CURIE: ANTENNA DESIGN

1. Dipole at 438MHz: Design of 45° angle UHF Dipole Antenna. Dipole element length of 14.9232cm for operation at 438MHz (λ=68.49cm). Simulated bandwidth (-3 dB) of 142.15 MHz and Realized Gain of 1.713 dB (Directivity of 1.845 dBi). Images and results shown on previous report. On CubeSat structure a 45° dipole is added to each side (right- and left-side), near the panels and on the same cube side where the patch arrays will be installed, with an additional 45° inclination with respect to the CubeSat side (See Fig. 1.1.). The gap between dipole arms is changed from 1.3cm to 0.5656cm.

Resonance for each dipole is shifted from 438MHz down to 434MHz, with a S11 parameter (magnitude) value of -11.76 dB and a Half-Power (-3dB) Bandwidth of 138.18MHz. Gain is somewhat enhanced, now at a value of 2.066 dB, and Directivity of 3.122 dBi.

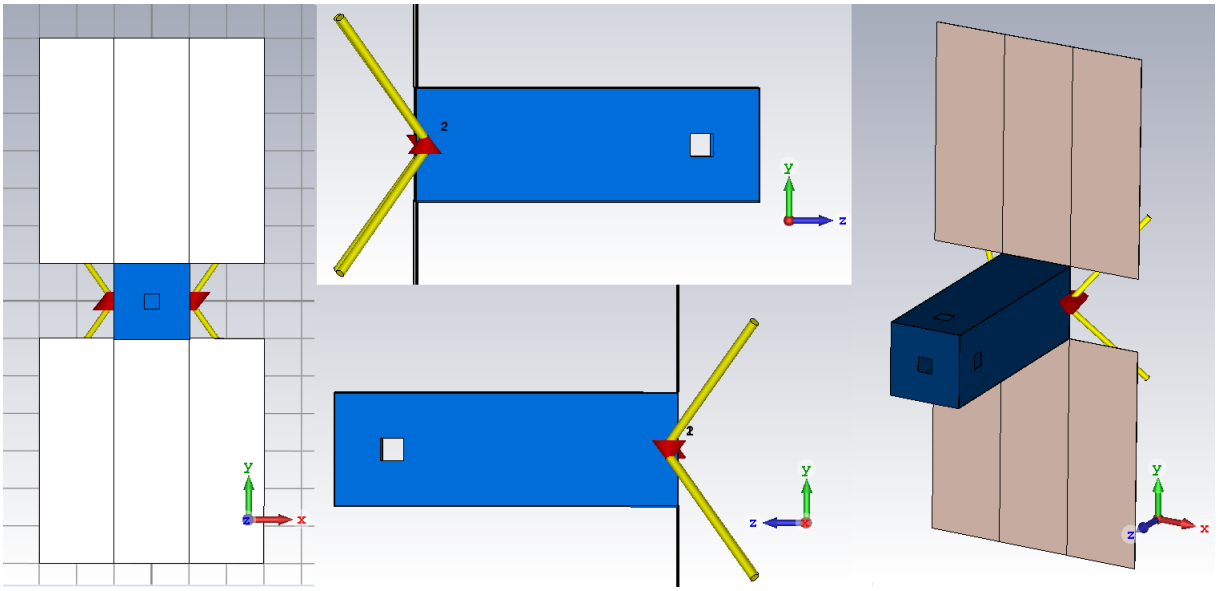

Figure 1.1. 45° Dipole Antenna on right- and left-side of CubeSat structure. Design and Simulation performed with CST Studio Suite 2017 ©.

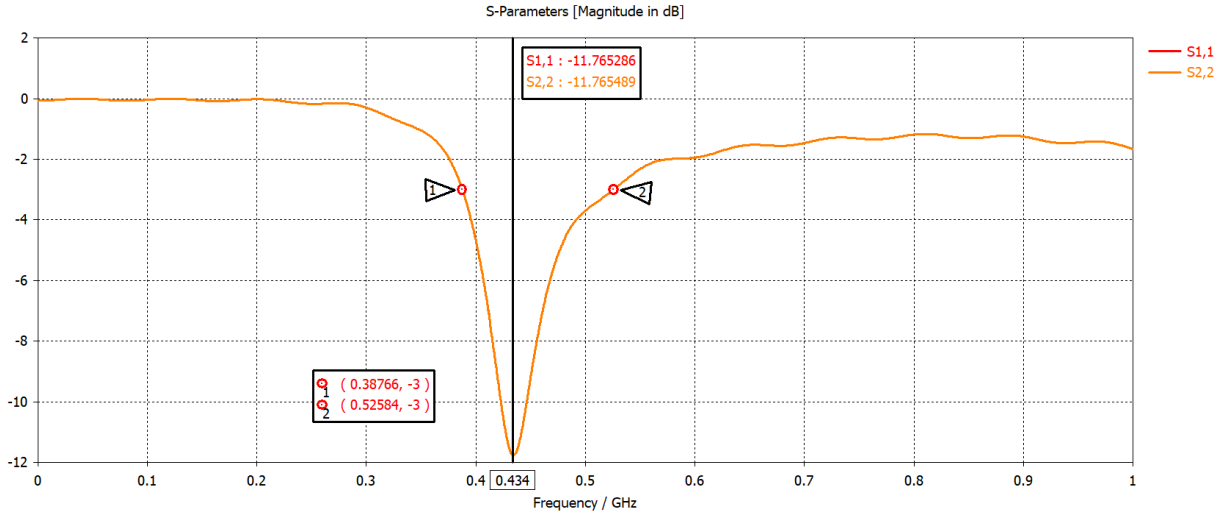

Figure 1.2. Input Reflection Coefficient for 45° Dipole Antenna on right- and left-side of CubeSat structure. Design and Simulation performed with CST Studio Suite 2017 ©.

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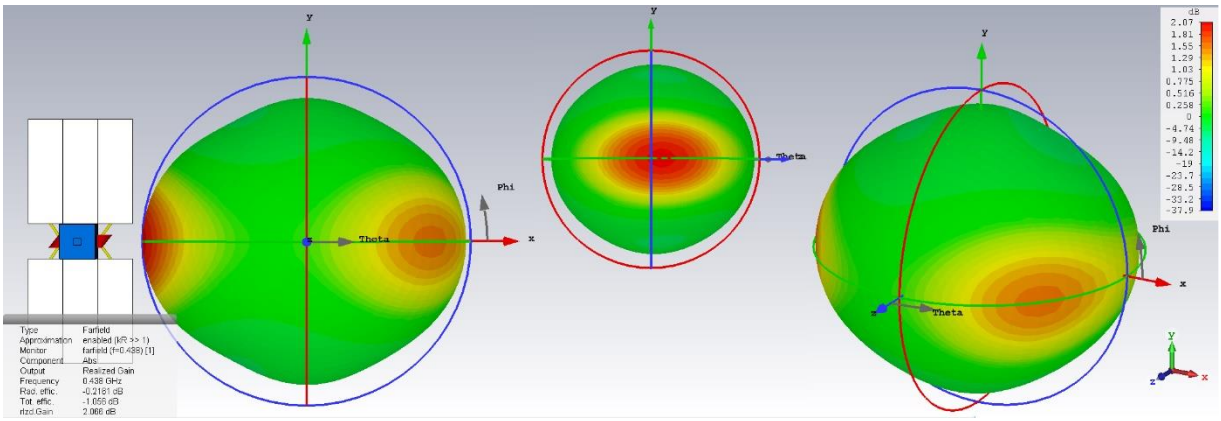

Figure 1.3. Farfield Radiation Pattern for 45° Dipole Antenna on left-side of CubeSat structure. Design and Simulation performed with CST Studio Suite 2017 ©.

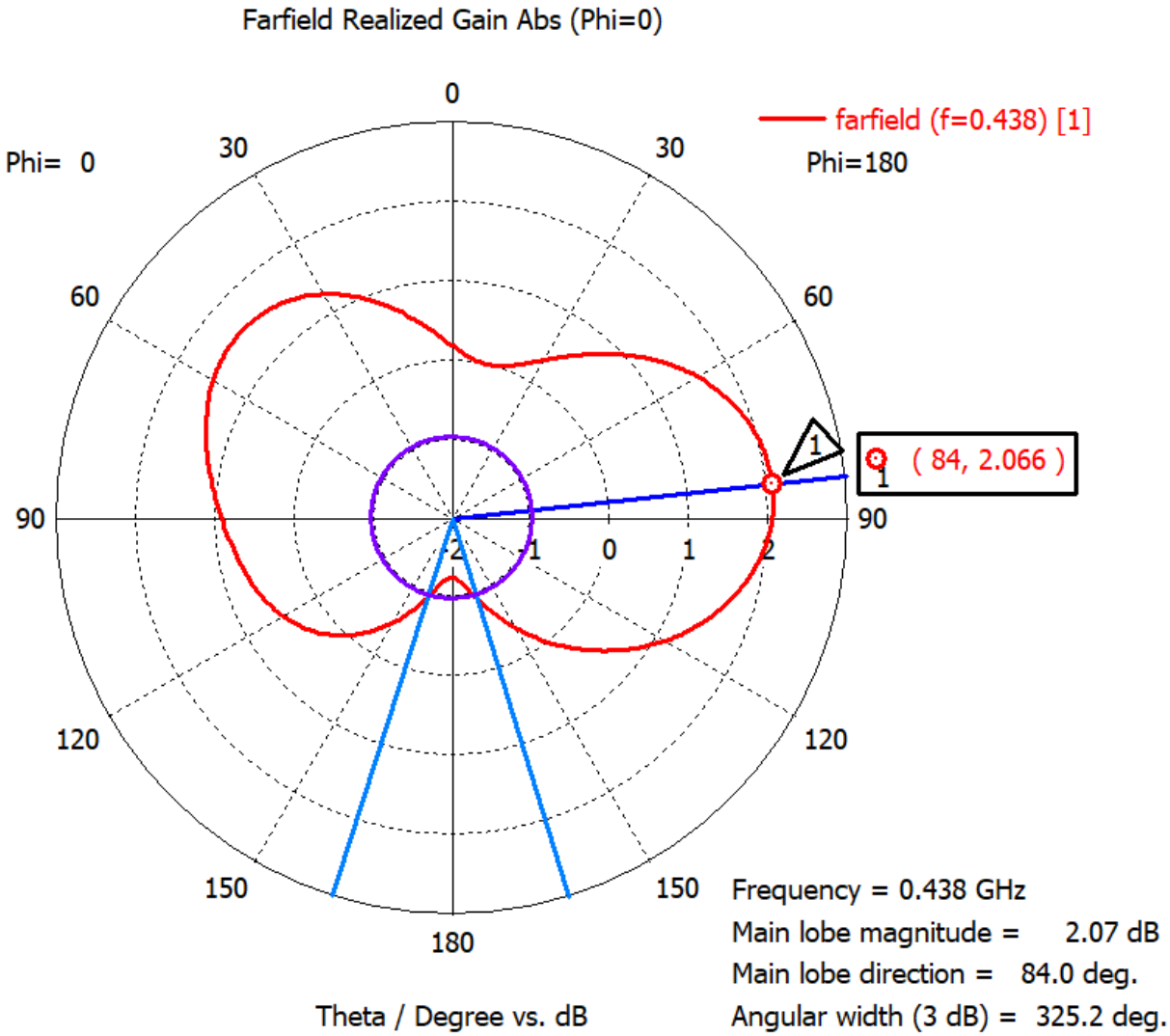

Figure 1.4. Farfield Radiation Pattern for 45° Dipole Antenna on left-side of CubeSat structure – Polar Plot. Design and Simulation performed with CST Studio Suite 2017 ©.

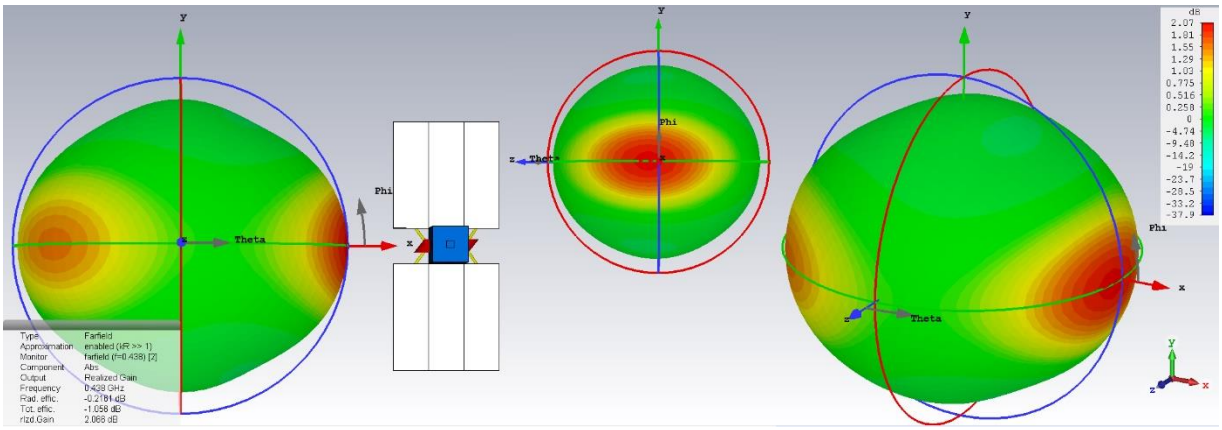

Figure 1.5. Farfield Radiation Pattern for 45° Dipole Antenna on right-side of CubeSat structure. Design and Simulation performed with CST Studio Suite 2017 ©.

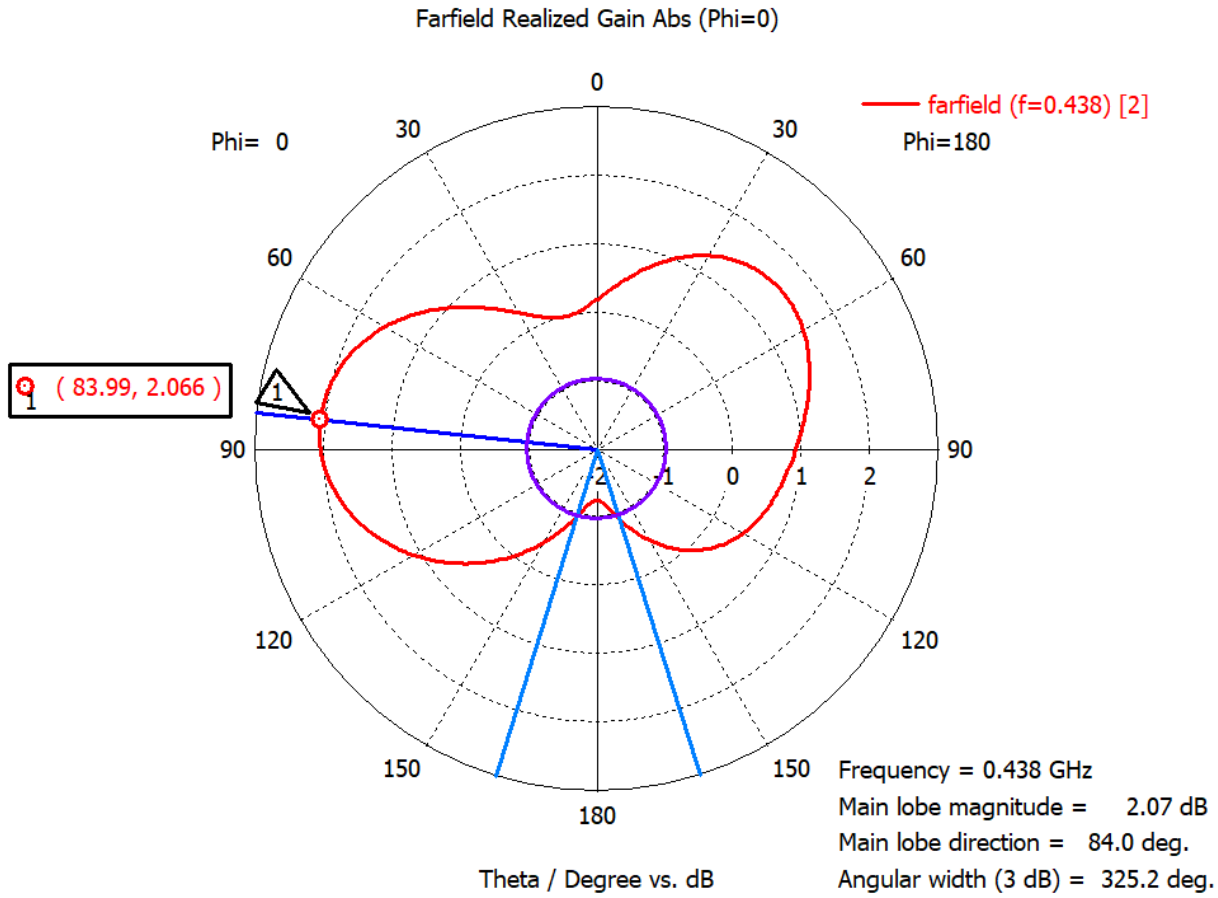

Figure 1.6. Farfield Radiation Pattern for 45° Dipole Antenna on right-side of CubeSat structure – Polar Plot. Design and Simulation performed with CST Studio Suite 2017 ©.

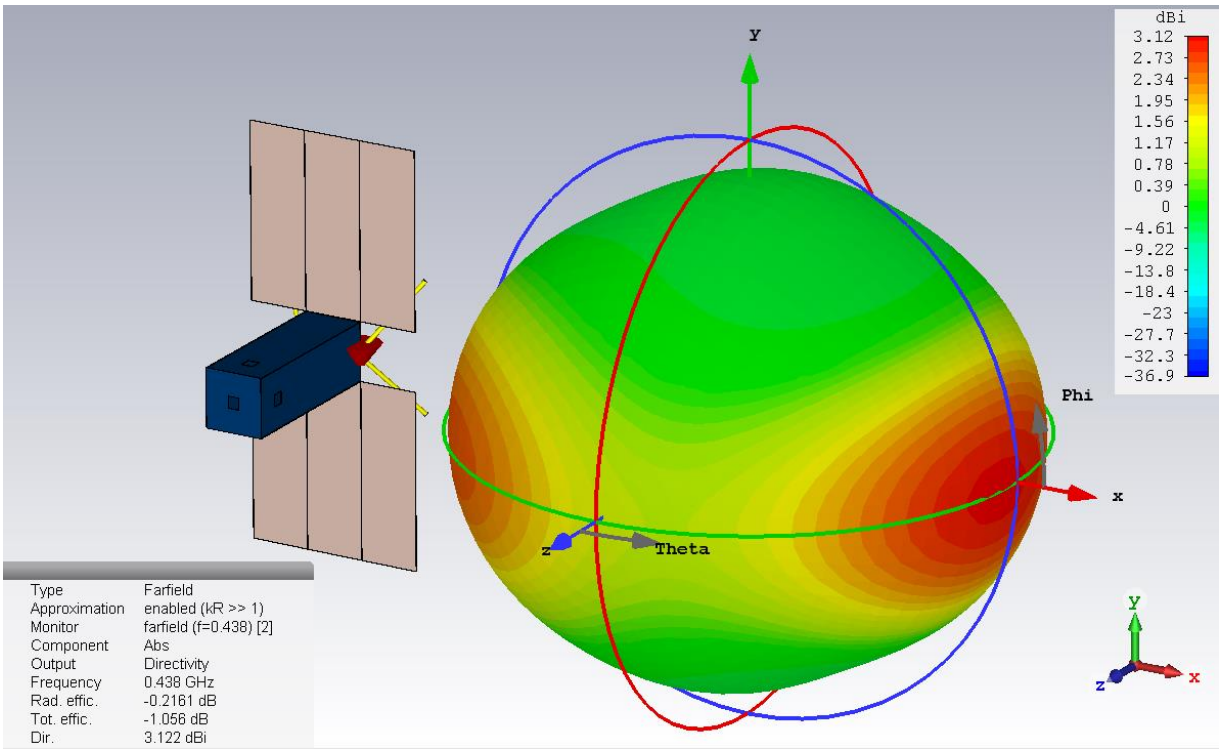

Figure 1.7. Directivity Radiation Pattern for 45° Dipole Antenna on left-side of CubeSat structure. Design and Simulation performed with CST Studio Suite 2017 ©.