



MOTOROLA

PERSONAL COMMUNICATIONS SECTOR

PRODUCT SAFETY AND COMPLIANCE

EMC LABORATORY

EMC TEST REPORT

Report Date – October 10, 2001

Test Report Details

Tests Performed By: Motorola Personal Communications Sector
 Product Safety and Compliance Group
 1500 Gateway Boulevard
 Boynton Beach, FL 33426

Test Report Number: 4560-1

Test Report Date: October 10, 2001

Product Type: Cellular Phone

Test Signaling Capability: CDMA 1900

Model Number: SUG2004BC

Received Date: October 1, 2001

Testing Start Date: October 5, 2001

Testing Complete Date: October 9, 2001

Summary of Testing

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
- Part 22 Subpart H - Public Mobile Services
- Part 24 - Personal Communications Services
- Part 90 - Private Land Mobile Radio Service

Test #	Test Name	Comply	Does Not Comply
1	RF Power Output		
2	Occupied Bandwidth		
3	Spurious Emissions at Antenna Terminal	X	
4	Field Strength of Spurious Emissions	X	
5	Frequency Stability		
6	Receiver Radiated Emissions	X	

Introduction

All measurements contained in this report were performed at the Motorola Inc. Product Safety and Compliance EMC Laboratory located at 1500 Gateway Boulevard, Boynton Beach, FL 33426. The FCC and Industry Canada recognize this measurement facility as a valid test site.

Physical Description of Test Facility

Shielded Enclosure

The EMC radiated test facility consists of a 3-meter semi-anechoic shielded enclosure. The interior shield to shield dimensions of the indoor semi-anechoic chamber are approximately 28 feet long by 20 feet wide by 17 feet 10 inches high.

Turntable and Ground Plane

The turntable is an electrically driven EMCO model 2088-1.53 with a 1.5 m diameter metal top and is capable of supporting 2200 lbs. An EMCO Model 2090 Multi-device Controller controls the turntable rotation with IEEE-488 data/control for automation.

The chamber's 6 inch raised ground plane consists of a continuous metallic surface with a vinyl top finish.

Antenna Mast

An EMCO Model 2071-2 electrically powered, air-polarized, antenna tower mast is used. It also is controlled by an EMCO Model 2090 Multi-device Controller with IEEE-488 data/control for automation.

Control Area

The control area is a RF shield enclosure attached to the semi-anechoic chamber with a connector panel for RF, fiber optic and control cables.

Quiet Zone and Test Range

The quiet zone for the 3m test range is a cylinder two (2) meters in diameter per volumetric quiet zone testing requirements specified in ANSI C63.4 1992.

Measuring Equipment and Calibration Information

Manufacturer	Item	Item Version/	Serial	CALIBRATION
Name	Name	Model #	Number	DUE DATE
	Description			
Rohde & Schwarz	EMI Test Receiver	ESI26	838386/010	2/28/2002
Hewlett Packard	EMC Analyzer	8593EM	3536A00118	10/12/2001
Hewlett Packard	RF Amplifier	8347A	3307A01225	12/19/2001
Hewlett Packard	Pre-Amplifier	8449B	3008A00535	12/19/2001
ETS	DRG Horn Antenna	3115	6222	9/23/2002
A.H. Systems Inc.	DRG Horn Antenna	SAS-200/571	265	8/21/2002
A.H. Systems Inc.	DRG Horn Antenna	SAS-200/571	365	10/26/2001
ETS	Log-Periodic Antenna	3148	1189	11/3/2003
ETS	Log-Periodic Antenna	3148	1188	11/3/2003
ETS	Biconical Antenna	3110B	3369	11/2/2003
ETS	Biconical Antenna	3110B	3370	11/2/2003
Hewlett Packard	CDMA Mobile Test Set	E8285A	US39220601	9/17/2002
Hewlett Packard	TDMA Mobile Test Set	8920B	US39225370	1/24/2002
Hewlett Packard	TDMA Cellular Adaptor	83206A	US39402234	1/24/2002
Hewlett Packard	GSM Mobile Test Set	8922M	3639U01033	4/10/2002
Hewlett Packard	GSM DCS/PCS RF Interface	83220E	3639U01057	4/12/2002
Hewlett Packard	Signal Generator	83623B	3844A00935	12/18/2001
Hewlett Packard	Signal Generator	83623B	3844A01195	1/23/2002
Thermotron	Environmental Chamber	S-4	31580	12/20/2001

Does not include measurement equipment required for RF Power Output Test.

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.

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.

Measurement Results

Attached

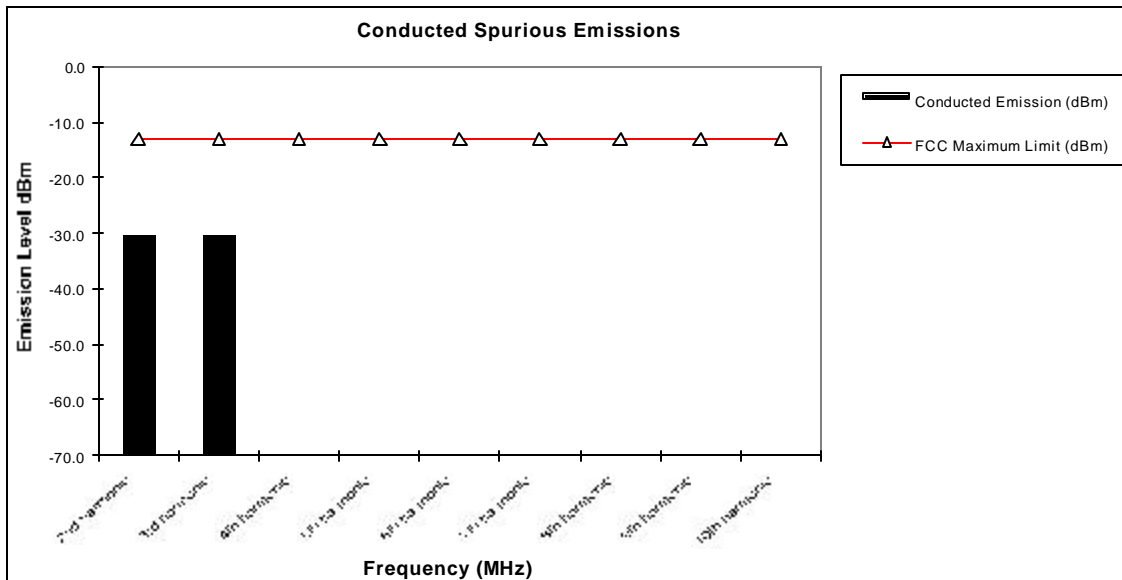
SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Measurement Results

Modulation: CDMA 1900

Conducted Spurious and Harmonic Emissions

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Conducted Emission (dBm)
2nd harmonic	-13	-30.2
3rd harmonic	-13	-30.3
4th harmonic	-13	*
5th harmonic	-13	*
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.

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.

Measurement Results

Attached

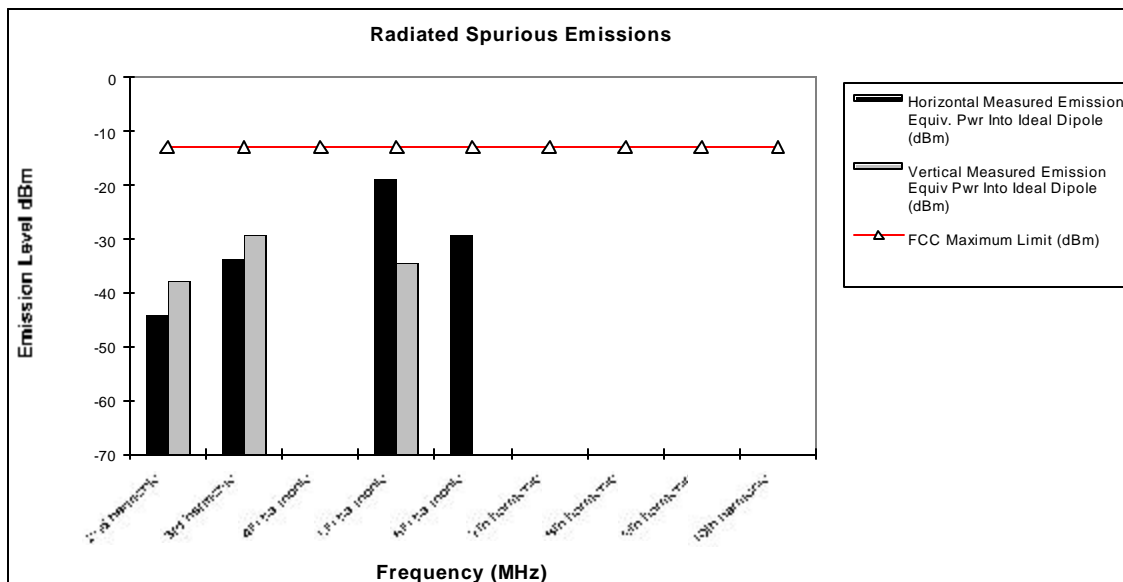
FIELD STRENGTH OF SPURIOUS EMISSIONS

Measurement Results

Modulation: CDMA 1900

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	-44.1	-37.7
3rd harmonic	-13	-33.6	-29.2
4th harmonic	-13	*	*
5th harmonic	-13	-18.7	-34.5
6th harmonic	-13	-29.4	*
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 30 MHz to the tenth harmonic of the fundamental.