

KTL Test Report No.:

0L0551RUS1

Applicant:

Allen Telecom Systems
140 Vista Center Drive
Forest, VA 24551

Equipment Under Test:

EAC-2100 PCS REPEATER

FCC ID:

BCR-RPT-EAC2100

In Accordance With:

FCC Part 24, Subpart E
Broadband PCS Repeaters

Tested By:

KTL Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136



Authorized By:

Tom Tidwell, EMC/Wireless Group Manager

Date:

February, 2001

Total Number of Pages:

40

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EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

Section 1. Summary of Test Results

Manufacturer: Grayson Wireless

Model No.: EAC-2100

Serial No.: 001

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”.

**NVLAP LAB CODE: 100426-0**

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Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	100W	50 W	Complies
Occupied Bandwidth (CDMA)	24.238	Input/Output	N/A	N/A
Occupied Bandwidth (GSM)	24.238	Input/Output	N/A	N/A
Occupied Bandwidth (NADC)	24.238	Input/Output	Input/Output	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	< -13 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	< -13 dBm	Complies
Frequency Stability	24.235		N/T	N/T

Footnotes:

- (1) CDMA & GSM modulations were not tested because the repeater is for NADC signals only..
- 2) Frequency stability testing was performed by the manufacturer

Measurement uncertainty for each test configuration is expressed to 95% probability.

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Section 2. General Equipment Specification

Supply Voltage Input:		120 VAC		
Frequency Bands:	Downlink:	☒	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:	Uplink:	☒	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 (G7W)	GSM (GXW)	NADC (DXW)
		☐	☐	☒
Output Impedance:		50 ohms		
RF Output (Rated):	Uplink	Per channel: .282 W Total: .560 W		
RF Output (Rated):	Downlink	Per channel: 25 W Total: 50 W		
Frequency Translation:		F1-F1	F1-F2	N/A
		☒	☐	☐
Band Selection:		Software	Duplexer	Fullband
		☐	☒	☐

EQUIPMENT: EAC 2100

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Description of Operation

The EAC-2100 booster is available in either a two-channel or a four-channel configuration. Each RF channel is capable of handling three full-rate TDMA channels. Therefore, a four-channel EAC-2100 can provide one DCCH channel and 11 DTC DTC channels.

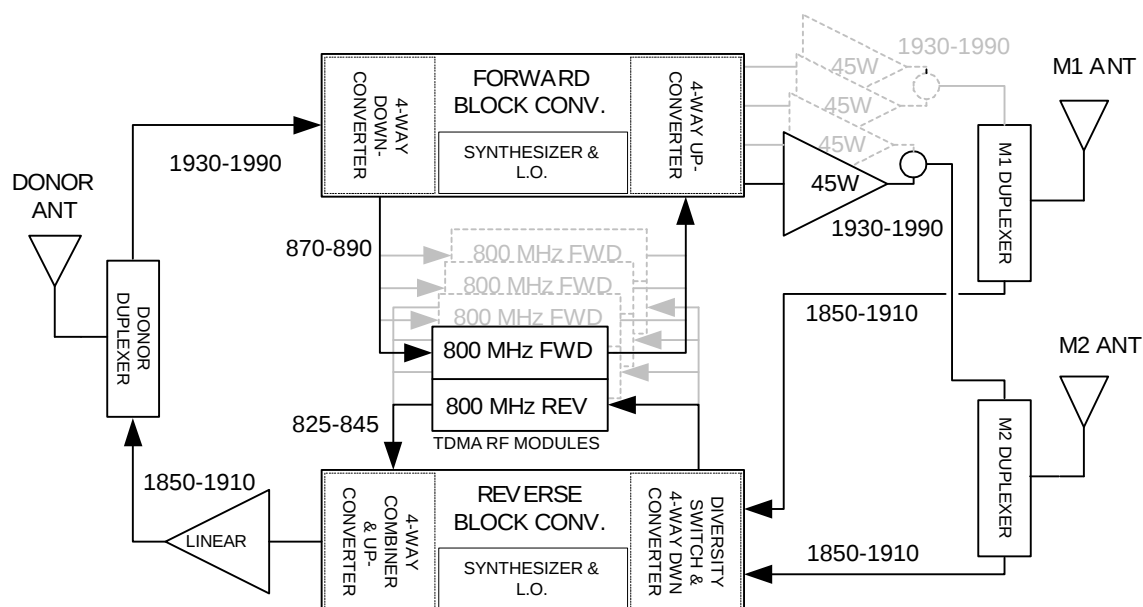
Also, two EAC-2100 boosters may be operated together to provide up to eight RF-channel operation (1 DCCH plus 23 DTC DTC channels). A digital control cable connects the two cabinets together to allow one cabinet to handle the DCCH duties.

A block diagram of the EAC-2100 is shown in figure 1-2. Up to four 800 MHz TDMA modules are used. These modules are similar to those used in the EAC-2000, with the main difference being that they have a lower output power level in the reverse direction. Like the EAC-2000, these modules provide the frequency translation feature necessary to allow high-gain repeater operation.

Block converters are used to convert the PCS band to the 800 MHz band, and likewise the 800 MHz band to the PCS band. A Forward Block Converter and a Reverse Block Converter is used. Each block converter has its own synthesizer and local-oscillator control for performing the block conversion process.

The Forward Block Converter converts the 1930-1990 MHz signals from the donor cell site to the 870-890 MHz band. The 870-890 MHz block is fed to the 800 MHz TDMA RF modules for signal processing. The outputs of the 800 MHz modules are individually converted back to the 1930-1990 MHz band for subsequent transmission to the repeater coverage area. Since the PCS band is wider than the 800 MHz tuning range of the 800 MHz RF modules, the Block Converters

System Diagram



EQUIPMENT: EAC 2100

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Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 1/26/01

Test Results: Complies.**Measurement Data:**

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	N/A	N/A
Downlink	CDMA	N/A	N/A
Uplink	GSM	N/A	N/A
Downlink	GSM	N/A	N/A
Uplink	NADC	24.5	27.5
Downlink	NADC	44	47

Equipment Used: 1036-1082-1475-1055**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 22 °C**Relative Humidity:** 50 %

EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

Section 4. Occupied Bandwidth

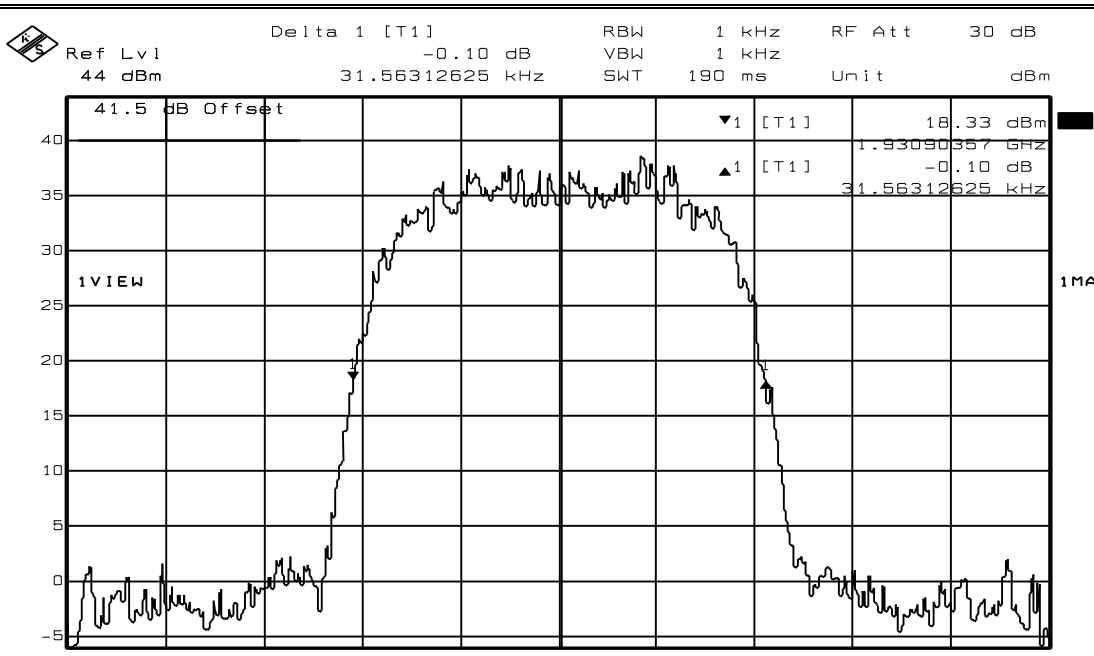
NAME OF TEST: Occupied Bandwidth (NADC)	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 1/26/01

Test Results: Complies.**Test Data:** See attached plot(s).**Equipment Used:** 1036-1082-1475-1055**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 22 °C**Relative
Humidity:** 50 %

EQUIPMENT: EAC 2100

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Test Data - Occupied Bandwidth - NADC

Data Plot Occupied Bandwidth	
Page 1 of 2	
Job No.: 0L0551R	Date: 01/26/00
Specification: Part 24	Temperature(°C): 22
Tested By: David Light	Relative Humidity(%) 50
E.U.T.: EAC-2100	
Configuration: Tx 1 channel - full power	
Sample No: S01	
Location: Lab 1	RBW: 1 kHz
Detector Type: Peak	VBW: 1 kHz
Test Equipment Used	
Antenna:	Directional Coupler: 1055
Pre-Amp:	Cable #1: 1082
Filter:	Cable #2:
Receiver: 1036	Cable #3:
Attenuator #1: 1475	Cable #4:
Attenuator #2:	Mixer:
Additional equipment used:	
Measurement Uncertainty: +/-3.6 dB	
 The plot shows a spectrum with a central peak at 1.930919274 GHz. The y-axis is labeled '1 VIEW' and ranges from -5 to 40 dBm. The x-axis is labeled 'Center 1.930919274 GHz' and 'Span 75 kHz'. A '41.5 dB Offset' is indicated. The plot shows a noisy signal with a peak level of 18.33 dBm. The plot is titled 'Delta 1 [T1]' and 'Ref Lvl 44 dBm'. The plot also shows 'RBW 1 kHz', 'VBW 1 kHz', 'RF Att 30 dB', 'SWT 190 ms', and 'Unit dBm'. The plot is dated '26.JAN.2001 14:06:23'.	
Notes: Occupied bandwidth - Downlink	

EQUIPMENT: EAC 2100

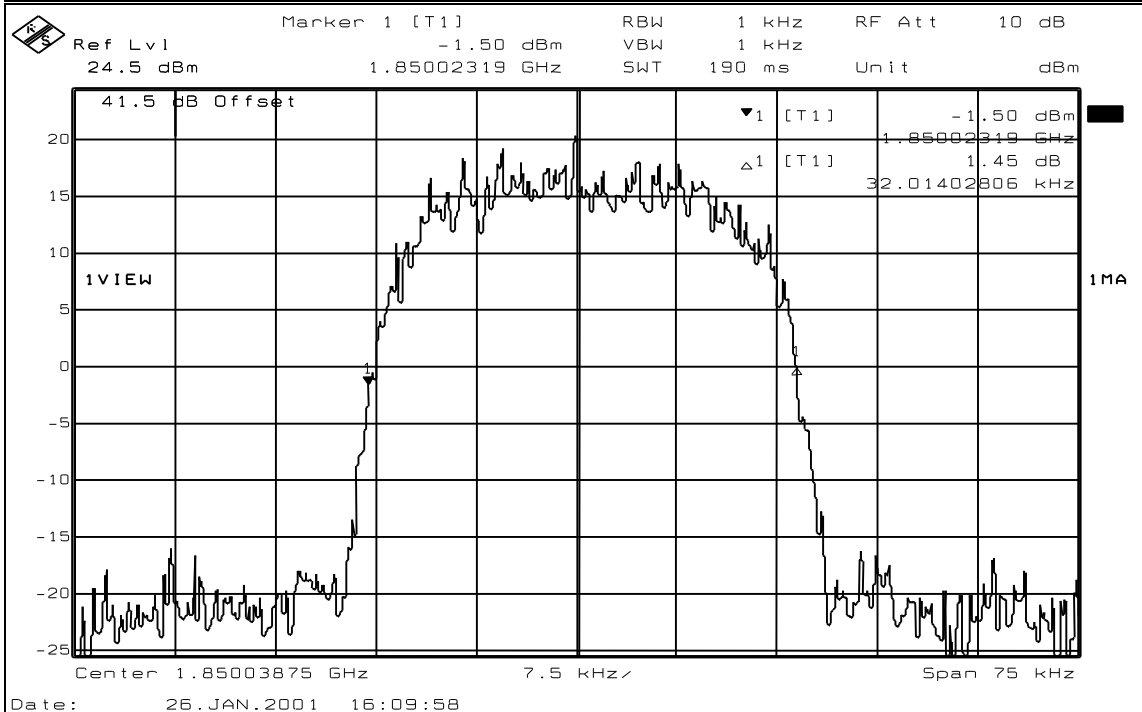
PROJECT NO.: 0L0551RUS1

Test Data - Occupied Bandwidth - NADC

Data Plot Occupied Bandwidth

Page 2 of 2

Job No.: 0L0551R Date: 01/26/00
Specification: Part 24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: EAC-2100
Configuration: Tx 1 channel - full power



Notes: Occupied bandwidth - Uplink

EQUIPMENT: EAC 2100

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Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE:1/26/01 & 1/29/01

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1475-1082-1055

Measurement Uncertainty: +/- 1.6 dB

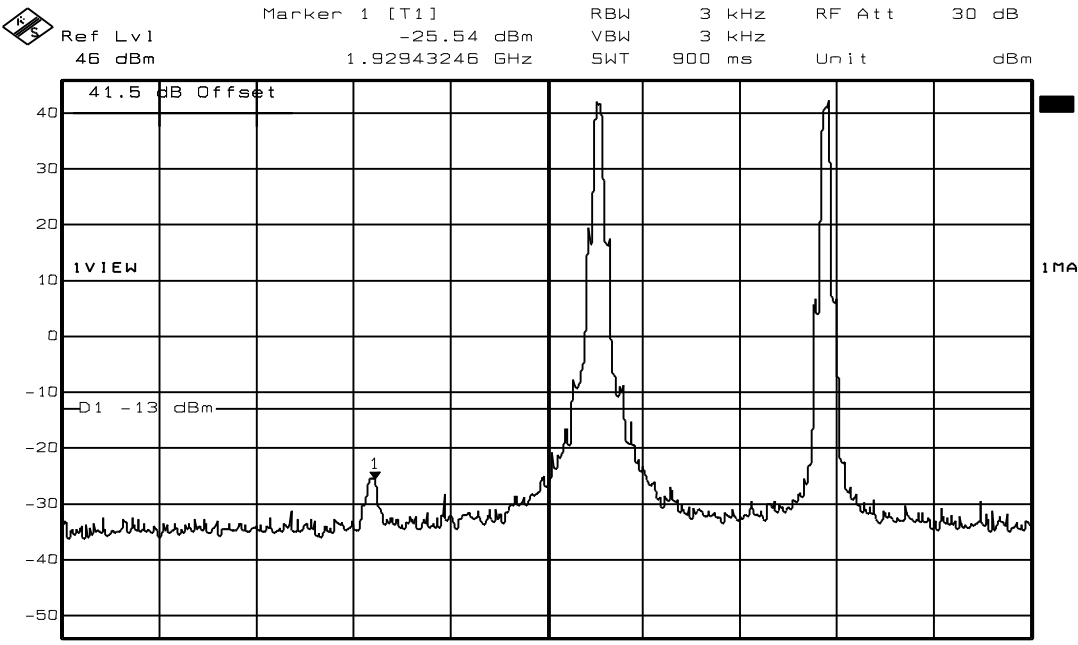
Temperature: 22 °C

Relative Humidity: 50 %

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals

Data Plot		Intermodulation Characteristics	
Page 1 of 4		Complete ☒ Preliminary ☐	
Job No.:	0L0551R	Date:	01/29/01
Specification:	PART 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%):	50
E.U.T.:	EAC-2100		
Configuration:	TX 2 TDMA CHANNELS		
Sample NO:	S01		
Location:	Lab 1	RBW:	3 kHz
Detector Type:	Peak	VBW:	3 kHz
Test Equipment Used			
Antenna:		Directional Coupler:	1055
Pre-Amp:		Cable #1:	1082
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1:	1475	Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used: _____			
Measurement Uncertainty: <u>+/-3.6 dB</u>			
			
Date: 26.JAN.2001 10:47:24			
Notes: <u>Intermodulation - Channels 5 & 30 - Downlink</u>			

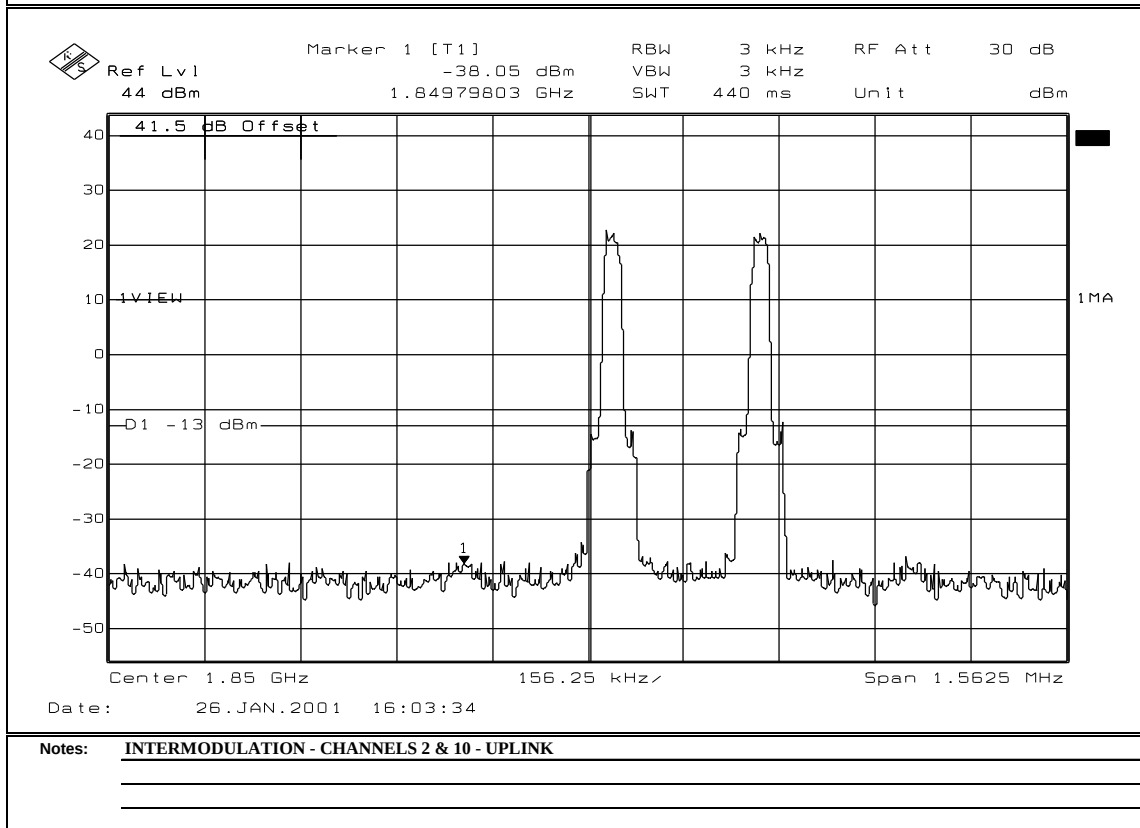
EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals**Data Plot Intermodulation Characteristics**

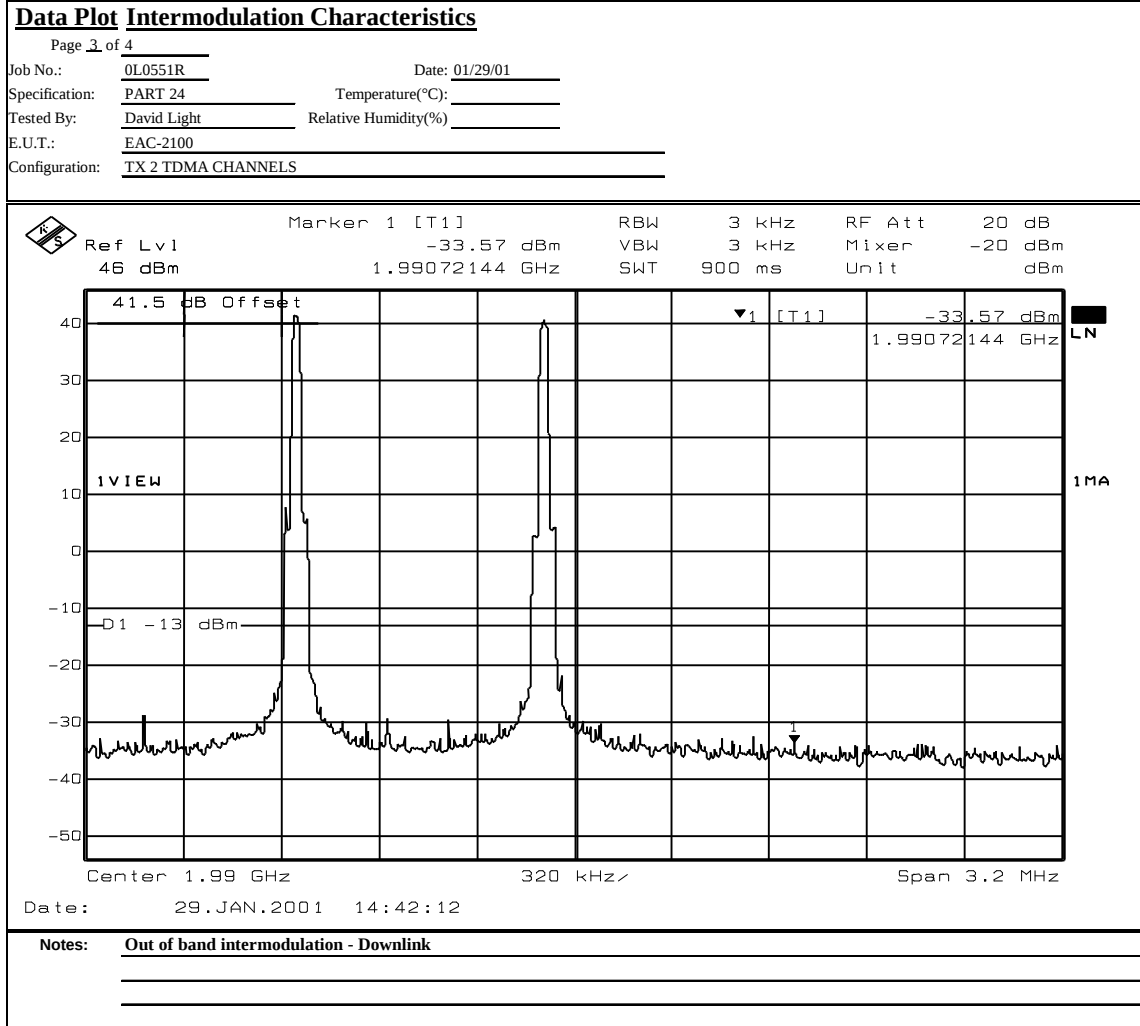
Page 2 of 4

Job No.: 0L0551R Date: 01/29/01
Specification: PART 24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: EAC-2100
Configuration: TX 2 TDMA CHANNELS



EQUIPMENT: EAC 2100

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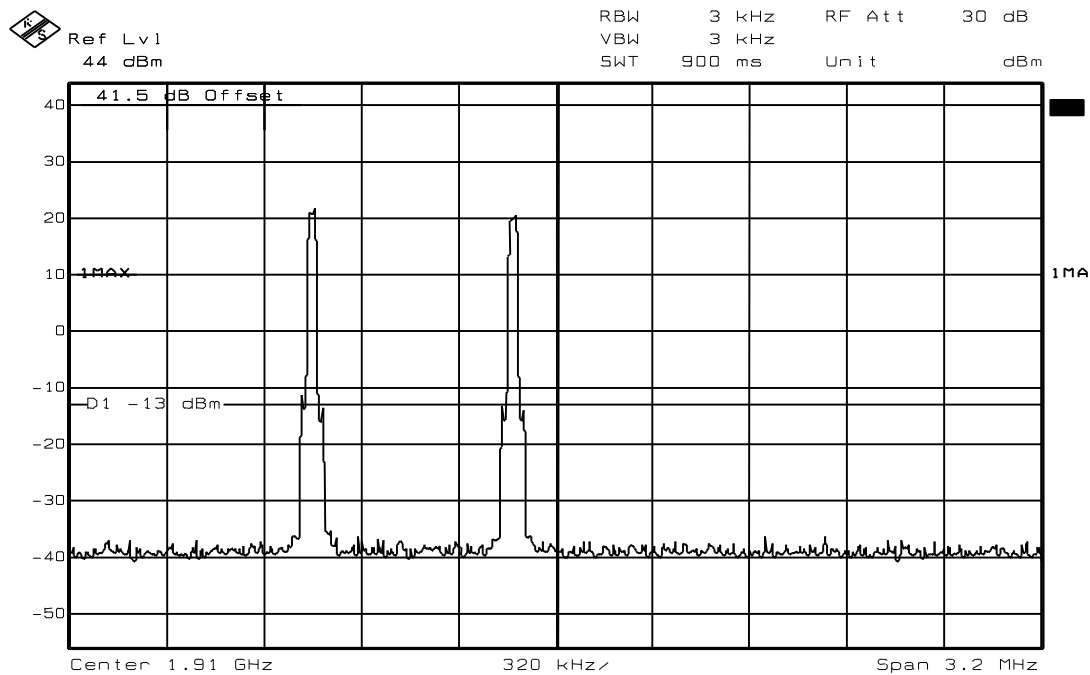
Test Data - Spurious Emissions at Antenna Terminals

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals**Test Plot: Intermodulation Characteristics**

Page 4 of 4
Job No.: 0L0551R Date: 01/29/01
Specification: PART 24 Temperature(°C):
Tested By: David Light Relative Humidity(%):
E.U.T.: EAC-2100
Configuration: TX 2 TDMA CHANNELS



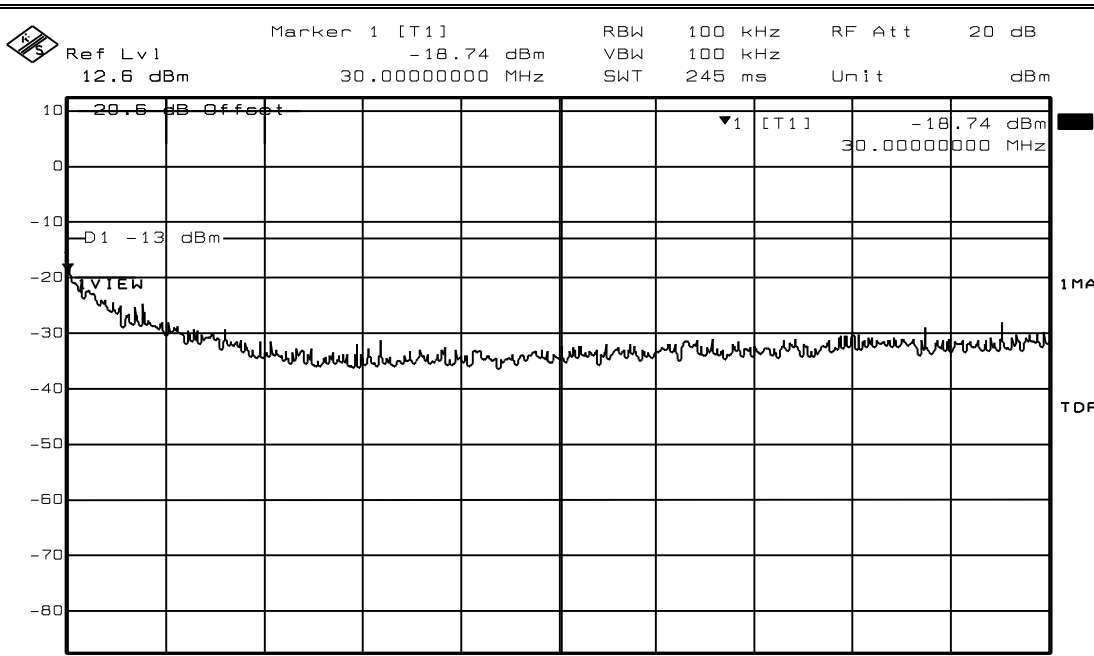
Date: 29.JAN.2001 14:55:38

Notes: Out of band intermodulation - Uplink

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals

Data Plot <u>Spurious Emissions at Antenna Terminals</u>	
Page <u>1</u> of <u>6</u>	Complete <u>X</u> Preliminary _____
Job No.: <u>0L0551R</u>	Date: <u>01/26/01</u>
Specification: <u>PART 24</u>	Temperature(°C): <u>22</u>
Tested By: <u>David Light</u>	Relative Humidity(%) <u>50</u>
E.U.T.: <u>EAC-2100</u>	
Configuration: <u>Tx 2 CHANNELS</u>	
Sample NO: <u>S01</u>	
Location: <u>Lab 1</u>	RBW: <u>Refer to plots</u>
Detector Type: <u>Peak</u>	VBW: <u>Refer to plots</u>
Test Equipment Used	
Antenna: _____	Directional Coupler: <u>1055</u>
Pre-Amp: _____	Cable #1: <u>1082</u>
Filter: _____	Cable #2: _____
Receiver: <u>1036</u>	Cable #3: _____
Attenuator #1: <u>1475</u>	Cable #4: _____
Attenuator #2: _____	Mixer: _____
Additional equipment used: _____	
Measurement Uncertainty: <u>+/-3.6 dB</u>	
 Marker 1 [T1] RBW 100 kHz RF Att 20 dB -18.74 dBm VBW 100 kHz 30.00000000 MHz SWT 245 ms Unit dBm Ref Lvl 12.6 dBm Start 30 MHz 97 MHz/ Stop 1 GHz Date: 26.JAN.2001 11:07:14	
Notes: <u>DOWNLINK</u>	

EQUIPMENT: EAC 2100

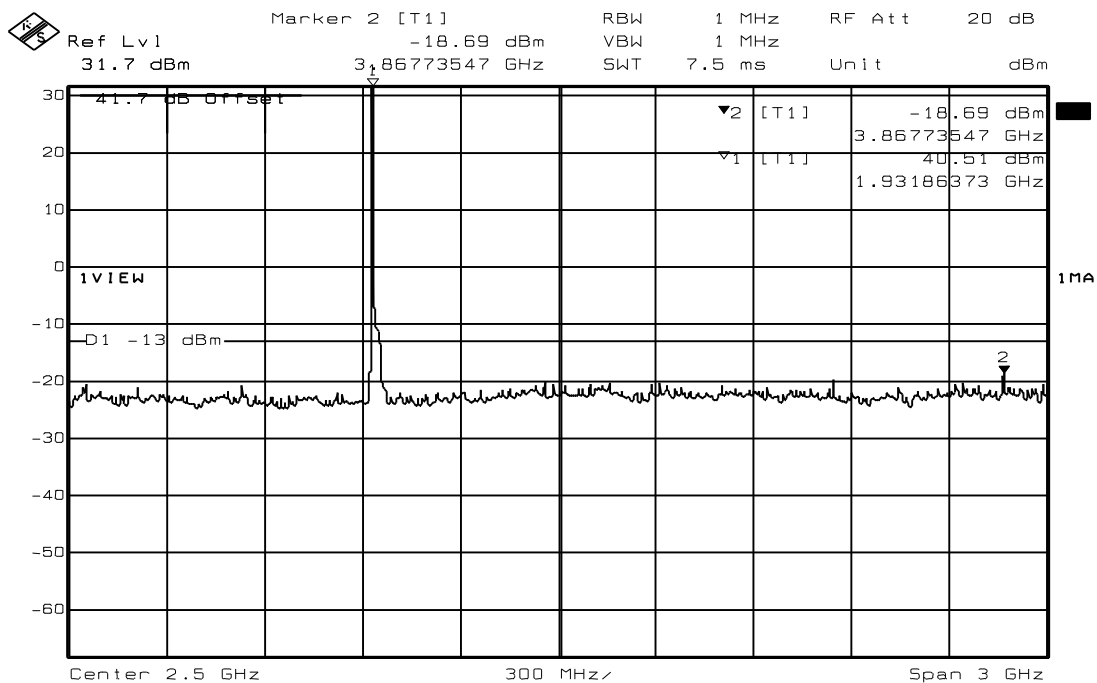
PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals

Data Plot Spurious Emissions at Antenna Terminals

Page 2 of 6

Job No.: 0L0551R Date: 01/26/01
Specification: PART 24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: EAC-2100
Configuration: Tx 2 CHANNELS



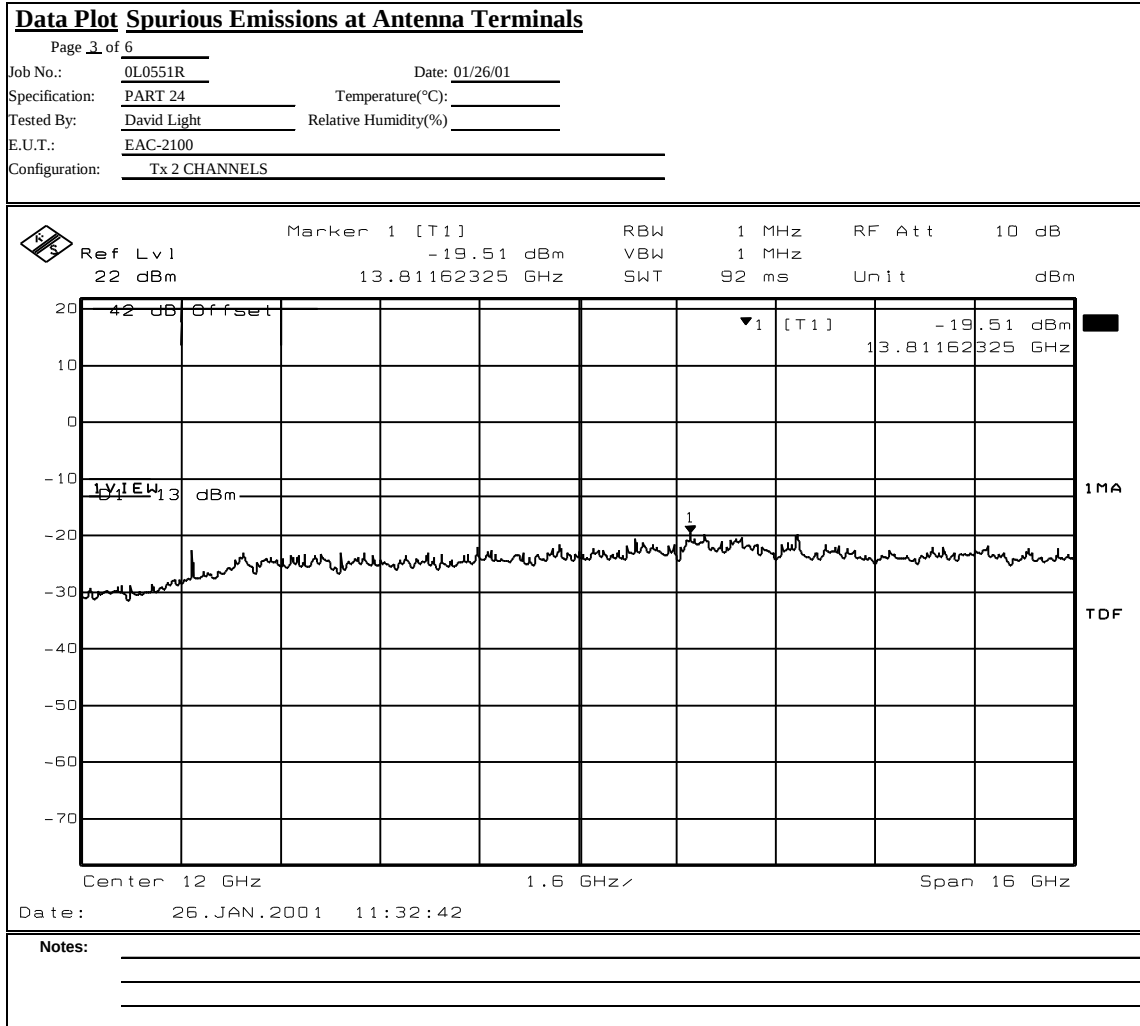
Date: 26.JAN.2001 11:21:18

Notes: DOWNLINK
MARKER 1 INDICATES CARRIER
MARKER 2 INDICATES SPURIOUS EMISSION

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals

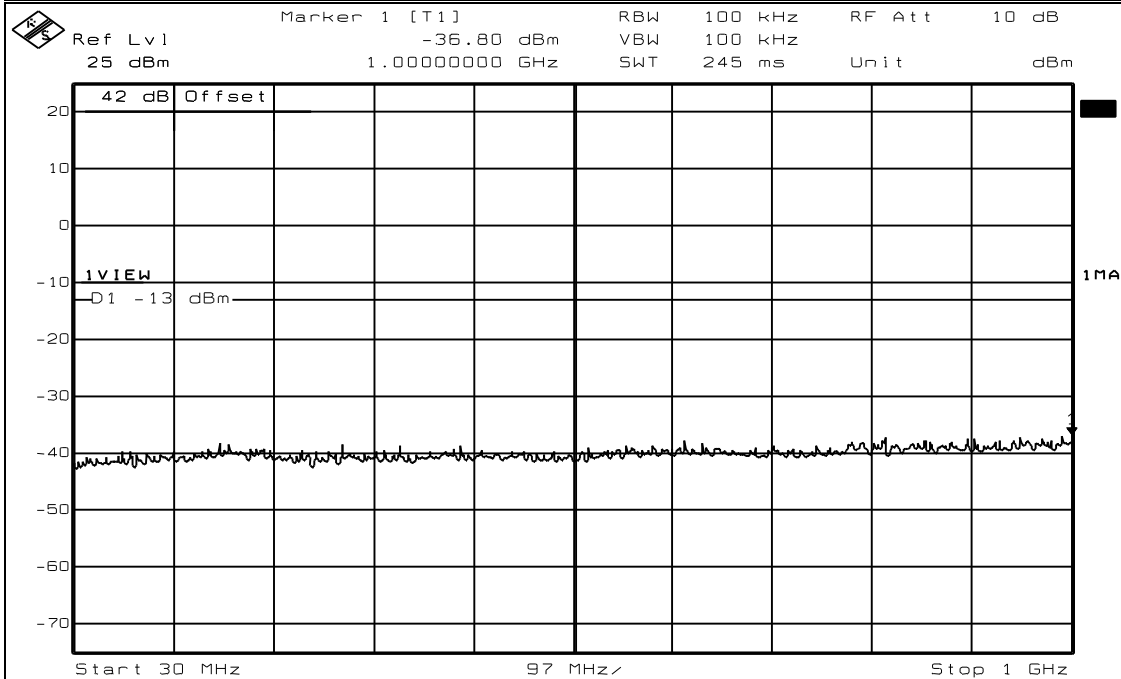


EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals**Test Plot: Spurious Emissions at Antenna Terminals**

Page 4 of 6
Job No.: 0L0551R Date: 01/26/01
Specification: PART 24 Temperature(°C):
Tested By: David Light Relative Humidity(%):
E.U.T.: EAC-2100
Configuration: Tx 2 CHANNELS

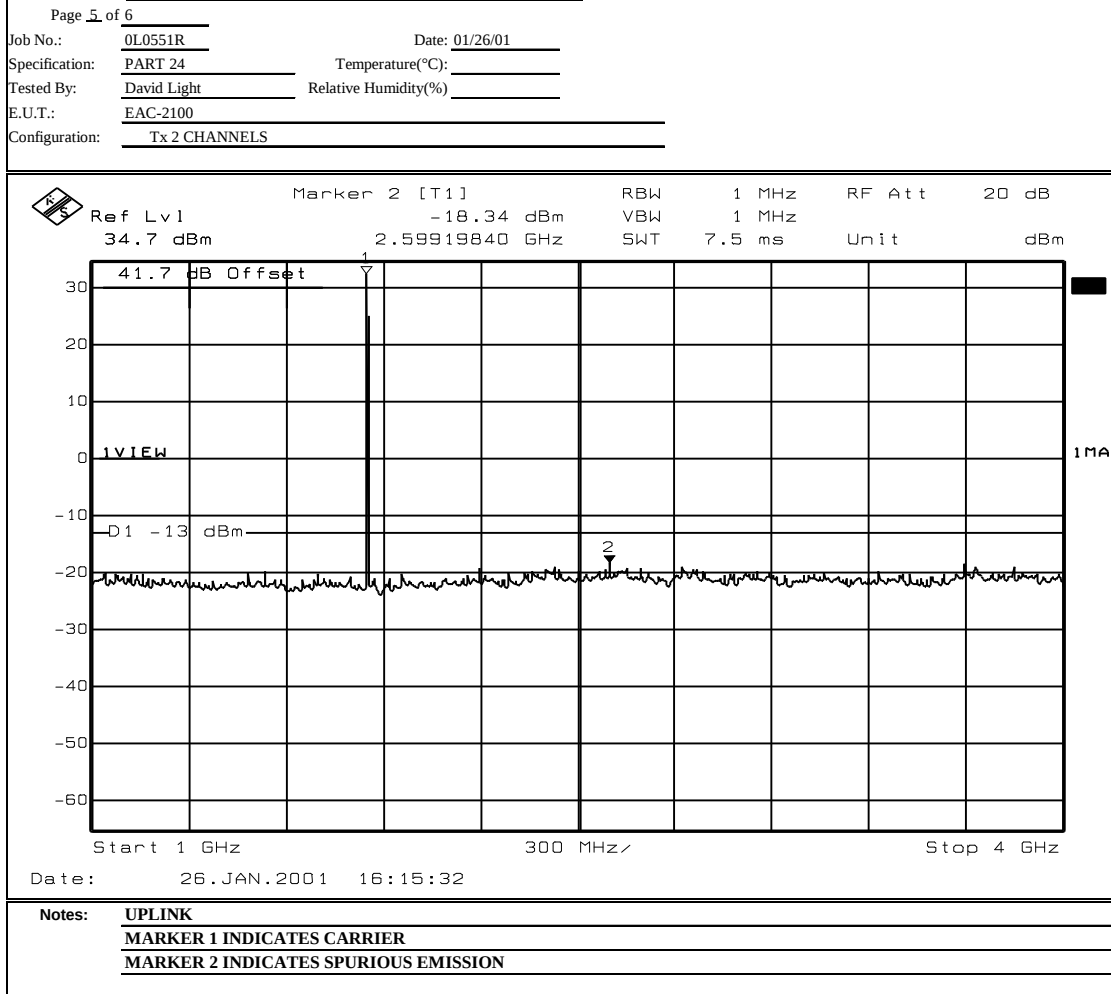


Date: 26.JAN.2001 16:28:25

Notes: UPLINK

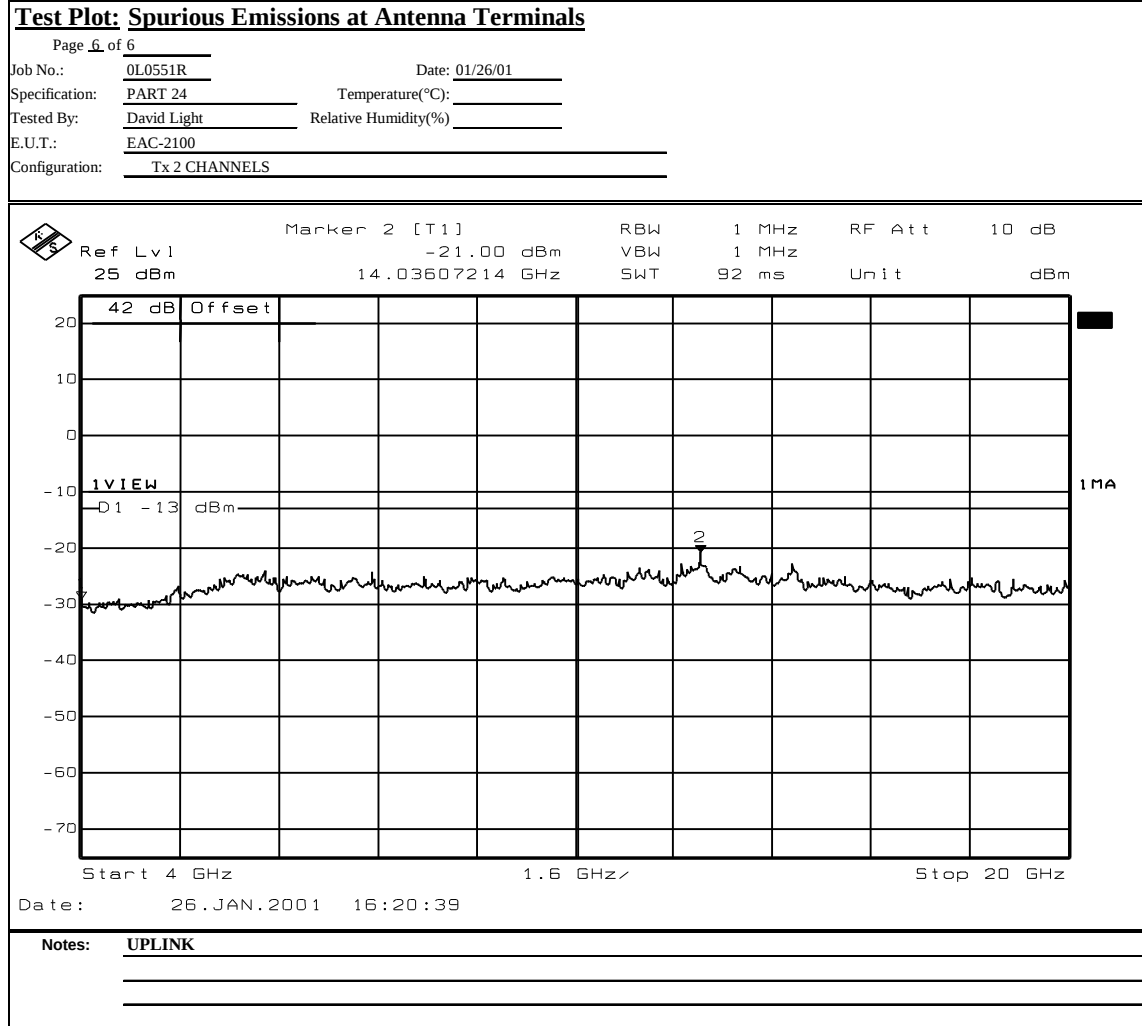
EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals**Test Plot: Spurious Emissions at Antenna Terminals**

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Spurious Emissions at Antenna Terminals

EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 1/29/01

Test Results: Complies.**Test Data:** See attached table.**Equipment Used:** 1436-1484-1485-993-1016-1481**Measurement Uncertainty:** +/- 3.6 dB**Temperature:** 22 °C**Relative
Humidity:** 50 %

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Test Data - Radiated Emissions

Field Strength of Spurious Emissions										
Page 1 of 1								Complete <u> X </u>		
Job No.: 9L0551R		Date: 01/29/01						Preliminary <u> </u>		
Specification: PART 24		Temperature(°C): 22								
Tested By: David Light		Relative Humidity(%): 50								
E.U.T.: EAC-2100										
Configuration: TRANSMIT NADC SIGNAL INTO 50 OHM TERMINATION ON CHANNEL 2										
Sample No: S01										
Location: AC 3		RBW: 1 MHz				Measurement				
Detector Type: Peak		VBW: 1 MHz				Distance: 3 m				
Test Equipment Used										
Antenna:		Directional Coupler:								
Pre-Amp: 1016		Cable #1: 1484								
Filter: 1481		Cable #2: 1485								
Receiver: 1464		Cable #3:								
Attenuator #1:		Cable #4:								
Attenuator #2:		Mixer:								
Additional equipment used:										
Measurement Uncertainty: +/-3.6 dB										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBd)	Mode	ERP (dBm)	ERP (mW)	Polarity	Comments
1930	-41.5	29.9		0.0	6.4	Downlink	-5.3	0.295121	V	CARRIER
3860.16	-46.6	40.4		33.3	8.0	Downlink	-31.5	0.000705	V	
5790.24	-63.0	38.5		32.5	9.1	Downlink	-47.9	0.000016	V	NOISE FLOOR
7720.32	-62.0	40.4		33.4	9.4	Downlink	-45.5	0.000028	V	NOISE FLOOR
9650.40	-63.0	40.4		36.1	10.5	Downlink	-48.2	0.000015	V	NOISE FLOOR
17370.72	-61.0	47.0		34.9	11.7	Downlink	-37.1	0.000193	V	NOISE FLOOR
1930.08	-47.5	32.7		0.0	6.4	Downlink	-8.5	0.142561	H	CARRIER
3860.16	-43.8	34.3		33.3	8.0	Downlink	-34.8	0.000333	H	
5790.24	-61.5	36.0		32.5	9.1	Downlink	-48.9	0.000013	H	
7720.32	-62.0	39.8		33.4	9.4	Downlink	-46.2	0.000024	H	NOISE FLOOR
9650.40	-63.0	42.6		36.1	10.5	Downlink	-46.0	0.000025	H	NOISE FLOOR
17370.72	-61.0	50.5		34.9	11.7	Downlink	-33.7	0.000430	H	NOISE FLOOR
1850.02	-62.3	32.7		0.0	6.4	Uplink	-23.3	0.004721	H	CARRIER
3700.04	-61.5	34.3		33.3	8.0	Uplink	-52.5	0.000006	H	NOISE FLOOR
5550.06	-62.5	36.0		32.8	9.1	Uplink	-50.2	0.000009	H	NOISE FLOOR
7400.08	-62.0	38.7		33.0	10.0	Uplink	-46.3	0.000023	H	NOISE FLOOR
16650.18	-62.0	46.1		34.2	13.0	Uplink	-37.0	0.000198	H	NOISE FLOOR
1850.02	-60.5	29.9		0.0	6.4	Uplink	-24.3	0.003715	V	CARRIER
3700.04	-61.5	40.4		33.3	8.0	Uplink	-46.4	0.000023	V	NOISE FLOOR
5550.06	-62.5	38.5		32.8	9.1	Uplink	-47.7	0.000017	V	NOISE FLOOR
7400.08	-62.0	39.4		33.0	10.0	Uplink	-45.6	0.000028	V	NOISE FLOOR
16650.18	-62.0	44.3		34.2	13.0	Uplink	-38.9	0.000130	V	NOISE FLOOR
Notes: MEASURED HARMONICS OF CARRIER TO 10TH HARMONIC										

Photographs of Test Setup

FRONT VIEW



REAR VIEW



EQUIPMENT: EAC 2100

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Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
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Test Results: Complies.

Measurement Data: See attached customer information.

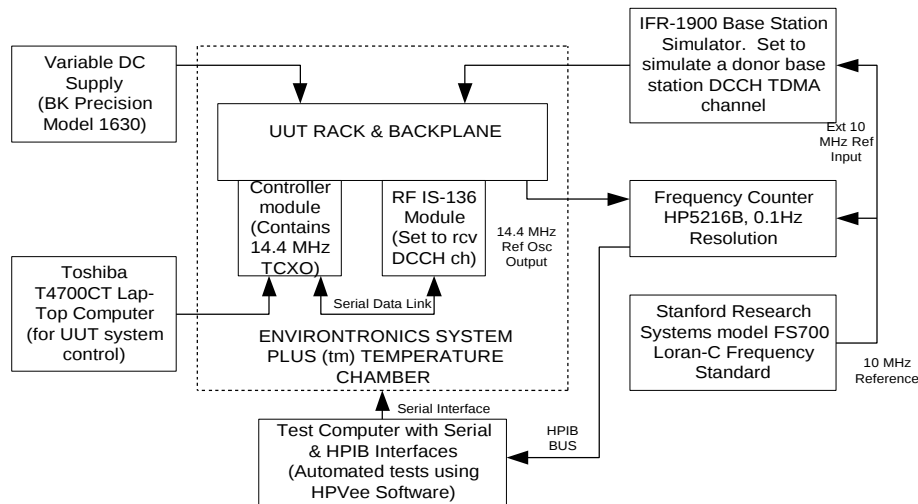
EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

2.1055, Frequency stability (sheet 1 of 3)

Frequency stability of any receive or transmit channel in the EAC-2100 is controlled by a 14.4 MHz TCXO in the Controller Module. A TCXOs that meet the basic ± 1 ppm tolerance is used in this product.

The test setup for measuring frequency stability as a function of temperature and as a function of supply voltage variation is as follows:



The worst-case supply voltage variation can occur if the EAC-2100 is operated on an external 24VDC battery power plant. Nominal voltage operation when AC mains is present will range from 27.5 to 28.5 VDC. Worst case minimum voltage will be 19VDC (the EAC-2100 automatically will shut down before this lower limit is met), and the maximum voltage could be as high as +31 VDC under cold temperature conditions. The results are as follows:

SUPPLY VOLTAGE	Murata (G68A0019-1)
19.0 VDC	14.3999994 MHz
27.8 VDC Nominal	14.3999994 MHz
31.0 VDC	14.3999992 MHz

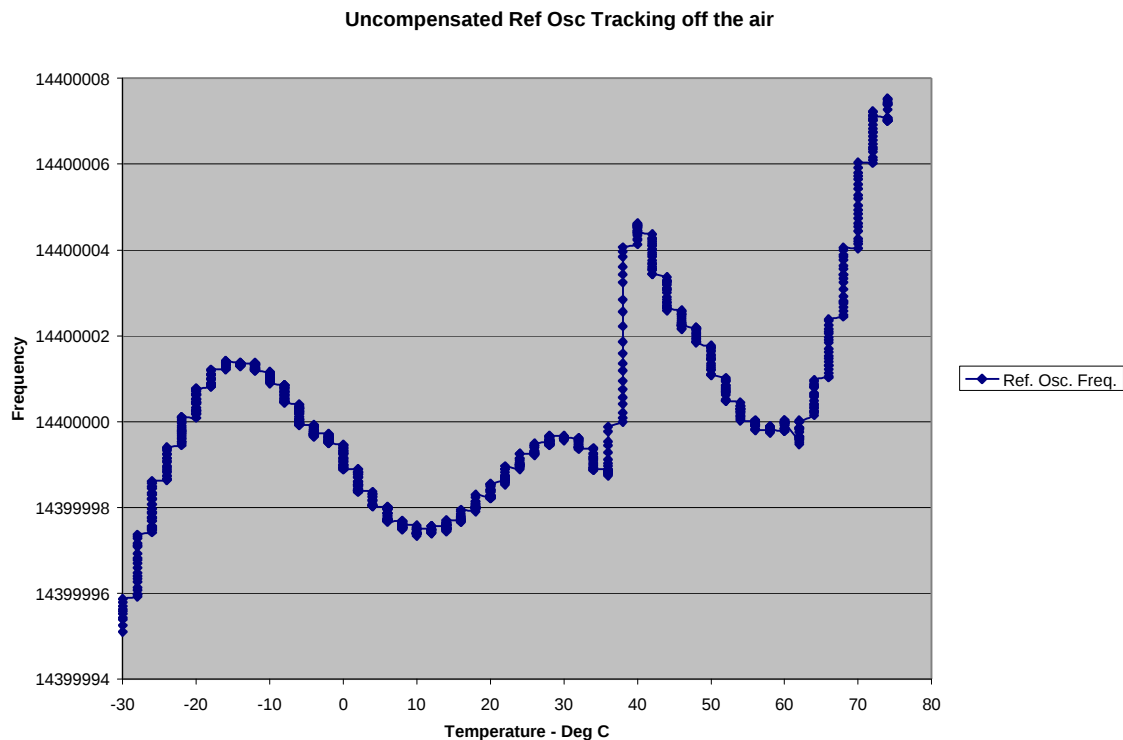
As shown above, the variation in the reference oscillator is at most 0.2 Hz ($< \pm 0.02$ ppm) over power-supply voltage extremes.

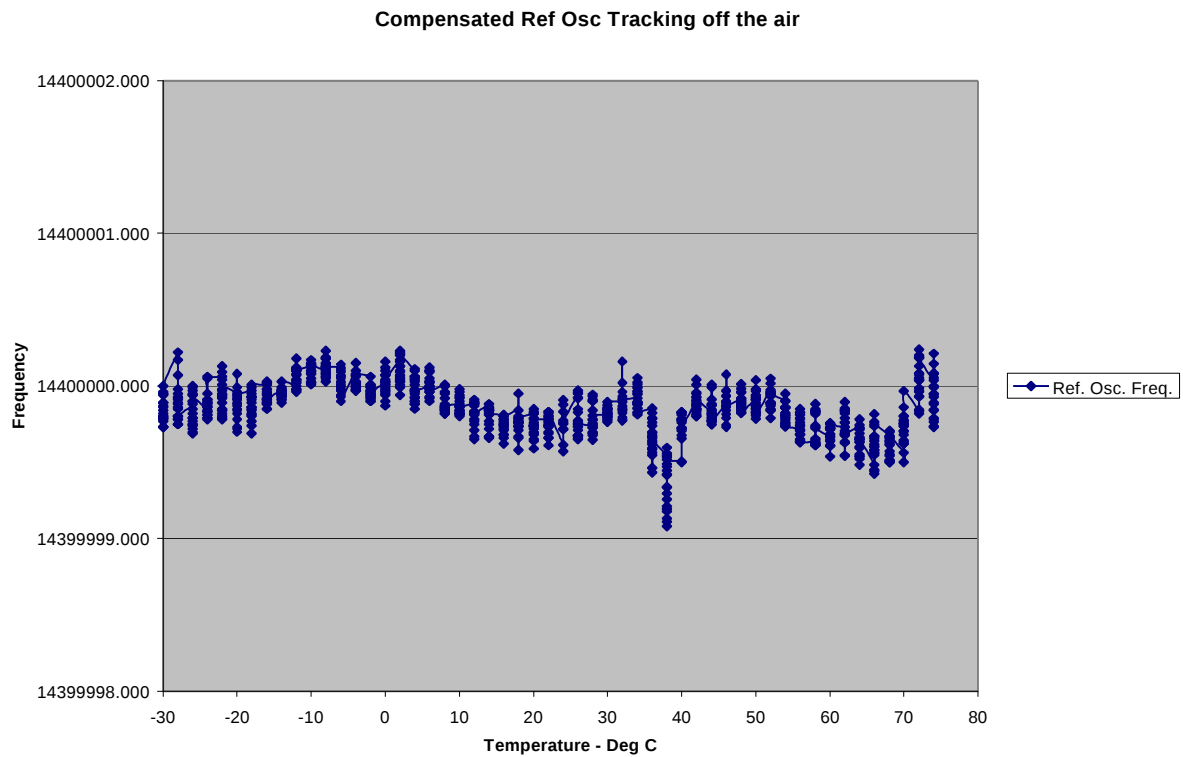
EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

2.1055, Frequency stability (sheet 2 of 3)

As described in Exhibit 10A, software control within the EAC-2100 will trim the 14.4 MHz TCXO such that it will be frequency-locked to within a few Hertz of the donor base station DCCH channel. This assures that the EAC-2100 will be compatible with the host digital cellular system, and will meet the ± 0.25 ppm frequency tolerance requirement.

Measurements of the reference oscillator over the specified temperature range is shown below. The first graph shows the uncompensated frequency of the TCXO. The second graph shows the compensated frequency of the Murata 14.4 MHz TCXO. Note that the frequency tolerance is held well within the ± 0.25 ppm requirement for successful system operation with mobiles. Note that internal heating elements are not employed. Therefore, frequency stability measurements as a function of time from cold-start were not measured.





EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Section 8. Test Equipment List

KTL ID	Description	Manufacturer Model Number	Serial Number	Calibration Date
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	06/14/99 2 Yr Cycle
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	01/02/01 2 Yr Cycle
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	05/25/00
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	05/25/00
1016	AMPLIFIER	HEWLETT PACKARD 8449A	2749A00159	05/24/00
1481	Microwave Highpass Filter	K & L 3DH1-2000/T8000-0/0	4	CBU
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	05/23/00
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	CBU
1058	DUAL DIRECTIONAL COUPLER	HEWLETT PACKARD 11692D	1212A03366	CBU
1475	20db Attenuator DC 18 Ghz	MCL Inc. BW-S20W3	NONE	CBU
1048	50 OHM LOAD	NARDA 27470	254	02/15/00

ANNEX A - TEST DETAILS

EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

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. Power output is measured with the maximum rated input level.

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: EAC 2100PROJECT NO.: 0L0551RUS1

NAME OF TEST: Occupied Bandwidth**PARA. NO.: 2.1047**

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

Spectrum analyzer settings:

RBW: 30 kHz

VBW: $\geq$ RBW

Span: 5 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz

VBW: $\geq$ RBW

Span: 2 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz

VBW: $\geq$ RBW

Span: 1 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

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

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

GSM

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

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 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.

EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

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.

EQUIPMENT: EAC 2100PROJECT NO.: 0L0551RUS1

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:

Frequency Stability With Voltage Variation

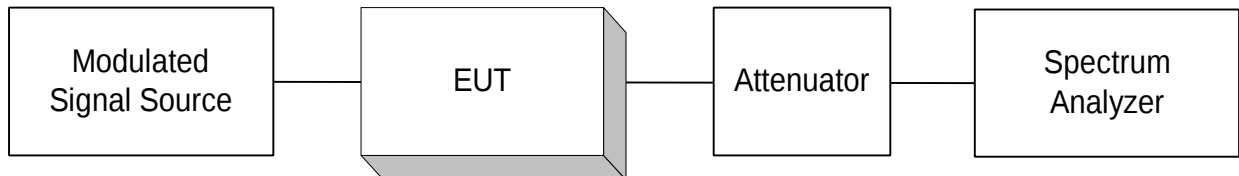
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. 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

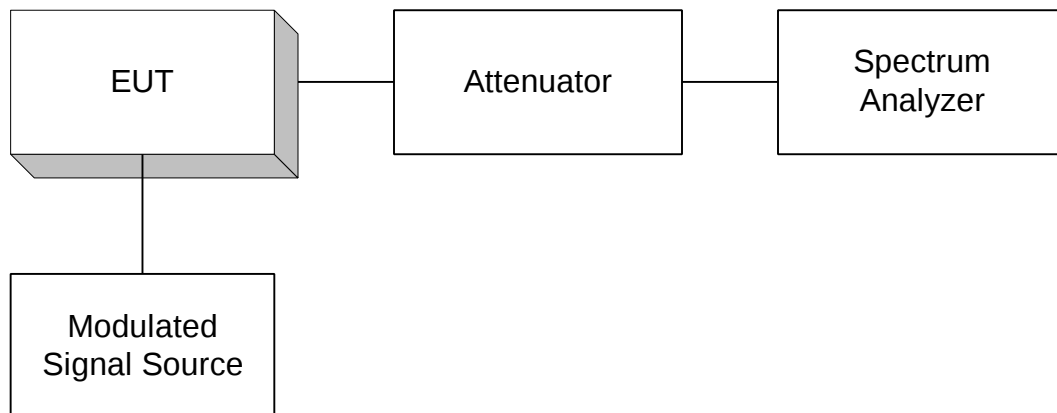
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

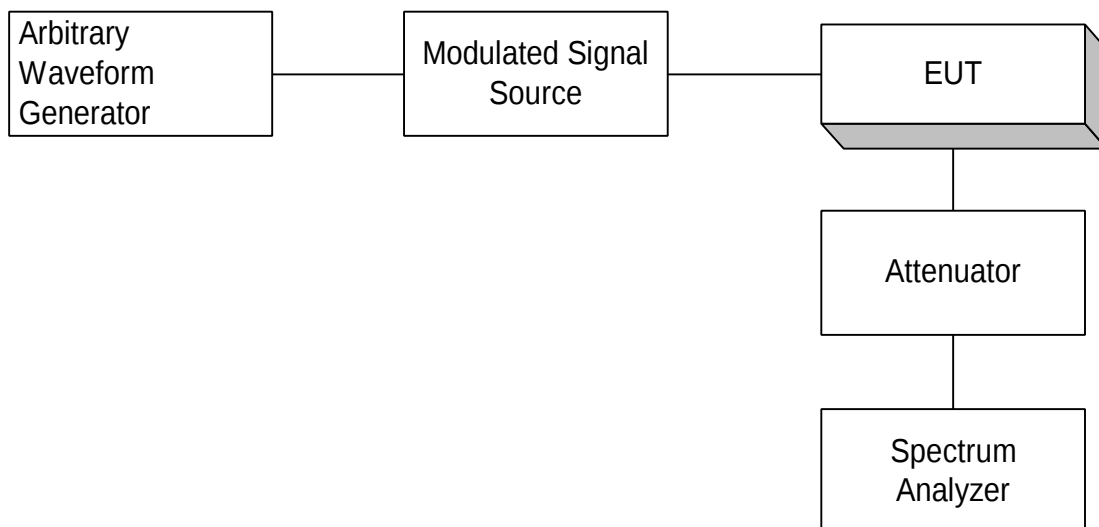
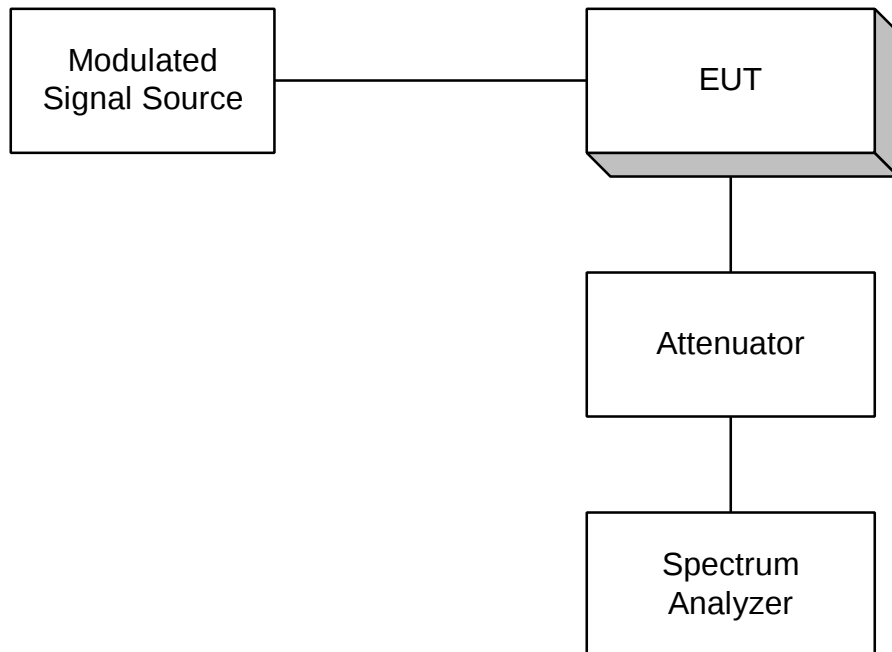
Para. No. 2.985 - R.F. Power Output



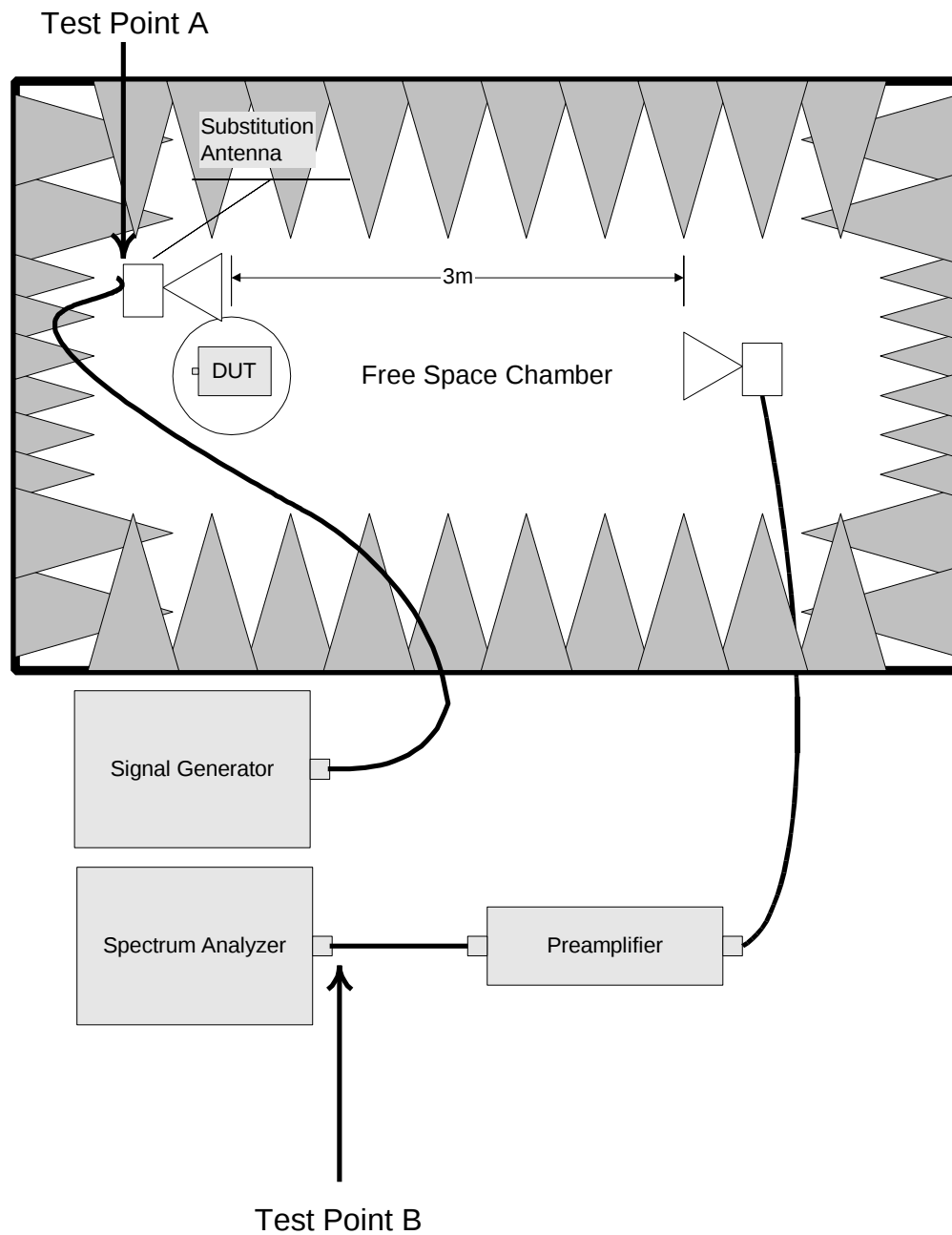
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



EQUIPMENT: EAC 2100

PROJECT NO.: 0L0551RUS1

Para. No. 2.995 - Frequency Stability

