Nemko Test Report No.:	5L0262RUS2
Applicant:	Samsung Telecommunications America1301 E. Lookout Drive Richardson, TX75081
Equipment Under Test:	SCBS-519L3 SHOR1 V.5 Outdoor Base Station
FCC ID.	NP6SCBS-519L3SHOR1
In Accordance With:	**FCC Part 24, Subpart E** Broadband PCS Base Station Transmitter
Tested By:	Nemko U.S.A., Inc. 802 N. Kealy Lewisville, Texas 75057-3136
Authorized By:	Tom Tidwell, Frontline Group Manager
Date:	29 June, 2005

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Section 1. Summary of Test Results

Manufacturer: Samsung

Model No.: SCBS-519L3 SHOR1 V.5

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 24, Subpart E.

☒ New Submission ☒ Production Unit

☐ Class II Permissive Change ☐ Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE

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This report applies only to the items tested.

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	24.232	100W	Complies
Occupied Bandwidth (CDMA)	24.238		Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Complies
Frequency Stability	24.235	± 0.05 ppm	Complies

Footnotes For N/A's:

Measurement uncertainty is expressed to a confidence level of 95%.

Section 2. General Equipment Specification

Supply Voltage Input:		27Vdc supplied by off-the-shelf rectifier.		
Frequency Bands:	**TX**	☐ Block A : 1930 – 1945 MHz		
		☒ Block D : 1945 – 1950 MHz		
		☒ Block B : 1950 – 1965 MHz		
		☐ Block E : 1965 – 1970 MHz		
		☐ Block F : 1970 – 1975 MHz		
		☐ Block C : 1975 – 1990 MHz		
Frequency Bands:	**RX**	☐ Block A : 1850 – 1865 MHz		
		☒ Block B : 1865 – 1870 MHz		
		☒ Block C : 1870 – 1885 MHz		
		☐ Block D : 1885 – 1890 MHz		
		☐ Block E : 1890 – 1895 MHz		
		☐ Block F : 1895 – 1910 MHz		
Type of Modulation and Designator:		**CDMA (1M25F9W)** ☒	**GSM (200KGXW)** ☐	**NADC (40K0DXW)** ☐
Output Impedance:		50 ohms		
RF Output (Rated):		Per FA: 20W		
Band Selection:		**Software** ☐	**Duplexer** ☐	**Fullband** ☒

System Description

The SCBS-519M V.5 Outdoor Base Station is a 20 Watt CDMA PCS base station operating from 1941.25 to 1960 MHz

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 6/7/2005

Test Results: Complies.

Measurement Data:

Modulation Type	Measured Output Power (dBm)	Measured Output Power (W)
CDMA	43.5	22.4

Equipment Used: 1066-1472-1036

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 6/7/2005

Test Results: Complies.

Test Data: See attached plot(s).

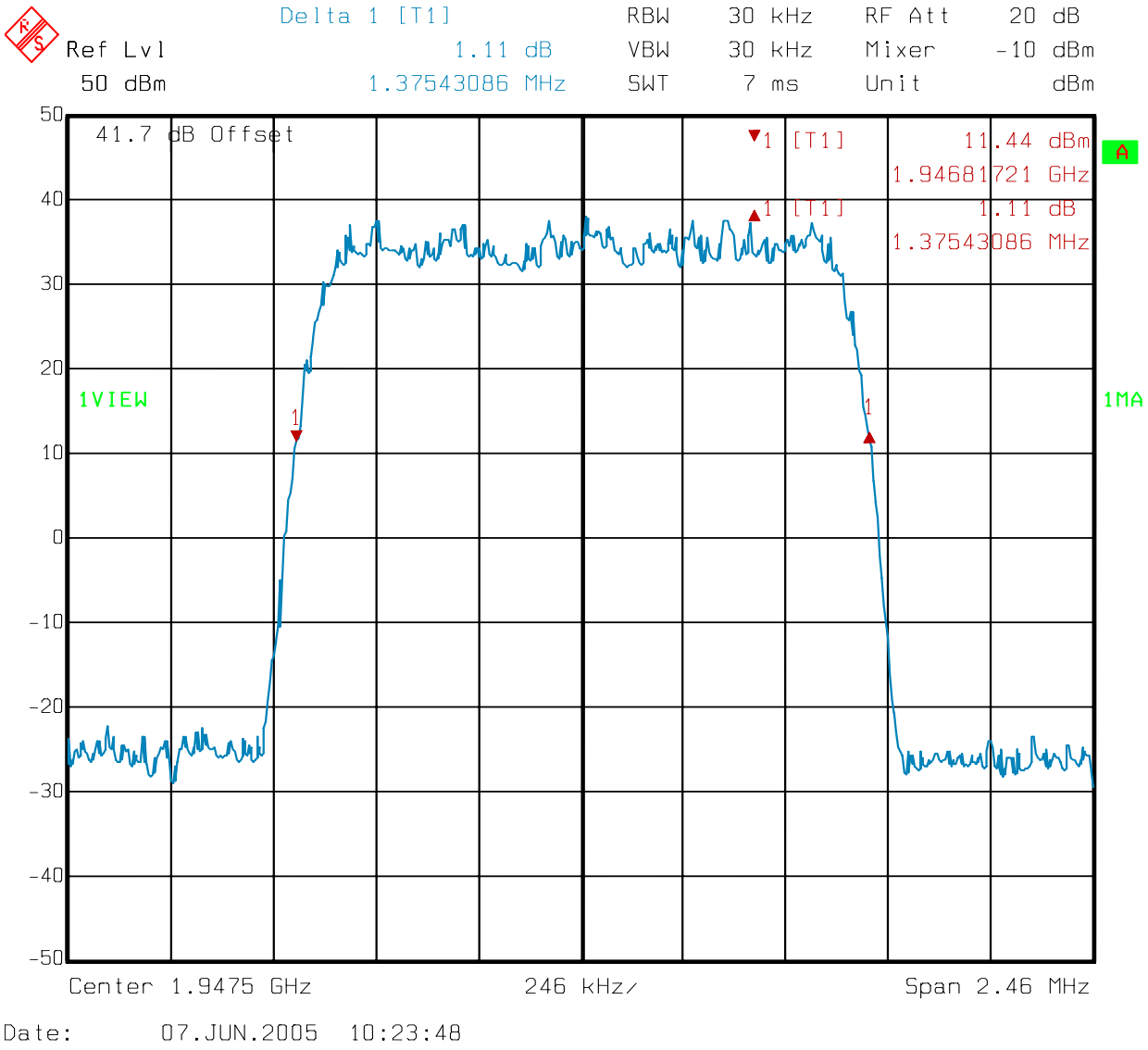
Equipment Used: 1066-1472-1036

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Test Data – 26 dB Bandwidth



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 6/7/2005

Test Results: Complies.

Test Data:

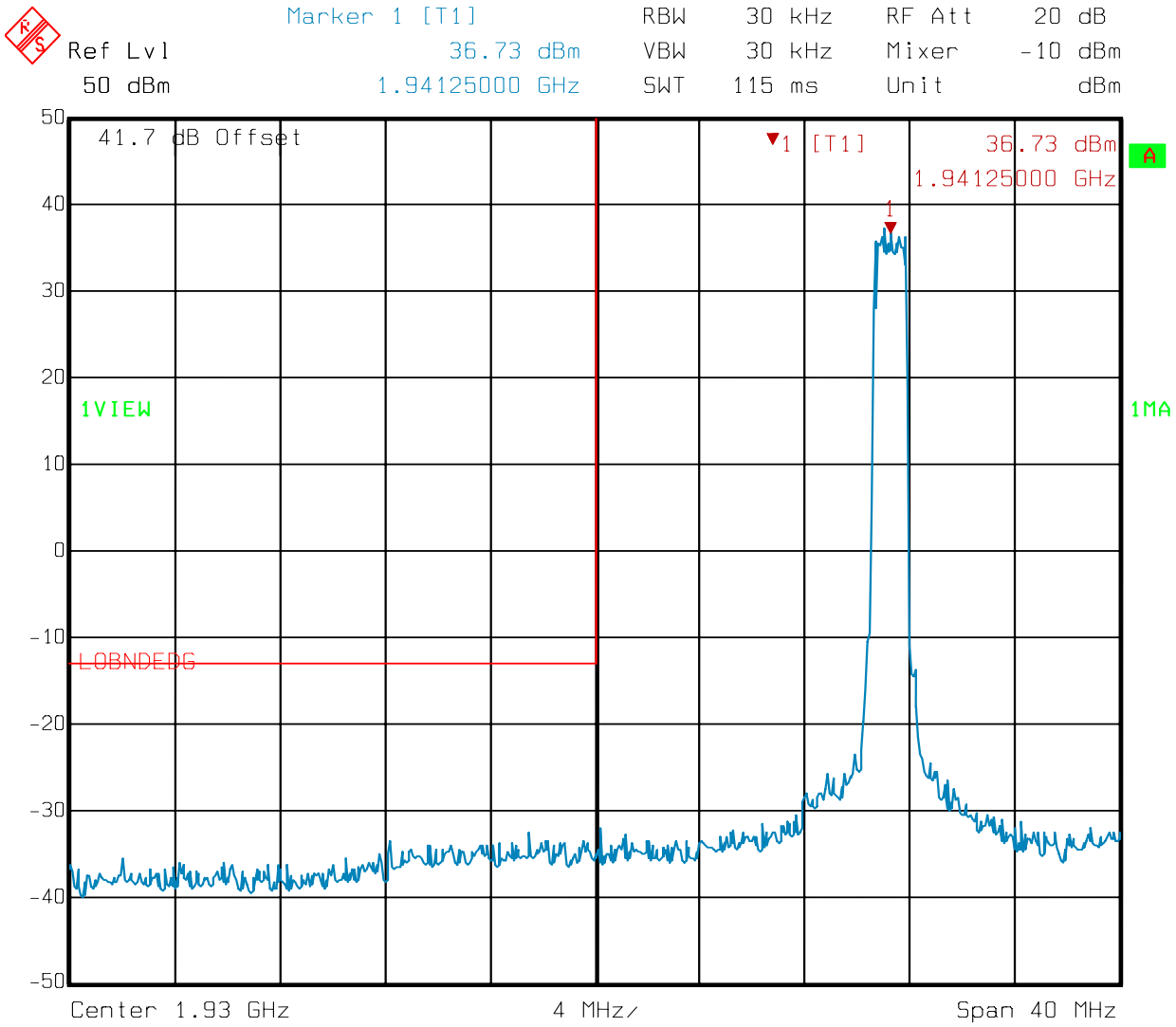
Equipment Used: 1066-1472-1036

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

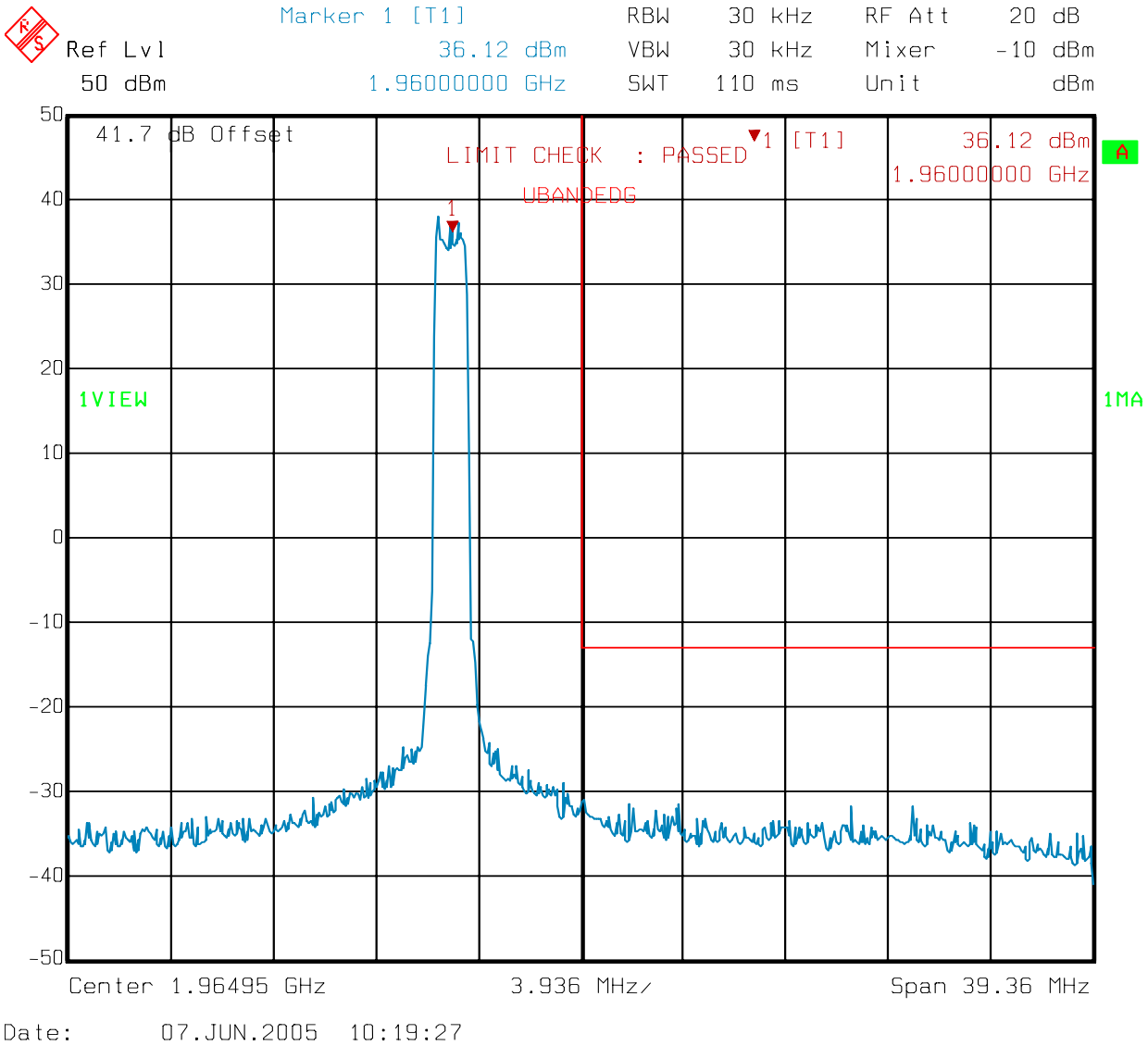
Relative Humidity: 40 %

Test Data – Spurious Emissions at Antenna Terminal



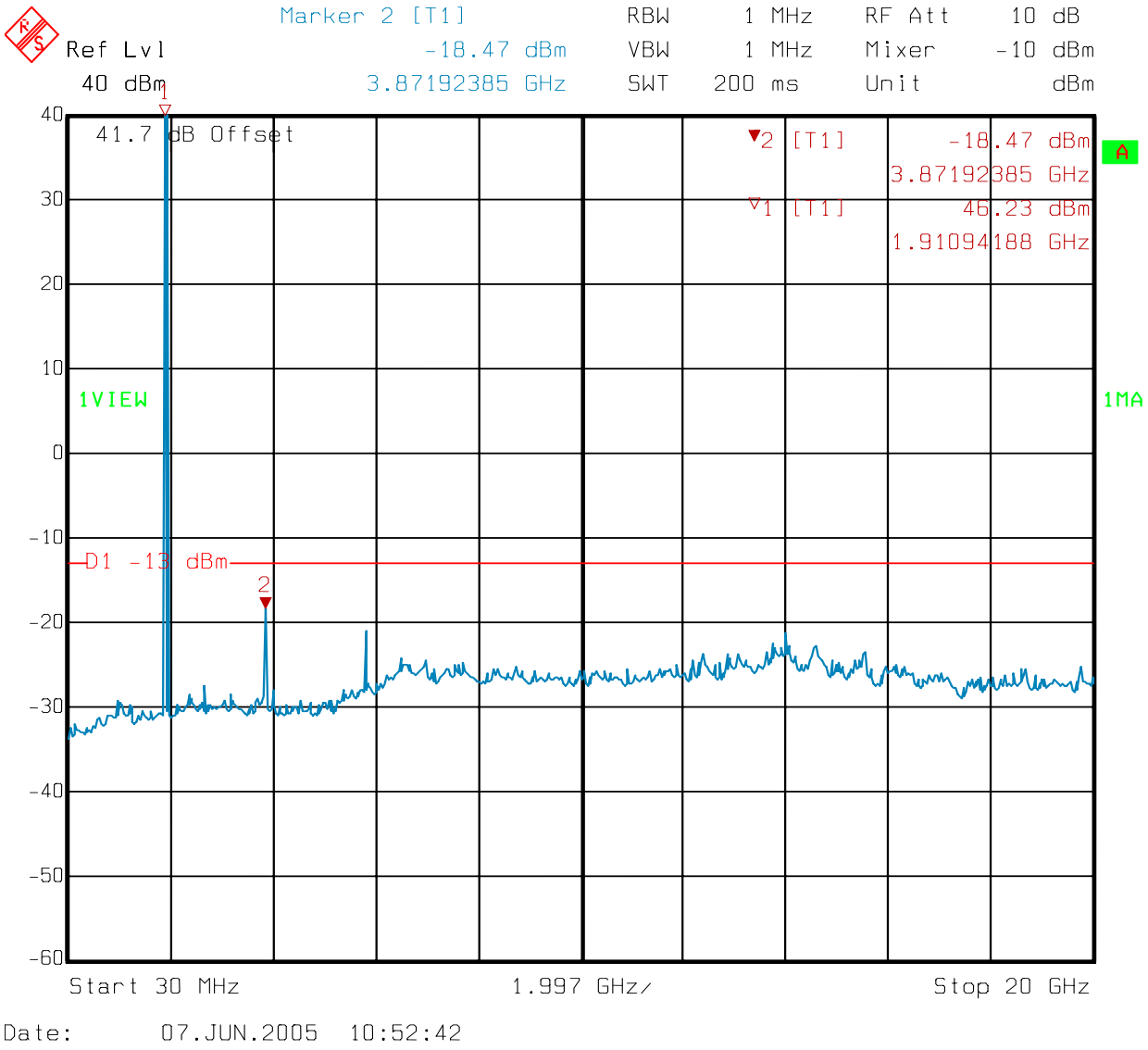
Lowest operating channel

Test Data – Spurious Emissions at Antenna Terminal



Highest operating channel

Test Data – Spurious Emissions at Antenna Terminal



Center channel

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 6/7/2005

Test Results: Complies.

Test Data: There were no emissions detected above the noise floor which was at least 30 dB below the specification limit of -13 dBm. The spectrum was searched from 30 MHz to 20 GHz..

Equipment Used: 1036-1016-1484-1485-1304-791-1982-760-759

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Photographs of Test Setup

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: David Light	DATE: 6/9/2005

Test Results: Complies

Measurement Data: Standard Test Frequency: 1946.25 MHz
Standard Test Voltage: 27 Vdc

Test Data – Frequency Stability

Frequency Stability

Page 1 of 1

Job No.: 5L0262R Date: 6/9/2005
Specification: Part 24 Temperature(°C): 20
Tested By: David Light Relative Humidity(%) 50
E.U.T.: Outdoor base station
Configuration: Tx CDMA signal at mid band
Sample Number: 1

Test Equipment Used

Antenna: Directional Coupler:
Pre-Amp: Cable #1: 1484
Filter: Cable #2:
Receiver: 1036
Attenuator #1 1472
Attenuator #2:

Measurement Uncertainty: $1x10^{-17}$ppm **Standard Test Frequency 1946.250000 MHz**

Temp (°C)	Measured Frequency (MHz)	Rho	Test Voltage	Freqeuncy Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	1946.250047	0.9982	27	47	973.1	0.024	
20	1946.250055	0.9983	23.0	55	973.1	0.028	
20	1946.250048	0.9980	31.0	48	973.1	0.025	
50	1946.250049	0.9982	27	49	973.1	0.025	
40	1946.250060	0.9983	27	60	973.1	0.031	
30	1946.250045	0.9984	27	45	973.1	0.023	
10	1946.250040	0.9982	27.0	40	973.1	0.021	
0	1946.250036	0.9981	27.0	36	973.1	0.018	
-10	1946.250037	0.9979	27.0	37	973.1	0.019	
-20	1946.250042	0.9980	27	42	973.1	0.022	
-30	1946.250048	0.9971	27	48	973.1	0.025	

Notes:

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	08/26/04	08/26/05
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	08/02/04	08/02/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/04	11/12/05
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	07/23/04	07/23/05
760	Antenna biconical	Electro Metrics MFC-25	477	06/22/04	06/22/05
791	PREAMP, 25dB	ICC LNA25	398	11/12/04	11/12/05
1982	CABLE, 7m	KTL RG223	N/A	10/25/00	N/A
1066	CABLE, 4M	STORM PR90-010-144	N/A	08/26/04	08/26/05
	Chart recorder ETL Asset 1244	Unk Unk		03/04/05	03/04/06
	Temp controller ETL asset 1154	Unk Unk		11/19/04	11/19/05

ANNEX A - TEST DETAILS

NAME OF TEST: RF Power Output **PARA. NO.: 2.1046**

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement: CDMA Per ANSI/J-STD-014
TDMA Per ANSI/J-STD-010

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer.

NAME OF TEST: Occupied Bandwidth	**PARA. NO.: 2.1049**

Minimum Standard: Para. No. 24.238(b). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB.

Method Of Measurement:

CDMA Per ANSI/J-STD-014

Spectrum analyzer settings:
RBW: 30 kHz
VBW: ≥ RBW
Span: 5 MHz
Sweep: Auto

GSM Per ANSI/J-STD-010

RBW: 3 kHz
VBW: ≥ RBW
Span: 2 MHz
Sweep: Auto

NADC Per IS-136

RBW: 1 kHz
VBW: ≥ RBW
Span: 1 MHz
Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA Per ANSI/J-STD-014

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM Per ANSI/J-STD-010

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: Disabled

NADC Per IS-136

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 1 kHz (< 1 MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

NAME OF TEST: Field Strength of Spurious Radiation	**PARA. NO.: 2.1053**

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least 43 + 10 log (P) dB.

Test Method:

The maximum field strength of the spurious emission is measured at a distance of 3 meters. The device under test is then replaced with a substitution antenna of known gain with respect to an isotropic radiator. A calibrated signal source is used to feed the substitution antenna. The rf level to the substitution antenna is adjusted to repeat the previously measured field strength. The rf input level to the substitution antenna is the effective isotropic radiated power of the spurious emission.

NAME OF TEST: Frequency Stability **PARA. NO.: 2.1055**

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement: CDMA Per ANSI/J-STD-014
TDMA Per ANSI/J-STD-010
NADC Per IS-136

Frequency Stability With Voltage Variation

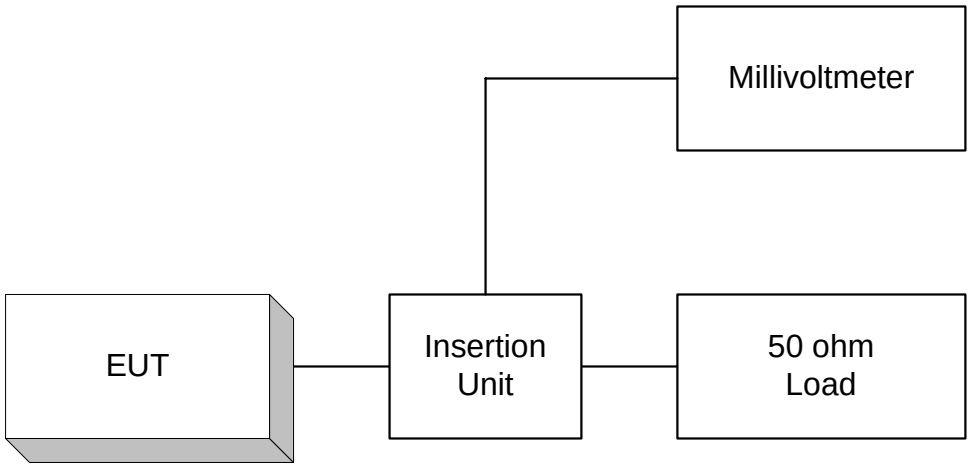
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

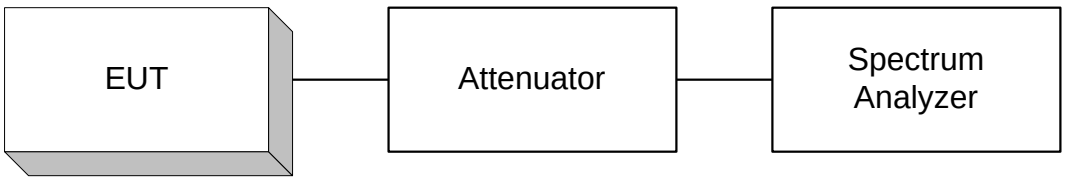
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

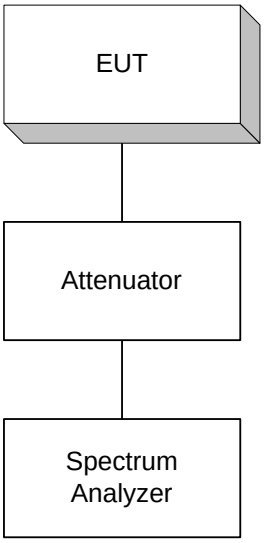
Para. No. 2.985 - R.F. Power Output



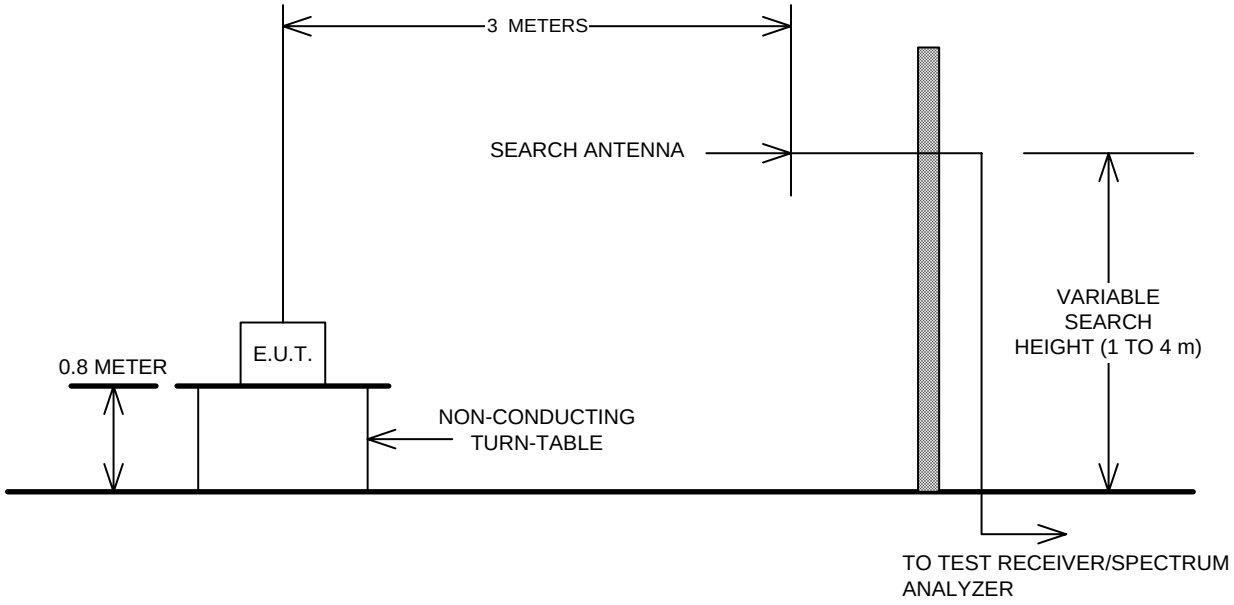
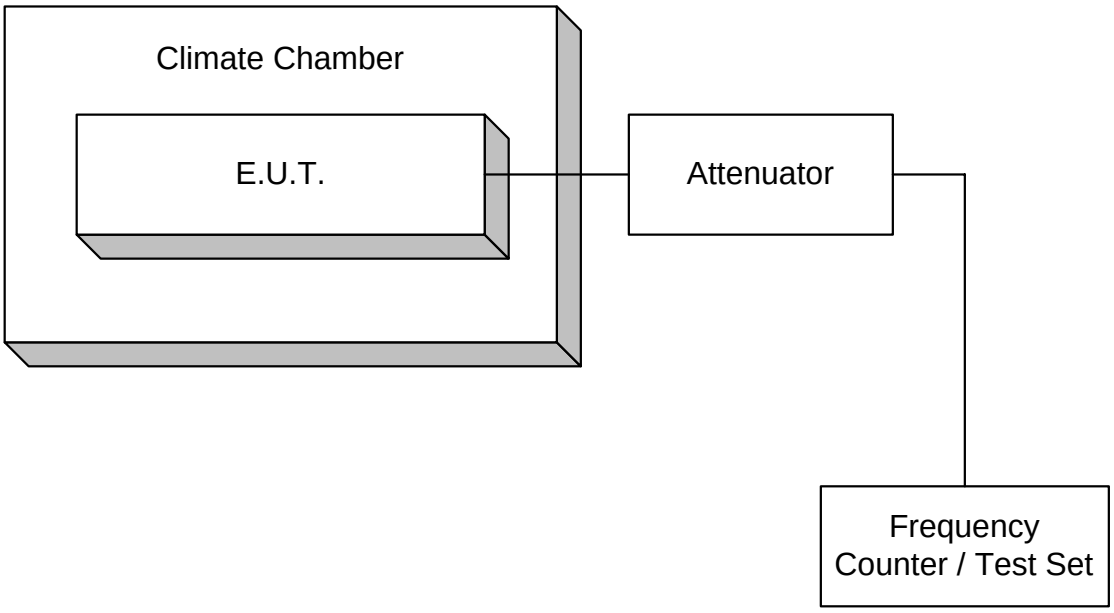
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability