



# FCC Test Report

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

FOR:

PERSONAL COMPUTER

MODEL #: PCG-4F1L

SONY CORPORATION  
6-7-35, KITASHINAGAWA, SHINAGAWA-KU  
TOKYO 141-001

FCC ID: AK8PCG4F1L  
IC ID: 409B-PCG4F1L

TEST REPORT #: EMC\_1008\_2005\_FCC22/24  
DATE: AUGUST 17, 2005



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

© Copyright by CETECOM

## **Table of Contents**

<b>1</b>	<b>ASSESSMENT .....</b>	<b>3</b>
<b>2</b>	<b>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</b>	<b>EQUIPMENT UNDER TEST (EUT).....</b>	<b>5</b>
3.1	IDENTIFICATION OF THE EQUIPMENT UNDER TEST .....	5
<b>4</b>	<b>SUBJECT OF INVESTIGATION.....</b>	<b>6</b>
<b>5</b>	<b>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 .....	16
5.2.1	<i>FCC 2.1053 Measurements required: Field strength of spurious radiation.</i> .....	16
5.2.2	<i>Limits:</i> .....	16
5.2.2.1	FCC 22.917 Emission limitations for cellular equipment. ....	16
5.2.2.2	FCC 24.238 Emission limitations for Broadband PCS equipment. ....	16
5.2.3	<i>Radiated out of band measurement procedure:</i> .....	17
5.2.4	<i>Radiated out of band emissions results on EUT:</i> .....	19
5.3	RECEIVER RADIATED EMISSIONS § 2.1053 / RSS-133 .....	50
5.3.1	<i>Receiver Spurious on EUT</i> .....	51
5.4	CO-LOCATION.....	56
5.4.1	<i>Results</i> .....	57
5.5	AC POWERLINE CONDUCTED EMISSIONS § 15.107/207 .....	62
5.5.1	<i>Results EUT</i> .....	63
<b>6</b>	<b>TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS .....</b>	<b>64</b>
<b>7</b>	<b>REFERENCES .....</b>	<b>65</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.

Company	Description	Model #
SONY CORPORATION	PERSONAL COMPUTER	PCG-4F1L



---

2005-08-17  
Neelesh Raj  
Project Leader



---

2005-08-17  
Lothar Schmidt  
Test Lab Manager

## **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:	2005-08-05 to 2005-08-11

### **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, 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>VGC-TX</b>
Description:	<b>Personal Computer</b>
Model No:	<b>PCG-4F1L</b>
FCC ID:	<b>AK8PCG4F1L</b>
IC ID:	<b>409B-PCG4F1L</b>
Frequency Range:	<b>824.2MHz – 848.8MHz for GSM 850, 1850.2MHz – 1909.8MHz for PCS 1900</b>
Type(s) of Modulation:	<b>GMSK</b>
Number of Channels:	<b>124 for GSM-850, 299 for PCS-1900</b>
Antenna Type:	<b>GSM: λ/monopole (Film Antenna)</b>
Output Power:	<b>FCC 22: 139mW ERP @ 836.6MHz FCC 24: 426mW EIRP @ 1850.2MHz</b>

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

All testing was performed on the PCG-4F1L referred to as EUT. During the testing process the GSM 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 GSM module with FCC ID# PY7FF031021. 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# 2-3875-01-01/05*.

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.

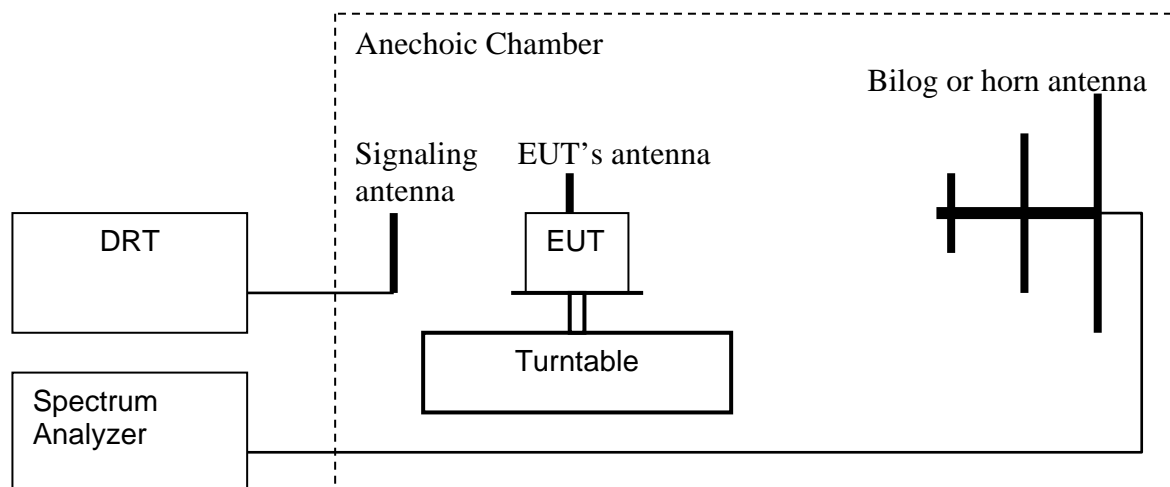
(b) Mobile/portable stations are limited to 2 Watts effective isotropic radiated power (EIRP).

(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-603B November 2002

##### 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:**

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

Frequency (MHz)	Effective Radiated Power (dBm)
824.2	20.91
836.6	21.43
848.8	20.70

**5.1.5 EIRP Results 1900 MHz band:**

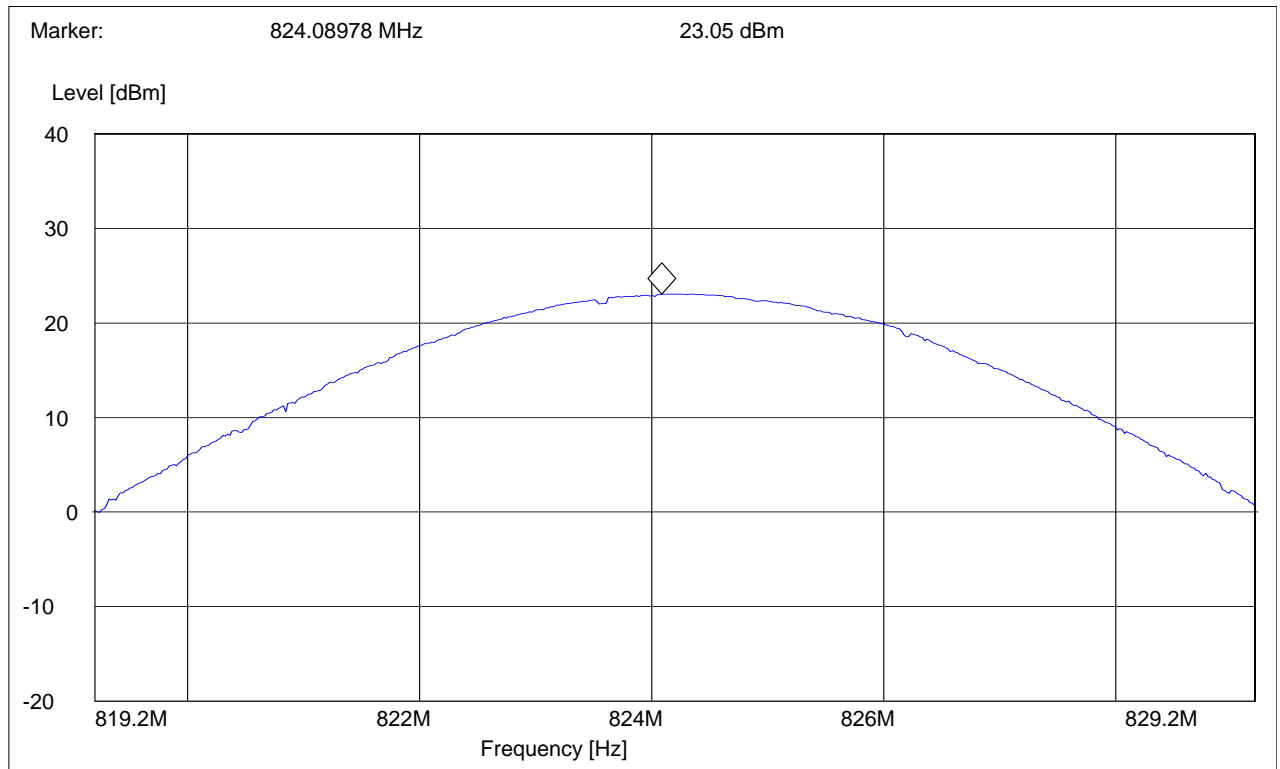
Power Control Level	Burst Peak EIRP
0	≤33dBm (1W)

Frequency (MHz)	Effective Isotropic Radiated Power (dBm)
1850.2	26.29
1880.0	25.82
1909.8	25.96

**EIRP (GSM-850)**  
**CHANNEL 128**

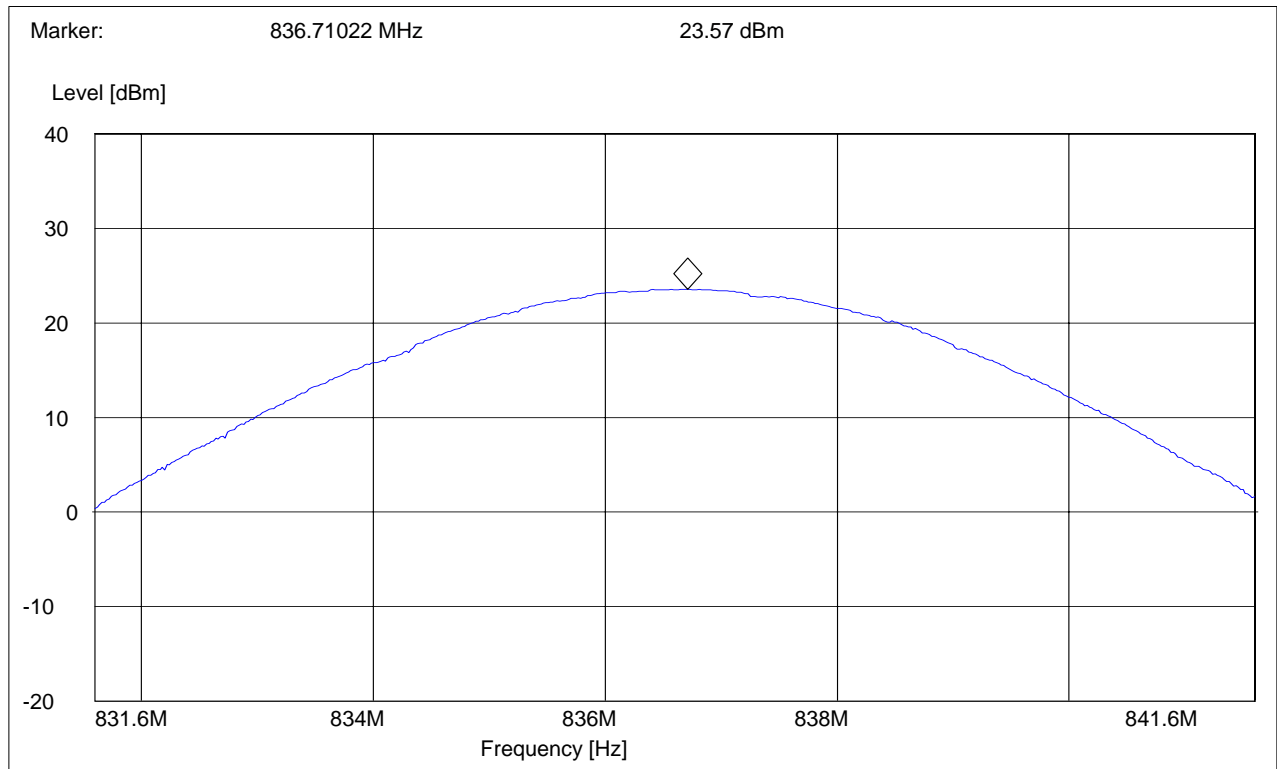
§22.913(a)

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
819.2 MHz	829.2 MHz	Max Peak	Coupled	3 MHz



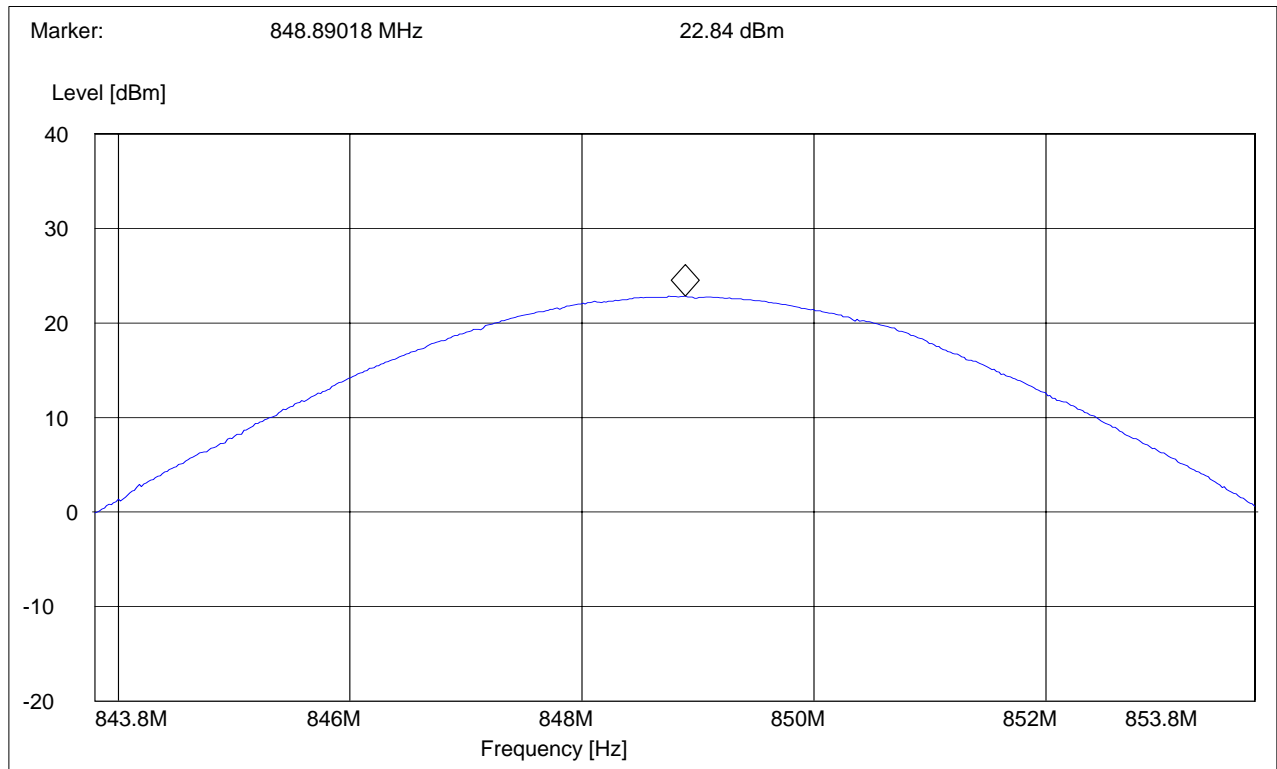
**EIRP (GSM-850)**  
**CHANNEL 190****§22.913(a)**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
831.6 MHz	841.6 MHz	Max Peak	Coupled	3 MHz



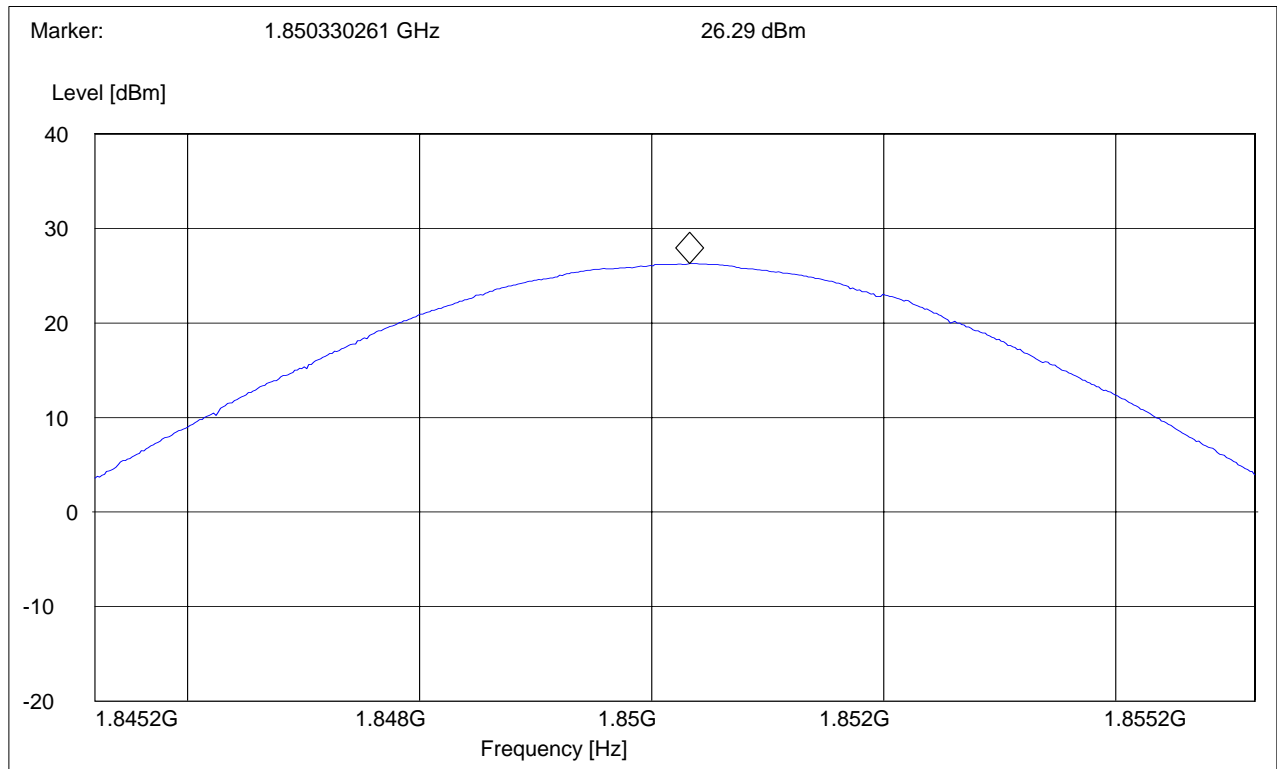
**EIRP (GSM-850)**  
**CHANNEL 251****§22.913(a)**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
843.8 MHz	853.8 MHz	Max Peak	Coupled	3 MHz



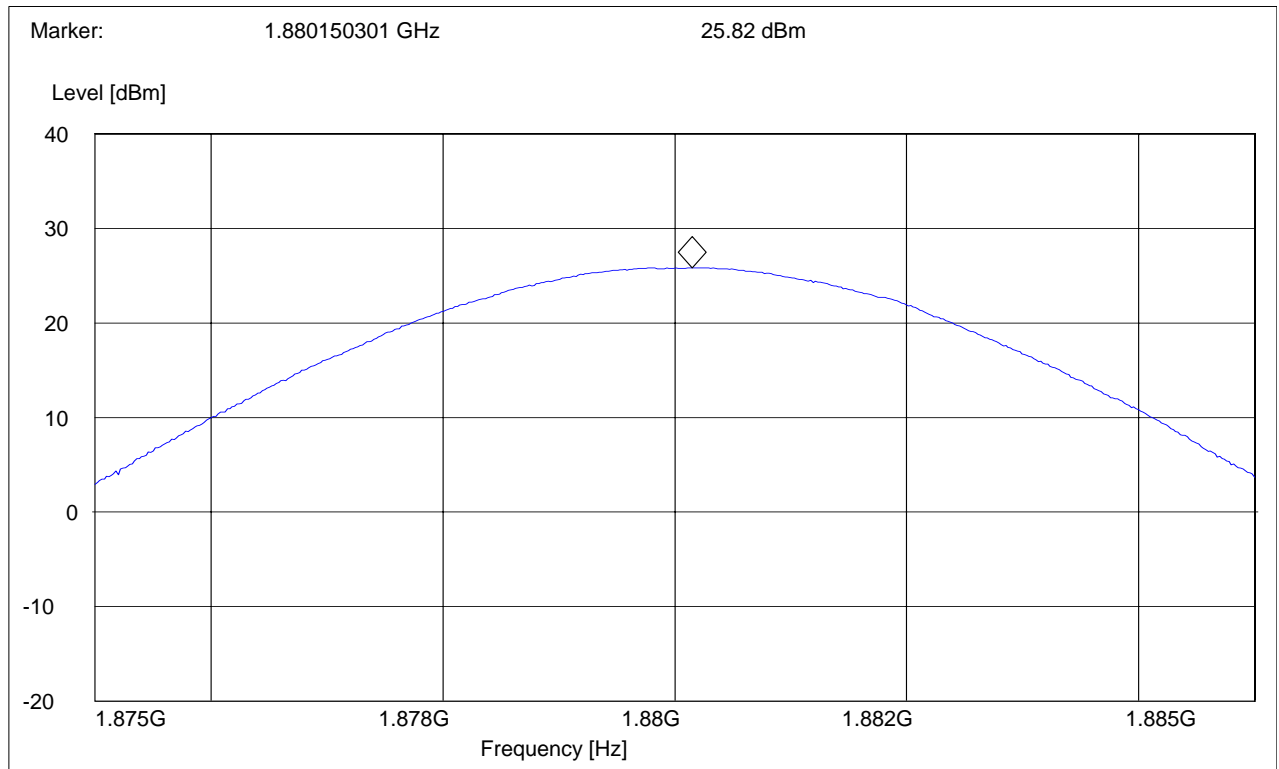
**EIRP (PCS-1900)  
CHANNEL 512****§24.232(b)**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
1.8452 GHz	1.8552 MHz	Max Peak	Coupled	3 MHz



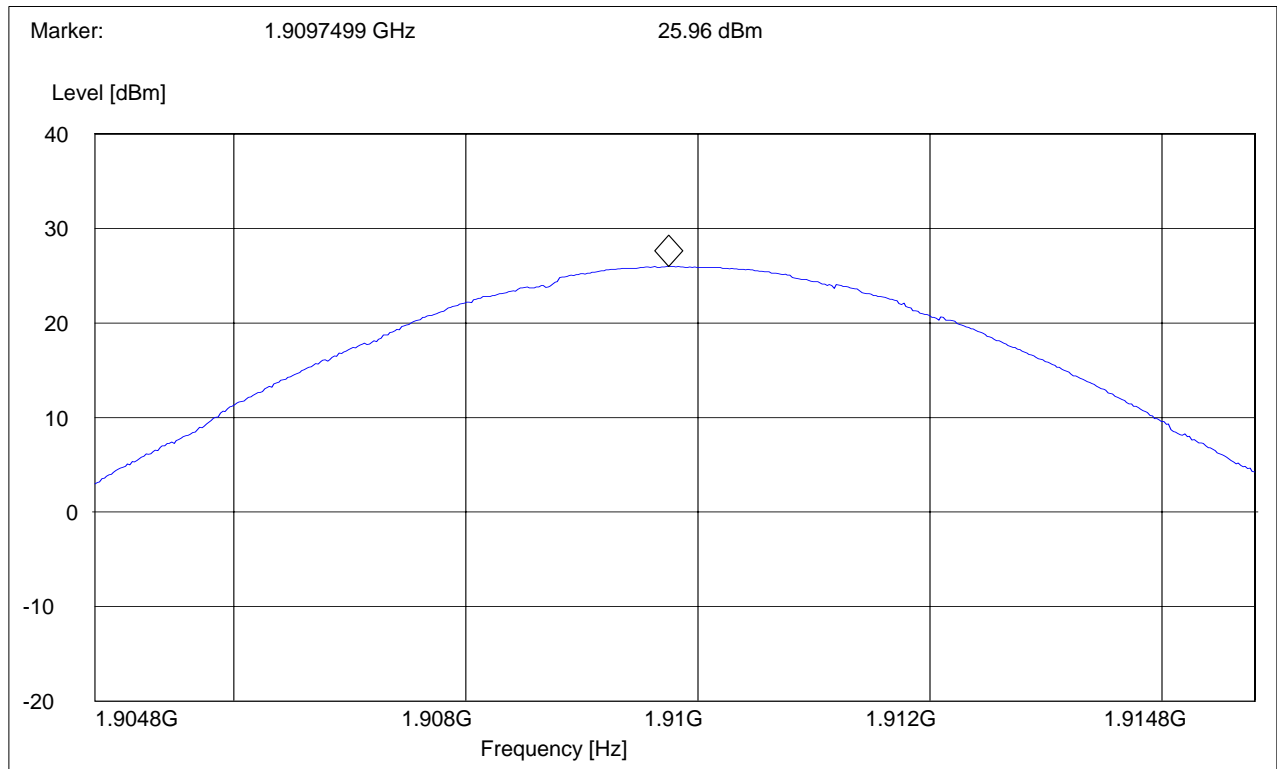
**EIRP (PCS-1900)**  
**CHANNEL 661****§24.232(b)**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
1.875 GHz	1.885 MHz	Max Peak	Coupled	3 MHz



**EIRP (PCS-1900)  
CHANNEL 810****§24.232(b)**

Start Frequency	Stop Frequency	Detector	Meas. Time	IF BW
1.9048 GHz	1.9148 MHz	Max Peak	Coupled	3 MHz



## 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

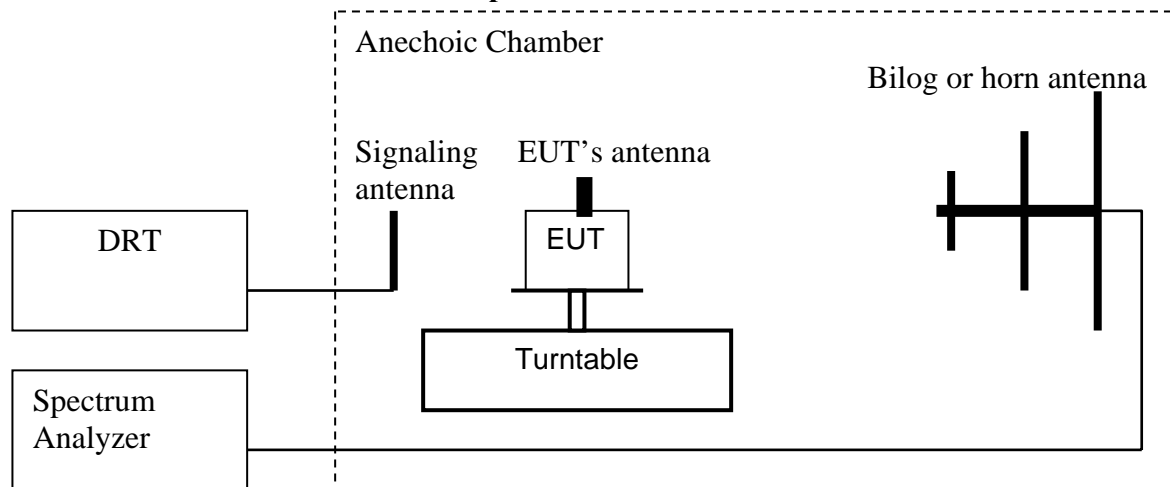


emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

### 5.2.3 Radiated out of band measurement procedure:

Based on TIA-603B November 2002

#### 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).  $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$ .
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 GSM-850 & PCS-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 GSM-850 & PCS-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 GSM-850:

Harmonics	Tx ch-128 Freq. (MHz)	Level (dBm)	Tx ch-190 Freq. (MHz)	Level (dBm)	Tx ch-251 Freq. (MHz)	Level (dBm)
2	1648.4	-45.06	1673.2	-43.79	1697.6	-42.95
3	2472.6	-37.71	2509.8	-39.81	2546.4	-41.17
4	3296.8	-52.67	3346.4	-45.86	3395.2	-42.62
5	4121	-53.67	4183	-50.96	4244	-54.30
6	4945.2	-50.14	5019.6	-49.29	5092.8	NF
7	5769.4	NF	5856.2	NF	5941.6	NF
8	6593.6	-43.98	6692.8	-43.40	6790.4	NF
9	7417.8	NF	7529.4	NF	7639.2	NF
10	8242	NF	8366	NF	8488	NF
NF = NOISE FLOOR						

**RADIATED SPURIOUS EMISSIONS (GSM-850)****TX: 30MHz - 1GHz**

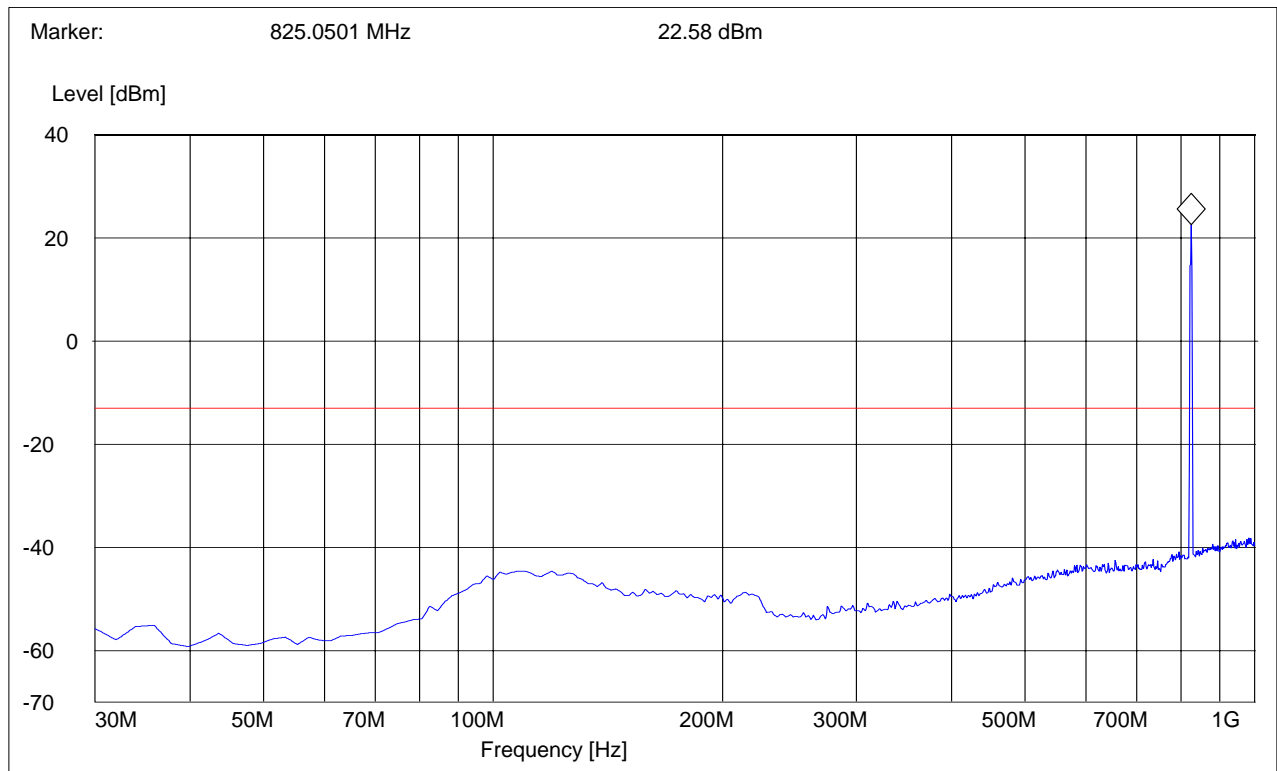
Spurious emission limit -13dBm

**Antenna: vertical*****SWEEP TABLE: "FCC 22 Spur 30M-1G"***

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

**Note:**

- 1.The peak above the limit line is the carrier freq.
- 2.This plot is valid for low, mid & high channels (worst-case plot)



**RADIATED SPURIOUS EMISSIONS (GSM-850)****TX: 30MHz - 1GHz**

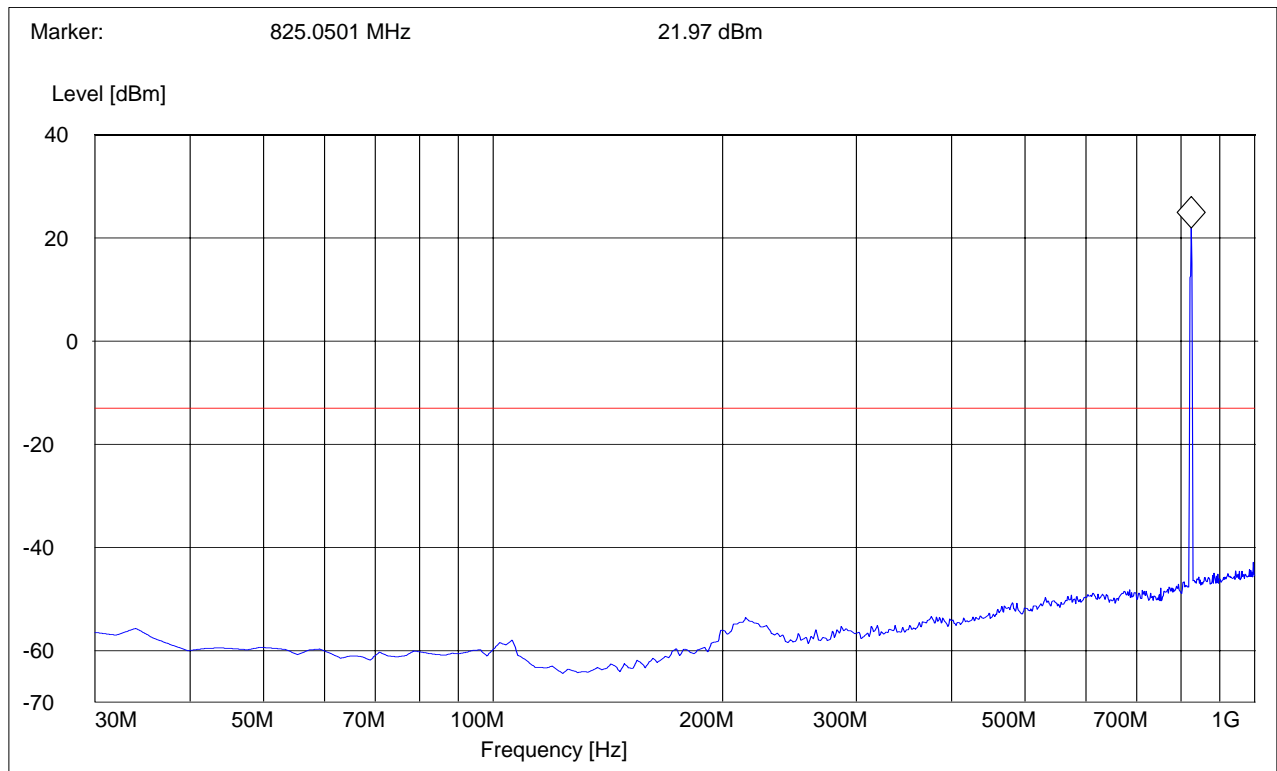
Spurious emission limit -13dBm

**Antenna: horizontal*****SWEEP TABLE: "FCC 22 Spur 30M-1G"***

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

**Note:**

- 1.The peak above the limit line is the carrier freq.**
- 2.This plot is valid for low, mid & high channels (worst-case plot)**

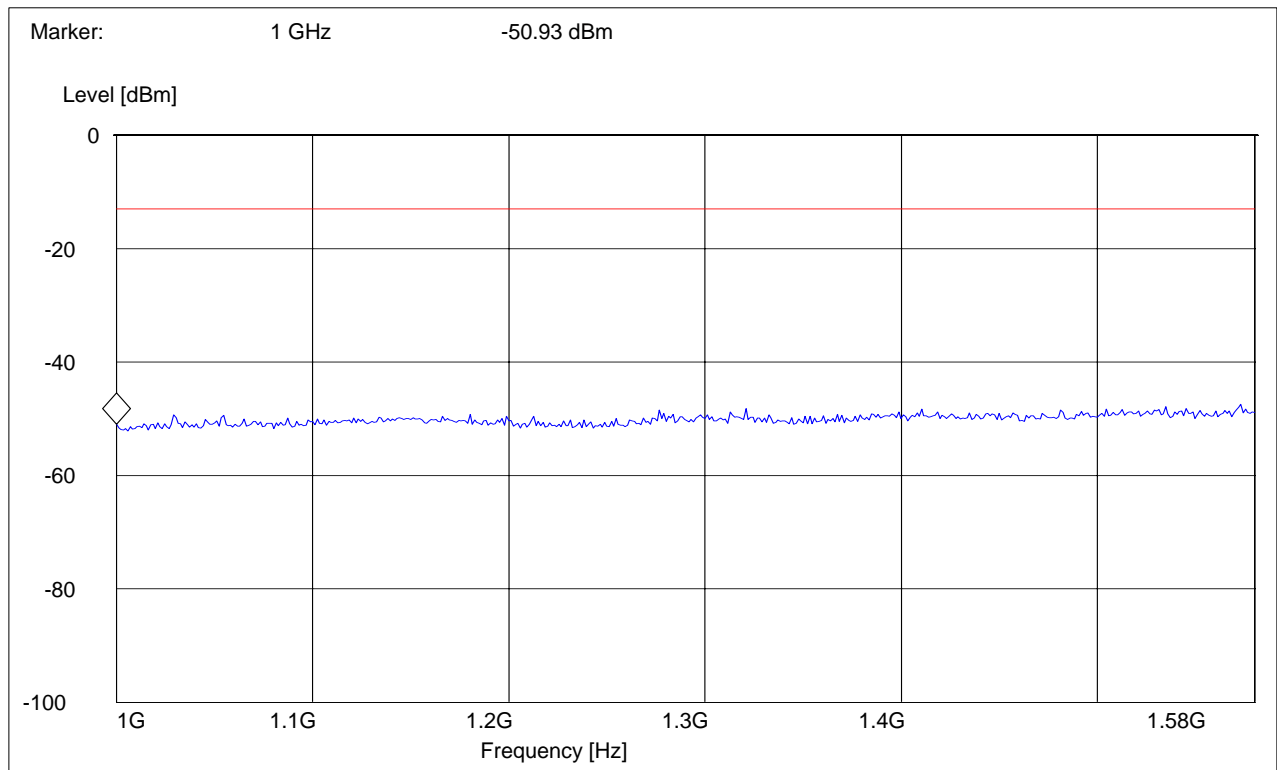


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz

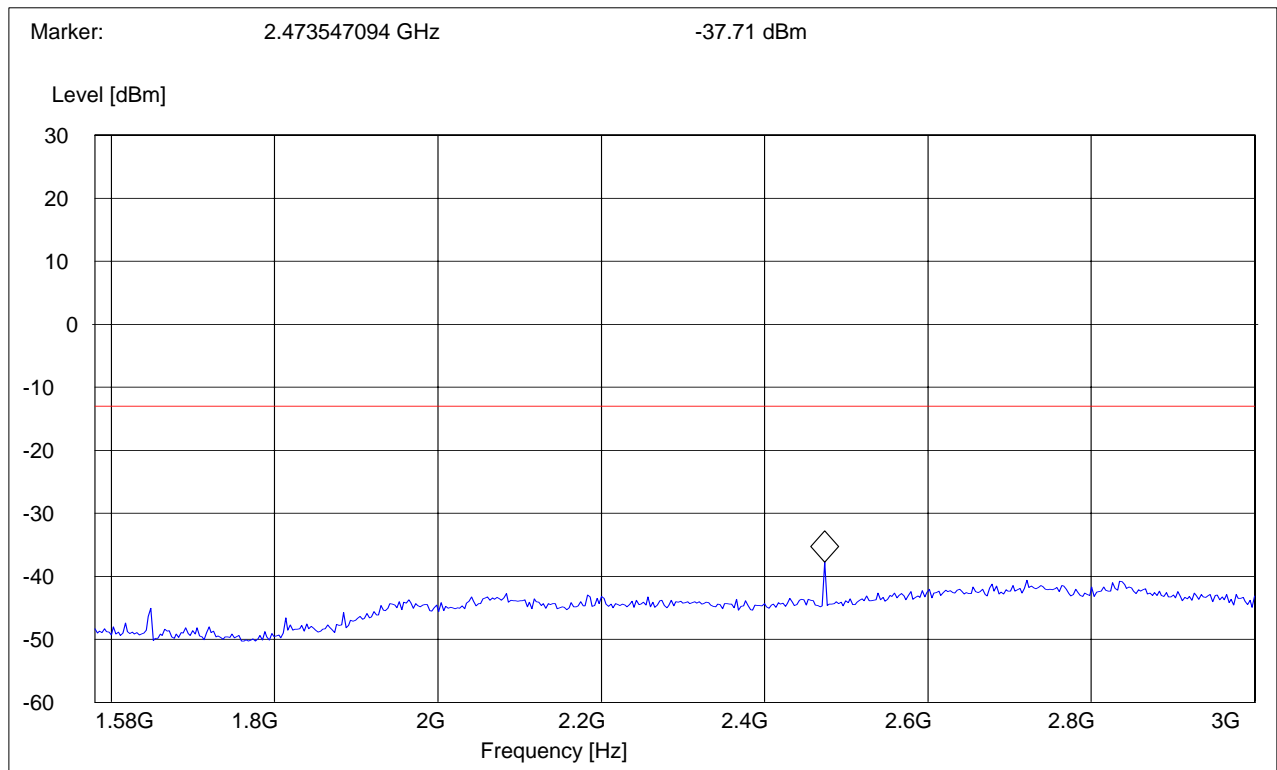


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 22 Spur 1.58-3G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

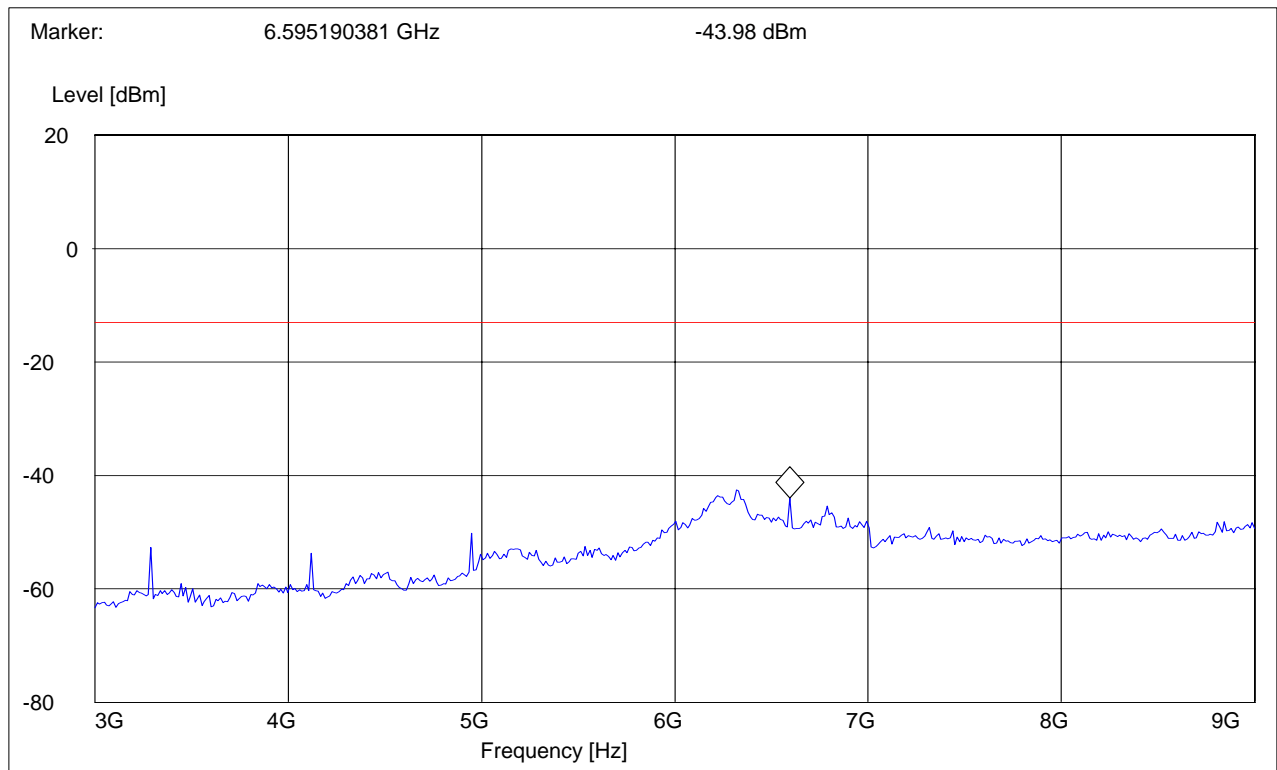


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 824.2MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 22 Spur 3-9G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz



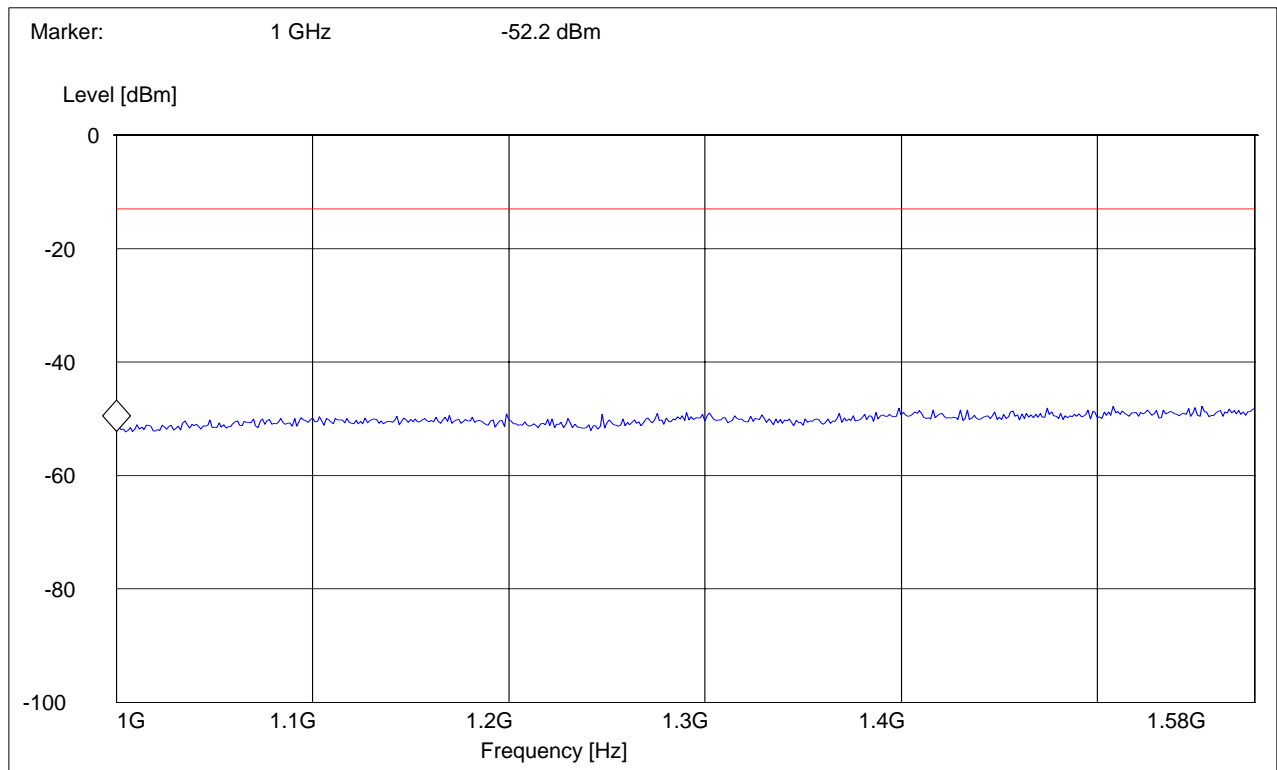


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz

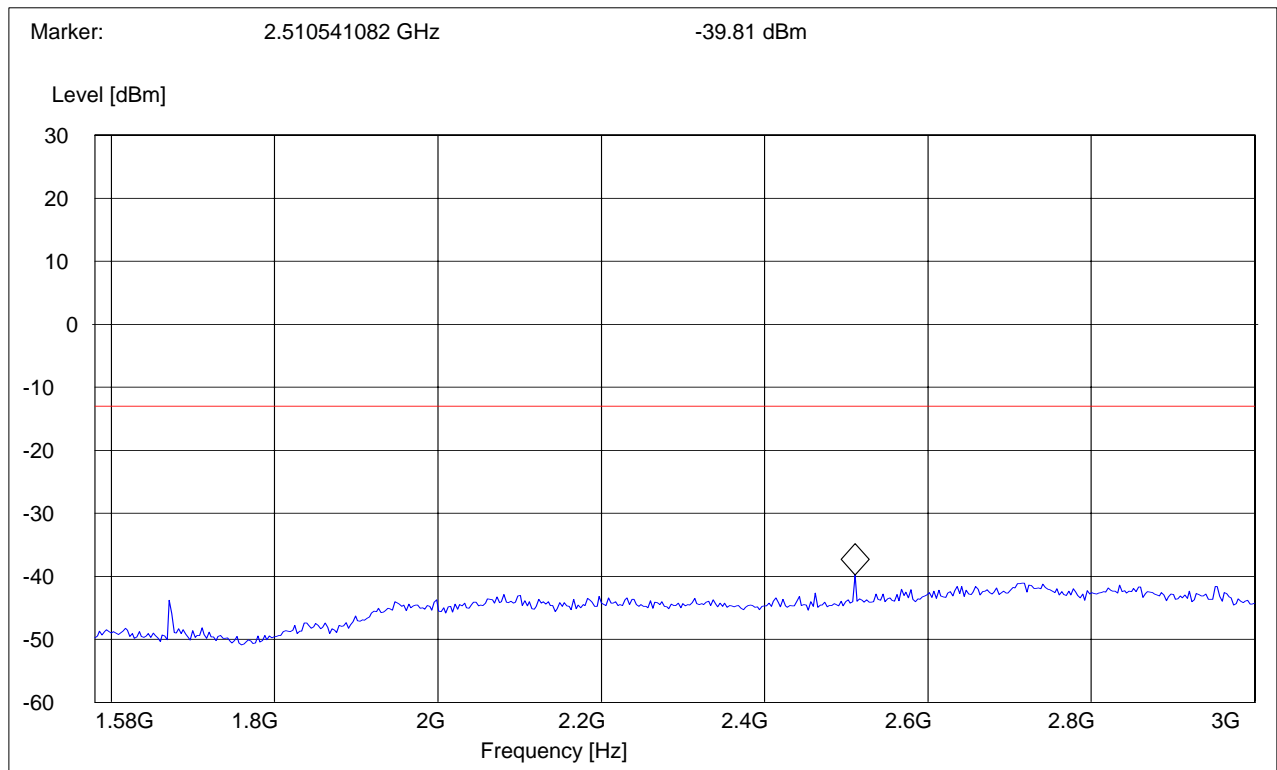


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 22 Spur 1.58-3G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

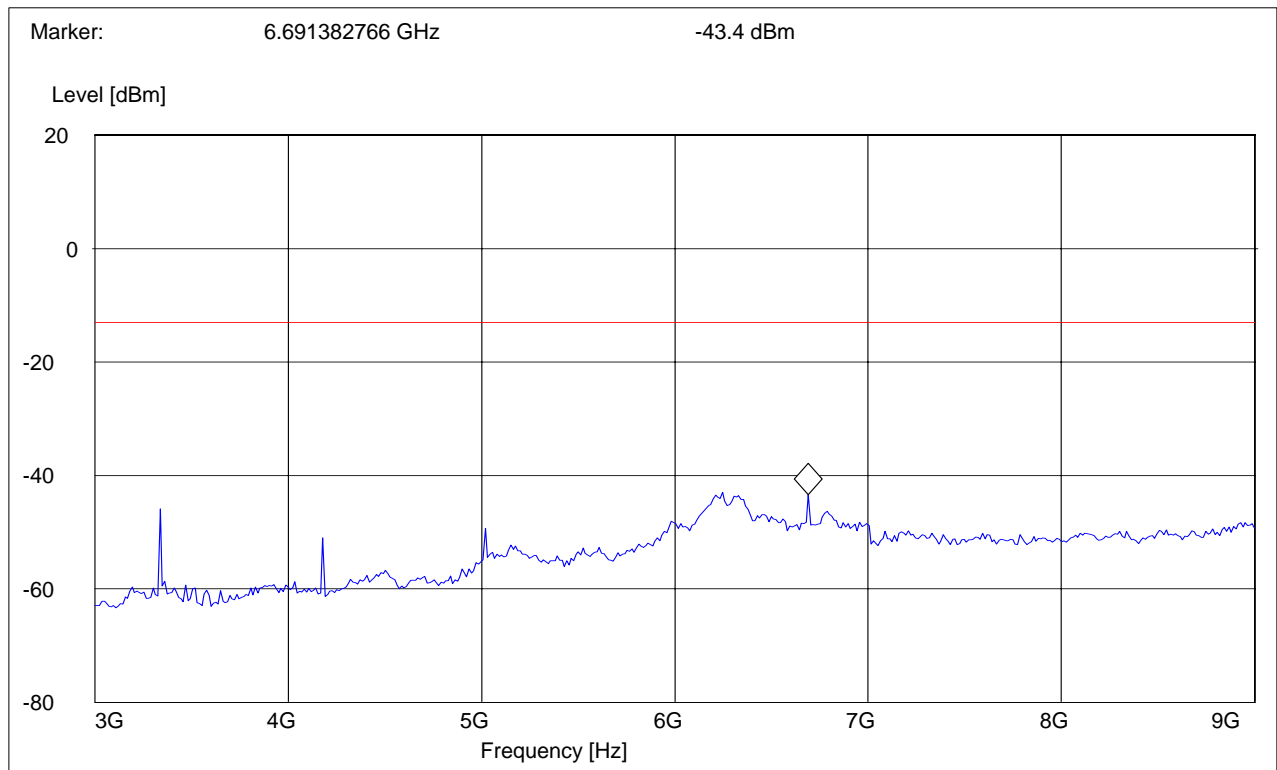


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 836.6MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 22 Spur 3-9G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz

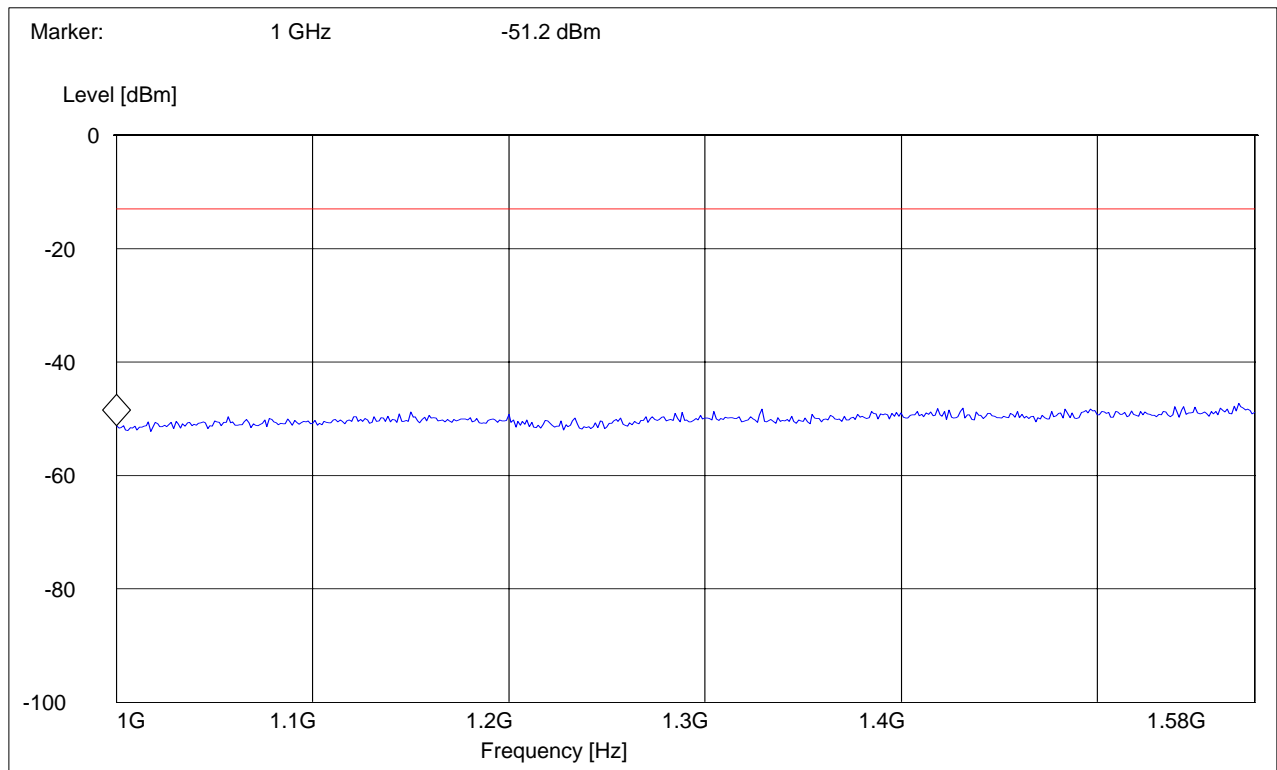


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 1GHz – 1.58GHz**

Spurious emission limit –13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1GHz	1.58GHz	Max Peak	Coupled	1 MHz	1 MHz

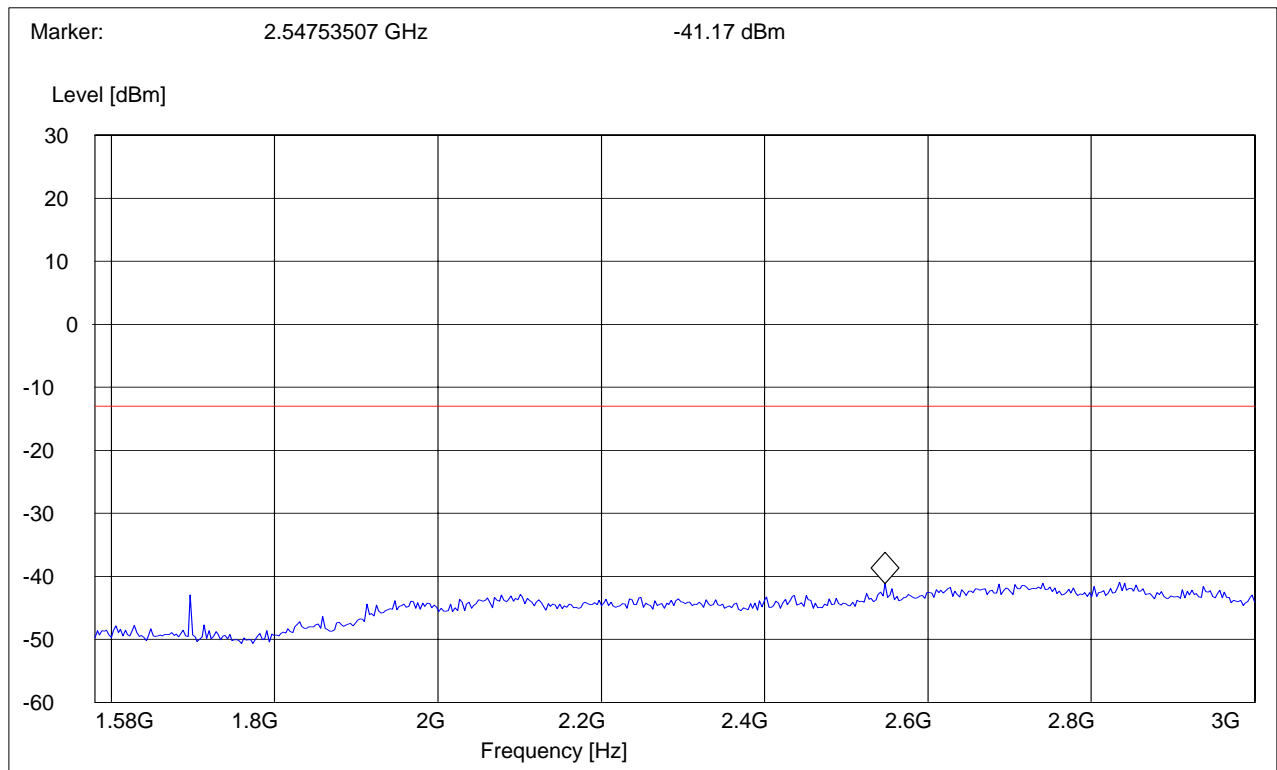


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 1.58GHz – 3GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 22 Spur 1.58-3G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
1.58GHz	3GHz	Max Peak	Coupled	1 MHz	1 MHz

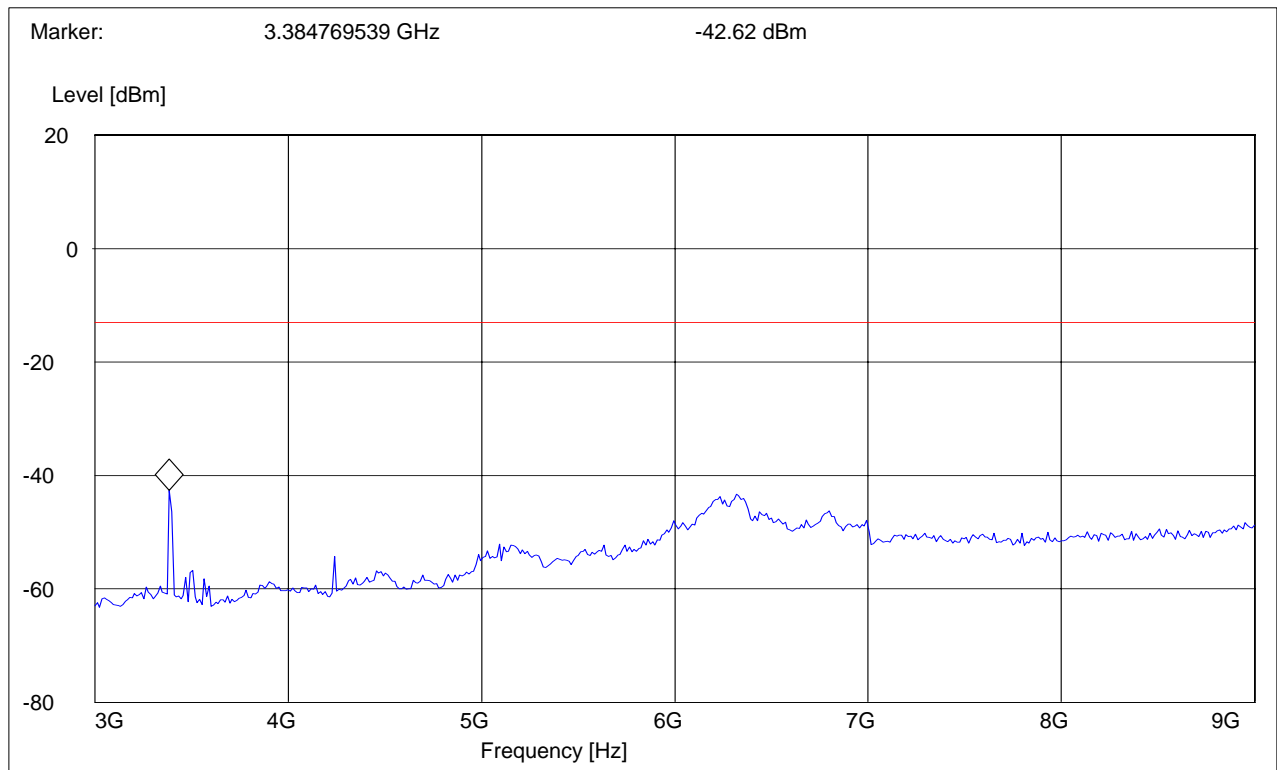


**RADIATED SPURIOUS EMISSIONS (GSM-850)****Tx @ 848.8MHz: 3GHz – 9GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 22 Spur 3-9G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz

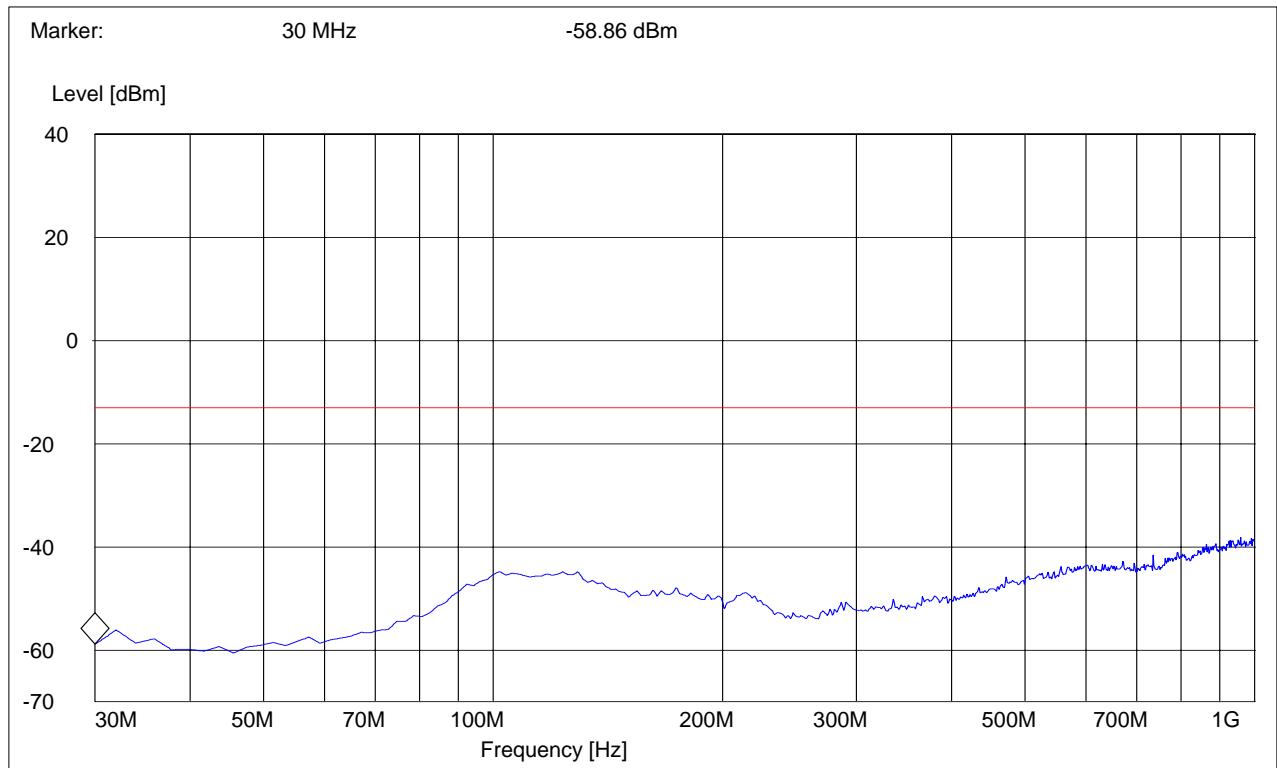


**RADIATED SPURIOUS EMISSIONS (GSM-850)****IDLE: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical*****SWEEP TABLE: "FCC 22 Spur 30M-1G"***

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

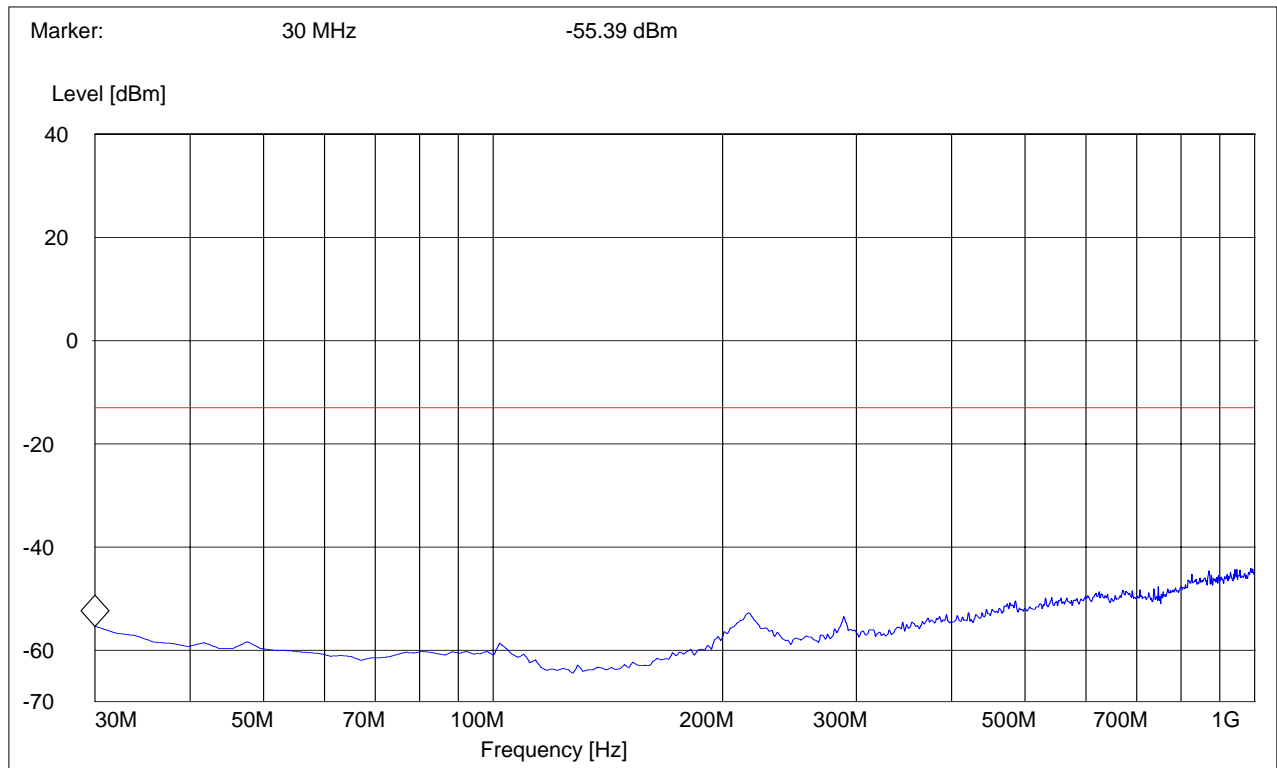


**RADIATED SPURIOUS EMISSIONS (GSM-850)****IDLE: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: horizontal*****SWEEP TABLE: "FCC 22 Spur 30M-1G"***

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



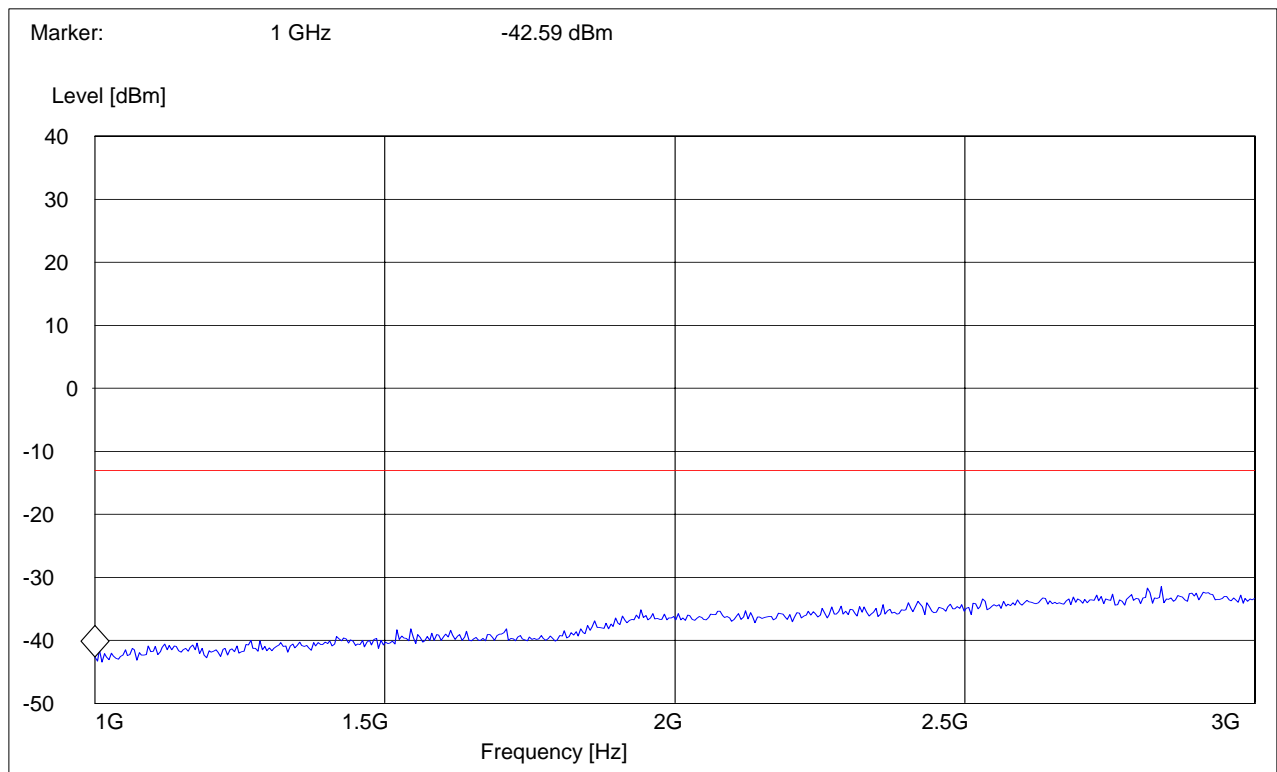


**RADIATED SPURIOUS EMISSIONS (GSM-850)****IDLE: 1GHz – 3GHz**

Spurious emission limit –13dBm

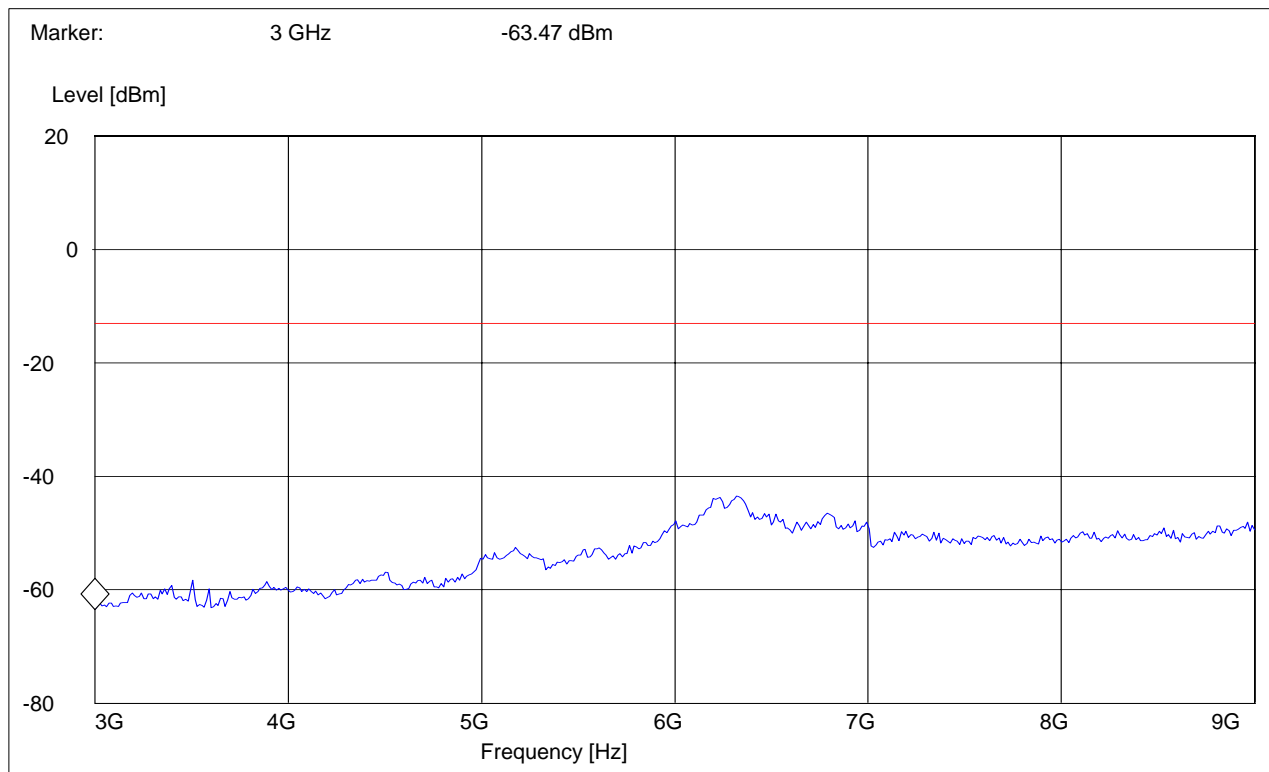
***SWEEP TABLE: "FCC 22 Spur 1-3G"***

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



**RADIATED SPURIOUS EMISSIONS (GSM-850)****IDLE: 3GHz – 9GHz*****SWEEP TABLE: "FCC 22 Spur 3-9G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
3GHz	9GHz	Max Peak	Coupled	1 MHz	1 MHz



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

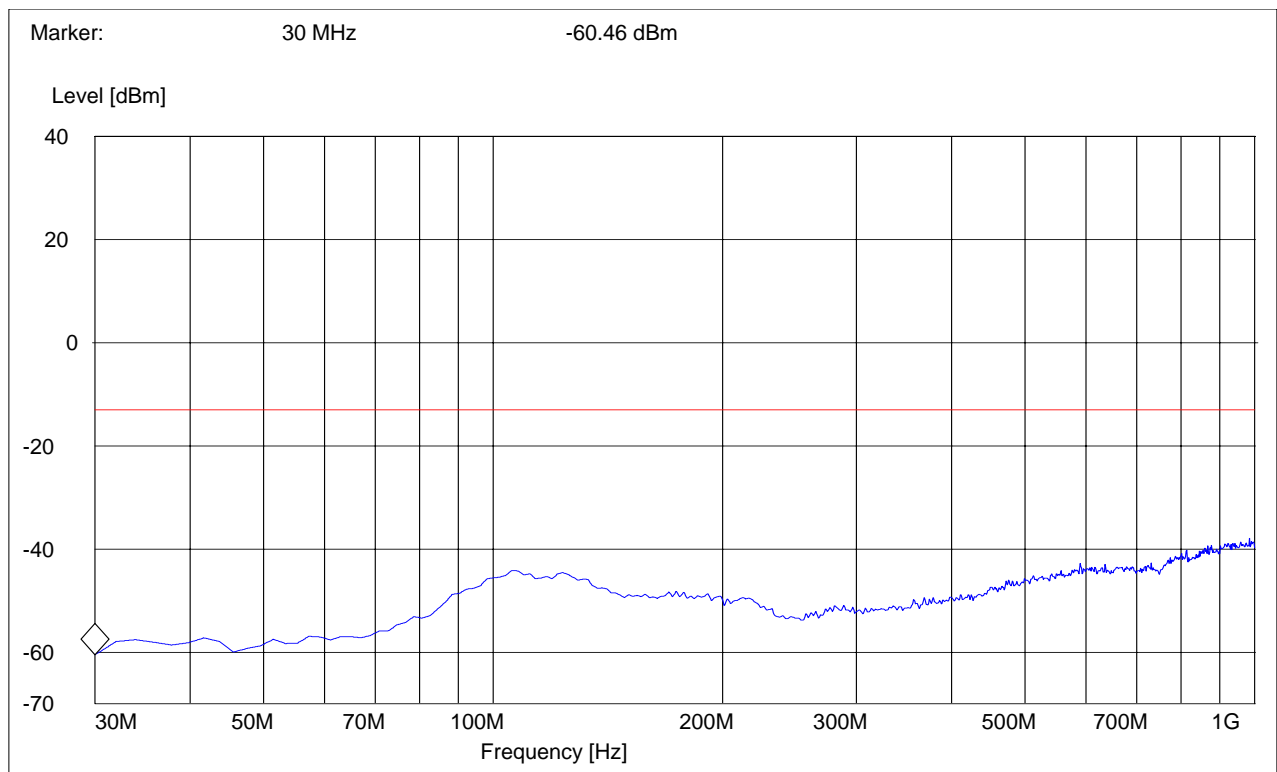
Harmonic	Tx ch-512 Freq.(MHz)	Level (dBm)	Tx ch-661 Freq. (MHz)	Level (dBm)	Tx ch-810 Freq. (MHz)	Level (dBm)
2	3700.4	-45.04	3760	-44.52	3819.6	-43.67
3	5550.6	-48.07	5640	-48.19	5729.4	-50.17
4	7400.8	NF	7520	NF	7639.2	-46.96
5	9251	NF	9400	-38.7	9549	-40.99
6	11101.2	NF	11280	NF	11458.8	-38.44
7	12951.4	-42.58	13160	NF	13368.6	-40.08
8	14801.6	NF	15040	NF	15278.4	NF
9	16651.8	NF	16920	NF	17188.2	NF
10	18502	NF	18800	NF	19098	NF
NF = NOISE FLOOR						

**RADIATED SPURIOUS EMISSIONS(PCS 1900)****TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: vertical*****SWEEP TABLE: "FCC 24 Spur 30M-1G"***

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

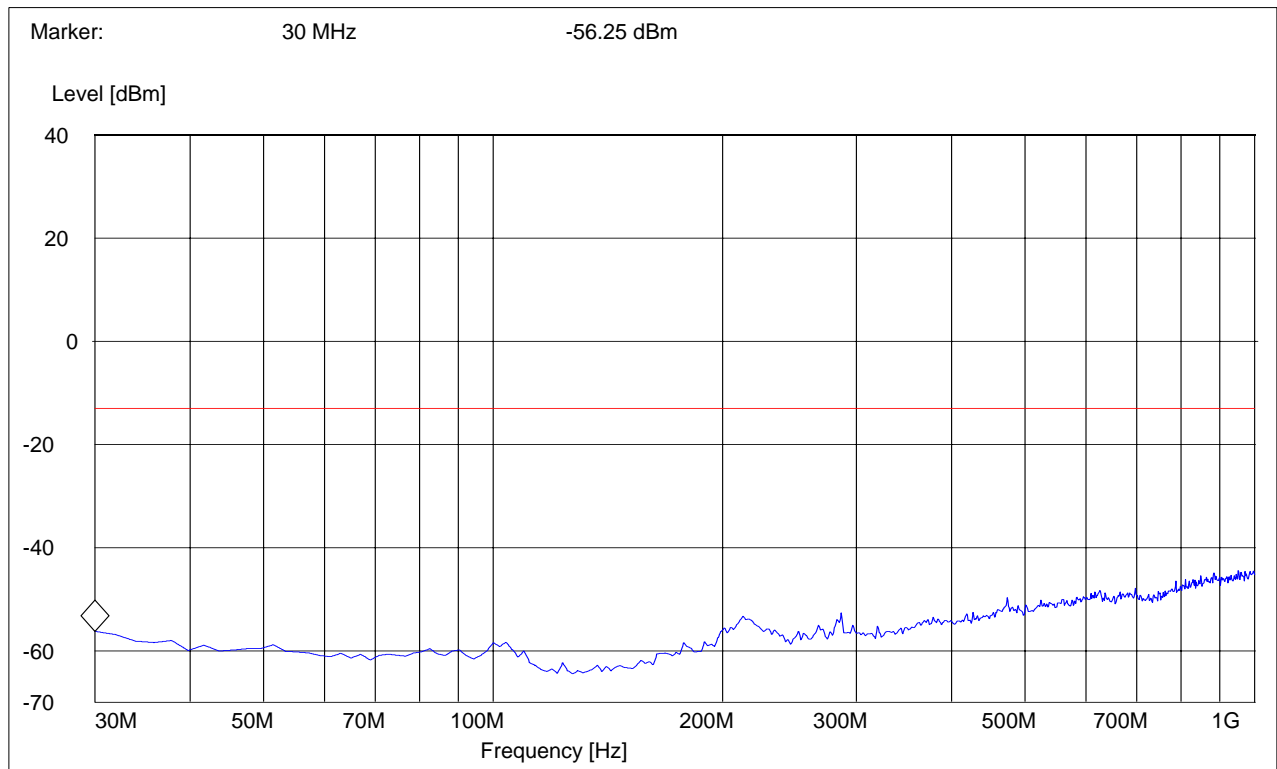
**Note: This plot is valid for low, mid & high channels (worst-case plot)**

**RADIATED SPURIOUS EMISSIONS(PCS 1900)****TX: 30MHz - 1GHz**

Spurious emission limit -13dBm

**Antenna: horizontal*****SWEEP TABLE: "FCC 24 Spur 30M-1G"***

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

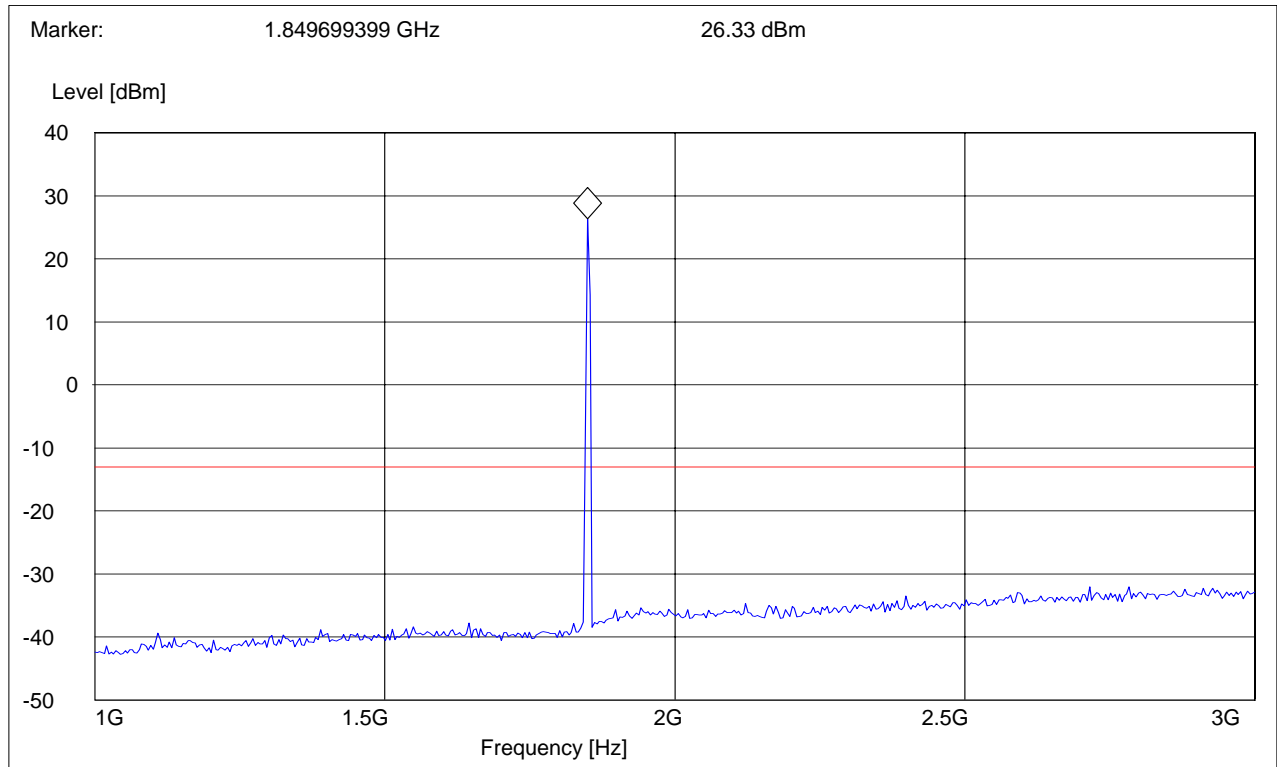
**Note: This plot is valid for low, mid & high channels (worst-case plot)**

**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1850.2MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

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

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

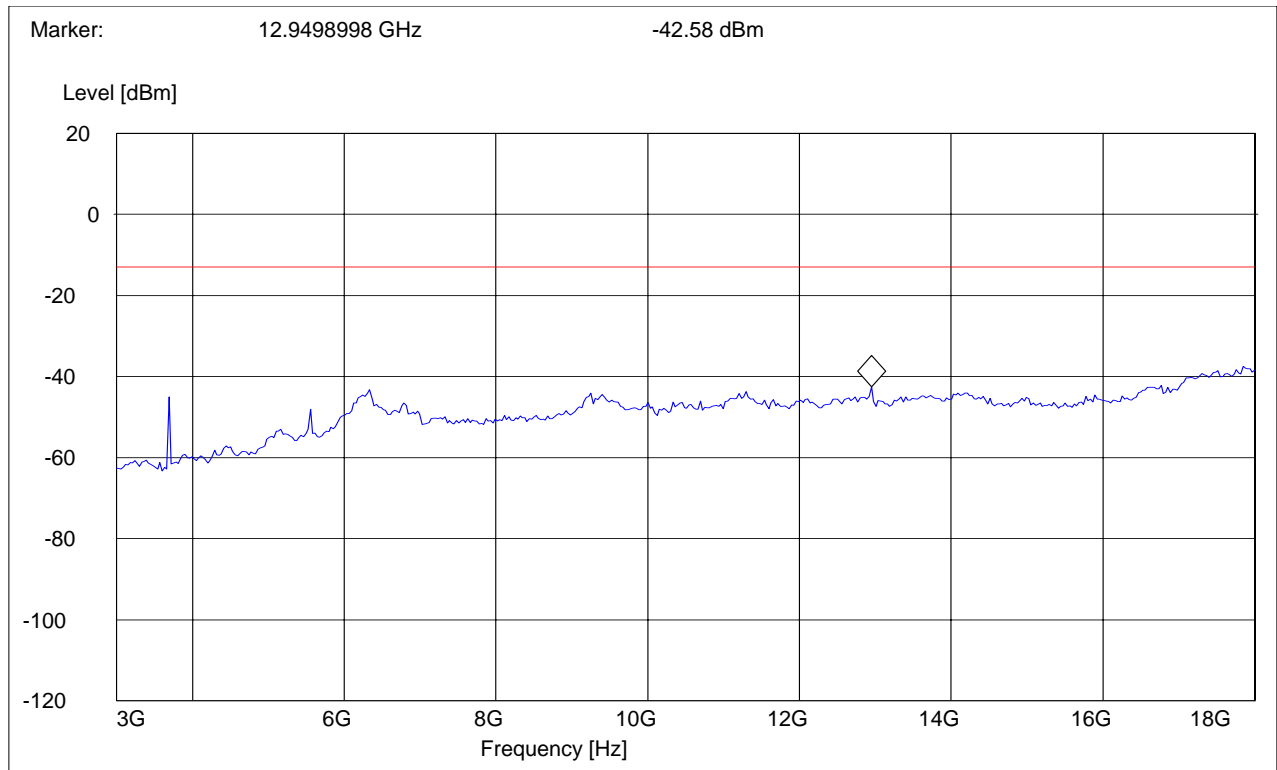
**Note: The peak above the limit line is the carrier freq. at ch-512.**

**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1850.2MHz: 3GHz – 18GHz**

Spurious emission limit -13dBm

***SWEEP TABLE: "FCC Spuri 3-18G"***

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

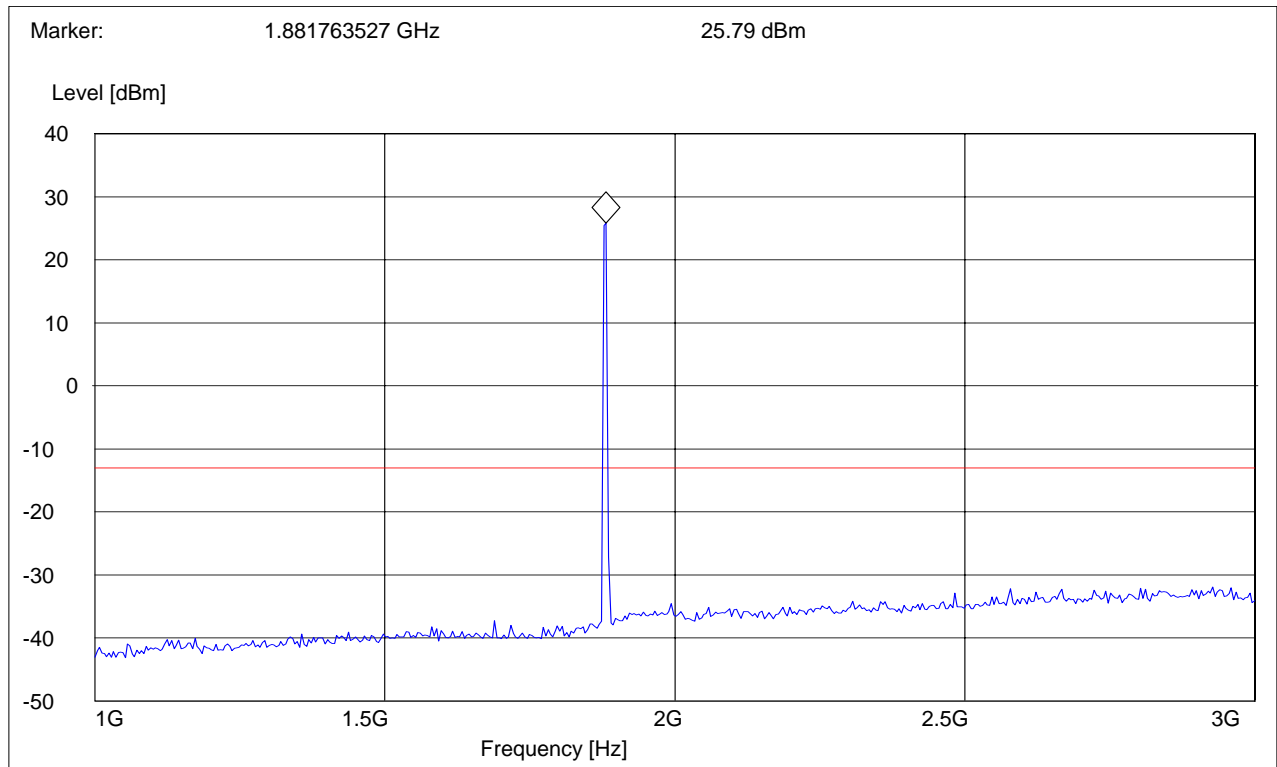


**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1880.0MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

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

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

**Note: The peak above the limit line is the carrier freq. at ch-661.**

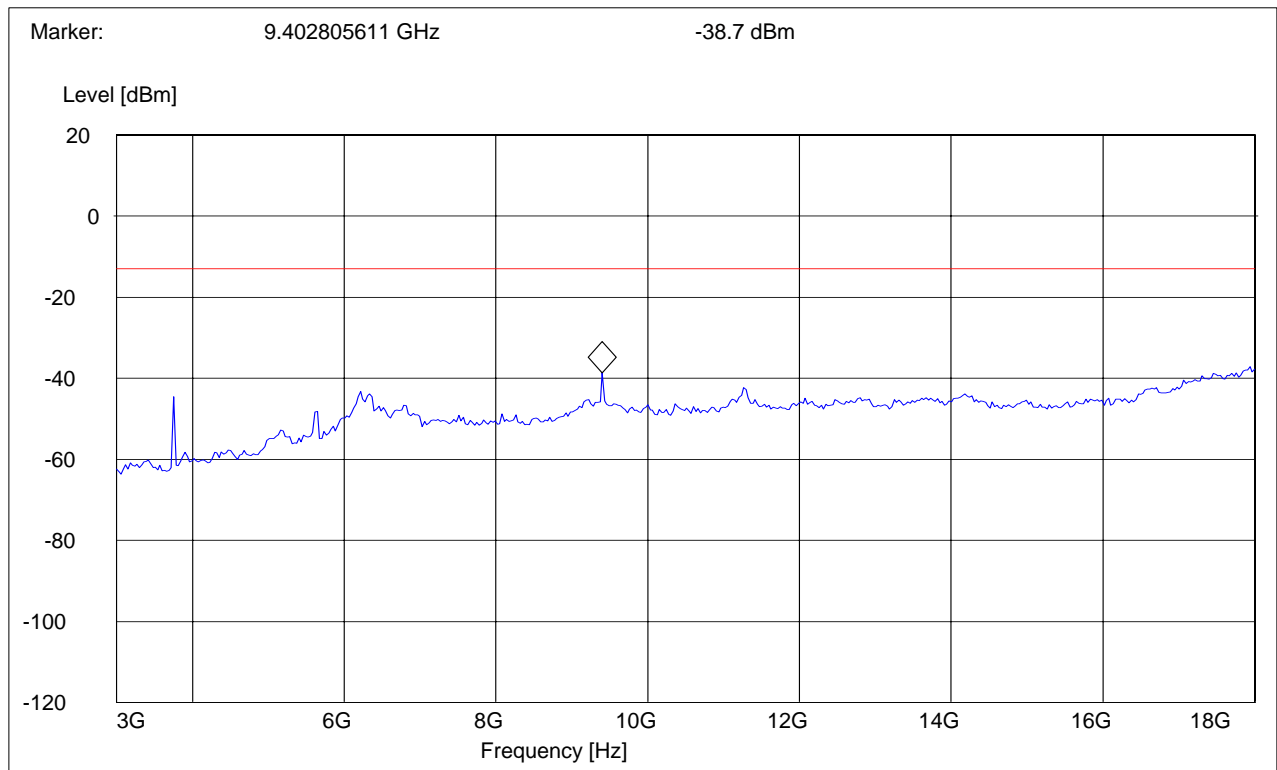


**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1880.0MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC Spuri 3-18G"***

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



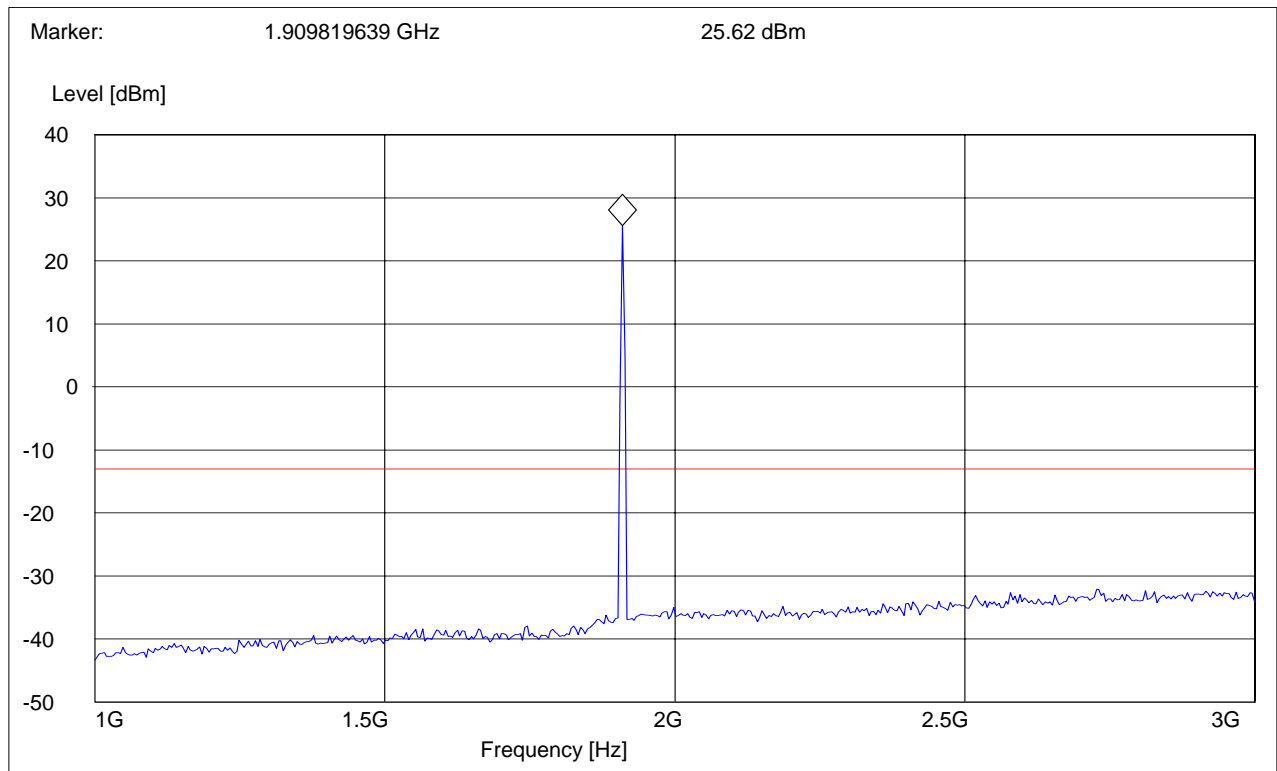
**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1909.8MHz: 1GHz – 3GHz**

Spurious emission limit –13dBm

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

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

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

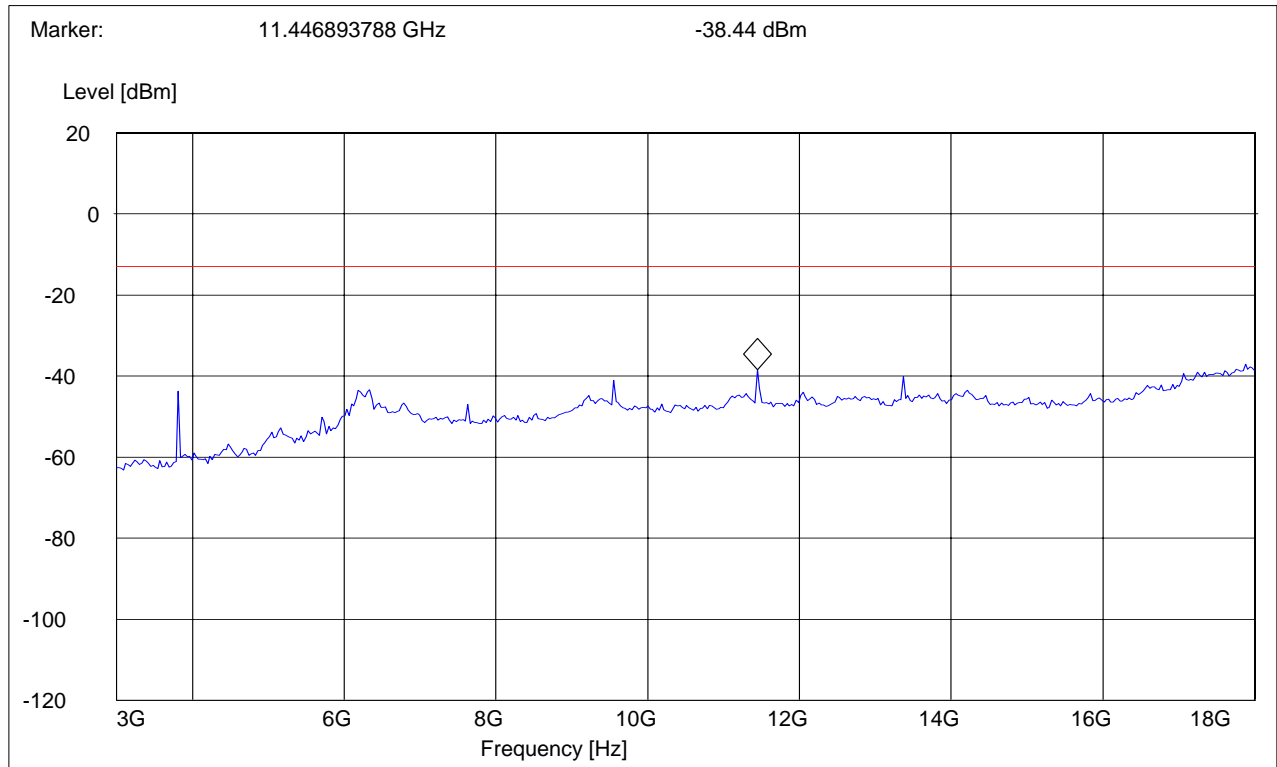
**Note: The peak above the limit line is the carrier freq. at ch-810.**

**RADIATED SPURIOUS EMISSIONS(PCS 1900)****Tx @ 1909.8MHz: 3GHz – 18GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC Spuri 3-18G"***

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

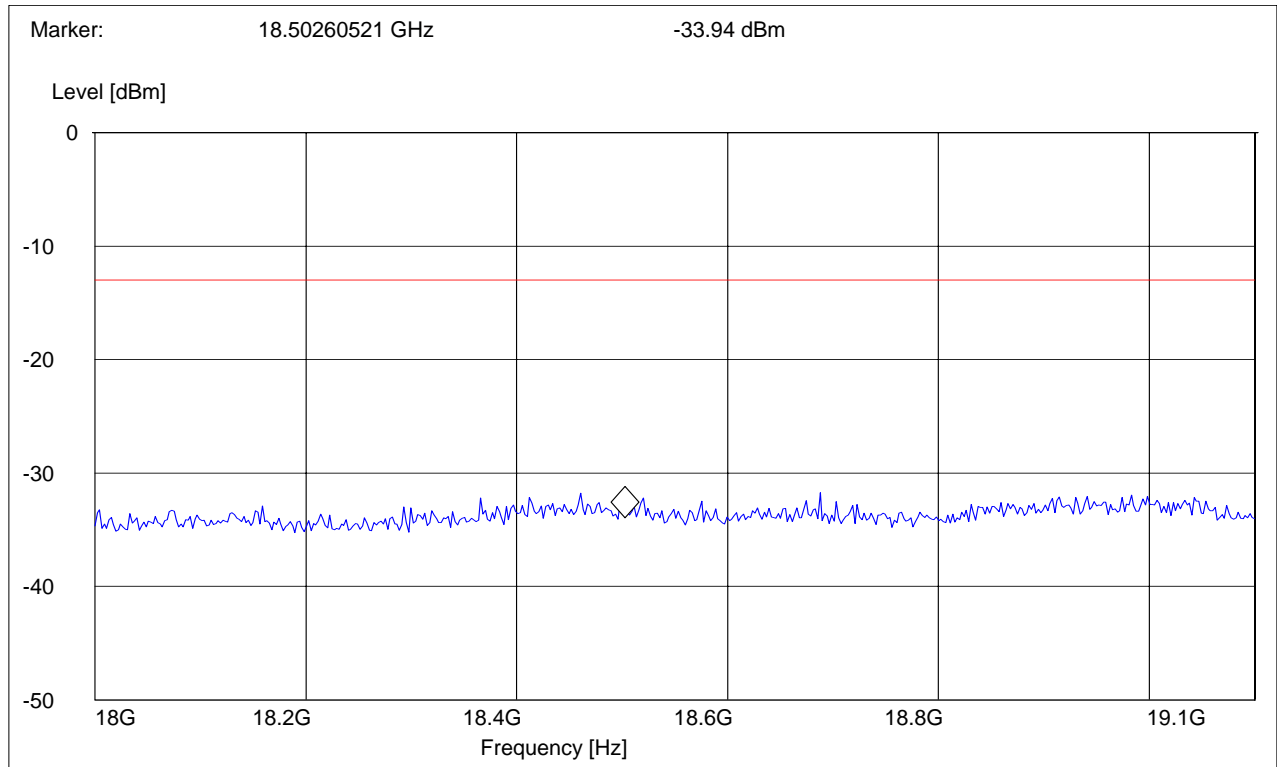


**RADIATED SPURIOUS EMISSIONS(PCS 1900)****18GHz – 19.1GHz**

Spurious emission limit –13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz

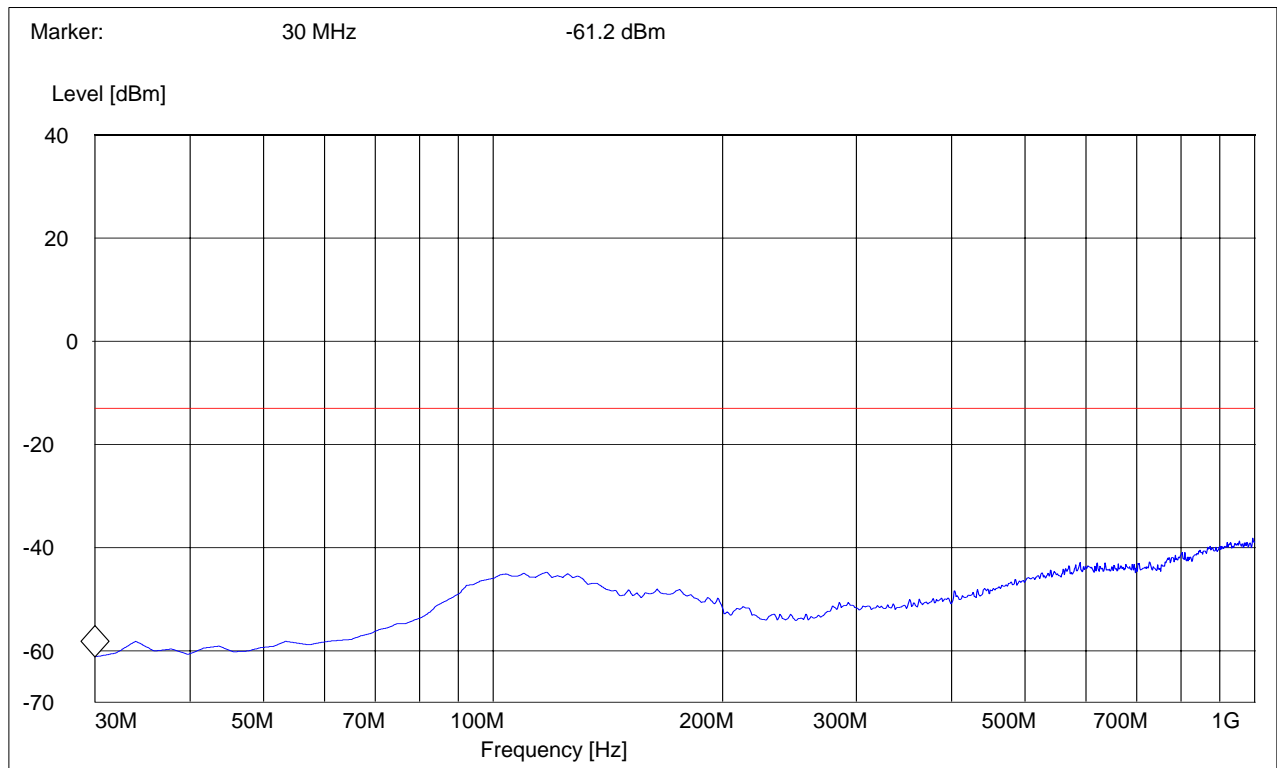
**Note: This plot is valid for low, mid & high channels (worst-case plot)**

**RADIATED SPURIOUS EMISSIONS (IDLE MODE)****EUT in Idle Mode: 30MHz – 1GHz**

Spurious emission limit –13dBm

**Antenna: vertical*****SWEEP TABLE: "FCC 22 Spur 30M-1G"***

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

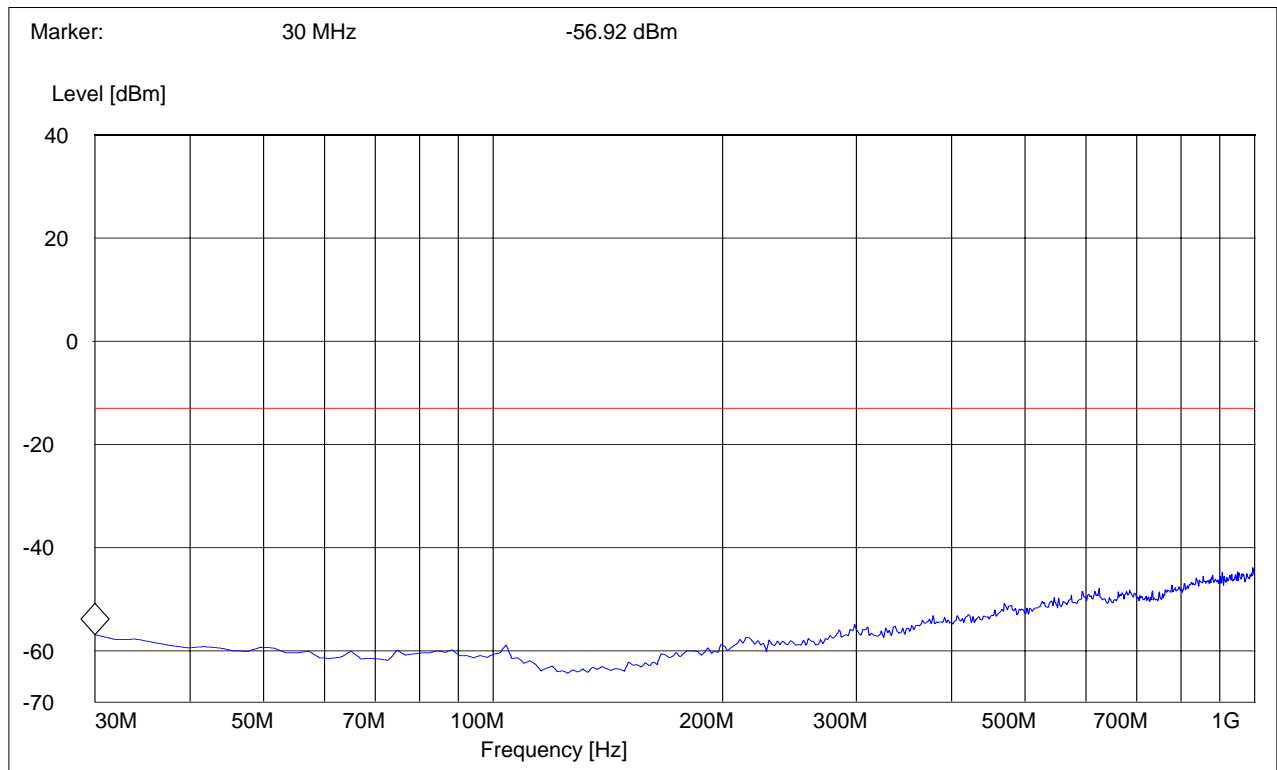


**RADIATED SPURIOUS EMISSIONS (IDLE MODE)****EUT in Idle Mode: 30MHz – 1GHz**

Spurious emission limit –13dBm

**Antenna: horizontal*****SWEEP TABLE: "FCC 22 Spur 30M-1G"***

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

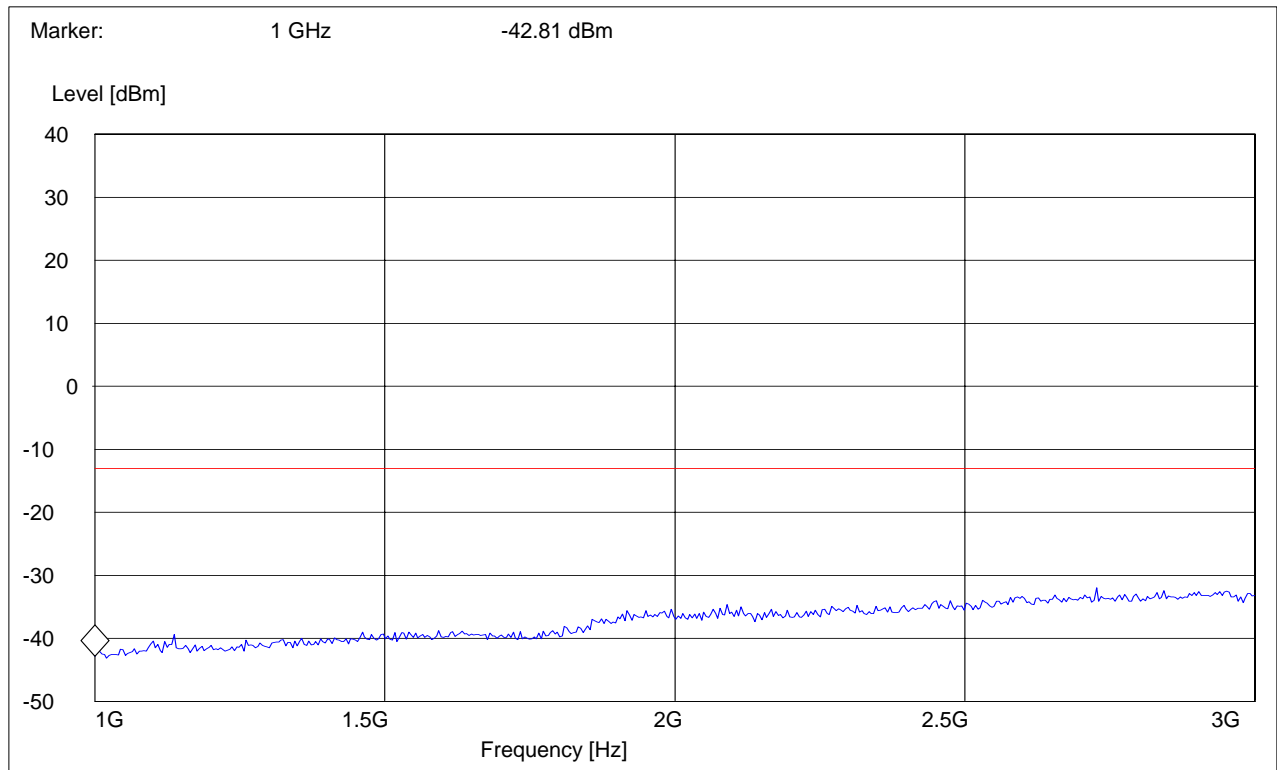


**RADIATED SPURIOUS EMISSIONS (IDLE MODE)****EUT in Idle Mode: 1GHz – 3GHz**

Spurious emission limit –13dBm

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

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

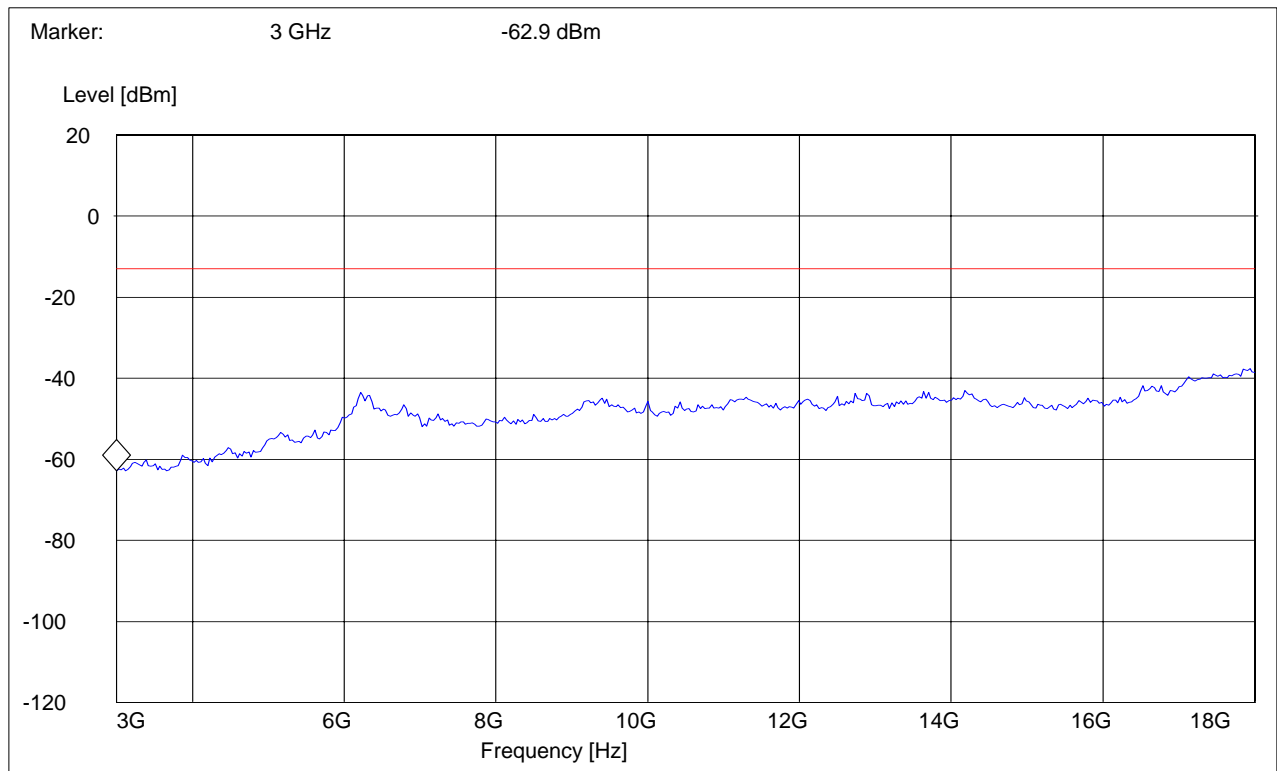


**RADIATED SPURIOUS EMISSIONS (IDLE MODE)****EUT in Idle Mode: 3GHz – 18GHz**

Spurious emission limit –13dBm

***SWEEP TABLE: "FCC 24 spuri 3-18G"***

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



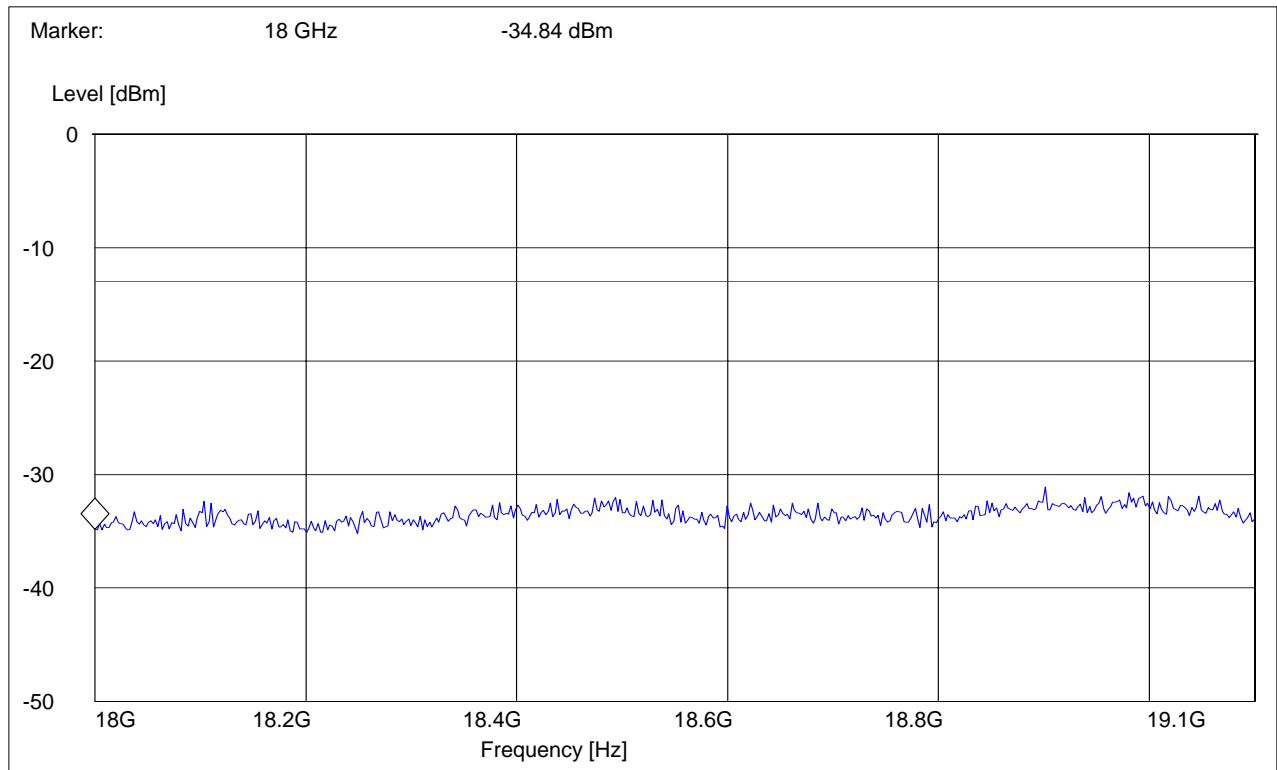


**RADIATED SPURIOUS EMISSIONS (IDLE MODE)****EUT in Idle Mode: 18GHz – 19.1GHz**

Spurious emission limit –13dBm

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

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz



**5.3 RECEIVER RADIATED EMISSIONS****§ 2.1053 / RSS-133****NOTE:**

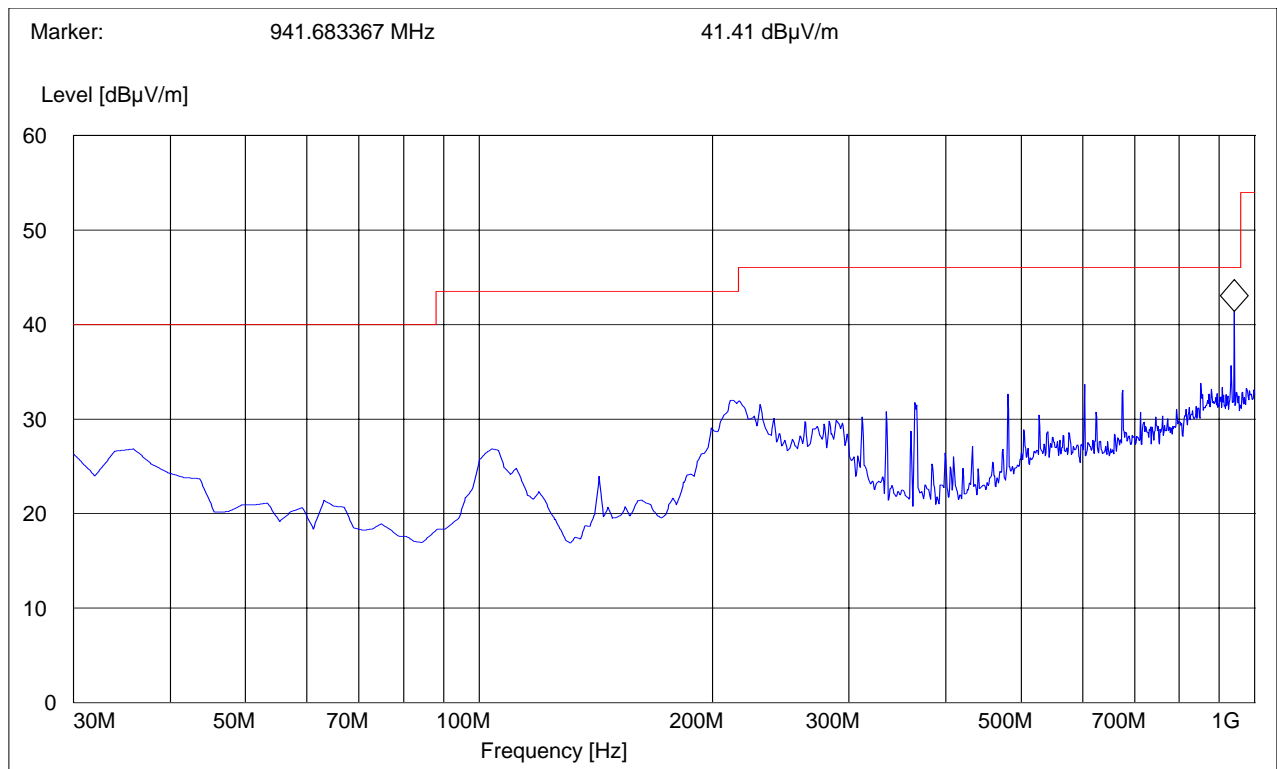
1. The radiated emissions were done with different settings, using the relevant pre-amplifiers for the relevant frequency ranges. This is the reason that the graphs show different noise levels. In the range between 3GHz and 26.5GHz very short cable connections to the antenna was used to minimize the 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 (µV/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

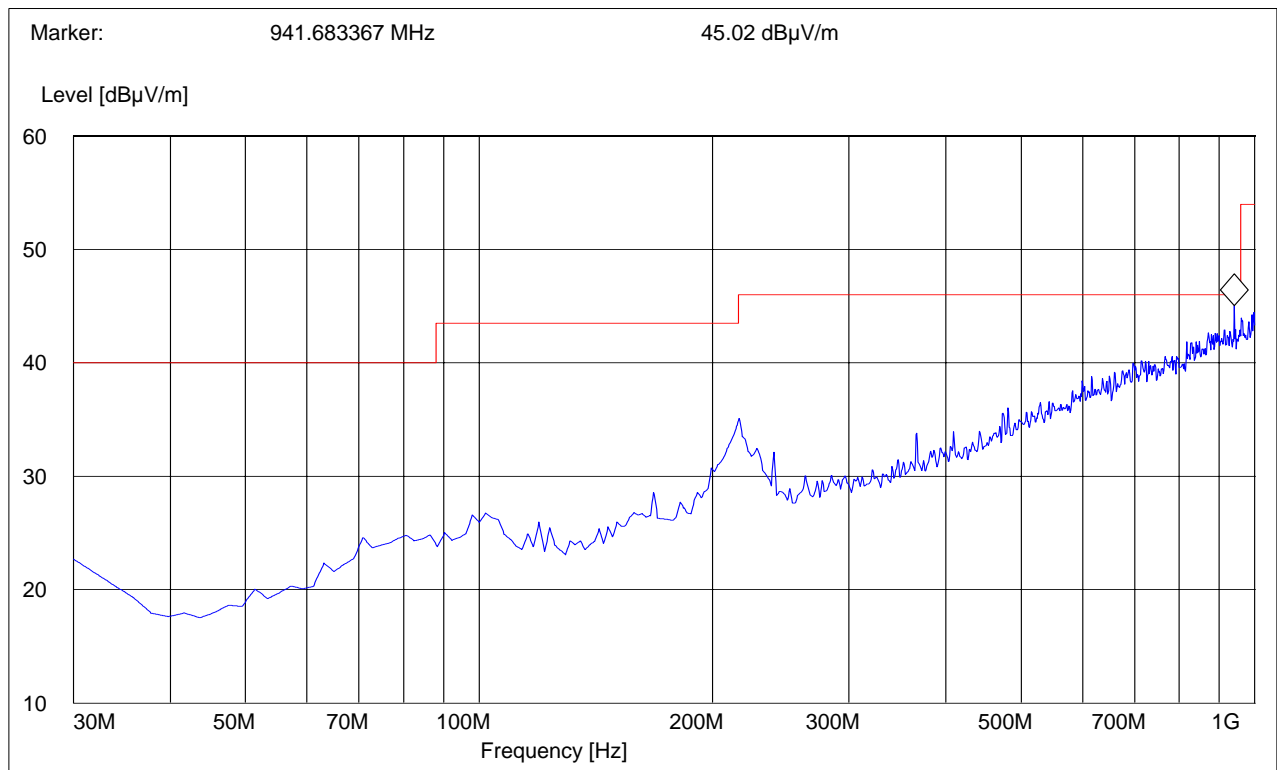
**5.3.1 Receiver Spurious on EUT****RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 30MHz – 1GHz****Antenna: vertical****SWEEP TABLE: "FCC Spur 30M-1G"**

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



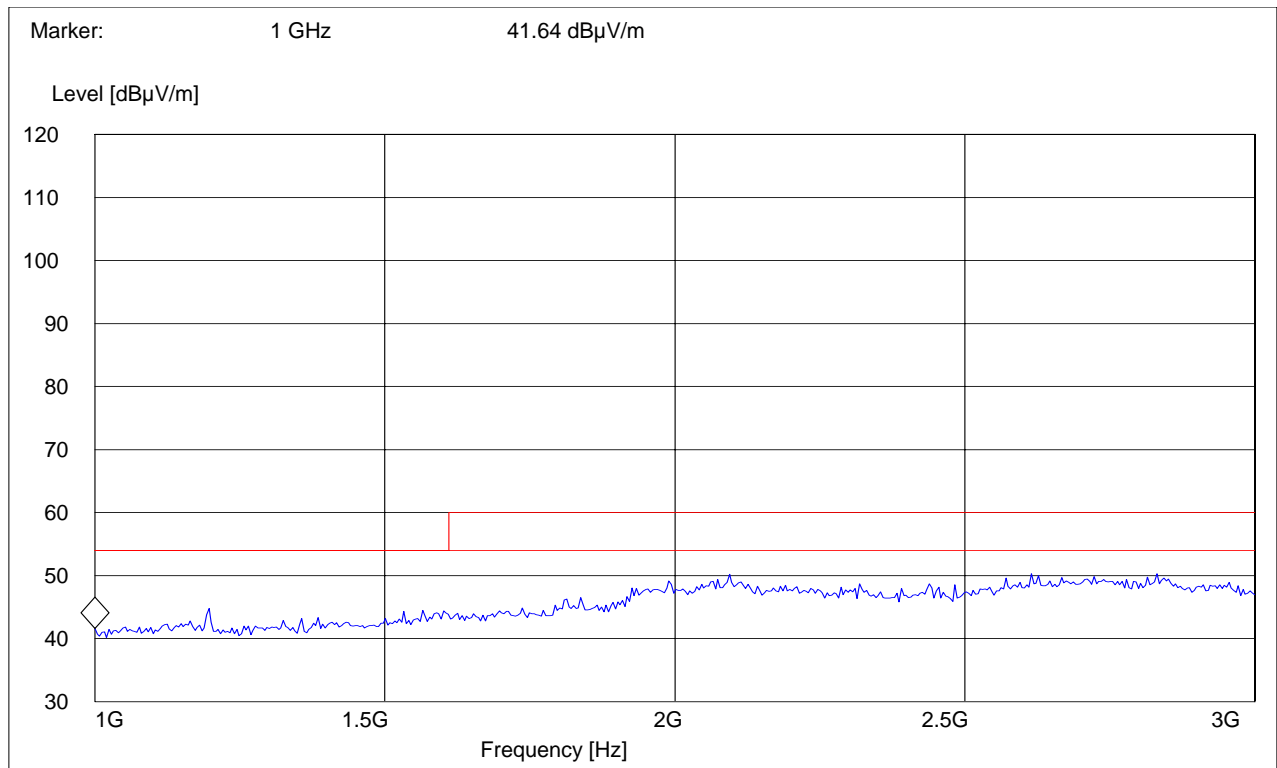
**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 30MHz – 1GHz****Antenna: horizontal****SWEEP TABLE: "FCC Spur 30M-1G"**

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



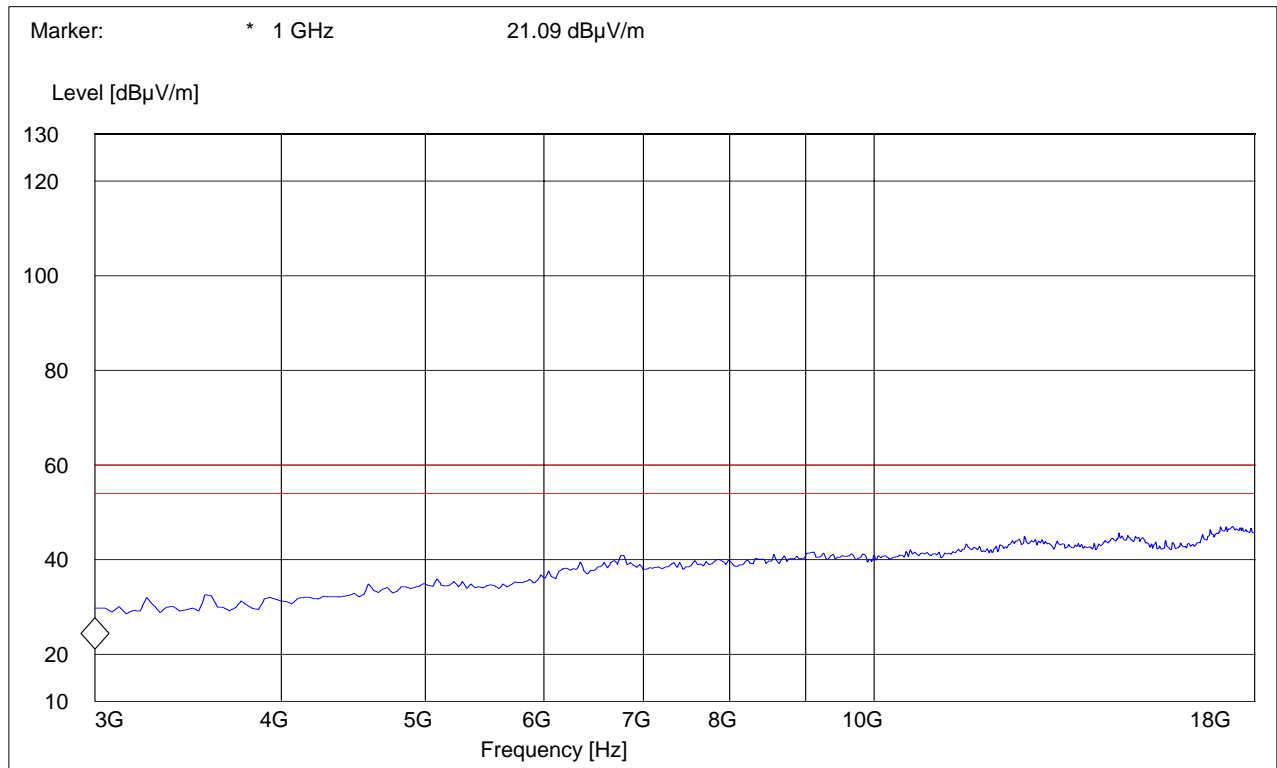
**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 1GHz – 3GHz*****SWEEP TABLE: "FCC Spuri 1-3G"***

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



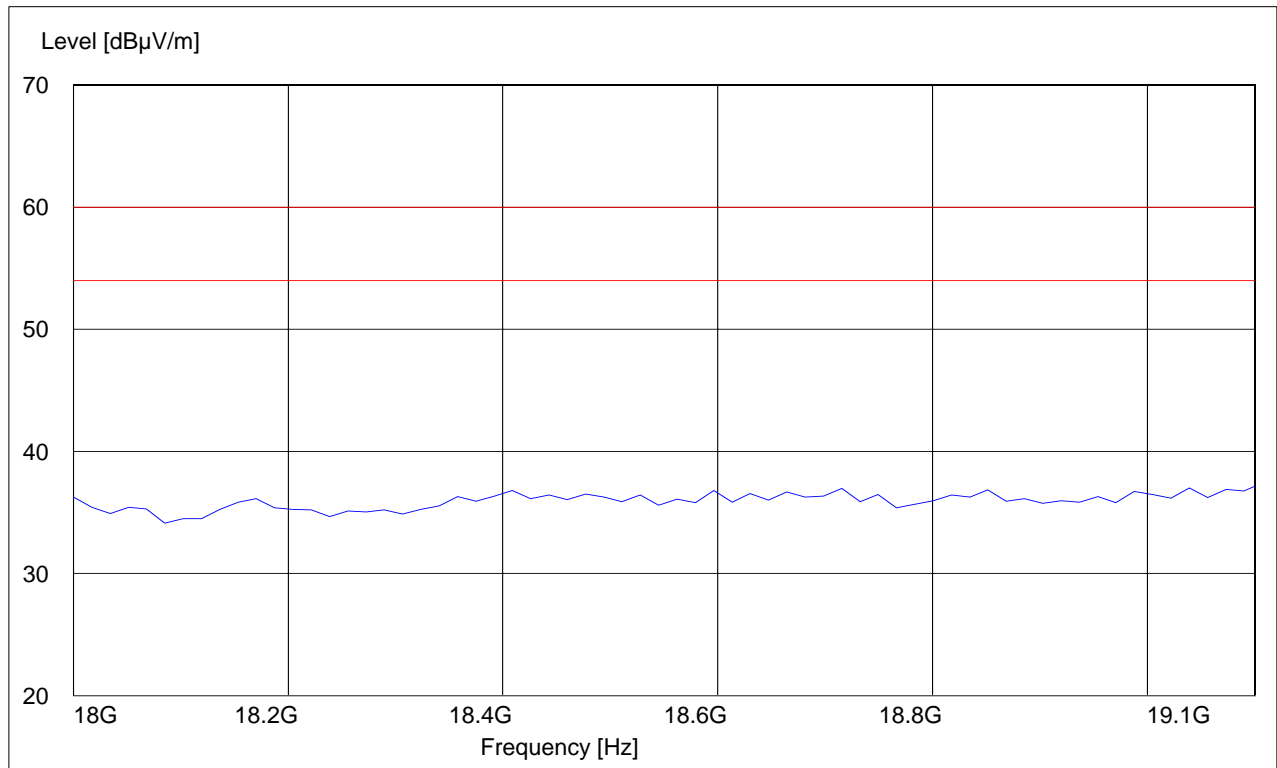
**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 3GHz – 18GHz*****SWEEP TABLE: "FCC spuri 3-18G"***

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



**RECEIVER RADIATED EMISSIONS****EUT in Idle Mode: 18GHz – 19.1GHz*****SWEEP TABLE: "FCC spuri 18-19.1G"***

Start Frequency	Stop Frequency	Detector	Meas. Time	RBW	VBW
18GHz	19.1GHz	Max Peak	Coupled	1 MHz	1 MHz



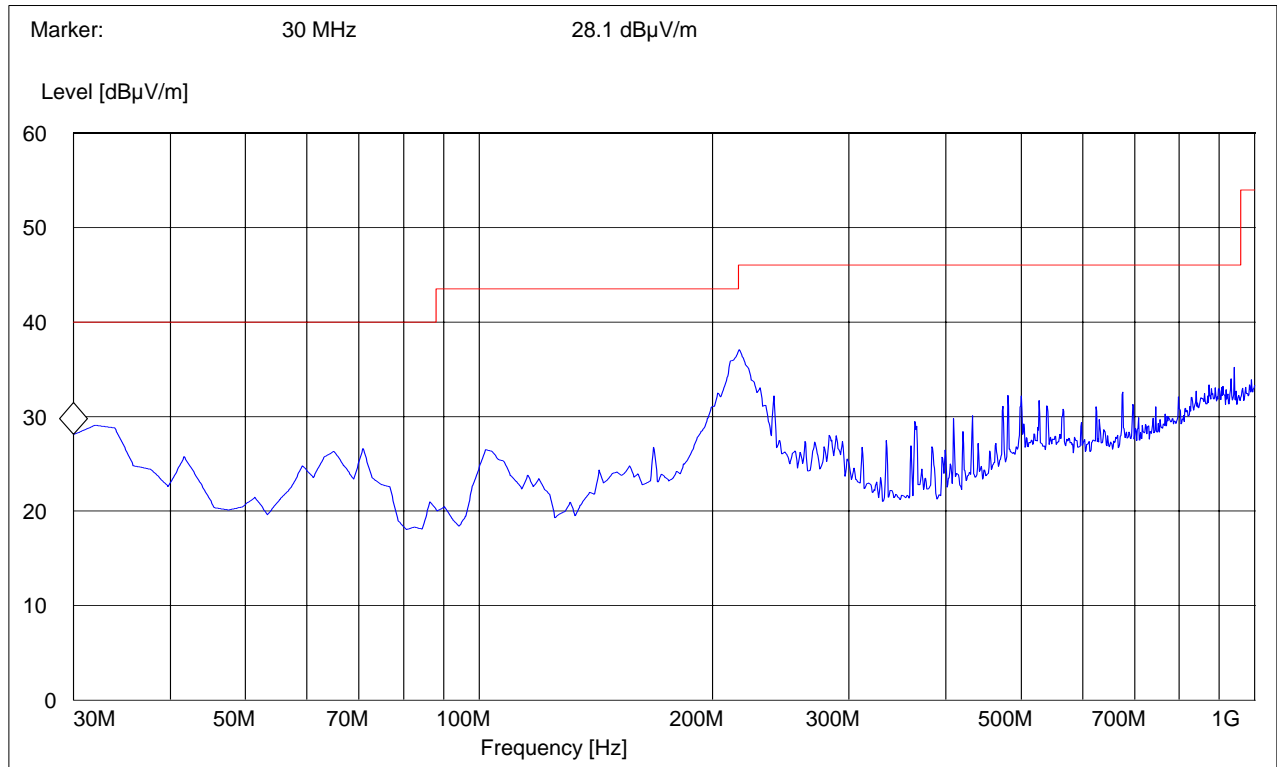
#### **5.4 Co-location**

All Co-location testing was performed with the EUT transmitting in the PCS band (1850.2MHz) and the EUT transmitting in Bluetooth mode(2402MHz). These channels were deemed worst case due to there EIRP readings. All testing was performed using FCC 15.247 procedures/limits.



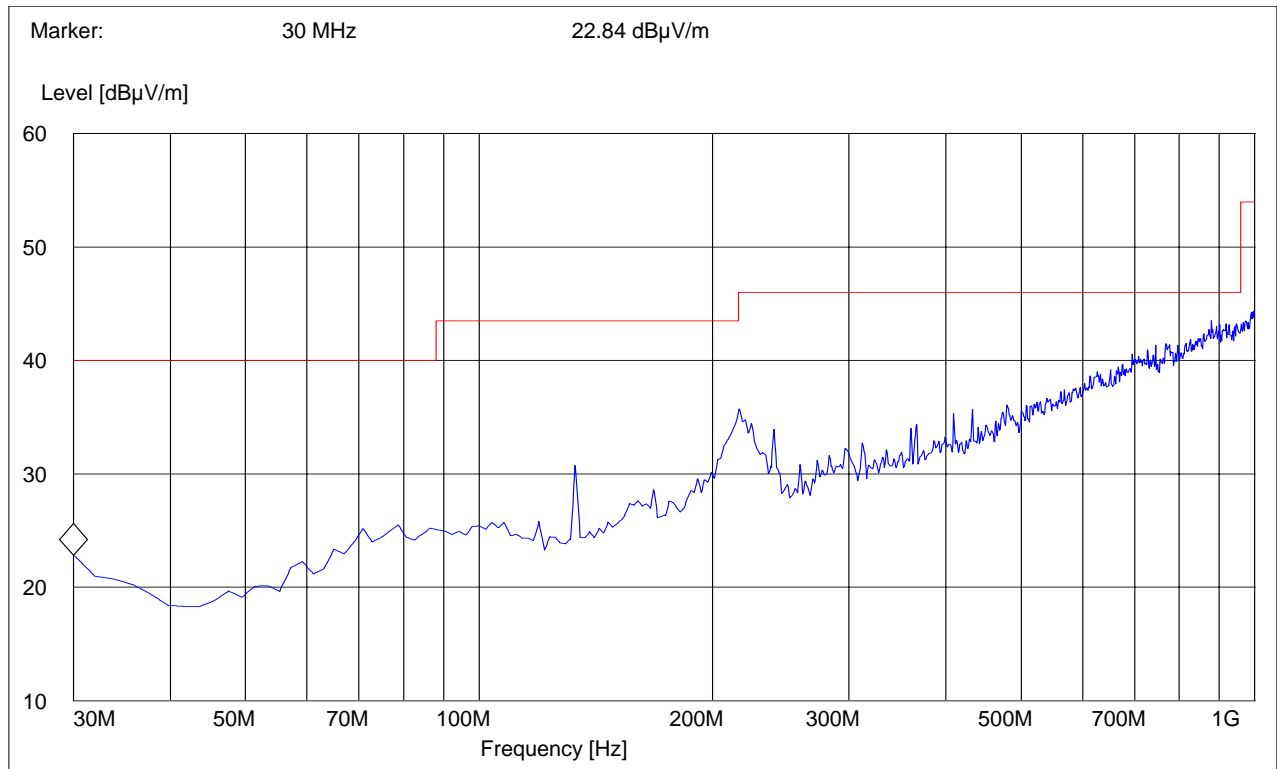
**5.4.1 Results****30MHz – 1GHz****Antenna: vertical**

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



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

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

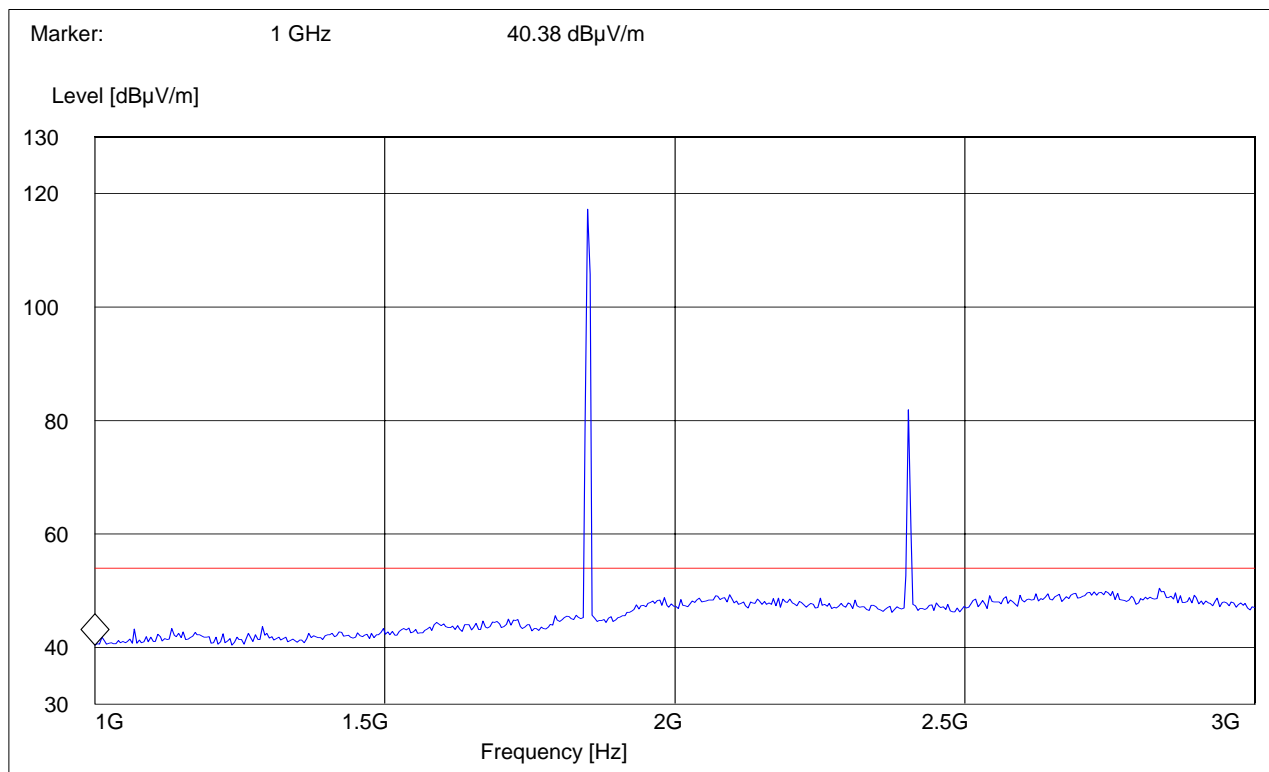


**1-3GHz**

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

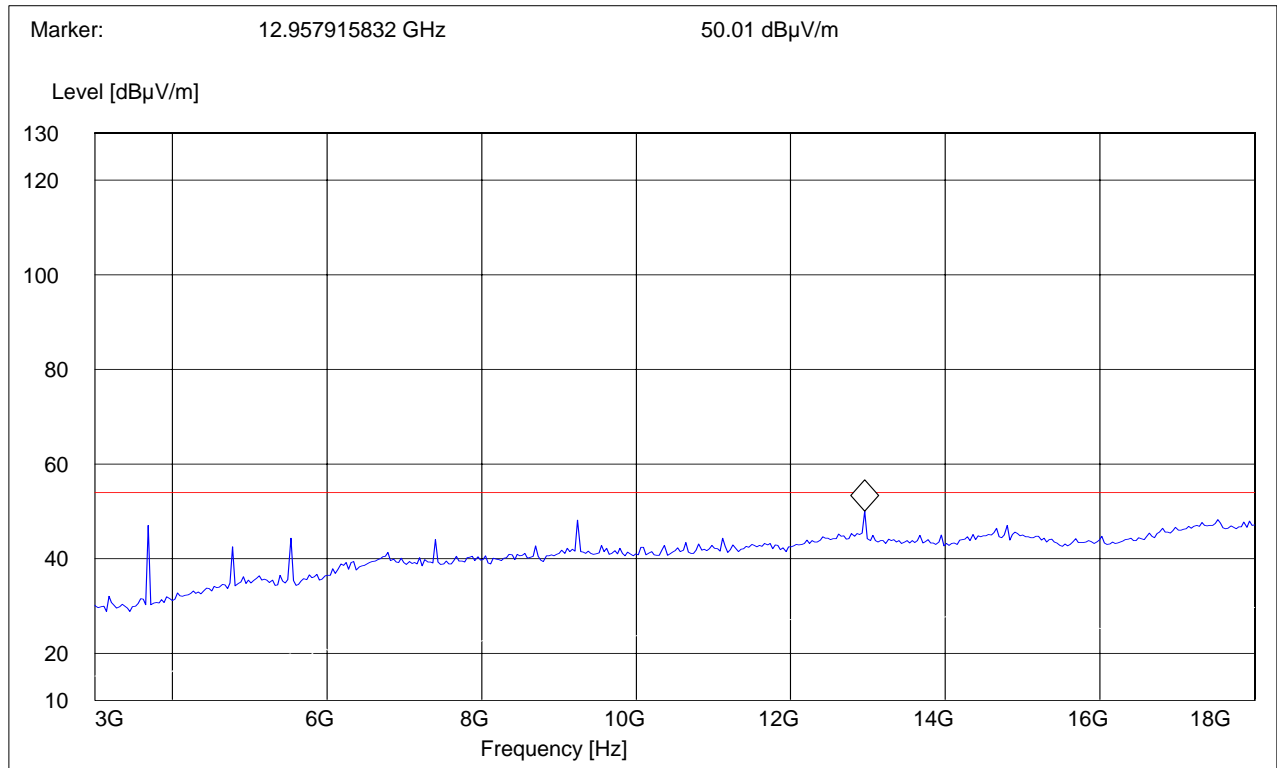
**Note: The peaks above the limit line is the carrier freq of the Bluetooth and PCS transmitter.**

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



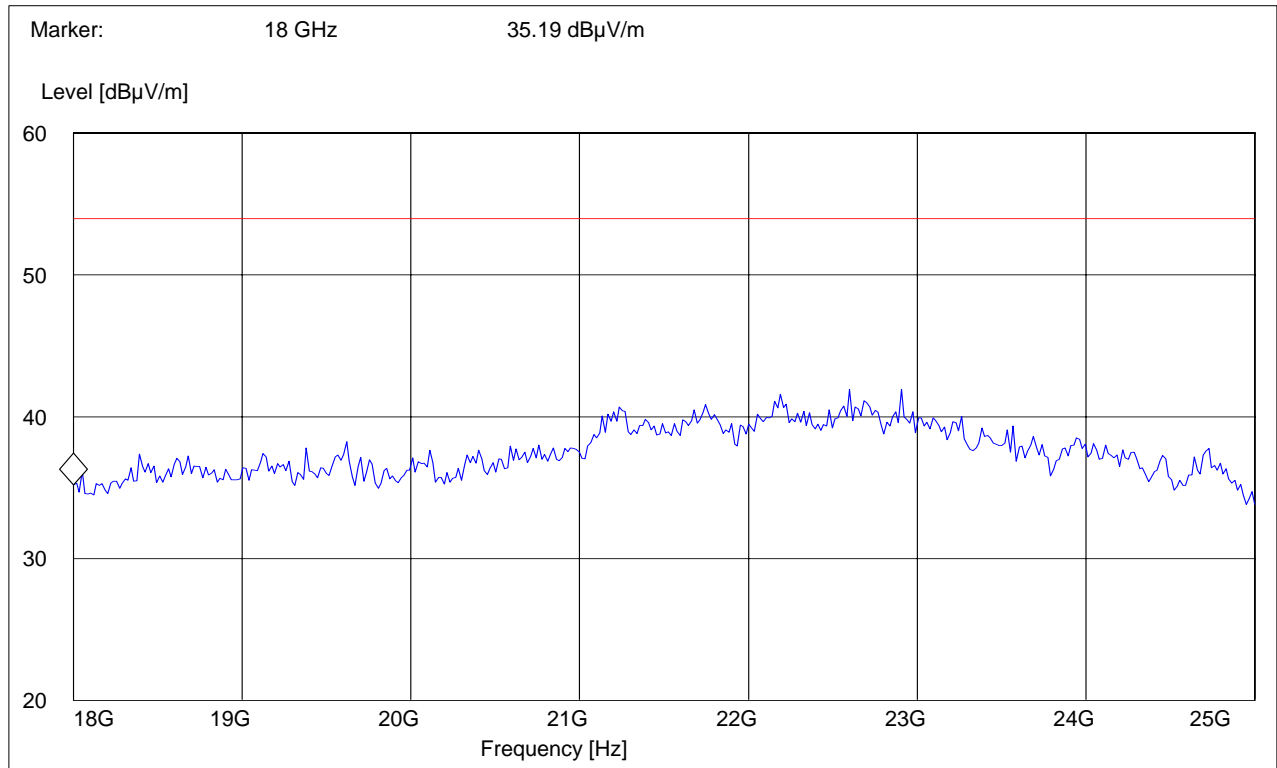
**3-18GHz**

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

Measured with AC/DC power adapter by SONY model#VGP-AC16V8

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

Conducted Emissions were done on both 850/1900 bands, but only worst-case plots are submitted in the test reports. The following results were done with the PCS and Bluetooth transmitters operating simultaneously.

**5.5.1 Results EUT**

LISN

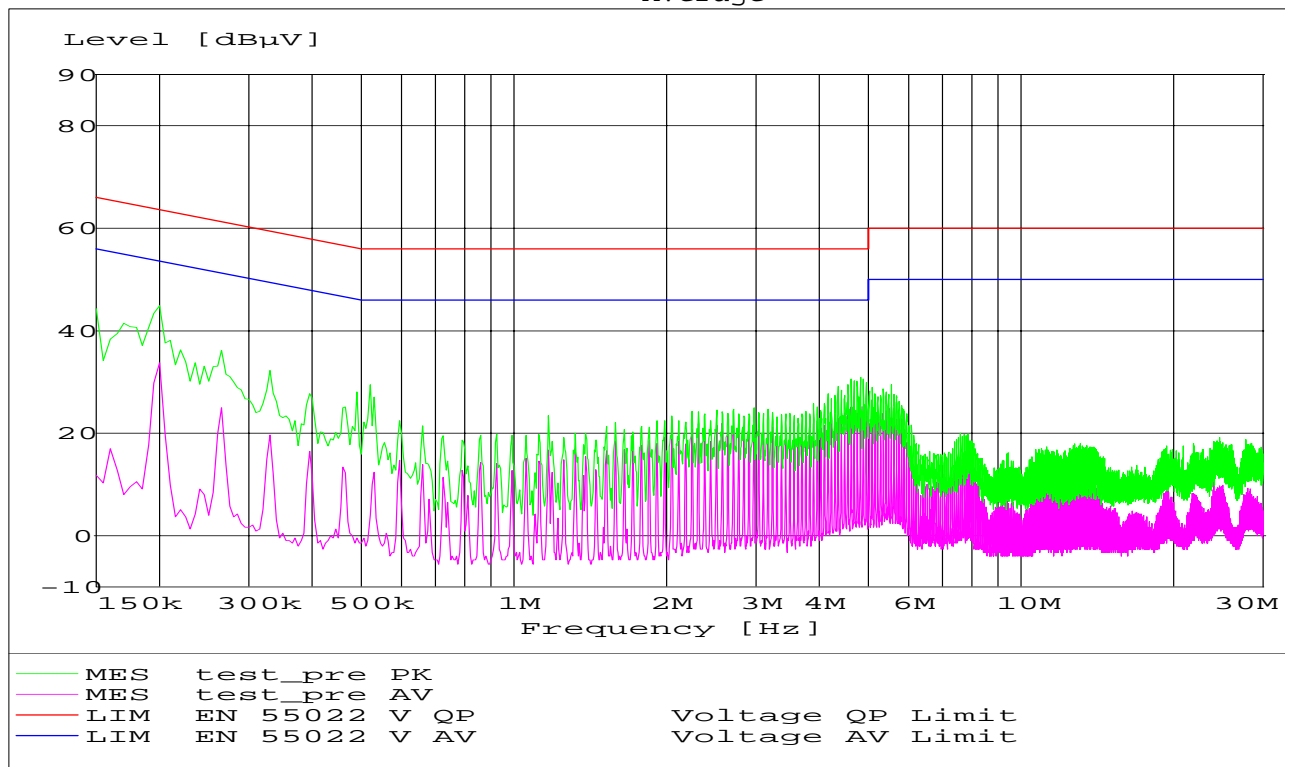
411 Dixon Landing Road, CA 95035

EUT / Description: viao  
Manufacturer: sony  
Test mode: co-lo(pcs1900@1850.2mhz and bluetooth@2402mhz)  
Test Engineer: Neelesh  
Phase: L & N  
Comment: 110 volt

Start of Test: 8/11/2005 / 12:50:43PM

SCAN TABLE: "EN 55022 Voltage"

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



## 6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

No	Instrument/Ancillary	Type	Manufacturer	Serial No.
01	Spectrum Analyzer	ESIB 40	Rohde & Schwarz	100107
02	Spectrum Analyzer	FSEM 30	Rohde & Schwarz	826880/010
03	Signal Generator	SMY02	Rohde & Schwarz	836878/011
04	Power-Meter	NRVD	Rohde & Schwarz	0857.8008.02
05	Biconilog Antenna	3141	EMCO	0005-1186
06	Horn Antenna (1-18GHz)	SAS-200/571	AH Systems	325
07	Horn Antenna (18-26.5GHz)	3160-09	EMCO	1240
08	Power Splitter	11667B	Hewlett Packard	645348
09	Climatic Chamber	VT4004	Voltsch	G1115
10	High Pass Filter	5HC2700	Trilithic Inc.	9926013
11	High Pass Filter	4HC1600	Trilithic Inc.	9922307
12	Pre-Amplifier	JS4-00102600	Miteq	00616
13	Power Sensor	URV5-Z2	Rohde & Schwarz	DE30807
14	Digital Radio Comm. Tester	CMD-55	Rohde & Schwarz	847958/008
15	Universal Radio Comm. Tester	CMU 200	Rohde & Schwarz	832221/06



## **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-B-2003 Land Mobile FM or PM Communications Equipment Measurement and Performance Standard November 7, 2002.