



## EMISSION -- TEST REPORT

Testreport file no. : **T15917-1-03KG** Date : Sep. 08, 1999  
of issue

Model : Child seat Presence and Orientation Detection /  
Passenger Presence Detection (CPOD/PPD)

Type : 5WK4 291

Applicant : Siemens AG

Manufacturer : Siemens S.A.

Licence holder : Siemens AG

Address : Wernerwerkstraße 2

D-93049 Regensburg

Test result accrdg.  
to the regulation(s) :  Positive  Negative  
at page 3

This testreport with appendix consists of 36 pages.  
The testresult only responds to the tested sample. It is not allowed to copy  
this report even partly without the allowance of the testlaboratory.

File No. **T15917-1-03KG** , Page 1 of 15

## DIRECTORY

Page

### A) Documentation

Directory	2
Testregulations	3
General information	4-5
Discovery of worst case condition	6
Equipment under Test	14
Summary	15

### B) Testdata

Conducted emissions 10/150 kHz - 30 MHz	7
Spurious emissions (magnetic field) 10 kHz - 30 MHz	8-9
Spurious emissions (electric field) 30 MHz - 1000 MHz	10
Spurious emissions (electric field) 1 GHz - 18 GHz	11
H-Field strength of the fundamental	12
Conducted power of the fundamental wave measured on the antenna terminals	13

### Attachment

A) Testdata	A1-A7
B) List of Test Equipment	B1
C) Photos of the test setup	C1-C4
D) Technical description of the test sample (e.g.CDF, Declaration)	D1-D3
E) Photos of the EuT	E1-E6
F) Measurement Protocol for FCC, VCCI and AUSTEL	--

**TEST REGULATIONS**

The tests were performed according to following regulations :

- - EN 50081-1 / 2.1991
- - EN 50081-2 / 7.1993

---

○ - EN 55011 / 3.1991	○ - Group 1	○ - Group 2
	○ - class A	○ - class B
○ - EN 55014 / 4.1993	○ - Household appliances and similar	
	○ - tools	
	○ - Semiconductor devices	
○ - EN 55014 / A2:1990		
○ - EN 55104 / 5.1995	Category:	
○ - EN 55015 / A1:1990		
○ - EN 55015 / 12.1993		
○ - EN 55022 / 5.1995	○ - class A	○ - class B
○ - prEN 55103-1 / 3.1995		
○ - prEN 50121-3-2 / 3.1995		
○ - EN 60601-1-2 / 4.1994		
○ - VCCI	○ - class 1	○ - class 2
■ - Part 15 Subpart C (15.209)		

### ADDRESS OF THE TEST LABORATORY

- - MIKES PRODUCT SERVICE GmbH  
Ohmstrasse 2-4  
D - 94342 Strasskirchen

- - \_\_\_\_\_  
\_\_\_\_\_

### ENVIRONMENTAL CONDITIONS

Temperature: 15-35 ° C  
Humidity 45-60 %  
Atmospheric pressure 860-1060 mbar

### POWER SUPPLY SYSTEM UTILIZED

Power supply system : vehicle battery DC 13.5V

### STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error of  $\pm 4$ dB. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

### SHORT DESCRIPTION OF THE EQUIPMENT UNDER TEST (EUT)

The CPOD is a transponder, principle based on a sensing device, that provides information on the passenger seat, if the child seat is present or not.

Number of received/tested samples:

2 / 1

### DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

- - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
- - Blank box indicates that the listed condition, standard or equipment was not applicable for this Report.

M E A S U R E M E N T   P R O T O C O L   F O R   F C C ,   V C C I  
A N D   A U S T E L

**Test Methodology**

Conducted and radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-1992 procedures and using the FCC limits or the CISPR 22 Limits.

**Measurement Error**

The test system for conducted emissions is defined as the LISN, tuned receiver and coaxial cable. The test system for spurious emissions is defined as the antenna, the pre-amplifier, the tuned receiver and the coaxial cable. These test systems have an expected error of  $\pm 3$  dB. The equipment comprising the test systems are calibrated on an annual basis.

**Justification**

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

**General Standard Information**

The test methods used comply with CISPR Publication 22 (1993), EN 55022 (1987) and AS 3548 (1992) - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment" and with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

For detailed description of each measurement please refer to section testresults.

**DISCOVERY OF WORST CASE MEASUREMENT CONDITION:**

The model 5WK4 291 works on 5 channels in the 125-135 kHz band. The transmitting frequency generator produces a signal which drives the transmitting antenna. The micro controller can modify the transmitting frequency in approx. 2kHz steps. This ensures that the resonance frequency in a specific child seat is optimizes. On the following 5 channels a inductive field will be generated:

Channel 1: 125.3 kHz  
Channel 2: 127.3 kHz  
Channel 3: 129.4 kHz  
Channel 4: 131.5 kHz  
Channel 5: 133.7 kHz

To find out the worst case channel for the complete measurement the following tests have been performed:

- Measurement of the radiated fieldstrength of the operating frequency measured in 3 different channels, lowest channel, middle channel and high end channel of the frequency bands. This measurement have been performed in order to find out the maximum transmitted fieldstrength of the transceiver.
- Measurement of the radiated spurious emissions measured in 3 different channels, lowest channel, middle channel and high end channel of the frequency bands. This measurement have been performed in order to find out the maximum spurious emissions of the transceiver.

Based on this testresults, the measurements have been performed completely on 3 channels. This testresults are documented in the following sections of the testreport.

## TEST RESULT

### CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz

**■ - Test not applicable**

**Test location :**

- - Shielded room no. 1
- - Shielded room no. 2
- - Shielded room no. 3
- - Shielded room no. 4
- - Shielded room no. 5
- - Shielded room no. 6
- - Shielded room no. 7
- - Anechoic chamber
- - Full compact chamber

For TEST EQUIPMENT USED please refer to ATTACHMENT D: \_\_\_\_\_

#### Description of Measurement

The final level, expressed in dB $\mu$ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC Limit or to the CISPR limit, which is equivalent to the Australian AS 3548 limit.

To convert between dB $\mu$ V and  $\mu$ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasipeak detection, and a Line Impedance Stabilization Network (LISN), with 50 $\Omega$  / 50  $\mu$ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are remeasured using a tuned receiver with quasipeak and average detection and recorded on the data sheets.

#### Test result

The requirements are

**O - MET**      **O - NOT MET**

Min. limit margin \_\_\_\_\_ dB at \_\_\_\_\_ MHz

Max. limit exceeding \_\_\_\_\_ dB at \_\_\_\_\_ MHz

Remarks: EUT is connected to the DC power supply in the car. There are no requirements for conducted emissions on DC input port for car use.

**SPURIOUS EMISSION**

Spurious emissions from the EUT are measured in the frequency range of 9 kHz to 30 MHz using a tuned receiver and a shielded loop antenna. The antenna was positioned 3, 10 or 30 meters horizontally from the EUT. Measurements have been made in all three orthogonal axes and the shielded loop antenna was rotated to locate the maximum of the emissions.

Spurious emissions from the EUT are measured in the frequency range of 30 MHz to 10 times the highest used frequency using a tuned receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasipeak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection, remeasurement of results which may be critical will be repeated in average mode. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna was positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees.

**SPURIOUS EMISSION (MAGNETIC FIELD) 10 kHz - 30 MHz**

- Test not applicable

- in a shielded room
- at a non - reflecting open-site and
- in a testdistance of 3 meters.
- in a testdistance of 30 meters.

For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER1

**Description of Measurement**

The final level, expressed in dB $\mu$ V/m, is arrived at by taking the reading from the EMI receiver (Level dB $\mu$ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit.

Example:

Frequency (MHz)	Level (dB $\mu$ V)	+	Factor (dB)	=	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	=	Delta (dB)
1.705	5	+	20	=	25	30	=	5

**Testresult in detail:**

Frequency MHz	L: QP dB $\mu$ V	L: AV dB $\mu$ V	Correct.	L: QP dB $\mu$ V/m	L: AV dB $\mu$ V/m	Limit dB $\mu$ V/m
0.375	49.5	--	+20.0	69.5	--	96.1
0.390	49.4	--	+20.0	69.4	--	95.8
0.405	49.0	--	+20.0	69.0	--	95.5
0.635	35.0	--	+20.0	55.0	--	71.5
0.650	34.0	--	+20.0	54.0	--	71.3
0.670	35.0	--	+20.0	55.0	--	71.1
0.875	28.0	--	+20.0	48.0	--	68.8
0.905	26.0	--	+20.0	46.0	--	68.5
0.935	26.0	--	+20.0	46.0	--	68.2

The requirements are

■ - MET

O - NOT MET

Min. limit margin 16.1 dB at 0.670 MHz

Max. limit exceeding        dB at        MHz

Remarks: The Limits are met. This was QP measurement. The reading

in average was 5 dB less than QP.

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

## o - Test not applicable

- - Open-site 1
- o - Open-site 2
- - 3 meters
- o - 10 meters
- o - 30 meters

 For TEST EQUIPMENT USED please refer to ATTACHMENT D: SER2
Description of Measurement

The final level, expressed in  $\text{dB}\mu\text{V}/\text{m}$ , is arrived by taking the reading from the EMI receiver (Level  $\text{dB}\mu\text{V}$ ) and adding the correction factors and cable loss factor (Factor dB) to it. This is done automatically in the EMI receiver, where the correction factors are stored. This result then has the FCC or CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets at page 24 - 25. The CISPR 22 limit is equivalent to the Australian AS 3548 limit.

Example:

Frequency (MHz)	Level ( $\text{dB}\mu\text{V}$ )	+	Factor (dB)	=	Level ( $\text{dB}\mu\text{V}/\text{m}$ )	Limit ( $\text{dB}\mu\text{V}/\text{m}$ )	=	Delta (dB)
719	75	+	32.6	=	107.6	110	=	-2.4

Testresult

The requirements are

■ - MET

o - NOT MET

Min. limit margin >10 dB at 30-1000 MHz

Max. limit exceeding    dB at    MHz

 Remarks: The limits are met. For Plot see page A1-A2

SPURIOUS EMISSION 1 GHz - 18 GHz

- Test not applicable

**Testlocation :**

- Open-site 1
- Open-site 2
- Anechoic chamber
- Full compact chamber
  
- 1 meters
- 3 meters
- 10 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT D: \_\_\_\_\_

Description of Measurement

The final level, expressed in  $\text{dB}\mu\text{V}/\text{m}$ , is arrived by taking the reading from the Spectруманалыzer in  $\text{dB}\mu\text{V}$  and adding the correction factors of the test setup incl. cables.

Example of the correction value at 1.5 GHz

Level reading at 1.5 GHz	correction EMCO 3115	correction Amplifier AWT 8035 + cable	correction factor (summarized)	corrected level
56 $\text{dB}\mu\text{V}$	+25.7	-41.7	-16	40 $\text{dB}\mu\text{V}$

Testresult

The requirements are

- MET

- NOT MET

Min. limit margin \_\_\_\_\_ dB at \_\_\_\_\_ GHz

Max. limit exceeding \_\_\_\_\_ dB at \_\_\_\_\_ GHz

Remarks: NOT APPLICABLE. Because of the used frequencies there are

no requirements for radiated emissions.

## H-FIELD STRENGTH OF THE FUNDAMENTAL WAVE (MAGNETIC FIELD)

○ - Test not applicable

- o - in a shielded room
- - at a non - reflecting open-site and
- - in a testdistance of 3 meters.
- o - in a testdistance of 30 meters.

For TEST EQUIPMENT USED please refer to ATTACHMENT D: CPR1

### Description of Measurement

The final level, expressed in dB $\mu$ V/m, is arrived at by taking the reading from the EMI receiver (Level dB $\mu$ V) and adding the antenna correction factor and cable loss factor (Factor dB) to it. This result then has to be compared with the relevant FCC limit.

Example:

Frequency (MHz)	Level (dB $\mu$ V)	+	Factor	=	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	=	Delta (dB)
1.705	5	+	20	=	25	30	=	5

### Testresult in detail:

Frequency kHz	L: QP dB $\mu$ V	L: AV dB $\mu$ V	Correct.	L: QP dB $\mu$ V/m	L: AV dB $\mu$ V/m	Limit dB $\mu$ V/m
125.3	72.5	--	+20.0	92.5	--	105.6
129.4	71.0	--	+20.0	91.0	--	105.3
133.7	71.5	--	+20.0	91.5	--	105.1

### Testresult

The requirements are

■ - MET

O - NOT MET

Min. limit margin

13.1 dB at 0.1253 MHz

#### Max. limit exceeding

dB                    at                    MHz

Remarks:

**CONDUCTED POWER OF THE FUNDAMENTAL WAVE MEASURED  
ON THE ANTENNA TERMINALS**

**■ - Test not applicable**

**Testlocation :**

- - Shielded room no. 1
- - Shielded room no. 2
- - Shielded room no. 3
- - Shielded room no. 4
- - Shielded room no. 5
- - Shielded room no. 6
- - Shielded room no. 7
- - Anechoic chamber
- - Full compact chamber
- - Climatic test chamber VLK

For TEST EQUIPMENT USED please refer to ATTACHMENT D: \_\_\_\_\_

**Description of Measurement**

The conducted power of the fundamental wave measured on the antenna terminals in a climatic test chamber. The antenna jack was connected to the input of a communication test receiver. The internal batteries have been removed also and a variable DC power supply was used instead. The measurements have been made with the EUT unmodulated. During the test the supply voltage and the temperature were varied and applied simultaneously. The lower supply voltage was given by the manufacturer. In case the equipment was switching off before, the switch off voltage was used instead.

**Testresult**

The requirements are

**O - MET**

**O - NOT MET**

Frequency range of equipment		Power/dBm	Power/dBm	Power/dBm	Power/dBm	Power/dBm	Power/dBm
Tempera-ture/°C	DC supply voltage/V						
-30							
-20							
-10							
0							
+10							
+20							
+30							
+40							
+50							

Remarks: NOT APPLICABLE

**EQUIPMENT UNDER TEST**

**Operation - mode of the EUT.:**

The equipment under test was operated during the measurement under following conditions:

- - Standby
- - Testprogram (H - Pattern)
- - Testprogram (color bar)
- - Testprogram (customer specific)
- - Transmit on the following 5 channels:

- 125.3 kHz, 127.3 kHz, 129.4 kHz, 131.5 kHz, 133.7 kHz

- -
- -

**Configuration of the equipment under test:** see appendix D  
**Following periphery devices and interface cables were connected during the measurement:**

- - Type : \_\_\_\_\_

■ - unshielded power cable

○ - unshielded cables

○ - shielded cables

MPS.No.:

○ - customer specific cables (wireless microphone)

- - \_\_\_\_\_
- - \_\_\_\_\_

**S U M M A R Y**

**GENERAL REMARKS:**

The product 5WK4 291 has been tested on the following frequencies:  
CH 1: 125.3 kHz  
CH 3: 129.3 kHz  
CH 5: 133.7 kHz

**FINAL JUDGEMENT:**

The requirements according to the technical regulations and tested operation modes are

- - met.
- - not met.

The equipment under test

- - **Fulfills** the general approval requirements cited on page 3.
- - **Does not** fulfill the general approval requirements cited on page 3.

Date of receipt of test sample : accdg. to storage record

Testing Start Date : April 16, 1999

Testing End Date : April 20, 1999

- MIKES PRODUCT SERVICE GmbH -

Test-engineer

Günter Mikes  
Günter Mikes  
Dipl.-Ing. (FH)

Klaus Gegenfurtner  
Klaus Gegenfurtner  
Dipl.-Ing. (FH)