Electrical Engineering Department,

Fourth Year - Communications & Electronics.

EE 466 ANTENNA

Lab#1

PREPARED BY	SECTION	SEAT.NO.
Mahmoud Mohamed Kamal Ismail	7	250

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1. m File

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%%
% Alexandria University - Faculty of Engineering
% Electrical and Electronic Engineering Department - Fourth Year -
Communications & Electronics
%
% Course: Antenna Lab
% Lab 1
%
% Name    : Mahmoud Mohamed Kamal Ismail
% Section : 7
% Seat No.: 250

%%
clear, clc;

%% Part (1): Relation between received power & distance bet antennas
(r)
%  Practical
r_cm  = [30 40 50 60 70];
s_dB  = [-30 -32.5 -34.25 -37 -39];
PL_dB = abs(s_dB-s_dB(1));

figure(1);
plot(r_cm,PL_dB)
title('Part (1): Relation between received power & distance bet
antennas (r) - Practical','fontsize',10)
xlabel('r (cm)','fontsize',10);
ylabel('|P.L| (dB)','fontsize',10);

% Theoretical
r1_cm = 30;
r2_cm = [30 40 50 60 70 80 90 100];
PL_dB = 20*log10(r2_cm./r1_cm);

figure(2);
plot(r2_cm,PL_dB)
title('Part (1): Relation between received power & distance bet
antennas (r) - Theoretical','fontsize',10)
xlabel('r (cm)','fontsize',10);
ylabel('|P.L| (dB)','fontsize',10);

%% Part (3): Sketch Antenna Pattern

theta_rad = [-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
70].*(pi/180);
PR_dB     = [-52.7 -52.6 -52.5 -52 -49 -40 -33 -30 -33.5 -38 -43 -50.2
-52 -52.2 -52.3];
PR_linear = db2mag(PR_dB.*2); % OR PR_linear = 10.^(PR_dB/10);
PR_linear = PR_linear./PR_linear(8);

figure(3);
polar(theta_rad,PR_linear)
title('Part (3): Sketch Antenna Pattern','fontsize',10)
```

2. Part (1): Relation between received power & distance bet antennas (r)

2.1. Practical

Table 1 Readings of Part (1) - Practical

r (cm)	30	40	50	60	70
s(r) (dB)	-30	-32.5	-34.25	-37	-39
s(r) – s(30) (dB)	0	-2.5	-4.25	-7	-9

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```
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%% Part (1): Relation between received power & distance bet antennas (r)
%  Practical
r_cm  = [30 40 50 60 70];
s_dB  = [-30 -32.5 -34.25 -37 -39];
PL_dB = abs(s_dB-s_dB(1));

figure(1);
plot(r_cm,PL_dB)
title('Part (1): Relation between received power & distance bet antennas (r) - Practical','fontsize',10)
xlabel('r (cm)','fontsize',10);
ylabel('|P.L| (dB)','fontsize',10);

```

Figure 1 Code of Part (1) - Practical

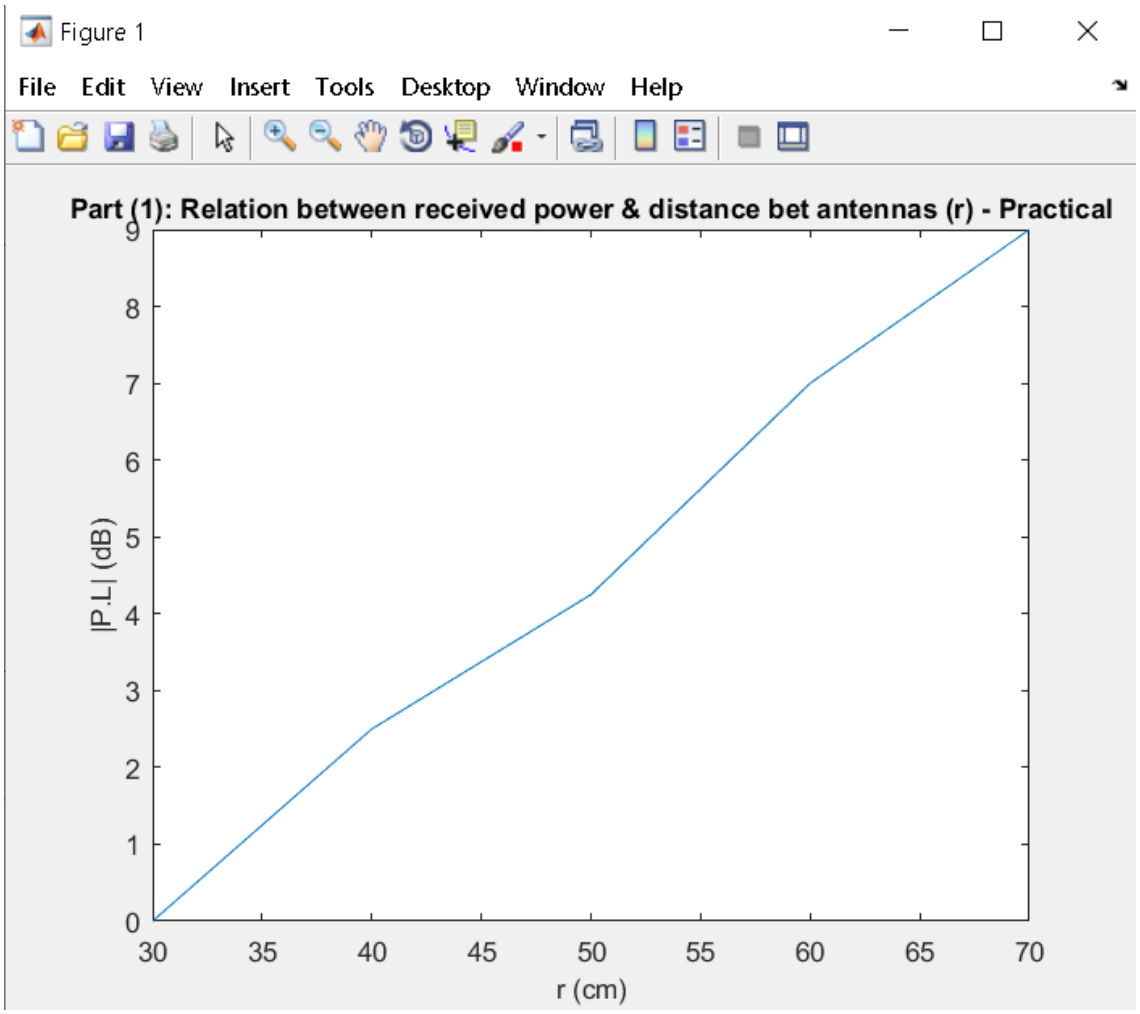

Figure 2 Relation between received power & distance bet antennas (r) - Practical

2.2. Theoretical

Table 2 Readings of Part (1) - Theoretical

r1 (cm)	30							
r2 (cm)	30	40	50	60	70	80	90	100
P.L (dB)	0	2.4988	4.437	6.0206	7.3595	8.5194	9.5424	10.4576

```
27      % Theoretical
28 -    r1_cm = 30;
29 -    r2_cm = [30 40 50 60 70 80 90 100];
30 -    PL_dB = 20*log10(r2_cm./r1_cm);
31
32 -    figure(2);
33 -    plot(r2_cm,PL_dB)
34 -    title('Part (1): Relation between received power & distance bet antennas (r) - Theoretical','fontsize',10)
35 -    xlabel('r (cm)','fontsize',10);
36 -    ylabel('|P.L| (dB)','fontsize',10);
37
```

Figure 3 Code of Part (1) - Theoretical

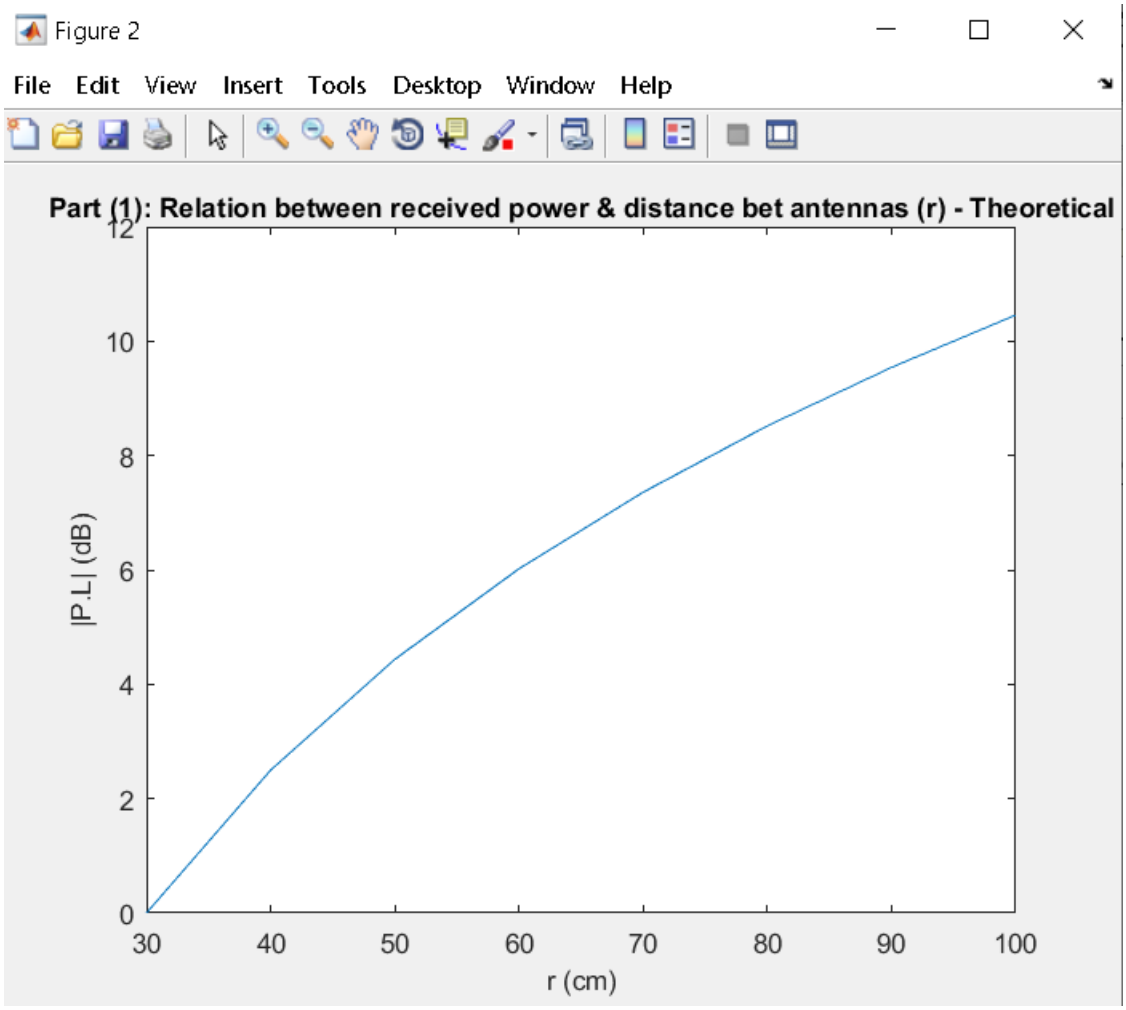

Figure 4 Relation between received power & distance bet antennas (r) - Theoretical

3. Part (3): Sketch Antenna Pattern

Table 3 Readings of Part (3)

θ	P_R (dB)
$-70°$	-52.7
$-60°$	-52.6
$-50°$	-52.5
$-40°$	-52
$-30°$	-49
$-20°$	-40
$-10°$	-33
$0°$	-30
$10°$	-33.5
$20°$	-38
$30°$	-43
$40°$	-50.2
$50°$	-52
$60°$	-52.2
$70°$	-52.3

```
28      %% Part (3): Sketch Antenna Pattern
29
30 -    theta_rad = [-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70].*(pi/180);
31 -    PR_dB     = [-52.7 -52.6 -52.5 -52 -49 -40 -33 -30 -33.5 -38 -43 -50.2 -52 -52.2 -52.3];
32 -    PR_linear = db2mag(PR_dB.*2); % OR PR_linear = 10.^(PR_dB/10);
33 -    PR_linear = PR_linear./PR_linear(8);
34
35 -    figure(2);
36 -    polar(theta_rad,PR_linear)
37 -    title('Part (3): Sketch Antenna Pattern','fontsize',10)
38
```

Figure 5 Code of Part (3)

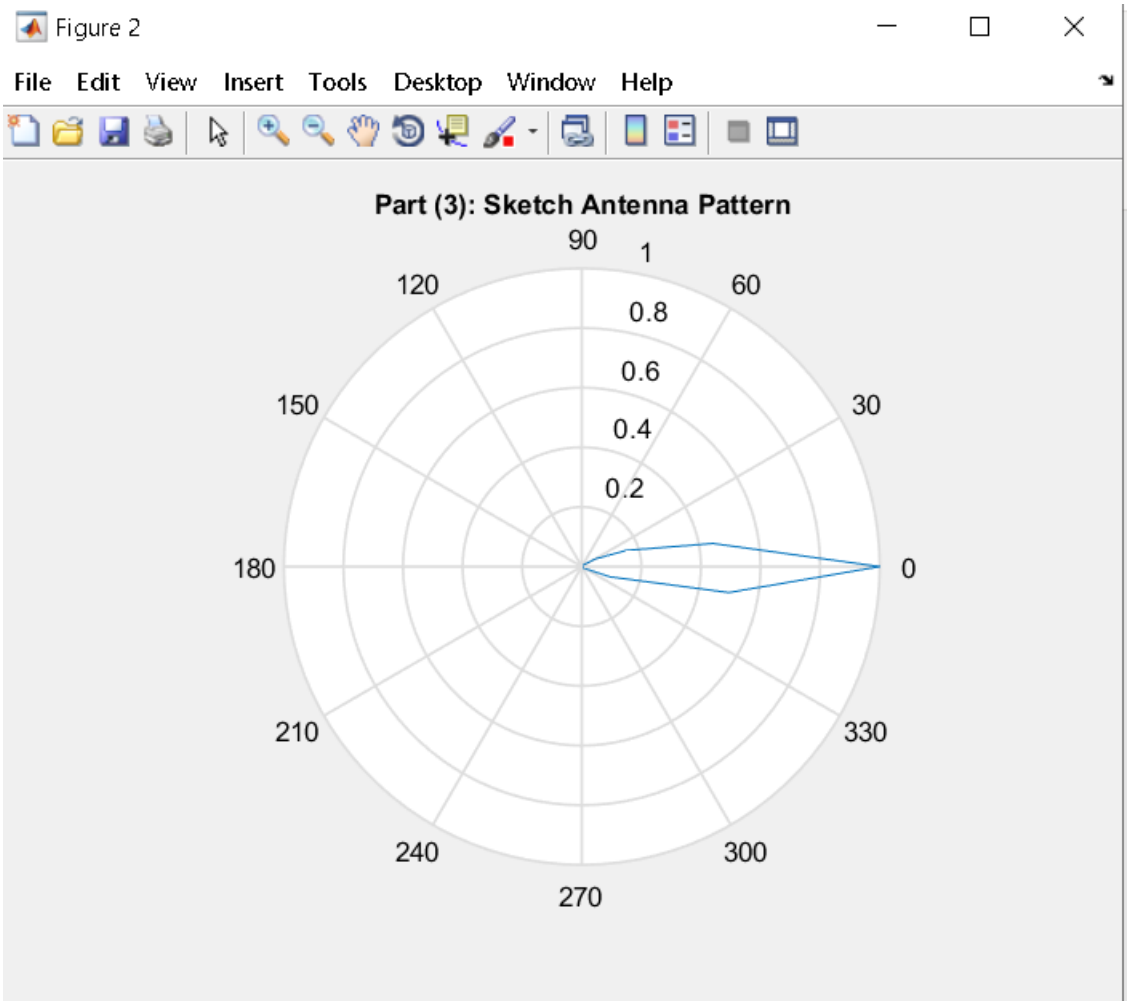

Figure 6 Antenna Pattern