Nemko Test Report:	5L0613RUS1
Applicant:	Nokia, Inc.
Equipment Under Test: (E.U.T.)	2115i
In Accordance With:	**FCC Part 24, Subpart E** Broadband PCS Subscriber Station
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	
Date:	21 December, 2005

NVLAP LAB CODE: 100426-0
Accreditation valid 1/1/05 to 12/31/05

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Nokia, Inc.

Model No.: 2115i

Serial No.: 04408616693

Type: RH-89

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 22, Subpart H and 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.
See " Summary of Test Data".

Summary Of Test Data

Part 24

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	24.232	Not tested
Occupied Bandwidth	24.238	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	Complies
Field Strength of Spurious Emissions	24.238(a)	Complies
Frequency Stability	24.235	Complies

Footnotes:

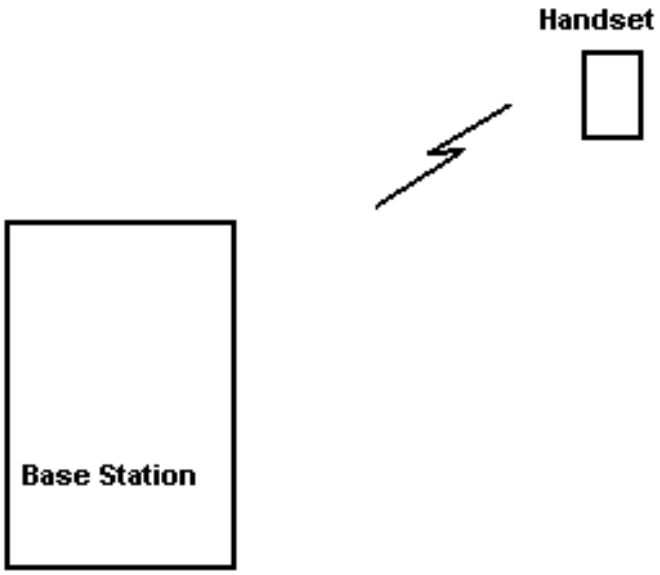
Section 2. General Equipment Specification

Frequency Bands:	1851.25 to 1908.75 MHz		
Type of Modulation and Designator:	**CDMA (F9W)** ☒	**AMPS (F8W)** ☐	**NADC (DXW)** ☐
Necessary Bandwidth:	1.235 MHz		
Emission designator(s):	1M23F9W		
Output Impedance:	50 ohms		

Operational Description

CDMA handset for use in 1900 PCS band

System Diagram



Section 3. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 24.238(a)
TESTED BY: David Light	DATE: 21 December 2005

Test Results: Complies.

The worst-case emission (noise floor) is –24.4 dBm at 3760 MHz.

Measurement Data: **Refer to attached data**

Orientation of device under test: The device under test was tested on three orthogonal axis in order to determine worst-case orientation. The worst-case orientation was found to be in the upright position.

Test Data - Radiated Emissions

Field Strength of Spurious Emissions

Page 1 of 1 Complete x

Job No.: 5L0613 Date: 12/21/05 Preliminary

Specification: Part24 Temperature(°C): 20

Tested By: David Light Relative Humidity(%) 40

E.U.T.: PCS band CDMA Handset

Configuration: CDMA1900

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement

Detector Type: Peak VBW: 1 MHz Distance: 3 m

Test Equipment Used

Antenna: 993 Directional Coupler:

Pre-Amp: 1016 Cable #1: 1484

Filter: 1482 Cable #2: 1485

Receiver: 1464 Cable #3:

Attenuator #1 Cable #4:

Attenuator #2: Mixer:

Additional equipment used: 1482

Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3760	-77.0	42.5		0	10.2		-24.4	0.0037	V	Noise floor
5640	-46.2	40.4		31.9	10.6		-27.1	0.0019	V	
3760	-77.0	33.9		0	10.2		-33.0	0.0005	H	Noise floor
5640	-46.3	36.6		31.9	10.6		-31.0	0.0008	H	

Notes:

The spectrum was searched to the 10th harmonic of carrier. All emissions and noise floor readings within 20 dB of the specification limit are reported.

Photographs of Test Setup

Section 4. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY: David Light	DATE: 20 December 2005

Test Results: Complies.

Measurement Data: Refer to attached dat**a**

Test Data – Frequency Stability

Frequency Stability

Page 1 of 1

Job No.: 5L0613 Date: 12/19/2005

Specification: Part 24 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 35

E.U.T.: CDMA 1900 Handset

Configuration: Tx

Sample Number: 1

Test Equipment Used

Antenna: Directional Coupler:

Pre-Amp: Cable #1: 1067

Filter: Cable #2:

Receiver: 8924C

Attenuator #1

PCS Extender: 83236B

Measurement Uncertainty: $1x10^{-17}$ppm **Standard Test Frequency 1880.000000 MHz**

Temp (°C)	Measured Frequency (MHz)	Rho	Test Voltage	Freqeuncy Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	1879.999996	0.986	3.7	-4	1880.0	0.00	
20	1879.999981	0.987	4.2	-19	1880.0	-0.01	
20	1879.999982	0.986	3.3	-18	1880.0	-0.01	Battery cutoff
50	1879.999994	0.987	3.7	-6	1880.0	0.00	
40	1879.999995	0.986	3.7	-5	1880.0	0.00	
30	1879.999990	0.985	3.7	-10	1880.0	-0.01	
10	1879.999993	0.983	3.7	-7	1880.0	0.00	
0	1879.999994	0.985	3.7	-6	1880.0	0.00	
-10	1879.999989	0.989	3.7	-11	1880.0	-0.01	
-20	1879.999987	0.986	3.7	-13	1880.0	-0.01	
-30					1880.0		

Notes: Handset ceased operation prior to reaching -30 C

Section 5. Spurious Emissions – Conducted

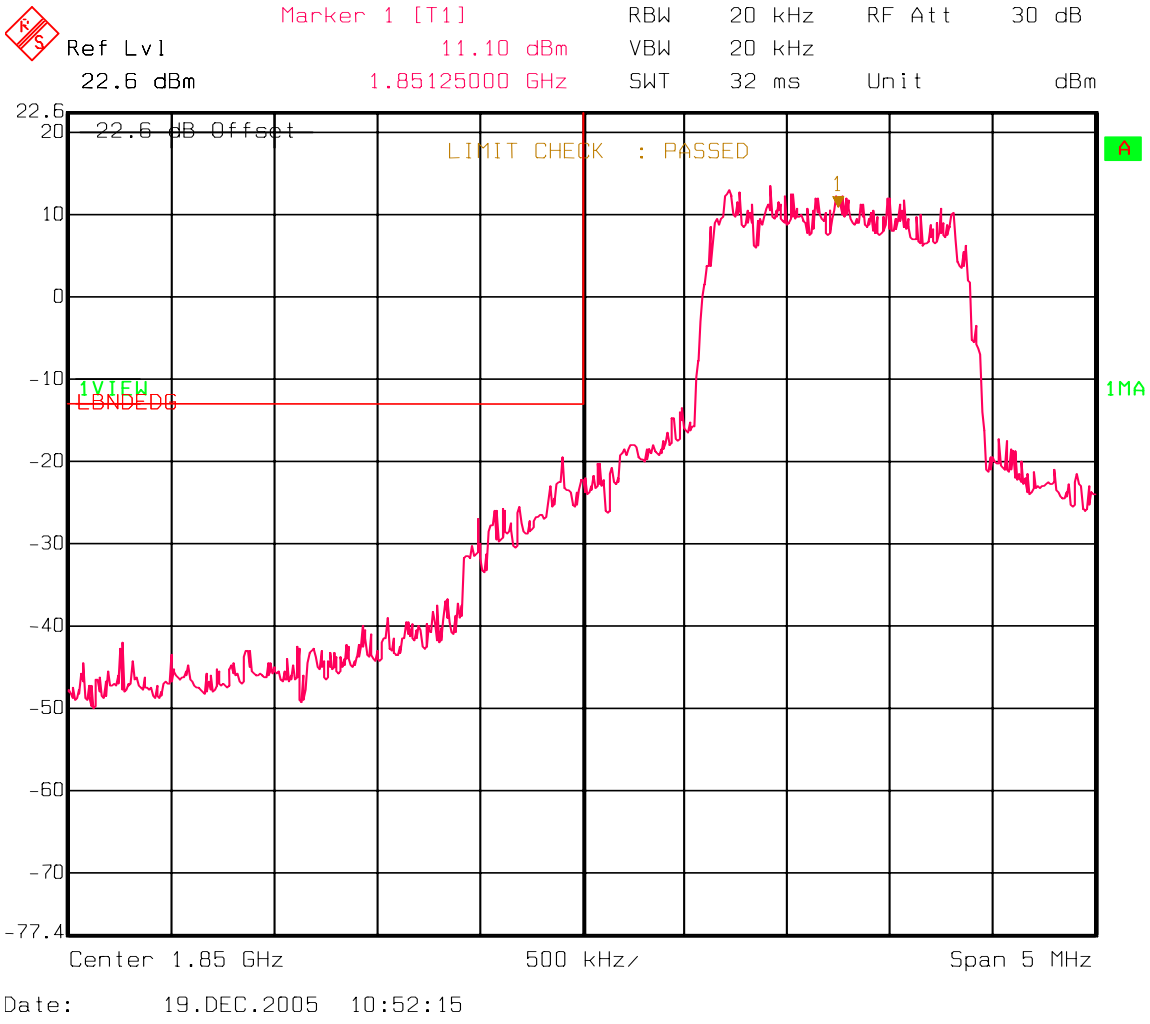
NAME OF TEST: Spurious Emissions - Conducted	PARA. NO.: 24.238(a)
TESTED BY: David Light	DATE: 20 December 2005

Test Results: Complies.

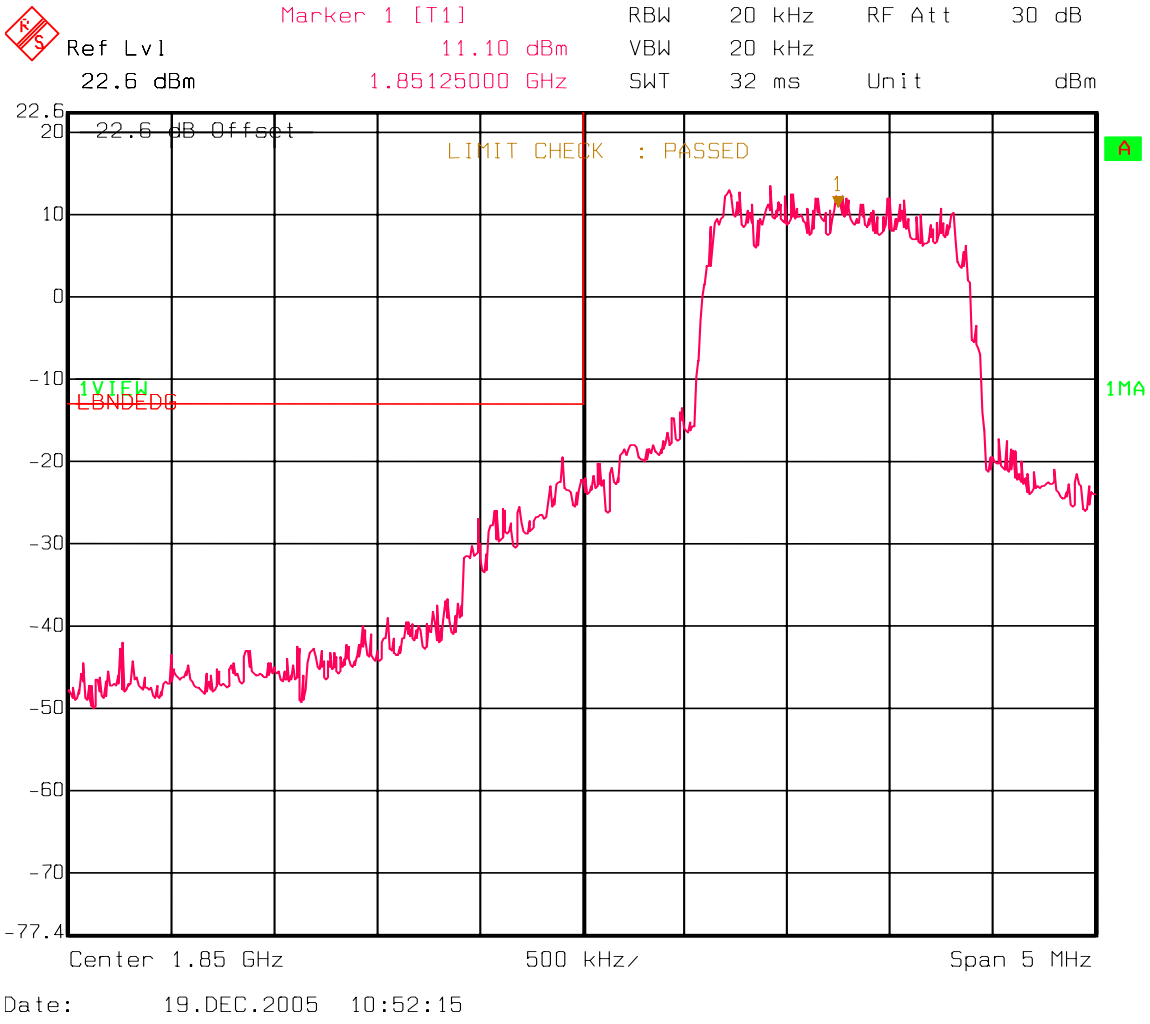
Measurement Data: **Refer to attached data**

Test Data – Spurious Emissions – Conducted

Channel 25

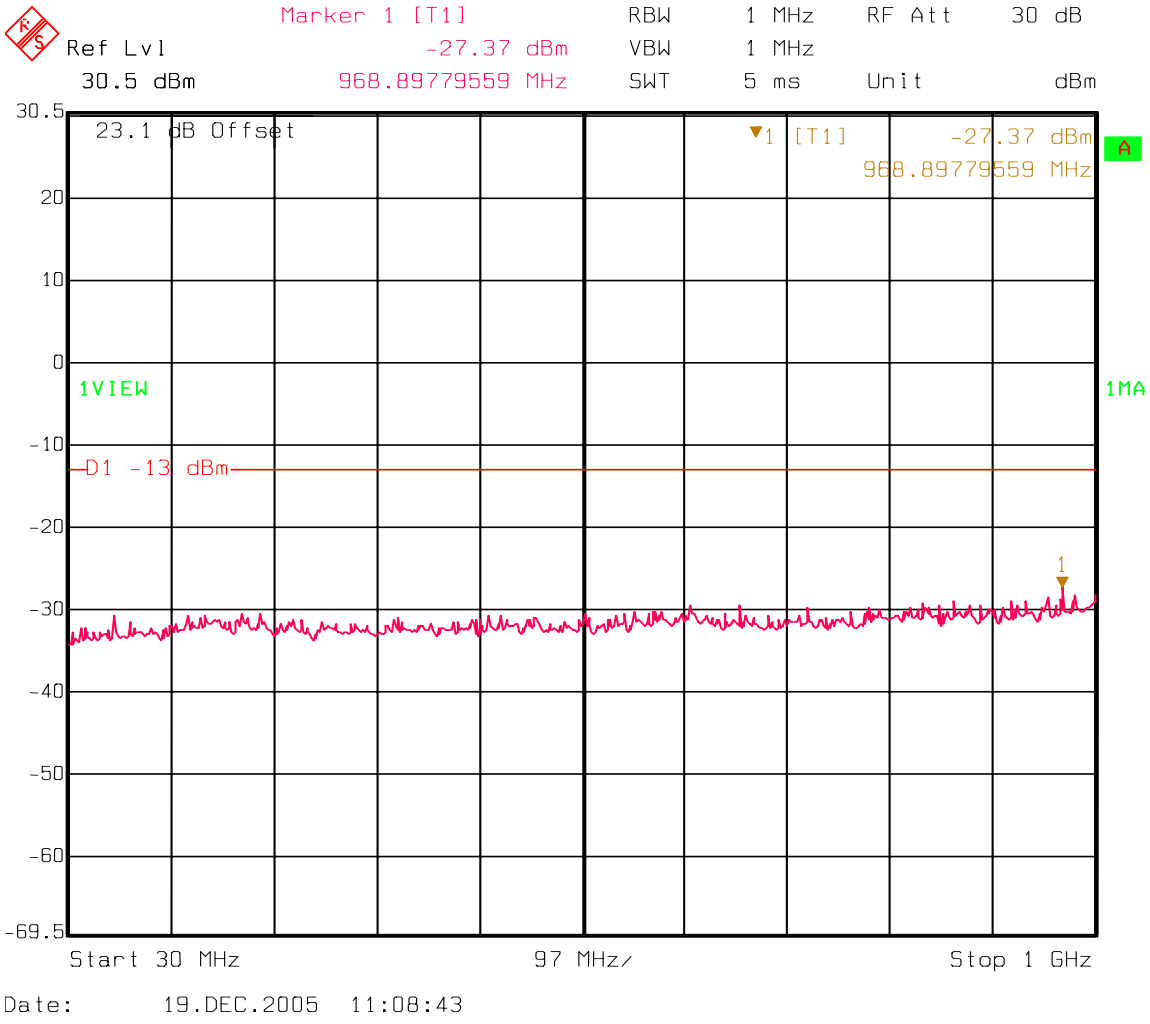


Test Data – Spurious Emissions – Conducted
Channel 1175



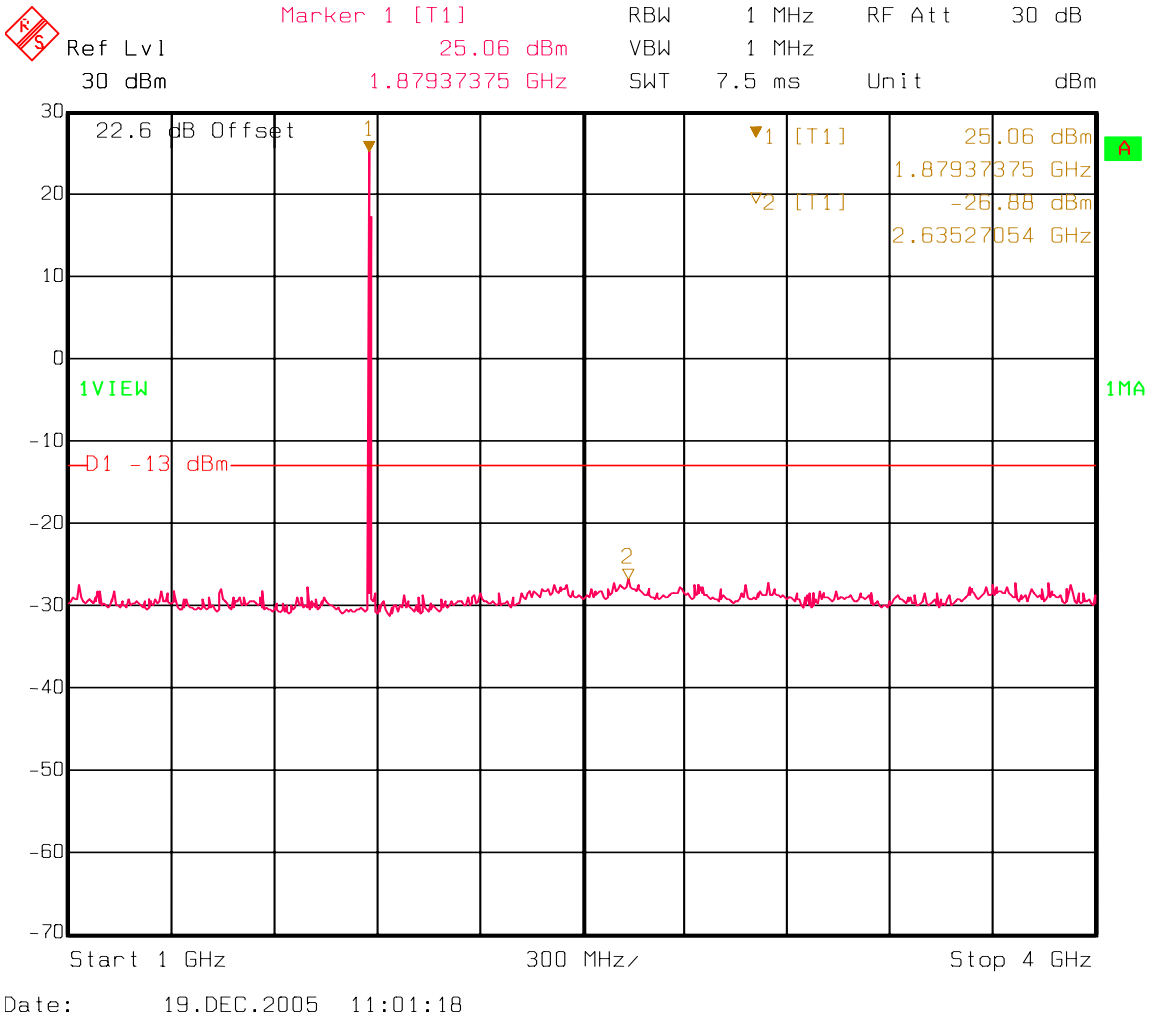
Test Data – Spurious Emissions – Conducted

Channel 600



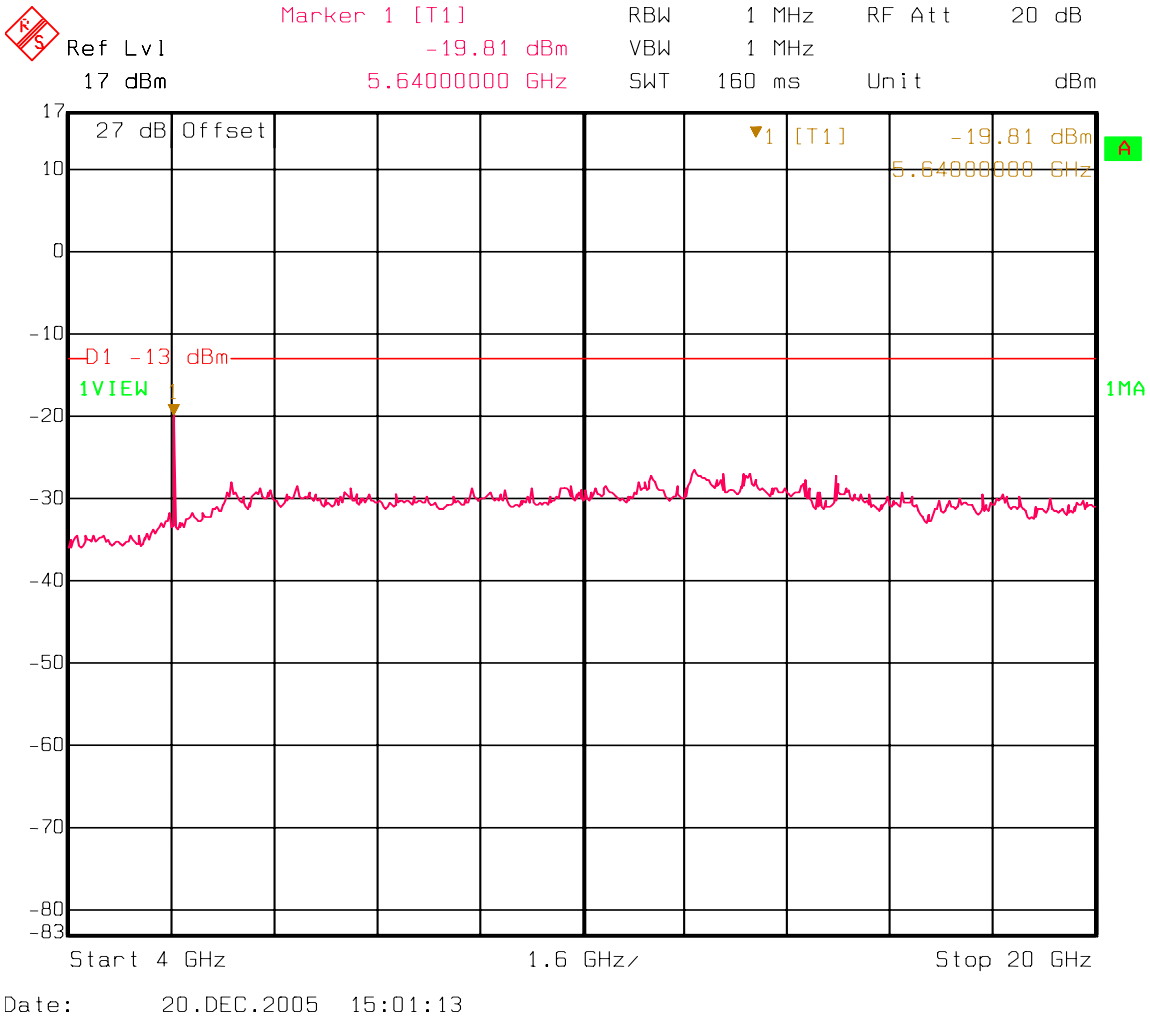
Test Data – Spurious Emissions – Conducted

Channel 600



Test Data – Spurious Emissions – Conducted

Channel 600



The spectrum was searched on three channels. Data presented is representative of all channels tested.

Section 6. Occupied Bandwidth

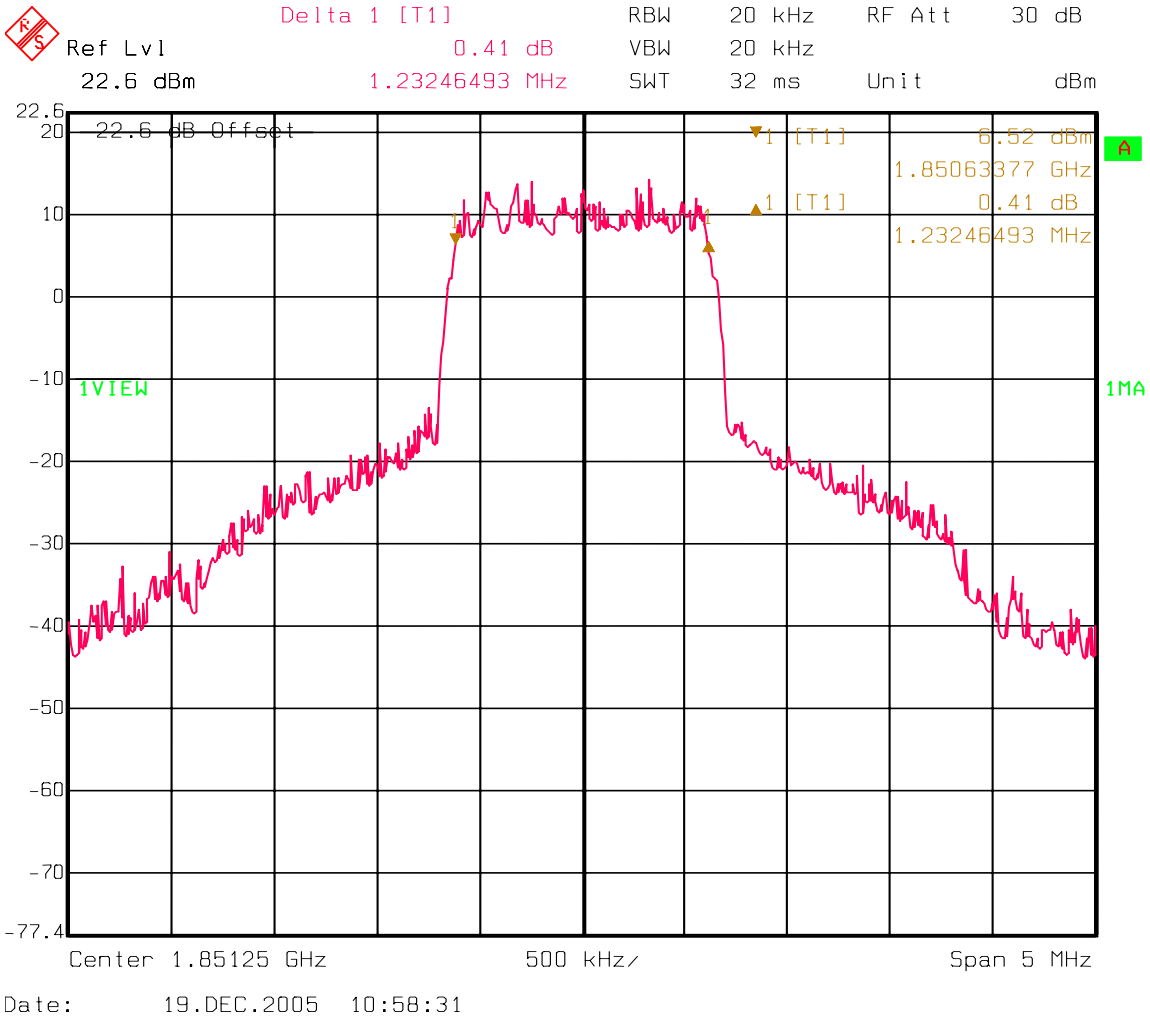
NAME OF TEST: Occupied Bandwidth	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 20 December 2005

Test Results: Complies.

Measurement Data: Refer to attached data

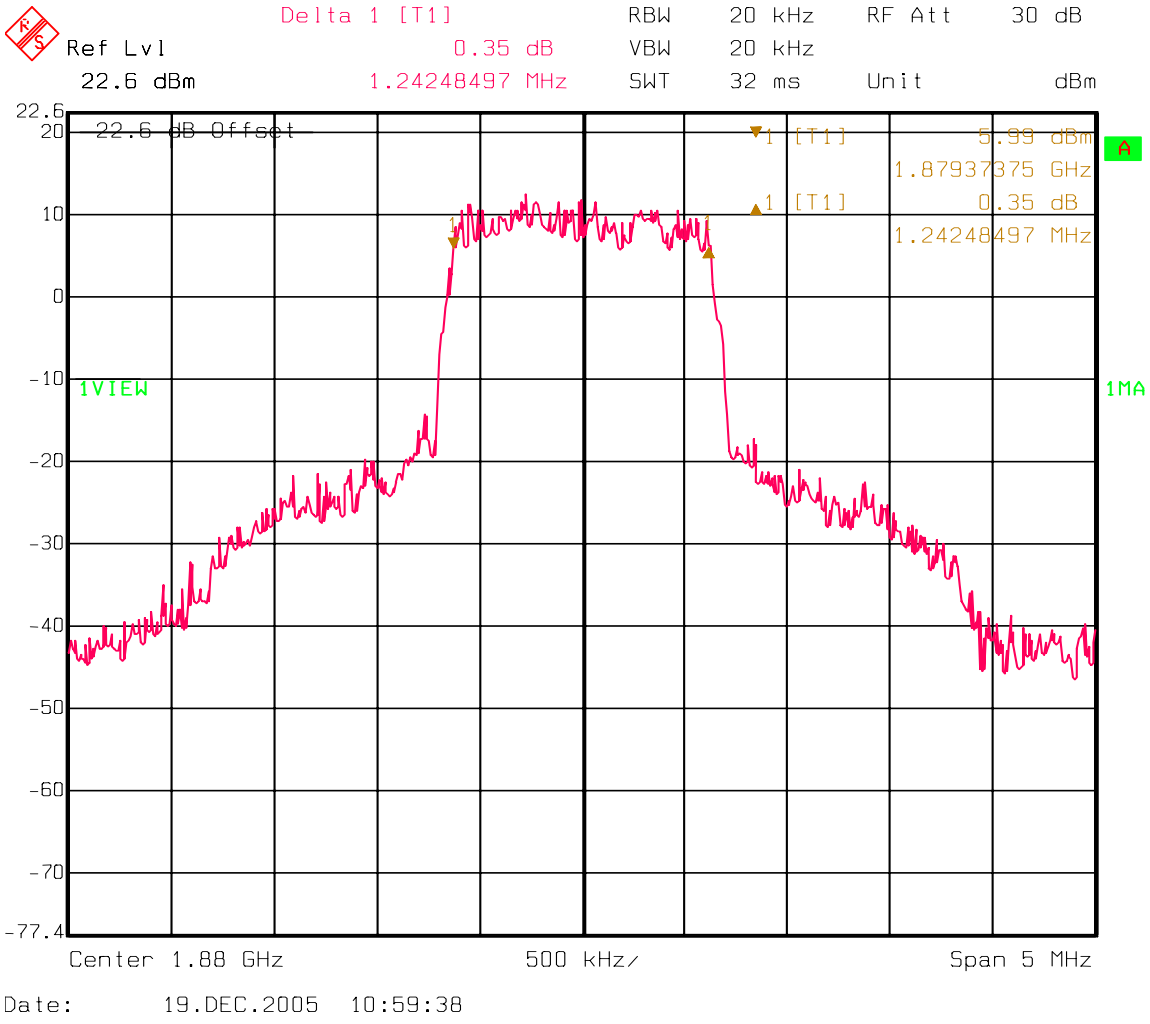
Test Data - Occupied Bandwidth

Channel 25

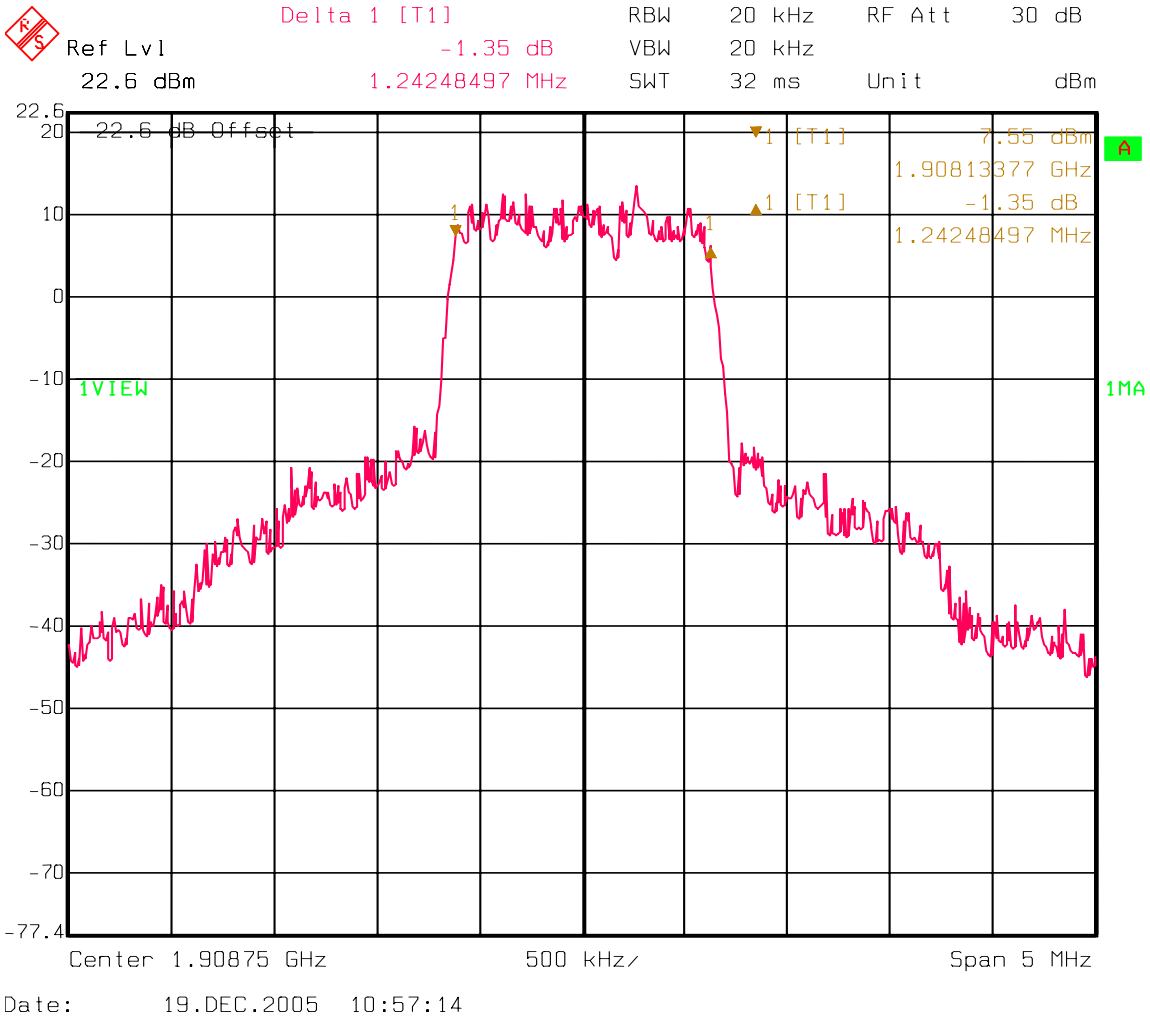


Test Data - Occupied Bandwidth

Channel 600



Test Data - Occupied Bandwidth
Channel 1175



Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1484	Cable	Storm PR90-010-072	N/A	08/26/05	08/26/06
1485	Cable	Storm PR90-010-216	N/A	08/26/05	08/26/06
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/14/05	01/15/07
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	11/12/05	11/12/06
791	PREAMP, 25dB	ICC LNA25	398	11/12/05	11/12/06
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	08/04/05	08/04/06
760	Antenna biconical	Electro Metrics MFC-25	477	08/04/05	08/04/06
1482	Band Pass Filter	K & L 11SH10-4000/T12000-0/0	2	CBU	N/A
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
619	THERMOMETER	FLUKE 51	4520028	09/26/05	09/26/06
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	CNR	NA
1067	Blue cable 4m	Storm PR90-010-144	0	08/02/04	08/02/05
	Cellular test set	HP 8924C	US38283285	07/05/05	07/05/07
	PCS Extender	HP	3711JJ04715	07/05/05	07/05/07
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	CBU	N/A
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU	N/A
1058	DUAL DIRECTIONAL COUPLER	HEWLETT PACKARD 11692D	1212A03366	CBU	N/A

ANNEX A - TEST METHODOLOGIES

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-008

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

GSM Per ANSI/J-STD-007

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-008

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 20 kHz (< 1MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM Per ANSI/J-STD-007

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: TIA/EIA-603-1992

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

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-008
TDMA Per ANSI/J-STD-007
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

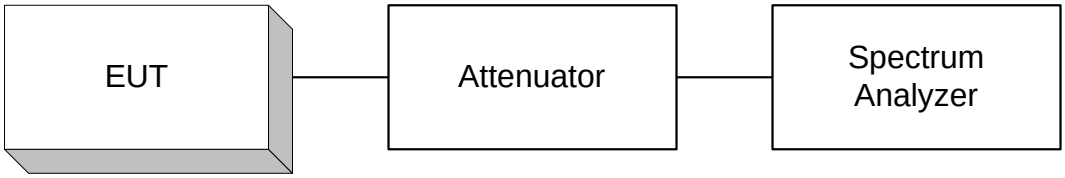
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Digitally Modulated Signals

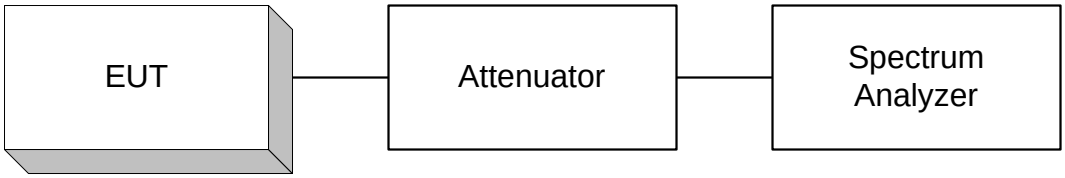
Equipment that produces a digitally modulated carrier is tested using a vector modulation analyzer. Frequency accuracy and rho are measured over the specified environmental extremes.

ANNEX B - TEST DIAGRAMS

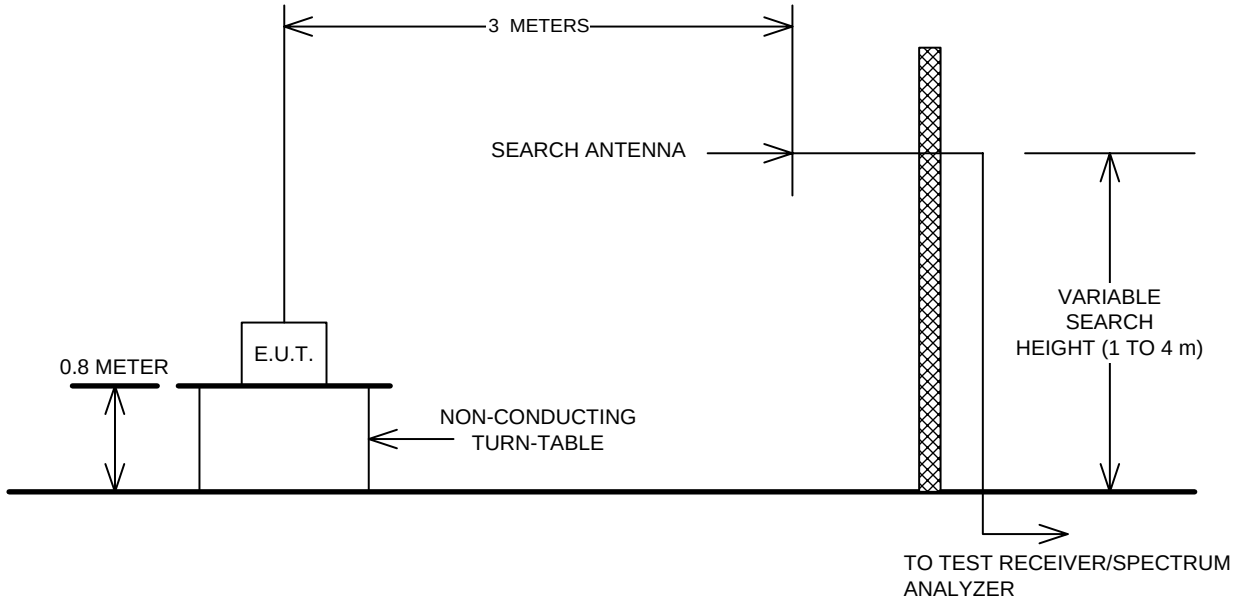
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability