RADIATED EMISSIONS

DATA

FOR

QUALCOMM, INC.
10300 Campus Point Drive
San Diego, CA 92121

Prepared by

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

TÜV PRODUCT SERVICE

Measurement Requirements (CFR 47 Part 24, Paragraph 24.238(a))

The measurements which follow were performed by TÜV Product Service. To the best of my knowledge these tests were conducted in accordance with the procedures outlined in Part 25 of the Commission's Rules and Regulations. The data presented below demonstrates compliance with the appropriate technical standards.

Floyd R. Fleury
EMC Manager

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

Emissions Test Conditions: SPURIOUS RADIATED EMISSIONS

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

Test Equipment Used :

Model No.	Prop. No.	Description	Manufacturer	Serial No.	Cal Date
8566B	720/721	Spectrum Analyzer & Display	Hewlett Packard	2115A00842	03/01
AA-190-10.00.0	656	High Frequency Cable	United Microwave Prod.	--	N/A*
AA-190-30.00.0	664	High Frequency Cable	United Microwave Prod.	--	N/A*
FF6549-1	778	High Pass Filter	Sage Laboratories	005	10/00
AMF-5D-010180-35-10P	719	Preamplifier	Miteq	549460	N/A*

Remarks: (*) Verified internally

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

TÜV PRODUCT SERVICE

REPORT No: S0229 TESTED BY: Stephen Rackleff SPEC: FCC Part 24.238(a)

CUSTOMER: Qualcomm Inc. TEST DIST: 3 Meters

E U T: Qsec 800 TEST SITE: 3

EUT MODE: Transmit -CDMA Mode BICONICAL: N/A

DATE: 31-May-00 LOG: 244

NOTES: OTHER: 251

RBW & VBW = 30kHz, Video averaging 30 samples for fundamental
RBW & VBW = 1MHz for harmonic peak measurements. VBW 10Hz for average
SA PN:720/721, CBL1&2 PN:656/664, Preamp PN:719, Filter PN:778

v.beta2

FREQ (MHz)	VERTICAL (dBuv) pk	VERTICAL (dBuv) av	HORIZONTAL (dBuv) pk	HORIZONTAL (dBuv) av	CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m) pk	MAX LEVEL (dBuV/m) av	SPEC LIMIT (dBuV/m) pk	SPEC LIMIT (dBuV/m) av	MARGIN (dB) av	MARGIN (dB) pk	EUT Rotation	Antenna Height	Notes
824.04	98.7		86.2		25.3	**124.0**				124				Channel 991
1648.08	28.8	16.3	18.3	9.4	30.6	**59.4**	**46.9**	81	81	-21.6	-34	165	1.2	TXMT Pwr 25 dBm conducted at antenna connector
2472.12	24.1	15.4	29.2	22.2	33.6	**62.8**	**55.8**	81	81	-18.2	-25	80	1.1	
3296.16	11.4		18.4	9.9	37.5	**55.9**	**47.4**	81	81	-25.1	-34	8	1.5	
4120.2	10.2		12.5		41.9	**54.4**	**41.9**	81	81	-26.6		14	1	
4944.24	20.1	8.7	15.4		41.1	**61.2**	**49.8**	81	81	-19.8	-31	20	1.5	
5768.28	19.3	7.1			44.4	**63.7**	**51.5**	81	81	-17.3	-30	353	1.2	
6592.32	7.6				44.7	**52.3**	**44.7**	81	81	-28.7	-36			No emissions detected above 8th harmonic
836.49	98.3		86.4		25.3	**123.6**				124		76	1	Channel 383
1672.98	24.1		30.4		30.5	**60.9**	**30.5**	80.6	80.6	-19.7				TXMT Pwr 25 dBm conducted at antenna connector
2509.47	21.8		19.1		36.4	**58.2**	**36.4**	80.6	80.6	-22.4				
3345.96	10.5		11.6		37.5	**49.1**	**37.5**	80.6	80.6	-31.5				
4182.45	8.6		8.1		41.9	**50.5**	**41.9**	80.6	80.6	-30.1				
5018.94	19.4		12.6		42.7	**62.1**	**42.7**	80.6	80.6	-18.5				
5855.43	13.7		12.9		44.4	**58.1**	**44.4**	80.6	80.6	-22.5				
6691.92			13.1		44.7	**57.8**	**44.7**	80.6	80.6	-22.8				No emissions detected above 8th harmonic
848.97	98.4		88.4		25.3	**123.7**				124				Channel 799
1697.94	23.2		24		30.5	**54.5**	**30.5**	80.7	80.7	-26.2				TXMT Pwr 25 dBm conducted at antenna connector
2546.91	22.3		23.7		36.4	**60.1**	**36.4**	80.7	80.7	-20.6				
3395.88	13.2		18		37.5	**55.5**	**37.5**	80.7	80.7	-25.2				
4244.85	8.6		8.2		41.9	**50.5**	**41.9**	80.7	80.7	-30.2				
5093.82	26.3	14.6	23		42.7	**69.0**	**57.3**	80.7	80.7	-11.7	-23	359	2	
5942.79	15.5		12.5		44.3	**59.8**	**44.3**	80.7	80.7	-20.9	-36			No emissions detected above 7th harmonic

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

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REPORT No: S0229 TESTED BY: Stephen Rackleff SPEC: FCC Part 24.238(a)

CUSTOMER: Qualcomm Inc. TEST DIST: 3 Meters

E U T: Qsec 800 Serial Number N1073H9V8 TEST SITE: 3

EUT MODE: Transmit -FM Mode BICONICAL: N/A

DATE: 1-Jun-00 LOG: 244

NOTES: OTHER: 251

RBW & VBW = 100kHz for fundamental

RBW & VBW = 1MHz for harmonic peak measurements. VBW 10Hz for average

SA PN:720/721, CBL1&2 PN:656/664, Preamp PN:719, Filter PN:778

v.beta2

FREQ (MHz)	VERTICAL (dBuv) pk	av	HORIZONTAL (dBuv) pk	av	CORRECTION FACTOR (dB/m)	MAX LEVEL (dBuV/m) pk	av	SPEC LIMIT (dBuV/m) pk	av	MARGIN (dB) av	pk	EUT Rotation	Antenna Height	Notes
824.04	101		91.5		24.3	**125.4**				125				Channel 991
1648.08	30.4		19.4		30.6	**61.0**		82.4	82.4	-21.4				XMT Pwr 28 dBm conducted at antenna connector
2472.12	25.7		27.3		33.6	**60.9**		82.4	82.4	-21.5				
3296.16	14.9		23.4		37.5	**60.9**		82.4	82.4	-21.5				
4120.2	11.7		16.4		41.9	**58.3**		82.4	82.4	-24.1				
4944.24	20		18.4		41.1	**61.1**		82.4	82.4	-21.3				
5768.28	15.1		12.2		44.4	**59.5**		82.4	82.4	-22.9				
6592.32	10.5		9.1		44.7	**55.2**		82.4	82.4	-27.2				No emissions detected above 8th harmonic
836.49	101		89.1		24.3	**125.3**				125				Channel 383
1672.98	30.9		18.1		30.5	**61.4**		82.3	82.3	-20.9				XMT Pwr 28 dBm conducted at antenna connector
2509.47	26.2	25.7	25.7		36.4	**62.6**	**62.1**	82.3	82.3	-19.7	-20	264	1.2	
3345.96	12.9		20.8		37.5	**58.3**		82.3	82.3	-24				
4182.45	13.8		11.6		41.9	**55.7**		82.3	82.3	-26.6				
5018.94	24.4	23.8	17.1		42.7	**67.1**	**66.5**	82.3	82.3	-15.2	-16	207	1.1	
5855.43	13.9		11.5		44.4	**58.3**		82.3	82.3	-24				
6691.92	7.7		8.7		44.7	**53.4**		82.3	82.3	-28.9				No emissions detected above 8th harmonic
848.97	100		89		25.1	**125.4**				125				Channel 799
1697.94	28.4		19.3		30.5	**58.9**		82.4	82.4	-23.5				XMT Pwr 28 dBm conducted at antenna connector
2546.91	26.4	25.8	25.5		36.4	**62.8**	**62.2**	82.4	82.4	-19.6	-20	37	1.5	
3395.88	12.7		17.2		37.5	**54.7**		82.4	82.4	-27.7				
4244.85	16.6		14.3		41.9	**58.5**		82.4	82.4	-23.9				
5093.82	32.5	32.5	26		42.7	**75.2**	**75.2**	82.4	82.4	-7.23	-7.2	358	1.5	
5942.79	22.2	21.3	17.9		44.3	**66.5**	**65.6**	82.4	82.4	-15.9	-17	52	1.3	
6791.76	13.4		13.1		44.6	**58.0**		82.4	82.4	-24.4				
7640.73	10.4		10.2		47.6	**58.0**		82.4	82.4	-24.4				
8489.7	10.5		11.4		48.3	**59.7**		82.4	82.4	-22.7				

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5/30/00 [handwritten initials]

To: dmarshall@tuvps.com, jowen@tuvps.com
From: Bill Moyer x8-3542 <wmoyer@qualcomm.com>
Subject: Final Globalstar Module Spurious Radiated Emissions Test Plan
Cc: pguckian, sgalati, jforrester
Bcc:
X-Attachments:

Dave Marshall:

The following is the test plan for measuring the field strength of the spurious radiated emissions of the Globalstar Satellite Packet Data Modem Module (GS Module) at TUV, following pre-scans and ODU antenna gain measurements performed at Qualcomm.

Globalstar Module Part 25 Spurious Radiated Emissions Test Plan
Emissions Limits: FCC Part 25, Section 25.202 (f)

Test Setup:

Horizontal Digital/RF Unit, resting face up, connected via 2 coaxial cables to Passive-Tx outdoor antenna unit (ODU). Horizontal ODU is pointed towards horizon and boresighted on test antenna at zero degrees azimuth (ODU is normally pointing to zenith with ODU resting on its base), on nonconductive support on wooden table on test site turntable, 1.0 m above ground plane. (Maximum UT antenna gain is in line with antenna axis.) Receive antenna will also be at 1.0 m height, except where E-Field maximization yields higher emissions levels at higher elevations, due to in-phase addition of ground-plane reflected power.

EUT Operation:

The car kit will be tested with the Module in a special-test stand-alone mode, with pre-loaded test code which permits fine adjustment of output power levels and channel frequencies, and with the ODU transmitting a full-power OQPSK CDMA pilot signal. Tests will be performed on 3 TX channels: low (1), middle (6), and high (9). Prior to the start of each test, the UT will be set to transmit using a laptop computer, RS-232 data monitor test port cable, calibrated (0.4 dB loss at 1610 MHz) RF Tx test port coaxial cable and adaptor, Power Meter, and the Hyperterminal program, as follows:

Data port cable connected to laptop and Digital/RF Unit.
Power Meter connected via calibrated coax cable adaptor and 30 dB pad to Unit's Tx output port (Rx port at top/outside of unit, Tx port located below/inside Rx port).
Set Power Meter offset to 30.2 dB, to account for 0.2 dB RF Tx test coaxial cable loss at 1610 MHz and the 30 dB pad attenuation.

Hyperterminal link settings, Com 1 port:

- 38400 bps
- 8 bits data,
- No parity
- 1 stop bit
- No flow control

```
h       Hardware Menu
gi      GUM Init
tx 2    Transmit Pilot signal
agc 17  AGC Init
agc 1 [power level]    (000 - 1FF)    Power Adjust Hex Code

        (hex numbering sequence:  0 1 2 3 4 5 6 7 8 9  A  B  C  D  E  F
                                  0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15)
```

```
agc 1 0  (minimum Tx power)
rf [rx channel index] [tx channel index]

     TX Channel 1 > TX Channel Index 4      1610.73 MHz
     TX Channel 6 > TX Channel Index 209    1616.88 MHz
     TX Channel 9 > TX Channel Index 332    1620.57 MHz

     RX Channel 1 > RX Channel Index 3

agc 1 55       (approx. 0 dBm)
     (iob 6046 39   Set Input/Output Buffer for Car Kit Transmit Mode)

agc 1 0d9      Approx. Max power hex value for Channel 1
agc 1 0e5      Approx. Max power hex value for Channel 6
agc 1 0eb      Approx. Max power hex value for channel 9

agc 1 0        Set Tx power to minimum prior to switching frequencies
               (repeating sequence after agc 17 for each channel)
```

Power adjust hex values shall be adjusted up/down as required to bring conducted Tx power level to 27.5+ dBm (corrected for attenuator pad and adaptor cable loss), the maximum rated conducted RF power output of the PA. This sets the Module to provide the maximum radiated transmit power (and intermod products) that the pre-production ODU is capable of producing.

The expected production ODU maximum achievable antenna gain (including optimized feed mismatch, internal cable losses, and tolerance error) is 7.0 dBic, yielding a maximum rated transmit power of 34.5 dBm circularly polarized. The pre-production test unit's previously measured maximum antenna gain is 5.7 dBic. Thus the test emissions limit, relative to a rated maximum radiated transmission power level of 34.5 dBm (4.5 dBW, 2.8 W) circularly polarized, must be adjusted downwards by the difference in the antenna gains and radiated power levels: 1.3 dB plus the loss (0.6 dB) of the 1.0 m long I/O cable used with the test unit, yielding a total test limit correction factor of 1.9 dB.

After the conducted power level has been established, the power meter shall be disconnected from the ODU Tx power test port, the ODU coaxial Tx I/O cable shall be reconnected, and the laptop RS-232 data cable shall be disconnected from the unit and removed from the vicinity of the radiating EUT.

Empirical Determination of Emissions Limit:

Part 25 Emissions Limit, at frequencies greater than twice the authorized bandwidth away from the band edge: Power in a 4 kHz bandwidth, shall be attenuated by 43 dB + 10*log(EIRP in Watts) below intentional signal power.

Measure Max Inband E-Field in 30 kHz BW (E.o dBuV/m) to establish baseline free-space 1.0 W EIRP equivalent value. (Best accuracy, in measuring Globalstar and IS-95 CDMA waveform inband E-field strengths with a spectrum analyzer, is obtained when measuring with a 30 kHz resolution BW, 30 kHz video bandwidth, and 30 sample averaging. Applying a quasi-empirical correction factor of 17 dB, the E-field level so measured will closely correspond to the total power measured using a power meter and (again with a 17 dB correction factor) the power measured with a spectrum analyzer with a CDMA measurement personality PCMCIA card.) Optimize antenna height for each frequency and polarization, starting at height of 1.0 m above ground.

```
E^2  =  30 P.o /(r^2)
E.o dBuV/m  =  120 + 10*log( 30 / r^2) + P.o dBW
```

Measure spurious harmonics E-field strengths in a 1 MHz bandwidth, and compare that level to the spurious limit, corrected for difference between measurement and limit bandwidths:

3.55 W EIRP Spurious Emissions Limit (for 1 MHz Res. BW measurement):

```
Pwr Limit =  P.o dBW - 43 dB - 4.5 dBW + 10*log(1000/4) - 1.9 dB
          =  P.o - 25.4 dB

E-Field Limit  =  E.o dBuV/m - 43 dB - 4.5 dBW + 10*log(1000/4) - 1.9 dB
               =  E.o dBuV/m - 25.4 dB
```

Test Procedure:

Use 1 MHz resolution BW for spurious emissions measurements. (If peak measurements are close to limit value, re-measure using average measurements, with 1 MHz Res. BW, 10 Hz Video BW, 30 samples.) Install test lab-provided previously-characterized high-pass filter in-line, between test instrumentation external pre-amp and antenna, as necessary to prevent pre-amp front-end overload and generation of harmonically-related intermod product test artifacts. (Typically seen when measuring pseudo-noise signals.) If high-pass filter is employed, include plot of filter insertion loss curve with pre-amp gain curve in test report.

----

1. Channel 1 Emissions Measurements

   a. Setup Module on table on OATS turntable per Setup description.

   b. Set frequency, load power adjust hex code, and measure Conducted Power out of ODU Tx test port, adjusting hex code input as required to get maximum rated conducted power level, 28.5 dBm. Record hex code value and conducted power level. Disconnect power meter and laptop.

   c. Measure vertically-polarized inband radiated E-Field strength. Optimize antenna height. Calculate and record radiated limit value. Measure E-Field strengths for transmitter harmonic frequencies in table following and record values.

   d. Repeat Step c for Horizontal polarization.

2. Channel 6 Emissions Measurements

   Repeat Steps a-d.

3. Channel 9 Emissions Measurements

   Repeat Steps a-d.

TX Frequency Harmonics to Measure

Harmonic	Frequency (MHz) Ch. 1	Ch. 6	Ch. 9
Fundamental	1610.73	1616.88	1620.57
2	3221.46	3233.76	3241.14
3	4832.19	4850.64	4861.71
4	6442.92	6467.52	6482.28
5	8053.65	8084.40	8102.85
6	9664.38	9701.28	9723.42

7	11275.11	11318.16	11343.99
8	12885.84	12935.04	12964.56
9	14496.57	14551.92	14585.13
10	16107.30	16168.80	16205.70

-WEM

Radiated Harmonics Test Limits and Frequencies

Boldface numerical values are input values.
Plaintext and Italic numbers are calculated values

Empirical Determination of Emissions Limit:

Part 25 Emissions Limit, at frequencies greater than twice the authorized bandwidth away from the band edge:
Power in a 4 kHz bandwidth, shall be attenuated by 43 dB + 10*log(EIRP in Watts) below intentional signal power.

E^2 = 30 P.o /(r^2)
E.o dBuV/m = 120 + 10*log(30 / r^2) + P.o dBW

P.o =	**2.82**	W
r =	**3.00**	m
Specified EUT Antenna Gain =	**7.00**	dBi LHCP
Actual EUT Gain =	**5.70**	dBi LHCP
EUT Cable Loss =	**0.6**	dB
Gain Difference =	*1.90*	dB

2.82 W EIRP Spurious Emissions Limit (for 1 MHz Res. BW measurement):

Pwr Limit = P.o dBW - 43 dB - 10*log(P.o) + 10*log(1000/4) - Gain Difference dB
= P.o dBW - 43 dB - *4.50* dBW + *23.98* dB/4 kHz - *1.90* dB
= P.o dBW - *19.02* dBW - *4.50* dB - *1.90* dB
= P.o dBW - *23.52* dB - *1.90* dB
= P.o dBW - *25.42* dB

E-Field Limit = E.o dBuV/m - 43 dB - 10*log(P.o) + 10*log(1000/4) - Gain Difference dB
= E.o dBuV/m - *25.42* dB

TX Frequency Harmonics to Measure

Harmonic	Frequency (MHz) Ch. 1	Ch. 6	Ch. 9
Fundamental	**1610.73**	**1616.88**	**1620.57**
2	3221.46	3233.76	3241.14
3	4832.19	4850.64	4861.71
4	6442.92	6467.52	6482.28
5	8053.65	8084.40	8102.85
6	9664.38	9701.28	9723.42
7	11275.11	11318.16	11343.99
8	12885.84	12935.04	12964.56
9	14496.57	14551.92	14585.13
10	16107.30	16168.80	16205.70

Theoretical E-Field Limit

(as Measured with a Linear Antenna at a Distance of *3.00* m)

E-Field Limit = E.o dBuV/m - 43 dB - 10*log(P.o) + 10*log(1000/4) - Gain Difference dB - 3 dB
= 120 + 10*log(30 / r^2) - 43 dB + 10*log(1000/4) - Gain Difference dB - 3 dB

E-Field Limit = *101.3* dBuV/m

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Testing Facilities

Certificates of Approval

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

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

DEPARTMENT OF COMMERCE ★ UNITED STATES OF AMERICA ★

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
FCC

December 31, 2000
Effective through

David F. Alderman
For the National Institute of Standards and Technology

NVLAP Lab Code: 100268-0

NVLAP-01C (11-95)

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

Page: 1 of 2

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.
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URL: http://www.tuvps.com

NVLAP Code	*Designation / Description*
International Special Committee on Radio Interference (CISPR) Methods	
12/CIS22	IEC/CISPR 22:1993: 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.
12/CIS22b	CNS 13438:1997: Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
Federal Communications Commission (FCC) Methods	
12/F01	FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a	Conducted Emissions, Power Lines, 450 KHz to 30 MHz
12/F01b	Radiated Emissions

December 31, 2000
Effective through

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

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Page: 2 of 2

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS — **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.

NVLAP Code — ***Designation / Description***

Australian Standards referred to by clauses in ACA Technical Standards

NVLAP Code	Designation / Description
12/T51	AS/NZS 3548: Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment

December 31, 2000
Effective through

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (11-95)

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

TÜV PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-

November 29, 1999

Mr. Floyd R. Fleury
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121-1034

NVLAP Lab Code: 100268-0

Dear Mr. Fleury:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility & Telecommunications, FCC is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 2000, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

Your Certificate of Accreditation is enclosed along with a statement of your Scope of Accreditation. You may reproduce these documents in their entirety and announce your organization's accreditation status using the NVLAP logo in business publications, the trade press, and other business-oriented literature. Accreditation does not relieve your organization from observing and complying with any applicable existing laws and/or regulations.

We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jon Crickenberger, Sr. Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, 100 Bureau Dr. Stop 2140, Gaithersburg, MD 20899-2140; (301) 975-4016.

Sincerely,

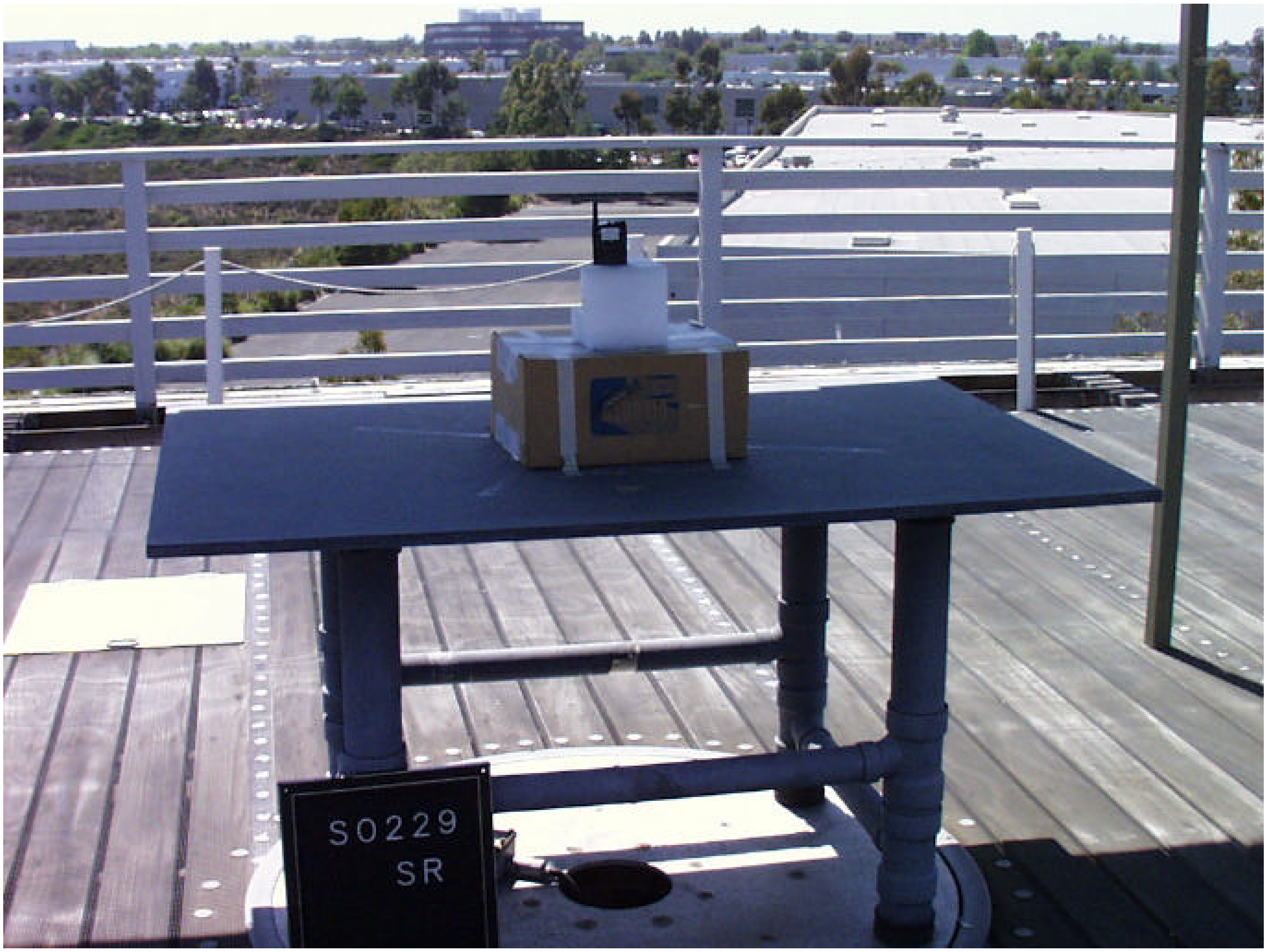
David F. Alderman

David F. Alderman, Acting Chief
Laboratory Accreditation Program

Enclosure(s)

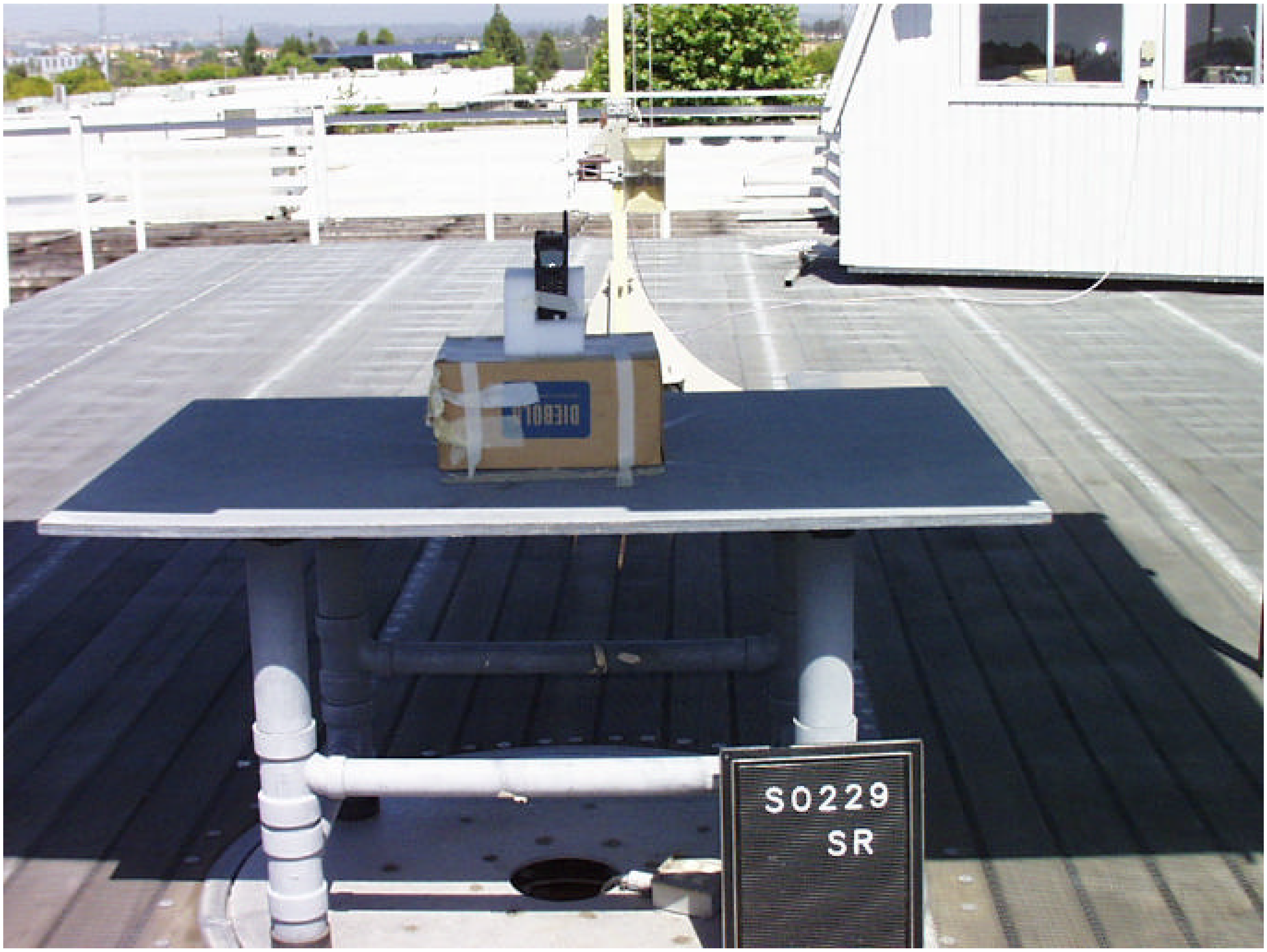
NIST

Photograph of Test Setup



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

Photograph of Test Setup



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