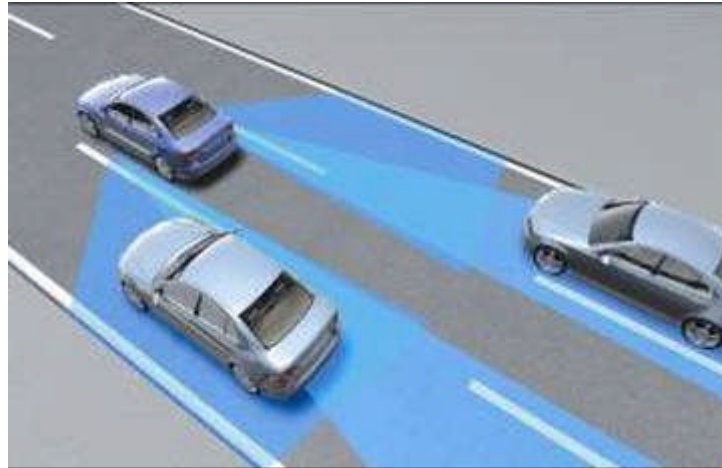


# **Annex no. 5**

# **Functional Description / User Manual**



# User's Manual for 24 GHz Blind-Spot Radar Sensor



**AUTHORS**

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Fehler! Es konnten keine Einträge für ein Abbildungsverzeichnis gefunden werden.

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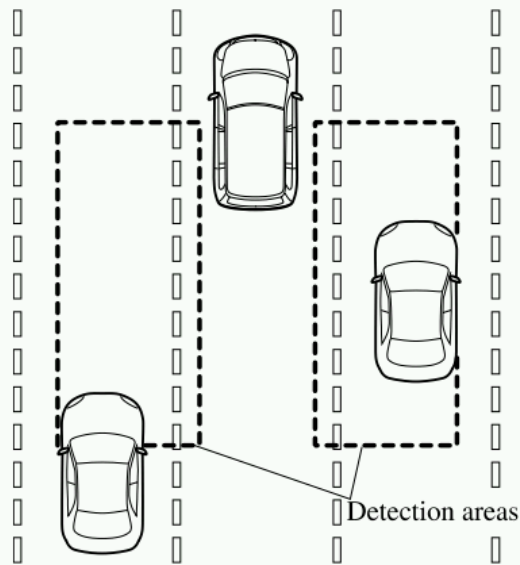
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## 2 System operational description

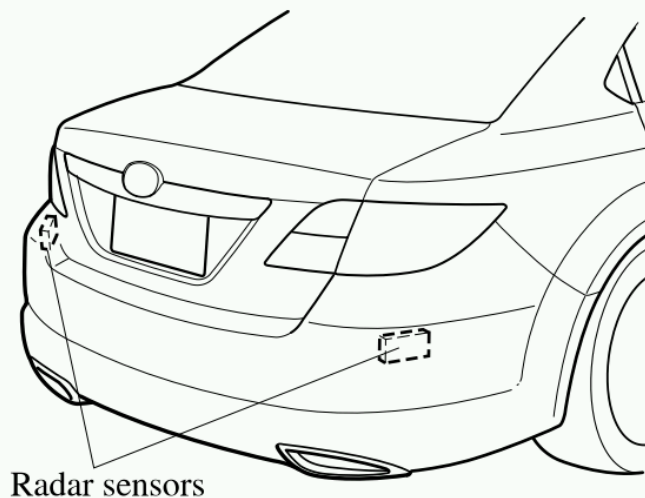
The Blind Spot Monitoring (BSM) system is designed to assist the driver by monitoring blind spots on both sides of the vehicle to the rear in certain situations such as when changing lanes on roads and freeways.

The BSM system monitors the detection areas on both sides of the vehicle to the rear when the vehicle speed is about 32 km/h (20 mph) or more, and notifies the driver of vehicles in the detection area by illuminating the BSM warning light.

If the turn signal lever is operated in the direction the BSM warning light is illuminated, the system warns the driver of the vehicle in the detection area with a beep sound.



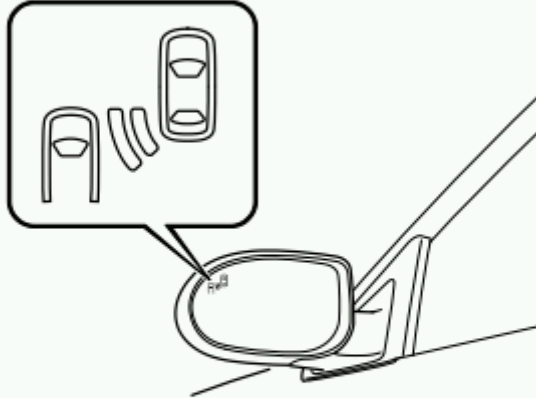
The radar sensors are equipped inside the rear bumper.



**▼ BSM Warning Light/Beep**

**BSM warning light**

Equipped on the left and right door mirrors.



This warning light illuminates for a few seconds when the ignition is switched ON.

If the BSM system detects a vehicle in the detection area while the vehicle is driven at a speed of about 32 km/h (20 mph) or more, the BSM warning light illuminates on the side of the vehicle where the rear on-coming vehicle is detected.

(depending on the implementation by the customer)

### 3 Sensor operational description



Figure 1: Cross section of BSDTX sensor

The sensor is shown in Figure 1. Two different RADAR beams are used to detect targets.

#### 3.1 BSDTX sensor surveillance zone

To cover the blind spot area beside the vehicle a two beam approach is used, as shown in Figure 2. A BROAD beam with a maximum range of ca. 8m and a smaller beam, that is tilted by 33° to the boresight direction of the broad beam is used. The smaller TILT beam has a maximum detection range of ca. 15 m. Despite the higher antenna gain of the TILT beam the maximum e.i.r.p. emitted power is identical with the BROAD beam. This is realized by changing the input power at the antenna ports accordingly.

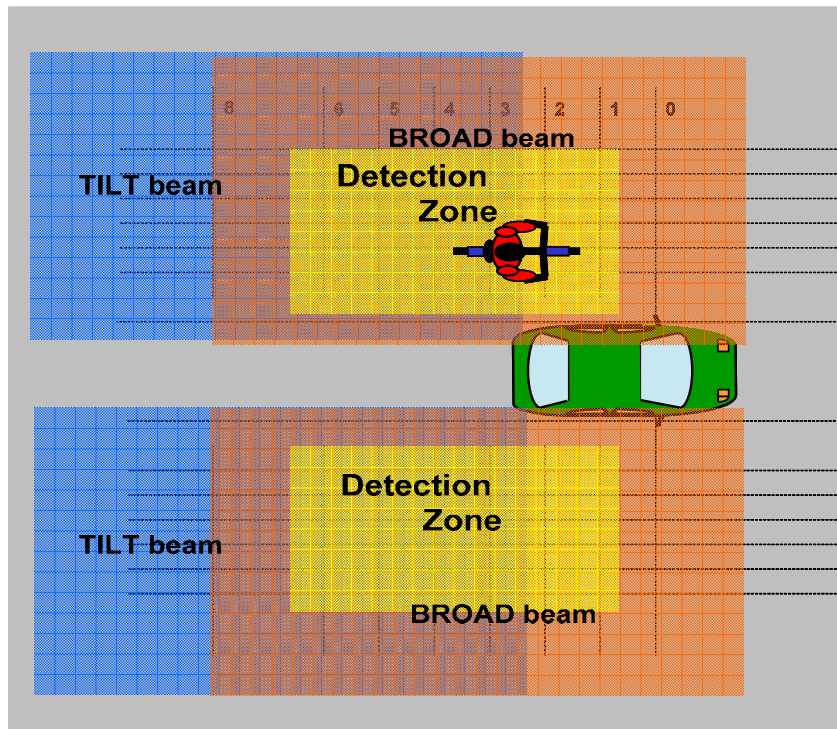


Figure 2: BSDTX surveillance zone two beam concept

## 4 Radiation Hazard

This BSM (blind spot monitoring) device emits intentional electromagnetic radiation in the 24 GHz to 25 GHz frequency range. The total radiated average power over the entire bandwidth is below  $-14$  dBm ( $40 \mu\text{W}$ ). The active emitting antenna surface is  $72 \text{ cm}^2$ ; therefore the radiated power density in front of the BSM device is  $0.55 \mu\text{W}/\text{cm}^2$ . This value is far below the legal human exposure protection limit of  $1 \text{ mW}/\text{cm}^2$  (MPE) in Europe and US.



## 5 Equipment Authorization

This BSM devices complies with part 15 of the FCC rules (15.252), with RSS-220 of Industry Canada and with EN 302 288 of ETSI/CEPT on a Class1 basis.

Operation is subject to the following 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.
3. This device may only work when the vehicle is in operation.

In Europe operation is allowed in the following countries:

Albania  
Andorra  
Austria  
Azerbaijan  
Belarus  
Belgium  
Bosnia and Herzegovina  
Bulgaria  
Croatia  
Cyprus  
Czech Republic  
Denmark  
Estonia  
Finland  
France  
Georgia  
Germany  
Greece  
Hungary  
Iceland  
Ireland  
Italy  
Latvia  
Liechtenstein  
Lithuania  
Luxembourg  
Macedonia  
Malta  
Moldova  
Monaco  
Montenegro  
Netherlands  
Norway  
Poland  
Portugal  
Romania  
Russian Federation  
San Marino  
Serbia  
Slovakia  
Slovenia  
Spain

Sweden  
Switzerland  
Turkey  
Ukraine  
United Kingdom  
Vatican City

For countries not mentioned in the list above the BSDTX radar device has to be deactivated.

## 5.1 Labeling

USA: FCC ID: OAYBSDTX

Canada: IC 4135A-BSDTX

EU: 

## 5.2 BSDTX radar specific emission limits

The following limits regarding intentional RF radiation apply for the two radar transmitters (TILT and BROAD):

- **Peak power limit = -14 dBm EIRP for 10 MHz resolution bandwidth**  
(corresponding to a worst-case peak power of 0dBm in 50 MHz) and
- **RMS average power limit = -41,3 dBm/MHz EIRP**

(EIRP means: emitted isotropic radiated power). The FCC regulations describe measurement rules which shall be used for equipment authorization. According to these rules a resolution bandwidth of 10 MHz is selected for the peak power measurements.