

2 Degree Antenna Statement

Re: 2.4 Meter Transportable Earth Station
Fixed Satellite Service
C-Band 5925 – 6425 MHz

Per §25.115(h)(4) the earth station applicant certifies that it will limit its pointing error to 0.5.

This antenna is a Prodelin 2.4 meter antenna and it does not strictly comply with 25.209 of the FCC Rules and Regulations. However, pursuant to Section 25.218 of the FCC Rules and Regulations an applicant may request routine processing of an application if it meets the applicable off-axis EIRP envelope.

The attached antenna patterns and corresponding table's present the data outlined in Section 25.218 and therefore the applicant request routine processing of this application.

The applicant agrees to accept any adjacent satellite interference in the 4 GHz receive band as a result of the performance of the antenna in the 1° to 1.5° region. The applicant understands that no adjacent satellite interference protection will be available in the 1° to 1.5° regions. The applicant understands that adjacent satellite interference protection applies only to the extent of the criteria set forth in §25.209.

Routine Licensing for Antennas with Low Power Densities

Pursuant to §25.134 (a)(2)¹ of the Rules and Regulations ("Regulations") of the Federal Communications Commission ("Commission"), the operator of an antenna smaller than 4.5m in the 4/6 GHz frequency bands must demonstrate that unacceptable interference will not be caused to any and all affected adjacent satellites. The proposed antenna in this application is smaller than 4.5m. Hence, a demonstration that interference will not be caused to adjacent satellites is now presented.

Power Calculations

Calculating the Maximum Total Input Power at the Antenna Flange as well as the Maximum EIRP Density per Carrier (E40, E48, and E49 of the application). The figures, as revised, are set forth below:

Power Calculations

Main Bean Gain	42.2 dBi	<i>[field E41]</i>
Total Input Power at Antenna Flange	200 watts	<i>[field E38]</i>
Max EIRP Density at Antenna Output	65.2 dBW	<i>[field E40]</i>

$$200\text{watts}\log_{10} = 23.0$$
$$42.2 + 23.0 = 65.2 \text{ dBW}$$

Maximum EIRP Density Per Carrier	29.2 dBW/4 KHz	<i>[field E49]</i>
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$$29.2 - 42.2 = (-13.0) \text{ dBW/4KHz}$$

Pursuant to §25.134(a) of the Regulations, the Maximum digital uplink transmitter power density at the antenna flange permitted is -2.7 dBW/4KHz. According to the calculations above, the proposed system is designed to operate with a maximum EIRP density at the antenna flange of -13.0 dBW/4KHz.

¹ 47 C.F.R. 25.134 (a)(2).

Consequently, the system will operate with a power density below the maximum allowed by a margin of 10.3 dB.

The 2.4m antenna proposed with this system does not strictly comply with §25.209² of the Regulations (patterns attached as an exhibit to the application). However, pursuant to §25.220 (b-c)³ of the Regulations⁴, an applicant may request the Commission to consider a non-compliant antenna if it can be shown that the operational power density will be below the requirement of §25.134. Specifically, the earth station operator must provide the power and power density levels that result by reducing the values stated in §25.134 by the number of decibels that the non-compliant antenna fails to meet the standards of §25.209.

In this case, the antenna exceeds the patterns of §25.209 in the 1° to 1.9° region measured at the low, mid, and high frequency bands. The Max EIRP Density at the Antenna Flange is -13.0 dBW/4KHz. This figure is below the maximum allowed power of -2.7 dBW/4KHz by a margin of 10.3 dB.

Affidavits from Adjacent Satellite Operators

In view of the new Section 25.220, affidavits from adjacent satellite operators are not necessarily required so long as the power density operates below the limits and such margin is enough to compensate for any power amount over the 2-degree compliance envelope of §25.209. Since the herein proposed system exhibits power density characteristics 10.3 dB below the limits set forth in §25.134, the provisions of 25.220 will apply.

Based on this information and the antenna patterns attached as an exhibit with this application, sufficient information has been provided to enable the Commission to grant this application for license.

Summary

The antenna pattern contained with this application exceeds the CFR 25.209 sidelobe specification for the sidelobe envelope in the ± 1 to 2.0 region. Outside the main beam, the antenna meets the requirements of 25.209.

The power density restrictions specified by the FCC for small diameter antennas utilizing digital traffic at C-Band is -2.7 dBW/4 kHz. This antenna will operate at a maximum transmit power density of -13.0 dBW/4 kHz.

If the use of this antenna should cause interference to other systems, the applicant will terminate such transmissions immediately upon notice from the FCC or offended parties.

There are currently no satellites located within 1.5° of the applicant's desired satellites.

Based on this information and the antenna patterns attached as an exhibit with this application, sufficient information has been provided to enable the Commission grant this application for license.

² 47 C.F.R. 25.209.

³ 47 C.F.R. 25.220 (b-c).

⁴ *Amendment to Part 25 of the Commission's Rules and Regulations to Reduce Alien Carrier Interference Between Fixed Satellites at Reduced Orbital Spacings and to Revise Application Procedures for Satellite Communications Services*, Appendix B, Rule Changes, Fifth Report and Order, Docket No. 00-248, 20 F.C.C.R. 5666 (Released March 15, 2005).

25.115 C-Band Compliance Table	EIRP at 6.175 GHz	Worst Case -5.3 dB	Worst Case -5.3 dB	Worst Case -11.03 dB				
Off-Axis Angle (deg.)	FCC Mask 25.218(d)(1) (dBW/4kHz z)	Geo Plane EIRP (dBW/4kHz z)	Difference Between EIRP Density and FCC Mask	FCC Mask 25.218(d)(2) (dBW/4kHz z)	Horizon Plane EIRP (dWB/4kHz z)	Difference Between EIRP Density and FCC Mask	Elevation Plane EIRP (dBW/4kHz z)	Difference Between EIRP Density and FCC Mask
-180	-12.7	-35.0	-22.3	-12.7	-28.0	-15.3		
-175	-12.7	-30.0	-17.3	-12.7	-26.0	-13.3		
-170	-12.7	-23.0	-10.3	-12.7	-22.5	-9.8		
-165	-12.7	-21.0	-8.3	-12.7	-20.0	-7.3		
-160	-12.7	-20.0	-7.3	-12.7	-20.5	-7.8		
-155	-12.7	-20.0	-7.3	-12.7	-22.0	-9.3		
-150	-12.7	-21.0	-8.3	-12.7	-26.5	-13.8		
-145	-12.7	-22.0	-9.3	-12.7	-25.5	-12.8		
-140	-12.7	-23.0	-10.3	-12.7	-26.0	-13.3		
-135	-12.7	-23.0	-10.3	-12.7	-18.0	-5.3		
-130	-12.7	-24.8	-12.1	-12.7	-23.0	-10.3		
-125	-12.7	-20.7	-8.0	-12.7	-19.0	-6.3		
-120	-12.7	-26.0	-13.3	-12.7	-24.0	-11.3		
-115	-12.7	-29.0	-16.3	-12.7	-30.0	-17.3		
-110	-12.7	-28.0	-15.3	-12.7	-25.5	-12.8		
-105	-12.7	-21.0	-8.3	-12.7	-21.0	-8.3		
-100	-12.7	-31.0	-18.3	-12.7	-29.0	-16.3		
-95	-12.7	-31.0	-18.3	-12.7	-30.0	-17.3		
-90	-12.7	-30.0	-17.3	-12.7	-28.0	-15.3		
-85	-12.7	-23.0	-10.3	-12.7	-23.0	-10.3		
-80	-12.7	-25.0	-12.3	-12.7	-25.5	-12.8		
-75	-12.7	-25.5	-12.8	-12.7	-28.0	-15.3		
-70	-12.7	-30.0	-17.3	-12.7	-31.0	-18.3		
-65	-12.7	-33.0	-20.3	-12.7	-29.0	-16.3		
-60	-12.7	-30.0	-17.3	-12.7	-26.0	-13.3		
-55	-12.7	-30.0	-17.3	-12.7	-29.0	-16.3		
-50	-12.7	-33.0	-20.3	-12.7	-30.5	-17.8		
-48	-12.7			-12.7				
-45	-12.0	-35.0	-23.0	-12.0	-33.0	-21.0		
-40	-10.8	-26.0	-15.2	-10.8	-31.0	-20.2		
-35	-9.3	-35.0	-25.7	-9.3	-31.0	-21.7		
-30	-7.6	-25.5	-17.9	-7.6	-30.5	-22.9		
-25	-5.6	-26.0	-20.4	-5.6	-28.0	-22.4		
-20	-3.2	-25.5	-22.3	-3.2	-26.5	-23.3		
-15	-0.1	-23.0	-22.9	-0.1	-25.5	-25.4		
-10	4.3	-15.5	-19.8	4.3	-23.0	-27.3		
-9.9	4.4	-18.0	-22.4	4.4	-20.5	-24.9		
-9.8	4.5	-23.0	-27.5	4.5	-18.0	-22.5		
-9.7	4.6	-28.0	-32.6	4.6	-15.5	-20.1		
-9.6	4.7	-30.0	-34.7	4.7	-14.0	-18.7		
-9.5	4.9	-33.0	-37.9	4.9	-12.0	-16.9		
-9.4	5.0	-30.0	-35.0	5.0	-12.2	-17.2		

-9.3	5.1	-28.0	-33.1	5.1	-12.4	-17.5		
-9.2	5.3	-24.0	-29.3	5.2	-12.6	-17.8		
-9.1	5.3	-23.0	-28.3	5.3	-12.8	-18.1		
-9	5.3	-16.0	-21.3	5.4	-13.0	-18.4	-12.3	-17.7
-8.9	5.3	-17.0	-22.3	5.6	-12.0	-17.6	-12.9	-18.4
-8.8	5.3	-19.0	-24.3	5.7	-11.0	-16.7	-13.4	-19.1
-8.7	5.3	-21.0	-26.3	5.8	-11.5	-17.3	-14.2	-20.0
-8.6	5.3	-23.0	-28.3	5.9	-12.0	-17.9	-15.0	-20.9
-8.5	5.3	-26.0	-31.3	6.1	-13.5	-19.6	-16.3	-22.4
-8.4	5.3	-23.0	-28.3	6.2	-18.0	-24.2	-16.7	-22.8
-8.3	5.3	-21.0	-26.3	6.3	-23.0	-29.3	-17.0	-23.3
-8.2	5.3	-20.0	-25.3	6.5	-34.0	-40.5	-16.0	-22.4
-8.1	5.3	-19.0	-24.3	6.6	-29.0	-35.6	-15.6	-22.2
-8	5.3	-17.0	-22.3	6.7	-23.0	-29.7	-14.2	-20.9
-7.9	5.3	-18.0	-23.3	6.9	-21.0	-27.9	-13.5	-20.3
-7.8	5.3	-20.0	-25.3	7.0	-19.0	-26.0	-12.9	-19.9
-7.7	5.3	-21.0	-26.3	7.1	-17.0	-24.1	-12.5	-19.6
-7.6	5.3	-23.0	-28.3	7.3	-18.0	-25.3	-12.3	-19.6
-7.5	5.3	-26.0	-31.3	7.4	-19.0	-26.4	-11.6	-19.1
-7.4	5.3	-36.0	-41.3	7.6	-25.0	-32.6	-10.7	-18.3
-7.3	5.3	-26.0	-31.3	7.7	-25.5	-33.2	-9.8	-17.5
-7.2	5.3	-22.0	-27.3	7.9	-20.0	-27.9	-8.8	-16.7
-7.1	5.3	-20.0	-25.3	8.0	-16.0	-24.0	-7.4	-15.4
-7.0	5.2	-16.0	-21.2	8.2	-13.0	-21.2	-6.7	-14.8
-6.9	5.3	-15.0	-20.3	8.3	-12.0	-20.3	-5.8	-14.1
-6.8	5.5	-14.5	-20.0	8.5	-11.0	-19.5	-5.5	-13.9
-6.7	5.6	-14.0	-19.6	8.6	-10.0	-18.6	-5.3	-13.9
-6.6	5.8	-13.0	-18.8	8.8	-9.0	-17.8	-5.6	-14.4
-6.5	6.0	-14.0	-20.0	9.0	-8.0	-17.0	-6.2	-15.2
-6.4	6.1	-16.0	-22.1	9.1	-10.5	-19.6	-7.7	-16.9
-6.3	6.3	-18.0	-24.3	9.3	-13.0	-22.3	-9.5	-18.8
-6.2	6.5	-20.0	-26.5	9.5	-15.5	-25.0	-13.0	-22.5
-6.1	6.7	-22.0	-28.7	9.7	-18.0	-27.7	-20.3	-30.0
-6.0	6.8	-4.1	-10.9	9.8	-20.5	-30.3	-28.6	-38.4
-5.9	7.0	-21.5	-28.5	10.0	-18.0	-28.0	-16.1	-26.1
-5.8	7.2	-20.5	-27.7	10.2	-18.0	-28.2	-11.9	-22.2
-5.7	7.4	-20.0	-27.4	10.4	-16.0	-26.4	-9.5	-19.9
-5.6	7.6	-19.5	-27.1	10.6	-14.0	-24.6	-8.3	-18.9
-5.5	7.8	-19.0	-26.8	10.8	-12.0	-22.8	-7.9	-18.7
-5.4	8.0	-18.0	-26.0	11.0	-12.0	-23.0	-7.8	-18.8
-5.3	8.2	-17.0	-25.2	11.2	-13.0	-24.2	-8.2	-19.4
-5.2	8.4	-16.0	-24.4	11.4	-17.0	-28.4	-8.4	-19.8
-5.1	8.6	-15.0	-23.6	11.6	-20.0	-31.6	-9.4	-21.0
-5.0	8.8	-14.0	-22.8	11.8	-24.0	-35.8	-10.1	-21.9
-4.9	9.0	-12.0	-21.0	12.0	-18.0	-30.0	-10.0	-22.1
-4.8	9.3	-11.0	-20.3	12.3	-13.0	-25.3	-8.4	-20.7
-4.7	9.5	-10.0	-19.5	12.5	-10.0	-22.5	-6.9	-19.4
-4.6	9.7	-9.0	-18.7	12.7	-8.0	-20.7	-5.1	-17.8
-4.5	10.0	-8.0	-18.0	13.0	-5.0	-18.0	-3.9	-16.9
-4.4	10.2	-11.0	-21.2	13.2	-4.0	-17.2	-3.1	-16.3
-4.3	10.5	-13.0	-23.5	13.5	-3.0	-16.5	-2.7	-16.1
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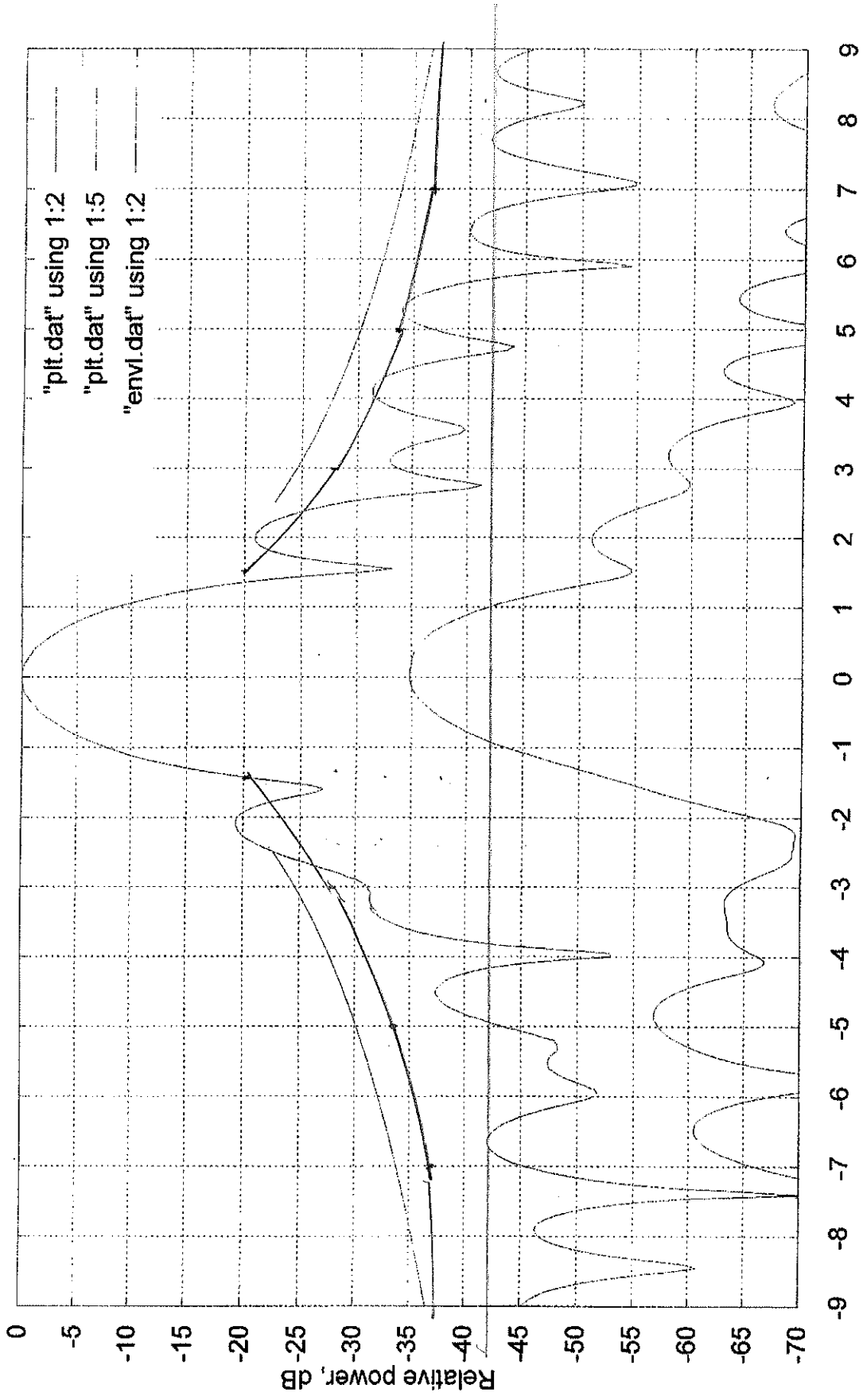
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-3.8	11.8	-18.0	-29.8	14.8	-12.9	-27.7	-8.1	-22.9
-3.7	12.1	-8.0	-20.1	15.1	-20.0	-35.1	-10.5	-25.6
-3.6	12.4	-6.0	-18.4	15.4	-16.0	-31.4	-16.2	-31.6
-3.5	12.7	-2.9	-15.6	15.7	-10.2	-25.9	-30.9	-46.6
-3.4	13.0	-3.0	-16.0	16.0	-5.0	-21.0	-17.3	-33.4
-3.3	13.3	-2.9	-16.2	16.3	-6.0	-22.3	-11.8	-28.2
-3.2	13.7	-2.8	-16.5	16.7	-5.0	-21.7	-8.6	-25.3
-3.1	14.0	-2.5	-16.5	17.0	-4.0	-21.0	-6.5	-23.5
-3.0	14.4	-2.0	-16.4	17.4	-2.5	-19.9	-4.8	-22.2
-2.9	14.7	0.0	-14.7		-2.0			
-2.8	15.1	1.0	-14.1		-1.5			
-2.7	15.5	2.0	-13.5		-0.5			
-2.6	15.9	5.0	-10.9		1.0			
-2.5	16.4	7.0	-9.4		2.0			
-2.4	16.8	8.0	-8.8		2.5			
-2.3	17.3	8.0	-9.3		3.0			
-2.2	17.7	9.0	-8.7		4.0			
-2.1	18.2	10.0	-8.2		5.0			
-2.0	18.8	8.0	-10.8		6.0			
-1.9	19.3	6.0	-13.3		5.0			
-1.8	19.9	4.0	-15.9		4.6			
-1.7	20.5	2.0	-18.5		5.0			
-1.6	21.2	5.0	-16.2		7.0			
-1.5	21.9	9.0	-12.9		9.5			
-1.4		16.0			12.7			
-1.3		17.6			15.0			
-1.2		19.2			17.5			
-1.1		20.5			19.4			
-1.0		21.8			20.9			
-0.9		23.1			22.4			
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-0.7		25.1			24.7			
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-0.5		26.8			26.5			
-0.4		27.3			27.1			
-0.3		27.8			27.6			
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0.0		29.0			29.0			
0.1		28.5			28.2			
0.2		28.4			28.1			
0.3		28.1			27.8			
0.4		27.7			27.5			
0.5		27.3			26.9			
0.6		26.5			26.3			
0.7		25.7			25.2			
0.8		24.8			24.3			
0.9		23.6			22.8			
1.0		22.3			21.3			

1.1		21.0			19.8			
1.2		19.4			17.7			
1.3		17.4			15.4			
1.4		15.7			12.3			
1.5	21.9	9.0	-12.9		9.5			
1.6	21.2	6.0	-15.2		7.0			
1.7	20.5	4.5	-16.0		5.0			
1.8	19.9	3.0	-16.9		4.0			
1.9	19.3	6.0	-13.3		6.0			
2.0	18.8	6.5	-12.3		7.0			
2.1	18.2	7.0	-11.2		6.0			
2.2	17.7	6.5	-11.2		5.0			
2.3	17.3	6.0	-11.3		4.0			
2.4	16.8	4.5	-12.3		2.0			
2.5	16.4	3.0	-13.4		-1.0			
2.6	15.9	1.0	-14.9		3.0			
2.7	15.5	-0.5	-16.0		2.0			
2.8	15.1	0.2	-14.9		1.0			
2.9	14.7	0.5	-14.2		0.0			
3.0	14.4	1.5	-12.9	17.4	1.0	-16.4	-2.2	-19.6
3.1	14.0	1.7	-12.3	17.0	0.0	-17.0	-5.3	-22.3
3.2	13.7	2.0	-11.7	16.7	-1.0	-17.7	-8.2	-24.9
3.3	13.3	1.0	-12.3	16.3	-2.0	-18.3	-13.2	-29.5
3.4	13.0	0.2	-12.8	16.0	-2.5	-18.5	-18.7	-34.8
3.5	12.7	-0.5	-13.2	15.7	-3.0	-18.7	-16.0	-31.7
3.6	12.4	-4.0	-16.4	15.4	-8.0	-23.4	-10.2	-25.6
3.7	12.1	-5.5	-17.6	15.1	-18.0	-33.1	-7.1	-22.2
3.8	11.8	-13.0	-24.8	14.8	-14.0	-28.8	-5.0	-19.8
3.9	11.5	-21.0	-32.5	14.5	-11.0	-25.5	-3.7	-18.2
4.0	11.2	-18.0	-29.2	14.2	-8.0	-22.2	-3.0	-17.2
4.1	11.0	-13.0	-24.0	14.0	-5.5	-19.5	-2.5	-16.4
4.2	10.7	-11.0	-21.7	13.7	-3.0	-16.7	-2.3	-16.0
4.3	10.5	-10.0	-20.5	13.5	-3.0	-16.5	-2.5	-16.0
4.4	10.2	-8.0	-18.2	13.2	-5.0	-18.2	-3.3	-16.5
4.5	10.0	-6.0	-16.0	13.0	-5.5	-18.5	-4.8	-17.7
4.6	9.7	-8.0	-17.7	12.7	-8.0	-20.7	-6.5	-19.2
4.7	9.5	-10.0	-19.5	12.5	-10.5	-23.0	-9.4	-21.9
4.8	9.3	-13.0	-22.3	12.3	-9.0	-21.3	-11.5	-23.7
4.9	9.0	-11.5	-20.5	12.0	-8.0	-20.0	-12.0	-24.0
5.0	8.8	-15.5	-24.3	11.8	-18.0	-29.8	-10.8	-22.6
5.1	8.6	-13.0	-21.6	11.6	-15.5	-27.1	-9.1	-20.7
5.2	8.4	-10.5	-18.9	11.4	-13.0	-24.4	-8.3	-19.6
5.3	8.2	-9.0	-17.2	11.2	-10.5	-21.7	-7.8	-19.0
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5.5	7.8	-8.0	-15.8	10.8	-10.5	-21.3	-8.8	-19.6
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135.0	-12.7	-21.0	-8.3	-12.7	-29.0	-16.3		
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145.0	-12.7	-25.5	-12.8	-12.7	-28.0	-15.3		
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160.0	-12.7	-21.0	-8.3	-12.7	-20.5	-7.8		
165.0	-12.7	-27.0	-14.3	-12.7	-20.5	-7.8		
170.0	-12.7	-29.0	-16.3	-12.7	-21.5	-8.8		
175.0	-12.7	-30.0	-17.3	-12.7	-30.0	-17.3		
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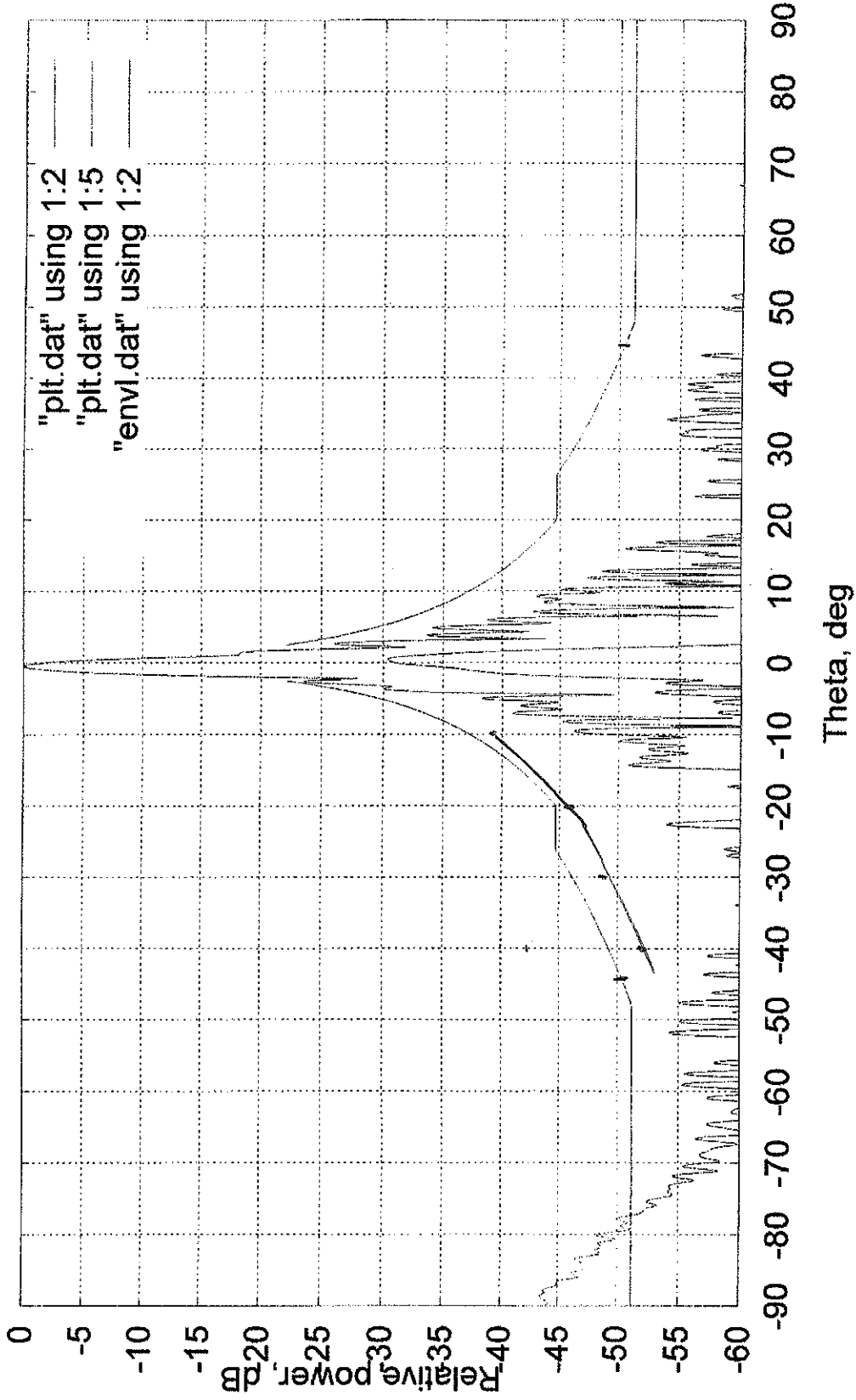
2.4m test offset 6.14 GHz V-pol EL cut



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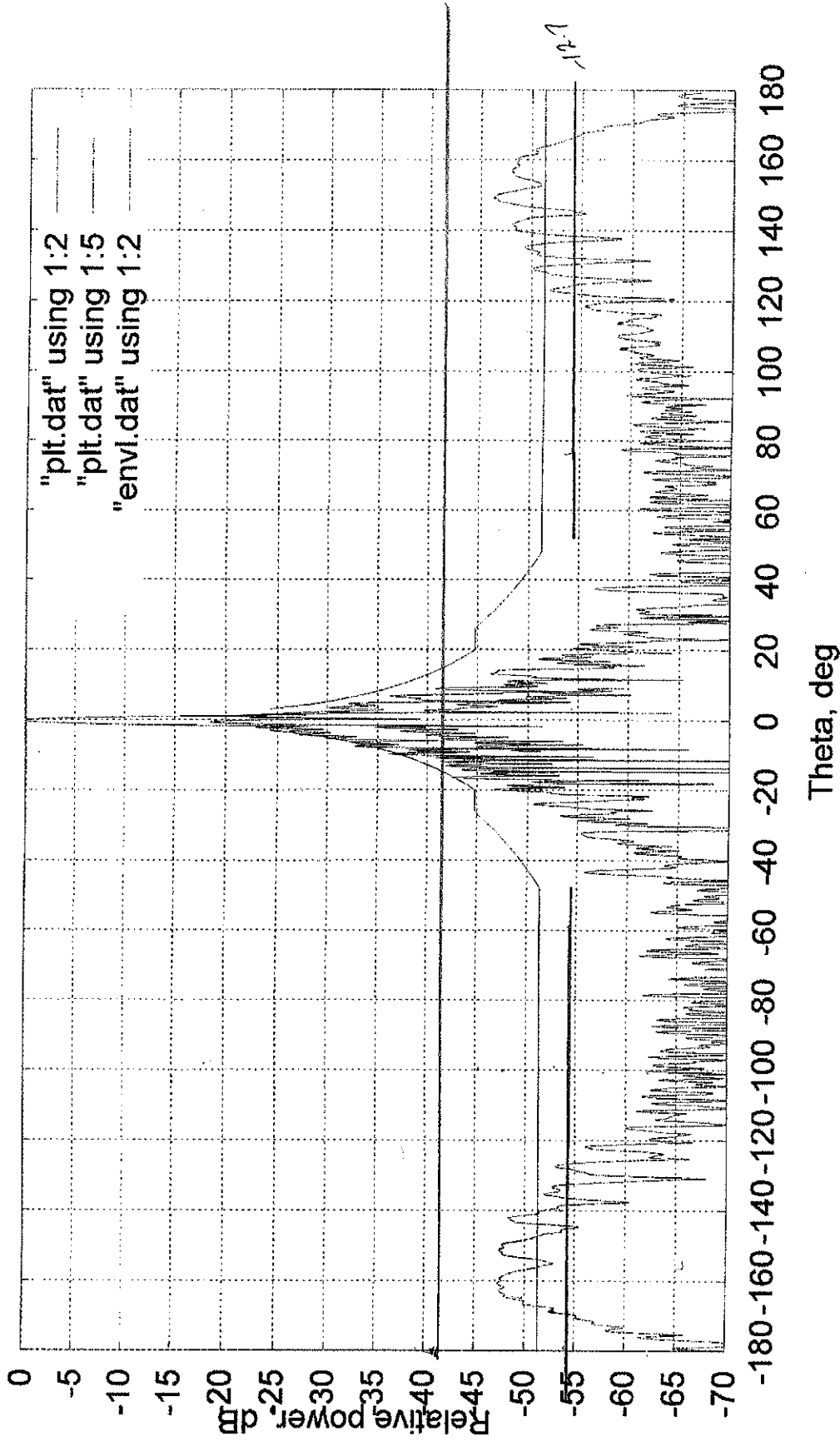
Theta, deg

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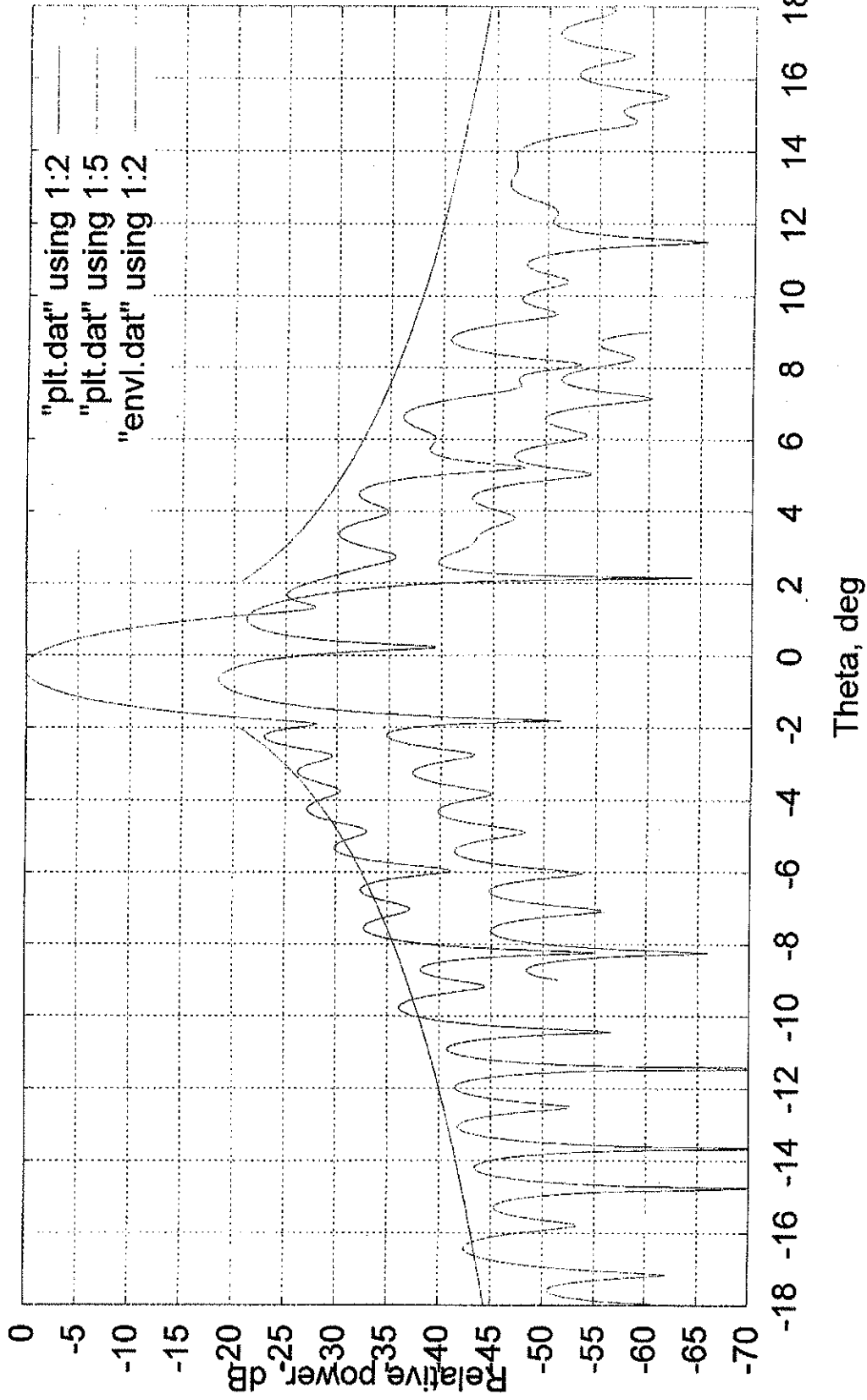
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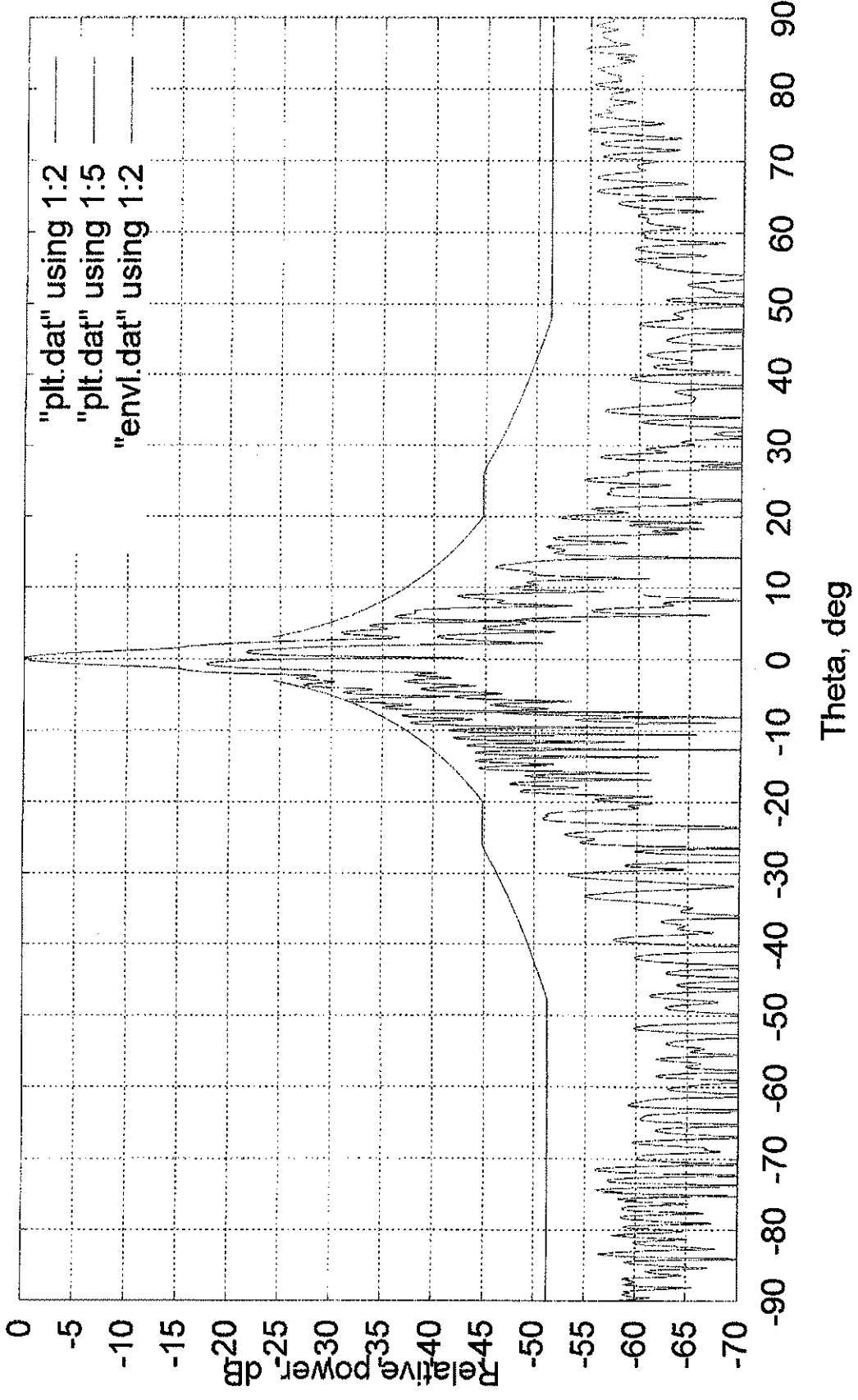
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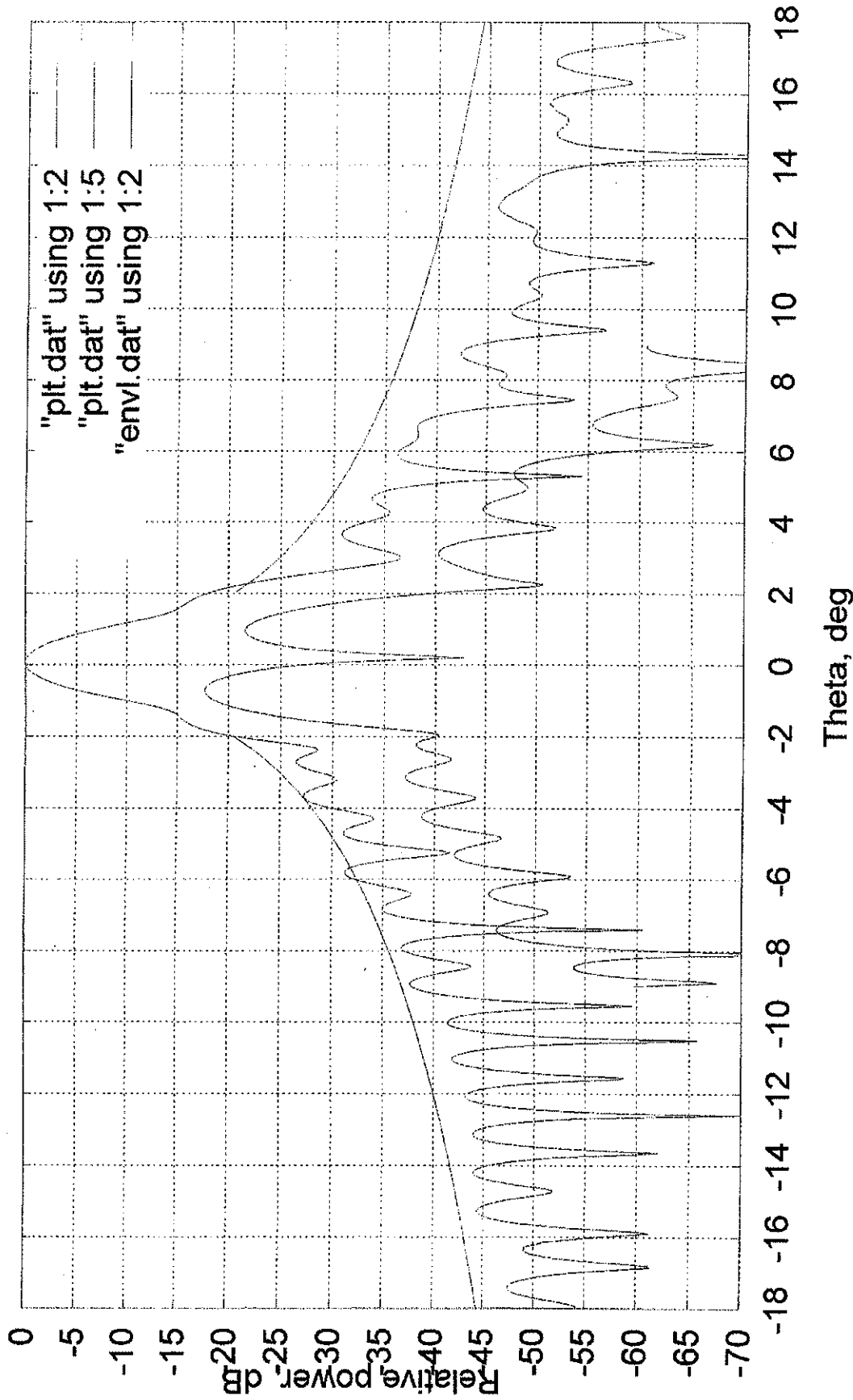
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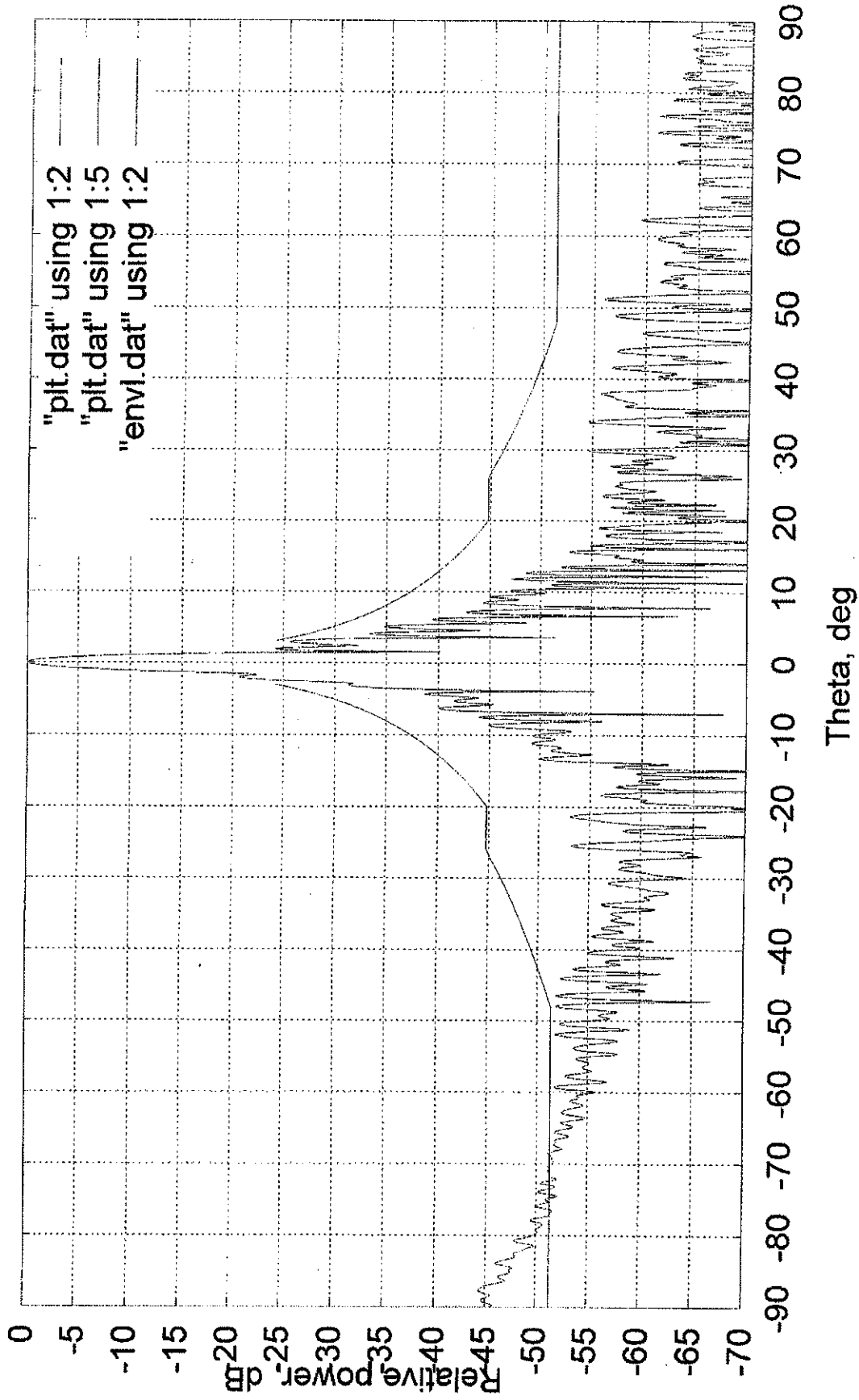
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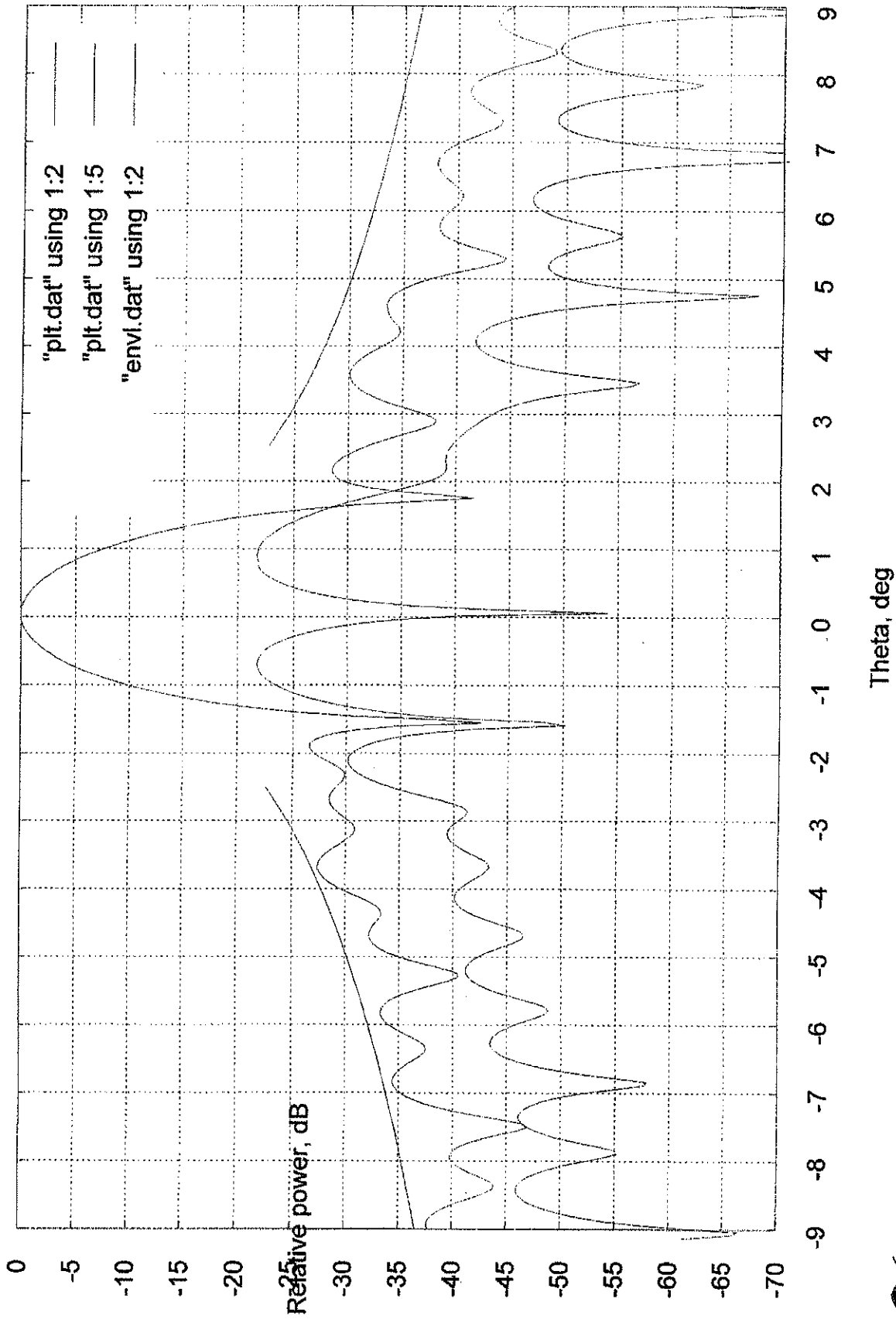
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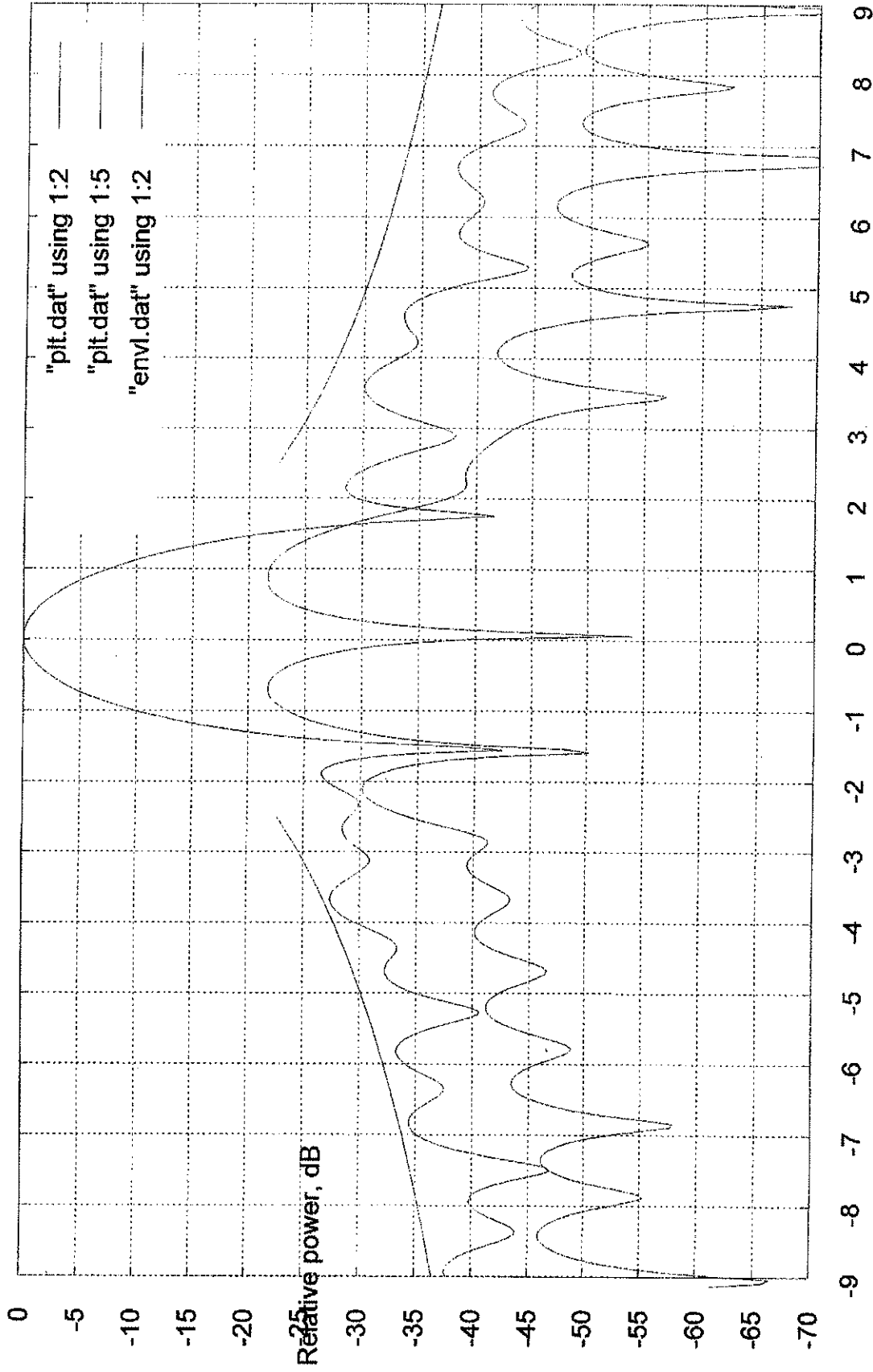
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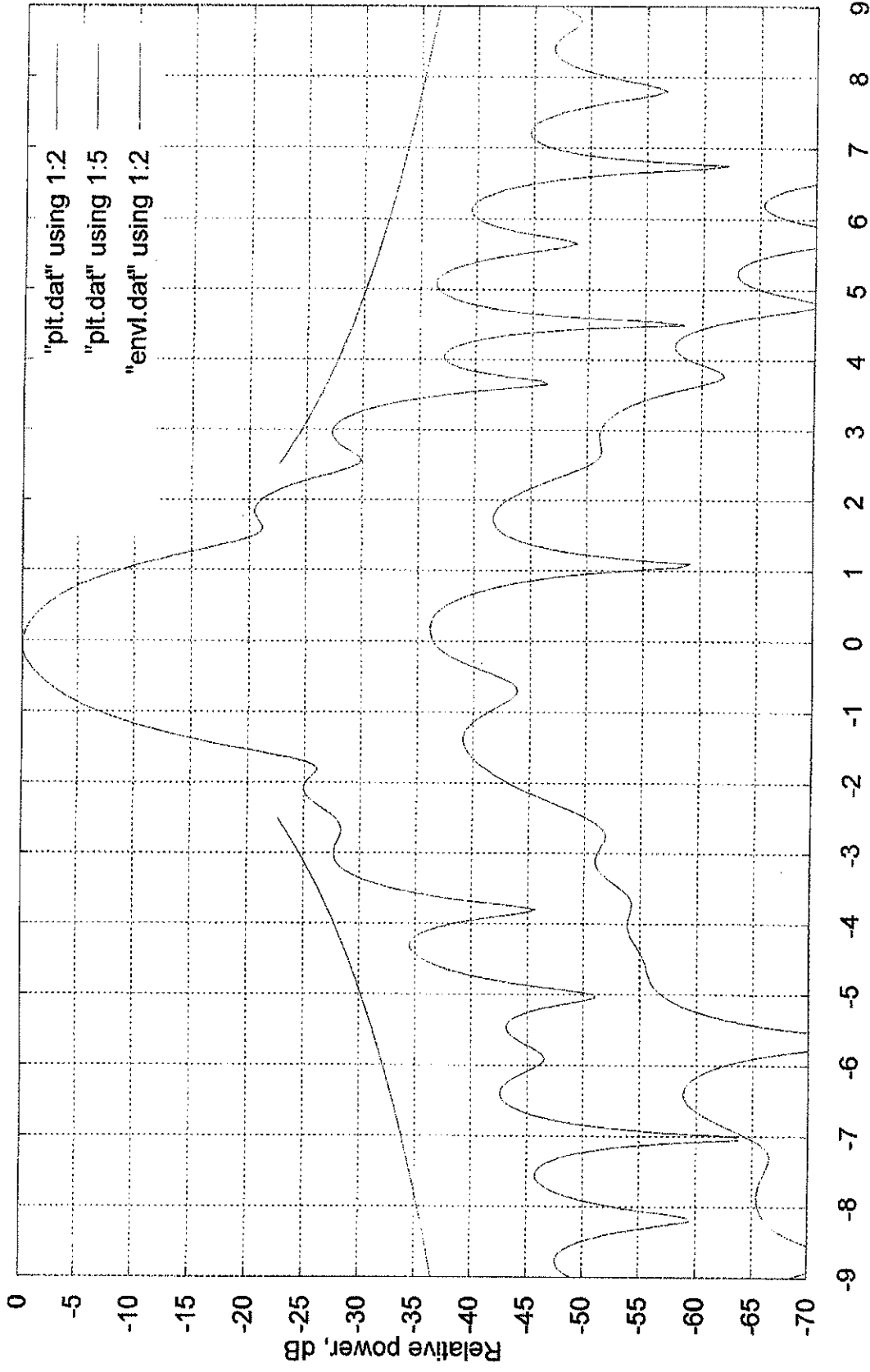
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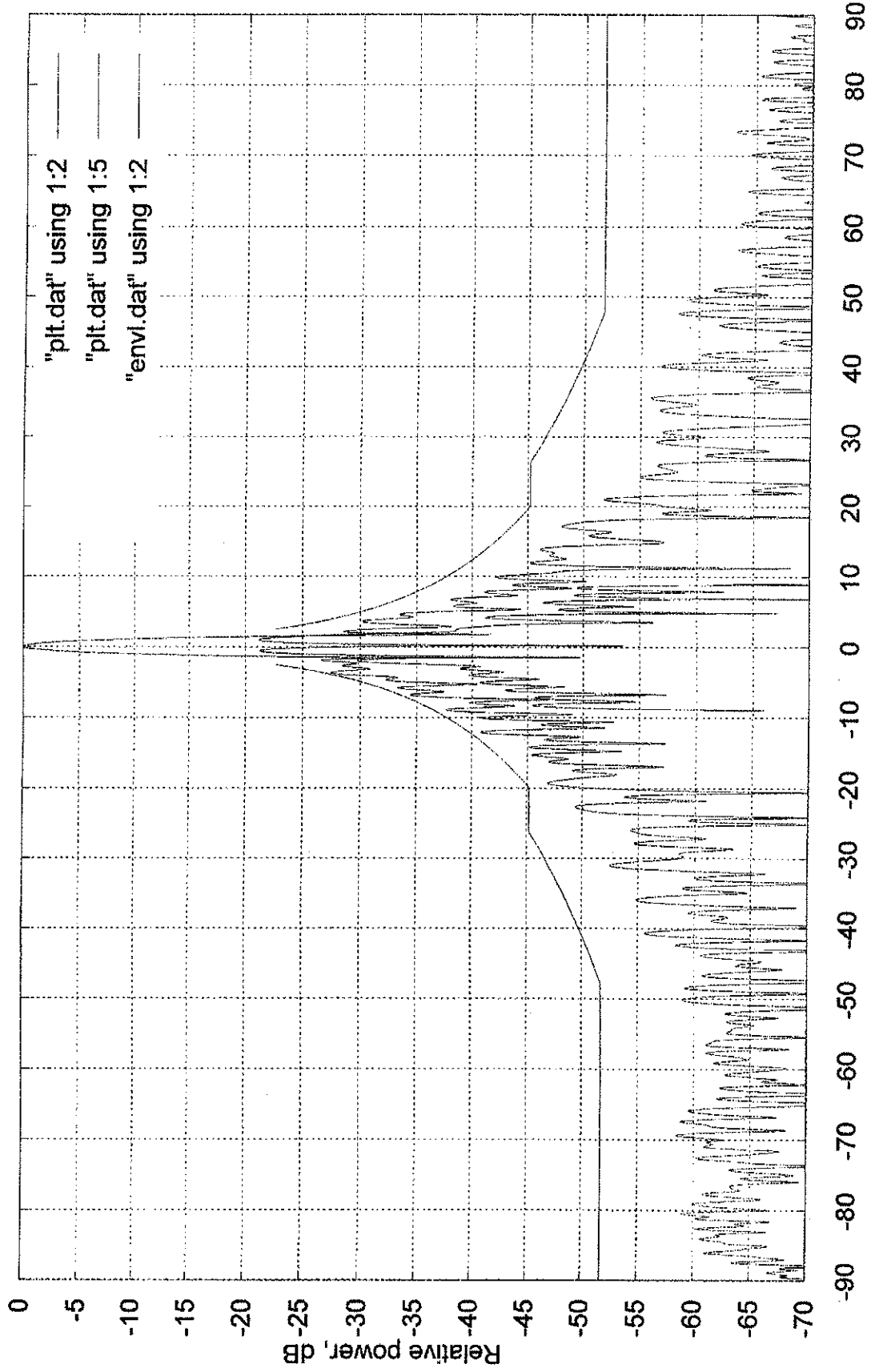
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Theta, deg

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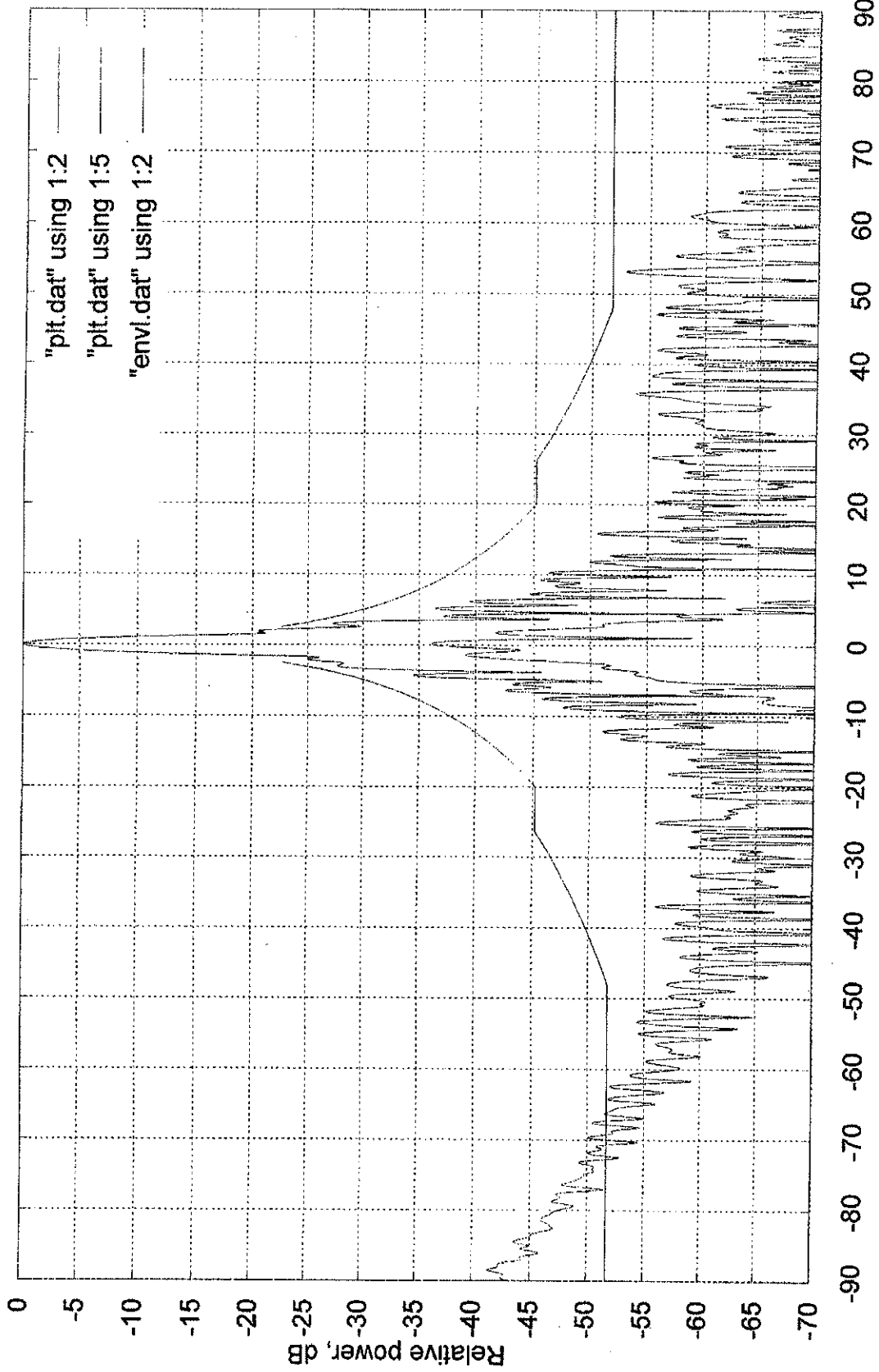
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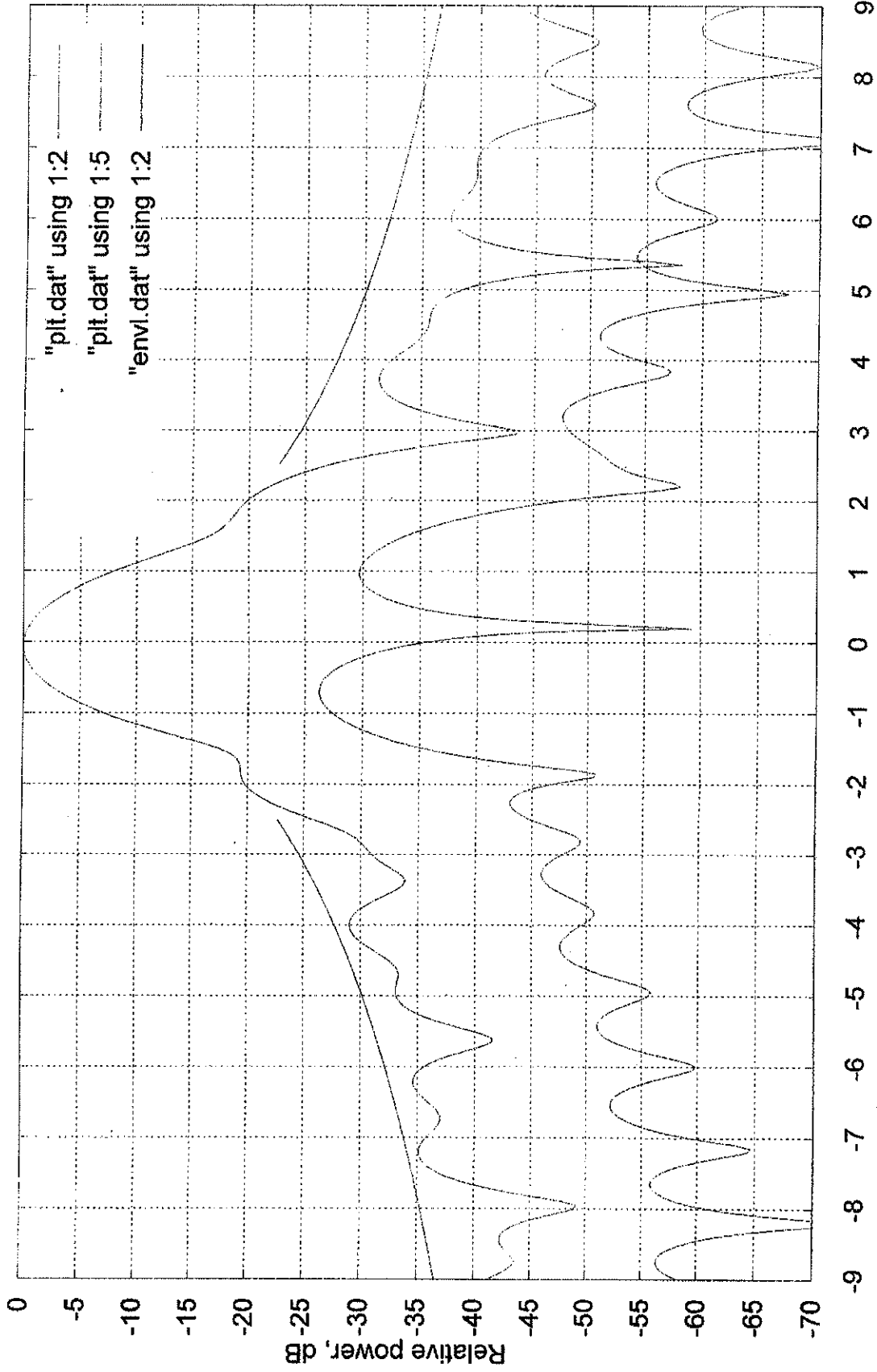
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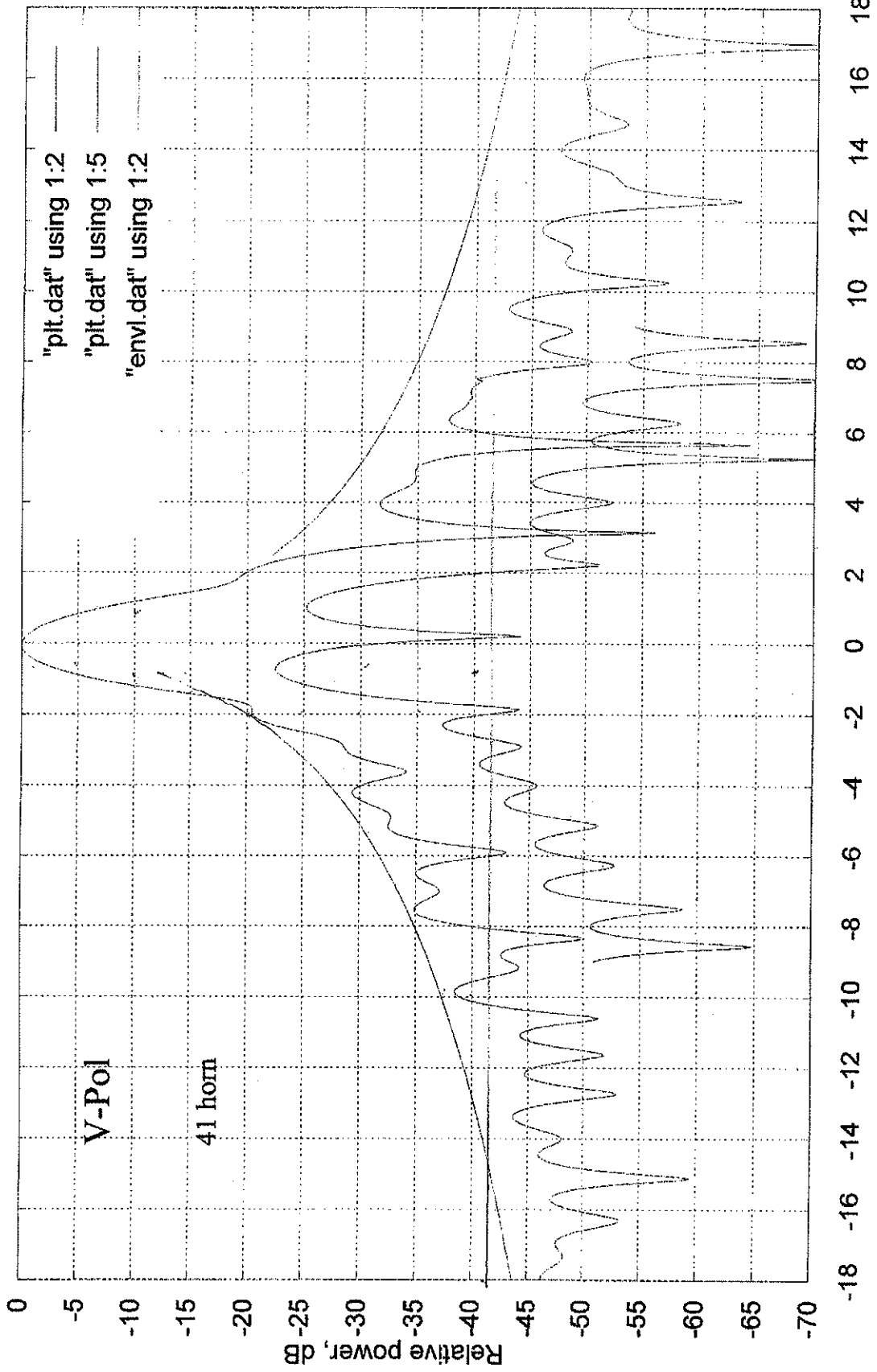
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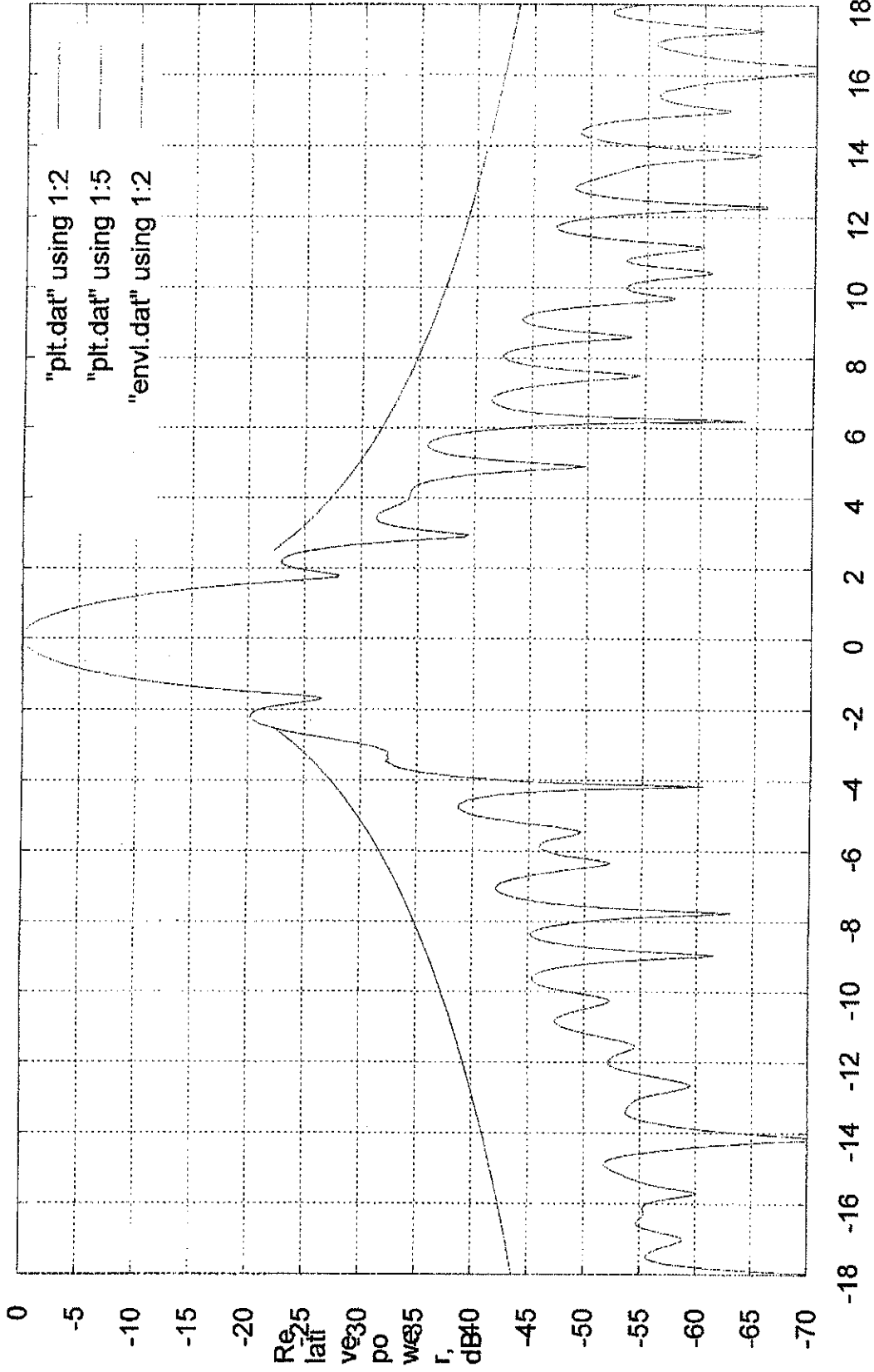
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2.4m test offset 5.85 GHz Az cut



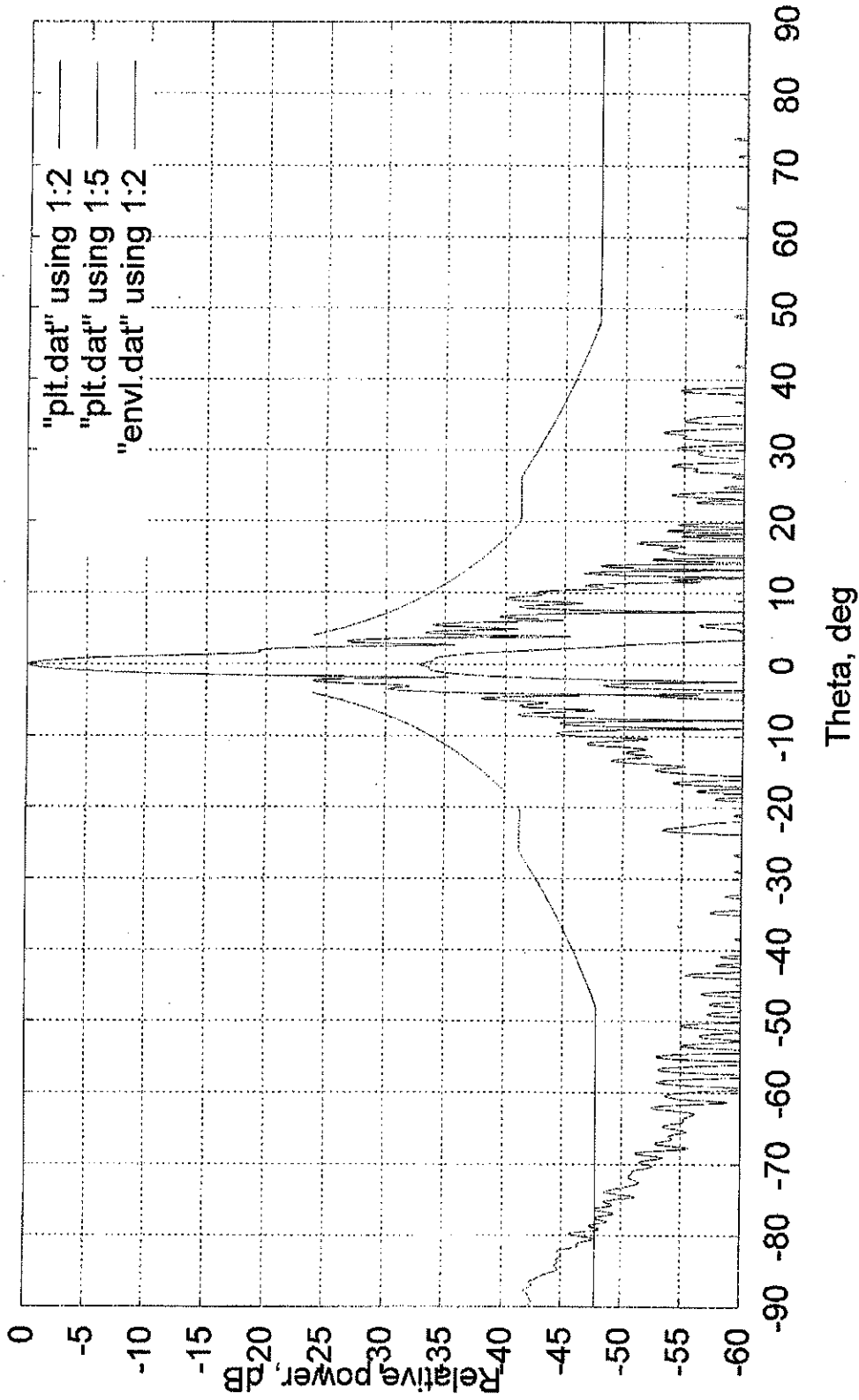
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2.4m test offset 5.85 GHz EL cut



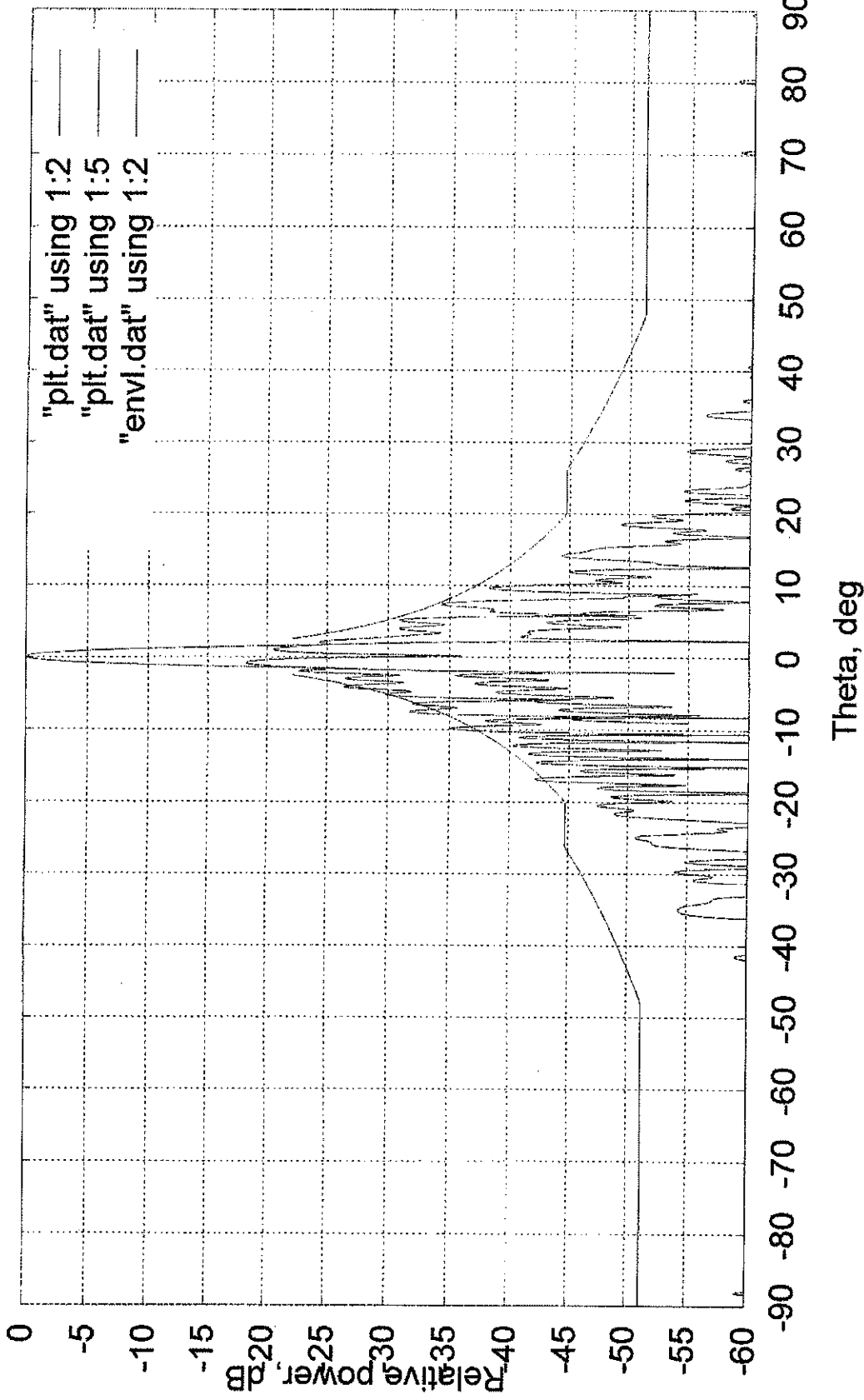
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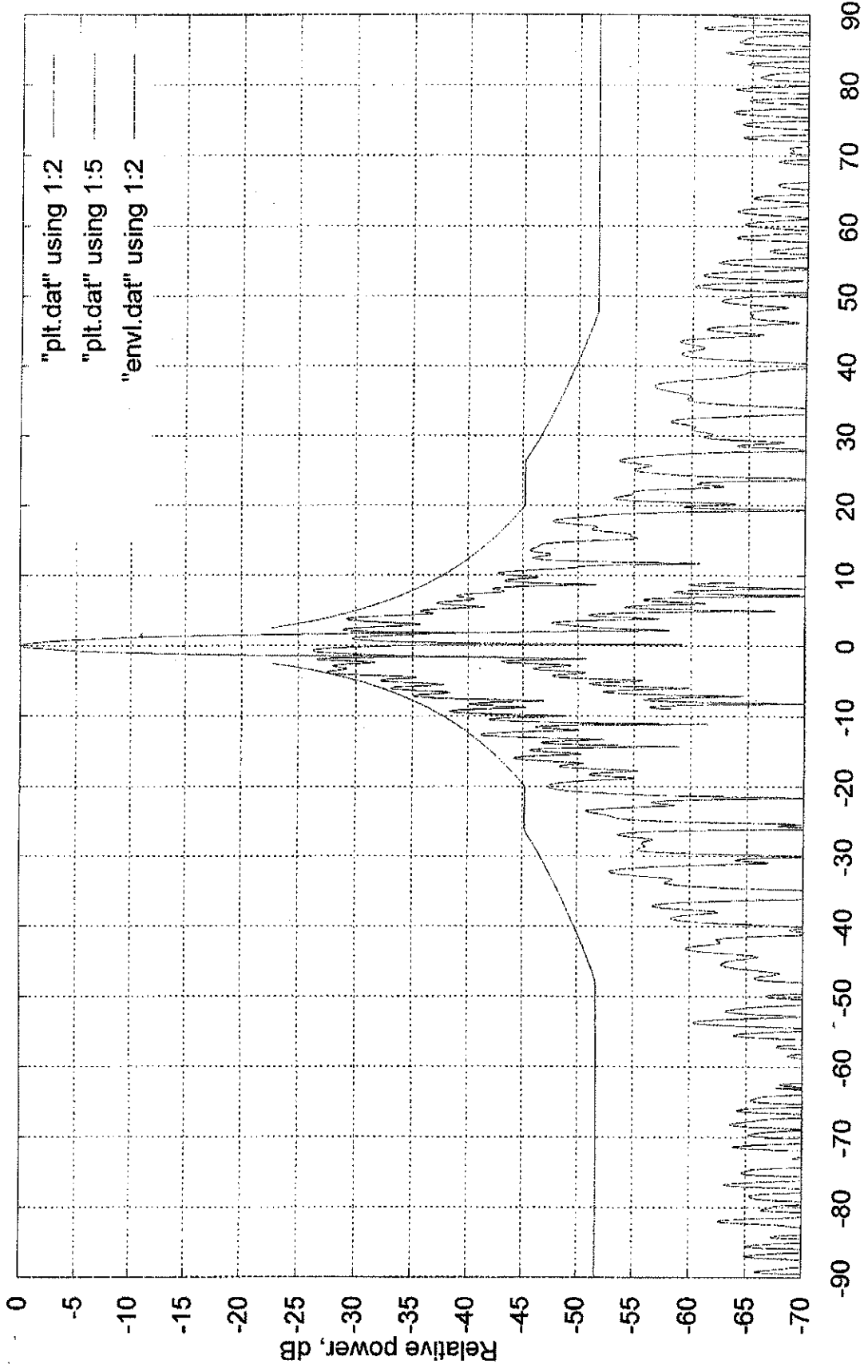
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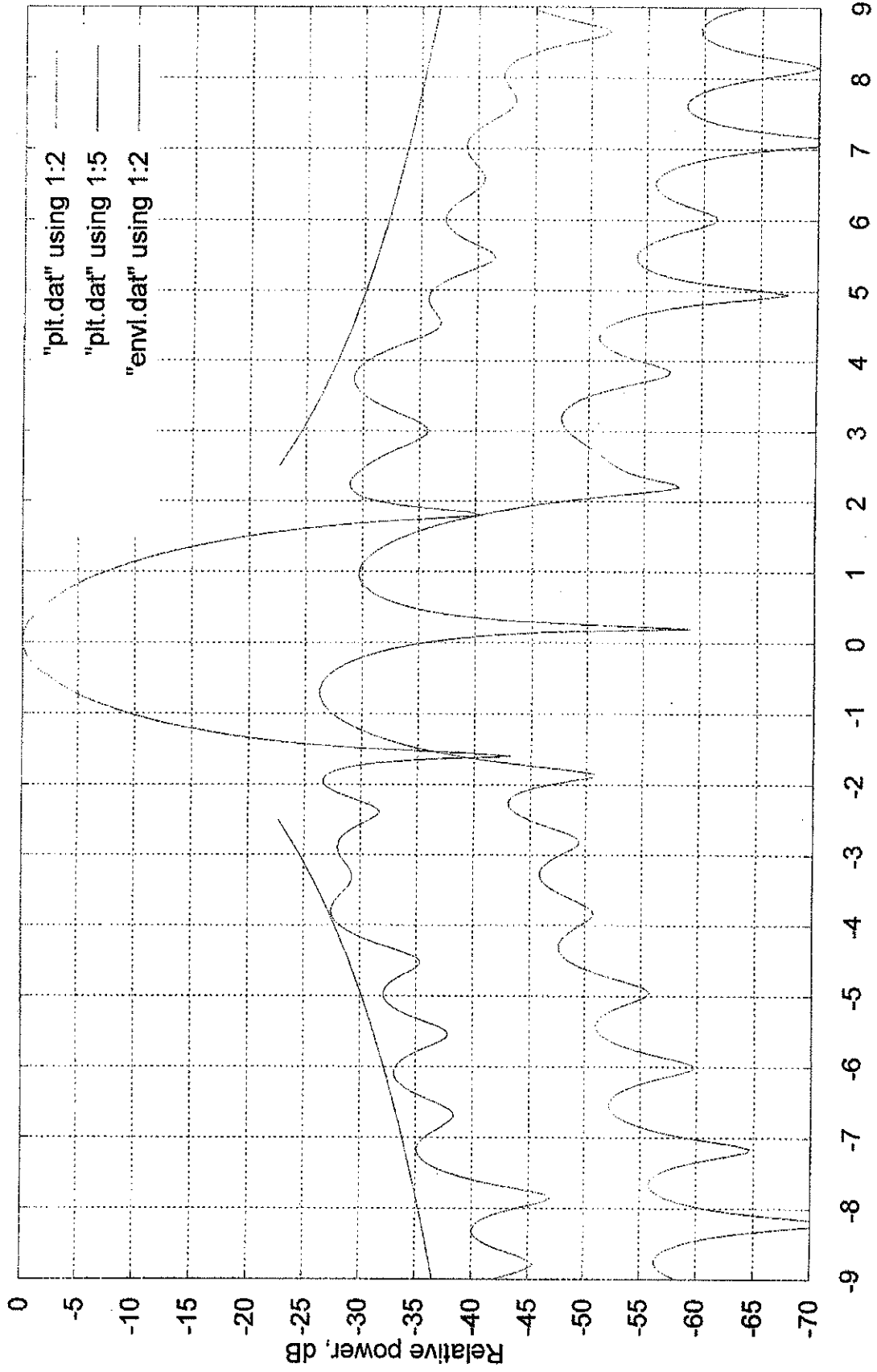
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