

Test Report - Peak Power & Pulse Width Measurements

Test Site	EMC Test Facility, Raytheon Marine Ltd., Portsmouth, Hampshire, U.K.		
Test Date	29th October, 1999		
EMC standards used	FCC Part 80		
Personnel	P. Bowen		
Author	P. Bowen	Sig. 	Date: 04.11.1999
Approved	R.A. Bell	Sig. 	Date: 04.11.1999

Description of Equipment under Test (EUT)

Brand Name:	Raytheon Marine
Model Name or Number:	Pathfinder Radar Scanner Type 5S
Unique Type Identification:	M92654
Serial Number:	005
Country of Manufacture:	England
Other Information:	Fitted with Toshiba magnetron type E3217L, serial number 9080205.

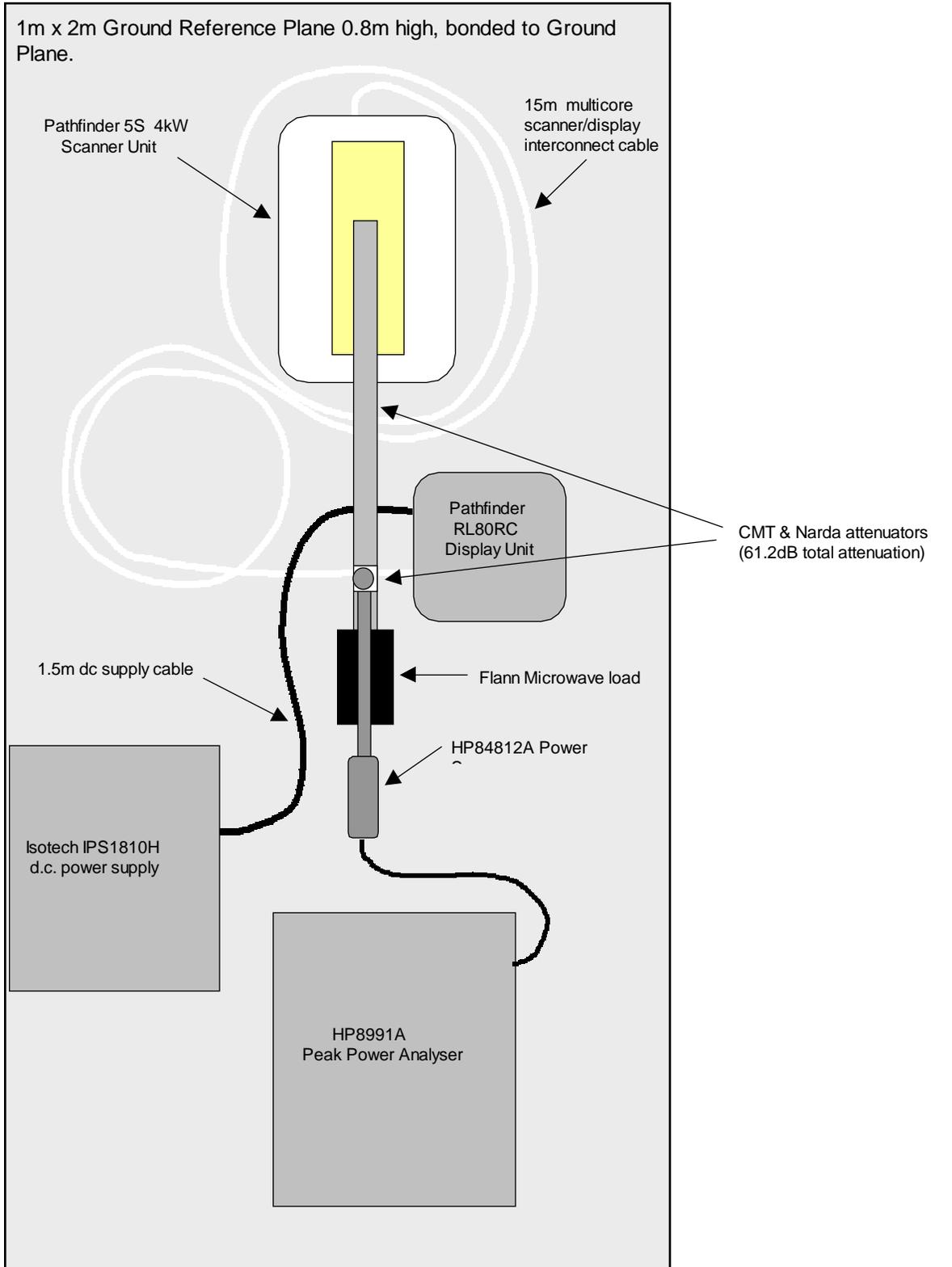
Description of Auxiliary Equipment

Brand Name:	Raytheon Marine
Model Name or Number:	Pathfinder R80RC 10" CRT Display Unit
Unique Type Identification:	M92673
Serial Number:	EMC001
Country of Manufacture:	England

Test Conditions

Title	Description	
Test Setup and EUT Operating Mode	Setup as per diagram page 2 12V supply. Range settings as required for correct pulse width generation. Head-up display. Interference rejection on. Manual gain set to 65%. Sea clutter manual, off. Rain and FTC off. RR/VRM active. Displaying radar picture & chart window. For Antenna Port tests, array replaced by 61.2dB attenuator and microwave power load. For Magnetron tests, attenuator and load connected directly to Magnetron output. Antenna rotation mechanism disabled.	
Supply Voltage	Ambient Temperature	Relative Humidity
12V d.c.	22-26C	40-48%

Test Configuration



List of Test Equipment

	Test Equipment Type	Manufacturer and Type Number	Serial Number
1	Power Supply Unit	Isotech IPS1810H	9201925
2	Digital Voltmeter	Fluke Model 83	63550394
3	Microwave Attenuator	CMT RBC90-40-1A-1A-1A-A	942117-006
4	Microwave Attenuator	Narda 4779-20	MX-1-20
5	Peak Power Analyser	Hewlett-Packard 8991A	3248A00128
6	Peak Power Sensor	Hewlett-Packard 84812A	3318A01050
7	Microwave Load	Flann Microwave Instruments 16100	173
8			
9			
10			

In accordance with NAMAS (UKAS) requirements, all the measurement equipment is on a calibration cycle. All test equipment has valid traceable calibration.

Measurements and Derived Results

Nominal Pulse Width	Measurement Port	Pulse Width (ns)	P.R.F.* (Hz)	Peak Power (dBm)	Peak Power (watts)	Average Power (watts)
1.0 us	Magnetron Antenna	998.004 1002.00	739.7	66.76 65.85	4742 3846	2.851
600 ns	Magnetron Antenna	600.798 602.794	1194.7	66.70 65.83	4677 3828	2.757
450 ns	Magnetron Antenna	443.114 443.114	1600.0	66.72 65.89	4699 3881	2.752
350 ns	Magnetron Antenna	347.305 345.309	1992.0	66.70 65.90	4677 3890	2.676
250 ns	Magnetron Antenna	249.501 253.493	2989.5	66.47 65.69	4677 3707	2.809
150 ns	Magnetron Antenna	149.701 150.699	2998.5	66.14 65.40	4111 3467	1.567
90 ns	Magnetron Antenna	89.820 87.824	2994.0	65.39 64.84	3459 3048	0.801
65 ns	Magnetron Antenna	63.872 63.872	2989.5	64.14 63.57	2594 2275	0.434

* Original application test results. PRF remain unchanged

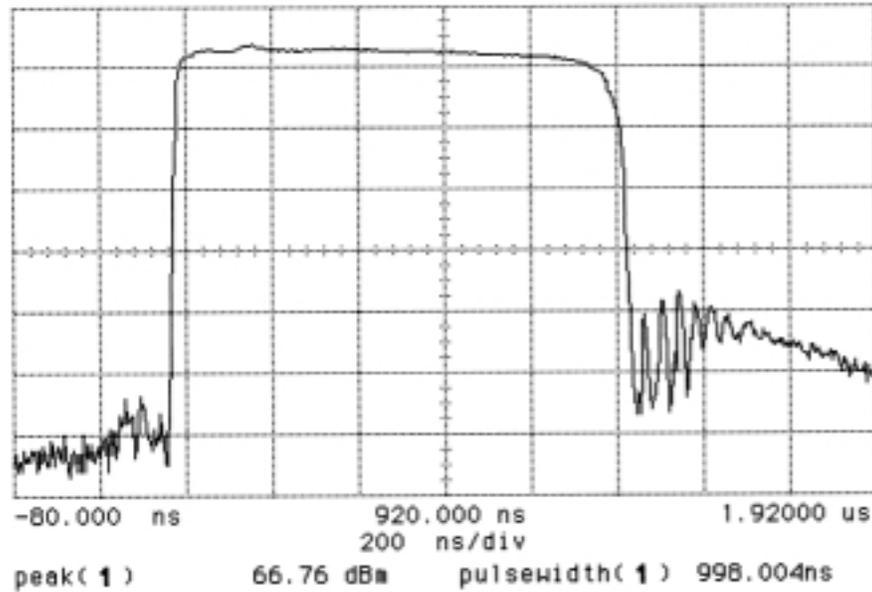
Average Power Calculation

Average Power = Peak Power x PRF x Pulse Width

$$P_{av} (\text{Watts}) = P_{pk} (\text{Watts}) \times \text{PRF} (\text{Hz}) \times \text{PW} (\text{ns}) \div 10^9$$

Raytheon 'Pathfinder' 4kW Open Array Scanner

hp printing



CHANNEL

1 2 3 4

off on

scale 5.0 dB/div

ref. level 70.00 dBm

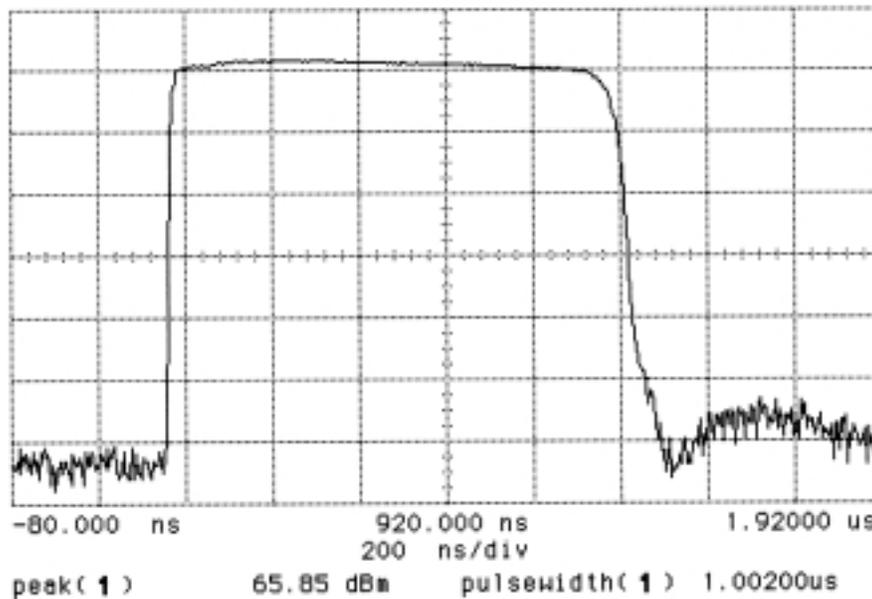
bandwidth high low CW

external loss 61.20 dB

sensor zero

Magnetron port, 1.0us Pulse Width

hp running



CHANNEL

1 2 3 4

off on

scale 5.0 dB/div

ref. level 70.00 dBm

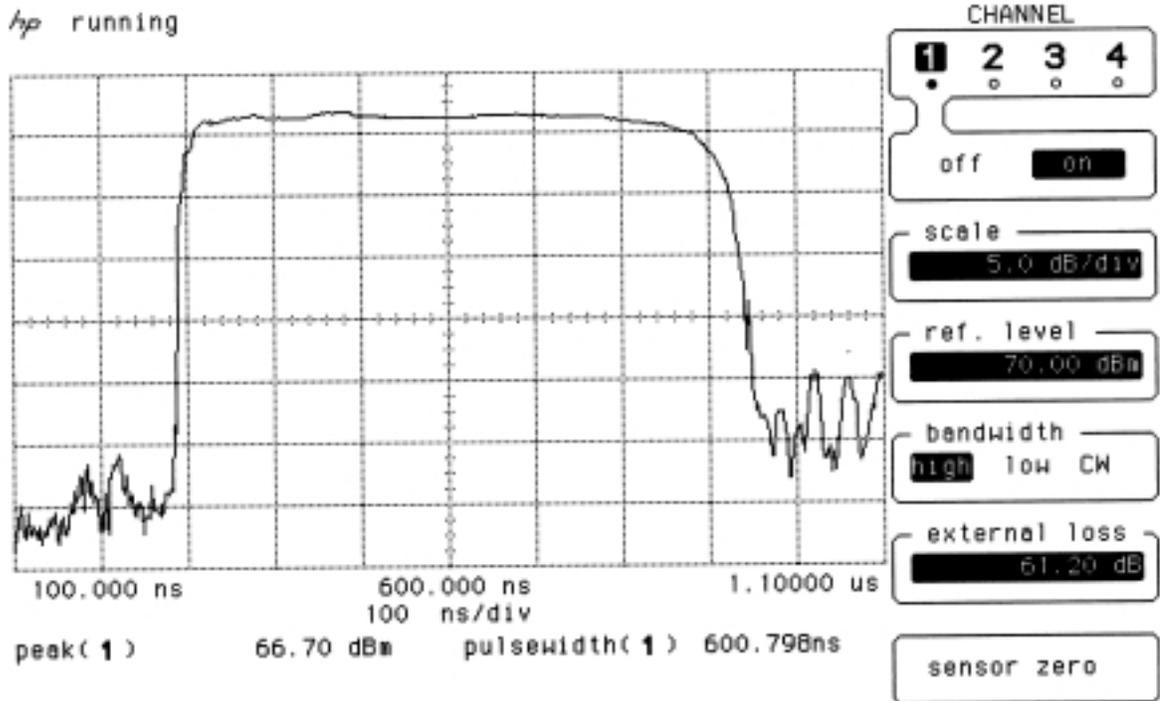
bandwidth high low CW

external loss 61.20 dB

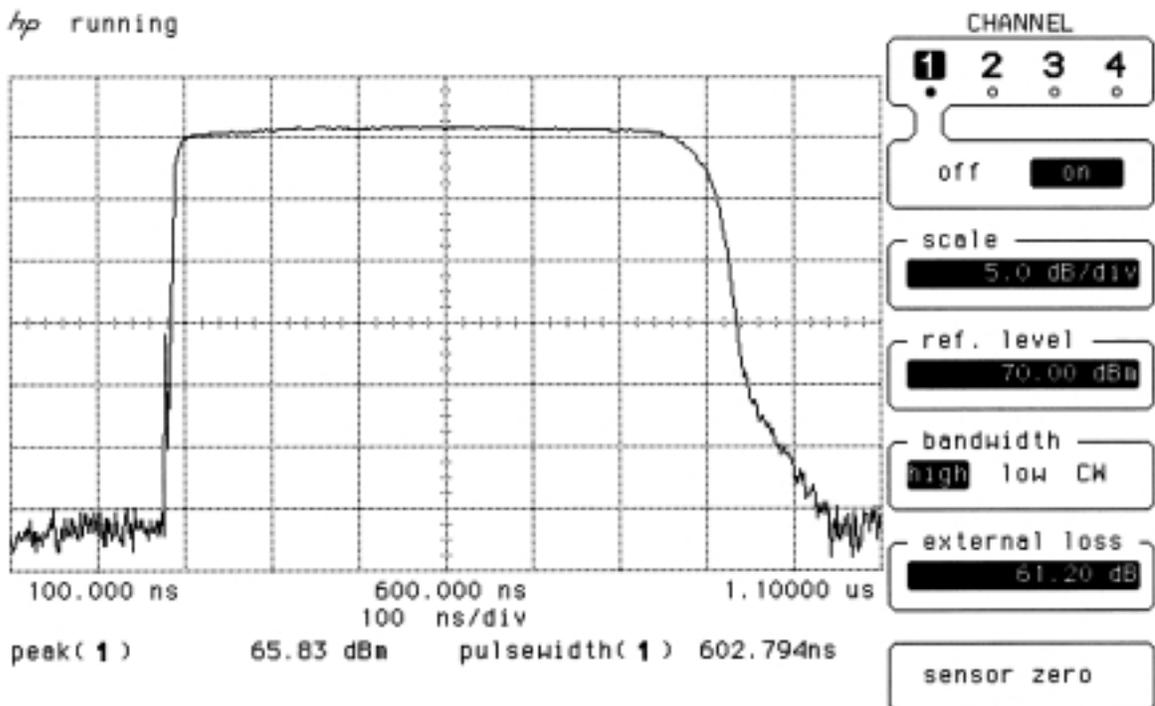
sensor zero

Antenna port, 1.0uS Pulse Width

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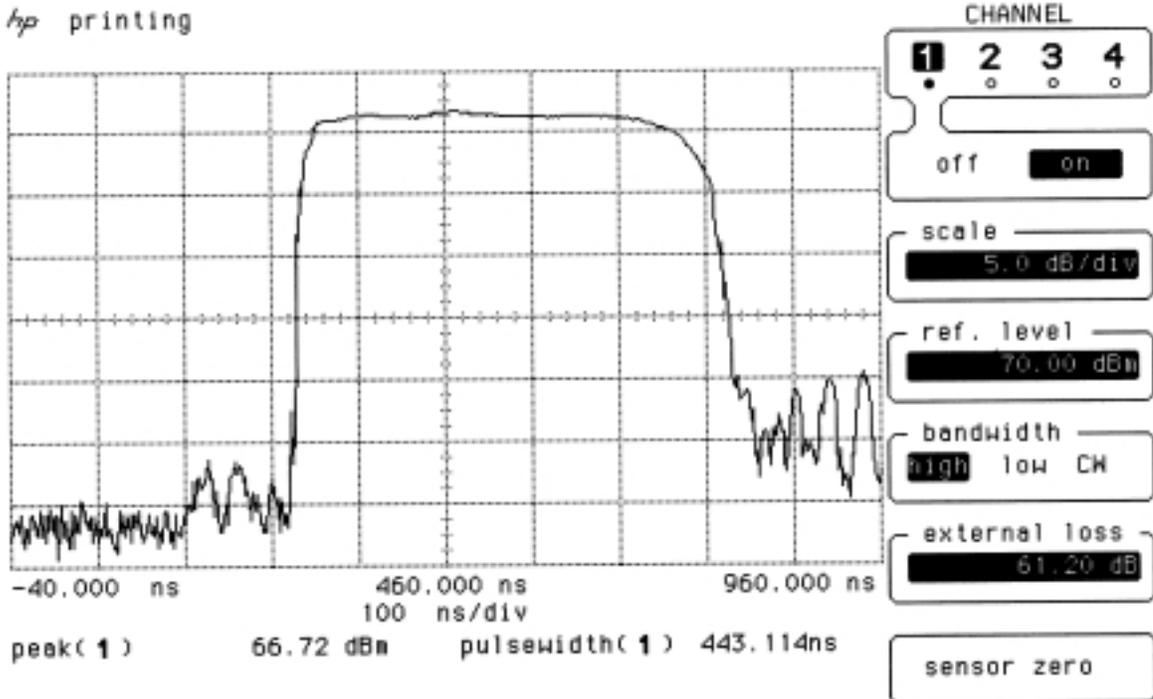
Magnetron port, 600ns Pulse Width



Antenna port, 600nS Pulse Width

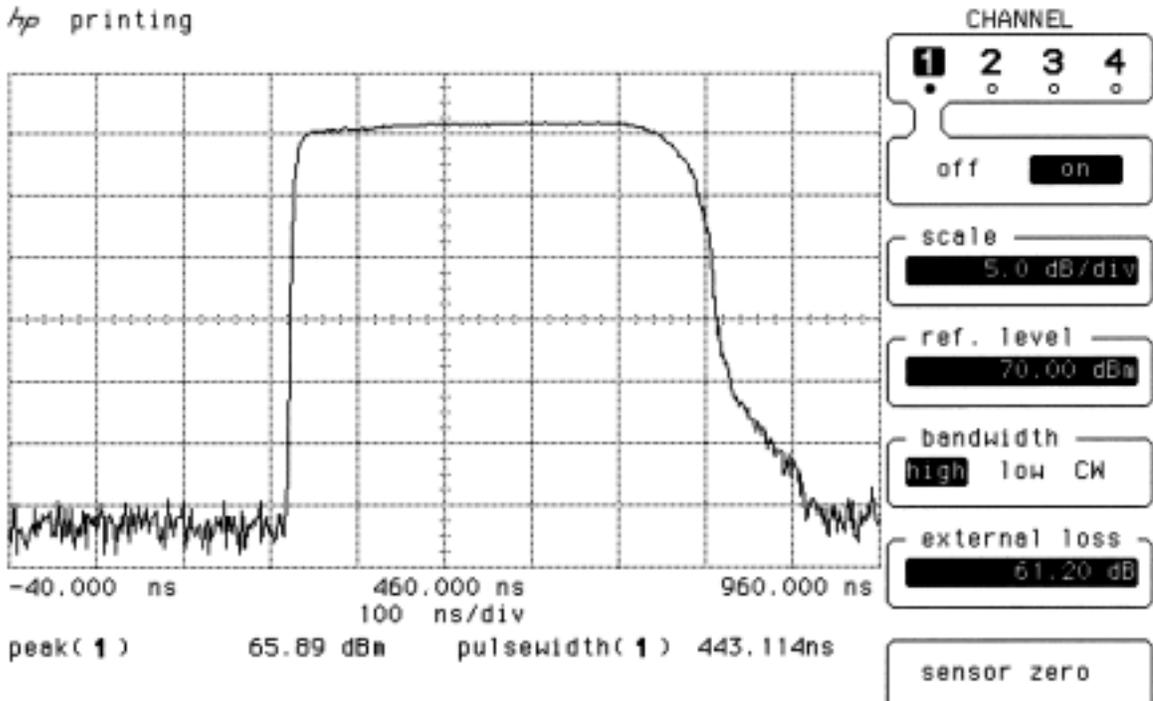
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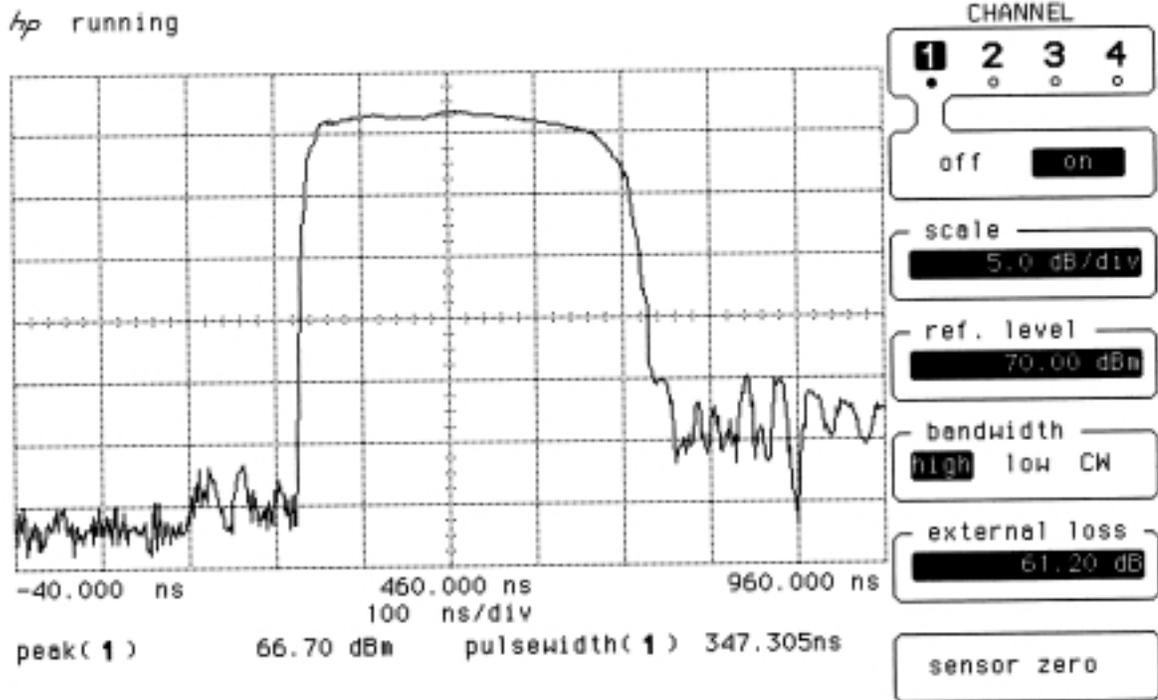
Magnetron port, 450ns Pulse Width

hp printing

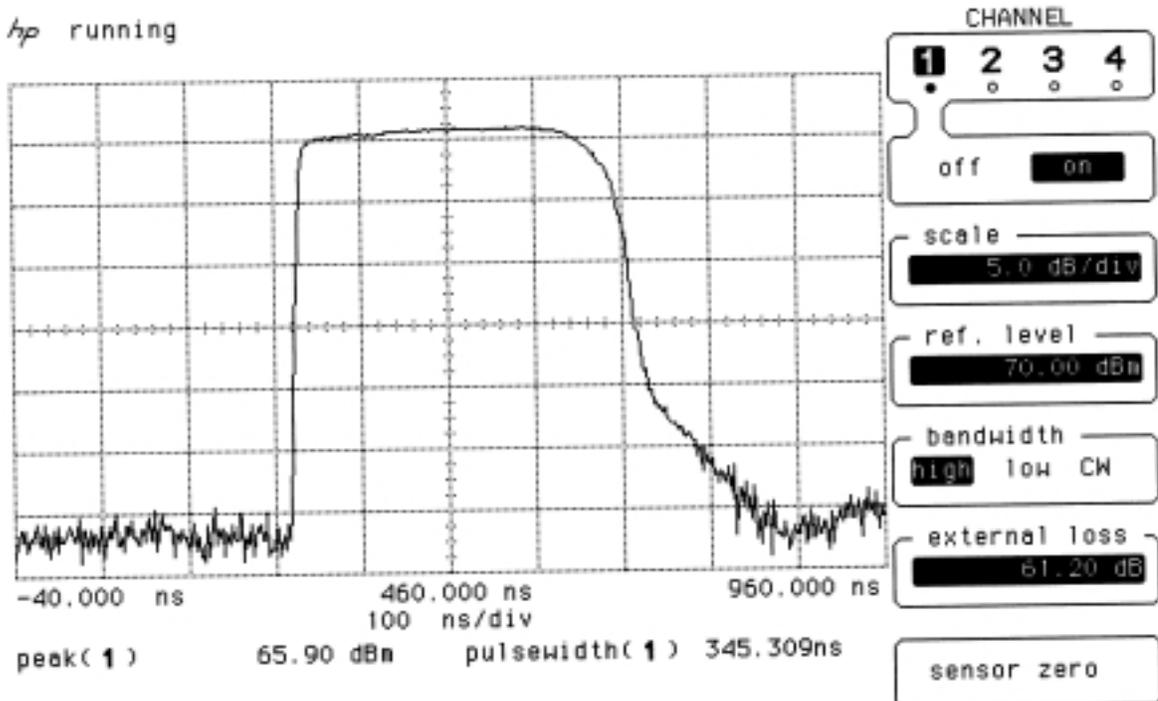


Antenna port, 450ns Pulse Width

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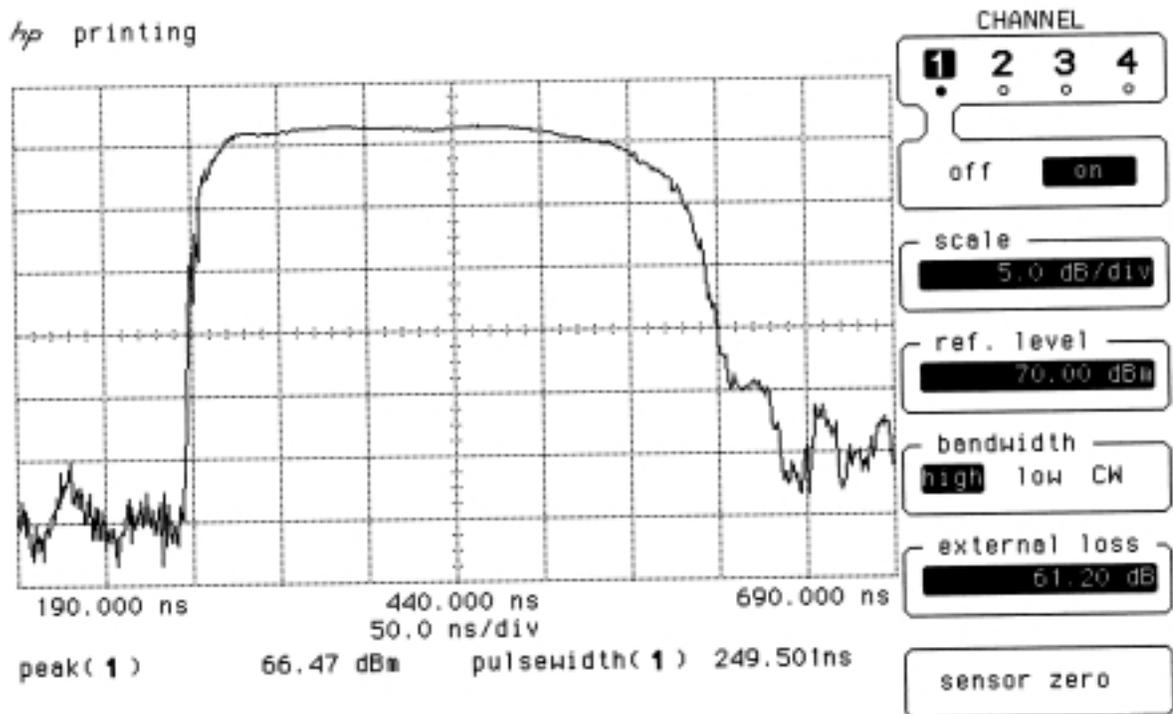


Magnetron port, 350ns Pulse Width

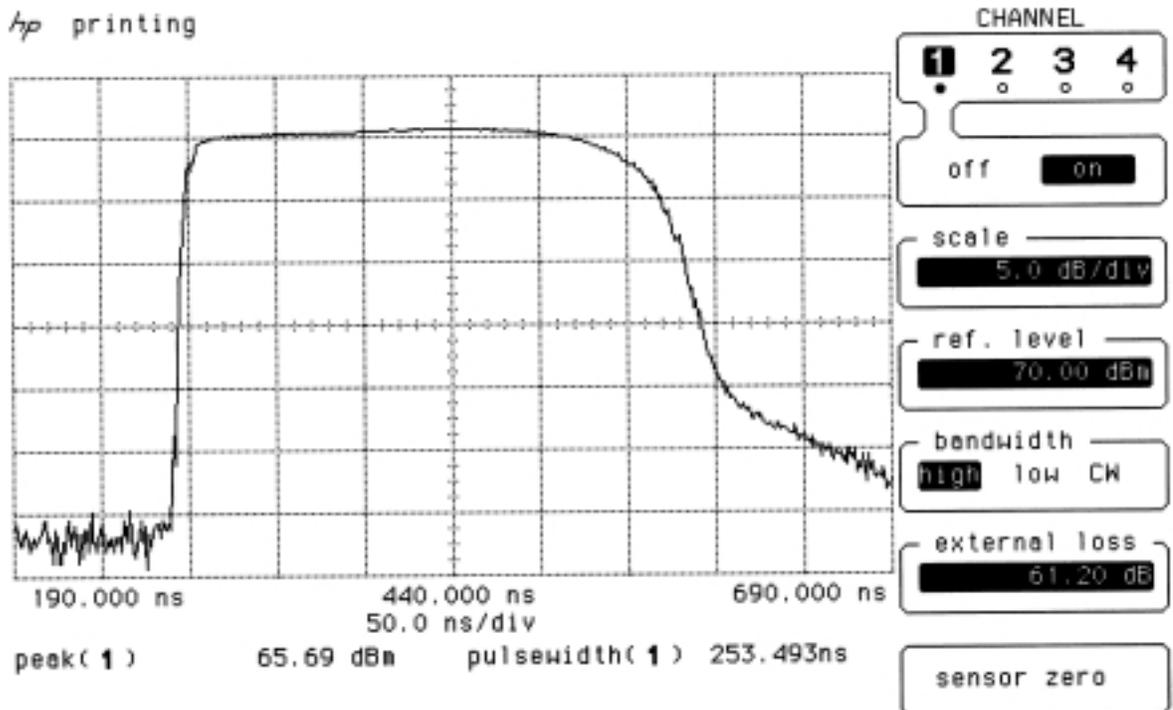


Antenna port, 350ns Pulse Width

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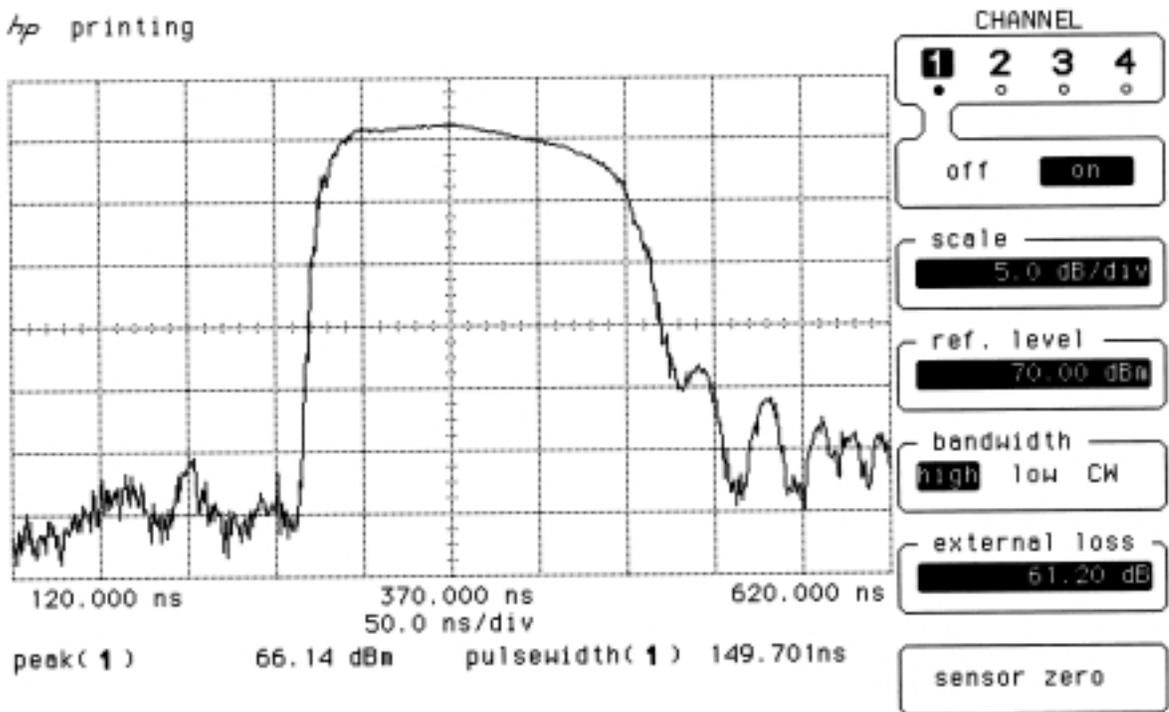
Magnetron port, 250ns Pulse Width



Antenna Port, 250ns Pulse Width

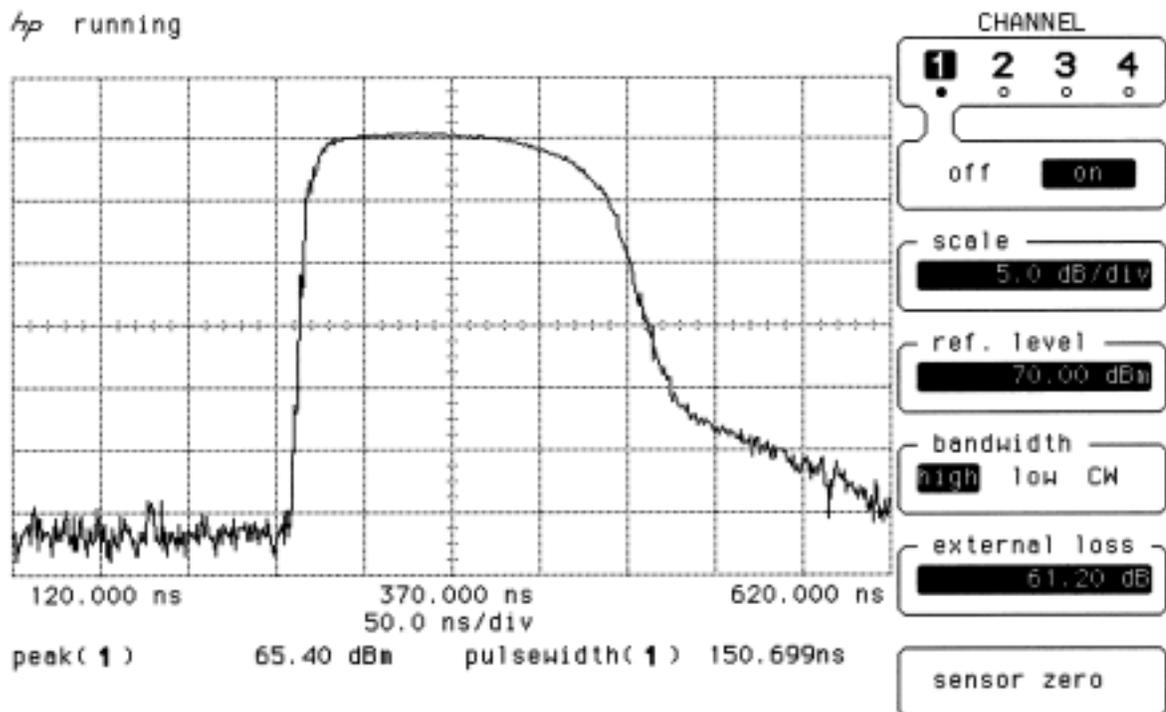
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Magnetron port, 150ns Pulse Width

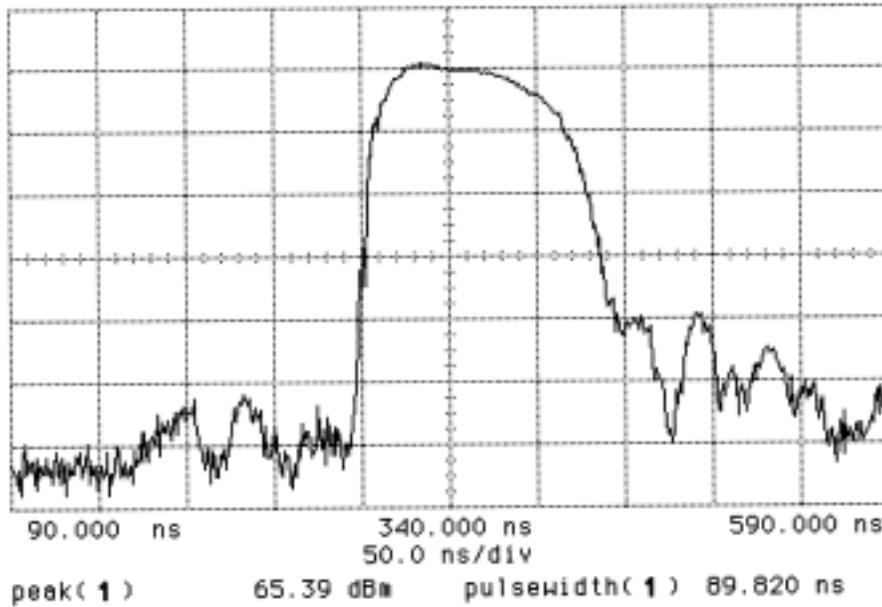
hp running



Antenna port, 150ns Pulse Width

Raytheon 'Pathfinder' 4kW Open Array Scanner

hp printing



CHANNEL

1 2 3 4

off on

scale 5.0 dB/div

ref. level 70.00 dBm

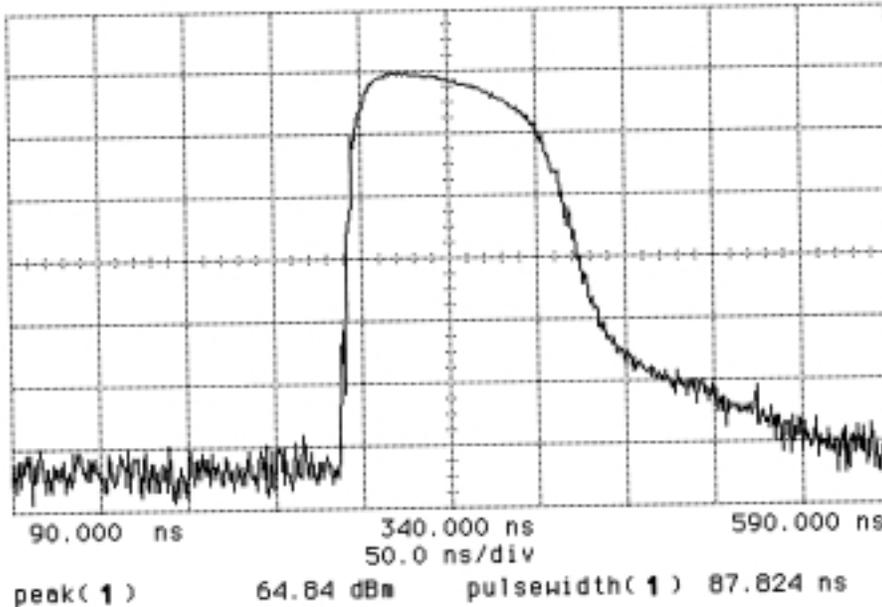
bandwidth high low CW

external loss 61.20 dB

sensor zero

Magnetron port, 90ns Pulse Width

hp running



CHANNEL

1 2 3 4

off on

scale 5.0 dB/div

ref. level 70.00 dBm

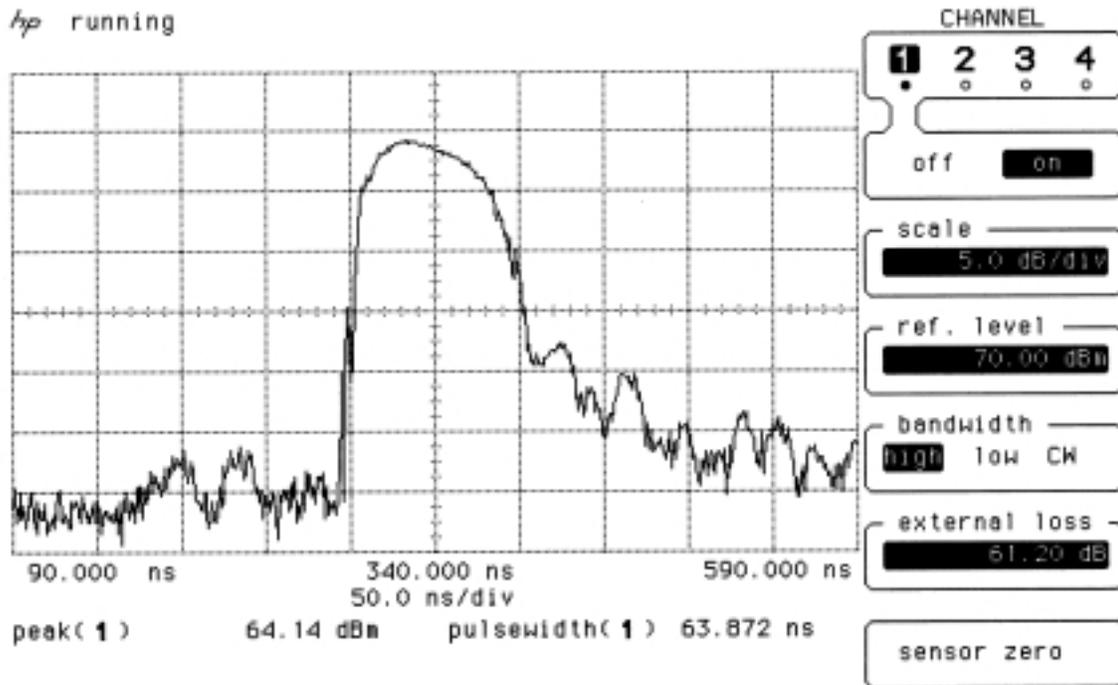
bandwidth high low CW

external loss 61.20 dB

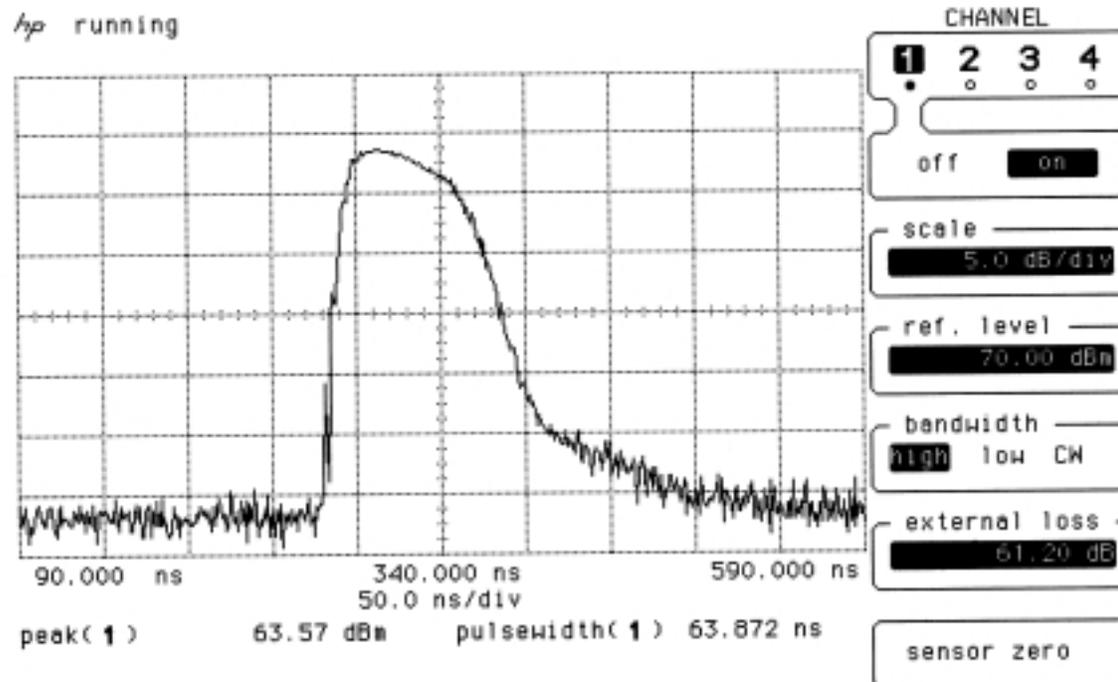
sensor zero

Antenna port, 90ns Pulse Width

Raytheon 'Pathfinder' 4kW Open Array Scanner



Magnetron port, 65ns Pulse Width



Antenna port, 65ns Pulse Width