



FCC Test Report

FCC Part 15.247 for FHSS systems/ CANADA RSS-210

Model #: PCG-4Q4L

FCC ID: AK8PCG4Q4L

IC ID: 409B-PCG4Q4L

**SONY Corporation
1-7-1 Konan, Minato-ku,
Tokyo, 108-0075
Japan**

**TEST REPORT #: EMC_SONYE_025_08001_15.247_FHSS_PCG4Q4L
DATE: 2008-7-29**



**FCC listed:
A2LA
accredited**

**IC recognized #
3462B**

CETECOM Inc.

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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 RSS210.

Company	Description	Model #
SONY Corporation	Notebook PC	PCG-4Q4L

Technical responsibility for area of testing:

Lothar Schmidt
(Director Regulatory and
Antenna Services)

2008-7-29 EMC & Radio

Date	Section	Name	Signature
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The test results of this test report relate exclusively to the test item specified in Identification of the Equipment under Test. The CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM Inc USA.

This report is prepared by:

Peter Mu
(EMC Project Engineer)

2008-7-29 EMC & Radio

Date	Section	Name	Signature
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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
Responsible Test Lab Manager:	Lothar Schmidt
Responsible Project Leader:	Peter Mu
Date of test:	2008-7-21 to 2008-7-29

2.2 Identification of the Client

APPLICANT	
Applicant (Company Name)	SONY Corporation
Street Address	1-7-1 Konan, Minato-ku,
City/Zip Code	Tokyo, 108-0075
Country	Japan
Contact Person	Michio Kobayashi
Telephone	+81-263-72-5696
Fax	+81-263-72-9755
e-mail	<u>Michio.Kobayashi@jp.sony.com</u>

2.3 Identification of the Manufacturer

MANUFACTURER (If different from Applicant)	
Applicant (Firm Name):	Sony EMCS Corporation
Contact Person:	Michio Kobayashi
Telephone:	+81-263-72-5696
Fax:	+81-263-72-9755
Address Line 1:	5432 Toyoshima,
City:	Azumino-shi, Nagano
Postal Code:	399-8282,
Country:	Japan
e-mail:	<u>Michio.Kobayashi@jp.sony.com</u>

3 **Equipment Under Test (EUT)**

3.1 **Specification of the Equipment under Test**

EUT	
Marketing Name of EUT (if not same as Model No.)	VAIO-VGN TT
Description	Notebook PC
Model No.	PCG-4Q4L
FCC-ID:	AK8PCG4Q4L
IC-ID (Industry Canada):	409B-PCG4Q4L

Frequency Range:	2400MHz – 2483.5MHz
Type(s) of Modulation:	GFSK, DQPSK, 8PSK
Number of Channels:	79
Antenna Type:	Inverted F, peak gain 2.21dBi
Output Power:	Conducted GFSK: 1.67dBm, 1.47mW Conducted EDR: 4.36dBm, 2.73mW Radiated GFSK: 3.88dBm, 2.44mW Radiated DQPSK: 6.57dBm, 4.54mW

3.2 **Identification of the Equipment under Test (EUT)**

EUT #	TYPE	MANF.	MODEL	SERIAL #
1	EUT	SONY Corporation	PCG-4Q4L	5865C0A7

3.3 **Identification of Accessory equipment**

AE #	TYPE	MANF.	MODEL	SERIAL #
1	AC/DC ADAPTER	SONY Corporation	VGP-AC16V13	148015421 0110574

4 Subject Of Investigation

All testing was performed on the product referred to in Section 3 as EUT. This test report contains full radiated and contacted testing as per FCC15.247 on the EUT with the Bluetooth module.

The EUT integrates an FCC approved Bluetooth module with FCC ID: QDS-BRCM1026. This report contains findings from radiated measurements only. All the conducted measurements are referenced from the original report of the module.

During the testing process the EUT was tested on low, mid, and high channels using PRBS9 payload using DH5, 2DH5, and 3DH5 packets, 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 RSS210. The maximization of portable equipment is conducted in accordance with ANSI C63.4.

5 Measurements (RADIATED)

5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)

5.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)

Frequency range	RF power output
2400-2483.5 MHz	36dBm EIRP

*limit is based upon antenna gain of less than or equal to 6dBi.

5.1.2 Test Results

EIRP = Conducted Peak Power + Antenna Gain (2.21dBi)

EIRP: GFSK

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T _{nom} (23)°C	V _{nom} VDC	2.98	3.88	3.62
Measurement uncertainty		±0.5dBm		

EIRP: EDR

TEST CONDITIONS		MAXIMUM PEAK OUTPUT POWER (dBm)		
Frequency (MHz)		2402	2441	2480
T _{nom} (23)°C	V _{nom} VDC	5.37	6.57	5.92
Measurement uncertainty		±0.5dBm		

5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205

5.2.1 LIMITS

30.□ Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

*PEAK LIMIT= 74dBuV/m

*AVG. LIMIT= 54dBuV/m

5.2.2 RESULTS: GFSK

(2402MHz) LOWER BAND EDGE PEAK –GFSK MODULATION

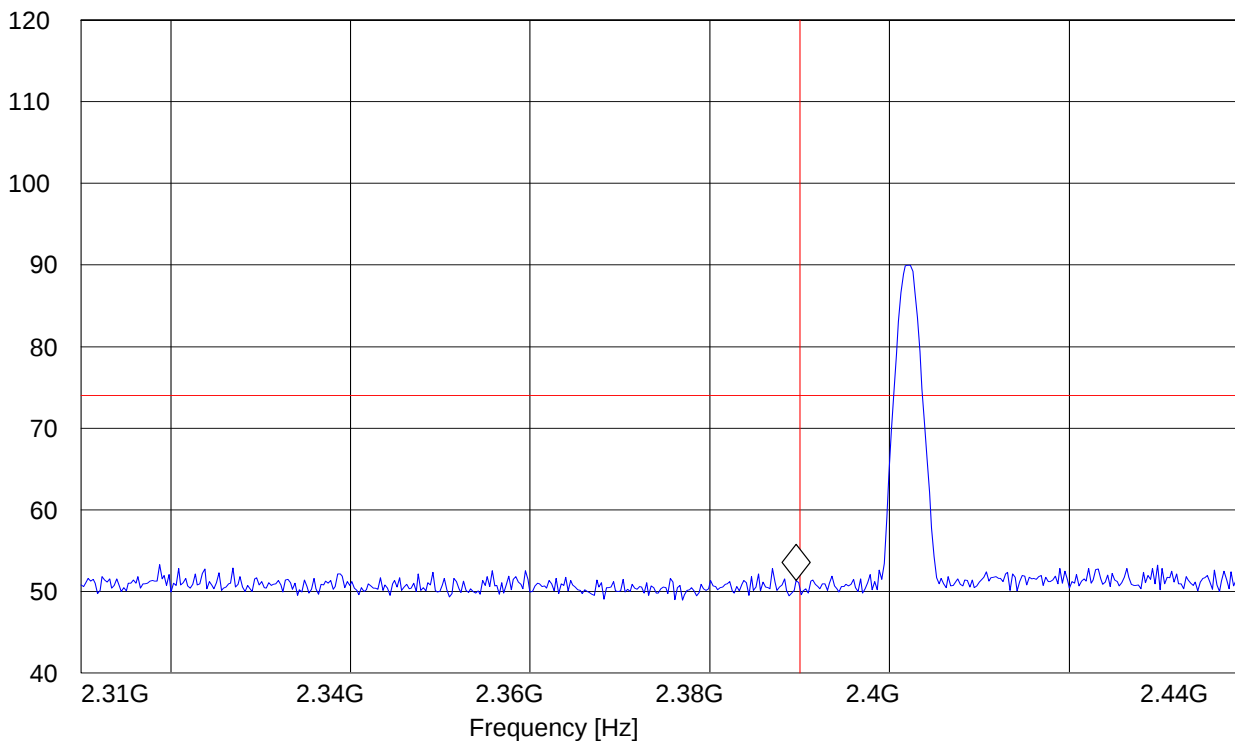
EUT: Laptop
Customer:: Sony
Test Mode: BT GFSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

SWEEP TABLE: "FCC15.247 LBE_PK"

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

Marker: 2.389623246 GHz 51.31 dBμV/m

Level [dBμV/m]





(2402MHz) LOWER BAND EDGE AVERAGE –GFSK MODULATION

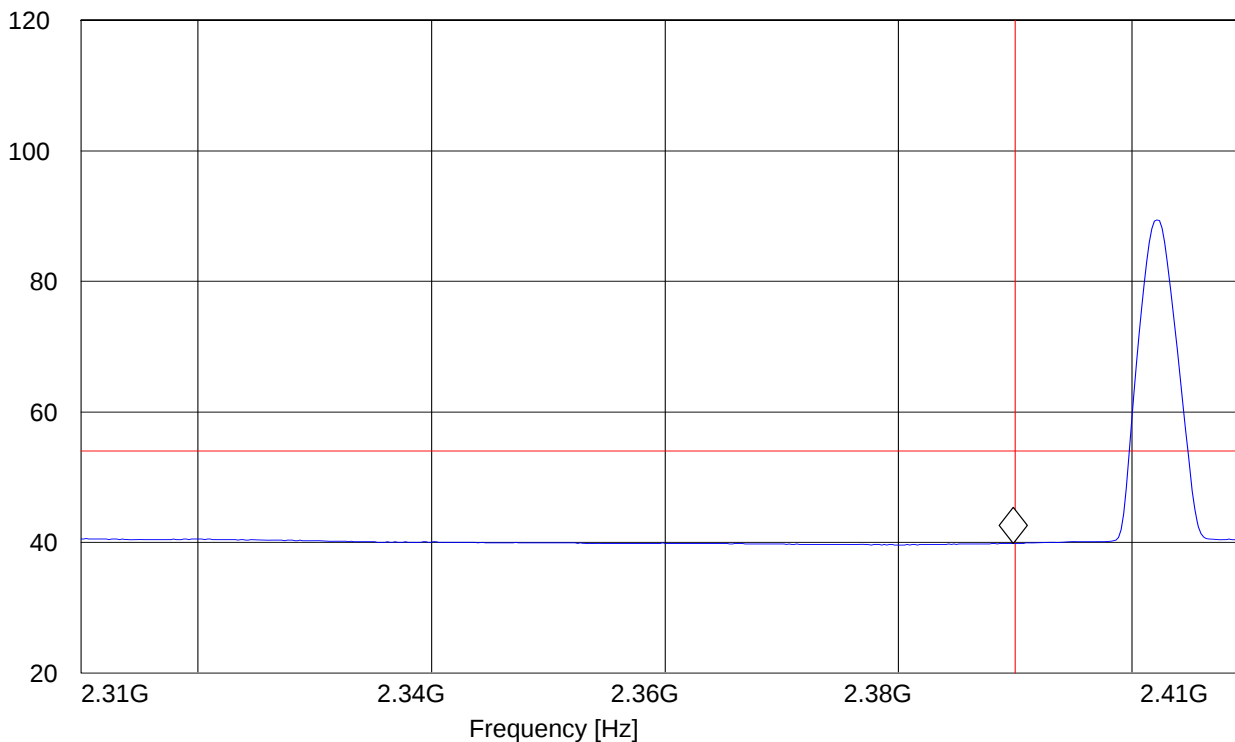
EUT: Laptop
Customer:: Sony
Test Mode: BT GFSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.389799599 GHz 39.87 dBμV/m

Level [dBμV/m]





(2480MHz) HIGHER BAND EDGE PEAK –GFSK MODULATION

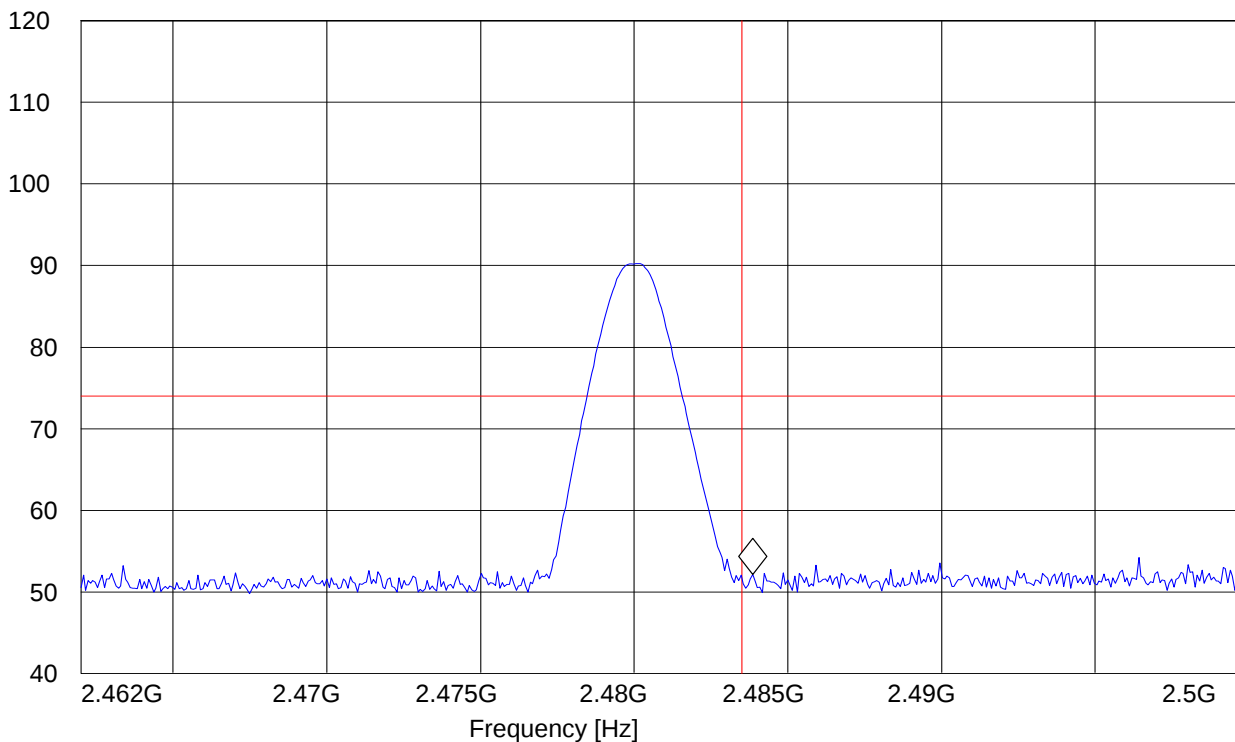
EUT: Laptop
Customer:: Sony
Test Mode: BT GFSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

SWEEP TABLE: "FCC15.247 HBE_PK"

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

Marker: 2.48385711 GHz 52.13 dBμV/m

Level [dBμV/m]



(2480MHz) HIGHER BAND EDGE AVERAGE-GFSK MODULATION

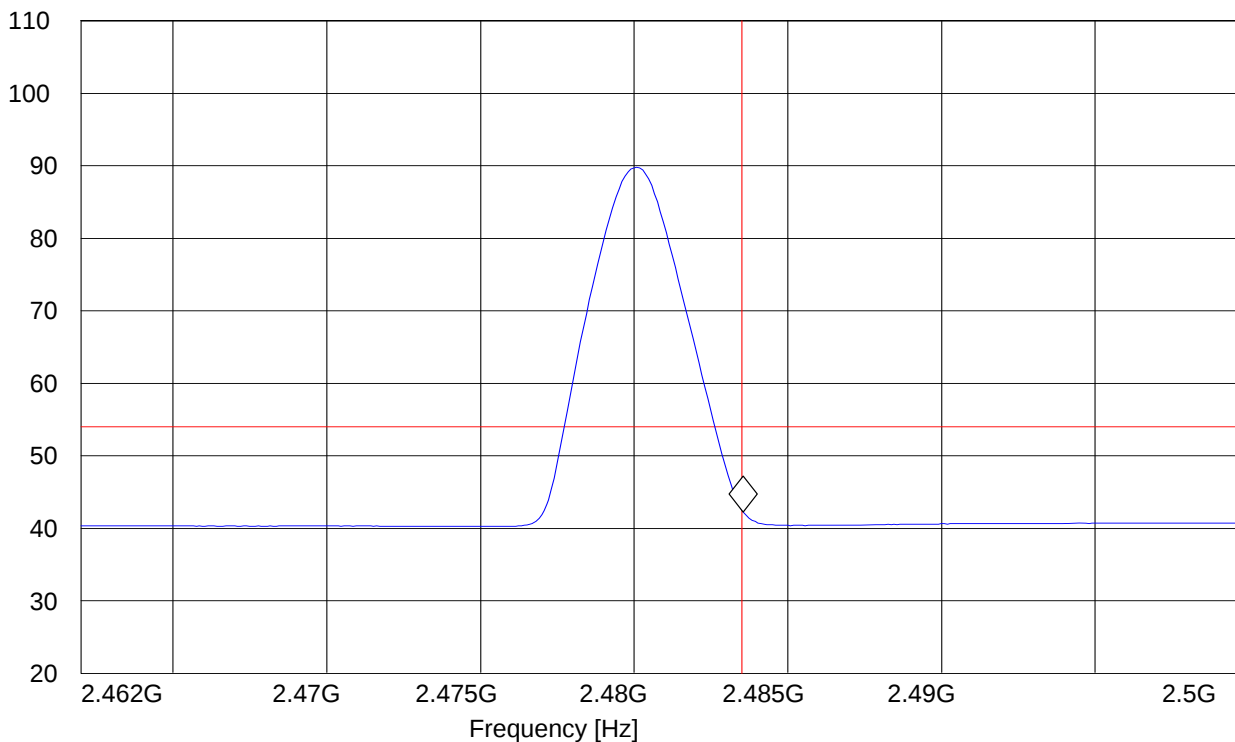
EUT: Laptop
Customer:: Sony
Test Mode: BT GFSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.483547094 GHz 42.29 dBμV/m

Level [dBμV/m]



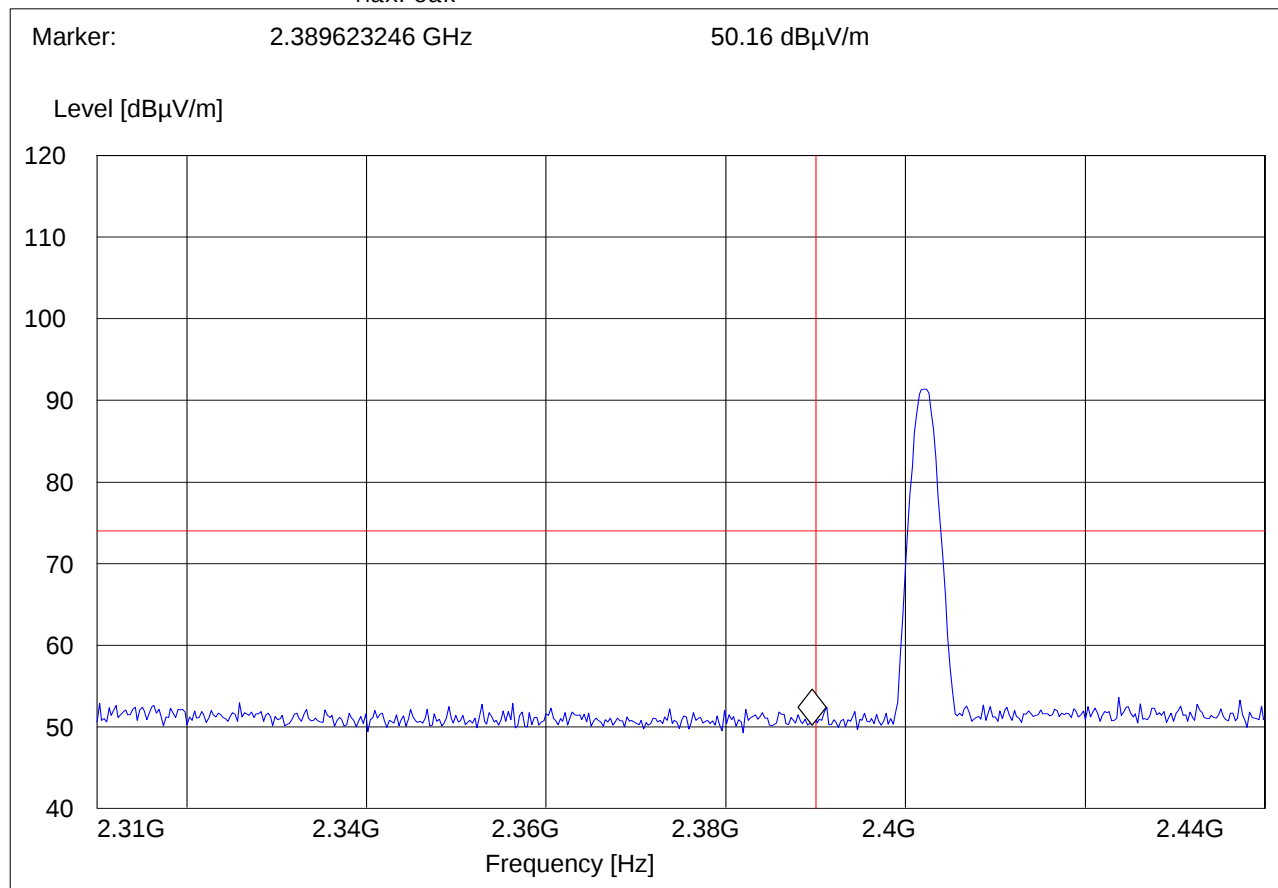
5.2.3 RESULTS: $\pi/4$ DQPSK

(2402MHz) LOWER BAND EDGE PEAK – $\pi/4$ DQPSK MODULATION

EUT: Laptop
Customer:: Sony
Test Mode: BT DQPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

SWEEP TABLE: "FCC15.247 LBE_PK"

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



(2402MHz) LOWER BAND EDGE AVERAGE $-\pi/4$ DQPSK MODULATION

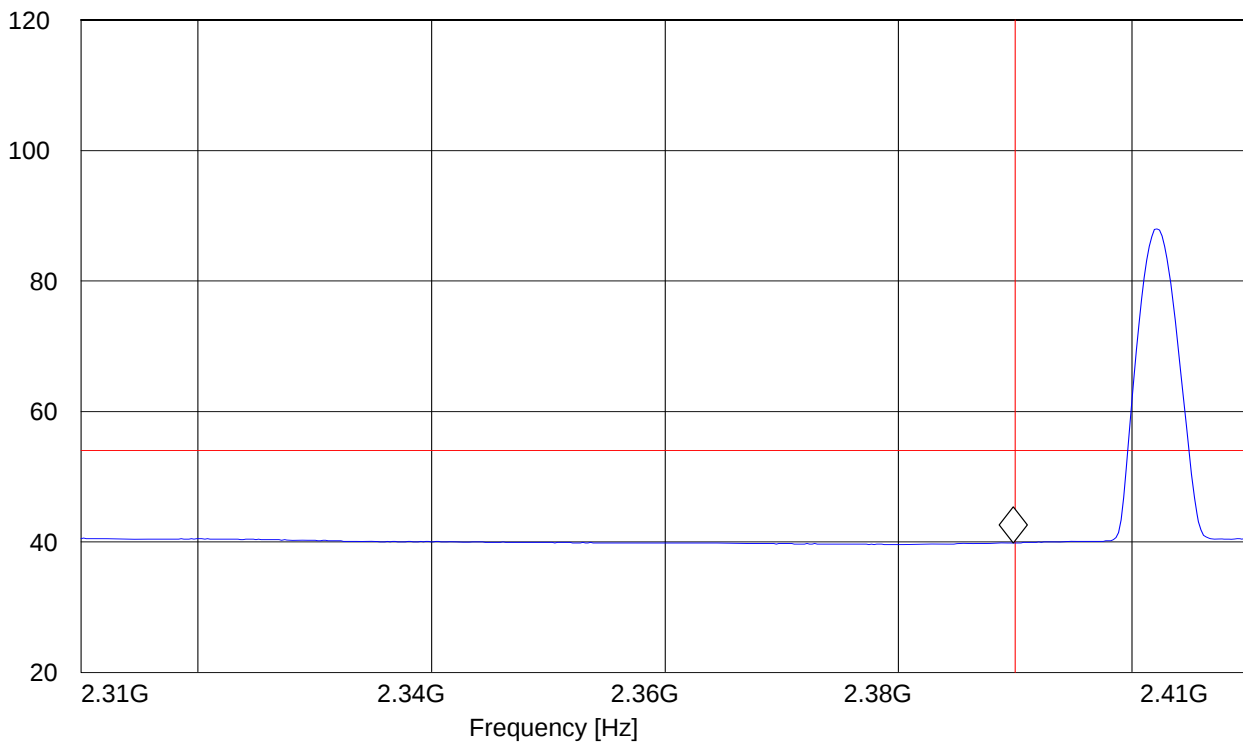
EUT: Laptop
Customer:: Sony
Test Mode: BT DQPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.389799599 GHz 39.9 dB μ V/m

Level [dB μ V/m]

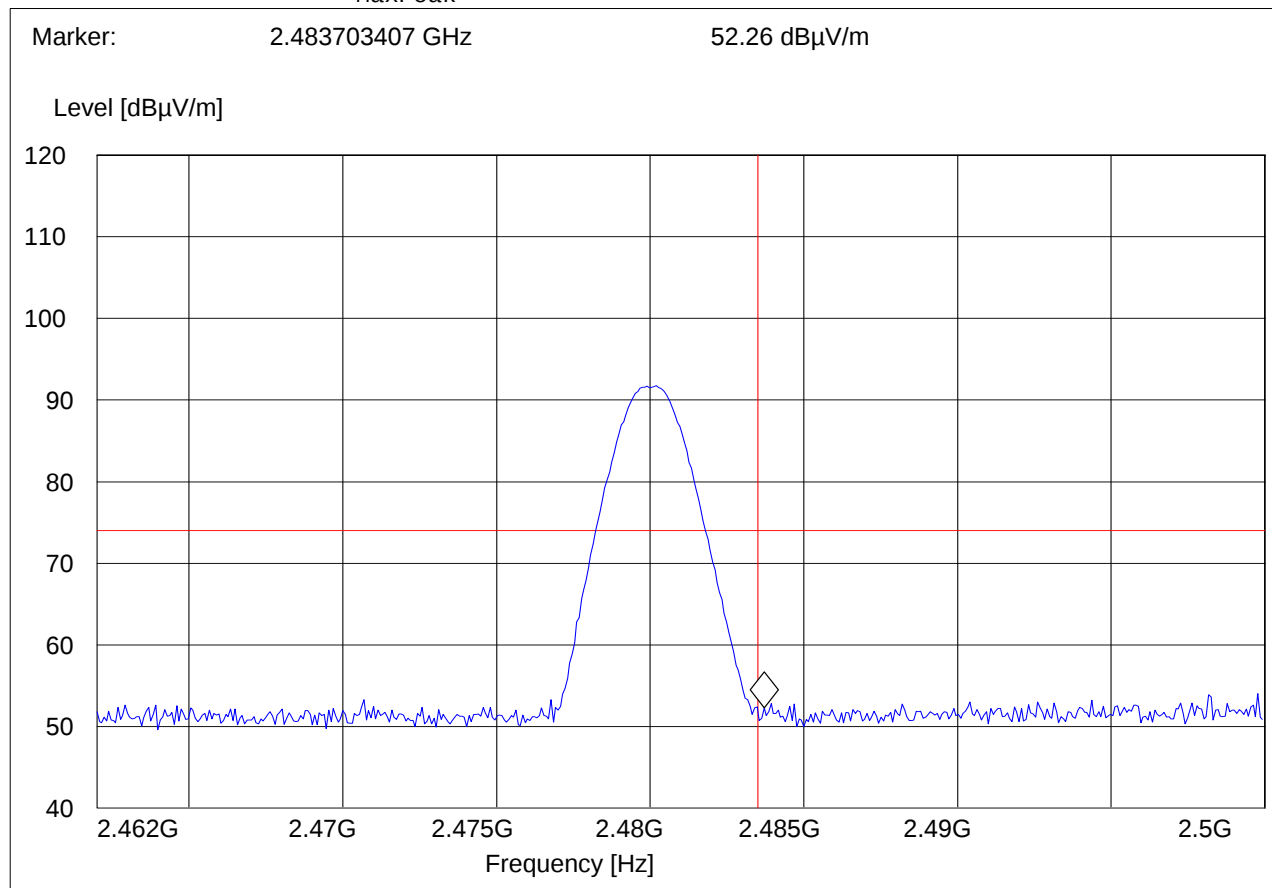


(2480MHz) HIGHER BAND EDGE PEAK $-\pi/4$ DQPSK MODULATION

EUT: Laptop
Customer:: Sony
Test Mode: BT DQPSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

SWEEP TABLE: "FCC15.247 HBE_PK"

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



(2480MHz) HIGHER BAND EDGE AVERAGE- $\pi/4$ DQPSK MODULATION

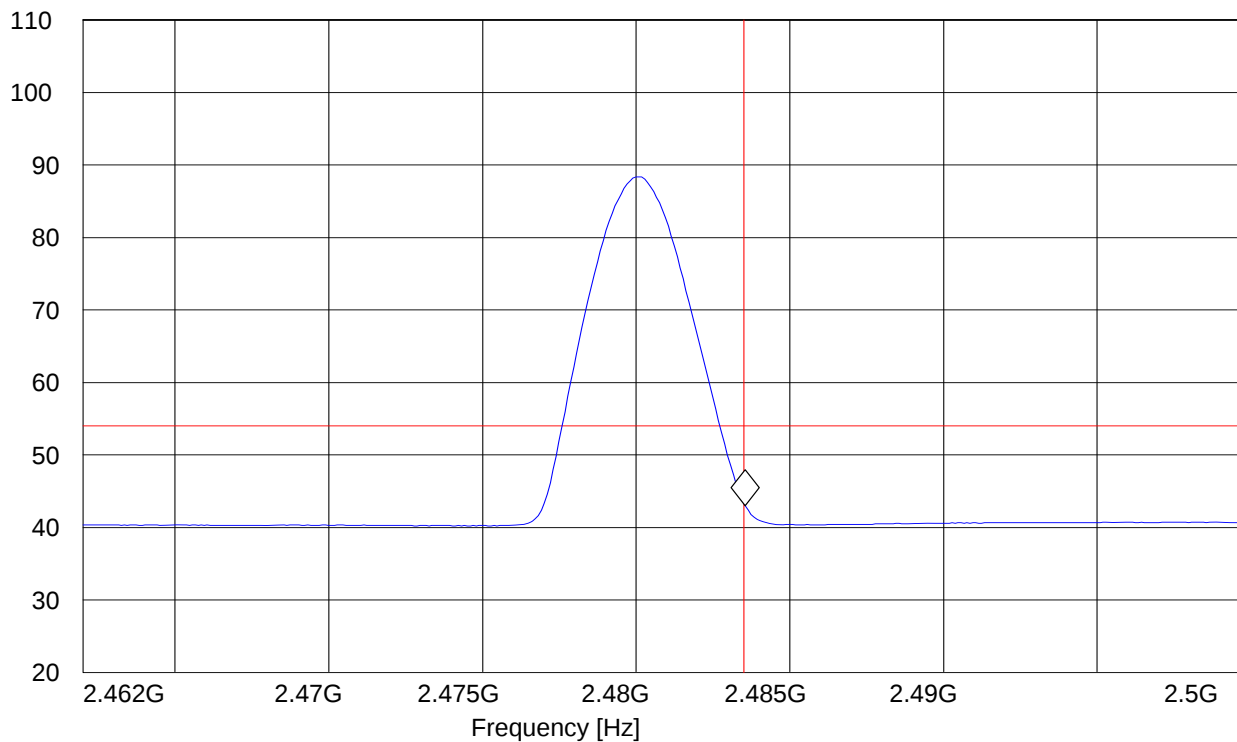
EUT: Laptop
Customer:: Sony
Test Mode: BT DQPSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.483547094 GHz 43.03 dB μ V/m

Level [dB μ V/m]



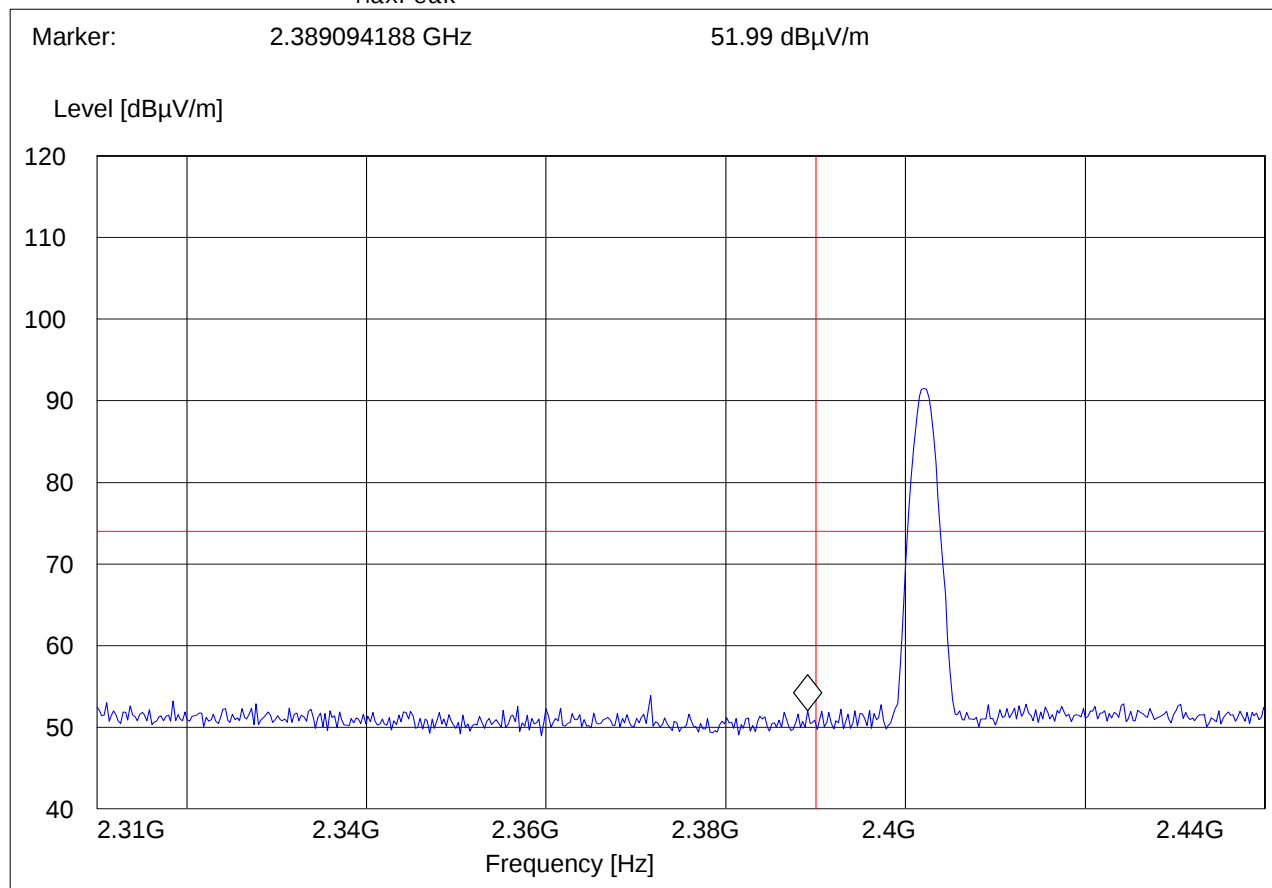
5.2.4 RESULTS: 8DPSK

(2402MHz) LOWER BAND EDGE PEAK – 8DPSK MODULATION

EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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





(2402MHz) LOWER BAND EDGE AVERAGE -8DPSK MODULATION

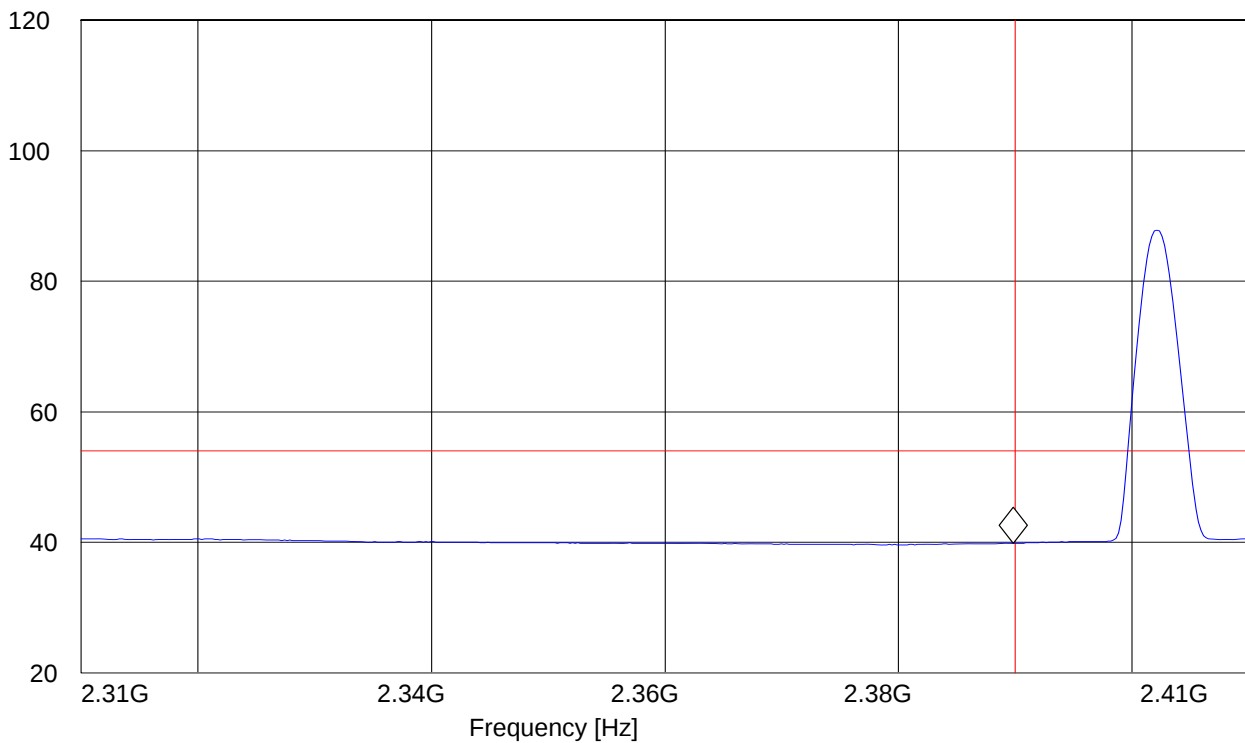
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.389799599 GHz 39.85 dBμV/m

Level [dBμV/m]



(2480MHz) HIGHER BAND EDGE PEAK – 8DPSK MODULATION

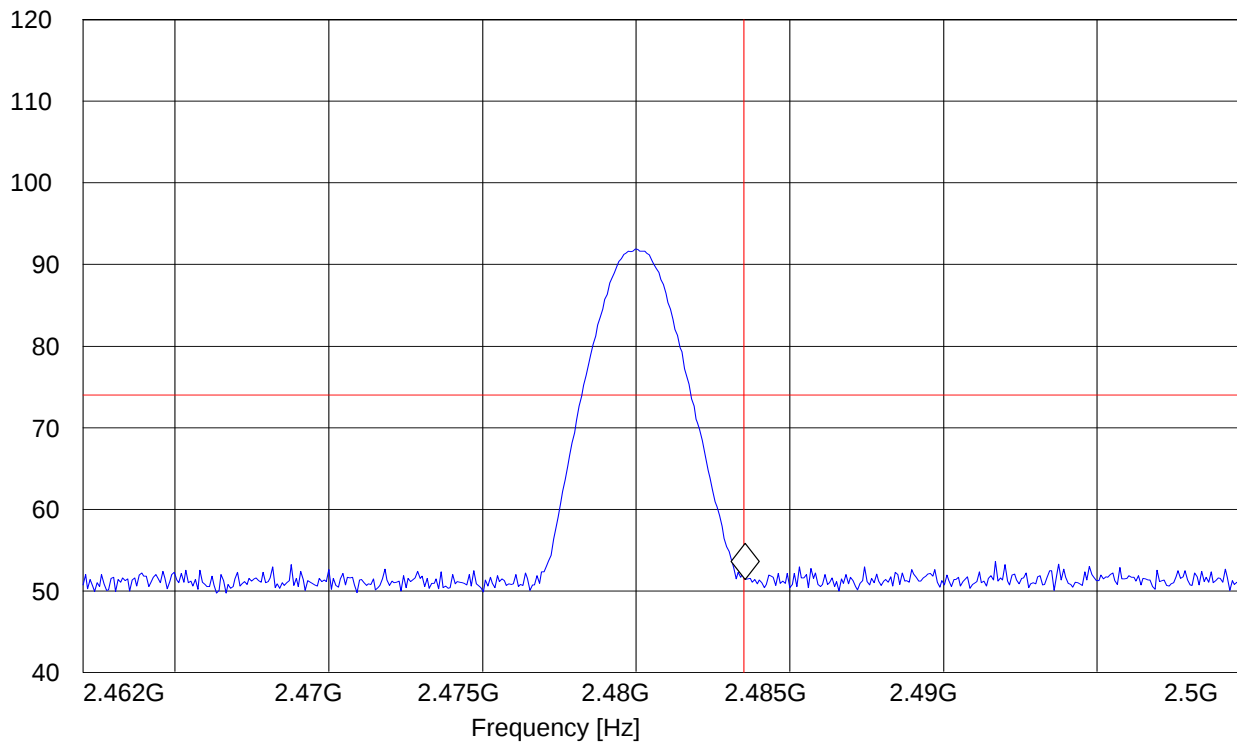
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

SWEEP TABLE: "FCC15.247 HBE_PK"

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

Marker: 2.483551102 GHz 51.43 dBμV/m

Level [dBμV/m]



(2480MHz) HIGHER BAND EDGE AVERAGE-8DPSK MODULATION

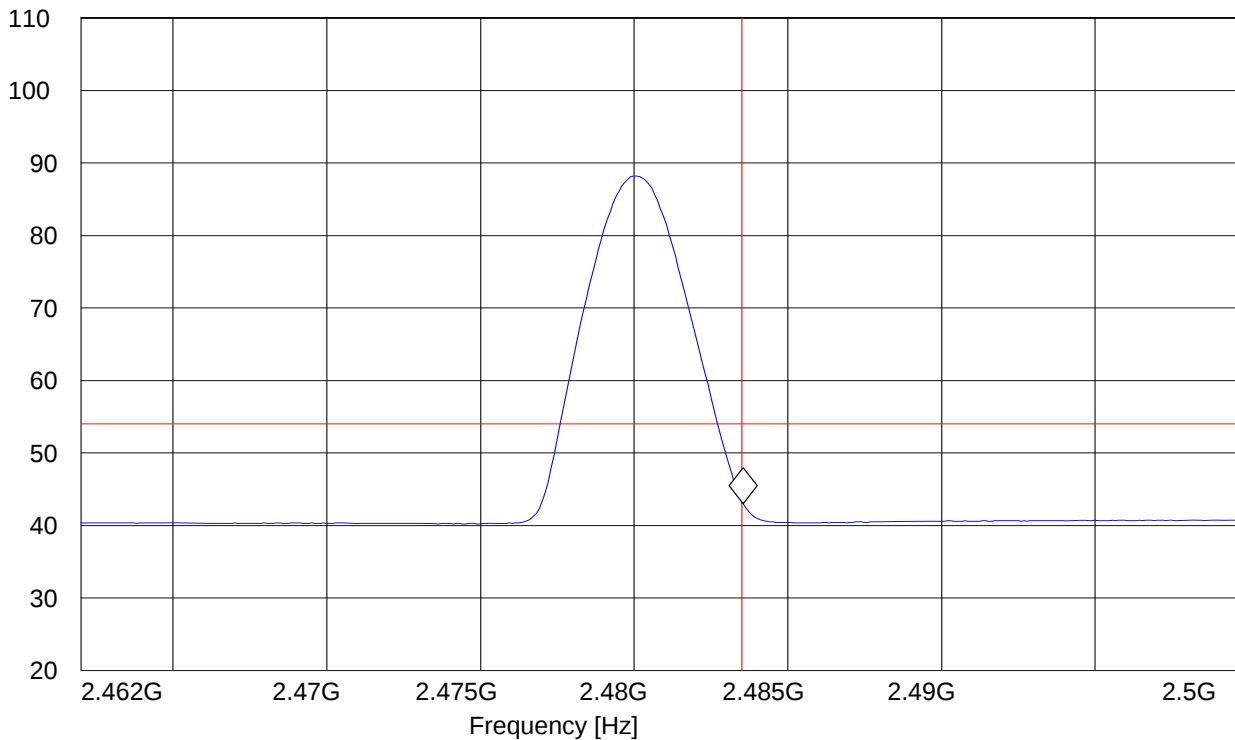
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.483547094 GHz 43.02 dBμV/m

Level [dBμV/m]



5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209

5.3.1 LIMITS

Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

*PEAK LIMIT= 74dBuV/m

*AVG. LIMIT= 54dBuV/m

NOTE:

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 25 GHz very short cable connections to the antenna was used to minimize the noise level.

2. All measurements are done in peak mode using an average limit , unless specified with the plots.

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

All Spurious Emission measurements are done in GFSK mode and represent the worse case emission from the device.

5.3.2 RESULTS

30MHz – 1GHz Antenna: vertical.

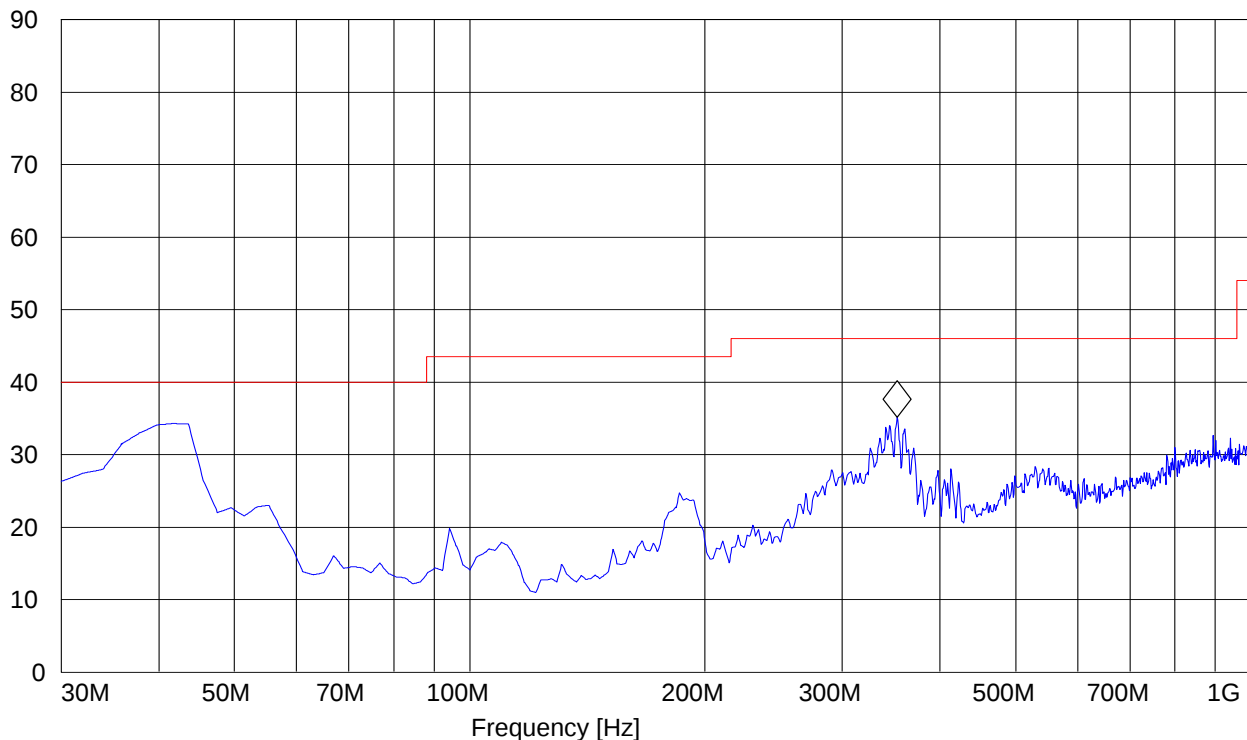
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 352.685371 MHz 35.16 dBμV/m

Level [dBμV/m]



30MHz – 1GHz Antenna: horizontal

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

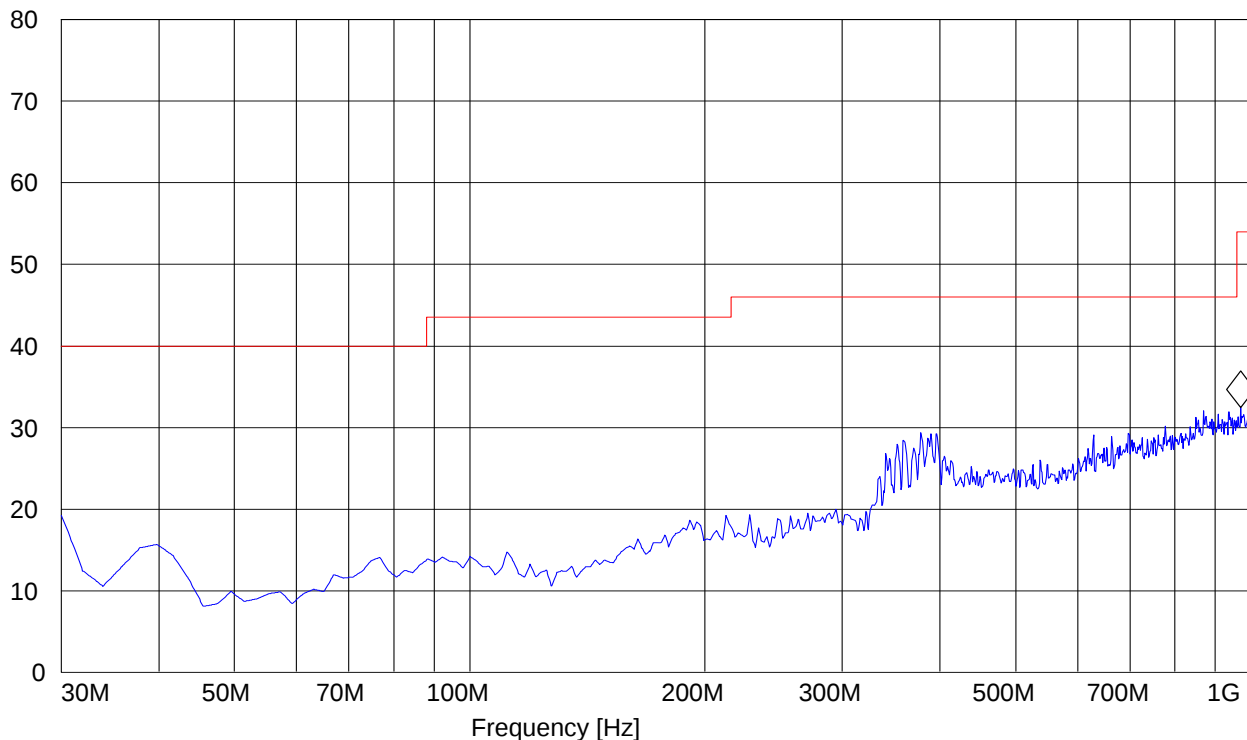
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 0
ANT Orientation: H
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 970.841683 MHz 32.45 dBμV/m

Level [dBμV/m]



1-3GHz (2402MHz)

Note: The peak above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

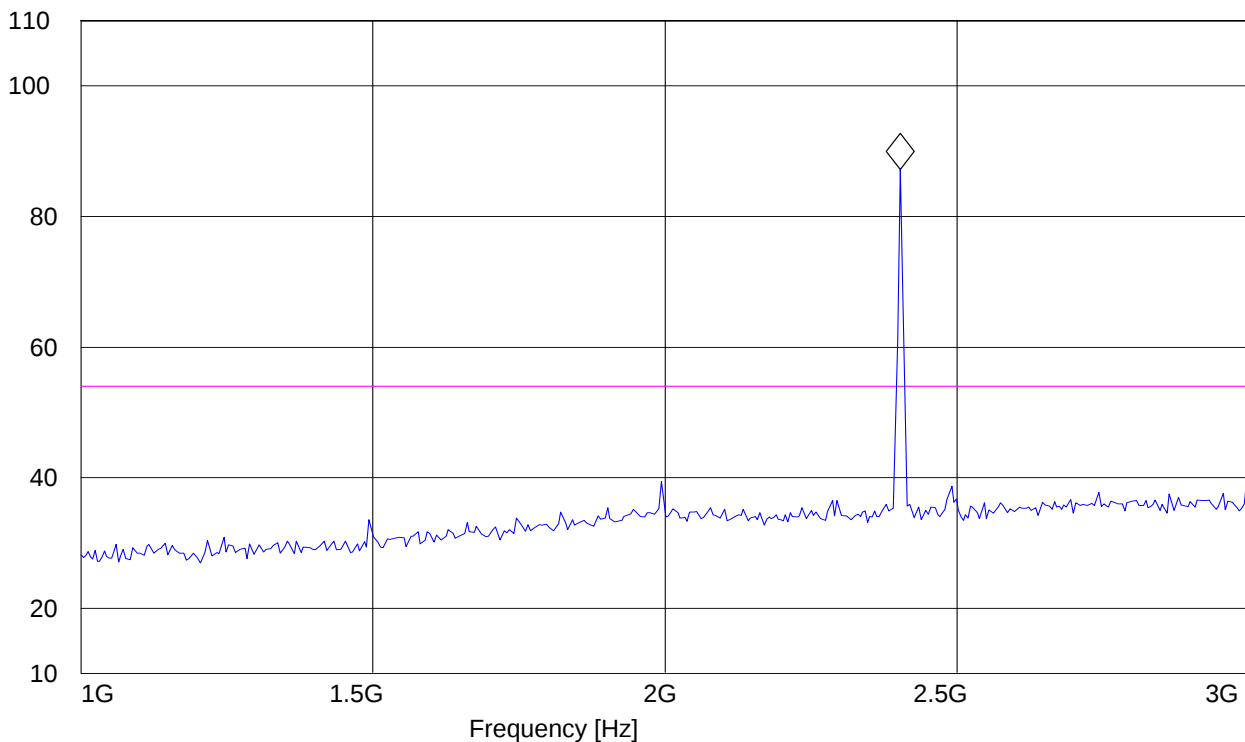
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.402805611 GHz 87.21 dBμV/m

Level [dBμV/m]



1-3GHz (2441MHz)

Note: The peak above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

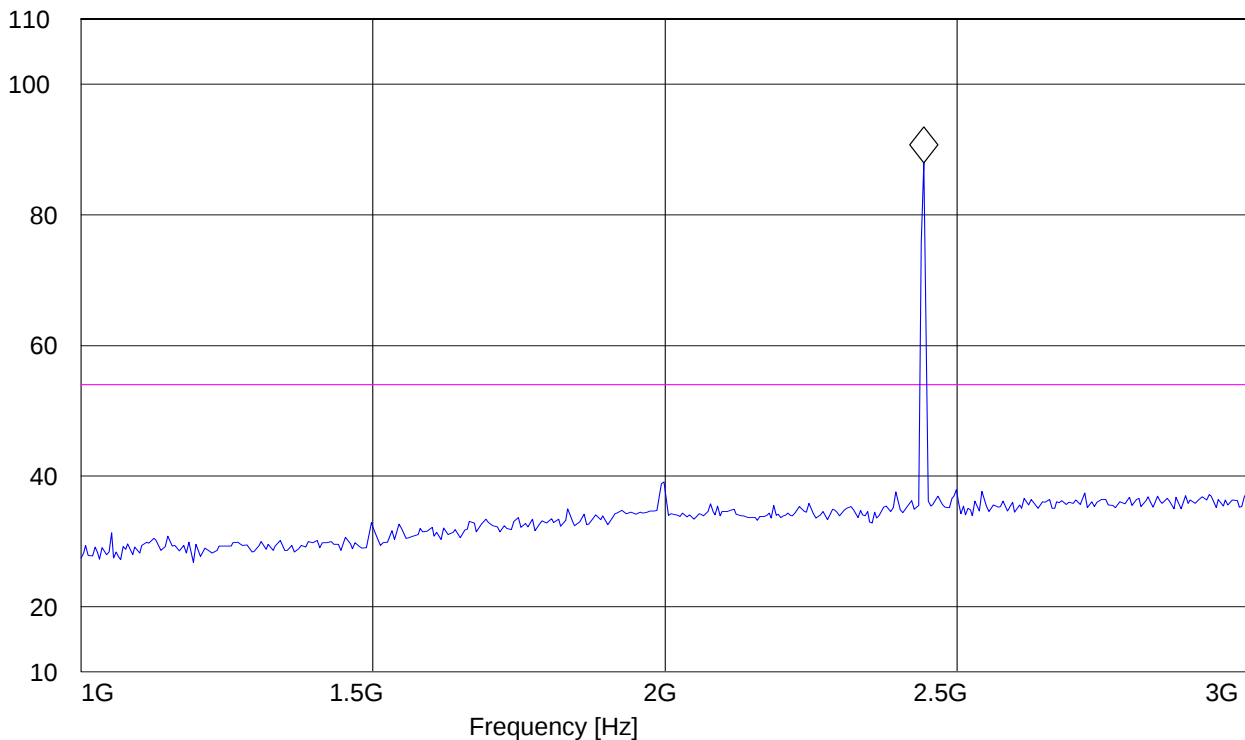
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 39
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.442885772 GHz 87.92 dB μ V/m

Level [dB μ V/m]



1-3GHz (2480MHz)

Note: The peak above the limit line is the carrier freq.

Note: Peak Reading vs. Average limit

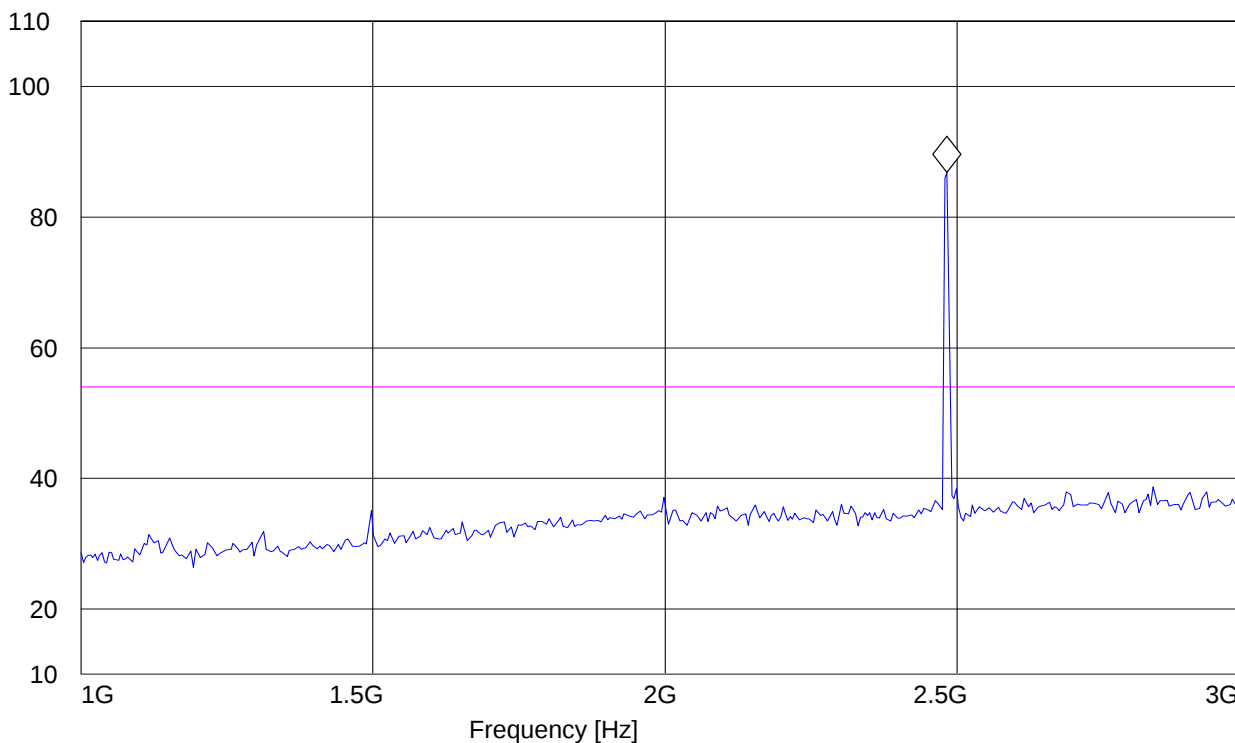
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.482965932 GHz 86.89 dBμV/m

Level [dBμV/m]



3-18GHz (2402MHz)

Note: Peak Reading vs. Average limit

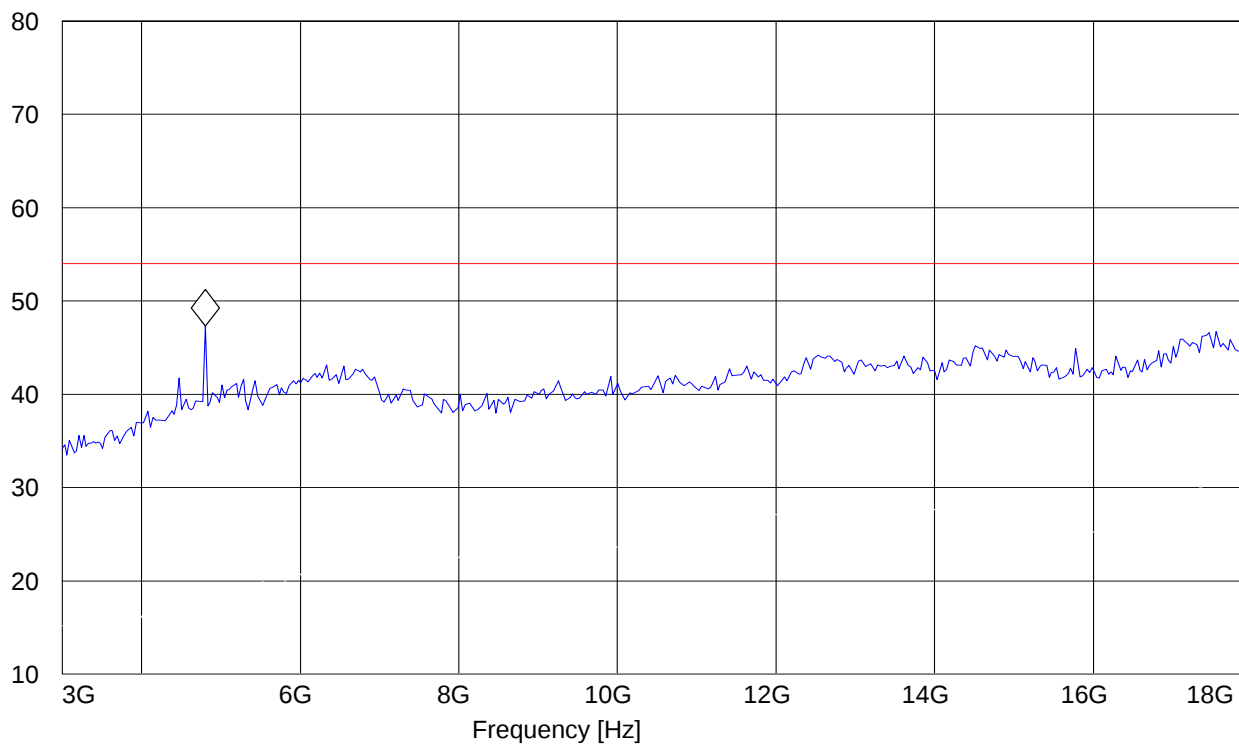
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 0
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 4.803607214 GHz 47.31 dB μ V/m

Level [dB μ V/m]



3-18GHz (2441MHz)

Note: Peak Reading vs. Average limit

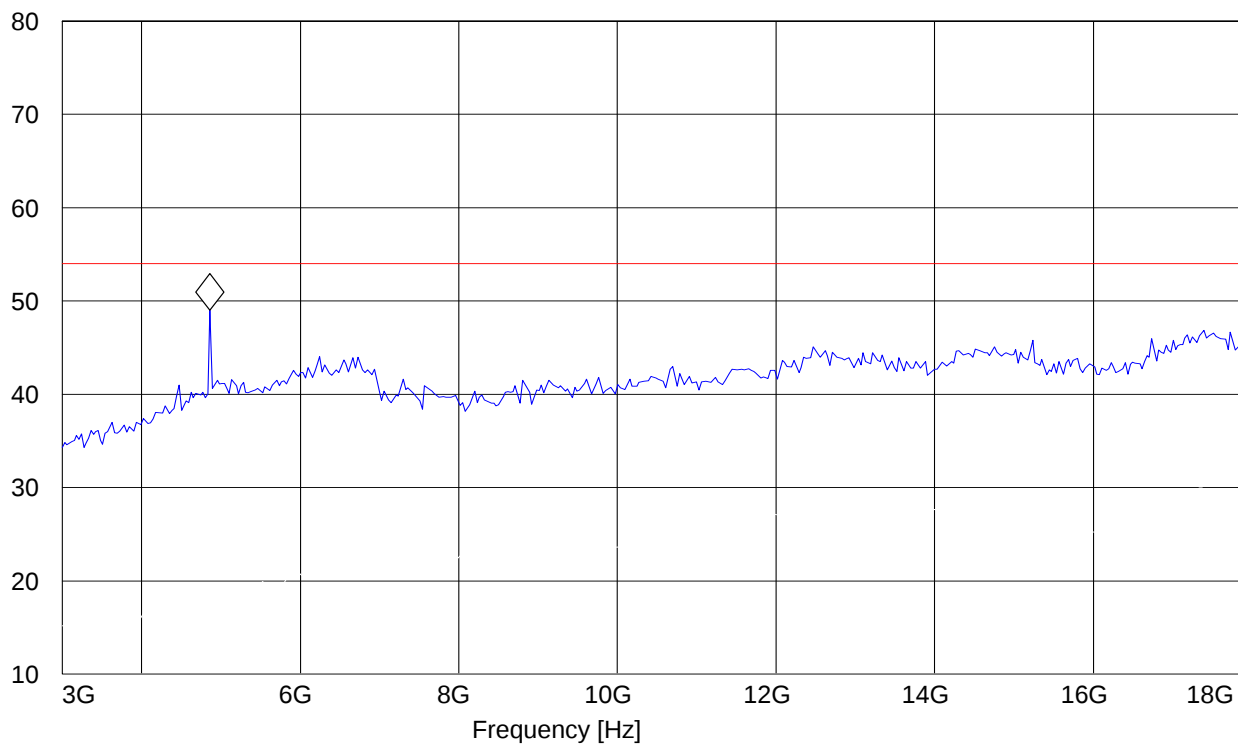
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 39
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 4.863727455 GHz 49.02 dB μ V/m

Level [dB μ V/m]



3-18GHz (2480MHz)

Note: Peak Reading vs. Average limit

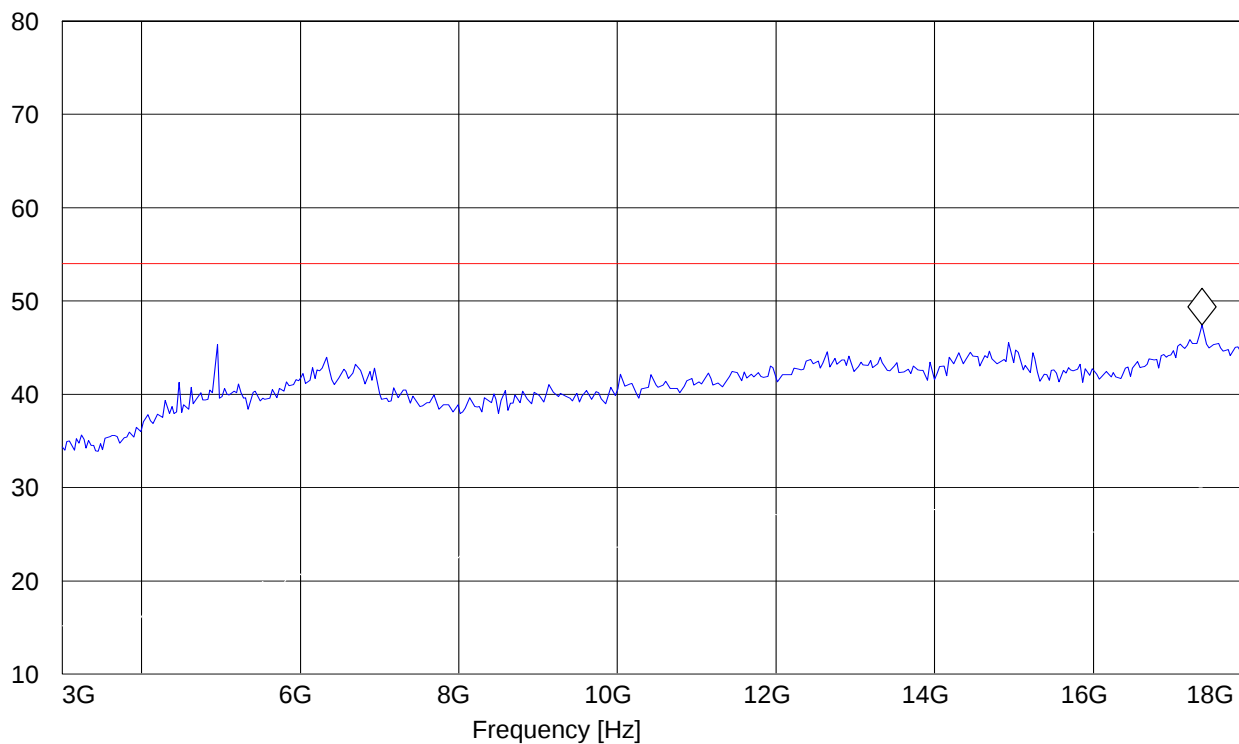
EUT: Laptop
Customer:: Sony
Test Mode: BT 8DPSK CH 78
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 17.368737475 GHz 47.45 dB μ V/m

Level [dB μ V/m]



18-25GHz

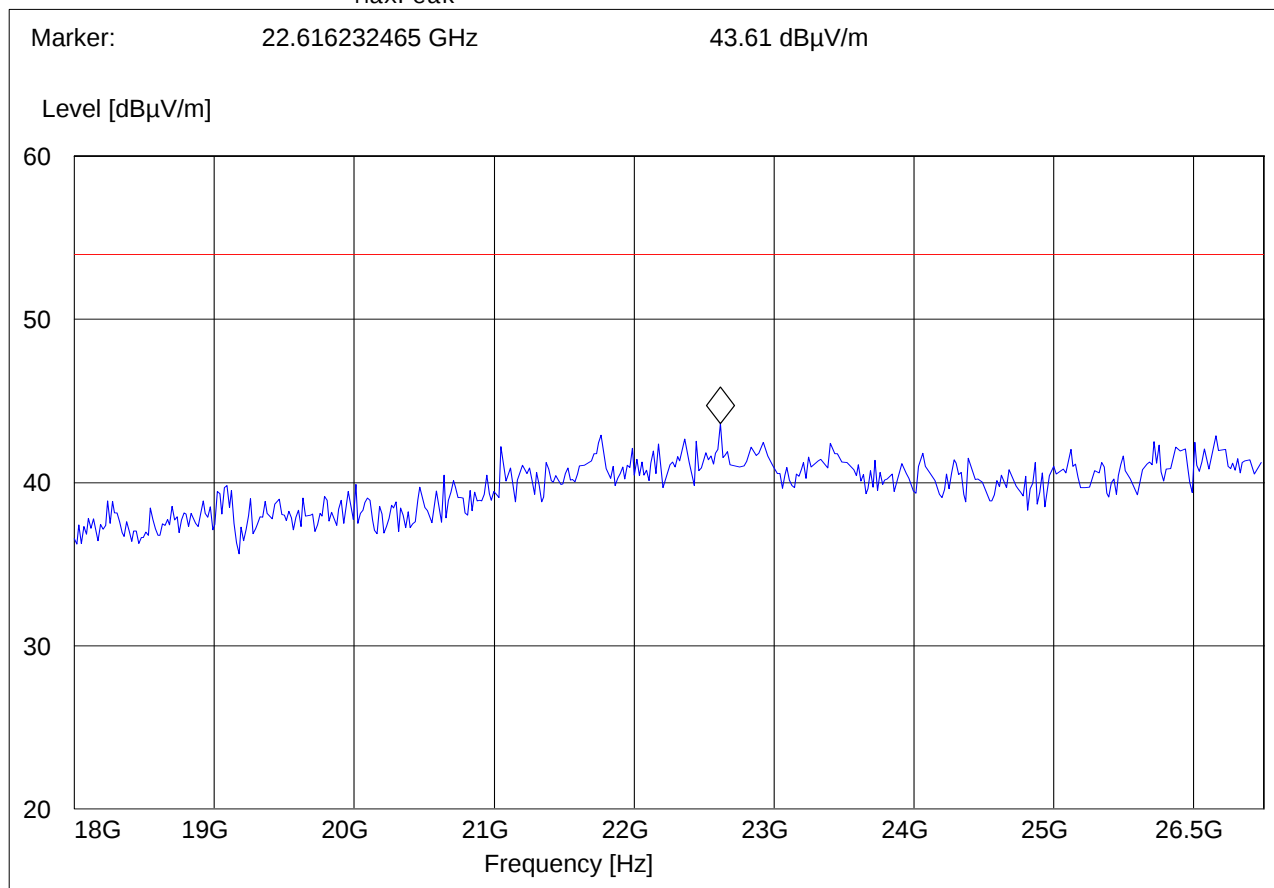
Note: This plot is valid for low, mid, high channels (worst-case plot)

Note: Peak Reading vs. Average limit

EUT: Laptop
 Customer:: Sony
 Test Mode: BT 8DPSK CH 39
 ANT Orientation: V
 EUT Orientation: H
 Test Engineer: SAM
 Voltage: AC
 Comments: TT@40°

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			



5.4 RECEIVER SPURIOUS RADIATION RSS-Gen(4.10)

5.4.1 LIMITS

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

NOTE:

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 25 GHz very short cable connections to the antenna was used to minimize the noise level.
2. All measurements are done in peak mode using an average limit, unless specified with the plots.

5.4.2 Results

30MHz – 1GHz Antenna: Vertical.

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

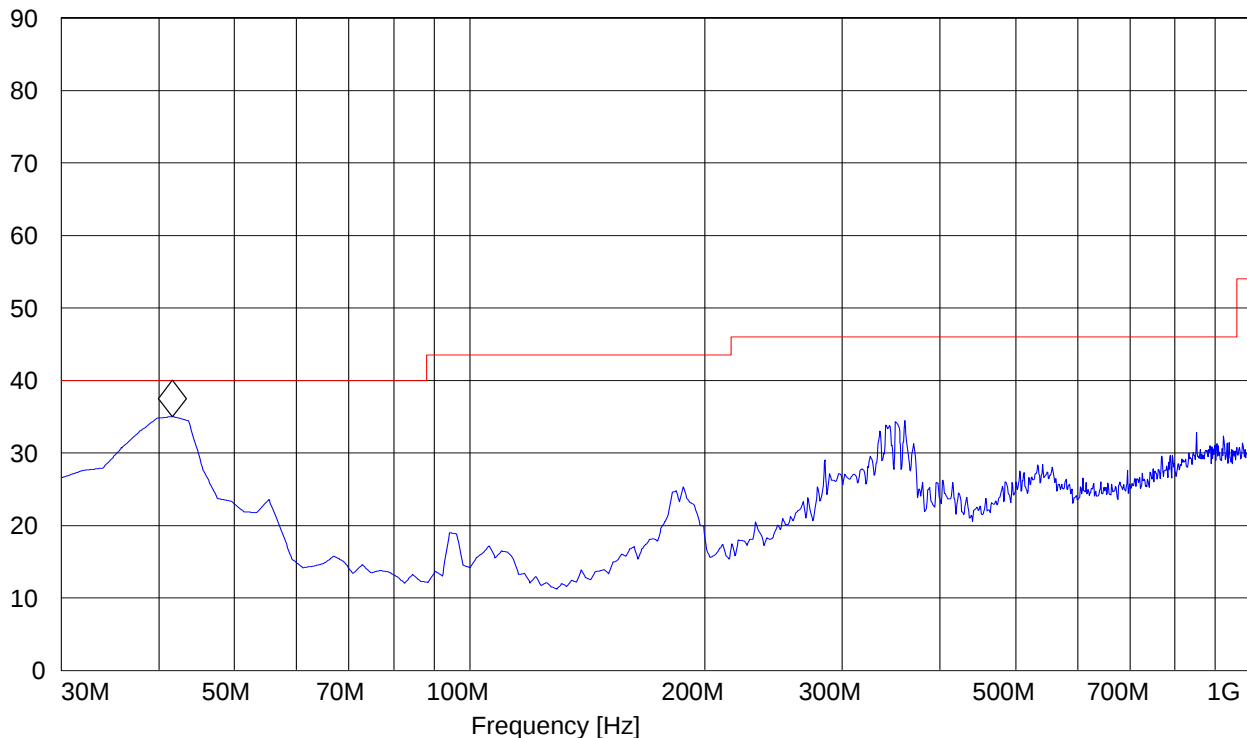
EUT: Laptop
 Customer:: Sony
 Test Mode: BT IDLE
 ANT Orientation: V
 EUT Orientation: H
 Test Engineer: SAM
 Voltage: AC
 Comments: TT@40°

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

Marker: 41.663327 MHz 35.04 dBμV/m

Level [dBμV/m]



30MHz – 1GHz Antenna: horizontal.

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

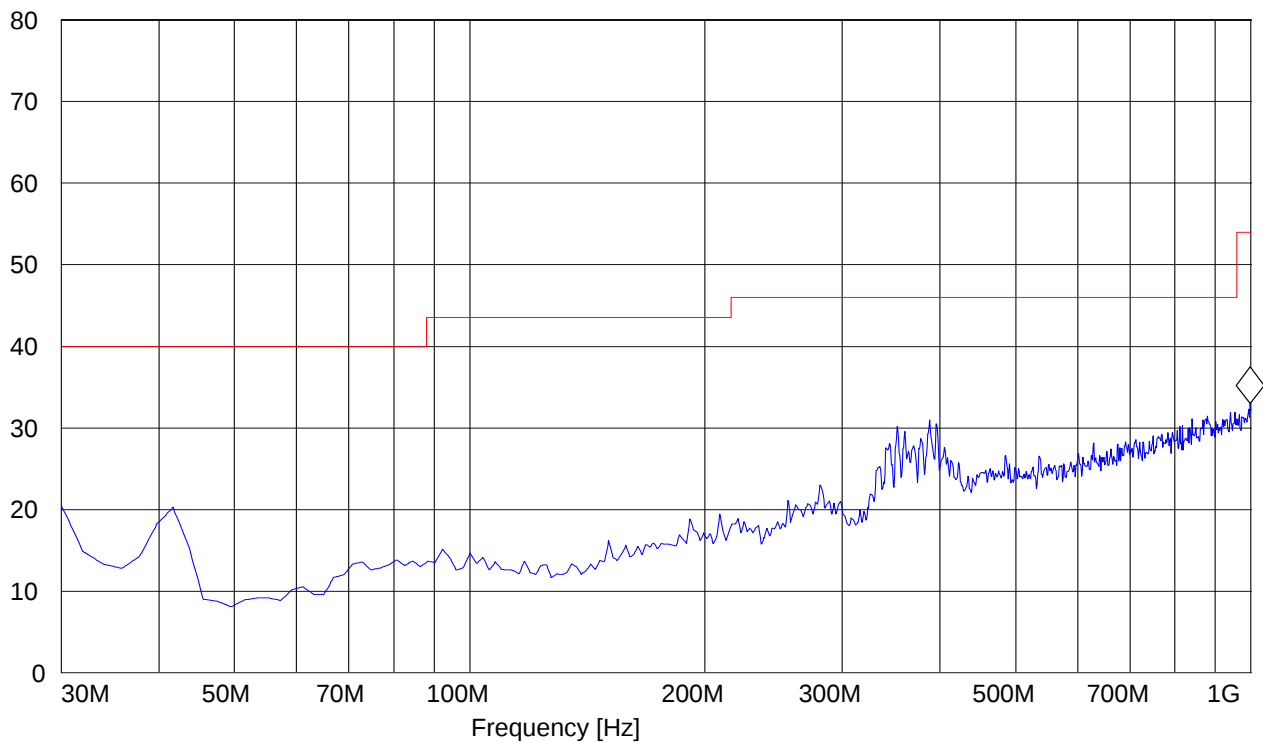
EUT: Laptop
Customer:: Sony
Test Mode: BT IDLE
ANT Orientation: H
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 998.056112 MHz 33.02 dBμV/m

Level [dBμV/m]



1-3GHz

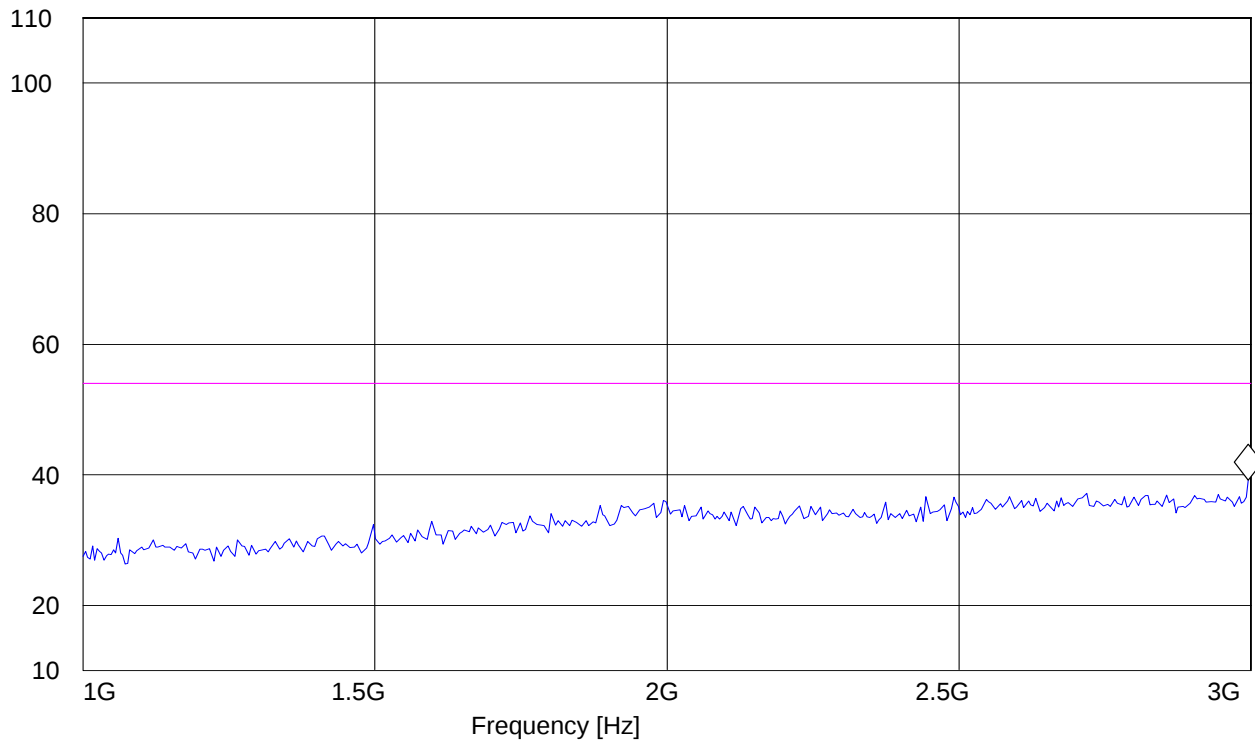
EUT: Laptop
Customer:: Sony
Test Mode: BT IDLE
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 2.995991984 GHz 39.17 dB μ V/m

Level [dB μ V/m]



3-18GHz

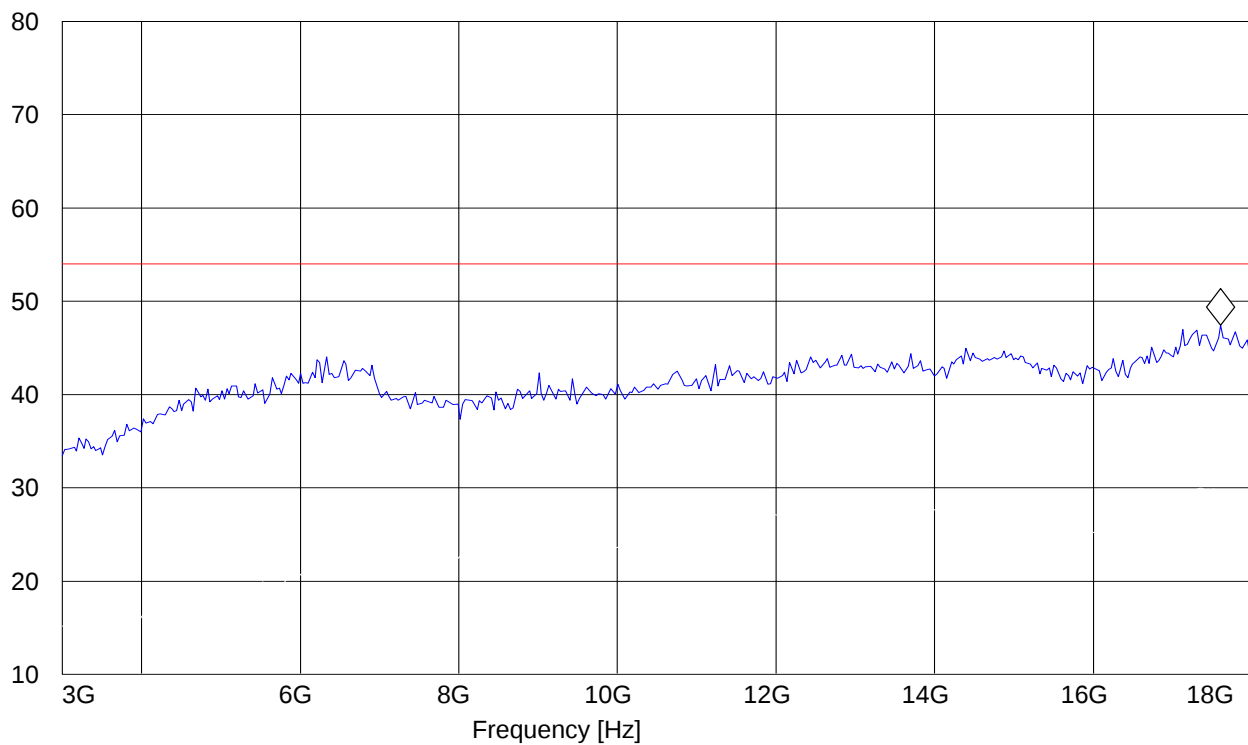
EUT: Laptop
Customer:: Sony
Test Mode: BT IDLE
ANT Orientation: V
EUT Orientation: H
Test Engineer: SAM
Voltage: AC
Comments: TT@40°

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

Marker: 17.609218437 GHz 47.45 dBμV/m

Level [dBμV/m]



6 Measurements (CONDUCTED)

6.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (CONDUCTED)

6.1.1 LIMIT SUB CLAUSE § 15.247 (b) (1)

Frequency range	RF power output
2400-2483.5 MHz	30dBm

*limit is based upon antenna gain of less than or equal to 6dBi.

6.1.2 RESULTS: GFSK

Test not conducted. This report is for radiated measurements only.

6.2 20dB BANDWIDTH

6.2.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

6.2.2 RESULTS: GFSK

Test not conducted. This report is for radiated measurements only.

6.3 CARRIER FREQUENCY SEPARATION

6.3.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

SEPARATION
> 25 KHz or > 20 dB BANDWIDTH

6.3.2 RESULTS:

Test not conducted. This report is for radiated measurements only.

6.4 NUMBER OF HOPPING CHANNELS

6.4.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (iii)

NUMBER OF CHANNELS
> 15

6.4.2 RESULTS:

Test not conducted. This report is for radiated measurements only.

6.5 TIME OF OCCUPANCY (DWELL TIME)

6.5.1 LIMIT SUB CLAUSE § 15.247 (a) (1) (i) (ii) (iii)

FREQUENCY RANGE	AVERAGE TIME OF OCCUPANCY PER 31.6 SECONDS (LIMIT)
2400-2483.5	< 0.4 Seconds

6.5.2 RESULTS:

Test not conducted. This report is for radiated measurements only.

6.6 CONDUCTED SPURIOUS EMISSION

6.6.1 LIMIT SUB CLAUSE § 15.247 (d)

FREQUENCY RANGE	limit
30M-25GHz	-20dBc

6.6.2 RESULTS: Tnom(23)°C VnomVDC

Test not conducted. This report is for radiated measurements only.

6.7 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

6.7.1 LIMITS

Technical specification: 15.107 / 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 μ H/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.

Limit

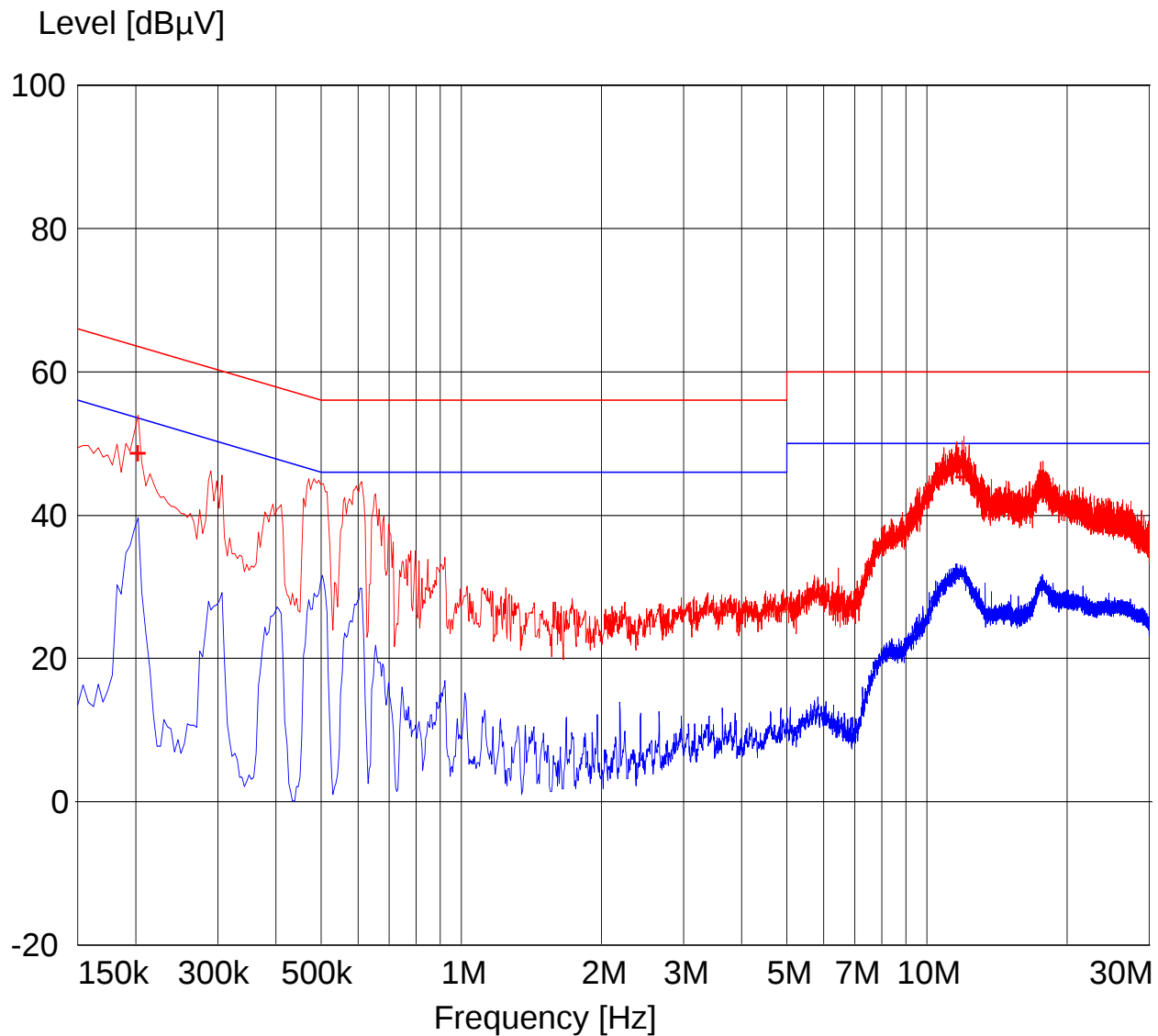
Frequency of Emission (MHz)	Conducted Limit (dB μ V)	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50
* Decreases with logarithm of the frequency		

ANALYZER SETTINGS: RBW = 10KHz

VBW = 10KHz

6.7.2 RESULTS TX Line:

EUT: Laptop
Manufacturer: Sony
Test Mode: BT Ch.39, 2441MHz
ANT Orientation:: LISN
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: : Line



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



MEASUREMENT RESULT: "55022 V AV QPk"

7/25/2008 12:03AM

Frequency	Level	Transd	Limit	Margin	Line	PE	AUX STATE
MHz	dBμV	dB	dBμV	dB			
0.202000	48.70	0.1	64	14.8	1	---	OFF
11.998000	45.40	0.7	60	14.6	1	---	OFF

LIMIT LINE: "EN 55022 V AV"

Short Description: Voltage AV Limit

4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	56.00
0.500000	46.00
5.000000	46.00
5.000000	50.00
30.000000	50.00

LIMIT LINE: "EN 55022 V QP"

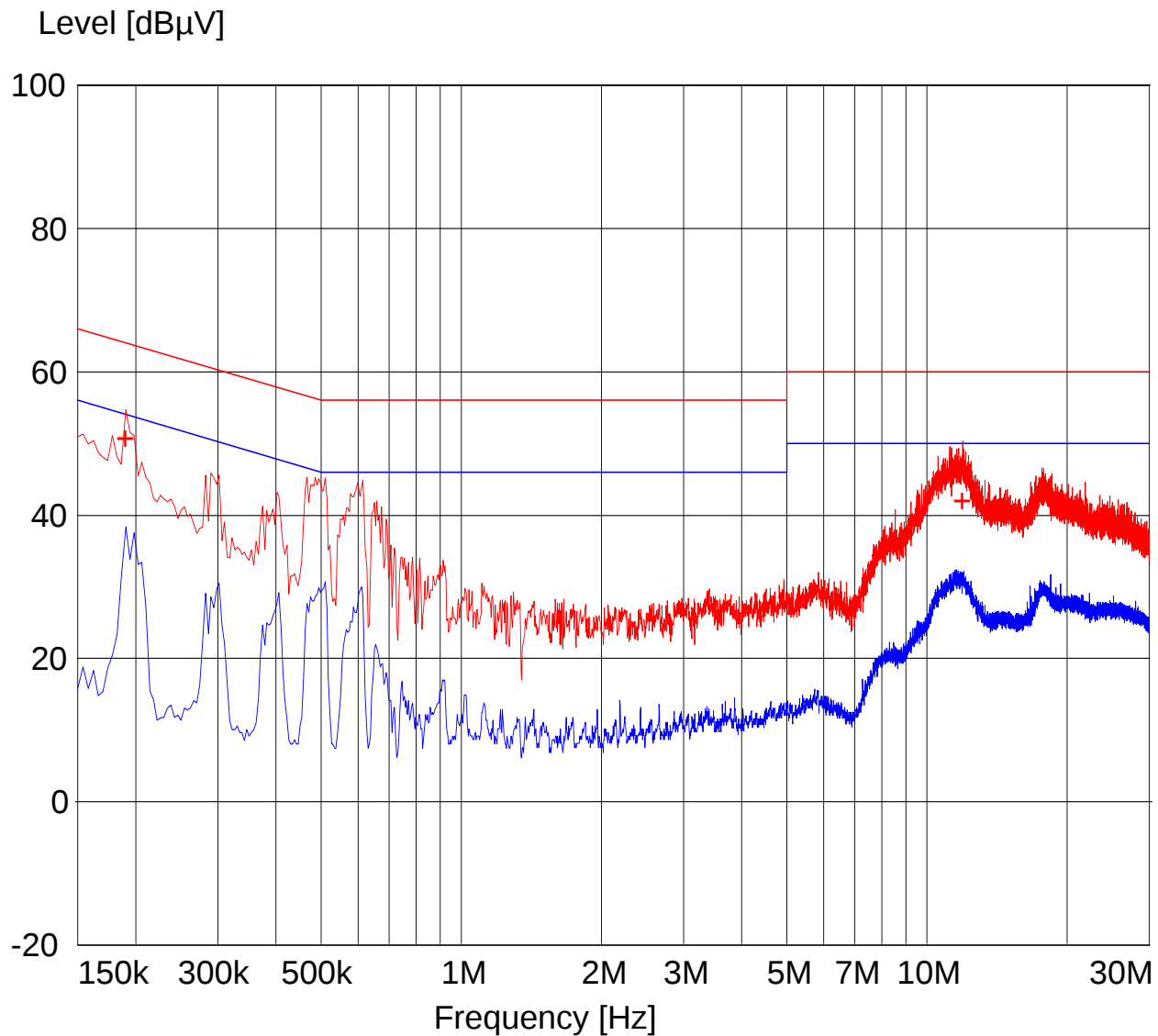
Short Description: Voltage QP Limit

4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	66.00
0.500000	56.00
5.000000	56.00
5.000000	60.00
30.000000	60.00

6.7.3 RESULTS TX Neutral

EUT: Laptop
Manufacturer: Sony
Test Mode: BT Ch.39, 2441MHz
ANT Orientation:: LISN
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: : Neutral



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



MEASUREMENT RESULT: "55022 V AV QPk"

7/24/2008 11:58PM

Frequency	Level	Transd	Limit	Margin	Line	PE	AUX STATE
MHz	dBμV	dB	dBμV	dB			
0.190000	50.70	0.1	64	13.4	1	---	OFF
11.926000	42.10	0.7	60	17.9	1	---	OFF

LIMIT LINE: "EN 55022 V AV"

Short Description: Voltage AV Limit
4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	56.00
0.500000	46.00
5.000000	46.00
5.000000	50.00
30.000000	50.00

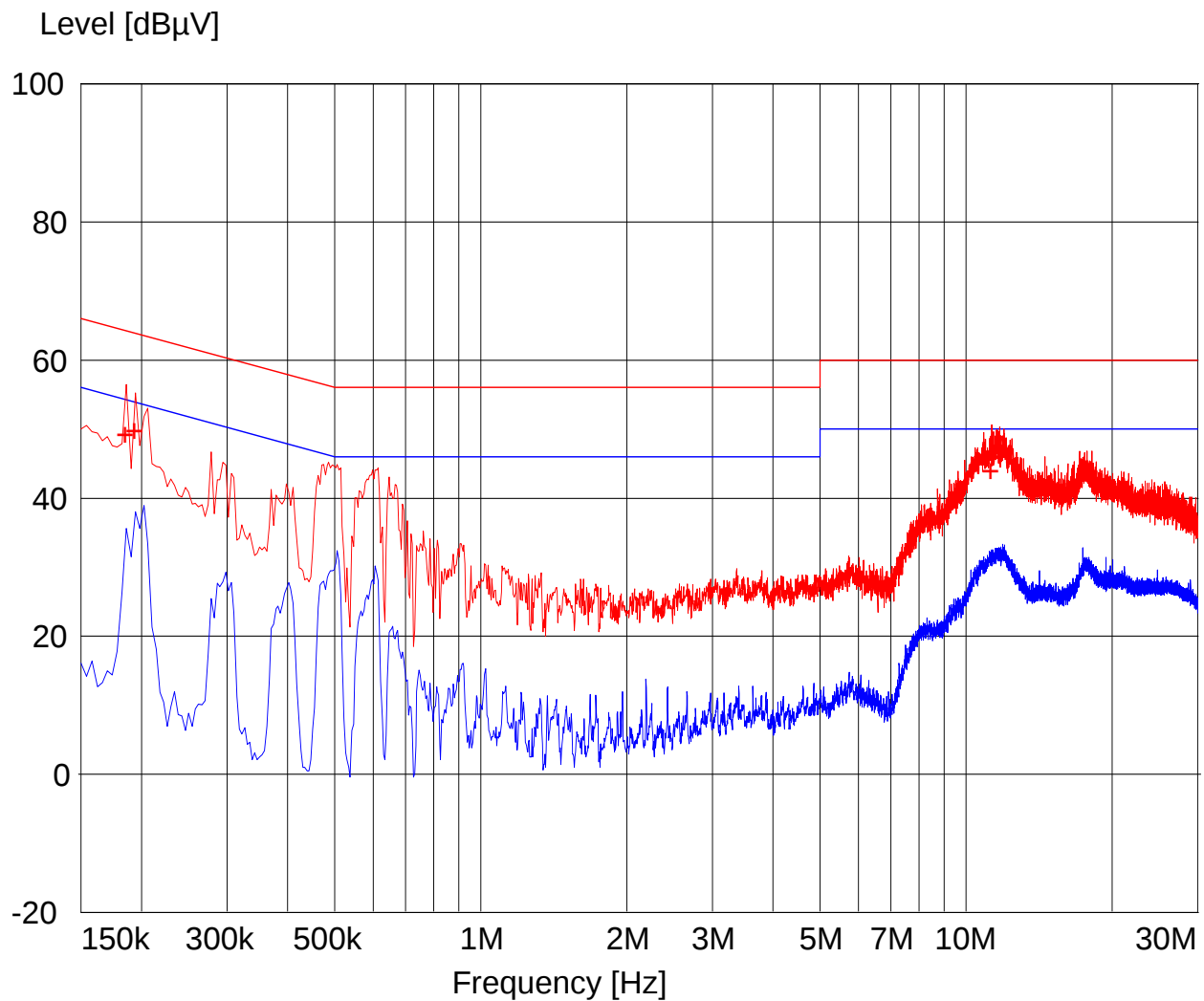
LIMIT LINE: "EN 55022 V QP"

Short Description: Voltage QP Limit
4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	66.00
0.500000	56.00
5.000000	56.00
5.000000	60.00
30.000000	60.00

6.7.4 RESULTS RX Line:

EUT: Laptop
Manufacturer: Sony
Test Mode: BT Ch.39, 2441MHz; RX
ANT Orientation:: LISN
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: :
Line



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



MEASUREMENT RESULT: "55022 V AV QPk"

7/25/2008 12:09AM

Frequency	Level	Transd	Limit	Margin	Line	PE	AUX STATE
MHz	dBμV	dB	dBμV	dB			
0.186000	49.30	0.1	64	15.0	1	---	OFF
0.194000	49.80	0.1	64	14.1	1	---	OFF
11.282000	44.00	0.6	60	16.0	1	---	OFF

LIMIT LINE: "EN 55022 V AV"

Short Description: Voltage AV Limit

4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	56.00
0.500000	46.00
5.000000	46.00
5.000000	50.00
30.000000	50.00

LIMIT LINE: "EN 55022 V QP"

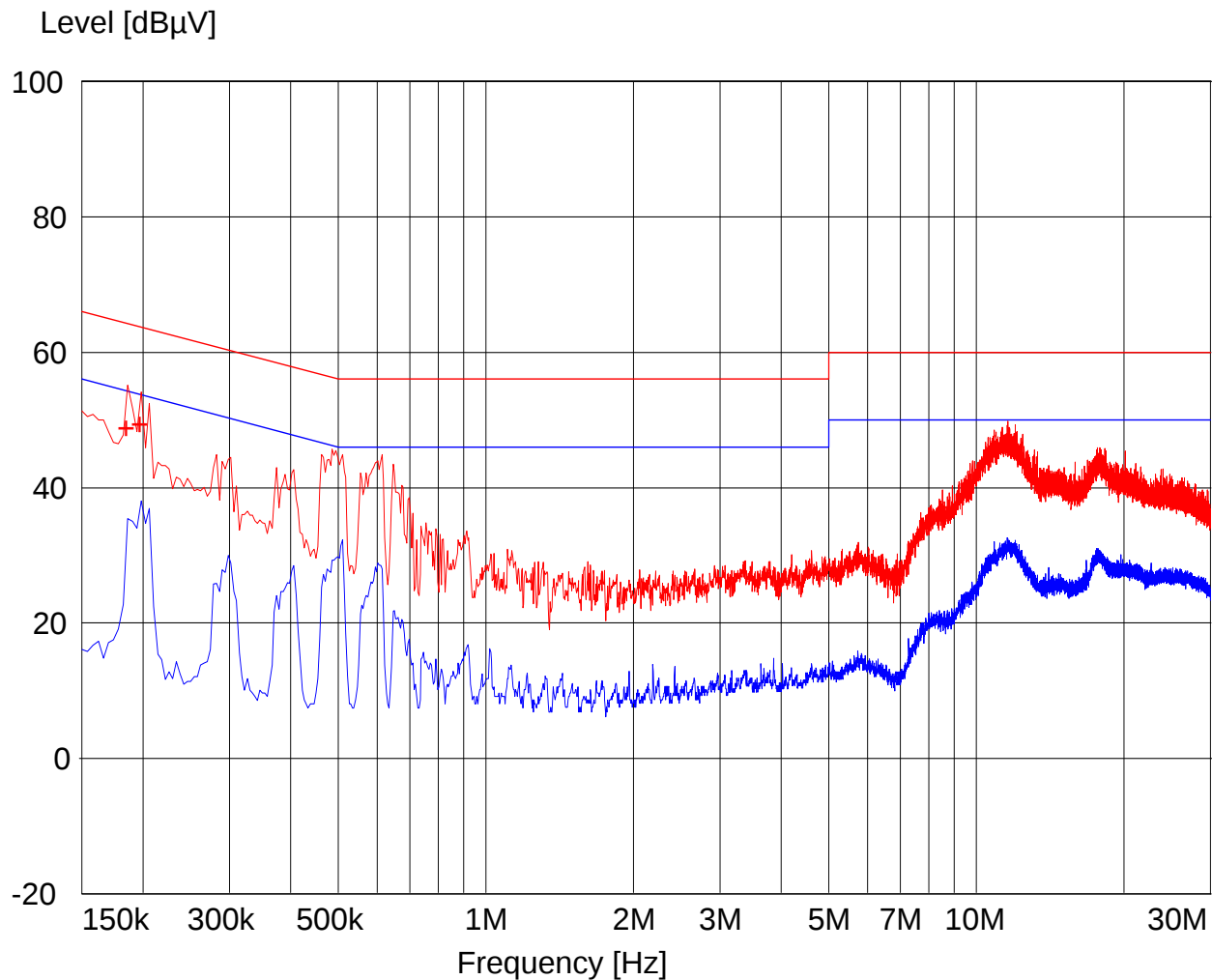
Short Description: Voltage QP Limit

4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	66.00
0.500000	56.00
5.000000	56.00
5.000000	60.00
30.000000	60.00

6.7.5 RESULTS RX Neutral

EUT: Laptop
Manufacturer: Sony
Test Mode: BT Ch.39, 2441MHz; RX
ANT Orientation:: LISN
EUT Orientation:: H
Test Engineer:: Chris
Power Supply: : AC Adapter
Comments: :
Neutral



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



MEASUREMENT RESULT: "55022 V AV QPk"

7/25/2008 12:16AM

Frequency	Level	Transd	Limit	Margin	Line	PE	AUX STATE
MHz	dBμV	dB	dBμV	dB			
0.186000	48.90	0.1	64	15.3	1	---	OFF
0.198000	49.40	0.1	64	14.3	1	---	OFF

LIMIT LINE: "EN 55022 V AV"

Short Description: Voltage AV Limit

4/27/1998 2:24PM

Frequency	Level
MHz	dBμV
0.150000	56.00
0.500000	46.00
5.000000	46.00
5.000000	50.00
30.000000	50.00

LIMIT LINE: "EN 55022 V QP"

Short Description: Voltage QP Limit

4/27/1998 2:24PM

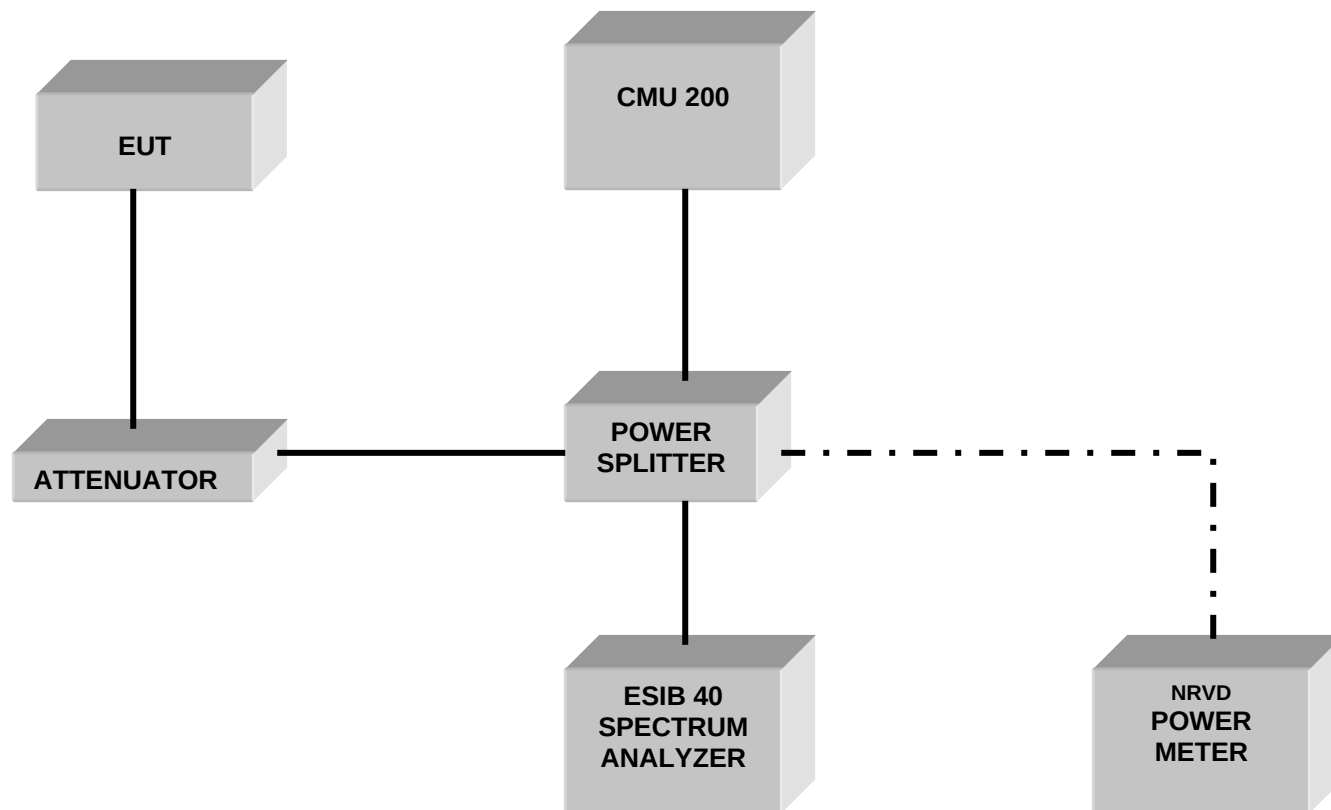
Frequency	Level
MHz	dBμV
0.150000	66.00
0.500000	56.00
5.000000	56.00
5.000000	60.00
30.000000	60.00

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 2009	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2009	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2009	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2009	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2009	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2009	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2009	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2009	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
12	Pre-Amplifier	JS4-00102600	Miteq	00616	May 2009	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2009	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2009	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2009	1 year
16	LISN	ESH3-Z5	Rohde & Schwarz	836679/003	May 2009	1 year
17	Loop Antenna	6512	EMCO	00049838	July 2009	2 years

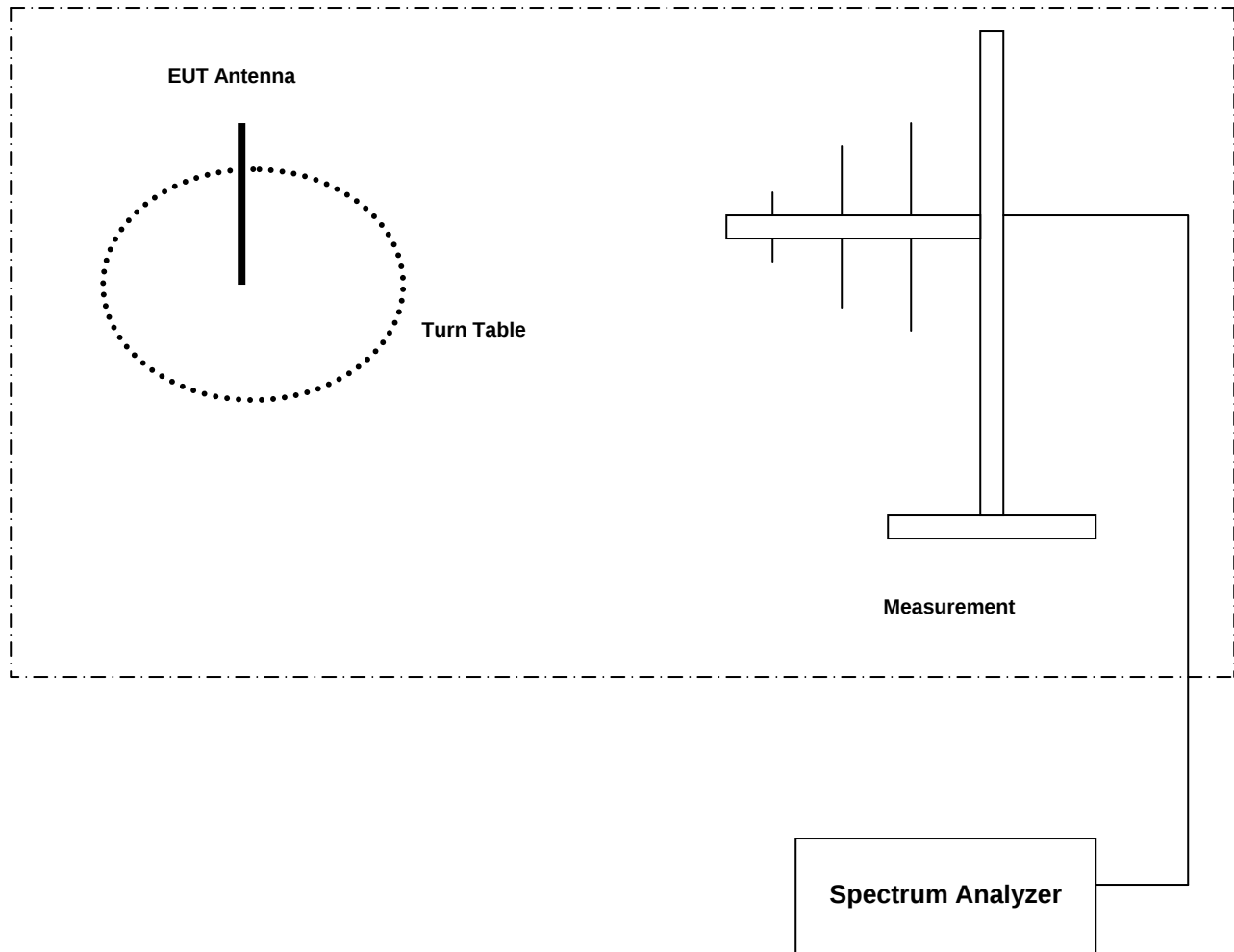
8 BLOCK DIAGRAMS

Conducted Testing



Radiated Testing

ANECHOIC CHAMBER



9 Revision History.

2008-7-29: First Issue