



MOBILE DEVICES BUSINESS

**PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY**

EMC TEST REPORT

Test Report Number – 23575-1

Report Date – April 8, 2010

The test results contained herein relate only to the model(s) identified. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics.

As the responsible EMC Engineer, I hereby declare that the equipment tested as specified in this report conforms to the requirements indicated.

Signature: 

Name: Albert J. Patapack

Title: EMC Engineer

Date: April 8, 2010

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THIS REPORT MUST NOT BE USED TO CLAIM PRODUCT ENDORSEMENT BY A2LA OR ANY AGENCY OF THE U.S. GOVERNMENT.

A2LA Certificate Number: 2518-02

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Test Report Details

Tests Performed By: Motorola Mobile Devices business (MDb)
 Product Safety and Compliance Group
 600 North US Hwy 45
 Libertyville, IL 60048
 PH (847) 523-6167 Fax (847) 523-4538
 Motorola MDb FRN: 0004321311
 FCC Registration Number: 316588
 Industry Canada Number: 1090-1

Tests Requested By: Motorola Inc.
 Mobile Devices Business
 600 North US Hwy 45
 Libertyville, IL 60048

Product Type: Data Card

Signaling Capability: GSM 850/1900, EDGE, GPRS

FCC ID: IHDT56LV3

Serial Numbers: LSDA160047, LSDA160027

Testing Complete Date: March 30, 2010

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

- Part 2
- Part 22 Subpart H - Public Mobile Services
- Part 24 Subpart E – Personal Communications Services

Applicable Standards: ANSI 63.4 2003, ANSI/TIA-603-C-2004, RSS-Gen Issue 2, RSS-132 Issue 2, RSS-133 Issue 5

Summary of Testing

| Test # | Test Name | Pass/Fail |
|--------|--|-----------|
| 1 | RF Power Output | NA |
| 2 | Occupied Bandwidth | Pass |
| 3 | Spurious Emissions at Antenna Terminal | Pass |
| 4 | Field Strength of Spurious Emissions | Pass |
| 5 | Frequency Stability | Pass |

| Test # | Test Name | Margin with respect to the Limit |
|--------|--|----------------------------------|
| 1 | RF Power Output | NA |
| 2 | Occupied Bandwidth | See Plots |
| 3 | Spurious Emissions at Antenna Terminal | See results |
| 4 | Field Strength of Spurious Emissions | See results |
| 5 | Frequency Stability | See results |

The margin with respect to the limit is the minimum margin for all modes and bands.

General and Special Conditions

For all testing the EUT was powered through the computer’s USB port or by using an external power supply.

All testing was done in an indoor controlled environment. The temperature and the relative humidity were maintained within the ANSI C63.4 2003 Standard requirements during the entire duration of testing.

Equipment and Cable Configurations

The EUT was tested in a stand-alone configuration that is representative of typical use.

| Manufacturer | Equipment Type | Model No. | Serial Number | Calibration Due Date |
|---------------------|------------------------|------------------|----------------------|-----------------------------|
| Rohde & Schwarz | Receiver | ESI26 | 100001 | 12/02/2010 |
| Hewlett Packard | EMC Analyzer | E7405 | US40240219 | 4/24/2010 |
| Agilent | MXA Signal Analyzer | N9020A | US46470586 | 12/18/2010 |
| Hewlett Packard | Signal Generator | 83623B | 3844A00935 | 4/24/2011 |
| A. H. Systems | DRG Horn Antenna | SAS 200/571 | 265 | 4/29/2010 |
| ETS | DRG Horn Antenna | 3115 | 6222 | 10/02/2010 |
| ETS | Log-Periodic Antenna | 3148 | 1189 | 6/12/2010 |
| ETS | Biconical Antenna | 3110B | 3370 | 10/02/2010 |
| Attenuator | Weinschel | AS-6 | 6675 | NCR |
| Attenuator | Weinschel | AS-6 | 6677 | NCR |
| Thermotron | Environmental Chamber | S-4 | 31580 | 1/19/2011 |
| Agilent | Power Meter | E4416A | GB41293263 | 9/11/2010 |
| Agilent | Power Sensor | E9323A | US40412067 | 9/11/2010 |
| Agilent | Microwave Preamplifier | 8449B | 3008A01442 | 2/25/2010 |
| Agilent | Microwave Preamplifier | 8449B | 3008A00535 | 10/05/2011 |

Note that the Agilent power meter and microwave preamplifier are on a two-year calibration cycle. All other equipment is on a one-year calibration cycle. All testing was performed using equipment that was within calibration at the time that the test was performed. No equipment listed in the table above was used after the specified calibration due date. If, during the course of product testing, a piece of equipment went out of calibration and that piece of equipment was needed to complete product testing, a similar piece of calibrated equipment was substituted. If a substitution was made, that new piece of equipment would be listed in the above table along with the piece that was removed from service.

Measurement Procedures and Data

RF POWER OUTPUT

Measurement Procedure

The RF output port of the equipment under test is directly coupled to the input of an Agilent power meter through a 30dB passive attenuator, adaptor (if needed), and specialized RF connector. The peak power output is measured for all channels.

Measurement Results

GSM 850

| Frequency (MHz) | Power (dBm) |
|-----------------|-------------|
| 824.2 | 33.66 |
| 836.6 | 33.64 |
| 848.8 | 33.51 |

GSM 1900

| Frequency (MHz) | Power (dBm) |
|-----------------|-------------|
| 1850.2 | 29.95 |
| 1880.0 | 29.93 |
| 1909.8 | 29.92 |

EDGE 850

| Frequency (MHz) | Power (dBm) |
|-----------------|-------------|
| 824.2 | 27.99 |
| 836.6 | 27.97 |
| 848.8 | 27.89 |

EDGE 1900

| Frequency (MHz) | Power (dBm) |
|-----------------|-------------|
| 1850.2 | 27.17 |
| 1880.0 | 27.12 |
| 1909.8 | 27.08 |

OCCUPIED BANDWIDTH

Measurement Procedure

The RF output port of the equipment under test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. The amplitude of the spectrum analyzer is corrected for the attenuator and any other applicable losses. The analyzer is set for Peak Detector and each trace is set for Max Hold. For all testing the EUT was powered using an external power supply.

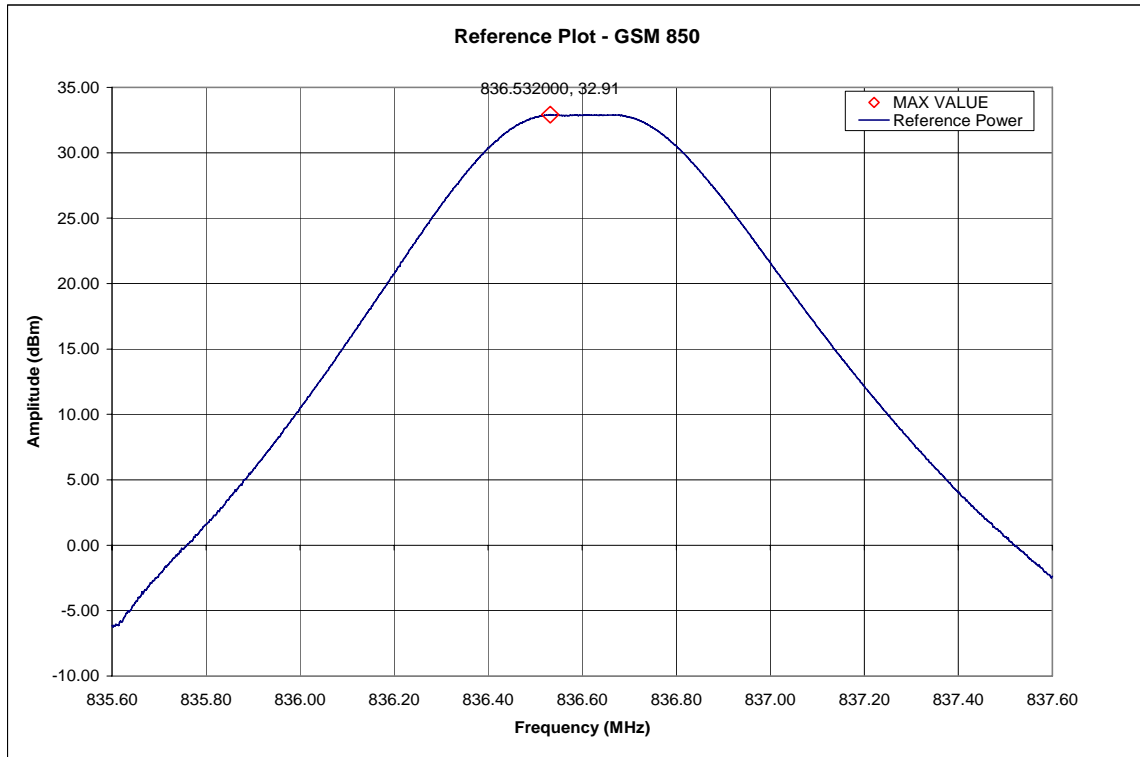
The middle channel within the designated frequency block was measured. For digital modulation, the lower and upper band edge plots are displayed.

Measurement Results
Attached

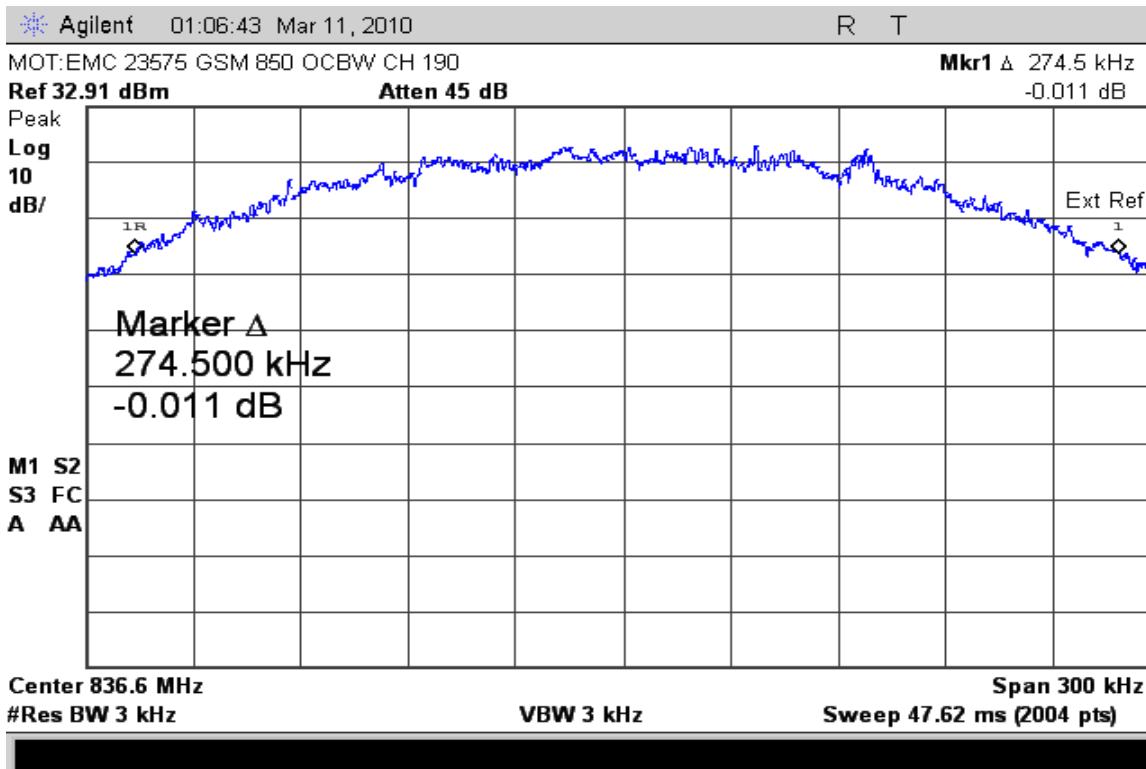
| Plot | Equipment Settings | | | | | |
|----------------------------|----------------------------|-----------------------|------------------|------------|----------|---------------------|
| | Resolution Bandwidth (kHz) | Video Bandwidth (kHz) | Sweep Points (#) | Trace Mode | Detector | Samples (\geq #) |
| Reference Plot - GSM 850 | 300 | Auto | 1001 | Max Hold | Peak | 30 |
| OCBW - GSM 850 | 3 | Auto | 1001 | Max Hold | Peak | 30 |
| Lower Band Edge - GSM 850 | 1 | Auto | 2004 | Max Hold | Peak | 30 |
| Upper Band Edge - GSM 850 | 1 | Auto | 2004 | Max Hold | Peak | 30 |
| Reference Plot - GSM 1900 | 300 | Auto | 1001 | Max Hold | Peak | 30 |
| OCBW - GSM 1900 | 3 | Auto | 1001 | Max Hold | Peak | 30 |
| Lower Band Edge - GSM 1900 | 1 | Auto | 2004 | Max Hold | Peak | 30 |
| Upper Band Edge - GSM 1900 | 1 | Auto | 2004 | Max Hold | Peak | 30 |

- Notes:
- 1) When the video bandwidth is set to Auto the video bandwidth self adjusts for ³ the resolution bandwidth.
 - 2) The plotted data shown for the band edge measurements is representative of data taken with a true 3 kHz resolution bandwidth filter. The raw data was taken using a 1 kHz resolution bandwidth and was integrated to produce a response representative of data taken using a true 3 kHz resolution bandwidth filter.

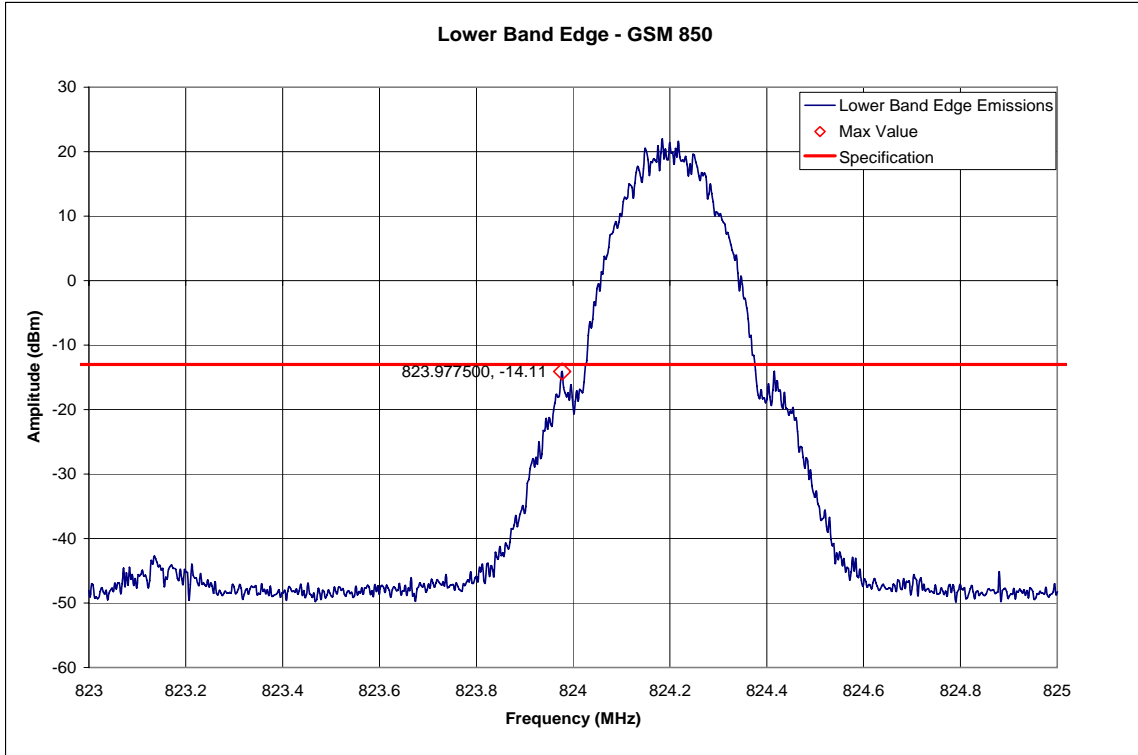
Measurement Results – GSM 850



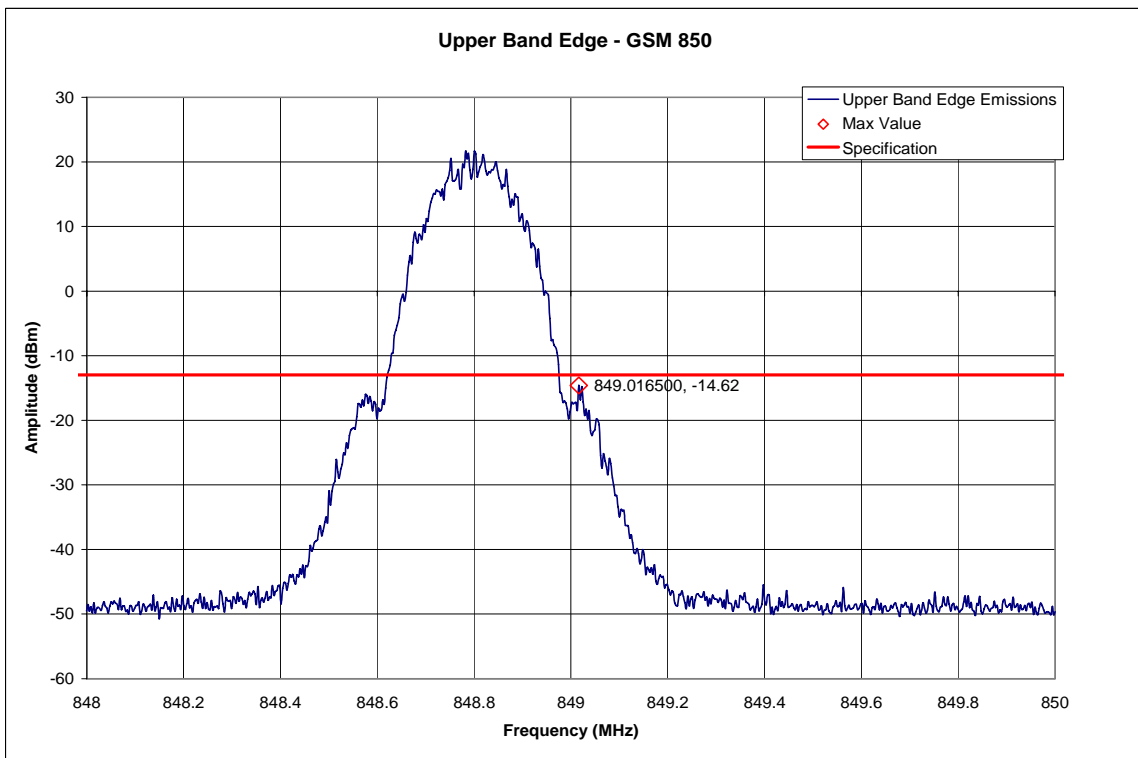
GSM 850 – Reference Level Plot – Channel 190 (836.60 MHz)



GSM 850 – Channel 190 (836.60 MHz) – Occupied Bandwidth

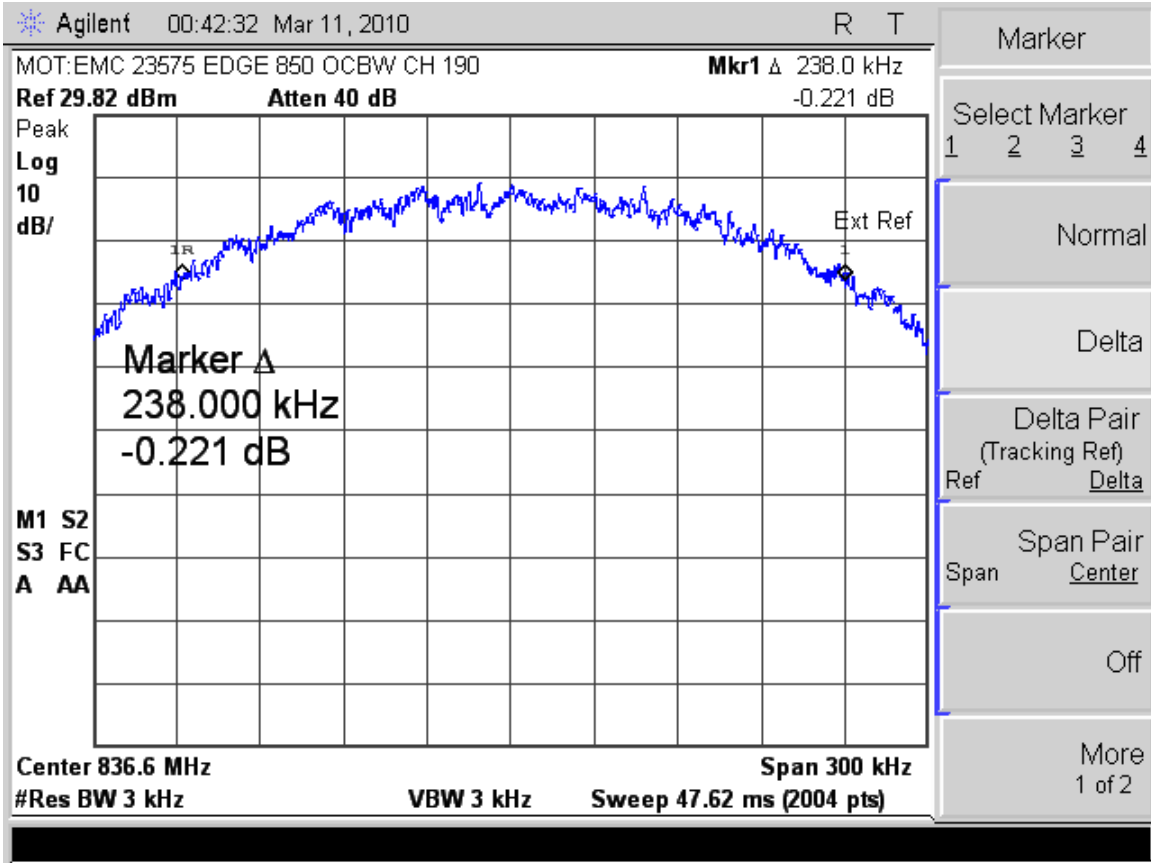


GSM 850 – Lower Band Edge – Channel 128 (824.2 MHz)

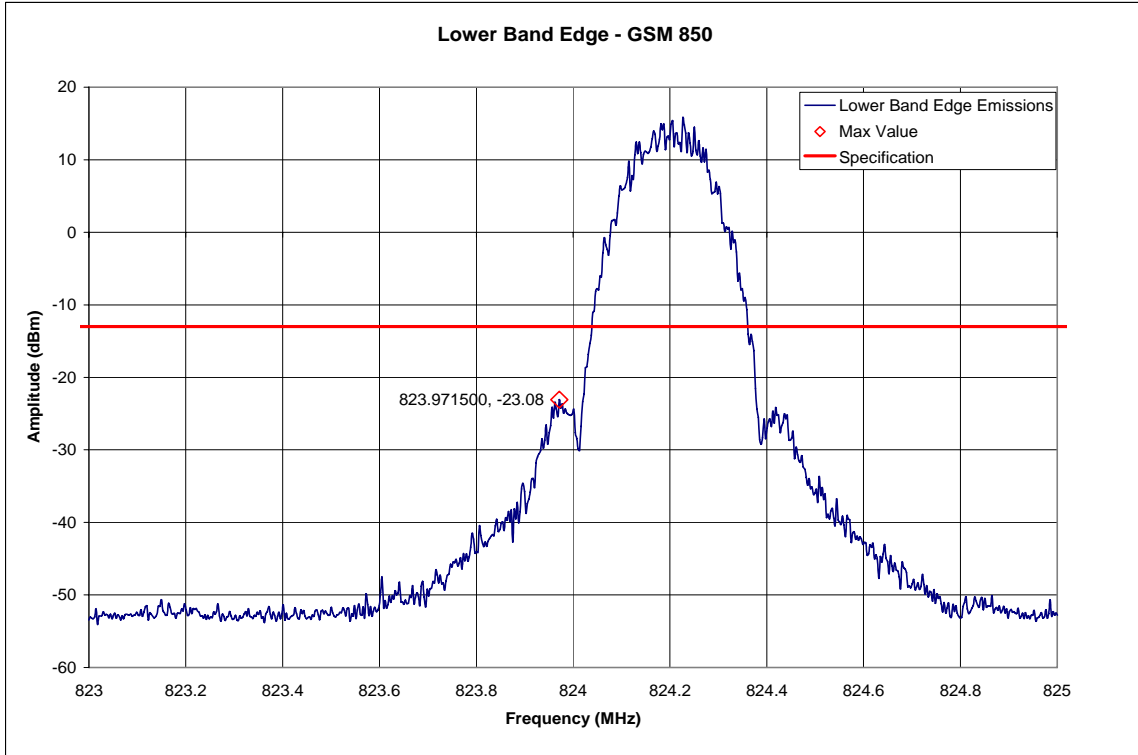


GSM 850 – Upper Band Edge – Channel 251 (848.8 MHz)

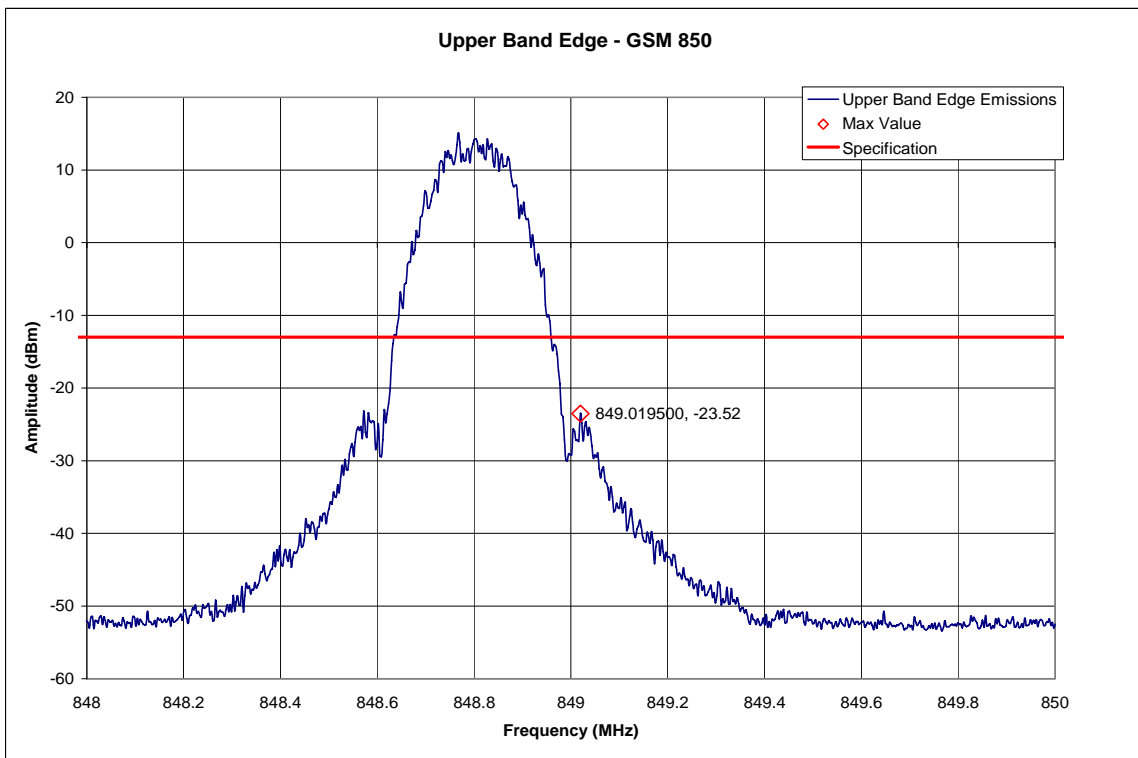
Measurement Results – EDGE 850



EDGE 850 – Channel 190 (836.60 MHz) – Occupied Bandwidth

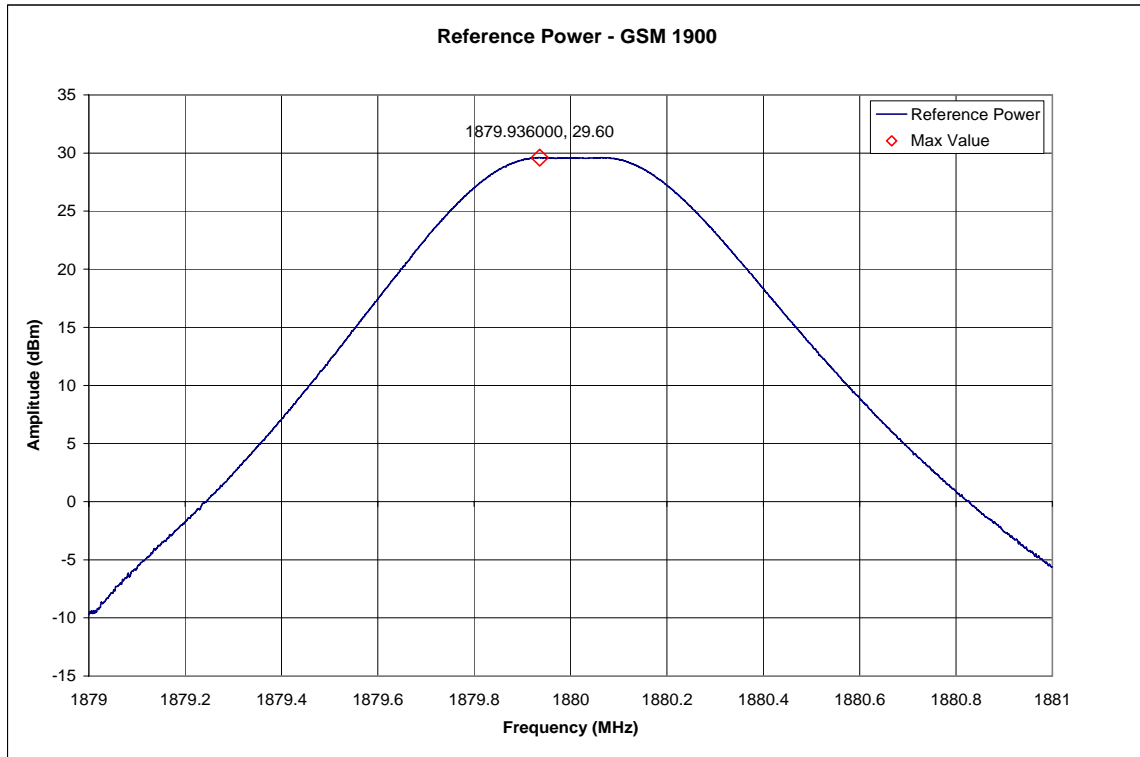


EDGE 850 – Lower Band Edge – Channel 128 (824.2 MHz)

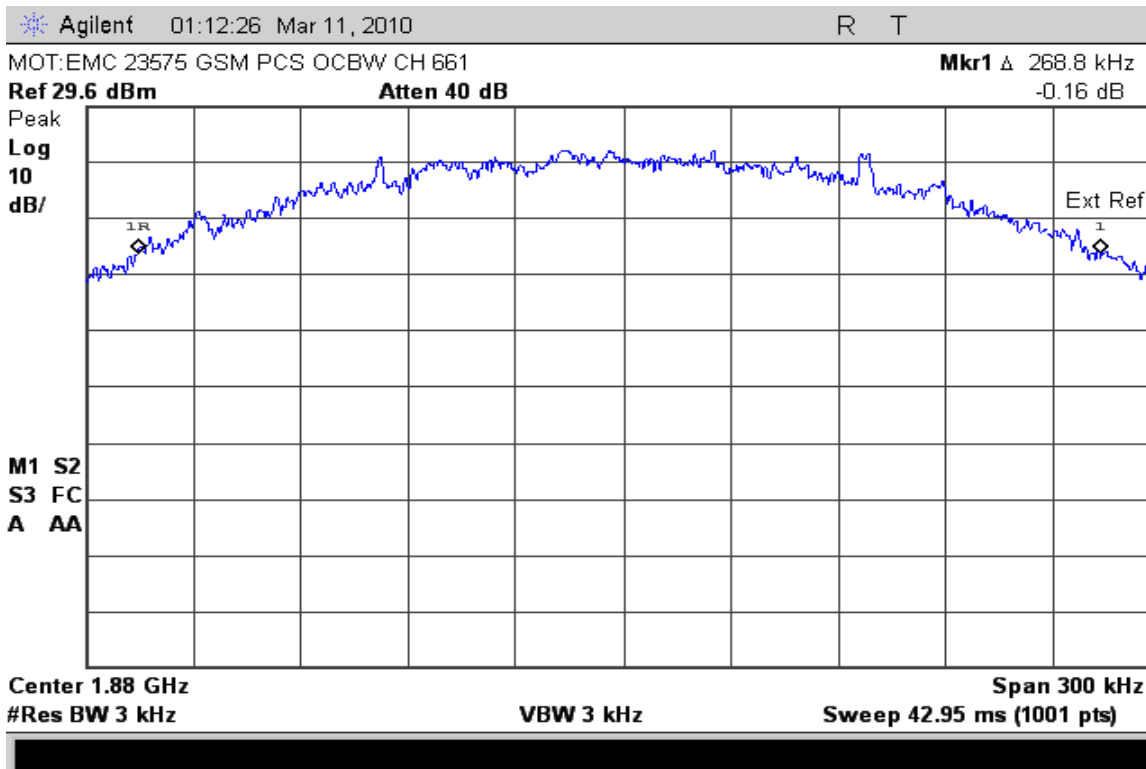


EDGE 850 – Upper Band Edge – Channel 251 (848.8 MHz)

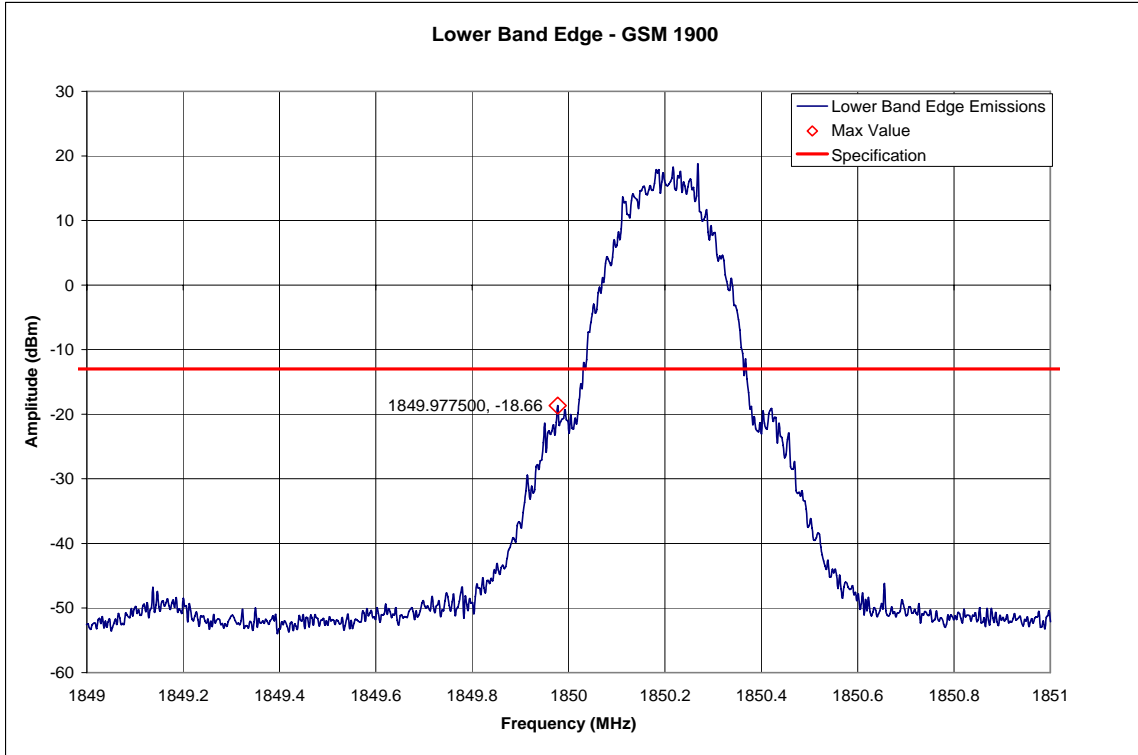
Measurement Results – GSM 1900



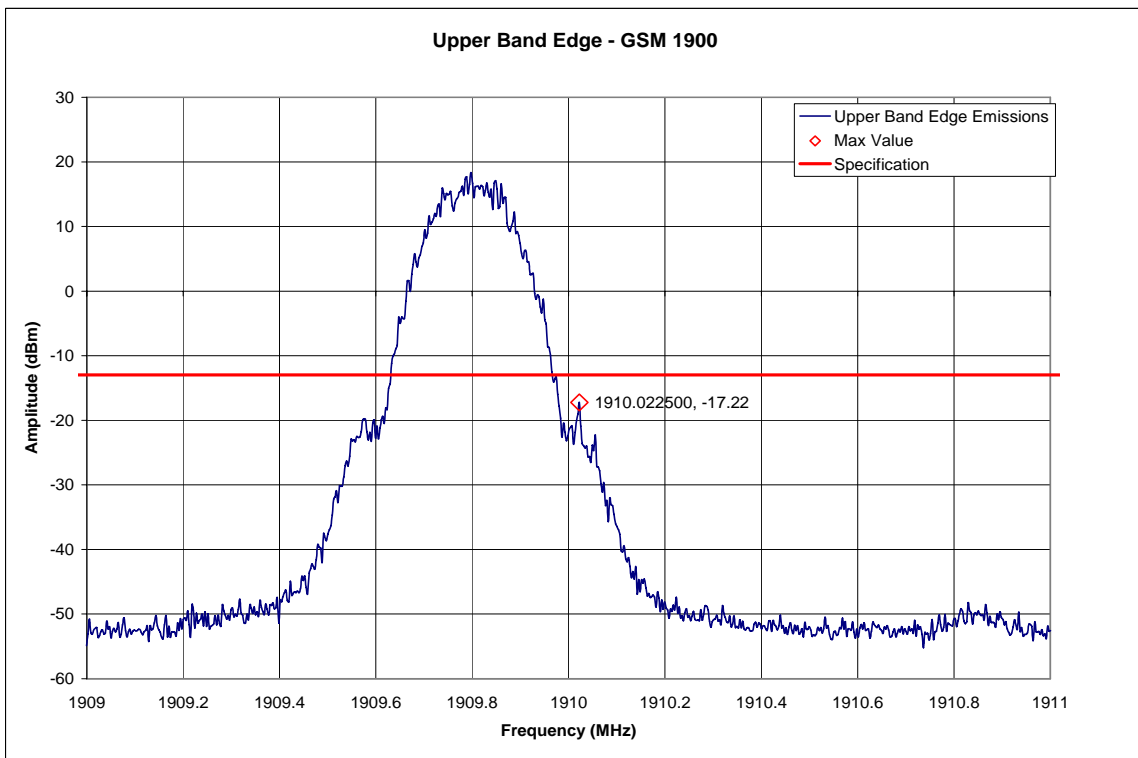
GSM 1900 – Reference Level Plot – Channel 661 (1880.00MHz)



GSM 1900 – Occupied Bandwidth – Channel 661 (1880.00MHz)

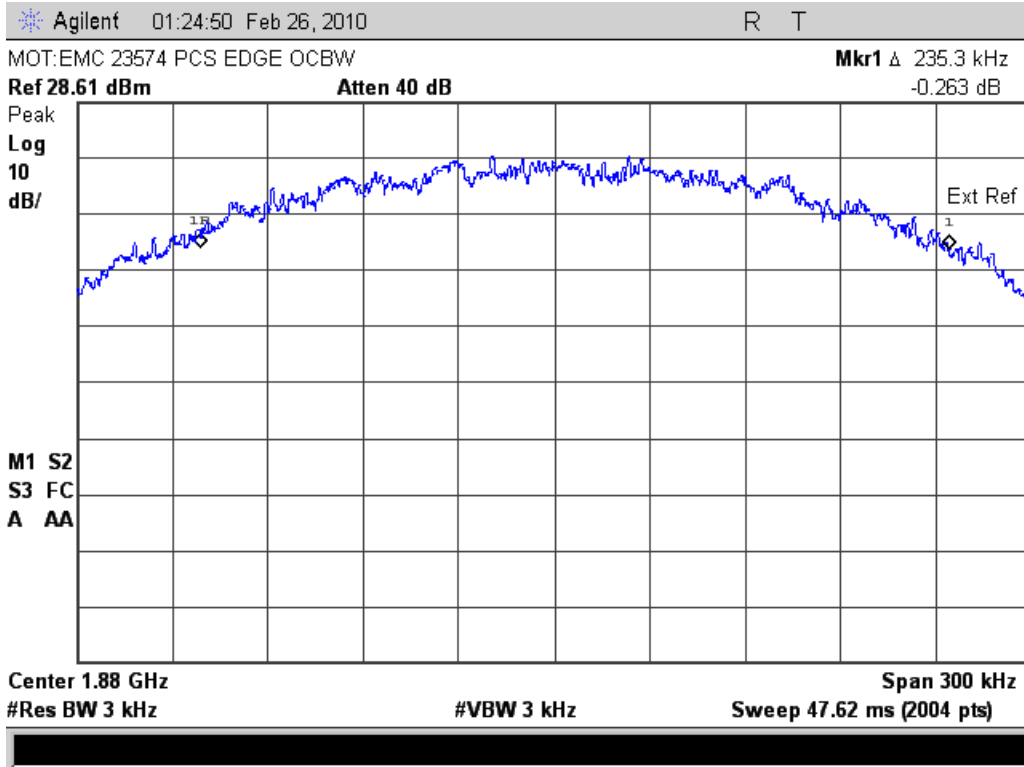


GSM 1900 – Lower Band Edge – Channel 512 (1850.2MHz)

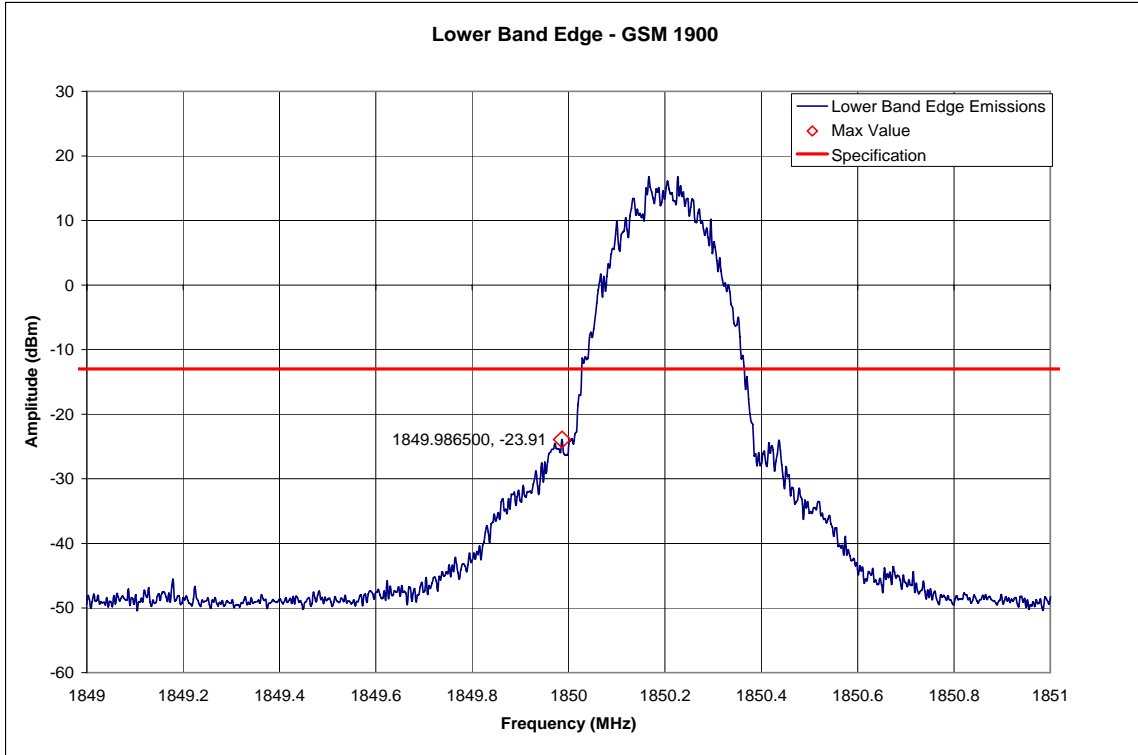


GSM 1900 – Upper Band Edge – Channel 810 (1909.8MHz)

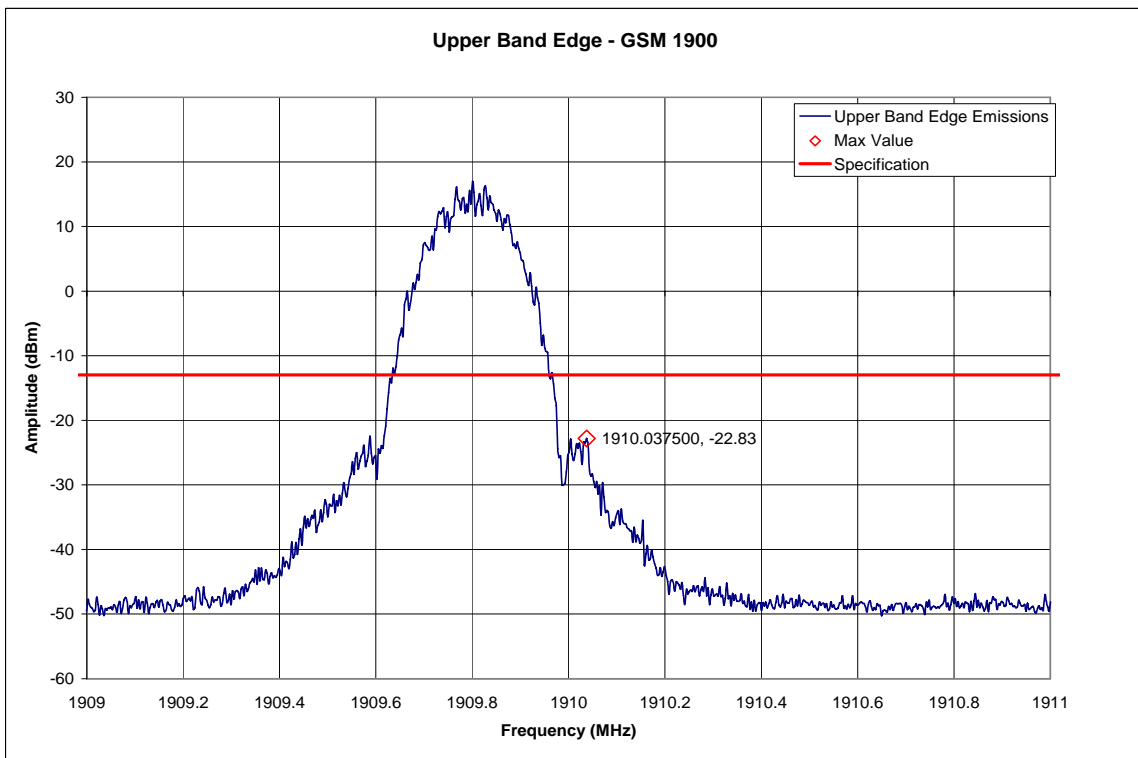
Measurement Results – EDGE 1900



GSM 1900 EDGE – Occupied Bandwidth – Channel 661 (1880.00MHz)



GSM 1900 EDGE – Lower Band Edge – Channel 512 (1850.2MHz)



GSM 1900 EDGE – Upper Band Edge – Channel 810 (1909.8MHz)

SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Measurement Procedure

The RF output port of the Equipment Under Test is directly coupled to the input of the EMC analyzer through a specialized RF connector and a 10dB passive attenuator. For all testing the EUT was powered using an external power supply.

The spectrum was investigated from the lowest frequency signal generated, without going below 9 kHz, up to at least the tenth harmonic of the fundamental or 40 GHz, whichever is lower.

The spectrum analyzer settings were as follows:

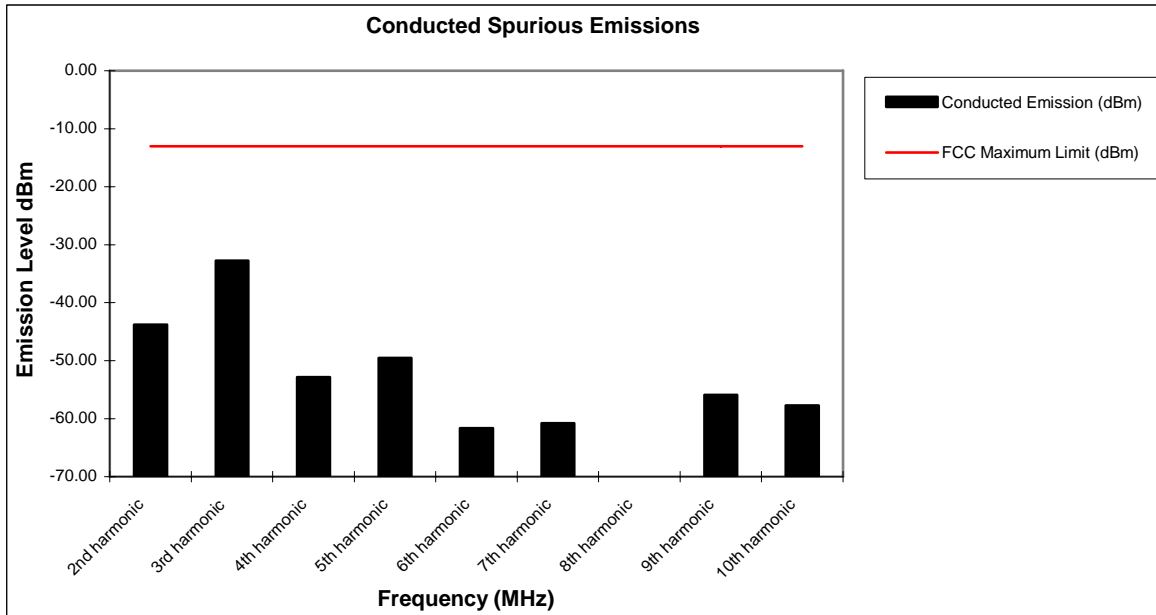
| | |
|-----------------------|---------------|
| Units | dBm |
| Divisions | 10 dB |
| Detector | Peak Detector |
| Resolution Bandwidth | 1 MHz |
| Video Bandwidth (AVG) | Auto |
| Sweep Time | Auto |

Measurement Results

Attached

Measurement Results
Modulation: GSM 850

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|-------------------------|-------------------------|--------------------------|
| 2nd harmonic | -13 | -43.78 |
| 3rd harmonic | -13 | -32.74 |
| 4th harmonic | -13 | -52.80 |
| 5th harmonic | -13 | -49.52 |
| 6th harmonic | -13 | -61.64 |
| 7th harmonic | -13 | -60.77 |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | -55.89 |
| 10th harmonic | -13 | -57.73 |



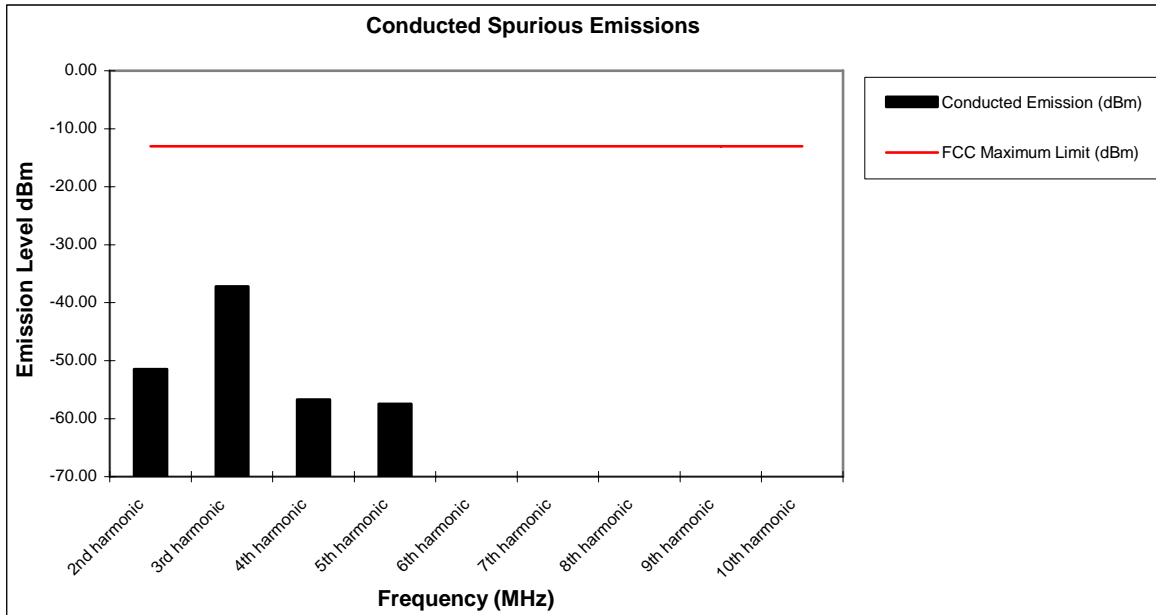
Notes:

1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

Measurement Results
Modulation: EDGE 850

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|-------------------------|-------------------------|--------------------------|
| 2nd harmonic | -13 | -51.49 |
| 3rd harmonic | -13 | -37.18 |
| 4th harmonic | -13 | -56.69 |
| 5th harmonic | -13 | -57.46 |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |



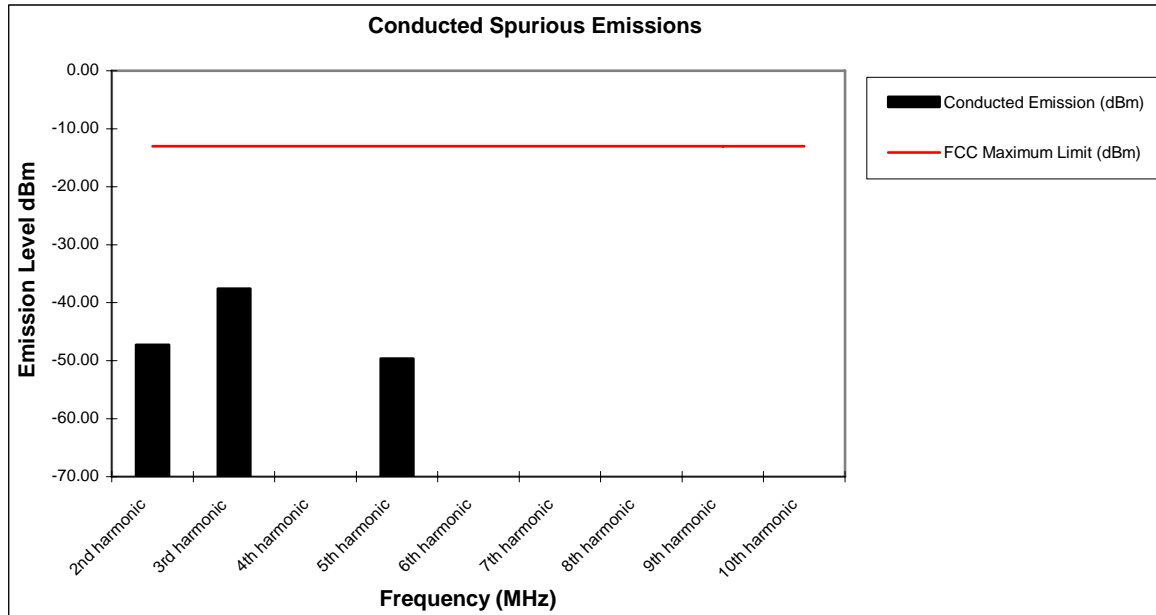
Notes:

1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

Measurement Results
Modulation: GSM 1900

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|-------------------------|-------------------------|--------------------------|
| 2nd harmonic | -13 | -47.25 |
| 3rd harmonic | -13 | -37.56 |
| 4th harmonic | -13 | * |
| 5th harmonic | -13 | -49.65 |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |



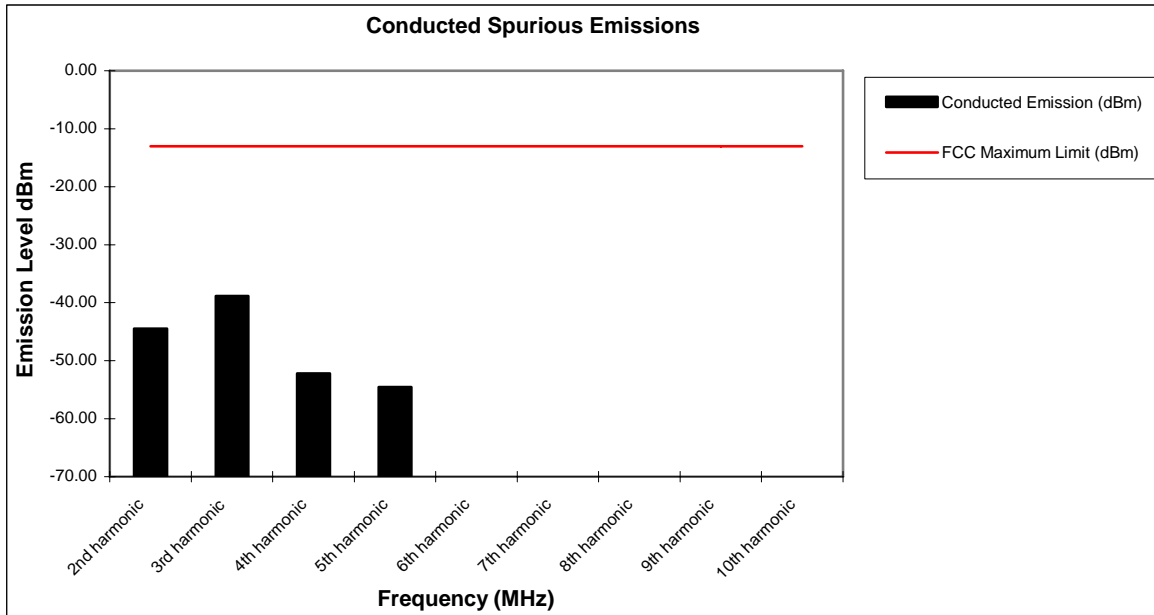
Notes:

1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

Measurement Results
Modulation: EDGE 1900

| Harmonic of Fundamental | FCC Maximum Limit (dBm) | Conducted Emission (dBm) |
|-------------------------|-------------------------|--------------------------|
| 2nd harmonic | -13 | -44.48 |
| 3rd harmonic | -13 | -38.86 |
| 4th harmonic | -13 | -52.19 |
| 5th harmonic | -13 | -54.56 |
| 6th harmonic | -13 | * |
| 7th harmonic | -13 | * |
| 8th harmonic | -13 | * |
| 9th harmonic | -13 | * |
| 10th harmonic | -13 | * |



Notes:

1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

FIELD STRENGTH OF SPURIOUS EMISSIONS

Measurement Procedure

The equipment under test is placed inside the semi-anechoic chamber on a wooden table at the turntable center. For each spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters and the turntable is rotated 360 degrees to obtain a maximum reading on the spectrum analyzer. This is repeated for both horizontal and vertical polarizations of the receive antenna.

The equipment under test is then replaced with a substitution antenna fed by a signal generator. With the signal generator tuned to a particular spurious frequency, the antenna mast is raised and lowered from 1 to 4 meters to obtain a maximum reading at the spectrum analyzer. The output of the signal generator is then adjusted until a reading identical to that obtained with the actual transmitter is achieved.

The power in dBm of each spurious emission is calculated by correcting the signal generator level for cable loss and gain of the substitution antenna referenced to a dipole. For all testing the EUT was powered using an external power supply.

The settings of the receiver were as follows:

| | |
|-----------------------|---------------|
| Units | dBm |
| Divisions | 5 dB |
| Detector | Peak Detector |
| Resolution Bandwidth | 1 MHz |
| Video Bandwidth (AVG) | Auto |
| Sweep Time | Auto |

Measurement Results

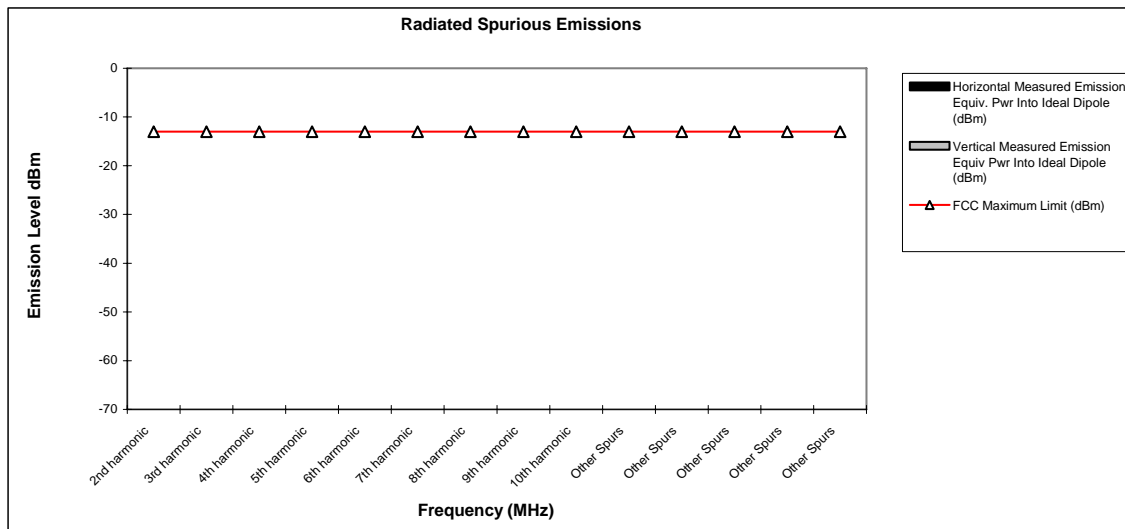
Attached

Measurement Results

Modulation: All operational bands and modes

Radiated Spurious and Harmonic Emissions

| Frequency (MHz) | FCC Maximum Limit (dBm) | Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm) | Vertical Measured Emission Equiv Pwr Into Ideal Dipole (dBm) |
|-----------------|-------------------------|---|--|
| 2nd harmonic | -13 | * | * |
| 3rd harmonic | -13 | * | * |
| 4th harmonic | -13 | * | * |
| 5th harmonic | -13 | * | * |
| 6th harmonic | -13 | * | * |
| 7th harmonic | -13 | * | * |
| 8th harmonic | -13 | * | * |
| 9th harmonic | -13 | * | * |
| 10th harmonic | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |
| Other Spurs | -13 | * | * |



Notes:

- * Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
- Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
- The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.

The margin with respect to the limit is the minimum margin for all modes and bands.

FREQUENCY STABILITY

Measurement Procedure

The equipment under test is placed in an environmental chamber. The antenna port of the Equipment Under Test is directly coupled to the input of the measurement equipment through a specialized RF connector. A power supply is attached as the primary voltage supply.

Frequency measurements are made at the extremes of the temperature range -30°C to $+60^{\circ}\text{C}$ and at intervals of 10°C with the primary supply voltage set to the nominal module operating voltage. A period of time sufficient to stabilize all components of the equipment is allowed at each frequency measurement. The maximum variation of frequency is measured.

At room temperature, the primary supply voltage is set at the operating endpoints of the equipment under test. The maximum variation of frequency is measured. A battery eliminator was used for the input supply voltage.

The EUT supports input voltage range of 2.8V to 4.2V supply and it will power down if the input voltage range drops below 2.8V.

Measurement Results

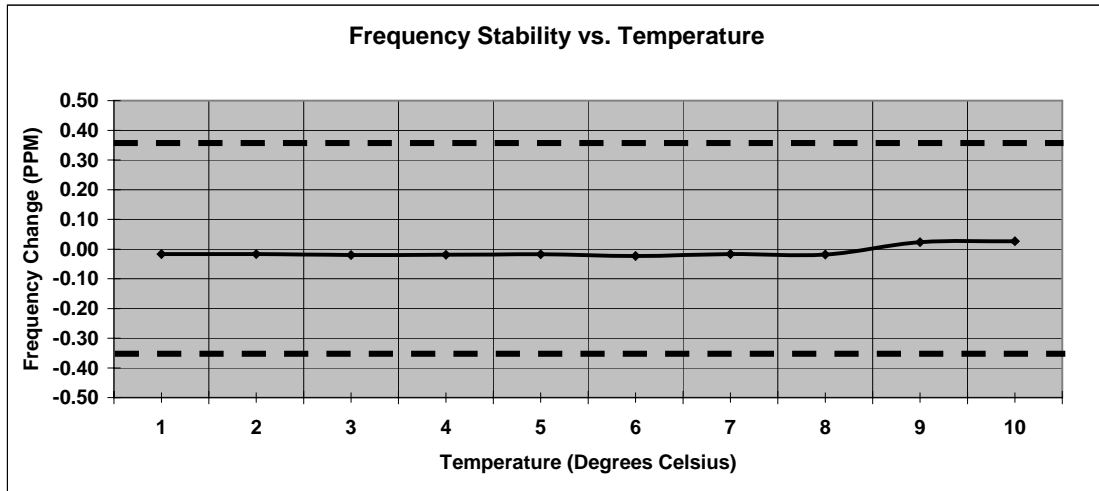
Attached

Measurement Results
Modulation: GSM 850

Frequency Stability

Mode: GSM 850 **Operating Frequency:** 836.6 MHz
Channel: 190 **Deviation Limit (PPM):** 0.359ppm (+/-300 Hz)

| Temperature C | Frequency Error HZ | Frequency Error (PPM) | Voltage (%) | Voltage (VDC) |
|------------------|-----------------------|--------------------------|-----------------|------------------|
| -30 C | -14.13 | -0.017 | 100% | 3.30 |
| -20 C | -13.95 | -0.017 | 100% | 3.30 |
| -10 C | -16.93 | -0.020 | 100% | 3.30 |
| 0 C | -16.25 | -0.019 | 100% | 3.30 |
| 10 C | -14.48 | -0.017 | 100% | 3.30 |
| 20 C | -19.77 | -0.024 | 100% | 3.30 |
| 30 C | -13.66 | -0.016 | 100% | 3.30 |
| 40 C | -15.55 | -0.019 | 100% | 3.30 |
| 50 C | 19.19 | 0.023 | 100% | 3.30 |
| 60 C | 22.43 | 0.027 | 100% | 3.30 |
| 20 C | -15.96 | -0.019 | Module Endpoint | 4.20 |
| 20 C | 21.32 | 0.025 | Module Endpoint | 2.80 |

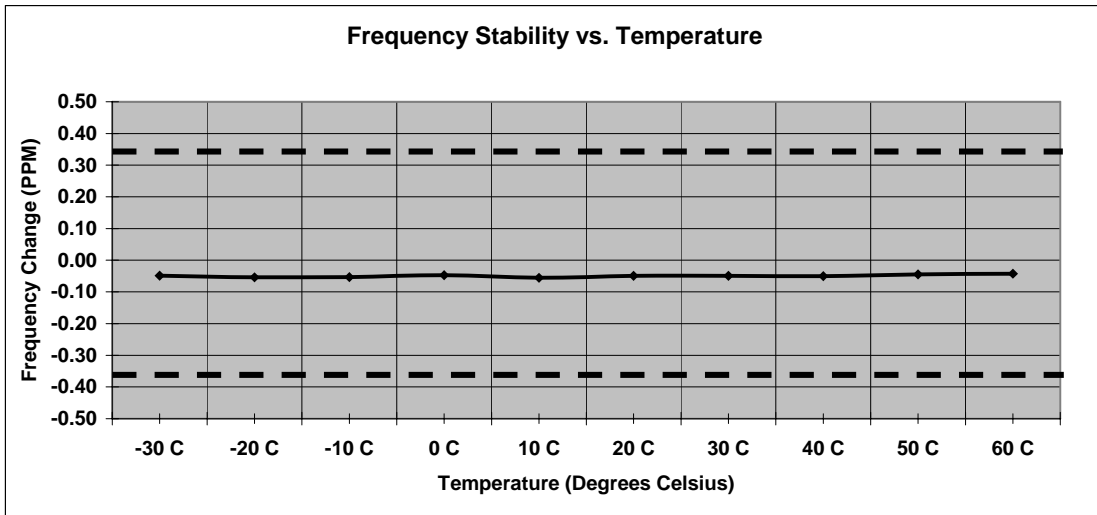


Measurement Results
Modulation: EDGE 850

Frequency Stability

Mode: EDGE 850 **Operating Frequency:** 836.6
Channel: 190 **Deviation Limit (PPM):** 0.359ppm (+/-300 Hz)

| Temperature C | Frequency Error HZ | Frequency Error (PPM) | Voltage (%) | Voltage (VDC) |
|------------------|-----------------------|--------------------------|-----------------|------------------|
| -30 C | -40.86 | -0.049 | 100% | 3.30 |
| -20 C | -45.08 | -0.054 | 100% | 3.30 |
| -10 C | -44.30 | -0.053 | 100% | 3.30 |
| 0 C | -39.22 | -0.047 | 100% | 3.30 |
| 10 C | -46.24 | -0.055 | 100% | 3.30 |
| 20 C | -41.18 | -0.049 | 100% | 3.30 |
| 30 C | -41.58 | -0.050 | 100% | 3.30 |
| 40 C | -41.78 | -0.050 | 100% | 3.30 |
| 50 C | -37.61 | -0.045 | 100% | 3.30 |
| 60 C | -35.76 | -0.043 | 100% | 3.30 |
| 20 C | -39.83 | -0.048 | Module Endpoint | 4.2V |
| 20 C | -35.61 | -0.043 | Module Endpoint | 2.80 |

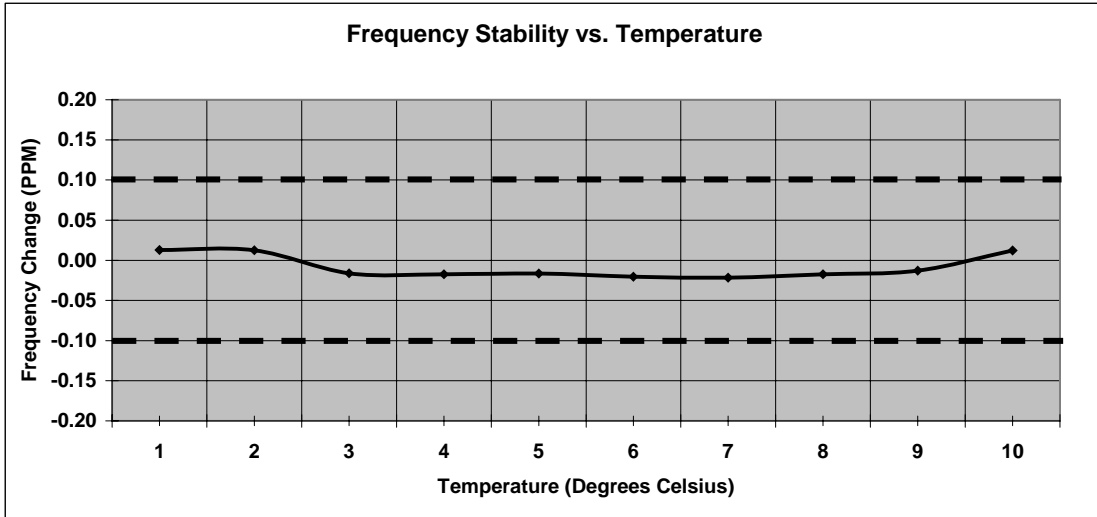


Measurement Results
Modulation: GSM 1900

Frequency Stability

Mode: GSM 1900 **Operating Frequency:** 1880.0 MHz
Channel: 661 **Deviation Limit (PPM):** 0.1ppm (+/-188Hz)

| Temperature C | Frequency Error HZ | Frequency Error (PPM) | Voltage (%) | Voltage (VDC) |
|------------------|-----------------------|--------------------------|-----------------|------------------|
| -30 C | 24.02 | 0.013 | 100% | 3.30 |
| -20 C | 23.49 | 0.012 | 100% | 3.30 |
| -10 C | -30.19 | -0.016 | 100% | 3.30 |
| 0 C | -32.59 | -0.017 | 100% | 3.30 |
| 10 C | -30.74 | -0.016 | 100% | 3.30 |
| 20 C | -38.40 | -0.020 | 100% | 3.30 |
| 30 C | -40.41 | -0.021 | 100% | 3.30 |
| 40 C | -32.81 | -0.017 | 100% | 3.30 |
| 50 C | -24.09 | -0.013 | 100% | 3.30 |
| 60 C | 22.84 | 0.012 | 100% | 3.30 |
| 20 C | -28.12 | -0.015 | Module Endpoint | 4.20 |
| 20 C | 18.94 | 0.010 | Module Endpoint | 2.80 |

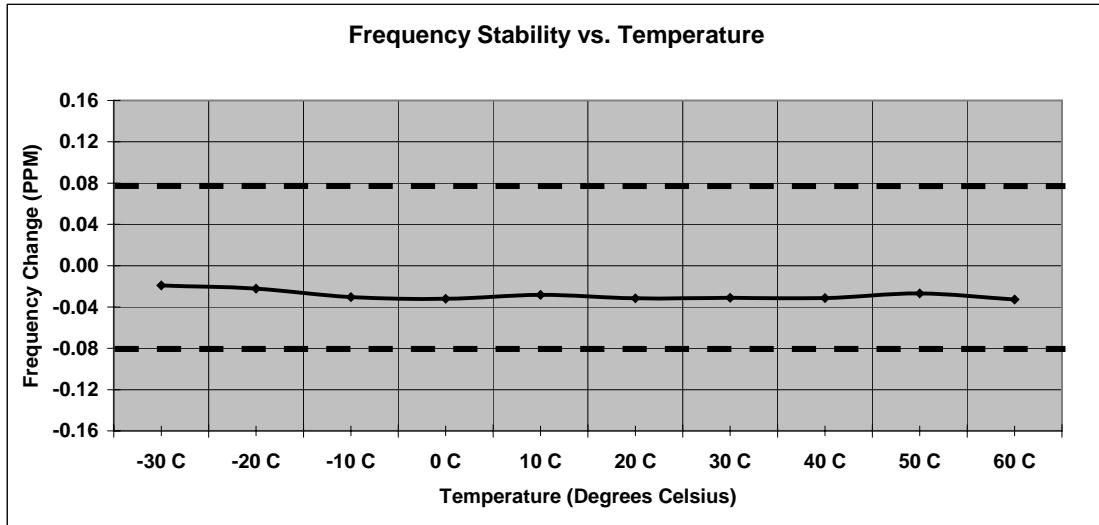


Measurement Results
Modulation: EDGE 1900

Frequency Stability

Mode: EDGE 1900 **Operating Frequency:** 1880.0 MHz
Channel: 661 **Deviation Limit (PPM):** 0.1ppm (+/-188Hz)

| Temperature C | Frequency Error HZ | Frequency Error (PPM) | Voltage (%) | Voltage (VDC) |
|------------------|-----------------------|--------------------------|-----------------|------------------|
| -30 C | -36.13 | -0.019 | 100% | 3.30 |
| -20 C | -41.63 | -0.022 | 100% | 3.30 |
| -10 C | -57.03 | -0.030 | 100% | 3.30 |
| 0 C | -60.05 | -0.032 | 100% | 3.30 |
| 10 C | -52.99 | -0.028 | 100% | 3.30 |
| 20 C | -59.29 | -0.032 | 100% | 3.30 |
| 30 C | -58.40 | -0.031 | 100% | 3.30 |
| 40 C | -58.88 | -0.031 | 100% | 3.30 |
| 50 C | -50.46 | -0.027 | 100% | 3.30 |
| 60 C | -61.63 | -0.033 | 100% | 3.30 |
| 20 C | -59.72 | -0.032 | Module Endpoint | 4.20 |
| 20 C | -45.61 | -0.024 | Module Endpoint | 2.80 |



End of Test Report