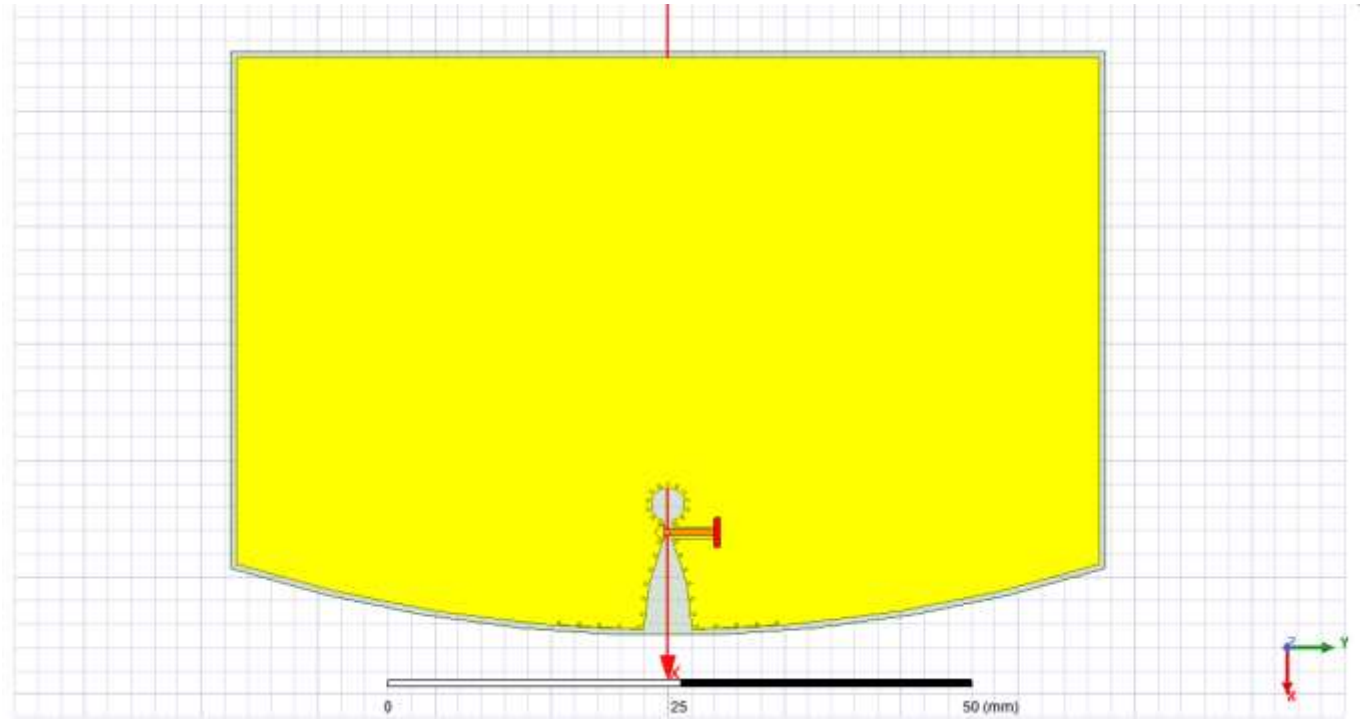
Mechanical Properties

The antenna is embedded into a large ground plane on a PCB.

The antenna is realized as a resonating slot with length Lambda/4 which is excited by a galvanical bridge connected to a grounded coplanar waveguide (GCPW) with 50R impedance.



Property	Value	Unit	Remarks
PCB Overall Size	50x70x1.6	mm	Size in x-, y-, and z-direction
Slot Size	12x4	mm	
Keep Out Area	16x14	mm	Symmetrically around the slot

Electrical Properties

Overview

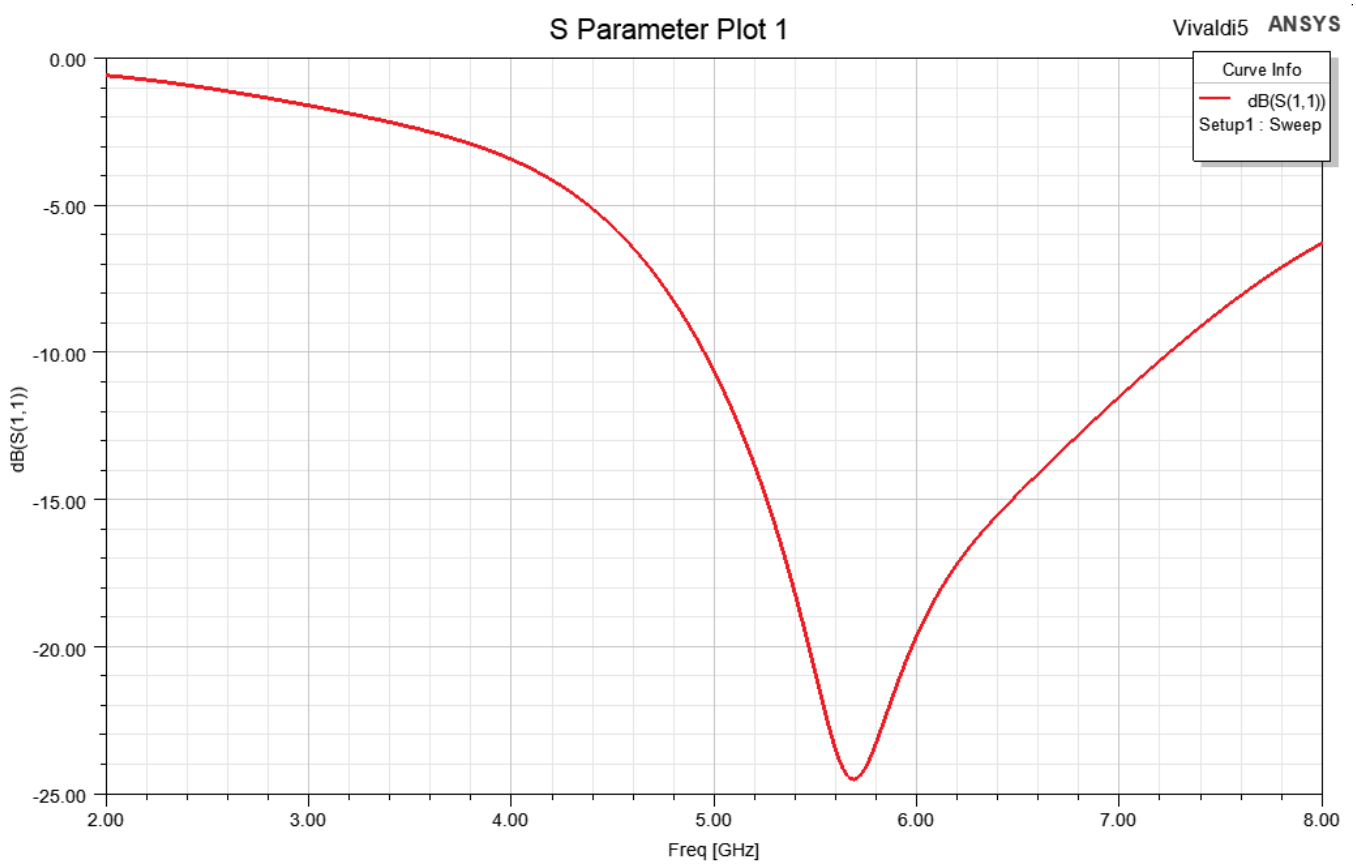
The PCB slot antenna has the following electrical properties (on a 70x50mm evaluation board):

Property	Value	Unit	Remarks
Impedance	50	Ω	
Frequency Range	5.0-7.0	GHz	at RL=10dB as given below.
Return Loss	10	dB	Return Loss
Efficiency	94	%	@5GHz (corresponds to average gain of -0.3dB)
	95	%	@6GHz
	94	%	@7GHz
Peak Gain	1.9	dB	@5GHz. Peak gain is achieved ~60° from slot direction
	3.5	dB	@6GHz. Peak gain is achieved ~45° from slot direction
	4.0	dB	@7GHz. Peak gain is achieved ~45° from slot direction

When the slot antenna is integrated into a large circular PCB of diameter 250mm, the radiation diagrams become more isotropic and the peak gains reduce to:

Property	Value	Unit	Remarks
Peak Gain	1.8	dB	@5GHz
	2.5	dB	@6GHz
	2.8	dB	@7GHz

Return Loss

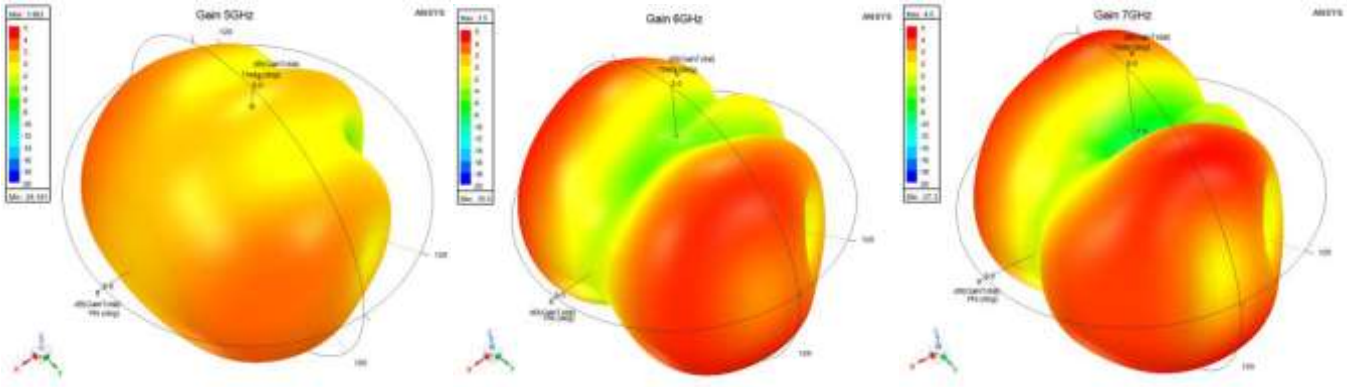


The return loss of better than 10dB corresponds to a VSWR of less than 2.0.

Radiation Diagrams

70x50mm Evaluation Board

Here the radiation diagrams (gain in dB) for the slot antenna on the 70x50mm eval board:



Note that with a different PCB length, the radiation can be directed more to boresight (+x direction).

Circular PCB with 250mm Diameter

Here the radiation diagrams for 5, 6, and 7 GHz for the slot antenna on a circular PCB as used for the Polaris lamps: