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2D Traffic Speed Radar

V1.0

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Version History

Date	Version	Version Description
2019-11-05	1.0	SEPAR100 1st version

Content

SEPAR100 Traffic Speed Radar White Paper

Summary：SEPAR100 is a 24GHz high-performance traffic speed radar that accurately measures vehicle speed and other information by using the frequency difference between the emitted radio waves and the echo. The SEPAR100 uses a microstrip array antenna design with accurate speed measurement and can distinguish between coming and going vehicles. Installed at the roadside, it can automatically measure the driving speed of vehicles in 1 to 4 lanes.

Keywords：SEPAR100，Speed radar detector，Speed feedback sign

1 Speed radar market demands

with the rapid development of city road traffic, it has cause a lot of traffic problems and hidden dangers. So the traffic management department of the public security increased investment in off-site punishment facilities. At present, the following methods are mainly used in the traffic speed measurement system:

(1)Loop coil sensor coupled with the camera forensics system, in this way speed measurement accuracy can be guaranteed, the disadvantage is that this way needs todestroy the road surface, high maintenance cost;

(2)Video image virtual coil and camera forensics system is also adopted. Due to theinconsistent installation of this method, measurement method cannot be "calibrated", sothe ministry of

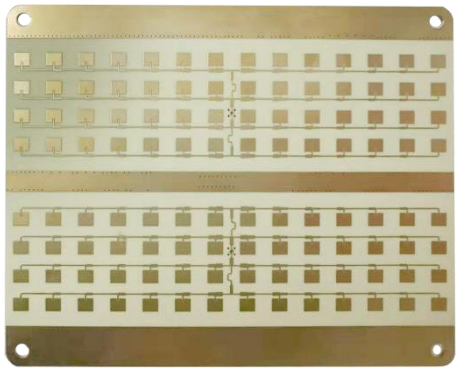
public security has clearly announced that it is banned.

(3) Laser speed radar and camera forensics system, which has high measurement accuracy. However, the equipment cost is very high, and it is difficult to be widely used at present.

2 SEPAR100 Speed radar description

2.1 Speed radar features

SEPAR100 is a very cost-effective k-band millimeter-wave radar sensor system with a detection range of up to 200 meters. It adopts the CW modulation mode to detect the speed and direction of moving targets, with high speed measurement accuracy.



2.2 Speed Radar Parameter

The SEPAR100 uses advanced SiGe MMIC technology to measure the speed and directionof a moving vehicles.

Figure 1 SEPAR100 Appearance

SEPAR100 uses low sidelobe array antenna design technology to effectively avoid additional interference caused by beam divergence. The azimuth plane -3dB beam width is about 6.7 °, and the elevation plane -3dB beam width is about 27 °. The SEPAR100 radar system direction characteristic chart is as follows

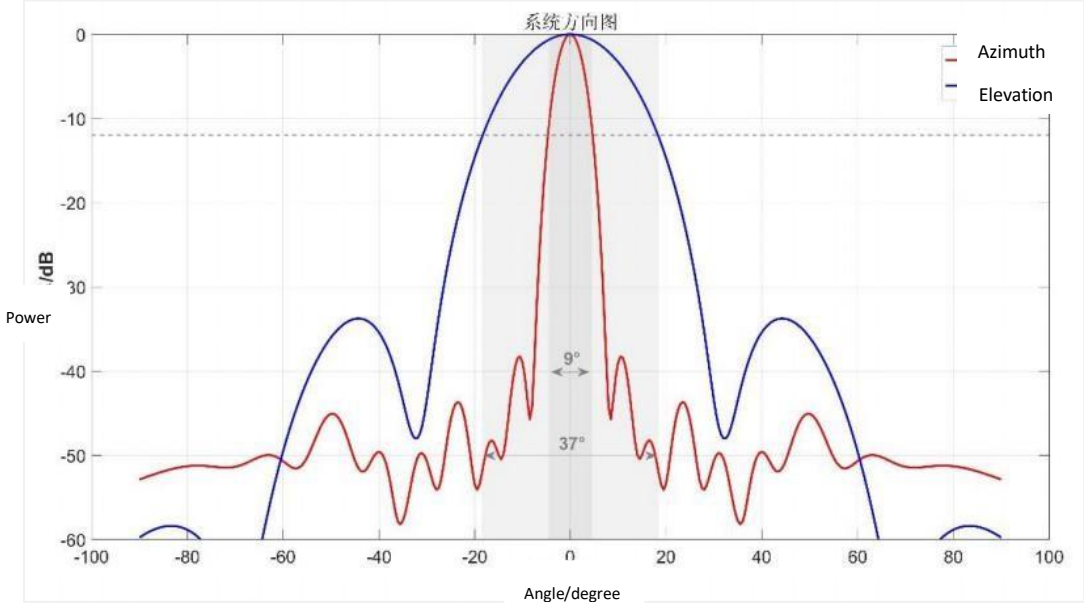


Figure 2 SEPAR100 Radar system directional characteristic diagram

Table 1 SEPAR100 performance parameter

Parameter	Condition	MIN	TYP	MIN	Unit
System performance					
Transmit frequency		24.00	24.15	24.25	GHz
Transmit power（EIRP）			20		dBm
Refresh time			20		ms
Transmit frequency error		-40		40	MHz
Power			1.6		W
Communication interface		RS485/RS232/Switch			
Speed measurement characteristic					
Speed range		5		200	km/h
Speed accuracy		-1		0	km/h
Direction		Distinguish car coming and going			
Detection range	Vehicle		150	200	m
Antenna					
Beam width/TX	Azimuth(-3dB)		6.7		deg
	Elevation(-3dB)		27		deg
Other characteristic					
Working voltage		9	12	16	V DC
Working current			0.13		A
Working temperature		-40		85	℃
Working humidity		5%		95%	RH
Size		105*85.5*13			mm

PCB drawing：

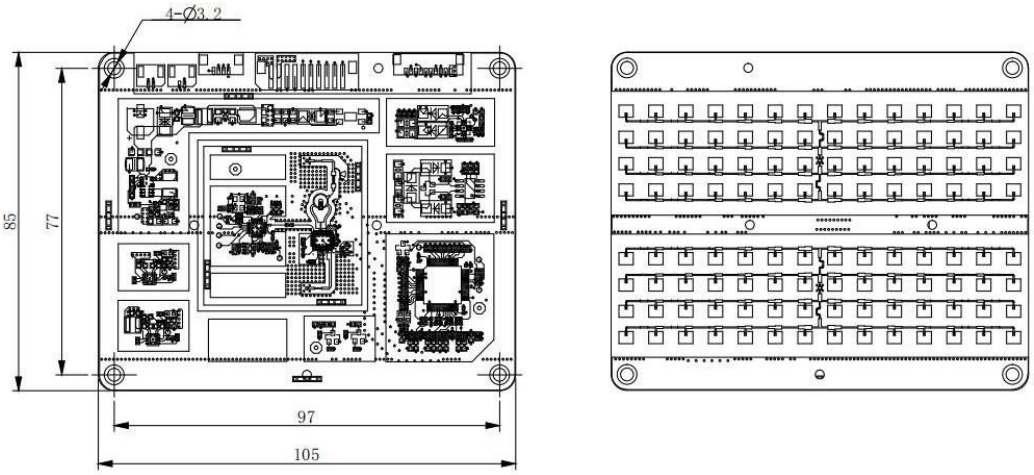


Figure 3 SEPAR100 PCB Size

2.3 Speed radar application

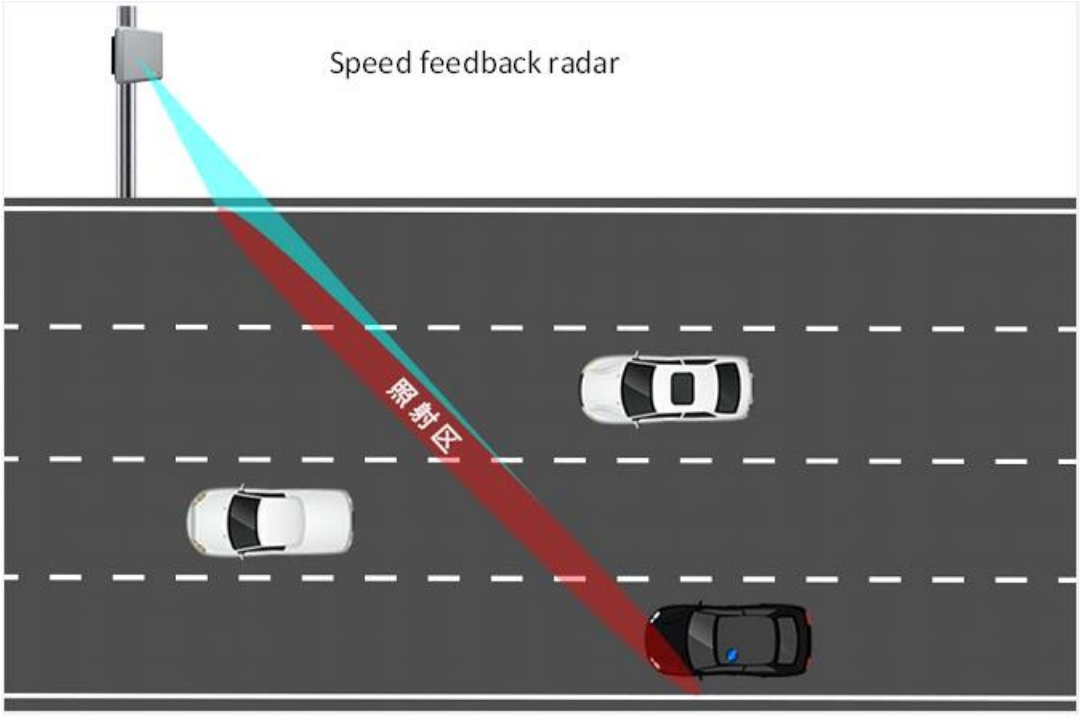
- Traffic speed monitoring
- Speed feedback
- Bend warning
- Crossing warning

3 Cases on installation

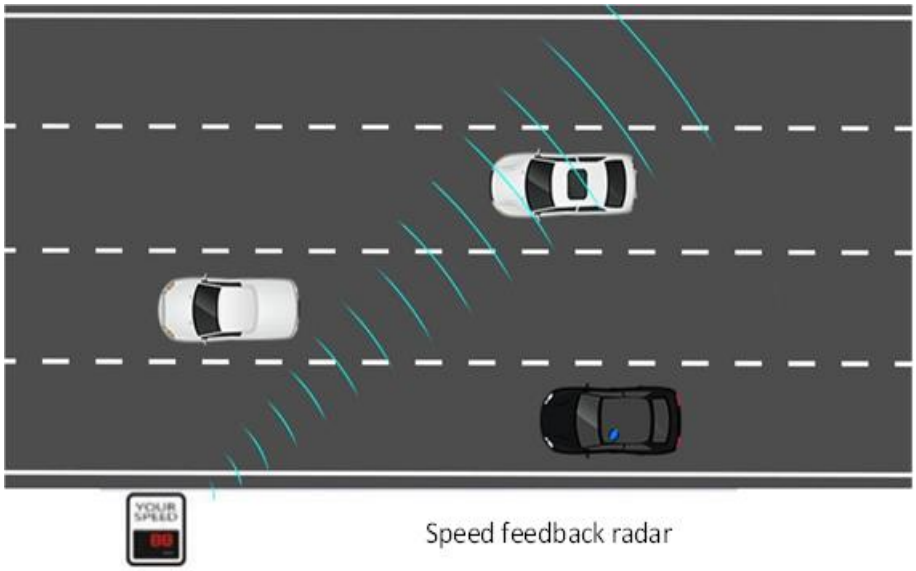
3.1 Portable or fixed install for over speed capture

One single radar can cover multiple lanes by oblique irradiation, avoiding interferencefrom vehicles outside the beam. The short response time enables real-time, automatic measurement of the vehicle speed in the monitoring lane, and distinguishes between coming and going vehicles,

so as to perform direction screening and illegal speed capture.



3.2 Speed feedback sign



When the speed measured by radar exceeds the set value, the speed feedback device will warn the driver through LED flashing (or changing color), to timely remind the driver to pay attention to reduce the speed of driving, so as to effectively reduce road traffic accidents caused by over speed.

4. Conclusion

SEPAR100 is a multi-lanes single object speed radar, it adopts advanced MMIC and signal processing technology, with high capture rate, accurate speed measuring, stable performance, and can be widely used in road traffic speed measuring system and other fields.The product can help reduce drivers' speeding violations and avoid road traffic accidents caused by over speed driving.