# Antenna Report

**FCC-ID: 2A4B7-1021**
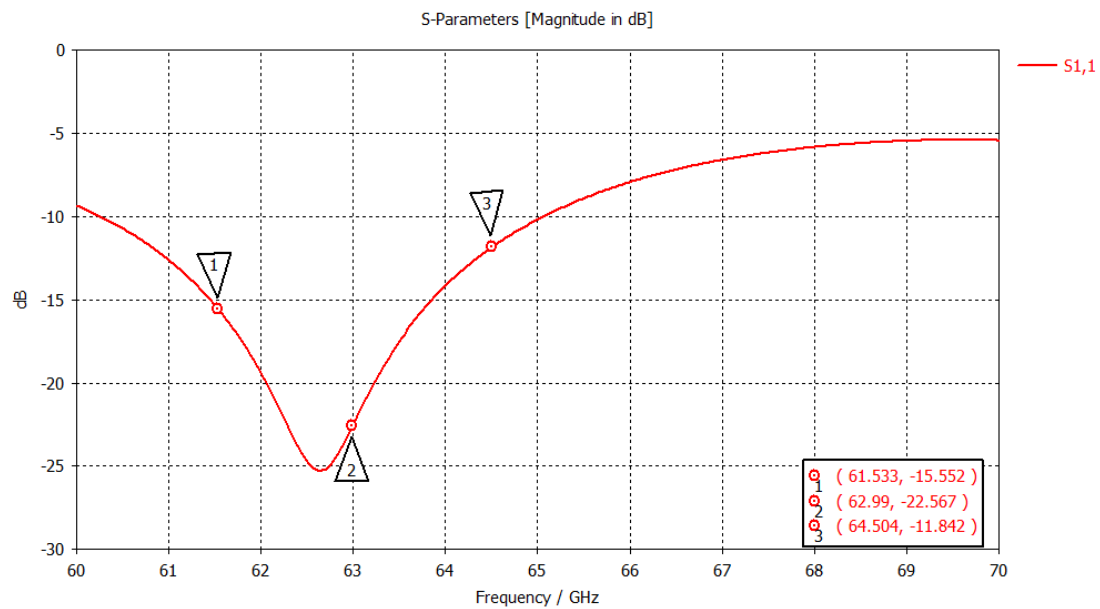
**Product Model Number: V4E6N2**

**Date: 08/15/2022**

**Blueberry Cornel LLC**

# Antenna Specification

**Frequency Range of operation**

- Radar has two possible modes:
    - 61.03-61.47 GHz
    - 62-63.1 GHz
- Antenna is matched S11<-10dB in 60-65 GHz

S-Parameters [Magnitude in dB]

| | |
|---|---|
| 1 | ( 61.533, -15.552 ) |
| 2 | ( 62.99, -22.567 ) |
| 3 | ( 64.504, -11.842 ) |

**Antenna Types:**

- Antennas are embedded antennas on the PCB

**Peak Antenna Gain:**

| Band | Group1 | | Peak Gain (dBi) Group2 | |
|---|---|---|---|---|
| | Single element | Array gain (12 antennas) | Single element | Array gain |
| 62 – 63.1 GHz | 6 | 16.79 | 6 | 16.79 |
| 61.03 – 61.47 GHz | 6 | 16.79 | 6 | 16.79 |

## Antenna Patterns



FOV

E-Field          Simulated at 60-70Ghz          H-Field
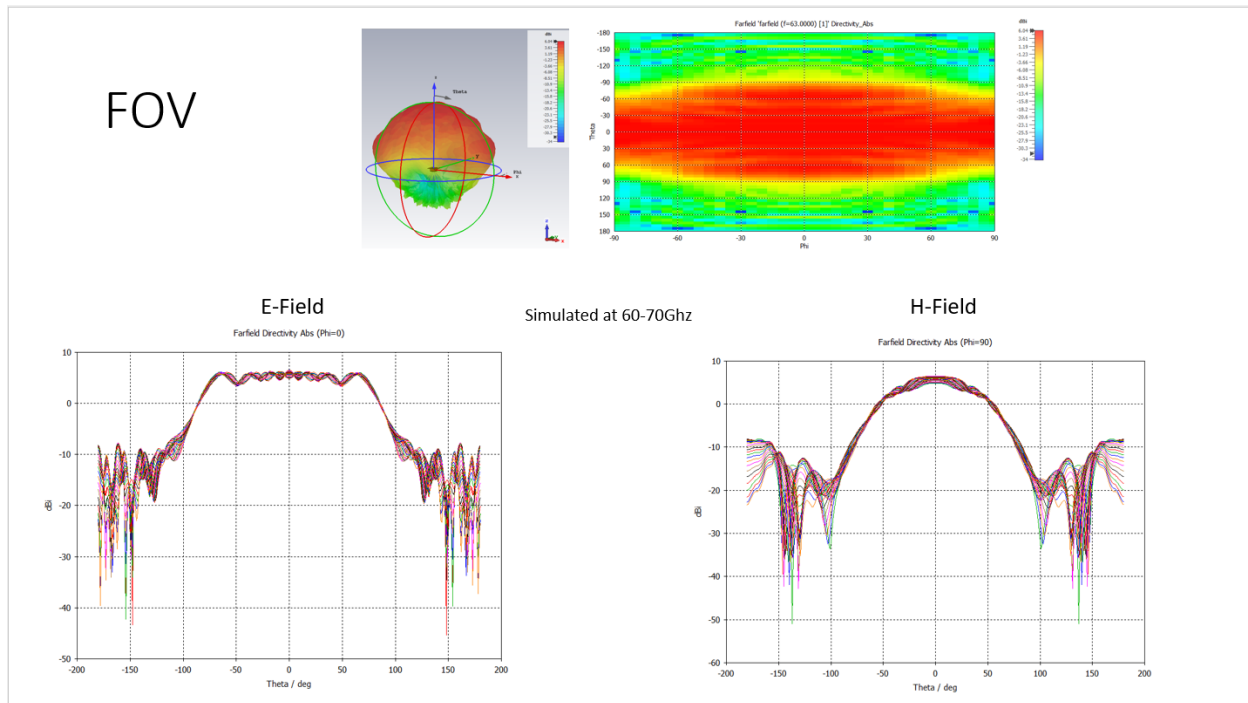
**Test Method and Parameters:** Antenna gain values are determined using FDTD computational analysis. The antenna gain submitted to FCC is based on simulation by a proven and reliable electromagnetic simulation software (CST – one of the industry standards). The simulated performance is in good correlation with the theoretically anticipated value corresponding to a dipole radiating into a half-space (due to a ground plane).

The simulation was done using CST version R2022 SP4, with the following parameters:

- Smallest cell 0.0135mm
- largest cell 0.097 mm
- Solver was Time domain solver
- Boundary conditions were Open with space

Per FCC KDB 662911 D01 Multiple Transmitter Output v02r01, if any two correlated transmitters correlated, the MIMO antenna gain should be calculated using "G= GANT + 10 log(NANT) dBi"

For this device, the "streams" are completely correlated, as we are transmitting the same frequency and waveform up to BPSK modulation.

G(array) in dBi = G(single element) + 10log(number of antennas) in dBi;

with real figures: G(array) = 6 +10log12 [dBi] = 16.79dBi