RADIATED SPURIOUS EMISSIONS

DATA

FOR

QUALCOMM, INC.
PO Box 919042
San Diego, CA 92191

Prepared by

TÜV AMERICA
10040 Mesa Rim Road
San Diego, CA 92121-2912

Measurement Requirements (CFR 47 Part 25, Paragraphs 25.200(c) and 25.202)

The following measurements were performed by TÜV America. To the best of my knowledge these tests were conducted in accordance with the procedures outlined in Part 2 of the Commission's Rules and Regulations. The data presented below demonstrates compliance with the appropriate technical standards.

Floyd R. Fleury
EMC Manager

TÜV AMERICA INC 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 858 546 3999 FAX 858 546 0364

Emissions Test Conditions: RADIATED SPURIOUS EMISSIONS

Roof (small open area test site)

The *Radiated Spurious Emissions* measurements were performed using the following equipment:

Test Equipment Used:

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
85662A	743	Spectrum Analyzer	Hewlett Packard	2403A08402	11/02
3115	453	Double Ridge Antenna	EMCO	9412-4364	11/02
AMF-5D-010180-35-10P	719	Amplifier	Miteq	549460	NCR*
AA-190-30.00.0	733	30' Cable	United Microwave Pro	--	NCR*

Remarks: (*) No Calibration Required

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GENERAL REMARKS:

(*) FCC Part 25.200(c) - no emissions detected between 1.559 GHz - 1.605 GHz.

SUMMARY:

All tests according to the regulations cited on page 2 were

■ - **Performed**

☐ - Performed with the following **exceptions**

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 2.*

☐ - **Does not** fulfill the general approval requirements cited on page 2.

Equipment Received Date: 13 December 2002

Testing Start Date: 13 December 2002

Testing End Date: 13 December 2002

- TÜV AMERICA, INC. -

Responsible Engineer:

Jim Owen
(EMC Chief Engineer)

Responsible Engineer:

David Gray
(EMC Engineer)

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Technical Documentation

Test Data Sheets

and

Test Setup Photos

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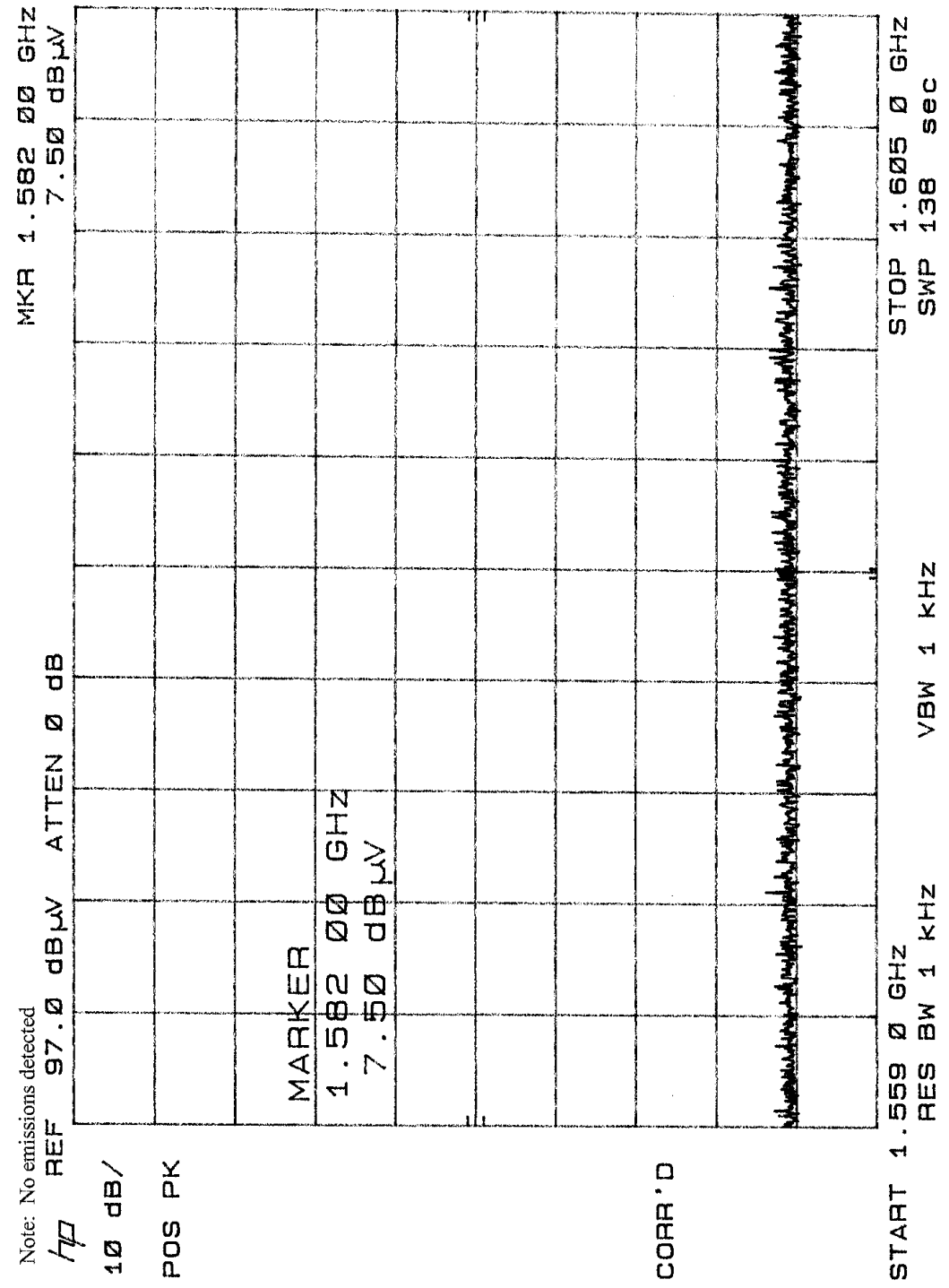
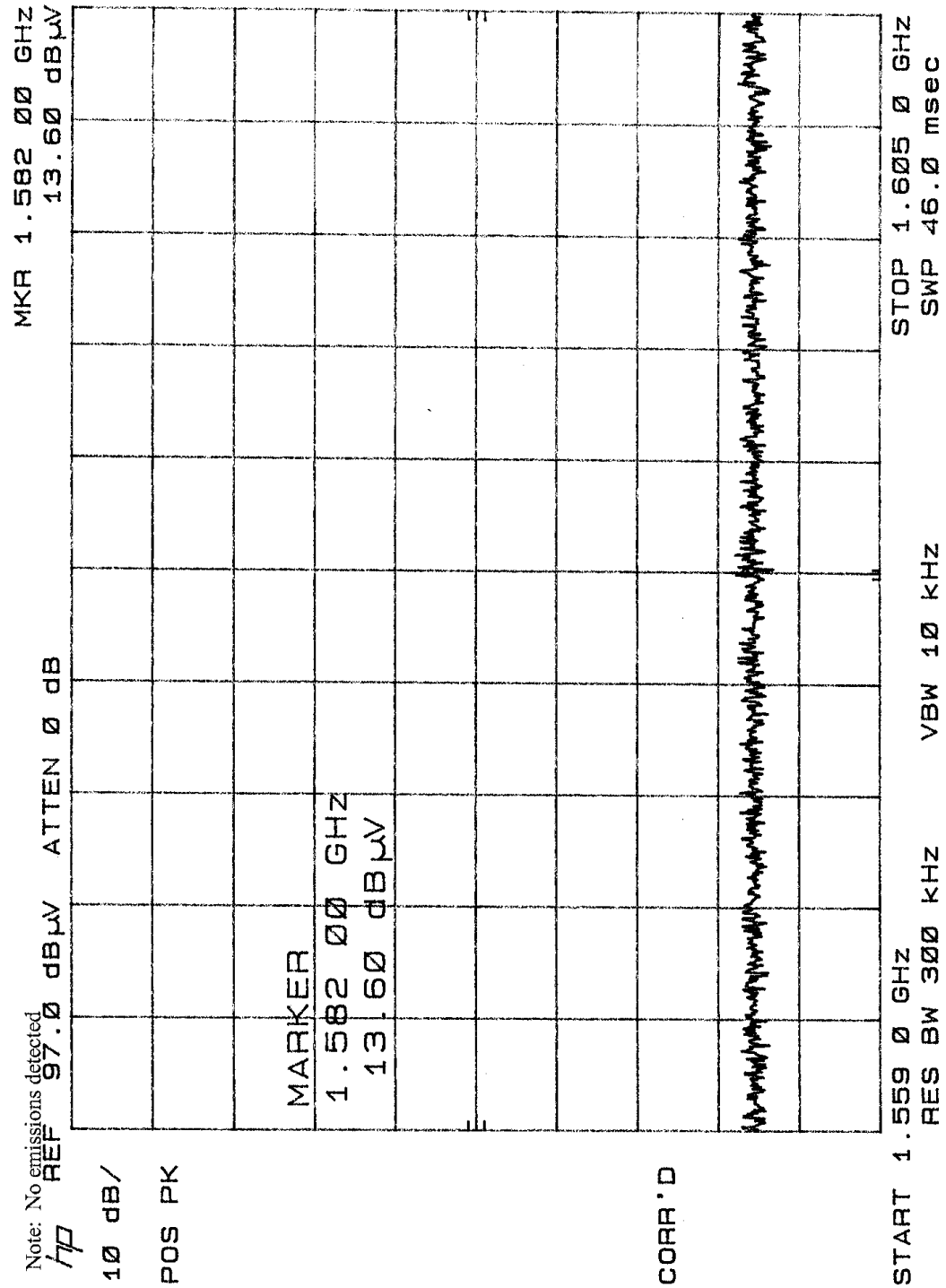
FCC Part 25.200(c)

Note: No emissions detected



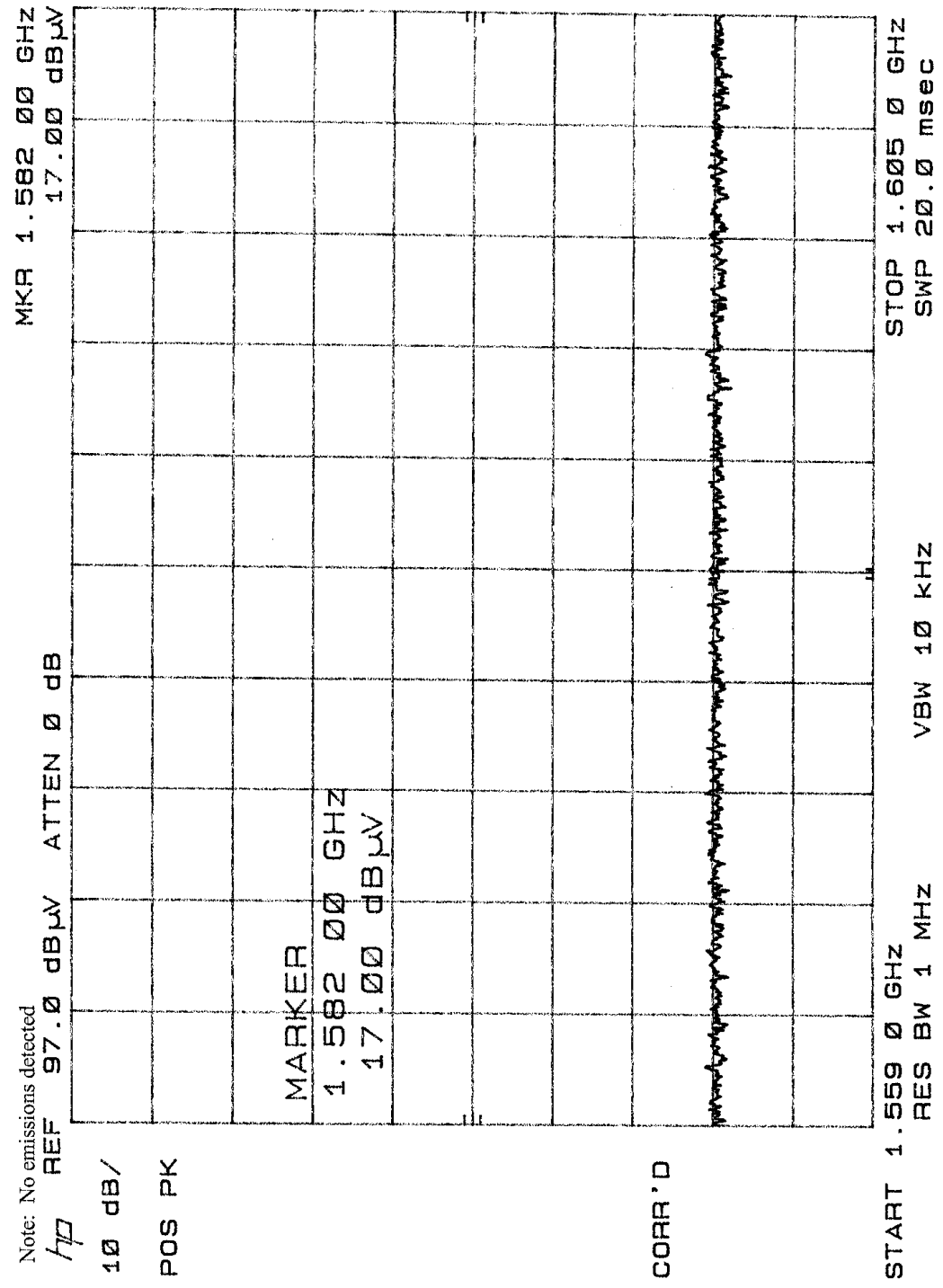
FCC Part 25.200(c)

Note: No emissions detected



FCC Part 25.200(c)

Note: No emissions detected



TÜV AMERICA

REPORT No: SC-206160 TESTER: David Gray SPEC: FCC Part 25.202

CUSTOMER: Qualcomm TEST DIST: 3 Meters

E U T: RCOM 100 TEST SITE: Roof

EUT MODE: Transmit BICONICAL: N/A

DATE: 12/13/02 ERP/EIRP Factor 5.5 LOG: N/A

NOTES: HORN: 453

CF = Antenna Factor + Cable Loss - Preamplifier Gain + Preselector Loss

v.beta1a

FREQ (MHz)	VERTICAL (dBuv) pk		HORIZONTAL (dBuv) pk		CF (dB/m)	MAX LEVEL (dBm) pk		SPEC LIMIT (dBm) pk		MARGIN (dB) pk		EUT Rotation	Antenna Height	Notes	dBuV/m	dBuV/m
1616.88	99.4		99.4		31.3	35.4								Fundamental (Low Band)	130.7	31.3
3233.76	50.4	39.5	50.5	39.5	-1.1	-45.8	-56.8	-13.0	-13.0	-32.8	-43.8	315	1.5		49.4	38.4
4850.64	47.6	35.6	45.8	36	0.6	-47.1	-58.7	-13.0	-13.0	-34.1	-45.7	315	1.5		48.2	36.6
6467.52	32	22	32	22	7.1	-56.2	-66.2	-13.0	-13.0	-43.2	-53.2			noise	39.1	29.1
8084.4	31	22	31	22	9.8	-54.5	-63.5	-13.0	-13.0	-41.5	-50.5			noise	40.8	31.8
9701.28	32	22	32	22	10.7	-52.6	-62.6	-13.0	-13.0	-39.6	-49.6			noise	42.7	32.7
11318.16	32	22	32	22	14.3	-49.0	-59.0	-13.0	-13.0	-36	-46			noise	46.3	36.3
12935.04	41	31	41	31	14.0	-40.3	-50.3	-13.0	-13.0	-27.3	-37.3			noise	55.0	45.0
14551.92	41	32	41	32	16.1	-38.1	-47.1	-13.0	-13.0	-25.1	-34.1			noise	57.1	48.1
16168.8	41	31	41	31	17.8	-36.5	-46.5	-13.0	-13.0	-23.5	-33.5			noise	58.8	48.8
1618.11	99.7		99.4		31.3	35.7								Fundamental (Mid Band)	131.0	31.3
3236.22	46.2	36.2	47.8	38.1	-1.1	-48.5	-58.2	-13.0	-13.0	-35.5	-45.2	25	2		46.7	37.0
4854.33	49.4	38.7	49.2	38.3	0.6	-45.2	-55.9	-13.0	-13.0	-32.2	-42.9	0	2		50.0	39.3
6472.44	33	22	33	22	7.1	-55.2	-66.2	-13.0	-13.0	-42.2	-53.2			noise	40.1	29.1
8090.55	32	22	32	22	9.8	-53.5	-63.5	-13.0	-13.0	-40.5	-50.5			noise	41.8	31.8
9708.66	32	22	32	22	10.7	-52.5	-62.5	-13.0	-13.0	-39.5	-49.5			noise	42.7	32.7
11326.77	33	22	33	22	14.3	-48.0	-59.0	-13.0	-13.0	-35	-46			noise	47.3	36.3
12944.88	41	31	41	31	13.9	-40.3	-50.3	-13.0	-13.0	-27.3	-37.3			noise	54.9	44.9
14562.99	41	32	41	32	16.2	-38.1	-47.1	-13.0	-13.0	-25.1	-34.1			noise	57.2	48.2
16181.1	41	31	41	31	17.9	-36.4	-46.4	-13.0	-13.0	-23.4	-33.4			noise	58.9	48.9
1620.57	99.3		97.9		31.3	35.3								Fundamental (High Band)	130.6	31.3
3241.14	47.5	33.8	48.1	40.3	-1.0	-48.2	-56.0	-13.0	-13.0	-35.2	-43	0	2		47.1	39.3
4861.71	40	30	40	30	0.7	-54.6	-64.6	-13.0	-13.0	-41.6	-51.6			noise	40.7	30.7
6482.28	33	22	33	22	7.1	-55.2	-66.2	-13.0	-13.0	-42.2	-53.2			noise	40.1	29.1
8102.85	31	21	31	21	9.8	-54.5	-64.5	-13.0	-13.0	-41.5	-51.5			noise	40.8	30.8
9723.42	31	21	31	21	10.8	-53.5	-63.5	-13.0	-13.0	-40.5	-50.5			noise	41.8	31.8
11343.99	31	21	31	21	14.3	-50.0	-60.0	-13.0	-13.0	-37	-47			noise	45.3	35.3
12964.56	42	32	42	32	13.9	-39.4	-49.4	-13.0	-13.0	-26.4	-36.4			noise	55.9	45.9
14585.13	42	32	42	32	16.2	-37.0	-47.0	-13.0	-13.0	-24	-34			noise	58.2	48.2
16205.7	42	31	42	31	17.9	-35.3	-46.3	-13.0	-13.0	-22.3	-33.3			noise	59.9	48.9

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Photograph of Test Setup

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Photograph of Test Setup

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Appendix

Supplemental Information

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Table 6.1-1 Tests Required for Certification of the Sebring

Test Parameter	FCC Part 2 Paragraph Number	FCC Part 25 Paragraph Number	FCC Part 25 Limit
Spectrum Mask	-	25.202	Frequency Offset / Atten. 20.833-41.667 kHz 25 dBc 41.667-104.16 kHz 35 dBc > 104.67 kHz 43+10log(Pt)
Spurious Emissions Antenna Terminals	2.1051	25.202 25.213	Same as above
Radiated Spurious Emissions	2.1053	"	"
Carrier Frequency Stability – Temperature	2.1055	25.202	0.001%
Carrier Frequency Stability – Voltage	2.1055	25.202	0.001%

6.1.2 Operational Configuration

The ISU was operated in transmit mode at maximum rated output power. The unit was configured for operation at three (3) different 'traffic channels', i.e. low, mid, and high. These settings were accomplished through direct Key Pad Programming (KPP) with the unit in "Test Mode". An auxiliary handset and DSC breakout board were used to control the Sebring operation.

Ancillary Equipment	*Item Number*
Handset	SCN4052A
Handset Cradle	SYN7908B
DSC Breakout Board	01P58183H Rev A

A special test Subscriber Identity Module (SIM) was required for KPP operation. The Test Mode is accessed by suspending the phone, i.e. depressing and holding the "#" key for approximately 3 seconds. The Static Traffic Channel command, "29xxyyzabc#", was used to select the appropriate channel and maximum power output level. The transmitter was modulated with typical DEQPSK modulation using pseudo-random data. General test setups are shown as Figures 6.1-1 and 6.1-2.

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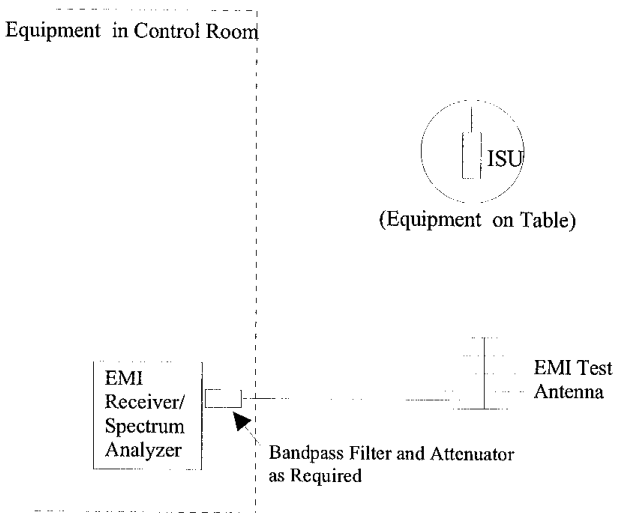

Figure 6.1-1 General Radiated Test Setup for Tests

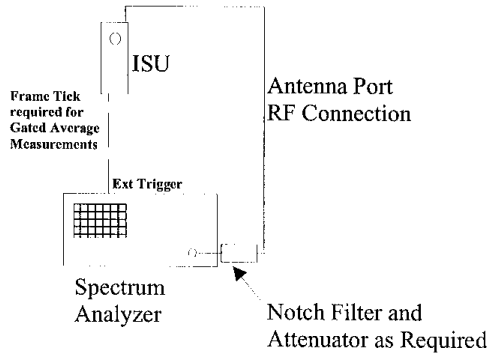

Figure 6.1-2 General Conducted Test Setup for Tests

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6.1.3 Measurement Equipment

Test Equipment Nomenclature	Item Number	Manufacturer	Model Number	Cal. Date	Cal. Due
Biconilog Antenna	T47085	EMCO	3142B	01/07/02	01/31/03
Biconilog Antenna	T47086	EMCO	3142B	01/07/02	01/31/03
Horn Antenna	G43961	EMCO	3115	07/02/01	06/30/02
Antenna Mast	0003-2246	EMCO	2070-2	NCR	NCR
Antenna Controller	G72315	EMCO	2090	NCR	NCR
Spectrum Analyzer/ EMI Receiver	G68094	Rhode & Schwarz	ESI40	05/17/01	05/31/02
Spectrum Analyzer/ EMI Receiver	G71179	Rhode & Schwarz	ESI-7	10/25/01	10/31/02
Attenuator, 20 dB	T48784	HP	8491	05/16/01	05/31/02
Attenuator, 30 dB	T14267	Narda	766-30	05/16/01	05/31/02

6.1.4 Radiated Spurious Emissions Procedure

Radiated spurious emissions were measured over the frequency range of 30 MHz to 16.3 GHz in an anecohic chamber (20ft x 24ft x 16ft) and an open area test site (OATS). Refer to Figure 6.1-2 and 6.1-3 for test setups.

The radiated emissions between 30 MHz and 1 GHz were initially measured in a semi-anechoic shield room in order to identify the emissions in an ambient free environment before proceeding to the open area test site (OATS). This provides the capability of taking accurate measurements in a higher ambient environment such as at the rooftop OATS. The Rohde & Schwarz EMI Receiver System was used for the pre-scans. Typically, signals within approximately 10 dB of the limit are noted for measurements on the OATS.

Final measurements on the OATS were taken with a Rohde & Schwarz EMI Receiver System receiver system at a 3-meter test distance from the receiving antenna. The Sebring was placed on a .8-meter high non-conductive table on a rotating turntable that is flush with the site ground plane. The receiving antenna was scanned over a height range from 1 to 4 meters in both antenna polarities, and the turntable was rotated 360 degrees. The highest emissions were recorded and the final field strength level determined using the following formula:

Field Strength (dBuV/m) = Measured Level (dBuV) + Cable Loss (dB) + Antenna Factor (dB)

The radiated emissions between above 1 GHz were measured in an anechoic chamber using a EMCO 3115 Horn antenna at a 3-meter distance. The emissions were maximized by rotating the equipment on the turntable and by changing polarities of the antenna.

The test methods of ANSI 63.4 were used for performing the Radiated Emissions tests.

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6.1.5 Conducted Spurious Emission, 30 MHz to 16.3 GHz, Procedure

Conducted spurious emissions are the radio frequency voltages or power generated within the equipment and appearing at the equipment's output terminal when properly loaded into its characteristic non-radiating artificial load. The mean power of the conducted spurious and harmonic emissions shall be attenuated below the mean output power of the transmitter by:

Frequency Offset	Attenuation (per 4 kHz)
20.833 to 41.667 kHz	25 dBc
41.667 to 104.16 kHz	35 dBc
>104.16 kHz	51.45 dBc

In the range of the frequencies between 1559 to 1605 MHz, emissions shall not exceed an EIRP density level of –70 dBW/MHz (-40 dBm/MHz) averaged over any 20 ms period and –80 dBW (-50 dBm) for any discrete (BW<600 Hz) spurious emissions. EIRP measurements were performed using a maximum worst-case antenna gain of 3 dBi included in the offset of the measurement system along with other measurement system losses.

The spectrum was scanned from 30 MHz to the tenth harmonic of the carrier. The level of the carrier and the various conducted spurious and harmonic emissions were measured by means of a calibrated receiver system. All signals were measured with peak detection (worst case) except at frequencies between 50% to 250% of the carrier and the 1559 to 1605 MHz band where average measurements were taken using an external frame trigger from the unit under test.

6.1.6 Frequency Stability Procedure

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency. The minimum frequency stability shall be +/- 0.001 % (10 ppm) at anytime during normal operation. Frequency measurements were made at the extremes of the temperature range –30 to +55 degrees C and at intervals of not more than 10 degrees throughout the range. A period of time sufficient to stabilize all of the components in the equipment shall be allowed prior to each frequency measurement. The frequency stability of the transmitting equipment shall be checked with variations in:

a) Temperature -30 to +55 °C

b) Supply Voltage over the specified DC voltage range

The carrier frequency of the transmitter was measured at room temperature to provide a reference. Measurements were started at –30 °C and subsequently made at each 10 degree intervals until +55 °C was reached. A period of not less than 35 minutes was allowed between temperature soaks to allow stabilization of the equipment between successive measurement intervals.

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