




Nemko Test Report: 8884RUS1

Applicant: Communication Components
89 Leuning Street, 2nd floor
South Hackensack, NJ 07606
USA

**Equipment Under Test:
(E.U.T.)** NT3DBA-1819-10

In Accordance With: **CFR 47, Part 24, Subpart E**
Broadband PCS Repeaters

Tested By: Nemko USA, Inc.
802 N. Kealy
Lewisville, TX 75057-3136

TESTED BY: 

David Light, Senior Wireless Engineer

DATE: 26 November 2007

APPROVED BY: 

Michael Cantwell, Frontline Manager

DATE: 06 December, 2007

Number of Pages: 30

Table of Contents

SECTION 1.	SUMMARY OF TEST RESULTS	3
SECTION 2.	GENERAL EQUIPMENT SPECIFICATION	5
SECTION 3.	RF POWER OUTPUT	7
SECTION 4.	OCCUPIED BANDWIDTH	8
SECTION 5.	SPURIOUS EMISSIONS AT ANTENNA TERMINALS	13
SECTION 6.	FIELD STRENGTH OF SPURIOUS	20
SECTION 7.	TEST EQUIPMENT LIST	21
ANNEX A - TEST DETAILS		22
ANNEX B - TEST DIAGRAMS		27

EQUIPMENT: **NT3DBA-1819-10**

Section 1. Summary of Test Results

Manufacturer Communication Components, Inc.

Model No.: NT3DBA-1819-10

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 CFR 47, Part 24, Subpart E.

- | | | | |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission | <input checked="" type="checkbox"/> | Production Unit |
| <input type="checkbox"/> | Class II Permissive Change | <input type="checkbox"/> | 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



Nemko USA Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko USA Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. 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	2.1049	Input/Output	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		NA

Footnotes:

(1) Modulation characteristics were not tested since the E.U.T. processes but does not produce a modulated waveform.

EQUIPMENT: **NT3DBA-1819-10**

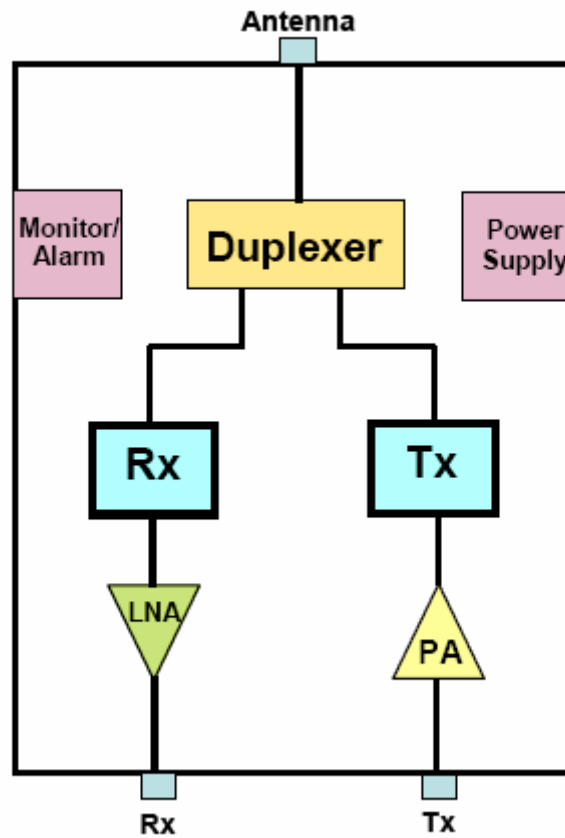
Section 2. General Equipment Specification

Supply Voltage Input:												
Frequency Bands:	Downlink:	1930 to 1990 MHz										
Frequency Bands:	Uplink:	NA										
Type of Modulation and Designator:	<table border="0"> <tr> <td>CDMA (F9W)</td> <td>GSM (GXW)</td> <td>NADC (DXW)</td> <td>UMTS (F9W)</td> <td>EDGE (G7W)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	CDMA (F9W)	GSM (GXW)	NADC (DXW)	UMTS (F9W)	EDGE (G7W)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
CDMA (F9W)	GSM (GXW)	NADC (DXW)	UMTS (F9W)	EDGE (G7W)								
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>								
System Gain:		25 dB										
Output Impedance:		50 ohms										
RF Output (Rated):	Uplink	$\frac{NA}{NA} \frac{W}{dBm}$										
RF Output (Rated):	Downlink	$\frac{10}{40} \frac{W \text{ Peak}}{dBm \text{ Peak}}$										
Frequency Translation:	<table border="0"> <tr> <td>F1-F1</td> <td>F1-F2</td> <td>N/A</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	F1-F1	F1-F2	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
F1-F1	F1-F2	N/A										
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
Band Selection:	<table border="0"> <tr> <td>Software</td> <td>Duplexer</td> <td>Fullband</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Software	Duplexer	Fullband	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>					
Software	Duplexer	Fullband										
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>										

Description of EUT

CCI's Pico-Cell Booster Amplifier improves the performance of low-power Micro Base Stations

System Diagram



EQUIPMENT: **NT3DBA-1819-10**

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 24.232
TESTED BY: David Light	DATE: 20 Nov 2007

Test Results: Complies.

Measurement Data:

Direction	Modulation	Output per Channel (dBm)	Composite Power (dBm)	Composite Power (W)
Downlink	EDGE	40	40	10
Downlink	GSM	40	40	10

Analyzer Settings: RBW = VBW = 300 kHz / PEAK detector

Equipment Used: 1036-1082-1604-1065

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

EQUIPMENT: **NT3DBA-1819-10**

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 20 Nov 2007

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1604-1065

Measurement Uncertainty: 1X10⁻⁷ ppm

Temperature: 22 °C

Relative Humidity: 45 %

EQUIPMENT: NT3DBA-1819-10

Test Data – Occupied Bandwidth

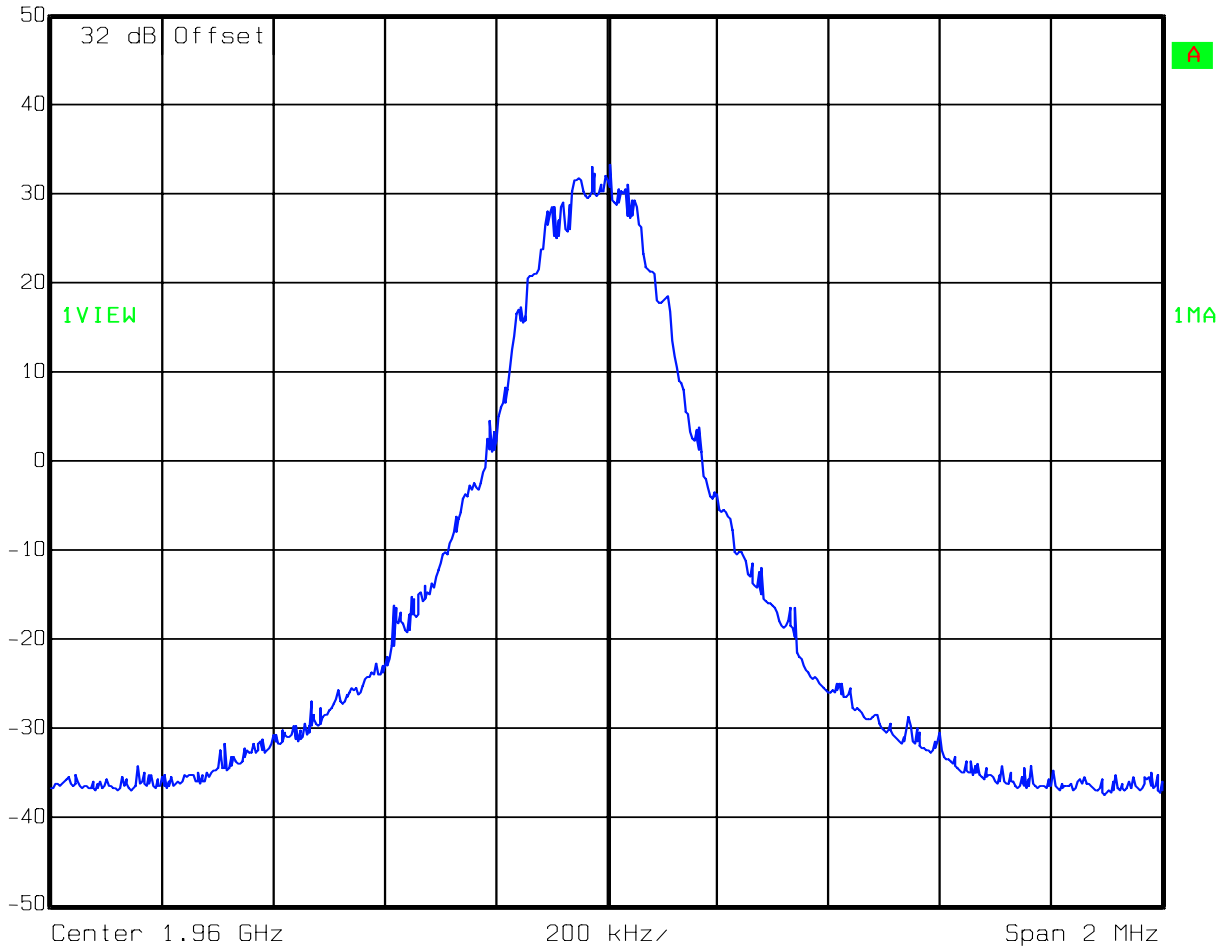
EDGE Output

+40 dBm



Ref Lvl
50 dBm

RBW 3 kHz RF Att 40 dB
VBW 3 kHz
SWT 560 ms Unit dBm



Date: 05.DEC.2007 11:33:10

EQUIPMENT: NT3DBA-1819-10

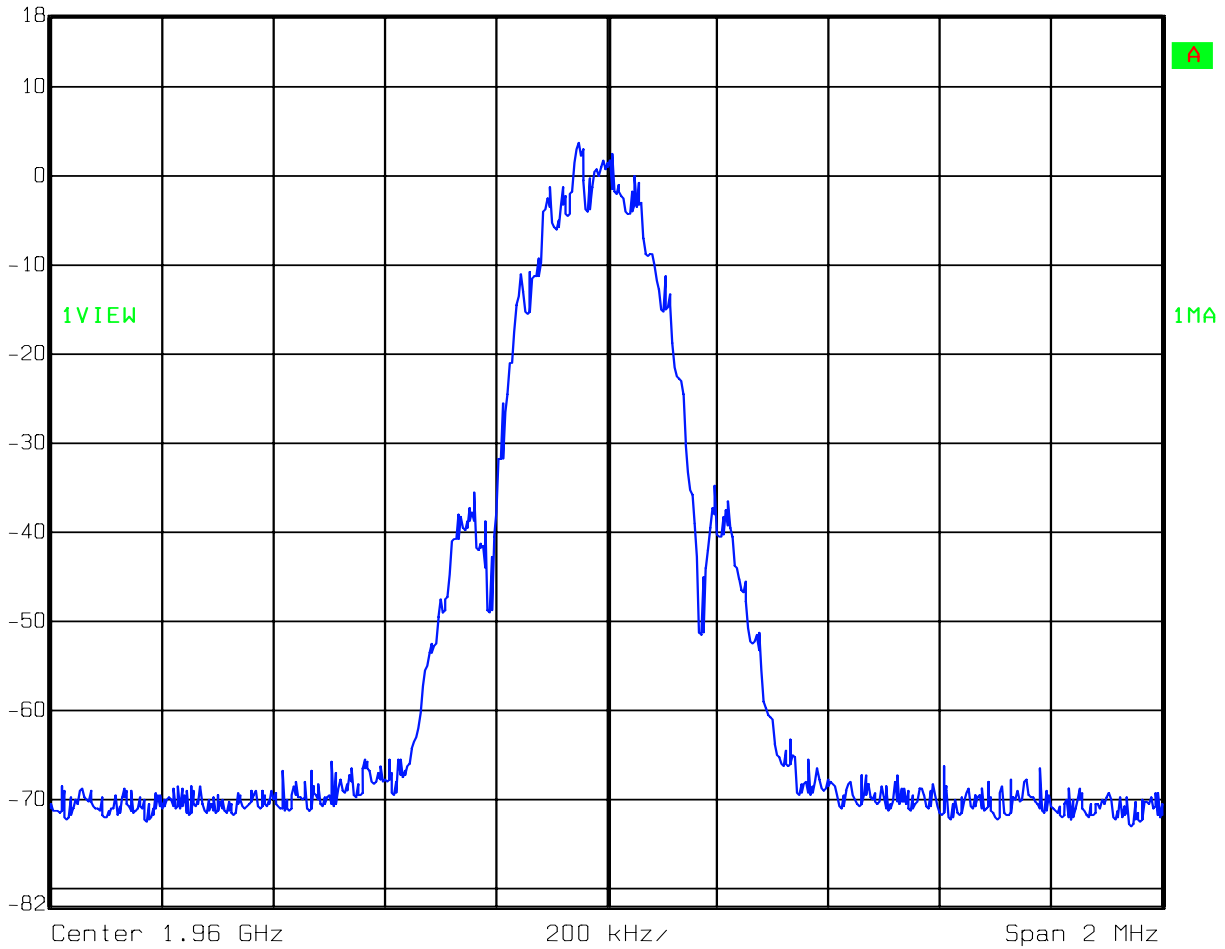
Test Data – Occupied Bandwidth

EDGE Input



Ref Lvl
18 dBm

RBW	3 kHz	RF Att	40 dB
VBW	3 kHz		
SWT	560 ms	Unit	dBm



Date: 05.DEC.2007 11:34:29

EQUIPMENT: NT3DBA-1819-10

Test Data – Occupied Bandwidth

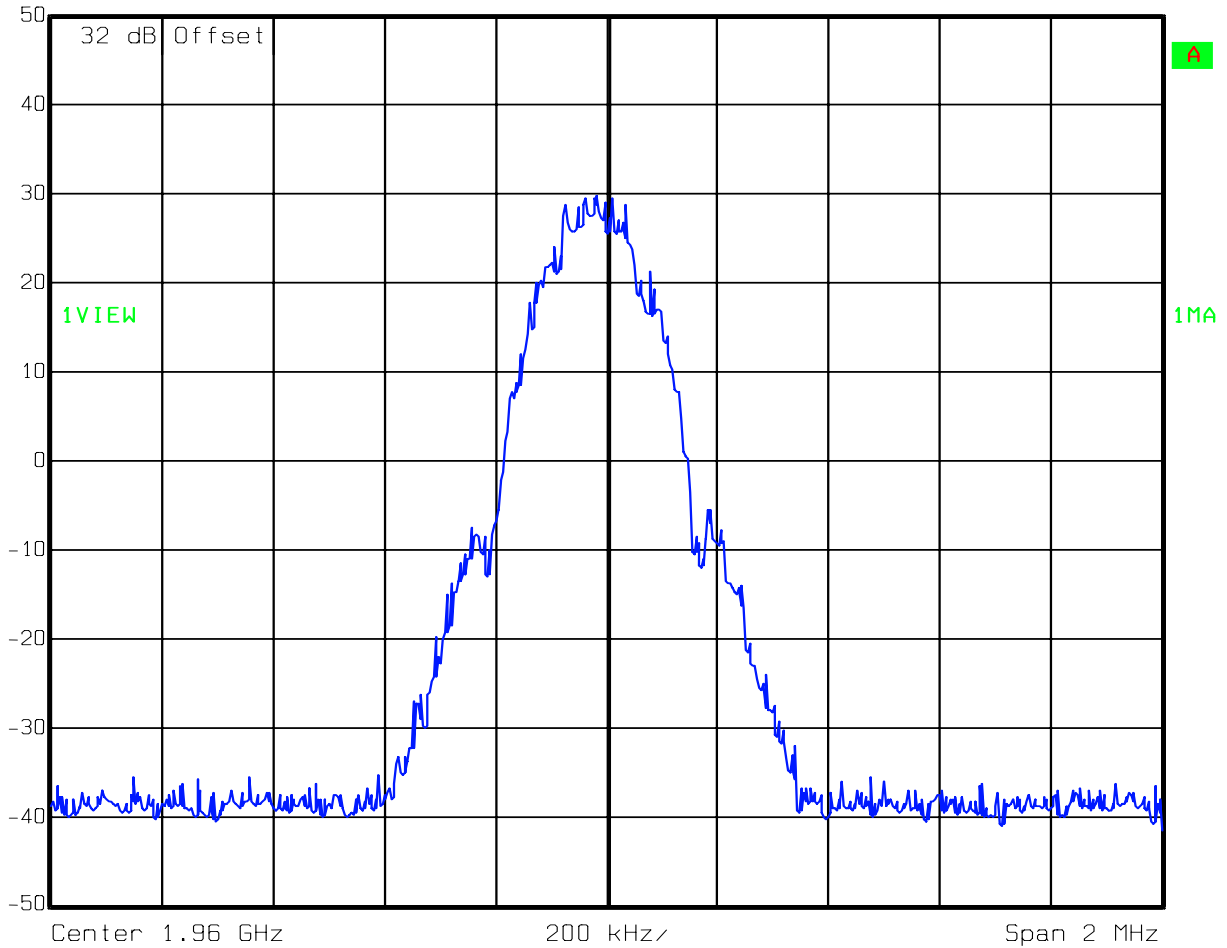
GSM Output

+40 dBm



Ref Lvl
50 dBm

RBW 3 kHz RF Att 40 dB
VBW 3 kHz
SWT 560 ms Unit dBm



Date: 05.DEC.2007 11:36:53

EQUIPMENT: NT3DBA-1819-10

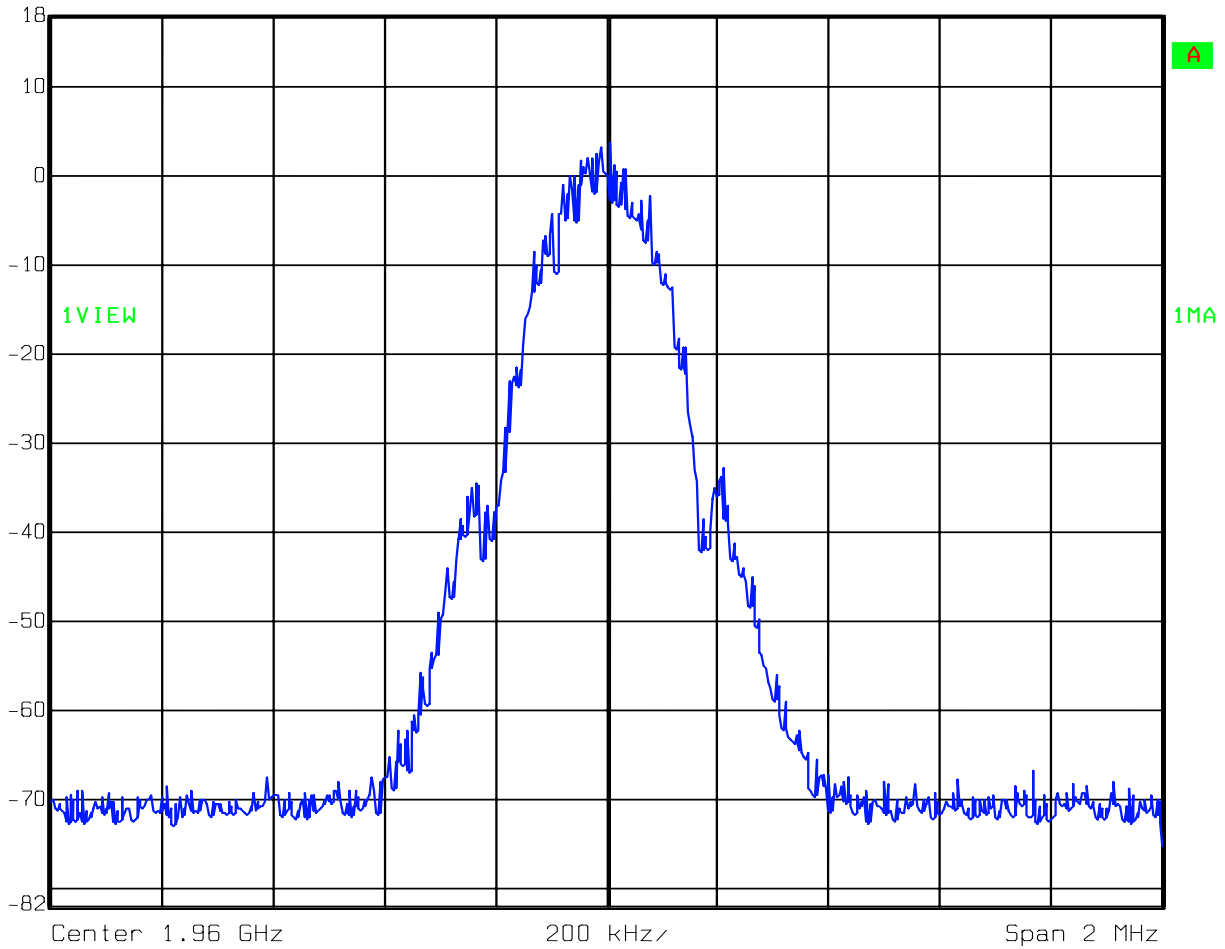
Test Data – Occupied Bandwidth

GSM Input



Ref Lvl
18 dBm

RBW 3 kHz RF Att 40 dB
VBW 3 kHz
SWT 560 ms Unit dBm



Date: 05.DEC.2007 11:39:00

EQUIPMENT: **NT3DBA-1819-10**

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 20 Nov 2007

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1604-1065

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

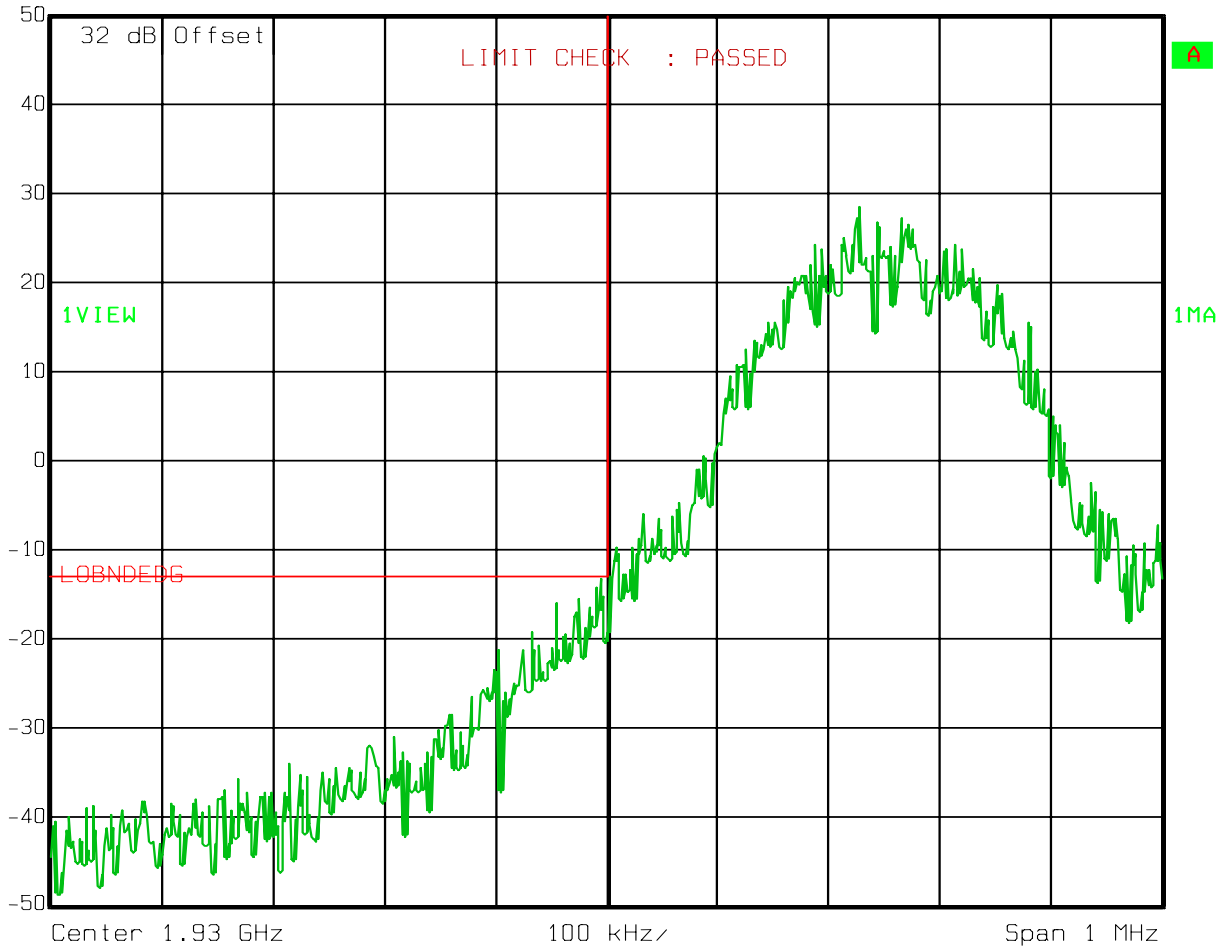
EQUIPMENT: NT3DBA-1819-10

Test Data – Spurious Emissions at Antenna Terminals

EDGE
40 dBm Output
DOWNLINK



Ref Lvl	RBW	3 kHz	RF Att	40 dB
50 dBm	VBW	3 kHz	Unit	dBm
	SWT	280 ms		



Date: 16.NOV.2007 16:10:06

EQUIPMENT: NT3DBA-1819-10

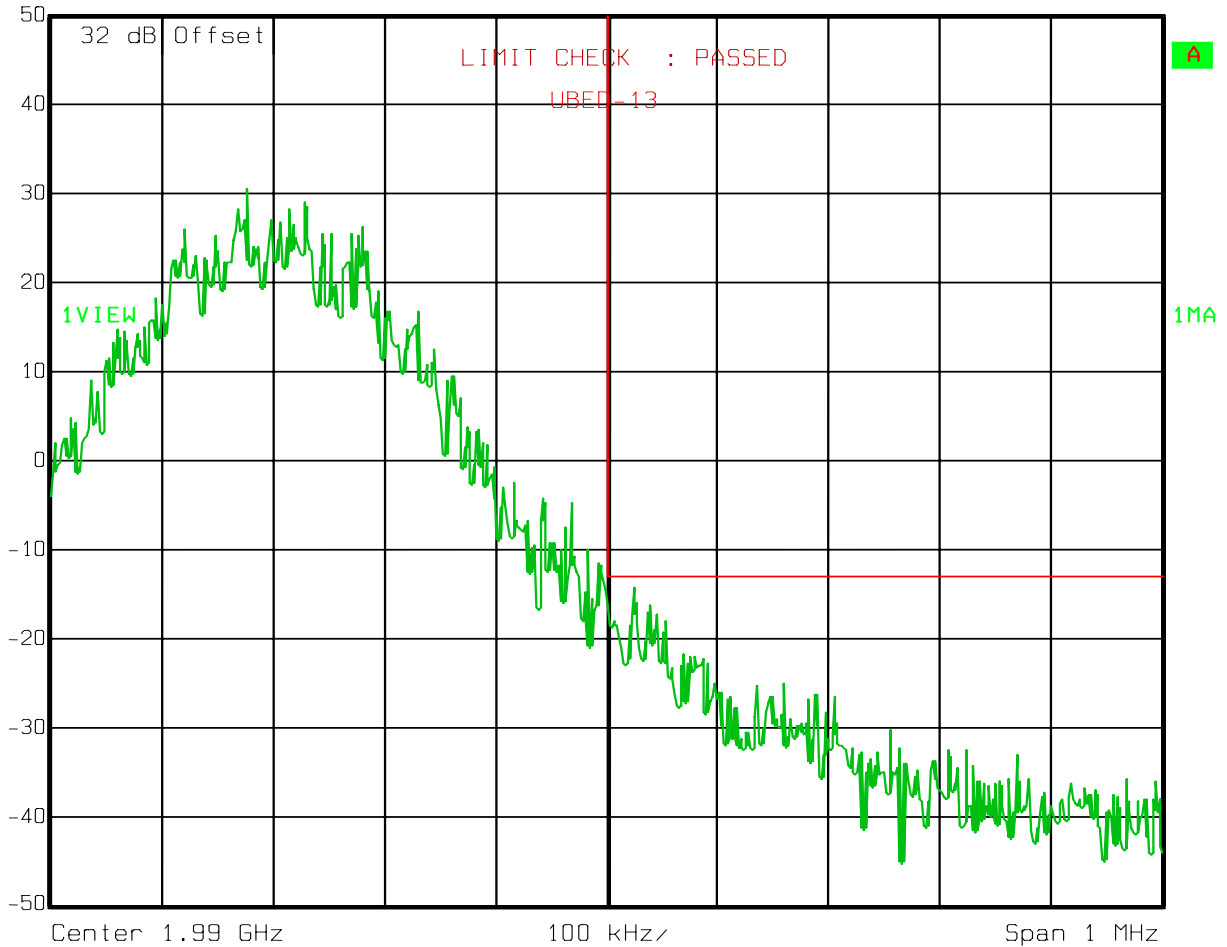
Test Data – Spurious Emissions at Antenna Terminals

EDGE
40 dBm Output
DOWNLINK



Ref Lvl
50 dBm

RBW 3 kHz RF Att 40 dB
VBW 3 kHz
SWT 280 ms Unit dBm



Date: 16.NOV.2007 16:14:27

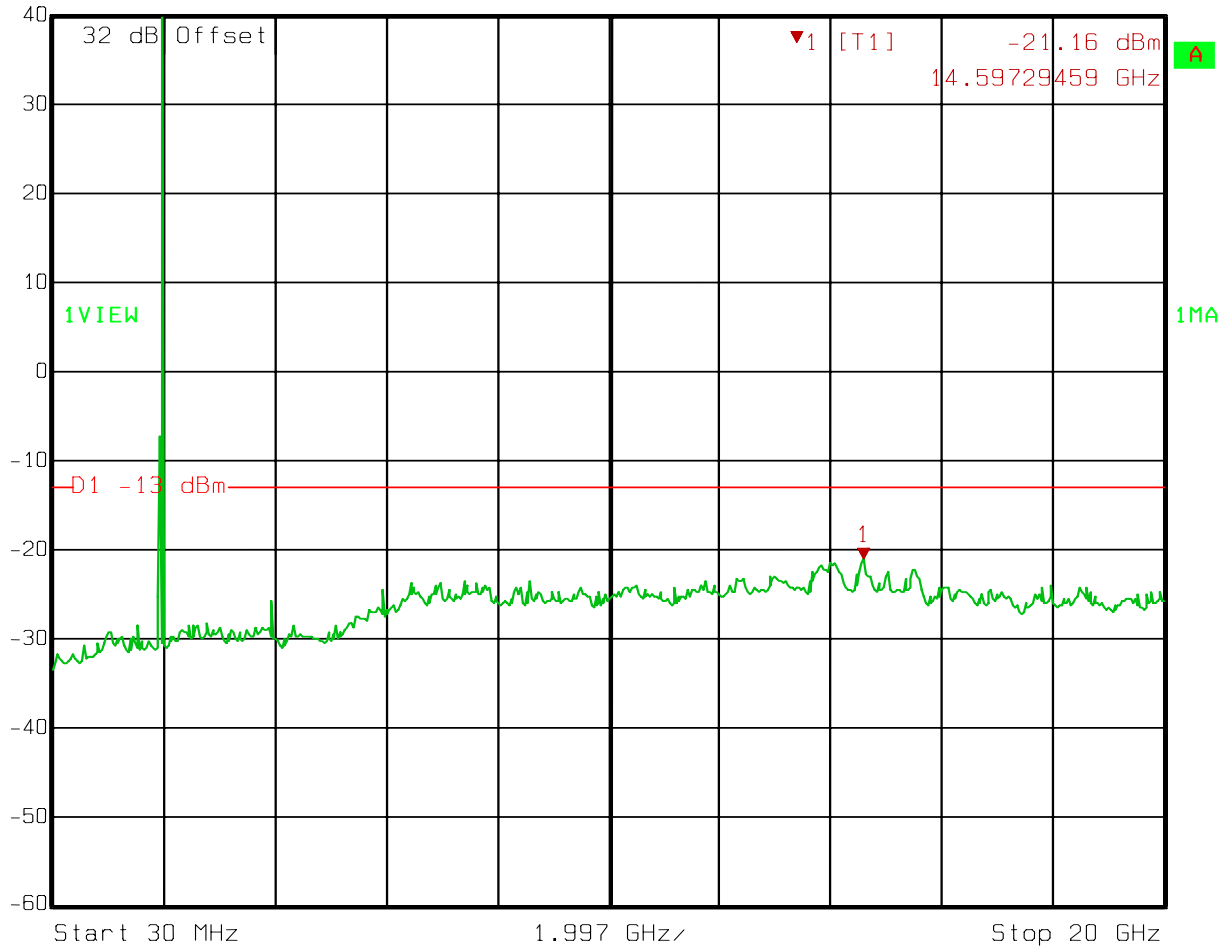
EQUIPMENT: NT3DBA-1819-10

Test Data – Spurious Emissions at Antenna Terminals

EDGE
+40 dBm
DOWNLINK



Marker 1 [T1] RBW 1 MHz RF Att 20 dB
-21.16 dBm VBW 1 MHz
14.59729459 GHz SWT 200 ms Unit dBm



Date: 16.NOV.2007 16:15:45

EQUIPMENT: NT3DBA-1819-10

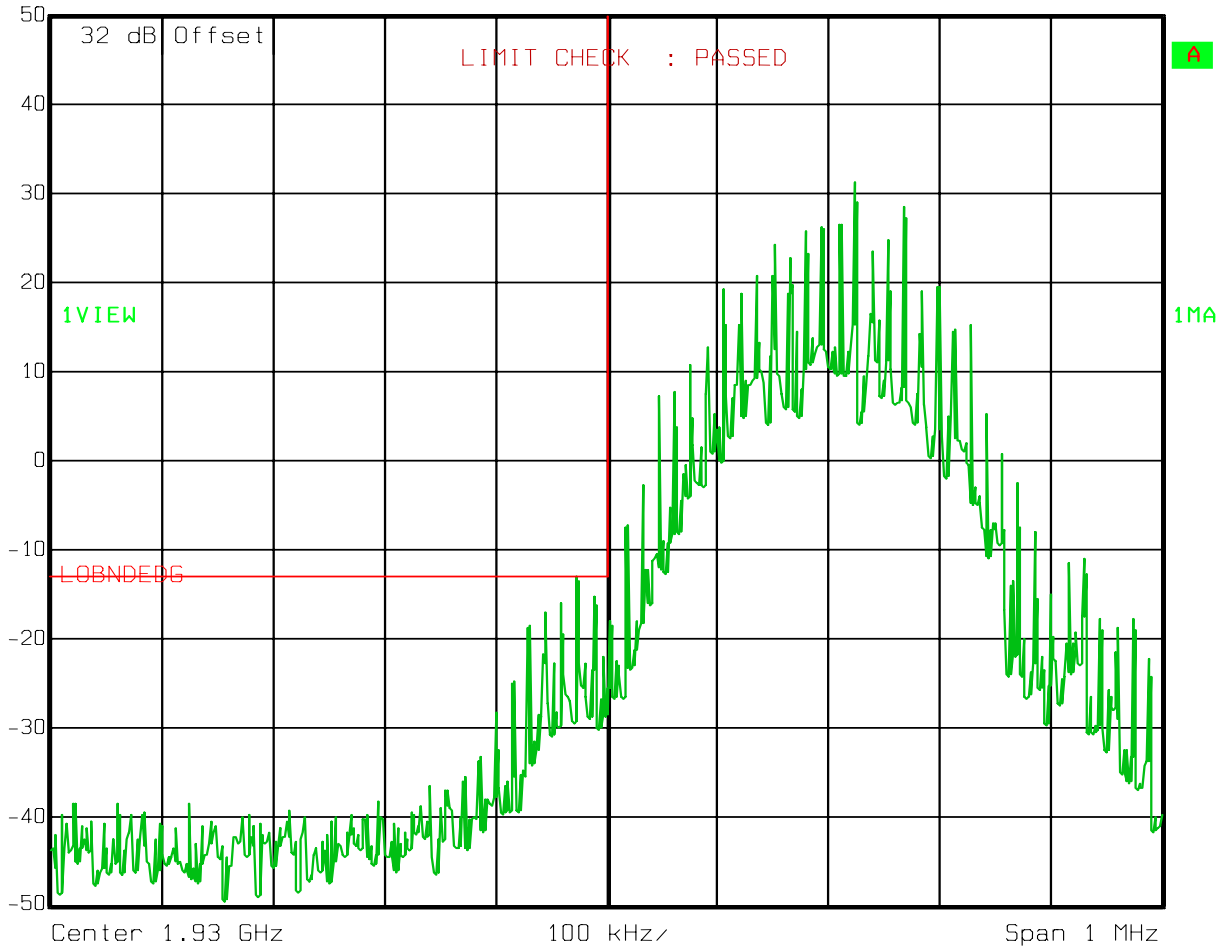
Test Data – Spurious Emissions at Antenna Terminals

GSM
40 dBm
DOWNLINK



Ref Lvl
50 dBm

RBW 3 kHz RF Att 40 dB
VBW 3 kHz
SWT 280 ms Unit dBm



Date: 16.NOV.2007 15:30:44

EQUIPMENT: NT3DBA-1819-10

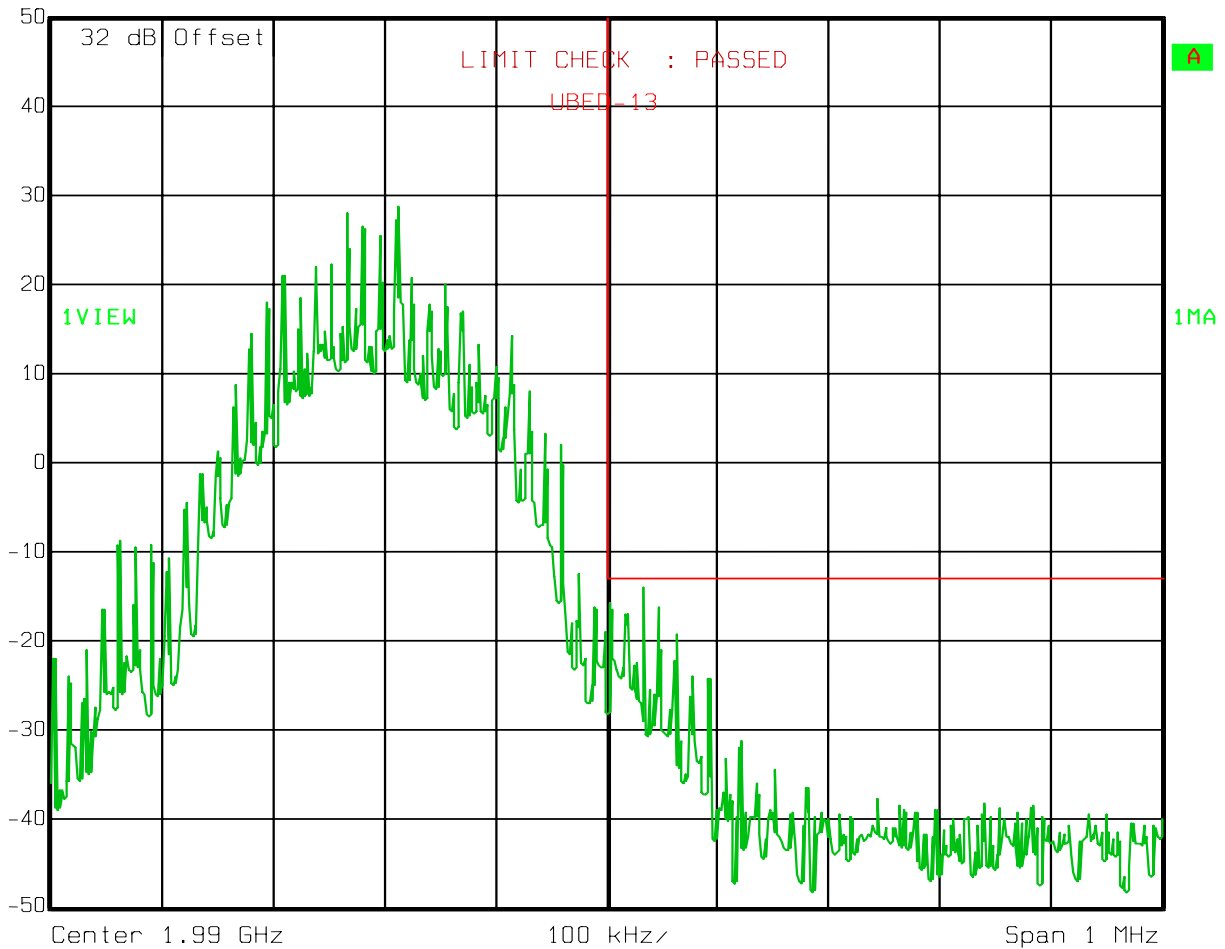
Test Data – Spurious Emissions at Antenna Terminals

GSM
+40 dBm Output
DOWNLINK



Ref Lvl
50 dBm

RBW 3 kHz RF Att 40 dB
VBW 3 kHz
SWT 280 ms Unit dBm



Date: 16.NOV.2007 16:02:21

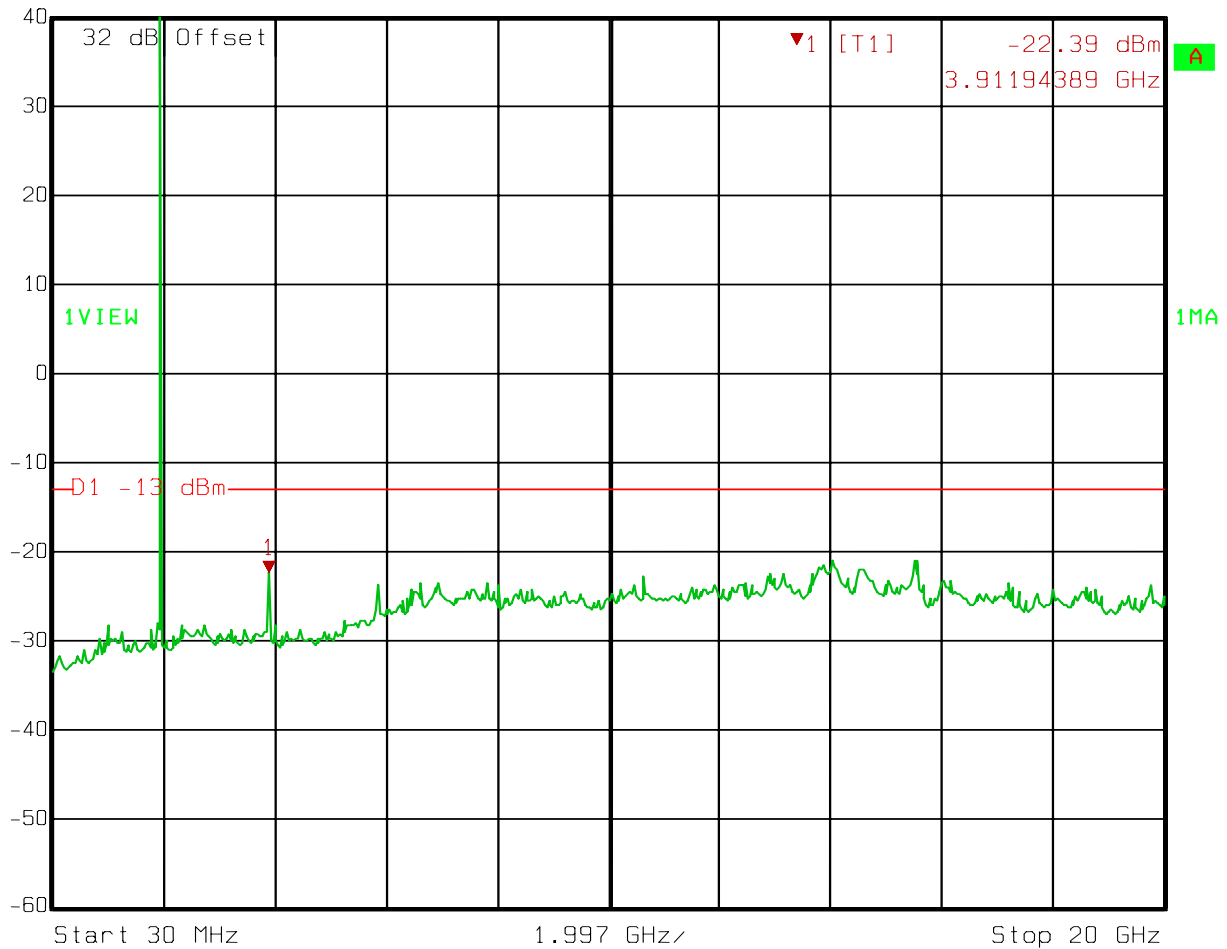
EQUIPMENT: NT3DBA-1819-10

Test Data – Spurious Emissions at Antenna Terminals

GSM
+40 dBm
DOWNLINK



Ref Lvl 40 dBm
Marker 1 [T1] -22.39 dBm
3.91194389 GHz
RBW 1 MHz RF Att 20 dB
VBW 1 MHz
SWT 200 ms Unit dBm



Date: 16.NOV.2007 16:04:27

EQUIPMENT: **NT3DBA-1819-10**

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 24.238
TESTED BY: David Light	DATE: 21 Nov 2007

Test Results: Complies. There were no emissions detected within 20 dB of the specification limit of -13 dBm

Equipment Used: 1464-1484-1485-993-1016-791-759-760

Measurement Uncertainty: +/-1.7 dB

Temperature: 22 °C

Relative Humidity: 45 %

EQUIPMENT: **NT3DBA-1819-10**

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	05/26/06	05/26/08
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1604	ATTENUATOR	NARDA 776B-20	NONE	N/A	N/A
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/24/07	01/24/09
1484	Cable	Storm PR90-010-072	N/A	05/02/07	05/01/08
1485	Cable	Storm PR90-010-216	N/A	05/02/07	05/01/08
993	Horn antenna	A.H. Systems SAS-200/571	XXX	08/31/07	08/30/08
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	05/01/07	04/30/08
791	PREAMP, 25dB	Nemko USA, Inc. LNA25	398	05/01/07	04/30/08
759	ANTENNA, LOG PERIODIC	A.H. SYSTEMS SAS-200/510	556	03/30/07	03/29/08
760	Antenna biconical	Electro Metrics MFC-25	477	01/19/07	01/19/08

Nemko USA, Inc.

CFR 47, PART 24, SUBPART E
BROADBAND PCS REPEATERS
PROJECT NO.: **8884RUS1**

EQUIPMENT: **NT3DBA-1819-10**

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:

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter or spectrum analyzer. Power output is measured with the maximum rated input level.

Integral Antenna:

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

EQUIPMENT: **NT3DBA-1819-10**

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

Minimum Standard: Input/Output

Method Of Measurement:

CDMA

Spectrum analyzer settings:

RBW=VBW=30 kHz

Span: 5 MHz

Sweep: Auto

GSM / EDGE

RBW=VBW= 3 kHz

Span: 1 MHz

Sweep: Auto

TDMA

RBW=VBW= 1 kHz

Span: 1 MHz

Sweep: Auto

UMTS

RBW=VBW= 100 kHz

Span: 10 MHz

Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 24.238

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

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

GSM / EDGE

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

TDMA

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

UMTS

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 100 kHz (< 1MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: 6 Sweeps

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.

EQUIPMENT: **NT3DBA-1819-10**

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 24.238
---	--------------------------

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 TIA/EIA-603-1992

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

Nemko USA, Inc.

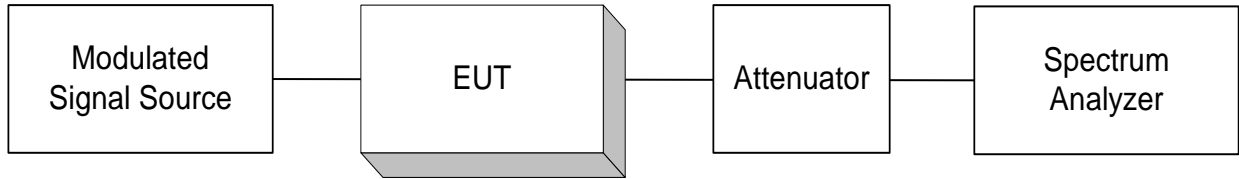
CFR 47, PART 24, SUBPART E
BROADBAND PCS REPEATERS
PROJECT NO.: **8884RUS1**

EQUIPMENT: **NT3DBA-1819-10**

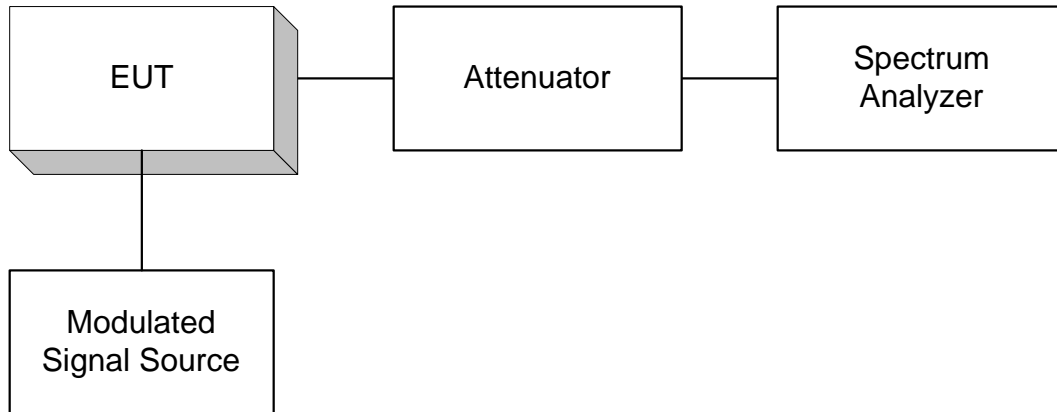
ANNEX B - TEST DIAGRAMS

EQUIPMENT: **NT3DBA-1819-10**

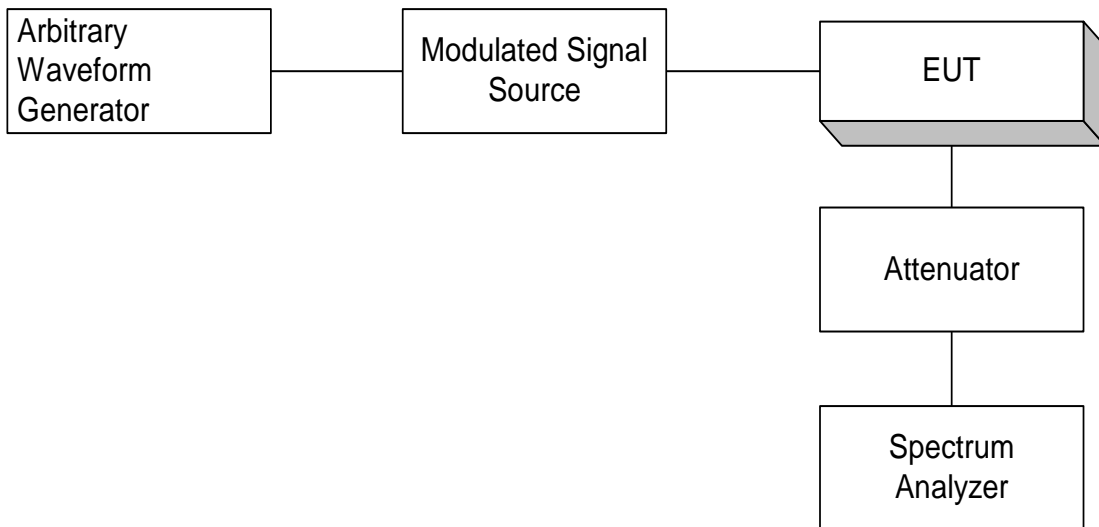
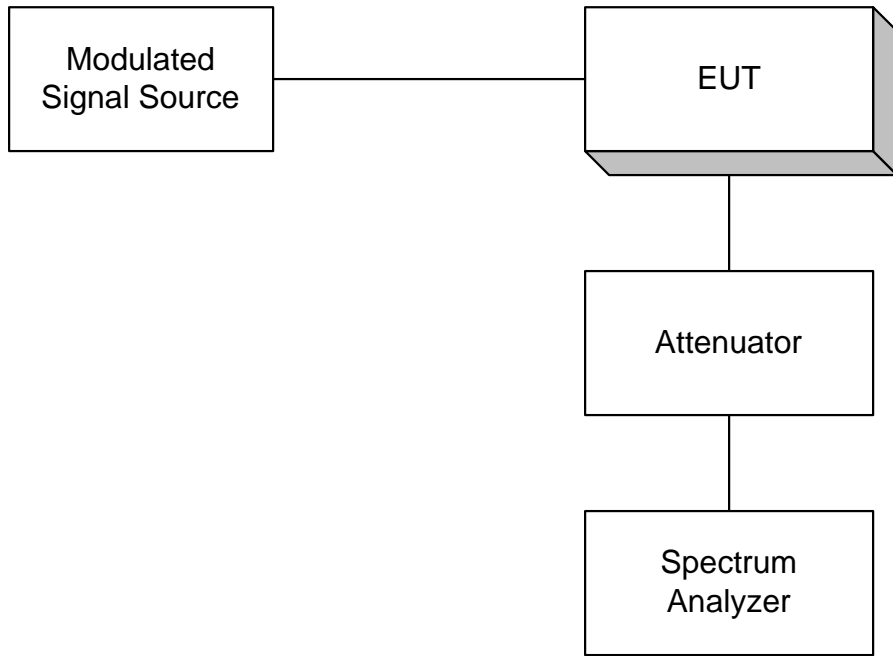
Para. No. 2.985 - R.F. Power Output



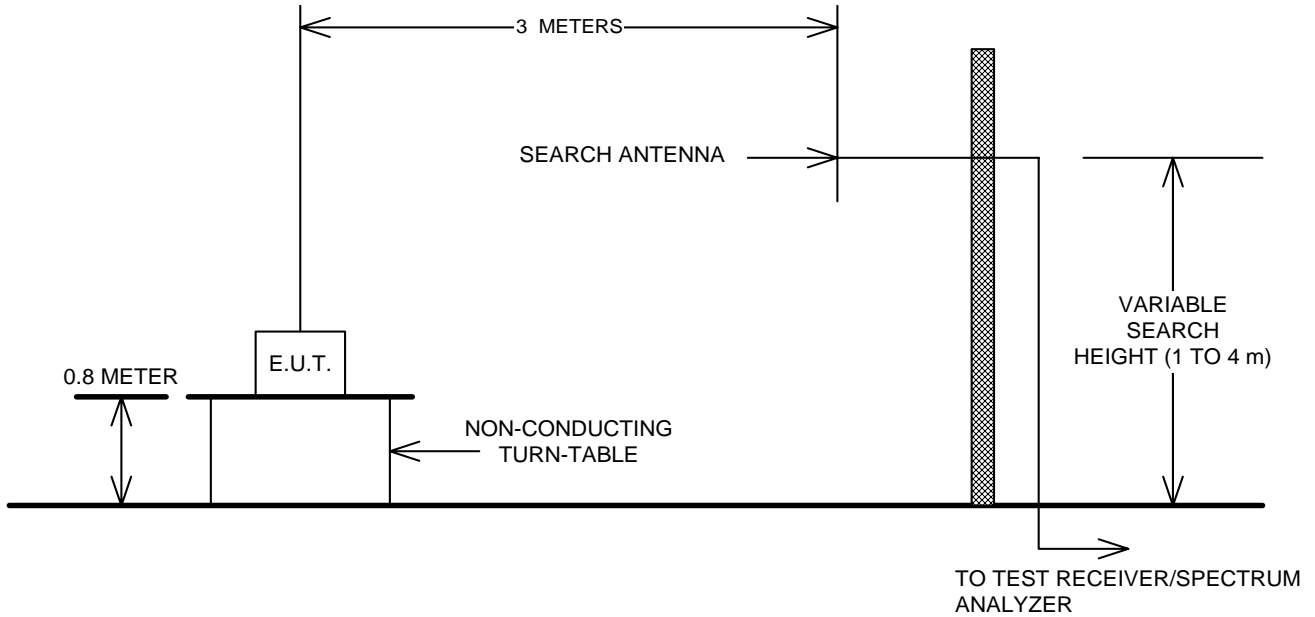
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

