

Radio approval 24GHZ-L-C**LPR antenna characteristics****C. Ouzounis**

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	0.0	2017-08-21	C.Ouzounis	Created
	0.1	2017-10-04	C.Ouzounis	Updated antenna list
	0.2	2018-01-03	C.Ouzounis	Differentiation between HART and FF/PA standard

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1 Purpose

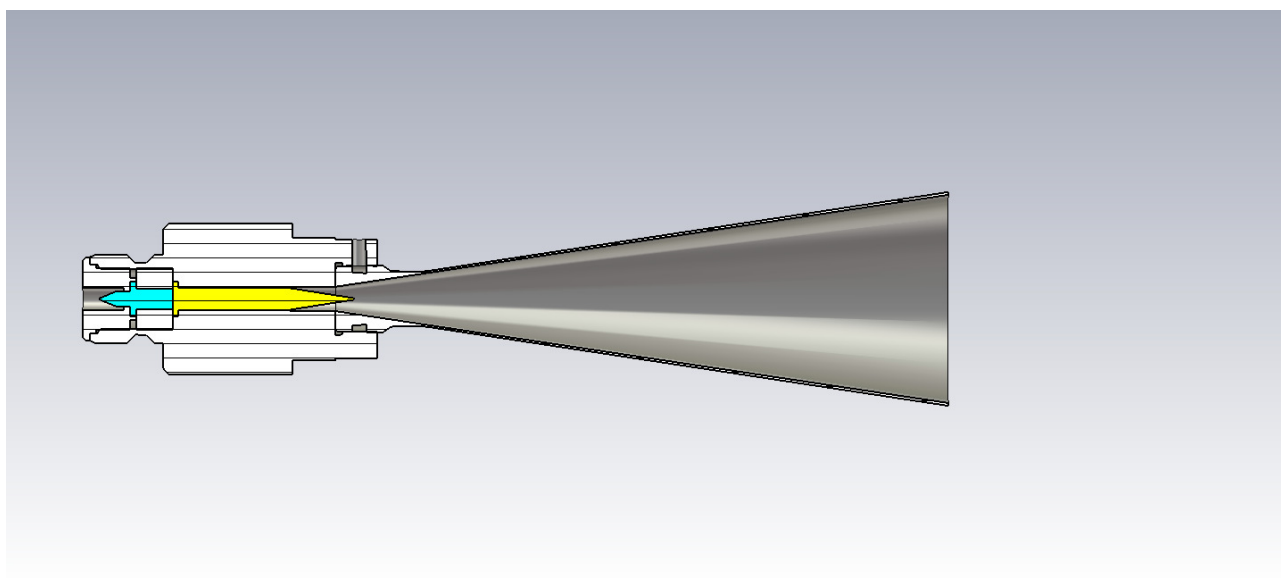
In the following measurements several characteristics of LPR antennas have been performed, like

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

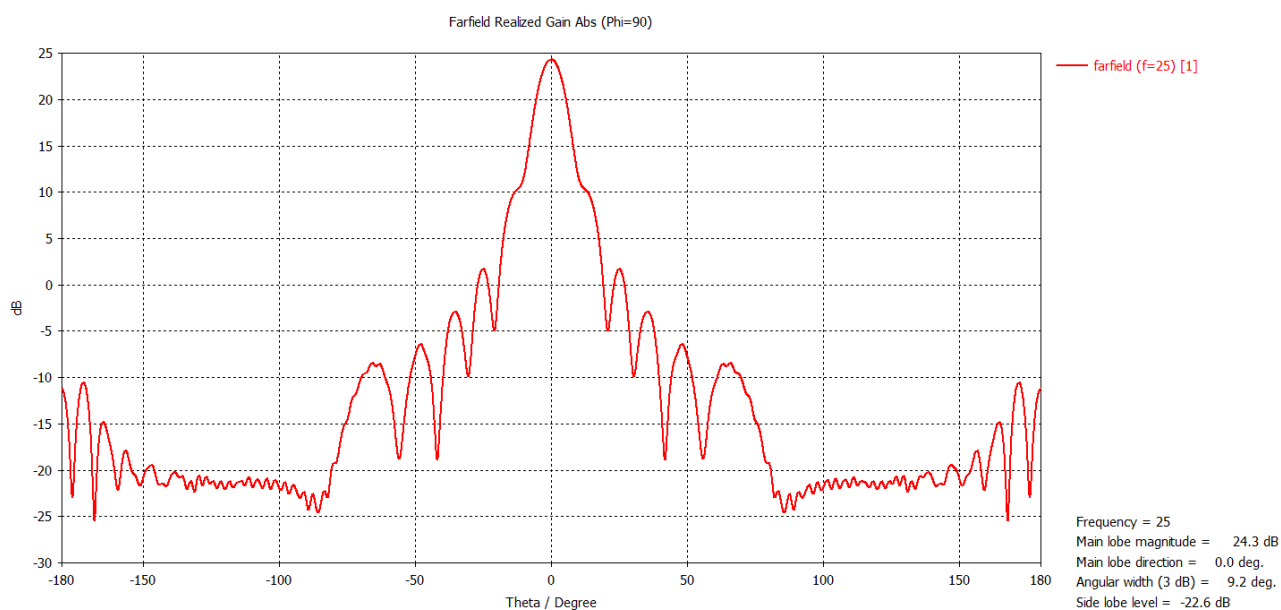
The antenna list is valid for HART devices (PMN: "OPTIWAVE x400 series") and FF/PA devices (PMN: "OPTIWAVE x400 FF-PA series").

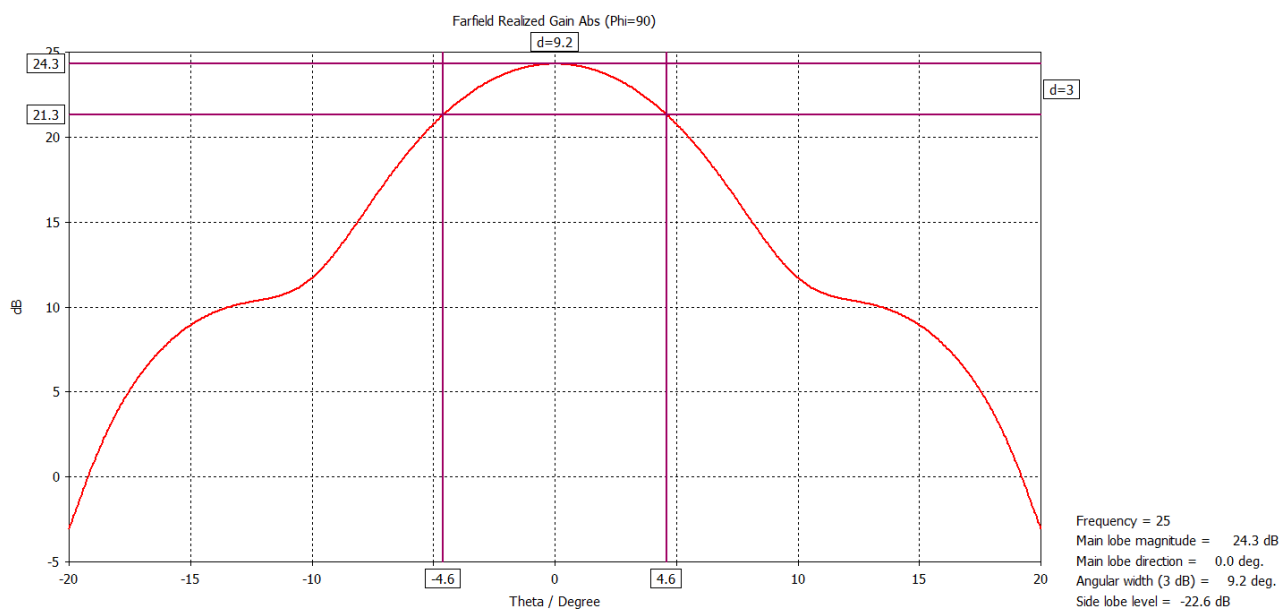
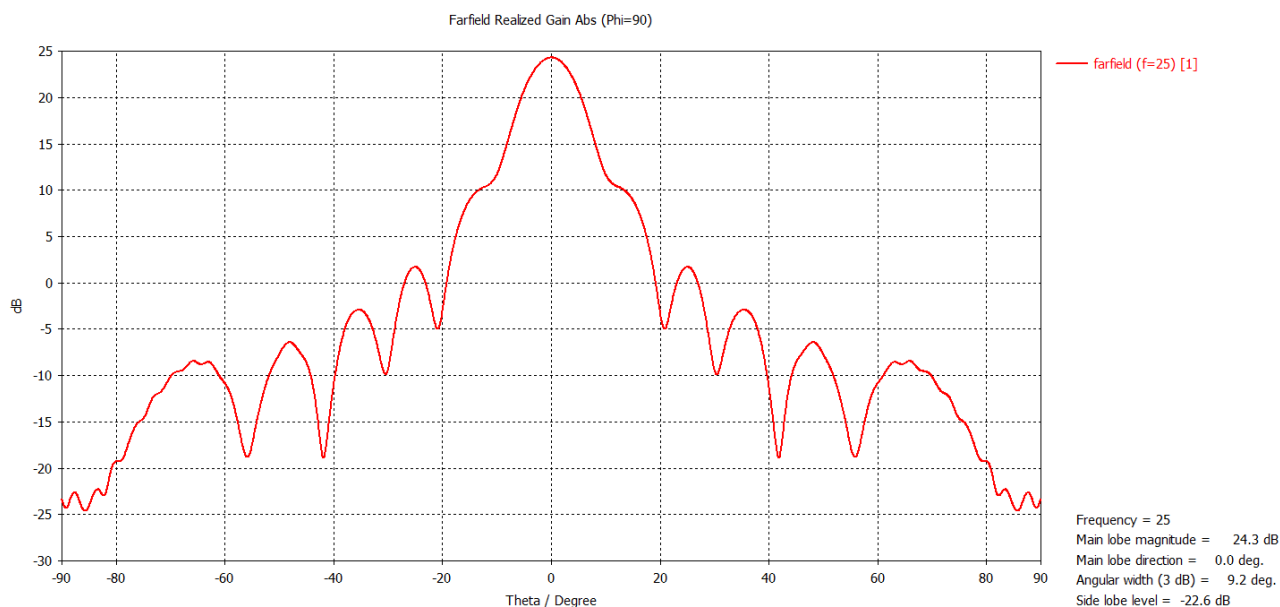
2 Antenna characteristics

2.1 316L / DN80 (3") Metallic Horn

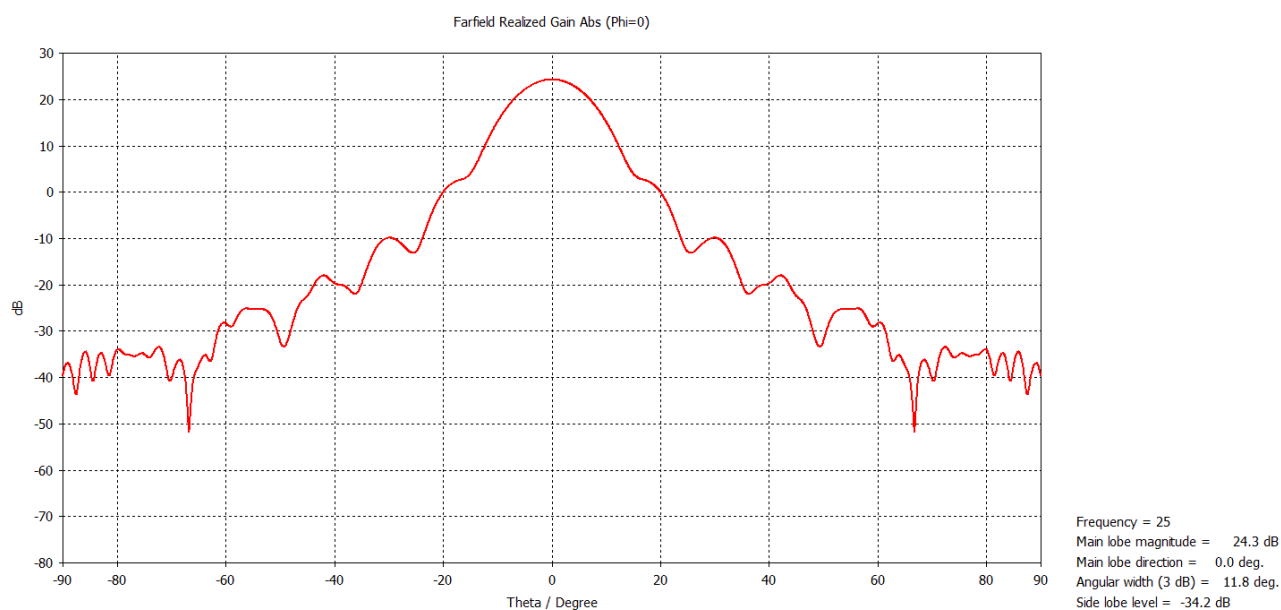
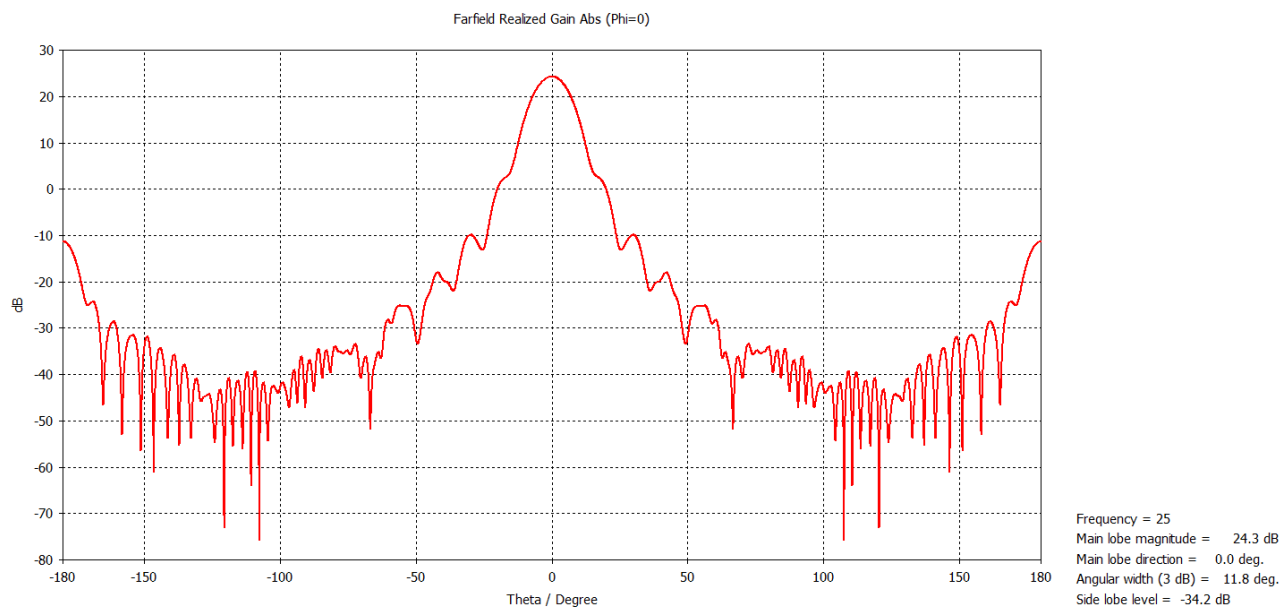


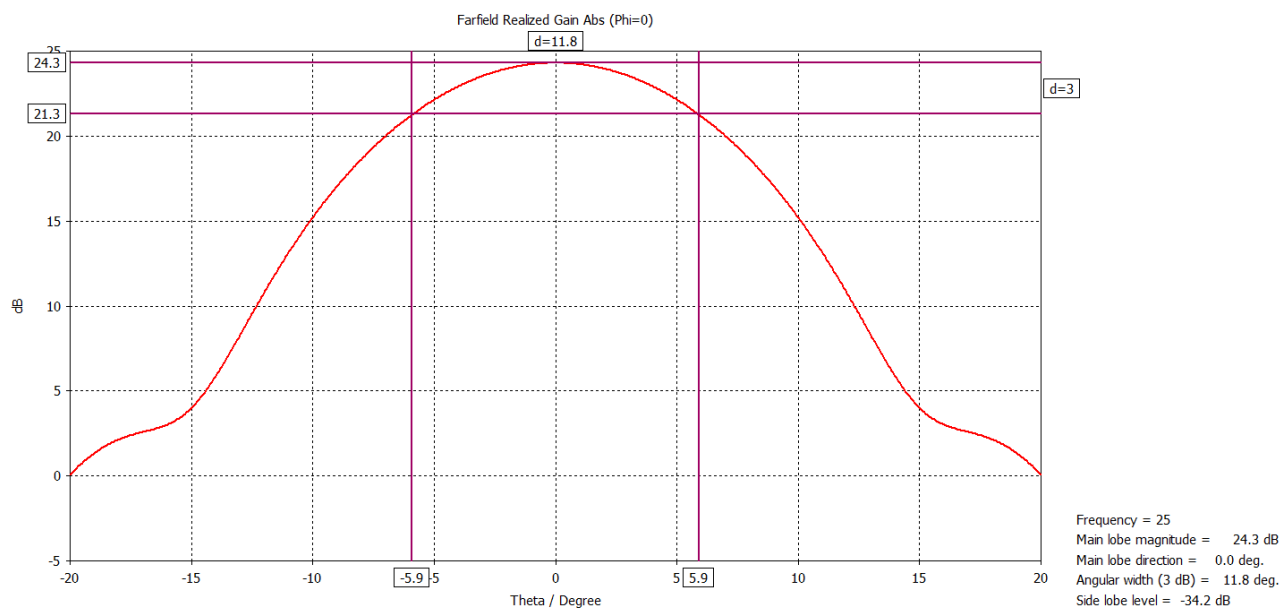
2.1.1 Radiation pattern in E-plane



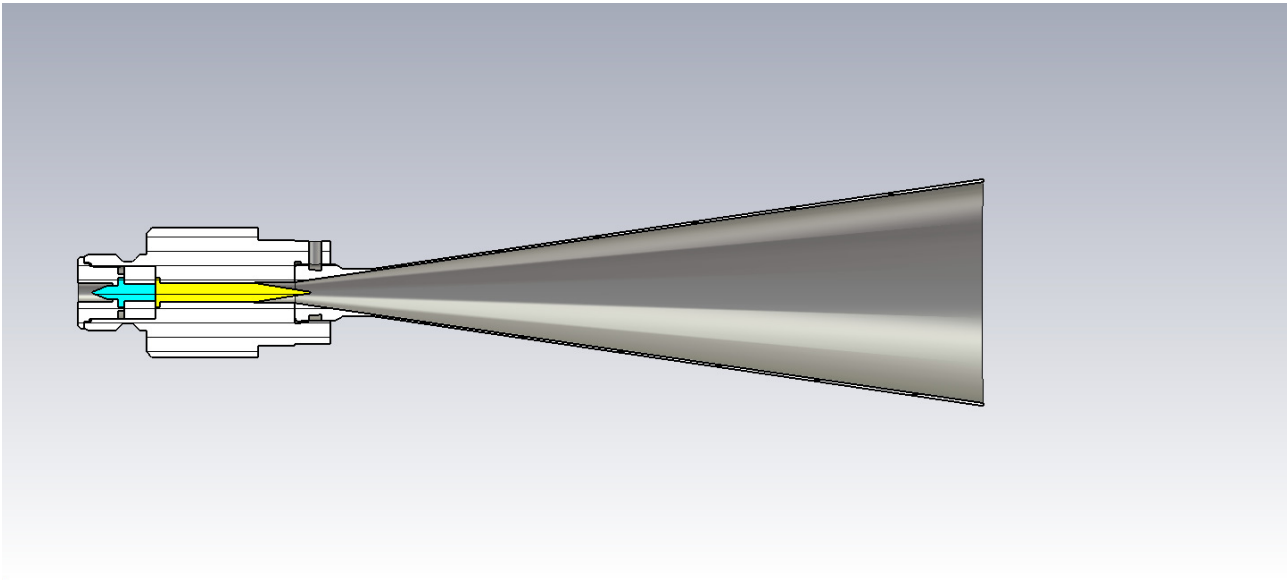


2.1.2 Radiation pattern in H-plane

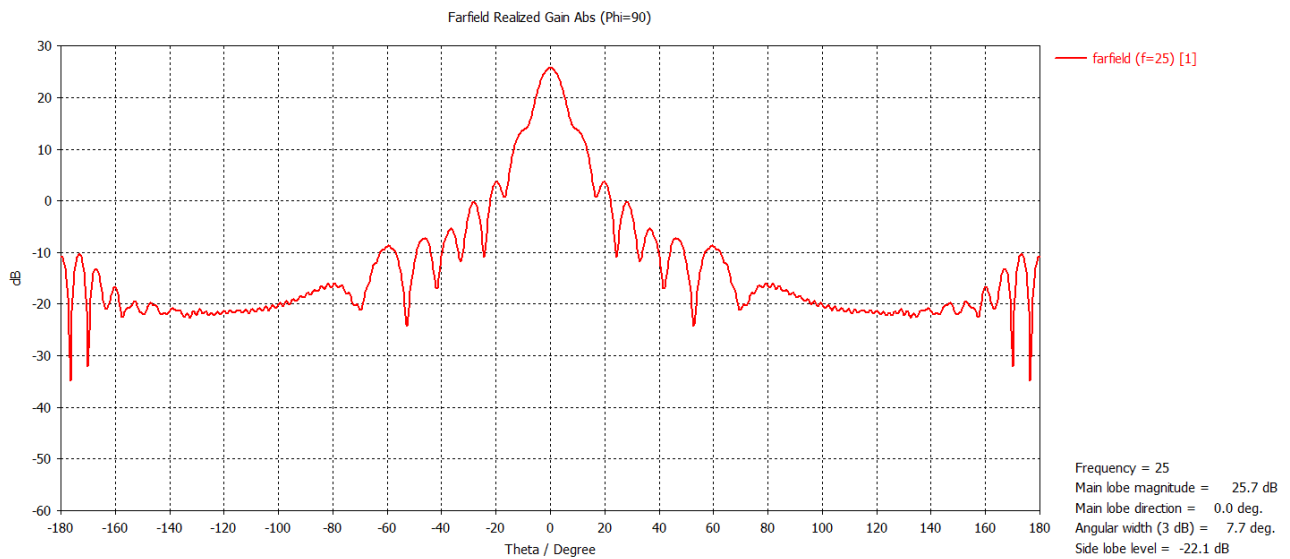


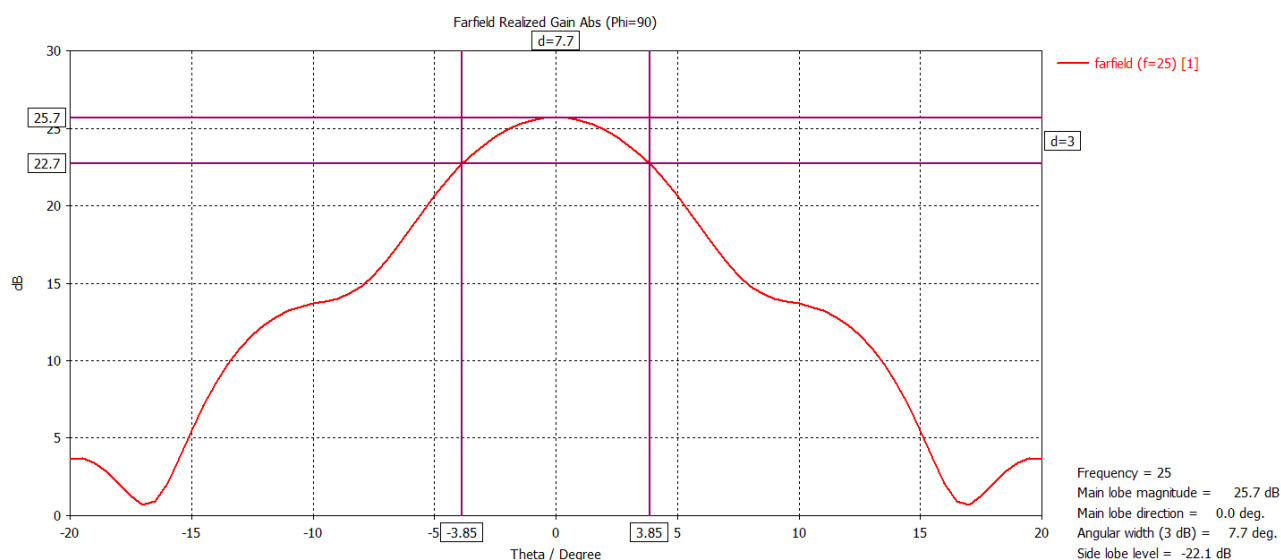
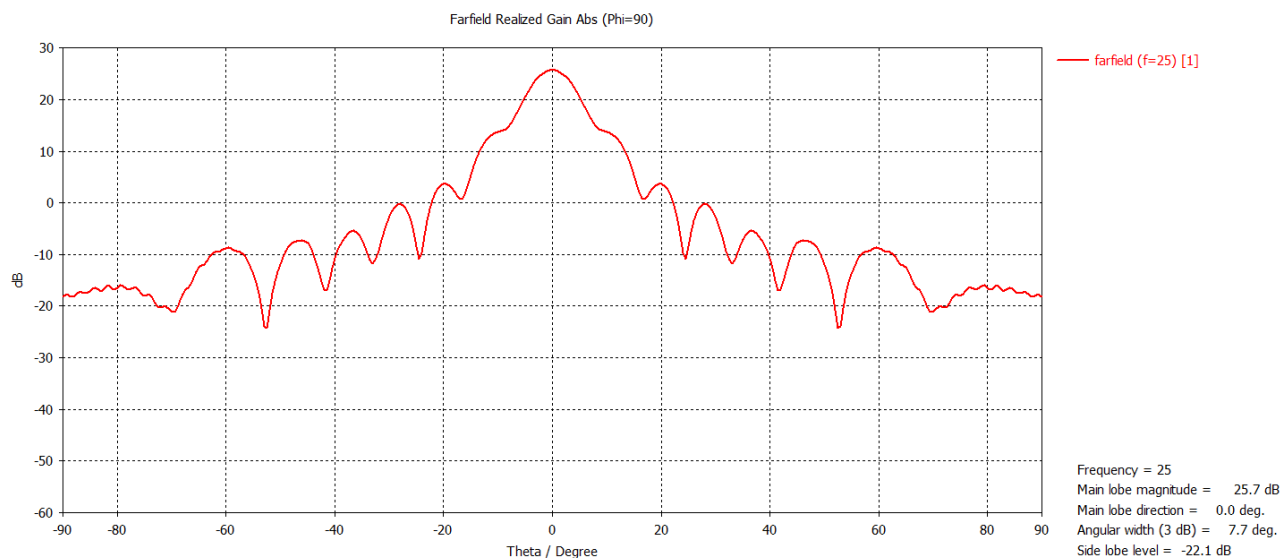


2.2 316L / DN100 (4") Metallic Horn

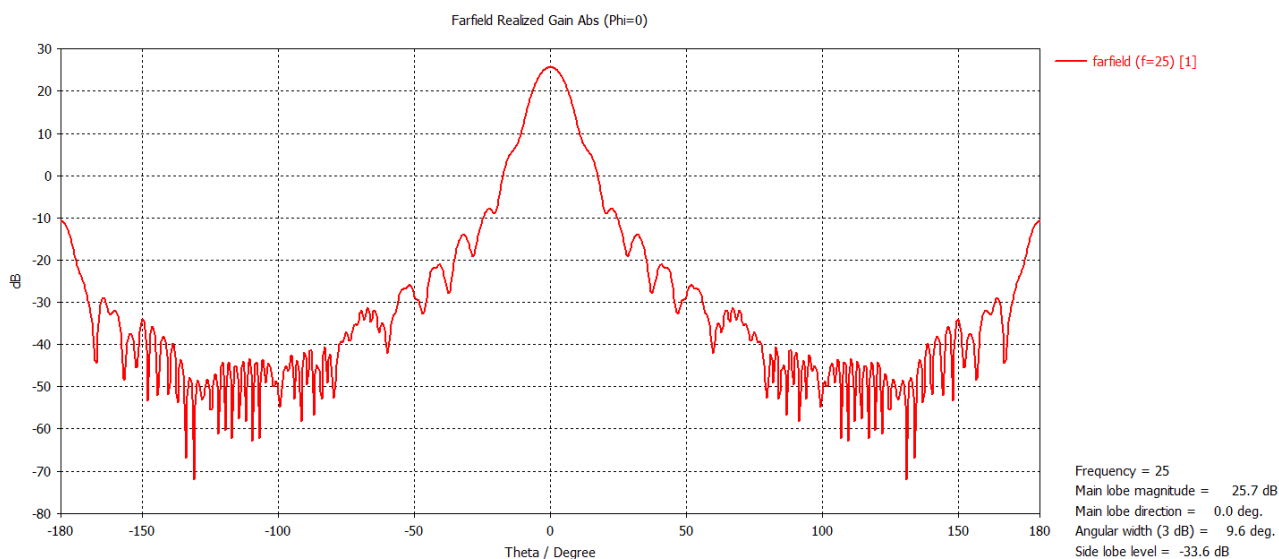


2.2.1 Radiation pattern in E-plane

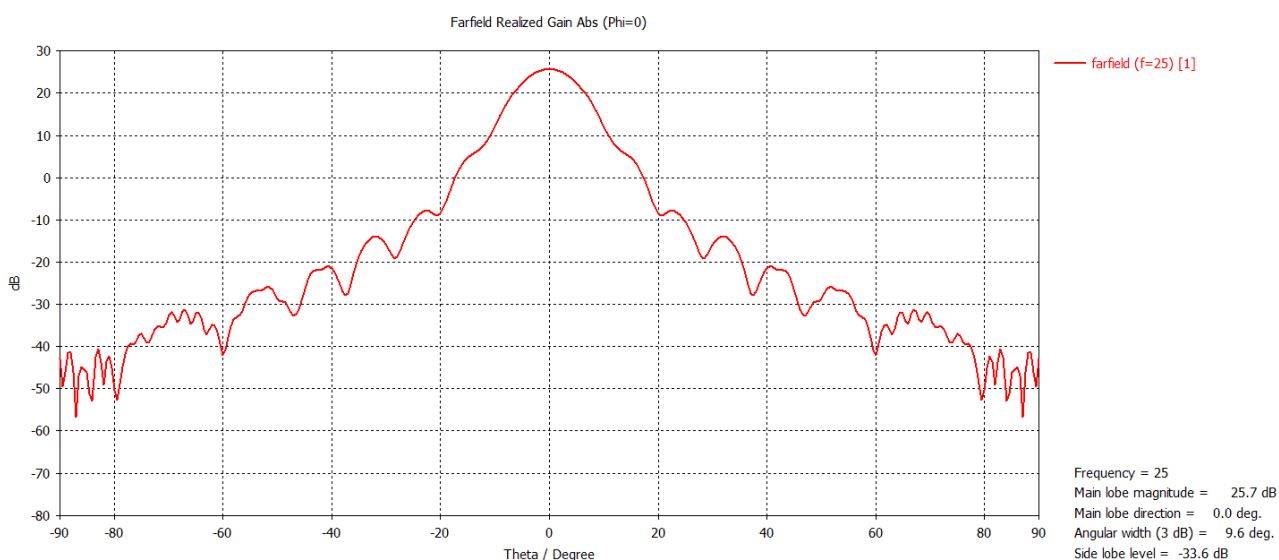


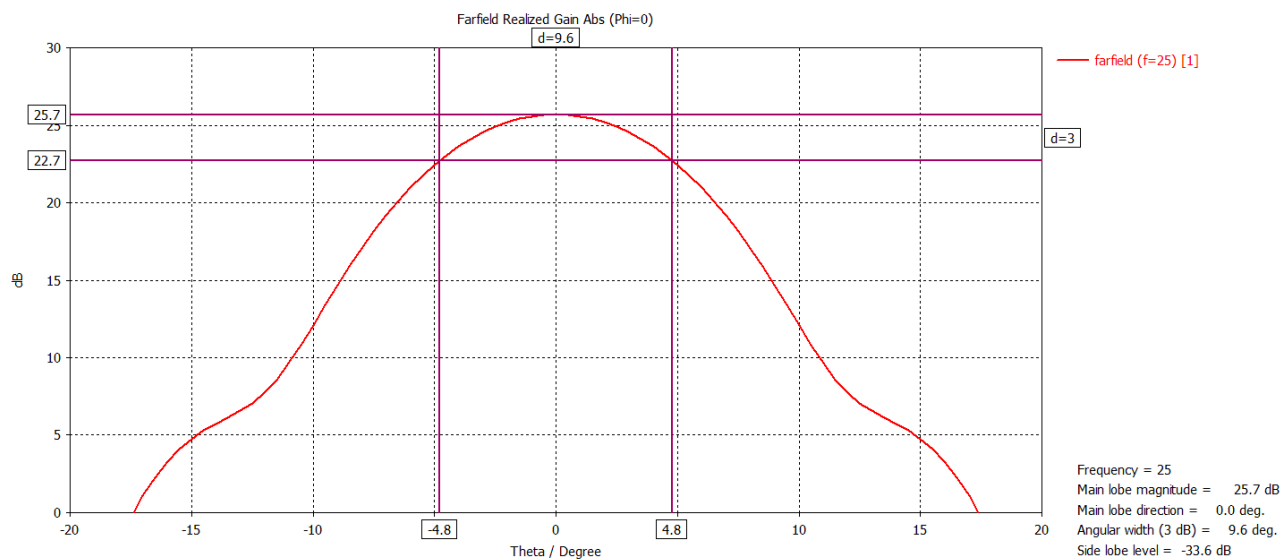


2.2.2 Radiation pattern in H-plane

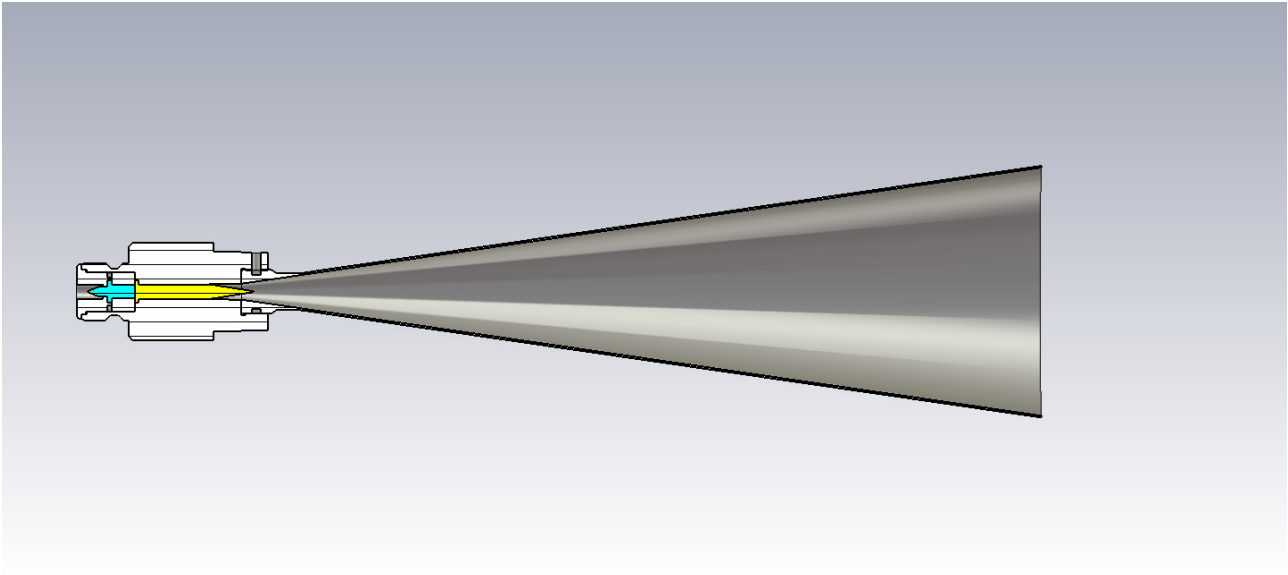


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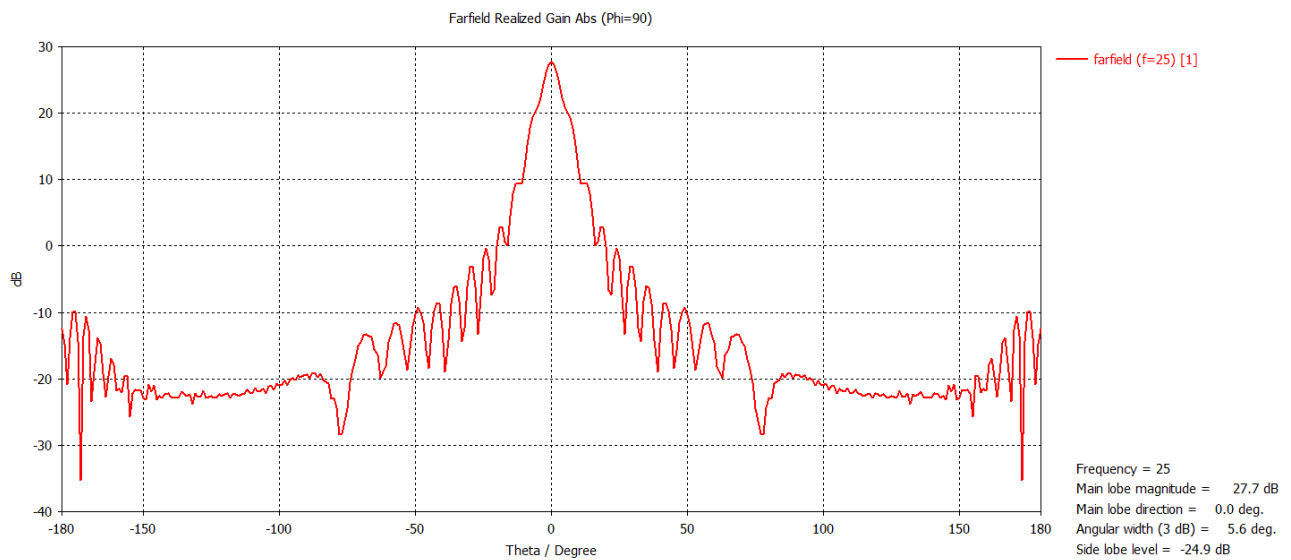


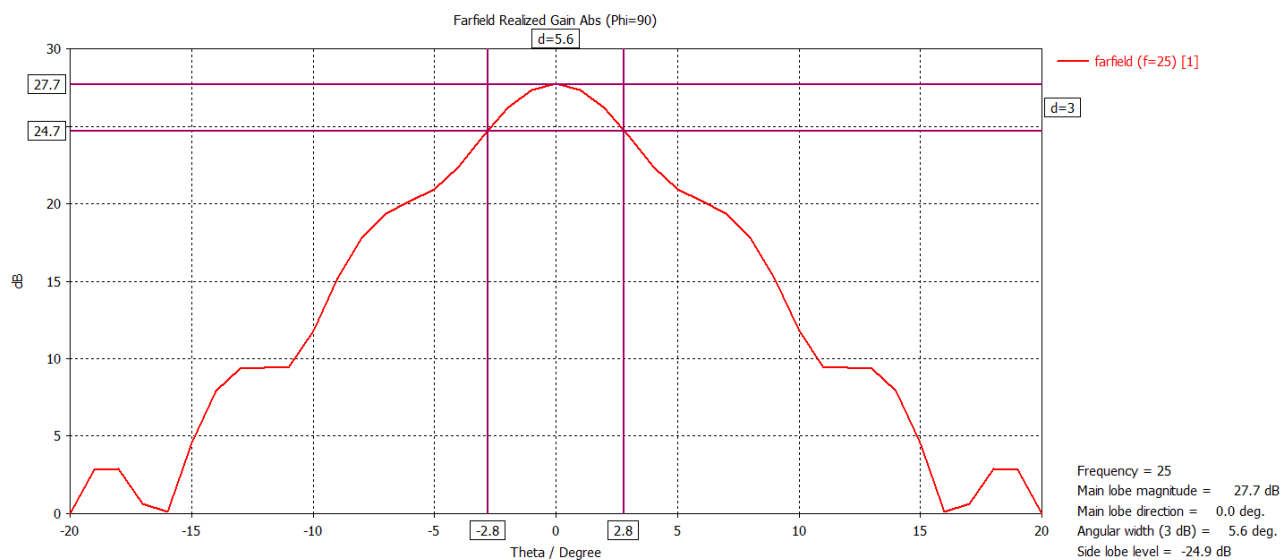
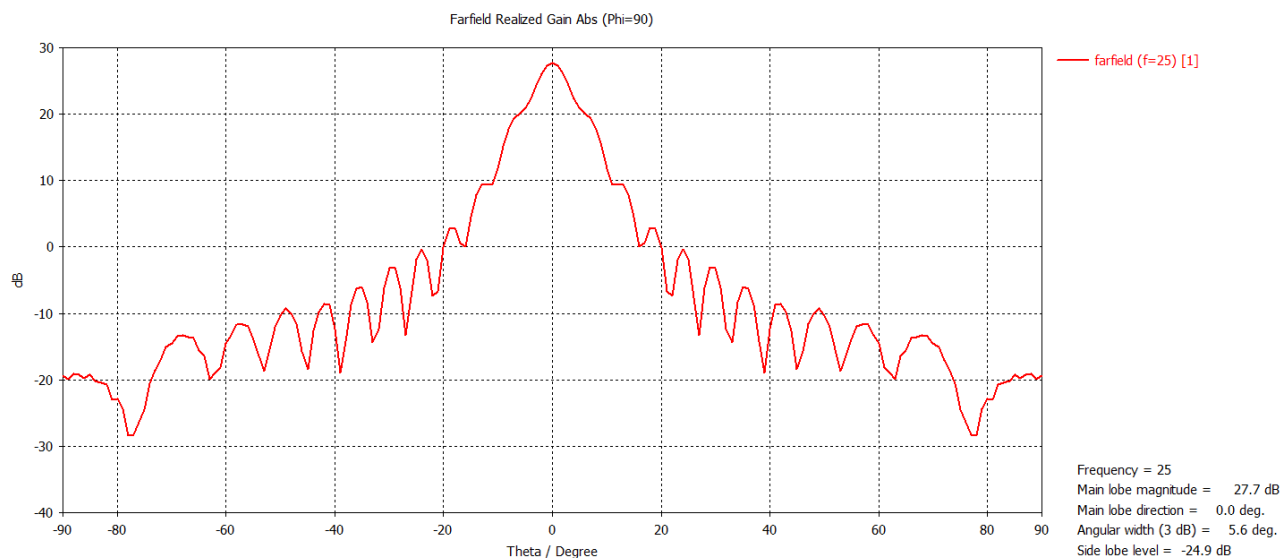


2.3 316L / DN150 (6") Metallic Horn

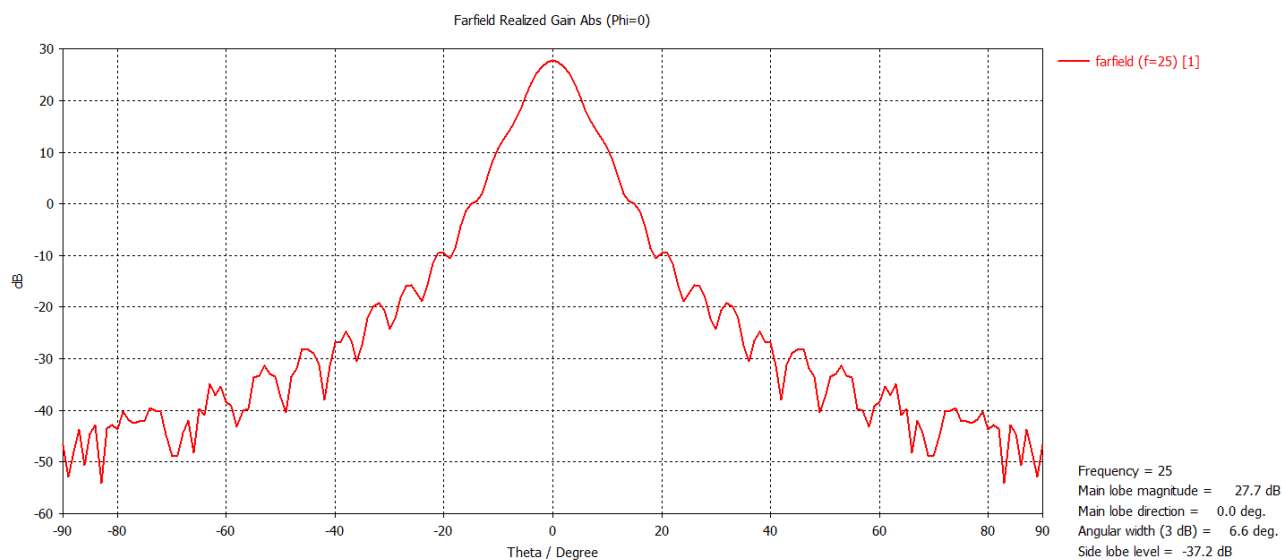
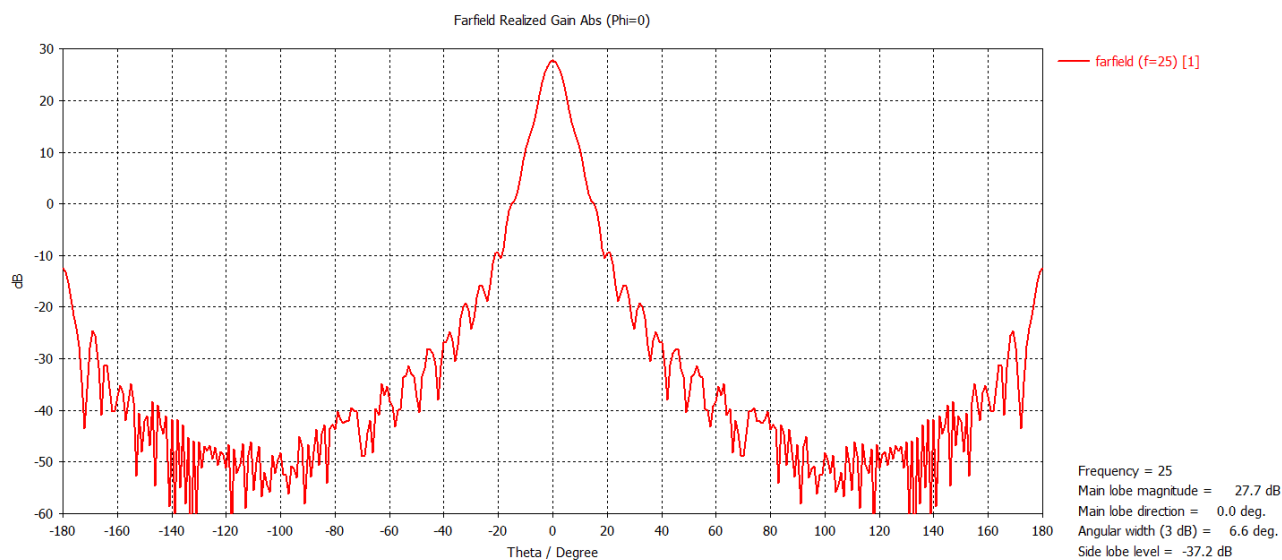


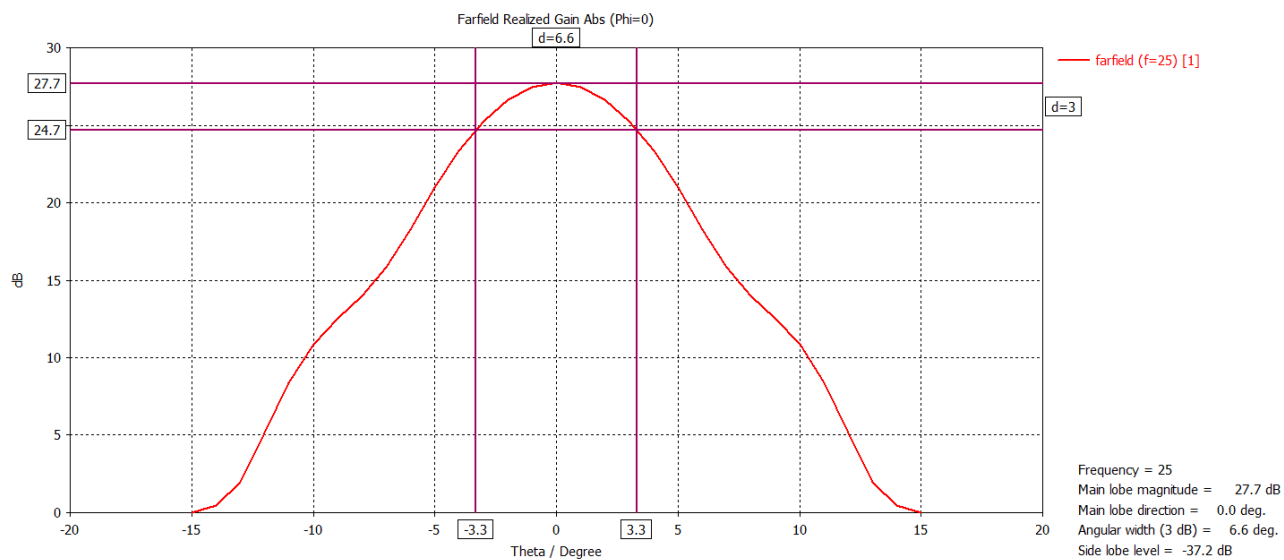
2.3.1 Radiation pattern in E-plane



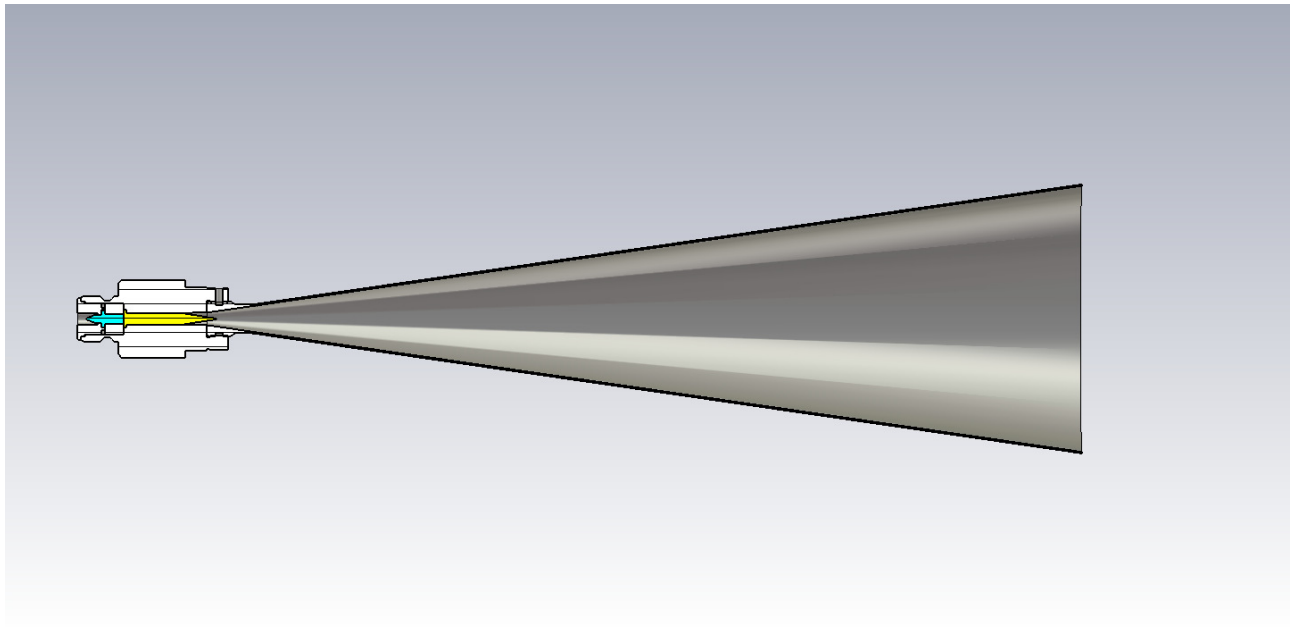


2.3.2 Radiation pattern in H-plane



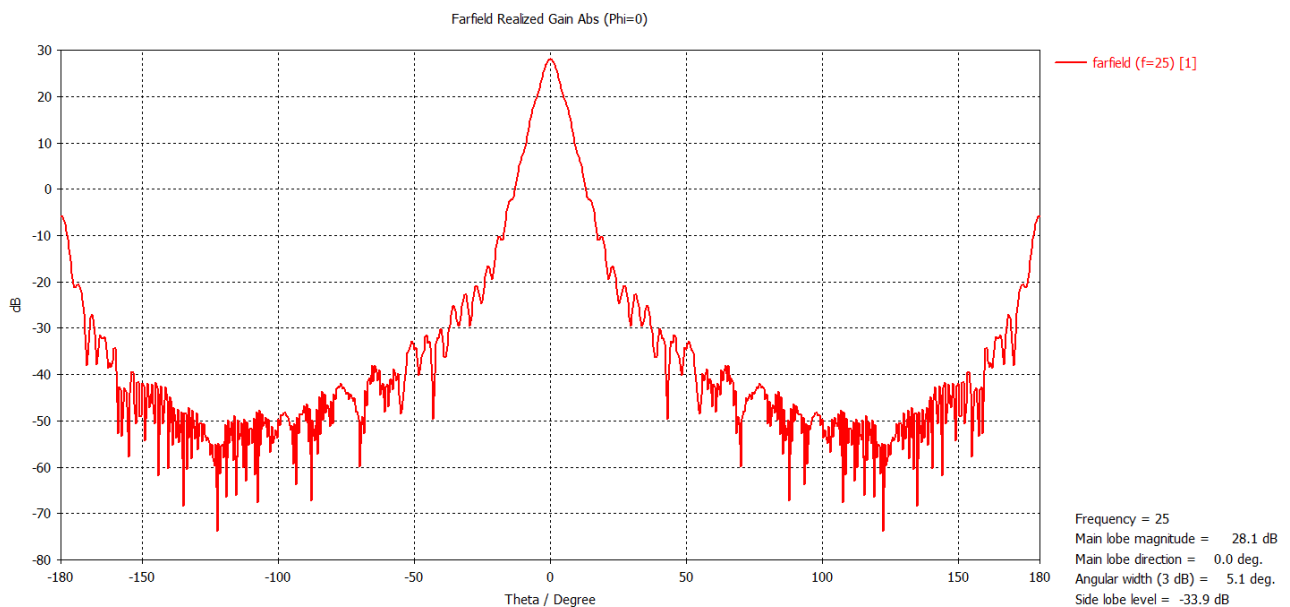


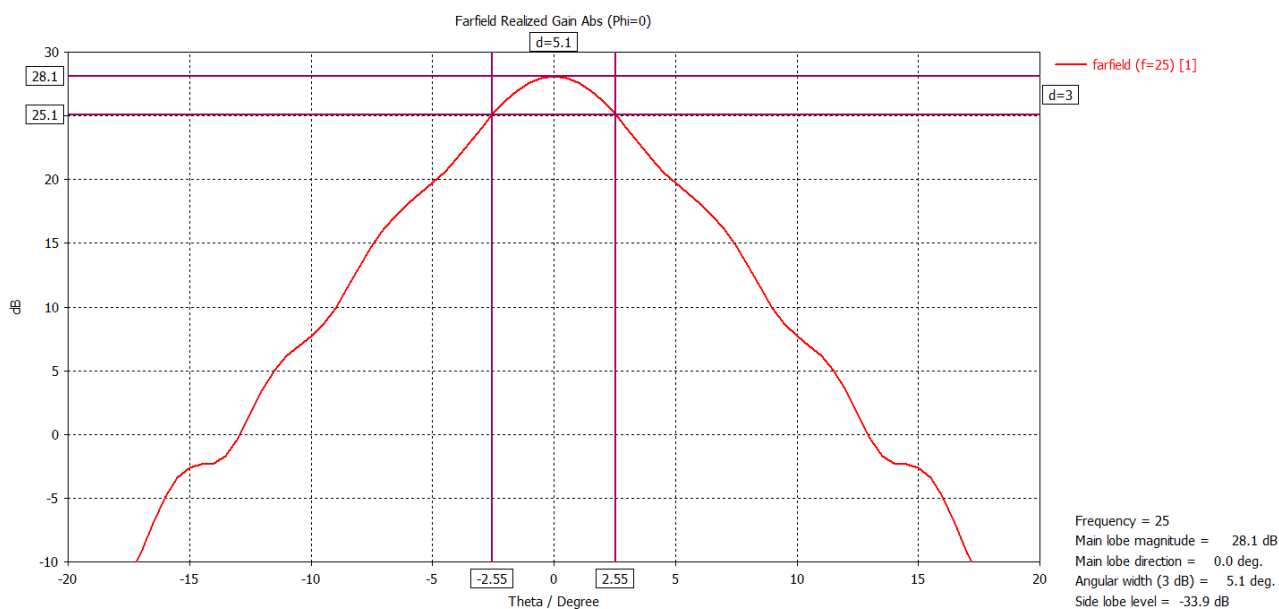
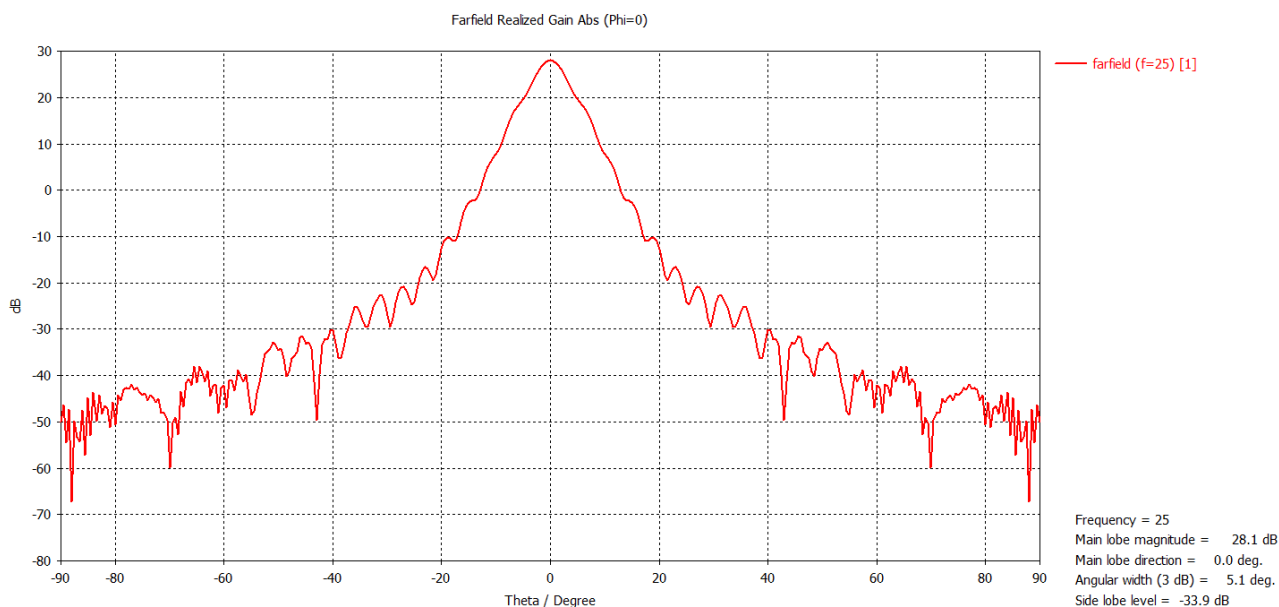
2.4 316L / DN200 (8") Metallic Horn



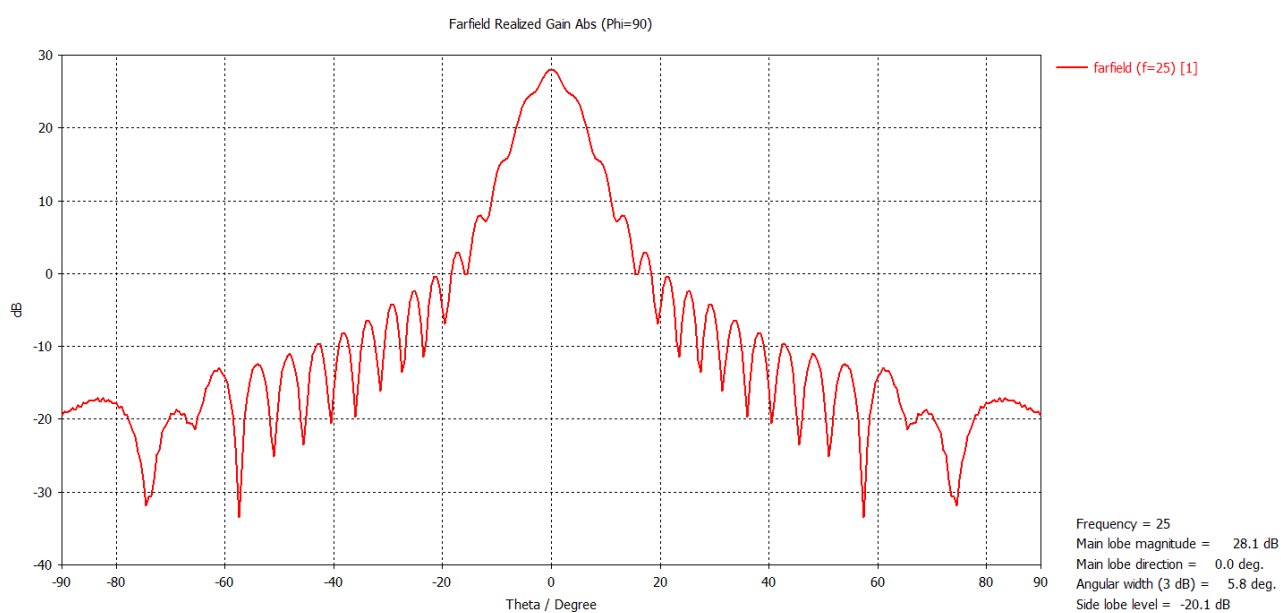
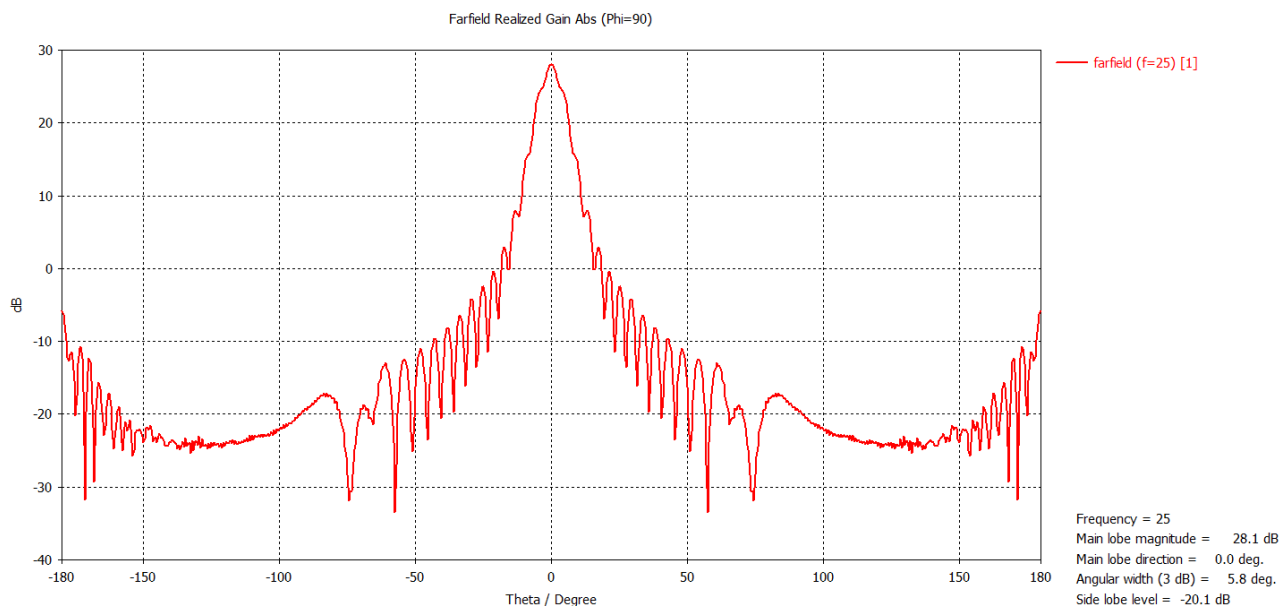
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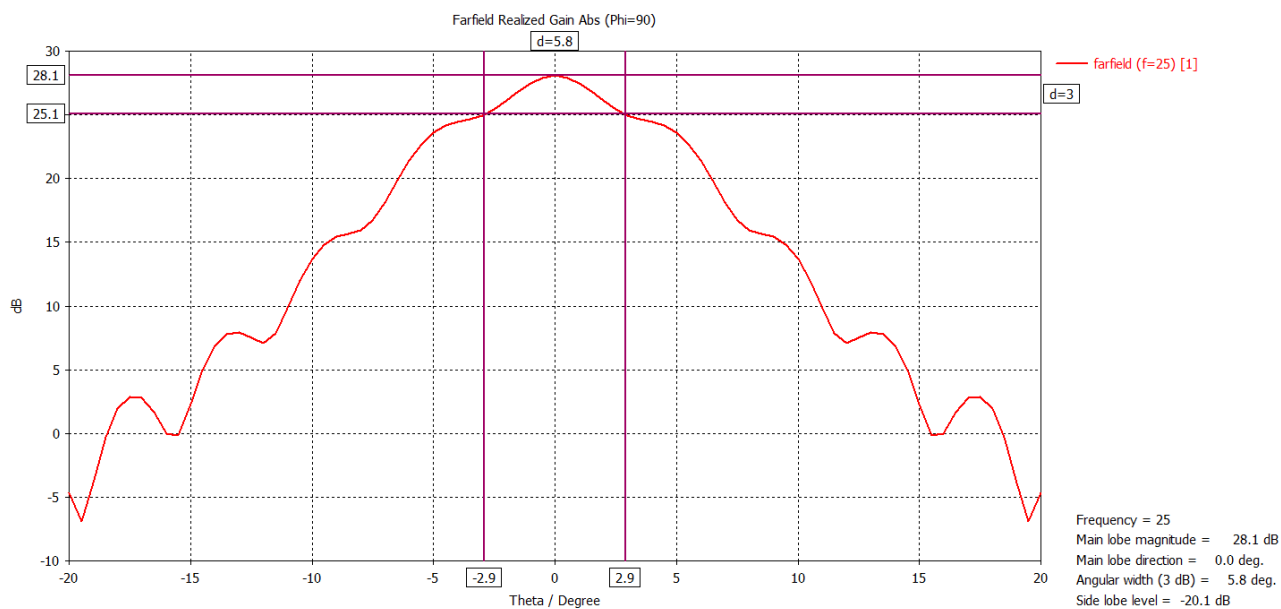
2.4.1 Radiation pattern in E-plane



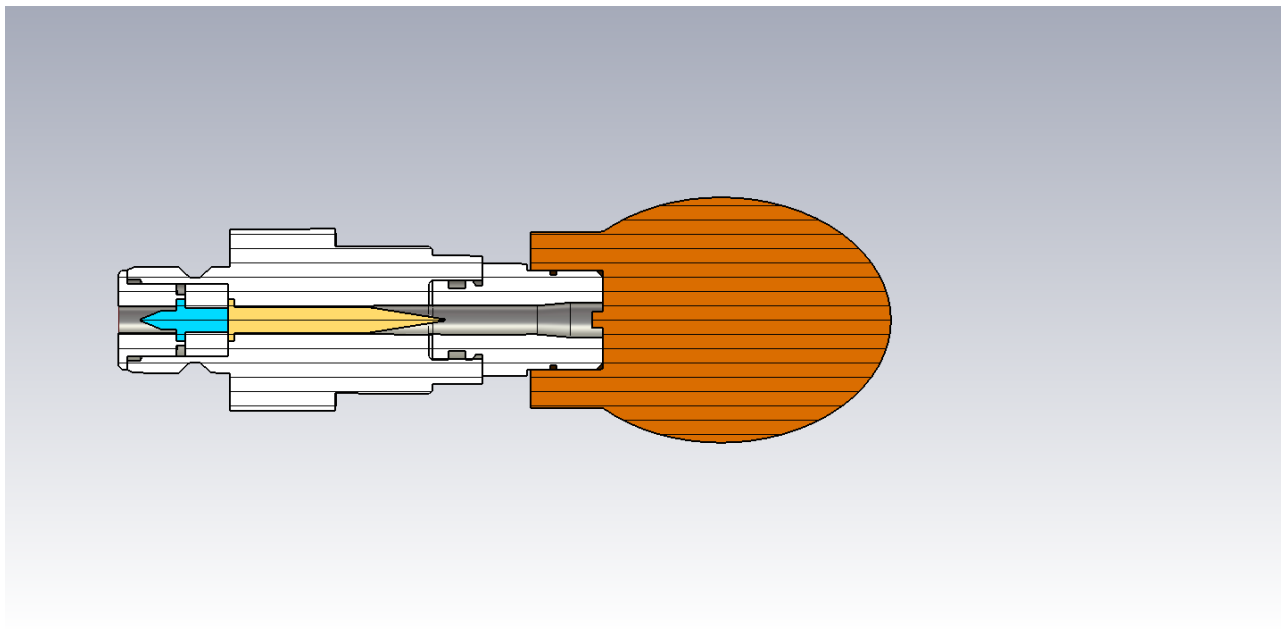


2.4.2 Radiation pattern in H-plane

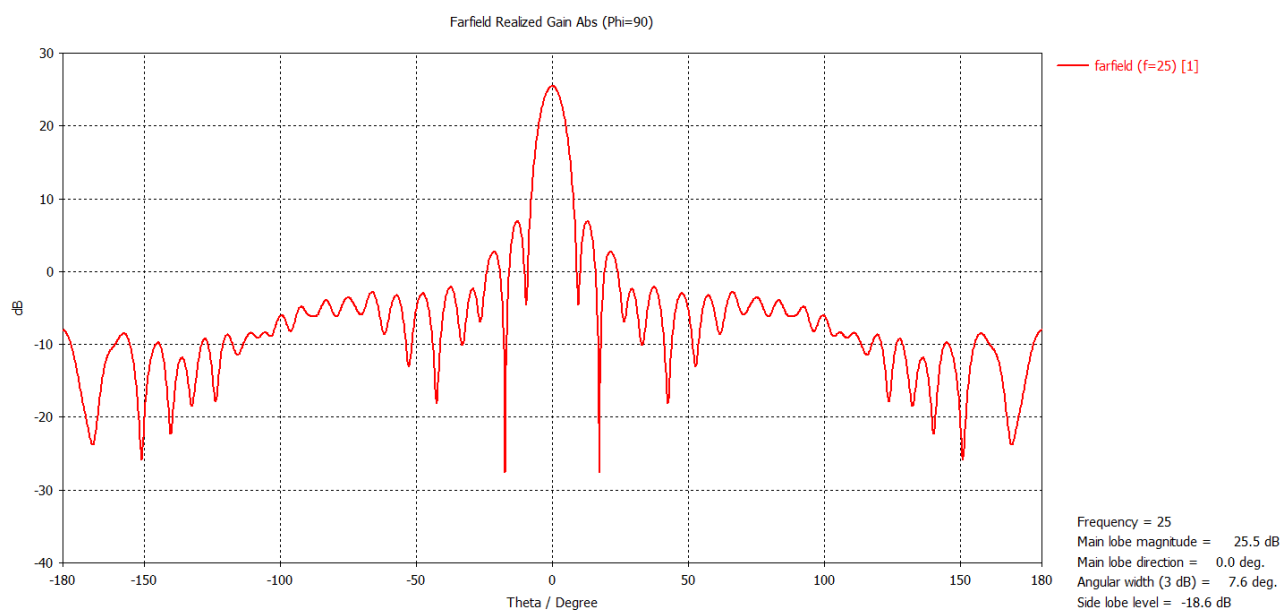


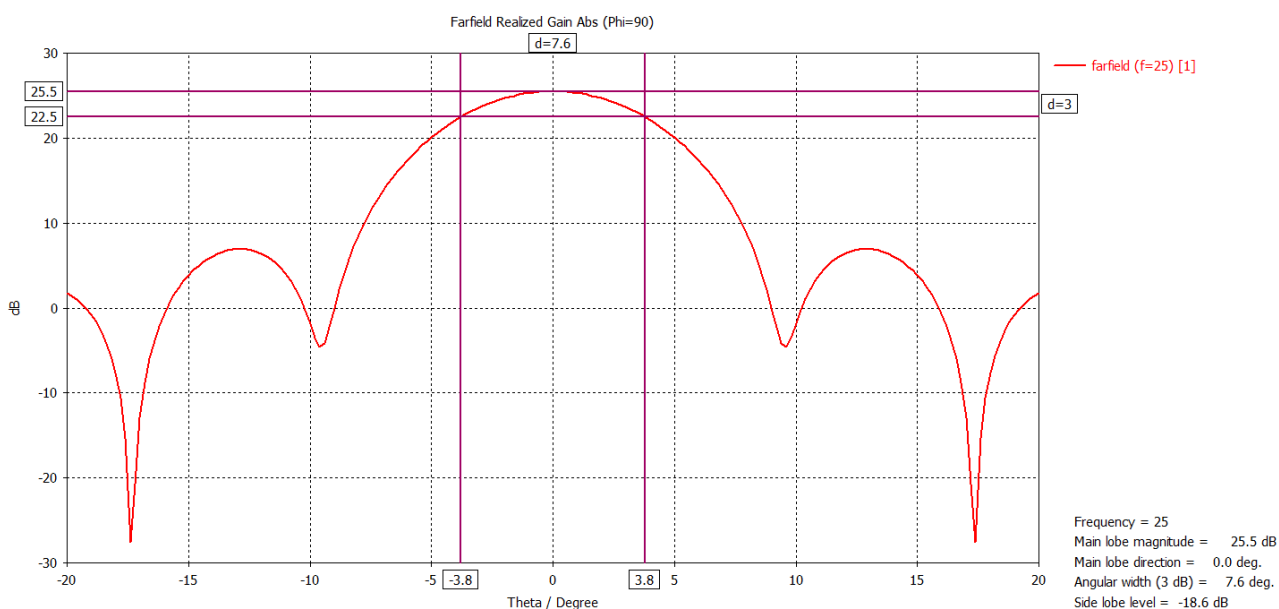
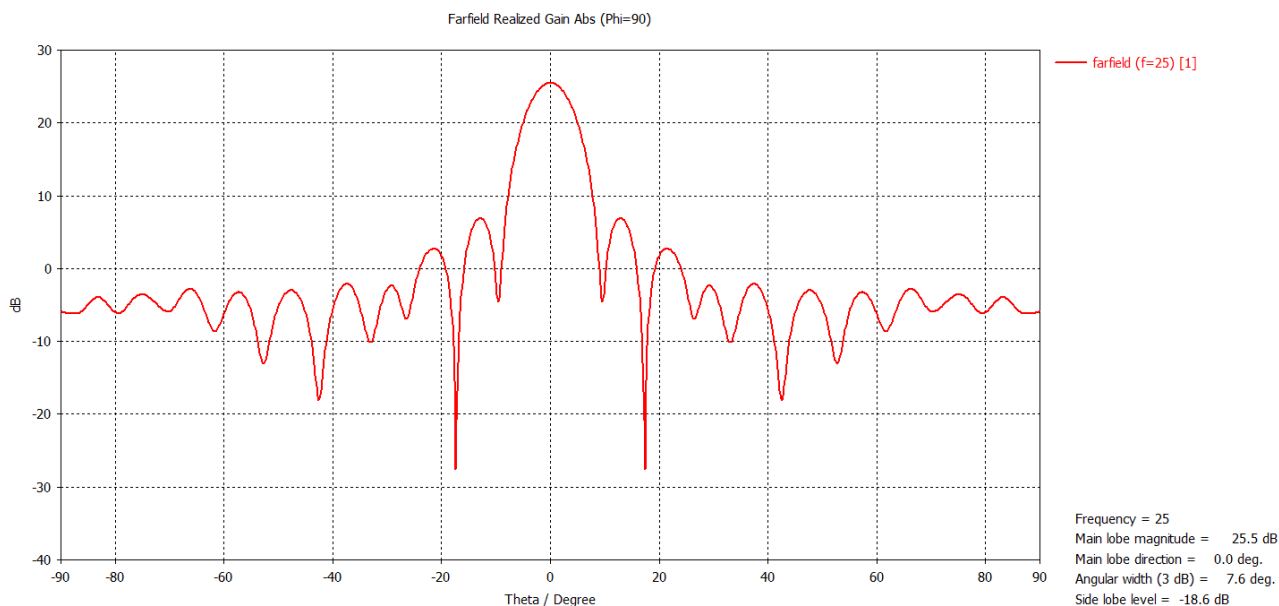


2.5 PTFE / DN80 (3") Drop

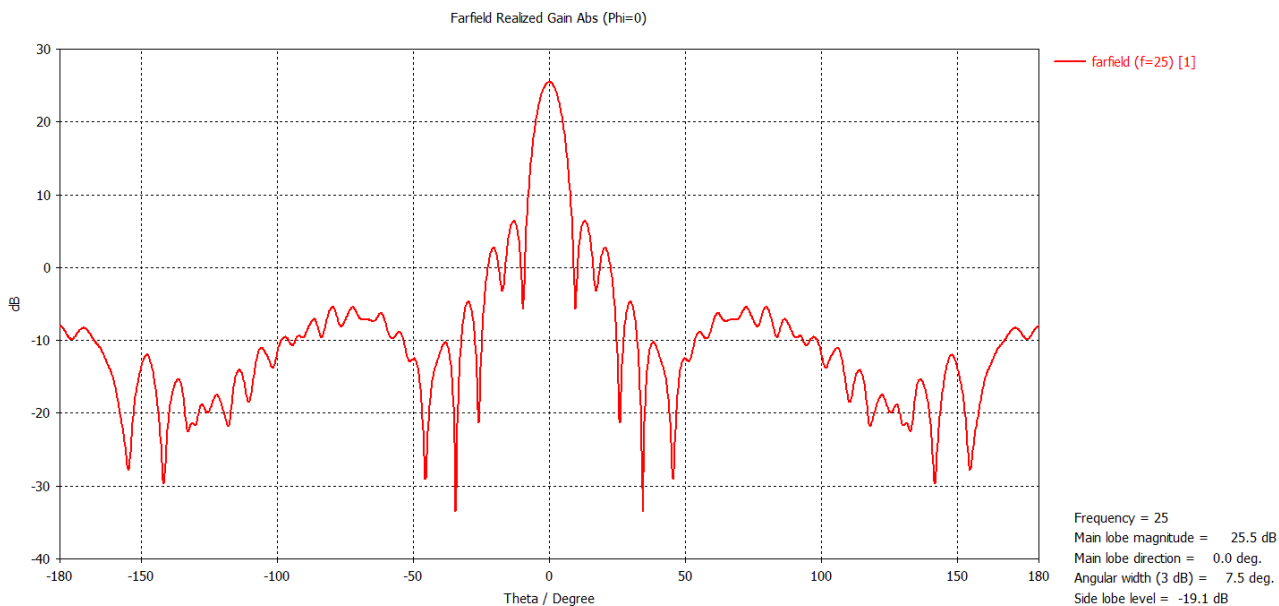


2.5.1 Radiation pattern in E-plane

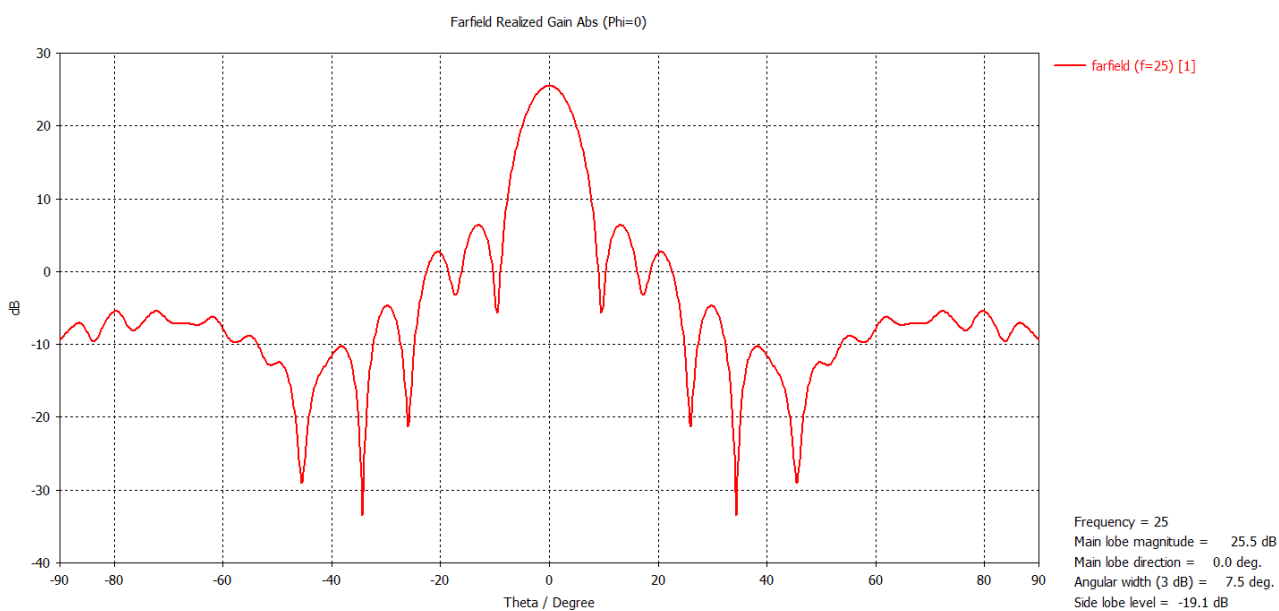


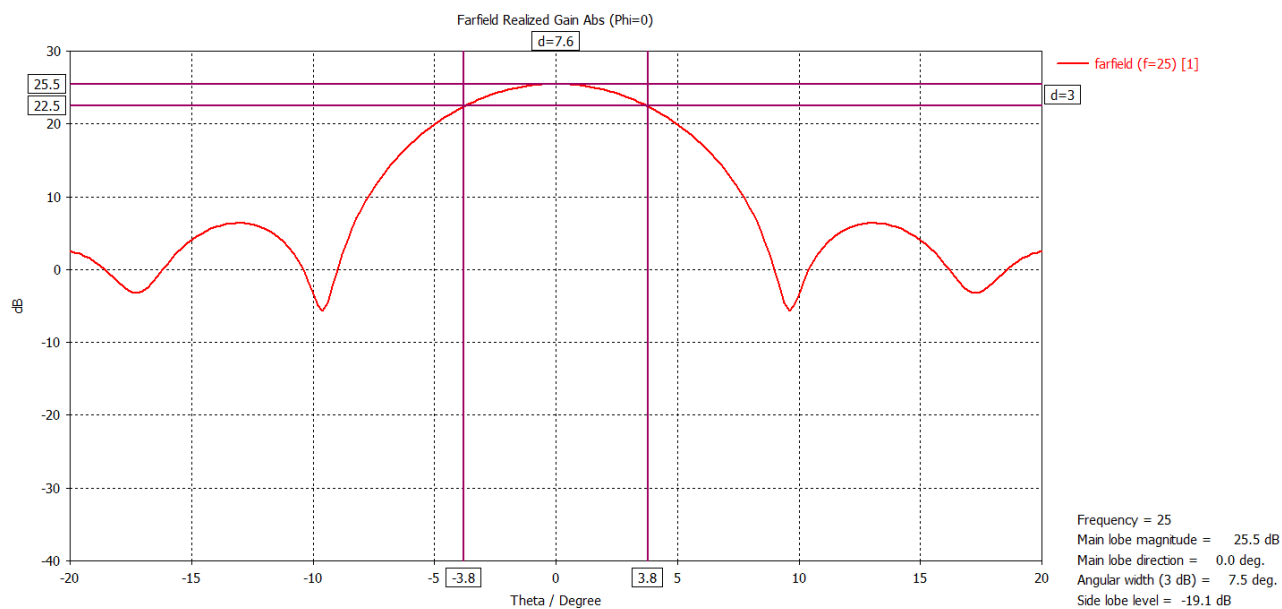


2.5.2 Radiation pattern in H-plane

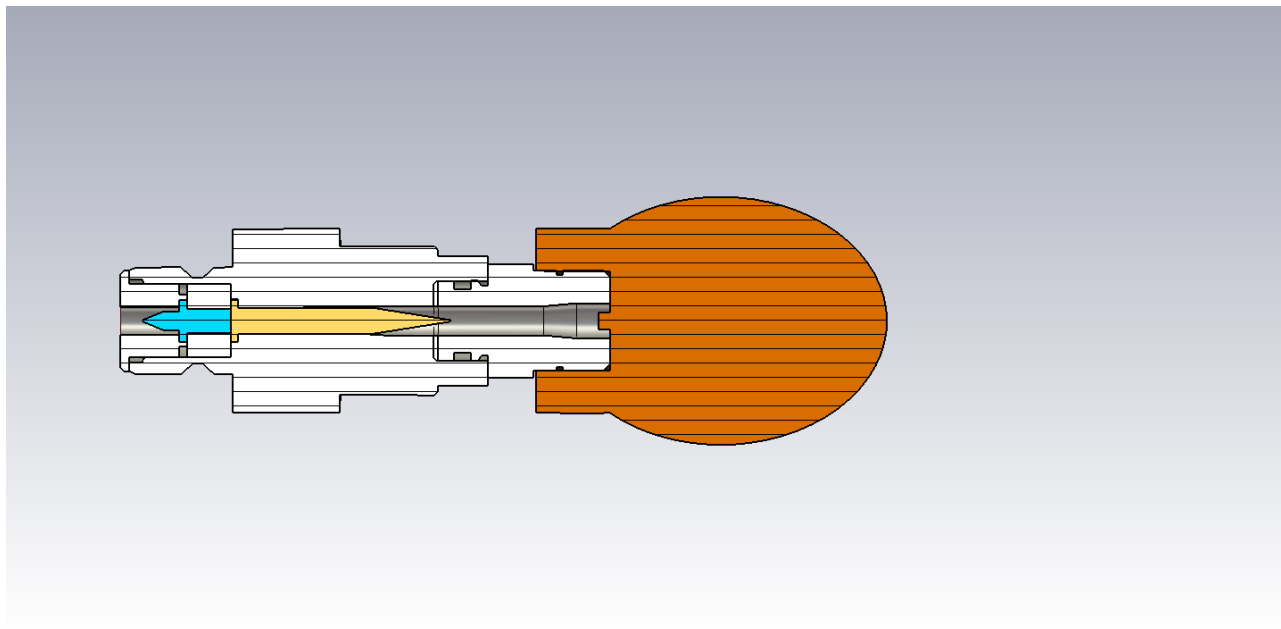


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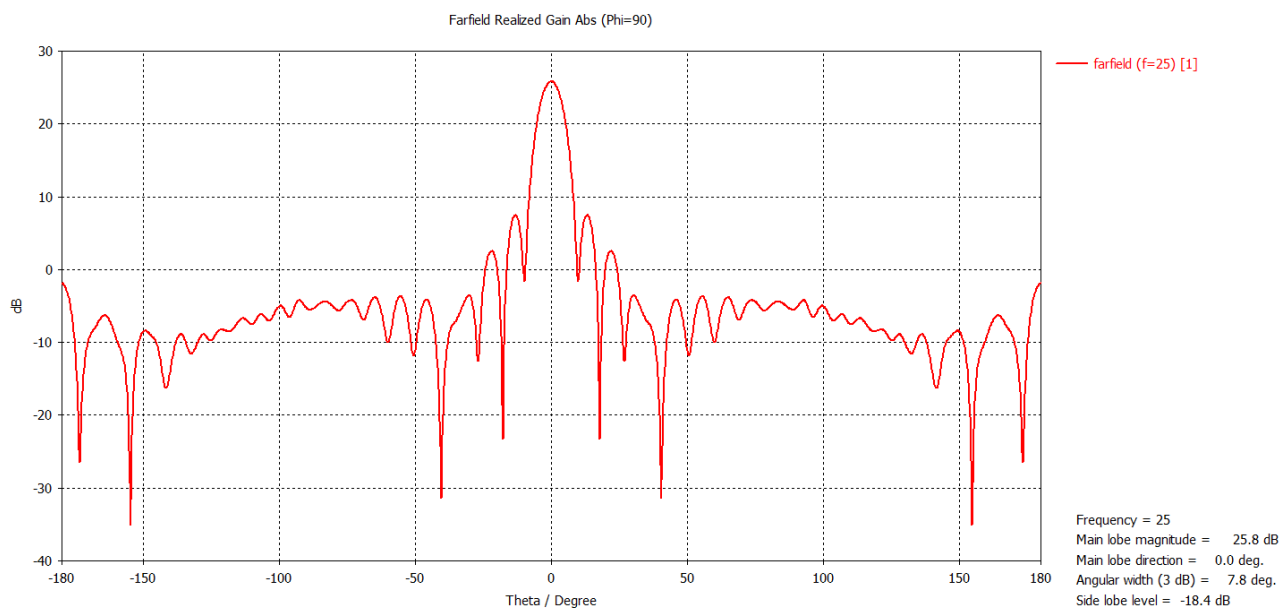


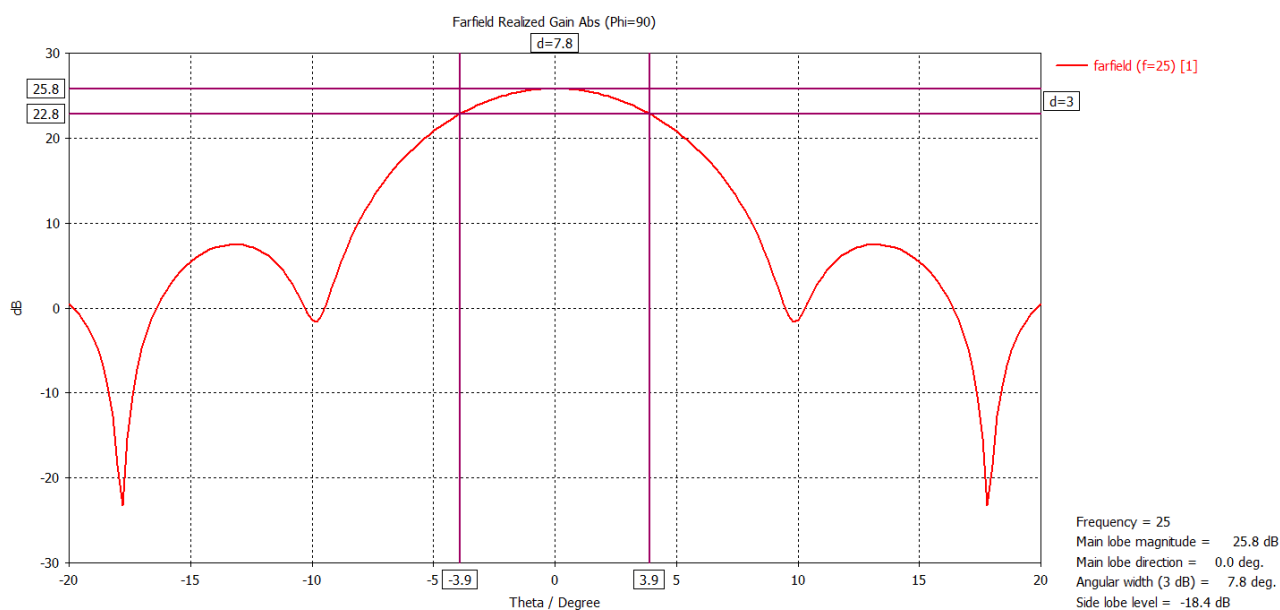
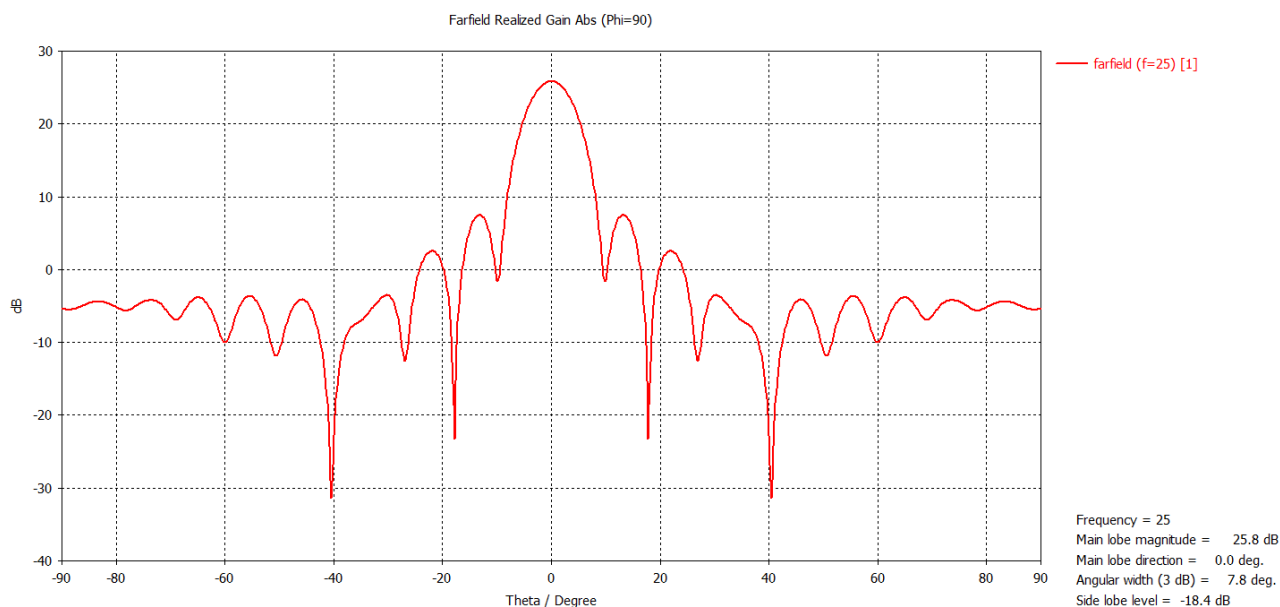


2.6 PP / DN80 (3") Drop

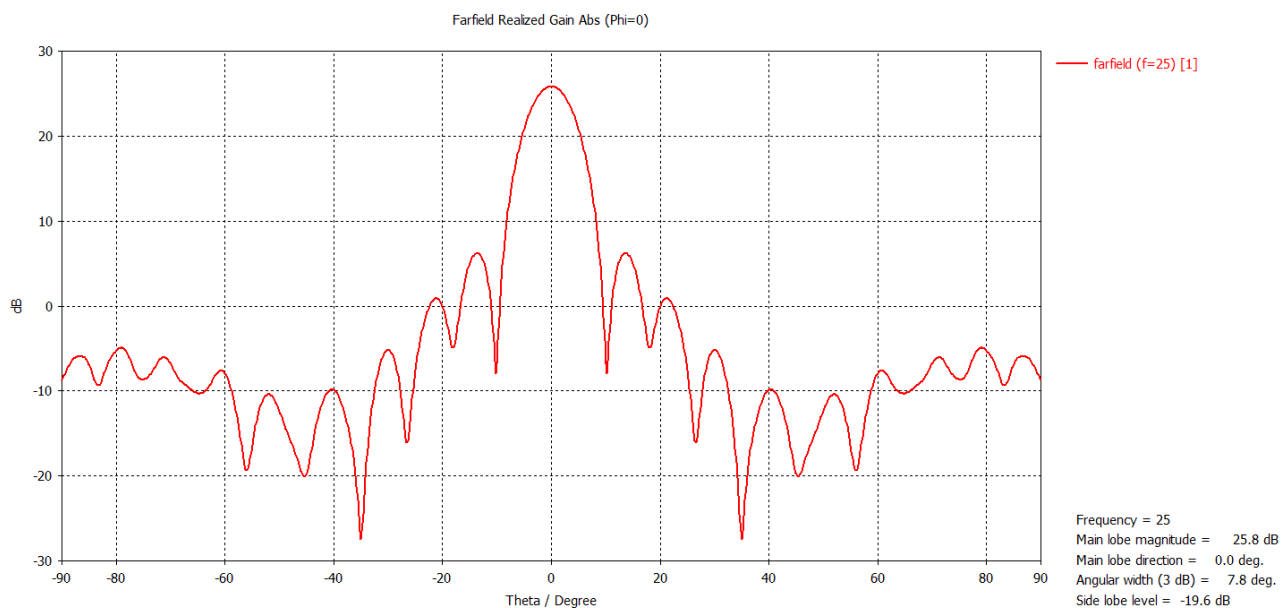
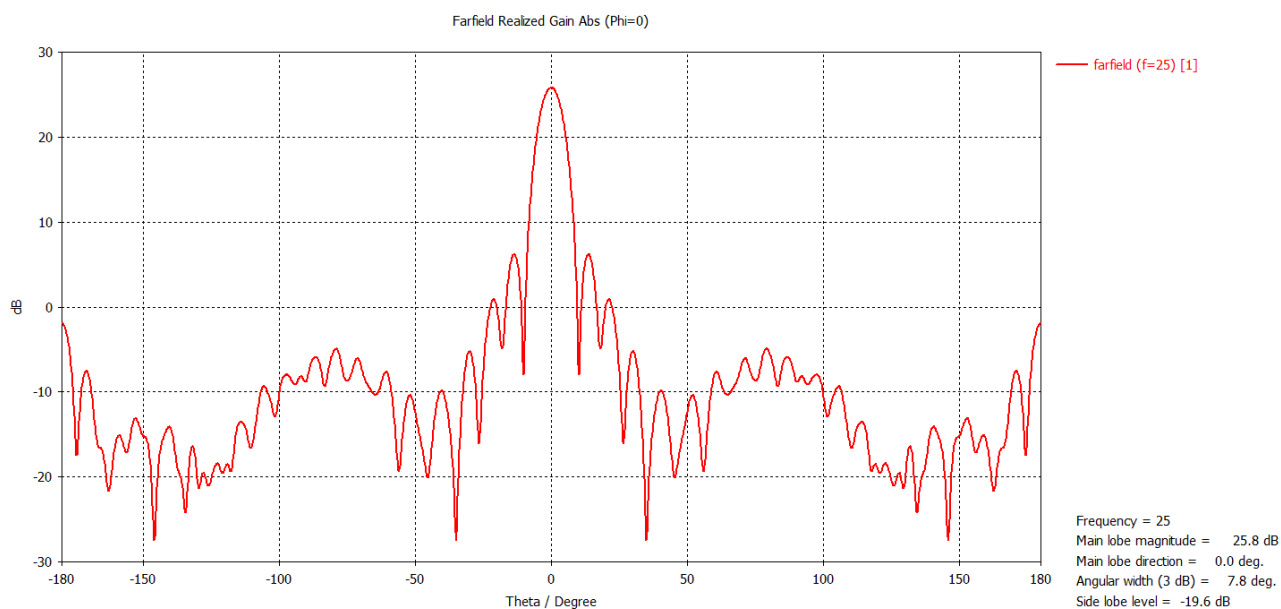


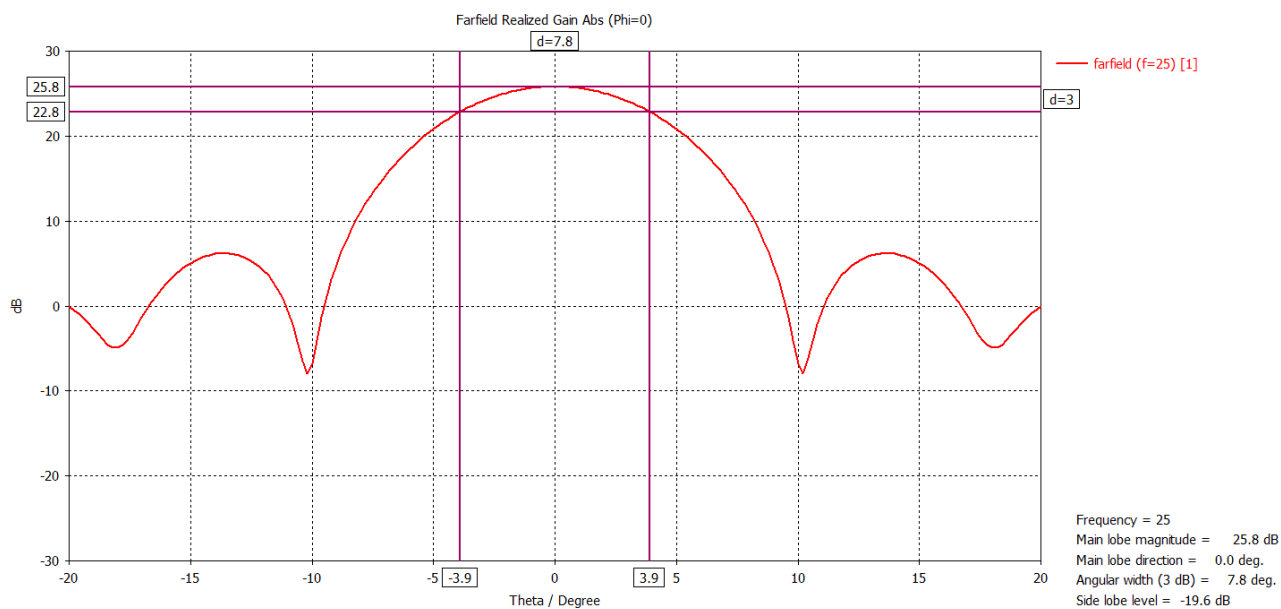
2.6.1 Radiation pattern in E-plane



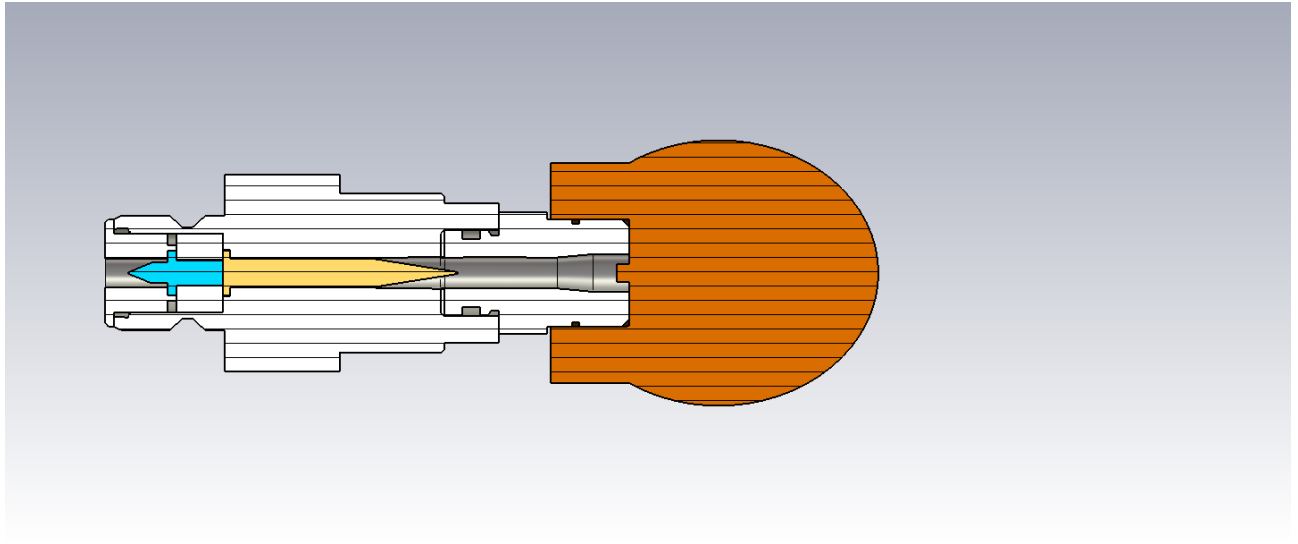


2.6.2 Radiation pattern in H-plane

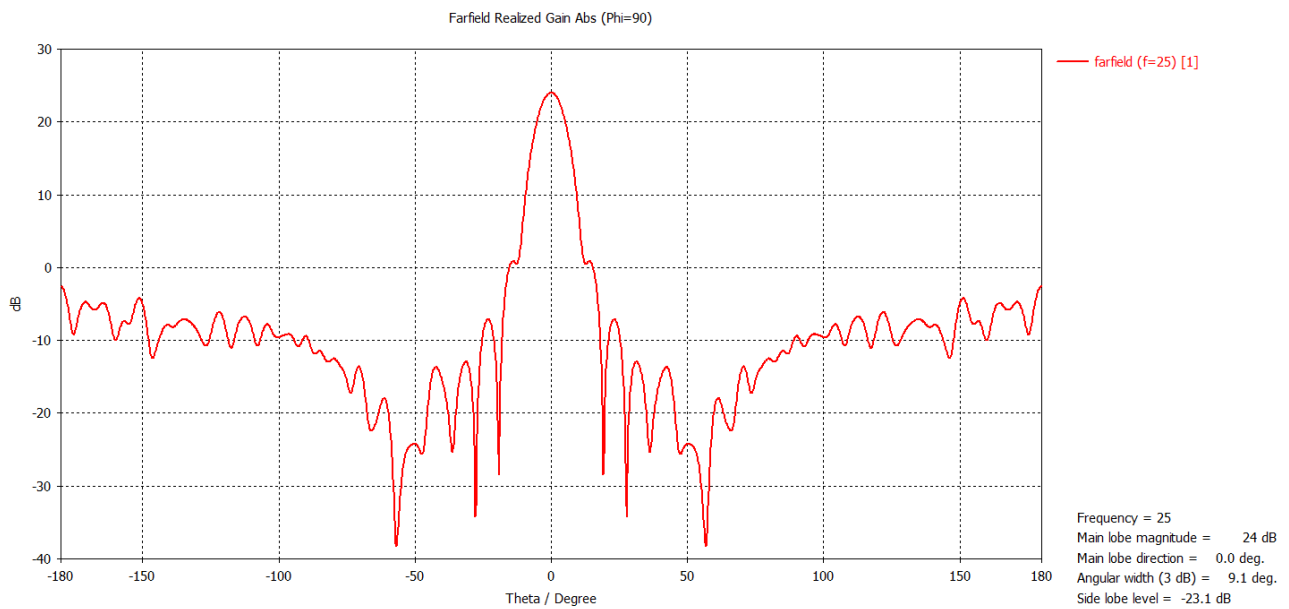


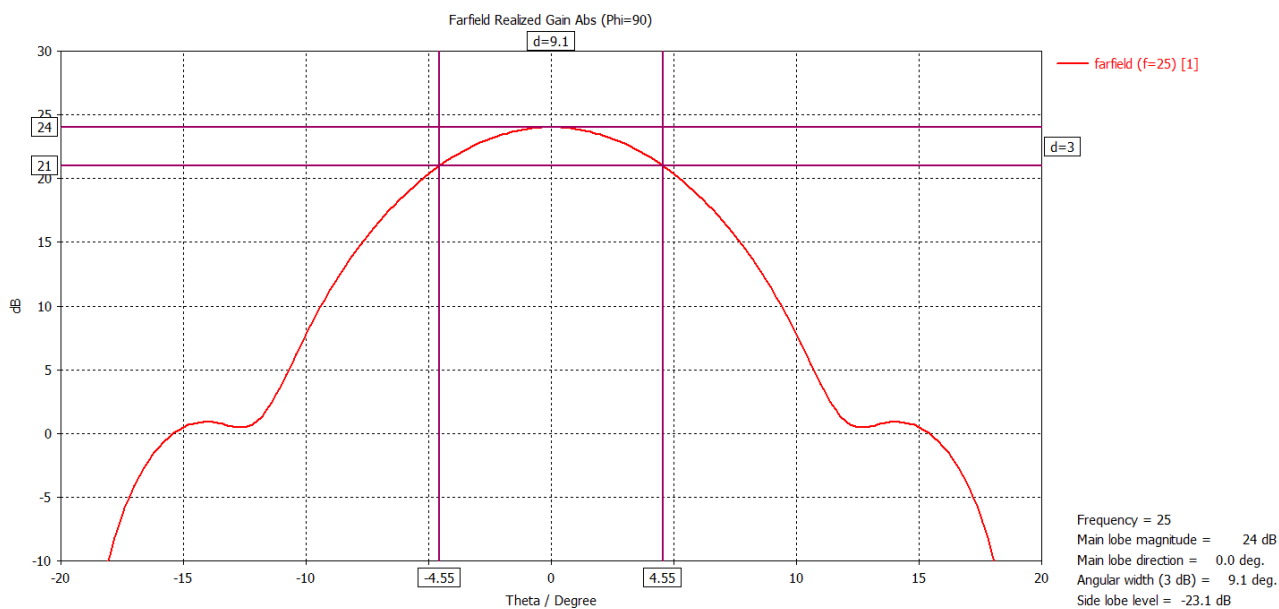
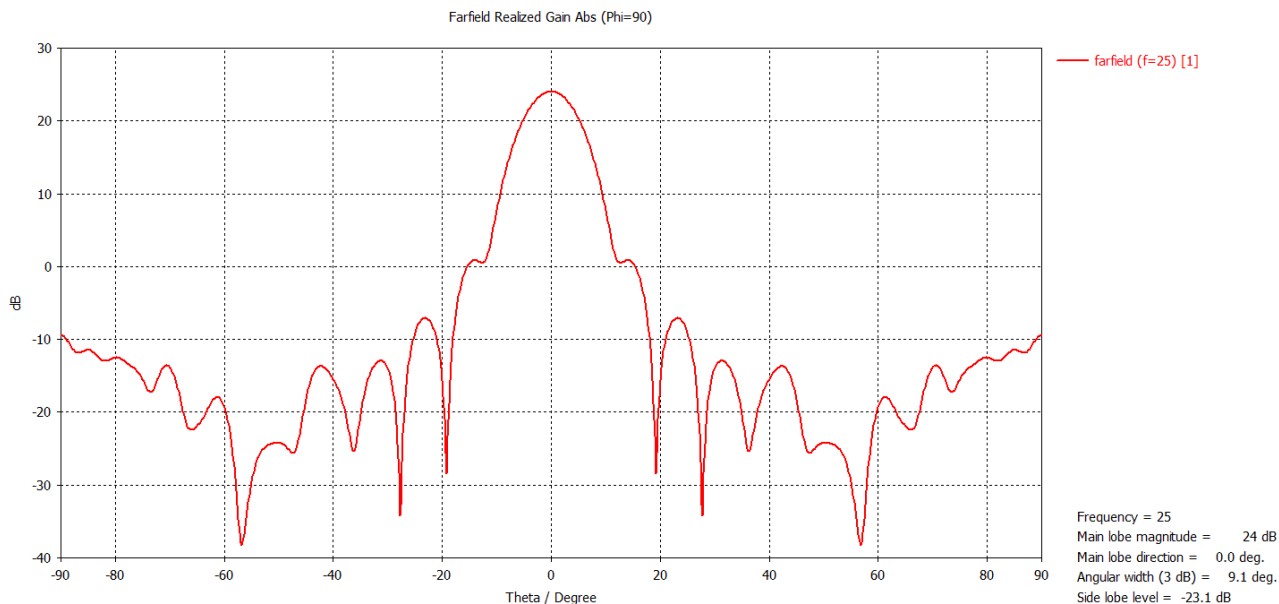


2.7 PEEK / DN80 (3") Drop

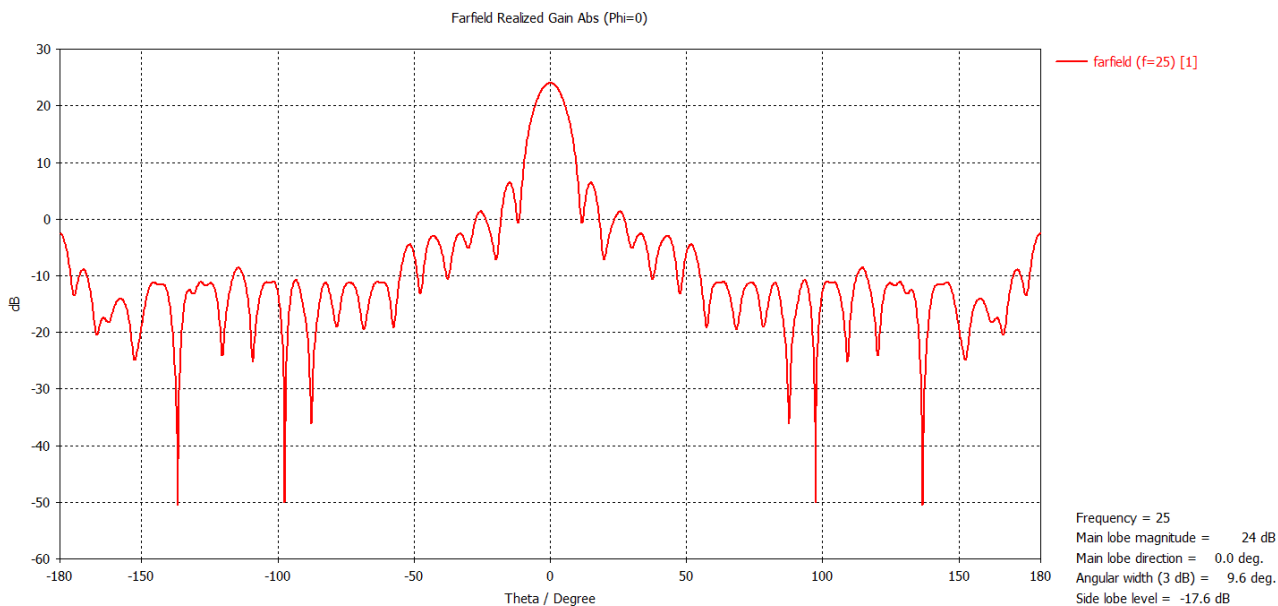


2.7.1 Radiation pattern in E-plane

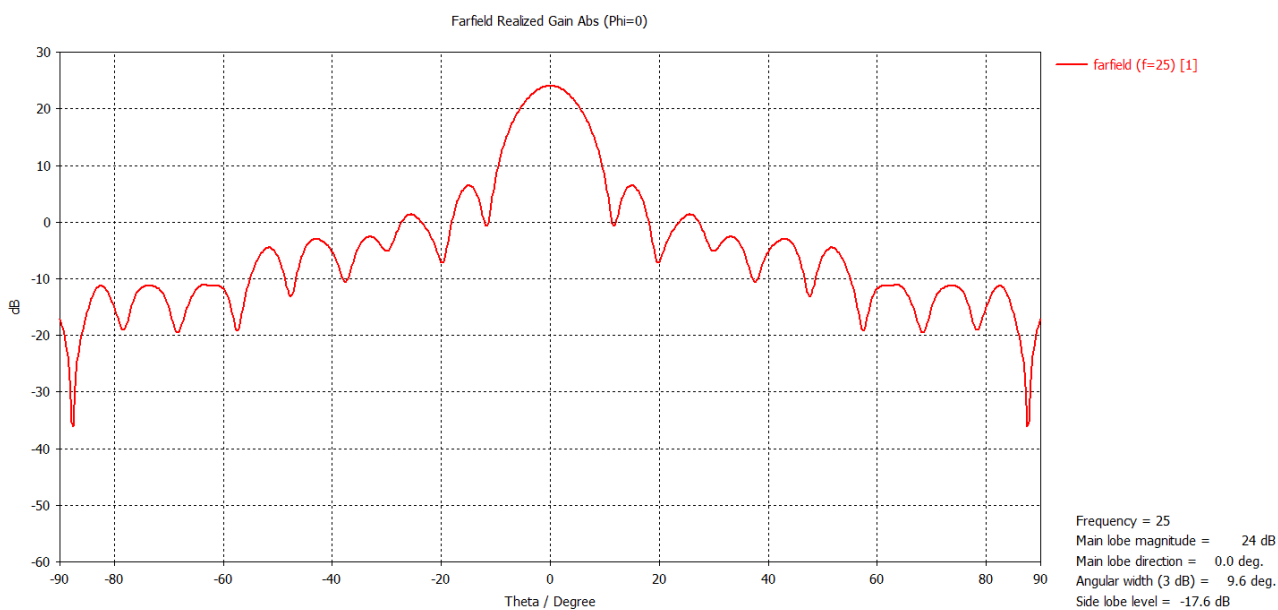


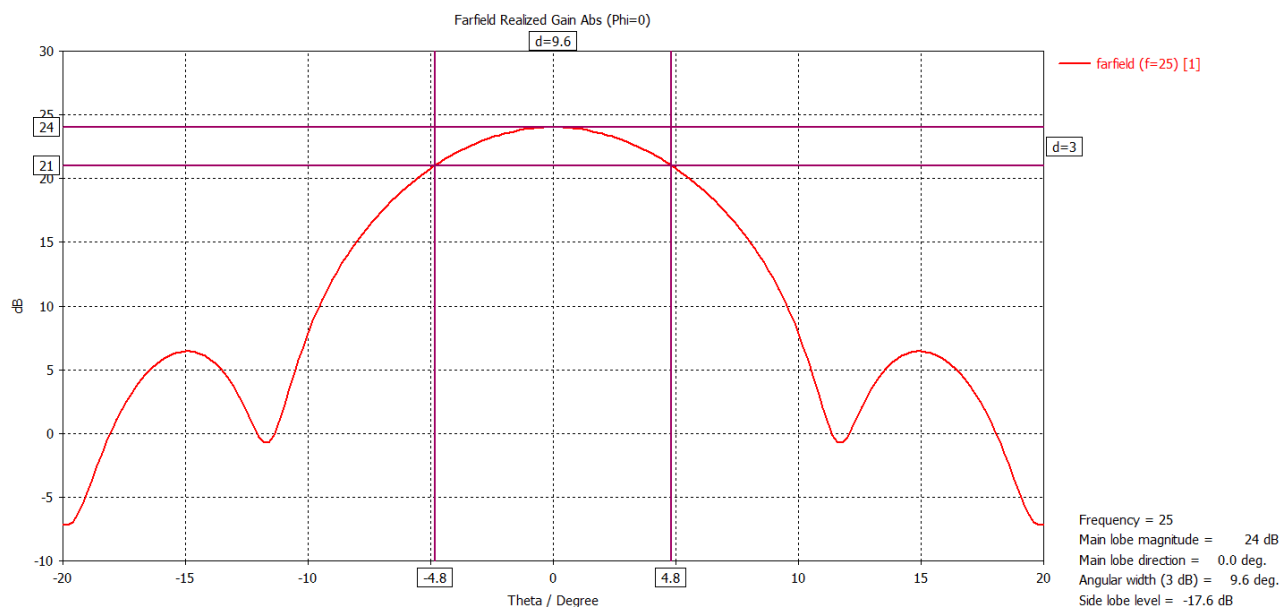


2.7.2 Radiation pattern in H-plane

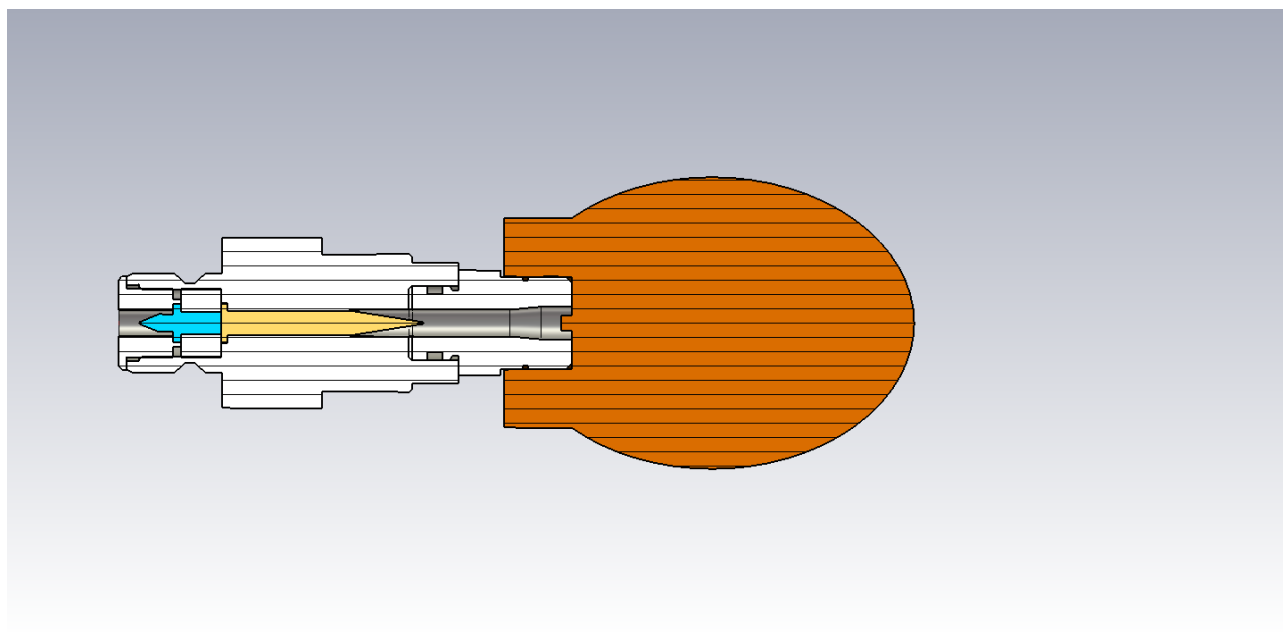


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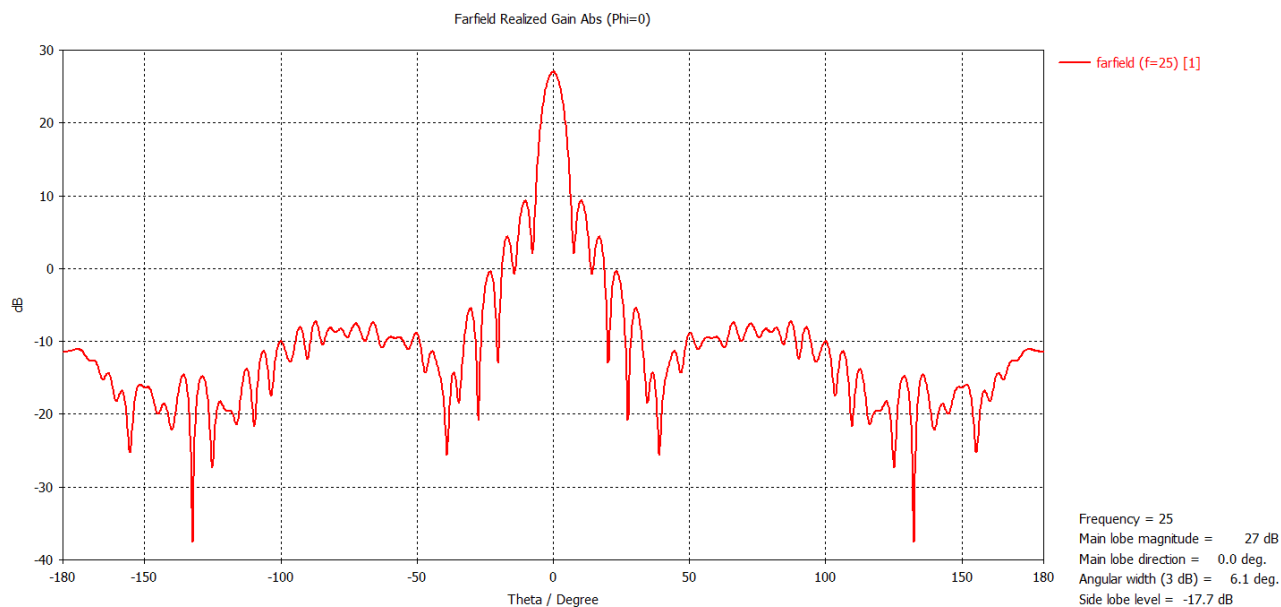


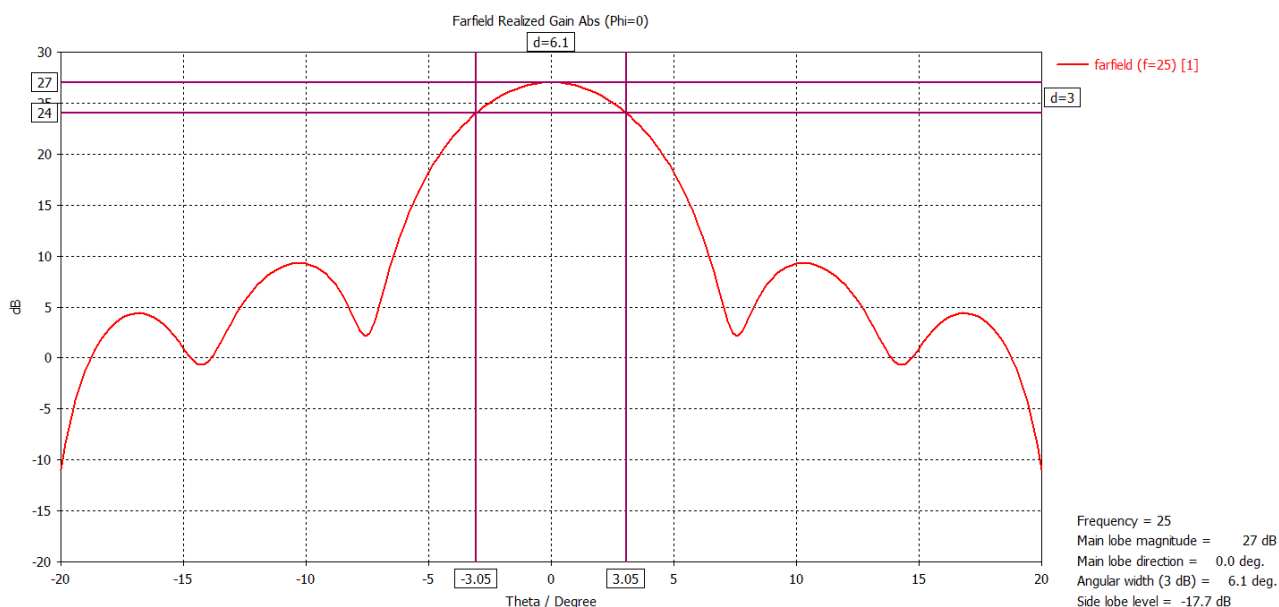
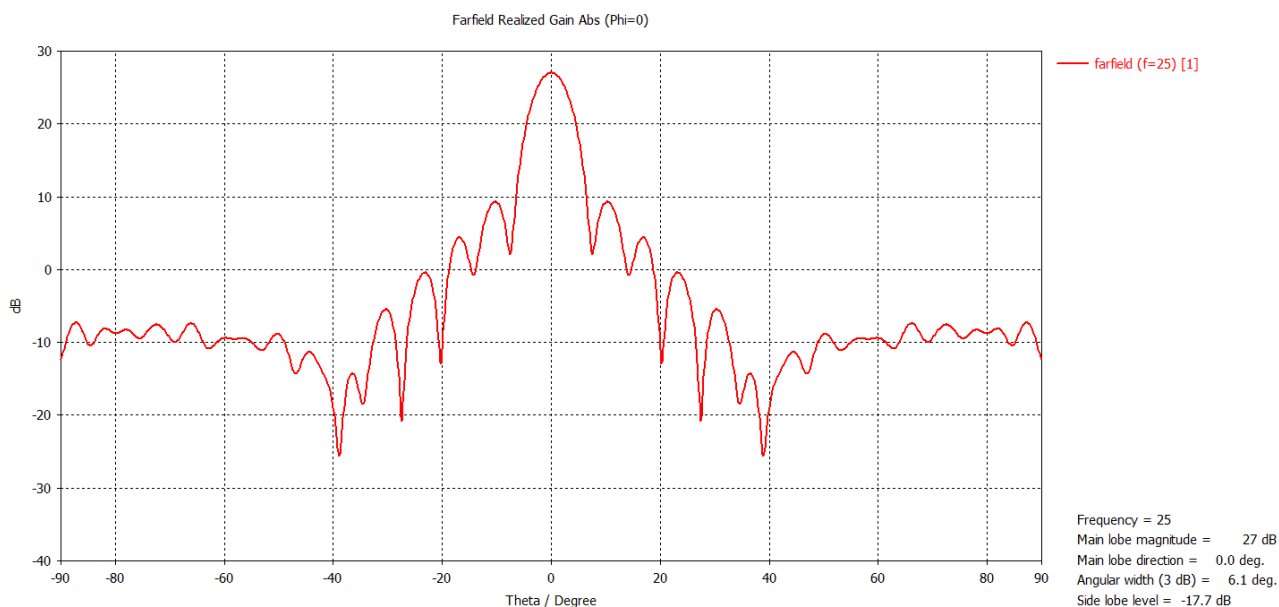
2.8 PTFE / DN100 (4") Drop



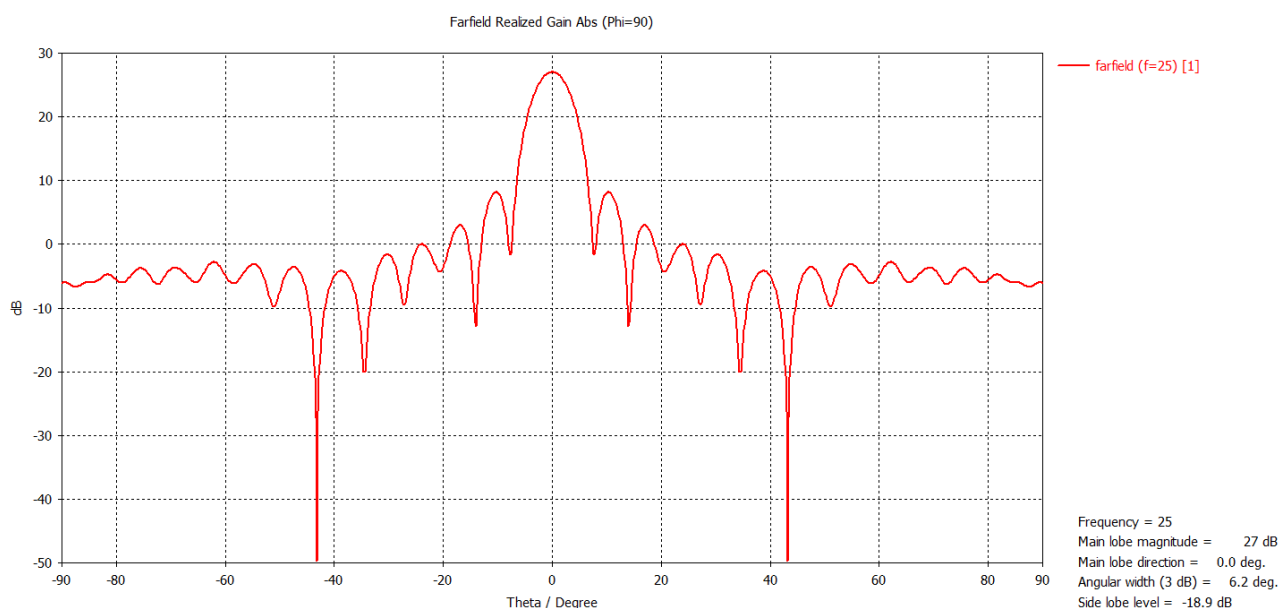
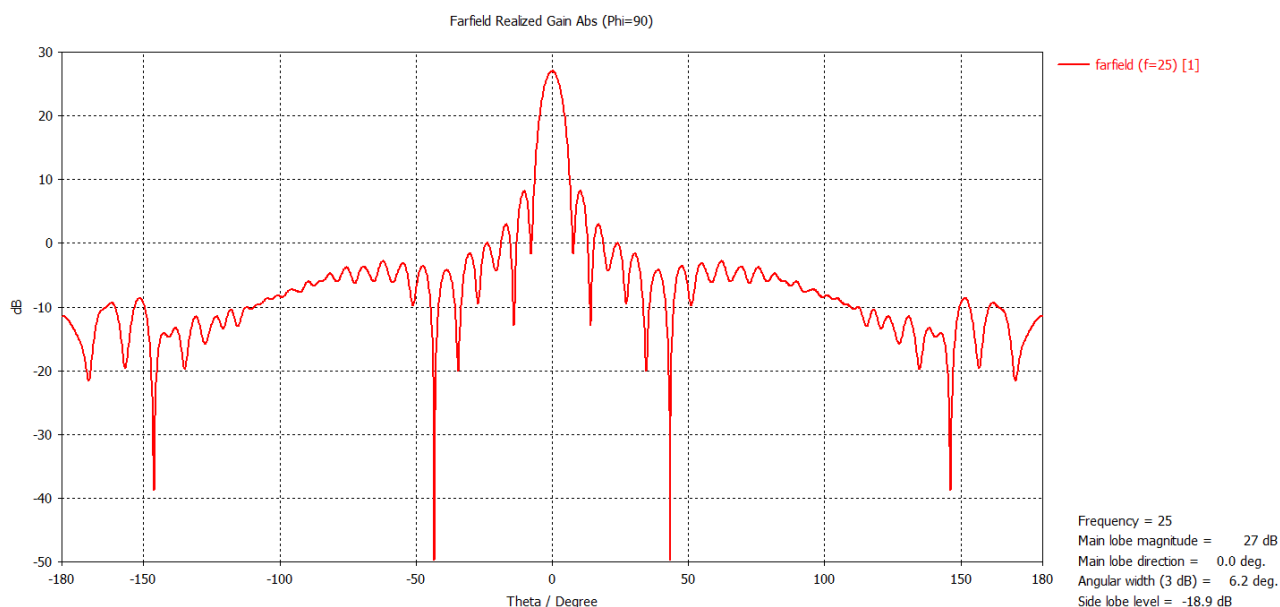
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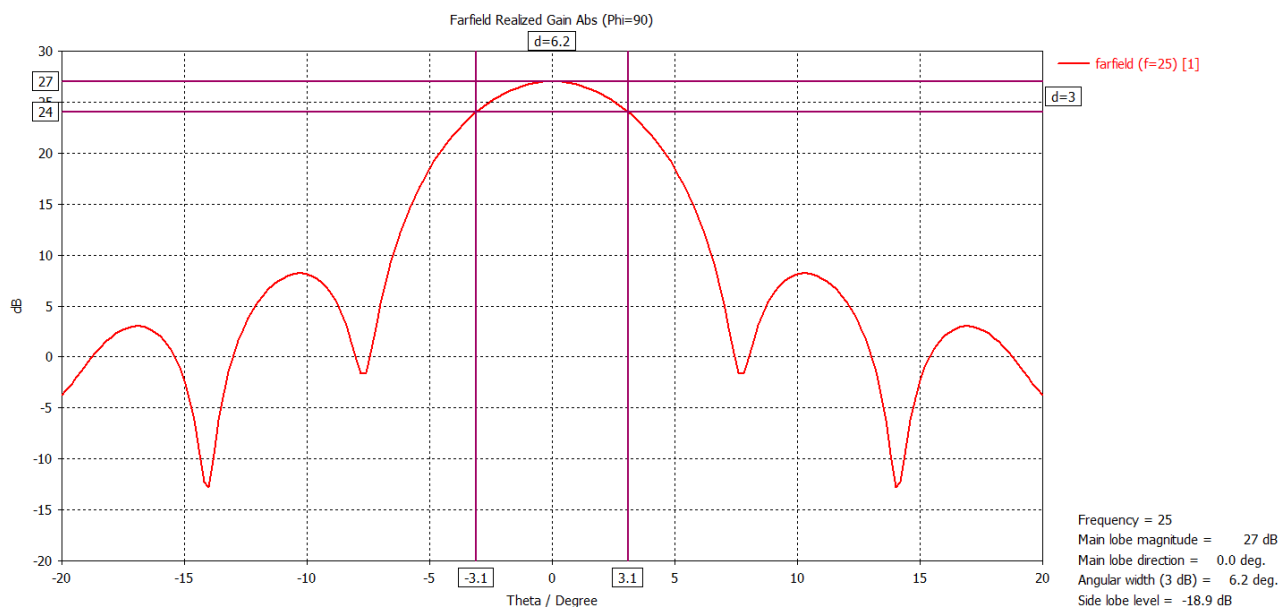
2.8.1 Radiation pattern in E-plane



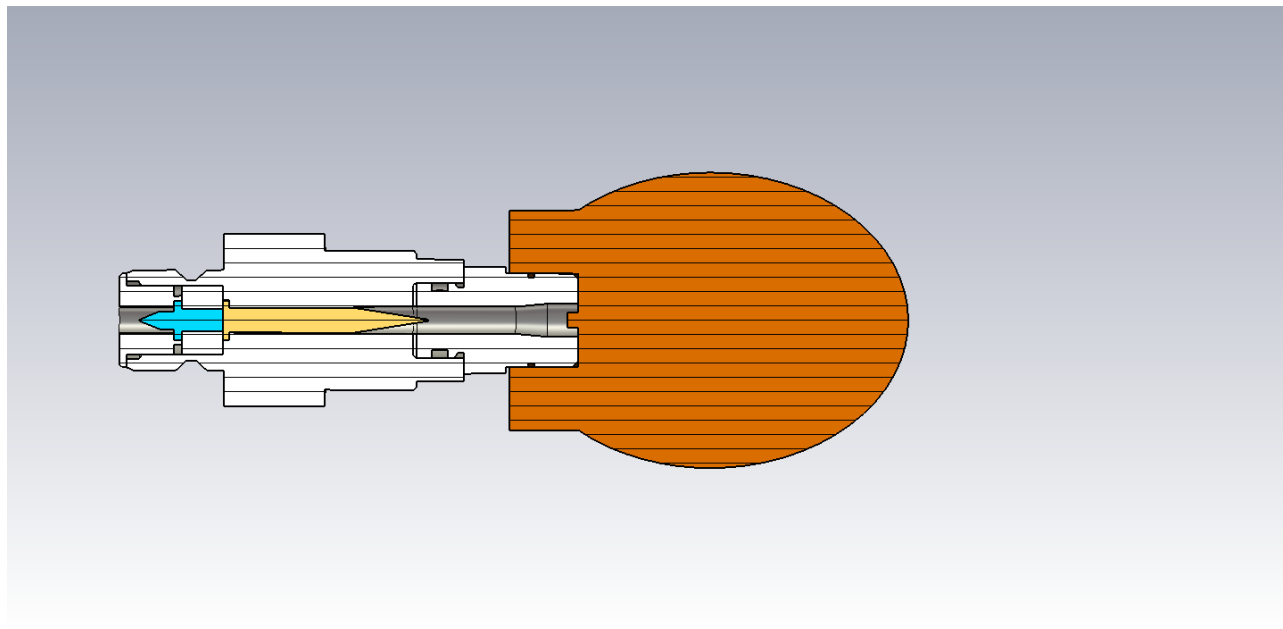


2.8.2 Radiation pattern in H-plane



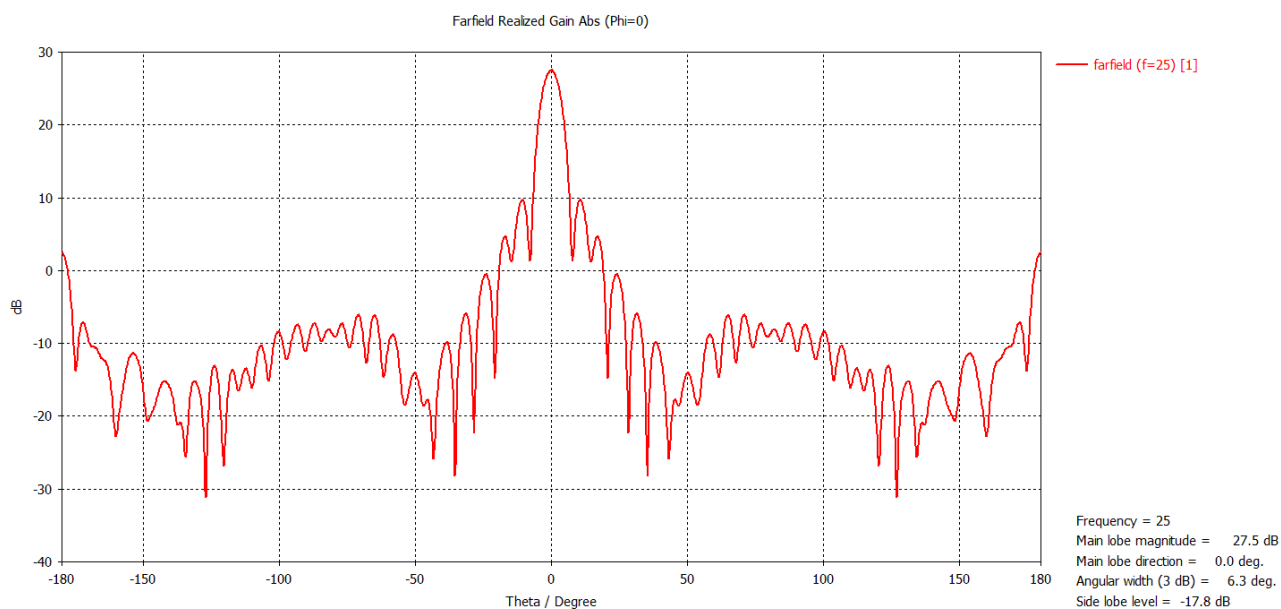


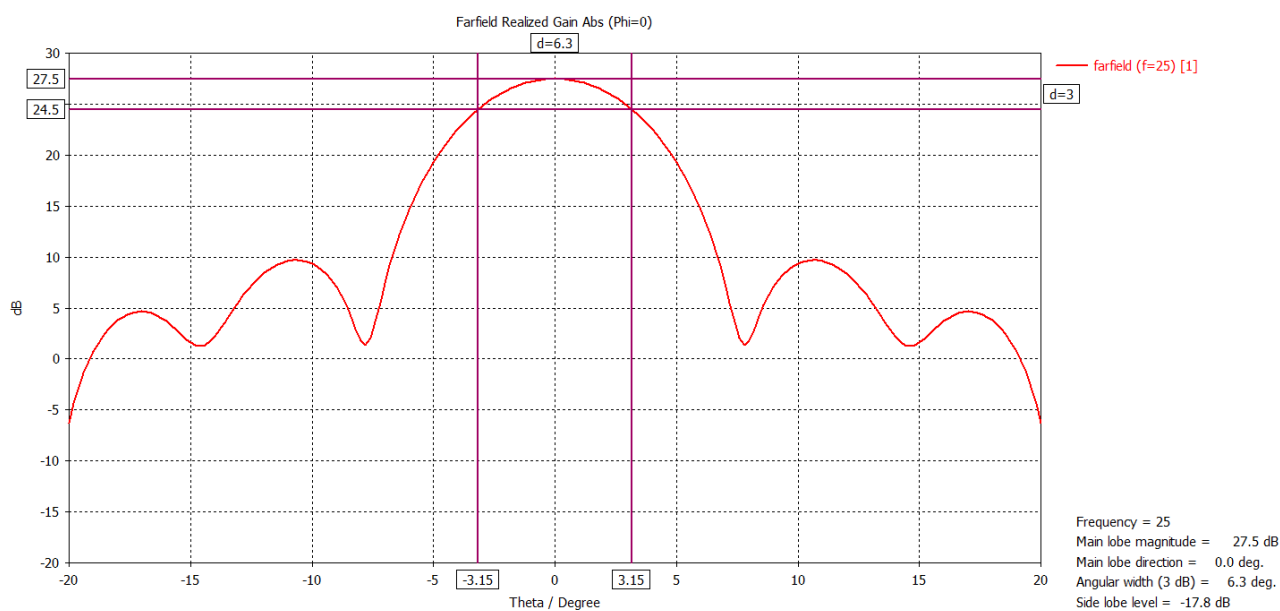
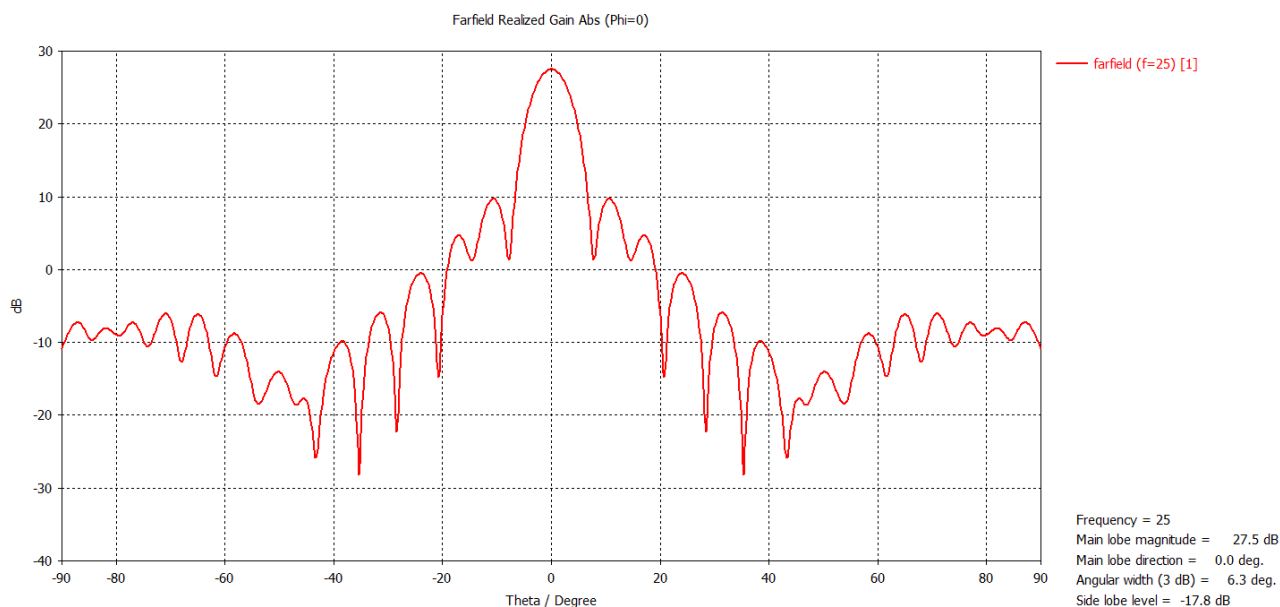
2.9 PP / DN100 (4") Drop



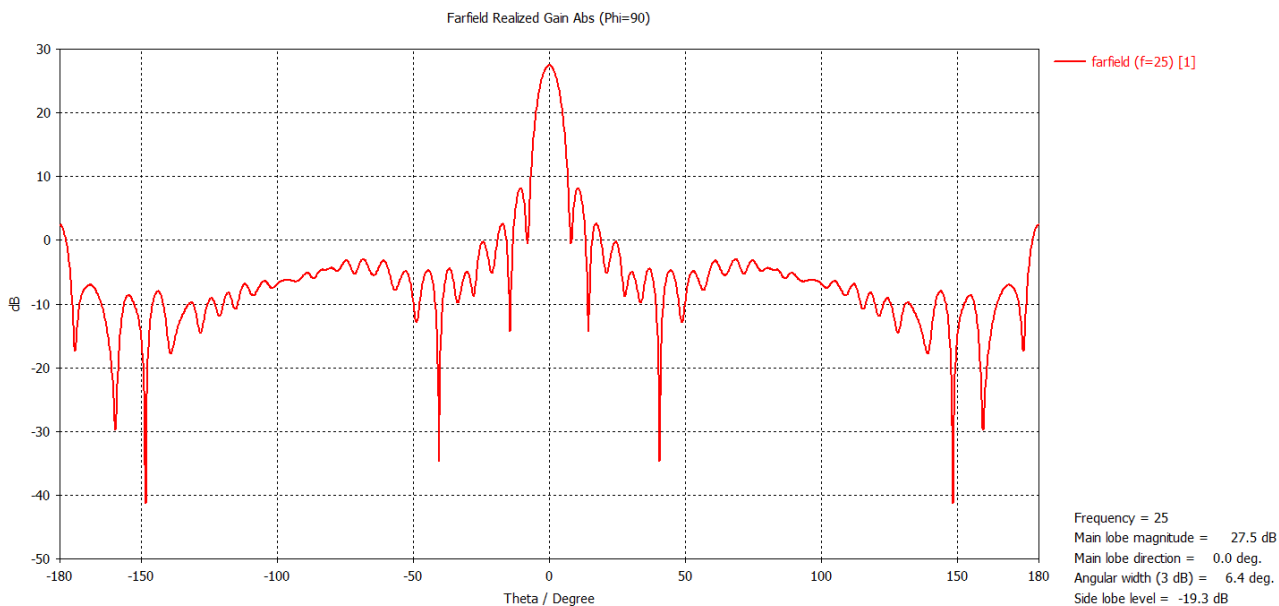
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2.9.1 Radiation pattern in E-plane

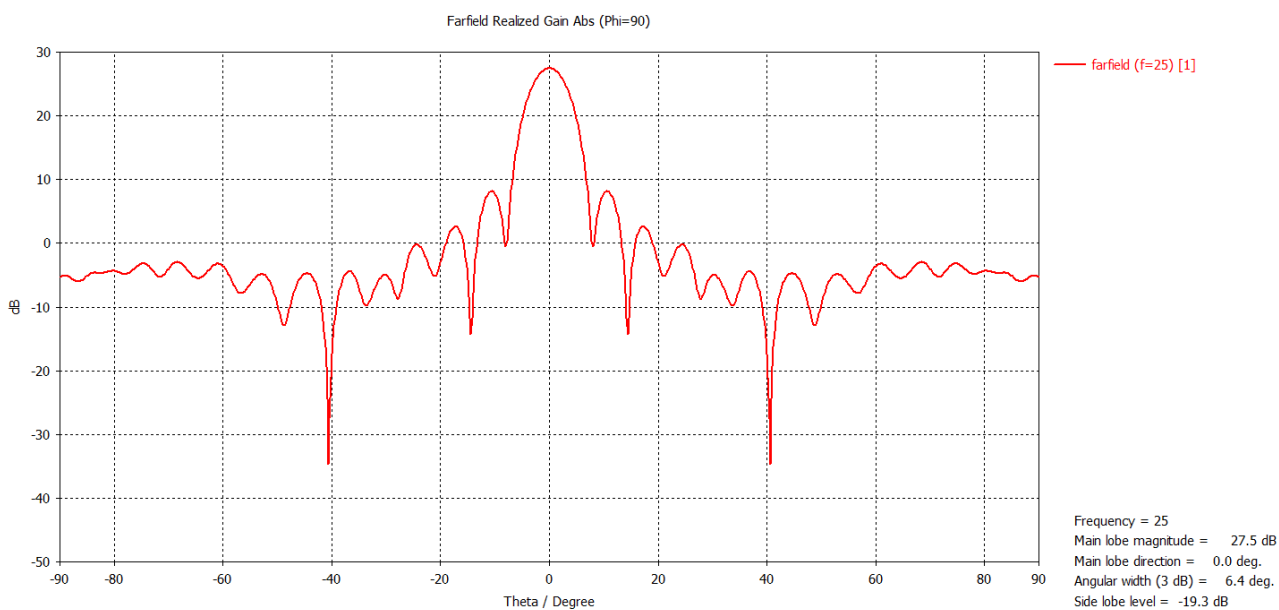


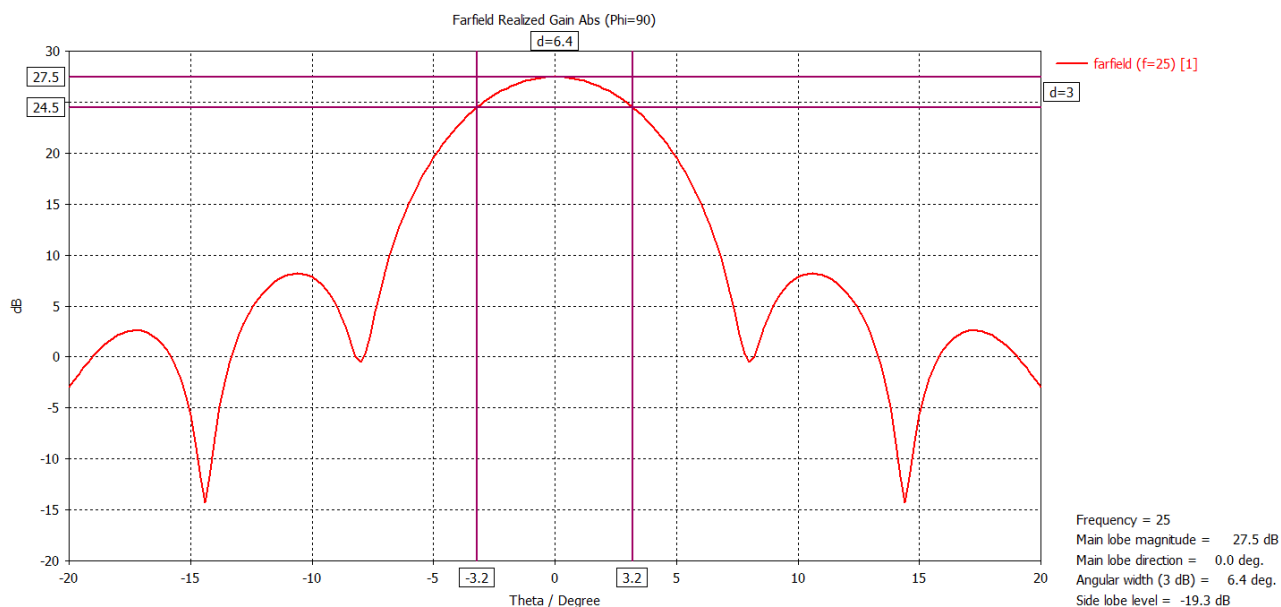


2.9.2 Radiation pattern in H-plane

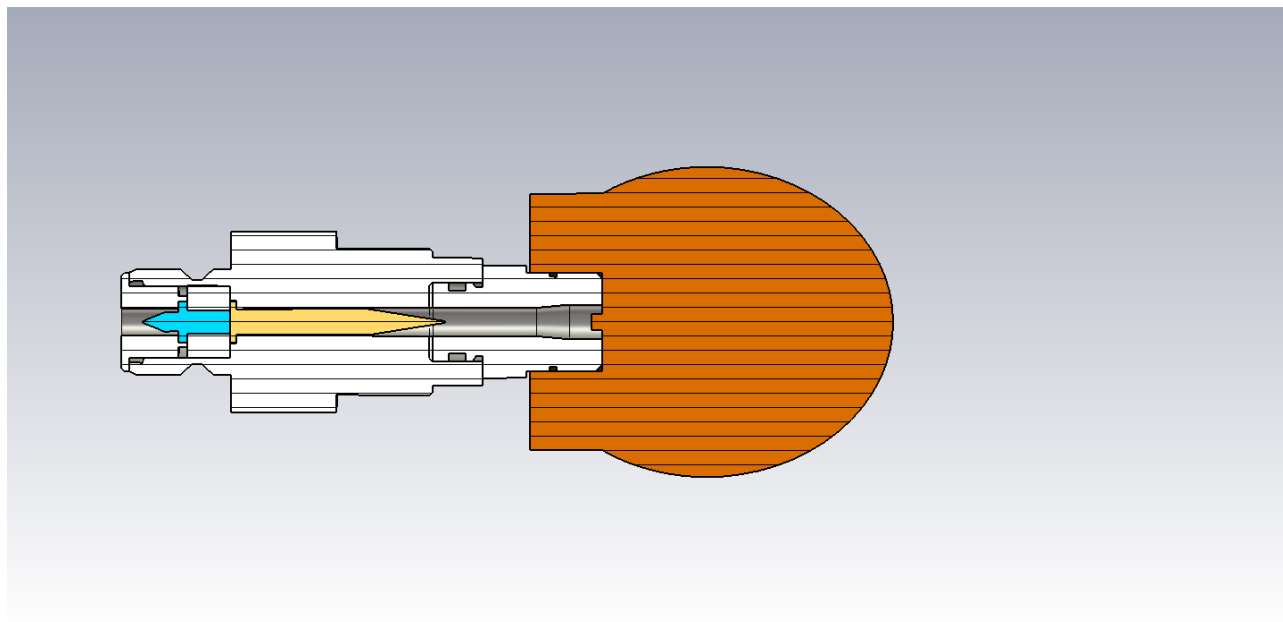


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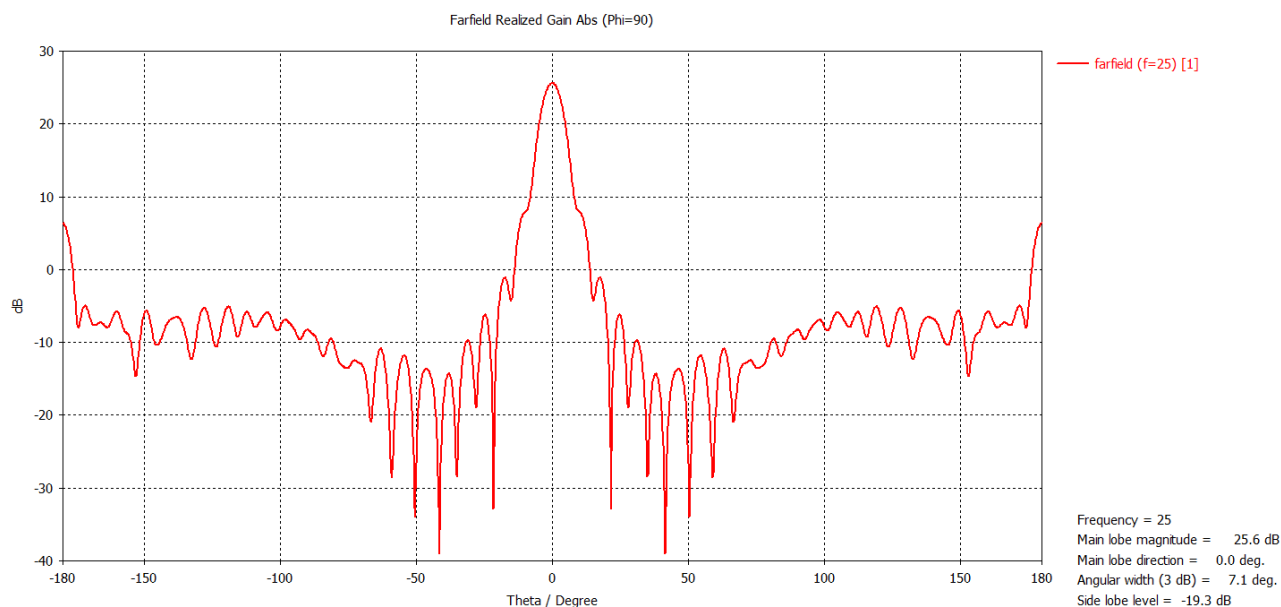


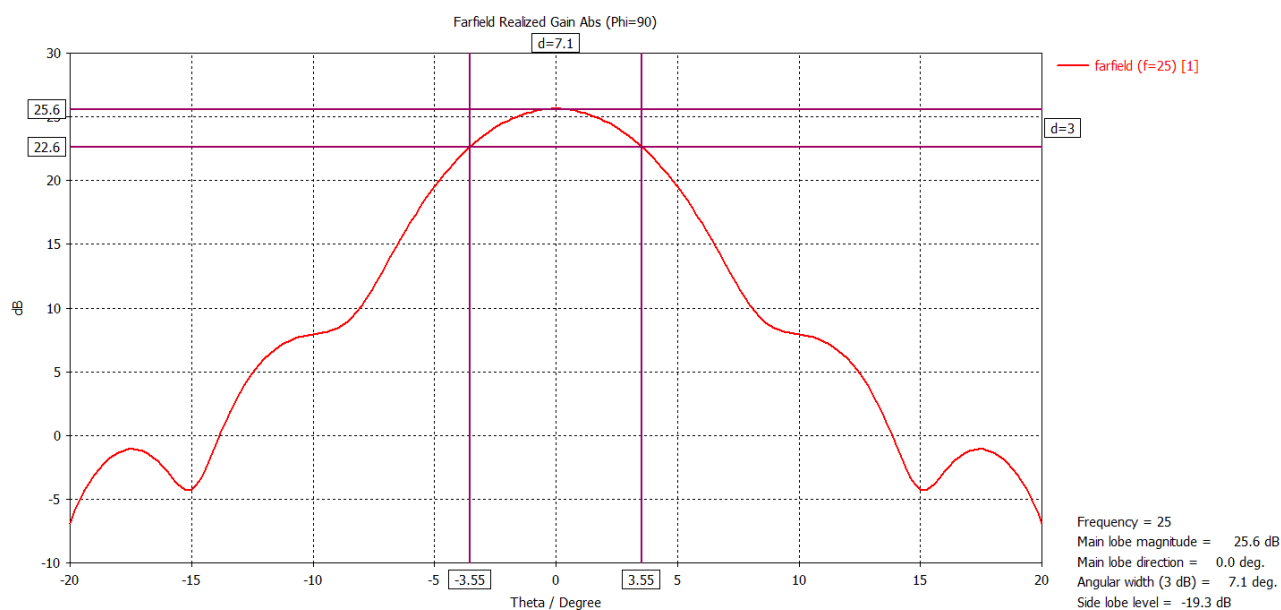
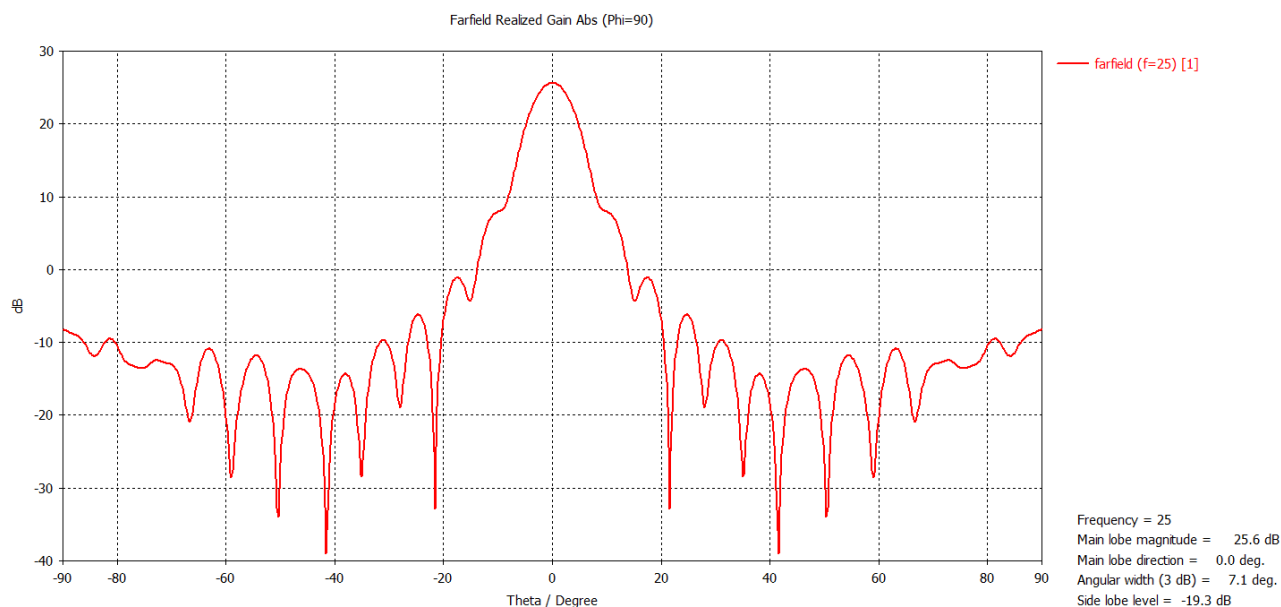


2.10 PEEK / DN100 (4") Drop

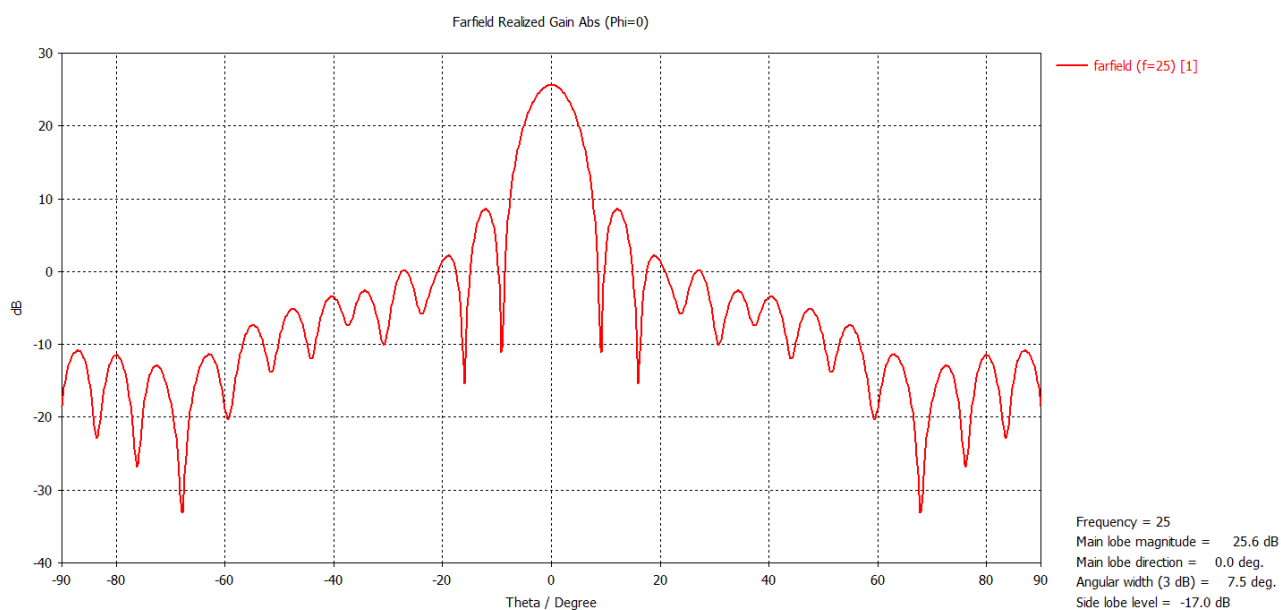
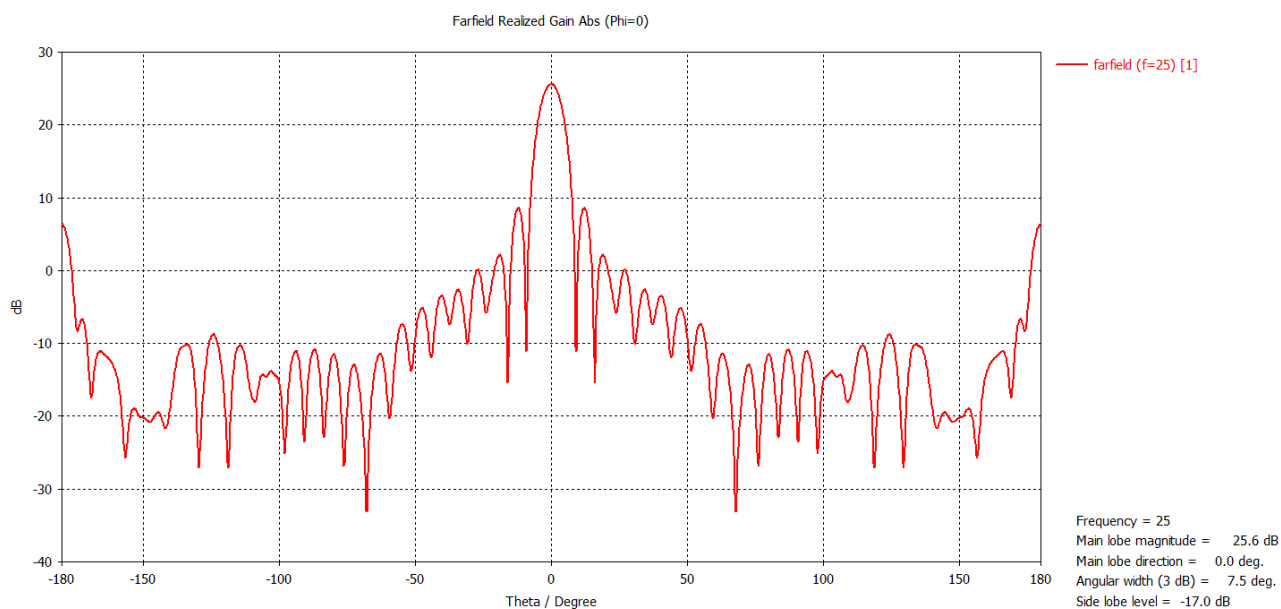


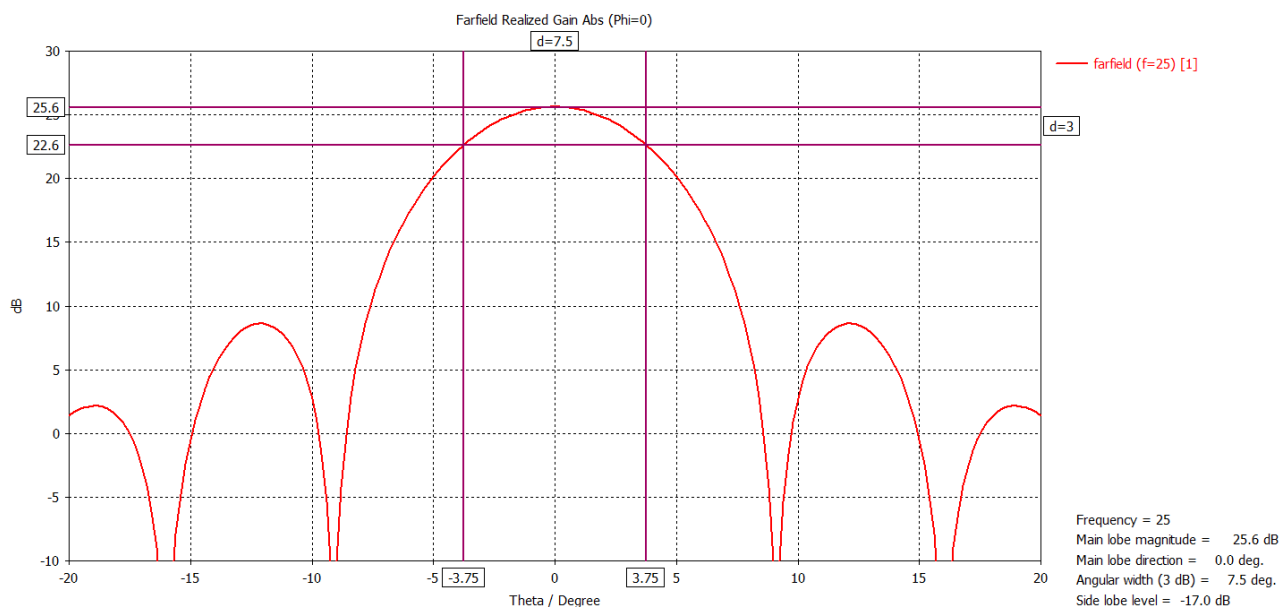
2.10.1 Radiation pattern in E-plane



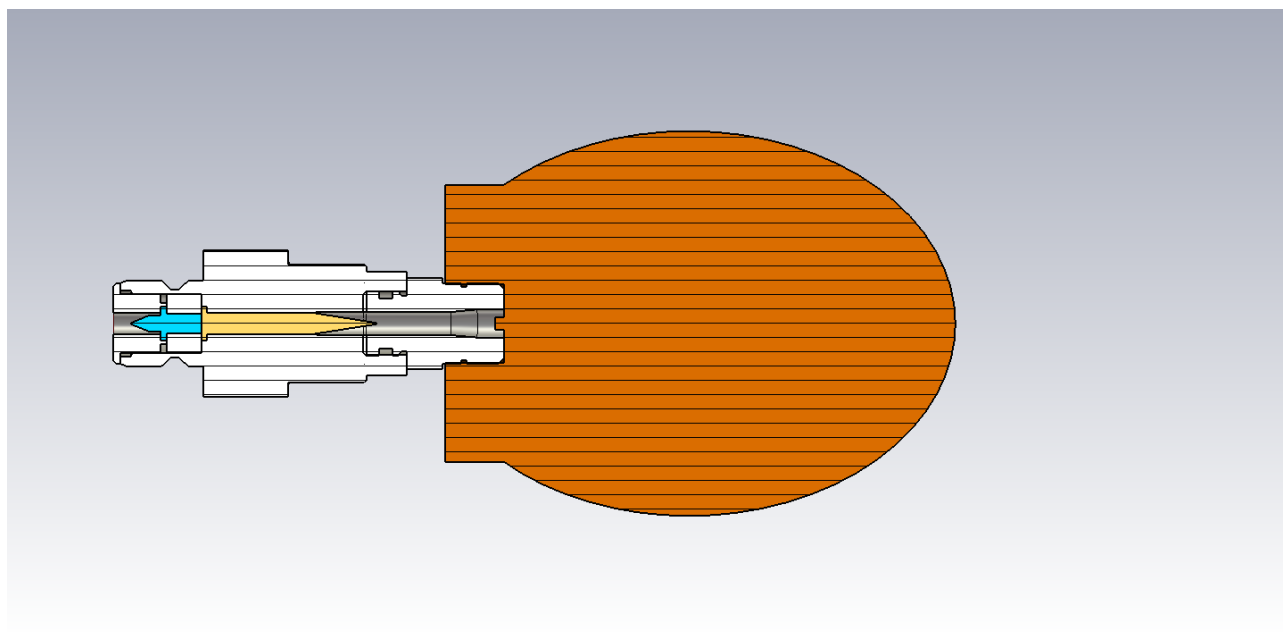


2.10.2 Radiation pattern in H-plane



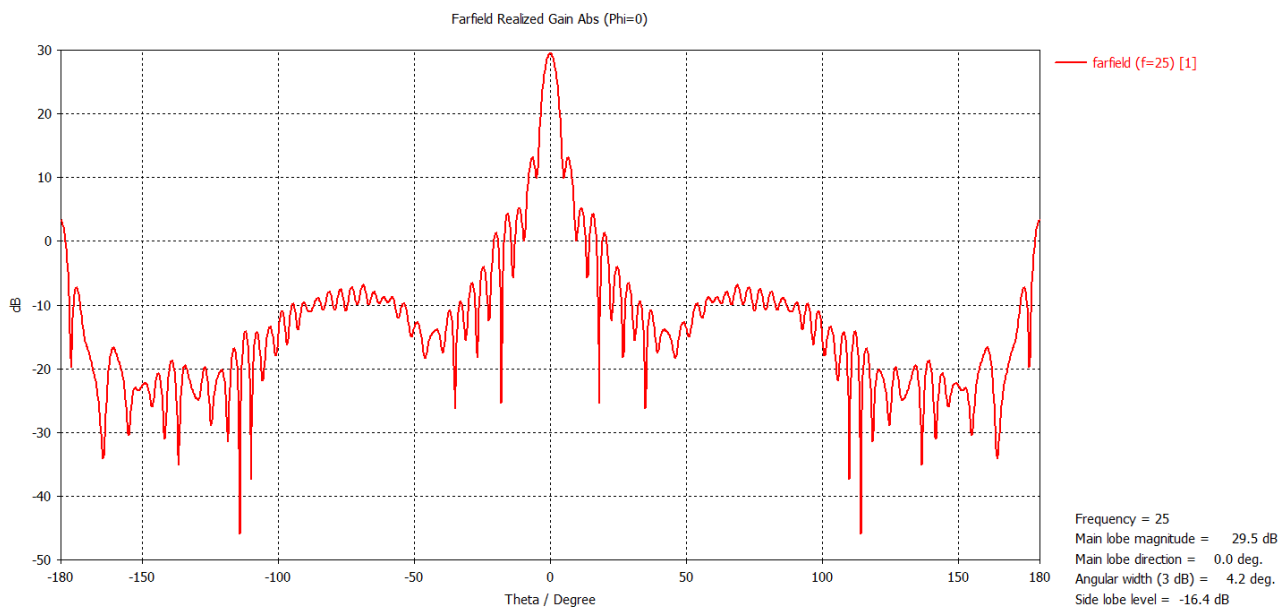


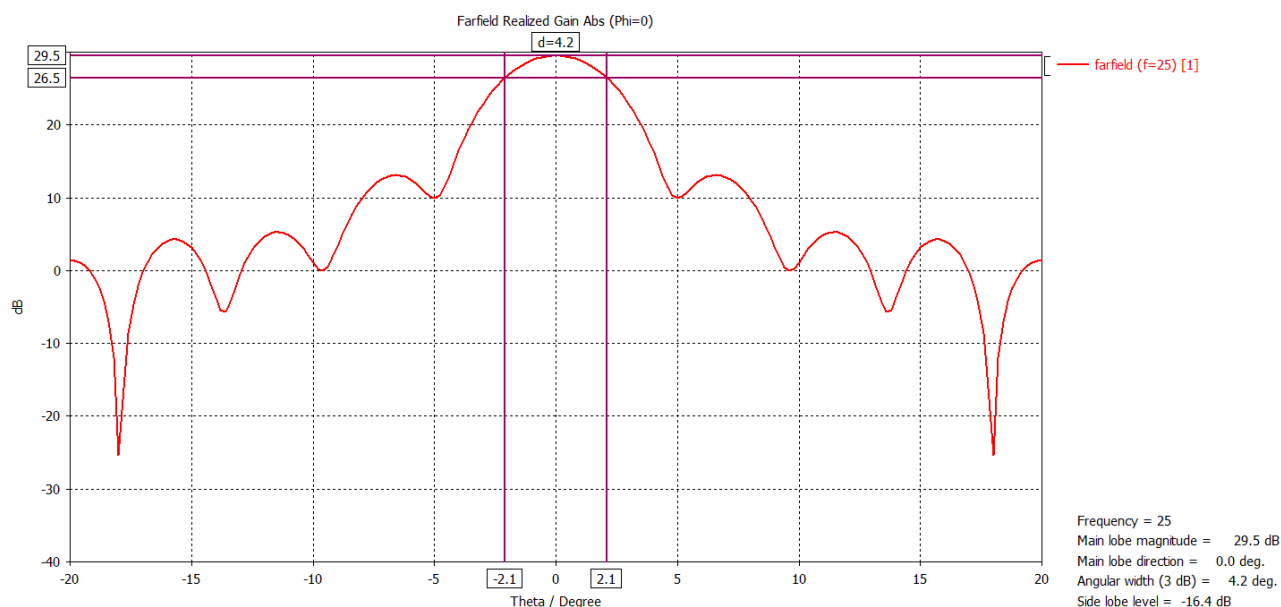
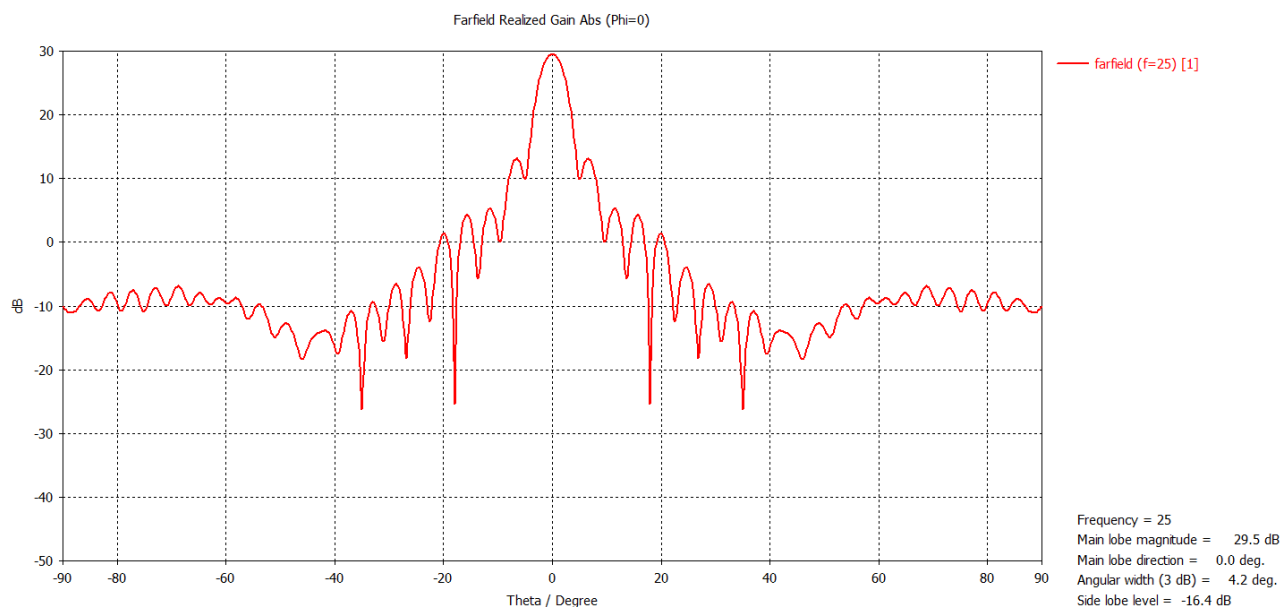
2.11 PTFE / DN150 (6") Drop



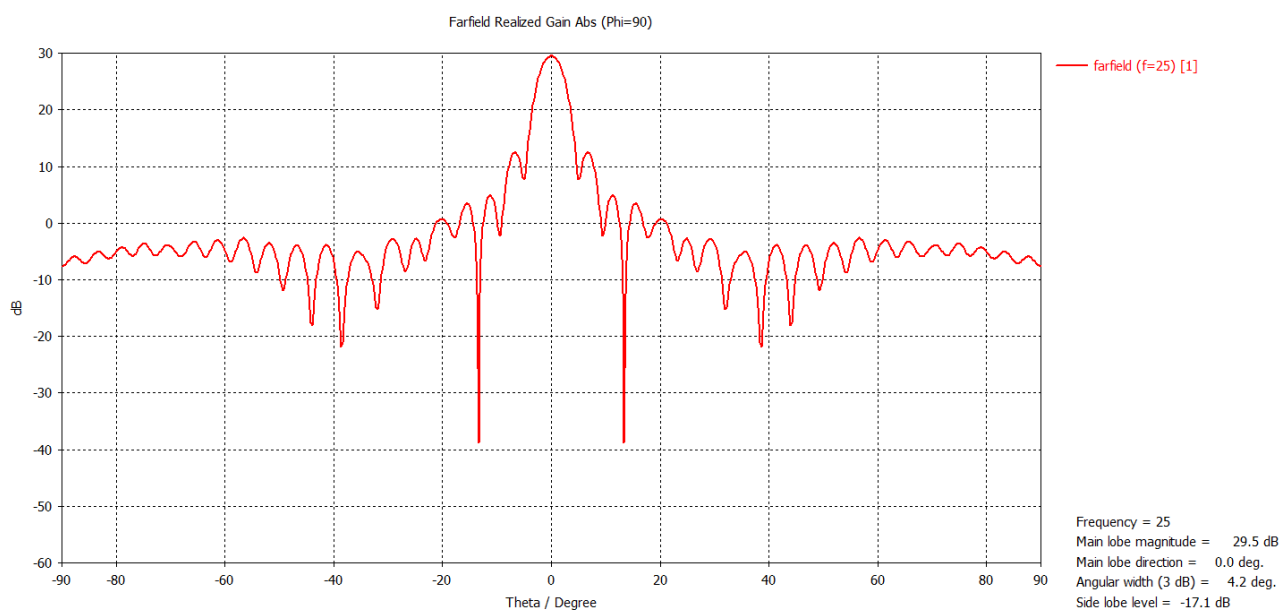
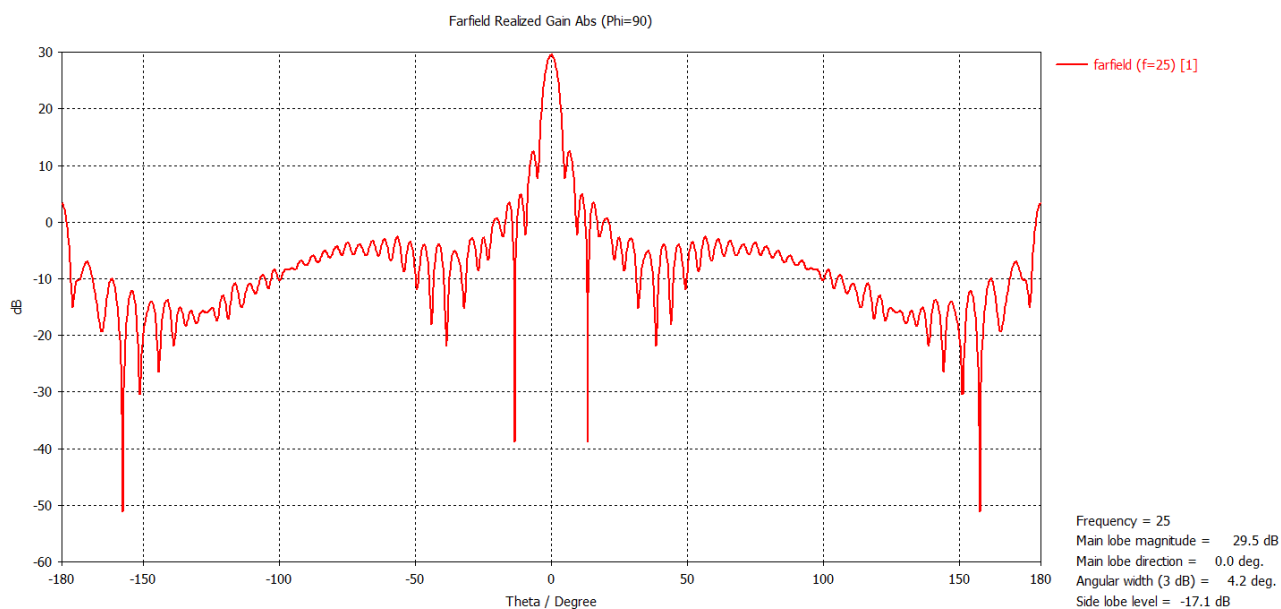
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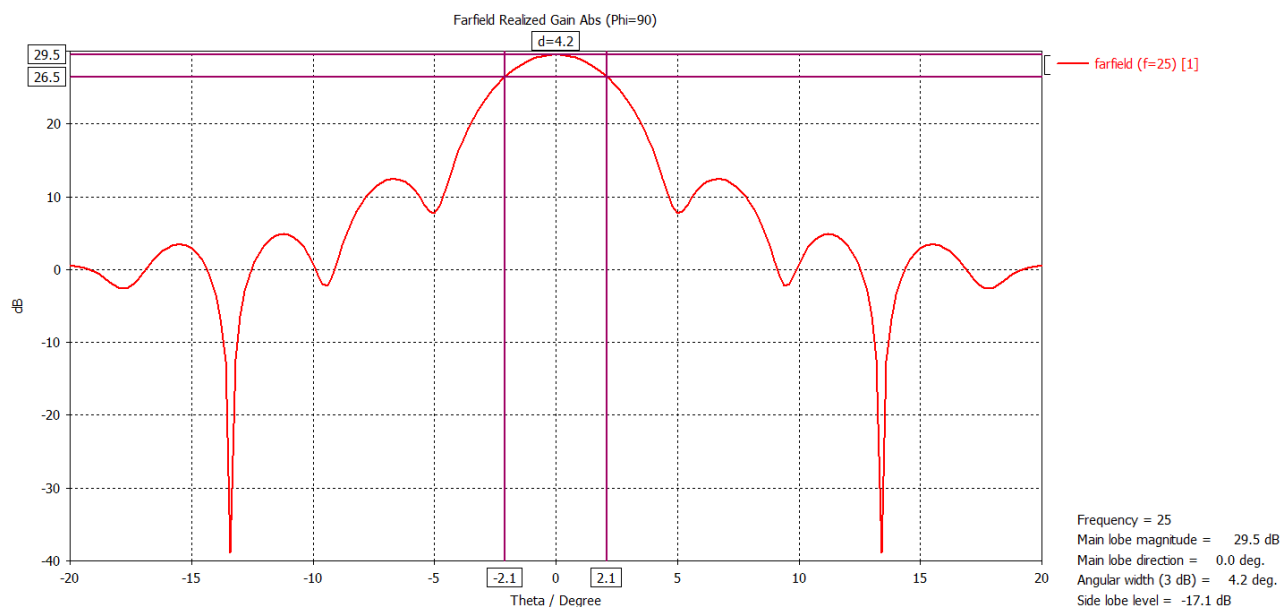
2.11.1 Radiation pattern in E-plane



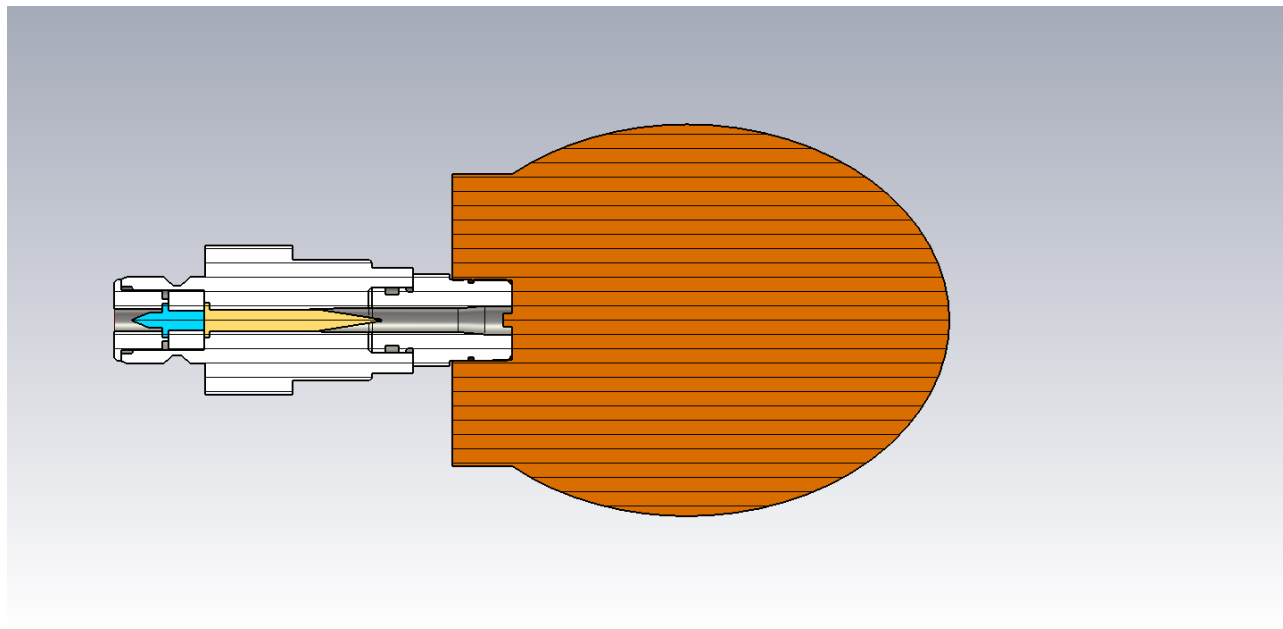


2.11.2 Radiation pattern in H-plane

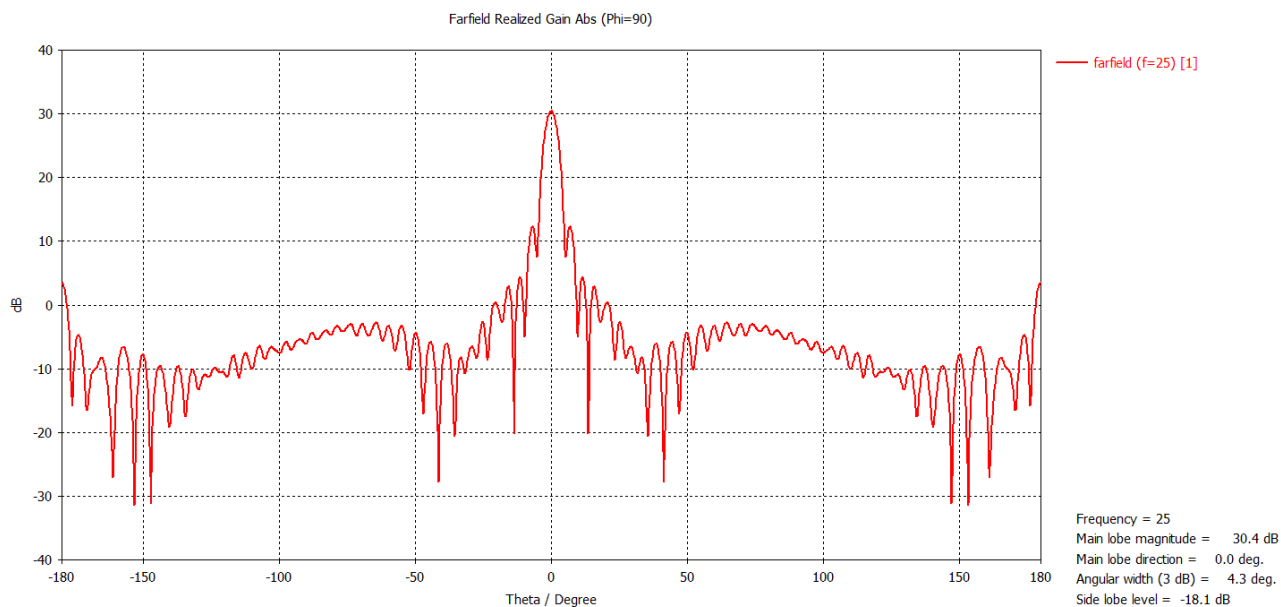


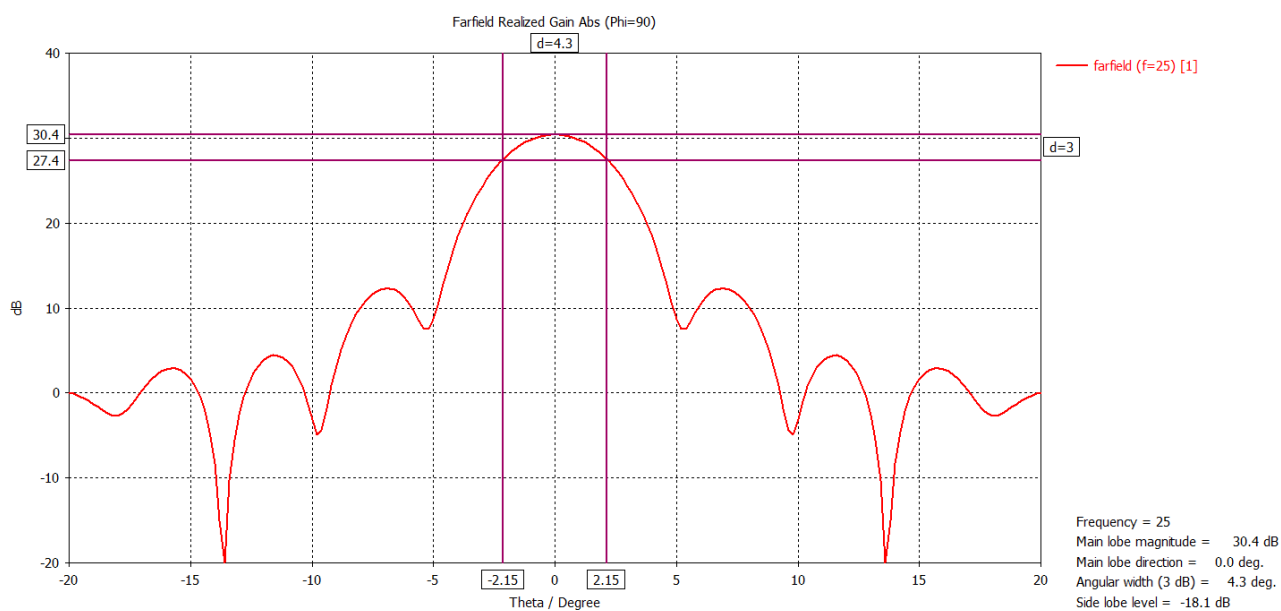
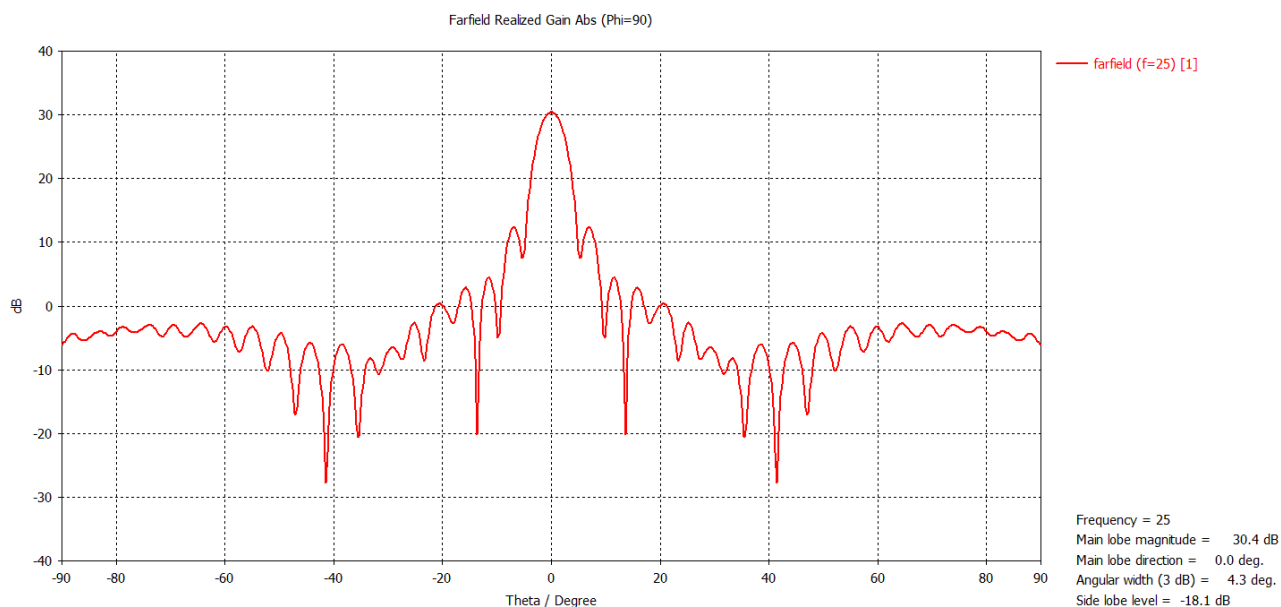


2.12 PP / DN150 (6") Drop antenna

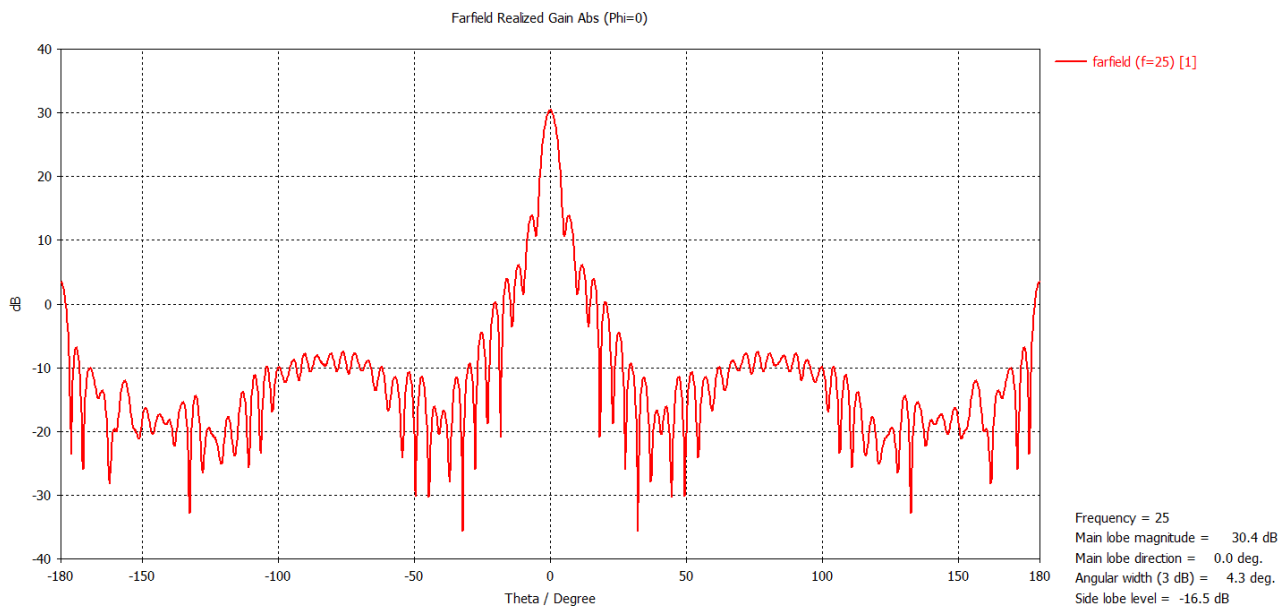


2.12.1 Radiation pattern in E-plane

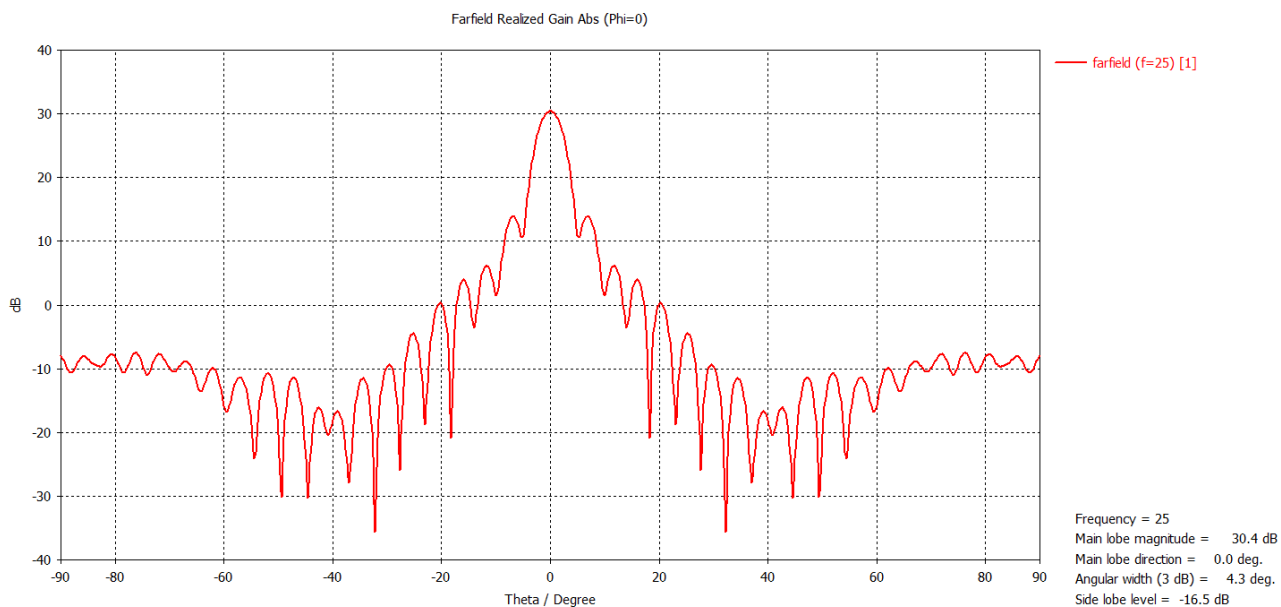


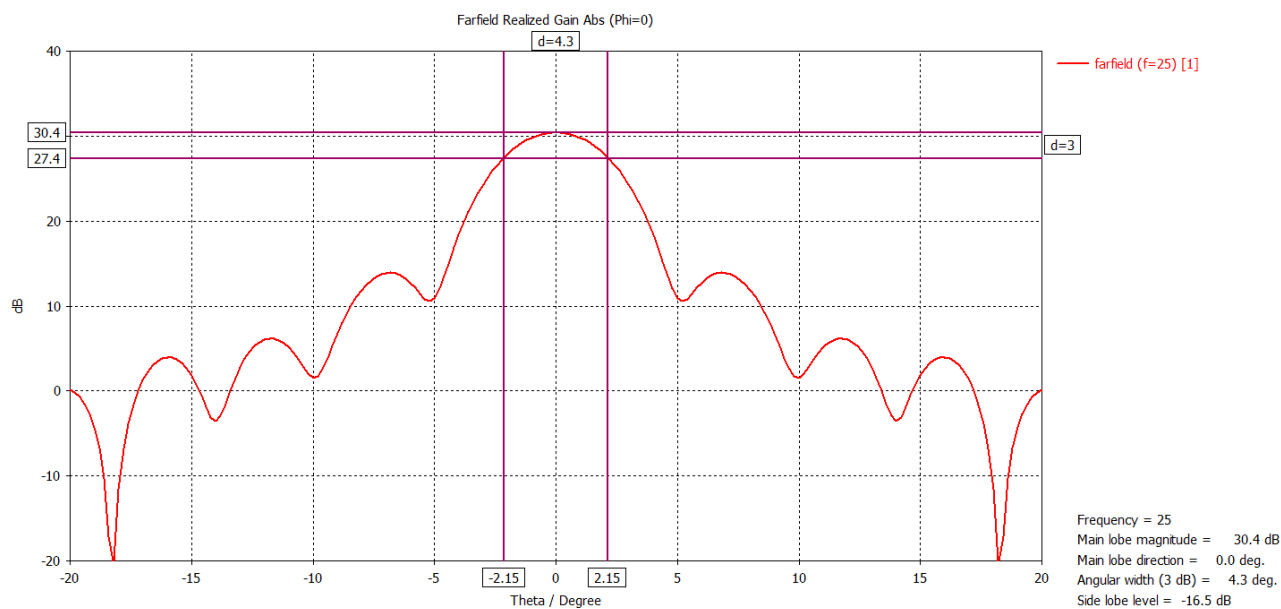


2.12.2 Radiation pattern in H-plane

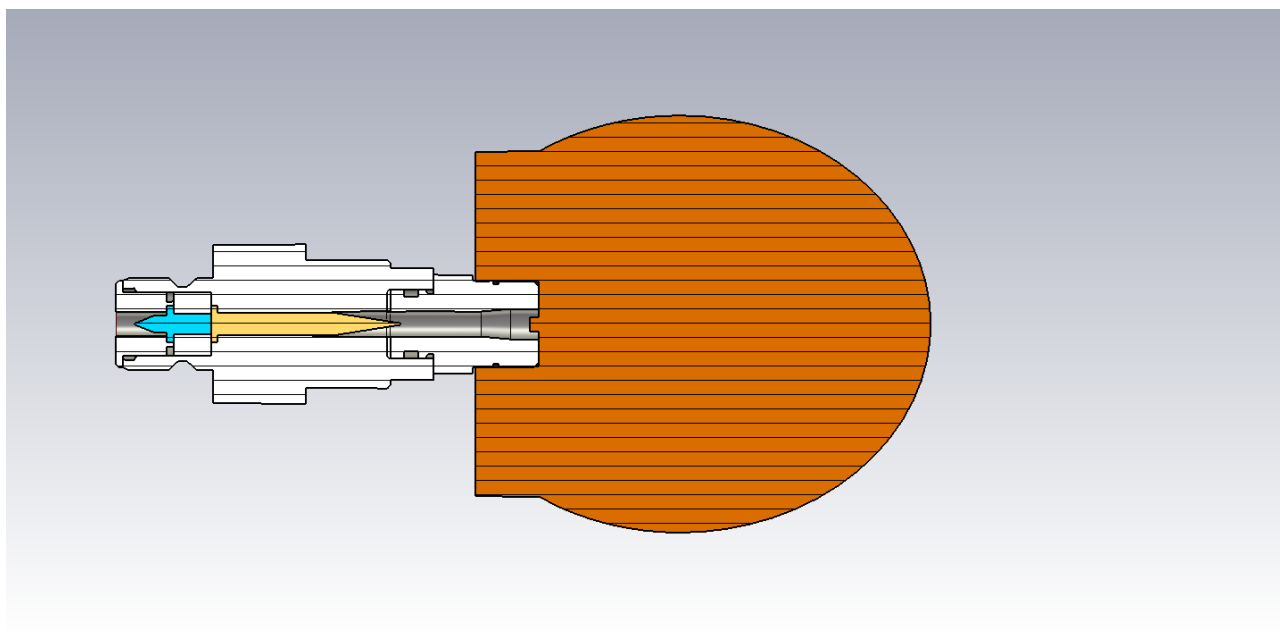


RF Sensors

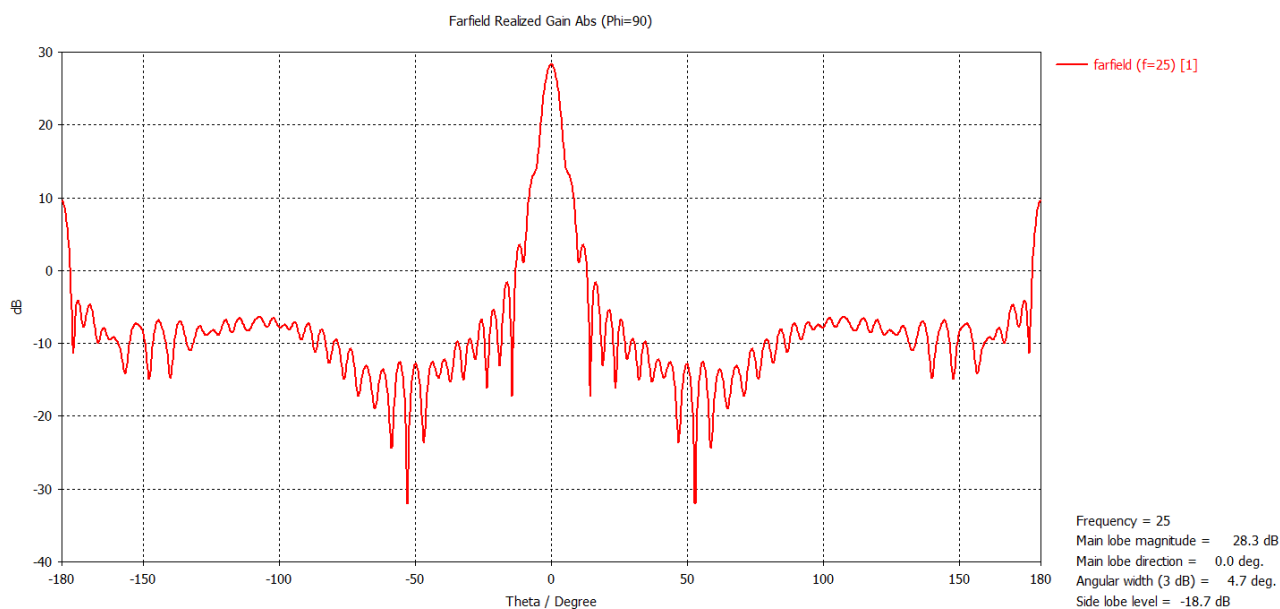


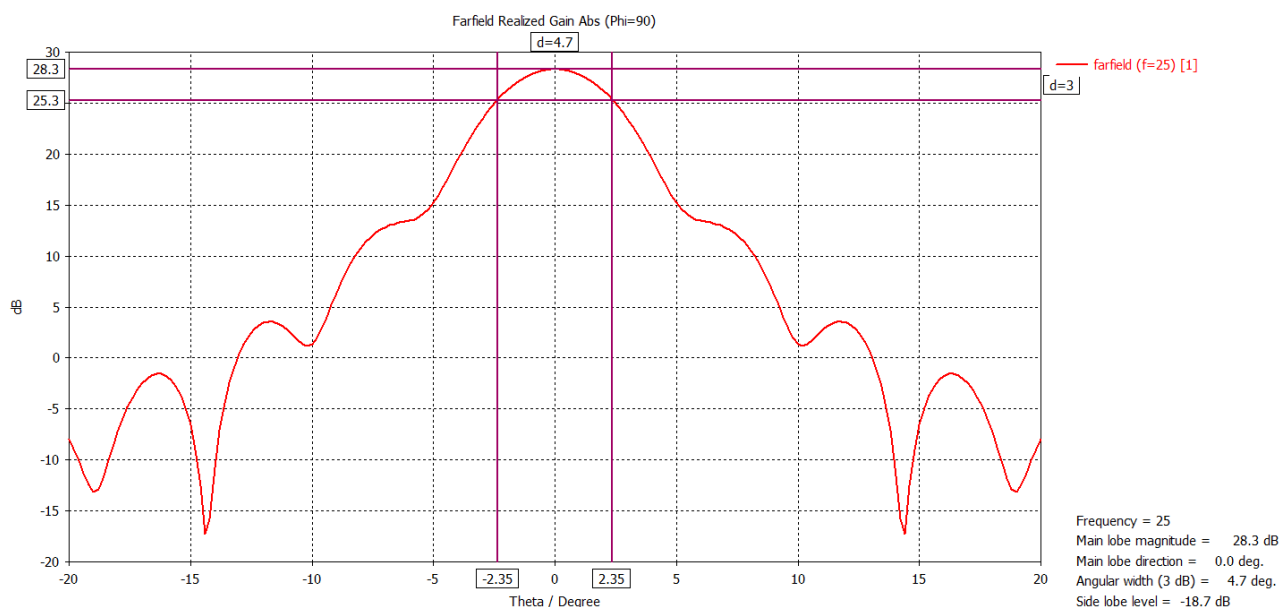
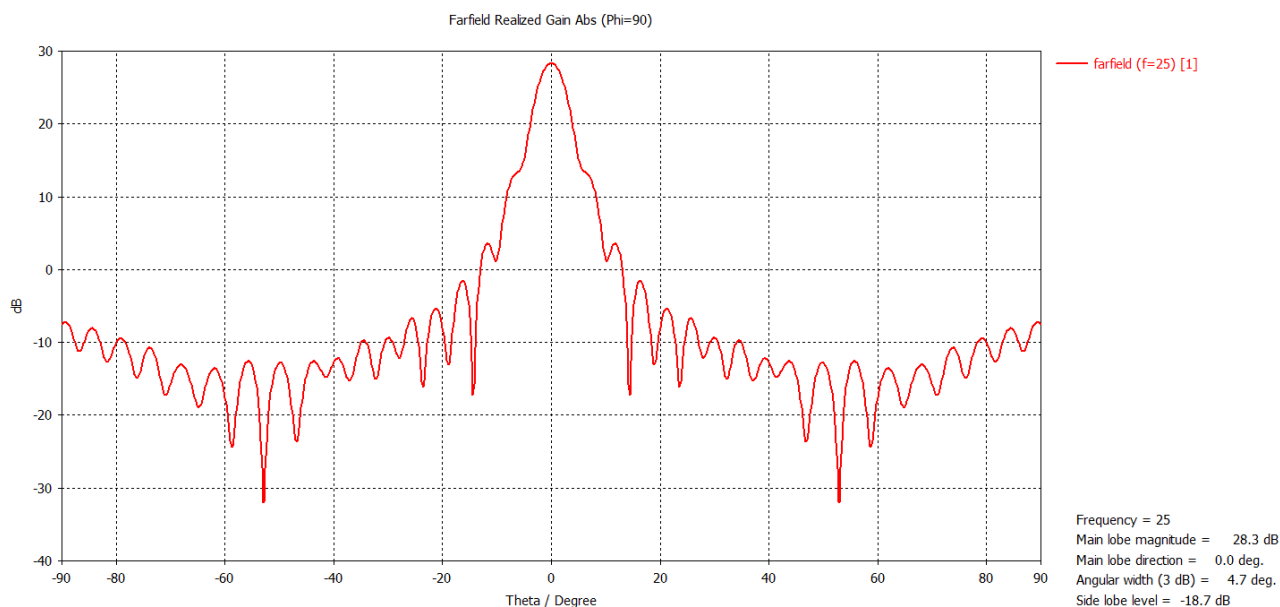


2.13 PEEK / DN150 (6") Drop

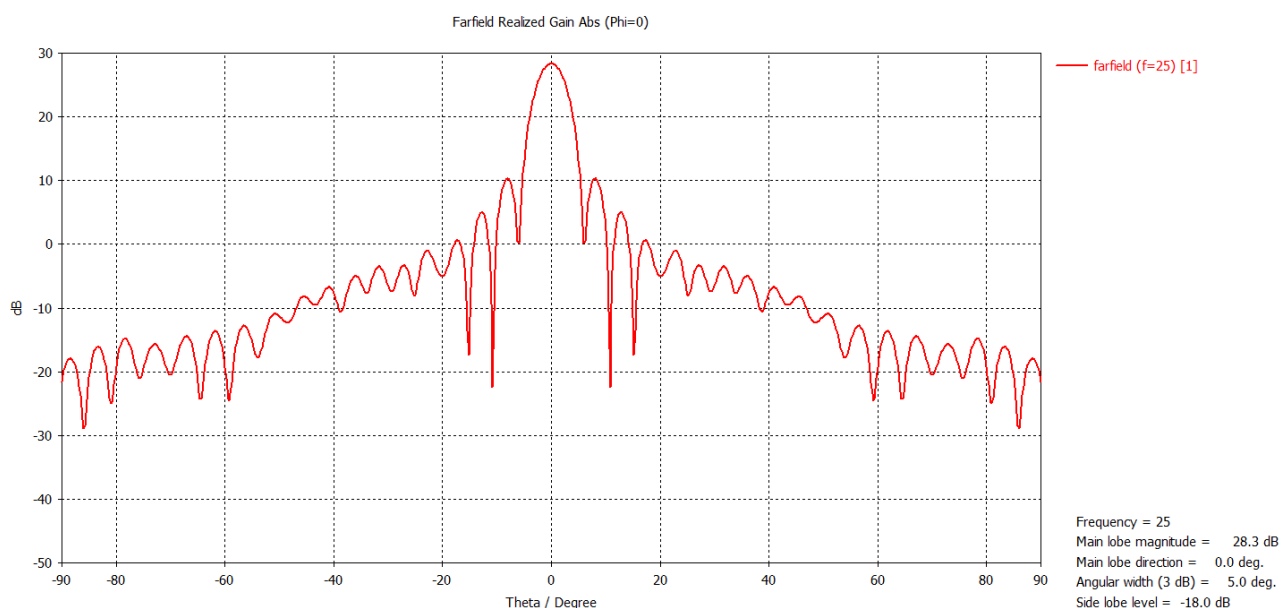
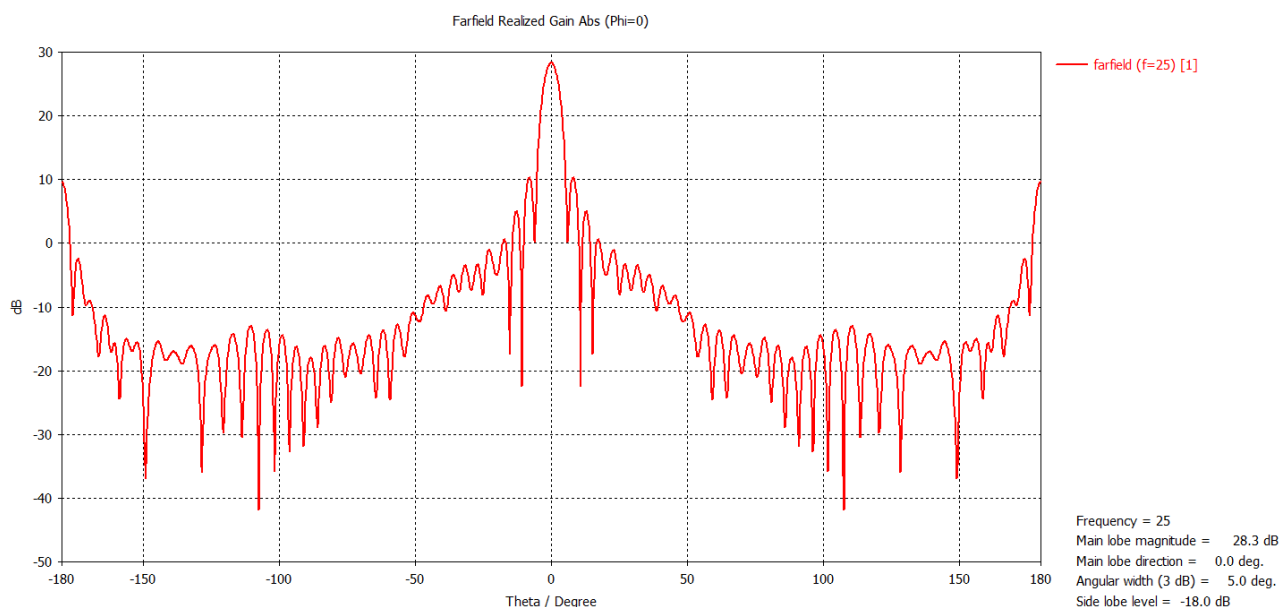


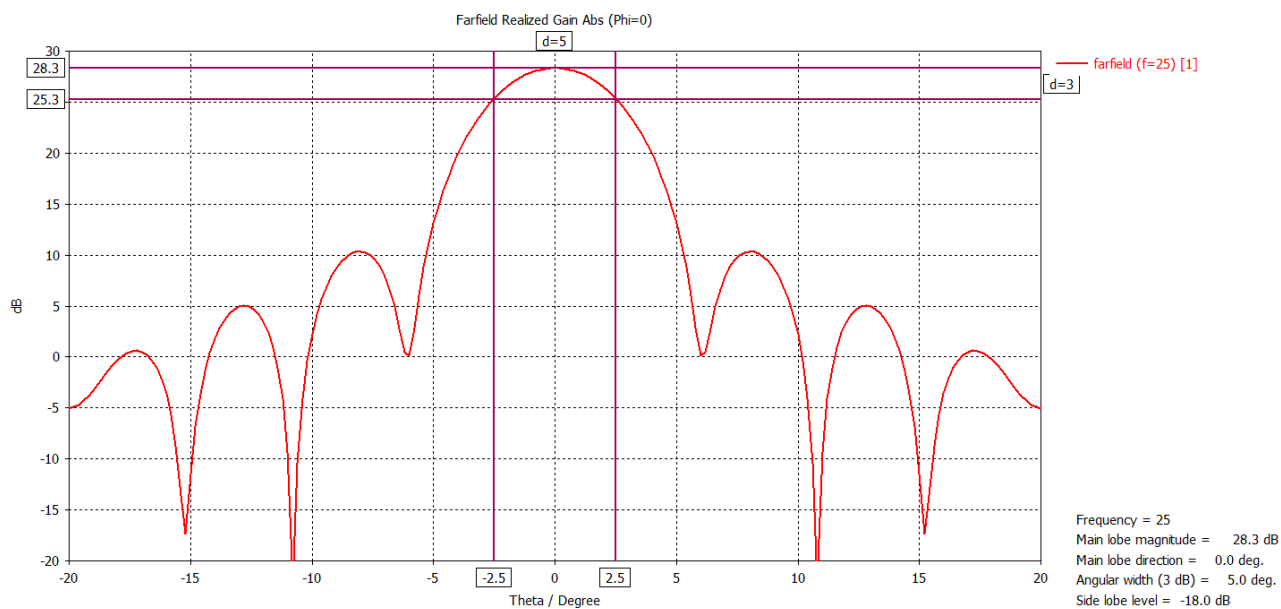
2.13.1 Radiation pattern in E-plane





2.13.2 Radiation pattern in H-plane





2.14 Overview of LPR antennas

Type	Gain [dB]	Angular width E- / H-plane [°]
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