MOBILE DEVICES BUSINESS

PRODUCT SAFETY AND COMPLIANCE
EMC LABORATORY

EMC TEST REPORT

Test Report Number – 23113-1

Report Date – July 15, 2009

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: July 15, 2009

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: 109O-1
Tests Requested By:	Motorola Inc. Mobile Devices Business 600 North US Hwy 45 Libertyville, IL 60048
Product Type:	Cellular Phone
Signaling Capability:	GSM 850/1900, GPRS Class 10, Bluetooth Class 2 Version 2.0
FCC ID:	IHDP56KP1
Serial Numbers:	004401020410193, 004401020410201
Testing Complete Date:	July 08, 2009

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 15 Subpart B – Unintentional Radiators
__X__Part 22 Subpart H - Public Mobile Services
__X__Part 24 Subpart E – Personal Communications Services
_____Part 27 – Miscellaneous Wireless Communications Services

Applicable Standards: TIA EIA 137-A, TIA EIA 98-C, ANSI 63.4 2001, RSS-118 (AMPS), RSS-128 (TDMA), RSS-129 (CDMA), RSS-133 (PCS)

Summary of Testing

Test #	Test Name	Pass/Fail
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	Pass
3	EIRP (Effective Isotropic Radiated Power)	Pass
4	Occupied Bandwidth	Pass
5	Spurious Emissions at Antenna Terminal	Pass
6	Field Strength of Spurious Emissions	Pass
7	Frequency Stability	Pass

Test #	Test Name	Margin with respect to the Limit
1	RF Power Output	NA
2	ERP (Effective Radiated Power)	See results
3	EIRP (Effective Isotropic Radiated Power)	See results
4	Occupied Bandwidth	See Plots
5	Spurious Emissions at Antenna Terminal	See results
6	Field Strength of Spurious Emissions	See results
7	Frequency Stability	See results

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

General and Special Conditions

The EUT was tested using a fully charged battery when applicable. Where a battery could not be used due to the need for a controlled variation of input voltage, an external power supply was utilized.

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	ESIB40	100226	1/30/2010
Hewlett Packard	EMC Analyzer	E7405	US40240219	4/24/2010
Agilent	Spectrum Analyzer	N9020A	US46470586	12/10/2009
Hewlett Packard	Signal Generator	83623B	3844A00935	4/24/2011
ETS	DRG Horn Antenna	SAS 200/571	265	4/29/2010
A.H. Systems	DRG Horn Antenna	SAS 200/571	365	12/23/2009
ETS	Log-Periodic Antenna	3148	1188	7/30/2009
ETS	Biconical Antenna	3110B	3370	7/29/2009
Attenuator	Weinschel	AS-6	6675	NCR
Attenuator	Weinschel	AS-6	6677	NCR
Thermotron	Environmental Chamber	S-4	31580	1/28/2010
Agilent	Power Meter	E4416A	GB41293246	9/10/2009
Agilent	Power Sensor	E9323A	US40412067	9/04/2009
Agilent	Microwave Preamplifier	8449B	3008A01442	2/25/2010

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 average power output is measured for all channels.

CFR47 Part 2.1046

Measurement Results

GSM 850

Frequency (MHz)	Power (dBm)
824.2	32.48
836.6	32.38
848.8	32.36

GSM 1900

Frequency (MHz)	Power (dBm)
1850.2	29.37
1880.0	29.39
1909.8	29.32

RADIATED POWER (EIRP AND ERP)

Measurement Procedure

The phone was tested in a 16' anechoic chamber with a 2-axis position system that permits taking complete spherical scans of the EUT's radiation patterns. For all tests, the phone was supported in a free space type environment, vertically oriented in the chamber.

All measurements were made with the phone placed in a call using a mobile station test set. The phone was weakly coupled to the test set and configured to transmit in full data rate mode. Radiated power was measured at each 15 degree step. The radiated power was measured using the peak detector. From these measurements, the software calculates the angle at which maximum radiated power occurs for each case, and the radiated power at this angle was extracted from the data. To get ERP (effective radiated power referenced to a half-wave dipole), subtract 2.1 dB from these numbers.

Measurement Results: The appropriate maximum is highlighted

Frequency (MHz)	EIRP (dBm)	ERP (dBm)
GSM 850		
128	27.92	25.82
190	30.52	**28.42**
251	29.34	27.24
GSM 1900		
512	29.01	26.91
661	**30.95**	28.85
810	30.29	28.19

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. A fully charged battery was used for the supply voltage.

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

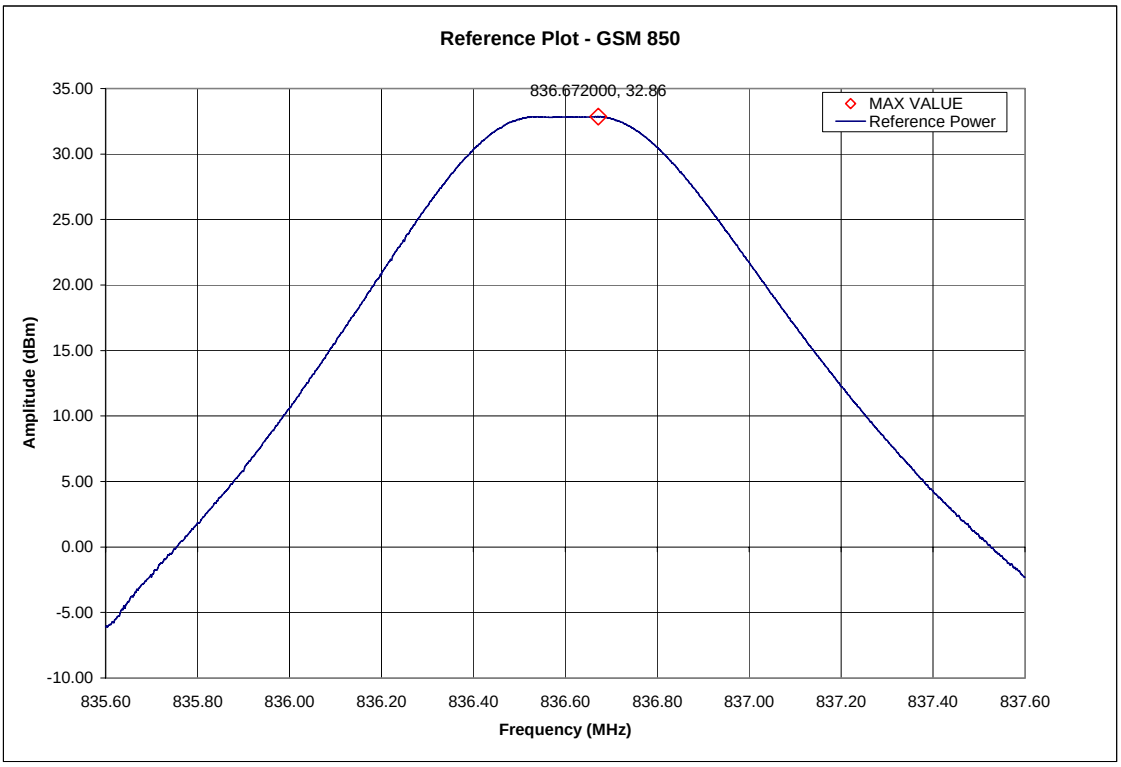
Measurement Results
Attached

	Equipment Settings					
Plot	Resolution Bandwidth (kHz)	Video Bandwidth (kHz)	Sweep Points (#)	Trace Mode	Detector	Samples (≥ #)
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

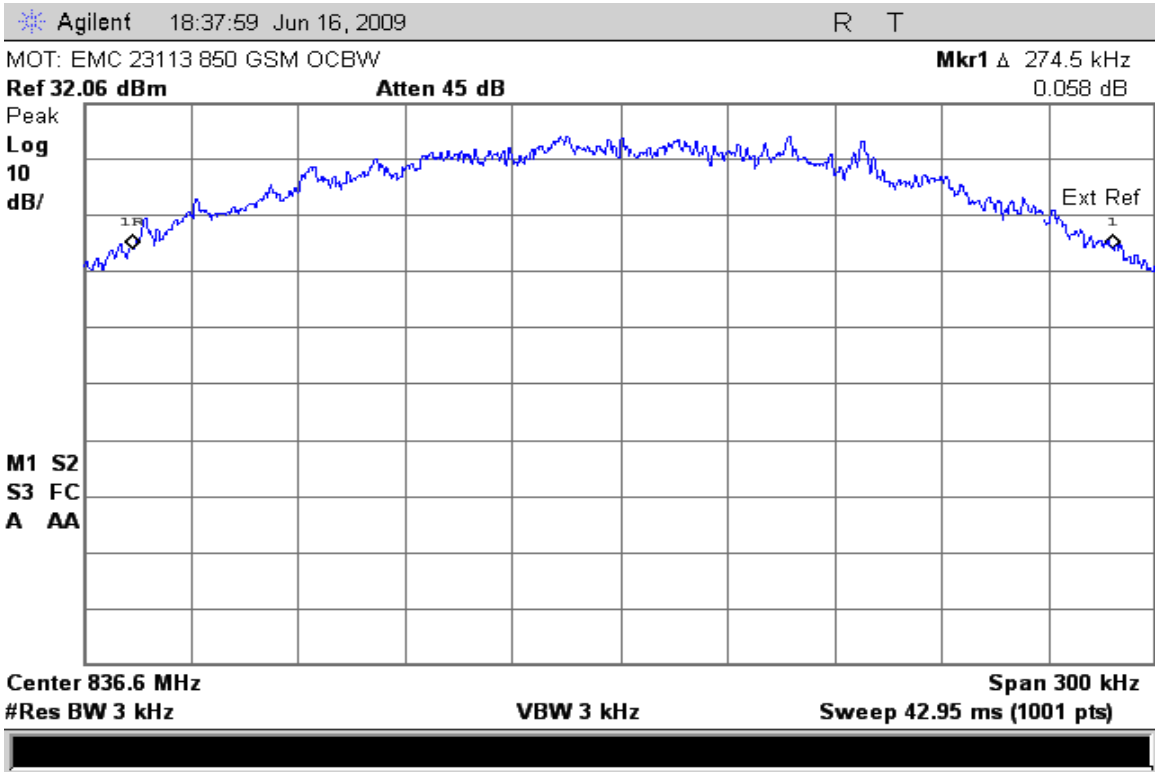
Notes: 1) When the video bandwidth is set to Auto the video bandwidth self adjusts for ³ the resolution bandwidth.

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.

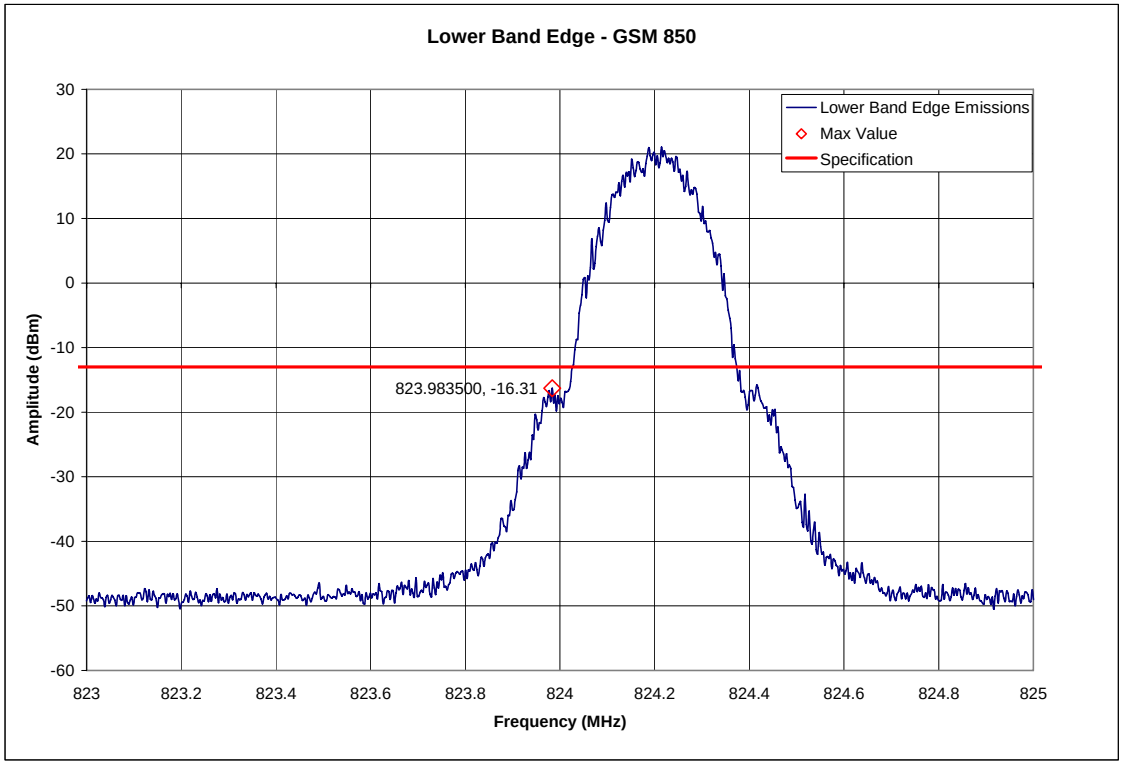
Measurement Results – GSM 850



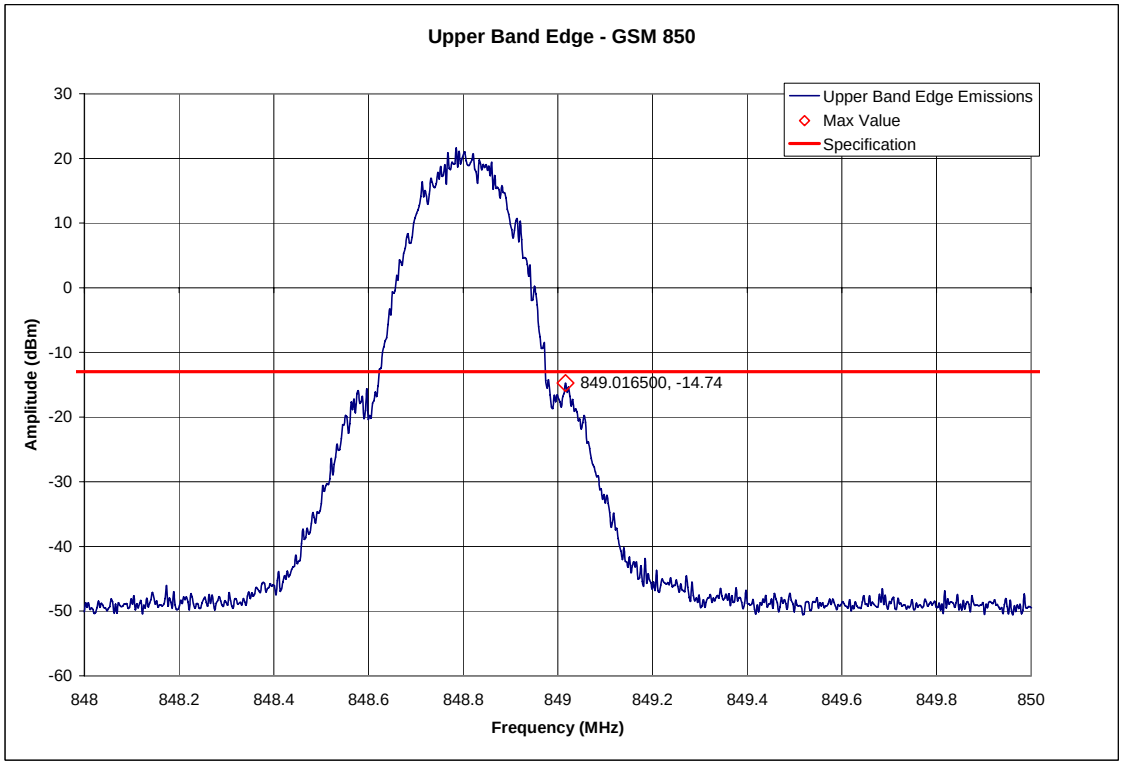
GSM 850 – Reference Level Plot – Channel 190 (836.60 MHz)



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

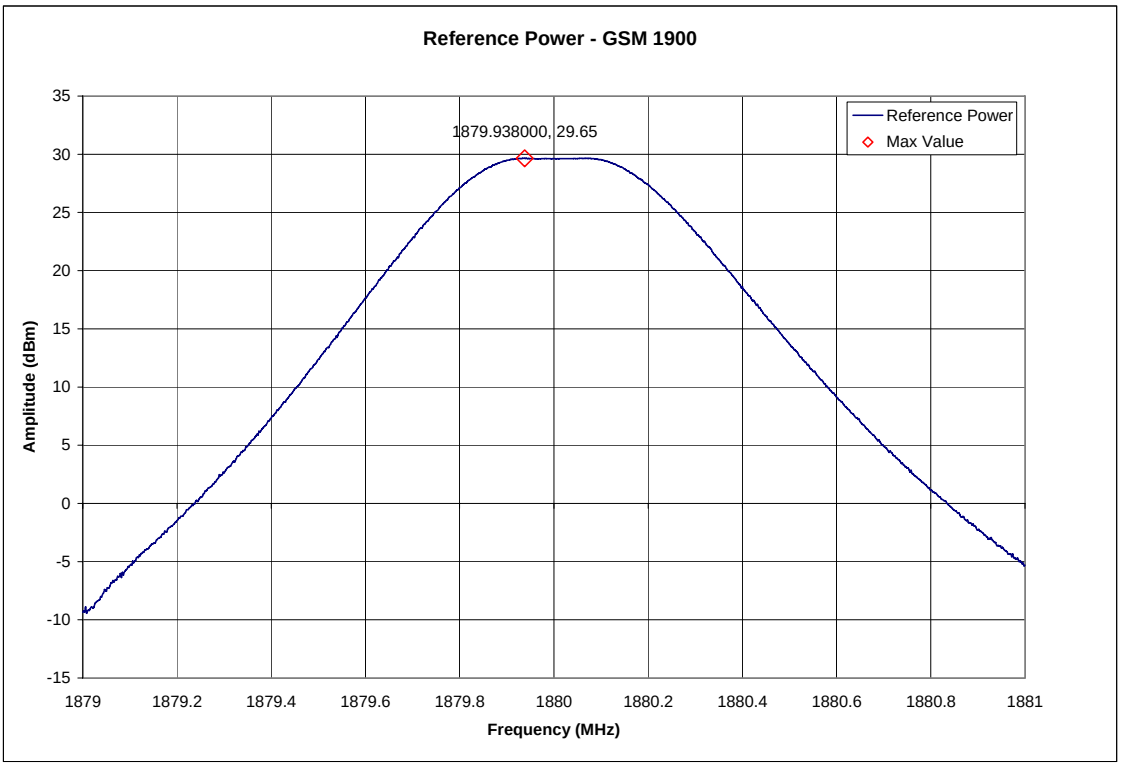


GSM 850 – Lower Band Edge – Channel 128 (824.2 MHz)

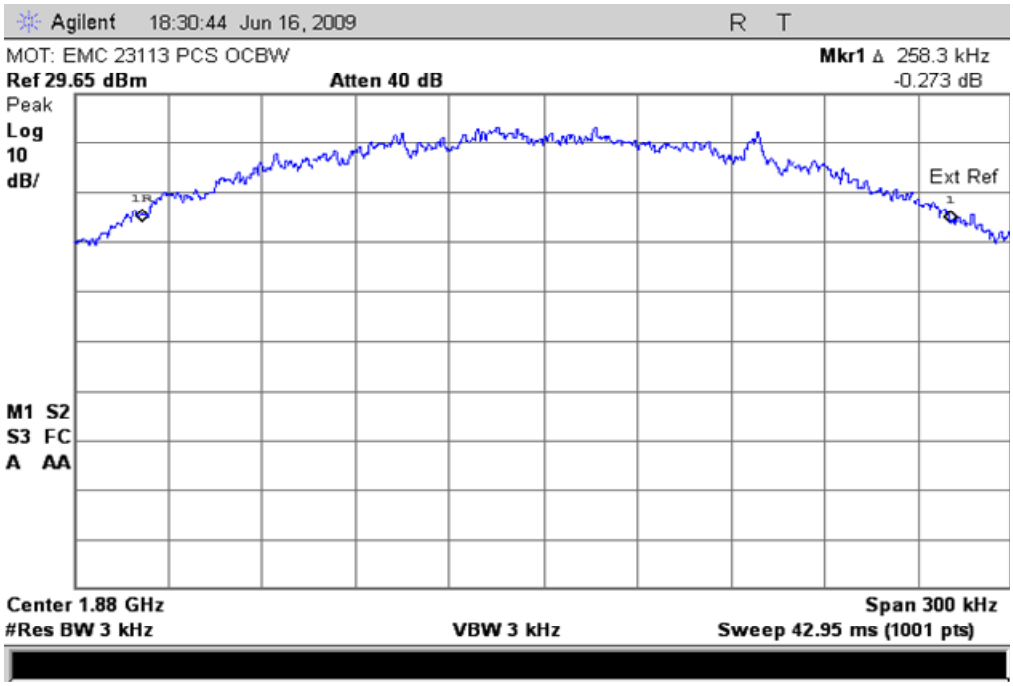


GSM 850 – Upper Band Edge – Channel 251 (848.8 MHz)

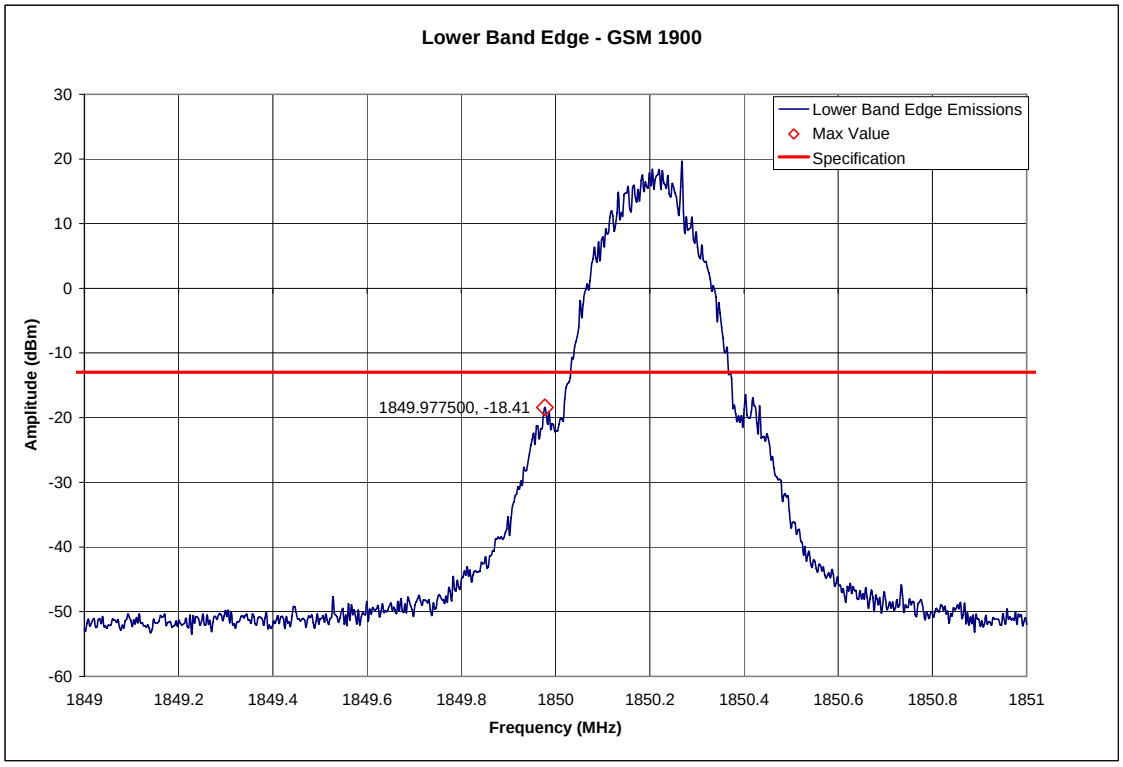
Measurement Results – GSM 1900



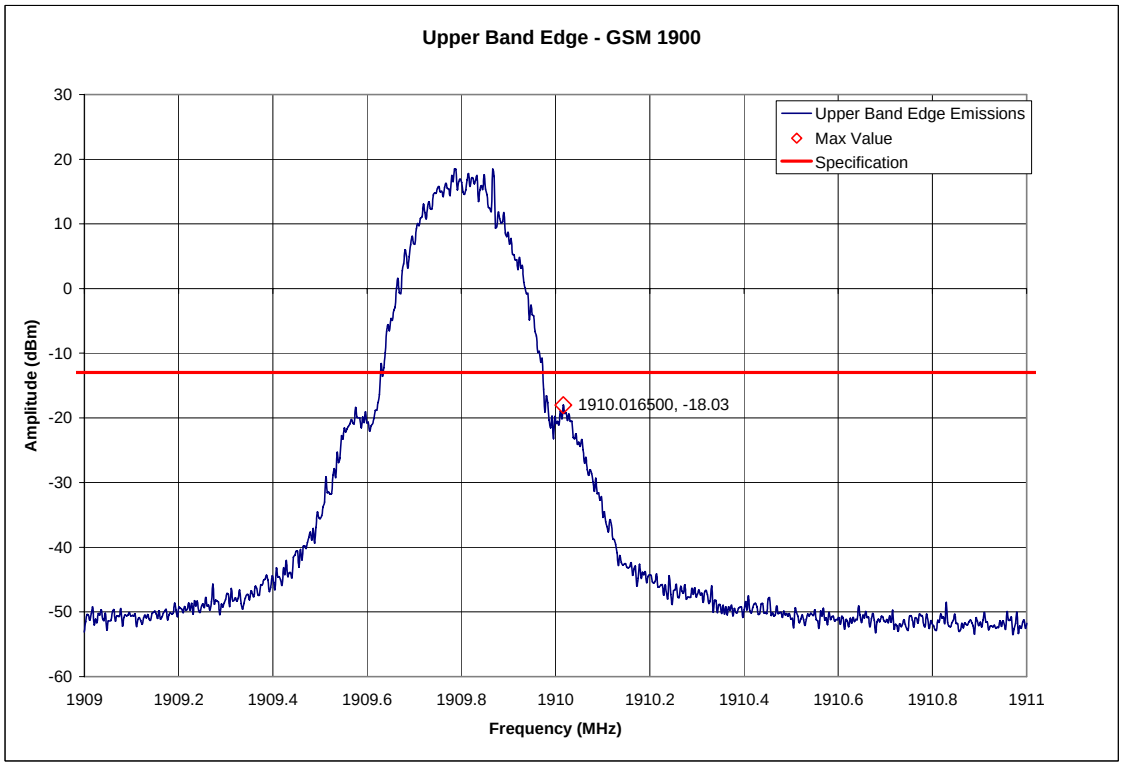
GSM 1900 – Reference Level Plot – Channel 661 (1880.00MHz)



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)

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. A fully charged battery was used for the supply voltage.

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:

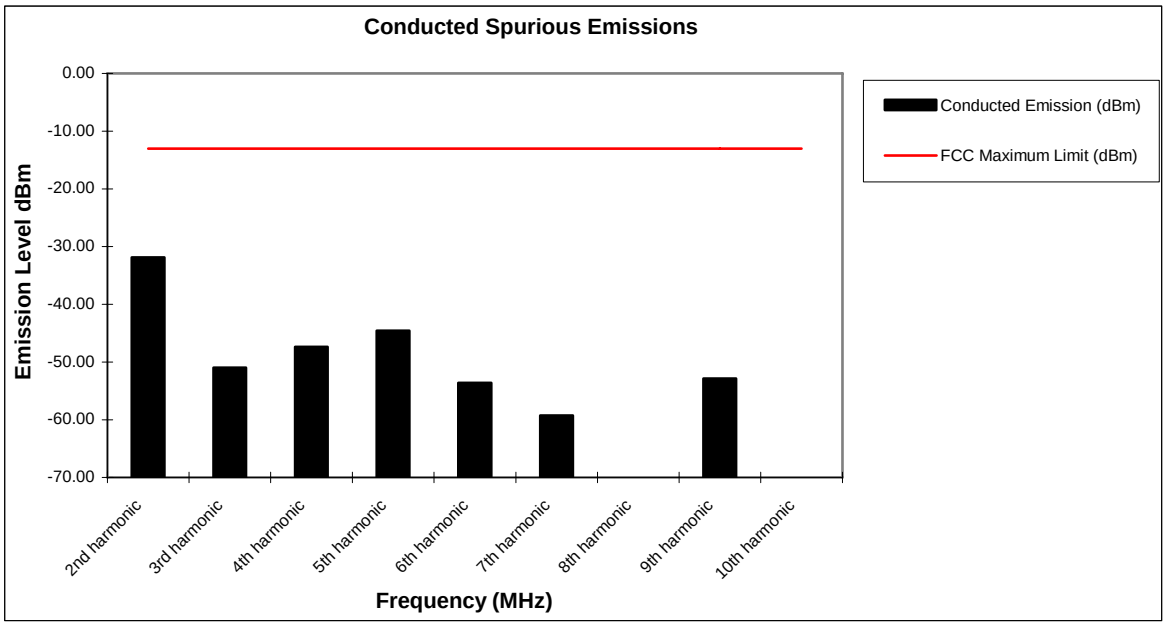
Units	dBm
Divisions	10 dB
Detector	Peak Detector
Resolution Bandwidth	1 MHz
Video Bandwidth (AVG)	Auto
Sweep Time	Auto

Measurement Results

Attached

Measurement Results
Modulation: GSM 850

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	-31.90
3rd harmonic	-13	-50.98
4th harmonic	-13	-47.36
5th harmonic	-13	-44.59
6th harmonic	-13	-53.60
7th harmonic	-13	-59.25
8th harmonic	-13	*
9th harmonic	-13	-52.84
10th harmonic	-13	*

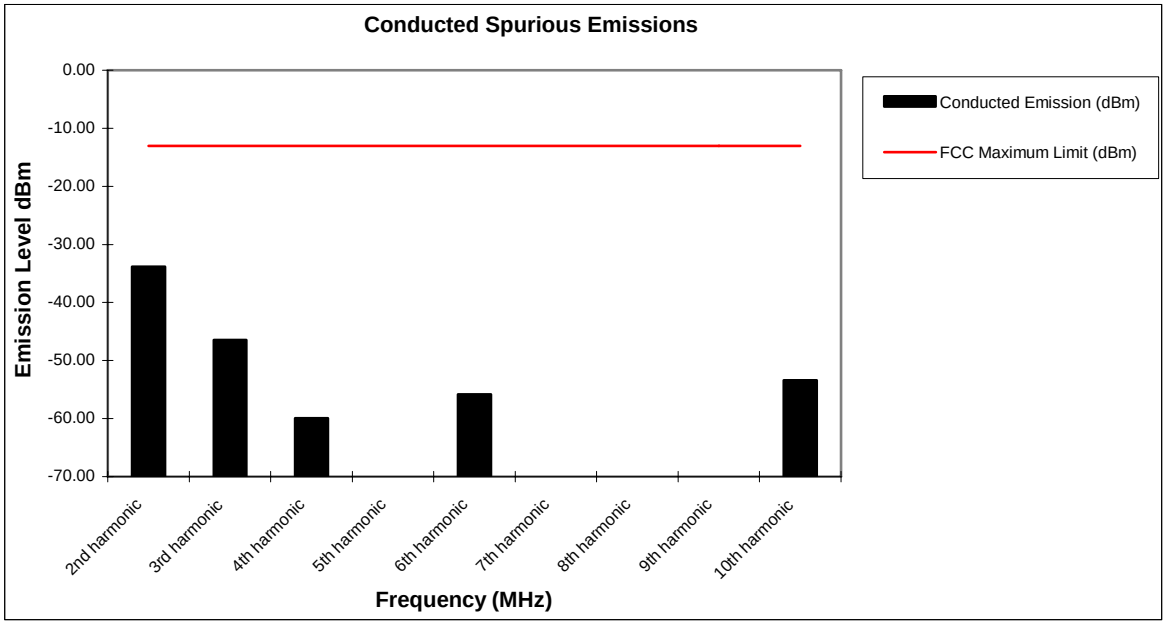


Notes:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients.
2. Each emission reported reflects the highest absolute level at the specific harmonic for the low, mid, and high channels at maximum power.
3. The Spectrum was investigated from 9 kHz to the tenth 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	-33.85
3rd harmonic	-13	-46.47
4th harmonic	-13	-59.95
5th harmonic	-13	*
6th harmonic	-13	-55.83
7th harmonic	-13	*
8th harmonic	-13	*
9th harmonic	-13	*
10th harmonic	-13	-53.40



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. A fully charged battery was used for the supply voltage.

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

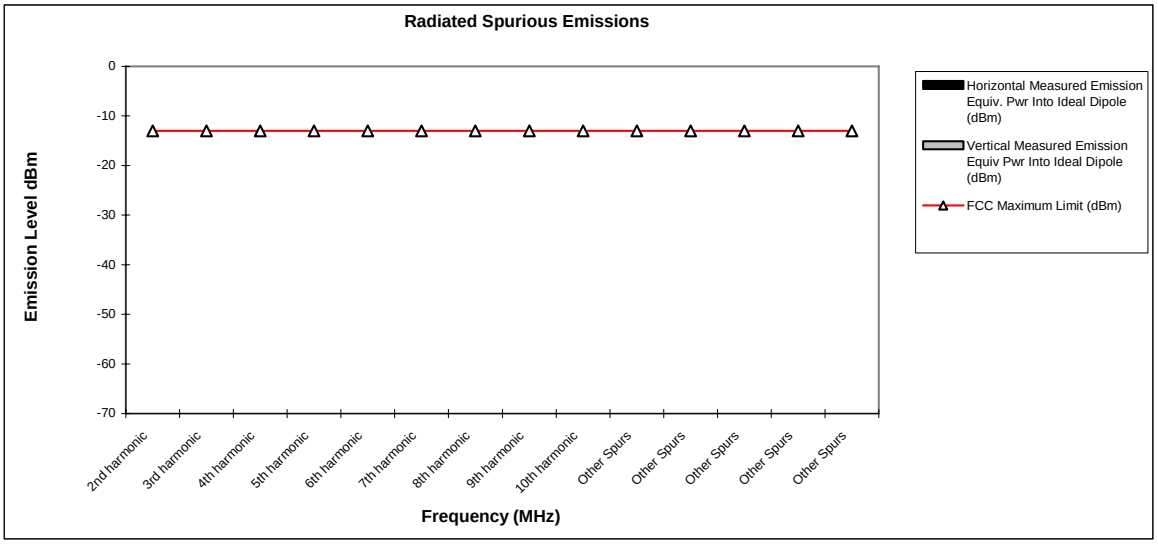
Measurement Results

Attached

Measurement Results – All operational 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:
1. * Indicates the spurious emission could not be detected due to noise limitations or ambients or the emissions are lower than -33 dBm.
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 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 -30º C to +60º C and at intervals of 10º C with the primary supply voltage set to the nominal battery 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 reduced to the battery operating endpoint of the equipment under test. The maximum variation of frequency is measured. A battery eliminator was used for the input supply voltage.

Measurement Results

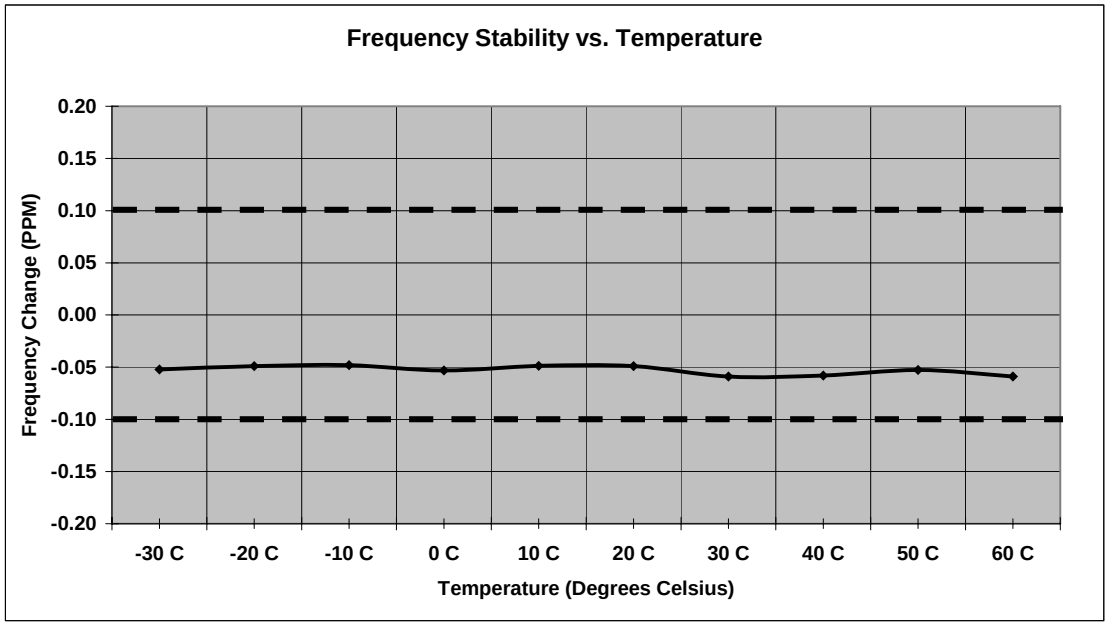
Attached

Measurement Results
Modulation: GSM 850

Frequency Stability

Mode: GSM 850 **Operating Frequency:** 836.6 MHz
Channel: 190 **Deviation Limit (PPM):** 0.1 ppm

Temperature	Frequency Error	Frequency Error	Voltage	Voltage
C	HZ	(PPM)	(%)	(VDC)
-30 C	**-43.81**	**-0.052**	100%	3.80
-20 C	**-40.95**	**-0.049**	100%	3.80
-10 C	**-40.19**	**-0.048**	100%	3.80
0 C	**-44.48**	**-0.053**	100%	3.80
10 C	**-40.81**	**-0.049**	100%	3.80
20 C	**-41.01**	**-0.049**	100%	3.80
30 C	**-49.39**	**-0.059**	100%	3.80
40 C	**-48.60**	**-0.058**	100%	3.80
50 C	**-44.04**	**-0.053**	100%	3.80
60 C	**-49.39**	**-0.059**	100%	3.80
20 C	**-55.07**	**-0.066**	Battery Endpoint	3.50

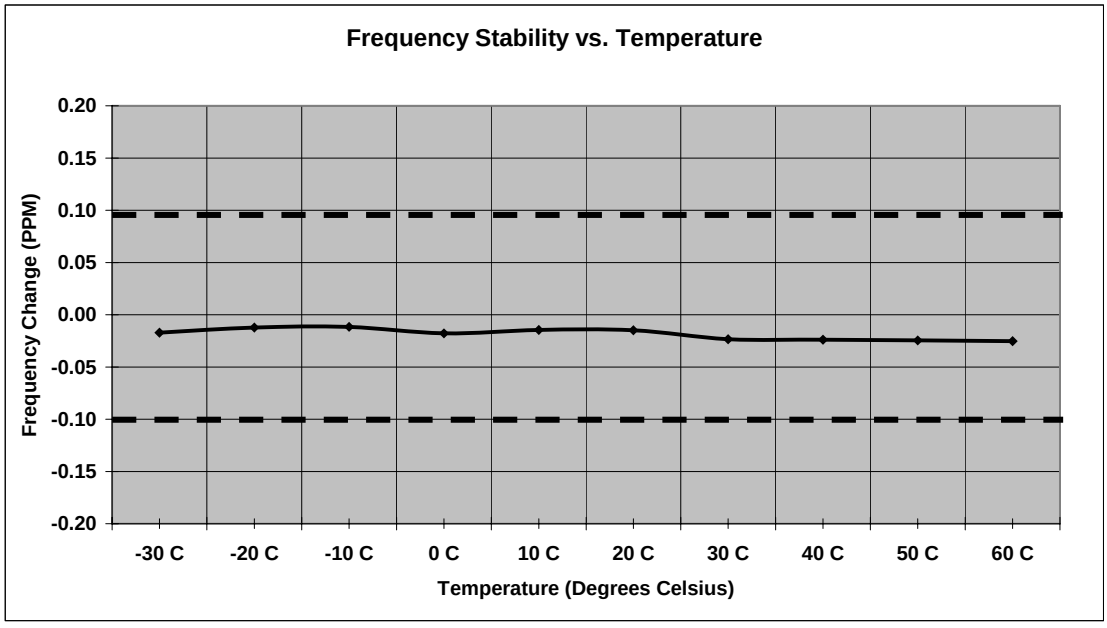


Measurement Results
Modulation: GSM 1900

Frequency Stability

Mode: GSM 1900 **Operating Frequency:** 1880.0 MHz
Channel: 661 **Deviation Limit (PPM):** 0.1ppm

Temperature	Frequency Error	Frequency Error	Voltage	Voltage
C	HZ	(PPM)	(%)	(VDC)
-30 C	**-32.42**	**-0.017**	100%	3.80
-20 C	**-23.27**	**-0.012**	100%	3.80
-10 C	**-21.87**	**-0.012**	100%	3.80
0 C	**-33.74**	**-0.018**	100%	3.80
10 C	**-27.41**	**-0.015**	100%	3.80
20 C	**-27.72**	**-0.015**	100%	3.80
30 C	**-44.00**	**-0.023**	100%	3.80
40 C	**-44.72**	**-0.024**	100%	3.80
50 C	**-46.14**	**-0.025**	100%	3.80
60 C	**-47.47**	**-0.025**	100%	3.80
20 C	**-29.58**	**-0.016**	Battery Endpoint	3.50



End of Test Report