



# FCC Test Report

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

FOR:

Notebook PC

MODEL #: PCG-4J3L

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

FCC ID: AK8PCG4J3L  
IC ID: 409B-PCG4J3L

TEST REPORT #: SONYE\_008\_06002\_15.247Bluetooth  
Date: 07/11/2006



FCC listed#  
101450

IC recognized #  
3925

**CETECOM Inc.**

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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-4J3L |

A handwritten signature in black ink that reads "Michael Grings".

---

Michael Grings  
Project Leader

A handwritten signature in blue ink that reads "Lothar Schmidt".

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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:                 | <b>CETECOM Inc.</b>                                             |
| Department:                   | <b>EMC</b>                                                      |
| Address:                      | <b>411 Dixon Landing Road<br/>Milpitas, CA 95035<br/>U.S.A.</b> |
| Telephone:                    | <b>+1 (408) 586 6200</b>                                        |
| Fax:                          | <b>+1 (408) 586 6299</b>                                        |
| Responsible Test Lab Manager: | <b>Lothar Schmidt</b>                                           |
| Responsible Project Leader:   | <b>Michael Grings</b>                                           |
| Date of test:                 | <b>6/19/2006 to 6/22/2006</b>                                   |

### **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>Katsunori Tsusui</b>                     |
| Phone No.         | <b>81-263-72-5696</b>                       |
| Fax:              | <b>81-263-72-9755</b>                       |
| e-mail:           | <b>Katsunori.tsusui@jp.sony.com</b>         |

### **2.3 Identification of the Manufacturer**

|                        |                                                          |
|------------------------|----------------------------------------------------------|
| Manufacturer's Name:   | <b>Sony EMCS Corporation</b>                             |
| Manufacturers Address: | <b>5432 Toyoshima, Toyoshima -machi, Minamiazumi-gun</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-TX</b>                                  |
| Description:           | <b>Notebook PC</b>                                  |
| Model No:              | <b>PCG-4J3L</b>                                     |
| FCC ID:                | <b>AK8PCG4J3L</b>                                   |
| IC ID:                 | <b>409B-PCG4J3L</b>                                 |
| Frequency Range:       | <b>2400-2483.5MHz</b>                               |
| Type(s) of Modulation: | <b>GFSK</b>                                         |
| Number of Channels:    | <b>79</b>                                           |
| Antenna Type:          | <b><math>\lambda</math>/monopole (Chip Antenna)</b> |
| Output Power:          | <b>0.000196 W EIRP@ 2441 MHz</b>                    |

#### **3.2 Identification of Accessory equipment**

| <b>TYPE</b> | <b>MANUFACTURER.</b> | <b>MODEL</b> |
|-------------|----------------------|--------------|
| AC ADAPTER  | SONY                 | VGP-AC16V8   |



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

All testing was performed on the PCG-4J3 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)

| 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 EIRP:

| TEST CONDITIONS         |                      | MAXIMUM PEAK OUTPUT POWER (dBm) |       |      |
|-------------------------|----------------------|---------------------------------|-------|------|
| Frequency (MHz)         |                      | 2402                            | 2441  | 2480 |
| T <sub>nom</sub> (23)°C | V <sub>nom</sub> VDC | -8.25                           | -7.08 | -7.3 |
| Measurement uncertainty |                      | ±0.5dBm                         |       |      |



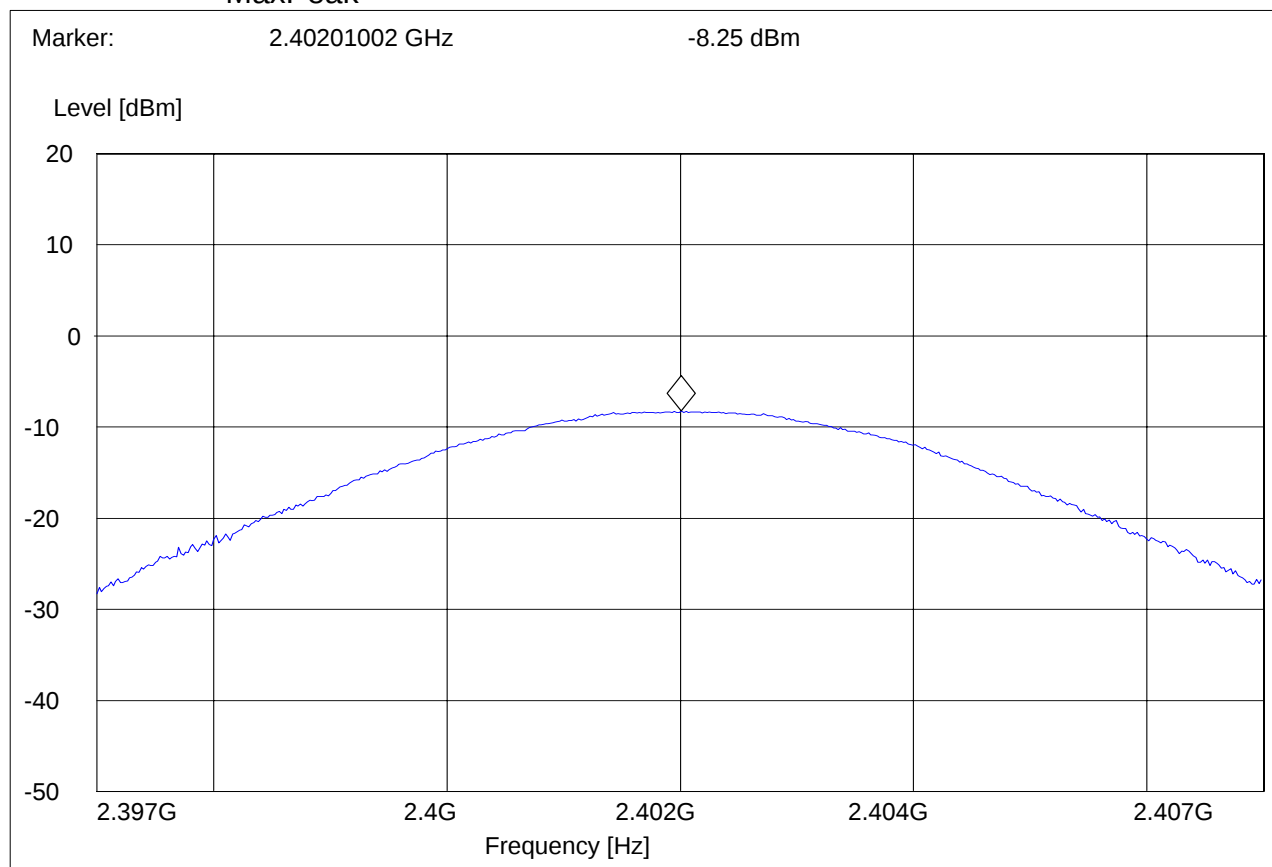
## EIRP (2402 MHz)

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC  
Sweep: EIRP BT lochannel 2402Mhz 282°

### ***SWEEP TABLE: "EIRP BT low channel"***

| Short Description: |           | EIRP Bluetooth channel-2402MHz |         |        |            |
|--------------------|-----------|--------------------------------|---------|--------|------------|
| Start              | Stop      | Detector                       | Meas.   | IF     | Transducer |
| Frequency          | Frequency |                                | Time    | Bandw. |            |
| 2.4 GHz            | 2.4 GHz   | MaxPeak                        | Coupled | 3 MHz  | DUMMY-DBM  |
| MaxPeak            |           |                                |         |        |            |





# **EIRP (2441 MHz)**

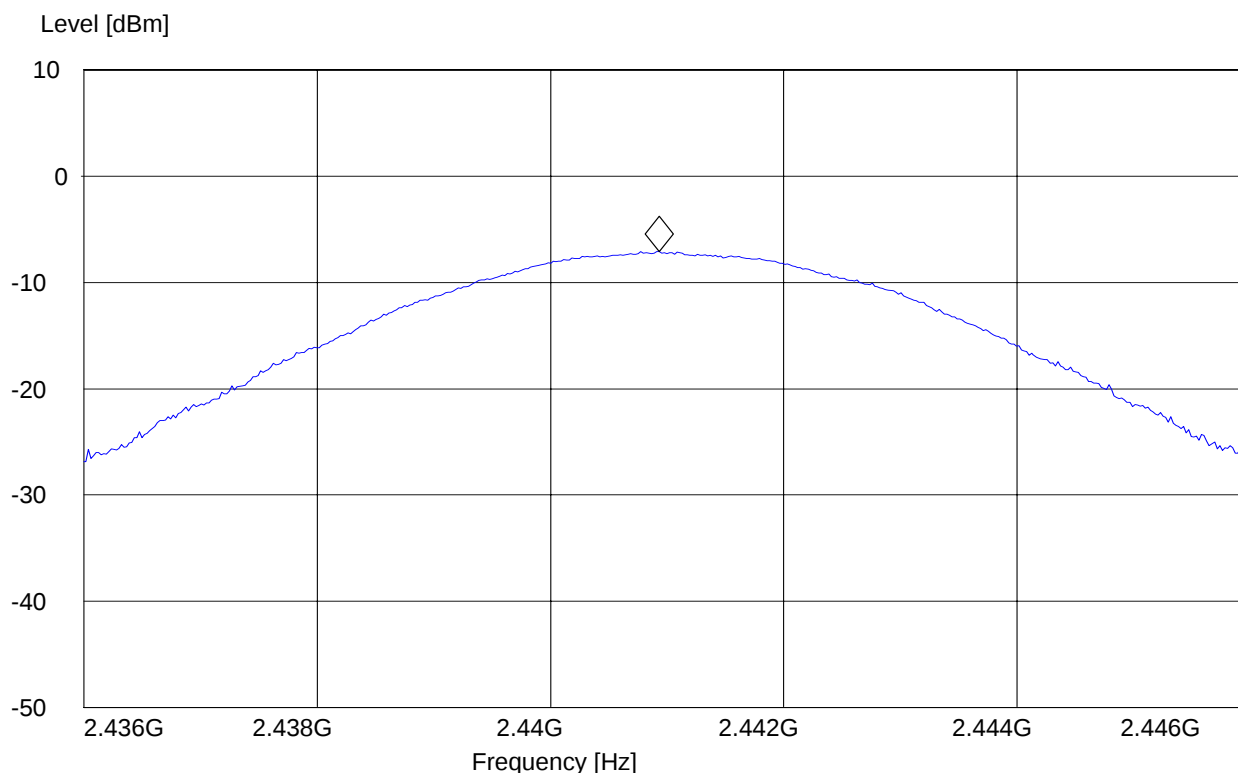
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: Sony Electronics  
 Operating Mode: Bluetooth testmode  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC  
 Sweep: EIRP BT midchannel 2441Mhz, TABLE 282 DEGREES.

## **SWEEP TABLE: "EIRP BT mid channel"**

Short Description: EIRP Bluetooth channel-2441MHz  
 Start Stop Detector Meas. IF Transducer  
 Frequency Frequency Time Bandw.  
 2.4 GHz 2.4 GHz MaxPeak Coupled 3 MHz DUMMY-DBM

Marker: 2.44092986 GHz -7.08 dBm





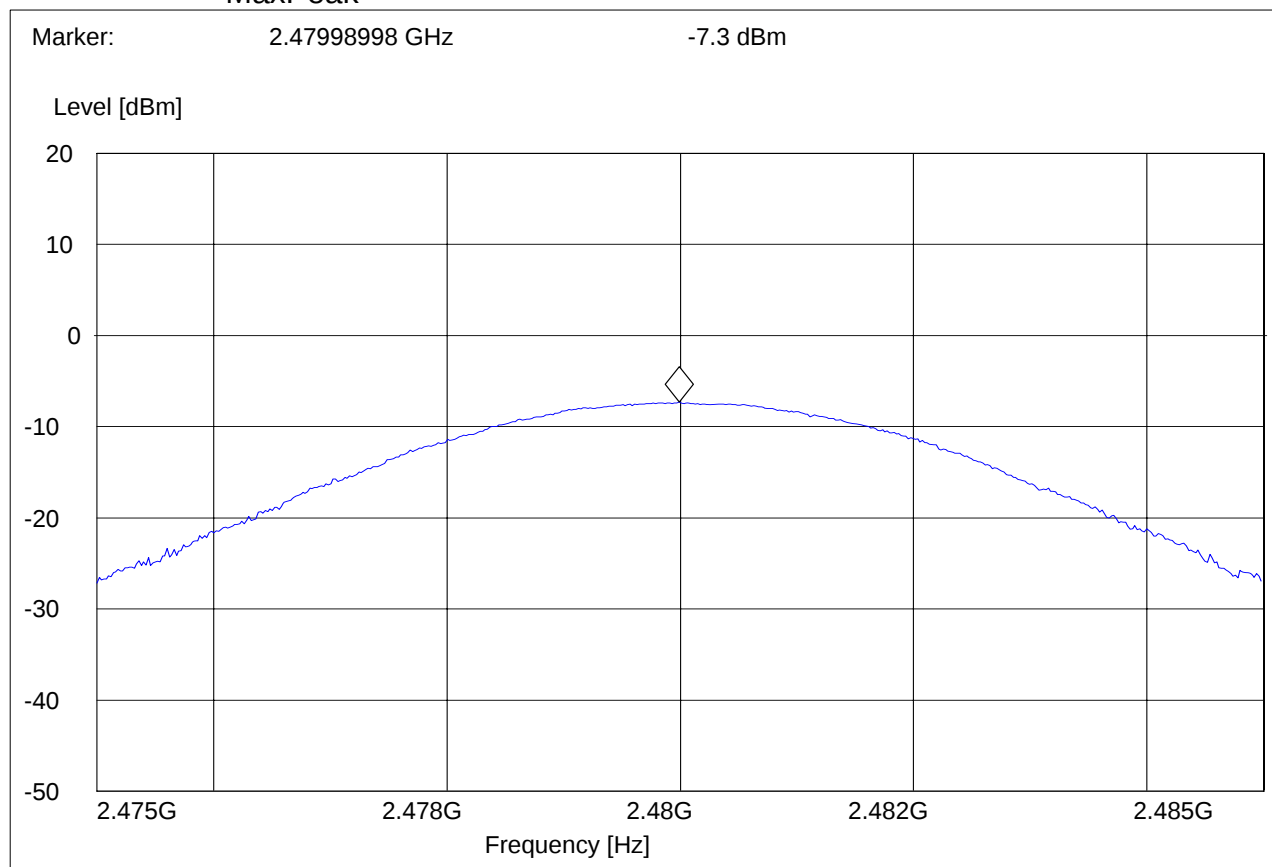
## EIRP (2480 MHz)

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode, 2480MHz  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC  
Sweep: EIRP BT hi channel 2480Mhz 282°

### ***SWEEP TABLE: "EIRP BT high channel"***

|                    |           |                                |         |        |            |
|--------------------|-----------|--------------------------------|---------|--------|------------|
| Short Description: |           | EIRP Bluetooth channel-2480MHz |         |        |            |
| Start              | Stop      | Detector                       | Meas.   | IF     | Transducer |
| Frequency          | Frequency |                                | Time    | Bandw. |            |
| 2.5 GHz            | 2.5 GHz   | MaxPeak                        | Coupled | 3 MHz  | DUMMY-DBM  |
| MaxPeak            |           |                                |         |        |            |



## 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



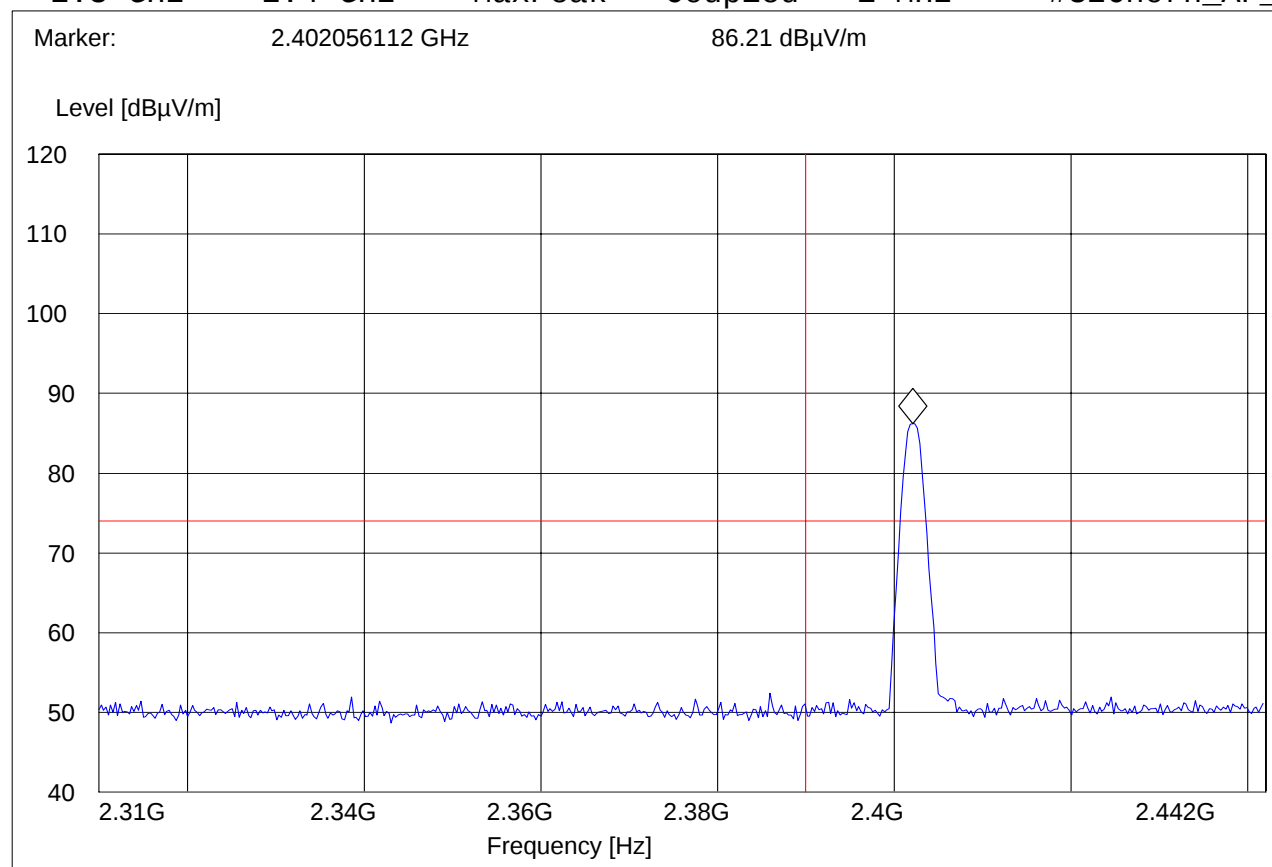
## 5.2.2 RESULTS (2402MHz) PEAK

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: PETER  
Voltage: AC  
Sweep: FCC15.247 LBE\_PK 2402Mhz 219°

### **SWEEP TABLE: "FCC15.247 LBE\_PK"**

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





AVG

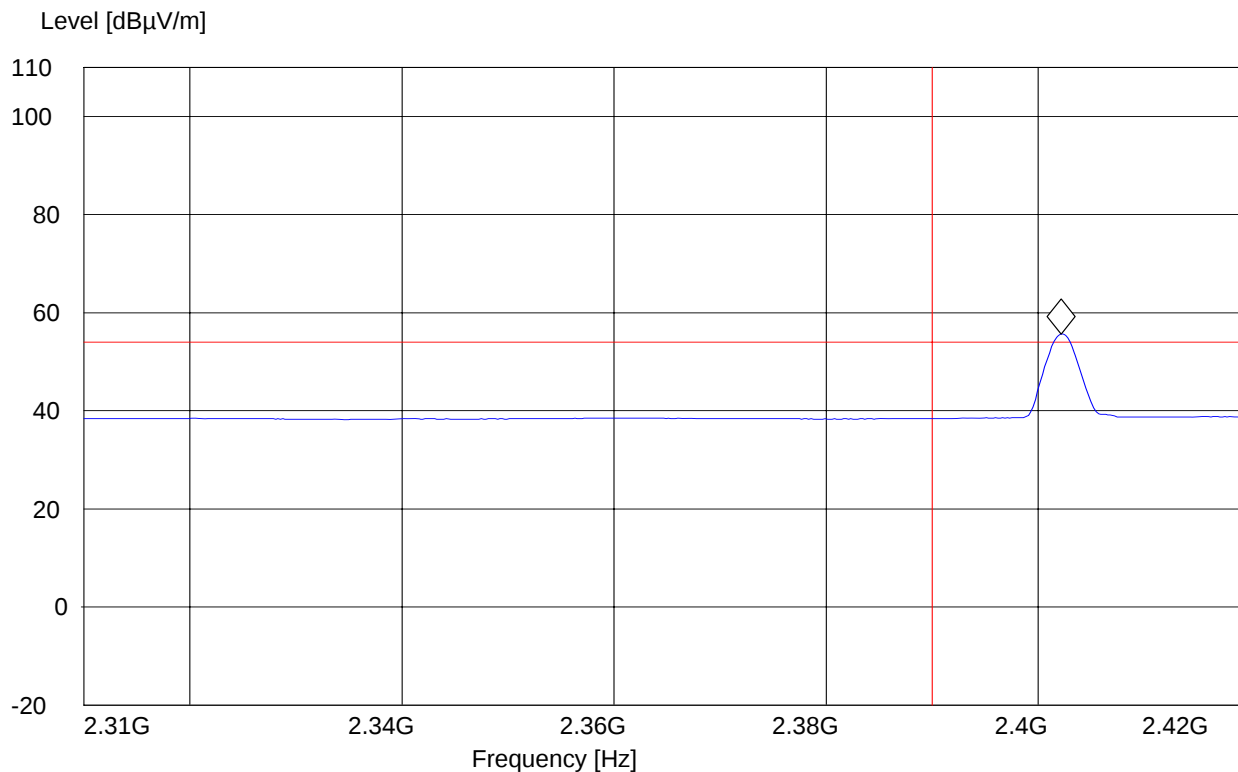
**CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: PETER  
Voltage: AC  
Sweep: FCC15.247 LBE\_AVG 2402Mhz 219°

**SWEEP TABLE: "FCC15.247 LBE\_AVG"**

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

Marker: 2.402144289 GHz 55.63 dBμV/m





### 5.2.3 RESULTS (2480MHz) PEAK

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

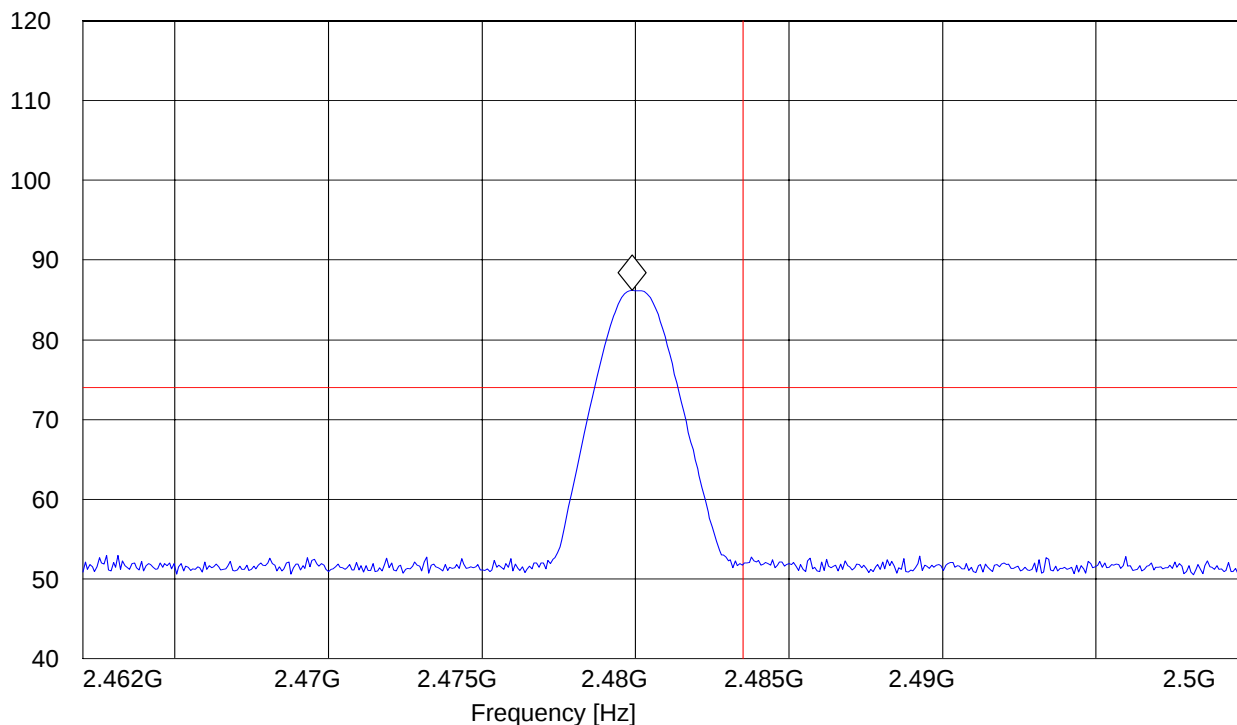
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: PETER  
Voltage: AC  
Sweep: FCC15.247 HBE\_PK 2480Mhz 219°

#### ***SWEEP TABLE: "FCC15.247 HBE\_PK"***

| Start<br>Frequency | Stop<br>Frequency | Detector | Meas.<br>Time | IF<br>Bandw. | Transducer       |
|--------------------|-------------------|----------|---------------|--------------|------------------|
| 2.5 GHz            | 2.5 GHz           | MaxPeak  | Coupled       | 1 MHz        | #326horn_AF_vert |

Marker: 2.479895792 GHz 86.18 dBμV/m

Level [dBμV/m]





**AVG**

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

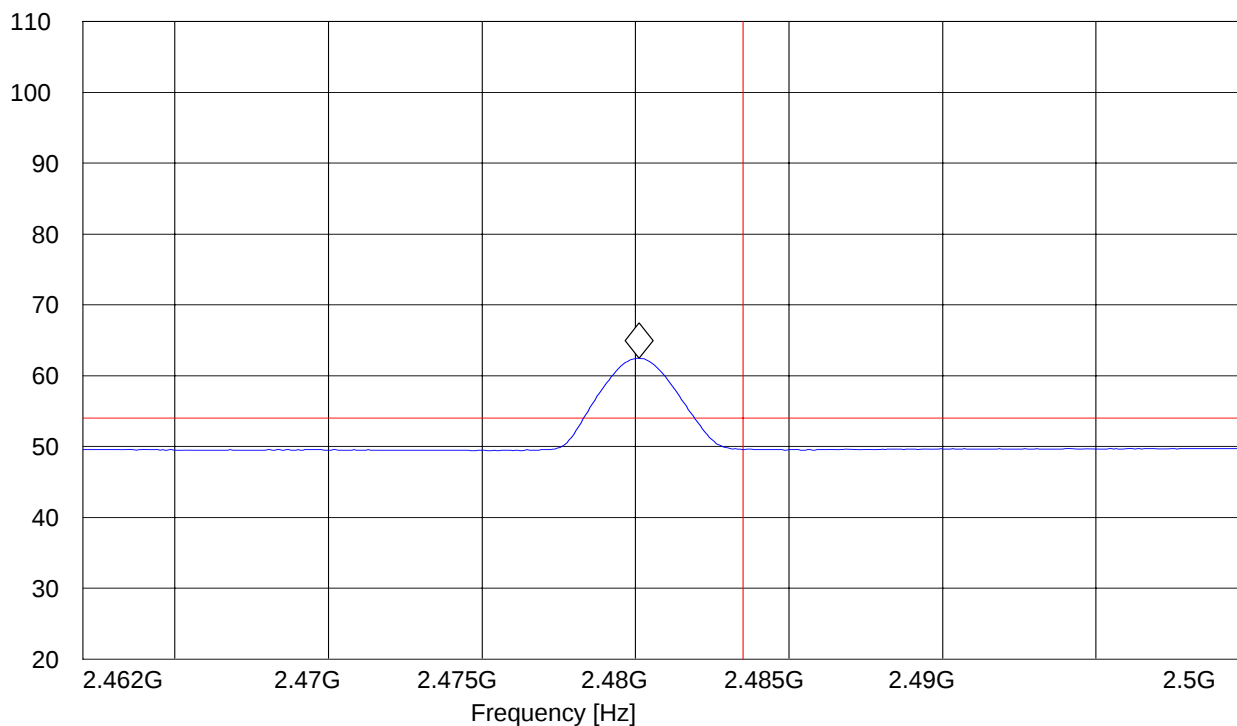
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: Sony Electronics  
 Operating Mode: Bluetooth testmode  
 Antenna: V  
 EUT: V  
 Test Engineer: PETER  
 Voltage: AC  
 Sweep: FCC15.247 HBE\_AVG 2480Mhz 219°

**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: 2.480124248 GHz 62.48 dBμV/m

Level [dBμV/m]



### 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

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

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6

Customer: Sony Electronics

Operating Mode: Bluetooth testmode

Antenna: V

EUT: V

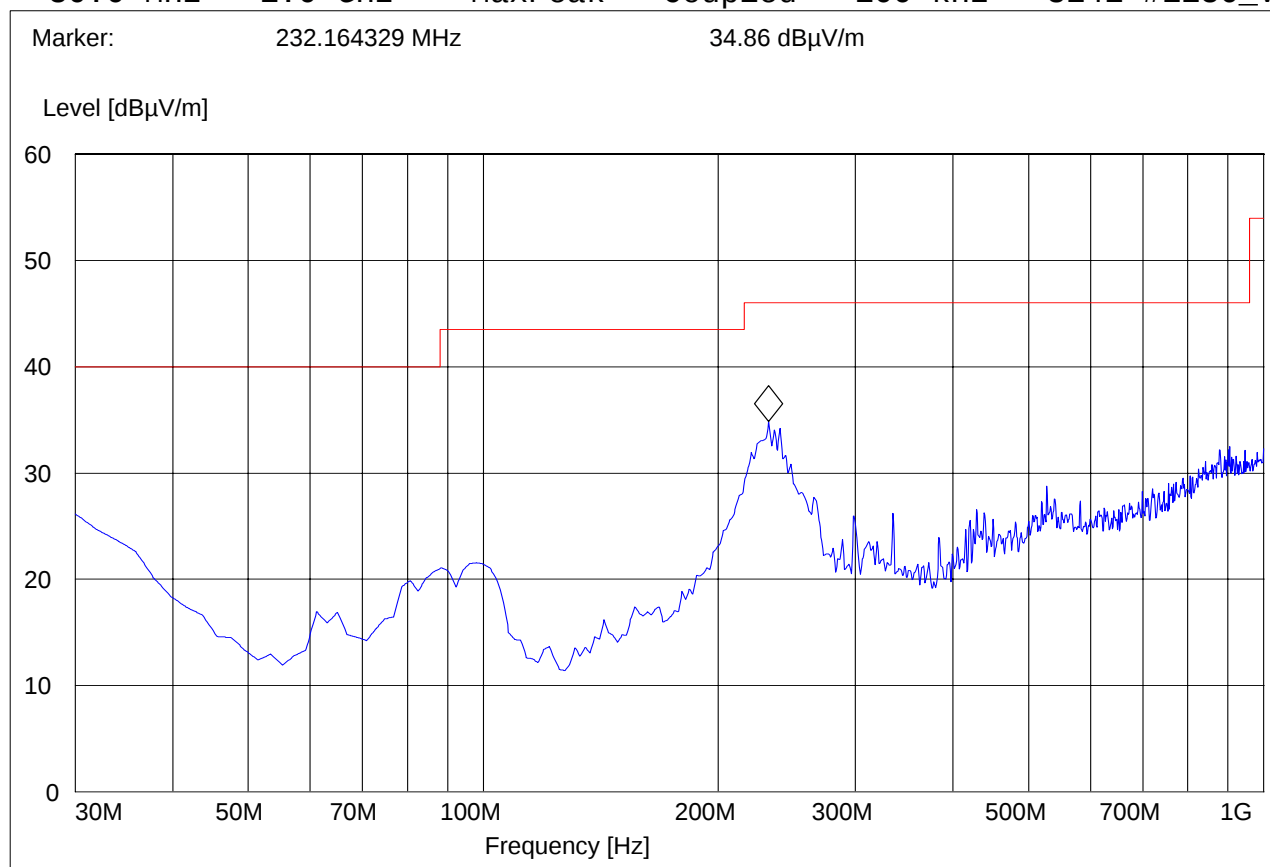
Test Engineer: PETER

Voltage: AC

Sweep: FCC15.247\_30-1G\_Ver 2402Mhz 219°

### **SWEEP TABLE: "FCC15.247\_30M-1G\_Ver"**

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





30MHz – 1GHz

Antenna: horizontal

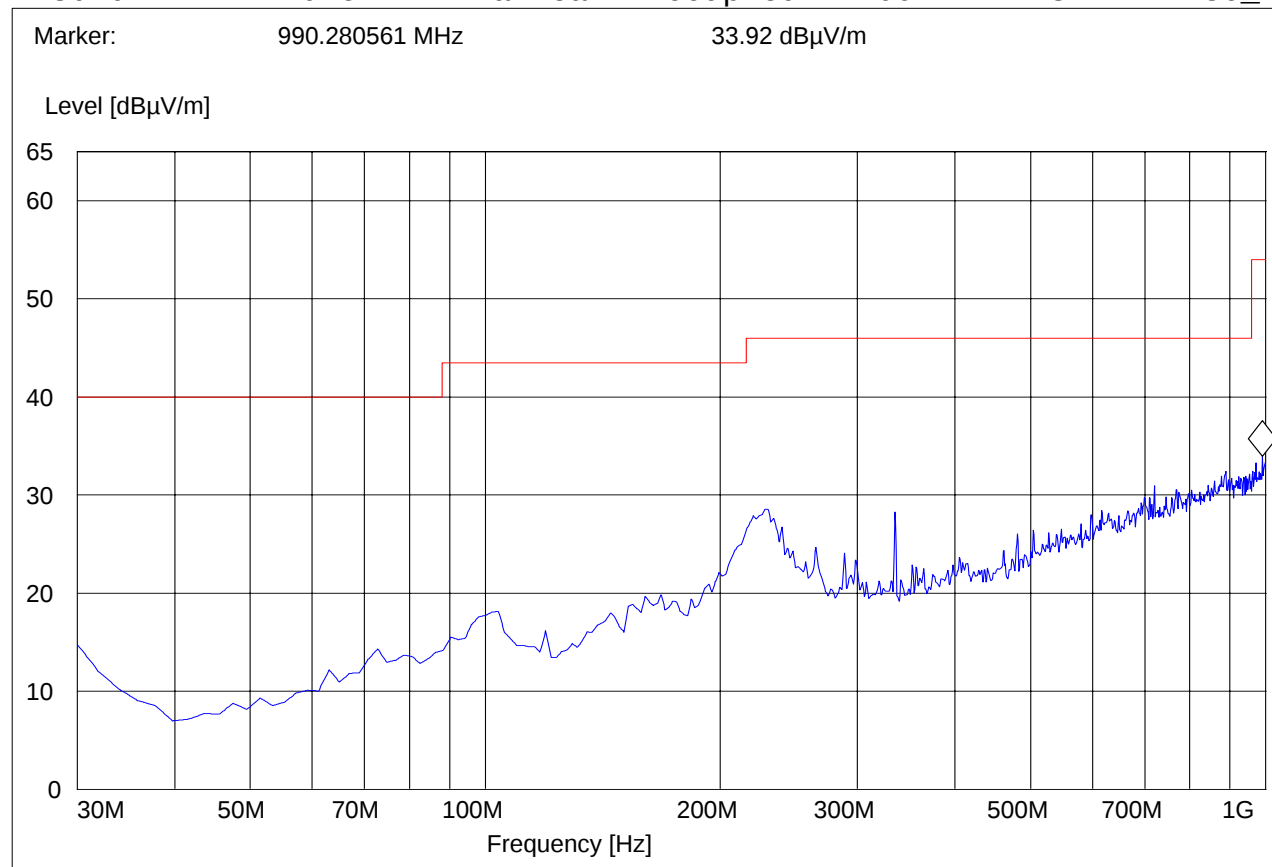
Note: This plot is valid for low, mid, high channels (worst-case plot)

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: H  
EUT: V  
Test Engineer: PETER  
Voltage: AC  
Sweep: FCC15.247\_30-1G\_Hor 2480Mhz 219°

**SWEEP TABLE: "FCC15.247\_30M-1G\_Hor"**

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





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

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

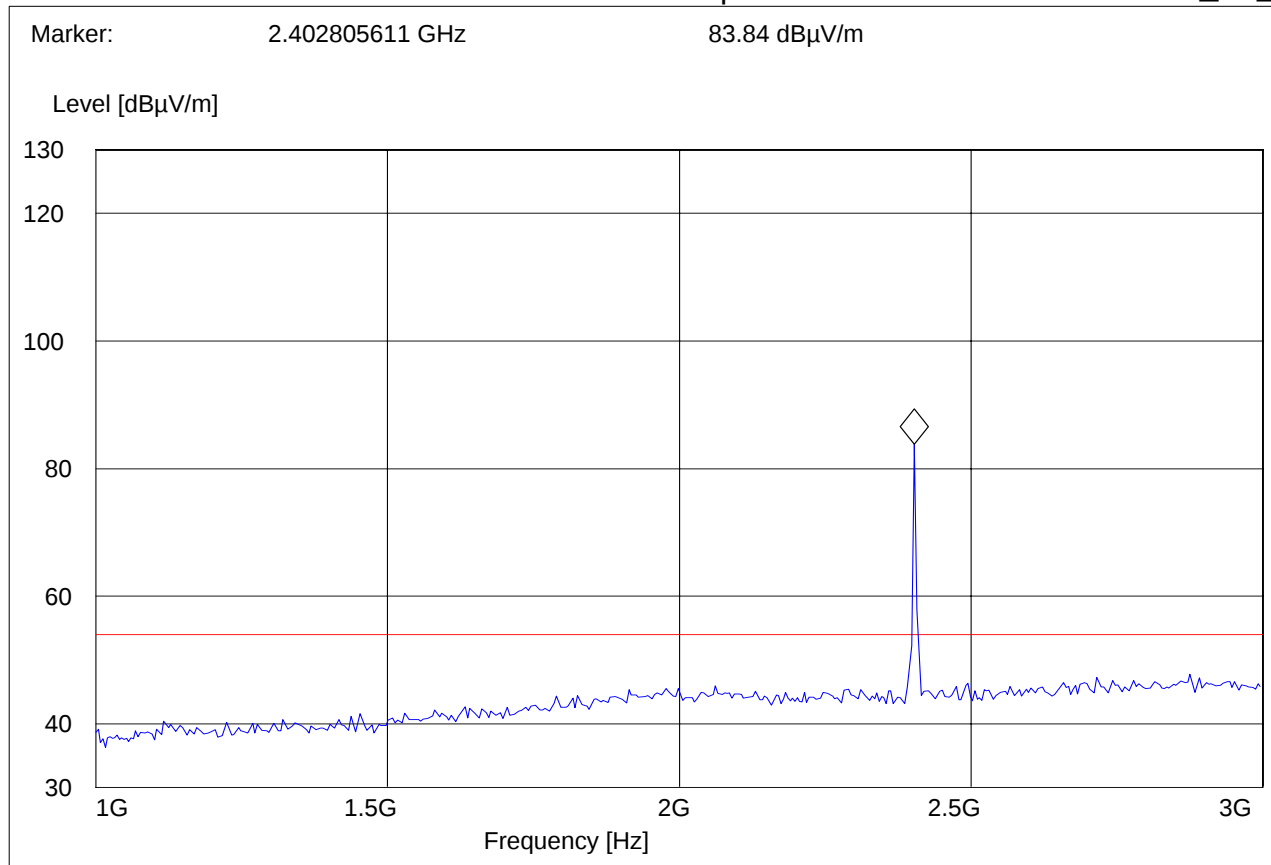
**Note: Peak Reading vs. Average limit**

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: Sony Electronics  
 Operating Mode: Bluetooth testmode  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC  
 Sweep: FCC15.247\_1-3G 2402Mhz 282°

**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 |





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

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

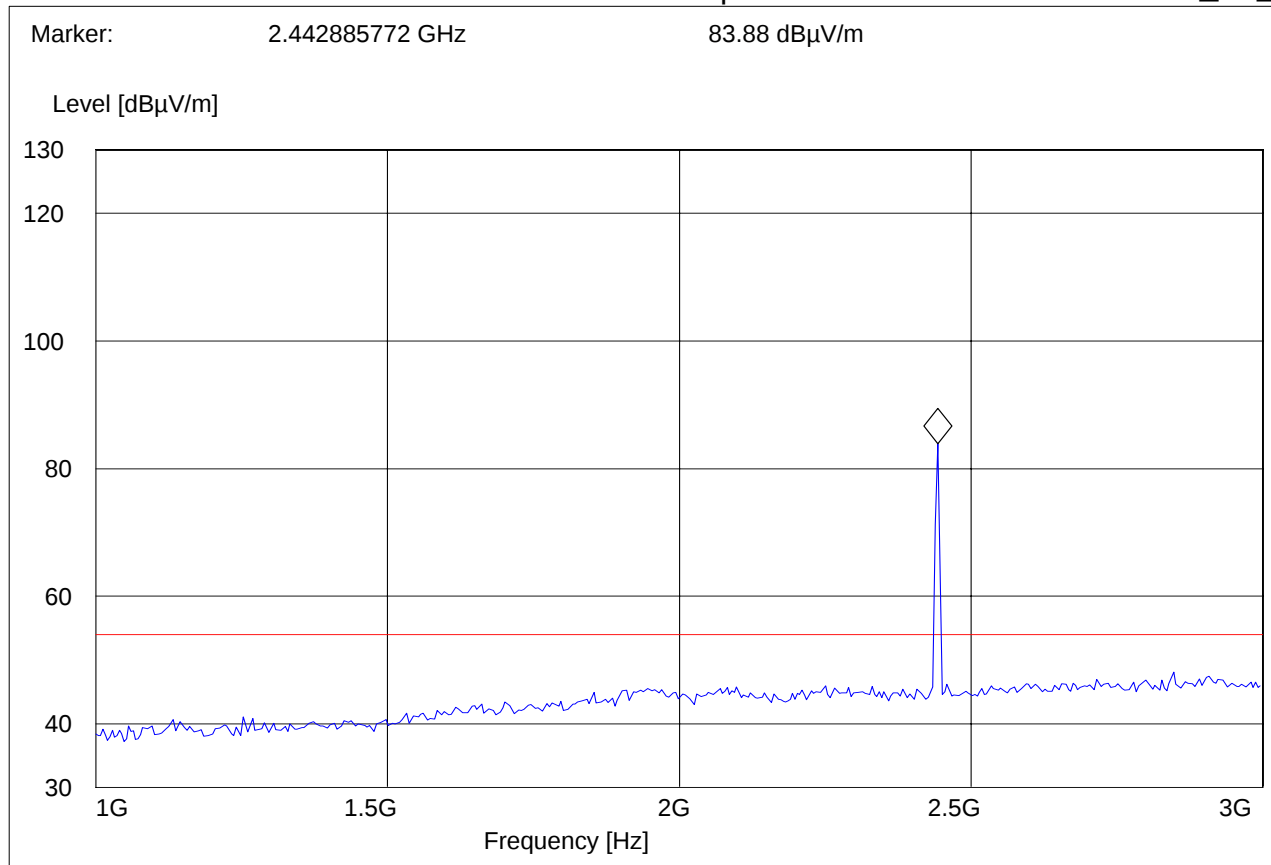
**Note: Peak Reading vs. Average limit**

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: Sony Electronics  
 Operating Mode: Bluetooth testmode  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC  
 Sweep: FCC15.247\_1-3G 2441Mhz 282°

**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 |





### 1-3GHz (2480MHz)

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

Note: Peak Reading vs. Average limit

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

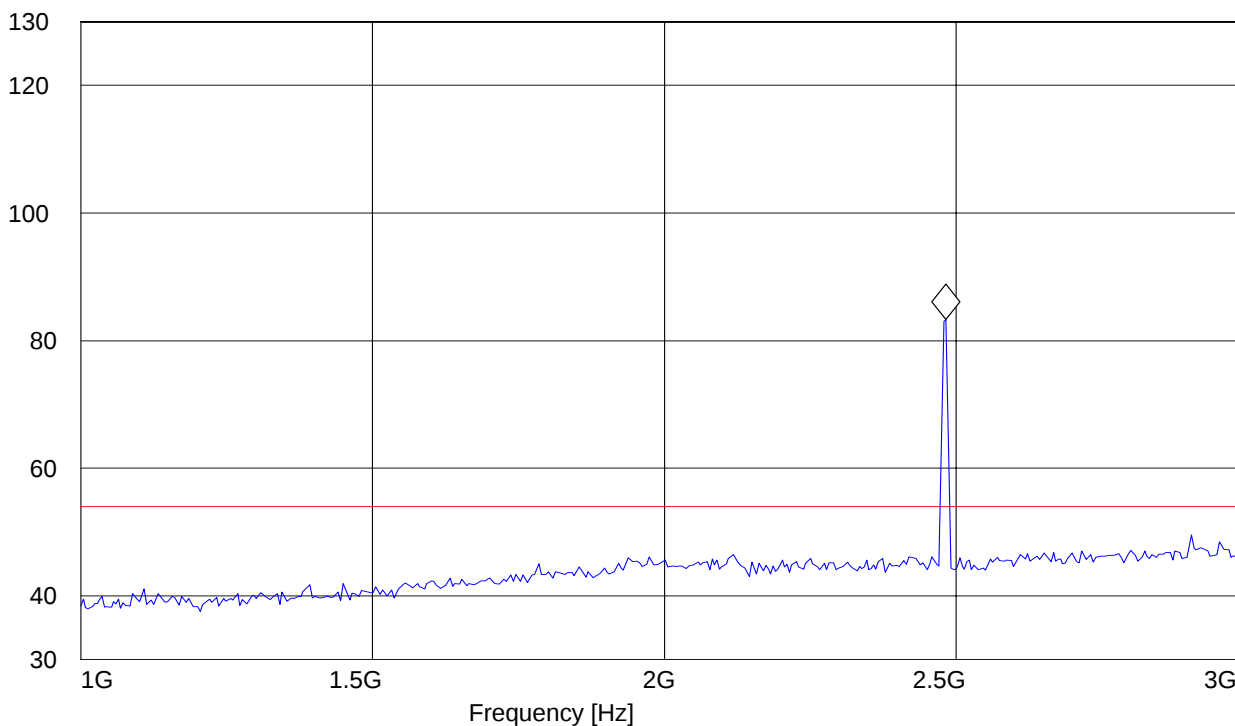
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC  
Sweep: FCC15.247\_1-3G 2480Mhz 282°

### ***SWEEP TABLE: "FCC15.247\_1-3G"***

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

Marker: 2.482965932 GHz 83.29 dBμV/m

Level [dBμV/m]





### 3-18GHz (2402MHz)

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

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

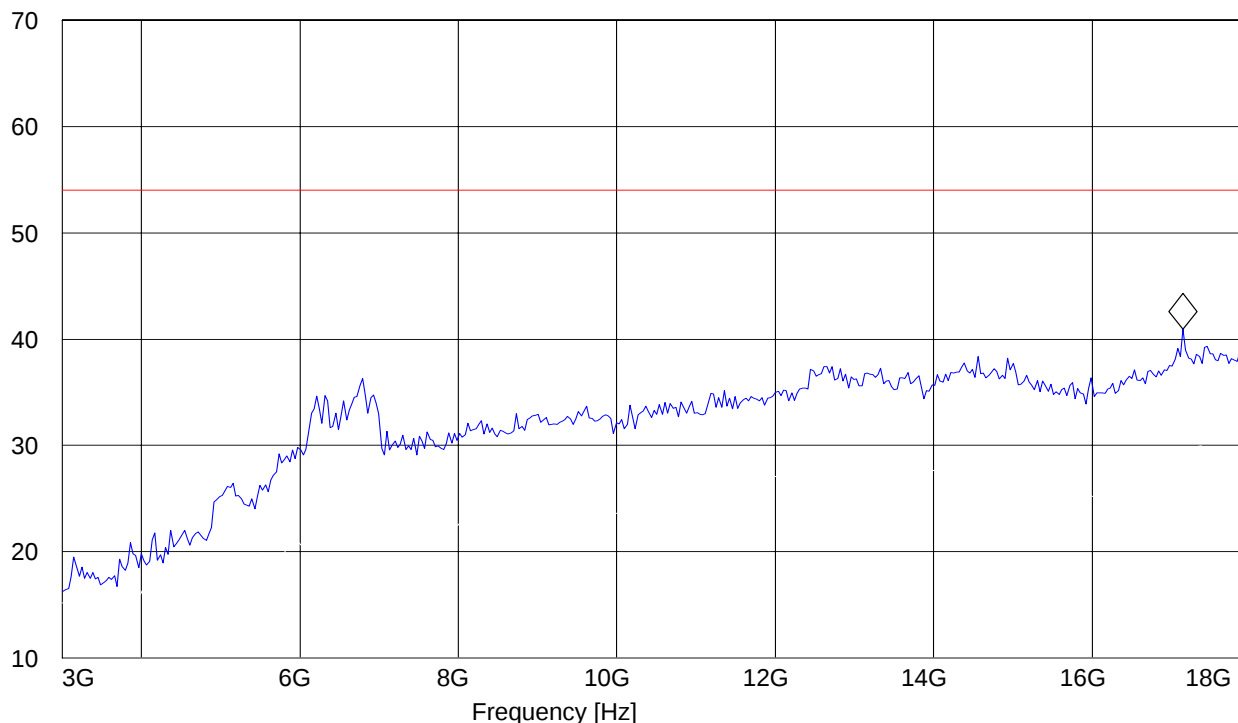
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC  
Sweep: FCC15.247\_3-18G 2402Mhz 282°

### ***SWEEP TABLE: "FCC15.247\_3-18G"***

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

Marker: 17.148296593 GHz 40.93 dBμV/m

Level [dBμV/m]





### 3-18GHz (2441MHz)

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

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

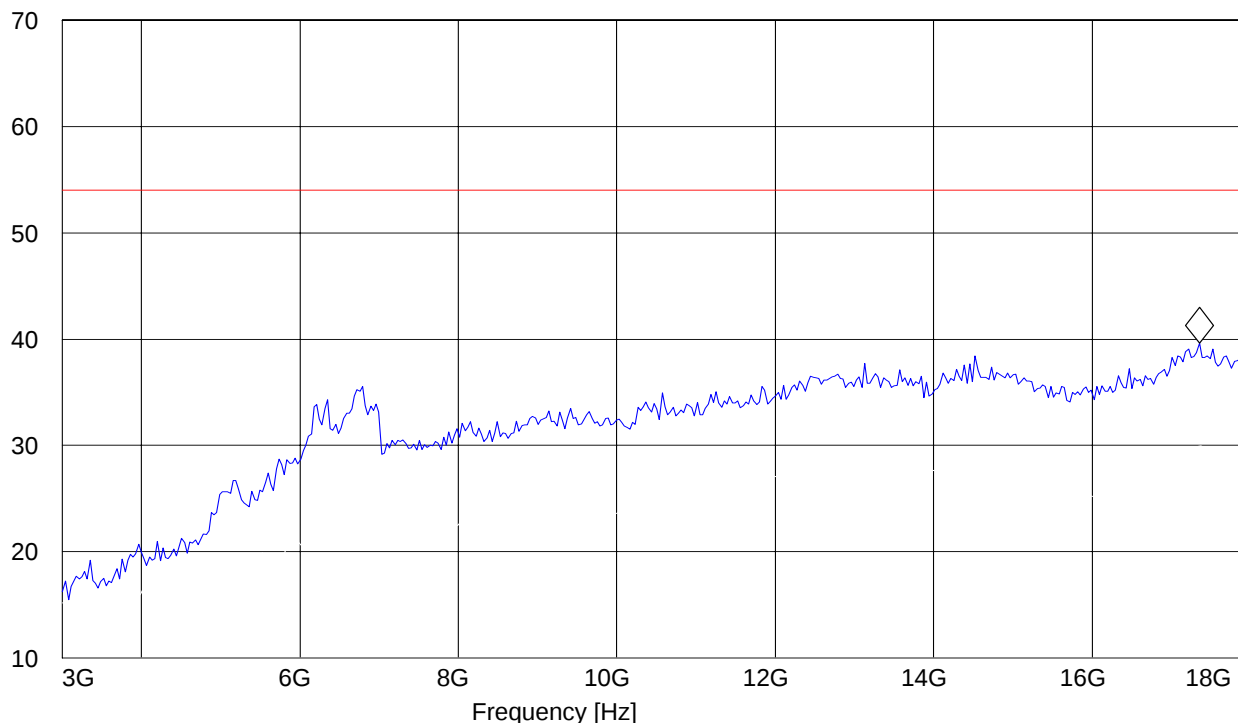
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC  
Sweep: FCC15.247\_3-18G 2441Mhz 282°

### ***SWEEP TABLE: "FCC15.247\_3-18G"***

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

Marker: 17.352705411 GHz 39.62 dBμV/m

Level [dBμV/m]





### 3-18GHz (2480MHz)

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

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

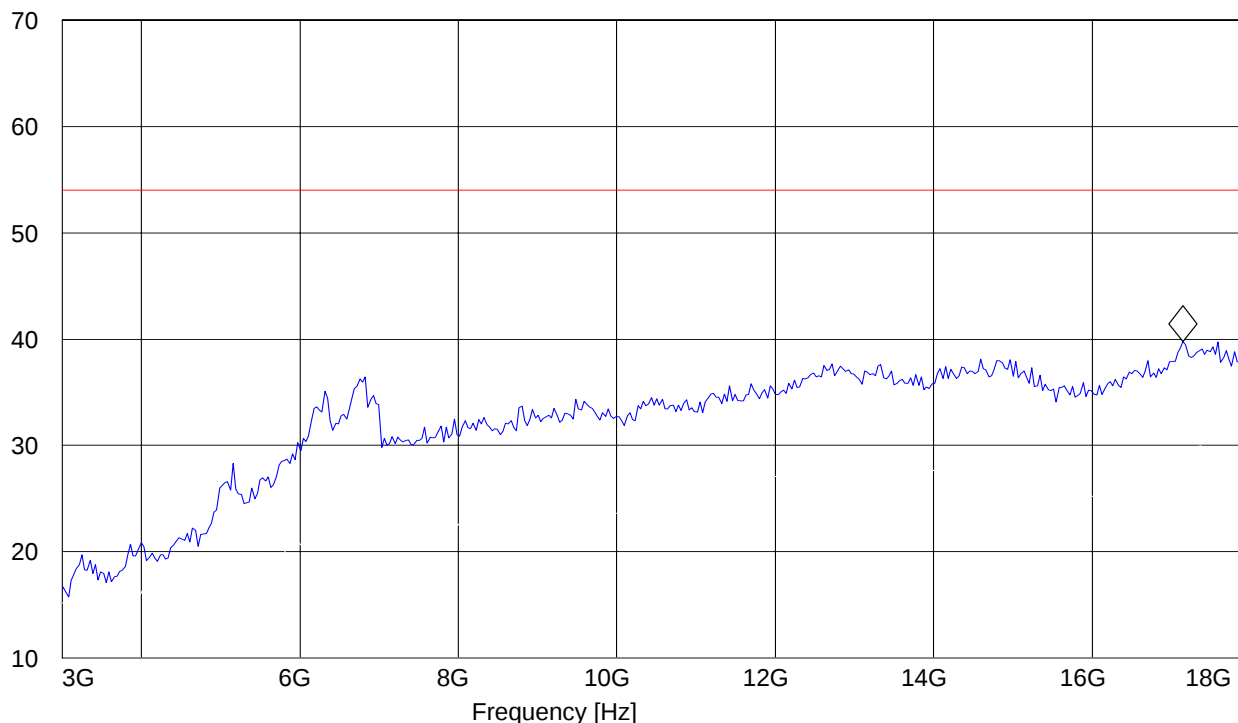
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC  
Sweep: FCC15.247\_3-18G 2480Mhz 282°

#### ***SWEEP TABLE: "FCC15.247\_3-18G"***

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

Marker: 17.148296593 GHz 39.77 dBμV/m

Level [dBμV/m]





### 18-25GHz

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

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

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

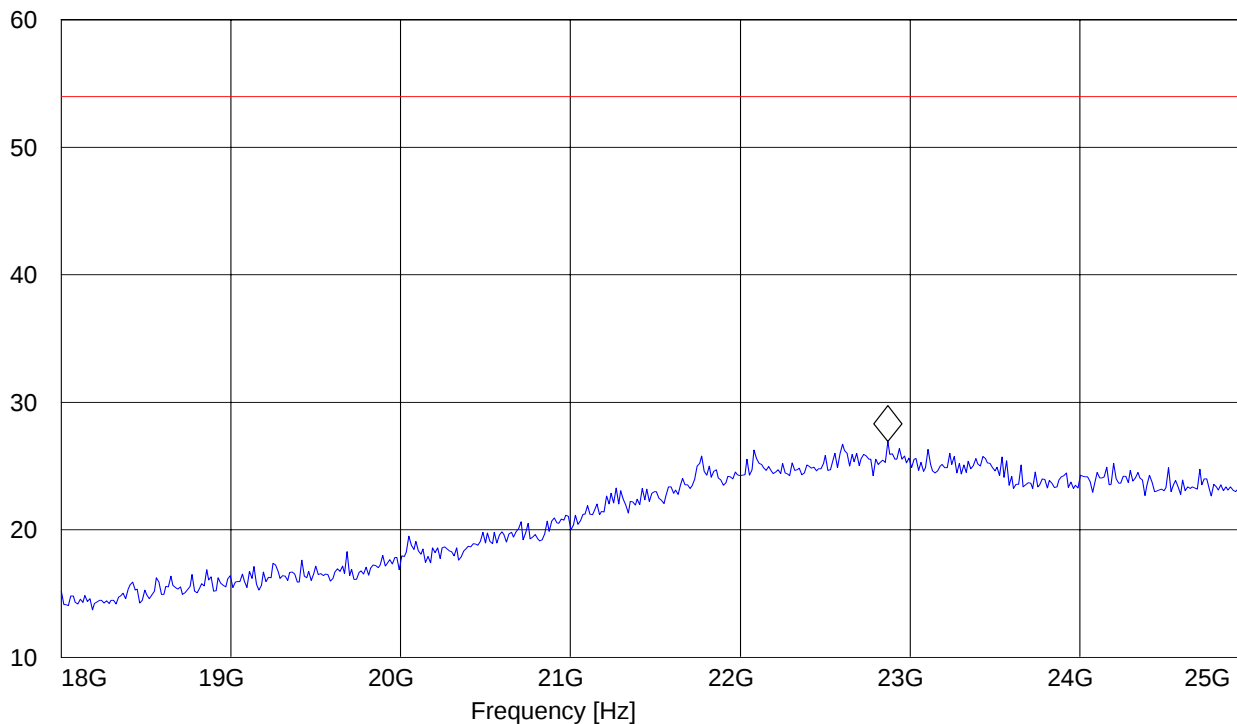
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
Customer: Sony Electronics  
Operating Mode: Bluetooth testmode  
Antenna: V  
EUT: V  
Test Engineer: PETER  
Voltage: AC  
Sweep: FCC15.247\_18-26.5G 2402Mhz 282°

### ***SWEEP TABLE: "FCC15.247\_18-26.5G"***

| Start<br>Frequency | Stop<br>Frequency | Detector | Meas.<br>Time | IF<br>Bandw. | Transducer   |
|--------------------|-------------------|----------|---------------|--------------|--------------|
| 18.0 GHz           | 25.0 GHz          | MaxPeak  | Coupled       | 1 MHz        | #572 horn AF |

Marker: 22.867735471 GHz 26.95 dBμV/m

Level [dBμV/m]



## 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   | 2400/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: horizontal

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

Note: Peak Reading vs. Quasi-peak limit

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

EUT / Description: Vaio laptop "F" series unit #2 ESN: 5B101BC3

Customer: Sony Electronics

Operating Mode: BT, RX 2402MHz TABLE 280°, ANT 100CM

Antenna: H

EUT: V

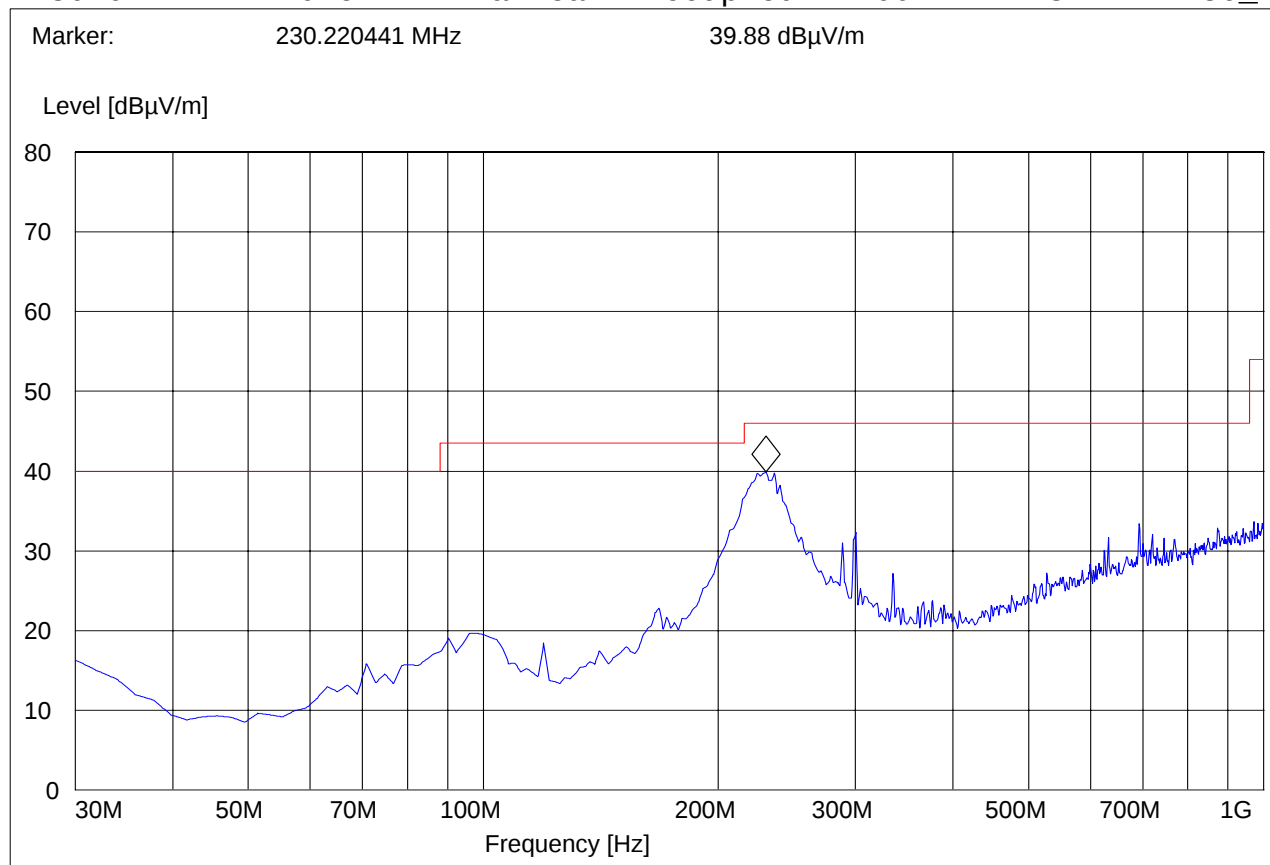
Test Engineer: PETER

Voltage: AC ADAPTOR

Sweep: CANADA RE\_30M-1G\_HOR

### ***SWEEP TABLE: "CANADA RE\_30M-1G\_Hor"***

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





### 1-3GHz

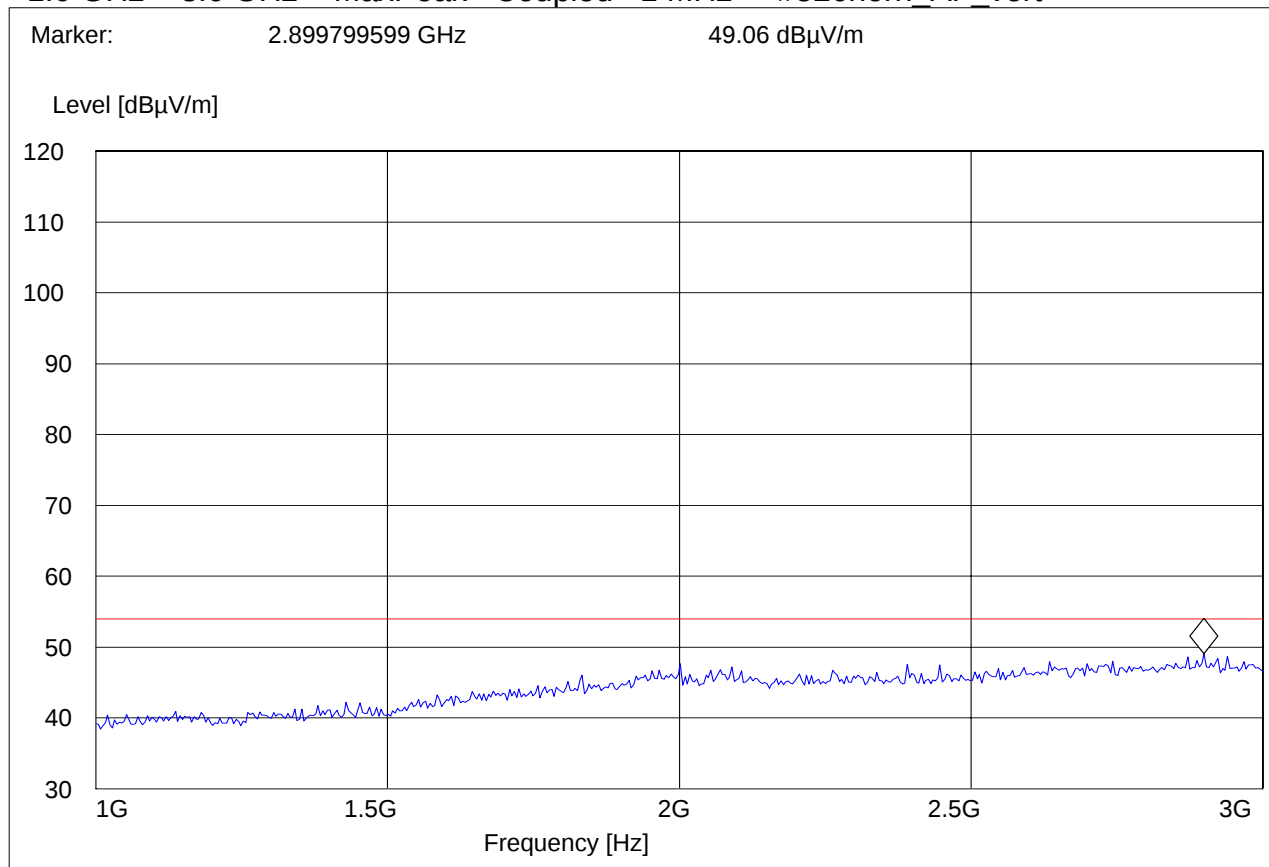
**Note: Peak Reading vs. Average limit**

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

EUT / Description: Vaio laptop "F" series unit #2 ESN: 5B101BC3  
Customer: Sony Electronics  
Operating Mode: BT, TX 2402MHz TABLE 280°  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC ADAPTOR  
Sweep: CANADA RE\_1-3G

### **SWEEP TABLE: "CANADA RE 1-3G"**

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





### 3-18GHz

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

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

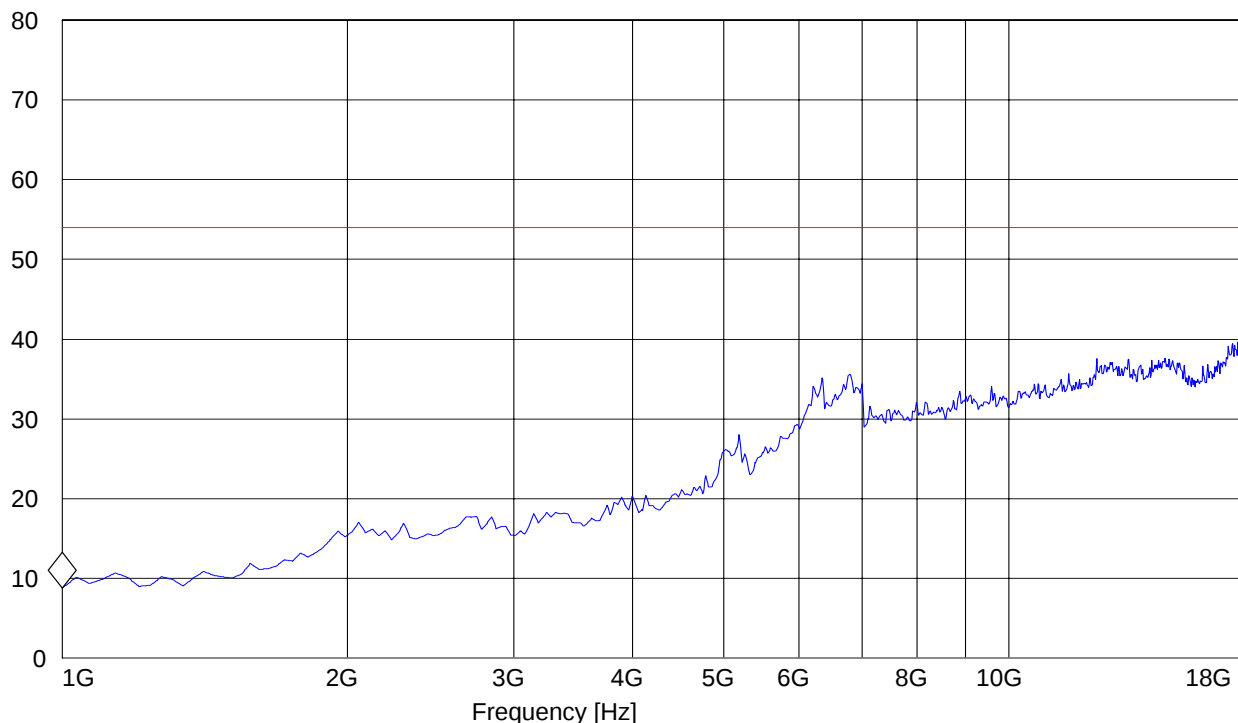
EUT / Description: Vaio laptop "F" series unit #2 ESN: 5B101BC3  
Customer: Sony Electronics  
Operating Mode: BT, TX 2402MHz TABLE 280°  
Antenna: V  
EUT: V  
Test Engineer: ED  
Voltage: AC ADAPTOR  
Sweep: CANADA RE\_3-18G

#### **SWEEP TABLE: "CANADA RE\_3-18G"**

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

Marker: 1 GHz 8.82 dBμV/m

Level [dBμV/m]





# **18-25GHz**

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

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

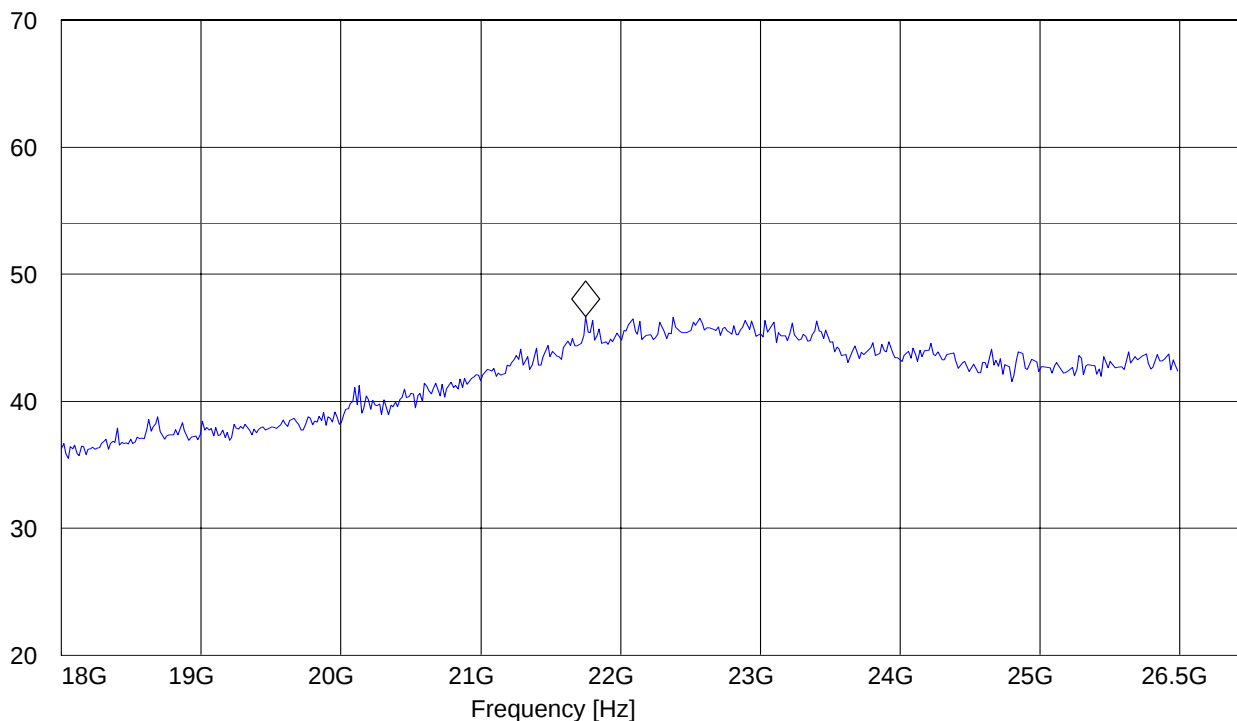
EUT / Description: Vaio laptop "F" series unit #2 ESN: 5B101BC3  
 Customer: Sony Electronics  
 Operating Mode: BT, TX 2402MHz TABLE 280°  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_18-26.5G

## **SWEEP TABLE: "CANADA RE\_18-26.5G"**

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer         |
|-----------------|----------------|----------|------------|-----------|--------------------|
| 18.0 GHz        | 26.0 GHz       | MaxPeak  | Coupled    | 1 MHz     | 3160 Horn 18-26.5G |

Marker: 21.751503006 GHz 46.64 dBμV/m

Level [dBμV/m]





## **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

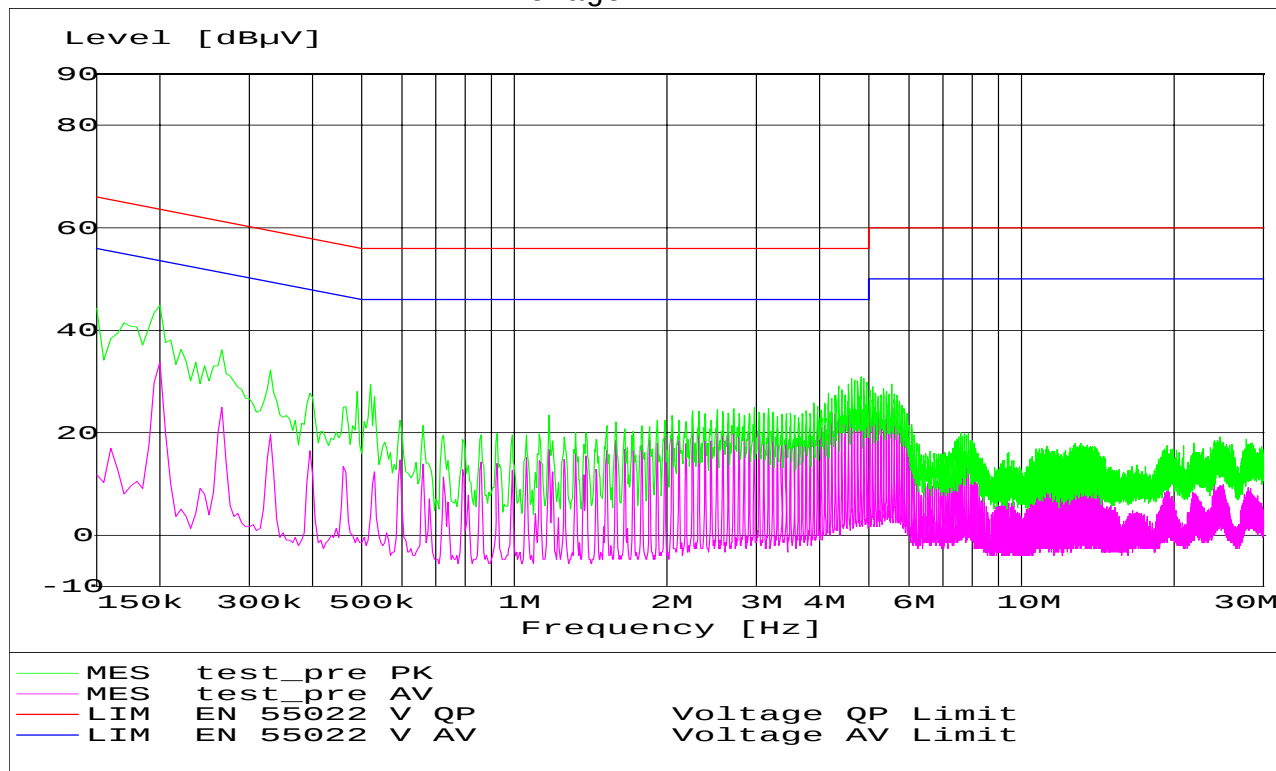
### LISN

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Manufacturer: Sony Electronics  
 Test Engineer: Ed  
 Phase: L & N  
 Comment: EN55022  
 AC/DC adapter at 110V

### ***SWEEP TABLE: "EN 55022 Voltage"***

|                    |           |                  |         |        |            |
|--------------------|-----------|------------------|---------|--------|------------|
| Short Description: |           | EN 55022 Voltage |         |        |            |
| Start              | Stop      | Detector         | Meas.   | IF     | Transducer |
| Frequency          | Frequency |                  | Time    | Bandw. |            |
| 150.0 kHz          | 30.0 MHz  | MaxPeak          | Coupled | 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 2007    | 1 year   |
| 02 | Spectrum Analyzer            | FSEM 30      | Rohde & Schwarz | 100017       | August 2007 | 1 year   |
| 03 | Signal Generator             | SMY02        | Rohde & Schwarz | 836878/011   | May 2007    | 1 year   |
| 04 | Power-Meter                  | NRVD         | Rohde & Schwarz | 0857.8008.02 | May 2007    | 1 year   |
| 05 | Biconilog Antenna            | 3141         | EMCO            | 0005-1186    | June 2007   | 1 year   |
| 06 | Horn Antenna (1-18GHz)       | SAS-200/571  | AH Systems      | 325          | June 2007   | 1 year   |
| 07 | Horn Antenna (18-26.5GHz)    | 3160-09      | EMCO            | 1240         | June 2007   | 1 year   |
| 08 | Power Splitter               | 11667B       | Hewlett Packard | 645348       | n/a         | n/a      |
| 09 | Climatic Chamber             | VT4004       | Voltsch         | G1115        | May 2007    | 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 2007    | 1 year   |
| 13 | Power Sensor                 | URV5-Z2      | Rohde & Schwarz | DE30807      | May 2007    | 1 year   |
| 14 | Digital Radio Comm. Tester   | CMD-55       | Rohde & Schwarz | 847958/008   | May 2007    | 1 year   |
| 15 | Universal Radio Comm. Tester | CMU 200      | Rohde & Schwarz | 832221/06    | May 2007    | 1 year   |
| 16 | LISN                         | ESH3-Z5      | Rohde & Schwarz | 836679/003   | May 2007    | 1 year   |
| 17 | Loop Antenna                 | 6512         | EMCO            | 00049838     | July 2007   | 2 years  |

## 5.7 BLOCK DIAGRAMS

### Radiated Testing

