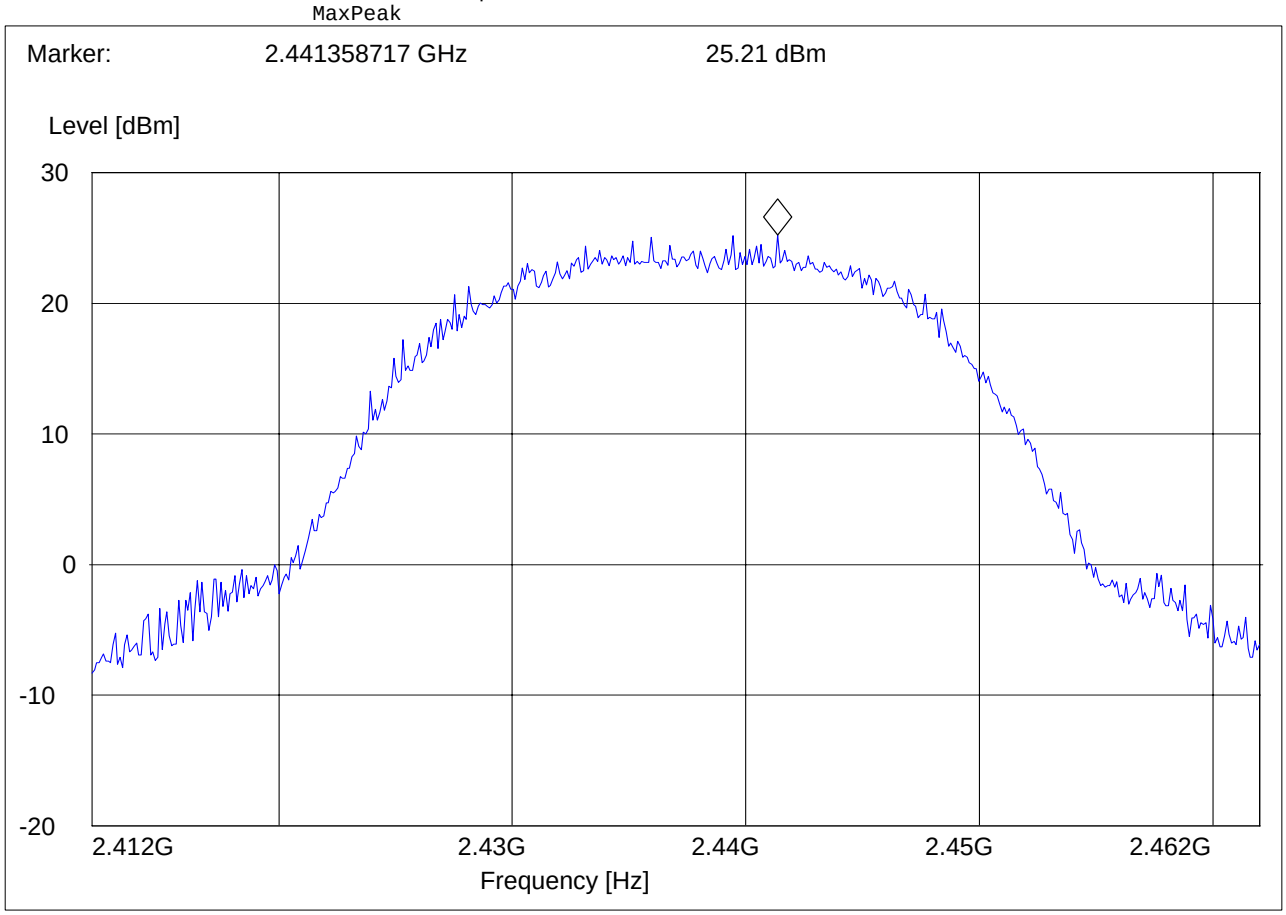


2437 MHz (802.11g)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.6, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         TT@224°
```

SWEEP TABLE: "EIRP RLAN CH6"

```
Short Description:              EIRP RLAN channel-2437 MHz
Start       Stop        Detector  Meas.      IF         Transducer
Frequency   Frequency             Time       Bandw.
2.4 GHz     2.5 GHz     MaxPeak   Coupled    10 MHz     DUMMY-DBM
                        MaxPeak
```

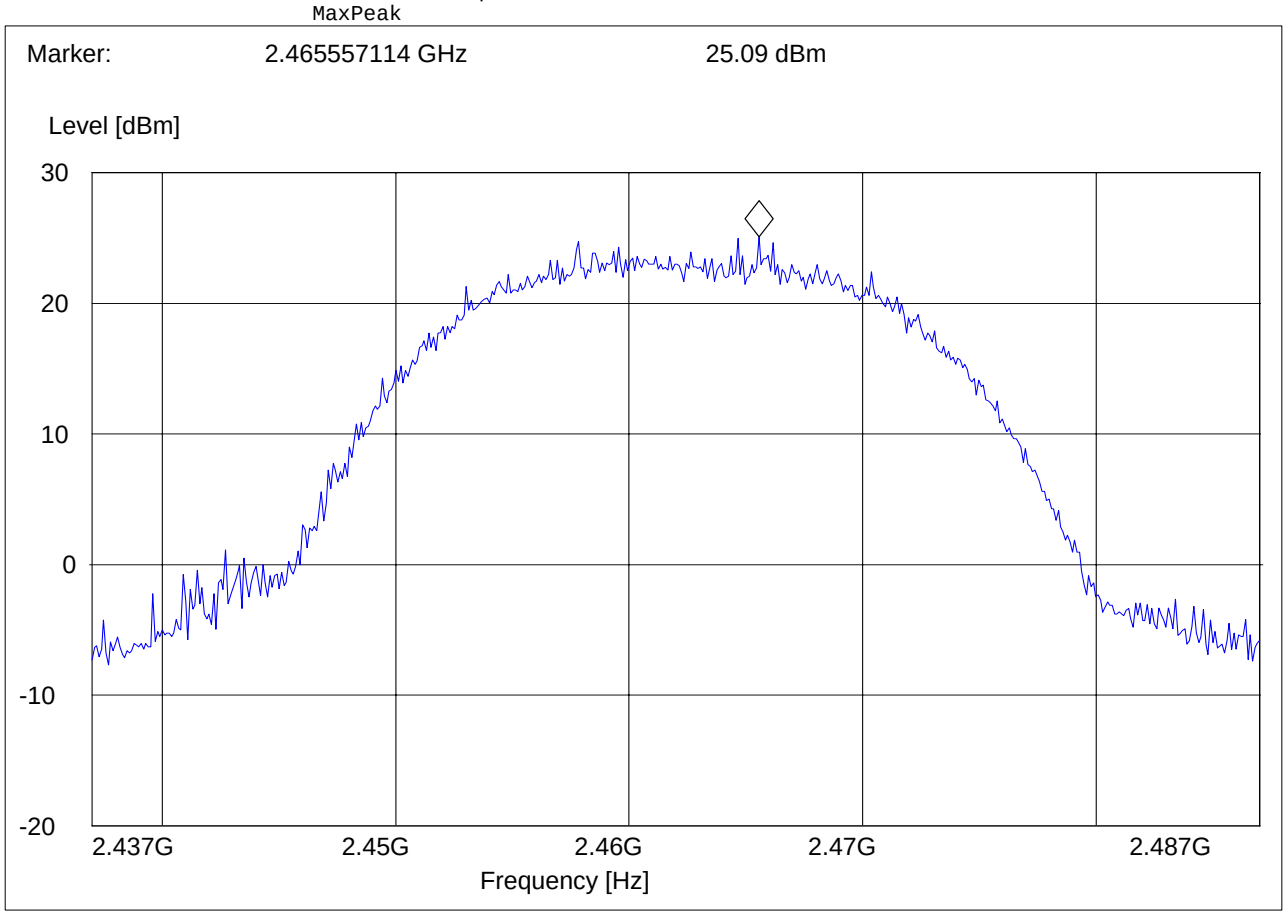


2462 MHz (802.11g)

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.11, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         TT@224°
```

SWEEP TABLE: "EIRP RLAN CH11"

```
Short Description:              EIRP RLAN channel-2462 MHz
Start      Stop       Detector  Meas.     IF         Transducer
Frequency  Frequency             Time      Bandw.
2.4 GHz    2.5 GHz    MaxPeak   Coupled   10 MHz     DUMMY-DBM
                      MaxPeak
```



5.2 RADIATED EMISSIONS MEASUREMENTS

Note: The worst case power was at vertical. Only the vertical Bandedge measurements reported.

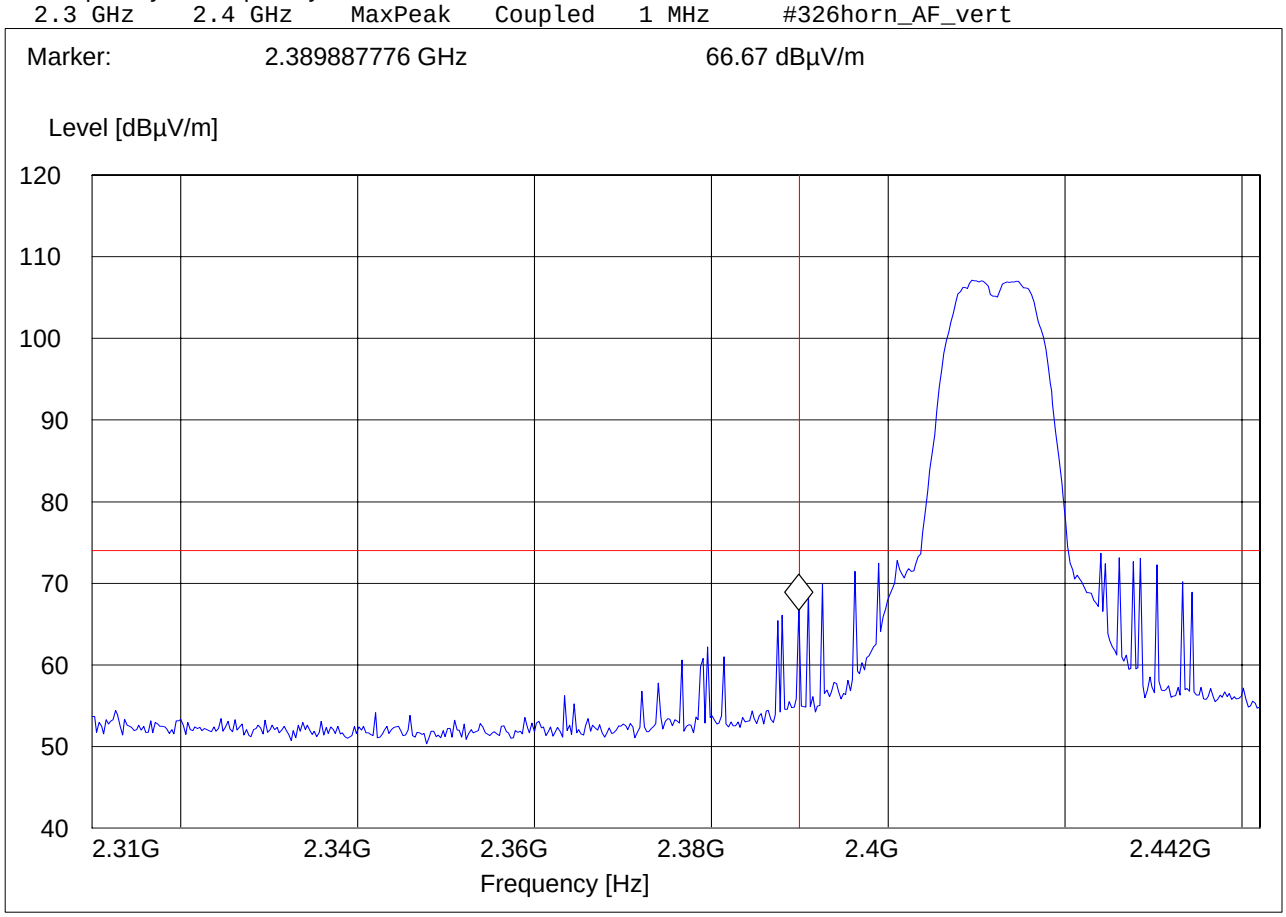
5.3 BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:             SOYUZ
Customer::       Broadcom
Test Mode:       802.11B, CH.1, AUX
ANT Orientation: V
EUT Orientation: H
Test Engineer:   Chris
Voltage:         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



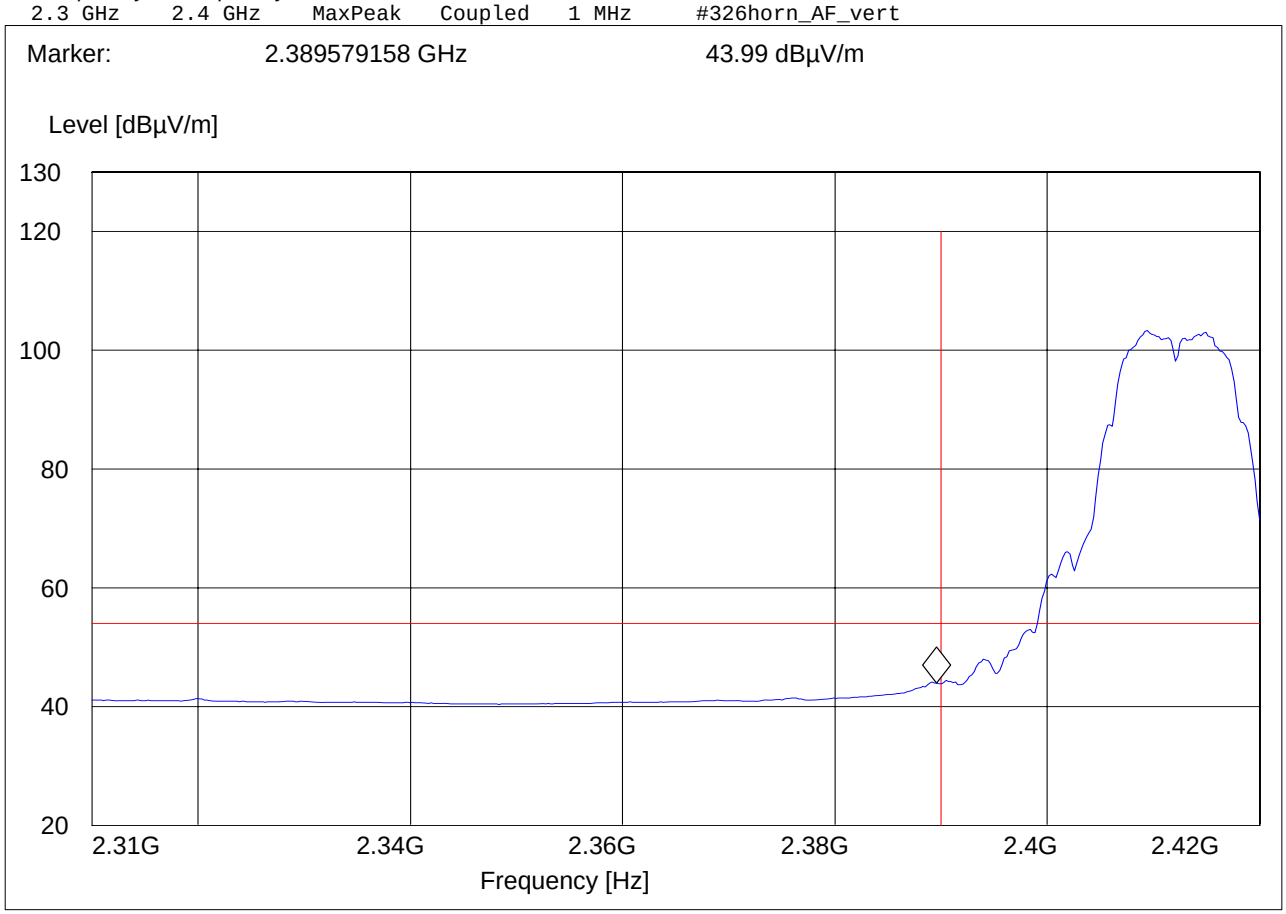
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.1, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



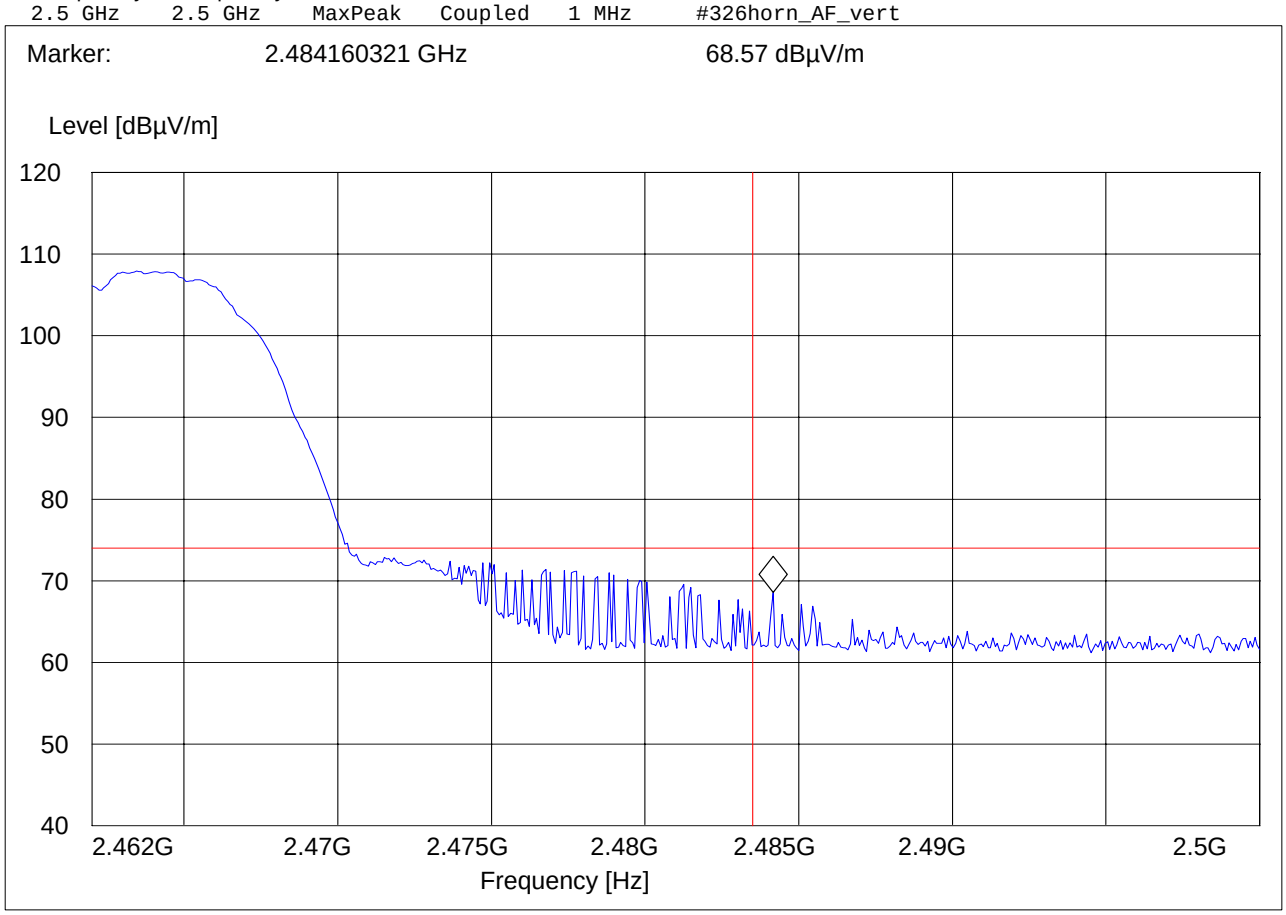
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.11, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



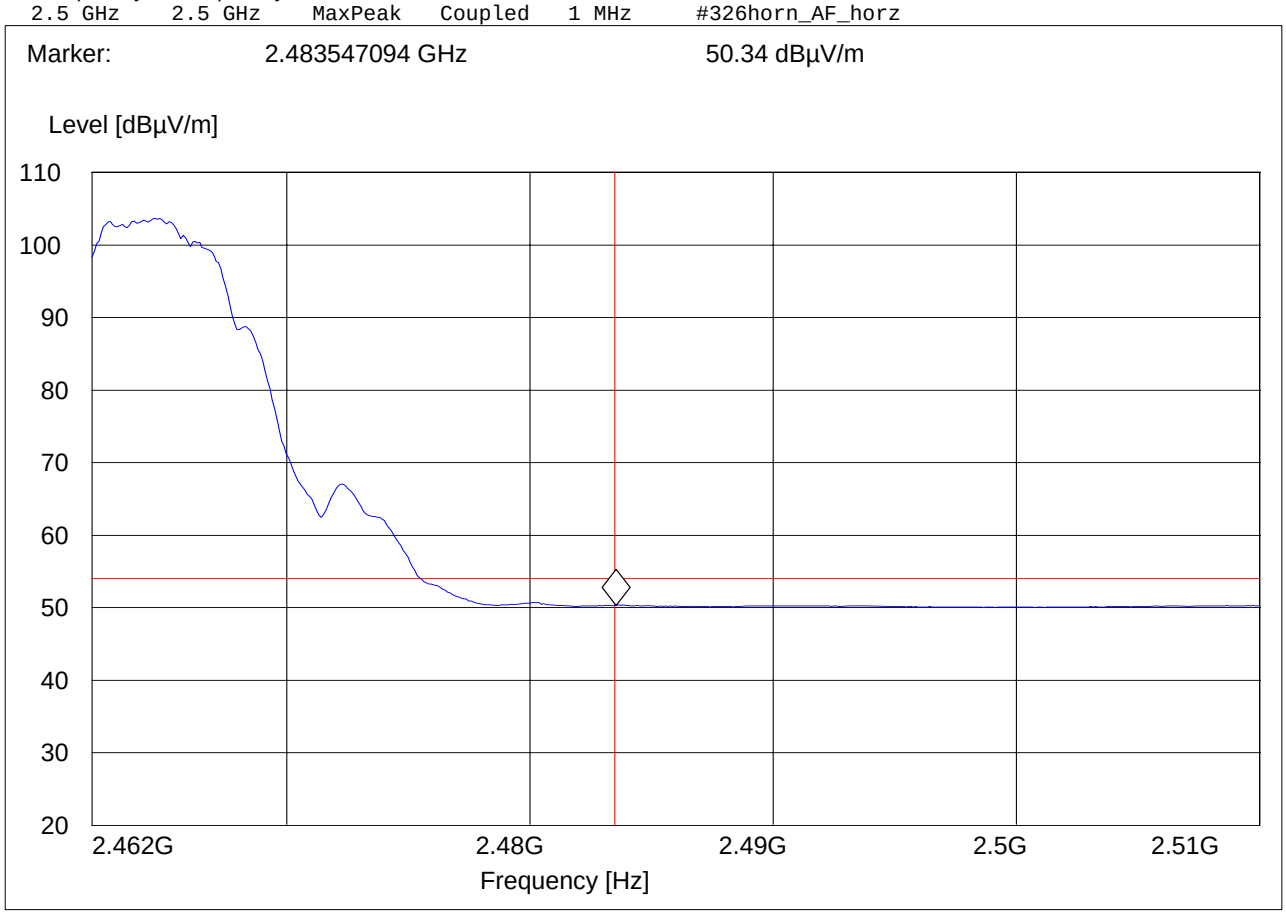
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.11, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



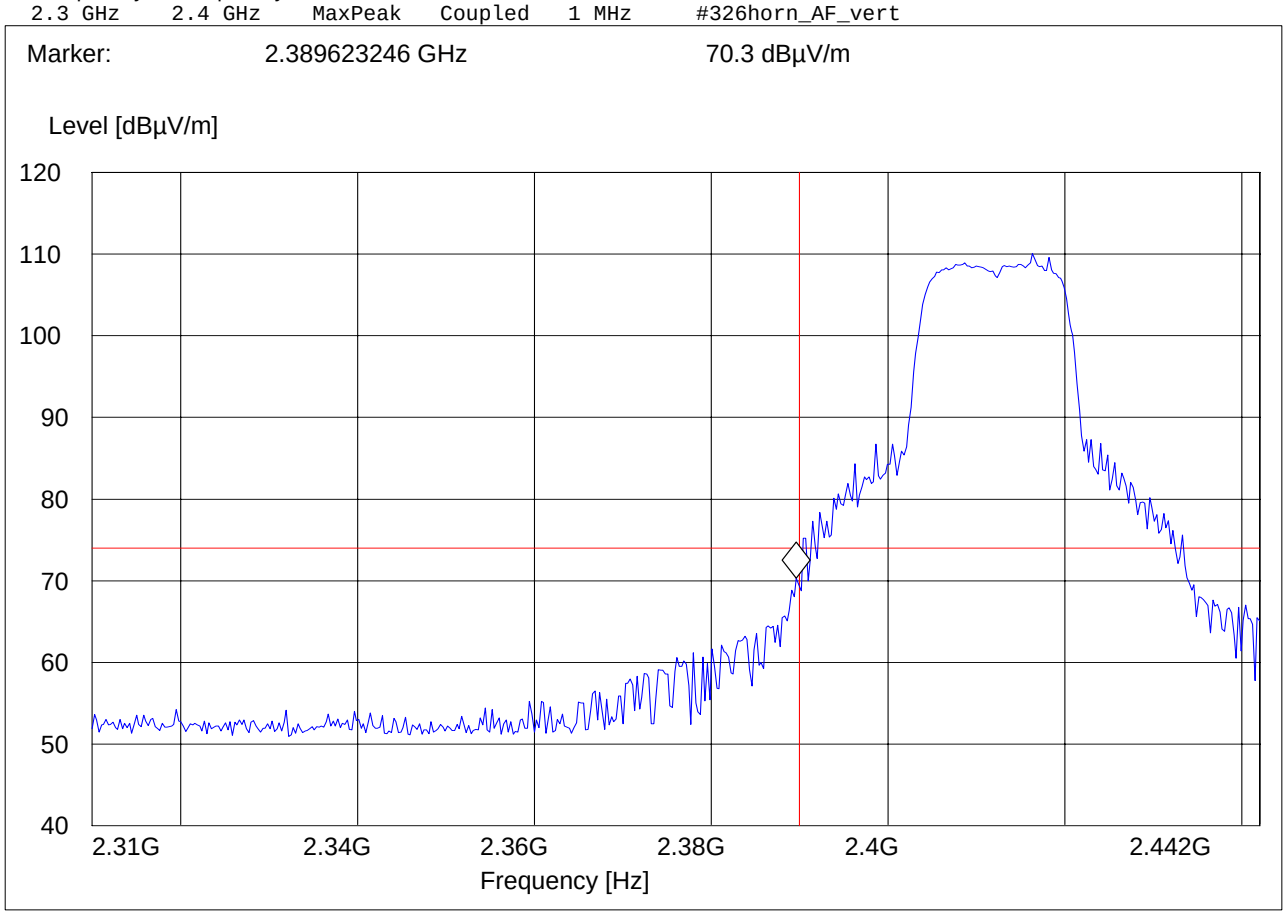
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.1, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



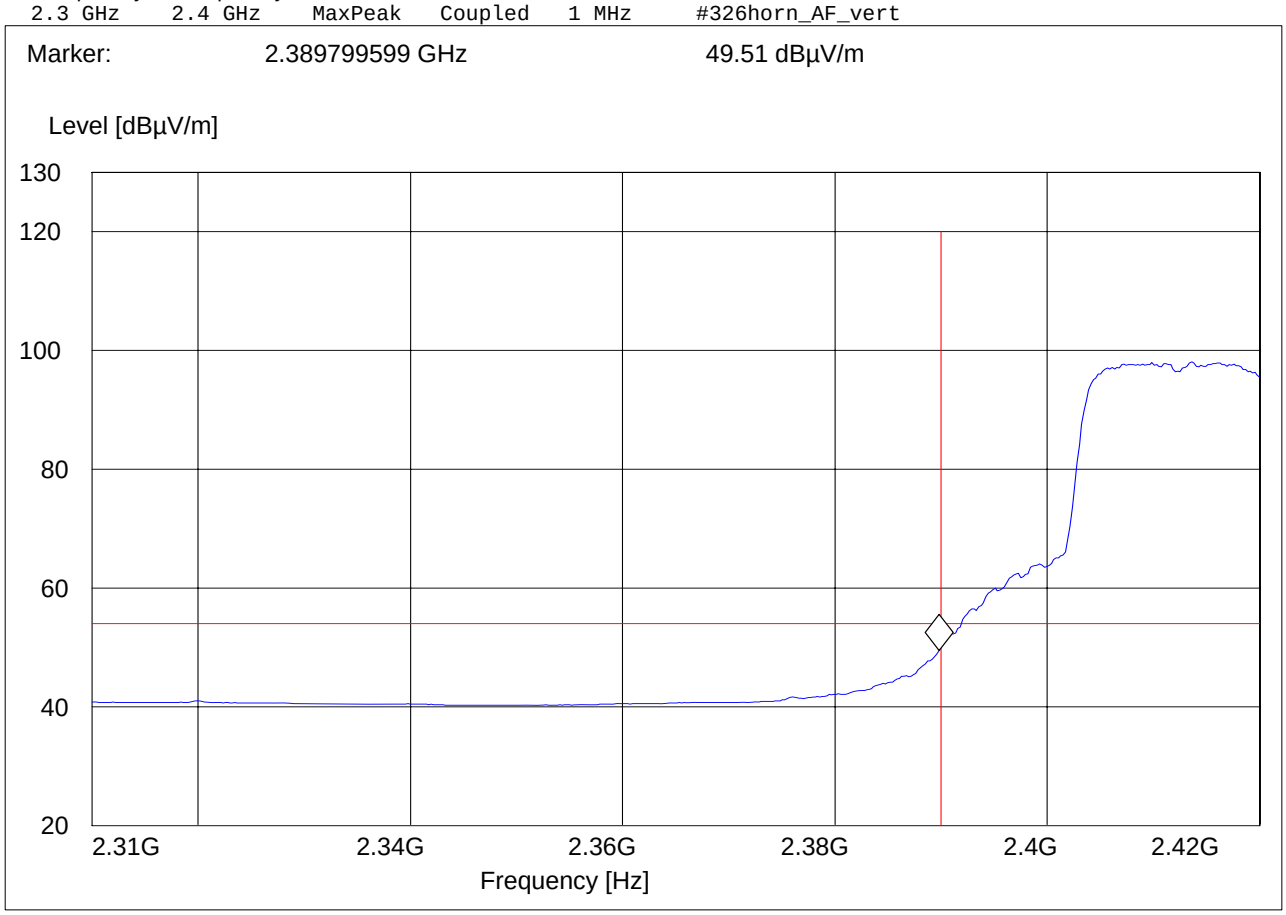
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.1, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



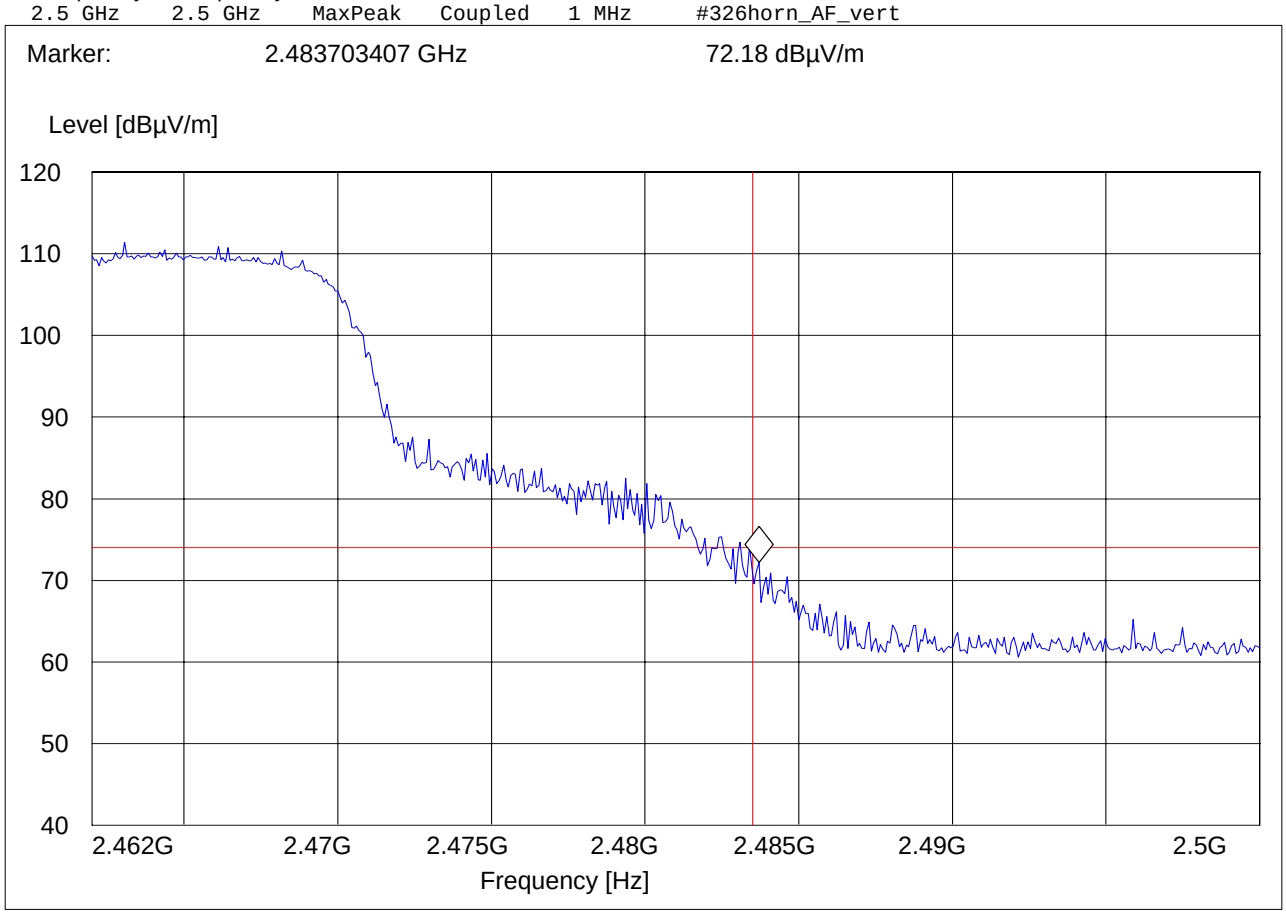
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.11, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
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



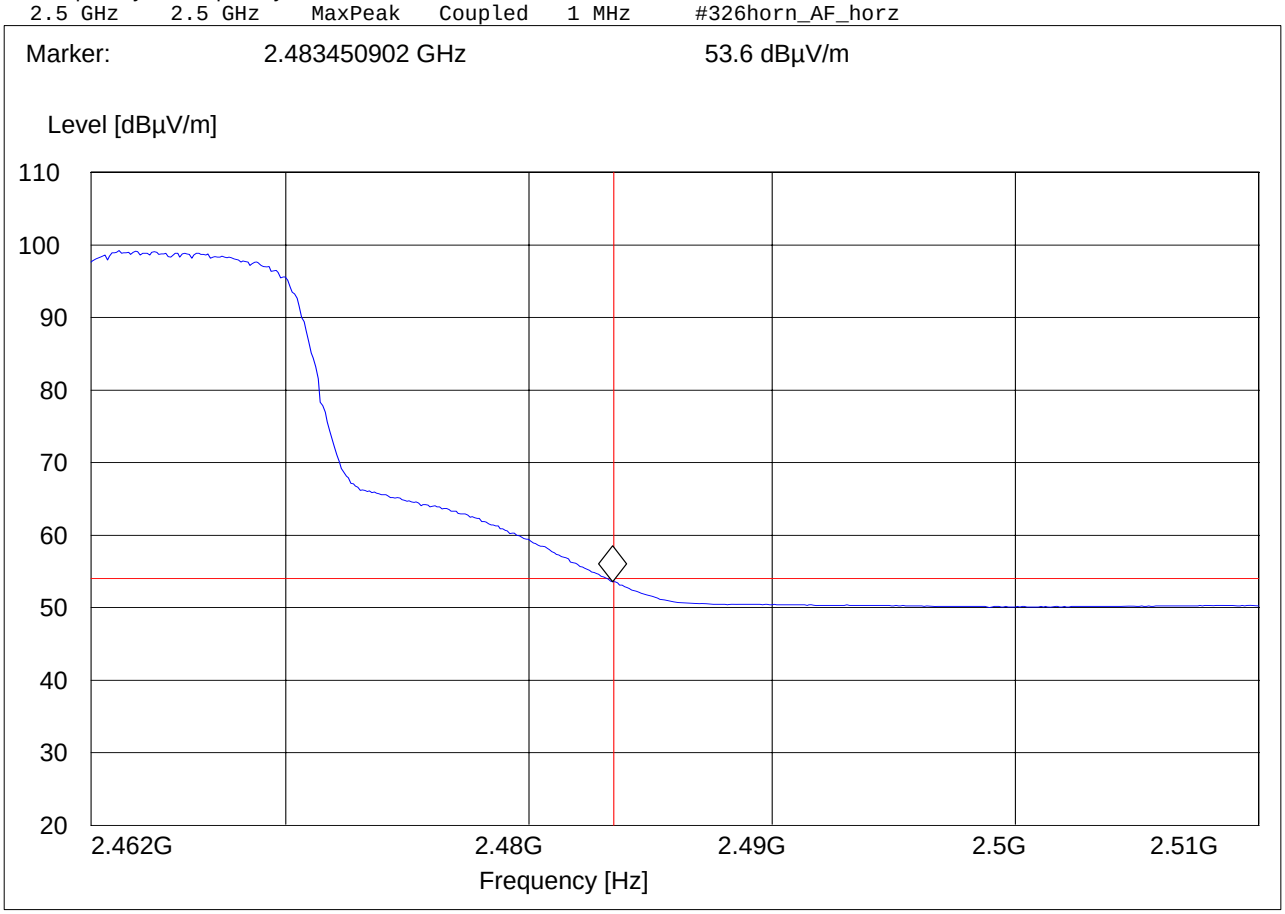
BAND EDGE COMPLIANCE §15.247 (d) & RSS-210(A8.5)

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.11, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



5.4 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)

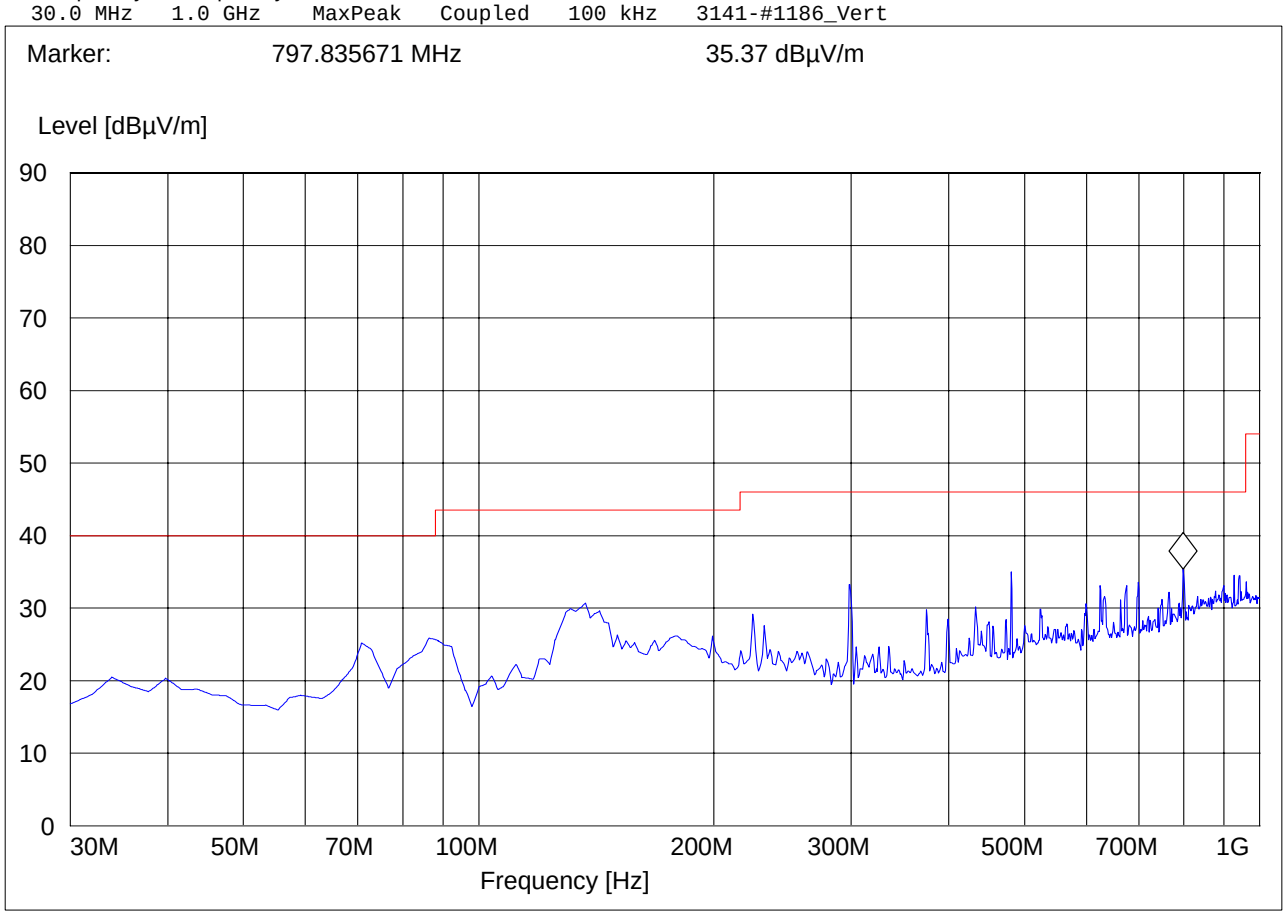
Lowest Channel (2412MHz): 30MHz – 1GHz

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



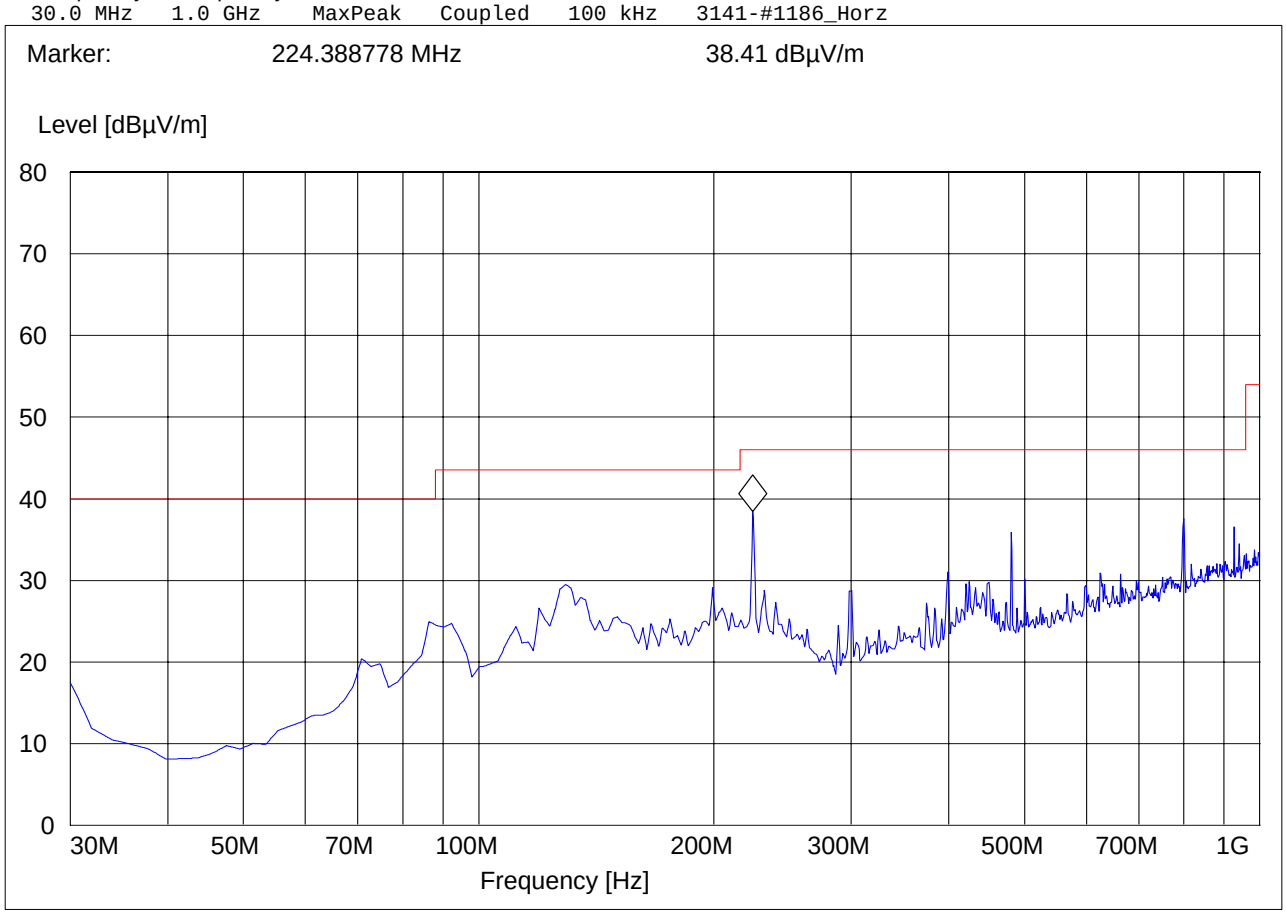
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Lowest Channel (2412MHz): 30MHz – 1GHz

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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

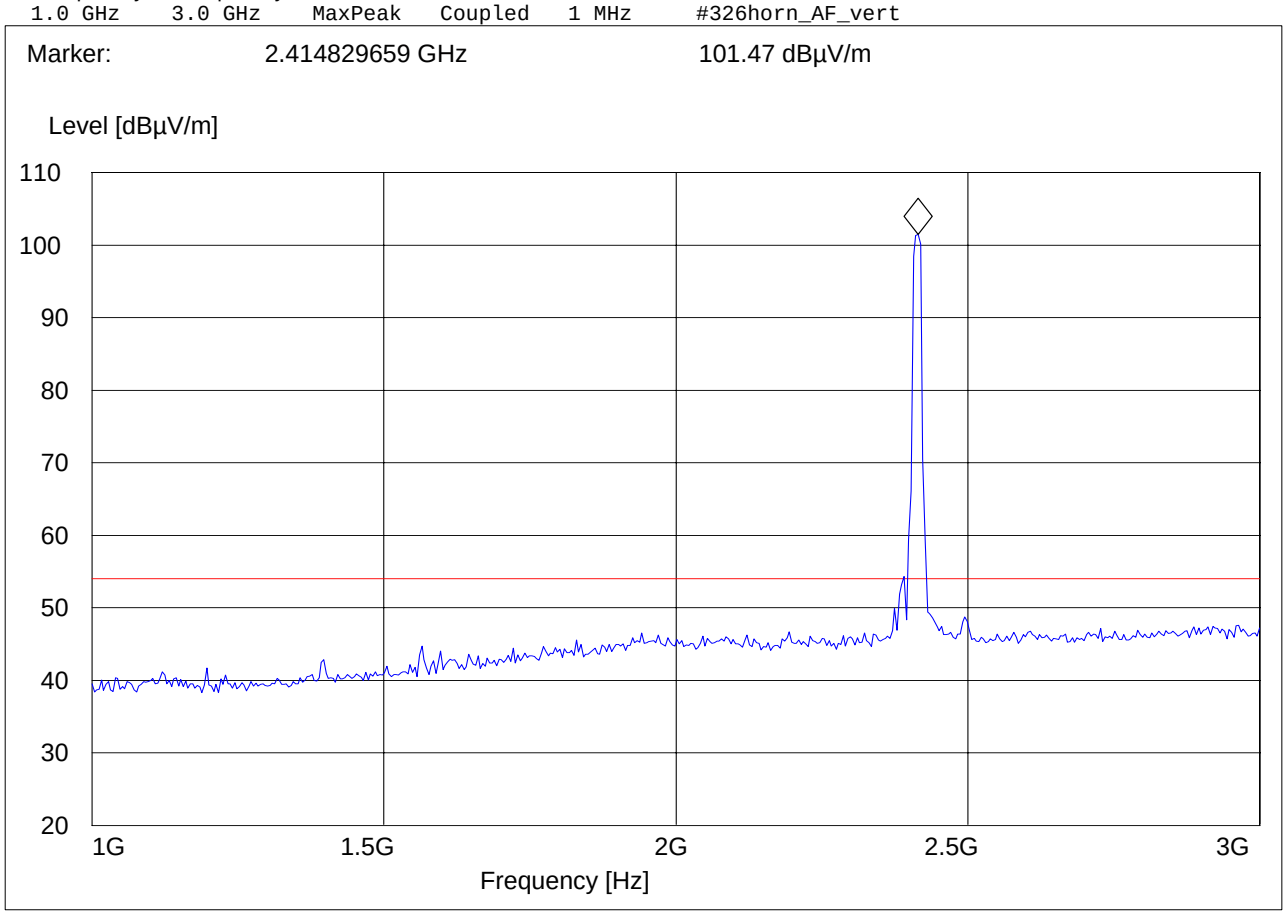


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 1GHz – 3 GHz
Note: Peak above the limit line is the carrier freq.

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.1, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         marker placed on Tx
```

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

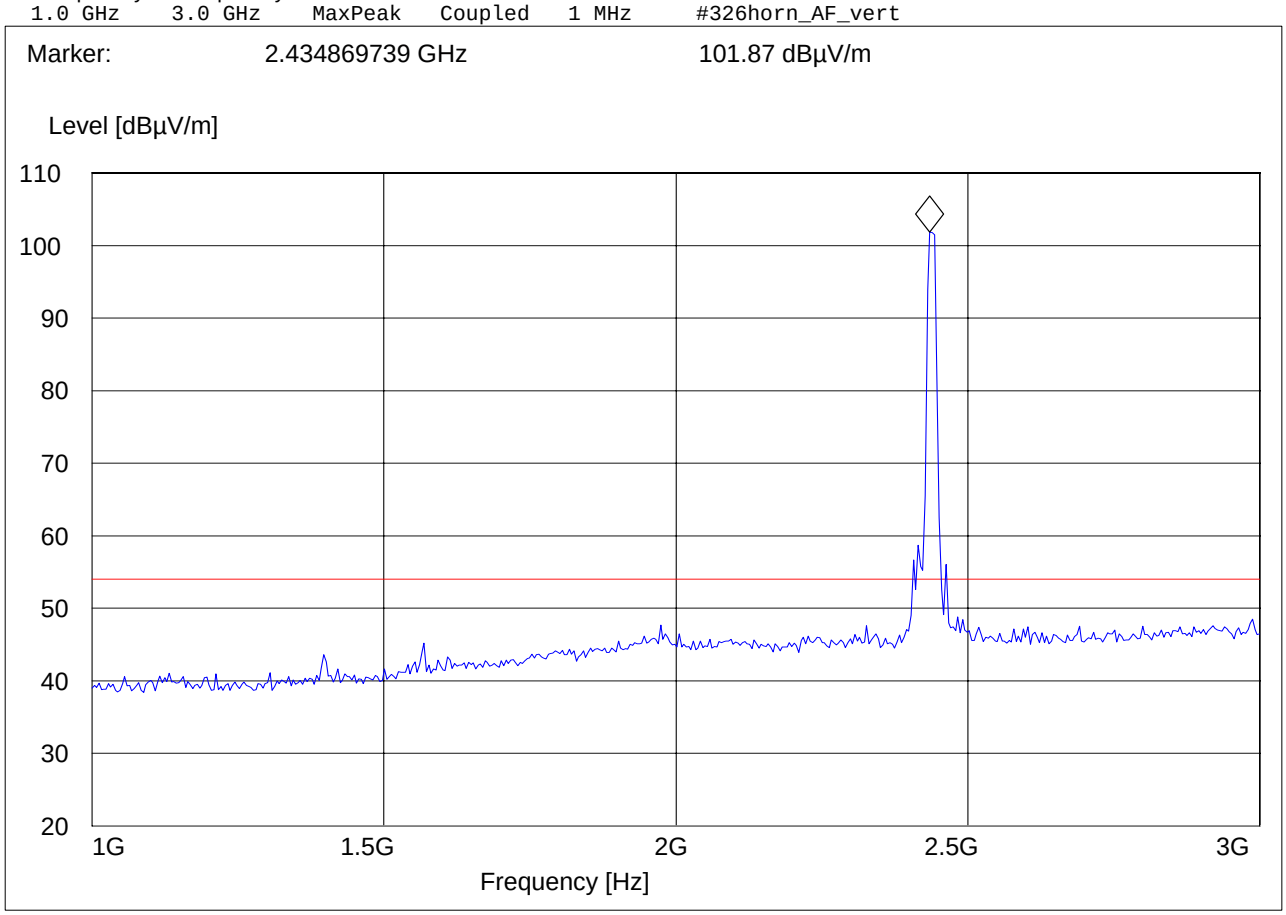


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 1GHz – 3 GHz
Note: Peak above the limit line is the carrier freq.

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         marker placed on Tx
```

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

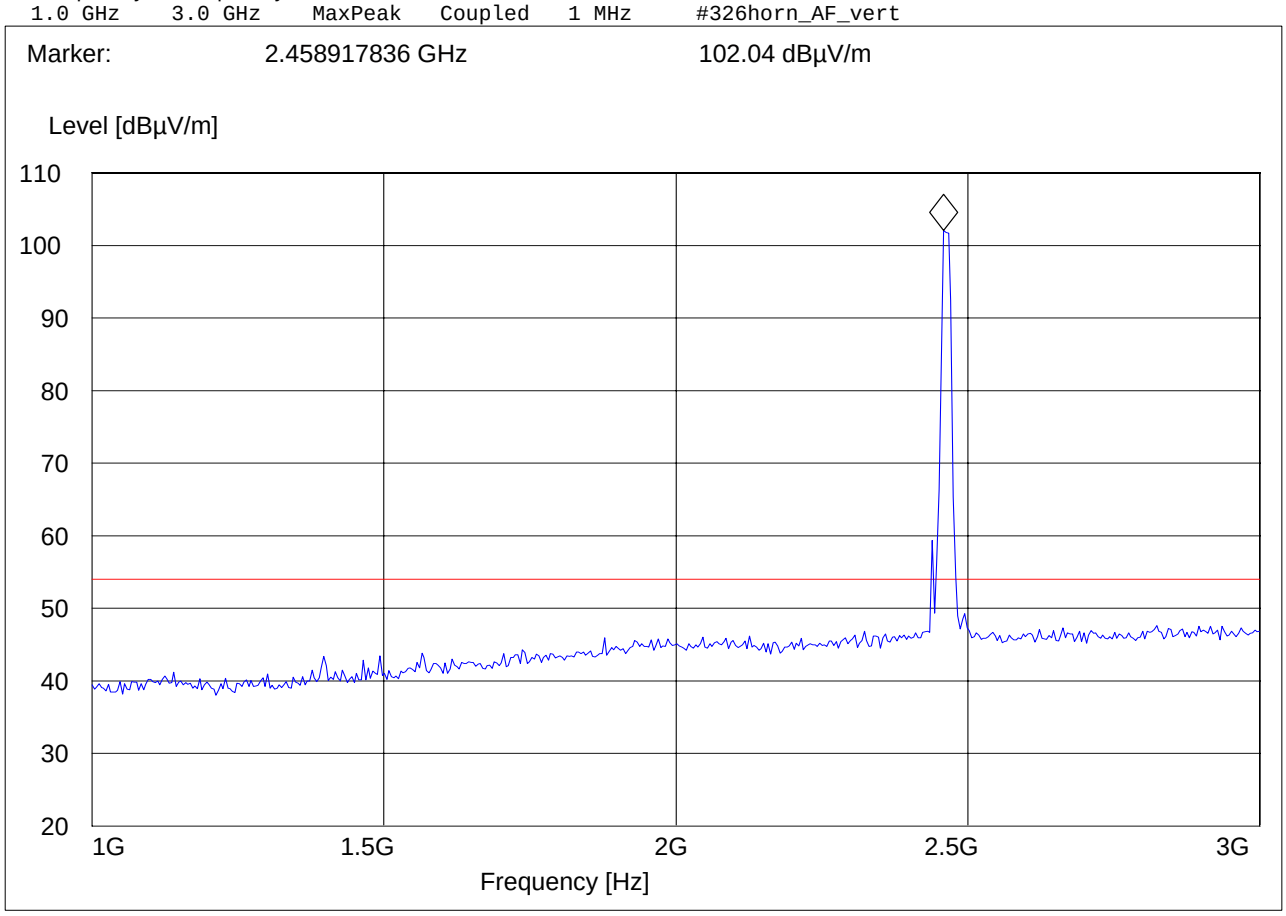


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 1GHz – 3 GHz
Note: Peak above the limit line is the carrier freq.

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.11, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:          marker placed on Tx
```

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

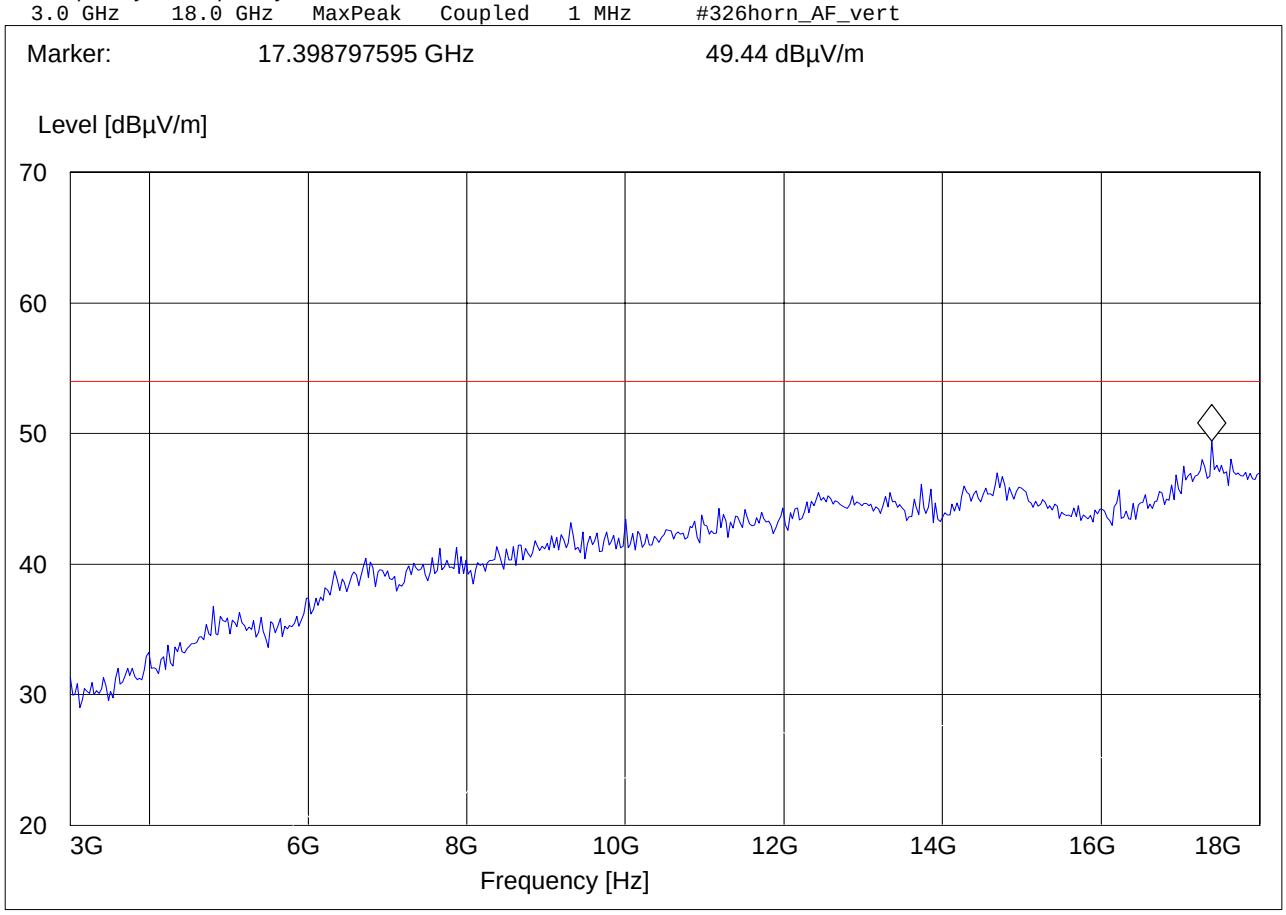


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 3GHz – 18 GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.1, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
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

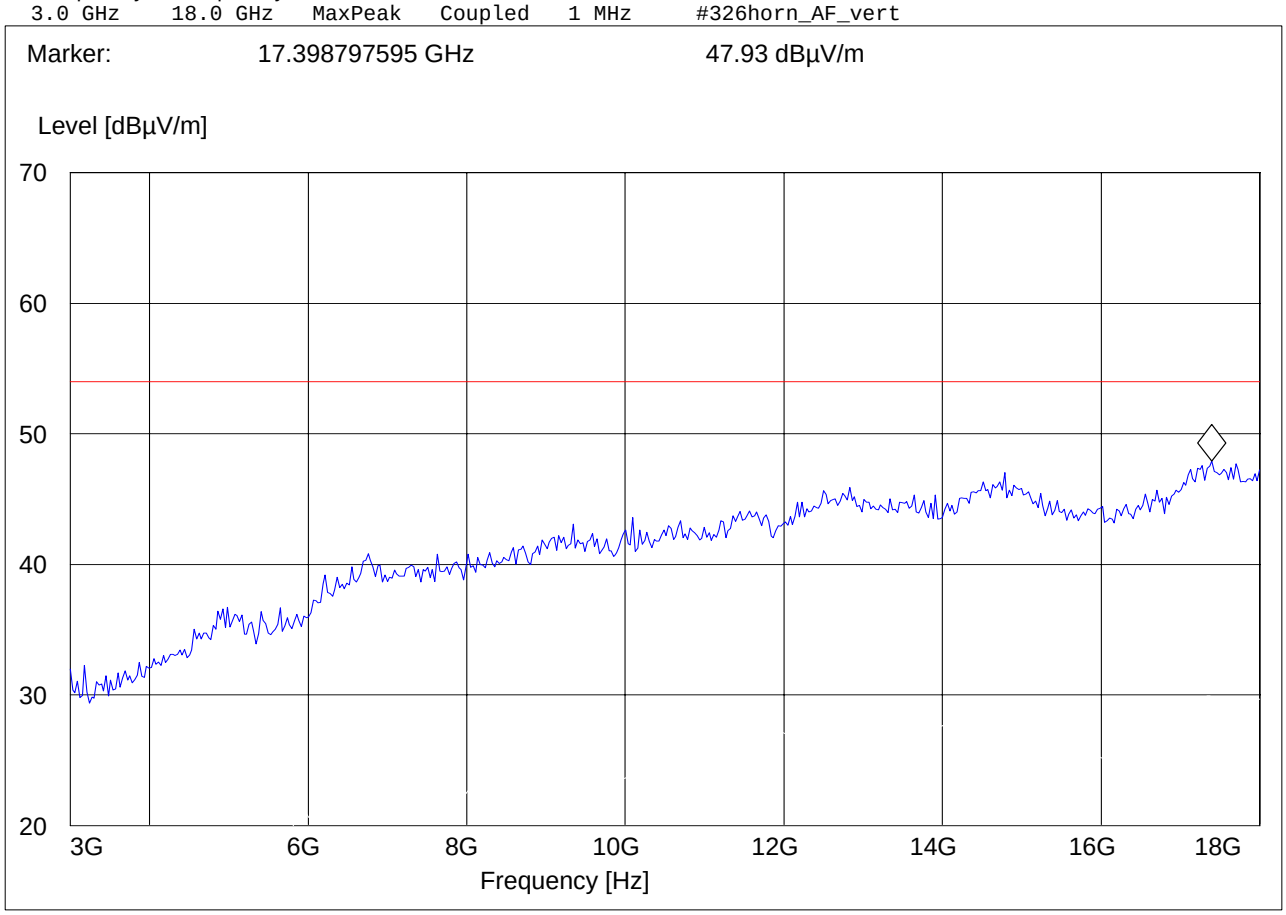


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 3GHz – 18 GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

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

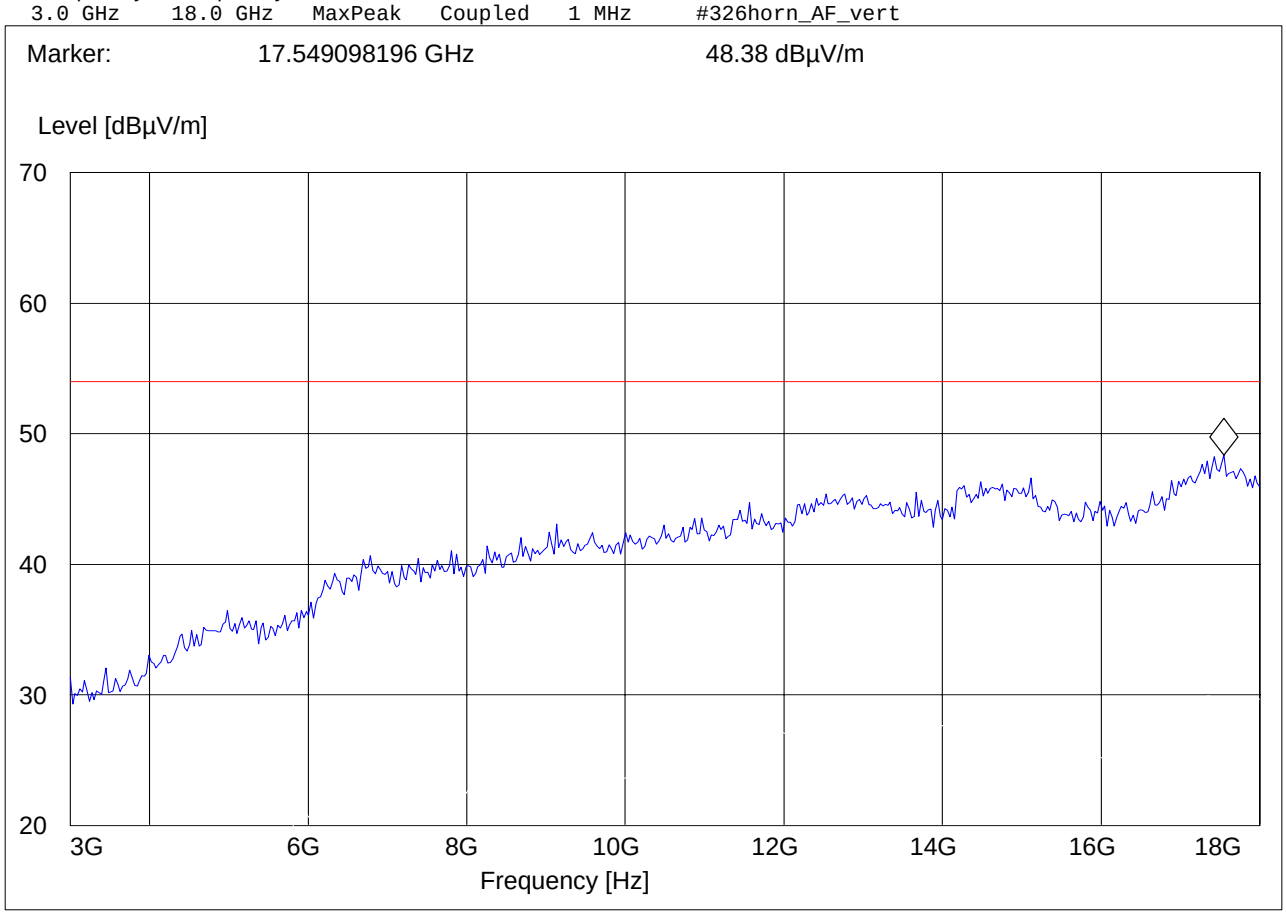


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 3 – 18GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.11, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

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

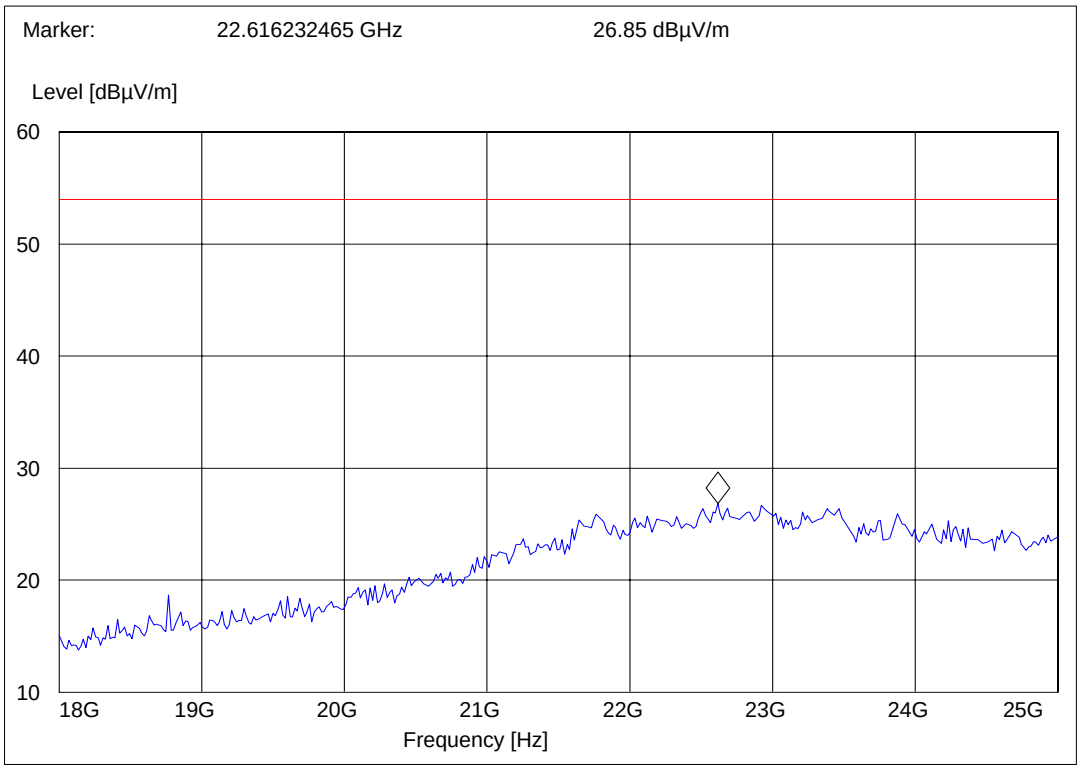


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
18GHz – 26.5GHz for low, middle, and high channels
Note: This plot is valid for low, mid, high channels (worst-case plot)

```
EUT / Description: BCM94312MCG
Manufacturer:      Broadcom
Operation Mode:    CH.13, 802.11g 11dBm, Main
ANT Orientation:   V & H
EUT Orientation:   H
Test Engineer:     Chris
Voltage:           AC Adapter
Comments::         Marker placed on transmit signal; with 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	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			

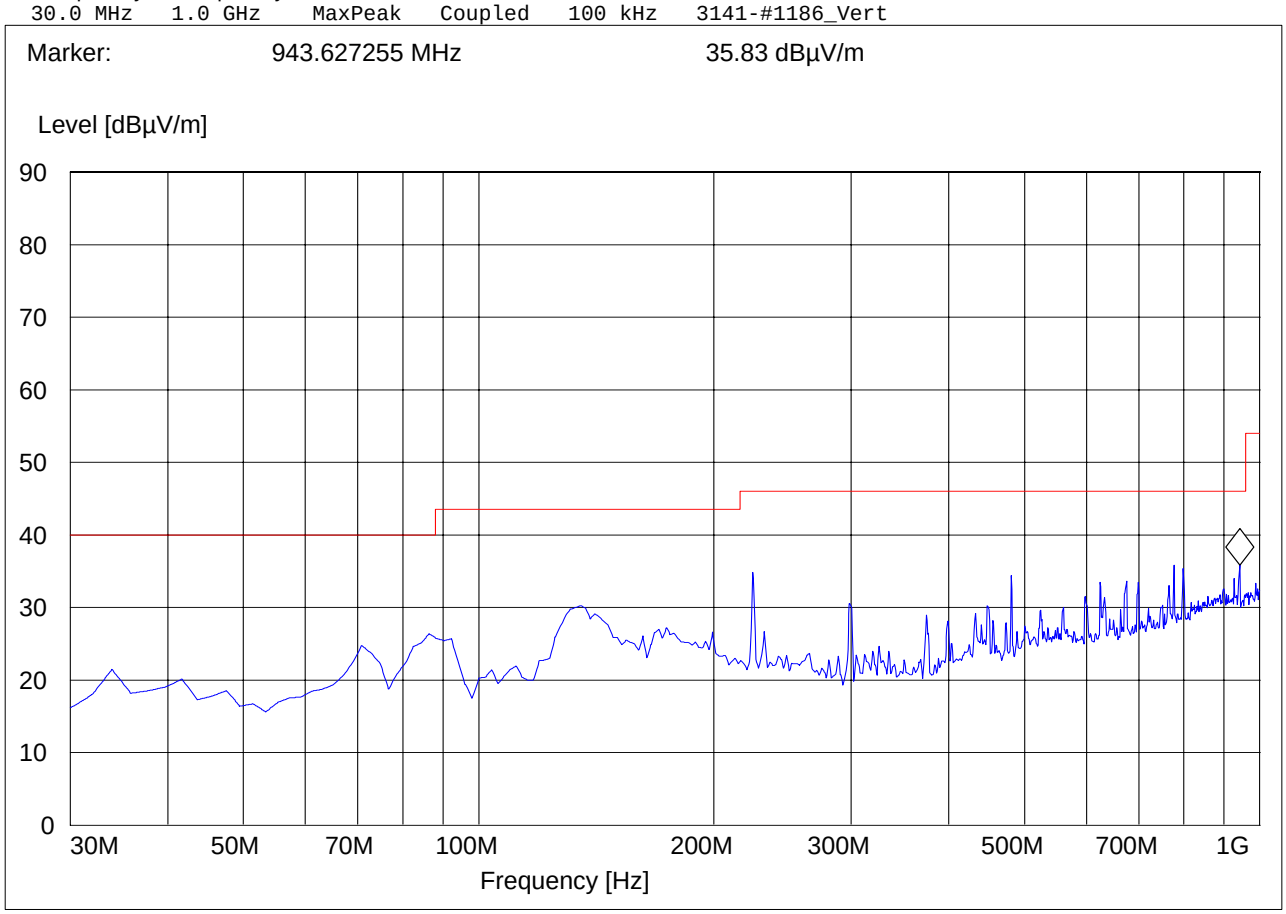
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Lowest Channel (2412MHz): 30MHz – 1GHz

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.6, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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



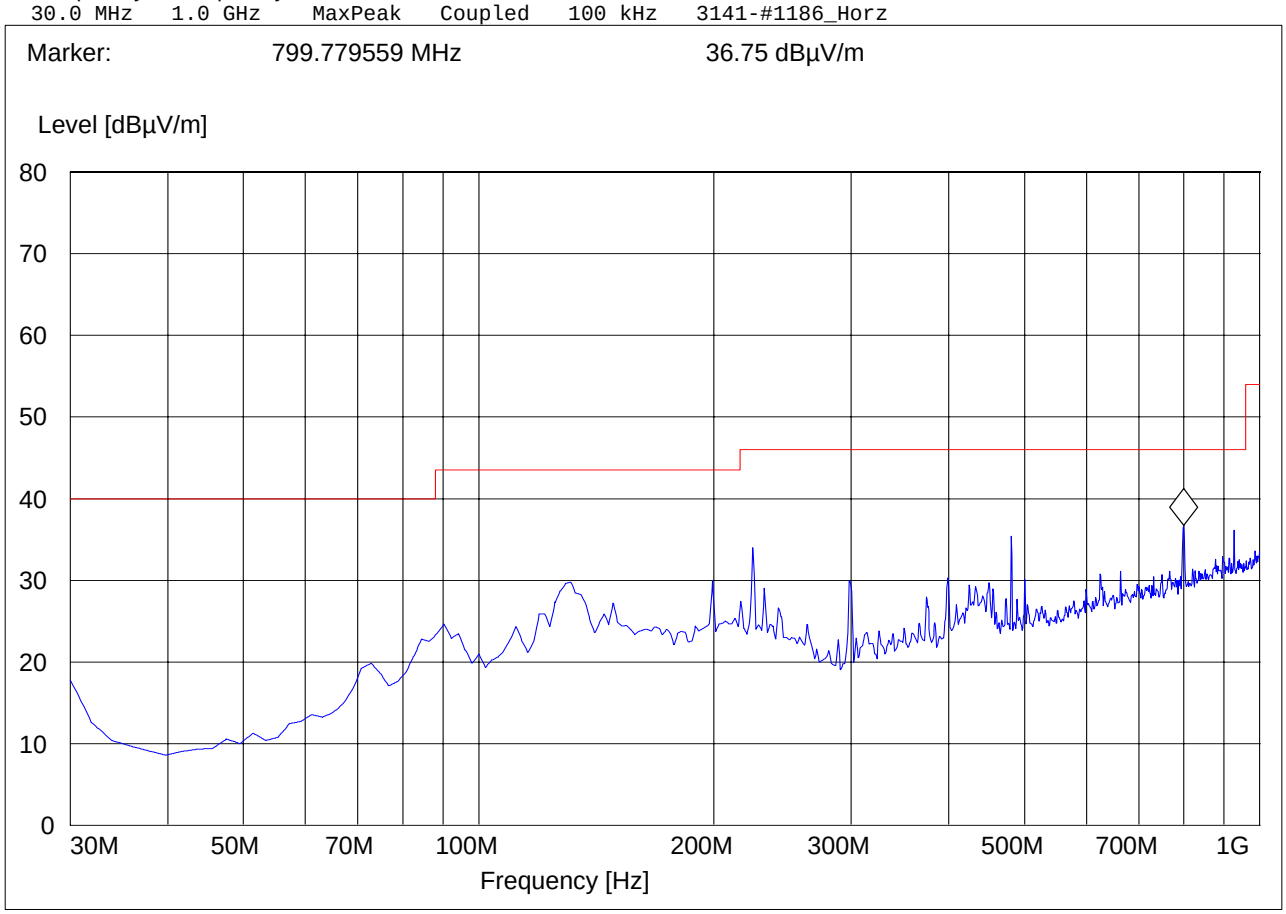
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
Lowest Channel (2412MHz): 30MHz – 1GHz

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

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.6, AUX
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          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

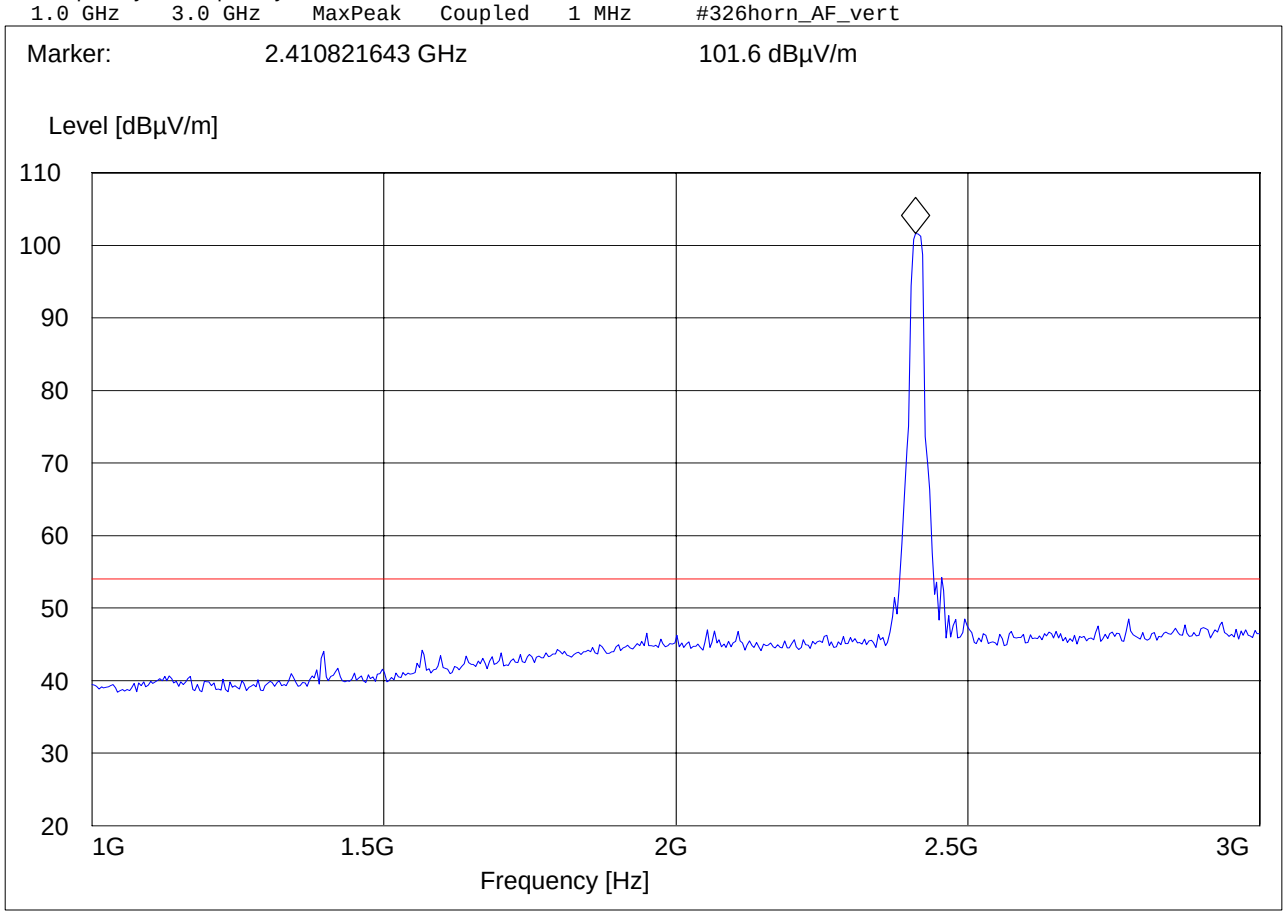


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 1GHz – 3 GHz
Note: Peak above the limit line is the carrier freq.

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.1, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         marker placed on Tx
```

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

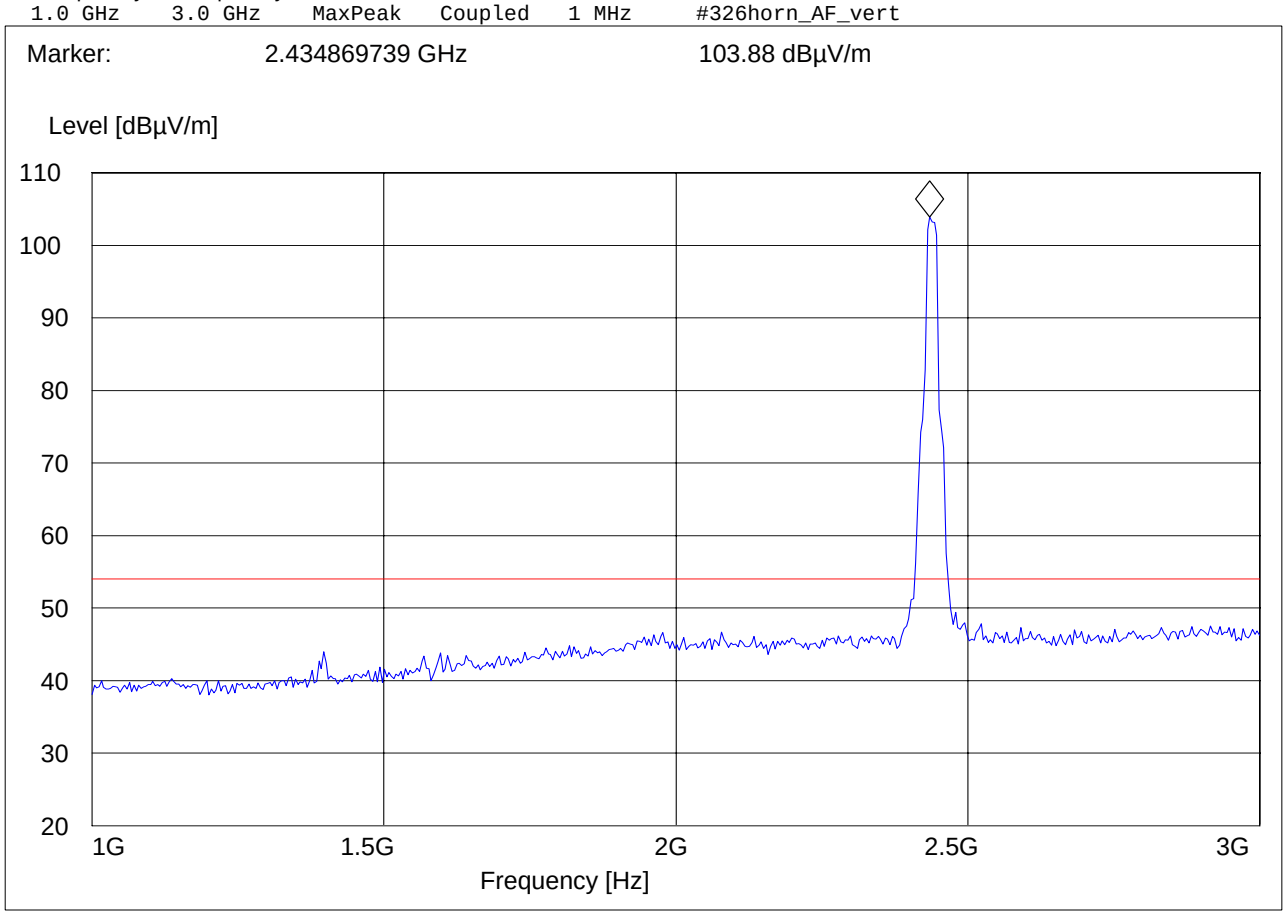


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 1GHz – 3 GHz
Note: Peak above the limit line is the carrier freq.

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.6, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:          marker placed on Tx
```

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

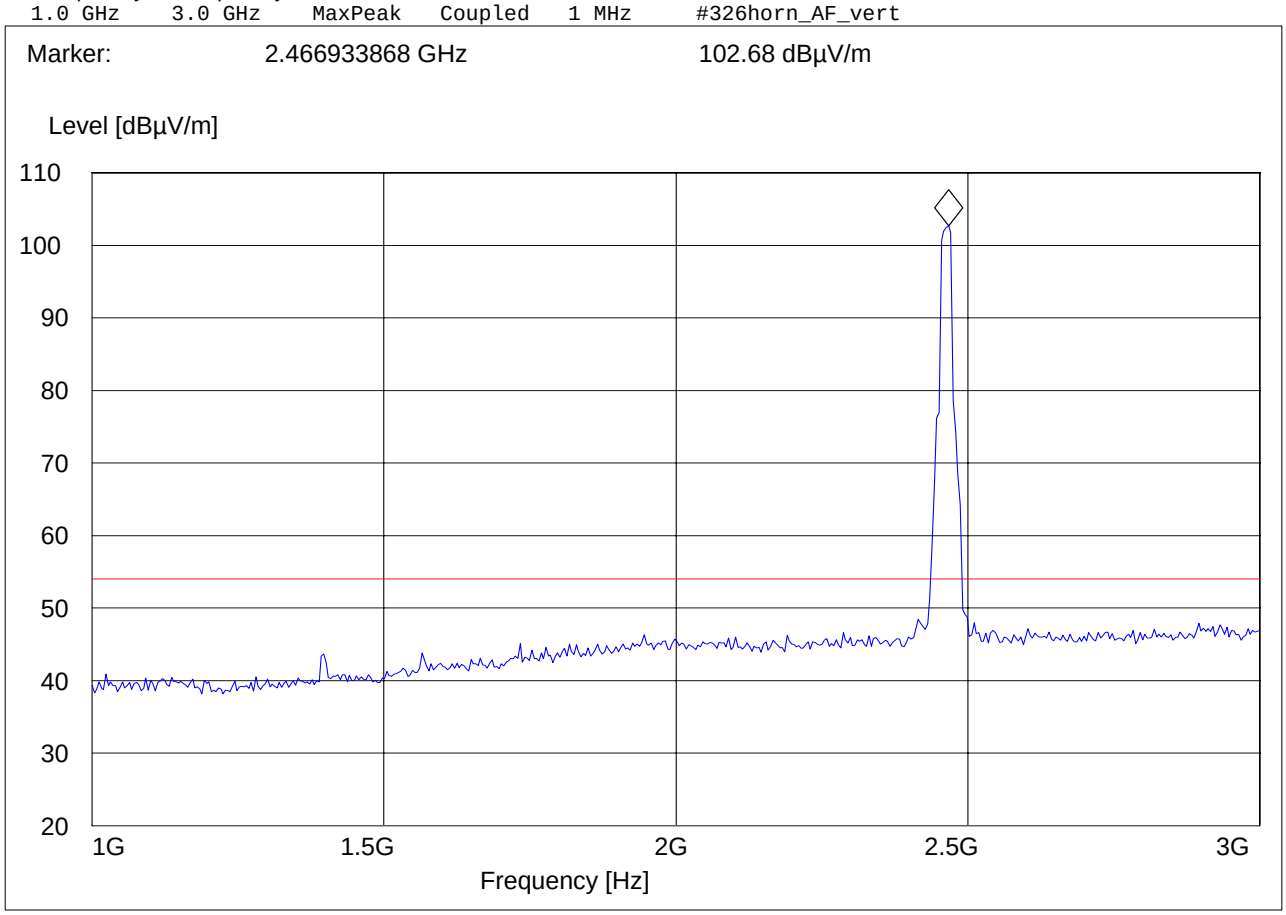


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 1GHz – 3 GHz
Note: Peak above the limit line is the carrier freq.

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.11, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:          marker placed on Tx
```

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

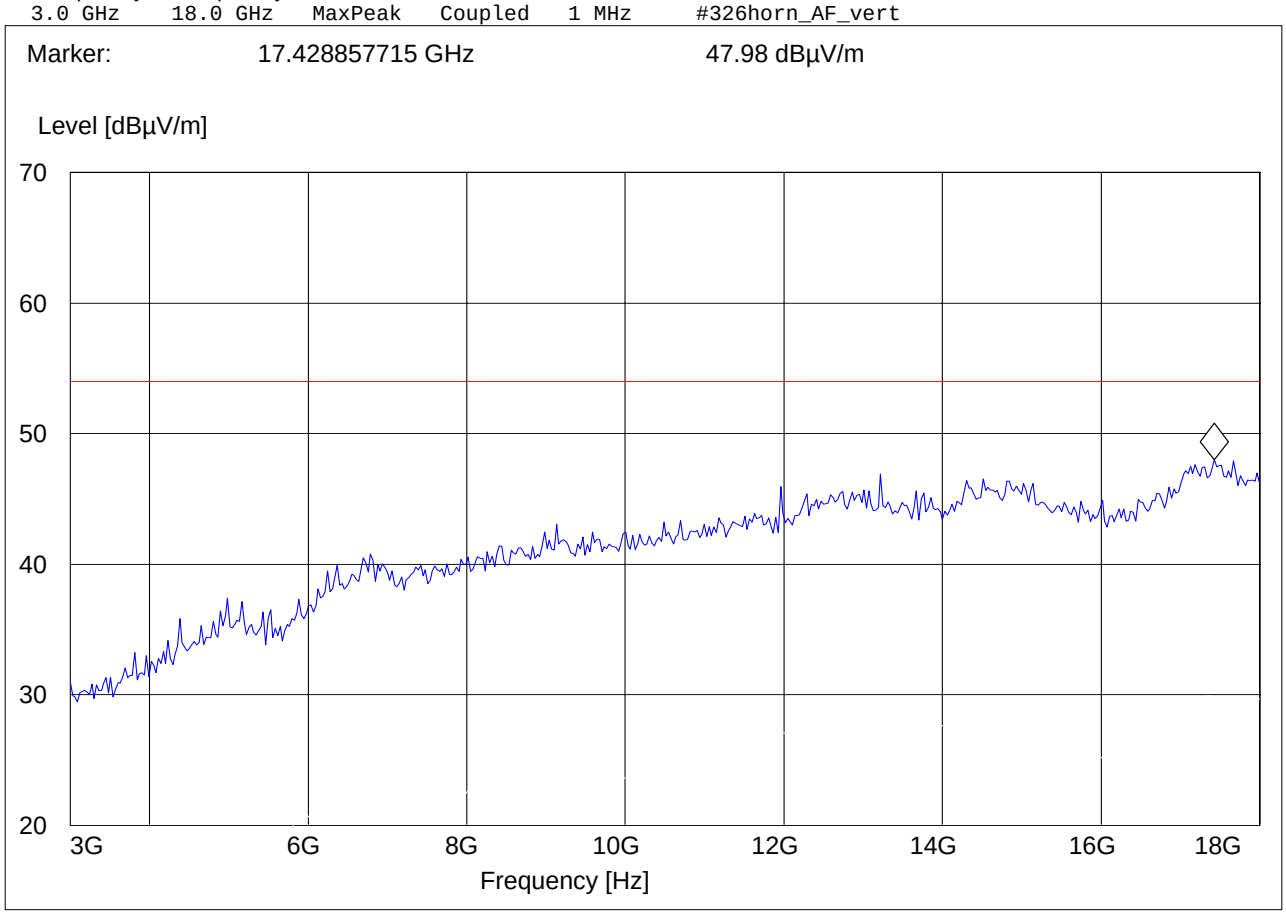


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2412 MHz: 3GHz – 18 GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.1, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

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

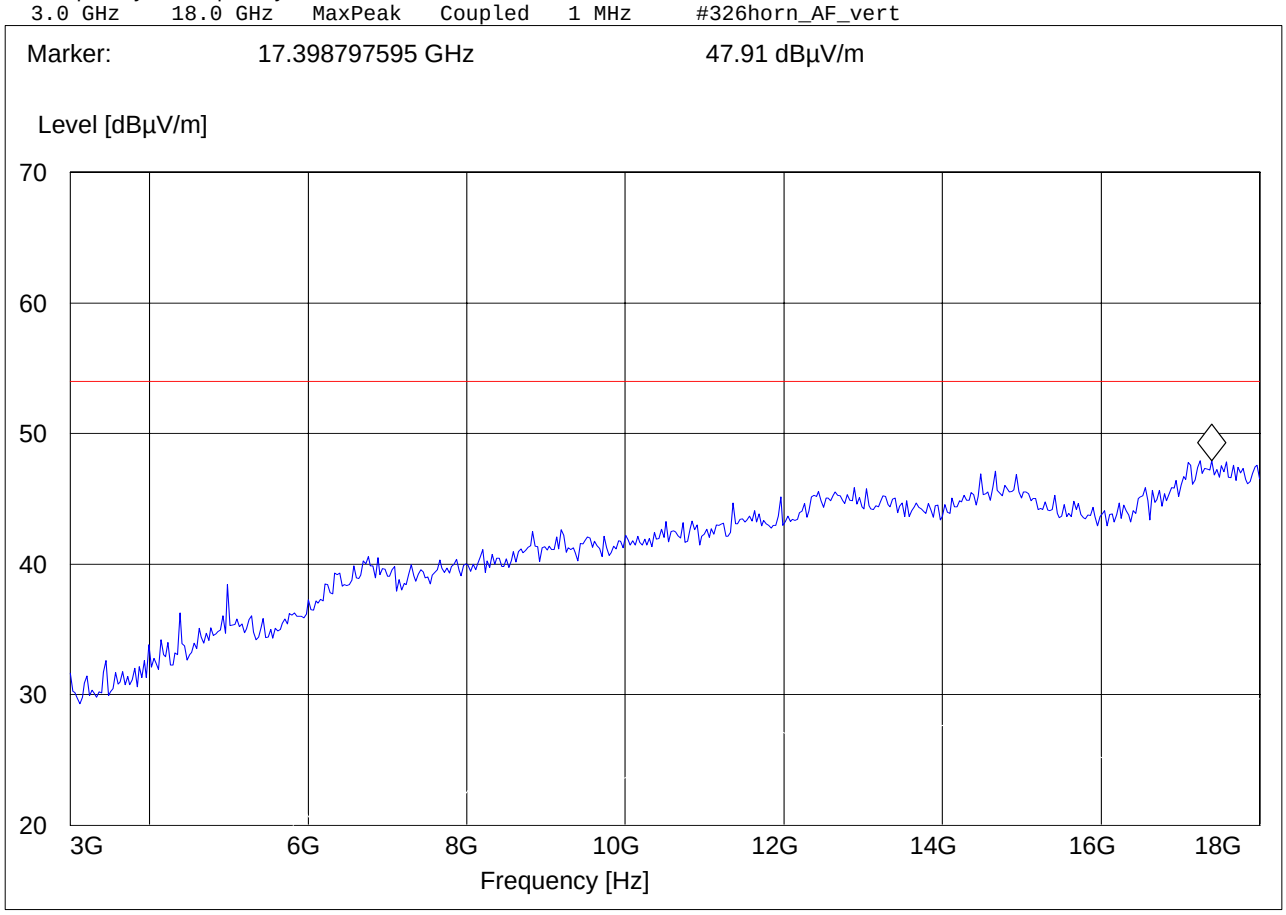


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2437 MHz: 3GHz – 18 GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.6, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
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

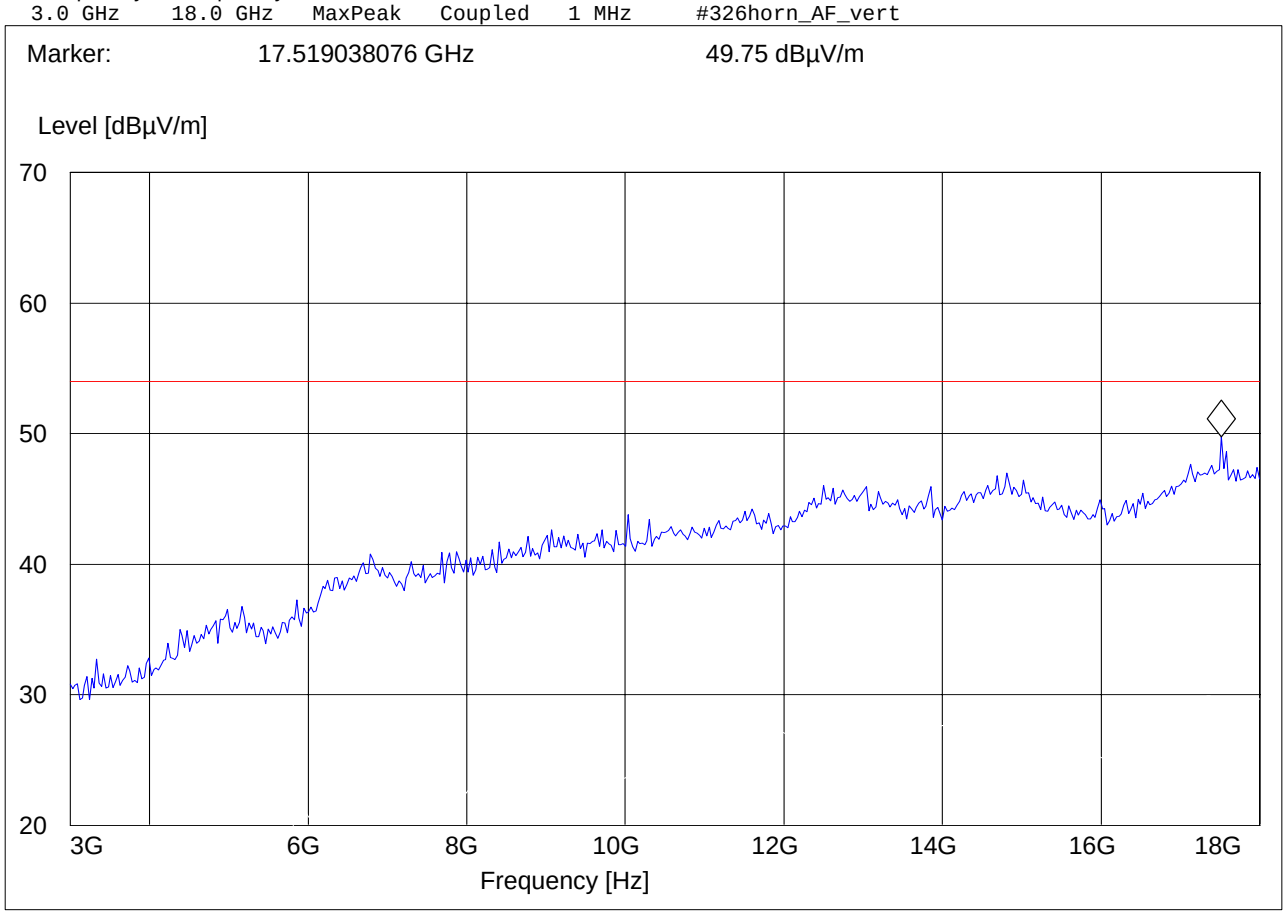


EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5)
2462 MHz: 3 – 18GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11G, CH.11, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
```

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



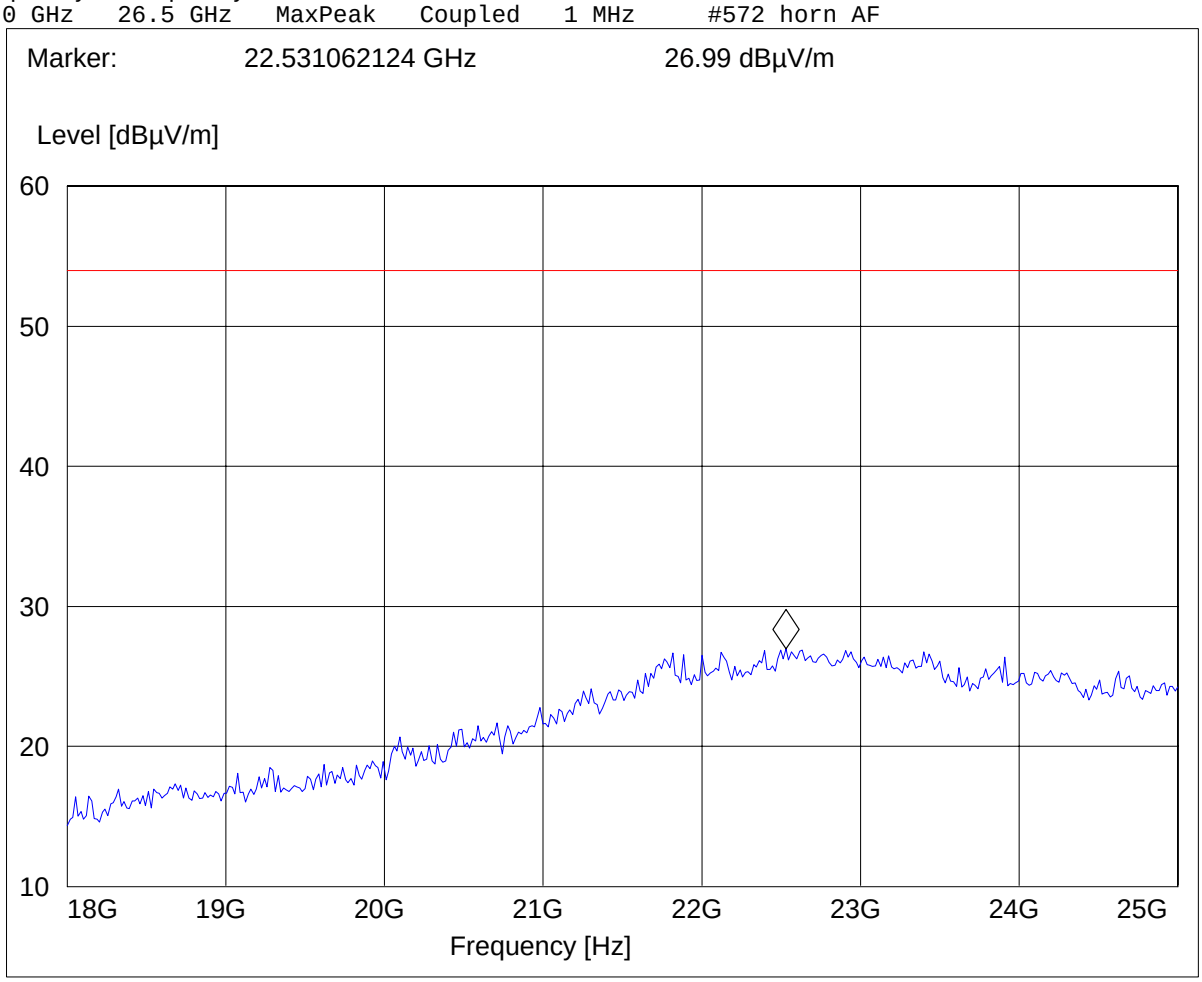
EMISSION LIMITATIONS - Radiated (Transmitter) §15.247 (d) & RSS-210(A8.5) 18GHz – 26.5GHz for low, middle, and high channels

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

```
EUT:              BCM94312MCG
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



5.5 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
30MHz – 18GHz	CANADA_30M-18G	PASS

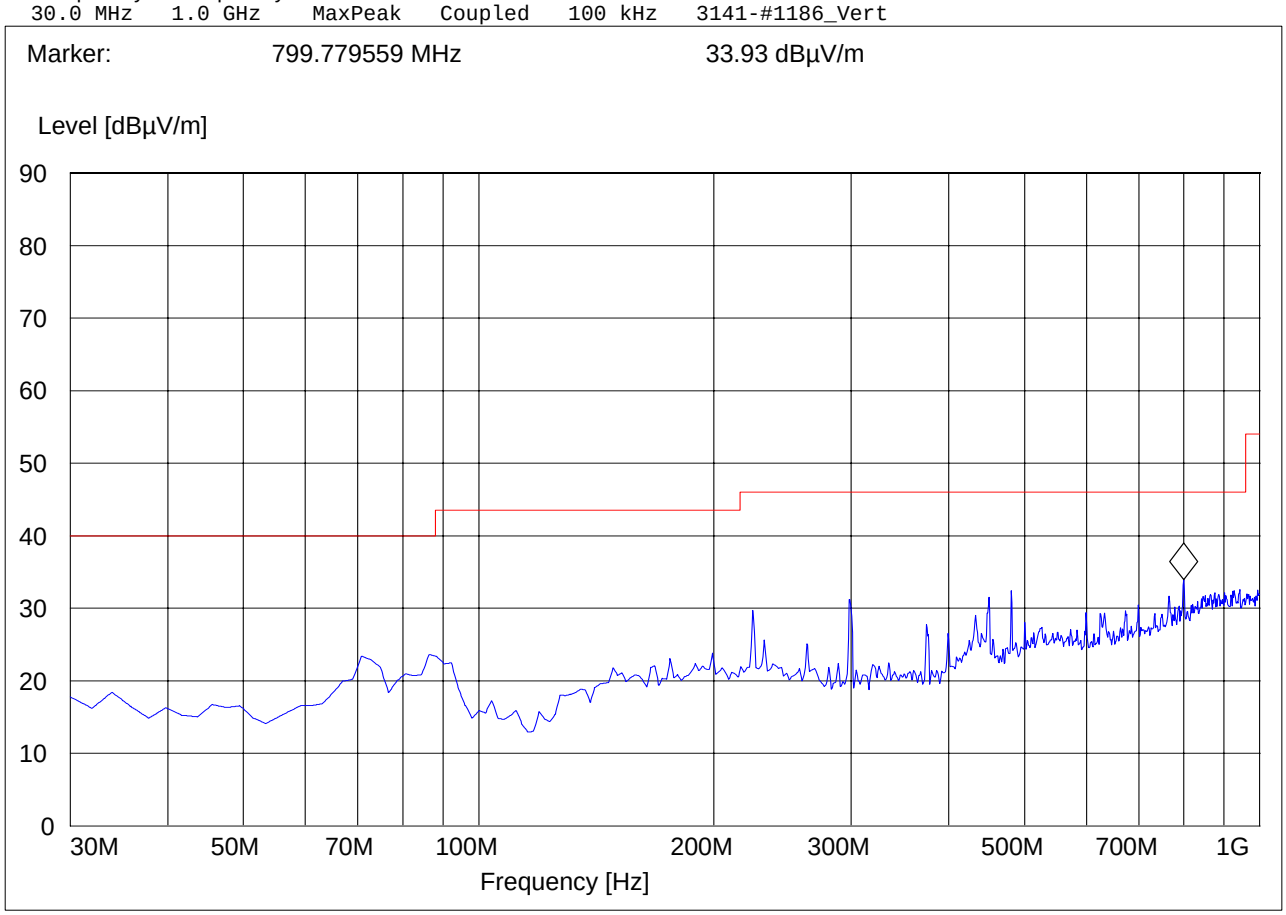
EMISSION LIMITATIONS - Radiated (Receiver) RSS-GEN (4.10) & (6)

Middle Channel (2437MHz): 30MHz – 1GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  V
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         IDLE
```

SWEEP TABLE: "Canada _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



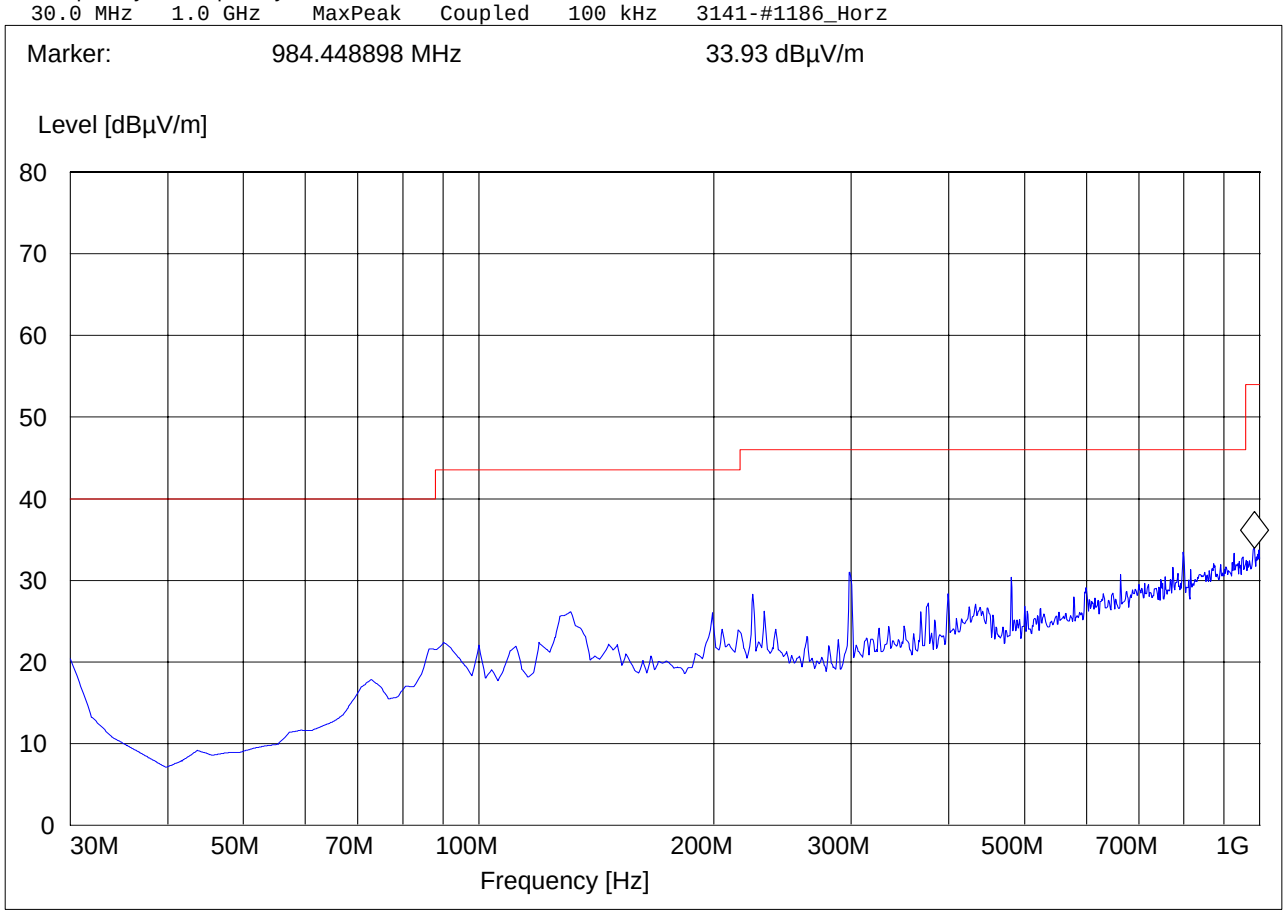
EMISSION LIMITATIONS - Radiated (Receiver) RSS-GEN (4.10) & (6)

Middle Channel (2437MHz): 30MHz – 1GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         IDLE
```

SWEEP TABLE: "Canada _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



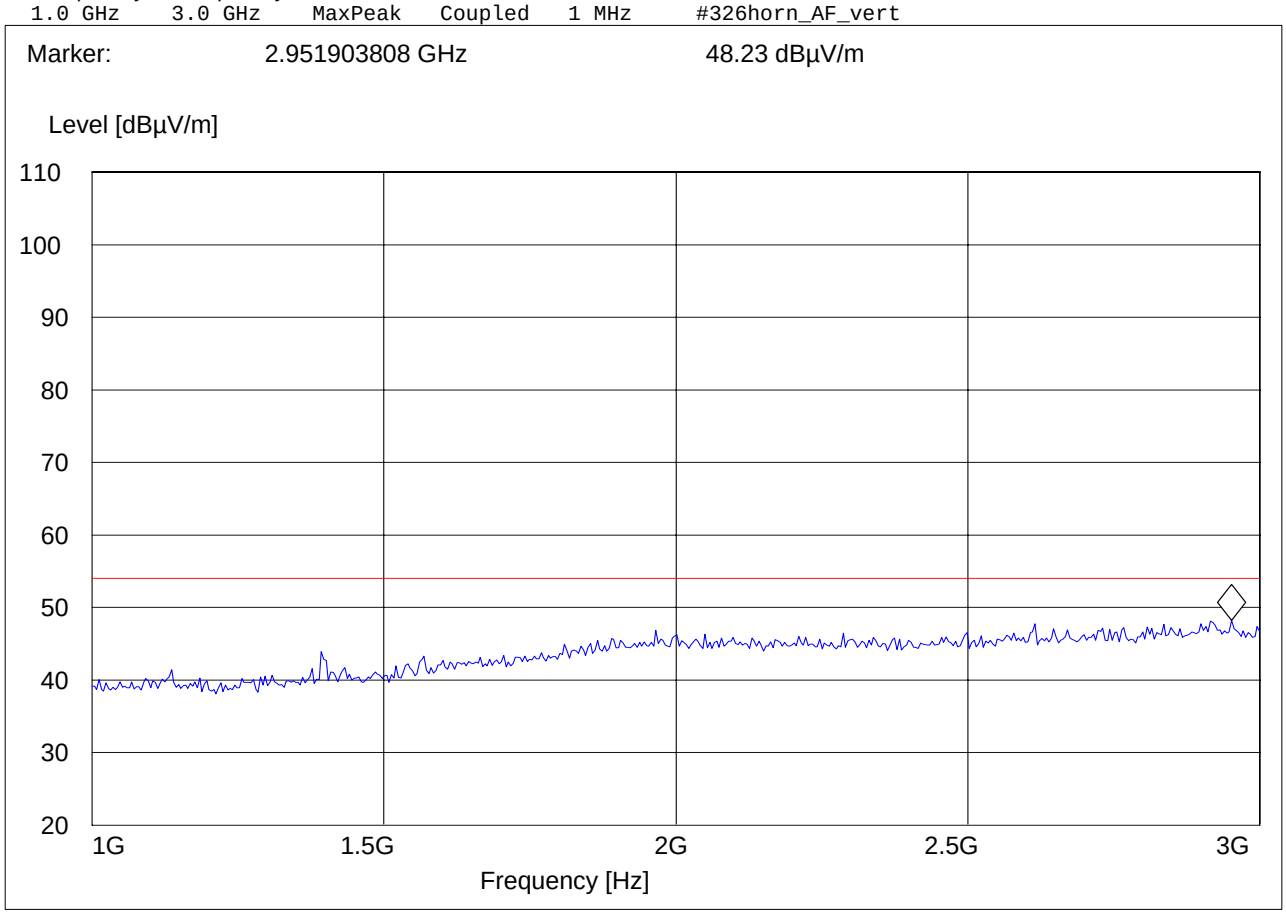
EMISSION LIMITATIONS - Radiated (Receiver) RSS-GEN (4.10) & (6)

Middle Channel (2437MHz): 1GHz – 3GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         IDLE
```

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



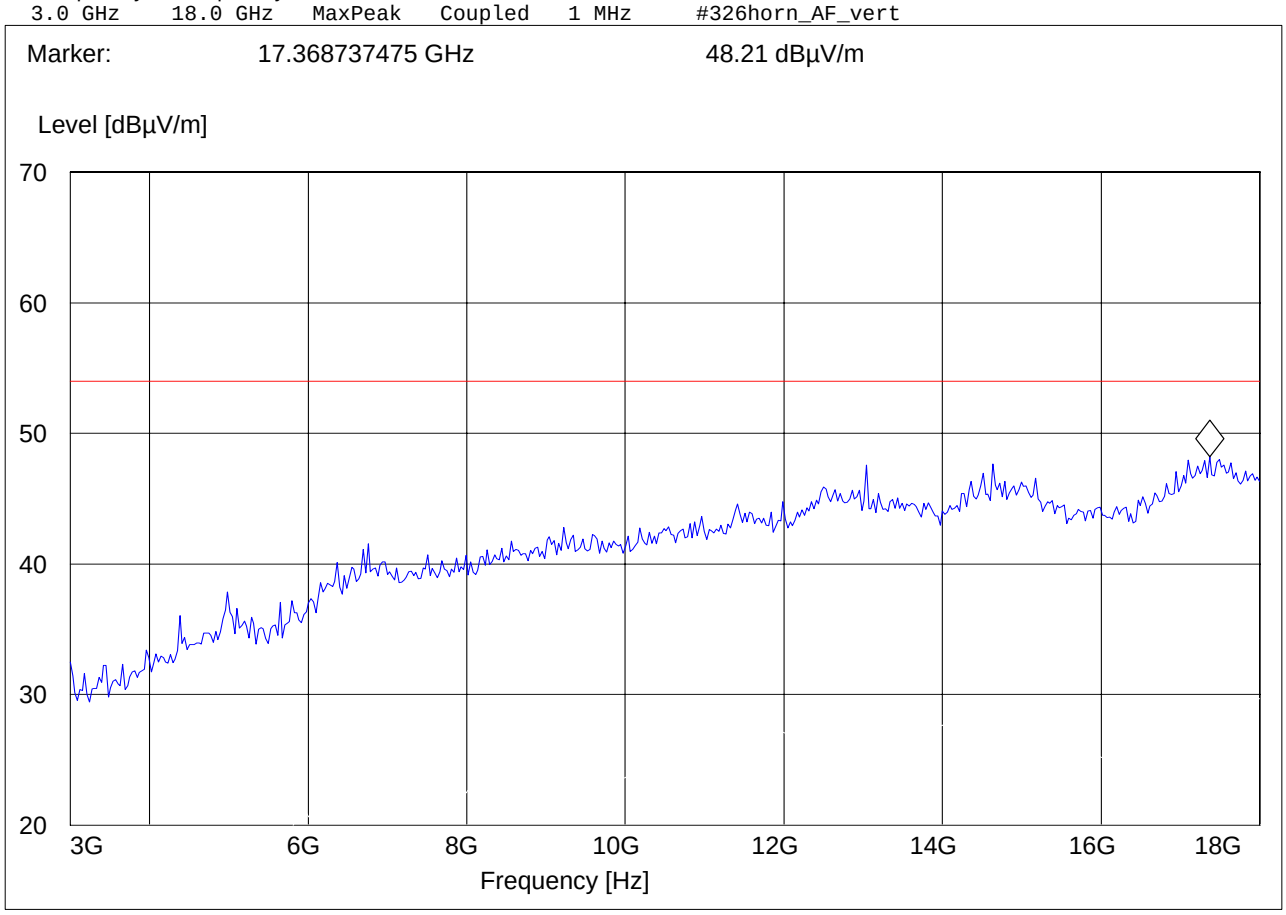
EMISSION LIMITATIONS - Radiated (Receiver) RSS-GEN (4.10) & (6)

Middle Channel (2437MHz): 3GHz – 18GHz

```
EUT:              SOYUZ
Customer::        Broadcom
Test Mode:        802.11B, CH.6, AUX
ANT Orientation:  V & H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC Adapter
Comments:         IDLE
```

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



6 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.

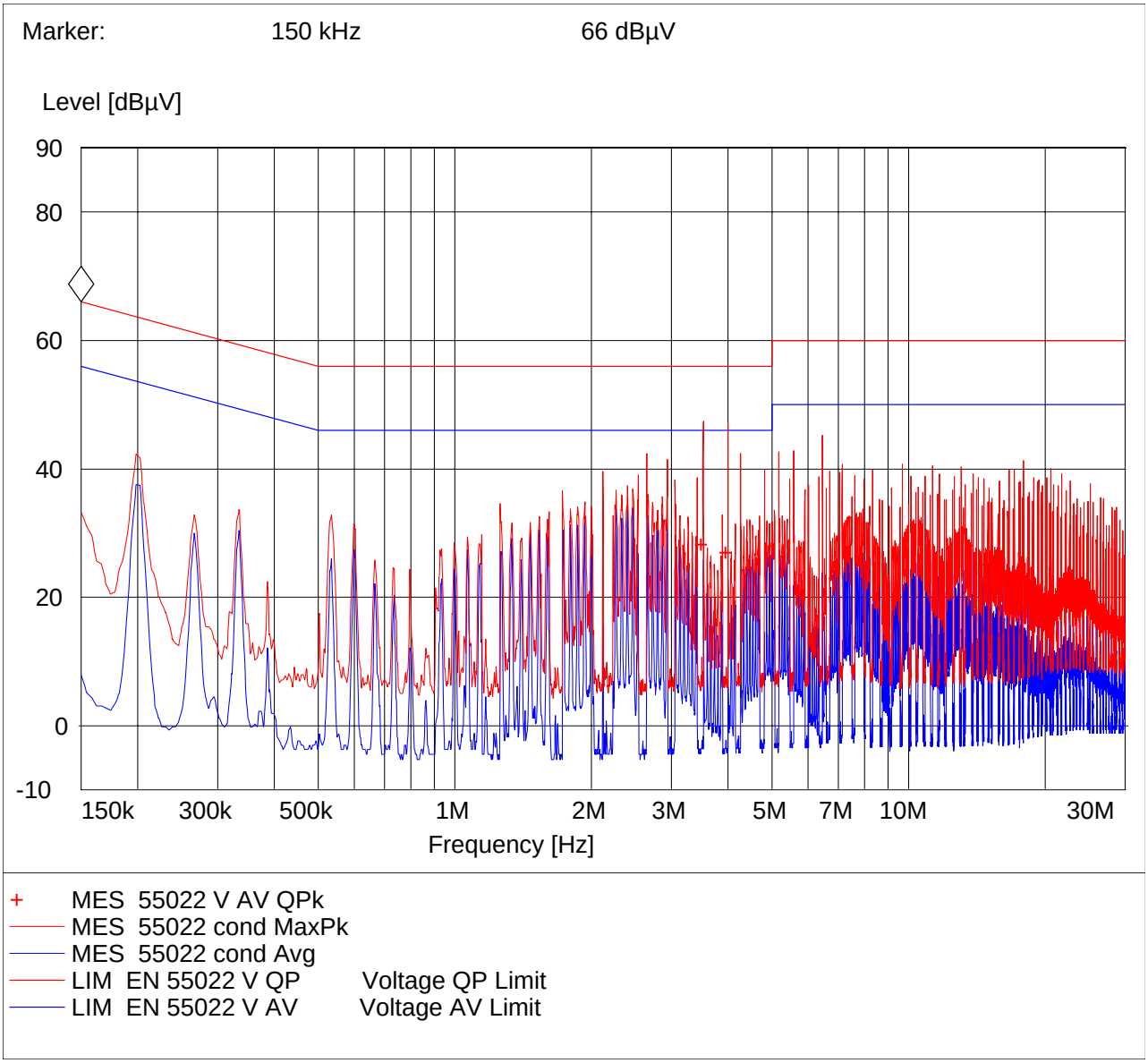
Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

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.

Voltage Mains Test (Line), Transmit

```
EUT:                  SOYUZ
Manufacturer:         Broadcom
Operating Condition:  802.11B, CH.11, AUX
ANT Orientation::     Conducted - TX
EUT Orientation::     H
Test Engineer::       Chris
Power Supply: :       120V AC
Comments:  :          Line
```



MEASUREMENT RESULT: "55022 V QPk"

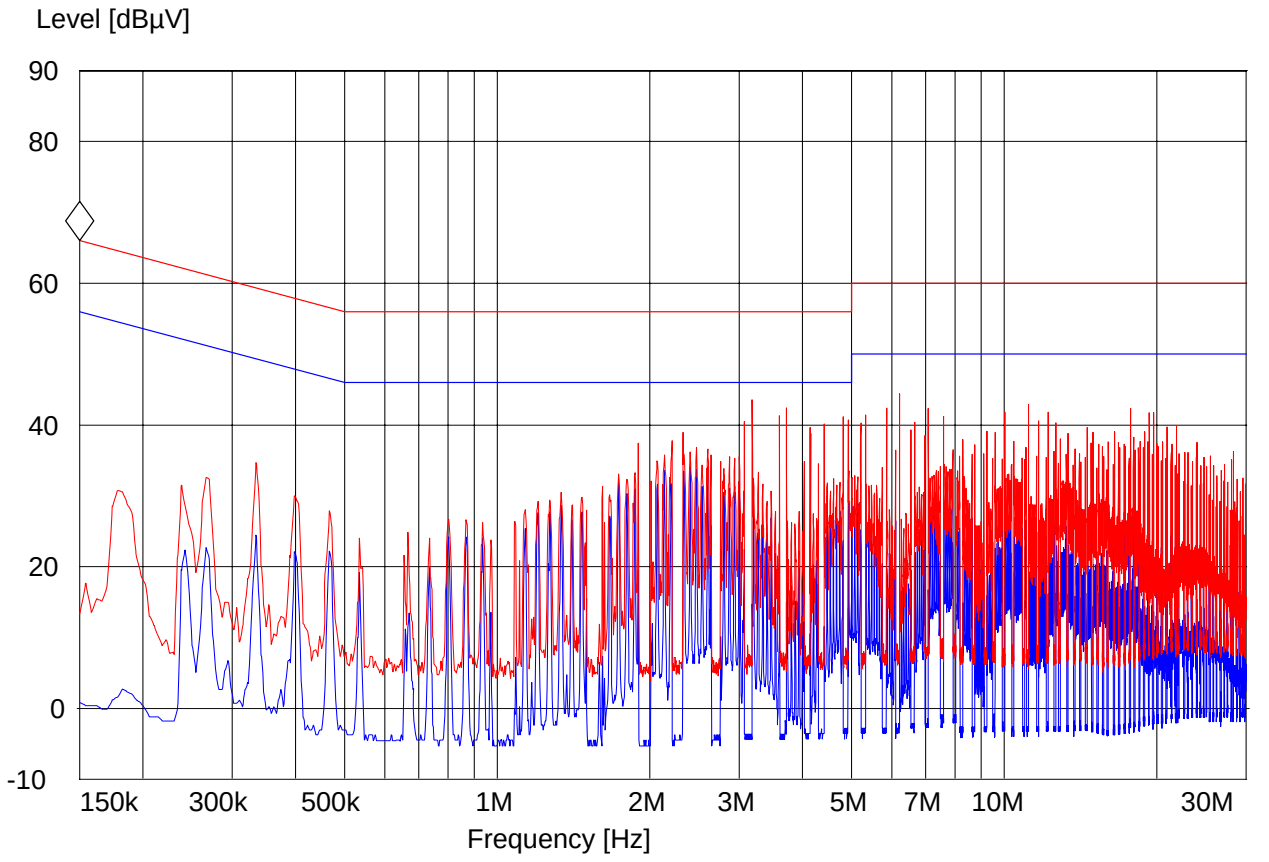
12/12/2007 8:08AM

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
3.530000	28.30	0.4	56	27.7	---	---
3.998000	27.00	0.4	56	29.0	---	---

Voltage Mains Test (Neutral), Transmit

```
EUT:                  SOYUZ
Manufacturer:         Broadcom
Operating Condition:  802.11B, CH.11, AUX
ANT Orientation::     Conducted - TX
EUT Orientation::     H
Test Engineer::       Chris
Power Supply: :       120V AC
Comments:  :          Neutral
```

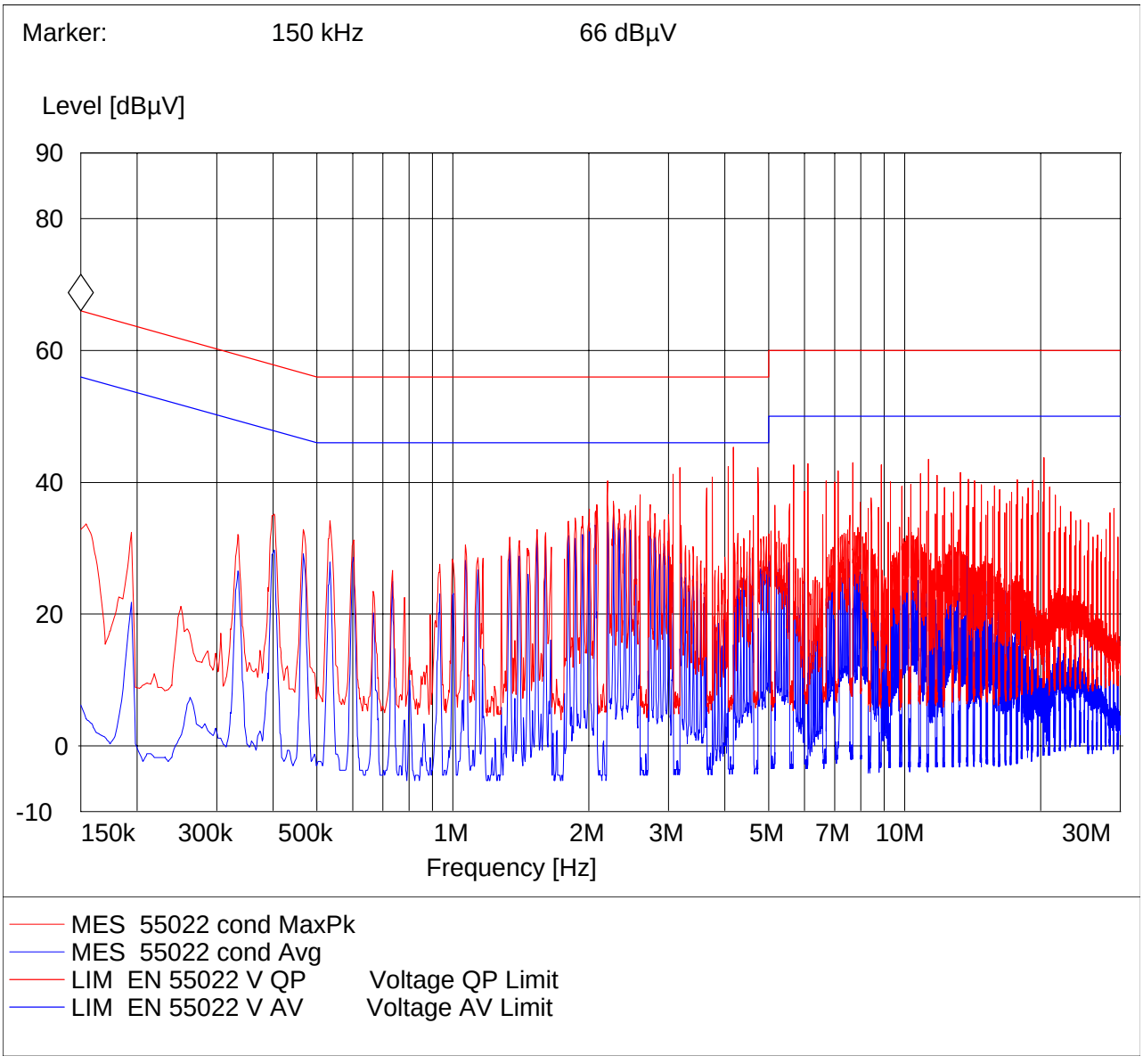
Marker: 150 kHz 66 dBµV



MES 55022 cond MaxPk
MES 55022 cond Avg
LIM EN 55022 V QP Voltage QP Limit
LIM EN 55022 V AV Voltage AV Limit

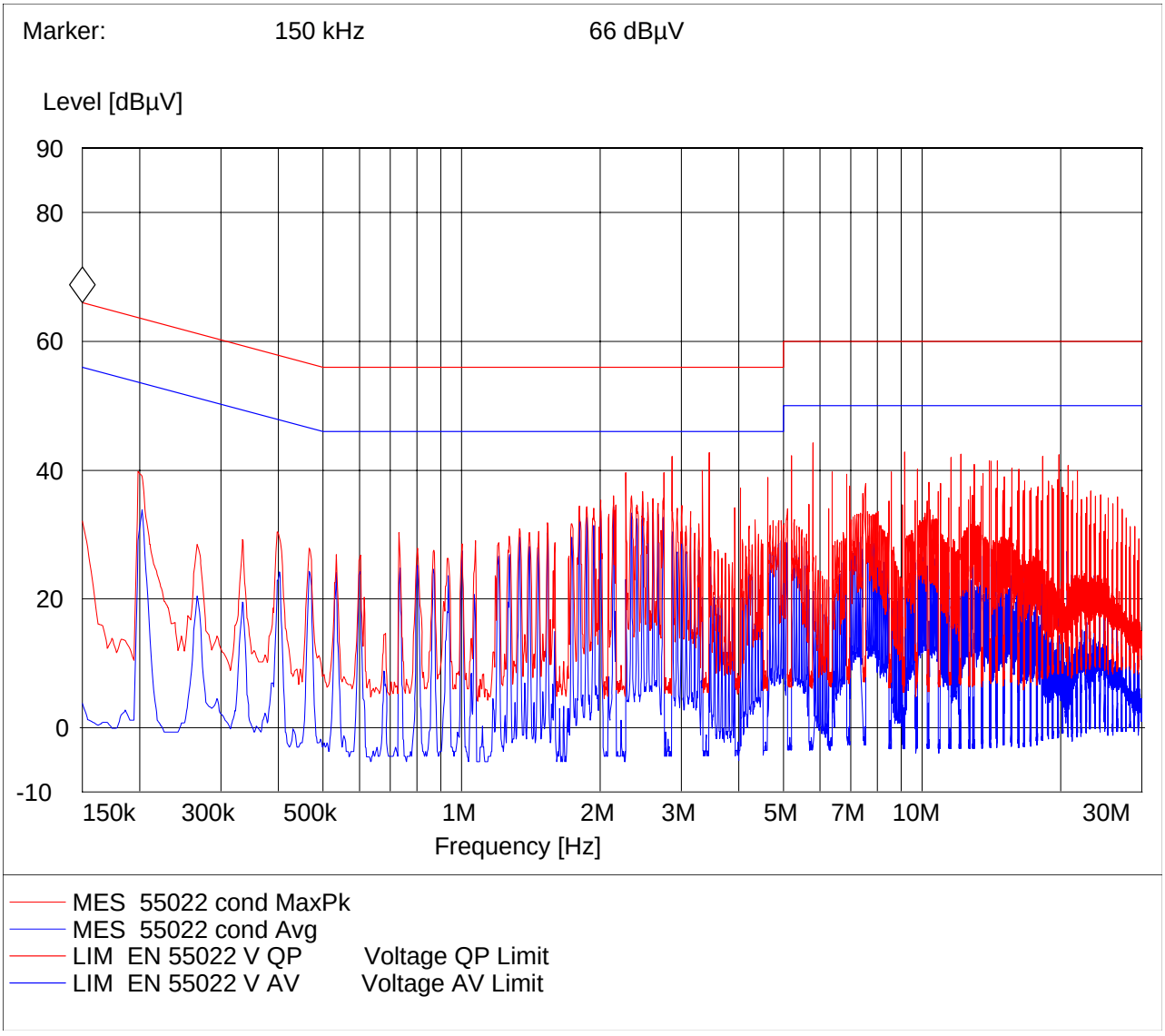
Voltage Mains Test (Line), Receive

```
EUT:                  SOYUZ
Manufacturer:         Broadcom
Operating Condition:  802.11B, CH.6, AUX
ANT Orientation::     Conducted - rx
EUT Orientation::     H
Test Engineer::       Chris
Power Supply: :       120V AC
Comments:  :          Line
```



Voltage Mains Test (Neutral), Receive

```
EUT:                  SOYUZ
Manufacturer:         Broadcom
Operating Condition:  802.11B, CH.6, AUX
ANT Orientation::     Conducted - rx
EUT Orientation::     H
Test Engineer::       Chris
Power Supply: :       120V AC
Comments:  :          Neutral
```

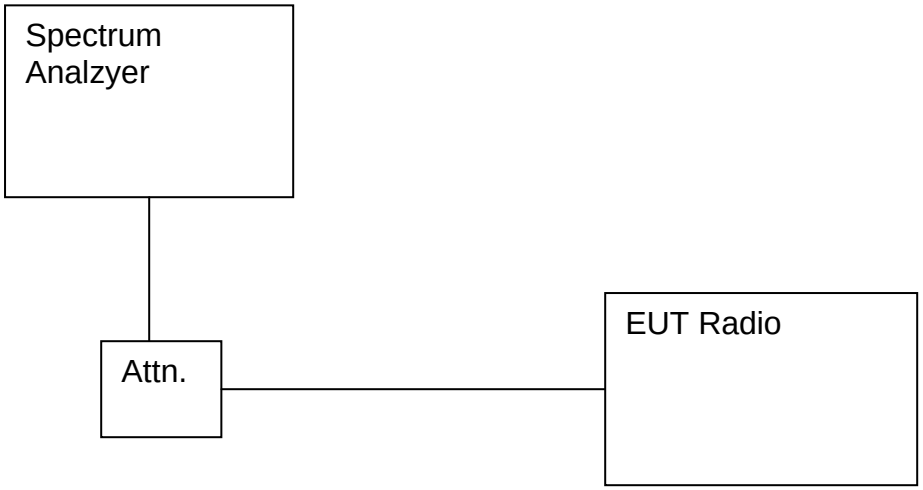


7 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

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)	3115	EMCO	N/A	June 2008	1 year
07	Horn Antenna (18-40GHz)	3116	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

8 BLOCK DIAGRAMS

8.1 Antenna Conducted Test



8.2 Radiated Testing

Note: For measurements above 1 GHz horn is place 1 meter away from the EUT.