77GHz Front Radar
For E-Bus ADAS system

Model: ARS-ST01

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1 Product Description

The project ARS-ST01 is a multi-mode, FMCW radar sensor capable of operation in the 77GHz band. This radar sensor integrates the functions of two operation modes of SRR for long-range coverage and MRR for wide FoV coverage at near distance. It enables real-time detection of objects in front of the vehicle, collecting the information including range, relative velocity and azimuth of multi- targets, satisfying the ADAS demands for features like ACC, AEB, FCW in EV markets especially for electric bus.

2 Features

- ARS-ST01 adapted TI ARW1843 77GHz SoC Platform
- Support SRR/MRR dual-mode
- Max detection range up to 150m
- Detects moving vehicles
- Cost effective and robust design for all vehicle segments
- Immune to bad weather
- Programmable alert zones for customization
- Platform support ISO26262 ASIL-B function safety compliance

3 Specification

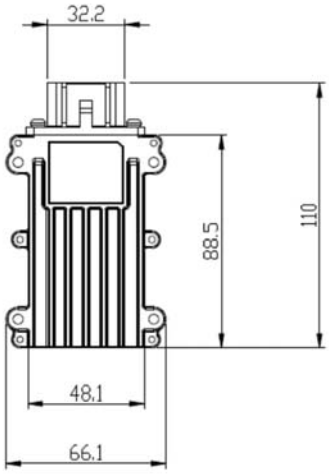
Radar Specification

Parameter	Front Radar	Unit
Radar Characteristics		
Frequency Band	76 ~ 77	GHz
Power supply	9-16	V DC
Detection range	150	m
Speed measurement range	90	km/h
Field of view	H = ±3 / V = ±3 @150M	deg
Distance measurement accuracy	<1.25	m
Speed measurement accuracy	1.5	km/h
Angle measurement accuracy	1.5	deg
Emitted radar power (EIRP Peak)	FCC : SRR:29.10 MRR:34.28	dBm
	NCC : SRR:20.40 MRR:30.51	
Emitted radar power (EIRP Average)	FCC : SRR:10.04 MRR:12.74	dBm
	NCC : SRR:12.58 MRR:14.26	
Update time	150	ms
Normal power consumption	10	W
Vehicle interface	CAN	
Mechanical size (w/ connector)	110 (L) x 66.1(W) x 15.8(H)	mm
Weight	96	g
Temperature range	Operating: -40 ~ +85	°C
	Storage: -40~90	°C
Mounting area	vertically: between 80~100cm above road surface level (35 degree)	
Connector	10-pin female (socket) flat connector	
Vehicle integration	Front (central) side of vehicle	
IP Rating	IP69K	
Reliability	ISO 16750	
Regulation/ Certification Compliant	FCC, NCC	
Modulation-related technical parameters		
Modulation period	SRR: 76.10~76.78 MRR:76.10~76.34	GHz
Modulation Bandwidth	SRR: 680 (total) MRR: 243 (total)	MHz

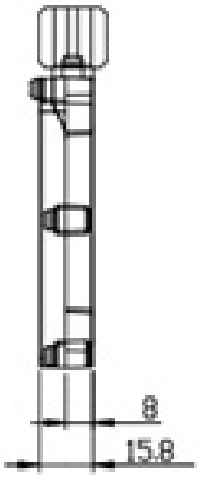
Modulation Type	sawtooth	
Sweep Bandwidth	SRR: 680 (total) MRR: 243 (total)	MHz
Sweep Rate	SRR: 100 MRR: 100	ms
Sweep Time	SRR: 29.2 MRR: 22.2	us
Maximum power modes (FCC)	SRR: 29.10 MRR: 34.28	dBm
Minimum power modes (FCC)	SRR: 29.10 MRR: 34.28	dBm
Power duty cycle (FCC)	SRR: 1.8 MRR: 2.18	%

4 Product Dimension

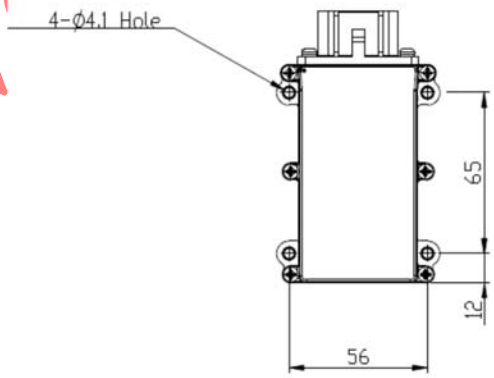
The ARS-ST01 product dimension is 110 (L) x 66.1(W) x 15.8(H) mm (with connector)



Radar front side view



Radar side view



Radar rear side view

5 Radar Setup

- Installation Height:
  The preferred installation height is 80~100cm. If the height is too low, the signal may be affected by the reflection of the ground due to the static object detection function. If the height is too high, the object reflection will be poor, which will affect the radar detection performance.
- Mounting Angle:
  Radar mounting angle should form a perpendicular line to the ground.

- Installation Precautions:
  - There should be no metal objects within 80cm in front of the radar, it is also recommended that there should be no plastic object thicker than the radar to be placed in front of the radar, or false reading may occur.
  - There should be no objects or body structures higher than the radar above and below the radar.
  - The radar should be secured fasten on to the car body to avoid vibrations related to the radar and the car body.

6 Regulations

6.1 FCC Warning Statement

FCC 15b devices (15.105)
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

FCC Part 15.21 information for user
You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

FCC Part 15.19
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation

FCC RF Radiation Exposure Statement
1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated, keeping the radiator at least 20cm or more away from the person's body.

6.2 NCC Warning Statement / NCC 警語

LP0002 低功率射頻器材技術規範_章節3.8.2

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前述合法通信，指依電信管理法規定作業之無線電通信。
低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

【須經專業工程人員安裝及設定，始得設置使用，且不得直接販售給一般消費者。】

7 Company Information

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