d = cell([16 1]); % store all ULA configs

arrSize = 8; % number of antenna elements in array

c = physconst('LightSpeed');

% 5GHz signal

fc5g = 5e9;

lambda5g = c / fc5g;

% 10GHz signal

fc10g = 10e9;

lambda10g = c / fc10g;

% NON-CONSTANT APERTURE

% plot 5GHz ULA (d = lambda5g/2) (Aperture = 0.48m)

sArr = phased.ULA(arrSize,lambda5g/2);

d(1) = {sArr};

% plot 10GHz ULA (d = lambda10g/2) (Aperture = 0.24m)

sArr = phased.ULA(arrSize,lambda10g/2);

d(2) = {sArr};

figure;

hold on;

pattern(d{1},fc5g,[-90:.1:90],0,'PropagationSpeed',c, ...

'CoordinateSystem','rectangular','Type','powerdb');

pattern(d{2},fc10g,[-90:.1:90],0,'PropagationSpeed',c, ...

'CoordinateSystem','rectangular','Type','powerdb');

title('Non-Constant Aperture d = lambda/2 (Aperture(10GHz) = 0.24m) (Aperture(5GHz) = 0.48m)')

ylim([-45 5]); xlim([-90 90]);

hold off;

% CONSTANT APERTURE (A = 21cm) (10GHz -> d = lambda10g; 5GHz -> d = lambda5g/2)

figure;

sArr1 = phased.ULA(arrSize,lambda10g);

pattern(sArr1,fc10g,[-90:.1:90],0,'PropagationSpeed',c, ...

'CoordinateSystem','rectangular','Type','powerdb');

sArr2 = phased.ULA(arrSize,lambda5g/2);

pattern(sArr2,fc5g,[-90:.1:90],0,'PropagationSpeed',c, ...

'CoordinateSystem','rectangular','Type','powerdb');