

KTL Test Report:	9R01401
Applicant:	Allen Telecom Group 140 Vista Centre Drive Forest, Virginia 24551 USA
Equipment Under Test: (E.U.T.)	MR701B Power
FCC ID:	BCR-RPT-MR701
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:	R. Grant, Senior RF Specialist
Date:	
Total Number of Pages:	235

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

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Section 1. Summary of Test Results

Manufacturer: Allen Telecom Group

Model No.: MR701B

Serial No.: 24

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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EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

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/Output	Plot	Complies
Occupied Bandwidth (GSM)	24.238	Input/Output	Plot	Complies
Occupied Bandwidth (NADC)	24.238	Input/Output	Plot	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	Plot	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Chart	Complies
Frequency Stability	24.235		N/A	N/A

Footnotes For N/A's: F1-F1 Transmission TxPE**Test Conditions:****Indoor** Temperature: 24 °C
Humidity: 40 %**Outdoor** Temperature: 25 °C
Humidity: 40 %

EQUIPMENT: MR701B Power
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Section 2. General Equipment Specification

Supply Voltage Input:	120 Vac, 60 Hz		
Frequency Range:	Downlink:	1930 to 1964.95 MHz or 1965.0 to 1990 MHz	
Frequency Range:	Uplink:	1850 to 1884.95 MHz or 1885.0 to 1910 MHz	
Type of Modulation and Designator:	CDMA (F9W)	GSM (GXW)	TDMA (DXW)
	☒	☒	☒
Output Impedance:	50 ohm		
Gain:	90 dB Nominal		
RF Output (Rated):	See Page 10		
Frequency Translation:	F1-F1	F1-F2	N/A
	☒	☐	☐
Band Selection:	Software	Duplexer Change	Fullband Coverage
	☒	☒	☐

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Description of Modifications For Class II Permissive Change

NOT APPLICABLE

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Modifications Made During Testing

NOT APPLICABLE

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Theory of Operation

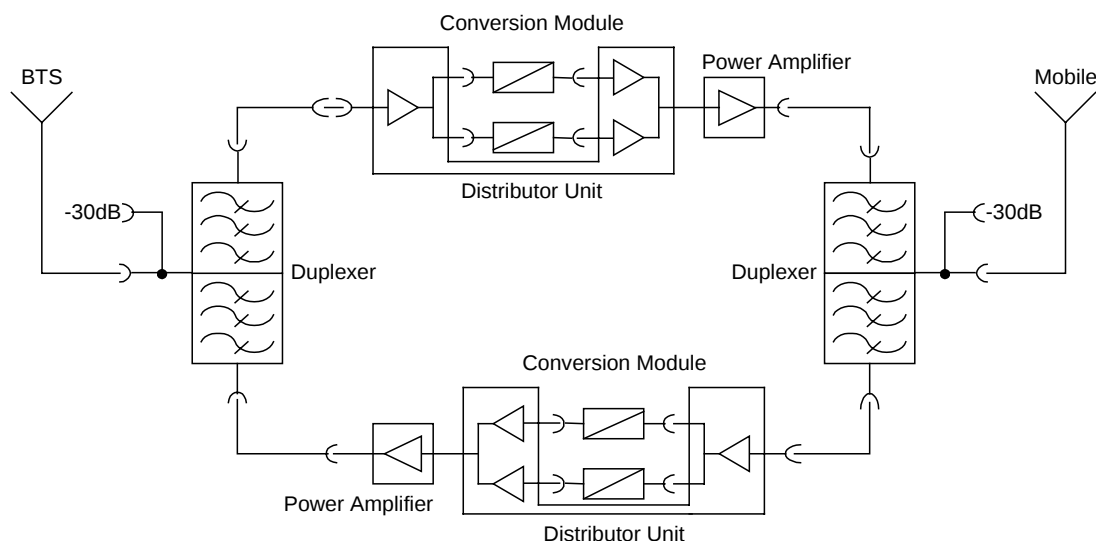
MIKOM's MR701B power is available as a band selective repeater for GSM, CDMA and TDMA and as a channel selective repeater for CDMA and TDMA, a GSM channel selective version is available (MMR741).

This repeater bi-directionally amplifies signals between multiple mobiles and a single base station in the PCS1900 frequency band. It is employed where poor topological conditions cause weak field strengths. It can provide highly selective amplification of band segments or channels in the PCS1900 band.

MR701B power modules can be combined with other repeater modules in order to create a multi-band repeater system. Modules operating in GMS1800, GSM900, AMPS800 or iDEN bands are available. When different modules are combined, a common antenna and control interface are available.

MR701B power can be set-up locally or remotely. A PCMCIA slot for modem operation is an available option. The repeater has a large number of functions that can be monitored and changed by the operators via a terminal emulation program or the MIKOM OMC software platform. An understandable communication language is available to aid the operator query status reports from the repeater or to change settings.

System Diagram



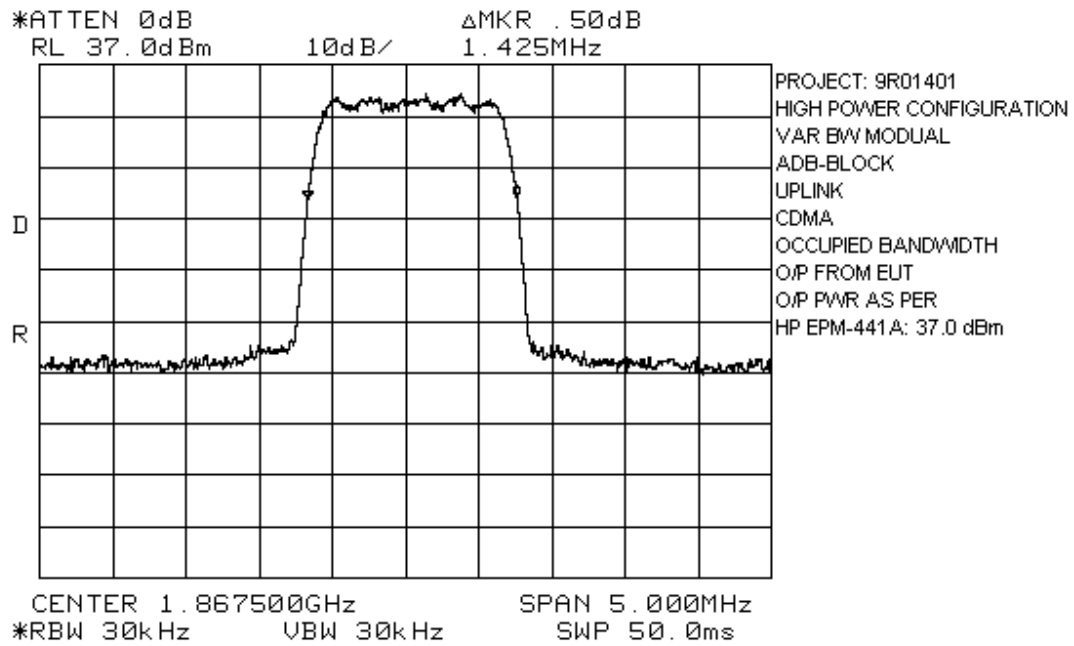
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ADB - Block

EQUIPMENT: MR701B Power
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EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701**Section 3. RF Power Output**

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
TESTED BY: Kevin Carr	DATE: August 16, 1999

Test Results: Complies.**Measurement Data:****ADB-Block:**

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)	Single Channel Power (dBm)
Uplink	CDMA	31	34	37.0
Downlink	CDMA	31	34	37.0
Uplink	GSM	37	40	40.0
Downlink	GSM	37	40	40.0
Uplink	TDMA	34	34	40.0
Downlink	TDMA	34	34	40.0

EFC-Block:

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)	Single Channel Power (dBm)
Uplink	CDMA	30.2	33.2	37.0
Downlink	CDMA	31.7	34.7	37.0
Uplink	GSM	37.0	40.0	40.0
Downlink	GSM	36.3	39.3	40.0
Uplink	TDMA	34.0	37.0	40.0
Downlink	TDMA	34.0	37.0	40.0

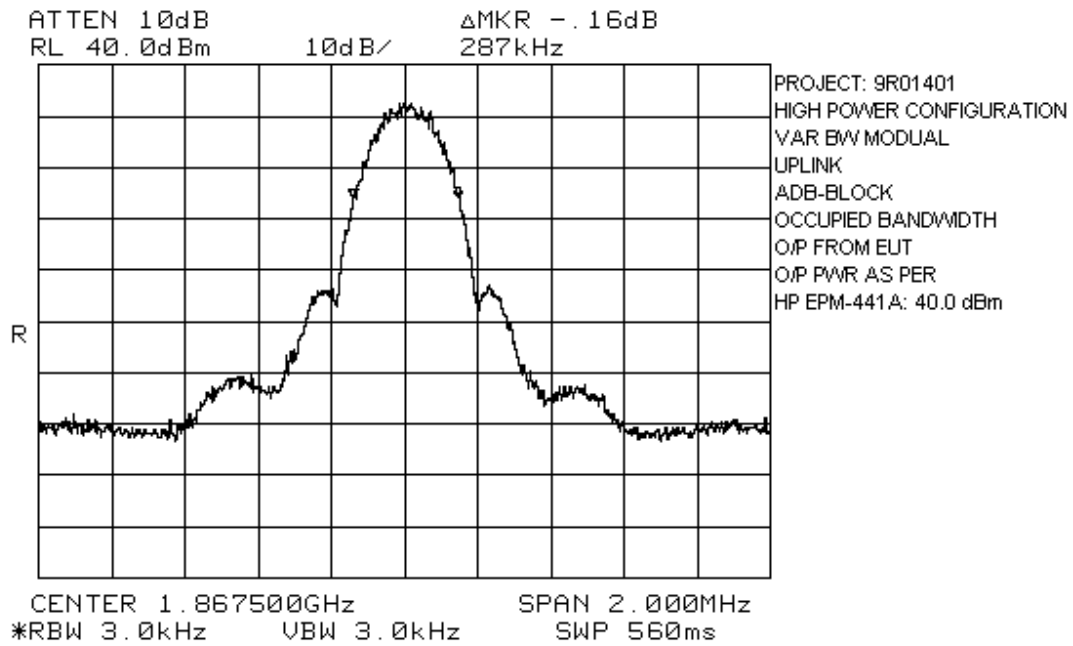
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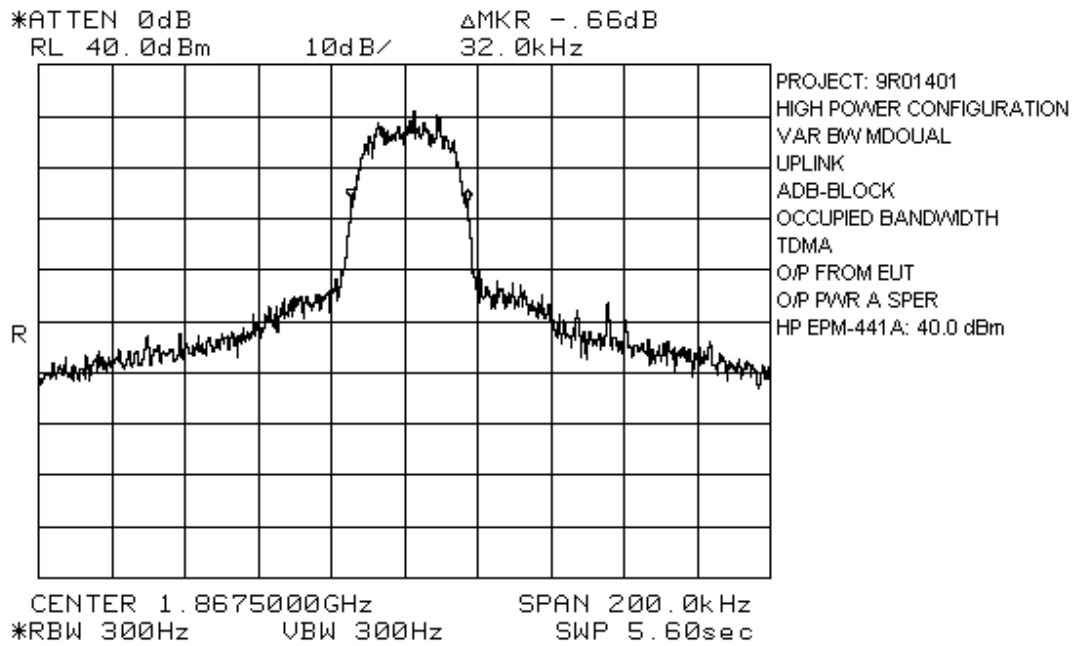
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FCC ID: BCR-RPT-MR701

ADB - Block

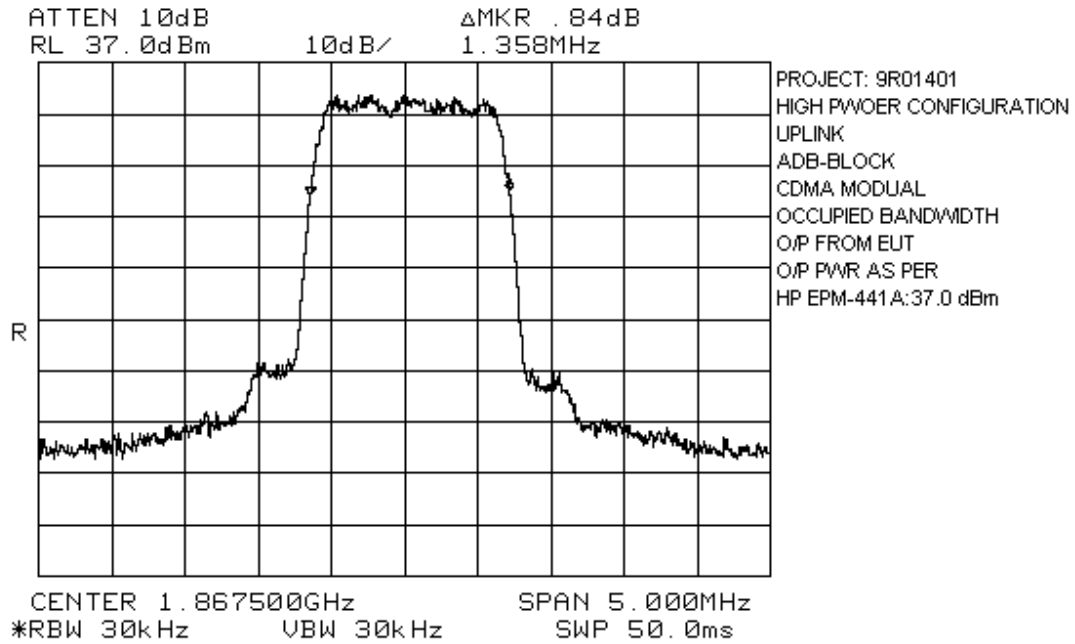
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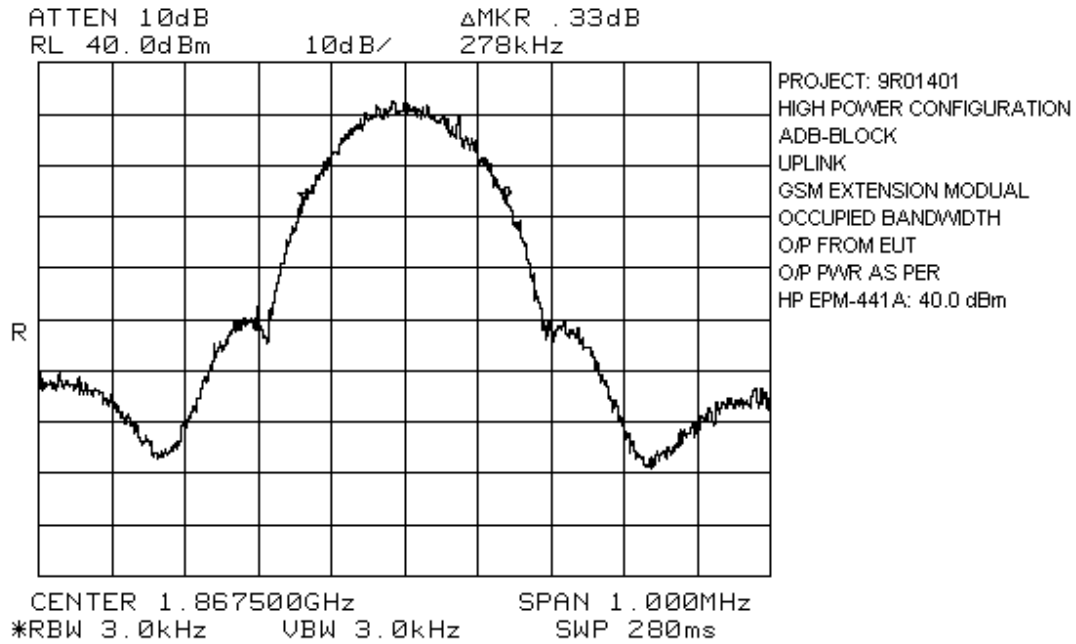
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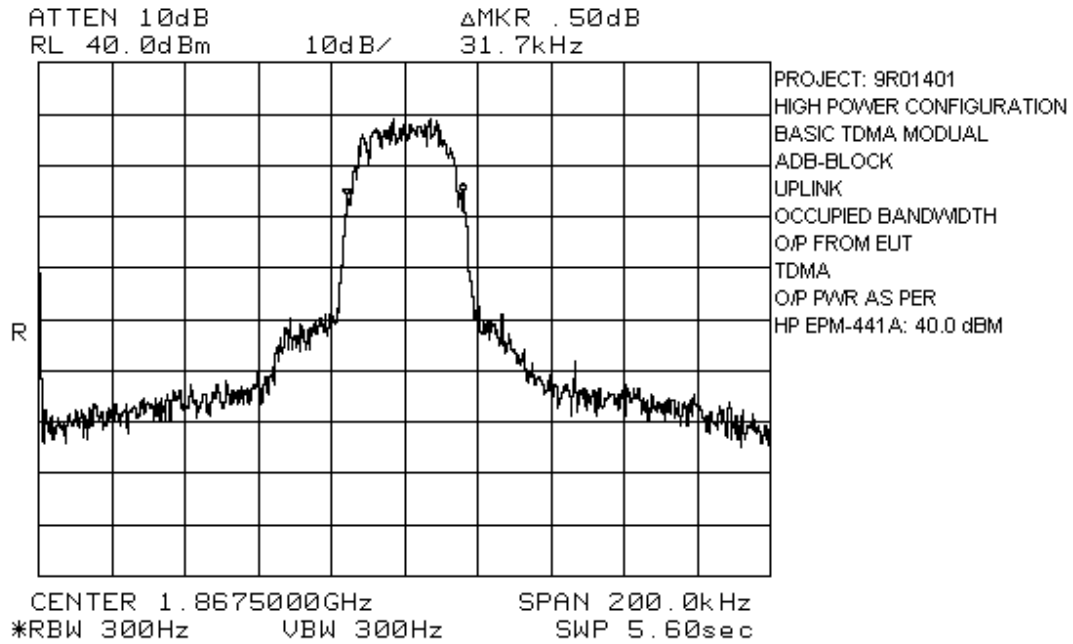
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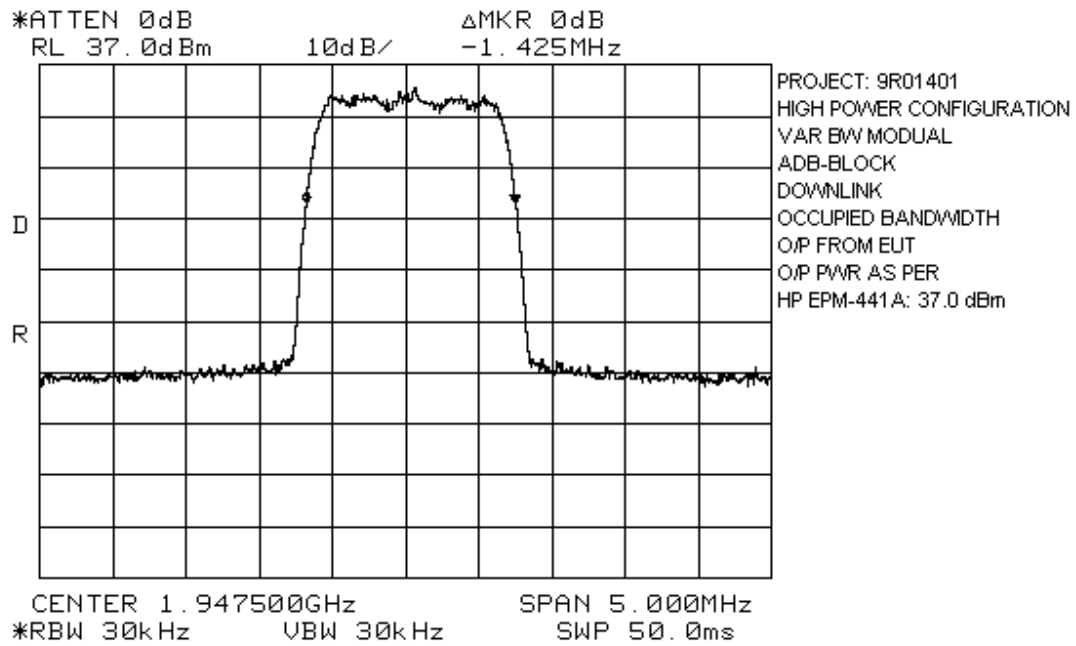
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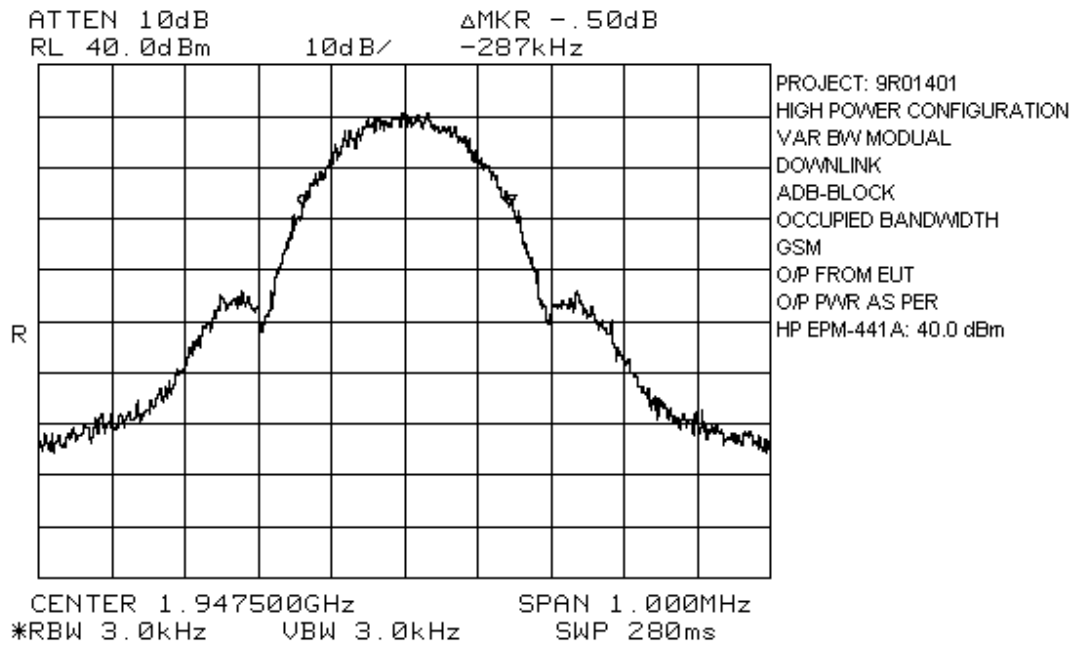
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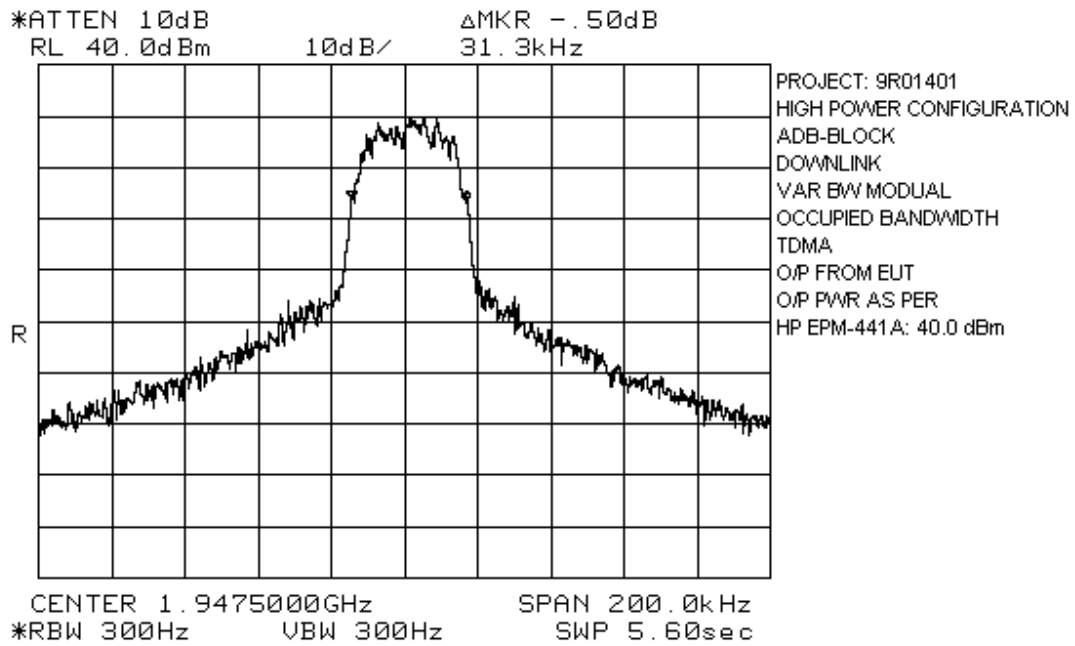
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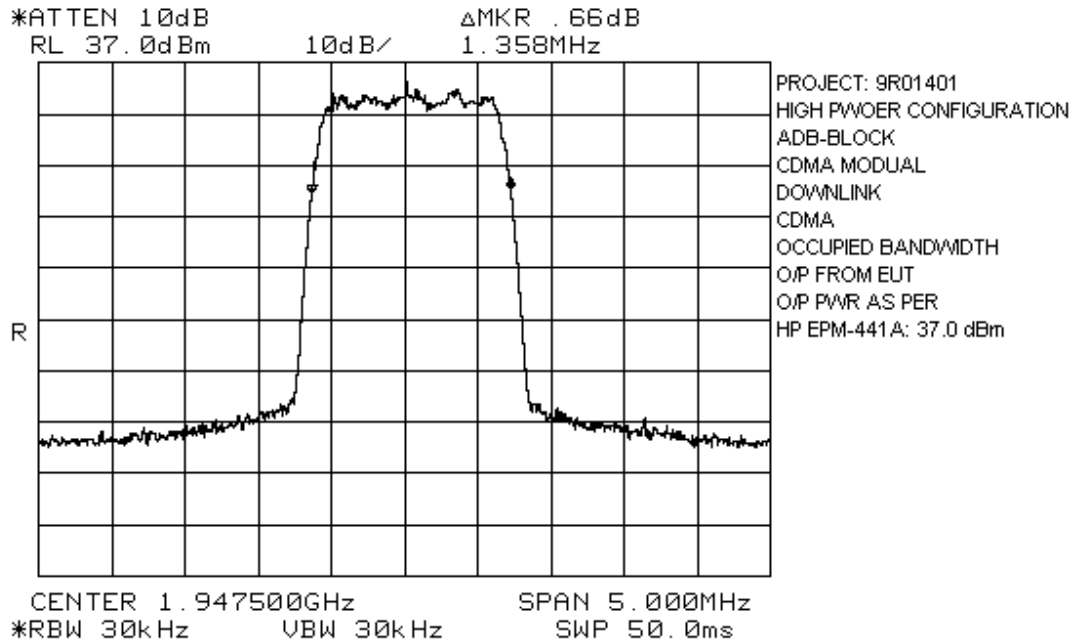
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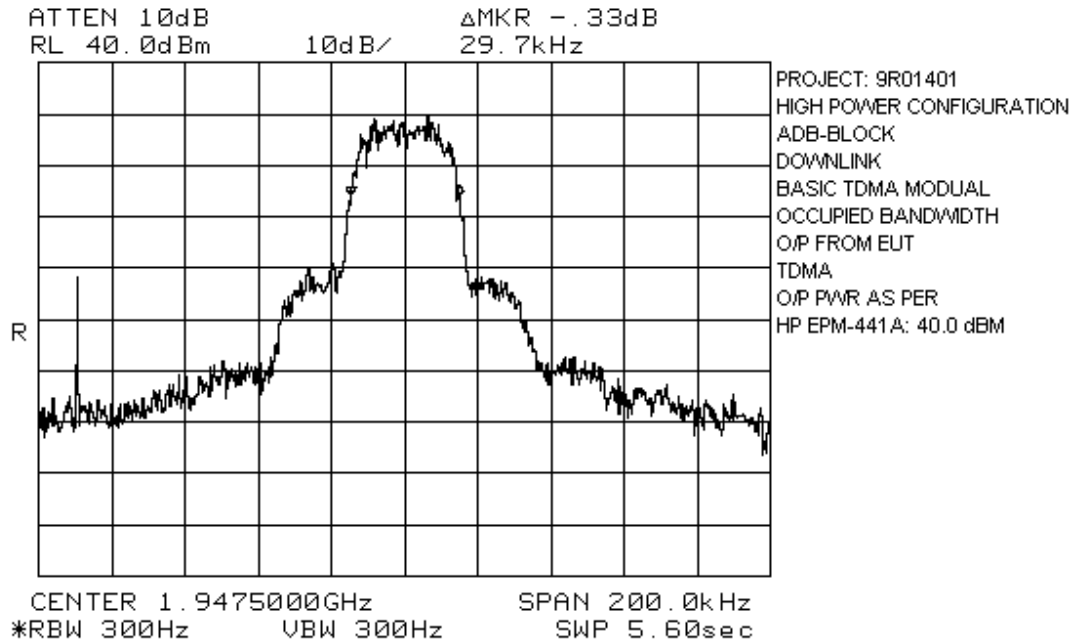
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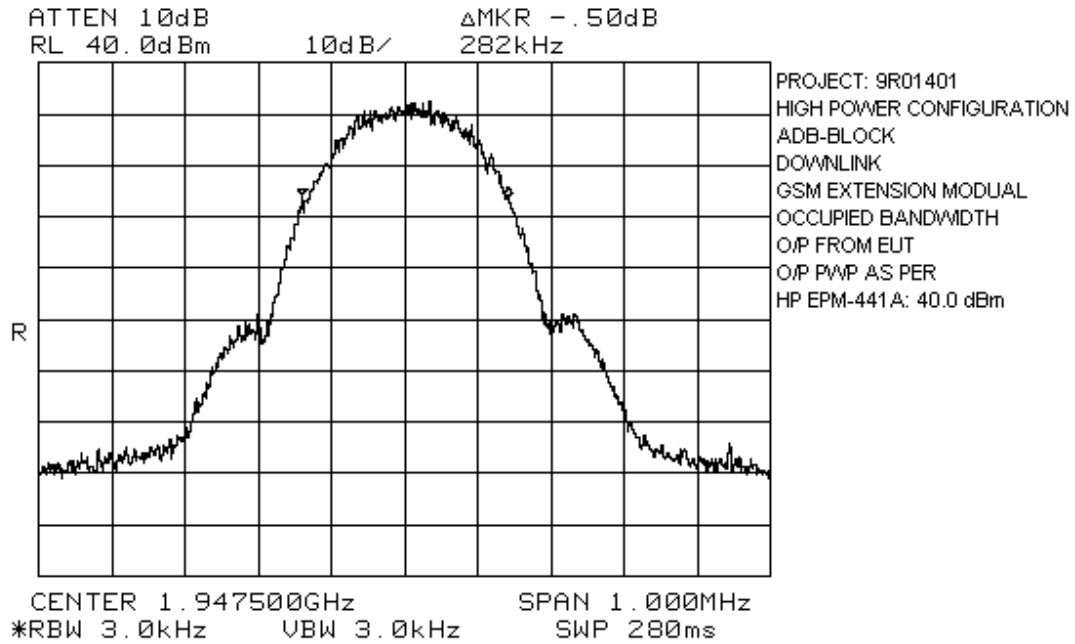
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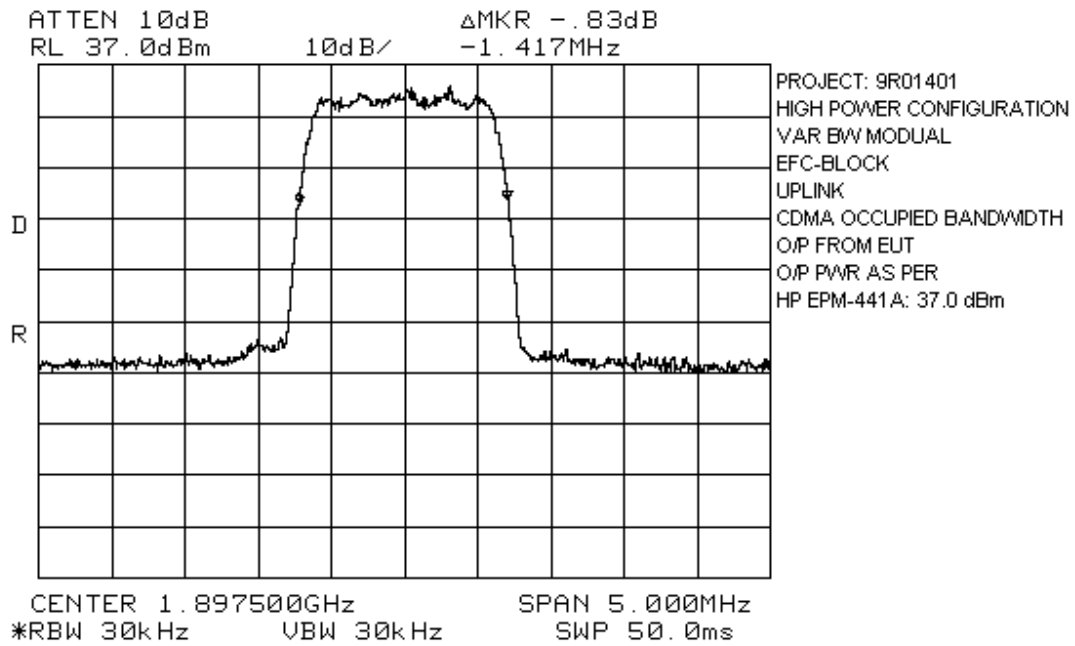
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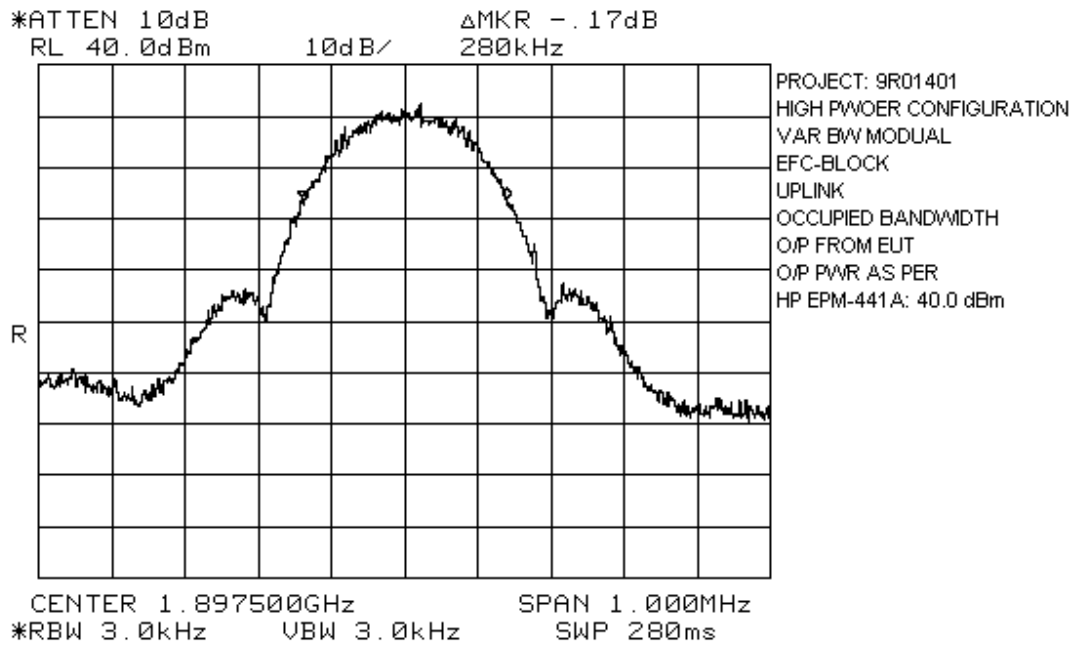
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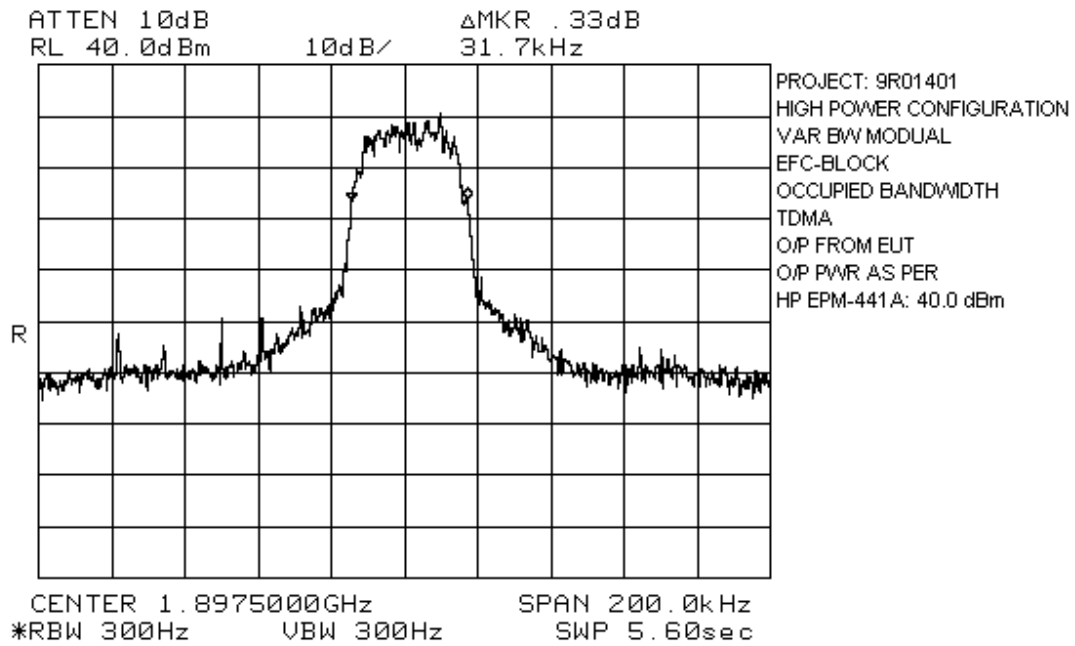
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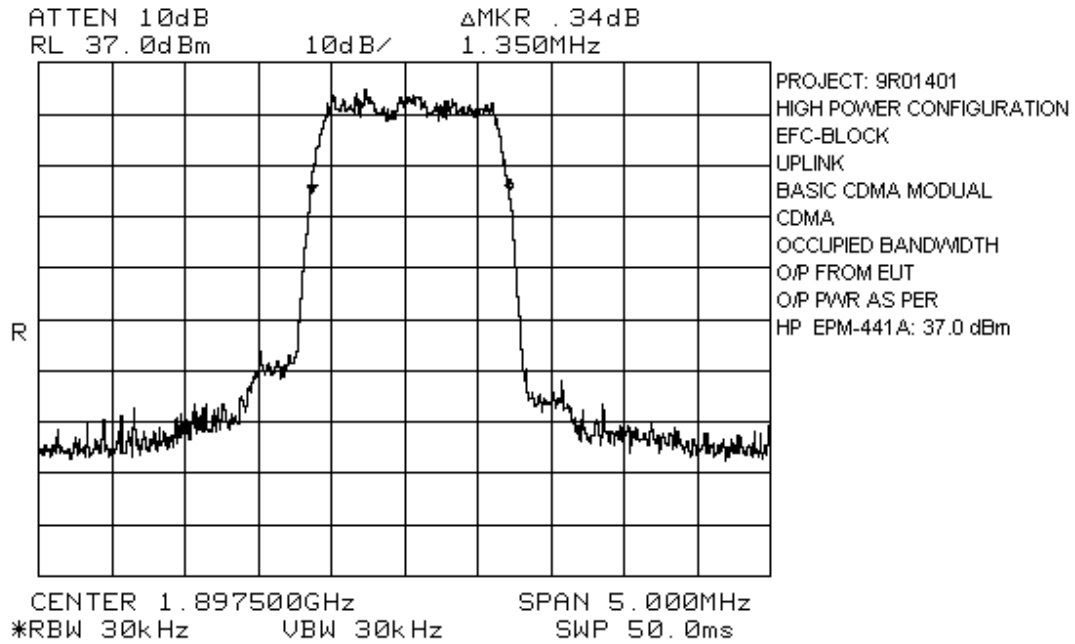
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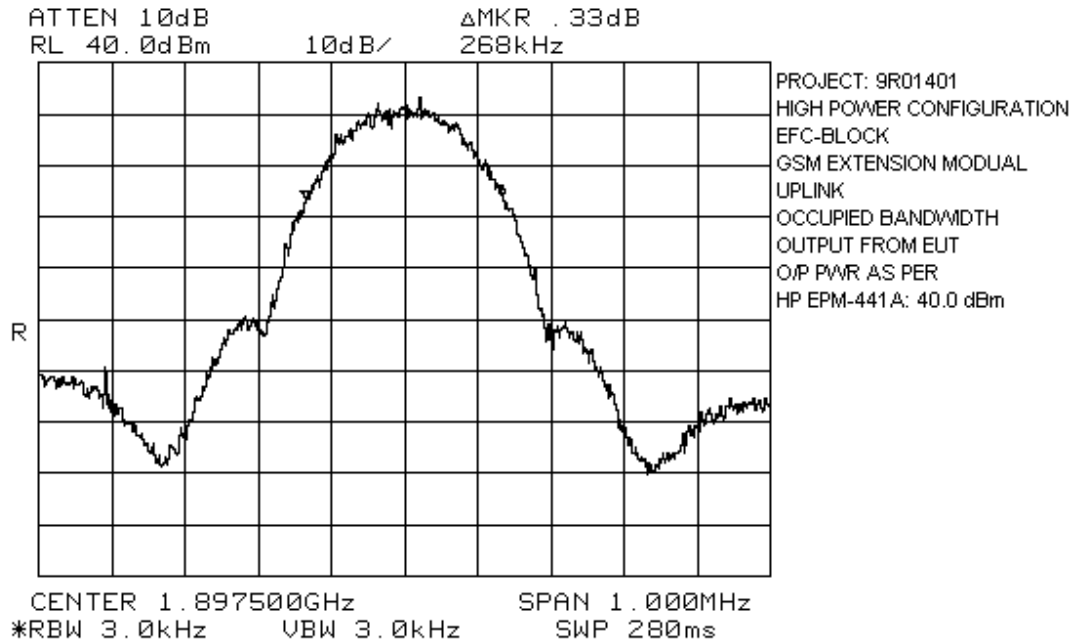
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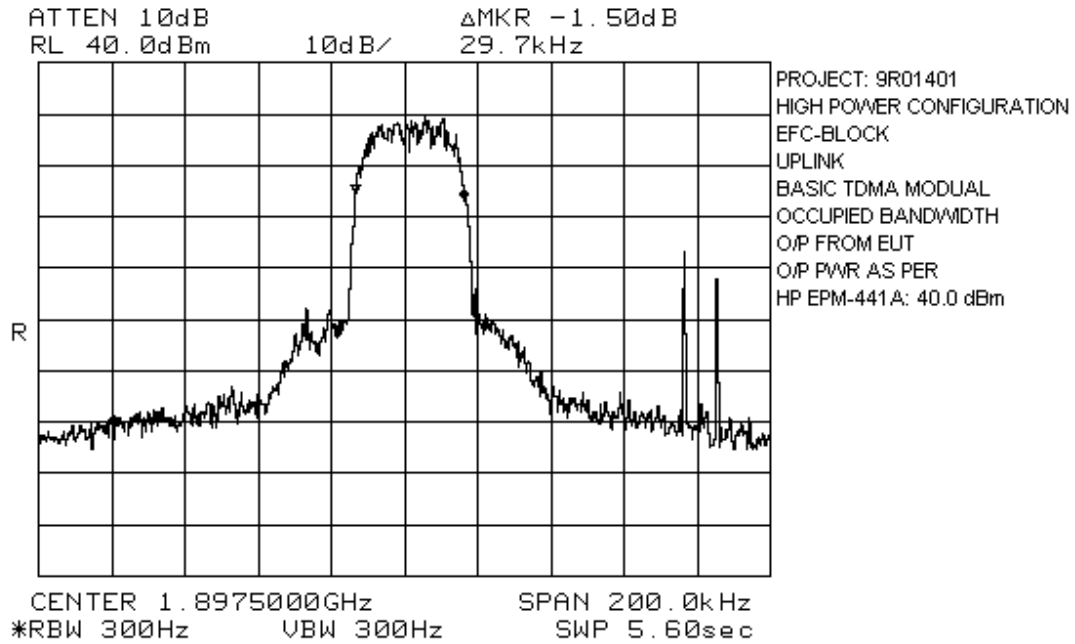
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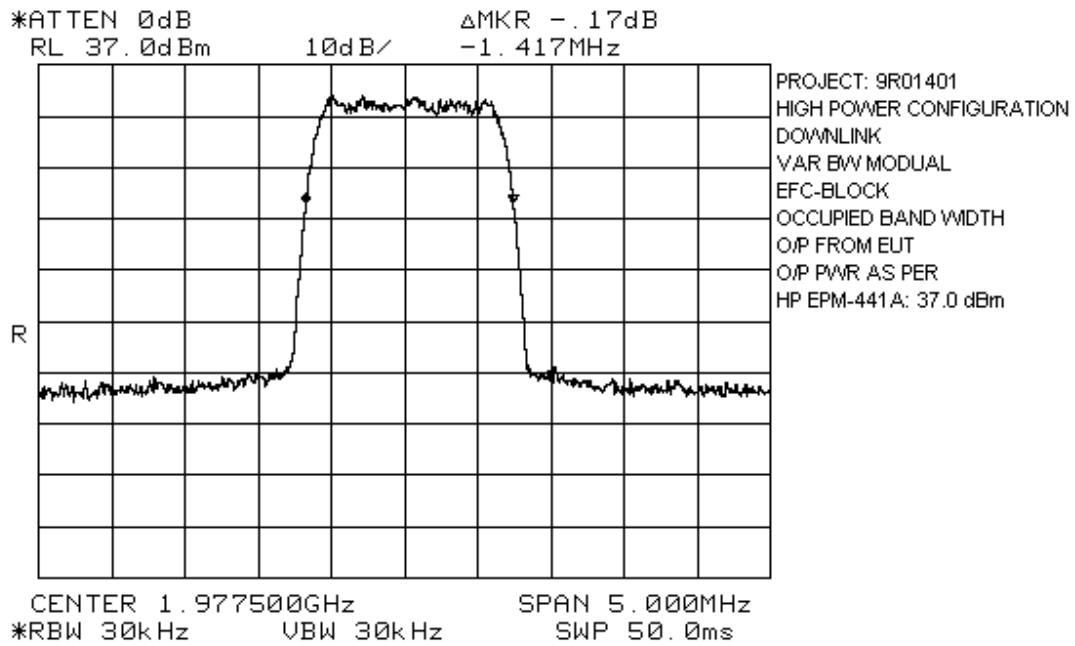
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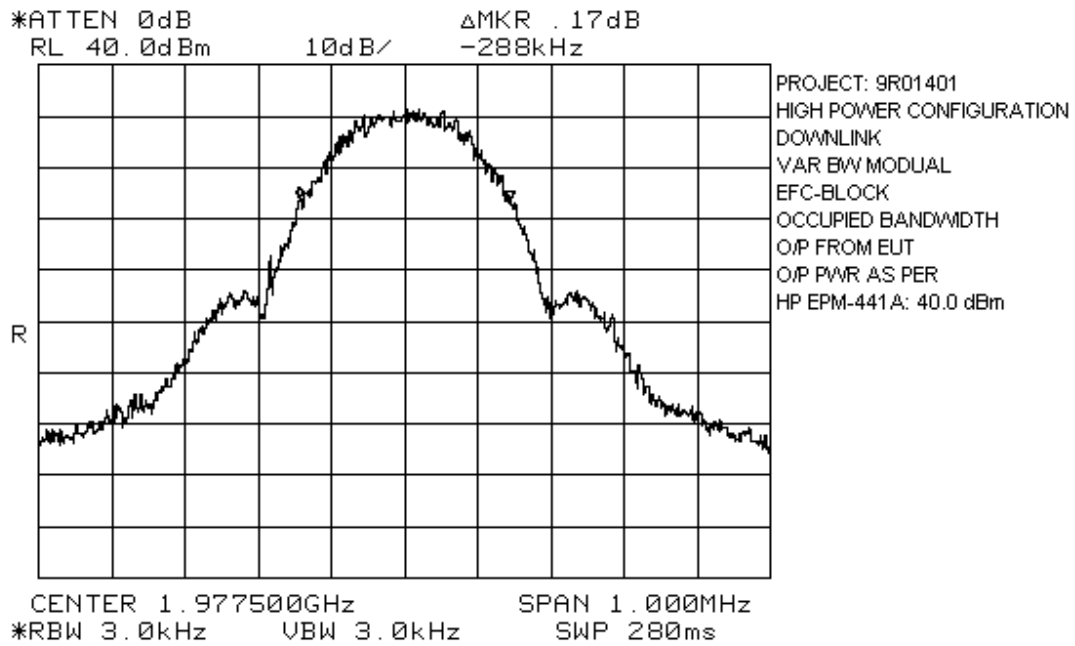
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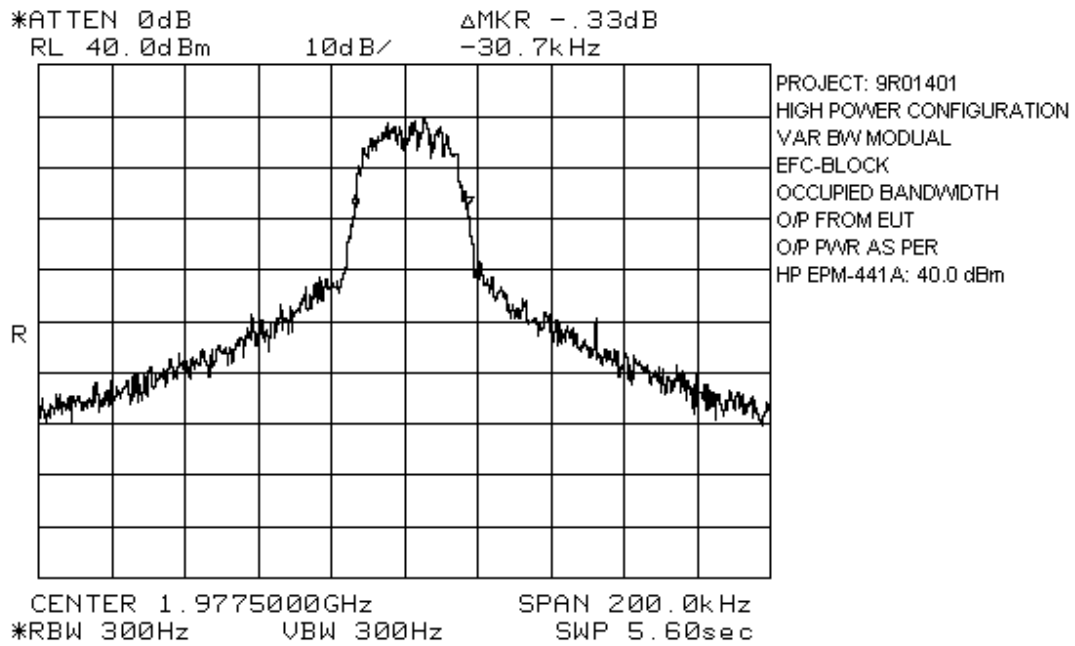
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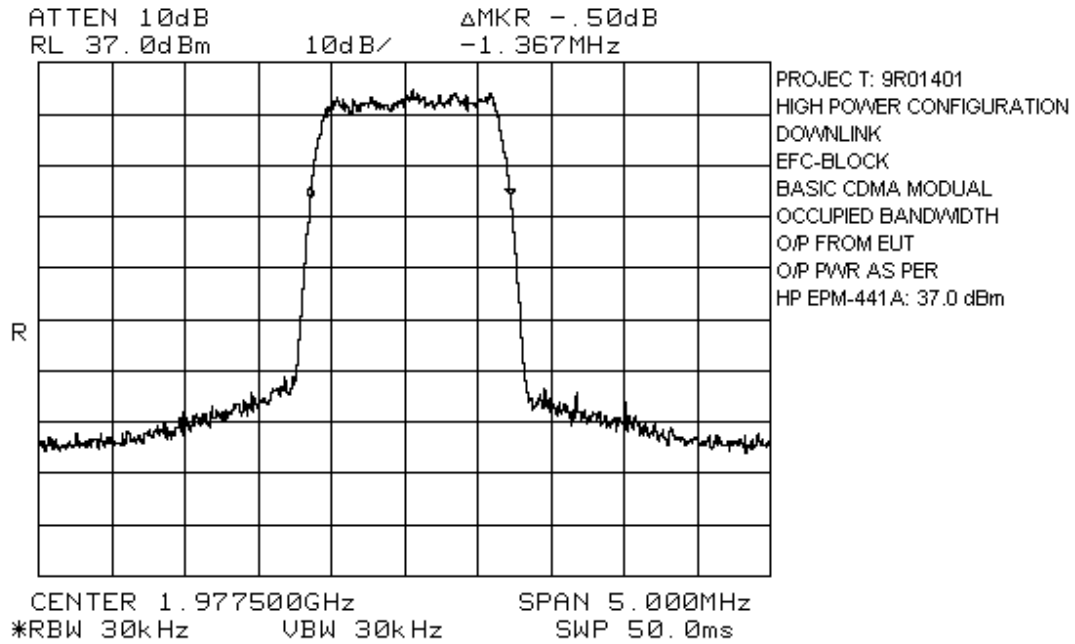
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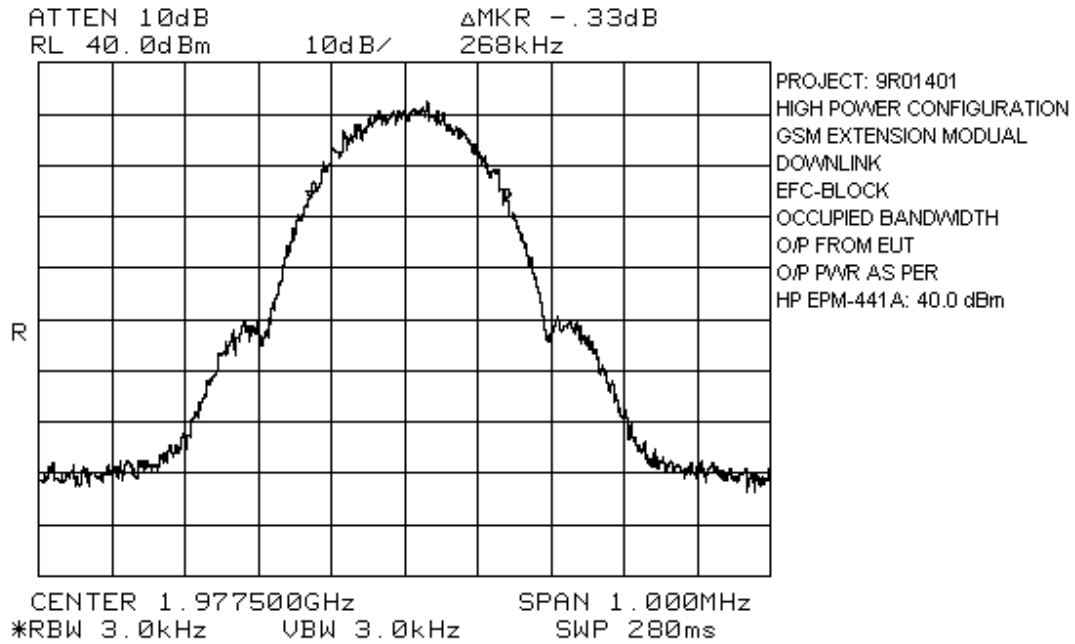
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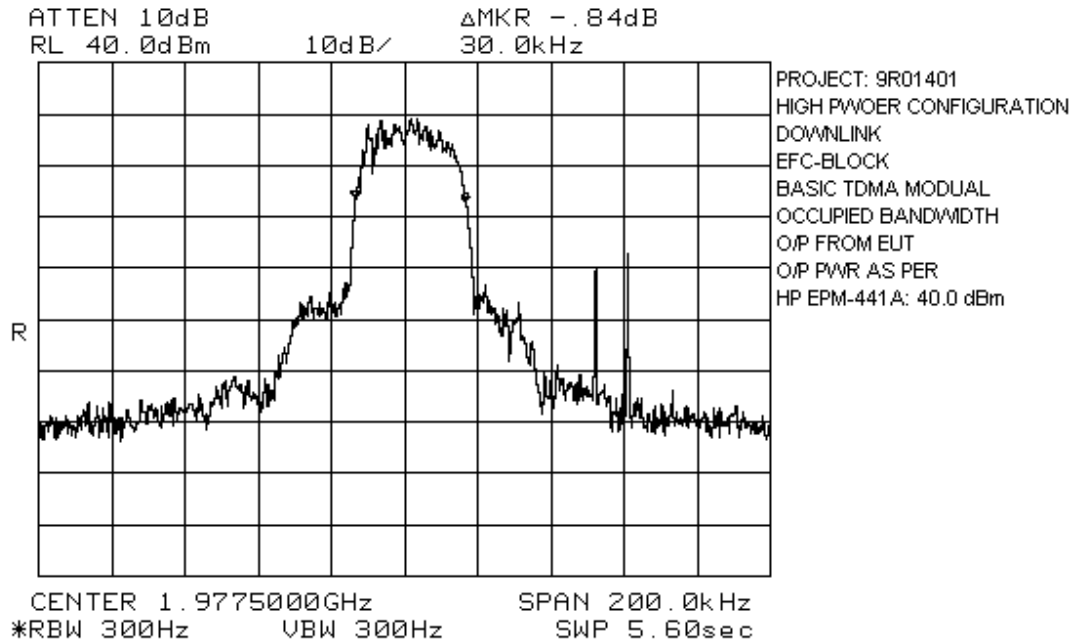
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EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: August 16, 1999

Test Results: Complies.

Test Data: See attached graph(s).

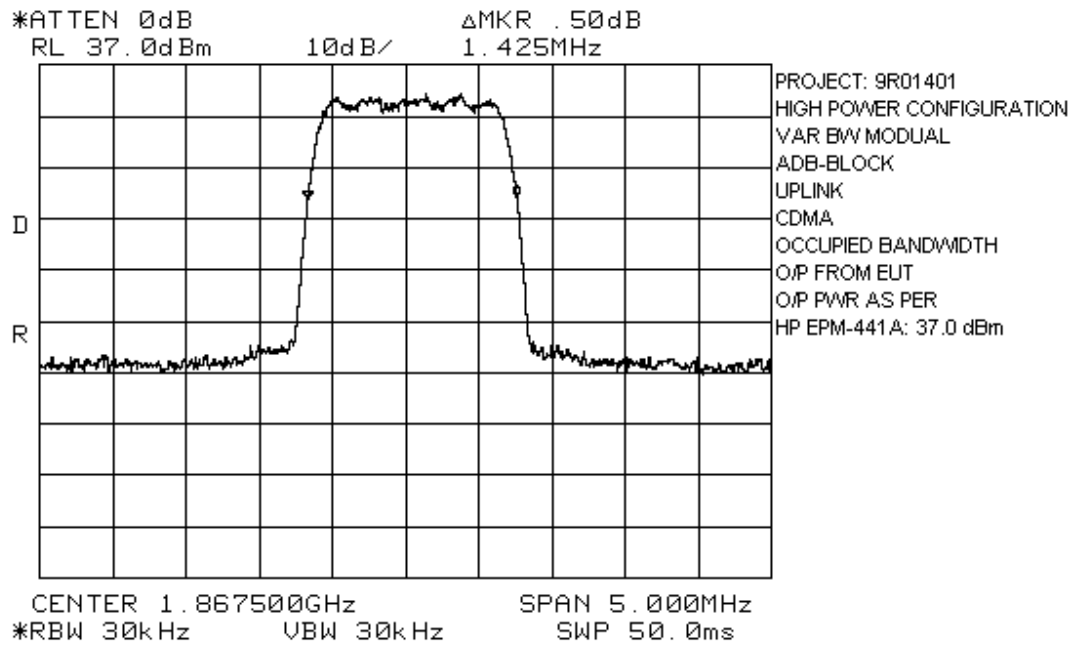
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BROADBAND PCS REPEATERS
PROJECT NO.: 9R01401

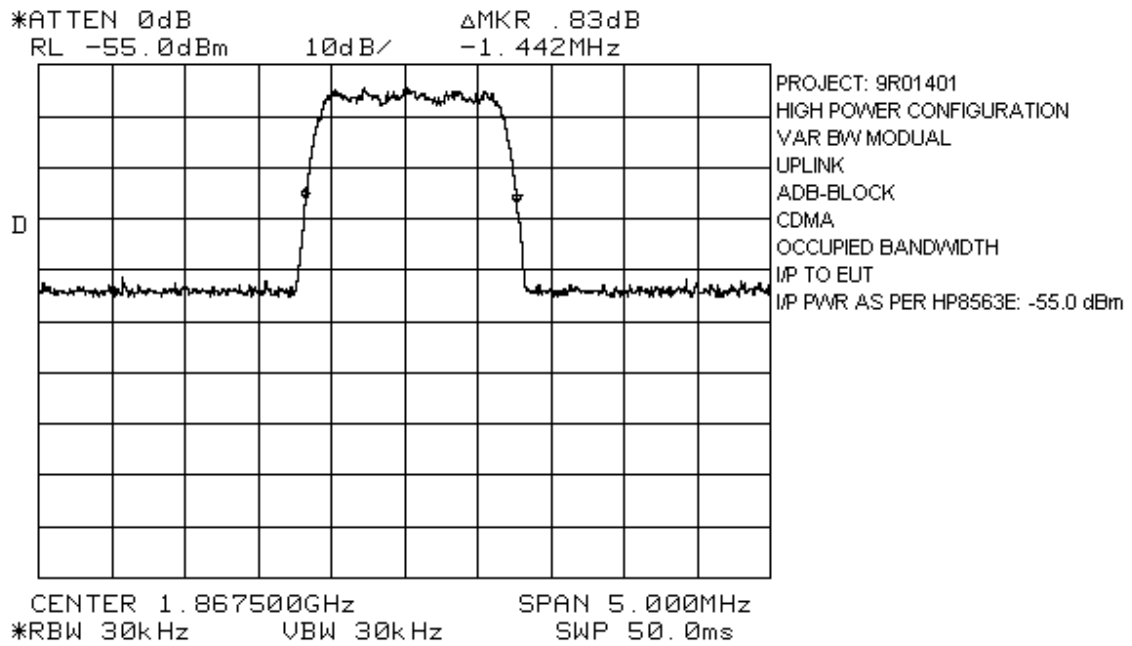
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ADB - Block

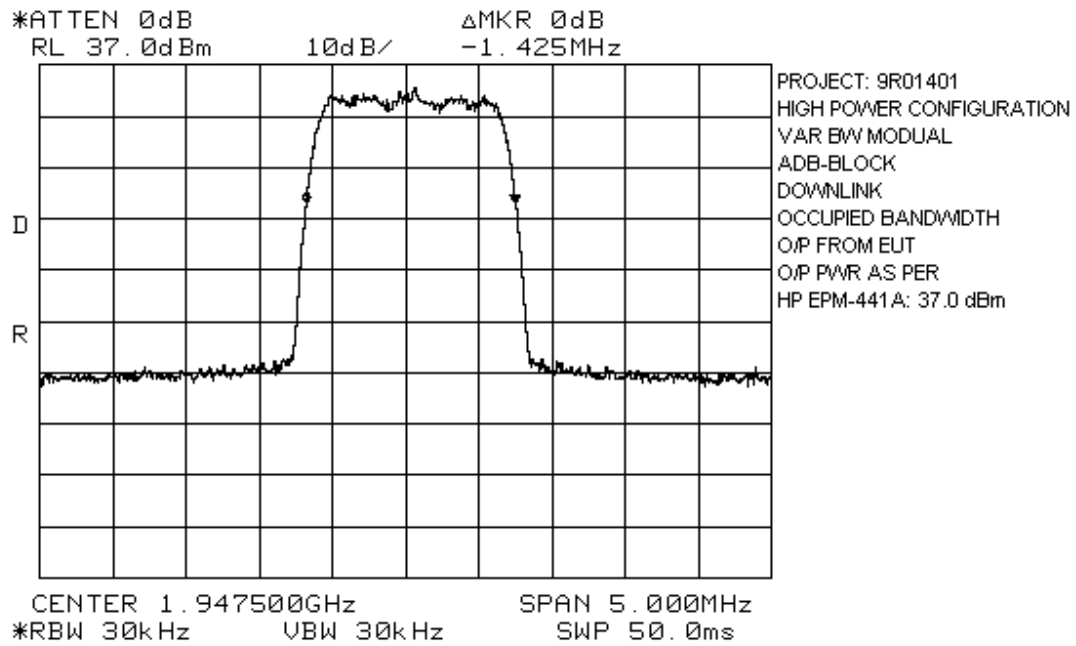
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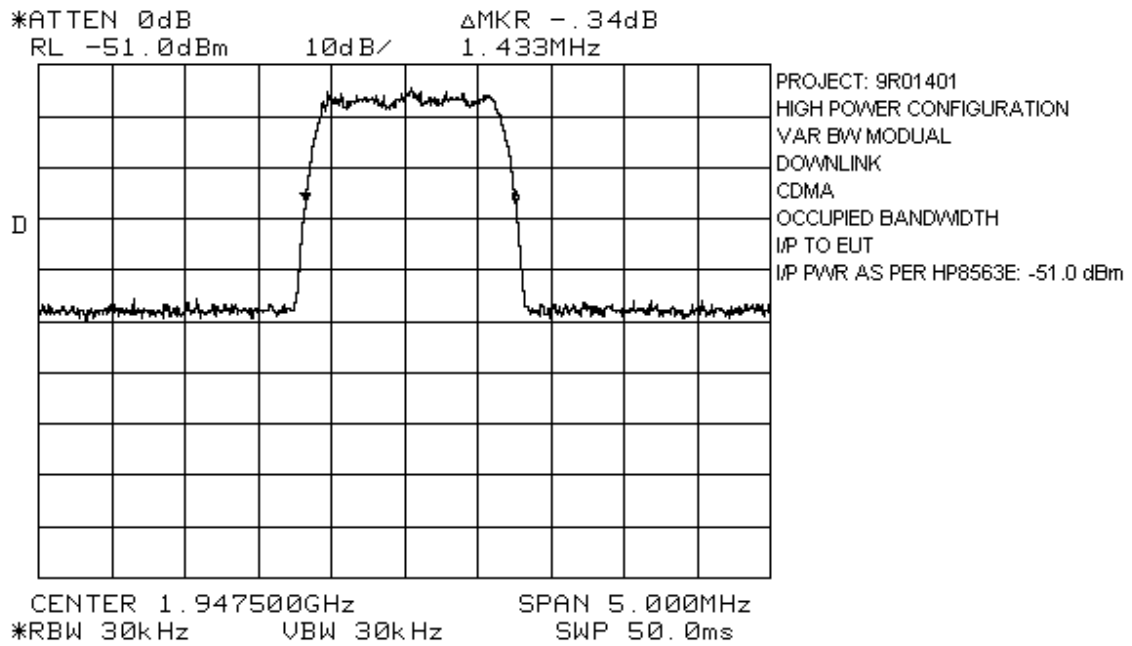
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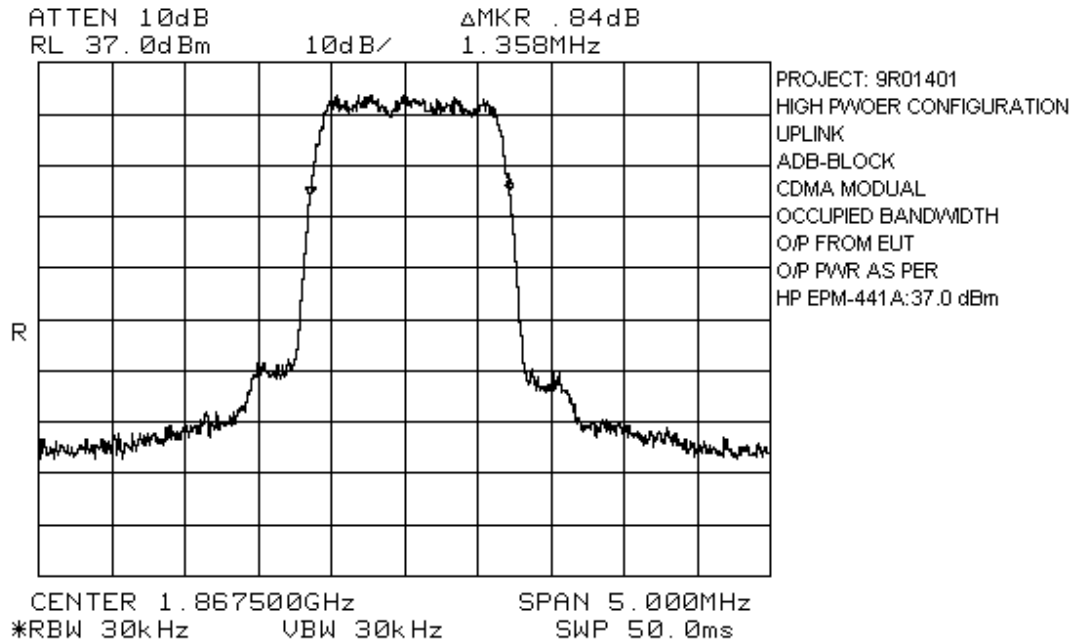
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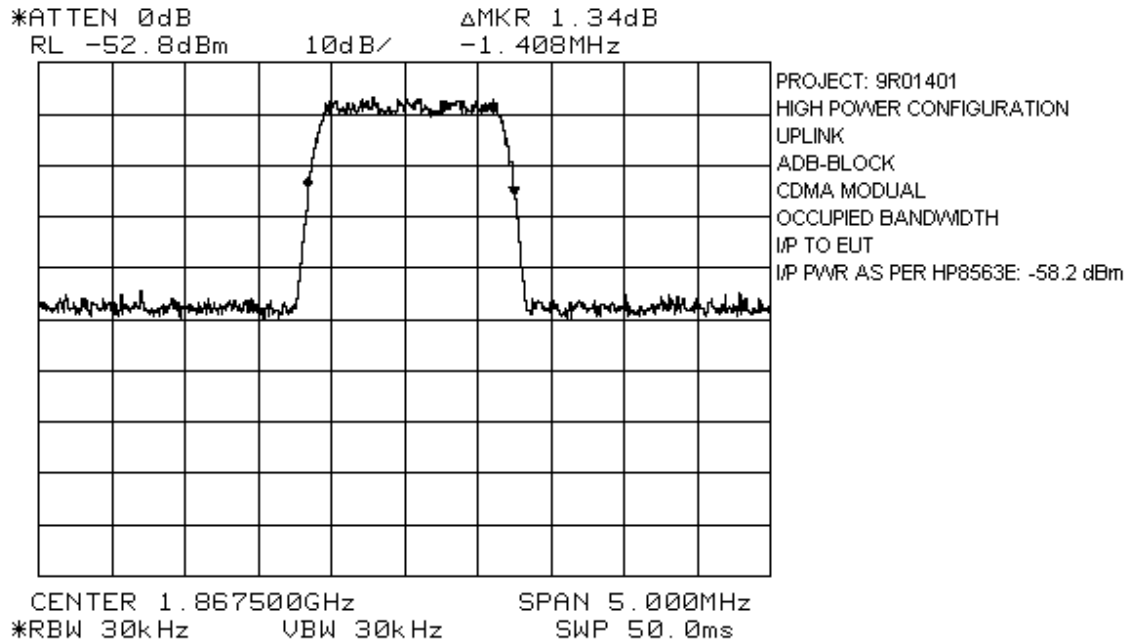
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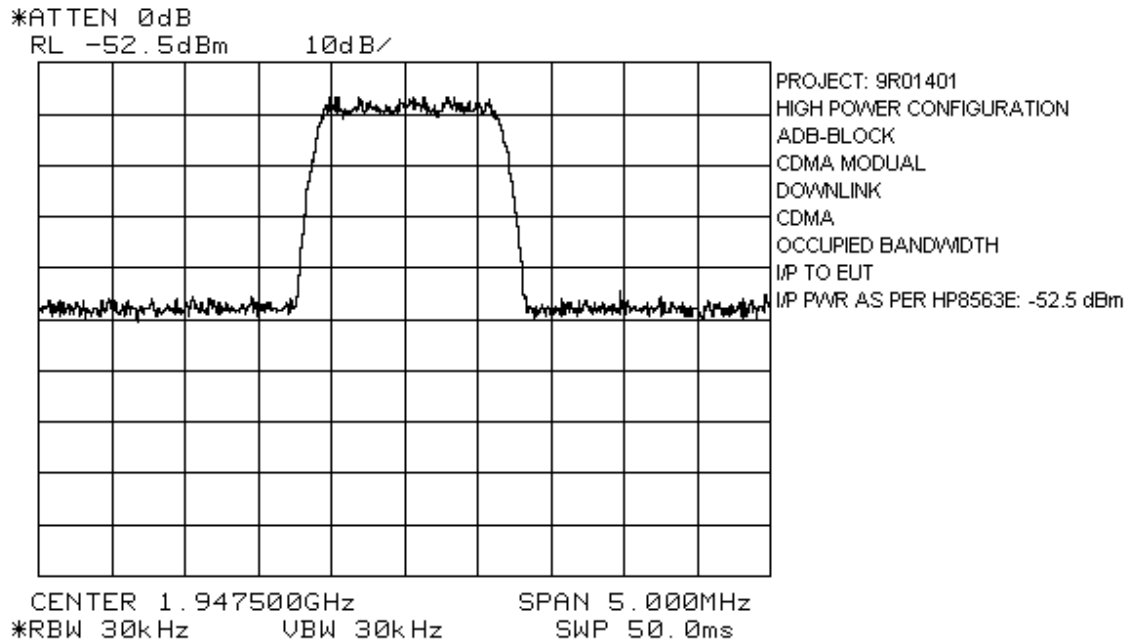
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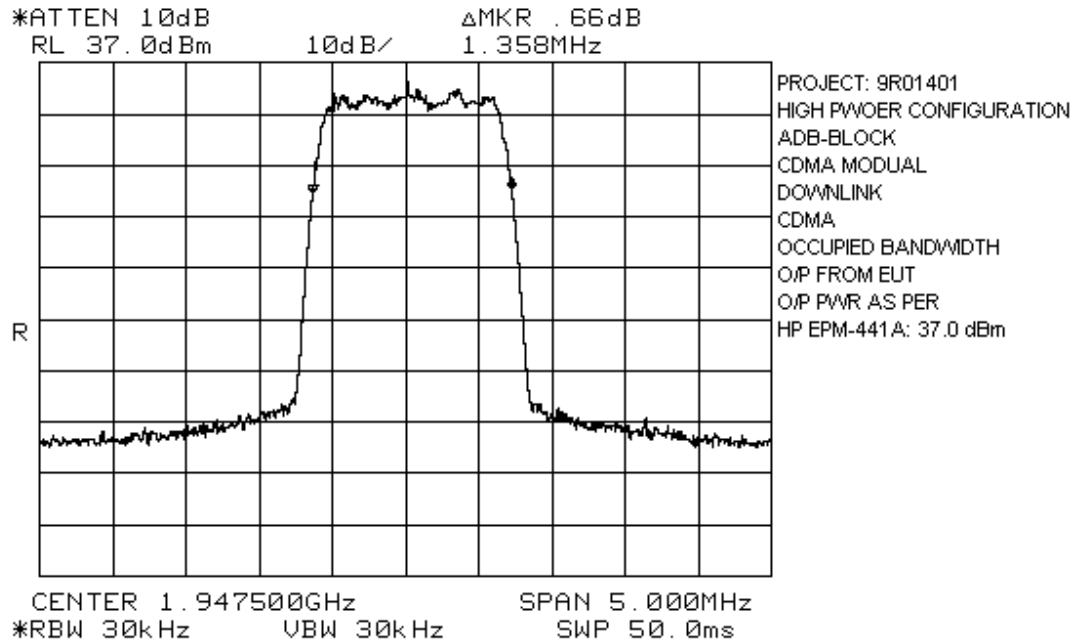
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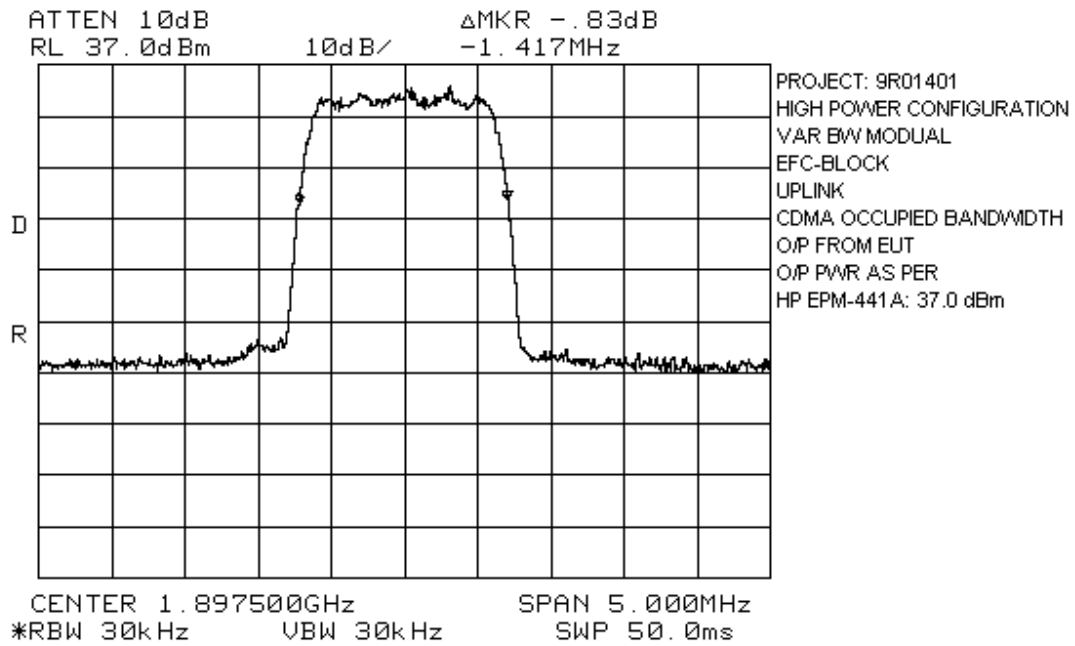
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BROADBAND PCS REPEATERS
PROJECT NO.: 9R01401

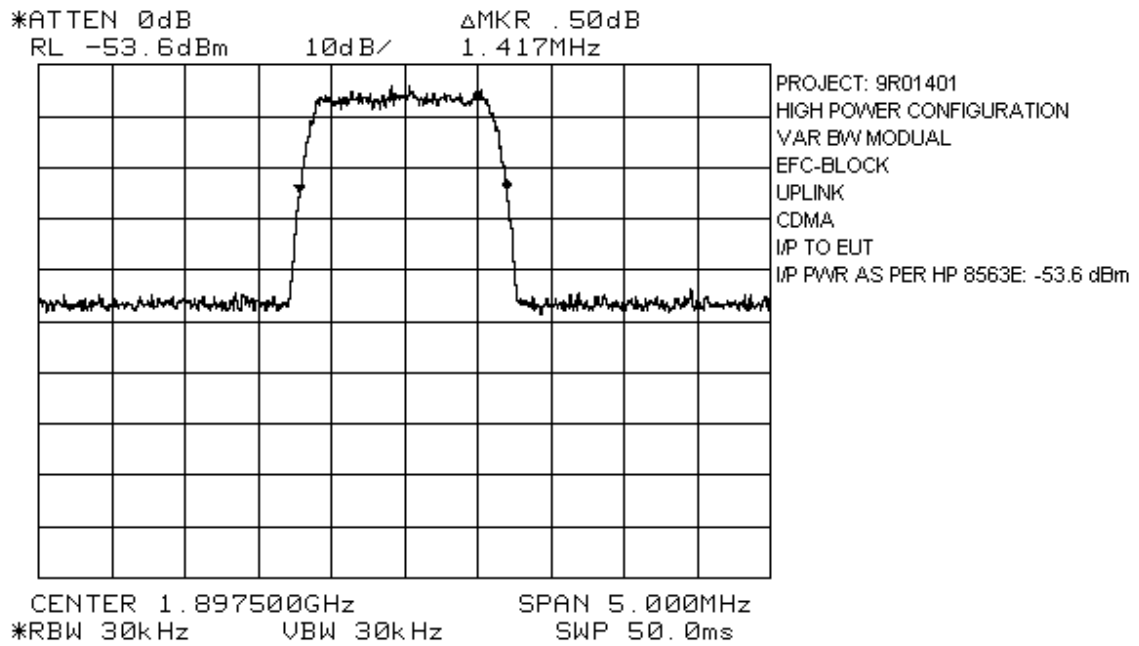
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EFC - Block

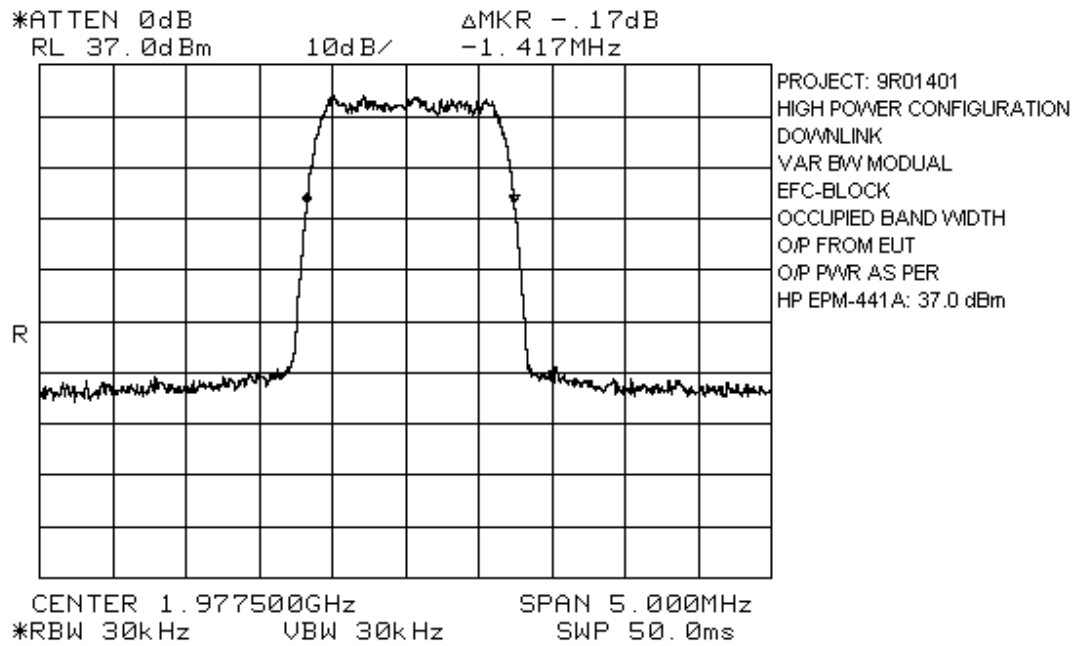
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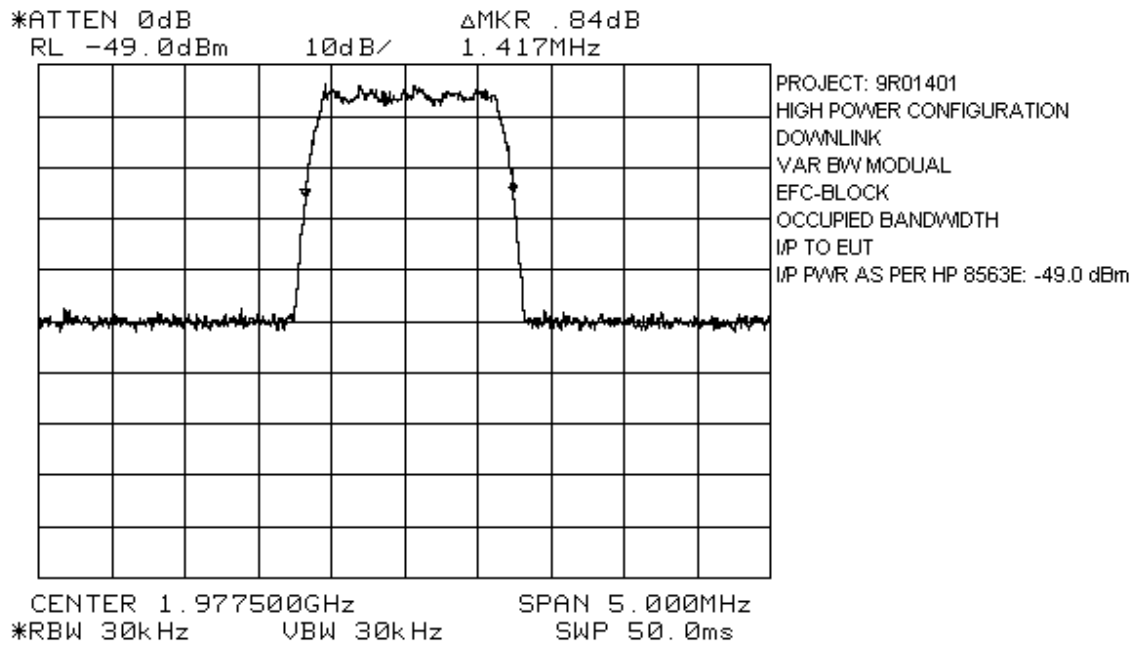
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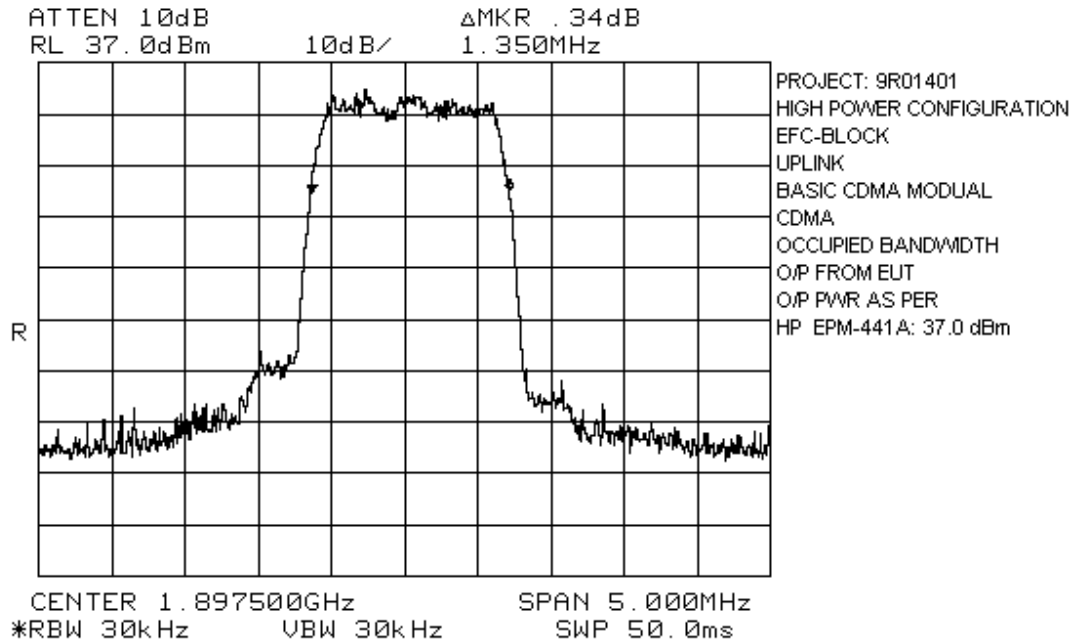
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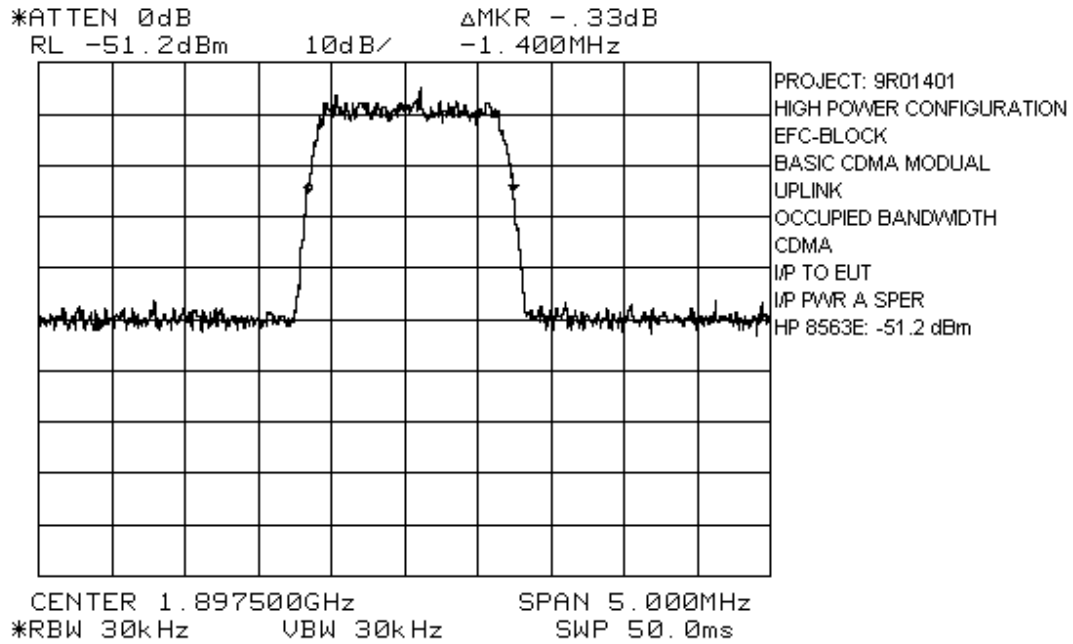
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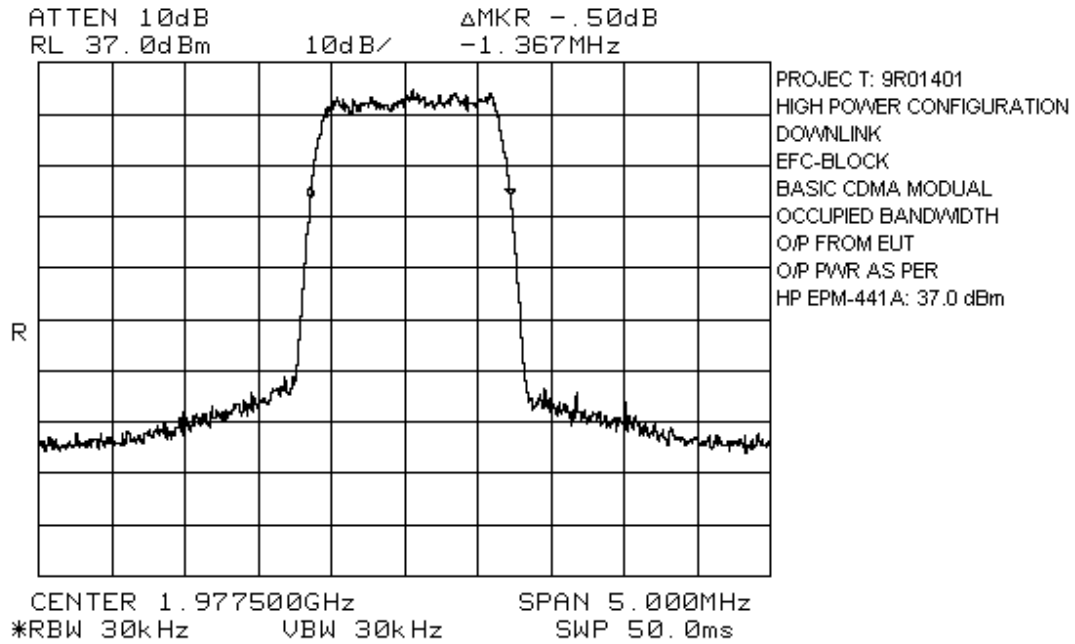
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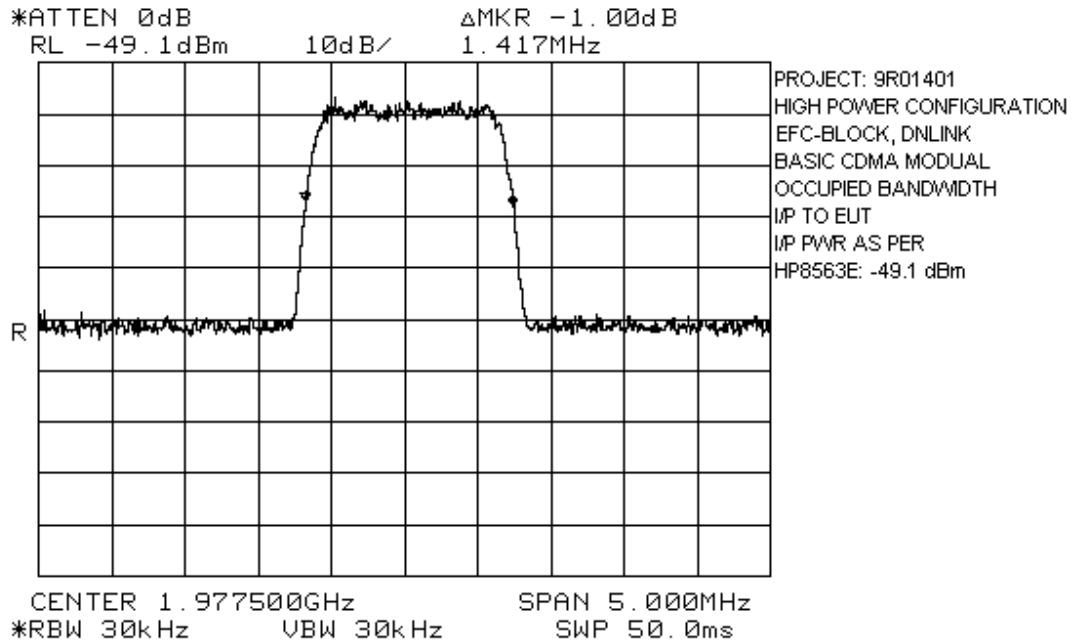
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EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

NAME OF TEST: Occupied Bandwidth (GSM)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: August 16, 1999

Test Results: Complies.

Test Data: See attached graph(s).

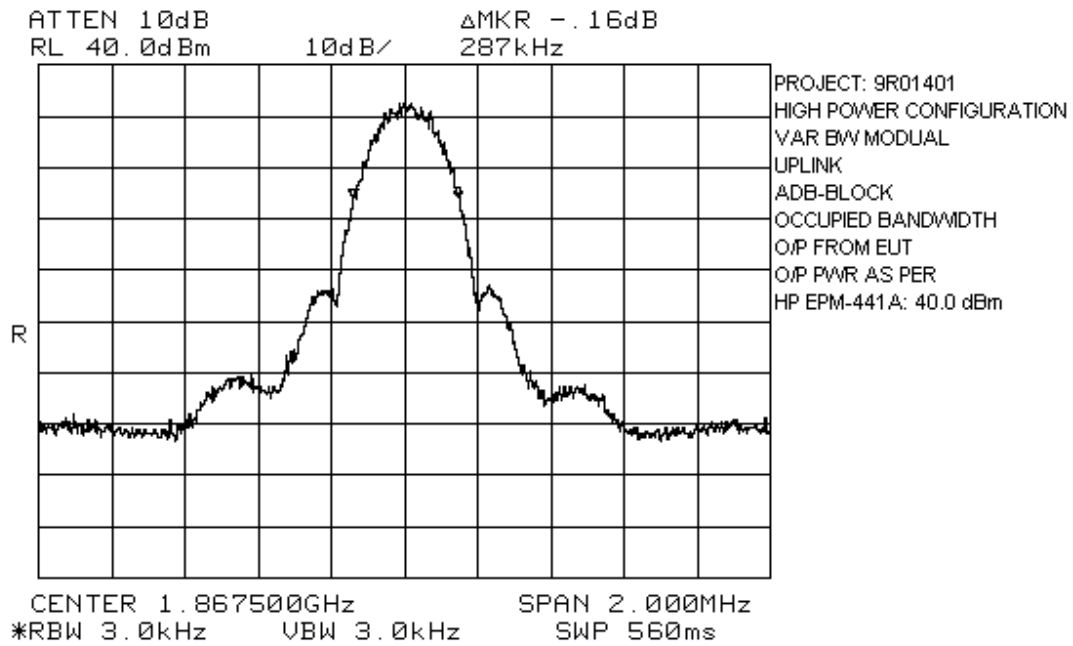
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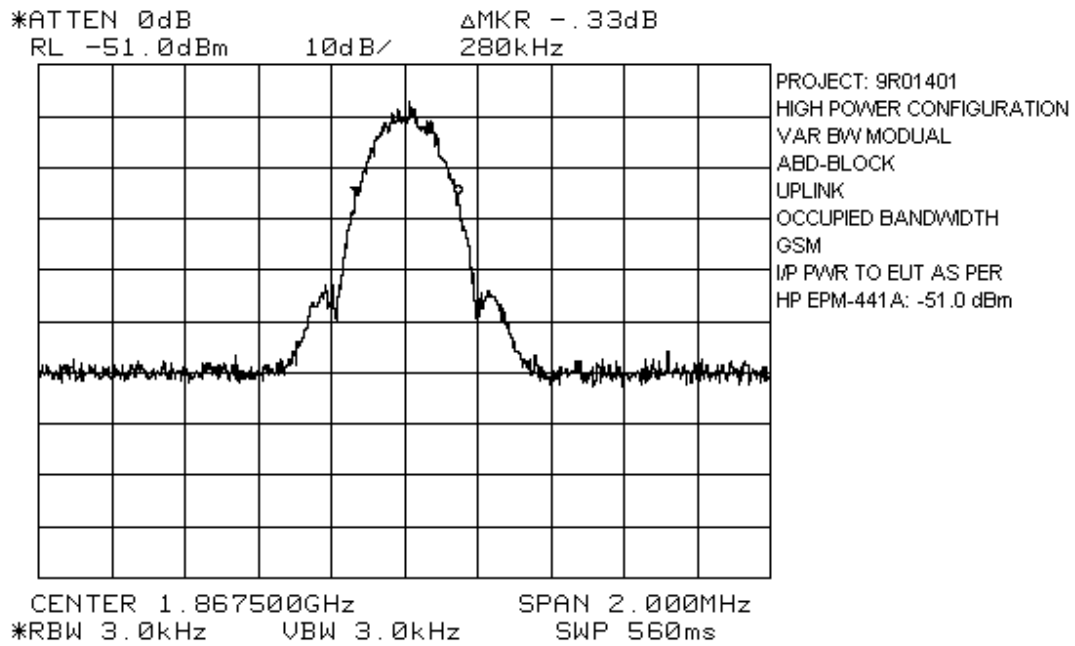
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ADB - Block

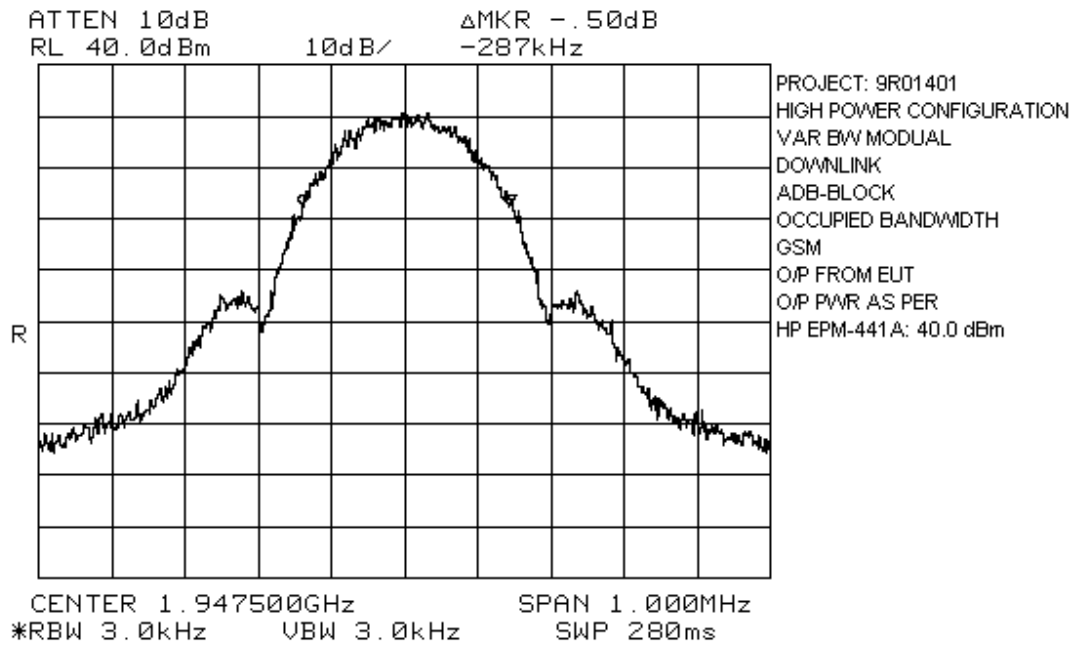
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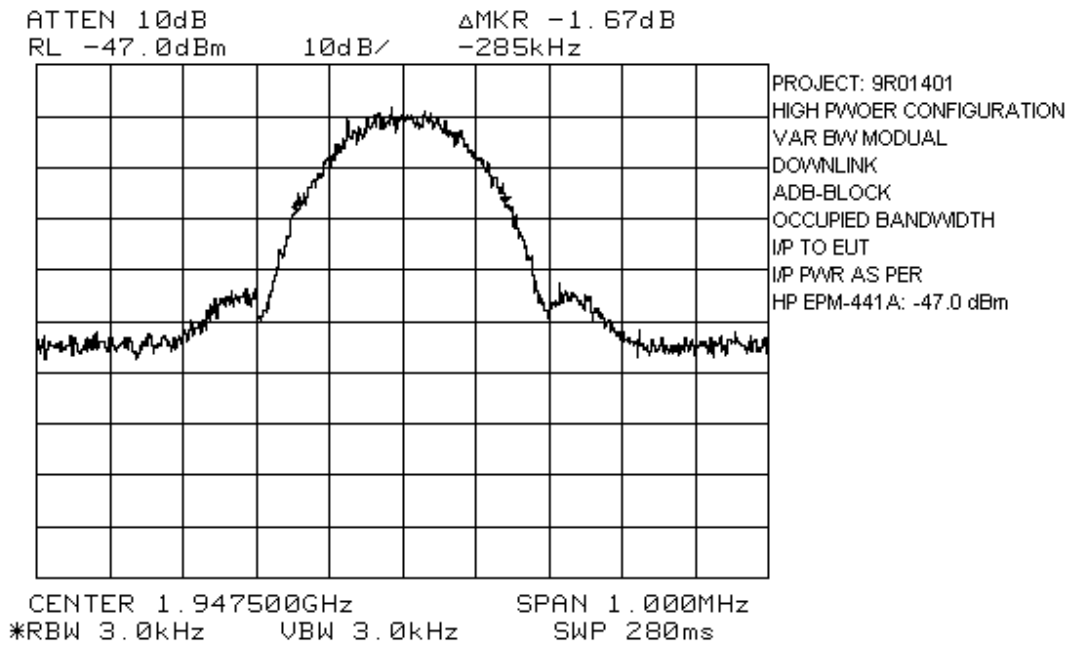
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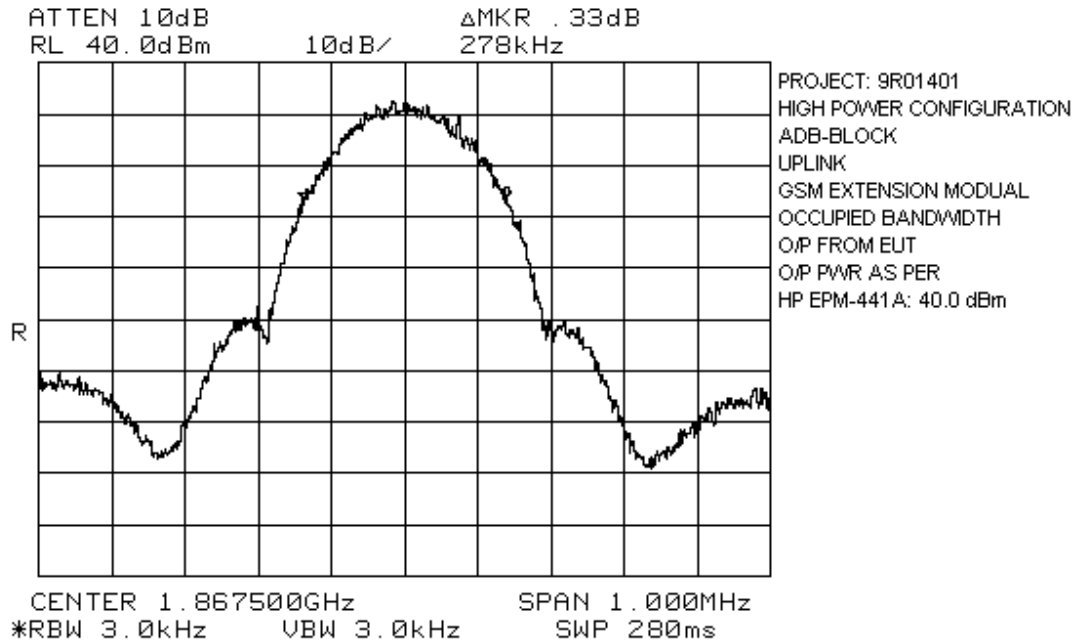
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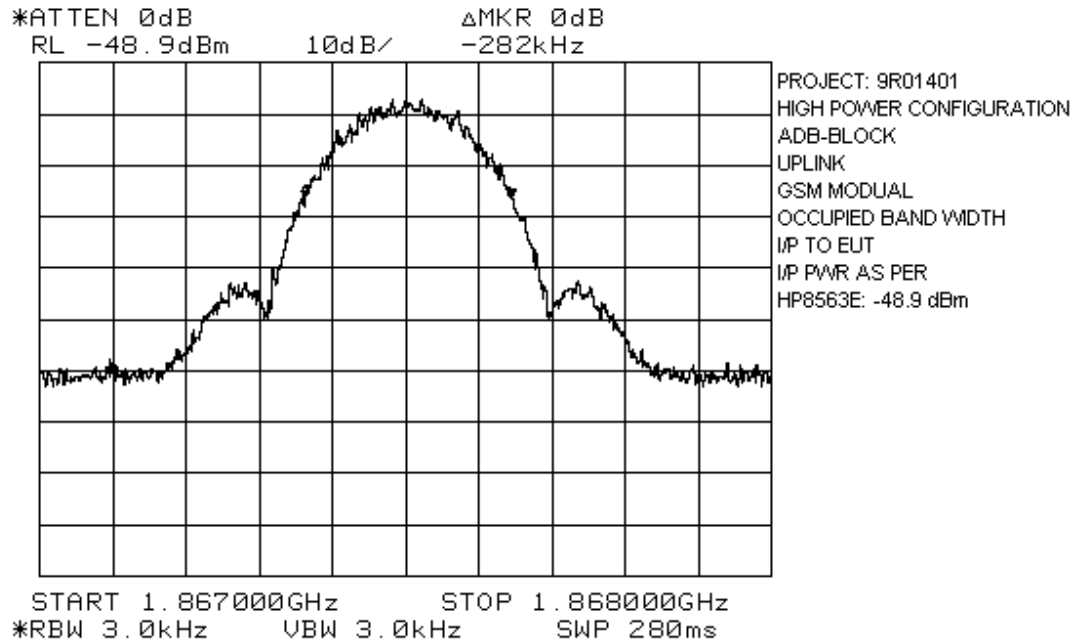
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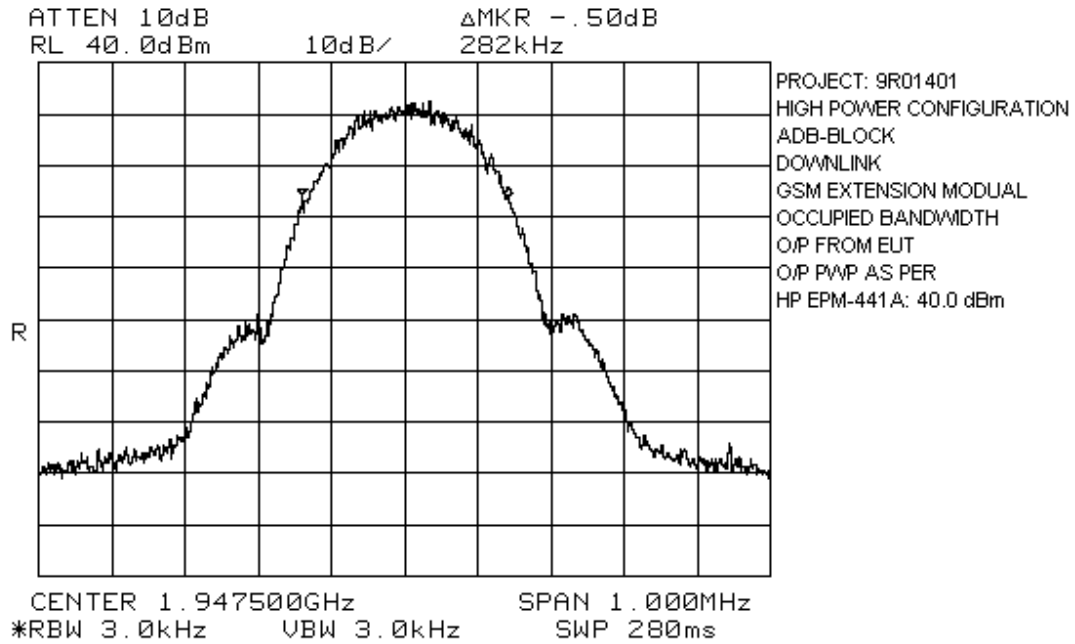
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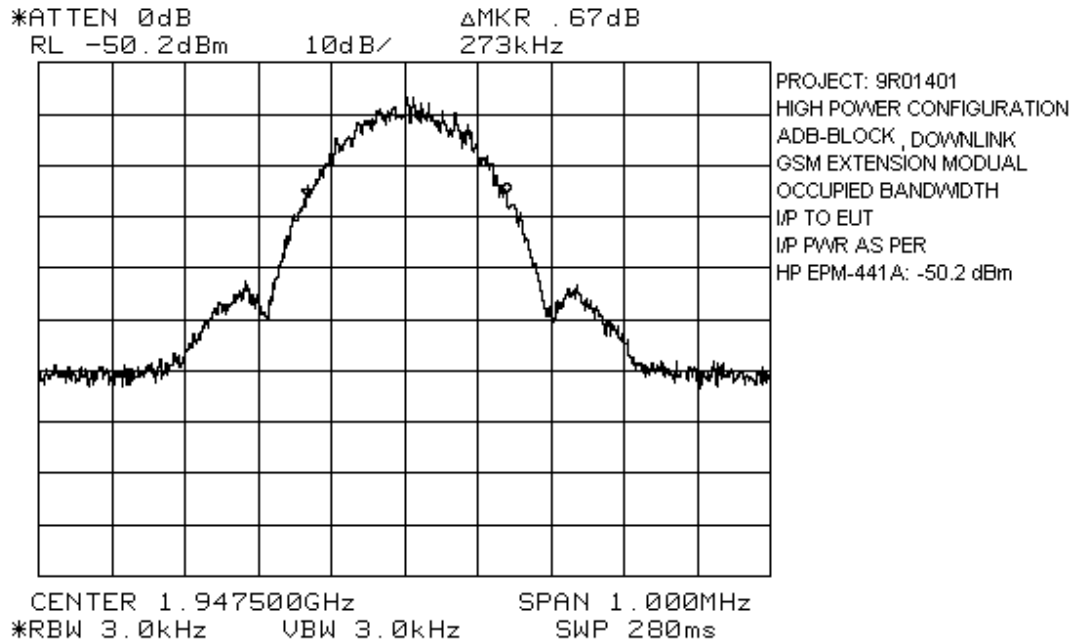
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EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



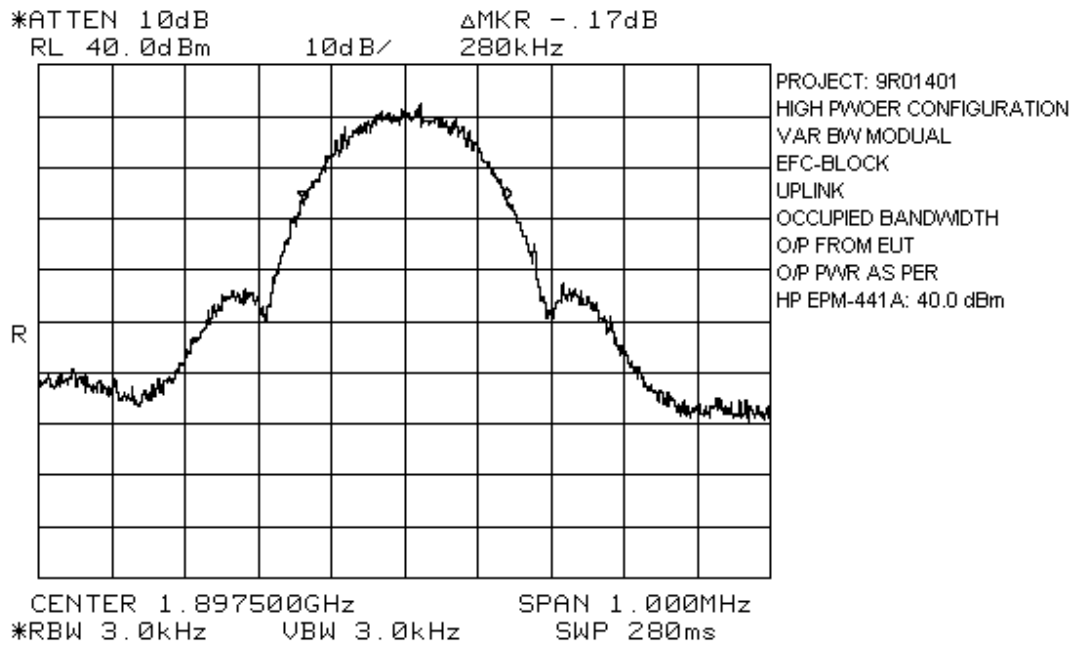
KTL Ottawa

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS
PROJECT NO.: 9R01401

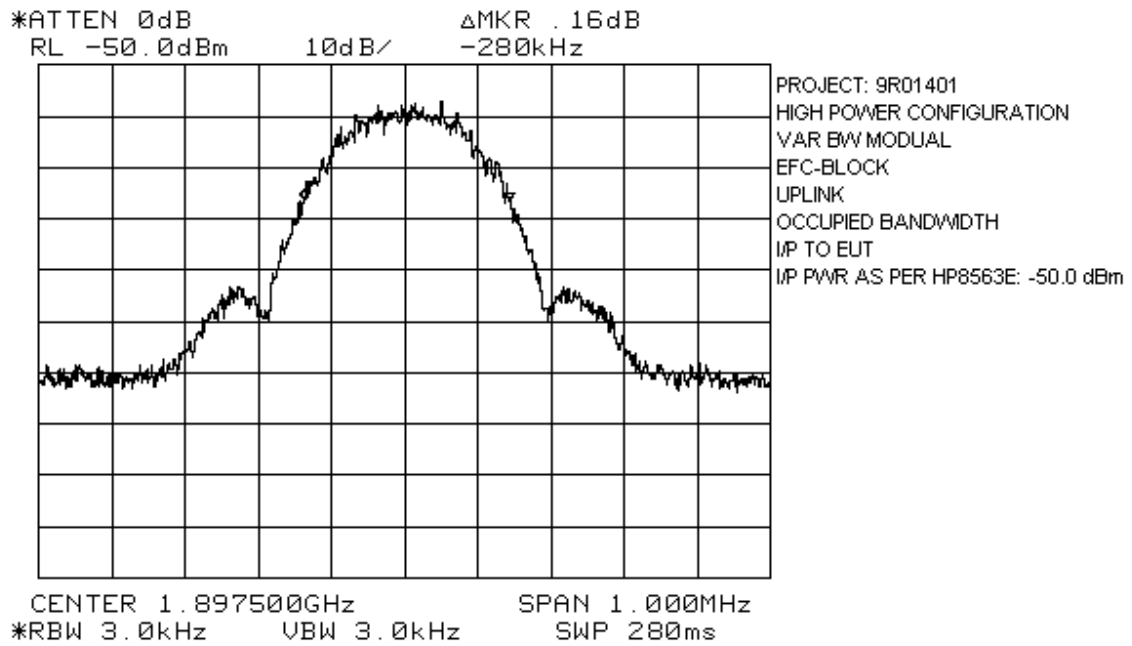
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EFC - Block

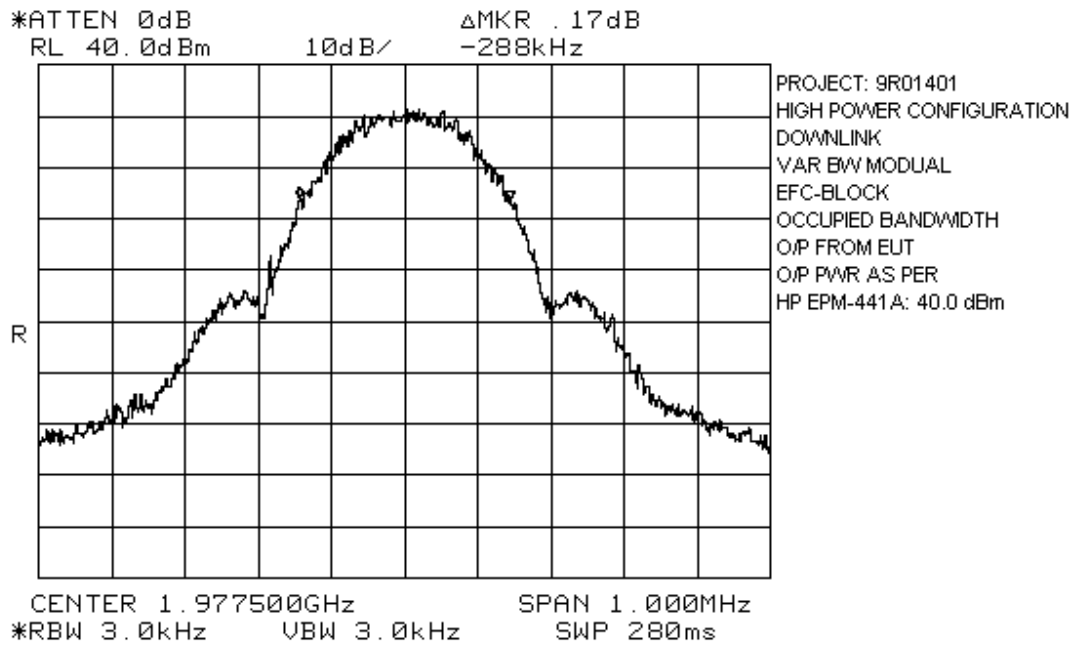
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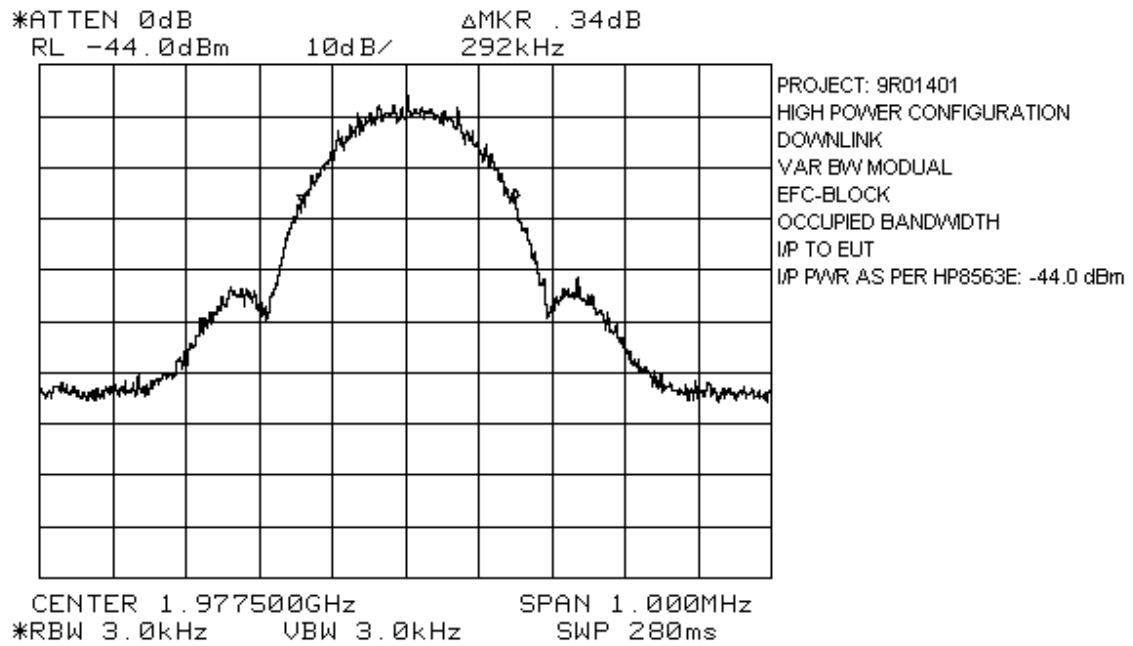
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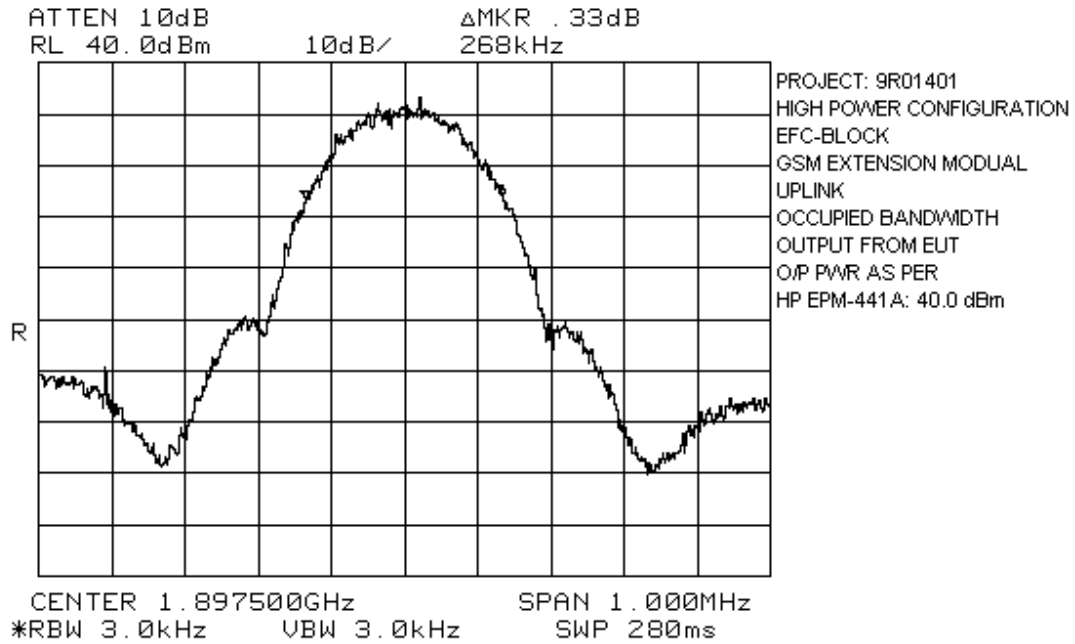
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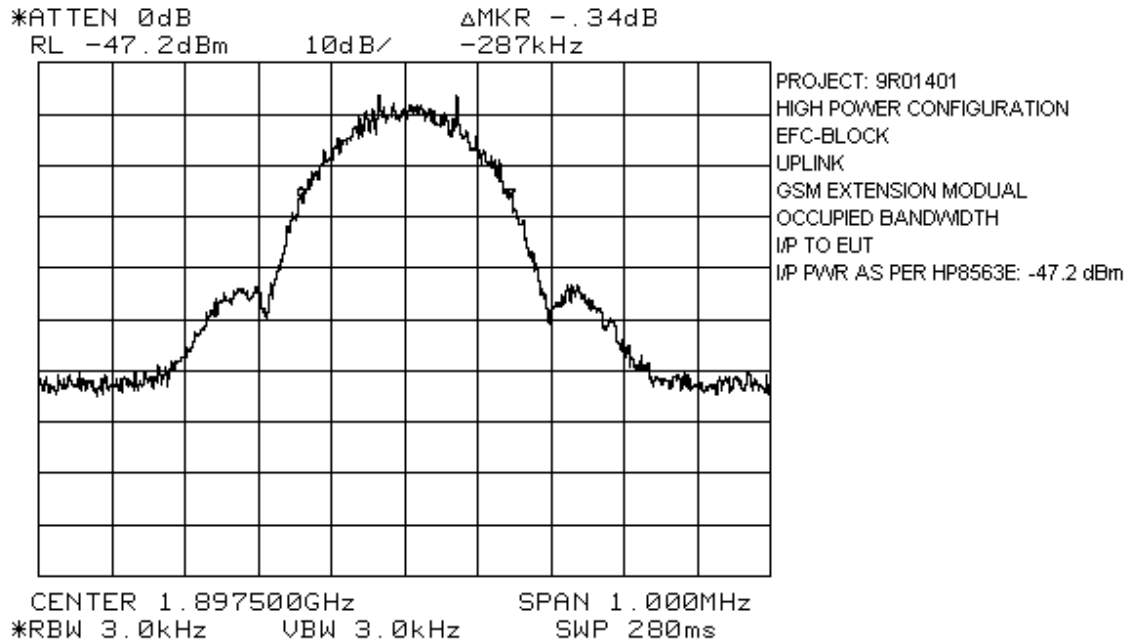
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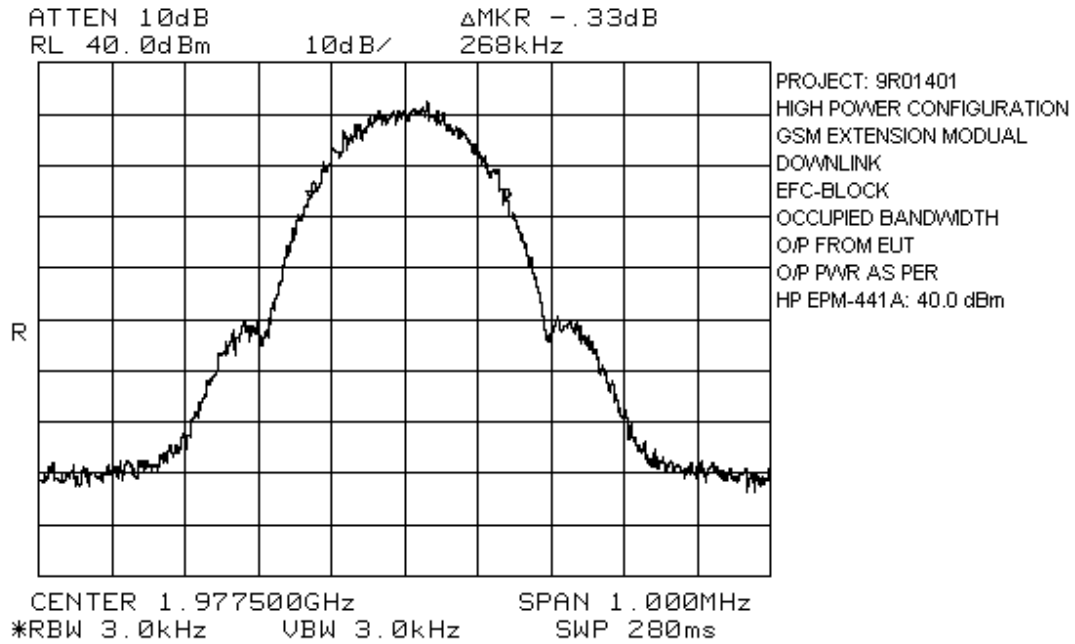
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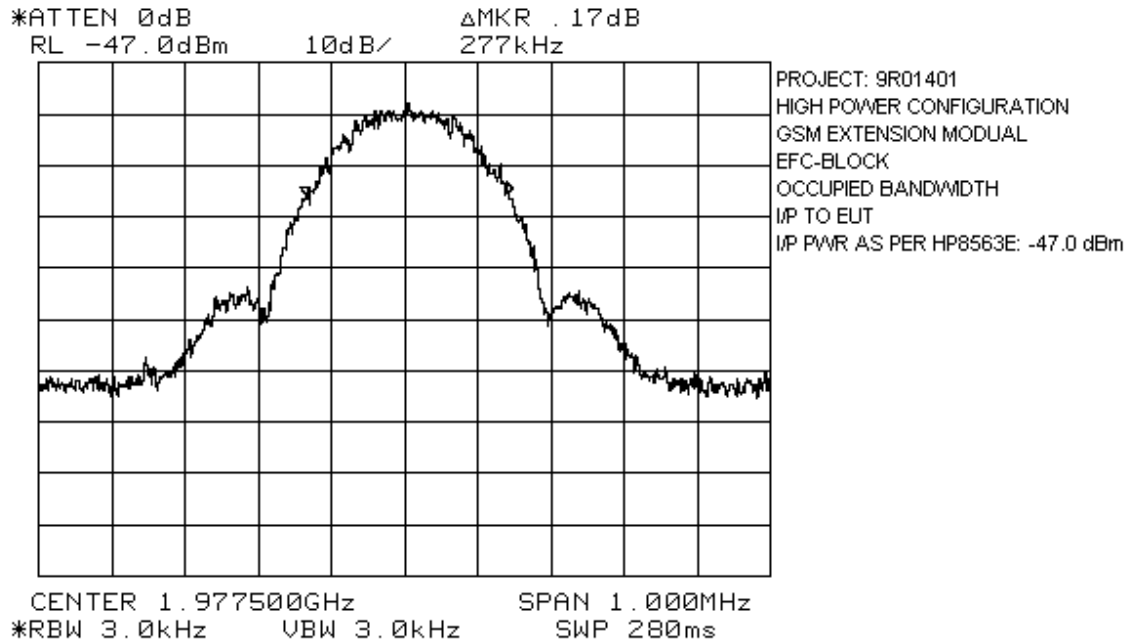
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EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

NAME OF TEST: Occupied Bandwidth (TDMA)	PARA. NO.: 2.917(c)
TESTED BY: Kevin Carr	DATE: August 16, 1999

Test Results: Complies.

Test Data: See attached graph(s).

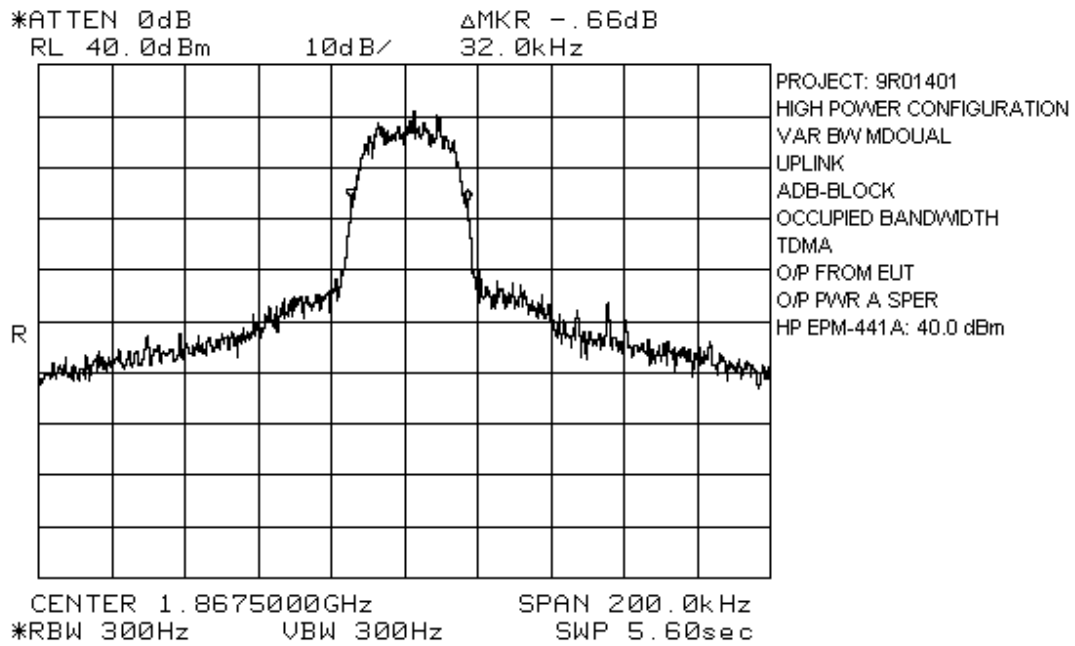
KTL Ottawa

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS
PROJECT NO.: 9R01401

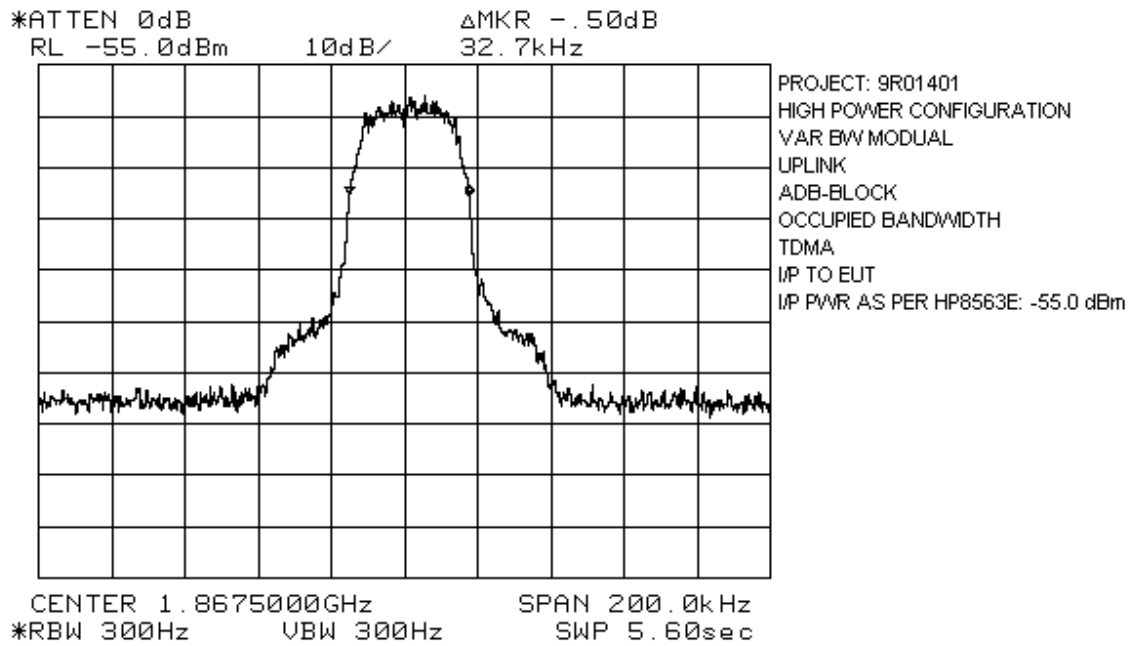
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ADB - Block

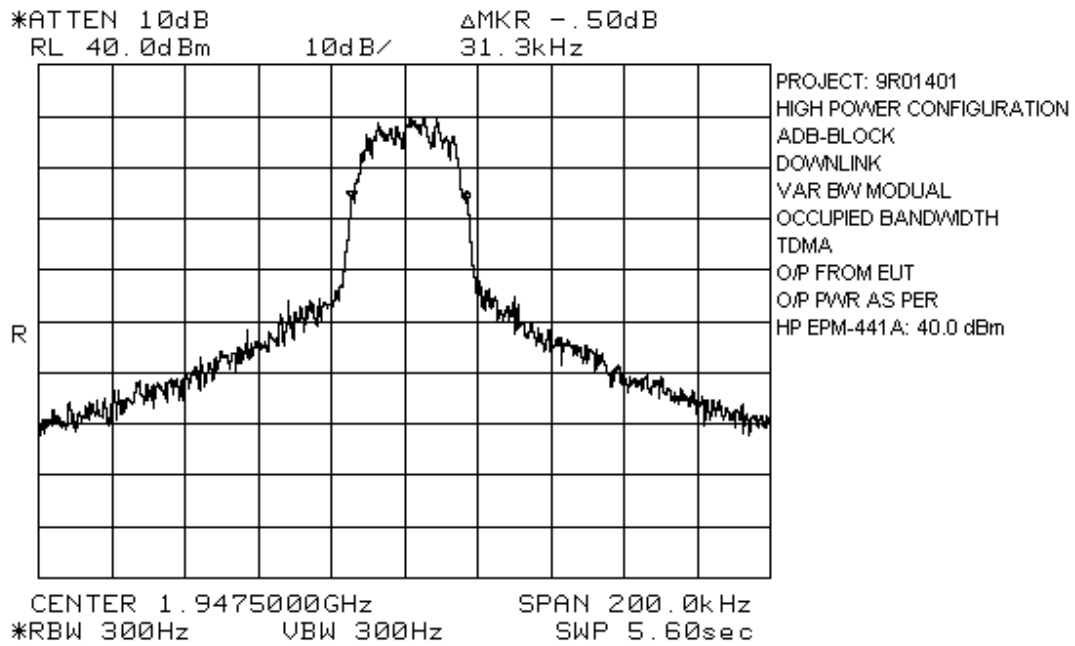
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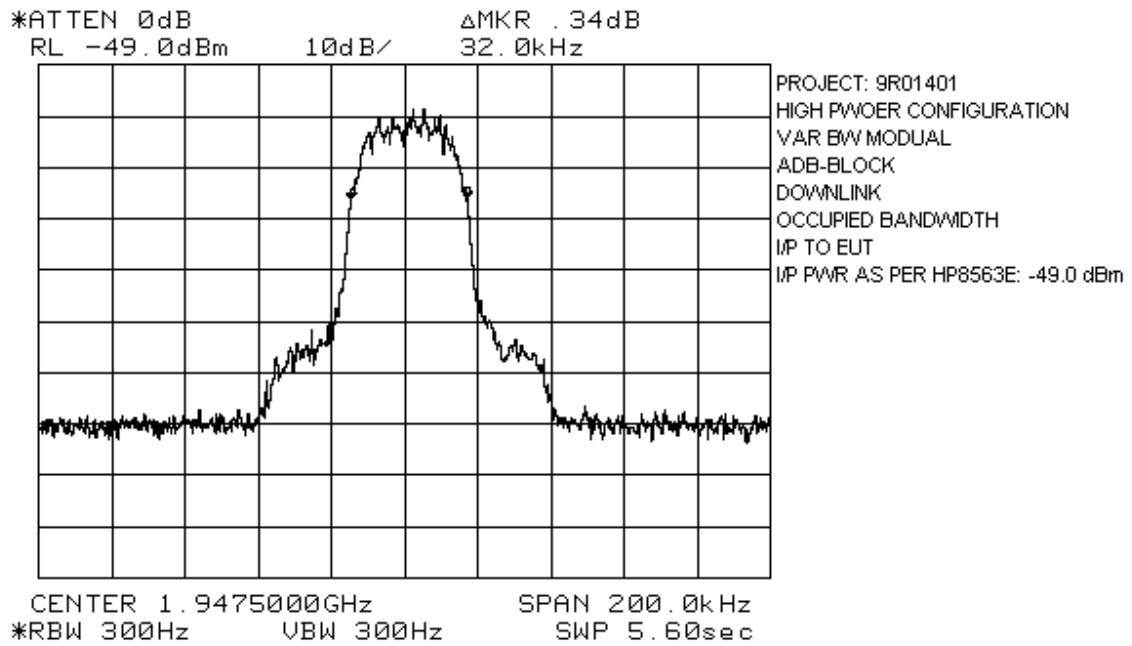
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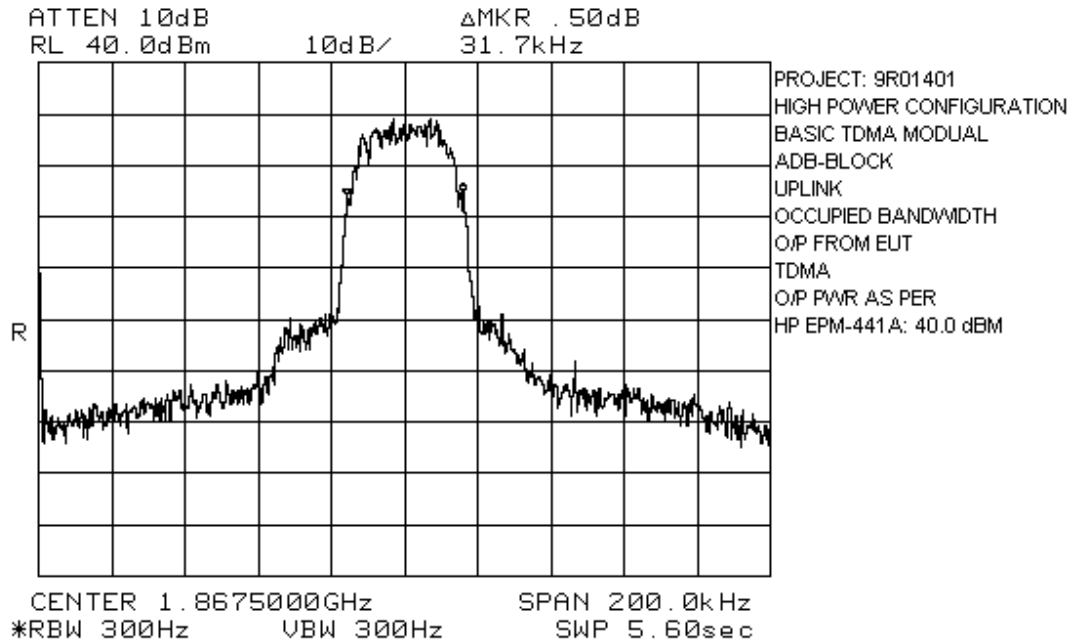
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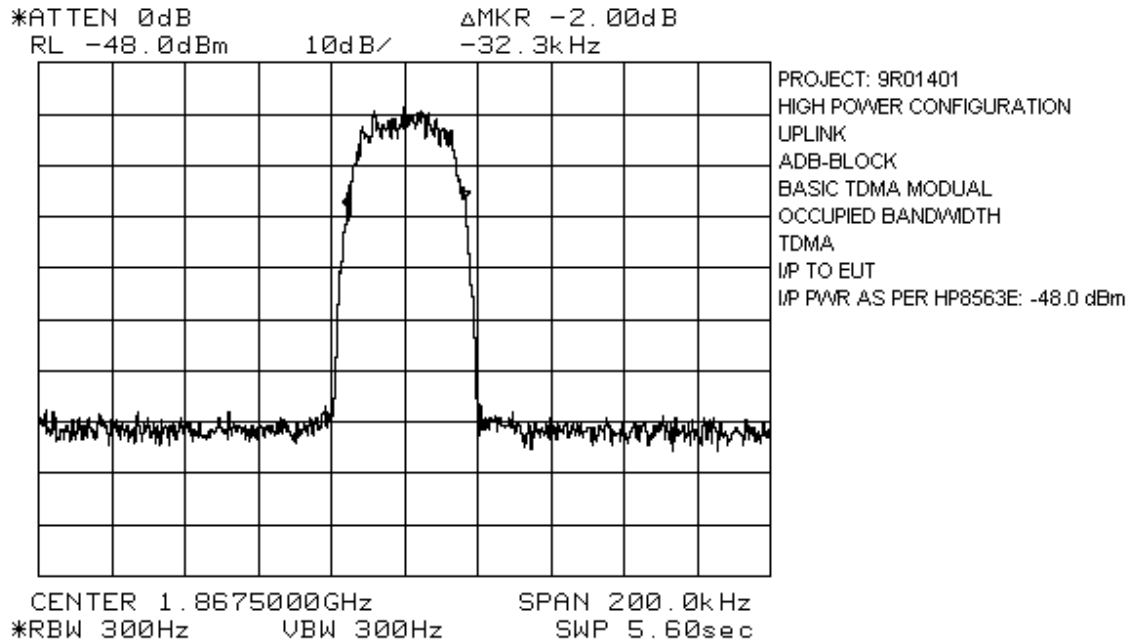
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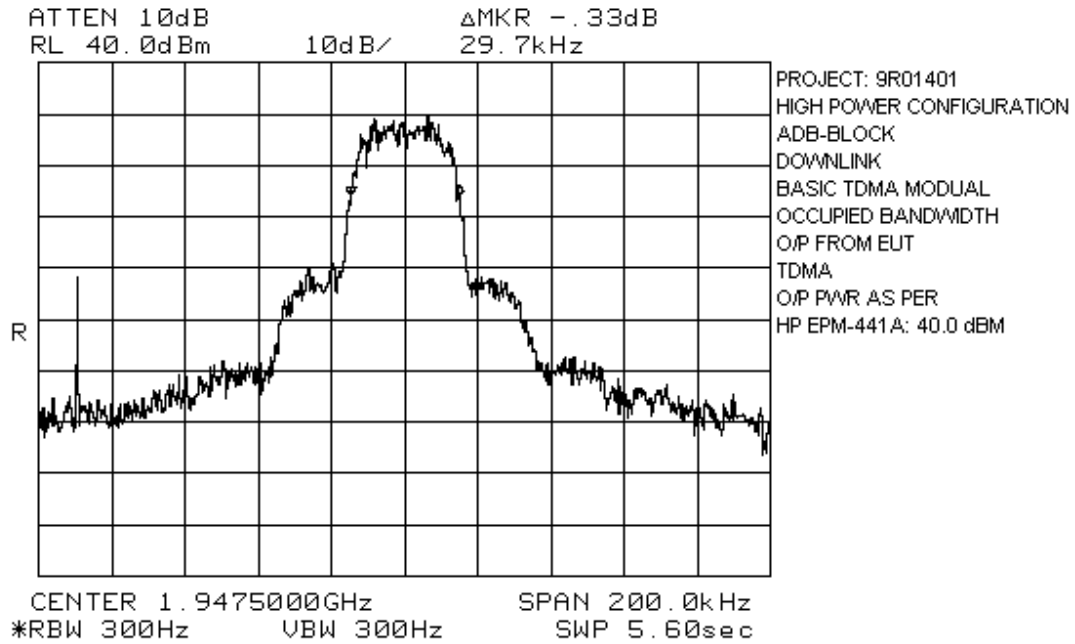
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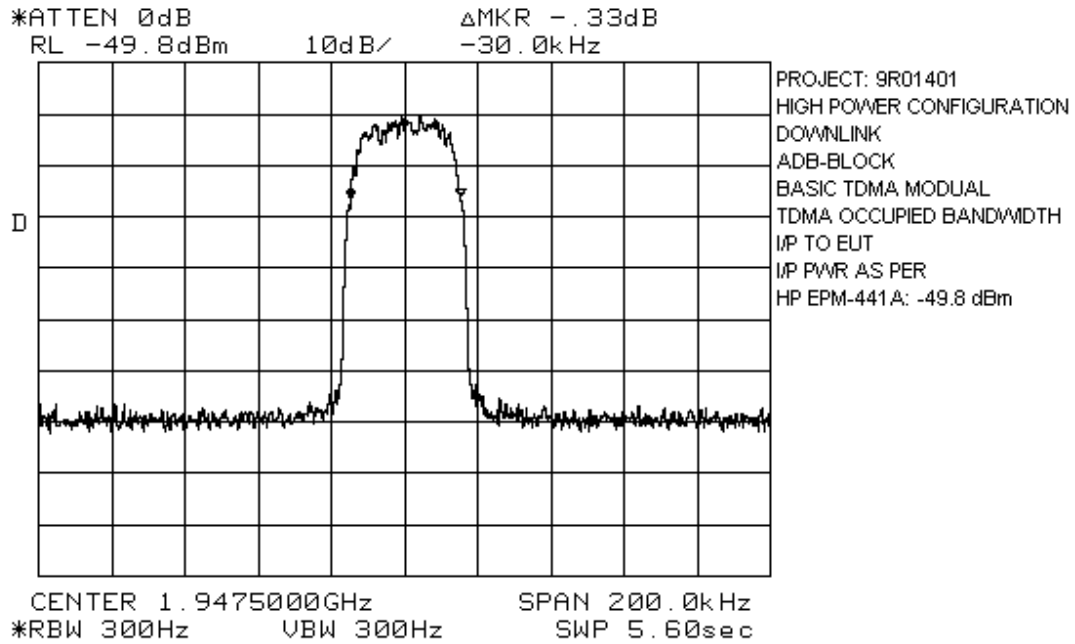
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EQUIPMENT: MR701B Power
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EQUIPMENT: MR701B Power
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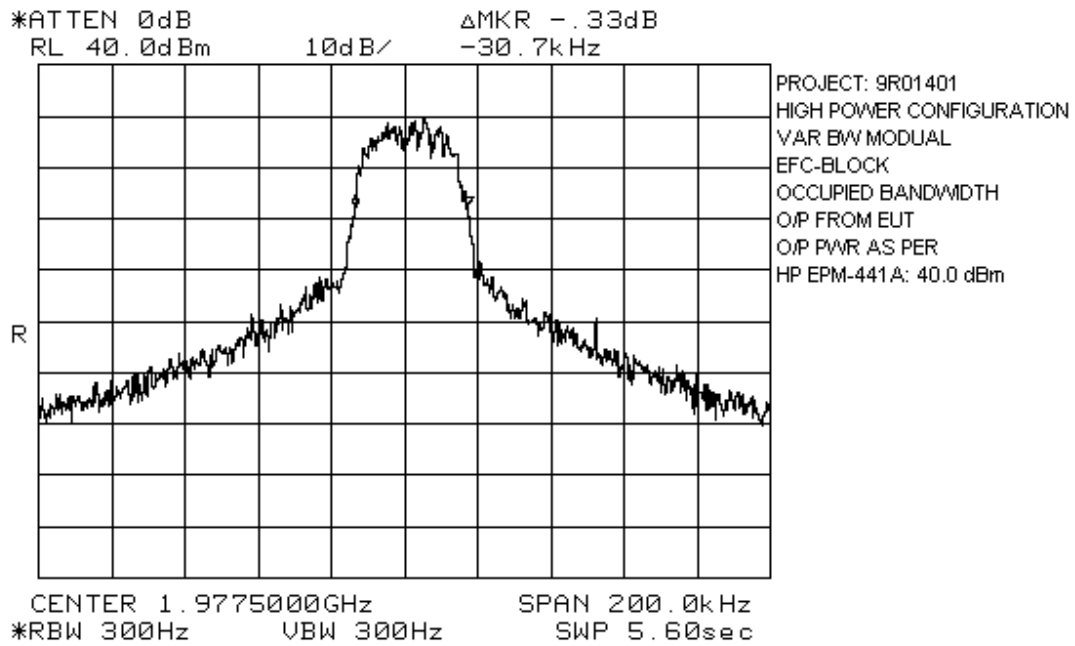
KTL Ottawa

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS
PROJECT NO.: 9R01401

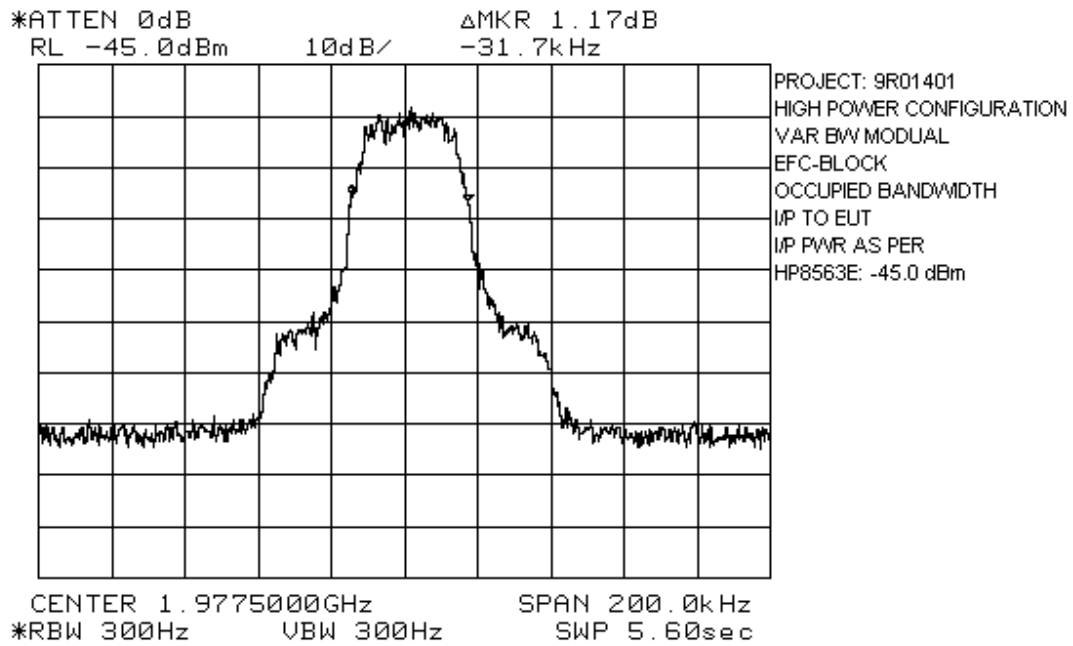
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EFC - Block

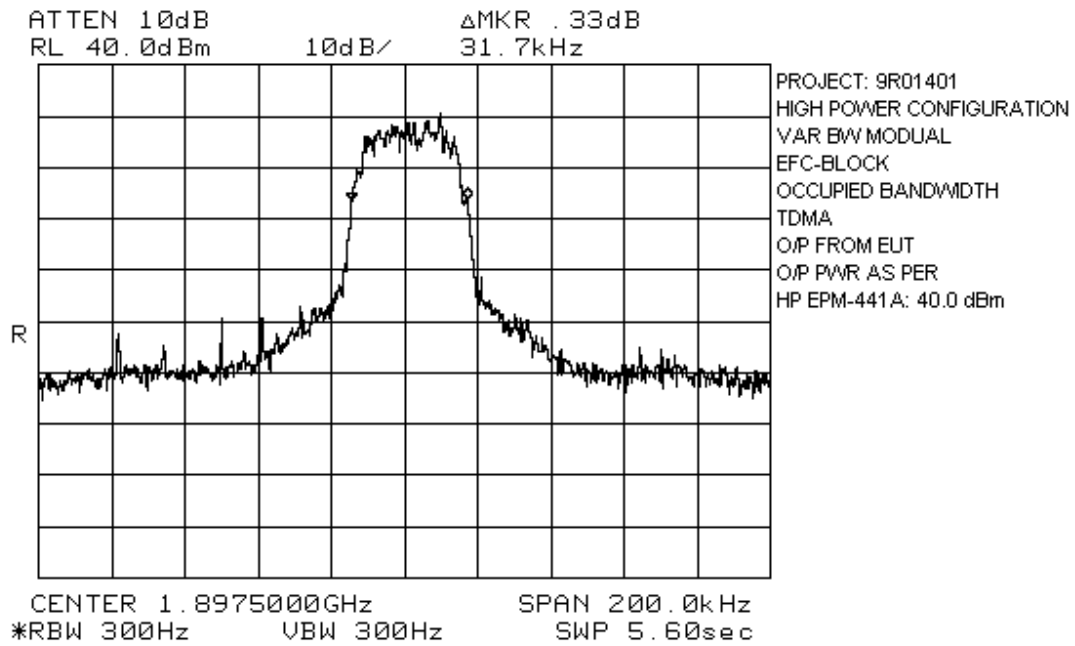
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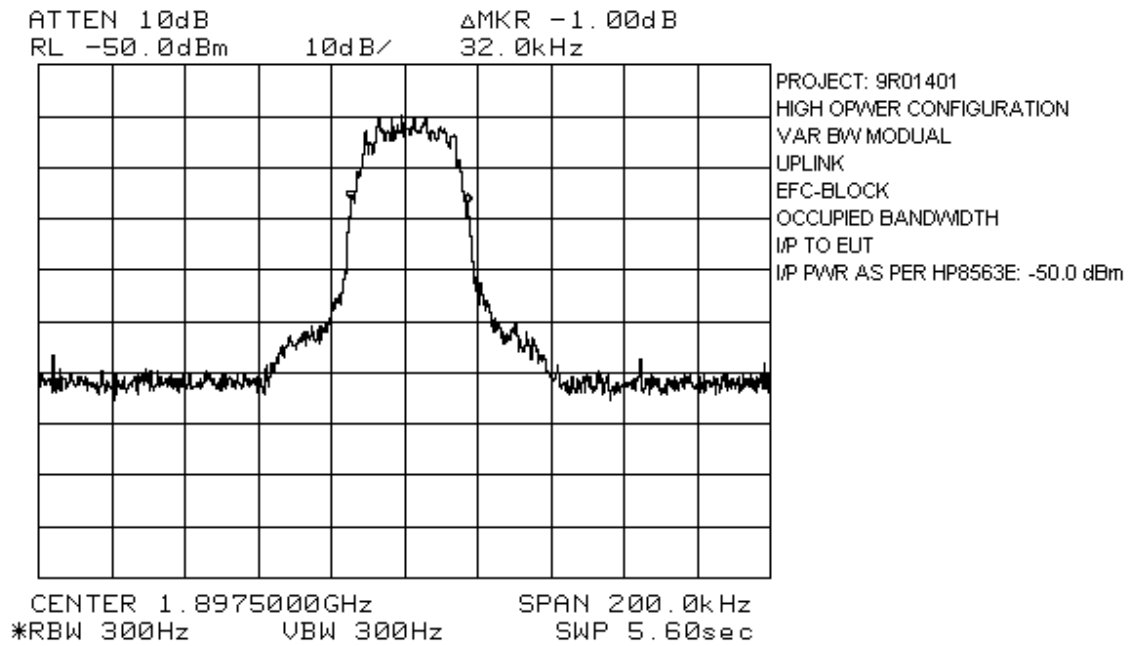
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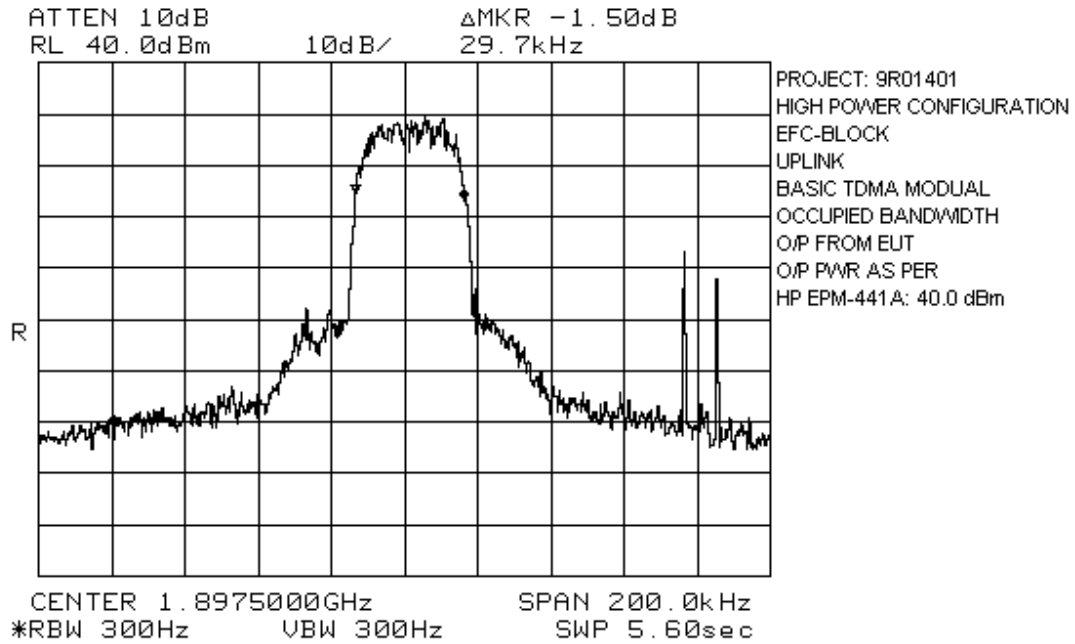
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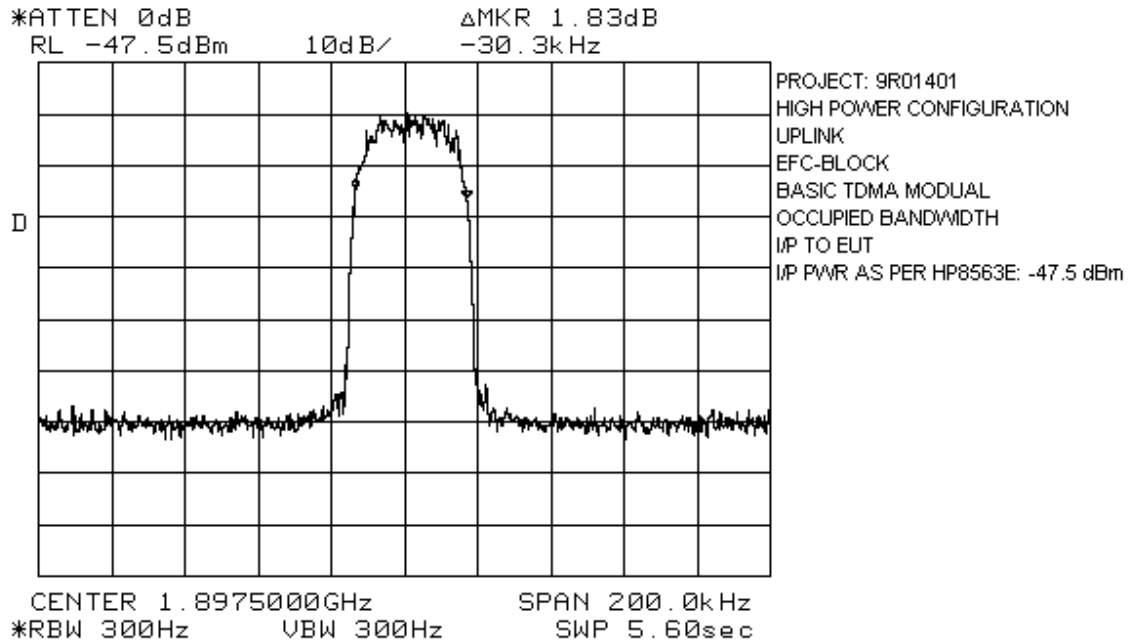
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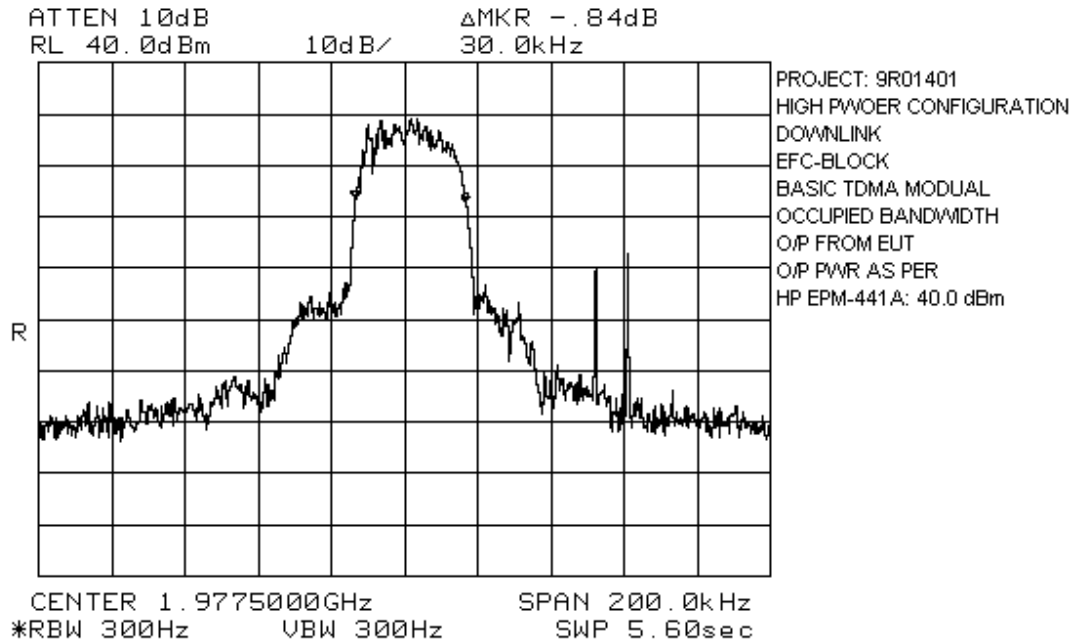
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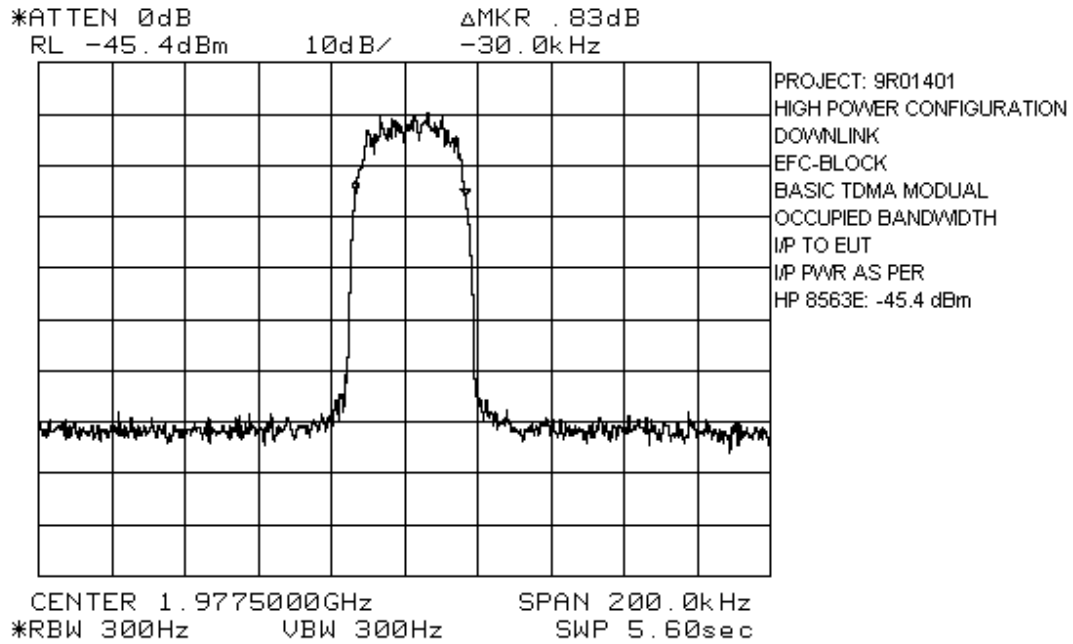
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Kevin Carr	DATE: August 16, 1999

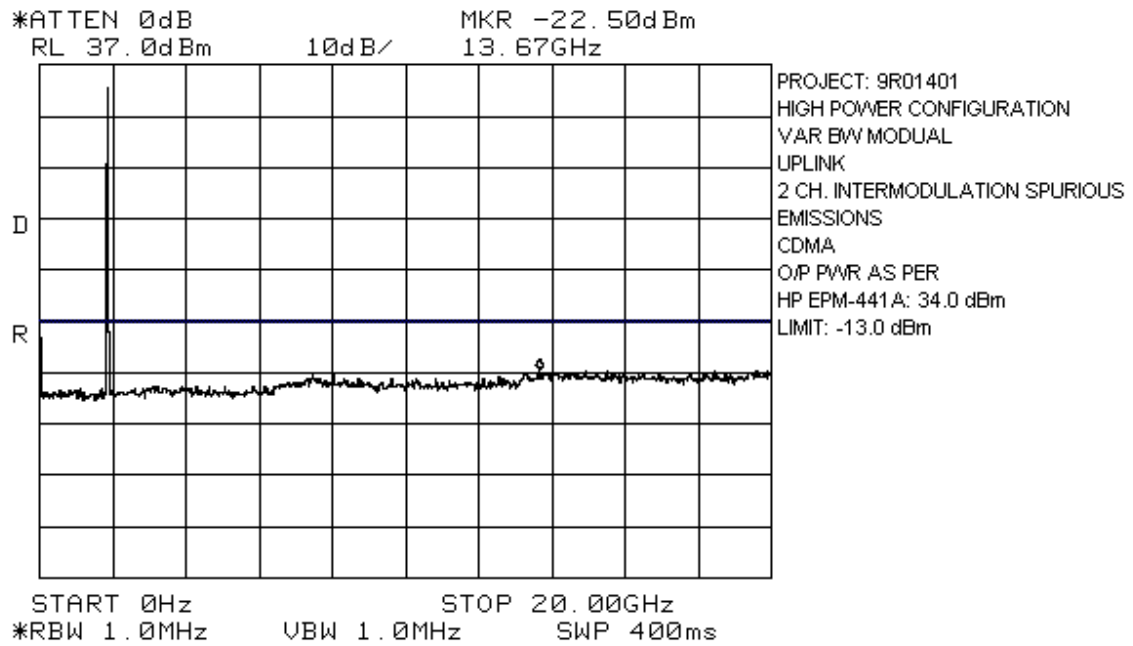
Test Results: Complies.**Test Data:**

NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz spurious (Uplink)	-21.6
0 to 20 GHz spurious (Downlink)	-20.3
2 - signal intermodulation (Uplink)	-13.0
2 - signal intermodulation (Downlink)	-13.0
Lower band edge spurious (Uplink)	-13.0
Lower band edge spurious (Downlink)	-13.0
Upper band edge spurious (Uplink)	-13.0
Upper band edge spurious (Downlink)	-13.0

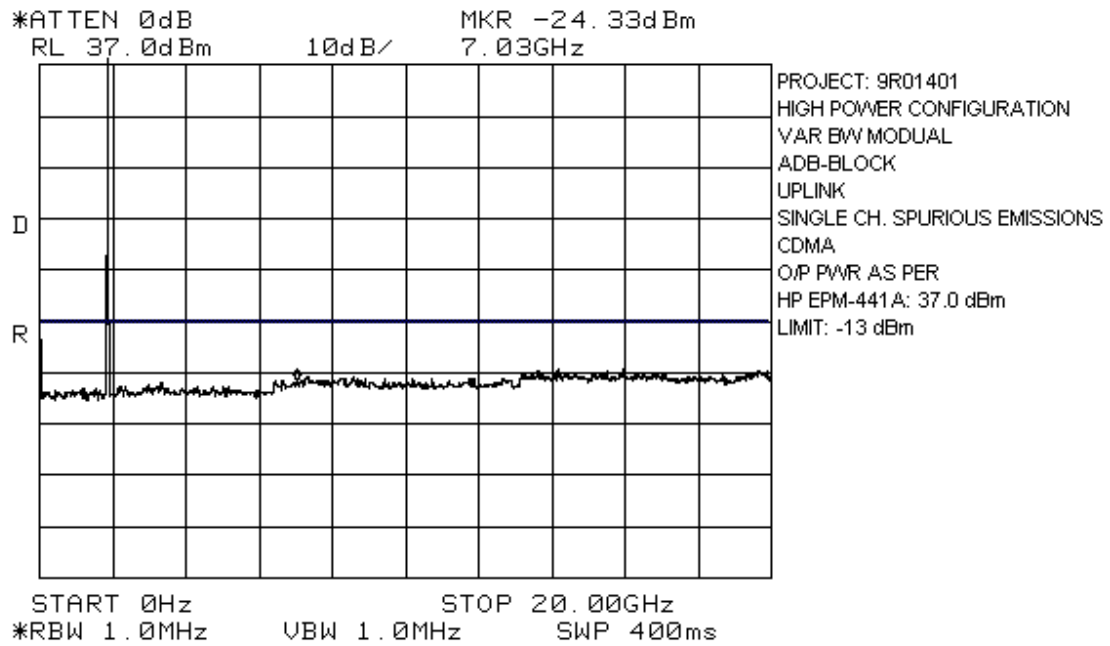
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Variable Bandwidth Module – ADB Block

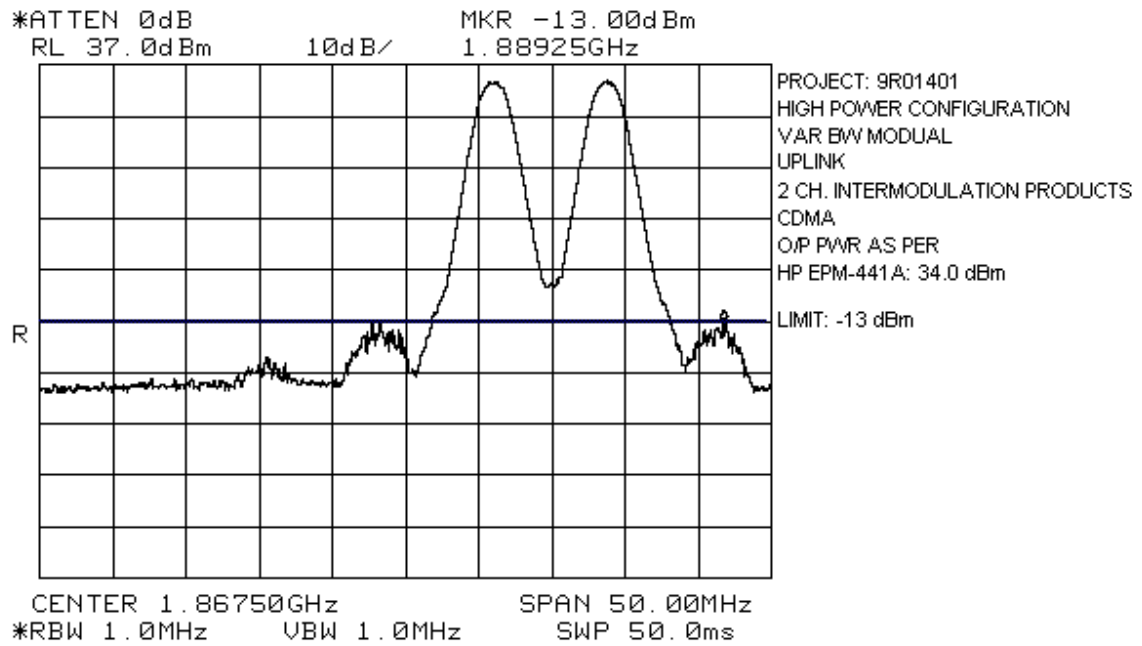
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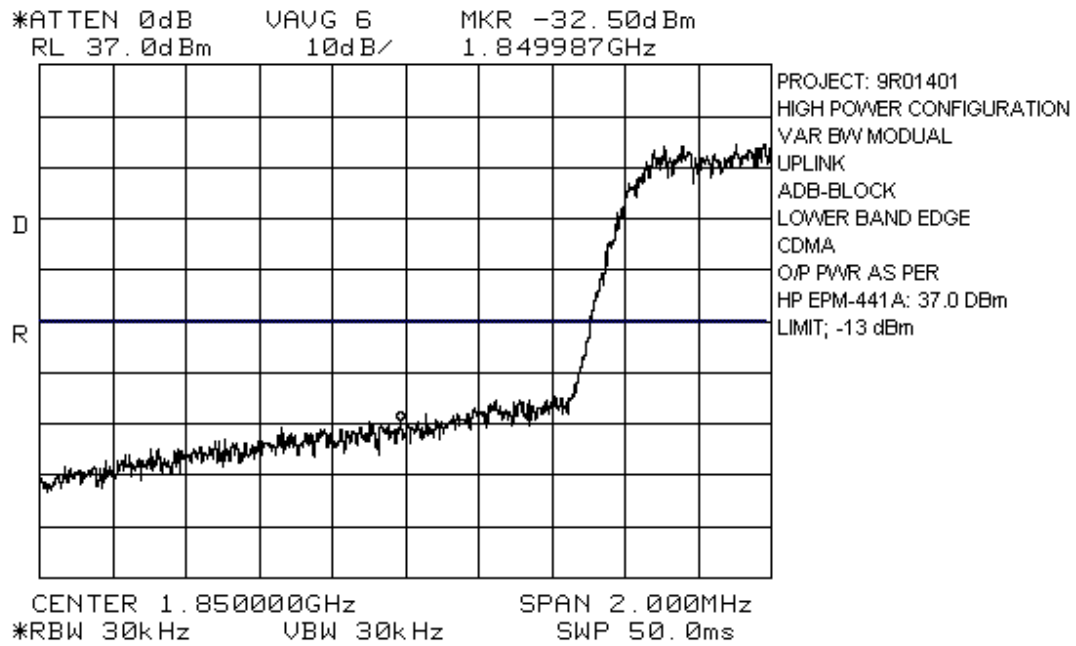
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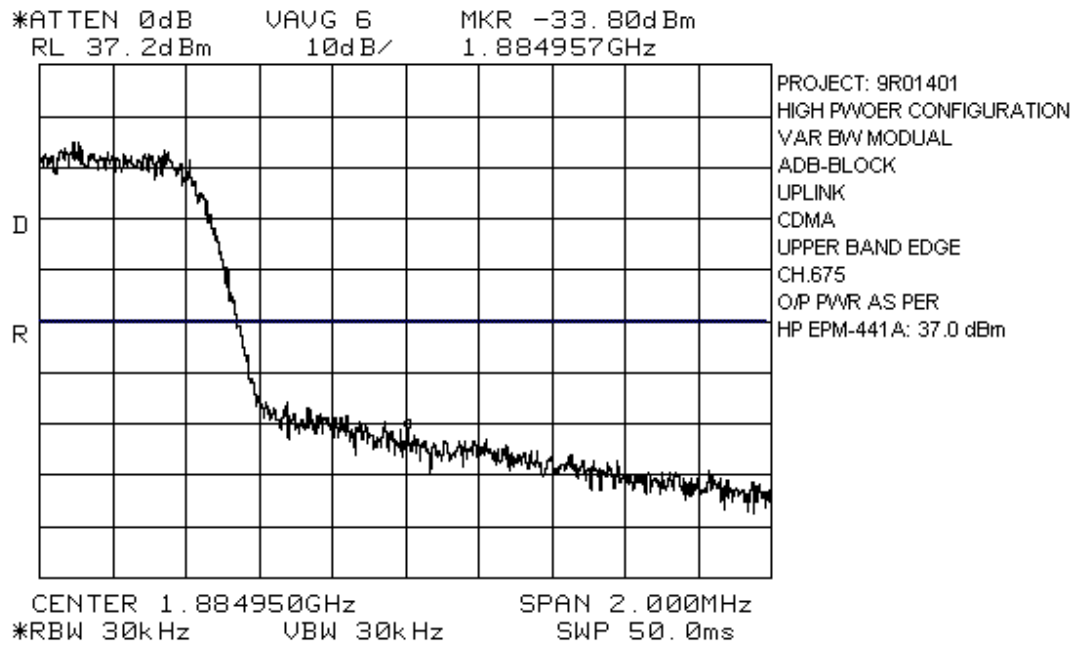
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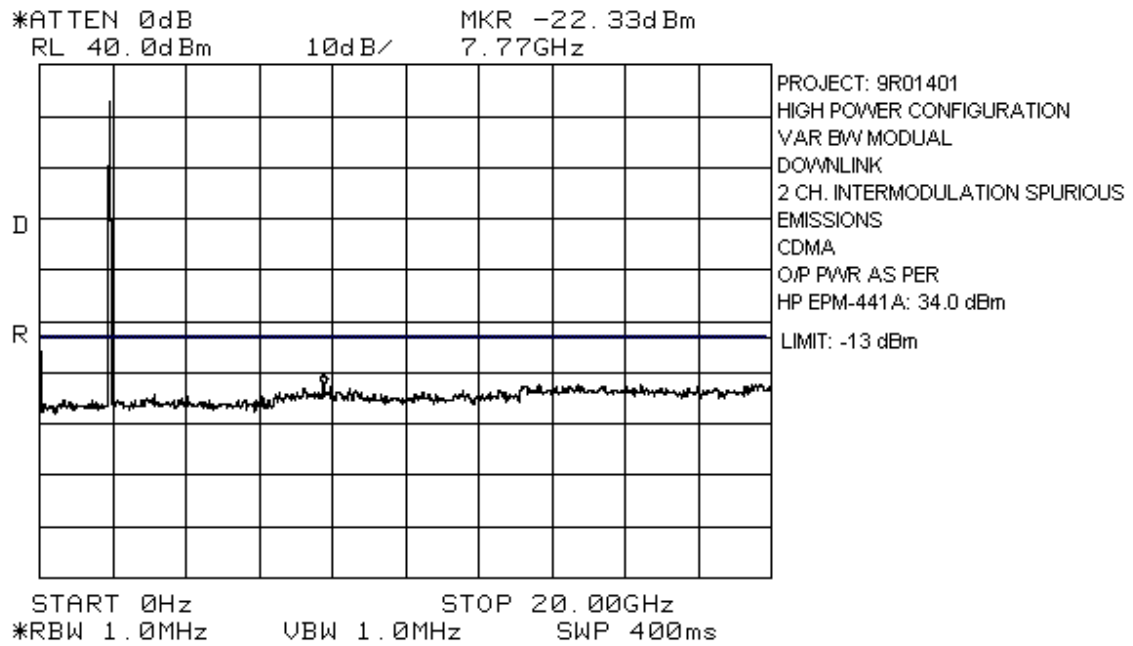
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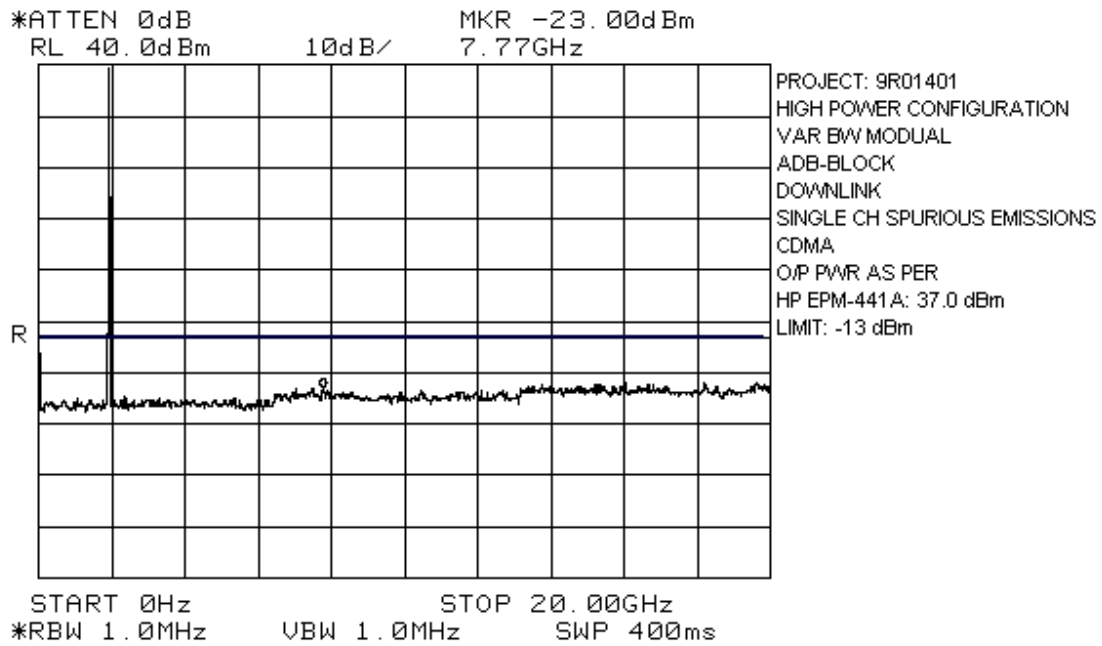
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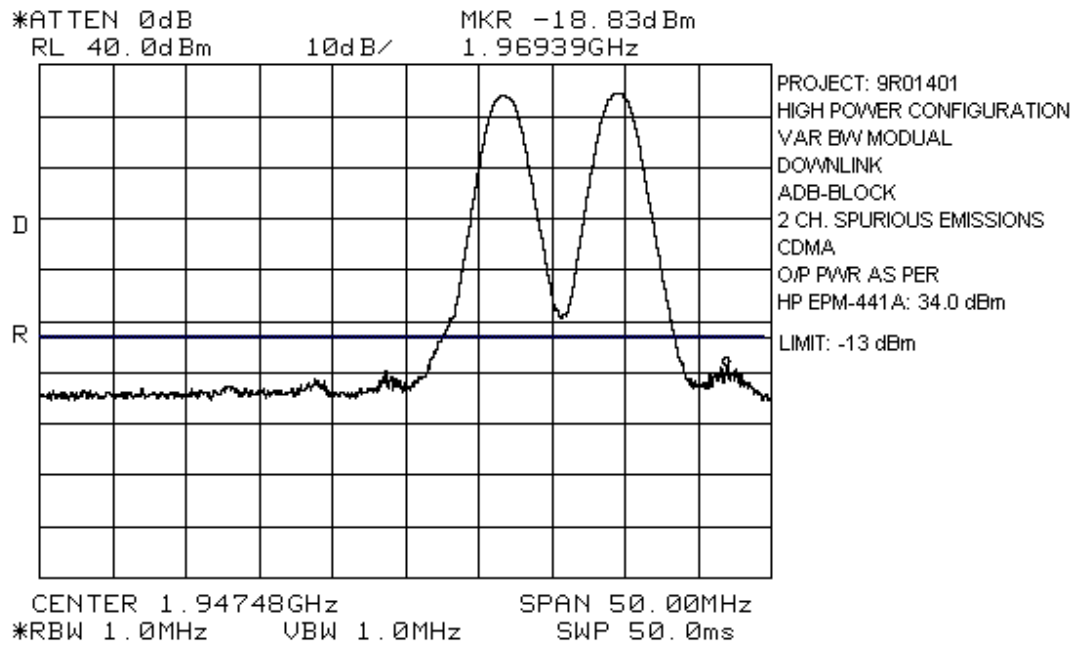
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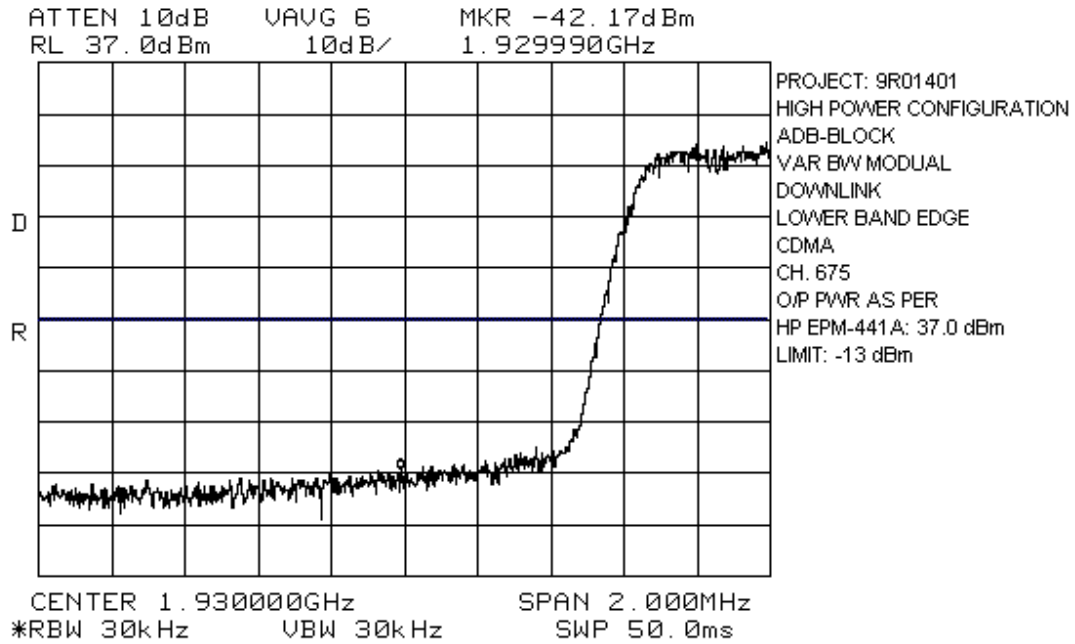
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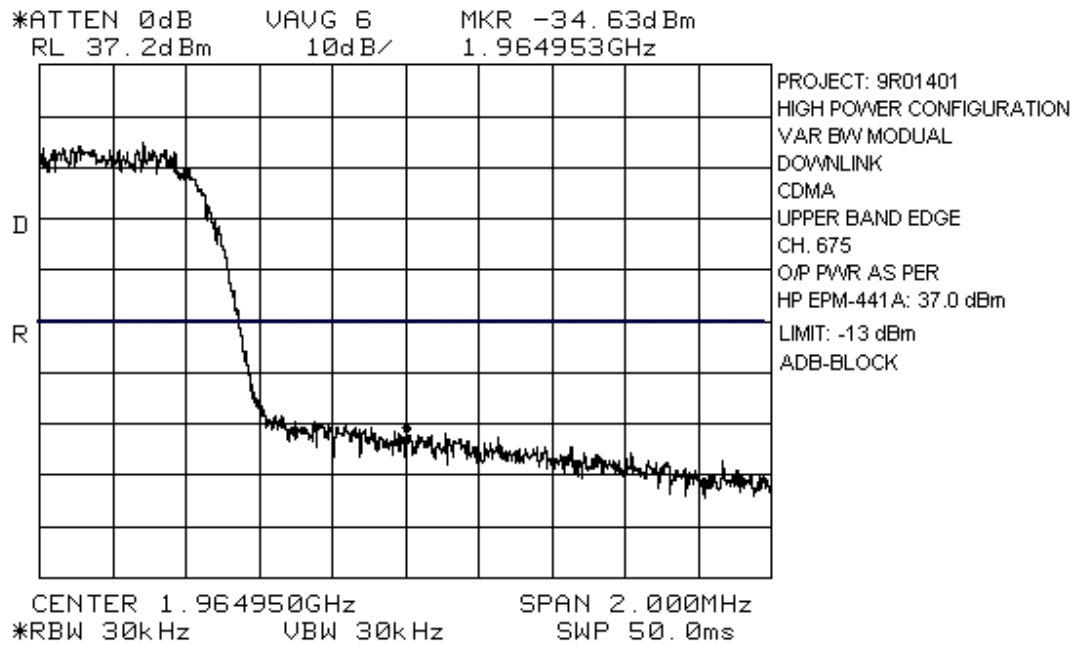
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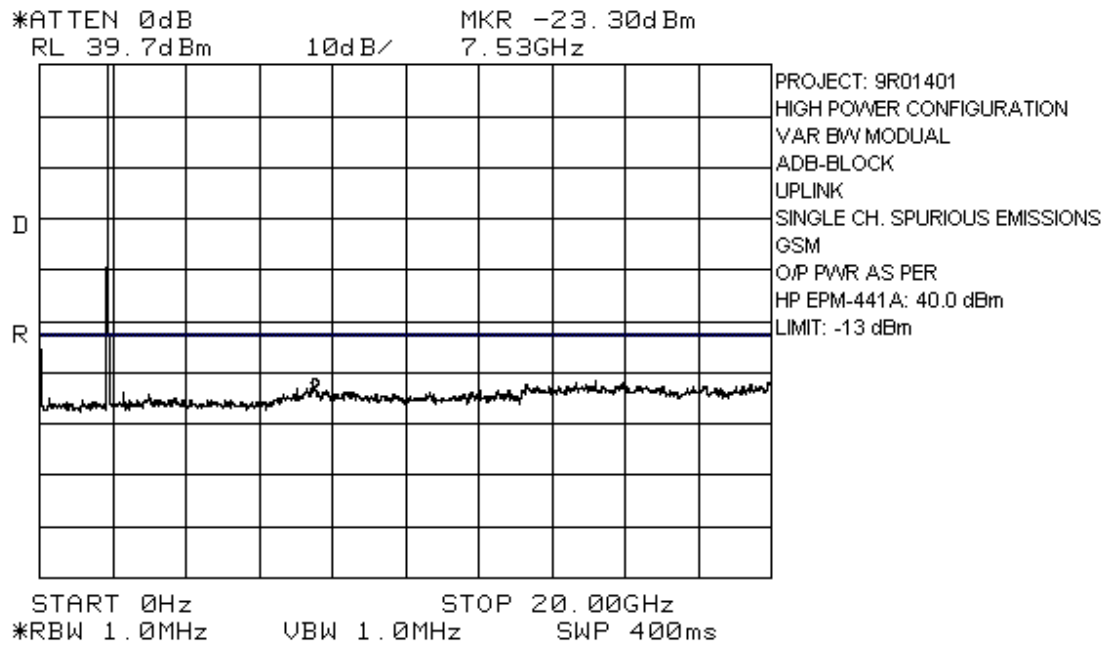
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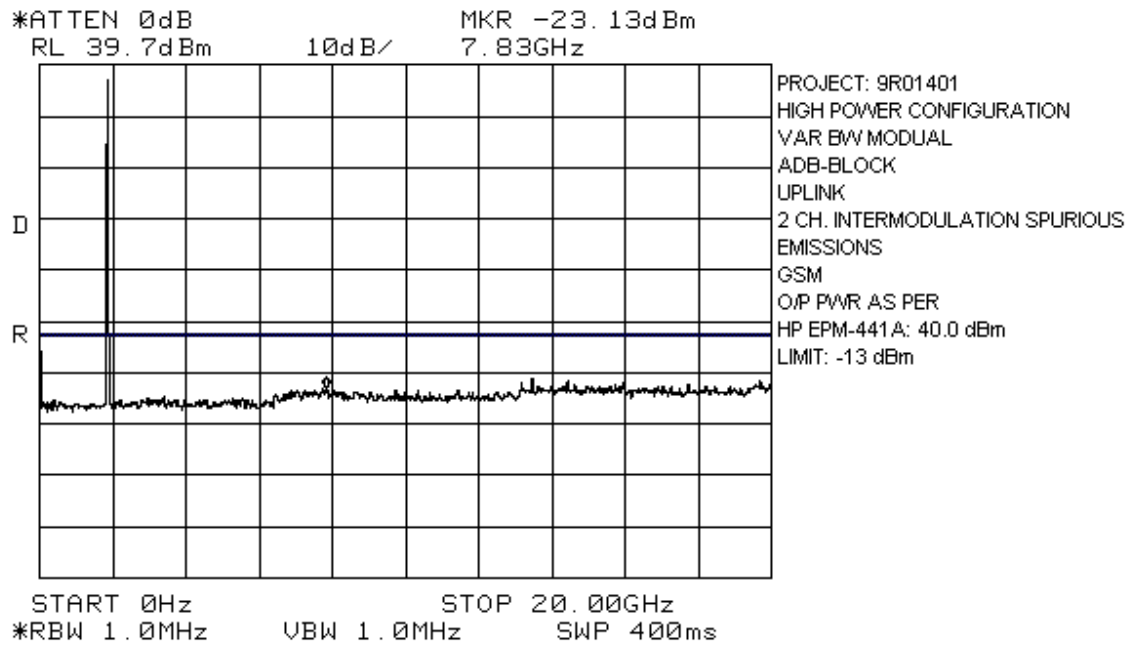
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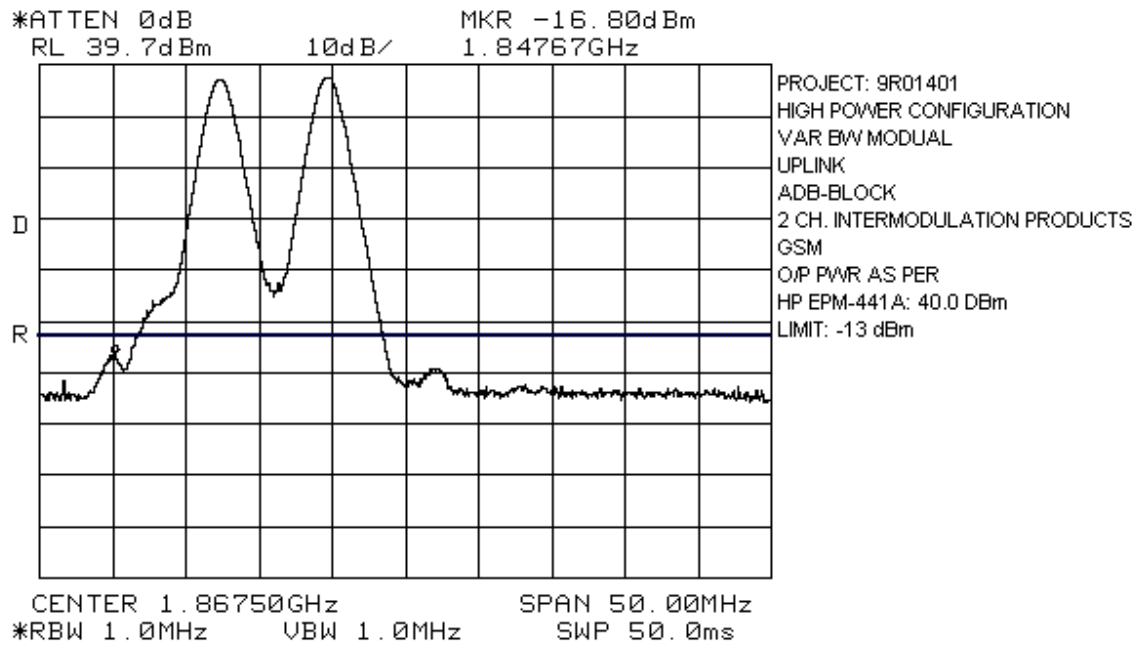
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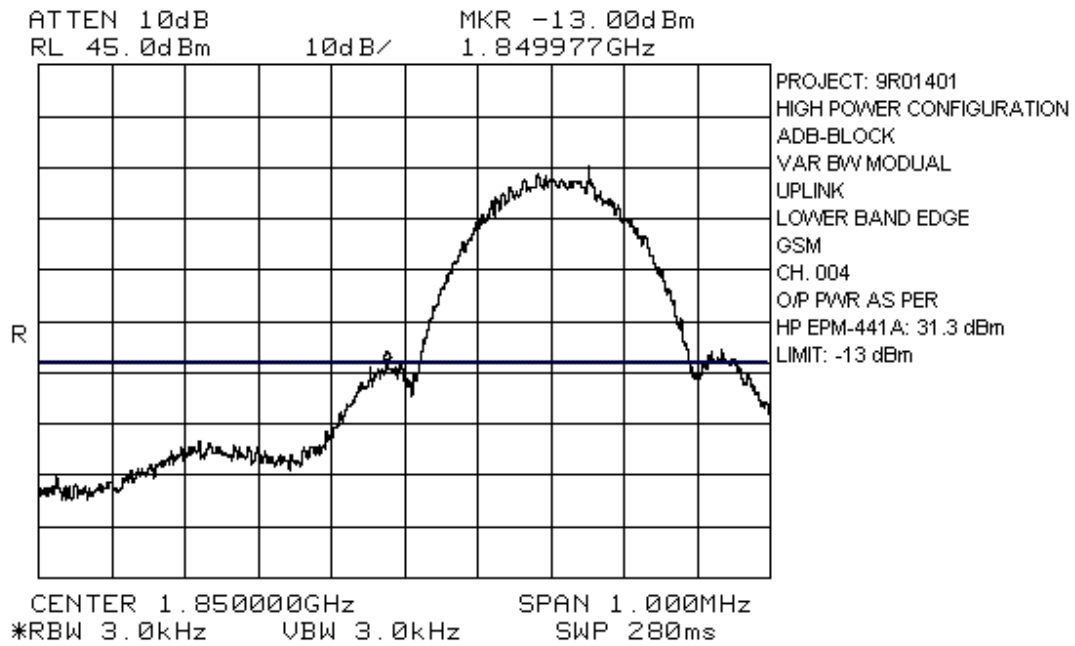
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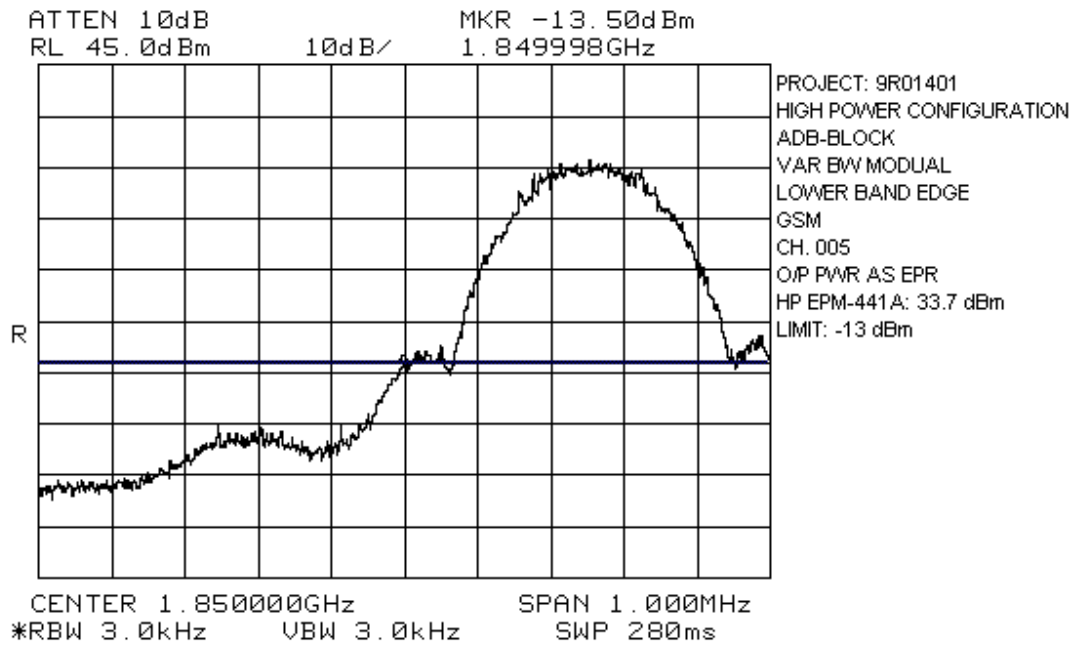
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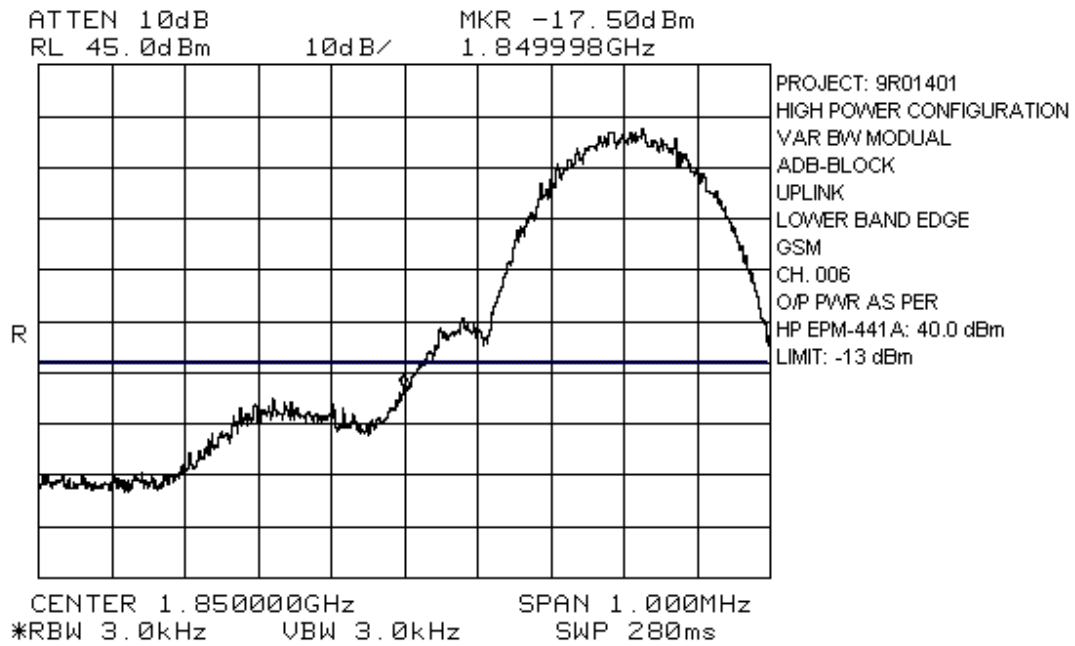
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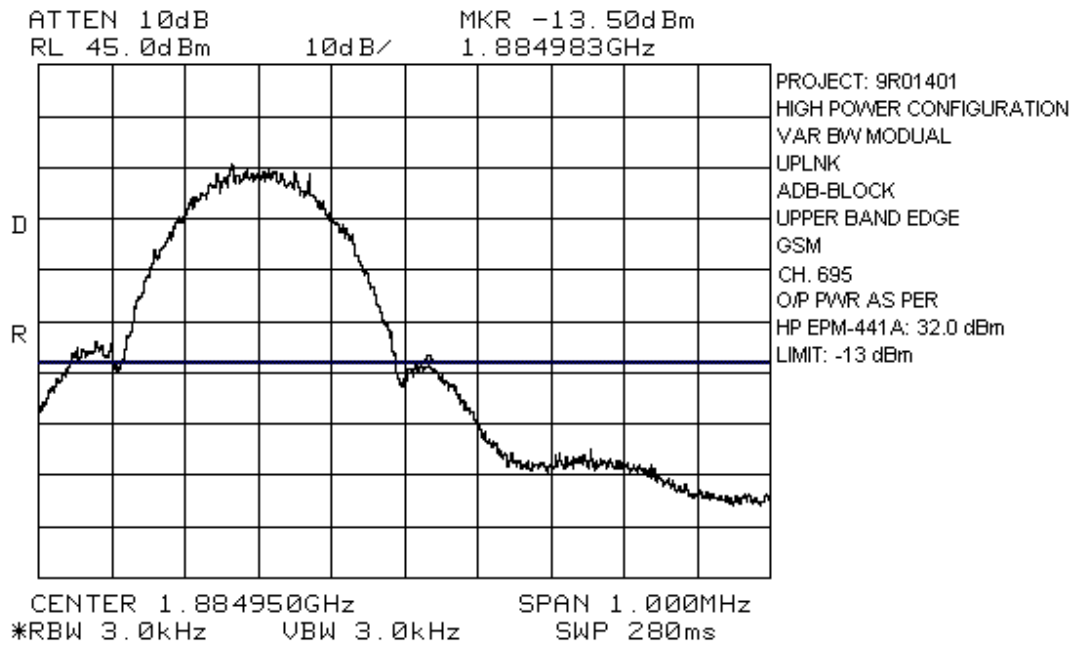
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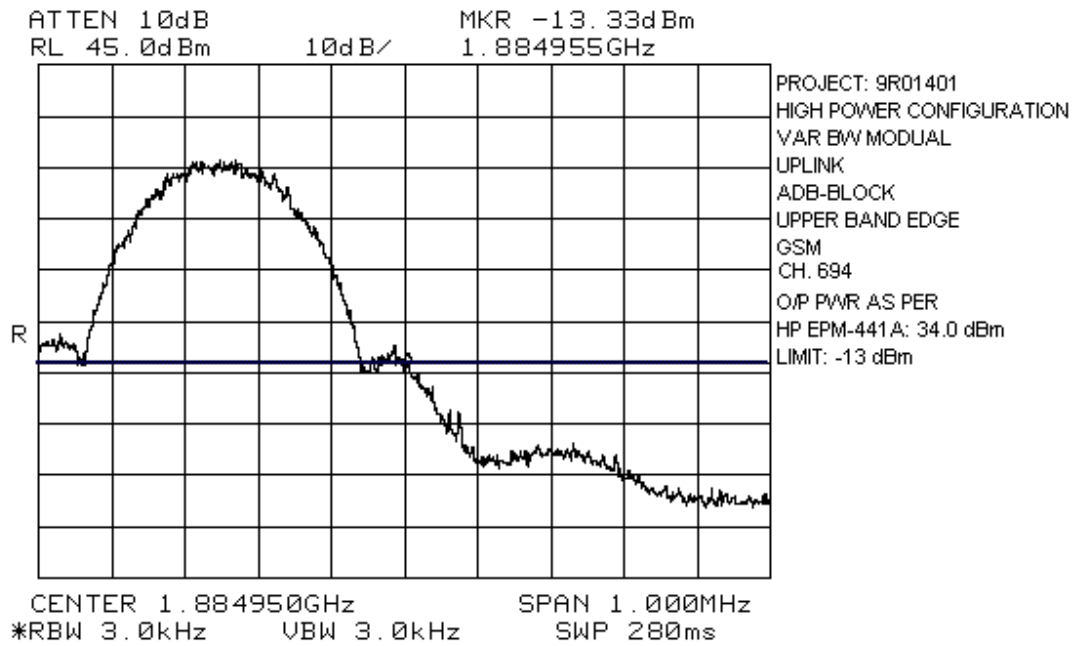
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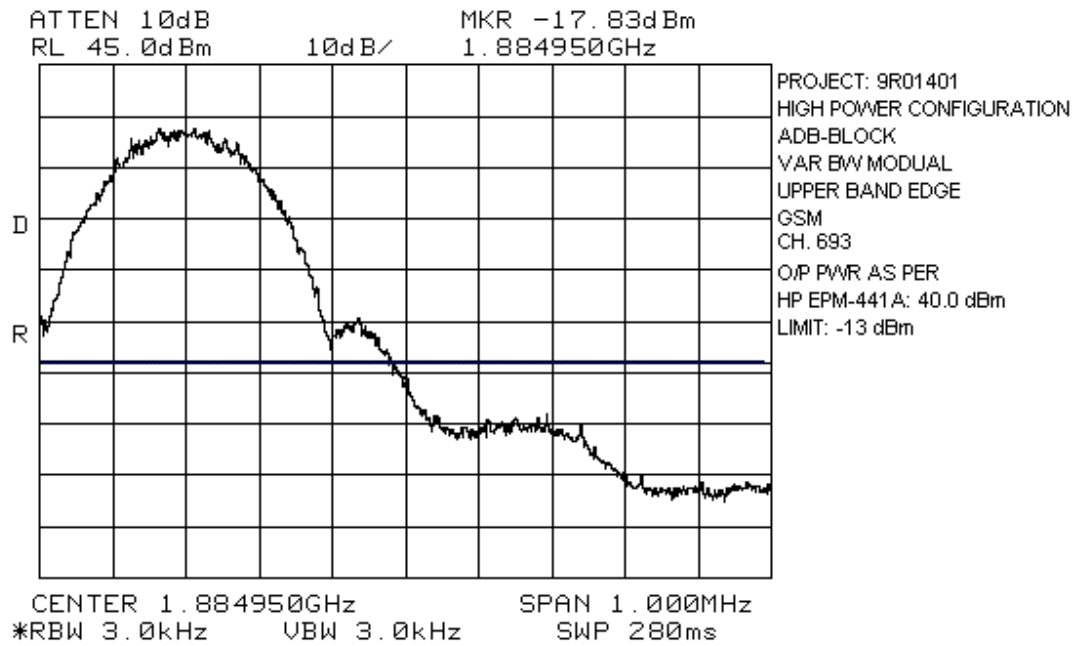
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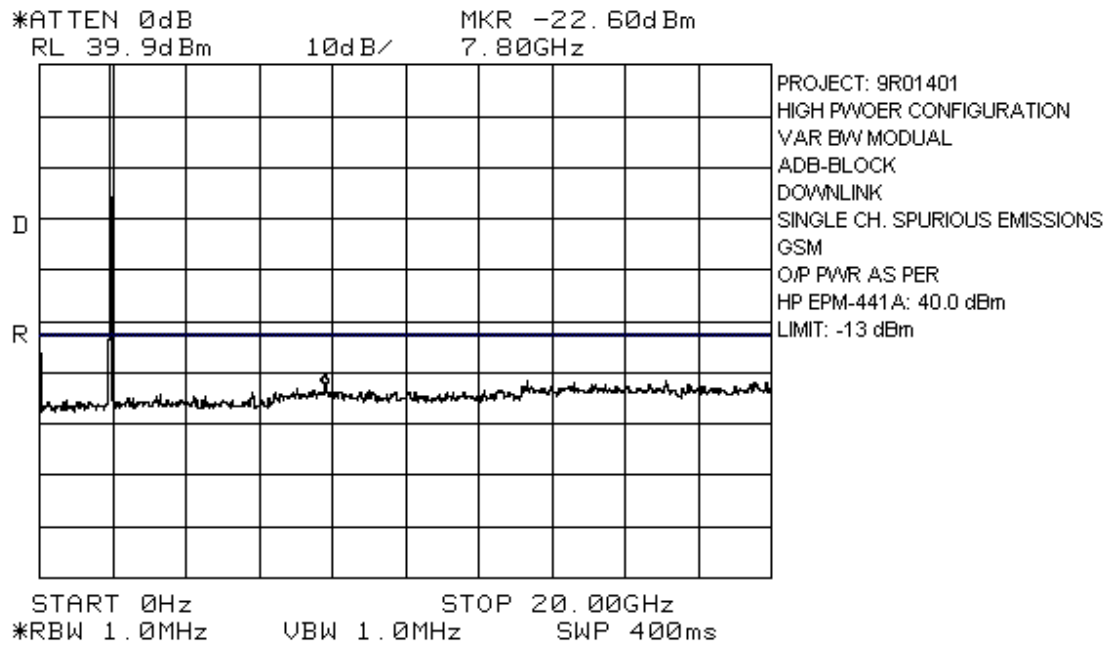
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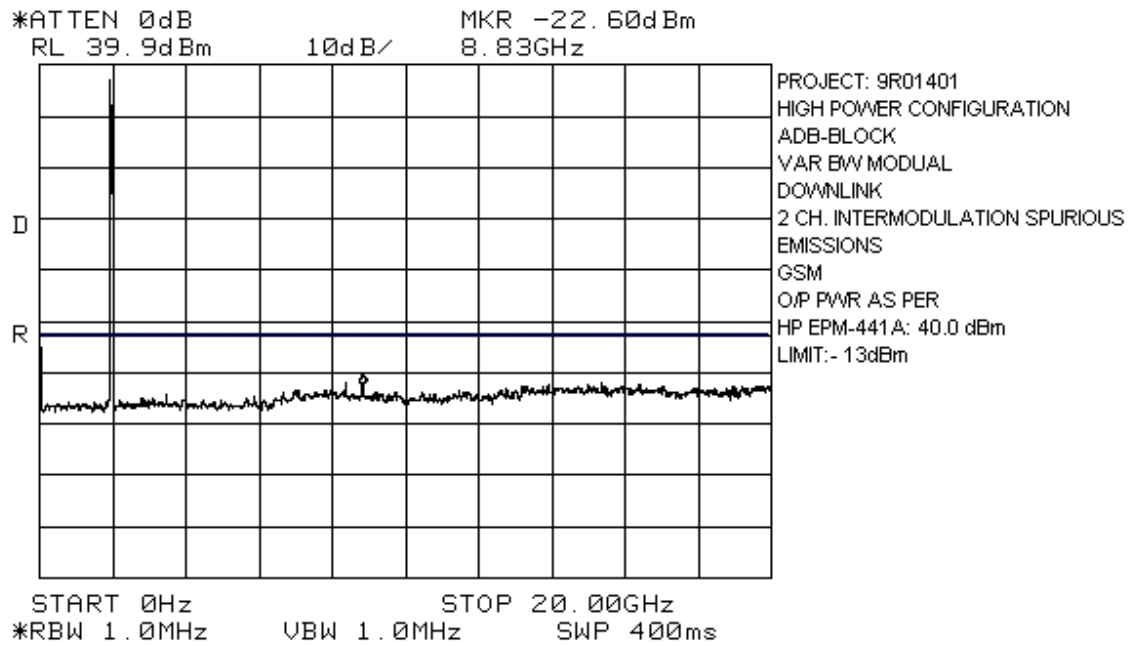
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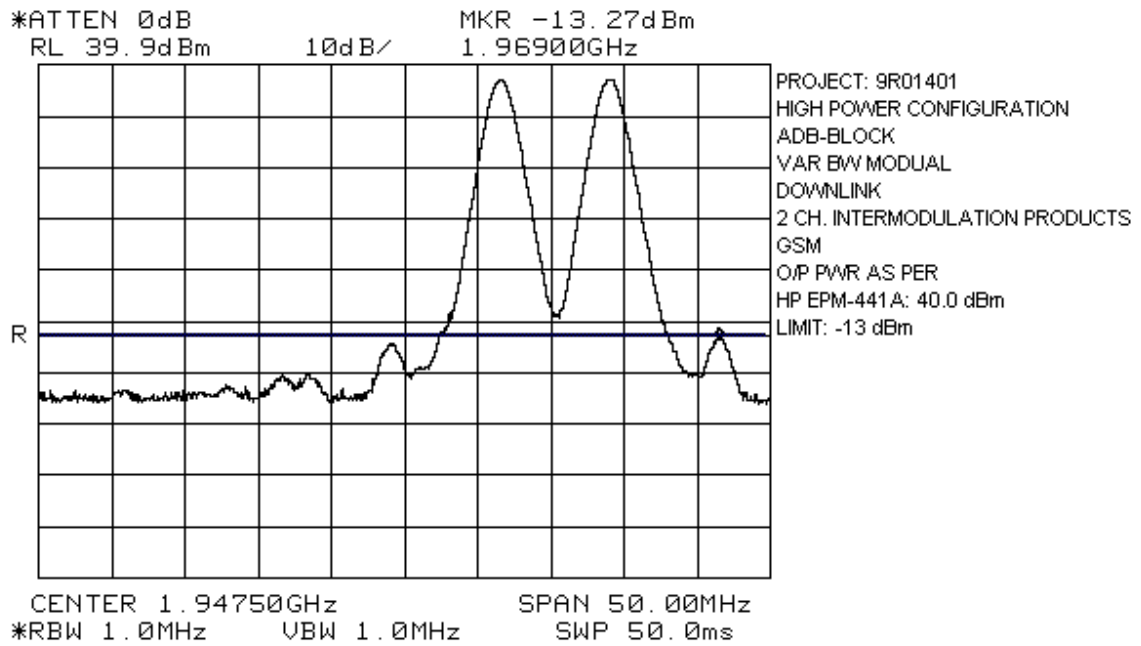
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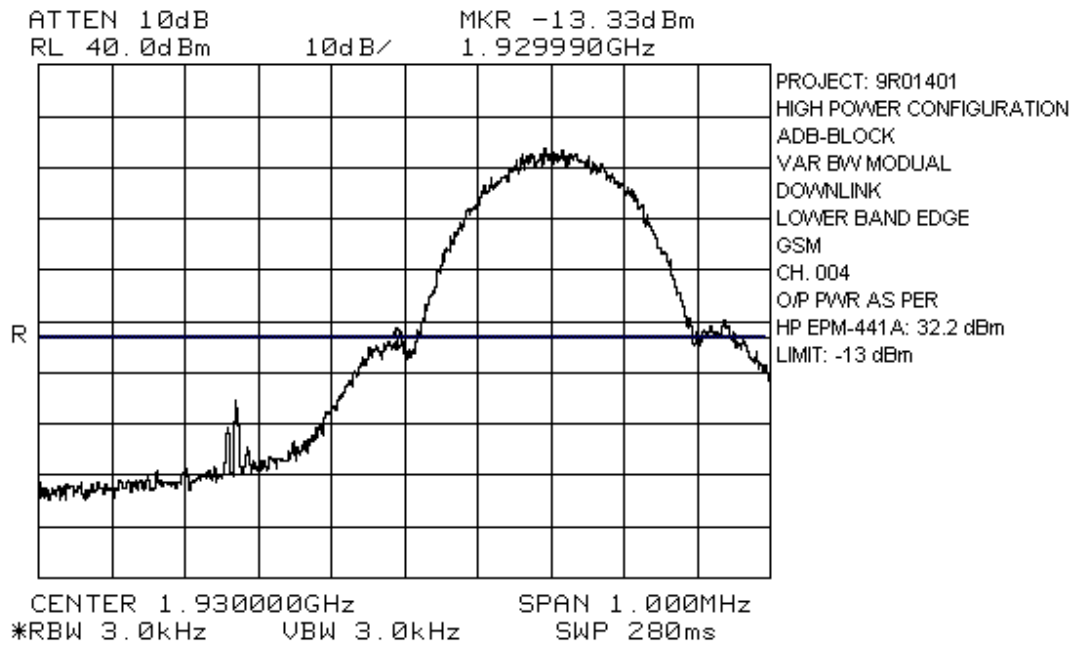
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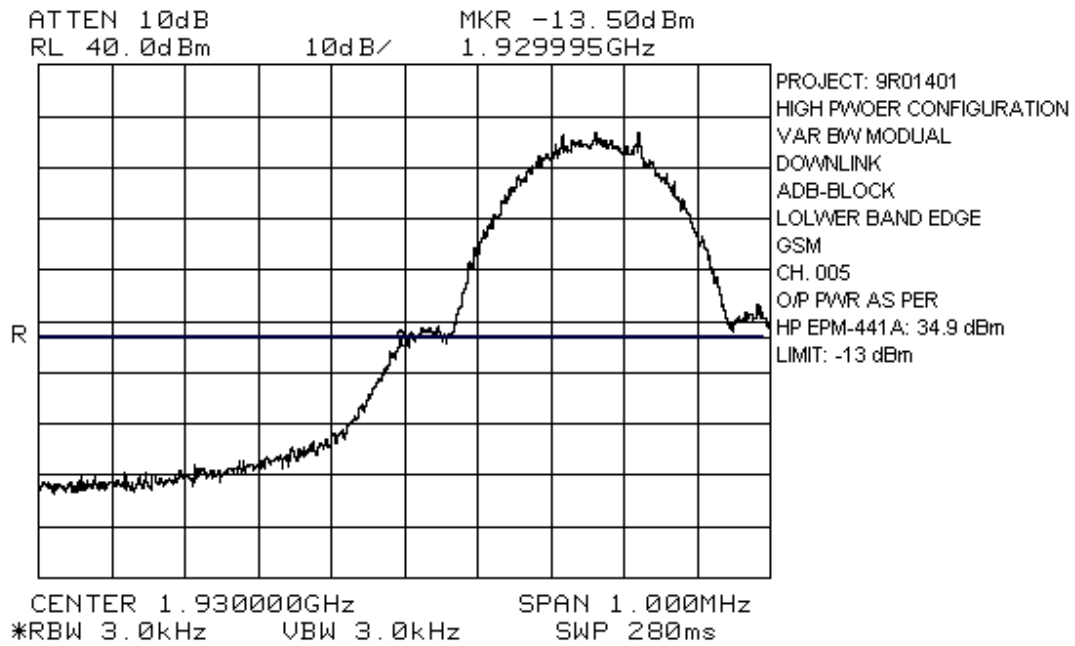
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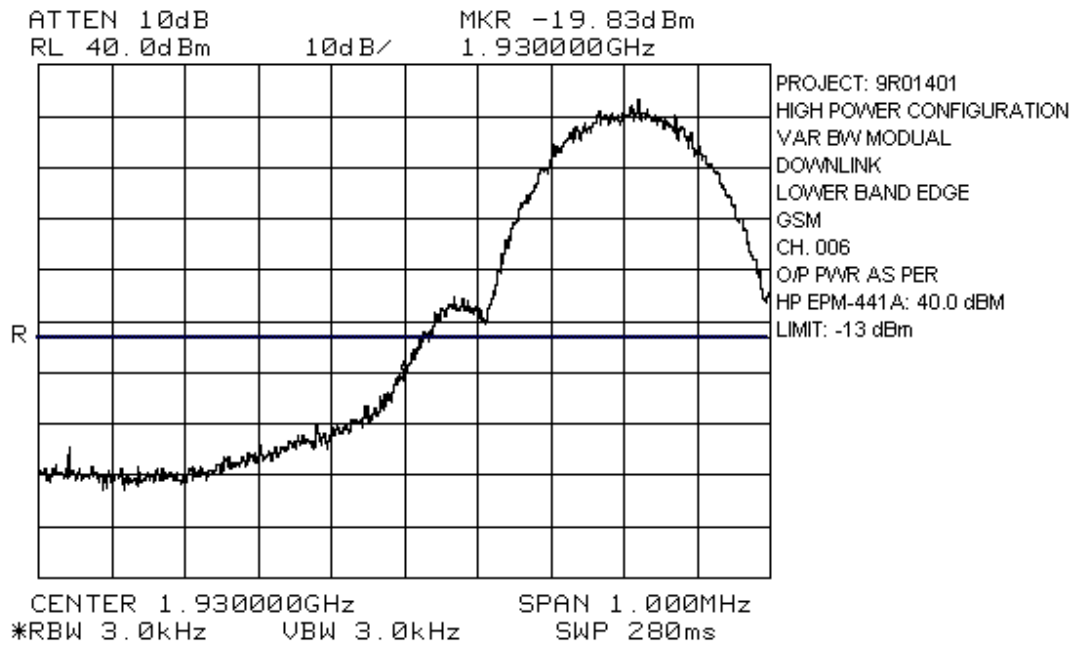
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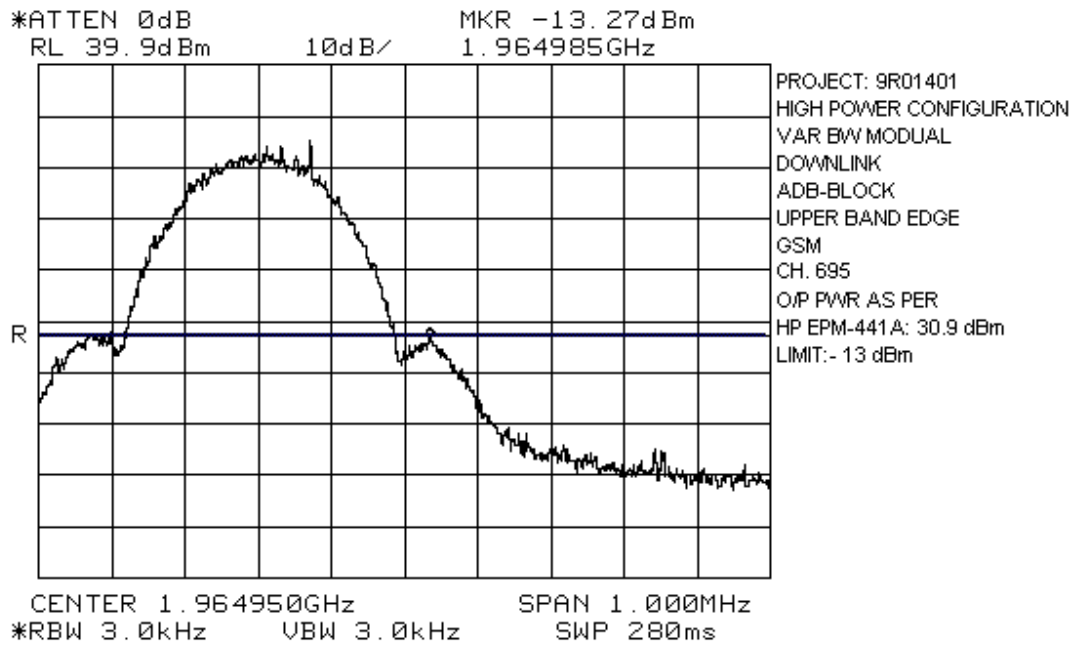
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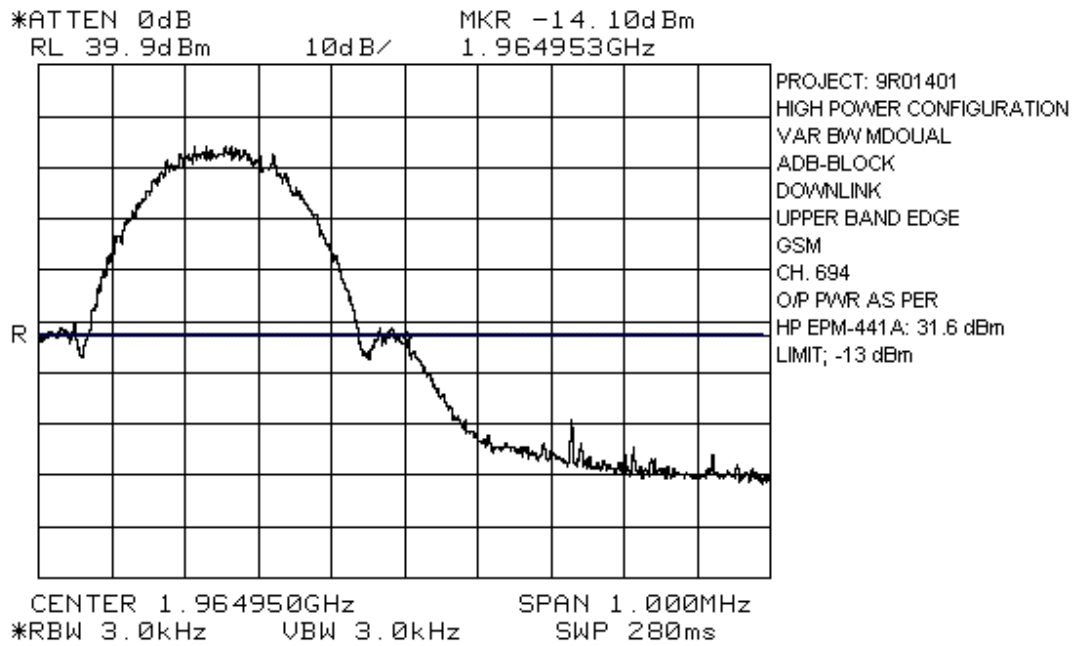
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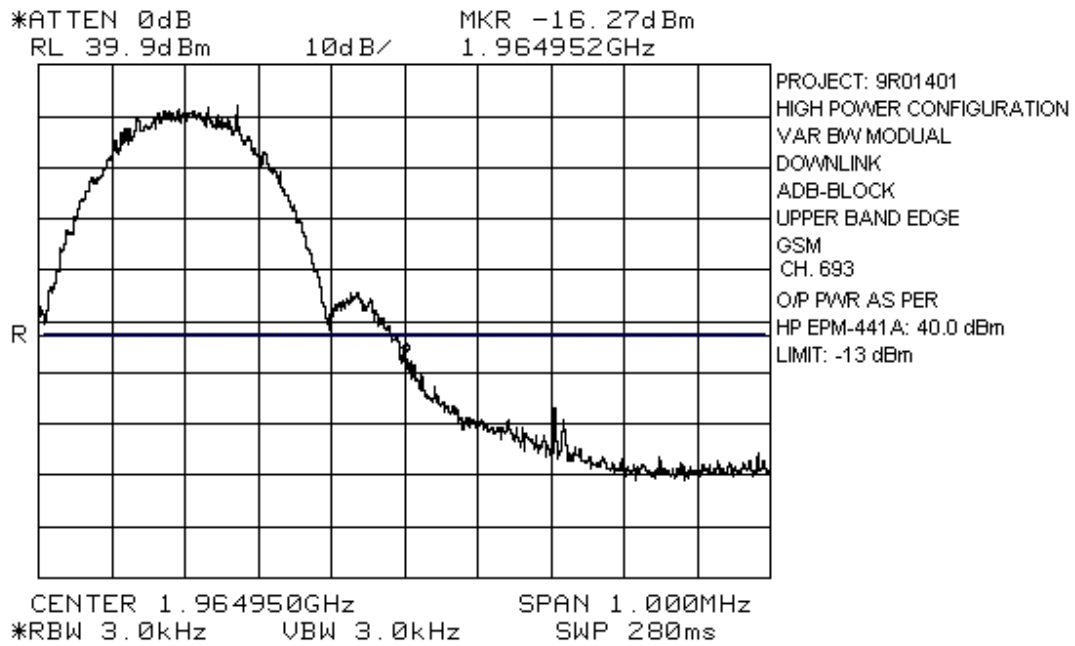
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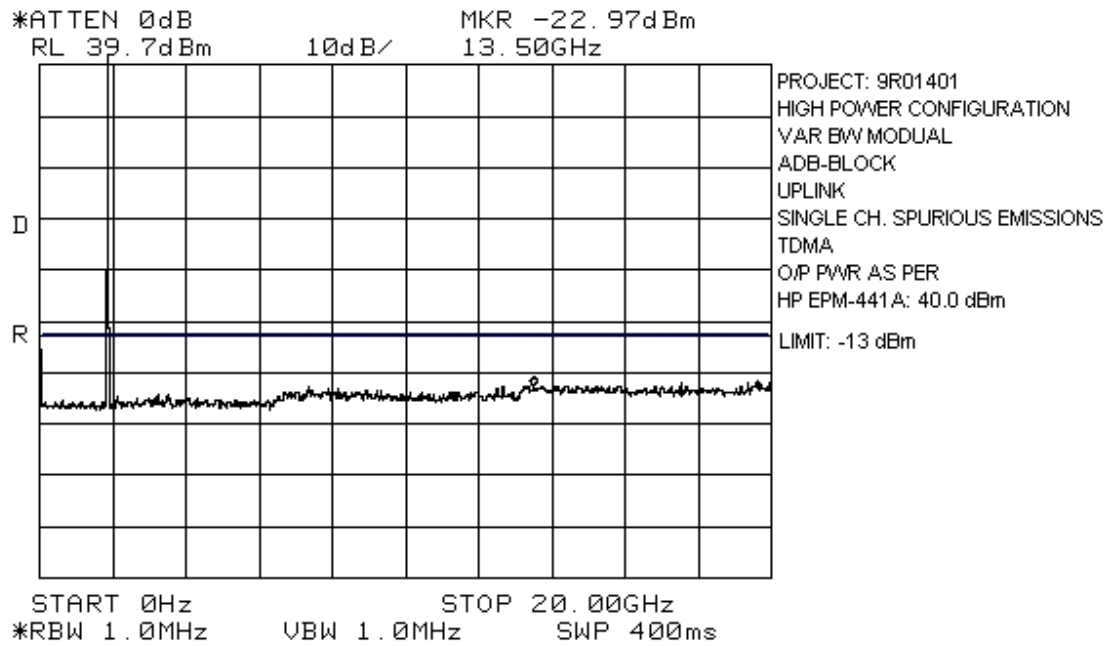
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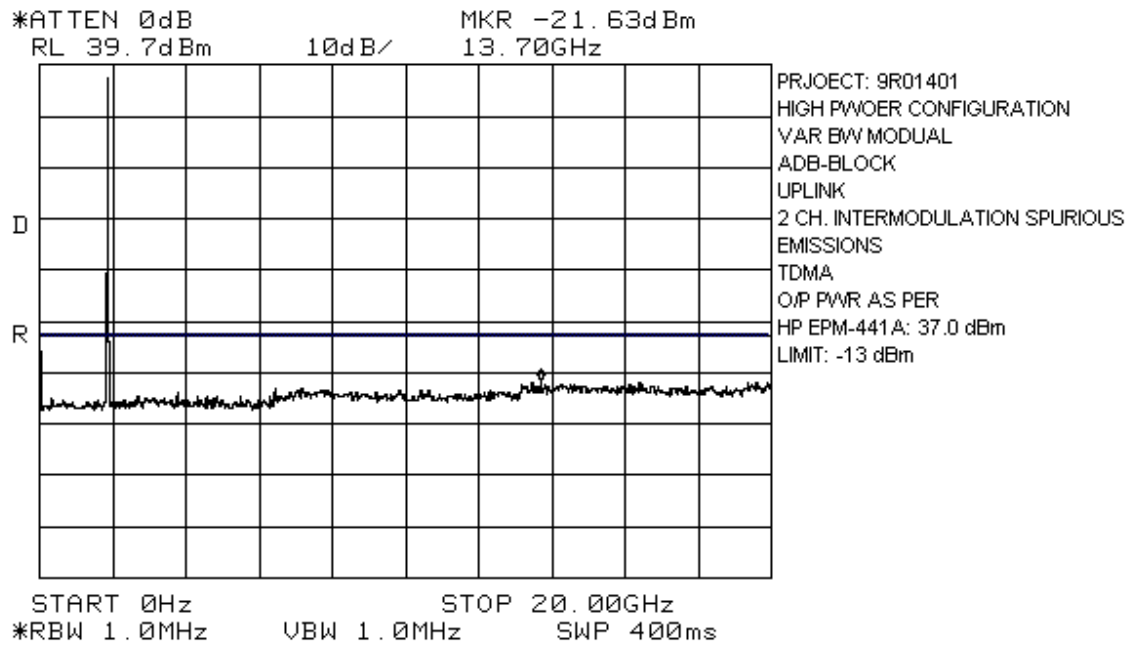
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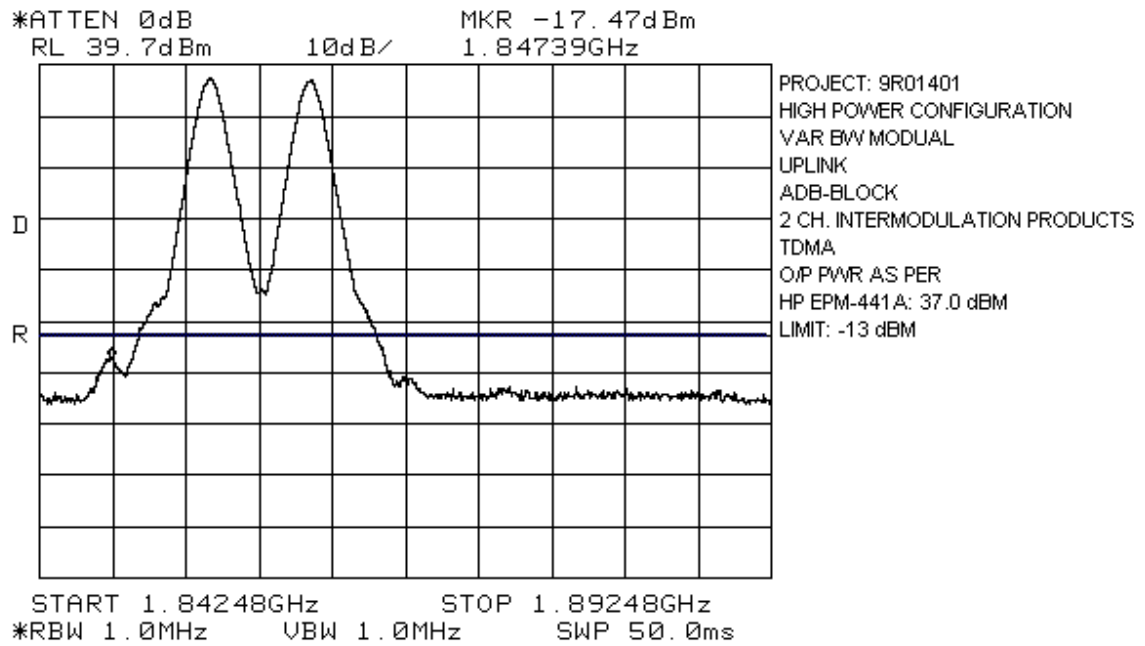
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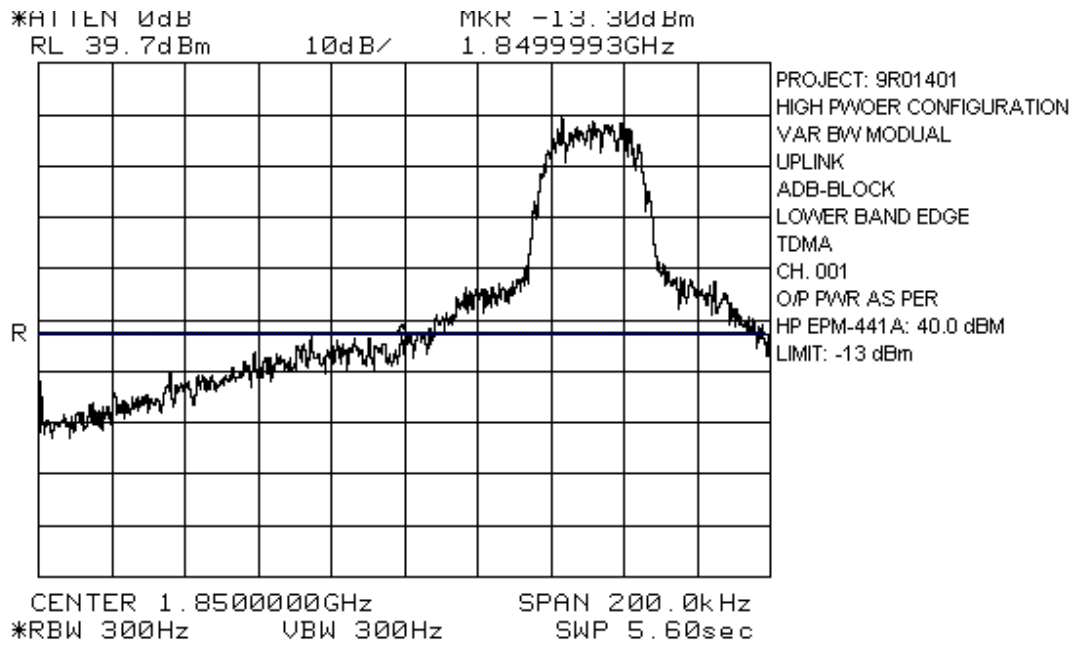
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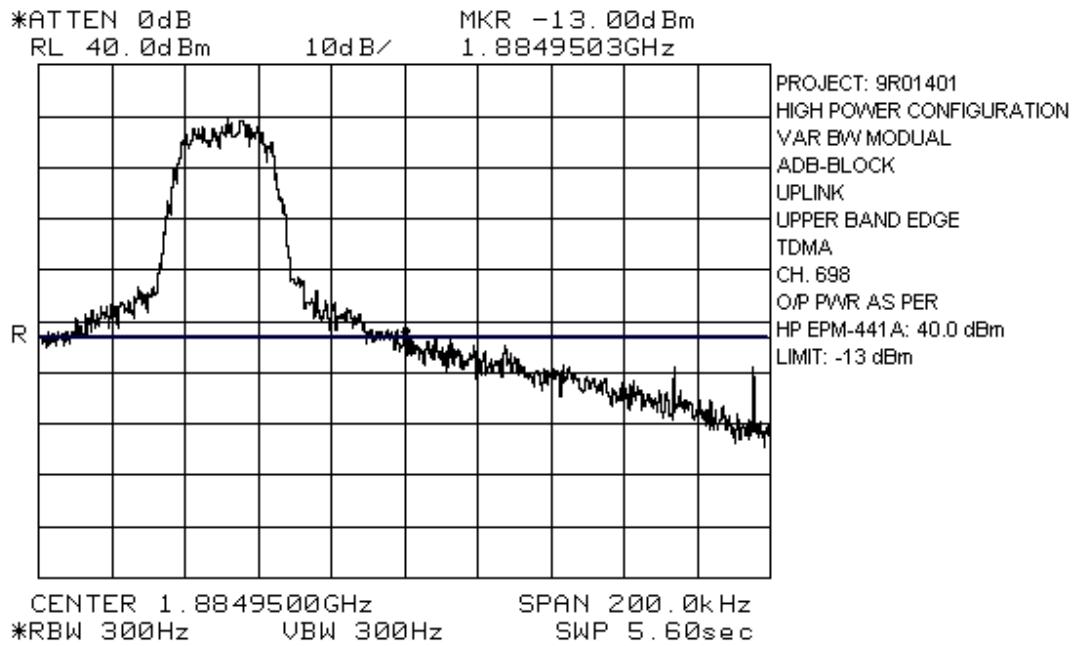
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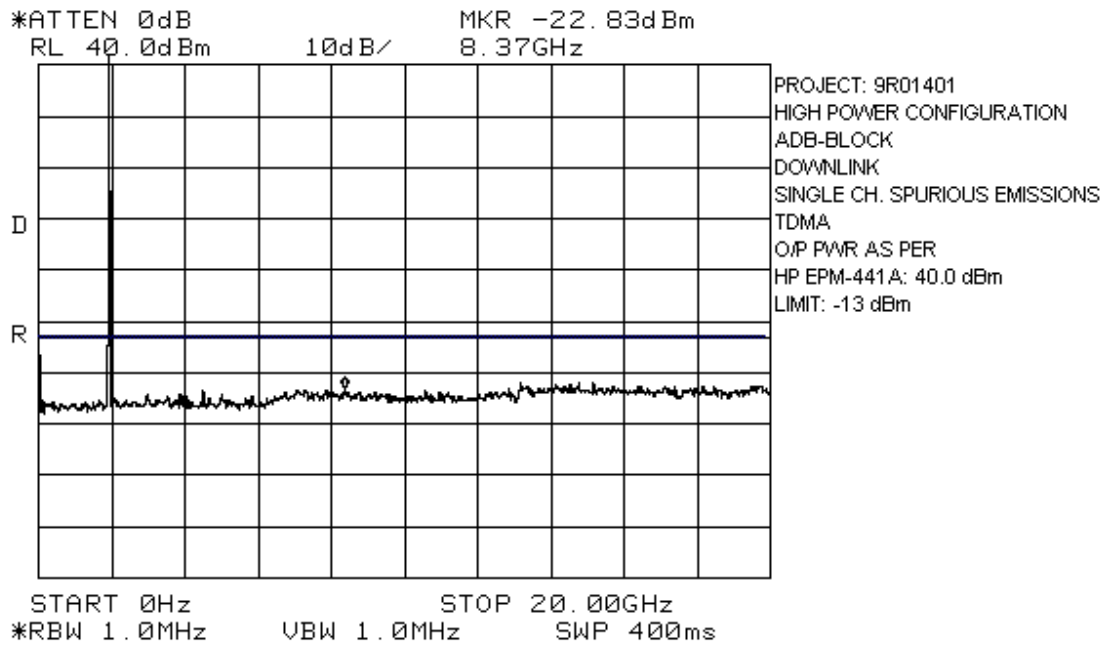
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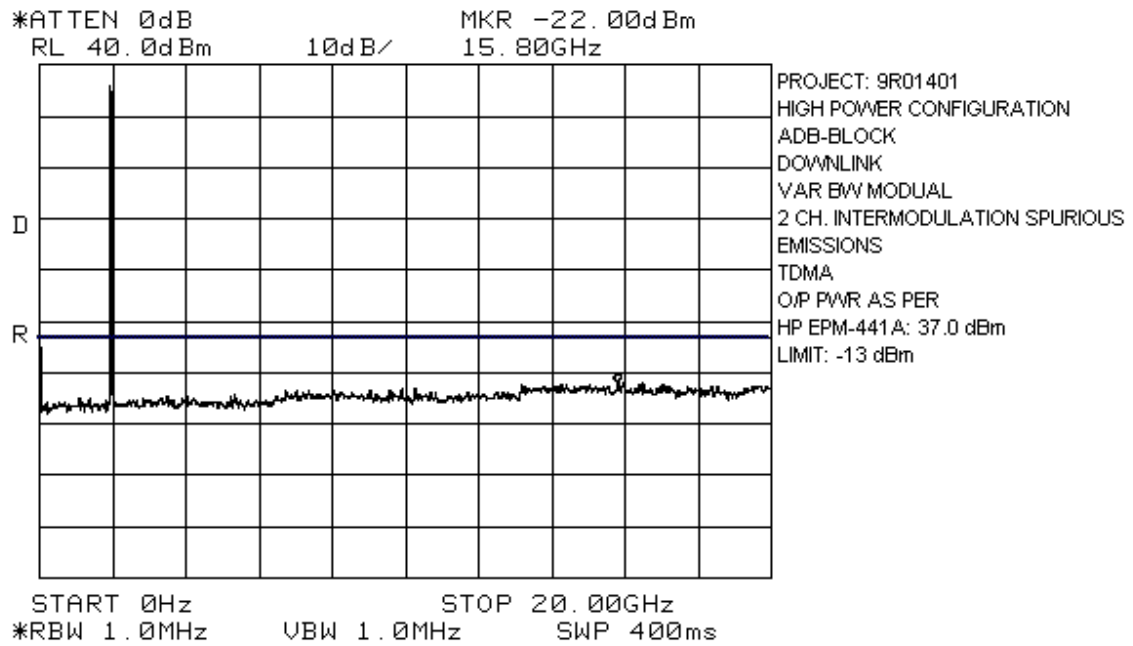
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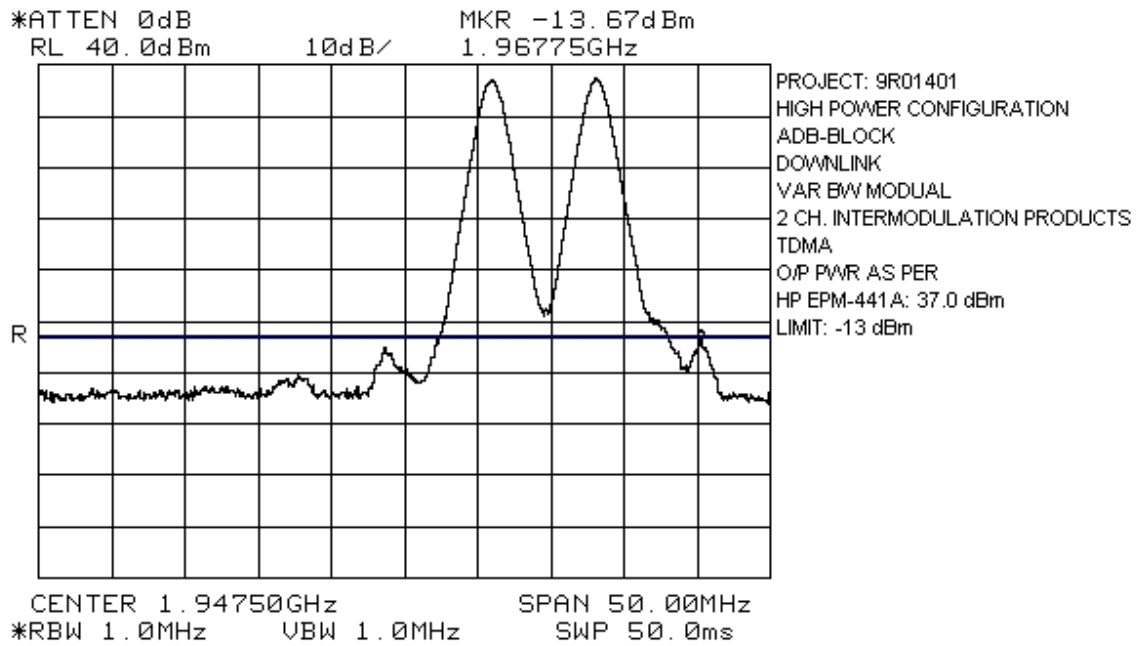
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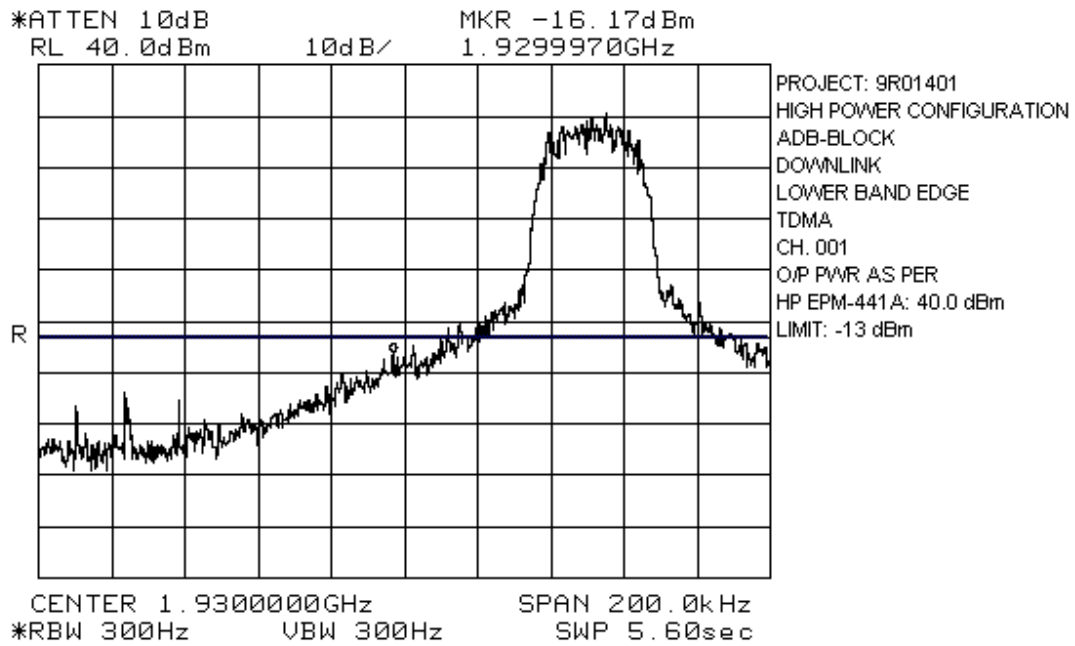
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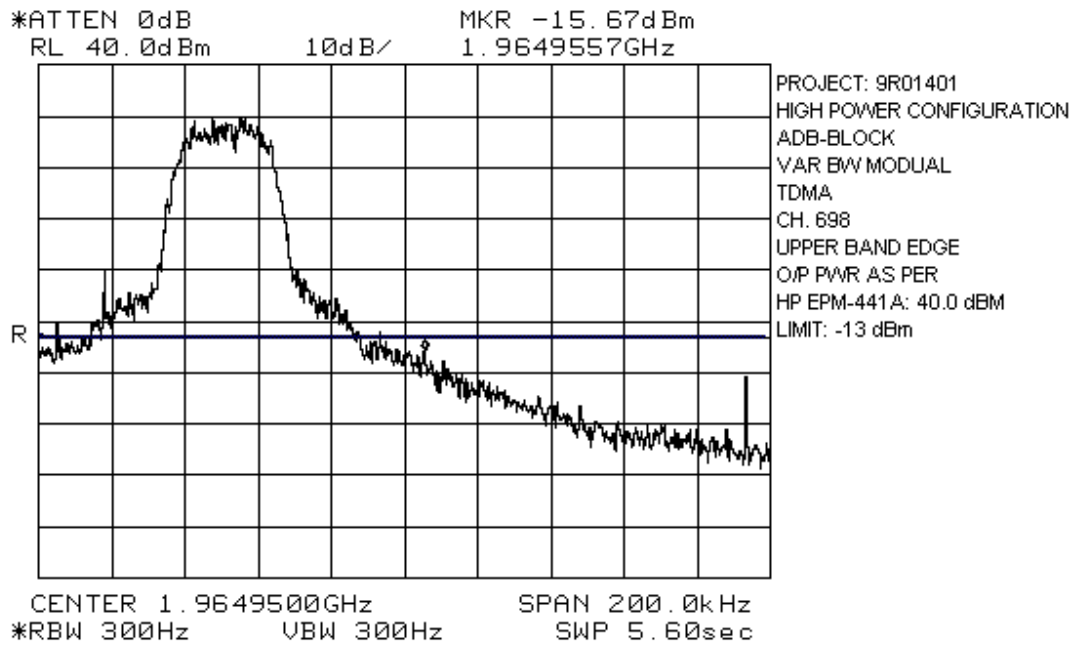
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FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



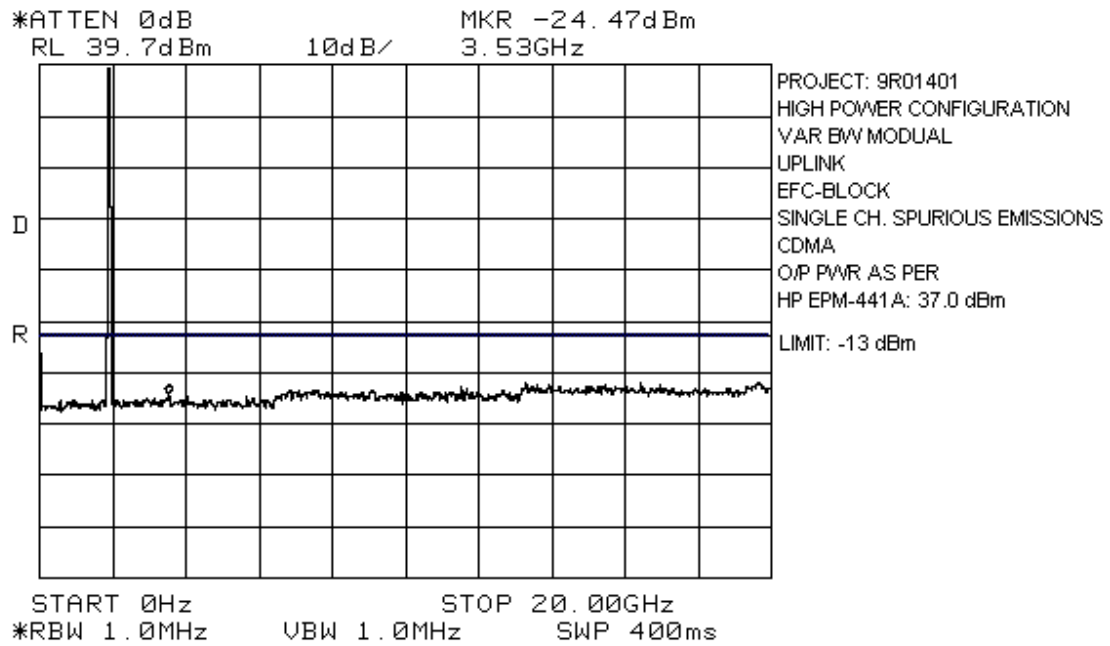
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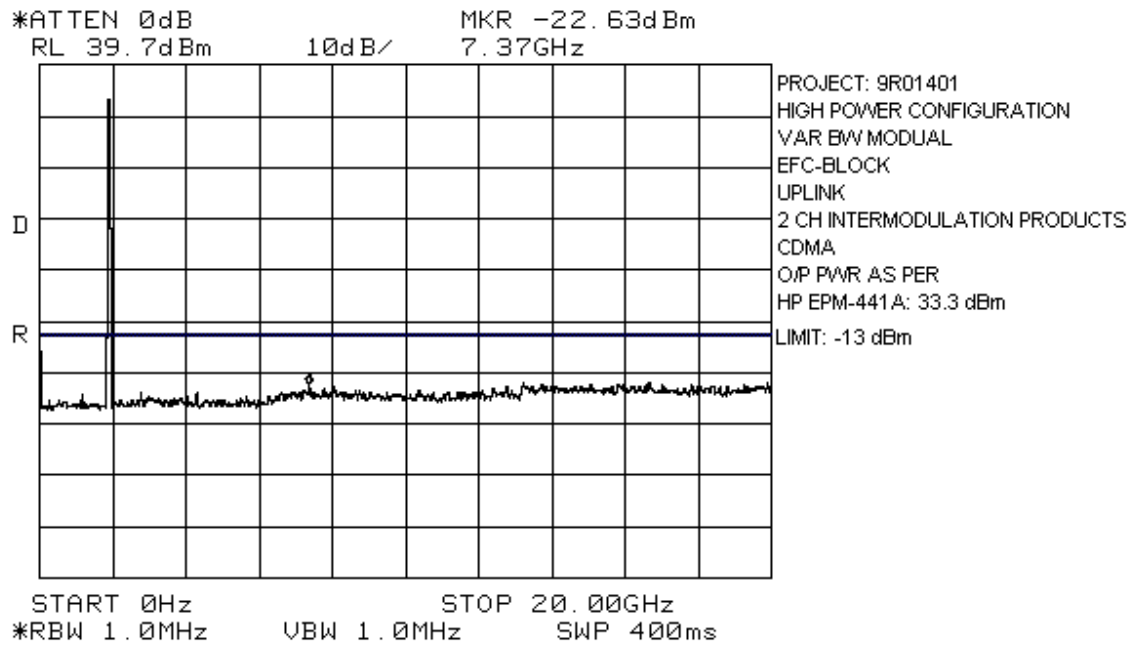
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Variable Bandwidth Module – EFC Block

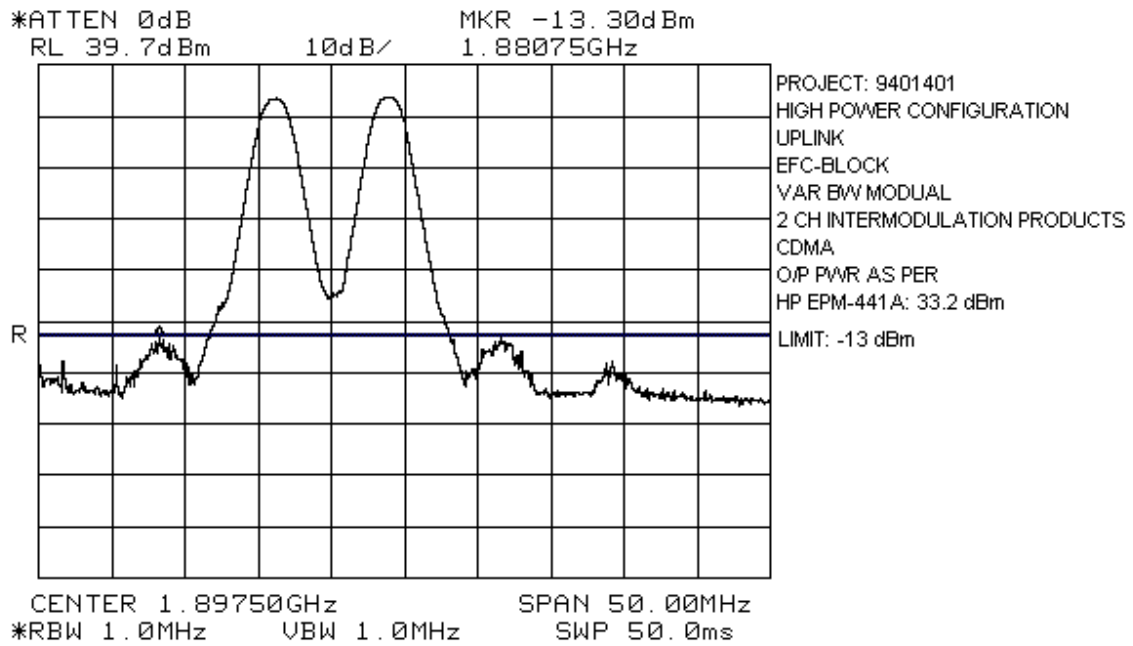
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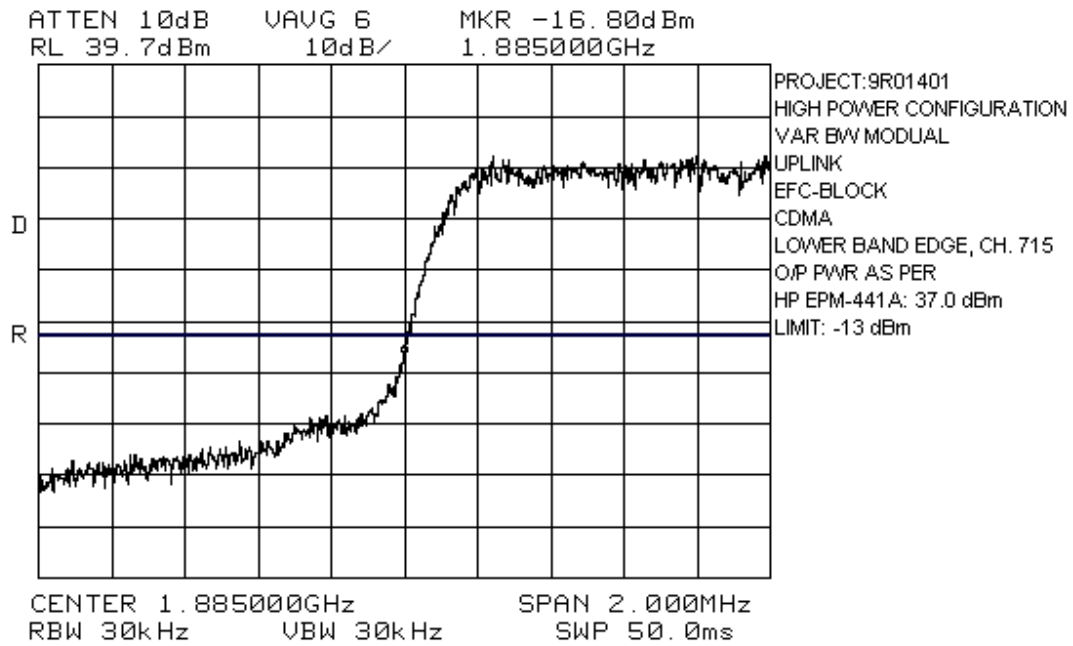
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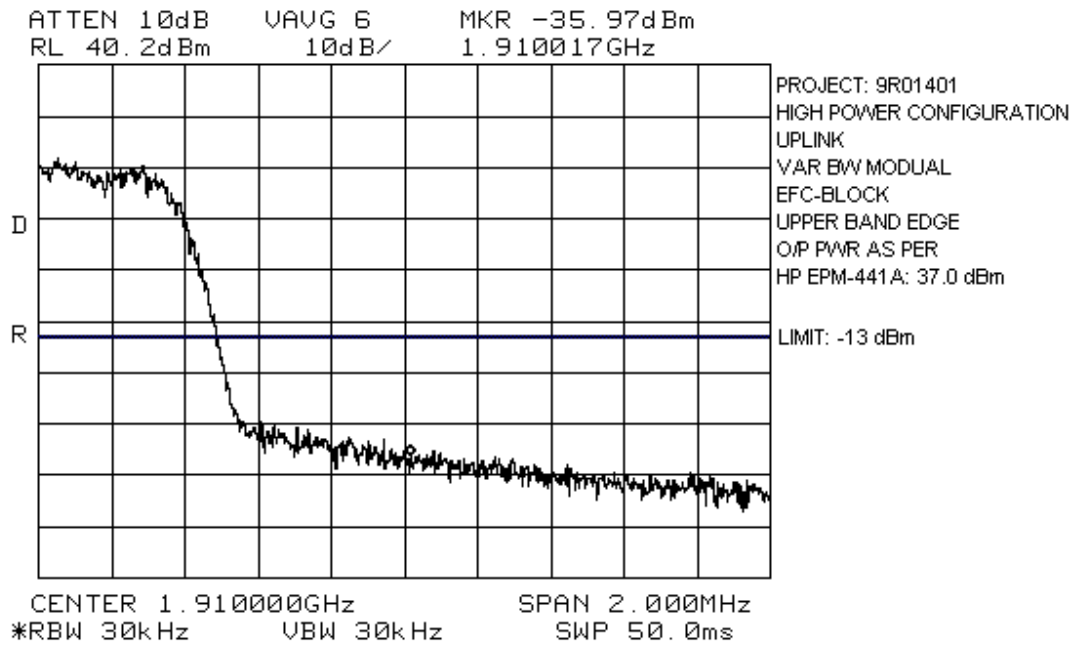
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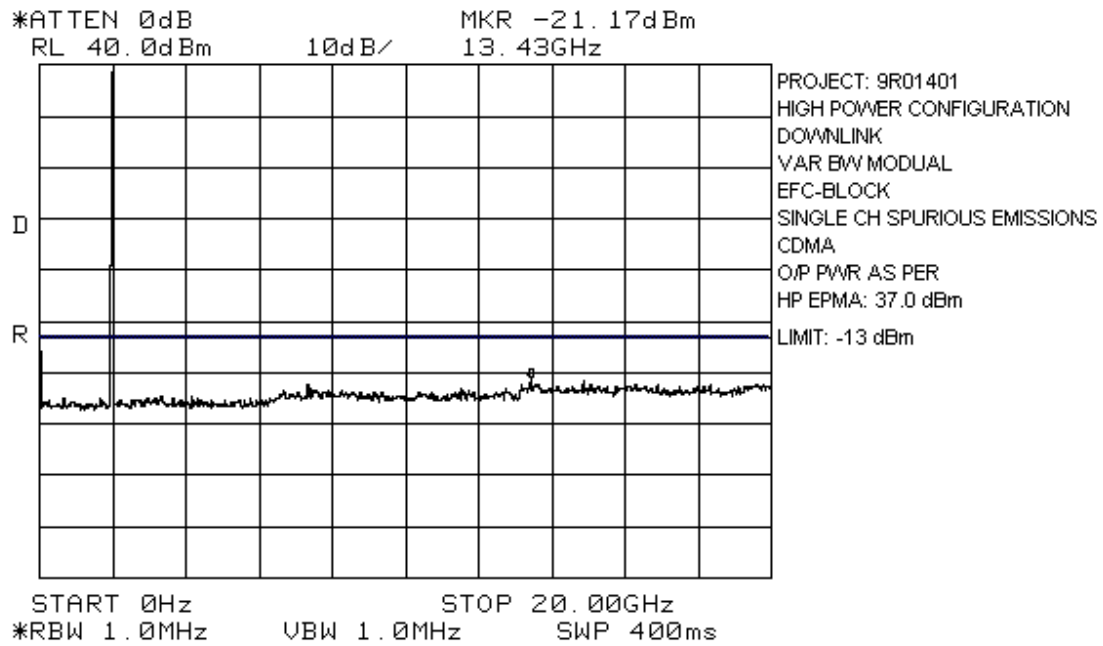
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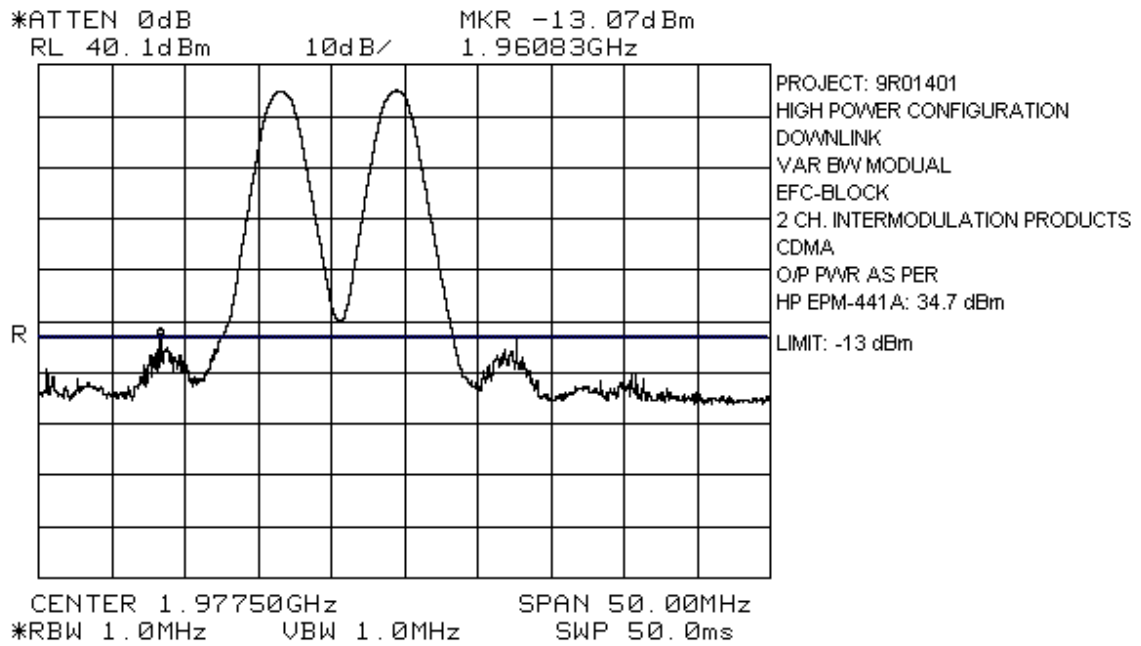
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FCC ID: BCR-RPT-MR701



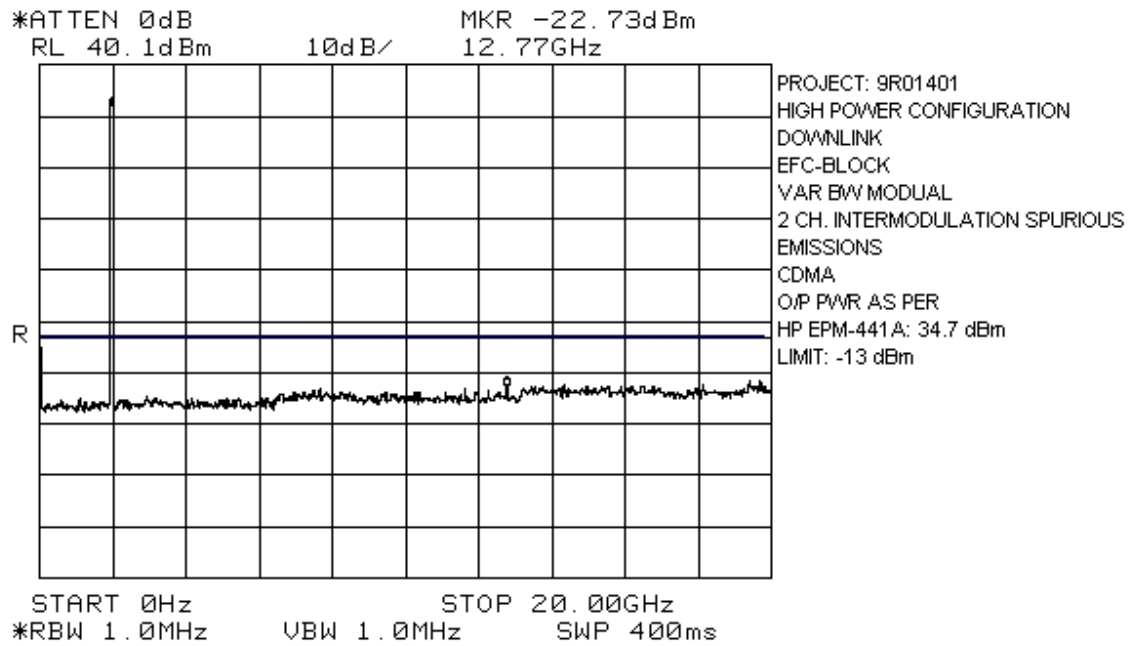
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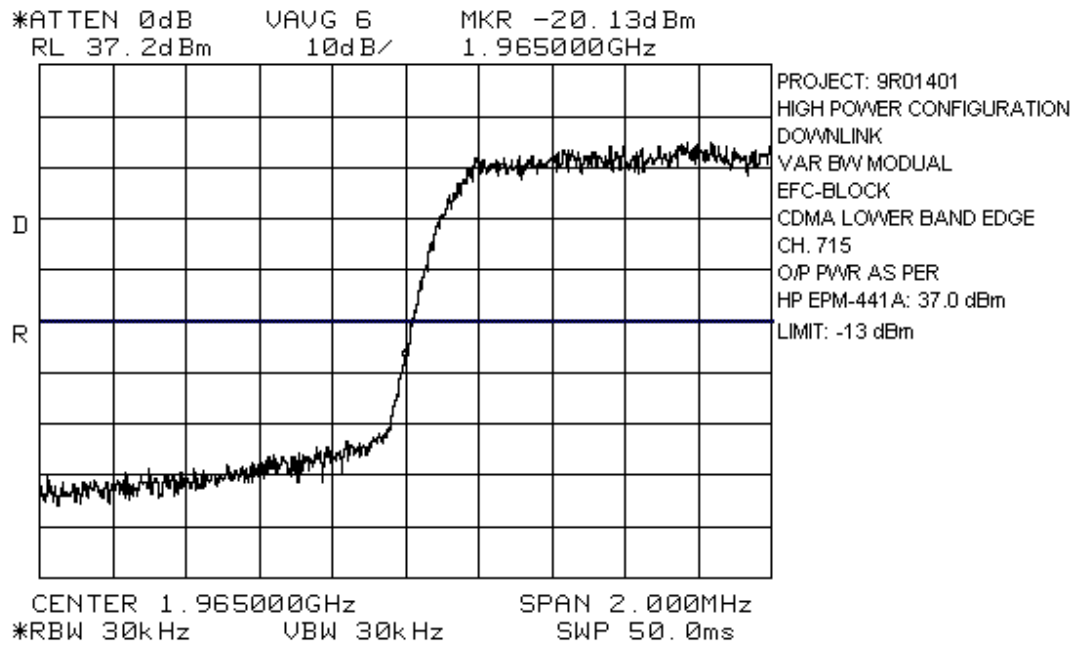
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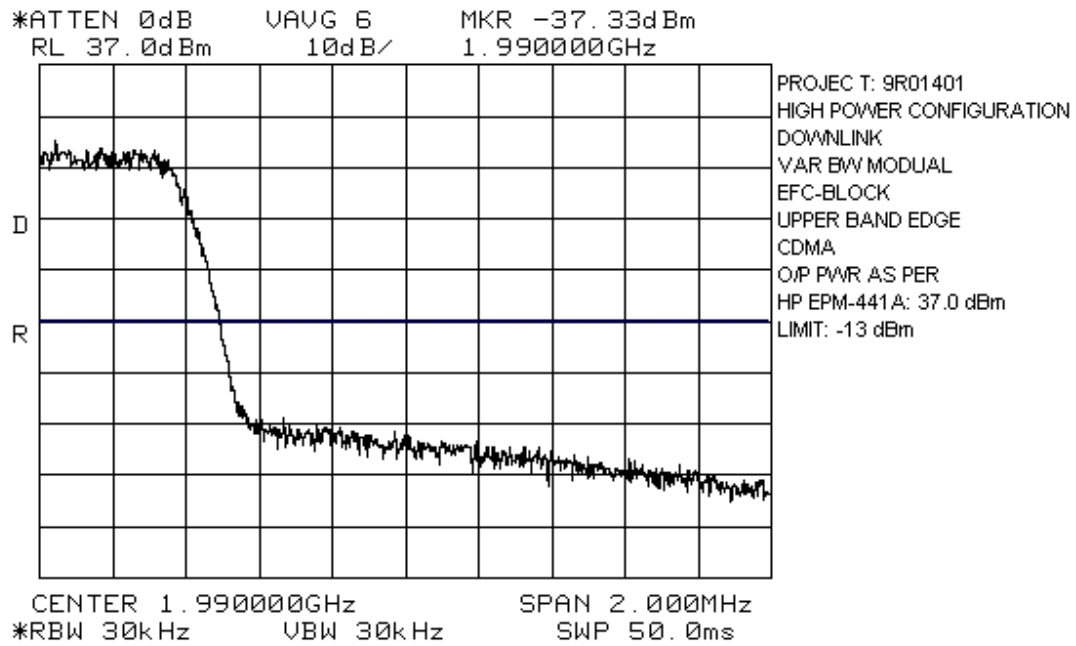
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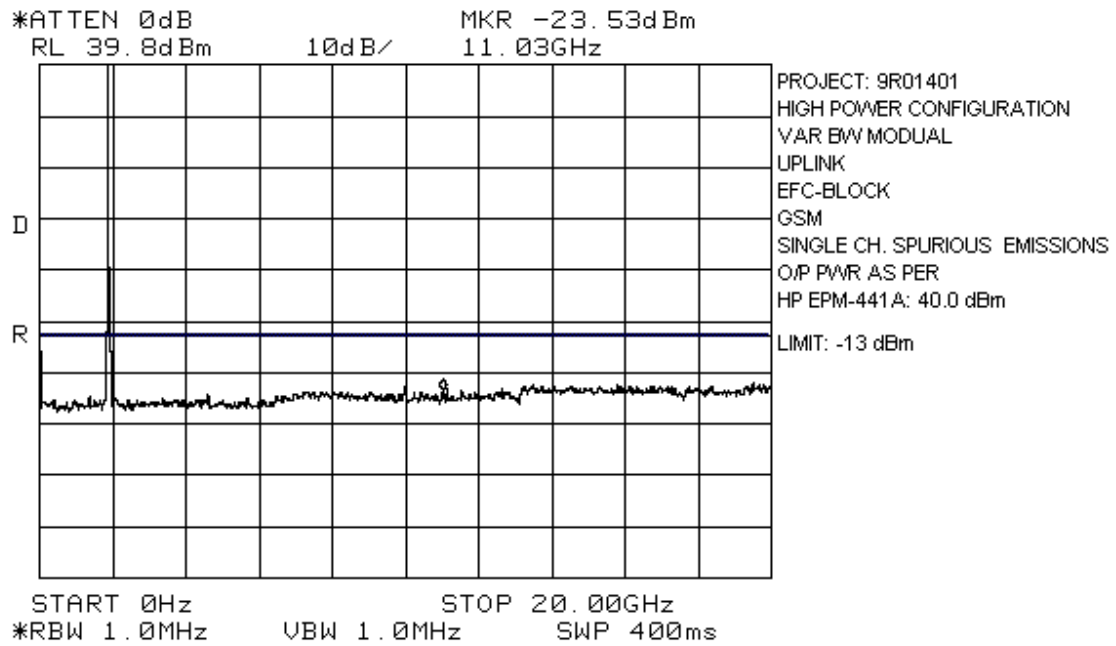
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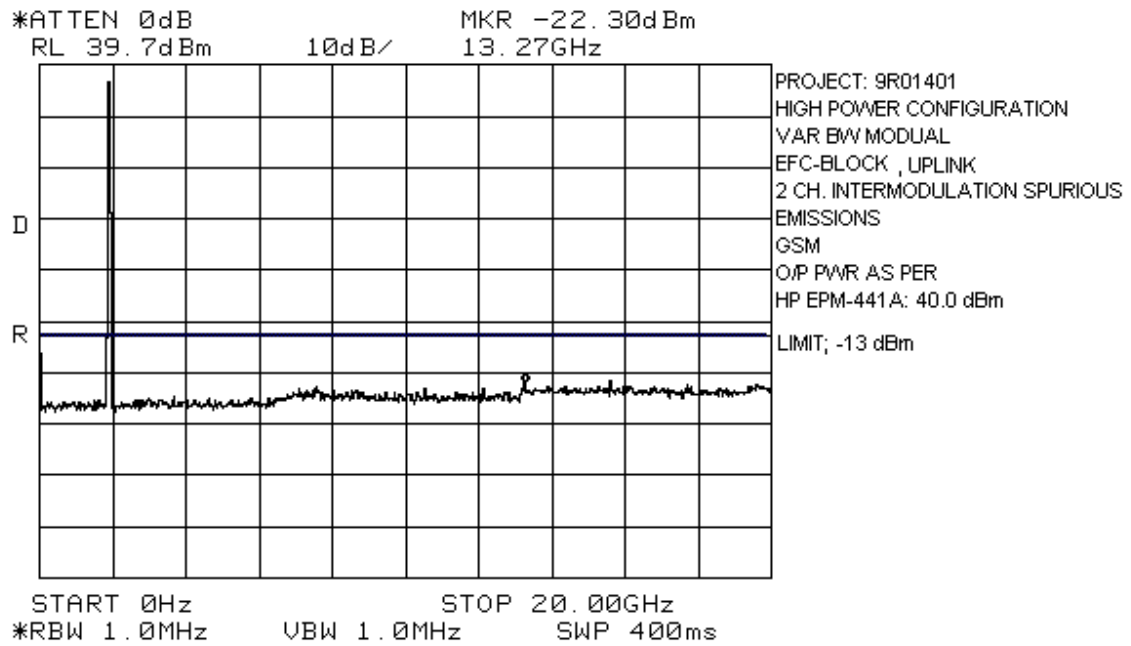
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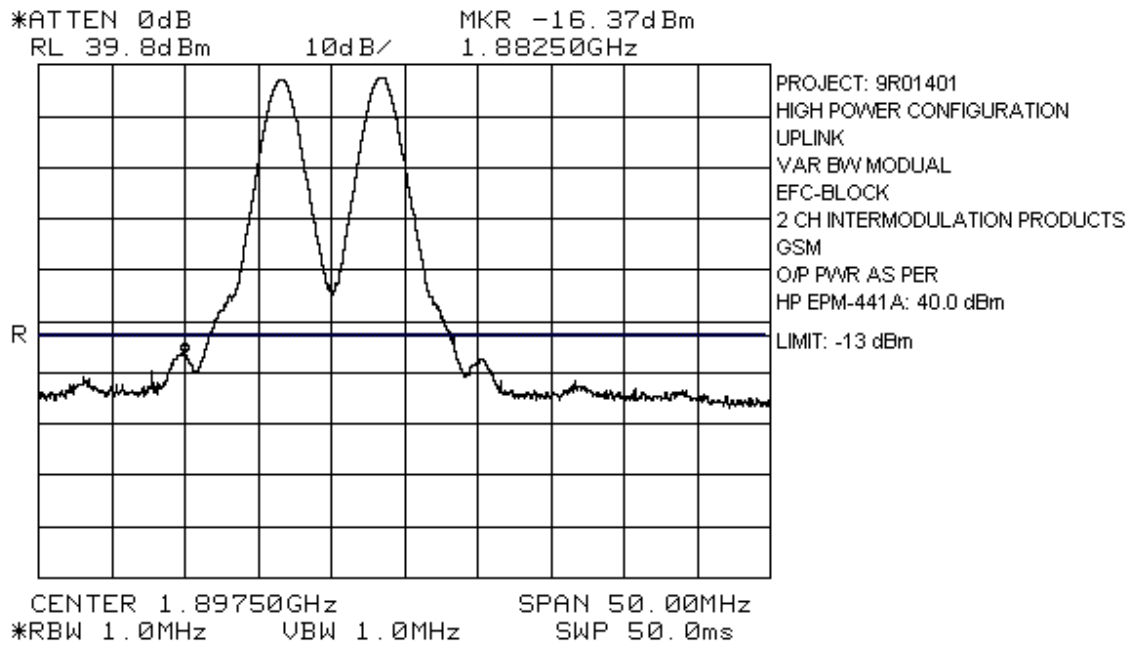
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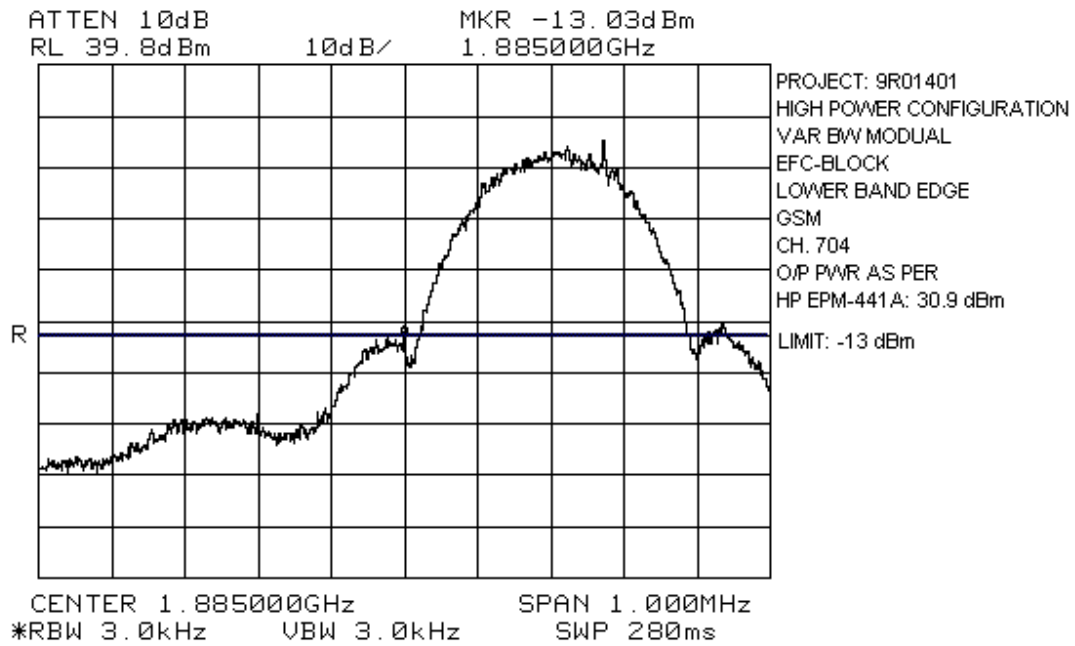
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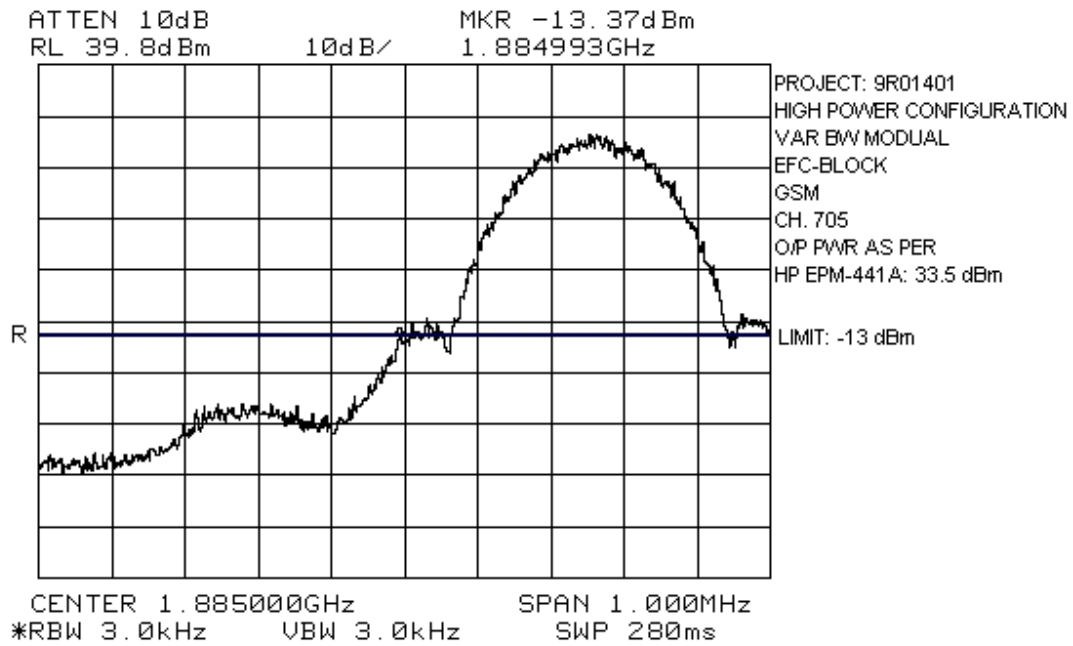
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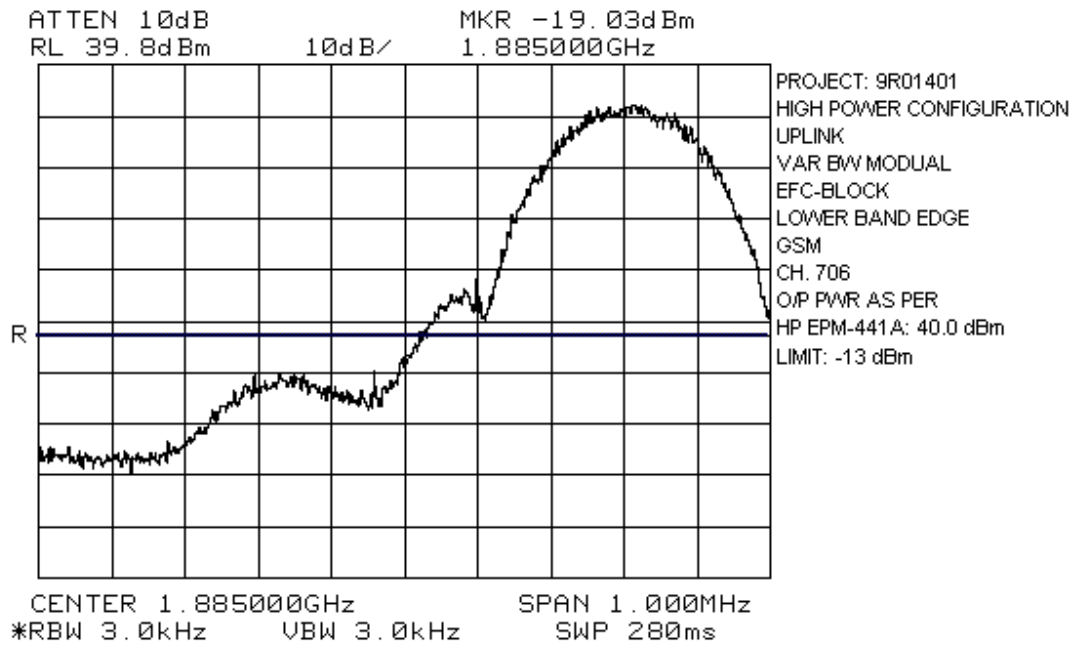
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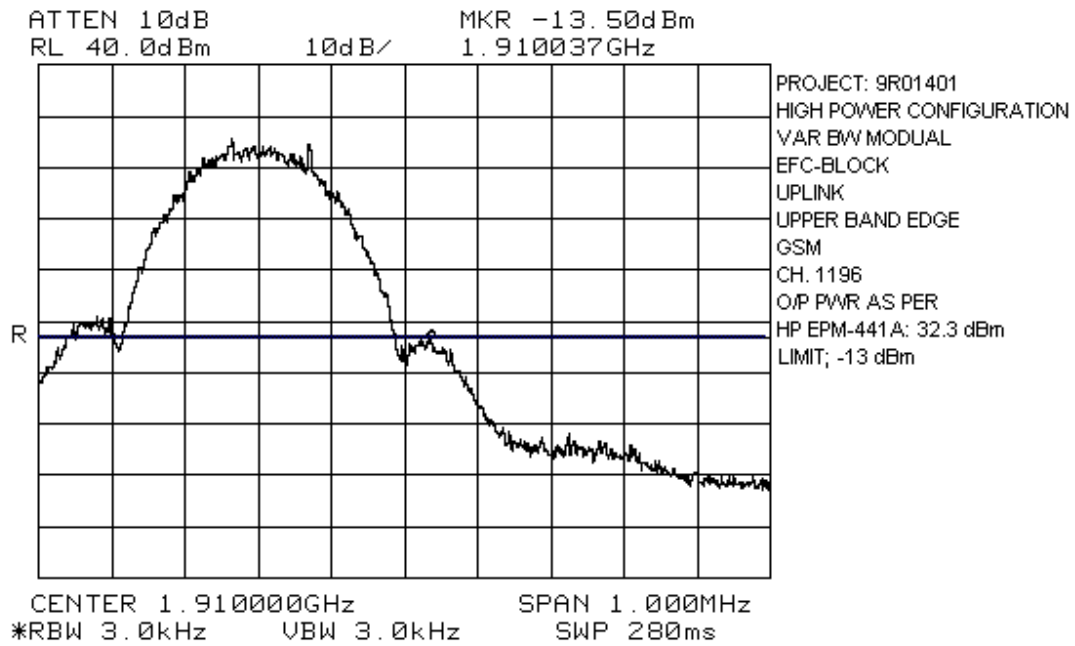
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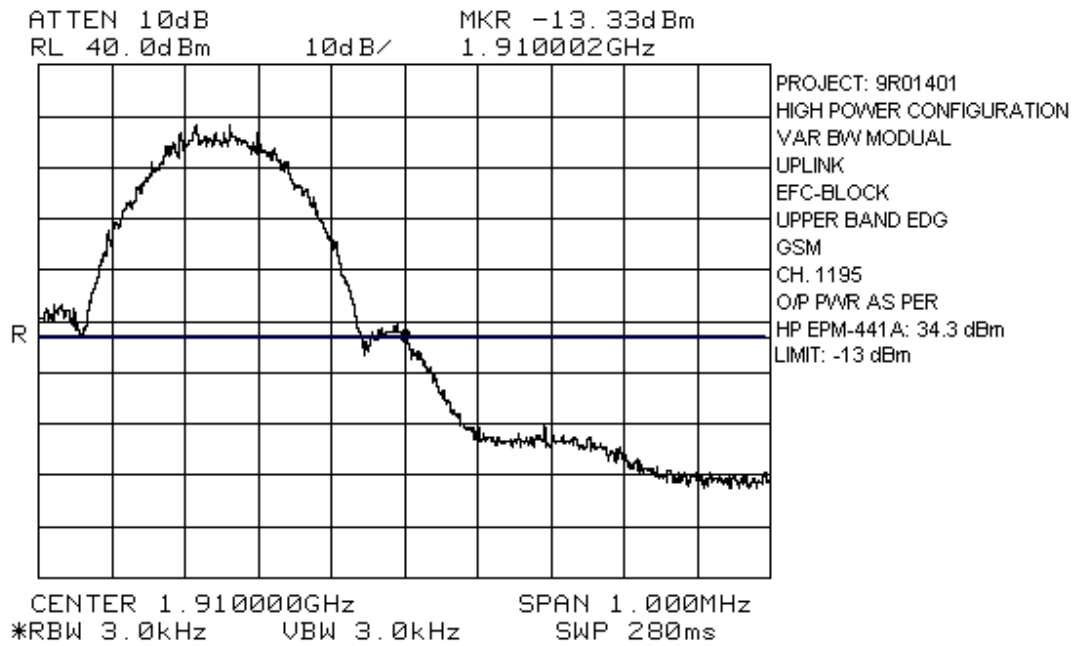
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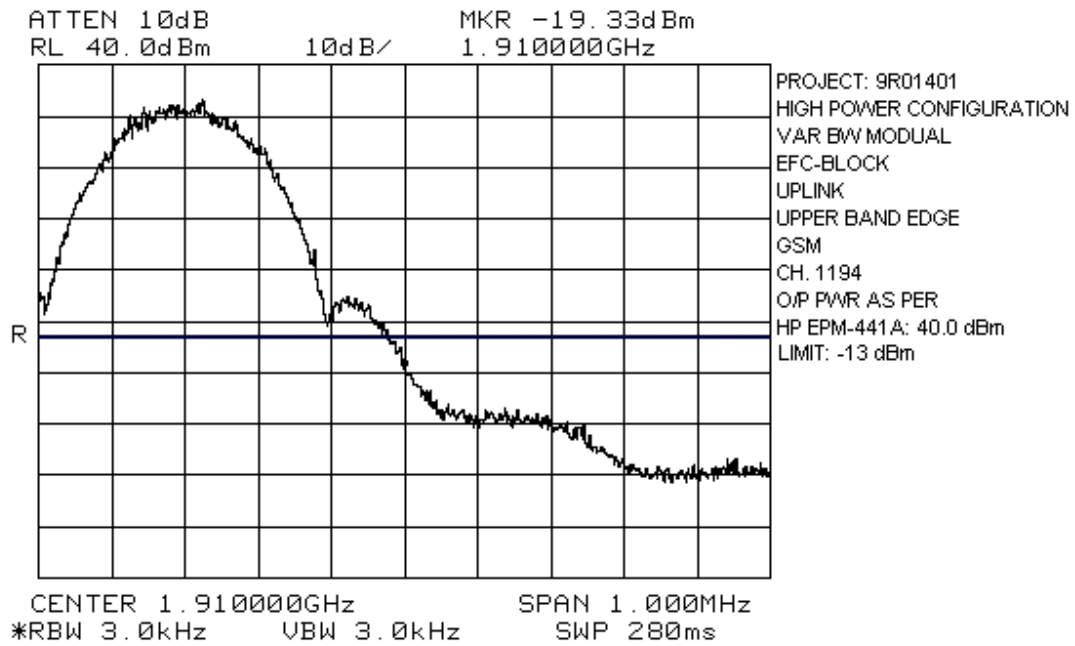
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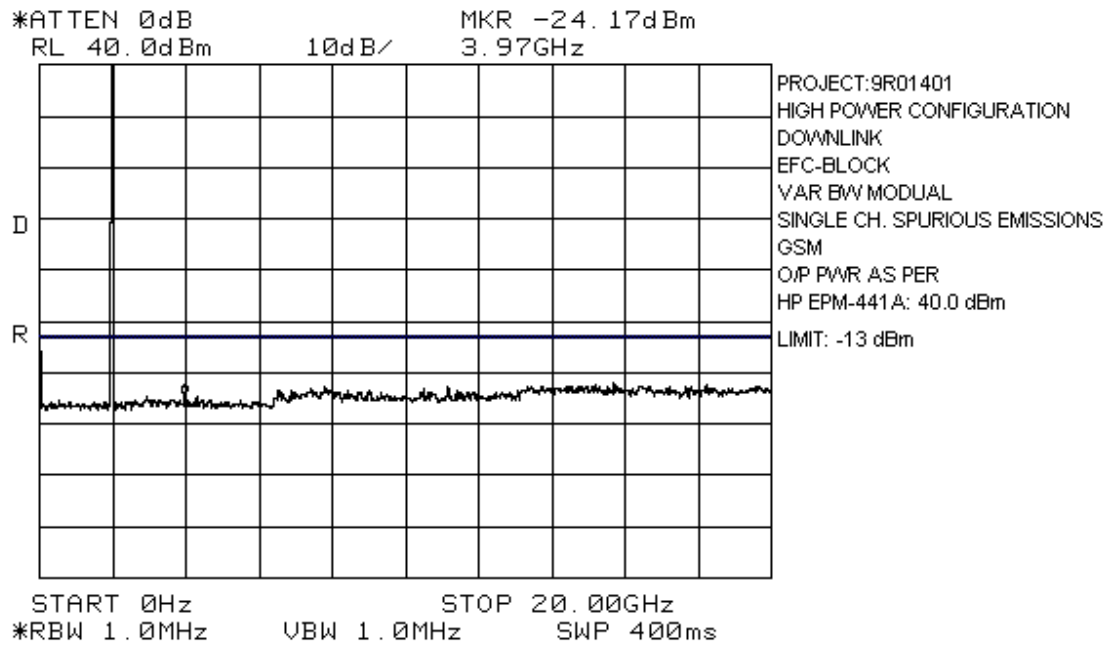
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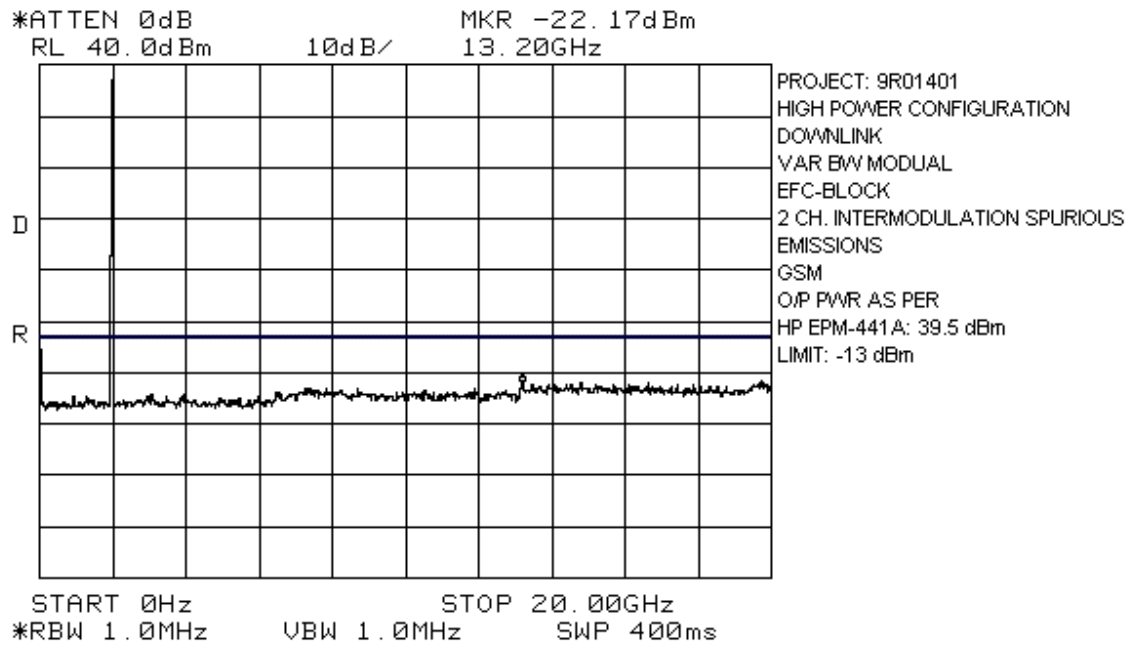
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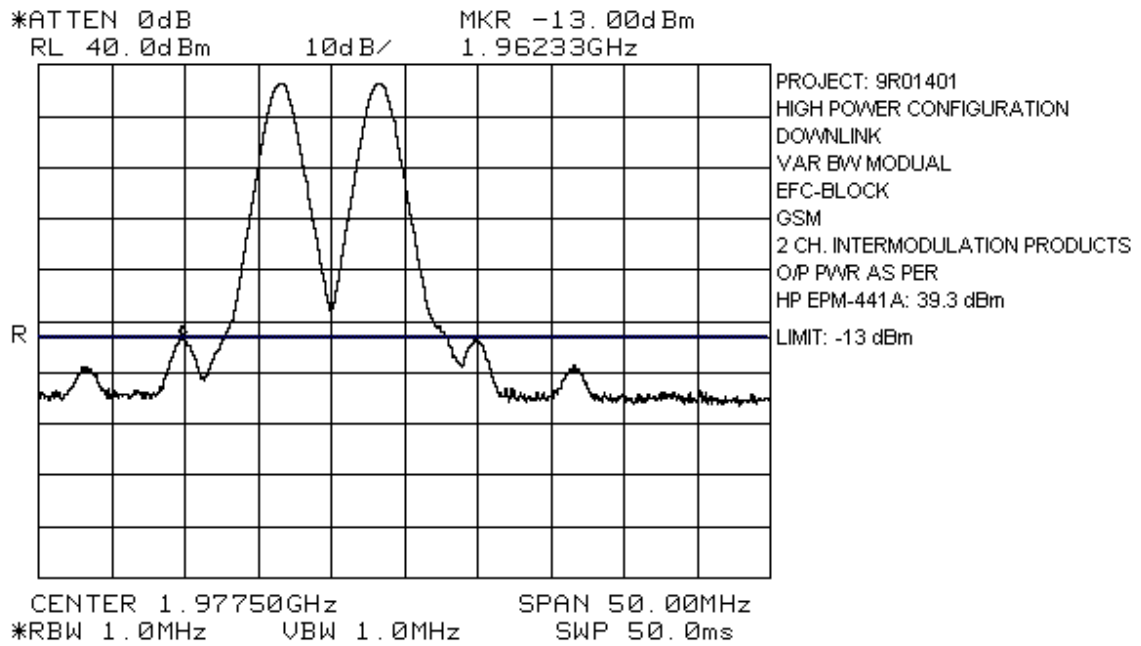
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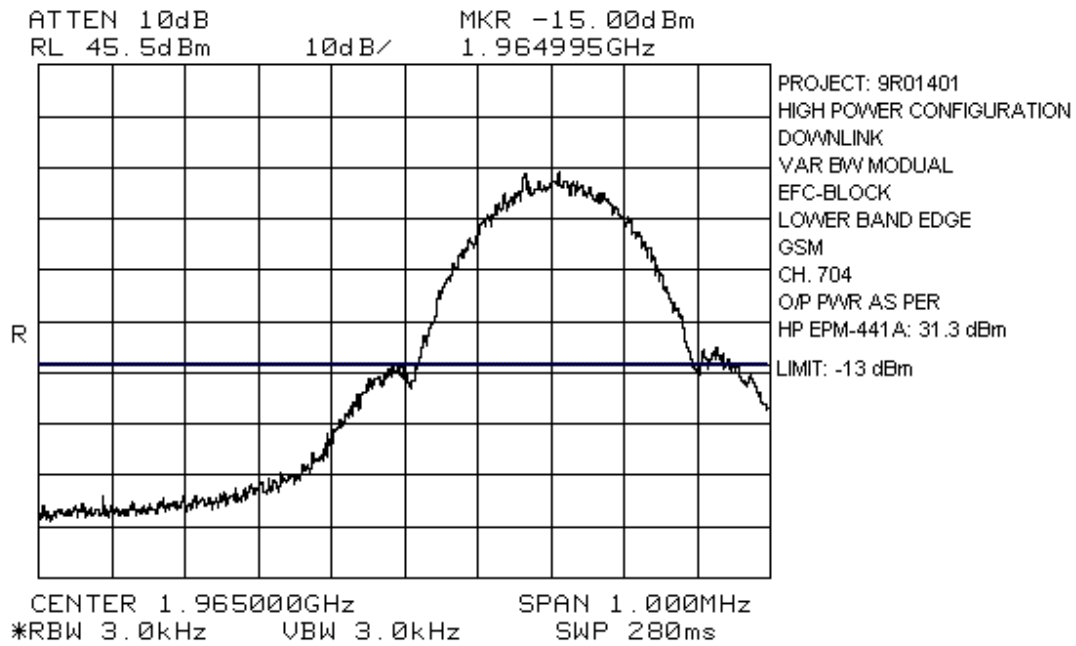
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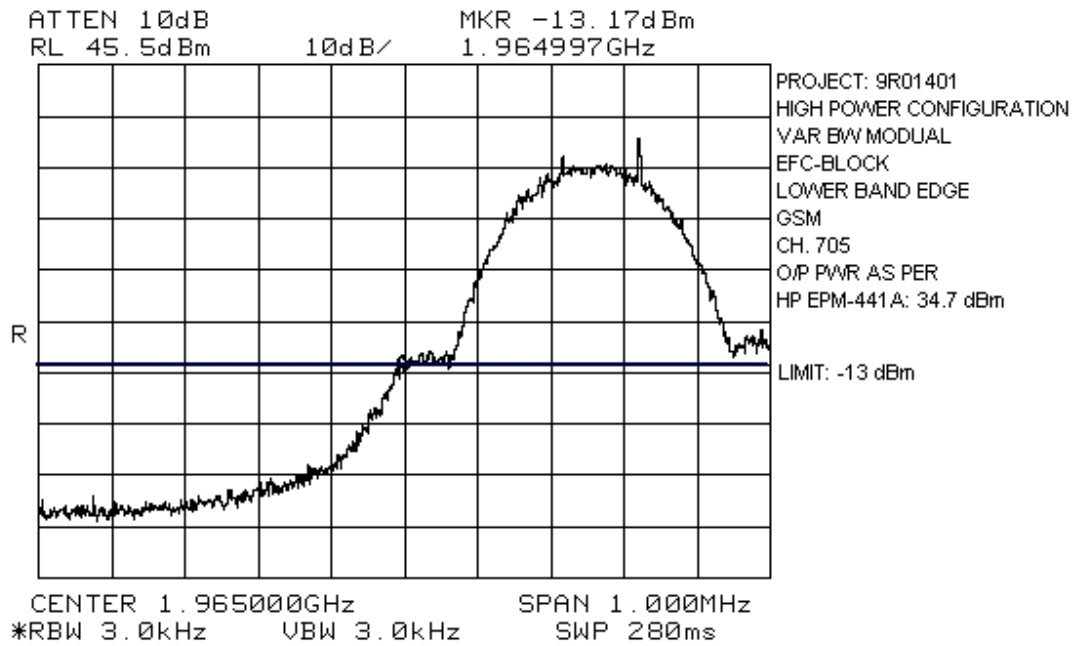
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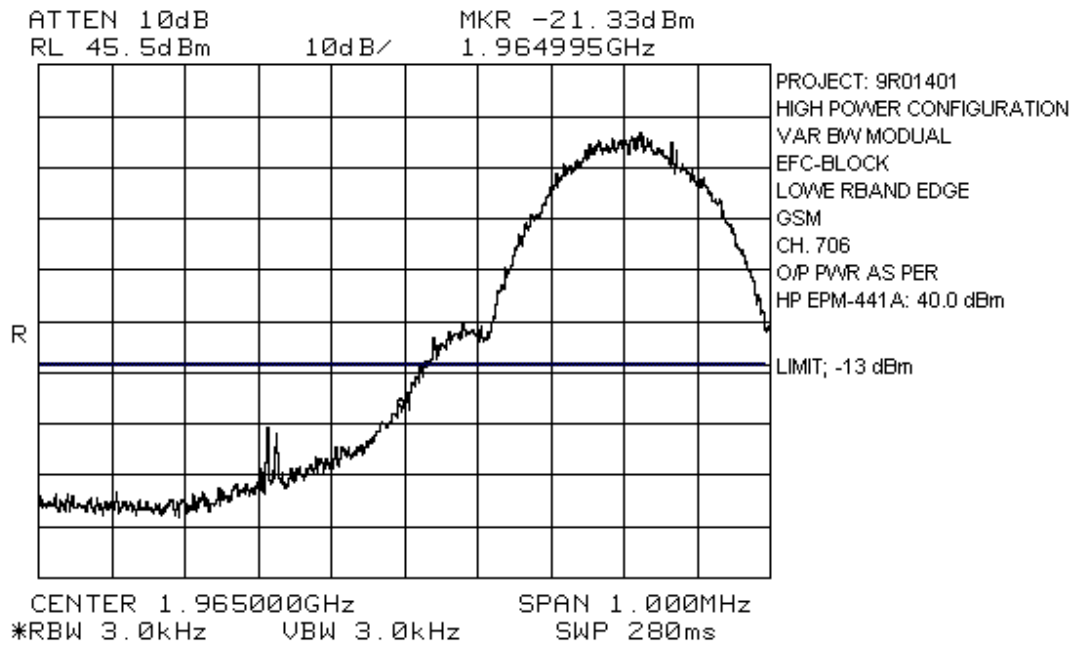
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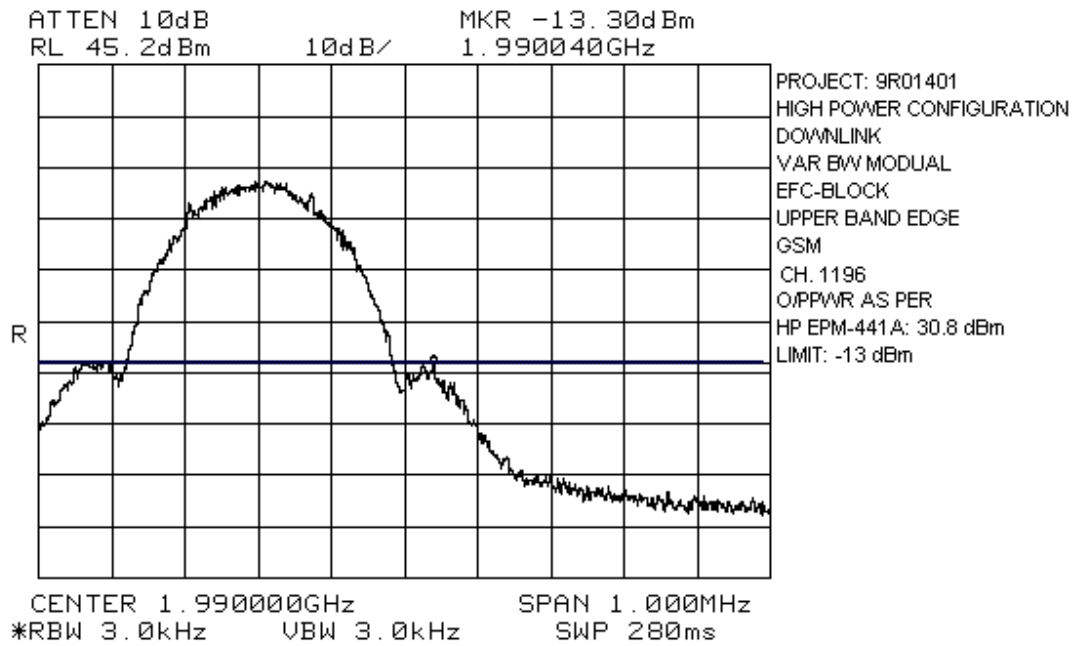
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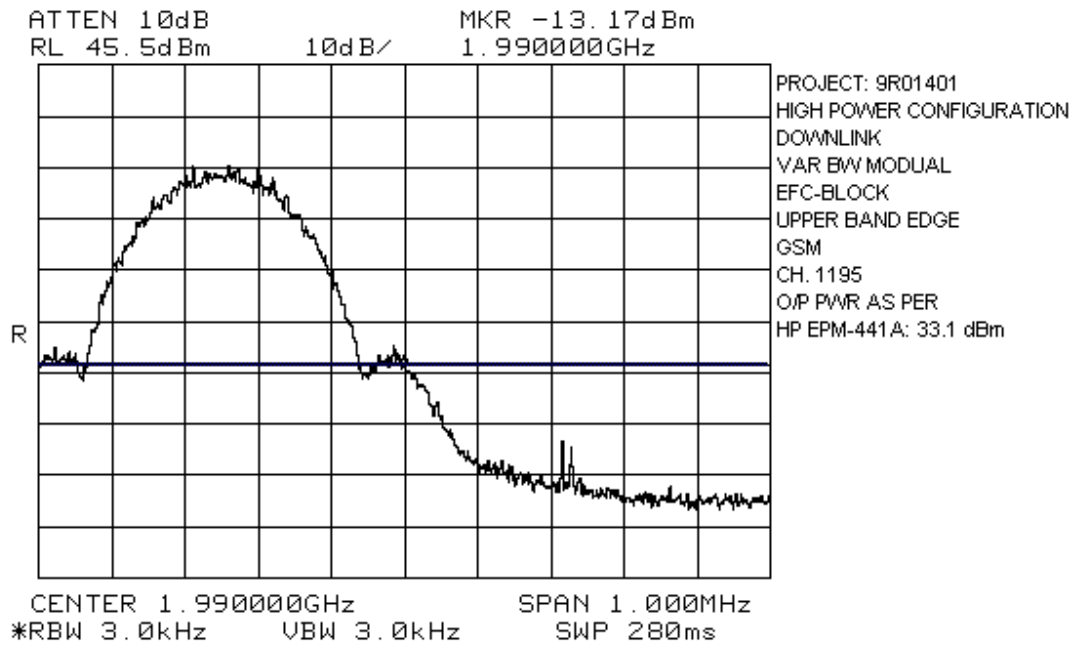
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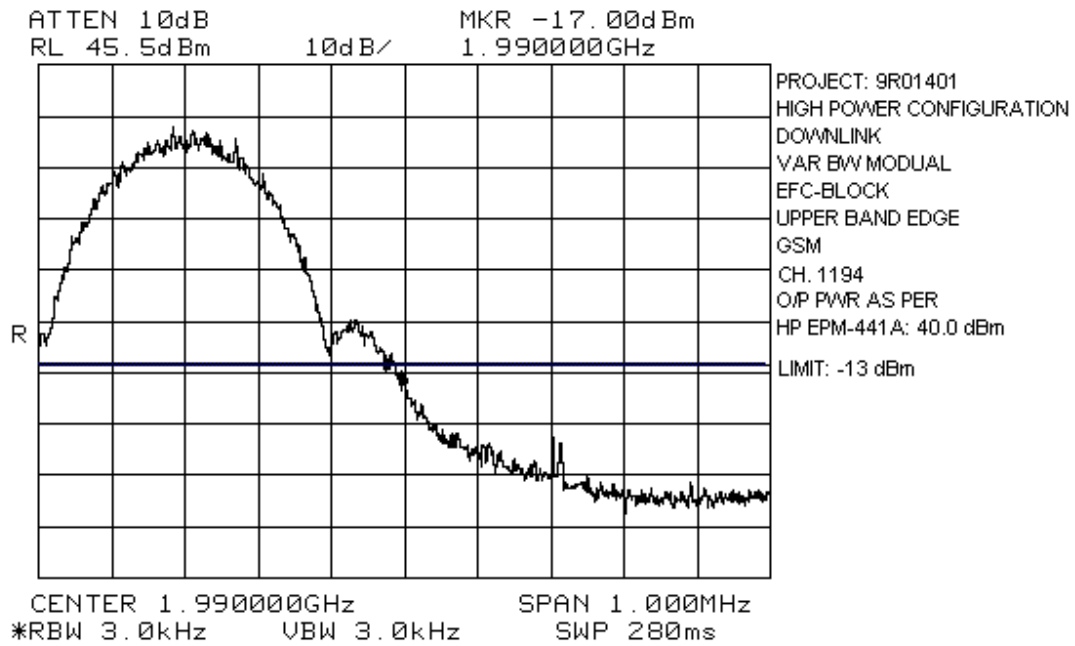
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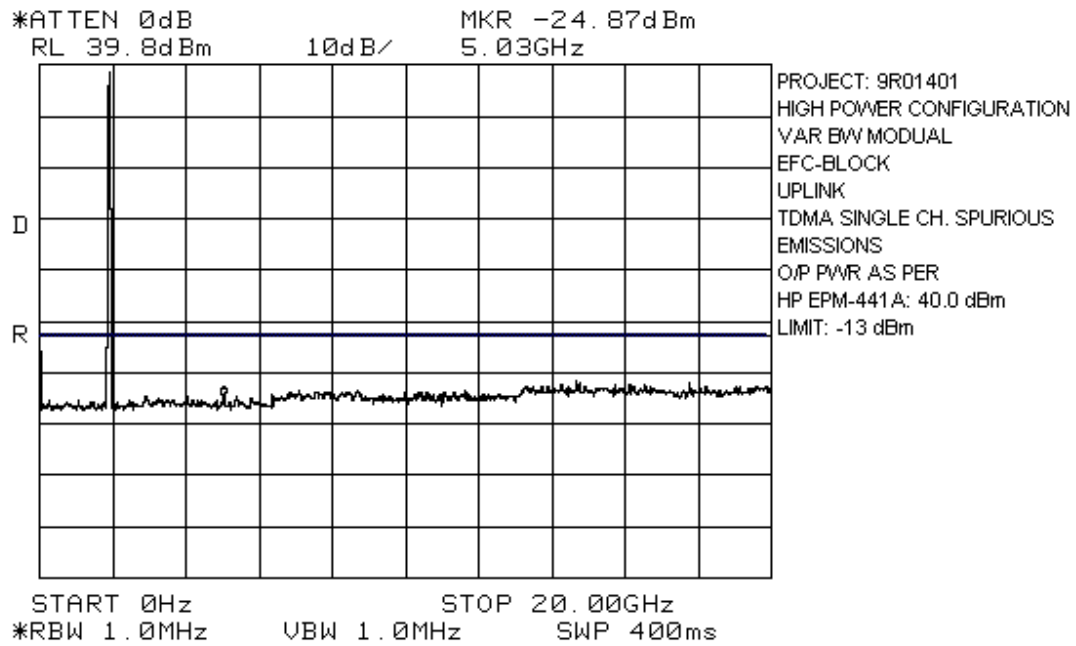
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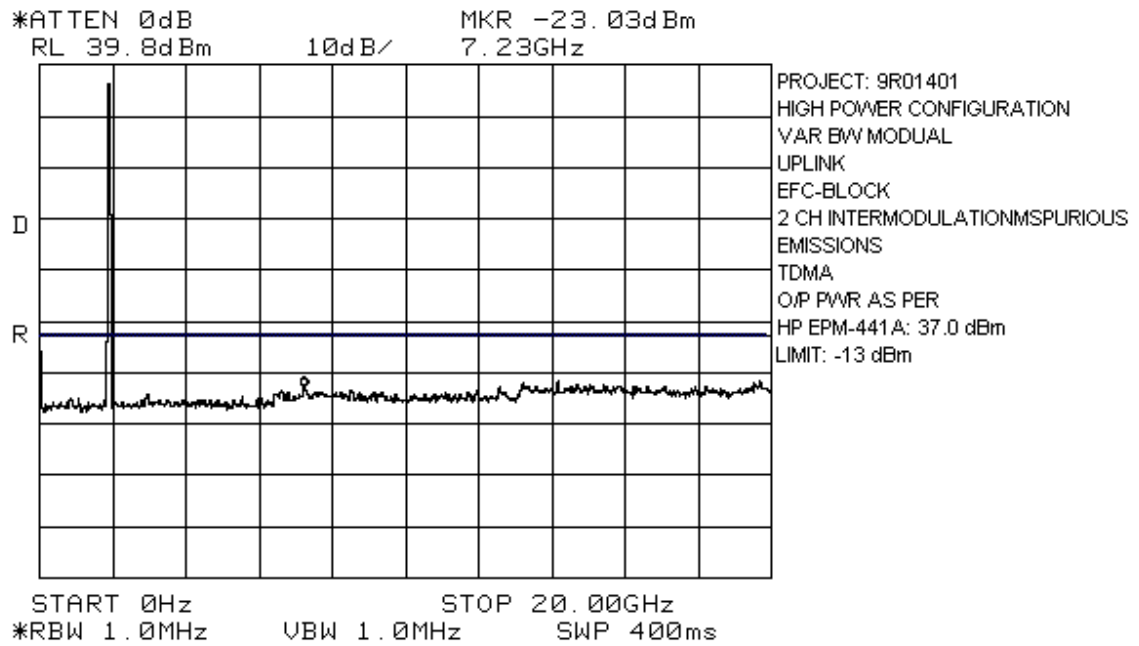
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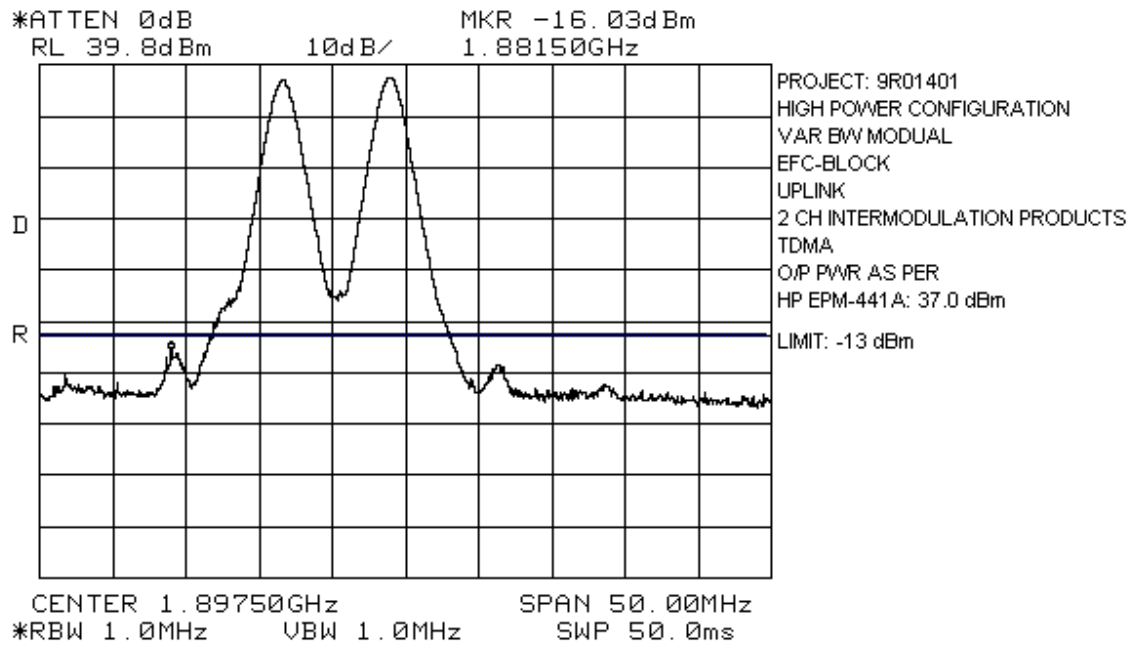
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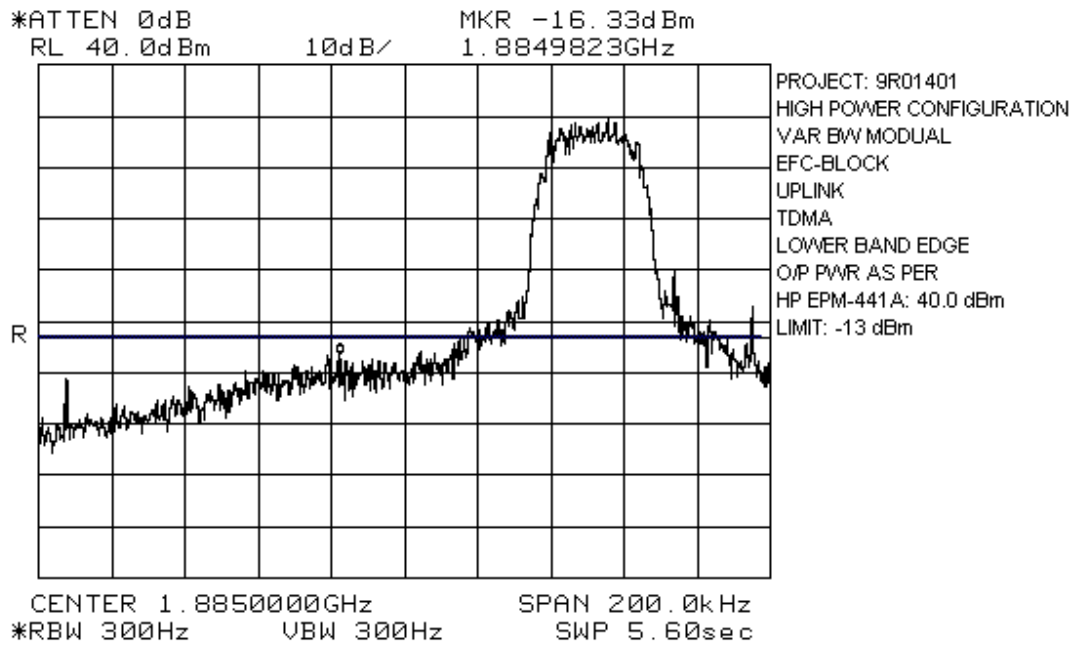
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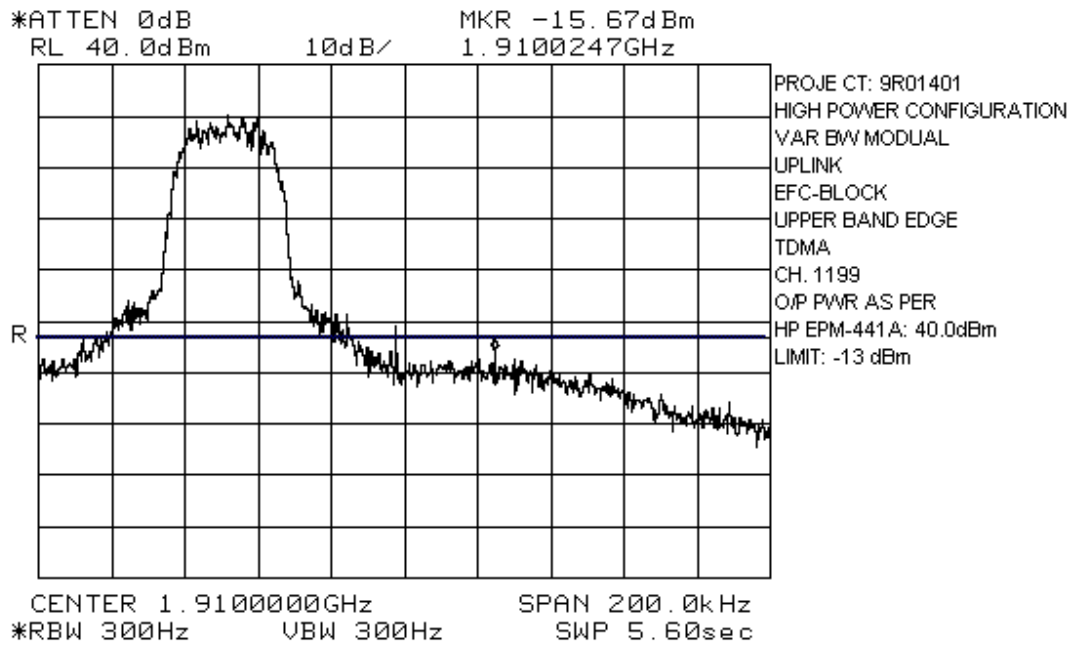
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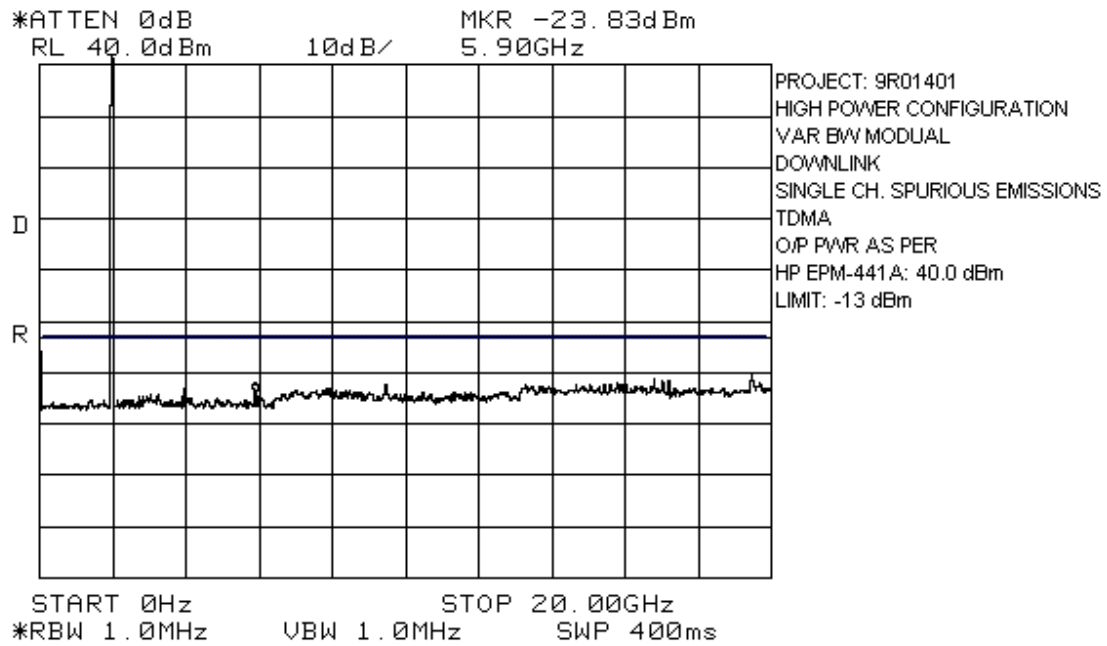
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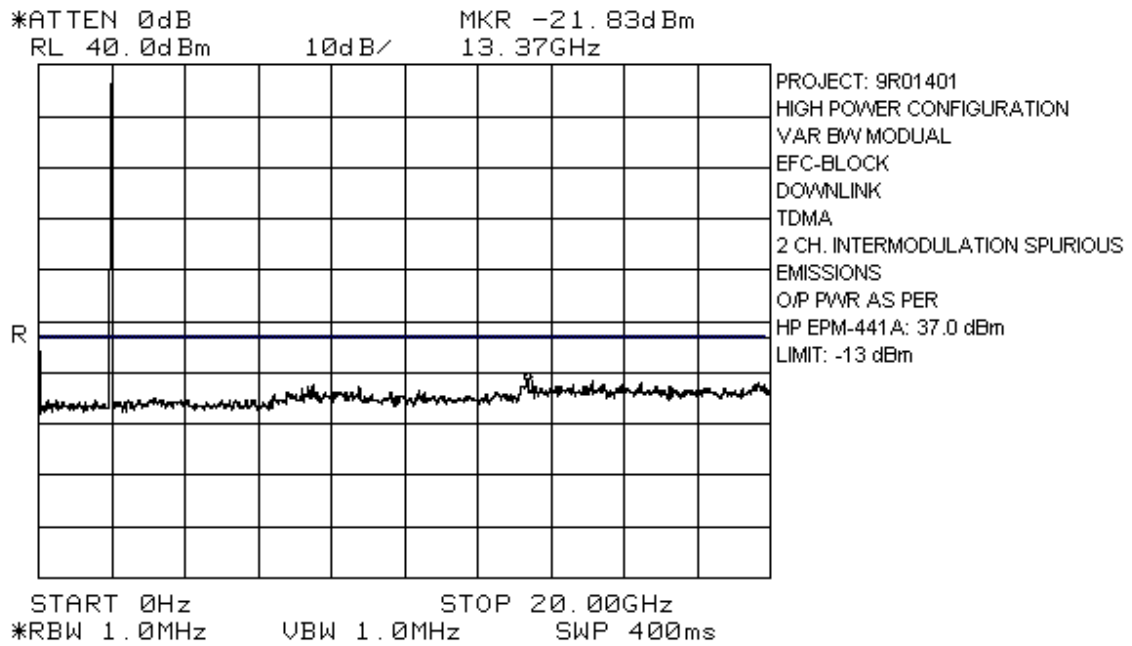
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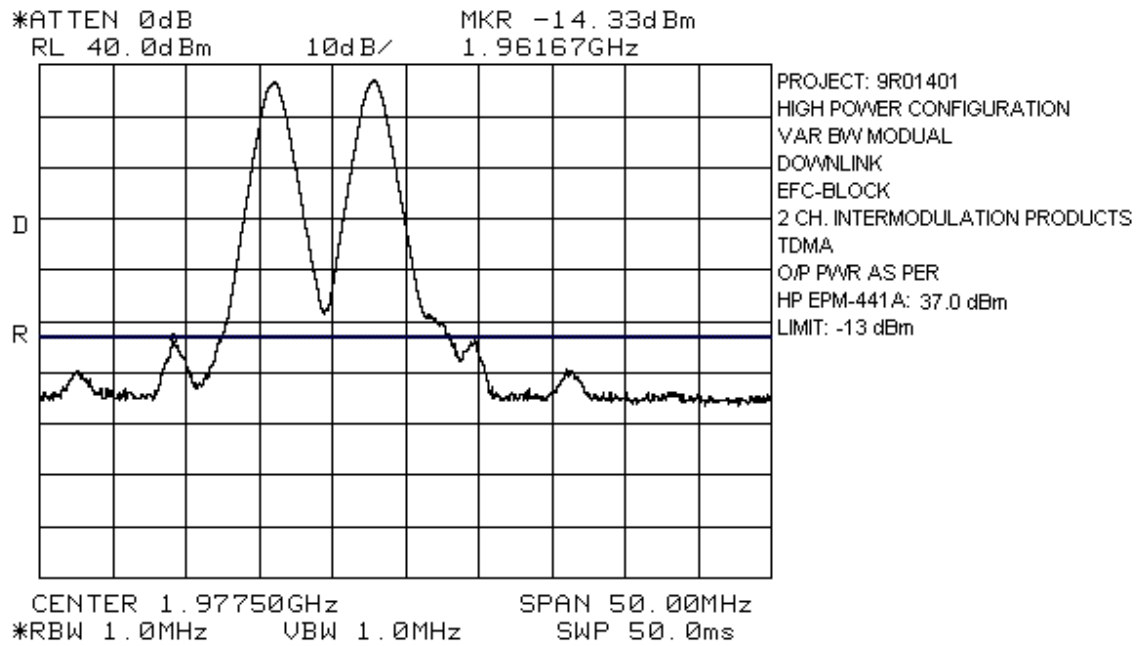
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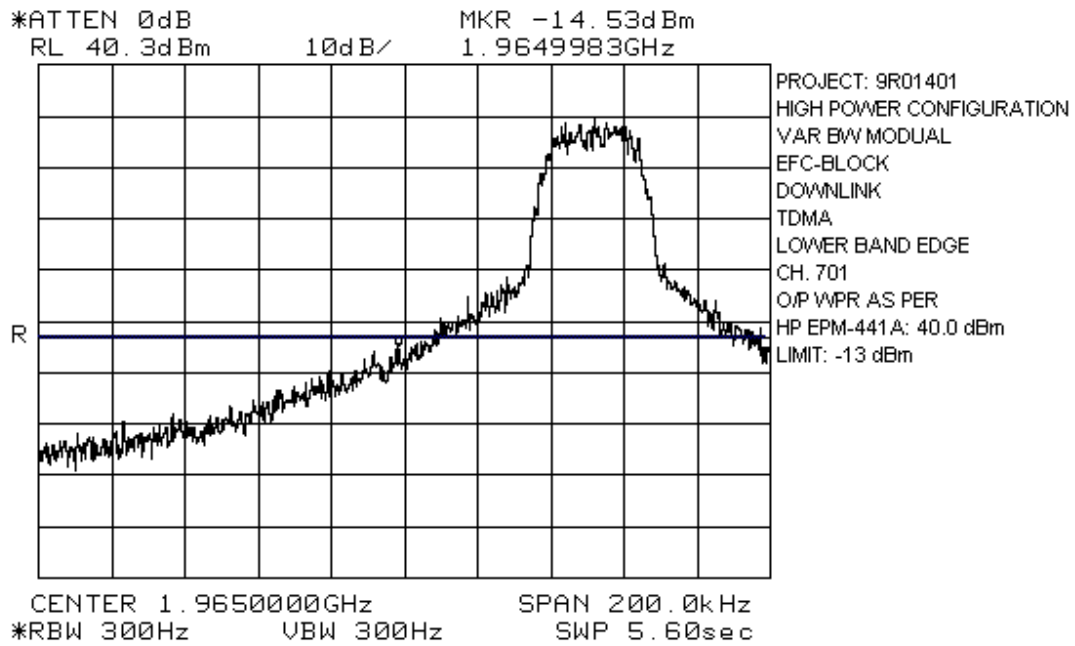
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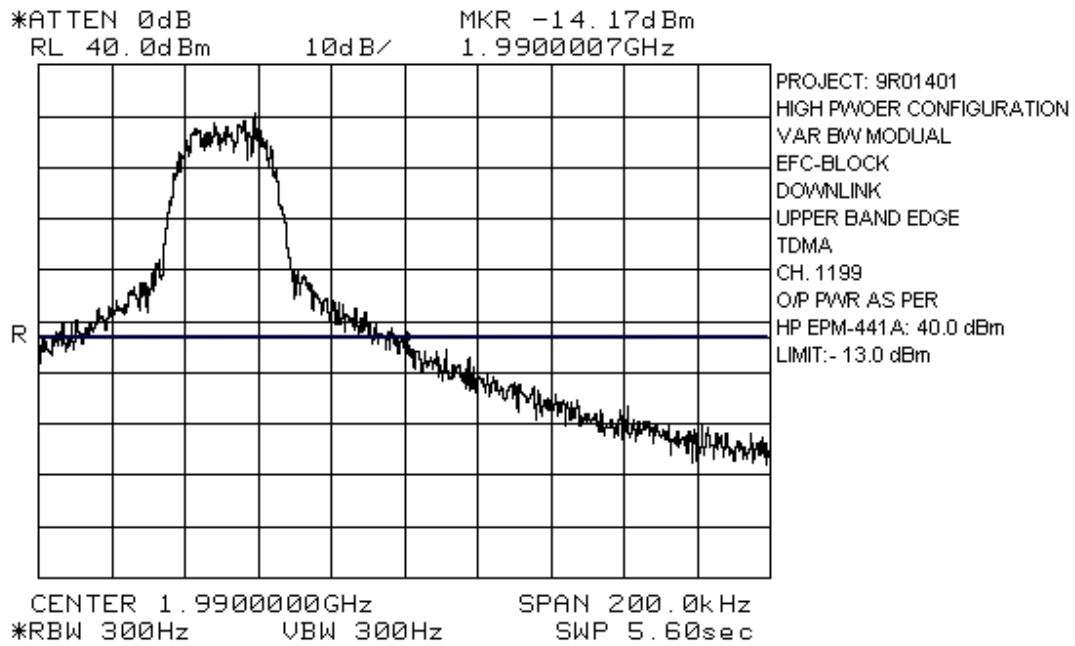
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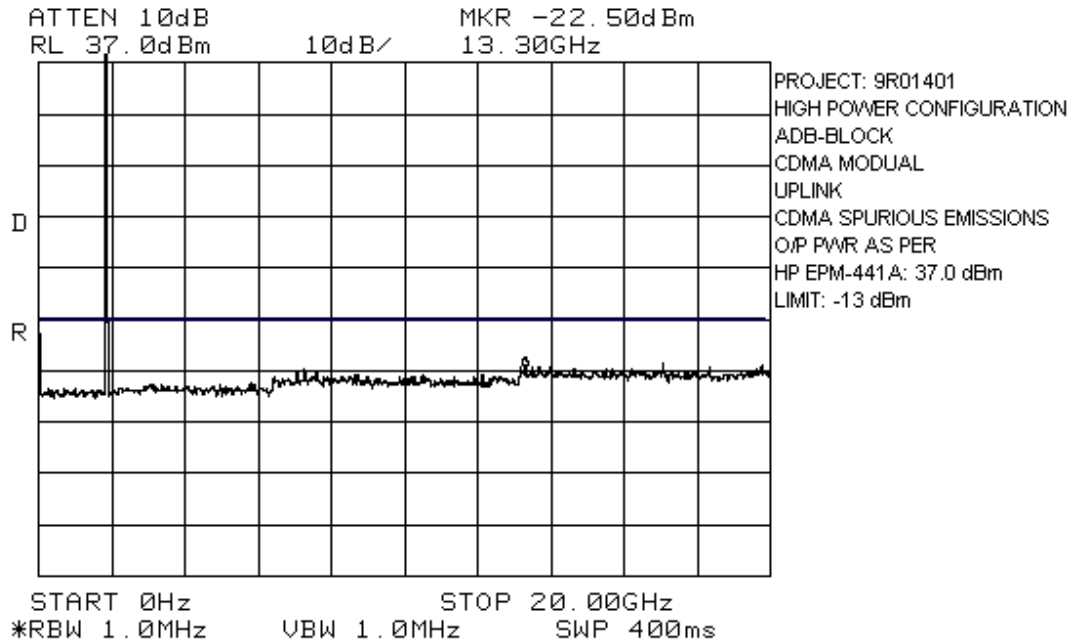
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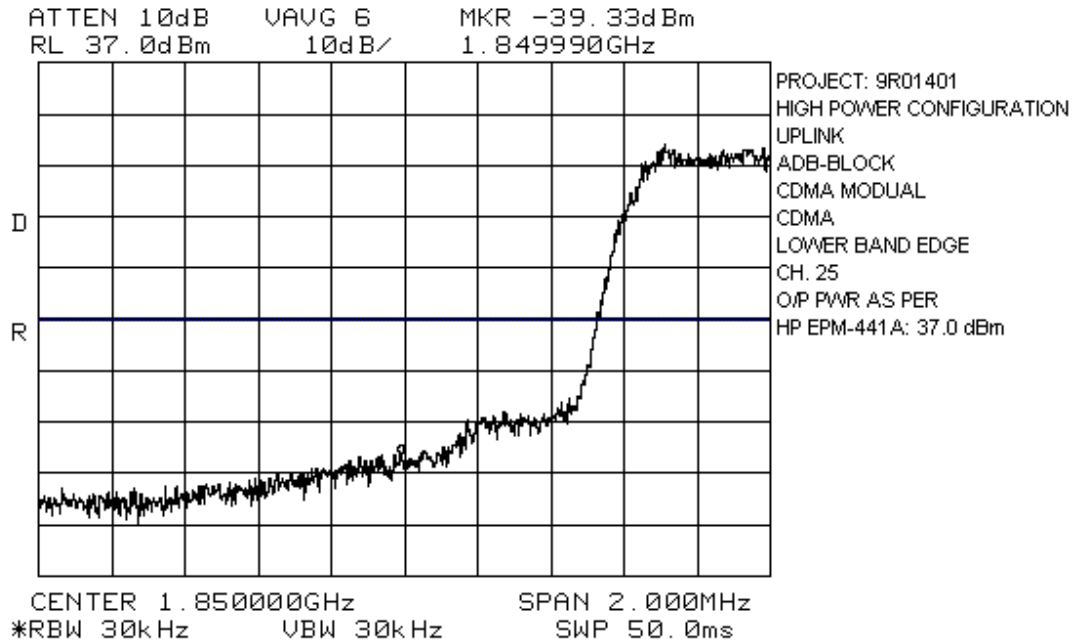
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Single Channel – Basic CDMA Module

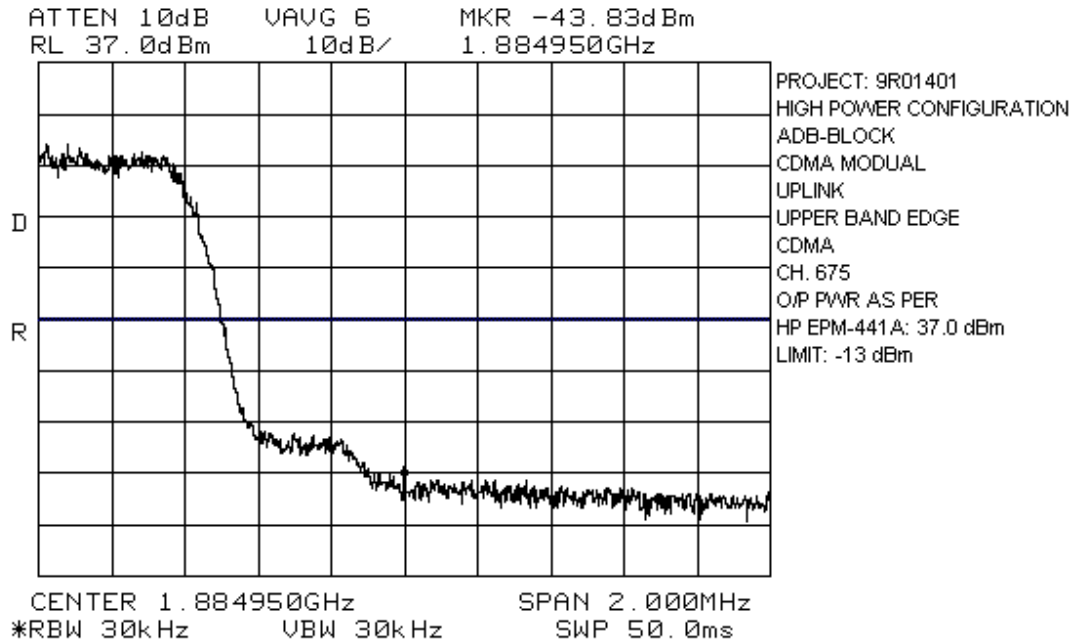
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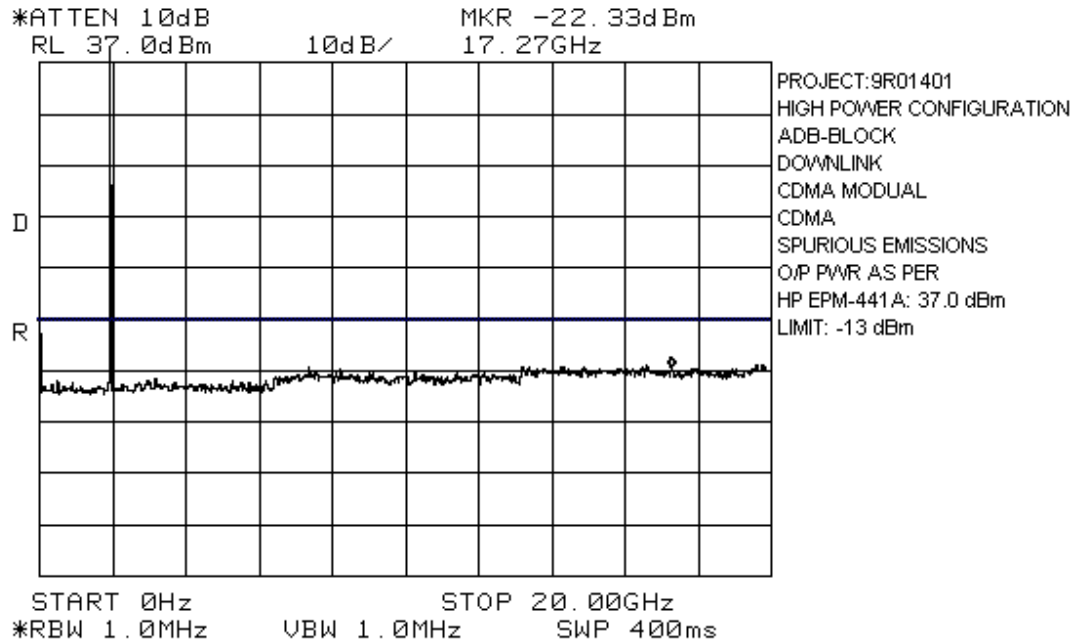
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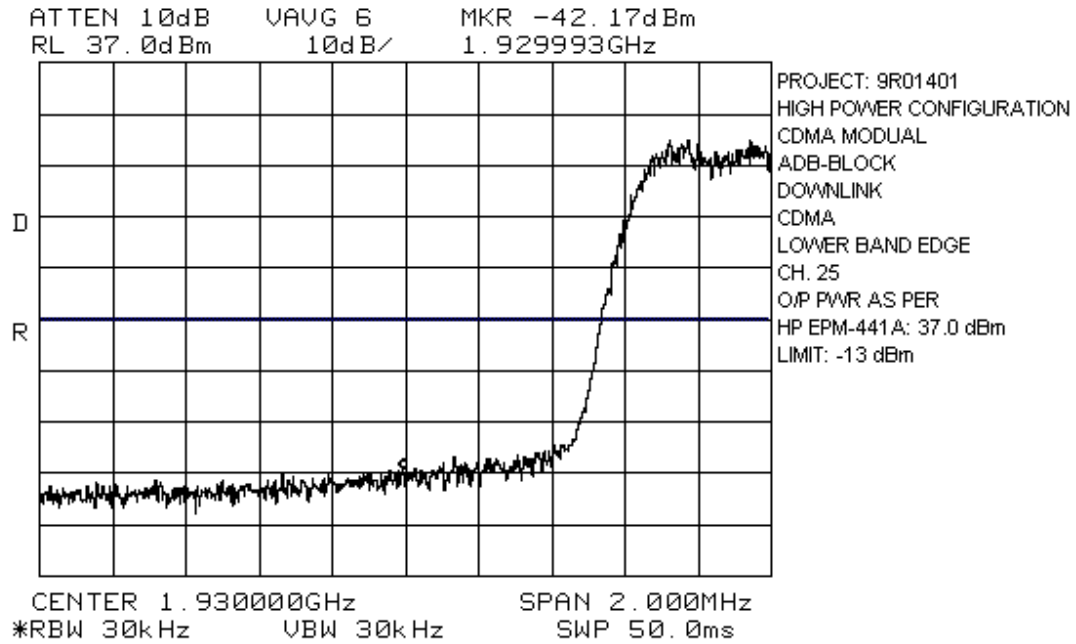
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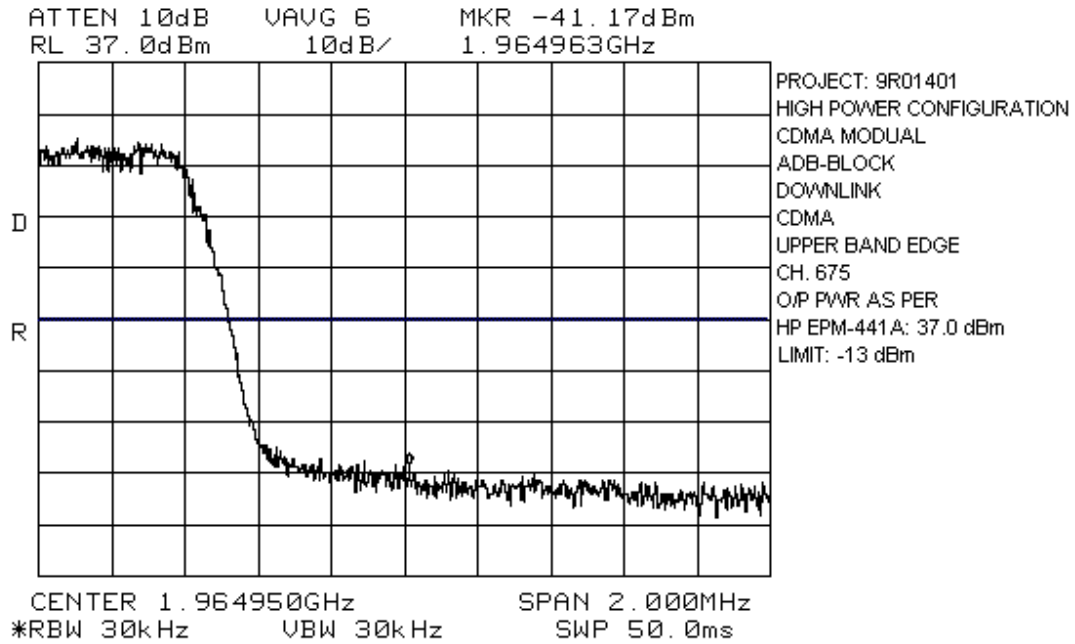
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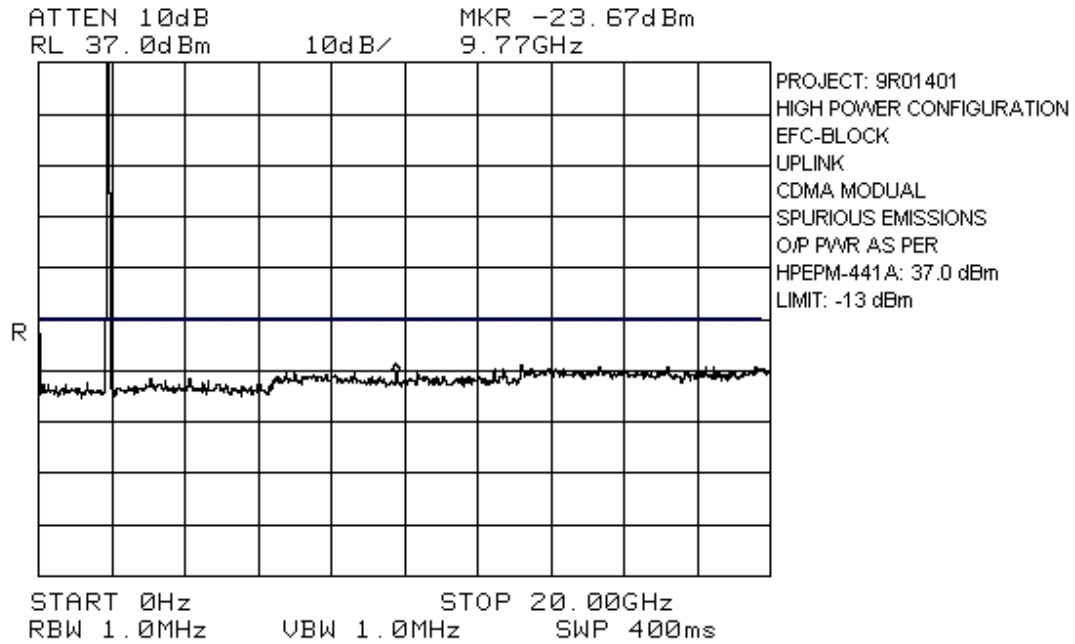
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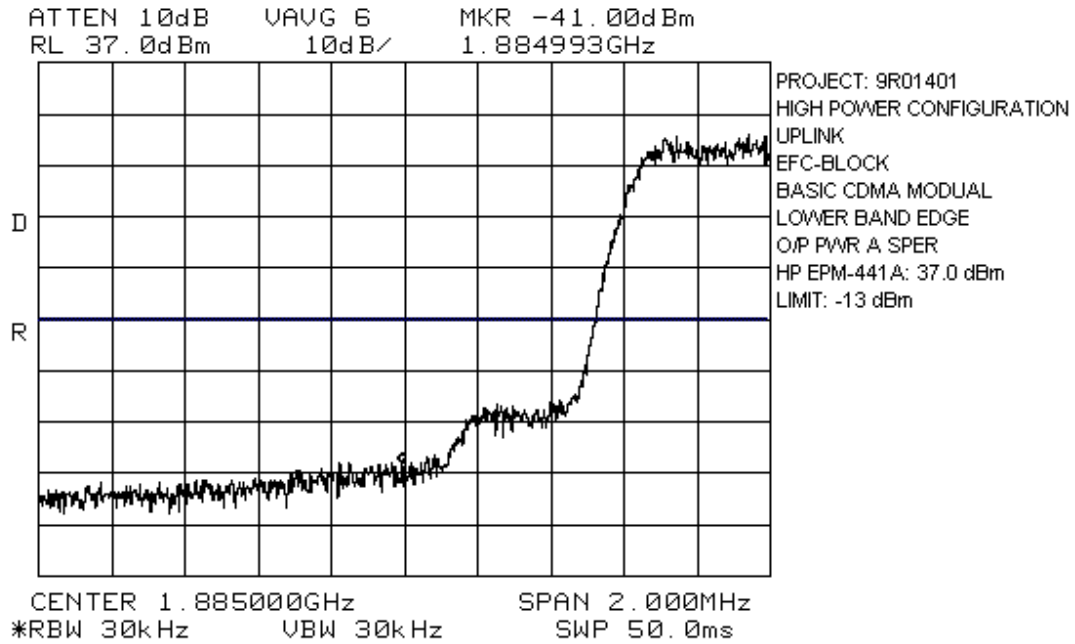
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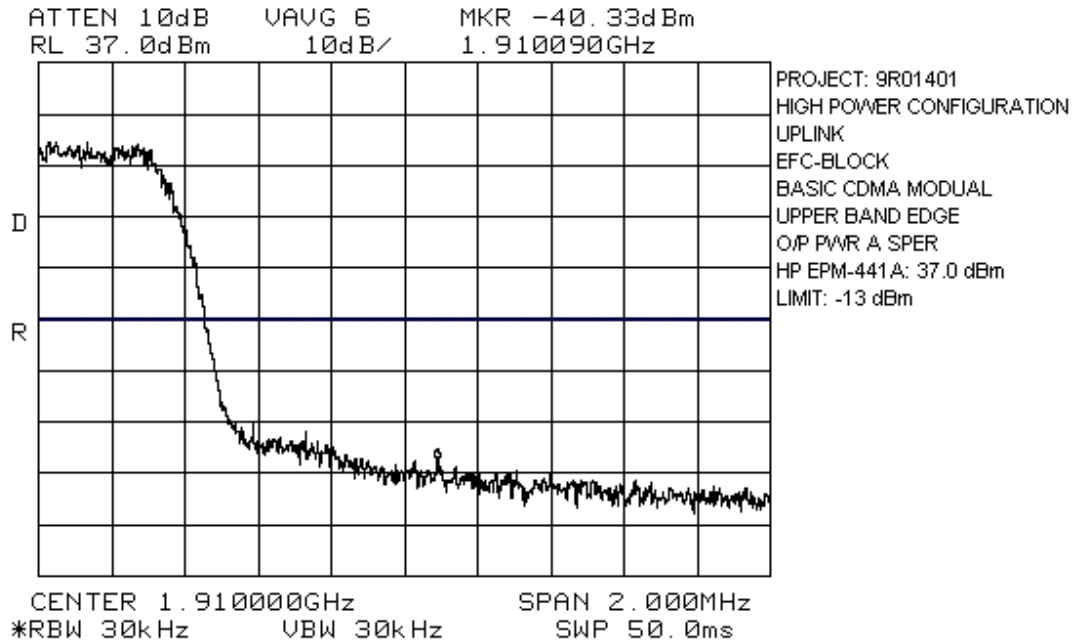
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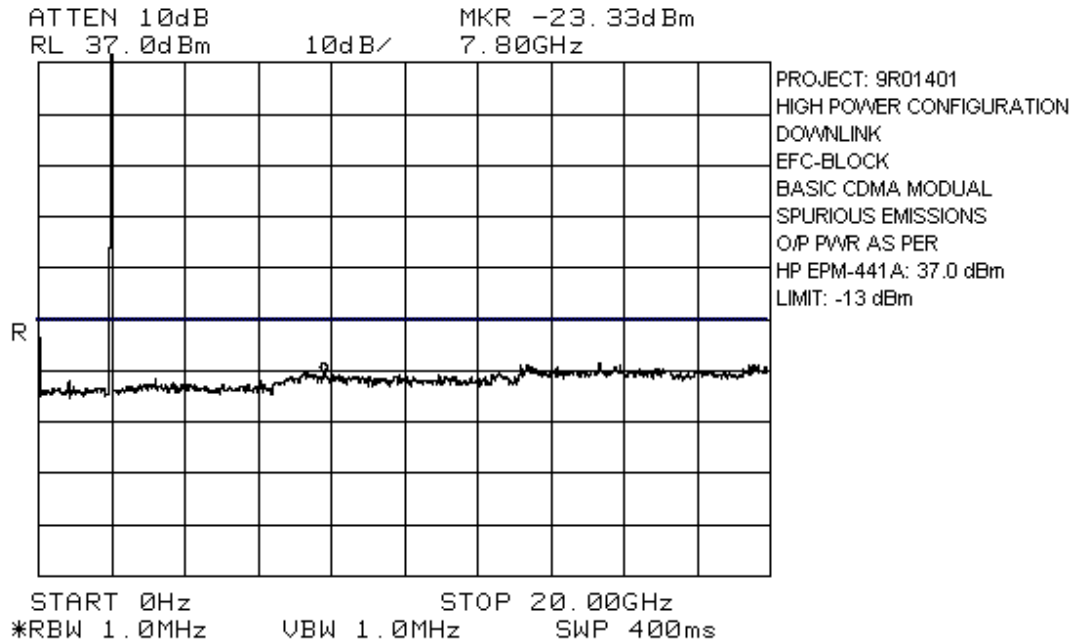
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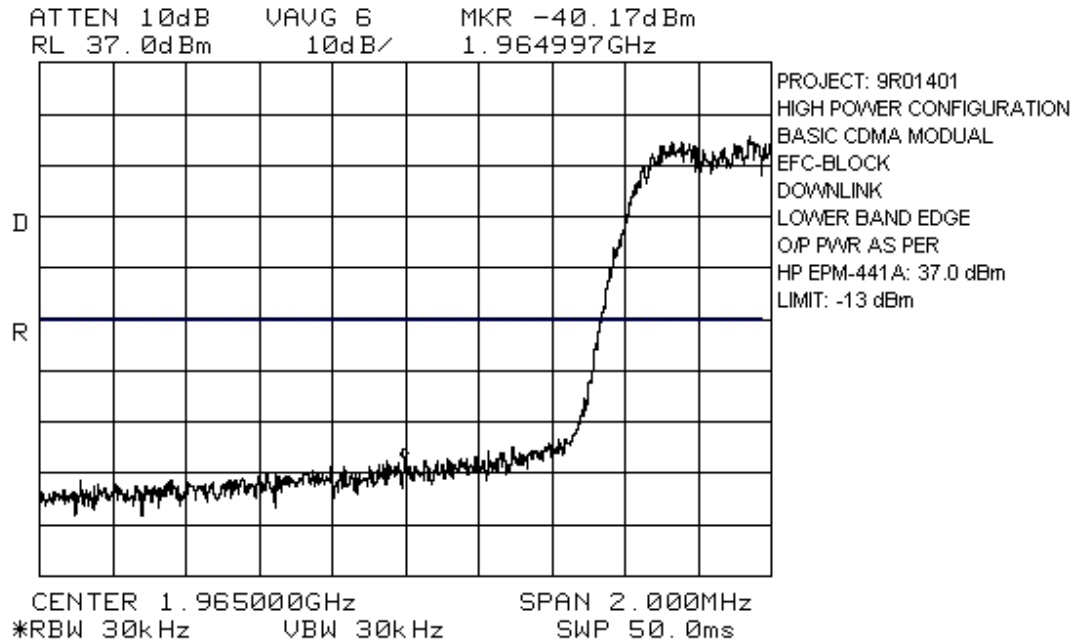
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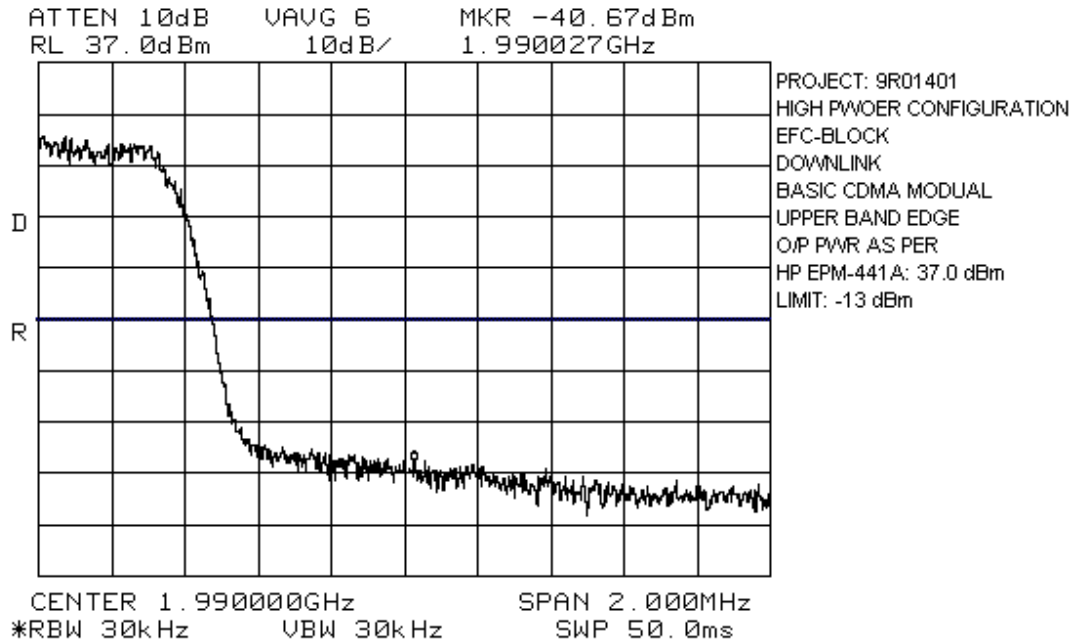
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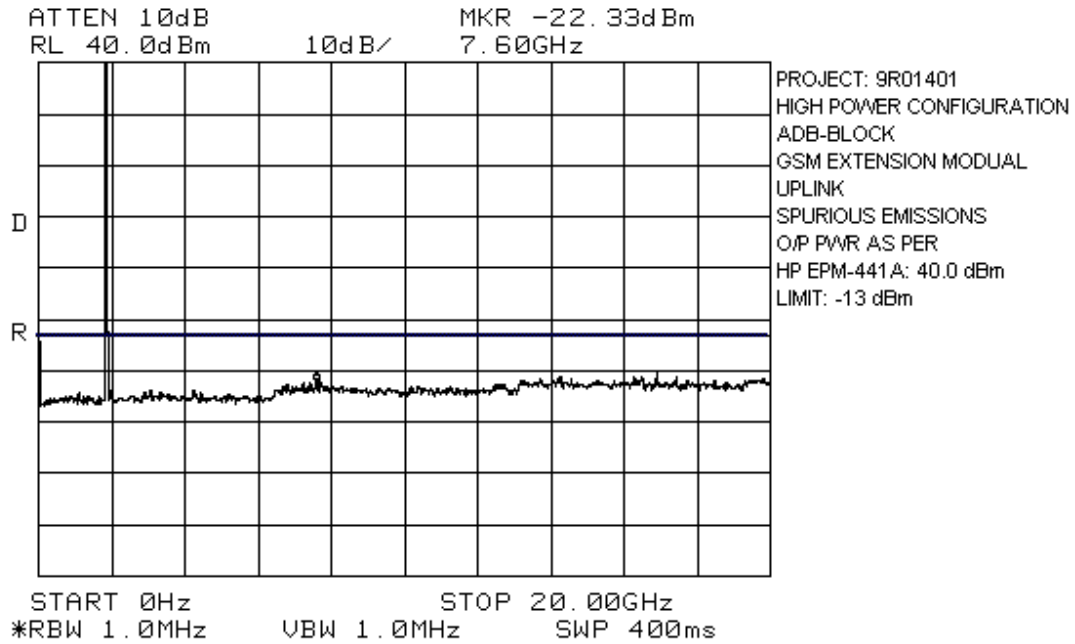
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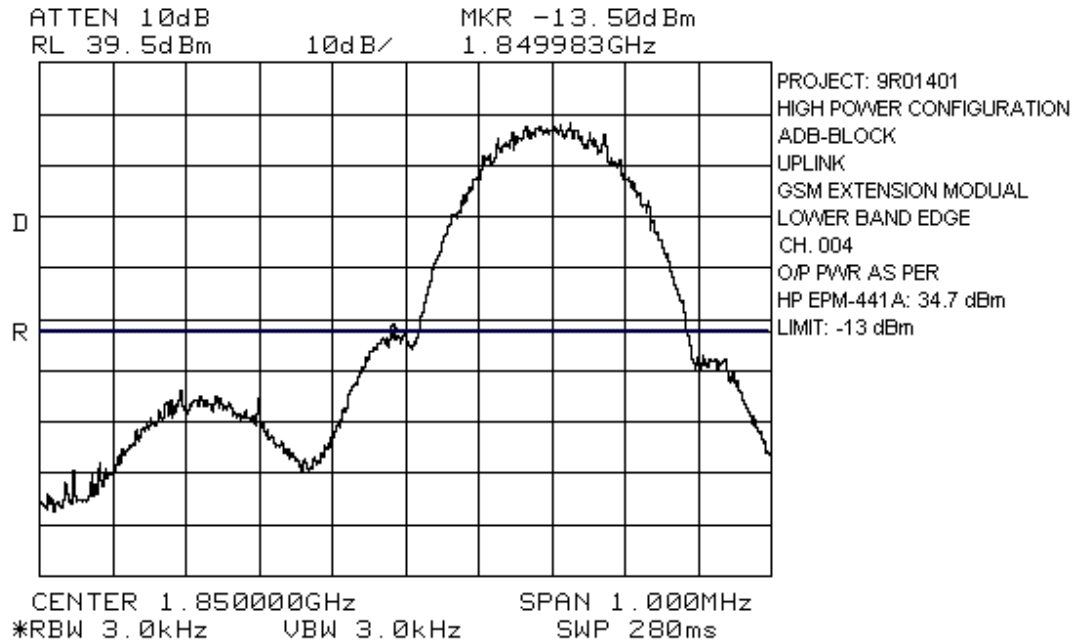
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GSM Extension Module

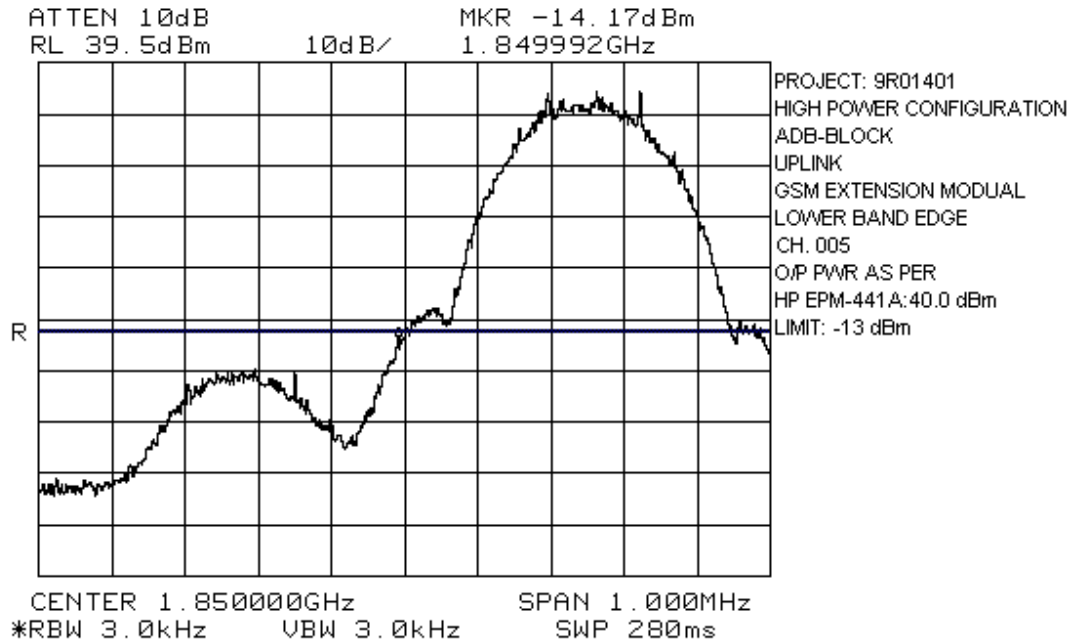
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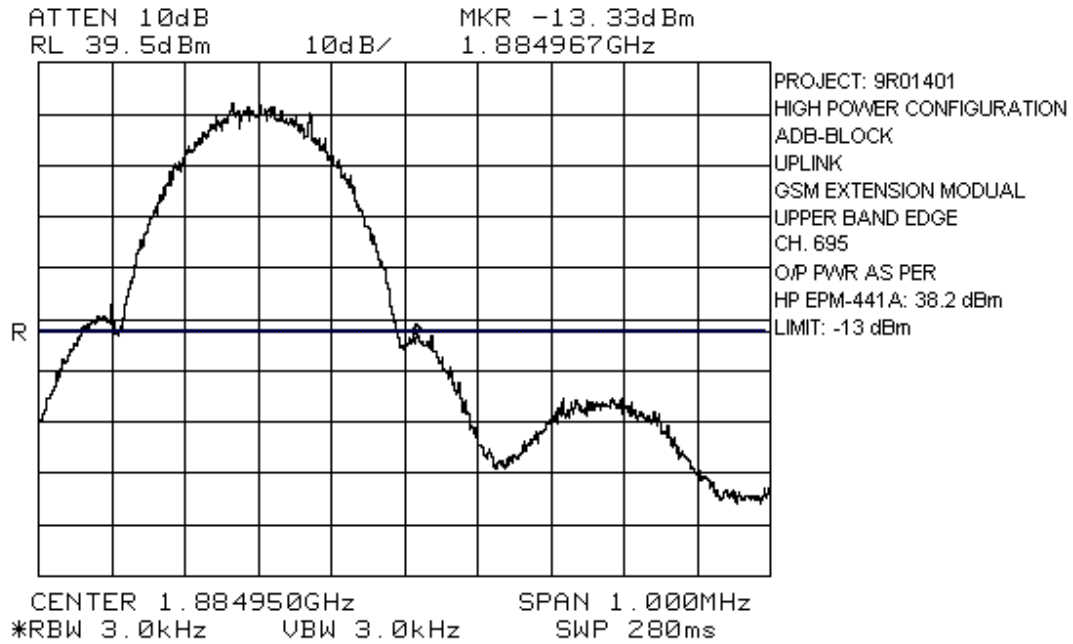
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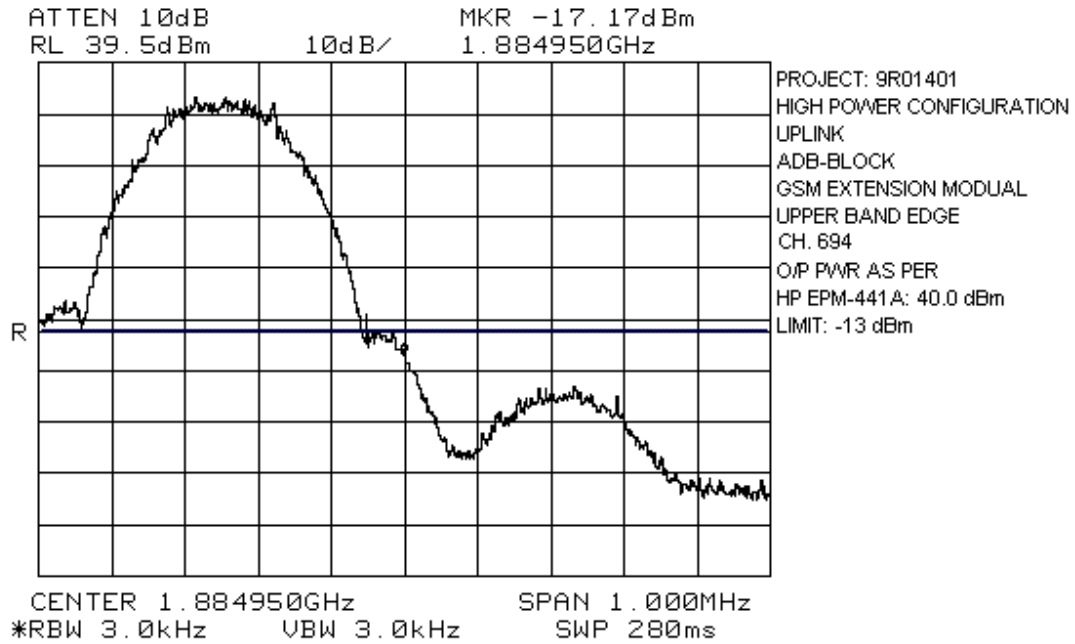
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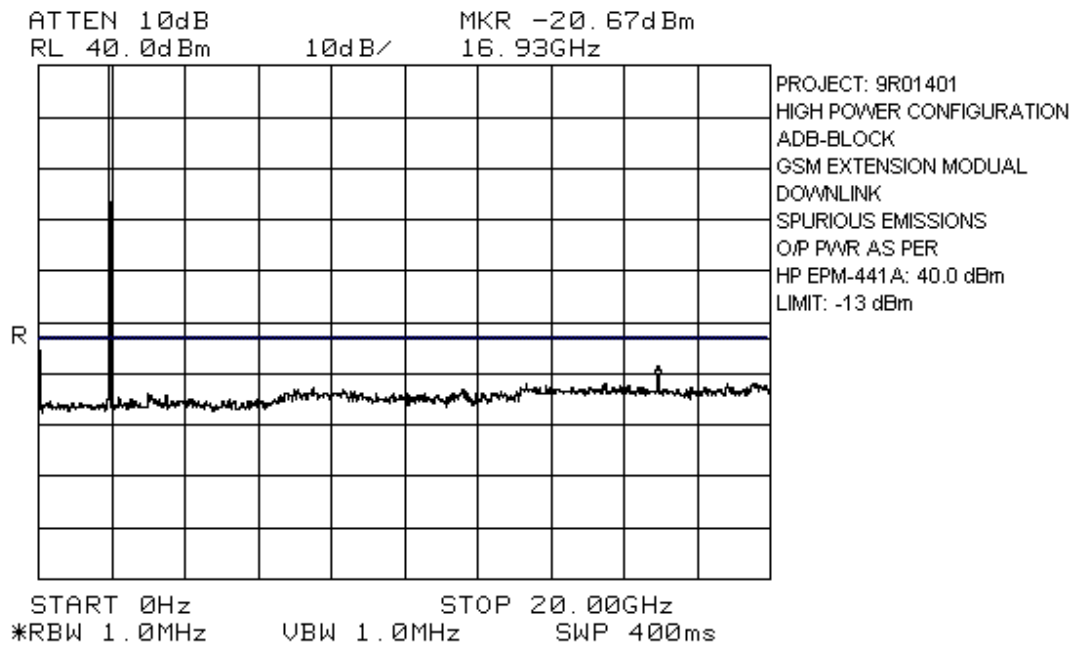
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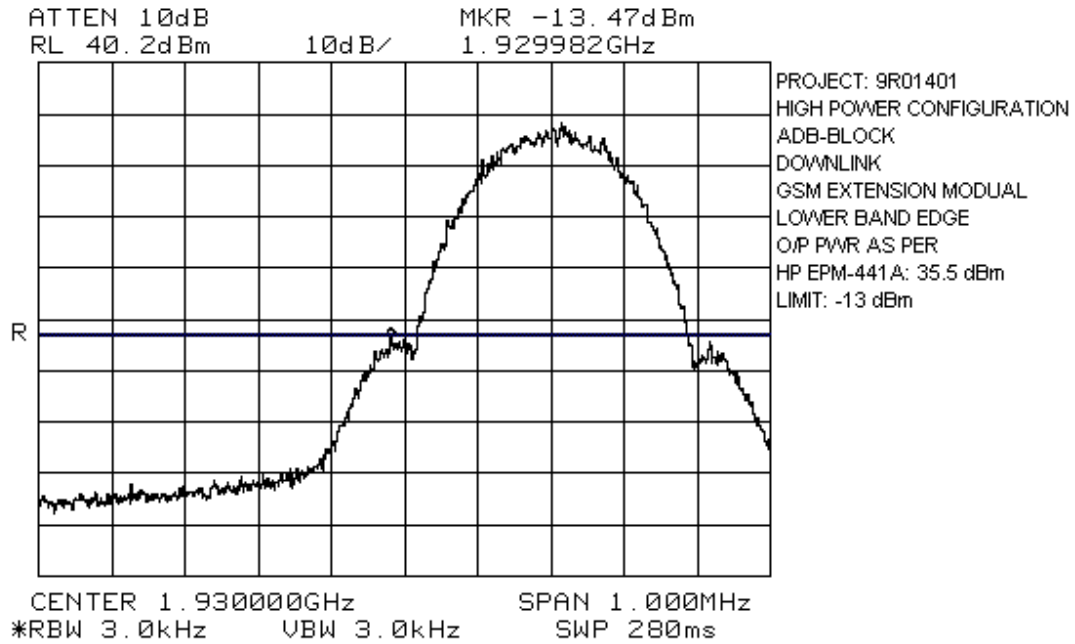
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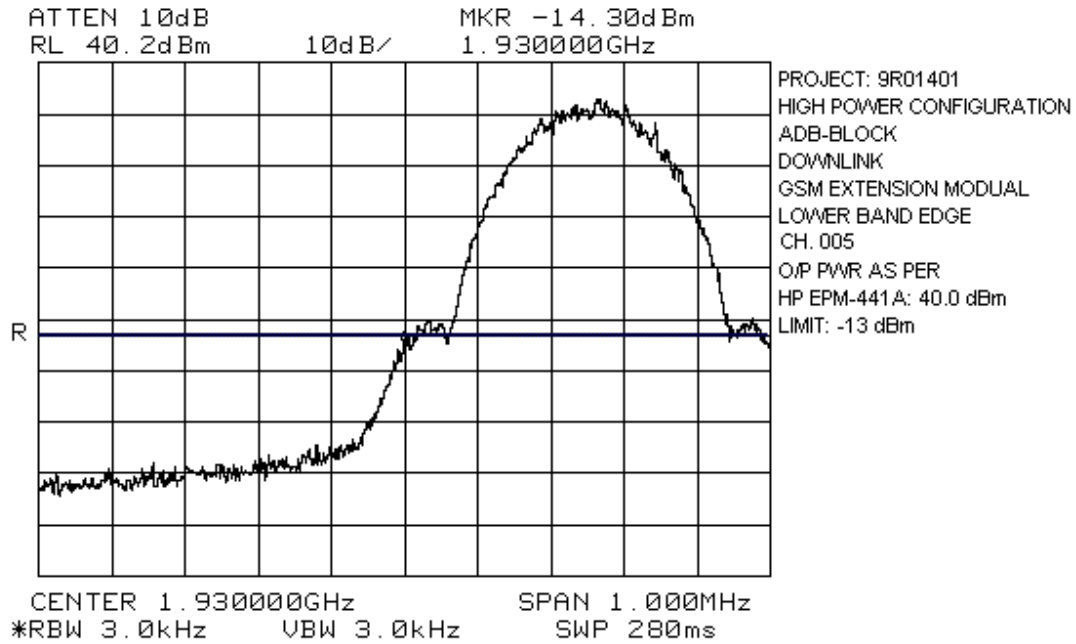
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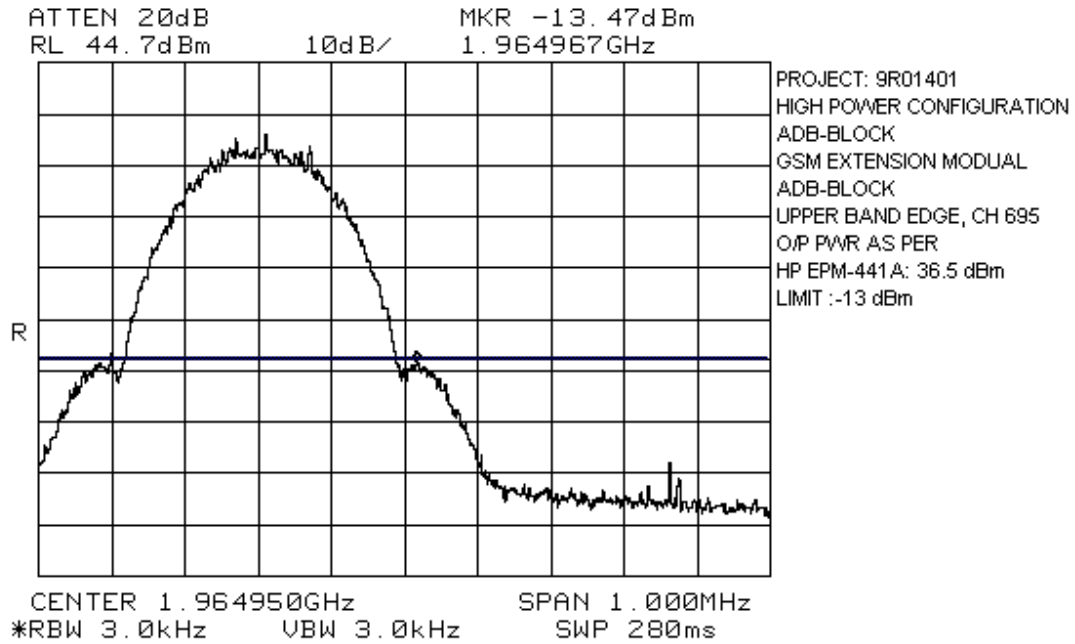
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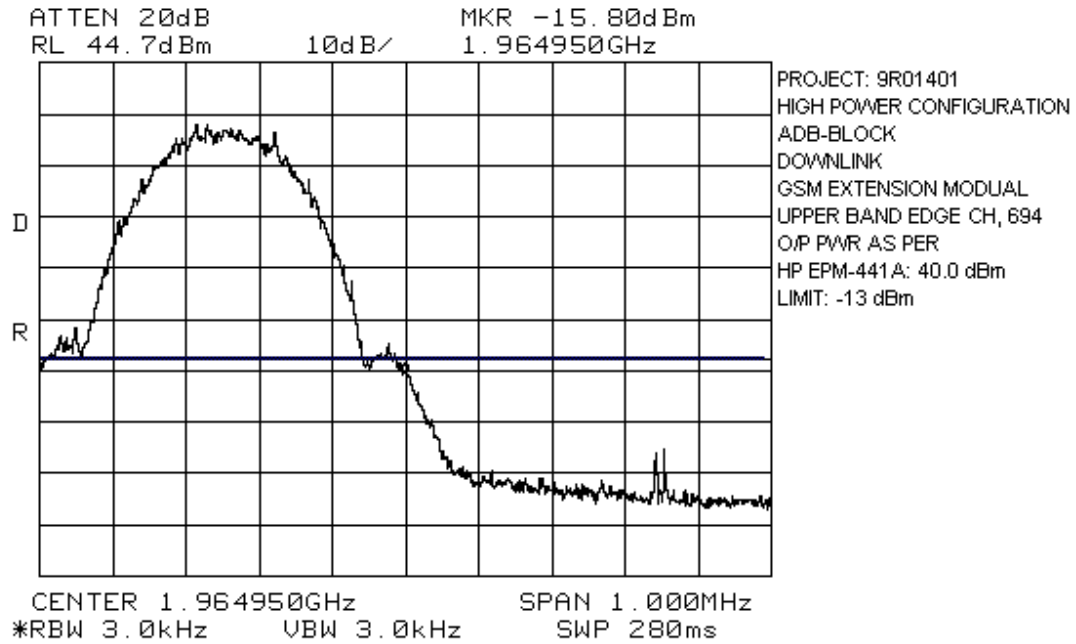
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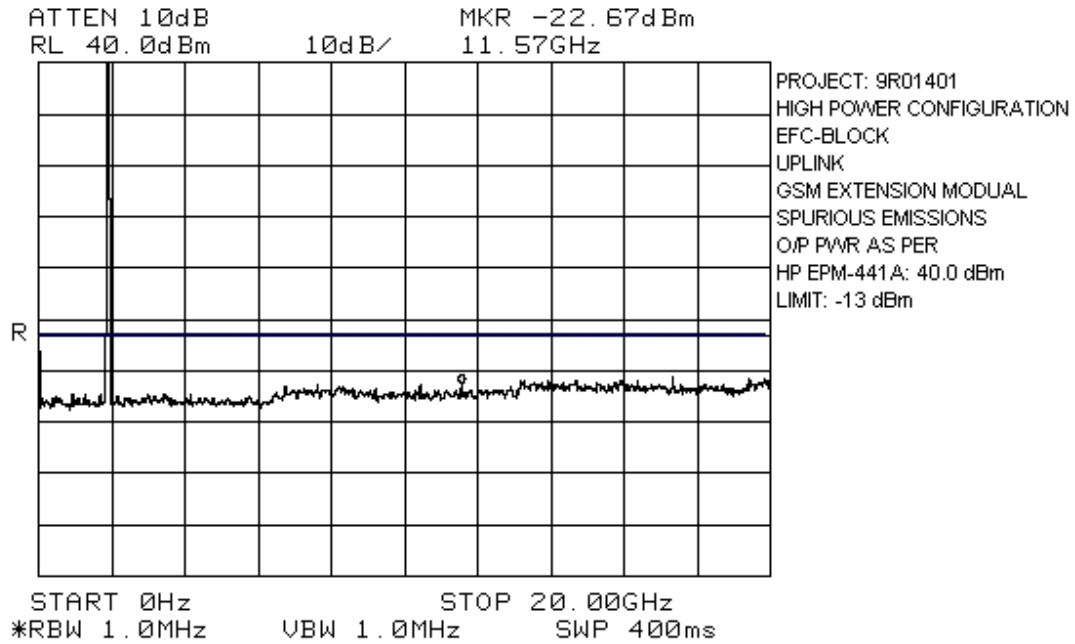
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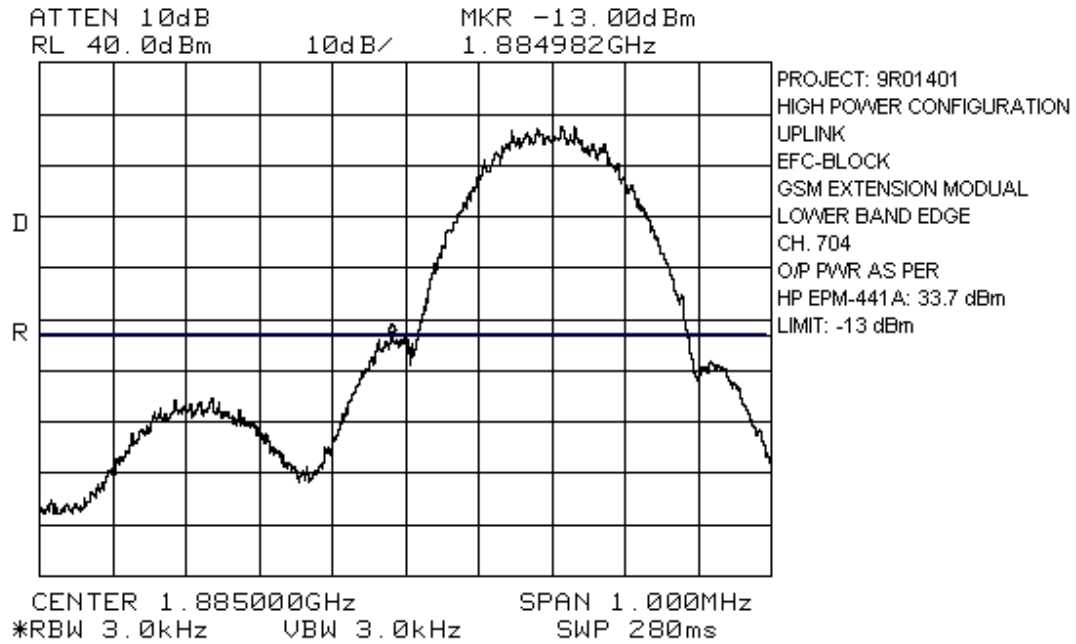
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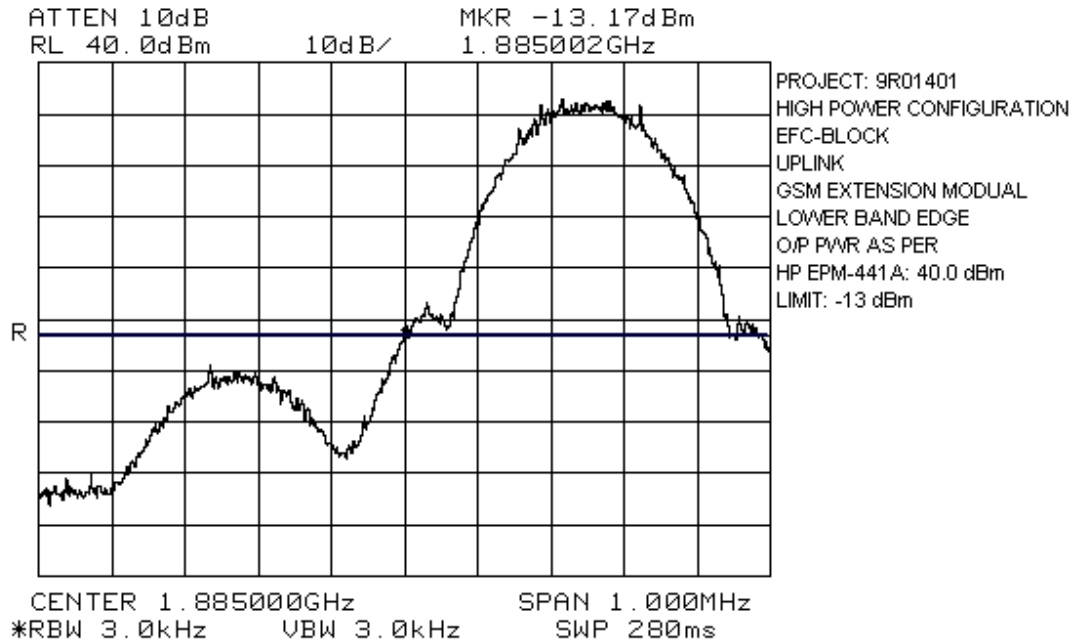
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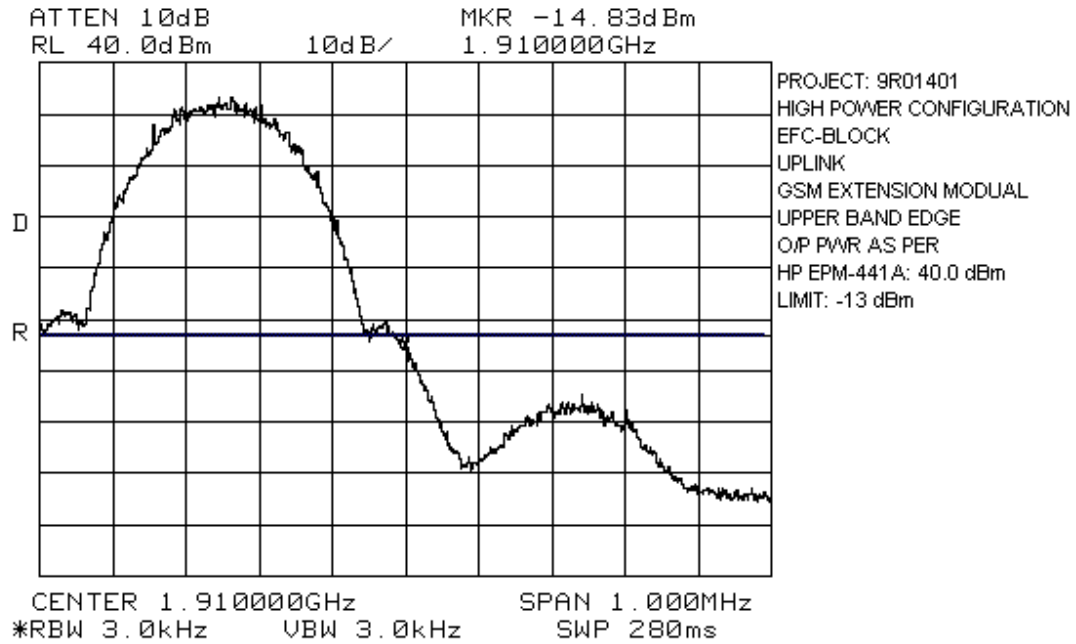
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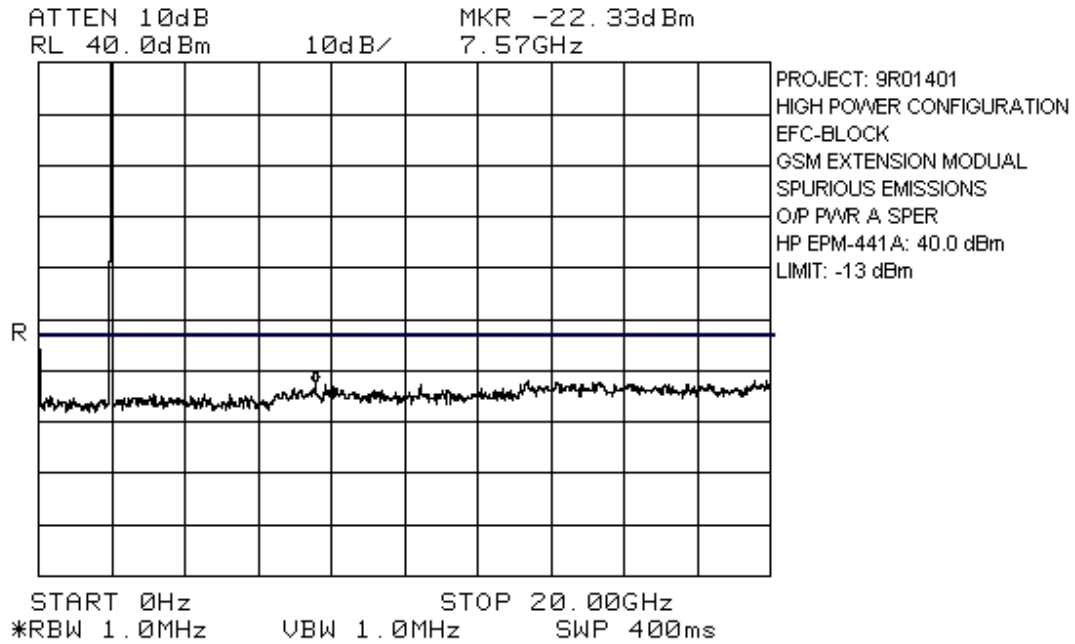
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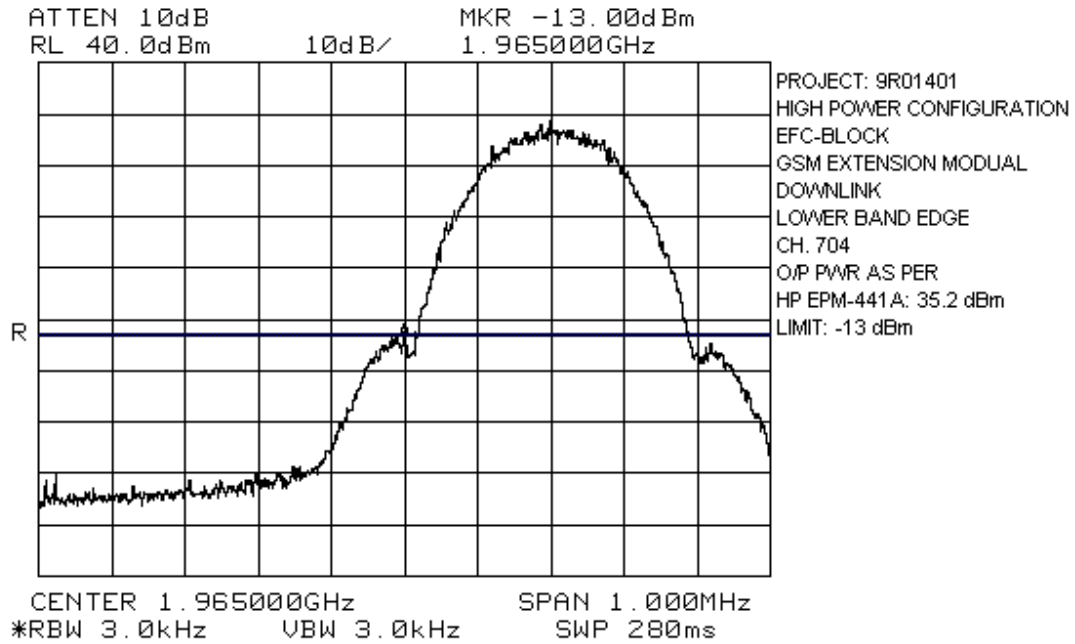
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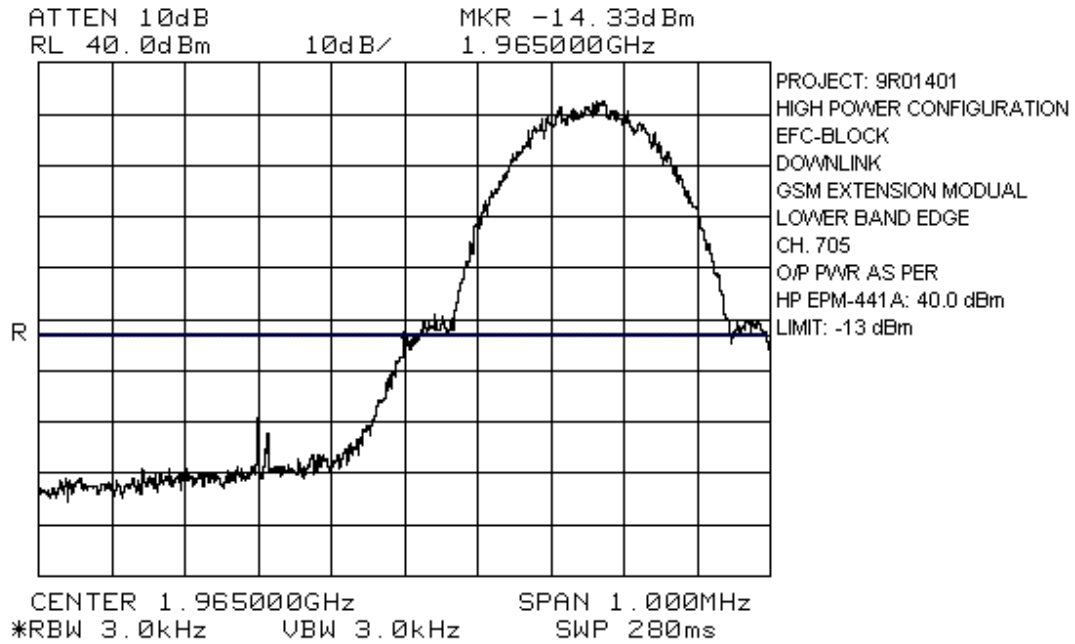
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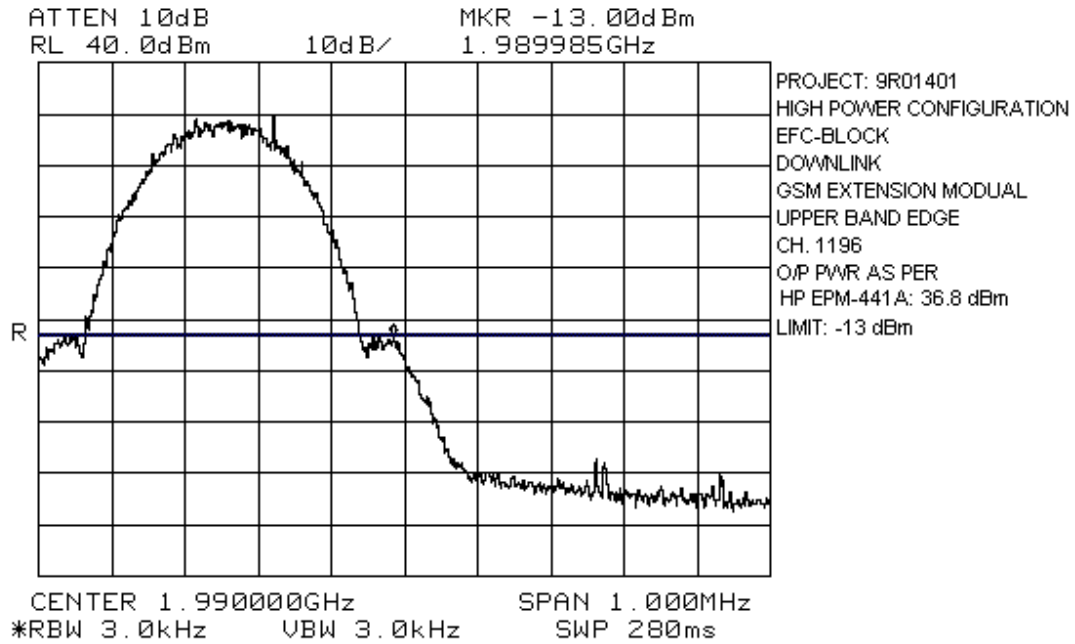
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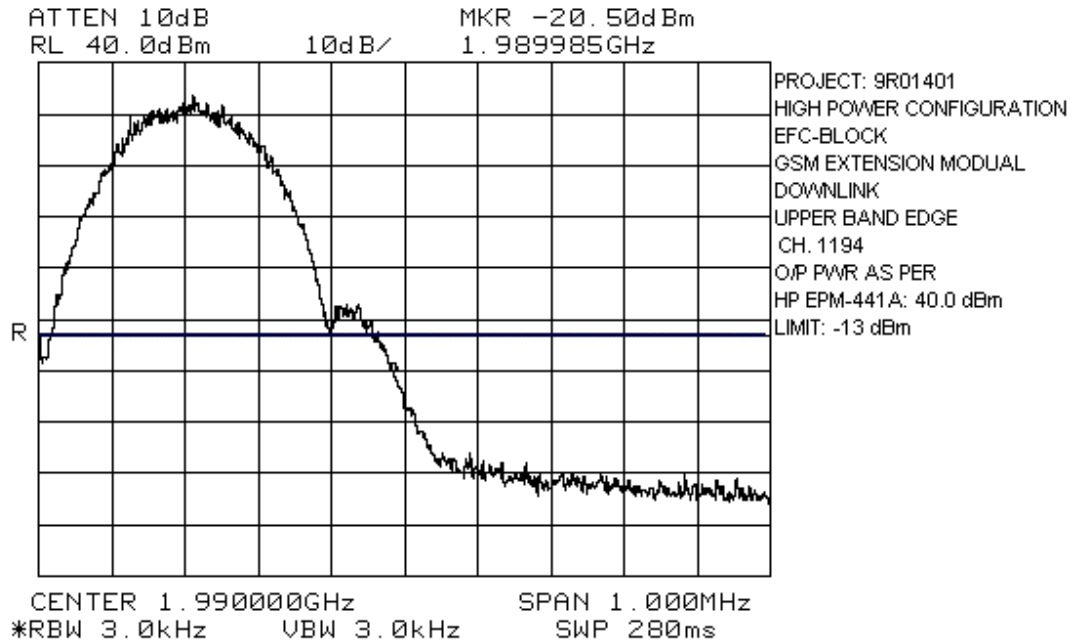
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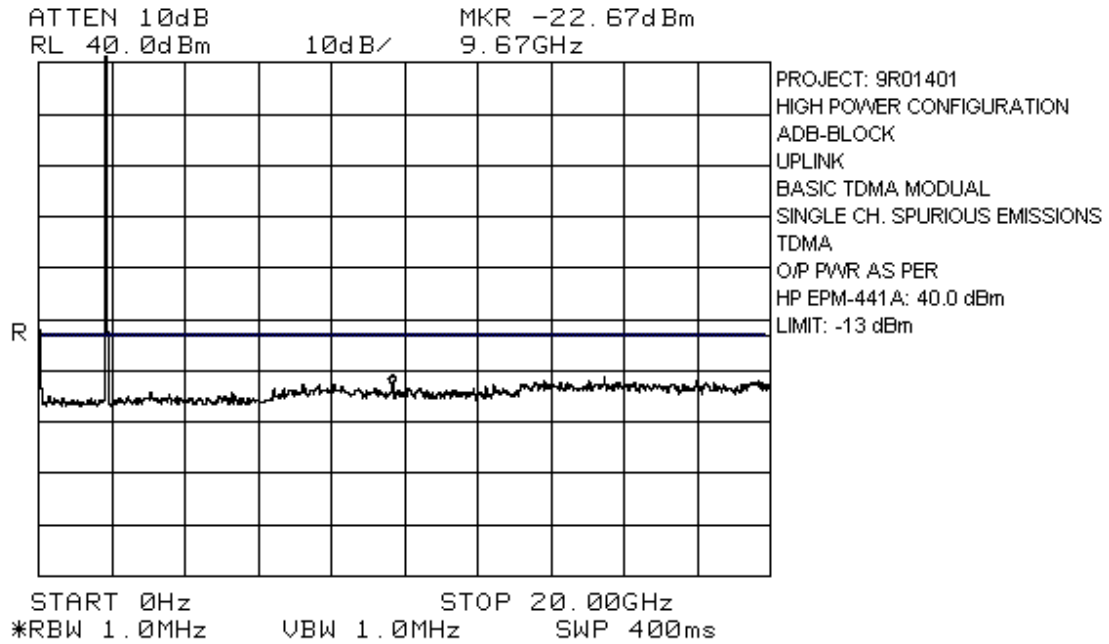
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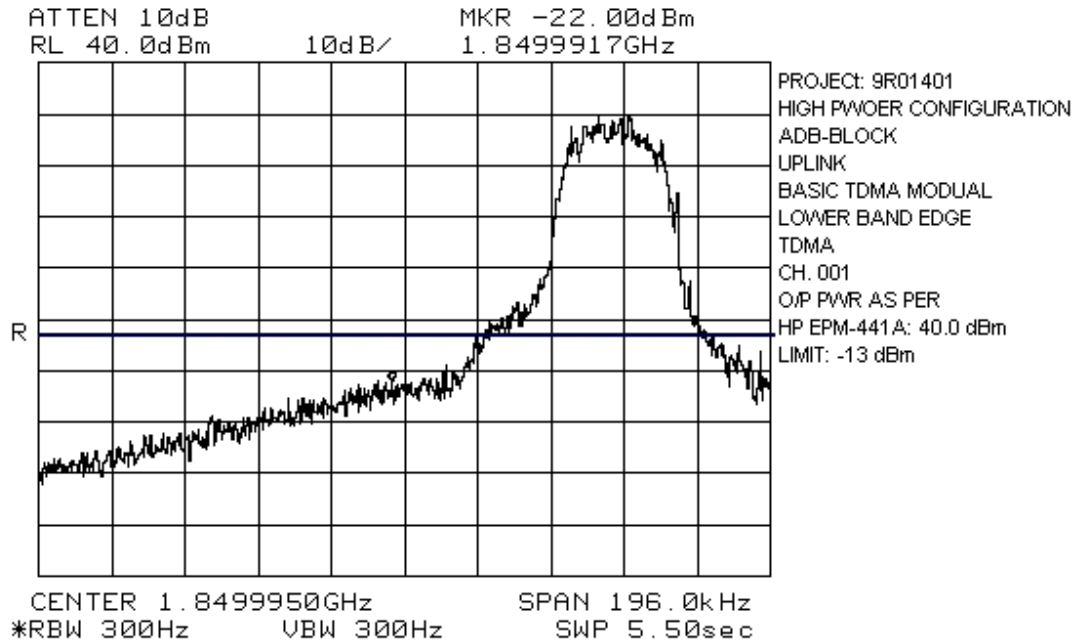
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Basic TDMA Module

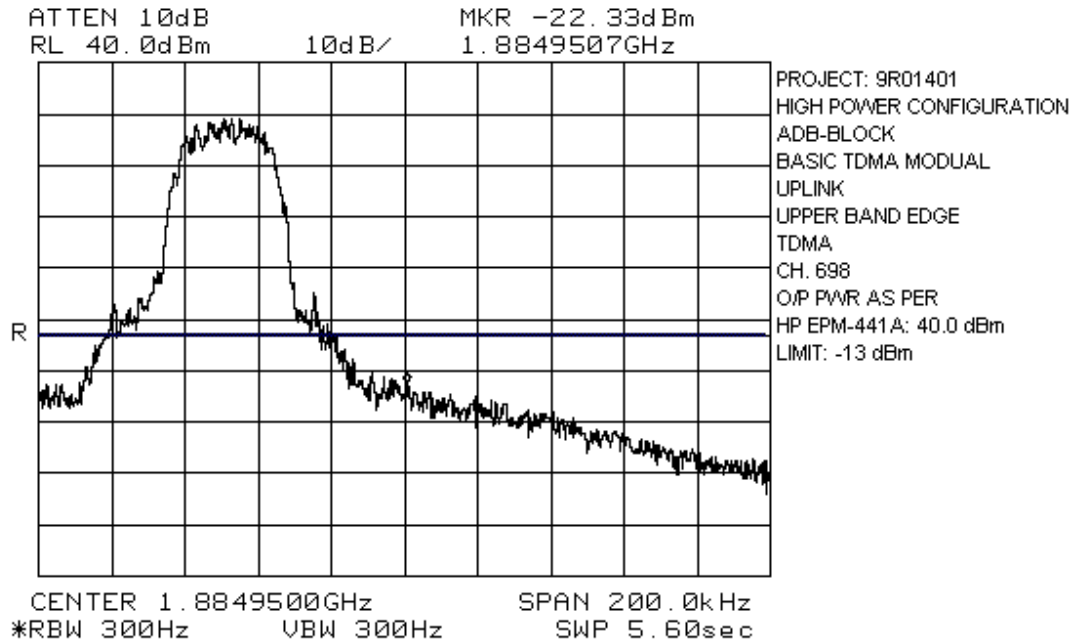
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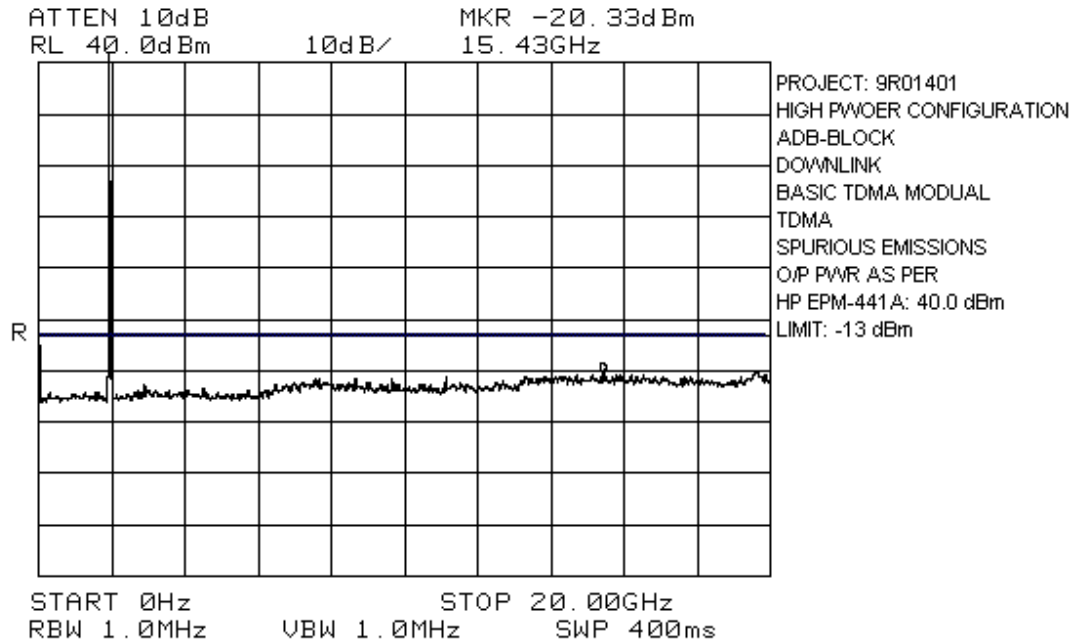
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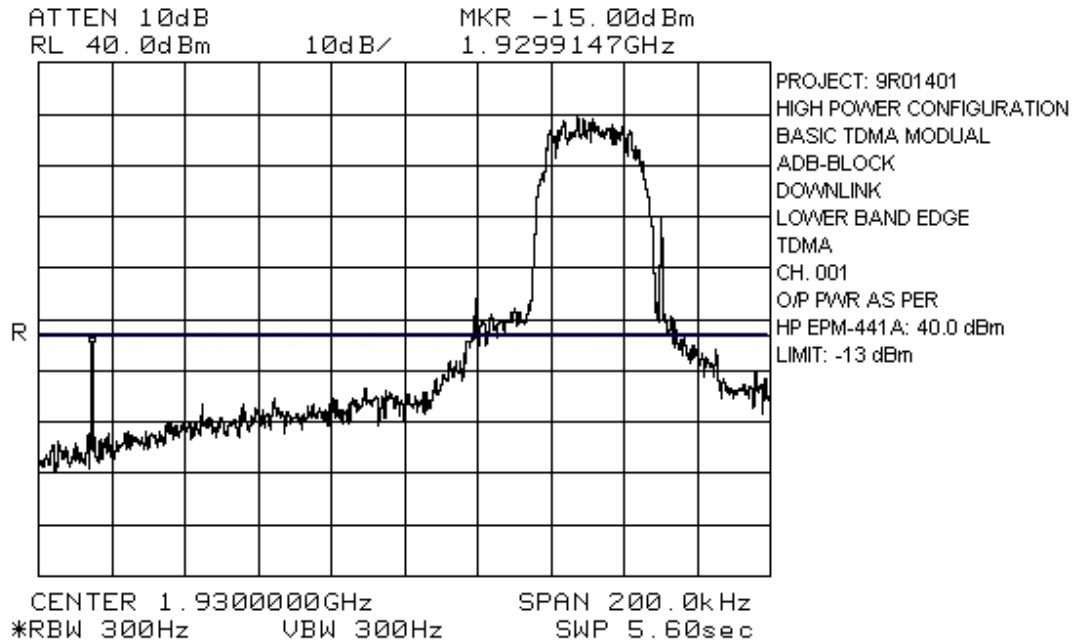
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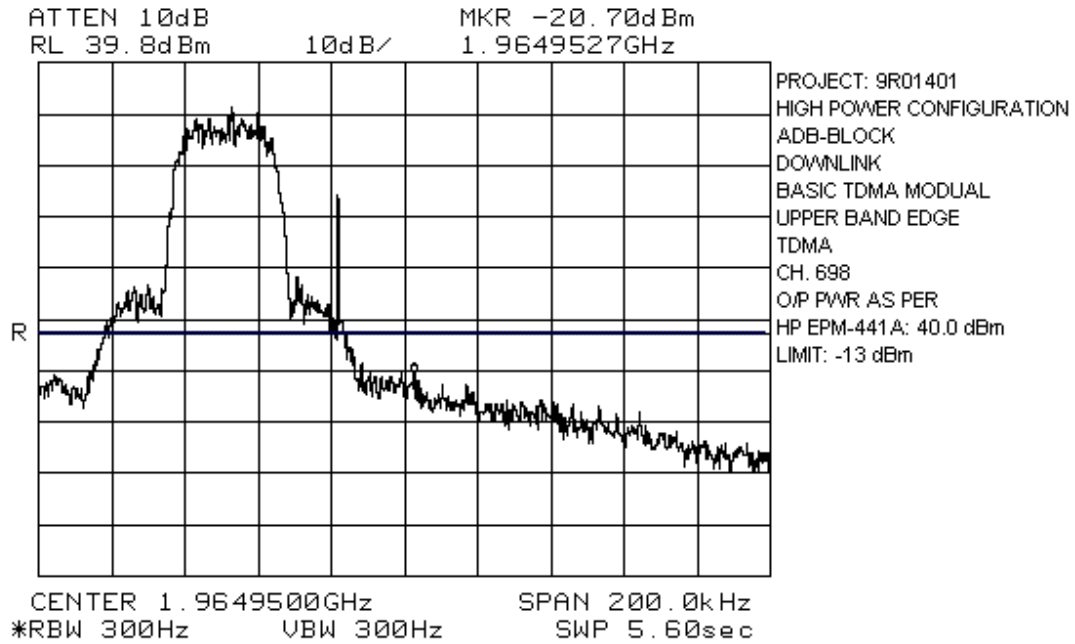
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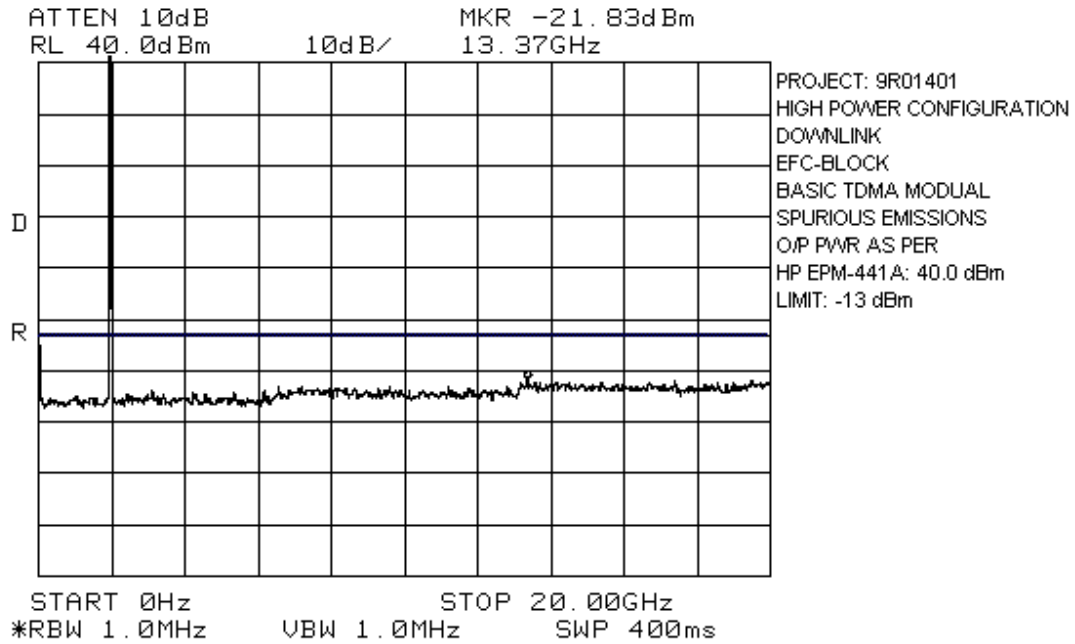
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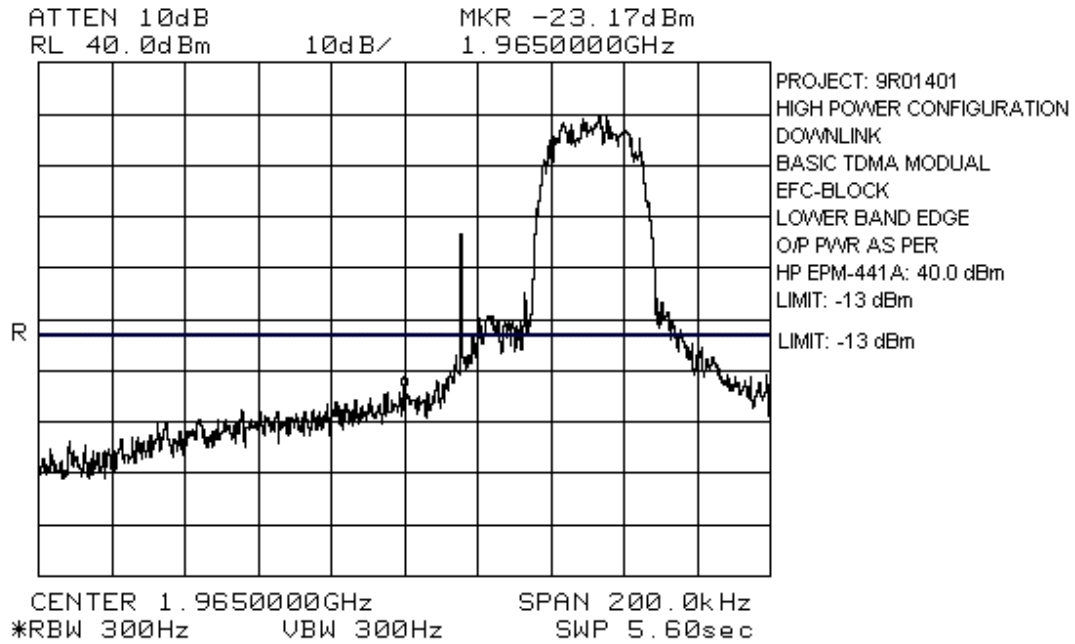
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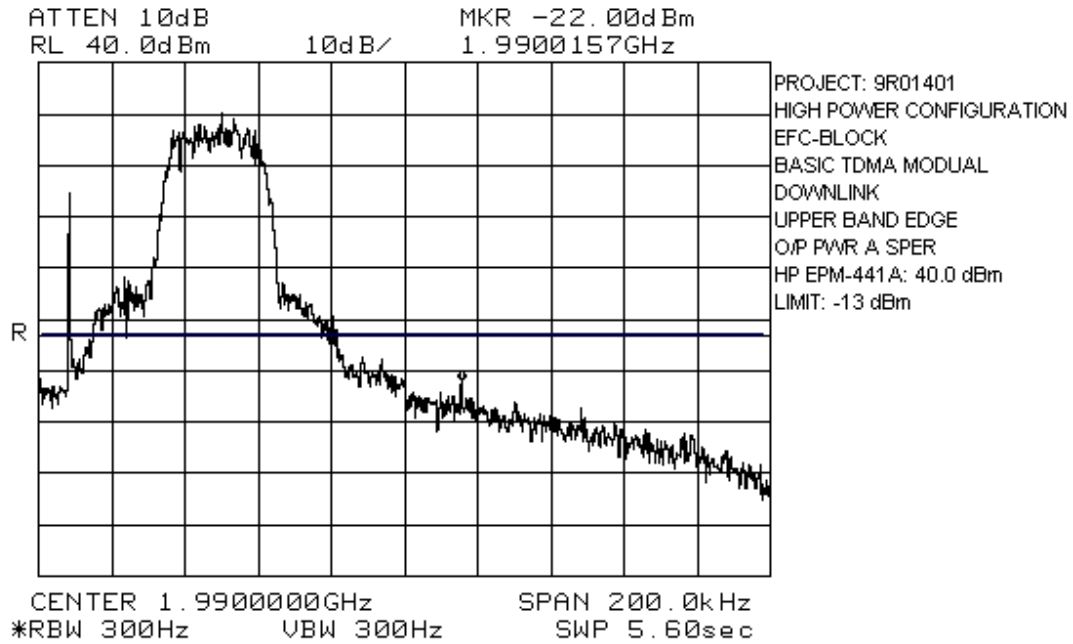
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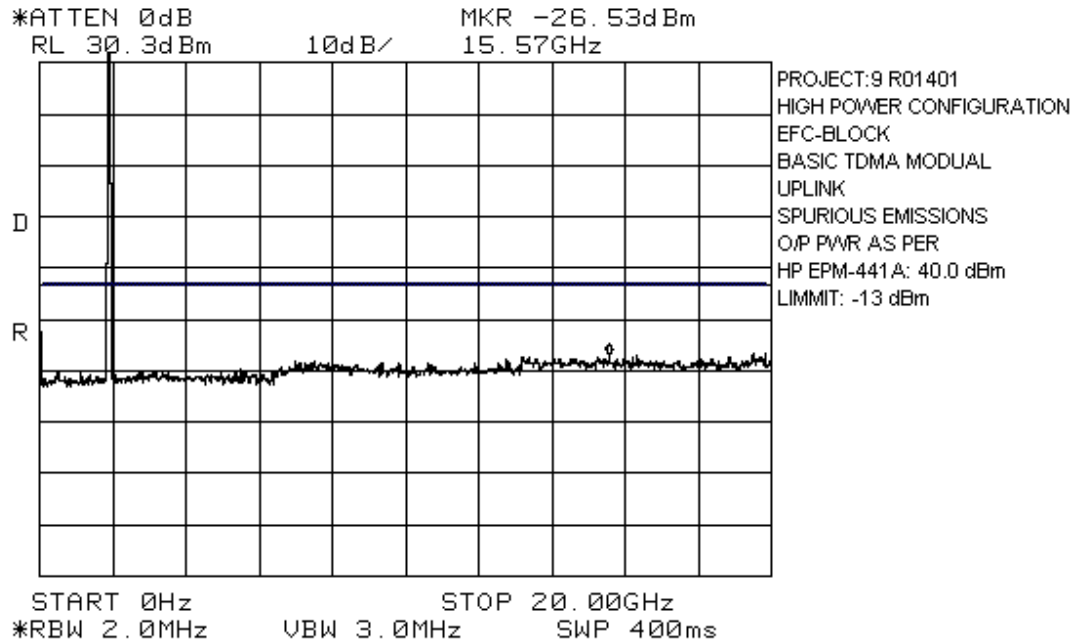
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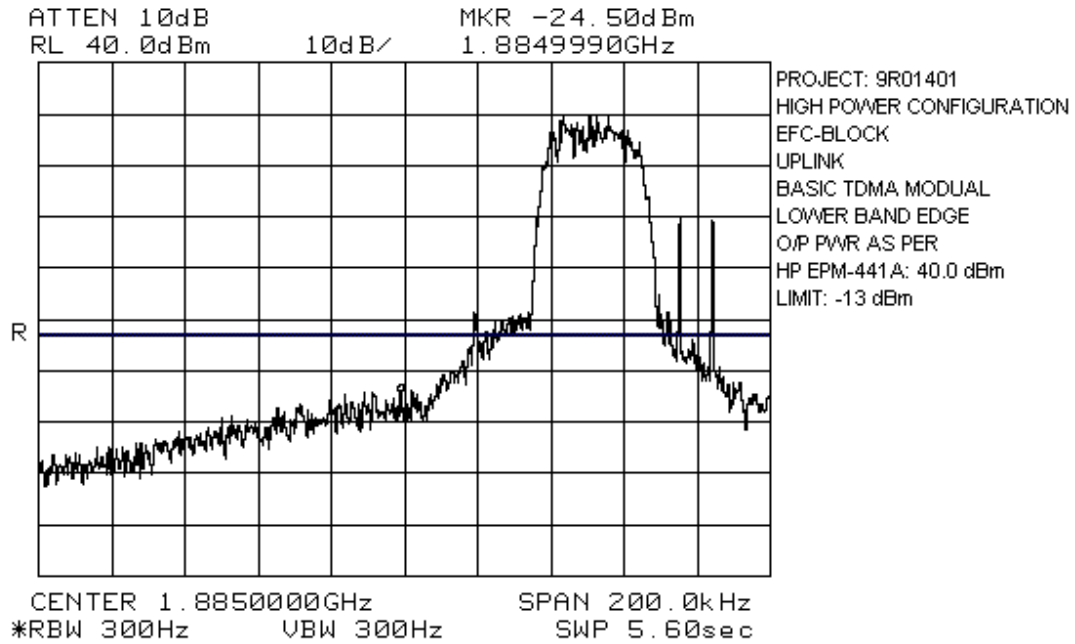
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



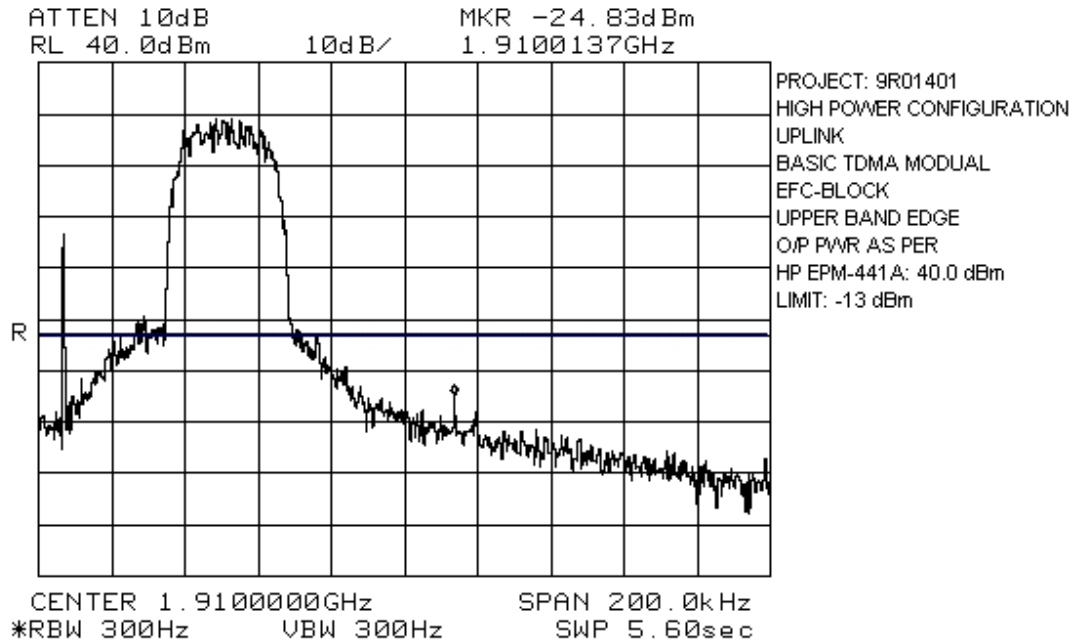
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Section 6. Field Strength of Spurious

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.917(e)
TESTED BY: Kevin Carr	DATE: August 19, 1999

Test Results: Complies.
The maximum field strength is 61.3dB μ V/m @ 7790 MHz @ 3m.

Test Data:

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Test Data - Radiated Emissions – Uplink

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP		RBW: 1 MHz, 3 MHz		Detector: VBW, 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)
3735.1	Hrn2	V			48.0	35.7	-42.4		41.3	82.3	41.0
3735.1	Hrn2	H			48.8	35.7	-42.4		42.1	82.3	40.2
5602.6	Hrn2	V			50.0	40.5	-43.1		47.4	82.3	34.9
5602.6	Hrn2	H			47.8	40.5	-43.1		45.2	82.3	37.1
7469.3	Hrn2	V			47.3	44.8	-42.0		50.1	82.3	32.2
7470.1	Hrn2	H			46.1	44.8	-42.0		48.9	82.3	33.4
9337.5	Hrn2	V			45.3	50.8	-43.4		42.7	82.3	29.6
9337.5	Hrn2	H			45.6	50.8	-43.4		53.0	82.3	29.3
11205.1	Hrn2	V			46.0	53.8	-43.5		56.3	82.3	26.0
11205.1	Hrn2	H			45.8	53.8	-43.5		56.1	82.3	26.2
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. No further emissions detected, noise floor > 35 dB below the limit.											

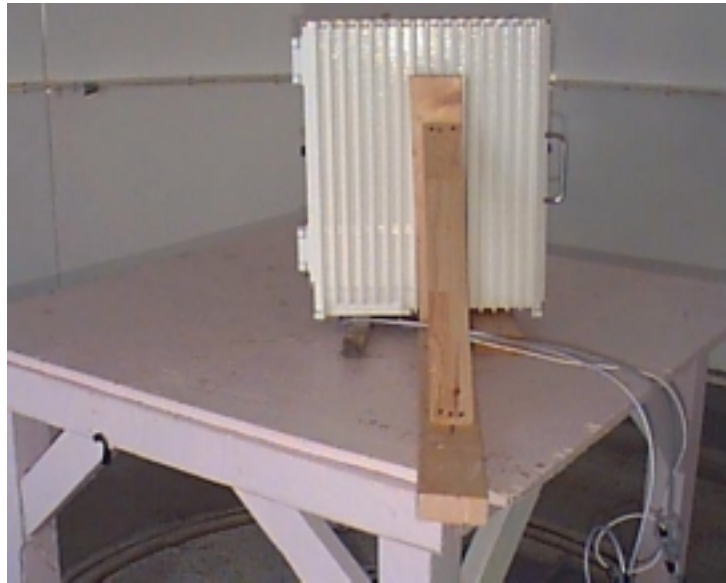
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701**Test Data - Radiated Emissions – Downlink**

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP		RBW: 1 MHz, 3 MHz		Detector: VBW, 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)
3894.8	Hrn2	V			55.3	36.0	-42.5		48.8	82.3	33.5
6895.1	Hrn2	H			53.5	36.0	-42.5		47.0	82.3	35.3
5842.7	Hrn2	V			57.3	41.7	-41.7		57.3	82.3	25.0
5842.2	Hrn2	H			55.3	41.7	-41.7		55.3	82.3	27.0
7790.0	Hrn2	V			56.8	45.5	-41.0		61.3	82.3	21.0
7790.2	Hrn2	H			55.5	45.5	-41.0		60.0	82.3	22.3
9738.7	Hrn2	V			41.3	51.5	-44.4		48.4	82.3	33.9
9738.6	Hrn2	H			40.1	51.5	-44.4		47.2	82.3	35.1
11686.1	Hrn2	V			41.6	54.2	-43.7		52.1	82.3	30.2
11684.5	Hrn2	H			39.8	54.2	-43.7		50.3	82.3	32.0
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. No further emissions detected, noise floor > 35 dB below the limit.											

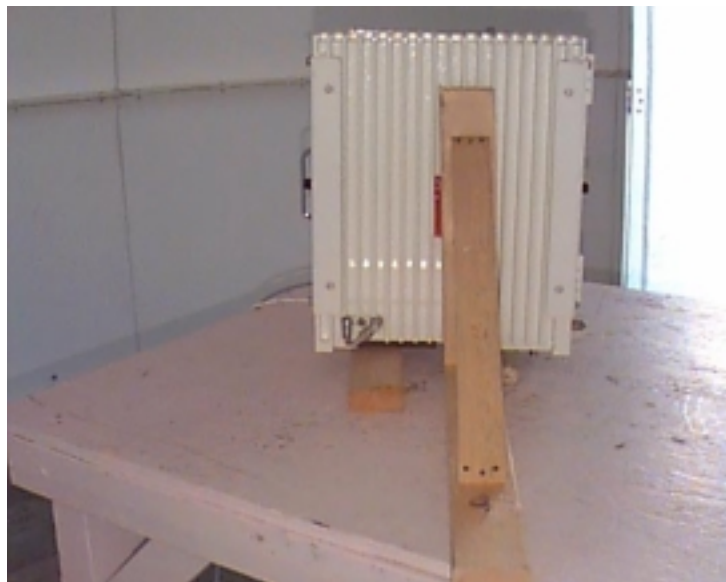
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Photographs of Test Setup

Front View



Rear View



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

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: MR701B Power
FCC ID: BCR-RPT-MR701

Section 8. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
2 Year	Spectrum Analyzer	Hewlett Packard	8563E	862205	Jan. 22/98	Jan. 22/00	
1 Year	Attenuator	Narda	768-20	9507	July 24/98	Sept. 24/99	
1 Year	Attenuator	Narda	765-20	9510	July 24/98	Sept. 24/99	
1 Year	Attenuator	Narda	768-10	9704	July 24/98	Sept. 24/99	
1 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA000420	July 23/98	Sept. 24/99	
1 Year	Insertion Unit	Rohde & Schwarz	URV5-Z4	FA000905	July 23/98	Sept. 24/99	
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	Sept. 24/99	
1 Year	Low Noise Amplifier	Avantek	AWT-8035	1005	Aug. 4/98	Sept. 24/99	
1 Year	Low Noise Amplifier	DBS Microwave	DWT-13035	9623	Aug. 4/98	Sept. 24/99	
3 Year	RF Generator	Rohde & Schwarz	SME3	DE14439	June 29/96	Dec. 29/99	
1 Year	RF Generator	Rohde & Schwarz	SIMIQ03E	DE24154	Sept. 24/98	Sept. 24/99	
1 Year	High Power Coupler 2-18 GHz	Narda	27000-30	0221	Nov. 25/98	Nov. 25/99	
1 Year	Power Head (Rental)	Hewlett Packard	8481A	909238	Feb. 5/99	Feb. 5/00	
1 Year	Power Meter	Hewlett Packard	EPM-441A	837896	Oct. 1/98	Oct. 1/99	

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

ANNEX A
TEST METHODOLOGIES

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

NAME OF TEST: RF Power Output	PARA. NO.: 2.985
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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: MR701B Power
FCC ID: BCR-RPT-MR701

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

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: 300 Hz

VBW: $\geq$ RBW

Span: 1 MHz

Sweep: Auto

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

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

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:

CDMARBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: 6 SweepsGSMRBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: DisabledNADCRBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge) 30 Hz
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: MR701B Power
FCC ID: BCR-RPT-MR701

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: MR701B Power
FCC ID: BCR-RPT-MR701

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:

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.

KTL Ottawa

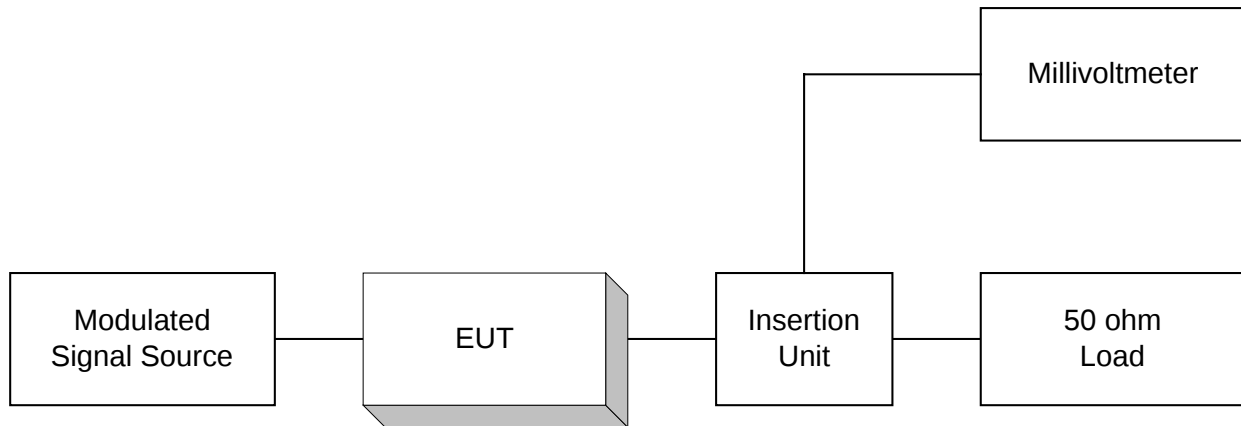
FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS
PROJECT NO.: 9R01401
ANNEX B

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

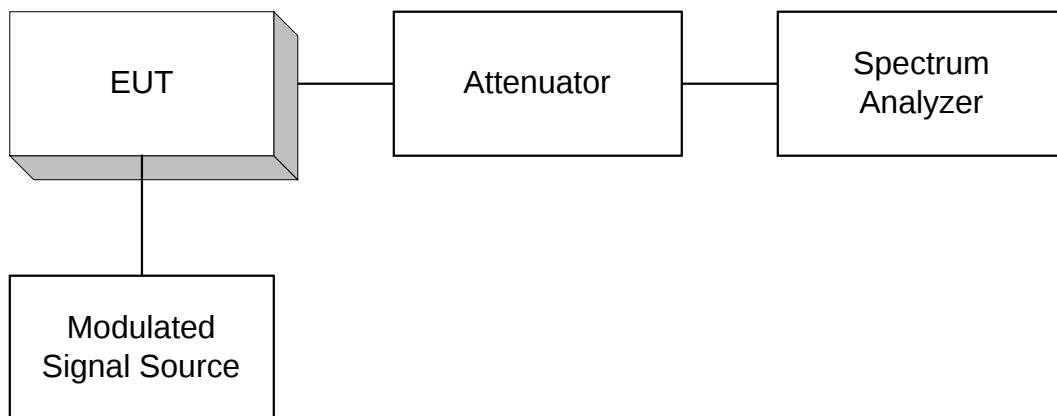
ANNEX B
TEST DIAGRAMS

EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

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

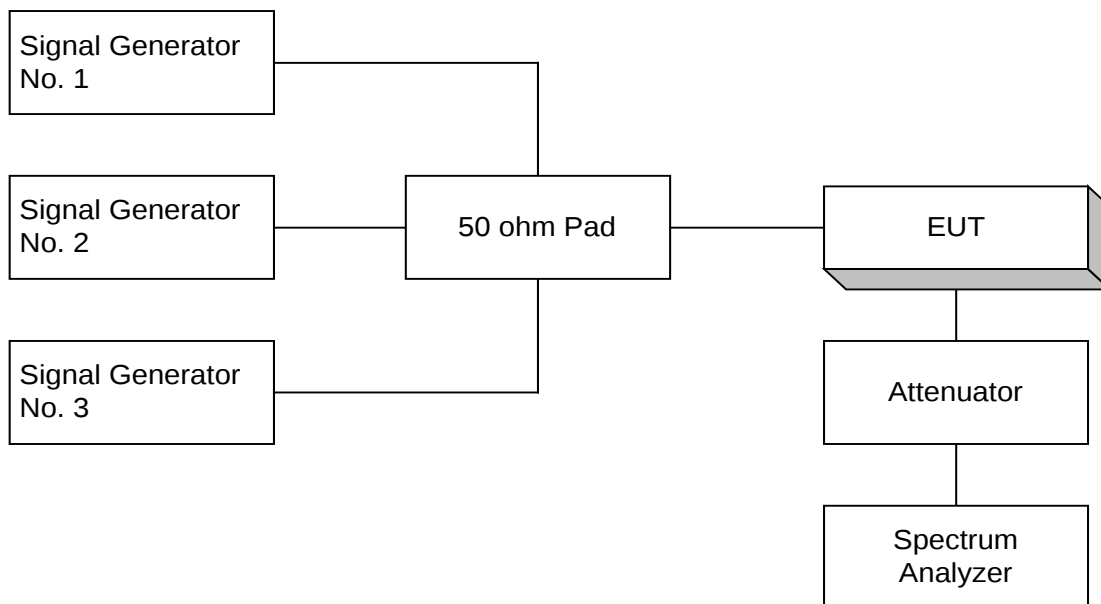
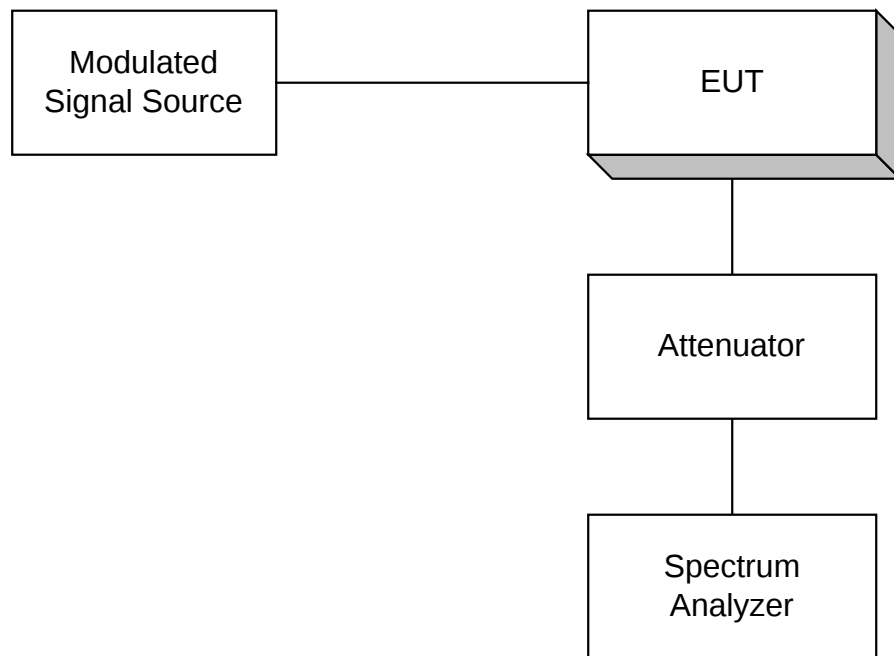


Para. No. 2.989 - Occupied Bandwidth



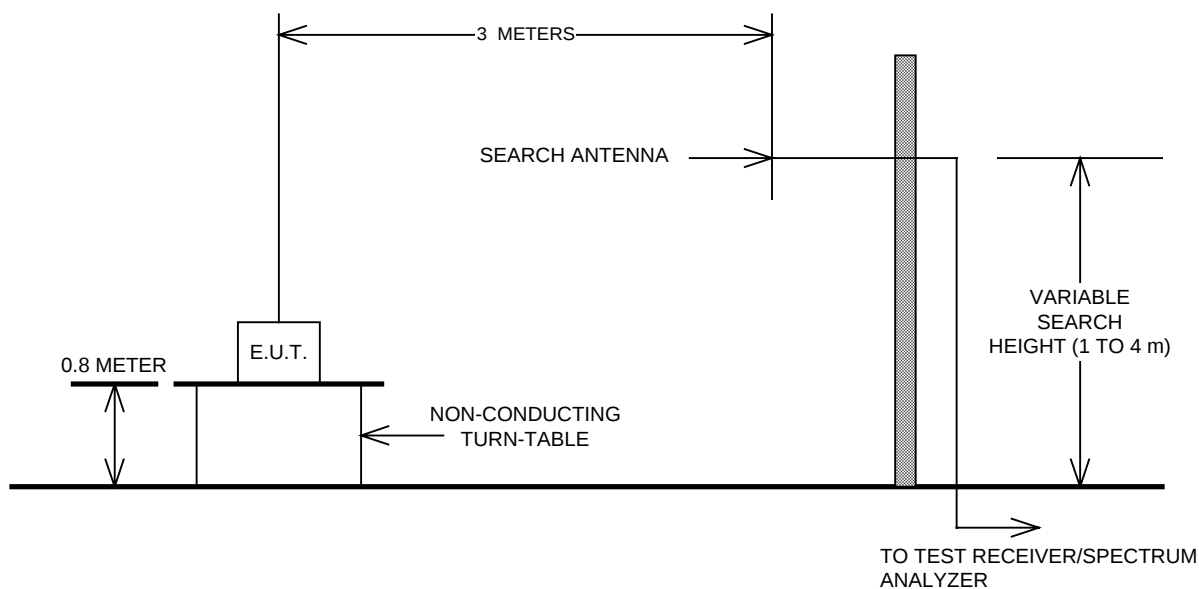
EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Para. No. 2.991 Spurious Emissions at Antenna Terminals



EQUIPMENT: MR701B Power
FCC ID: BCR-RPT-MR701

Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

