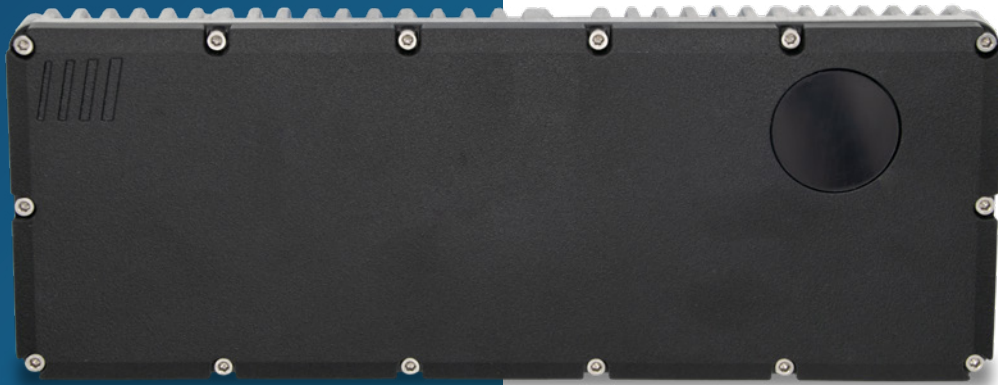


Data Sheet

ITR-3811

Version 1.0



The ITR-3811 is a multilane 4D MIMO Radar for highway, arterial and intersection applications. Highly accurate speed measurement enables it for speed enforcement applications, conform to OIML R91. Processing and tracking algorithms optimized specifically for highway and arterial use cases provide precise metering. Multilane capability is designed for a wide variety of different road situations all over the world.

FEATURES

- Monitor, count and classify vehicles on highways
- 4D MIMO FMCW RADAR operating in the 24 GHz ISM band
- Worldwide certification
- Conform to OIML R91 for speed enforcement up 230 km/h
- Coverage of up to 8 lanes
- Maximum detection range up to 276 m
- 4 classes identifiable up to 150 m



APPLICATIONS

- Speed Enforcement
- Highway and Arterial Monitoring
- Intersection Management

CERTIFICATES

InnoSenT GmbH has established and implements a quality system for development, production and sales of radar sensors for industrial and automotive sensors.

See more information on our quality standards at:

<https://www.innosent.de/certifications/>

ADDITIONAL INFORMATION

This is an InnoSenT Standard Product. Changes will not be notified as long as there is no impact on form, fit or specified function of the product described within this data sheet.

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1. FUNCTIONS



High-Performance Radar for Modern Traffic Applications

The ITR-3811 is a state-of-the-art 4D MIMO radar sensor designed for a wide range of traffic management tasks. It operates in the license-free 24 GHz ISM band and is certified for worldwide use. Thanks to advanced processing and tracking algorithms, the sensor delivers precise data even in complex highway and arterial environments.



Speed Enforcement up to 230 km/h

With highly accurate speed measurement capabilities, the ITR-3811 is suitable for speed enforcement applications and conforms to OIML R91 standards. The radar reliably detects vehicles traveling at speeds of up to 230 km/h.



Intersection Monitoring

The radar covers 1 lane in each direction, enabling efficient monitoring on small and medium intersections. With a detection range of up to 276 meters, the ITR-3811 ensures high reliability even in wide or fast-moving traffic scenarios.



Vehicle Classification and Traffic Flow Insights

The system can identify up to 4 vehicle classes at distances of up to 150 m. This allows for detailed traffic flow analysis, vehicle counting, and classification, making the ITR-3811 ideal for traffic planning and real-time monitoring.

Versatile Use Cases

- Speed Enforcement
- Highway and Arterial Monitoring
- Intersection Management (e.g. single-lane per direction)
- Multilane Coverage with One Device

2. PARAMETERS

PARAMETER	MIN	TYPICAL ¹	MAX	UNIT
Regulatory				
Operating Frequency		24		GHz
Bandwidth		200		MHz
Output Power (EIRP)	< 20dBm PK // < 108dB μ V/m AVG			
Output Power (EIRP AVG)		< 12.7 dBm		
Range				
Min. Detection Range ²		5 16.4		m ft
Max. Detection // Classification: Pedestrian ^{2,3}		119 390 // 76 250		m ft
Max. Detection // Classification: Bike ^{2,3}		119 390 // 76 250		m ft
Max. Detection // Classification: Car ^{2,3}		276 905 // 168 551		m ft
Max. Detection // Classification: Truck ^{2,3}		276 905 // 168 551		m ft
Range Accuracy		0.47 1.5		m ft
Lane Separation ⁴ : Approaching // Receding		120 394 // 180 591		m ft
Speed				
Radial Speed Resolution		0.46 0.29		km/h mph
Speed Range	-233 -144.8		+233 +144.8	km/h mph
Speed Accuracy		0.23 0.14		km/h mph
Angle				
Field of View: Azimuth		110		°
Field of View: Elevation		30		°
Separation: Azimuth		10		°
Angular Accuracy: Azimuth		0.5		°
Operation				
Update Rate		50		ms
Processing Latency		50 1		ms cycle
System Start Up		60		s
Interfaces				
Configuration A	External Power Supply Ethernet 1Gbit/s RS485 full duplex			
Configuration B ⁵	PoE Ethernet 1Gbit/s RS485 full duplex			
Connectors	M12 industrial			

1 Typical specifications are for general understanding and may vary

2 Standard detection field @-10 dB beam width; the detection range for specific object types differs

3 The classification parameter is defined as the max. distance up to which an object can be classified

4 Measured on standard lane with 3.75 m width

5 Applied PoE standard: IEEE 802.3bt Type 3 „4PPoE“

3. PERFORMANCE

PARAMETER	MIN	TYPICAL ⁶	MAX	UNIT
Power supply				
Operating Voltage: DC	24 ±5%		48 ±5%	V
Supply Current ⁷		< 0.75		A
Power Consumption: External Power Supply ⁷		≤ 18		w
Power Consumption: PoE ⁷		≤ 20		W
Environment				
Operating Temperature	-40		80	°C
Storage Temperature	-40		85	°C
Protection Class ⁸	IP67			
Mechanical				
Dimensions (with connectors): H/W/D	102 x 270 x 37 (47) 4 x 10.6 x 1.5 (1.8)			mm in
Weight		< 1 < 2.2		kg lb
Mounting ⁹	VESA MIS-D 75			
Detection				
Max. amount of zones (loops)		64		
Max. amount of ignore zones ¹⁰		10		
Max. amount of objects/tracks ¹¹		128		
Max. amount of targets		512		
Amount of sensors to cover intersection ¹²		2		
Coverage with 1 sensor on highway		8 lanes		

6 Typical specifications are for general understanding and may vary

7 Recommended and valid for 24 V at 25 °C

8 Tested in independent laboratory; only IP67 protected, if cables and/or gaskets are plugged into connectors

9 Recommended tightening torque for M4 screws: 1.25 Nm; valid only, if screw locking measures like safety washers are taken

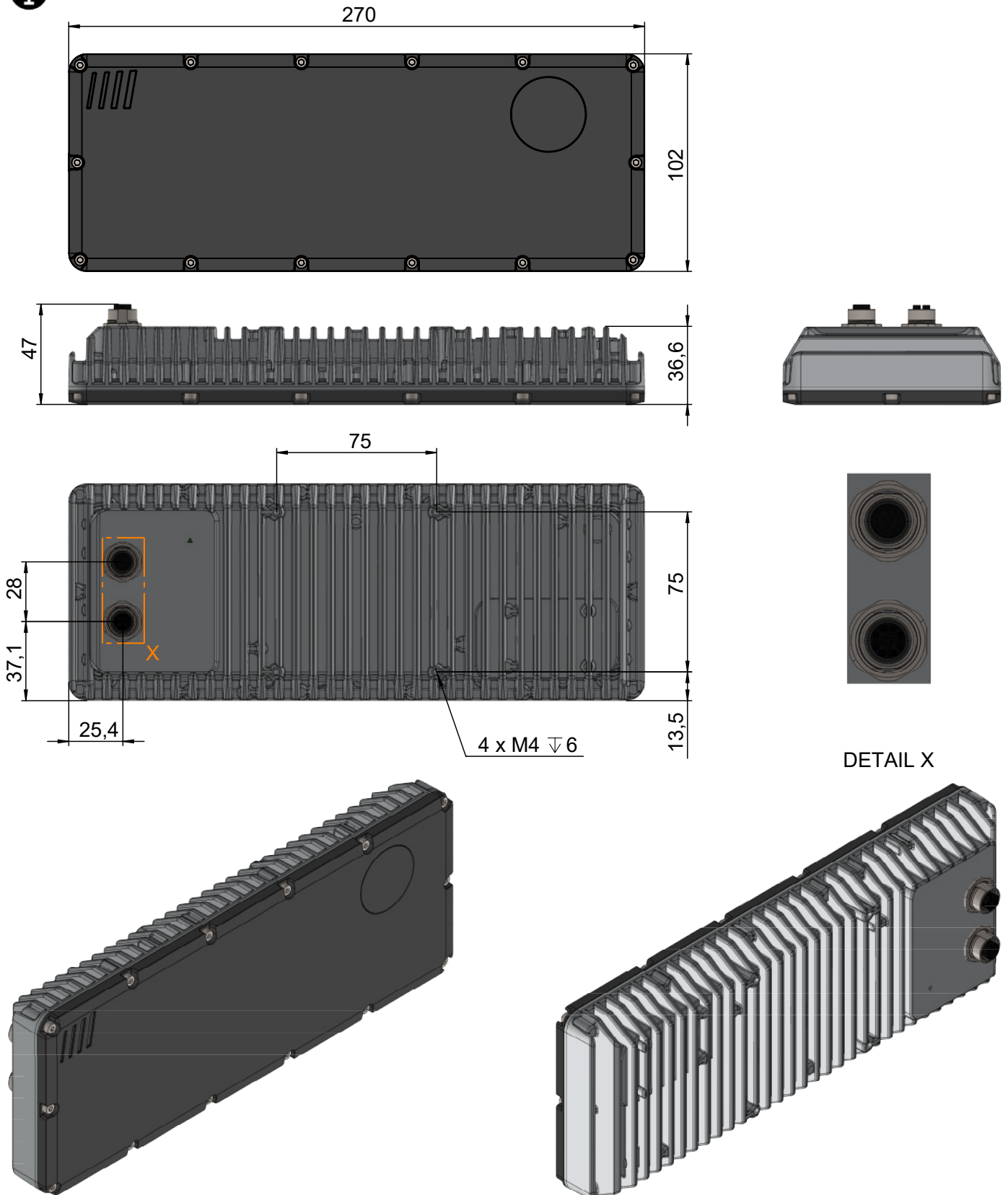
10 Ignore zones improve detection quality in harsh environments, e.g urban areas with dense building

11 Objects/tracks are humans and all types of vehicles, which are provided as output

12 Standard intersection with 4 directions

4. MECHANICAL DRAWING

i Note: All dimensions in mm

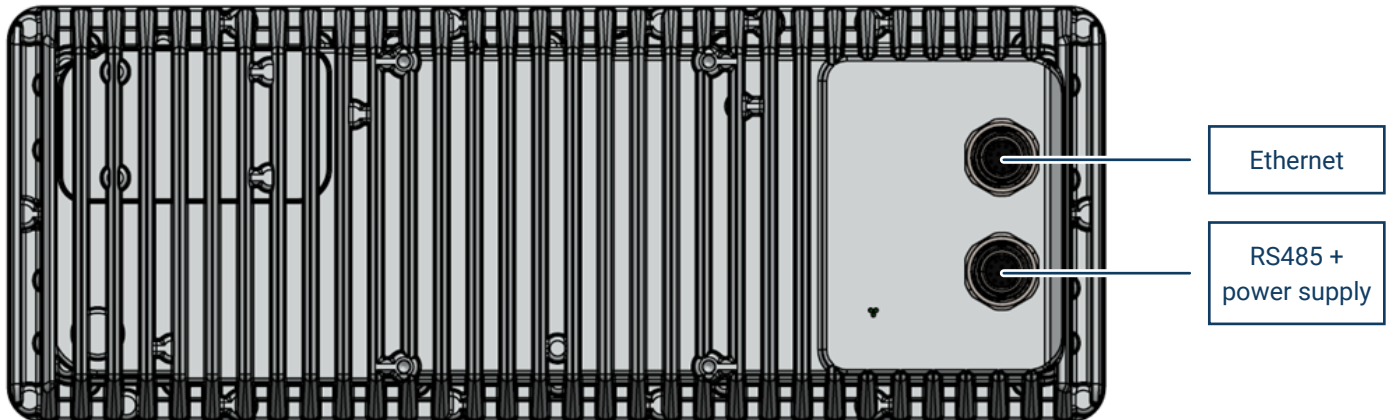


5. INTERFACES

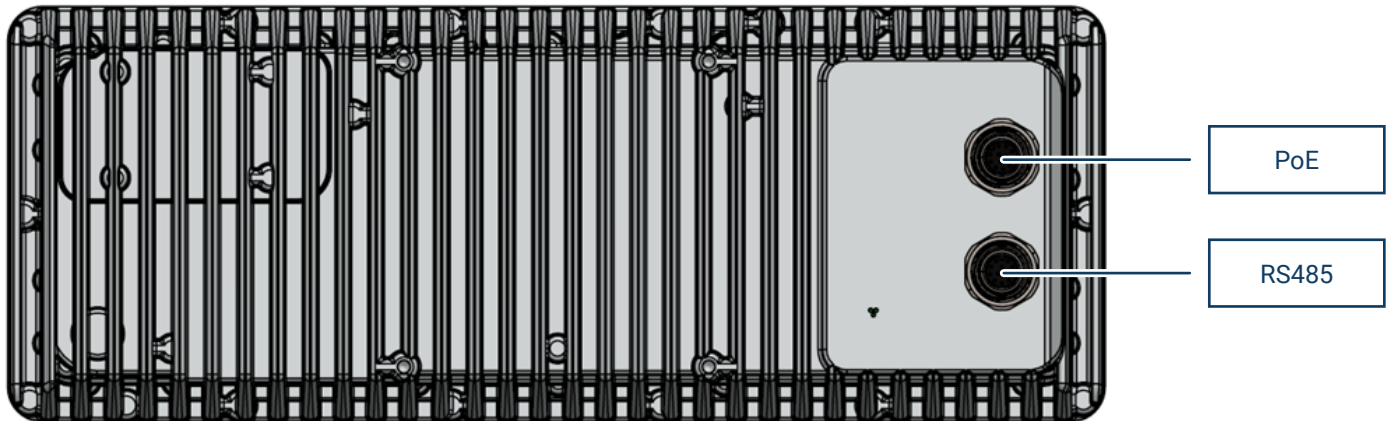
The module provides two different interfacing possibilities. The user may choose which one to use.

i Warning: Connect the module only as stated below. Do not interchange these options. Connections other than illustrated below may result in unexpected behaviour!

Configuration A: Ethernet + RS485 full duplex + power supply



Configuration B: PoE + Ethernet 1Gbit/s + RS485 full duplex

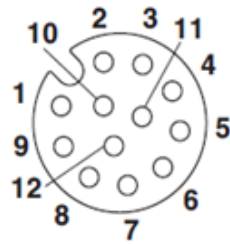


TYPE	CABLE	PIN COUNT	INNOSENT ORDERING NUMBER
PoE / Ethernet cable	M12 <-> RJ45 ETH	8	29.00000283
RS485 / Power supply cable	M12 <-> COM / banana jacks	12	29.00000284
ITR-3811 Starter Kit			80.00000665

6. CONNECTORS

Configuration A: PoE + Ethernet 1GBit/s + RS485 full duplex

Type: PHOENIX CONTACT - Contact insert - SACC-CI-M12FS-12CON-SH TOR 32 - 1457704

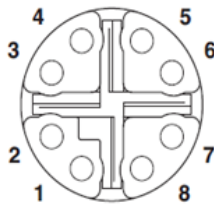


PIN	DESCRIPTION
1	GND
2	GND
3	RS485_FD.A
4	RS485_FD.B
5	RS485_FD.Z
6	RS485_FD.Y
7	VCC
8	VCC
9	Do not connect
10	Do not connect
11	Do not connect
12	Do not connect

PoE / Ethernet Connector

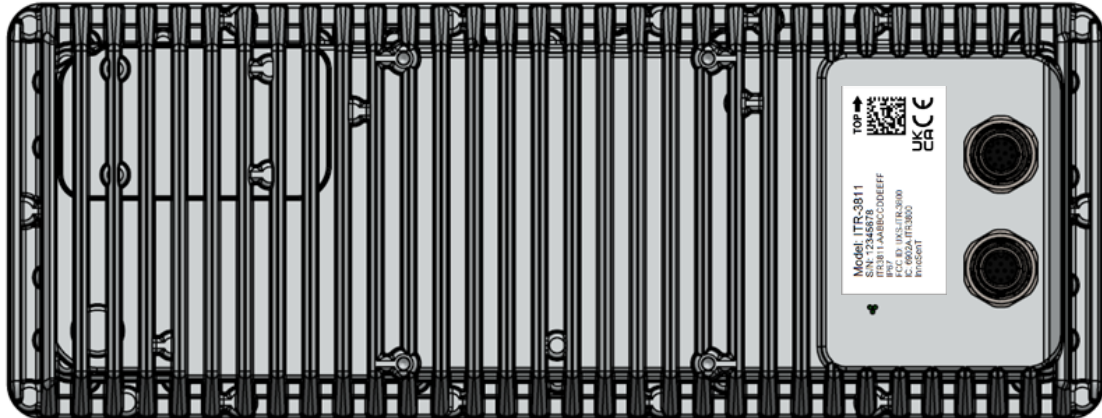
Type: PHOENIX CONTACT - Contact insert - SACC-CI-M12FS-8CON-L180-10G - 1402457

PoE is implemented, according to IEEE 802.3bt standard, see [User Manual, 9.2].



POE IEEE 802.3BT		
PIN	DATA	POE
1	A+	IN1
2	A-	
3	B+	IN1
4	B-	
5	D+	IN2
6	D-	
7	C-	IN2
8	C+	

7. LABEL LOCATION

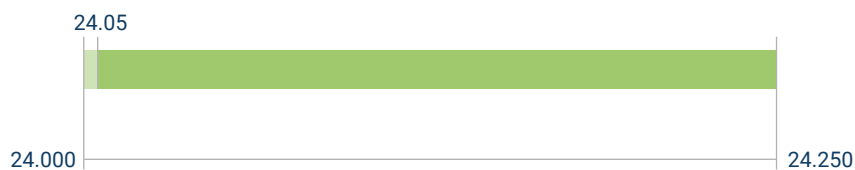


8. LABEL DESCRIPTION

Model: ITR-3811	TOP →	Unique Serial Number
S/N: 12345678	[QR Code]	Module Name with MAC-Address
ITR3811-AABBCCDDEEFF		FCC ID ¹³
IP67	UK CA CE	ISED ID ¹³
FCC ID: UXS-ITR-3800		
IC: 6902A-ITR3800		
InnoSenT		

9. ISM FREQUENCY BAND

In general, the ITR-3811 can be used in EU, USA, Canada and UK, as well as other regions which apply to those regulations.



¹³ FCC and ISED IDs are the same as ITR-3800

10. COMPLIANCES

Declarations of conformity, certificates and test reports can be provided upon request.

STANDARD	COMMENT
Conformity / Certificates	
CE	Declaration of Conformity
UKCA	Declaration of Conformity
FCC Part 15.245	Tested by external TCB and applies to relevant regulatory limitations.
ISED	Tested by external TCB and applies to relevant regulatory limitations.
RF / Electrical / Traffic / Other	
EN 300 440 V2.1.1	Tested by external TCB and applies to relevant regulatory limitations.
EN 301 489-1 V2.2.3	Tested by external TCB and applies to relevant regulatory limitations.
EN 301 489-3 V2.3.2	Tested by external TCB and applies to relevant regulatory limitations.
NEMA TS 2	Referring to temperature and vibration.
DIN EN 60529	Tested and certified by external laboratory.
DIN EN IEC 62311	
DIN EN IEC 62368-1	
DIN EN 50293	Tested and certified by external laboratory.
OIML R91	Tested and certified by external laboratory.

11. FCC & ISED COMPLIANCE

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s) and complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage.
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC §15.21

Changes or modifications made to this equipment not expressly approved by InnoSenT GmbH may void the FCC authorization to operate this equipment.

FCC §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.

RF Exposure

This equipment complies with FCC and ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

Ce transmetteur ne doit pas être placé au même endroit ou utilisé simultanément avec un autre transmetteur ou antenne.

12. DISPOSAL

The device is to be disposed of according to the European Community Directive 2012/19/EU on waste electrical and electronic equipment.

Devices must not be disposed of with consumer waste.

For environmentally compatible recycling and disposal of the device, please contact a certified waste management company or send the device back to InnoSenT GmbH.






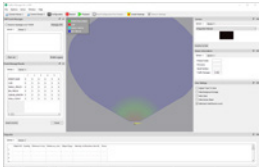
13. ESD-INFORMATION



This InnoSenT sensor is sensitive to damage from ESD. Normal precautions as usually applied to CMOS devices are sufficient when handling the device. Touching the signal output pins has to be avoided at any time before soldering or plugging the device into a motherboard.

14. EVALUATION KIT

Order number: 80.00000665, see [3]

ACCESSORY	ORDER NUMBER	PICTURE	DESCRIPTION
ITR-3811	80.00000594		ITR-3811
Power Supply Cable	29.00000284		Connection with power supply Connection with RS485 interface
Ethernet Cable	29.00000283		Connection with PoE or Ethernet
Mounting Bracket	80.00000417		Attaches the ITR-3811 to a mast, post or pole [1]
PoE Injector	29.00000297		Digitus PoE Ultra Injector, 60W, see vendor data sheet
Software Package	Download at InnoSenT download portal		Software Package: -Traffic Manager - Radar API - Network Browser - Firmware Update Traffic Manager is used for configuring the ITR-3811 and displays the radar data on screen.

15. CO-APPLICABLE DOCUMENTS

REFERENCE	DOCUMENT
[1]	ITR-3811 User Manual
[2]	ITR-3811 Quick Start Guide
[3]	ITR-3811 Interface Protocol

16. APPROVAL

This data sheet contains the technical specifications of the described product. Changes of the specification must be in written form. All previous versions of this data sheet are no longer valid.

VERSION	DATE	COMMENT
1.0	2025-04-11	Initial Release
0.1 Preliminary	2024-07-17	Initial Release



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