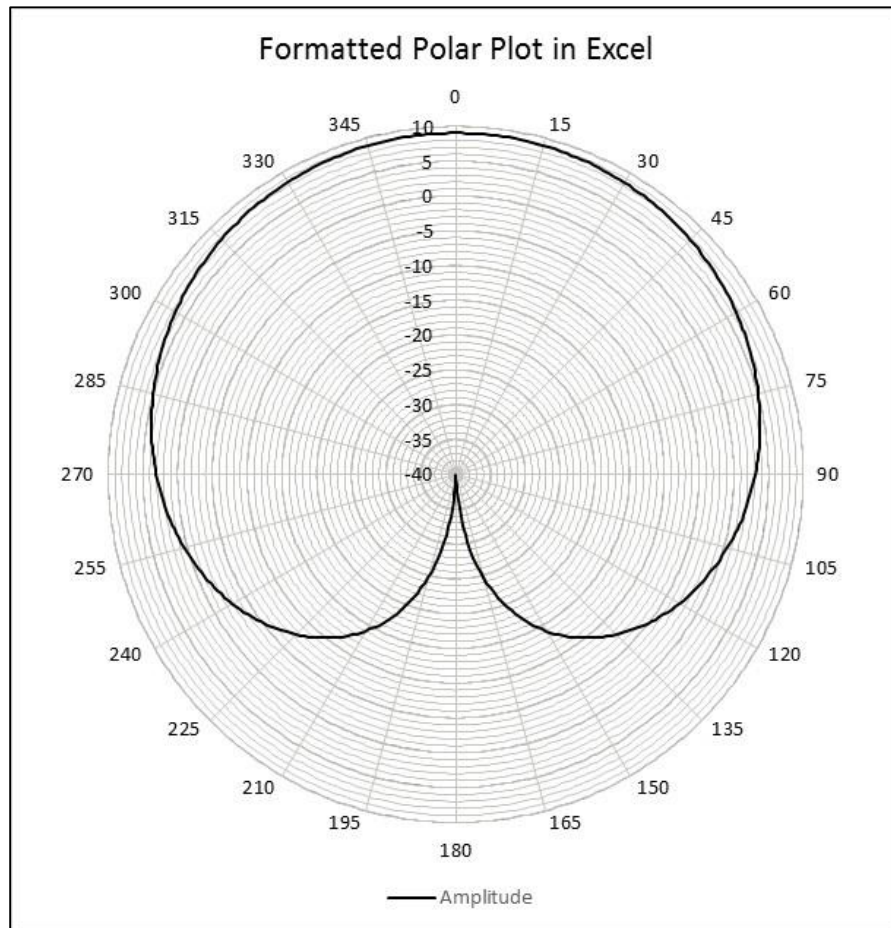


Polar Plots in Excel 2013/2016

Using the Radar Chart



Let's start with generating some polar data:

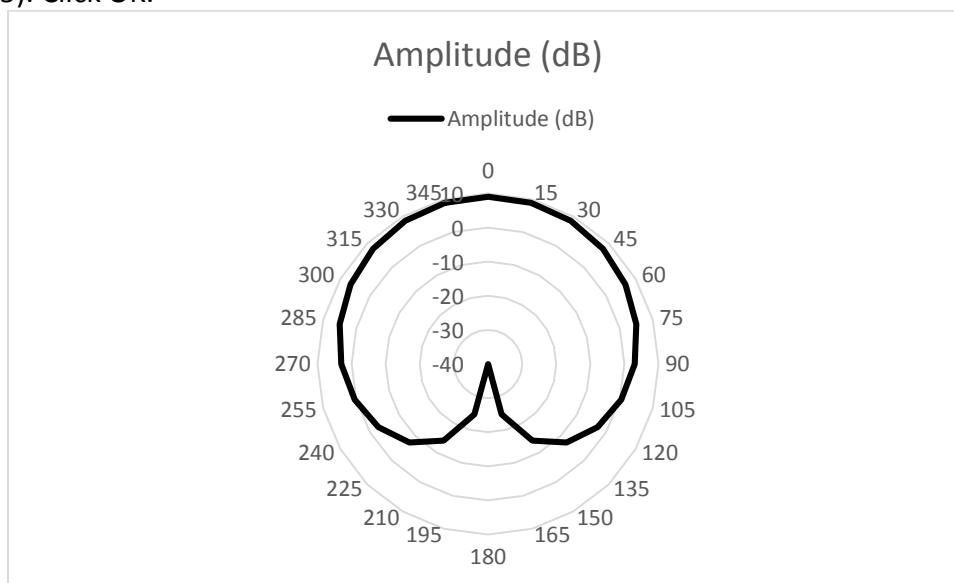
Create a (theta, Amplitude) pair of polar data to be plotted. Theta (deg) [cells A2:A25] was chosen as integer values 0 to 345. Unfortunately, this won't work if you're going multiple revolutions. Amplitude can be whatever you want, such as measured data, but here we'll create a cardioid shape via formula (for example, in cell B2):
 $=20*\text{LOG10}(0.01+\text{ABS}(\text{SQRT}(2)*(1+\text{COS}(\text{RADIANS}(A2))))))$.

Note: the sqrt(2) amplitude is arbitrary and the 0.01 factor keeps the null of the cardioid finite (-40dB).

Theta Labels [C2:C13] are 0-330 in increments of 30 and Theta Labels Dummy Values [E2:E13] have a few non-adjacent very small values (which will not be plotted due to how Excel treats discontinuous data).

	A	B	C	D	E	F	G	H
1	theta (deg)	Amplitude (dB)		Theta Labels	Dummy Values			
2	0	9.061554968		0	1.00E-03			
3	15	8.912827988		30				
4	30	8.461502872		60				
5	45	7.691417532		90	0.001			
6	60	6.572974607		120				
7	75	5.058220114		150				
8	90	3.071502342		180	0.001			
9	105	0.491257947		210				
10	120	-2.88832341		240				
11	135	-7.44830902		270	0.001			
12	150	-14.0025052		300				
13	165	-24.7033077		330				
14	180	-40						
15	195	-24.7033077						
16	210	-14.0025052						
17	225	-7.44830902						
18	240	-2.88832341						
19	255	0.491257947						
20	270	3.071502342						
21	285	5.058220114						
22	300	6.572974607						
23	315	7.691417532						
24	330	8.461502872						
25	345	8.912827988						

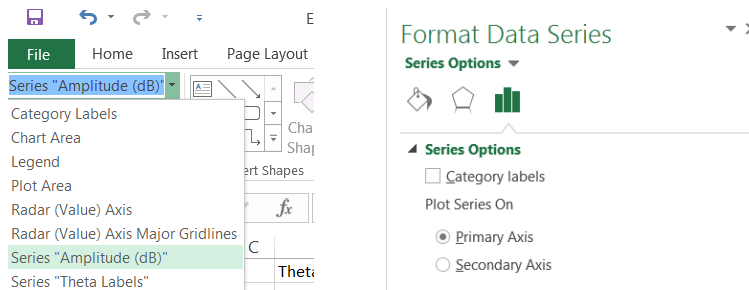
1. Insert a new radar chart. Right-click on the chart and "Select Data". Delete any series that populate by default.
2. Create a new series. Name it "Amplitude (dB)", or similar. For the series values, select your column of Dummy Values (B2:B25). Click OK.
3. Edit the Horizontal (Category) Axis Labels for this series, and select theta (deg) values (A2:A25). Click OK.



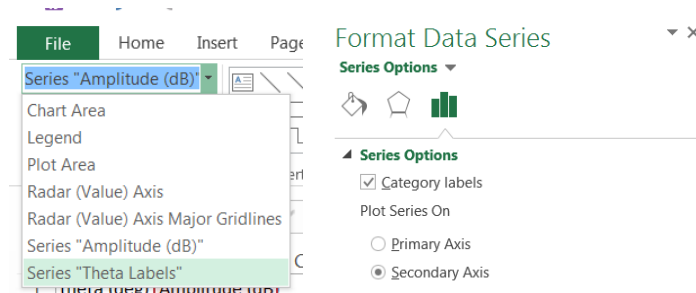
This plot is technically correct but not report-worthy in appearance. Radial lines (spokes) at certain intervals are desired, but not at 15 degree increments. For instance, we'd rather have theta values at 30 degree increments- as in our Theta Labels data. In

versions prior to Excel 2013, radial lines are included by default. There is a workaround in 2013/2016 below.

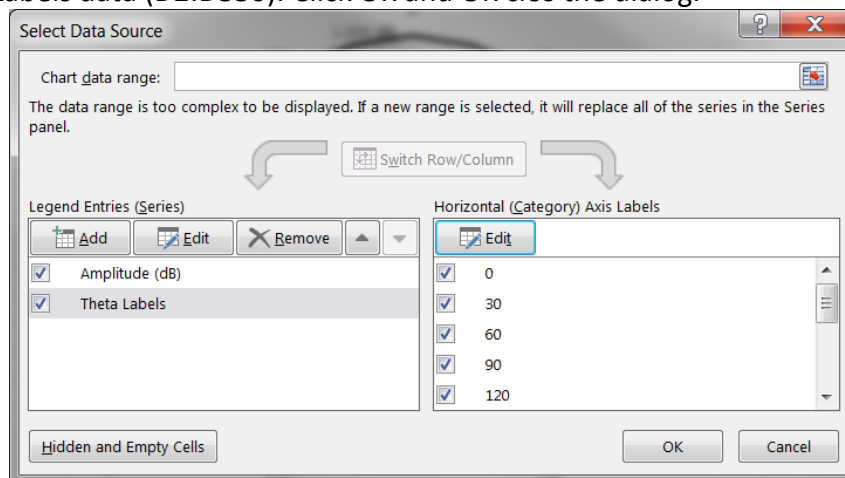
- Again right-click on the plot, “Select Data” and add a Series “Theta Labels” with Series Values of the Dummy Values (E2:E13). Click OK to close the dialog.
- Use the Current Selection dialog in the Format tab to Format the Series “Amplitude (dB)”. In the Format Data Series side window, uncheck the “Category Labels”.



- Format the series “Theta Labels”. Check the Category Labels and Plot the Series on the Secondary Axis.



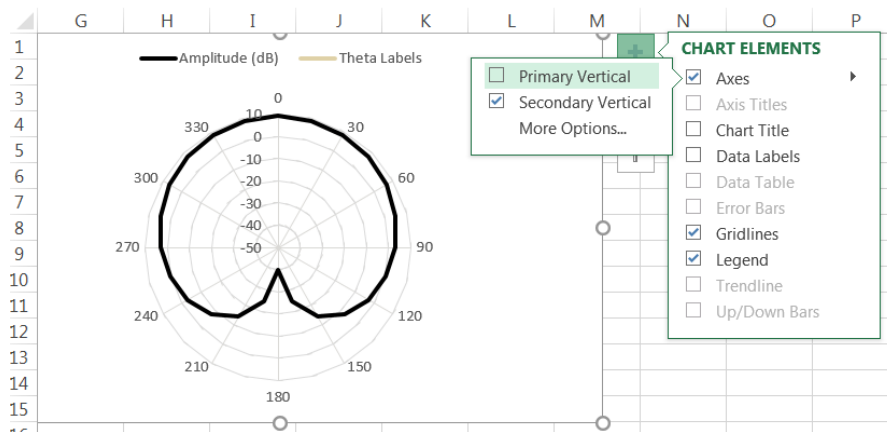
- Now that the Theta Labels is on the secondary axis, right click on the chart and “Select Data”. Select “Theta Labels” Series and Edit the Horizontal (Category) Axis Labels. Select the Theta Labels data (D2:D330). Click OK and OK close the dialog.



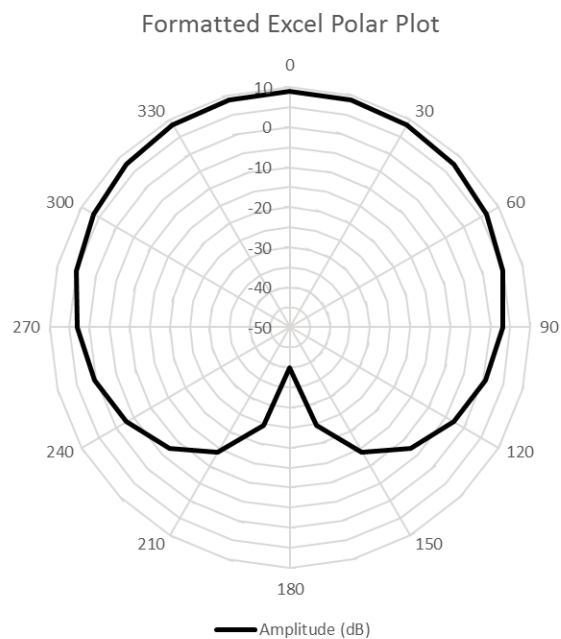
- Format the Series “Secondary Radar (Value) Axis.” Under “Line” select “solid line”. I changed the color to match the amplitude demarcation.

Note: Excel 2013 and 2016 both have a historical bug where the radial lines sometimes don't show up. Switching the chart type (right click chart → Change Chart Type) to a filled radar plot, then selecting the lines and then switching back seems to be a weird workaround to the problem.

9. Remove the axis from the Amplitude (dB) plot using the Chart Elements (+) dialog.



10. Almost done. Add any additional formatting, remove the “Theta Labels” from the legend, add Chart Titles, etc.



11. It is highly recommended that you save this as chart type as a template so you can reuse it later without as much formatting!

Note: you should be able to add a second set of data to the plot without additional formatting changes.