

2

$$\lambda/4$$

$$L = \lambda/4$$

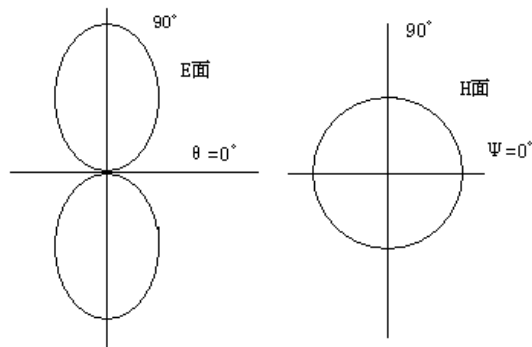
$$|E| = \frac{60I}{r} \frac{\cos(\frac{\pi}{2} \cos \theta)}{\sin \theta} = \frac{60I}{r} f(\theta)$$

$f(\theta)$

$$|F(\theta)| = \frac{|f(\theta)|}{f_{\max}} = \frac{\cos(\frac{\pi}{2} \cos \theta)}{\sin \theta}$$

f_{\max} $f(\theta)$

3



3

ϕ H

E

8

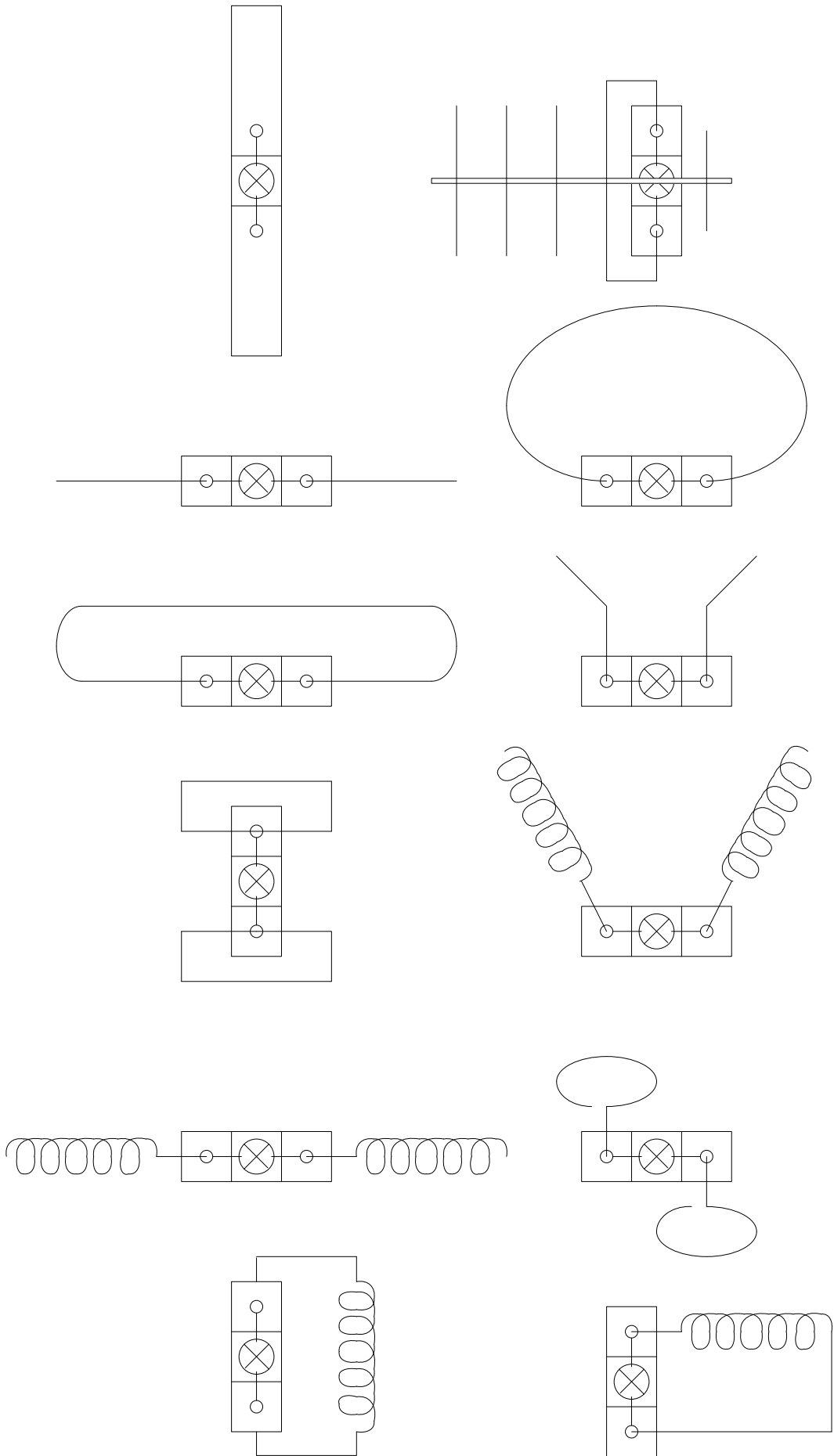
$\theta = \pi/2$

0.625λ

$\theta = \pi/2$

L

$\theta = \pi/2$



1

2

1

2

$$E_x = E_m \cos(\omega t - kz)$$

$$E_y = E_m \cos(\omega t + kz + \delta)$$

$$\delta = \beta z$$

$$\delta = \beta z_1 = n\pi \quad (n = 0, 1, 2, \dots)$$

z_1

$$\delta = \beta z_2 = (2n+1)\pi/2 \quad (n = 0, 1, 2, \dots)$$

z_2

$$z_1 = n\pi / \beta = n\lambda / 2$$

$$z_2 = (n+1/2)\pi / \beta = (2n+1)\lambda / 4$$

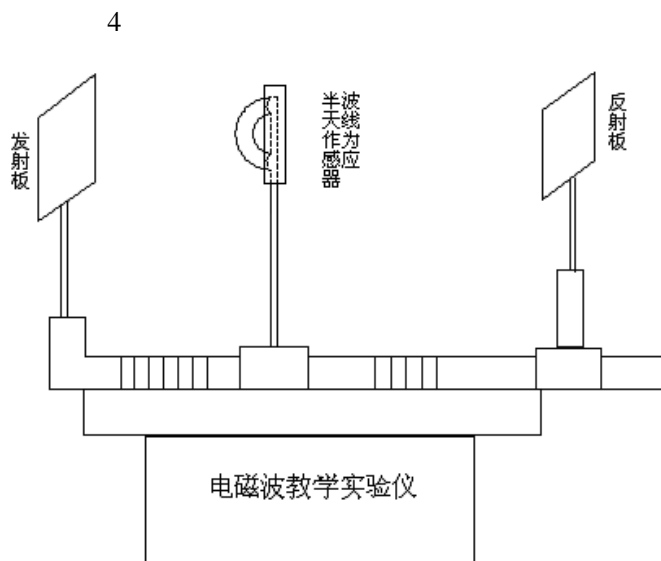
$$\lambda / 4$$

ΔL

$$\Delta L = \lambda / 4$$

$$\lambda = 4\Delta L$$

ΔL



4

1

30 cm 35cm 40cm

2

Power Tx

3

4

1

$\lambda / 2$

2

3

	cm	1 cm	2 cm	cm	cm	Hz
1						
2						
3						

1 Tx Alarm

Output

2

20cm

3 Tx

4

1

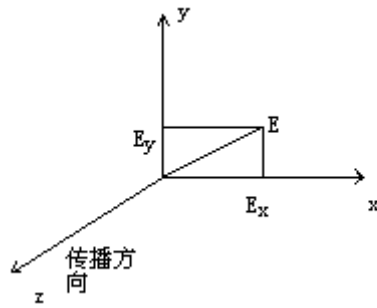
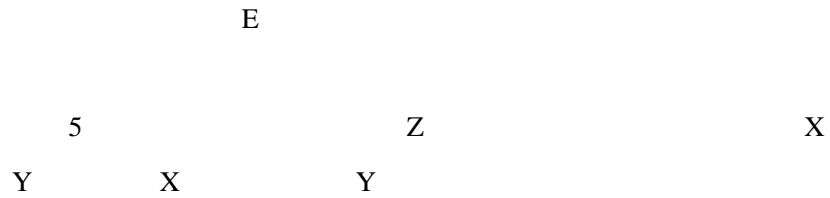
2

3

4

1
2
3

1
2
3



5

$$E_x = E_{xm} \sin(\omega t - kz)$$

$$E_y = E_{ym} \sin(\omega t - kz + \delta)$$

$$E_{xm} \quad E_{ym}$$

$$\delta \quad E_y \quad E_x$$

$$z = 0$$

$$E_x = E_{xm} \sin(\omega t)$$

$$E_y = E_{ym} \sin(\omega t + \delta)$$

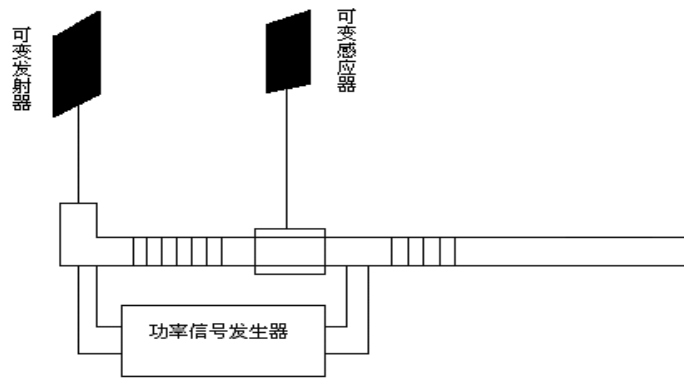
$$aE_x^2 - bE_xE_y + cE_y^2 = 1$$

a b c
 E_{xm} E_{ym} δ
 E_x E_y

1
 2 $\pi/2$
 3 $\pi/2$

N

6



6

1
Power

Output

2
Tx
3

45

	cm			
			45	

1 Tx Alarm

Output

2

20cm

3

Tx

Tx

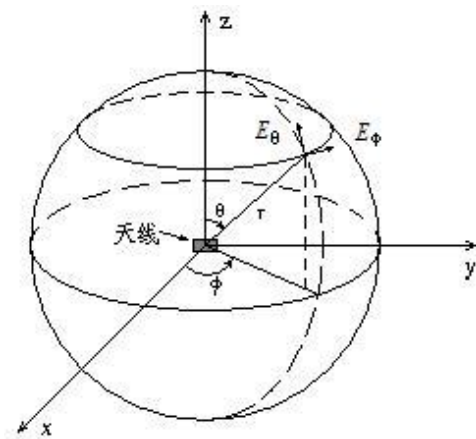
4

1

2

3

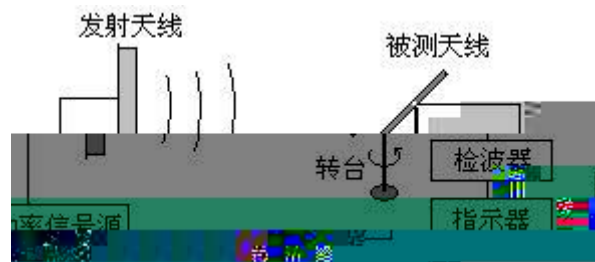
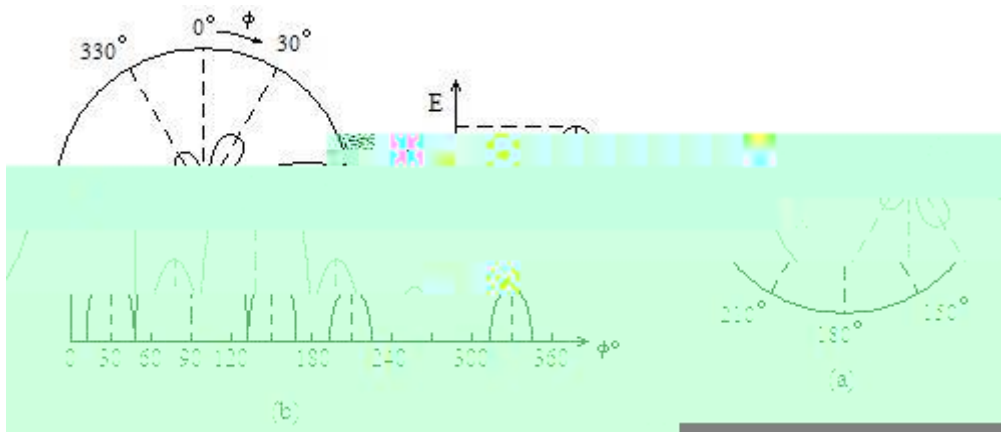
4



$$E(\theta, \phi)/E_{\max}$$

$$E(\theta, \phi)$$

$$E_{\max}$$



Signal

Alarm

