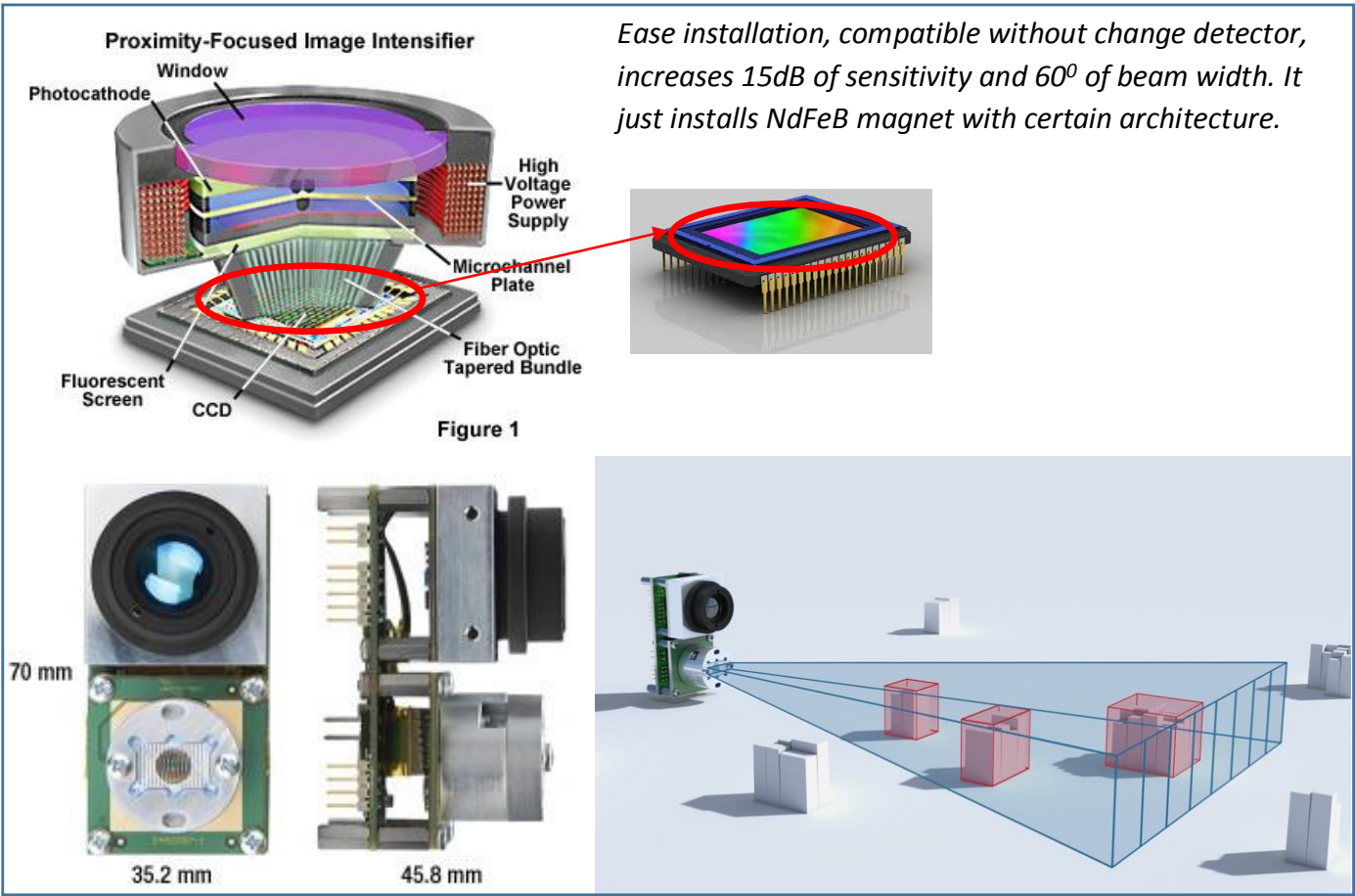
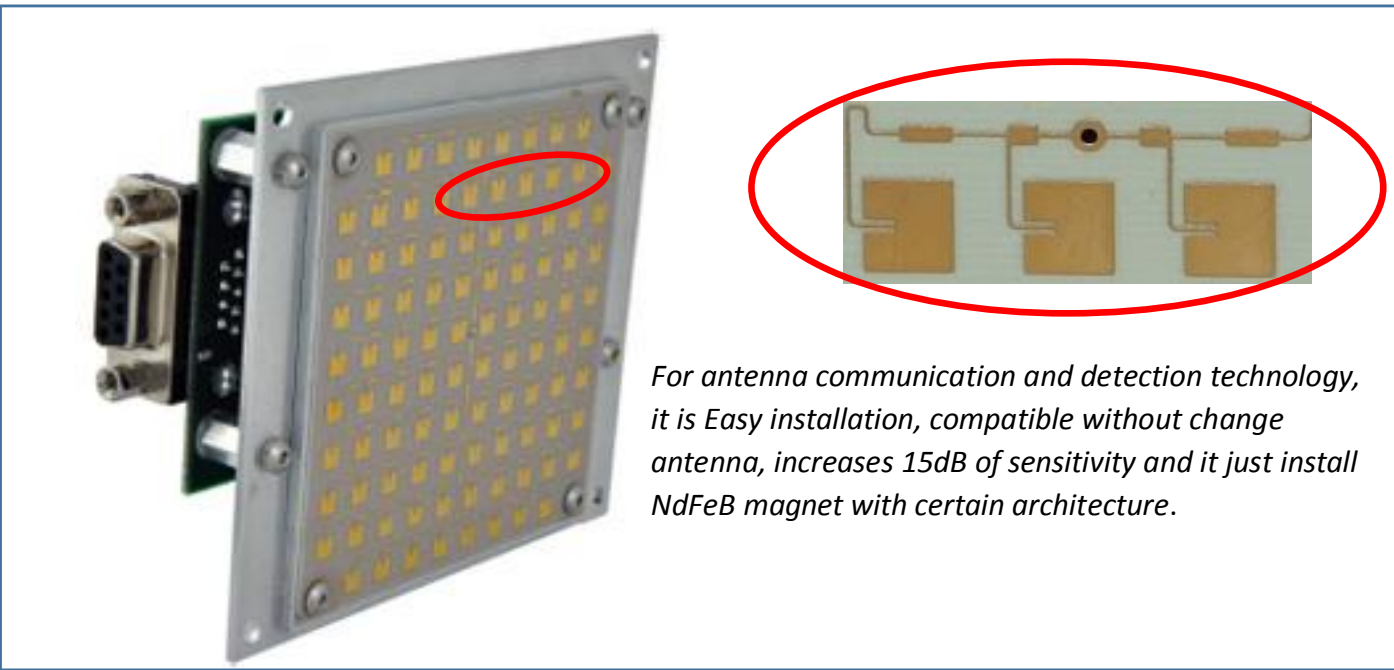


Innovation PEMF (Potential Electro Motion Force) and Multi wires method for INNOVATIVE SENSING TECHNOLOGIES

Prototype design

All technologies of sensor need photodetector and antenna as main part in sense and detect. Increase technology photodetector and antenna to sense and detect will increase reliability, accuracy, and performance with novel technology PEMF (Potential Electro Motion Force) that increase reactivity electron moves in Photodiode/photodetector (Semiconductor) and antenna (Conductor) in electromagnetic wave induction to sense and detect. This technology is ease to installation and maintenance, compatible and very low cost operation and installation.

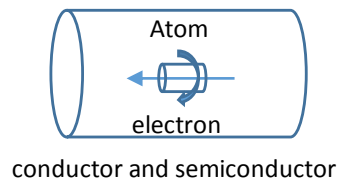


With PEMF method:

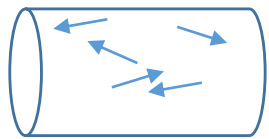
- With increases sensitivity it will Increase reliability signal with decrease Bit error rate until 10^{-7} from 10^{-2} .
- It also increases until 560% Of accuracy detection and performance and increase more than 560% of range detection so it will increase area detection.
- Compatible in all detection method with electromagnetic induction and work in all band of electromagnetic wave.
- Without change and substitute detector and detection system, it just by install NdFeB magnet with less than € 1 per detector, it is very low cost and temperature work until 300°C.
- Possible to develop to next level detection.

PEMF (Potential Electro Motion Force) and conductor and semiconductor elementary magnet and evidence PEMF method to IR, photodetector and antenna

All things consist of atoms including in semiconductor and conductor. An atom is an elementary of magnet that spin of electron to atomic nucleus in all time. Antenna use conductor and IR, photodetector use semiconductor to sense electromagnetic wave.



For simply form on elementary magnet of semiconductor and conductor as illustrated below.



conductor and semiconductor

Random direction or polarity elementary magnet neutralizing magnetic character of semiconductor and conductor, these its character.

Electromagnetic induction on semiconductor and conductor elementary magnet

In magnetic field change of magnetic flux produce electro motion force in semiconductor and conductor. The difference of potential consist of different potential of elementary semiconductor and conductor as illustrated below.

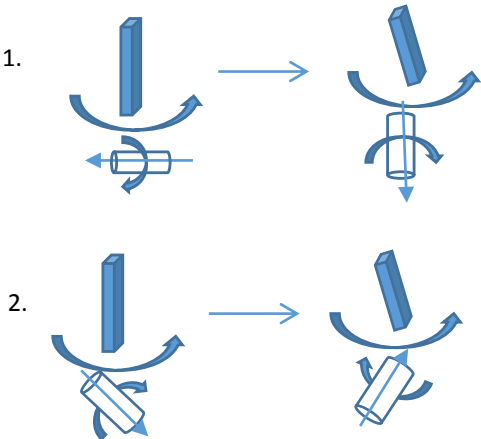
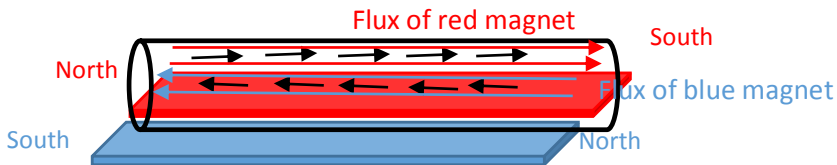


Figure 1 is electromagnetic induction when polaritation elementary semiconductor and conductor parallel with semiconductor and conductor and figure 2 is electromagnetic induction when polaritation elementary semiconductor and conductor not parallel with conductor and semiconductor. Random direction or polarity elementary magnet in semiconductor and conductor and it electro motion force in figure 1 is bigger than figure 2 caused electron moving in figure 1 more rective to flow than figure 2.

1. Bidirectional polarity for conductor of conductor elementary magnet with magnetic flux for antenna receptor

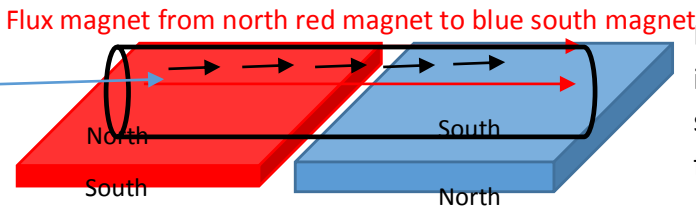
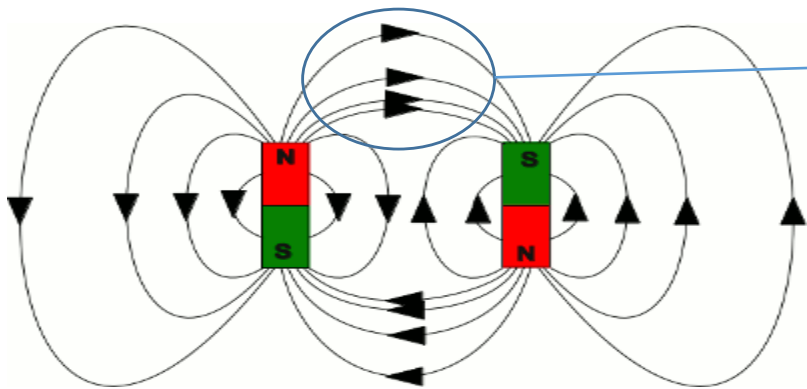
Magnetic field is area of magnetic induction by flux magnet. In flowing flux from north to south pole of magnet induct elementary conductor as illustrated below.



Blue and red magnet have opposite pole position and static to wire. Each magnet induction 100% wire with each polarization that make wire has bidirectional polarity of elementary conductor magnet. These will increase sensitivity conductor to feel change of magnetic field or increasing potential reactivity electron to move by electromagnetic induction.

2. Unidirectional polarity for semiconductor of semiconductor elementary magnet with magnetic flux for IR, Photodetector receptor

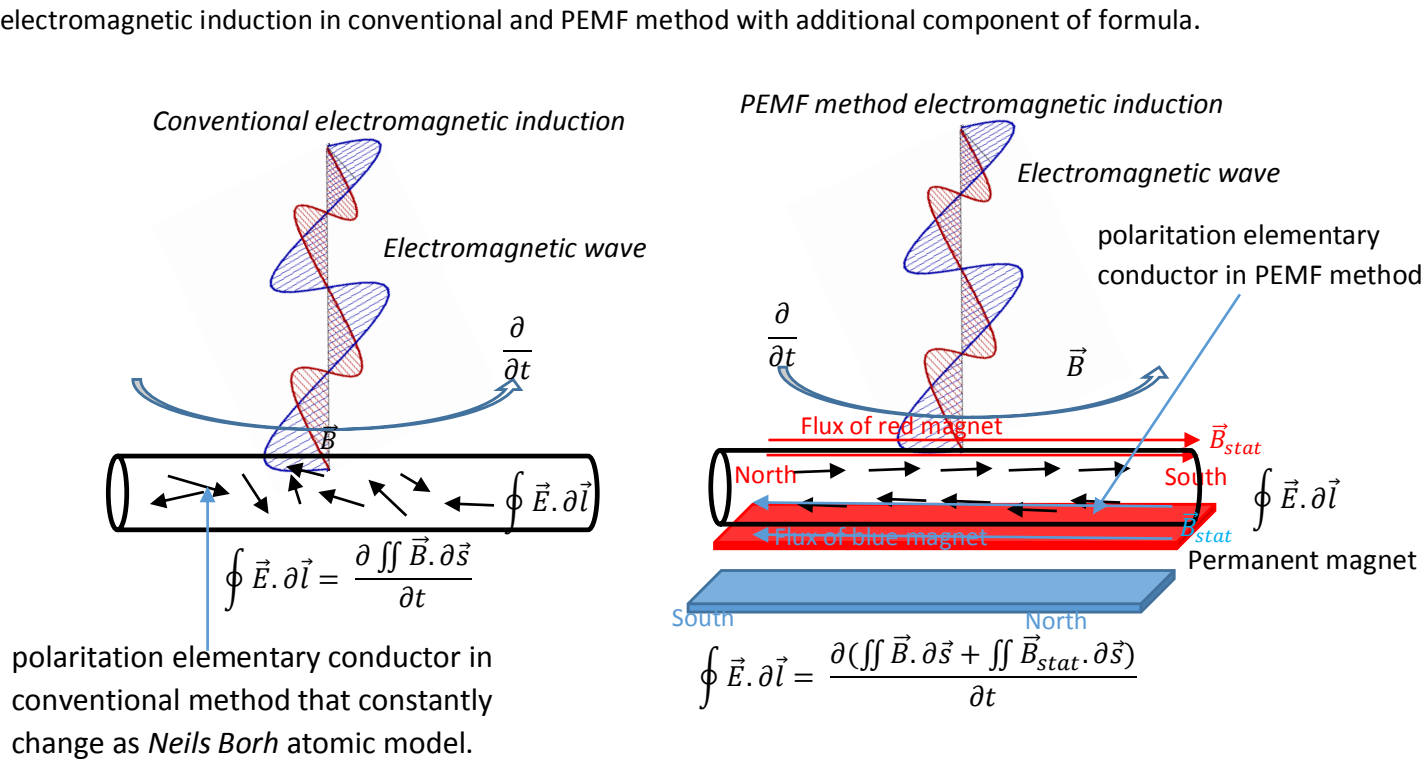
Magnetic field is area of magnetic induction by flux magnet. In flowing flux from single north pole magnet to another south pole of magnet induct elementary semiconductor in single direction as direction of conductivities semiconductor in illustrated below.



Blue and red magnet have opposite pole position and static to semiconductor wire. Each magnet induction 100% wire with each polarization that make wire has unidirectional polarity of elementary semiconductor magnet. These will increase sensitivity semiconductor to feel change of magnetic field or increasing potential reactivity electron to move by electromagnetic induction.

1. PEMF (Potential Electro Motion Force) in radio wave and microwave spectrum for antenna

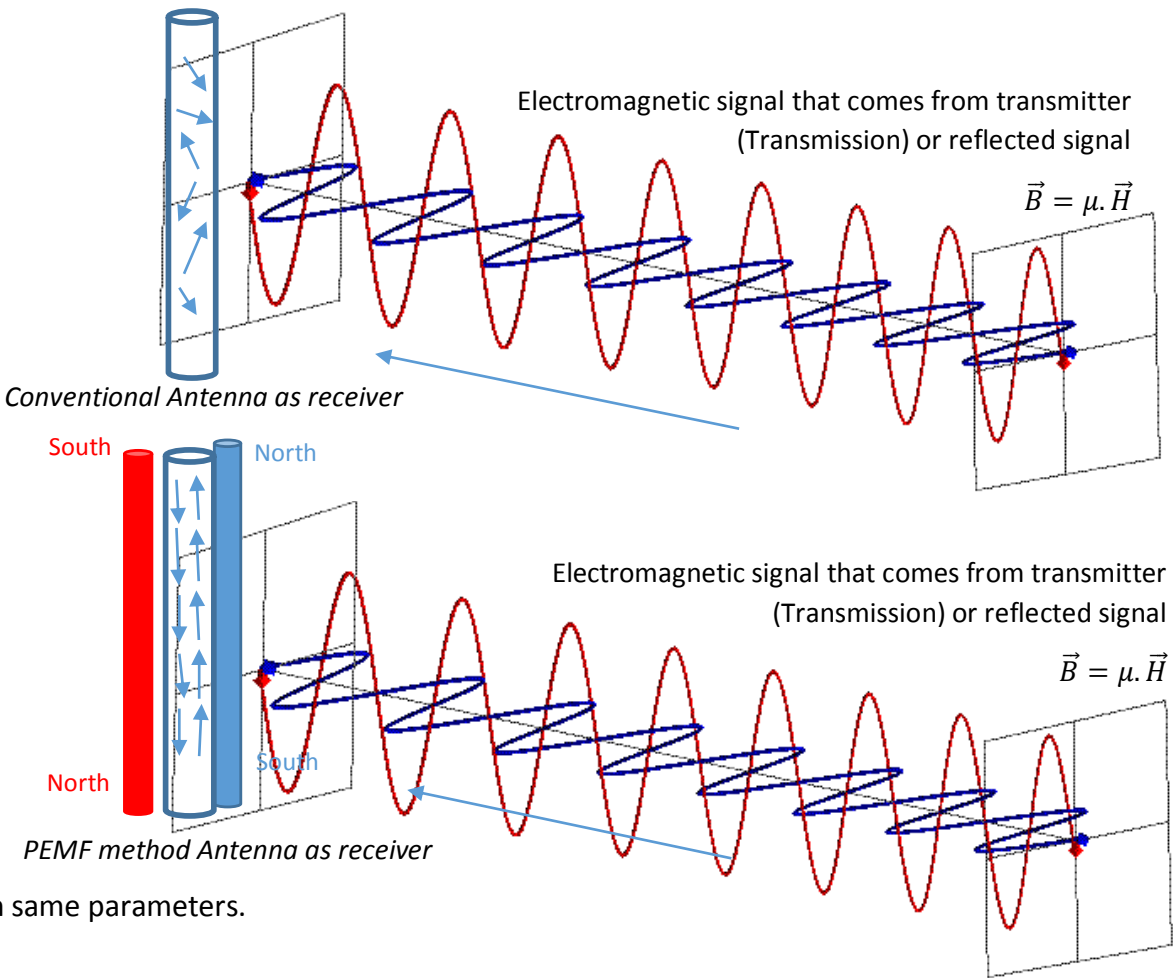
Static magnetic induction increase reactivity electron to move by dynamic magnetic induction in conductor. Parallelism atomic conductor (elementary magnet) increase different potential by increasing reactivity electron to move. Electro motion force in conventional electromagnetic induction is potential different in random polarity of atomic conductor while in PEMF method electro motion force is potential different in bidirectional polarity of atomic conductor. Illustrating below is electromagnetic induction in conventional and PEMF method with additional component of formula.



Result of Conventional and PEMF antenna receive signal power test

With compare Conventional Antenna and PEMF antenna with 50% level PEMF (1.9*10⁻³ Tesla) with dipole antenna in same parameters.

No	Conventional Antenna (dBm)	PEMF Antenna (50% PEMF) (dBm)	Increase of gain (dB)
1	-41,5	-36,3	5,2
2	-42,6	-36,2	6,4
3	-40,6	-37,2	3,4
4	-40,5	-36,6	3,9
5	-40,6	-36,5	4,1
6	-40,8	-36,1	4,7
7	-40,6	-36,3	4,3
8	-40,7	-36,2	4,5
9	-40,8	-36,2	4,6
10	-40,6	-36,1	4,5



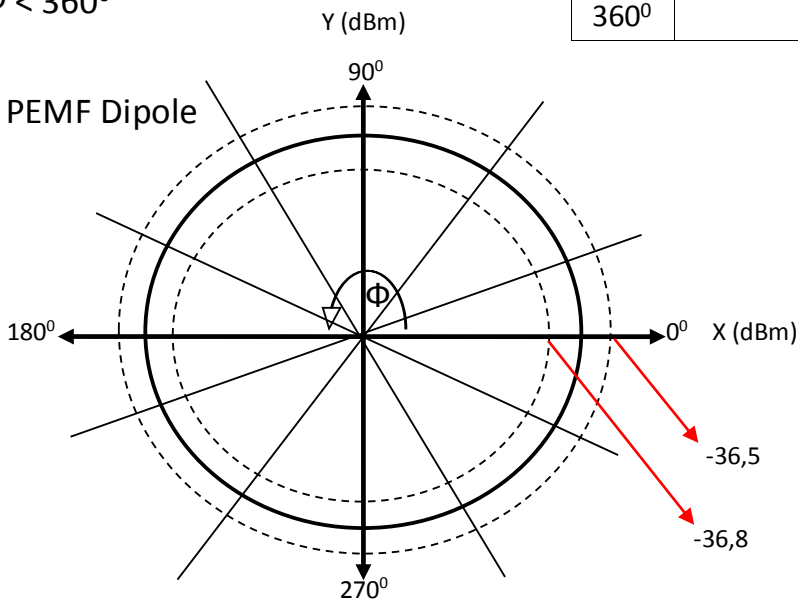
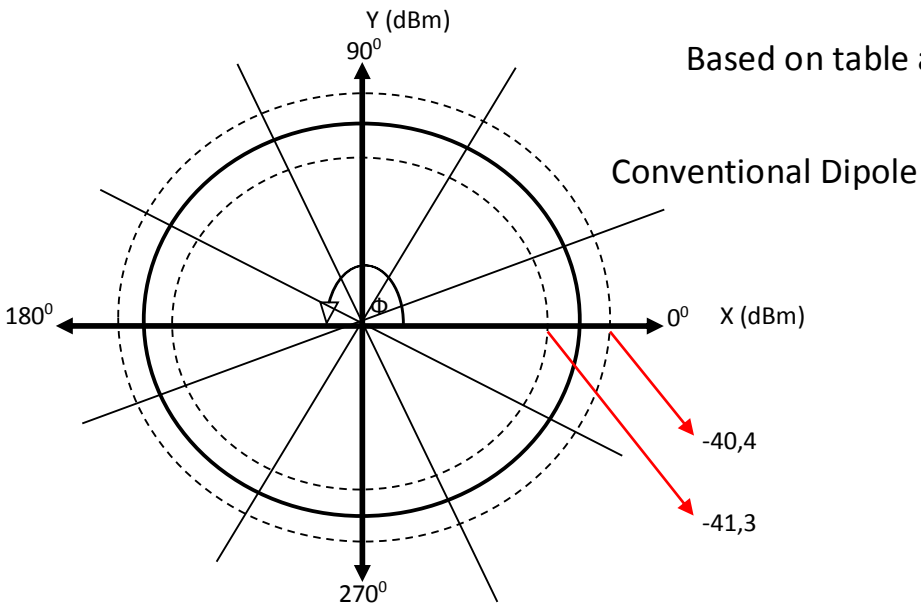
Mean of ten samples of test of prototype : $\frac{\sum_{i=1}^n G_i}{n}$

- 1. Conventional dipole = -40,93 dBm.
- 2. PEMF antenna dipole = -36,37 dBm.

Gain = PEMF Antenna – conventional Antenna = 4,56 dB

Result of Conventional and PEMF antenna propagation test in $0^0 < \Phi < 360^0$ and $0^0 < \Theta < 360^0$

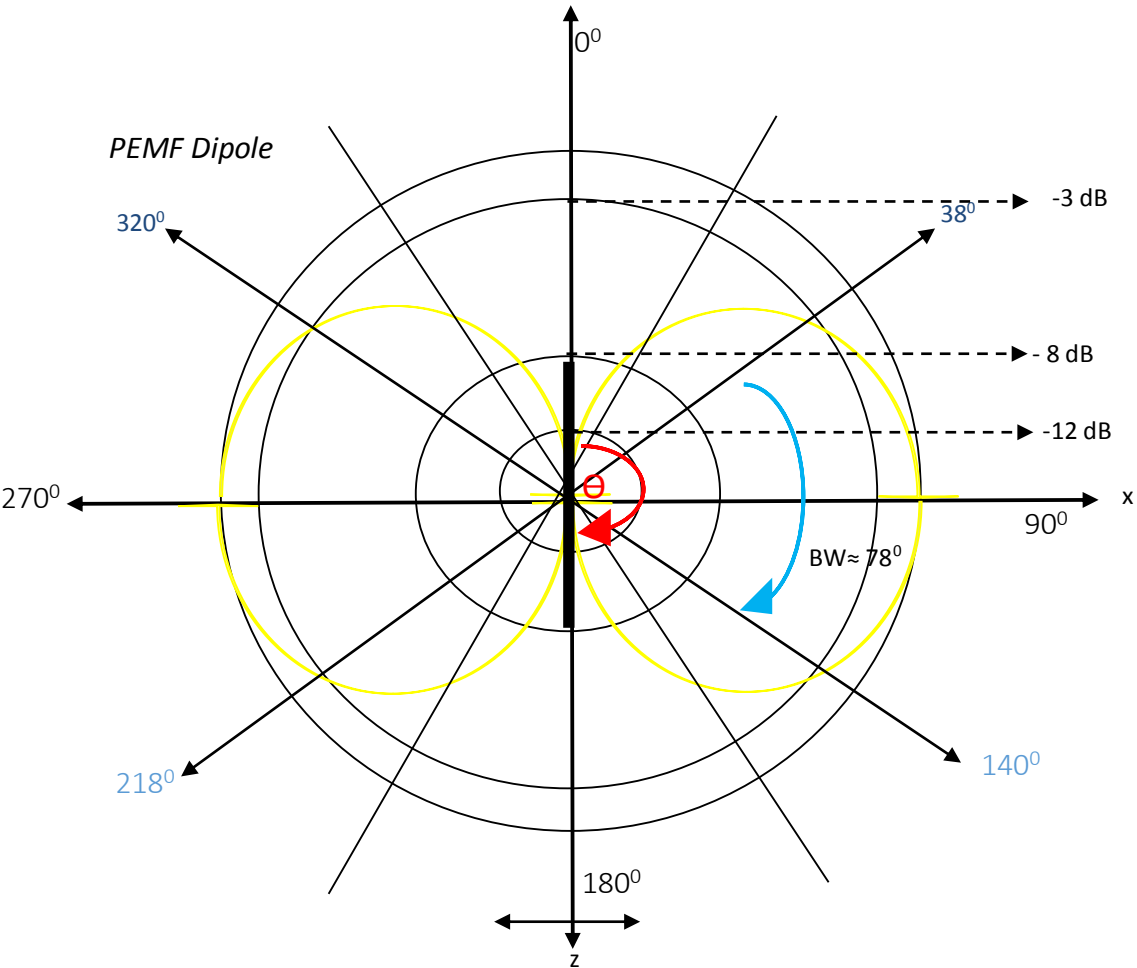
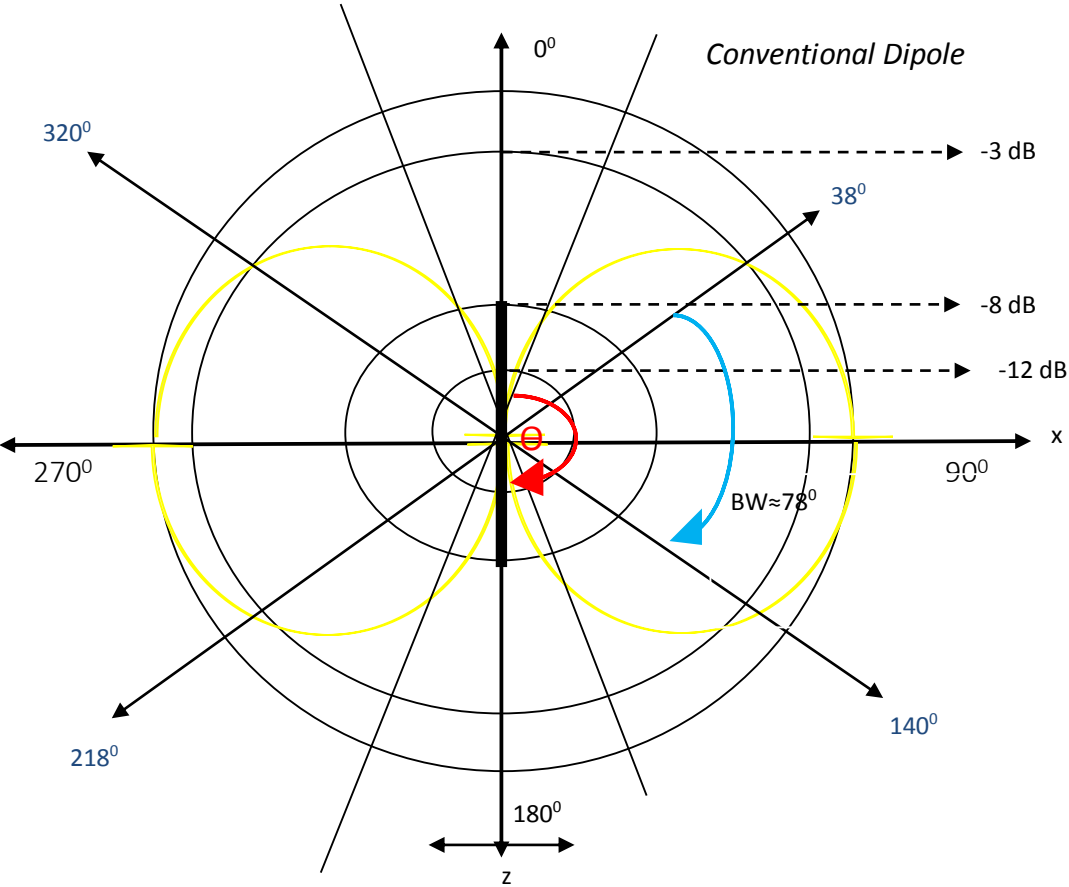
Φ	Conventional Dipole Antenna (dBm)	PEMF Dipole Antenna (dBm)
0^0	-40,6	-36,6
30^0	-40,6	-36,5
45^0	-40,5	-36,7
60^0	-40,8	-36,8
90^0	-41,3	-36,7
120^0	-40,5	-36,6
135^0	-40,7	-36,7
180^0	-40,4	-36,7
270^0	-40,7	-36,7
360^0	-40,5	-36,8



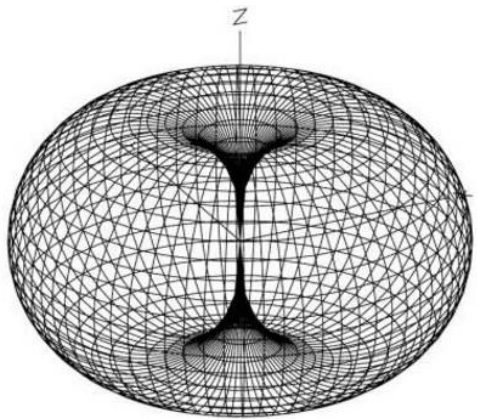
Θ	Conventional Dipole Antenna (dBm)	PEMF Dipole Antenna (dBm)
0^0	-40,1	-36,3
30^0	-42,8	-37,9
38^0	-43,3	-39,2
45^0	-44,5	-41,1
60^0	-47,6	-43,6
90^0	-52,9	-47,9
120^0	-48,0	-42,6
135^0	-45,7	-38,8
180^0	-54,1	-49,8
270^0	-52,0	-46,8
320^0	-43,2	-39,2
360^0	-40,3	-36,2

No	Θ	PEMF Dipole (dBm)	Conventional Dipole (dBm)	Δ Power PEMF Dipole Beam width	Δ convention dipole Beam width	$\Delta \Theta$	Beam width
1	0^0	-36,3	-40,1	PEMF dipole2 – PEMF dipole1 = 2,9 dB	dipole2-dipole1=3,2 dB	Θ_1 - Θ_2 = 38^0	$\Delta\Theta_{12} + \Delta\Theta_{34} = 78^0$
2	38^0	-39,2	-43,3				
3	320^0	-39,2	-43,2	PEMF dipole4 – PEMF dipole3 = 3 dB	dipole4- dipole3=2,9 dB	Θ_1 - Θ_2 = 40^0	
4	360^0	-36,2	-40,3				

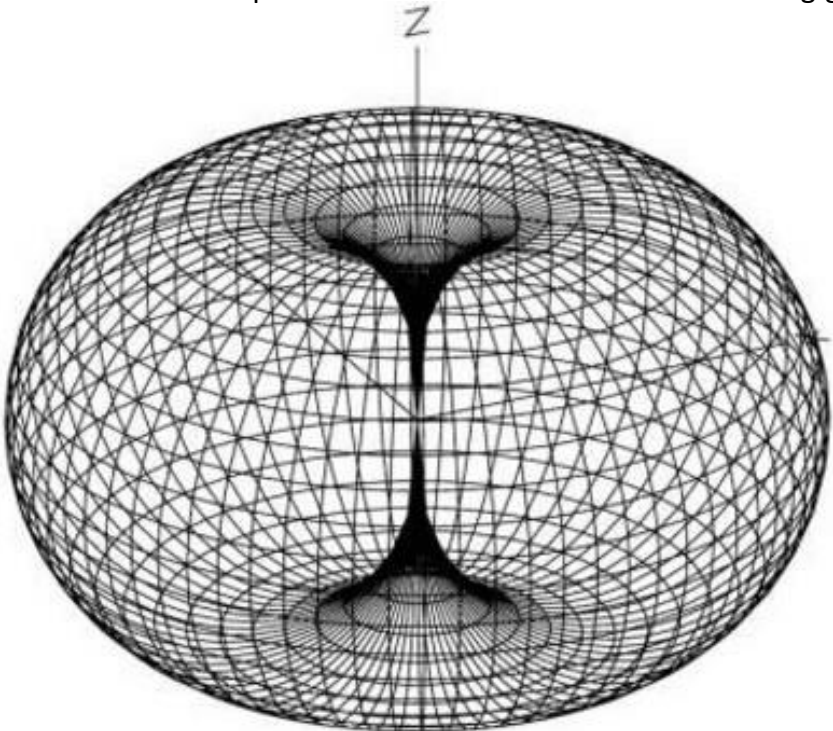
Based on table above $0^\circ < \theta < 360^\circ$



Based on result of test propagation PEMF Dipole antenna has equal form with conventional dipole with 78° of beam width so Increasing gain without decreasing of beam width by application magnet are increasing of antennas sensitivity and are not as parasitic component.



Propagation conventional Dipole receiver antenna



Propagation PEMF Dipole receiver antenna

Illustrating beside describe increase propagation area that can fill by receptor of antenna with applicate PEMF method.

Increasing gain in propagations dipole antenna without decreasing beam width proof of increase of sensitivity by applicate static flux magnet in receptor antenna.

Magnet that put near antenna receptor produce magnetic flux that fill inside of antenna receptor to increase reactivity electron move and not reflected or directed electromagnetic signal (Parasitic component).

Increase range interconnection and signal quality with PEMF method

	Conventional dipole antenna	PEMF method Dipole antenna with Ferrite magnet 0.4 Tesla	PEMF method Dipole antenna with NdFeB magnet 1.4 Tesla
Increasing Gain	0 dB	5 dB	15 dB
Maximum range detection	-	Increase 260%	Increase 550%
Beam width	360 ⁰	360 ⁰	360 ⁰

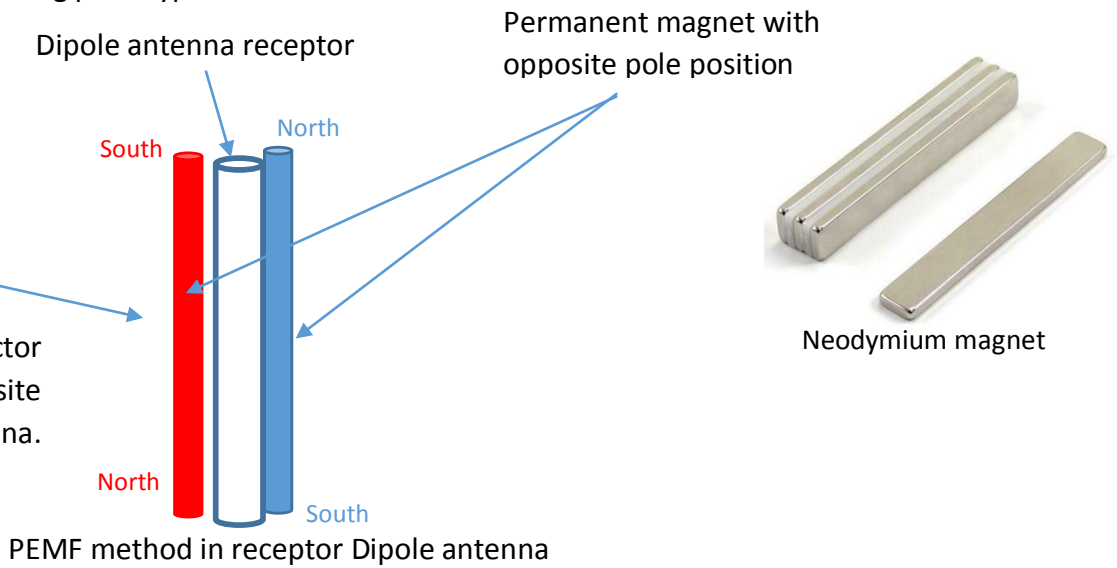
With compare Conventional antenna and PEMF antenna in same parameters. PEMF method will increase sensitivity of radio wave and micro wave antenna to sense electromagnetic signal. Increase sensitivity means are increasing gain or directivity without decreasing beam width and also possible in increase bandwidth of band frequencies. Table beside explain increasing sensitivity sample dipole antenna detector and communications, 100 meters’ max range detection with 15 dB of increasing Gain that based on working prototype.

Application PEMF method in dipole antenna

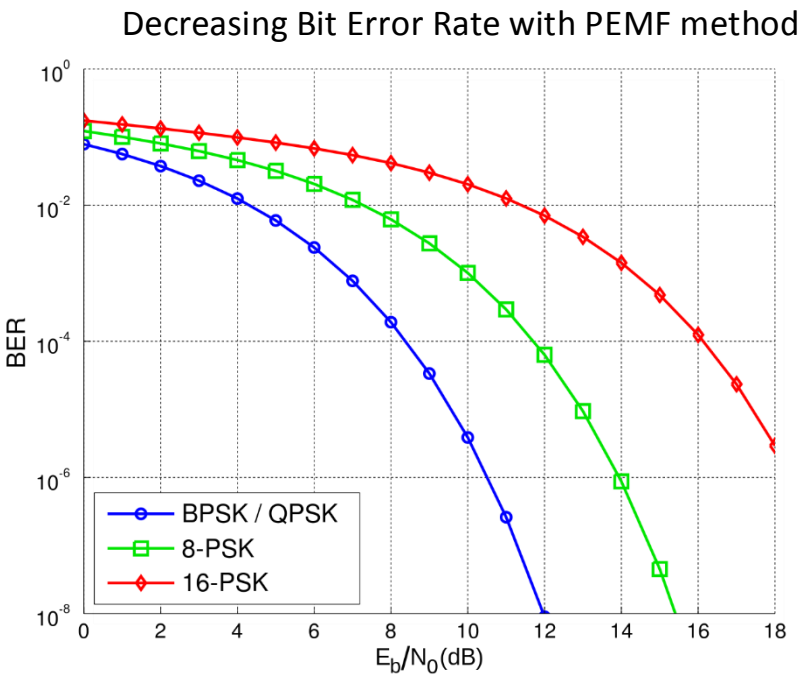
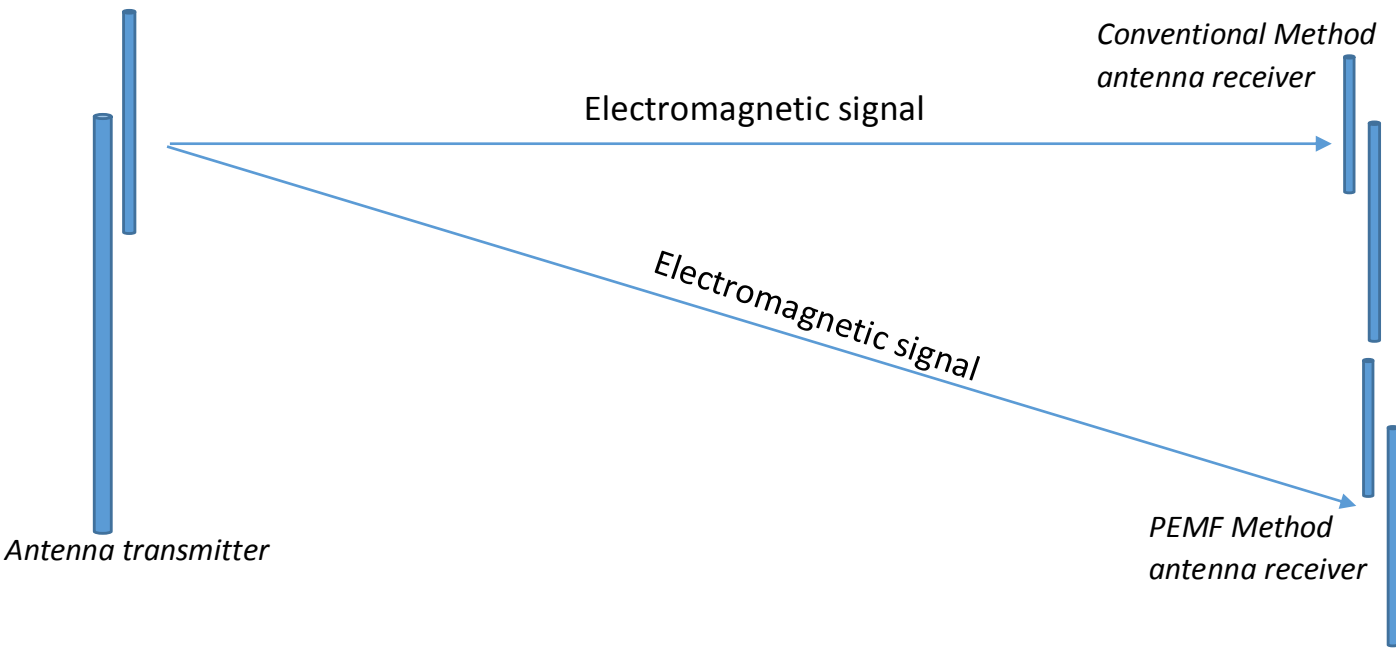


Main idea of PEMF method is induces magnetic flux in the same direction with electron flow in conductor antenna receptor. Magnetic flux direction is from north pole to south pole and electron flow is opposite direction with electric current in conductor antenna receptor. PEMF method position is in receiver antenna.

All transmission work in radio frequency ($10^4 - 10^8$) Hz



Experiment method Antenna transmission and Application PEMF method in Antenna



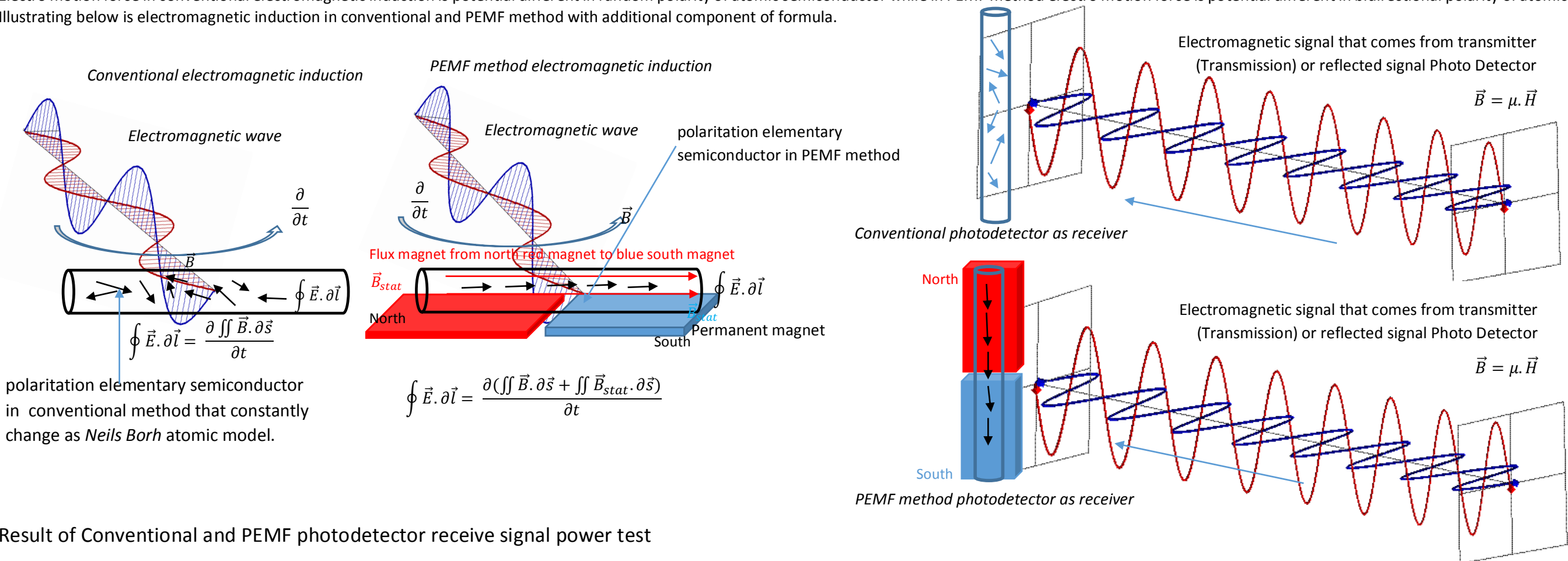
PEMF method with 1.4 Tesla NdFeB magnet will increase 15 dB signal received and based on Bit error rate table at least increasing 15 dB will decrease bit error rate from 10^{-2} to 10^{-7} .

Experiment and test of PEMF method in receiving electromagnetic signal with directly compare signal received in conventional receiver antenna and PEMF receiver antenna. Increasing signal received saw in spectrum analyzer.

Increasing signal with PEMF method come from increasing sensitivity antenna to sense electromagnetic signal, so PEMF method can directly use in all kinds receiving wireless communication system.

2. PEMF (Potential Electro Motion Force) in infrared, Visible light and UV spectrum for Photodetector

Static magnetic induction increase reactivity electron to move by dynamic magnetic induction in semiconductor. Parallelism atomic semiconductor (elementary magnet) increase different potential by increasing reactivity electron to move. Electro motion force in conventional electromagnetic induction is potential different in random polarity of atomic semiconductor while in PEMF method electro motion force is potential different in bidirectional polarity of atomic semiconductor. Illustrating below is electromagnetic induction in conventional and PEMF method with additional component of formula.

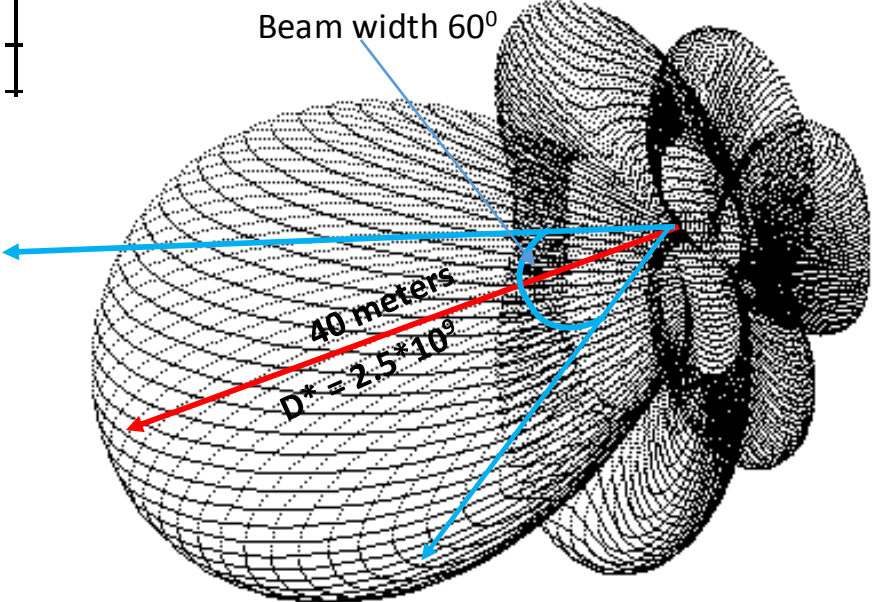
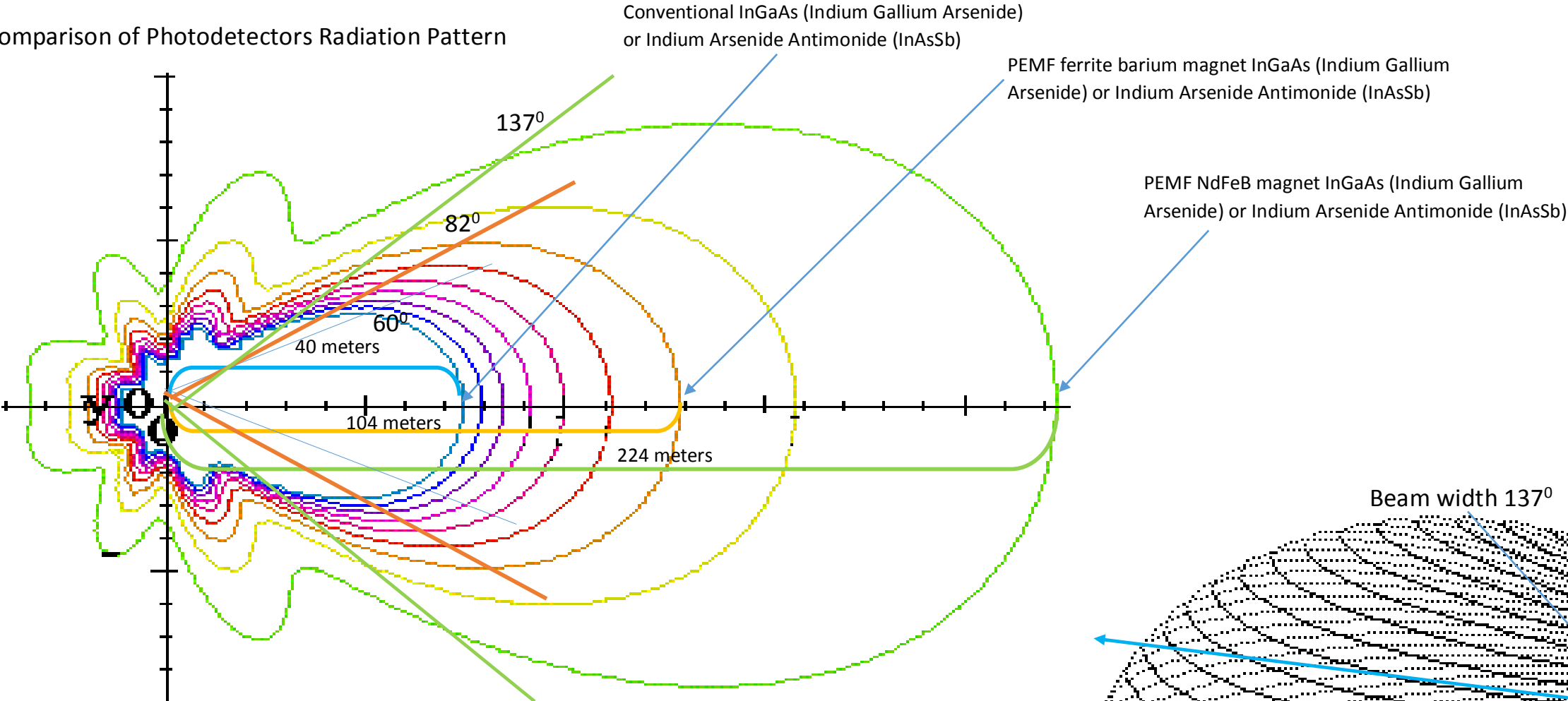


Result of Conventional and PEMF photodetector receive signal power test

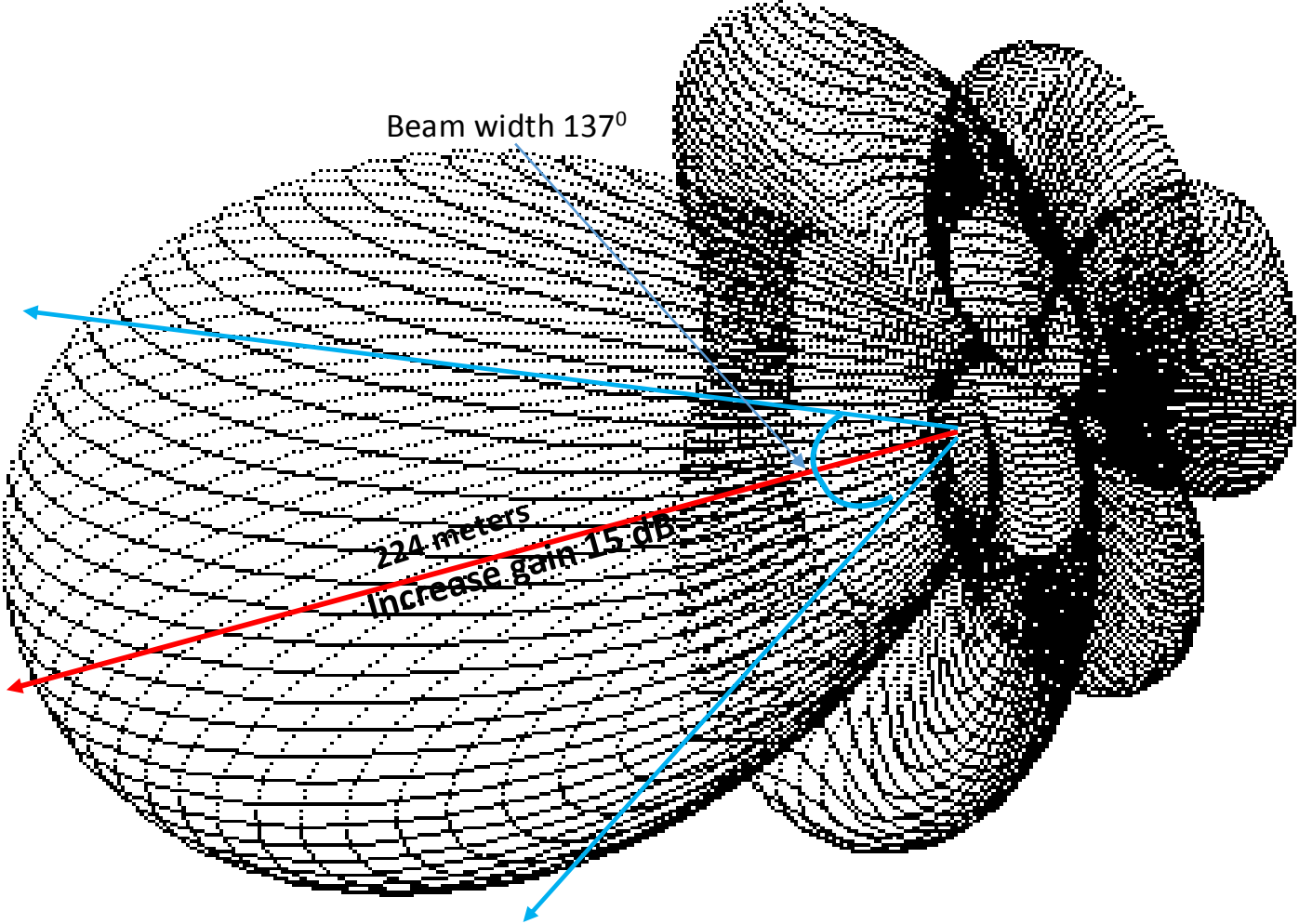
With compare Conventional photodetector and PEMF photodetector in same parameters. PEMF method will increase sensitivity of Photo detector to sense electromagnetic signal. Increase sensitivity in photodetector means are increasing gain or directivity and also increasing beam width and possible in increase bandwidth of band frequencies. Table below explains increasing sensitivity sample photo detector Si (Silicon), D*= 2.5*10⁹, Indium Arsenide Antimonide (InAsSb) and Indium Gallium Arsenide (InGaAs), D*=1*10¹⁰ with 0.7 μm – 5.5 μm wavelength (fire detection area), 20 meters and 40 meters’ max range detection and 60° beam width that based on working prototype.

		Conventional photo detector	PEMF method Photo detector with Ferrite magnet 0.4 Tesla	PEMF method photo detector with NdFeB magnet 1.4 Tesla
Si Detector	Directivity	2.5*10 ⁹	6.5*10 ⁹	1.4*10 ¹⁰
	Maximum range detection	20 meters	52 meters	112 meters
	Beam width	60 ⁰	82 ⁰	137 ⁰
InGaAs / InAsSb	Directivity	1*10 ¹⁰	2.6*10 ¹⁰	5.6*10 ¹⁰
	Maximum range detection	40 meters	104 meters	224 meters
	Beam width	60 ⁰	82 ⁰	137 ⁰

Comparison of Photodetectors Radiation Pattern



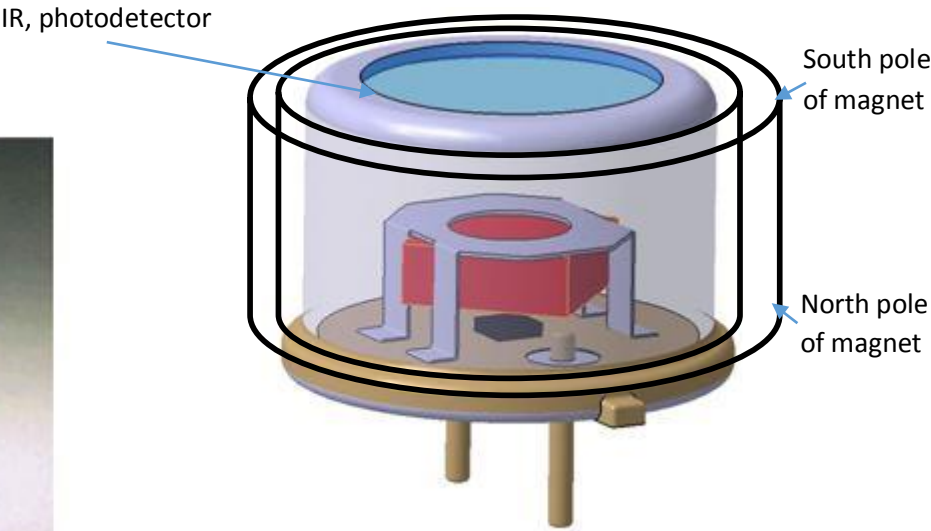
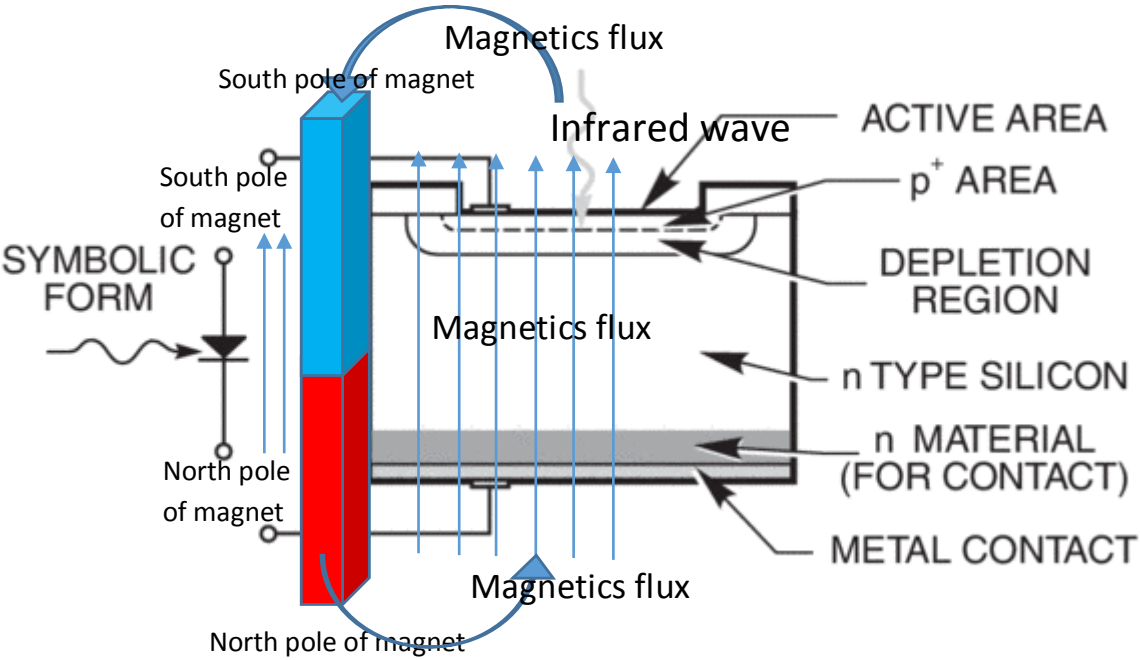
Conventional InGaAs (Indium Gallium Arsenide) or Indium Arsenide Antimonide (InAsSb) radiations pattern with beam width 60° and maximum range detection 40 meters and Conventional InGaAs (Indium Gallium Arsenide) or Indium Arsenide Antimonide (InAsSb) radiations pattern with beam width 60° and $D^* = 2.5 \times 10^9$



PEMF NdFeB magnet InGaAs (Indium Gallium Arsenide) or Indium Arsenide Antimonide (InAsSb) radiations pattern with beam width 137° and maximum range detection 224 meters and PEMF NdFeB magnet InGaAs (Indium Gallium Arsenide) or Indium Arsenide Antimonide (InAsSb) radiations pattern with increasing beam width 137° (128%) and increase 15dB of Gain.

Application PEMF Method in photodetector

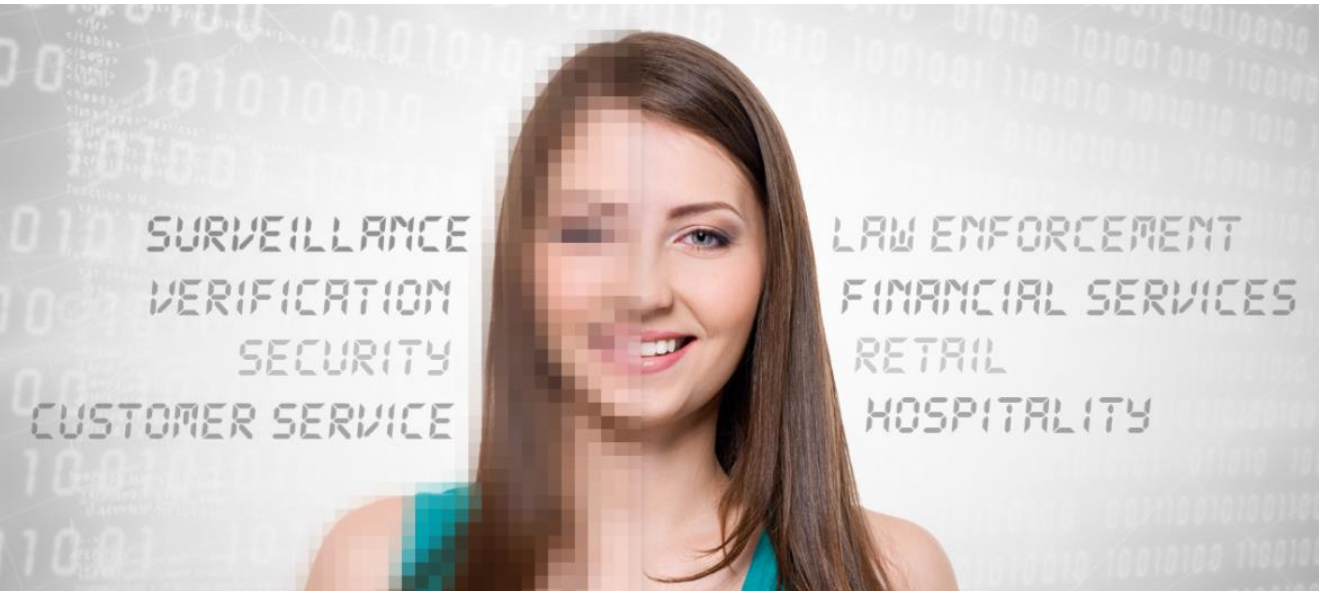
Main idea of PEMF method is induces magnetic flux in the same direction with electron flow in semiconductor. Magnetic flux direction is from north pole to south pole and electron flow is opposite direction with electric current in semiconductor IR, photodetector.



Increasing signal quality and accuracy detection with PEMF method in Photo detector

Low quality detection with conventional detector

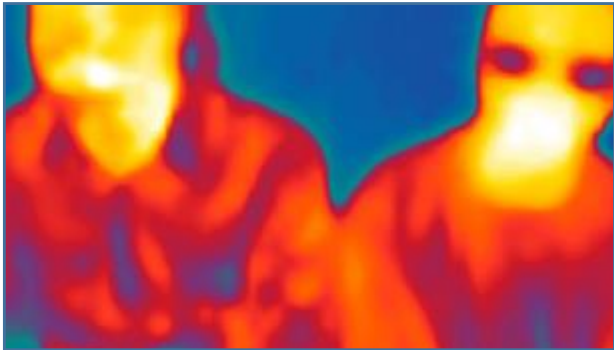
High quality detection with PEMF method



For IR thermal detection PEMF method directly increase quality of detection and make more ease to recognize

High quality detection with PEMF method

Low quality detection with conventional detector



Increase beam width will increase area detection