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Radio approval Optiwave 7400

LPR antenna characteristics

Distribution list: KI LS

Document Type: Report

KI LS

Revision history	Issue	Date	Issued by	Modification
	0.0	2014-05-19	C.O.	Created

Content

1. LPR antenna characteristics

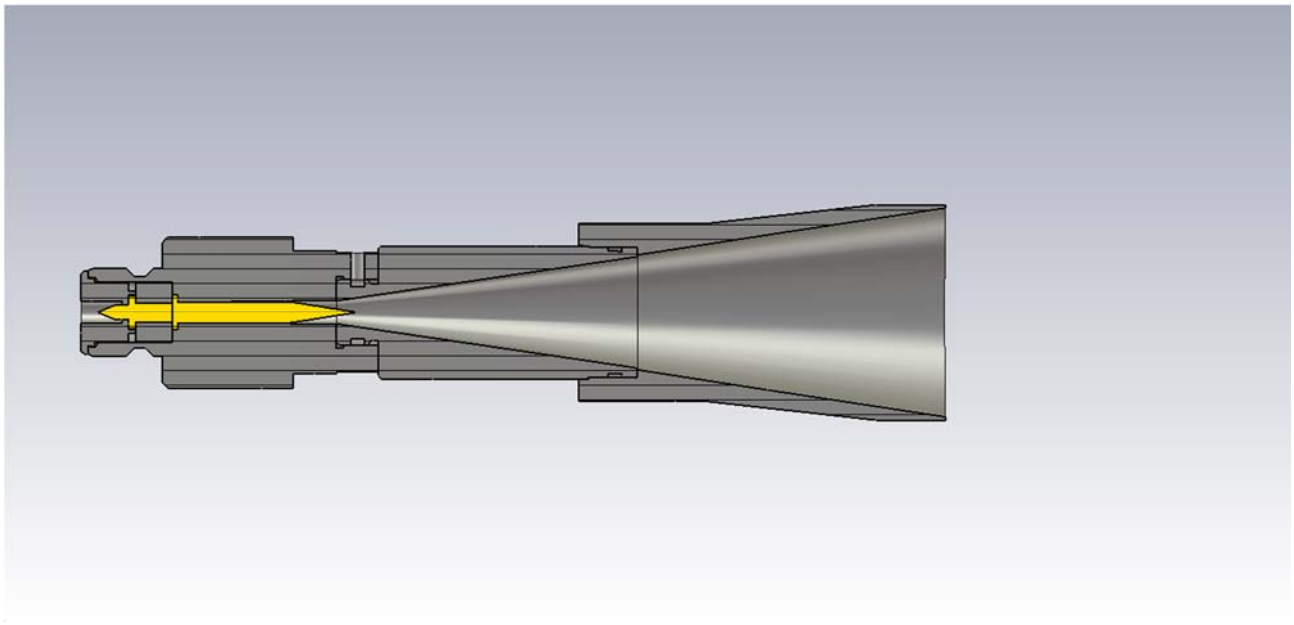
The LPR device of Optiwave 7400 can be used with the following antennas:

- Wave Horn DN80 (stainless steel)
- Wave Horn DN100 (stainless steel)
- Wave Horn DN80 (metal sheet)
- Wave Horn DN100 (metal sheet)
- Wave Horn DN150 (metal sheet)
- Wave Horn DN 200 (metal sheet)
- Drop antenna DN80
- Drop antenna DN150

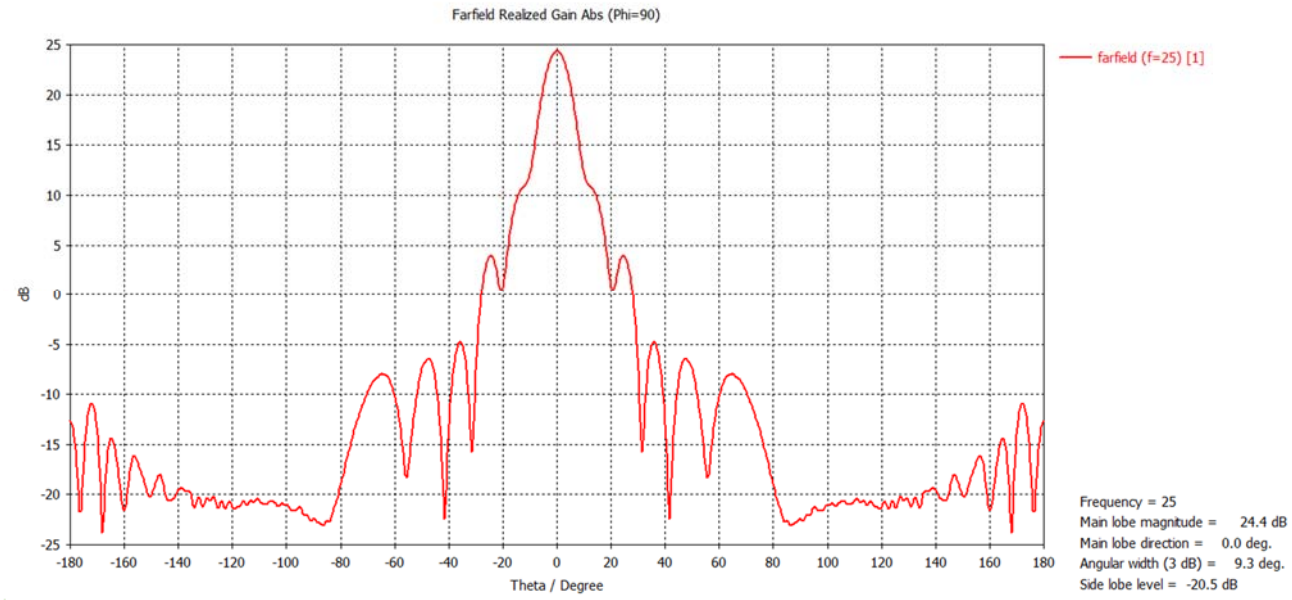
The maximum antenna beam width is defined by -3dB levels relative to the maximum gain and expressed as ± half beam width (total opening angle). The maximum antenna beam width is 12° in the frequency range 24.05GHz…26.05GHz.

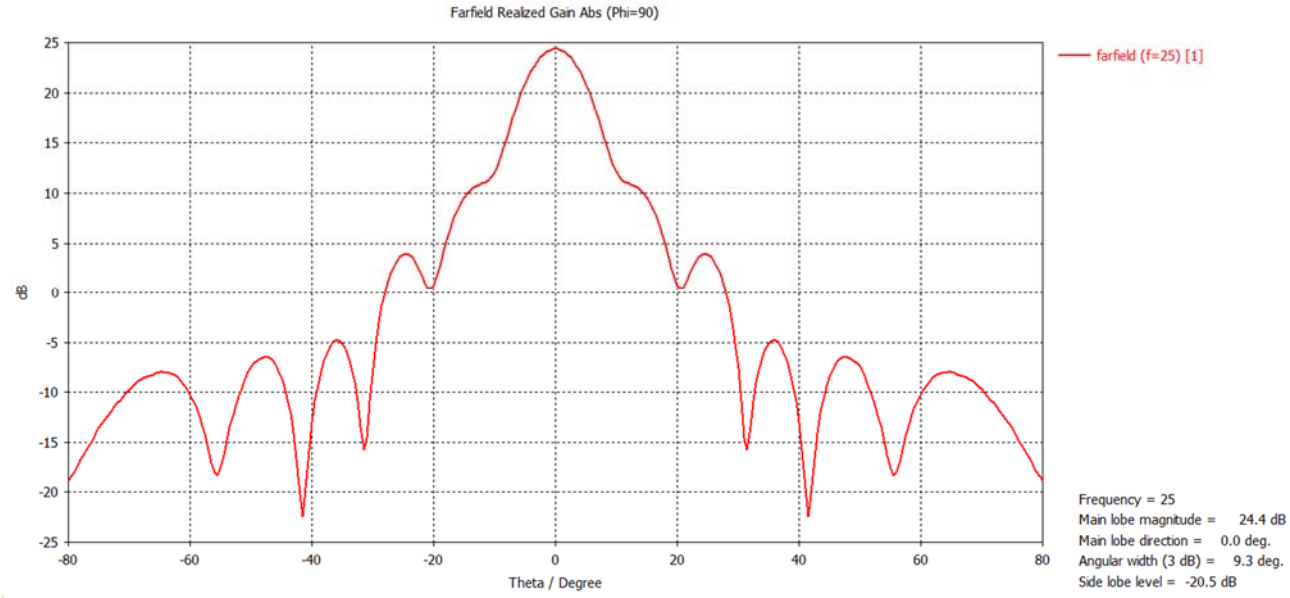
In the following figures the used antennas have been simulated. All simulations were done in E-plane and H-plane to define the characteristic, as a function of ϕ and θ.

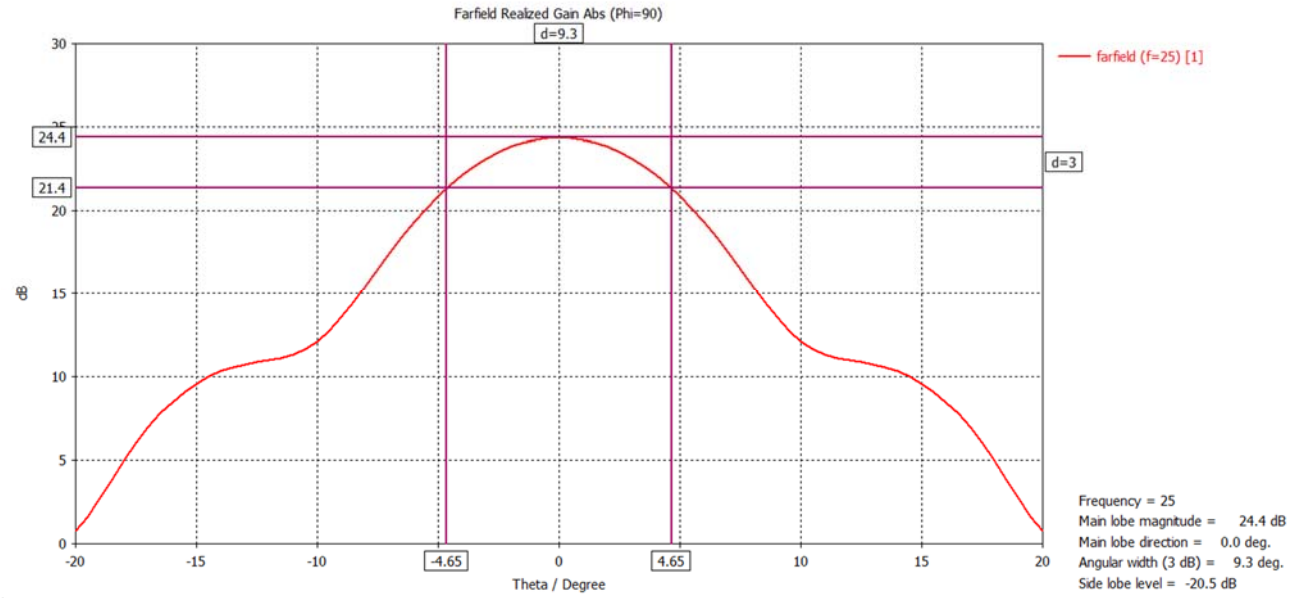
1.1 Wave Horn DN80 (stainless steel)



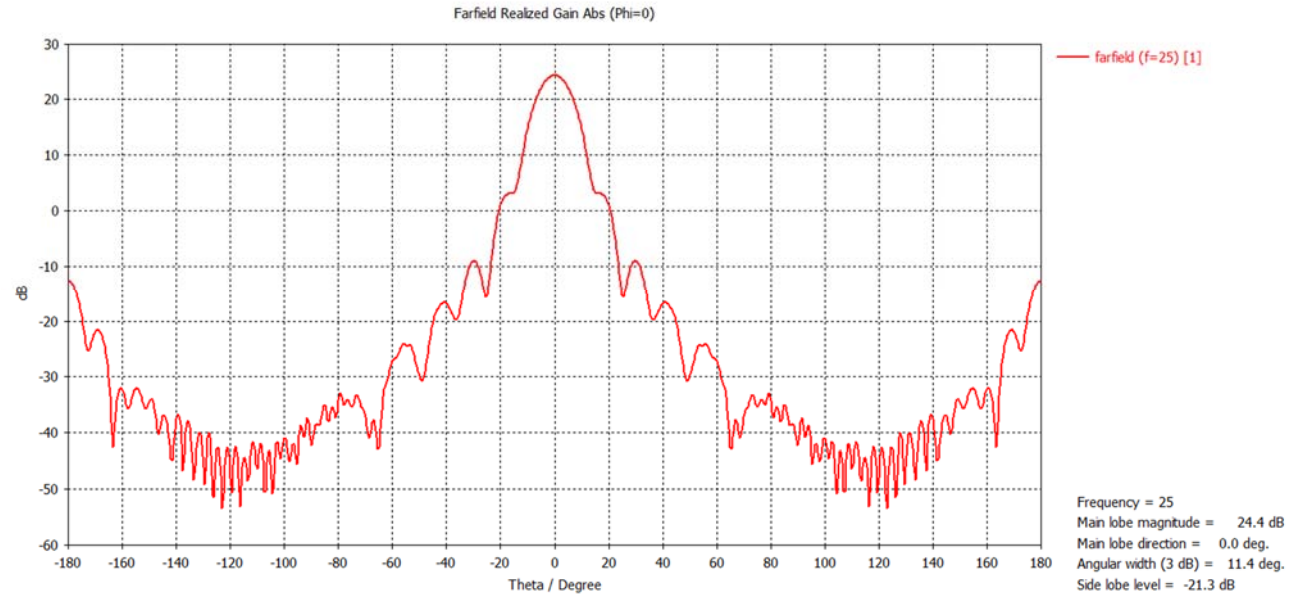
1.1.1 Radiation pattern in E-plane

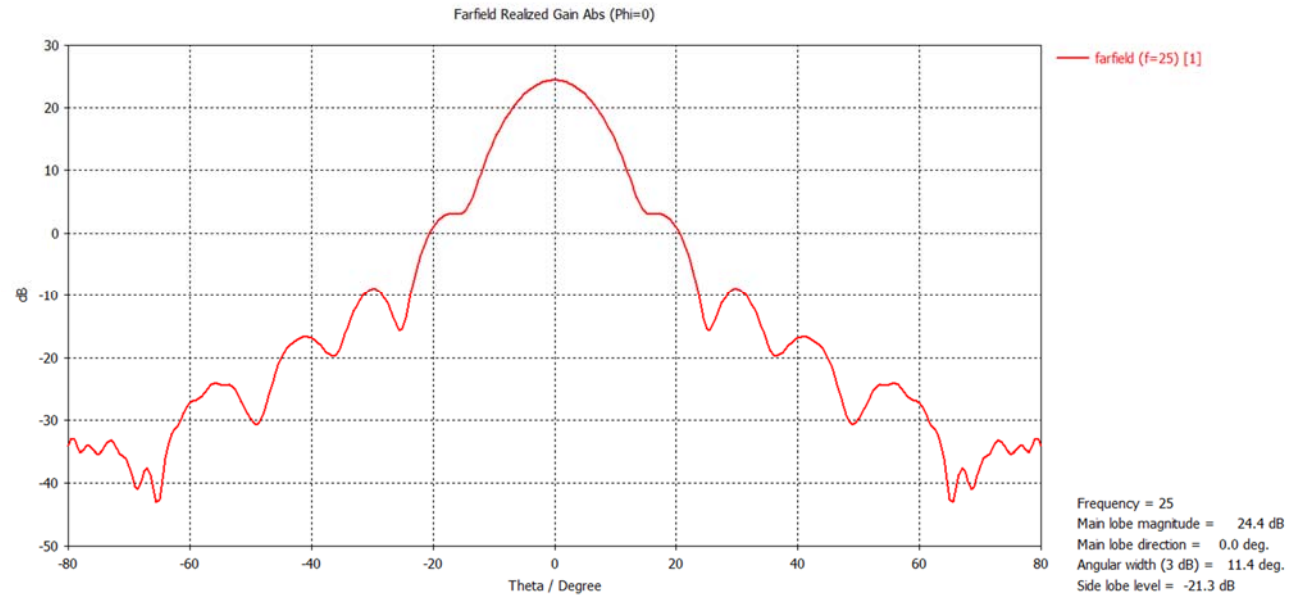


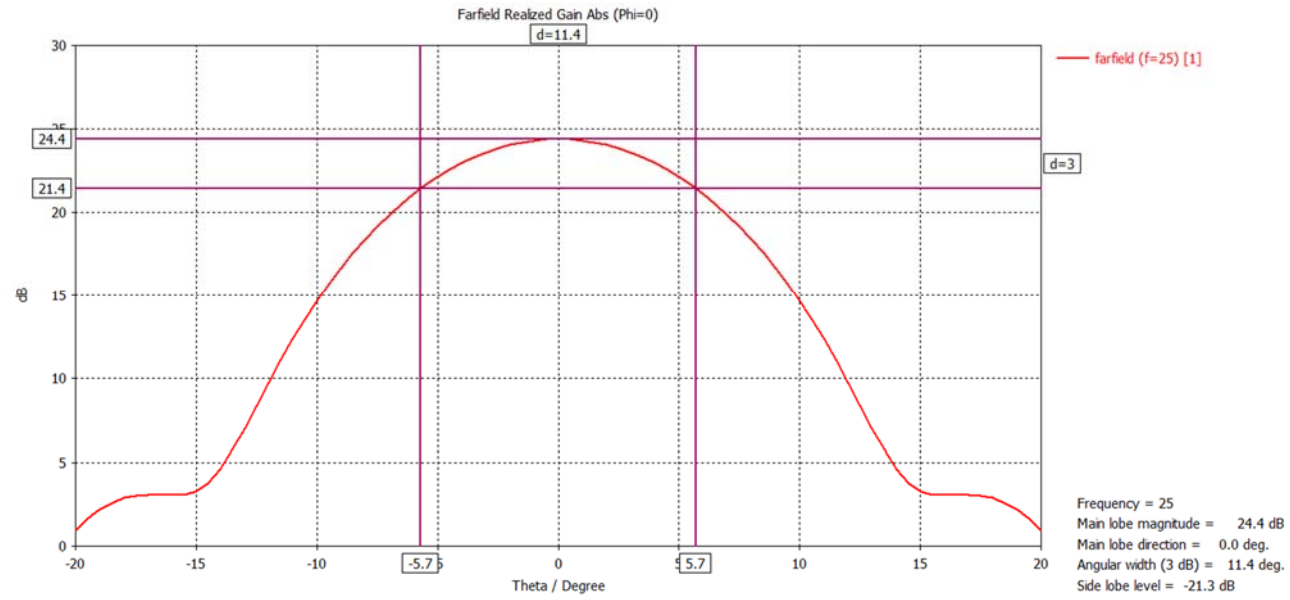

Farfield Realzed Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 24.4 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 9.3 deg.
Side lobe level = -20.5 dB


Farfield Realzed Gain Abs (Phi=90)
d=9.3
farfield (f=25) [1]
24.4
21.4
d=3
dB
-4.65
4.65
Theta / Degree
Frequency = 25
Main lobe magnitude = 24.4 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 9.3 deg.
Side lobe level = -20.5 dB

1.1.2 Radiation pattern in H-plane







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Max. Peak Power → +18.9dBm (limit: +26dBm)

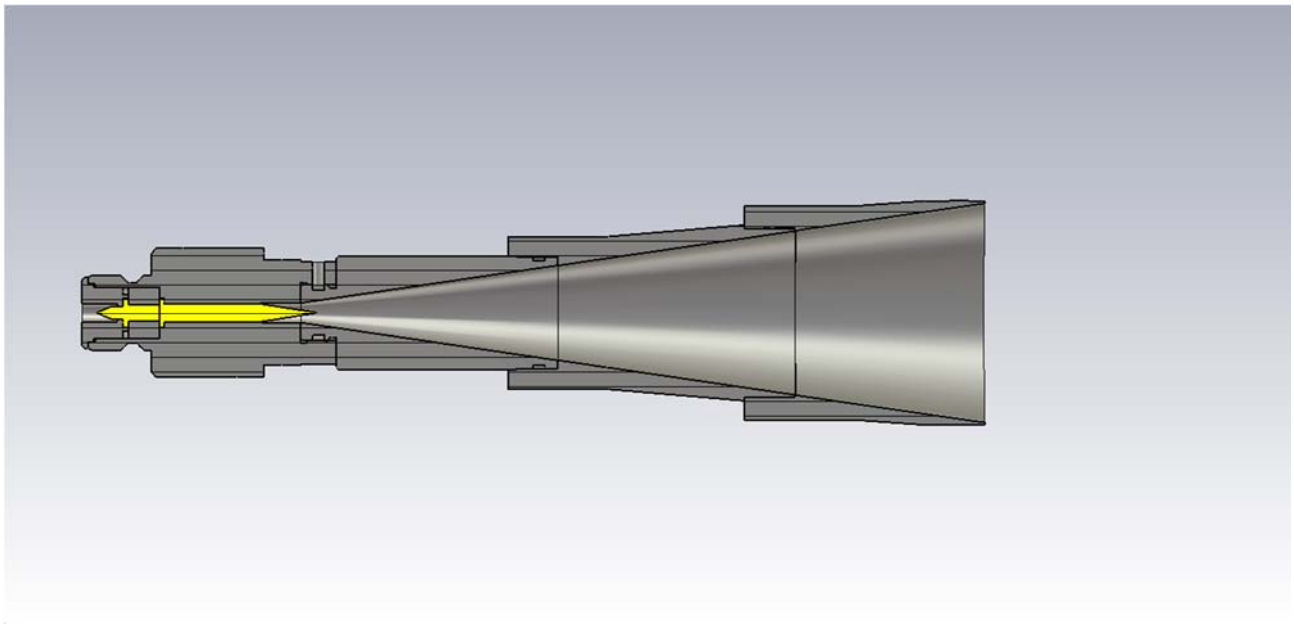
Max. Mean Power → -35.6dBm (limit: -14dBm)

Main Beam Gain → 24.4dB

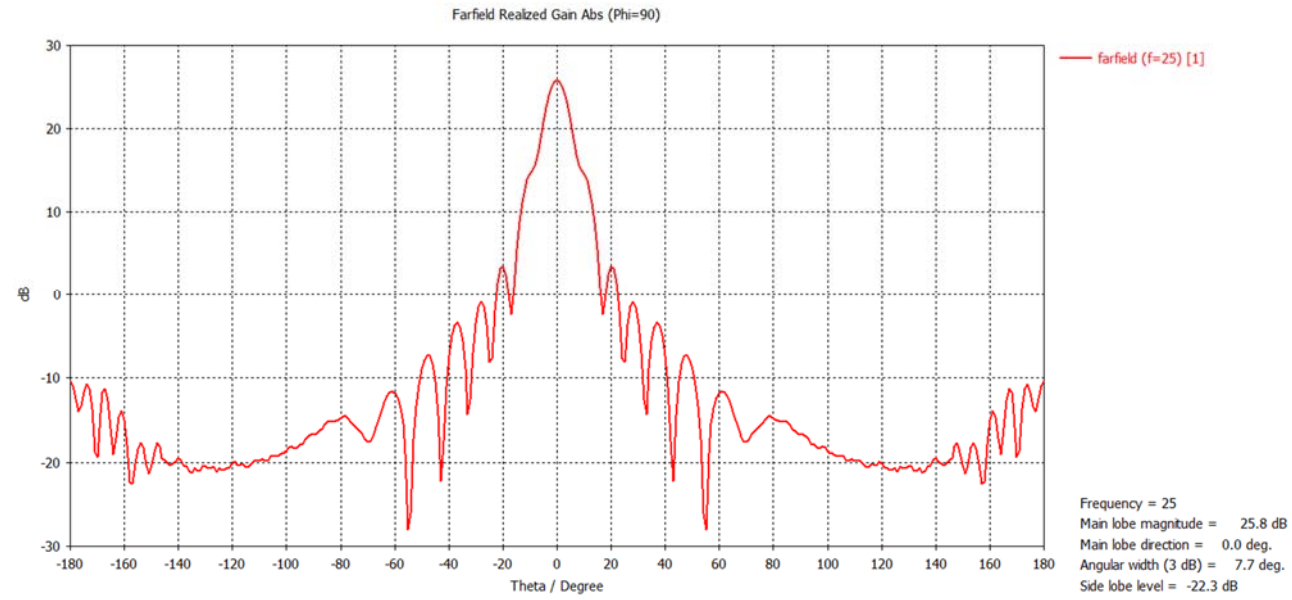
Side Lobe Level → -2.6dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

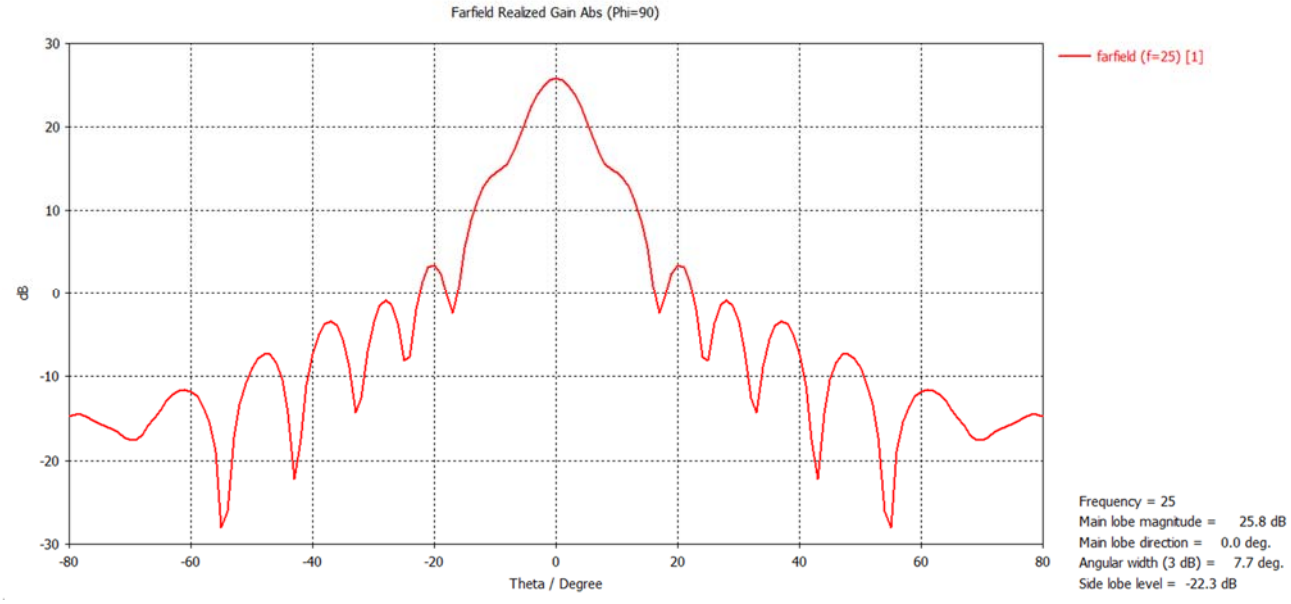
Angular width (3dB) → 9.3°/11.4° (limit: 12°)

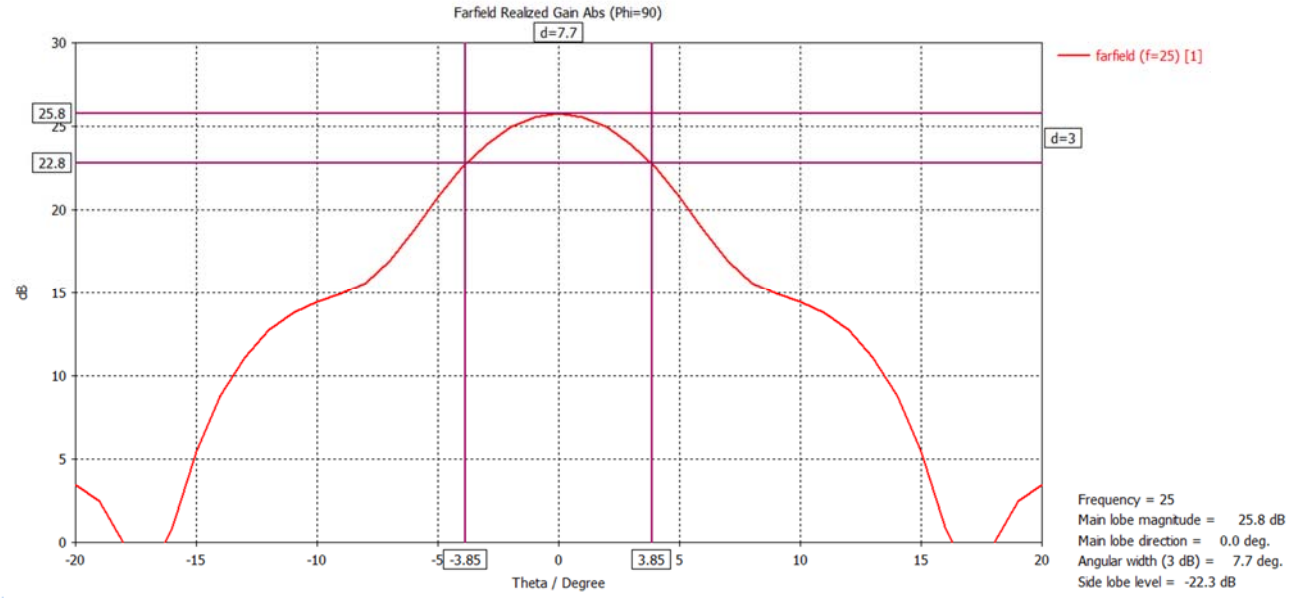
1.2 Wave Horn DN100 (stainless steel)



1.2.1 Radiation pattern in E-plane




Farfield Realized Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 25.8 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 7.7 deg.
Side lobe level = -22.3 dB


Farfield Realized Gain Abs (Phi=90)
d=7.7
25.8
22.8
d=3
farfield (f=25) [1]
dB
-3.85
3.85
Theta / Degree
Frequency = 25
Main lobe magnitude = 25.8 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 7.7 deg.
Side lobe level = -22.3 dB

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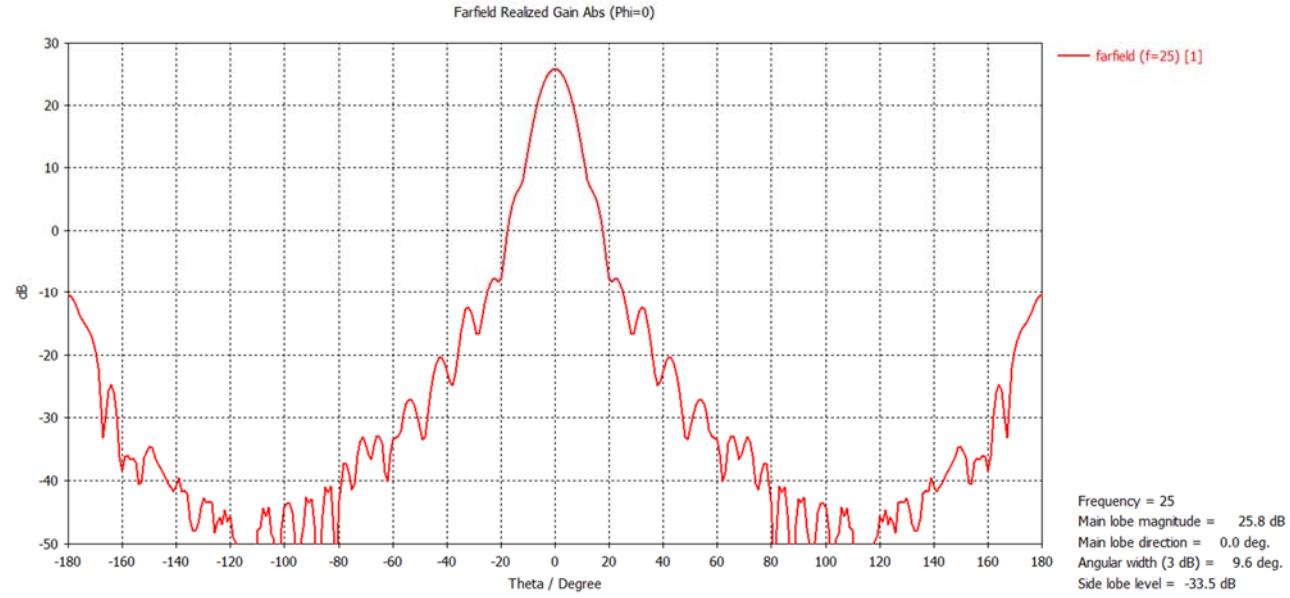
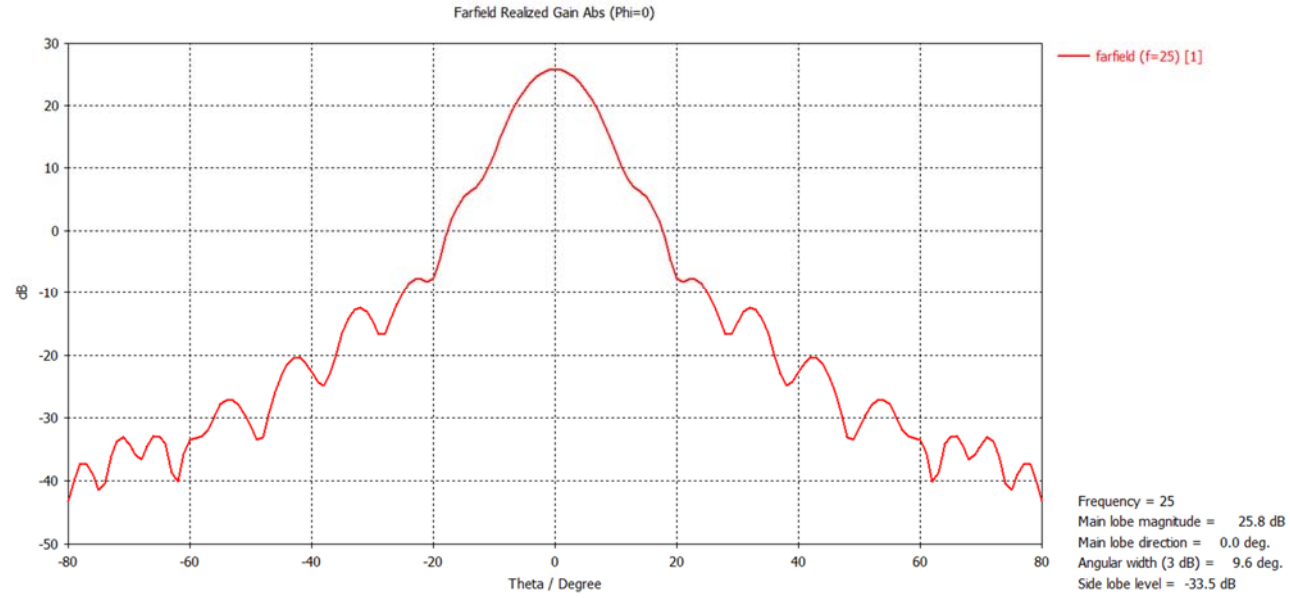
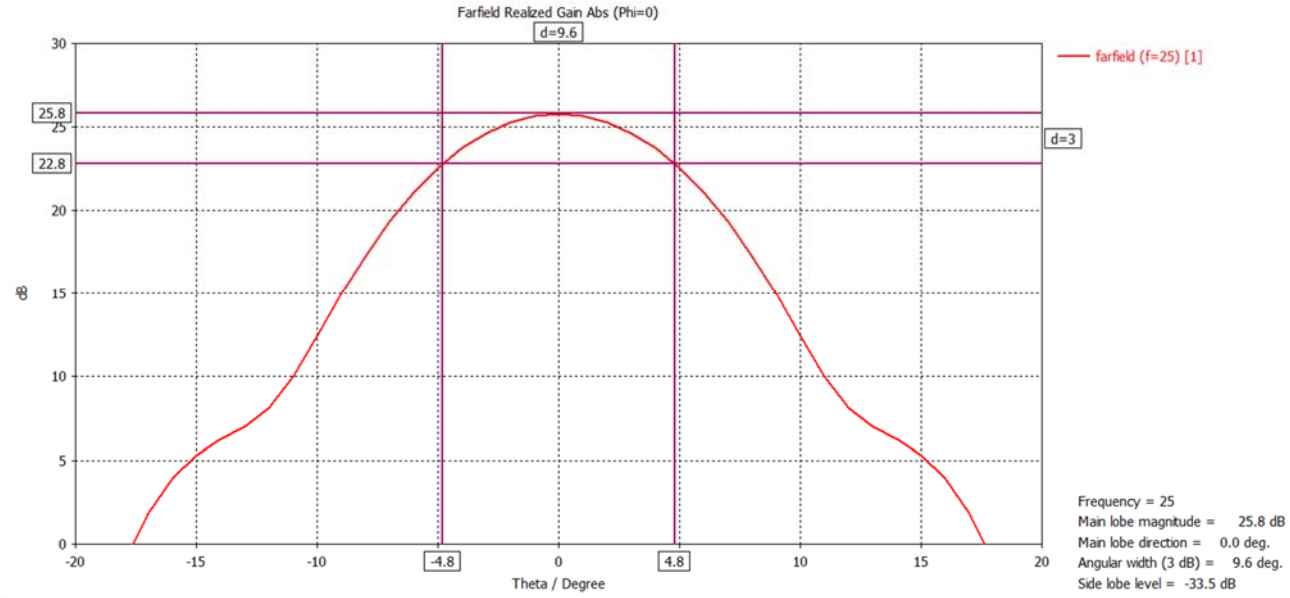
1.2.2 Radiation pattern in H-plane







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Max. Peak Power → +20.3dBm (limit: +26dBm)

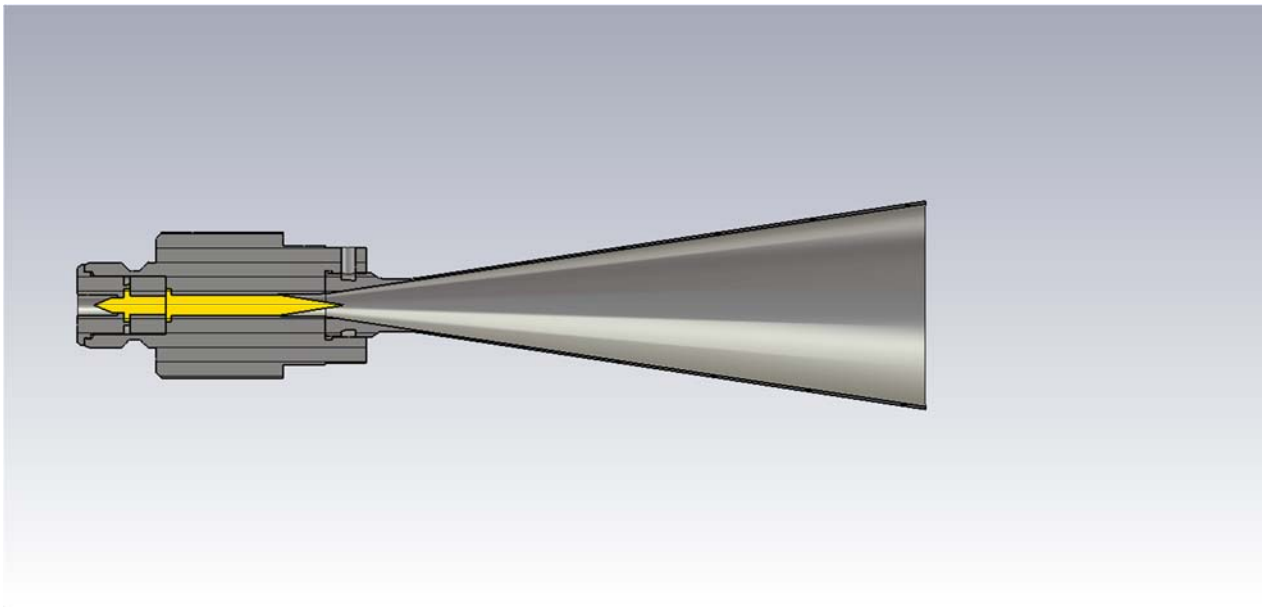
Max. Mean Power → -34.2dBm (limit: -14dBm)

Main Beam Gain → 25.8dB

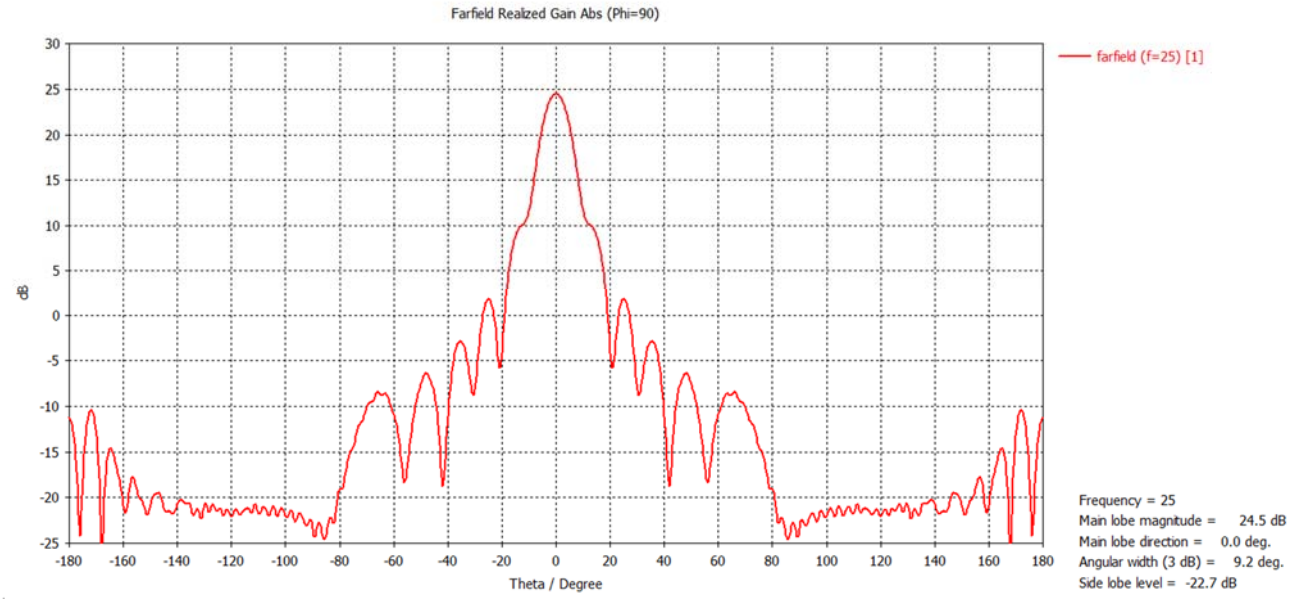
Side Lobe Level → -1.2dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

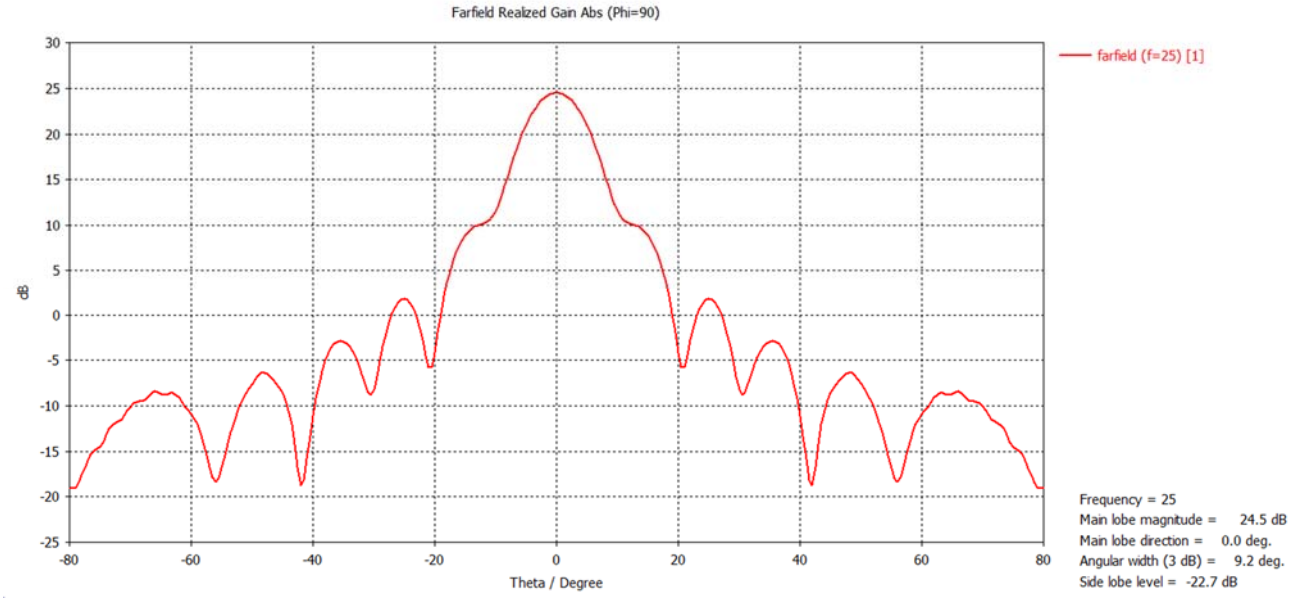
Angular width (3dB) → 7.7°/9.6° (limit: 12°)

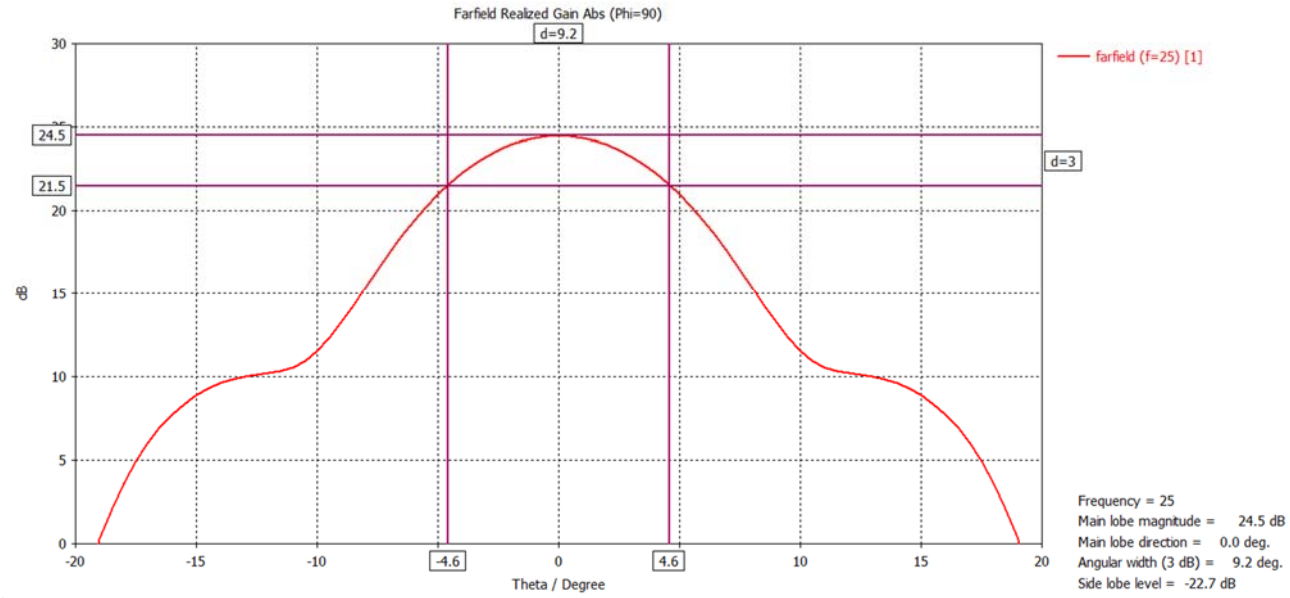
1.3 Wave Horn DN80 (metal sheet)



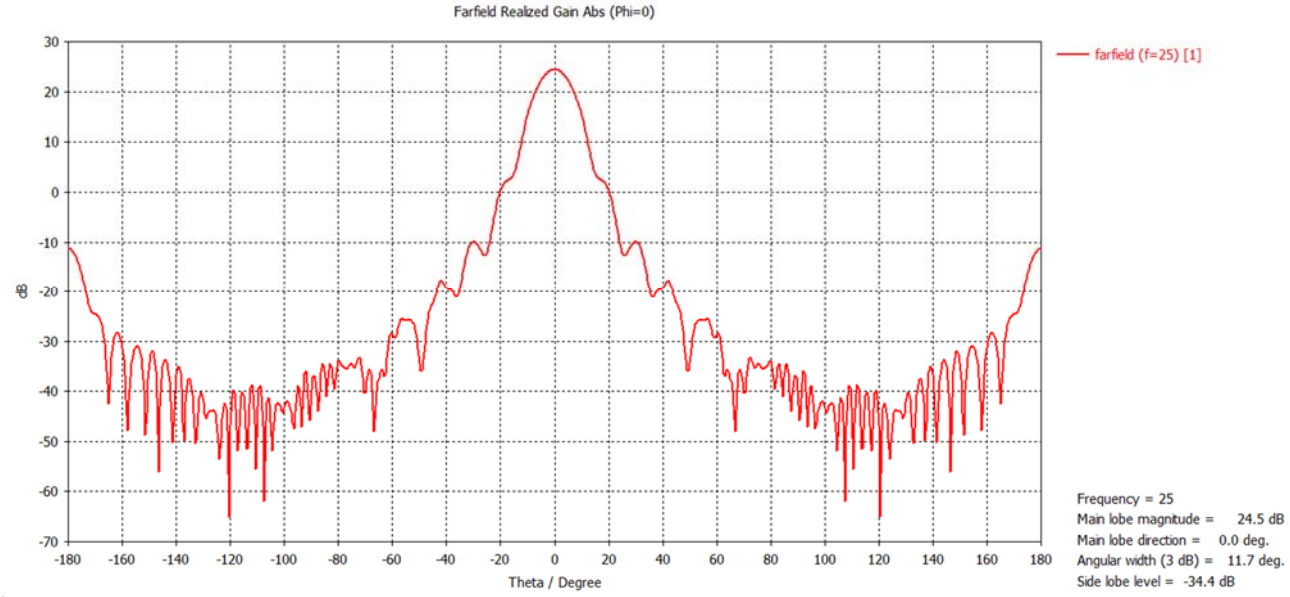
1.3.1 Radiation pattern in E-plane

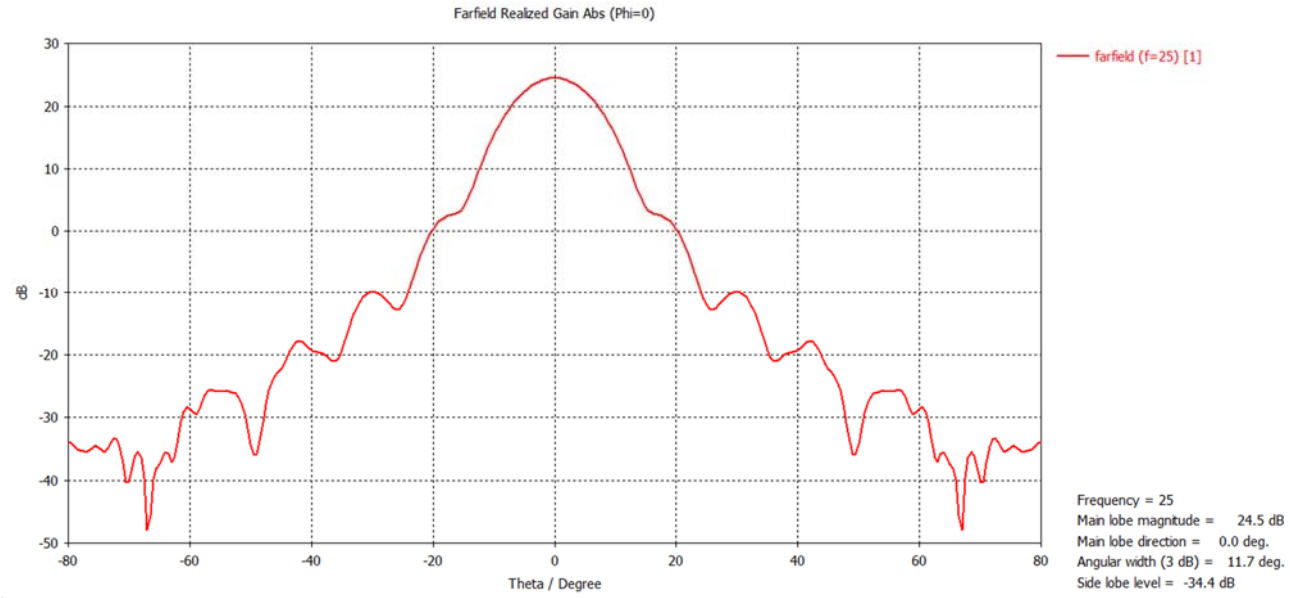


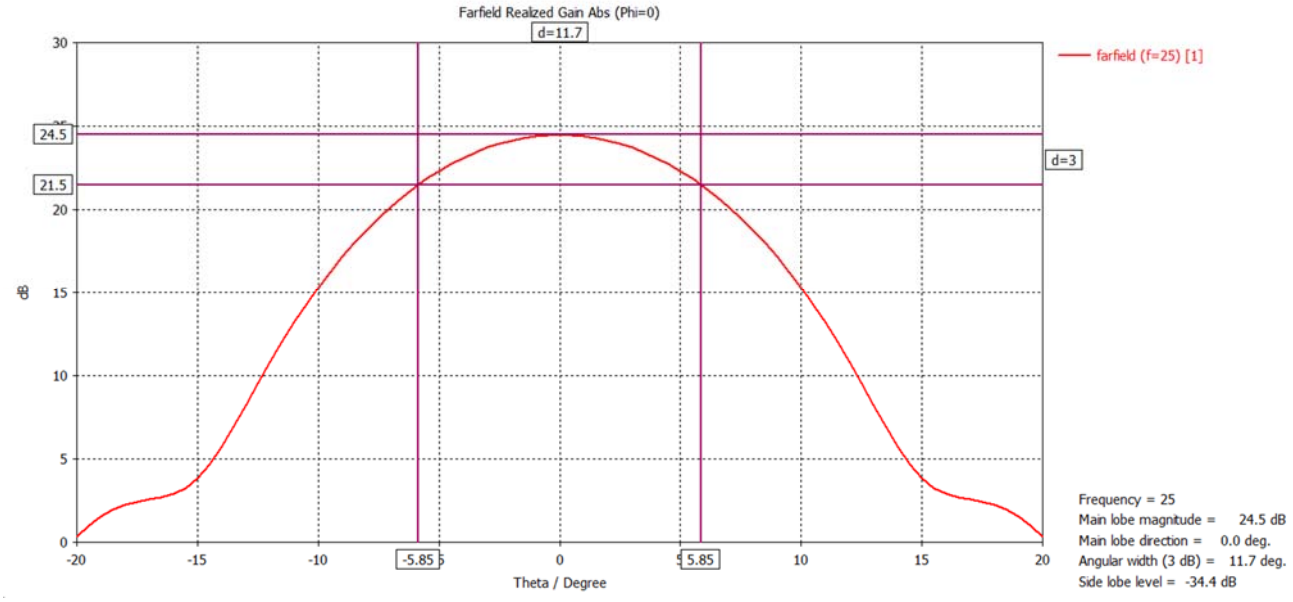

Farfield Realized Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 24.5 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 9.2 deg.
Side lobe level = -22.7 dB


Farfield Realized Gain Abs (Phi=90)
d=9.2
farfield (f=25) [1]
24.5
21.5
d=3
dB
-4.6
4.6
Theta / Degree
Frequency = 25
Main lobe magnitude = 24.5 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 9.2 deg.
Side lobe level = -22.7 dB

1.3.2 Radiation pattern in H-plane







Max. Peak Power → +19.5dBm (limit: +26dBm)

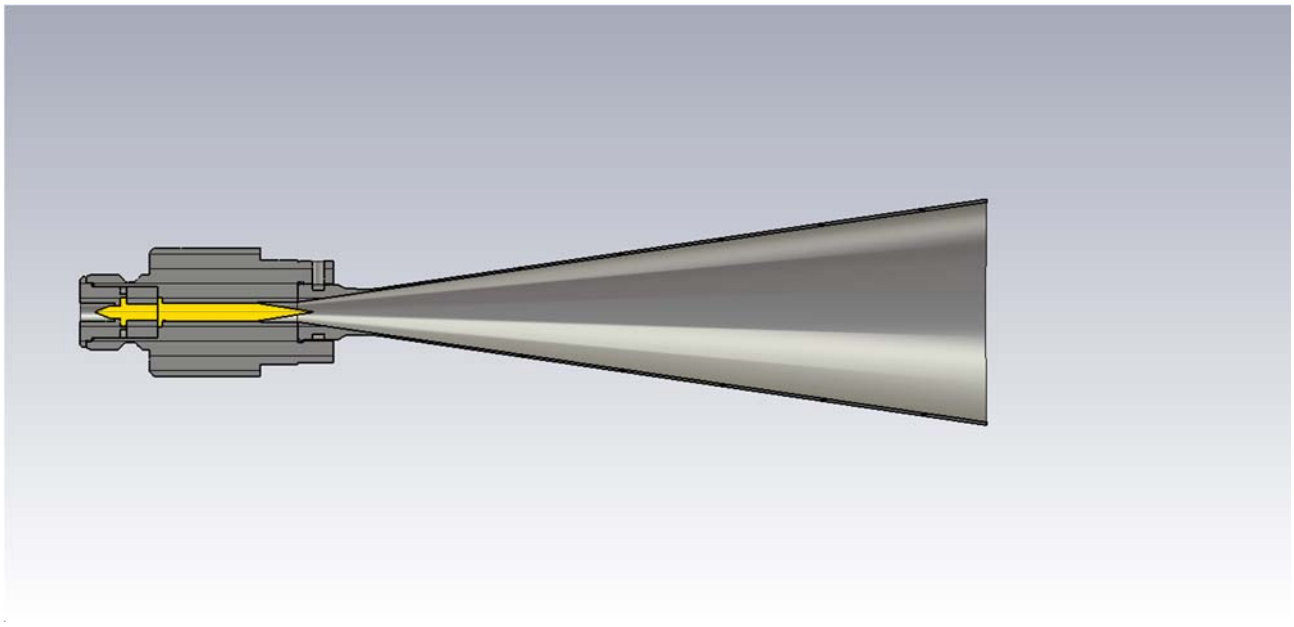
Max. Mean Power → -35.5dBm (limit: -14dBm)

Main Beam Gain → 24.5dB

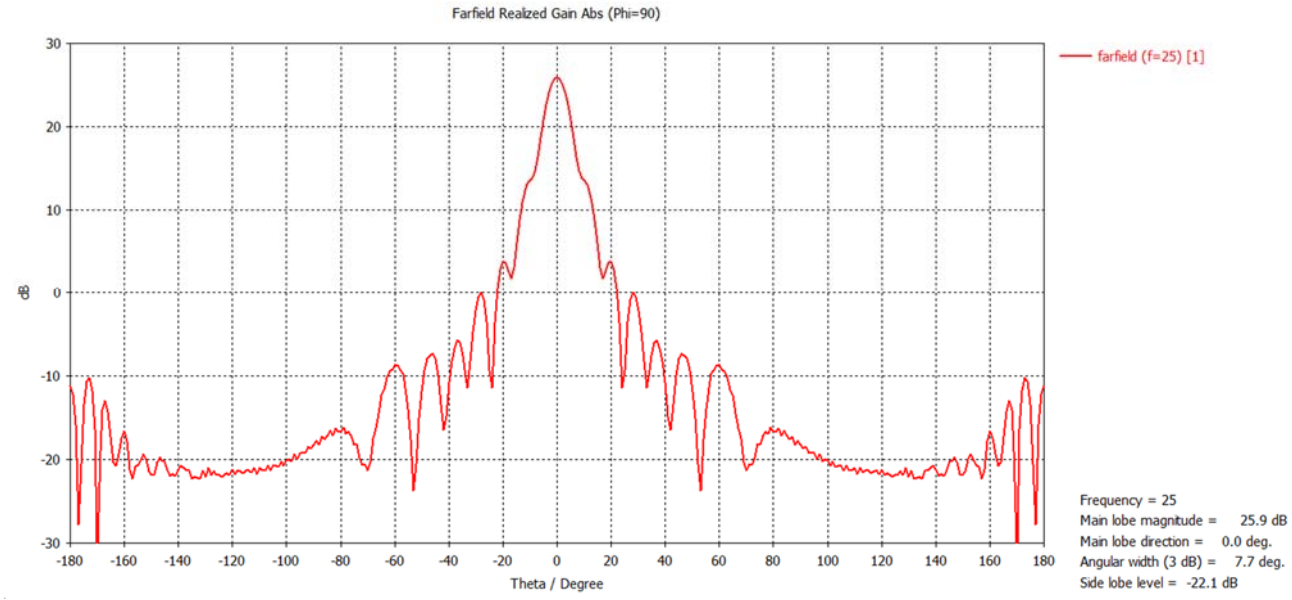
Side Lobe Level → -2.5dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

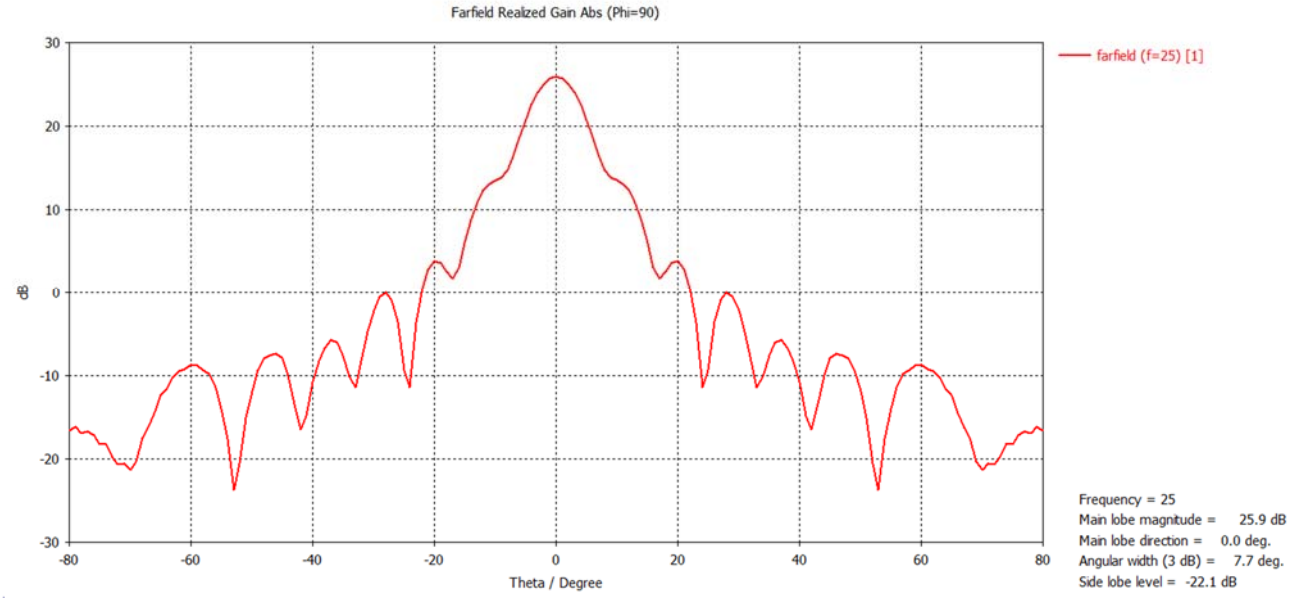
Angular width (3dB) → 9.2°/11.7° (limit: 12°)

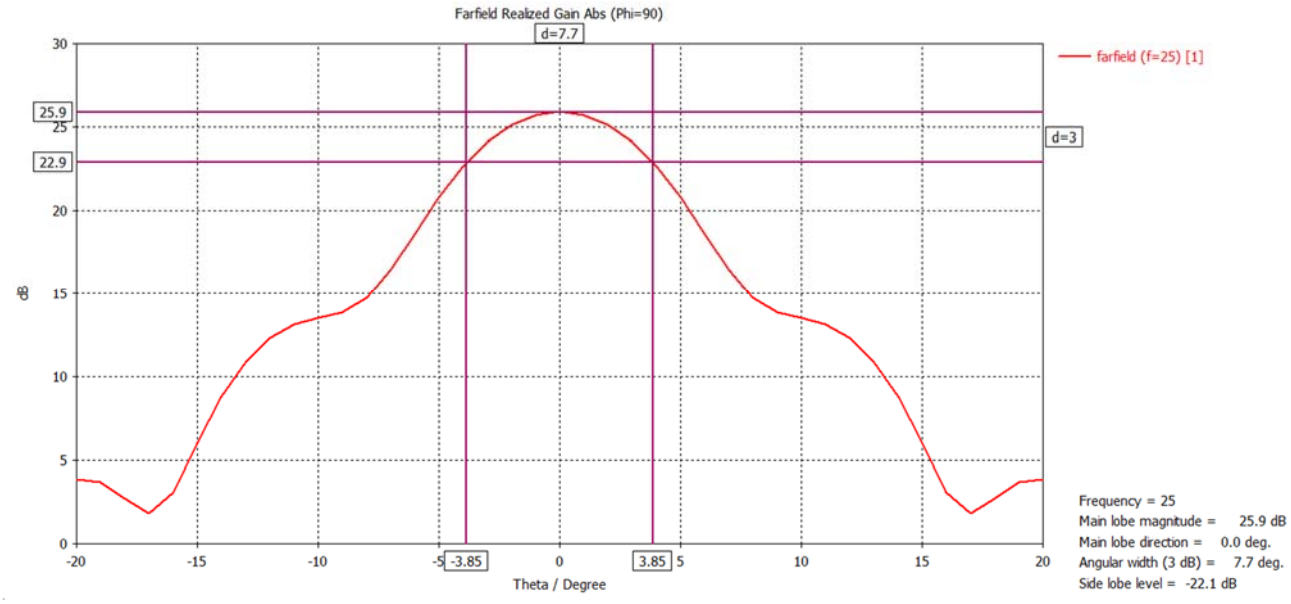
1.4 Wave Horn DN100 (metal sheet)



1.4.1 Radiation pattern in E-plane




Farfield Realized Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 25.9 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 7.7 deg.
Side lobe level = -22.1 dB


Farfield Realized Gain Abs (Phi=90)
d=7.7
d=3
25.9
22.9
-3.85
3.85
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 25.9 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 7.7 deg.
Side lobe level = -22.1 dB

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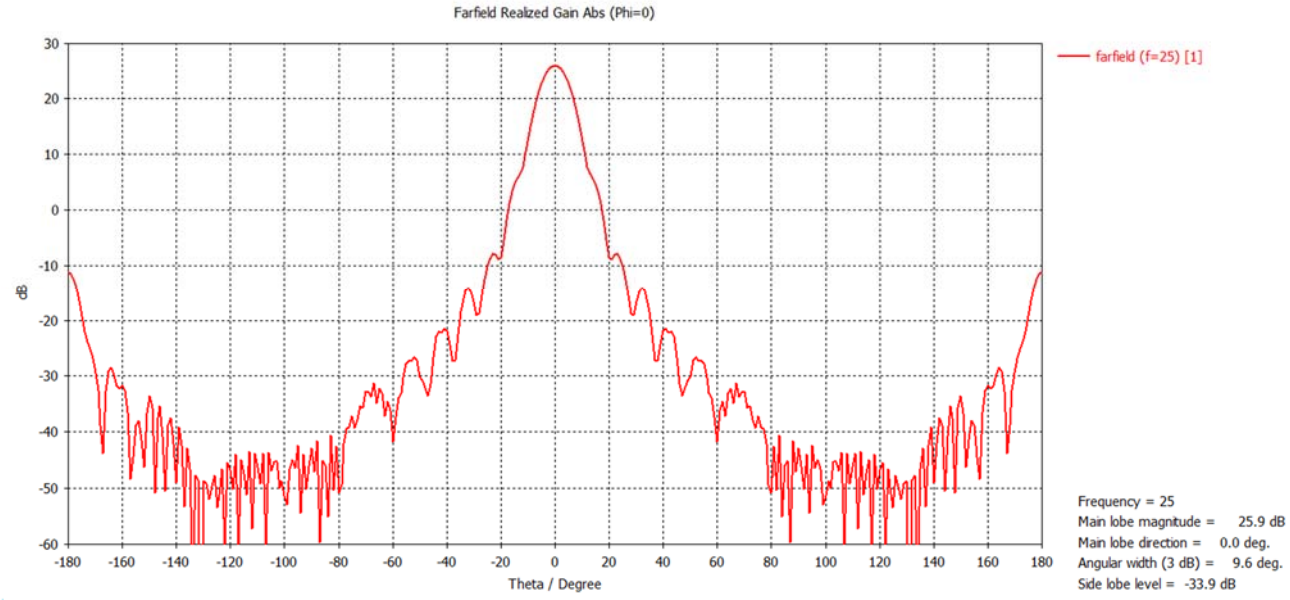
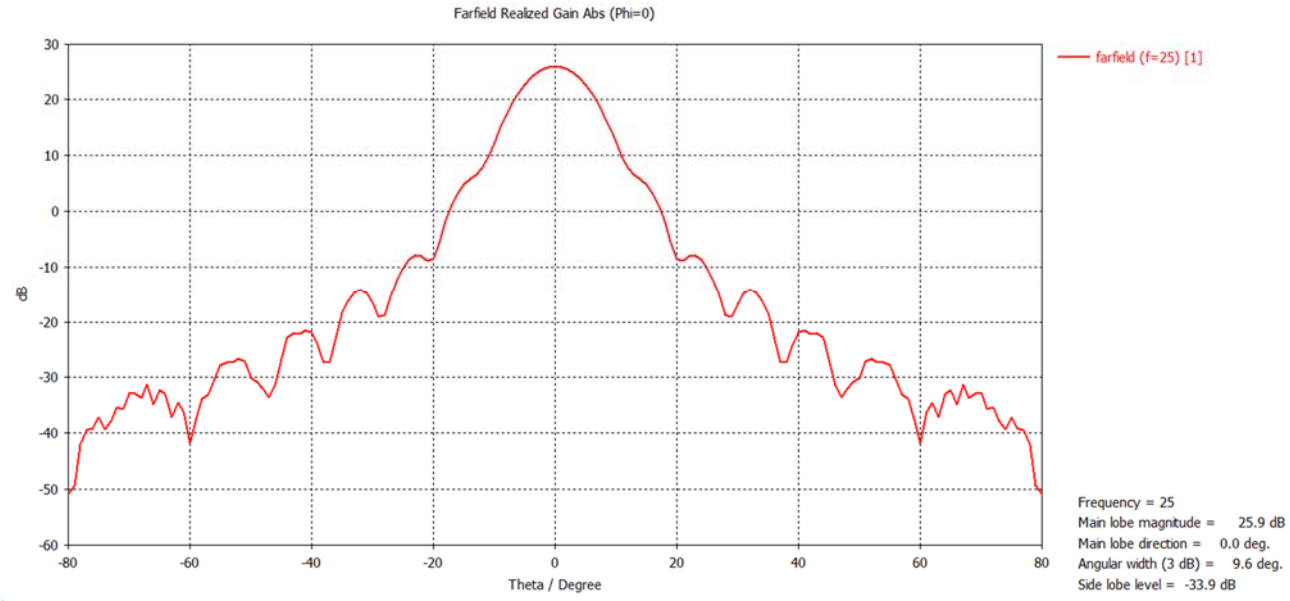
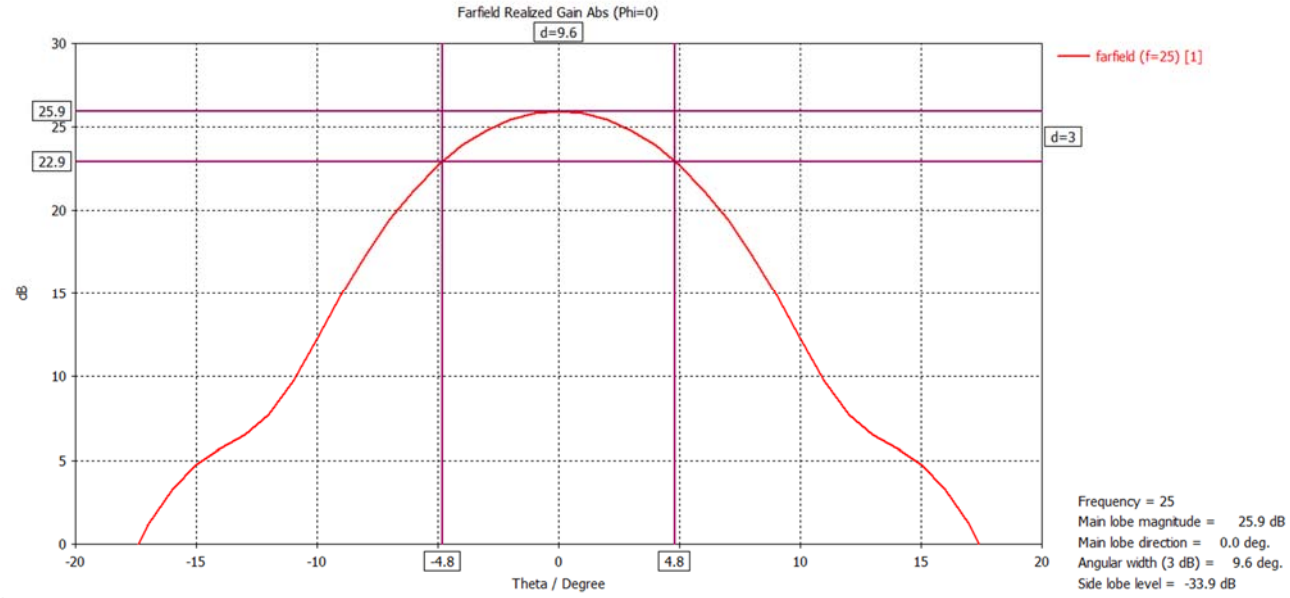
1.4.2 Radiation pattern in H-plane







KI LS

Max. Peak Power → +20.4dBm (limit: +26dBm)

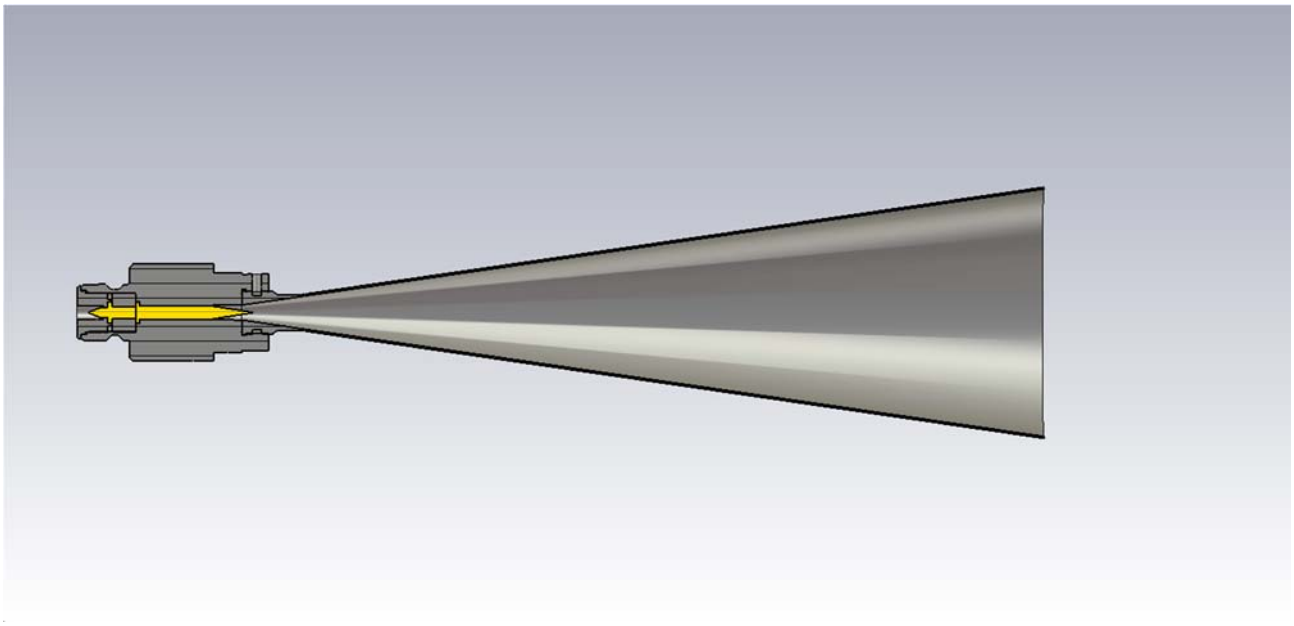
Max. Mean Power → -34.1dBm (limit: -14dBm)

Main Beam Gain → 25.9dB

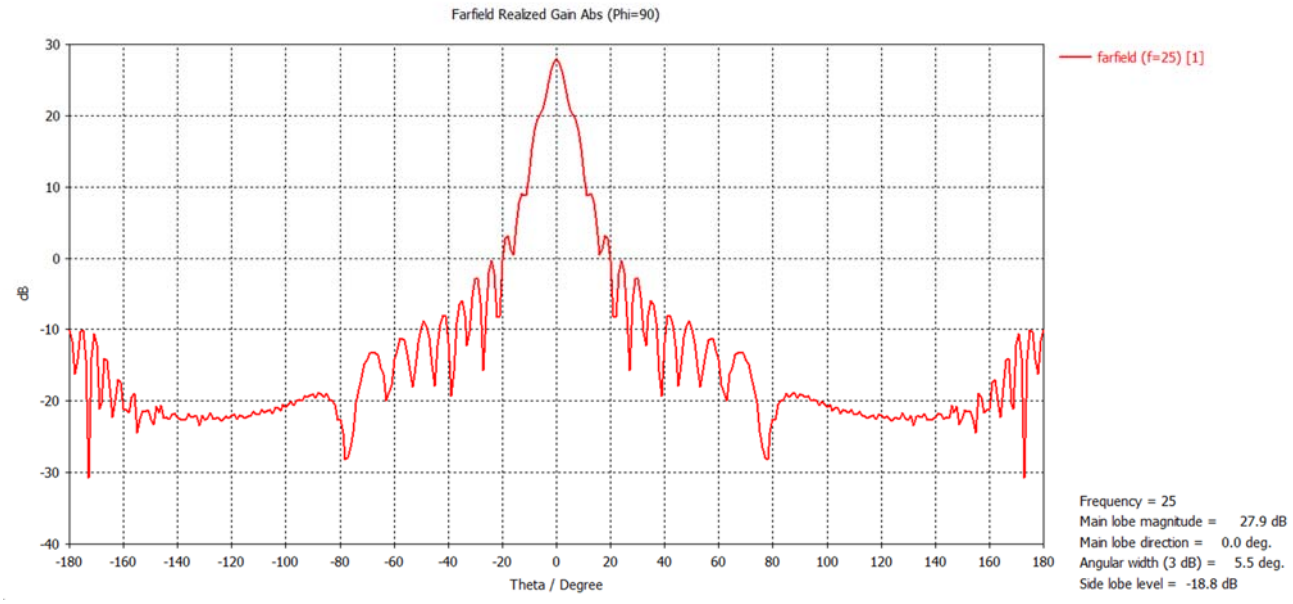
Side Lobe Level → -1.1dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

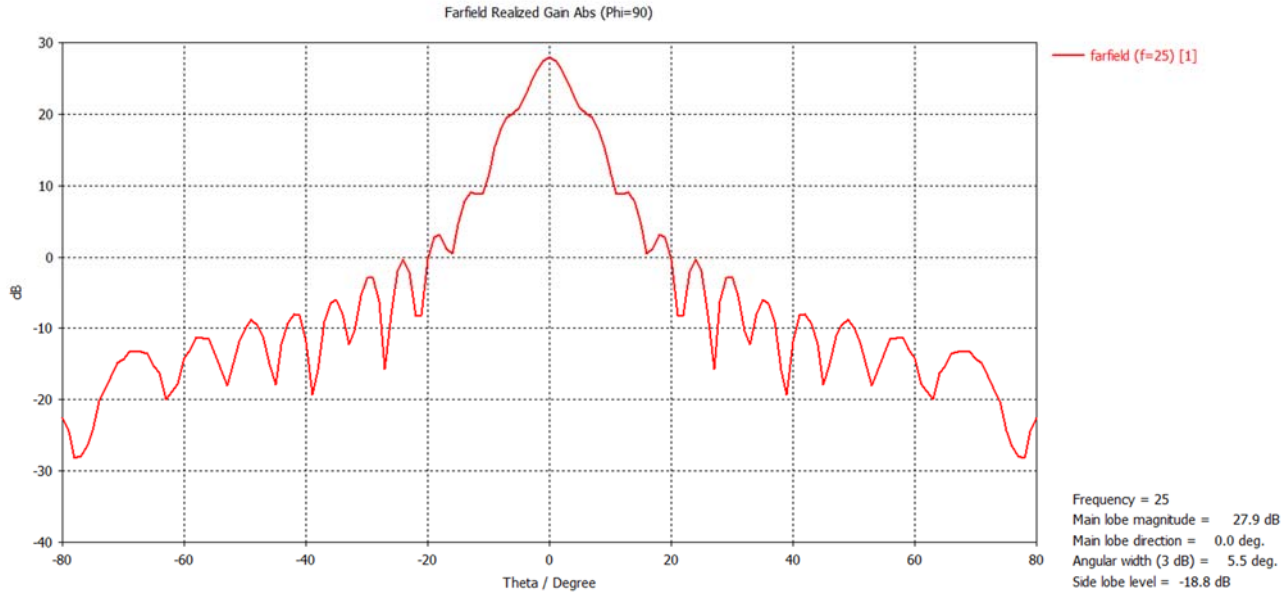
Angular width (3dB) → 7.7°/9.6° (limit: 12°)

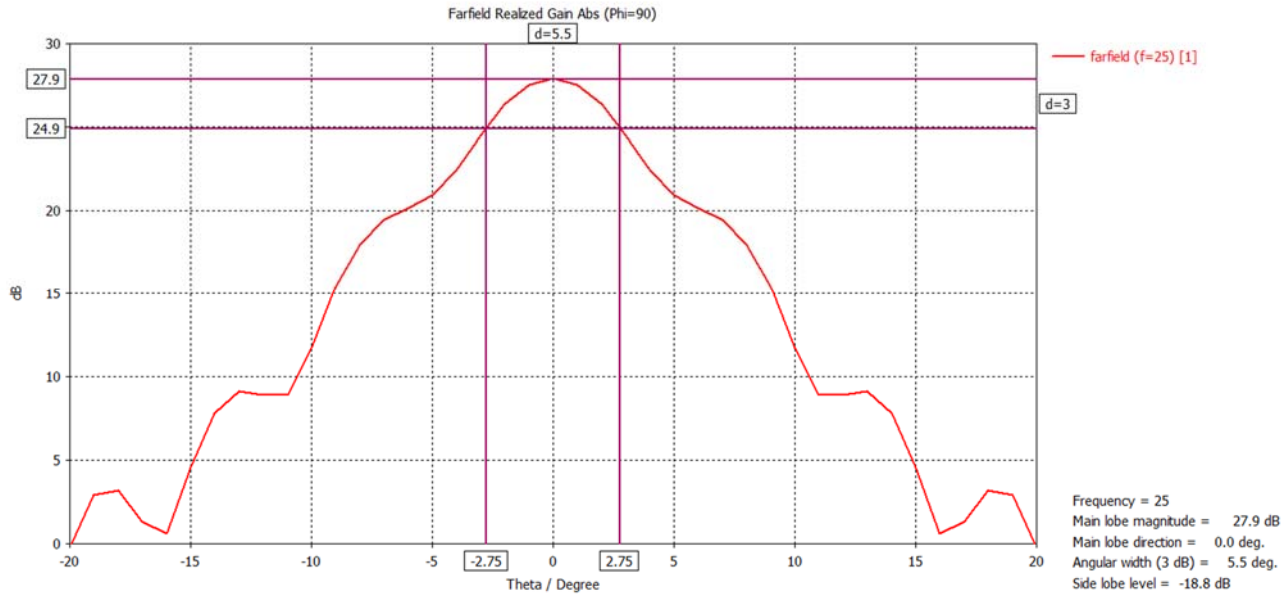
1.5 Wave Horn DN150 (metal sheet)



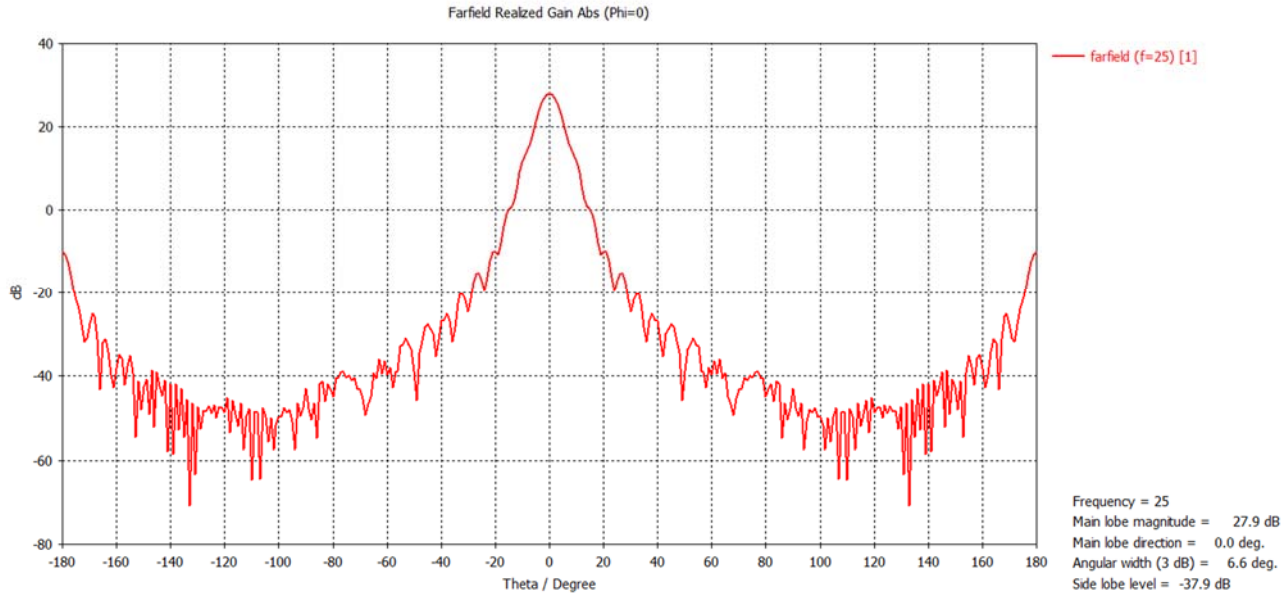
1.5.1 Radiation pattern in E-plane

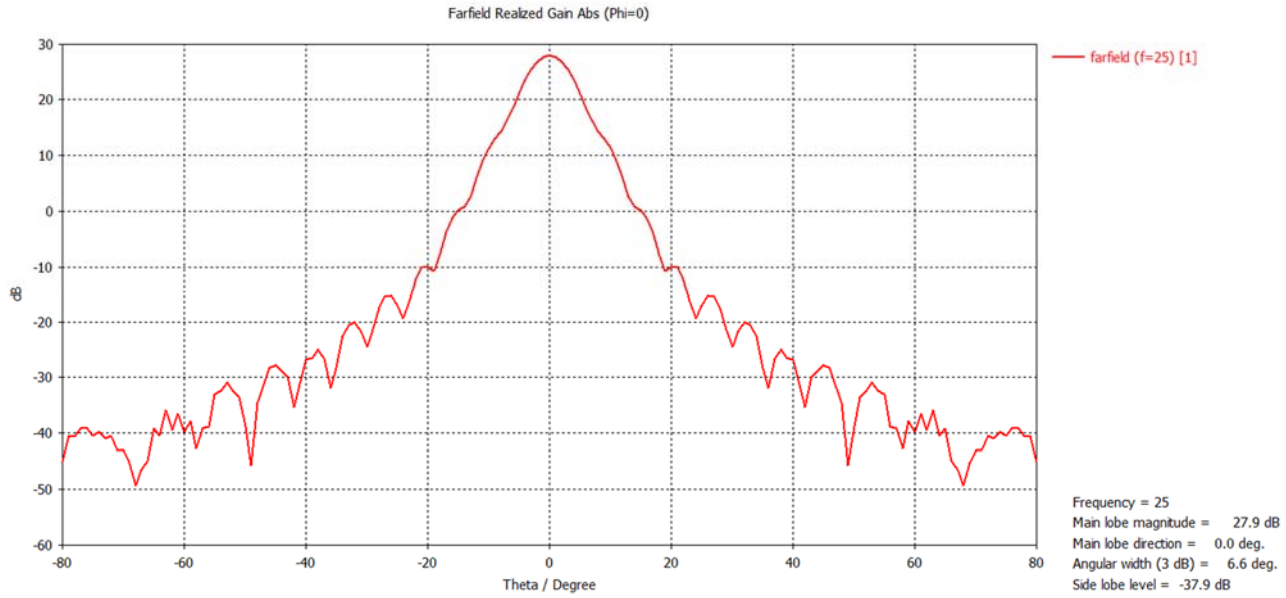


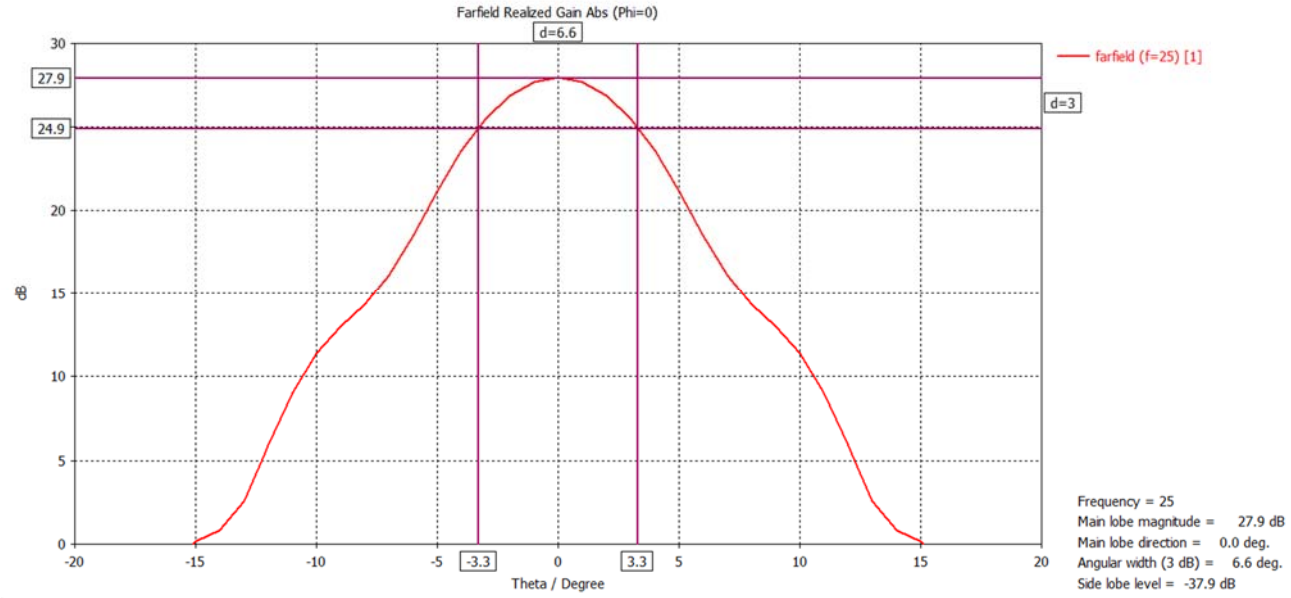

Farfield Realzed Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 27.9 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 5.5 deg.
Side lobe level = -18.8 dB


Farfield Realzed Gain Abs (Phi=90)
d=5.5
27.9
24.9
d=3
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 27.9 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 5.5 deg.
Side lobe level = -18.8 dB

1.5.2 Radiation pattern in H-plane







Max. Peak Power → +22.4dBm (limit: +26dBm)

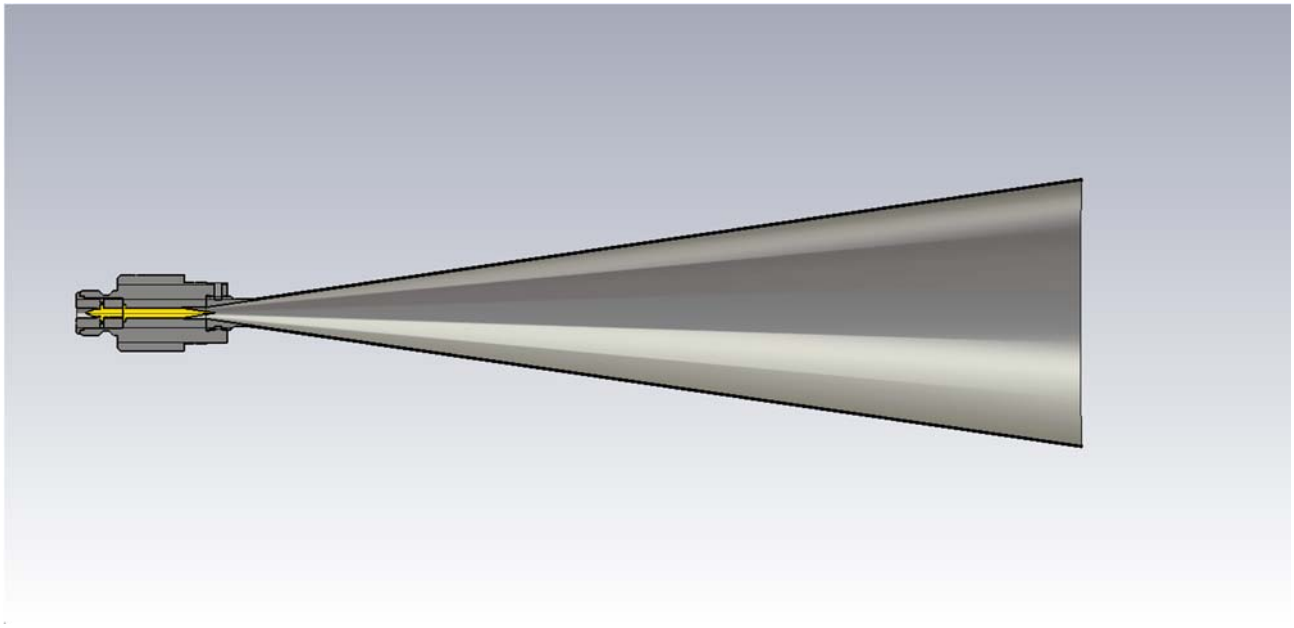
Max. Mean Power → -32.1dBm (limit: -14dBm)

Main Beam Gain → 27.9dB

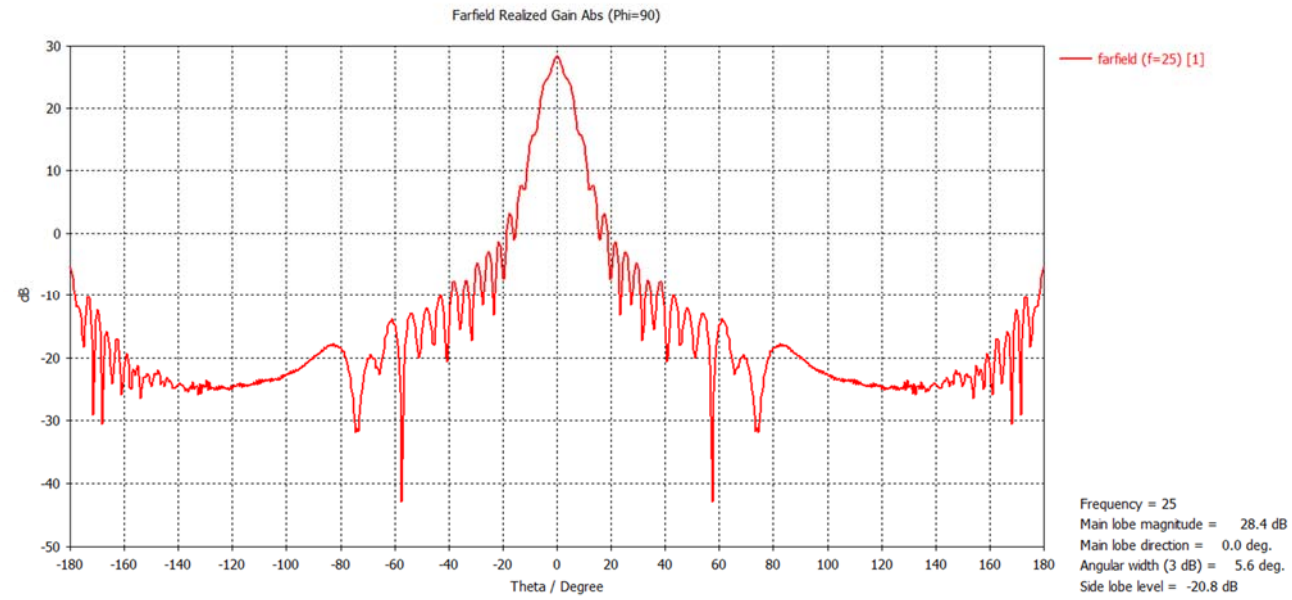
Side Lobe Level → 0.9dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

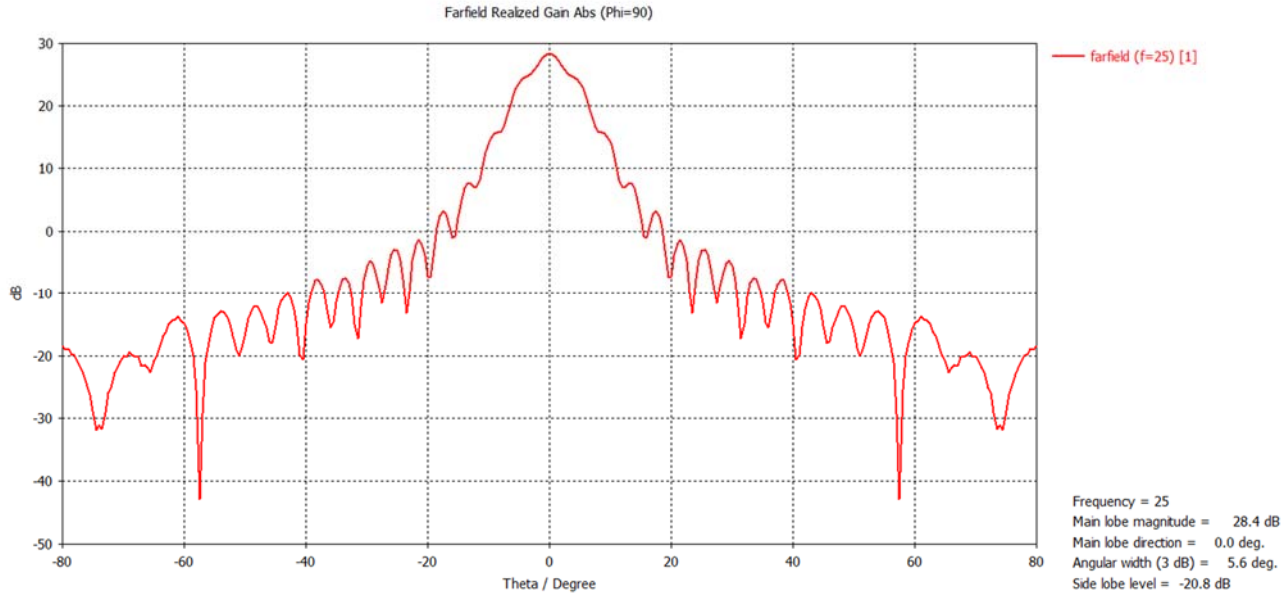
Angular width (3dB) → 5.5°/6.6° (limit: 12°)

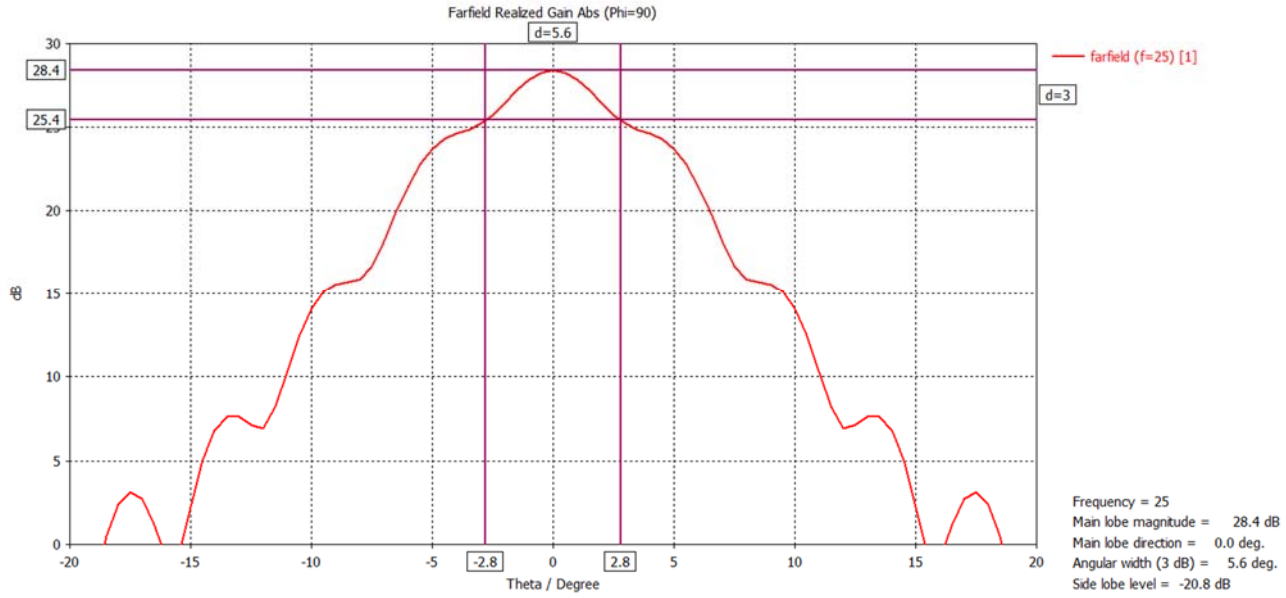
1.6 Wave Horn DN200 (metal sheet)



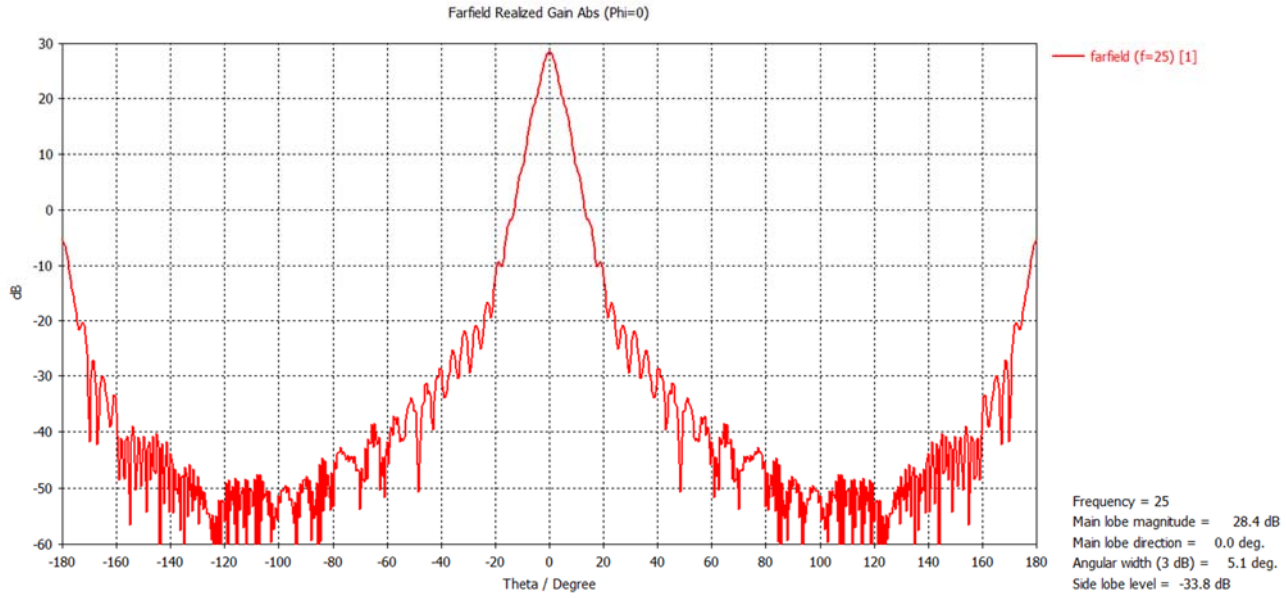
1.6.1 Radiation pattern in E-plane

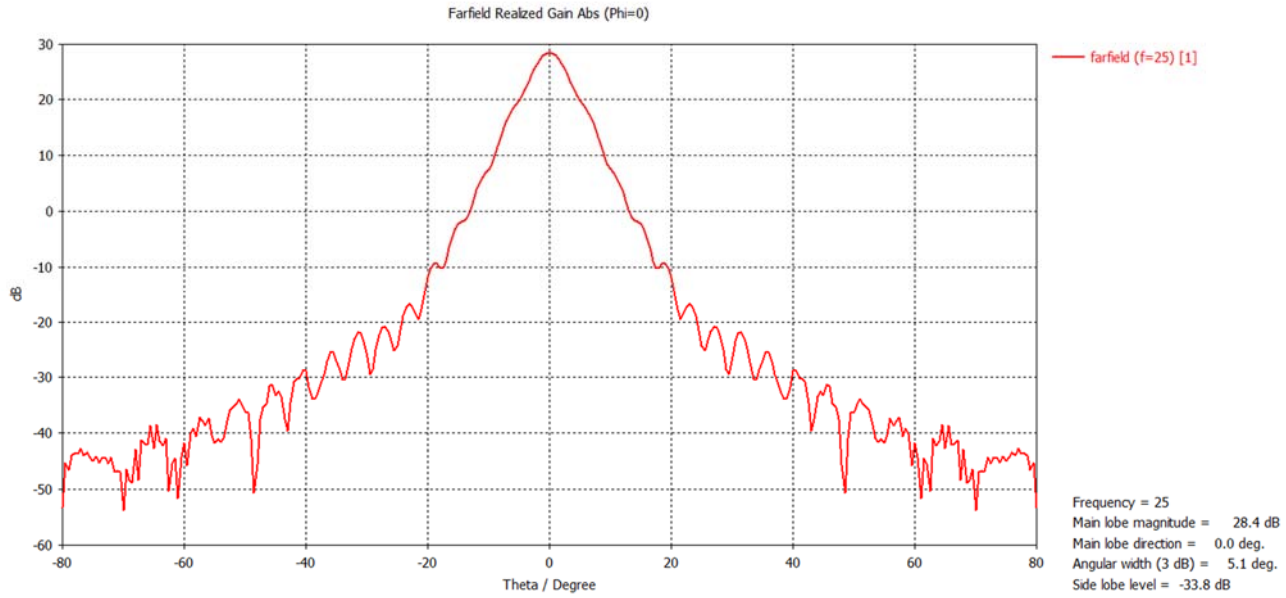


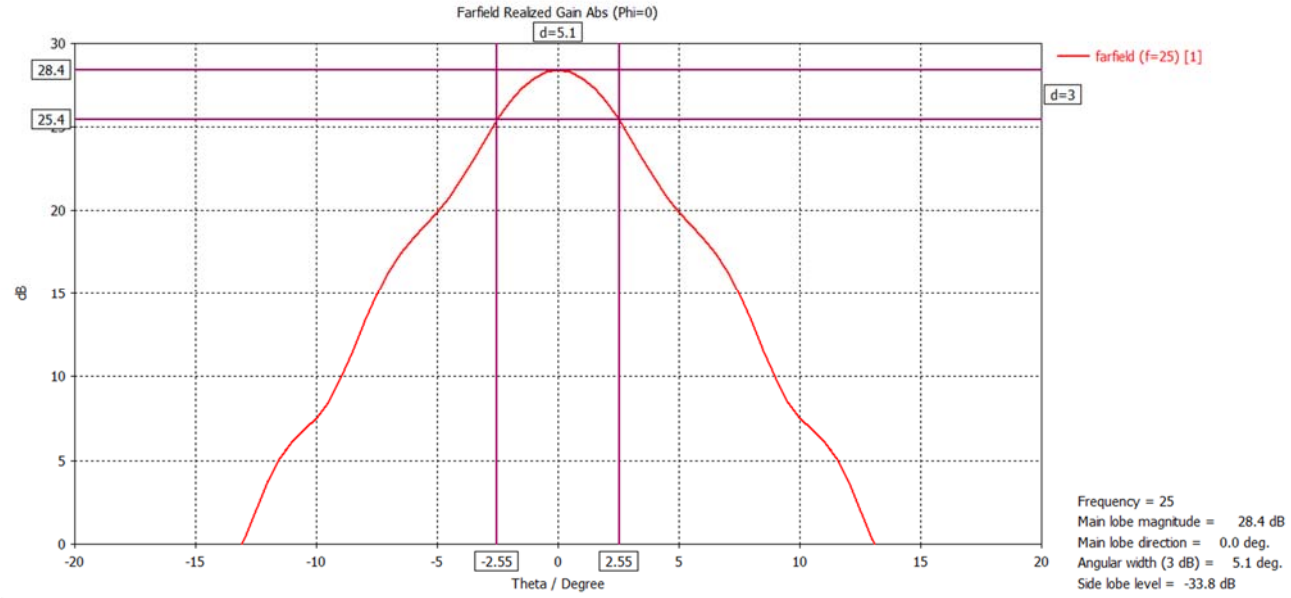

Farfield Realzed Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 28.4 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 5.6 deg.
Side lobe level = -20.8 dB


Farfield Realzed Gain Abs (Phi=90)
d=5.6
28.4
25.4
d=3
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 28.4 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 5.6 deg.
Side lobe level = -20.8 dB

1.6.2 Radiation pattern in H-plane







Max. Peak Power → +22.9dBm (limit: +26dBm)

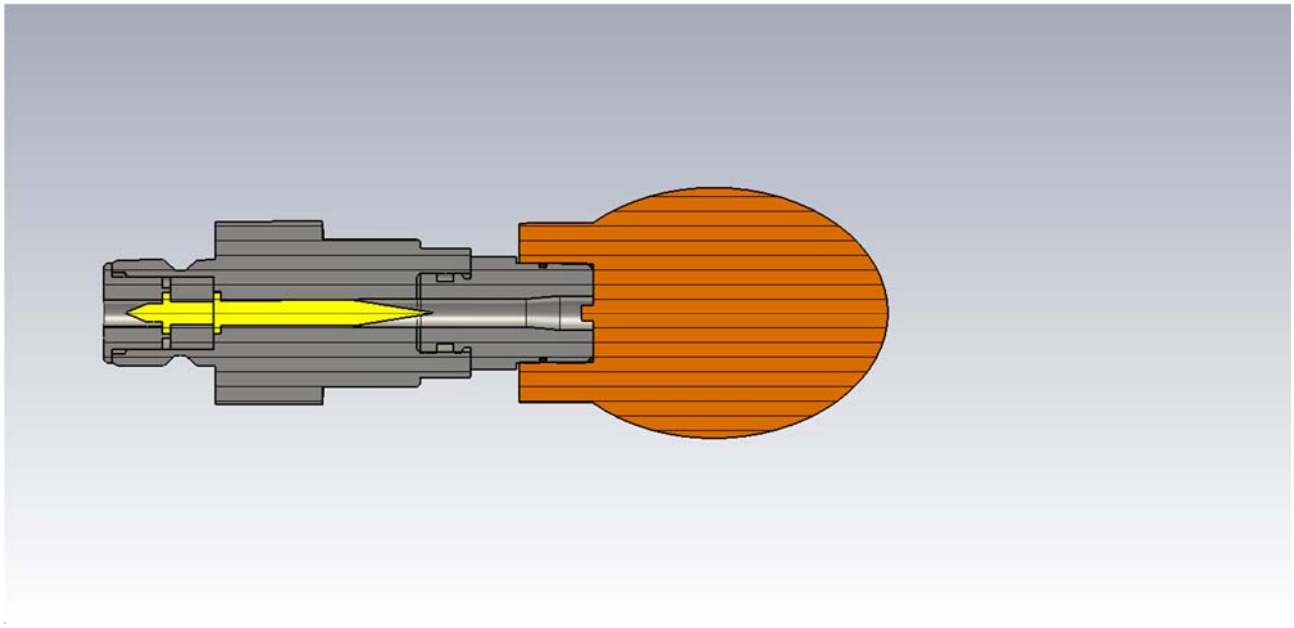
Max. Mean Power → -31.6dBm (limit: -14dBm)

Main Beam Gain → 28.4dB

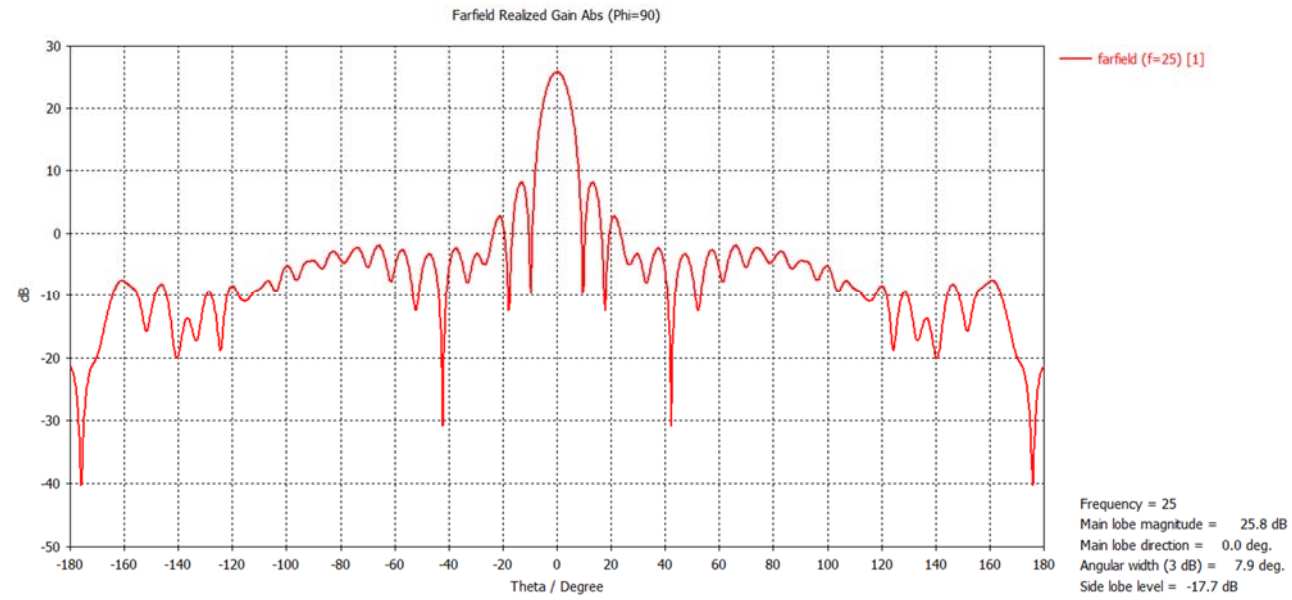
Side Lobe Gain Limit → 1.4dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

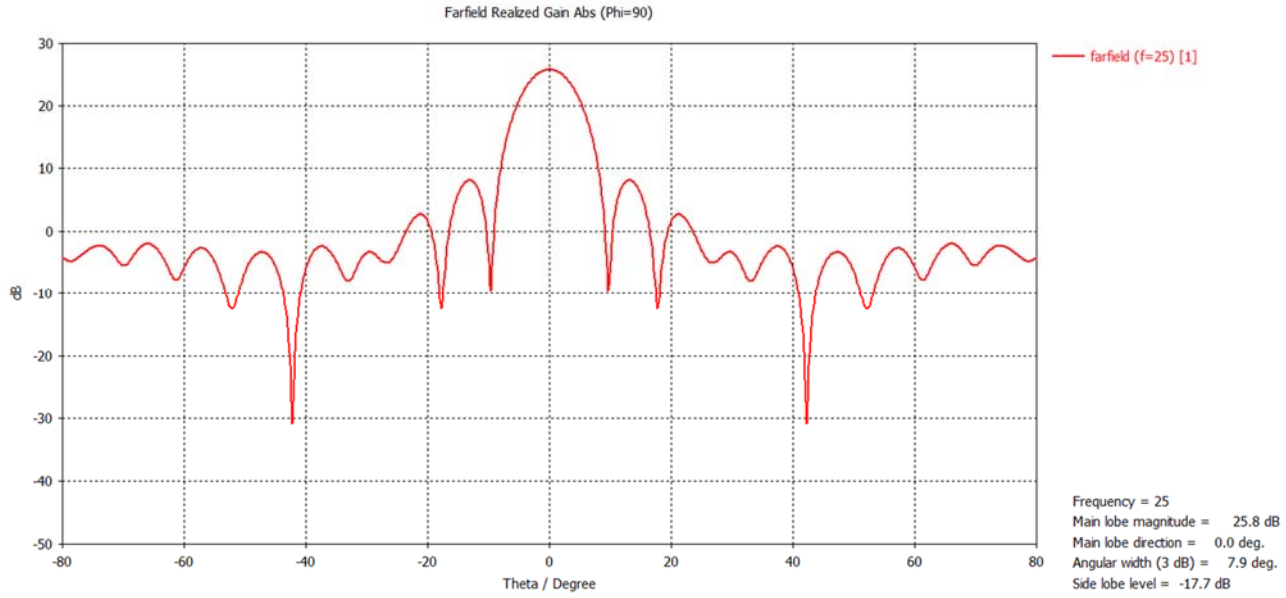
Angular width (3dB) → 5.6°/5.1° (limit: 12°)

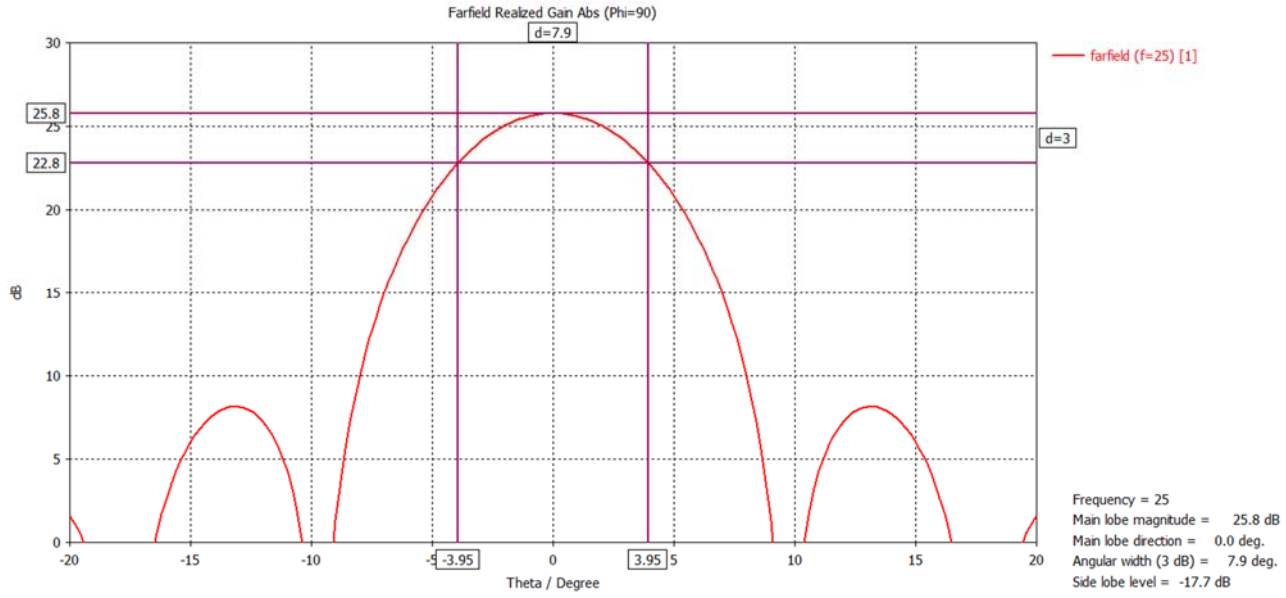
1.7 Drop antenna DN80



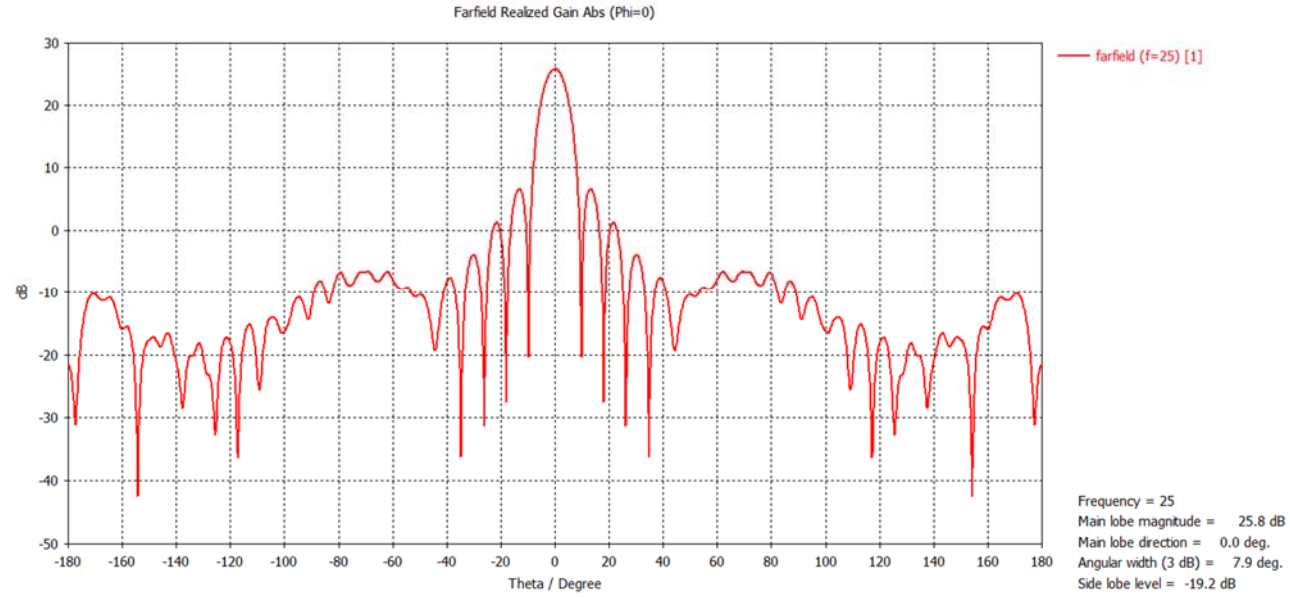
1.7.1 Radiation pattern in E-plane

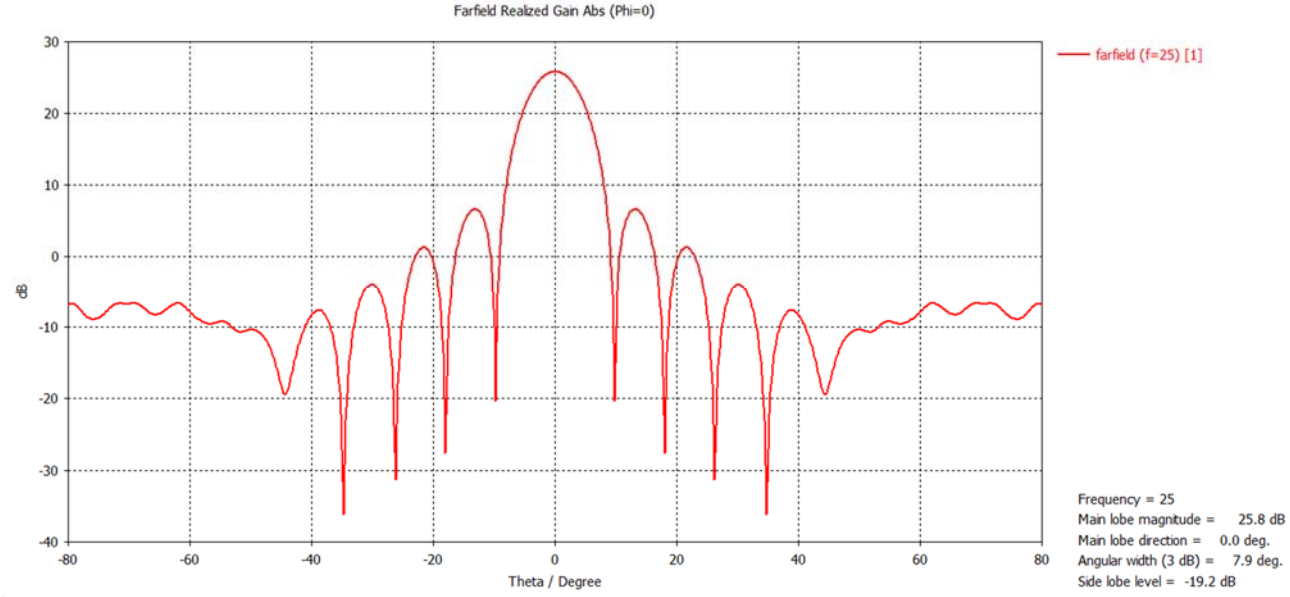


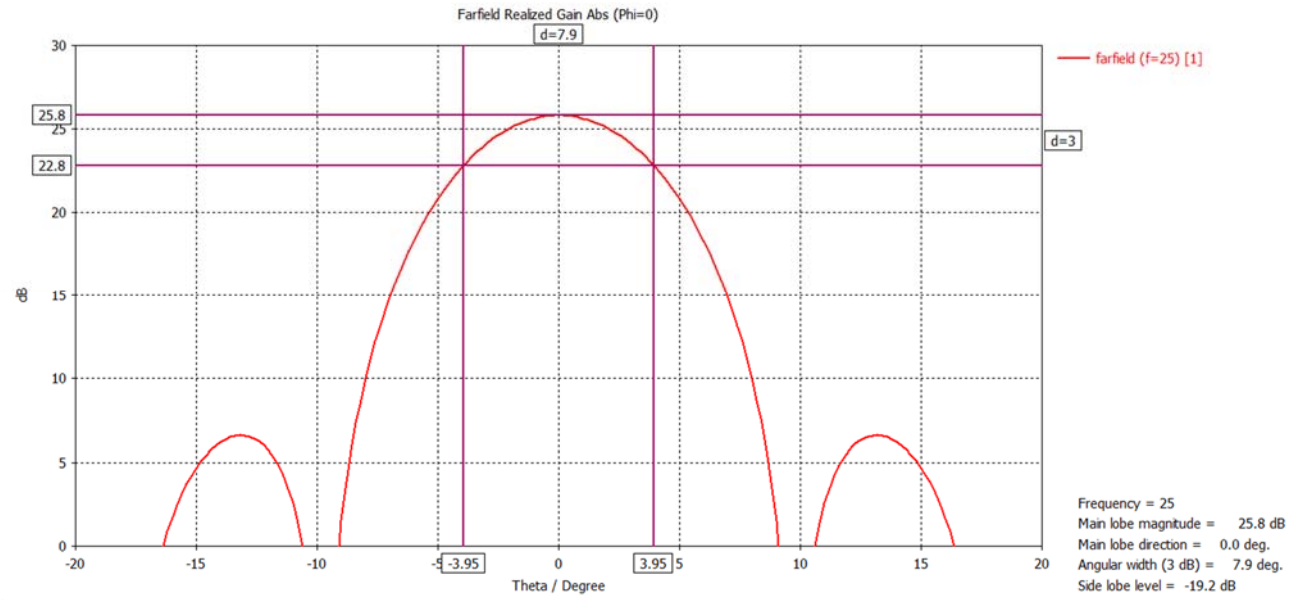

Farfield Realzed Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 25.8 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 7.9 deg.
Side lobe level = -17.7 dB


Farfield Realzed Gain Abs (Phi=90)
d=7.9
d=3
25.8
22.8
-3.95
3.95
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 25.8 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 7.9 deg.
Side lobe level = -17.7 dB

1.7.2 Radiation pattern in H-plane







KI LS

Max. Peak Power → +20.4dBm (limit: +26dBm)

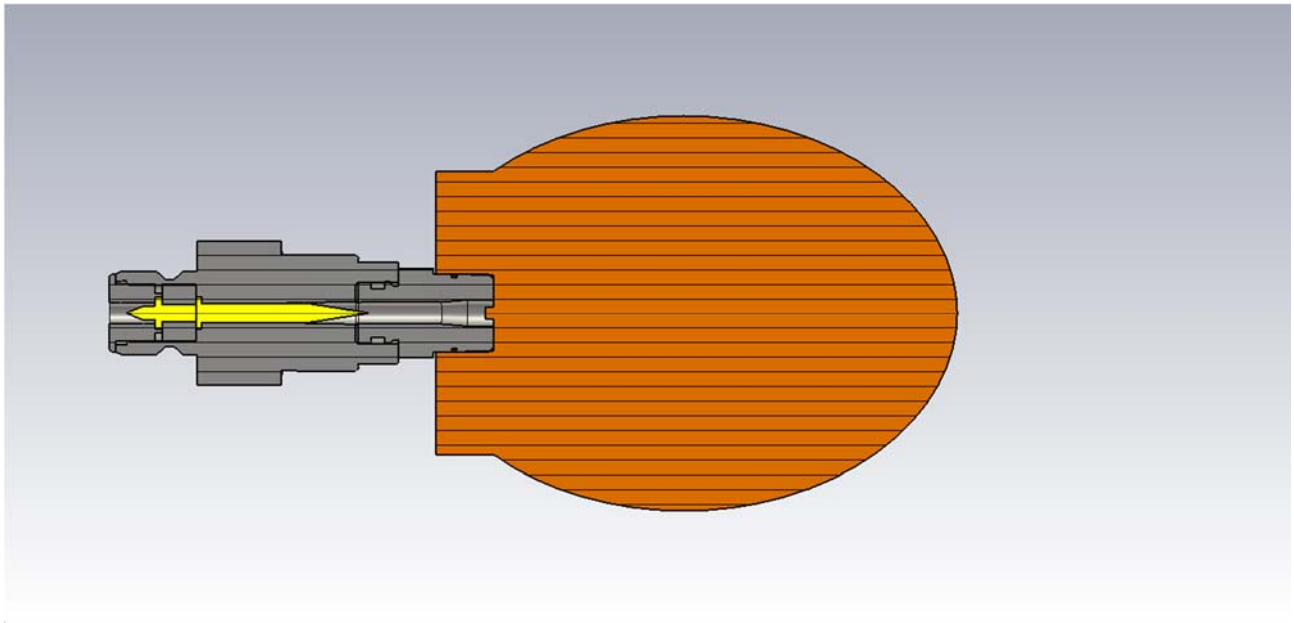
Max. Mean Power → -34.1dBm (limit: -14dBm)

Main Beam Gain → 25.8dB

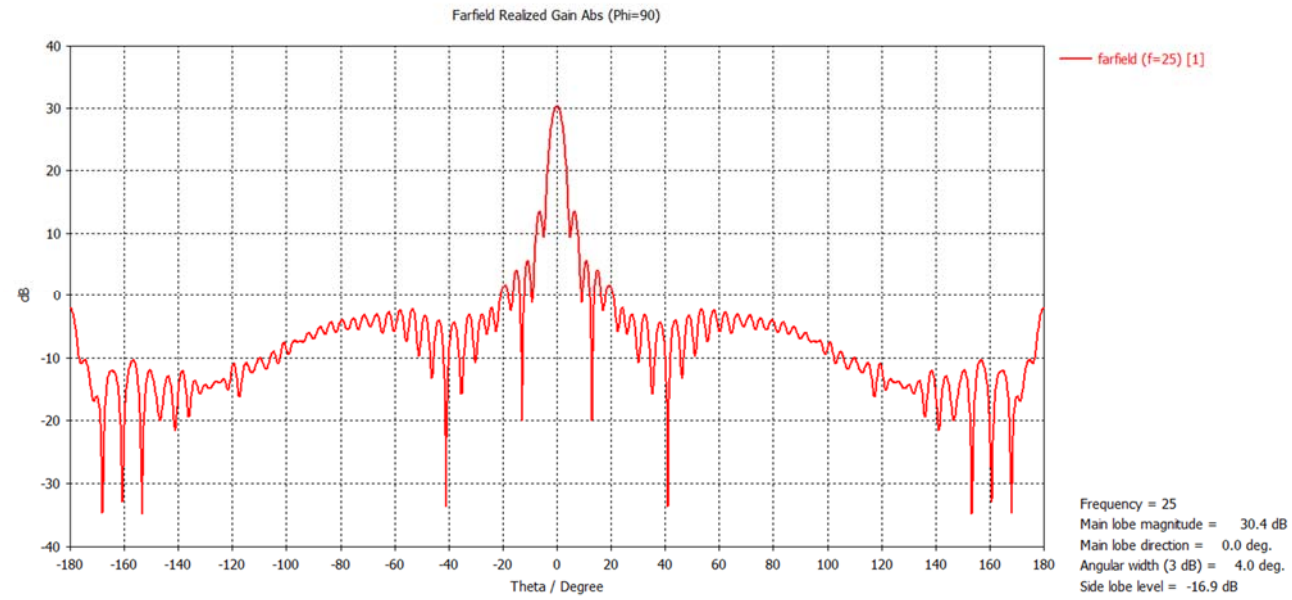
Side Lobe Gain Limit → -1.1dB @ >60°

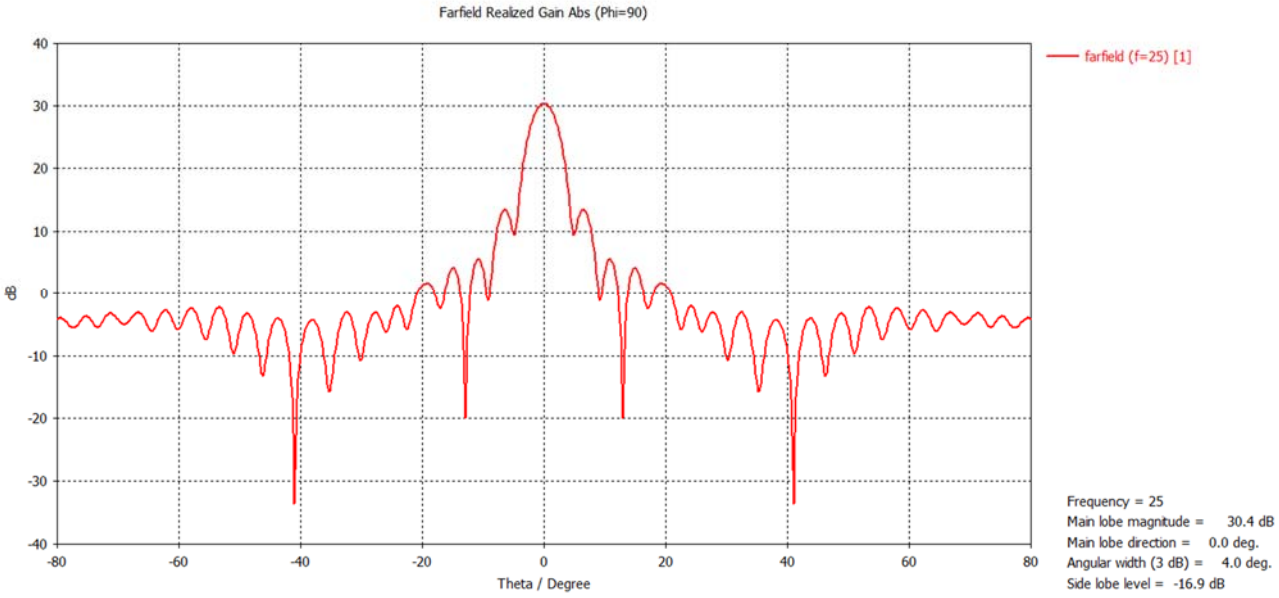
Angular width (3dB) → 7.9°/7.9° (limit: 12°)

1.8 Drop antenna DN150

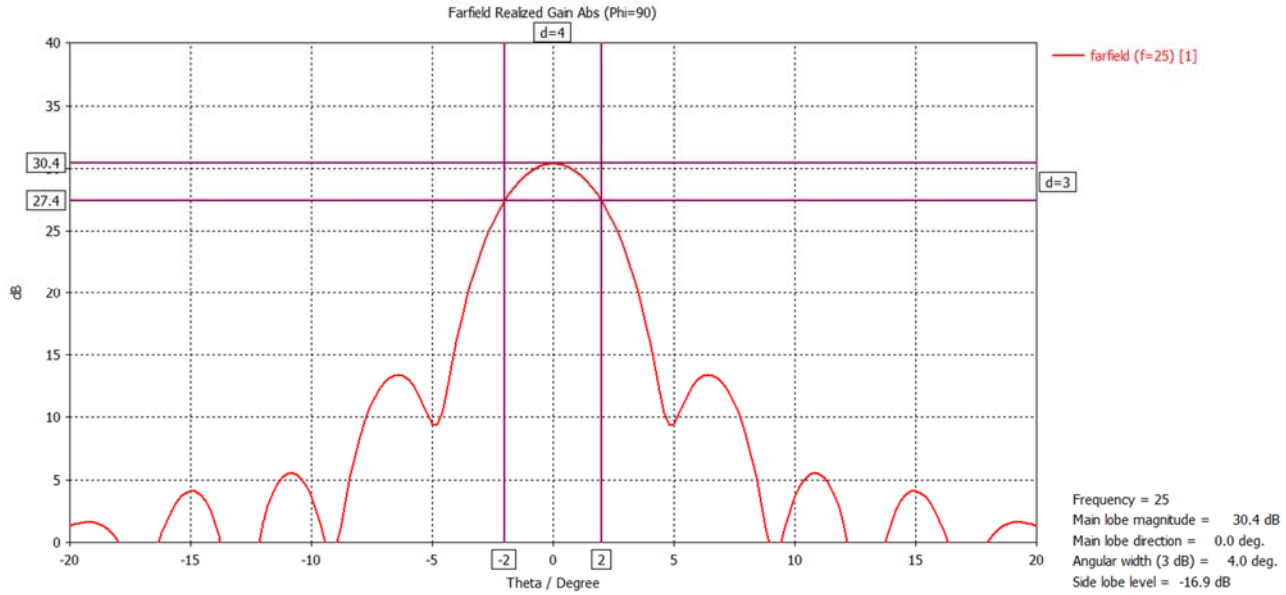


1.8.1 Radiation pattern in E-plane

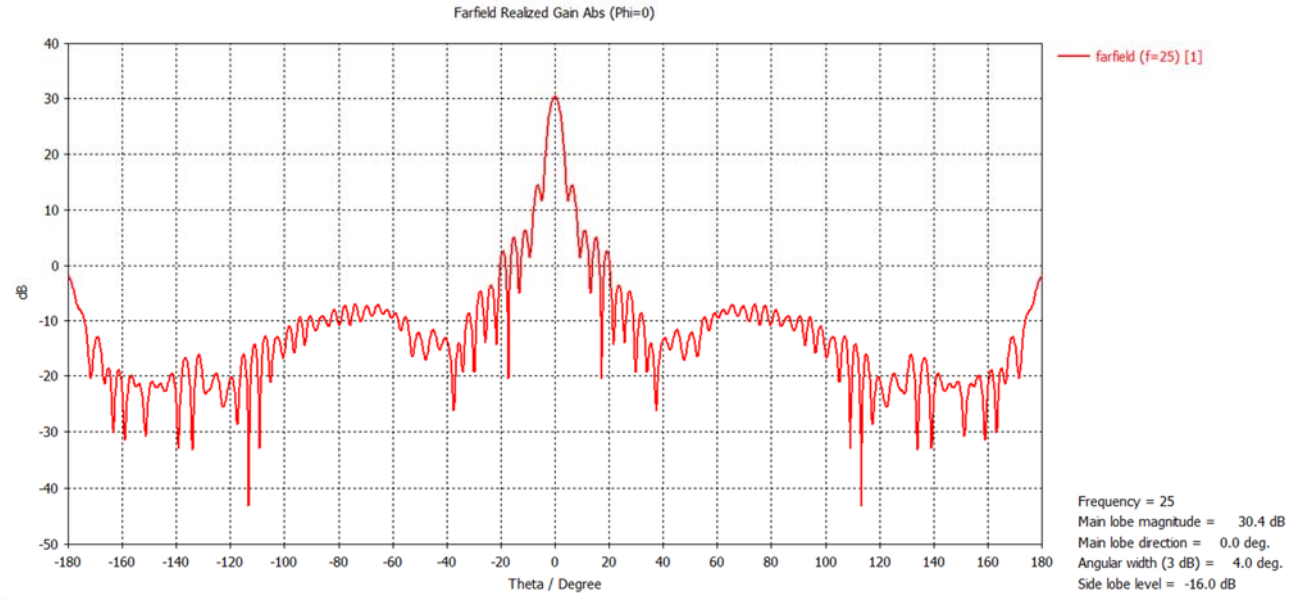


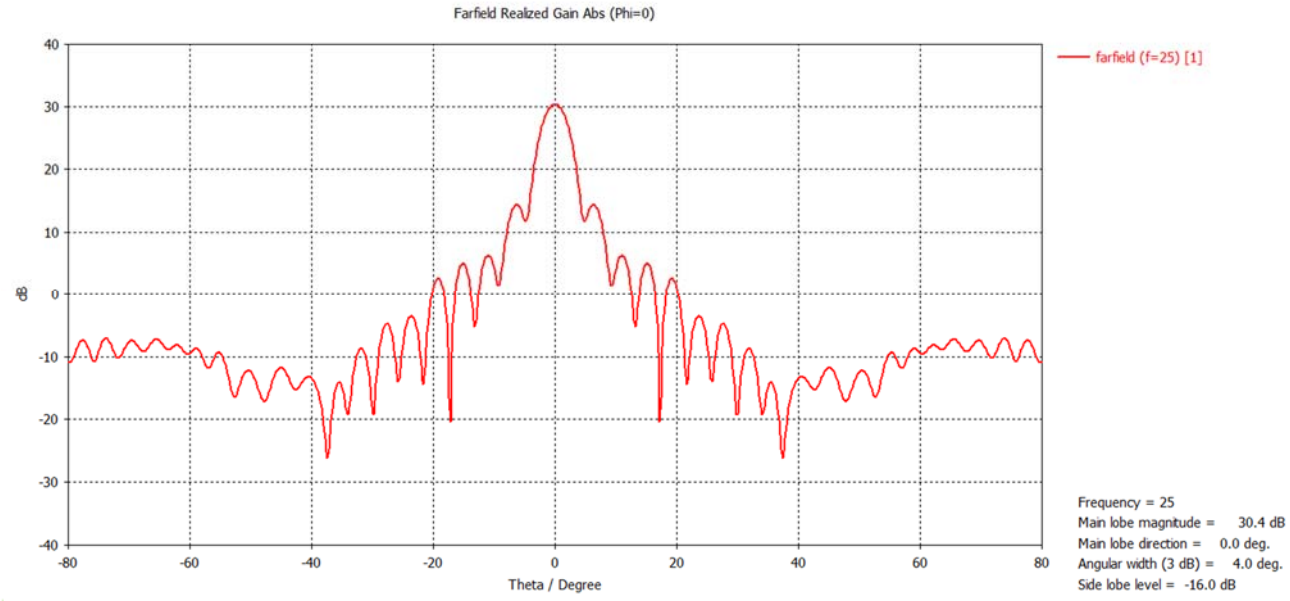

Farfield Realzed Gain Abs (Phi=90)
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 30.4 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 4.0 deg.
Side lobe level = -16.9 dB

KI LS

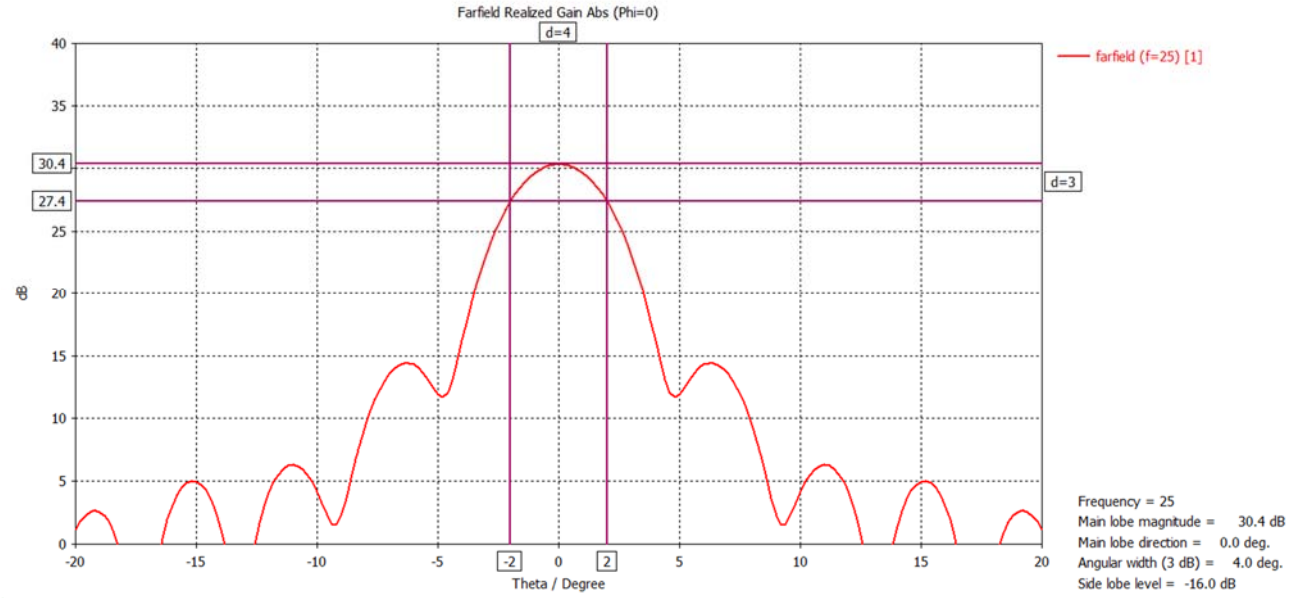

Farfield Realzed Gain Abs (Phi=90)
d=4
d=3
30.4
27.4
farfield (f=25) [1]
dB
Theta / Degree
Frequency = 25
Main lobe magnitude = 30.4 dB
Main lobe direction = 0.0 deg.
Angular width (3 dB) = 4.0 deg.
Side lobe level = -16.9 dB

1.8.2 Radiation pattern in H-plane





KI LS



Max. Peak Power → +24.9dBm (limit: +26dBm)

Max. Mean Power → -29.6dBm (limit: -14dBm)

Main Beam Gain → 30.4dB

Side Lobe Gain Limit → 3.4dB @ >60°
(Antenna Side Lobe Gain Limit relative to Main Beam Gain → -27dB)

Angular width (3dB) → 4.0°/4.0° (limit: 12°)