



# FCC Test Report

## FCC Part 22,24 / RSS 132,133

FOR:

Notebook PC

MODEL #: PCG4J1L

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

FCC ID: AK8PCG4J1L

IC ID: 409B-PCG4J1L

TEST REPORT #: SONYE\_008\_06002\_FCC22-24  
DATE: 08/25/2006



Certificate # 2135.01



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

© Copyright by CETECOM

**Table of Contents**

<b>1 ASSESSMENT .....</b>	<b>3</b>
<b>2 ADMINISTRATIVE DATA.....</b>	<b>4</b>
2.1 IDENTIFICATION OF THE TESTING LABORATORY ISSUING THE EMC TEST REPORT .....	4
2.2 IDENTIFICATION OF THE CLIENT .....	4
2.3 IDENTIFICATION OF THE MANUFACTURER.....	4
<b>3 EQUIPMENT UNDER TEST (EUT).....</b>	<b>5</b>
3.1 IDENTIFICATION OF THE EQUIPMENT UNDER TEST .....	5
3.2 IDENTIFICATION OF ACCESSORY EQUIPMENT .....	5
<b>4 SUBJECT OF INVESTIGATION.....</b>	<b>6</b>
<b>5 MEASUREMENTS.....</b>	<b>7</b>
5.1 RADIATED POWER .....	7
5.1.1 <i>FCC 2.1046 Measurements required: RF power output.</i> .....	7
5.1.2 <i>Limits:</i> .....	7
5.1.2.1 FCC 22.913 (a) Effective radiated power limits. ....	7
5.1.2.2 FCC 24.232 (b)(c) Power limits. ....	7
5.1.3 <i>Radiated Output Power Measurement procedure:</i> .....	7
5.1.4 <i>ERP Results 850 MHz band:</i> .....	9
5.1.5 <i>EIRP Results 1900 MHz band:</i> .....	9
5.2 SPURIOUS EMISSIONS RADIATED .....	10
5.2.1 <i>FCC 2.1053 Measurements required: Field strength of spurious radiation.</i> .....	10
5.2.2 <i>Limits:</i> .....	10
5.2.2.1 FCC 22.917 Emission limitations for cellular equipment. ....	10
5.2.2.2 FCC 24.238 Emission limitations for Broadband PCS equipment. ....	10
5.2.3 <i>Radiated out of band measurement procedure:</i> .....	11
5.2.4 <i>Radiated out of band emissions results on EUT:</i> .....	13
5.3 RECEIVER RADIATED EMISSIONS § 2.1053 / RSS-133 .....	33
5.3.1 <i>Receiver Spurious on EUT</i> .....	34
5.4 AC POWERLINE CONDUCTED EMISSIONS § 15.107/207 .....	38
5.4.1 <i>Results EUT</i> .....	39
<b>6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS .....</b>	<b>40</b>
<b>7 REFERENCES.....</b>	<b>41</b>
<b>8 BLOCK DIAGRAMS .....</b>	<b>42</b>

## **1 Assessment**

**The following is in compliance with the applicable criteria specified in FCC rules Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and in compliance with the applicable criteria specified in Industry Canada rules RSS132 and RSS133.**  
**This report contains only radiated data**

Company	Description	Model #
<b>SONY CORPORATION</b>	<b>Notebook PC</b>	<b>PCG4J1L</b>



---

Michael Grings  
Deputy 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 Milpitas, CA 95035 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>6/26/2006 to 6/27/2006</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, Minamiiazumi-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-4J1L</b>
FCC ID:	<b>AK8PCG4J1L</b>
IC ID:	<b>409B-PCG4J1L</b>
Frequency Range:	<b>824.7MHz – 848.31MHz for CDMA 850, 1851.25MHz – 1908.75MHz for CDMA 1900</b>
Type(s) of Modulation:	<b>CDMA, FHSS, DSSS/OFDM,</b>
Number of Channels:	<b>652 for CDMA-850, 1150 for CDMA-1900</b>
Antenna Type:	<b>λ/monopole (Film Antenna)</b>
Output Power:	<b>FCC 22: 0.029 W ERP @ 848.31 MHz FCC 24: 0.359 W EIRP@ 1880 MHz</b>

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

TYPE	MANUFACTURER.	MODEL
AC ADAPTER	SONY	VGP-AC16V8

#### **4 Subject of Investigation**

All testing was performed on the PCG4J1L referred to as EUT. During the testing process the CDMA antenna was tested in all possible positions and the worst case was determined to be vertical, all data was taken in the worst case configuration.

The EUT carries a pre-certified EV-DO module with FCC ID# PKRNVWES720. This test report contains full radiated testing as per FCC 22/24 on the EUT with the pre-certified GSM module. All conducted measurements are covered under test report# **MFA p0660009, d0660020**

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 Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations and Industry Canada rules RSS132 and RSS133.

## 5 Measurements

### 5.1 Radiated Power

#### 5.1.1 FCC 2.1046 Measurements required: RF power output.

Power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on circuit elements as specified. The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

#### 5.1.2 Limits:

##### 5.1.2.1 **FCC 22.913 (a) Effective radiated power limits.**

The effective radiated power (ERP) of mobile transmitters must not exceed 7 Watts.

##### 5.1.2.2 **FCC 24.232 (b)(c) Power limits.**

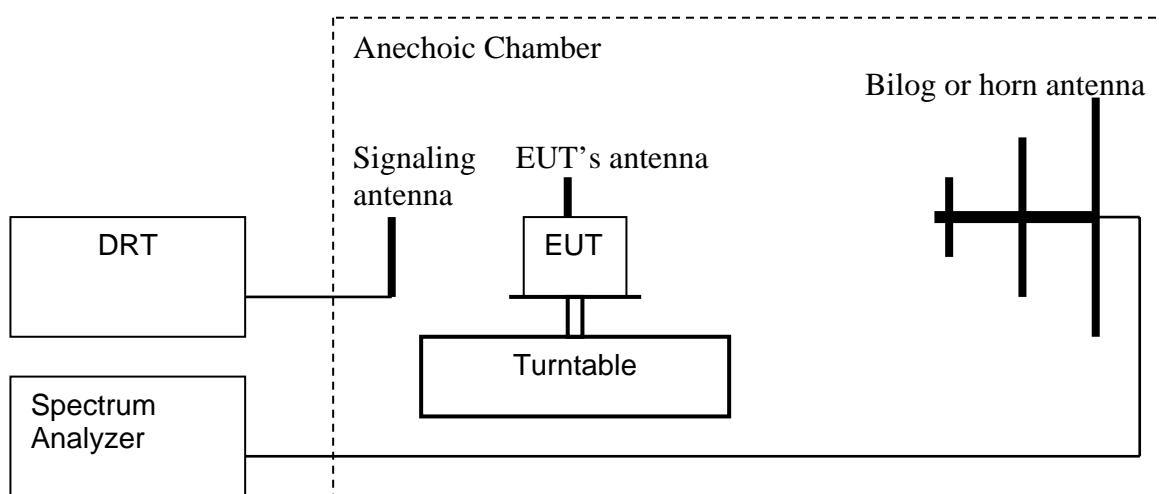
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).

(c) Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement over the full bandwidth of the channel.

#### 5.1.3 Radiated Output Power Measurement procedure:

Based on TIA-603C 2004

#### 2.2.17.2 Effective Radiated Power (ERP) or Effective Isotropic Radiated Power (EIRP)



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a vertical orientation.

2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to the channel frequency. Set the analyzer to measure peak hold with the required settings.
4. Rotate the EUT 360°. Record the peak level in dBm (**LVL**).
5. Replace the EUT with a vertically polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the ERP using the following equation:  
**ERP** (dBm) = **LVL** (dBm) + **LOSS** (dB)
8. Determine the EIRP using the following equation:  
**EIRP** (dBm) = **ERP** (dBm) + 2.14 (dB)
9. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band. **Spectrum analyzer settings** = **rbw=vbw=3MHz**  
**(note:** Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4, 7 and 8 above are performed with test software.)

**5.1.4 ERP Results 850 MHz band:**

Note: ERP and EIRP measurements were performed in antenna chamber.

Power Control Level	Burst Peak ERP
5	≤38.45dBm (7W)

Frequency (MHz)	Effective Radiated Power (dBm)
824.7	14.01
836.52	14.51
848.31	14.55

**5.1.5 EIRP Results 1900 MHz band:**

Power Control Level	Burst Peak EIRP
0	≤33dBm (2W)

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)
1851.25	23.85
1880.0	25.55
1908.75	24.47

## 5.2 Spurious Emissions Radiated

### 5.2.1 FCC 2.1053 Measurements required: Field strength of spurious radiation.

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission.

### 5.2.2 Limits:

#### 5.2.2.1 FCC 22.917 Emission limitations for cellular equipment.

The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

#### 5.2.2.2 FCC 24.238 Emission limitations for Broadband PCS equipment.

The rules in this section govern the spectral characteristics of emissions in the Broadband Personal Communications Service.

(a) *Out of band emissions.* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

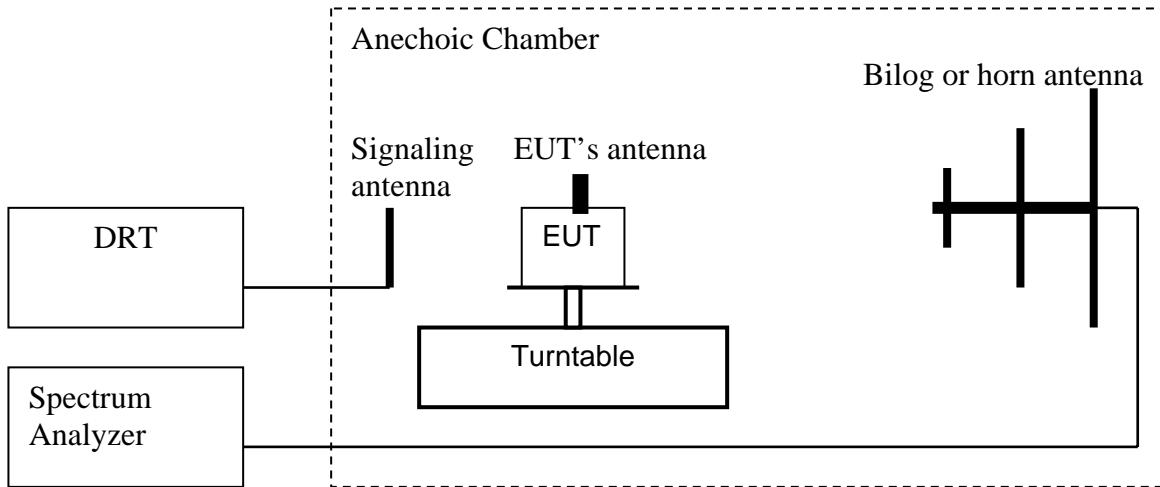
(b) *Measurement procedure.* Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 100 kHz of 1 percent of emission bandwidth, as specified). The

emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### **5.2.3 Radiated out of band measurement procedure:**

Based on TIA-603C 2004

#### **2.2.12 Unwanted emissions: Radiated Spurious**



1. Connect the equipment as shown in the above diagram with the EUT's antenna in a horizontal orientation.
2. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
3. Set the spectrum analyzer to measure peak hold with the required settings.
4. Place the measurement antenna in a horizontal orientation. Rotate the EUT 360°. Raise the measurement antenna up to 4 meters in 0.5 meters increments and rotate the EUT 360° at each height to maximize all emissions. Measure and record all spurious emissions (**LVL**) up to the tenth harmonic of the carrier frequency.
5. Replace the EUT with a horizontally polarized half wave dipole or known gain antenna. The center of the antenna should be at the same location as the center of the EUT's antenna.
6. Connect the antenna to a signal generator with known output power and record the path loss in dB (**LOSS**). **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
7. Determine the level of spurious emissions using the following equation:  

$$\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
8. Repeat steps 4, 5 and 6 with all antennas vertically polarized.
9. Determine the level of spurious emissions using the following equation:  

$$\text{Spurious (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$
10. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

(note: Steps 5 and 6 above are performed prior to testing and **LOSS** is recorded by test software. Steps 3, 4 and 7 above are performed with test software.)

**Spectrum analyzer settings:**

Res B/W: 1 MHz

Vid B/W: 1 MHz

**Measurement Survey:**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the CDMA-850 & CDMA-1900 bands. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the CDMA-850 & CDMA-1900 band into any of the other blocks respectively. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**5.2.4 Radiated out of band emissions results on EUT:****RESULTS OF RADIATED TESTS CDMA-850:**

Harmonics	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
2	<b>1649.4</b>	NF	<b>1673.04</b>	NF	<b>1696.62</b>	NF
3	<b>2474.1</b>	NF	<b>2509.56</b>	NF	<b>2544.93</b>	NF
4	<b>3298.8</b>	NF	<b>3346.08</b>	NF	<b>3393.24</b>	NF
5	<b>4123.5</b>	NF	<b>4182.6</b>	NF	<b>4241.55</b>	NF
6	<b>4948.2</b>	NF	<b>5019.12</b>	NF	<b>5089.86</b>	NF
7	<b>5772.9</b>	NF	<b>5855.64</b>	NF	<b>5938.17</b>	NF
8	<b>6597.6</b>	NF	<b>6692.16</b>	NF	<b>6786.48</b>	NF
9	<b>7422.3</b>	NF	<b>7528.68</b>	NF	<b>7634.79</b>	NF
10	<b>8247</b>	NF	<b>8365.2</b>	NF	<b>8483.1</b>	NF

NF = NOISE FLOOR

**RADIATED SPURIOUS EMISSIONS (CDMA-850)****TX: 30MHz - 1GHz****Spurious emission limit -13dBm****Antenna: vertical****Note:**

1. The peak above the limit line is the carrier freq.
2. This plot is valid for low, mid & high channels horizontal and vertical polarities (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

Operating Mode: TX CH 758, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC24 SPUR 30M-1G\_V MARKER ON TX CH

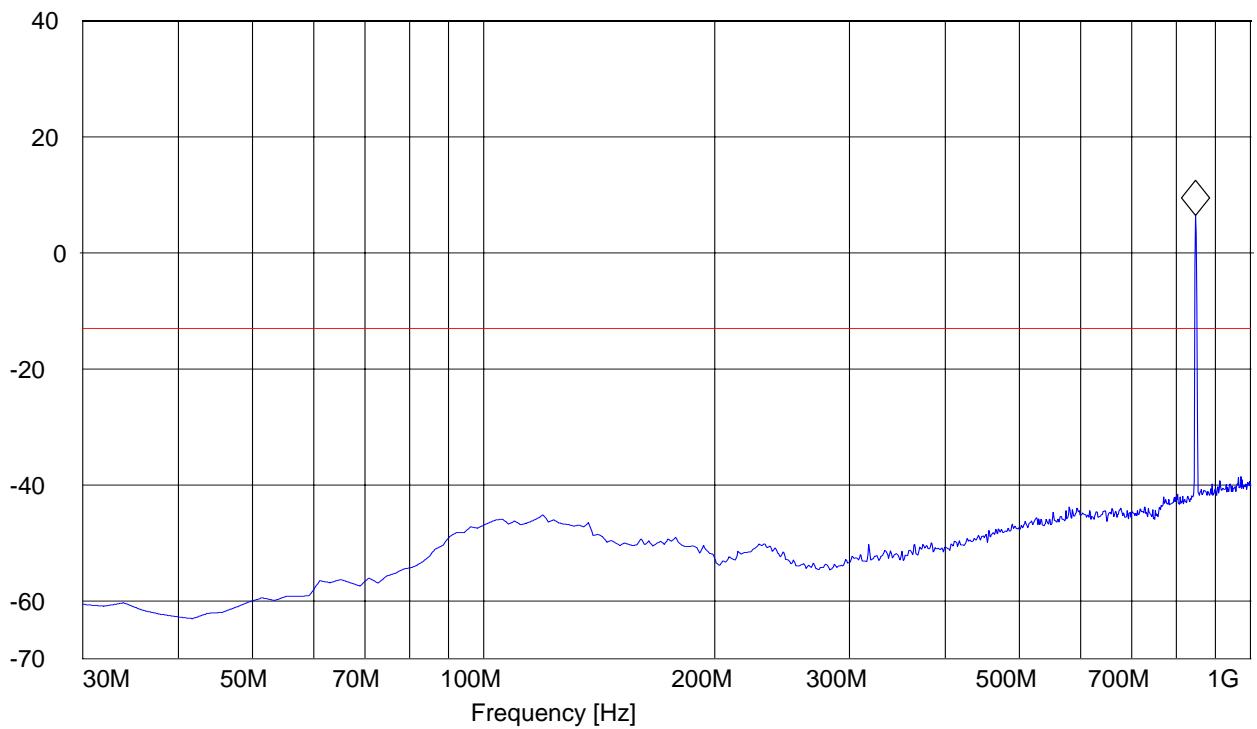
***SWEET TABLE: "FCC 24 Spur 30M-1G\_V"***

Short Description: FCC 24 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Time	Bandw.	
			Coupled	1 MHz	DUMMY-DBM

Marker: 848.376754 MHz 6.48 dBm

Level [dBm]



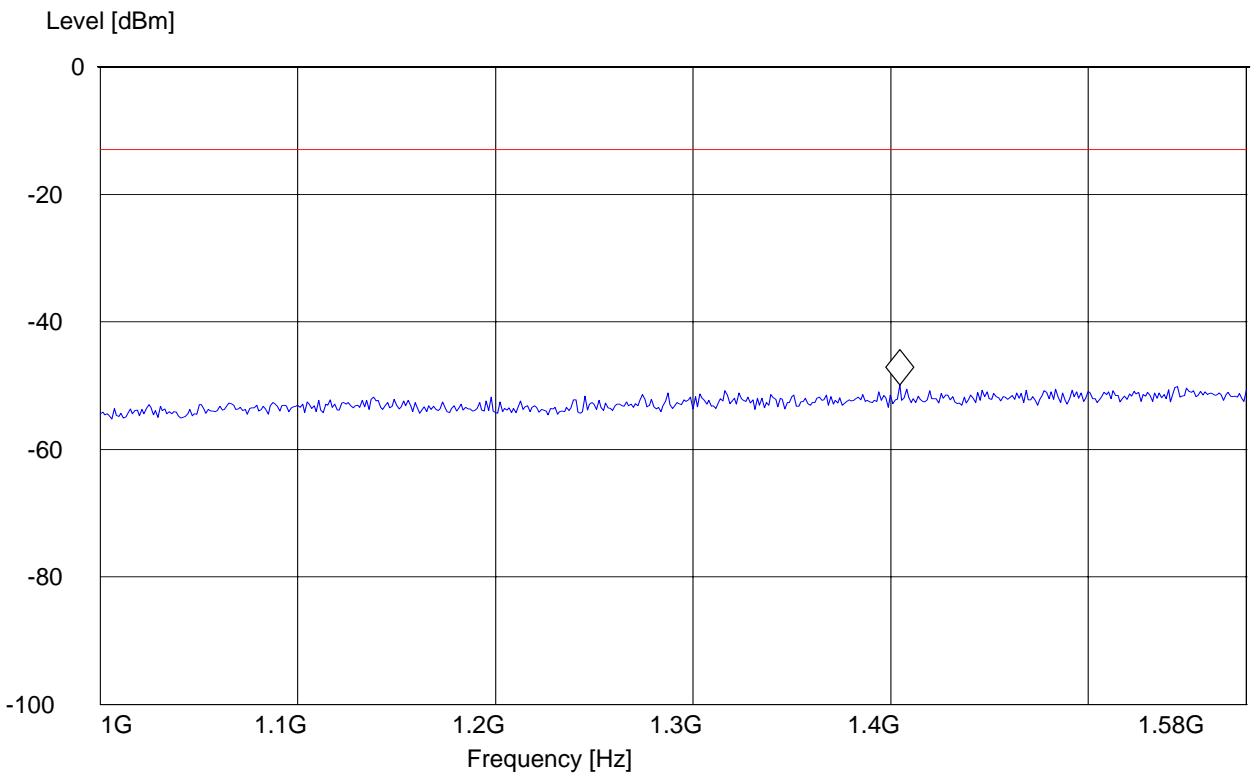
**RADIATED SPURIOUS EMISSIONS (CDMA-850)****Tx @ 824.7MHz: 1GHz – 1.58GHz****Spurious emission limit -13dBm****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 8, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 1-1.58G

***SWEEP TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:		FCC 24	1GHz-8GHz		
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.404488978 GHz -49.9 dBm



**RADIATED SPURIOUS EMISSIONS (CDMA-850)**

Tx @ 824.7MHz: 1.58GHz – 3GHz

Spurious emission limit –13dBm

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

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

Customer: SONY

Operating Mode: TX CH 8, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

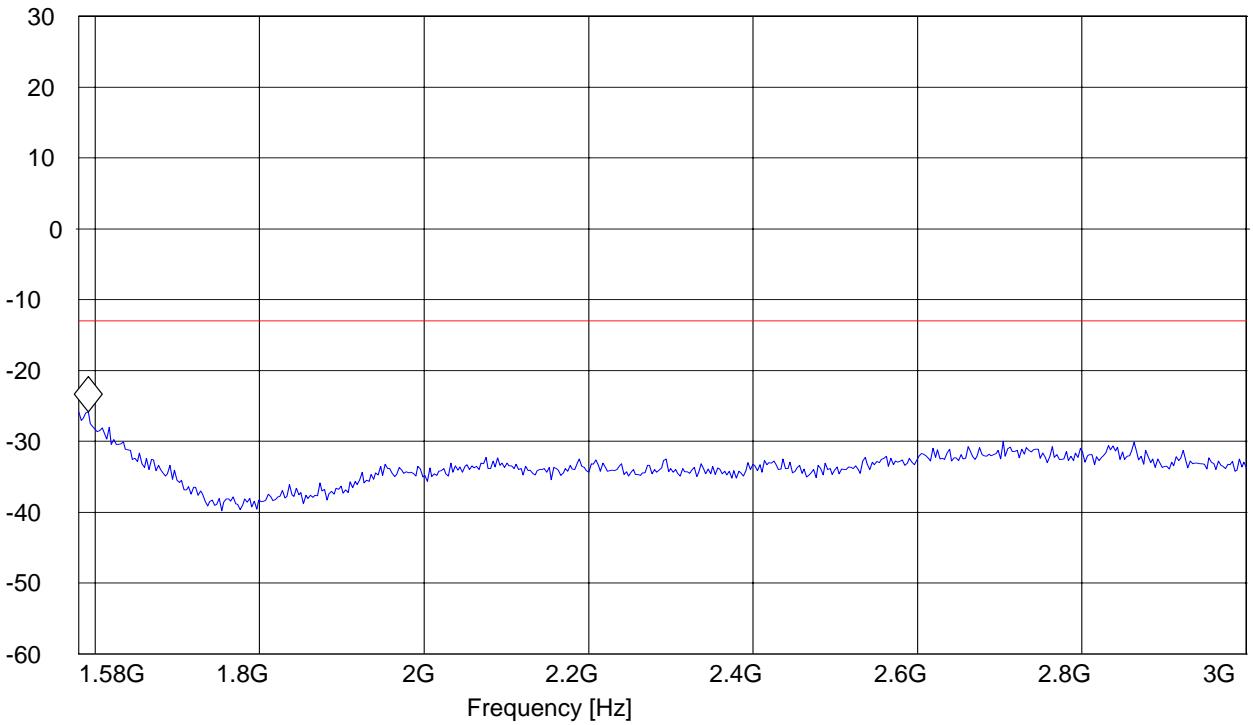
Sweep: FCC 22SPURI 1.58-3G

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 22 1GHz-8GHz			Transducer
Start Frequency	Stop Frequency	Detector	Meas.	IF	
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.591382766 GHz -25.81 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS (CDMA-850)**

Tx @ 824.7MHz: 3GHz – 9GHz

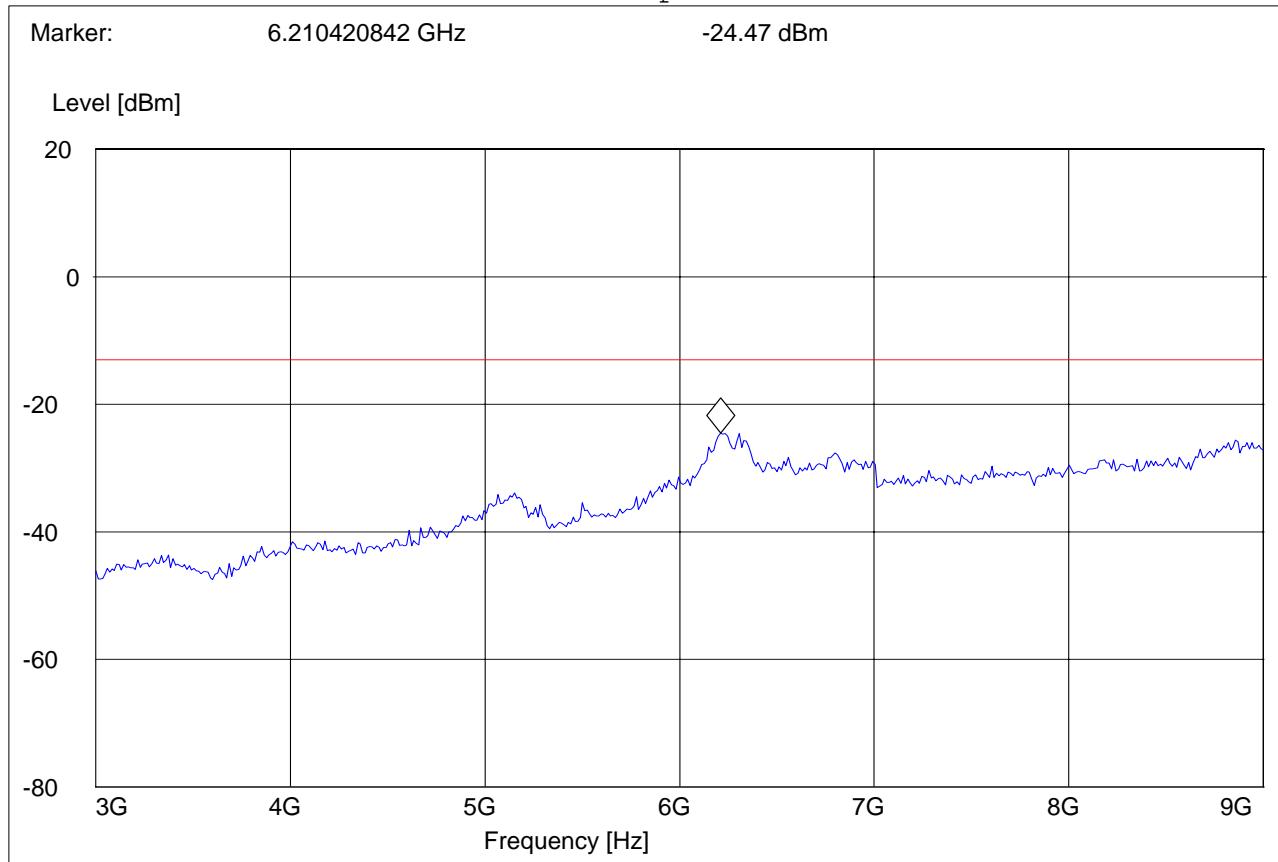
Spurious emission limit -13dBm

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 8, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 3-9G

***SWEET TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24	1GHz-8GHz	IF	Transducer
Start Frequency	Stop Frequency	Detector	Meas.	Time	Bandw.
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (CDMA-850)**

Tx @ 836.52MHz: 1GHz – 1.58GHz

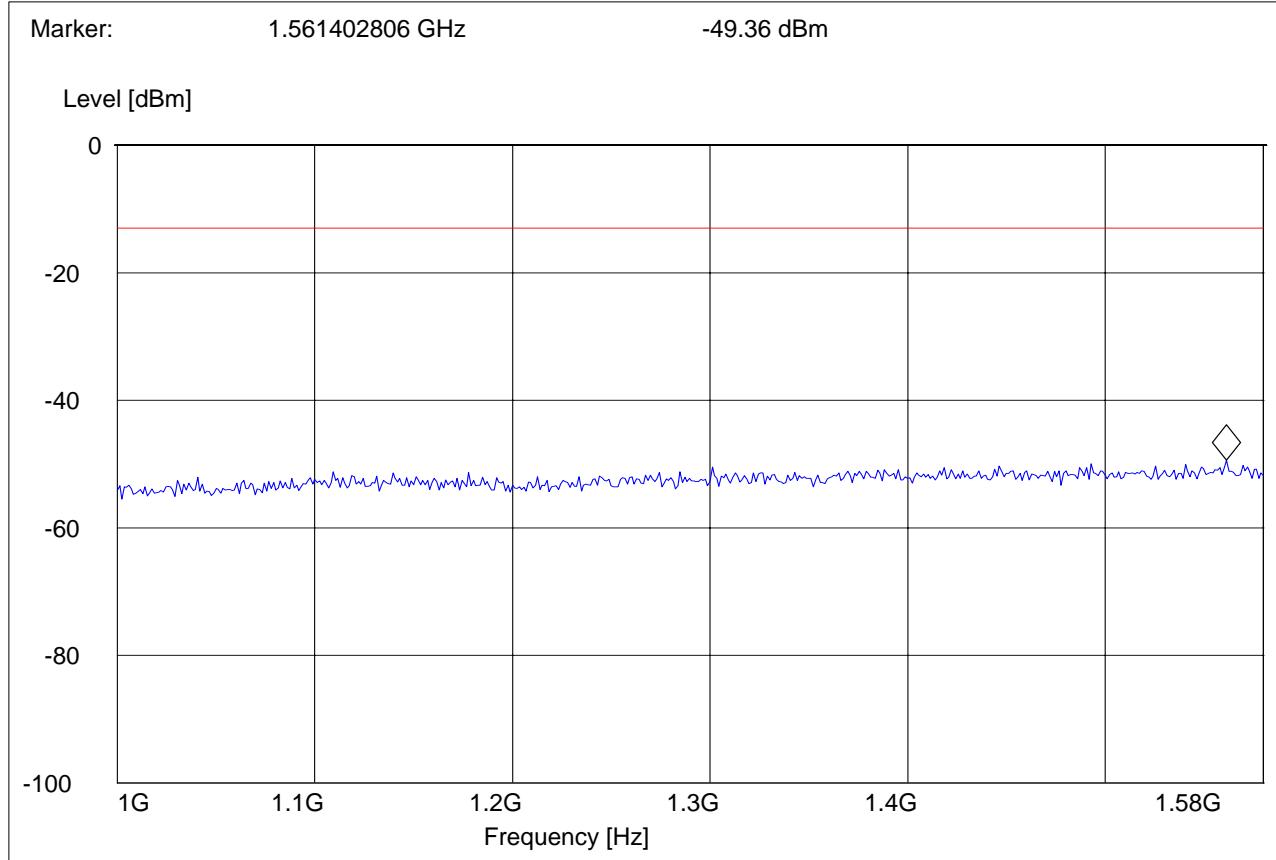
Spurious emission limit -13dBm

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 383, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 1-1.58G

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (CDMA-850)**

Tx @ 836.52MHz: 1.58GHz – 3GHz

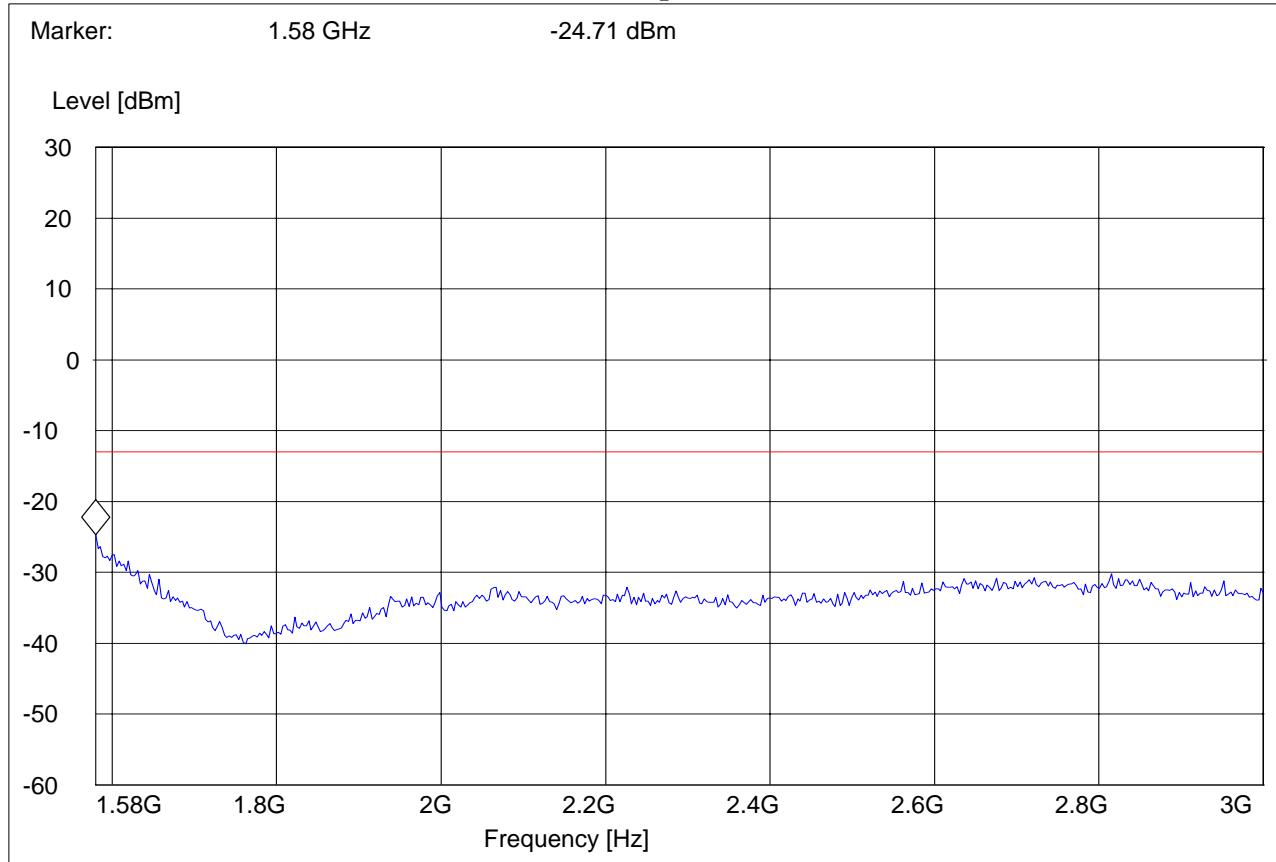
Spurious emission limit –13dBm

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 383, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 1-1.58G

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 22 1GHz-8GHz			Transducer
Start Frequency	Stop Frequency	Detector	Meas.	IF	
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (CDMA-850)**

Tx @ 836.52MHz: 3GHz – 9GHz

Spurious emission limit -13dBm

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

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

Customer: SONY

Operating Mode: TX CH 383, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

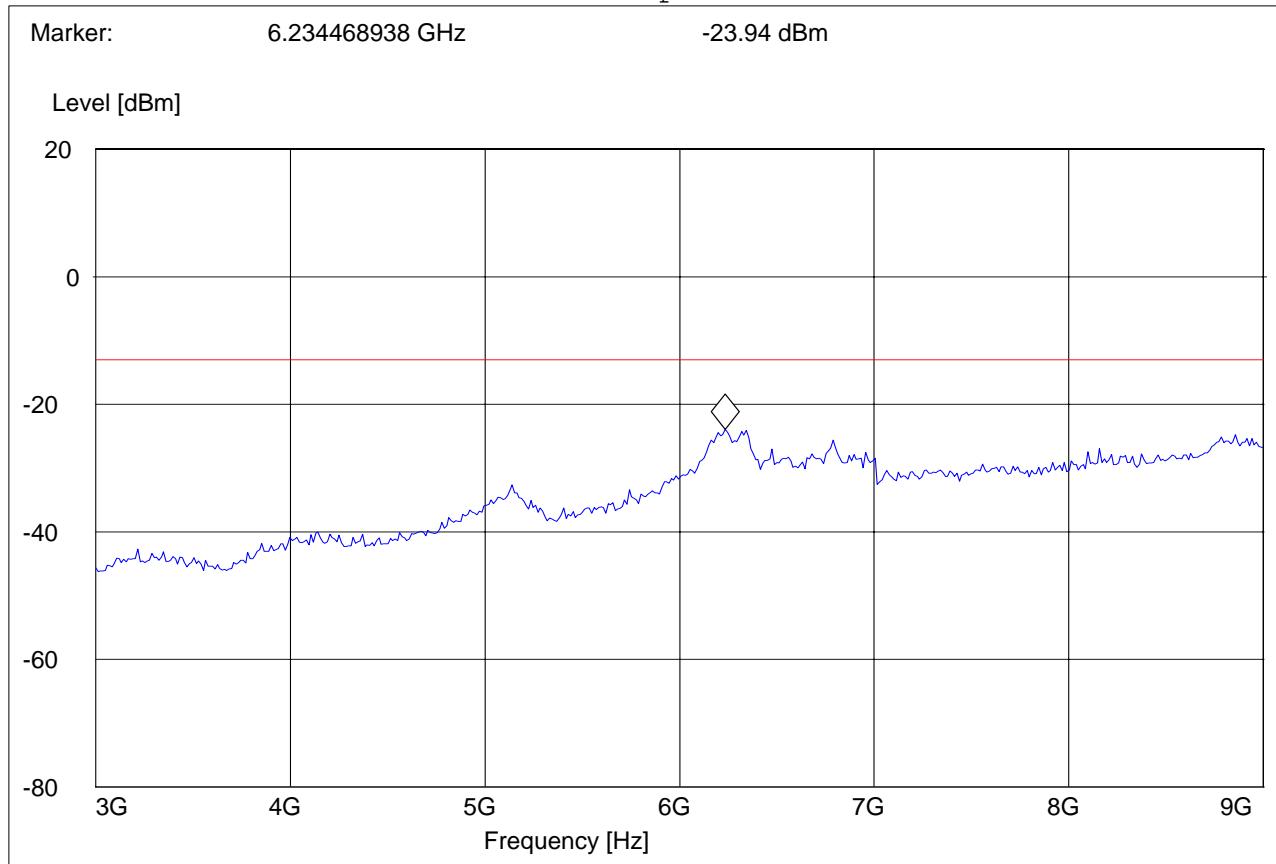
Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC 22SPURI 3-9G

***SWEET TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24	1GHz-8GHz	IF	Transducer
Start Frequency	Stop Frequency	Detector	Meas.	Time	Bandw.
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS (CDMA-850)**

Tx @ 848.31MHz: 1GHz – 1.58GHz

Spurious emission limit -13dBm

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

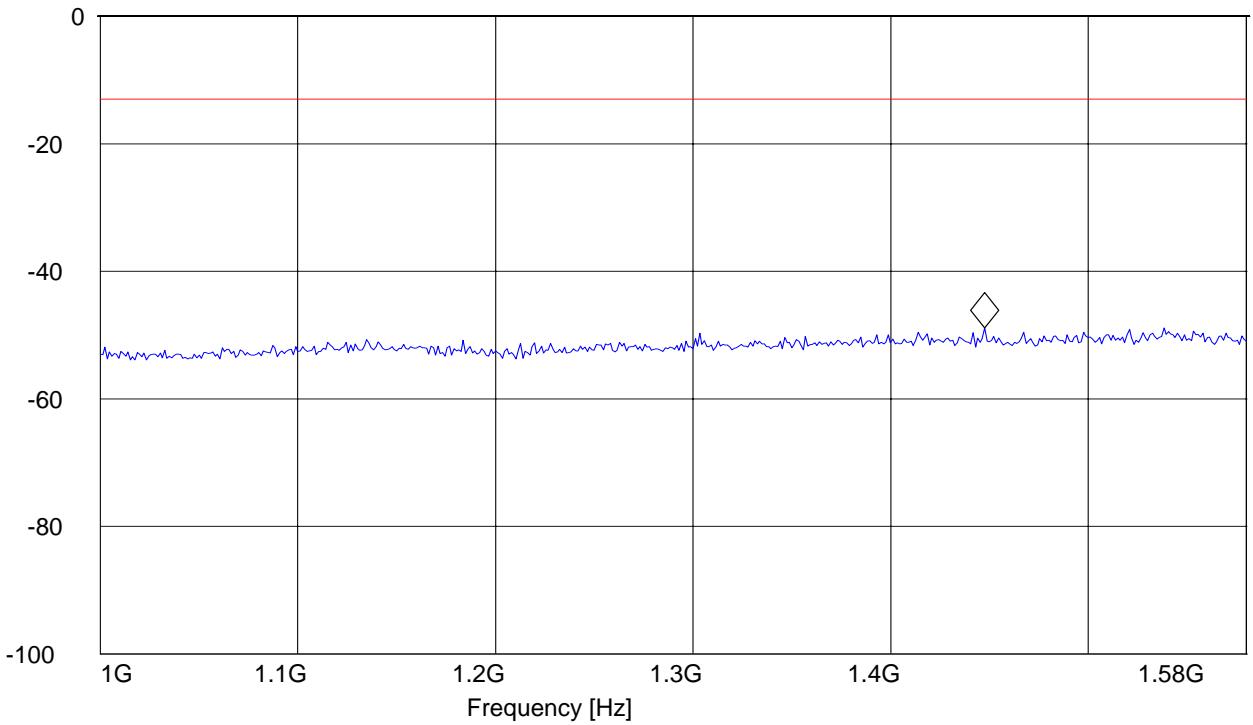
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 758, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 1-1.58G

***SWEET TABLE: "FCC 22Spuri 1-1.58G"***

Short Description:		FCC 24	1GHz-8GHz		
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	1.6 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker:	1.44749499 GHz	-48.85 dBm
---------	----------------	------------

Level [dBm]



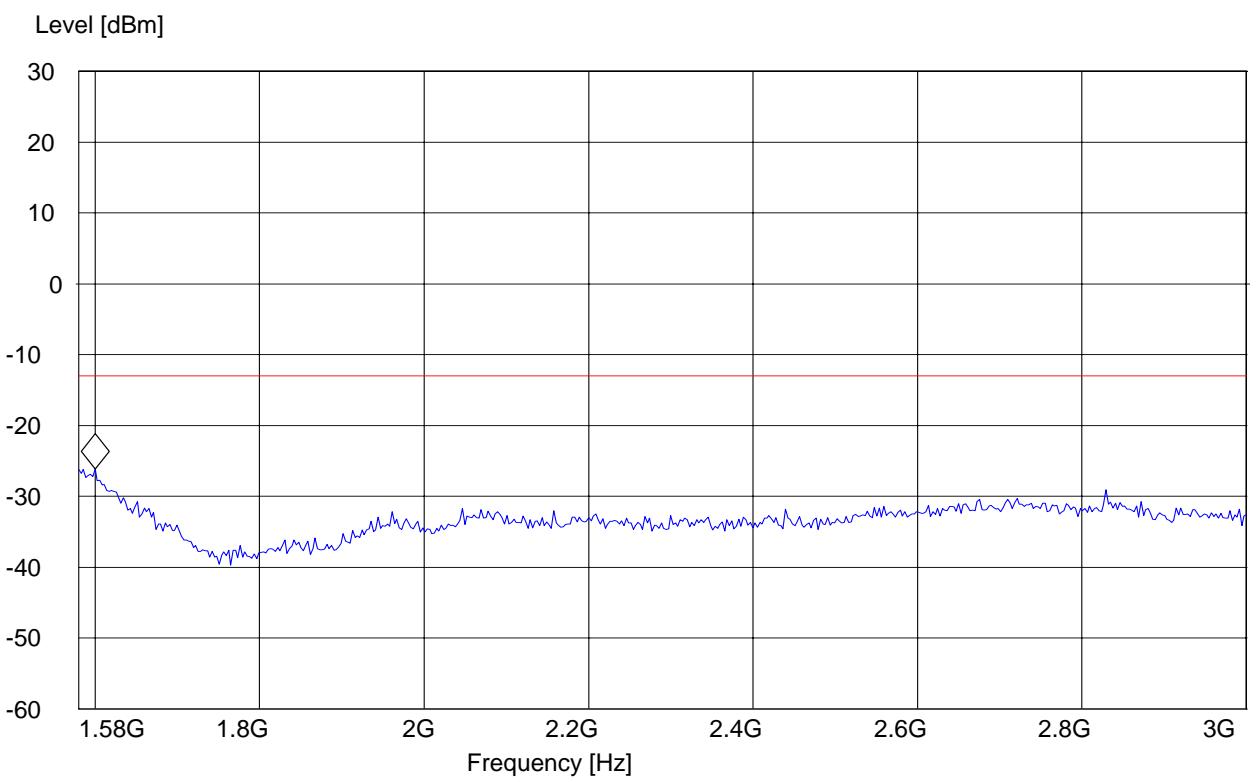
**RADIATED SPURIOUS EMISSIONS (CDMA-850)****Tx @ 848.31MHz: 1.58GHz – 3GHz****Spurious emission limit –13dBm****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 758, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 1.58-3G

***SWEET TABLE: "FCC 22Spuri 1.58-3G"***

Short Description:		FCC 24	1GHz-8GHz	IF	Transducer
Start Frequency	Stop Frequency	Detector	Meas.	Time	Bandw.
1.6 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker:	1.59991984 GHz	-26.14 dBm
---------	----------------	------------



**RADIATED SPURIOUS EMISSIONS (GSM-850)**

Tx @ 848.31MHz: 3GHz – 9GHz

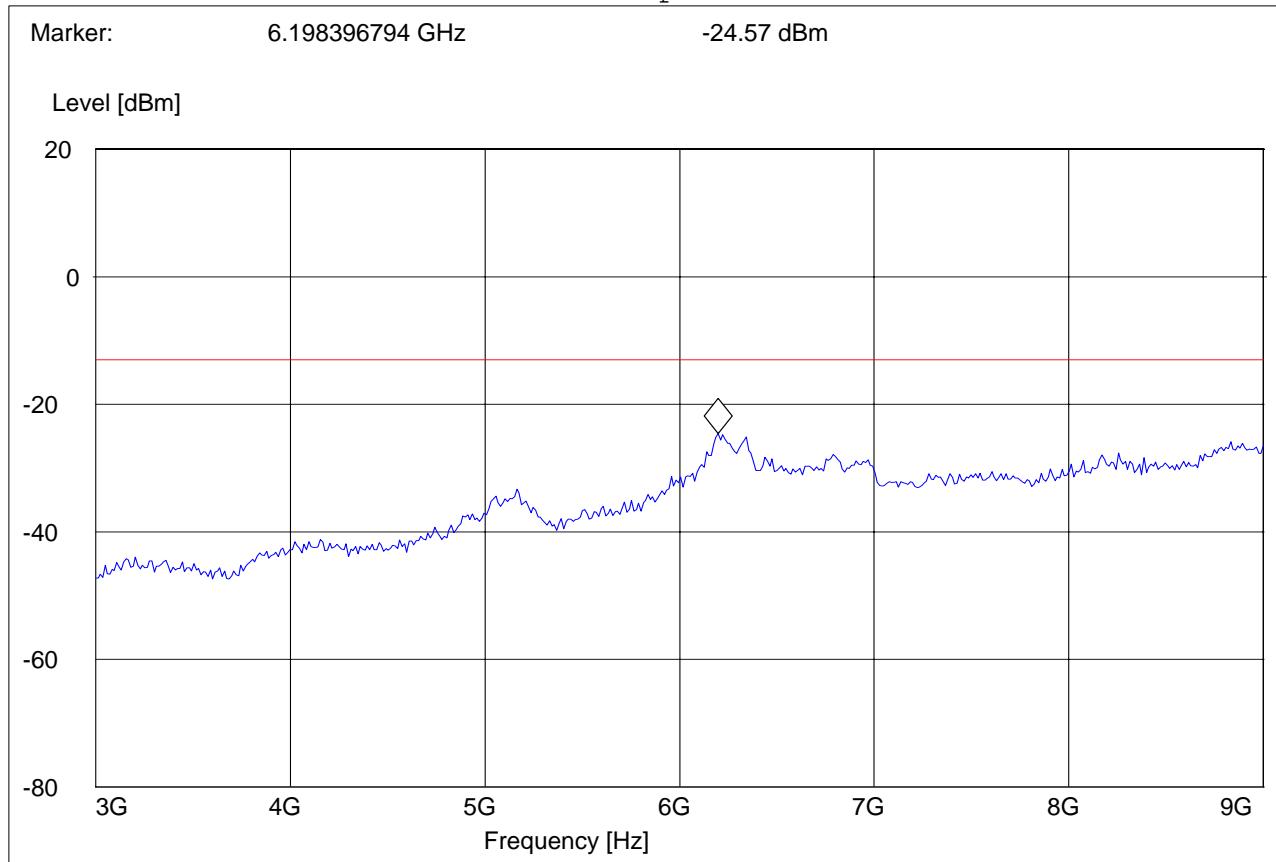
Spurious emission limit -13dBm

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 758, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 22SPURI 3-9G

***SWEET TABLE: "FCC 22Spuri 3-9G"***

Short Description:		FCC 24	1GHz-8GHz		
Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	9.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RESULTS OF RADIATED TESTS CDMA-1900:**

Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
2	<b>3702.5</b>	<b>NF</b>	<b>3760</b>	<b>NF</b>	<b>3817.5</b>	<b>NF</b>
3	<b>5553.75</b>	<b>NF</b>	<b>5640</b>	<b>NF</b>	<b>5726.25</b>	<b>NF</b>
4	<b>7405</b>	<b>NF</b>	<b>7520</b>	<b>NF</b>	<b>7635</b>	<b>NF</b>
5	<b>9256.25</b>	<b>NF</b>	<b>9400</b>	<b>NF</b>	<b>9543.75</b>	<b>NF</b>
6	<b>11107.5</b>	<b>NF</b>	<b>11280</b>	<b>NF</b>	<b>11452.5</b>	<b>NF</b>
7	<b>12958.75</b>	<b>NF</b>	<b>13160</b>	<b>NF</b>	<b>13361.25</b>	<b>NF</b>
8	<b>14810</b>	<b>NF</b>	<b>15040</b>	<b>NF</b>	<b>15270</b>	<b>NF</b>
9	<b>16661.25</b>	<b>NF</b>	<b>16920</b>	<b>NF</b>	<b>17178.75</b>	<b>NF</b>
10	<b>18512.5</b>	<b>NF</b>	<b>18800</b>	<b>NF</b>	<b>19087.5</b>	<b>NF</b>
NF = NOISE FLOOR						

**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****TX: 30MHz - 1GHz****Spurious emission limit -13dBm****Antenna: vertical****Note: This plot is valid for low, mid & high channels horizontal and vertical polarities (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

Operating Mode: TX CH 600, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC 24SPURI 30M-1G\_V

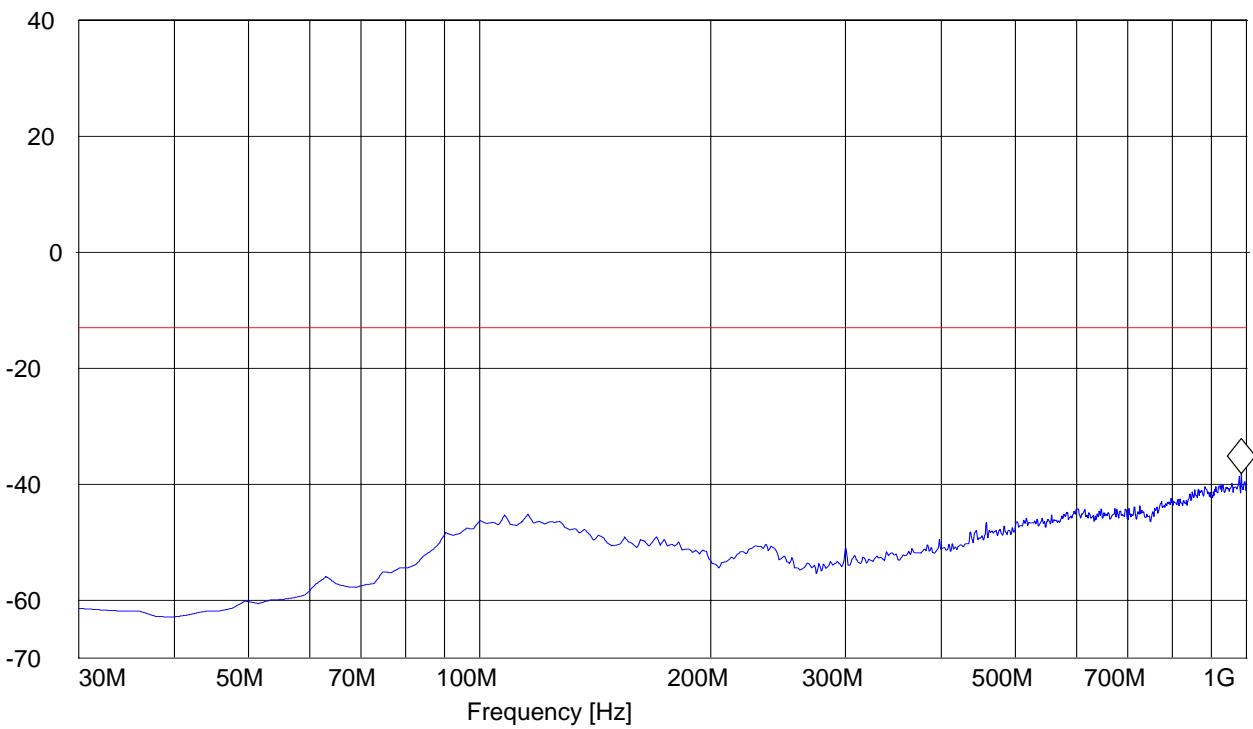
***SWEET TABLE: "FCC 24 Spur 30M-1G\_V"***

Short Description: FCC 24 30MHz-1GHz

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
30.0 MHz	1.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 984.448898 MHz -38.22 dBm

Level [dBm]



**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****Tx @ 1851.25MHz: 1GHz – 3GHz****Spurious emission limit –13dBm****Note: The peak above the limit line is the carrier freq. at ch-512.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

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

Customer: SONY

Operating Mode: TX CH 25, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC 24SPURI 1-3G

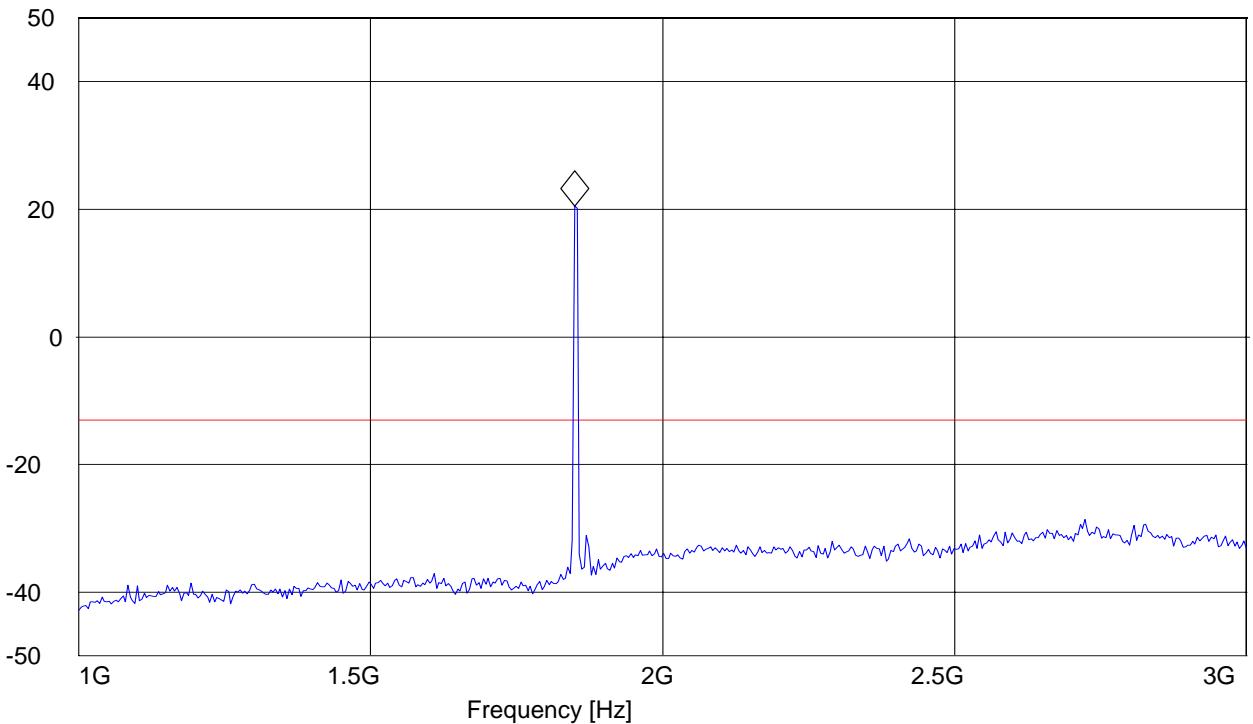
***SWEEP TABLE: "FCC 24Spuri 1-3G"***

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.849699399 GHz 20.5 dBm

Level [dBm]

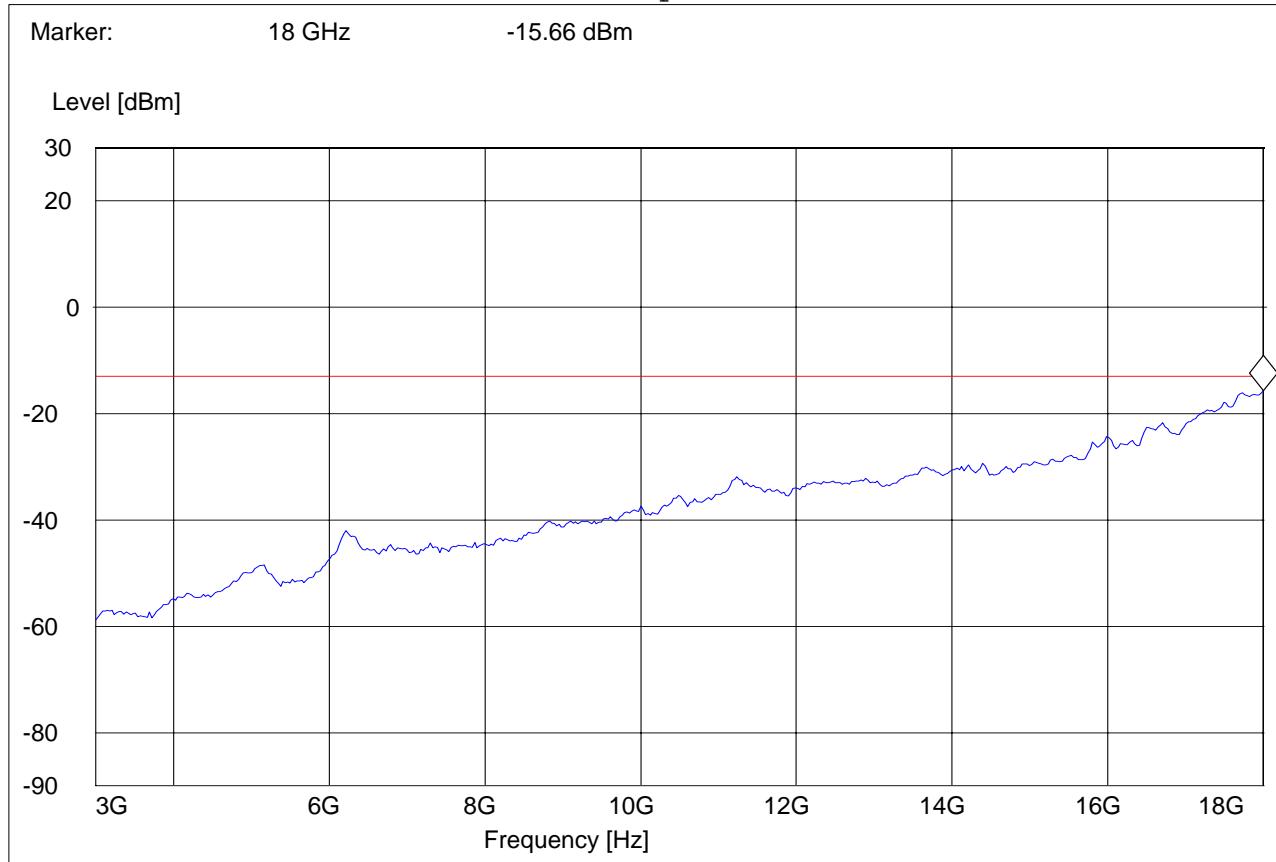


**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****Tx @ 1851.25MHz: 3GHz – 18GHz****Spurious emission limit –13dBm****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 25, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24SPURI 3-18G

***SWEET TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****Tx @ 1880.0MHz: 1GHz – 3GHz****Spurious emission limit -13dBm****Note: The peak above the limit line is the carrier freq. at ch-661.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

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

Customer: SONY

Operating Mode: TX CH 600, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC 24 SPUR 1-3G, MARKER ON TX CH

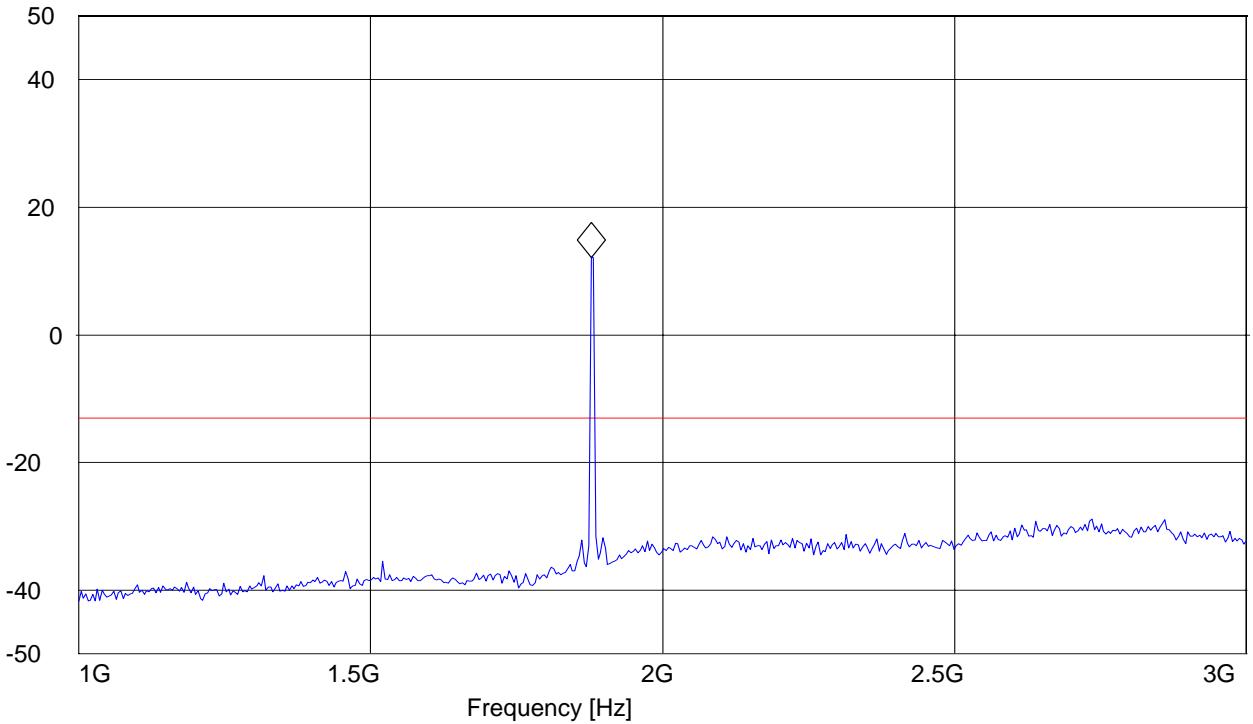
***SWEET TABLE: "FCC 24Spuri 1-3G"***

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.877755511 GHz 12.12 dBm

Level [dBm]

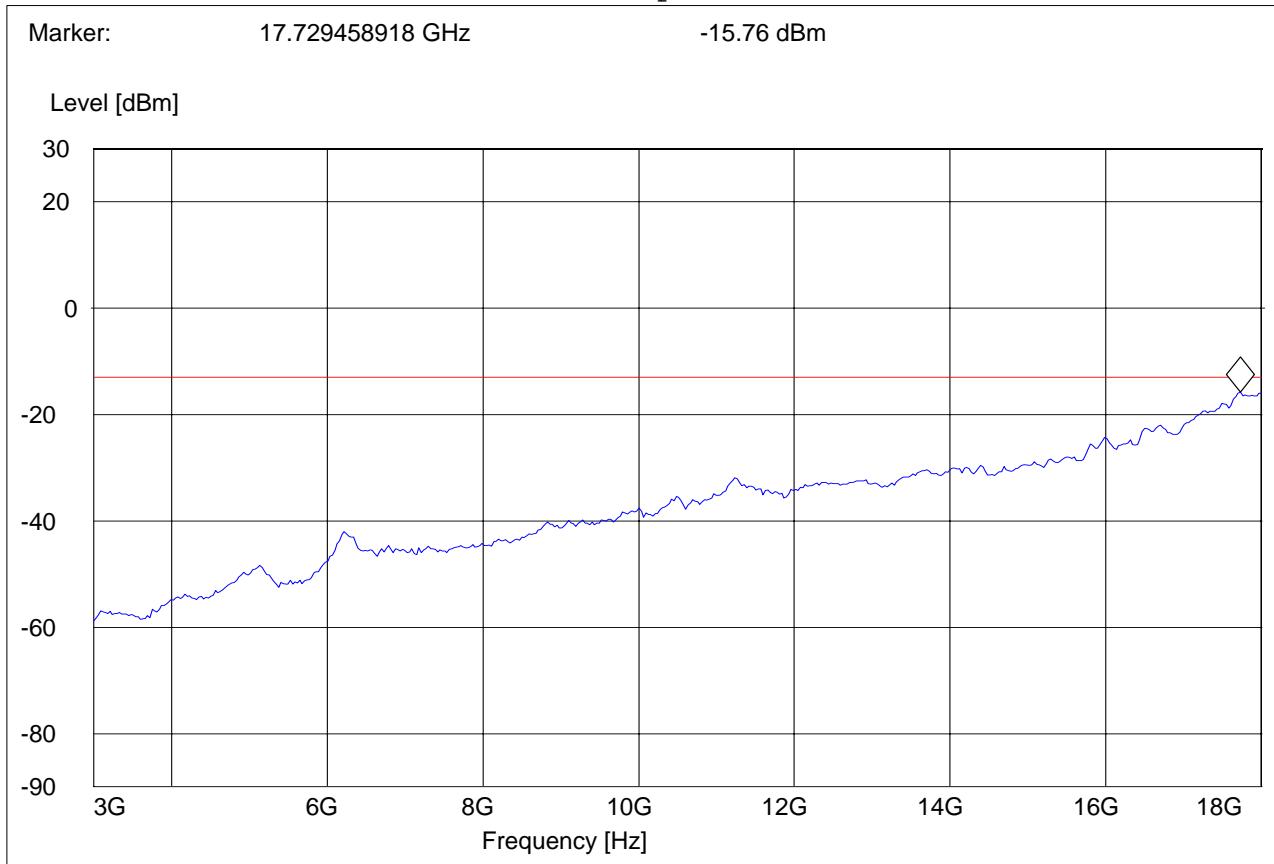


**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****Tx @ 1880.0MHz: 3GHz – 18GHz****Spurious emission limit -13dBm****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 600, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24 SPUR 3-18G

***SWEET TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****Tx @ 1908.75MHz: 1GHz – 3GHz****Spurious emission limit –13dBm****Note: The peak above the limit line is the carrier freq. at ch-810.****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

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

Customer: SONY

Operating Mode: TX CH 1175, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC 24 SPUR 1-3G, MARKER ON TX CH.

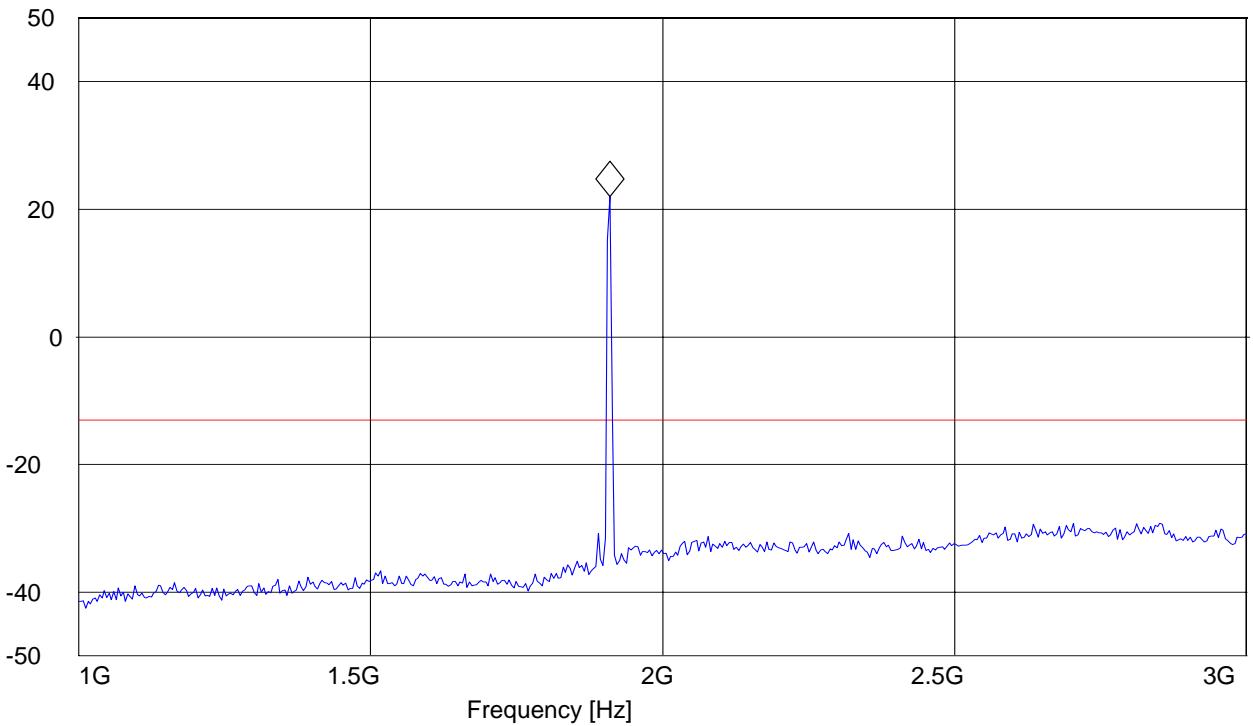
***SWEET TABLE: "FCC 24Spuri 1-3G"***

Short Description: FCC 24 1GHz-8GHz

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
1.0 GHz	3.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 1.909819639 GHz 22.03 dBm

Level [dBm]

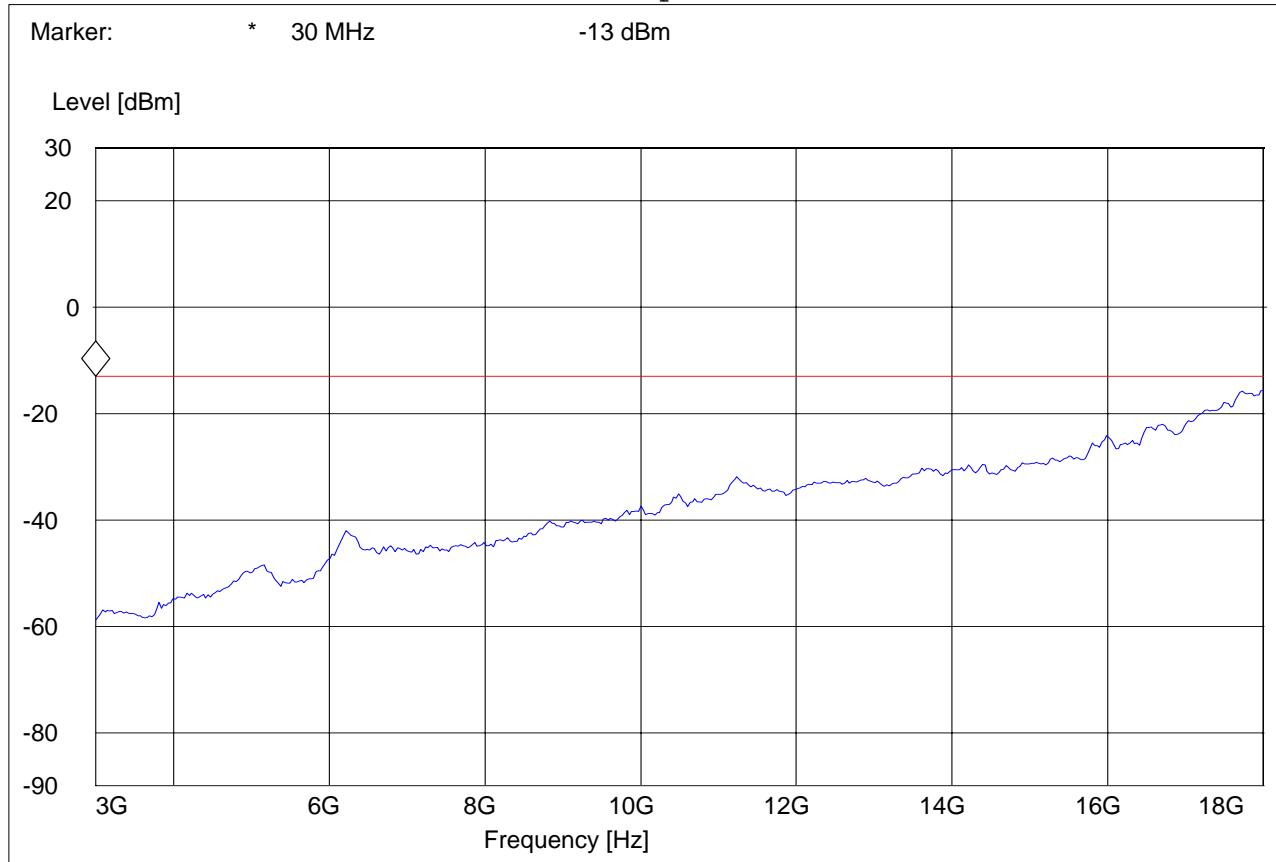


**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****Tx @ 1908.75MHz: 3GHz – 18GHz****Spurious emission limit -13dBm****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 1175, TABLE 45°, MAX TX LEVEL.  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: FCC 24 SPUR 3-18G

***SWEET TABLE: "FCC 24Spuri 3-18G"***

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
3.0 GHz	18.0 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM



**RADIATED SPURIOUS EMISSIONS(CDMA-1900)****18GHz – 19.1GHz****Spurious emission limit -13dBm****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

Operating Mode: TX CH 25, TABLE 45°, MAX TX LEVEL.

Antenna: V

EUT: V

Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: FCC 24SPURI 18-19.1G

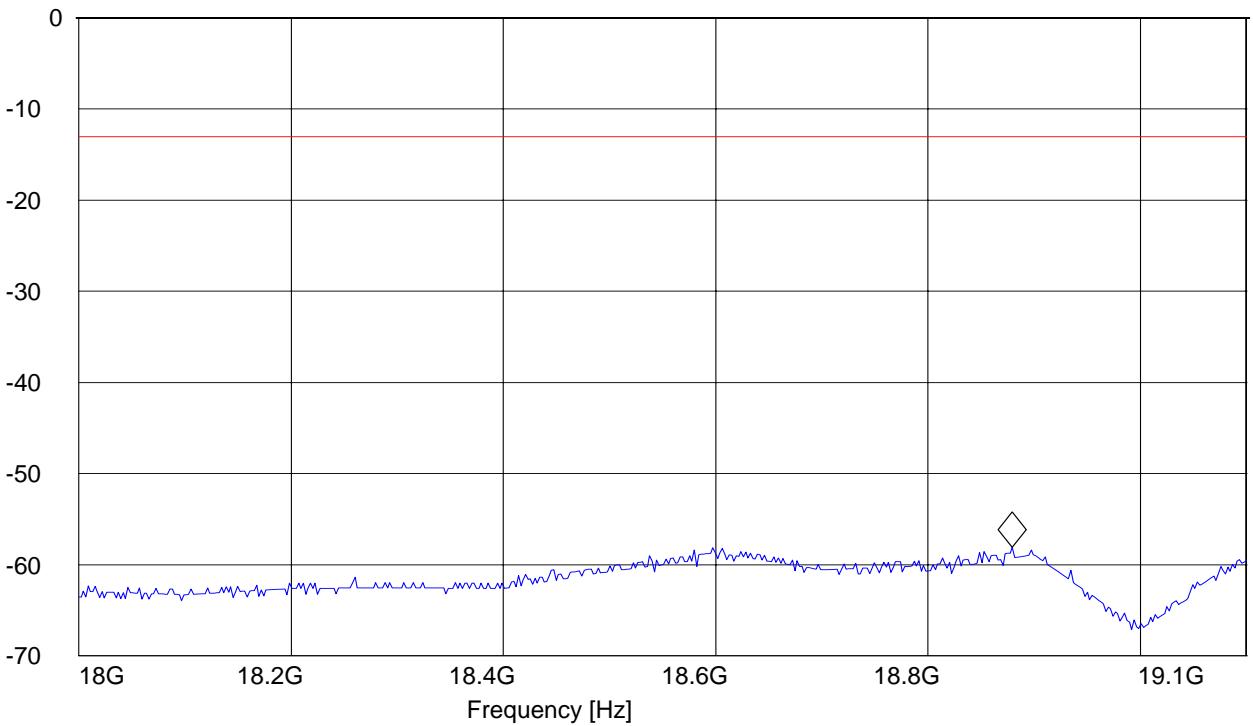
***SWEEP TABLE: "FCC 24spuri 18-19.1G"***

Short Description: FCC 24 18GHz-19.1GHz

Start Frequency	Stop Frequency	Detector	Meas.	IF	Transducer
18.0 GHz	19.1 GHz	MaxPeak	Coupled	1 MHz	DUMMY-DBM

Marker: 18.879559118 GHz -58.11 dBm

Level [dBm]



**5.3 RECEIVER RADIATED EMISSIONS****§ 2.1053 / RSS-133****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 3GHz and 26.5GHz very short cable connections to the antenna was used to minimize the noise level.
2. Receiver radiated emissions were done on both 850/1900 bands, but only worst-case plots are submitted in the test reports.

**Limits****SUBCLAUSE § RSS-133**

Frequency (MHz)	Field strength ( $\mu$ 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

**5.3.1 Receiver Spurious on EUT****RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 30MHz – 1GHz****Antenna: vertical****Note: This plot is valid for horizontal and vertical polarization (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

Operating Mode: TX CH 600, TABLE 45°, IDLE MODE

Antenna: V

EUT: V

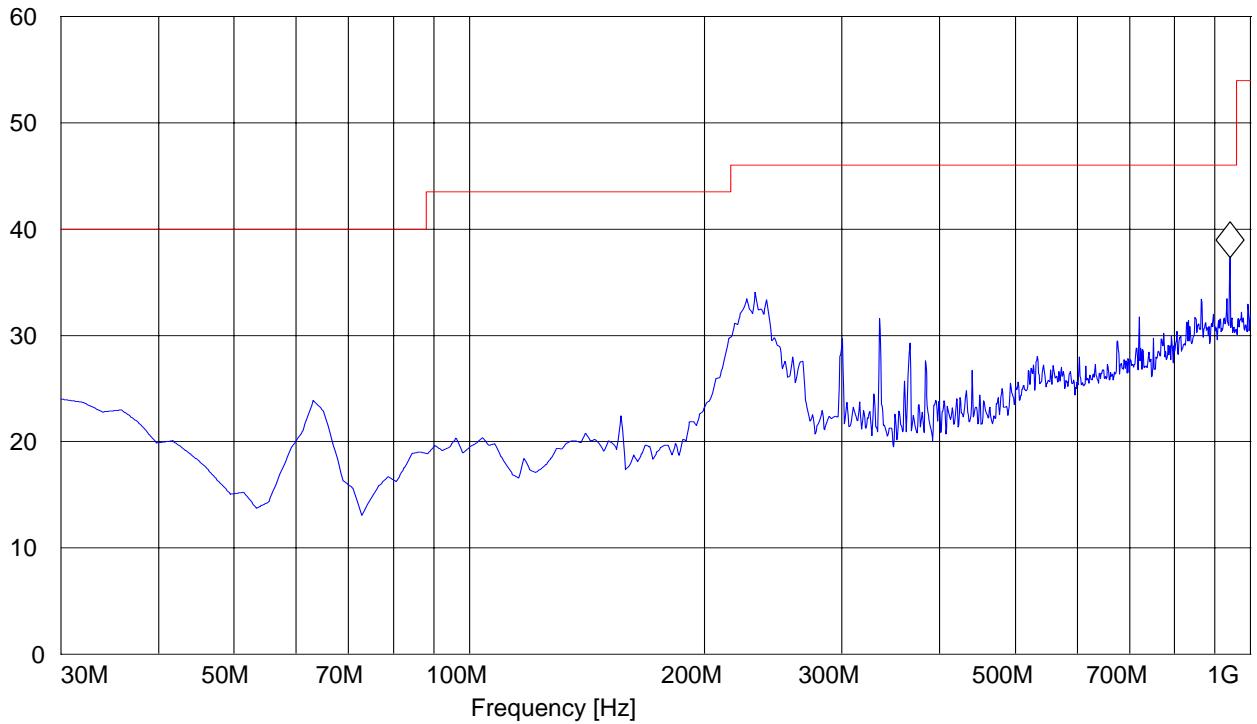
Test Engineer: ED

Voltage: AC ADAPTOR

Sweep: CANADA RE\_30M-1G\_V

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

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

Marker: 941.683367 MHz 37.3 dB $\mu$ V/mLevel [dB $\mu$ V/m]

**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 1GHz – 3GHz****Note: marked peak is downlink from the base station****CETECOM Inc., 411 Dixon Landing Road, Milpitas CA 95035, USA**

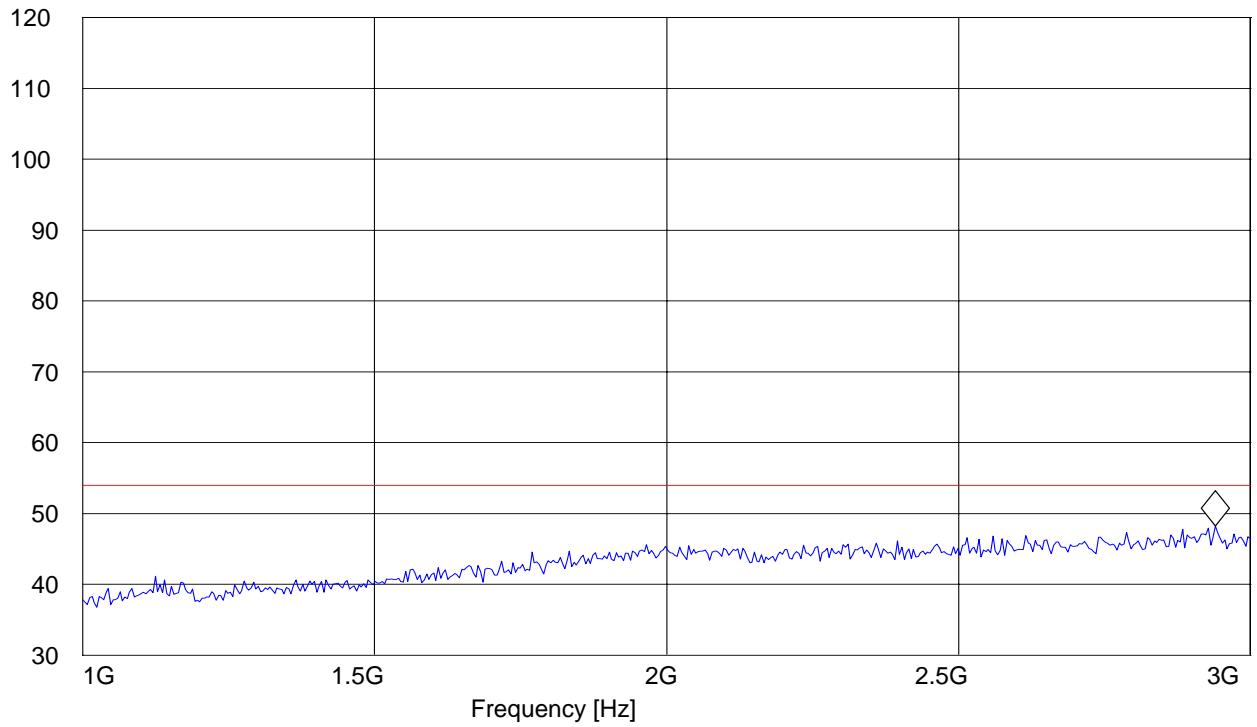
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 600, TABLE 45°, IDLE MODE  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_1-3G

***SWEET TABLE: "CANADA RE\_1-3G"***

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

Marker: 2.93987976 GHz 48.22 dB $\mu$ V/m

Level [dB $\mu$ V/m]



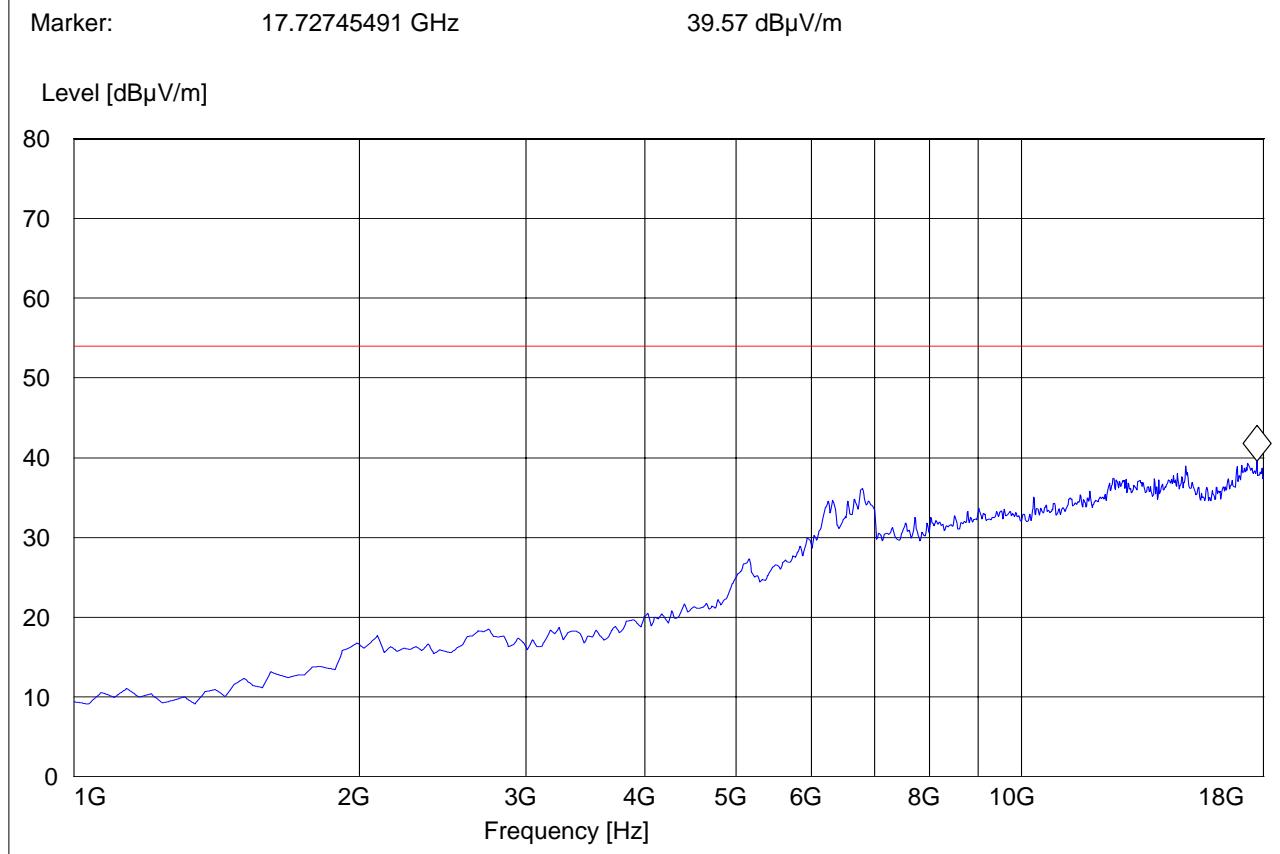
**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 3GHz – 18GHz**

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

EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 600, TABLE 45°, IDLE MODE  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_3-18G

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

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



**RECEIVER RADIATED EMISSIONS**  
**EUT in Idle Mode: 18GHz – 19.1GHz**

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

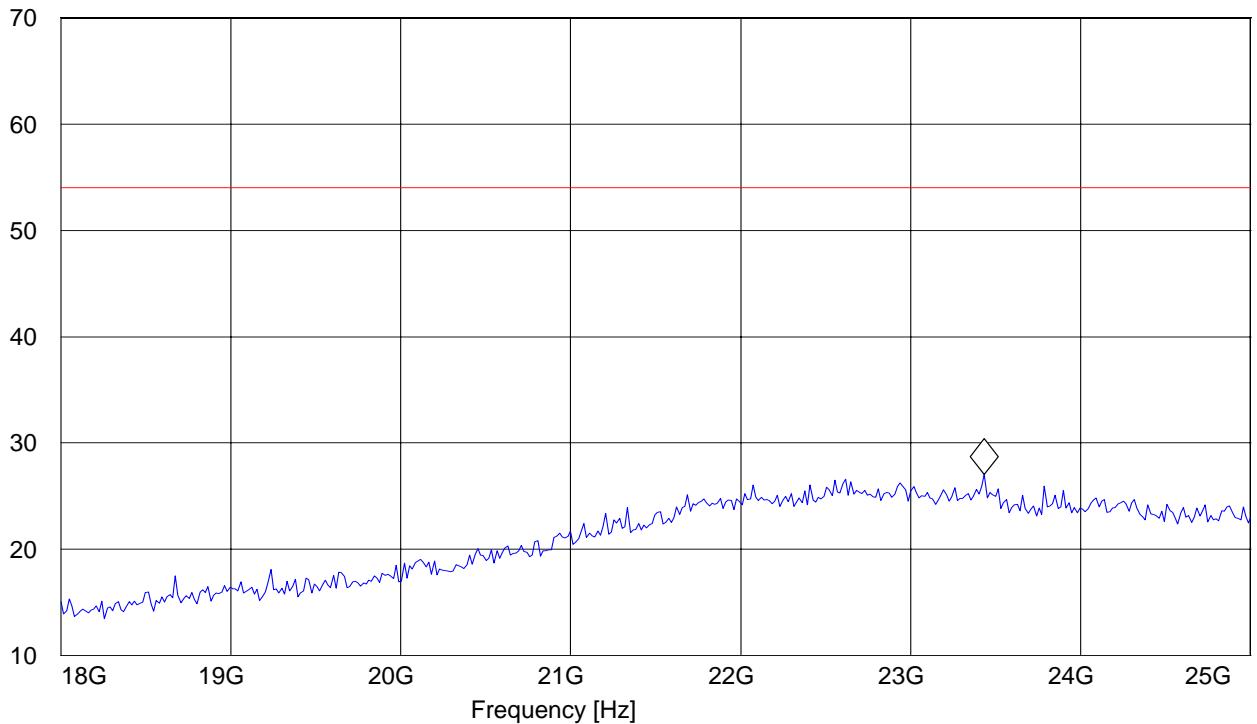
EUT / Description: Vaio laptop "F" series unit #1 ESN: 5B101BA6  
 Customer: SONY  
 Operating Mode: TX CH 600, TABLE 45°, IDLE MODE  
 Antenna: V  
 EUT: V  
 Test Engineer: ED  
 Voltage: AC ADAPTOR  
 Sweep: CANADA RE\_19-26.5G

***SWEET TABLE: "CANADA RE\_3-18G"***

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

Marker: 23.434869739 GHz 27.04 dB $\mu$ V/m

Level [dB $\mu$ V/m]



**5.4 AC POWERLINE CONDUCTED EMISSIONS****§ 15.107/207****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

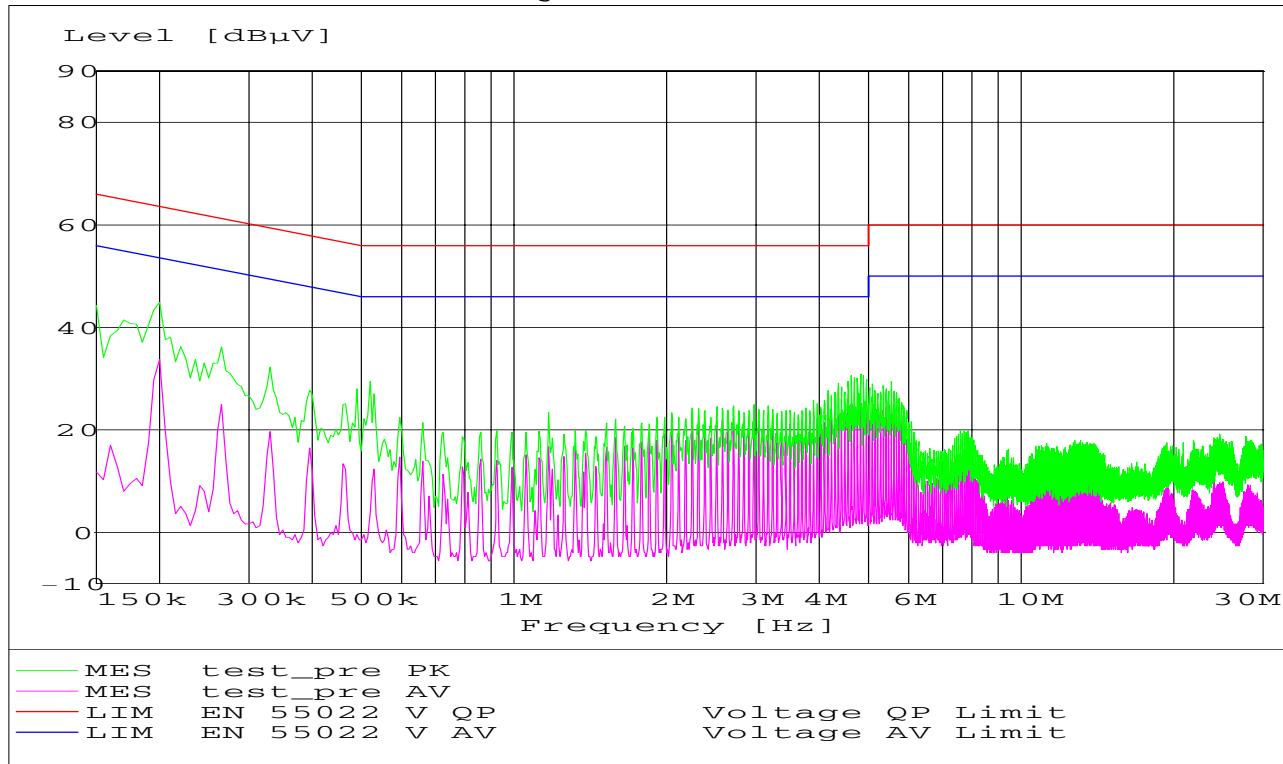
**ANALYZER SETTINGS: RBW = 10KHz      VBW = 10KHz****Prescans were performed on both 850/1900 bands, full testing on the worst-case band is submitted in the test report.**

**5.4.1 Results EUT****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

***SWEET TABLE: "EN 55022 Voltage"***

Short Description:		EN 55022 Voltage			
Start Frequency	Stop Frequency	Detector	Meas.	IF Time	Transducer
150.0 kHz	30.0 MHz	MaxPeak	Coupled	9 kHz	None
Average					



**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

## **7 References**

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,  
PART 2--FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS October 1, 2001.

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,  
PART 22 PUBLIC MOBILE SERVICES October 1, 1998.

FCC Report and order 02-229 September 24, 2002.

Title 47—Telecommunication, CHAPTER I--FEDERAL COMMUNICATIONS COMMISSION,  
PART 24 PERSONAL COMMUNICATIONS SERVICES October 1, 1998.

ANSI / TIA-603-C-2004 Land Mobile FM or PM Communications Equipment Measurement and Performance Standard November 7, 2002.

## 8 BLOCK DIAGRAMS

### Radiated Testing

#### ANECHOIC CHAMBER

