

## Project Documentation | Feature Description

---

**Project Number:**

...

**SMS Project Number:**

**Project Title:**

BSD

**Keyword(s):**

Blind Spot Detection

**Date:**

February 17, 2012

**Document:**

Blind Spot Detection Function Description.doc

**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.

# 1 Contents

1	Contents.....	2
2	Blind Spot System Feature Description .....	3
2.1	Activation criteria .....	3
2.2	Warning states.....	3
2.3	System performance .....	4
2.4	Requirements for the blind spot warning function .....	6
2.4.1	Left side blind spot warning requirements .....	6
2.4.2	Right side blind spot warning requirements .....	6
2.4.3	Optional blind spot warning suppression.....	6
3	Feld of view .....	11

**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.

## **2 Blind Spot System Feature Description**

The blind spot system is designed to be compliant to the ISO 17387 standard - type I for a blind spot warning function.

### **2.1 Activation criteria**

The system is activated based on the subject vehicle speed. If the subject vehicle speeds above 10km/h the system will transition in the active state.

### **2.2 Warning states**

The system has two warning levels.

The warning level 1 becomes true if the system is activated and the warning requirements are fulfilled.

The warning level 2 happens as soon as in addition to the warning level 1 conditions the turn signal (direction indicator) is switched on.

The warning is separate for the left and right side.

#### **CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.

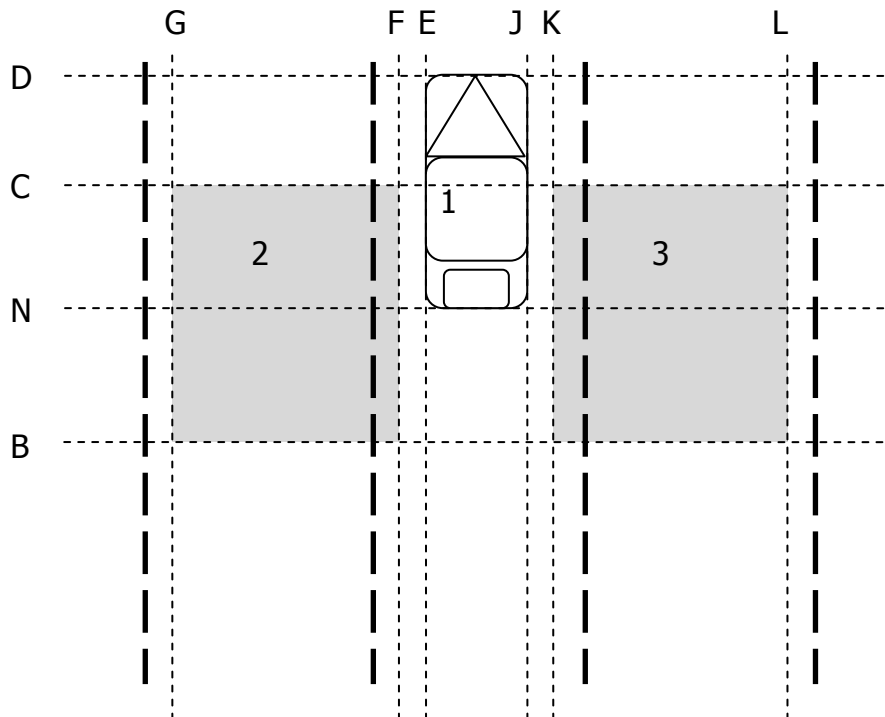
## 2.3 System performance

The following lines, illustrated in Figure 1, are needed for the description of the blind spot warning requirements. The designations right, left and behind refer to the driving direction of the subject vehicle. The lane markings in Figure 1 are shown for reference only. All dimensions are given with respect to the subject vehicle.

- Line B shall be parallel to the trailing edge of the subject vehicle and a distance of 5,0 meters behind it.
- Line C shall be parallel to the leading edge of the subject vehicle and located at the center of the 95<sup>th</sup> percentile eyes.
- Line D shall be the extension in both directions of the leading edge of the subject vehicle.
- Line E shall be parallel to the centerline of the subject vehicle and located at the left outermost edge of the subject vehicle's body excluding the exterior mirror.
- Line F shall be parallel to the centerline of the subject vehicle and a distance of 0,5 meter to the left of the left outermost edge of the subject vehicle's body.
- Line G shall be parallel to the centerline of the subject vehicle and a distance of 3,9 meters to the left of the left outermost edge of the subject vehicle's body.
- Line J shall be parallel to the centerline of the subject vehicle and located at the right outermost edge of the subject vehicle's body excluding the exterior mirror.
- Line K shall be parallel to the centerline of the subject vehicle and a distance of 0,5 meter to the right of the right outermost edge of the subject vehicle's body.
- Line L shall be parallel to the centerline of the subject vehicle and a distance of 3,9 meters to the right of the right outermost edge of the subject vehicle's body.
- Line N shall be the extension in both directions of the trailing edge of the subject vehicle.

### CONFIDENTIAL AND PROPRIETARY

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.



**Figure 1: Warning requirements diagram**

- 1 subject vehicle
- 2 left adjacent zone
- 3 right adjacent zone

**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.

## 2.4 Requirements for the blind spot warning function

The blind spot warning function provide coverage of the left and right adjacent zones. The lines illustrated in Figure 1 are needed for the description of the blind spot warning requirements

### 2.4.1 Left side blind spot warning requirements

Referring to Figure 1, a left side blind spot warning shall be issued to the subject vehicle driver if a target vehicle satisfies all of the following conditions:

- any part of the target vehicle is forward of line B;
- the target vehicle is entirely behind line C;
- the target vehicle is entirely to the left of line F;
- any part of the target vehicle is to the right of line G.

### 2.4.2 Right side blind spot warning requirements

Referring to Figure 1, a right side blind spot warning shall be issued to the subject vehicle driver if a target vehicle satisfies all of the following conditions:

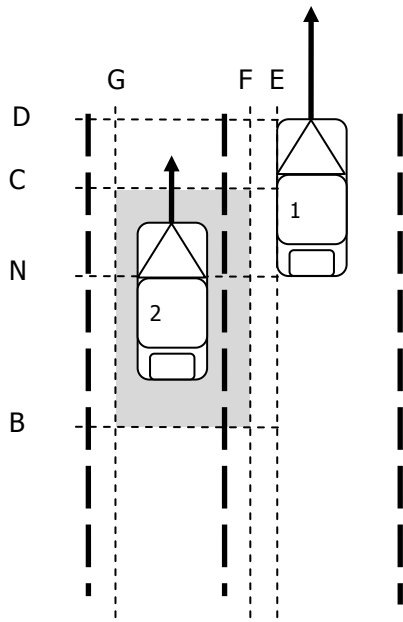
- any part of the target vehicle is forward of line B;
- the target vehicle is entirely behind line C;
- the target vehicle is entirely to the right of line K;
- any part of the target vehicle is to the left of line L.

### 2.4.3 Optional blind spot warning suppression

If the subject vehicle is overtaking the target vehicle and the target vehicle has entered the adjacent zone from the front, the blind spot warning will be suppressed for a period of no more than 1.5 s after the blind spot warning is first required.

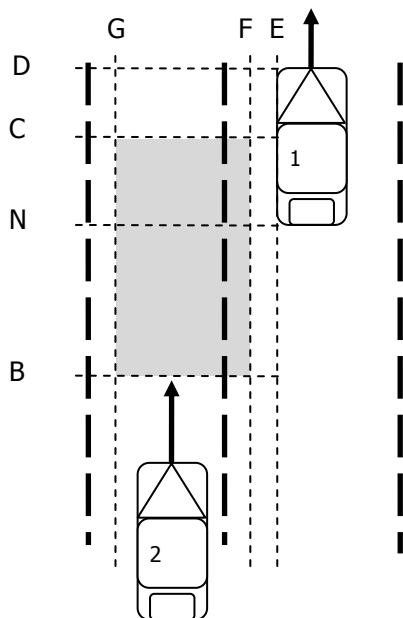
#### CONFIDENTIAL AND PROPRIETARY

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.



1 subject vehicle  
2 target vehicle

In this case the blind spot warning function must not give a warning.  
The target vehicle is in the adjacent zone but the subject vehicle is over 10km/h faster as the target vehicle.

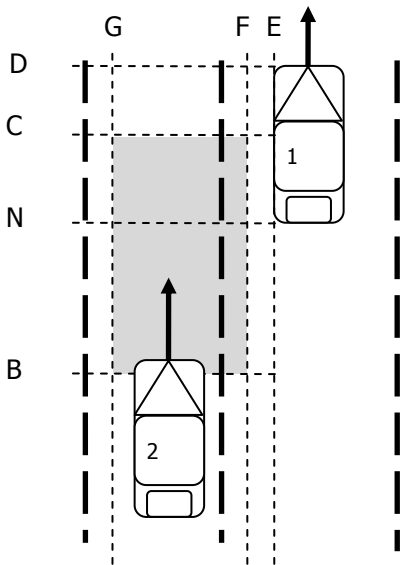


1 subject vehicle  
2 target vehicle

In this case the blind spot warning function may give a warning.  
The target vehicle is not in the adjacent zone but the target vehicle is faster as the subject vehicle.

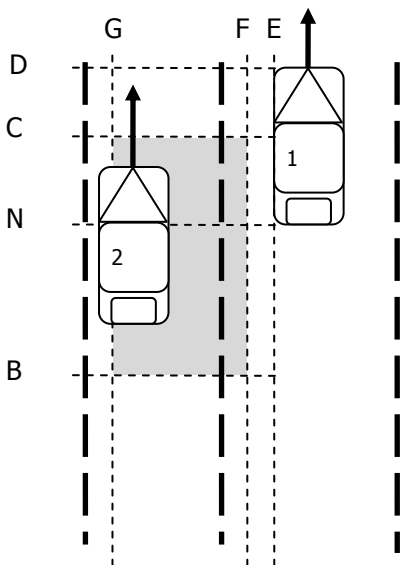
**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.



- 1 subject vehicle
- 2 target vehicle

In this case the blind spot warning function must give a warning. The front of the target vehicle is in the adjacent zone, in front of line B.



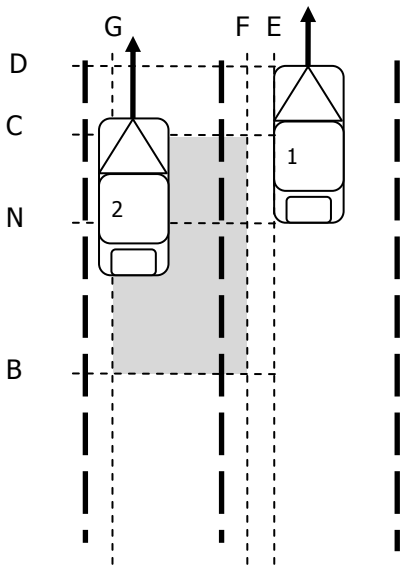
- 1 subject vehicle
- 2 target vehicle

In this case the blind spot warning function must give a warning. The target vehicle is entirely behind line C.

**CONFIDENTIAL AND PROPRIETARY**

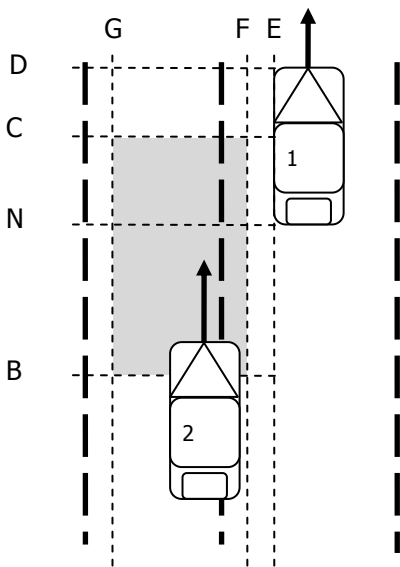
The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.





1 subject vehicle  
2 target vehicle

In this case the blind spot warning function may give a warning. The warning is not required because the target vehicle is not entirely behind line C.

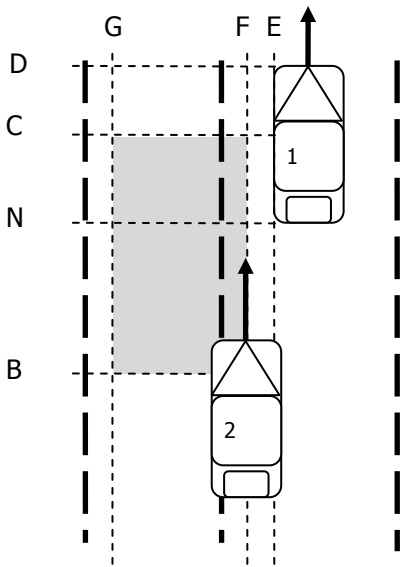


1 subject vehicle  
2 target vehicle

In this case the blind spot warning function must give a warning. The target vehicle is entirely behind line F.

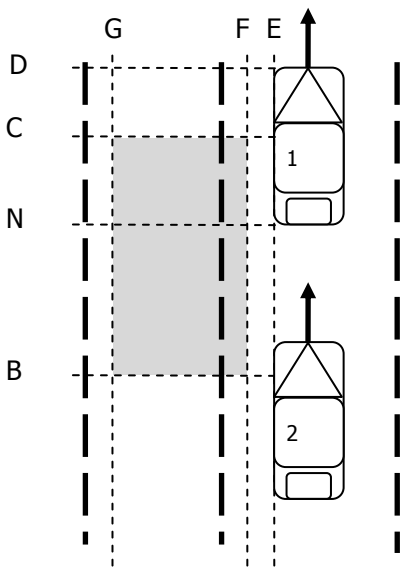
**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.



1 subject vehicle  
2 target vehicle

In this case the blind spot warning function may give a warning. The warning is not required because the target vehicle is not entirely behind line F.



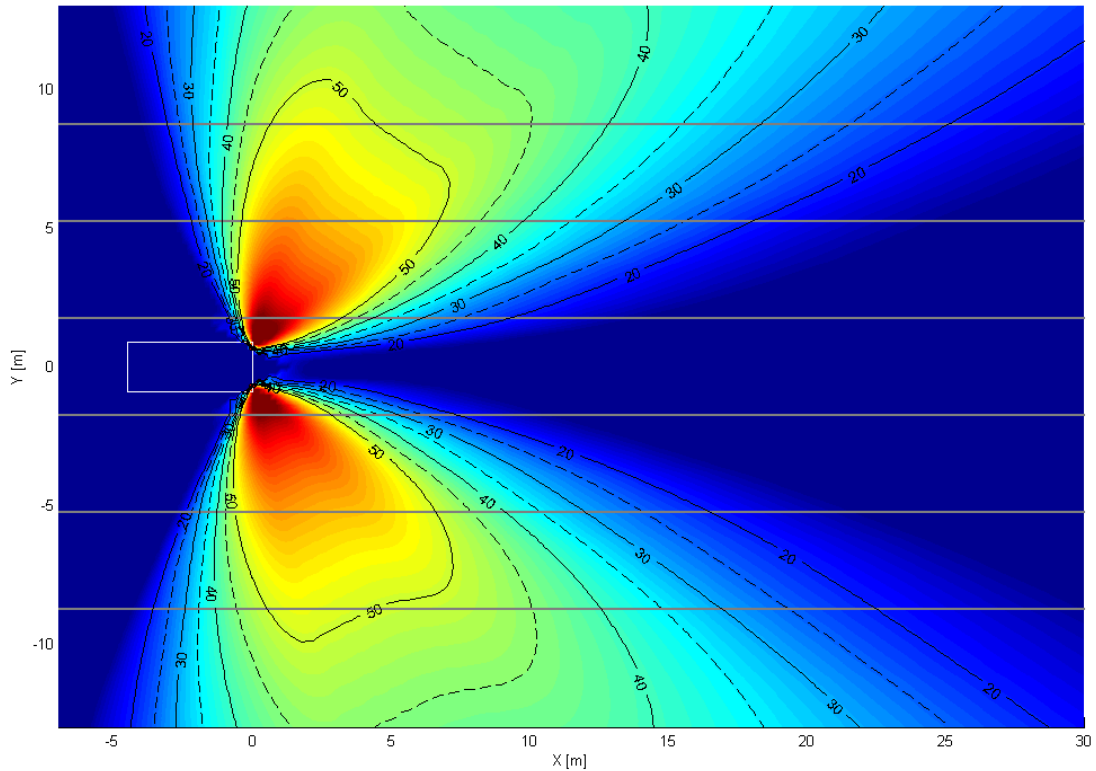
1 subject vehicle  
2 target vehicle

In this case the blind spot warning function must not give a warning. The target vehicle is completely outside of the zone defined by lines A, D, E.

**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.

### 3 Feld of view



**Figure 2: BSD system antenna type 31 at 60degree squint angle**

**CONFIDENTIAL AND PROPRIETARY**

The Information contained in this document shall remain the sole exclusive property of s.m.s smart microwave sensors GmbH and shall not be disclosed by the recipient to third parties without prior consent of s.m.s smart microwave sensors GmbH in writing.