

EMISSION -- TESTREPORT

Testreport file no. : **T 19905-1-02 KJ** Date : December 13, 2000
of issue

Model / Type No. : Keyless access control system and immobilizer

Type : KESY

Applicant : SIEMENS Automotive AG

Manufacturer : SIEMENS Automotive AG

Licence holder : SIEMENS Automotive AG

Address : Wernerwerkstrasse 2

D-93049 Regensburg

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

:

POSITIVE

This testreport with appendix consists of 67 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.

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TEST REGULATIONS

The tests were performed according to following regulations :

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

-
- o - EN 55011 / 3.1991

- o - Group 1
- o - class A
- o - Group 2
- o - class B

- o - EN 55014 / 4.1993

- o - Household appliances and similar
- o - tools
- o - Semiconductor devices

- o - EN 55014 / A2:1990

- o - EN 55104 / 5.1995

Category:

- o - EN 55015 / A1:1990

- o - EN 55015 / 12.1993

- o - EN 55022 / 5.1995

- o - class A
- o - class B

- o - prEN 55103-1 / 3.1995

- o - prEN 50121-3-2 / 3.1995

- o - EN 60601-1-2 / 4.1994

- o - VCCI

- o - class 1

- o - class 2

- - Part 15 Subpart C (15.209)

- o - Part 15 Subpart C (15.231)

**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 ± 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 keyless access control system and immobilizer, type KESY, is designed for the operation on the fixed transmitter frequency range of approx. 123.75 kHz to 126.25 kHz.

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

- Measurement of the radiated fieldstrength of the operating frequency measured in permanent operation mode in the specified channel. This measurement have been performed in order to find out the maximum transmitted fieldstrength of the keyless access control system and immobilizer, type KESY.
- Measurement of the radiated spurious emissions measured in permanent operation mode in the specified channel. This measurement have been performed in order to find out the maximum spurious emissions of the keyless access control system and immobilizer, type KESY.

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

T E S T R E S U L T

CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz

■ - Test not applicable

Testlocation :

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

For TEST EQUIPMENT USED please refer to ATTACHMENT B: -----

Description of Measurement

The final level, expressed in dBµV, 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 dBµV and µV, 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 50Ω /50 µH (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.

Testresult

The requirements are	O - MET	O - NOT MET
Min. limit margin	_____ dB	at _____ MHz
Max. limit exceeding	_____ dB	at _____ MHz

Remarks: NOT APPLICABLE.

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) 9 kHz - 30 MHz

o - Test not applicable

- o - in a shielded room
- - at a non - reflecting open-site and
- - in a testdistance of 3 meters.
- - in a testdistance of 10 meters.
- - in a testdistance of 30 meters.

For TEST EQUIPMENT USED please refer to ATTACHMENT B: SER1

Description of Measurement

The final level, expressed in dBµV/m, is arrived at by taking the reading from the EMI receiver (Level dBµV) 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.

The resolution bandwidth during the measurement is as follows:

9 kHz - 150 kHz: ResBW: 200 Hz
150 kHz - 30 MHz: ResBW: 10 kHz

Example:

Frequency	Level	+	Factor	=	Level	Limit	=	Delta
(MHz)	(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dB)
1.705	5	+	20	=	25	30	=	5

Testresult in detail:

Bumper antennas - 2x 5WK4 5016

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	43	19	33	20	63	39	53	99.7
375	43	21	37	20	63	41	57	96.1
500	30	11	23	20	50	31	43	73.6
625	25	7	18	20	45	27	38	71.7
750	18	7	11	20	38	27	31	70.1
875	23	6	16	20	43	26	36	68.8
1125	15	1	9	20	35	21	29	66.6

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20
375	<0	<0	<0	20	<20	<20	<20
500	<0	<0	<0	20	<20	<20	<20
625	<0	<0	<0	20	<20	<20	<20
750	<0	<0	<0	20	<20	<20	<20
875	<0	<0	<0	20	<20	<20	<20
1125	<0	<0	<0	20	<20	<20	<20

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20	59.7
375	<0	<0	<0	20	<20	<20	<20	56.1
500	<0	<0	<0	20	<20	<20	<20	33.6
625	<0	<0	<0	20	<20	<20	<20	31.7
750	<0	<0	<0	20	<20	<20	<20	30.1
875	<0	<0	<0	20	<20	<20	<20	28.8
1125	<0	<0	<0	20	<20	<20	<20	26.6

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

0.009-30 MHz

Min. limit exceeding

_____ dB

_____ MHz

Remarks: The limits are met.

The measurement was performed up to the 10th

FCC ID: KR5KESSY

Testresult in detail:

Interior antennas - 2x 5WK4 5014 / 1x 5WK4 5015

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	46	3	37	20	66	23	57	99.7
375	26	7	23	20	46	27	43	96.1
625	35	13	30	20	55	33	50	71.7
750	21	4	13	20	41	24	33	70.1
875	20	4	13	20	40	24	33	68.8

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20
375	<0	<0	<0	20	<20	<20	<20
625	<0	<0	<0	20	<20	<20	<20
750	<0	<0	<0	20	<20	<20	<20
875	<0	<0	<0	20	<20	<20	<20

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20	59.7
375	<0	<0	<0	20	<20	<20	<20	56.1
625	<0	<0	<0	20	<20	<20	<20	31.7
750	<0	<0	<0	20	<20	<20	<20	30.1
875	<0	<0	<0	20	<20	<20	<20	28.8

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

0.009-30 MHz

Min. limit exceeding

_____ dB

_____ MHz

Remarks: The limits are met.

The measurement was performed up to the 10th

Testresult in detail:

Door handle antennas - 2x 3D0 837 205/206

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	39	15	26	20	59	35	46	99.7
375	39	18	33	20	59	38	53	96.1
500	27	9	19	20	47	29	39	73.6
625	23	6	16	20	43	26	36	71.7
750	16	3	10	20	36	23	30	70.1
875	21	4	14	20	41	24	34	68.8
1125	14	2	8	20	34	22	28	66.6

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20
375	<0	<0	<0	20	<20	<20	<20
500	<0	<0	<0	20	<20	<20	<20
625	<0	<0	<0	20	<20	<20	<20
750	<0	<0	<0	20	<20	<20	<20
875	<0	<0	<0	20	<20	<20	<20
1125	<0	<0	<0	20	<20	<20	<20

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20	59.7
375	<0	<0	<0	20	<20	<20	<20	56.1
500	<0	<0	<0	20	<20	<20	<20	33.6
625	<0	<0	<0	20	<20	<20	<20	31.7
750	<0	<0	<0	20	<20	<20	<20	30.1
875	<0	<0	<0	20	<20	<20	<20	28.8
1125	<0	<0	<0	20	<20	<20	<20	26.6

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

0.009-30 MHz

Min. limit exceeding

_____ dB

_____ MHz

Remarks: The limits are met.

The measurement was performed up to the 10th harmonic

FCC ID: KR5KESSY

Testresult in detail:

Backlite shelf antennas - 1x 5WK4 5017

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	36	15	25	20	56	35	45	99.7
375	37	16	31	20	57	36	51	96.1
500	25	8	18	20	45	28	38	73.6
625	20	5	13	20	40	25	33	71.7
875	19	4	12	20	39	24	32	68.8

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20
375	<0	<0	<0	20	<20	<20	<20
500	<0	<0	<0	20	<20	<20	<20
625	<0	<0	<0	20	<20	<20	<20
875	<0	<0	<0	20	<20	<20	<20

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
250	<0	<0	<0	20	<20	<20	<20	59.7
375	<0	<0	<0	20	<20	<20	<20	56.1
500	<0	<0	<0	20	<20	<20	<20	33.6
625	<0	<0	<0	20	<20	<20	<20	31.7
875	<0	<0	<0	20	<20	<20	<20	28.8

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

0.009-30 MHz

Min. limit exceeding

_____ dB

_____ MHz

Remarks: The limits are met.

The measurement was performed up to the 10th harmonic

FCC ID: KR5KESSY

Testresult in detail:

Electronic ignition lock (EZS) antenna - 1x 3D0 905 865

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
246	24	15	20	20	44	35	40	100.1
370	30	28	29	20	50	48	49	96.2
493	17	6	12	20	37	26	32	73.7
617	22	19	20	20	42	39	40	71.8
863	18	13	15	20	38	33	35	68.9
1110	16	9	12	20	36	29	32	66.7

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
246	<0	<0	<0	20	<20	<20	<20
370	<0	<0	<0	20	<20	<20	<20
493	<0	<0	<0	20	<20	<20	<20
617	<0	<0	<0	20	<20	<20	<20
863	<0	<0	<0	20	<20	<20	<20
1110	<0	<0	<0	20	<20	<20	<20

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
246	<0	<0	<0	20	<20	<20	<20	60.1
370	<0	<0	<0	20	<20	<20	<20	56.2
493	<0	<0	<0	20	<20	<20	<20	33.7
617	<0	<0	<0	20	<20	<20	<20	31.8
863	<0	<0	<0	20	<20	<20	<20	28.9
1110	<0	<0	<0	20	<20	<20	<20	26.7

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

0.009-30 MHz

Min. limit exceeding

_____ dB

_____ MHz

Remarks: The limits are met.

The measurement was performed up to the 10th harmonic

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

■ - Test not applicable

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

For TEST EQUIPMENT USED please refer to ATTACHMENT B: -----

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the EMI receiver (Level dBµV) 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	Level	+	Factor	=	Level	Limit	=	Delta
(MHz)	(dBµV)		(dB)		(dBµV/m)	(dBµV/m)		(dB)
719	75	+	32.6	=	107.6	110	=	-2.4

Frequency [MHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]

Testresult

The requirements are

O - MET

O - NOT MET

Min. limit margin

_____ dB

_____ MHz

Min. limit exceeding

_____ dB

_____ MHz

Remarks: NOT APPLICABLE.

Transmission frequency 125 kHz.

SPURIOUS EMISSION 1 GHz - 18 GHz

■ - Test not applicable

Testlocation :

- o - Open-site 1
- o - Open-site 2
- o - Anechoic chamber
- o - Full compact chamber

- o - 1 meters
- o - 3 meters
- o - 10 meters

For TEST EQUIPMENT USED please refer to ATTACHMENT B: -----

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the Spectrumalyzer in dBµV and adding the correction factors of the test setup incl. cables.

Example of the correction value at 1.8 GHz

Level reading at 1.8 GHz	Correction EMCO 3115	correction Amplifier AWT 4534 + cable	Correction factor (summarized)	corrected level
56 dBµV	+27.3 dB	-41.2 dB	-15.8 dB	42.1 dBµV/m

Testresult in detail:

Frequency [MHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]

Testresult

The requirements are

O - MET

O - NOT MET

Min. limit margin

_____ dB

_____ GHz

Min. limit exceeding

_____ dB

_____ GHz

Remarks: NOT APPLICABLE.
Transmission frequency 125 kHz.

FIELD STRENGTH OF THE FUNDAMENTAL WAVE

o - Test not applicable

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

For TEST EQUIPMENT USED please refer to ATTACHMENT B: CPR1

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the EMI receiver (Level dBµV) 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	Level	+	Factor	=	Level	-	Limit	=	Delta
(MHz)	(dBµV)		(dB)		(dBµV/m)		(dBµV/m)		(dB)
315	45	+	22.5	=	67.5	-	74.3	=	-6.8

Testresult in detail:

Bumper antennas - 2x 5WK4 5016

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	91	68	84	20	111	88	104	105.7

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
125	58	36	50	20	78	56	70

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	26	<0	13	20	46	<20	33	65.7

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

125 kHz

Min. limit exceeding

_____ dB

_____ kHz

Remarks: The limits are met.

Testresult in detail:

Interior antennas - 2x 5WK4 5014 / 1x 5WK4 5015

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	85	62	77	20	105	82	97	105.7

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
125	57	34	49	20	77	54	69

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	28	<0	13	20	48	<20	33	65.7

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

125 kHz

Min. limit exceeding

_____ dB

_____ kHz

Remarks: The limits are met.

Testresult in detail:

Door handle antennas - 2x 3D0 837 205/206

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	88	65	80	20	108	85	100	105.7

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
125	62	39	54	20	82	59	74

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	30	12	21	20	50	32	41	65.7

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

125 kHz

Min. limit exceeding

_____ dB

_____ kHz

Remarks: The limits are met.

Testresult in detail:

Backlite shelf antennas - 1x 5WK4 5017

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	85	62	78	20	105	82	98	105.7

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
125	60	36	52	20	80	56	72

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
125	33	13	19	20	53	33	39	65.7

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

125 kHz

Min. limit exceeding

_____ dB

_____ kHz

Remarks: The limits are met.

FCC ID: KR5KESSY

Testresult in detail:

Electronic ignition lock (EZS) antenna - 1x 3D0 905 865

Testdistance 3 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
123.35	64	63	63	20	84	83	83	105.8

Testdistance 10 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]
123.35	38	37	36	20	58	57	56

Testdistance 30 m

Frequency [kHz]	L: PK [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]
123.35	12	8	10	20	32	28	30	65.8

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

>5 dB

123.35 kHz

Min. limit exceeding

_____ dB

_____ kHz

Remarks: The limits are met.

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

■ - Test not applicable

Testlocation :

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

For TEST EQUIPMENT USED please refer to ATTACHMENT B: -----

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								
Temperature/°C	DC supply voltage/V	Power/dBm	Power/dBm	Power/dBm	Power/dBm	Power/dBm	Power/dBm	Power/dBm
-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:

- o - Standby
- o - Testprogram (H - Pattern)
- o - Testprogram (color bar)
- - Testprogram (customer specific)
- - Transmit in the frequency range of 123.13 kHz to 126.88 kHz.
- o - _____
- o - _____

Configuration of the equipment under test:

Following periphery devices and interface cables were connected during the measurement:

- - Power supply Type : MIKES
- - Control unit (M-Option) Type : 5WK4 7026
- - Control unit (Basic-Option) Type : 5WK4 7025
- o - _____ Type : _____
- o - _____ Type : _____
- o - _____ Type : _____

- - unshielded power cable
- o - unshielded cables
- o - shielded cables MPS.No.:
- - customer specific cables
- - Wiring harness (Test box - Control unit)
- - Wiring harness (Test box - Antennas)

SUMMARY

GENERAL REMARKS:

The product keyless access control system and immobilizer type KESY has been tested on the following antennas and frequencies:

- 5WK4 5014 - Center console antenna / rear arm rest antenna
TX-Mode: frequency 125 kHz
- 5WK4 5015 - Gearshift-lever housing antenna
TX-Mode: frequency 125 kHz
- 5WK4 5016 - Bumper antenna
TX-Mode: frequency 125 kHz
- 5WK4 5017 - Backlite shelf antenna
TX-Mode: frequency 125 kHz
- 3D0 905 865 - Electronic ignition lock (EVS) antenna
TX-Mode: frequency 125 kHz
- 3D0 837 205/206 - Outside door handle antenna
TX-Mode: frequency 123.35 kHz

SUMMARY

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 : December 4, 2000

Testing End Date : December 11, 2000

- MIKES BABT PRODUCT SERVICE GmbH -

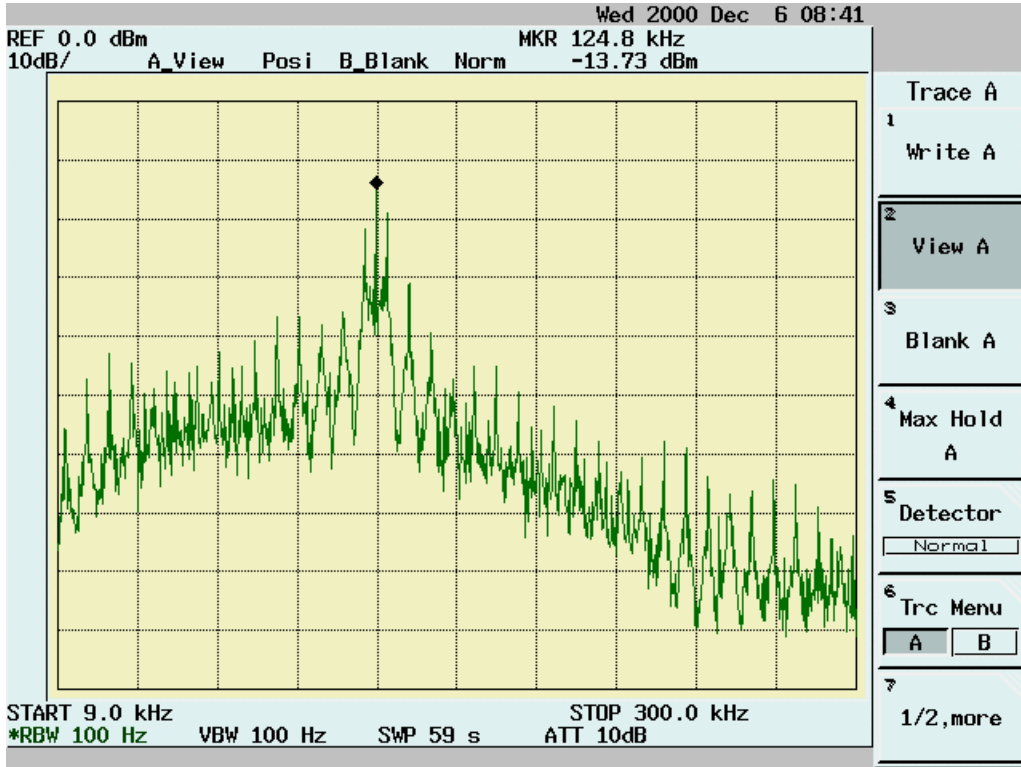
Test-engineer



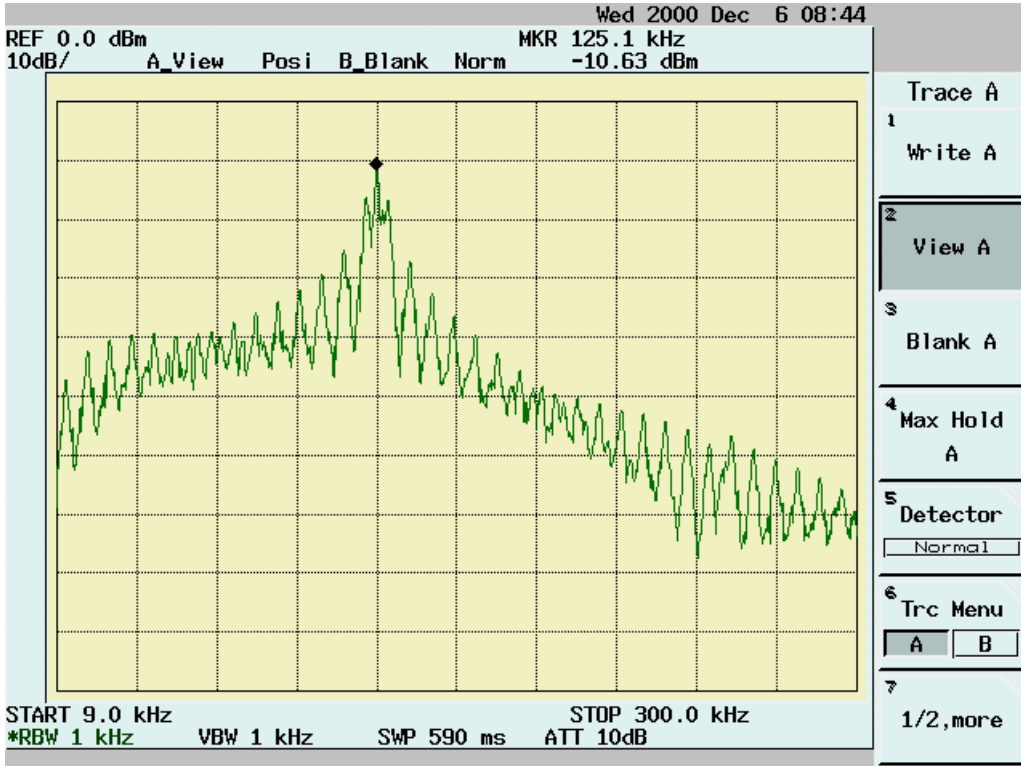
Günter Mikes
Dipl.-Ing.(FH)



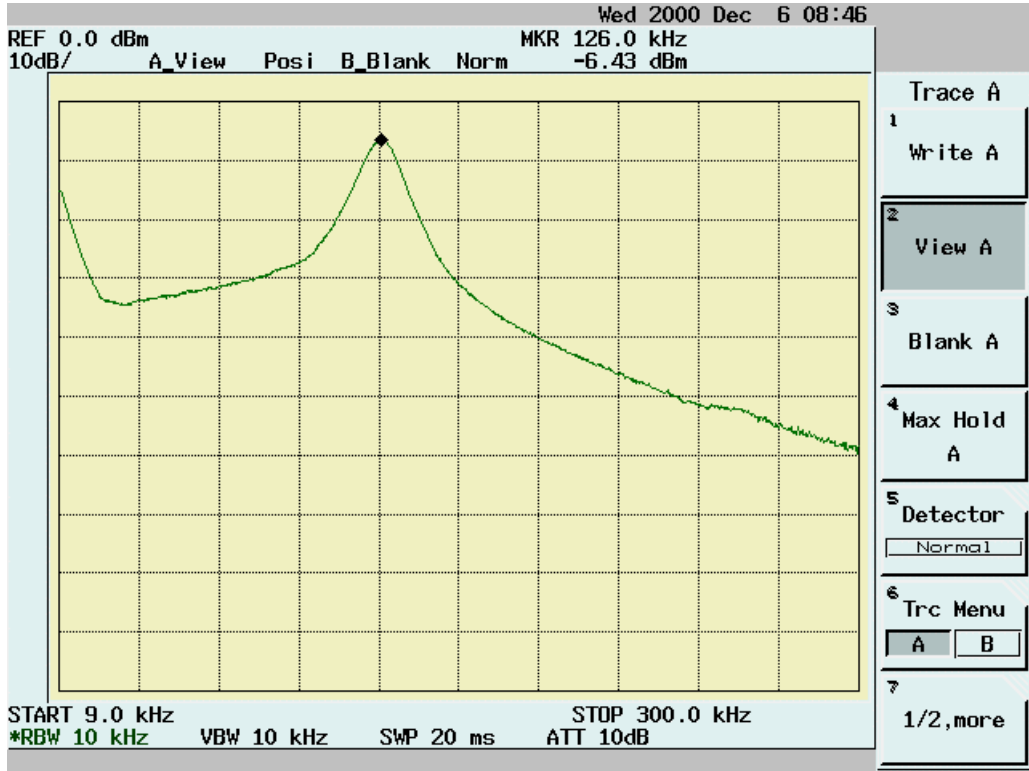
Josef Knab



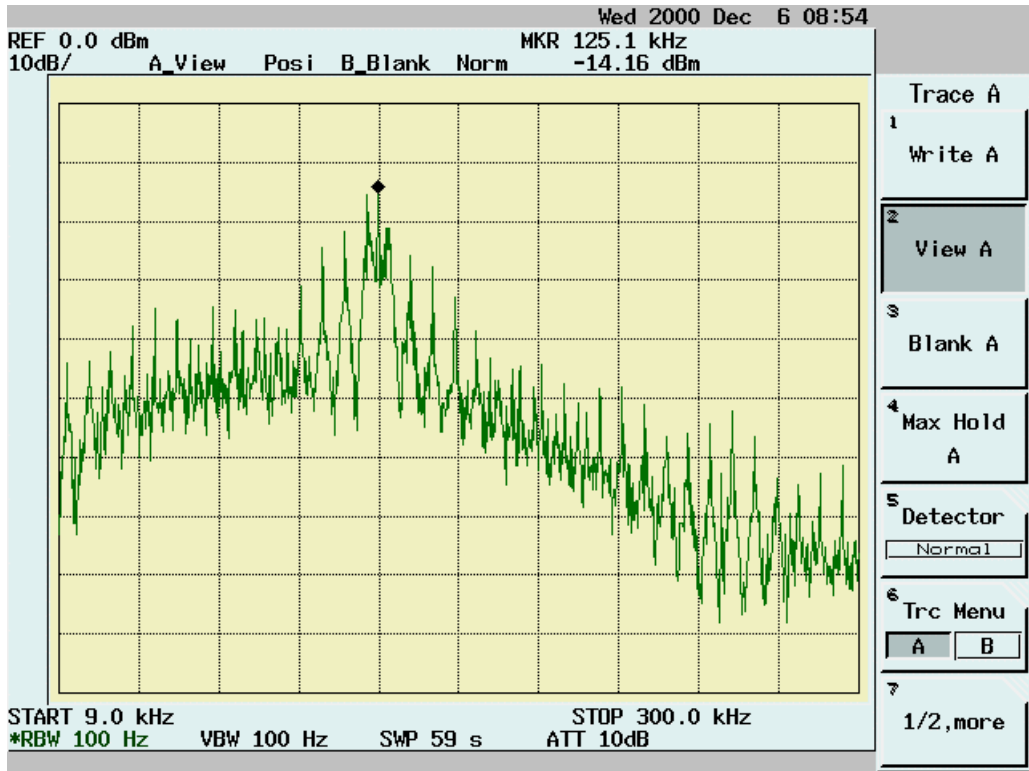
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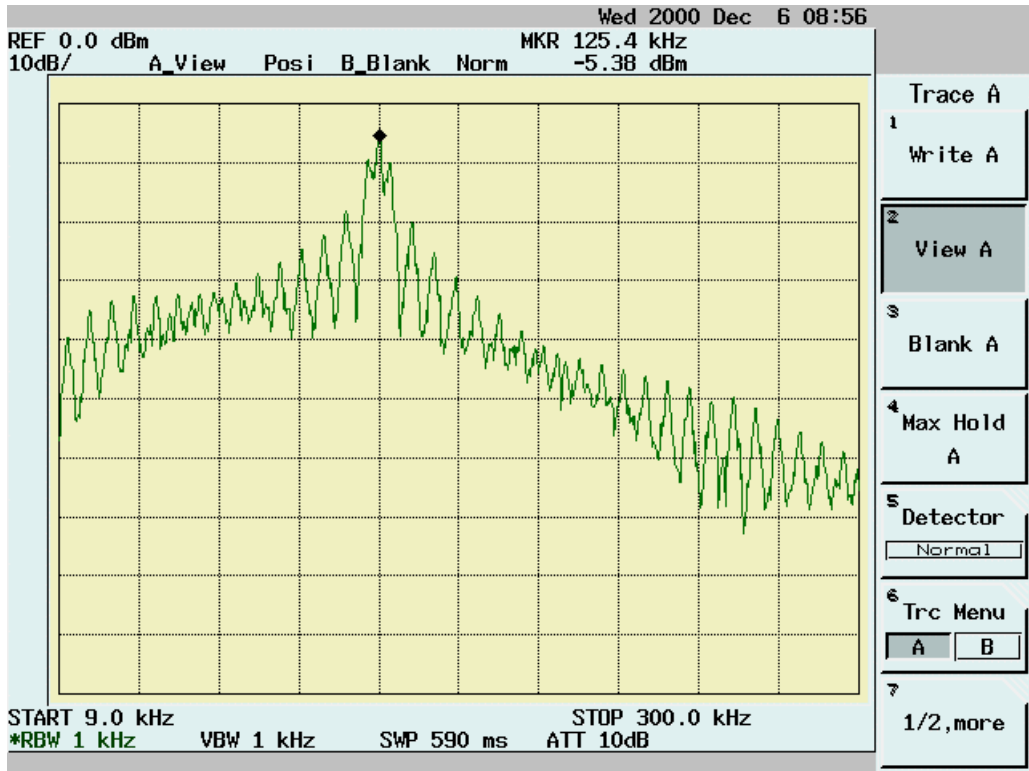
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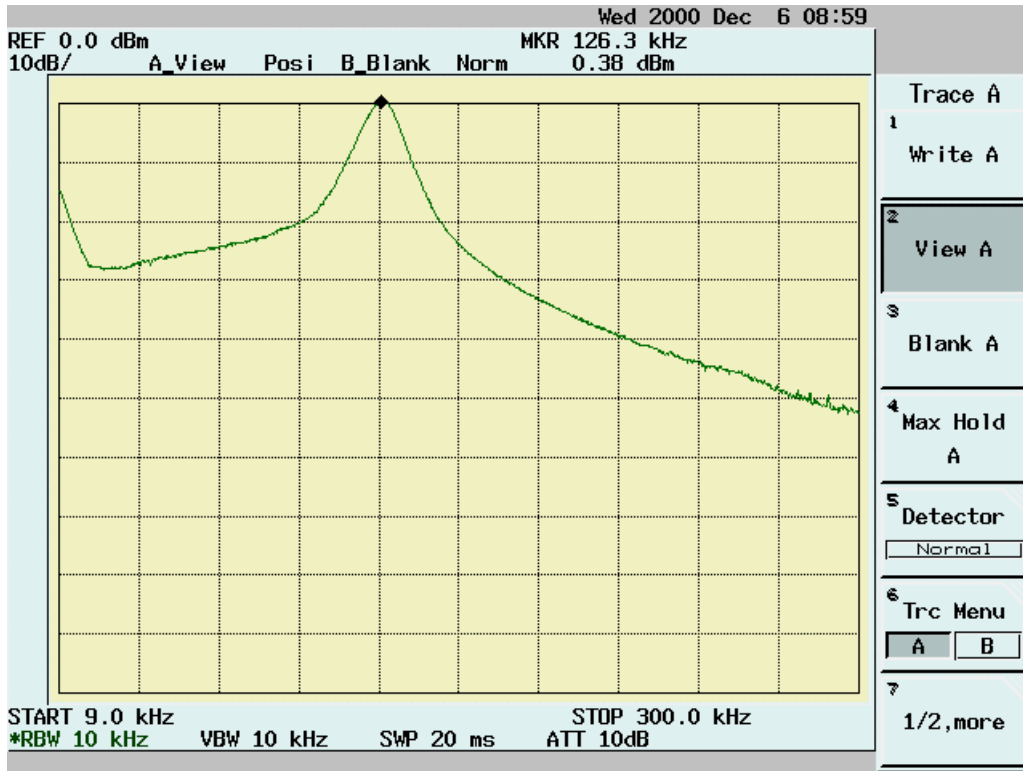
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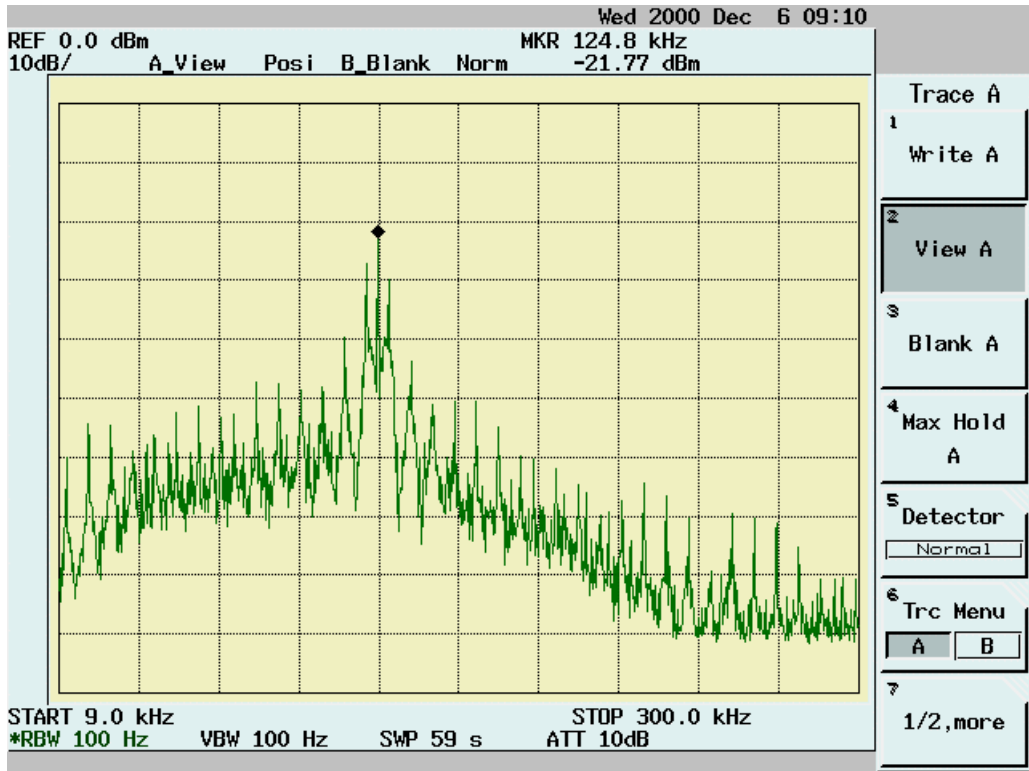
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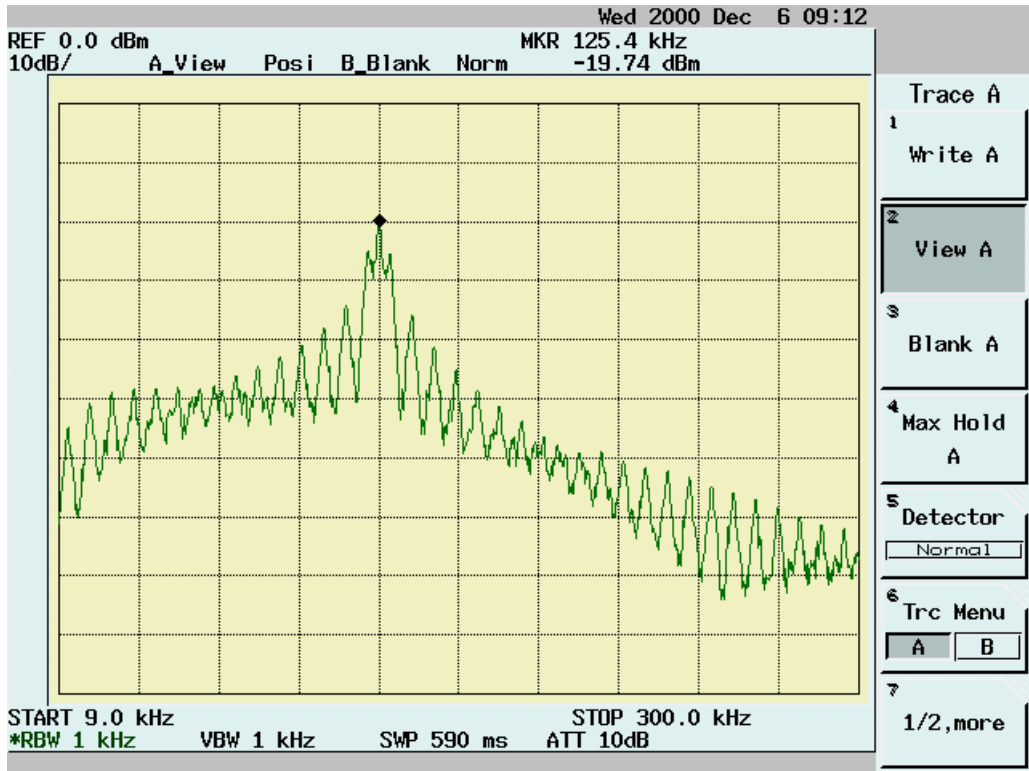
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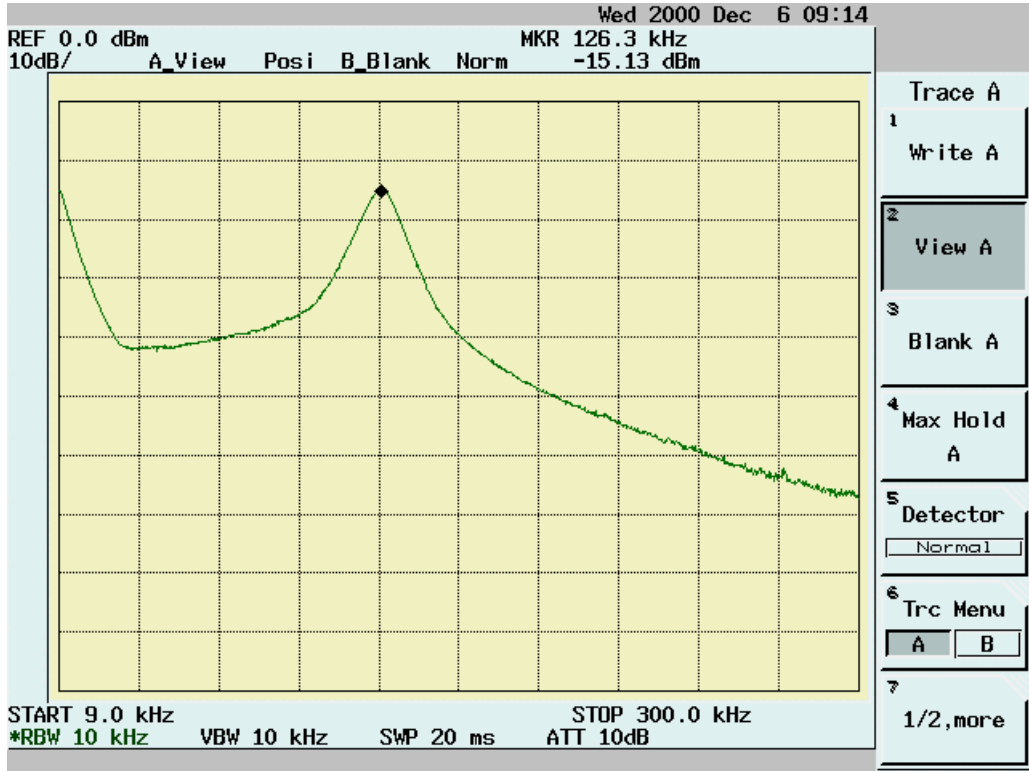
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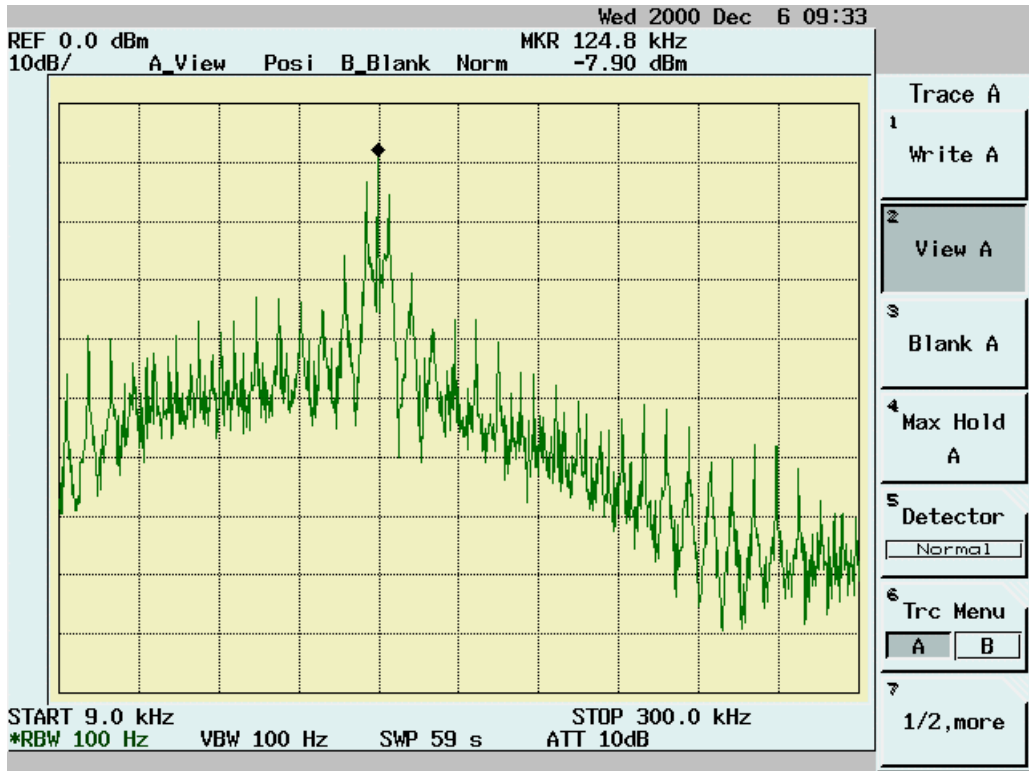
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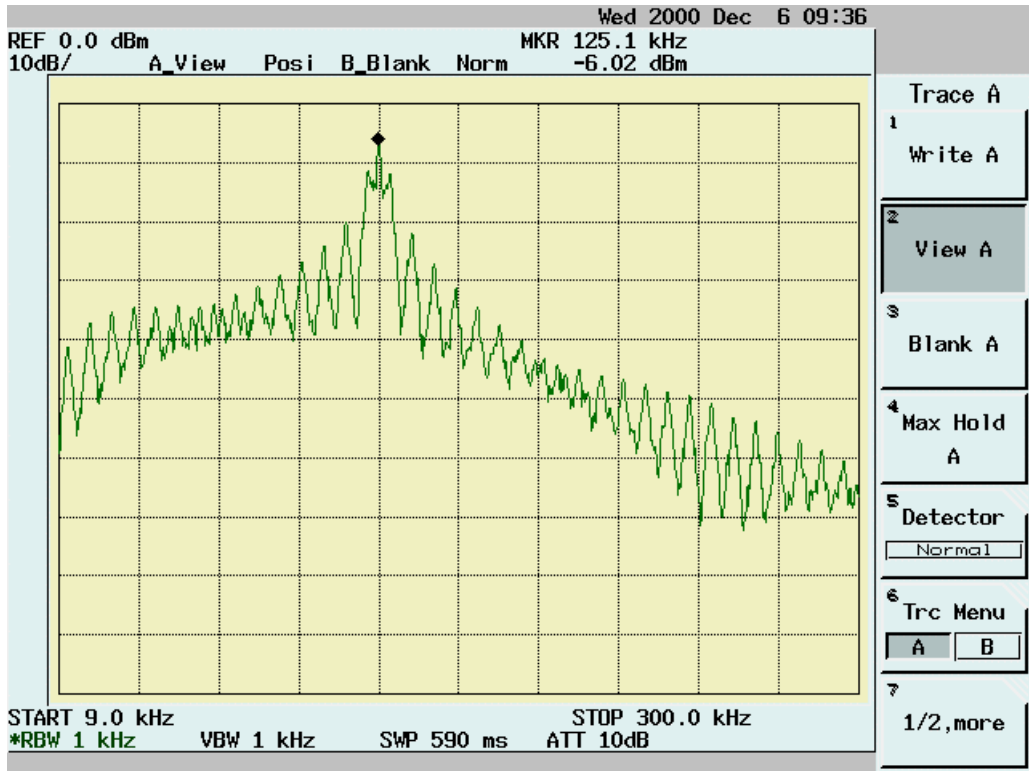
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5WK4 5015



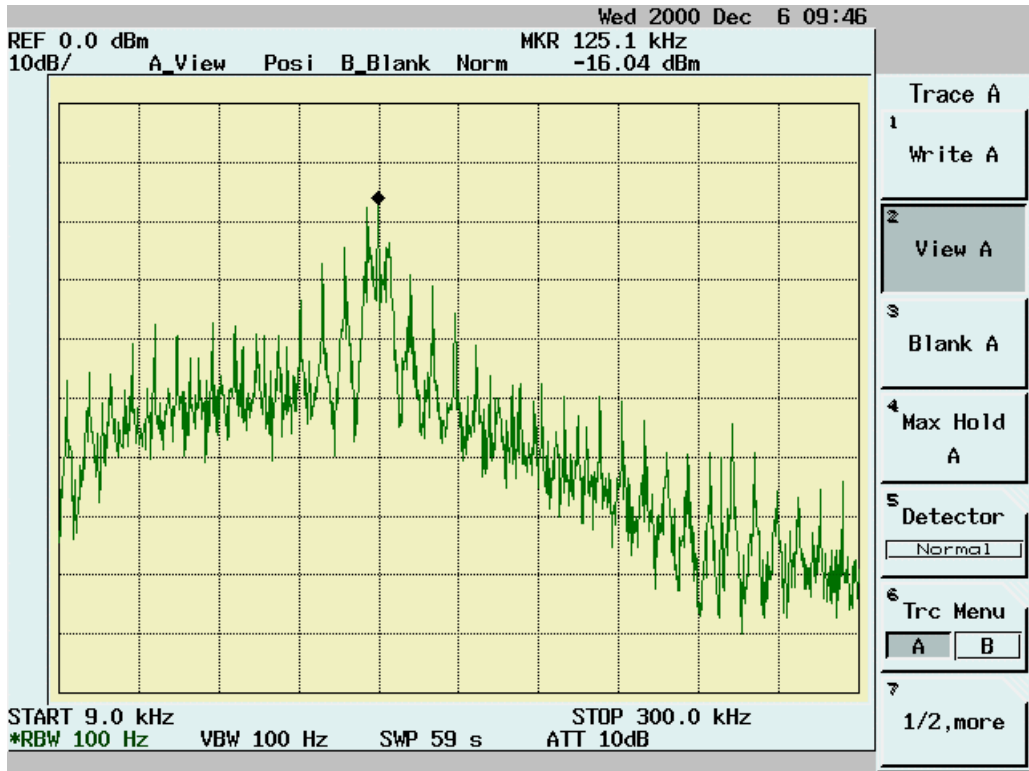
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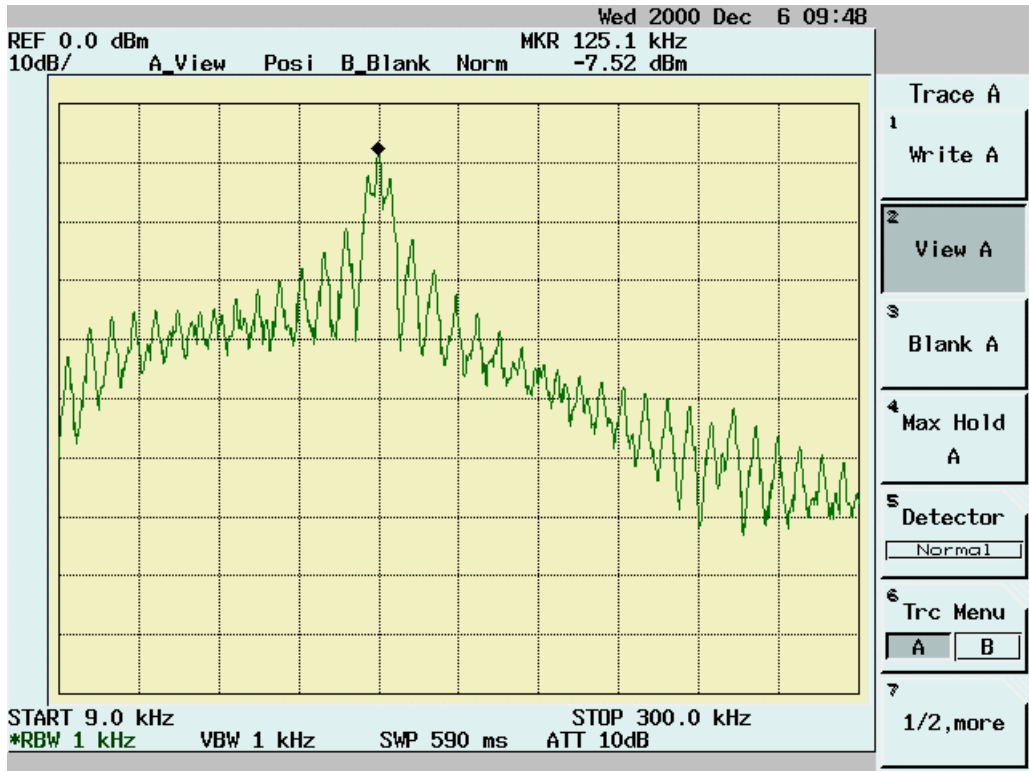
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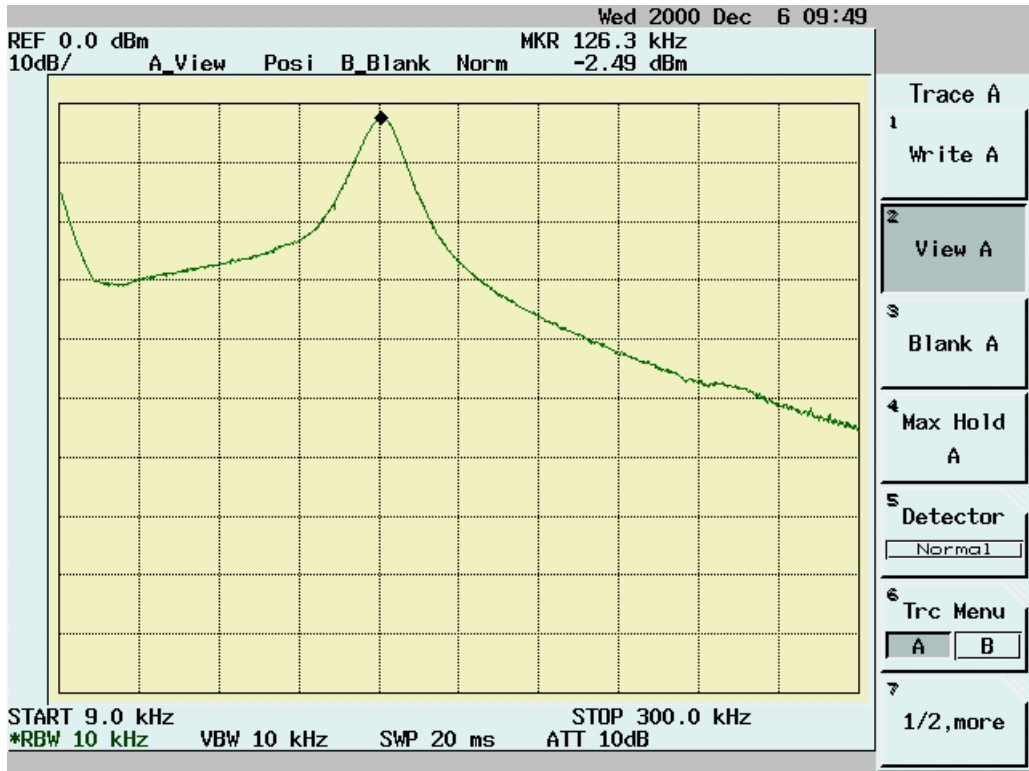
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5WK4 5017



5WK4 5017



5WK4 5017



3D0 905 865



3D0 905 865



3D0 905 865

Attachment : B

FCC ID KR5 KESSY

List of Test Equipment

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Test Report No: T 19905-1-02 KJ
 Beginning of Testing: 04-Dezember-2000

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR1	FMZB 1516	Antenna	Schwarzbeck G.	04-07/62-90-018
	ESHS 30	Test Receiver	Rohde & Schwarz	04-07/63-92-045
MB	HZ-10	Magnetic Field Antenna	Rohde & Schwarz	04-07/62-95-320
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
SER1	FMZB 1516	Antenna	Schwarzbeck G.	04-07/62-90-018
	ESHS 30	Test Receiver	Rohde & Schwarz	04-07/63-92-045

CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT

Licence holder:	Siemens Automotive AG		
Address:	Wernerwerkstrasse 2, D-93049 Regensburg, Germany		
Manufacturer:	Siemens Automotive AG		
Address:	Wernerwerkstrasse 2, D-93049 Regensburg, Germany		
Type:	Keyless access control and immobilizer system		
Model:	KESSY		
Serial-No.:		Protection class:	

Additional informations to the above named model:

Antenna: Center console antenna / rear arm rest antenna (5WK4 5014) transmitter	Type: Loop	Length/size: 0,0103 m2
	Type: Ferrite	Length/size: 0,0103 m2
Antenna: Gearshift-lever (5WK4 5015) transmitter:		
Antenna: Bumper (5WK4 5016) transmitterer	Type: Loop	
	Length/size: 0,0006 m2	
Antenna: Backlite shelf (5WK4 5017) transmitter	Type: Loop	
	Length/size: 0,005 m2	
Antenna: 3D0 905 865 Electronic ignition lock transmitter	Type: Loop	
	Length/size: 0,0008 m2	
Antenna: 3D0 837 205/206 Outside door handle transmitter	Type: Ferrite	
	Length/size: 0,000126 m2	
receiver:	Type:	
	Length/size:	
Power supply of the transmitter:		
Type:	vehicle battery	nominal voltage: 13,5 V
		lowest voltage: 12 V
		highest voltage: 17,5 V
Power supply of the receiver:		
Type:		nominal voltage: V

Ancillary equipment:

Description:	Type:	Serial-no.:
Description:	Type:	Serial-no.:
Description:	Type:	Serial-no.:

O If applicable, if necessary complete overleaf

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FCC ID KR5 KESSY

Extreme temperature range in which the approval test should be performed:

- Category I: General (-20°C to +55°C)
- Category II: Portable (-10°C to +55°C)
- Category III: Equipment for normal indoor use (0°C to +55°C)

Connectable cables:

Name of the cable	Digital	Length/m	shielded
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no

0 If applicable, if necessary complete overleaf

Page D 2

Type designation: KESSY			
Name and type designation of individual units comprising the radio equipment:			
Type of equipment:			
<input type="checkbox"/> Radiotelephone equipment	<input type="checkbox"/> Remote-control equipment	<input type="checkbox"/> Radiomaritime equipment	<input type="checkbox"/> LPD
<input type="checkbox"/> One-way radiotelephone equipment	<input checked="" type="checkbox"/> Inductive loop system	<input type="checkbox"/> Inland waterways equipment	<input type="checkbox"/> RLAN
<input type="checkbox"/> Personal paging system	<input type="checkbox"/> Radio-relay system	<input type="checkbox"/> Radionavigation equipment.	<input type="checkbox"/>
<input type="checkbox"/> Satellite earth station	<input type="checkbox"/> CB radiotelephone equipment	<input type="checkbox"/> Antenna	<input type="checkbox"/>
<input type="checkbox"/> Data transmission equipment	<input type="checkbox"/> Movement detector	<input type="checkbox"/> Aeronautical equipment	<input type="checkbox"/>
Technical characteristics:			
	Transmitter-receiver	Transmitter	Receiver
Frequency range		125 kHz ± 1,5 %	
Maximum no. of channels		1	
Channel spacing		n.a.	
Class of emission (type of modulation)		K1D	
Maximum RF output power		42,0 dBµA/m at 10 meter	
Maximum effective radiated power (ERP)		22,0 dBµA/m at 10 meter	
Output power variable		n.a.	
Channel switching frequency range		n.a.	
Method of frequency generation	<input type="checkbox"/> Synthesizer	<input checked="" type="checkbox"/> Crystal	<input type="checkbox"/> Other
Frequency generation TX			
Frequency generation RX			
IF	1st IF	2nd IF	3rd IF
Integral selective calling			
Audio-frequency interface level at external data socket			
Modes of operation	<input type="checkbox"/> Duplex mode	<input type="checkbox"/> Semi-duplex mode	<input checked="" type="checkbox"/> Simplex mode
Power source	<input type="checkbox"/> Mains	<input checked="" type="checkbox"/> Vehicle-regulated	<input type="checkbox"/> Integral
Antenna socket	<input type="checkbox"/> BNC <input type="checkbox"/> M <input type="checkbox"/> None	<input type="checkbox"/> TNC <input type="checkbox"/> UHF <input type="checkbox"/>	<input type="checkbox"/> N <input type="checkbox"/> Adapter <input type="checkbox"/>
Test specifications:			

O If applicable, if necessary complete overleaf

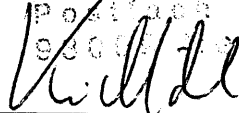
Page D 3

FCC ID KR5 KESSY

Declarations:

- We declare that the above information are correct and the named model was supplied with the maximum configuration to the accredited test laboratory.

Regensburg, 18.12.2000
_____, date
place of issue

SIEMENS Aktiengesellschaft
Bereich Automobiltechnik
Postfach 10 00 55
93002 Regensburg


Seal and signature of applicant