BOSCH TELECOM	**Exhibit 6 -- Test Report** Bosch Telecom Node Transmitter FCC ID: NNS3214823 Part Number: 3214823-003 (Vertically Polarized) 3214823-004 (Horizontally Polarized)

Information Provided in this Exhibit

KTL Test Report, No. 980193.REP, 17 July 1998

This report contains the compliance test data from testing performed on one Bosch Telecom Transmitter at KTL, Lewisville, Texas.

KTL Dallas, Inc.
Safety - EMC - Telecom - ISO Guide 25

FCC PART 101

MEASUREMENT / TECHNICAL REPORT
TEST REPORT #: 980193.REP

Number of pages in Test Report: 122

on the

Model Node Equipment Solid-State Transmitter (US)

FCC ID: NNS3214823

for

Bosch Telecom, Inc.
8360 LBJ Freeway Center II
Dallas, Texas 75243

NVLAP

NVLAP LAB CODE: 100426-0

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CORPORATE POLICY

KTL Dallas, Inc. test reports are submitted for exclusive use of the clients to whom they are addressed. The test report's significance is subject to the adequacy of the samples in representing production models and representative of the samples and the comprehensiveness of the tests or surveys performed.

No quotations from KTL Dallas, Inc. reports or use of KTL Dallas, Inc.'s name are permitted except as expressly authorized by KTL Dallas, Inc. in writing.

QUALITY SYSTEM

The quality system in place conforms to IEC Guide 25 and EN 45001. The EMC Laboratory has been audited to the EN 45001 standard by TÜV Rheinland, an European Union Competent Body in Germany, as well as NEMKO, a Certification Body in Norway. The EMC Laboratory has also been audited using the ISO 9000 Quality System by Interference Technology International, an European Union Competent Body in the United Kingdom.

KTL Dallas, Inc. is accredited by the United States of America National Institute of Standards and Technology, as well as National Voluntary Laboratory Accreditation Program (NVLAP) for selected test methods or services.

KTL Dallas, Inc. is a recognized laboratory with VCCI (Japan), the Federal Communications Commission, the Ministry of Commerce (New Zealand), and is also an Underwriters Laboratory Certificated Agency for Administrative.

Appendix C contains copies of the certificates and recognitions issued to KTL Dallas, Inc. for compliance testing services.

A. INTRODUCTION

STANDARD REFERENCES

Standards applied to the EUT:

American National Standards Institute (ANSI) C63.4-1992, Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical Electronic Equipment in the range of 9 kHz to 40 GHz.

Code of Federal Regulations (CFR) Title 47, Part 101, Fixed Microwave Devices; General Rules and Regulations, (October 1, 1997).

Code of Federal Regulations (CFR) Title 47, Part 2, Frequency Allocations and Radio Treaty Matters; General Rules and Regulations, Subpart J Equipment Authorization Procedures (October 1, 1997).

ICC Measurement /Technical Report # 980179.REP, Model Customer Premises Equipment Network Interface Unit for Bosch Telecom, Inc. (June 17, 1998).

Standards utilized for measurement methods and/or equipment:

CISPR Publication 16, Second Edition, (CISPR specification for radio interference measuring apparatus and measurement methods) IEC 1987.

The test facility, International Compliance Corporation, was legally changed to KTL Dallas, Inc. KTL Dallas, Inc. is in the process of updating forms. Some forms in this report reference the former company, International Compliance Corporation.

The following tests contain data which are not covered by NVLAP accreditation.

RF POWER SPECTRAL DENSITY

The RF Power Spectral Density amplitudes were measured from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) at the Bosch Telecom, Inc. Facility on October 27, 1998. **The test results confirm that the amplitudes of the RF Power Spectral Density from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101.113 requirements.**

MODULATION CHARACTERISTICS

The modulation characteristics were measured from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US)t the KTL Dallas, Inc. Electromagnetic Measurements Laboratory on June 16, 1998. **The test results confirm that the modulation characteristics from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101 (FCC Part 2.987) requirements.**

OCCUPIED BANDWIDTH

The occupied bandwidth was measured from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) at the KTL Dallas, Inc. Electromagnetic Measurements Laboratory on June 16, 1998. **The tests confirm that the amplitudes of the occupied bandwidth from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101 (FCC Part 2.989) requirements.**

SPURIOUS EMISSIONS

ANTENNA TERMINAL CONDUCTED EMISSIONS

The antenna terminal conducted electromagnetic emissions amplitudes were measured from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) at the KTL Dallas, Inc. Open Area Test Site on June 17th and 23rd of 1998. **The test results confirm that the amplitudes of the conducted emissions from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101 (FCC Part 2.991) requirements.**

RADIATED EMISSIONS (FIELD STRENGTH)

The radiated electromagnetic emissions amplitudes were measured from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) at the KTL Dallas, Inc. Open Area Test Site on June 19th and 22nd of 1998. **The test results confirm that the amplitudes of the electric-field radiated emissions from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101 (FCC Part 2.993) requirements.**

A. INTRODUCTION (Continued)

SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH)

The microwave spurious radiated emissions amplitudes were measured from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) at the KTL Dallas, Inc. Open Area Test Site on. June 18th, 19th, 22nd, and 23rd of 1998. **The test results confirm that the amplitudes of the microwave radiated emissions from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101 9FCC Part 2.993) requirements.**

FREQUENCY STABILITY

The frequency stability was measured from the Bosch Telecom, Inc. Model Model Node Equipment Solid State Transmitter (US)at the KTL Dallas, Inc. Environmental Chamber on April 08, 1998. **The test results confirm that the frequency stability from the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) tested in conjunction with other equipment (identified later in this report) are within the FCC Part 101(FCC Part 2.995) requirements.**

TEST	CATEGORY	PASS/FAIL
FCC Part 2/101		
RF Power Spectral Density	Part 101.113 - 27.550 GHz, 27.5900, 27.7109 GHz	Pass
Modulation Characteristics	Part 101 (2.987) 27.5100 GHz , 27.5500 GHz, 27.5900 GHz, 27.7100 GHz,	Pass
Occupied Bandwidth	Part 101 (2.989) 27.5100 GHz , 27.5500 GHz, 27.7109 GHz	Pass
Spurious Radiated Emission (Antenna Terminal)	Part 101 (2.991) 30 MHz - 40 GHz	Pass
	40 GHz - 100 GHz	Pass
Spurious Emissions (Field Strength)	Part 101 (2.993) – 30 MHz - 1000 MHz	Pass
Spurious Emissions (Microwave Field Strength)	Part 101 (2.993) – 1GHz - 18 GHz	Pass
	18 GHz - 26.5 GHz	Pass
	26.5 GHz - 40 GHz	Pass
	40 GHz - 100 GHz	Pass
Frequency Stability	Part 101 (2.995) 27.920000 GHz	Pass

B. EQUIPMENT-UNDER-TEST

The equipment-under-test (EUT) was received by KTL Dallas, Inc. on 1998 May 5, 1998, from Bosch Telecom, Inc.

The EUT is the Bosch Telecom, Inc. Model Node Equipment Solid State Transmitter (US) S/N 005, P/N 3214823-001 & P/N 3214823-001-002. **Refer to Figure B-1 for EUT photographs.**

The Model Node Equipment Solid State Transmitter (US) for the radiated emission testing was tested with the following equipment and cables:

One Modem Test Set, Mfr. Bosch Telecom, Inc. P/N [TBD], S/N 001.

One Junction Box, Mfr. Bosch Telecom, Inc., P/N [TBD], S/N [TBD].

One Personal Computer 166 MHz Pentium, Dual RS-485 Interface Card, IEEE-488 Interface Card.

One 8' RS-485/Power Cable, P/N 3214944-002, Mfr. Bosch Telecom, Inc.

Two 8' N-N Coaxial Cables, P/N 8000048-001, Mfr. Florida Labs for Bosch Telecom Inc., (Florida Labs P/N NMS - L195W-96,0-NMS).

Two 175' N-N Coaxial Cables, Times LMR-500-FR, between RF Signal Sources and 8' RF cables.

One 15' #8 AWG Insulated Grounding Cable.

One 135' Multiconductor Cable, RS-485 Belden 1484A, terminated between PC an J –Box, (2 (ea.) DB-9P connectors on PC end, CA06COME18-4SBF80 connector on J-Box end).
(Aluminum foil and copper tape to form backshell between overall cable shield and connector on J-Box end).

One 135' Multiconductor Cable, DC Power, Belden 9843, between Power Supply and J-Box, (banana plugs on power supply end, CA06COME22-23SBF80 connector on J-Box end).
(Aluminum foil and copper tape to form backshell between overall cable shield and connector on J-Box end).

One Valox Resin Capwire, 8AWG, Type MTW 600 Volts Cable.

The Model Node Equipment Solid State Transmitter (US) for the non- radiated emission testing was tested with the following equipment and cables:

Modem Test Set, Mfr. Bosch Telecom, Inc. P/N [TBD], S/N 001.

One Personal Computer, 166 MHz Pentium, Dual RS-485 Interface Card, IEEE-488 Interface Card.

One 15' RS-485/Power Test Cable, Belden 9320, Mfr. Bosch Telecom, Inc., No P/N, no shielding connected.

Two 8' N-N Coaxial Cables, P/N 8000048-001, Mfr. Florida Labs for Bosch Telecom, (Florida Labs P/N NMS-L195W-96.0-NMS).

One 15' #8 AWG Insulated Grounding Cable.

One Valox Resin Capwire, 8AWG, Type MTW 600 Volts Cable.

MODES OF OPERATION

The EUT was operating in a steady state with unit operating at one CW frequency, three simulated, and one actual QPSK input frequencies, all at max. rated output power (1 watt).

CHANGES TO THE EUT AFTER RECEIPT OF SAMPLE

No additional measures were taken over those already incorporated in the product.

DEVIATION CRITERIA

No deviation was required.

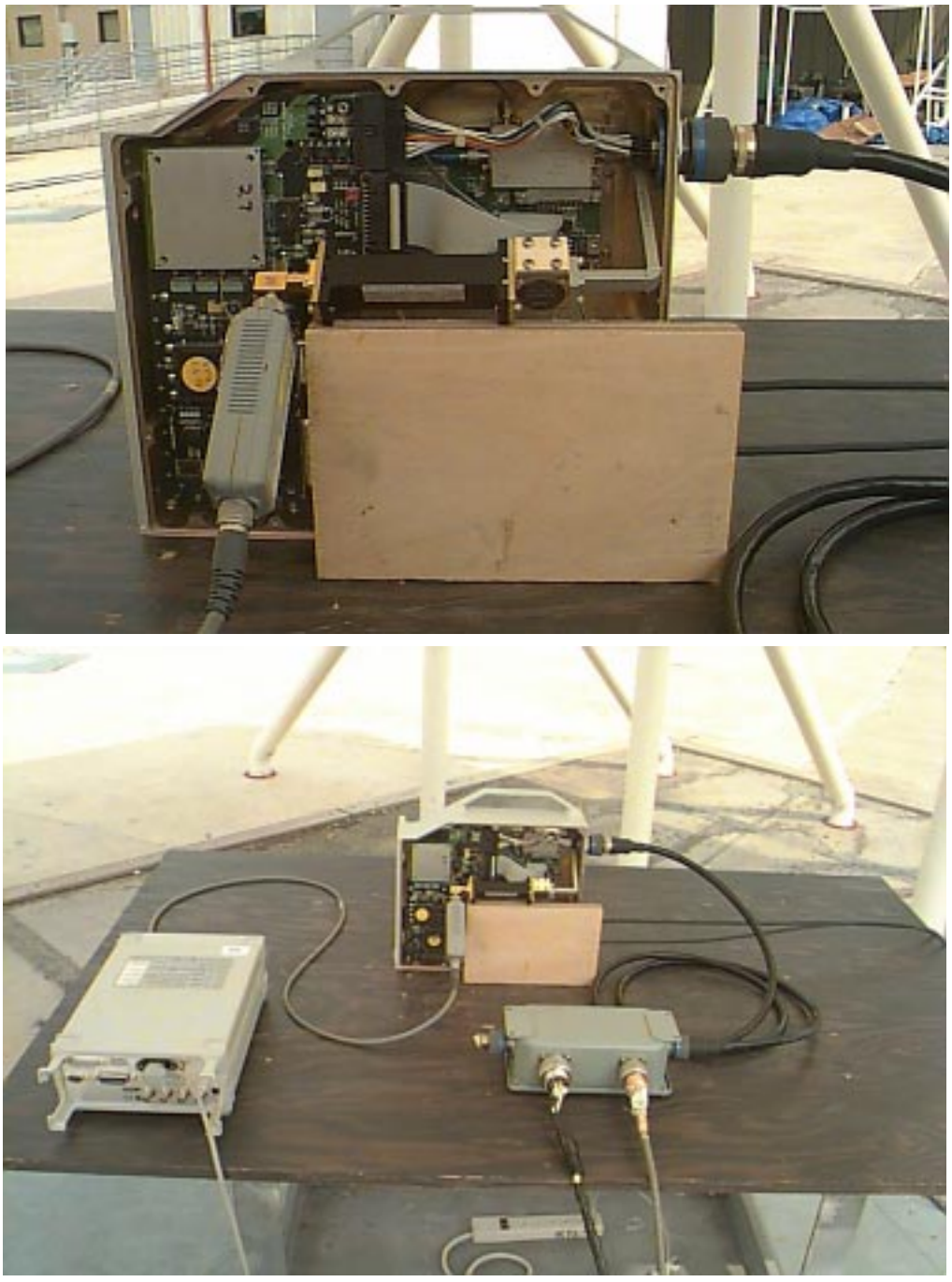


FIGURE B-1. EQUIPMENT-UNDER-TEST (EUT) PHOTOGRAPHS

C. TEST PROCEDURE

RF POWER SPECTRAL DENSITY:

The RF Power Spectral Density amplitudes were measured at the Bosch Telecom, Inc. Facility in the following configurations:

TX 27.510GHz 30dBm CW SIGNAL (U.S.)
TX 27.710GHz 30dBm QPSK/30MHz BW TEST EQUIPMENT CONFIGURATION
TX 27.550GHz 30dBm QPSK/40MHz BW
TX 27.590GHz 30dBm QPSK/50MHz BW.

MODUALATION CHARACTERISTICS:

The modulation characteristics were measured at the KTL Dallas, Inc. Electromagnetic Measurements Laboratory in the following configurations:

Fundamental Frequency 27.510000 GHz, IF Input -16.0 dBm measured through 30 dBm Attentuation, 30.0 dBm Output.
Fundamental Frequency 27.710000 GHz, IF Input -10.2 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW
Fundamental Frequency 27.7100 GHz, IF Input -10.2 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW
Fundamental Frequency 27.5500 GHz, IF Input -11.9 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 40MHz QPSK BW
Fundamental Frequency 27.5500 GHz, IF Input -11.5 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 40MHz QPSK BW
Fundamental Frequency 27.5900 GHz, IF Input -12.7 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 50MHz QPSK BW
Fundamental Frequency 27.5900 GHz,IF Input -12.7 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 50MHz QPSK BW
Fundamental Frequency 27.7109 GHz, IF Input -20.9 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW, Bosch Modem Test Set
Fundamental Frequency 27.7109 GHz, IF Input -20.9 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW, Bosch Modem Test Set.

OCCUPIED BANDWIDTH:

Fundamental Frequency 27.710000 GHz, IF Input -10.2 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW
Fundamental Frequency 27.7100 GHz, IF Input -10.2 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW
Fundamental Frequency 27.5500 GHz, IF Input -11.9 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 40MHz QPSK BW
Fundamental Frequency 27.5500 GHz, IF Input -11.5 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 40MHz QPSK BW
Fundamental Frequency 27.5900 GHz, IF Input -12.7 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 50MHz QPSK BW
Fundamental Frequency 27.5900 GHz,IF Input -12.7 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 50MHz QPSK BW
Fundamental Frequency 27.7109 GHz, IF Input -20.9 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW, Bosch Modem Test Set
Fundamental Frequency 27.7109 GHz, IF Input -20.9 dBm measured through 30 dBm Attentuation, 30.0 dBm Output, 30MHz QPSK BW, Bosch Modem Test Set.

ELECTROMAGNETIC EMISSIONS

The test procedures used for determining FCC Part 101 Private Land Mobile Radio Services compliance were in accordance with FCC Rules and Regulations, ANSI C63.4-1992 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

All measurements were performed using the CISPR quasi-peak, peak or average detector functions of the receiver or spectrum analyzer. The bandwidths (6-dB) were as follows for the different detector functions and frequency ranges (deviations if necessary would be noted on the individual data sheets):

FREQUENCY RANGE	QUASI-PEAK	PEAK	AVERAGE
10 kHz – 150kHz	200 Hz	200 Hz	200 Hz
150 kHz – 30 kHz	9 kHz	10 kHz	10 kHz
30 MHz – 1000 MHz	120 kHz	100 kHz	100 kHz
> 1000 MHz	N/A	1 MHz	1 MHz

SPURIOUS RADIATED EMISSIONS AT ANTENNA TERMINALS:

The antenna terminal spurious radiated emissions amplitudes were measured at the KTL Dallas, Inc. Open Area Test Site. Measurements were made in the following configurations:

TX 27.510 GHz U.S. TX 30.0dBm CW (Scan 30 MHz – 40 GHz)
TX 27.510 GHz U.S. TX 30.0dBm CW (Scan 40 GHz – 100 GHz)
TX 27.710 GHz OPSK 30 MHz BW 30.0dBm (Scan 30 MHz - 40 GHz)
TX 27.710 GHz OPSK 30 MHz BW 30.0dBm (Scan 40 GHz - 100 GHz)
TX 27.550 GHz QPSK 40 MHz BW 30.0dBm (Scan 30 MHz –40 GHz)
TX 27.550 GHz QPSK 40 MHz BW 30.0dBm (Scan 40 –100 GHz)
TX 27.550 GHz QPSK 50 MHz BW 30.0dBm (Scan 30 MHz –40 GHz)
TX 27.590 GHz QPSK 50 MHz BW 30.0dBm, (Scan 40 GHz – 100 Ghz)
TX 27.710926 GHz OPSK 30 MHz BW, Bosch Modem Test Set (Scan 30 MHz - 40GHz)
TX 27.710926 GHz OPSK 30 MHz BW, Bosch Modem Test Set (Scan 40GHz - 100GHz)

RADIATED EMISSIONS (FIELD STRENGTH) MEASUREMENTS:

The radiated electromagnetic emissions were measured between 30 MHz and 1 GHz at the KTL Dallas, Inc. Open Area Test Site at a 3 meter distance in the following configurations:

TX 30.0 dBm 27.510 GHz CW US Frequency
TX 27.710926 QPSK/30 MHz BW
TX 27.550 GHz QPSK/40 MHz
TX 27.590 GHz QPSK/50 MHz).
TX 27.710926 QPSK/30 MHz BW Bosch Modem Test Set

The antennas were vertically and then horizontally polarized. The antenna height was varied between 1 and 4 meters. The electric-field radiated-emissions amplitudes were measured at various azimuthal orientations in order to maximize amplitudes. Cables were oriented to maximize the field strength amplitudes.

MICROWAVE RADIATED EMISSIONS (FIELD STRENGTH) MEASUREMENTS:

The microwave radiated electromagnetic emissions were measured at the KTL Dallas, Inc. Open Area Test Site at a 3 meter distance. Measurements were made in the following configurations:

TX 30.0 dBm 27.510 GHz CW Signal U.S. Frequency – (Scan 1 GHz- 18 GHz)
TX 30.0 dBm 27.510 GHz CW Signal U.S. Frequency –(Scan 18 GHz- 26.5 GHz)
TX 30.0 dBm 27.510 GHz CW Signal U.S. Frequency - (Scan 26.5 GHz- 40 GHz)
TX 30.0 dBm 27.510 GHz CW Signal U.S. Frequency – (Scan 40 GHz – 100 GHz)
TX 30.0 dBm QPSK/30 MHz BW (Scan 1 GHz- 18 GHGz)
TX 30.0 dBm QPSK/30 MHz BW – (Scan (18 GHz- 26.5 GHz)
TX 30.0 dBm QPSK/30 MHz BW – (Scan (26.5 GHz- 40 GHz)
TX 30.0 dBm QPSK/30 MHz BW – (Scan (40 GHz- 100 GHz)
TX 30.0 dBm QPSK/40 MHz BW (Scan 18 GHz- 26.5 GHz)
TX 30.0 dBm QPSK/40 MHz BW (Scan 18 GHz- 26.5 GHz)
TX 30.0 dBm QPSK/40 MHz BW (Scan 26.5 GHz- 40 GHz)
TX 30.0 dBm QPSK/40 MHz BW (Scan 40 GHz- 100 GHz)
TX 30.0 dBm QPSK/50 MHz BW (Scan 1 GHz – 18 GHz)
TX 30.0 dBm QPSK/50 MHz BW (Scan 18 GHz – 26.5 GHz)
TX 30.0 dBm QPSK/50 MHz BW (Scan 40 GHz- 100 GHz)
TX 30.0 dBm Bosch MODEM TEST SET (Scan 1 GHz- 18 GHz)
TX 30.0 dBm Bosch MODEM TEST SET (Scan 18 GHz – 26.5GHz)
TX 30.0 dBm 27.710926 GHz QSK/30MHz BW BOSCH MODEM TEST SET (Scan 26.5 –40 GHz)
TX 30.0 dBm 27.710926 GHz QSK/30MHz BW BOSCH MODEM TEST SET (Scan 40 – 100 GHz0

The antennas were vertically and then horizontally polarized. The antenna height was set at 1 meter. The microwave radiated-emissions amplitudes were measured at various azimuthal orientations in order to maximize amplitudes. Cables were oriented to maximize the field strength amplitudes.

Unless otherwise specified, broadband antennas were used. Standard broadband antennas used were selected from the following: Biconical 30 MHz - 300 MHz, Log Periodic 0.3 GHz - 1 GHz and Horn 1 GHz - 40 GHz. For measurements (up to 1 GHz) that were close to the limit, a tuned dipole antenna may have been used.

FREQUENCY STABILITY:

Frequency Stability was measured at the KLT Dallas, Inc. Environmental Chamber in TX 27.920000 GHz configuration at voltages, 40.0 Vdc, 48.0 Vdc and 55.2 Vdc, with the following temperatures: - 30 Cº, -20 Cº, -10 Cº, 0 Cº, 10 Cº, 20 Cº, 30 Cº, 40 Cº, and 50 Cº.

D. TEST RESULTS

TEST	CATEGORY	PASS/FAIL
FCC Part 2/101		
RF Power Spectral Density	Part 101.113 - 27.550 GHz, 27.5900, 27.7109 GHz	Pass
Modulation Characteristics	Part 101 (2.987) 27.5100 GHz , 27.5500 GHz, 27.5900 GHz, 27.7100 GHz,	Pass
Occupied Bandwidth	Part 101 (2.989) 27.5100 GHz , 27.5500 GHz, 27.7109 GHz	Pass
Spurious Radiated Emission (Antenna Terminal)	Part 101 (2.991) 30 MHz - 40 GHz	Pass
	40 GHz - 100 GHz	Pass
Spurious Emissions (Field Strength)	Part 101 (2.993) – 30 MHz - 1000 MHz	Pass
Spurious Emissions (Microwave Field Strength)	Part 101 (2.993) – 1GHz - 18 GHz	Pass
	18 GHz - 26.5 GHz	Pass
	26.5 GHz - 40 GHz	Pass
	40 GHz - 100 GHz	Pass
Frequency Stability	Part 101 (2.995) 27.920000 GHz	Pass

The worst-case data are tabulated in Tables D-I, D-II, D-III, D-IV, and D-V.

The test data are contained in Appendix B of this report.

The RF Power Spectral Density data sheet is labeled Test # RF Power Spectral Density dated October 27, 1998.

The modulation characteristics data plots are labeled Plots # 2, # 3, # 4, # 5, # 6, # 7, # 8, # 9, and # 10 dated June 16 1998.

The occupied bandwidth data plots are labeled Plots # 3, # 4, # 5, # 6, # 7, # 8, # 9, and # 10 dated June 16 1998.

The antenna-terminal conducted emissions data sheets are labeled Tests # 218V1, # 218V3, # 218V4, # 218V5, and # 218V6 dated June 17, 1998 and Tests # 218V7, # 218V9, # 218V10 and # 218V11 dated June 23, 1998.

The radiated emissions (field strength) data sheets are labeled Tests # RE-1 dated June 19, 1998 and # RE 3, # RE-4, # RE-5, and # RE-6 dated June 22, 1998.

The radiated spurious emissions (microwave field strength) data sheets are labeled Tests # 218U01, # 218U03, # 218U04, # 218U05 dated June 18, 1998, and Tests # 218U07, # 218U08, # 218U09, # 218U10, and # 218U11 dated June 19, 1998. The radiated spurious emissions (microwave field strength) data sheets are also labeled Tests # REMW02, # REMW03, # REMW04, # REMW05, and # REMW06 dated June 22, 1998, and Tests # REMW08, # REMW09, # REMW10, # REMW11 and # REMW12 dated June 23, 1998.

The frequency stability data sheets are labeled frequency stability dated May 8, 1998.

Figures D-1 contains photographs of he RF Power Spectral Density. Figure D-2 contains photographs of occupied bandwidth test set-ups. Figure D-3 contains photographs of the antenna terminal conducted emissions test set-ups. Figures D-4 and D-5 contain photographs of the spurious emissions (field strength and microwave field strength) test set-ups. Figure D6 contains photographs of frequency stability test set up. Photographs of modulation characteristics are unavailable.

TEST RESULTS SUMMARY

The test results confirm that the RF Power Spectral Density, modulation characteristics, occupied bandwidth, antenna terminal conducted emissions, spurious emissions (field strength) amplitudes, spurious emissions (microwave field strength) amplitudes and frequency stability are within the FCC Part 101 and FCC Part 2 requirements.

SAMPLE CALCULATIONS

RF Power Spectral Density

Center Frequency (GHz)	Channel Bandwidth (MHz)	Analyzer Reading (dBm/Hz)	External Attenuation (dB)	Conversions		Antenna Gain (dBi)	Corrected Reading (dBW/MHz)	Limit (dBW/MHz)
				Hz to MHz (dB)	dBm to dBW (dB)			
27.7109	30	-92.7	45.7	60	-30	15	-2	30

The calculation proceeds as follows: Analyzer Reading (dBm/Hz) + External Attenuation (dB) + Conversion Hz to MHz (dB) + Conversion dBm to dBW (dB) + Antenna Gain (dBi) = Corrected Reading (dBw/MHz).

Antenna Terminal Conducted Emissions

Test #: 218V1	Frequency:	27.400 MHz	Power Line:		
Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	4 kHz RBW Correction Factor (dB)	Corrected Reading (dBm)	Limit dBc
-50.0	30.2	1.0	-24.0	-42.8	-13.0

The calculation proceeds as follows: Meter Reading (dBm) + Attenuation (dB) + Cable Loss (dB) + 4 kHz RBW Correction Factor (dB) = Corrected Reading (dBm).

4 kHz RBW Correction Factor Calculation:

Ratio BW / [10 x log (RBW_{4k}/RBW_{100k})] = - 23.979 = - 24.0 dB.

dBc Limit Calculation:

$A = 43 \text{ dB} + 10 \log_{10} M0PW = -13 \text{ dB}$

Radiated Emissions (Field Strength)

Test #: RE-1	Frequency: 35.000 MHz		Polarization: Vertical	
Meter Reading (dBµV)	Antenna Factor (dB)	Path Loss (dB)	Amplifier Gain (dB)	Field Strength (dBµV/m)
31.0	10.6	1.4	24.6	18.4

The calculations proceed as follows: Meter Reading (dBµV) + Antenna Factor (dB) + Path Loss (dB) - Amplifier Gain (dB) = Field Strength (dBµV/m).

When the emission level is less than 6 dB above the ambient noise floor, the antenna is moved closer to the EUT. A 3-meter measurement level is compared with a 10-meter limit by extrapolating the limit to a 3-meter distance. One adds a factor of 10.5 dB to the limit, which is derived from:

Correction Factor (dB) = 20 log (10 m/3 m) = 10.5 dB

e.g., Limit @ 10 m = 30 dBµV/m @ 10 m
Limit @ 3 m = 40.5 dBµV/m @ 3 m

Similarly, a 10-meter limit is extrapolated to a specified 30-meter limit by use of a correction factor of 20 log (10 m/30 m) = -9.5 dB.

Microwave Radiated Emissions (Field Strength)

Test #	REMW02	Frequency:	1.920 GHz	Polarization:	Vertical		
Meter Reading (dBµV)	4 kHz RBW Correction Factor (dB)	Antenna Factor (dB)	Cable Loss (dB)	Amplifier Gain (dB)	Field Strength (dBµV/m)	dBc	dB Limit
36.0	-24	28.2	3.5	30.9	12.8	-114.8	-43.0

The calculations proceed as for RF Radiated Emissions, except for the added conversion factor.

4 kHz RBW Correction Factor Calculation:

Ratio BW / [10 x log (RBW_{4k}/RBW_{100k})] =23.979 = - 24.0 dBm.

dBc Limit Calculation:

$A = 43 dB + 10 \log_{10} M0PW = -43 dB$

Field Intensity (equivalent to 1 W into tuned dipole) = 30 dBm-28.87 +116 + 10.5 = 127.63 dBµV/m.

TABLE D-I. RF POWER SPECTRAL DENSITY DATA

Center Frequency GHz	Channel Bandwidth	Analyzer Reading dBm/Hz	External Attenuation dB	Conversions		Antenna Gain dBi	Corrected Reading	FCC Limit 101.113 dBW/MHz	Delta dB
				Hz to MHz	dBm to dBW				
27.55	30	-92.5	44.6	60	-30	15	-2.9	30	-32.9
27.59	30	-93.6	44.7	60	-30	15	-3.9	30	-33.9
27.7109	30	-92.7	45.7	60	-30	15	-2	30	-32

Comments:

1.Data contained in Appendix B- Test RF Power Spectral Density.

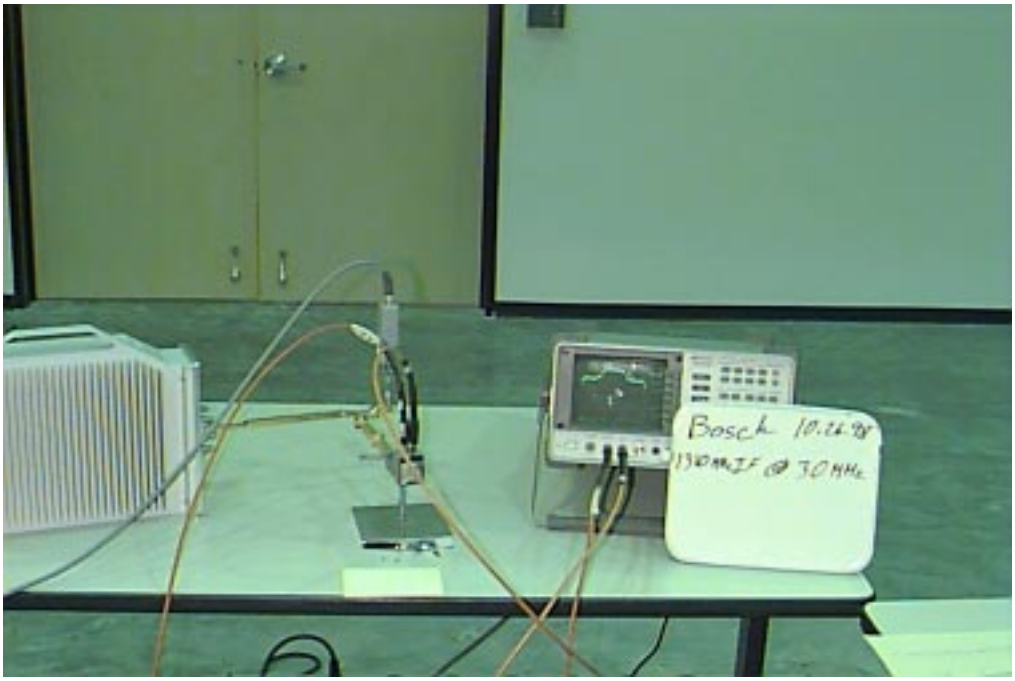


FIGURE D-1. RF POWER SPECTRAL DENSITY TEST SETUP

Bosch Telecom, Inc. Proprietary Information -- Not for Public Disclosure

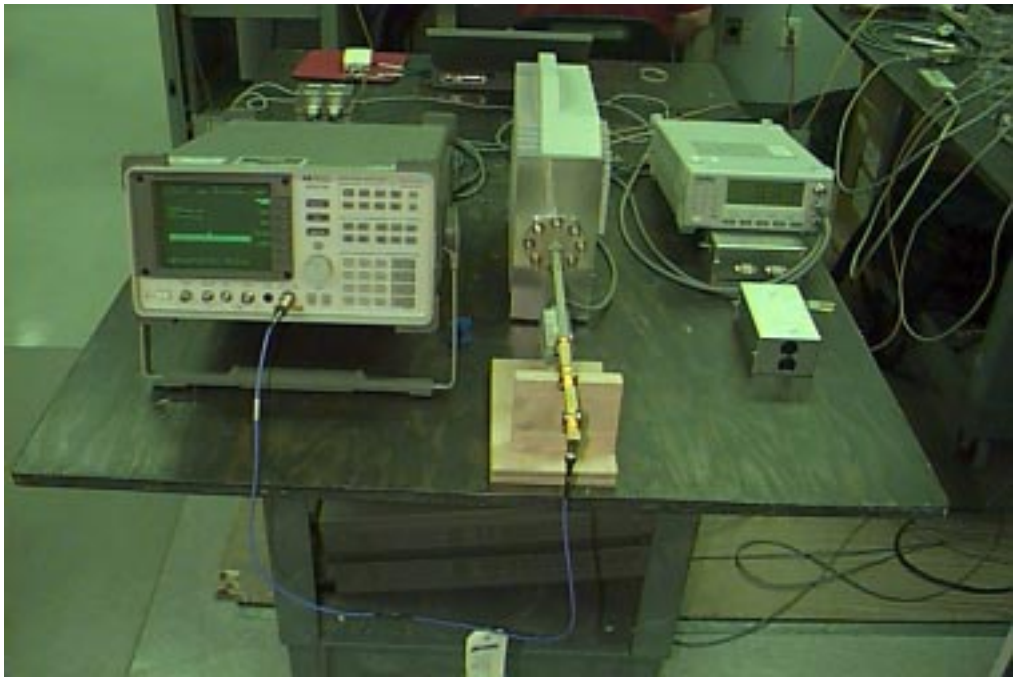


FIGURE D-2. OCCUPIED BANDWIDTH TEST SETUP

TABLE D-II. ANTENNA TERMINAL CONDUCTED EMISSIONS DATA

Scan 30 MHz – 40 GHz

Test # 218V3 TX 27.510 GHz U. S. TX 30.0 dBm CW, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (db)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
1.1900	-72.0	30.2	1.0	-40.8	-13.0	27.8	1,5
13.090	-71.0	30.2	1.0	-39.8	-13.0	26.8	1,5
27.666	-54.0	30.2	1.0	-22.8	-13.0	9.8	1
27.717	-48.5	30.2	1.0	-17.3	-13.0	4.3	1
28.130	-60.0	30.2	1.0	-28.8	-13.0	15.8	1

Scan 40 GHz – 100 GHz

Test # 218V7 TX 27.510 GHz U. S. TX 30.0 dBm CW, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
53.100	-73.0	28.2	1.0	-67.8	-13.0	54.8	1,2
55.020	-74.0	28.2	1.0	-68.8	-13.0	55.8	1,3
79.650	-69.0	28.2	1.0	-63.8	-13.0	50.8	1,4
82.530	-70.5	28.2	1.0	-65.3	-13.0	52.3	1,3

Scan 30 MH z- 40 GHz

Test # 218V4 TX 27.710GHz QPSK/30MHz BW TX 30.0dBm, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
1.190	-72.5	-30.20	1.0	-65.3	-13.0	52.3	1,5
13.090	-70.0	-30.2	1.0	-62.9	-13.0	49.9	1,5

Scan 40 GHz- 100 GHz

Test # 218V9 TX 27.710GHz QPSK/30MHz BW TX 30.0dBm, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
52.080	-74.0	28.2	1.0	-44.8	-13.0	31.8	1,2
55.420	-73.0	28.2	1.0	-43.8	-13.0	30.8	1,3
78.120	-69.0	28.2	1.0	-39.8	-13.0	26.8	1,4
83.130	-70.0	28.2	1.0	-40.8	-13.0	27.8	1,3

D. TEST RESULTS (Continued)

Scan 30 MHz- 40 GHz

Test # 218V5 TX 27.550GHz QPSK/40MHz BW TX 30.0dBm, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
1.1900	-72.0	30.2	1.0	-40.8	-13.0	27.8	1,5
13.090	-70.0	30.2	1.0	-38.8	-13.0	25.8	1,5

Scan 40 GHz- 100 GHz

Test # 218V10 TX 27.550 GHz QPSK 40 MHz BW TX 30.0dBm, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
52.080	-74.0	28.2	1.0	-68.8	-13.0	55.8	1,2
55.100	-73.0	28.2	1.0	-67.8	-13.0	54.8	1,3
78.120	-70.0	28.2	1.0	-64.8	-13.0	51.8	1,4
83.650	-70.0	28.2	1.0	-64.8	-13.0	51.8	1,,3

Scan 30 MHz- 40 GHz

Test # 218V6 TX 27.590 GHz QPSK 50 MHz BW TX 30.0dBm, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
1.1900	-72.0	-30.2	1.0	-40.8	-13.0	27.8	1,5
13.090	-75.5	-30.2	1.0	-41.3	-13.0	28.3	1,5

Scan 40 GHz- 100 GHz

Test # 218V11 TX 27.590 GHz QPSK 50 MHz Bw TX 30.0dBm, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
52.800	-74.0	28.2	1.0	-44.8	-13.0	31.8	1,2
55.180	-73.0	28.2	1.0	-43.8	-13.0	30.8	1,3
79.200	-70.0	28.2	1.0	-40.8	-13.0	27.8	1,4
82.770	-70.5	28.2	1.0	-41.3	-13.0	28.3	1,3

Scan 30 MHz- 40 GHz

Test # 218V1 TX 30.0 dBm 27.710926 GHz, QPSK/30MHz BW,
Bosch Modem Test Set, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
27.400	-50.0	30.2	1.0	-42.8	-13.0	29.8	1
1.1900	-72.5	30.2	1.0	-65.3	-13.0	52.3	1,5
13.090	-70.0	30.2	1.0	-62.8	-13.0	49.8	1,5

Scan 40 GHz- 100 GHz

Test # 218V08 TX 30.0dBm 27.710926 GHz QPSK/30MHz BW
Bosch Modem Test Set, -48 Vdc

Frequency (MHz)	Meter Reading (dBm)	Attenuation (dB)	Cable Loss (dB)	Corrected Reading (dBm)	FCC 2.991 Q.P. Limit (dBm)	Margin* (dB) (Limit-Amplitude)	Comments
52.08000	-73.0	28.2	1.0	-67.8	-13.0	54.8	1,2
55.42185	-72.0	28.2	1.0	-66.8	-13.0	53.8	1,3
78.12000	-71.0	28.2	1.0	-65.8	-13.0	52.8	1,4
82.13278	-70.0	28.2	1.0	-64.8	-13.0	51.8	1,3

Comments:

Data contained in Appendix B - Tests # 218V1, # 218V3, # 218V4, Test # 218V5, and # 218V6 (06/17/98) and Tests # 218V7, # 218V9, # 218V10 and # 218V11 (06/2398).

Second harmonic/Local Oscillator.

Second harmonic/Fundamental.

Third harmonic/Local Oscillator.

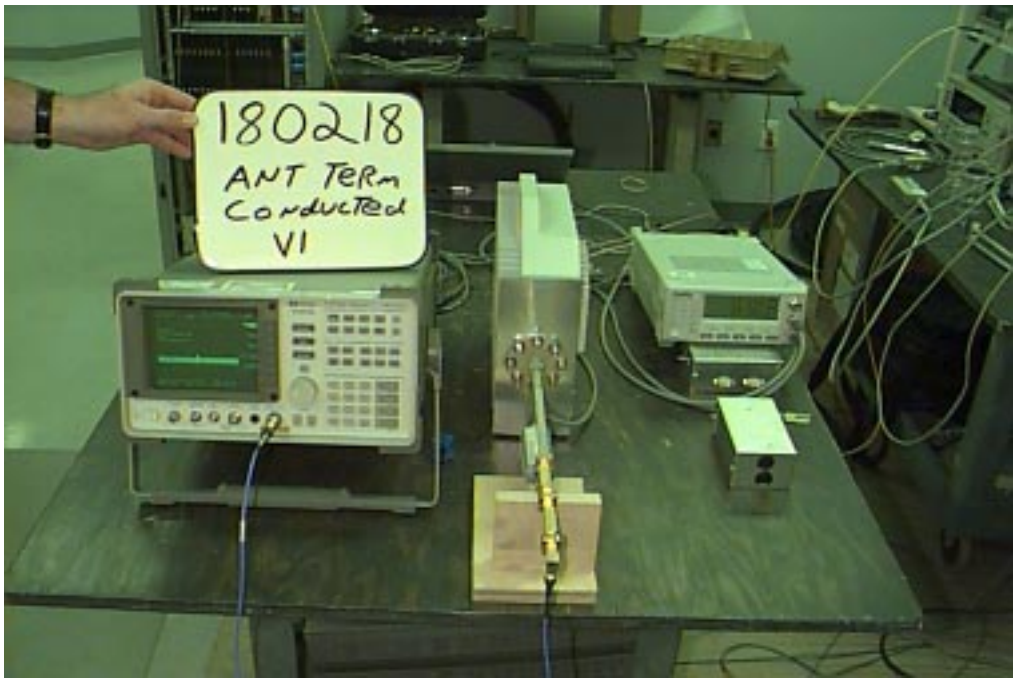
Noise floor reading.

Note:

*Calculations may not agree exactly with data due to rounding of numbers.

4 kHz RBW correction factor of –24 dB was added to the formula (refer to sample calculations).

Amplitudes were measured using the peak detector. Reference detector specified in the limit is the peak detector.



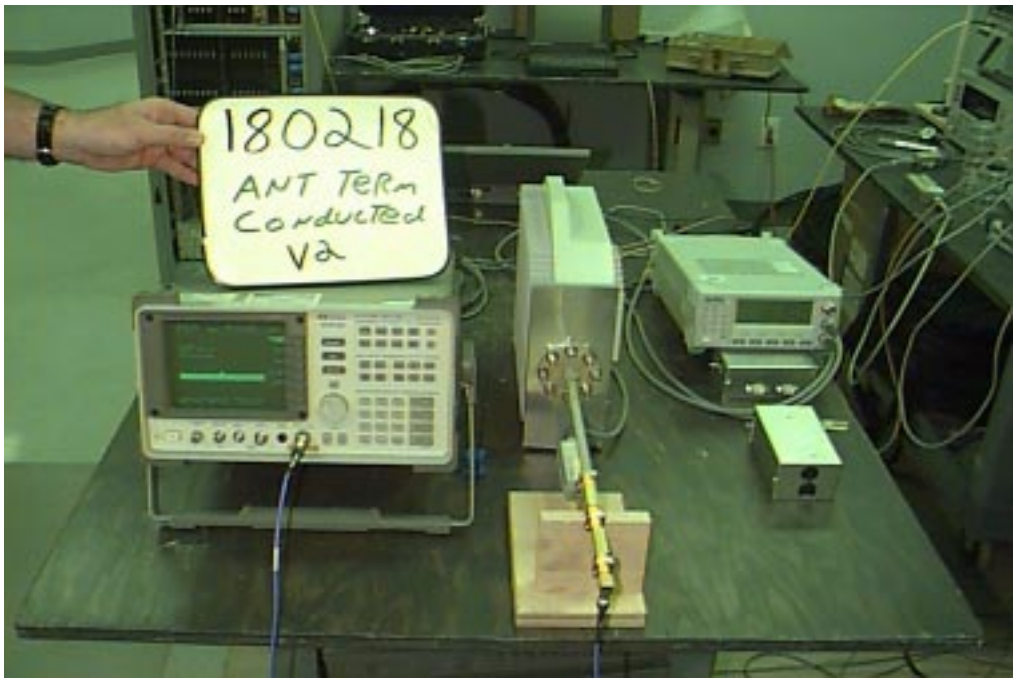


FIGURE D-3 ANTENNA TERMINAL CONDUCTED EMISSIONS TEST SETUP

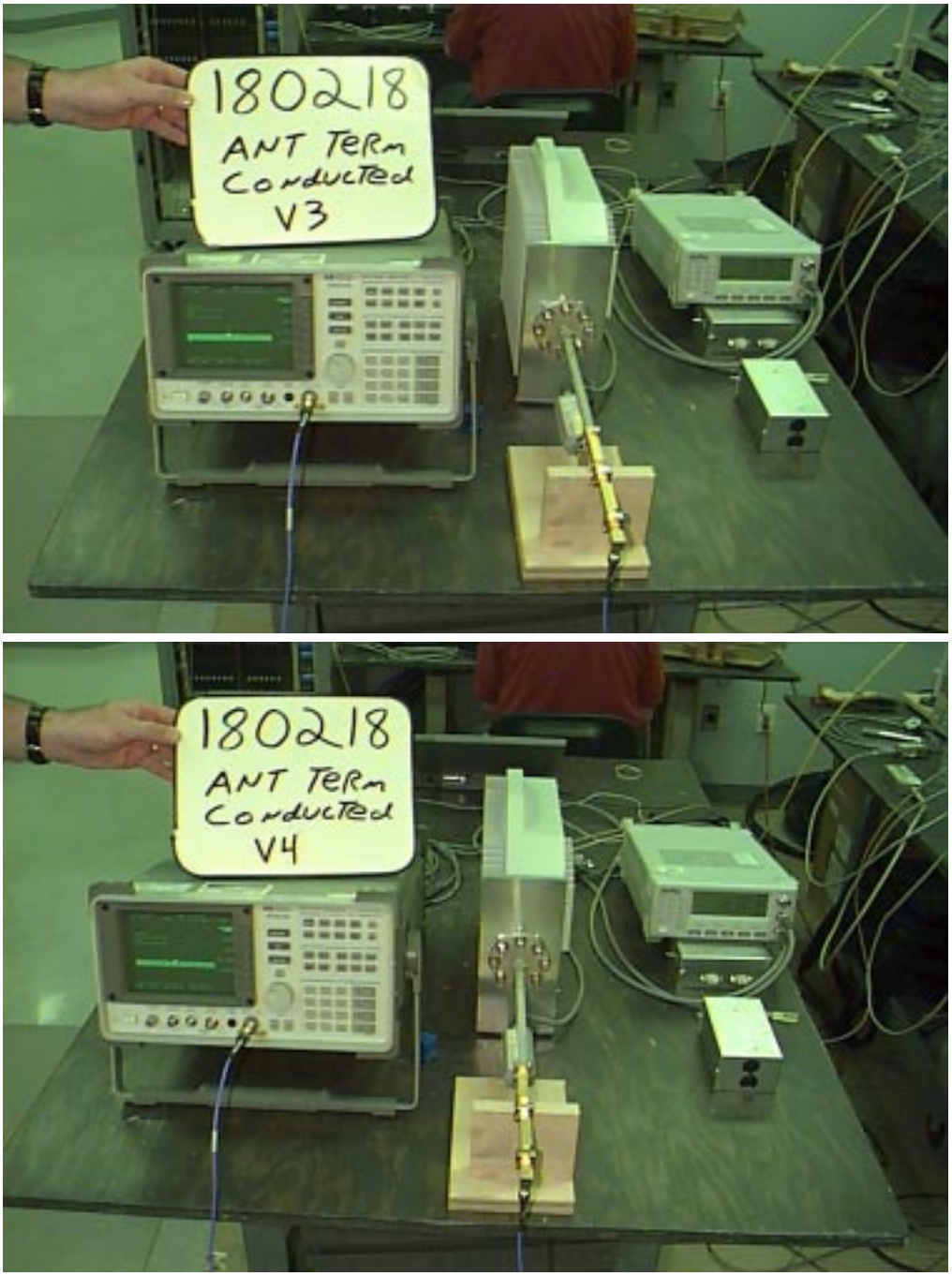


FIGURE D-3. ANTENNA TEMINAL CONDUCTED EMISSIONS TEST SETUP
(Continued)

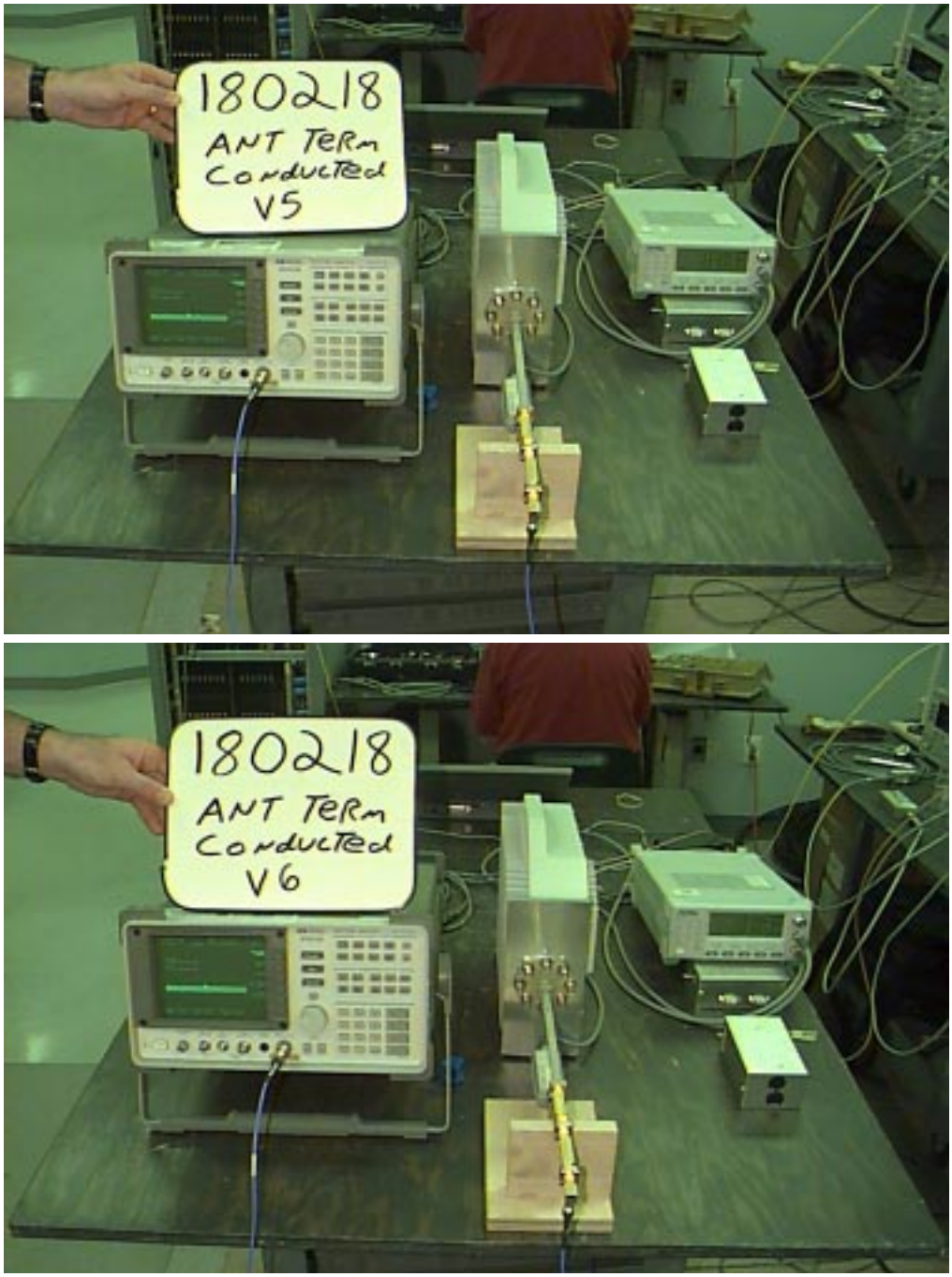


FIGURE D-3. ANTENNA TEMINAL CONDUCTED EMISSIONS TEST SETUP
(Conducted)

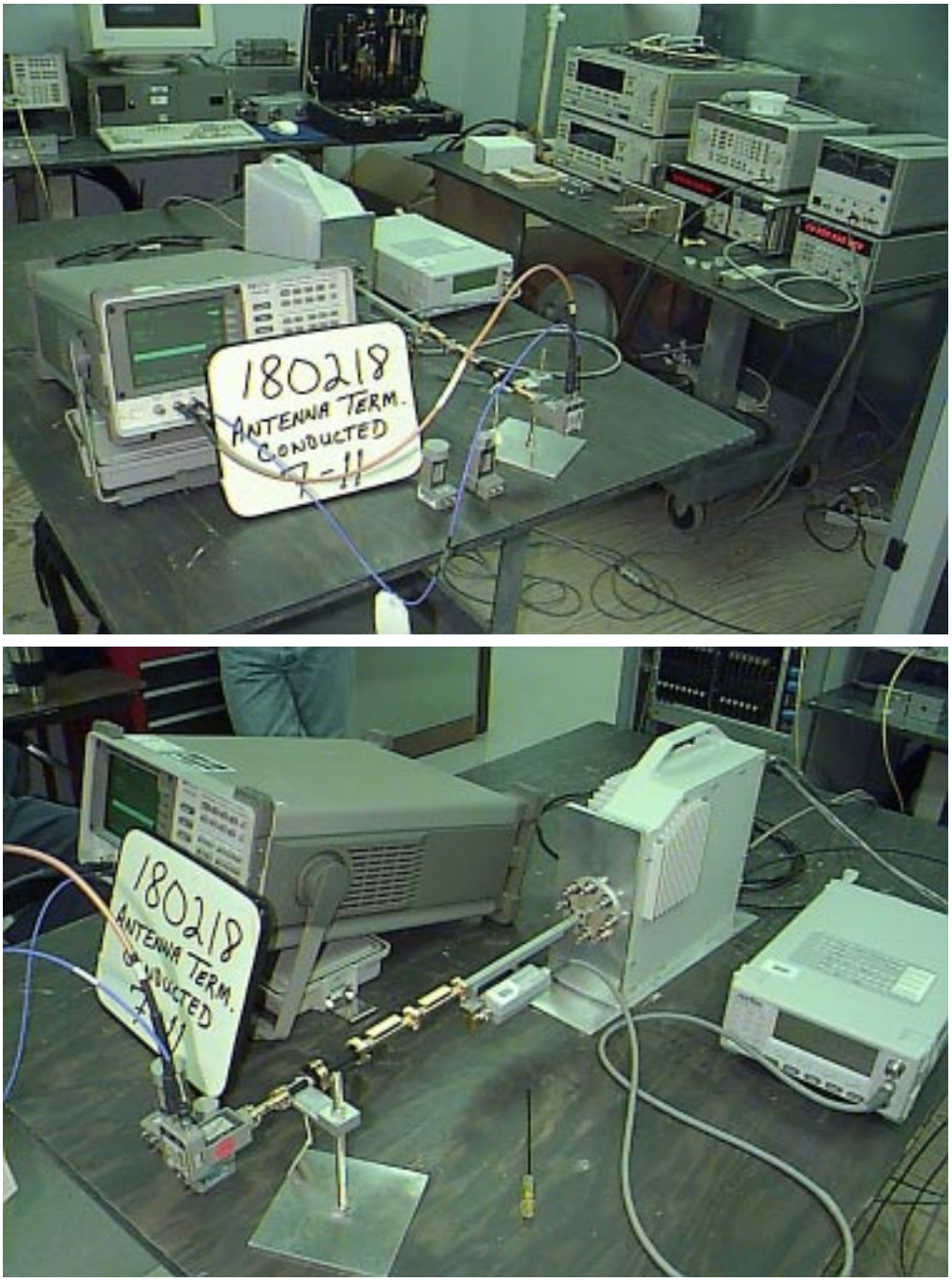


FIGURE D-3 ANTENNA TEMINAL CONDUCTED EMISSIONS TEST SETUP
(Continued)

TABLE D-III WORST-CASE SPURIOUS EMISSIONS (FIELD STRENGTH) DATA

Test # RE-3, TX 30.0 dBm 27.510 GHz CW US Frequency, -48 Vdc

Frequency (MHz)	Amplitude Peak (dBµV/m)	FCC 2.993 Limit (dBµV/m)	Margin* (dB) (Limit-Amplitude)	Polarization Vertical/ Horizontal	Comments
32.835	33.7	84.6	50.9	Vertical	1
175.252	37.7	84.6	46.9	Vertical	1,2
960.000	47.1	84.6	37.5	Vertical	1
220.620	31.7	84.6	52.9	Horizontal	1,2
650.000	35.6	84.6	49.0	Horizontal	1,2
960.000	38.5	84.6	46.1	Horizontal	1,2

Test # RE-5, TX 30.0 dBm 27.550 GHz QSPK/40 MHz BW, -48 Vdc

Frequency (MHz)	Amplitude Peak (dBµV/m)	FCC 2.993 Limit (dBµV/m)	Margin* (dB) (Limit-Amplitude)	Polarization Vertical/ Horizontal	Comments
421.250	32.4	84.6	52.2	Vertical	1
650.000	33.6	84.6	51.0	Vertical	1
900.000	37.8	84.6	46.8	Vertical	1
250.000	28.3	84.6	56.3	Horizontal	1,2
650.000	33.6	84.6	51.0	Horizontal	1,2
900.000	37.8	84.6	46.8	Horizontal	1,2

Test # RE-6, TX 30.0 dBm 27.590 GHz QSPK/50 MHz BW, -48 Vdc

Frequency (MHz)	Amplitude Peak (dBµV/m)	FCC 2.993 Q.P. Limit (dBµV/m)	Margin* (dB) (Limit-Amplitude)	Polarization Vertical/ Horizontal	Comments
421.250	33.4	84.6	51.2	Vertical	1
650.000	33.6	84.6	51.0	Vertical	1,2
900.000	37.8	84.6	46.8	Vertical	1,2
250.000	27.2	84.6	57.4	Horizontal	1,2
650.000	33.6	84.6	51.0	Horizontal	1,2
900.000	37.8	84.6	46.8	Horizontal	1,2

Test # RE-4, TX 30 dBm 27.710926 GHz QPSK/30 MHz BW Bosch Modem Test Set, -48 Vdc

Frequency (MHz)	Amplitude Peak (dBµV/m)	FCC 2.993 Limit (dBµV/m)	Margin* (dB) (Limit-Amplitude)	Polarization Vertical/ Horizontal	Comments
32.835	32.4	84.6	52.2	Vertical	1
650.000	34.6	84.6	50.0	Vertical	1,2
900.000	38.8	84.6	45.8	Vertical	1,2
30.000	19.1	84.6	65.5	Horizontal	1,2
32.835	27.4	84.6	57.2	Horizontal	1
650.000	34.6	84.6	50.0	Horizontal	1,2

Test # RE-1, TX 30 dBm 270710926 GHz QPSK/30 MHz BE Bosch Modem Test Set, -48 Vdc

Frequency (MHz)	Amplitude Peak (dBµV/m)	FCC 2.993 Limit (dBµV/m)	Margin* (dB) (Limit-Amplitude)	Polarization Vertical/ Horizontal	Comments
320.000	28.3	84.6	56.3	Vertical	1,2
425.000	27.4	84.6	57.2	Vertical	1,2
960.000	37.5	84.6	47.1	Vertical	1,2
320.000	28.3	84.6	56.3	Horizontal	1,2
425.000	28.4	84.6	56.2	Horizontal	1,2
960.000	38.5	84.6	46.1	Horizontal	1,2

Comments:

1. Data contained in Appendix B - Tests # RE-1 (06/19/98) and # RE-3, # RE-4, # RE-5, and # RE-6 (06/22/98).

2. Noise floor reading.

Notes:

*Calculations may not agree exactly with data due to rounding of numbers.

All other radiated emissions amplitudes were at least 10 dB within the FCC Part 2 Subpart 2.993 Limits. Emissions were scanned from 30 MHz to 1 GHz with antennas in both the vertical and horizontal orientation. The specified radiated emissions antenna reference distance was 3 meters. Testing of the EUT was conducted at 3 meters. No additional signal was detected.

Amplitudes were measured using the peak detector. Reference detector specified in the limit is the CISPR quasi-peak detector.

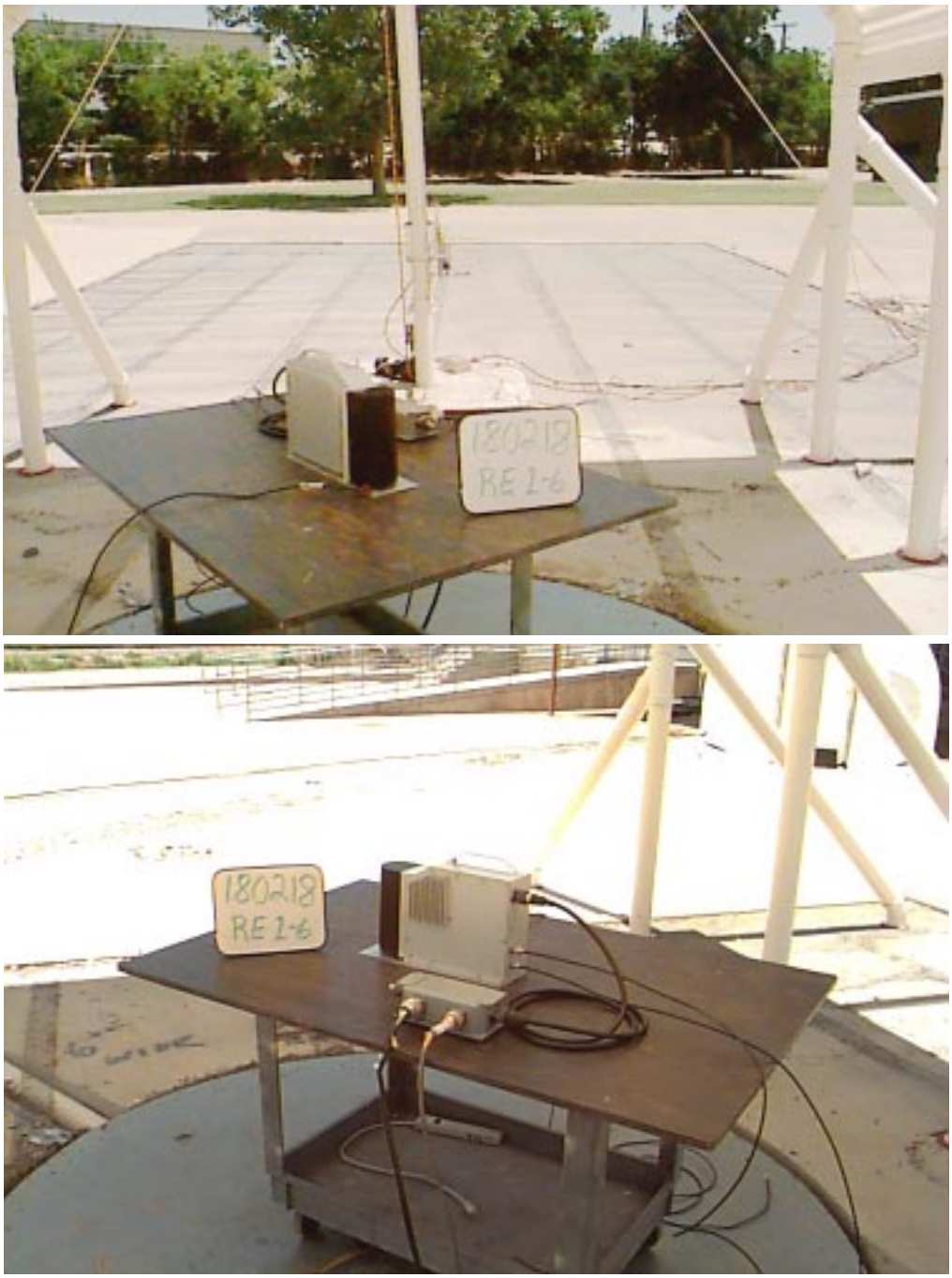


FIGURE D-4. WORST-CASE SPURIOUS EMISSIONS (FIELD STRENGTH) TEST SETUP

TABLE D-IV. WORST-CASE SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH) DATA

SCAN 1 18 GHz

Test # REMW02, TX 30.0 dBm 27.510 GHz CW Signal U. S. Frequency, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
1.920	-114.8	-43.0	71.8	12.8	Vertical	1,2
10.560	-101.9	-43.0	58.9	25.7	Vertical	1,2
17.280	-91.8	-43.0	48.8	35.8	Vertical	1,2
1.920	-115.8	-43.0	72.8	11.8	Horizontal	1,2
10.560	-101.9	-43.0	58.9	25.7	Horizontal	1,2
17.280	-91.8	-43.0	48.8	35.8	Horizontal	1,2

SCAN 18-26.5 GHz

Test # REMW08, TX 30.0 dBm 27.510 GHz CW Signal U. S. Frequency, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
18.000	-90.5	-43.0	47.5	37.1	Vertical	1,2
22.000	-84.2	-43.0	41.2	43.4	Vertical	1,2
26.500	-85.8	-43.0	42.8	41.8	Vertical	1,2
18.000	-90.5	-43.0	47.5	37.1	Horizontal	1,2
22.000	-84.2	-43.0	41.2	43.4	Horizontal	1,2
26.500	-85.8	-43.0	42.8	41.8	Horizontal	1,2

SCAN 26.5-40 GHz

Test # 218U03, TX 30.0 dBm 27.510 GHz CW Signal US Frequency, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
26.550	-50.2	-43.0	7.2	78.4	Vertical	1,2
27.510	-50.2	-43.0	7.2	83.3	Vertical	1,2
32.000	-49.1	-43.0	6.1	77.5	Vertical	1,2
26.550	-49.2	-43.0	6.2	77.4	Horizontal	1,2
27.510	-44.3	-43.0	1.3	77.4	Horizontal	1,2
32.000	-50.1	-43.0	7.1	78.5	Horizontal	1,2

SCAN 40-100 GHz

Test # 218U11, TX 30.0 dBm 27.510 GHz CW Signal US Frequency, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
60.000	-60.4	-43.0	17.4	67.2	Vertical	1,2
79.650	-67.5	-43.0	24.5	30.1	Vertical	1,2
82.530	-67.3	-43.0	24.3	60.3	Vertical	1,2
60.000	-60.3	-43.0	17.3	67.3	Horizontal	1,2
79.650	-67.7	-43.0	24.7	59.9	Horizontal	1,2
82.530	-67.5	-43.0	24.5	60.1	Horizontal	1,2
300 kHz RBW						
60.000	-55.2	-43.0	12.1	60.3	Vertical	1,2
60.000	-55.1	-43.0	12.2	67.7	Horizontal	1,2

SCAN 1-18 GHz

Test # REMW03, TX 30.0 dBm QPSK/30 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (db) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
1.670	-117.6	-43.0	74.6	9.9	Vertical	1,2
10.020	-103.5	-43.0	60.5	24.1	Vertical	1,2
16.700	-96.5	-43.0	53.5	31.1	Vertical	1,2
1.670	-118.6	-43.0	75.6	9.0	Horizontal	1,2
10.020	-102.5	-43.0	59.5	25.1	Horizontal	1,2
16.700	-95.5	-43.0	52.5	32.1	Horizontal	1,2

SCAN 18-26.5 GHz

Test #REMW09, TX 30.0 dBm QPSK/30 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
18.000	-90.5	-43.0	47.5	37.1	Vertical	1,2
22.000	-87.2	-43.0	44.2	40.4	Vertical	1,2
26.040	-84.8	-43.0	41.8	42.8	Vertical	1,2
18.000	-90.5	-43.0	47.5	37.1	Horizontal	1,2
22.000	-84.2	-43.0	41.2	43.4	Horizontal	1,2
26.040	-83.8	-43.0	40.8	43.8	Horizontal	1,2

SCAN 26.5 40 GHz

Test # 218U04, TX 30.0 dBm 27.710GHz QPSK/30 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
26.040	-48.8	-43.0	5.8	78.8	Vertical	1,2
27.710	-49.2	-43.0	6.2	78.4	Vertical	1,2
32.000	-49.1	-43.0	6.1	78.5	Vertical	1,2
26.040	-49.0	-43.0	6.0	78.6	Horizontal	1,2
27.710	-48.2	-43.0	5.2	79.4	Horizontal	1,2
32.000	-49.1	-43.0	6.1	78.5	Horizontal	1,2

SCAN 40-100 GHz

Test # 218U09, TX 30.0 dBm 27.710GHz QPSK/30 MHz BW, -48 Vdc

Frequency (GHz)	DBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
60.000	-60.0	-43.0	17.0	67.3	Vertical	1,2
78.120	-67.5	-43.0	24.5	60.1	Vertical	1,2
83.130	-67.6	-43.0	24.6	60.0	Vertical	1,2
60.000	-60.5	-43.0	17.5	67.1	Horizontal	1,2
78.120	-67.6	-43.0	24.6	60.0	Horizontal	1,2
83.130	-67.0	-43.0	24.0	60.6	Horizontal	1,2
300 kHz RBW						
60.000	-64.1	-43.0	21.1	63.5	Vertical	1,2
60.000	-64.1	-43.0	21.1	63.5	Horizontal	1,2

SCAN 1-18GHz

Test # REMW04, TX 30.0 dBm QPSK/40 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
1.510	-117.6	-43.0	74.6	10.0	Vertical	1,2
9.060	-104.2	-43.0	61.2	23.4	Vertical	1,2
16.610	-94.5	-43.0	51.5	33.1	Vertical	1,2
1.510	-117.6	-43.0	74.6	10.0	Horizontal	1,2
9.060	-104.2	-43.0	61.2	23.4	Horizontal	1,2
16.610	-94.5	-43.0	51.5	33.1	Horizontal	1,2

SCAN 18-26.5 GHz

Test # REMW10, TX 30.0 dBm QPSK/40 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
18.000	-90.5	-43.0	47.5	37.1	Vertical	1,2
22.000	-84.2	-43.0	41.2	43.4	Vertical	1,2
26.040	-83.8	-43.0	40.8	43.8	Vertical	1,2
18.000	-90.5	-43.0	47.5	37.1	Horizontal	1,2
22.000	-84.2	-43.0	41.2	43.4	Horizontal	1,2
26.040	-83.8	-43.0	40.8	43.8	Horizontal	1,2

SCAN 26.5-40 GHz

Test # 218U05, TX 30.0 dBm 27.550GHz QPSK/40 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
26.040	-72.2	-43.0	29.2	55.4	Vertical	1,2
27.550	-73.2	-43.0	30.2	54.4	Vertical	1,2
32.000	-72.6	-43.0	29.6	55.0	Vertical	1,2
26.040	-72.2	-43.0	29.2	55.4	Horizontal	1,2
27.550	-73.2	-43.0	30.2	54.4	Horizontal	1,2
32.000	-79.1	-43.0	36.1	48.5	Horizontal	1,2

SCAN 40-100 GHz

Test # 218U08, TX 30.0 dBm 27.550GHz QPSK/40 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
60.000	-61.0	-43.0	18.0	66.6	Vertical	1,2
78.120	-67.3	-43.0	24.3	60.3	Vertical	1,2
82.650	-67.3	-43.0	24.3	60.3	Vertical	1,2
60.000	-61.3	-43.0	18.3	66.3	Horizontal	1,2
78.120	-68.5	-43.0	25.5	59.1	Horizontal	1,2
82.650	-67.3	-43.0	24.3	60.3	Horizontal	1,2
300 kHz RBW						
60.000	-64.1	-43	21.1	63.5	Vertical	1,2
60.000	-64.1	-43	21.1	63.5	Horizontal	1,2

SCAN 1-18 GHz

Test # REMW 05, TX 30.0 dBm QPSK/50 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
1.190	-119.4	-43.0	76.4	8.2	Vertical	1,2
9.520	-102.4	-43.0	59.4	24.7	Vertical	1,2
17.850	-92.2	-43.0	49.2	35.4	Vertical	1,2
1.190	-119.4	-43.0	76.4	8.2	Horizontal	1,2
9.520	-102.9	-43.0	59.9	24.7	Horizontal	1,2
17.850	-92.2	-43.0	49.2	34.4	Horizontal	1,2

SCAN 18-26 GHz

Test #REMW11, TX 30.0 dBm QPSK/50 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
18.000	-90.5	-43.0	47.5	37.1	Vertical	1,2
22.000	-84.2	-43.0	41.2	43.4	Vertical	1,2
26.400	-84.8	-43.0	41.8	42.8	Vertical	1,2
18.00	-90.5	-43.0	47.5	37.1	Horizontal	1,2
22.00	-84.2	-43.0	41.2	43.4	Horizontal	1,2
26.400	-84.8	-43.0	41.8	42.8	Horizontal	1,2

SCAN 40-100 GHz

Test # 218U07, TX 30.0 dBm 27.590 GHz QPSK/50 MHz BW, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (d dBµV/m)	Polarization Vertical/ Horizontal	Comments
60.000	-60.3	-43.0	17.3	67.0	Vertical	1,2
79.200	-67.7.	-43.0	24.7	59.9	Vertical	1,2
82.770	-67.1	-43.0	24.1	60.5	Vertical	1,2
60.000	-60.3	-43.0	17.3	67.3	Horizontal	1,2
79.200	-67.4	-43.0	24.4	60.2	Horizontal	1,2
82.770	-67.0	-43.0	24.0	60.6	Horizontal	1,2
300 kHz RBW						
60.000	-64.1	-43.0	21.1	63.5	Vertical	1,2
60.000	-64.1	-43.0	21.1	63.5	Horizontal	1,2

SCAN 1-18 GHz

Test # REMW06, TX 30.0 dBm BOSCH MODEM TEST SET, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
1.670926	-117.5	-43.0	74.5	10.0	Vertical	1,2
8.35463	-105.3	-43.0	62.3	22.3	Vertical	1,2
16.70926	-96.5	-43.0	53.5	31.1	Vertical	1,2
1.670926	-117.5	-43.0	74.5	10.0	Horizontal	1,2
8.35463	-103.3	-43.0	60.3	24.3	Horizontal	1,2
16.70926	-95.5	-43.0	52.5	32.1	Horizontal	1,2

SCAN 18-26.5 GHz

Test # REMW12, TX 30.0 dBm BOSCH MODEM TEST SET, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
18.000	-90.5	-43.0	47.5	37.1	Vertical	1,2
22.00	-84.2	-43.0	41.2	43.4	Vertical	1,2
26.400	-84.8	-43.0	41.8	42.8	Vertical	1,2
18.000	-90.5	-43.0	47.5	37.1	Horizontal	1,2
22.000	-84.2	-43.0	41.2	43.4	Horizontal	1,2
26.400	-84.8	-43.0	41.8	42.8	Horizontal	1,2

SCAN 26.5-40 GHz

Test # 218U01, TX 30.0 dBm 27.710926GHz QPSK/30 MHz BW Bosch Modem Test Set, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
27.040	-75.2	-43.0	32.2	52.4	Vertical	1,2
27.710	-75.2	-43.0	32.2	52.4	Vertical	1,2
32.000	-75.1	-43.0	32.1	52.5	Vertical	1,2
27.040	-75.2	-43.0	32.2	52.4	Horizontal	1,2
27.710	-75.2	-43.0	32.2	52.4	Horizontal	1,2
32.000	-75.1	-43.0	32.1	52.5	Horizontal	1,2

SCAN 40-100 GHz

Test # 218U10, TX 30.0 dBm 27.710926GHz QPSK/30 MHz BW Bosch Modem Test Set, -48 Vdc

Frequency (GHz)	dBc (dB)	FCC 2.993 Limit (dB)	Margin* (dB) (Limit-Amplitude)	Amplitude Peak (dBµV/m)	Polarization Vertical/ Horizontal	Comments
78.12000	-67.3	-43.0	24.3	60.3	Vertical	1,2
83.13278	-67.5	-43.0	24.5	60.1	Vertical	1,2
60.00000	-63.3	-43.0	20.3	64.3	Vertical	1,2
78.12000	-66.3	-43.0	23.3	61.3	Horizontal	1,2
83.13278	-67.5	-43.0	24.5	60.1	Horizontal	1,2
60.0000	-63.3	-43.0	20.3	64.3	Horizontal	1,2
300 kHz RBW						
60.0000	-64.1	-43.0	21.1	63.5	Vertical	1,2
60.0000	-64.1	-43.0	21.1	63.5	Horizontal	1,2

Comments:

Data contained in Appendix B - Tests # 218U01, # 21803, # 218U04, and # 218U05 (06/18/98) and Tests # 218U07, # 218U08, # 218U09, #218U10, # 218U11, (06/19/98). Tests # REMW02, #REMW03, # REMW04, # REMW05, and # REMW06 (06/22/98) and # REMW08, # REMW09, # REMW10, # REMW10 and # REMW12 (06/23/98).

Noise floor reading.

Notes:

4 kHz RBW correction factor of -24 dB was added to the formula (refer to sample calculations).

*Calculations may not agree exactly with data due to rounding of numbers.

All other radiated emissions amplitudes were at least 10 dB within the FCC Part 2 Subpart 2.993 Limits. Emissions were scanned from 1 GHz to 18 GHz, 18GHz-26.5 GHz, 26.5 GHz to 40 GHz, and 40 to 100 GHz with antennas in both the vertical and horizontal orientation. The specified radiated emissions antenna reference distance was 3 meters. Testing of the EUT was conducted at 3meters. No additional signal was detected.

Amplitudes were measured using the peakdetector. Reference detector specified in the limit is the average detector.

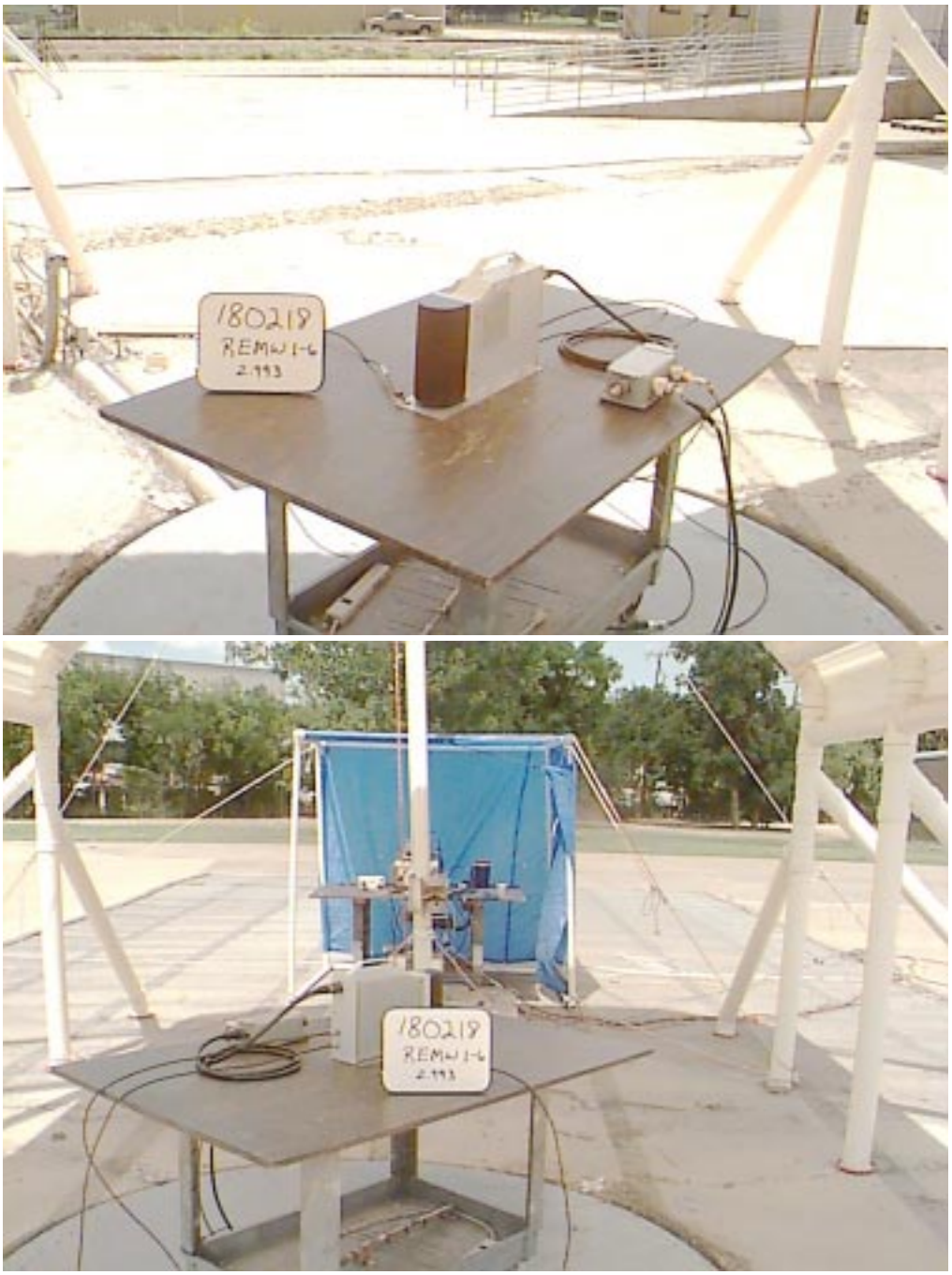


FIGURE D-5. WORST-CASE SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH) TEST SETUP

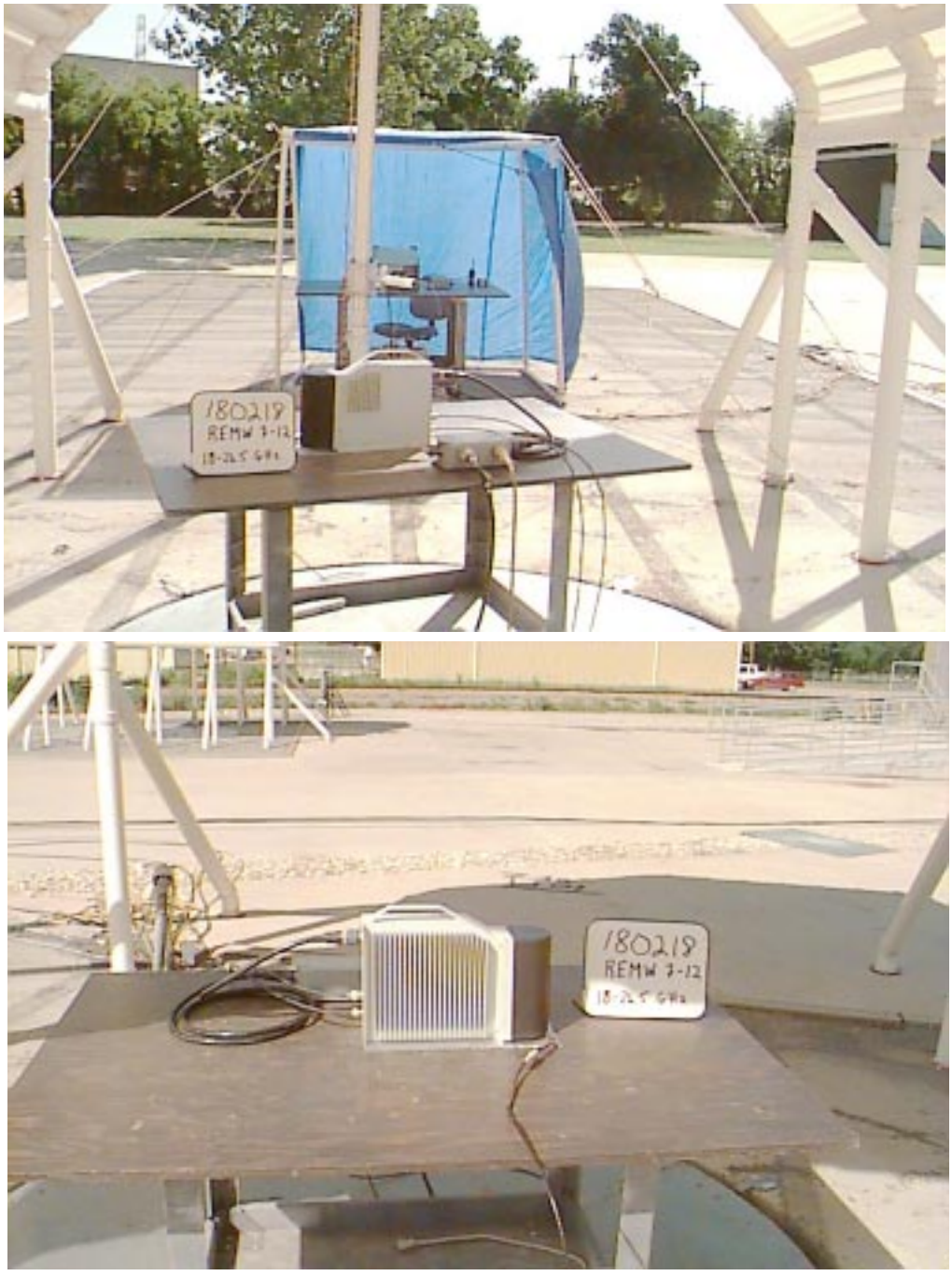


FIGURE D-5. WORST-CASE SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH) TEST SETUP

(Continued)

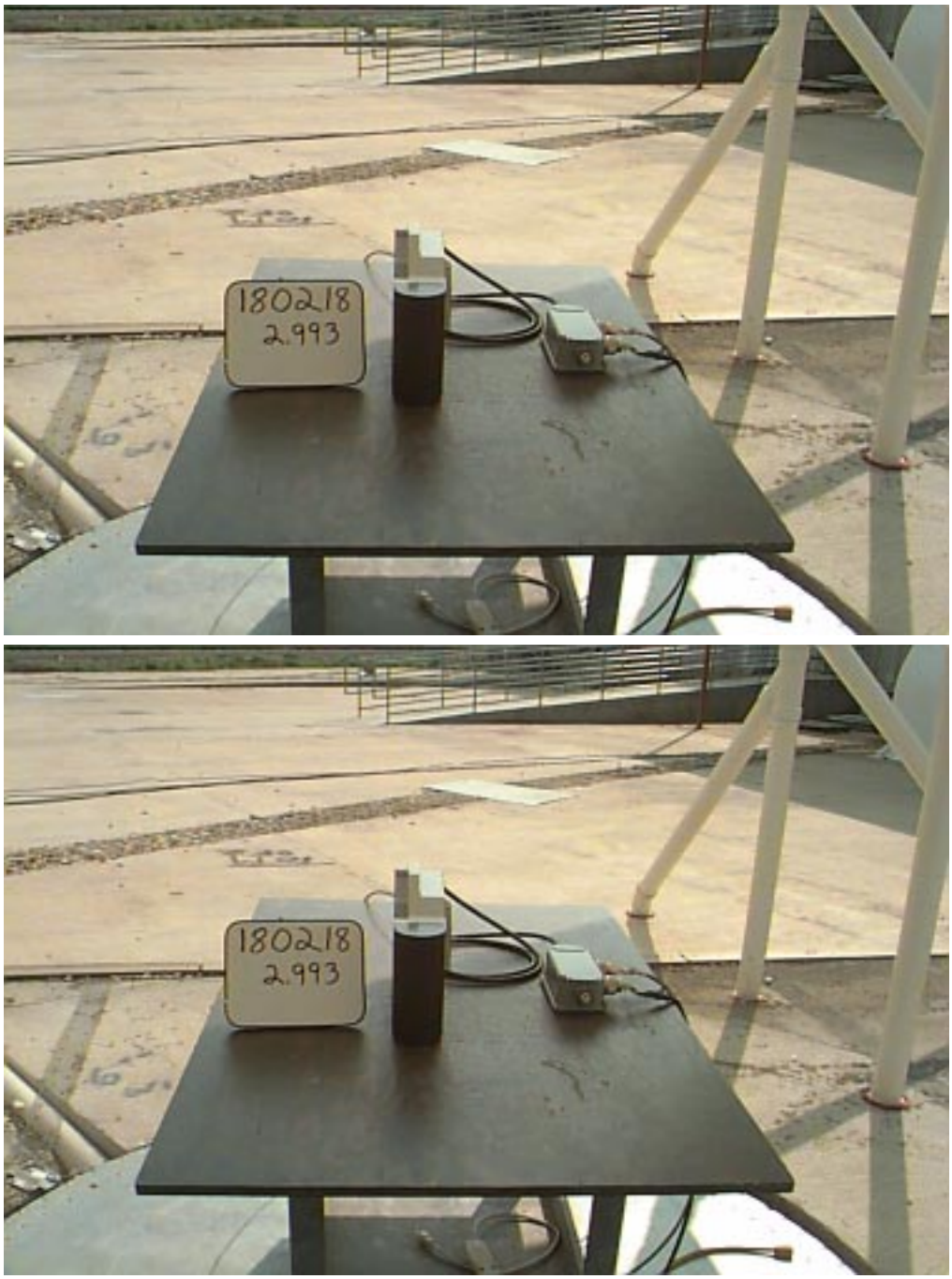


FIGURE D-5. WORST-CASE SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH) TEST SETUP

(Continued)

FIGURE D-5. WORST-CASE SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH) TEST SETUP

(Continued)

FIGURE D-5. WORST-CASE SPURIOUS EMISSIONS (MICROWAVE FIELD STRENGTH) TEST SETUP

(Continued)

TABLE D-V. FREQUENCY STABILITY DATA

Frequency Stability Configuration: TX 27.920000 GHz

Frequency (MHz)	Temperature	FCC Limit 101 (2.995)	Voltage	Time
27.920000010 (R/F) freq	-30 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000011 (R/F) freq	-30 Cº	.001% (+/- 279.2 kHz)	Nominal 48 Vdc	1030
27.920000020 (R/F) freq	-30 Cº	.001% (+/- 279.2 kHz)	(- 15%) 55.2 Vdc)	
27.920000105 (RF) freq	-20 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000099 (RF) freq	-20 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1115
27.920000099 (RF) freq	-20 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000216 (RF) freq	-10 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000215 (RF) freq	-10 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1200
27.920000208 (RF) freq	-10 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000206 (RF) freq	0 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000197 (RF) freq	0 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1245
27.920000215 (RF) freq	0 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000181 (RF) freq	10 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000192 (RF) freq	10 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1330
27.920000202 (RF) freq	10 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000205 (RF) freq	20 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000194 (RF) freq	20 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1415
27.920000197 (RF) freq	20 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000148 (RF) freq	30 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000136 (RF) freq	30 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1500
27.920000116 (RF) freq	30 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000106 (RF) freq	40 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000103 (RF) freq	40 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1545
27.920000120 (RF) freq	40 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	
27.920000108 (RF) freq	50 Cº	.001% (+/- 279.2 kHz)	(-15%) 40.8 Vdc	
27.920000112 (RF) freq	50 Cº	.001% (+/- 279.2 kHz)	Nominal 48.0 Vdc	1630
27.920000107 (RF) freq	50 Cº	.001% (+/- 279.2 kHz)	(+15%) 55.2 Vdc	

Comments:

1. Data contained in Appendix B – Test Frequency Stability (05/08/98).

E. MEASUREMENT FACILITY AND INSTRUMENTATION

A report describing the KTL Dallas, Inc. measurement facility is on file with the Federal Communications Commission in Columbia, Maryland. The laboratory has been audited by two Competent Bodies in the European Union, TÜV Rheinland and Interference Technology International, Ltd. The laboratory has also been audited by NEMKO, a Certification Body in Norway, and the U.S. National Institute of Standards and Technology (NIST); the National Voluntary Laboratory Accreditation Program (NVLAP) has also audited the laboratory for selected test methods or services. These audits and certifications were performed in accordance with EN 45001, ISO/IEC Guide 25: 1990, ISO/IEC Guide 58: 1993 and ISO 9002: 1994.

The instrumentation used conforms to ANSI C63.4 (1992), ANSI C63.2 (1987), CISPR, and FCC requirements for detector function and bandwidth. The antennas used are linearly polarized. Table E-I identifies the instrumentation utilized for the test. Calibration of measurement instrumentation is performed annually. Calibrations are traceable to NIST (formerly called NBS) to ensure the instrumentation accuracy.

Multiple ***open area test sites*** are capable of being used for 3-, 10-, and 30-meter measurement distances. The ground plane is composed of overlapping sheets of galvanized hardware cloth. The overlap distance is at least 10 cm. The overall ground plane size varies by field site. The ac power for the EUT is buried.

Multiple ***turntables*** allow for the equipment-under-test (EUT) to be rotated 360 azimuthally. For floor-standing EUT, the EUT to be tested is placed directly on a metal top turntable. Table-top EUT is placed on a test table located 80 cm above the ground plane. The unsunken turntables are composed primarily of wood and PVC. The only metal parts are the pivot mechanism/pedestal which is 15 cm above the ground plane and required bolts and nuts that are no longer than 4 cm.

The ***antenna mast*** allows for the antennas to be raised and lowered continuously from 1 to 4 meters in height above the ground plane. The mast is composed primarily of wood and plastic. All metal hardware is less than 10 cm in length and positioned to be as far from the antenna as possible.

The ***tripod*** is of wooden construction and is used to support the antennas during preliminary radiated-emissions measurements.

The ***instrumentation support stand*** is of wood construction and is located outside of the minimum reflection-free area of the open-field measurement site.

The S***emi-Anechoic Chamber #1*** is a Rayproof Shielded Enclosure assembled professionally by Shielding Resources Group. The dimensions of the enclosure are 8.5m X 5.5m X 6.1m. The three-phase ac power and neutral, 60 Hz, are filtered using Keene Corporation 225 ampere ac power line filters. The power line filters have 100 dB attenuation over most of the spectrum. The three-phase ac power and neutral, 50 Hz, are filtered using Universal Shielding Corporation 100 ampere ac power line filters with similar attenuation. Access to the room is through a double-wide door (6' wide by 7' tall). The room is lined on all sides and the ceiling with 3' anechoic cones and ferrite tile (in selected locations). The floor may be made anechoic by the use of removable ferrite tile squares that cover a 10' by 10' area between the transmit antenna and the EUT. The height of the enclosure permits a full 4-meter antenna scan height. Site-attenuation measurements and uniform-field measurements have been performed inside the room.

E. MEASUREMENT FACILITY AND INSTRUMENTATION (Continued)

The ***Shielded Enclosure #1 and #2*** consist of an ARK Electronics Corp. Plyshield Shielded Enclosure. The enclosure is divided into two rooms: ***#1*** is 2.5 m x 3.0 m x 3.0 m and ***#2*** is 6.1 m x 3.0 m x 3.0 m. The dimensions of the enclosure are (8.6 m x 3.0 m x 3.0 m). The three-phase ac power and neutral for the larger room are filtered using Corcom 100 ampere ac power line filters. The power for the smaller room is filtered using ARK 30 ampere power filters. The power line filters have 100 dB of attenuation between 14 kHz and 10 GHz.

The ***shielded room conducted emissions test setup*** is located inside the 6.1 m x 3.0 m x 3.0 m room of the shielded enclosure. The ac power is filtered using Corcom 100 ampere ac power line filters. The power line filters have 100 dB of attenuation between 14 kHz and 10 GHz. The EUT is supported on a wooden table that is located at the side of the enclosure. The table is 80-cm high. The instrumentation is located inside the enclosure during conducted-emissions measurements.

The ***laboratory conducted emissions test setups*** are located in each of the test laboratories with horizontal and vertical conducting planes each measuring 2.4 by 2.4 meters. The horizontal and vertical planes overlap two inches and are bonded together by screws placed on one foot centers. The EUT is supported on a portable wooden/plastic table that is 80 cm in height with the back edge located 40 cm from the vertical conducting plane.

The S***emi-Anechoic Chamber #2*** is a Keene Corp. Plyshield Shielded Enclosure. The dimensions of the shielded enclosure are 8.7 meters long by 4.9 meters wide by 3.7 meters high. Access is provided through a double leaf door of 1.8 meters wide by 2.3 meters height and by a single leaf door of 0.9 meters wide by 2.3 meters height. The three-phase 60 Hz ac power for the enclosure is filtered using Universal Shielding 100 ampere ac power line filters. The single-phase 50 Hz power is filtered using Keene 30 ampere ac power line filters. The power line filters have 100 dB of attenuation between 14 kHz and 10 GHz. The side walls and ceiling of the enclosure are covered with anechoic material.

TABLE E-1 TEST EQUIPMENT

The listing below indicates the test equipment utilized for the test (s).

KTL/(ICC) ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
CF00	Storm Cable (7.7 meters)			04/28/98
CF06	Flex Cable (0.3 meter N)			08/11/97
CF20	Semi Flex Cable (3 meters)			CNR
CF24	Workhorse (3.6 meters)			12/02/97
180	DC Block	Tektronix 7A26	NSN	02/27/98
181	Limiter	Fischer FCC-45013-1.2	NSN	02/12/98
227	Antenna, LP	A.H. Systems SAS-200/510	556	01/24/98
230	Biconical Antenna (30 MHz – 300 MHz)	International Compliance Corporation. BCON-30300	210	01/17/98
401	Low Noise Preamplifer (1 MHz - 1 GHz)	RF Consultants LNA-14	020	08/11/97
494	Horn Antenna	A.H. Systems SAS-200/571	162	04/29/98
697	Spectrum Analyzer	Hewlett Packard 8563E	3551A04428	08/01/97
739	Environmental Chamber	Environtics SH27	129010083	11/06/98
878	Mixer	Hewlett Packard 11970A	2332A01929	10/17/97
879	Mixer	Hewlett Packard 5356D	2521A00583	10/30/97
881	Harmonic Mixer	Hewlett Packard 1197OU	2332A00116	10/20/97
897	Signal Generator	Marooni 2022D	119223029	01/27/98

TABLE E-1 TEST EQUIPMENT

(Continued)

The listing below indicates the test equipment utilized for the test (s).

KTL/(ICC) ID	Nomenclature	Manufacturer Model Number	Serial Number	Calibration Date
EM2200	Amplifer	Hewlett Packard 8449A	2749A00159	02/22/98
	Bosch Telecom Power Meter	Anritsu MN: 2438A	97500031	03/18/98
G2624	Spectrum Analyzer	Hewlett Packard 8563E	3551A04428	10/05/98
	Attenuators	DC9807	521A-20/599	10/27/98
	Attenuator		521A-6/599	10/27/98
	Directional Coupler		559A-20/599	10/27/98
		LAB #2 (IN DOOR)		
		SITE B O.A.T.S. (OPEN AREA TEST SITE) 10 Meter Site		
	Turntable Flush Mounted, Metal Covered, 8 Foot	RF Consultants Model AT-8 (Automated)		CNR
	Antenna Mast, 4 Meter	ICC (Automated)		CNR
		BOSCH TELECOM, INC. FACILITY		

LEGEND:

CNR = CALIBRATION NOT REQUIRED
N/A = NOT APPLICABLE
CBU = CALIBRATED BEFORE USE