



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

FCC Rules & Regulations
Part 22 Subpart H & Part 24 Subpart E

Cellular Radiotelephone Service and Broadband PCS

THE FOLLOWING "**MEETS**" THE ABOVE TEST SPECIFICATION

Formal Name: Motorola V710 Mobile Phone
Kind of Equipment: Mobile Phone
Test Configuration: Connection Mode with other products - Conducted (via a RF cable) & Radiated (via Antenna)
Model Number(s): SUG3171AA
Model(s) Tested: SUG3171AA
Serial Number(s): 77047CB2
FCC ID: IHDT56EC1
Date of Tests: November 19-21 & 26, 2003
Test Conducted For: Motorola
600 N. US Highway 45
Libertyville IL 60048

NOTICE: "This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government". Please see the "Additional Description of Equipment Under Test" page listed inside of this report. This report must not be reproduced (except in full), without the approval of D.L.S. Electronic Systems.



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SIGNATURE PAGE

Report By:

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Test Engineer
EMC-001375-NE

Reviewed By:

William Stumpf
OATS Manager

Approved By:

Brian Mattson
General Manager

Company Official:


Motorola



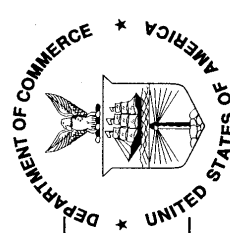
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United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation



D.L.S. ELECTRONIC SYSTEMS, INC.
WHEELING, IL

is recognized by the National Voluntary Laboratory Accreditation Program
for satisfactory compliance with criteria set forth in NIST Handbook 150:2001,
all requirements of ISO/IEC 17025:1999, and relevant requirements of ISO 9002:1994.
Accreditation is awarded for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

ISO/IEC 17025:1999
ISO 9002:1994

September 30, 2004

Effective through

W. P. Walsh


For the National Institute of Standards and Technology
NVLAP Lab Code: 100276-0

NVLAP-01C (06-01)




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D.L.S. ELECTRONIC SYSTEMS, INC.
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<i>NVLAP Code</i>	<i>Designation / Description</i>
Emissions Test Methods:	
12/160D21	RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 21 - Emission of Radio Frequency Energy
12/300220a	EN 300 220-1 V1.3.1 (2000-09): Electromagnetic compatibility and Radio spectrum Matters; Short Range Devices; Radio equipment to be used in the 25 MHz to 1000 MHz frequency range with power levels ranging up to 500 mW; Part 1: Technical characteristics and test methods
12/300386a	EN 300 386 V.1.2.1: Electromagnetic compatibility and radio spectrum matter (ERM); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements
12/C63.17	ANSI C63.17-1998: American National Standard for Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices

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12/C6317a	ANSI C63.17-1998: American National Standard for Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices
12/CIS11	IEC/CISPR 11 + A1 (1997), EN 55011 (1998), AS/NZS 2064 (1997), and CNS 137803 (1997): Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment
12/CIS13	IEC/CISPR 13 (2001-04), EN 55013 (2001), AS/NZS 1053 (2001), and CNS 13439 (2001): Sound and television broadcast receivers and associated equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS14	CISPR 14-1 (March 30, 2000): Limits and methods of measurement of radio interference characteristics of household electrical appliances, portable tools and similar electrical apparatus - Part 1: Emissions
12/CIS14a	EN 55014-1 (1993) with Amendments A1 (1997) & A2 (1999)
12/CIS14d	IEC/CISPR 14-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emissions
12/CIS14e	EN 55014-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission

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12/CIS14f	AS/NZS 1044 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS14g	CNS 13783-1 (2001) and A1 (2001): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS15	IEC/CISPR 15 (2000) + A1 (2001): Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment
12/CIS15a	AS/NZS CISPR (2002): Limits and methods of measurements of radio disturbance characteristics of electrical lighting and similar equipment
12/CIS15b	CNS 13439 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
12/CIS15c	EN 55015 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
12/CIS22	IEC/CISPR 22 (1997) and EN 55022 (1998): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1:1995, and Amendment 2:1996.

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12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/EM02a	IEC 61000-3-2, Edition 2.1 (2001-10), EN 61000-3-2 (2000), and AS/NZS 2279.1 (2000): Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A)
12/EM03	EN 61000-3-3 (1995), IEC 61000-3-3 (1995), and AS/NZS 2279.3 (1995): EMC - Part 3: Limits - Section 3. Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to 16A
12/F18	FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment)
12/FCC15b	ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart B: Unintentional Radiators
12/FCC15c	ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart C: Intentional Radiators
12/FCC15d	ANSI C63.4 (2001) with FCC Method - 47 CFR Part 15, Subpart D: Unlicensed Personal Communications Service Devices

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NVLAP Code Designation / Description

- 12/FCC15e ANSI C63.4 (2001) with FCC Method - CFR Part 15, Subpart E: Unlicensed National Information Infrastructure Service Devices
- 12/T51 AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment
- 12/VCCIa Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/02.04

Immunity Test Methods:

- 12/1089a GR-1089-CORE, Issue 3, October 2002: Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment (sections 2, 3.3, and 3.5)
- 12/160D16 RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 16 - Power Input
- 12/160D17 RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 17 - Voltage Spike
- 12/160D18 RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 18 - Audio Frequency Conducted Susceptibility - Power Inputs

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<i>NVLAP Code</i>	<i>Designation / Description</i>
12/160D19	RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 19 - Induced Signal Susceptibility
12/160D20	RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 20 - Radio Frequency Susceptibility (Radiated and Conducted)
12/160D22	RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 22 - Lightning Induced Transient Susceptibility
12/160D25	RTCA/DO-160D (1997): Environmental Conditions and Test Procedures for Airborne Equipment - Section 25 - Electrostatic Discharge (ESD)
12/I01	IEC 61000-4-2 (1995) and Amendment 1 (1998) and EN 61000-4-2: Electrostatic Discharge Immunity Test
12/I02	IEC 61000-4-3 (1995) and Amendment 1 (1998) and EN 61000-4-3: Radiated, Radio-Frequency Electromagnetic Field Immunity Test
12/I03	IEC 61000-4-4 (1995) and EN 61000-4-4: Electrical Fast Transient/Burst Immunity Test
12/I04	IEC 61000-4-5 (1995) and EN 61000-4-5: Surge Immunity Test

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12/I05	IEC 61000-4-6 (1996) and EN 61000-4-6: Immunity to Conducted Disturbances, Induced Radio-Frequency Fields
12/I06	IEC 61000-4-8 (1993): Power Frequency Magnetic Field Immunity Test
12/I07	IEC 61000-4-11 (1994): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/J111324	SAE J1113/24: Immunity to radiated electromagnetic fields; 10 kHz to 200 MHz - Crawford TEM cell and 10 kHz to 5 GHz - Wideband TEM cell
12/J111341	SAE J1113/41 (1995-07): Limits and methods of measurement of radio disturbance characteristics of components and modules for the protection of receivers used on board vehicles

Radio Test Methods

12/RSS119	RSS-119, Issue 6 (March 25, 2000): Land Mobile and Fixed Radio Transmitters and Receivers, 27.41 to 960 MHz
12/RSS123	RSS-123, Issue 1, Rev. 2 (November 6, 1999): Low Power Licensed Radiocommunication Devices
12/RSS137	RSS-137, Issue 1, Rev. 1 (September 25, 1999): Location and Monitoring Service (902 - 928 MHz)

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<i>NVLAP Code</i>	<i>Designation / Description</i>
12/RSS139	RSS-139, Issue 1 (February 5, 2000): Licensed Radiocommunications Devices in the Band 2400 - 2483.5 MHz
12/CIS15c	EN 55015 (2000) + A1 (2001): Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
MIL-STD-462 : Conducted Emissions:	
12/A18	MIL-STD-461 Version E Method CE106
MIL-STD-462 : Conducted Susceptibility:	
12/B12	MIL-STD-462 Version D Method CS101
12/B13	MIL-STD-462 Version D Method CS103
12/B25	MIL-STD-461 Version E Method CS114
12/B26	MIL-STD-461 Version E Method CS115
12/B27	MIL-STD-461 Version E Method CS116
MIL-STD-462 : Radiated Emissions:	
12/D04	MIL-STD-462 Version D Method RE101

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12/D05	MIL-STD-462 Version D Method RE102
12/D06	MIL-STD-462 Version D Method RE103
MIL-STD-462 : Radiated Susceptibility:	
12/E08	MIL-STD-462 Version D Method RS101
12/E09	MIL-STD-462 Version D Method RS103

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1.0 SUMMARY OF TEST REPORT

It was found that the Motorola V710 mobile phone, Model Number SUG3171AA, **"meets"** the radio interference conducted and radiated emission requirements of the FCC "Rules and Regulations", Part 22, Subpart E, Section 22.535, for paging and radiotelephone service.

This test report relates only to the items tested and contains the following number of pages.

Text: 64

2.0 INTRODUCTION

On November 7, 2002, a series of radio frequency interference measurements was performed on the Motorola V710 Cellular Phone, Model Number SUG3171AA, Serial Number: 77047CB2. The tests were performed according to the procedures of the FCC as stated in Part 2 Subpart J of the Code of Federal Regulations. Tests were performed by personnel of D.L.S. Electronic Systems, Inc. who are responsible to Donald L. Sweeney, Senior EMC Engineer.

3.0 OBJECT

The purpose of this series of tests was to determine if the test sample could meet the radio frequency interference requirements of CFR 47 part 22 Subpart H, "Cellular Radiotelephone Services", and Part 24, "Broadband PCS".



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4.0 TEST SET-UP: (FCC Part 2.947)

All tests were performed at D.L.S. Electronic Systems, Inc. and set up according to the American National Standards Institute, ANSI C63.4-2001, Section 7, (Figures 9a, 9b, 9c and 9d). The conducted tests if required were performed with the test item placed on a non-conductive table (table top equipment), located in the test room. Equipment normally operated on the floor was tested by placing it on the metal ground plane. The ground plane has an electrical isolation layer over its surface approximately 7mm thick. The power line supplied was connected to a dual line impedance stabilization network electrically bonded to the ground plane, located on the floor. The networks were constructed per the requirements of the American National Standards Institute, ANSI C63.4-2001, Section 4, (Figure 2).

All radiated emissions tests were performed with the test item placed on a 80 cm high rotating non-conductive table, located in the test room. Equipment normally operated on the floor was placed on a metal covered turntable, which is flush with the surrounding conducting ground plane. The ground plane has an electrical isolation layer over its surface approximately 7 mm thick. The EUT is separated from the turntable ground plane by a non-conductive layer. The equipment under test was set up according to ANSI C63.4-2001, Sections 6 and 8.



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5.0 TEST EQUIPMENT (Bandwidths and Detector Function)

All preliminary data below 1000 MHz was automatically plotted using the HP Spectrum Analyzer or ESI 26/ESI 40 Fixed Tuned Receiver. The data was taken using Peak, Quasi-Peak or the Average Detector Functions as required. This information was then used to determine the frequencies of maximum emissions. Above 1000 MHz, final data was taken using the Average Detector.

Final data was taken using Rohde & Schwarz ESI 40 fixed tuned receiver and the “substitution method” or conducted at the antenna terminals as appropriate. Bandwidths used are as follows: for frequencies below 1000MHz – ANSI C63.4-2001. For frequencies above 1000MHz – 1GHz (AMPS) and 3GHz (CDMA & PCS).

A list of the equipment used can be found in Table 1. All primary equipment was calibrated against known reference standards with a verified traceable path to NIST.



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6.0 AMBIENT MEASUREMENTS

For emissions measurements, broadband antennas and an EMI Test Receiver with a panoramic spectrum display are used. First the frequency range is scanned and displayed on the test receiver display. Next the scanned frequency range is divided into smaller ranges, and then it is manually tuned through to determine the emissions from the EUT. A headset or loudspeaker is connected to the test receiver's AM/FM demodulated output as an aid in detecting ambient signals and finding frequencies of significant emission from the EUT. If there is any doubt as to the source of the emission, it is further investigated by rotating the EUT, or by disconnecting the power from the EUT.

The EUT is set up in its typical configuration and operated in its various modes. For tabletop systems, cables are manipulated within the range of likely configurations. For floor-standing equipment, the cables or are located in the same manner as the user would install them and no further manipulation is made. If the manner of cable installation is not known, or if it changes with each installation, cables or wires for floor-standing equipment shall be manipulated to the extent possible to produce the maximum level of emissions. For each mode of operation, the frequency spectrum is monitored. Variations in antenna height, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) are explored to produce the emission that has the highest amplitude relative to the limit. These methods are performed to the specifications in ANSI C63.4: 2001.



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7.0 AC POWER LINE CONDUCTED EMISSIONS

AC line conducted emissions are not required for 47CFR Part 22 Subpart H and Part 24 Subpart E. AC line conducted emissions can be found in the associated Part 15 report for this product.



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8.0 RADIATED EMISSION MEASUREMENTS

Preliminary radiation measurements were performed at a 3-meter test distance. The frequency range from 30 MHz to 20 GHz was automatically scanned and plotted at various angles.

After preliminary measurements were taken, the EUT was taken to one of our 10 meter open field test site located at Genoa City, Wisconsin, FCC File No. 31040/SIT, where final radiated emissions measurements were made over the entire frequency range.

For signals in the frequency range of 30 to 200 MHz were measured with a Bi-conical Antenna or Tuned Dipole as the pickup device. From 200 MHz, a Log Periodic Antenna or a Tuned Dipole was used and above 1000 MHz a Double Ridge Horn Antenna was used.

During the test for frequencies below 1000 MHz, the equipment was rotated and the antenna was raised and lowered from 1 meter to 4 meters to find the maximum level of emissions. For frequencies greater than 1000 MHz the Double Ridge Horn Antenna was set at 1 or 3 meters from the EUT with the antenna height varied from 1 to 4 meters above the ground plane. Tests were made in both horizontal and vertical planes of polarization. The EUT, peripheral equipment and cables were configured to meet the conditions in ANSI C63.4-2001, Sections 6 & 8. All measurements for this product and FCC part were done using the substitution method or conducted at the antenna terminals as appropriate.

NOTE:

All radiated emissions measurements were made at an enclosed test room temperature of **69°F** at **32%** relative humidity. The test room temperature and humidity are regulated to be within the specifications required for this test.



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9.0 DESCRIPTION OF TEST SAMPLE: (See also Paragraph 10.0)

9.1 Description:

The sample tested is a mobile phone. It is capable of making wireless connection with a base station for the purpose of voice or data connectivity. The phone is a dual mode, triband (AMPS, CDMA 800 & PCS 1900) system with capability for GPS and Bluetooth.



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9.0 DESCRIPTION OF TEST SAMPLE: (CONT)

9.2 PHYSICAL DIMENSIONS OF EQUIPMENT UNDER TEST

Length: 0.93 Width: 0.5 Height: 0.23 (flip closed)

9.3 LINE FILTER USED:

N/A

9.4 INTERNAL CLOCK FREQUENCIES:

Switching Power Supply Frequencies:

N/A

Clock Frequencies:

19.2 MHz

Circuit Board part numbers/Rev numbers: 8489474N02 P2



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10.0 CHANGES MADE FOR COMPLIANCE DURING TESTING

No changes were made to the EUT during testing to meet the FCC requirements



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Appendix A



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2.1046 – RF Power Output

Test Results:

See the following pages for RF Power Output test results.

22.913 Effective radiated power limits.

The effective radiated power (ERP) of transmitters in the Cellular Radiotelephone. Service must not exceed the limits in this section.

(a) *Maximum ERP.* The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts. The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

Test Results:

See the following pages for effective radiated power test results.



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Maximum power tests for the V710 (CDMA) Phone #1, Submission # 13262

The phone was tested in Libertyville Chamber 1, which is a 16' cubical anechoic chamber with a 2-axis positioner system that permits taking complete spherical scans of the AUT's radiation patterns. For all tests, the phone was supported in a free-space type environment, vertically oriented in the chamber. Tests were done for AMPS 800 frequency (824.04Mhz, 836.52Mhz, and 848.97Mhz), 800 CDMA frequencies, (824.7MHz, 836.52MHz, and 848.37 MHz) and 1900 CDMA frequencies,(1850.2Mhz,1880.0 MHz,and 1909.80 MHz) with antenna UP and DOWN. **SEE TEXT**

Special instructions given on if antenna should be extended or retracted for the tests. (Given by SAR Lab)

CDMA measurements were made with the phone placed in a call using the HP E8285A 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 every 15 degree step from theta=0 to 165 degrees and phi=0 to 360 degrees. The radiated power was measured using a Gigatronics 8542C power meter in "Mod Avg" mode. 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. The max radiated power results for V710 follows, as EIRP in dBm. To get ERP (effective radiated power referenced to a half-wave dipole), subtract 2.1 dB from these numbers.

AMPS 800:	Antenna Extended		
824.04 MHz:	24.78 dBm		
836.52 MHz:	24.28 dBm		
848.97 MHz:	25.17 dBm		
CDMA 800:	Antenna Extended	CDMA 1900:	Antenna Retracted
824.70 MHz:	24.57 dBm	1850.2 Mhz	27.87 dBm
836.52 MHz:	23.98 dBm	1880.0 Mhz	27.62 dBm
848.37 MHz:	24.85 dBm	1909.8 Mhz	26.94 dBm

For all measurement, calibration was performed via gain substitution with a half-wave dipole.

From this it is concluded that the max EIRP is 25.17 dBm in AMPS 800 mode (max ERP is 23.07 dBm) at angles of 90 degrees Theta, 180 degrees Phi.

From this it is concluded that the max EIRP is 24.85 dBm in 800 CDMA mode (max ERP is 22.75 dBm) at angles of 90 degrees Theta, 180 degrees Phi.

From this it is concluded that the max EIRP is 27.87 dBm in 1900 CDMA mode (max ERP is 25.77 dBm) at angles of 120 degrees Theta, 195 degrees Phi.



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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2.1047 a – Modulation Characteristics: (Part 22.915 – Modulation Requirements)

Test Results: Passed

Characteristics – Applicable documents are CFR Part 2.1047, 22.9915. The tests should include at least the following:

- Transmit Audio Frequency Response
- Modulation Limiting vs. Modulation Input Voltage with Compandor On and Off
- Post Limiter Filter Attenuation

See the following pages test results.

NOTE:

Data from MSM5100-based designs is applicable for MSM6100 designs.



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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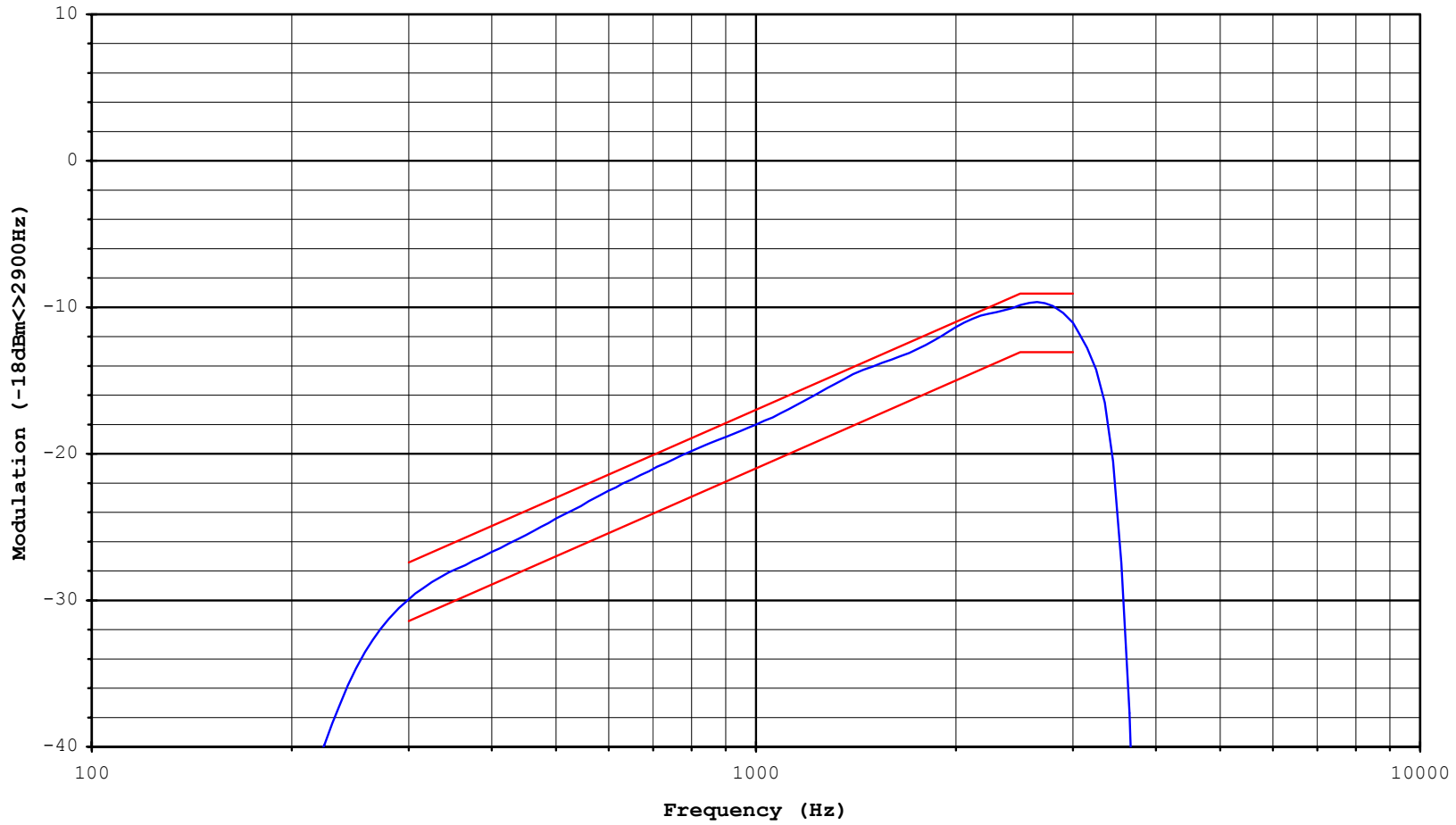
Transmit Audio Frequency Response Graphs



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

Transmit Audio Response - EXT Audio - V710 P2 1.20_chg6 SW

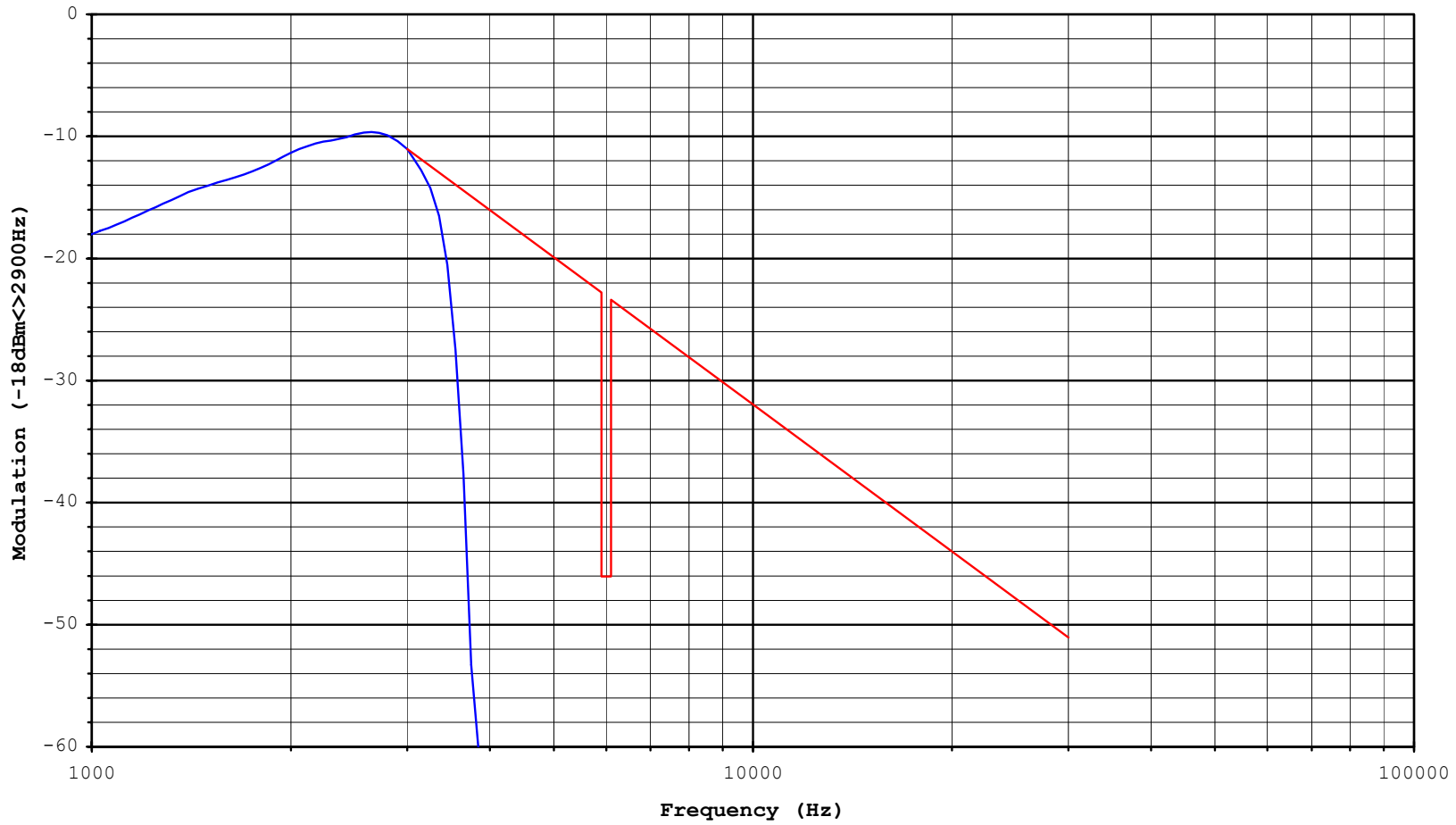




Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

Transmit Audio Response - EXT Audio - V710 P2 1.20_chg6 SW





Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

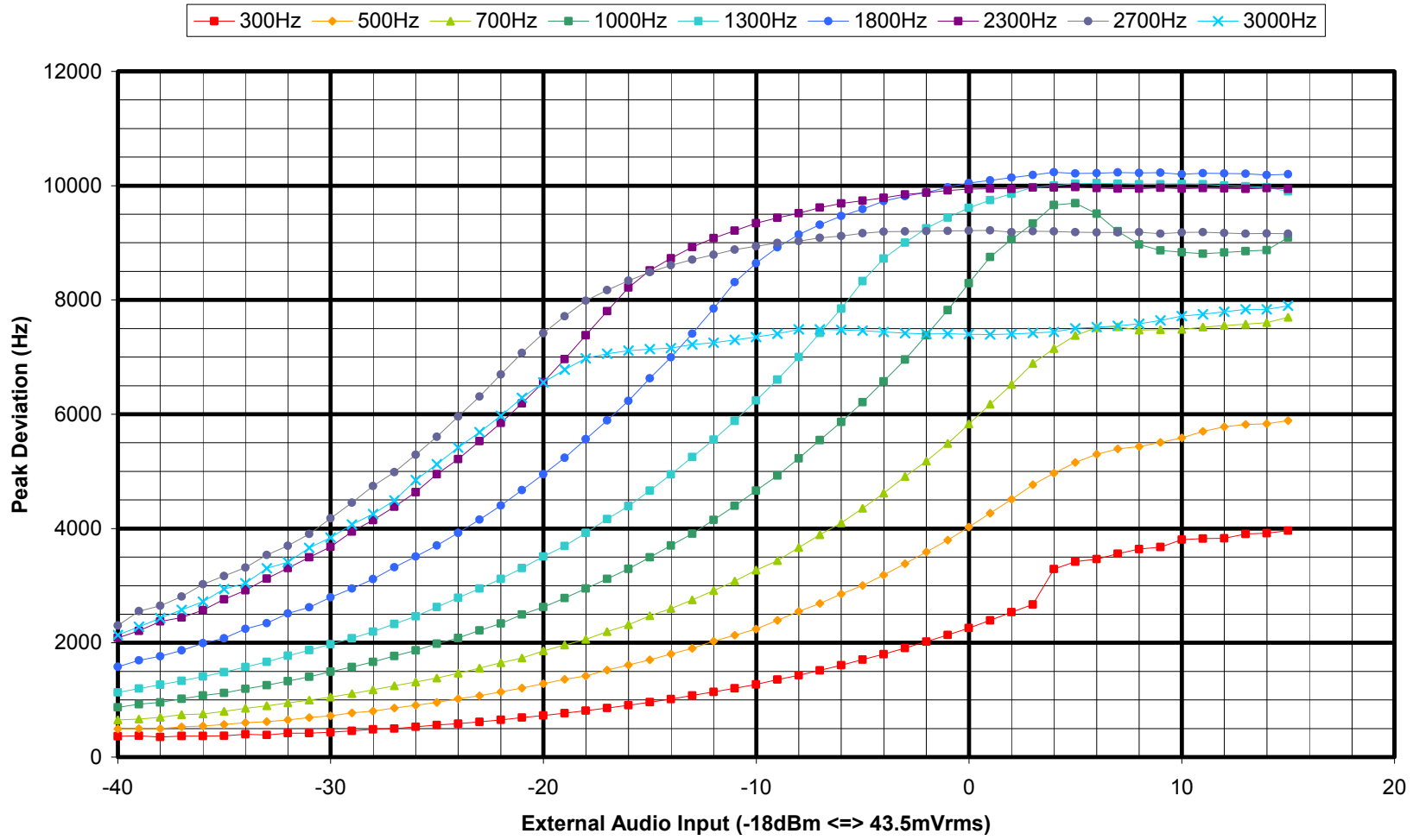
Modulation Limiting vs. Modulation Input Voltage with Compandor On and Off Graphs



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

Deviation Limiting Compressor ON

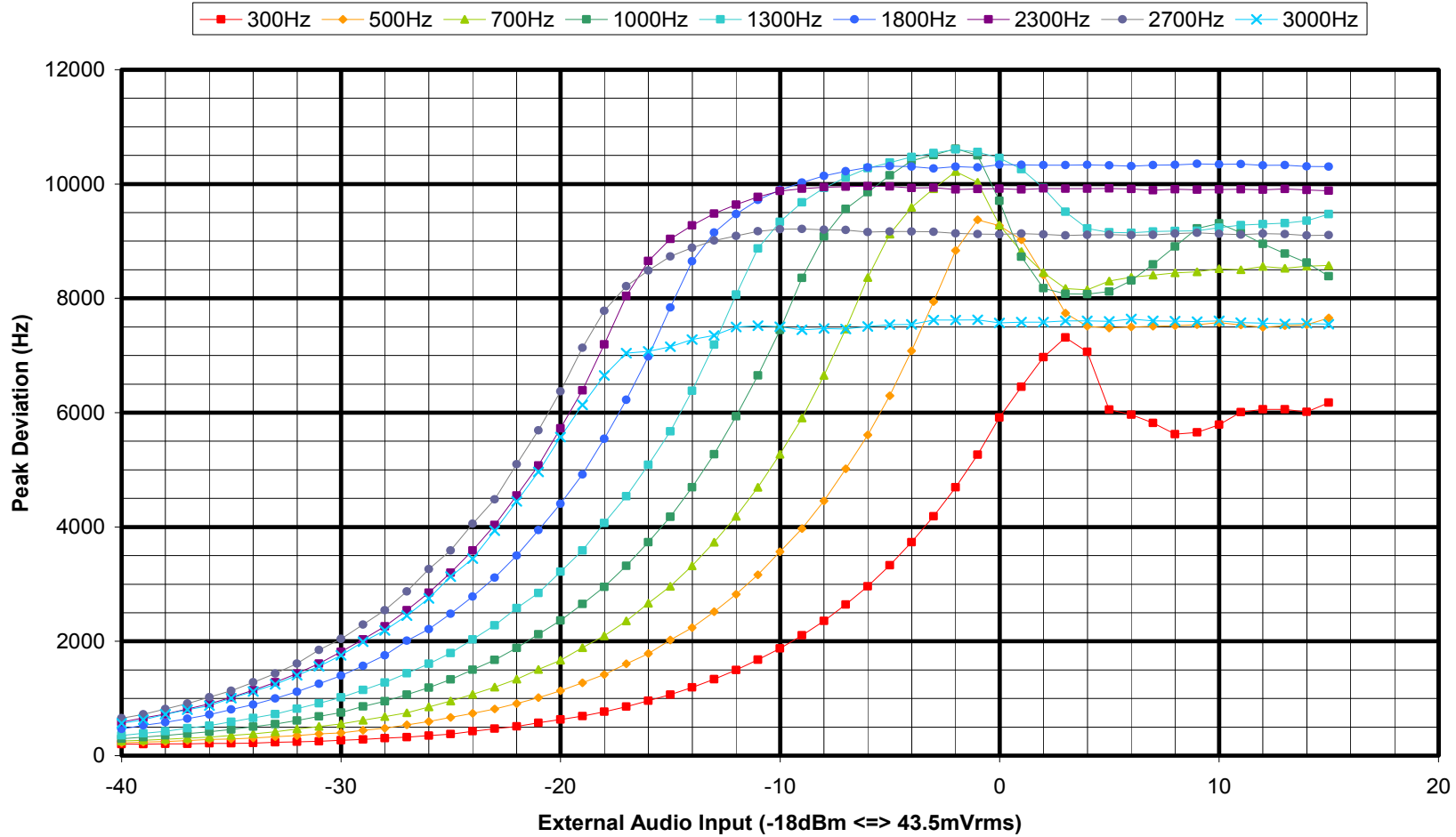




Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

Deviation Limiting Compressor OFF



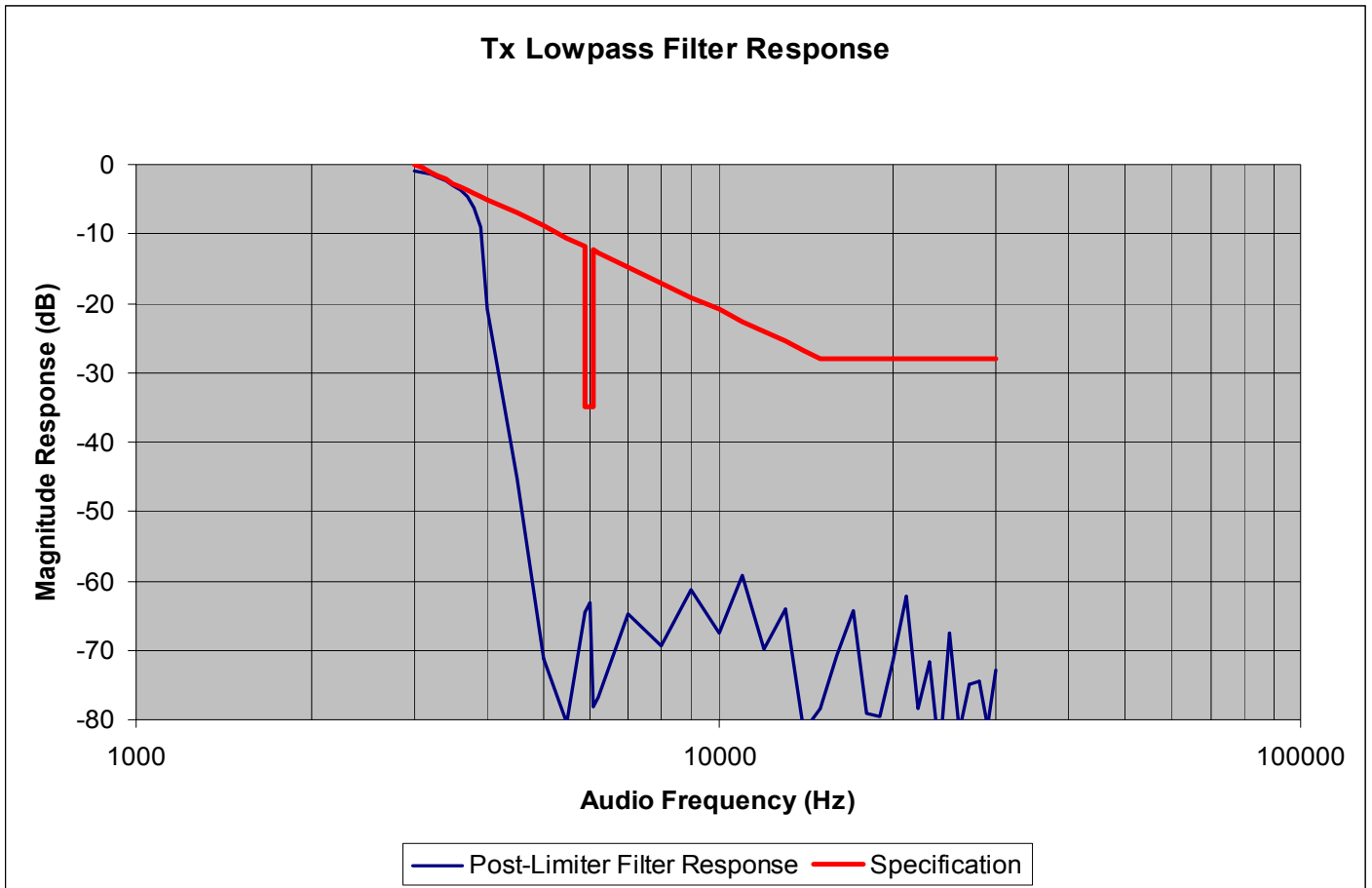


Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Post Limiter Filter Attenuation Graph

Post Limiter Filter Attenuation





Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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2.1049 – Occupied Bandwidth: (22.917 – Emission Limitations for Cellular)

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

- (a) *Analog radiotelephony emissions.* F3E emissions must be used only on the communication channels.
- (b) *F3E/F3D emission mask for use with audio filter.* For F3E and F3D emissions, except as provided in paragraph (c) of this section, the mean power of emissions must be attenuated below the mean power of the unmodulated carrier wave (P) as follows:
 - (1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz: at least 26 dB.
 - (2) On any frequency removed from the carrier frequency by more than 45 kHz, up to the first multiple of the carrier frequency: at least 60 dB or $43 + 10 \log P$ dB, whichever is the lesser attenuation.

Results of Test: Passed

See the following pages for Occupied Bandwidth test results.



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

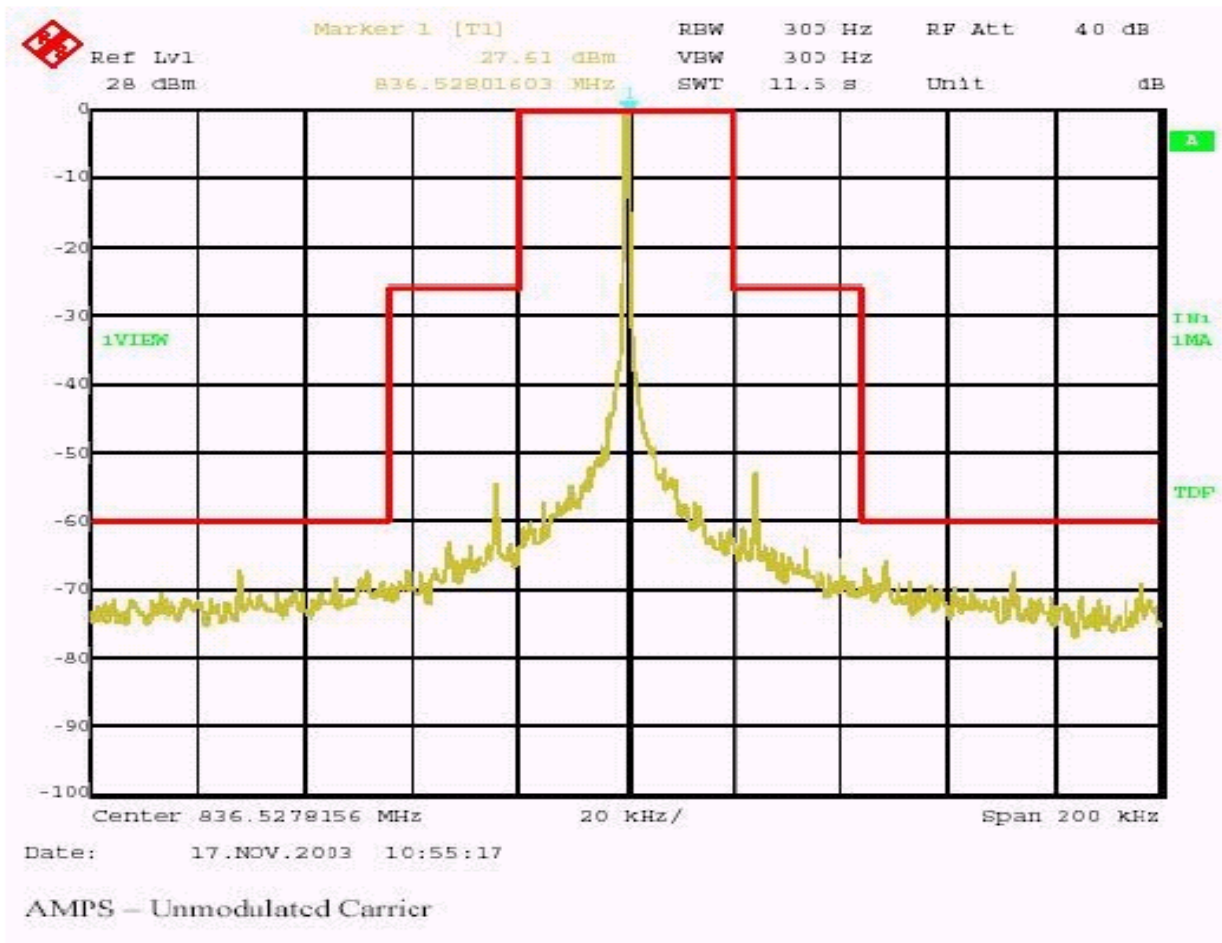
1250 Peterson Dr., Wheeling, IL 60090

2.1049 – Occupied Bandwidth: (Part 22.917 – Emission Limitations for Cellular)

Test Results: Passed

Test Date: 11-17-03
EUT: V710
Test: Occupied Bandwidth - Conducted
Operator: Jason L.
Comment: AMPS – Un-modulated Carrier

Yellow Trace = Un-modulated Carrier



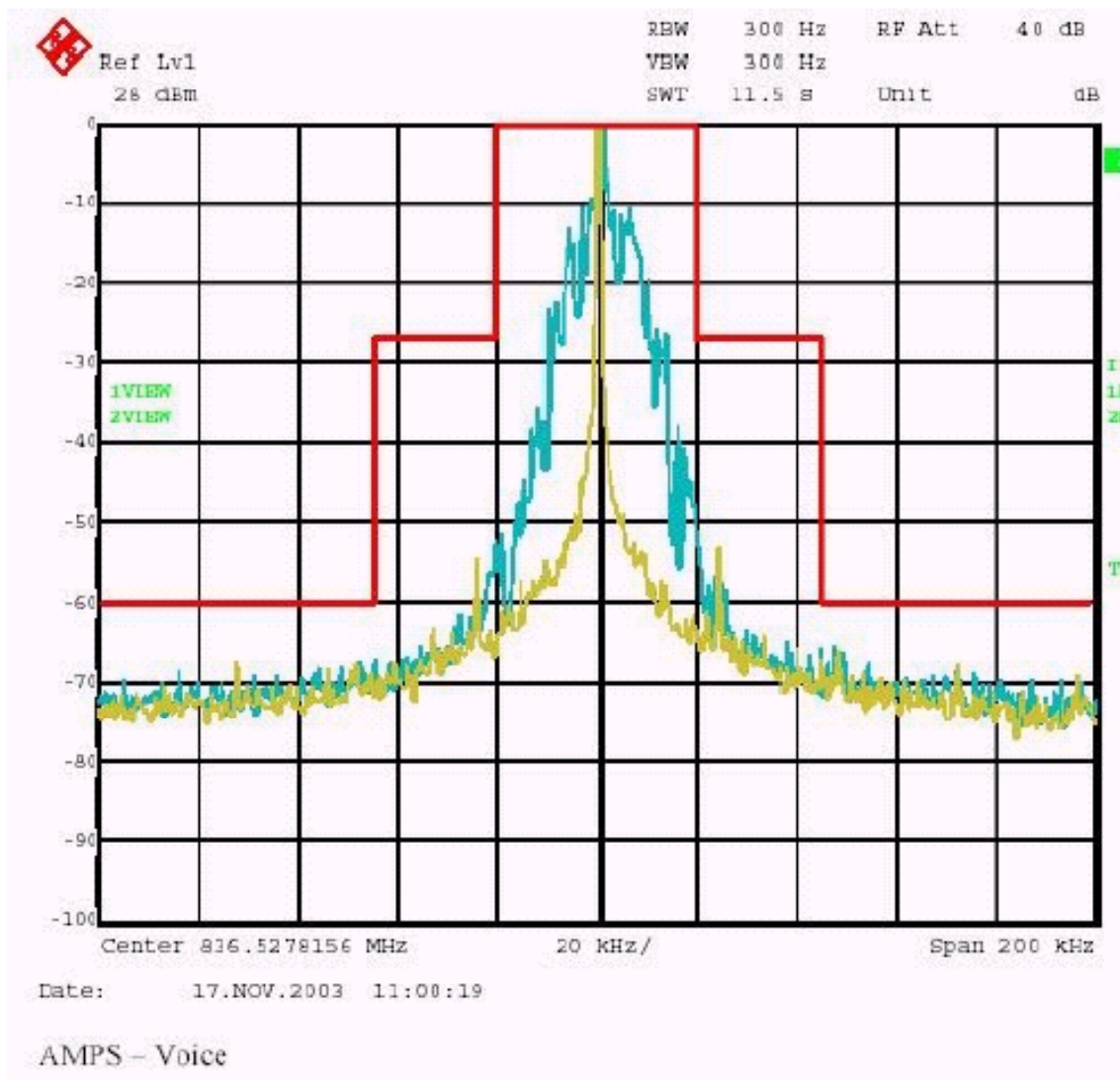


Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Test Date: 11-17-03
EUT: V710
Test: Occupied Bandwidth - Conducted
Operator: Jason L.
Comment: AMPS - Voice

Blue Trace = Voice
Yellow Trace = Un-modulated Carrier



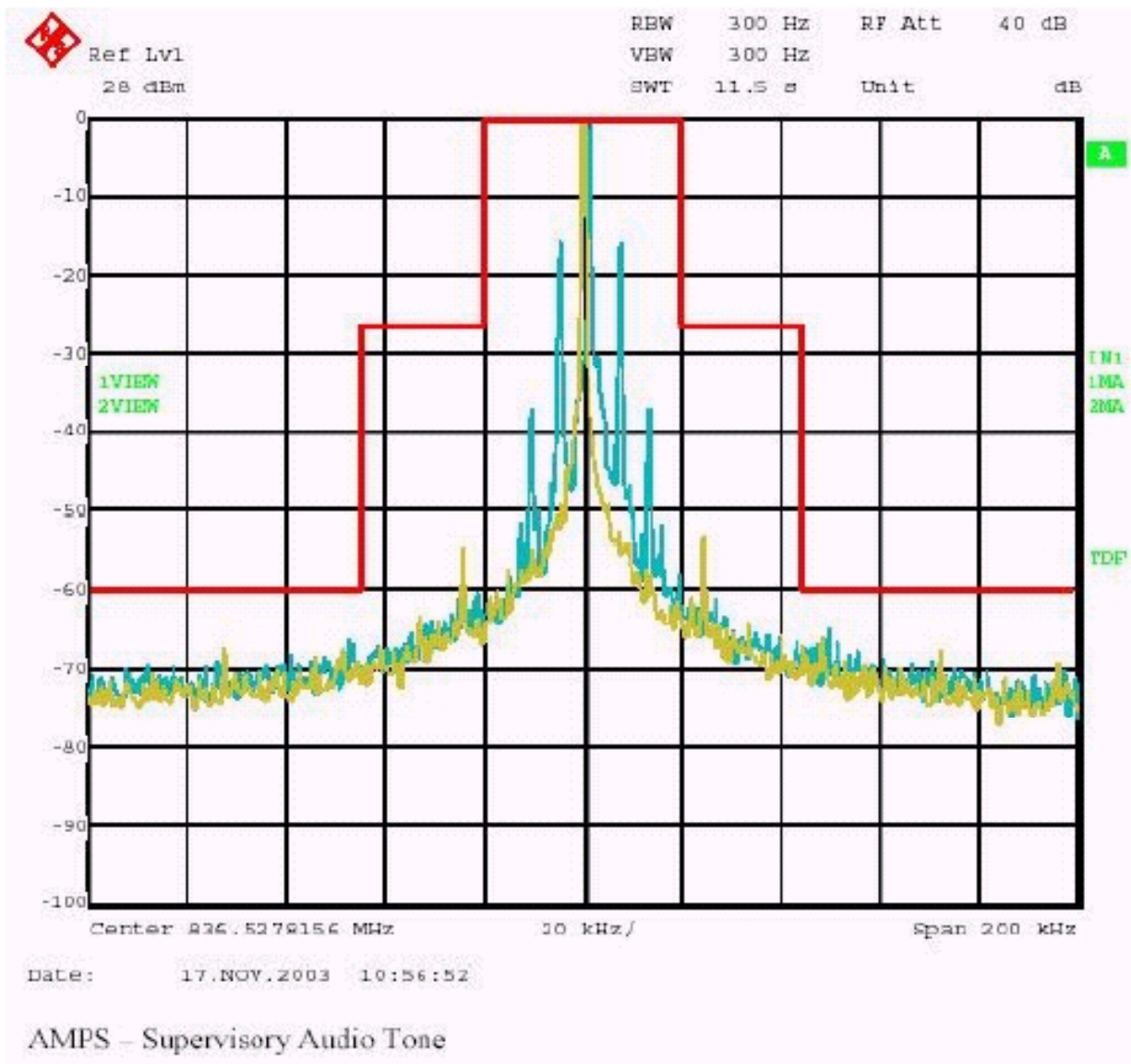


Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Test Date: 11-17-03
EUT: V710
Test: Occupied Bandwidth - Conducted
Operator: Jason L.
Comment: AMPS – Supervisory Audio Tone

Blue Trace = Supervisory Audio Tone
Yellow Trace = Un-modulated Carrier



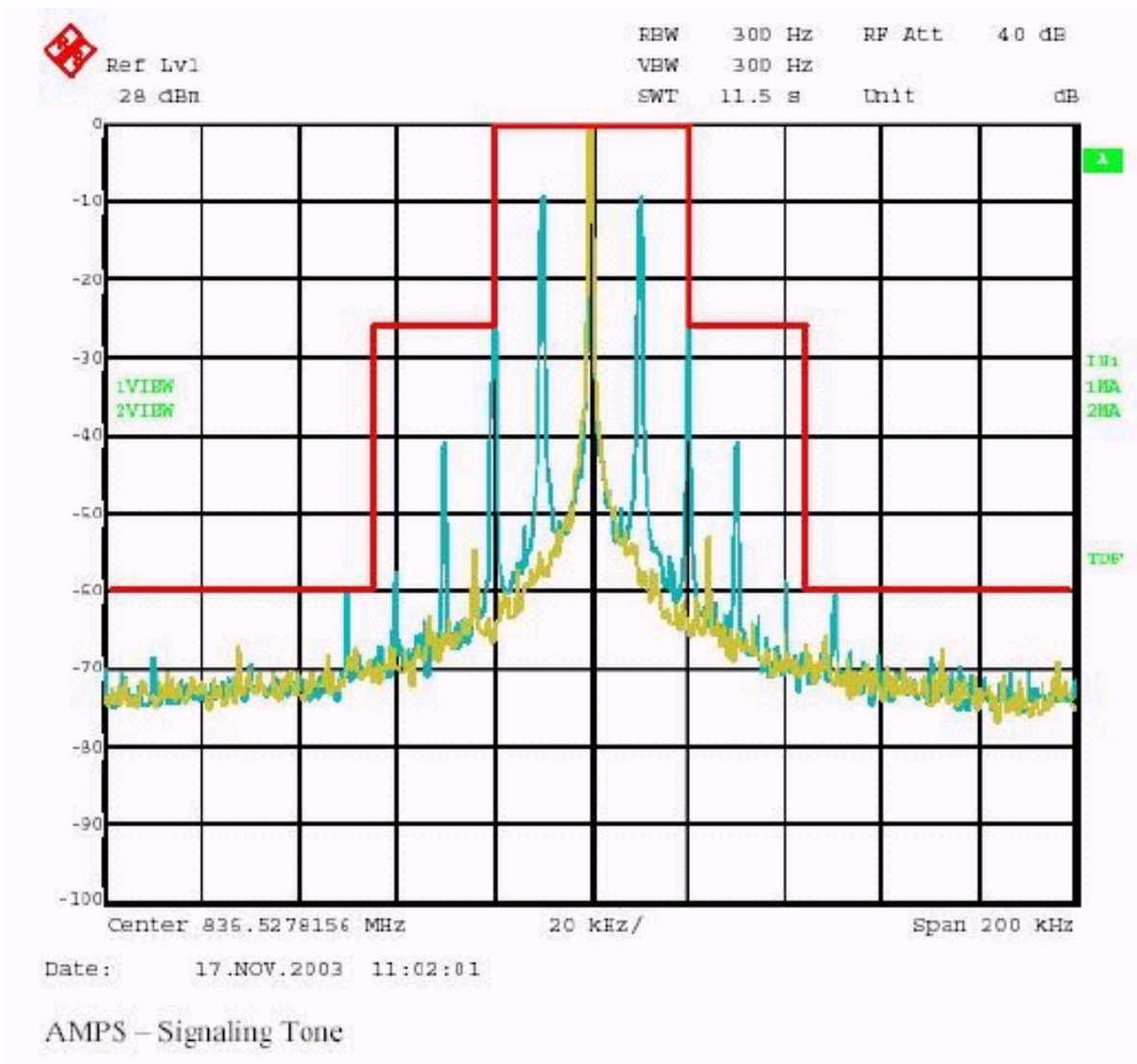


Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

1250 Peterson Dr., Wheeling, IL 60090

Test Date: 11-17-03
EUT: V710
Test: Occupied Bandwidth - Conducted
Operator: Jason L.
Comment: AMPS - Signaling Tone

Blue Trace = Signaling Tone
Yellow Trace = Un-modulated Carrier



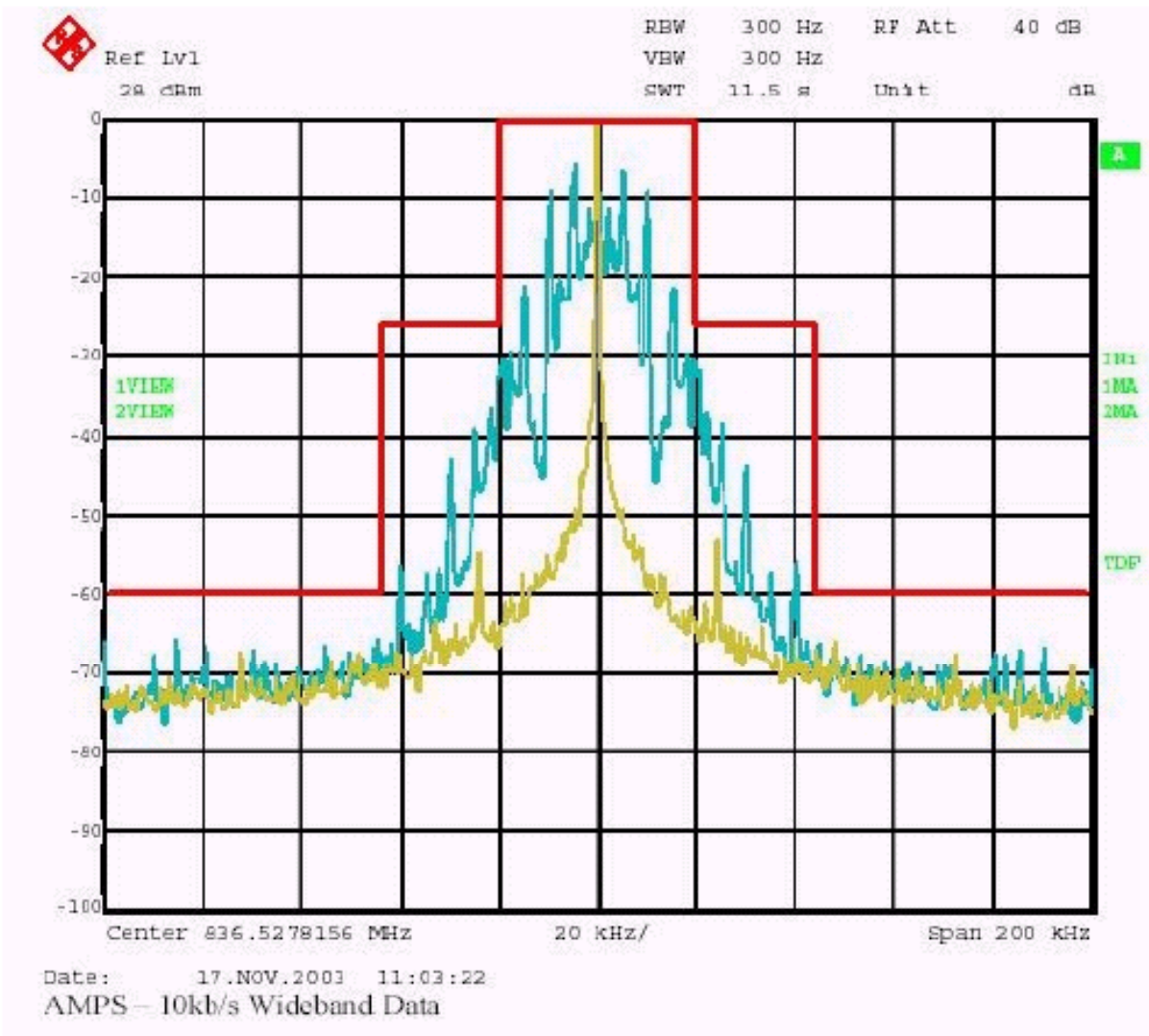


Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Test Date: 11-17-03
EUT: V710
Test: Occupied Bandwidth - Conducted
Operator: Jason L.
Comment: AMPS - 10 kb/s Wideband Data

Blue Trace = 10 kb/s Wideband Data
Yellow Trace = Un-modulated Carrier





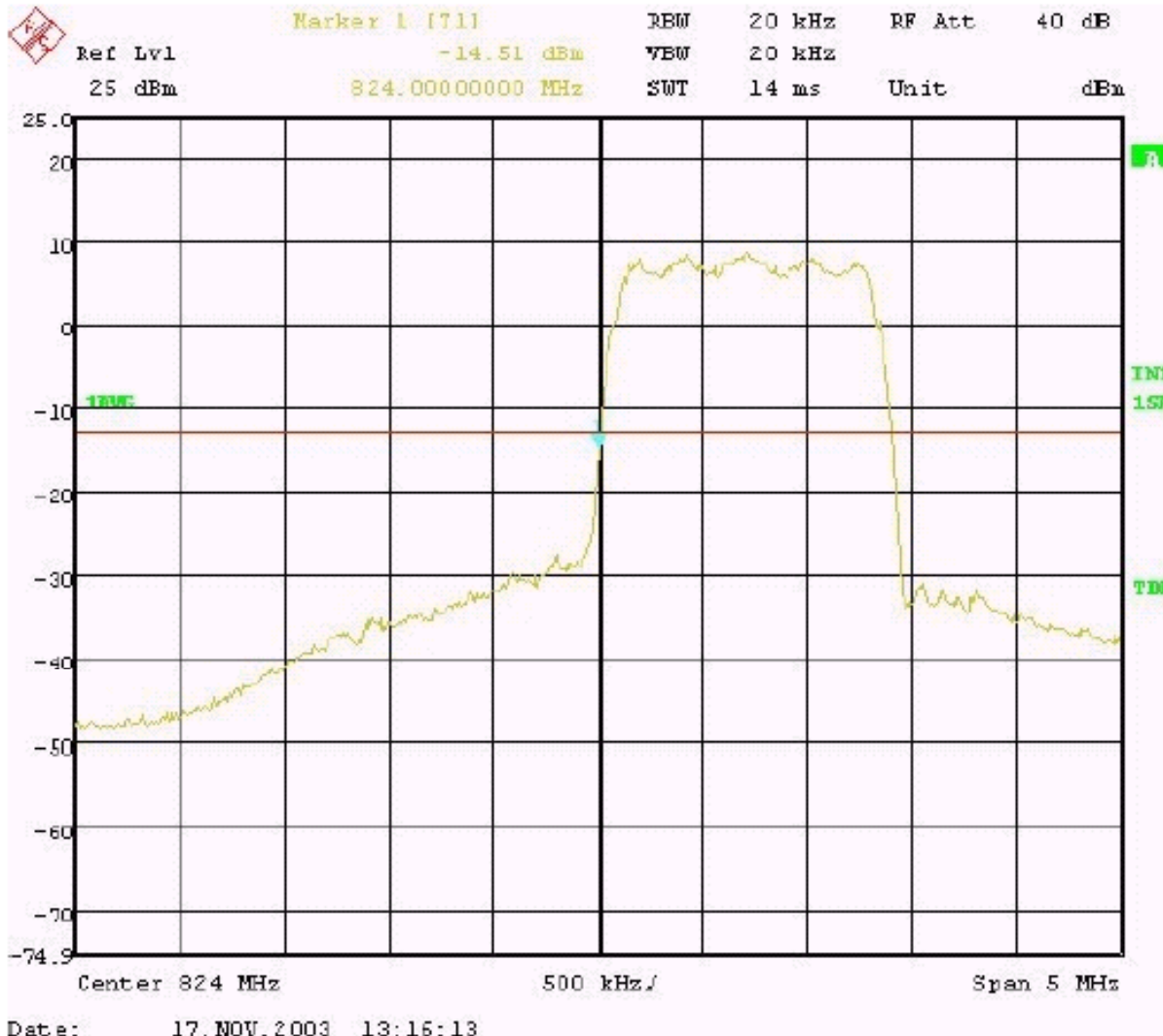
Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Band Edge Measurement Data:

Test Date: 11-17-03
EUT: V710
Test: Band Edge - Conducted
Operator: Jason L.
Comment: CDMA 800 - Lower Band Edge
Limit = -13 dBm Actual = -14.51 dBm

Band-Edge 824.00 MHz





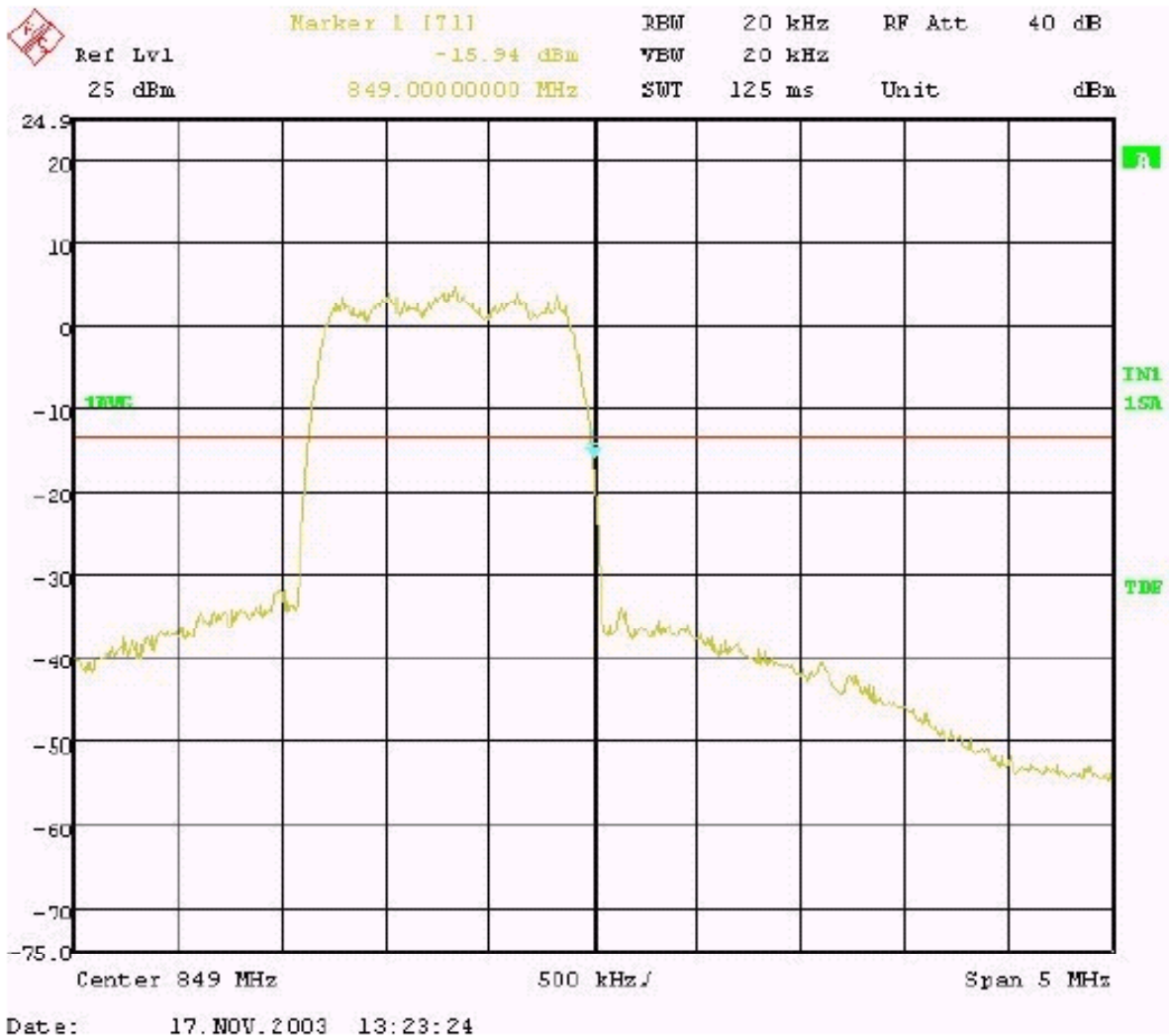
Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Band Edge Measurement Data: continued

Test Date: 11-17-03
EUT: V710
Test: Band Edge - Conducted
Operator: Jason L.
Comment: CDMA 800 - Upper Band Edge
Limit = -13 dBm Actual = -15.94 dBm

Band-Edge 849.00 MHz





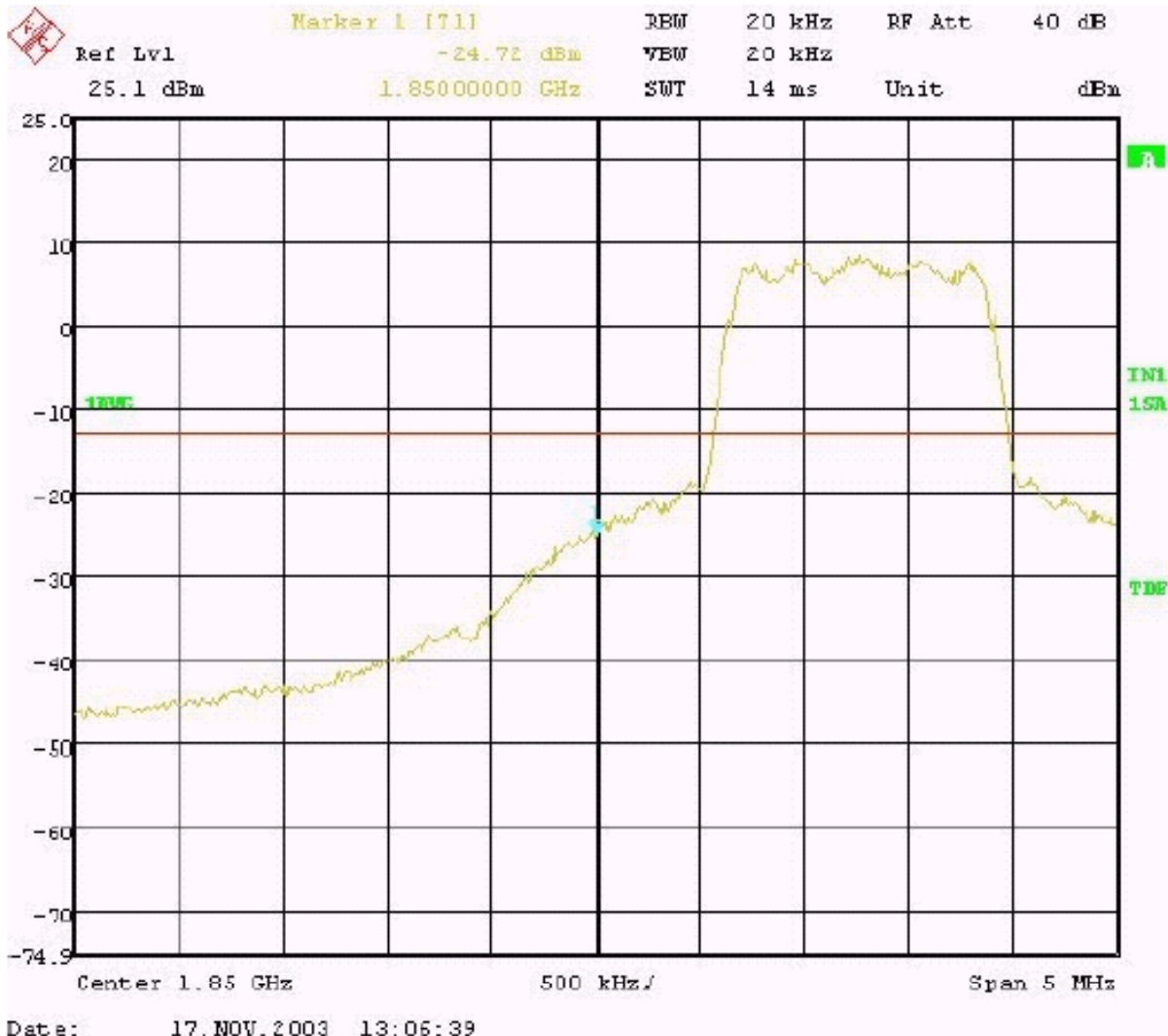
Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Band Edge Measurement Data: continued

Test Date: 11-17-03
EUT: V710
Test: Band Edge - Conducted
Operator: Jason L.
Comment: CDMA 1900 - Lower Band Edge
Limit = -13 dBm Actual = -24.72 dBm

Band-Edge 1.85 GHz





Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Band Edge Measurement Data: continued

Test Date: 11-17-03
EUT: V710
Test: Band Edge - Conducted
Operator: Jason L.
Comment: CDMA 1900 - Upper Band Edge
Limit = -13 dBm Actual = -26.98 dBm

Band-Edge 1.91 GHz





Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

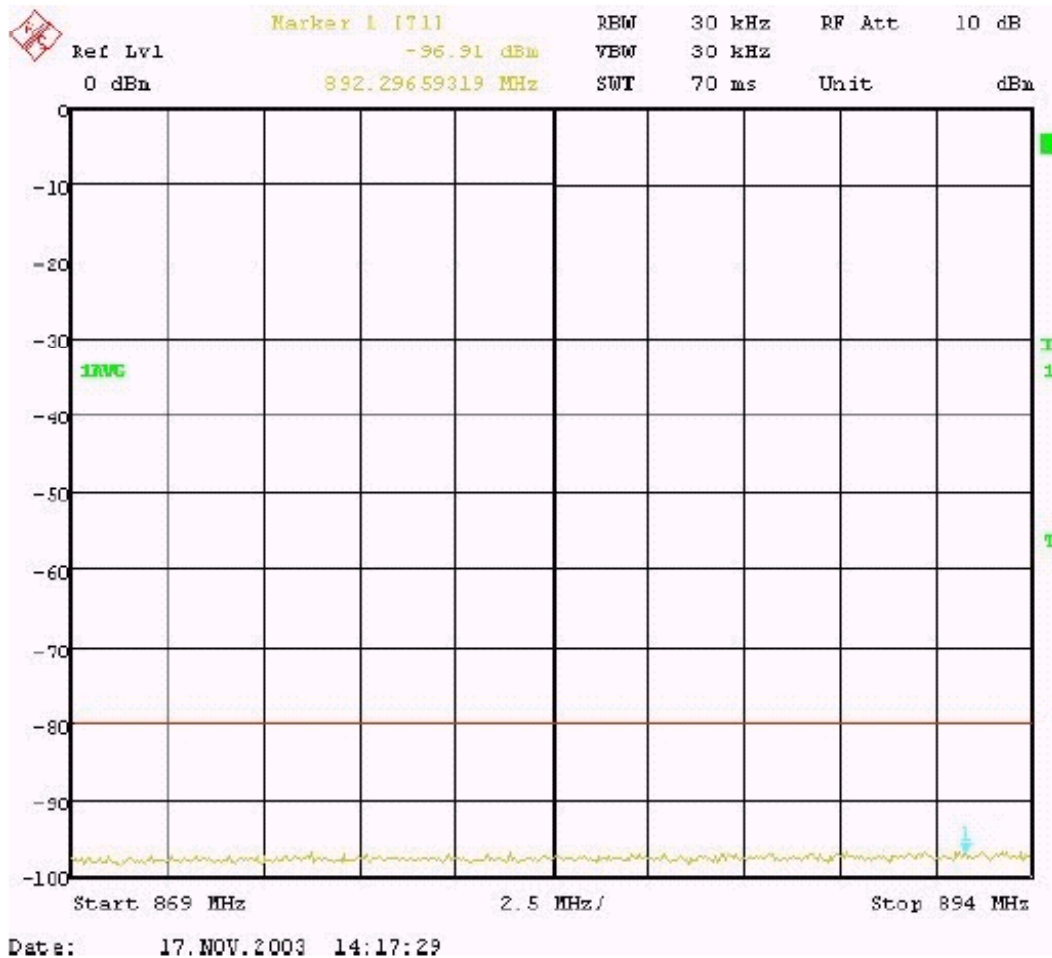
1250 Peterson Dr., Wheeling, IL 60090

2.1051 – Spurious Emissions at Antenna Terminals: Part 22 & 24 (Part 22.917f)

Test Results: Passed

AMPS

Test Date: 11-17-03
EUT: V710
Test: Cellular Base Station Frequency Range - Conducted
Operator: Jason L.
Comment: AMPS
Limit = -80 dBm





Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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2.1051 – Spurious Emissions at Antenna Terminals (Part 22 & 24)

Test Results: Passed

CDMA

Test Date: 11-17-03
EUT: V710
Test: Cellular Base Station Frequency Range - Conducted
Operator: Jason L.
Comment: CDMA 800
Limit = -80 dBm





Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Part 22.917e: Spurious Emissions AMPS

Test Results: Passed

Test Date: 11-17-03
EUT: V710
Test: Spurious Emissions - Conducted (Out of Band)
Operator: Jason L.
Comment: AMPS – Low, Mid and High Frequency Maximums

Harmonics of Fundamental	FCC Maximum Limit (dBm)	Conducted Emissions (dBm)
2 nd Harmonic	-13	-40.2
3 rd Harmonic	-13	-48.2
4 th Harmonic	-13	-56.3
5 th Harmonic	-13	*
6 th Harmonic	-13	*
7 th Harmonic	-13	*
8 th Harmonic	-13	*
9 th Harmonic	-13	*
10 th Harmonic	-13	*

Notes:

- 1) * Indicates the spurious emission could not be detected due to the noise floor of the receiver.
- 2) Each emission reported reflects the highest absolute level at the specific harmonics 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.



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Part 22.917e: Spurious Emissions CDMA 800

Test Date: 11-17-03
EUT: V710
Test: Spurious Emissions - Conducted
Operator: Jason L.
Comment: CDMA 800 – Low, Mid and High Frequency Maximums

Harmonics of Fundamental	FCC Maximum Limit (dBm)	Conducted Emissions (dBm)
2 nd Harmonic	-13	-38.0
3 rd Harmonic	-13	-46.4
4 th Harmonic	-13	-54.1
5 th Harmonic	-13	*
6 th Harmonic	-13	*
7 th Harmonic	-13	*
8 th Harmonic	-13	*
9 th Harmonic	-13	*
10 th Harmonic	-13	*

Notes:

- 4) * Indicates the spurious emission could not be detected due to the noise floor of the receiver.
- 5) Each emission reported reflects the highest absolute level at the specific harmonics for the low, mid and high channels at maximum power.
- 6) The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.



Company: Motorola
Model Tested: SUG3171AA
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Part 24.238: Spurious Emissions CDMA 1900

Test Date: 11-17-03
EUT: V710
Test: Spurious Emissions - Conducted
Operator: Jason L.
Comment: CDMA 1900 – Low, Mid and High Frequency Maximums

Harmonics of Fundamental	FCC Maximum Limit (dBm)	Conducted Emissions (dBm)
2 nd Harmonic	-13	-43.2
3 rd Harmonic	-13	-34.4
4 th Harmonic	-13	-51.9
5 th Harmonic	-13	-55.6
6 th Harmonic	-13	*
7 th Harmonic	-13	*
8 th Harmonic	-13	*
9 th Harmonic	-13	*
10 th Harmonic	-13	*

Notes:

- 7) * Indicates the spurious emission could not be detected due to the noise floor of the receiver.
- 8) Each emission reported reflects the highest absolute level at the specific harmonics for the low, mid and high channels at maximum power.
- 9) The Spectrum was investigated from 9 kHz to the tenth harmonic of the fundamental.



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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2.1053 – Field Strength of Spurious Radiation (Part 22 & 24) - AMPS

Test Results: Passed

Test Date: 11-18-03
 EUT: V710
 Test: Spurious Emissions - Radiated
 Operator: Jason L.
 Comment: **AMPS** – Low, Mid and High Frequency Maximums

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)
2 nd Harmonic	-13	-40.68	-47.38
3 rd Harmonic	-13	-46.30	-51.70
4 th Harmonic	-13	-47.62	-47.92
5 th Harmonic	-13	-53.32	-57.32
6 th Harmonic	-13	-62.14	-55.84
7 th Harmonic	-13	*	*
8 th Harmonic	-13	*	*
9 th Harmonic	-13	*	*
10 th Harmonic	-13	*	*

Notes:

- 10) * Indicates the spurious emission could not be detected due to the noise floor of the receiver.
- 11) Each emission reported reflects the highest absolute level at the specific harmonics for the low, mid and high channels at maximum power.
- 12) The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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2.1053 – Field Strength of Spurious Radiation (Part 22 & 24) continued – CDMA 800.

Test Date: 11-18-03
 EUT: V710
 Test: Spurious Emissions - Radiated
 Operator: Jason L.
 Comment: **CDMA 800** – Low, Mid and High Frequency Maximums

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)
2 nd Harmonic	-13	-34.98	-38.18
3 rd Harmonic	-13	-36.60	-38.70
4 th Harmonic	-13	-39.12	-43.72
5 th Harmonic	-13	-50.22	-52.02
6 th Harmonic	-13	-47.84	-49.84
7 th Harmonic	-13	*	*
8 th Harmonic	-13	*	*
9 th Harmonic	-13	*	*
10 th Harmonic	-13	*	*

Notes:

- 13) * Indicates the spurious emission could not be detected due to the noise floor of the receiver.
- 14) Each emission reported reflects the highest absolute level at the specific harmonics for the low, mid and high channels at maximum power.
- 15) The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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2.1053 – Field Strength of Spurious Radiation (Part 22 & 24) continued – CDMA1900

Test Date: 11-18-03
 EUT: V710
 Test: Spurious Emissions - Radiated
 Operator: Jason L.
 Comment: **CDMA 1900 – Low, Mid and High Frequency Maximums**

Harmonic of Fundamental	FCC Maximum Limit (dBm)	Horizontal Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)	Vertical Measured Emission Equiv. Pwr Into Ideal Dipole (dBm)
2 nd Harmonic	-13	-36.01	-35.91
3 rd Harmonic	-13	-36.20	-34.20
4 th Harmonic	-13	-46.79	-43.59
5 th Harmonic	-13	-46.90	-47.00
6 th Harmonic	-13	*	*
7 th Harmonic	-13	*	*
8 th Harmonic	-13	*	*
9 th Harmonic	-13	*	*
10 th Harmonic	-13	*	*

Notes:

- 16) * Indicates the spurious emission could not be detected due to the noise floor of the receiver.
- 17) Each emission reported reflects the highest absolute level at the specific harmonics for the low, mid and high channels at maximum power.
- 18) The Spectrum was investigated from 30 MHz to the tenth harmonic of the fundamental.



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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2.1055 – Frequency Stability - AMPS

Test Results: Passed

MODE:	AMPS	Operating Frequency:	836.52 MHz
Channel:	384	Deviation Limit (PPM):	2.5 ppm

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage %	Voltage (VDC)
-30	119	0.142	100%	3.6
-20	104	0.124	100%	3.6
-10	94	0.112	100%	3.6
0	105	0.126	100%	3.6
10	57	0.068	100%	3.6
20	50	0.060	100%	3.6
30	59	0.071	100%	3.6
40	56	0.067	100%	3.6
50	50	0.060	100%	3.6
60	54	0.065	100%	3.6
20	54	0.065	Battery Endpoint	3.2



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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2.1055 – Frequency Stability – CDMA 800

Test Results: Passed

MODE:	CDMA 800	Operating Frequency:	836.52 MHz
Channel:	384	Deviation Limit (PPM):	0.359ppm(+/-300Hz)

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage %	Voltage (VDC)
-30	8.78	0.010	100%	3.6
-20	-9.76	-0.012	100%	3.6
-10	7.86	0.009	100%	3.6
0	-6.34	-0.008	100%	3.6
10	6.9	0.008	100%	3.6
20	7.67	0.009	100%	3.6
30	-8.33	-0.010	100%	3.6
40	-7.73	-0.009	100%	3.6
50	8.5	0.010	100%	3.6
60	11.24	0.013	100%	3.6
20	59	0.071	Battery Endpoint	3.2



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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2.1055 – Frequency Stability – CDMA 1900

Test Results: Passed

MODE:	CDMA 1900	Operating Frequency:	1880 MHz
Channel:	600	Deviation Limit (PPM):	0.08ppm(+/-150Hz)

Temperature C	Frequency Error HZ	Frequency Error (PPM)	Voltage %	Voltage (VDC)
-30	16.85	0.009	100%	3.6
-20	-14.43	-0.008	100%	3.6
-10	12.96	0.007	100%	3.6
0	16.43	0.009	100%	3.6
10	-16.35	-0.009	100%	3.6
20	-15.51	-0.008	100%	3.6
30	-14.15	-0.008	100%	3.6
40	13.6	0.007	100%	3.6
50	24.16	0.013	100%	3.6
60	14.6	0.008	100%	3.6
20	87.2	0.046	Battery Endpoint	3.2



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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Equipment List – 2.1055 Frequency Stability:

Equipment for Test

Name of Manufacture	Type of Equipment	Model Number	Serial Number	Date of Cal	Owned By
Agilent	Wireless Communications Test Set	8960 Series 10 E5515C	GB42361381	6/23/2003	Technology Rentals and Service
Keithley	High Speed Power Supply	2303	683487		Motorola
Associated Enviromental Systems	Temperature Chamber	BK 1108	4611		D.L.S.
Radio Shack	Thermometer	63-867		1/13/2003	D.L.S.



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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2.1057 – Frequency Spectrum to be Investigated

(a) In all of the measurements set forth in §§ 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz, up to at least the frequency shown below:

(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Frequency Range Investigated: 30 MHz to 20 GHz.



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

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Appendix B

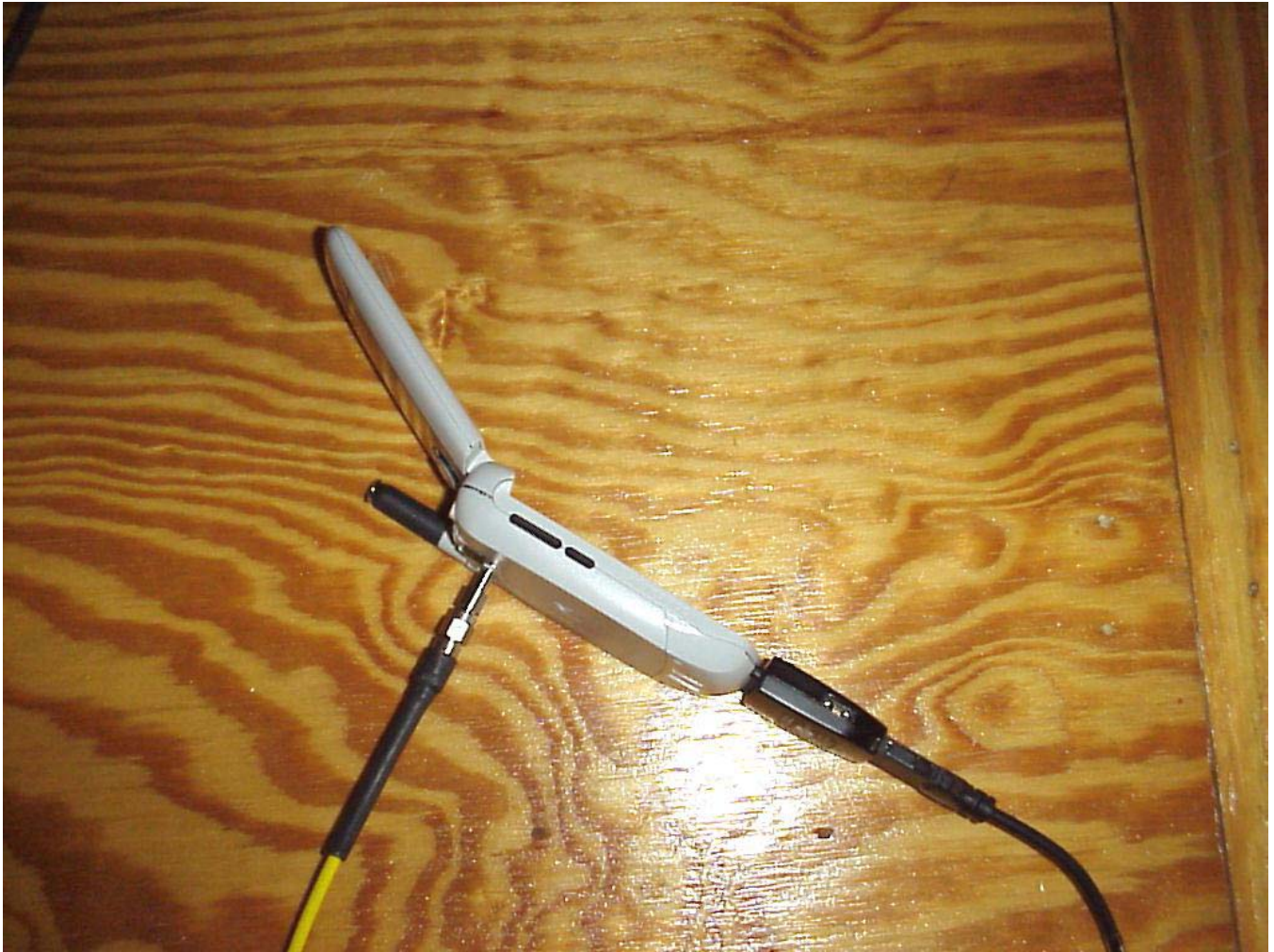
PHOTOS TAKEN DURING TESTING



Company: Motorola
Model Tested: SUG3171AA
Report Number: 10439

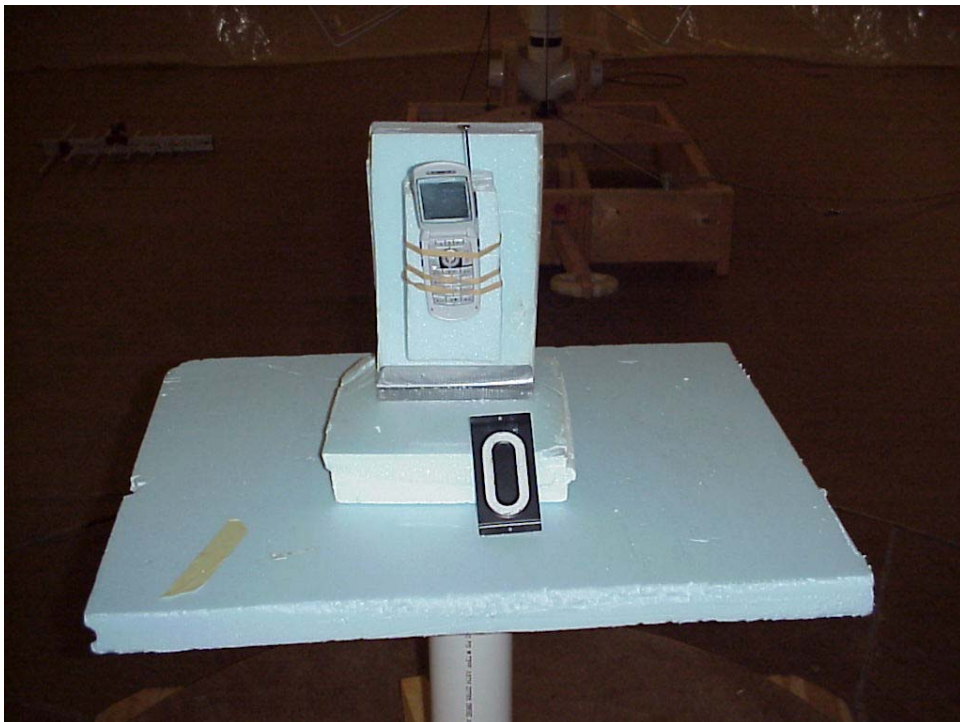
1250 Peterson Dr., Wheeling, IL 60090

RF CONDUCTED TEST SETUP PHOTOS TAKEN DURING TESTING:



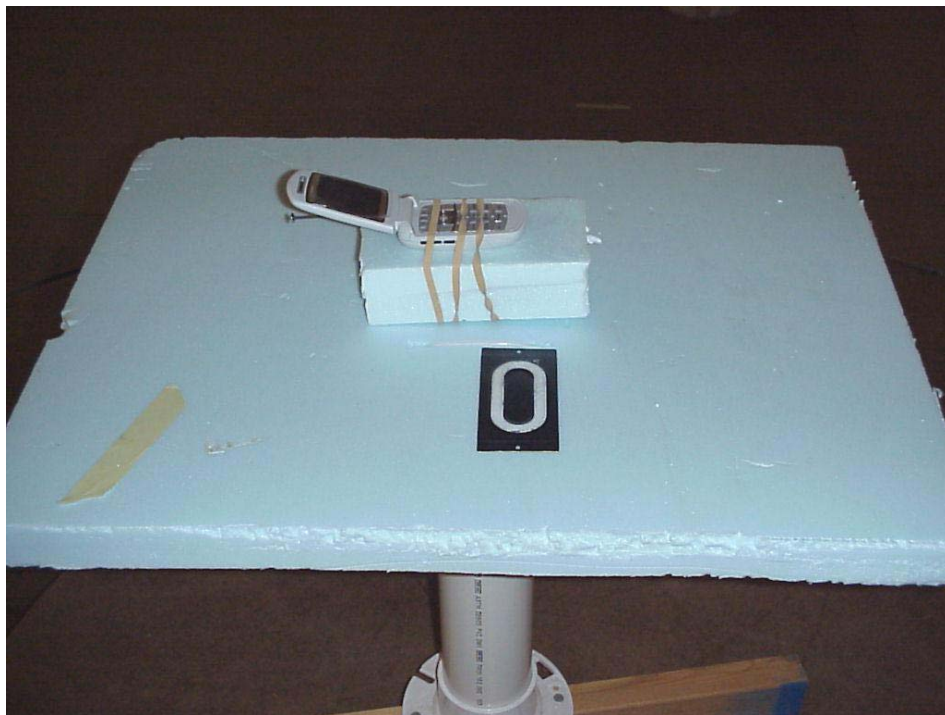
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Radiated Emissions Test Setup:



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Radiated Emissions Test Setup:



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Temperature & Voltage Stability Setup:





Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Spectrum Analyzer	Hewlett/ Packard	8566B	2240A002041	100 Hz – 22 GHz	10/04
Quasi-Peak Adapter	Hewlett/ Packard	85650A	2043A00121	10 kHz – 1 GHz	10/04
Spectrum Analyzer	Hewlett/ Packard	8566B	2421A00452	100 Hz – 22 GHz	2/04
Quasi-Peak Adapter	Hewlett/ Packard	85650A	2043A00450	10 kHz – 1 GHz	2/04
Spectrum Analyzer	Hewlett/ Packard	8591A	3009A00700	9 kHz – 1.8 GHz	3/04
Receiver	Electrometrics	EMC-30	44168	10 kHz – 1 GHz	9/04
Receiver	Rohde & Schwarz	ESI 26	837491/010	20 Hz – 26 GHz	11/04
Receiver	Rohde & Schwarz	ESI 40	837808/006	20 Hz – 40 GHz	12/03
Receiver	Rohde & Schwarz	ESI 40	837808/005	20 Hz – 40 GHz	12/03
Antenna	EMCO	3104C	00054891	20 MHz – 200 MHz	2/04
Antenna	Electrometrics	LPA-25	1114	200 MHz – 1 GHz	3/04
Antenna	EMCO	3104C	00054892	20 MHz – 200 MHz	3/04
Wireless Communications Test Set	Agilent	8960 Series 10 E5515C	GB42361381	NA	6/03

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.



Company: Motorola
 Model Tested: SUG3171AA
 Report Number: 10439

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TABLE 1 – EQUIPMENT LIST

Test Equipment	Manufacturer	Model Number	Serial Number	Frequency Range	Cal Due Dates
Antenna	Electrometrics	3146	1205	200 MHz – 1 GHz	3/04
Antenna	EMCO	3104C	97014785	20 MHz – 200 MHz	2/04
Antenna	EMCO	3146	97024895	200 MHz – 1 GHz	3/04
Antenna	EMCO	3115	2479	1 GHz – 18 GHz	8/04
Antenna	EMCO	3115	99035731	1 GHz – 18 GHz	4/04
Antenna	Rohde & Schwarz	HUF-Z1	829381001	20 MHz – 1 GHz	2/04
Antenna	Rohde & Schwarz	HUF-Z1	829381005	20 MHz – 1 GHz	8/04

All primary equipment is calibrated against known reference standards with a verified traceable path to NIST.