# FCC Test Report

## FCC Part 22

### Model #: CDMA CA001

### FCC ID: TYKNX6450

**TEST REPORT #: EMC_CET10_043_08501_CA001_FCC22**
**DATE: 2008-10-21**



**Bluetooth Qualification Test Facility (BQTF)**


**FCC listed: A2LA accredited**

**IC recognized # 3462B**

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# 1 Assessment

**The following is in compliance with the applicable criteria specified in FCC rules Parts 2, 22 of Title 47 of the Code of Federal Regulations.**

| Company | Description | Model # |
|---|---|---|
| **Casio Hitachi Mobile Communications Co., Ltd.** | **The cellular phone for the global roaming of the CDMA method of 3G equipped with the Bluetooth function and the FeliCa function sold in Japan.** | **CDMA CA001** |

**This report is reviewed by:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2008-10-21 | EMC & Radio | Marc Douat (EMC Project Engineer) | Marc Douat I am approving this document |

**This report is prepared by:**

| Date | Section | Name | Signature |
|---|---|---|---|
| 2008-10-21 | EMC & Radio | Ahmad Safdari (EMC Project Engineer) | Ahmad Safdari Digitally signed by Ahmad Safdari Reason: I am the author of this document |

# 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<br>Milpitas, CA 95035<br>U.S.A.** |
| Telephone: | **+1 (408) 586 6200** |
| Fax: | **+1 (408) 586 6299** |
| Responsible Test Lab Manager: | **Lothar Schmidt** |
| Responsible Project Leader: | **Ahmad Safdari** |
| Date of test: | **2008-10-13 to 2008-10-15** |

## 2.2 Identification of the Client

| **APPLICANT** | |
|---|---|
| **Applicant (Company Name)** | **Casio Hitachi Mobile Communications Co.,Ltd.** |
| **Street Address** | **2-229-1, Sakuragaoka** |
| **City/Zip Code** | **Higashiyamato-shi, Tokyo 207-8501** |
| **Country** | **Japan** |
| **Contact Person** | **Osamu Hasegawa** |
| **Telephone** | **+81-42-516-2184** |
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| **e-mail** | **Osamu-hasegawa@ch-mobile.co.jp** |

# 3 Equipment under Test (EUT)

## 3.1 Specification of the Equipment under Test

| | |
|---|---|
| **Marketing Name of EUT (if not same as Model No.)** | **CA001** |
| **Model No.** | **CDMA CA001** |
| **FCC-ID** | **TYKNX6450** |
| Frequency Range: | **824.7MHz – 848.31 MHz for CDMA 850** |
| Type(s) of Modulation: | **QPSK** |
| Number of Channels: | **Depends on service.** |
| Antenna Type: | **Integral** |
| Max. Output Power: | **Conducted CDMA 850: 27.77dBm, 598.4mW**<br>**Radiated CDMA 850: 21.65dBm, 146.2.mW** |

## 3.2 Identification of the Equipment Under Test (EUT)

| EUT # | TYPE | MODEL | SERIAL # | HW Version |
|---|---|---|---|---|
| 1 | EUT | CDMA CA001 | SCADM000137 | PWB-6420-MAIN-20S |
| 2 | EUT | CDMA CA001 | SCADM000138 | PWB-6420-MAIN-20S |
| 3 | EUT | CDMA CA001 | SCADM000139 | PWB-6420-MAIN-20S |
| 4 | EUT | CDMA CA001 | SCADM000140 | PWB-6420-MAIN-20S |

**SW version: V008**

## 3.3 Identification of Accessory equipment

| AE # | TYPE | MODEL |
|---|---|---|
| 1 | AC Adapter | 0203PQA |
| 2 | Cradle | N/A |
| 3 | USB Cable | N/A |
| 4 | Headset | N/A |

# 4 Subject of Investigation

All testing was performed on the EUT listed in Section 3. The EUT was maximized in the X,Y, Z positions , 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 Parts 2, 22 and 24 of Title 47 of the Code of Federal Regulations.

# 5 Measurements

## 5.1 RF Power Output

### 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:

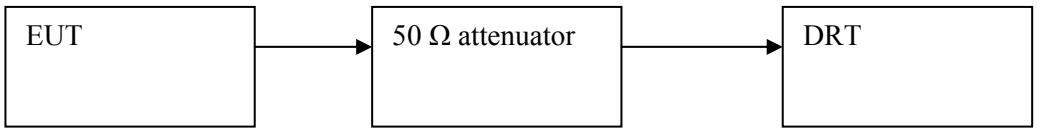
#### 5.1.2.1 FCC 22.913 (a) Effective radiated power limits.

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

### 5.1.3 Conducted Output Power Measurement procedure:

**Based on TIA-603C 2004**

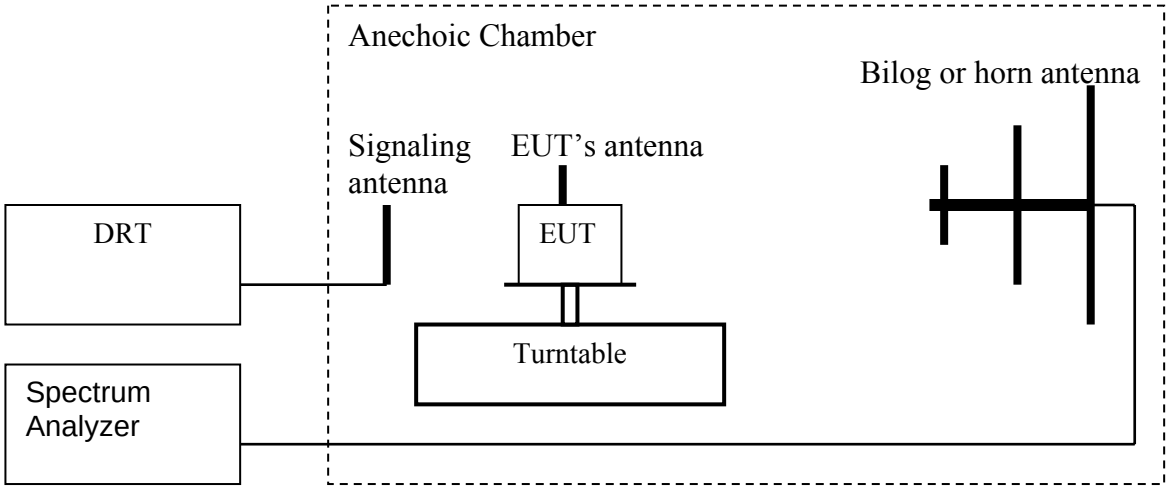
**2.2.1 Conducted Carrier Output Power Rating**




1. Connect the equipment as shown in the above diagram. A Digital Radiocommunication Tester (DRT) is used to enable the EUT to transmit and to measure the output power.
2. Adjust the settings of the DRT to set the EUT to its maximum power at the required channel.
3. Record the output power level measured by the DRT.
4. Correct the measured level for all losses in the RF path.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

### 5.1.4 Radiated Output Power Mmeasurement 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.)

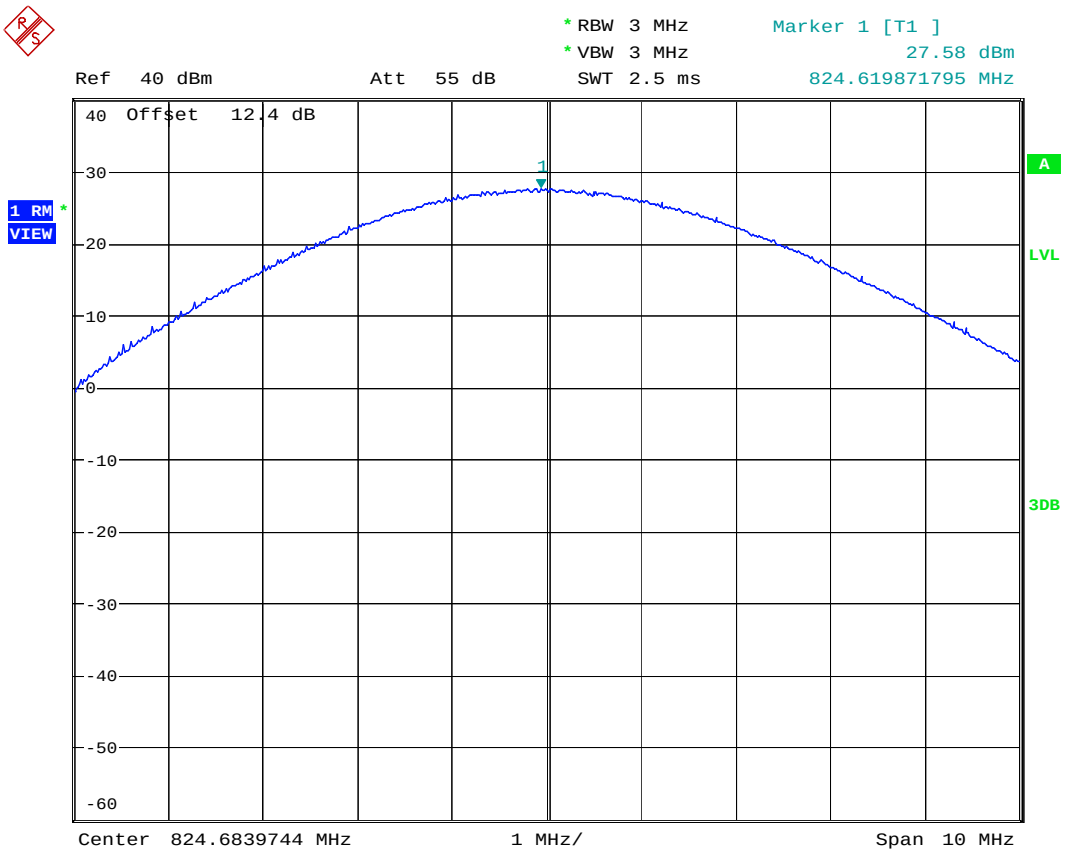
### 5.1.5 Conducted Peak Power 850MHz band

| Frequency (MHz) | Conducted Peak Power (dBm) |
|---|---|
| | CDMA |
| 824.7 | 27.58 |
| 836.52 | 27.77 |
| 848.31 | 27.08 |

### 5.1.6 ERP Results 850MHz band:

| Frequency (MHz) | Effective Radiated Power (dBm) |
|---|---|
| | CDMA |
| 824.7 | 20.48 |
| 836.52 | 21.22 |
| 848.31 | 21.65 |

## CONDUCTED PEAK POWER CHANNEL 1013 §22.913(a)

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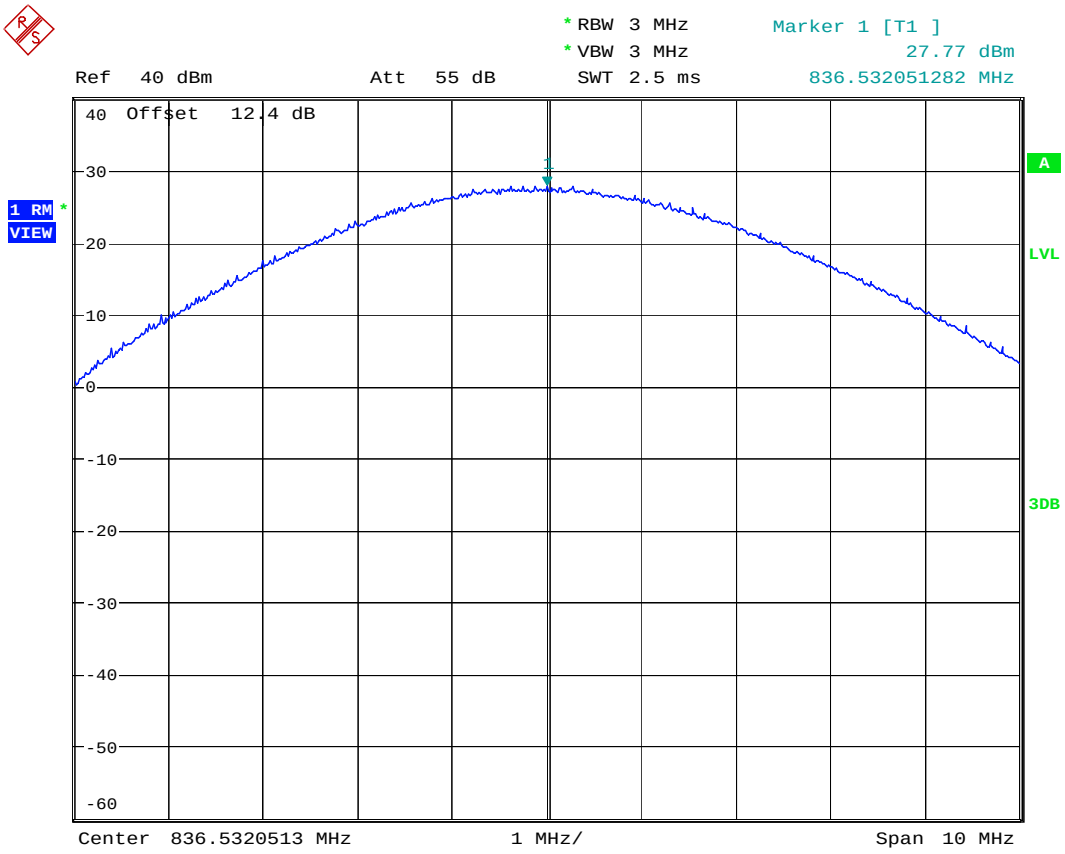
## CONDUCTED PEAK POWER CHANNEL 384 §22.913(a)

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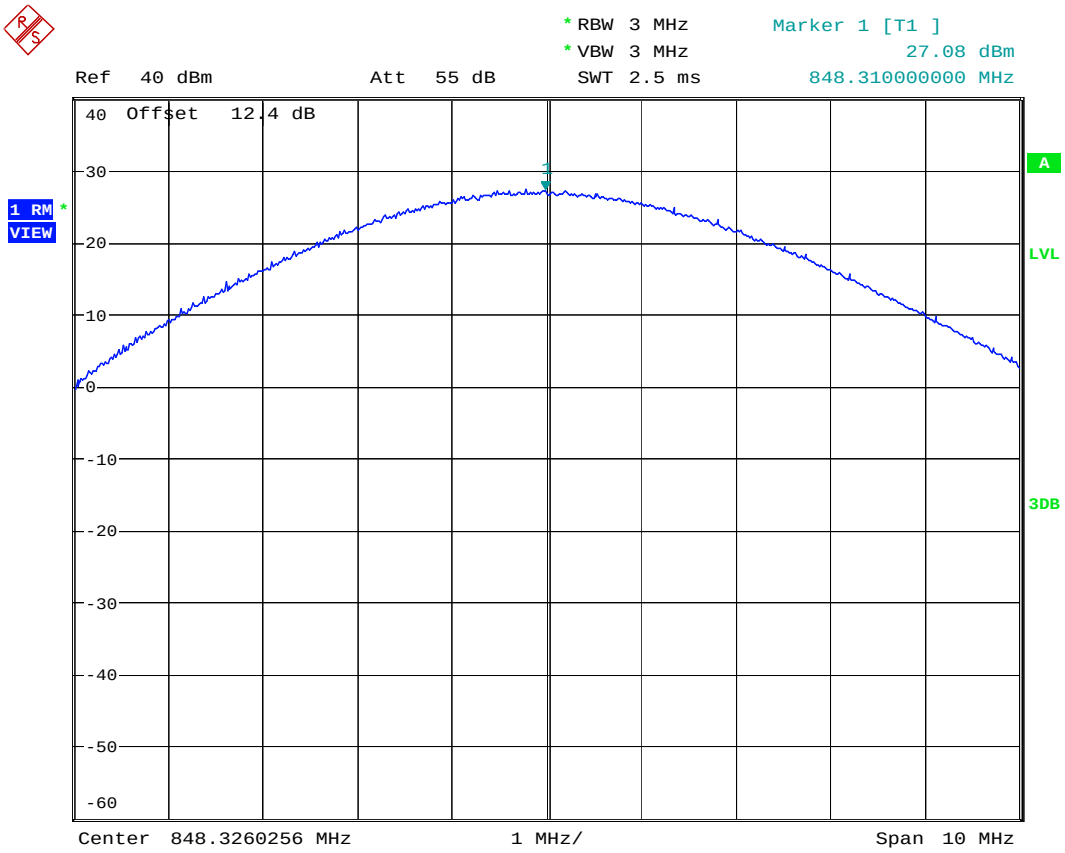
## CONDUCTED PEAK POWER CHANNEL 777 §22.913(a)

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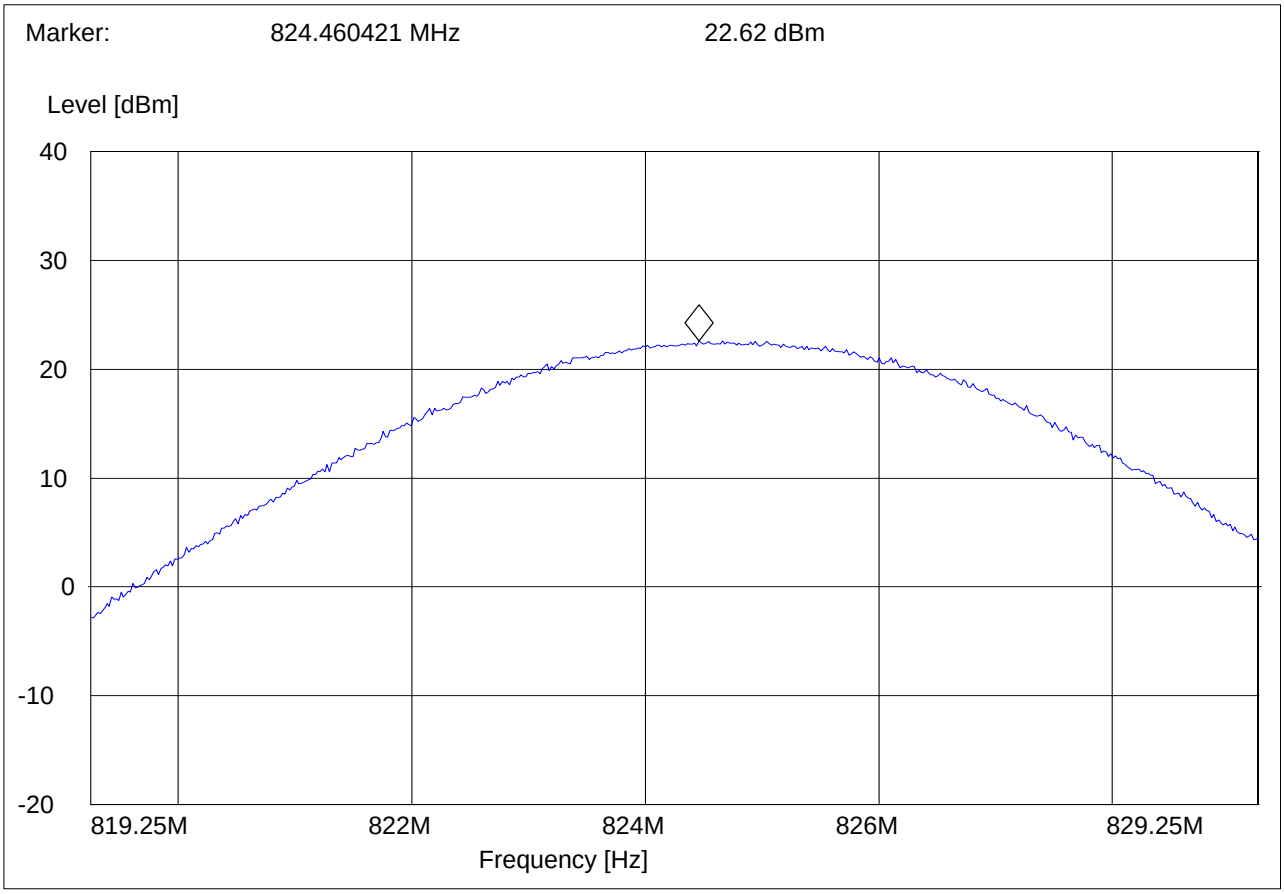
## EIRP CHANNEL 1013 §22.913(a)

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 1013
ANT Orientation:  V
EUT Orientation:  V
Test Engineer:    Chris
Voltage:          Internal Battery
Comments:
```

***SWEEP TABLE: "EIRP CDMA 850 CH8"***

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 819.3 MHz | 829.3 MHz | MaxPeak | Coupled | 3 MHz | DUMMY-DBM |

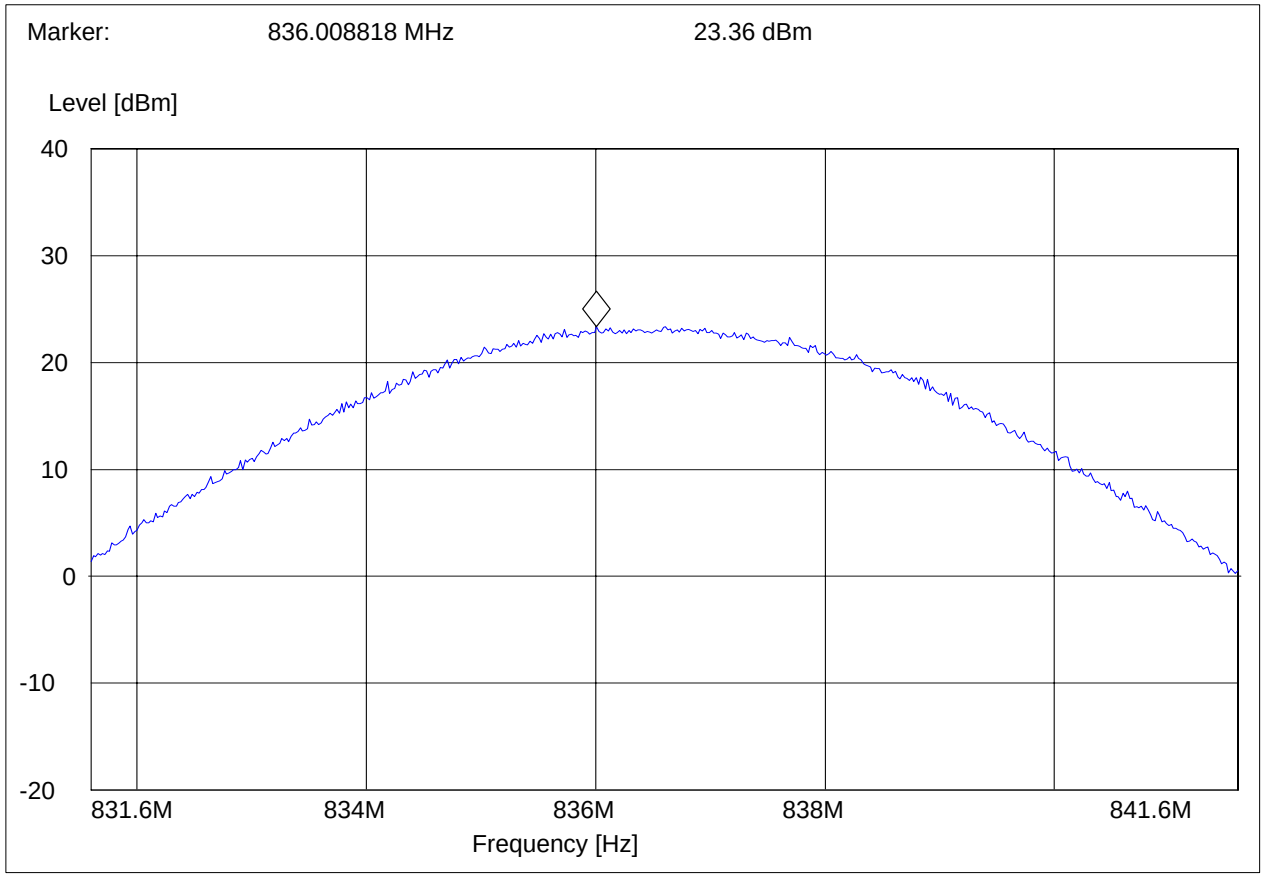


## EIRP CHANNEL 384 §22.913(a)

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 384
ANT Orientation:  H
EUT Orientation:  H
Test Engineer:    Chris
Voltage:          AC
Comments:
```

***SWEEP TABLE: "EIRP 850 CH 190 H"***

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 831.6 MHz | 841.6 MHz | MaxPeak<br>MaxPeak | Coupled | 3 MHz | DUMMY-DBM |

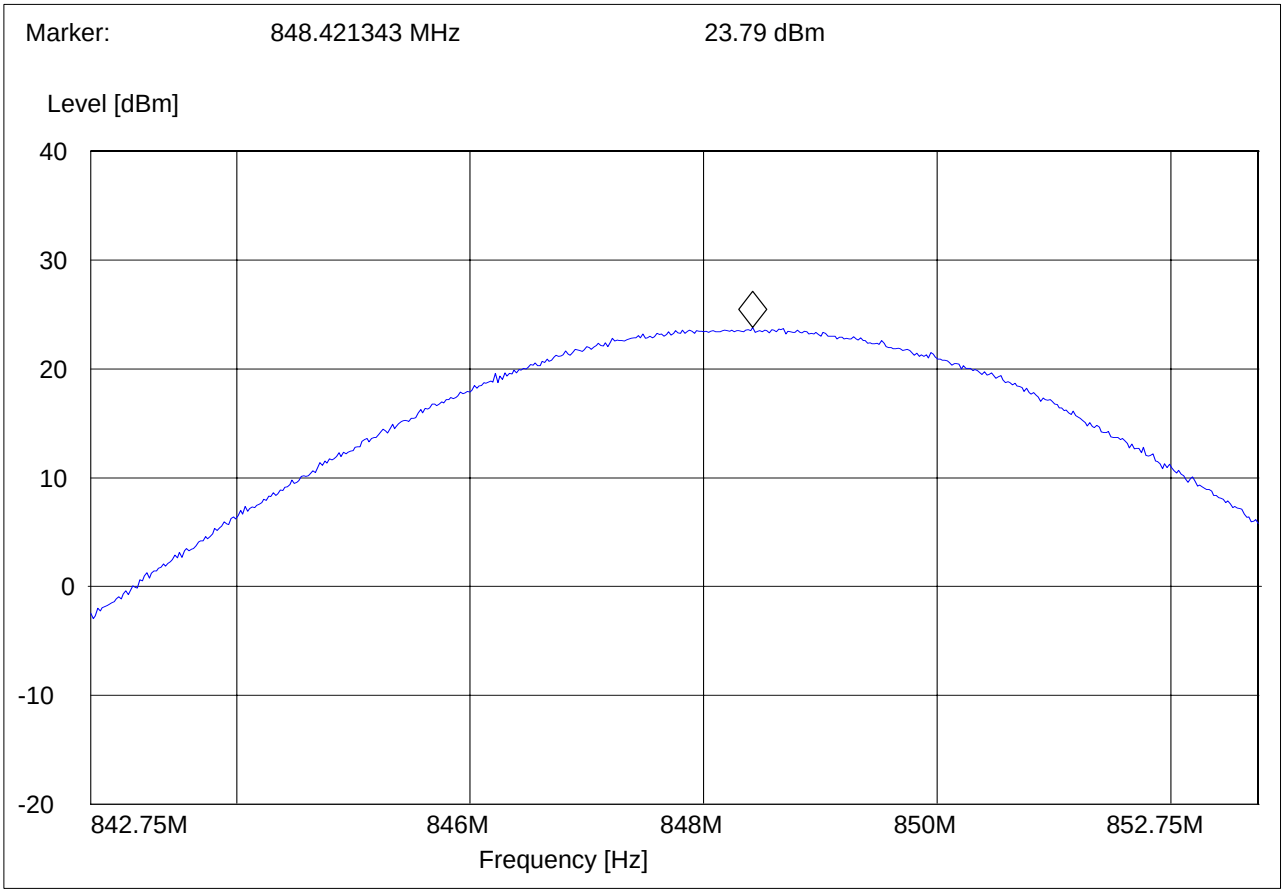


## EIRP CHANNEL 777 §22.913(a)

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 777
ANT Orientation:  V
EUT Orientation:  V
Test Engineer:    Chris
Voltage:          Internal Battery
Comments:
```

***SWEEP TABLE: "EIRP CDMA 850 CH758"***

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 842.8 MHz | 852.8 MHz | MaxPeak | Coupled | 3 MHz | DUMMY-DBM |

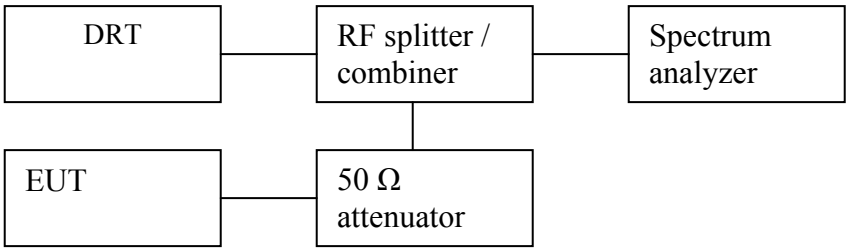


## 5.2 Occupied Bandwidth/Emission Bandwidth

### 5.2.1 FCC 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable.
(h) Transmitters employing digital modulation techniques-when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated.

### 5.2.2 Occupied / emission bandwidth measurement procedure:




1. Connect the equipment as shown in the above diagram.
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 the 99% (-20 dB) occupied bandwidth. Record the value.
4. Set the spectrum analyzer to measure the 99.5% (-26 dB) emission bandwidth. Record the value.
5. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.

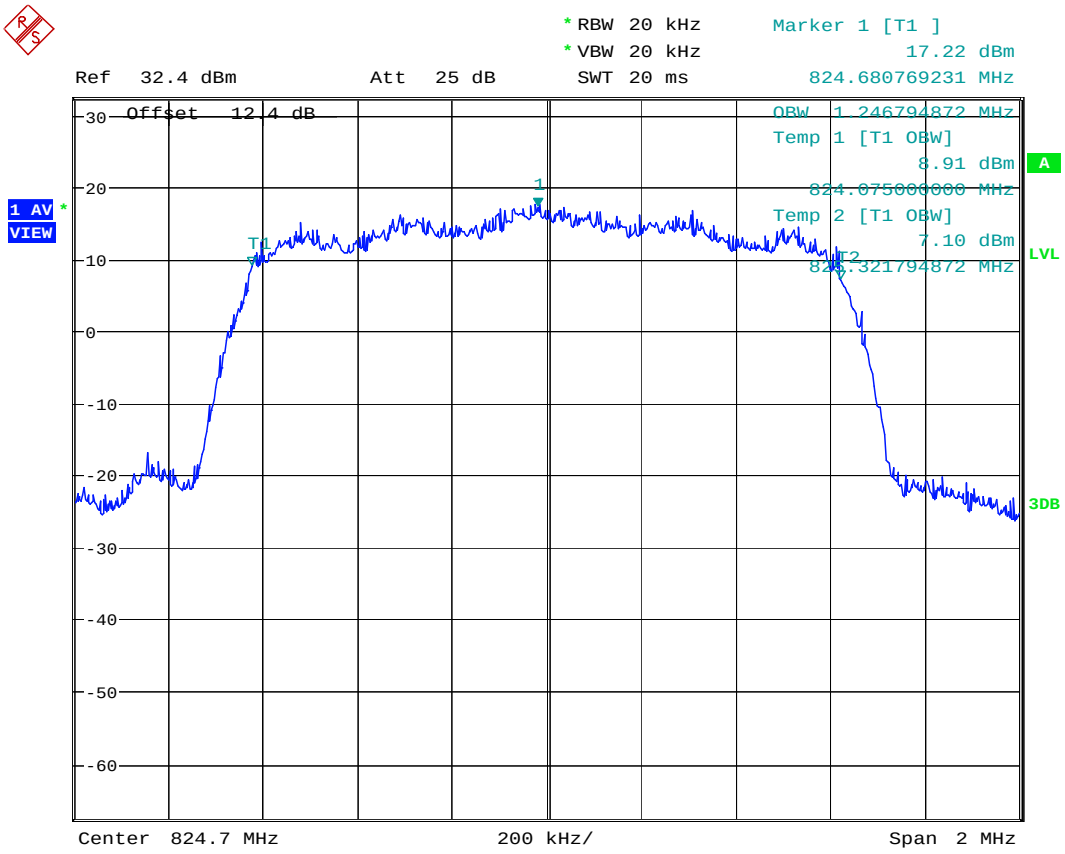
### 5.2.3 Occupied bandwidth results 850 MHz band.

| Frequency (MHz) | Occupied Bandwidth (MHz) |
|---|---|
| | CDMA |
| 824.7 | 1.246 |
| 836.52 | 1.243 |
| 848.31 | 1.246 |

### 5.2.4 Emission bandwidth results 850 MHz band.

| Frequency (MHz) | Emission Bandwidth (MHz) |
|---|---|
| | CDMA |
| 824.7 | 1.410 |
| 836.52 | 1.407 |
| 848.31 | 1.416 |

## Occupied band Width Channel 1013

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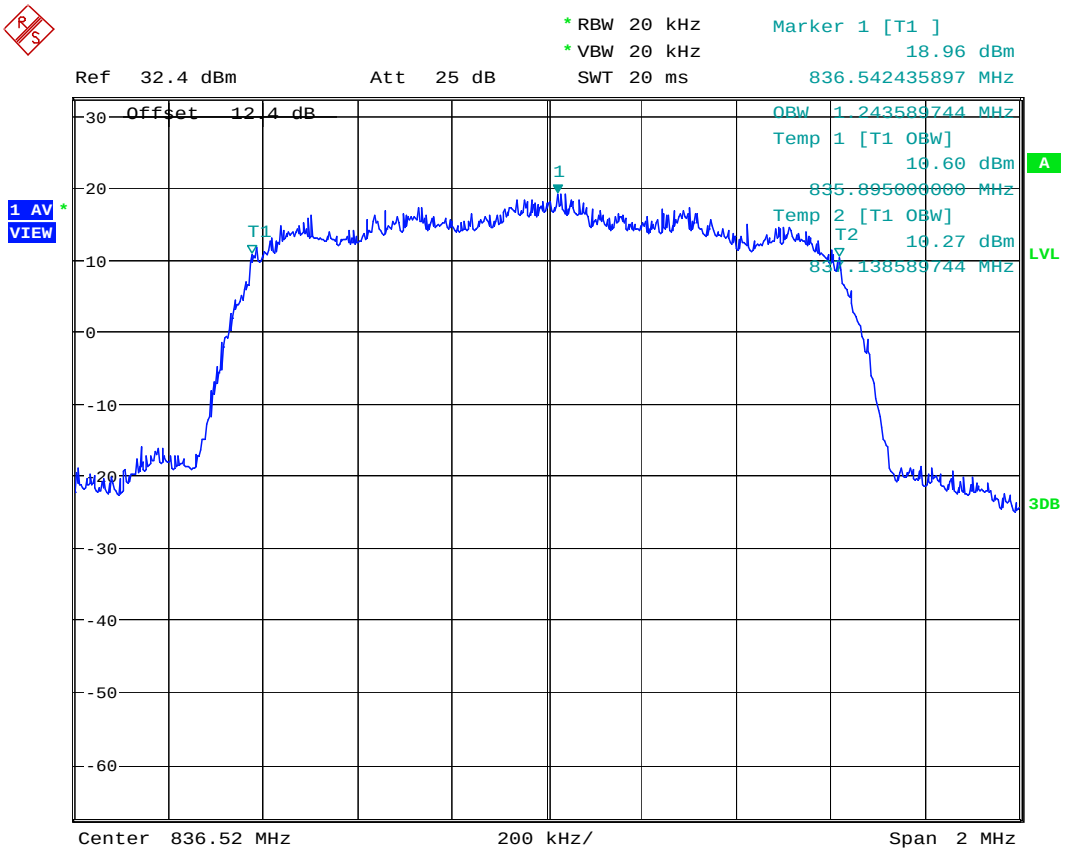
## Occupied band Width Channel 384

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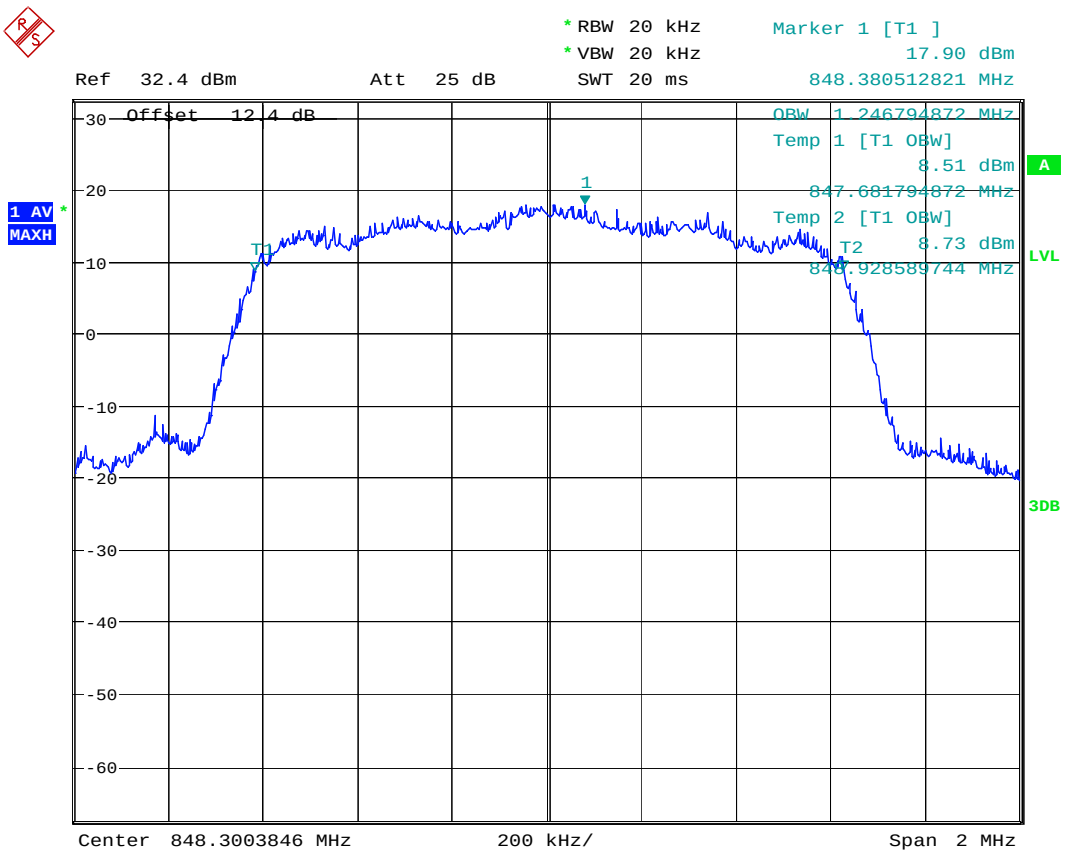
## Occupied band Width Channel 777

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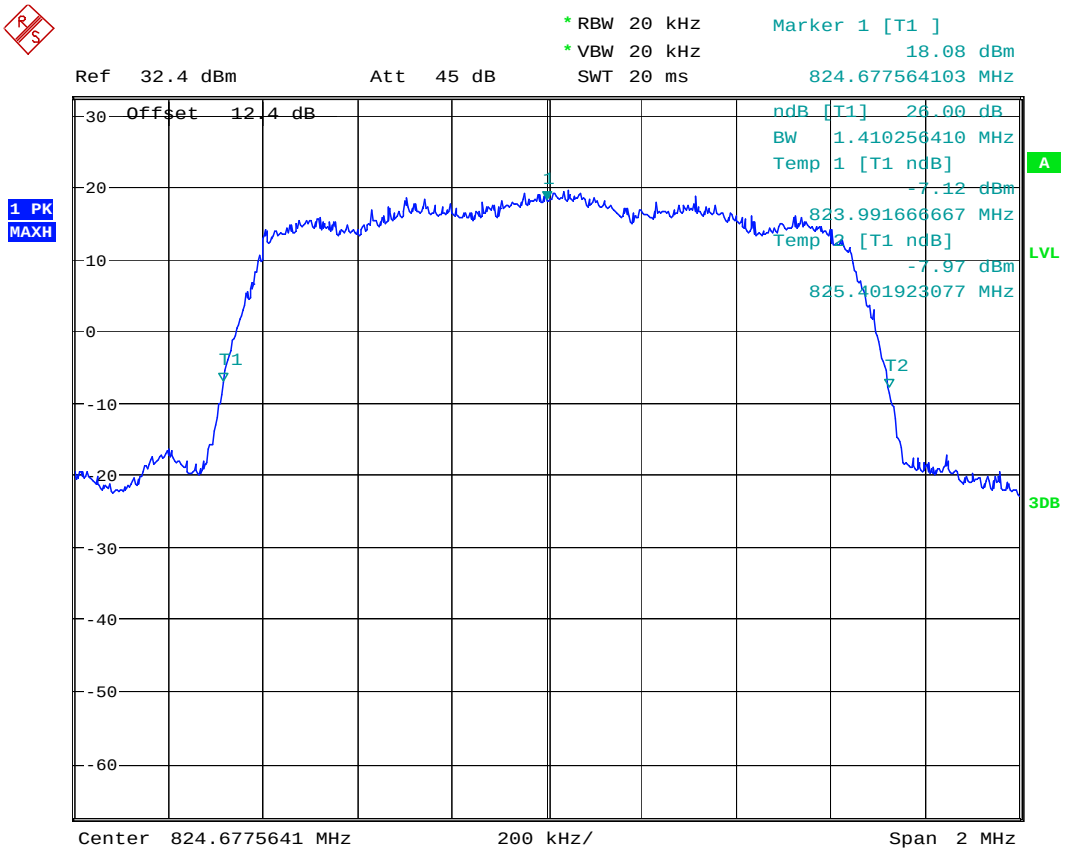
## Emission band Width Channel 1013

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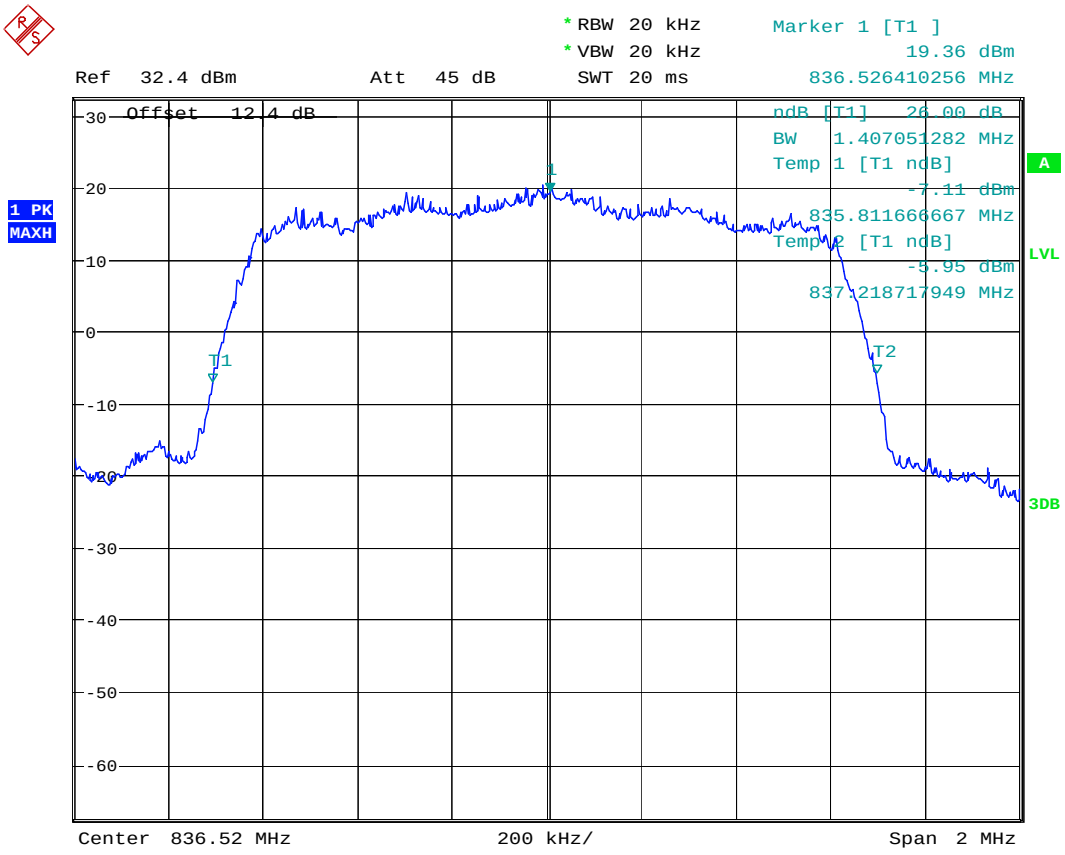
## Emission band Width Channel 384

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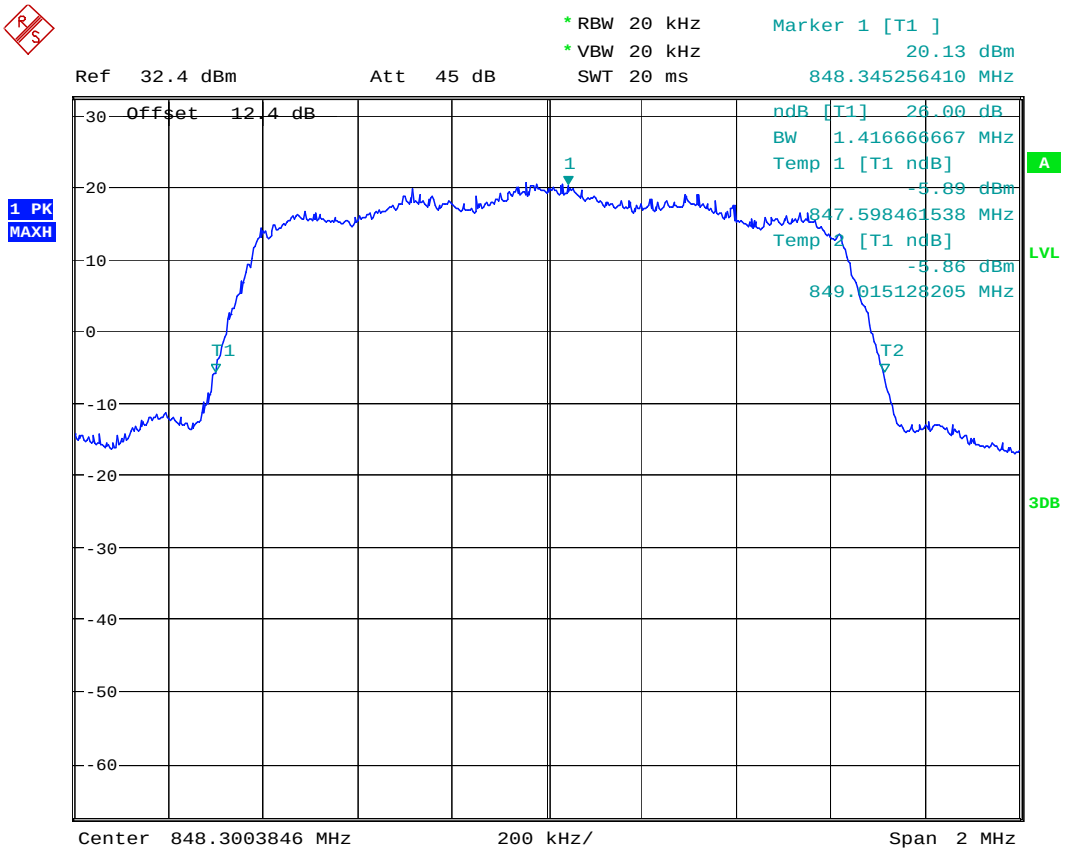
## Emission band Width Channel 777

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## 5.3 Frequency Stability

### 5.3.1 Limit

**For Hand carried battery powered equipment:**
According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.4VDC and 4.2VDC, with a nominal voltage of 3.7VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

**Method of Measurement:**
In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of R&S CMU 200 UNIVERSAL RADIO COMMUNICATION TESTER.
1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30 C.
3. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel (190 for GSM 850 & 4183 for FDD5 & 661 for PCS-1900&9400 for FDD2), measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10 C increments from -30 C to +50 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1 1/2 hours un-powered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50 C.
7. With the EUT, powered via nominal voltage, connected to the CMU 200 and in a simulated call on mid channel, measure the carrier frequency. These measurements should be made within 2 minutes of powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 C increments from +50 C to -30 C. Allow at least 1 1/2 hours at each temperature, un-powered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5 C during the measurement procedure.

**For equipment powered by primary supply voltage:**
According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 24.235, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.
For this EUT section 2.1055(d)(1) applies. This requires to vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

### 5.3.2 Test Results Frequency Stability (GSM-850)

| Channel No. 384 | 836.52MHz | |
|---|---|---|
| Voltage (V) | Freq. Error (Hz) | Freq. Error (ppm) |
| **Low vol.:** | 10 | 0.01195 |
| **High vol.:** | 11 | 0.01314 |

**§2.1055 (a)(1)**
AFC FREQ ERROR vs. TEMPERATURE

| Channel No. 384 | 836.52MHz | |
|---|---|---|
| Temperature (°C) | Freq. Error (Hz) | Freq. Error (ppm) |
| -30 | 8 | 0.00956 |
| -20 | 12 | 0.01434 |
| -10 | 10 | 0.01195 |
| 0 | 12 | 0.01434 |
| +10 | 9 | 0.01075 |
| +20 | 11 | 0.01314 |
| +30 | 12 | 0.01434 |
| +35 | 10 | 0.01195 |
| +50 | 10 | 0.01195 |

## 5.4 Spurious Emissions Conducted

### 5.4.1 FCC 2.1051 Measurements required: Spurious emissions at antenna terminals.

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in FCC 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

### 5.4.2 Limits:

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

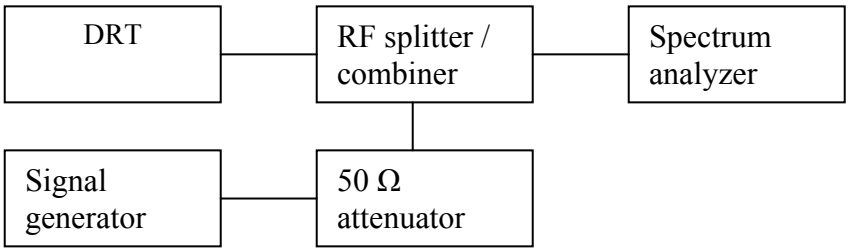
The rules in this section govern the spectral characteristics of emissions in the Cellular Radiotelephone Service.

(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.

### 5.4.3 Conducted out of band emissions measurement procedure:

**Based on TIA-603C 2004**
**2.2.13 Unwanted Emissions: Conducted Spurious**




1. Connect the equipment as shown in the above diagram.
2. Set the spectrum analyzer to measure peak hold with the required settings.
3. Set the signal generator to a known output power and record the path loss in dB (**LOSS)** for frequencies up to the tenth harmonic of the EUT's carrier frequency. **LOSS** = Generator Output Power (dBm) – Analyzer reading (dBm).
4. Replace the signal generator with the EUT.
5. Adjust the settings of the Digital Radiocommunication Tester (DRT) to set the EUT to its maximum power at the required channel.
6. Set the spectrum analyzer to measure peak hold with the required settings. Offset the spectrum analyzer reference level by the path loss measured above.
7. Measure and record all spurious emissions up to the tenth harmonic of the carrier frequency.
8. Measurements are to be performed with the EUT set to the low, middle and high channel of each frequency band.
9. If necessary steps 6 and 7 may be performed with the spectrum analyzer set to average detector.

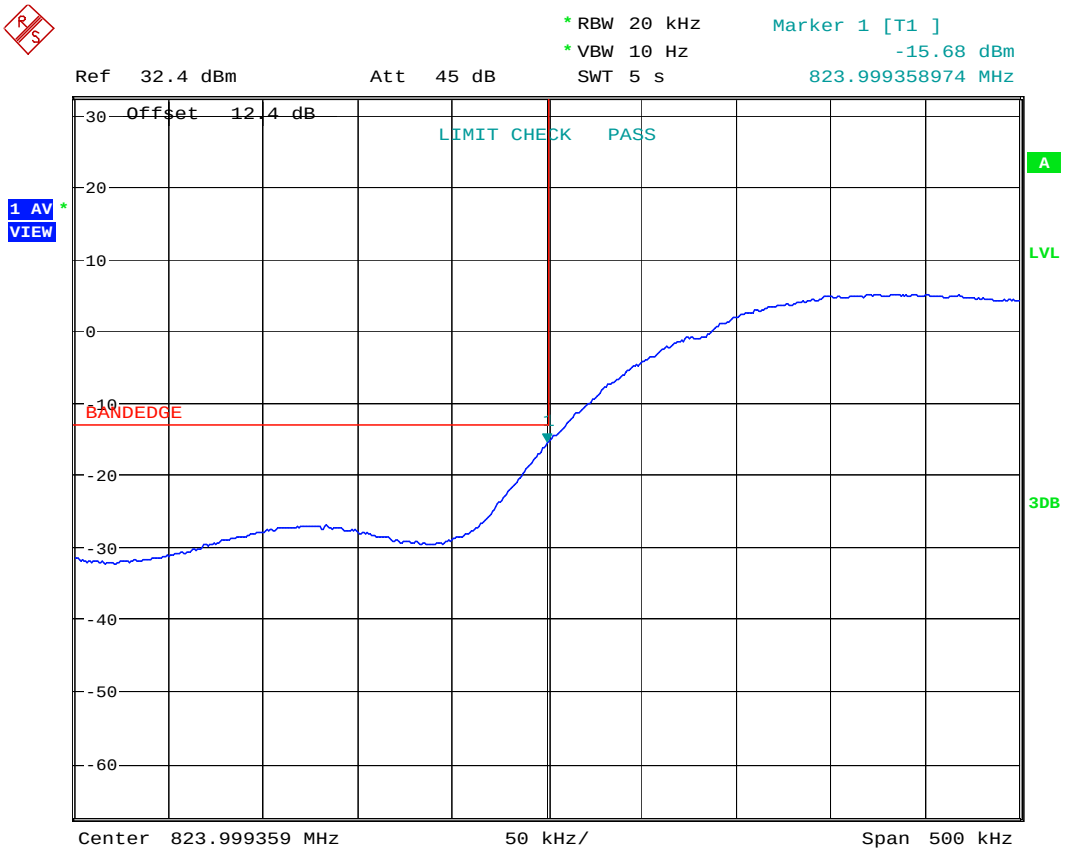
(**note:** Step 3 above is performed prior to testing and **LOSS** is recorded by test software. Steps 2, 6, and 7 above are performed with test software.)

### 5.4.4 Test Results: Conducted Out of band Emission:

No measurable emissions noted. See plots.

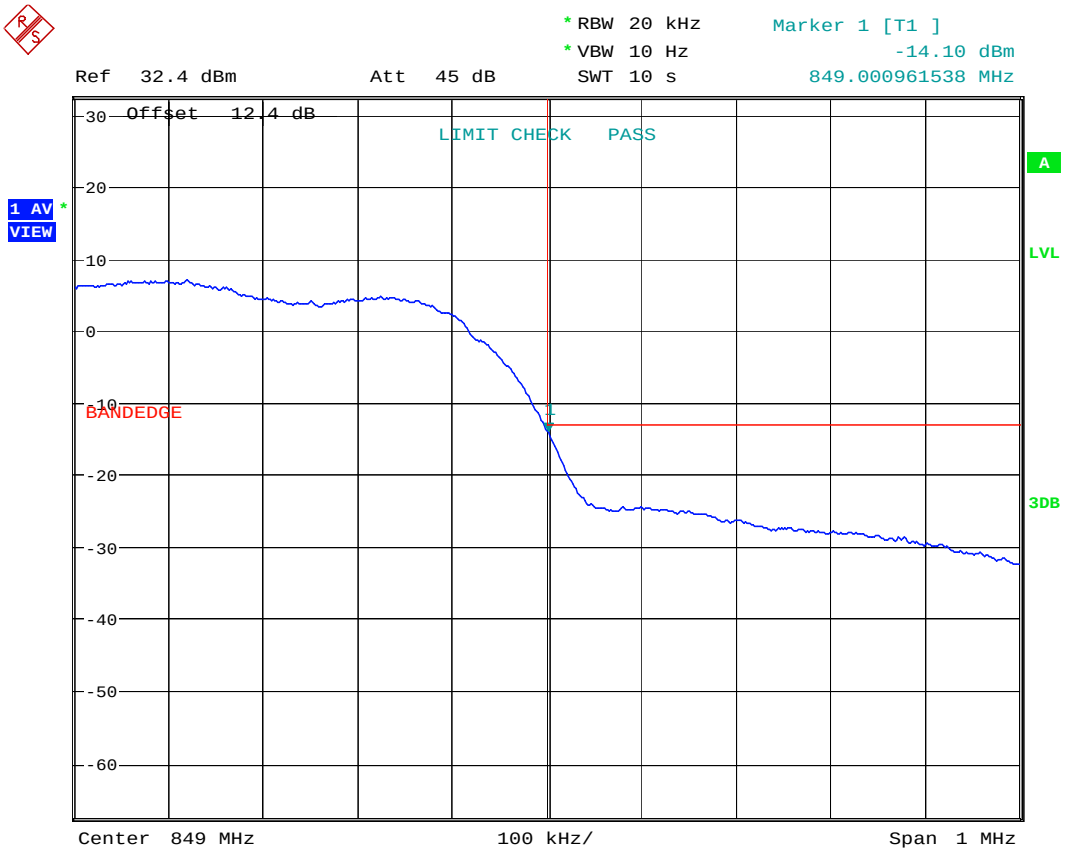
All measurement conducted with highest power settings. Plots here show worse case emission for each channel under any modulation.

## Lower Band Edge



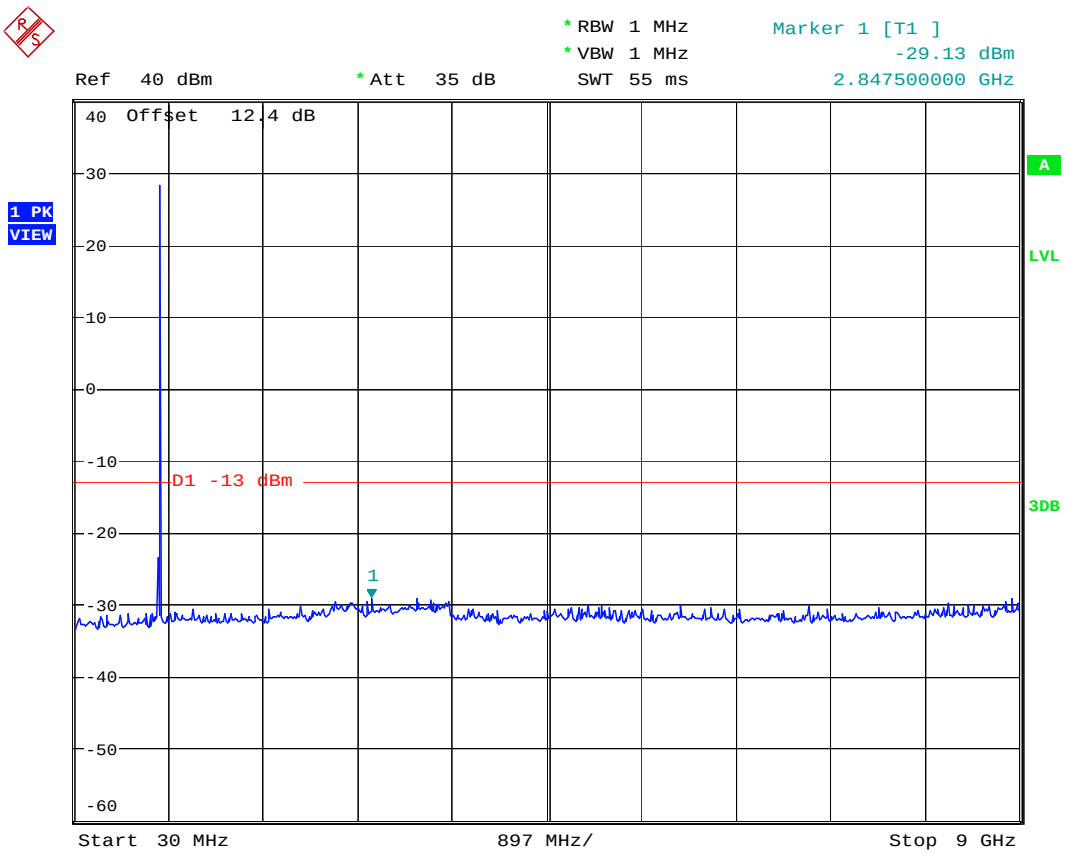

Date: 17.OCT.2008 16:14:41

## Upper Band Edge



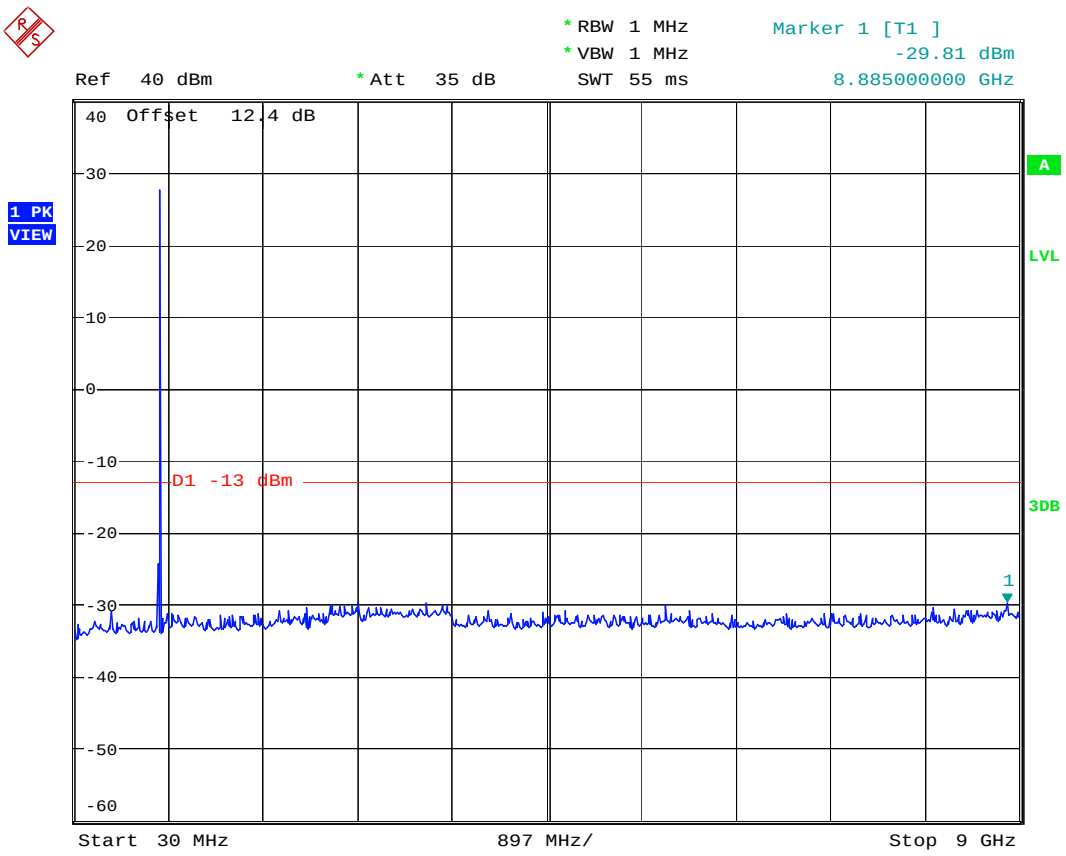

Date: 17.OCT.2008 16:22:22

## Conducted Out of band Emission channel 1013:



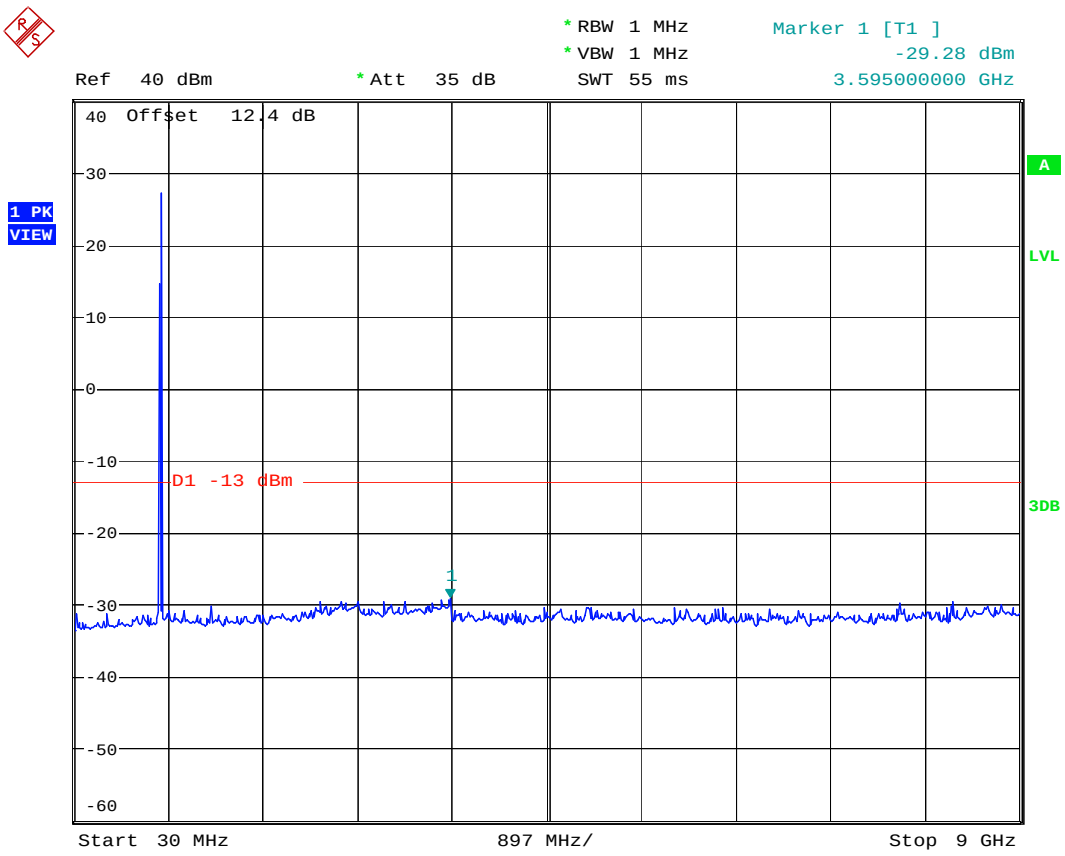

Date: 22.OCT.2008 10:31:02

## Conducted Out of band Emission channel 384:




Date: 22.OCT.2008 10:41:53

## Conducted Out of band Emission channel 777:




Date: 22.OCT.2008 10:44:29

## 5.5 Spurious Emissions Radiated

### 5.5.1 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.

### 5.5.2 Limits:

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

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

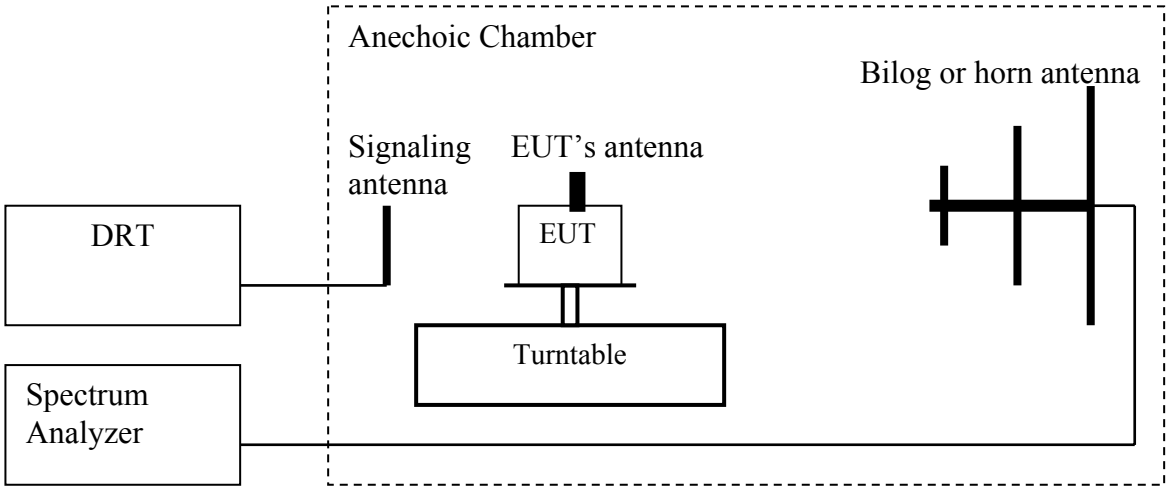
(a) *Out of band emissions*. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

(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.

### 5.5.3 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: **Spurious** (dBm) = **LVL** (dBm) + **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: **Spurious** (dBm) = **LVL** (dBm) + **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 Surve**y:

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.

Radiated emission measurements were made only with Circuit Switched mode GMSK modulation because this mode represents the worse case emission for all the modulations for GSM. See section 5.5.4.1 and 5.5.4.3

Radiated emissions measurements were made also with UMTS FDD mode. See section 5.5.4.2 and 5.5.4.4

### 5.5.4 Radiated out of band emissions results on EUT:

#### 5.5.4.1 Test Results Transmitter Spurious Emission GSM850:

| 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** | NF | **1673.2** | NF | **1697.6** | NF |
| **3** | **2472.6** | NF | **2509.8** | NF | **2546.4** | NF |
| **4** | **3296.8** | NF | **3346.4** | NF | **3395.2** | NF |
| **5** | **4121** | NF | **4183** | NF | **4244** | NF |
| **6** | **4945.2** | NF | **5019.6** | NF | **5092.8** | NF |
| **7** | **5769.4** | NF | **5856.2** | NF | **5941.6** | NF |
| **8** | **6593.6** | NF | **6692.8** | NF | **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 TX: 30MHz - 1GHz**
Spurious emission limit –13dBm
**Antenna: vertical**

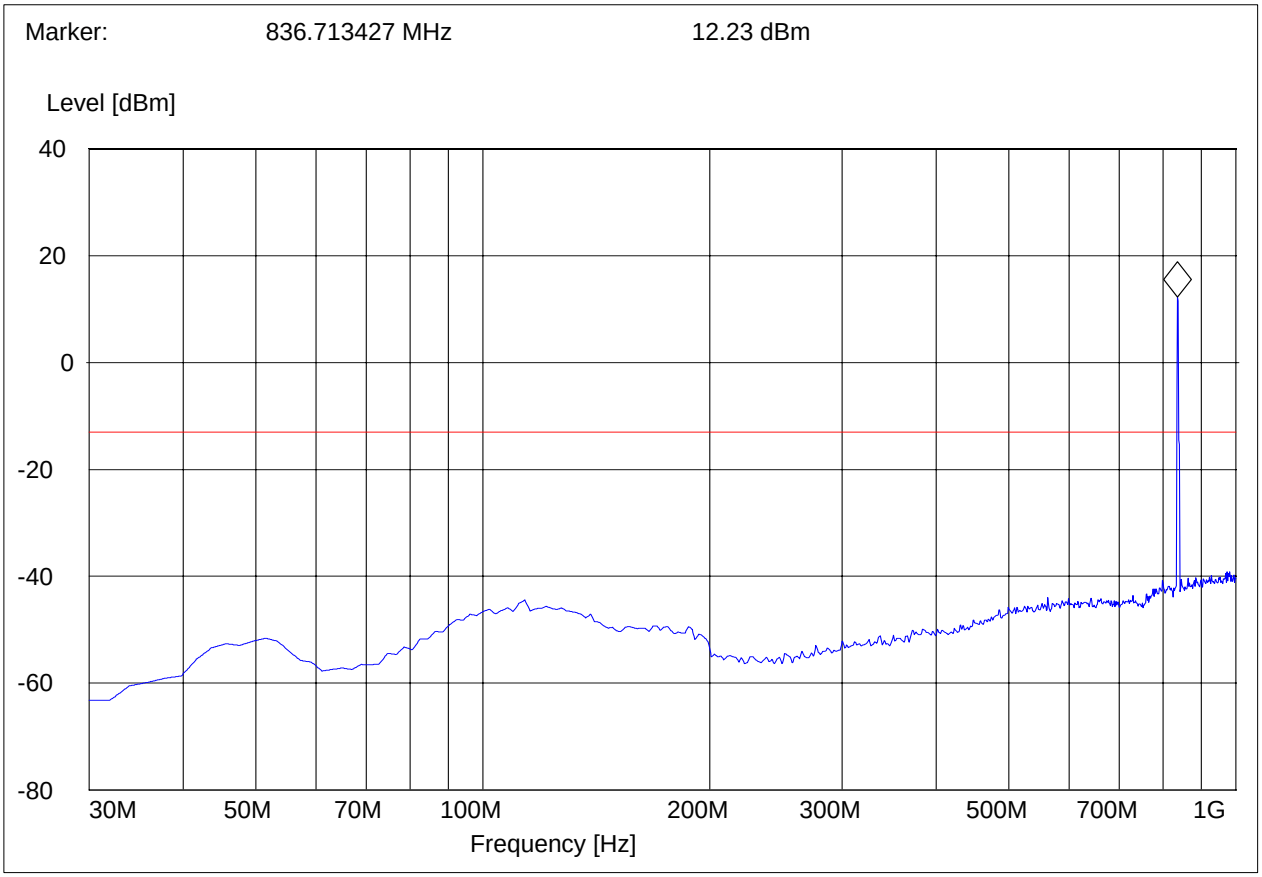
**Note:**

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

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 384
ANT Orientation:  V
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

***SWEEP TABLE: "FCC 24 Spur 30M-1G_V"***

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



**RADIATED SPURIOUS EMISSIONS TX: 30MHz - 1GHz**
Spurious emission limit –13dBm
**Antenna: horizontal**

**Note:**

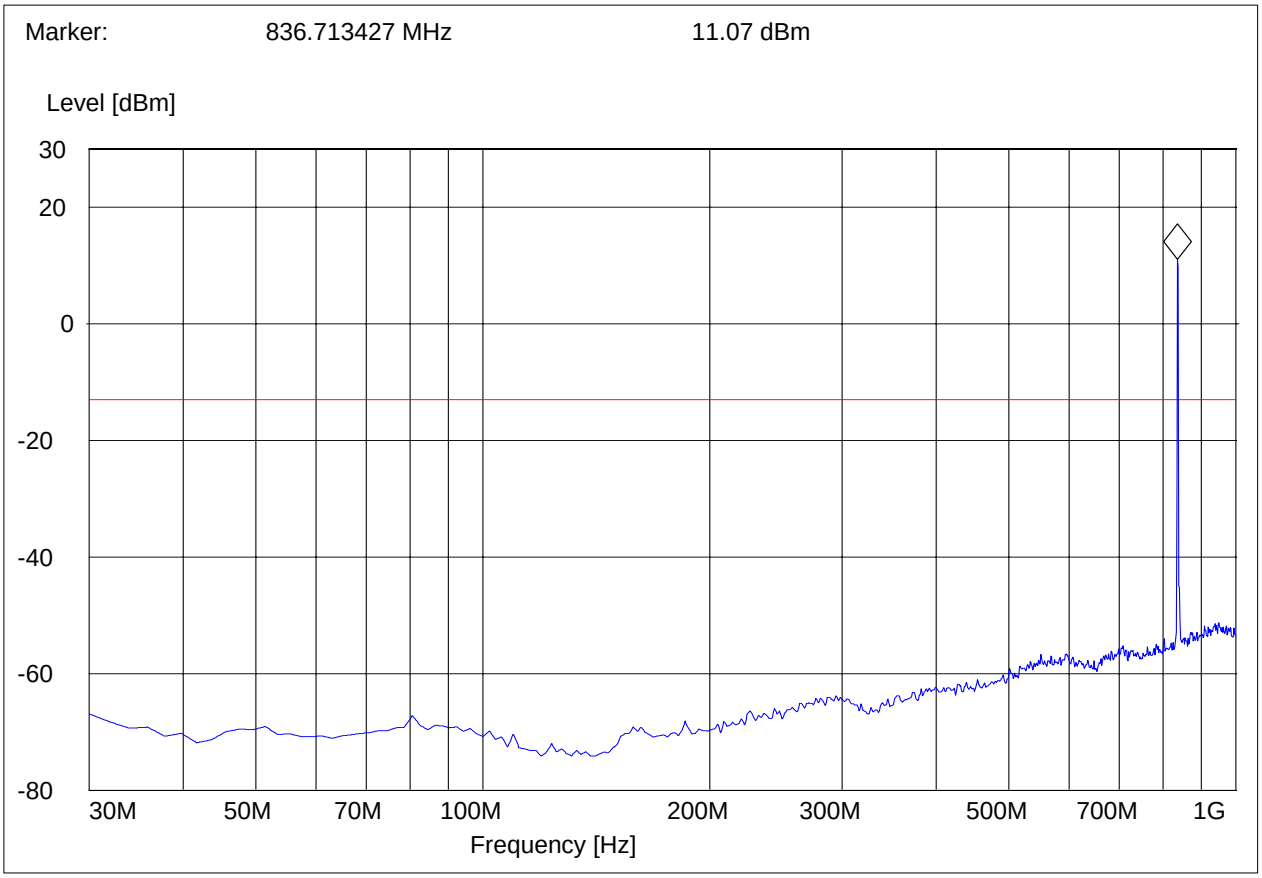
**1.The peak above the limit line is the carrier freq.**

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

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 384
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

***SWEEP TABLE: "FCC 24 Spur 30M-1G_H"***

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | DUMMY-DBM |

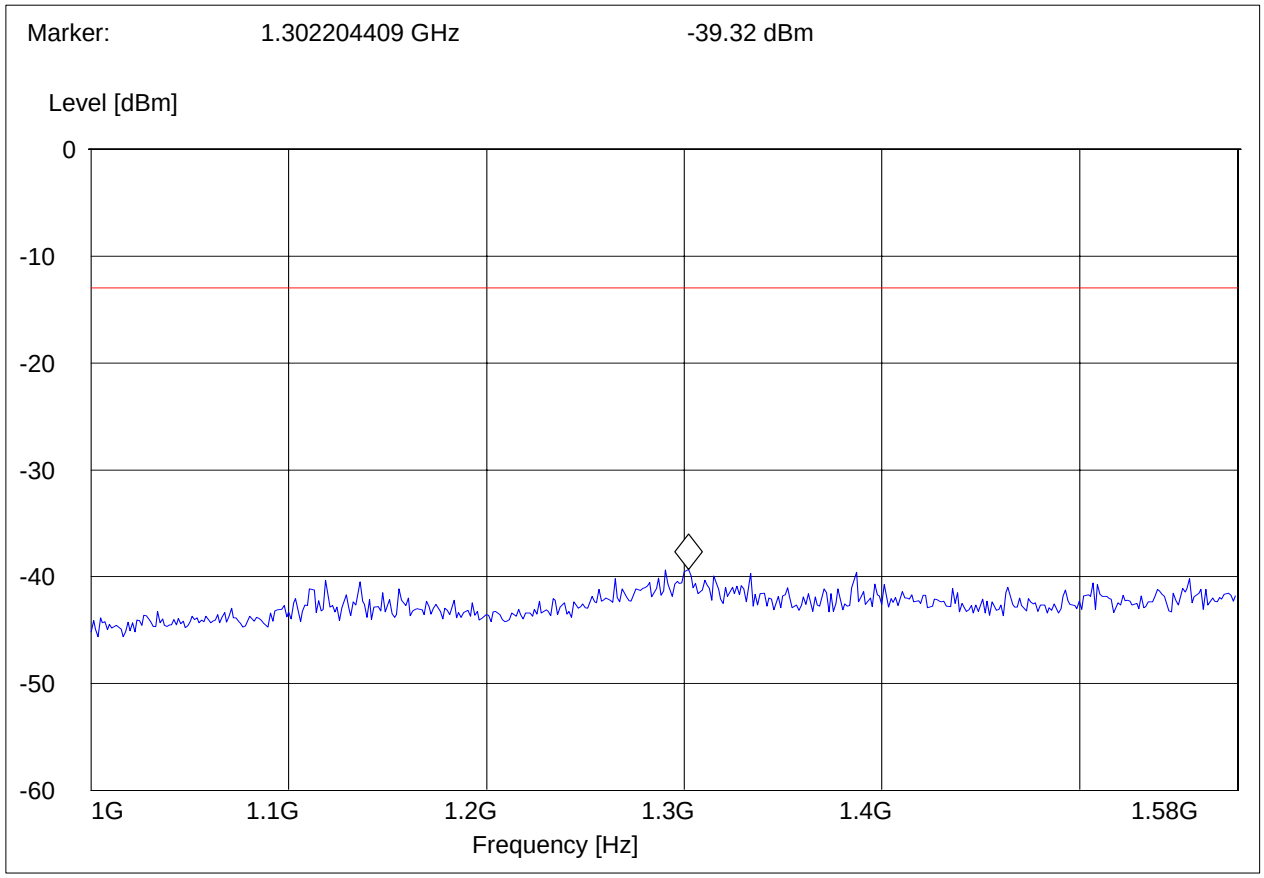


## RADIATED SPURIOUS EMISSIONS CHANNEL 1013 Tx : 1GHz – 1.58GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 1013
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

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

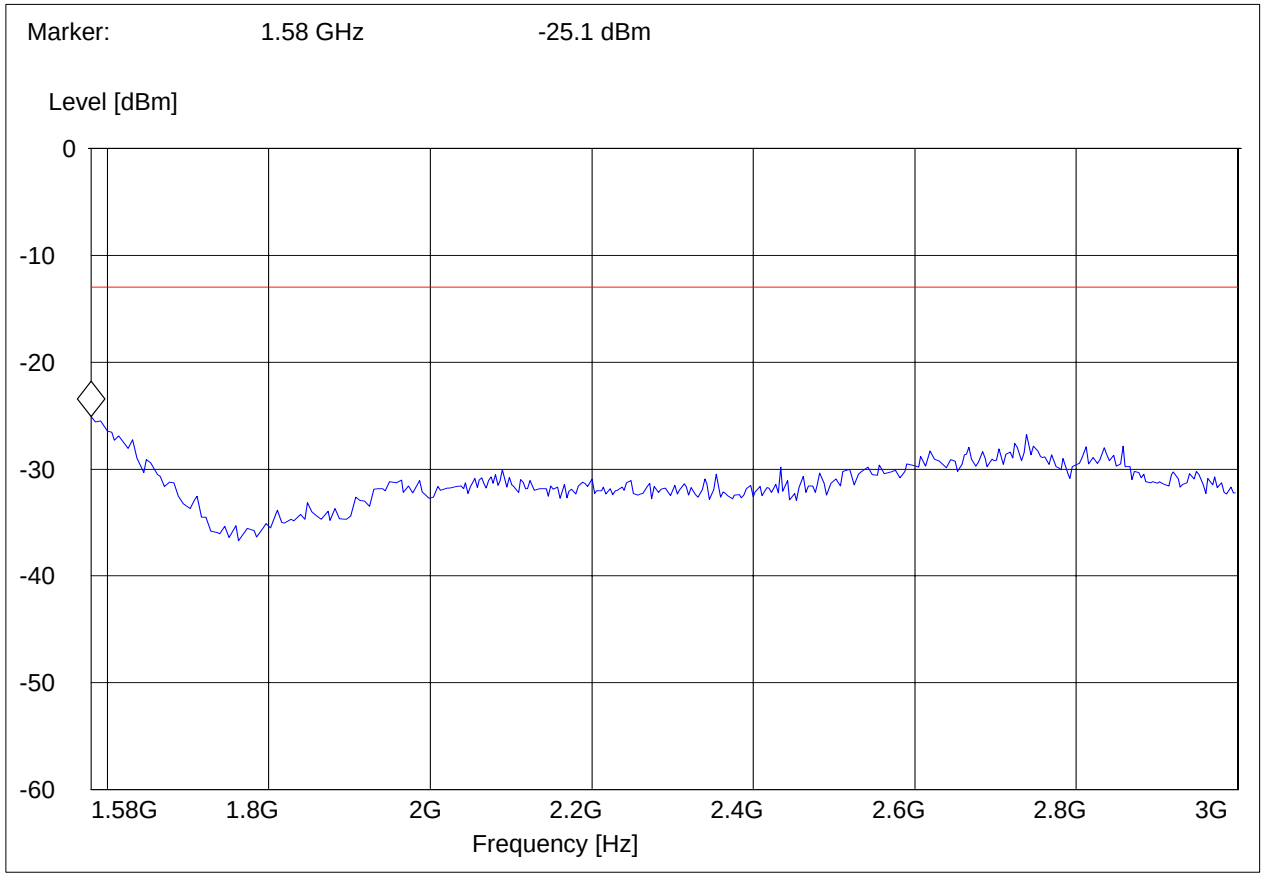


## RADIATED SPURIOUS EMISSIONS Tx CHANNEL 1013: 1.58GHz – 3GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 1013
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 1.6 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | DUMMY-DBM |

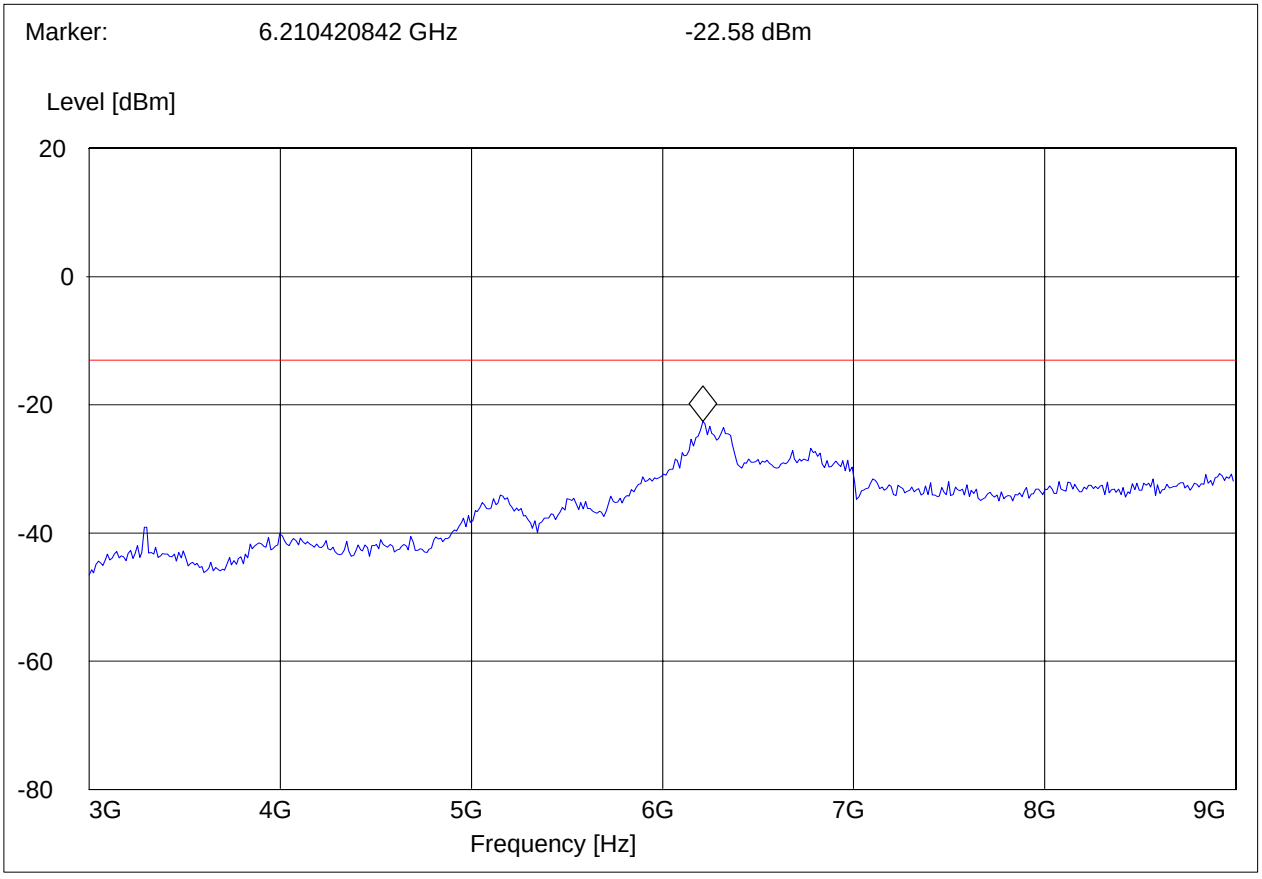


## RADIATED SPURIOUS EMISSIONS Tx CHANNEL 1013: 3GHz – 9GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 1013
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

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

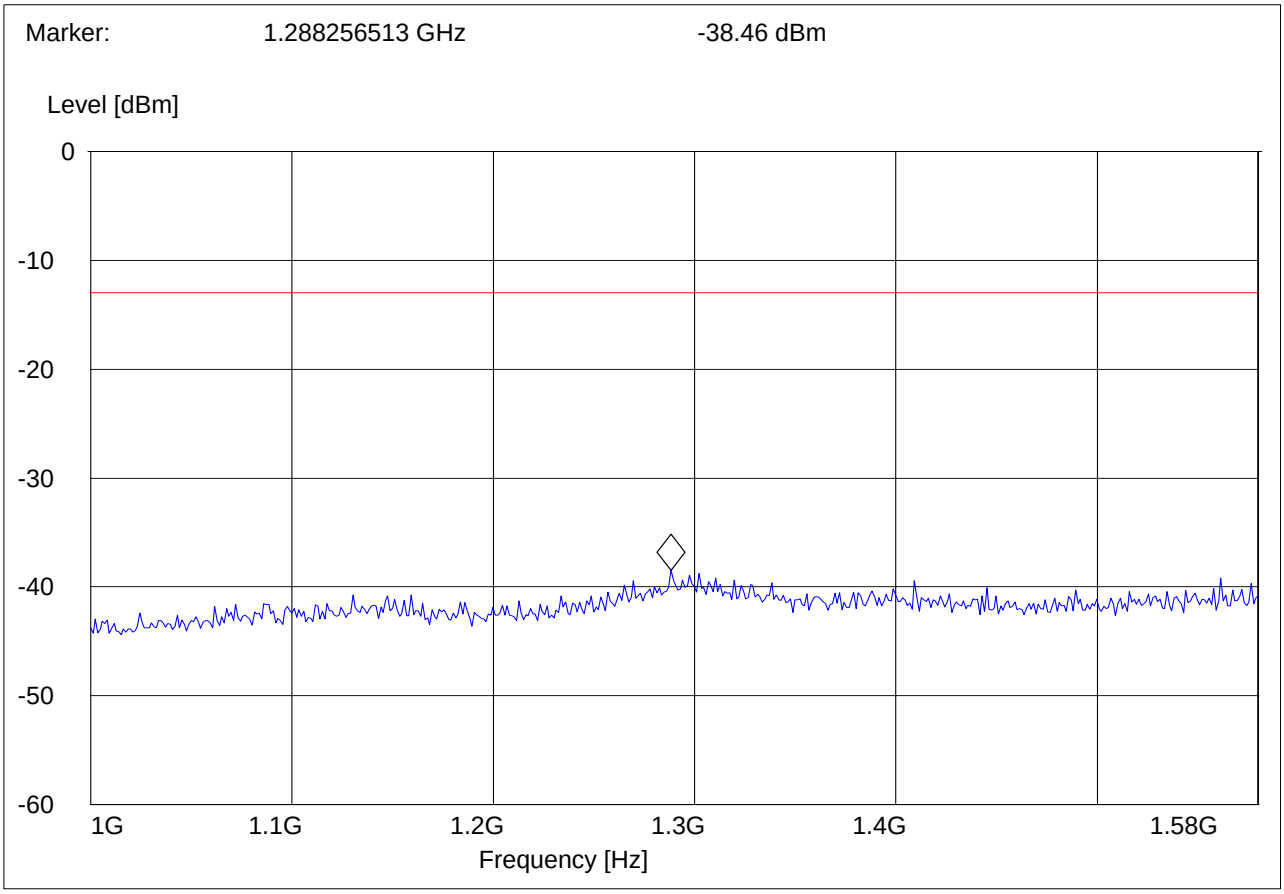


## RADIATED SPURIOUS EMISSIONS CHANNEL 384 Tx : 1GHz – 1.58GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 384
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

***SWEEP TABLE: "FCC 24 Spur 30M-1G_H"***

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 30.0 MHz | 1.0 GHz | MaxPeak | Coupled | 100 kHz | DUMMY-DBM |

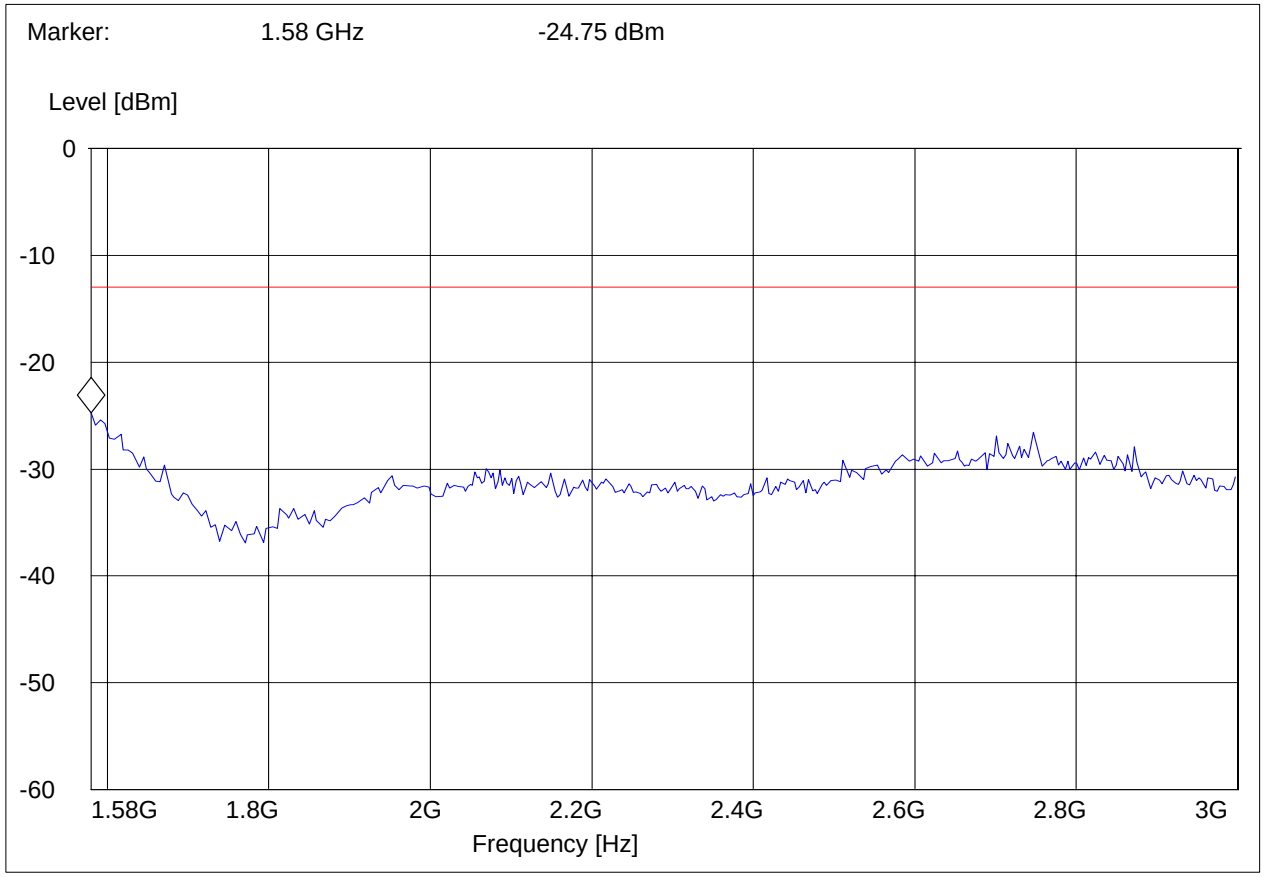


## RADIATED SPURIOUS EMISSIONS Tx CHANNEL 384: 1.58GHz – 3GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 384
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 1.6 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | DUMMY-DBM |

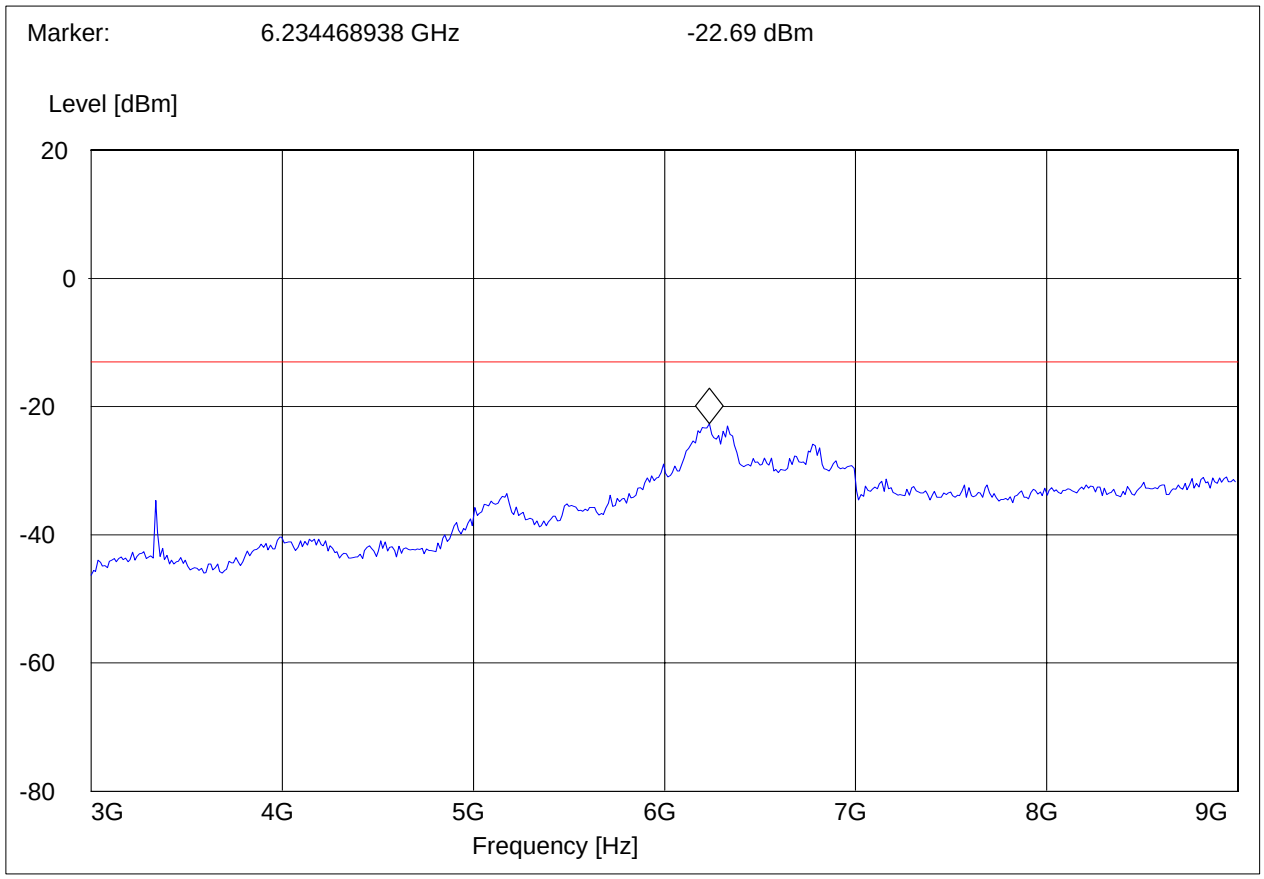


## RADIATED SPURIOUS EMISSIONS Tx CHANNEL 384: 3GHz – 9GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 384
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

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

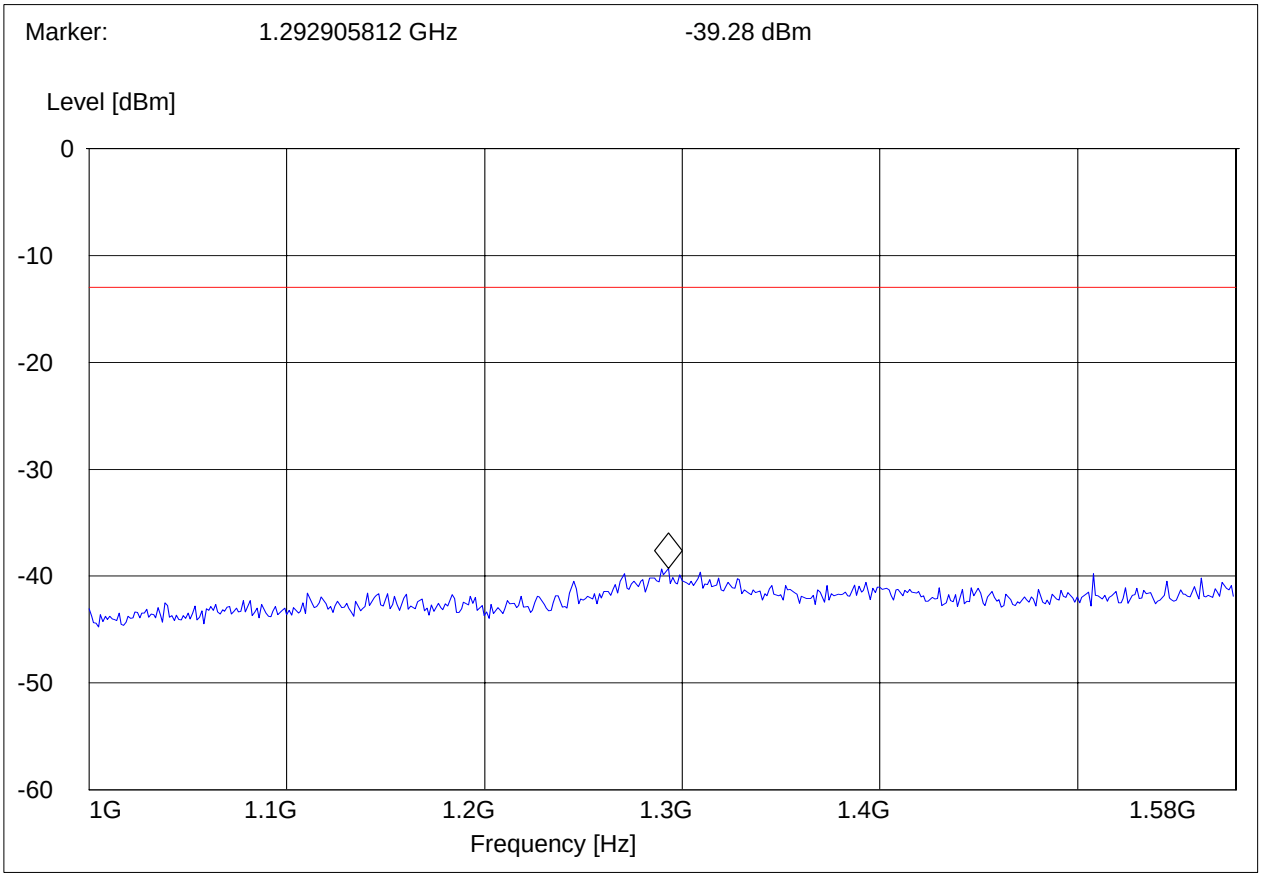


## RADIATED SPURIOUS EMISSIONS CHANNEL 777 Tx : 1GHz – 1.58GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 777
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

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

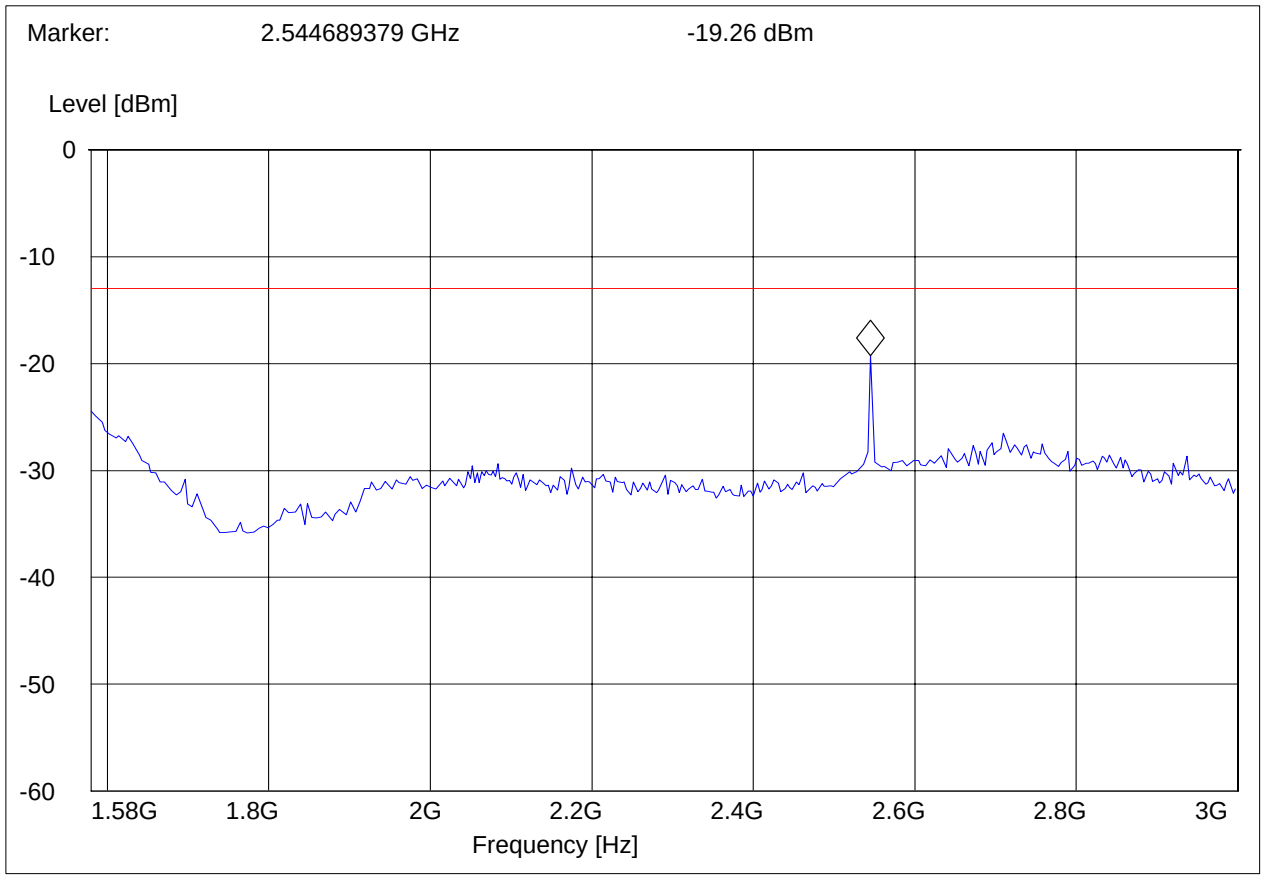


## RADIATED SPURIOUS EMISSIONS Tx CHANNEL 777: 1.58GHz – 3GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 777
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

| Start Frequency | Stop Frequency | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|
| 1.6 GHz | 3.0 GHz | MaxPeak | Coupled | 1 MHz | DUMMY-DBM |

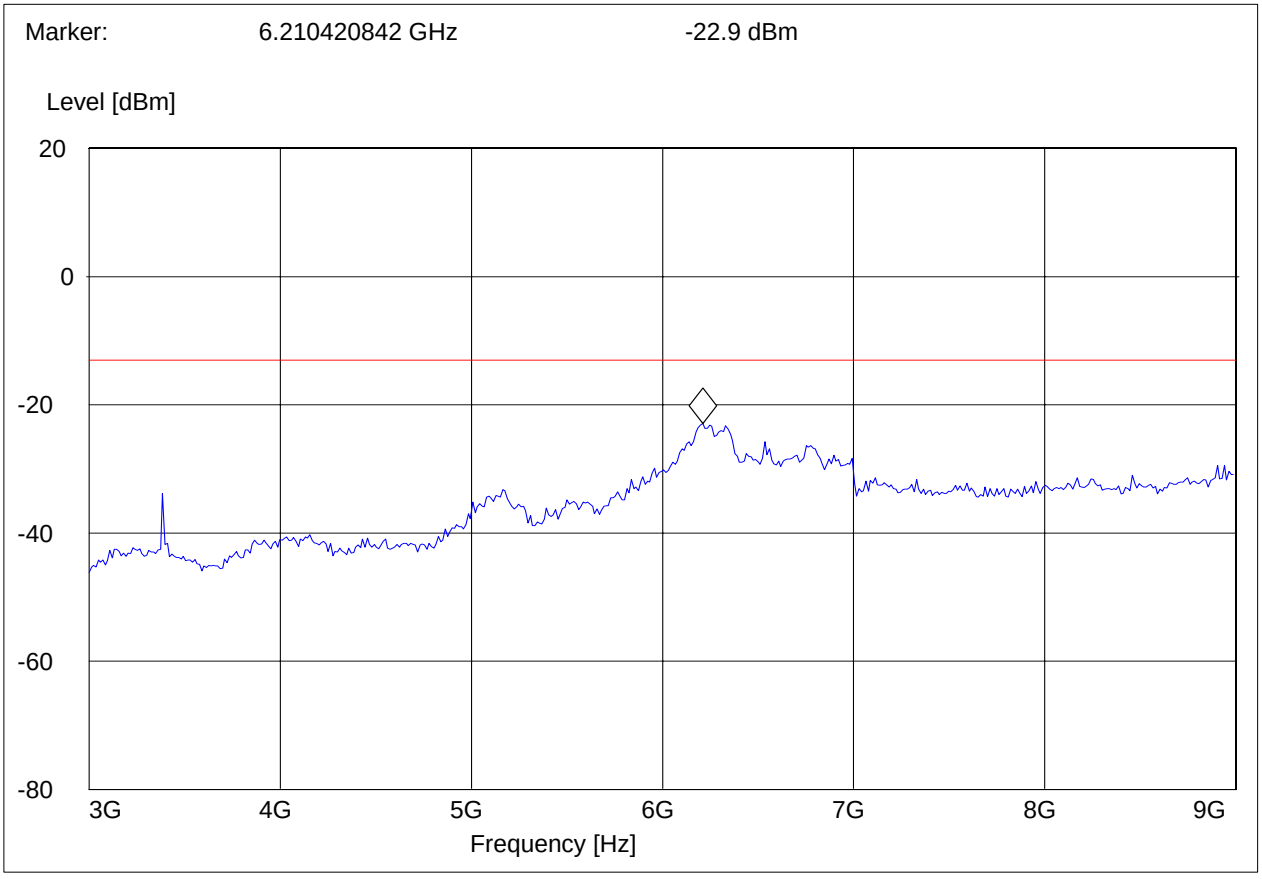


## RADIATED SPURIOUS EMISSIONS Tx CHANNEL 777: 3GHz – 9GHz

```
EUT:              CDMA CA001
Customer::        Casio Hitachi
Test Mode:        CDMA 850; CH 777
ANT Orientation:  H
EUT Orientation:  On Cradle
Test Engineer:    Chris
Voltage:          AC + Internal Battery
Comments:
```

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

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



## 5.6 AC POWER LINE CONDUCTED EMISSIONS § 15.107/207

### 5.6.1 Limits

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

§15.207 (a) Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

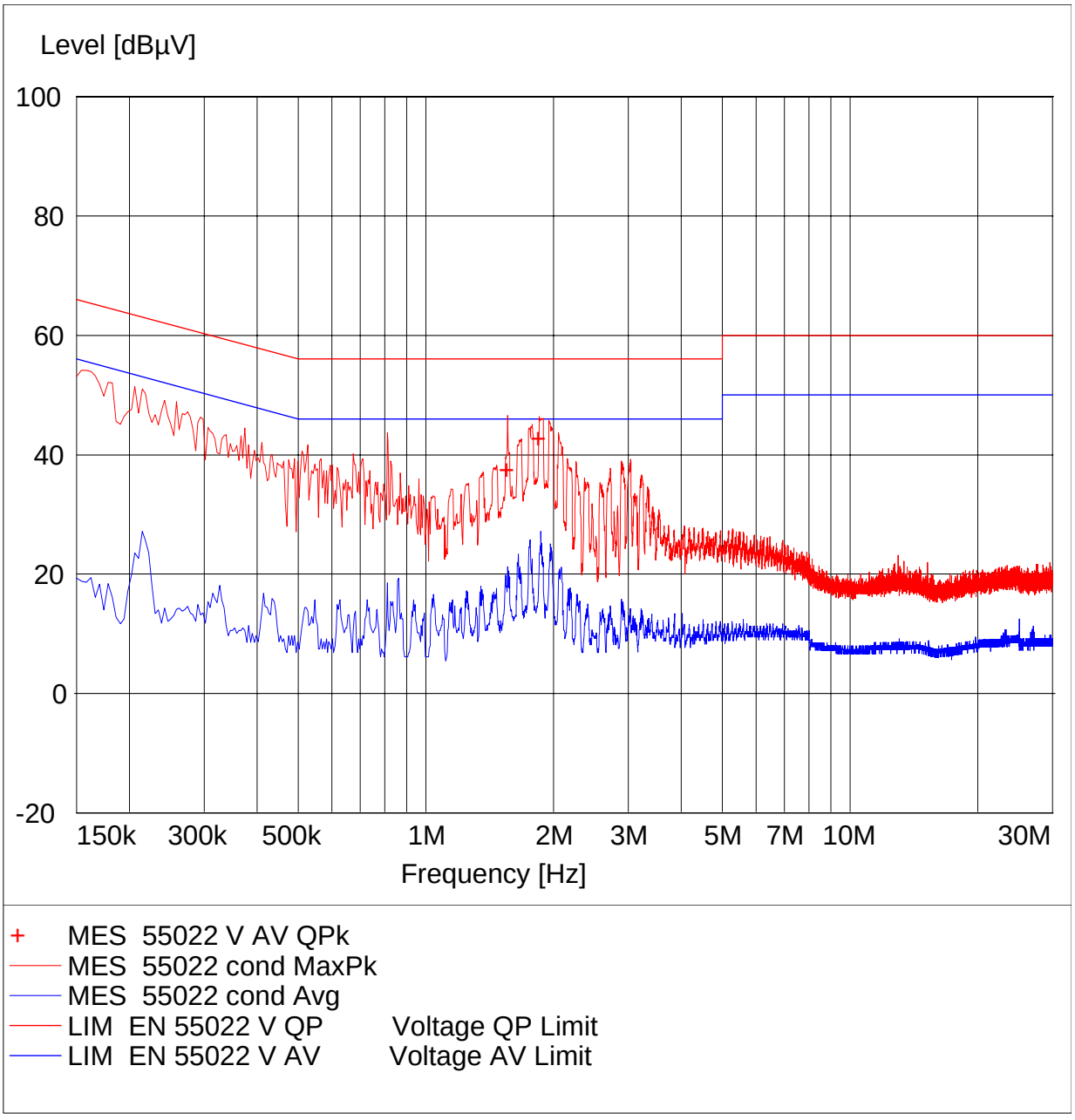
**Limit**

| Frequency of Emission (MHz) | Conducted Limit (dBµV) | |
|---|---|---|
| | 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**

**Line:**

```
EUT:              CDMA CA001
Customer:     Casio Hitachi
Test Mode:        CDMA 850
ANT Orientation:: N/A
EUT Orientation:: H; On cradle
Test Engineer::   Chris
Power Supply: :   AC + Internal Battery
Comments:  :      Line
```



***MEASUREMENT RESULT: "55022 V AV QPk"***

10/16/2008 9:08AM

| Frequency | Level | Transd | Limit | Margin | Line | PE | AUX STATE |
|---|---|---|---|---|---|---|---|
| MHz | dBµV | dB | dBµV | dB | | | |
| 1.558000 | 37.40 | 0.2 | 56 | 18.6 | 1 | --- | OFF |
| 1.850000 | 42.80 | 0.2 | 56 | 13.2 | 1 | --- | OFF |

***LIMIT LINE: "EN 55022 V AV"***

Short Description: Voltage AV Limit

4/27/1998 2:24PM

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

***LIMIT LINE: "EN 55022 V QP"***

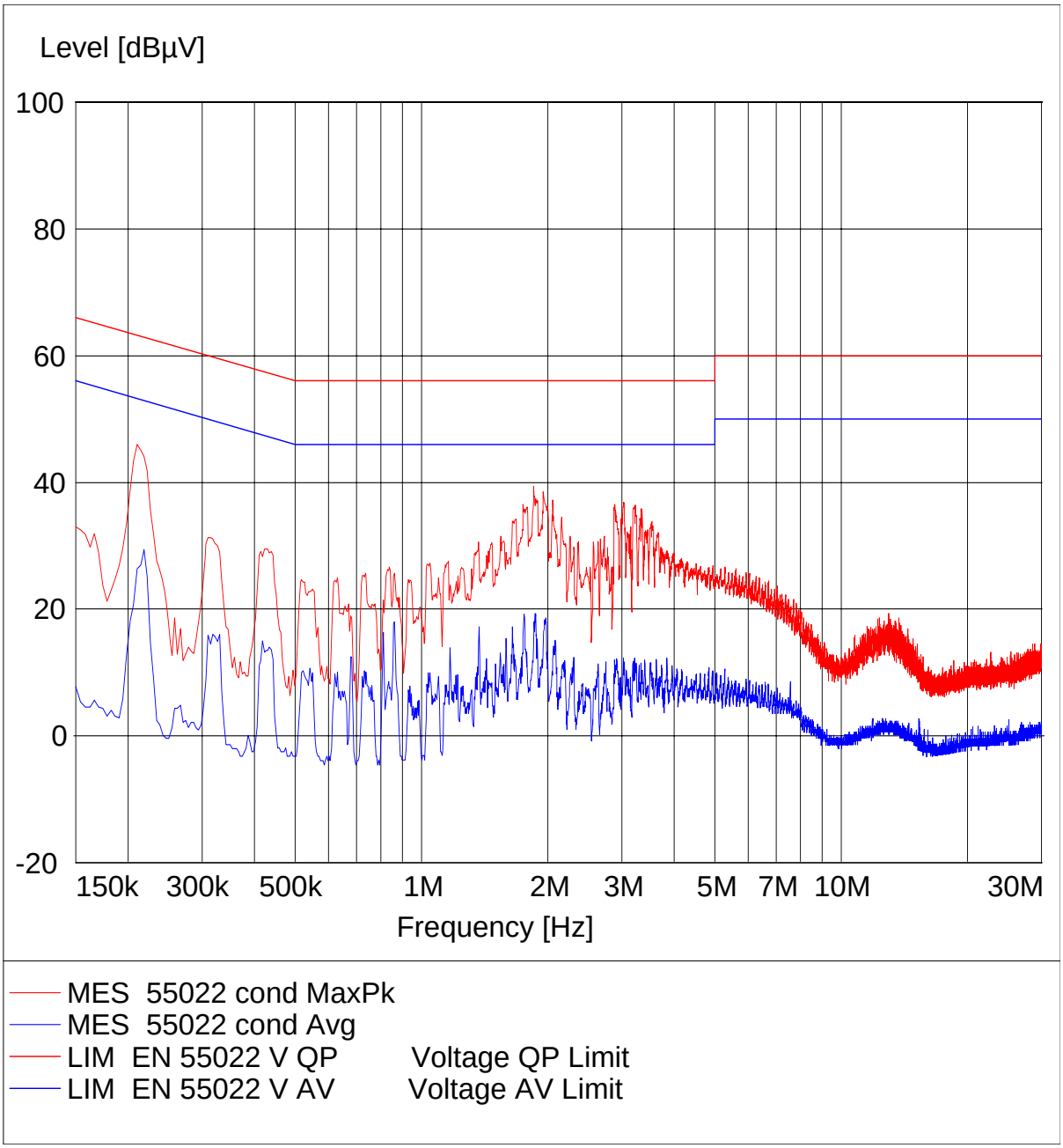
Short Description: Voltage QP Limit

4/27/1998 2:24PM

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

**Neutral:**

```
EUT:              CDMA CA001
Customer:     Casio Hitachi
Test Mode:        CDMA 850
ANT Orientation:: N/A
EUT Orientation:: H; On cradle
Test Engineer::   Chris
Power Supply: :   AC + Internal Battery
Comments:  :      Neutral
```



***LIMIT LINE: "EN 55022 V AV"***

```
  Short Description:            Voltage AV Limit
4/27/1998  2:24PM
   Frequency    Level
         MHz     dBµV

    0.150000    56.00
    0.500000    46.00
    5.000000    46.00
    5.000000    50.00
   30.000000    50.00
```

***LIMIT LINE: "EN 55022 V QP"***

```
  Short Description:            Voltage QP Limit
4/27/1998  2:24PM
   Frequency    Level
         MHz     dBµV

    0.150000    66.00
    0.500000    56.00
    5.000000    56.00
    5.000000    60.00
   30.000000    60.00
```

# 6 TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS

| No | Instrument/Ancillary | Type | Manufacturer | Serial No. | Cal Due | Interval |
|---|---|---|---|---|---|---|
| **01** | Spectrum Analyzer | ESIB 40 | Rohde & Schwarz | 100107 | May 2009 | 1 year |
| **02** | Spectrum Analyzer | FSEM 30 | Rohde & Schwarz | 100017 | May 2009 | 1 year |
| **03** | Signal Generator | SMY02 | Rohde & Schwarz | 836878/011 | May 2009 | 1 year |
| **04** | Power-Meter | NRVD | Rohde & Schwarz | 0857.8008.02 | May 2009 | 1 year |
| **05** | Biconilog Antenna | 3141 | EMCO | 0005-1186 | June 2009 | 1 year |
| **06** | Horn Antenna (1-18GHz) | SAS-200/571 | AH Systems | 325 | June 2009 | 1 year |
| **07** | Horn Antenna (18-26.5GHz) | 3160-09 | EMCO | 1240 | June 2009 | 1 year |
| **08** | Power Splitter | 11667B | Hewlett Packard | 645348 | n/a | n/a |
| **09** | Climatic Chamber | VT4004 | Voltsch | G1115 | May 2009 | 1 year |
| **10** | High Pass Filter | 5HC2700 | Trilithic Inc. | 9926013 | n/a | n/a |
| **11** | High Pass Filter | 4HC1600 | Trilithic Inc. | 9922307 | n/a | n/a |
| **12** | Pre-Amplifier | JS4-00102600 | Miteq | 00616 | May 2009 | 1 year |
| **13** | Power Sensor | URV5-Z2 | Rohde & Schwarz | DE30807 | May 2009 | 1 year |
| **14** | Digital Radio Comm. Tester | CMD-55 | Rohde & Schwarz | 847958/008 | May 2009 | 1 year |
| **15** | Universal Radio Comm. Tester | CMU 200 | Rohde & Schwarz | 832221/06 | May 2009 | 1 year |
| **16** | LISN | ESH3-Z5 | Rohde & Schwarz | 836679/003 | May 2009 | 1 year |
| **17** | Loop Antenna | 6512 | EMCO | 00049838 | July 2010 | 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.

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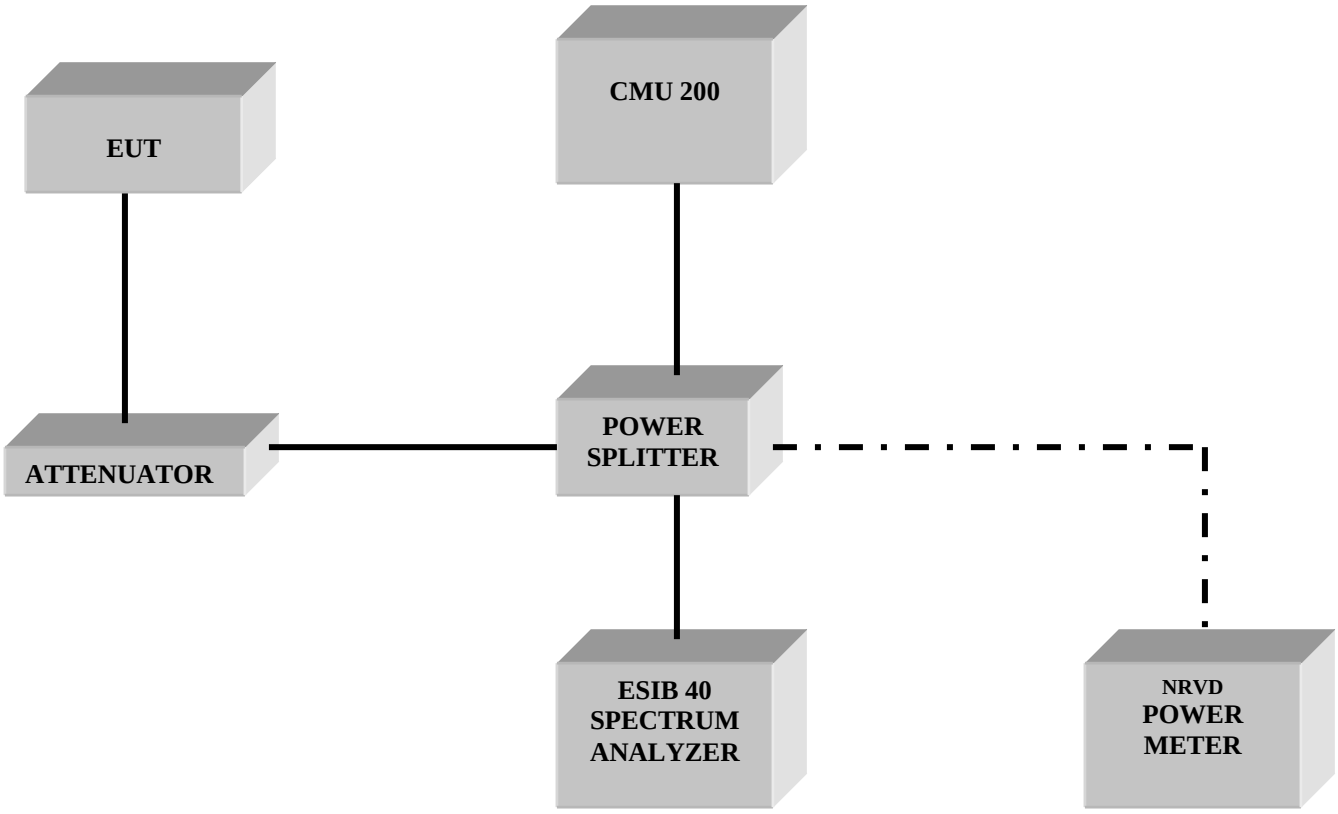
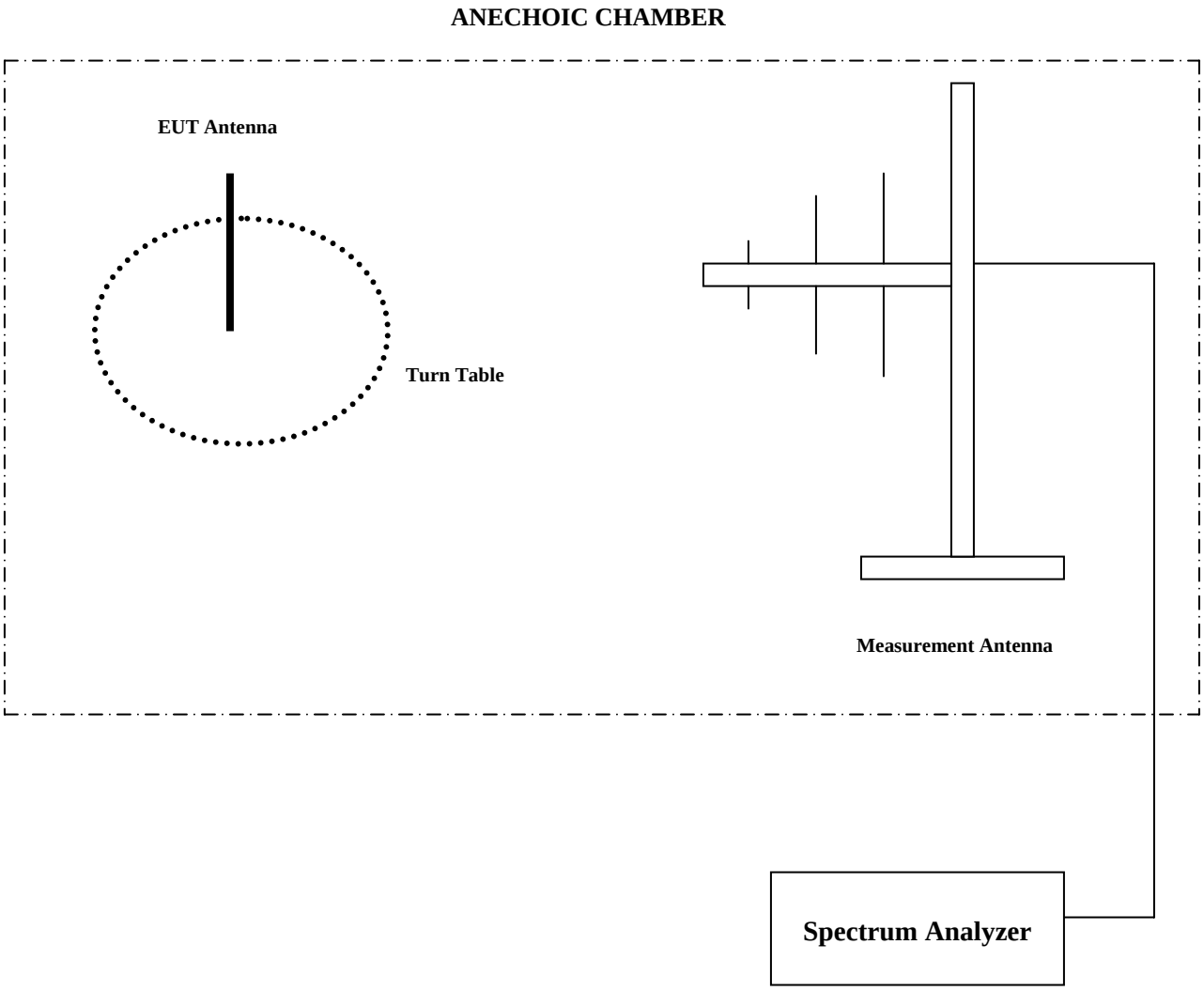
# 8 BLOCK DIAGRAMS

**Conducted Testing**



## Radiated Testing



# 9 REPORT HISTORY

2008-10-21 Original Report