

Radio approval 24GHZ-T-C**TLPR antenna characteristics****C. Ouzounis**

10. October 2022

Distribution list: KMTKI RF Sensors

Document Type: Report

Revision history	Issue	Date	Issued by	Modification
	0.0	2017-08-21	C.Ouzounis	Created
	0.1	2017-10-25	C.Ouzounis	Updated antenna list
	0.2	2018-01-03	C.Ouzounis	Differentiation between HART and FF/PA standard
	0.3	2022-10-10	C.Ouzounis	Clerical error of naming "DN40"

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1 Purpose

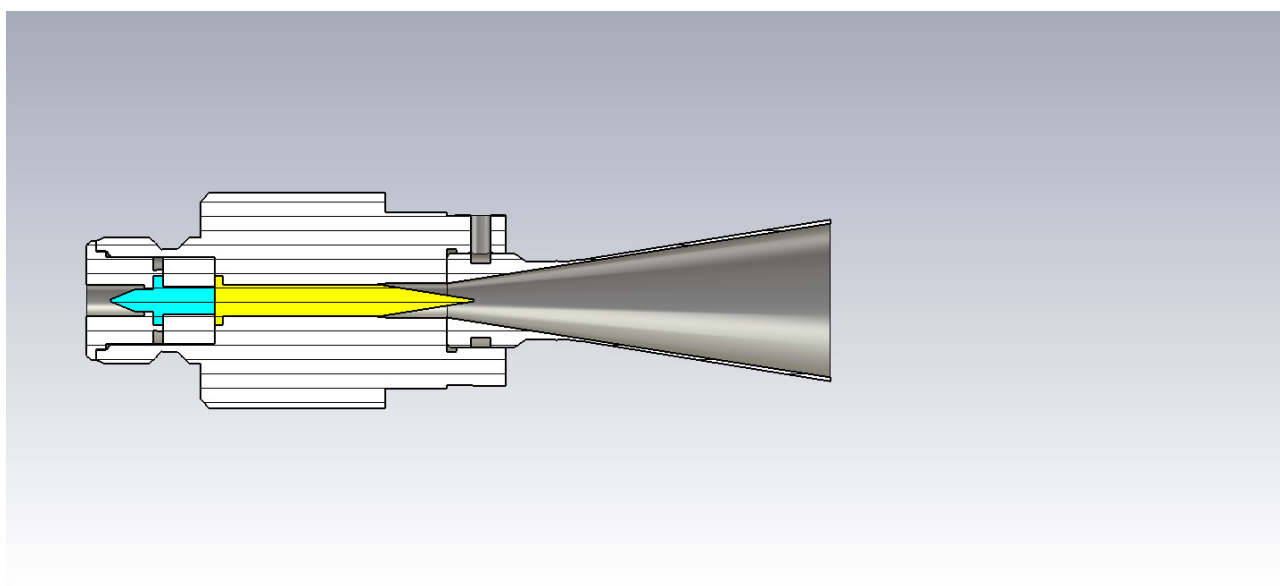
In the following measurements several characteristics of antennas have been performed, like

- Radiation pattern in E-plane and H-plane
- Main lobe magnitude
- Angular width (3 dB)

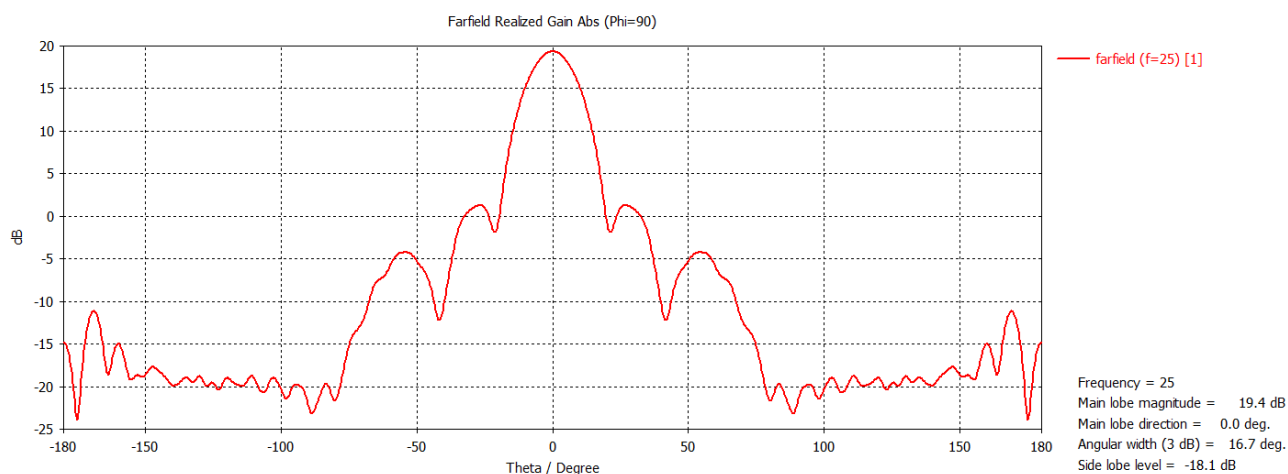
The antenna list is valid for HART devices (PMN: "OPTIWAVE x400 series") and FF/PA devices (PMN: "OPTIWAVE x400 FF-PA series").

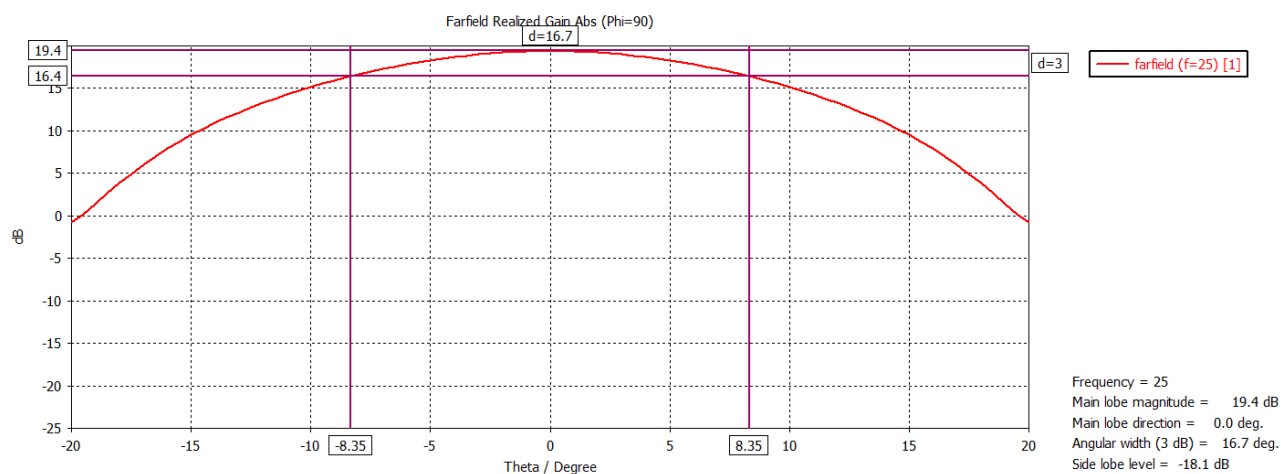
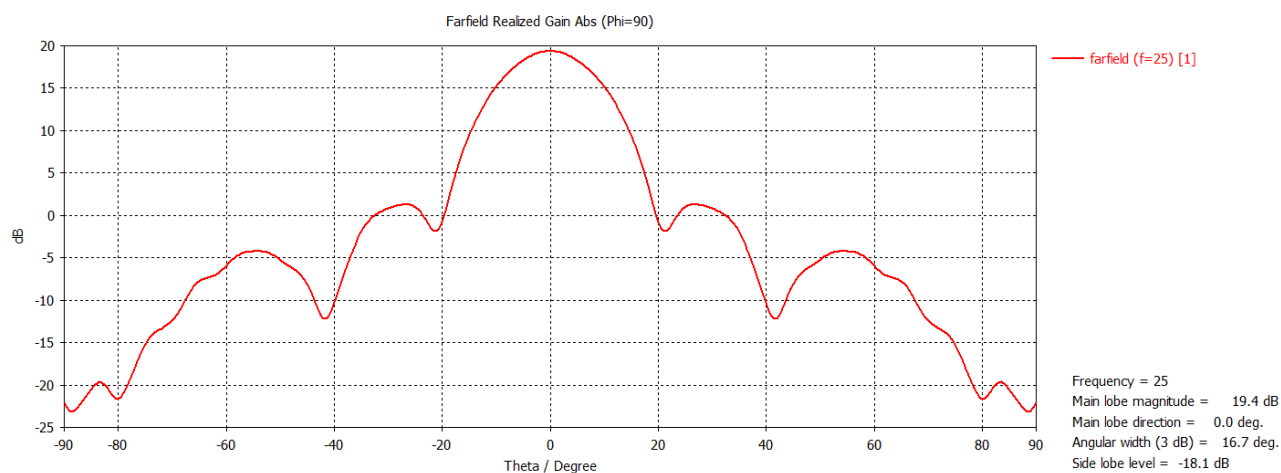
2 Antenna characteristics

2.1 316L / DN40 (1,5") Metallic Horn

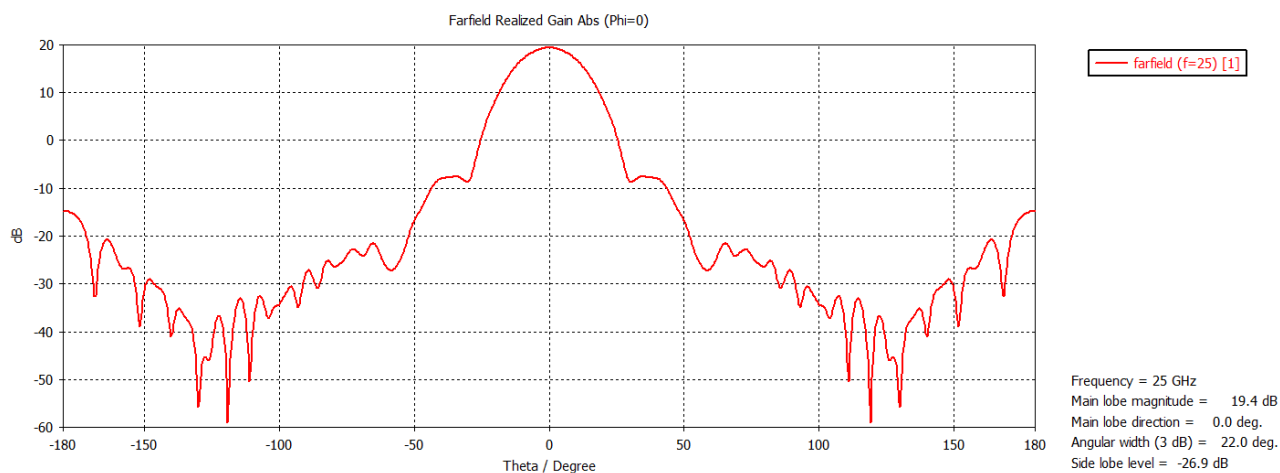


2.1.1 Radiation pattern in E-plane

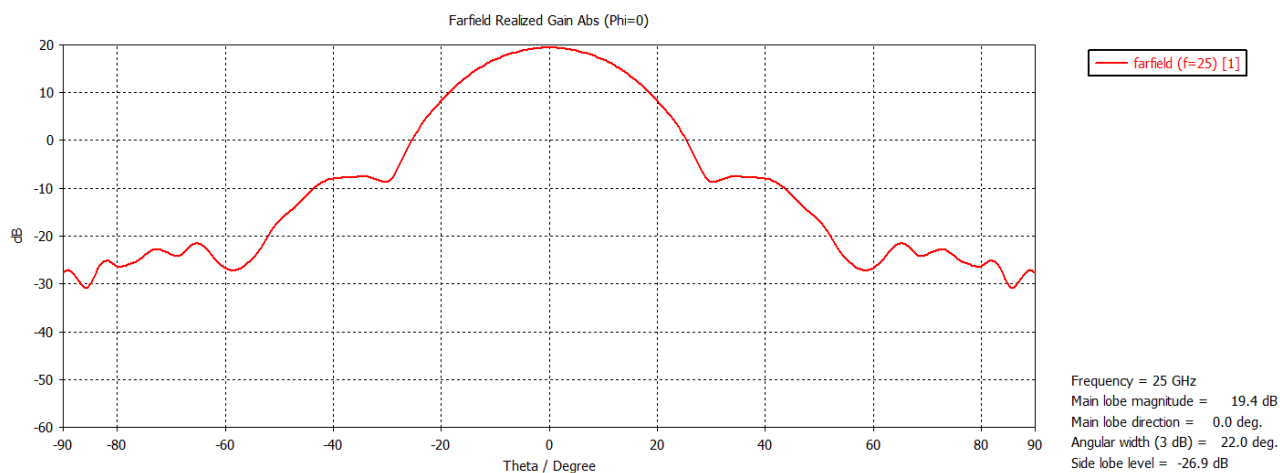


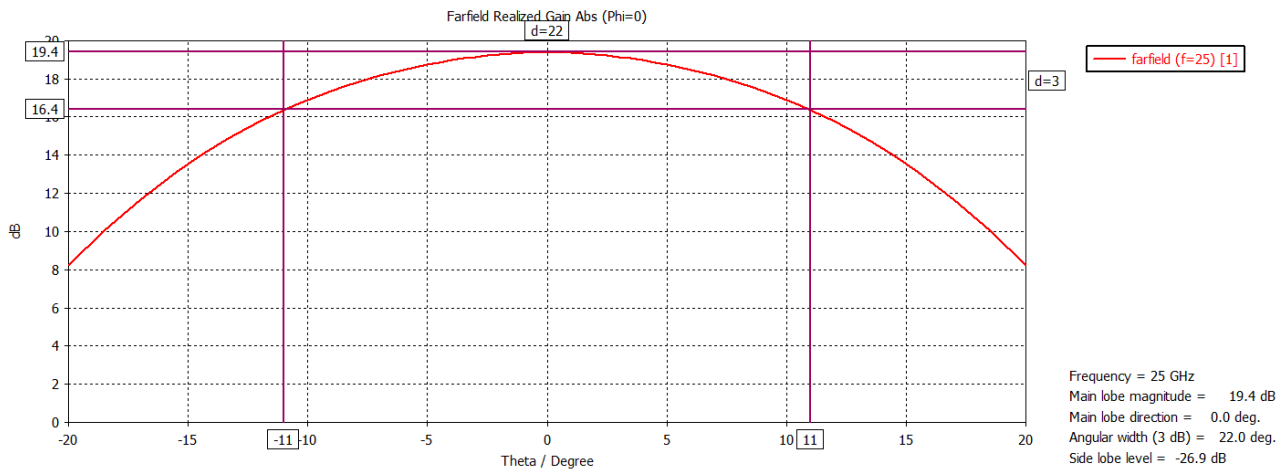


2.1.2 Radiation pattern in H-Plane

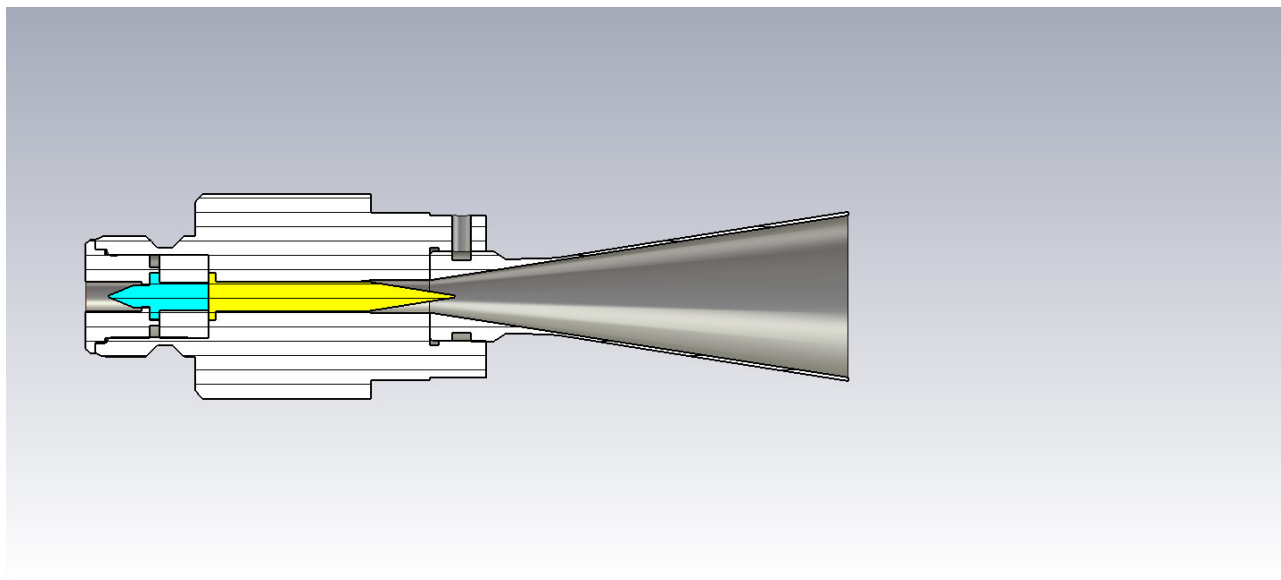


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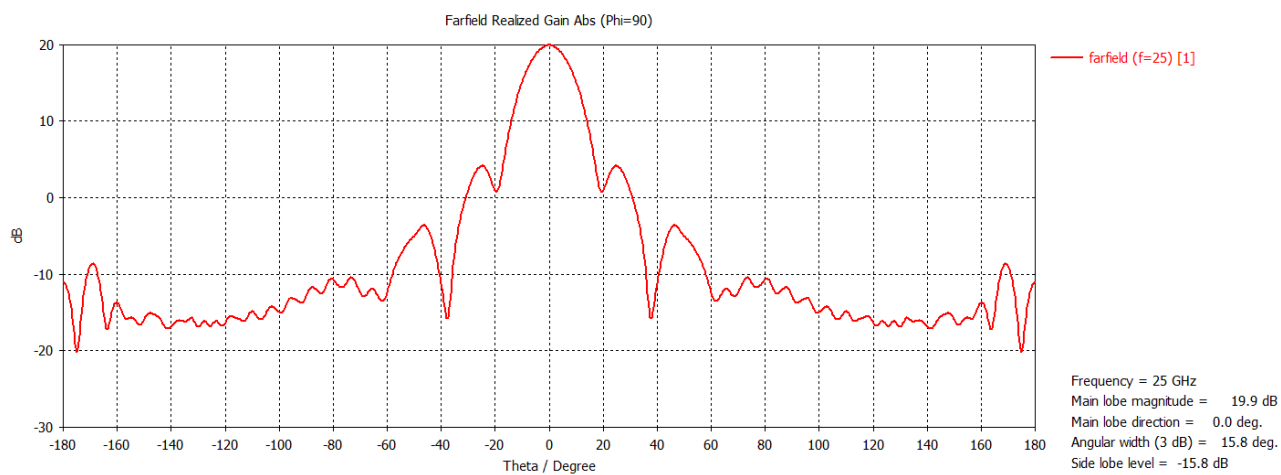


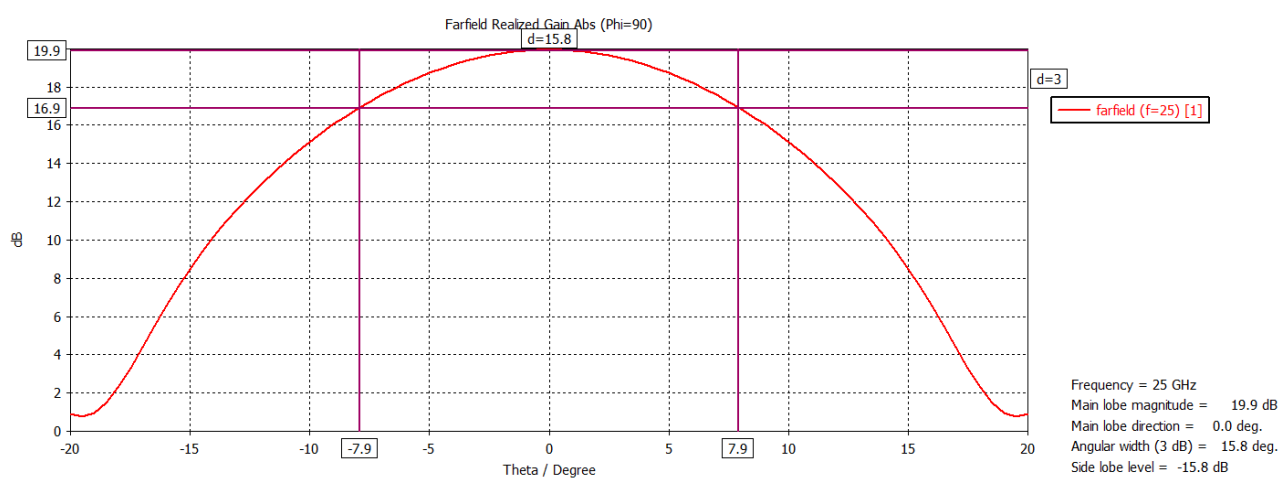
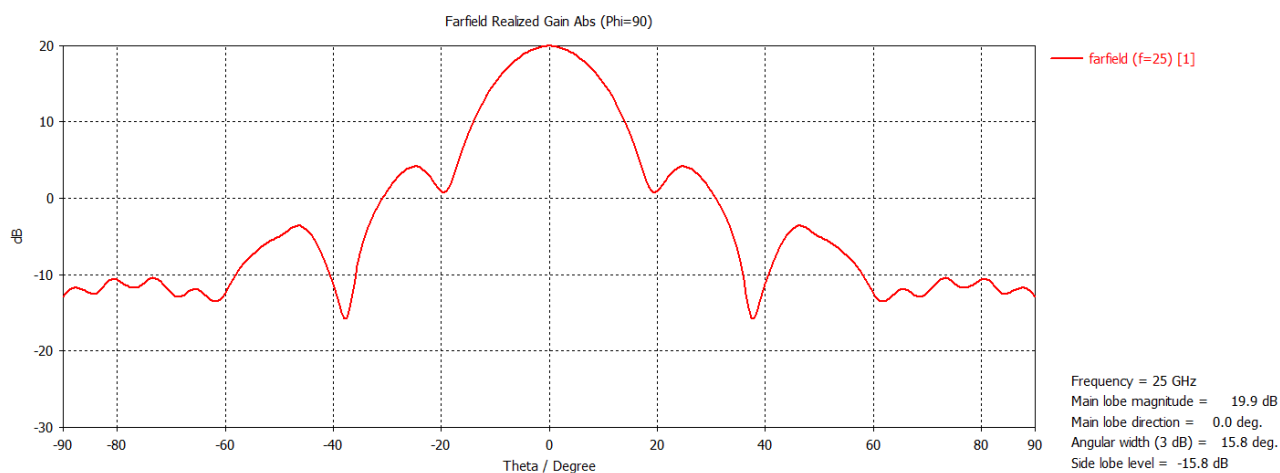


2.2 316L / DN50 (2") Metallic Horn

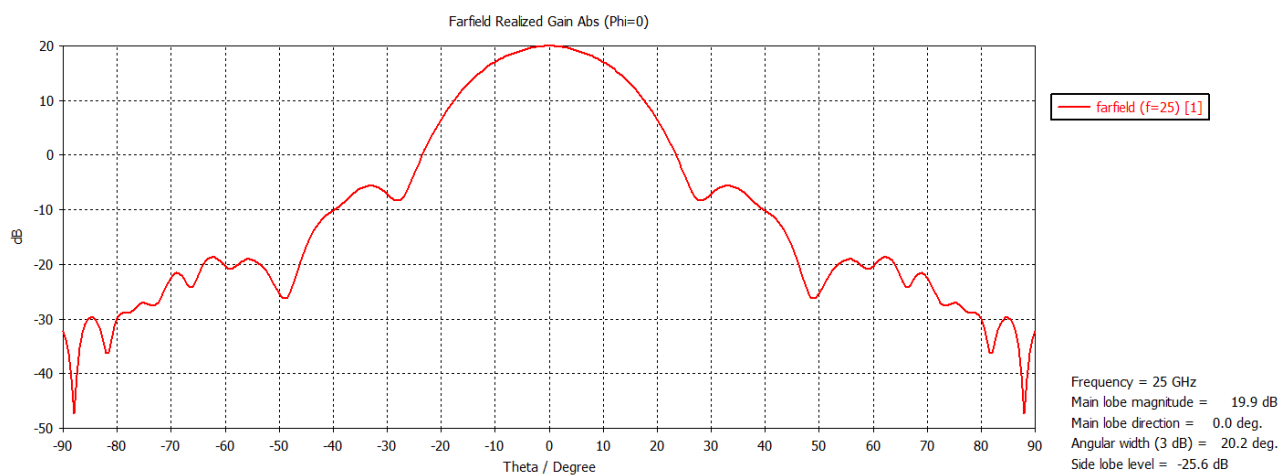
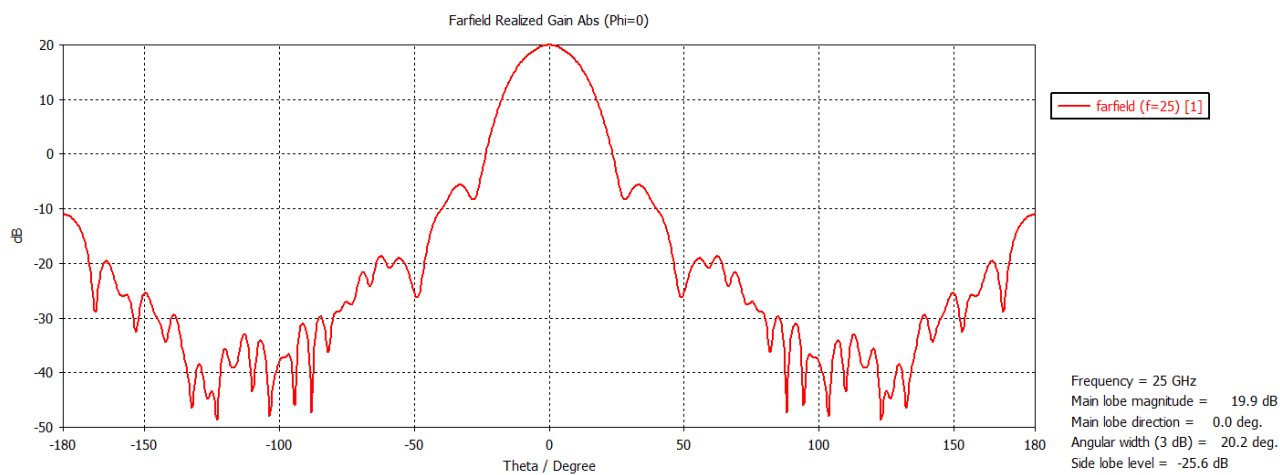


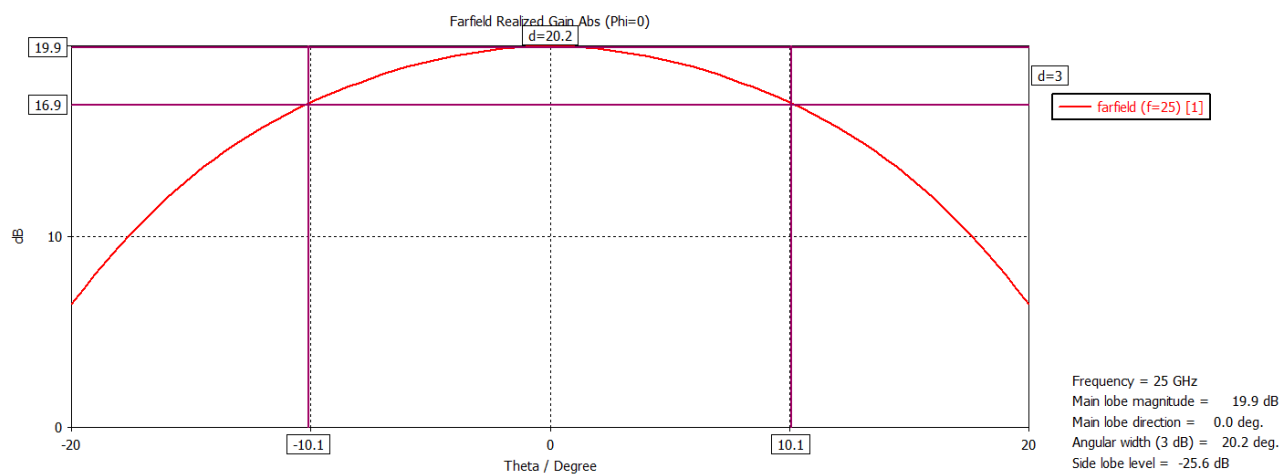
2.2.1 Radiation pattern in E-plane



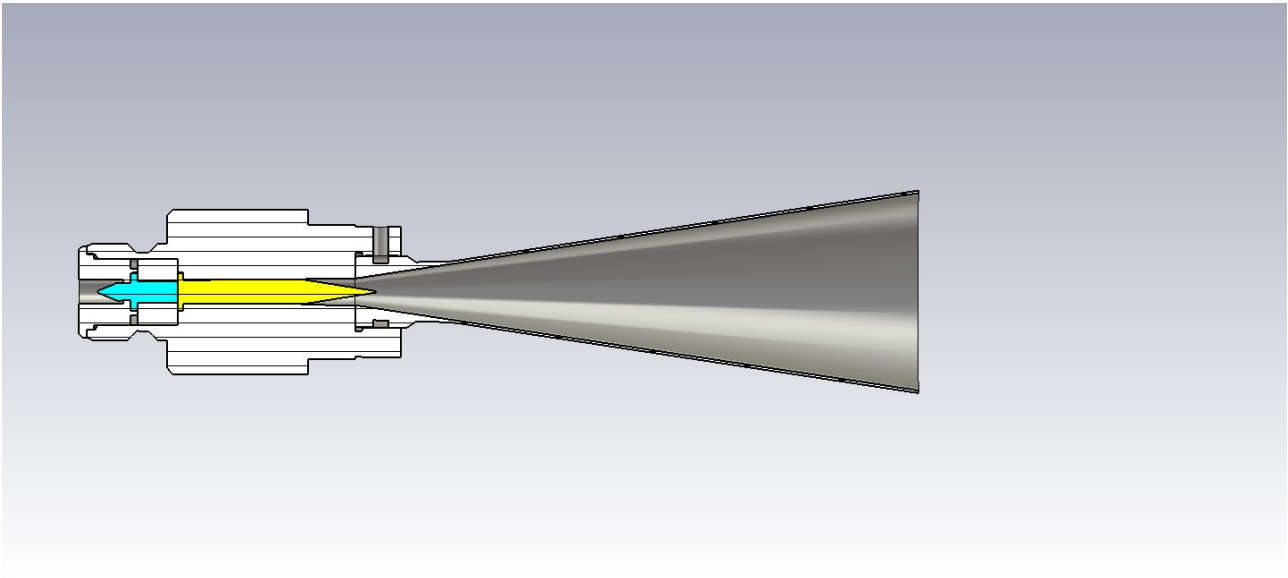


2.2.2 Radiation pattern in H-Plane

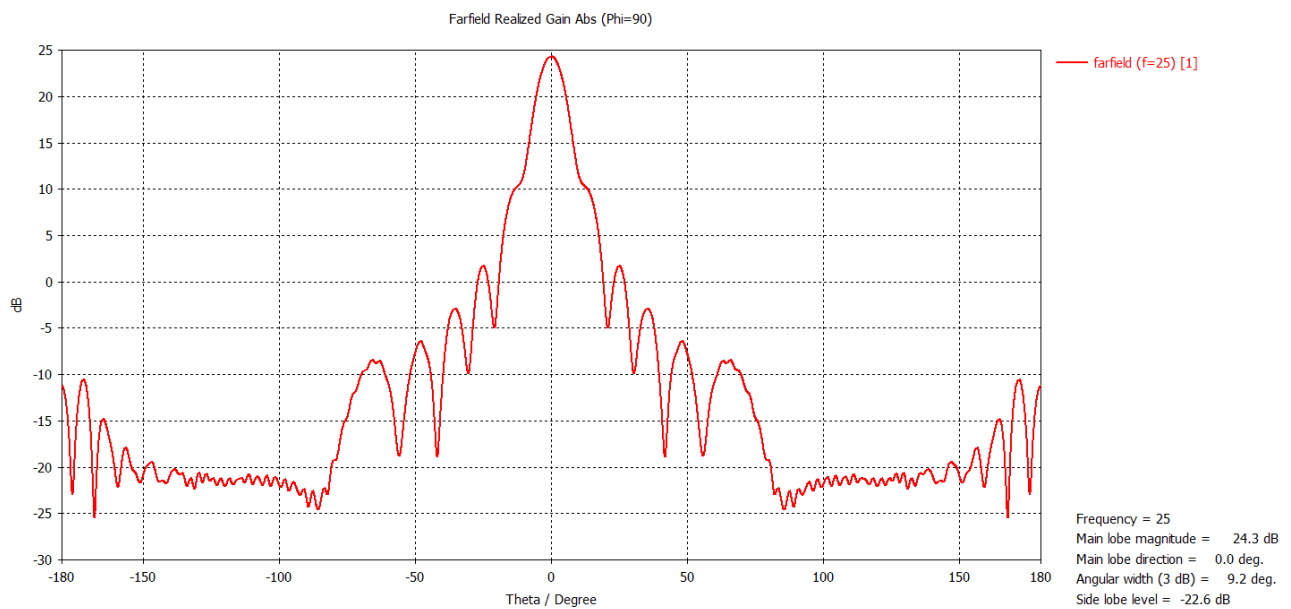


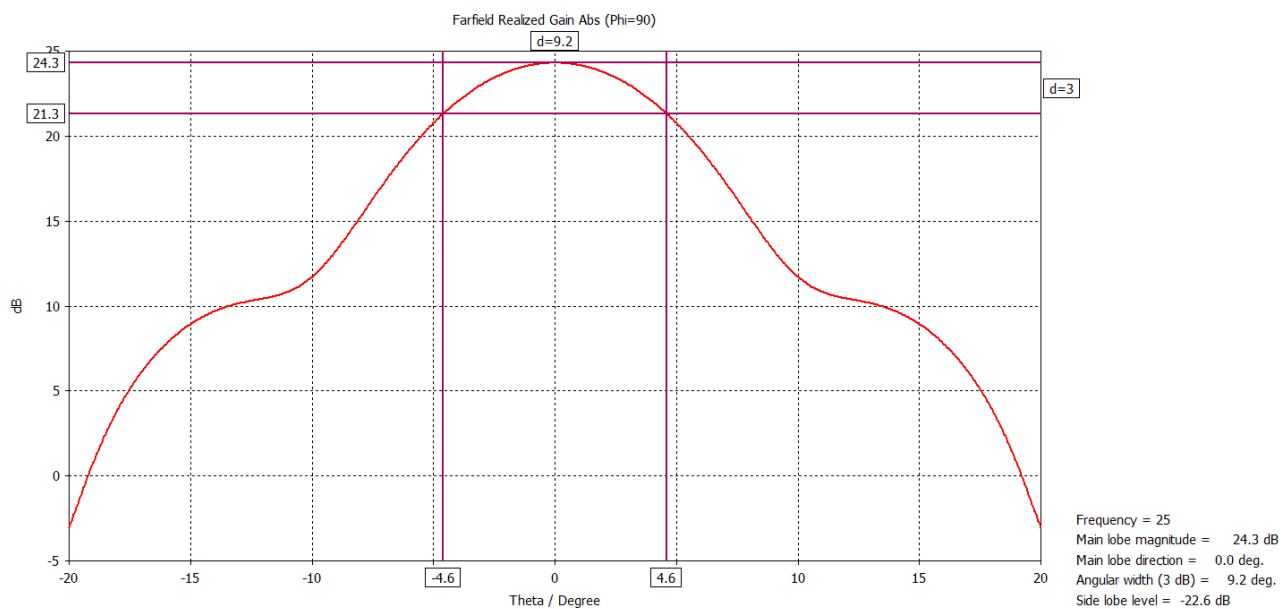
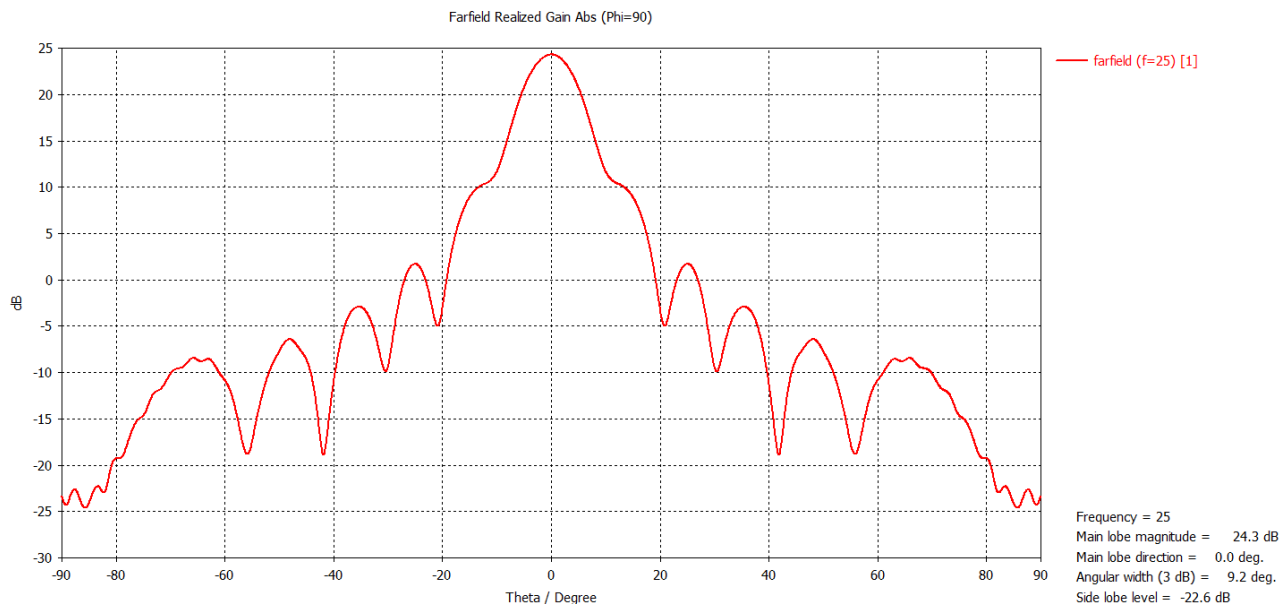


2.3 316L / DN65 (2,5") Metallic Horn

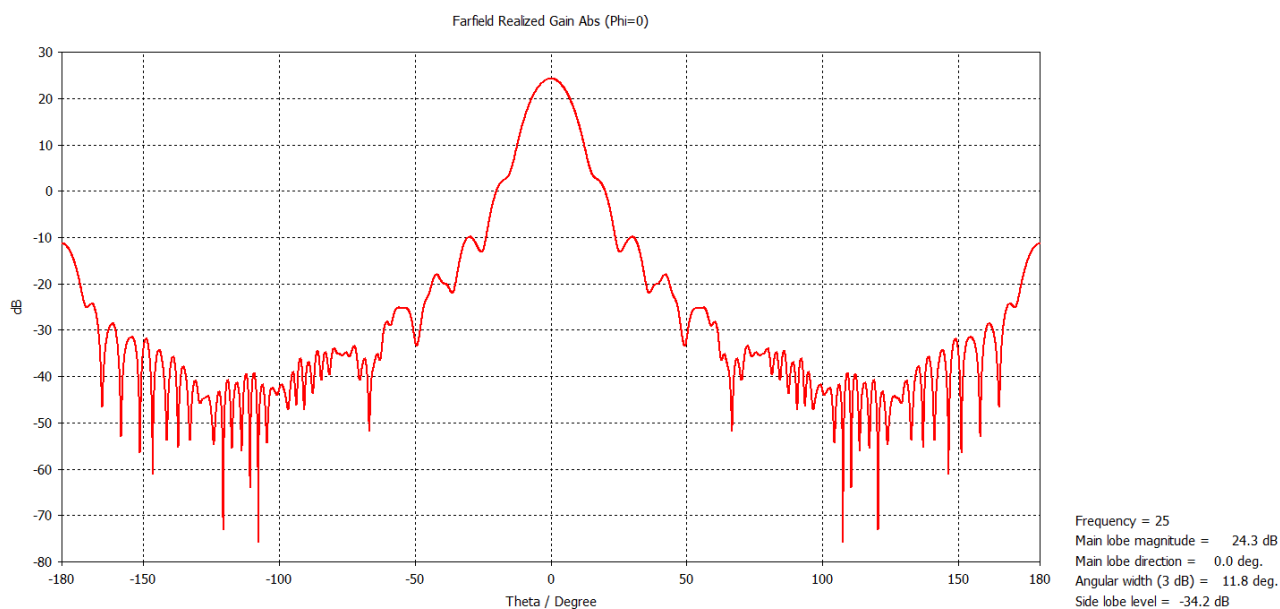


2.3.1 Radiation pattern in E-plane

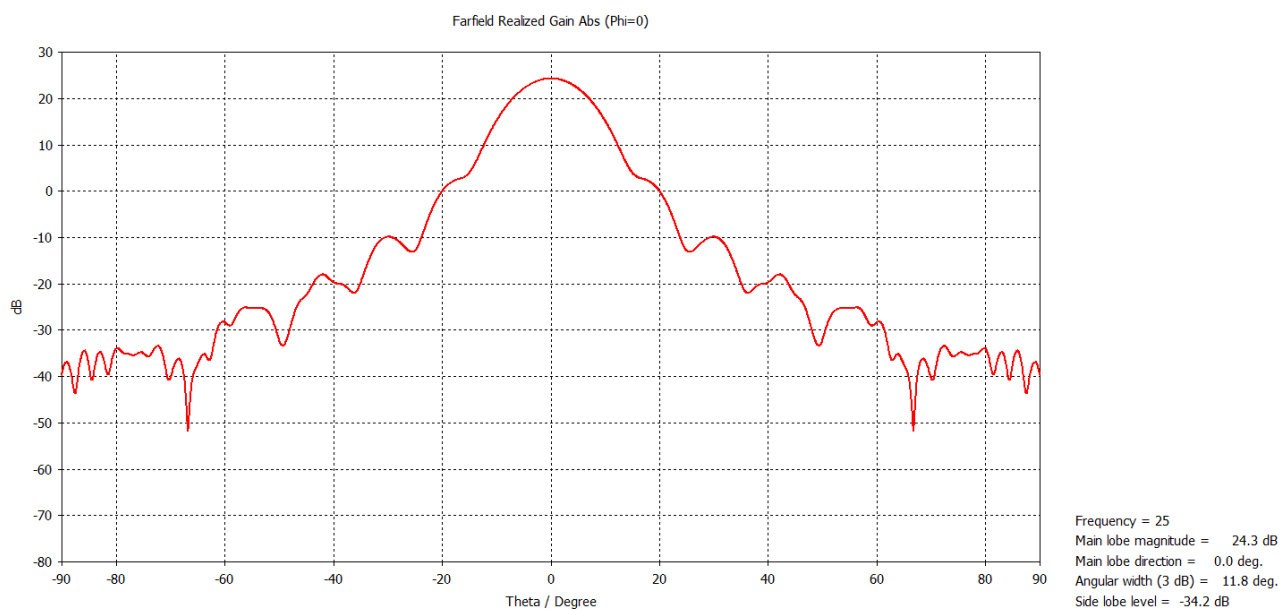


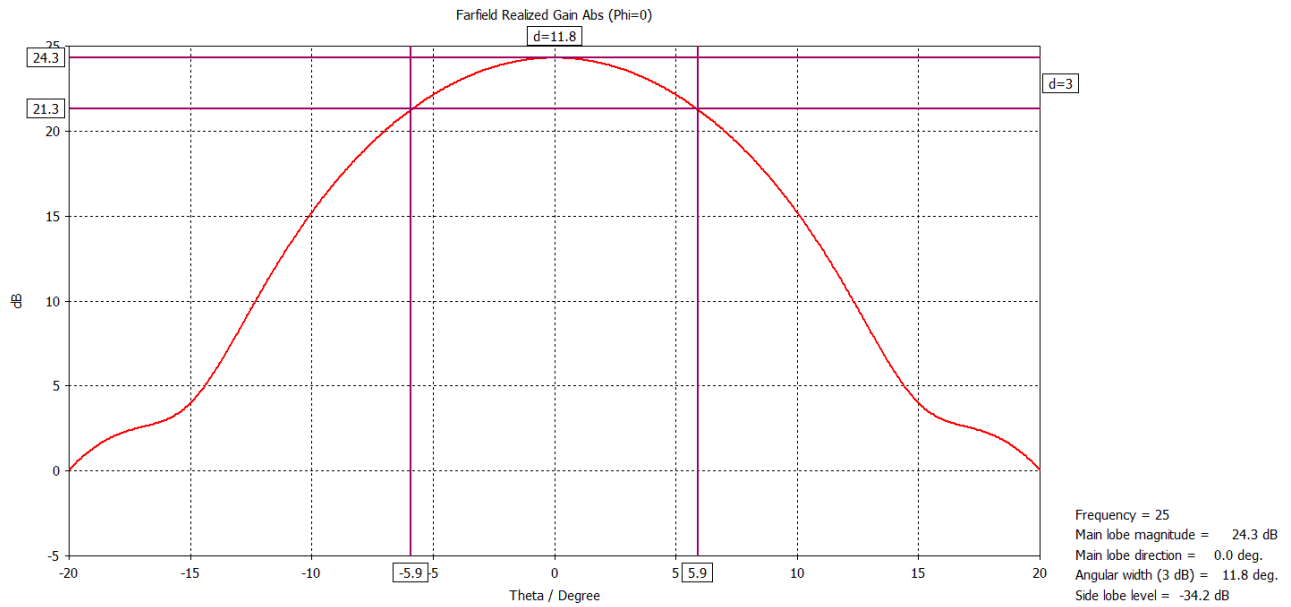


2.3.2 Radiation pattern in H-Plane

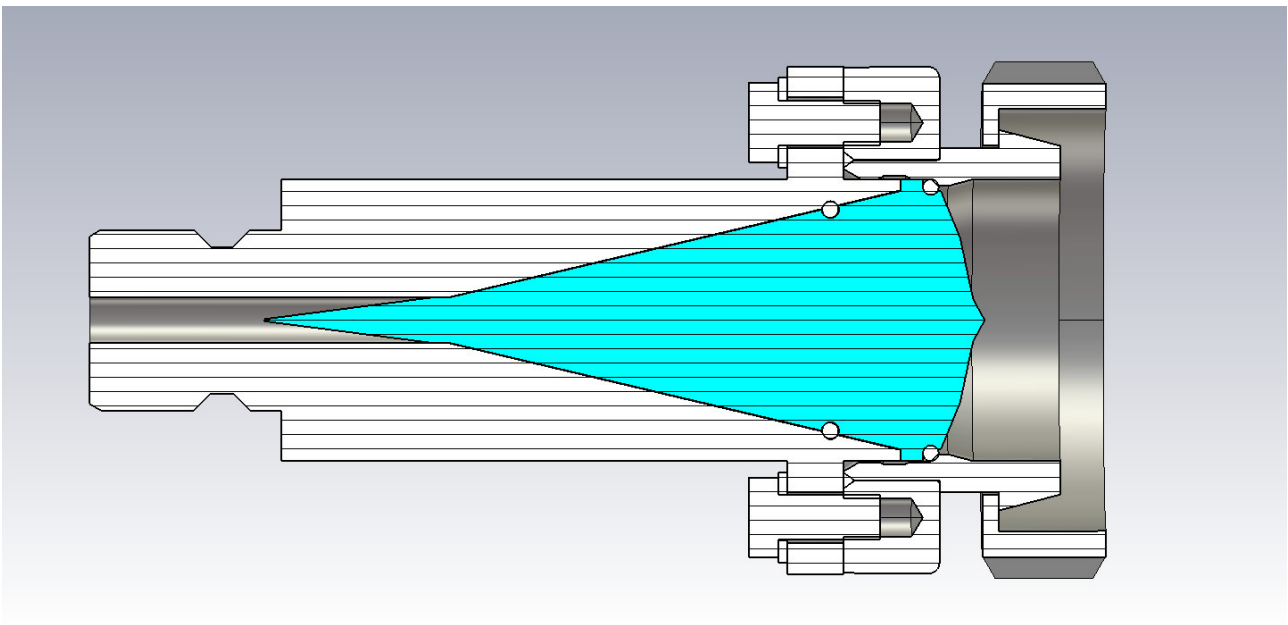


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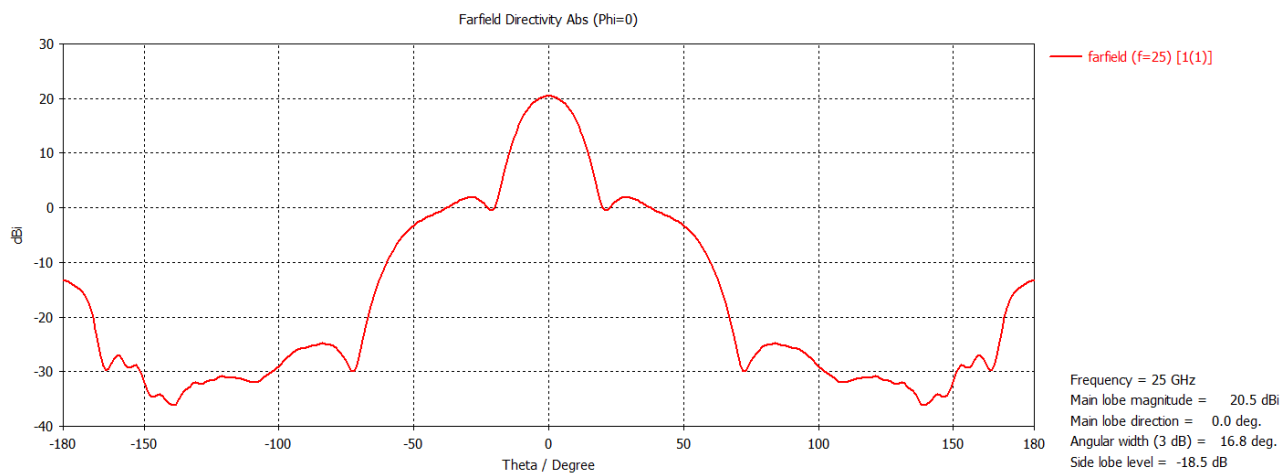




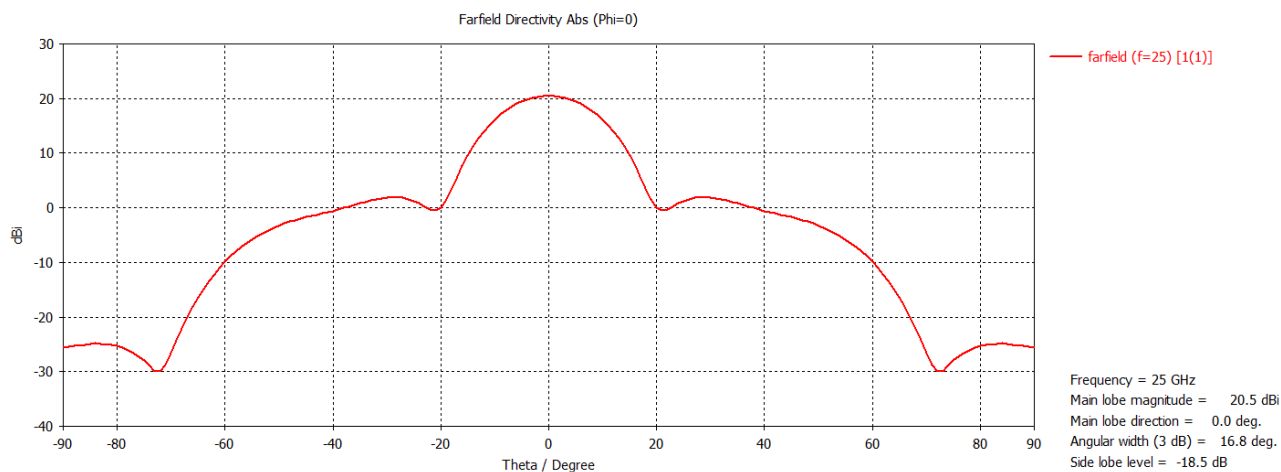
2.4 PEEK / Hygienic antenna

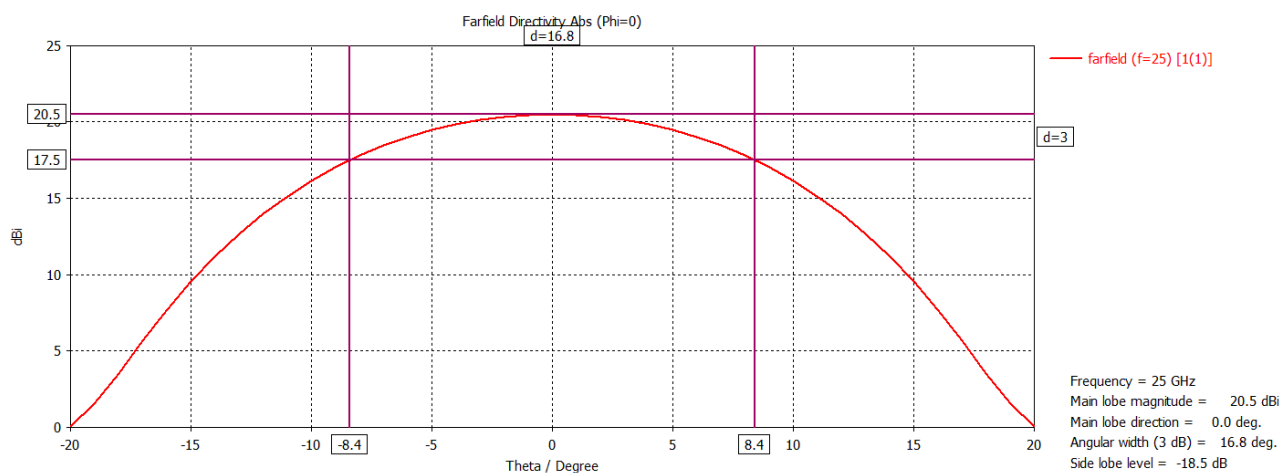


2.4.1 Radiation pattern in E-plane

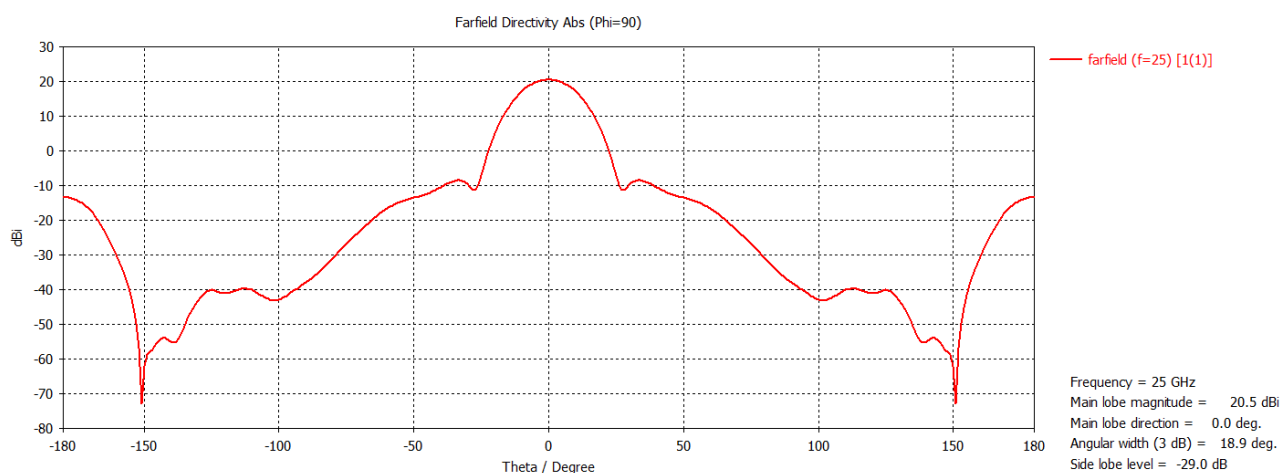


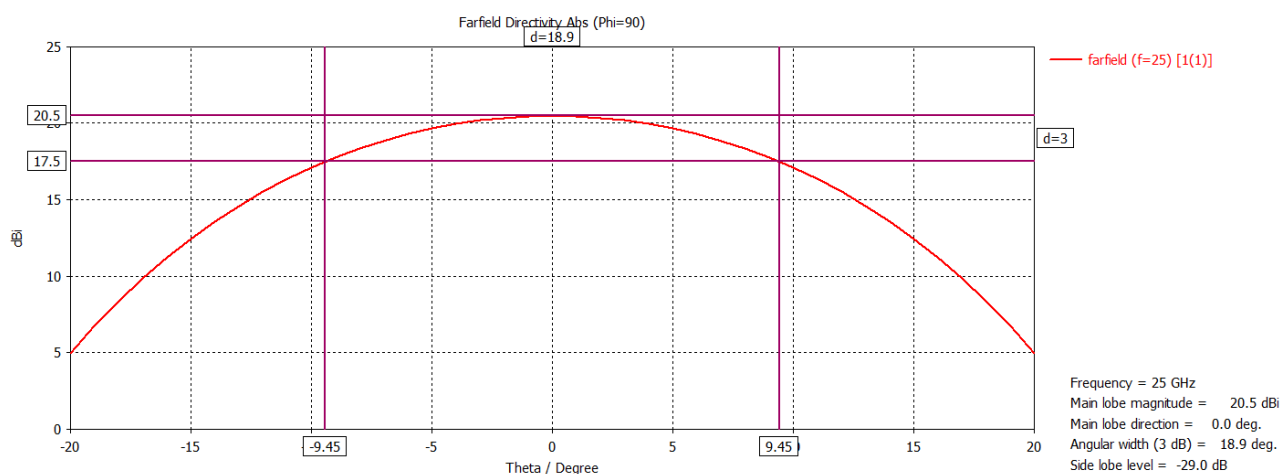
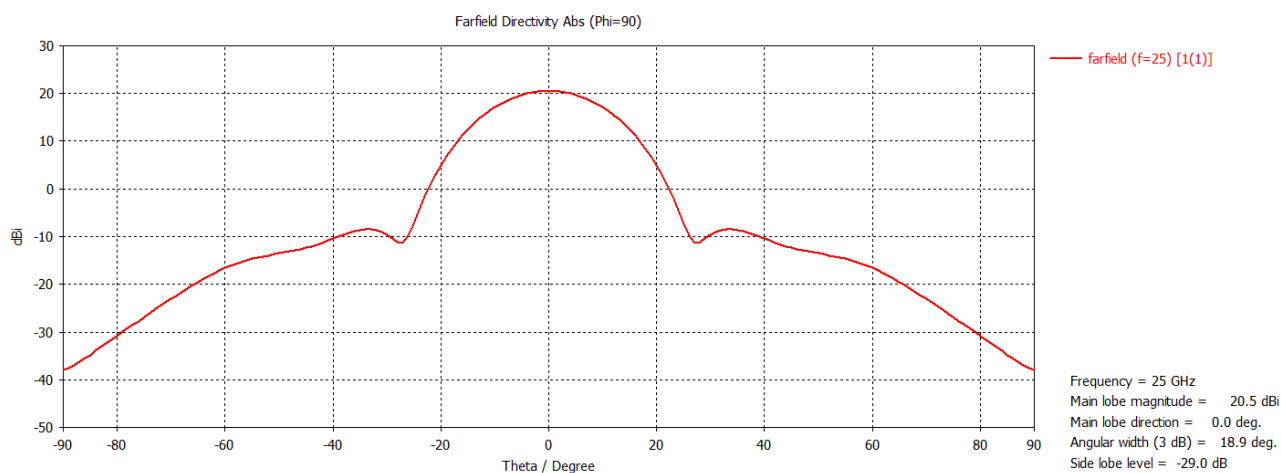
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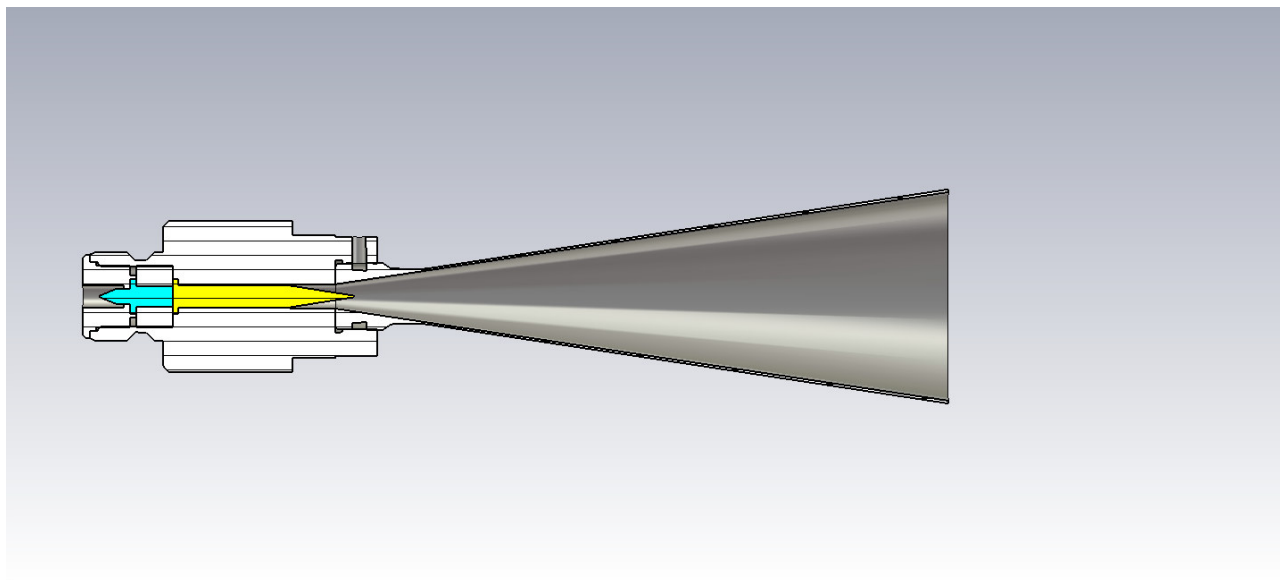


2.4.2 Radiation pattern in H-Plane

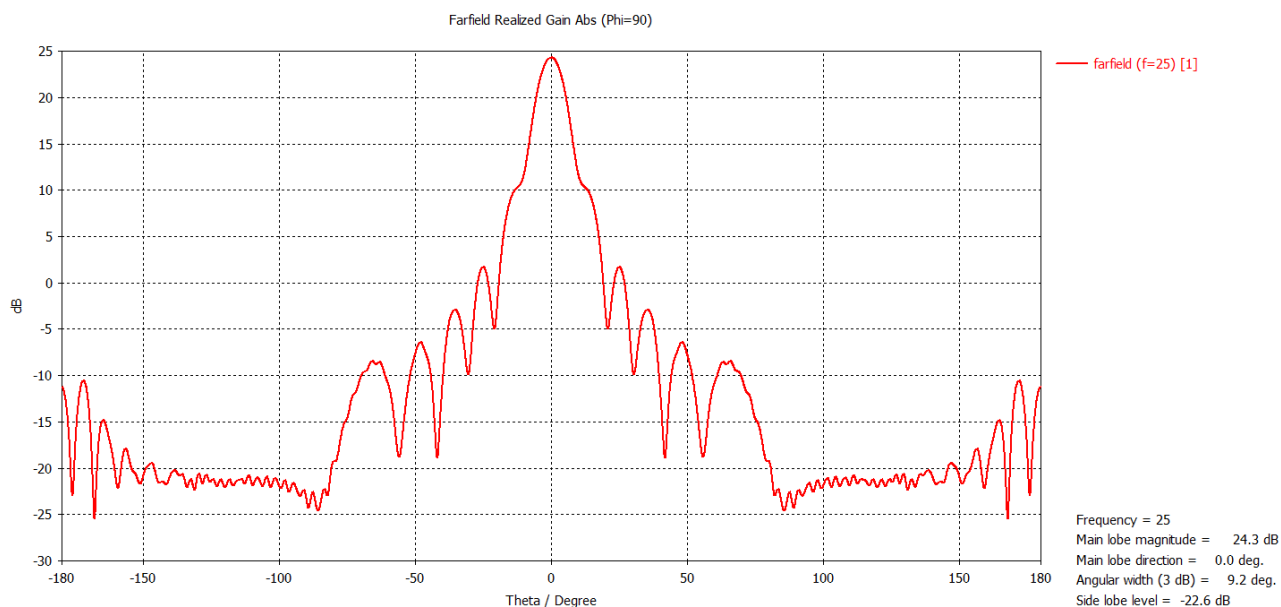


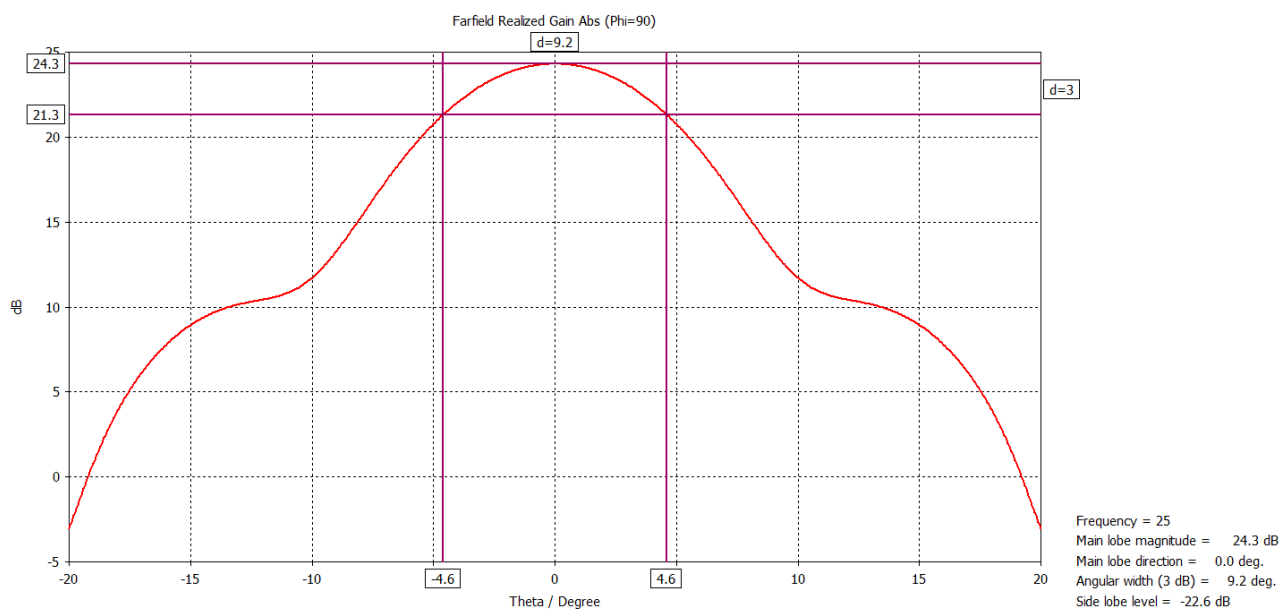
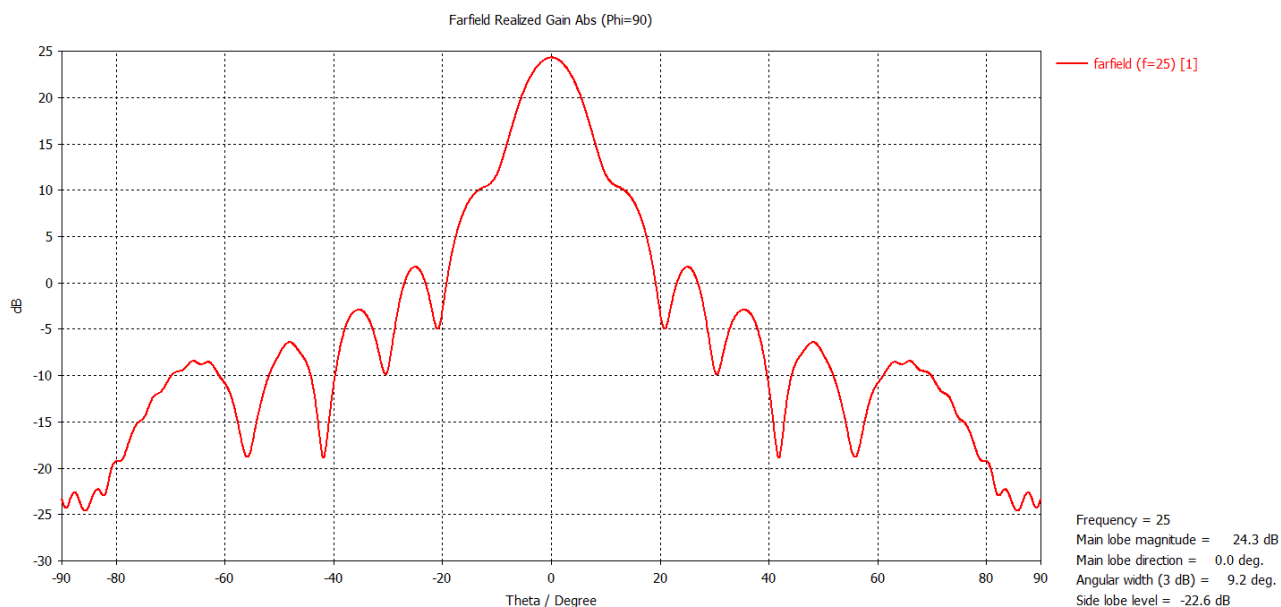


2.5 316L / DN80 (3") Metallic Horn

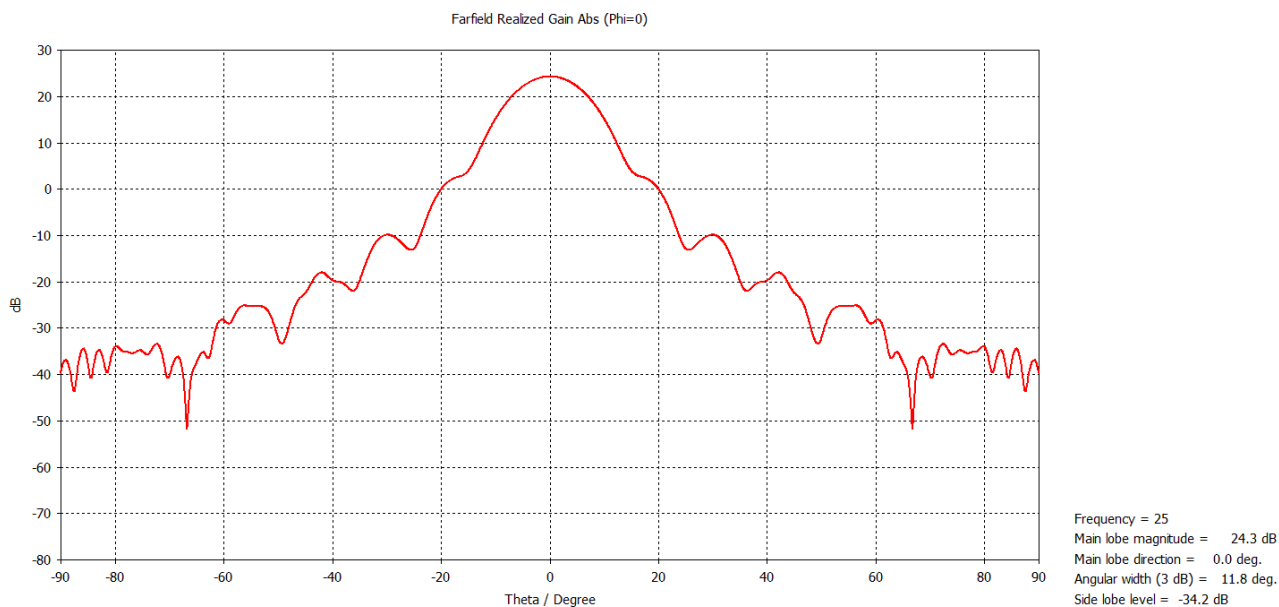
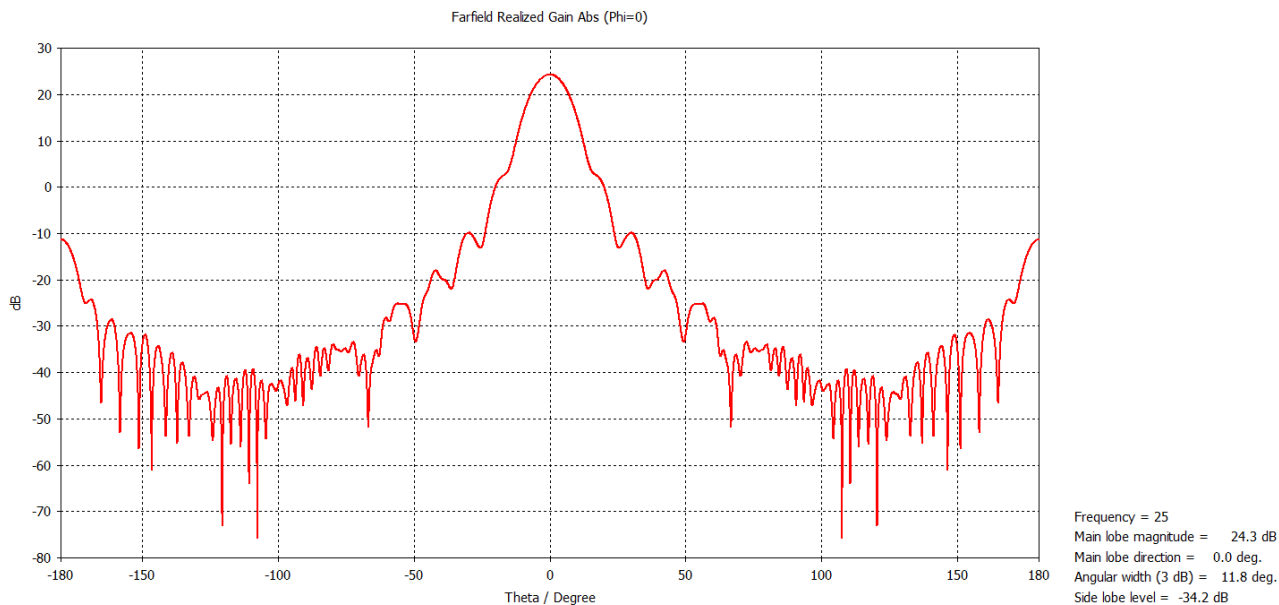


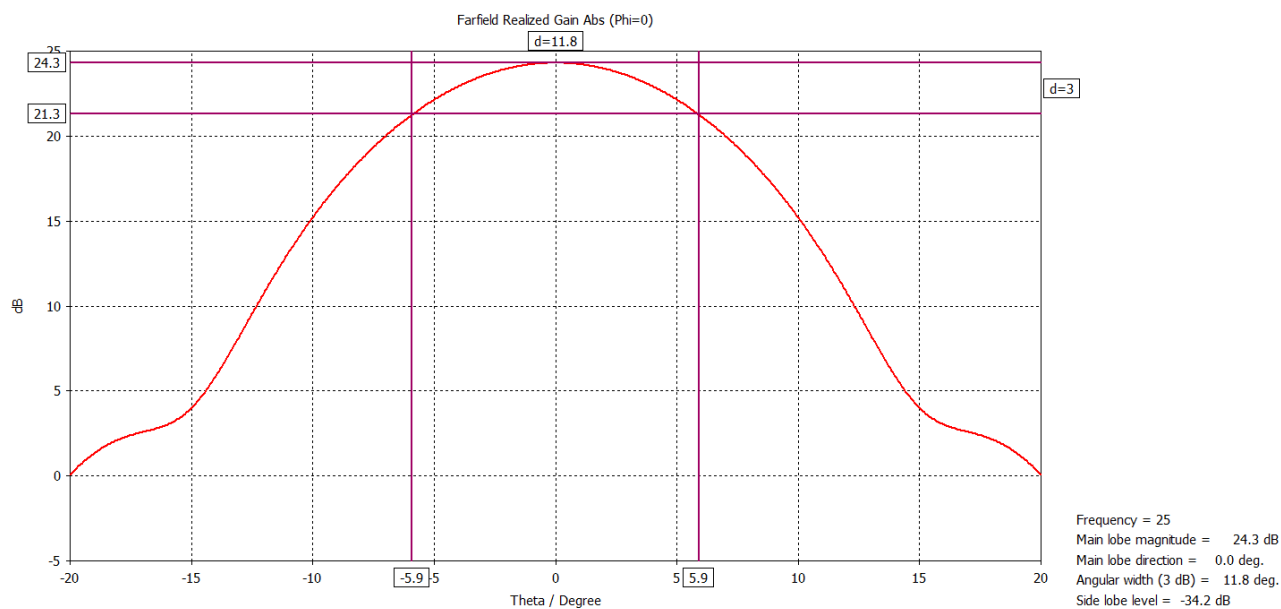
2.5.1 Radiation pattern in E-plane



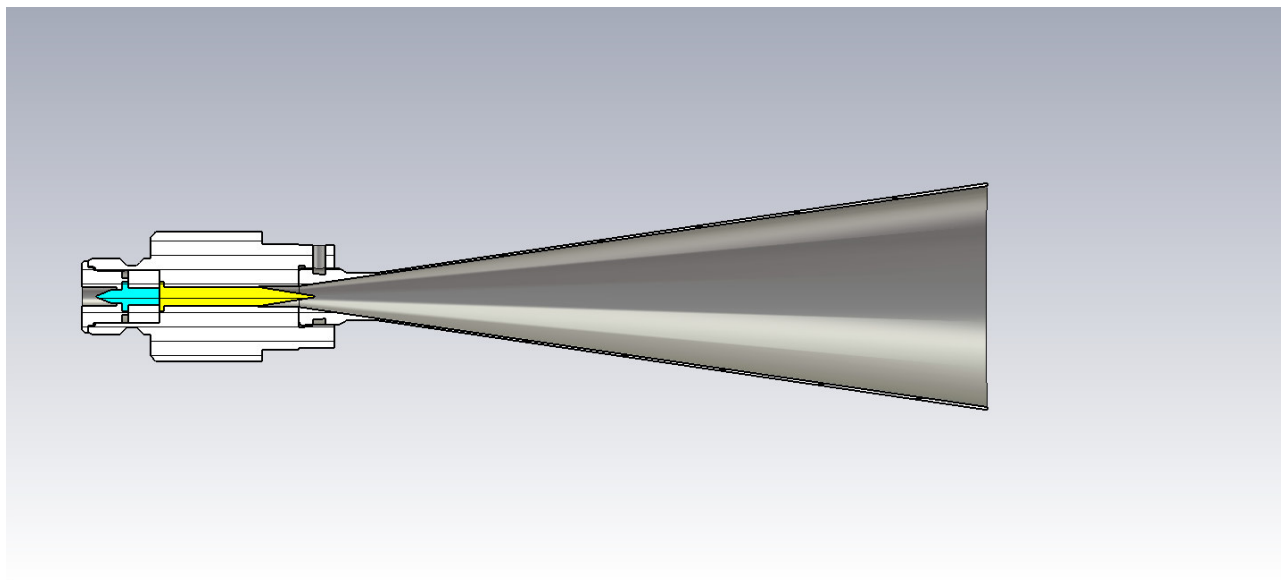


2.5.2 Radiation pattern in H-plane

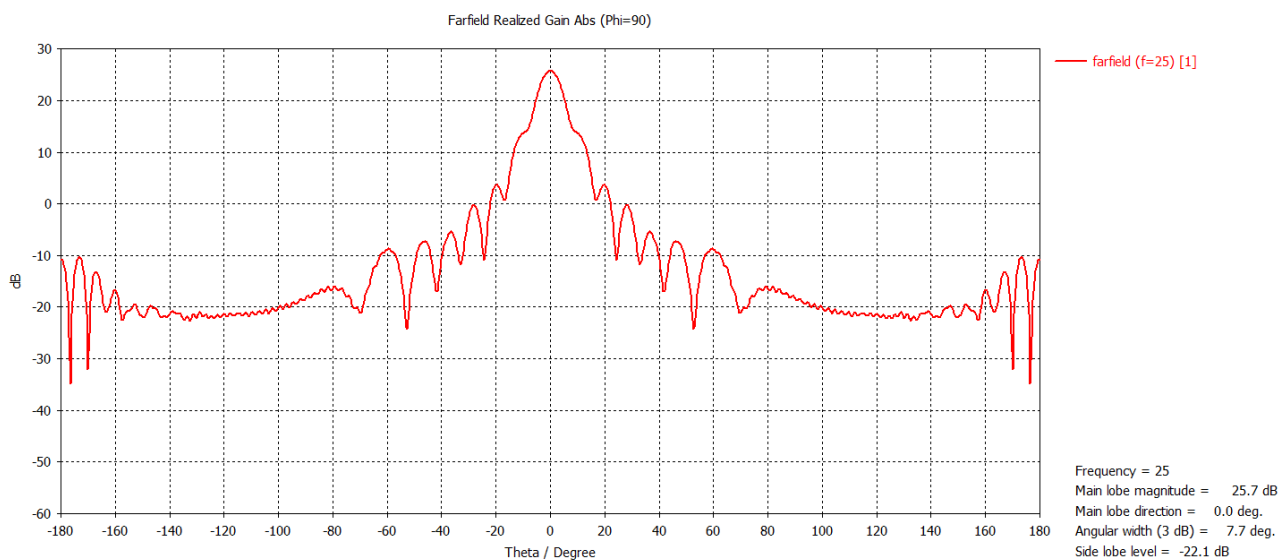


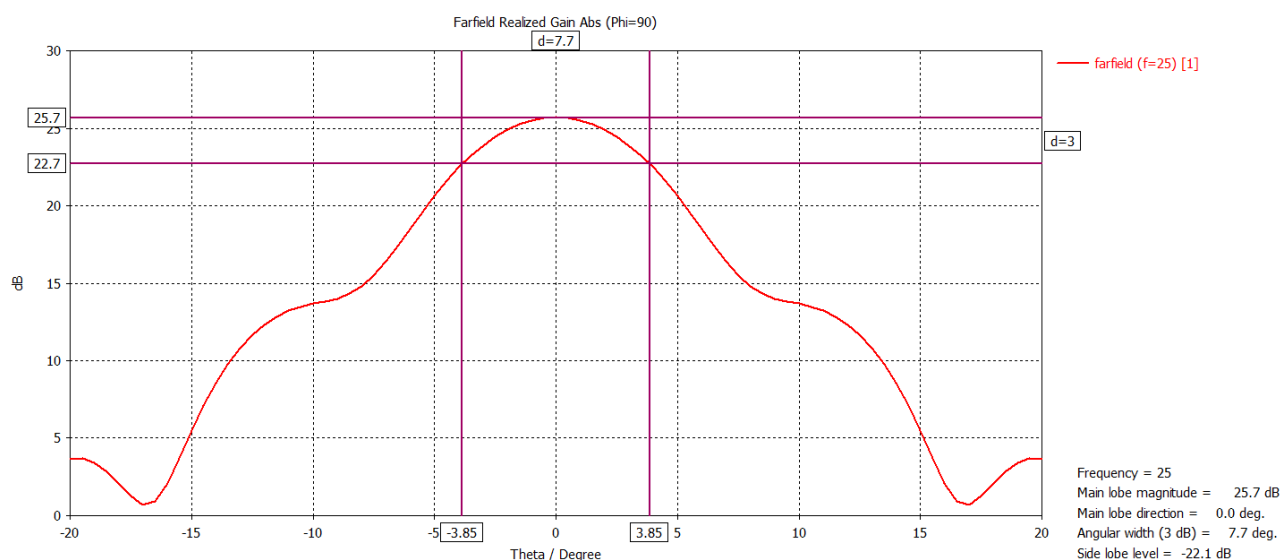
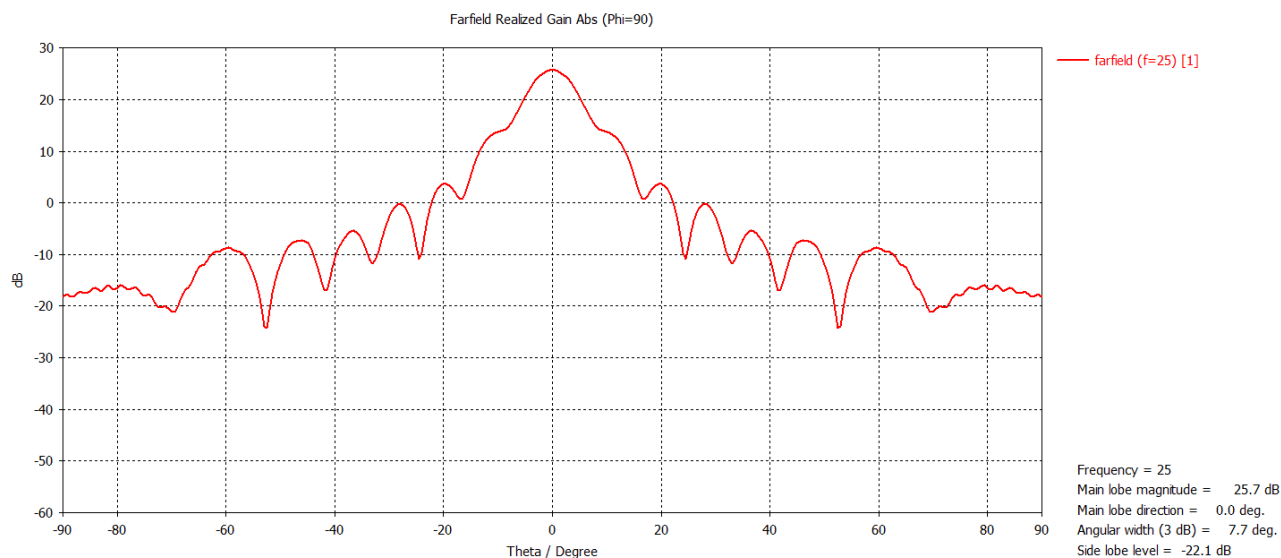


2.6 316L / DN100 (4") Metallic Horn

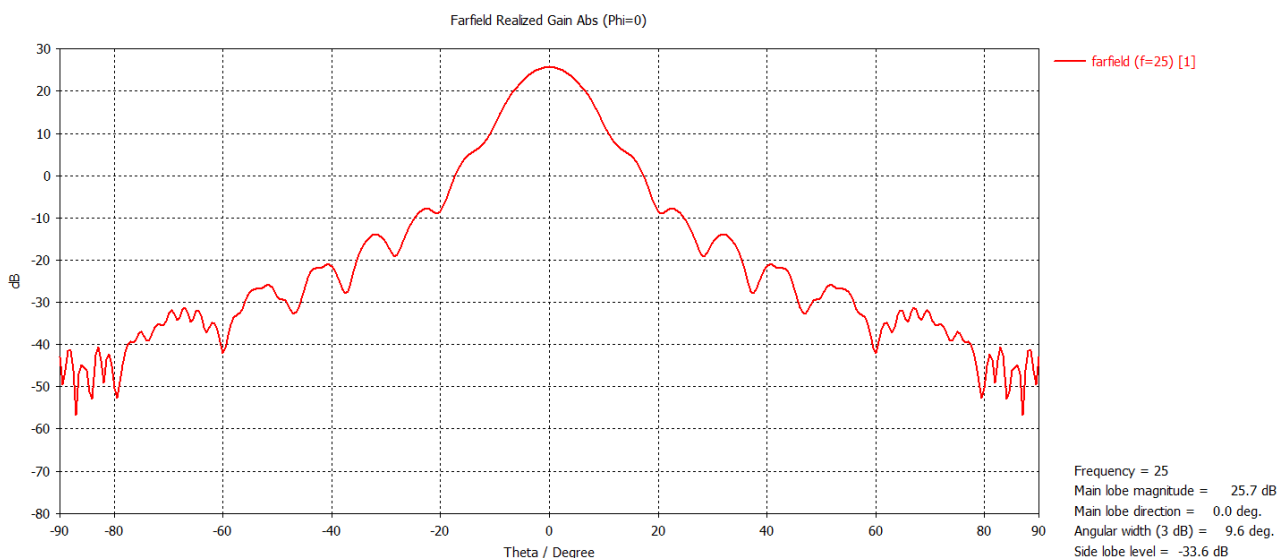
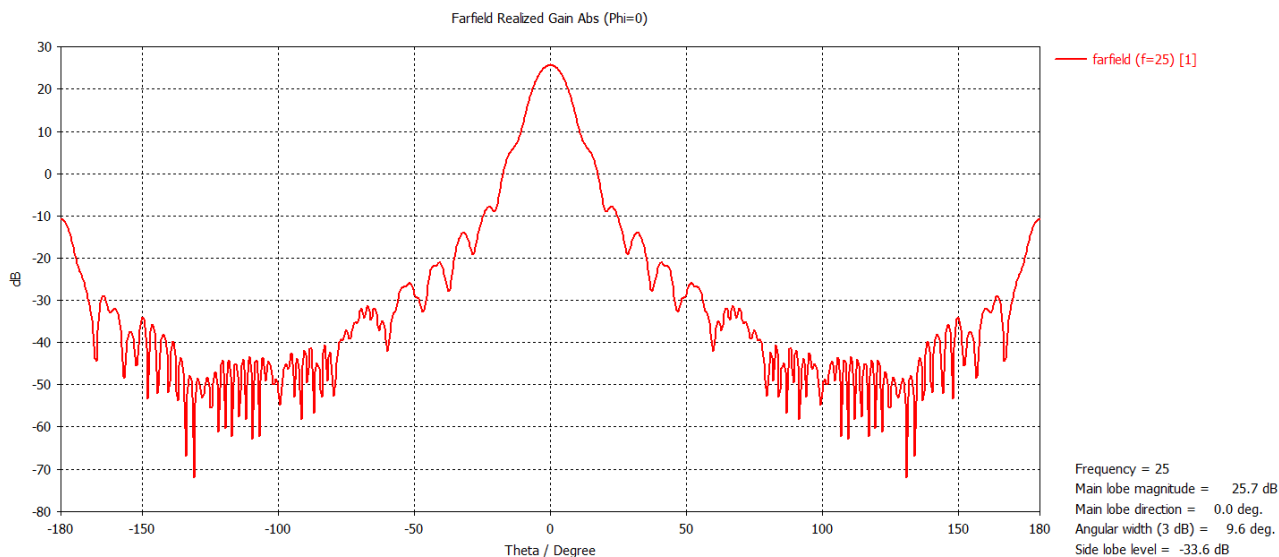


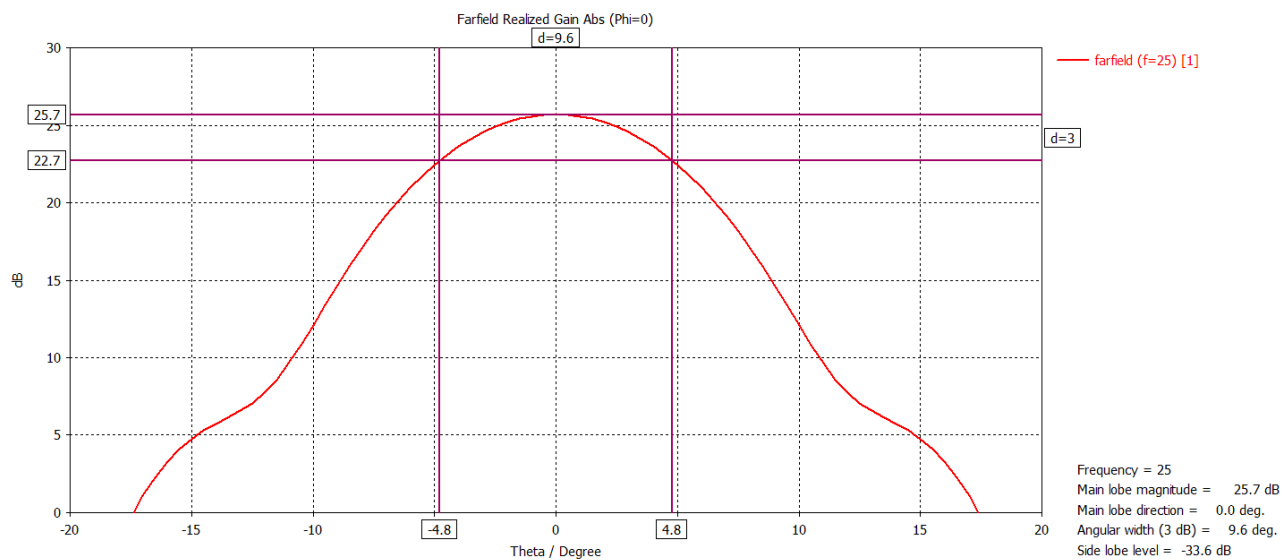
2.6.1 Radiation pattern in E-plane



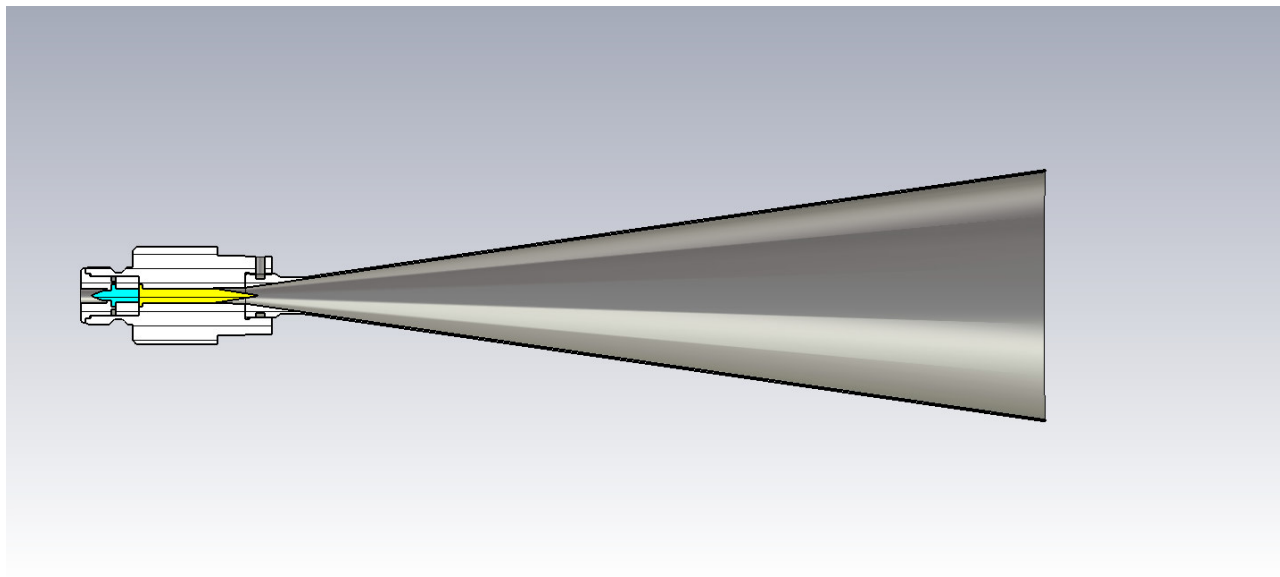


2.6.2 Radiation pattern in H-plane

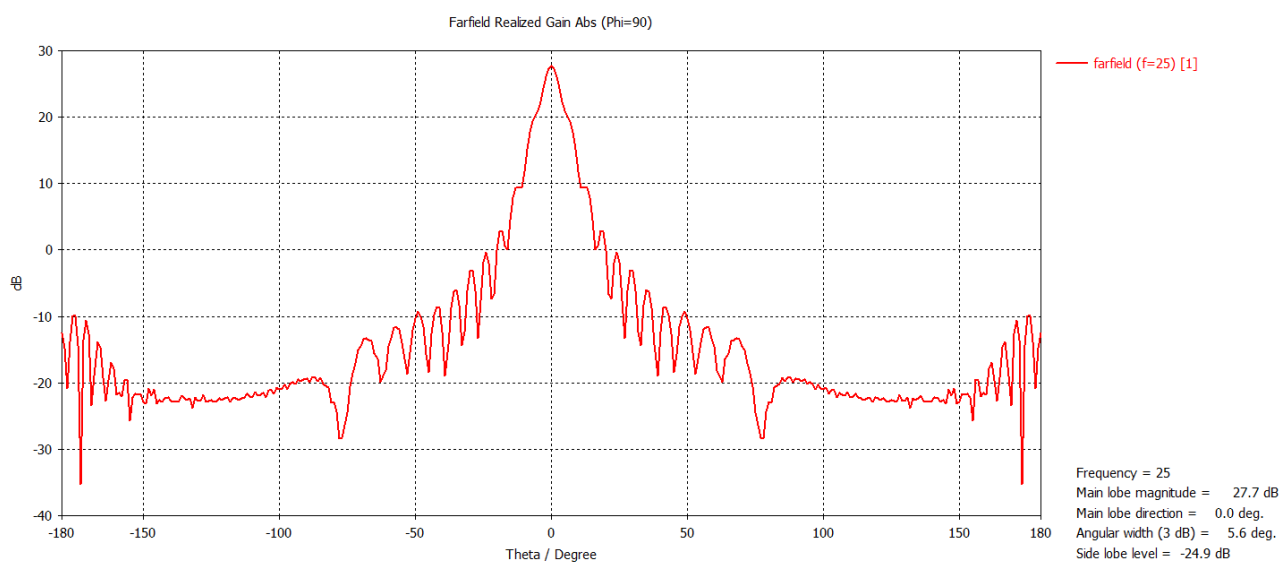


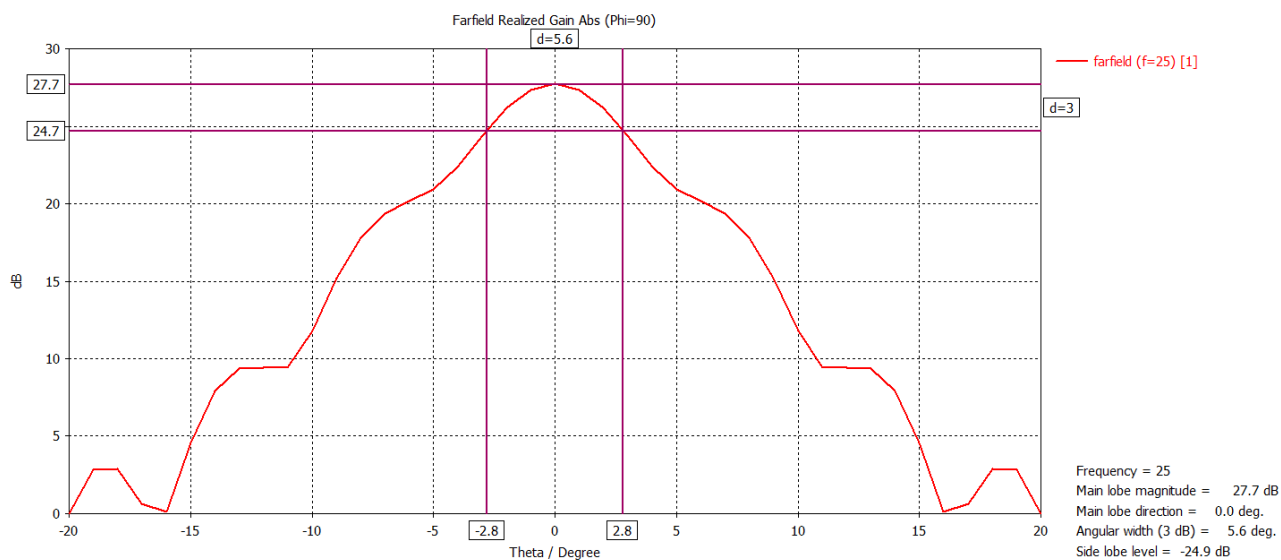
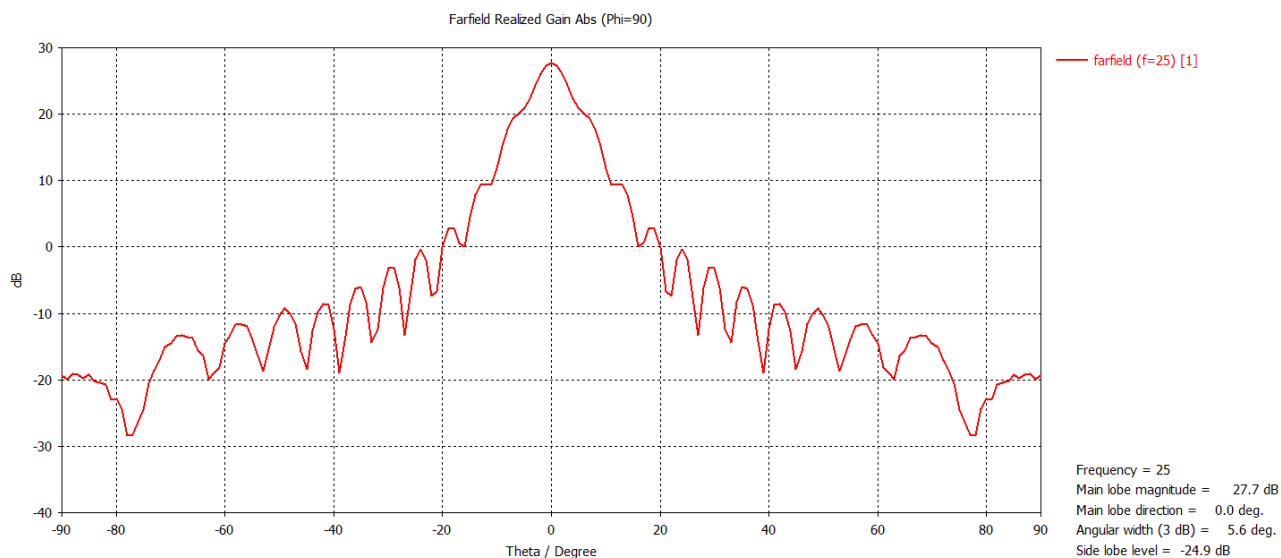


2.7 316L / DN150 (6") Metallic Horn

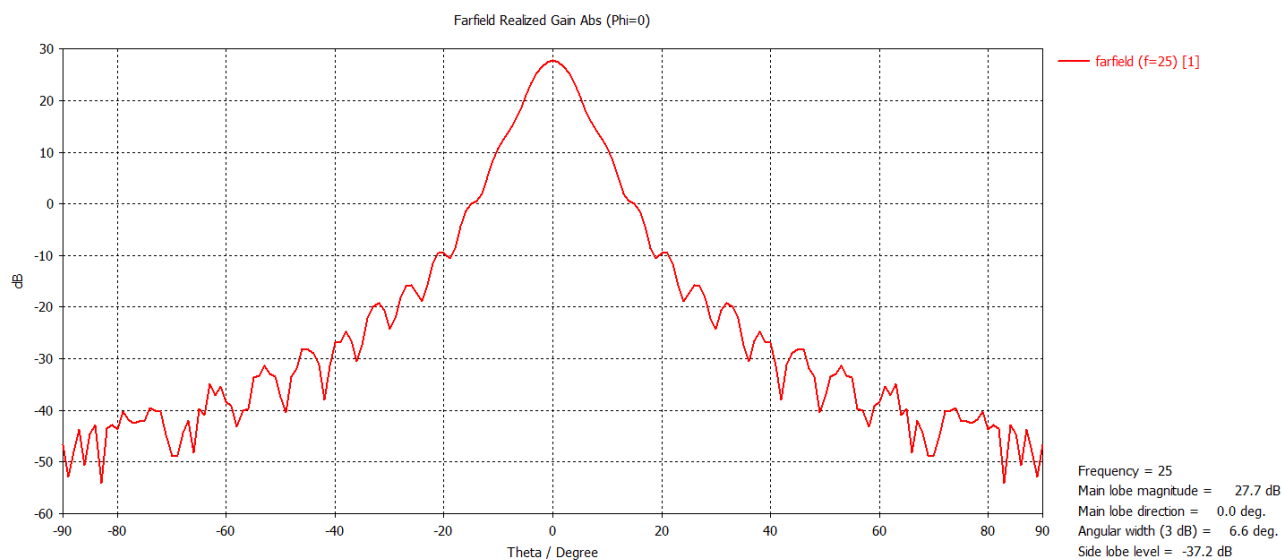
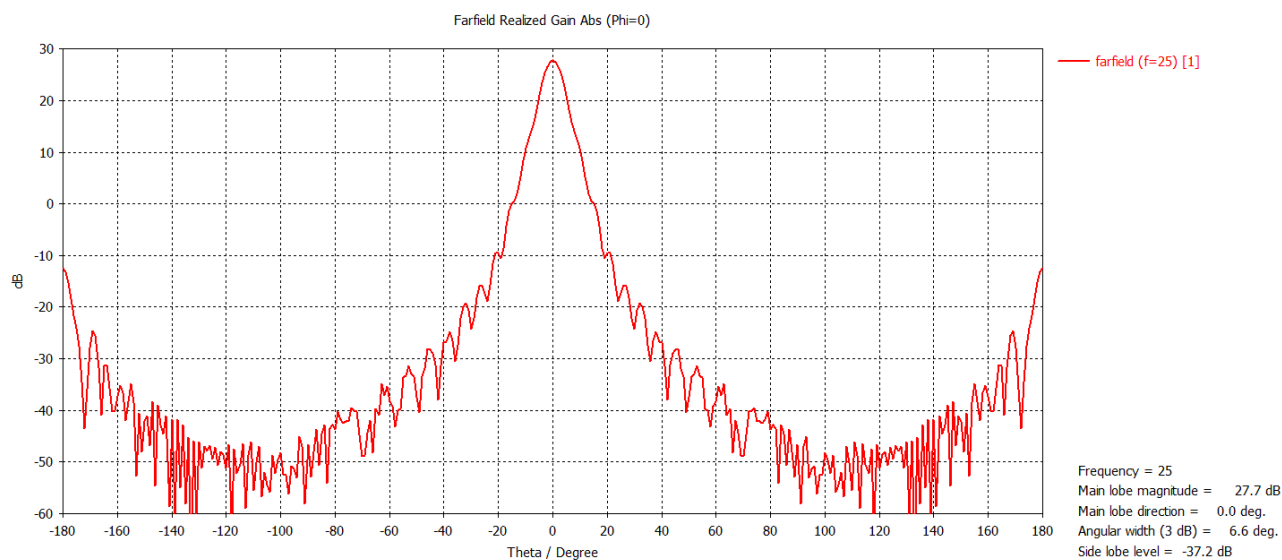


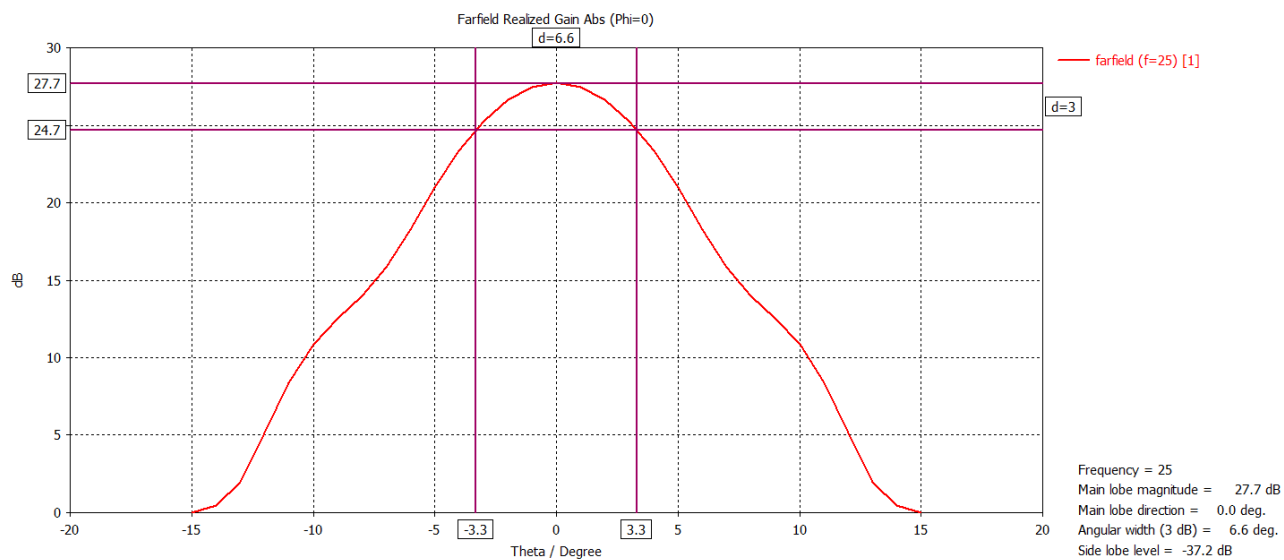
2.7.1 Radiation pattern in E-plane



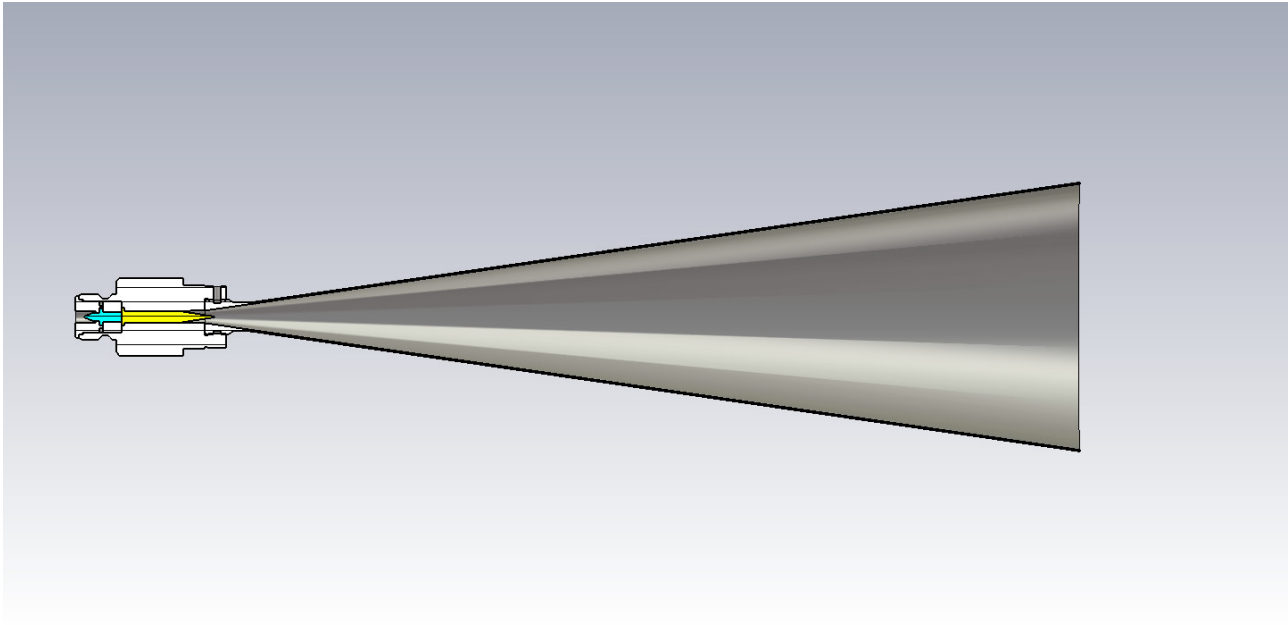


2.7.2 Radiation pattern in H-plane

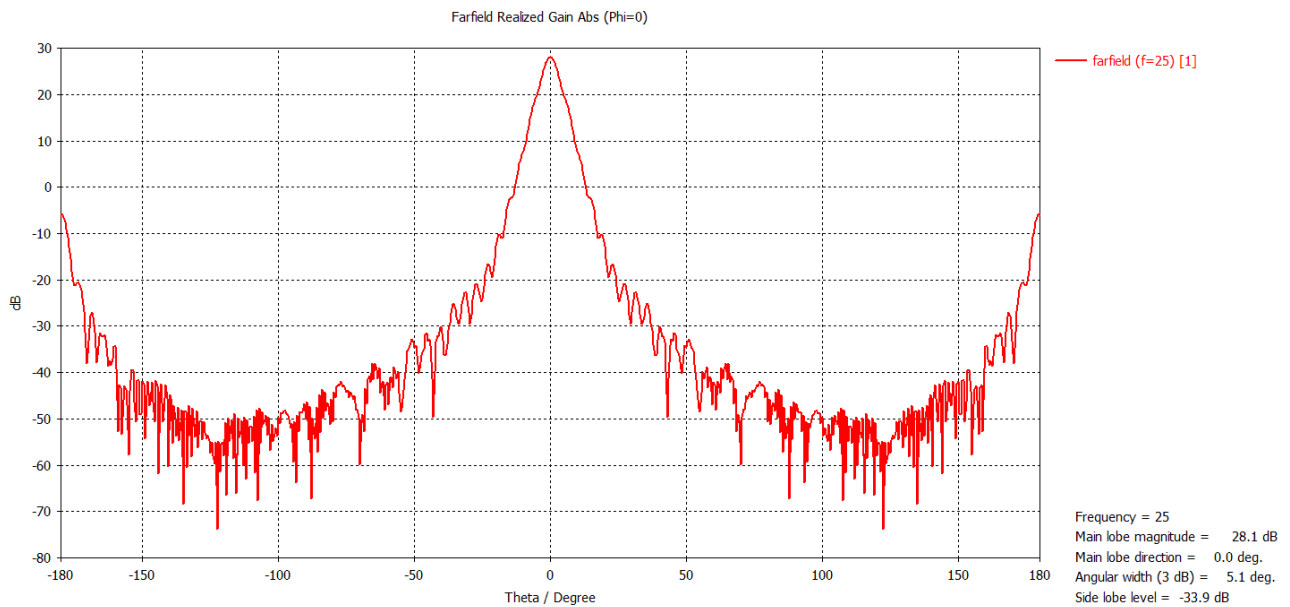


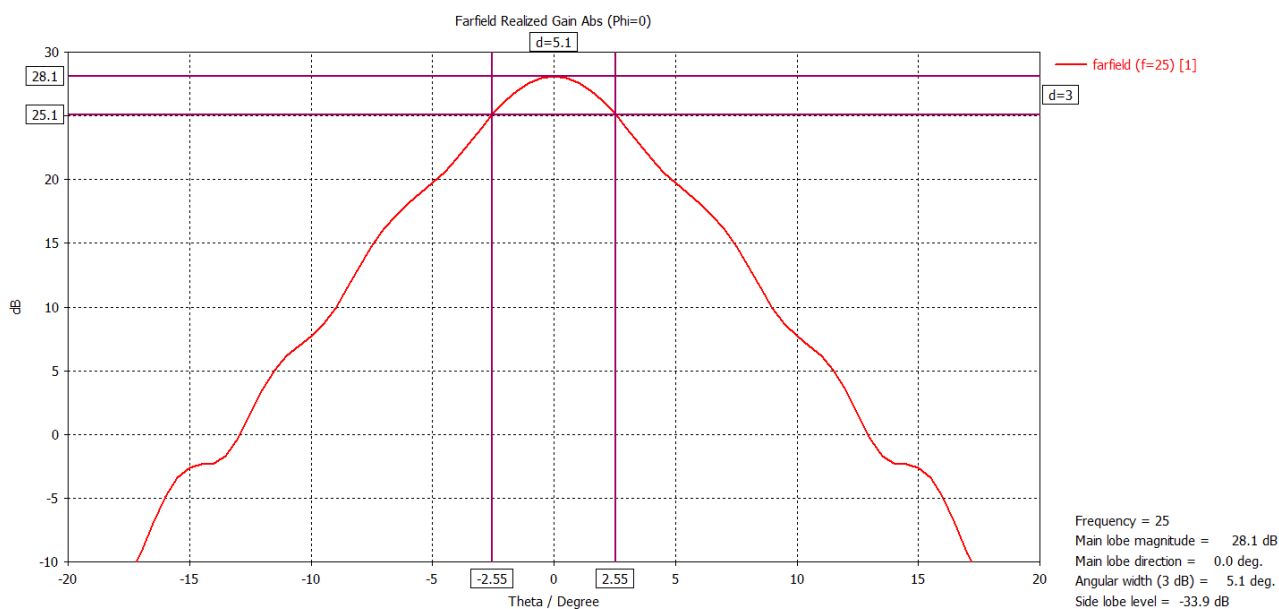
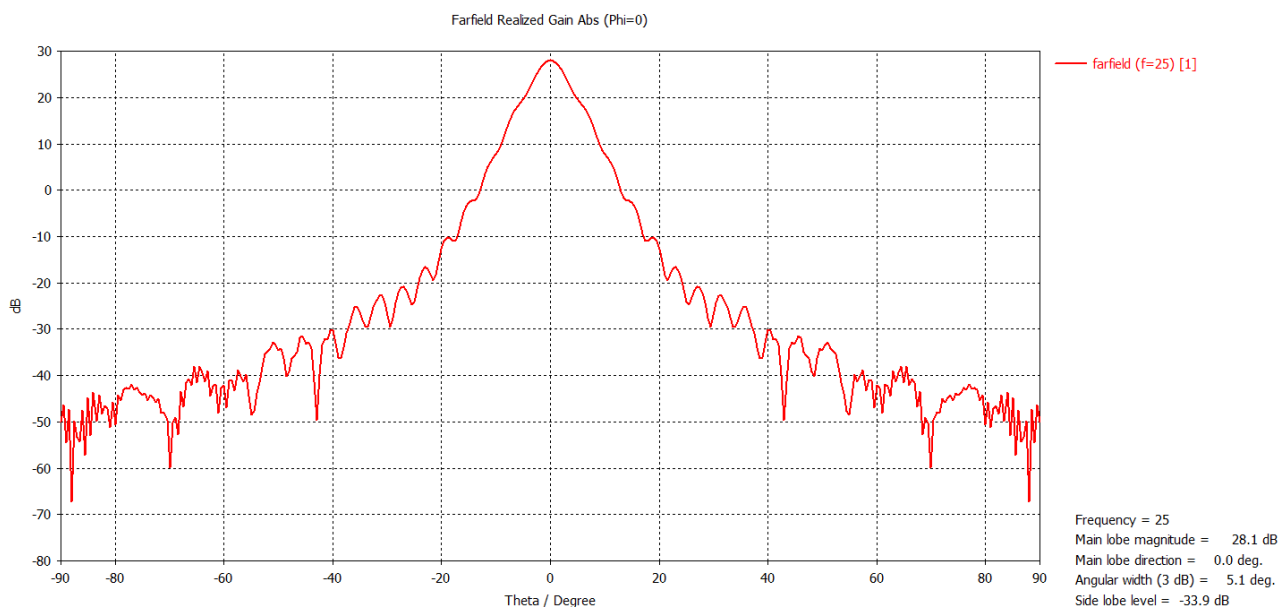


2.8 316L / DN200 (8") Metallic Horn

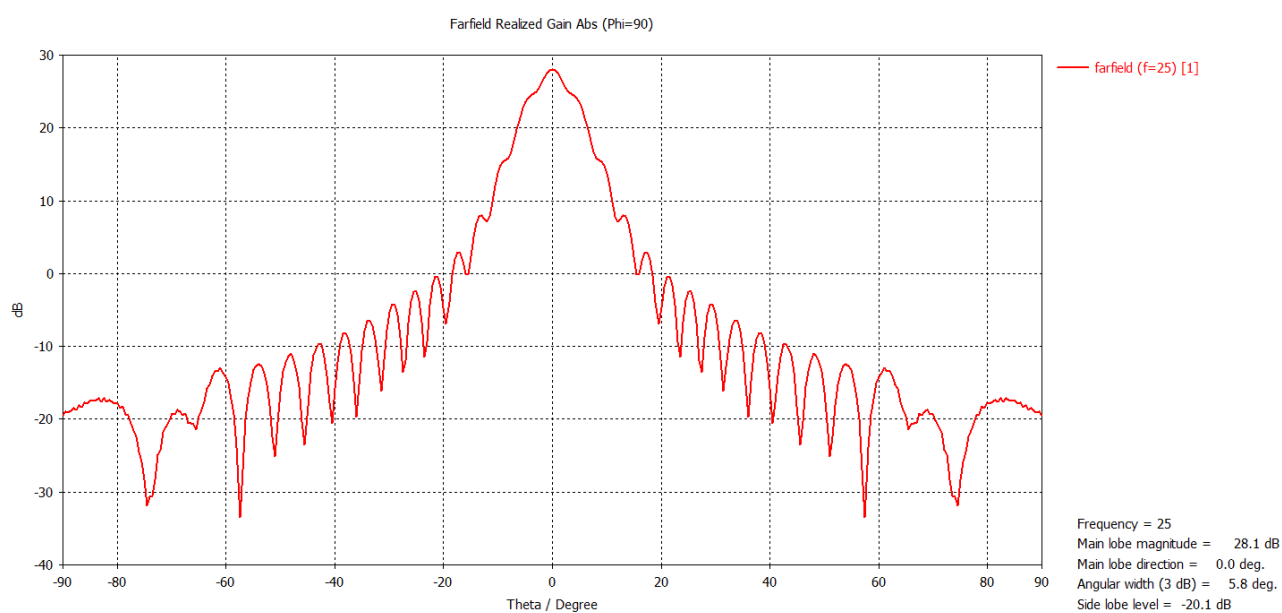
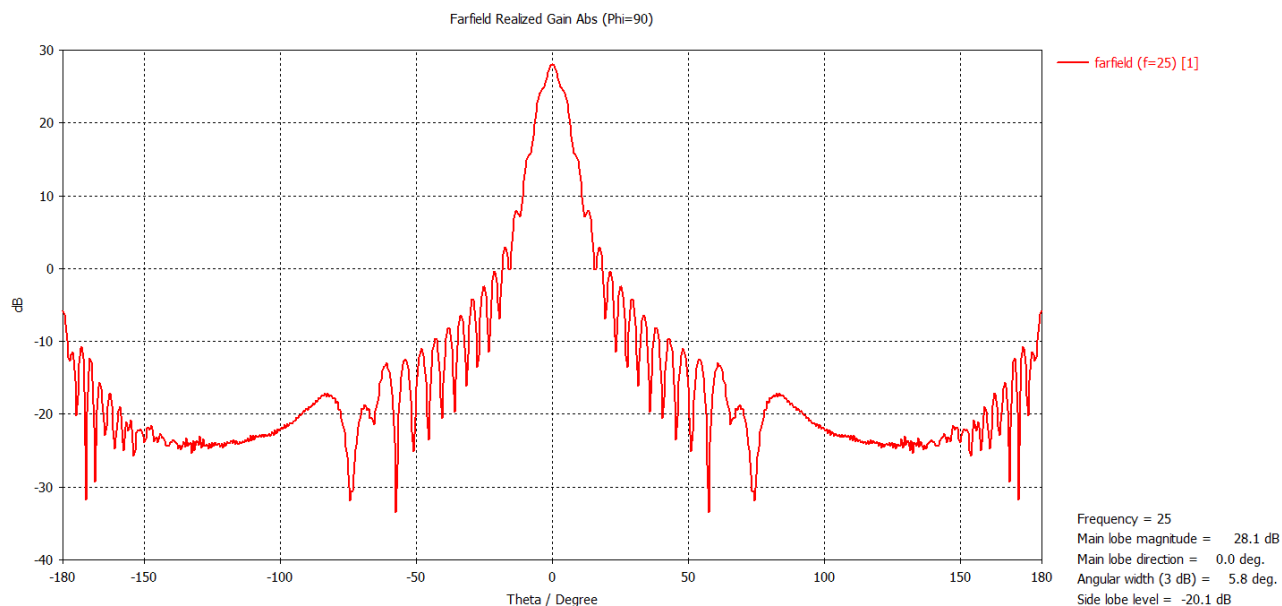


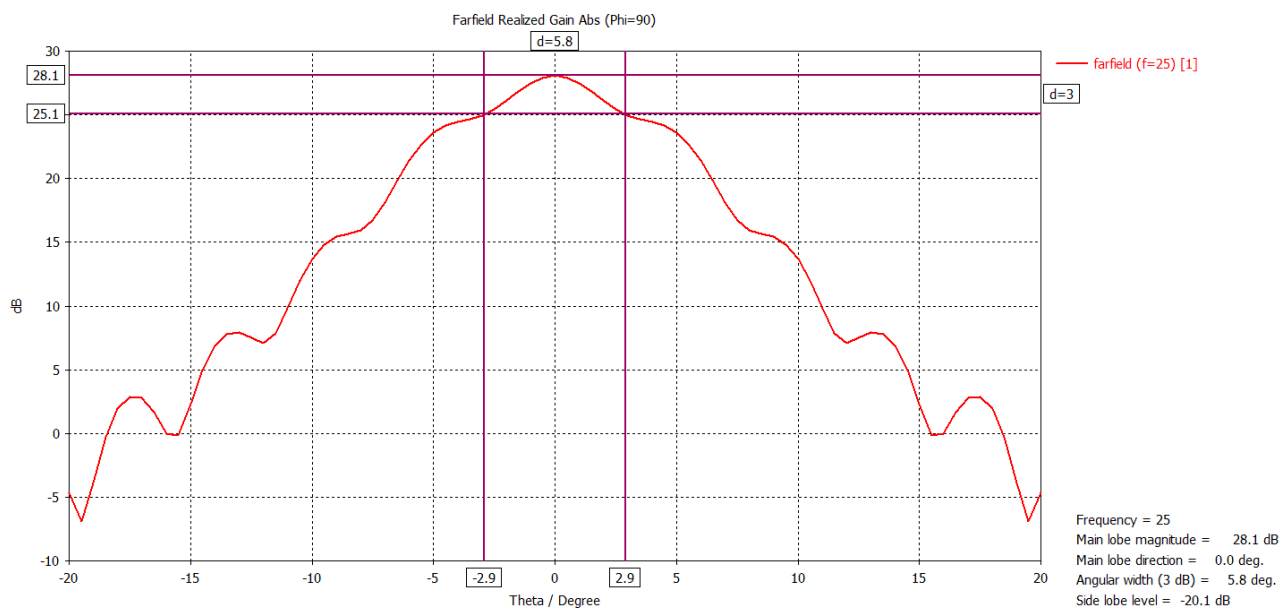
2.8.1 Radiation pattern in E-plane



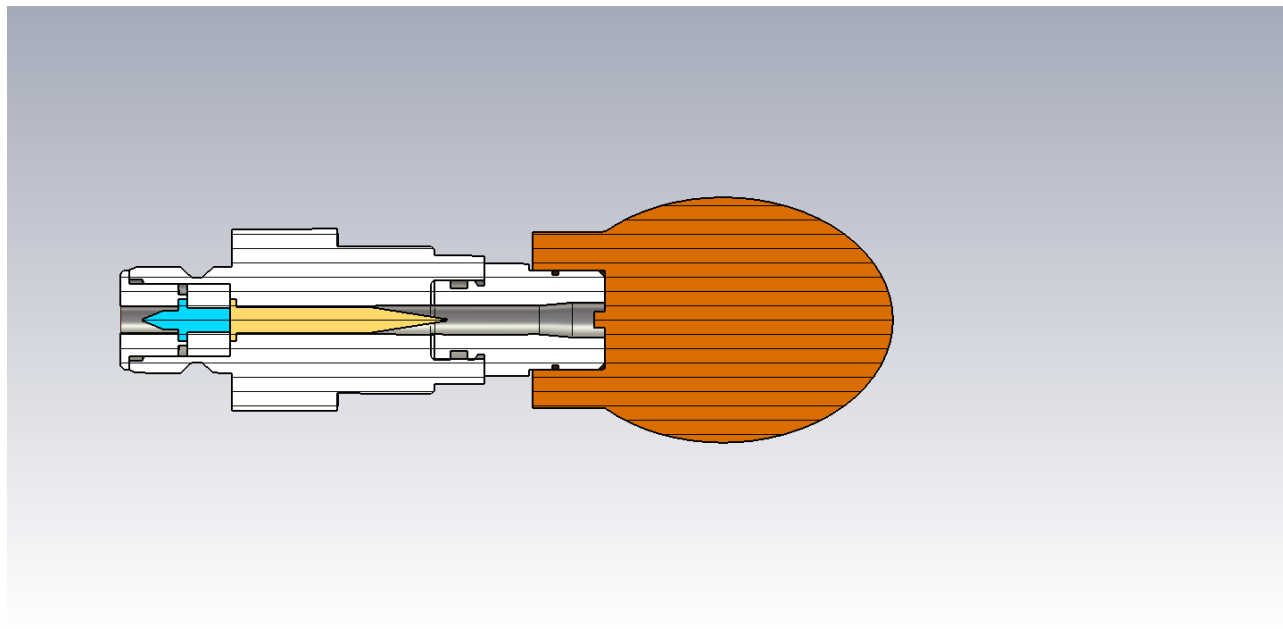


2.8.2 Radiation pattern in H-plane

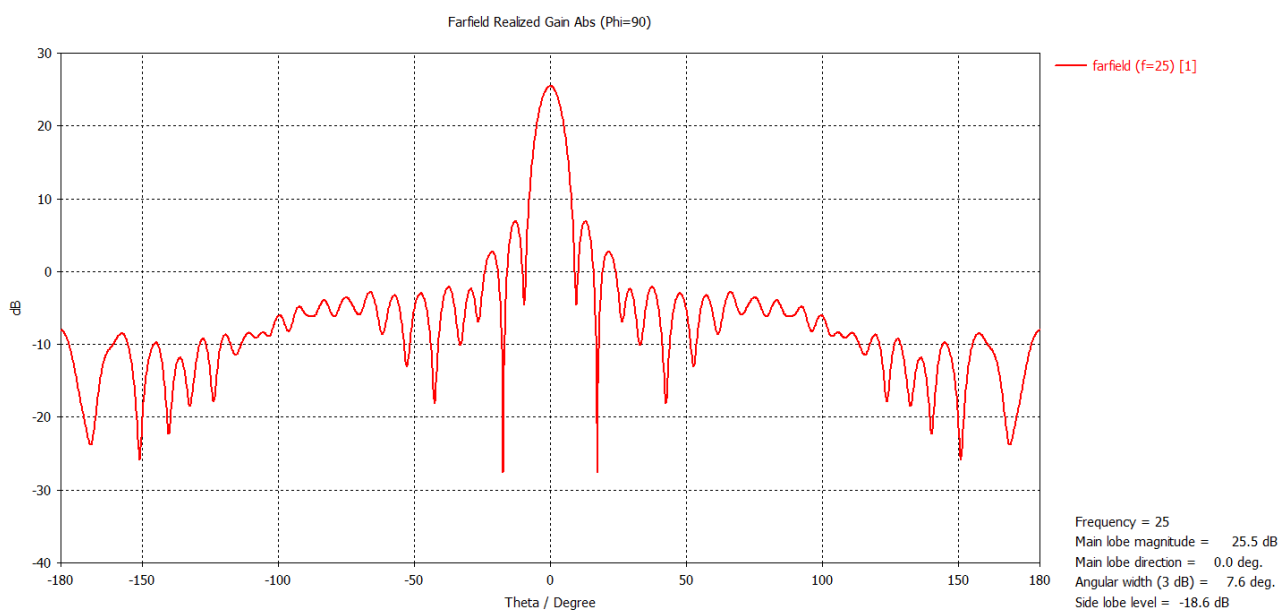


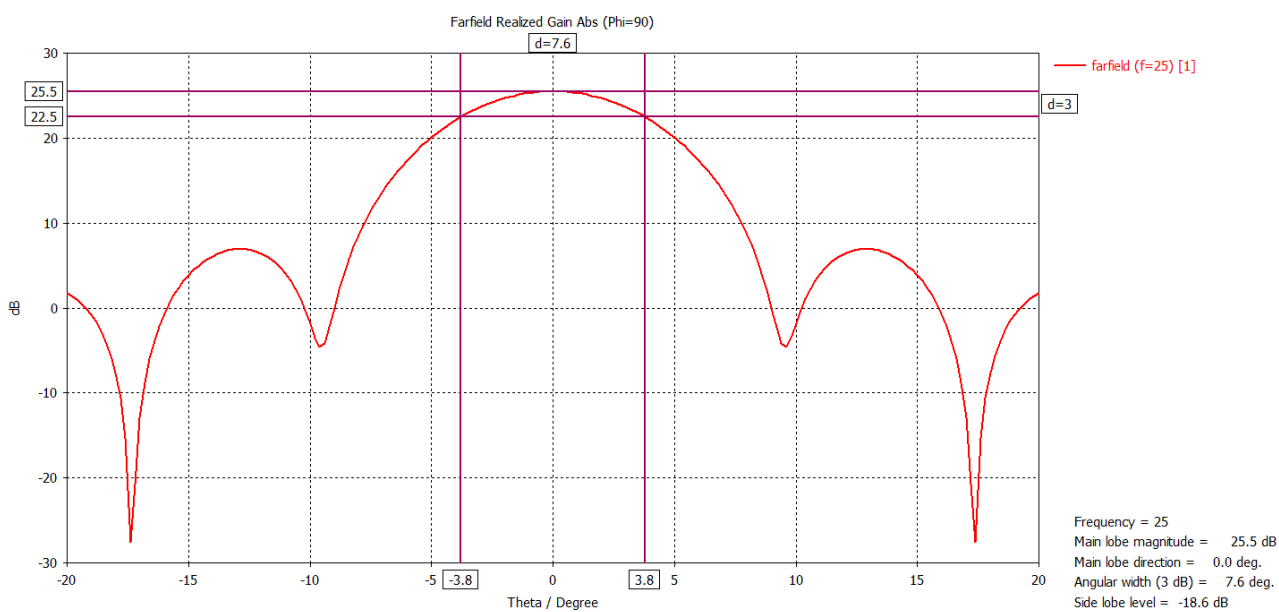
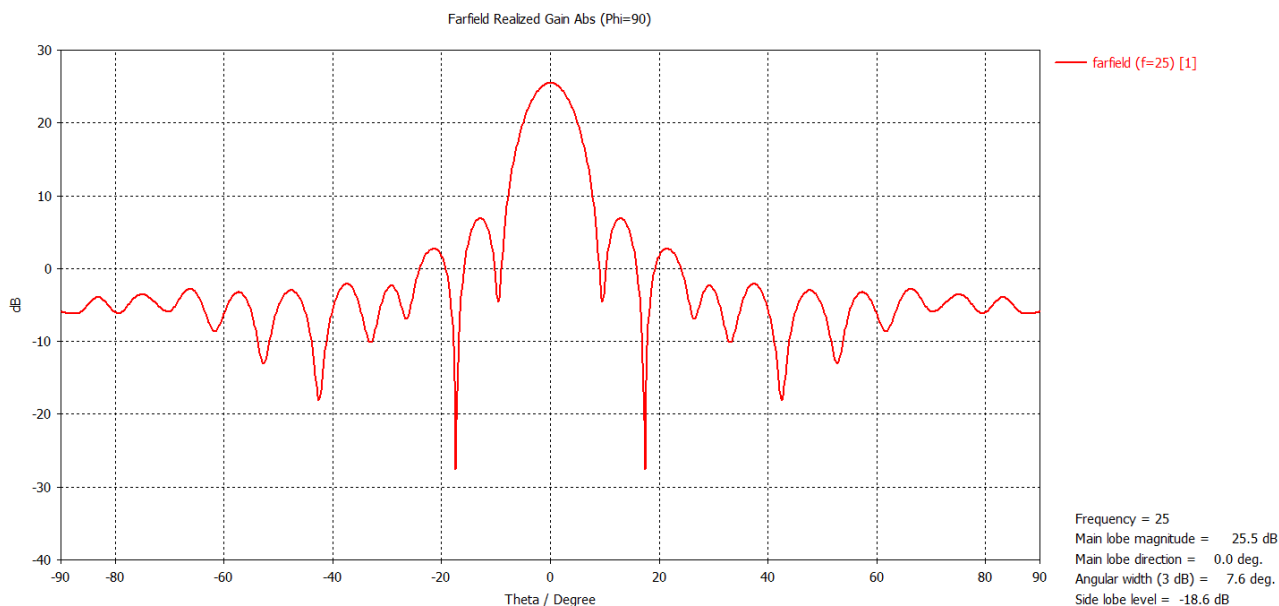


2.9 PTFE / DN80 (3") Drop

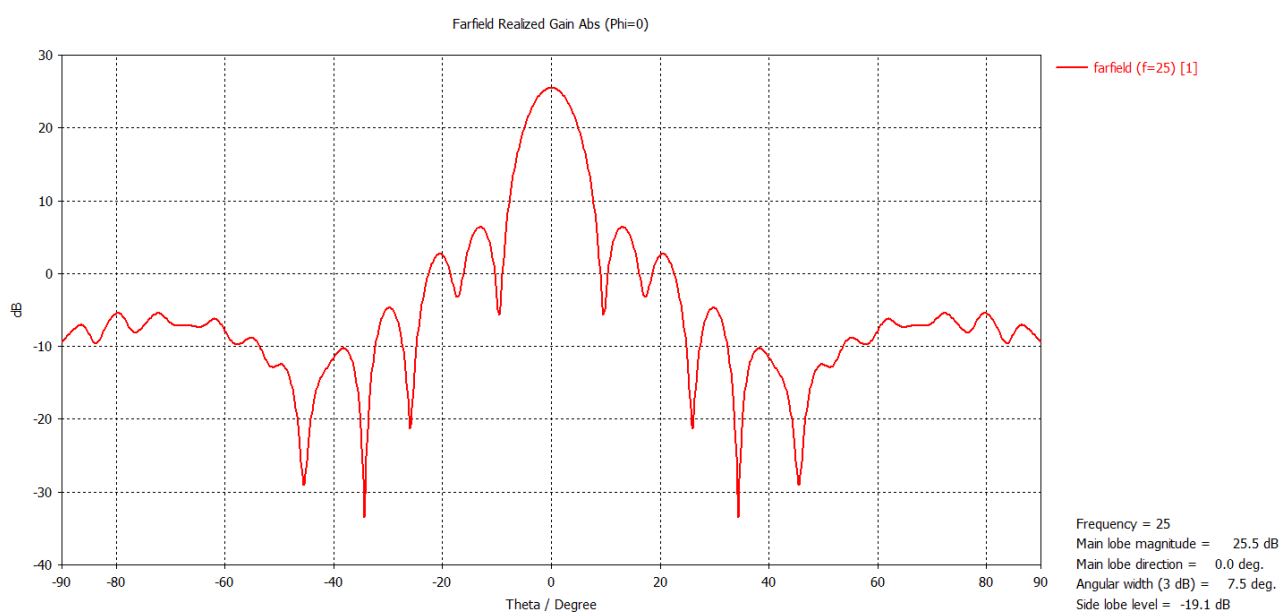
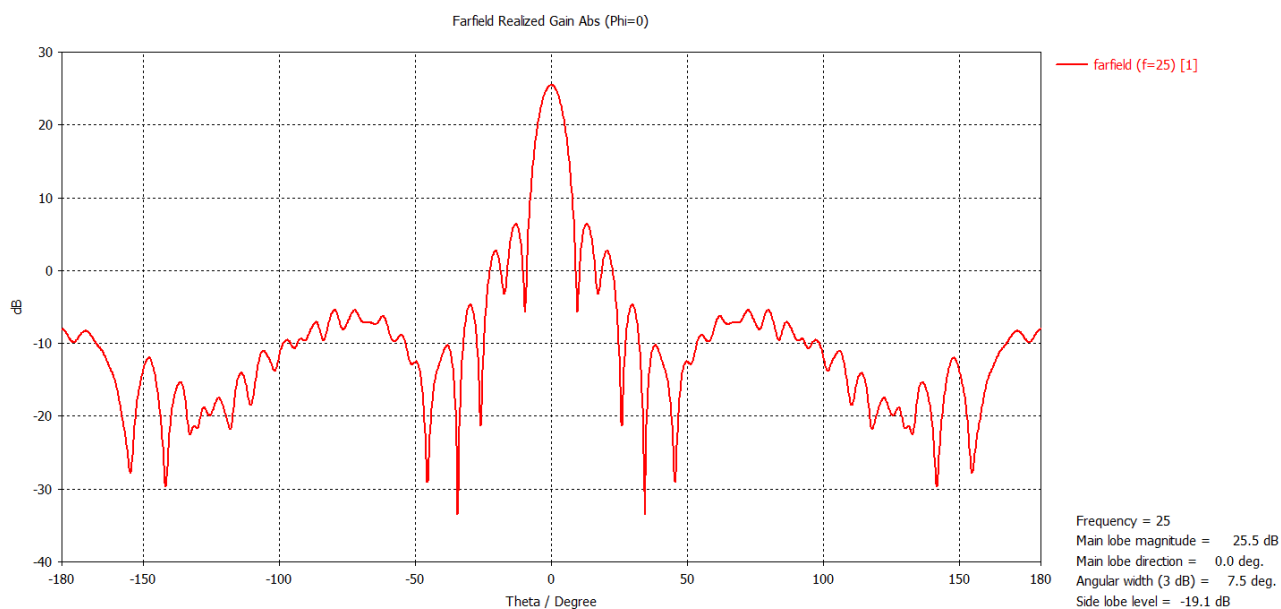


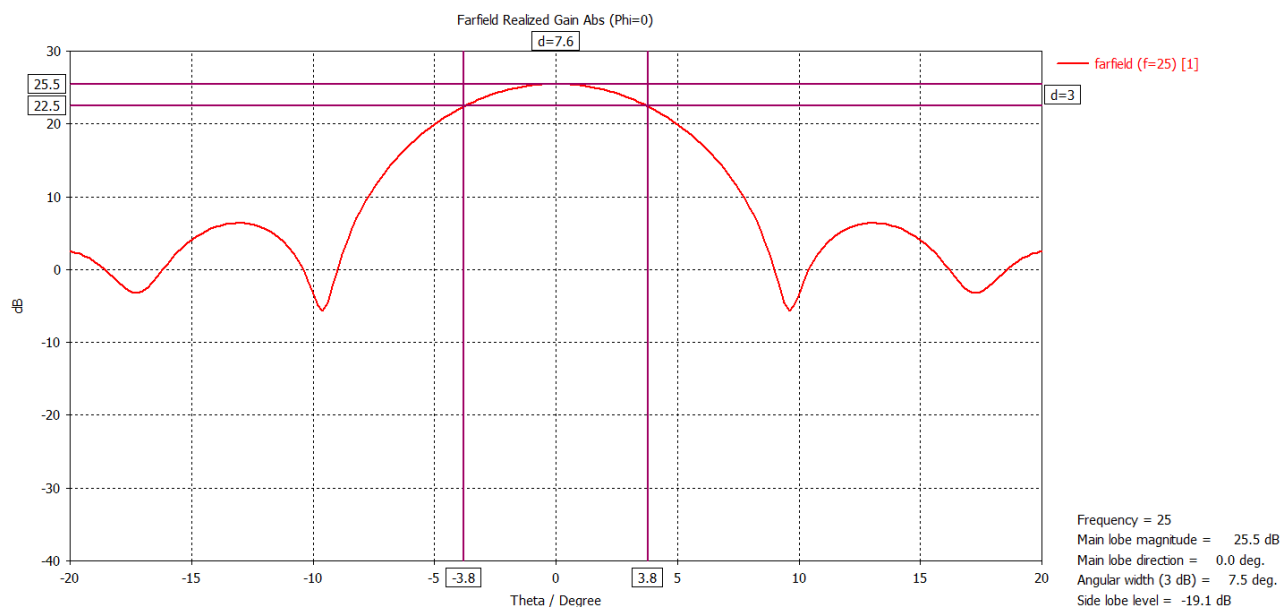
2.9.1 Radiation pattern in E-plane



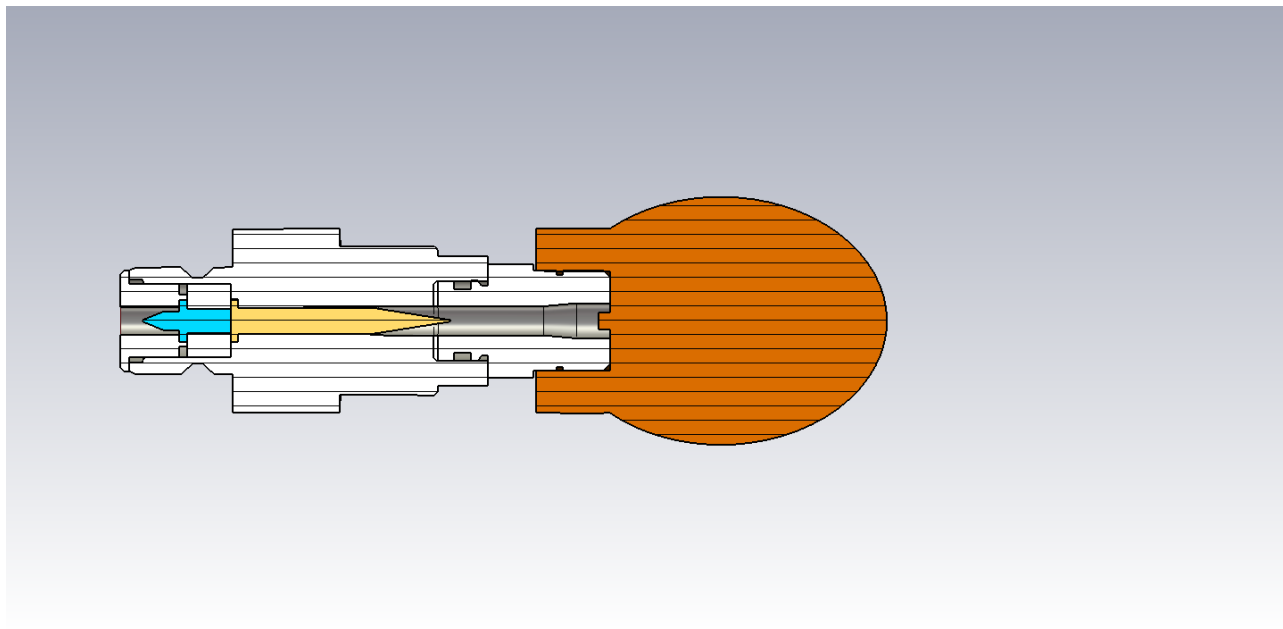


2.9.2 Radiation pattern in H-plane

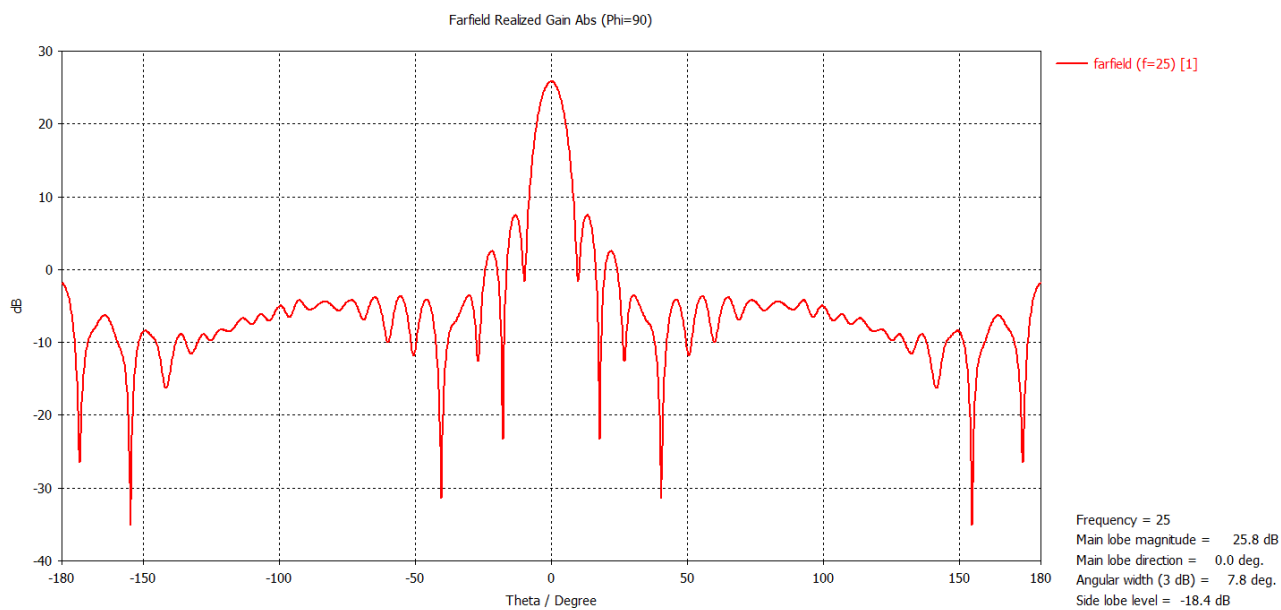


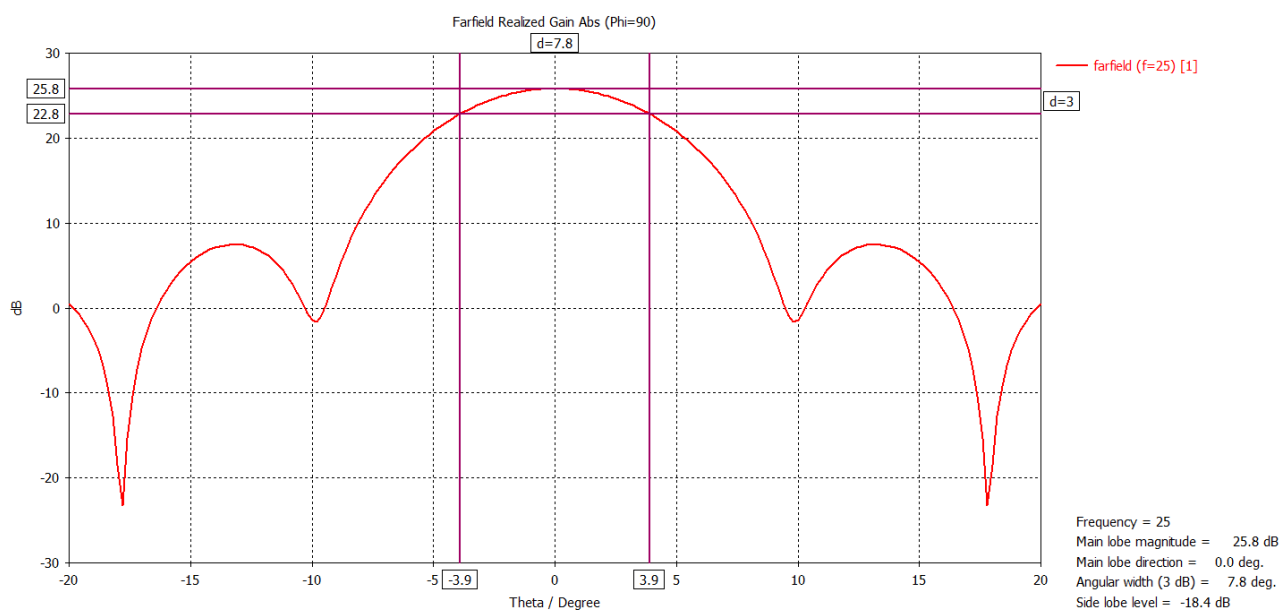
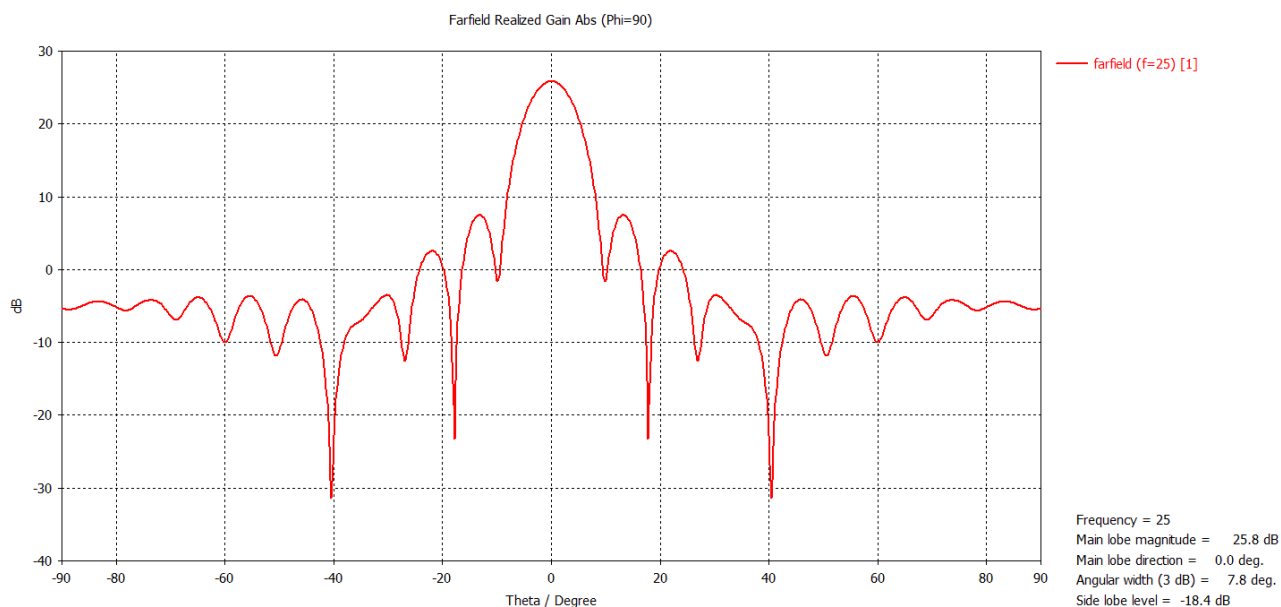


2.10 PP / DN80 (3") Drop

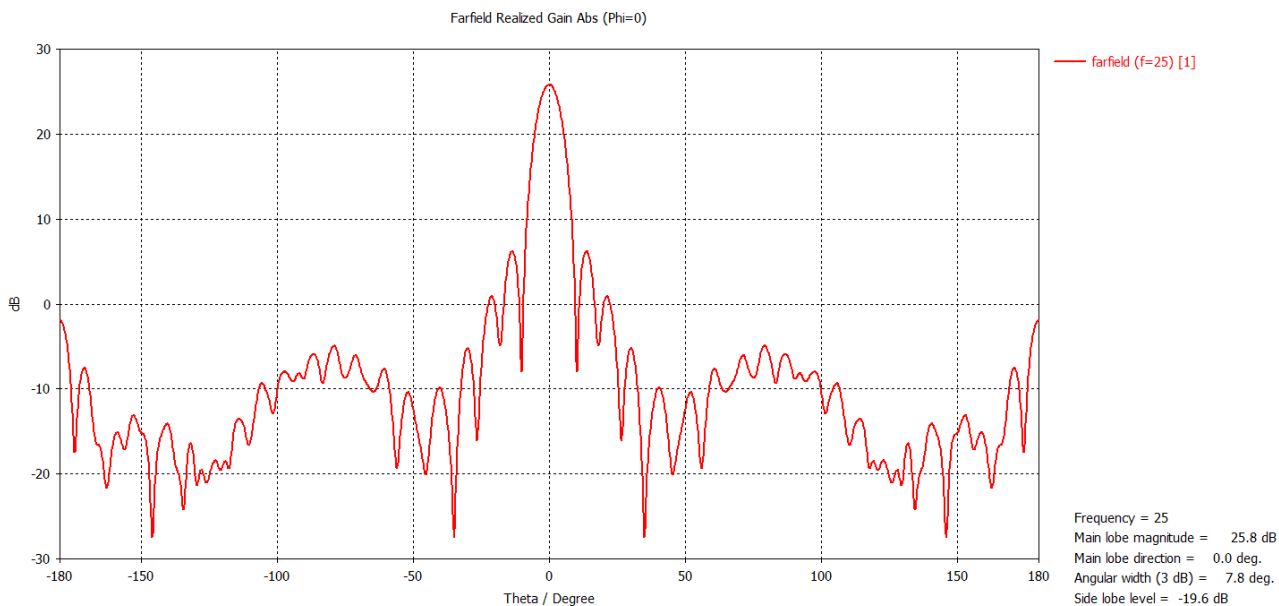


2.10.1 Radiation pattern in E-plane

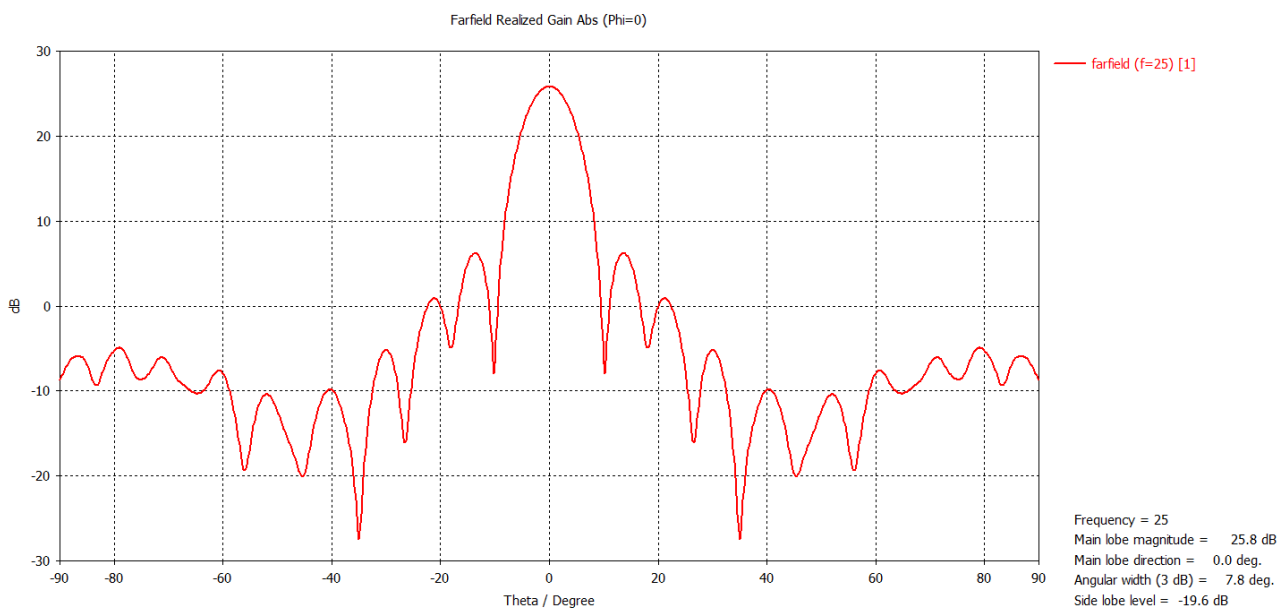


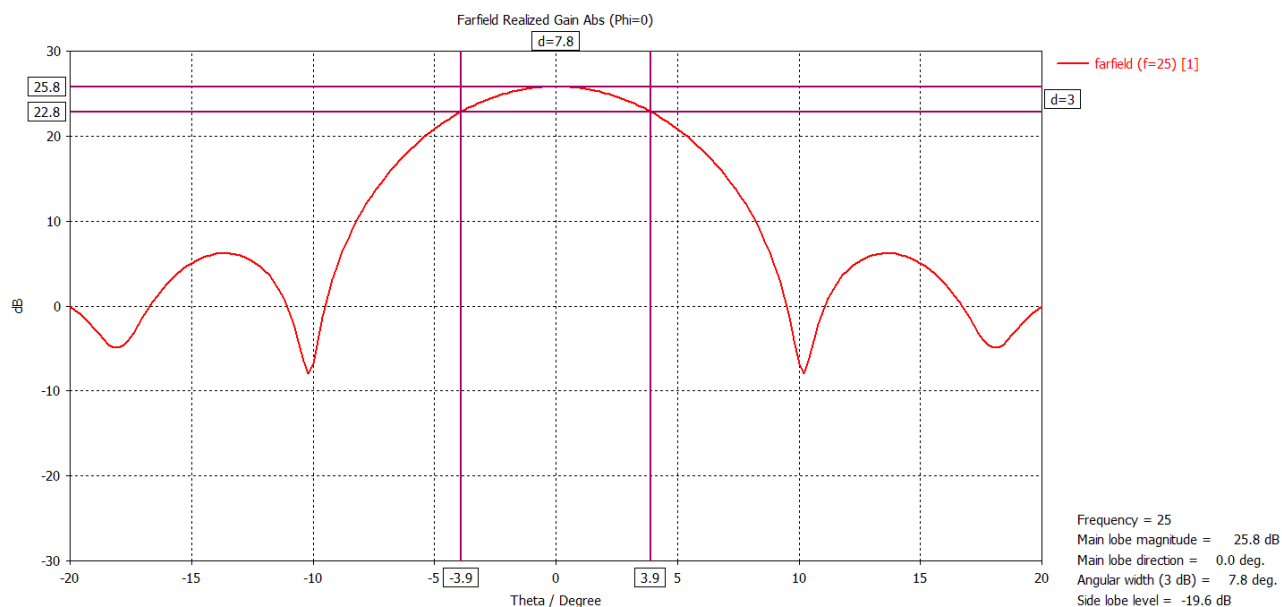


2.10.2 Radiation pattern in H-plane

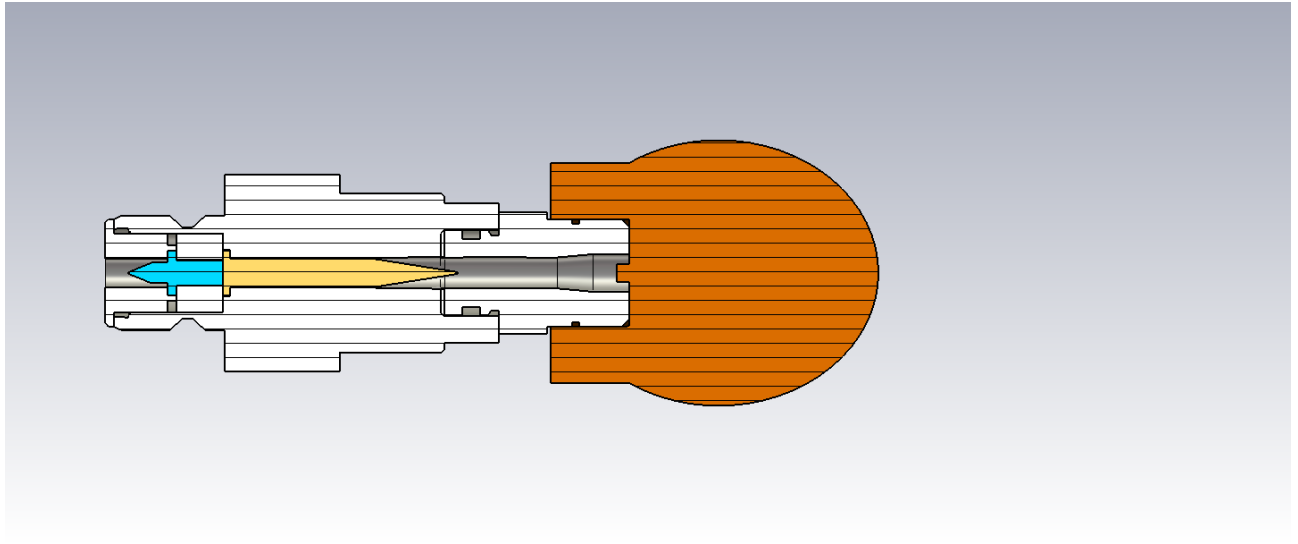


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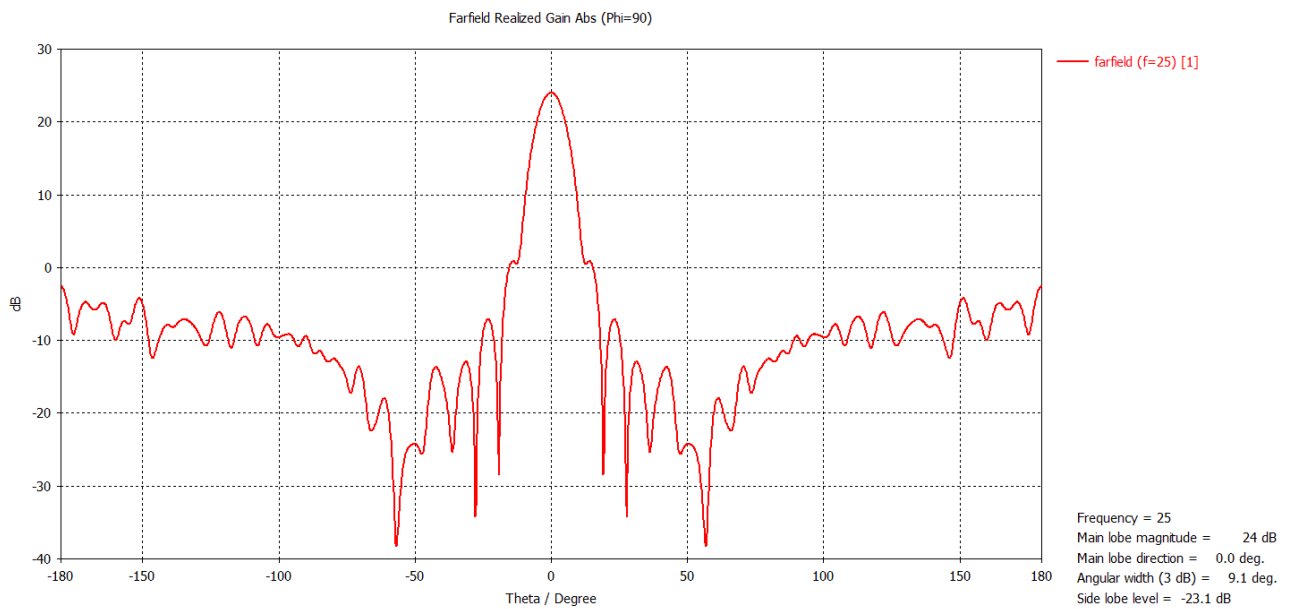


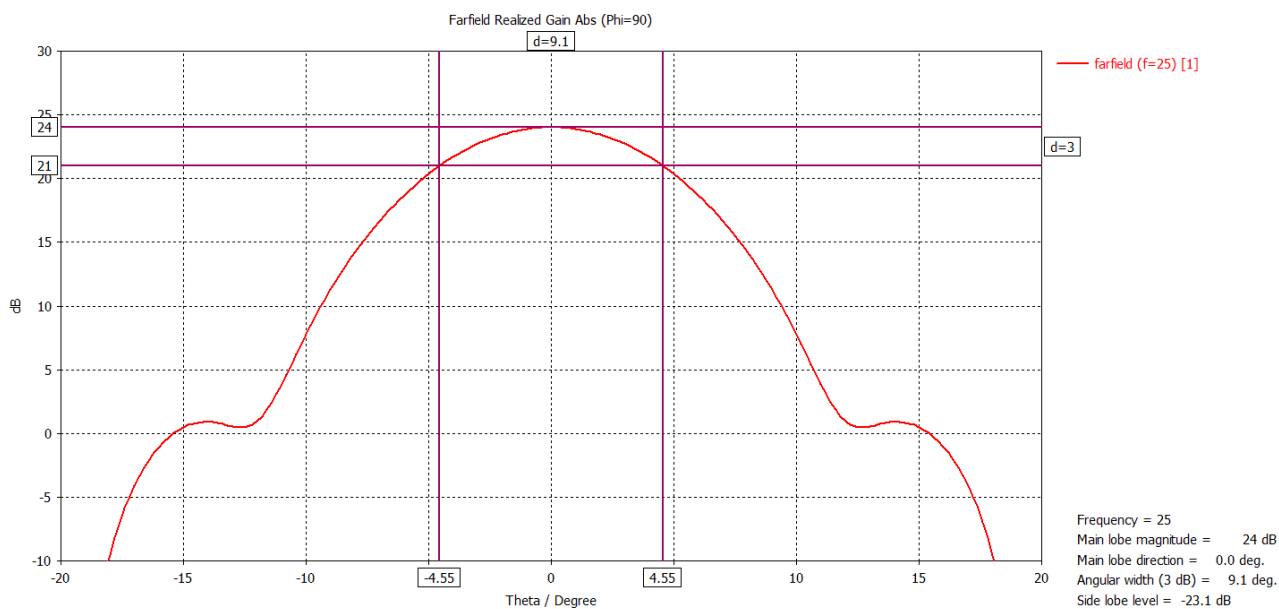
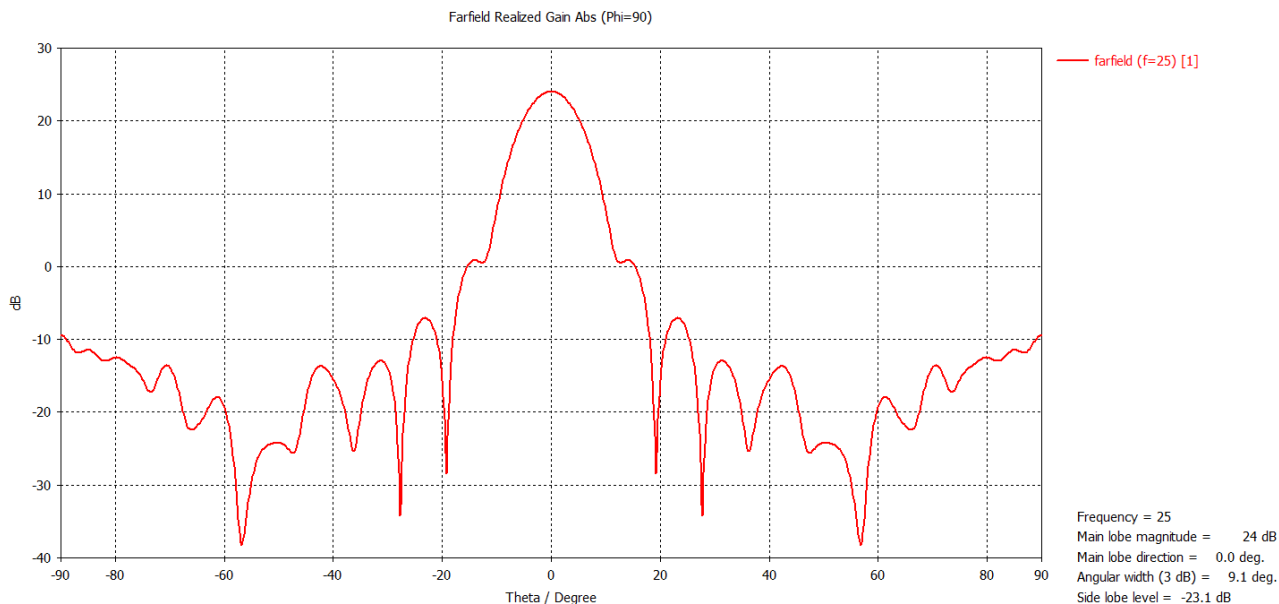


2.11 PEEK / DN80 (3") Drop

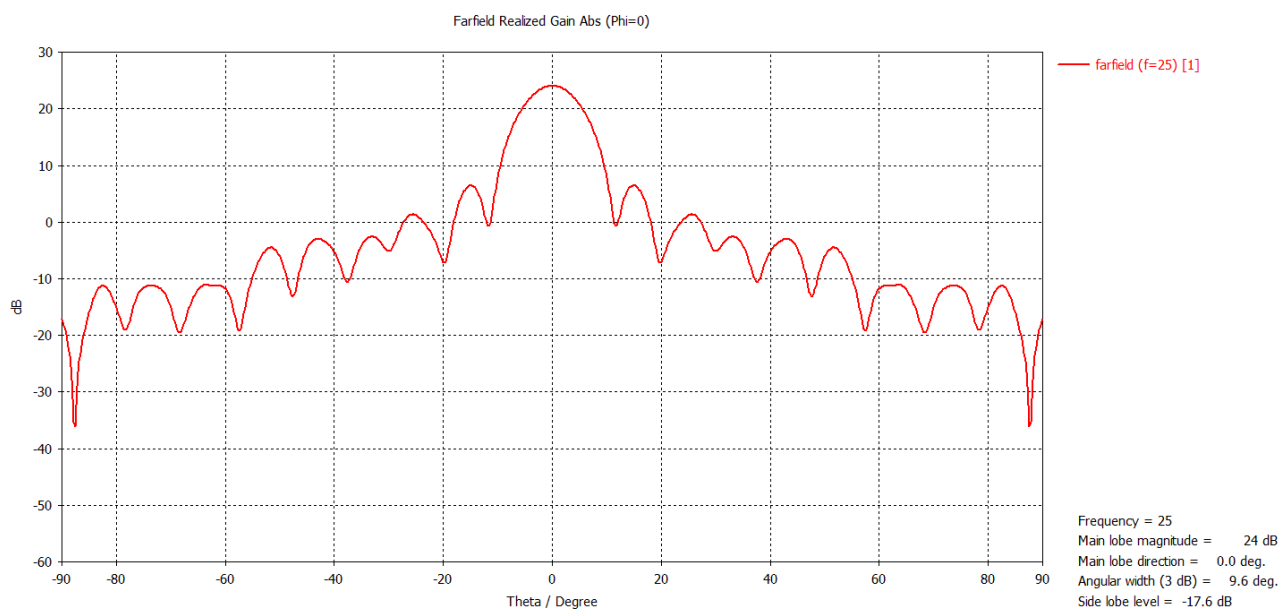
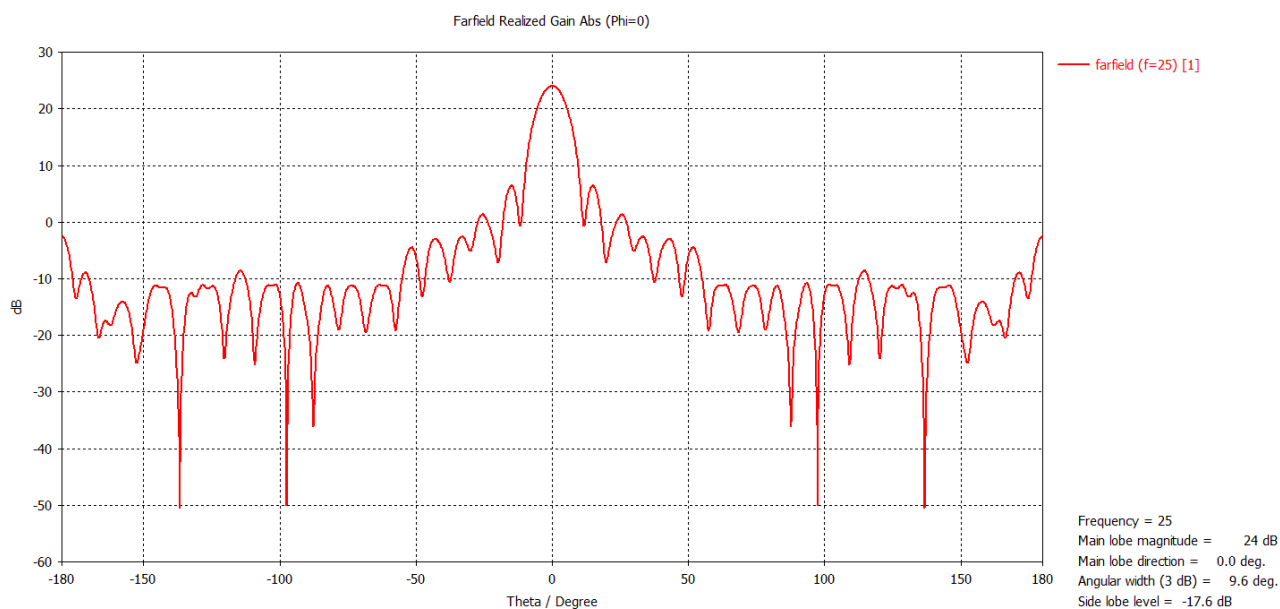


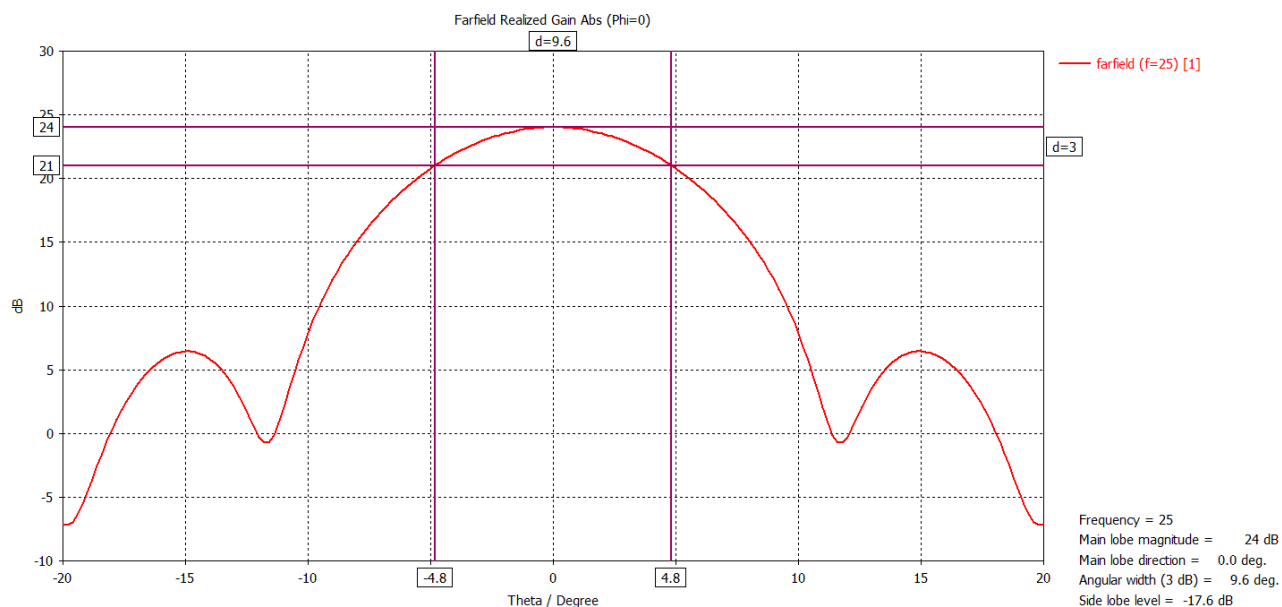
2.11.1 Radiation pattern in E-plane



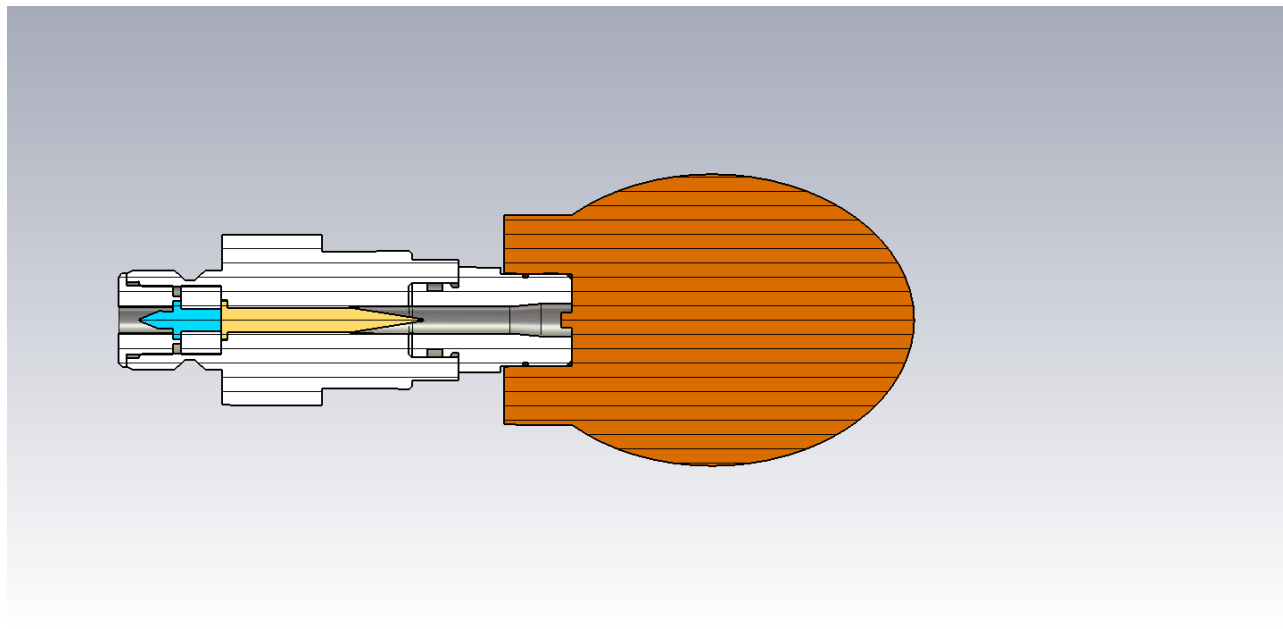


2.11.2 Radiation pattern in H-plane

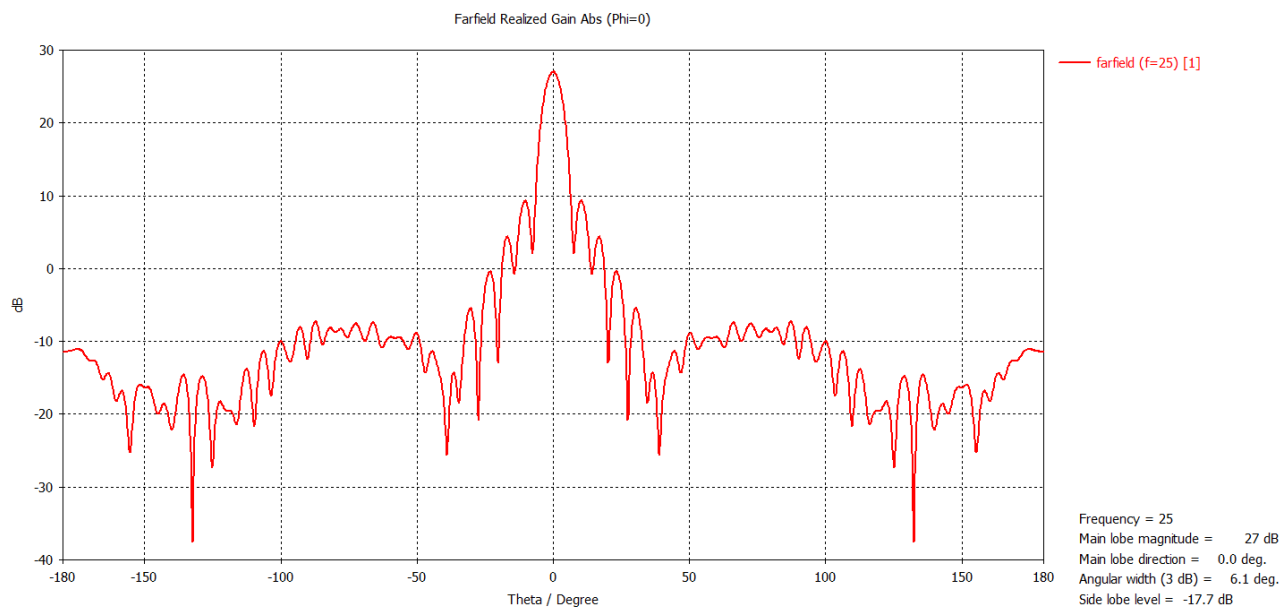


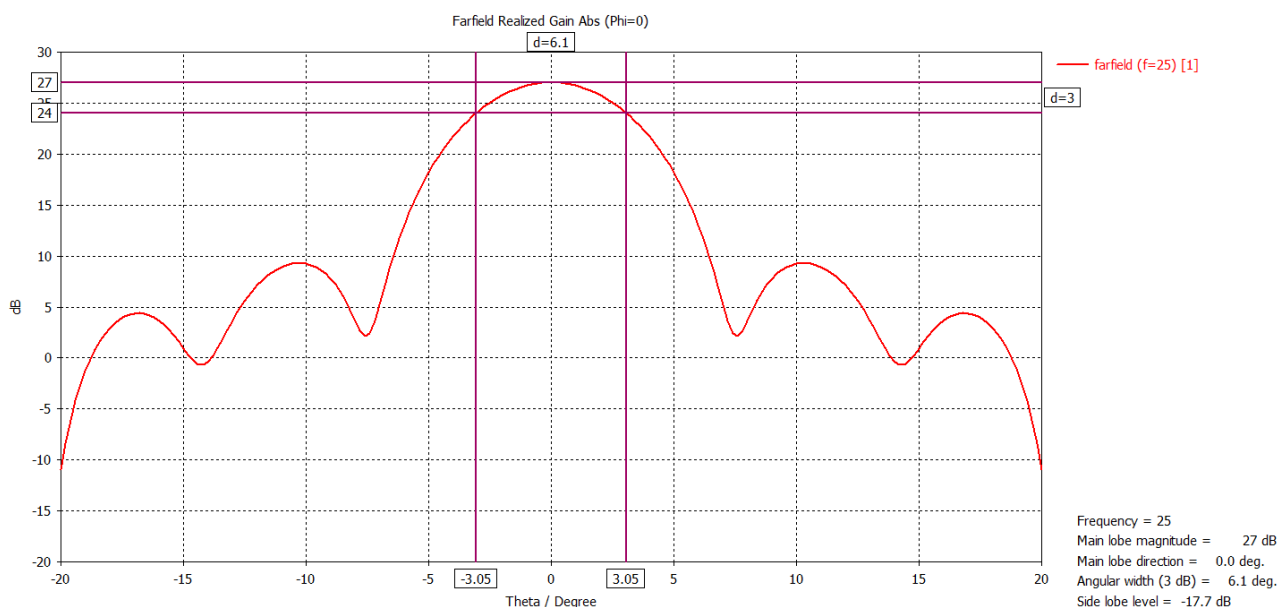
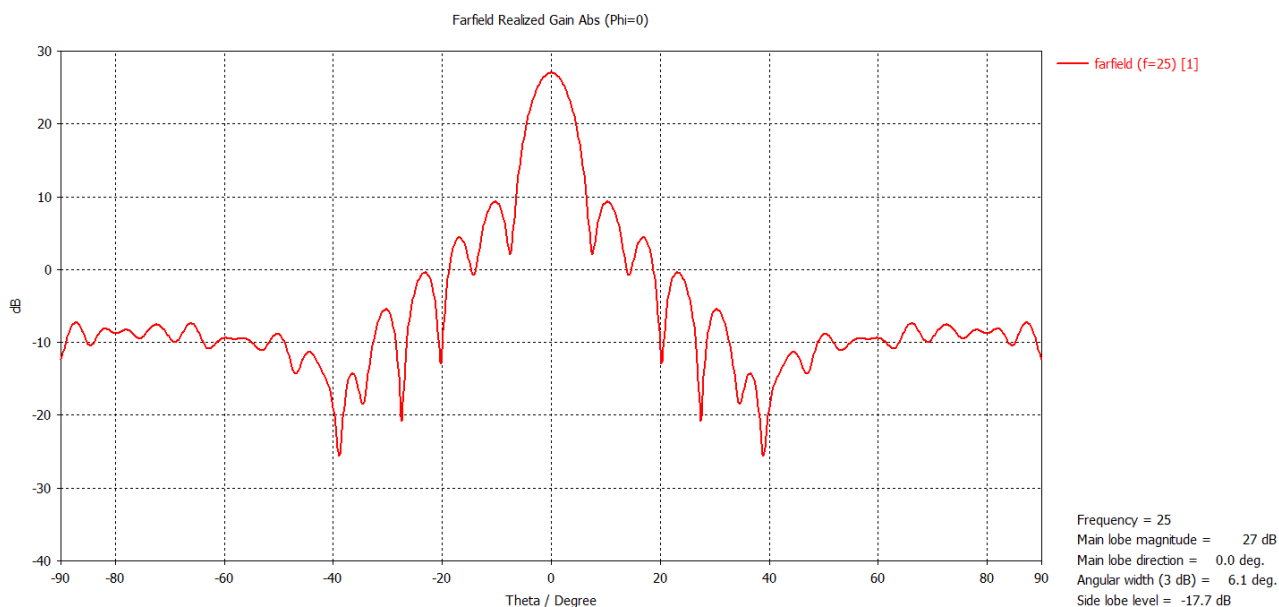


2.12 PTFE / DN100 (4") Drop

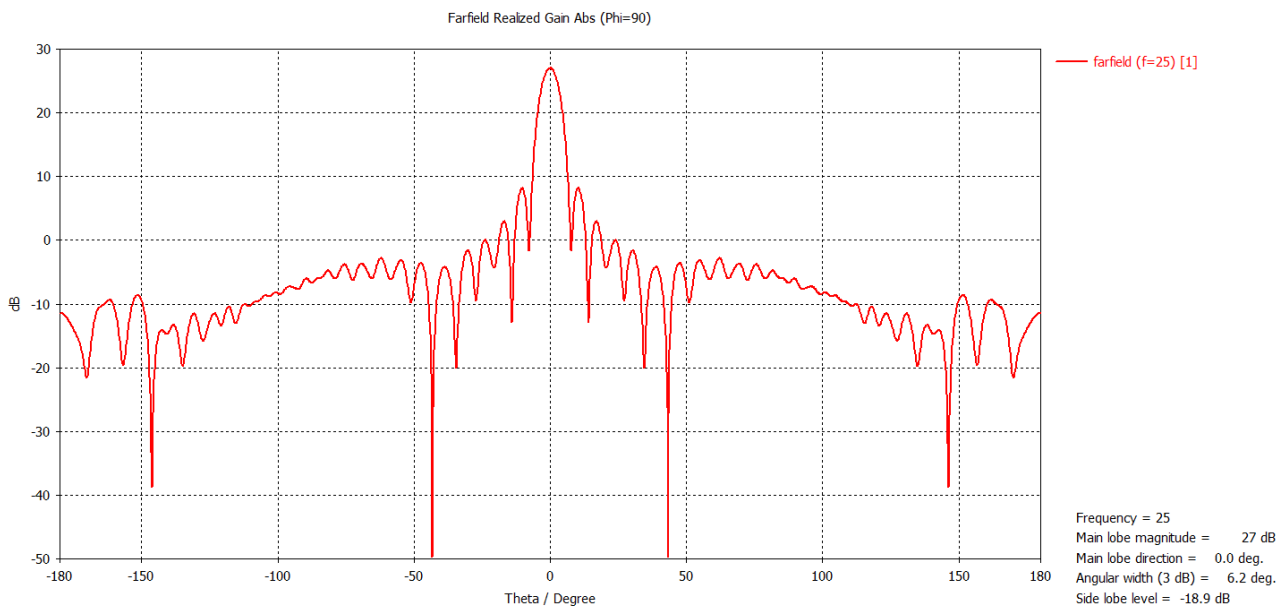


2.12.1 Radiation pattern in E-plane

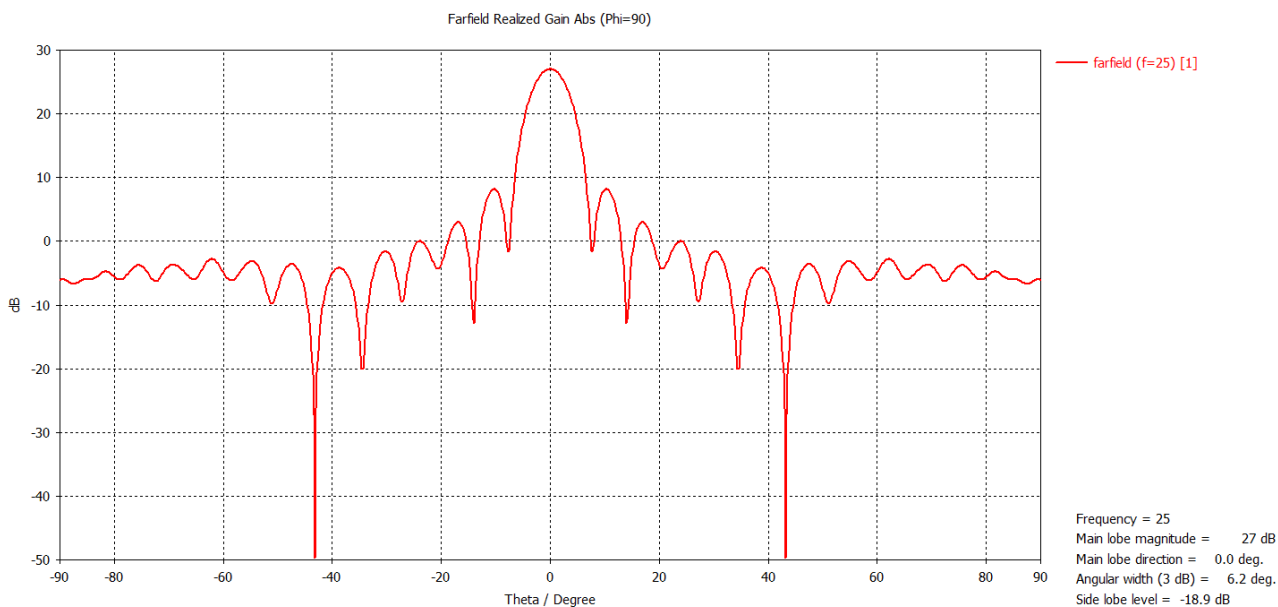


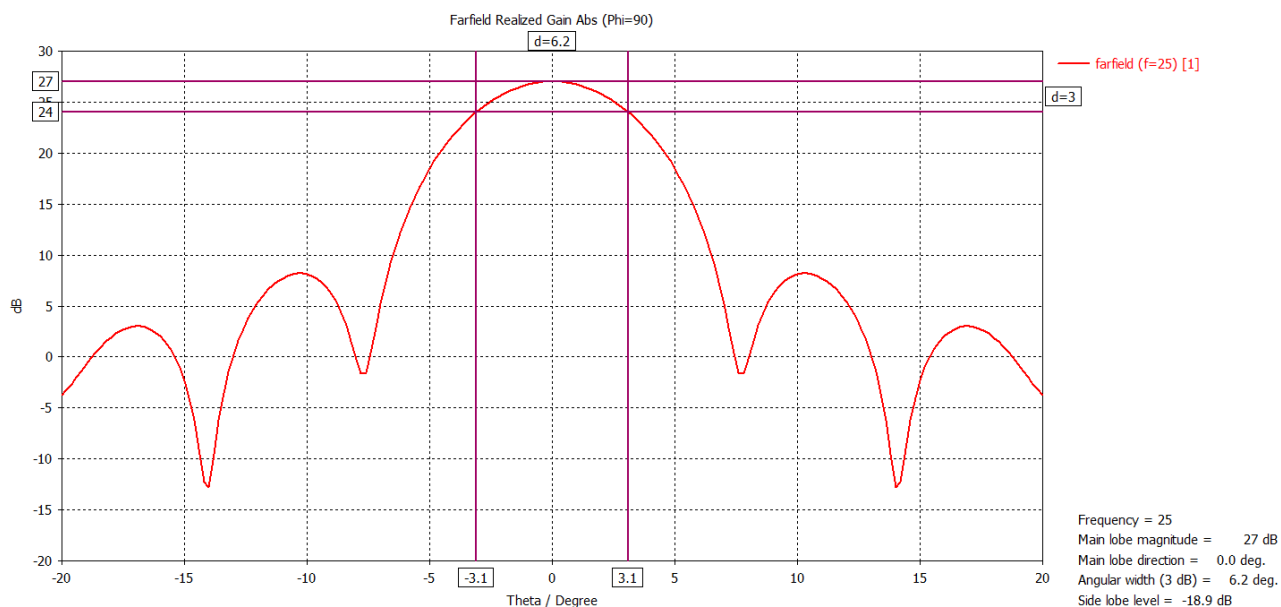


2.12.2 Radiation pattern in H-plane

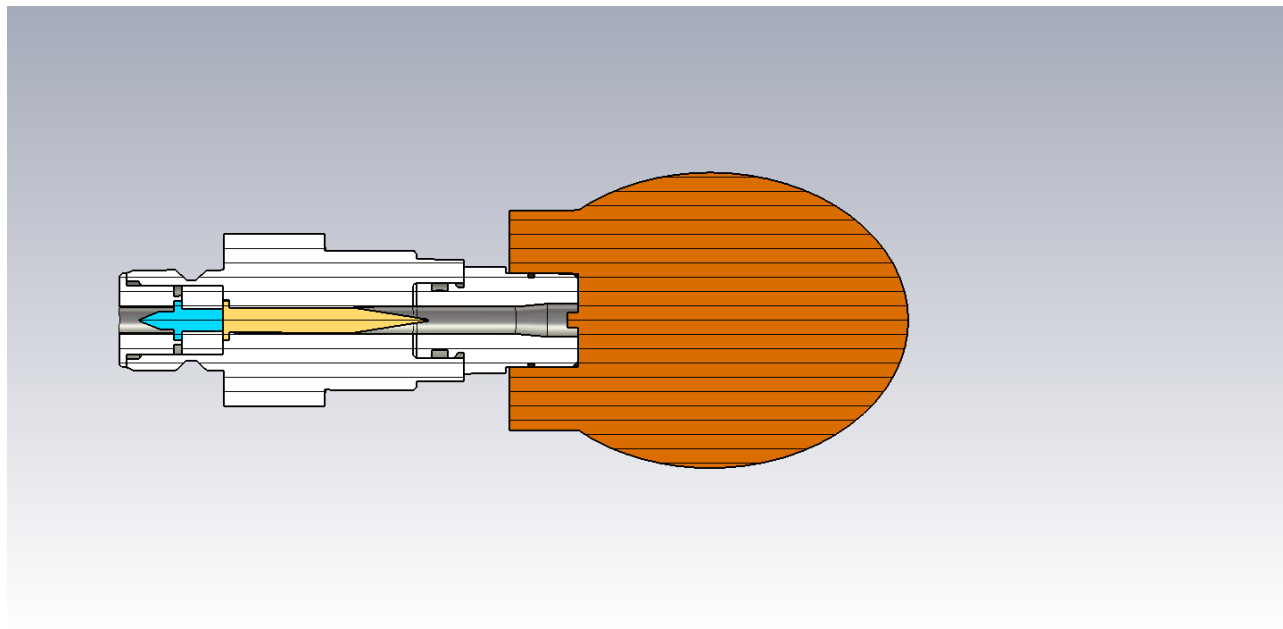


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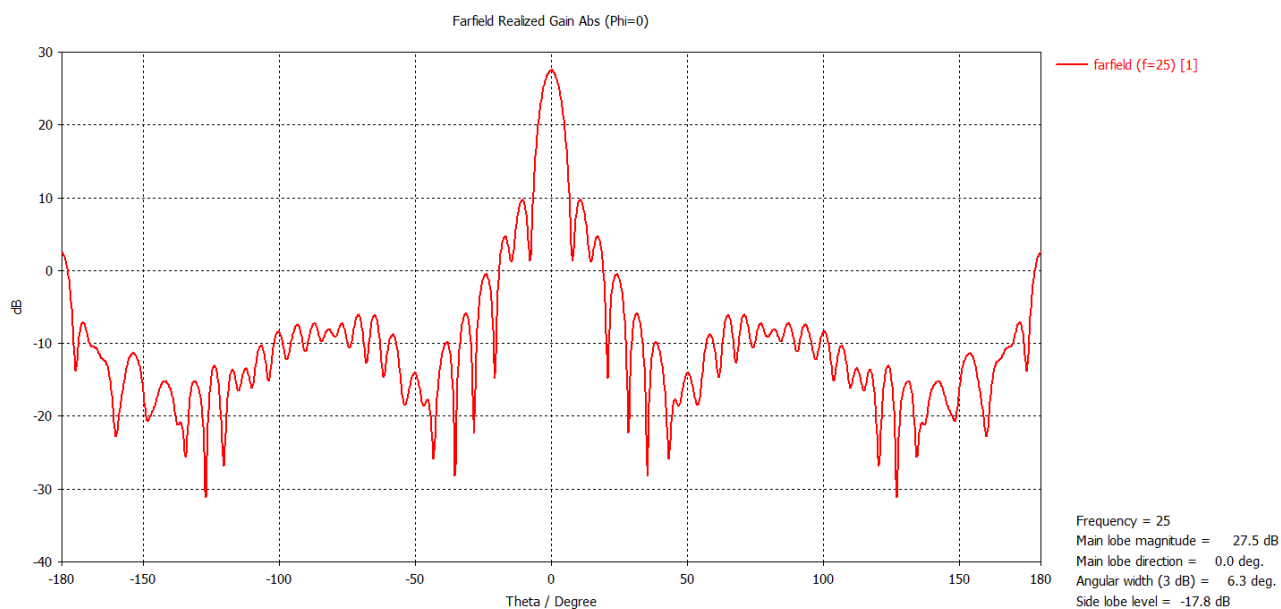


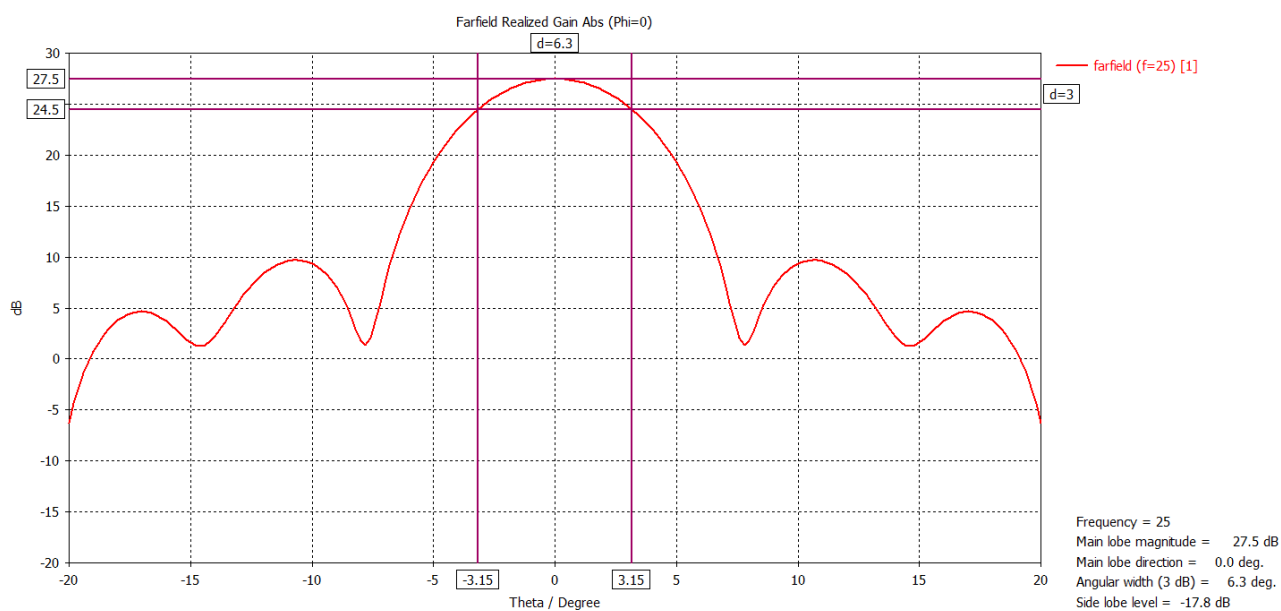
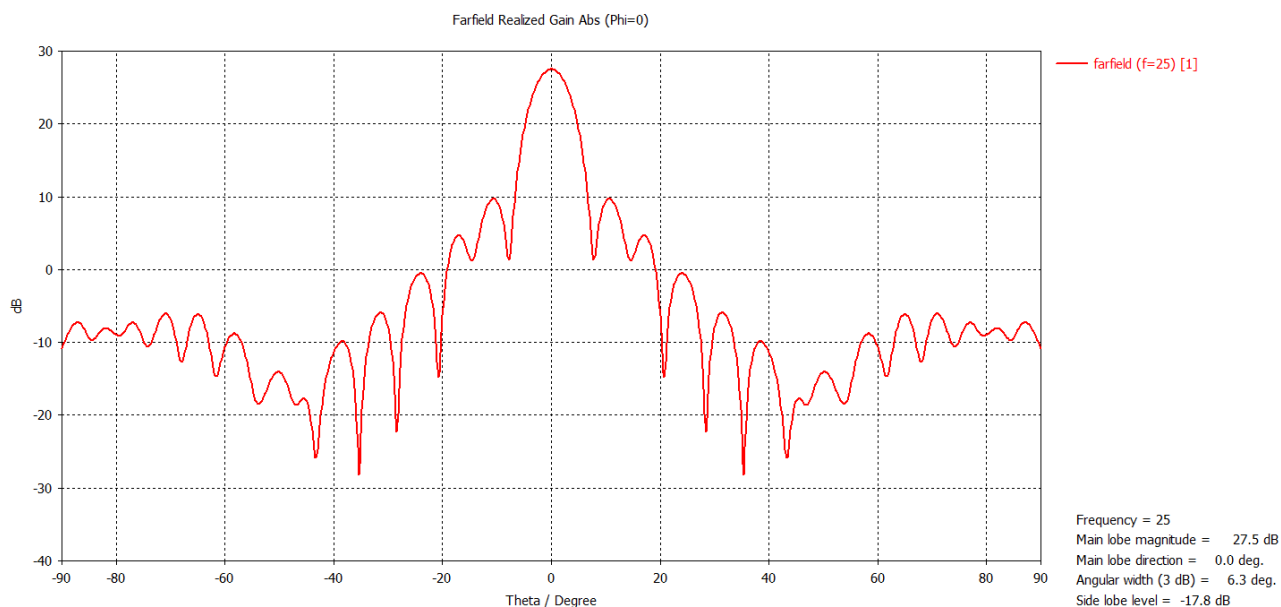


2.13 PP / DN100 (4") Drop

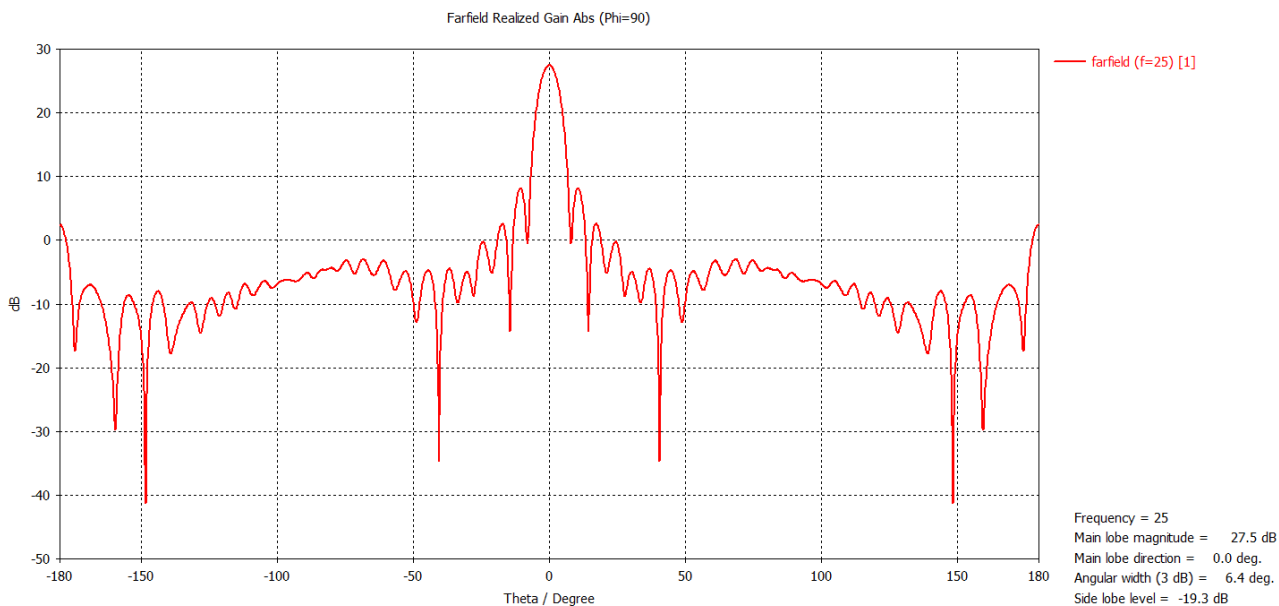


2.13.1 Radiation pattern in E-plane

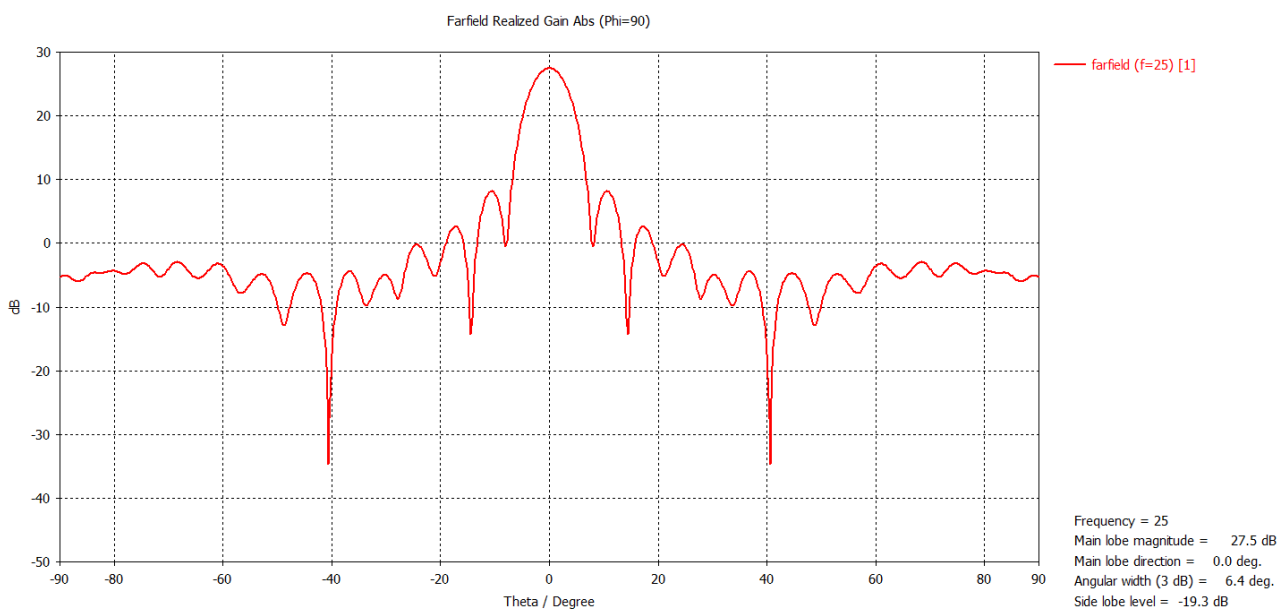


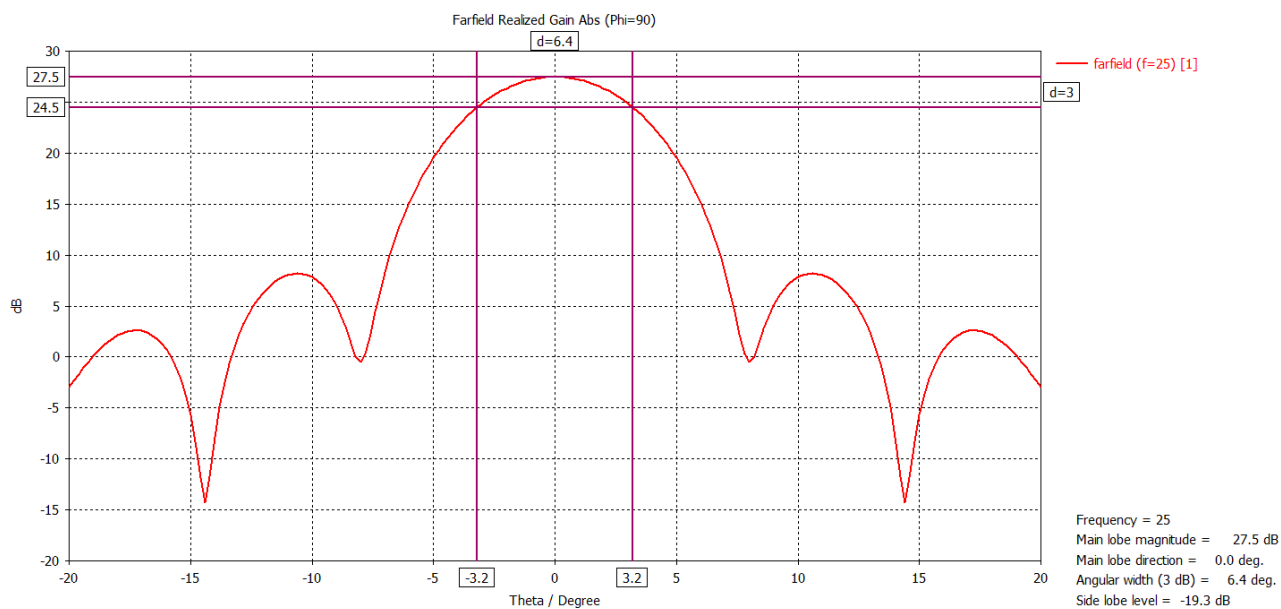


2.13.2 Radiation pattern in H-plane

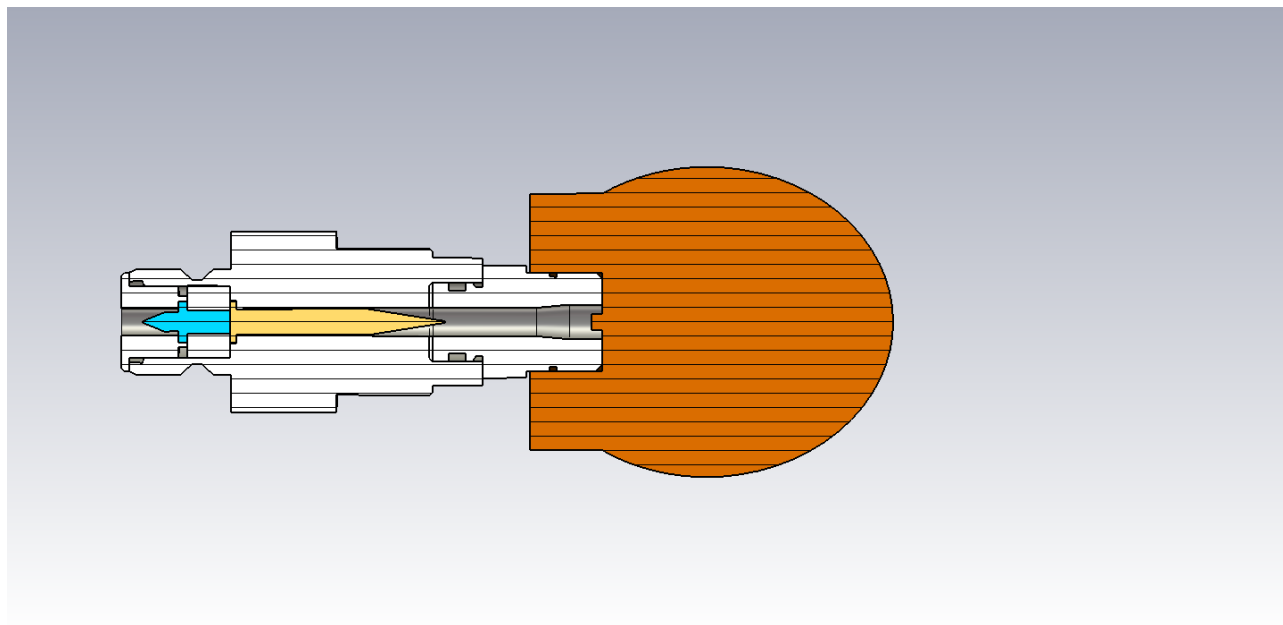


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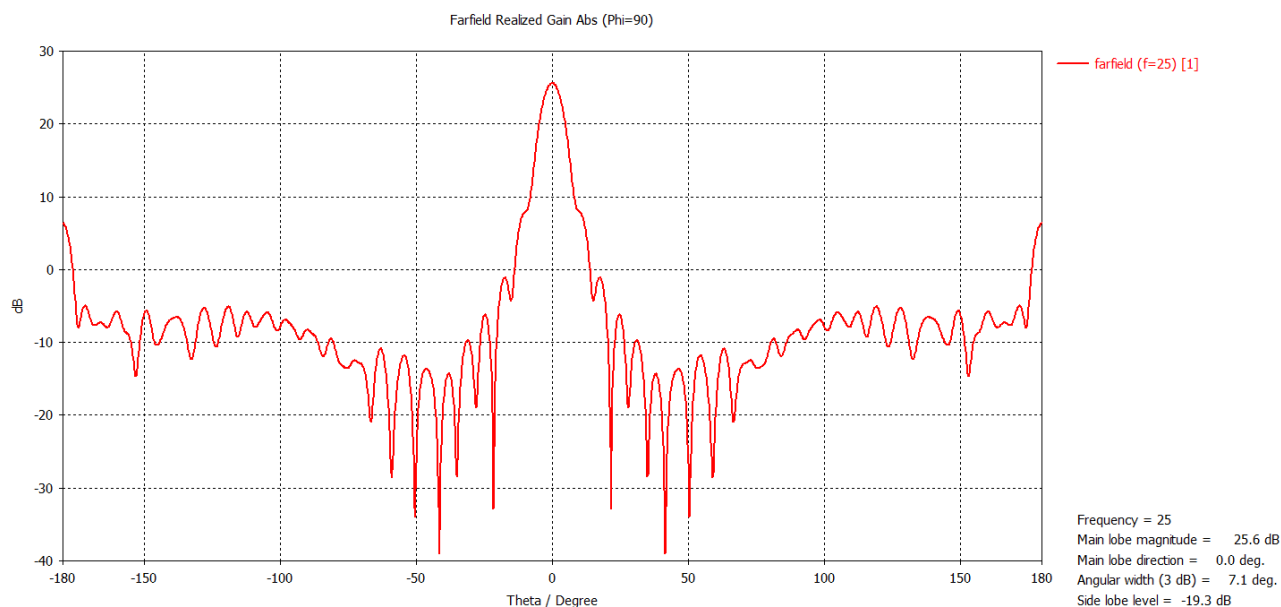


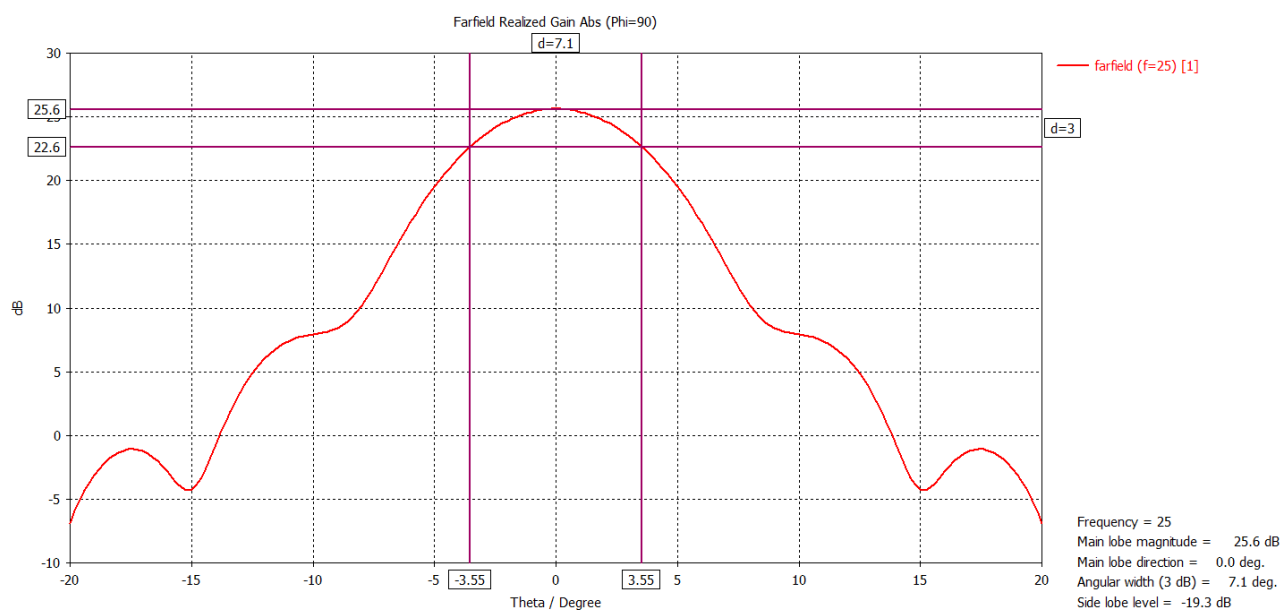
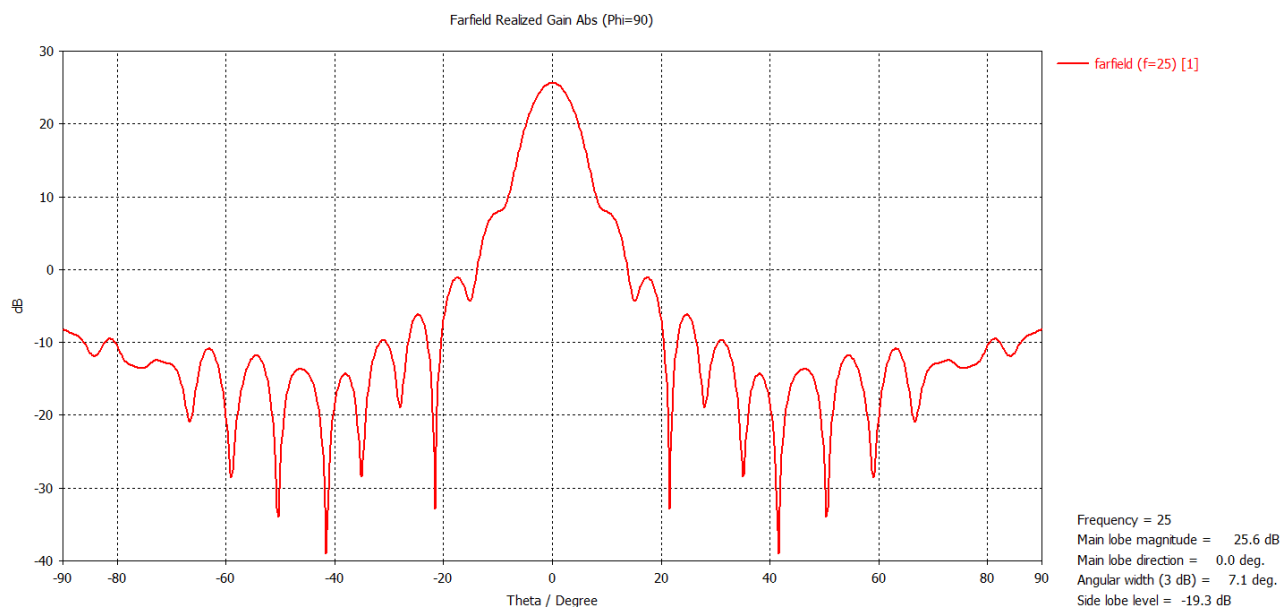


2.14 PEEK / DN100 (4") Drop

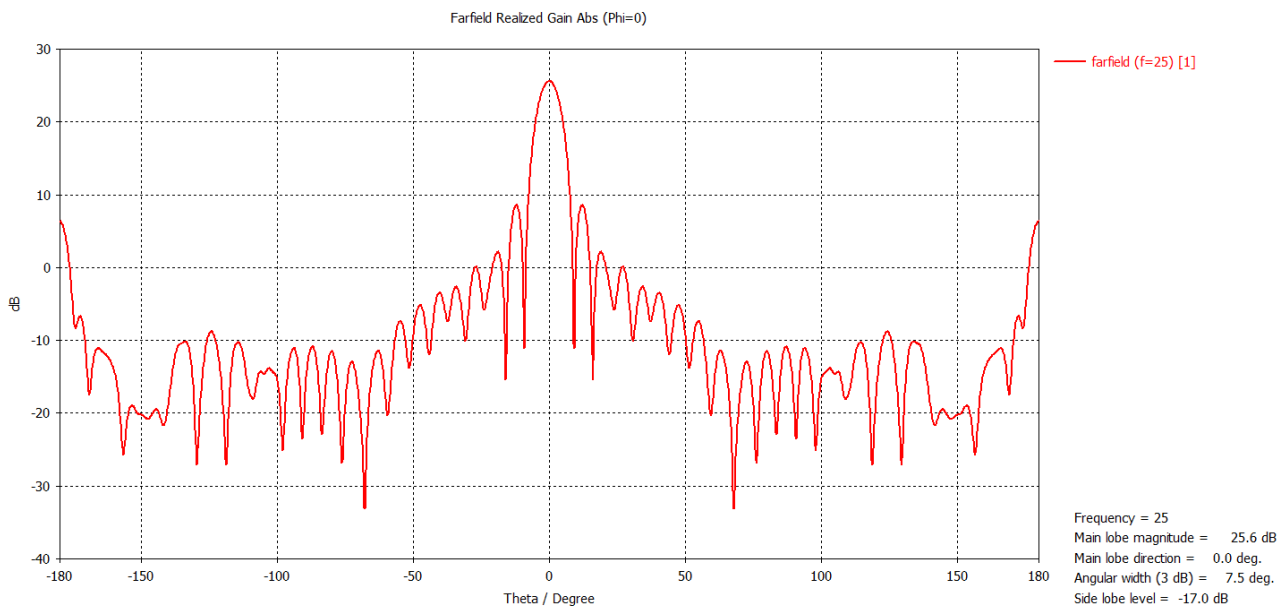


2.14.1 Radiation pattern in E-plane

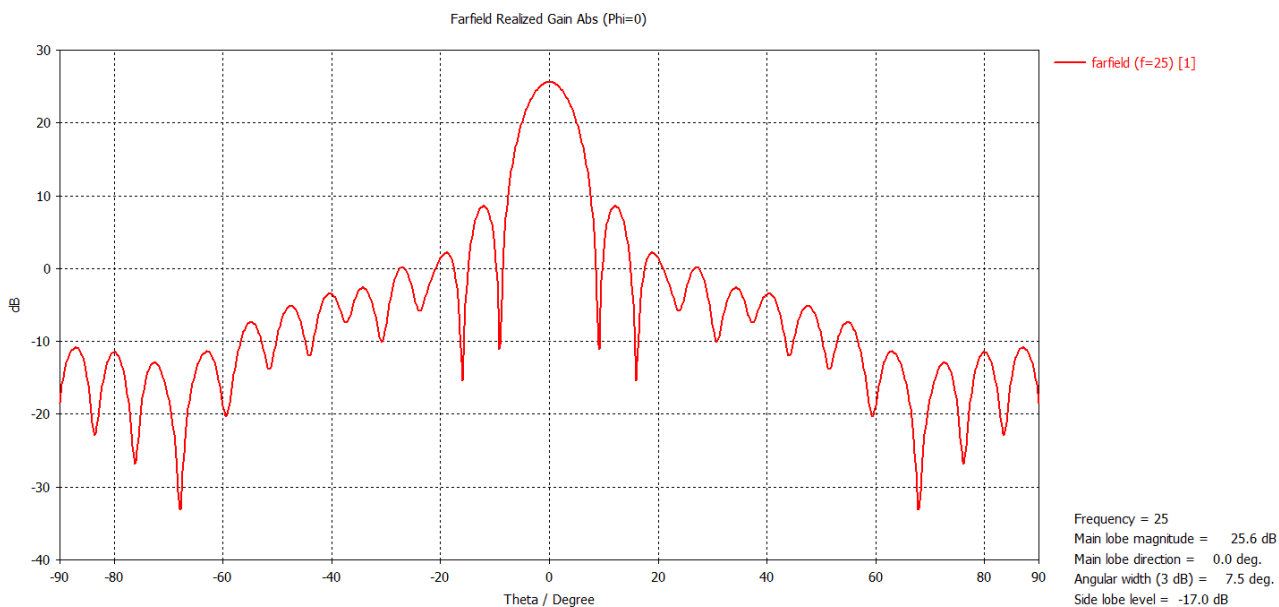


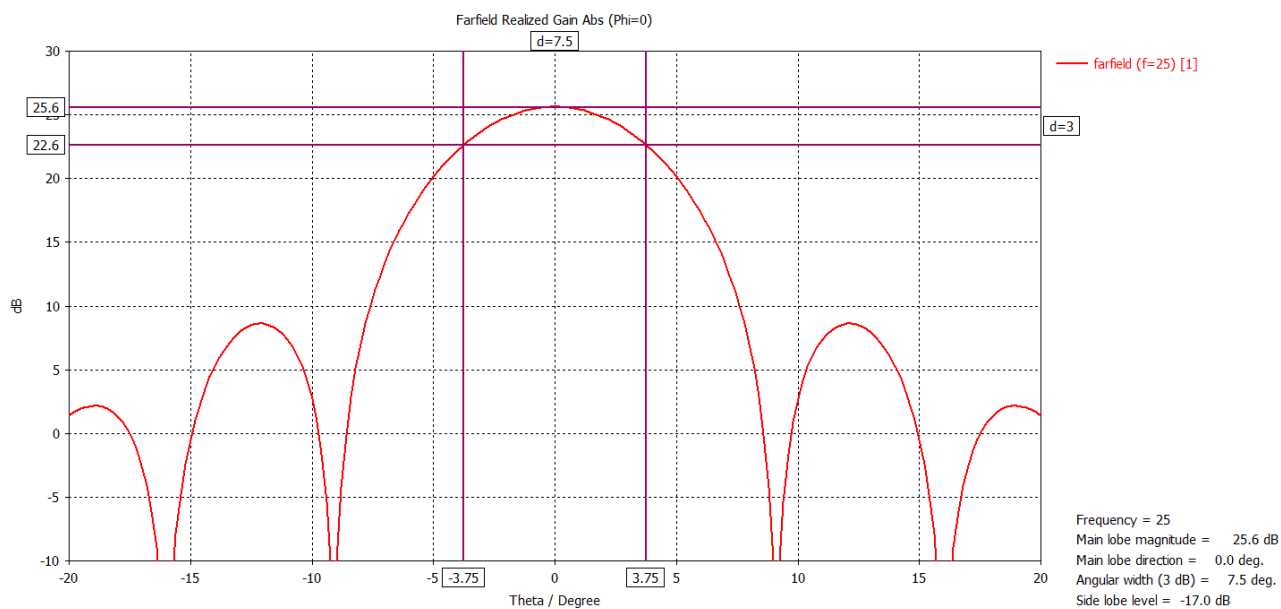


2.14.2 Radiation pattern in H-plane

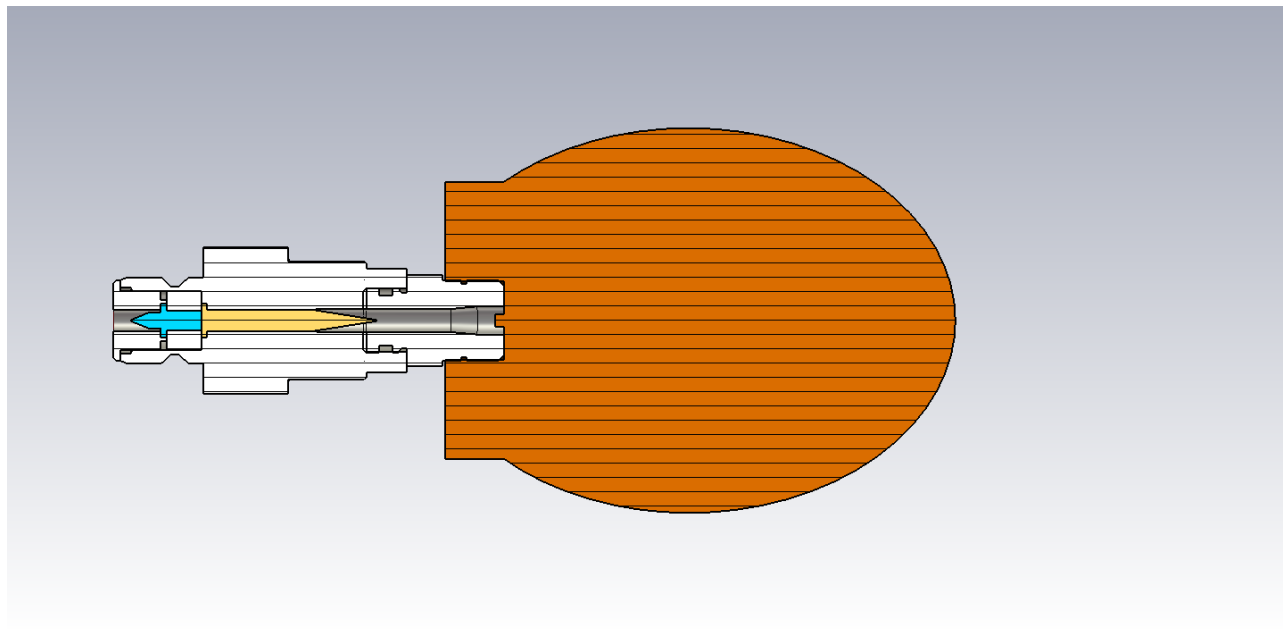


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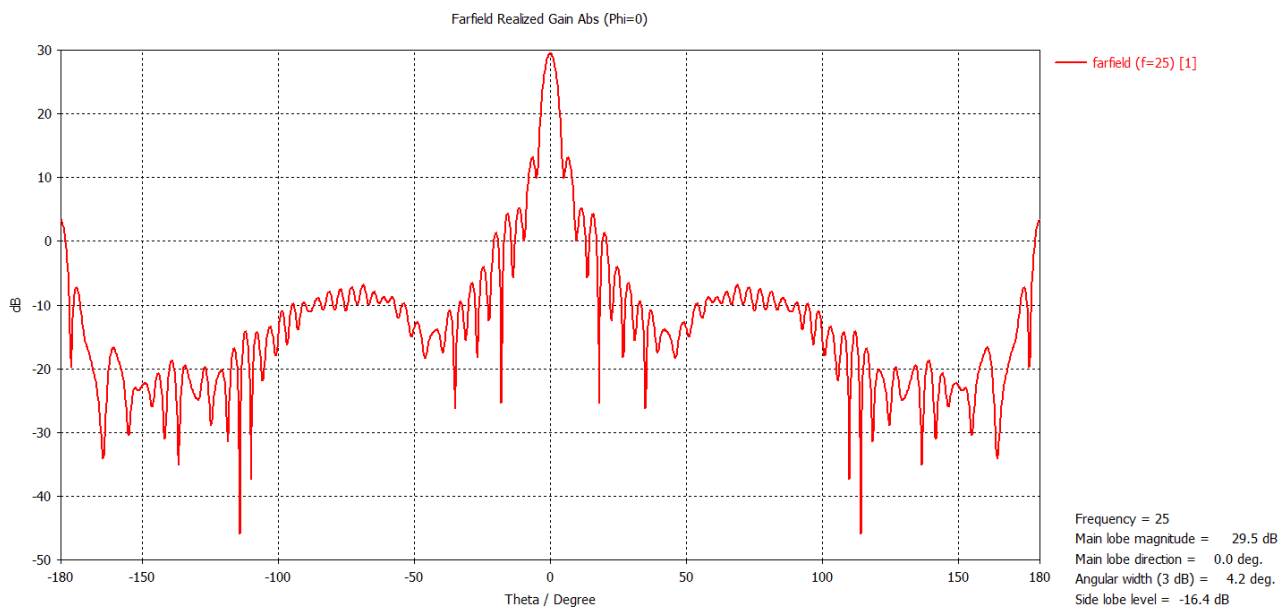


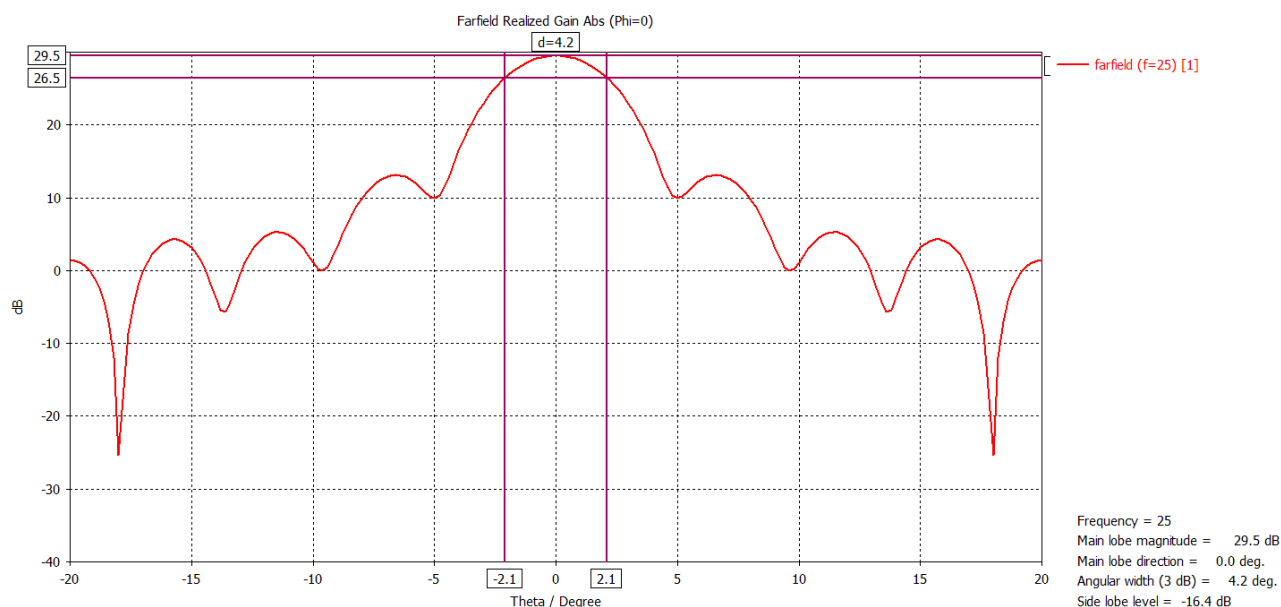
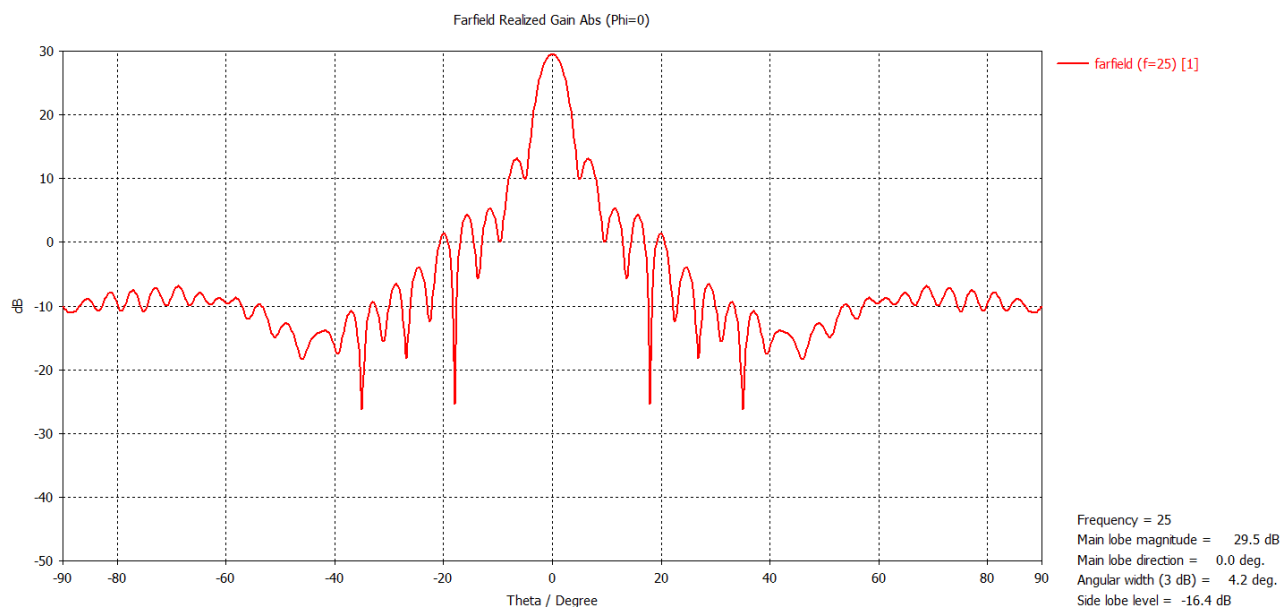
2.15 PTFE / DN150 (6") Drop



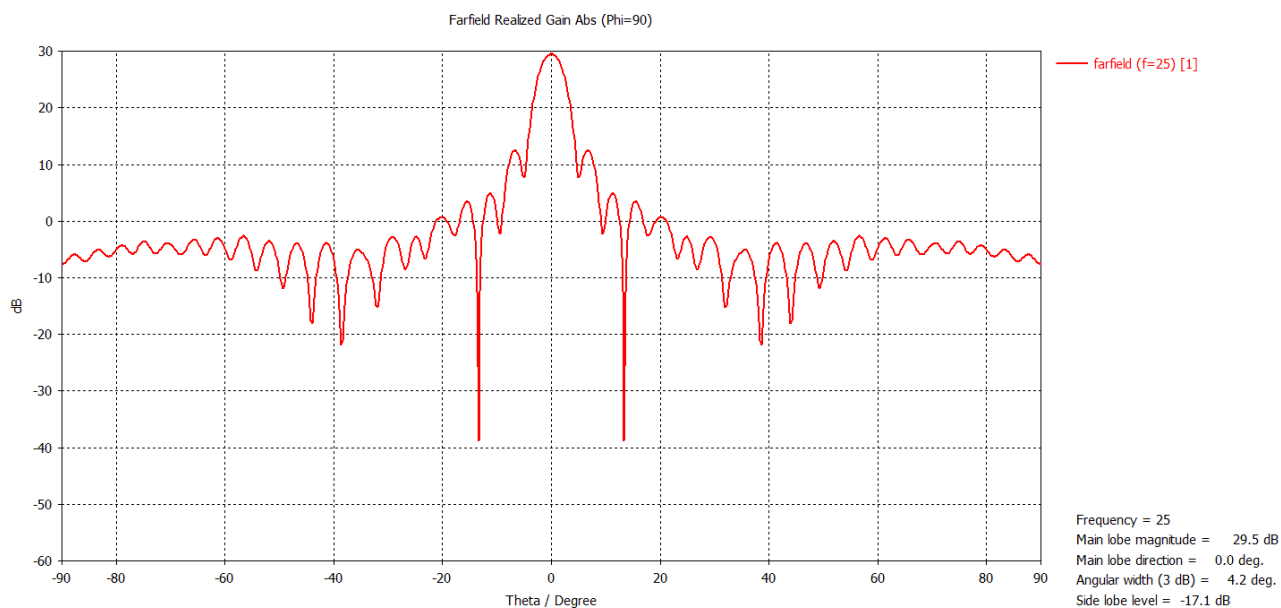
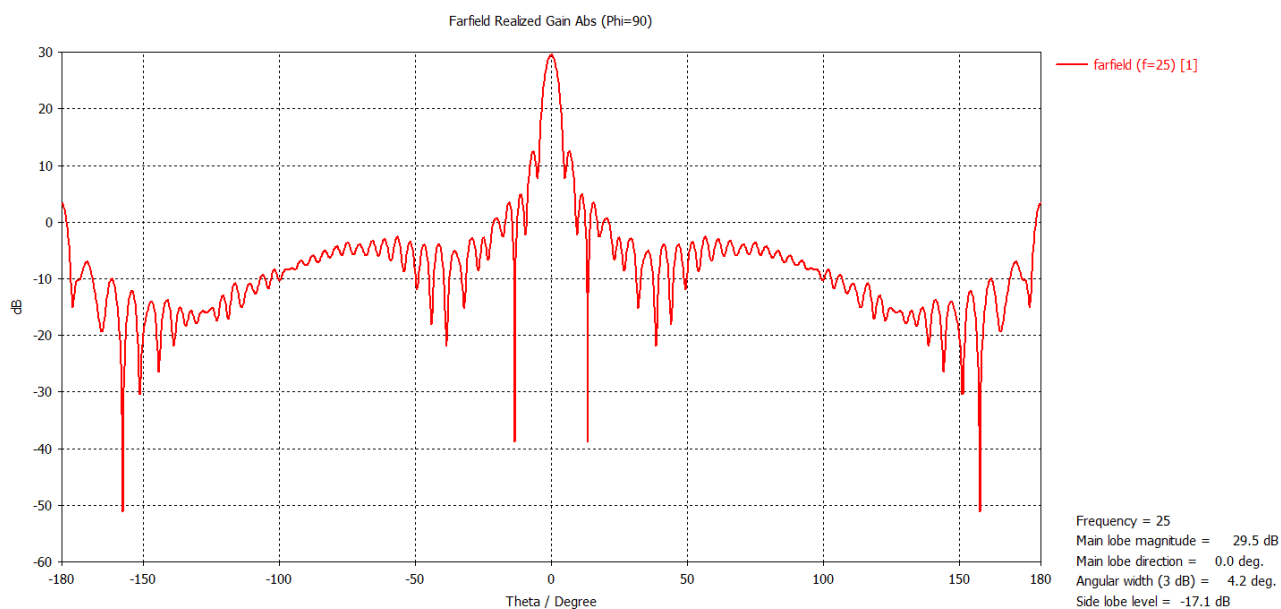
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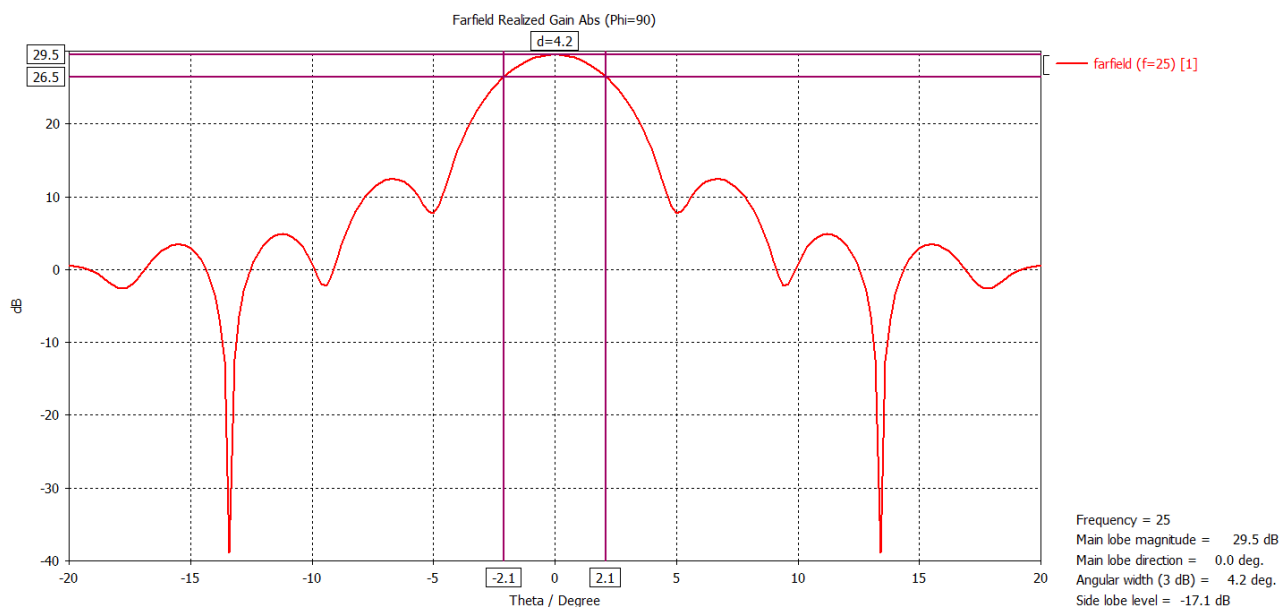
2.15.1 Radiation pattern in E-plane



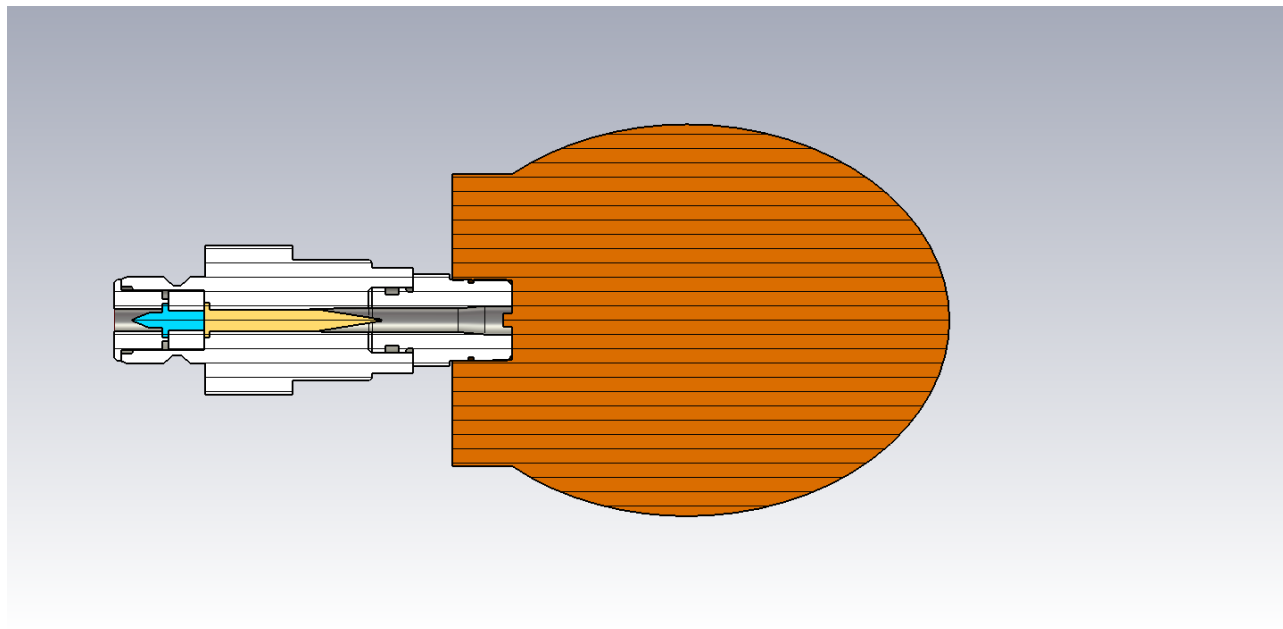


2.15.2 Radiation pattern in H-plane



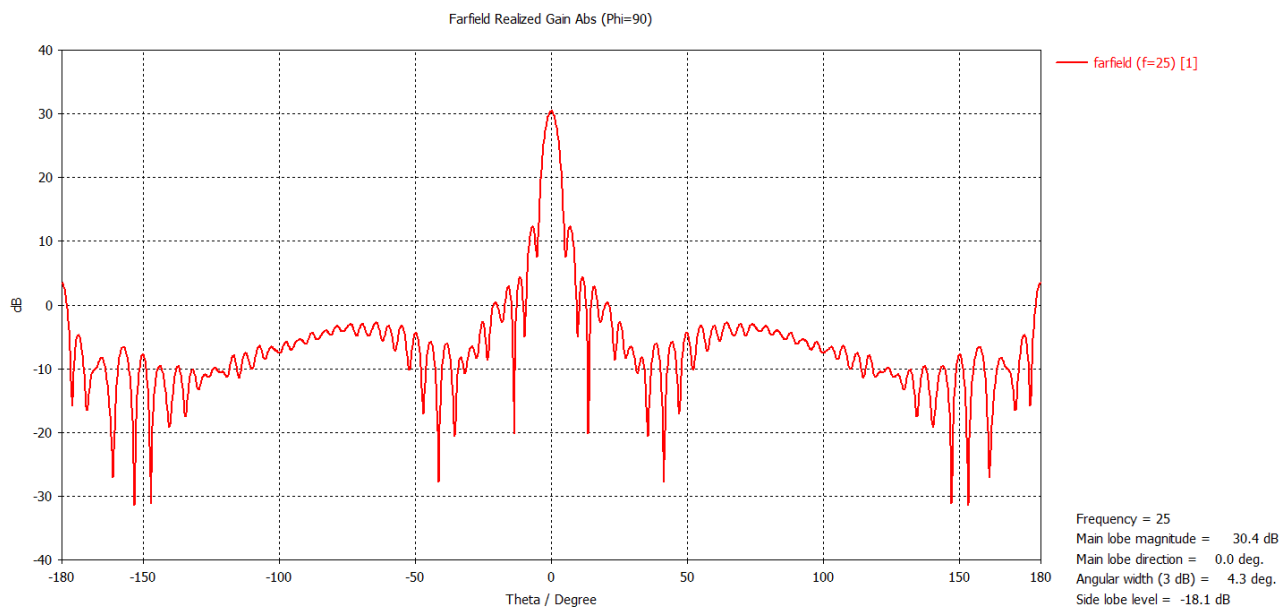


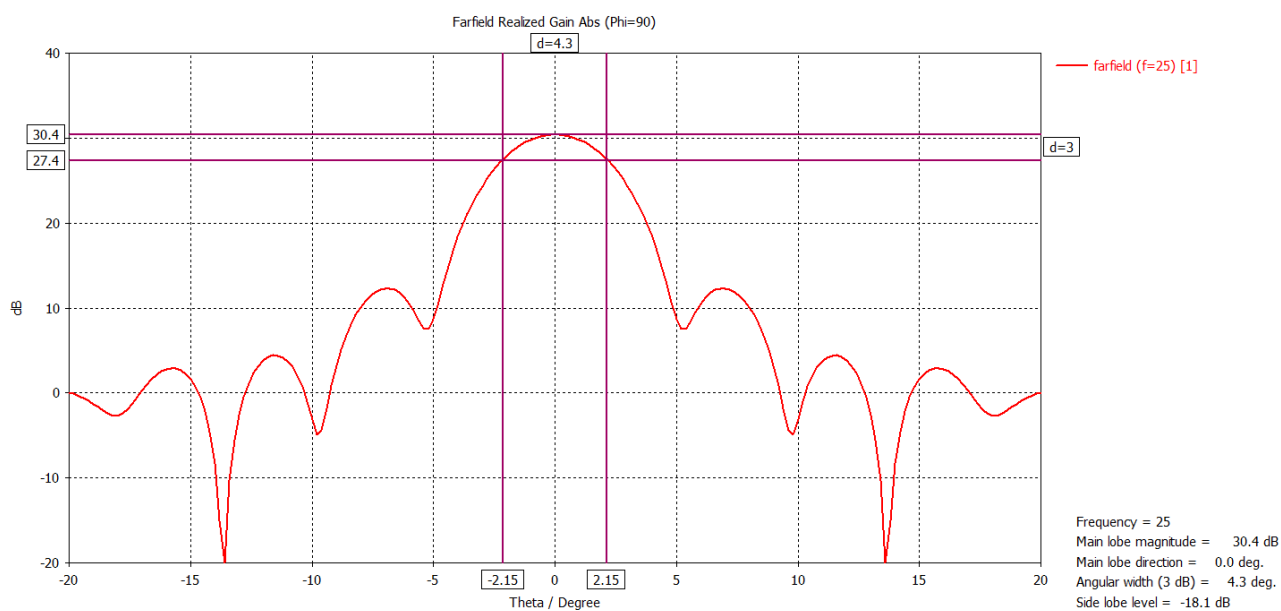
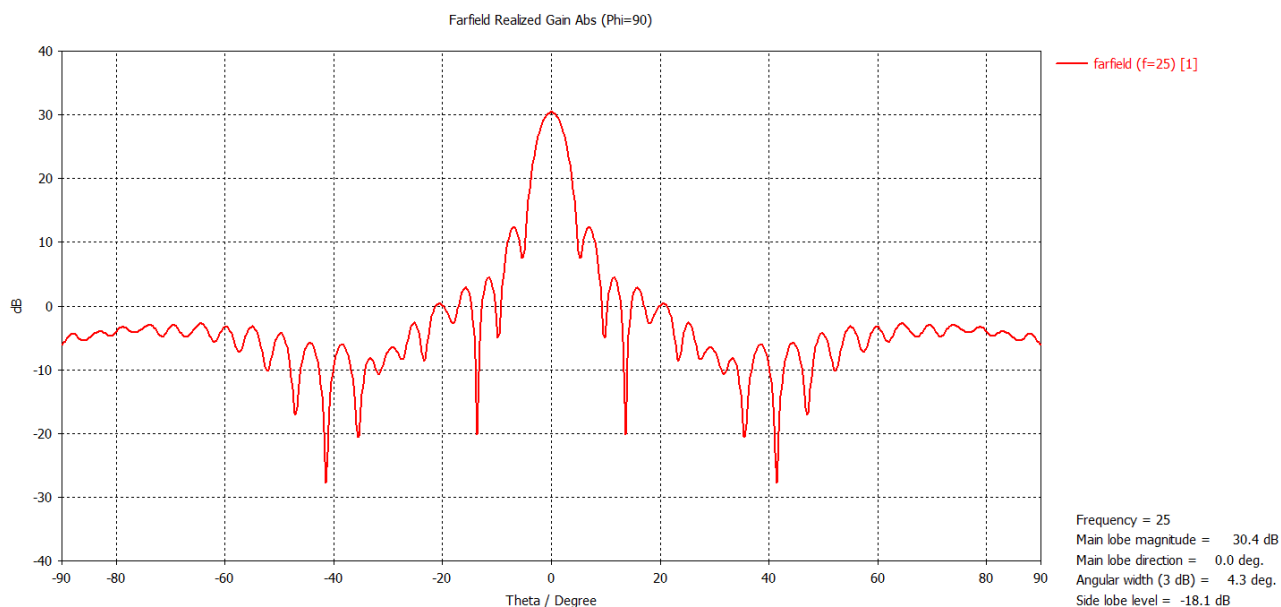
2.16 PP / DN150 (6") Drop antenna



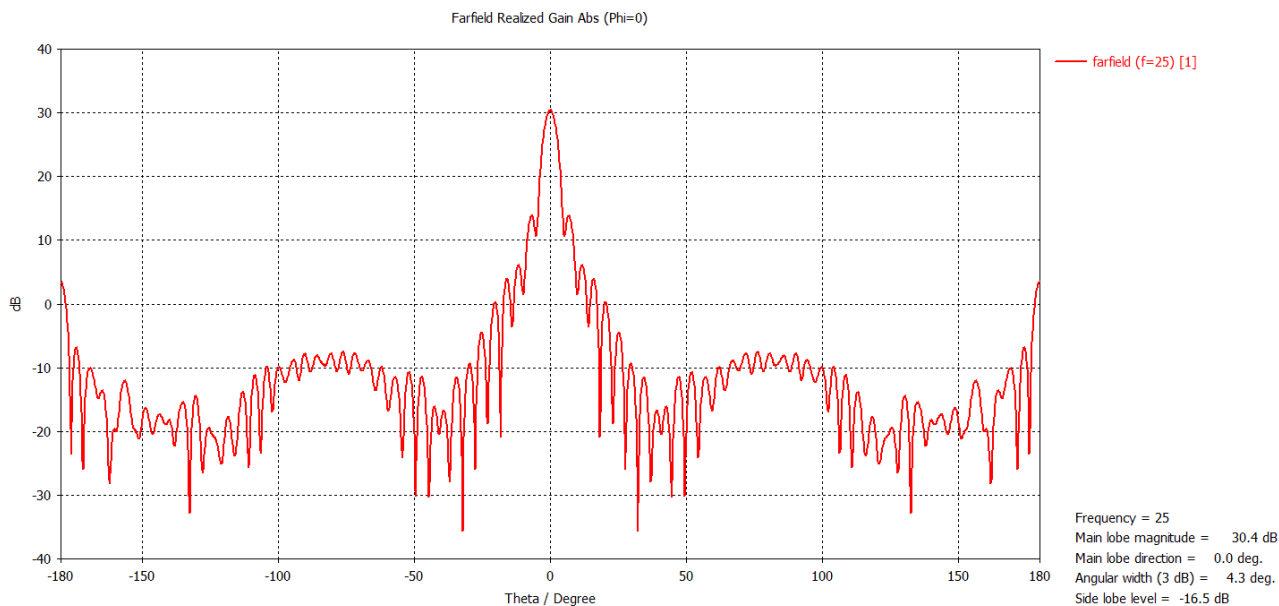
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2.16.1 Radiation pattern in E-plane

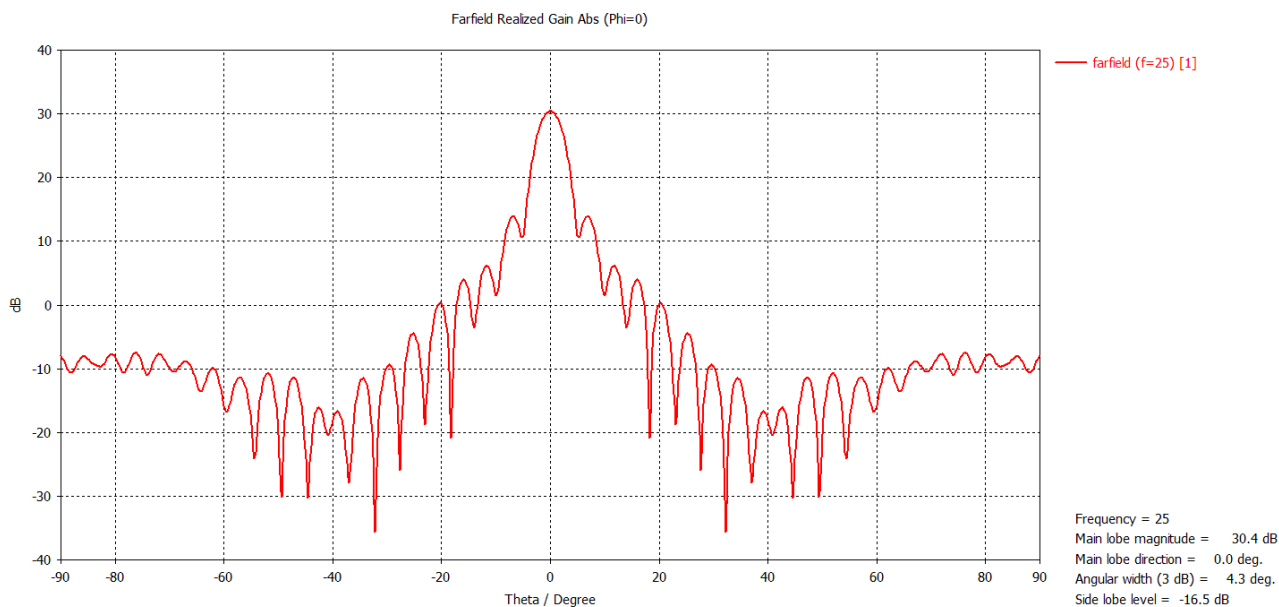


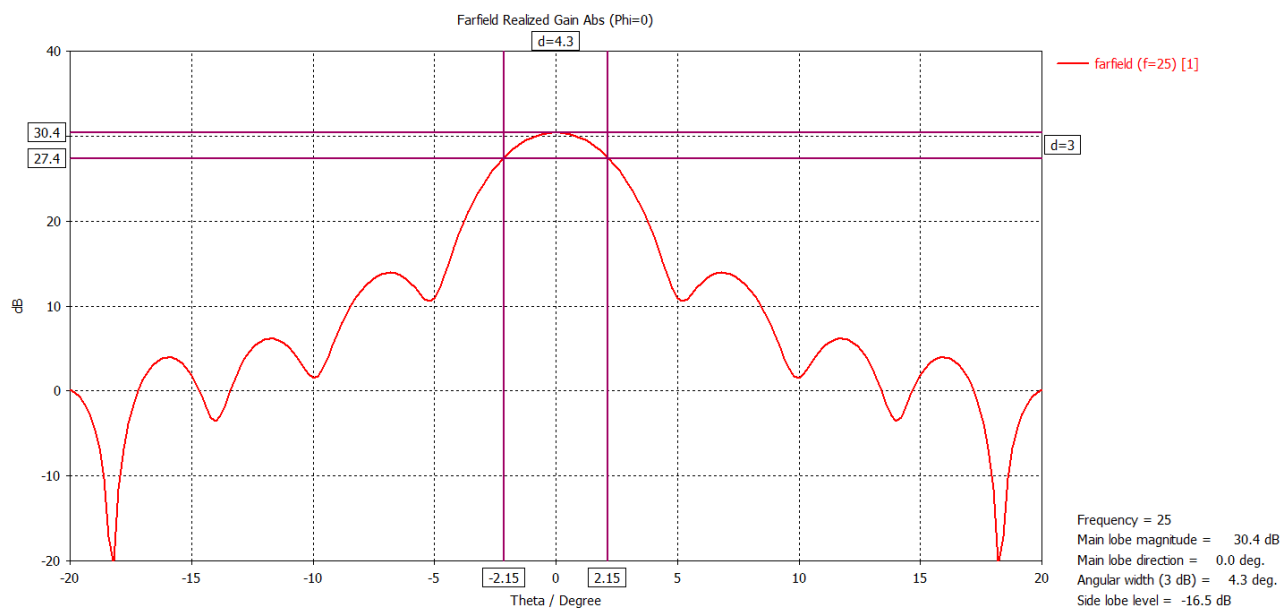


2.16.2 Radiation pattern in H-plane

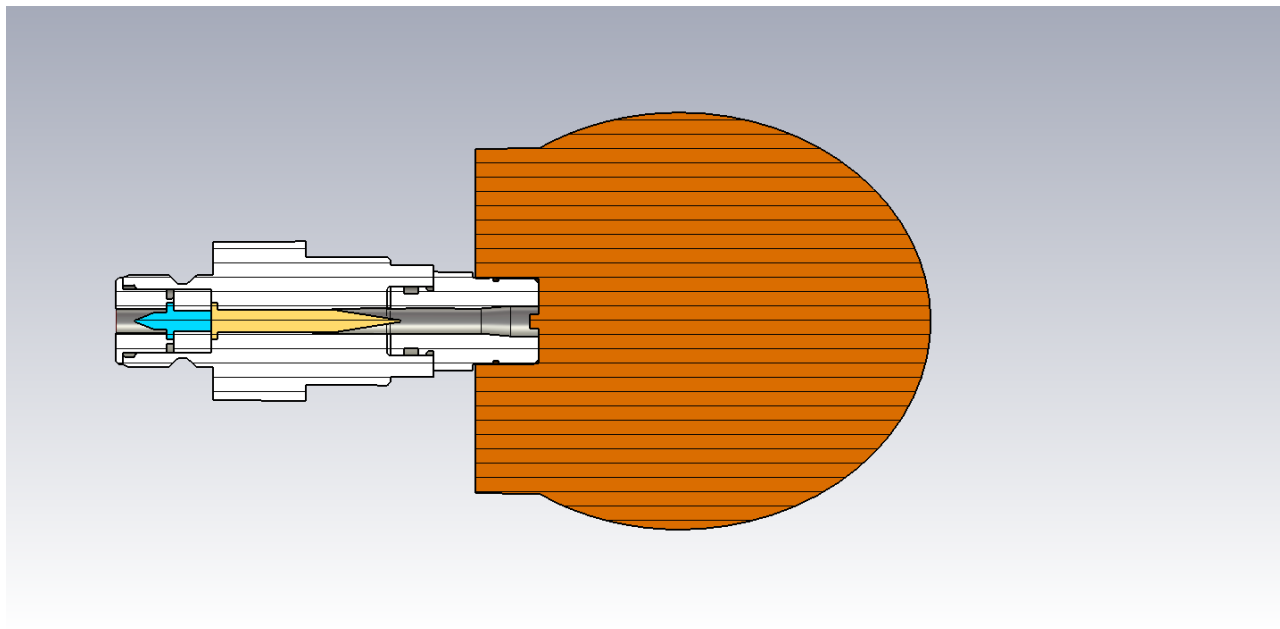


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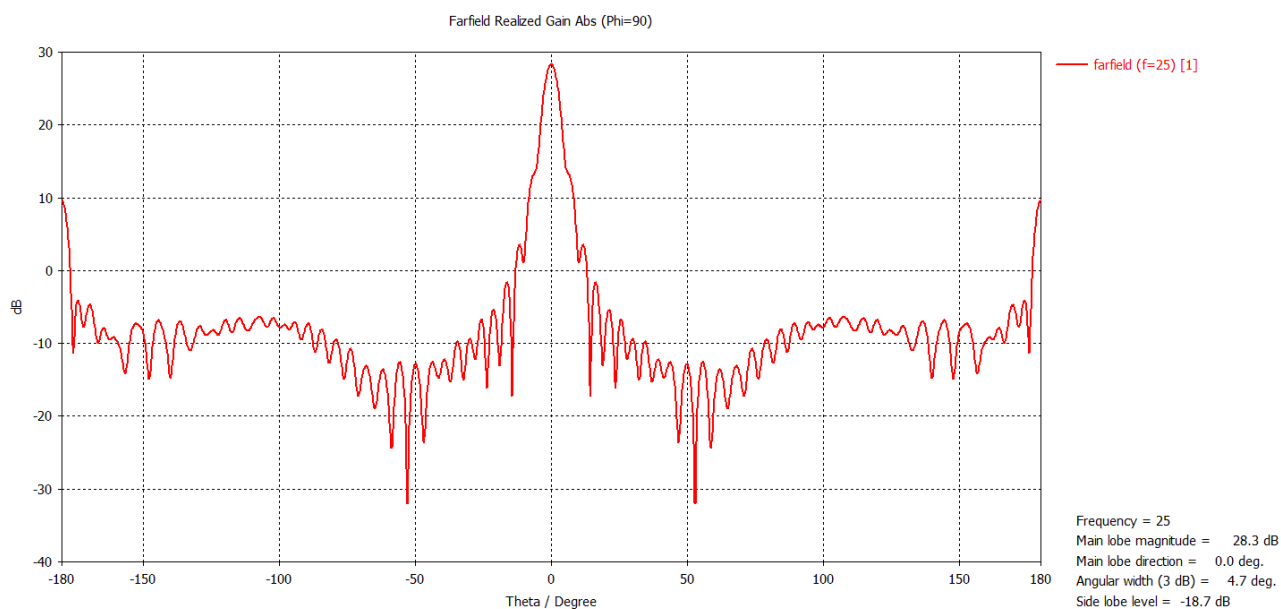


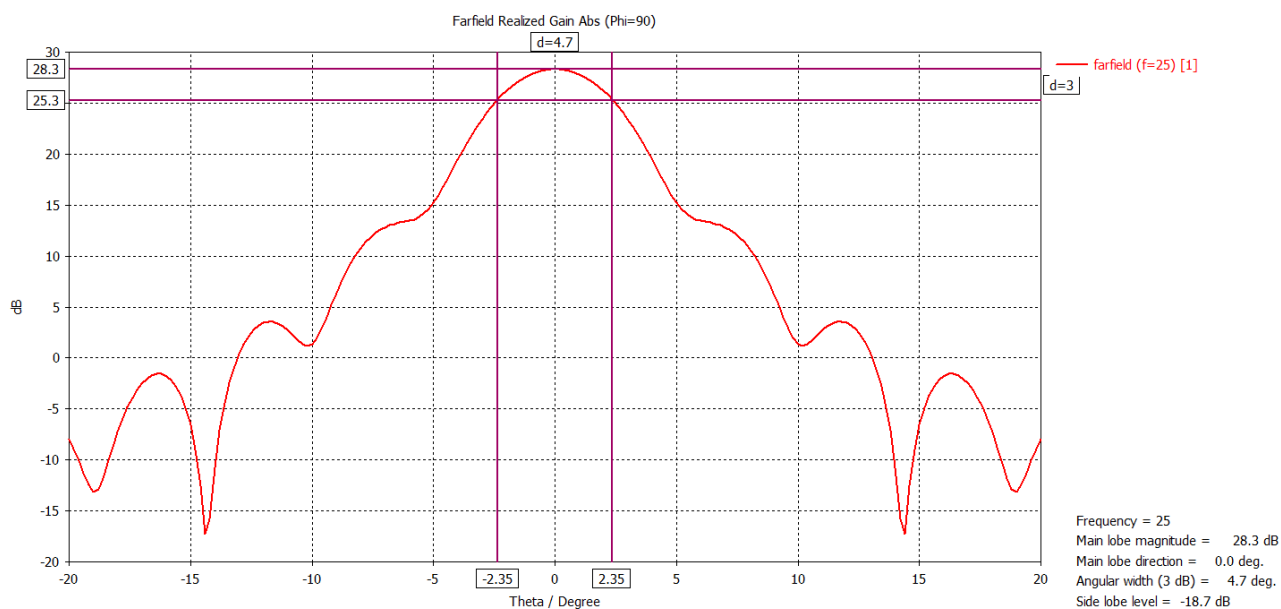
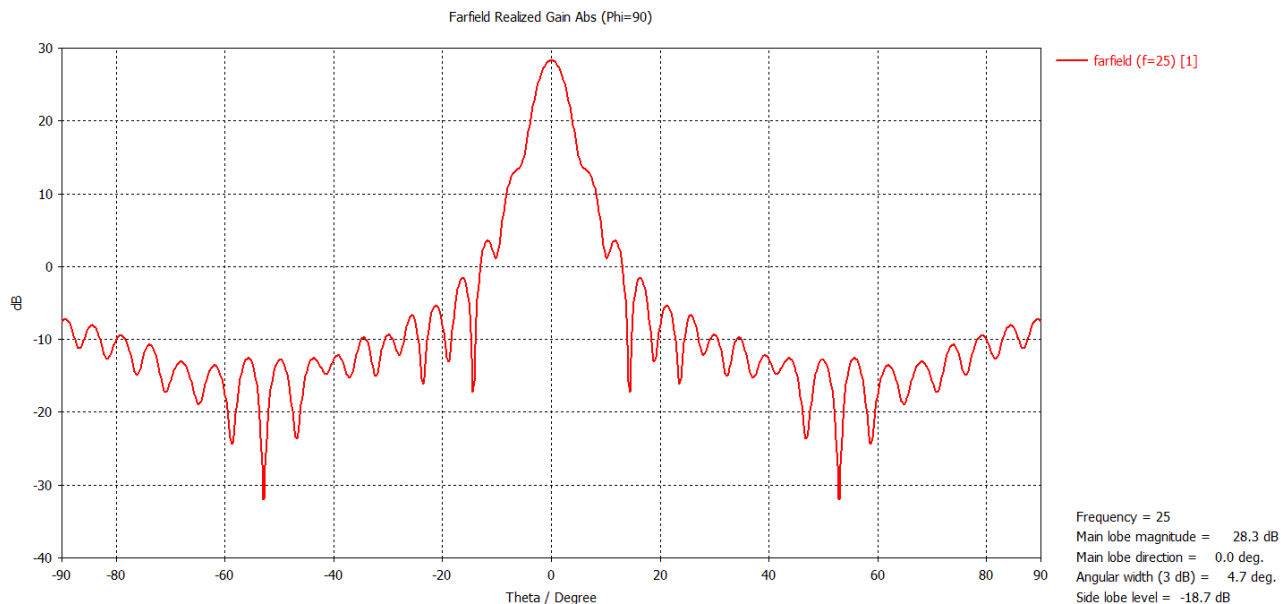


2.17 PEEK / DN150 (6") Drop

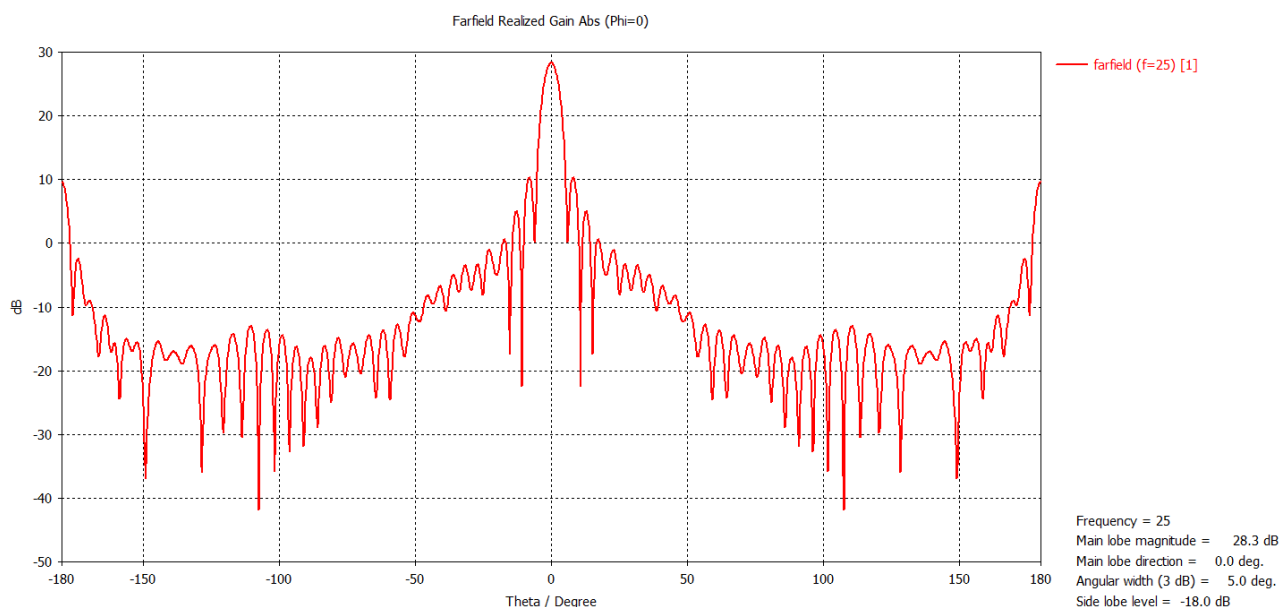


2.17.1 Radiation pattern in E-plane

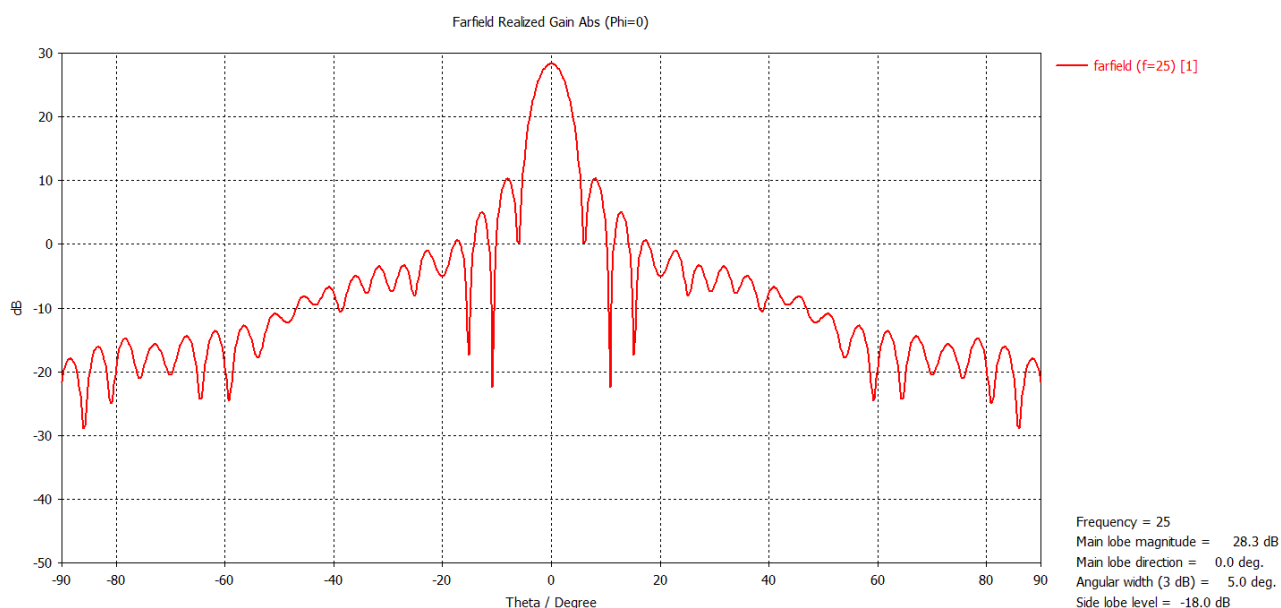


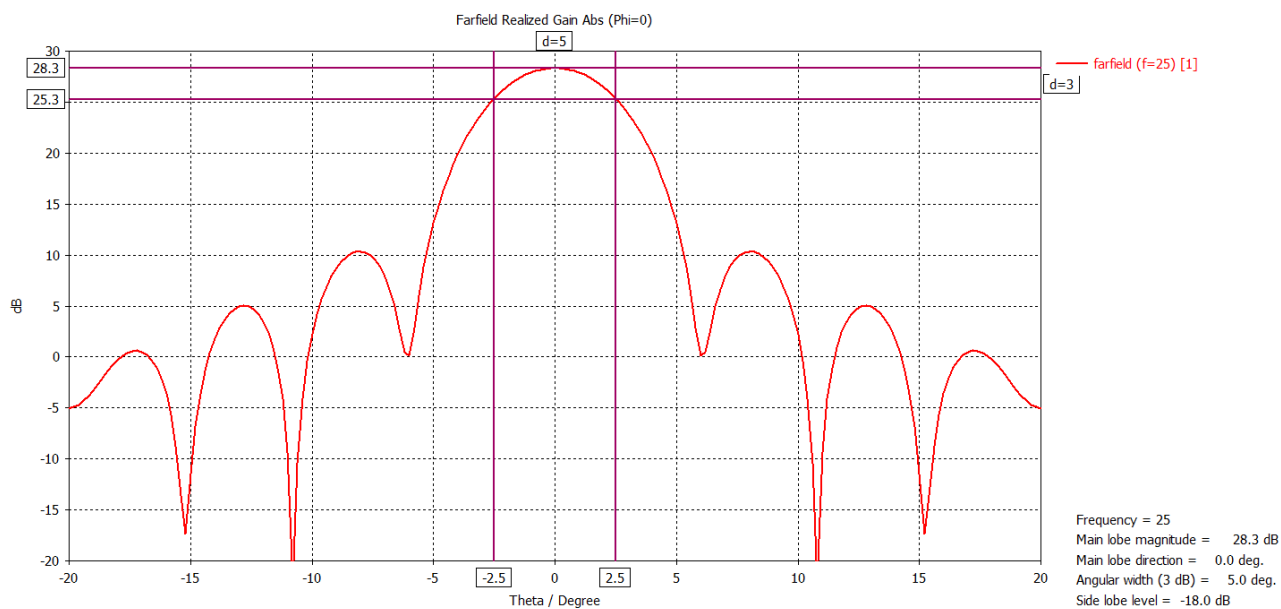


2.17.2 Radiation pattern in H-plane



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2.18 Overview of TLPR antennas

Type	Gain [dB]	Angular width E- / H-plane [°]
316L / DN40 (1.5") Metallic Horn	19.4	16.7 / 11.8
316L / DN50 (2") Metallic Horn	19.9	15.8 / 20.2
316L / DN65 (2.5") Metallic Horn	24.3	9.2 / 11.8
PEEK / Hygienic antenna	20.5	16.8 / 18.9
316L / DN80 (3") Metallic Horn	24.3	9.2 / 11.8
316L / DN100 (4") Metallic Horn	25.7	7.7 / 9.6
316L / DN150 (6") Metallic Horn	27.7	5.6 / 6.6
316L / DN200 (8") Metallic Horn	28.1	5.1 / 5.8
PTFE / DN80 (3") Drop	25.5	7.6 / 7.5
PP / DN80 (3") Drop	25.8	7.8 / 7.8
PEEK / DN80 (3") Drop	24.0	9.1 / 9.6
PTFE / DN100 (4") Drop	27.0	6.1 / 6.2
PP / DN100 (4") Drop	27.5	6.3 / 6.4
PEEK / DN100 (4") Drop	25.6	7.1 / 7.5
PTFE / DN150 (6") Drop	29.5	4.2 / 4.2
PP / DN150 (6") Drop	30.4	4.3 / 4.3
PEEK / DN150 (6") Drop	28.3	4.7 / 5.0