



# FCC Test Report

## FCC Part 15.247 for FHSS systems/ CANADA RSS-210

FOR:

NOTEBOOK PC

MODEL #: PCG-6J1L

SONY CORPORATION  
6-7-35, KITASHINAGAWA, SHINAGAWA-KU  
TOKYO 141-0001  
JAPAN

FCC ID: AK8PCG6J1L  
IC ID: 409-BPCG6J1L

TEST REPORT #: SONYE\_004\_05002\_15.247BLUETOOTH  
DATE: JANUARY 24, 2006



TTI-P-G 081/94-A0

Accredited according to ISO/IEC 17025



Bluetooth Qualification  
Test Facility  
(BQTF)



FCC listed # 101450

IC recognized # 3925

### 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](mailto: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**

<b>1</b>	<b>Assessment</b>	<b>3</b>
<b>2</b>	<b>Administrative Data</b>	<b>4</b>
2.1	<b>Identification of the Testing Laboratory Issuing the EMC Test Report</b>	<b>4</b>
2.2	<b>Identification of the Client</b>	<b>4</b>
2.3	<b>Identification of the Manufacturer</b>	<b>4</b>
<b>3</b>	<b>Equipment under Test (EUT)</b>	<b>5</b>
3.1	<b>Identification of the Equipment under Test</b>	<b>5</b>
3.2	<b>Identification of Accessory equipment</b>	<b>5</b>
<b>4</b>	<b>Subject Of Investigation</b>	<b>6</b>
<b>5</b>	<b>Measurements</b>	<b>7</b>
5.1	<b>MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)</b>	<b>7</b>
5.1.1	LIMIT SUB CLAUSE § 15.247 (b) (1) (2) (3) (4)	7
5.1.2	EIRP:	7
5.2	<b>RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205</b>	<b>11</b>
5.2.1	LIMITS	11
5.2.2	RESULTS (2402MHz)	12
5.2.3	RESULTS (2480MHz)	14
5.3	<b>TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209</b>	<b>16</b>
5.3.1	LIMITS	16
5.3.2	RESULTS	17
5.4	<b>RECEIVER SPURIOUS RADIATION § 15.209/RSS210</b>	<b>26</b>
5.4.1	LIMITS	26
5.4.2	RESULTS	27
5.5	<b>AC POWER LINE CONDUCTED EMISSIONS § 15.107/207</b>	<b>32</b>
5.5.1	LIMITS	32
5.5.2	RESULTS	33
5.6	<b>TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS</b>	<b>34</b>
5.7	<b>BLOCK DIAGRAMS</b>	<b>35</b>



## 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 CORP.	NOTEBOOK PC	PCG-6J1L

A handwritten signature in black ink, appearing to read "Neelesh Raj".

---

2006-01-24  
Neelesh Raj  
Project Leader

A handwritten signature in blue ink, appearing to read "Lothar Schmidt".

---

2006-01-24  
Lothar Schmidt  
Test Lab Manager

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.



## 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:	Neelesh Raj
Date of test:	2006-01-17 to 2006-01-24

### 2.2 Identification of the Client

Applicant's Name:	<b>SONY Corporation</b>
Street Address:	<b>6-7-35, Kitashinagawa, Shinagawa-ku,</b>
City/Zip Code	<b>Tokyo 141-0001</b>
Country	<b>Japan</b>
Contact Person:	<b>Takumi Ozawa</b>
Phone No.	<b>81-3-5795-8716</b>
Fax:	<b>81-3-5795-8981</b>
e-mail:	<b>ozawa@sm.sony.co.jp</b>

### 2.3 Identification of the Manufacturer

Manufacturer's Name:	<b>Sony EMCS Corporation</b>
Manufacturers Address:	<b>5432 Toyoshima, Azumino-shi,</b>
City/Zip Code	<b>Nagano 399-8282,</b>
Country	<b>Japan</b>



### 3 Equipment under Test (EUT)

#### 3.1 Identification of the Equipment under Test

Marketing Name:	<b>VAIO-VGN SZ</b>
Description:	<b>NOTEBOOK PC</b>
Model No:	<b>PCG-6J1L</b>
FCC ID:	<b>AK8PCG6J1L</b>
IC ID:	<b>409-BPCG6J1L</b>
Frequency Range:	<b>2400-2483.5MHz</b>
Type(s) of Modulation:	<b>GFSK</b>
Number of Channels:	<b>79</b>
Antenna Type:	<b>λ/monopole (Chip Antenna)</b>
Output Power:	<b>0.00072W EIRP@ 2441MHz</b>

#### 3.2 Identification of Accessory equipment

<b>TYPE</b>	<b>MANF.</b>	<b>MODEL</b>
AC ADAPTER	SONY	VGP-AC19V10



#### **4 Subject Of Investigation**

All testing was performed on the PCG-6J1L referred to as EUT. The EUT carries a pre-certified Bluetooth module with FCC ID# CWTUGPZ6. This test report contains full radiated testing as per FCC15.247 on the EUT with the pre-certified Bluetooth module. All conducted measurements are covered under *test report# 25JE0028-YK-1*.

During the testing process the EUT was tested on a single channel using PRBS9 payload using DH5 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.



**5 Measurements**

**5.1 MAXIMUM PEAK OUTPUT POWER § 15.247 (RADIATED)**

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

<b>Frequency range</b>	<b>RF power output</b>
<b>2400-2483.5 MHz</b>	<b>36dBm EIRP</b>

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

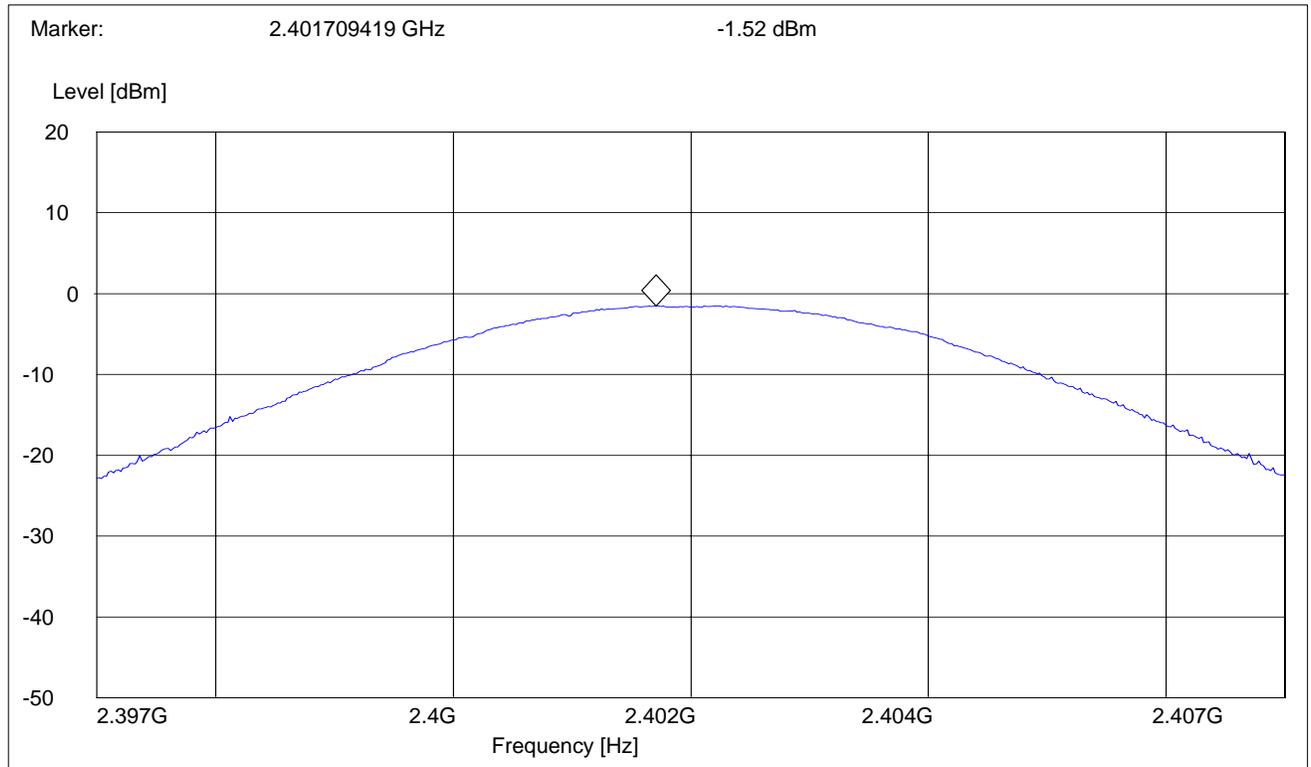
**5.1.2 EIRP:**

<b>TEST CONDITIONS</b>		<b>MAXIMUM PEAK OUTPUT POWER (dBm)</b>		
<b>Frequency (MHz)</b>		<b>2402</b>	<b>2441</b>	<b>2480</b>
<b>T<sub>nom</sub>(23)°C</b>	<b>V<sub>nom</sub> VDC</b>	<b>-1.52</b>	<b>-1.41</b>	<b>-2.38</b>
<b>Measurement uncertainty</b>		<b>±0.5dBm</b>		



**EIRP (2402 MHz)**

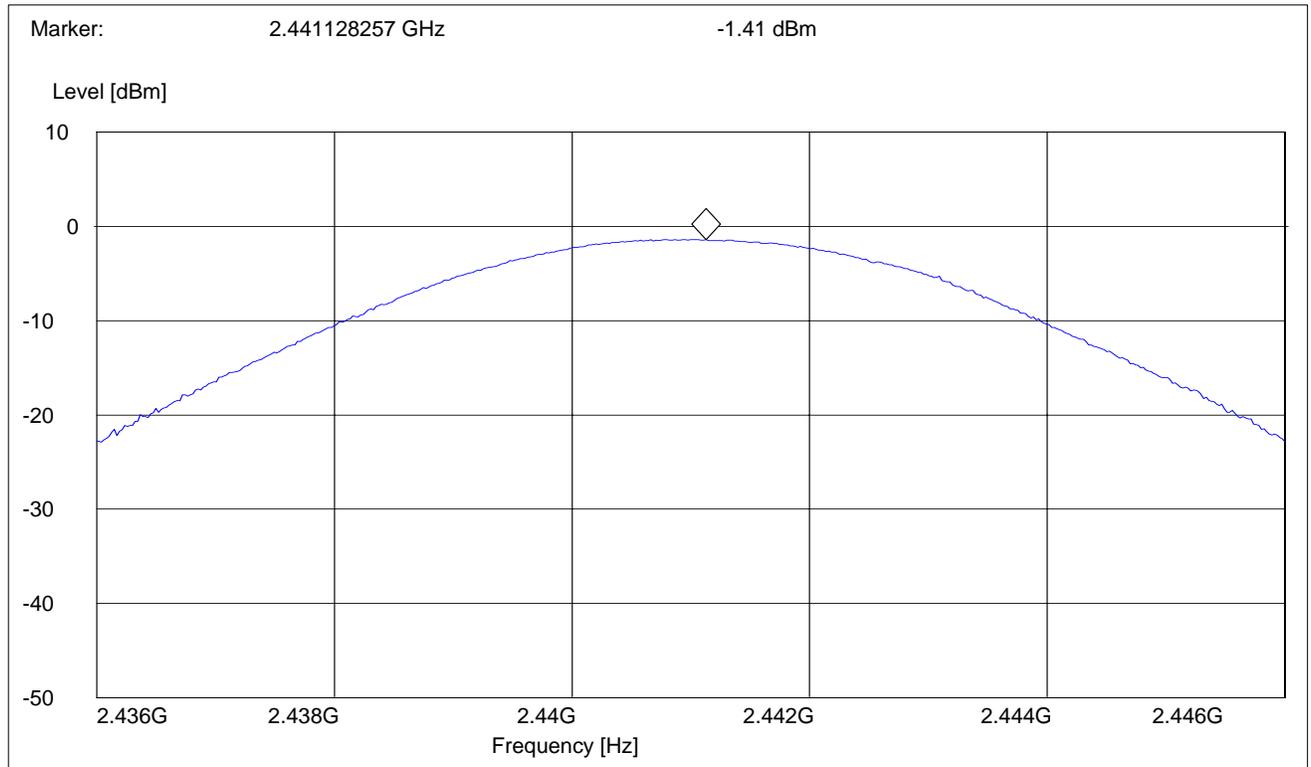
Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2397 MHz	2407 MHz	Max Peak	Coupled	3 MHz





**EIRP (2441 MHz)**

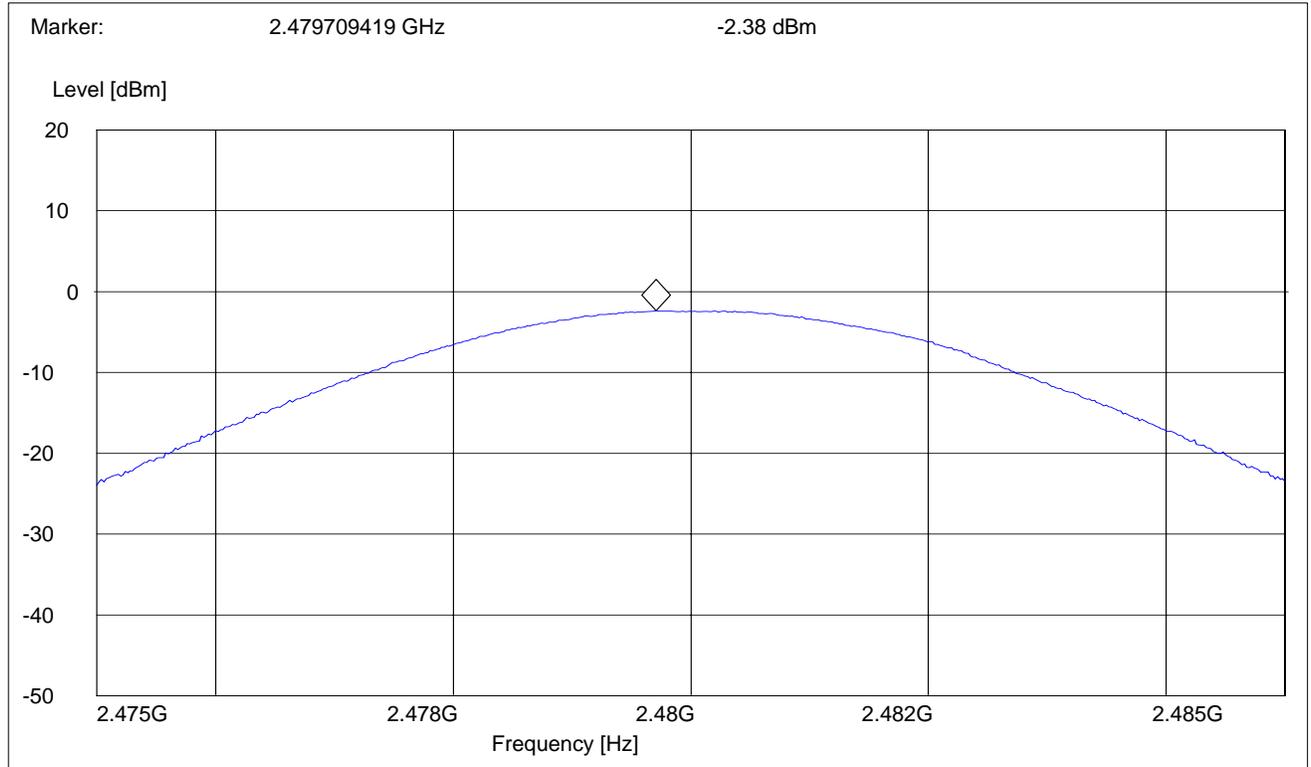
Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2436 MHz	2446 MHz	Max Peak	Coupled	3 MHz





**EIRP (2480 MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
2475 MHz	2485 MHz	Max Peak	Coupled	3 MHz





**5.2 RESTRICTED BAND EDGE COMPLIANCE RADIATED §15.247/15.205**

**5.2.1 LIMITS**

(a) 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
<sup>1</sup> 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	( <sup>2</sup> )
13.36 - 13.41			

**\*PEAK LIMIT= 74dBuV/m**

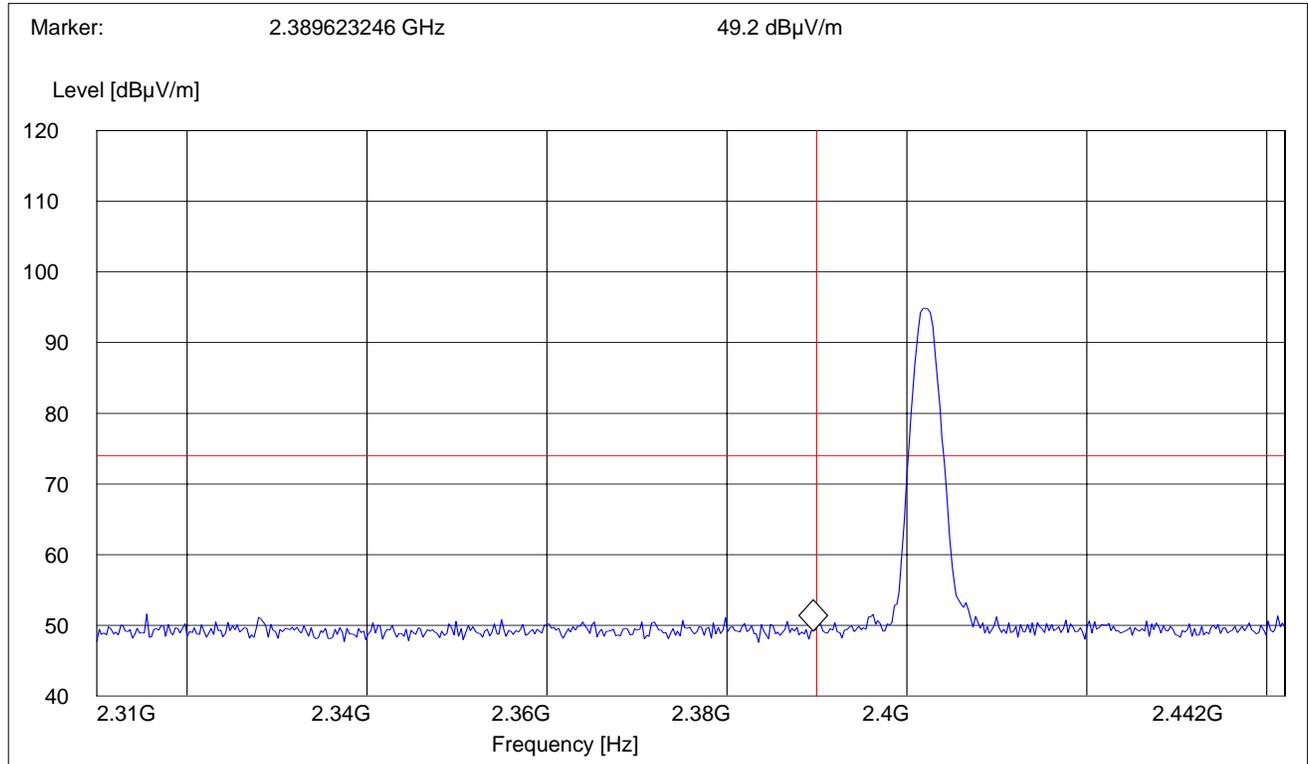
**\*AVG. LIMIT= 54dBuV/m**



**5.2.2 RESULTS (2402MHz)**

**PEAK**

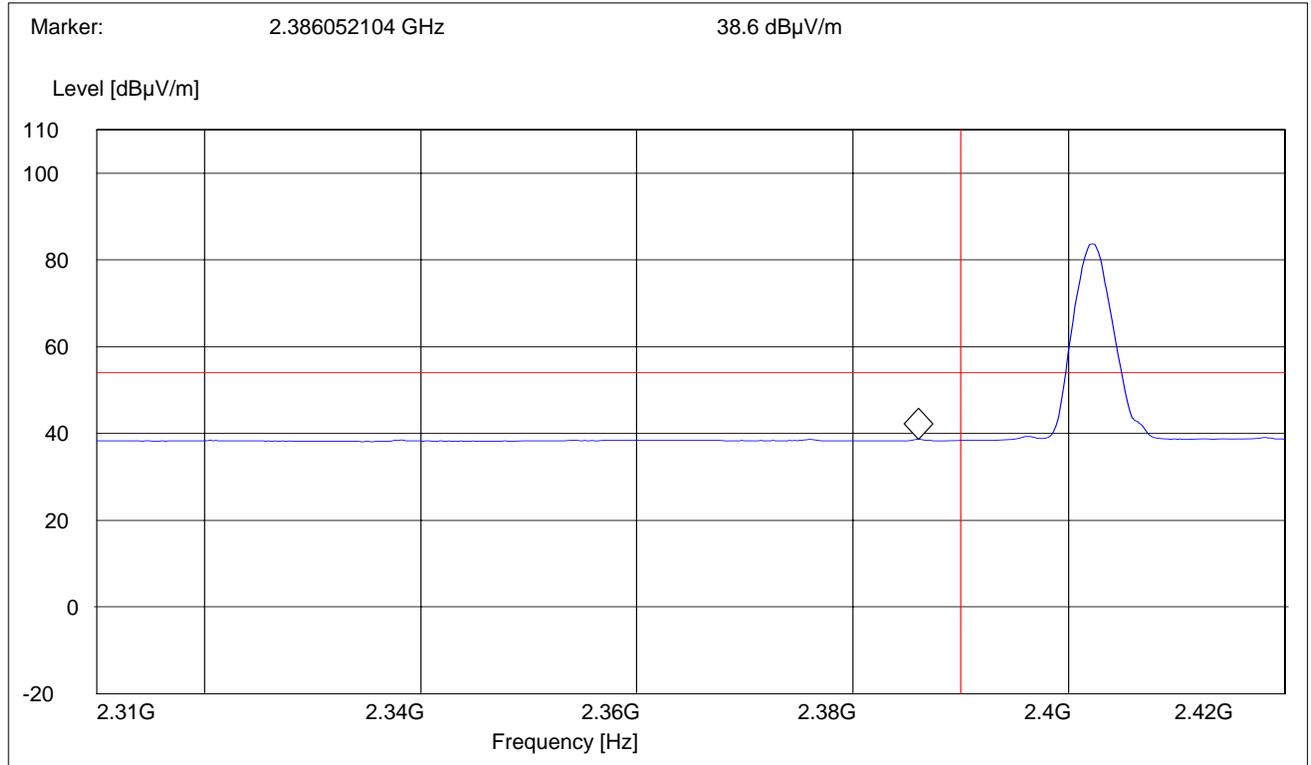
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
2310 MHz	2442 MHz	Max Peak	Coupled	1 MHz	1 MHz





AVG

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
2310 MHz	2420 MHz	Max Peak	Coupled	1 MHz	10 Hz

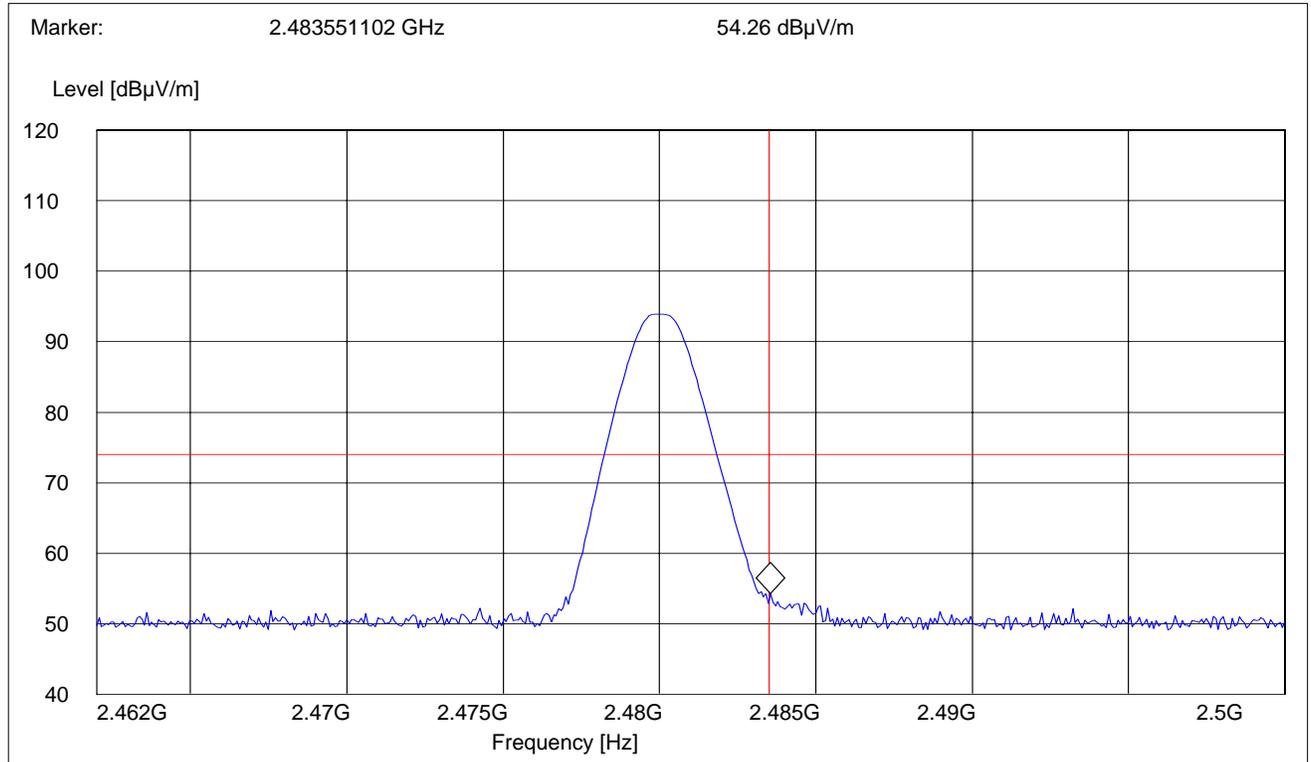




**5.2.3 RESULTS (2480MHz)**

**PEAK**

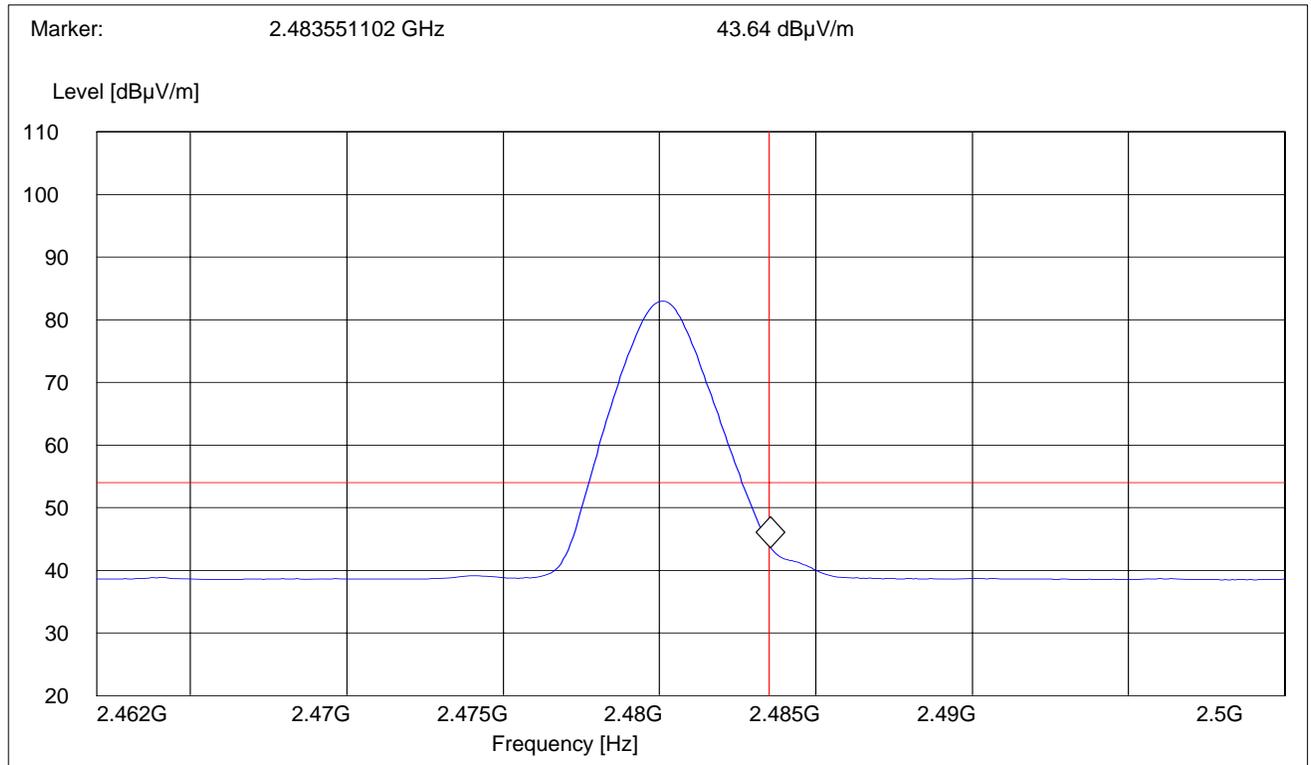
Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
2462 MHz	2500 MHz	Max Peak	Coupled	1 MHz	1 MHz





**AVG**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
2462 MHz	2500 MHz	Max Peak	Coupled	1 MHz	10 Hz





**5.3 TRANSMITTER SPURIOUS EMISSIONS RADIATED § 15.247/15.205/15.209**

**5.3.1 LIMITS**

(a) 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
<sup>1</sup> 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	( <sup>2</sup> )
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

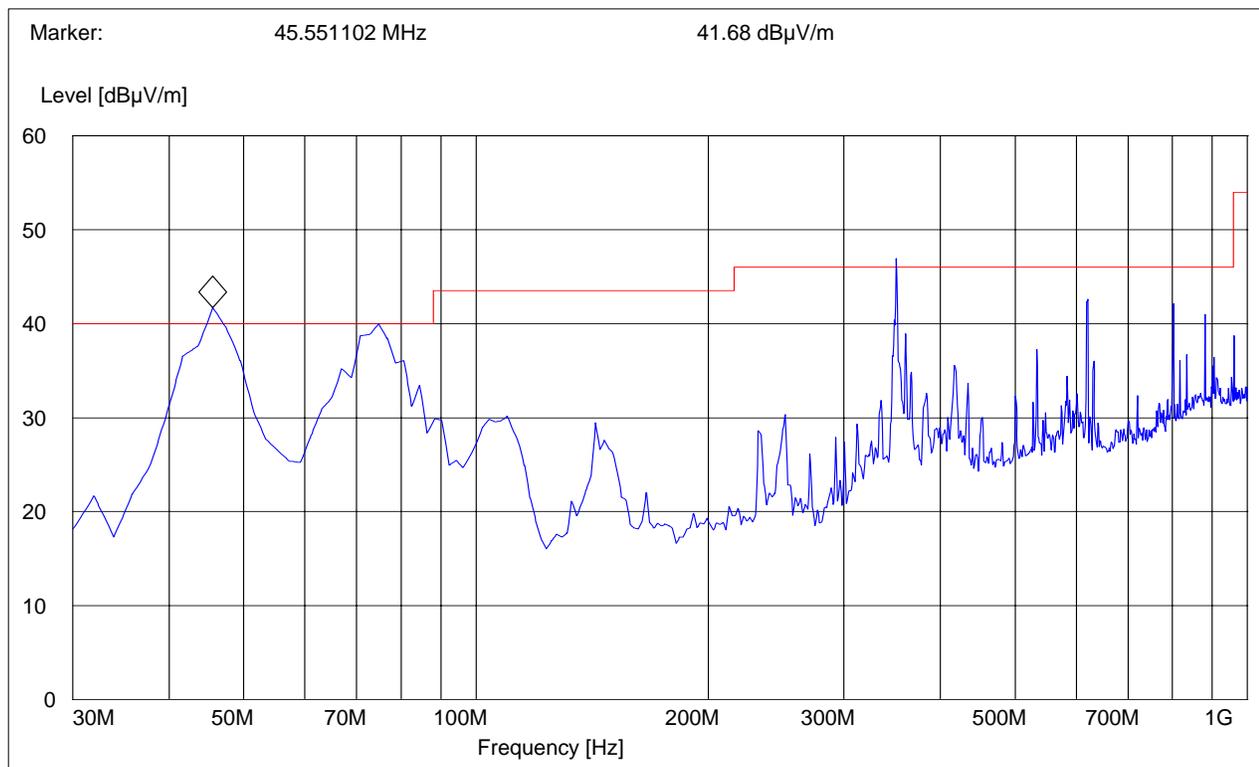


5.3.2 RESULTS

30MHz – 1GHz  
 Antenna: vertical

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

Note: This plot is valid for low, mid, high channels (worst-case plot)  
 Note: Peak reading vs. Quasi-peak limit



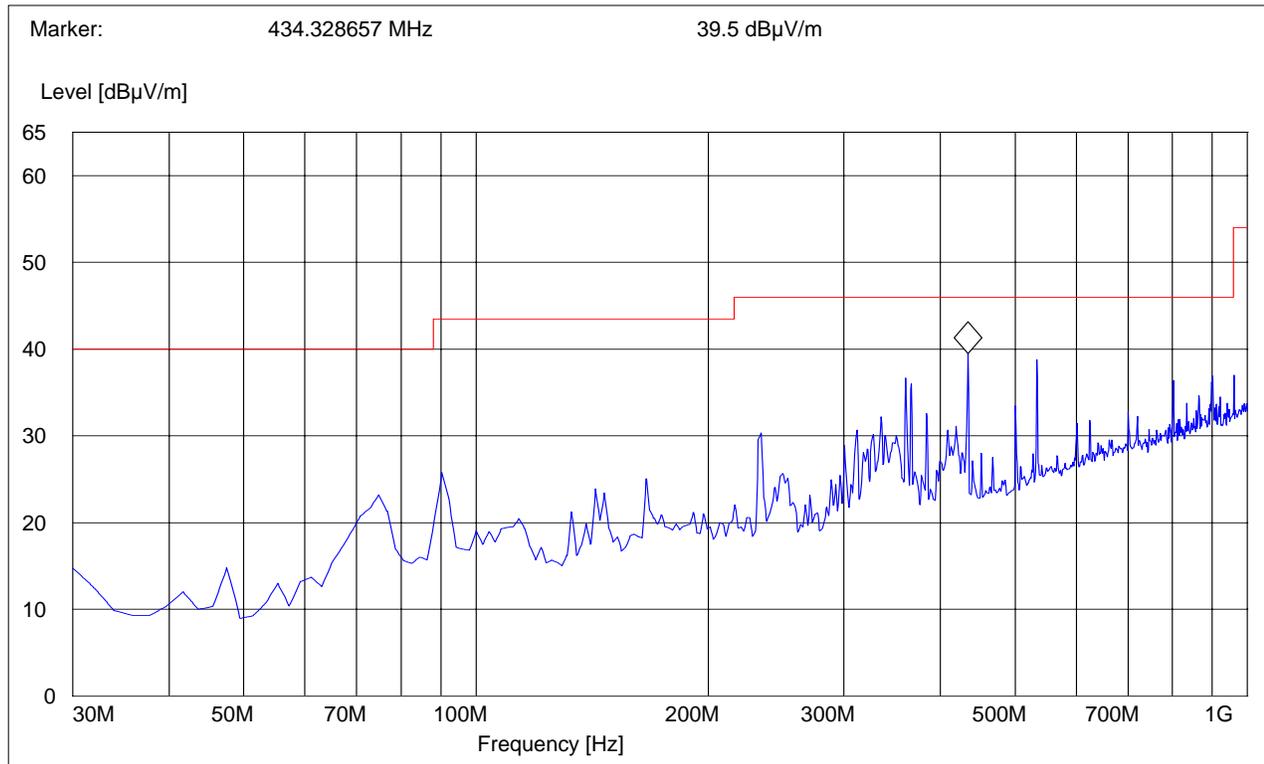
Frequency (MHz)	Max peak (dBuV/m)	Quasi-peak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
45.55	41.68	38.68	40	-1.32	Pass
74.9097	39.9	36.9	40	-3.1	Pass
350.72	46.93	44.632	46	-1.368	Pass



**30MHz – 1GHz**  
**Antenna: horizontal**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

**Note: This plot is valid for low, mid, high channels (worst-case plot)**  
**Note: Peak reading vs. Quasi-peak limit**



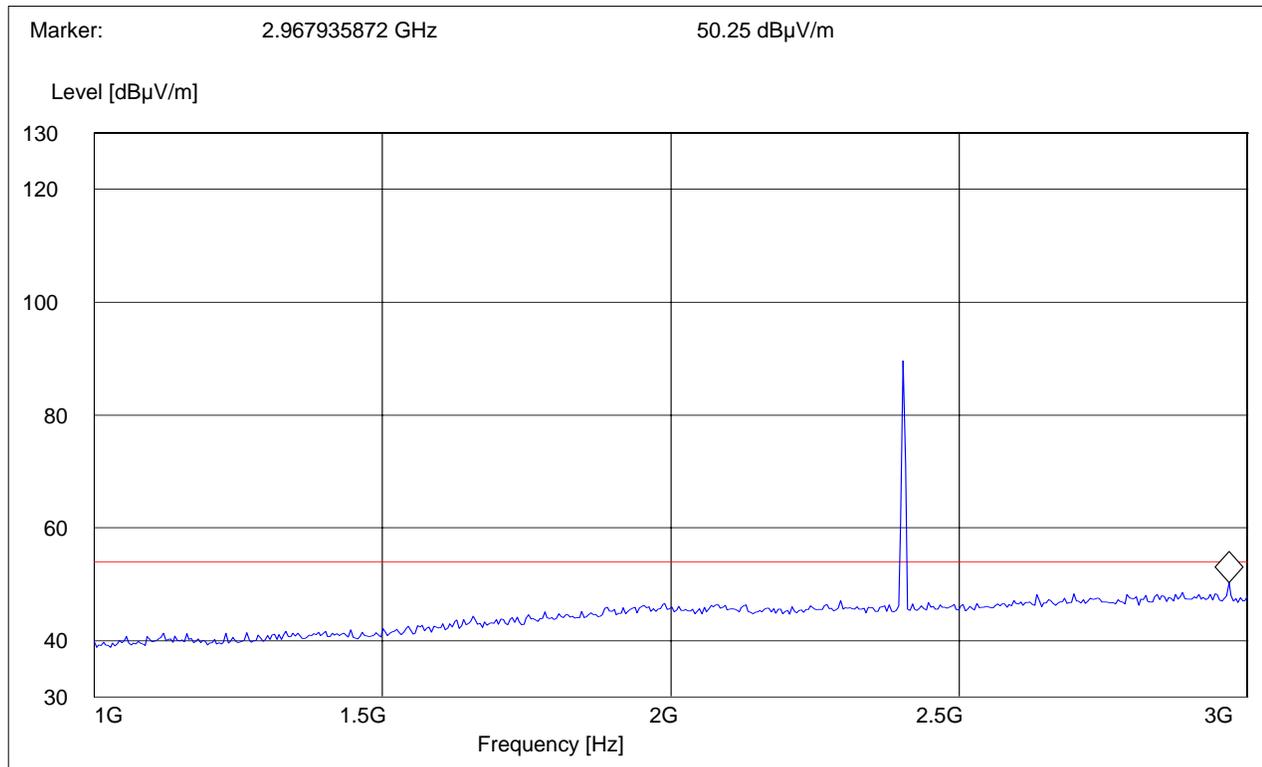


**1-3GHz (2402MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: The peaks above the limit line is the carrier freq.**

**Note: Peak Reading vs. Average limit**



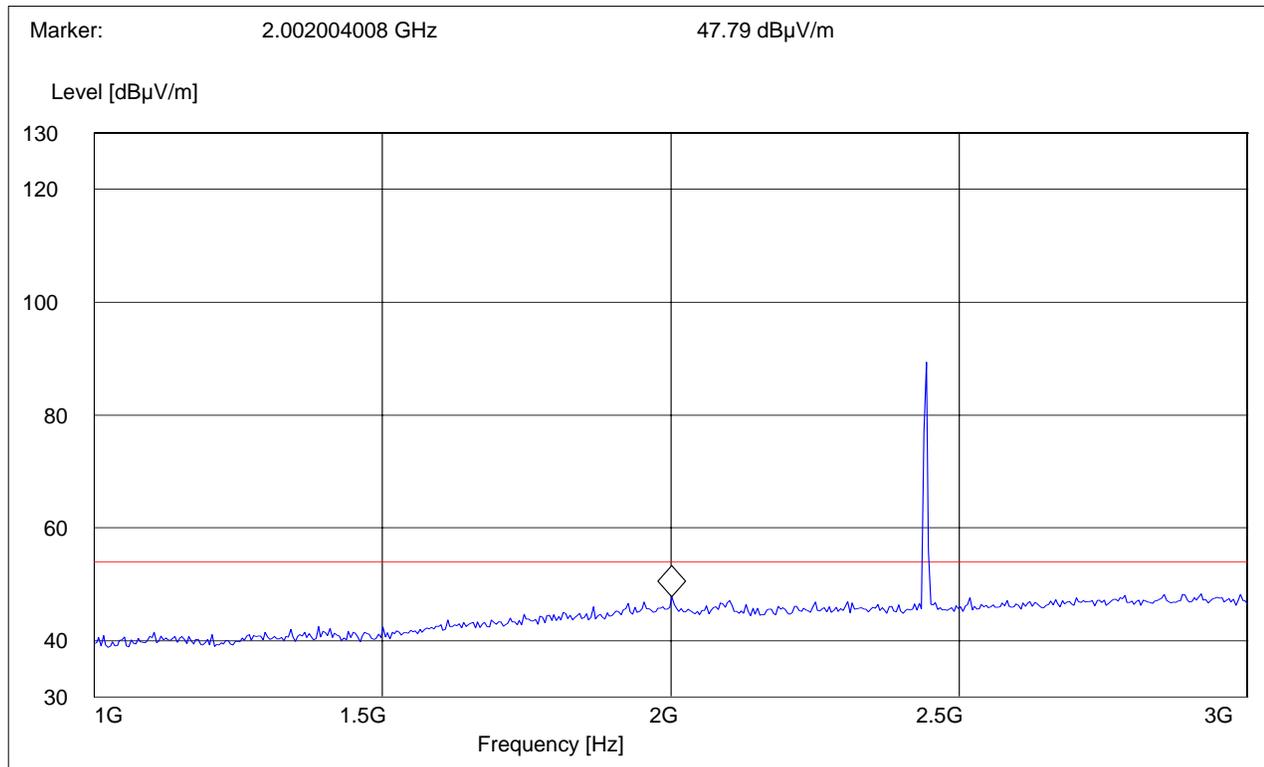


**1-3GHz (2441MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: The peaks above the limit line is the carrier freq.**

**Note: Peak Reading vs. Average limit**



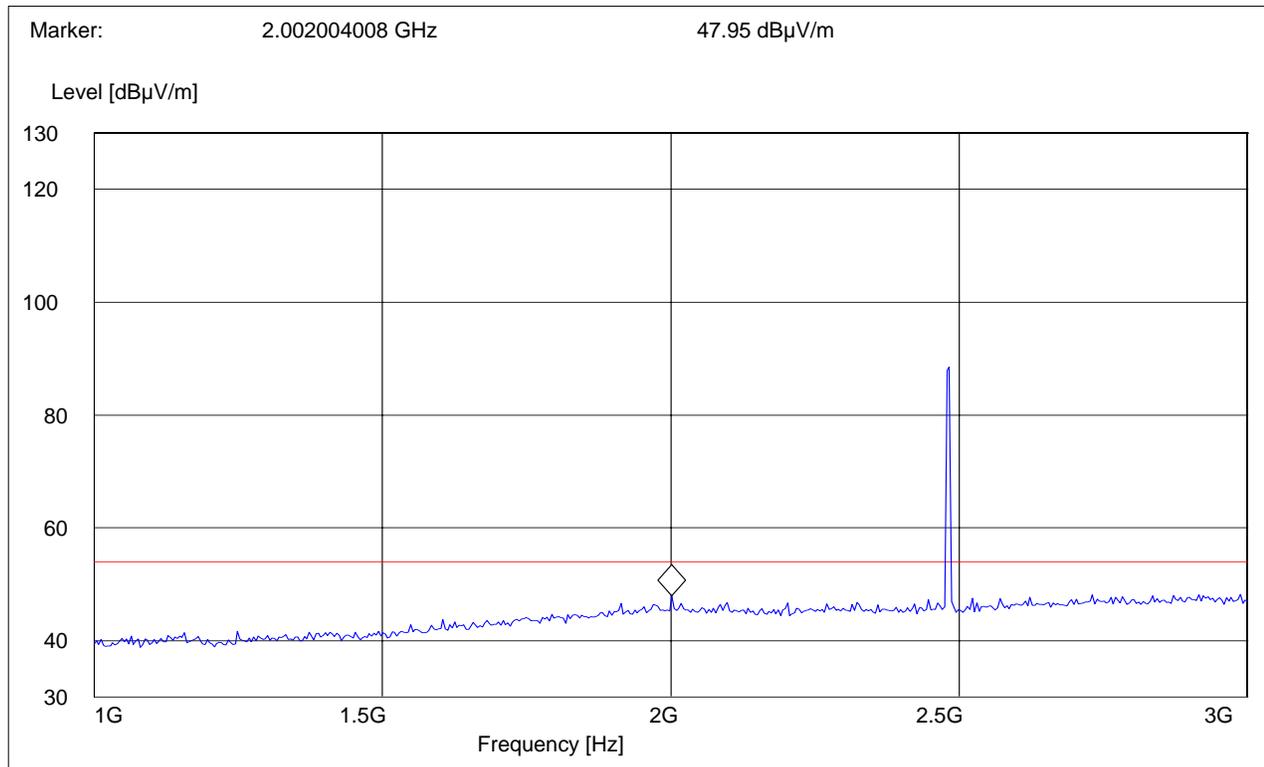


**1-3GHz (2480MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: The peaks above the limit line is the carrier freq.**

**Note: Peak Reading vs. Average limit**

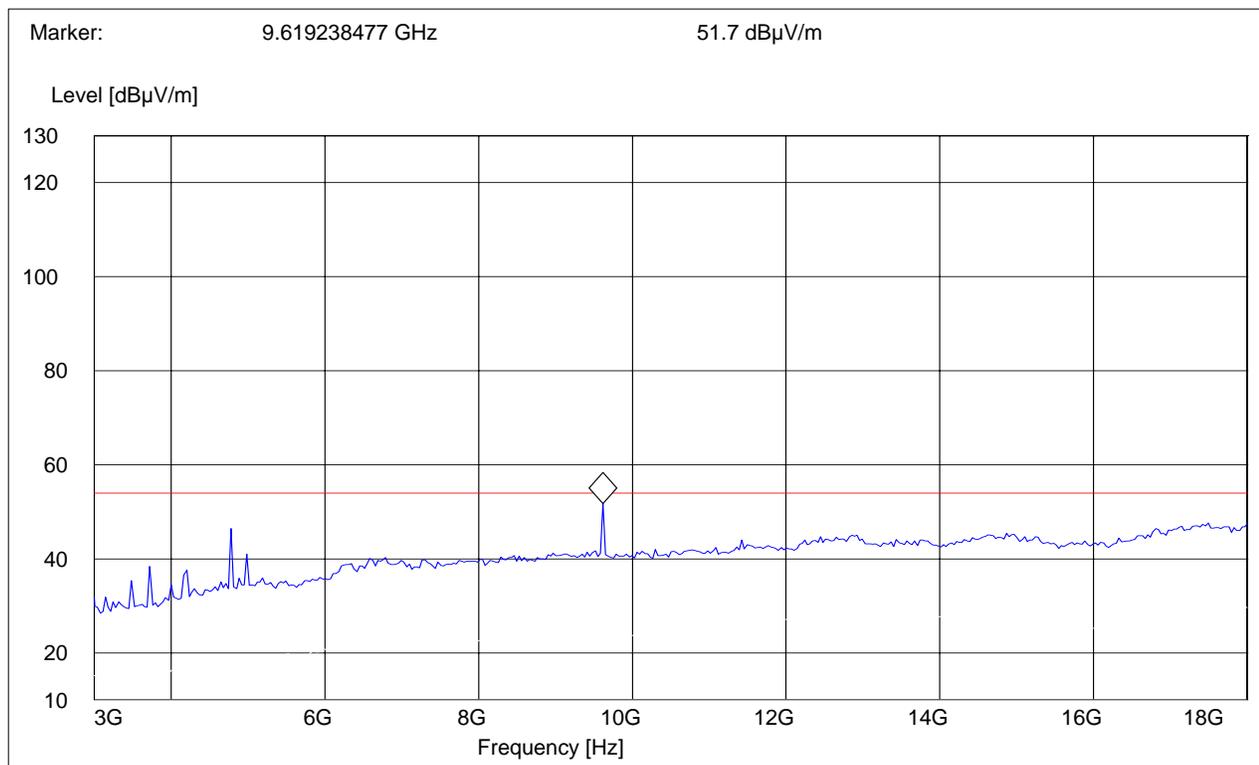




**3-18GHz (2402MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: Peak Reading vs. Average limit**

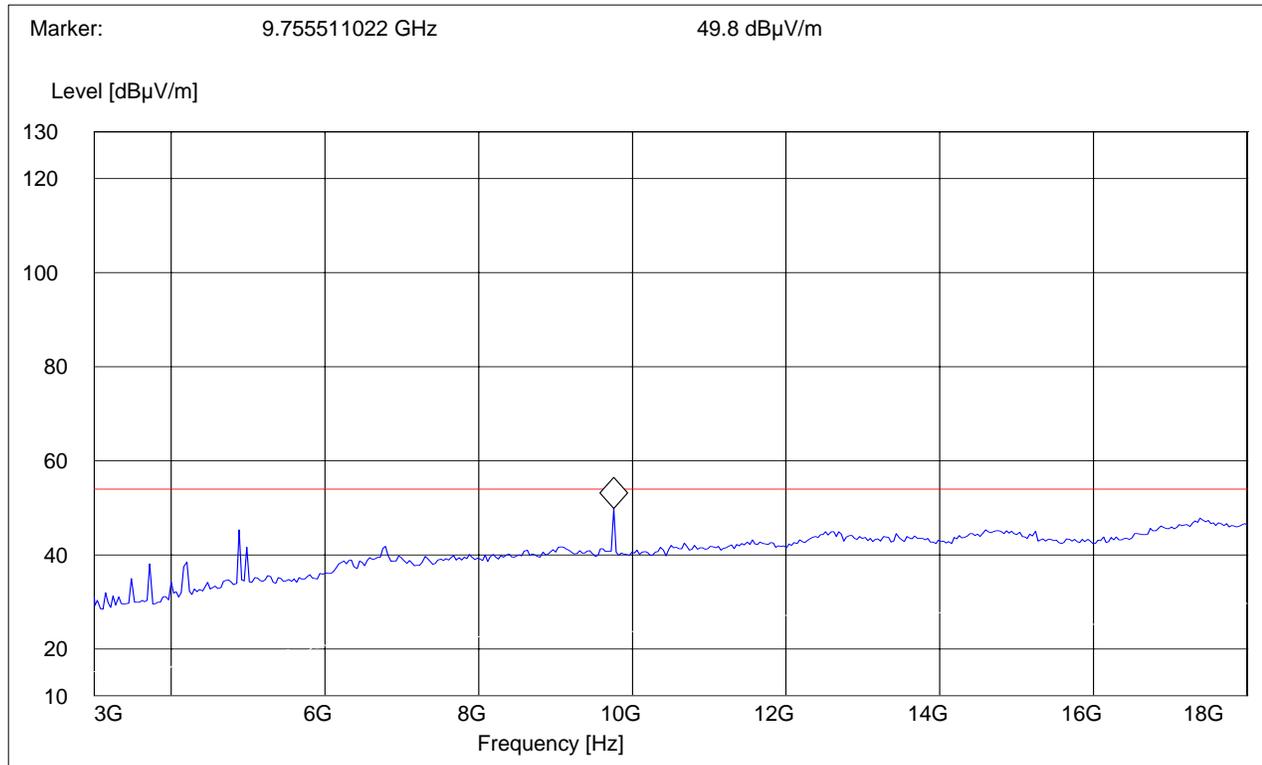




**3-18GHz (2441MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: Peak Reading vs. Average limit**

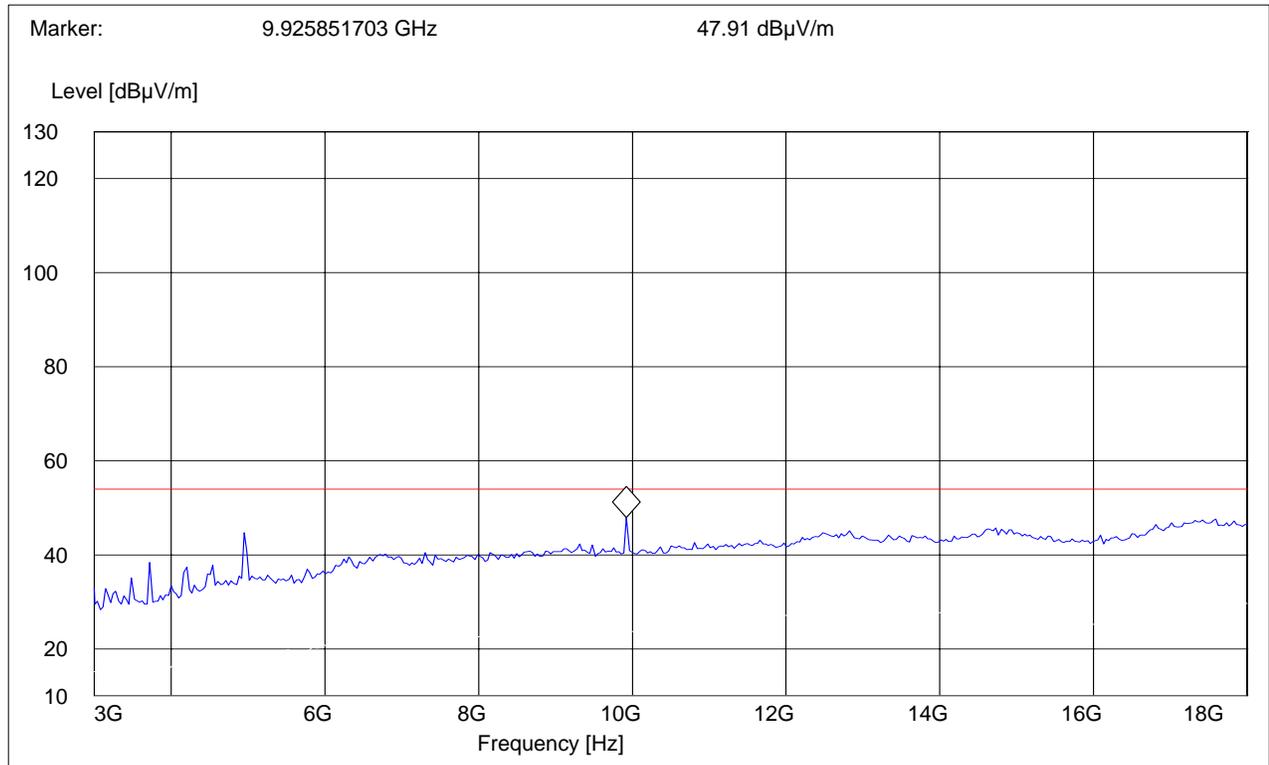




**3-18GHz (2480MHz)**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: Peak Reading vs. Average limit**



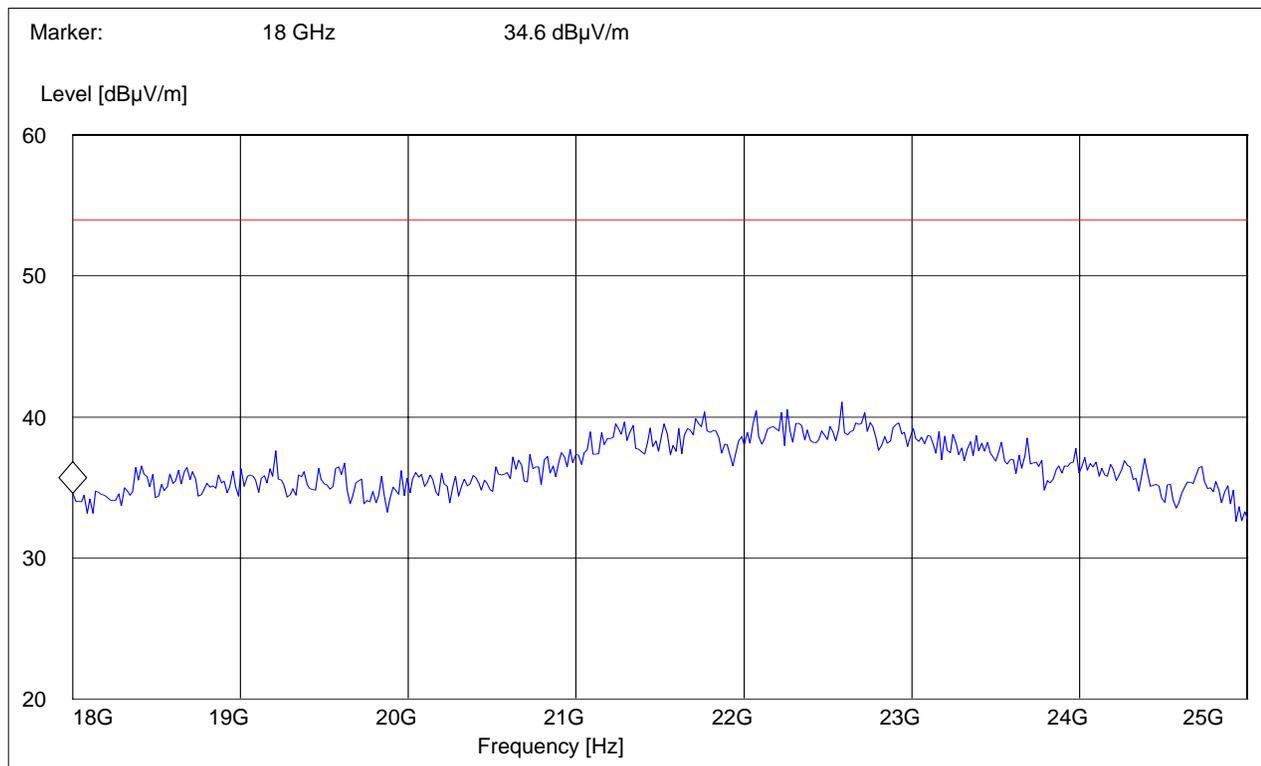


**18-25GHz**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	25GHz	Max Peak	Coupled	1 MHz	1 MHz

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

**Note: Peak Reading vs. Average limit**





#### 5.4 RECEIVER SPURIOUS RADIATION § 15.209/RSS210

##### 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 a quasi peak or average limit , unless specified with the plots.

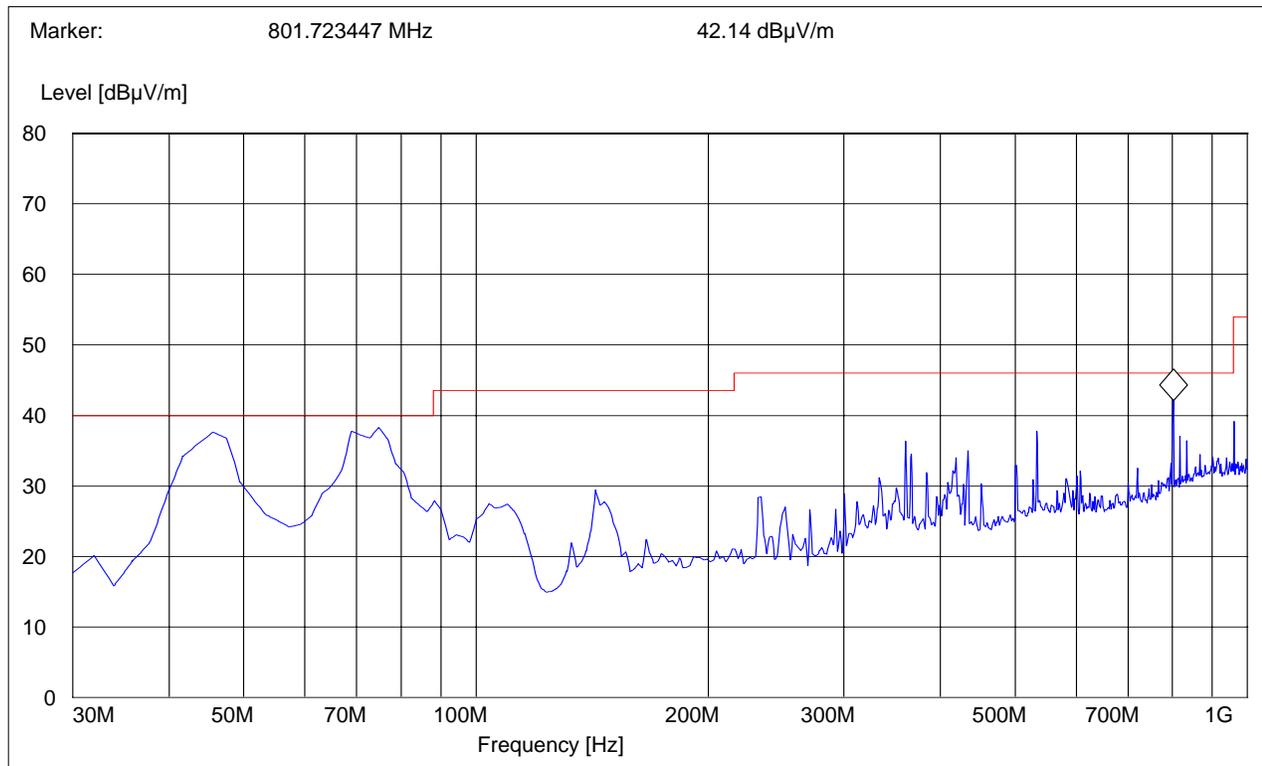


**5.4.2 RESULTS**

**30MHz – 1GHz**  
**Antenna: vertical**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

**Note: Peak Reading vs. Quasi-peak limit**

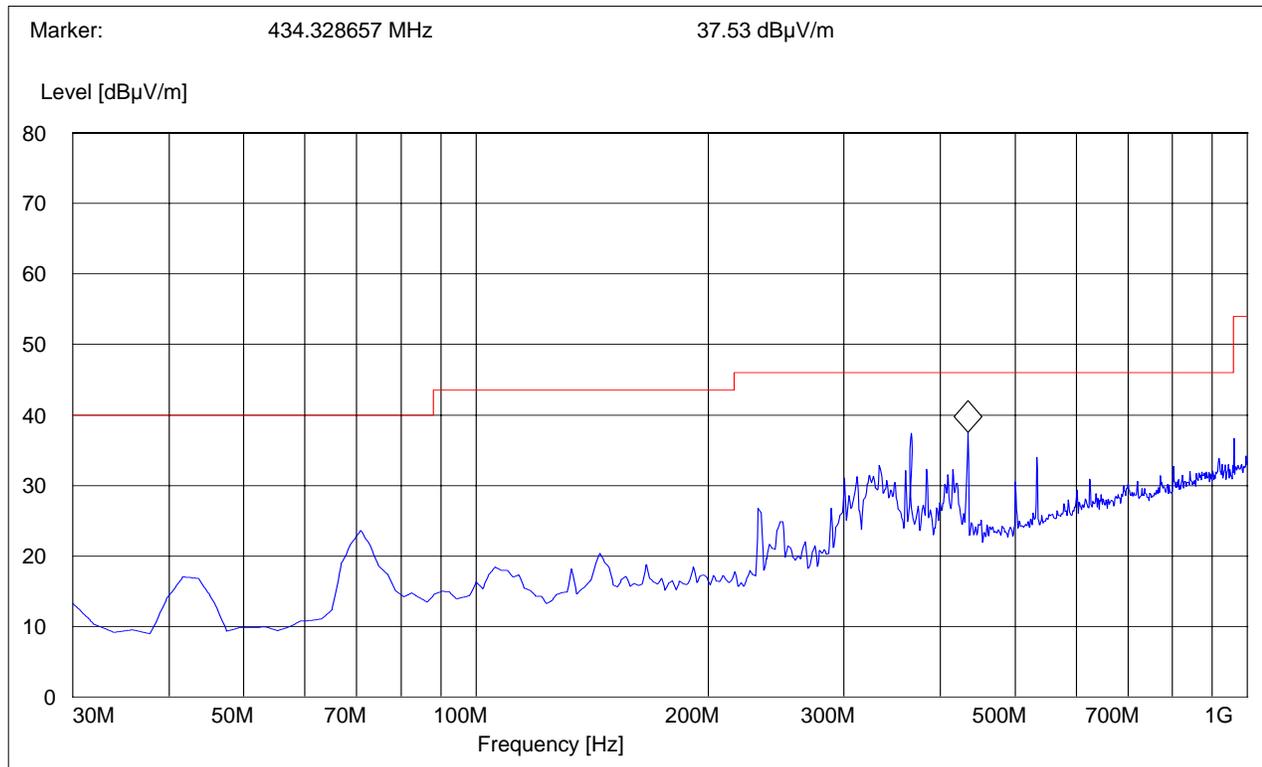




**30MHz – 1GHz**  
**Antenna: horizontal**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
30MHz	1GHz	Max Peak	Coupled	100 KHz	100 KHz

**Note: Peak Reading vs. Quasi-peak limit**

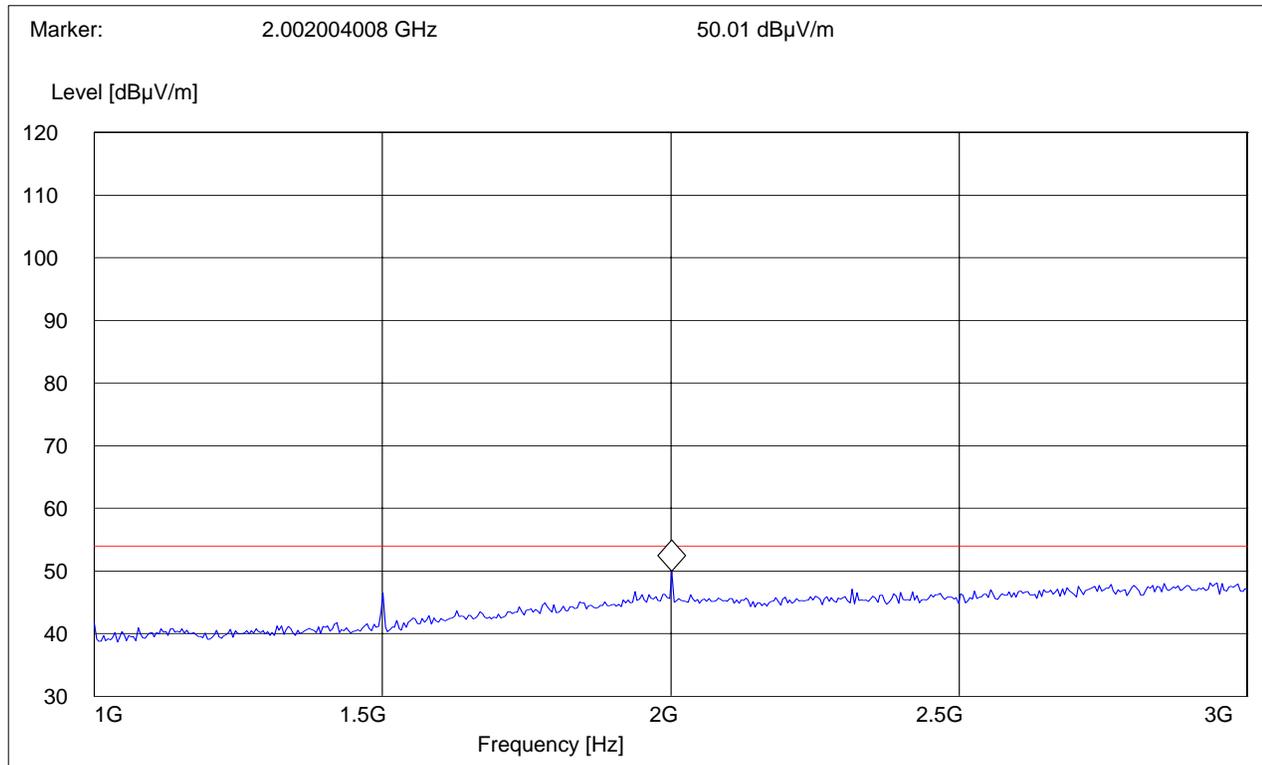




**1-3GHz**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: Peak Reading vs. Average limit**

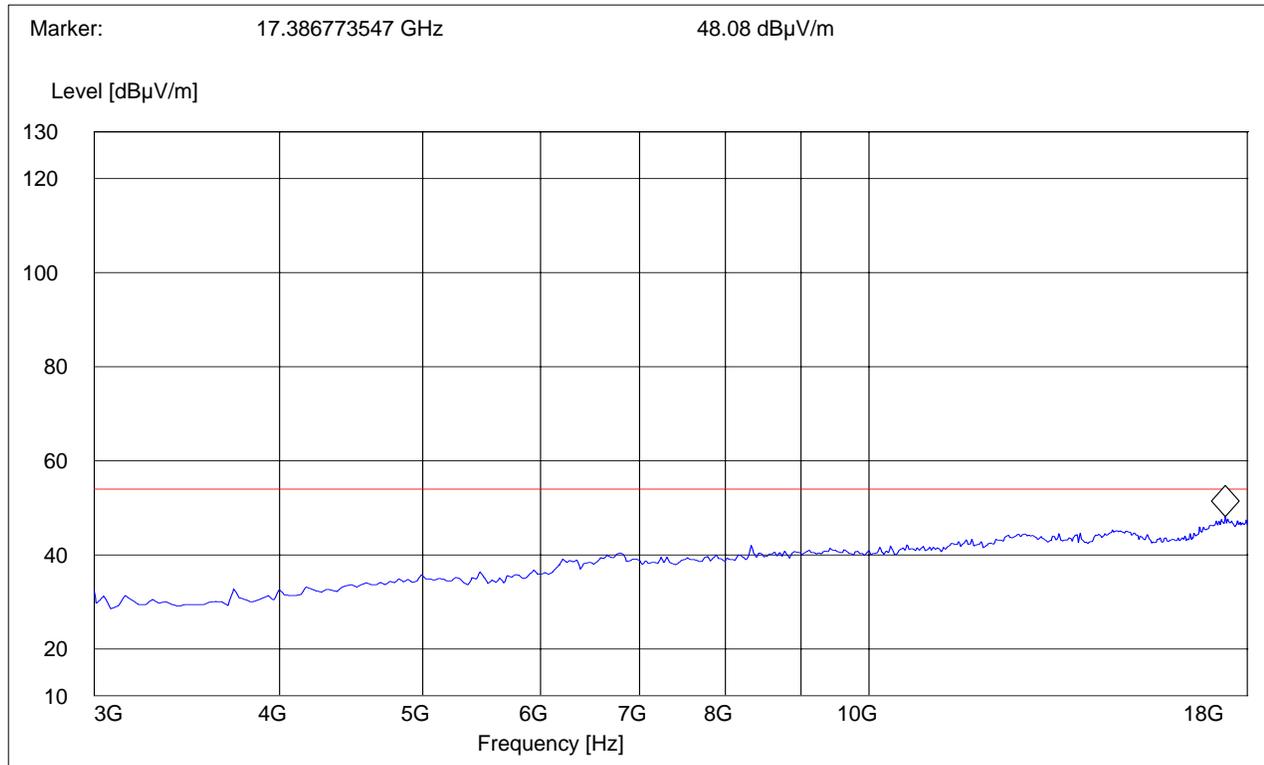




**3-18GHz**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	18GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: Peak Reading vs. Average limit**

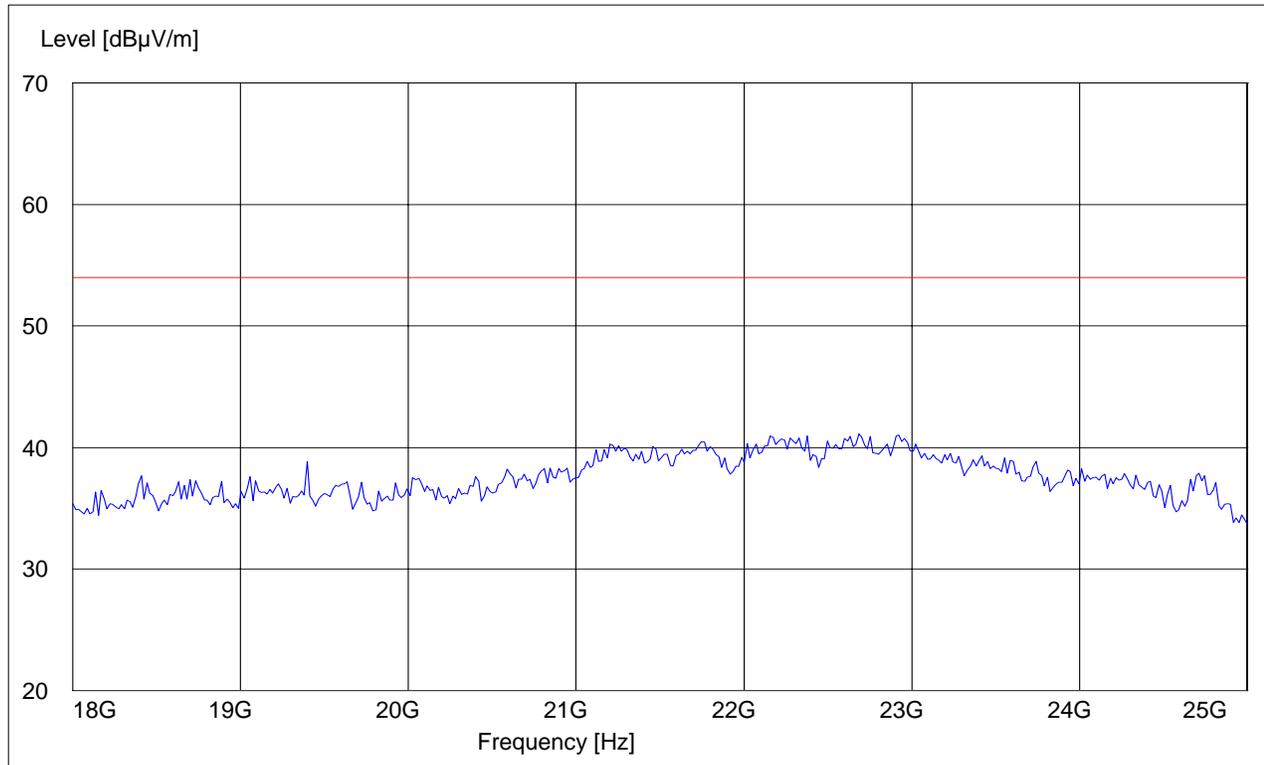




**18-25GHz**

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	25GHz	Max Peak	Coupled	1 MHz	1 MHz

**Note: Peak Reading vs. Average limit**





**5.5 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207**

**5.5.1 LIMITS**

**Technical specification: 15.107 / 15.207 (Revised as of August 20, 2002)**

**Limit**

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ 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

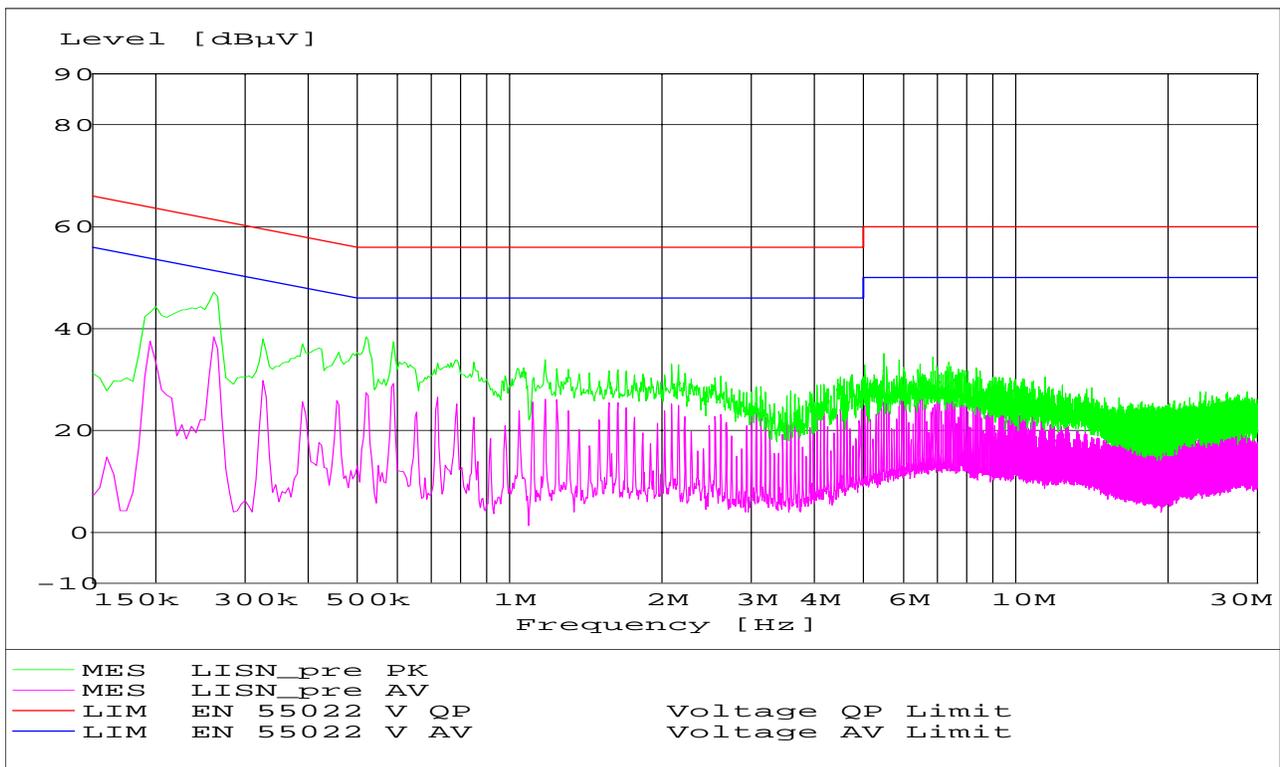
**ANALYZER SETTINGS: RBW = 10KHz VBW = 10KHz**



### 5.5.2 RESULTS

**SCAN TABLE: "EN 55022 Voltage @ 110VAC"**

Short Description:			EN 55022 Voltage			
Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
150.0 kHz	30.0 MHz	5.0 kHz	MaxPeak	10.0 ms	9 kHz	None
			Average			





**5.6 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 2006	1 year
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	100017	August 2006	1 year
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011	May 2006	1 year
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02	May 2006	1 year
05	Biconilog Antenna	3141	EMCO	0005-1186	June 2006	1 year
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325	June 2006	1 year
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240	June 2006	1 year
08	Power Splitter	11667B	Hewlett Packard	645348	n/a	n/a
09	Climatic Chamber	VT4004	Voltsch	G1115	May 2006	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 2006	1 year
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807	May 2006	1 year
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008	May 2006	1 year
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06	May 2006	1 year

**5.7 BLOCK DIAGRAMS**  
**Radiated Testing**

**ANECHOIC CHAMBER**

