


**KTL Test Report No.:** 9L0629RUS1

**Applicant:** Samsung Telecommunications America, Inc.  
1130 E. Arapaho Rd.  
Richardson, TX  
75081

**Equipment Under Test:** Indoor BTS (Model SCBS-319L)

**FCC ID:** NP8-SCBS-319L

**In Accordance With:** **FCC Part 24, Subpart E**  
Broadband PCS Base Station Transmitter

**Tested By:** KTL Dallas Inc.  
802 N. Kealy  
Lewisville, Texas 75057-3136  


**Authorized By:** Tom Tidwell, RF Group Manager

**Date:** 4/6/00

**Total Number of Pages:** 37

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EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

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### Section 1. Summary of Test Results

Manufacturer: Samsung Telecommunications America, Inc.

Model No.: SCBS-319L

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



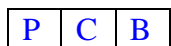
Production Unit



Class II Permissive Change



Pre-Production Unit



Equipment Code

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"



**NVLAP LAB CODE: 100351-0**

TESTED BY: David Light DATE: 3/9/00 - 3/31/00  
Wireless Technician

TESTED BY: Kevin Rose DATE: 3/24/00 – 3/31/00  
Wireless Technician

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This report applies only to the items tested.

EQUIPMENT UNDER TEST: INDOOR MINI BTS

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**Summary Of Test Data**

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	Max. 100W	20 W	Complies
Occupied Bandwidth (CDMA)	24.238	Mask	Mask	Complies
Occupied Bandwidth (GSM)	24.238	N/A	N/A	N/A
Occupied Bandwidth (NADC)	24.238	N/A	N/A	N/A
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	-14.5 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	-25.3 dBm E.I.R.P.	Complies
Frequency Stability	24.235	± 0.05 ppm	0.0127 ppm	Complies

**Footnotes:**

1. Since the E.U.T. is a CDMA only base station transceiver, only the CDMA access protocol waveform was evaluated.
2. Modulation characteristics were evaluated by a Rho (waveform quality) measurement. These results are presented in the frequency stability data in section 7 of this report.

**Measurement uncertainties are expressed as combined, expanded uncertainties to a confidence level of 95%.**

EQUIPMENT UNDER TEST: **INDOOR MINI BTS**

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**Section 2. General Equipment Specification**

<b>Supply Voltage Input:</b>	28 Vdc		
<b>Frequency Bands: TX</b>	<input checked="" type="checkbox"/> Block A : 1930 – 1945 MHz <input checked="" type="checkbox"/> Block D : 1945 – 1950 MHz <input checked="" type="checkbox"/> Block B : 1950 – 1965 MHz <input checked="" type="checkbox"/> Block E : 1965 – 1970 MHz <input checked="" type="checkbox"/> Block F : 1970 – 1975 MHz <input checked="" type="checkbox"/> Block C : 1975 – 1990 MHz		
<b>Frequency Bands: RX</b>	<input checked="" type="checkbox"/> Block A : 1850 – 1865 MHz <input checked="" type="checkbox"/> Block B : 1865 – 1870 MHz <input checked="" type="checkbox"/> Block C : 1870 – 1885 MHz <input checked="" type="checkbox"/> Block D : 1885 – 1890 MHz <input checked="" type="checkbox"/> Block E : 1890 – 1895 MHz <input checked="" type="checkbox"/> Block F : 1895 – 1910 MHz		
<b>Type of Modulation and Designator:</b>	<b>CDMA</b> (1M25G7W) <input checked="" type="checkbox"/>	<b>GSM</b> (200KGXW) <input type="checkbox"/>	<b>NADC</b> (40K0DXW) <input type="checkbox"/>
<b>Maximum No. of Carriers:</b>	2 rf channels per tx antenna maximum. Each sector is represented by one TX antenna.		
<b>Output Impedance:</b>	50 ohms		
<b>RF Output (Rated):</b>	Per channel: 20 W Total: 40 W (with 2 channels)		
<b>Band Selection:</b>	<b>Software</b> <input checked="" type="checkbox"/>	<b>Duplexer</b> <input checked="" type="checkbox"/>	<b>Fullband</b> <input type="checkbox"/>

EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)FCC ID: [NP8-SCBS-319L](#)PROJECT NO.: [9L0629RUS1](#)

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**System Description**

The equipment tested is a PCS base station transceiver that uses the CDMA access protocol. Up to 2 rf carriers are combined and transmitted at each transmit antenna port. The rated power output is 20 W per channel. The I-BTS is professionally installed with roof-mount antennas. Access to site installations is restricted to service and maintenance personnel.

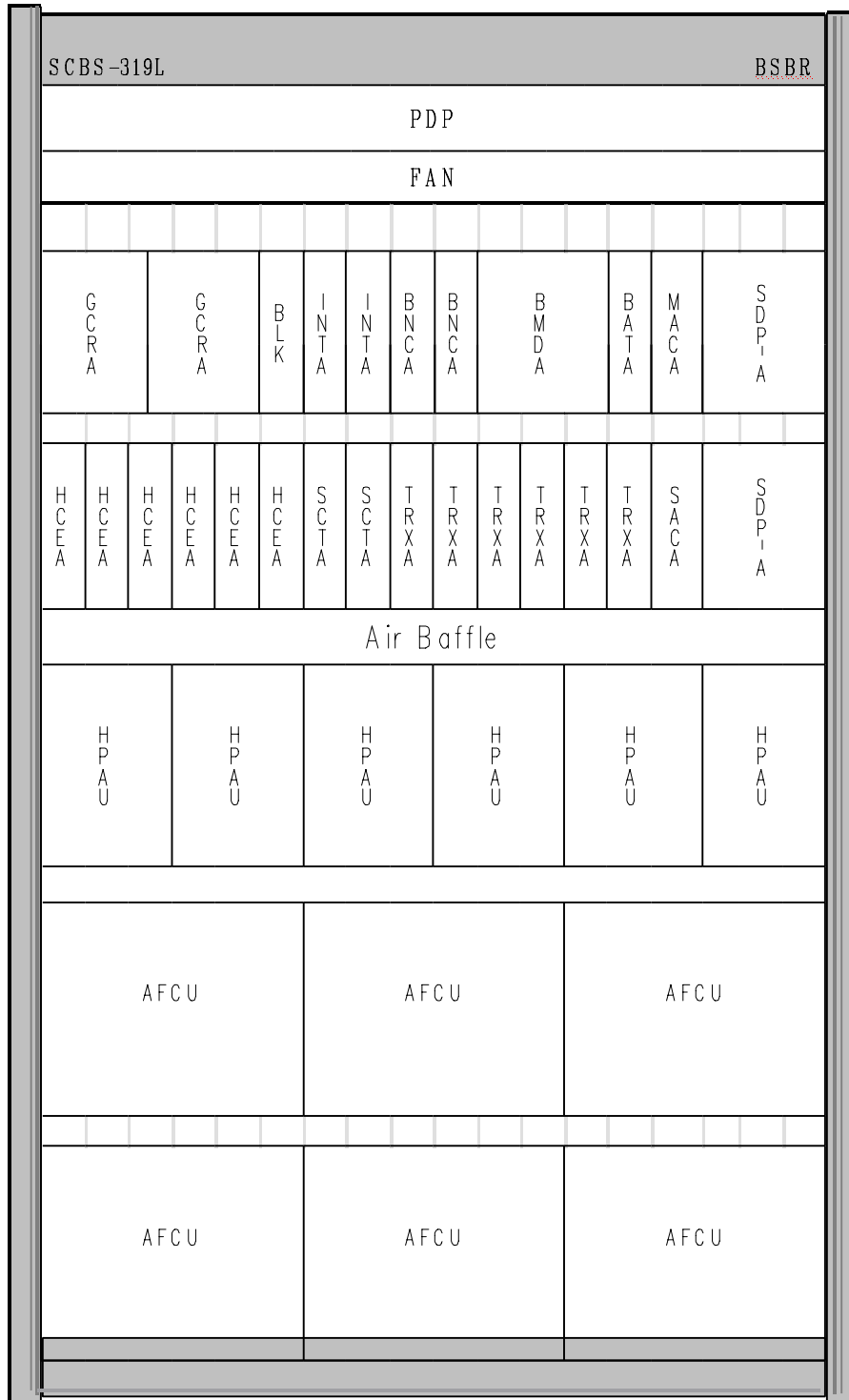
**System Diagram**

Refer to Figure 1 on the following page.

EQUIPMENT UNDER TEST: **INDOOR MINI BTS**

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**Figure 1 – Indoor Mini BTS**

EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

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**List of Modules Installed for Testing**

Designation	Part No.	Designation	Part No.
GCRA-B	s21kc56078	HPAU	s22N105281
GCRA-C	s21kc56089	HPAU	s22N105282
SPD-A	s22n105284	HPAU	s22N105283
SPD-A	s22n105283	HPAU	s22N105284
BNCA	s21kc47579	HPAU	s22N105285
BNCA	s21kc47568	HPAU	s22N105286
INTA	s21kc4762T	AFCU 2	s22N105270
INTA	s21kc48278	AFCU 2	s22N105271
BATA	s21kc47615	AFCU 2	s22N105272
BMDA	s21kc44655	AFCU 2	s22N105273
MACA	s21kc47551	AFCU 2	s22N105274
SACA	s21kc42724	AFCU 2	s22N105275
TRXA	s21n114470	BBBP	s3an102840
TRXA	s21kc52232	PDP	s22n105282
TRXA	s21n114469		
TRXA	s21kc52244		
TRXA	s21kc52250		
TRXA	s21kc52252		
SCTA	s21kc34413		
SCTA	s21kc3430		



EQUIPMENT UNDER TEST: **INDOOR MINI BTS**

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**Section 3. RF Power Output**

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 3/9/00

**Test Results:** **Complies.**

**Measurement Data:**

Modulation Type	Measured Output Power (dBm)	Measured Output Power (W)	Measured/Rated Output Power (dB)
CDMA	+43.0	20	0.0
GSM	N/A	N/A	N/A
NADC	N/A	N/A	N/A

NOTE: The power output was measured in Block D. The power output was set to the rated power output of 20 W per channel. All testing was performed with the transmitter operating at this output level.

**Equipment Used:** G2632, G3867, G1366, G3726, G3890, CF43, CF44

**Measurement Uncertainty:** +/- 1.25 dB

**Temperature:** 25 °C

**Relative Humidity:** 30 %

EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

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**Section 4. Occupied Bandwidth**

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 3/10/00

**Test Results:** [Complies.](#)

**Test Data:** See attached plot(s).

**Equipment Used:** [G2632, G3867, G1366, G3726, G3890, CF43, CF44](#)

**Measurement Uncertainty:** +/- [1.65](#) dB

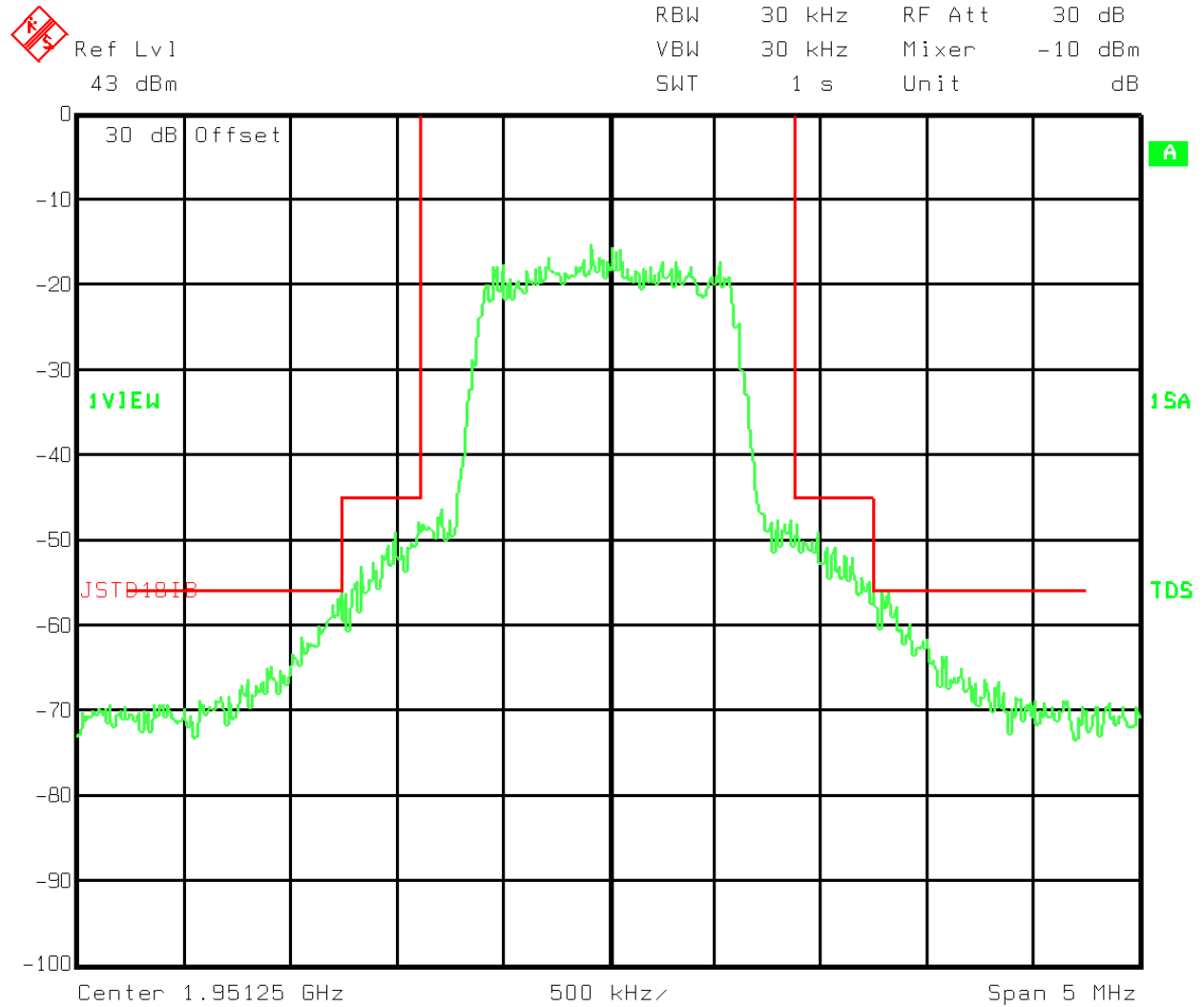
**Temperature:** [25](#) °C

**Relative Humidity:** [30](#) %

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

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Title: OCCUPIED BAND WIDTH - BLOCK B - CHANNEL 425  
Date: 10.MAR.2000 16:49:08

Plot 1 – Occupied Bandwidth

EQUIPMENT UNDER TEST: **INDOOR MINI BTS**

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PROJECT NO.: **9L0629RUS1**

**Section 5. Spurious Emissions at Antenna Terminals**

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 3/9/00

**Test Results:** **Complies.**

**Test Data:**

NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-27.5
Inter-modulation	-20.1
Lower Band Edge	-17.7
Upper Band Edge	-14.5

**Equipment Used:** **G2632, G3867, G1366, G3726, G3725, G3727, G1711, CF43, CF44**

**Measurement Uncertainty:** **+/- 1.65 dB**

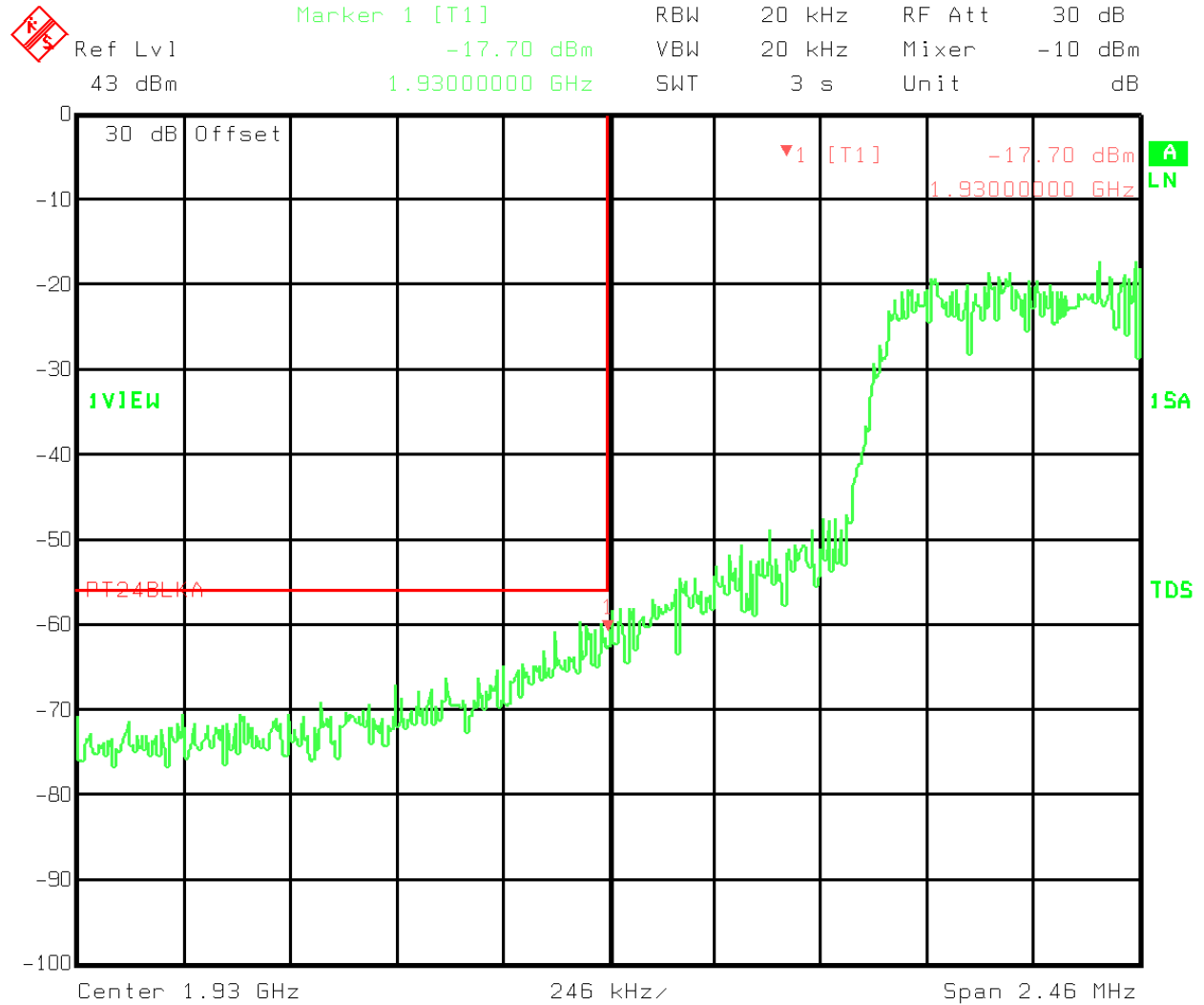
**Temperature:** **25 °C**

**Relative Humidity:** **27 %**

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



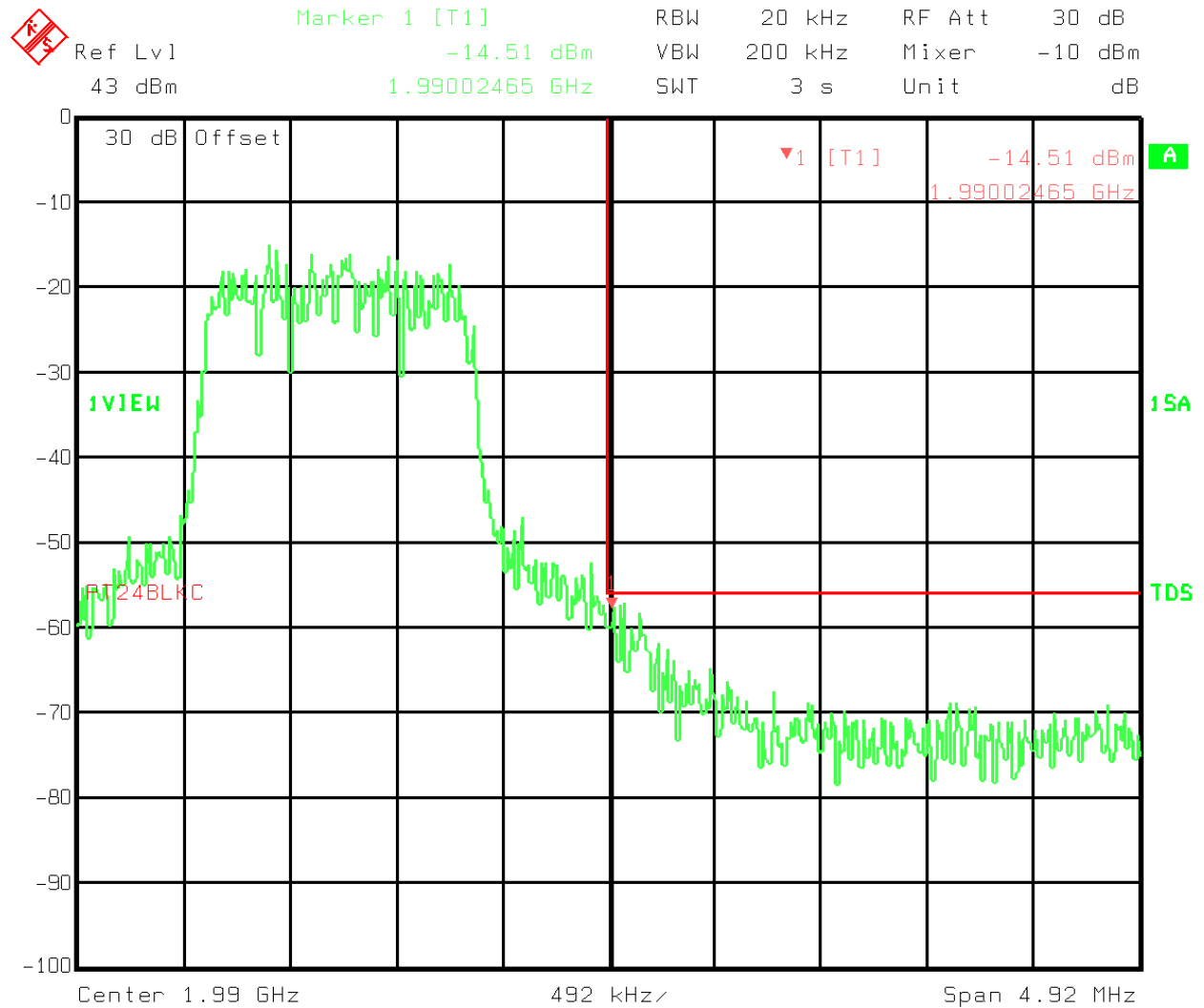
Title: Lower Band Edge - Block A  
Comment A: Channel 25  
Date: 10.MAR.2000 11:31:38

Plot 2 - Lower Band Edge Block A

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



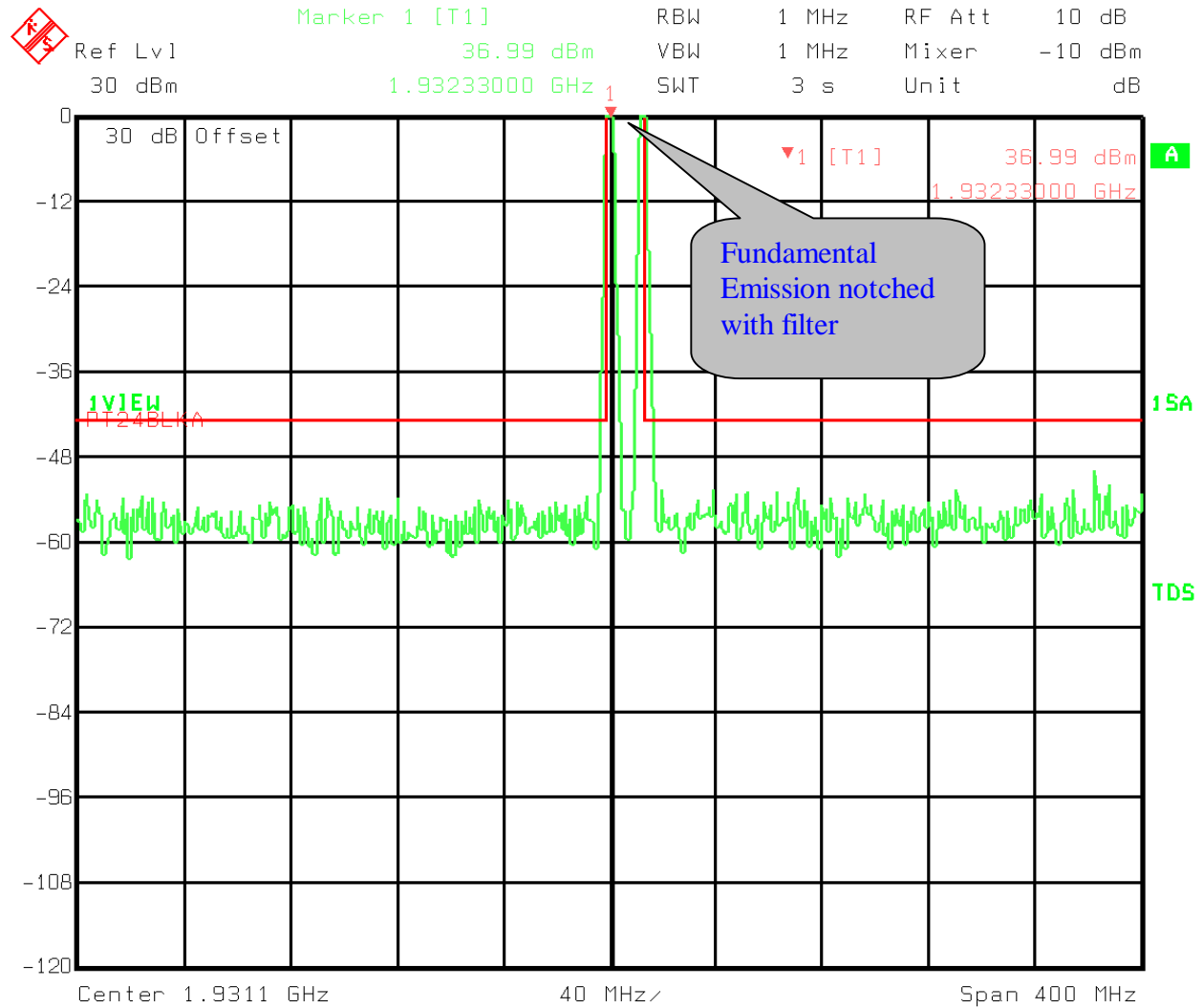
Title: Upper Band Edge - BLOCK C - CHANNEL 1175  
Date: 10.MAR.2000 18:28:53

Plot 3 - Upper Band Edge Block C

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



Title: Intermodulation Spurious Emissions  
Comment A: Channels 25 and 275 - 2 x 20 Watt carriers  
Date: 10.MAR.2000 12:25:56

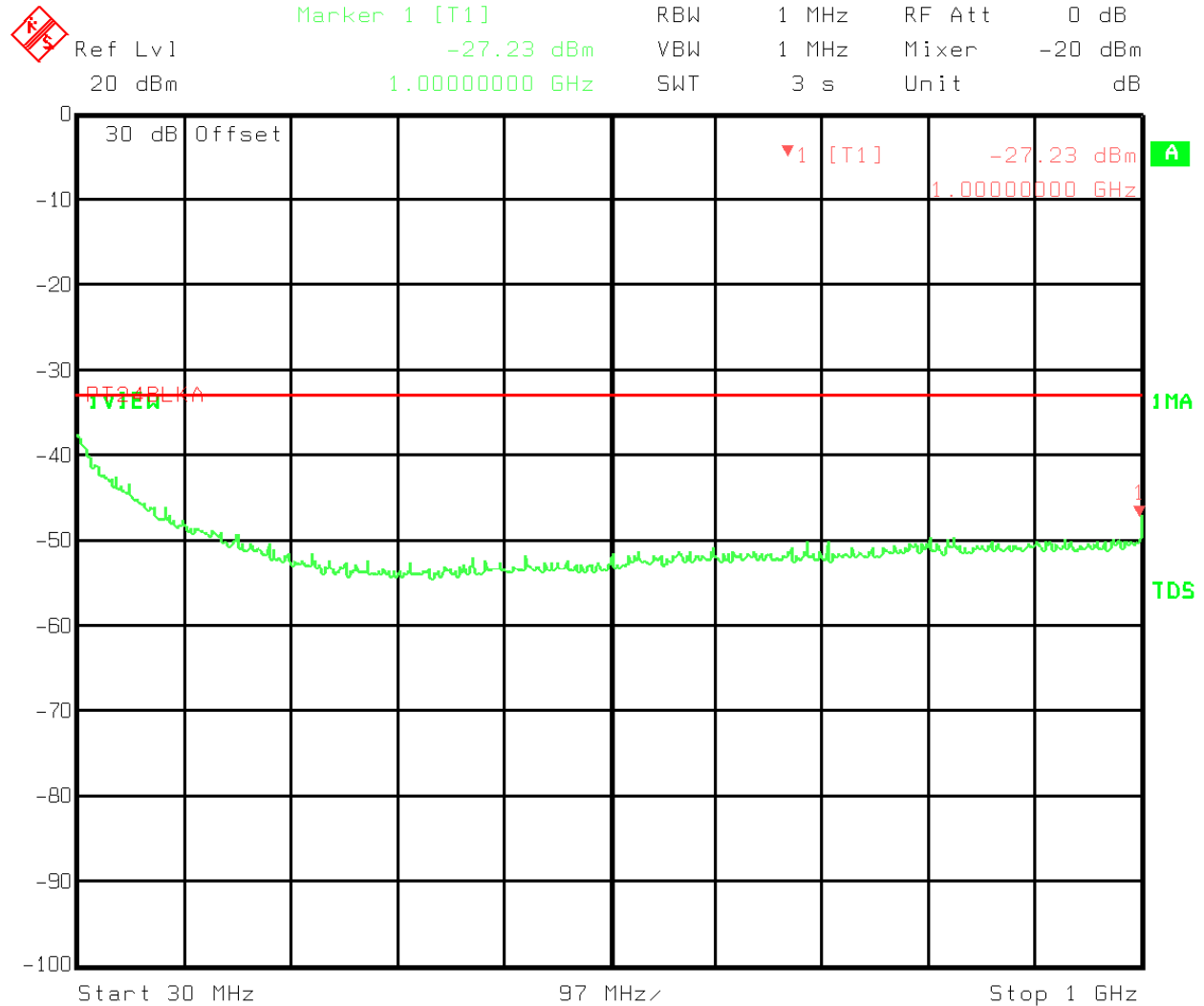
### Plot 4 – Inter-modulation Spurious

**NOTE: This plot is intended to demonstrate compliance of the inter-modulation products, not the band edge spurious emissions.**

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

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Title: Intermodulation Spurious Emissions  
 Comment A: Channels 25 and 275 - 2 x 20 Watt carriers  
 Fundamental emissions notched  
 Date: 10.MAR.2000 14:10:39

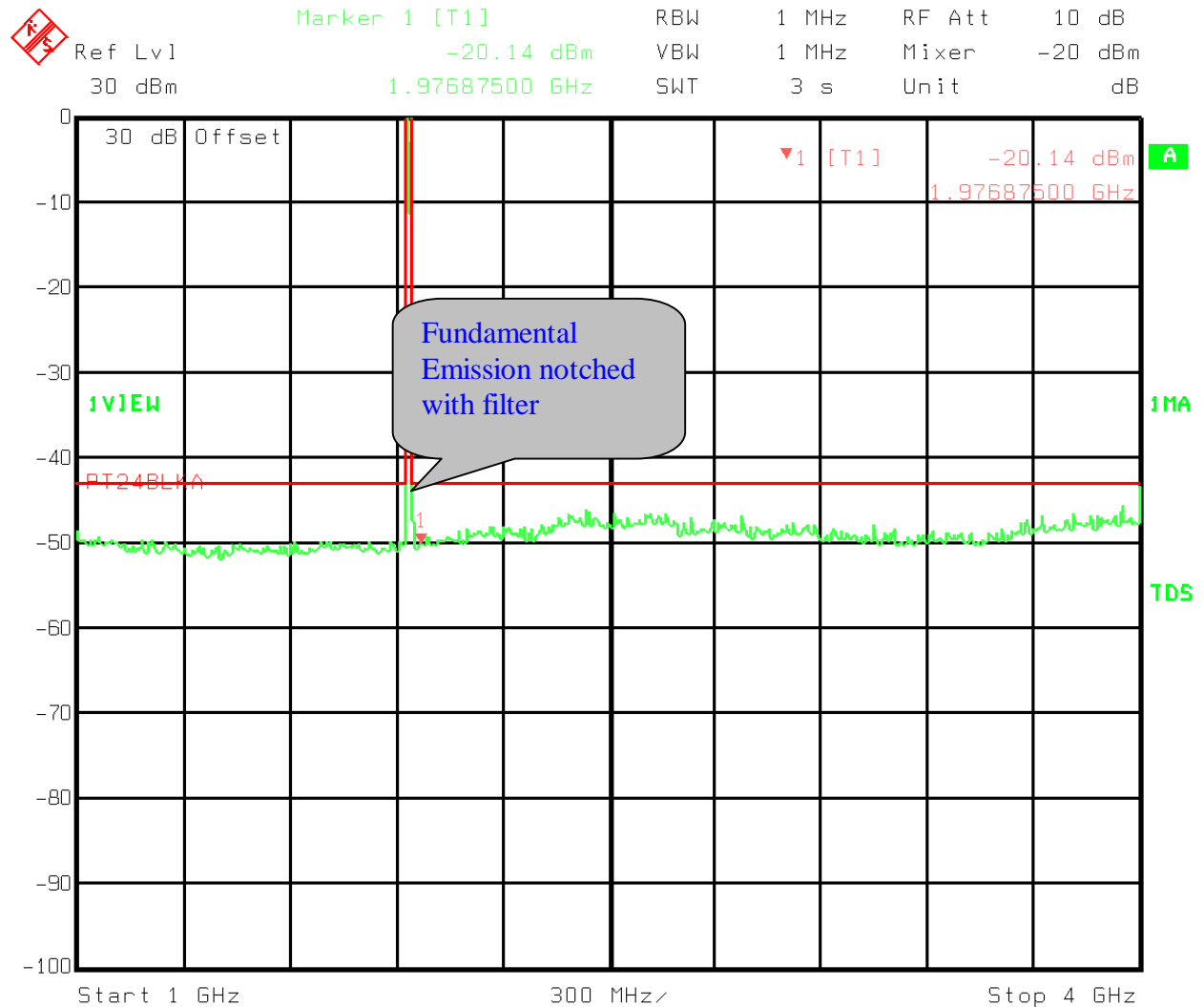
**Plot 5 - Inter-modulation Spurious**



EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



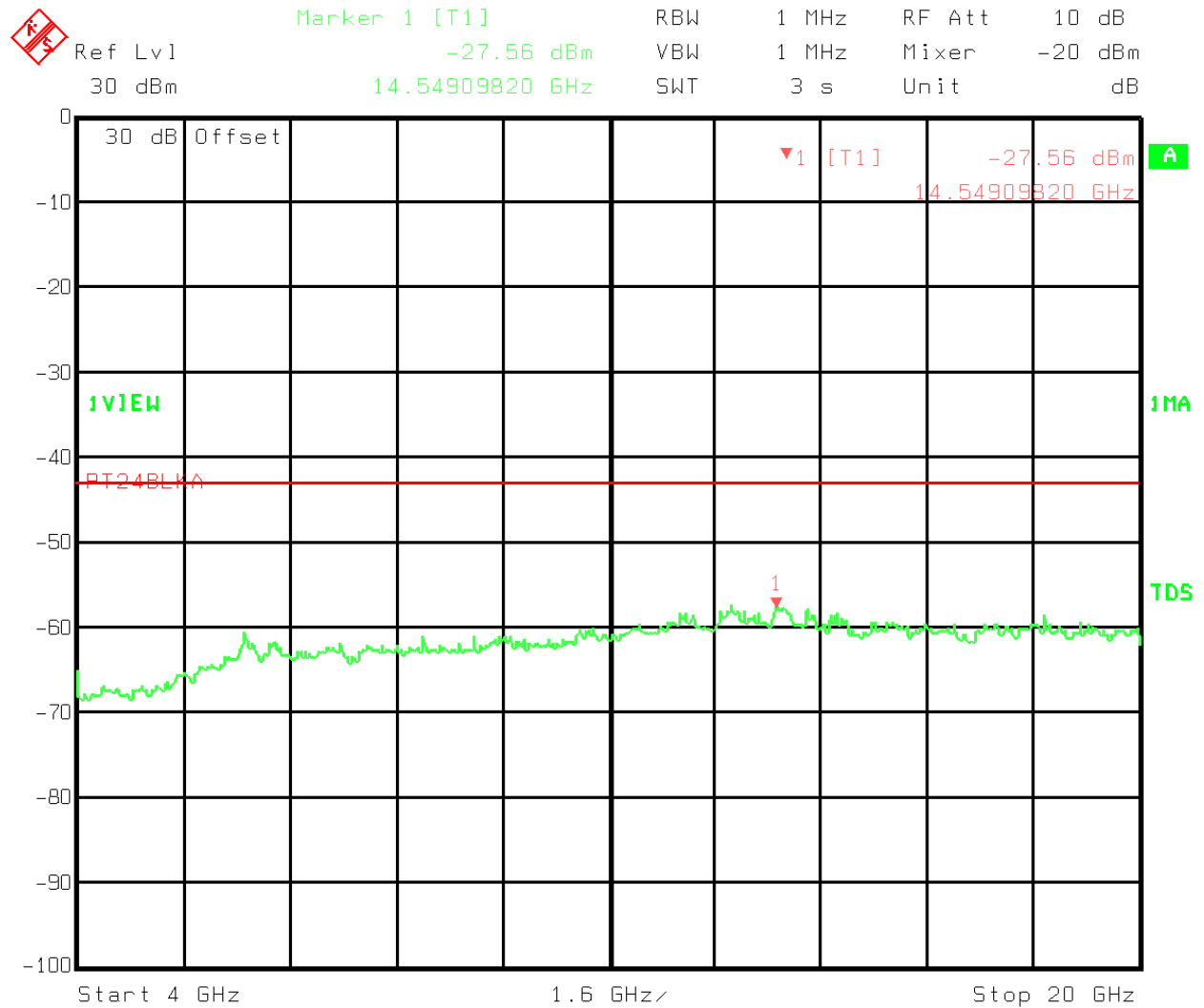
Title: Intermodulation Spurious Emissions  
Comment A: Channels 25 and 275 - 2 x 20 Watt carriers  
Fundamental emissions notched  
Date: 10.MAR.2000 14:00:28

Plot 6 - Inter-modulation Spurious

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



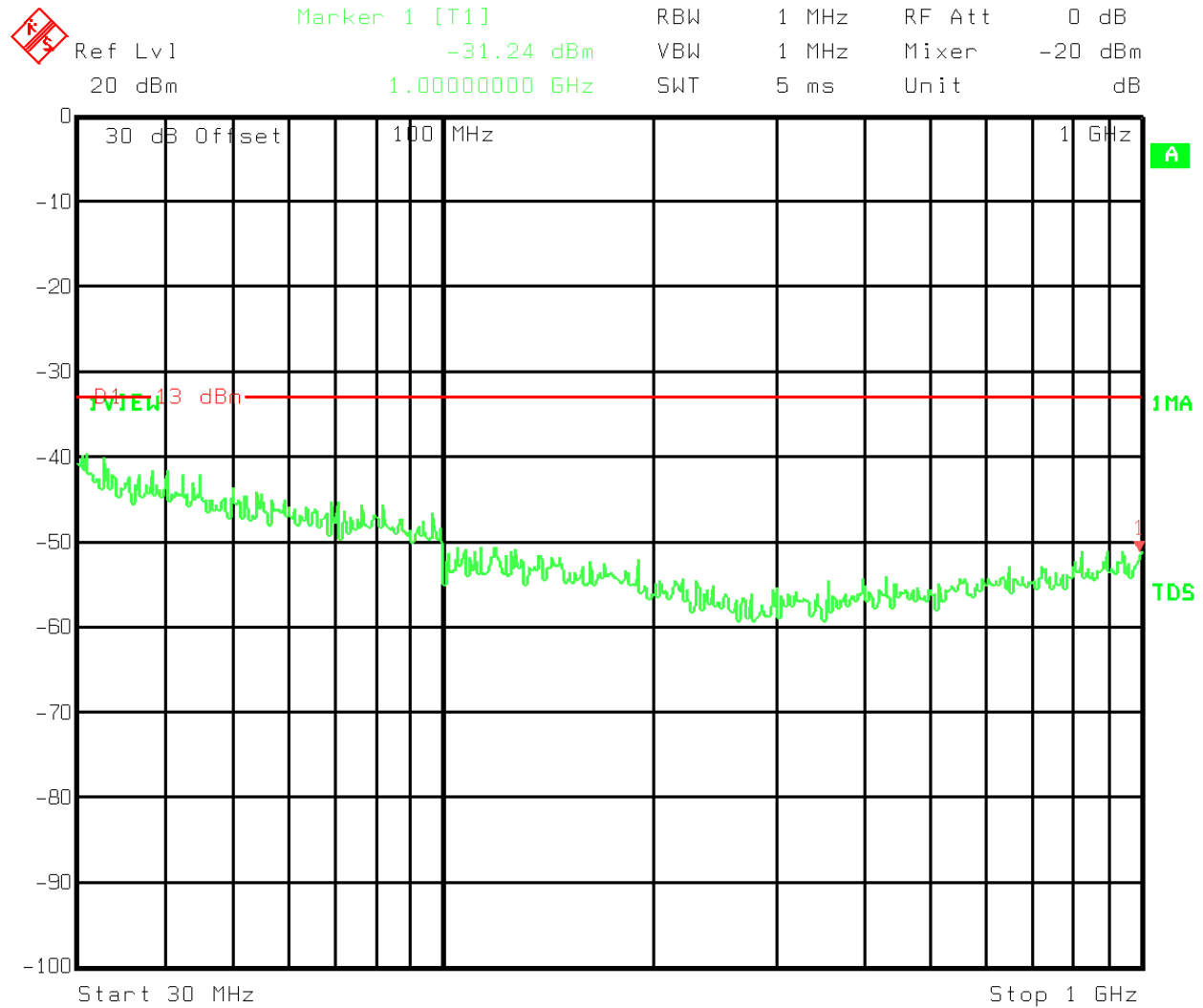
Title: Intermodulation Spurious Emissions  
 Comment A: Channels 25 and 275 - 2 x 20 Watt carriers  
 Fundamental emissions notched  
 Date: 10.MAR.2000 14:07:05

**Plot 7 – Inter-modulation Spurious**

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



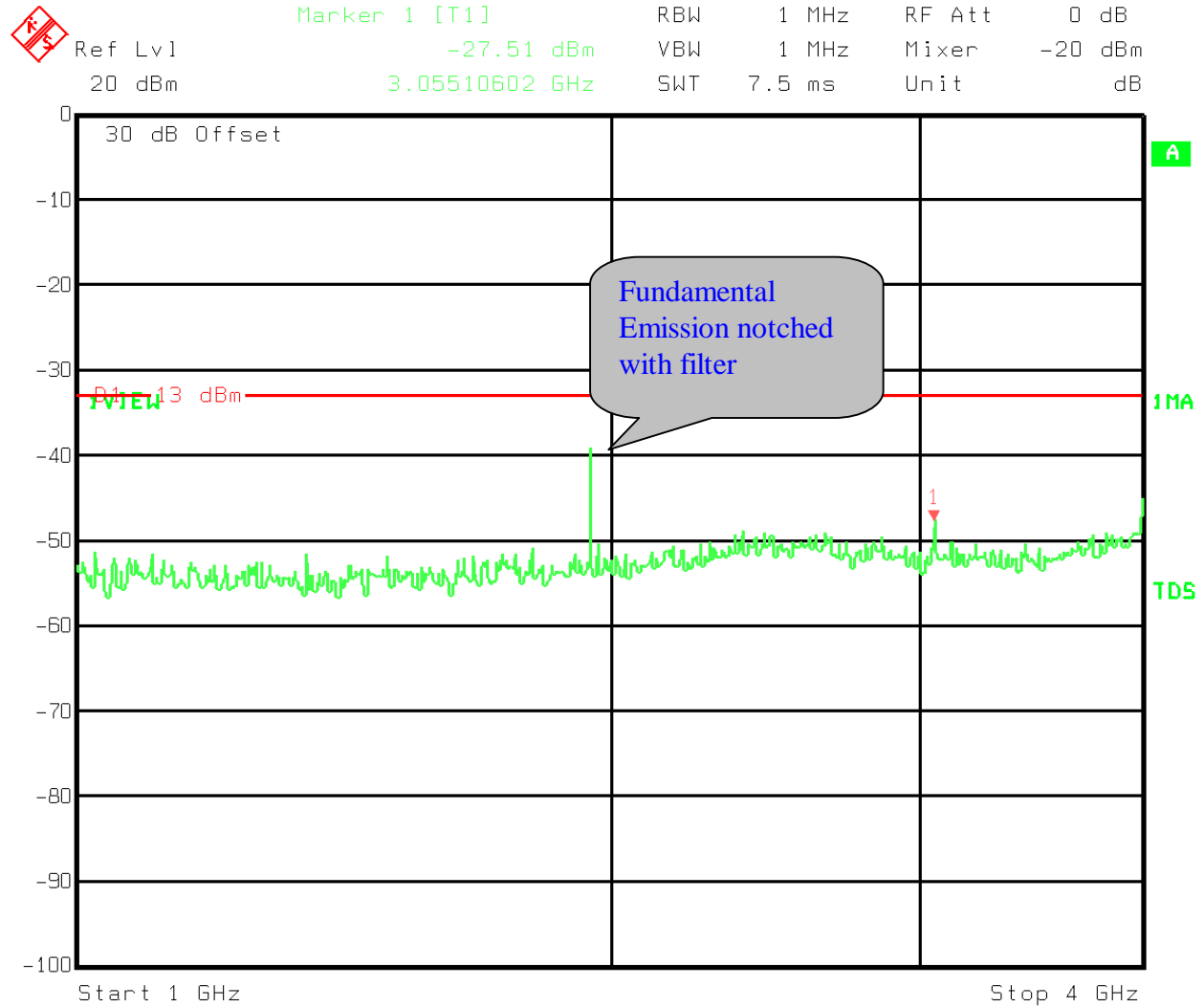
Title: Block D Spurious Emissions  
Comment A: Ambient Temp., Nominal Volt./ Ch. 350  
Date: 9.MAR.2000 19:16:32

Plot 8 - Spurious Emissions - Single Channel

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



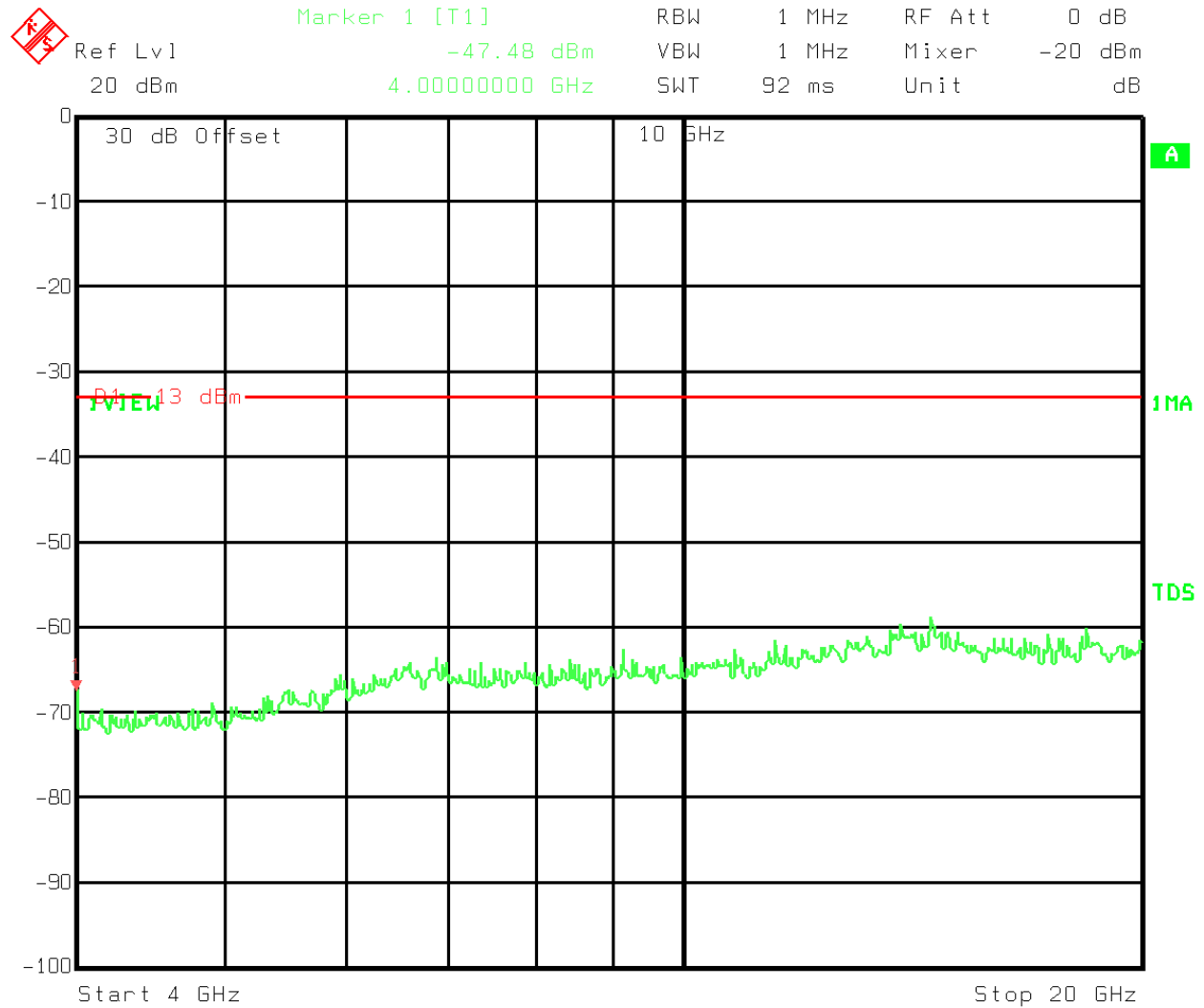
Title: Block D Spurious Emissions  
Comment A: Ambient Temp., Nominal Volt./ Ch. 350  
Date: 9.MAR.2000 19:18:56

Plot 9 - Spurious Emissions - Single Channel

EQUIPMENT UNDER TEST: INDOOR MINI BTS

FCC ID: NP8-SCBS-319L

PROJECT NO.: 9L0629RUS1



Title: Block D Spurious Emissions  
Comment A: Ambient Temp., Nominal Volt./ Ch. 350  
Date: 9.MAR.2000 19:27:02

Plot 10 - Spurious Emissions - Single Channel

EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

FCC ID: [NP8-SCBS-319L](#)

PROJECT NO.: [9L0629RUS1](#)

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**Section 6. Field Strength of Spurious**

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light, Kevin Rose	DATE: 3/30/00 – 3/31/00

**Test Results:** [Complies.](#)

**Test Data:** See attached table.

**Equipment Used:** [CF42, CF43, CF44, CF46, G1711, G2016, G2200, G2626](#)

**Measurement Uncertainty:** +/- [3.64](#) dB

**Temperature:** [22](#) °C

**Relative Humidity:** [50](#) %

EQUIPMENT UNDER TEST: **INDOOR MINI BTS**

FCC ID: **NP8-SCBS-319L**

PROJECT NO.: **9L0629RUS1**

**Test Data - Radiated Emissions REMW-1**

**Microwave Radiated Emissions Data**

Complete  Preliminary  Page 1 of 1

Client: Samsung Test #: REMW-1 W.O.#: 9L0629R

EUT: I - Mini BTS S/N: NONE Photo ID: 9L0629R

Technician: K. Rose / D. Light Specification: CFR47, 2.1051 Lab: AC1 Date: 3/29/00

Equipment Used: CF42-CF43-G2200-G2016-CF44-G1711-CF46-G2626

Configuration: Transmitting 20 watts (43 dBm) into load @ Channel 600

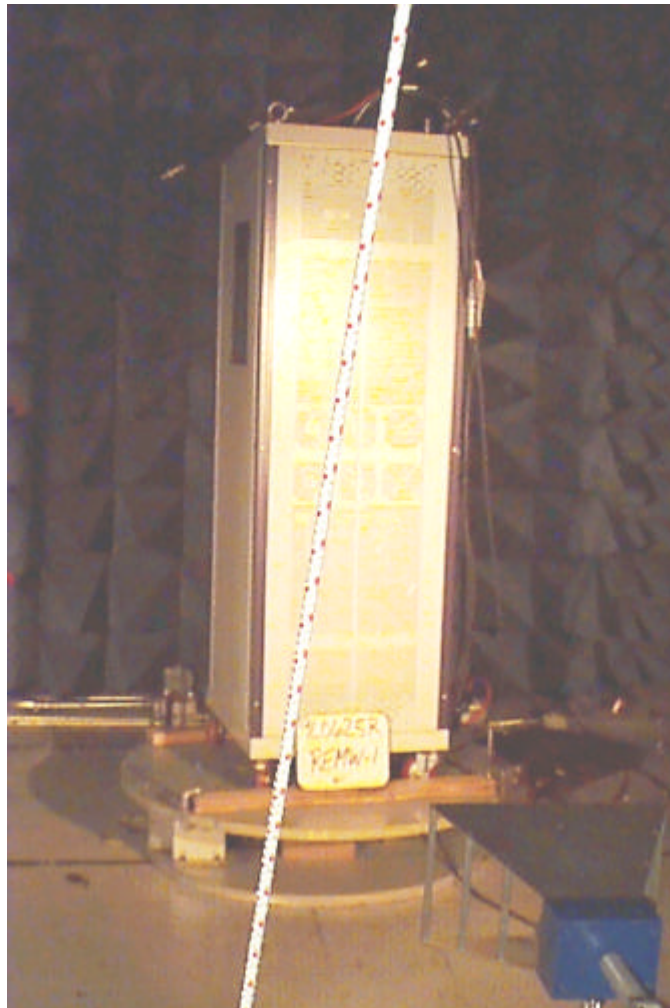
Bandwidth: 1 MHz Video Bandwidth: 1 MHz Antenna Distance 3 m Detector:

Climatic Conditions: EUT Power: 115 V.A.C. 60 Hz  Peak  
 Temperature: 22 C 208 V.A.C. 50 Hz  Average  
 Relative Humidity: 50 % 230 V.A.C.  
 Atmospheric Pressure: 999 mbar  Other 27 VDC  1 Phase  3 Phase

Freq. (GHz)	Meter Reading (dBm)	Antenna Factor (dB)	Cable Loss (dB)	RF Gain (dB)	Conver. Factor	Corrected Reading (dBuV/m)	ERP (mW)	ERP (dBm)	Pol.	Comments:
3.92	-64.4	31.6	6.1	31.2	107	49.1	0.000024	-46.1	V	PASS
5.88	-61.8	34.4	7.1	31.6	107	55.1	0.000097	-40.1	V	PASS
7.84	-65.1	37.8	7.9	32.9	107	54.7	0.000089	-40.5	V	NF
9.8	-63.9	37.2	9.7	33.3	107	56.7	0.000140	-38.5	V	NF
11.76	-63.3	39.5	11.2	33.1	107	61.3	0.000405	-33.9	V	NF
13.72	-63.5	43.0	13.4	31.3	107	68.6	0.002173	-26.6	V	NF
15.68	-64.8	39.5	13.5	30.6	107	64.6	0.000865	-30.6	V	NF
17.64	-63.4	43.0	14.3	31.3	107	69.6	0.002736	-25.6	V	NF
3.92	-65.7	31.6	6.1	31.2	107	47.8	0.000018	-47.4	H	PASS
5.88	-58.5	34.4	7.1	31.6	107	58.4	0.000208	-36.8	H	PASS
7.84	-65.4	37.8	7.9	32.9	107	54.4	0.000083	-40.8	H	NF
9.8	-65.5	37.2	9.7	33.3	107	55.1	0.000097	-40.1	H	NF
11.76	-63.4	39.5	11.2	33.1	107	61.2	0.000395	-34.0	H	NF
13.72	-63.5	43.0	13.4	31.3	107	68.6	0.002173	-26.6	H	NF
15.68	-65	39.5	13.5	30.6	107	64.4	0.000826	-30.8	H	NF
17.64	-64.6	43.0	14.3	31.3	107	68.4	0.002075	-26.8	H	NF
<b>Scanned to the 10th harmonic of the fundamental</b>										

DATACOMMON\FORMS\TESTDATASHEETS\MICRORE REV 030597

**Photographs of Test Setup REMW-1**



**Photo 1 - Indoor Mini-BTS REAR VIEW**



EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

FCC ID: [NP8-SCBS-319L](#)

PROJECT NO.: [9L0629RUS1](#)

## Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: David Light, Kevin Rose	DATE: 3/16/00 – 3/23/00

**Test Results:** Complies

**Measurement Data:** Standard Test Frequency: 1960.00 MHz  
 Standard Test Voltage: 27 Vdc  
 Maximum frequency error: +24.9 Hz (0.0127 ppm)

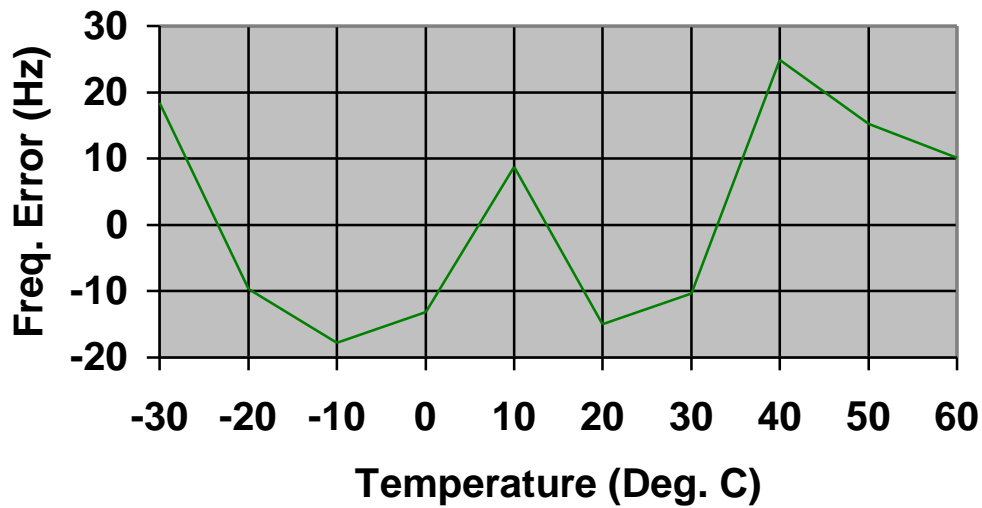
CH. 600	Temperature	Freq. Error	Rho	Voltage
	-30	+18.4	0.9623	+27 V
	-20	-9.70	0.9630	+27 V
	-10	-17.8	0.9580	+27 V
	0	-13.2	0.9555	+27 V
	10	+8.7	0.9730	+27 V
	20	-9.90	0.9747	<b>+23 V</b>
	20	-15.0	0.9747	<b>+27 V</b>
	20	-11.0	0.9747	<b>+31 V</b>
	30	-10.4	0.9745	+27 V
	40	+24.9	0.9750	+27 V
	50	+15.2	0.9641	+27 V
	60	+10.1	0.9523	+27 V

**Measurement Uncertainty:** +/-  $1 \times 10^{-7}$  ppm

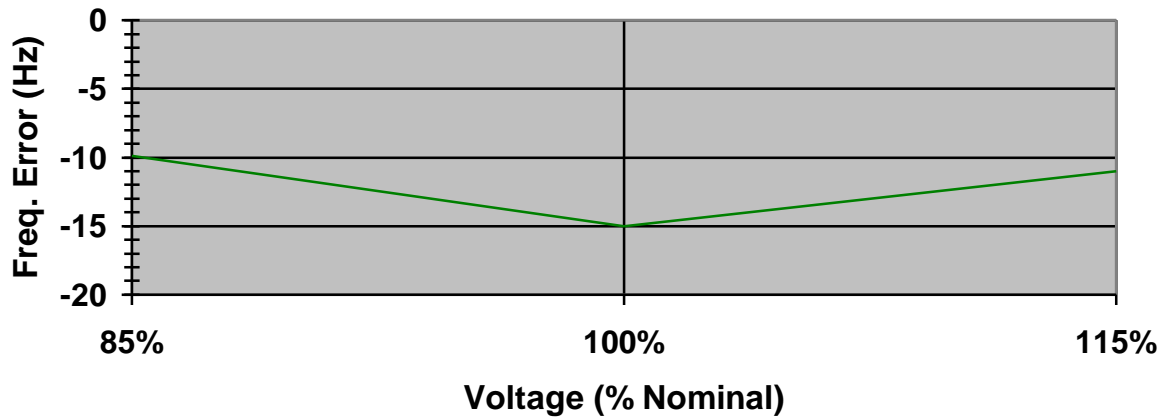
**Temperature:** -30 to +60 °C

**Relative Humidity:** [Uncontrolled](#) %

### Frequency Error over Temperature



### Frequency Error over Voltage



EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)FCC ID: [NP8-SCBS-319L](#)PROJECT NO.: [9L0629RUS1](#)**Section 8. Test Equipment List**

KTL ID	Description	Manufacturer Model Number	Serial Number	Calibration Date
G1366	50 OHM LOAD	NARDA 27470	254	08/25/99
G1711	TUNABLE NOTCH FILTER	K&L 3TNF-1000/2000-N/N	144	CBU
G2016	ANTENNA, HORN	A.H. SYSTEMS SAS-200/571	162	07/16/99
G2200	AMPLIFIER	HEWLETT PACKARD 8449A	2749A00159	06/11/99
G2626	SPECTRUM ANALYZER	HEWLETT PACKARD 8566B	2618A02843	03/08/00
G2632	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	06/14/99
G3725	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	05/19/99
G3726	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	05/19/99
G3727	DUAL DIRECTIONAL COUPLER	HEWLETT PACKARD 11692D	1212A03366	05/07/99
G3893	POWER METER	WAVETEK 8531	1911	06/17/99
CF42	HIGH FREQUENCY CABLE	ASTROLAB 32022-2-29094K-1M	N/A	09/30/99
CF43	HIGH FREQUENCY CABLE	ASTROLAB 32022-2-29094K-1M	N/A	09/30/99
CF44	CABLE, 4M	STORM PR90-010-144	N/A	10/15/99
CF46	CABLE, 4M	STORM PR90-010-144	N/A	10/15/99
G3894	SENSOR,RF POWER	WAVETEK 85310	2310	06/17/99
LEASED	CDMA BASE STATION TEST SET	HEWLETT PACKARD	8935 937720	2/7/00

CBU – Calibrate Before Use

## **ANNEX A - TEST DETAILS**

EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)FCC ID: [NP8-SCBS-319L](#)PROJECT NO.: [9L0629RUS1](#)**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 and J-STD-019  
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.

Integral Antenna:

If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation  $GP/4\pi R^2 = E^2/120\pi$  and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts

E = the maximum measured field strength in V/m

R = the measurement range (3 meters)

G = the numeric gain of the transmit antenna in relation to an isotropic radiator

EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

FCC ID: [NP8-SCBS-319L](#)

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<b>NAME OF TEST: Occupied Bandwidth</b>	<b>PARA. NO.: 2.1049</b>
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**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 and J-STD-019

Spectrum analyzer settings:

RBW: 30 kHz

VBW:  $\geq$  RBW

Span: 5 MHz

Sweep: Auto

GSM Per ANSI/J-STD-010

RBW: 3 kHz

VBW:  $\geq$  RBW

Span: 2 MHz

Sweep: Auto

NADC Per IS-136

RBW: 1 kHz

VBW:  $\geq$  RBW

Span: 1 MHz

Sweep: Auto

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<b>NAME OF TEST: Spurious Emission at Antenna Terminals</b>	<b>PARA. NO.: 2.1051</b>
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**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 and J-STD-019

GSM Per ANSI/J-STD-010

RBW: 1 MHz (> 1 MHz from Band Edge)  
RBW: 20 or 30 kHz (< 1MHz from Band Edge)  
VBW:  $\geq$  RBW  
Sweep: Auto  
Video Avg: 6 Sweeps

RBW: 1 MHz (> 1 MHz from Band Edge)  
RBW: 3 kHz (< 1 MHz from Band Edge)  
VBW:  $\geq$  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:  $\geq$  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.

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<b>NAME OF TEST: Field Strength of Spurious Radiation</b>	<b>PARA. NO.: 2.1053</b>
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**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.

### Calculation Of Field Strength Limit

An example of attenuation requirement of  $43 + 10 \log P$  is equivalent to -13 dBm ( $5 \times 10^{-5}$  Watts) at the antenna terminal. We determine the field strength limit by using the plane wave relation.

$$GP/4\pi R^2 = E^2/120\pi$$

For emissions  $\leq 1$  GHz:

$G = 1.64$  (Dipole Gain)

$P = 10^{-5}$  Watts (Maximum spurious output power)

$R = 3$ m (Measurement Distance)

$$E = \frac{\sqrt{30GP}}{R}$$

$$E = \frac{\sqrt{30 \times 1.64 \times 5 \times 10^{-5}}}{3} = 0.016533 \text{ V / m} = 84.4 \text{ dB}\mu\text{V / m}$$

For emissions  $> 1$  GHz:

$G = 1$  (Isotropic Gain)

$P = 1 \times 10^{-5}$  Watts (Maximum spurious output power)

$R = 3$ m (Measurement Distance)

$$E = 84.4 - 20 \log \sqrt{1.64} = 82.3 \text{ dB}\mu\text{V / m} @ 3 \text{ m}$$



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<b>NAME OF TEST: Frequency Stability</b>	<b>PARA. NO.: 2.1055</b>
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**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 and J-STD-019  
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. The worst-case frequency error is recorded.

## **ANNEX B - TEST DIAGRAMS**

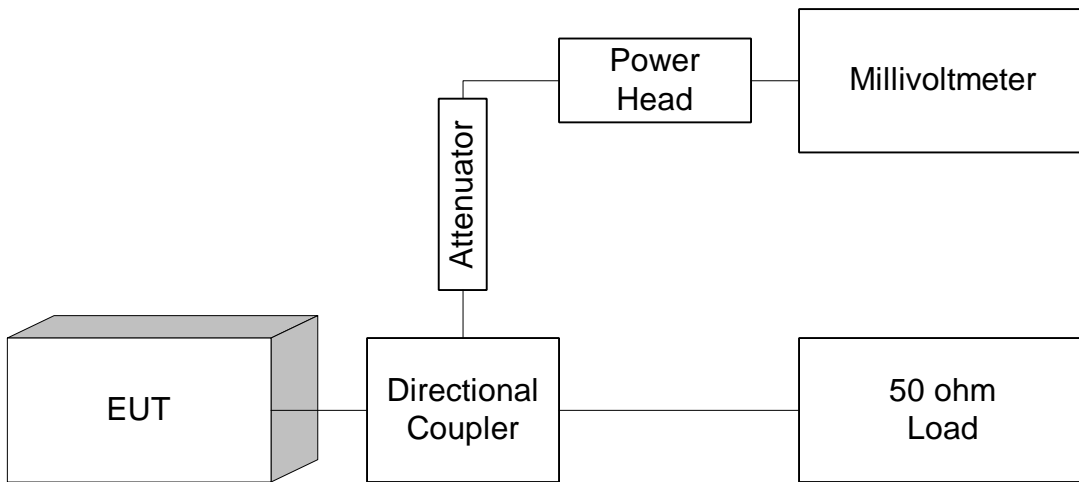
EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

FCC ID: [NP8-SCBS-319L](#)

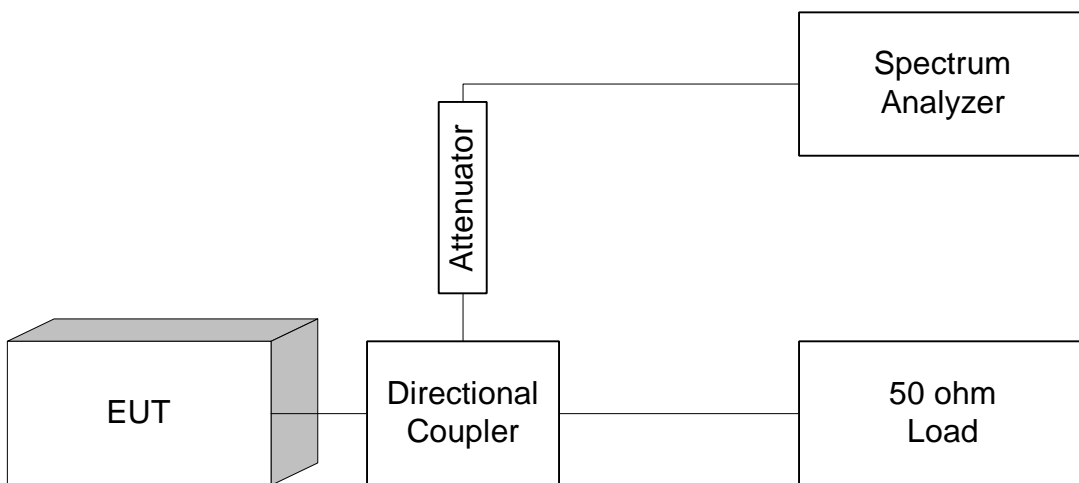
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**Para. No. 2.985 - R.F. Power Output**



**Para. No. 2.989 - Occupied Bandwidth**

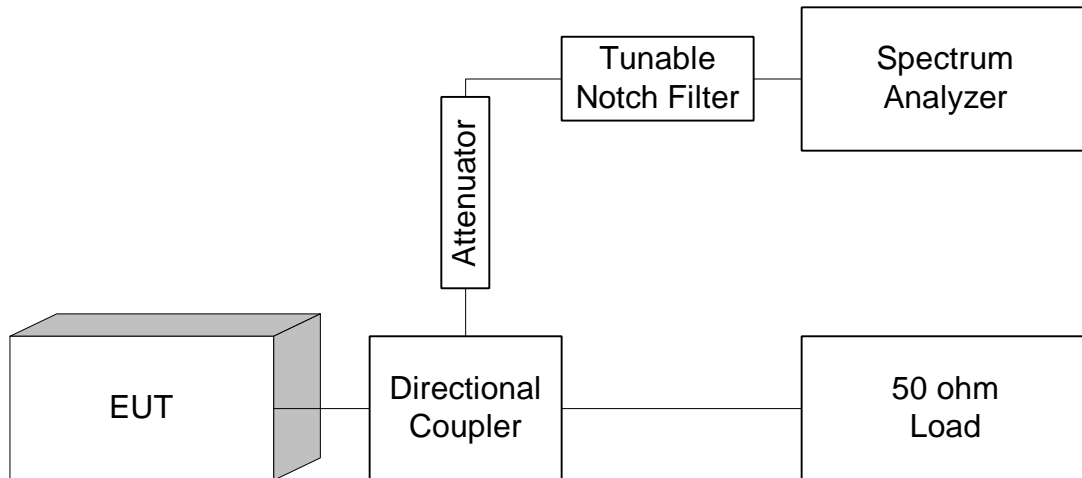


EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

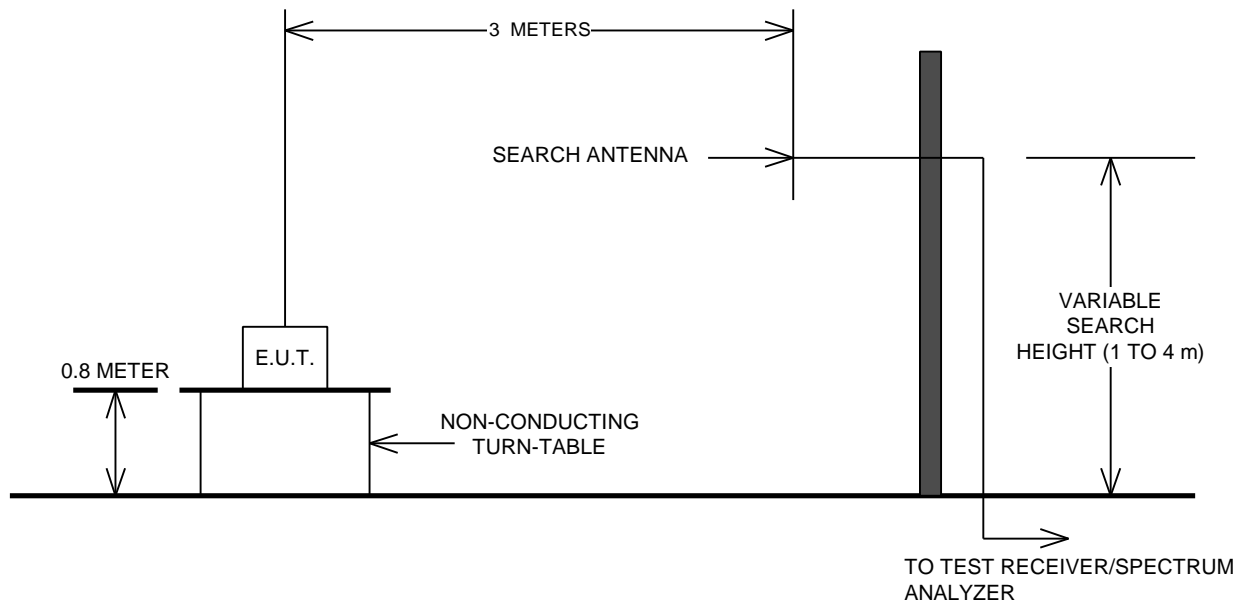
FCC ID: [NP8-SCBS-319L](#)

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**Para. No. 2.991 Spurious Emissions at Antenna Terminals**



**Para. No. 2.993 - Field Strength of Spurious Radiation**



EQUIPMENT UNDER TEST: [INDOOR MINI BTS](#)

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**Para. No. 2.995 - Frequency Stability**

