Nemko Test Report:	**3L0478RUS2**
Applicant:	**Hop-On Wireless**
Equipment Under Test: (E.U.T.)	**Dual Band Tri-mode CDMA Cellular Phone**
FCC ID:	**QHOHPN1900**
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:

Tom Tidwell, Frontline Manager

Date: 2/18/04

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Hop-On Wireless

Model No.: HPN1900

Serial No.: 065-190000009

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.
See " Summary of Test Data".

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	24.232	Complies
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:

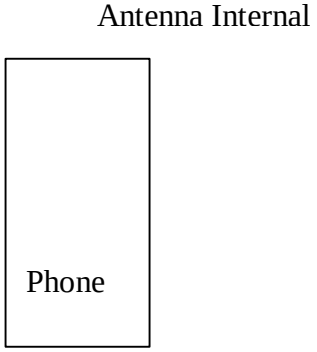
Section 2. General Equipment Specification

Supply Voltage Input:	3.7 V Lithium-ion		
Frequency Bands:	☒ Block A - F:	1851.25 – 1908.75 MHz	
	CDMA (1M25F9W) ☒	**GSM (GXW)** ☐	**NADC (DXW)** ☐
Necessary Bandwidth:	1.25MHz		
Output Impedance:	50 ohms		
RF Output (conducted):	22.1 dBm		
RF Output (e.i.r.p.):	21.6 dBm	(145 mW)	
Internal Antenna Gain:	-0.5 dBi		

System Description

The device is a wireless telephone operating in the 800 MHz cellular and 1900 MHz PCS band

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: Dustin Oaks	DATE: 12/04/2003

Test Results: Complies.

Measurement Data:

Frequency	Output Power (dBm)	Output Power (W)	EIRP (dBm)	EIRP (W)
1851	22.1	0.162	21.6	0.1445
1880	22.1	0.162	21.6	0.1445
1908	22.1	0.162	21.6	0.1445

Antenna gain = -0.5dBi

Measurement Uncertainty: +/- 0.6 dB

Temperature: 21 °C

Relative Humidity: 51 %

Equipment Used: 1036, 1627, 1474

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1047
TESTED BY: Dustin Oaks	DATE: 12/4/2003

Test Results: Complies.

Test Data: See attached plots.

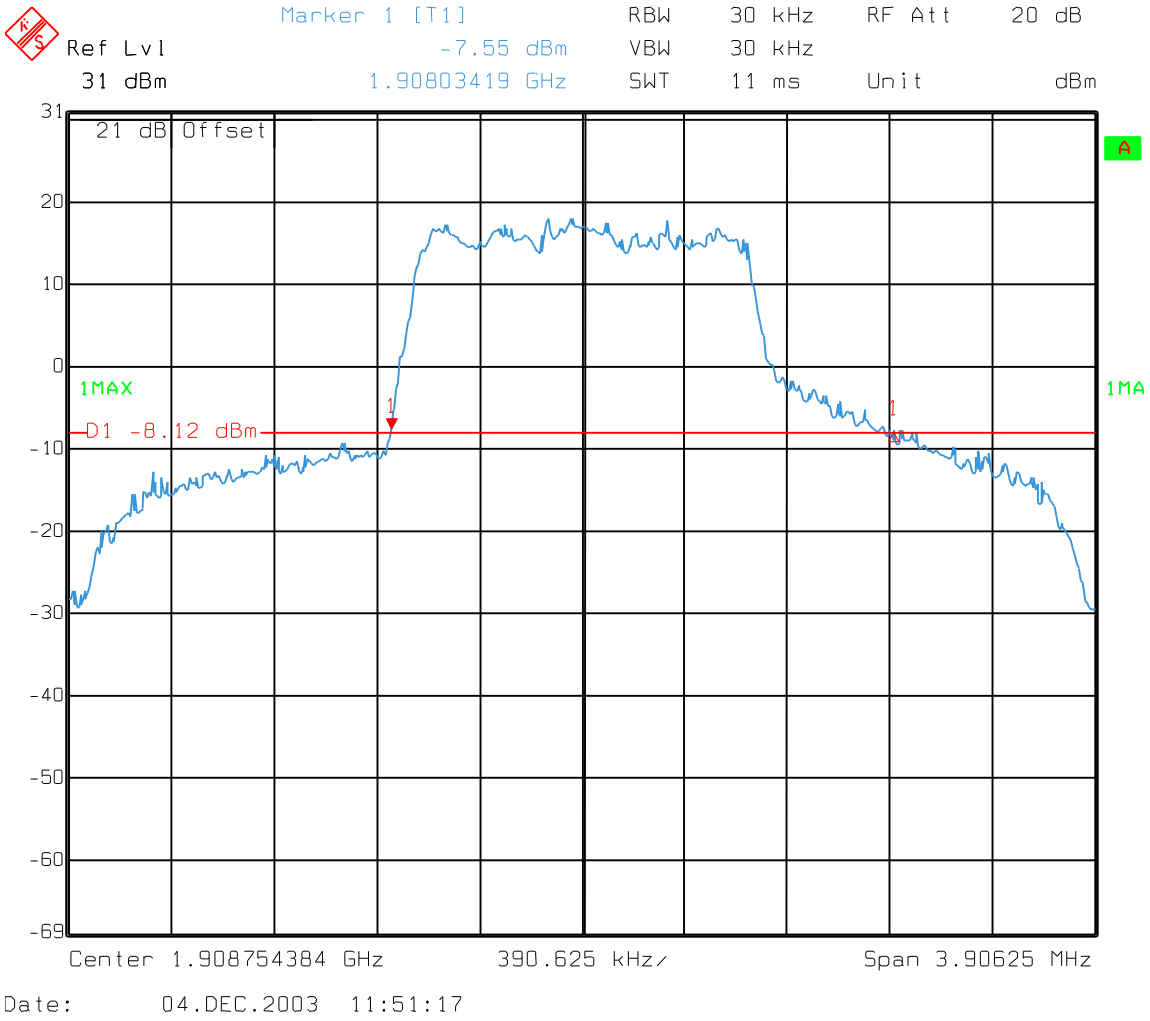
Measurement Uncertainty: +/- 1.7 dB

Temperature: 21 °C

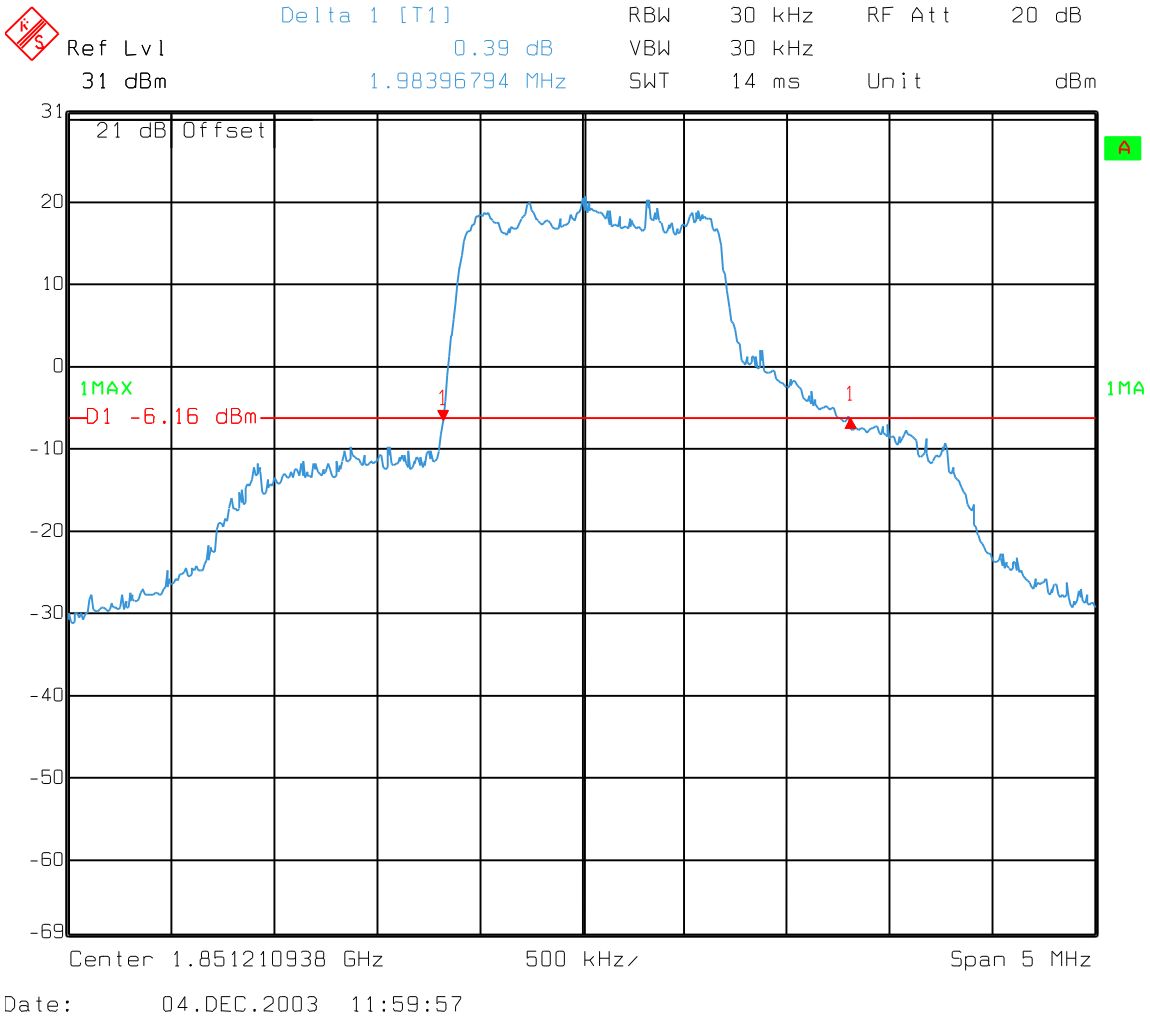
Relative Humidity: 51 %

Equipment Used: 1036, 1627, 1474

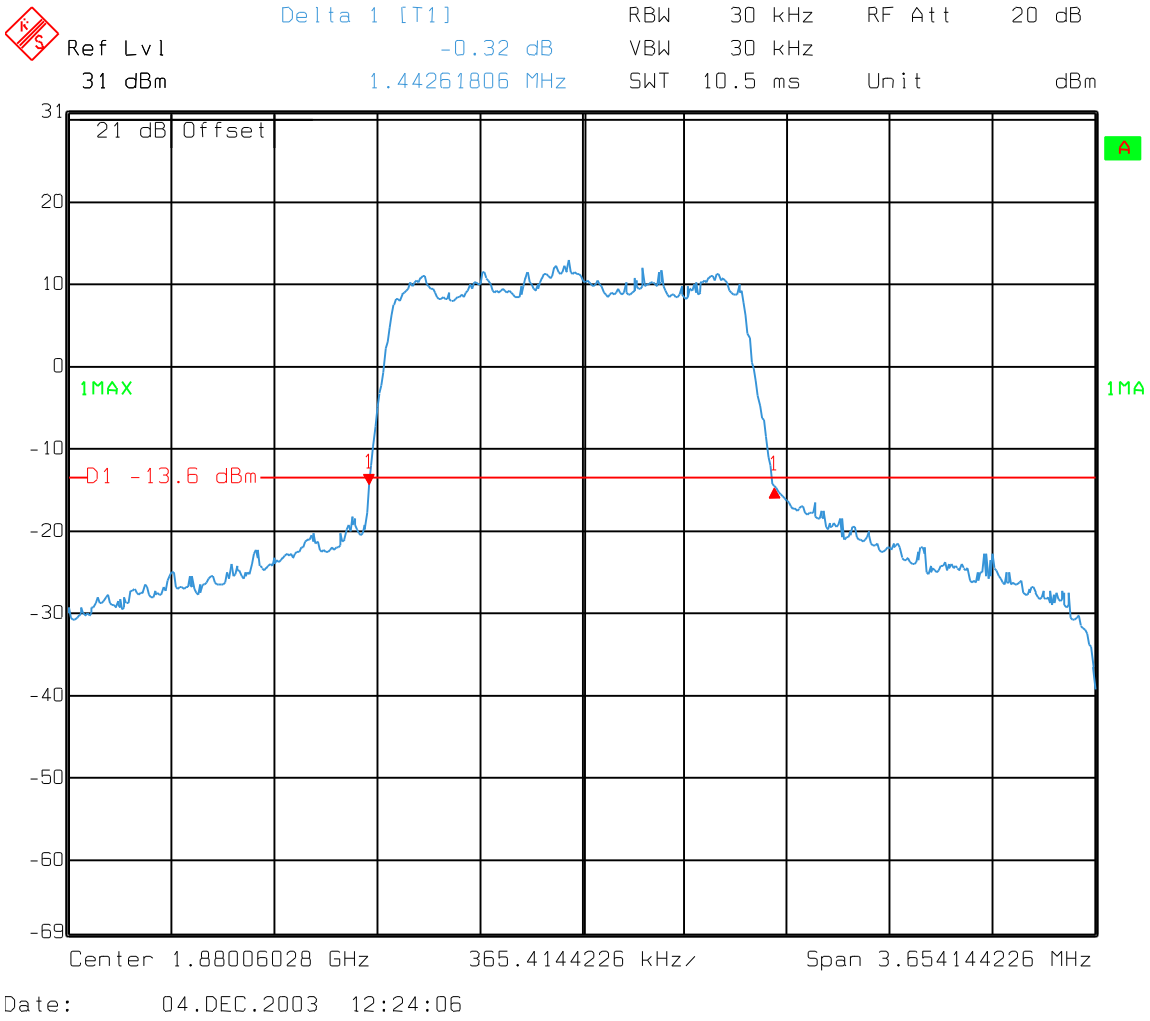
PCS: 1908MHz


Marker 1 [T1]
Ref Lvl
31 dBm
-7.55 dBm
1.90803419 GHz
RBW 30 kHz
VBW 30 kHz
SWT 11 ms
RF Att 20 dB
Unit dBm
21 dB Offset
1MAX
D1 -8.12 dBm
1MA
Center 1.908754384 GHz
390.625 kHz/
Span 3.90625 MHz
Date: 04.DEC.2003 11:51:17

PCS: 1851MHz


Delta 1 [T1]
0.39 dB
1.98396794 MHz
RBW 30 kHz
VBW 30 kHz
SWT 14 ms
RF Att 20 dB
Unit dBm
Ref Lvl
31 dBm
21 dB Offset
1MAX
D1 -6.16 dBm
1MA
A
31
20
10
0
-10
-20
-30
-40
-50
-60
-69
Center 1.851210938 GHz
500 kHz/
Span 5 MHz
Date: 04.DEC.2003 11:59:57

PCS 1880


Delta 1 [T1]
-0.32 dB
1.44261806 MHz
RBW 30 kHz
VBW 30 kHz
SWT 10.5 ms
RF Att 20 dB
Unit dBm
Ref Lvl
31 dBm
21 dB Offset
1MAX
D1 -13.6 dBm
1MA
Center 1.88006028 GHz
365.4144226 kHz/
Span 3.654144226 MHz
Date: 04.DEC.2003 12:24:06

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: Dustin Oaks	DATE: 12/04/2003

Test Results: Complies.

Test Data: See attached plots.

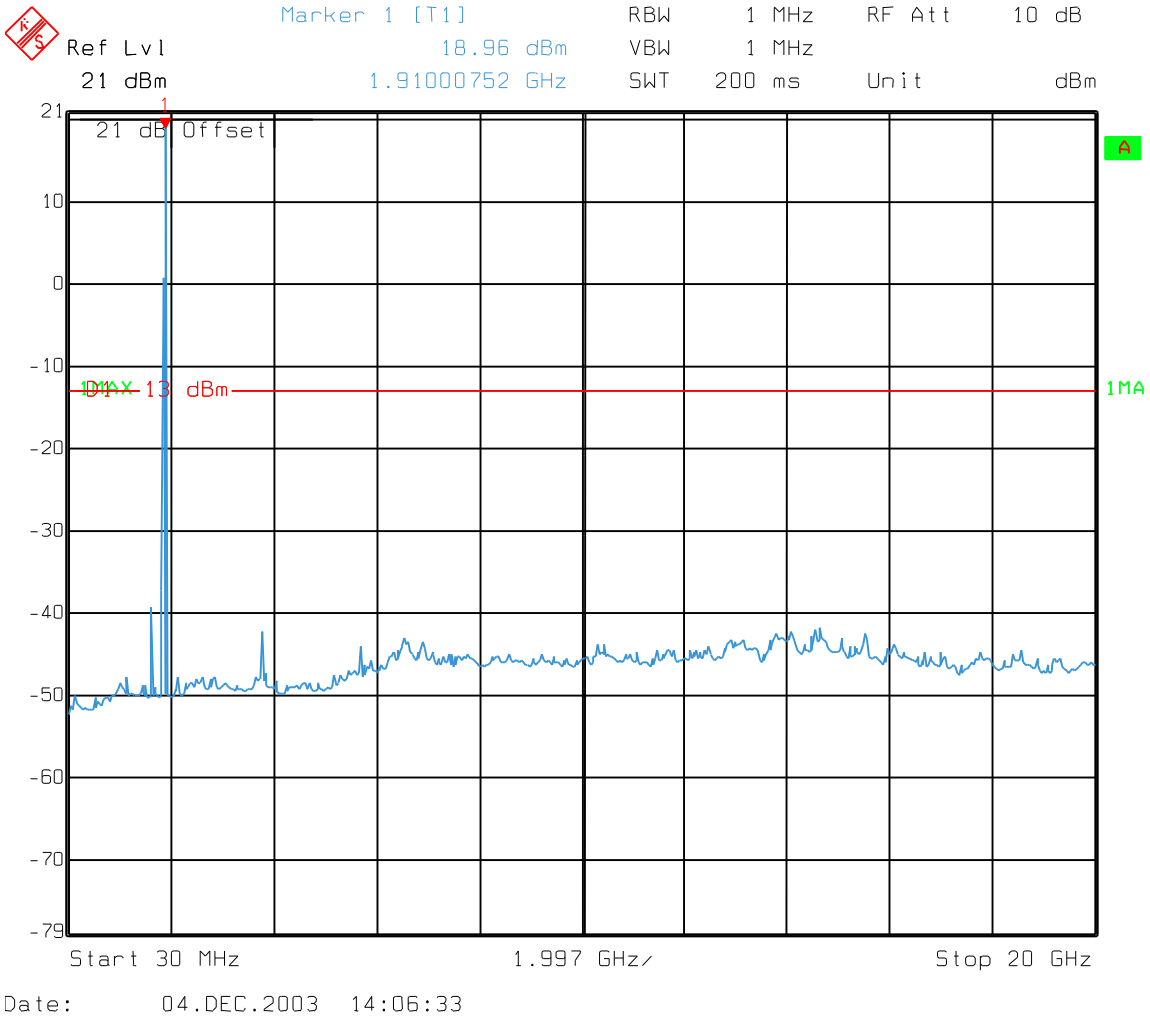
Measurement Uncertainty: +/- 1.7 dB

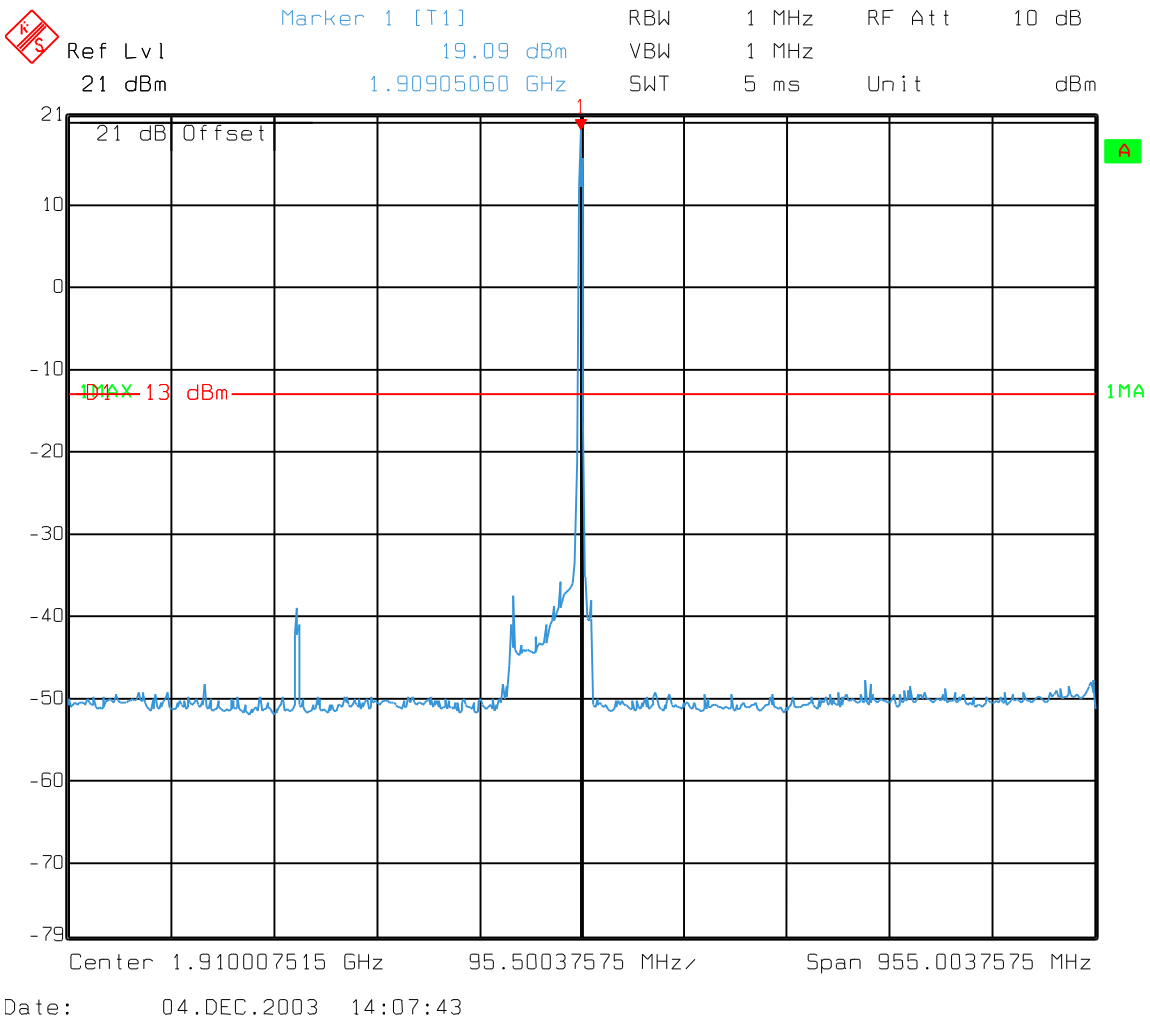
Temperature: 21 °C

Relative Humidity: 51 %

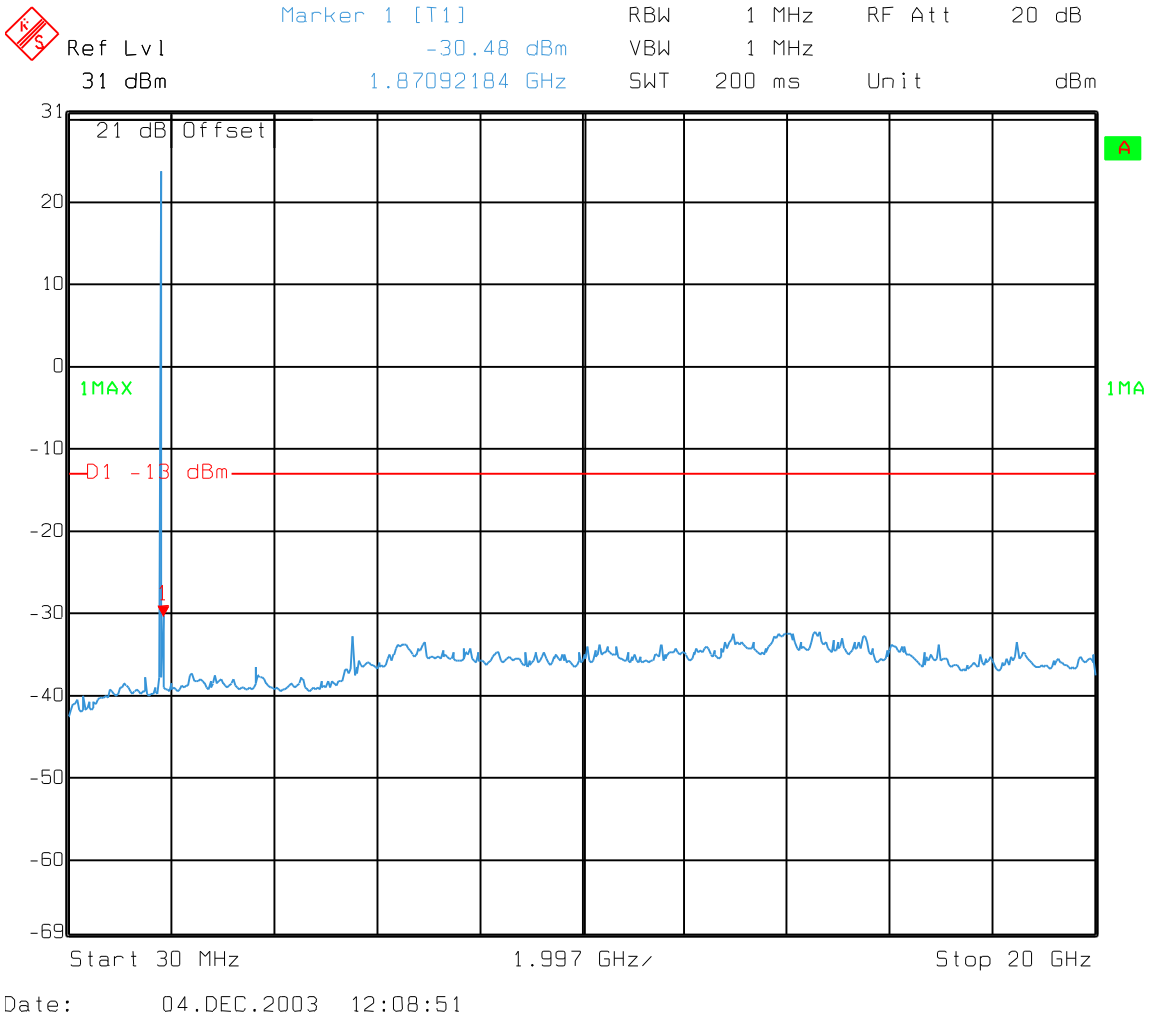
Equipment Used: 1036, 1627, 1474

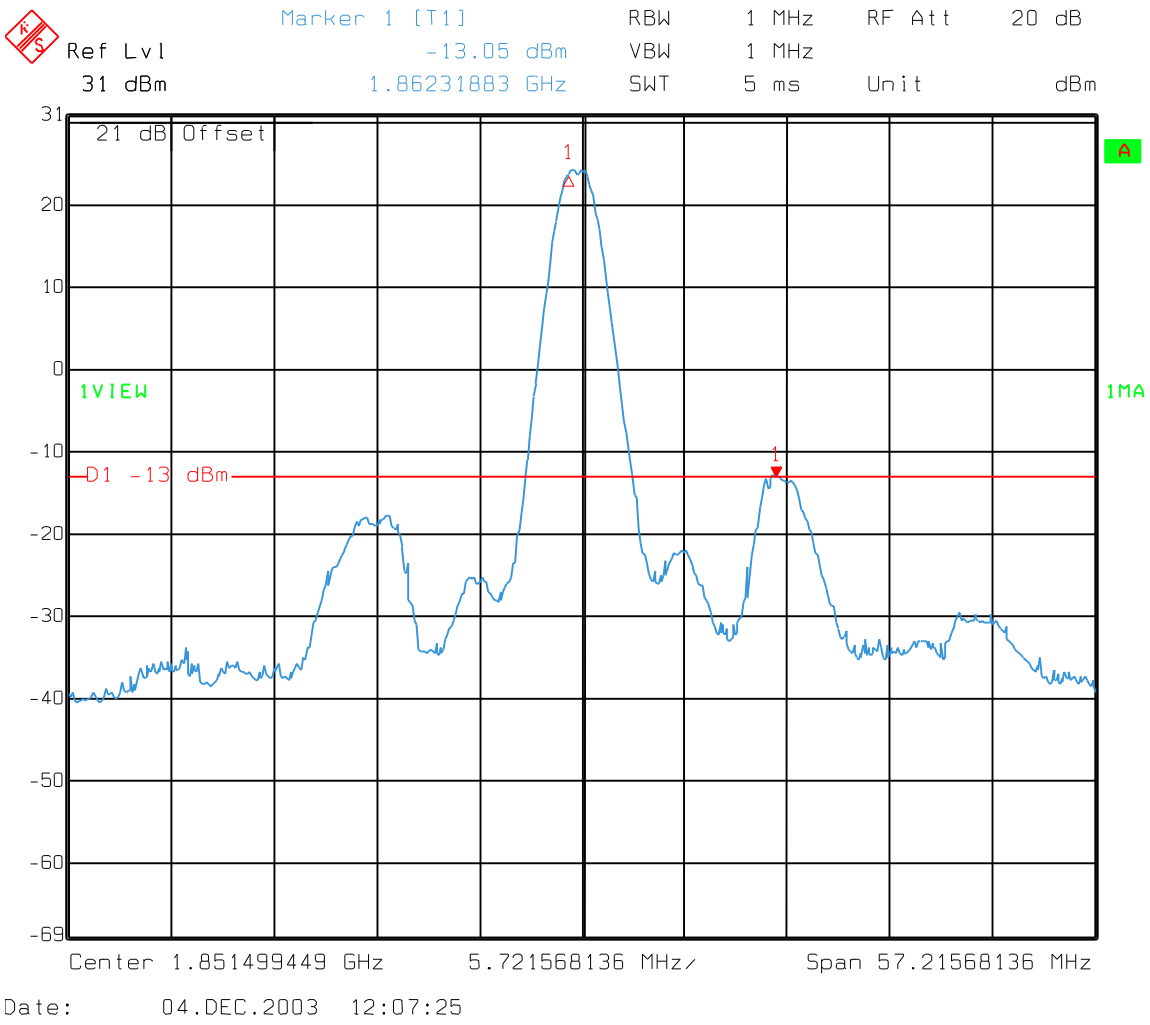
PCS: Channel 1908MHz



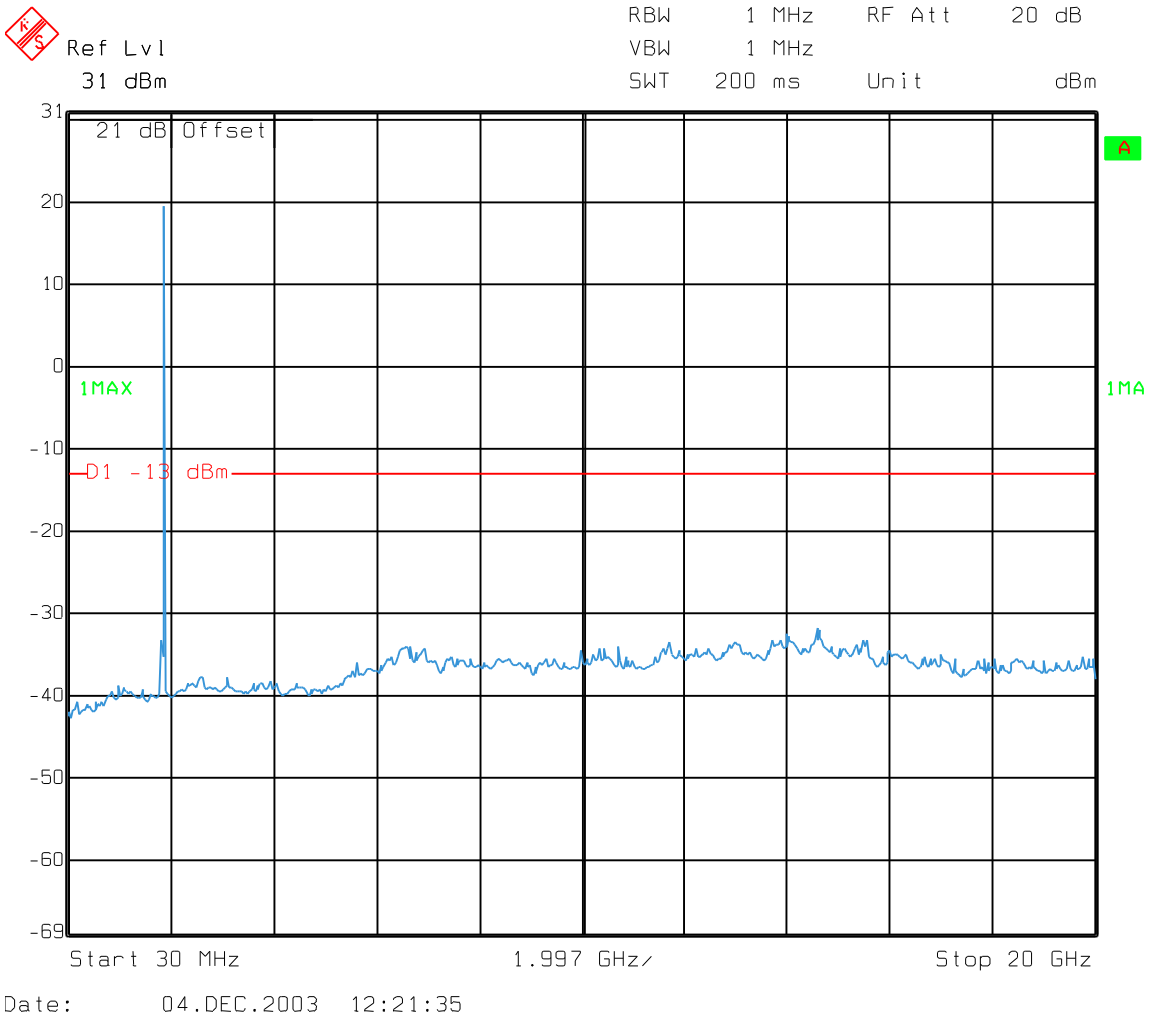

Marker 1 [T1]
19.09 dBm
1.90905060 GHz
RBW 1 MHz
VBW 1 MHz
SWT 5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
21 dBm
21 dB Offset
DMAX 13 dBm
1MA
21
10
0
-10
-20
-30
-40
-50
-60
-70
-79
Center 1.910007515 GHz
95.50037575 MHz/
Span 955.0037575 MHz
Date: 04.DEC.2003 14:07:43

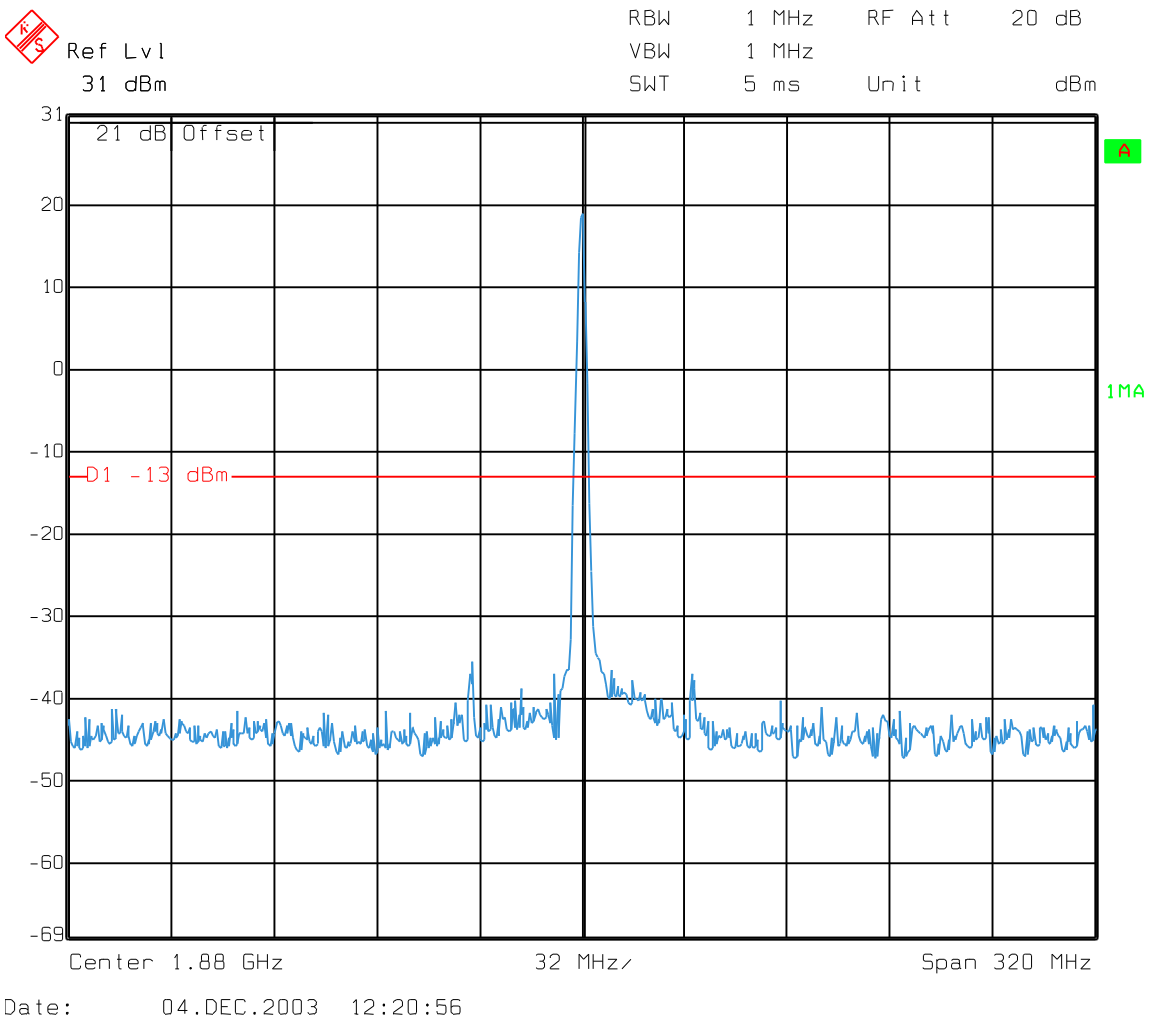
PCS: 1851MHz


Marker 1 [T1]
Ref Lvl
31 dBm
-30.48 dBm
1.87092184 GHz
RBW 1 MHz
VBW 1 MHz
SWT 200 ms
RF Att 20 dB
Unit dBm
21 dB Offset
1MAX
D1 -13 dBm
1MA
Start 30 MHz
1.997 GHz/
Stop 20 GHz
Date: 04.DEC.2003 12:08:51

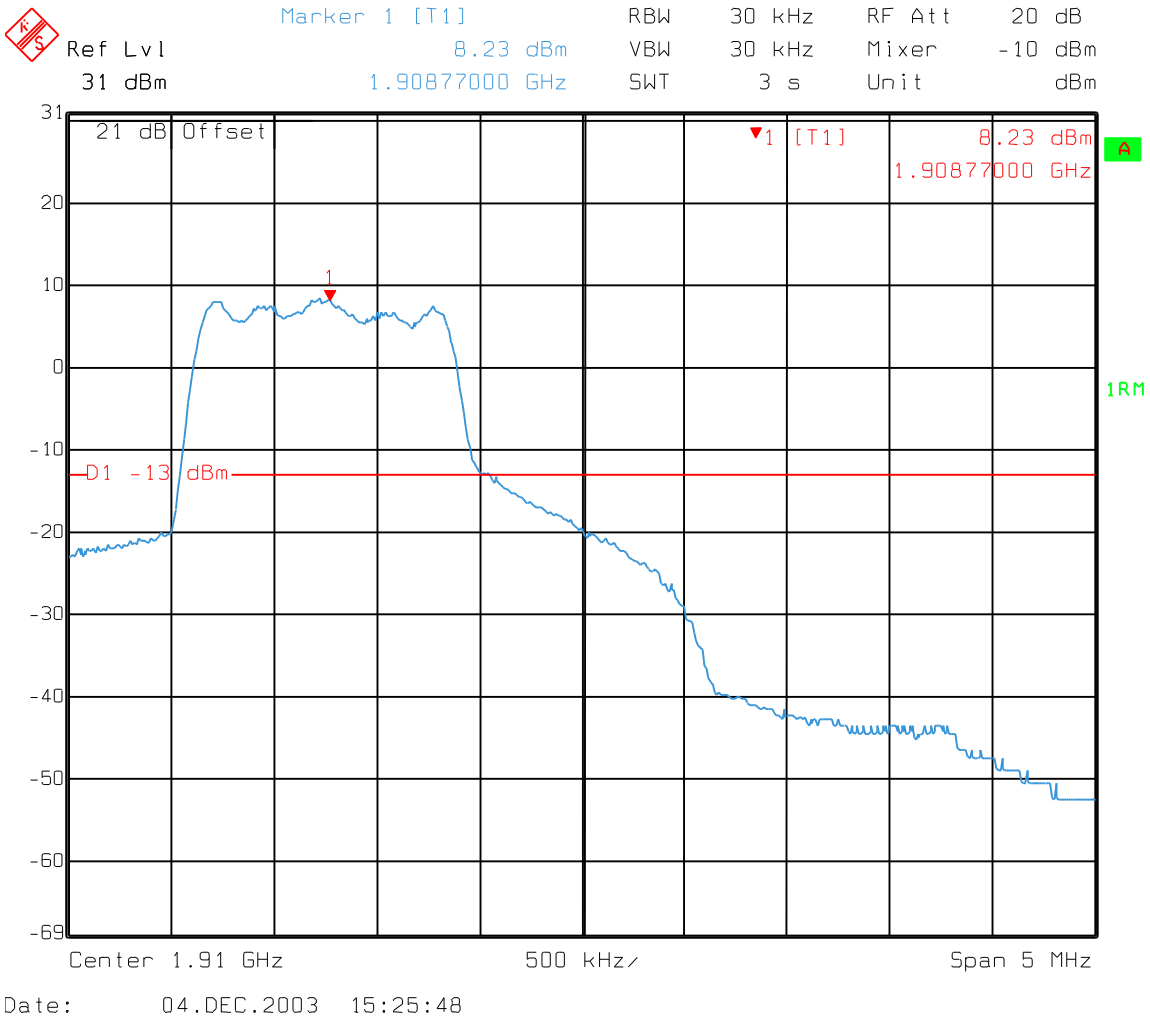

Marker 1 [T1]
Ref Lvl
31 dBm
-13.05 dBm
1.86231883 GHz
RBW 1 MHz
VBW 1 MHz
SWT 5 ms
RF Att 20 dB
Unit dBm
21 dB Offset
1VIEW
1MA
D1 -13 dBm
31
20
10
0
-10
-20
-30
-40
-50
-60
-69
Center 1.851499449 GHz
5.721568136 MHz/
Span 57.21568136 MHz
Date: 04.DEC.2003 12:07:25

PCS: 1880MHz

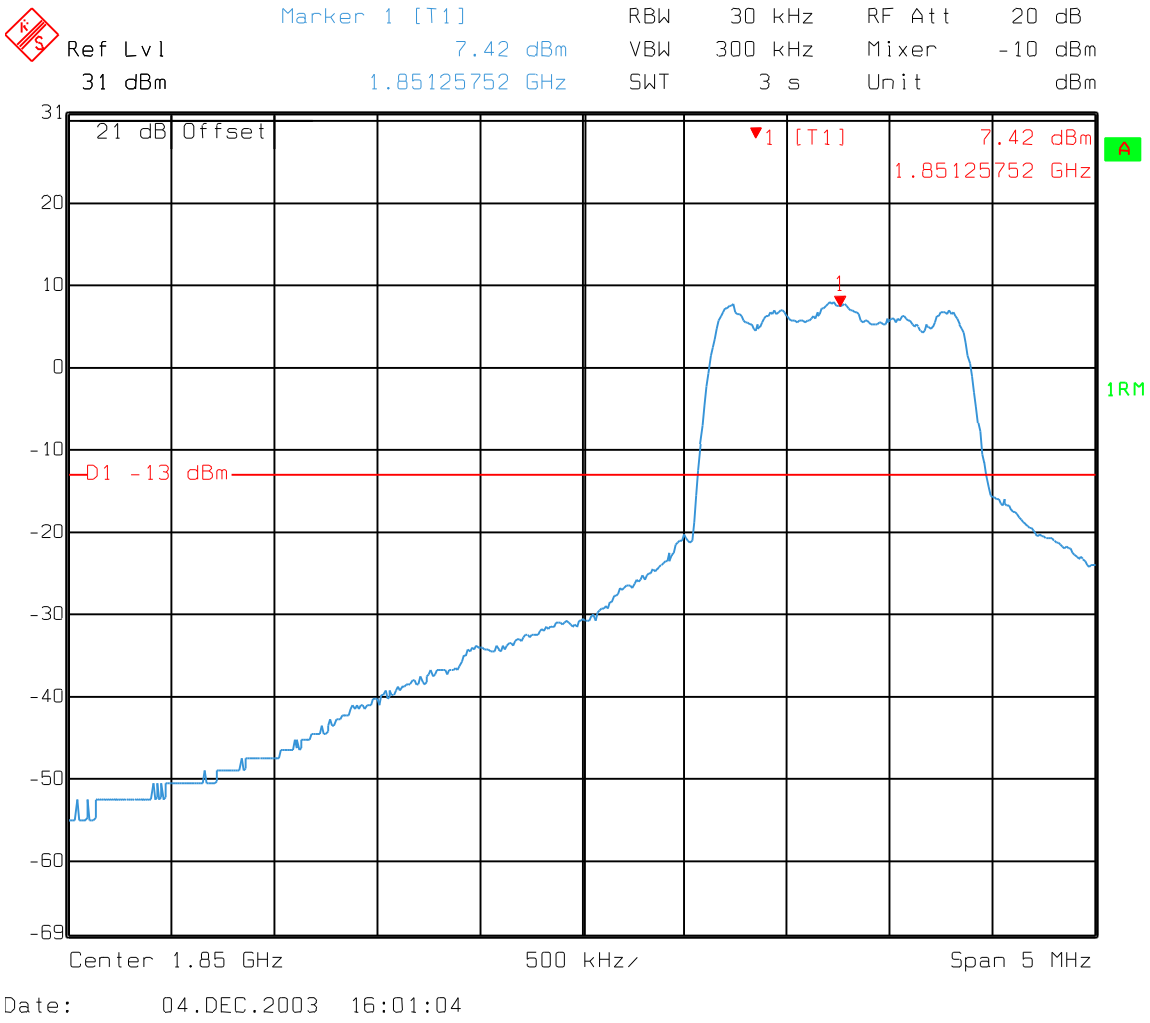

RBW 1 MHz
RF Att 20 dB
VBW 1 MHz
Ref Lvl
31 dBm
SWT 200 ms
Unit dBm
21 dB Offset
A
1MAX
1MA
D1 -13 dBm
Start 30 MHz
1.997 GHz/
Stop 20 GHz
Date: 04.DEC.2003 12:21:35


RBW 1 MHz
RF Att 20 dB
Ref Lvl
VBW 1 MHz
31 dBm
SWT 5 ms
Unit dBm
21 dB Offset
A
1MA
D1 -13 dBm
31
20
10
0
-10
-20
-30
-40
-50
-60
-69
Center 1.88 GHz
32 MHz/
Span 320 MHz
Date: 04.DEC.2003 12:20:56

Band Edge
PCS: 1908



Band Edge
PCS: 1850MHz



Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1053
TESTED BY: Dustin Oaks	DATE: 12/04/2003

Test Results: Complies.

Test Data: See attached table.

Measurement Uncertainty: +/- 1.7 dB

Temperature: 21 °C

Relative Humidity: 51 %

Equipment Used: 1464, 791, 1016, 1484, 1485, 1304, 1480

EIRP Substitution Method

Page 1 of 1 Complete

Job No.: 3L0478 Date: 12/4/03 Preliminary X

Specification: 22 & 24 Temperature(°C): 20

Tested By: Dustin Oaks Relative Humidity(%) 40

E.U.T.: DUAL BAND/TRI-MODE PHONE

Configuration: TX

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement

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

Test Equipment Used

Antenna: 1304 Directional Coupler:

Pre-Amp: Cable #1: 1484

Filter: 1482 Cable #2: 1485

Receiver: 1464 Cable #3:

Attenuator #1 Cable #4:

Attenuator #2: Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB

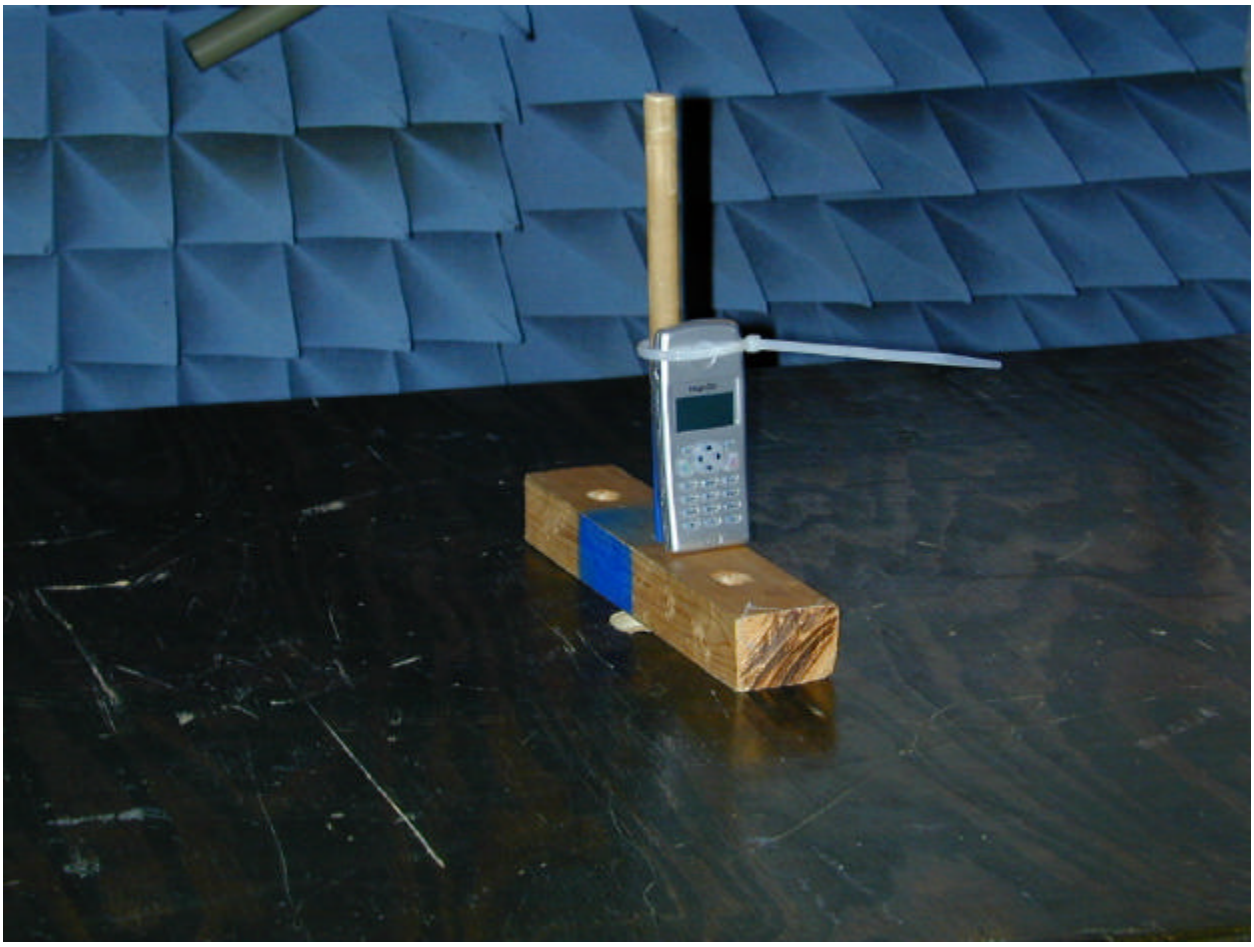
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)		EIRP (dBm)	EIRP (mW)	Polarity	Comments
2474	-67.9	37.0			8.9		-22.0	0.01	h	On 824.7, EUT Vert
1649.5	-68.9	33.0			9.4		-26.5	0.002239	h	On 824.7, EUT Vert
1649.5	-66.6	33.0			9.4		-24.2	0.003776	h	On 824.7, EUT Flat
2474	-70.0	34.2			8.9		-26.9	0.002040	v	On 824.7, EUT Flat
1862	-57.8	31.0			9.4		-17.4	0.018281	v	On 1851, EUT Vert
1840	-64.5	31.0			9.4		-24.1	0.00	v	On 1851, EUT Vert
1862	-59.7	33.0			9.4		-17.3	0.02	h	On 1851, EUT Vert
1840	-64.8	33.0			9.4		-22.4	0.005768	h	On 1851, EUT Vert
3703	-66.3	35.5			10.7		-20.1	0.009795	h	On 1851, EUT Vert
1862	-65.6	33.0			9.4		-23.2	0.004753	h	On 1851, EUT Flat
1839	-61.1	33.0			9.4		-18.7	0.013490	h	On 1851, EUT Flat
1862	-57.7	31.0			9.4		-17.3	0.02	v	On 1851, EUT Flat
1839	-65.1	31.0			9.4		-24.7	0.003381	v	On 1851, EUT Flat
1862	-60.6	33.0			9.4		-18.2	0.015276	h	On 1851, EUT Edge
1839	-58.4	33.0			9.4		-16.0	0.025293	h	On 1851, EUT Edge
1862	-61.6	31.0			9.4		-21.2	0.007638	v	On 1851, EUT Edge
1839	-60.9	31.0			9.4		-20.5	0.008933	v	On 1851, EUT Edge
1918	-70.7	31.0			9.4		-30.3	0.000931	v	On 1908, EUT Vert
1918	-70.1	33.0			9.4		-27.7	0.001698	h	On 1908, EUT Vert
1918	-69.2	33.0			9.4		-26.8	0.002084	h	On 1908, EUT Flat

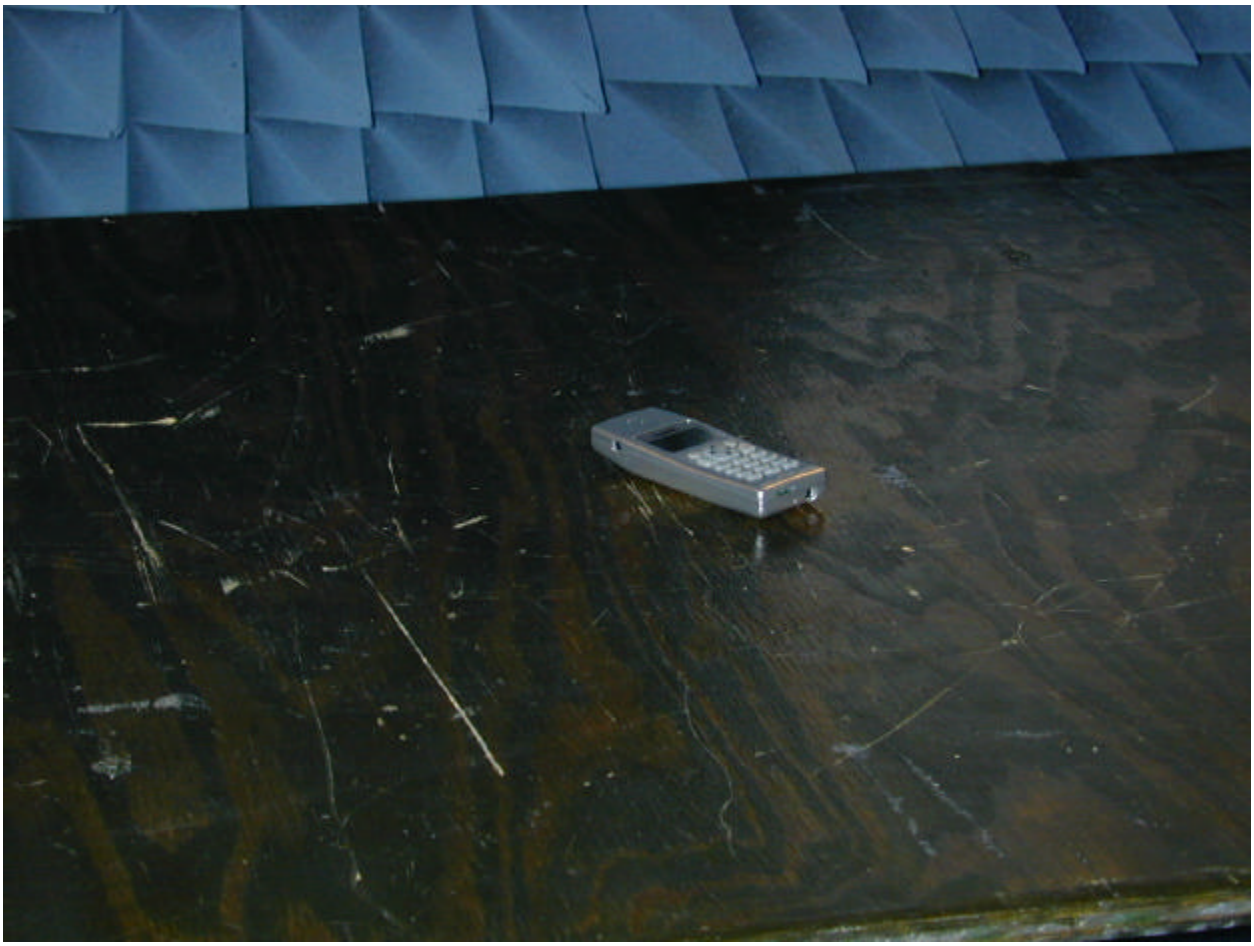
Notes: +/- 4 dB in Cell Band
+/- 10 dB in PCS band
Performed in 3 orthogonal plans, 3 channels in AMPs, CDMA and PCS. 30MHz - 20GHz tested

Test Data - Radiated Emissions

Photographs of Test Setup

FRONT VIEW





Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY: Dustin Oaks	DATE: 12/10/2003

Test Results: Complies.

Measurement Data:

At nominal voltage

	PCS	
Nominal Frequency (GHz):	1.88000359	
Temp (C)	**Frequency (GHz)**	**Deviation (Hz)**
50	1.88000339	-200.00
40	1.88000323	-360.00
30	1.88000338	-210.00
20	1.88000360	10.00
10	1.88000331	-280.00
0	1.88000273	-860.00
-10	1.88000293	-660.00
-20	1.88000312	-466.40
-30	1.88000319	-400.00
MAX Deviation:		**-860.00 Hz**

At battery end-point

	PCS	
Nominal Frequency (GHz):		1.88000359
Temp (C)	**Frequency (GHz)**	**Deviation (Hz)**
50	1.88000300	-590.00
40	1.88000300	-590.00
30	1.88000330	-290.00
20	1.88000310	-490.00
10	1.88000301	-580.00
0	1.88000292	-670.00
-10	1.88000272	-870.00
-20	1.88000314	-450.00
-30	1.88000323	-360.00
MAX Deviation:		**-870.00 Hz**

Equipment Used: 1036, 1474, 0283, 1629

Measurement Uncertainty: 1x10-7 ppm

Temperature: 21 °C

Relative Humidity: 51 %

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	12/18/01	12/19/03
1627	CABLE, 5 ft	MEGAPHASE 10312 1GVT4	N/A	CBU	NA
1474	20db Attenuator DC 18 Ghz	MCL Inc. BW-S20W2	NONE	CBU	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
791	PREAMP, 25dB	ICC LNA25	398	10/27/03	10/27/04
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	08/28/03	08/28/04
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/24/03	07/23/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/23/04
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1480	Bilog Antenna	Schaffner-Chase CBL6111C	2572	CalNotReq	N/A
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	04/22/03	04/21/04

ANNEX A - TEST METHODOLOGIES

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-008
TDMA Per ANSI/J-STD-010
PCS 1900 Per ANSI/J-STD-007

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

Integral Antenna:

Test Method: TIA/EIA-603-1992, Section 2.2.12

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: 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, Section 2.2.12

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

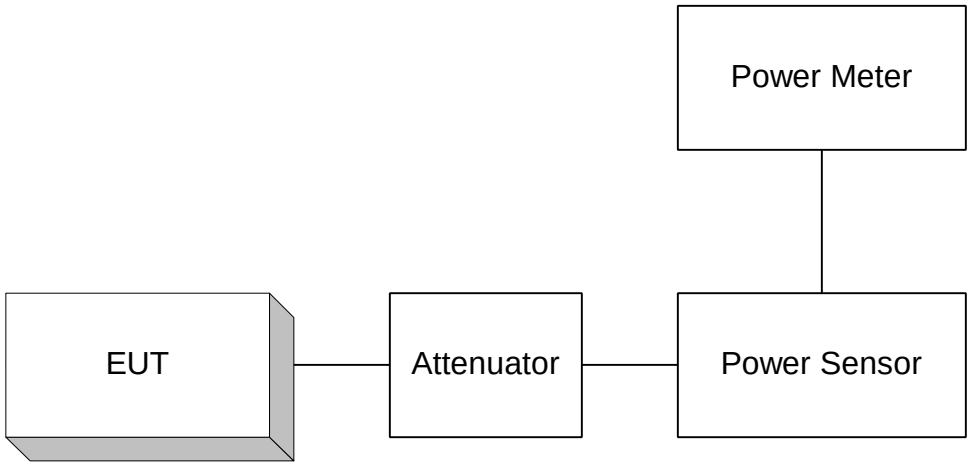
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Digitally Modulated Signals

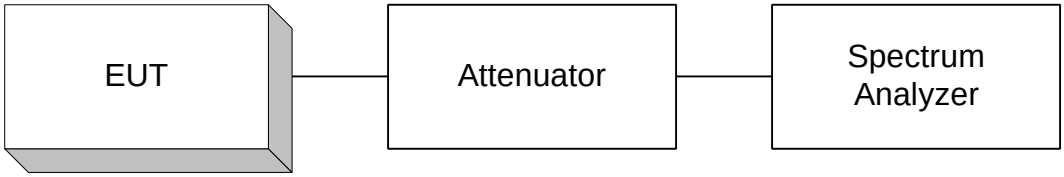
Equipment that produces a digitally modulated carrier is tested using a vector modulation analyzer. Frequency accuracy and rho are measured over the specified environmental extremes.

ANNEX B - TEST DIAGRAMS

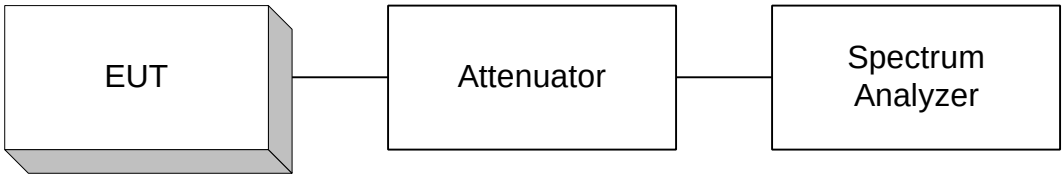
Para. No. 2.985 - R.F. Power Output



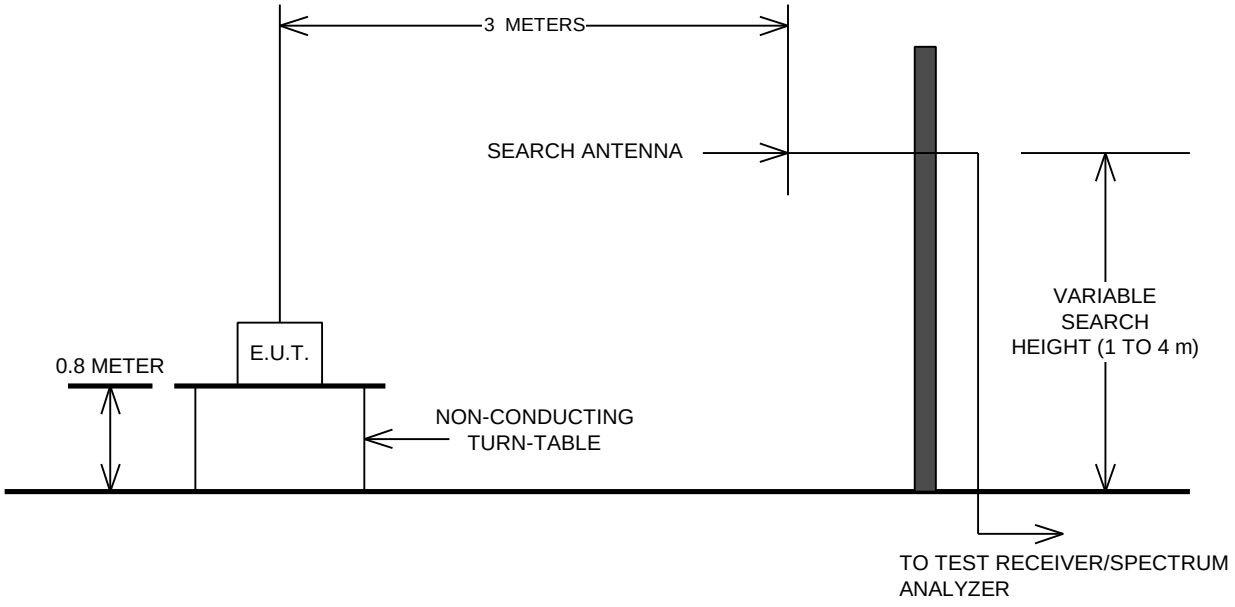
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability