

# Log-Periodic Dipole Antenna

## Model and Results

This application notes presents how to model LPDA antenna in WIPL-D software suite. Results of simulation at different operating frequencies are also presented.

### Model of Antenna

Log-Periodic Dipole Antenna with 26 printed dipoles is created in WIPL-D AW Modeler and then simulated in WIPL-D Pro v8.0. Because LPDA antenna is symmetrical, only half of the structure is simulated. Antenna is printed on 0.813 mm thick dielectric substrate with dielectric permittivity 2.33. Entire antenna is around 261 mm long and it is placed 4.25 mm away from the metallic circle with diameter 248 mm. The longest arm of the antenna is around 76.2 mm long and length of the shortest one is around 1.53 mm.

In order to have very accurate results, WIPL-D Edge feature is included in all projects.

Antenna is presented in Fig 1. Antenna is fed at the top of the antenna (Fig. 2).

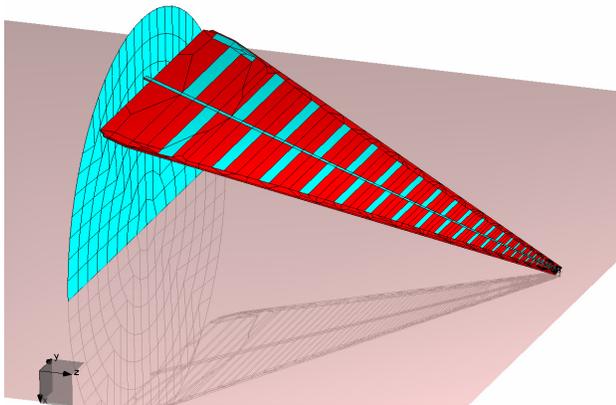


Figure 1. LPDA Antenna

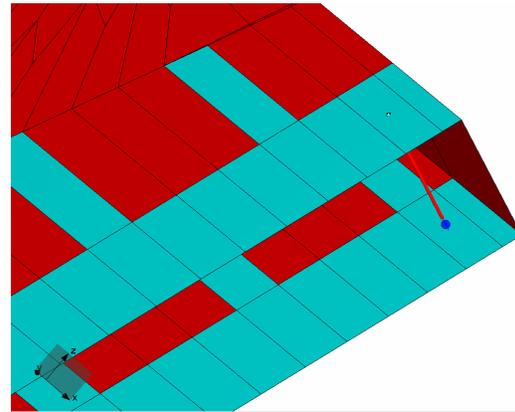


Figure 2. Feeding of the LPDA Antenna

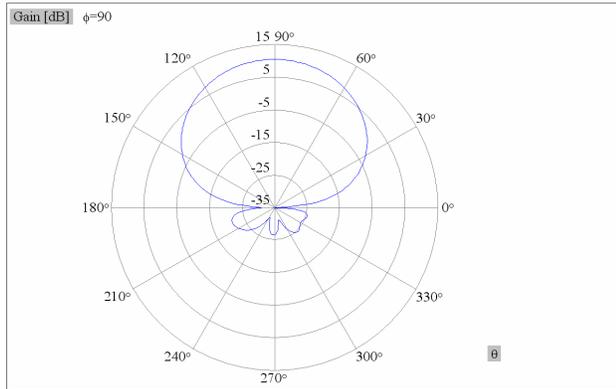
### Simulation and Results

Simulation times and number of unknowns needed for simulating LPDA antenna at different operating frequencies in the frequency range from 1 GHz to 18 GHz, are presented in Table 1. The computer used was a Dell PE 2900 with two Xeon Quad CPUs and 24 GB of RAM.

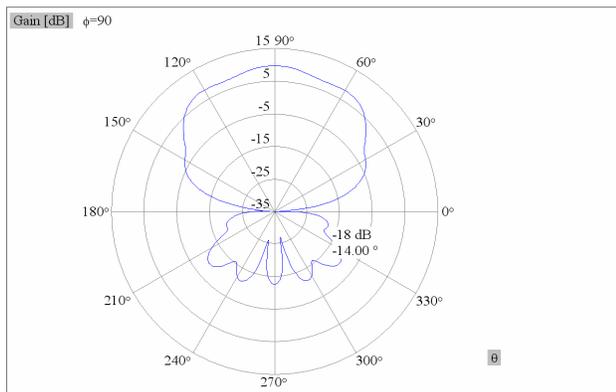
Table 1. Simulation times and required number of unknowns

Frequency [GHz]	Number of unknowns	Simulation time [s]
1	7,884	89
3	9849	136
5	13026	196
8	21112	481
12	31051	1121
18	49854	3612

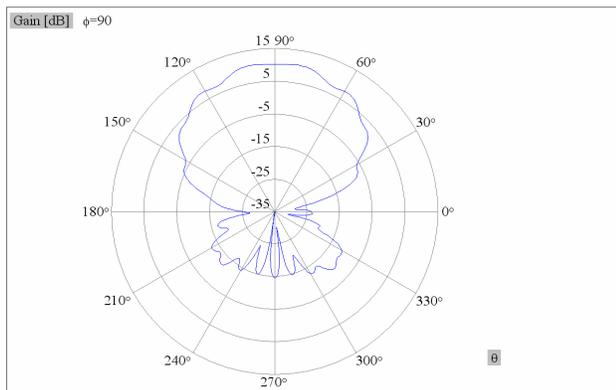
Radiation pattern at different frequencies in the horizontal plane of radiation, for different operating frequencies, is shown in Figs.



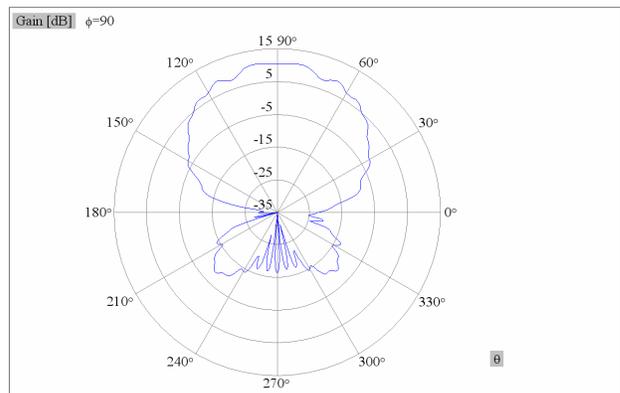
**Figure 3. Radiation pattern in the horizontal plane at 1 GHz**



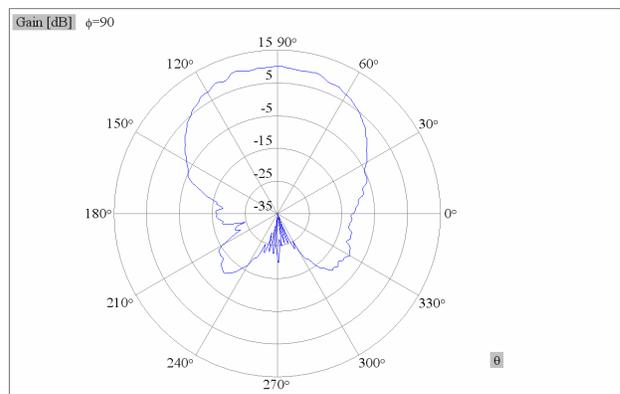
**Figure 4. Radiation pattern in the horizontal plane at 3 GHz**



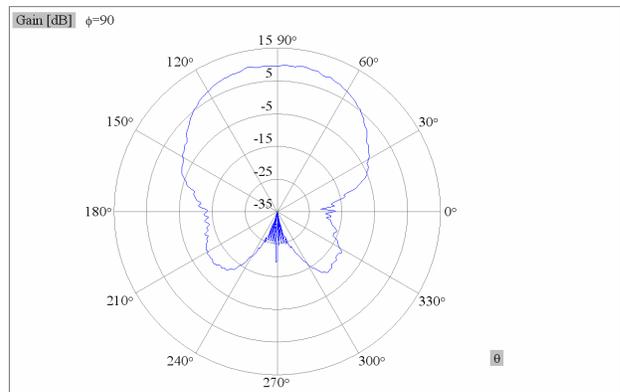
**Figure 5. Radiation pattern in the horizontal plane at 5 GHz**



**Figure 6. Radiation pattern in the horizontal plane at 8 GHz**



**Figure 7. Radiation pattern in the horizontal plane at 12 GHz**



**Figure 8. Radiation pattern in the horizontal plane at 18 GHz**