KTL Test Report:	8R01233
Applicant:	Cellwave - Corvallis 4100 S.W. Research Way Corvallis, OR 97333 USA
Equipment Under Test: (E.U.T.)	Bi-Directional Amplifier CDMA Single Channel
FCC ID:	IWDBDA48660
In Accordance With:	**FCC Part 24, Subpart E** Broadband PCS Repeaters
Tested By:	KTL Ottawa Inc. 3325 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	
	T. Tidwell, Laboratory Manager
Date:	
Total Number of Pages:	60

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Section 1. Summary of Test Results

Manufacturer: Cellwave - Corvallis

Model No.: Intelli BDA

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

A	M	P

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: _____ DATE: _____
Wayne Clarke, Technologist

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	100W	0.2	Complies
Occupied Bandwidth (CDMA)	24.238	Input/Output	Graph	Complies
Occupied Bandwidth (GSM)	24.238	Input/Output	N/A	N/A
Occupied Bandwidth (NADC)	24.238	Input/Output	N/A	N/A
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	<-28 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	<-28 dBm	Complies
Frequency Stability	24.235		N/A	N/A

Footnotes For N/A's:

Test Conditions:

Indoor Temperature: 22 °C
Humidity: 30 %

Outdoor Temperature: 3 °C
Humidity: 80 %

Section 2. General Equipment Specification

Supply Voltage Input:		120 VAC, 60 Hz
Frequency Range:	**Downlink:**	1930 to 1990 MHz
Frequency Range:	**Uplink:**	1850 to 1910 MHz

Type of Modulation and Designator:

CDMA (F9W)	**GSM (GXW)**	**NADC (DXW)**
☒	☐	☐

AGC Threshold:		+23 dBm
Output Impedance:		50 ohm
Gain:		65 dB
Max Input Power:		-35 dBm
RF Output (Rated):	**Single:**	+23 dBm
	Composite:	N/A

Frequency Translation:

F1-F1	**F1-F2**	**N/A**
☒	☐	☐

Band Selection:

Software	**Duplexer Change**	**Fullband Coverage**
☒	☐	☐

Description of Modifications For Class II Permissive Change

NOT APPLICABLE

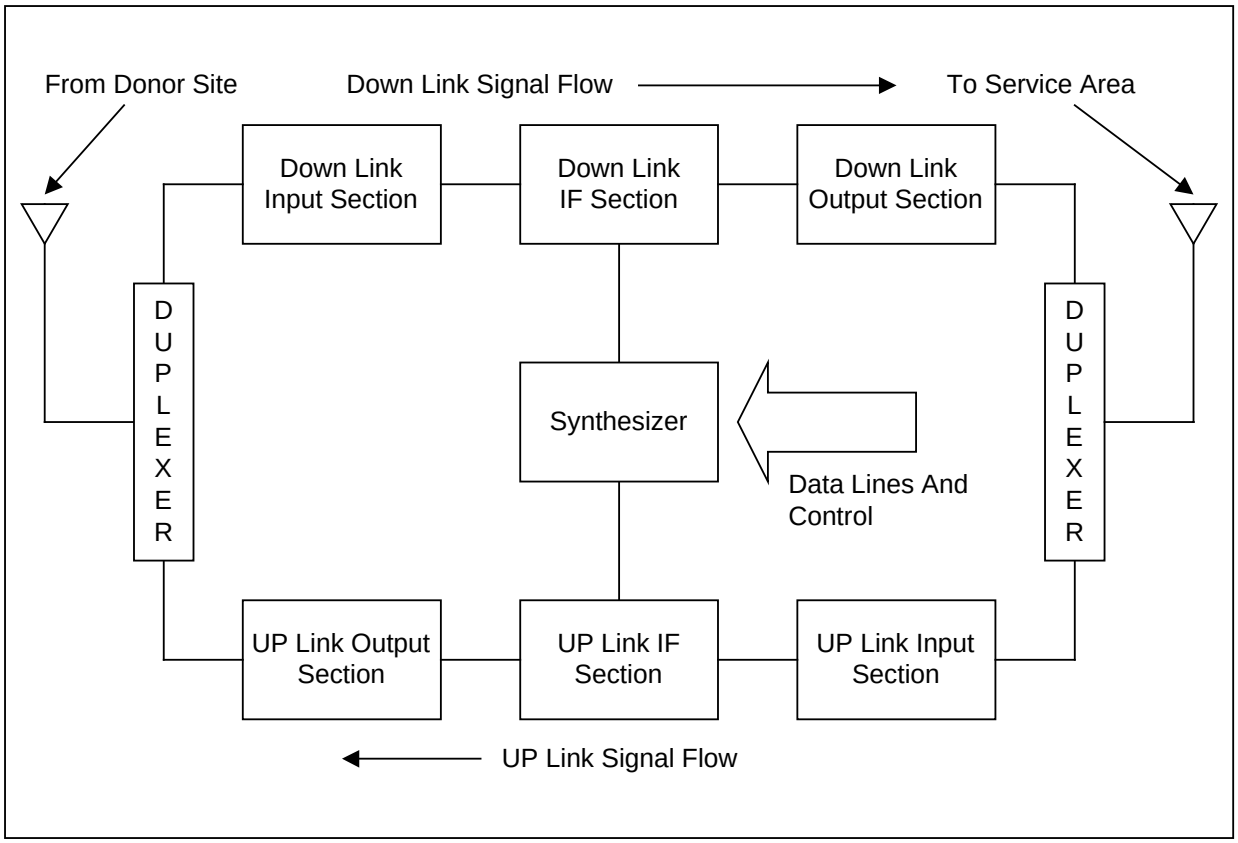
Modifications Made During Testing

NOT APPLICABLE

Theory of Operation

The E.U.T. is a single channel CDMA PCS Bi-Directional Amplifier. The incoming signal is filtered through a duplexer, then through an input stage, then though IF section for down conversion, filtering and amplification and back to the original frequency.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: Wayne Clarke	DATE: March 19, 1999

Test Results: Complies.

Measurement Data:

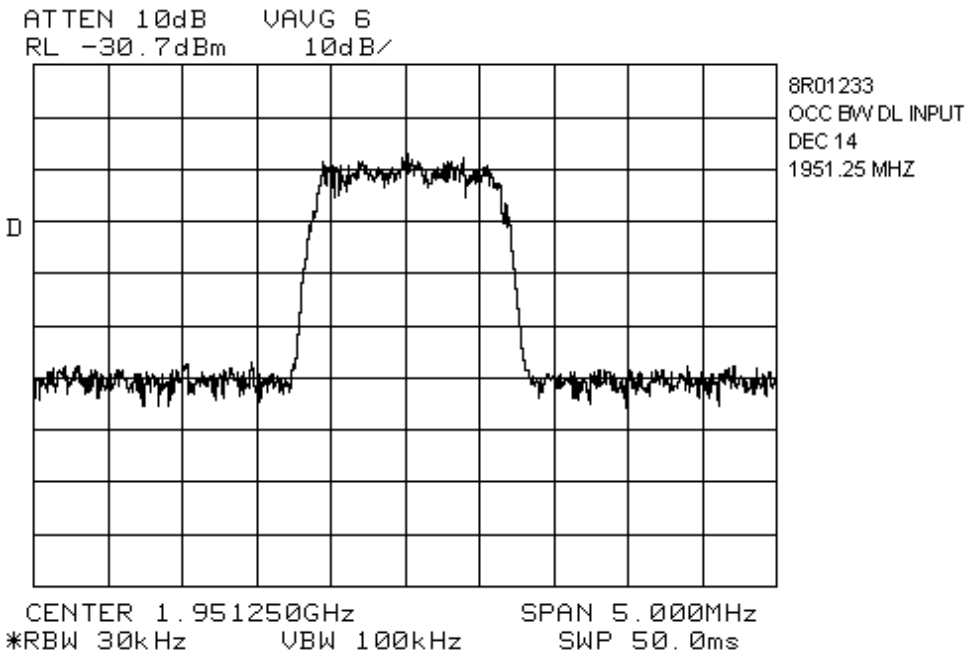
	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	23.02	N/A
Downlink	CDMA	23.08	N/A

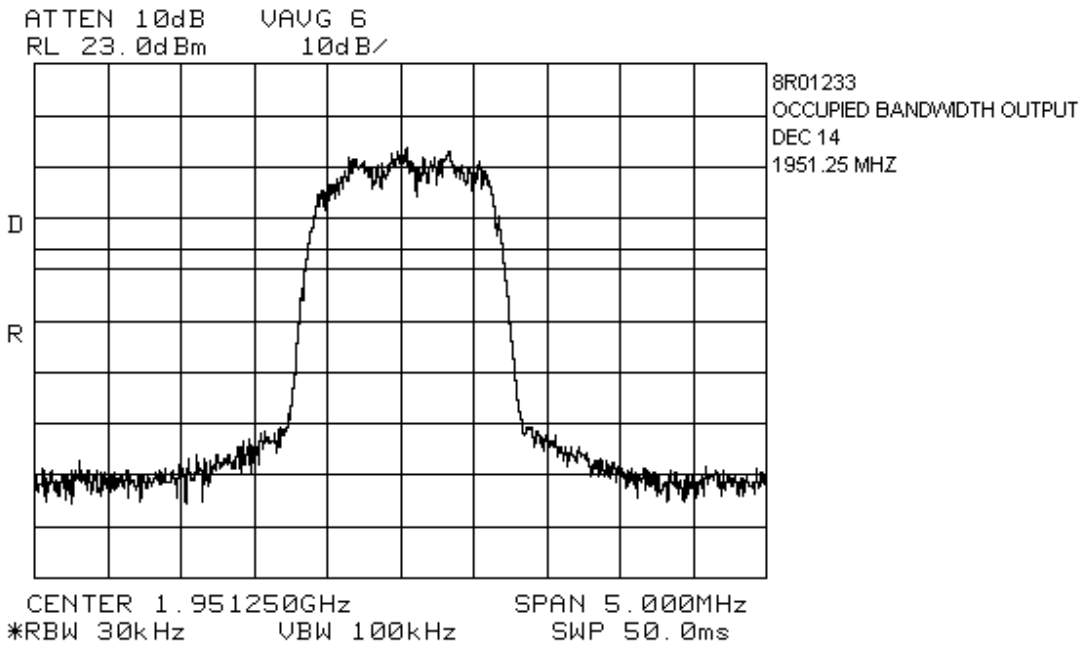
Section 4. Occupied Bandwidth

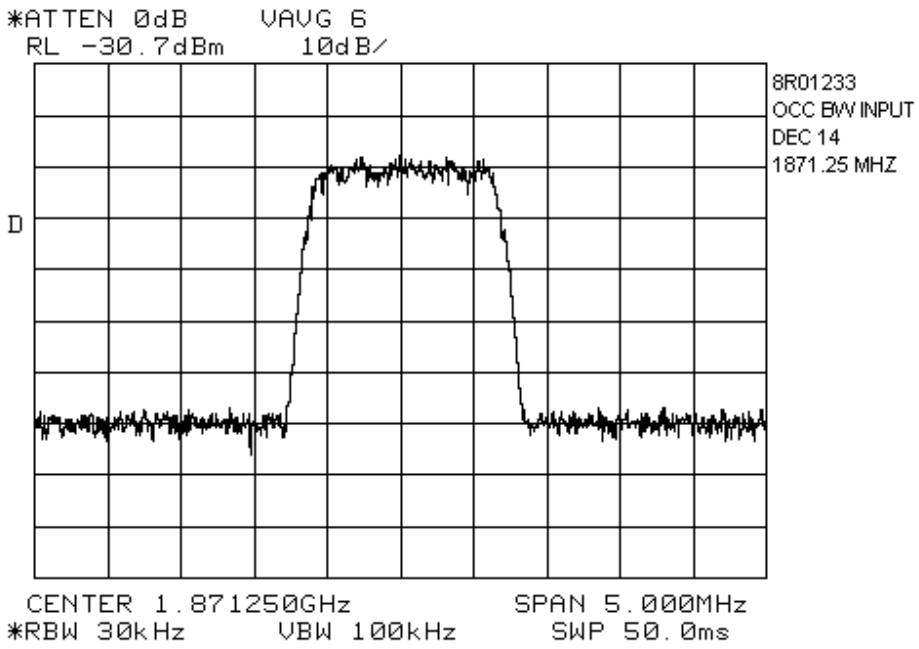
NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.917(c)
TESTED BY: Wayne Clarke	DATE: March 22, 1999

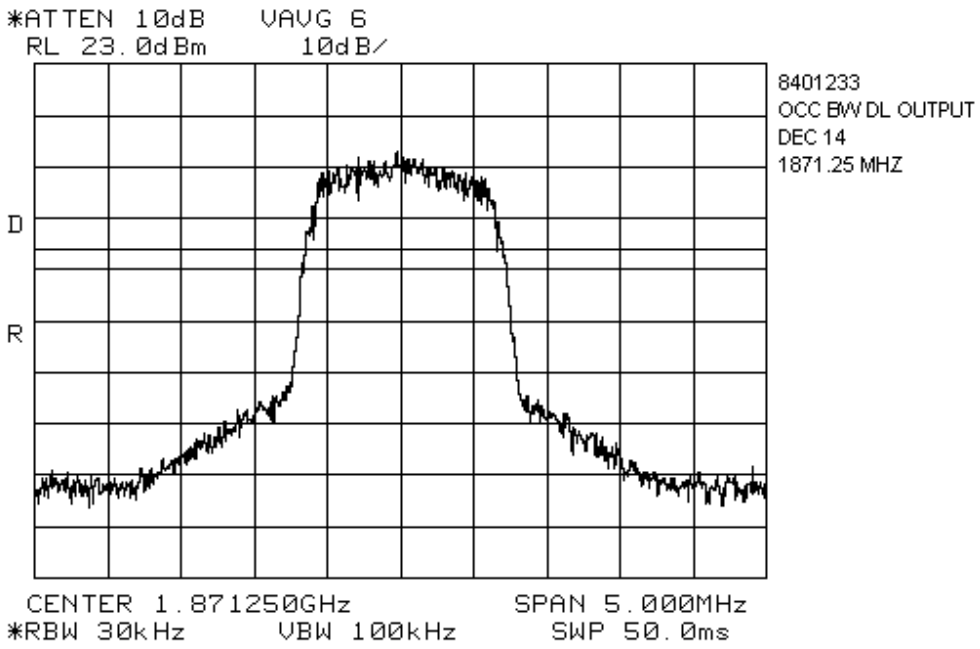
Test Results: Complies.

Test Data: See attached graph(s).


ATTEN 10dB VAVG 6
RL -30.7dBm 10dB/
D
8R01233
OCC BW DL INPUT
DEC 14
1951.25 MHZ
CENTER 1.951250GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
OCCUPIED BANDWIDTH OUTPUT
DEC 14
1951.25 MHZ
D
R
CENTER 1.951250GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


*ATTEN 0dB
VAVG 6
RL -30.7dBm
10dB/
8R01233
OCC BW INPUT
DEC 14
1871.25 MHZ
D
CENTER 1.871250GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8401233
OCC BW DL OUTPUT
DEC 14
1871.25 MHZ
D
R
CENTER 1.871250GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

NAME OF TEST: Occupied Bandwidth (GSM)	PARA. NO.: 2.917(c)
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.

Test Data: See attached graph(s).

NOT APPLICABLE

NAME OF TEST: Occupied Bandwidth (NADC)	PARA. NO.: 2.917(c)
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.

Test Data: See attached graph(s).

NOT APPLICABLE

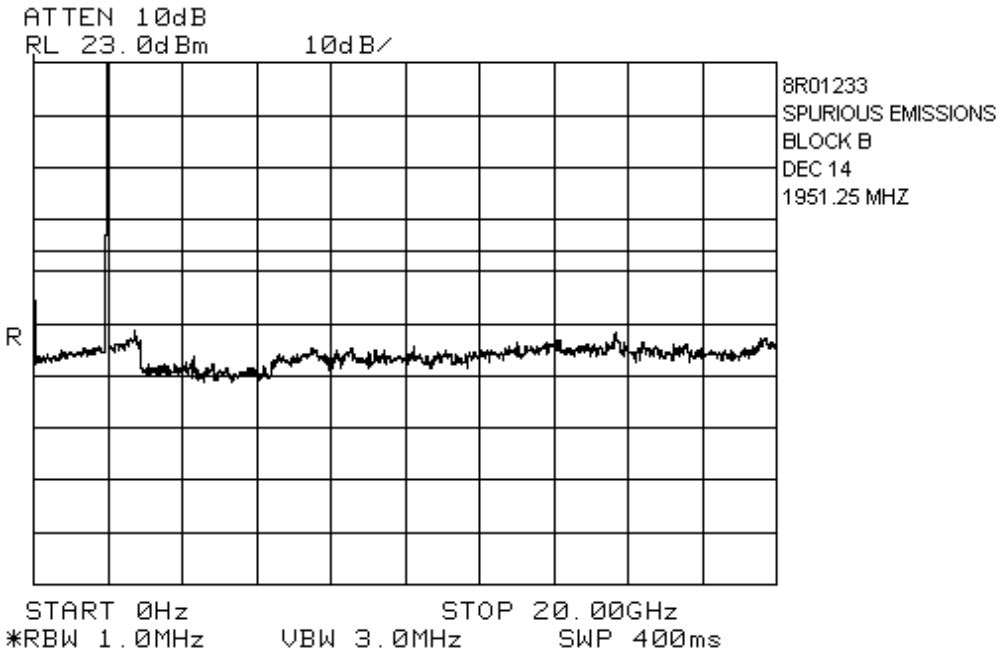
Section 5. Spurious Emissions at Antenna Terminals

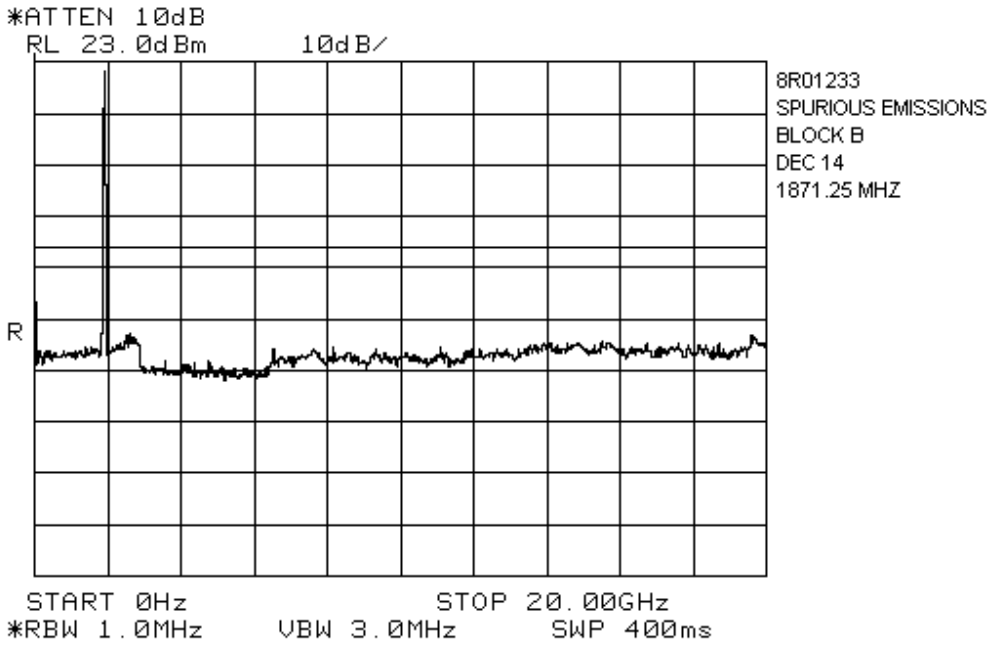
NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Wayne Clarke	DATE: March 22, 1999

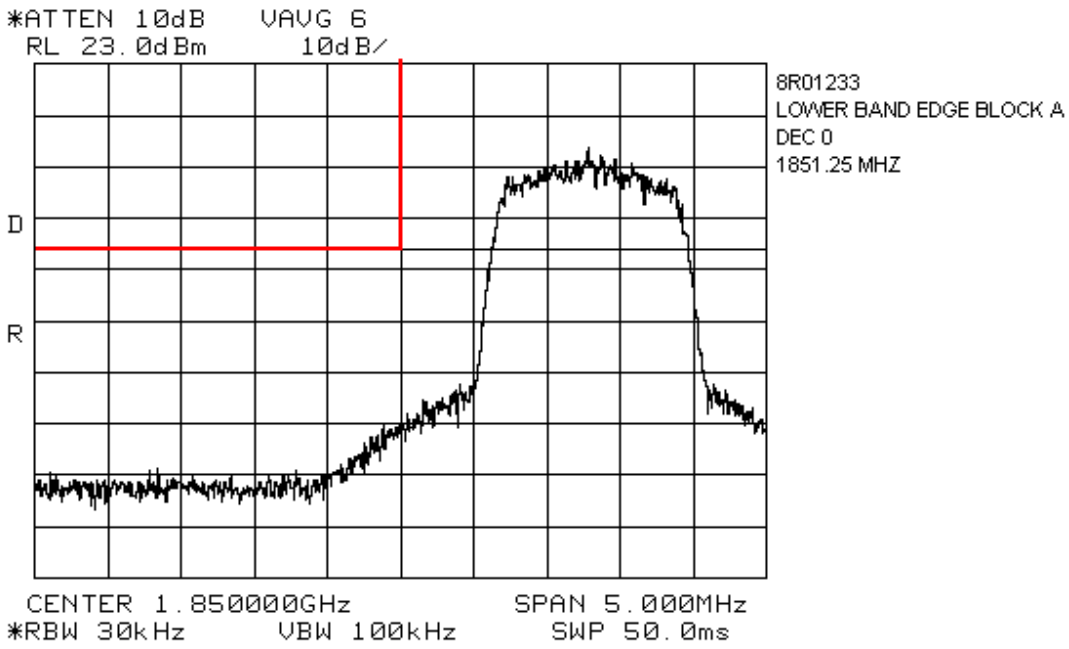
Test Results: Complies.

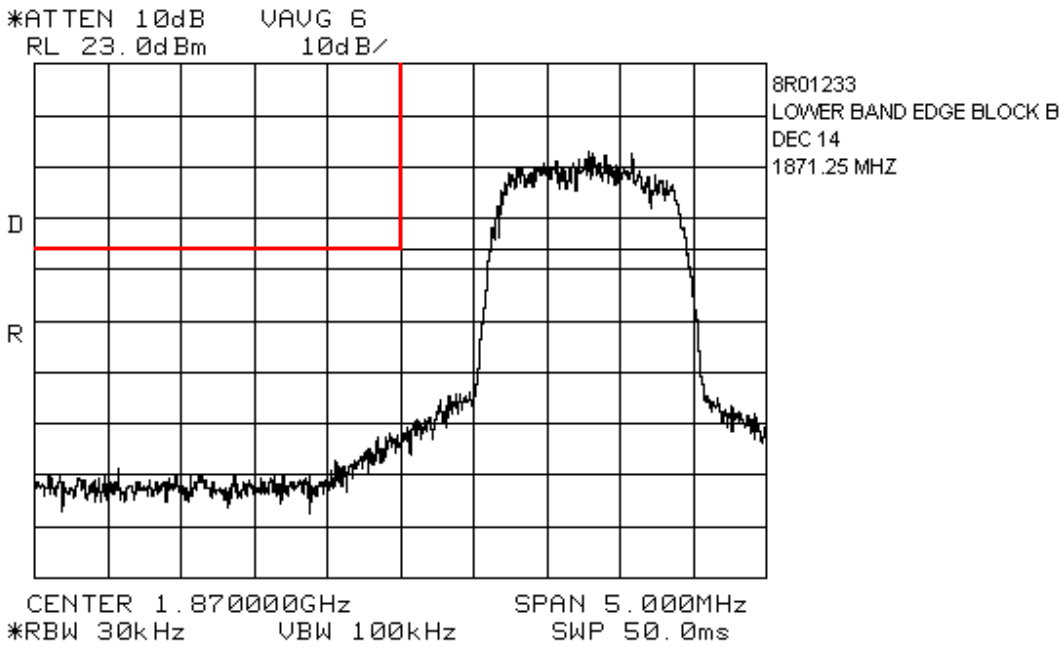
Test Data:

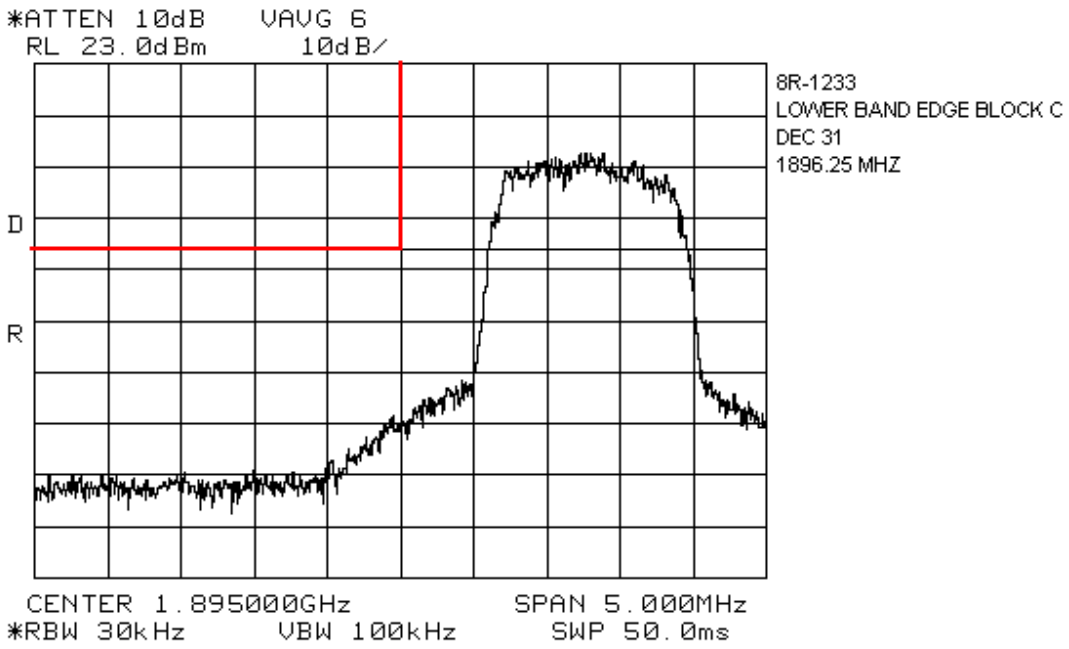
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz spurious (Uplink)	<-28
0 to 20 GHz spurious (Downlink)	<-28

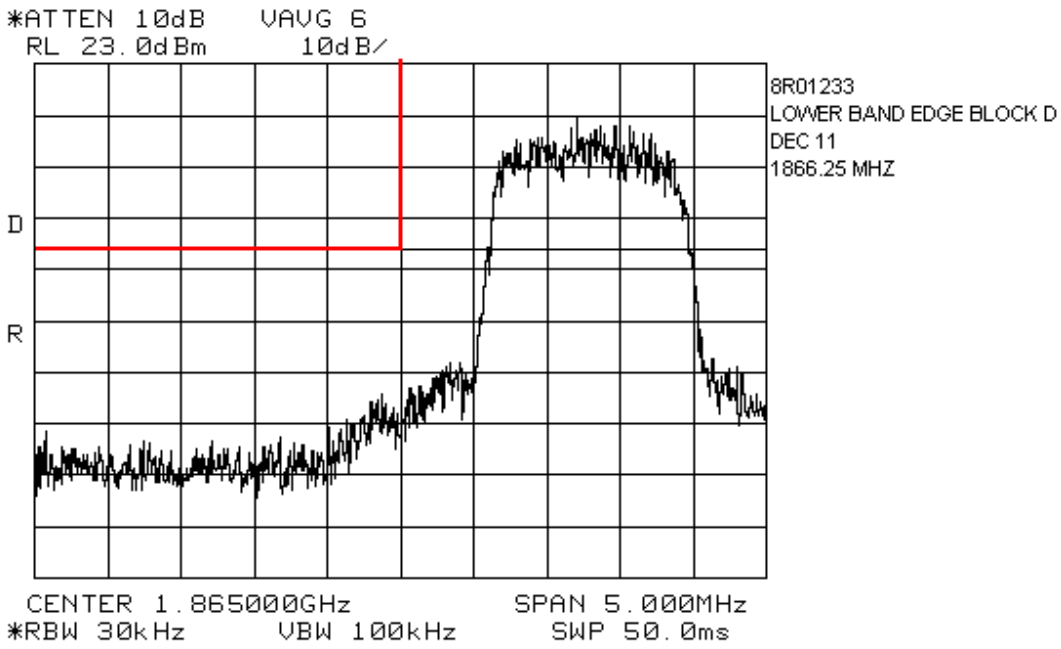

ATTEN 10dB
RL 23.0dBm
10dB/
8R01233
SPURIOUS EMISSIONS
BLOCK B
DEC 14
1951.25 MHZ
R
START 0Hz
STOP 20.00GHz
*RBW 1.0MHz
VBW 3.0MHz
SWP 400ms

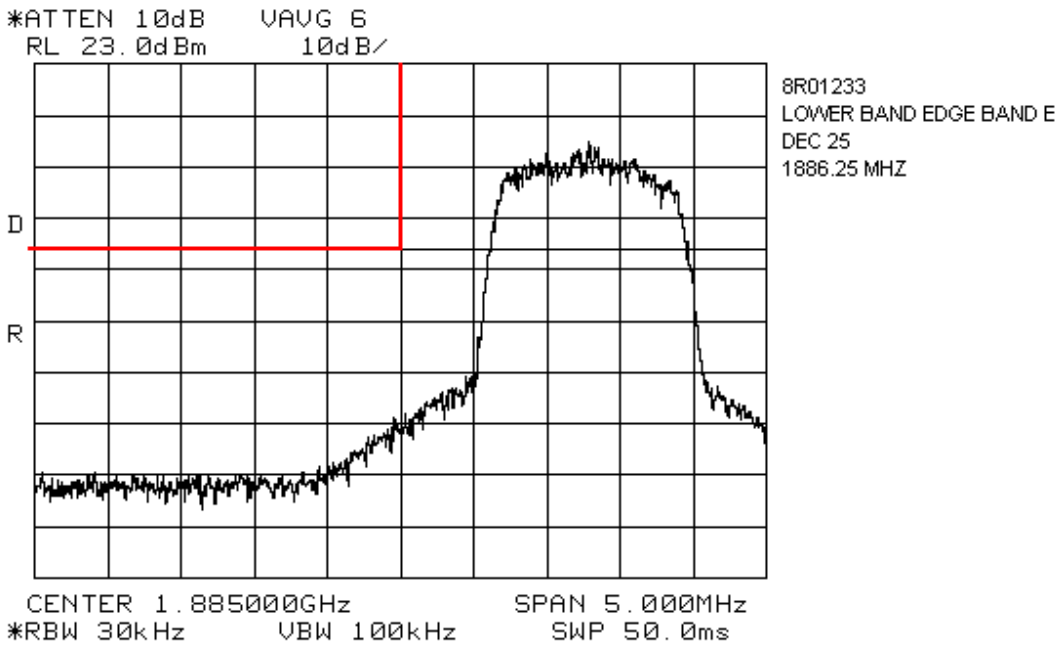

*ATTEN 10dB
RL 23.0dBm
10dB/
R
8R01233
SPURIOUS EMISSIONS
BLOCK B
DEC 14
1871.25 MHZ
START 0Hz
STOP 20.00GHz
*RBW 1.0MHz
VBW 3.0MHz
SWP 400ms

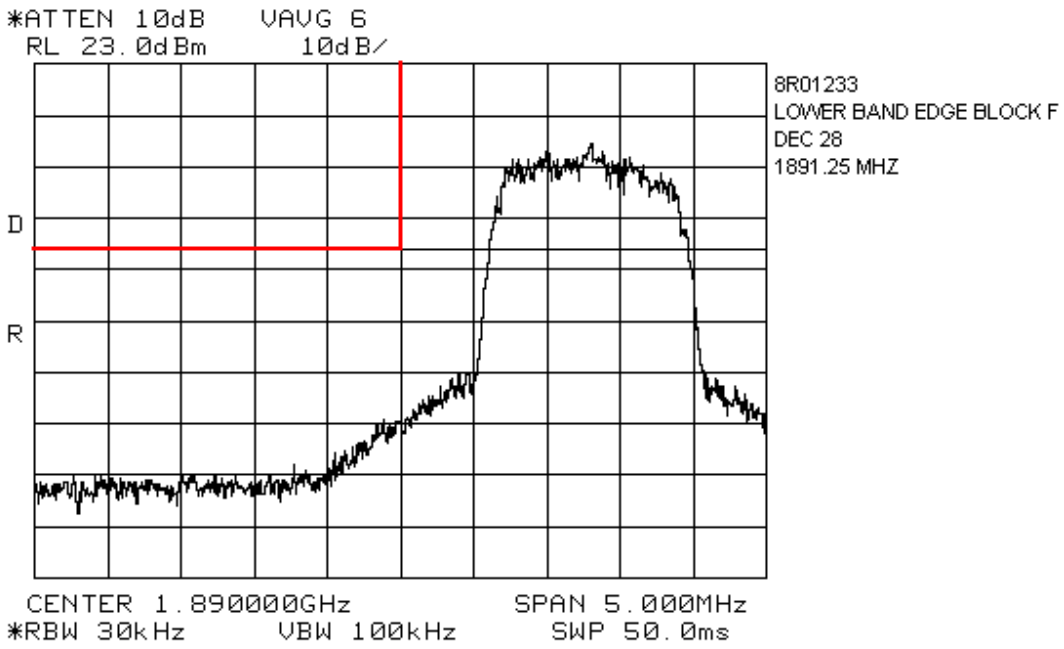

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK A
DEC 0
1851.25 MHZ
D
R
CENTER 1.850000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

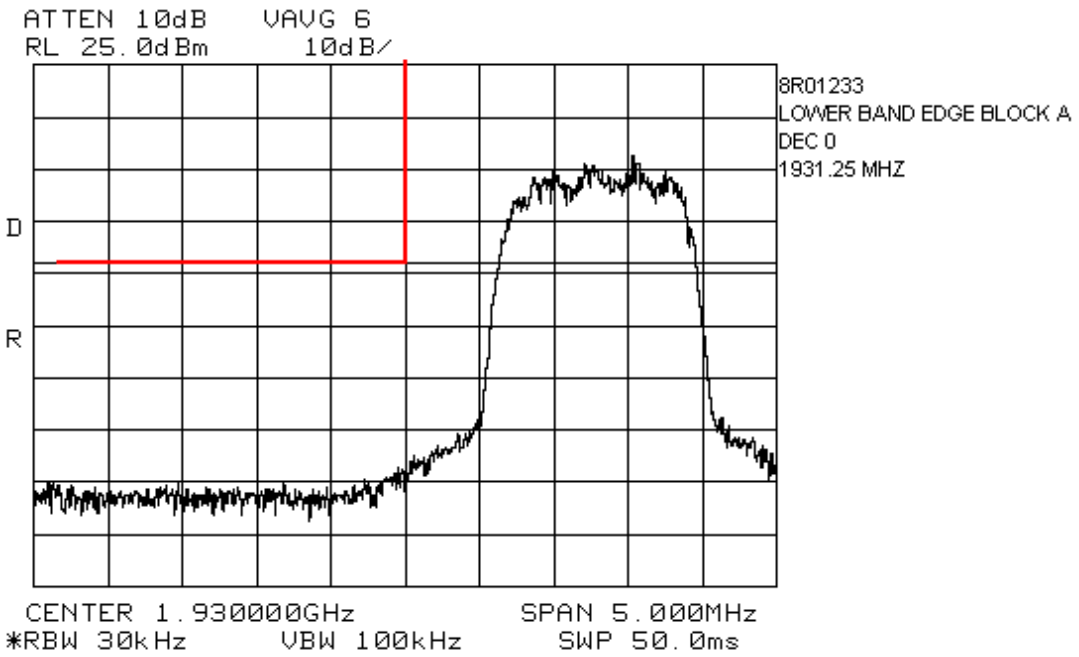

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK B
DEC 14
1871.25 MHZ
D
R
CENTER 1.870000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

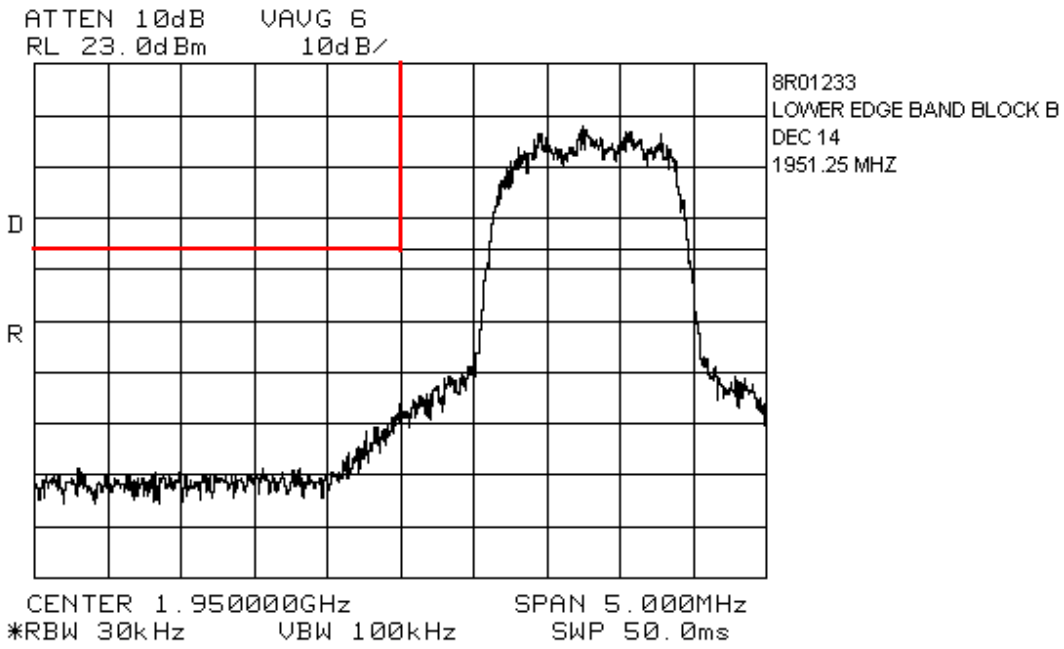

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R-1233
LOWER BAND EDGE BLOCK C
DEC 31
1896.25 MHZ
D
R
CENTER 1.895000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

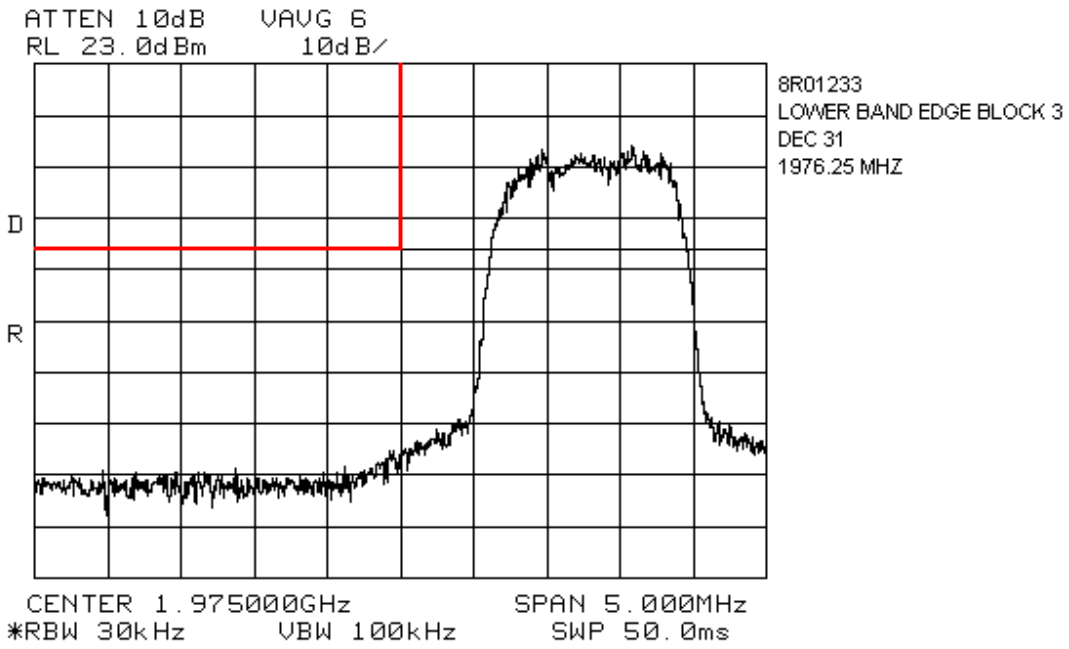

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK D
DEC 11
1866.25 MHZ
D
R
CENTER 1.865000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

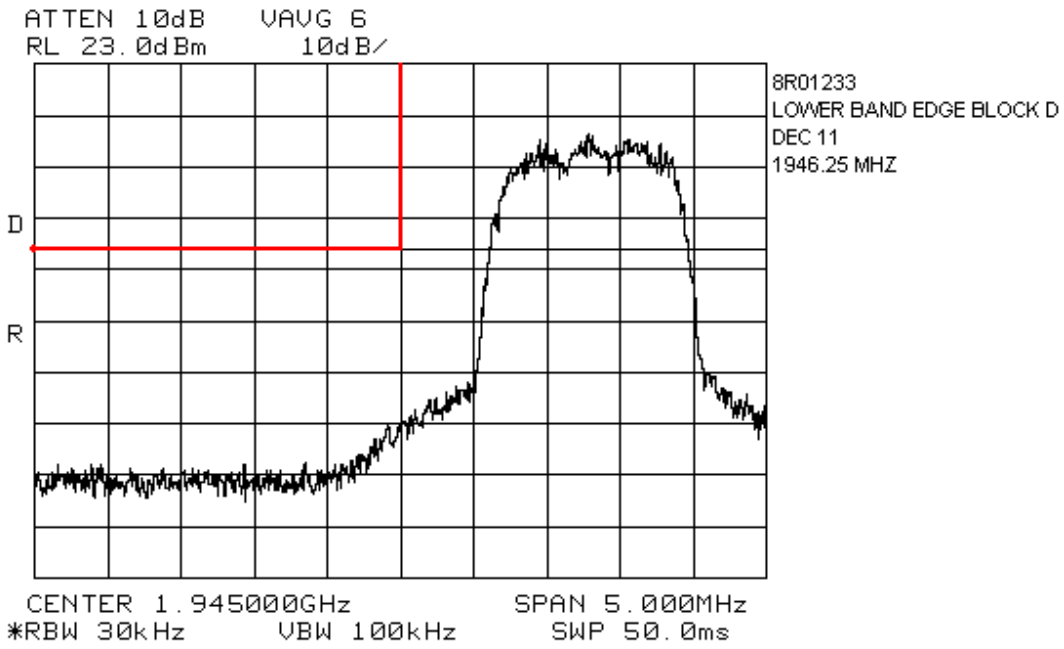

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
D
R
8R01233
LOWER BAND EDGE BAND E
DEC 25
1886.25 MHZ
CENTER 1.885000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

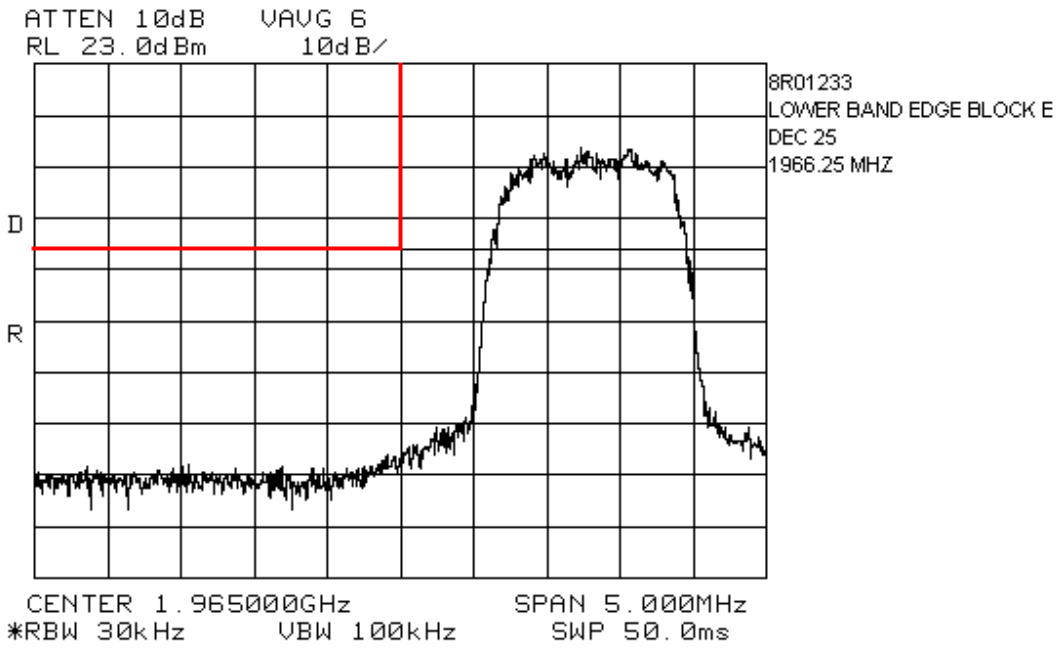

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK F
DEC 28
1891.25 MHZ
D
R
CENTER 1.890000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

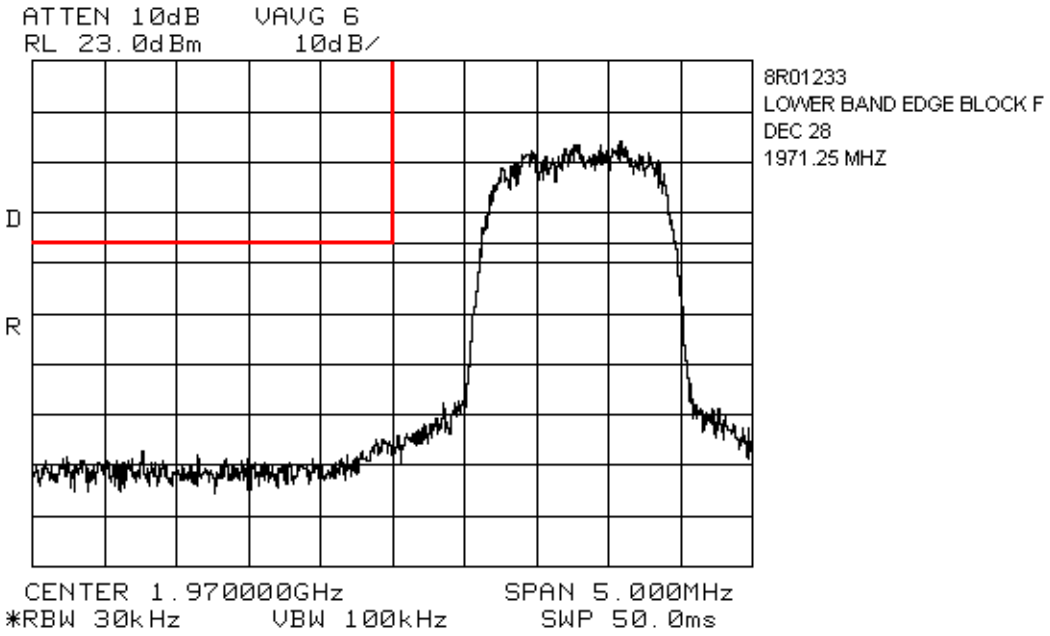

ATTEN 10dB
VAVG 6
RL 25.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK A
DEC 0
1931.25 MHZ
D
R
CENTER 1.930000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

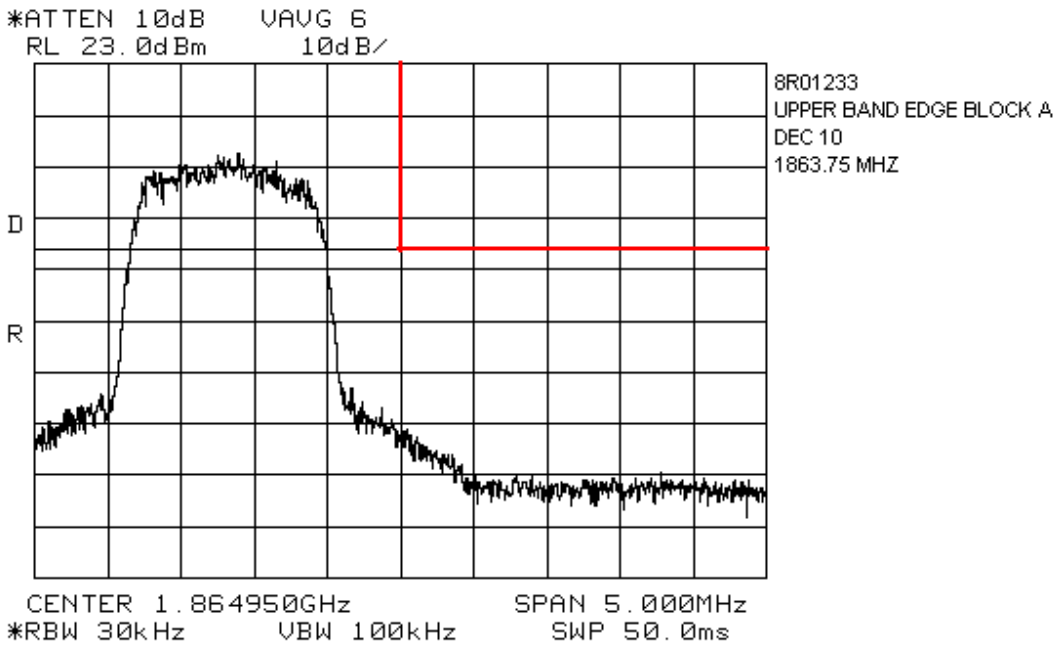

ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER EDGE BAND BLOCK B
DEC 14
1951.25 MHZ
D
R
CENTER 1.950000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

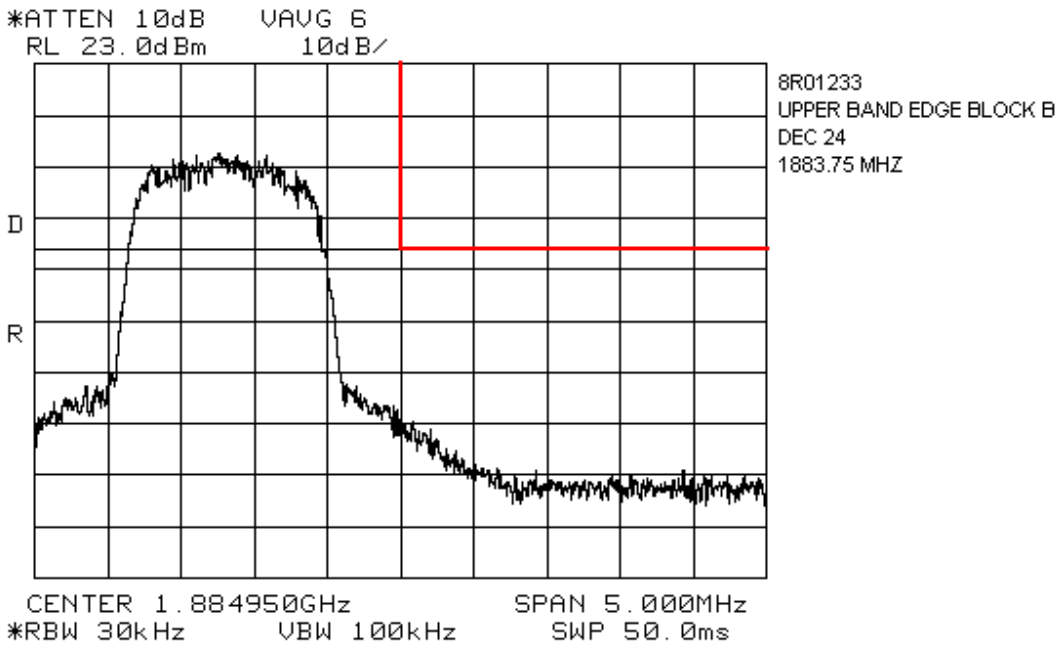

ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
D
R
8R01233
LOWER BAND EDGE BLOCK 3
DEC 31
1976.25 MHZ
CENTER 1.975000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK D
DEC 11
1946.25 MHZ
D
R
CENTER 1.945000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK E
DEC 25
1966.25 MHZ
D
R
CENTER 1.965000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BLOCK F
DEC 28
1971.25 MHZ
D
R
CENTER 1.970000GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK A
DEC 10
1863.75 MHZ
D
R
CENTER 1.864950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms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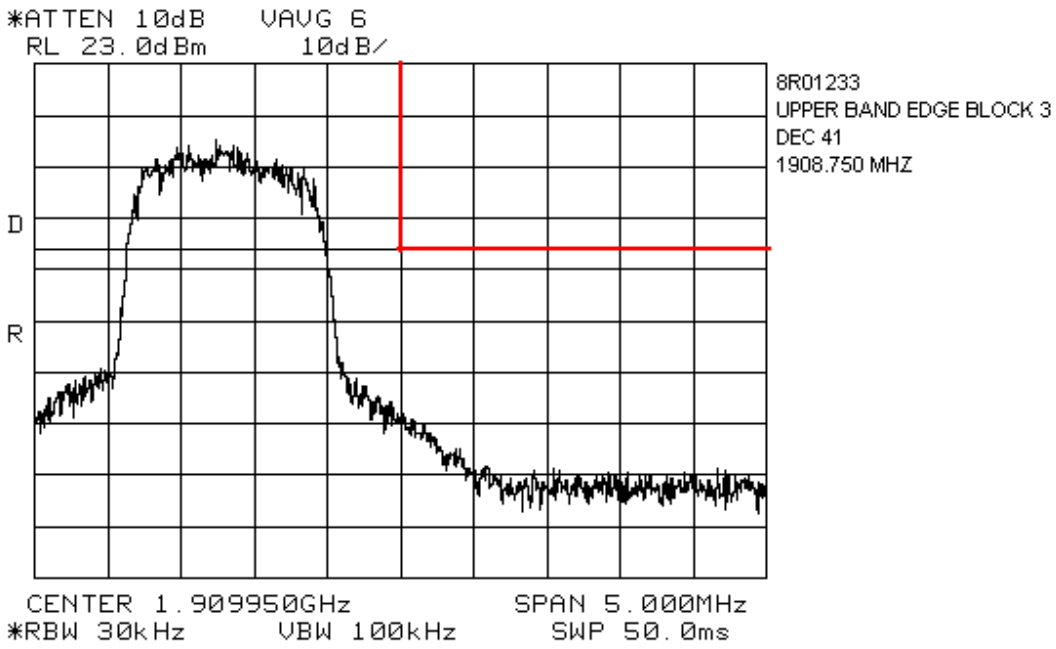
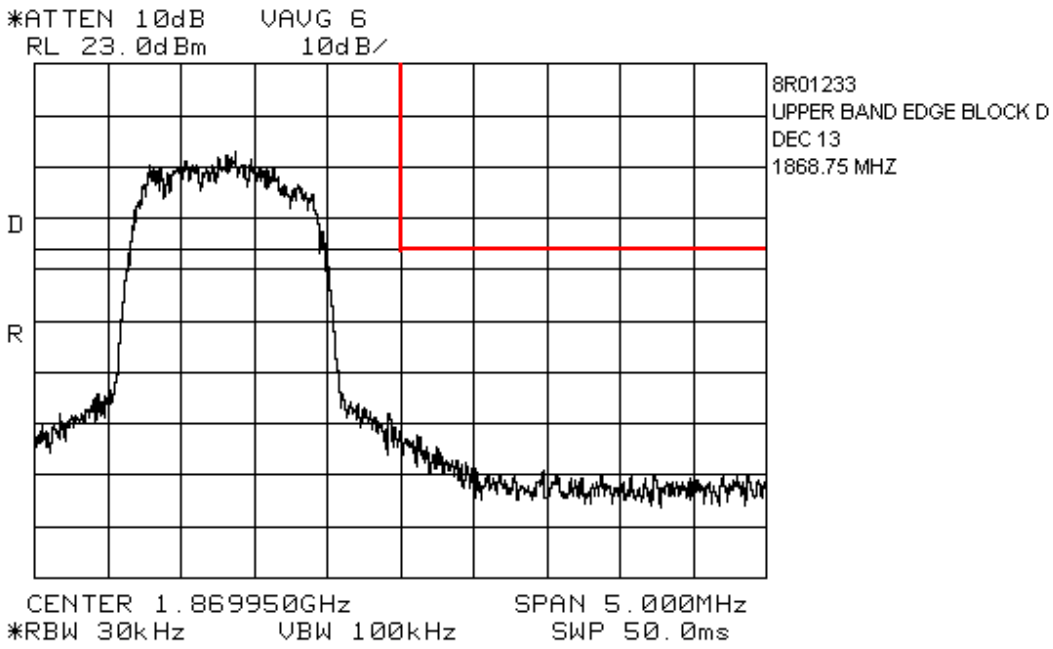
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK B
DEC 24
1883.75 MHZ
D
R
CENTER 1.884950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK 3
DEC 41
1908.750 MHZ
D
R
CENTER 1.909950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms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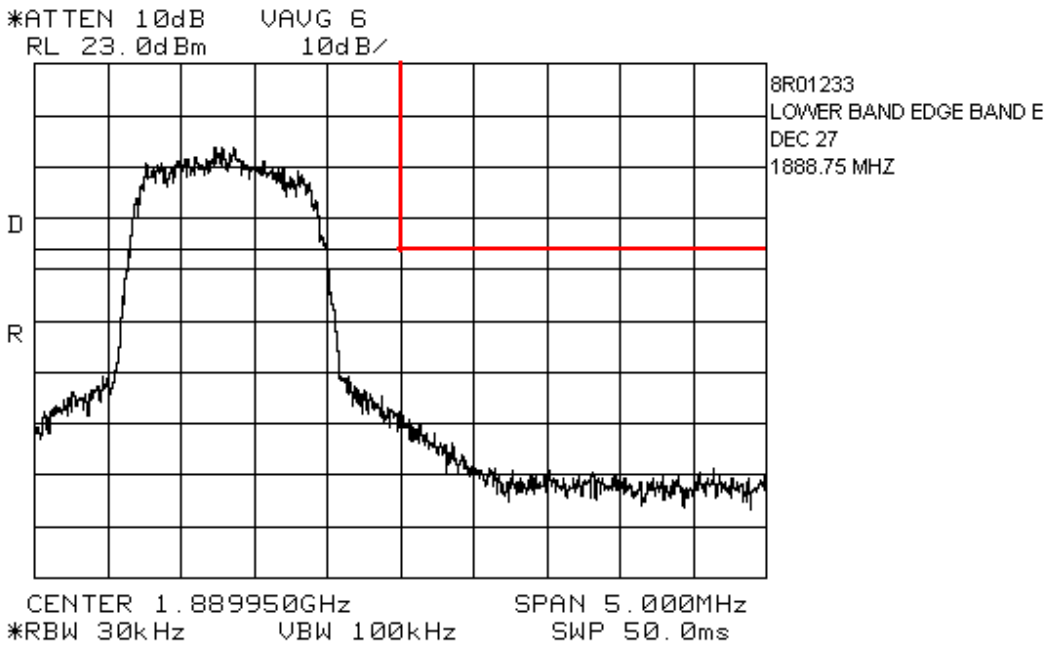
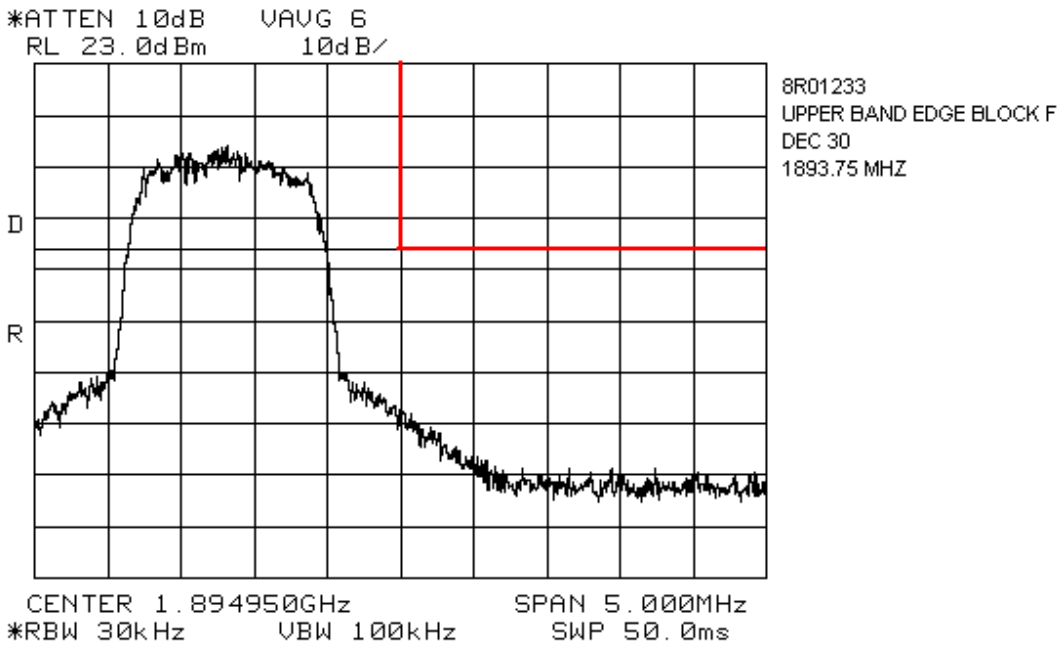
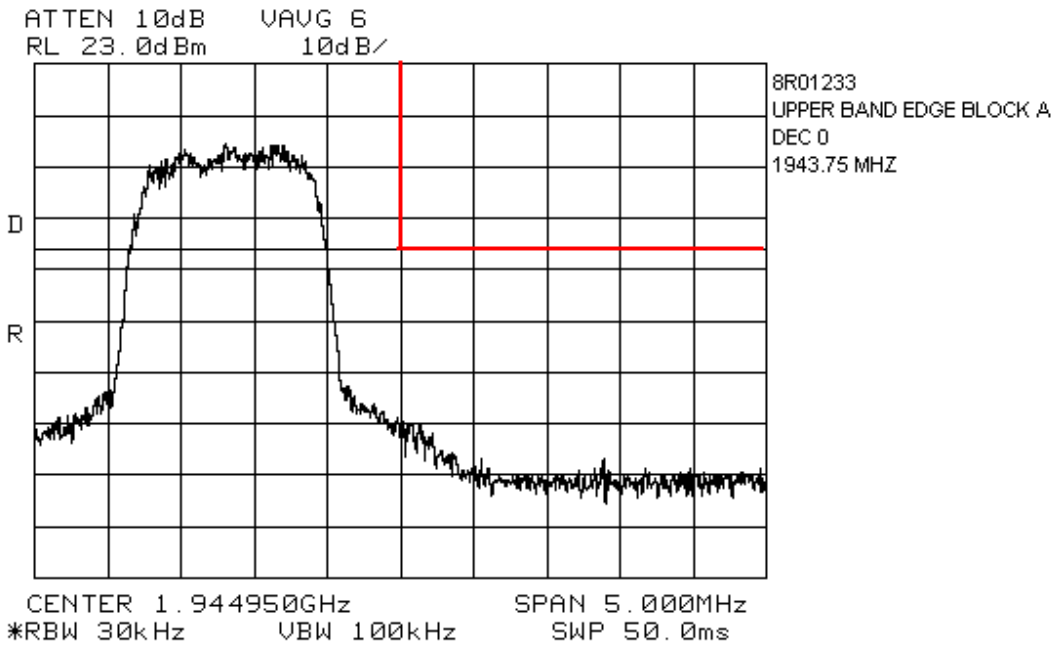
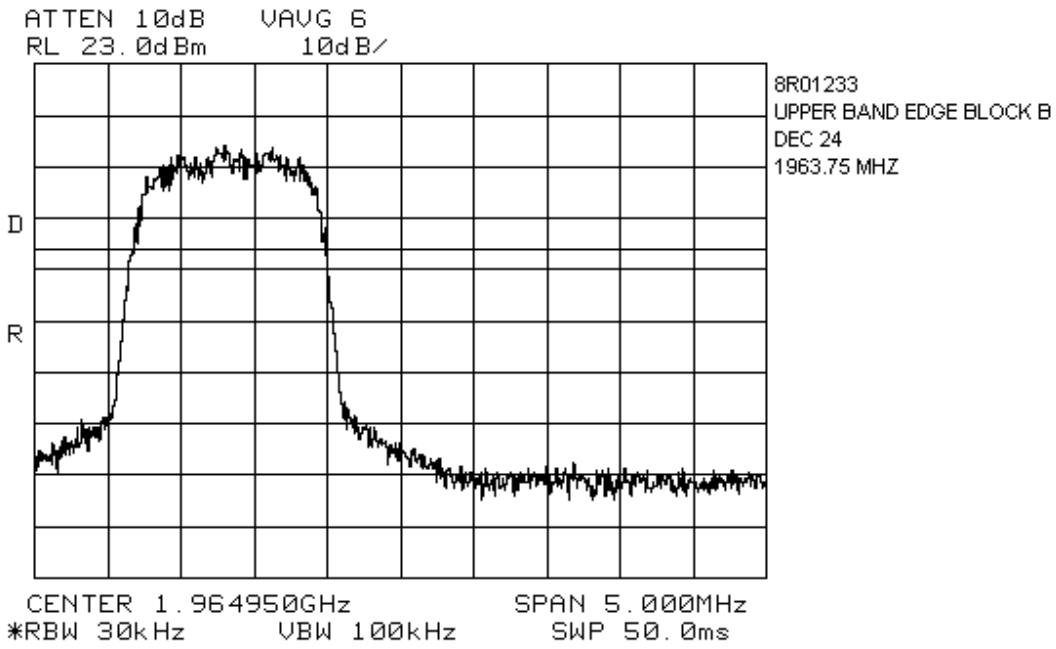
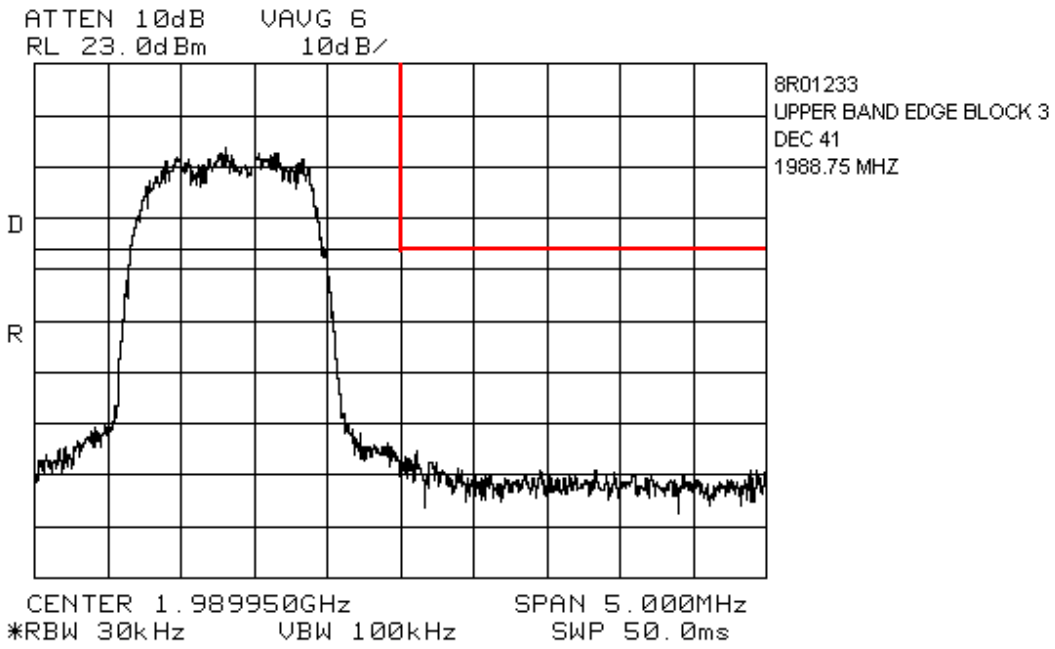
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK D
DEC 13
1868.75 MHZ
D
R
CENTER 1.869950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

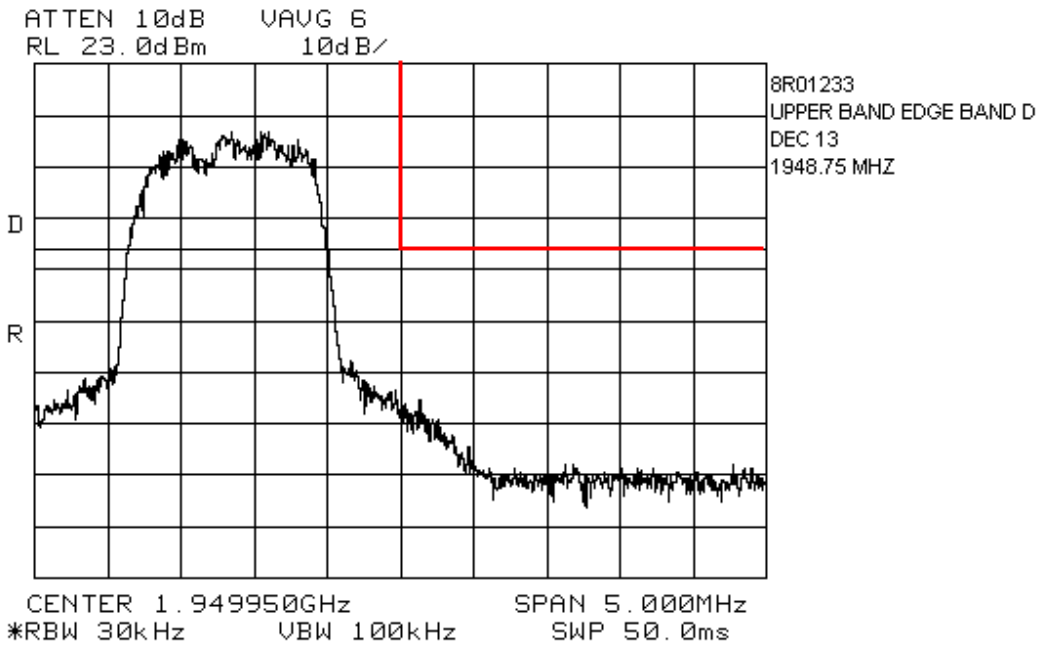

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
LOWER BAND EDGE BAND E
DEC 27
1888.75 MHZ
D
R
CENTER 1.889950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

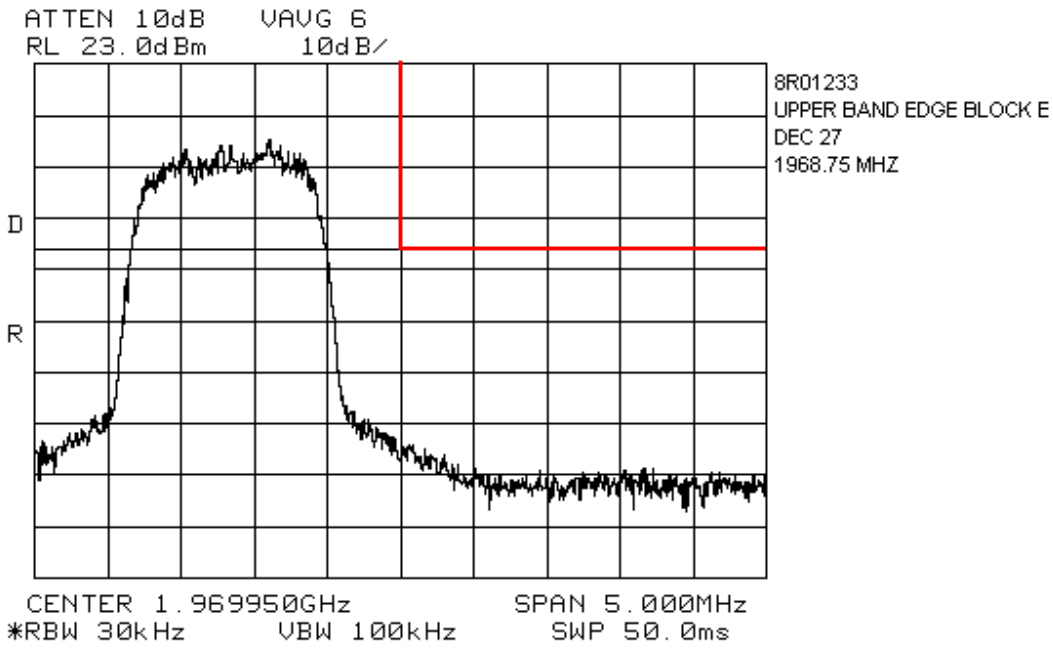

*ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
D
R
8R01233
UPPER BAND EDGE BLOCK F
DEC 30
1893.75 MHZ
CENTER 1.894950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

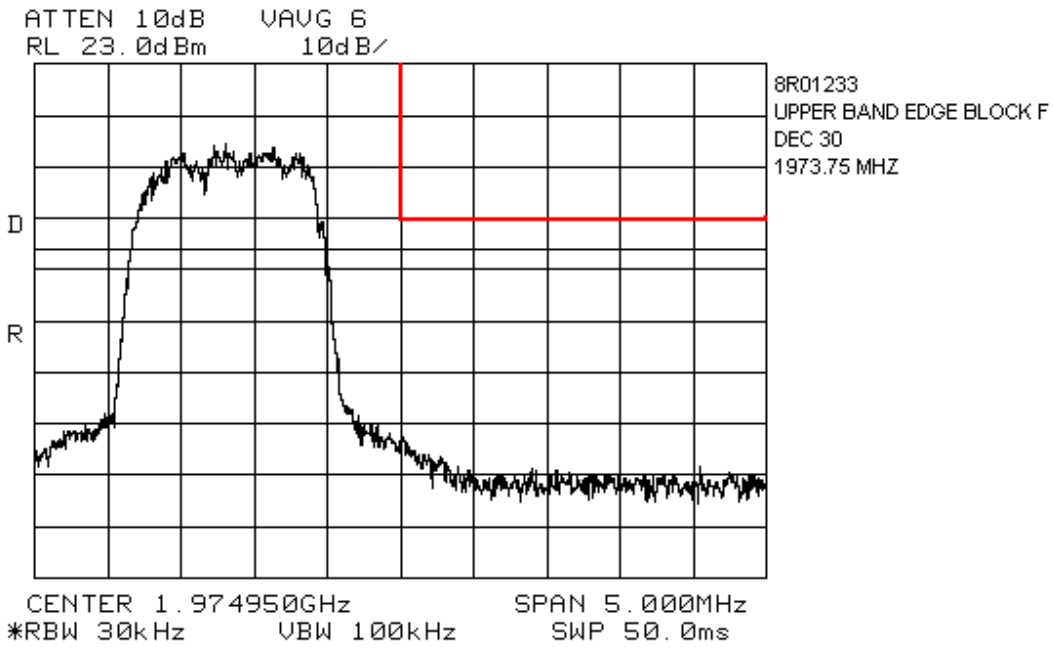

ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK A
DEC 0
1943.75 MHZ
D
R
CENTER 1.944950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK B
DEC 24
1963.75 MHZ
D
R
CENTER 1.964950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK 3
DEC 41
1988.75 MHZ
D
R
CENTER 1.989950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BAND D
DEC 13
1948.75 MHZ
D
R
CENTER 1.949950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK E
DEC 27
1968.75 MHZ
D
R
CENTER 1.969950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms


ATTEN 10dB
VAVG 6
RL 23.0dBm
10dB/
8R01233
UPPER BAND EDGE BLOCK F
DEC 30
1973.75 MHZ
D
R
CENTER 1.974950GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 100kHz
SWP 50.0ms

Section 6. Field Strength of Spurious

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Wayne Clarke	DATE: March 23, 1999

Test Results: Complies. There were no emissions detected within 20 dB of the 82.3 dBµV/m limit.

Test Data:

Test Data - Radiated Emissions – Uplink

Test Distance (meters) : 3		Range:		Receiver:		RBW(1 MHz):		Detector:			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)

NO EMISSIONS DETECTED

Notes:
The spectrum was search up to the 10th harmonic of the fundamental frequency.
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Includes cable loss when amplifier is not used.
** Includes cable loss.
( ) Denotes failing emission level.

Test Data - Radiated Emissions – Downlink

Test Distance (meters) : 3		Range:		Receiver:		RBW(1 MHz):		Detector:			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dBµV/m)	Ant. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBµV/m)	Limit (dBµV/m)	Margin (dB)

Notes:
The spectrum was search up to the 10th harmonic of the fundamental frequency.
B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole
* Includes cable loss when amplifier is not used.
** Includes cable loss.
( ) Denotes failing emission level.

Photographs of Test Setup

Front View

Rear View

Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY:	DATE:

Test Results: Complies/Does Not Comply.

Measurement Data: Standard Test Frequency _____ MHz
Standard Test Voltage _____ Vdc

NOT APPLICABLE

Section 8. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	May 20/98	May 20/99	
	Plotter	Hewlett Packard	7470A	2308A30807	NCR	NCR	
1 Year	Spectrum Analyzer-**1**	Hewlett Packard	8566B	2311A02238	Oct. 22/98	Oct. 22/99	
1 Year	Spectrum Analyzer Display-**1**	Hewlett Packard	8566B	2314A04759	Oct. 22/98	Oct. 22/99	
1 Year	Quasi-peak adapter-**1**	Hewlett-Packard	85650A	2043A00302	Oct. 22/98	Oct. 22/99	
1 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA000420	July 23/98	July 23/99	
1 Year	Insertion Unit	Rohde & Schwarz	URV5-Z4	FA000905	July 23/98	July 23/99	
1 Year	LISN	Rohde & Schwarz	ESH2-Z5	890485/017	July 23/98	July 23/99	
1 Year	LISN(peripheral)	Tegam	95300-50	T-109014/15	July 24/98	July 24/99	
2 Year	Horn Antenna	EMCO #2	3115	4336	Oct. 30/97	Oct. 30/99	

NA: Not Applicable
NCR: No Cal Required

ANNEX A

TEST METHODOLOGIES

NAME OF TEST: RF Power Output	**PARA. NO.: 2.985**

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

NAME OF TEST: Occupied Bandwidth	**PARA. NO.: 2.989**

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: ≥ RBW
Span: 5 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz
VBW: ≥ RBW
Span: 2 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz
VBW: ≥ RBW
Span: 1 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.991

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

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

NADC

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 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.: 2.993

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 (5×10^{-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 ≤ 1 GHz:

G = 1.64 (Dipole Gain)
P = 10^{-5} Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

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

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

For emissions > 1 GHz:

G = 1 (Isotropic Gain)
P = 1×10^{-5} Watts (Maximum spurious output power)
R = 3m (Measurement Distance)

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

NAME OF TEST: Frequency Stability	**PARA. NO.: 2.995**

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.

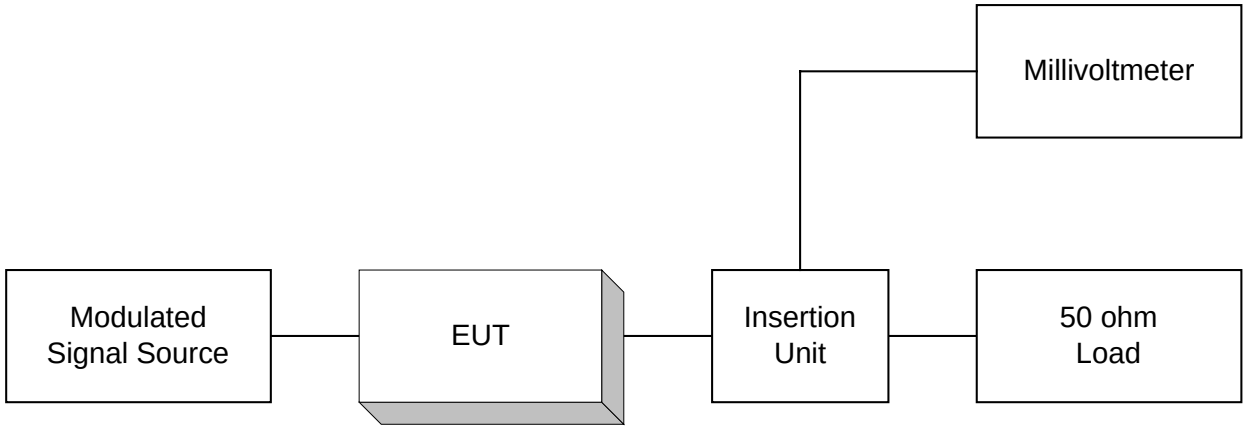
Frequency Stability With Temperature Variation

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.

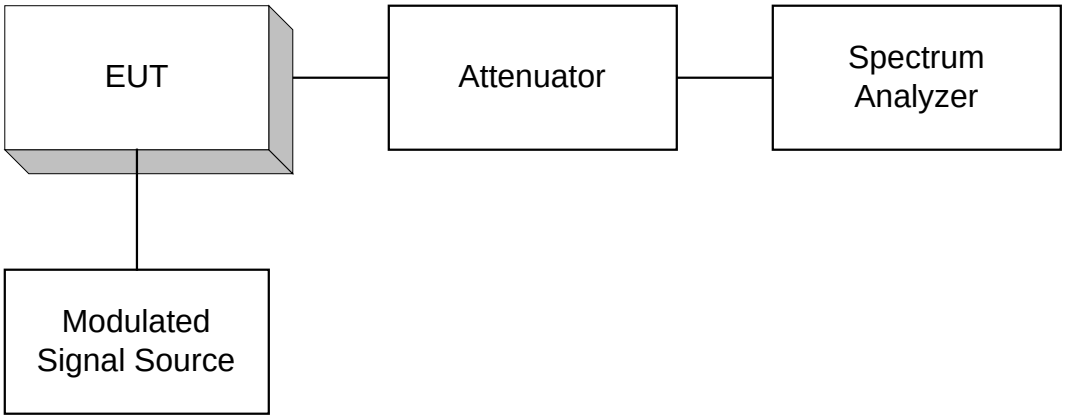
ANNEX B

TEST DIAGRAMS

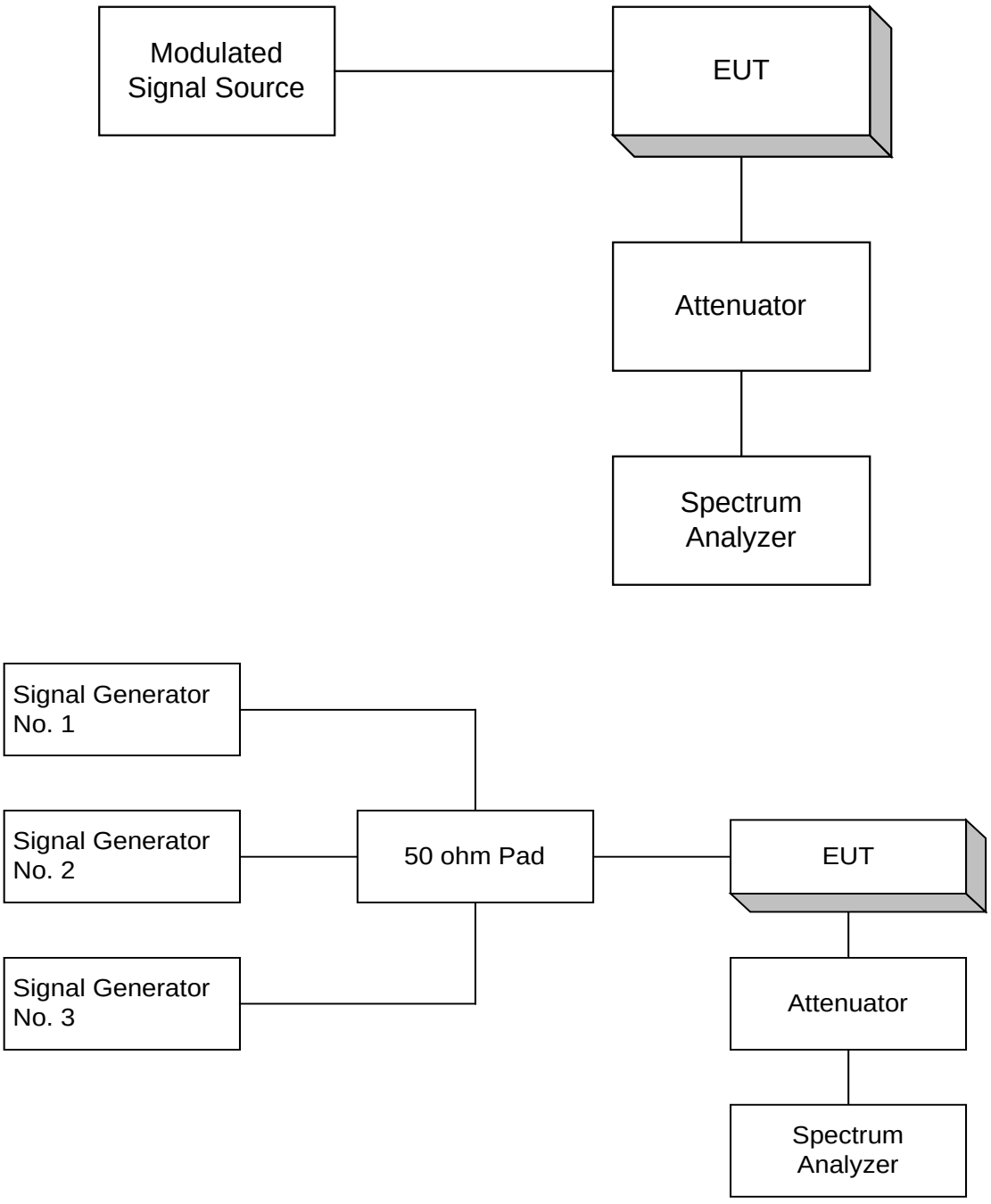
Para. No. 2.985 - R.F. Power Output



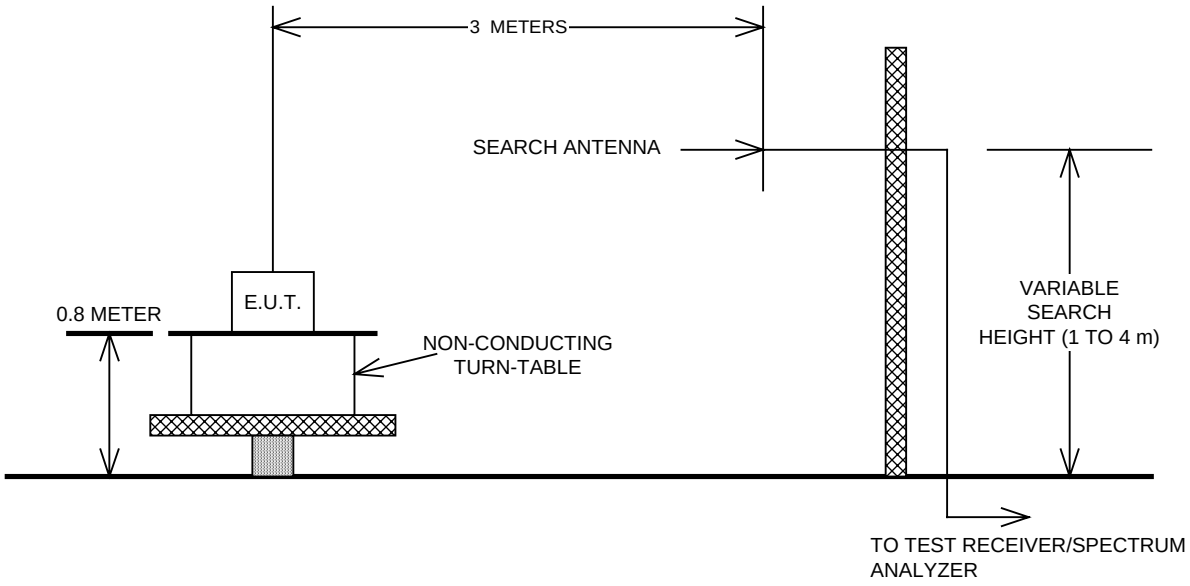
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability