

KTL Test Report:	8R01375
Applicant:	Allen Telecom Group 140 Vista Centre Drive Forest, Virginia 24551 USA
Equipment Under Test: (E.U.T.)	Band Selective Booster Amplifier
FCC ID:	BCR-MRB-PCS
In Accordance With:	FCC Part 24, Subpart E Broadband PCS Base Station
Tested By:	KTL Ottawa Inc. 3325 River Road, R.R. 5 Ottawa, Ontario K1V 1H2
Authorized By:	 R. Grant, Senior RF Specialist
Date:	
Total Number of Pages:	196

Table of Contents

Section 1. Summary of Test Results

- General
- Summary of Test Data

Section 2. General Equipment Specification

- Specifications
- Description of Modifications for Class II Permissive Change
- Modifications Made During Testing
- Theory of Operation
- System Diagram

Section 3. RF Power Output

- Test Results
- Measurement Data
- Power Over Bandwidth Graphs

Section 4. Occupied Bandwidth

- Occupied Bandwidth (CDMA)
 - Test Results
 - CDMA Input and Output Graphs
- Occupied Bandwidth (GSM)
 - Test Results
 - GSM Input and Output Graphs
- Occupied Bandwidth (NADC)
 - Test Results
 - NADC Input and Output Graphs

Section 5. Spurious Emissions at Antenna Terminals

- Test Results
- Test Data
- Graphs

Section 6. Field Strength of Spurious

- Test Results
- Test Data
- Test Data - Radiated Emissions - Uplink
- Test Data - Radiated Emissions - Downlink
- Photographs of Test Setup
- Pre-Scan Data

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Table of Contents, continued

Section 7. Frequency Stability

- Test Results
- Measurement Data
- Graphs

Section 8. Test Equipment List

Annex A - Test Methodologies

- RF Power Output
- Occupied Bandwidth (CDMA)
- Occupied Bandwidth (GSM)
- Occupied Bandwidth (NADC)
- Spurious Emission at Antenna Terminals
- Field Strength of Spurious
- Frequency Stability

Annex B - Test Diagrams

- R.F. Power Output
- Occupied Bandwidth
- Spurious Emissions at Antenna Terminals
- Field Strength of Spurious
- Frequency Stability

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Section 1. Summary of Test Results

Manufacturer: Allen Telecom Group

Model No.: Band Selective Booster Amplifier

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



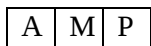
Production Unit



Class II Permissive Change



Pre-Production Unit



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: _____
Kevin Carr, Technologist

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This report applies only to the items tested.

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	MEAS.	RESULT
RF Power Output	24.232	100W	Plot	Complies
Occupied Bandwidth (CDMA)	24.238	Input vs. Output	Plot	Complies
Occupied Bandwidth (GSM)	24.238	Input vs. Output	Plot	Complies
Occupied Bandwidth (TDMA)	24.238	Input vs. Output	Plot	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	-13.0	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Chart	Complies
Frequency Stability	24.235	± 0.05 ppm	N/A	N/A

Footnotes For N/A's:

Test Conditions: **LAB:** Temperature: 22 °C
 Humidity: 41 %

OATS: Temperature: 24.5 °C
 Humidity: 41.0 %

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Section 2. General Equipment Specification**Supply Voltage Input:** 120 VAC, 60 Hz**Frequency Range(s):** ADB-Block, 1930.0 – 1964.95 MHz
EFC-Block, 1965.0 – 1989.95 MHz

Type of Modulation and Designator:	CDMA (F9W)	GSM (GXW)	TDMA (DXW)
	☒	☒	☒

Emission & Bandwidth Designator: Not Applicable**Output Impedance:** 50 ohm

RF Output (Rated):	4-Amplifier Configuration:	ADB-Block:	41.0 dBm
		EFC-Block:	38.4 dBm
		<i>Single Channel</i>	
	2-Amplifier Configuration:	ADB-Block:	42.6 dBm
		EFC-Block:	45.0 dBm
		<i>Single Channel</i>	
		ADB-Block:	38.7 dBm
		EFC-Block:	38.7 dBm
		<i>Single Channel</i>	
		ADB-Block:	44.1 dBm
		EFC-Block:	42.0 dBm

Band Selection:	Software	Duplexer Change	Fullband Coverage
	☐	☒	☐

EQUIPMENT: Band Selective Booster Amplifier
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Description of Modifications For Class II Permissive Change

NOT APPLICABLE

EQUIPMENT: Band Selective Booster Amplifier
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Modifications Made During Testing

NOT APPLICABLE

EQUIPMENT: Band Selective Booster Amplifier
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System Description

The RF Booster is a band selective device, which will increase the maximum output power of a signal from a repeater in the downlink. In addition, an integrated LNA will reduce the noise figure in the uplink so as to maintain balance in both paths. It is employed wherever additional signal strengths are needed and isolation requirements allow it. It can be ordered initially with a repeater or retrofitted to an existing product in the field.

The RF Booster is available for most frequency bands including PCS1900, GSM1800, GSM900, AMPS800 and LMR800. As it is a band selective amplifier it can be used with all technologies including GSM, CDMA, TDMA, iDEN and Analog.

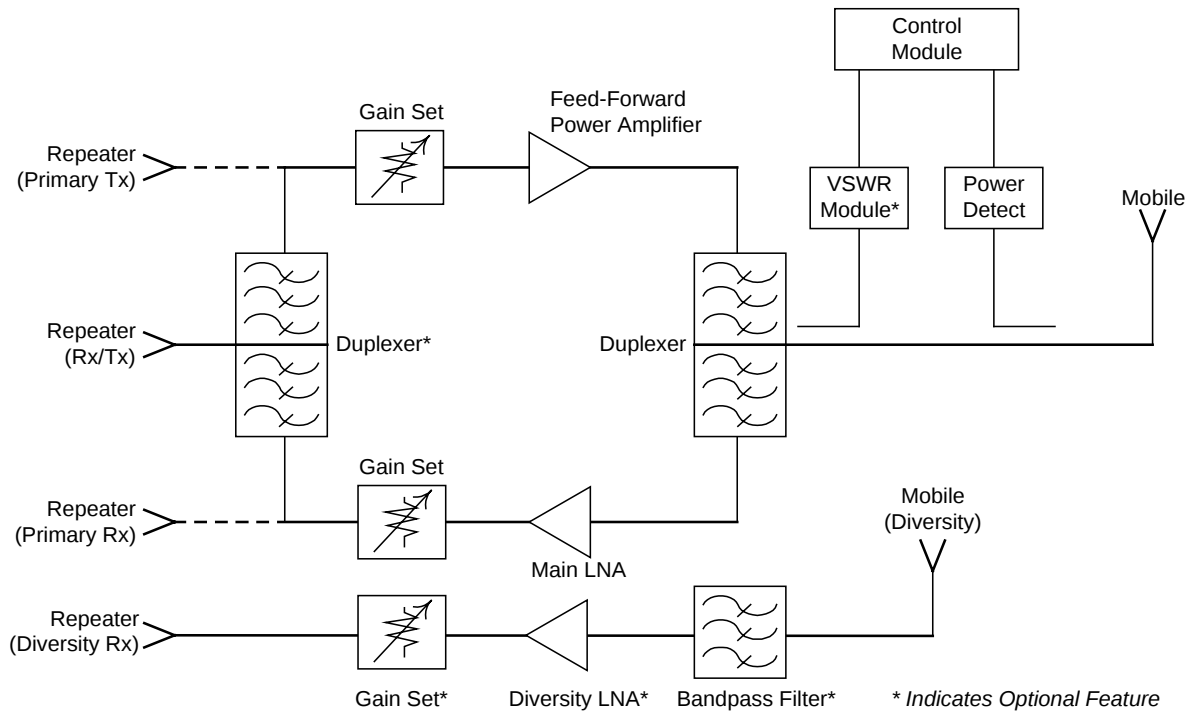
The RF Booster passes alarms back through the repeater it is attached to. The operator may monitor the RF Booster through the repeater as well, via terminal emulation program or the MIKOM OMC software platform. The same language that is used for the repeater supports the operator when querying status reports or changing settings.

Note:

The RF booster has multiple configurations. There is a 4-amplifier configuration and a dual amplifier configuration. Within each of the previous amplifier configurations are two swappable duplexer configurations. One duplexer set covers the ABD-Blocks and the second set covers the EFC-Blocks.

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

System Diagram



EQUIPMENT: Band Selective Booster Amplifier
*FCC ID: BCR-MRB-PCS***Section 3. RF Power Output**

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: Kevin Carr	DATE: May 12, 1999

Test Results: Complies.**Measurement Data:****4-Amplifier Configuration**

Modulation Type	ADB-Block		EFC-Block	
	Output Power (dBm)	Output Power (w)	Output Power (dBm)	Output Power (w)
CDMA	41.0	12.6	38.4	6.9
GSM	45.5	35.5	43.9	24.6
TDMA	44.1	25.7	43.3	21.4

Single Channel Power

Modulation Type	ADB-Block		EFC-Block	
	Output Power (dBm)	Output Power (w)	Output Power (dBm)	Output Power (w)
CDMA	42.6	18.2	45.0	31.6
GSM	46.5	44.7	45.0	31.6
TDMA	46.5	44.7	46.3	42.7

2-Amplifier Configuration

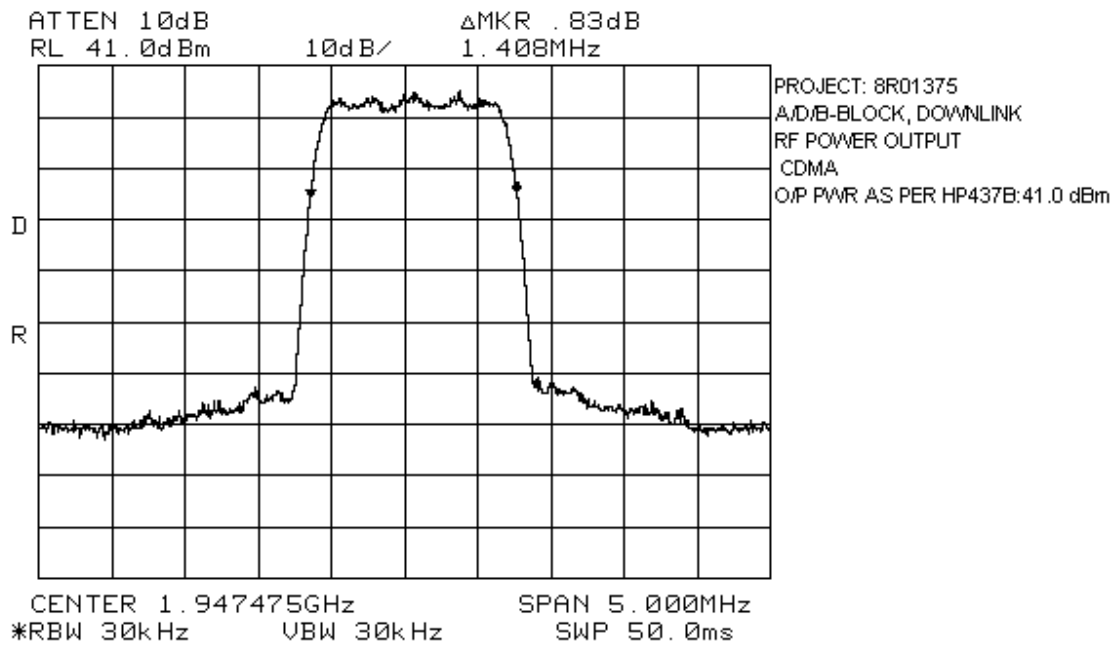
Modulation Type	ADB-Block		EFC-Block	
	Output Power (dBm)	Output Power (w)	Output Power (dBm)	Output Power (w)
CDMA	38.7	7.4	38.7	7.4
GSM	44.2	26.3	44.3	26.9
TDMA	42.0	15.8	40.6	11.5

Single Channel Power

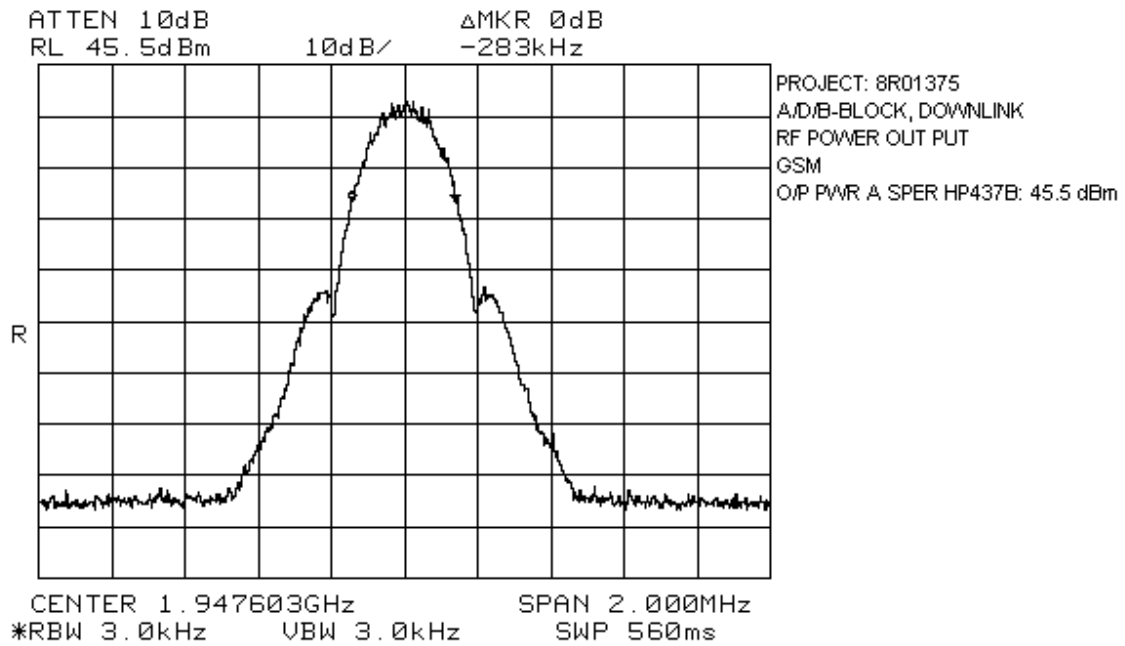
Modulation Type	ADB-Block		EFC-Block	
	Output Power (dBm)	Output Power (w)	Output Power (dBm)	Output Power (w)
CDMA	44.1	25.7	42.0	15.8
GSM	46.0	39.8	42.0	15.8
TDMA	44.7	29.5	42.0	15.8

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

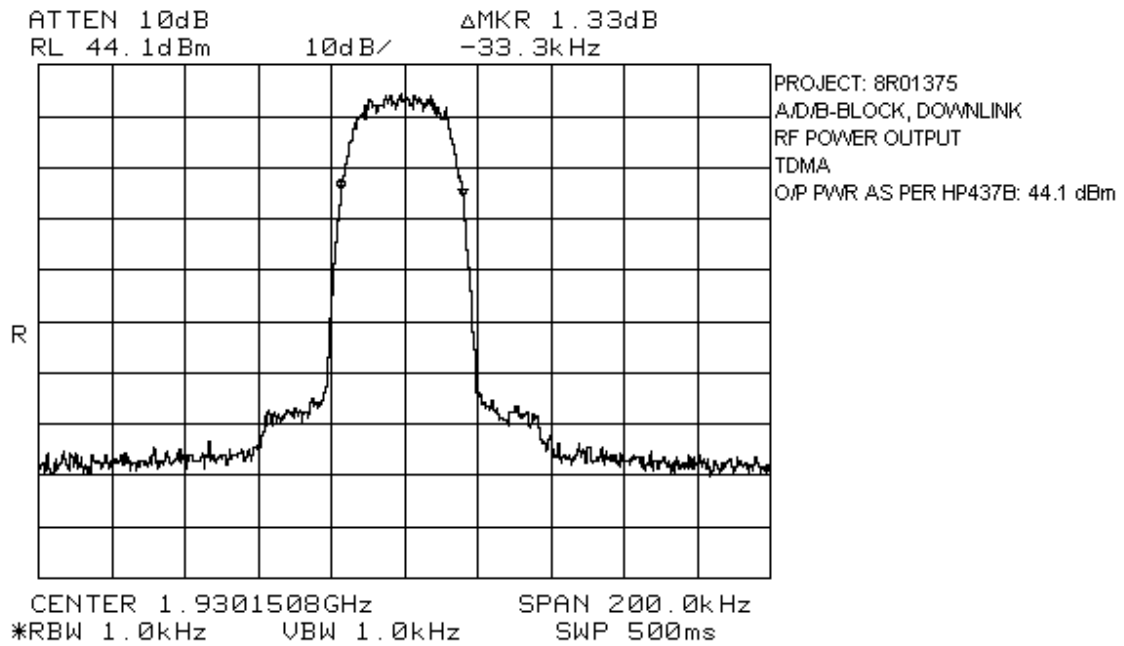
4-Amplifier Configuration (ADB-Block) Two Channel & Single Channel



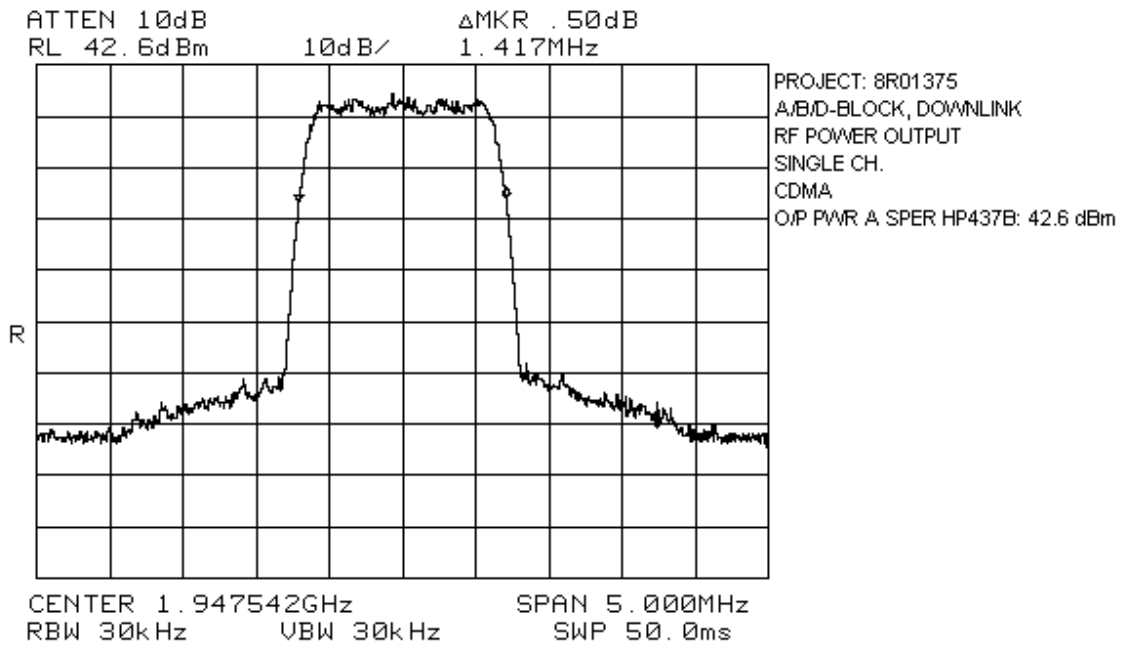
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FCC ID: BCR-MRB-PCS



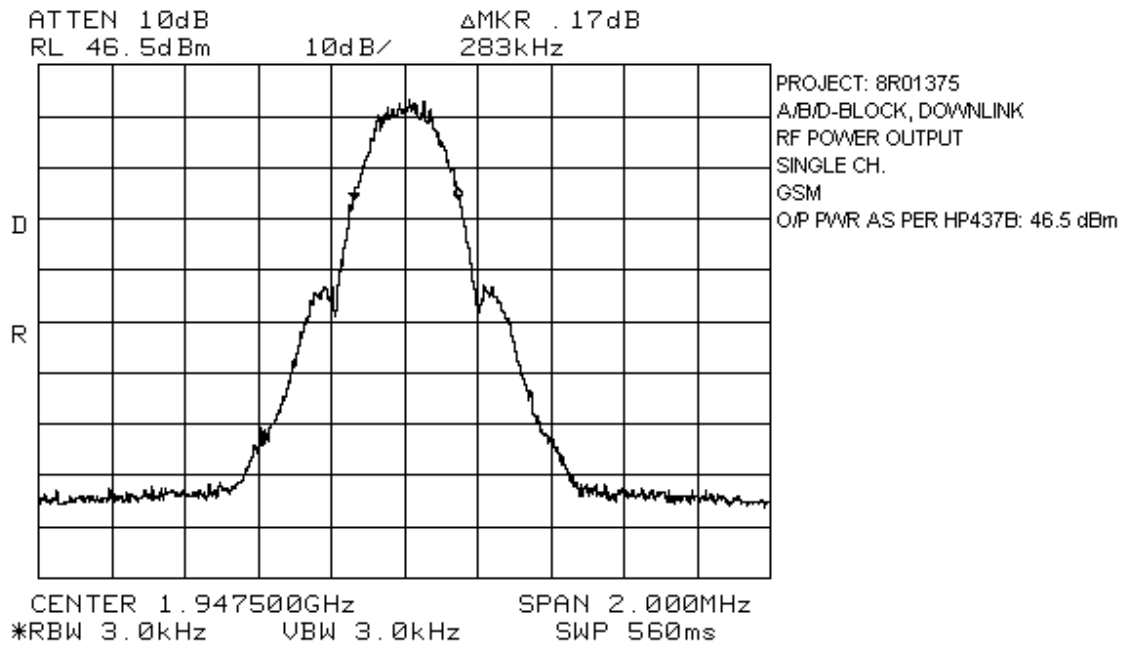
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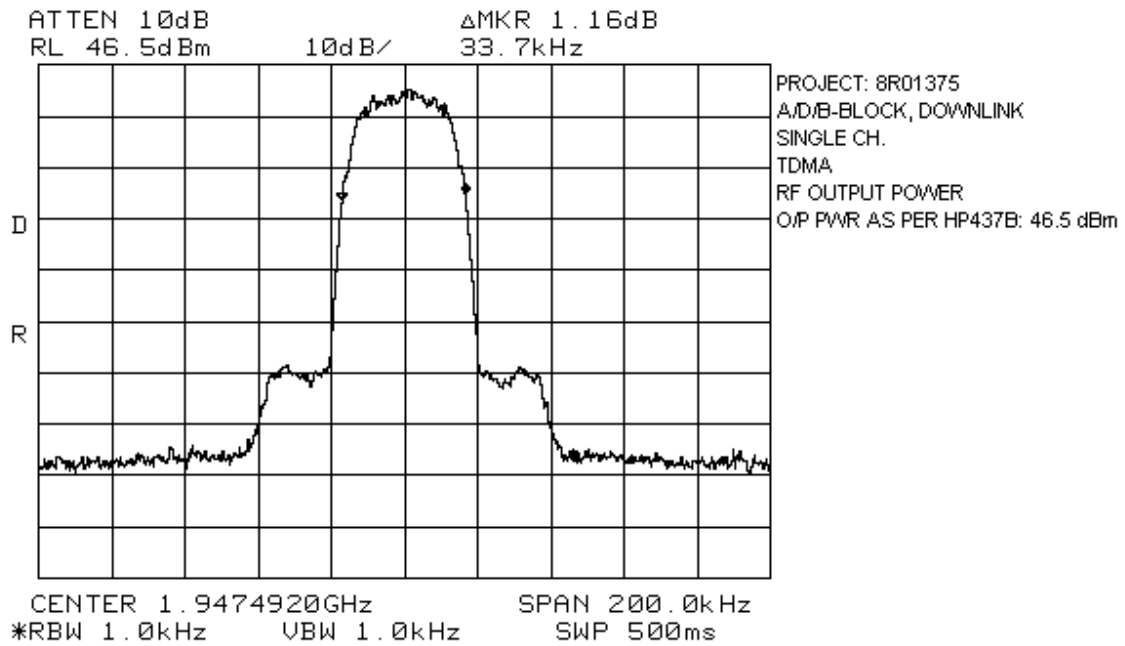
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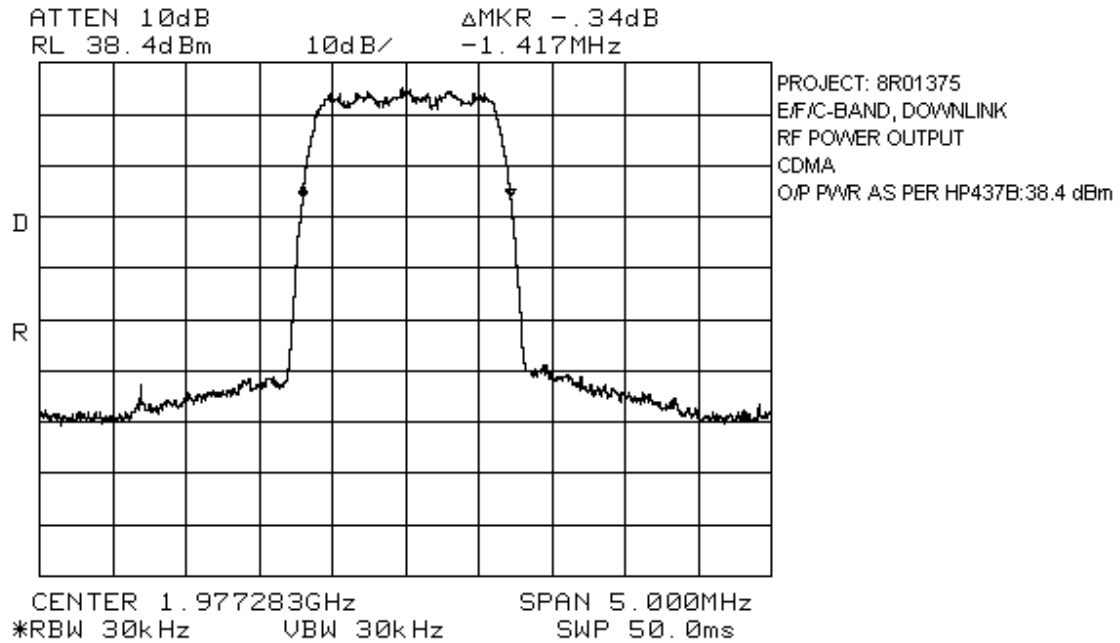


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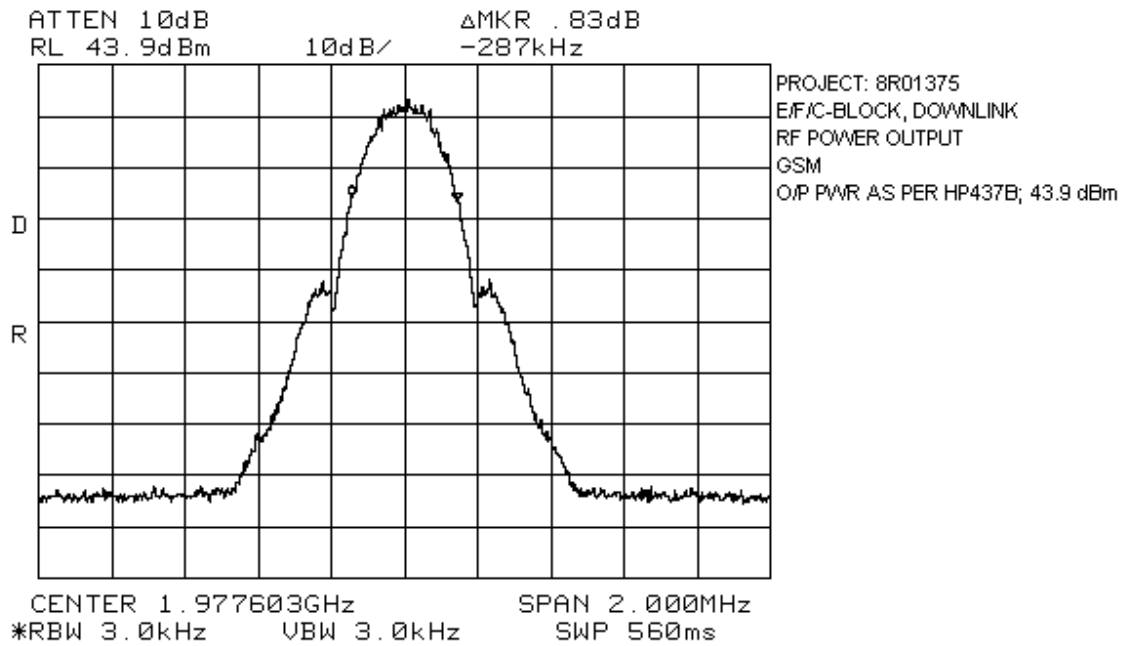


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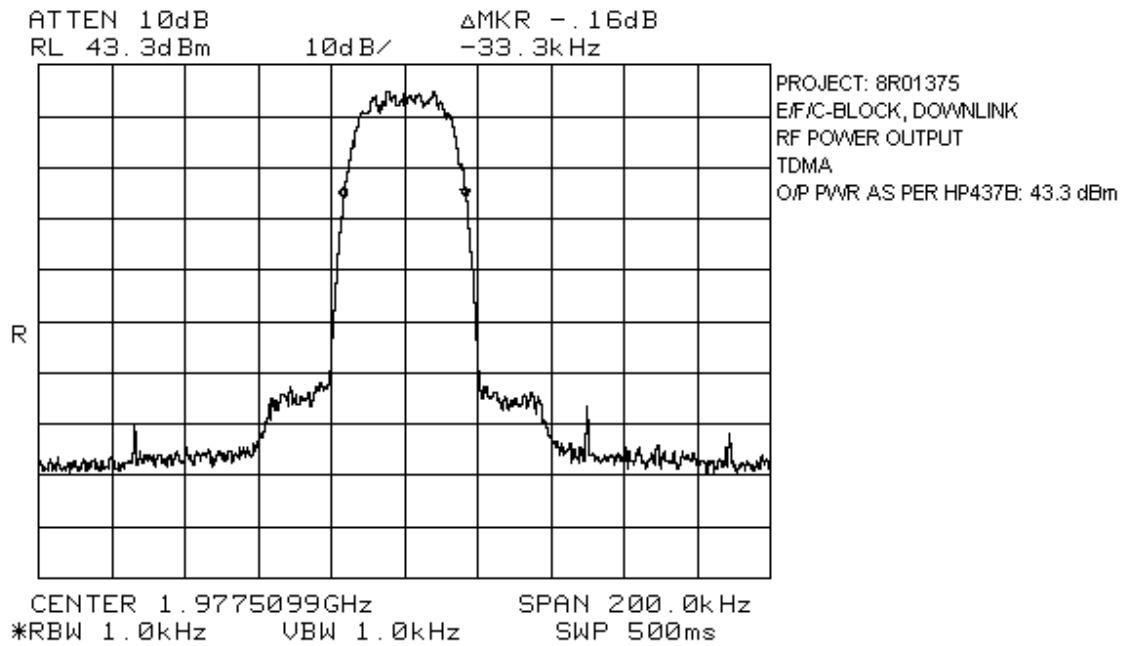
4-Amplifier Configuration (EFC-Block) 2 Channel & Single Channel



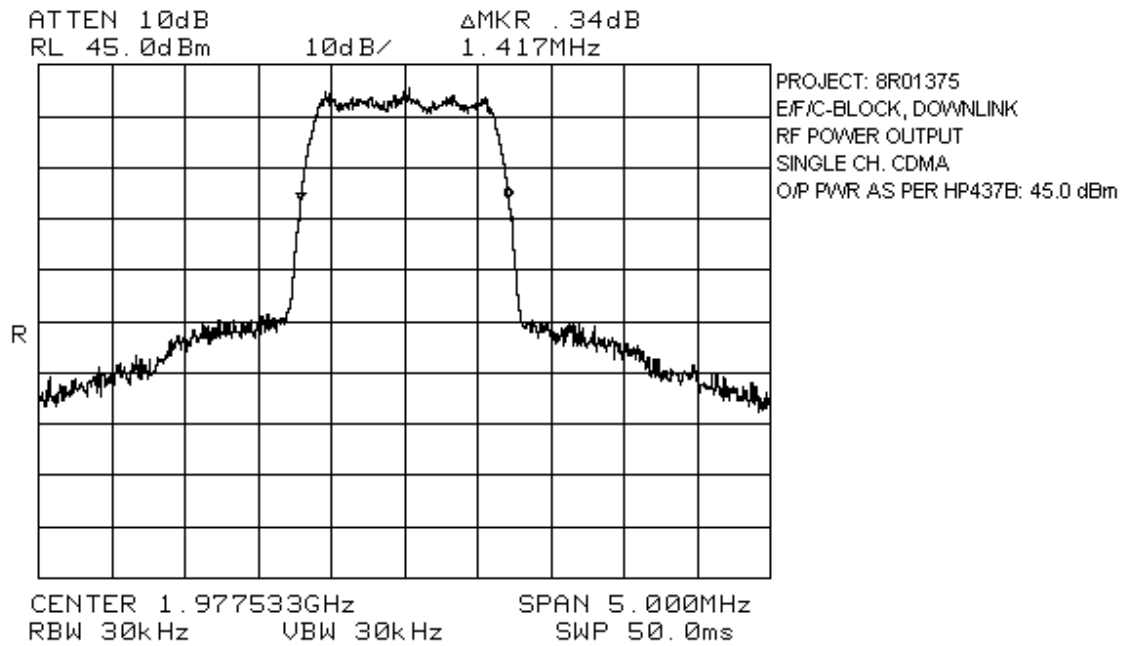
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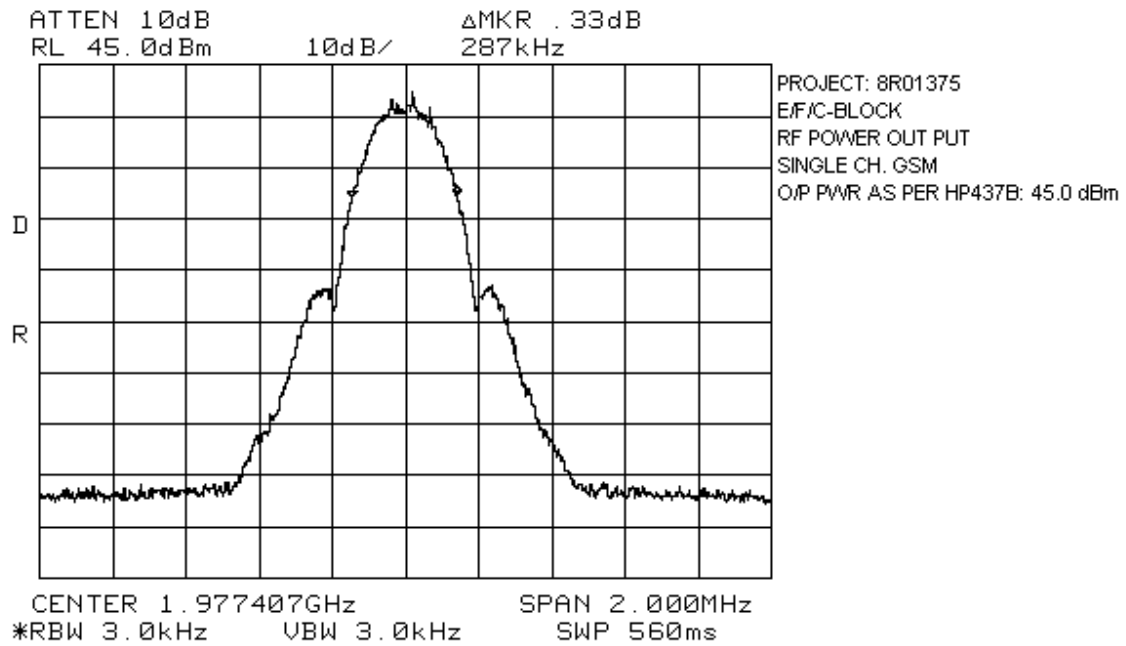
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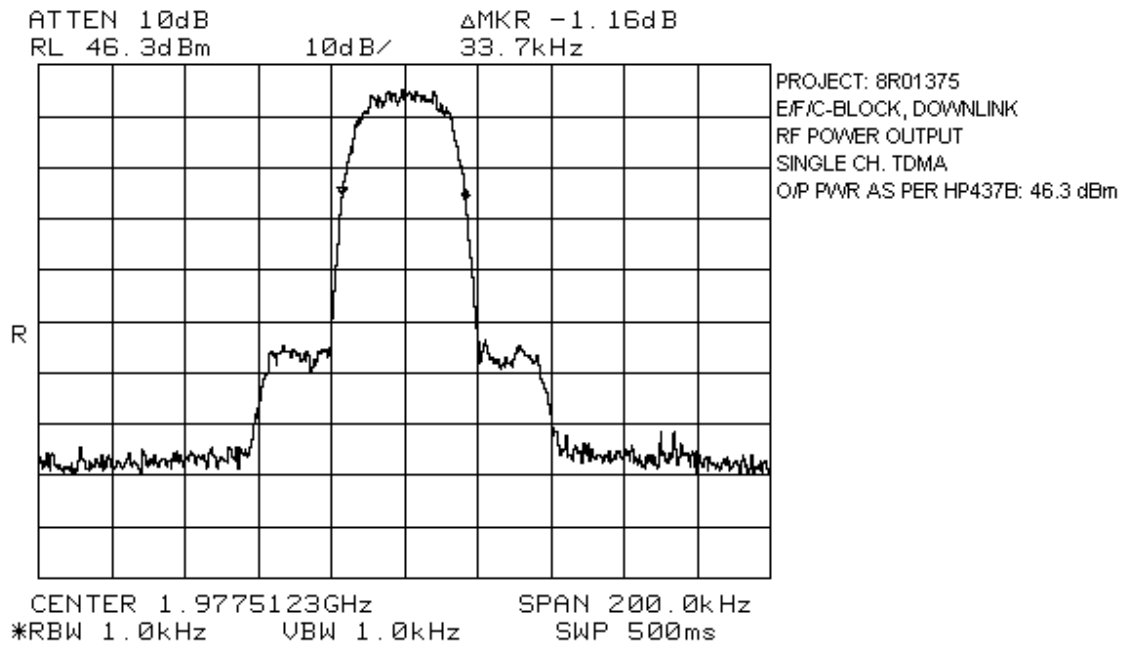
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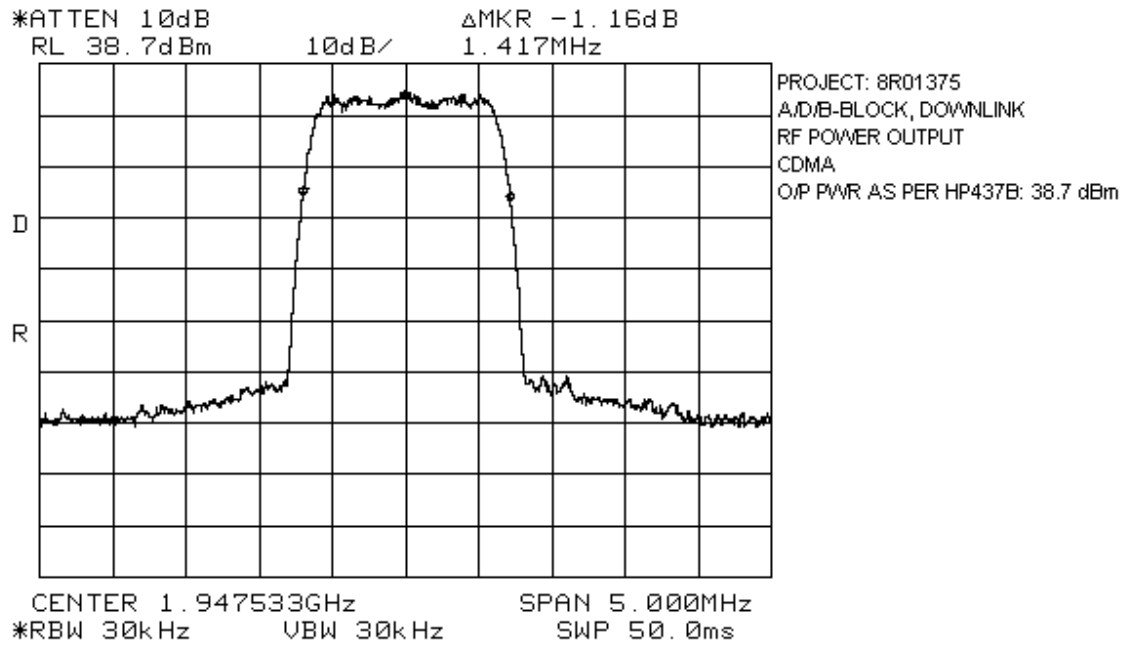


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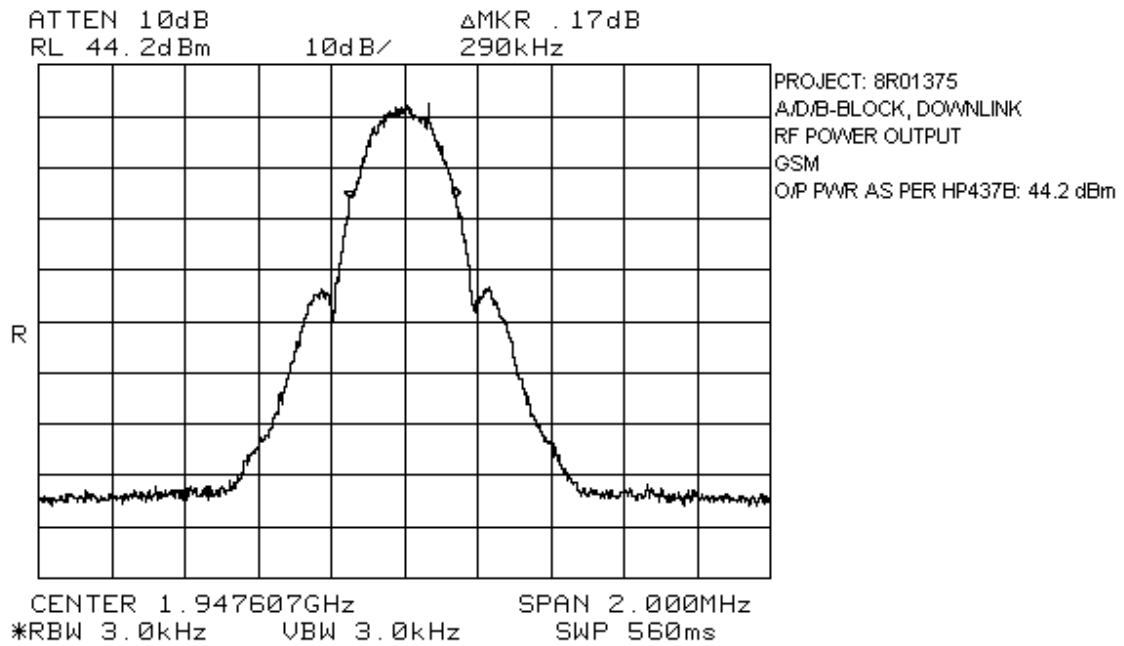


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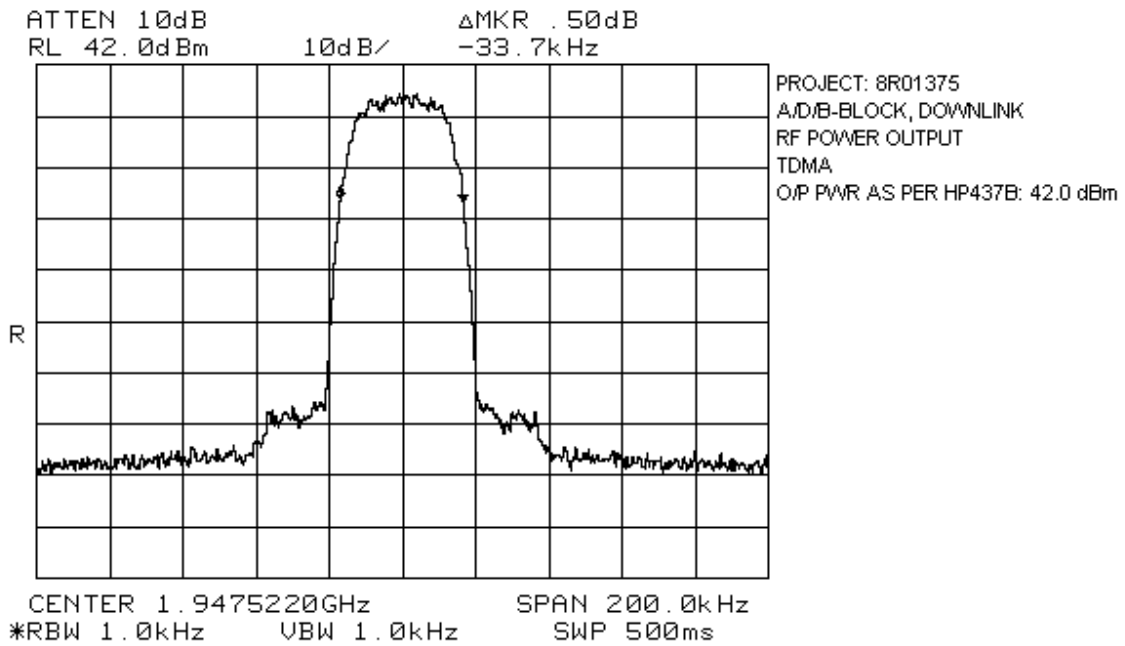
2-Amplifier Configuration (ADB-Block) 2 Channel & Single Channel



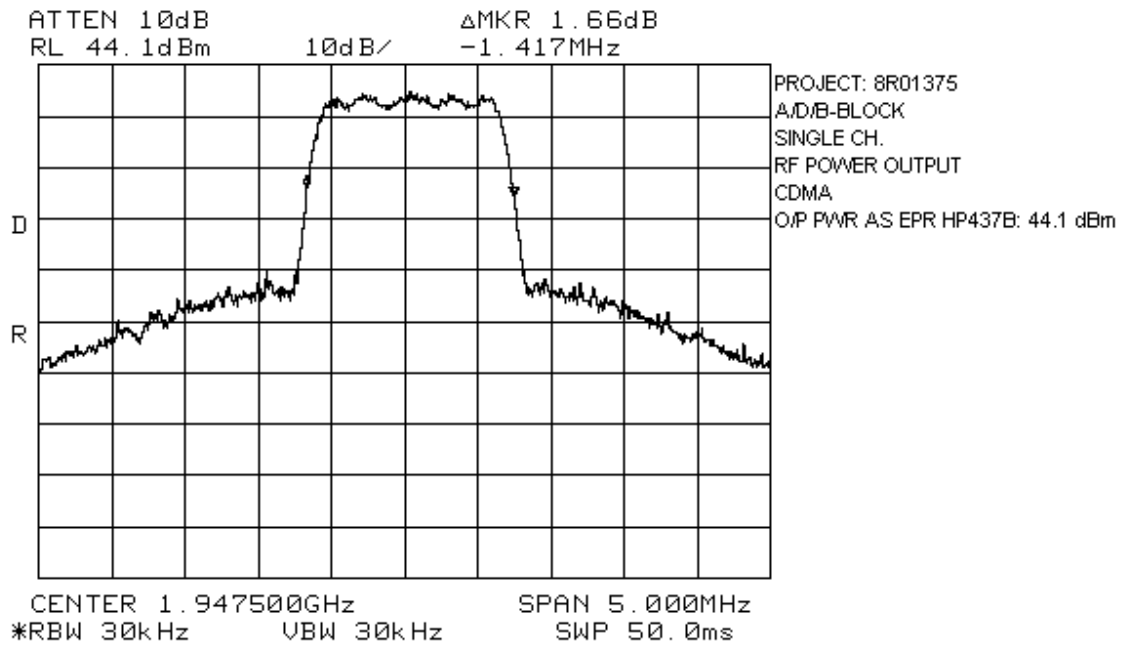
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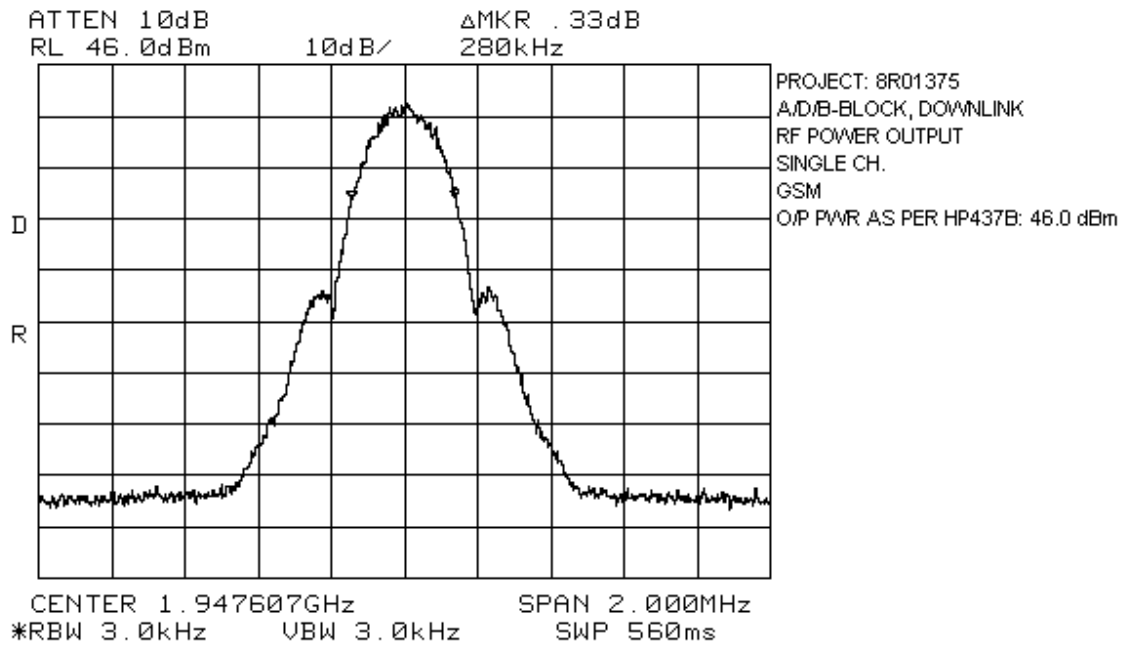
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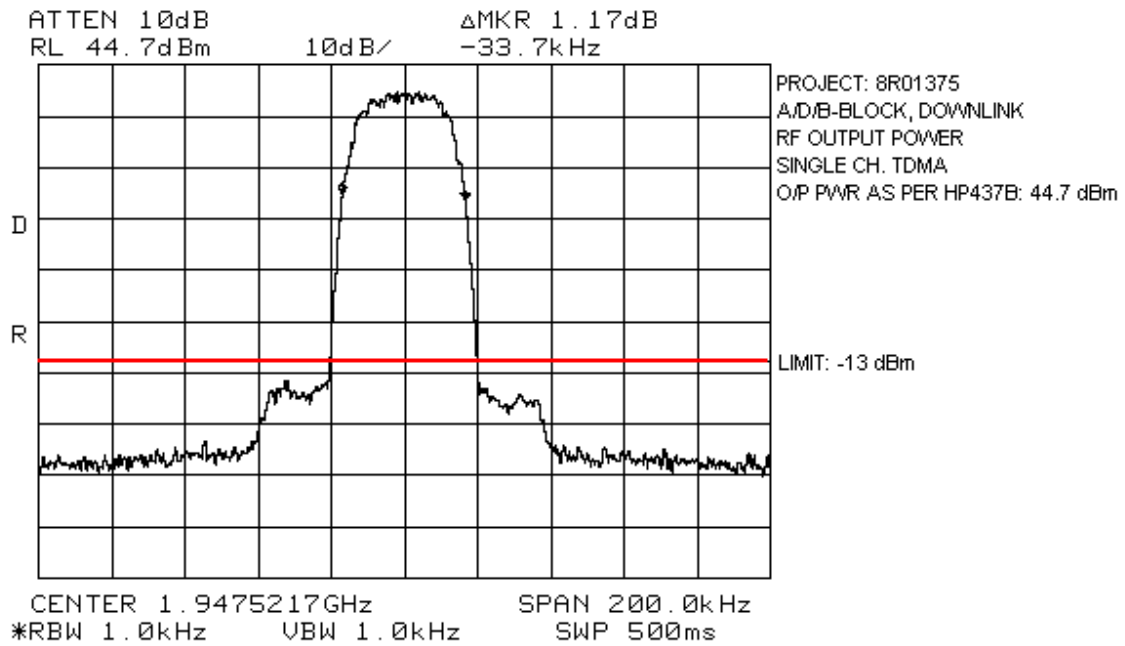
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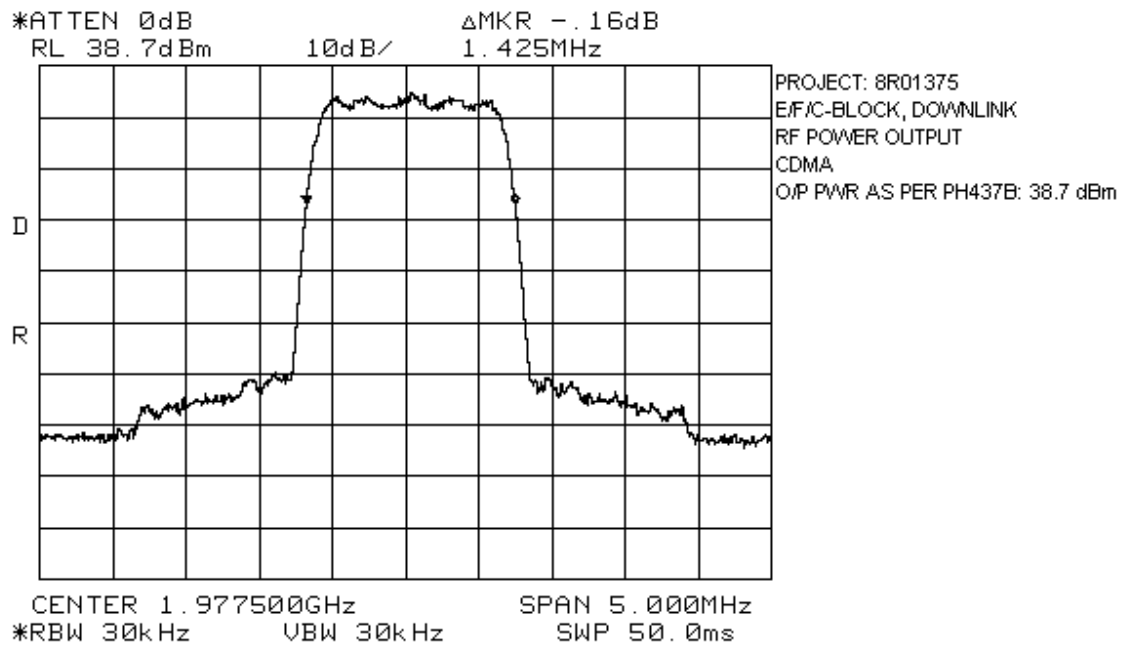


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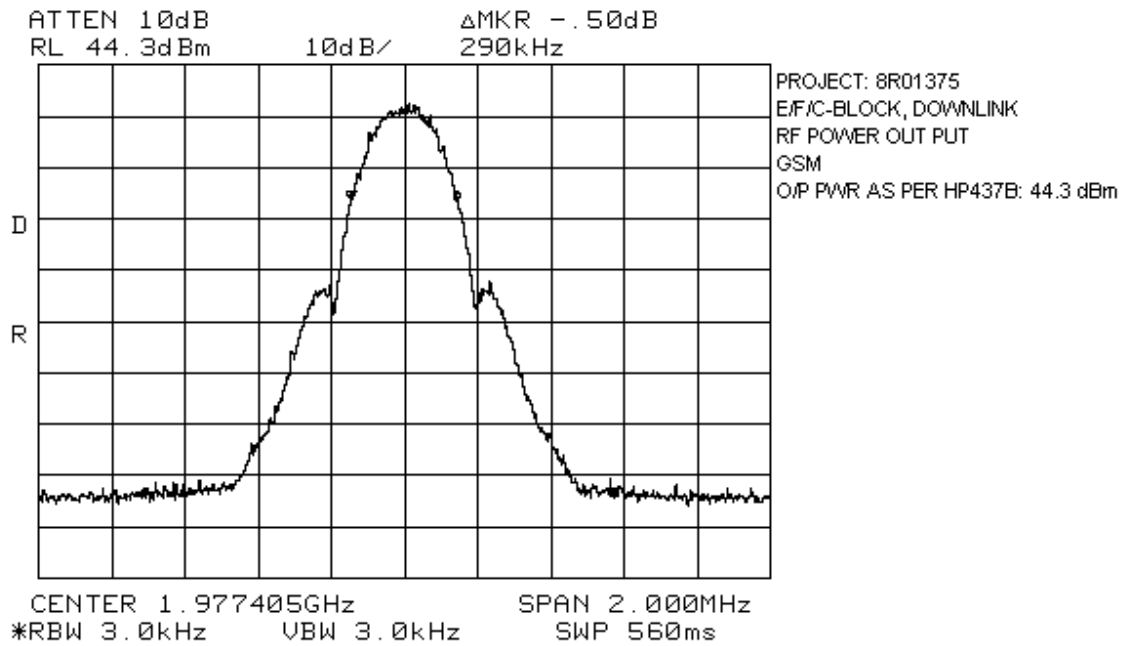


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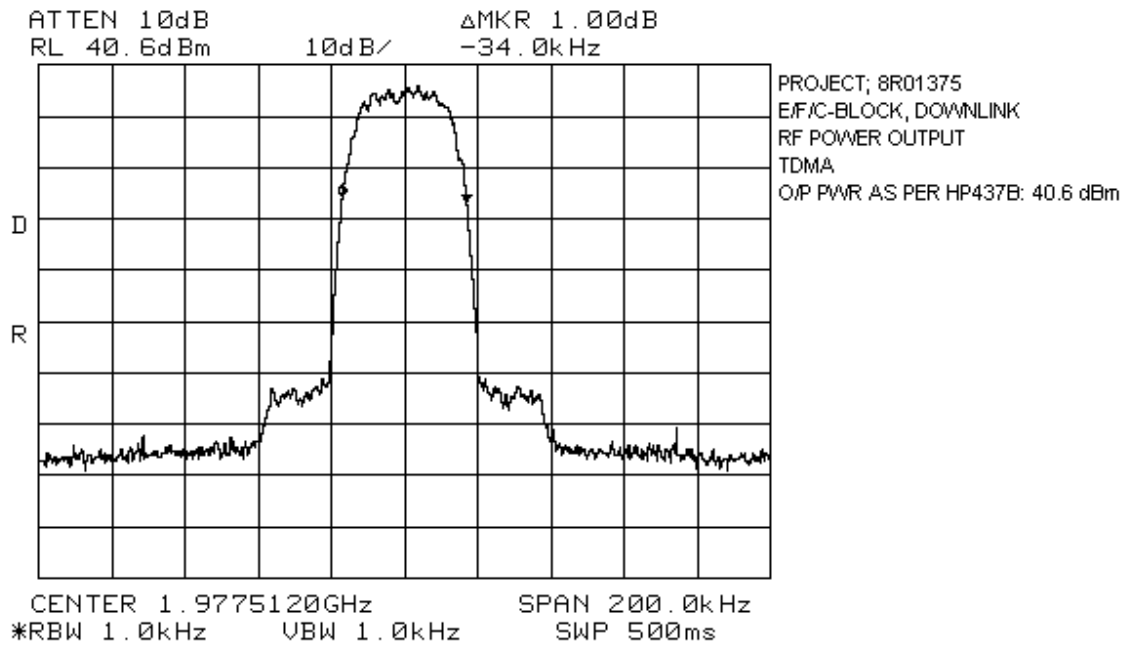
2-Amplifier Configuration (EFC-Block) 2 Channel & Single Channel



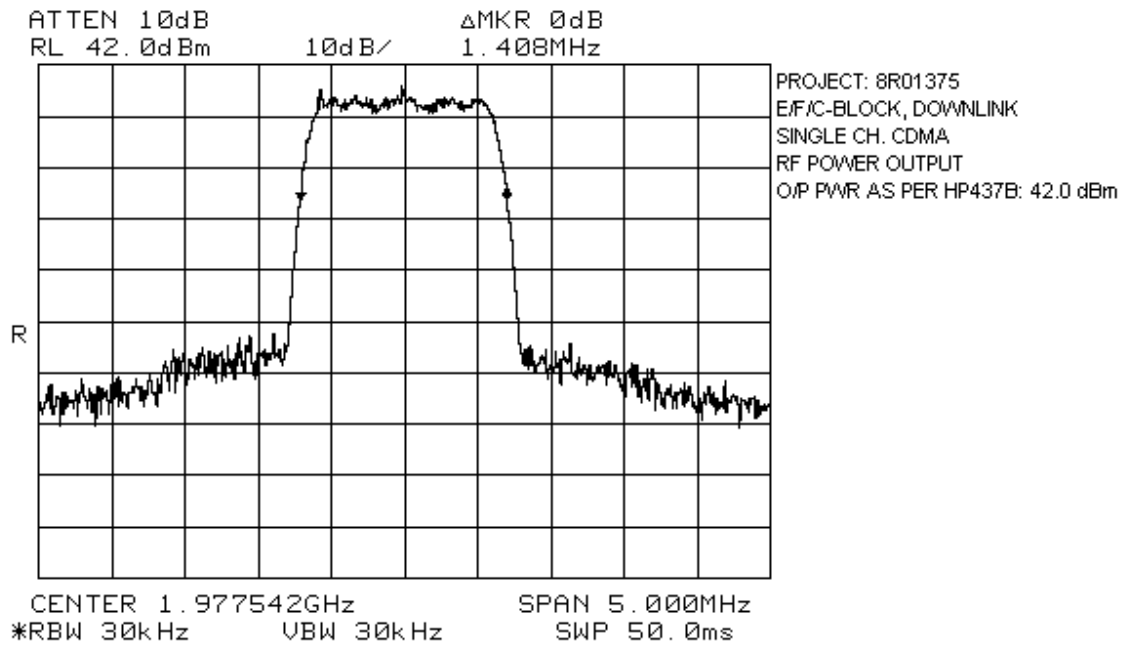
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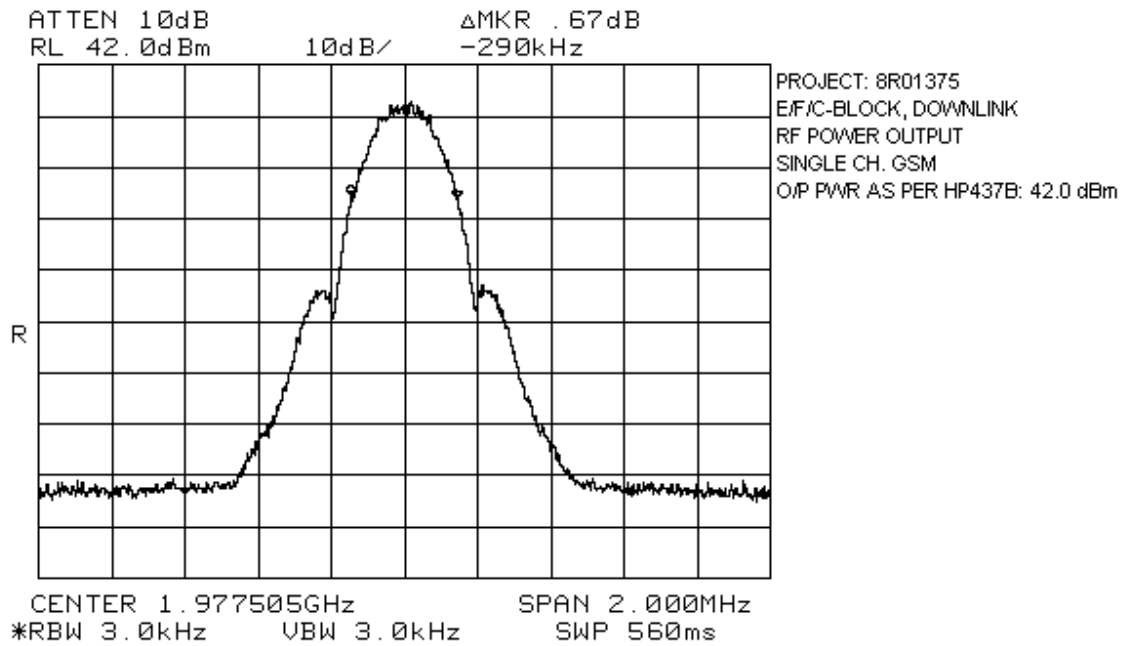
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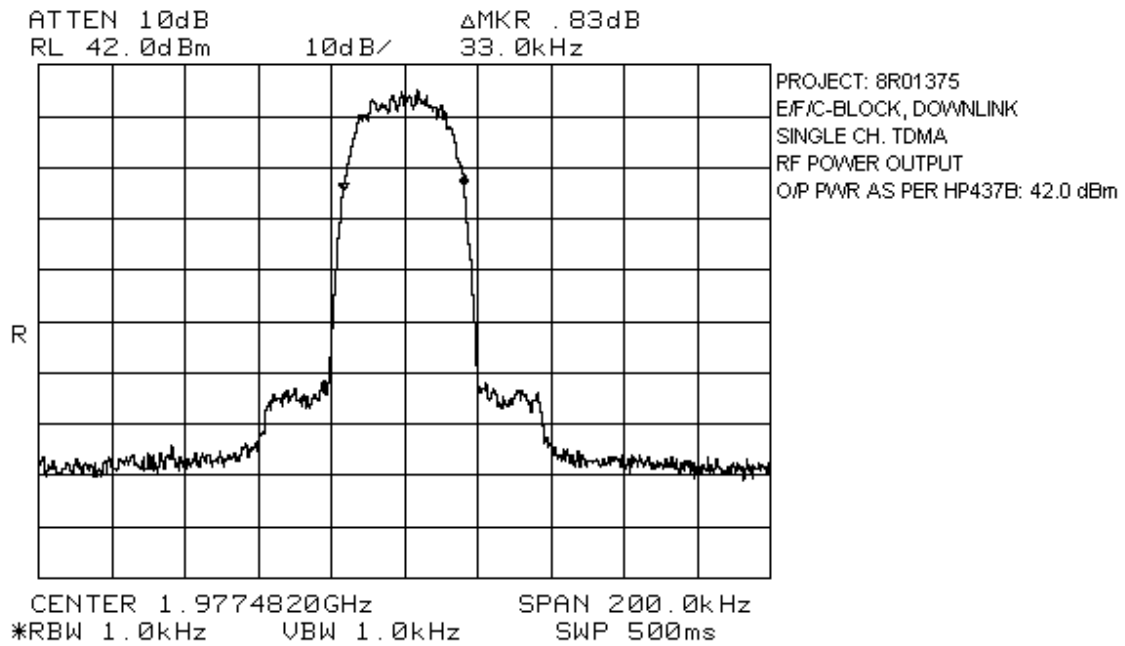
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Section 4. Occupied Bandwidth

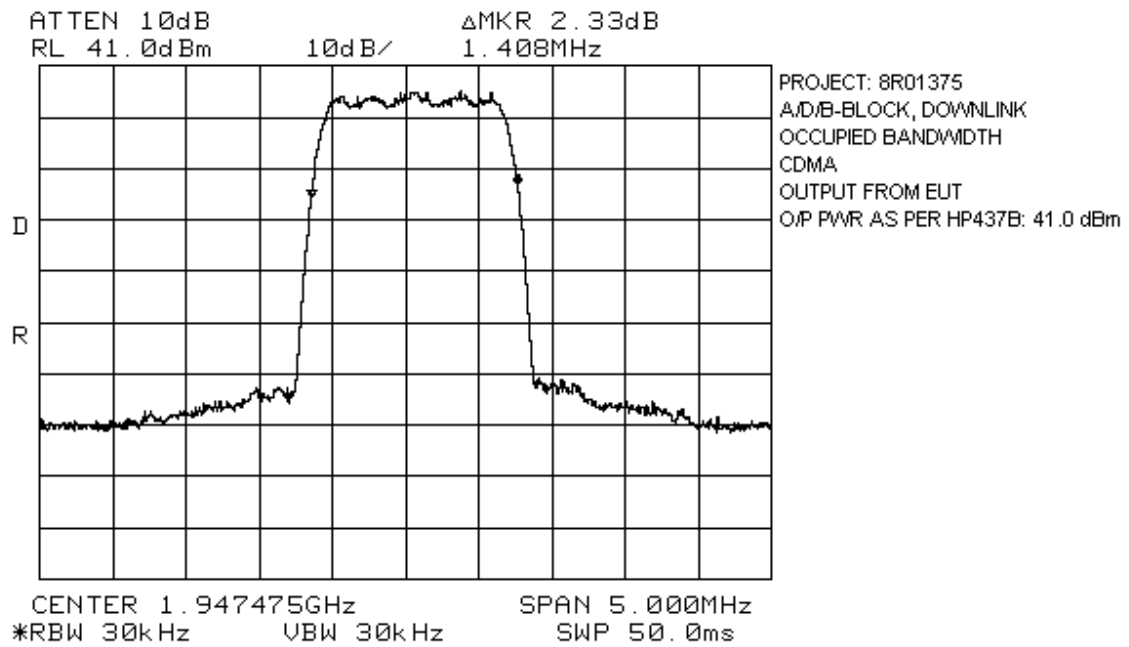
NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: May 26, 1999

Test Results: Complies.

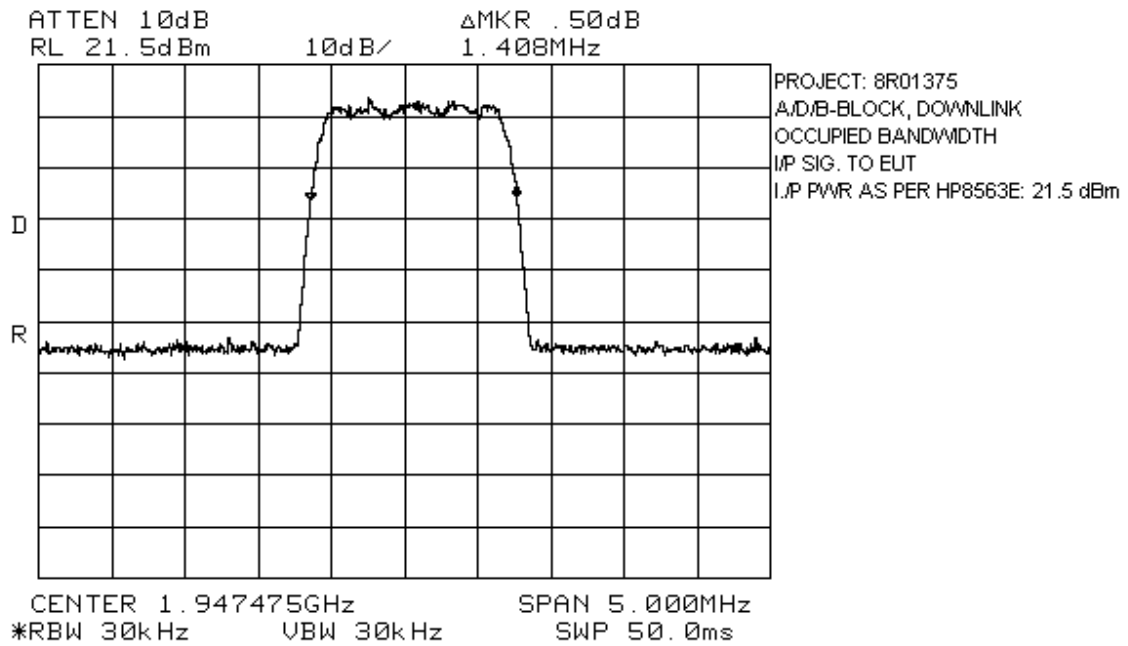
Test Data: See attached graph(s).

EQUIPMENT: Band Selective Booster Amplifier
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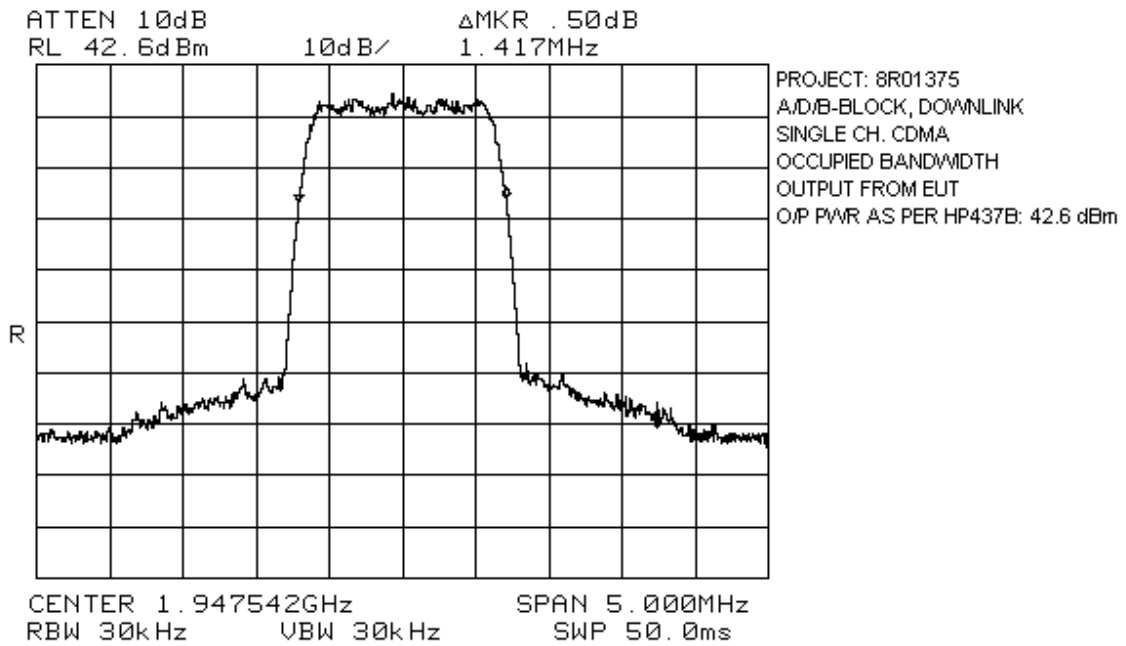
4-Amplifier Configuration (ABD & EFC Blocks) 2 Channel & Single Channel



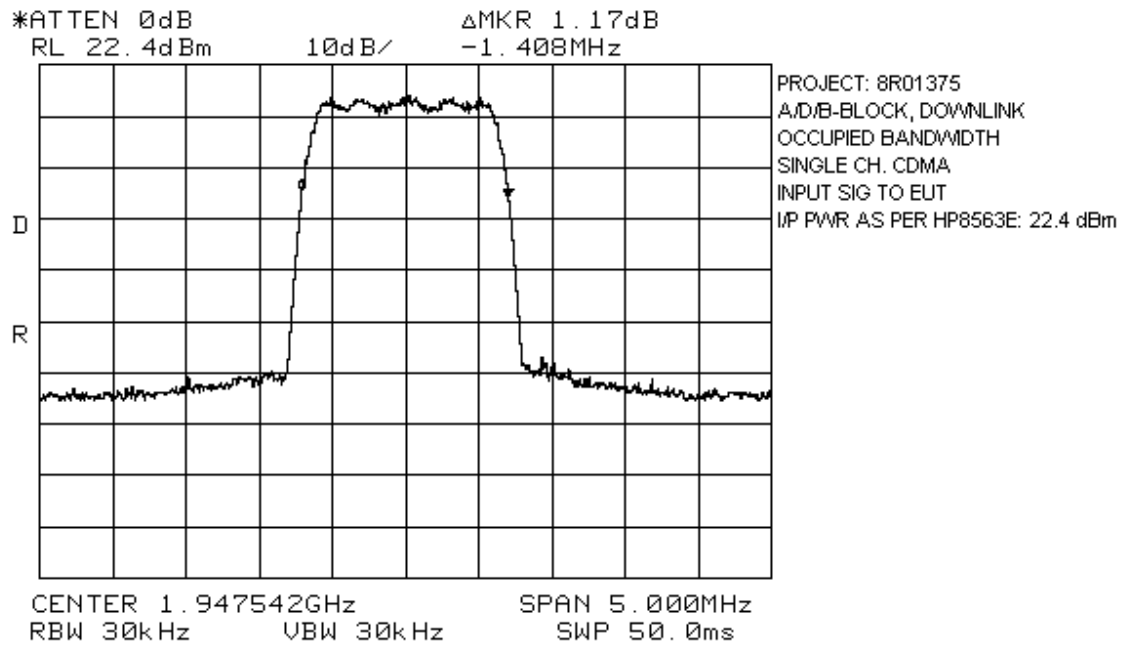
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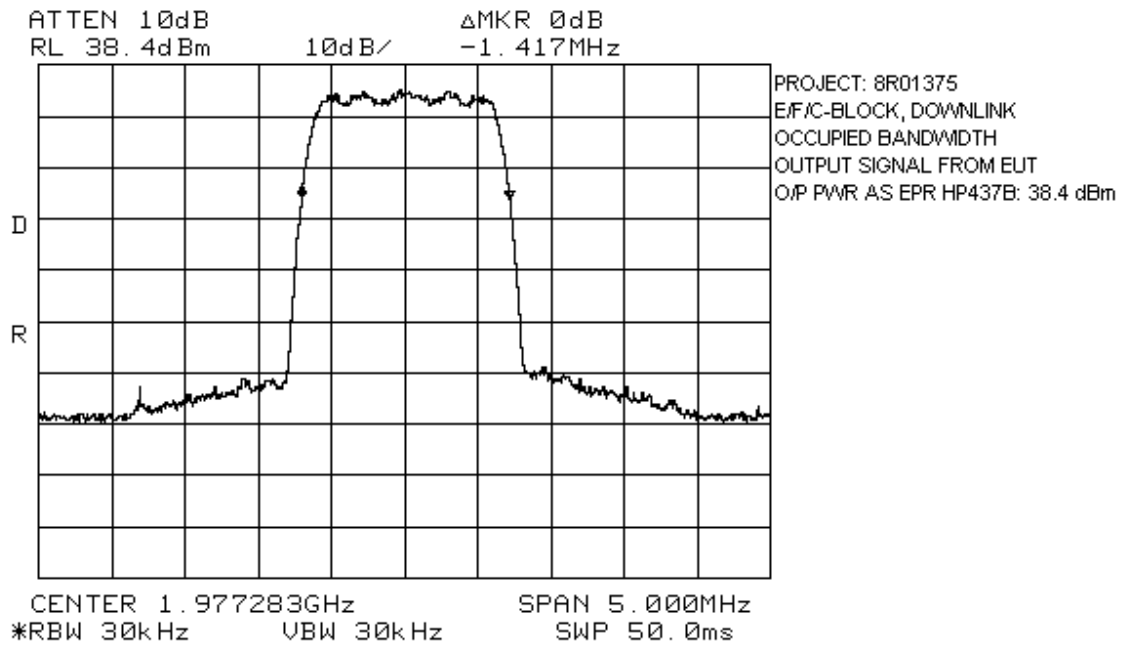
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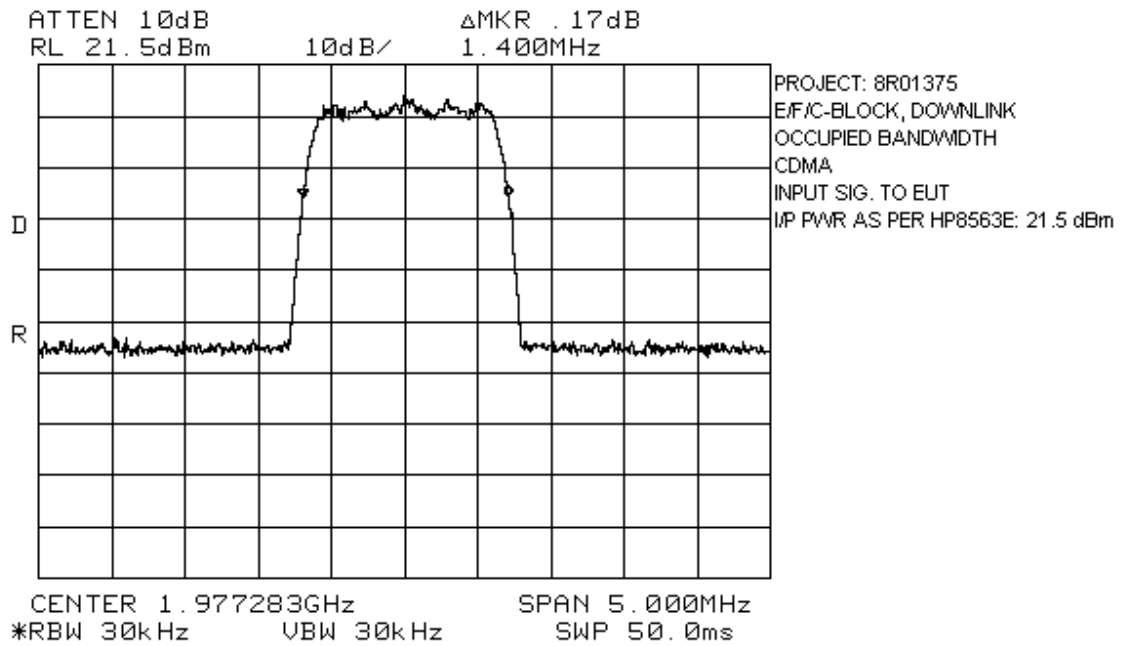
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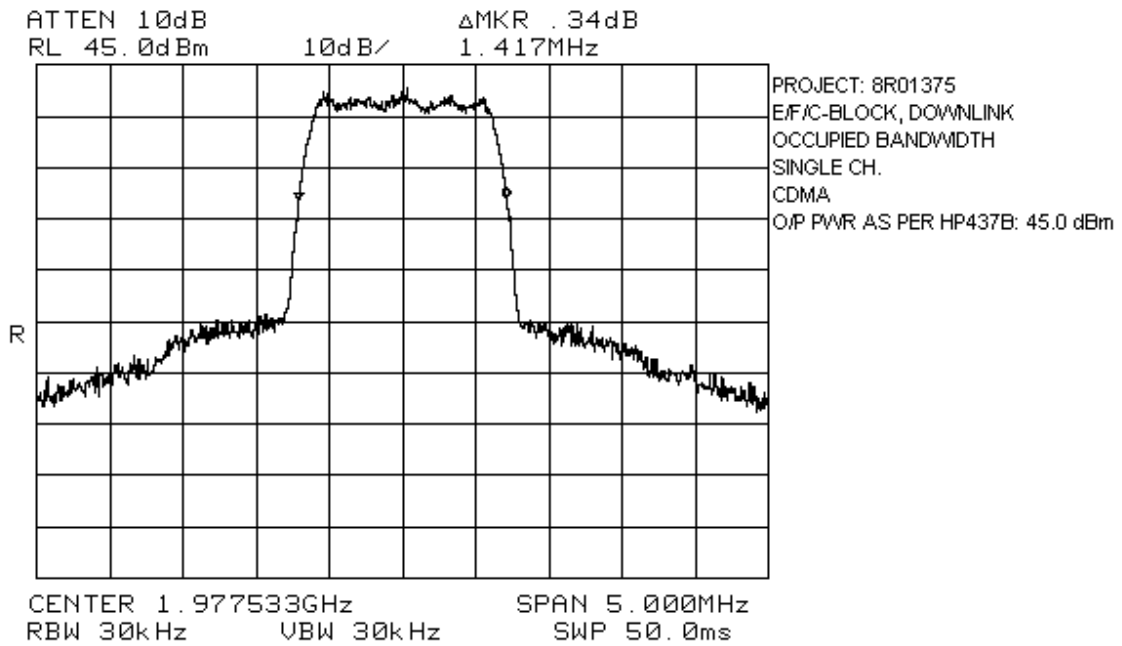
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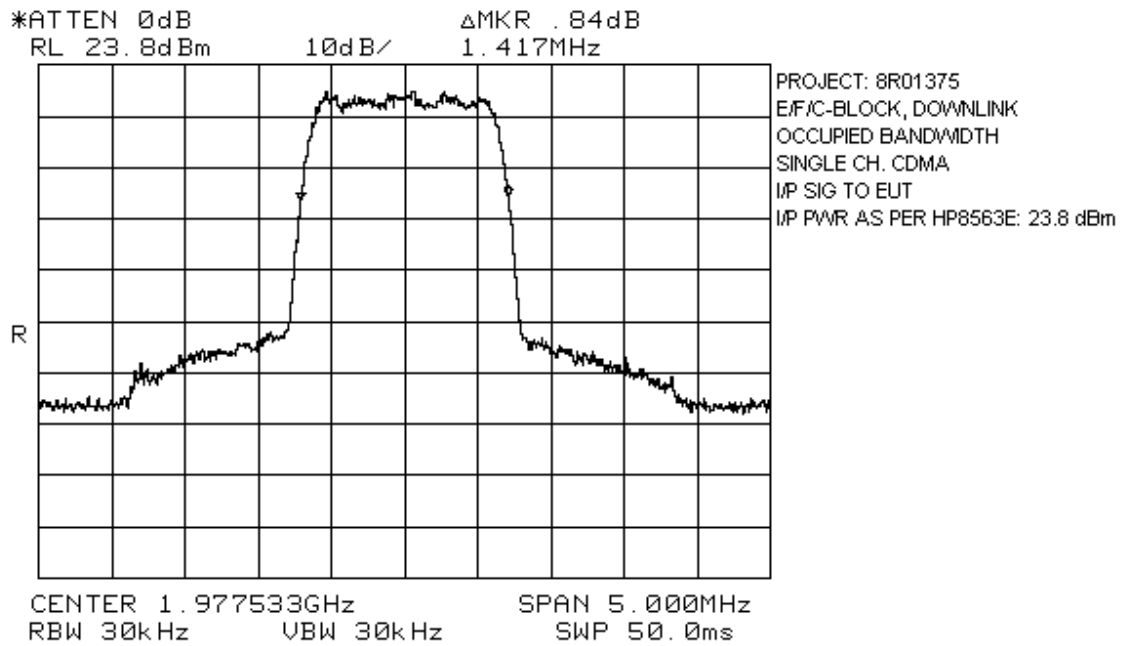
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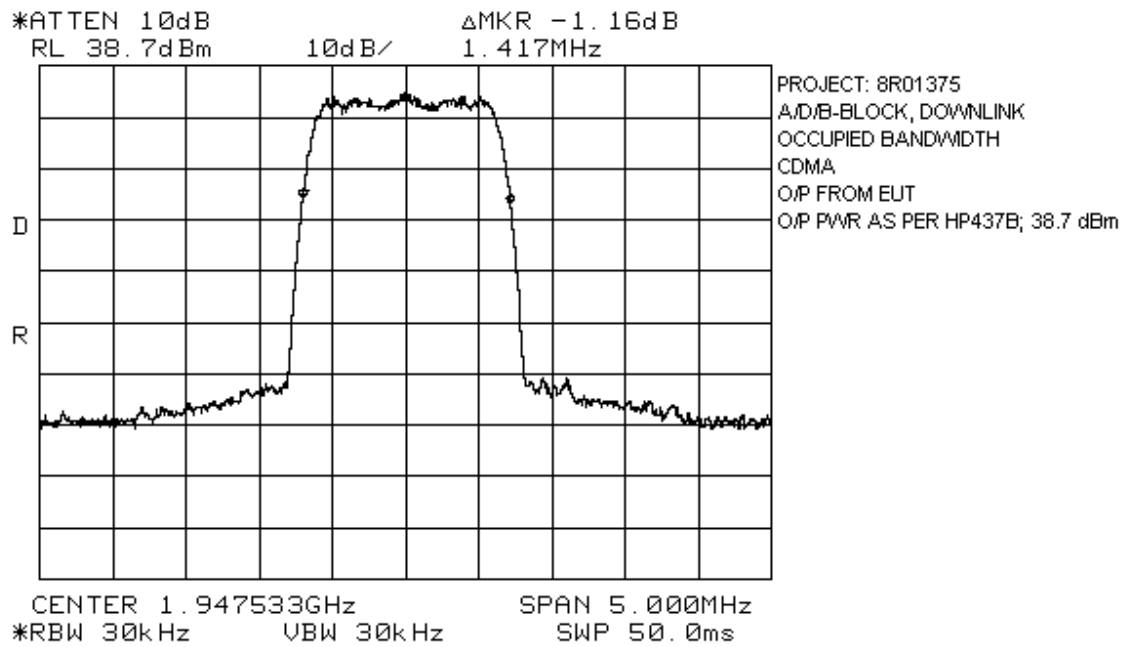


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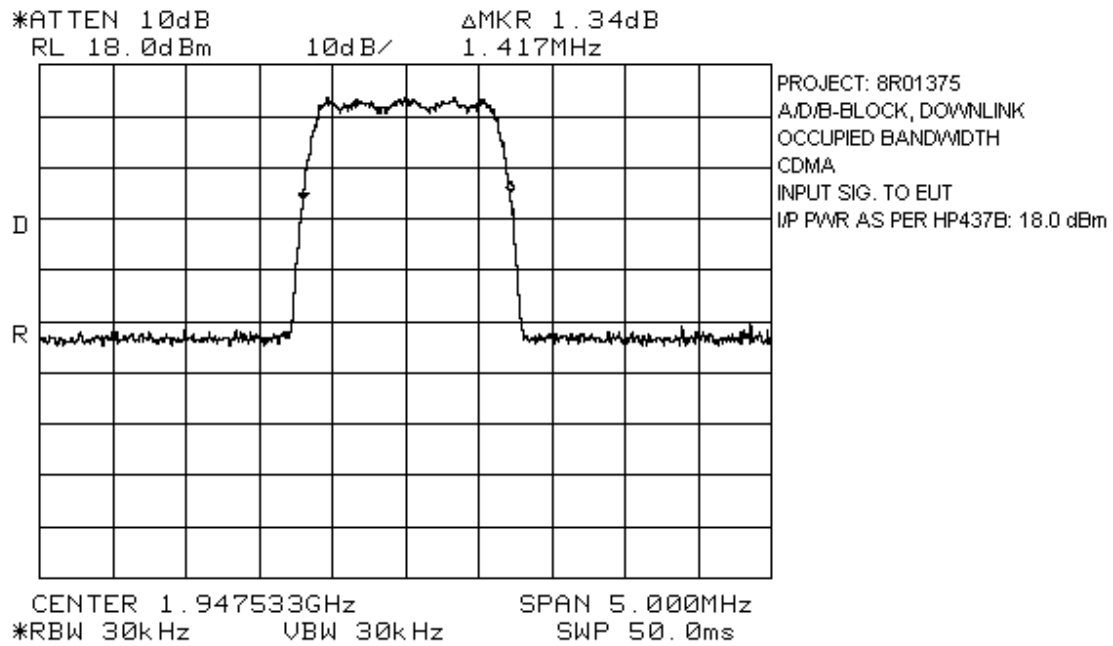


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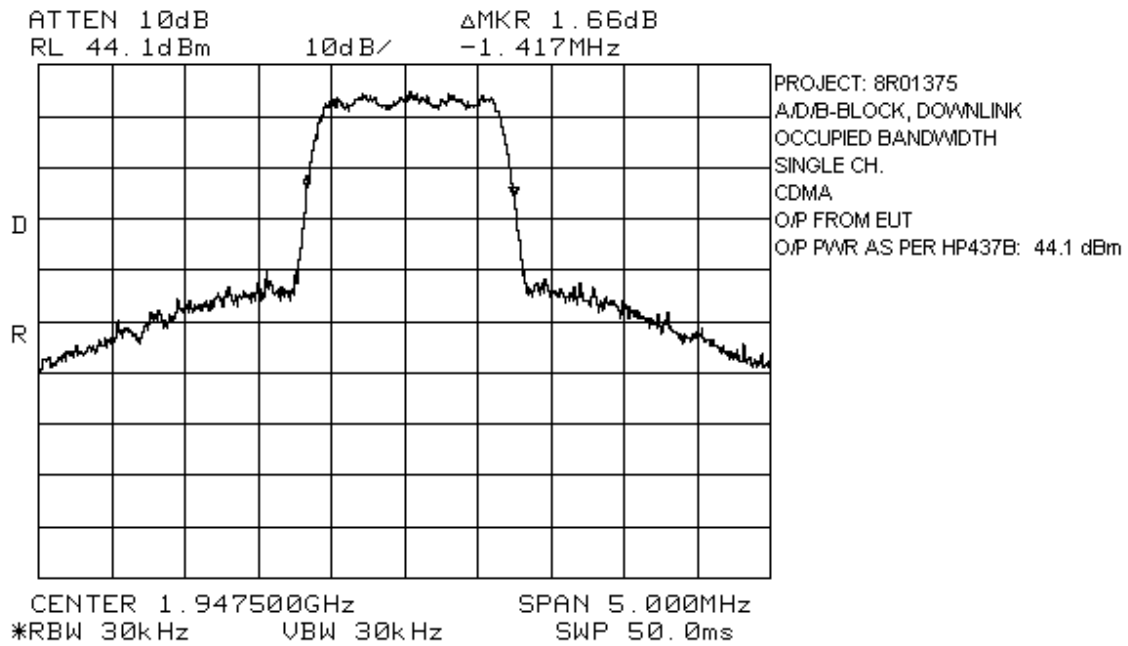
2-Amplifier Configuration (ADB & EFC Blocks) 2 Channel & Single Channel



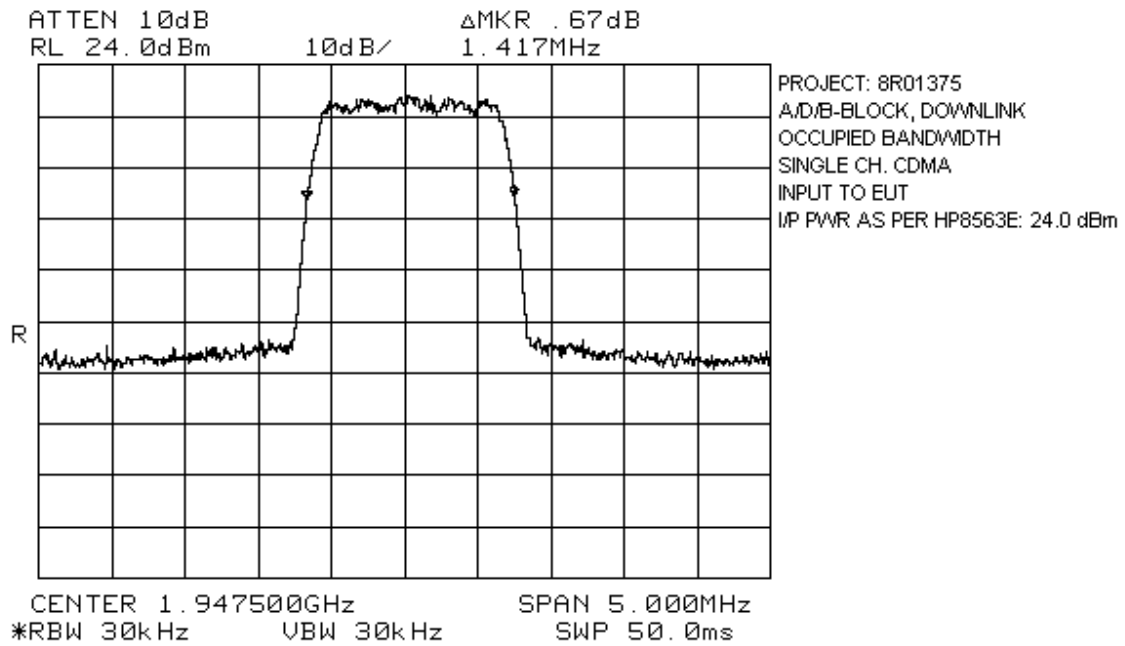
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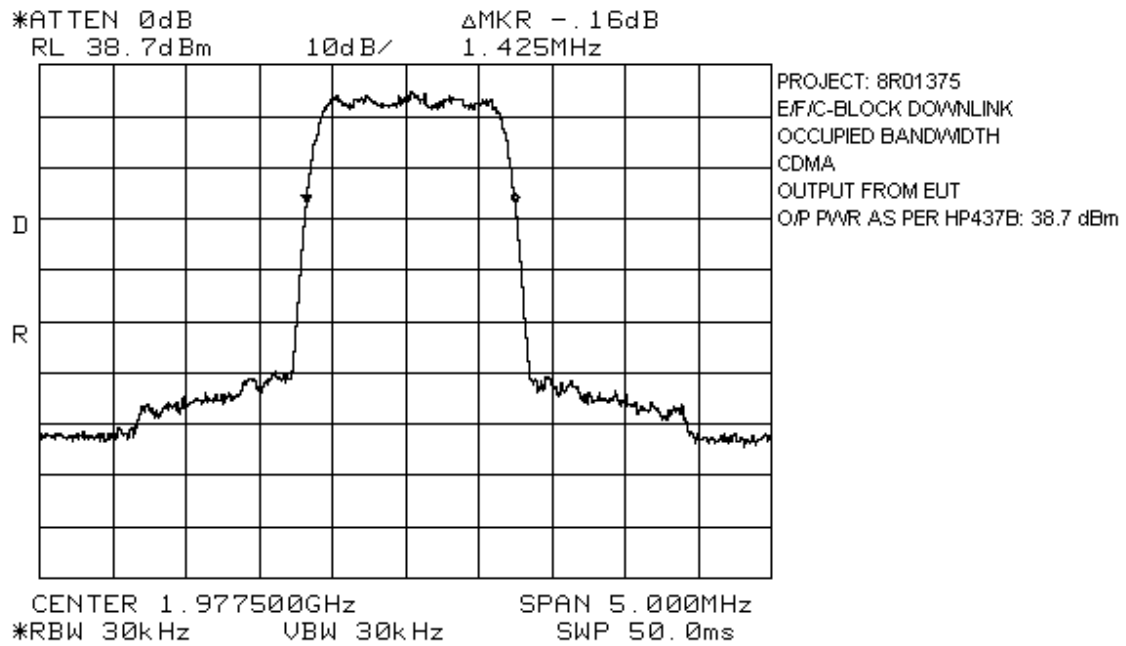
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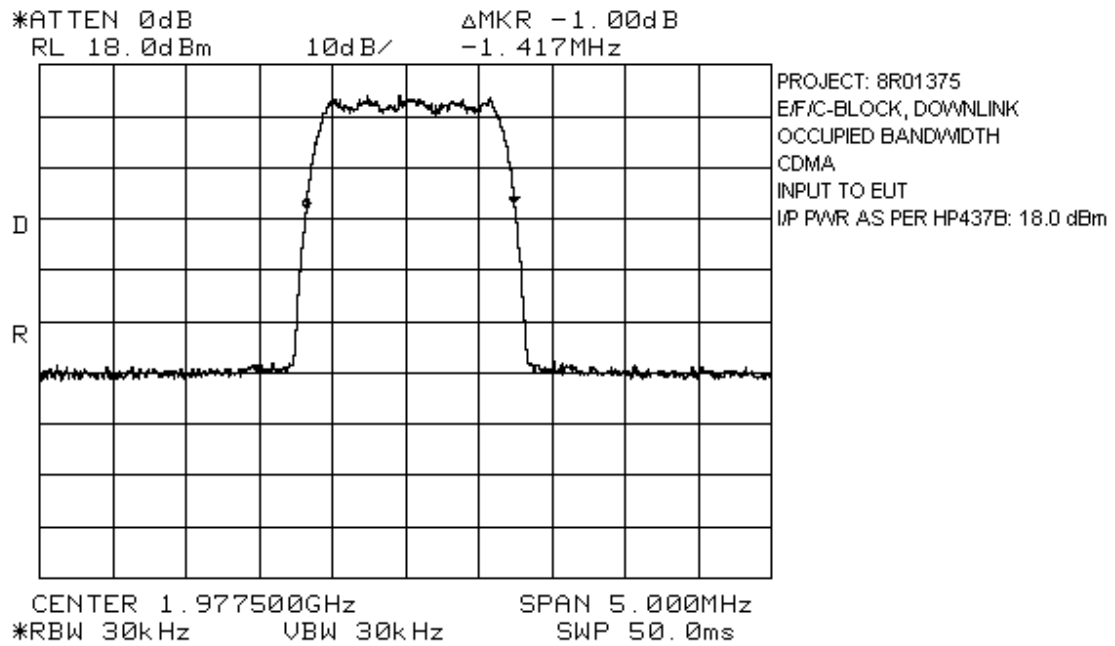
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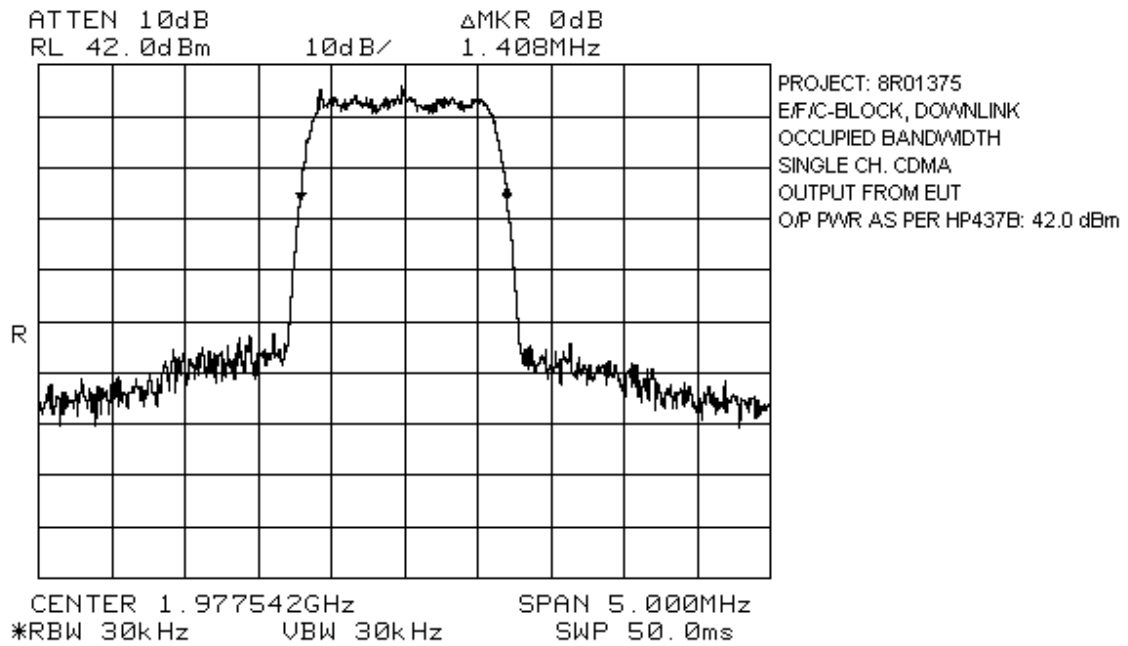
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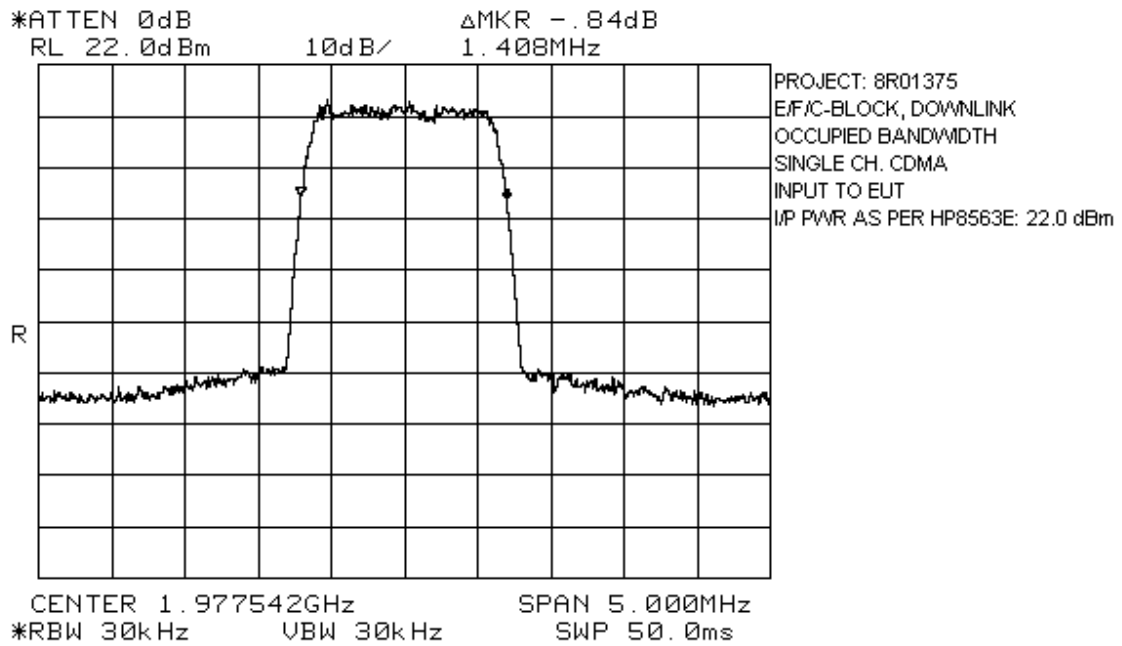
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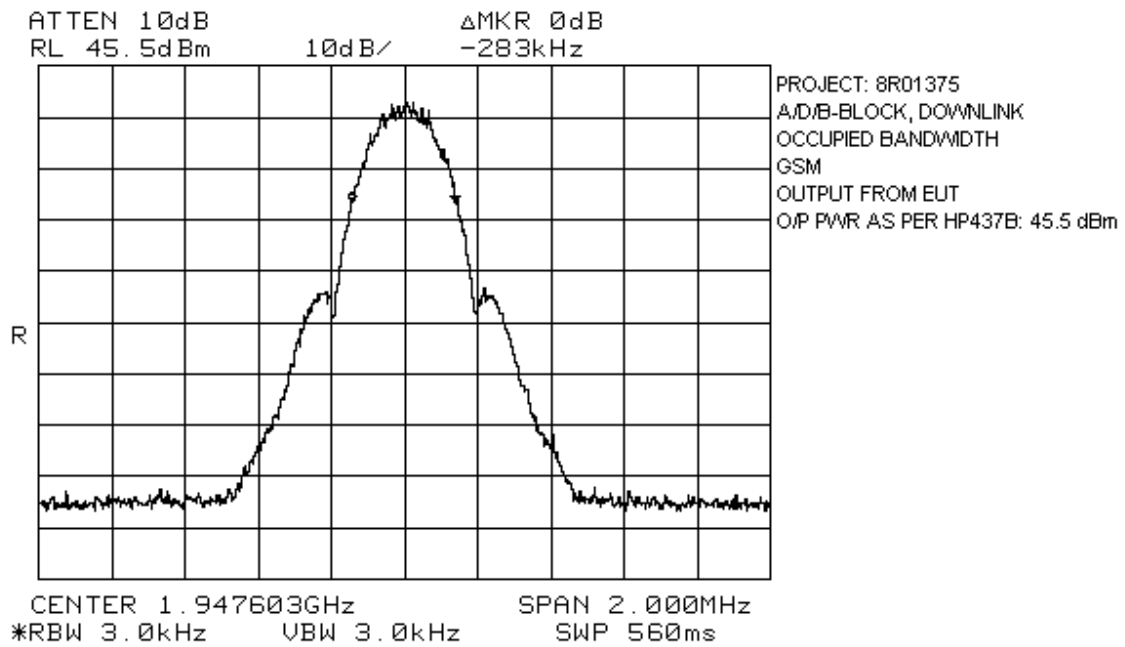
NAME OF TEST: Occupied Bandwidth (GSM)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: May 26, 1999

Test Results: Complies.

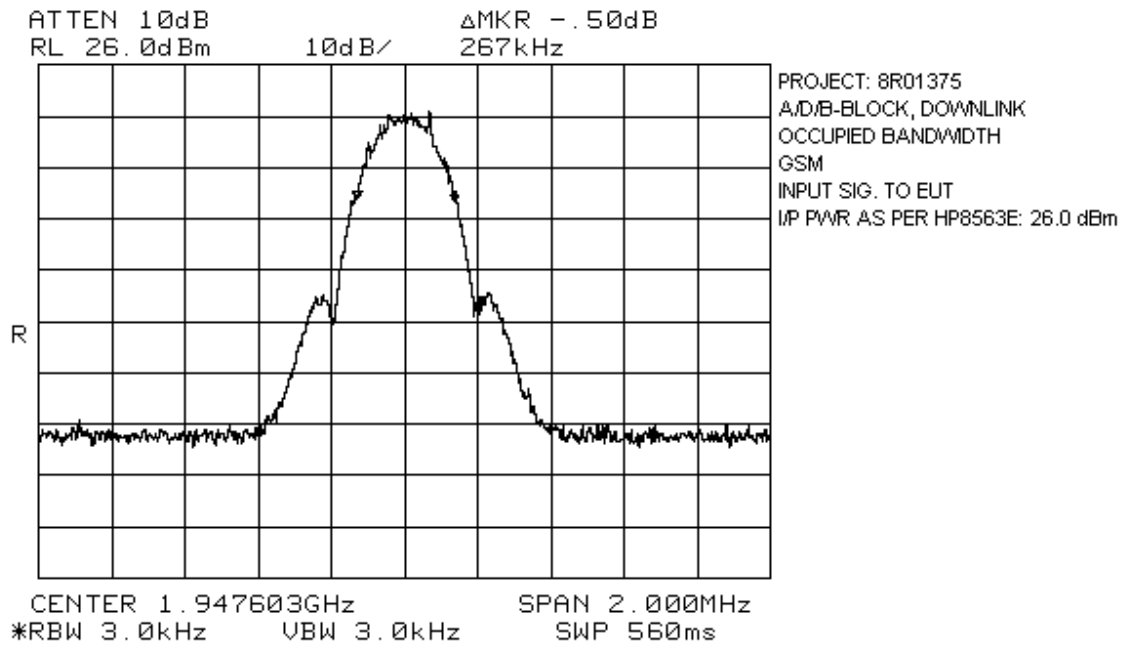
Test Data: See attached graph(s).

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

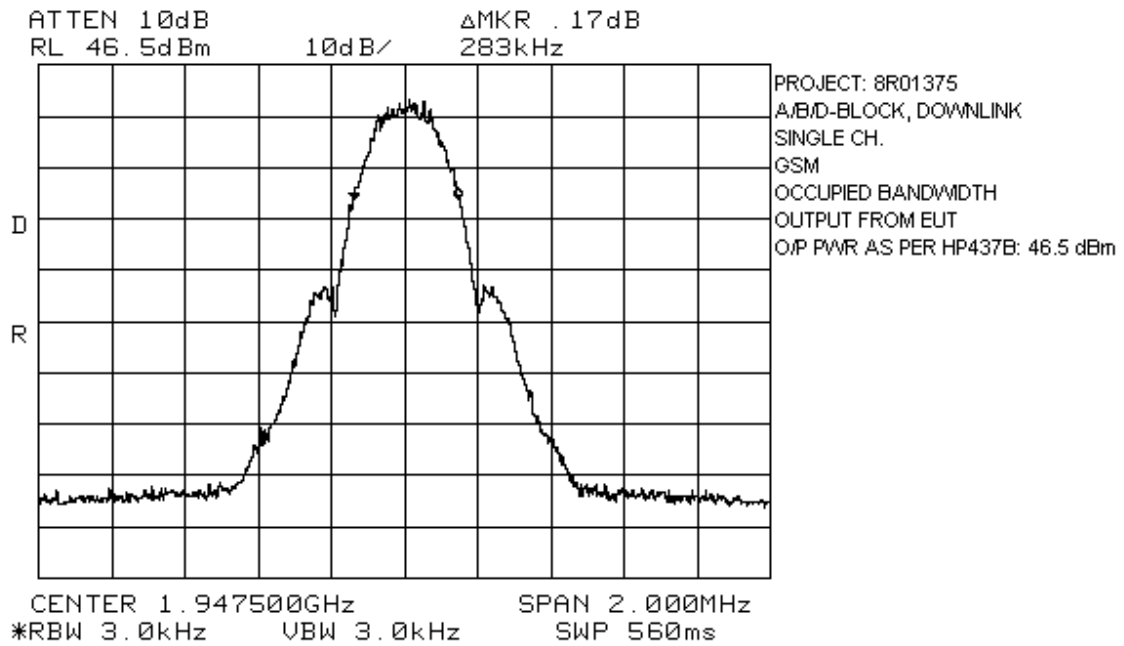
4-Amplifier Configuration (ABD & EFC Blocks) 2 Channel & Single Channel



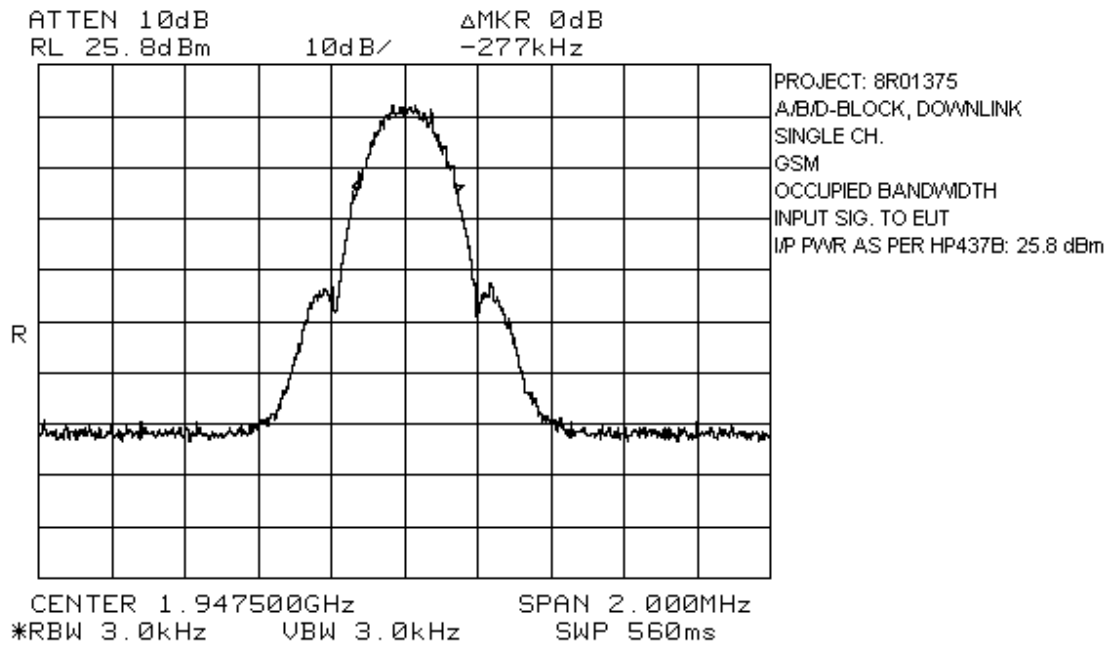
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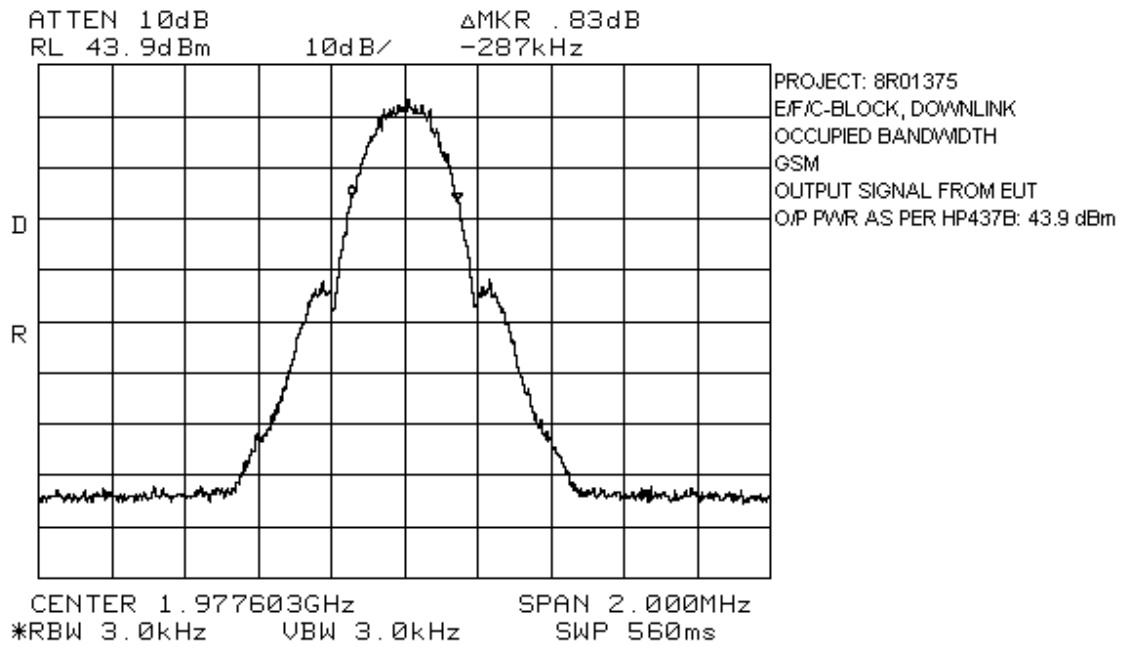
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FCC ID: BCR-MRB-PCS



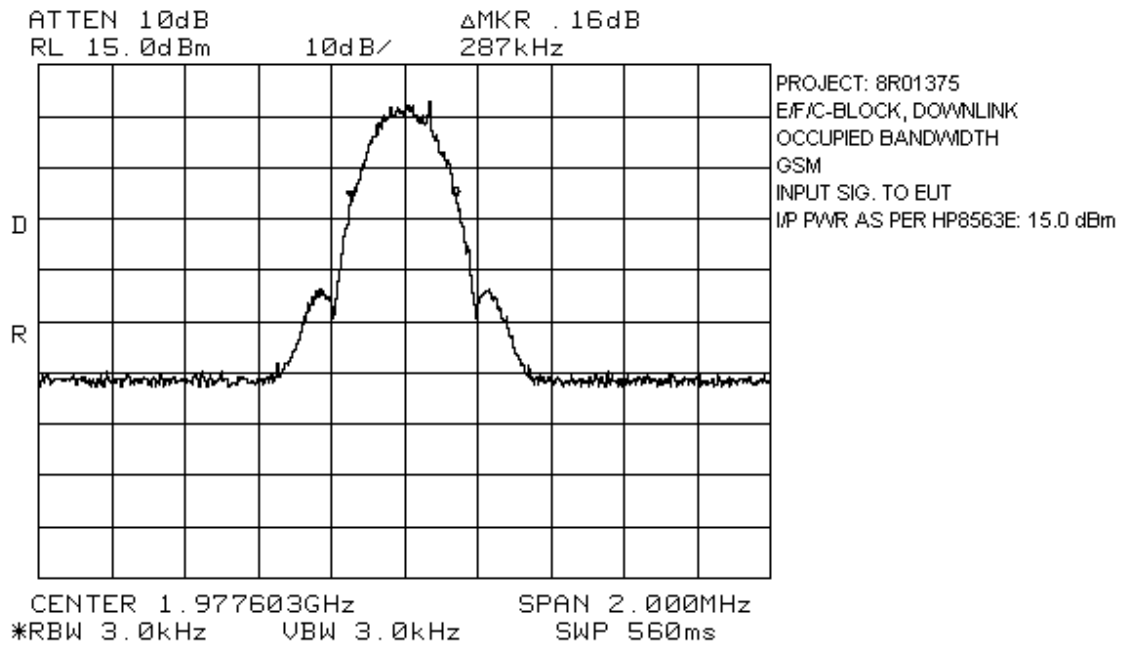
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



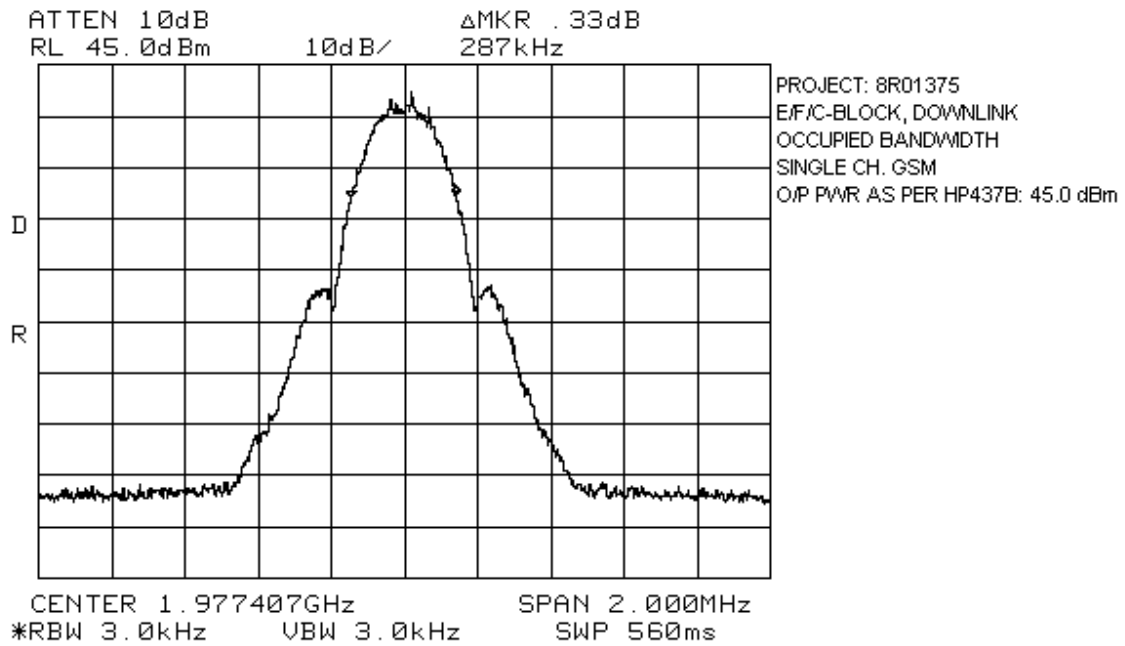
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FCC ID: BCR-MRB-PCS



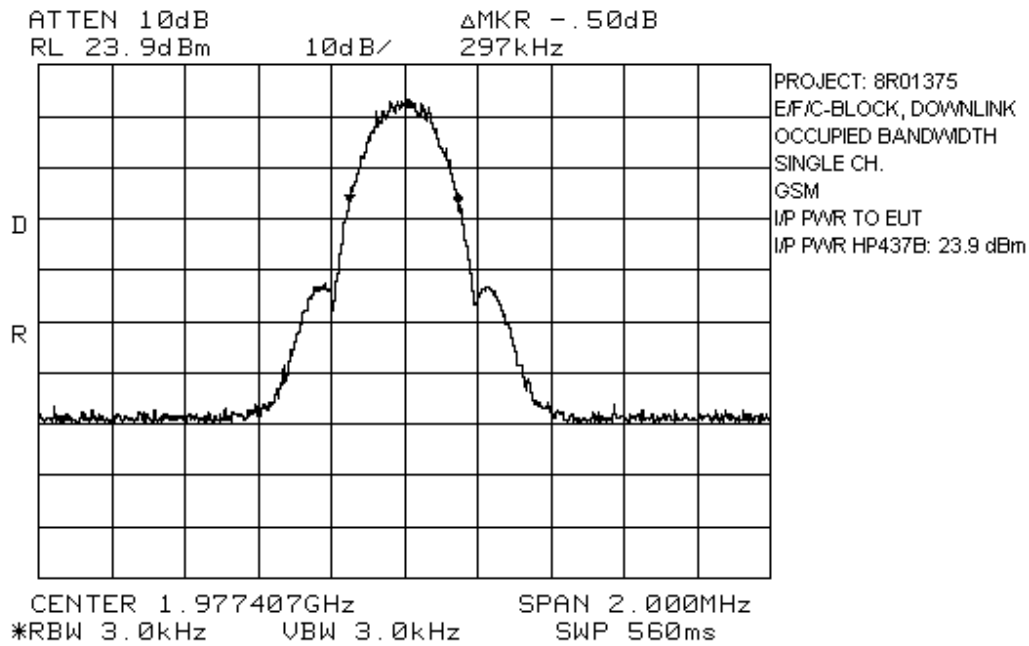
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EQUIPMENT: Band Selective Booster Amplifier
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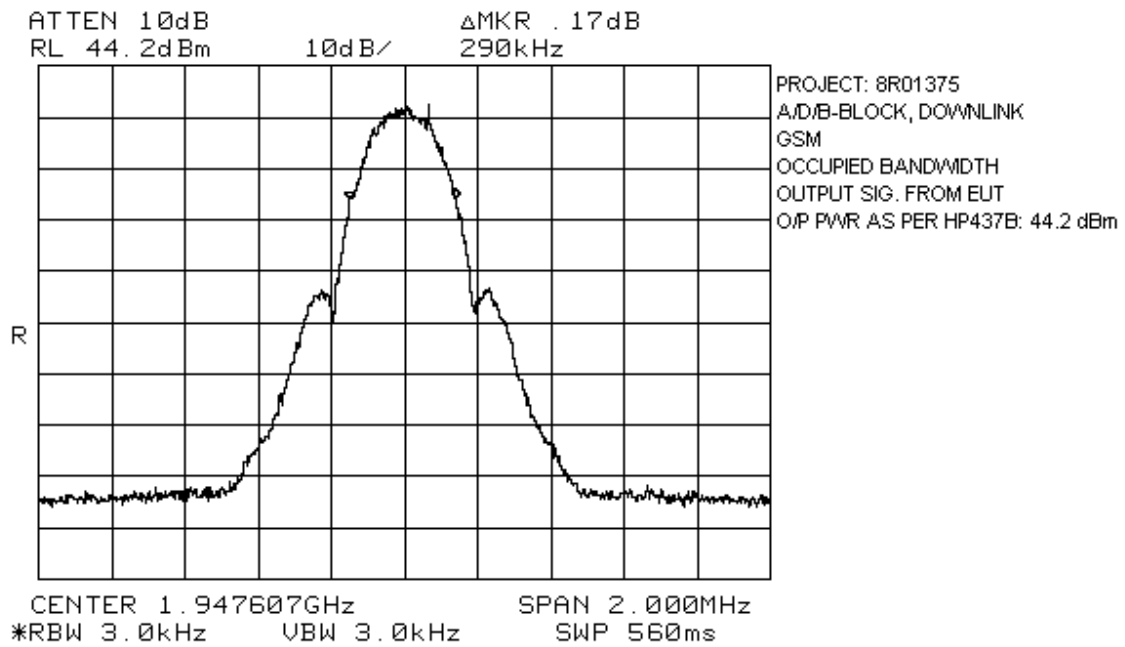


EQUIPMENT: Band Selective Booster Amplifier
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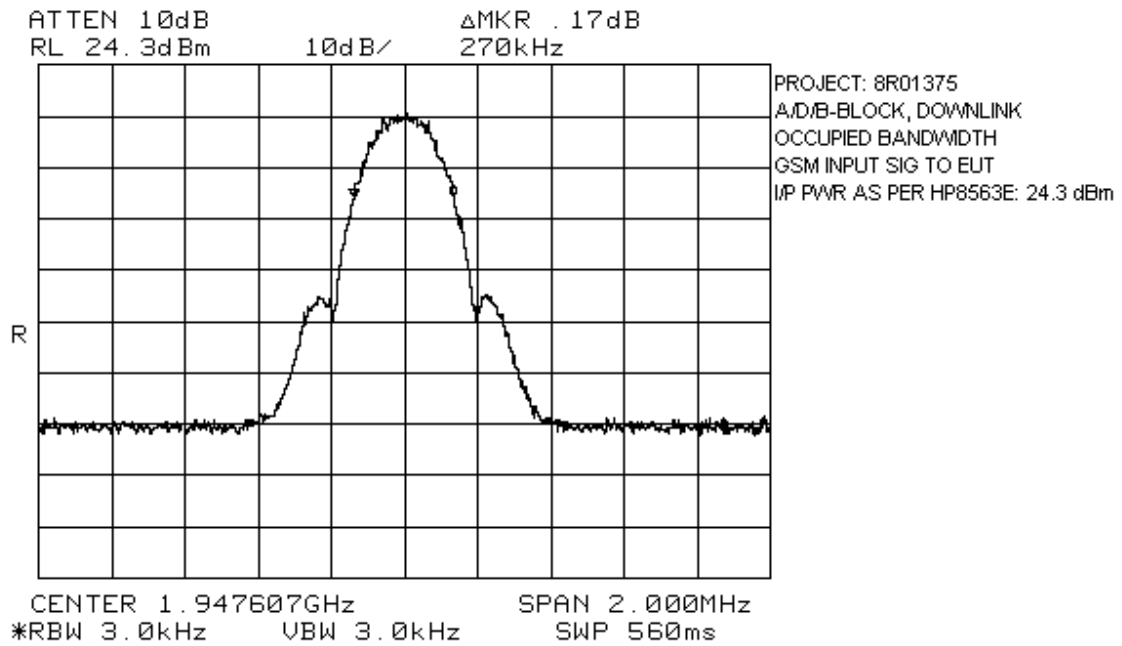


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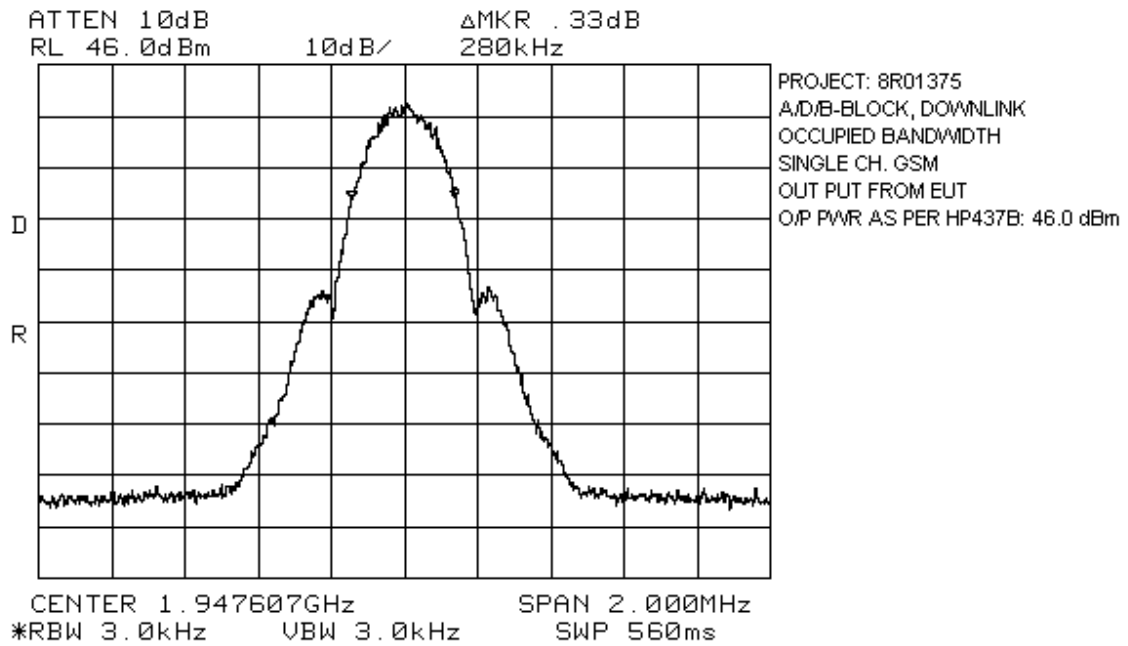
2-Amplifier Configuration (ABD & EFC Blocks) 2 Channel & Single Channel



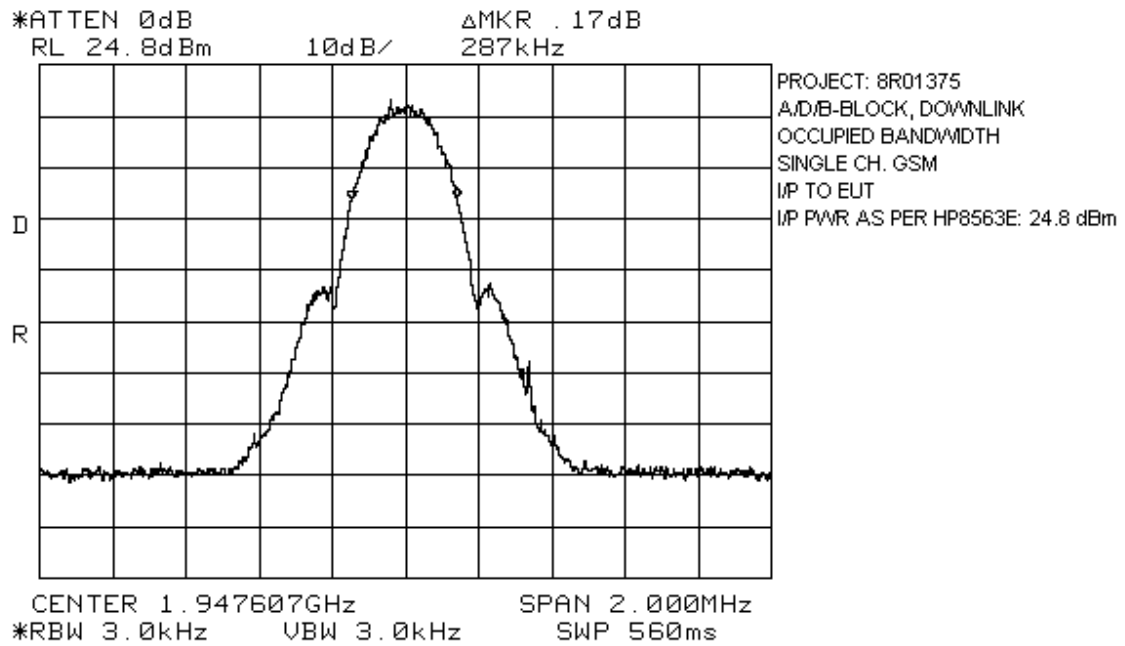
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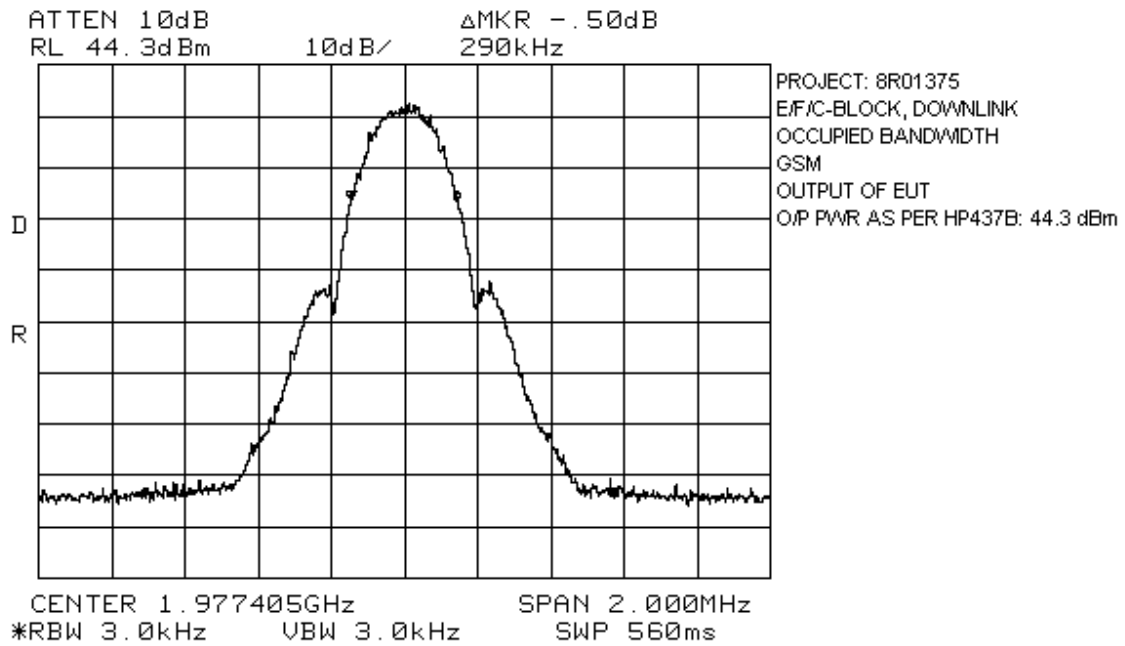
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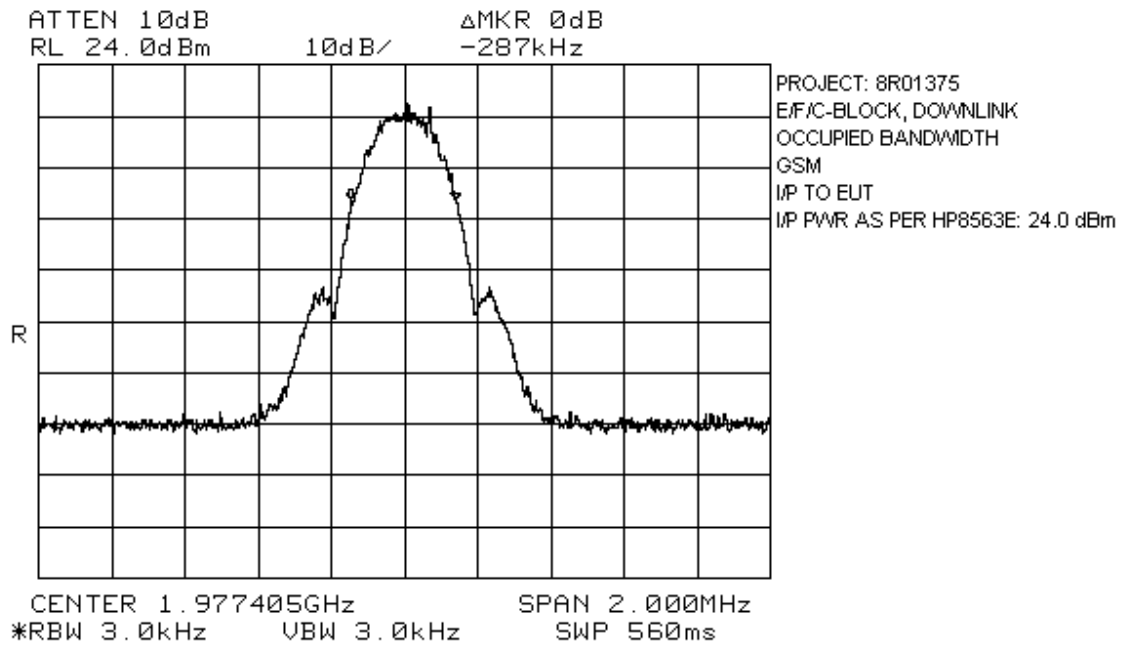
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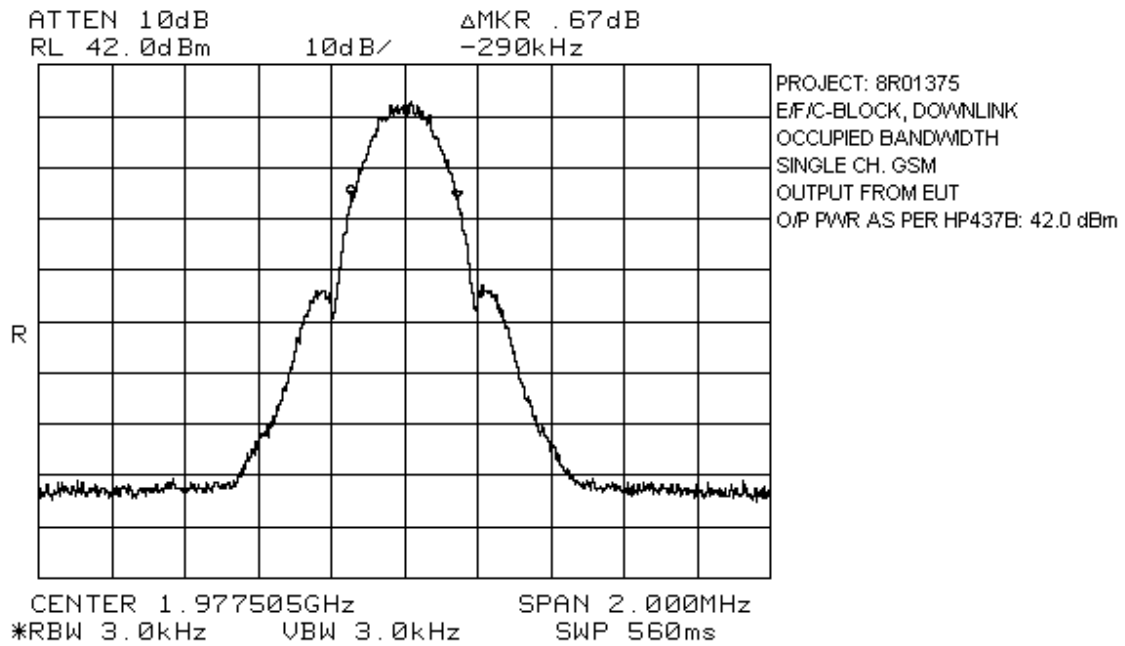
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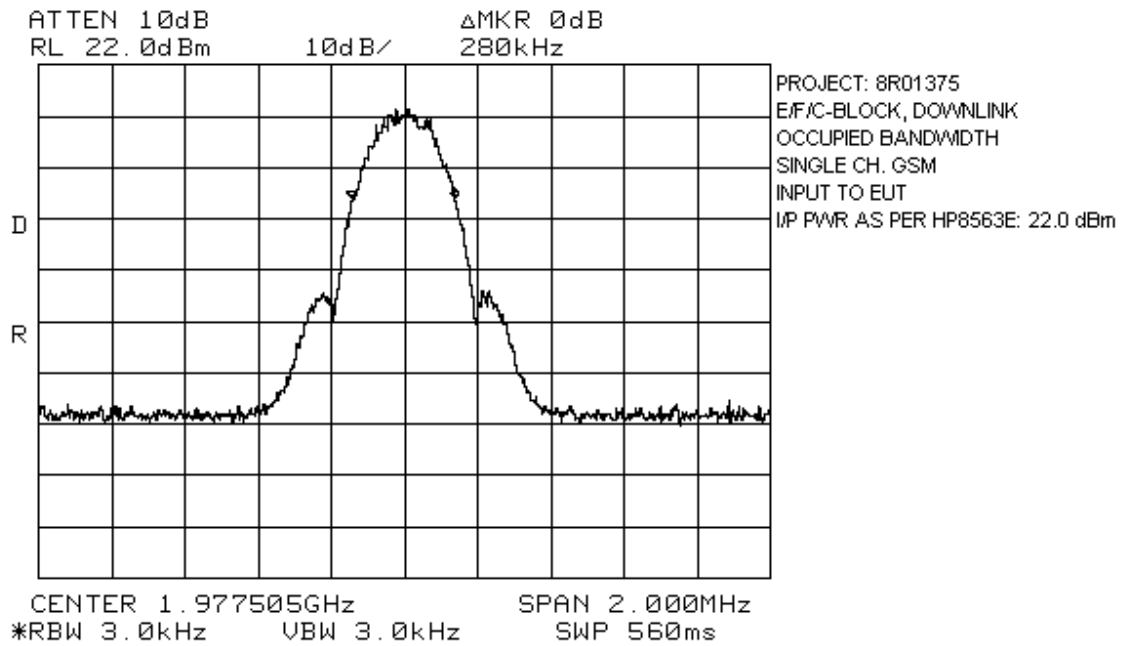
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EQUIPMENT: Band Selective Booster Amplifier
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EQUIPMENT: Band Selective Booster Amplifier
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EQUIPMENT: Band Selective Booster Amplifier
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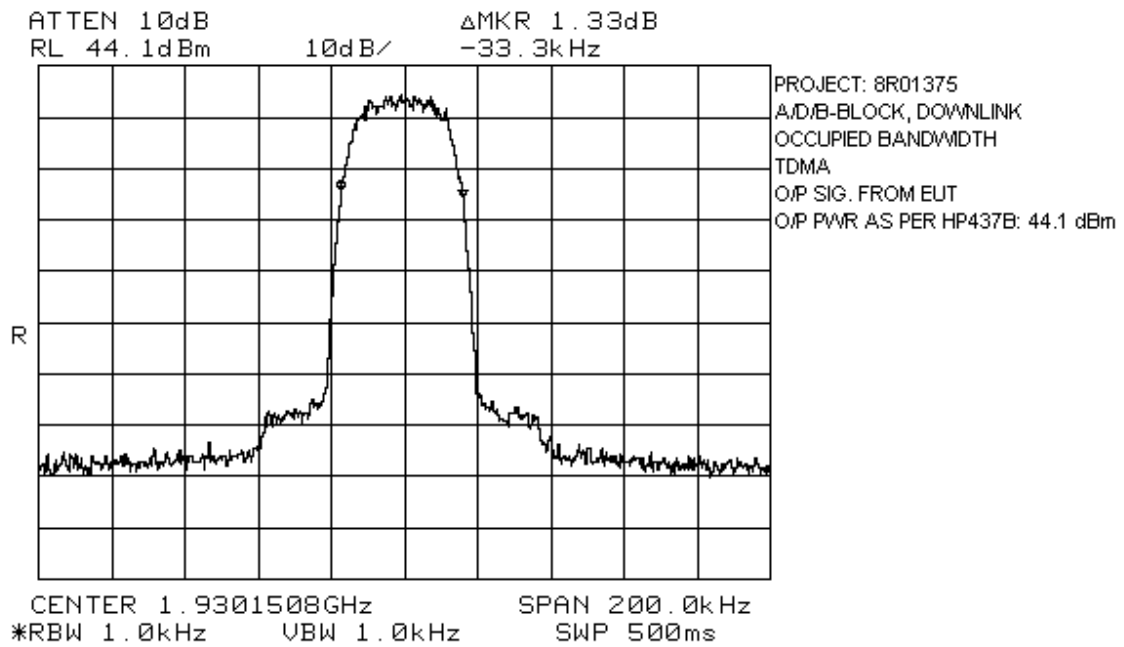
NAME OF TEST: Occupied Bandwidth (TDMA)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: May 12, 1999

Test Results: Complies.

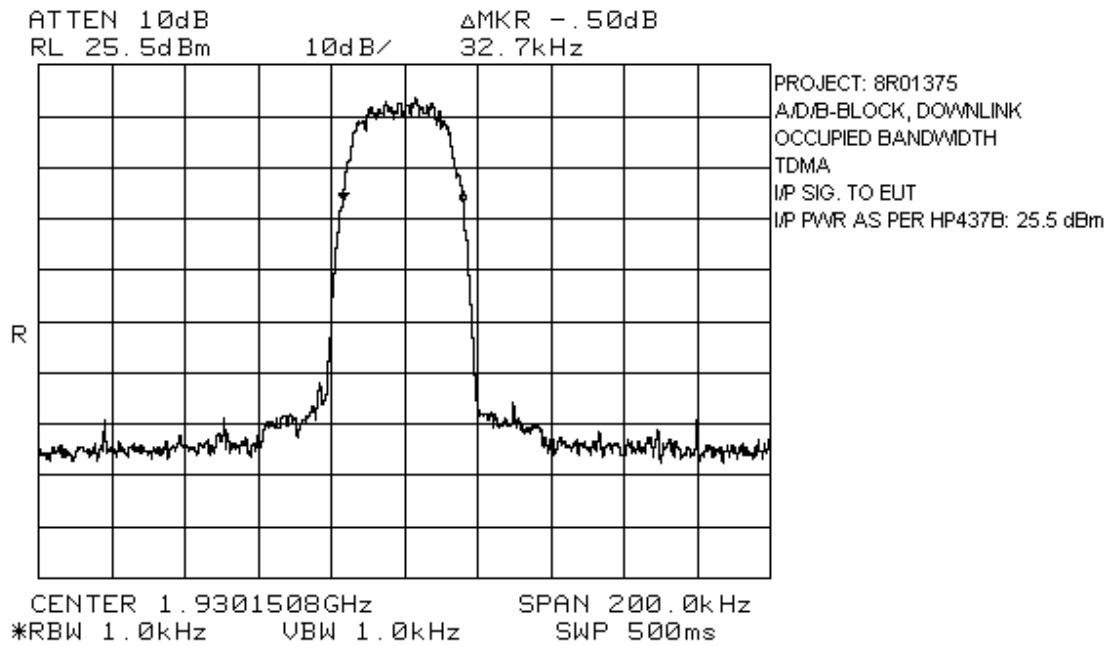
Test Data: See attached graph(s).

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

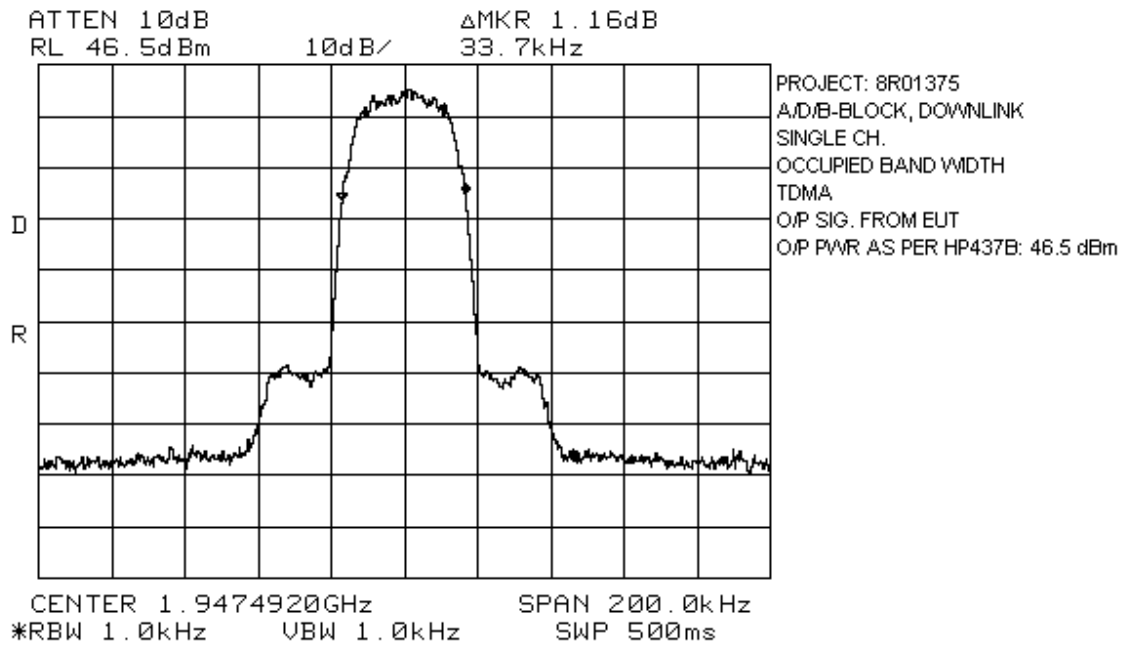
4-Amplifier Configuration (ADB & EFC Blocks) 2 Channel & Single Channel



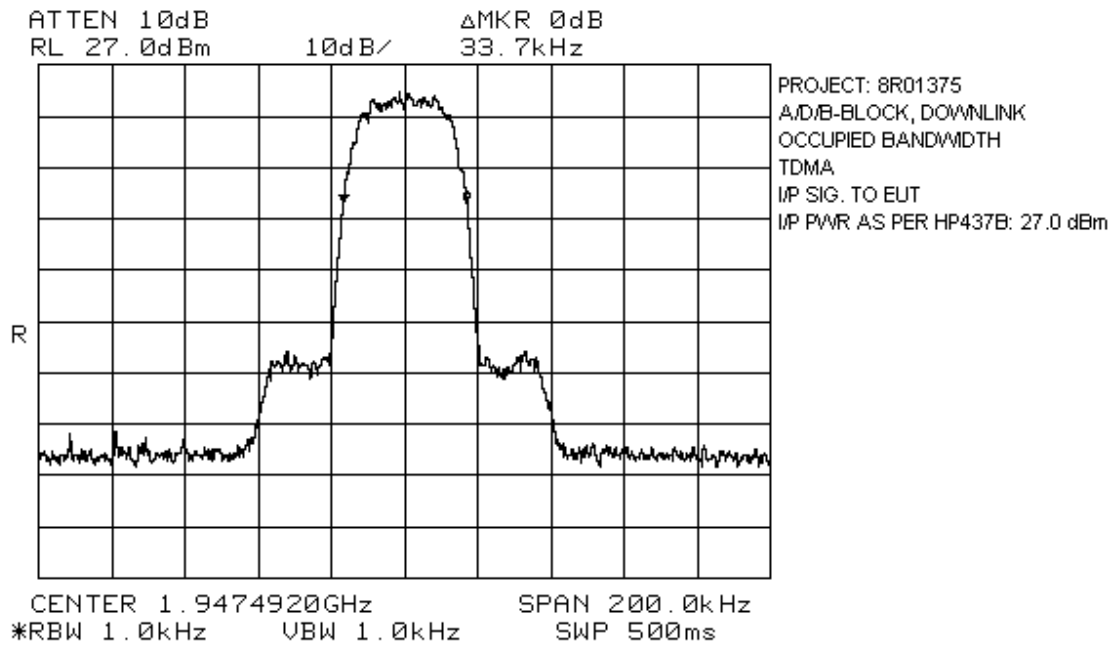
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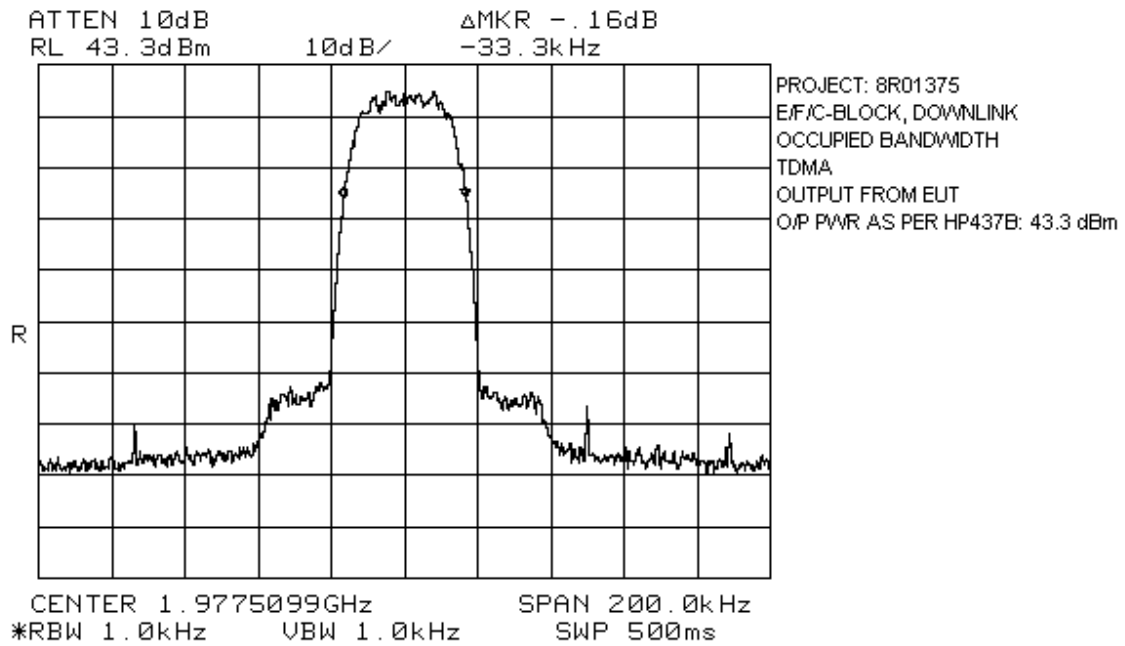
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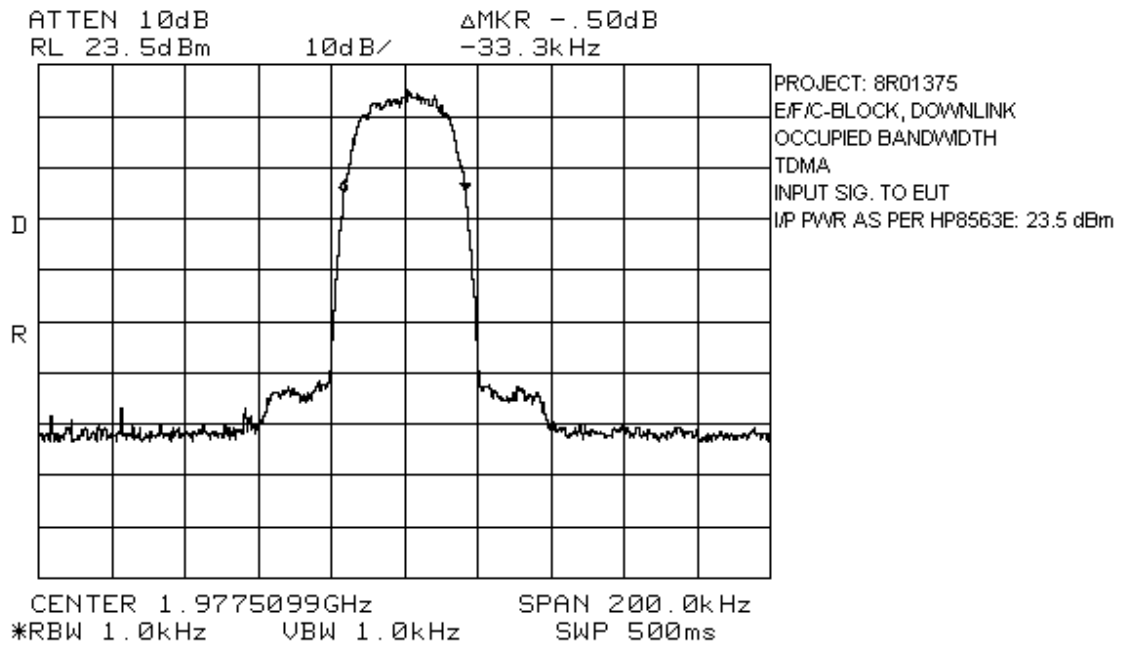
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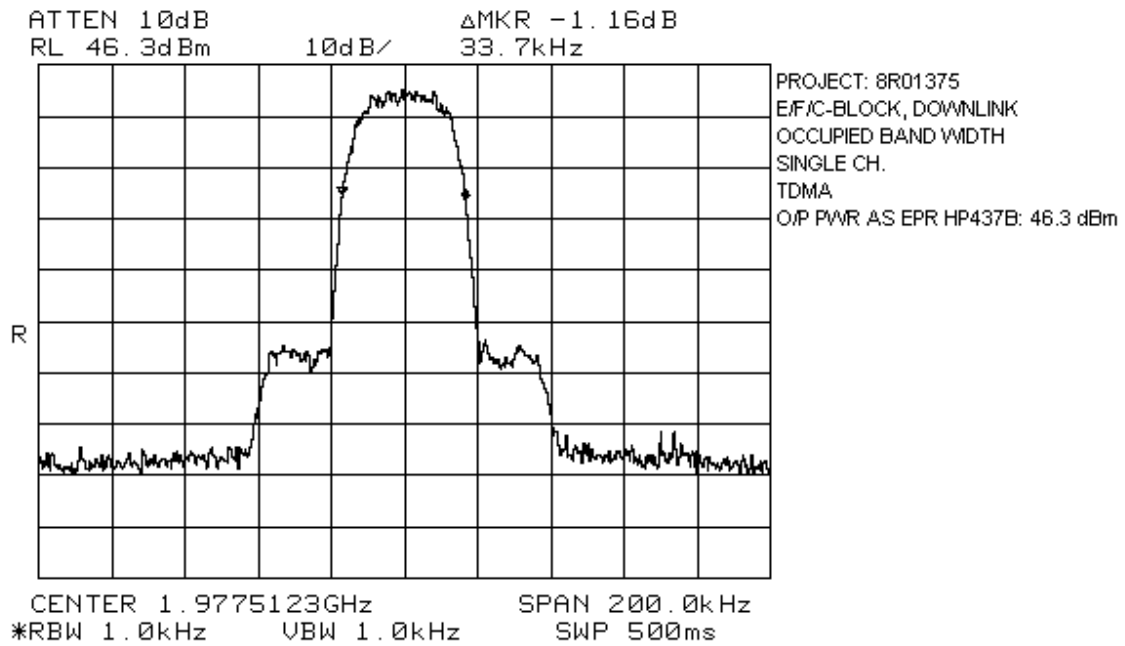
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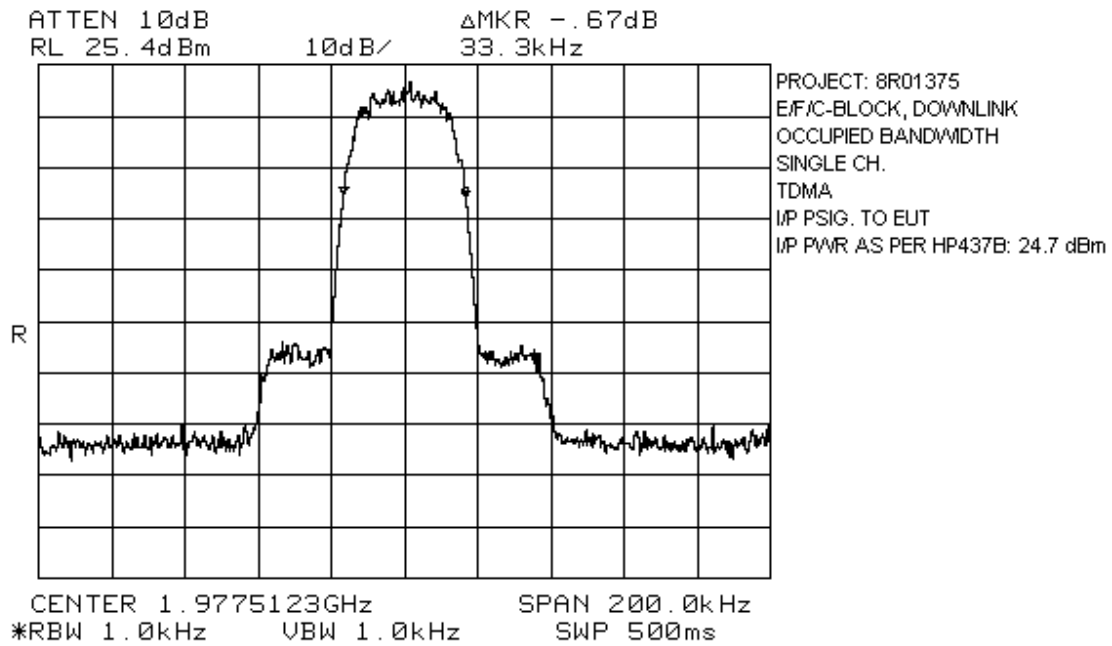
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EQUIPMENT: Band Selective Booster Amplifier
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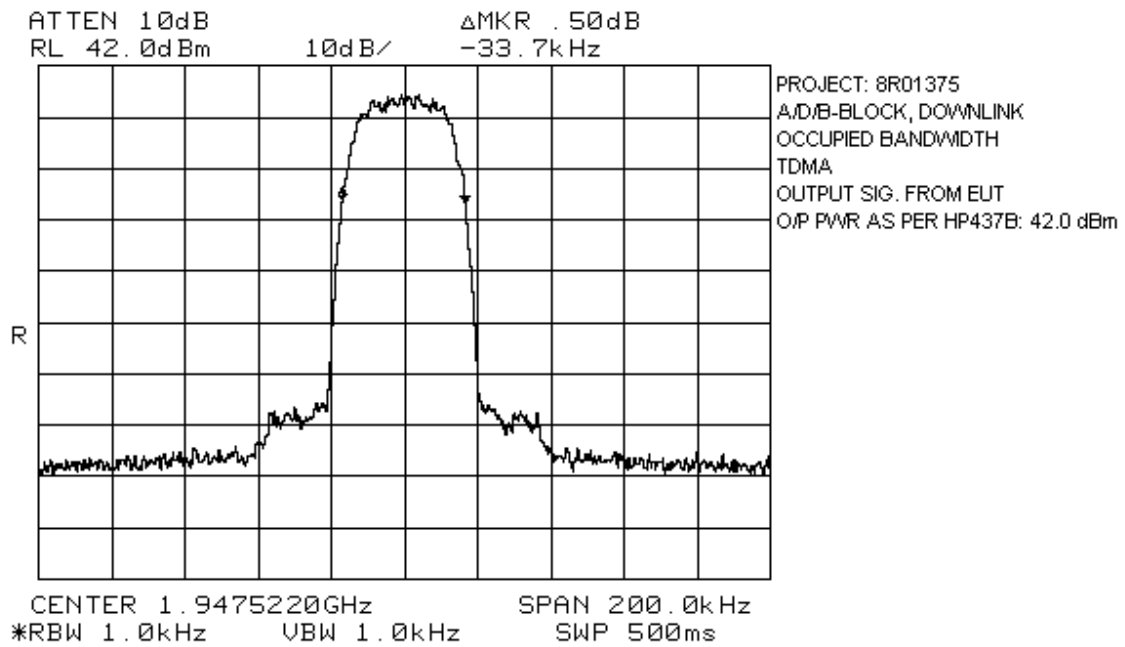


EQUIPMENT: Band Selective Booster Amplifier
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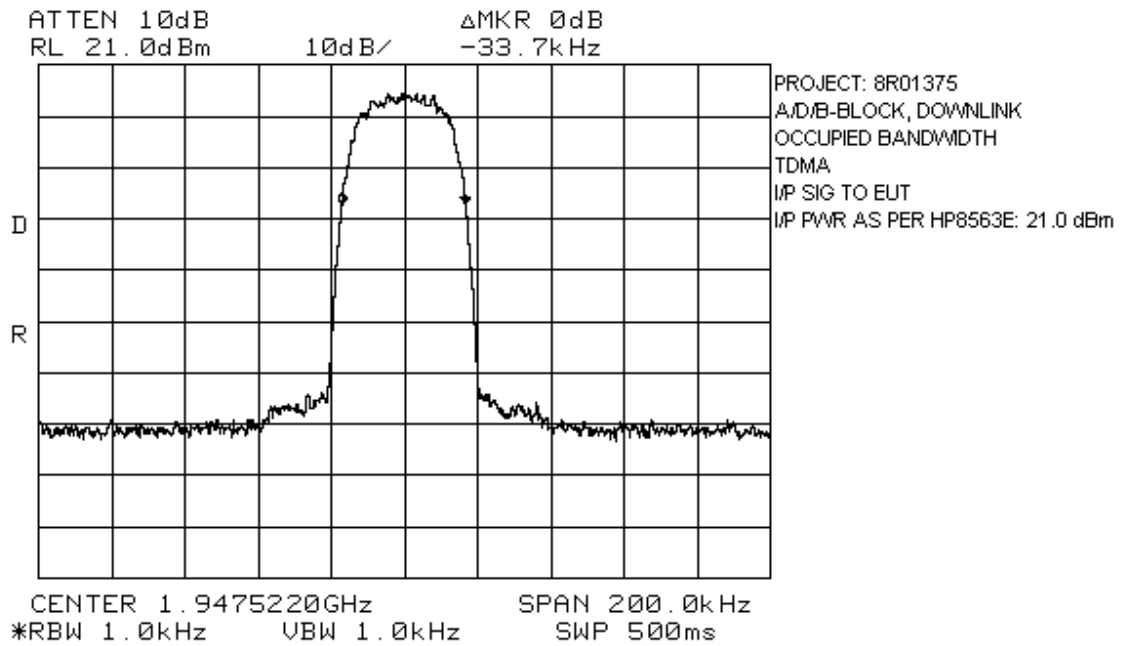


EQUIPMENT: Band Selective Booster Amplifier
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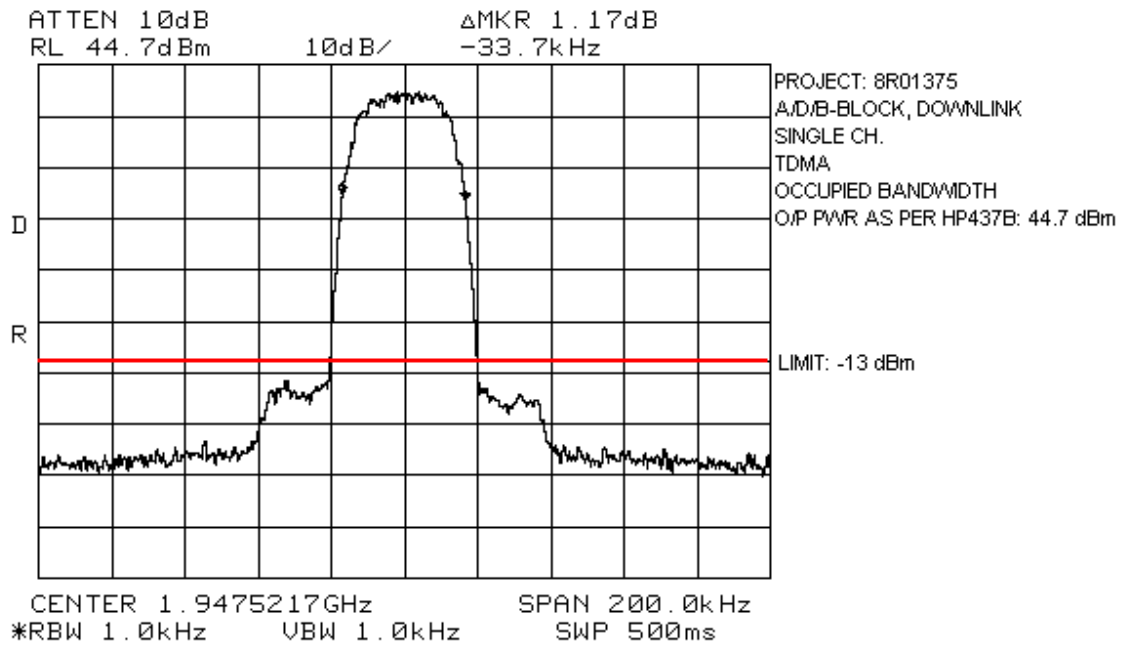
2-Amplifier Configuration (ADB & EFC Block) 2 Channel & Single Channel



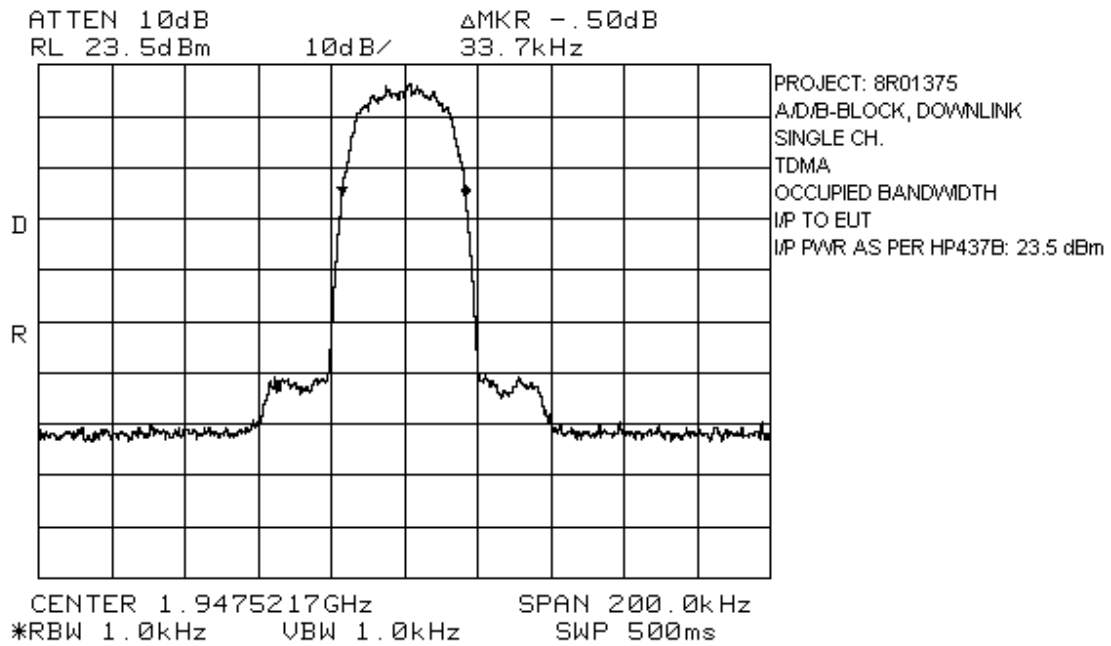
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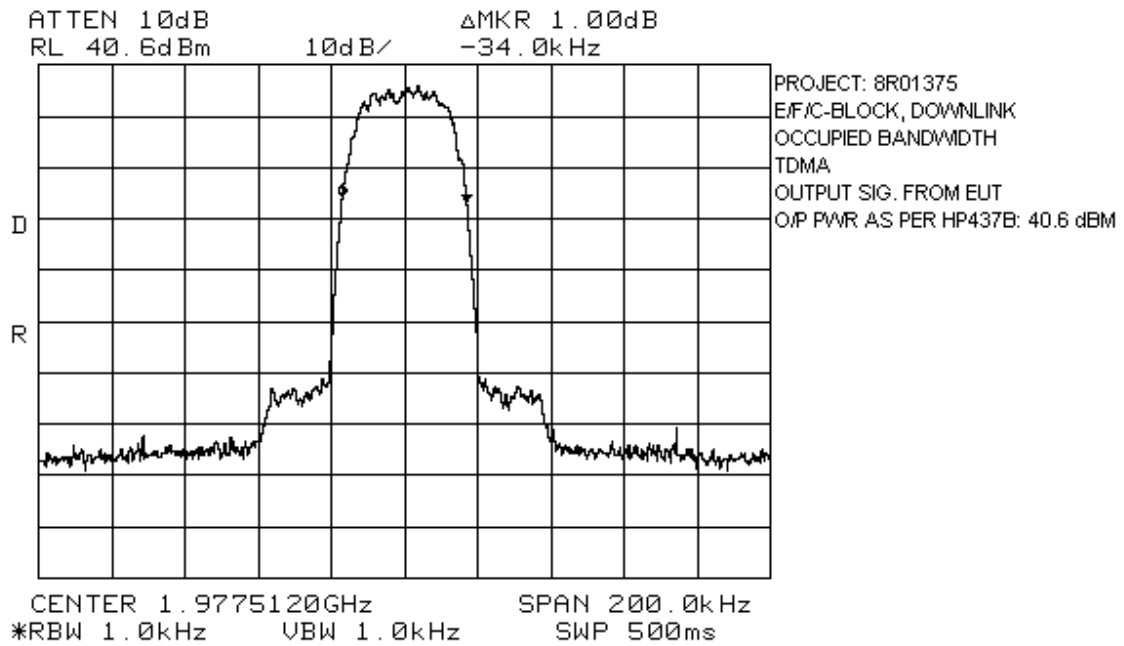
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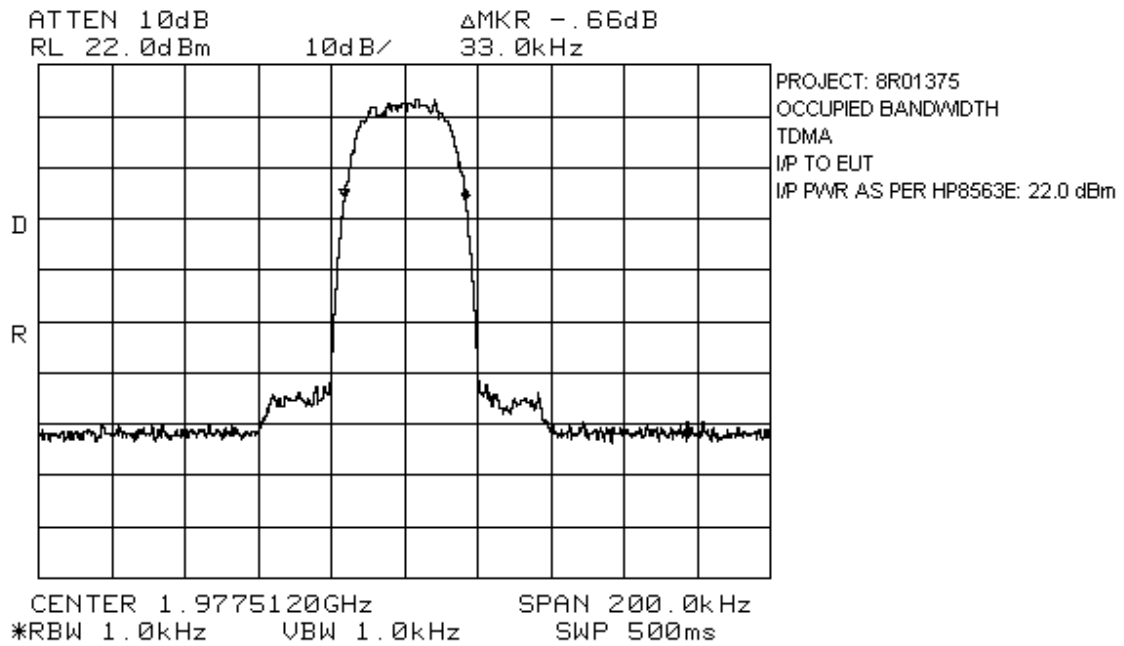
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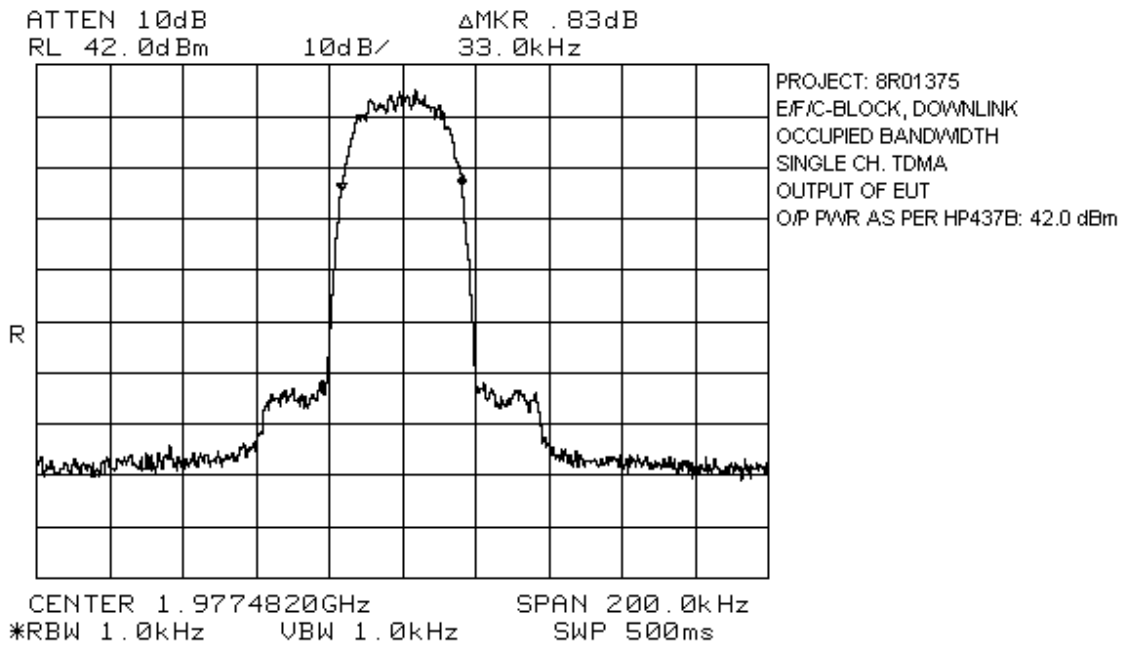
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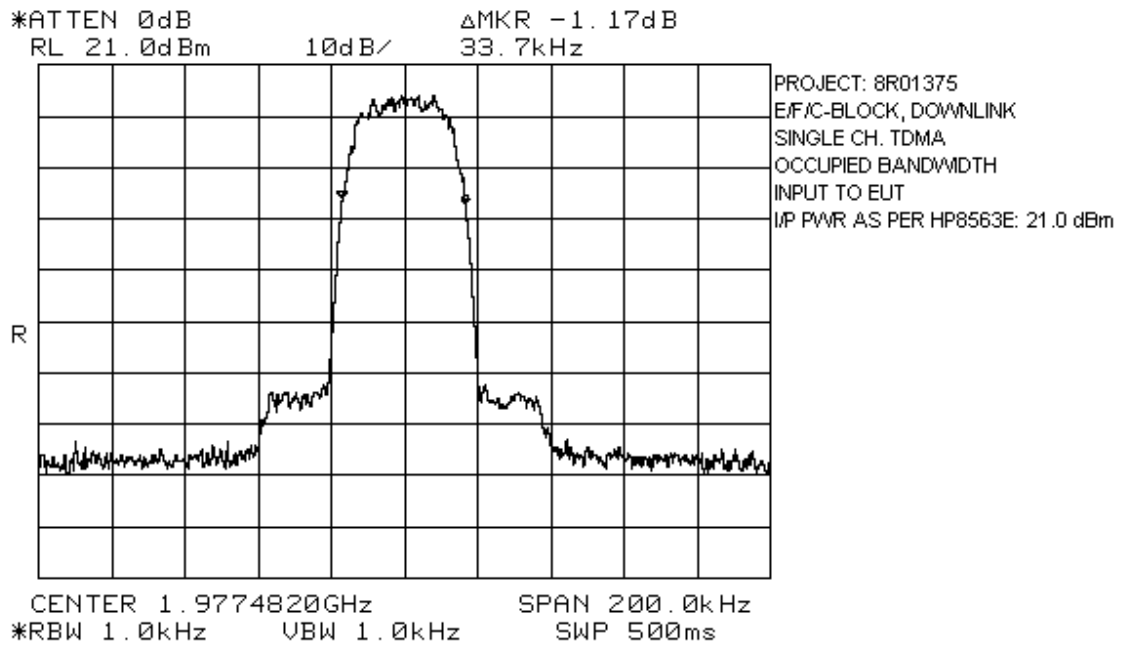
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



EQUIPMENT: Band Selective Booster Amplifier
*FCC ID: BCR-MRB-PCS***Section 5. Spurious Emissions at Antenna Terminals**

NAME OF TEST: Spurious Emissions @ Antenna Terminals PARA. NO.: 2.917(e)

TESTED BY: Kevin Carr

DATE: May 12, 1999

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

ADB-BLOCK	
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-18.87
Lower Band Edge	-13.0
Upper Band Edge	-13.0
2-Channel Intermodulation Products	-13.0

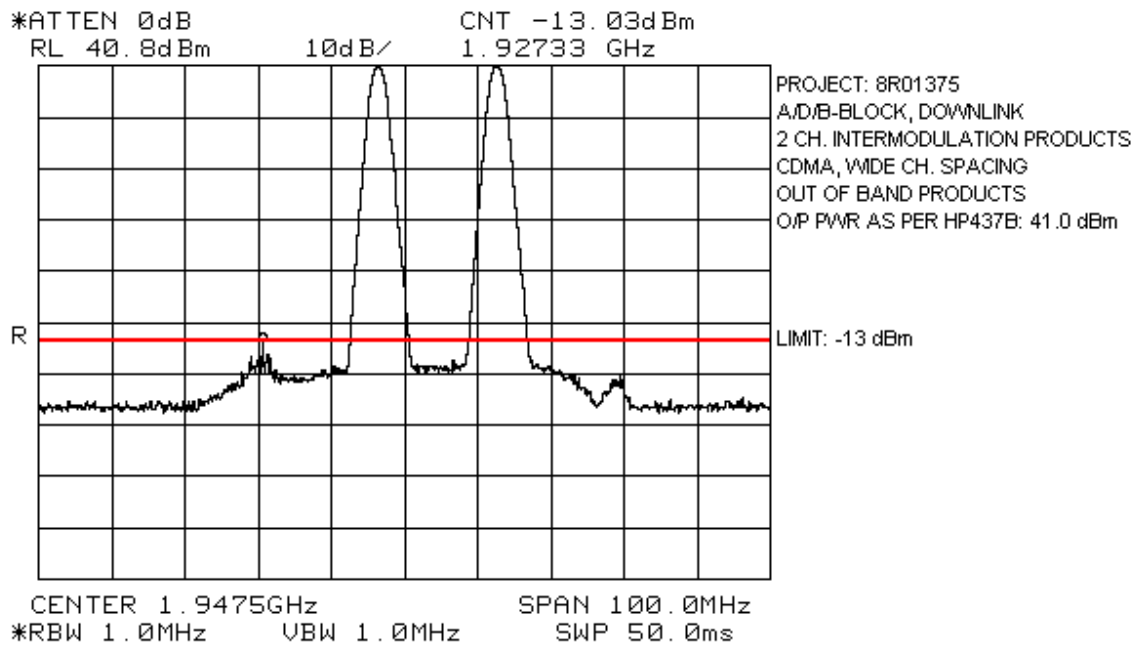
ADB-BLOCK, SINGLE CHANNEL	
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-18.2
Lower Band Edge	-13.0
Upper Band Edge	-13.0
2-Channel Intermodulation Products	-13.0

EFC-BLOCK	
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-19.4
Lower Band Edge	-13.0
Upper Band Edge	-13.0
2-Channel Intermodulation Products	-13.0

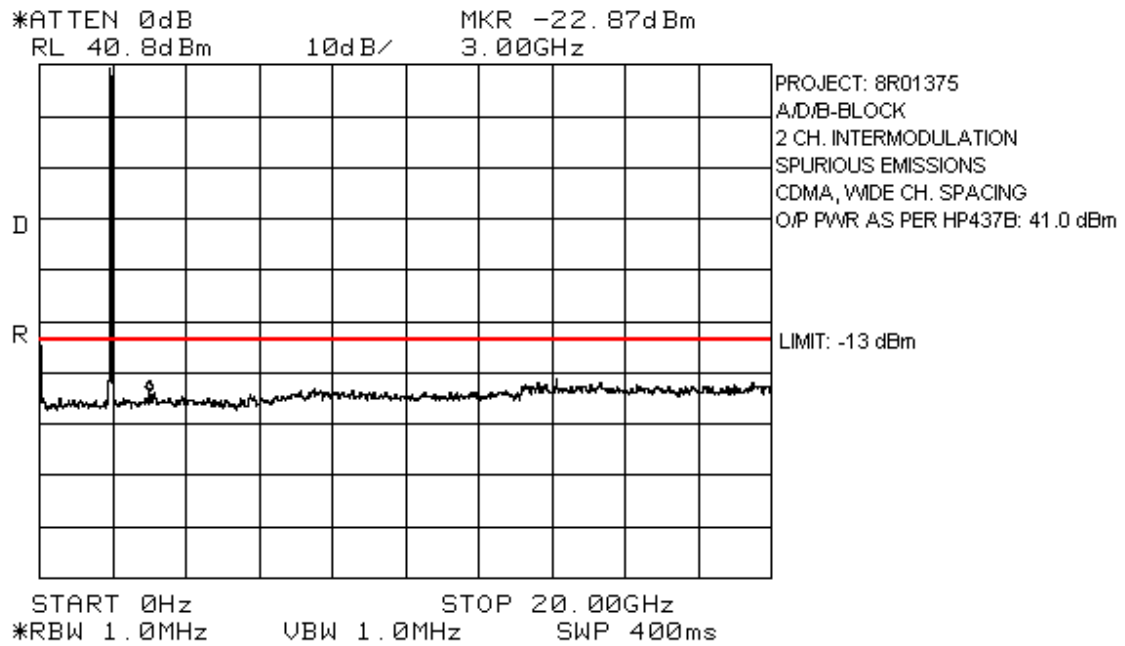
EFC-BLOCK, SINGLE CHANNEL	
NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-17.37
Lower Band Edge	-13.0
Upper Band Edge	-13.0
2-Channel Intermodulation Products	-13.0

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

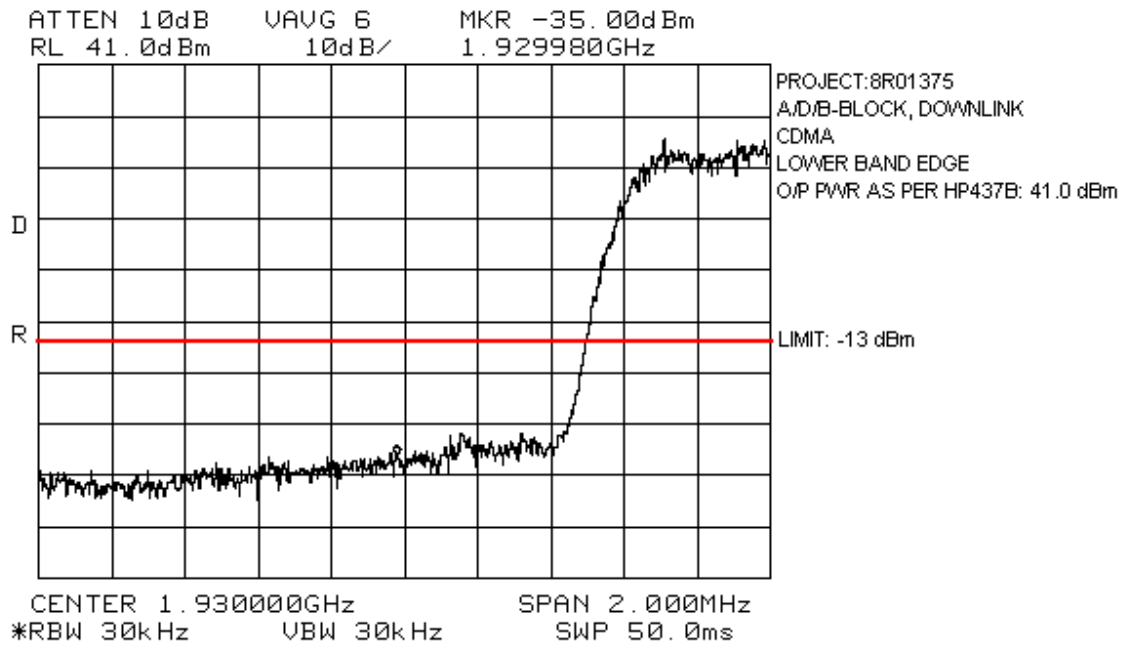
4-Amplifier Configuration (ADB-Block) 2 Channel & Single Channel



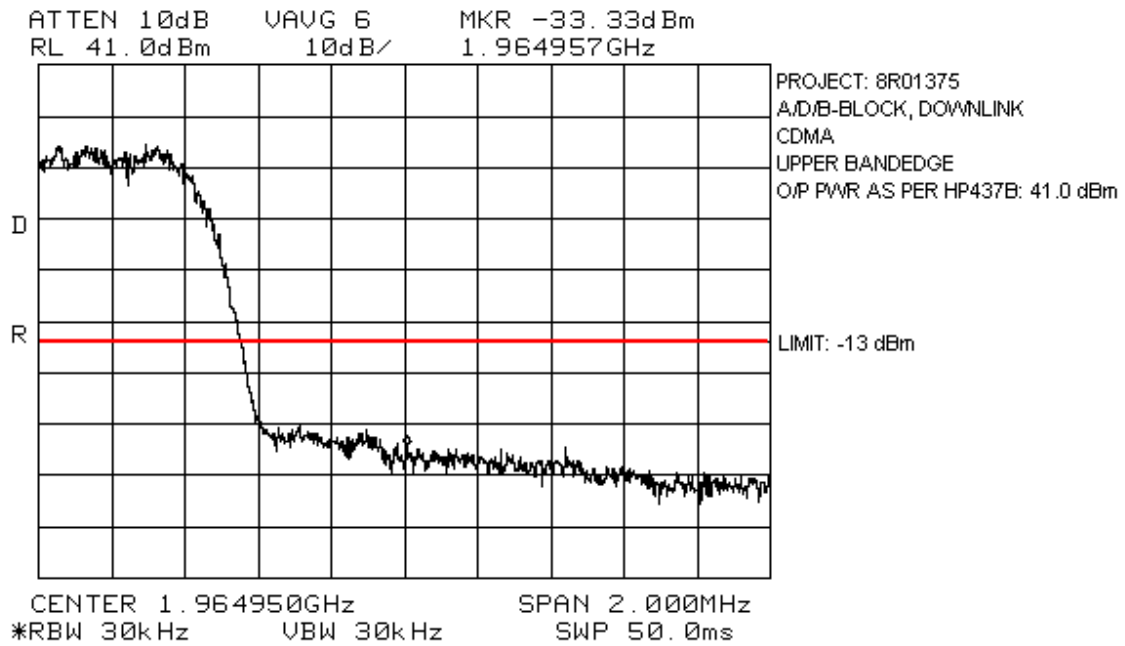
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



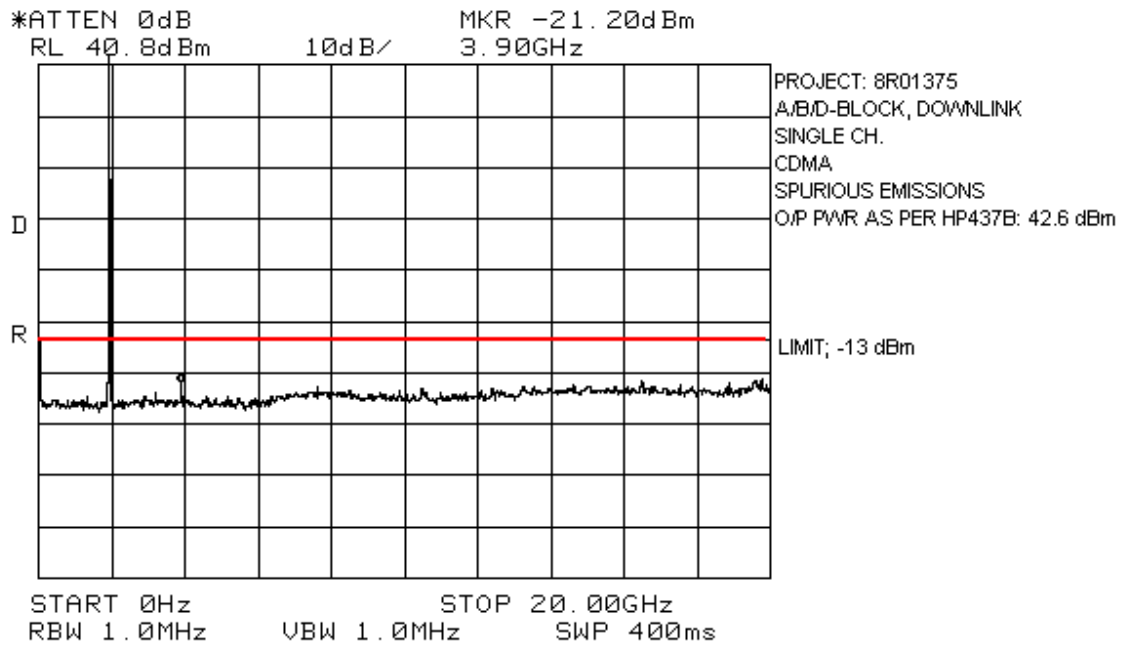
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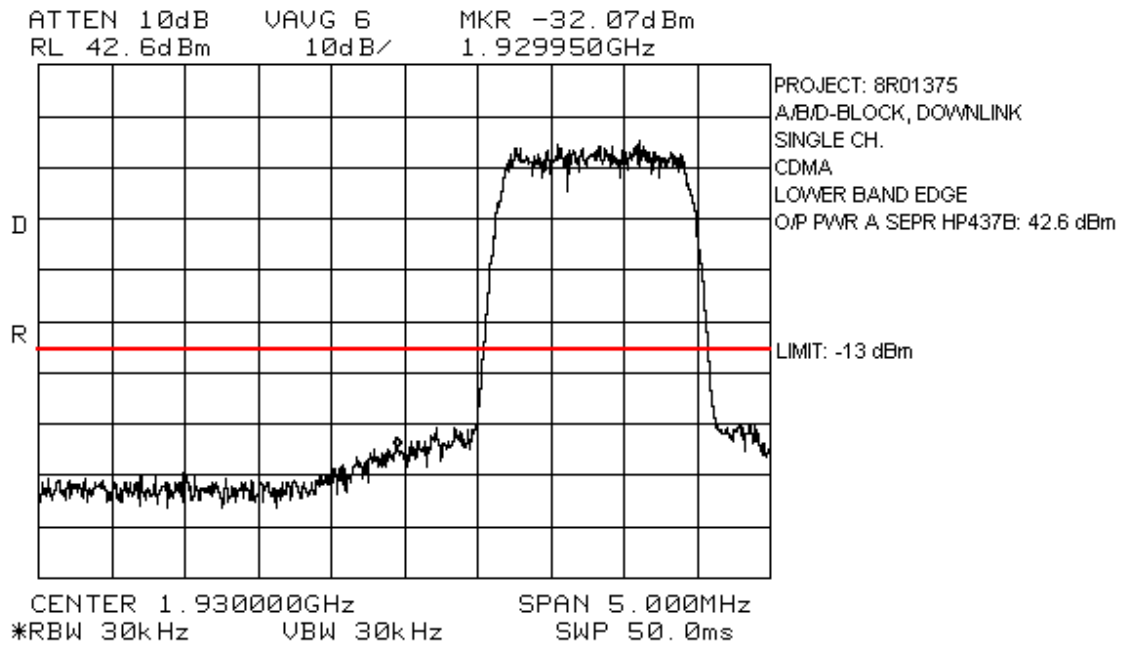
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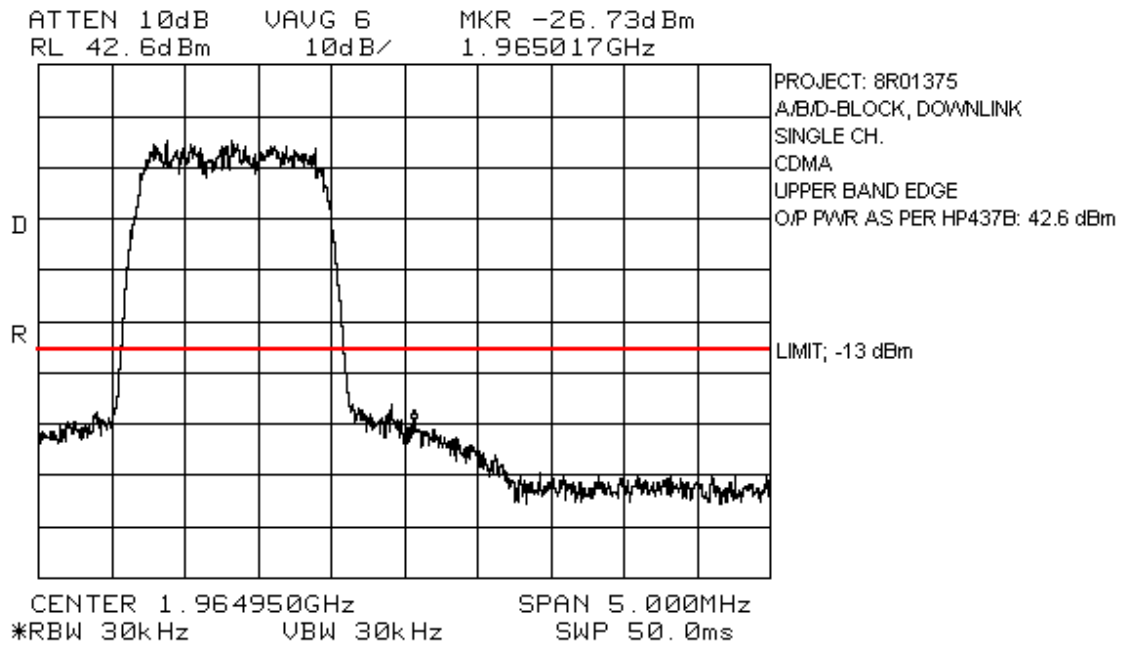
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



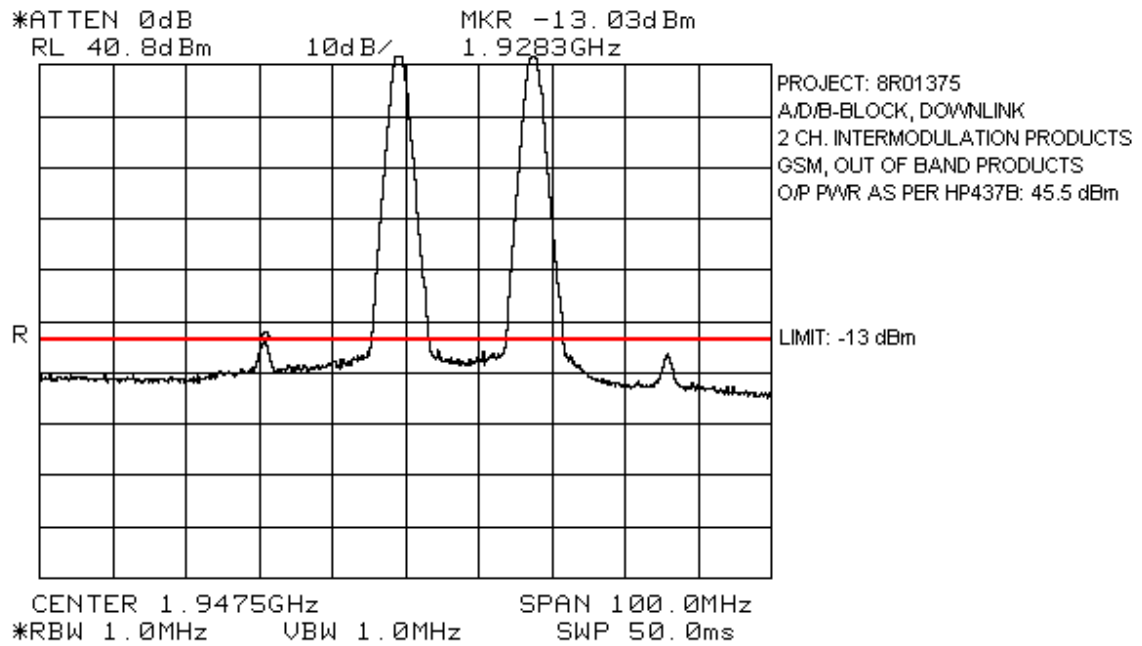
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FCC ID: BCR-MRB-PCS



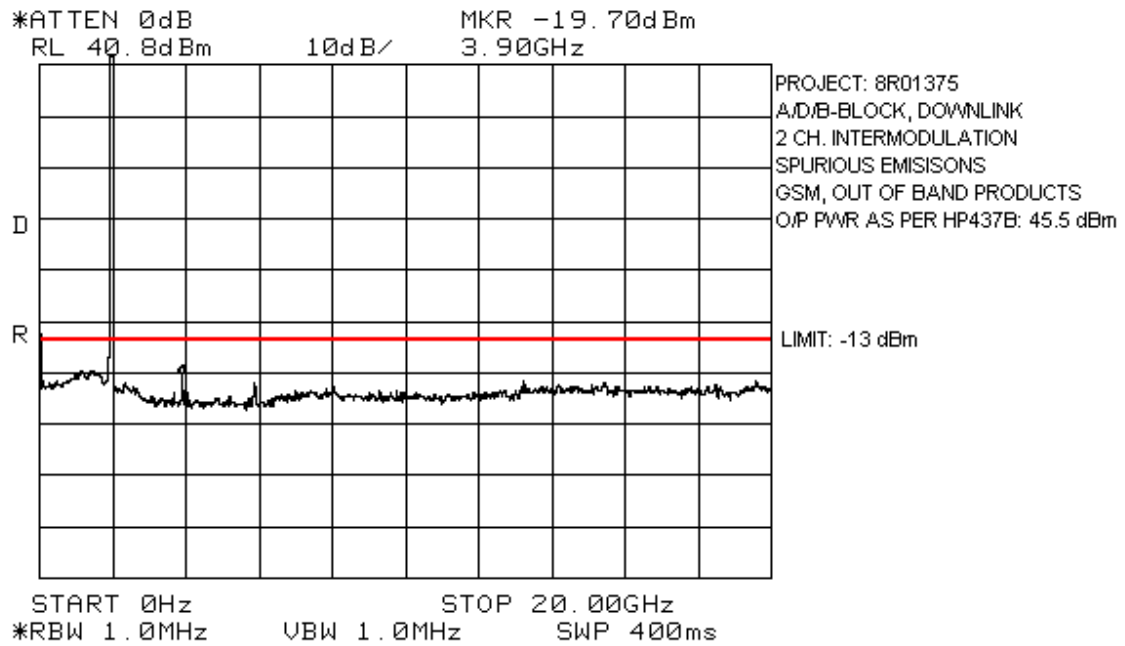
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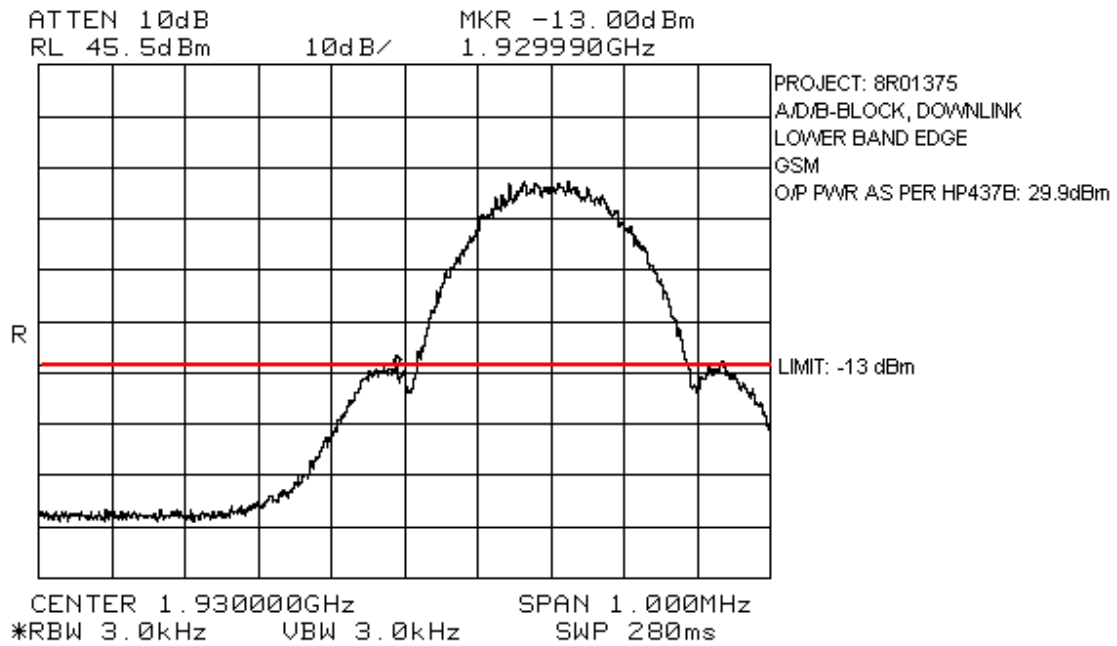
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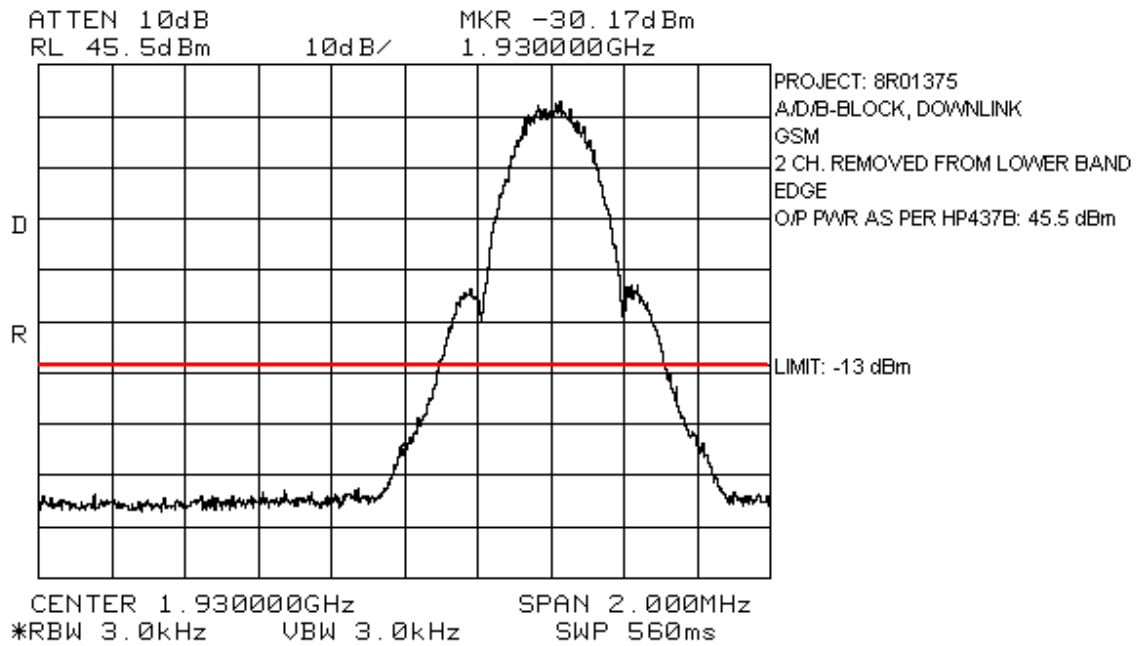
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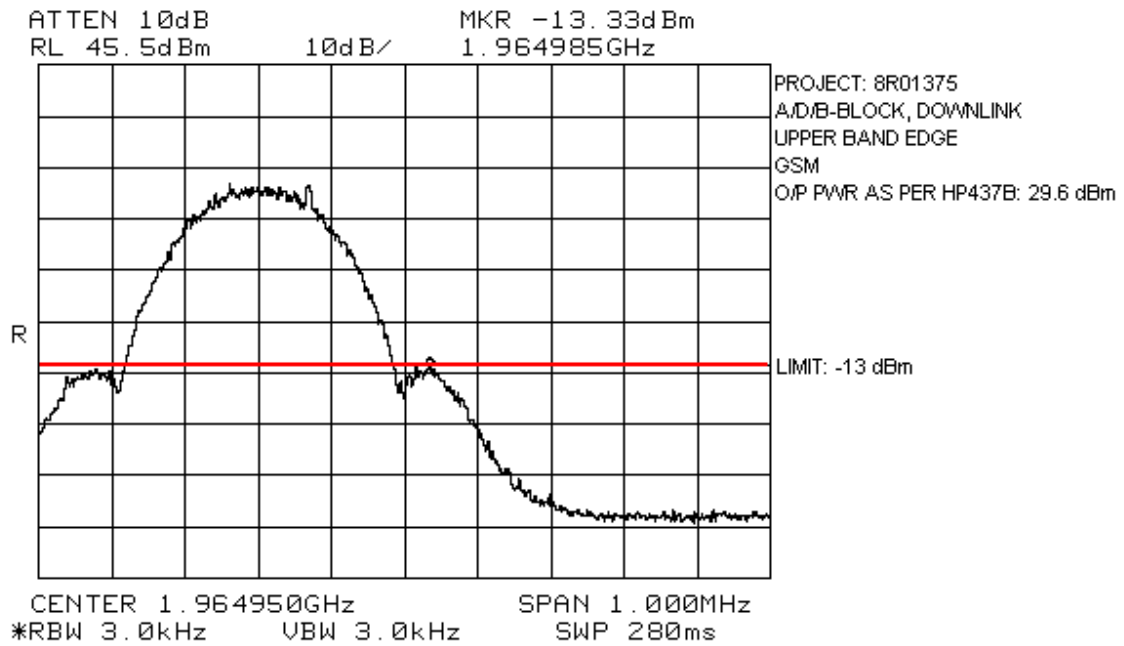
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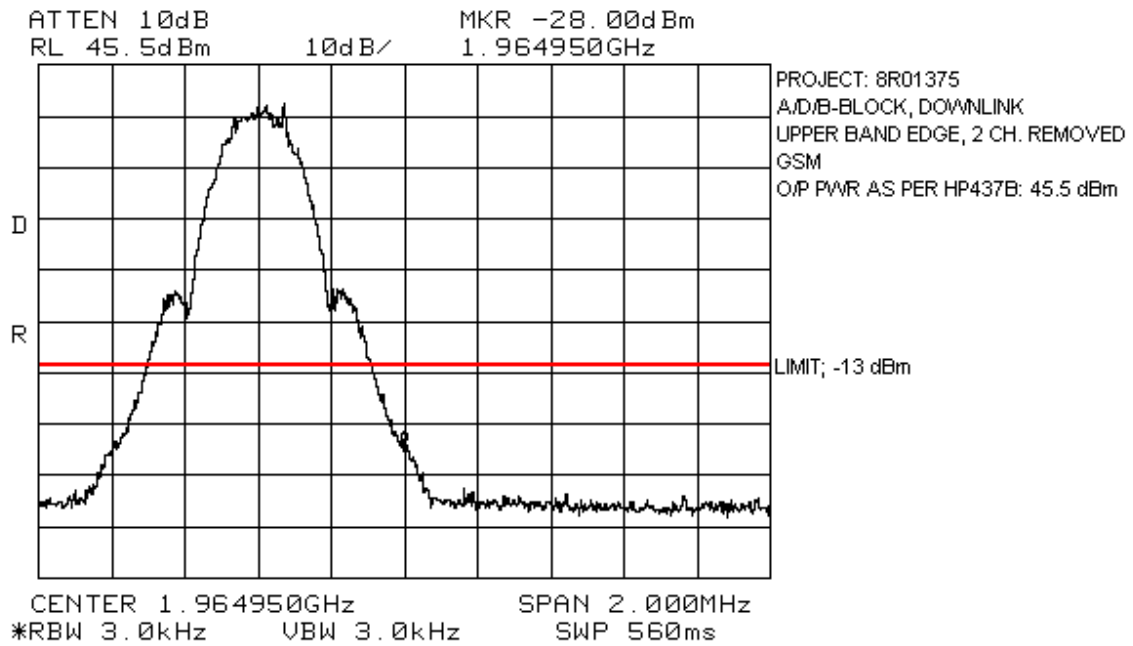
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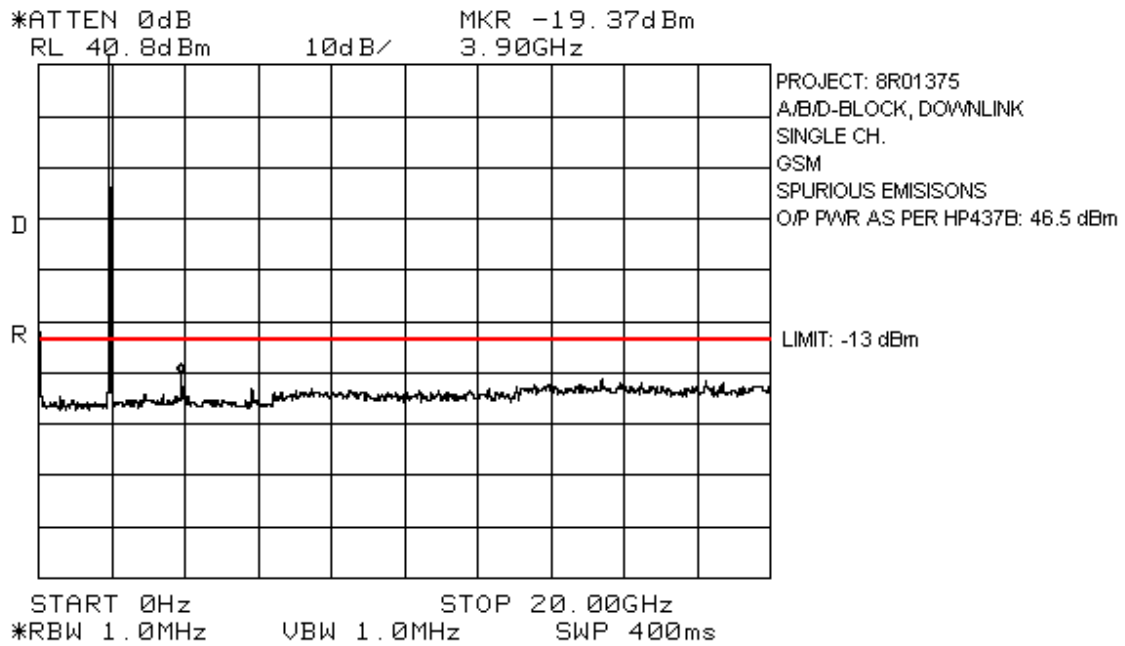
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FCC ID: BCR-MRB-PCS



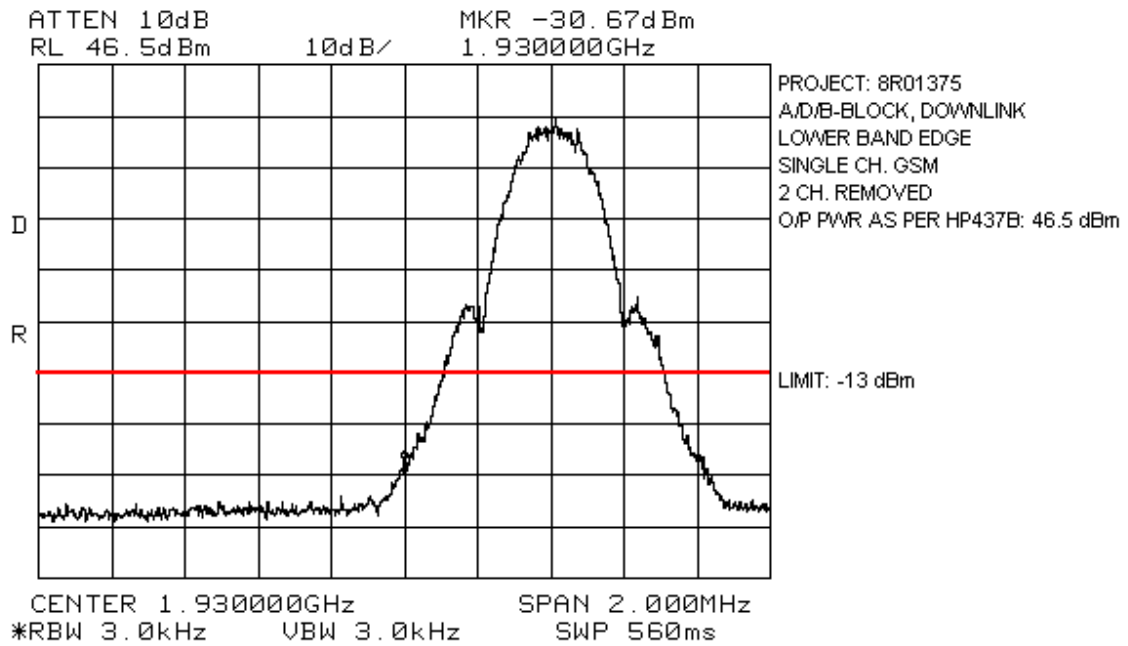
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FCC ID: BCR-MRB-PCS



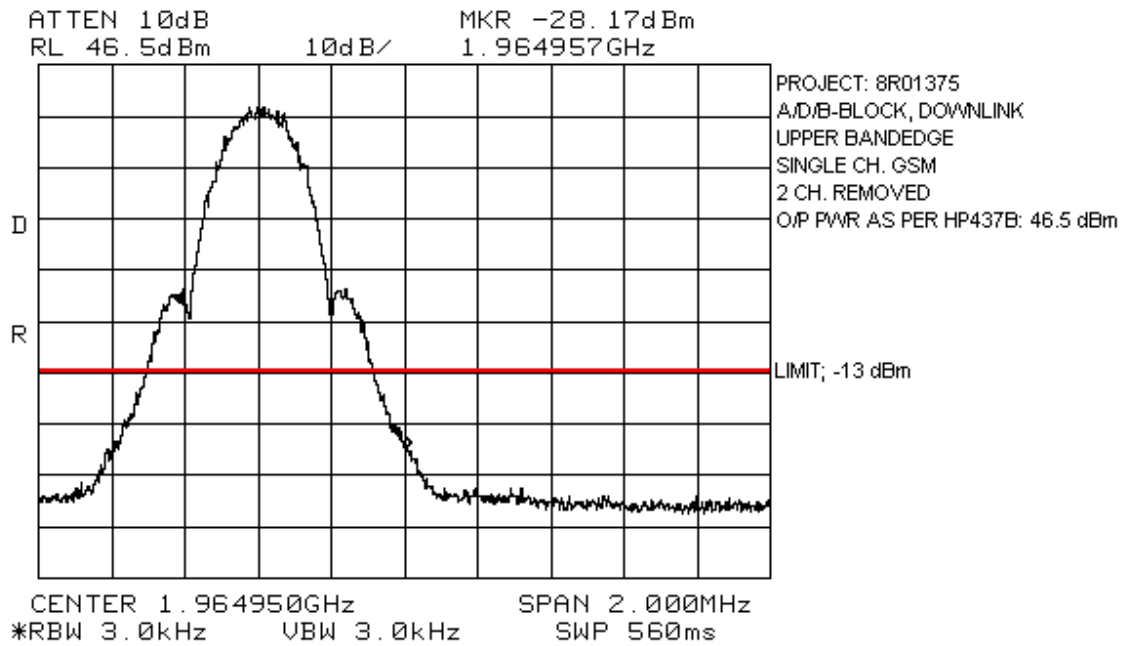
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



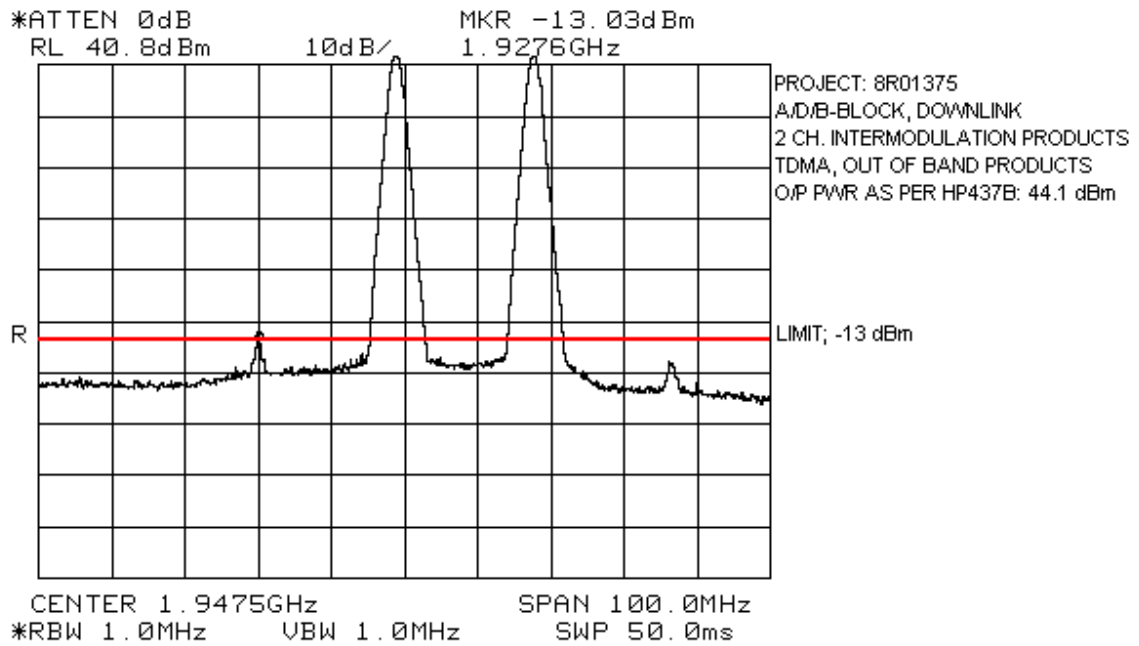
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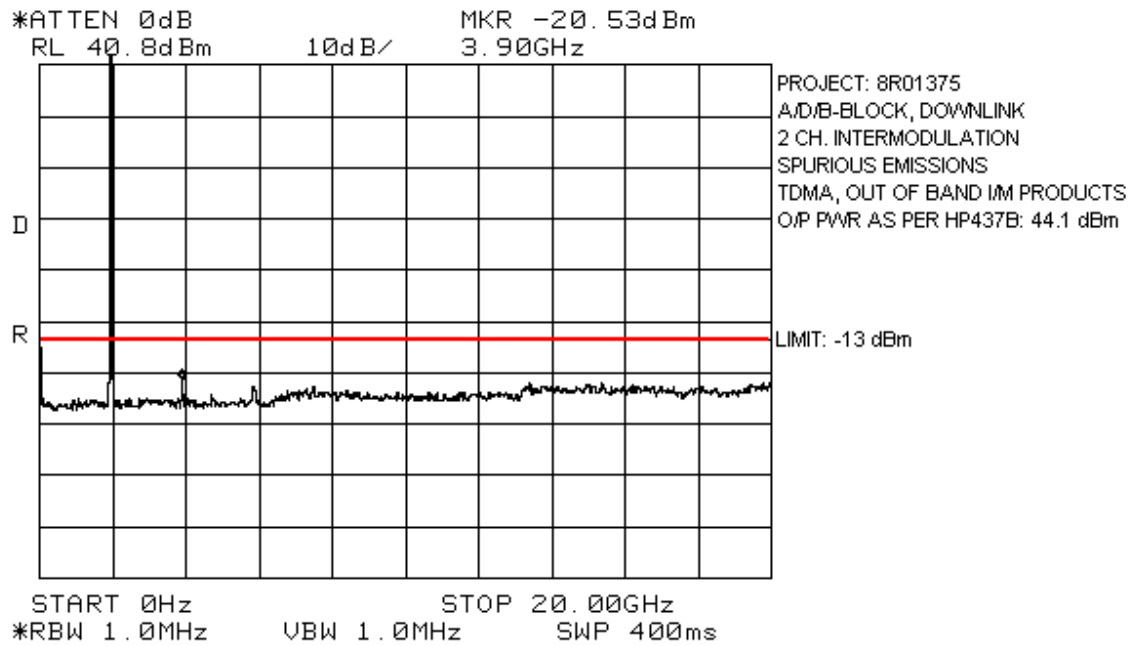
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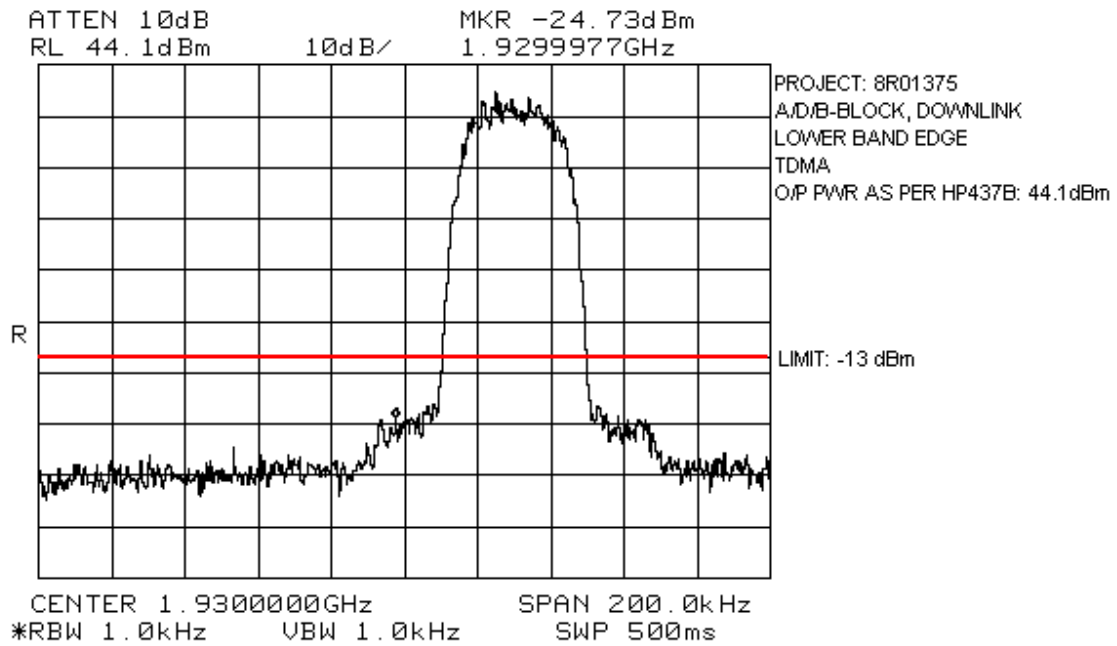
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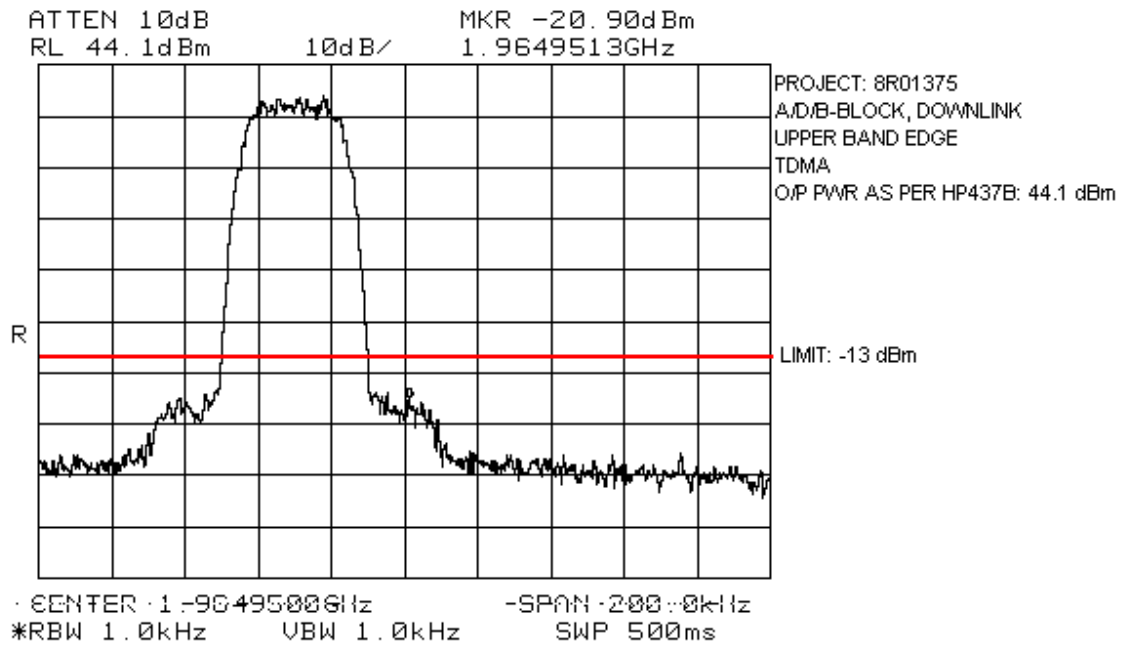
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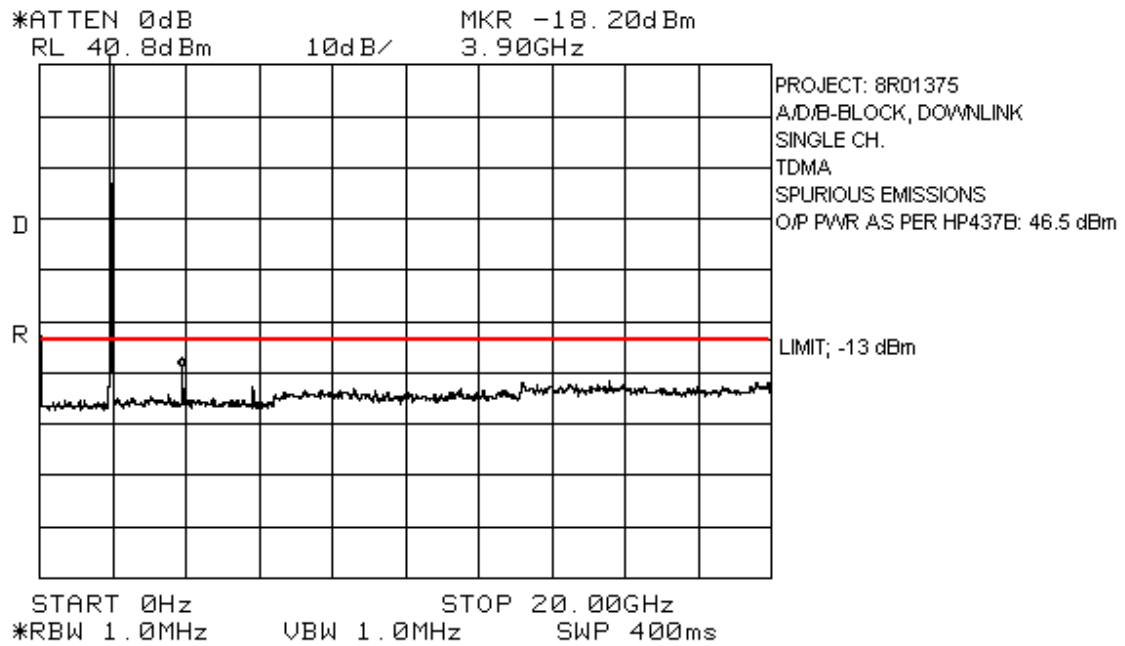
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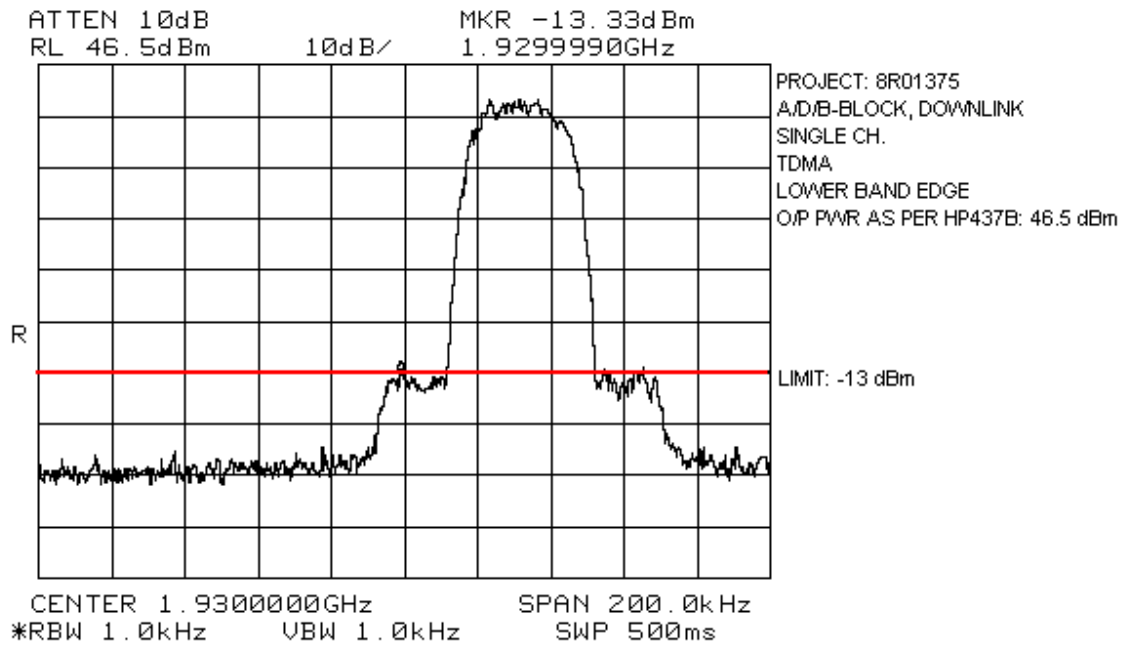
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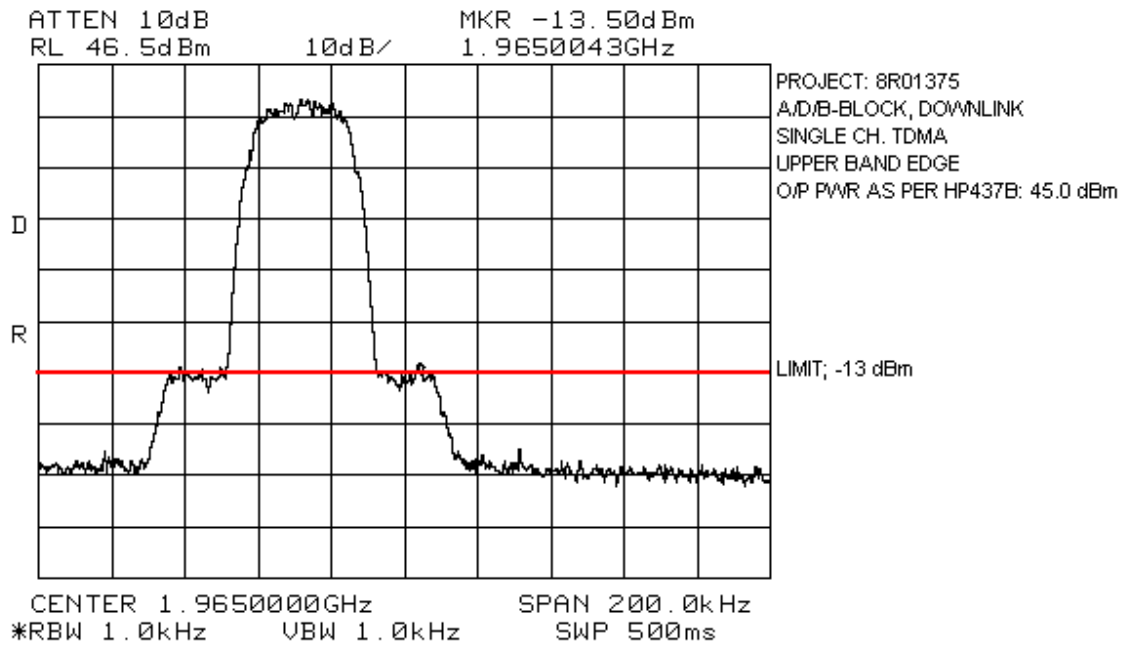
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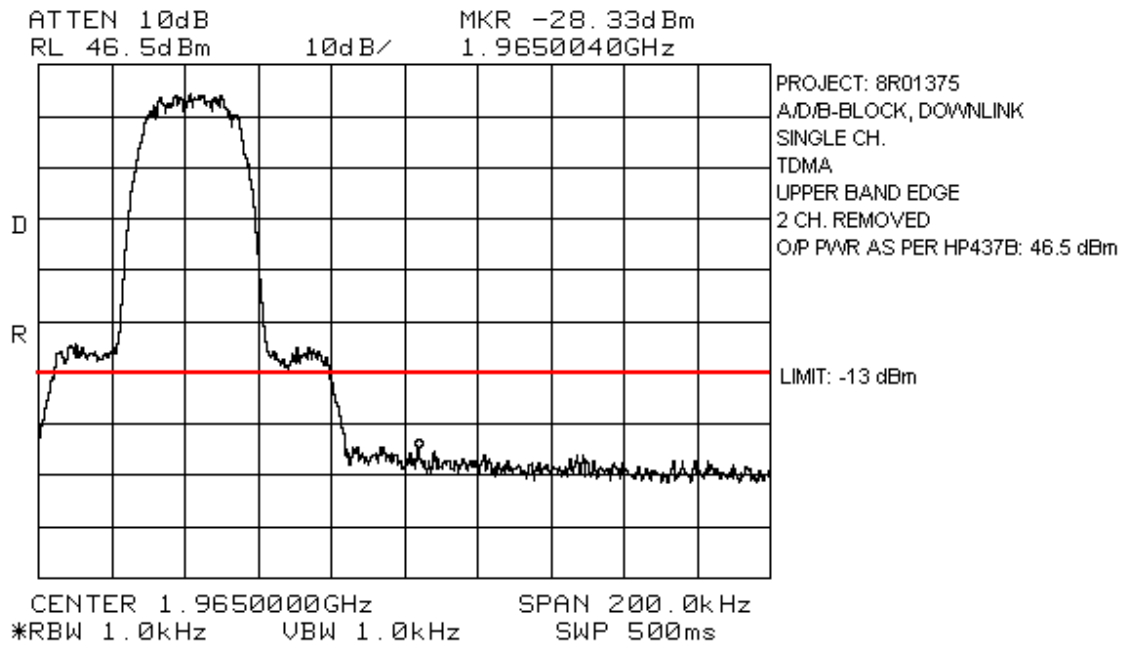
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EQUIPMENT: Band Selective Booster Amplifier
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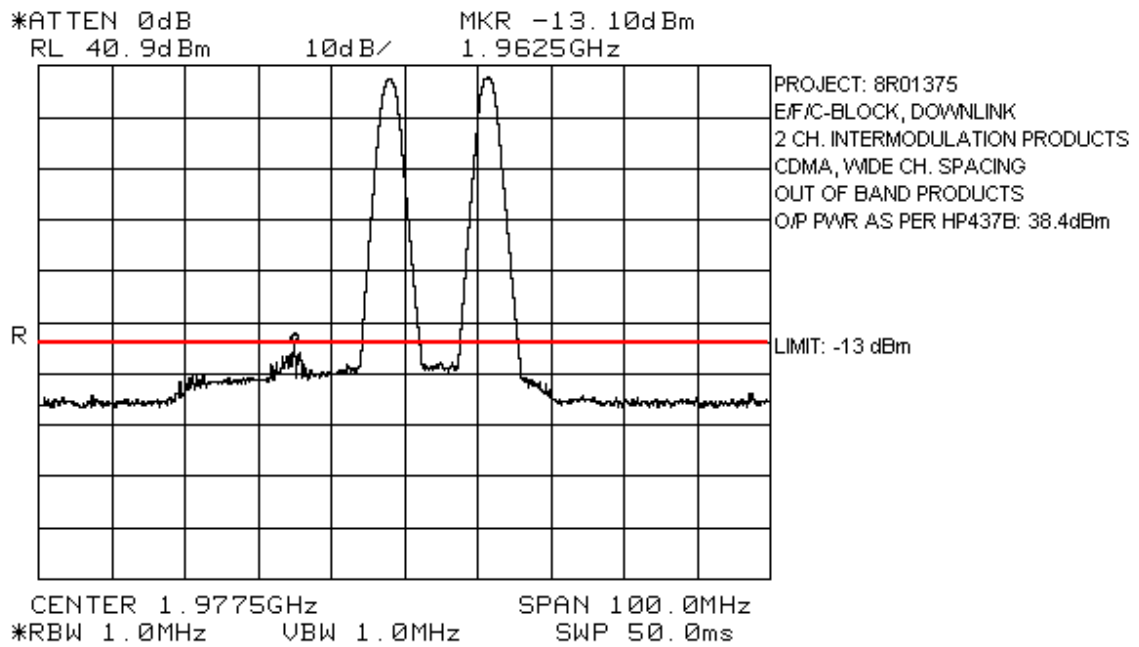


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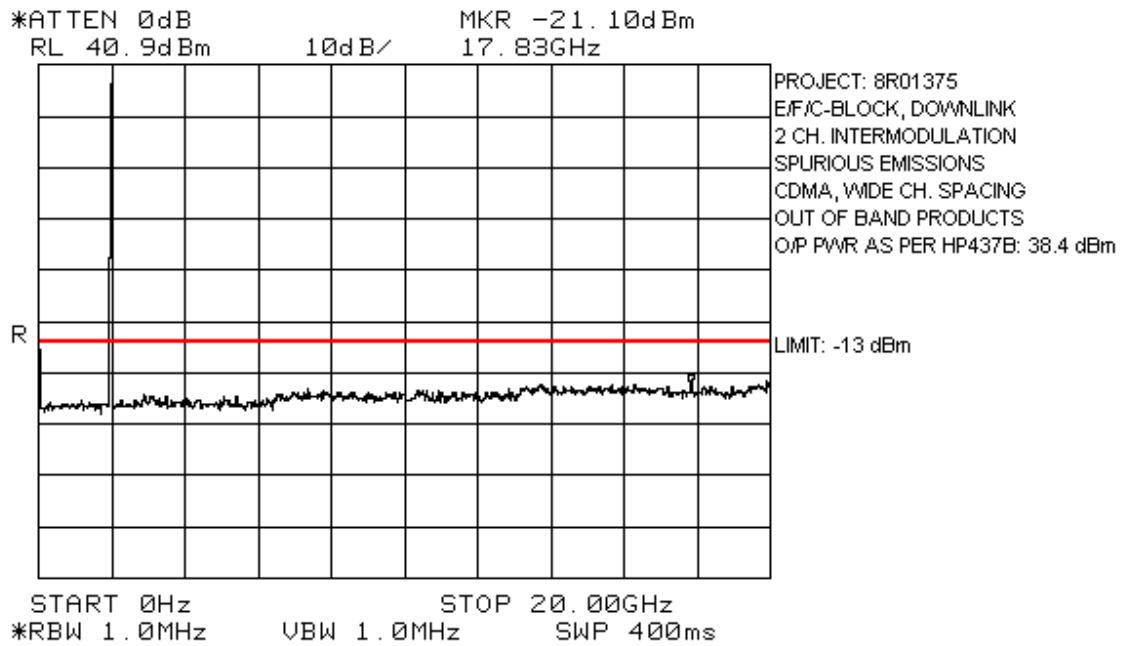


EQUIPMENT: Band Selective Booster Amplifier
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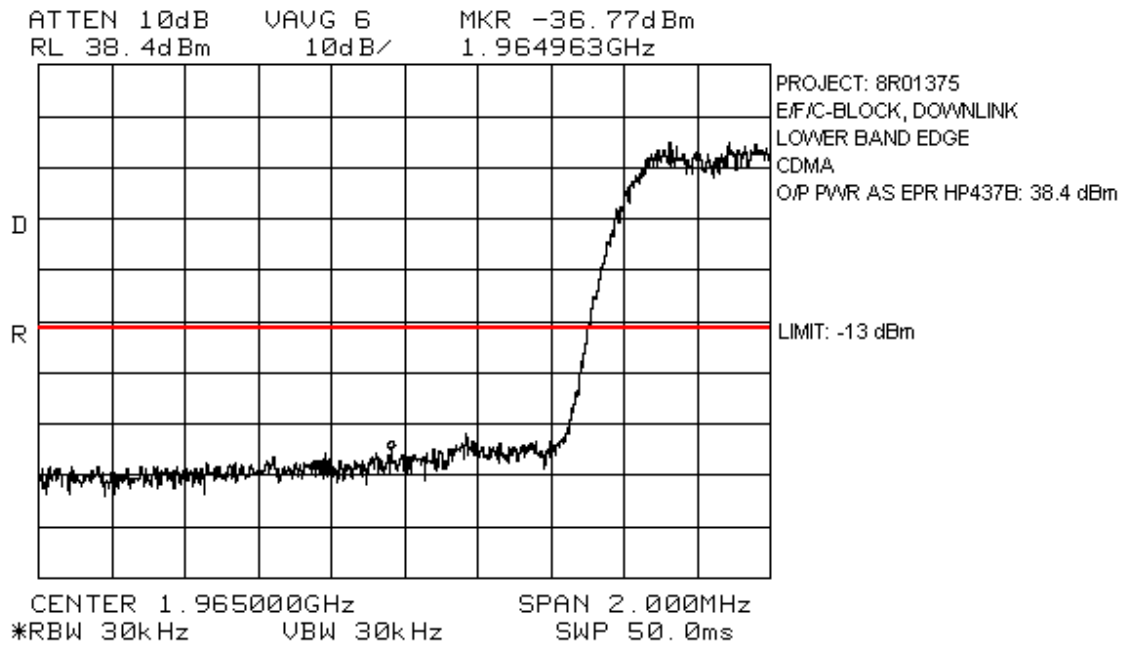
4-Amplifier Configuration (EFC Block) 2 Channel & Single Channel



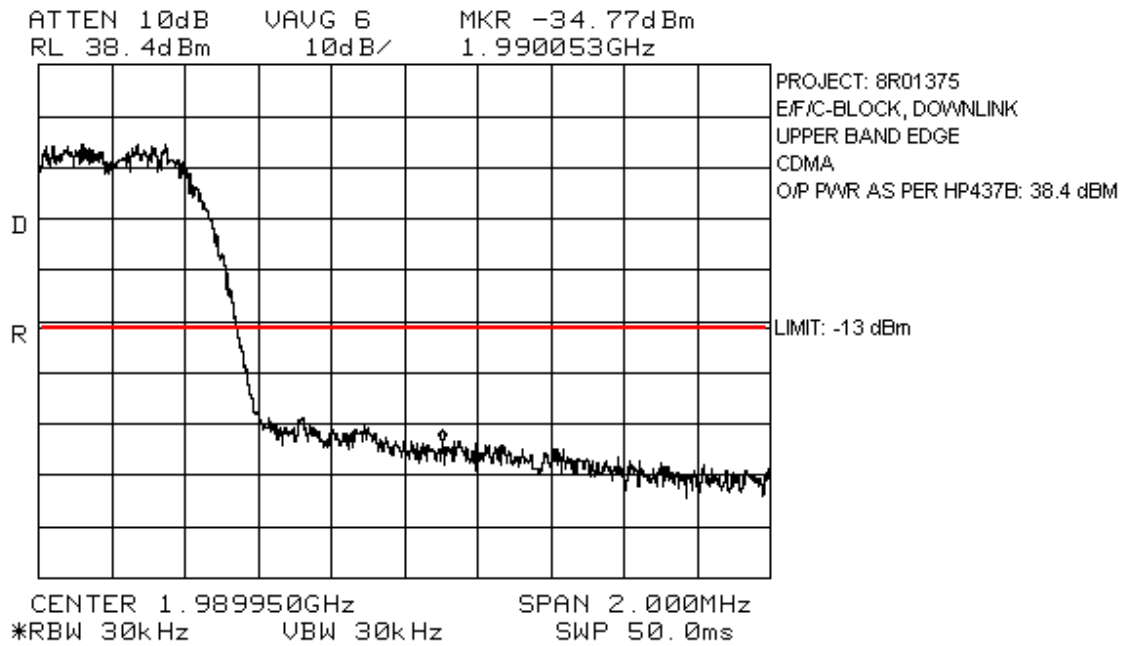
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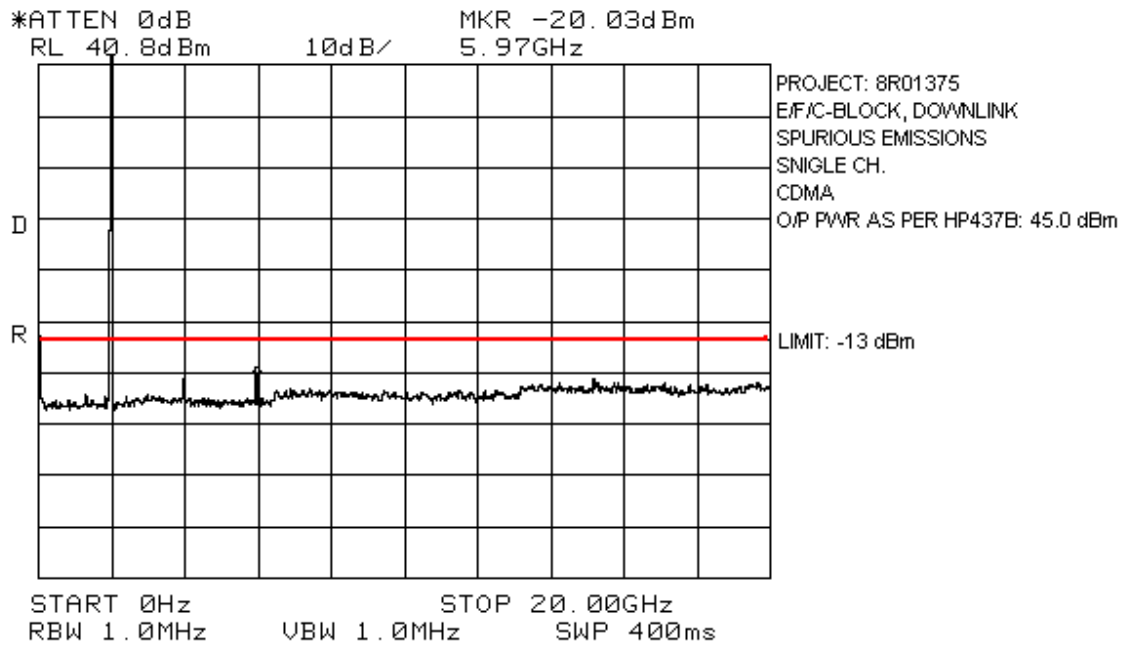
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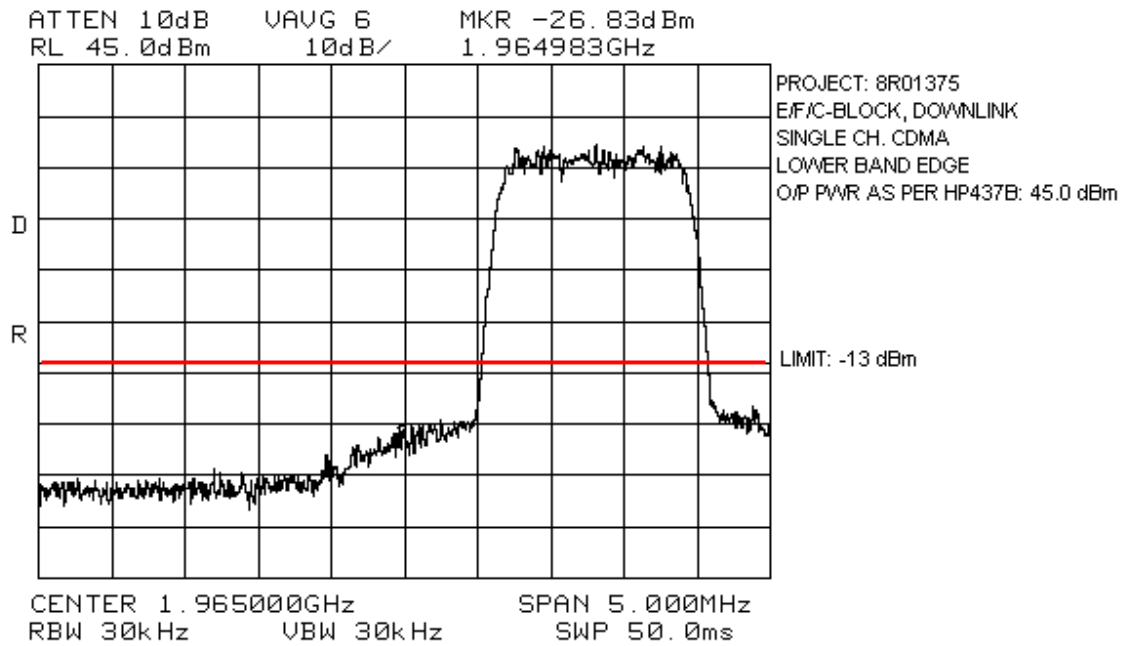
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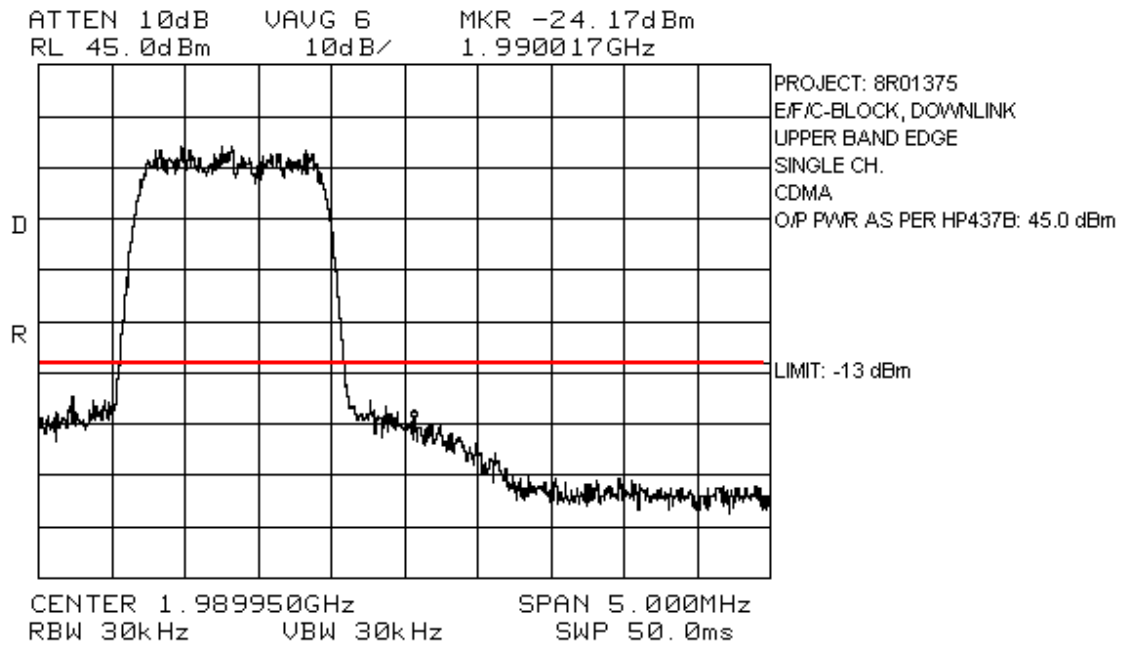
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FCC ID: BCR-MRB-PCS



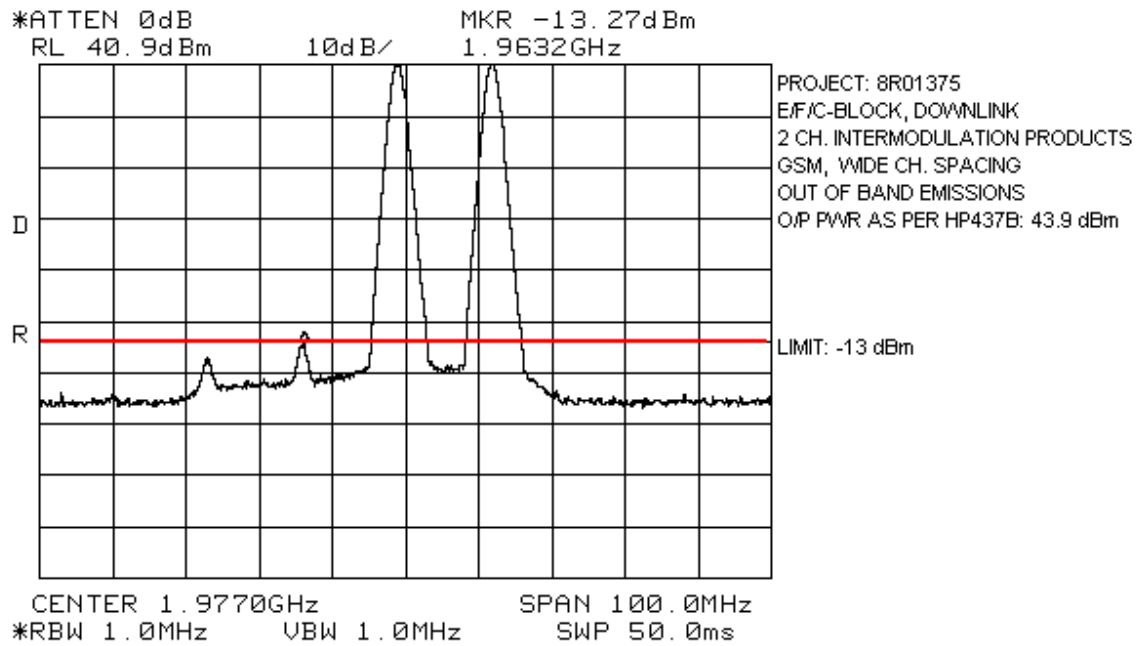
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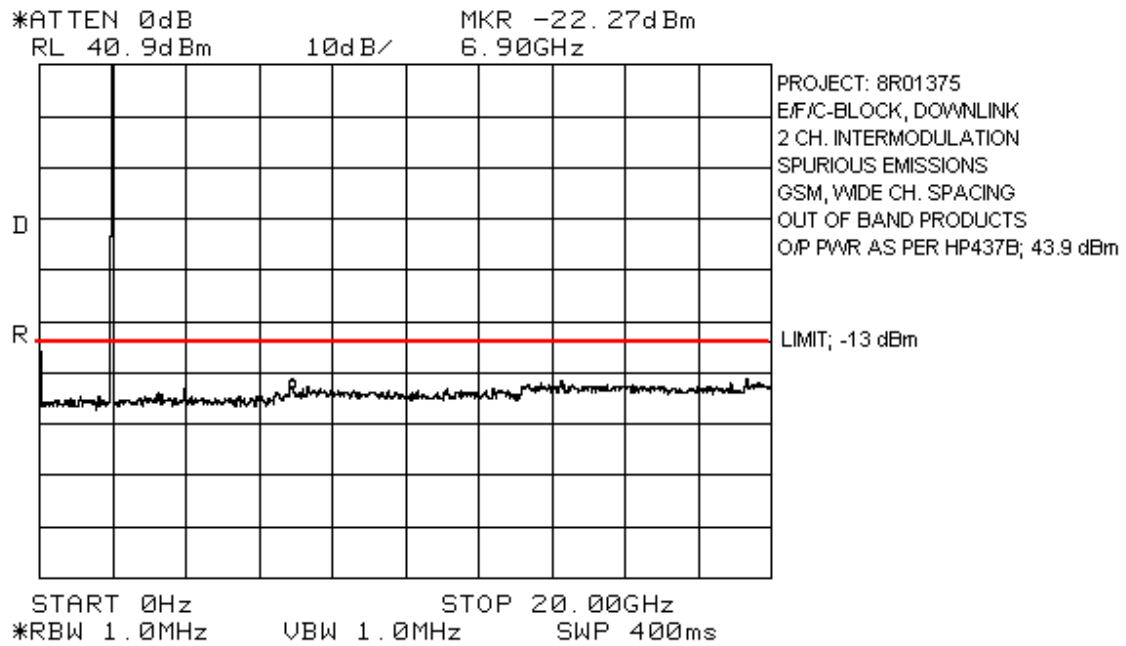
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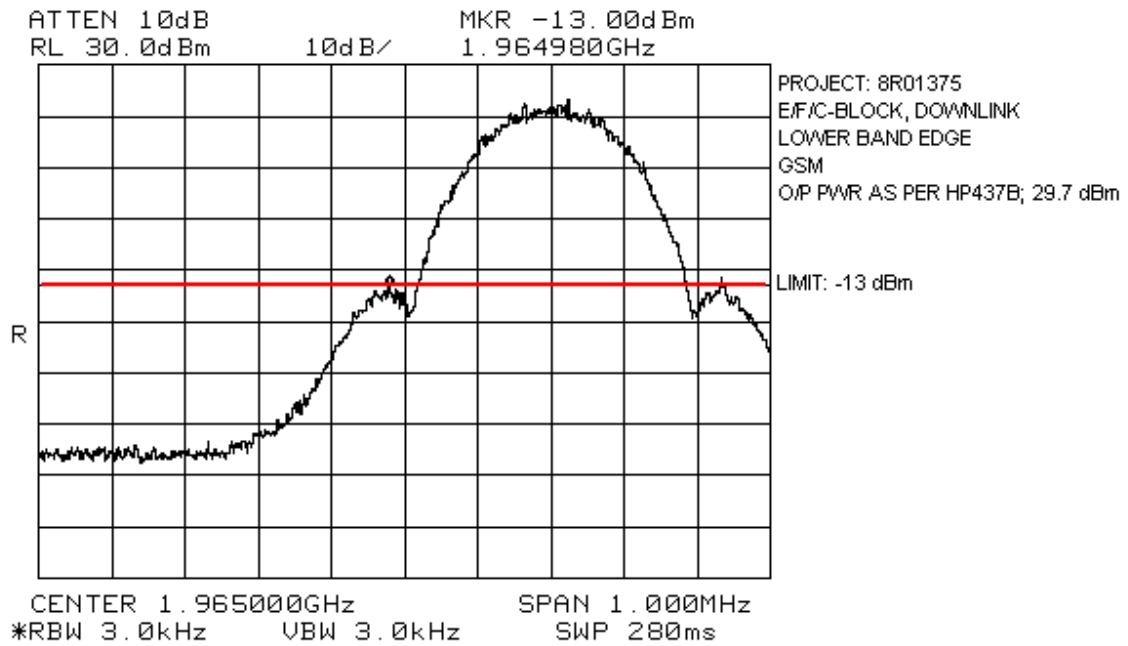
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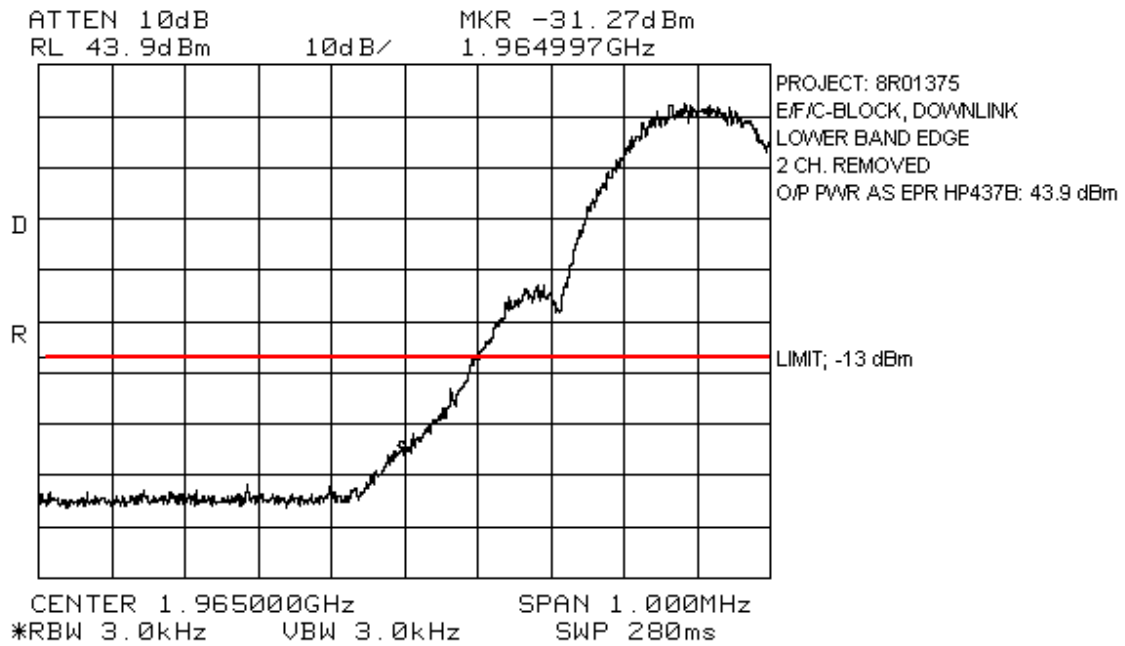
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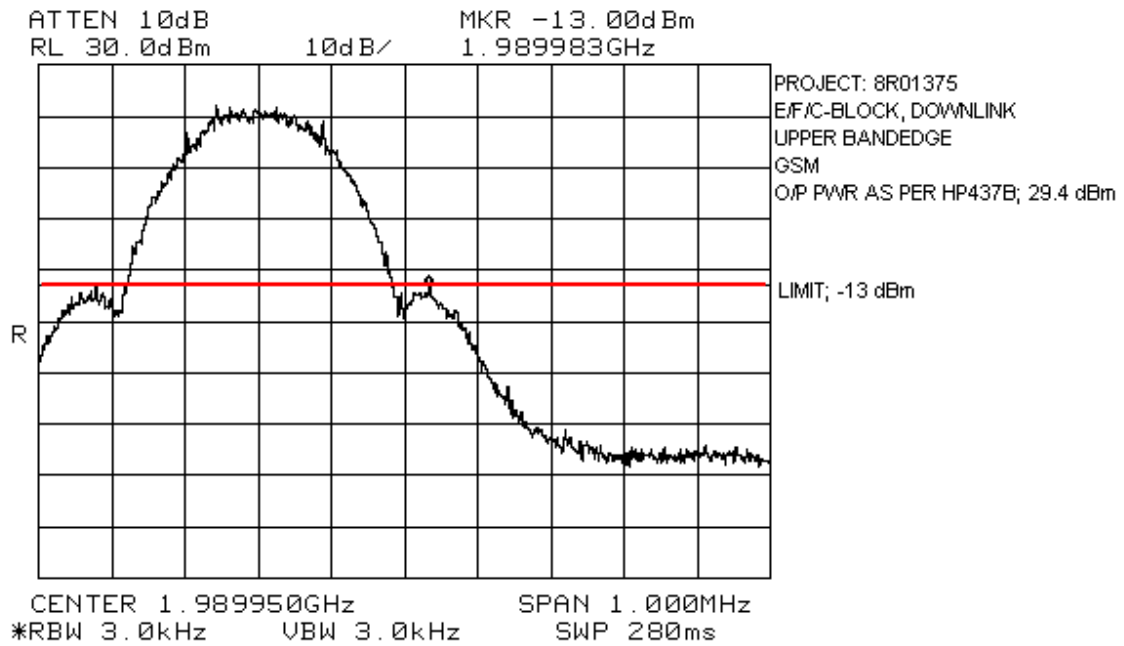
EQUIPMENT: Band Selective Booster Amplifier
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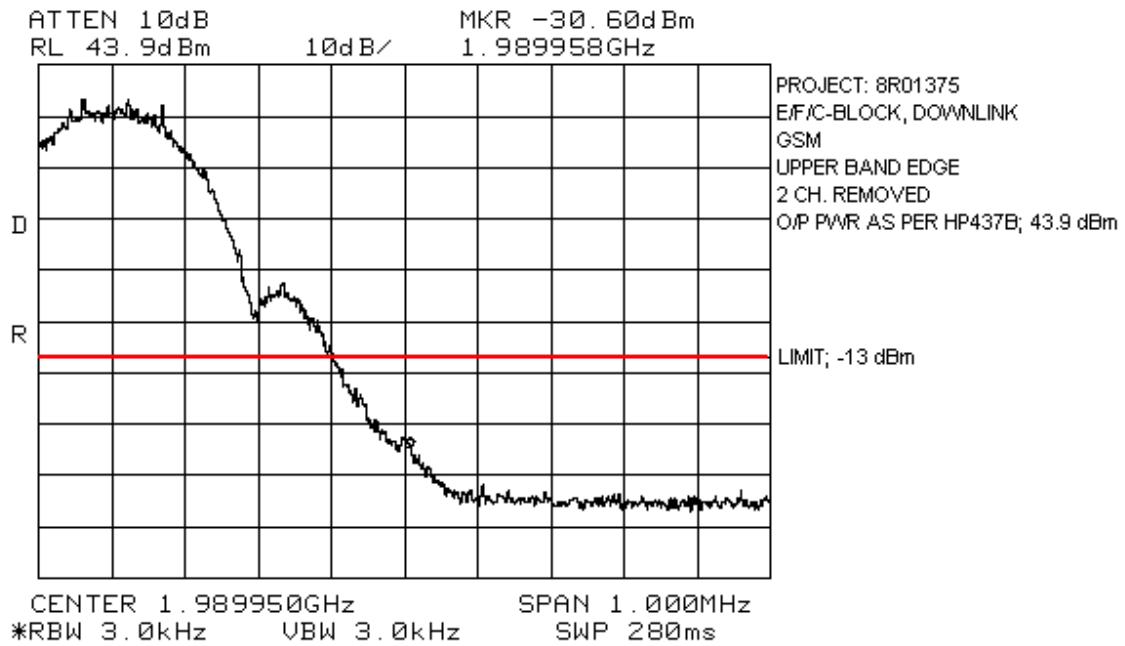
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



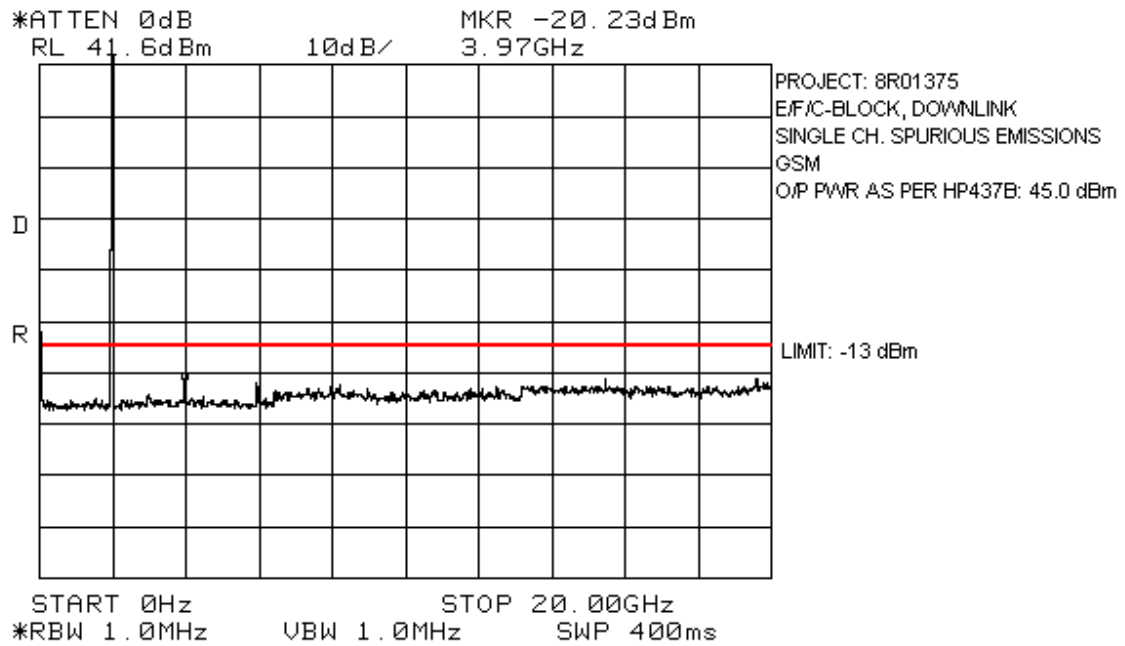
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



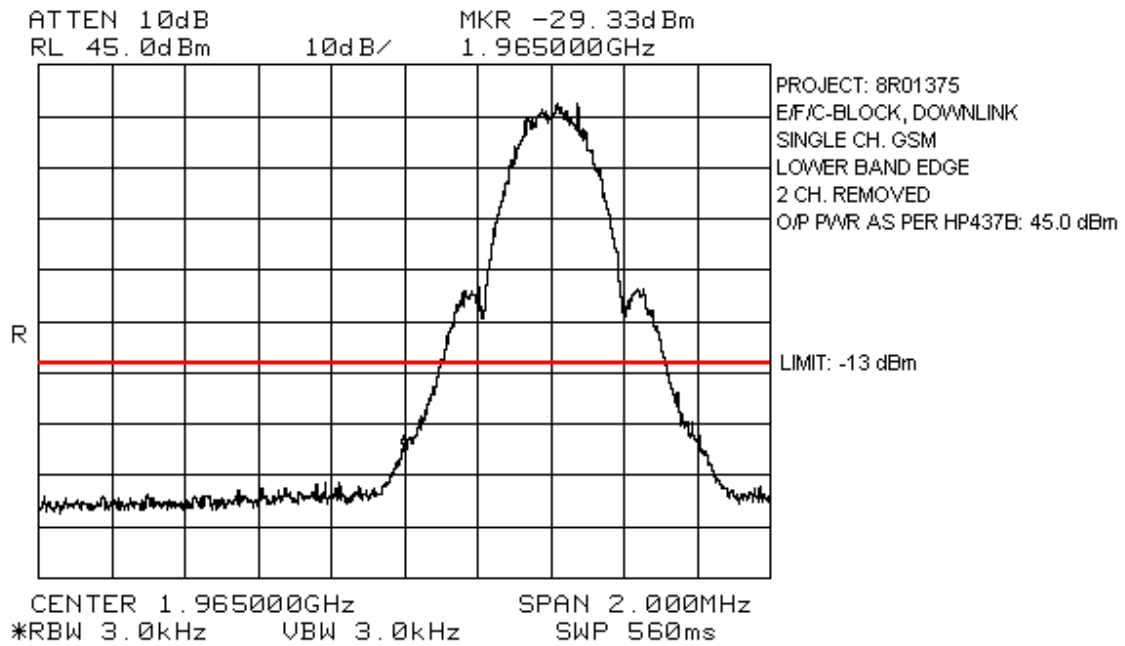
EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS



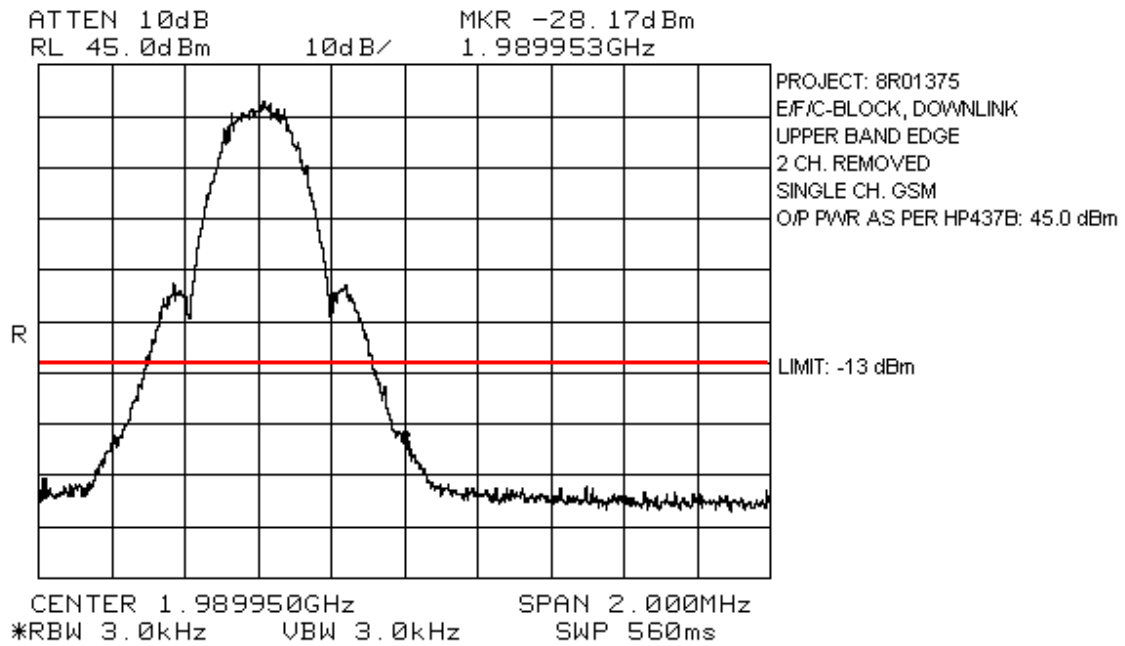
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FCC ID: BCR-MRB-PCS



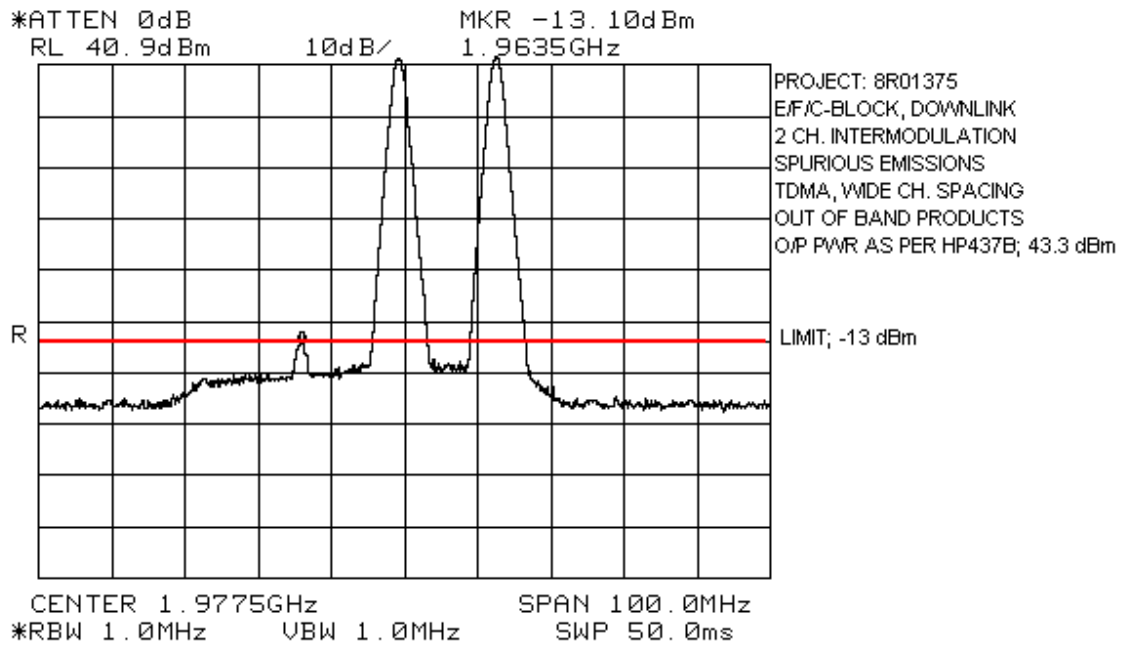
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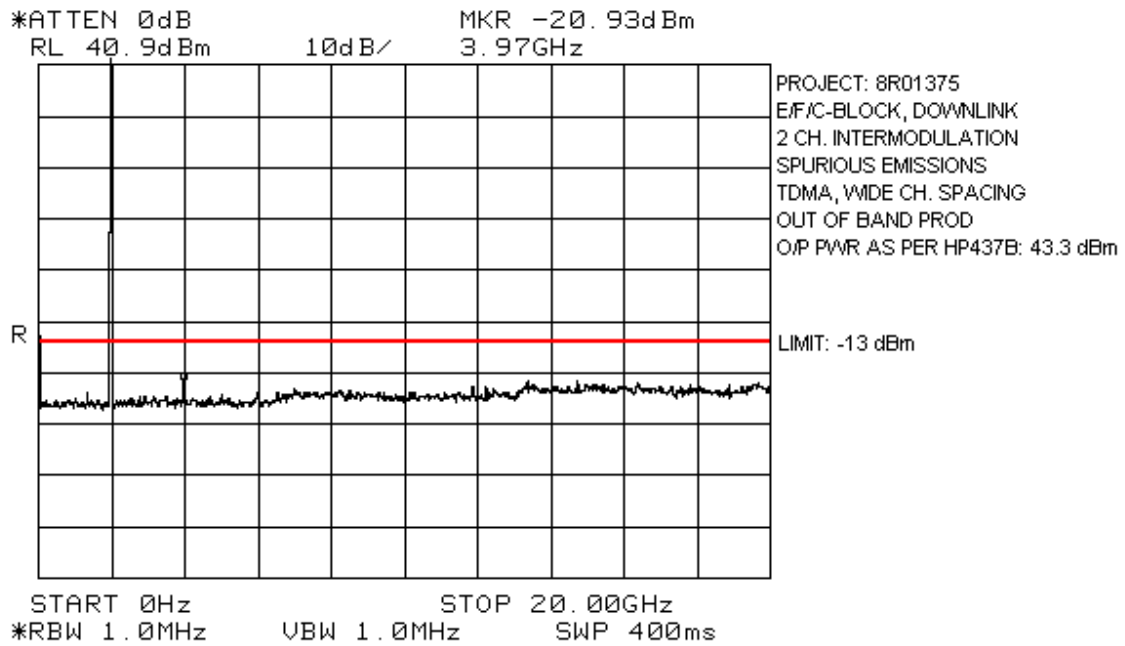
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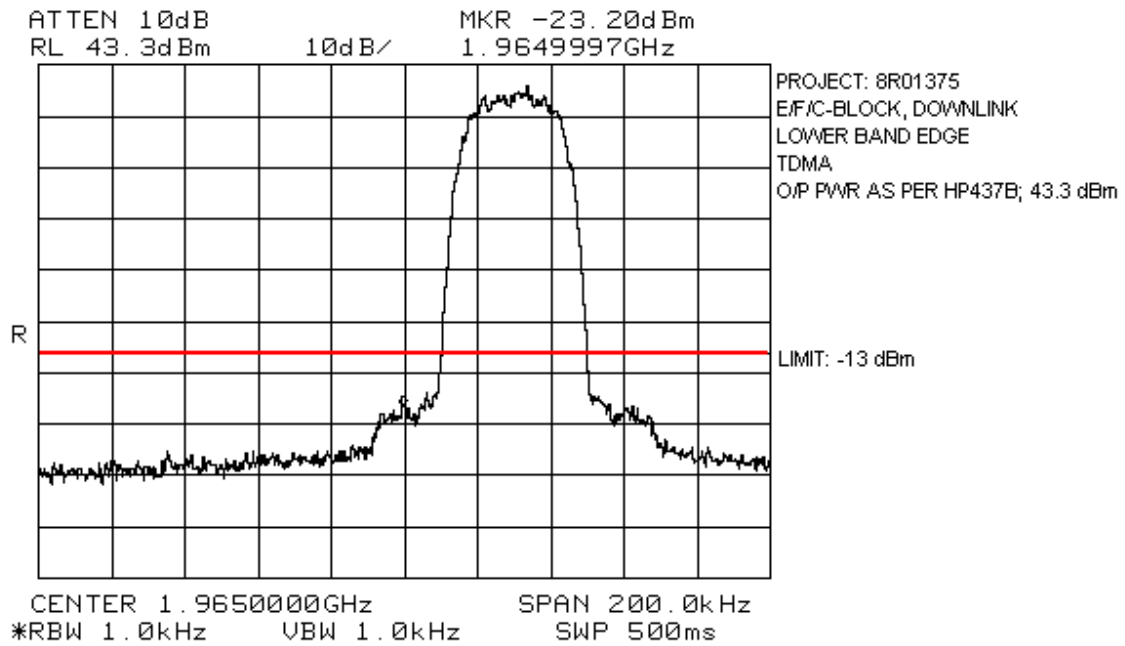
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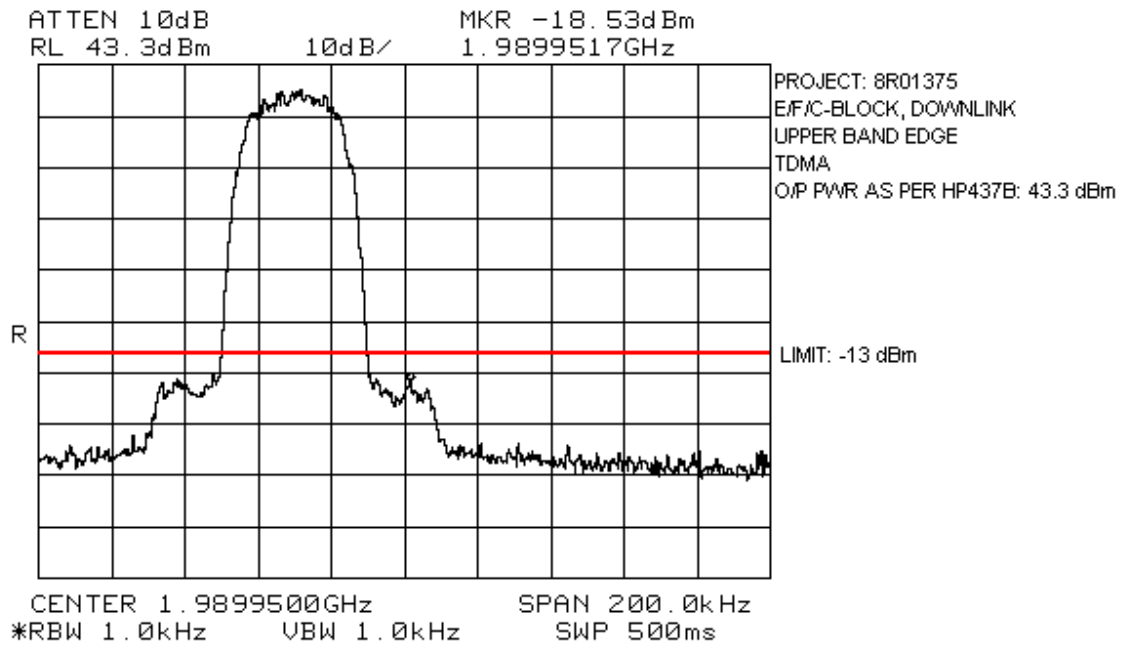
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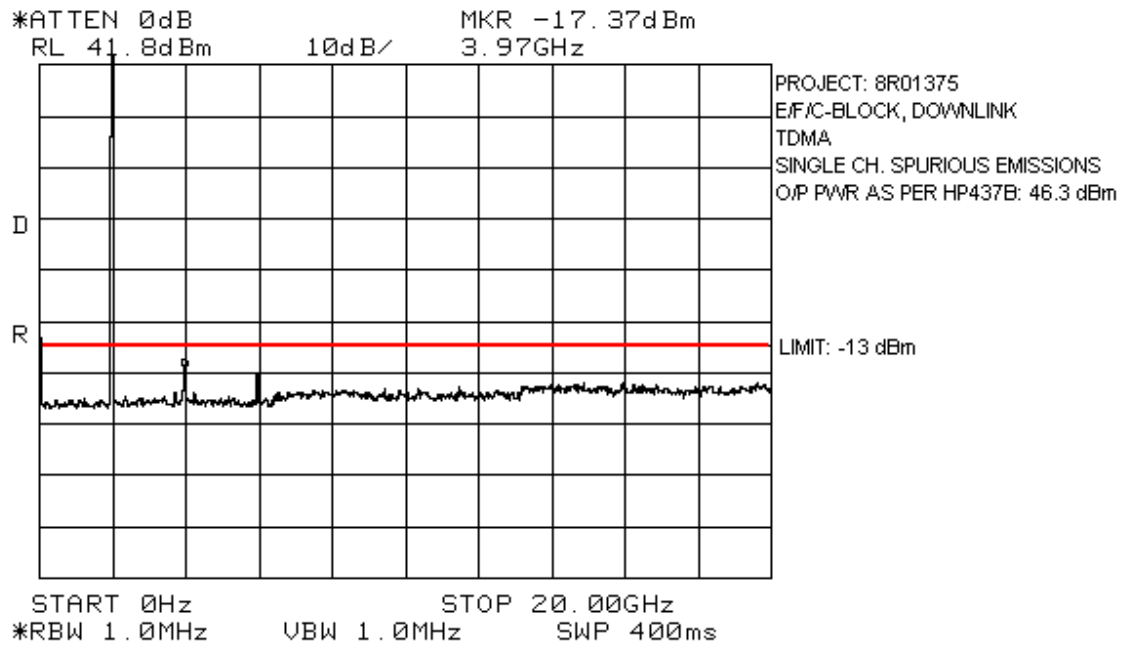
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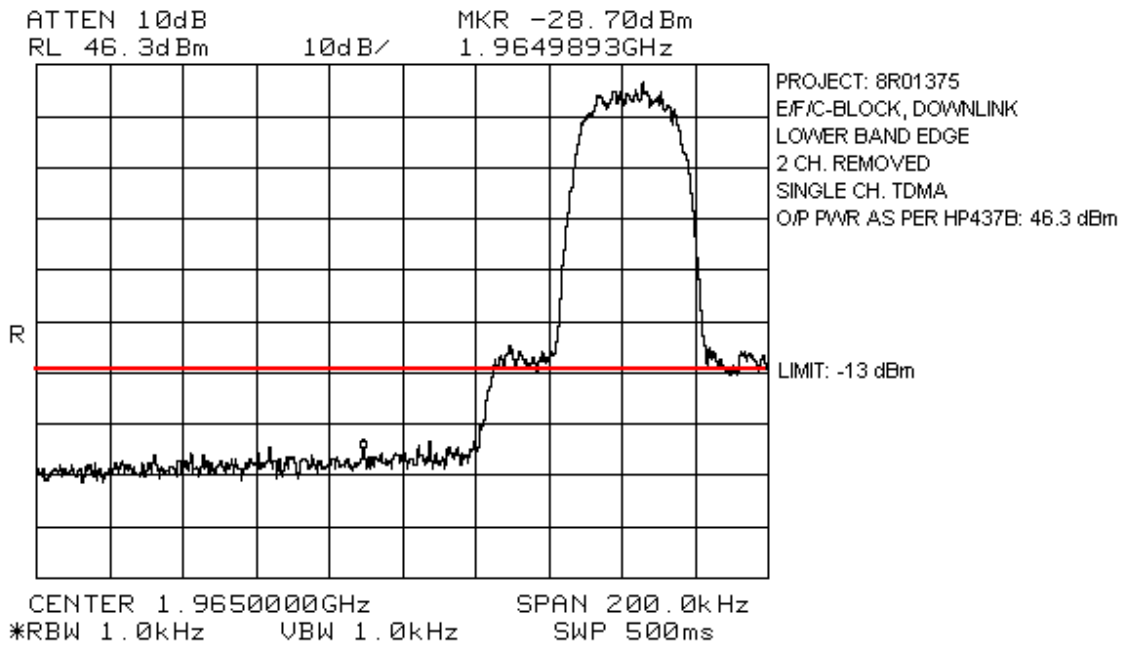
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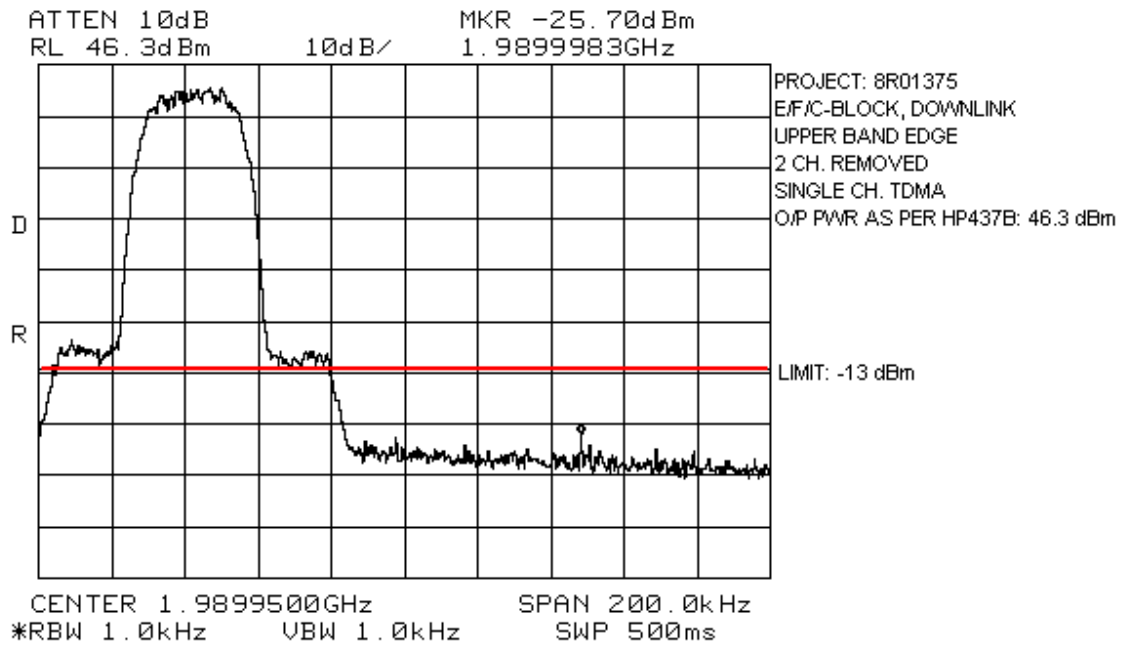
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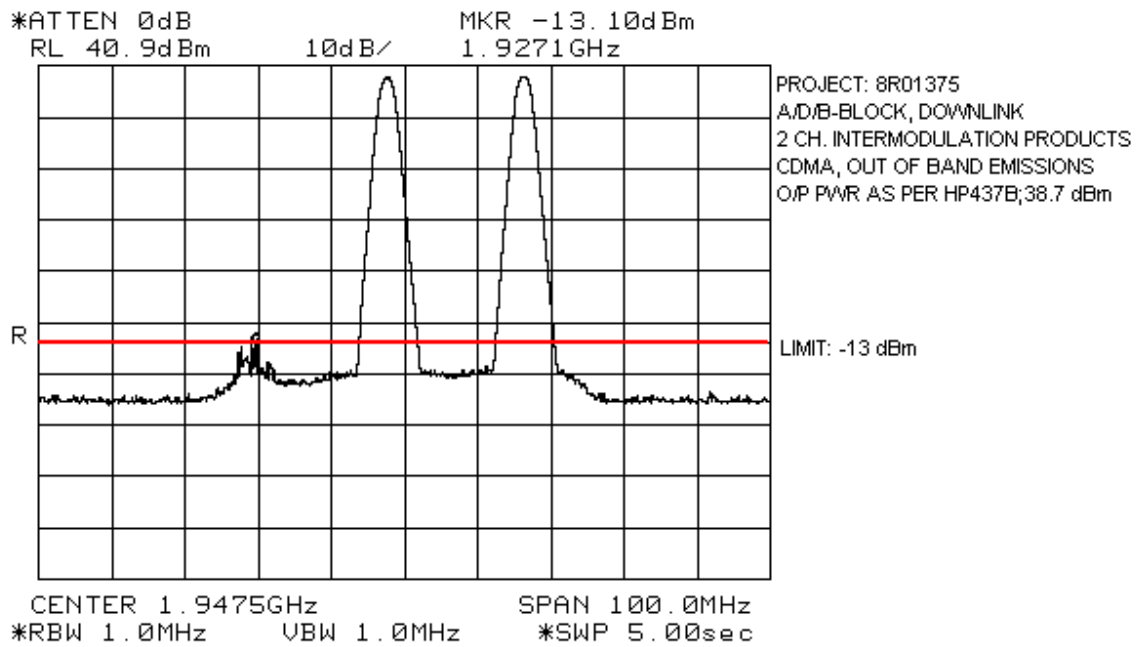


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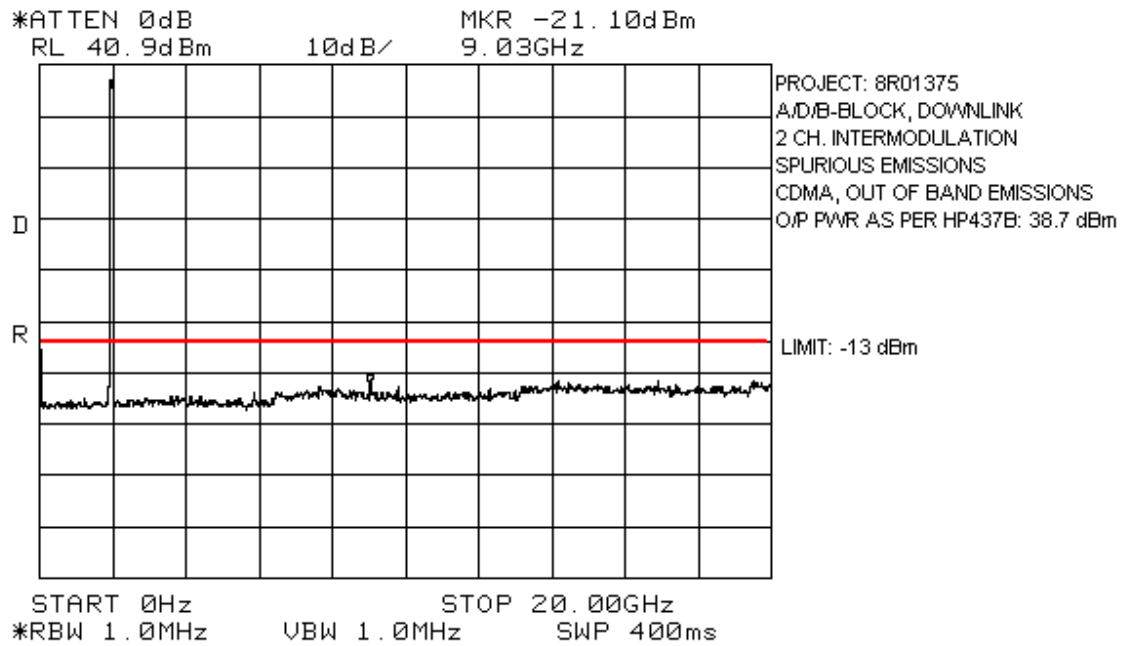


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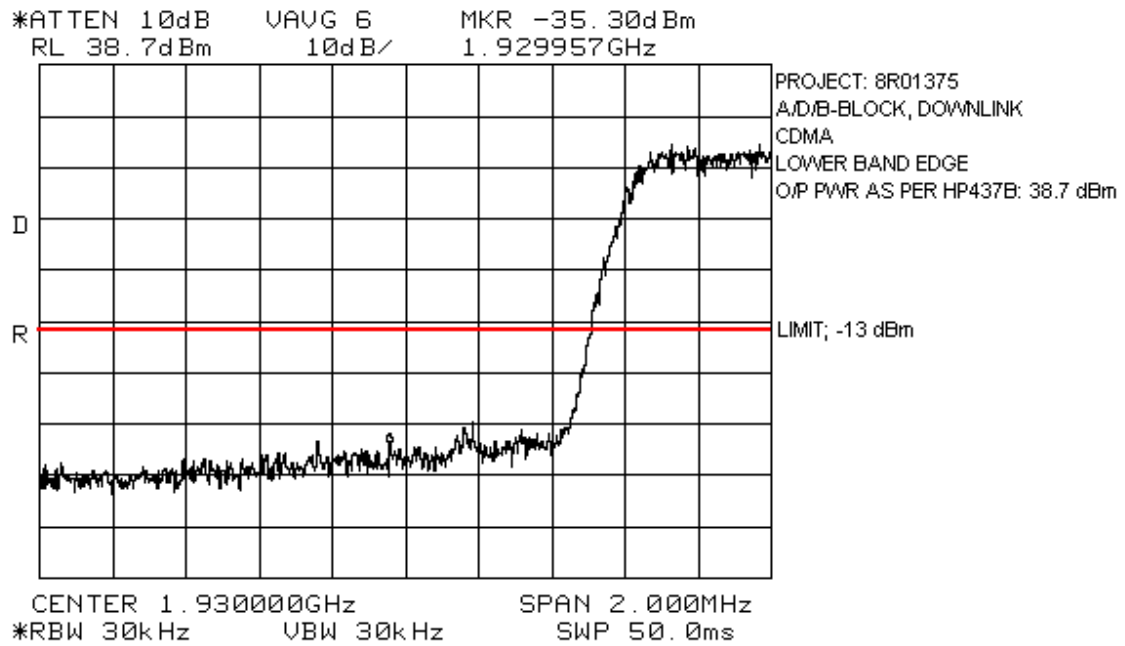
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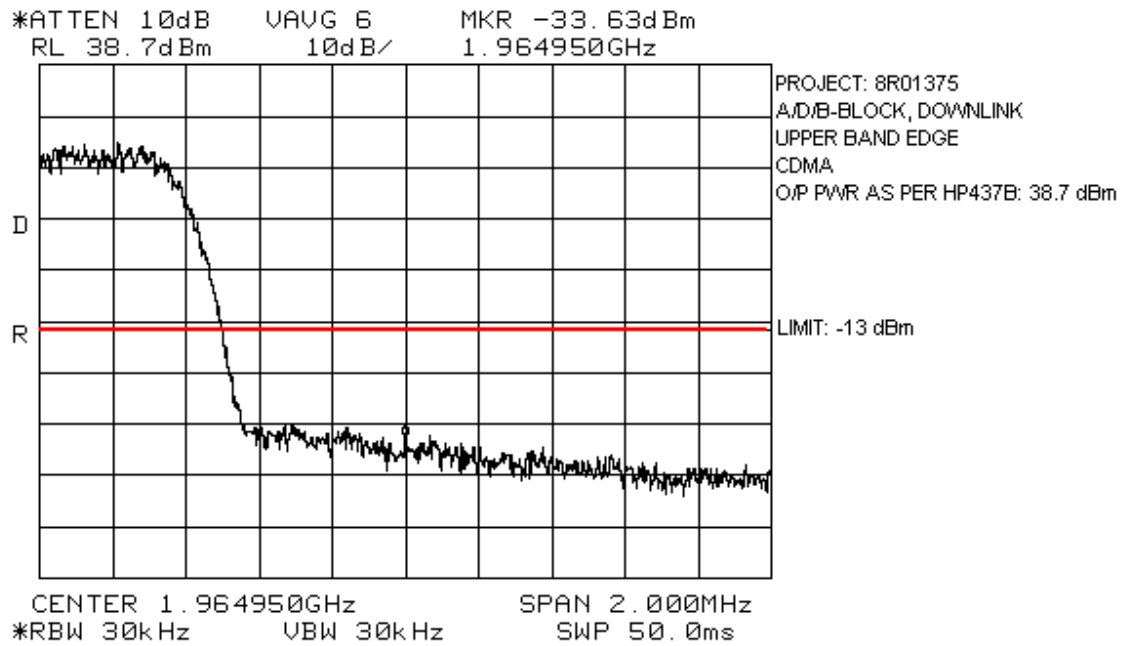
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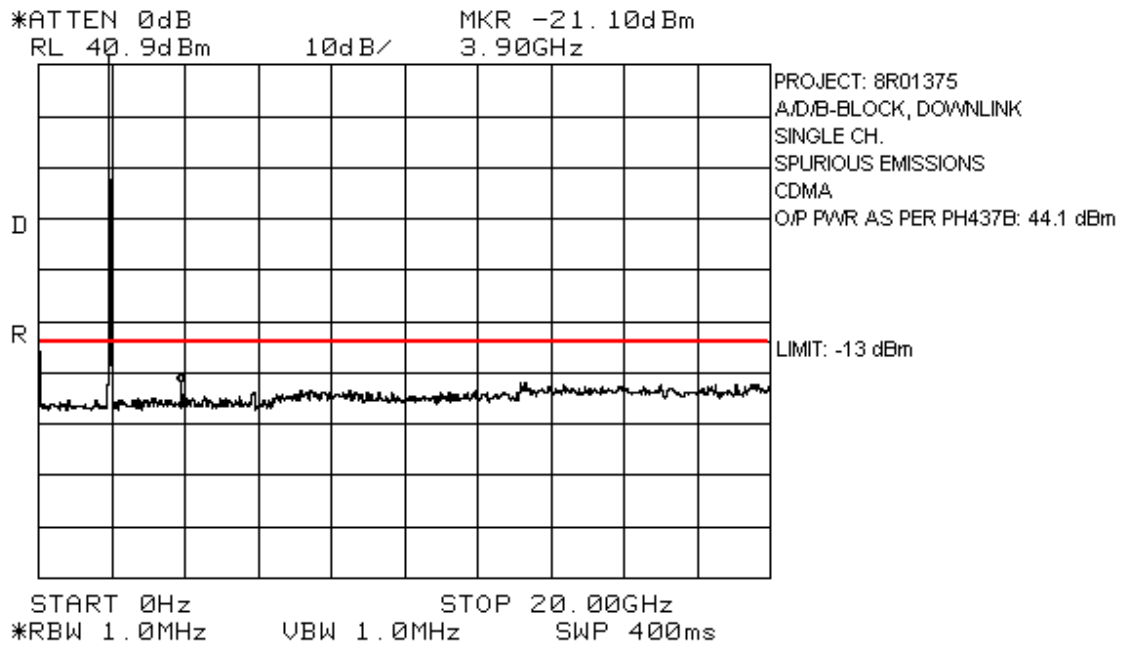
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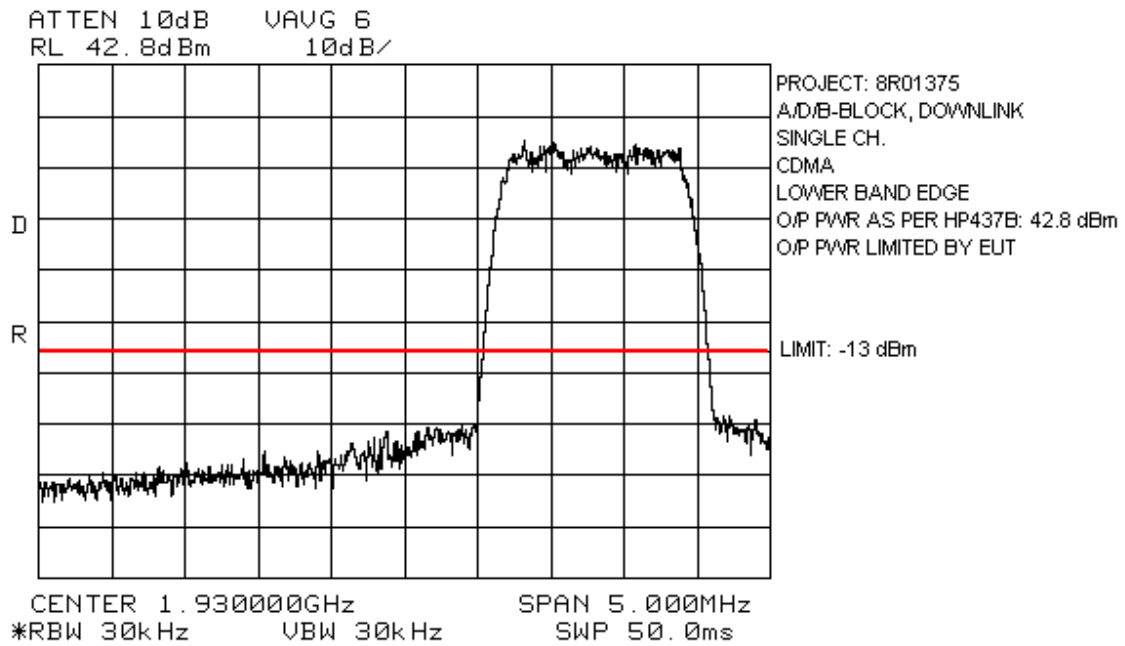
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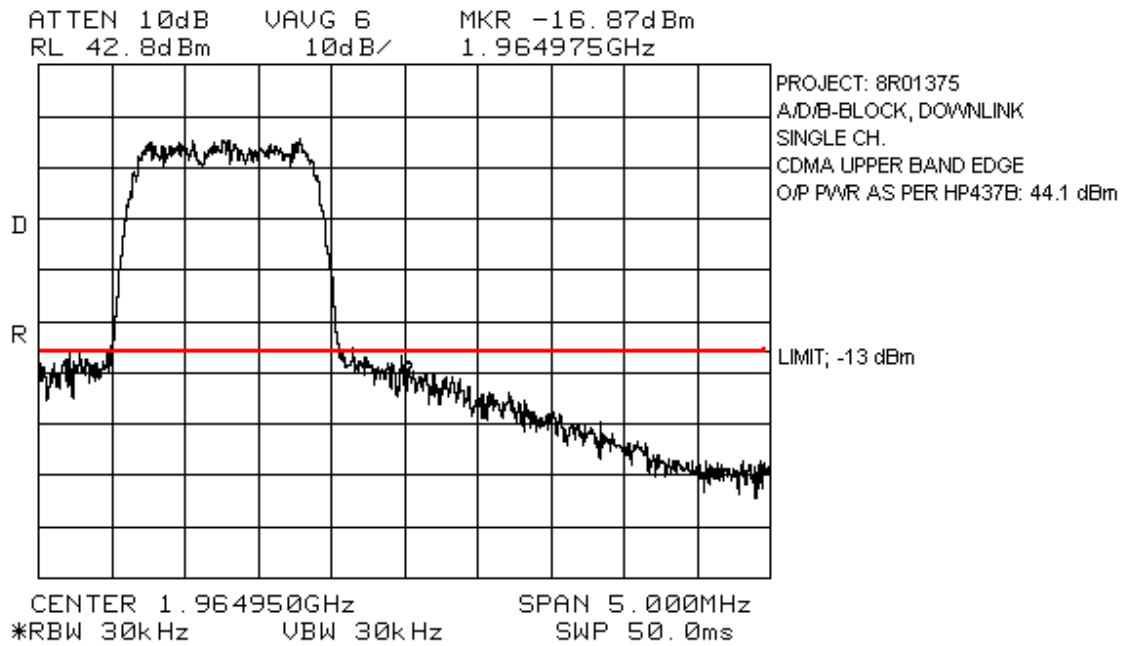
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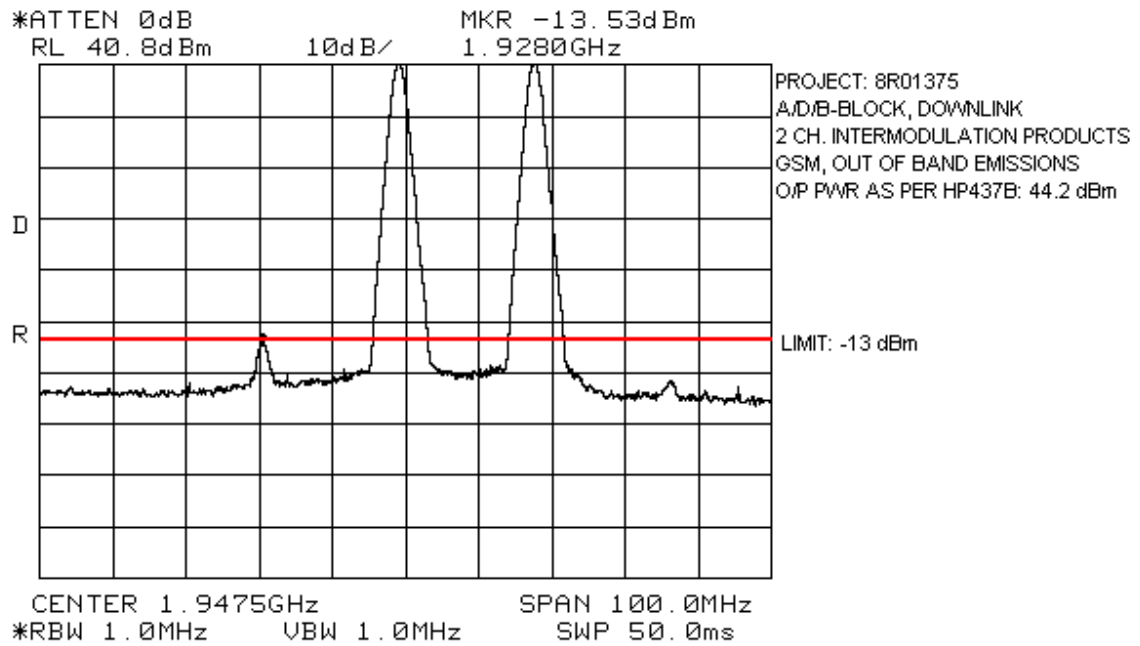
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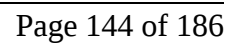
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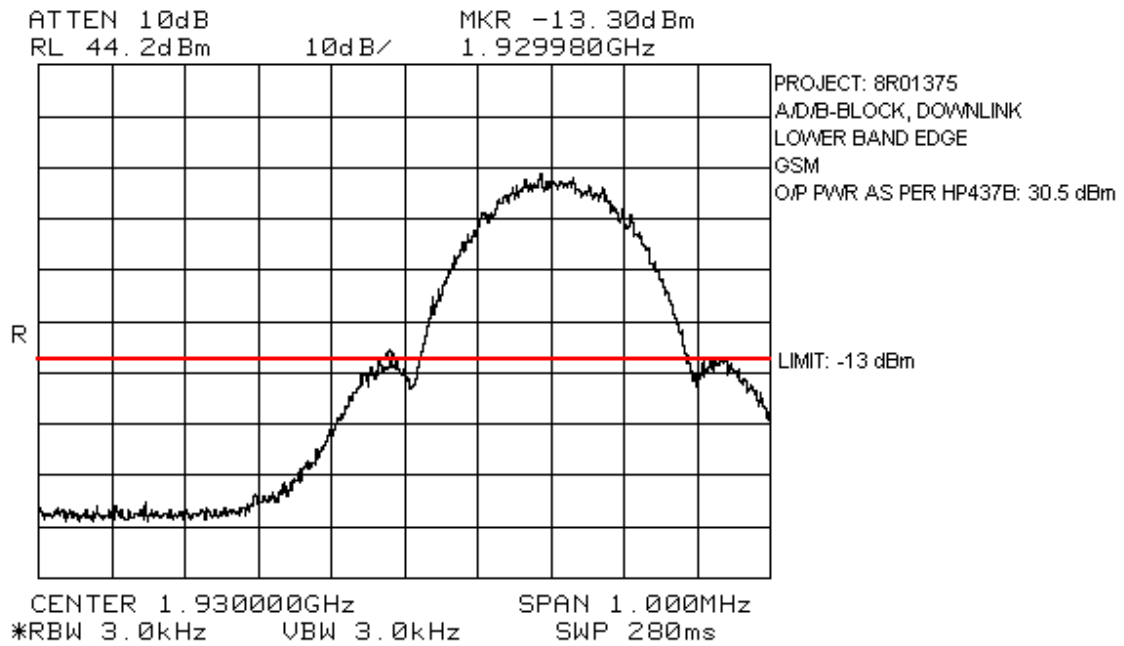
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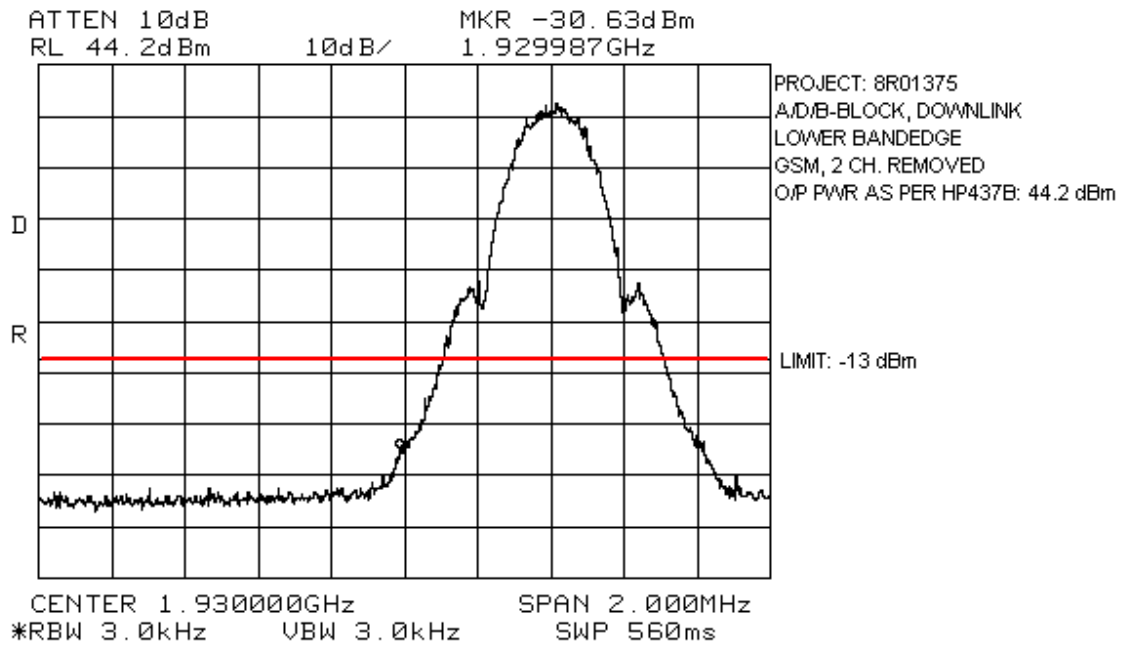
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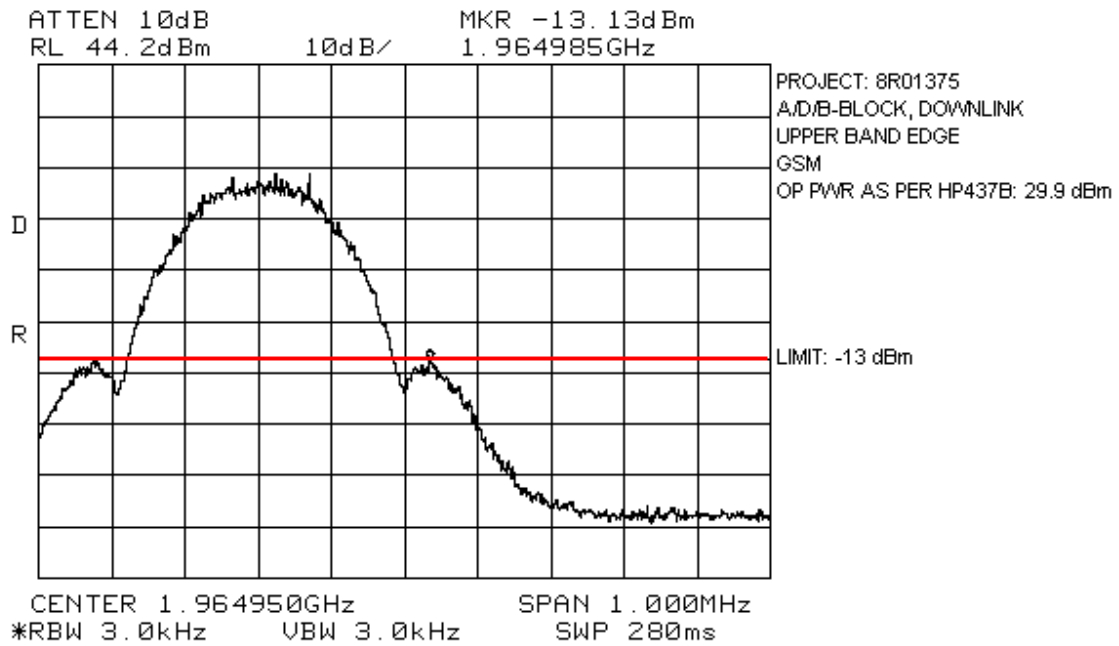
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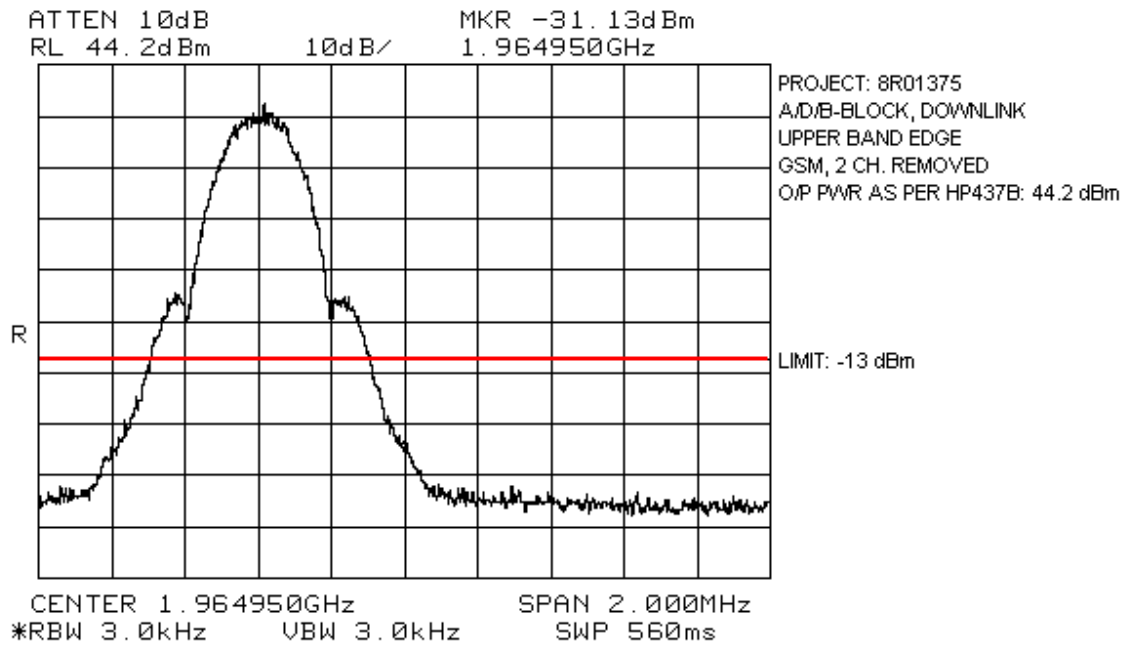
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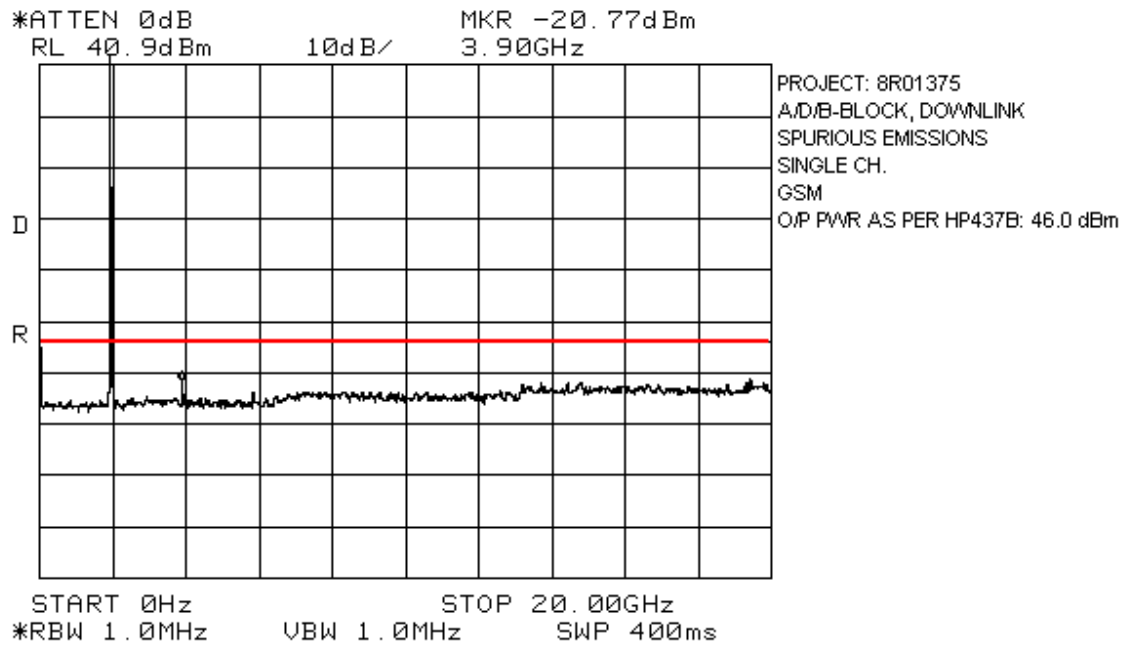
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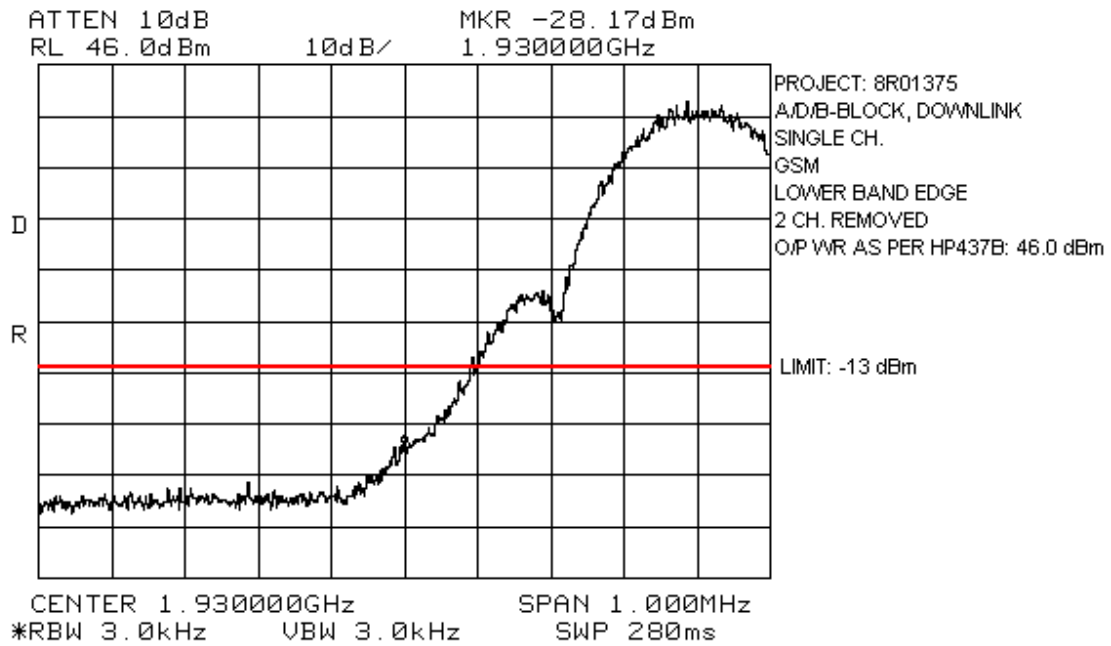
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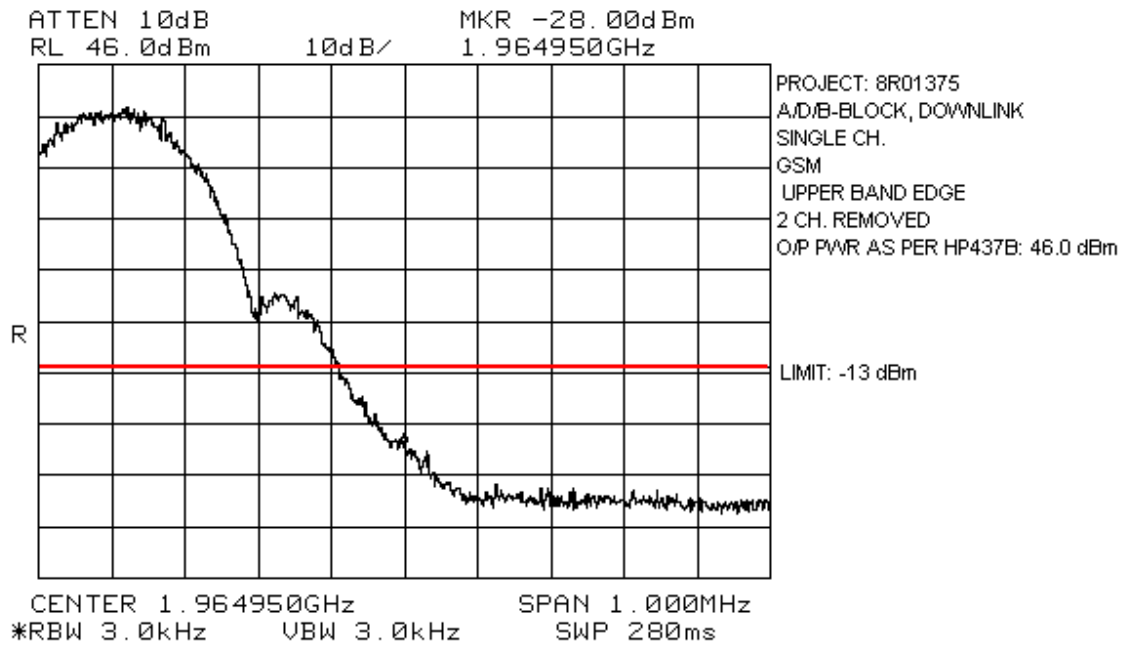
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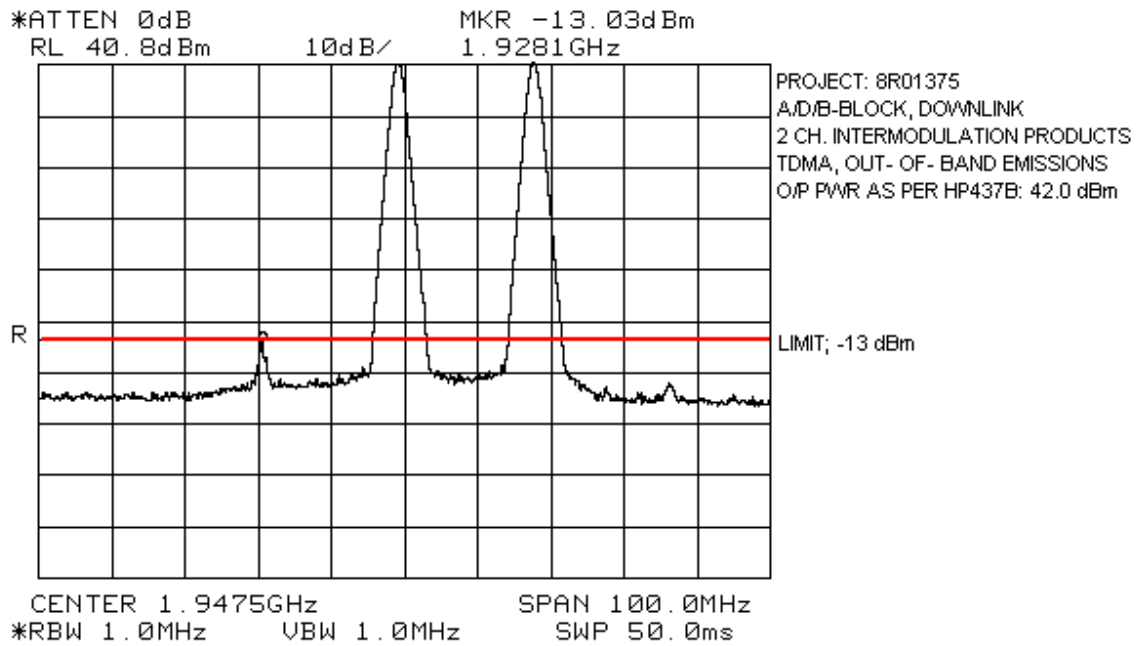
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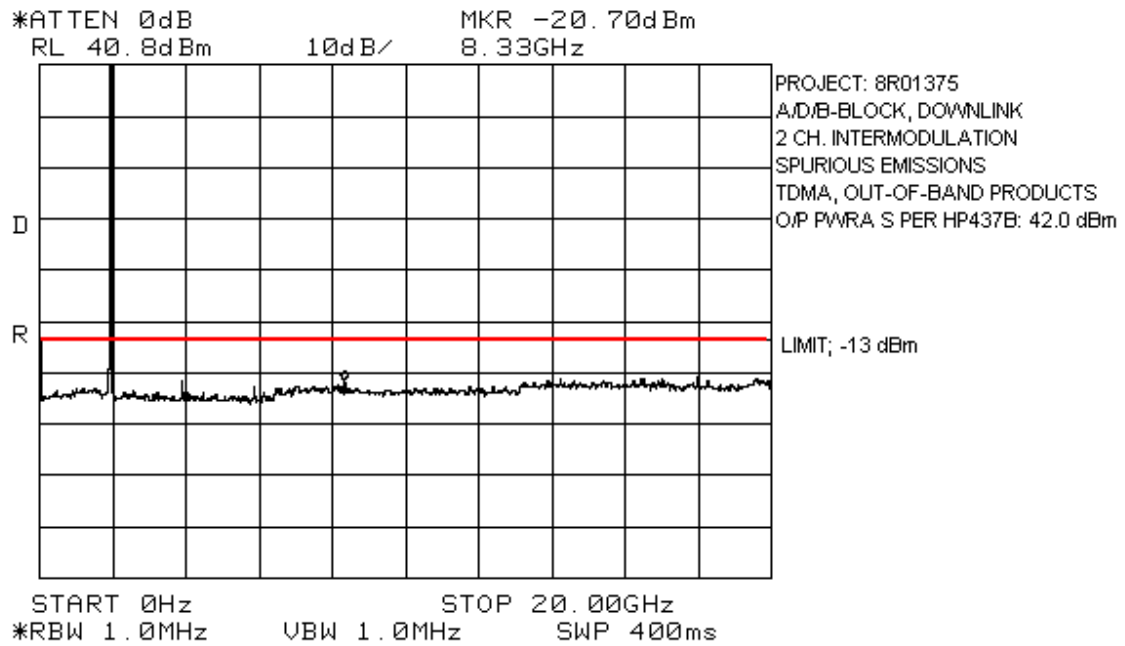
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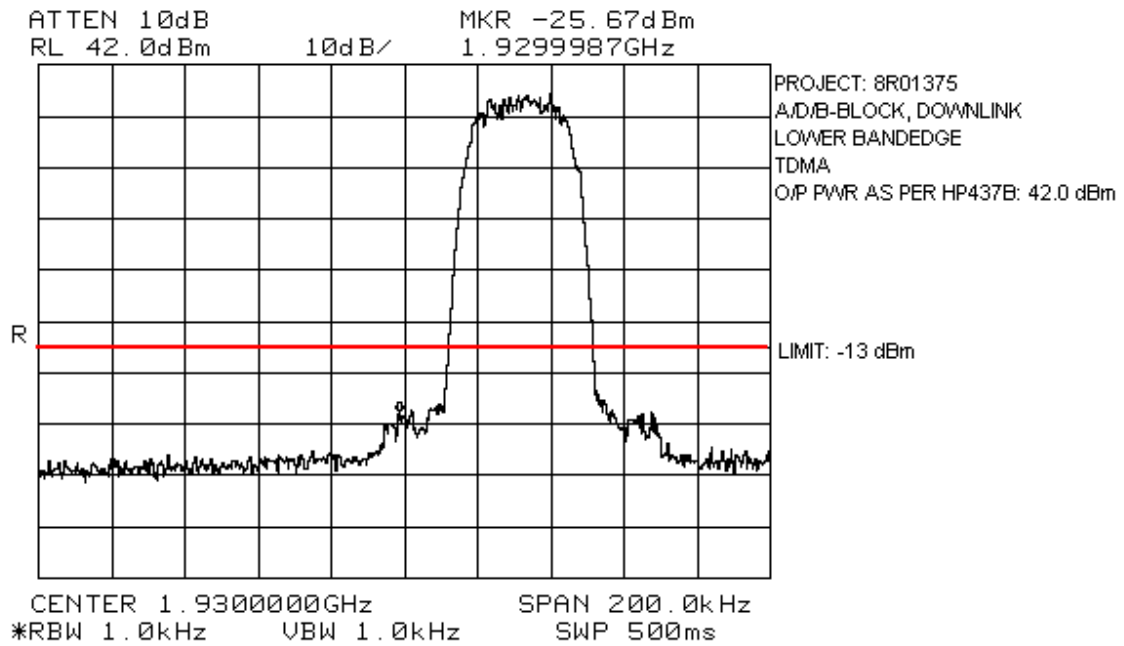
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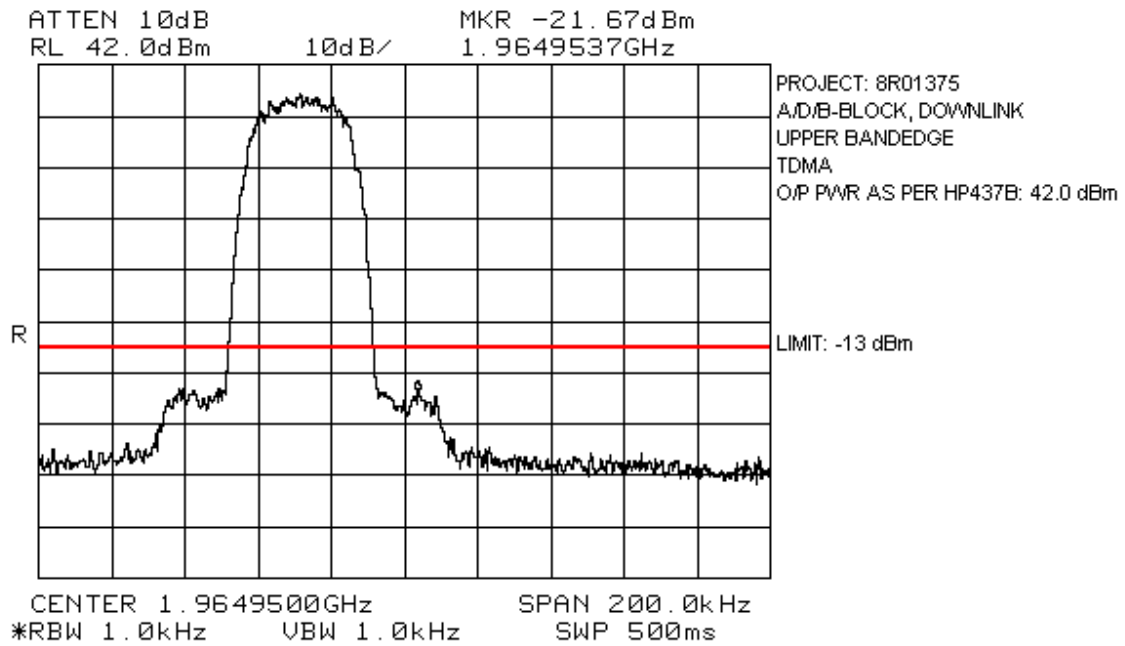
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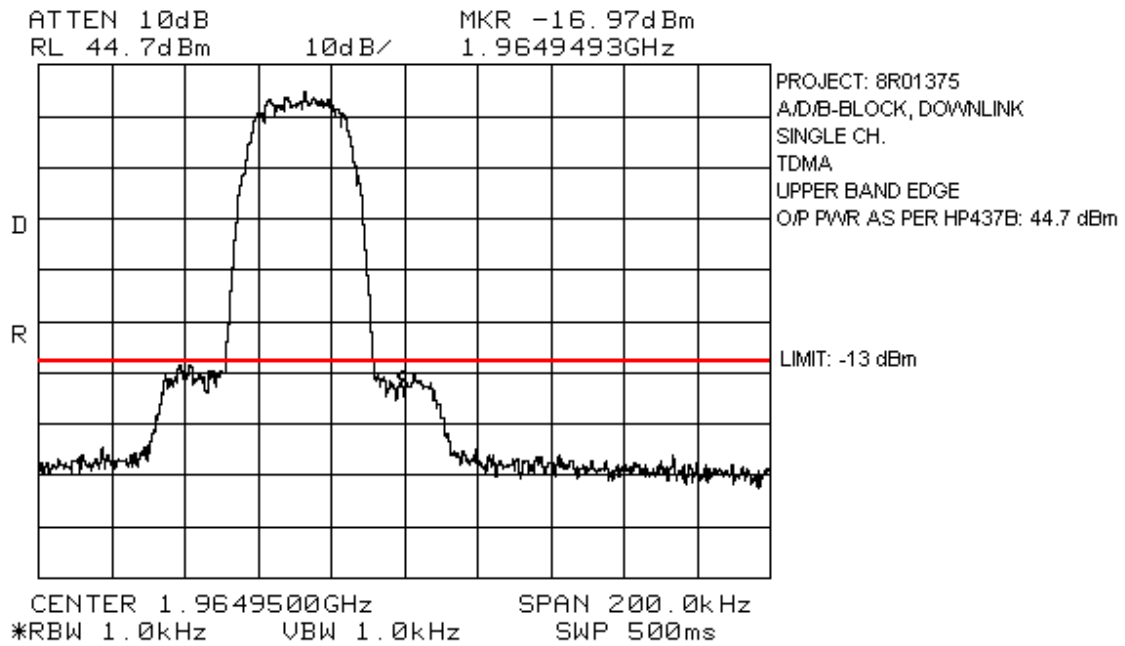
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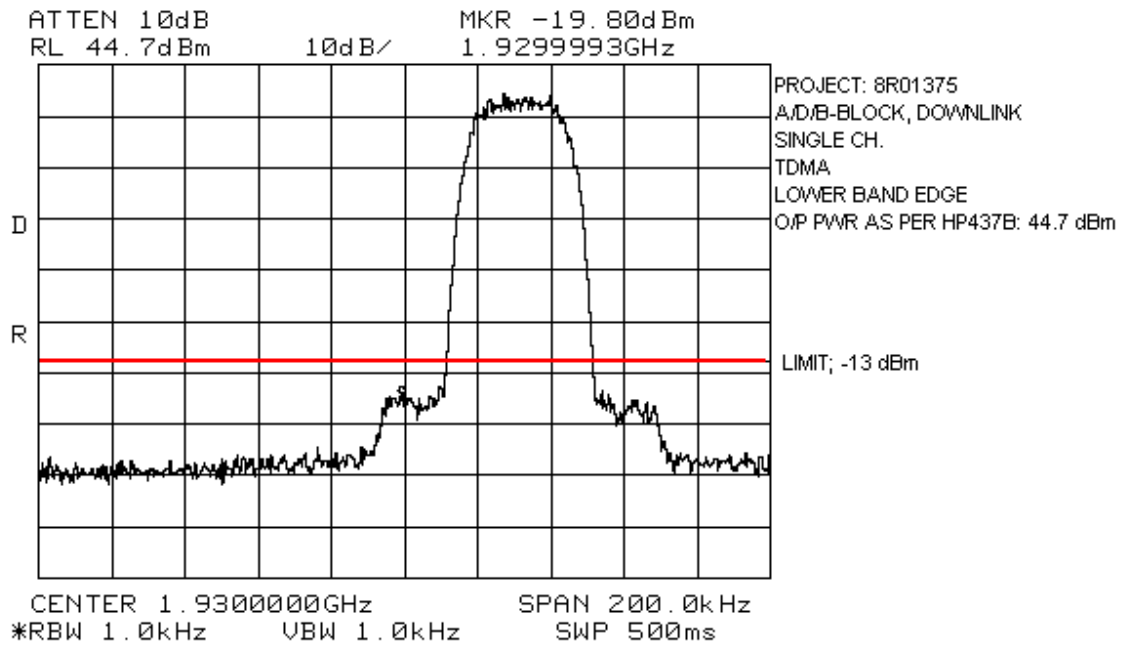
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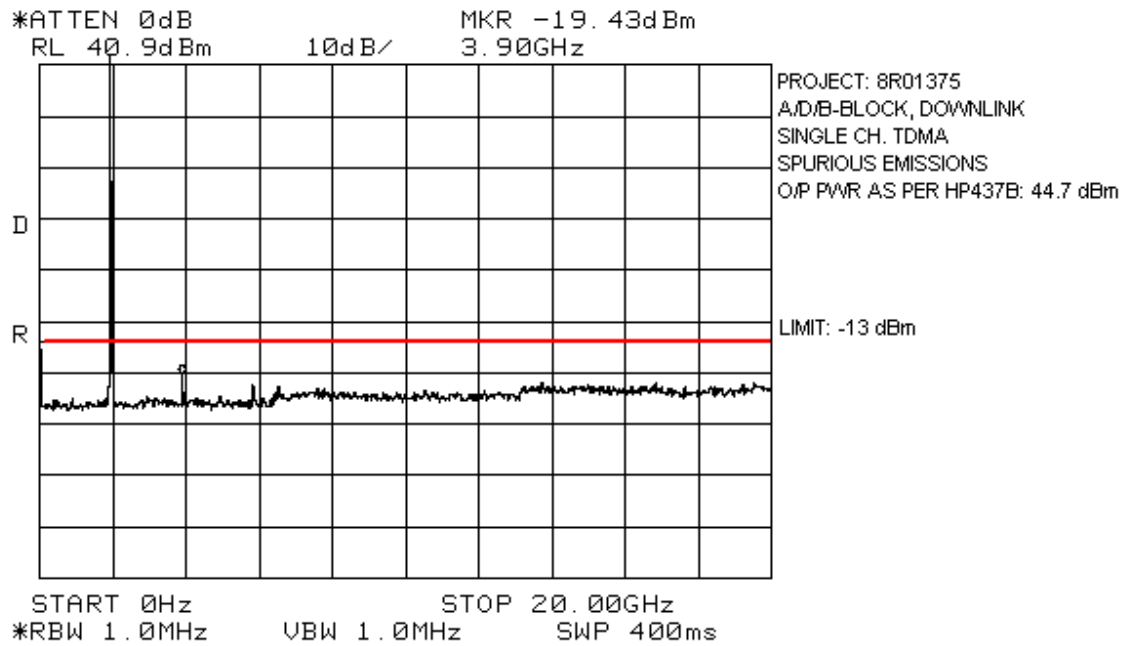
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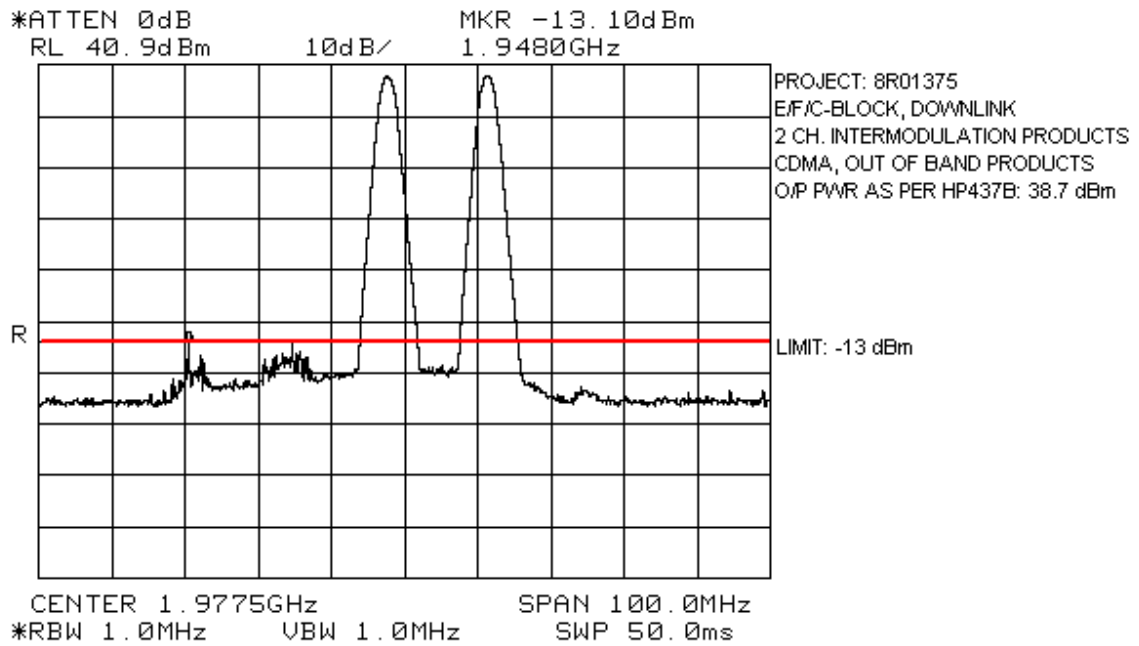
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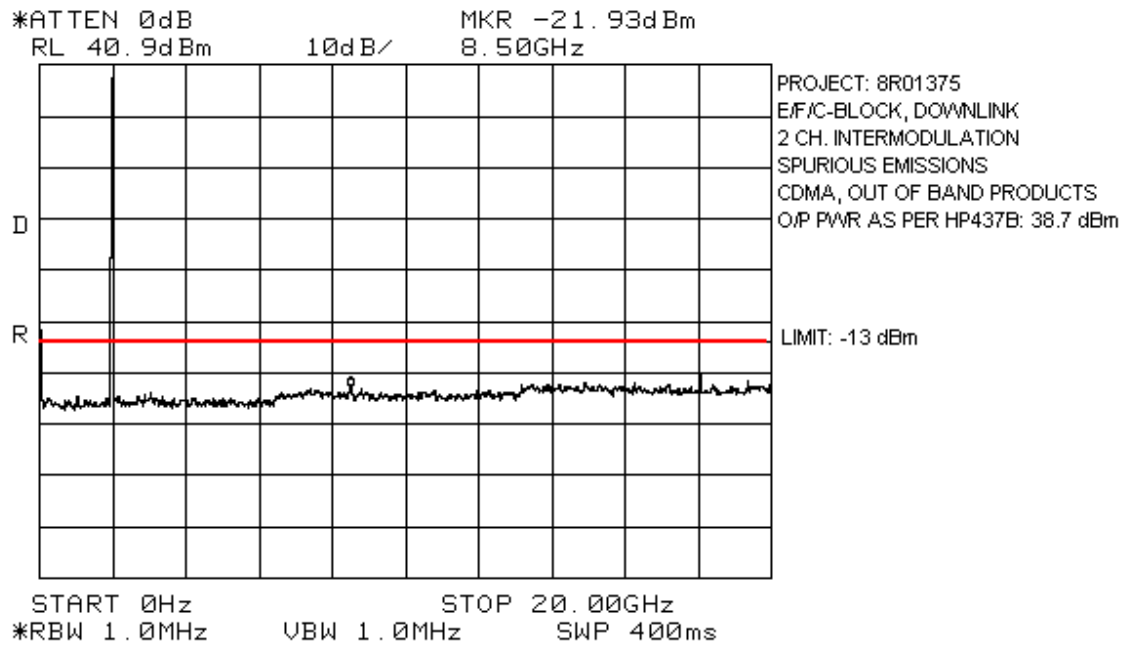
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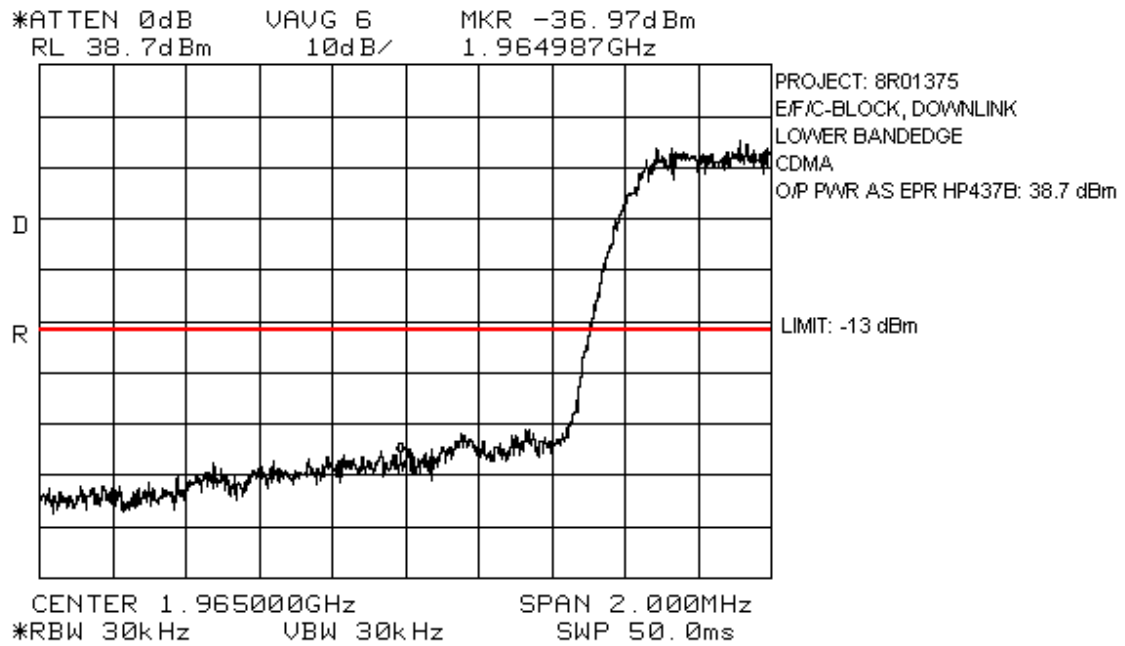
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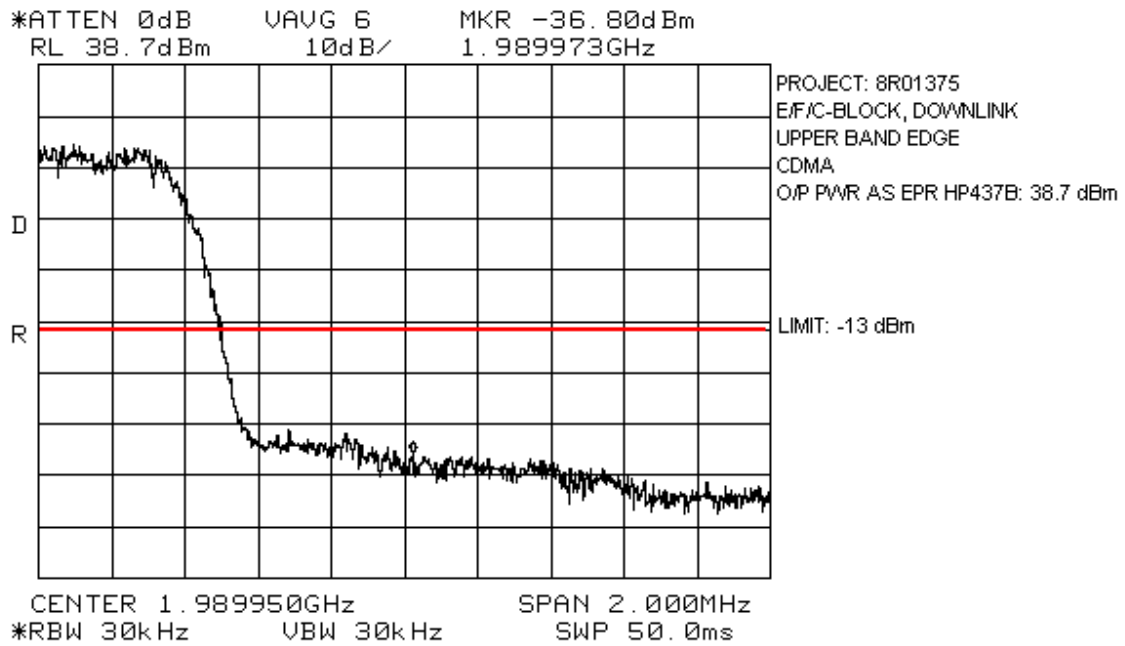
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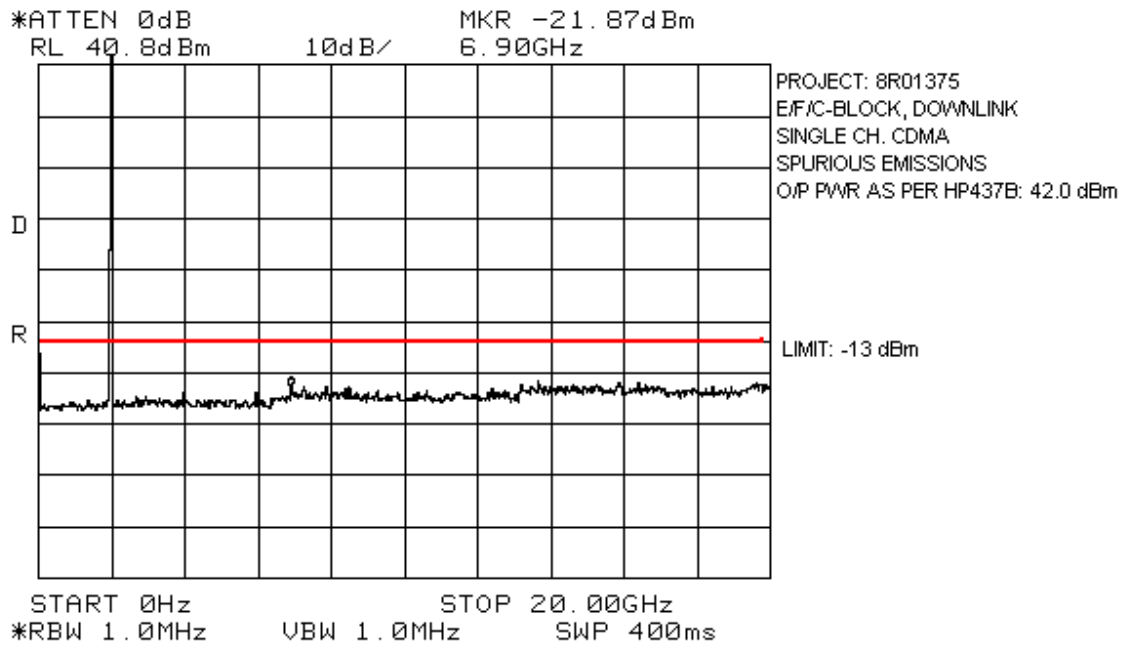
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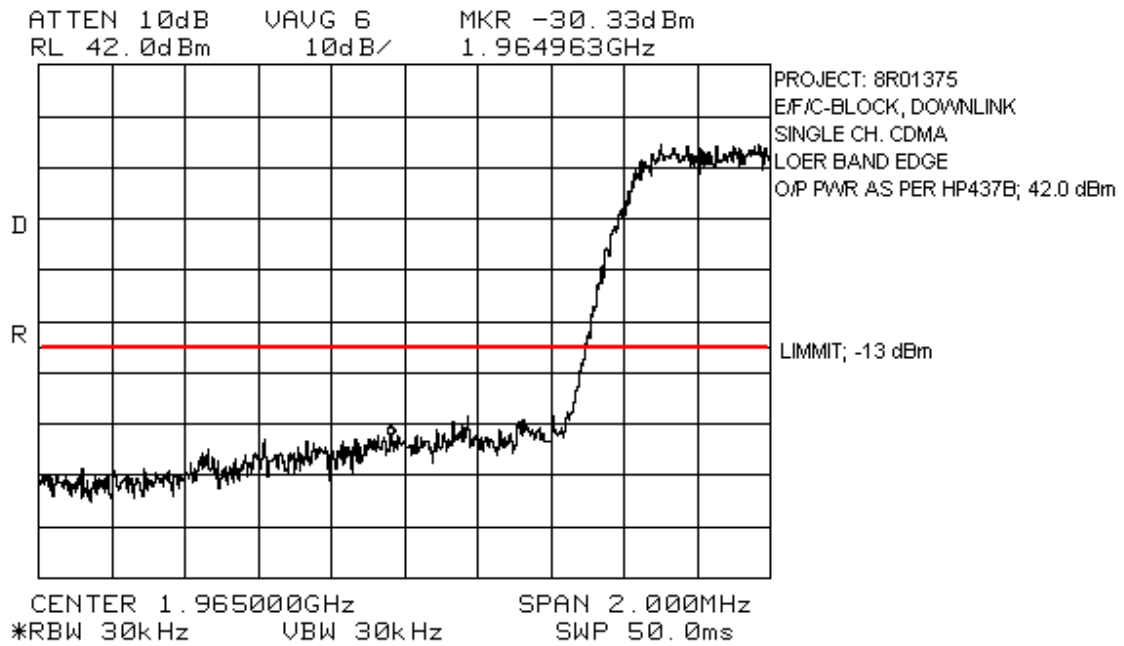
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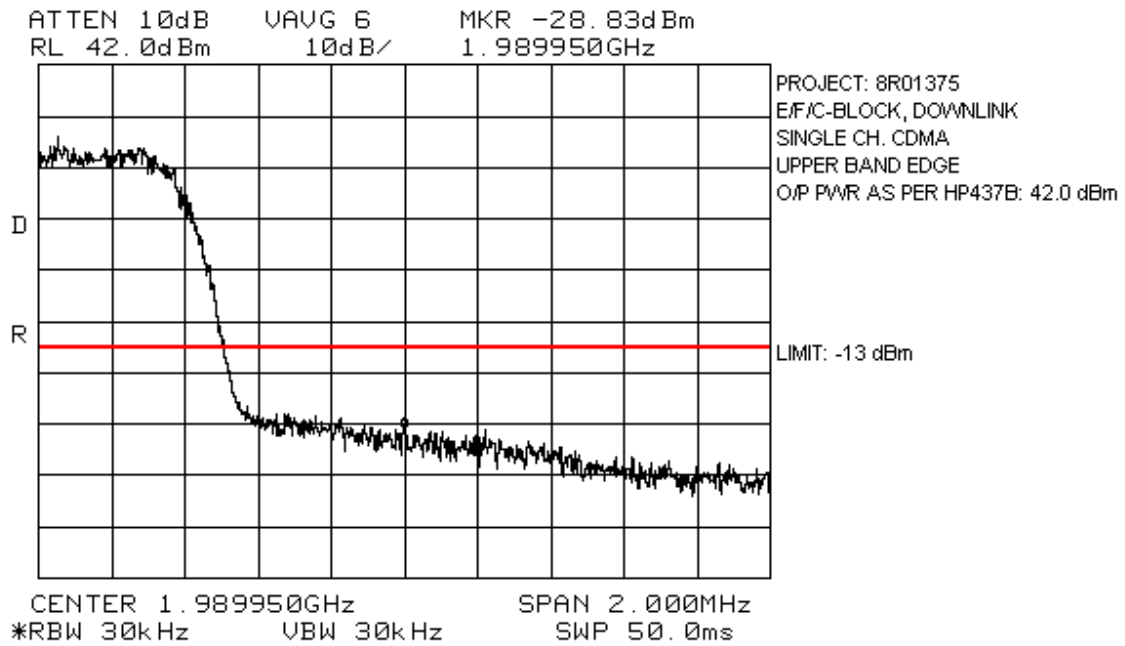
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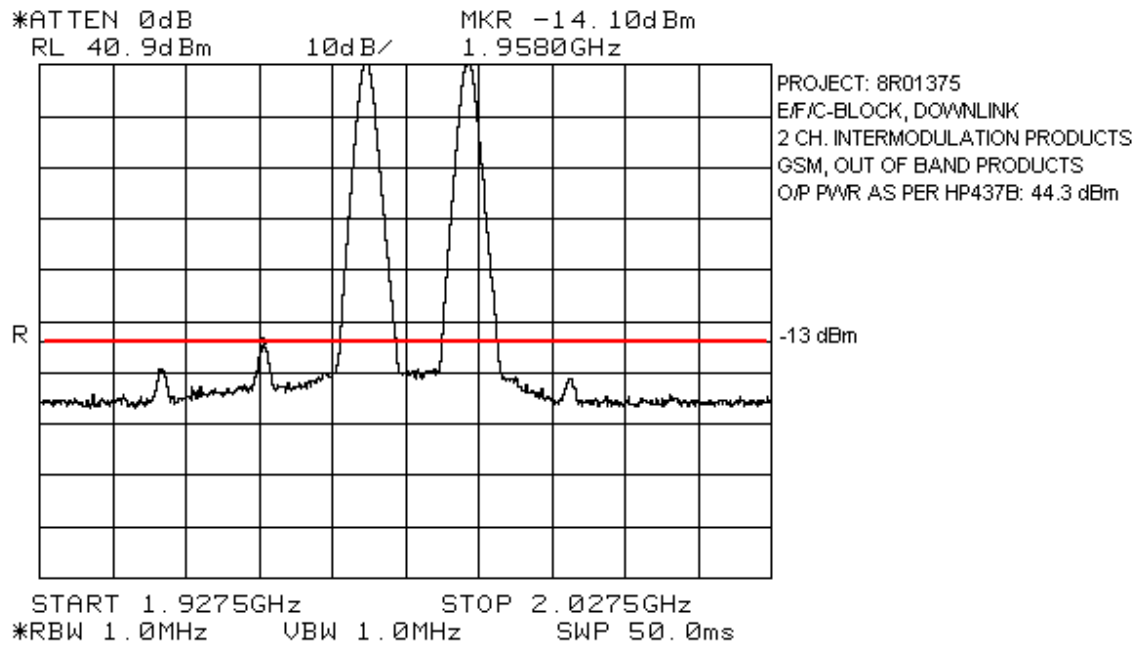
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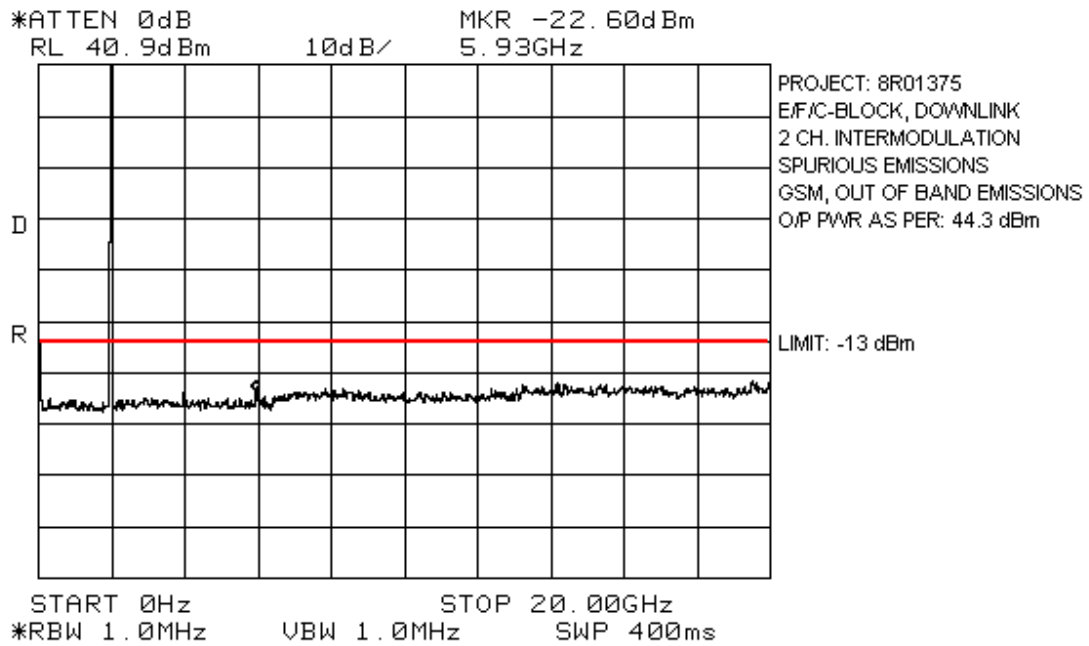
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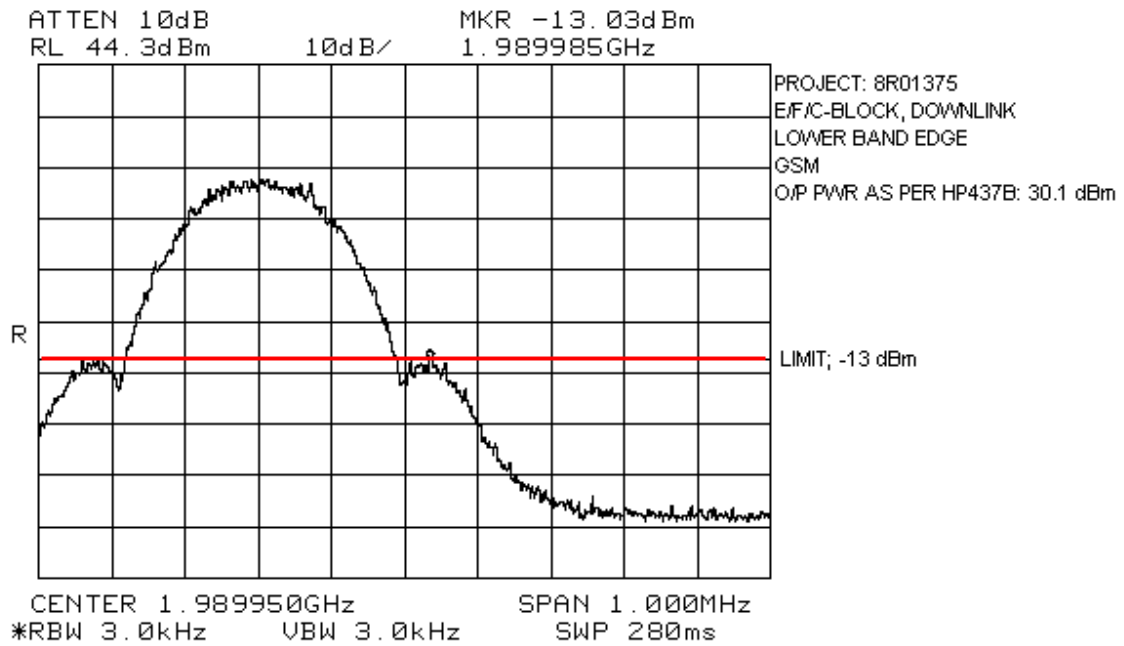
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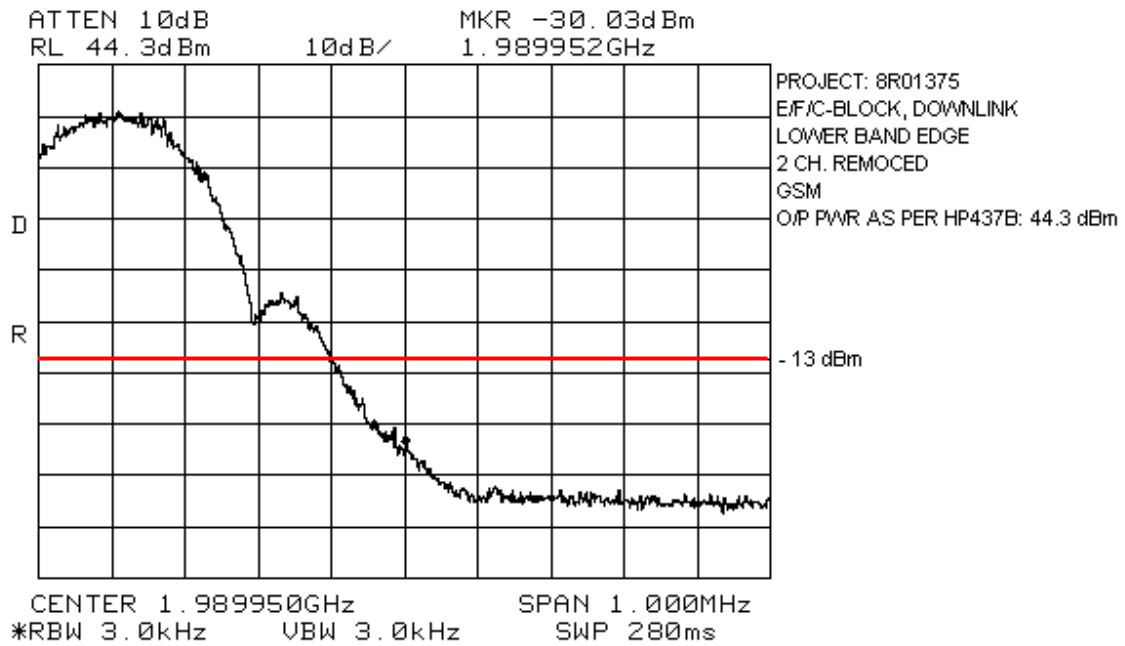
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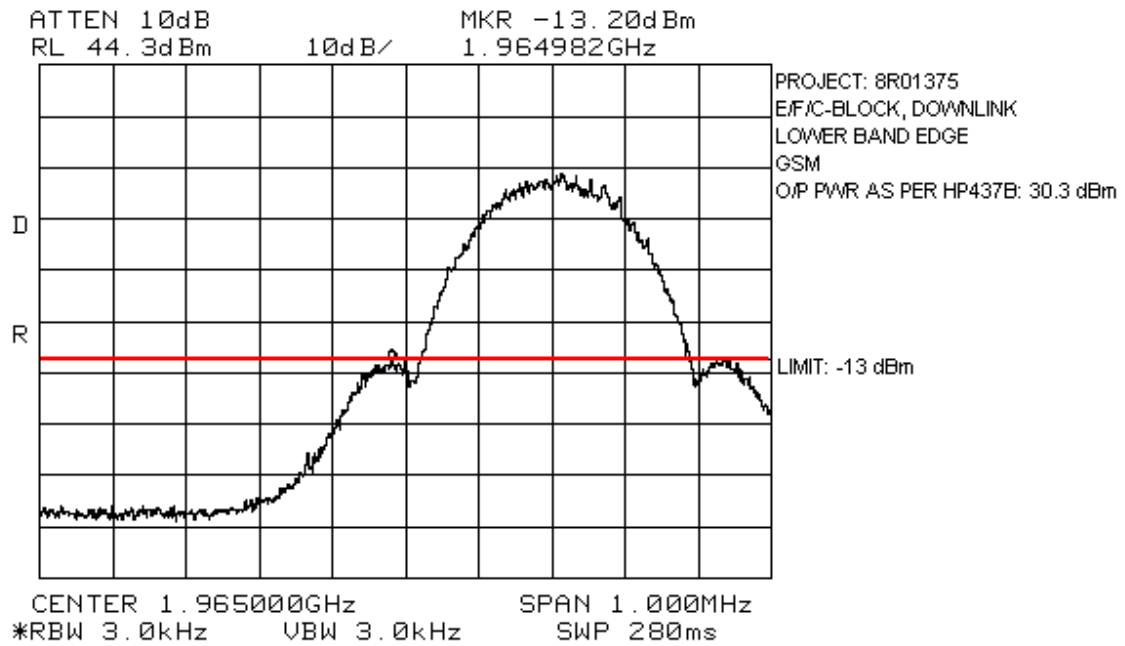
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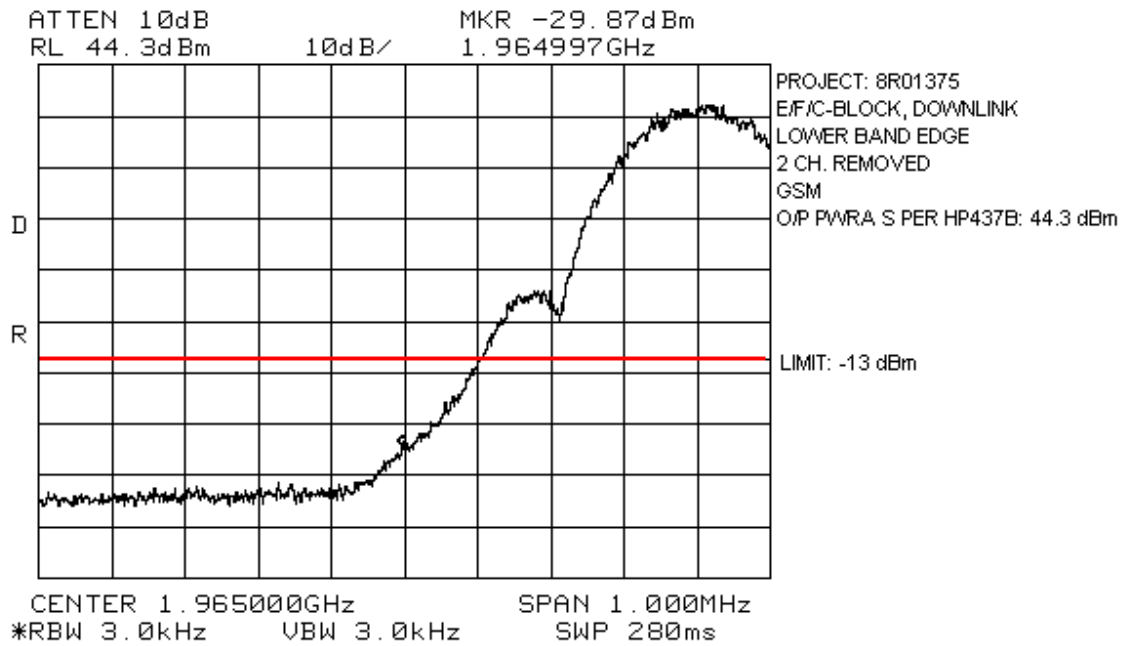
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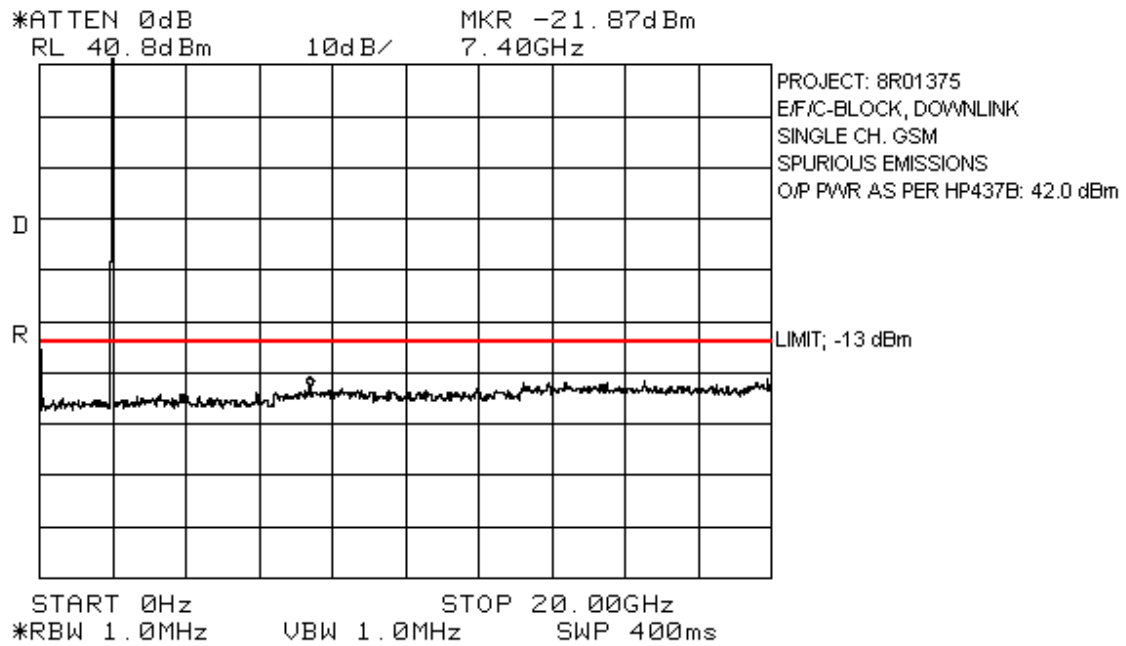
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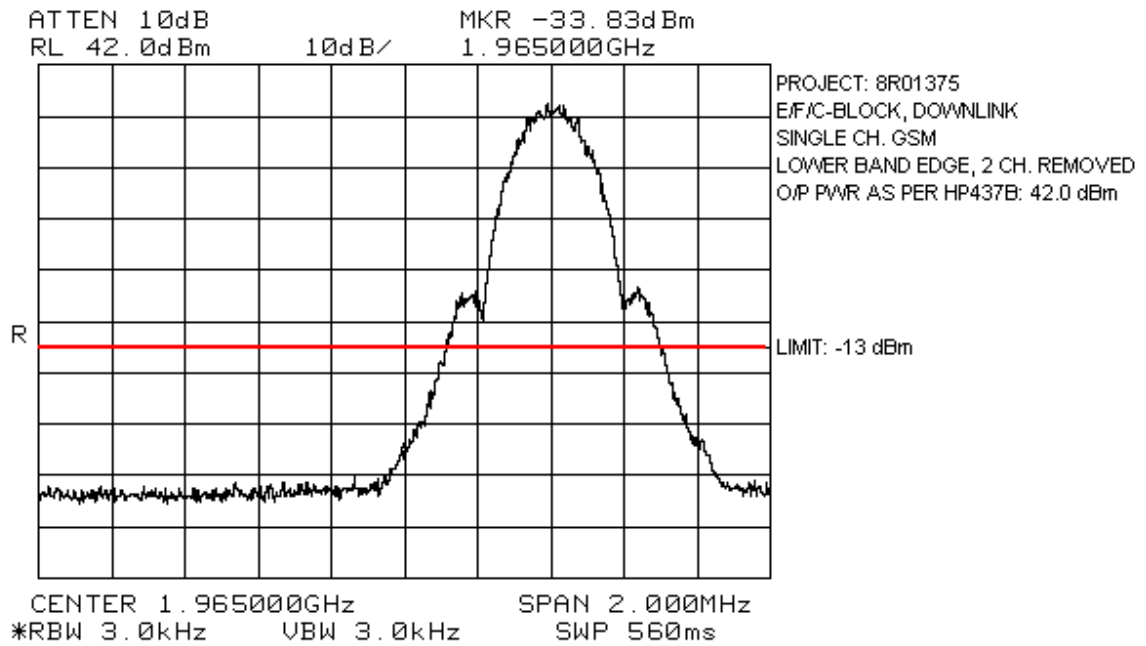
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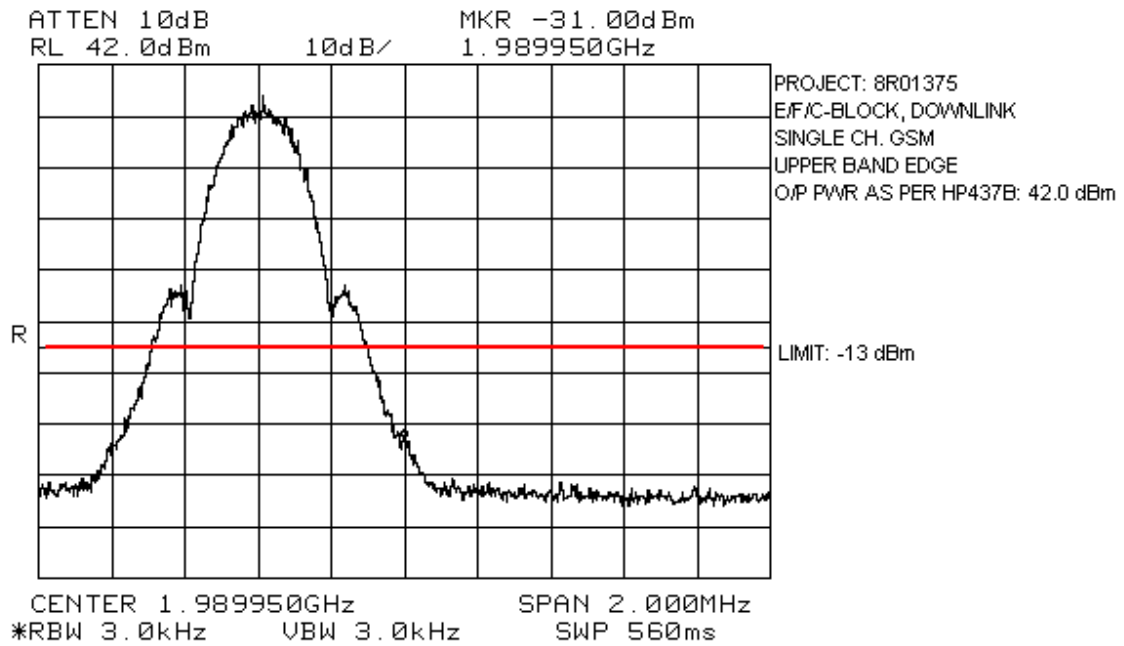
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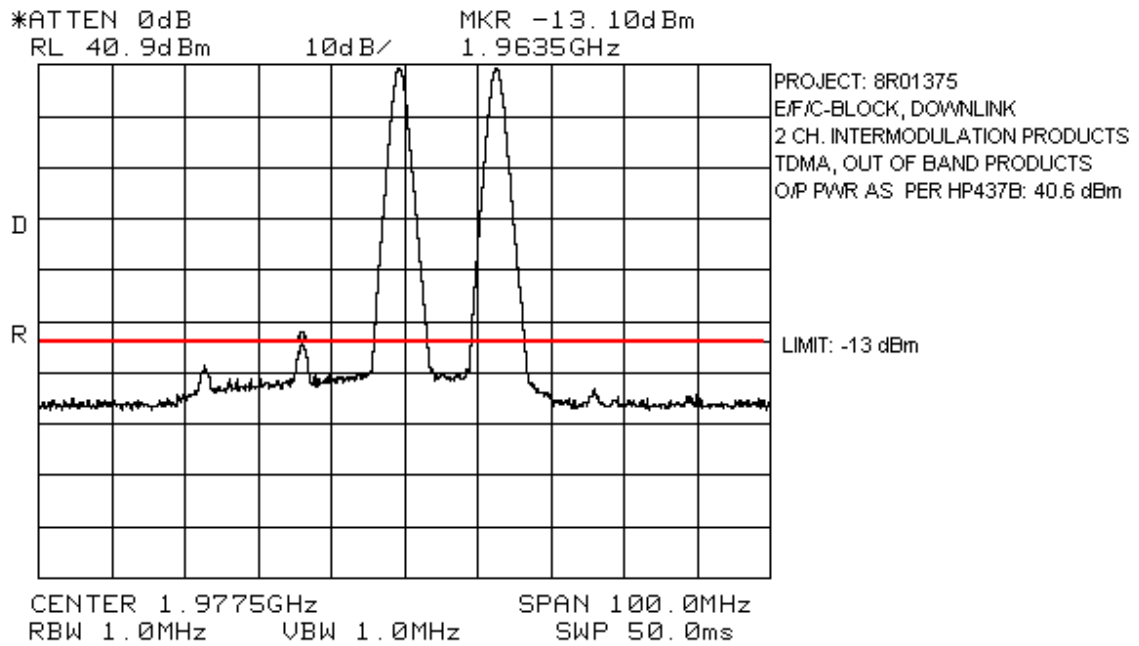
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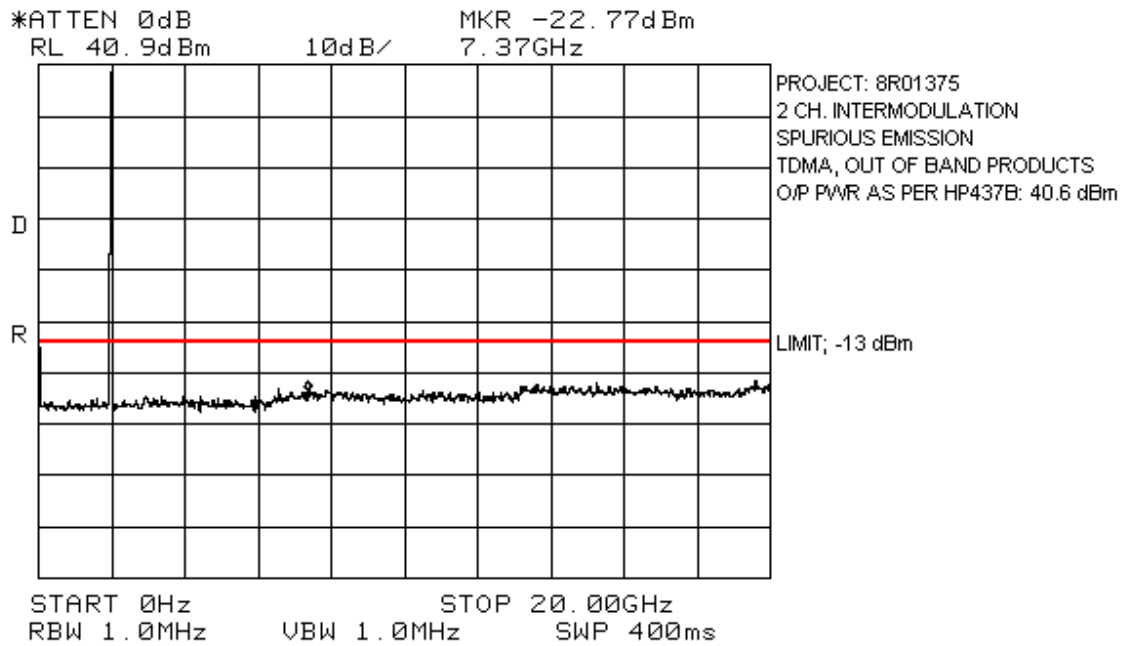
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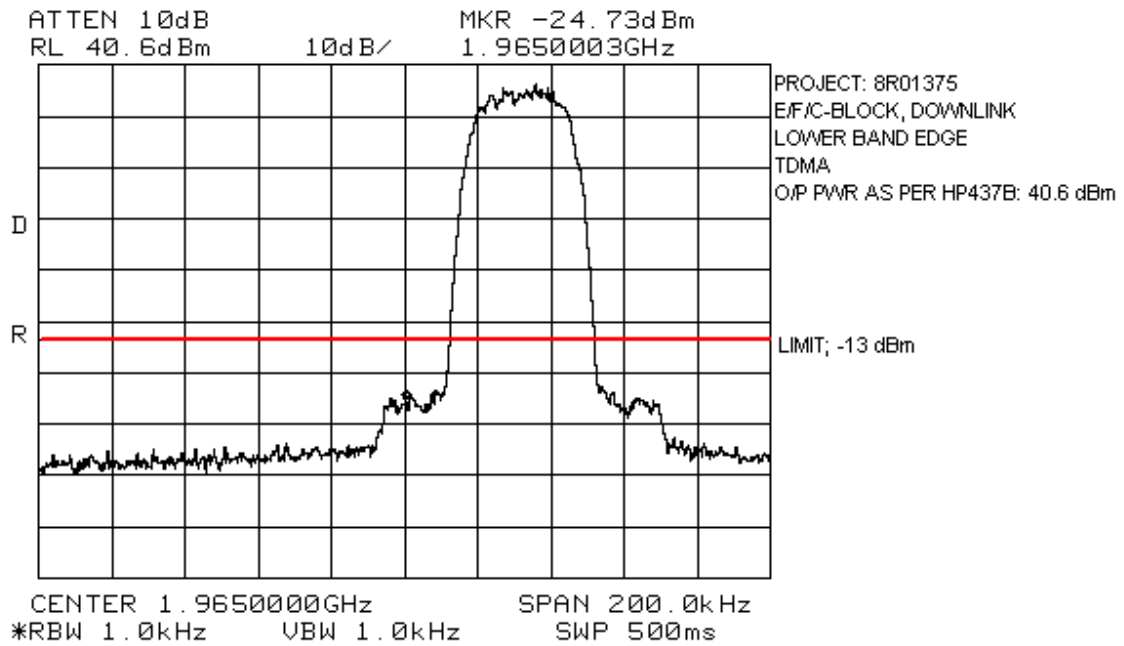
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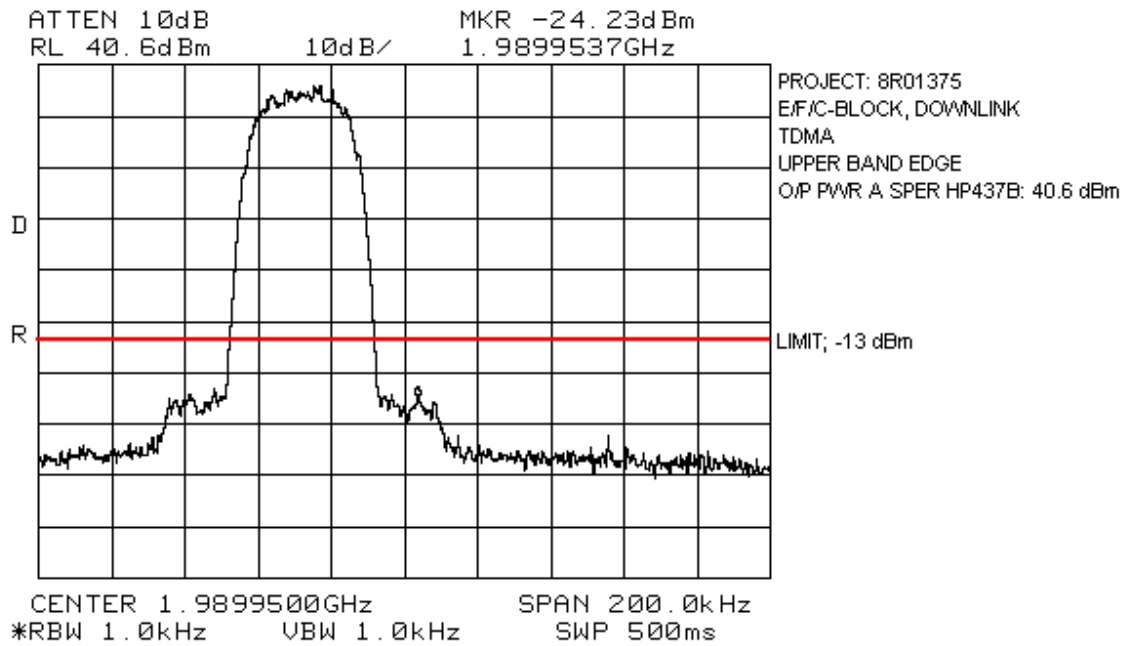
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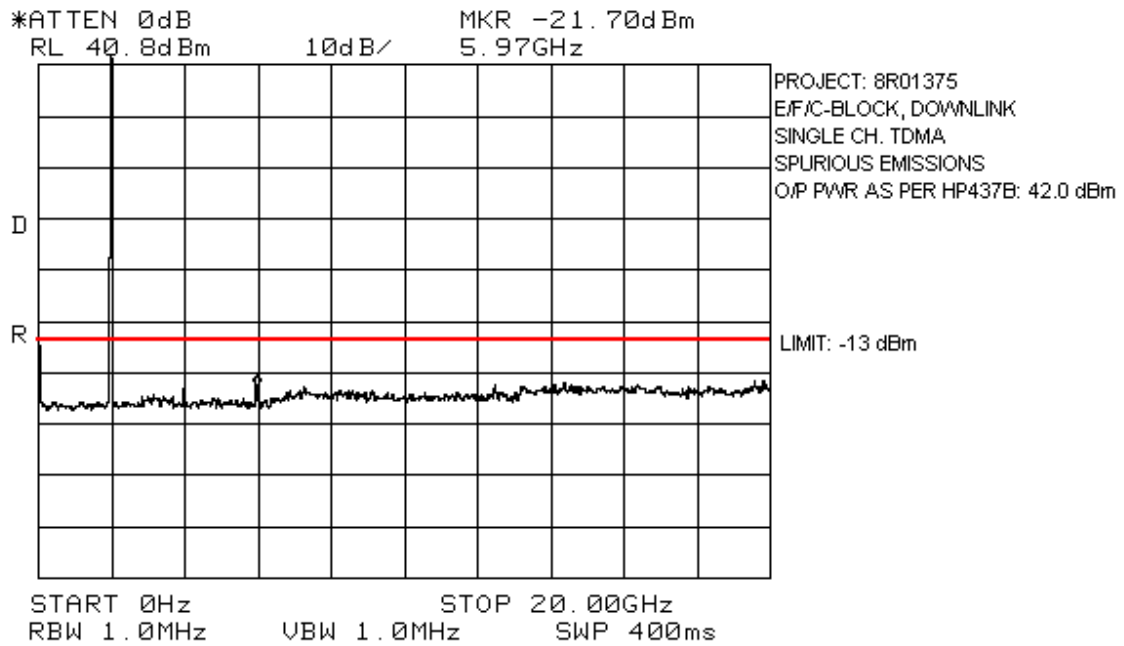
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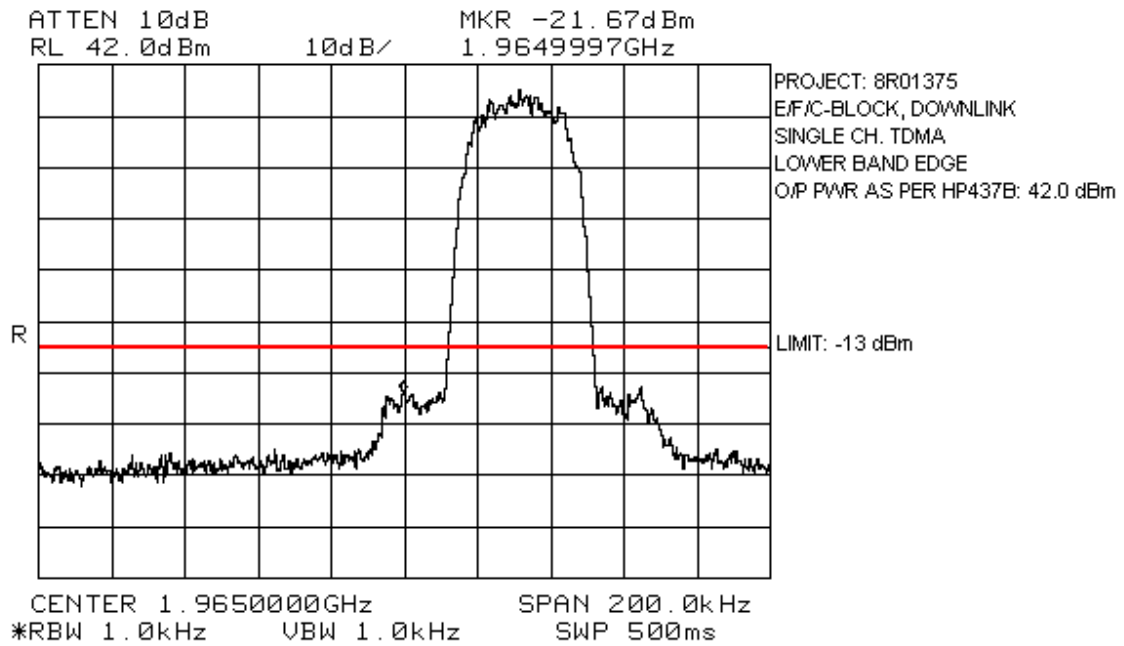
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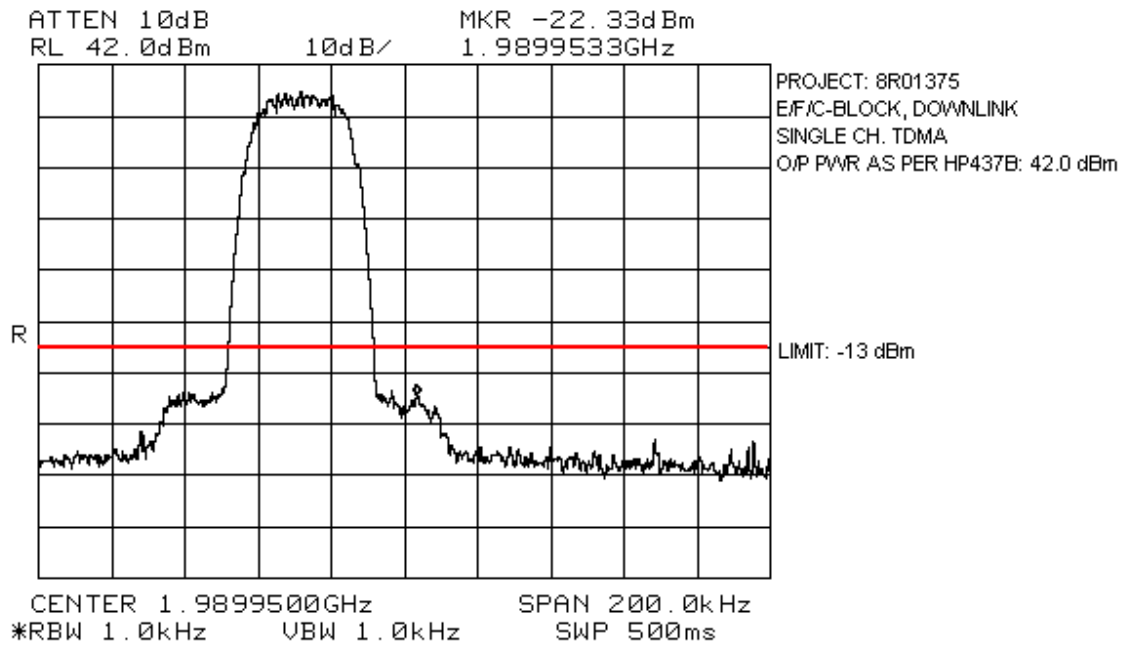
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EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.917(e)
TESTED BY: Kevin Carr	DATE: May 27, 1999

Test Results: Complies.
 The maximum field strength is 73.3 dBμV/m @ 3m.

Test Data:

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Test Data - Radiated Emissions

Test Distance (meters) : 3		Range: A Tower		Receiver: H.P. 8563E		RBW(1 MHz): 300 kHz		Detector: Peak			
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)
3895.0	Hrn2	V			79.8	36.0	42.5		73.3	82.3	9.0
3895.0	Hrn2	H			70.0	36.0	42.5		63.5	82.3	18.8
5842.6	Hrn2	V			64.2	41.7	41.7		64.2	82.3	18.1
5842.5	Hrn2	H			55.5	41.7	41.7		55.5	82.3	26.8
7790.1	Hrn2	V			61.8	45.5	41.0		66.3	82.3	16.0
7790.0	Hrn2	H			50.7	45.5	41.0		55.2	82.3	27.1
9737.5	Hrn2	V			37.7	51.5	44.4		44.8	82.3	37.5
9737.5	Hrn2	H			35.8	51.5	44.4		42.9	82.3	39.4
11685.0	Hrn2	V			32.8	54.2	43.7		43.3	82.3	39.0
11685.0	Hrn2	H			32.6	54.2	43.7		43.1	82.3	39.2
Notes: The spectrum was search up to the 10 th 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. <i>No further emissions detected as the noise floor was 20 dB below the limit.</i>											

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Photographs of Test Setup

Front View



Rear View



EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

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

EQUIPMENT: Band Selective Booster Amplifier
*FCC ID: BCR-MRB-PCS***Section 8. Test Equipment List**

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
1 Year	Attenuator	Narda	768-20	9507	July 24/98	July 24/99	
1 Year	Attenuator	Narda	765-20	9510	July 24/98	July 24/99	
1 Year	Attenuator	Narda	768-10	9704	July 24/98	July 24/99	
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	
2 Year	Horn Antenna	EMCO #2	3115	4336	Oct. 30/97	Oct. 30/99	
1 Year	50 ohm Combiner Pad	Mini Circuits	ZA3PD-2	9746	July 23/98	July 23/99	
1 Year	Low Noise Amplifier	Avantek	AWT-8035	1005	Aug. 4/98	Aug. 4/99	
1 Year	Low Noise Amplifier	DBS Microwave	DWT-13035	9623	Aug. 4/98	Aug. 4/99	
1 Year	Signal Generator	Rohde & Schwarz	SM1Q03	1084-8004-03	July 23/98	July 23/99	
1 Year	RF Generator	Rohde & Schwarz	SIMIQ03E	DE24154	Sept. 28/98	Sept. 28/99	
1 Year	High Power Coupler 2-18 GHz	Narda	27000-30	0221	Nov. 25/98	Nov. 25/99	
	High Pass Filter	K&L	11SH10-4000	FA001340	COU	COU	
2 Year Rental	Spectrum Analyzer	Hewlett Packard	8563E	3751A08229	Jan. 22/98	Jan. 22/00	
1 Year Rental	Power Meter	Hewlett Packard	437B	909609	Feb. 8/99	Feb. 8/00	

NA: Not Applicable
NCR: No Cal Required
COU: CAL On Use

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

ANNEX A
TEST METHODOLOGIES

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

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: CDMA Per ANSI/J-STD-014
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: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

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

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

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

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

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

GSM Per ANSI/J-STD-010

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.

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.993
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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 (5×10^{-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)

$R = 3\text{m}$ (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)

$R = 3\text{m}$ (Measurement Distance)

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

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

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

KTL Ottawa

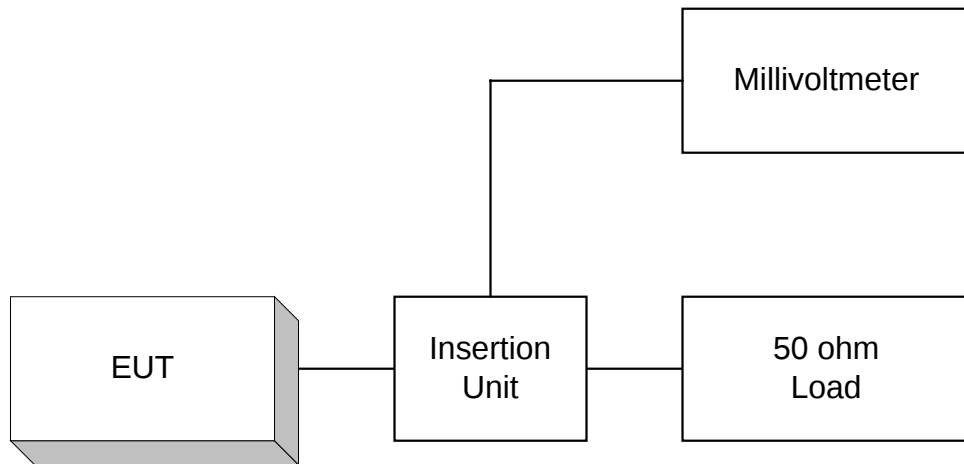
FCC PART 24, SUBPART E
BROADBAND PCS BASE STATION
PROJECT NO.: 8R01375
ANNEX B

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

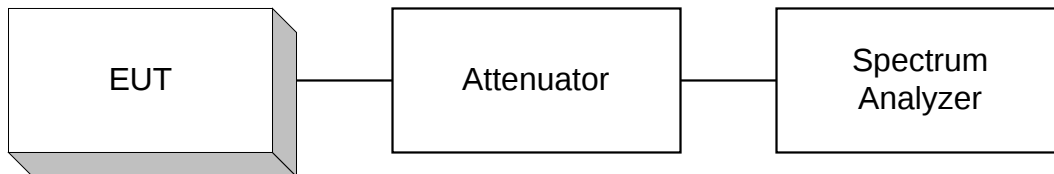
ANNEX B
TEST DIAGRAMS

EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

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

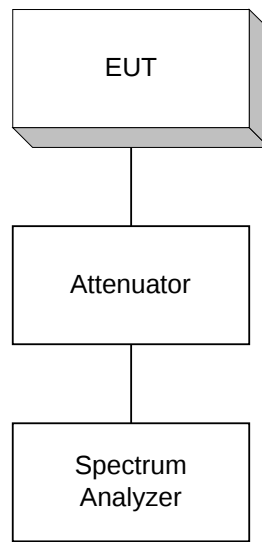


Para. No. 2.989 - Occupied Bandwidth

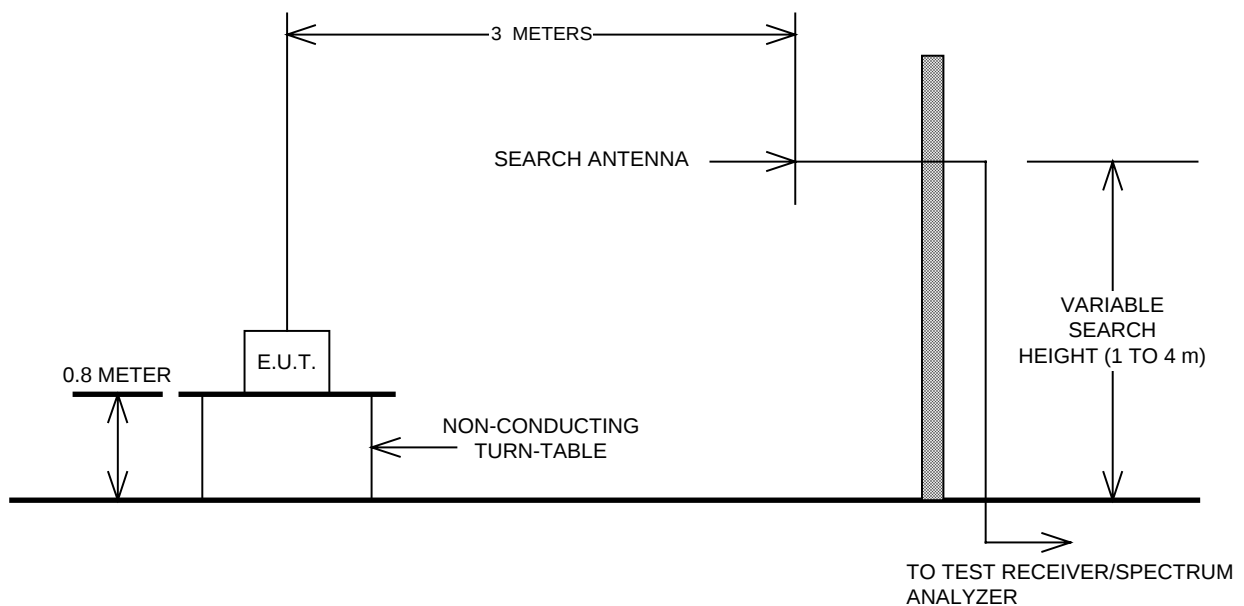


EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



EQUIPMENT: Band Selective Booster Amplifier
FCC ID: BCR-MRB-PCS

Para. No. 2.995 - Frequency Stability

