

FCC ID:KR55WK49266

EMI -- TEST REPORT**Test Report No. : T30484-00-02HU**

24. January 2006

Date of issue

Type / Model Name : 5WK49266Product Description : Radio Frequency Transmitter / Receiver**Applicant** : Siemens VDO Automotive AGAddress : Siemensstrasse 12D-93055 Regensburg, Germany**Manufacturer** : Siemens VDO Automotive AGAddress : Siemensstrasse 12D-93055 Regensburg, Germany**Licence holder** : Siemens VDO Automotive AGAddress : Siemensstrasse 12D-93055 Regensburg, Germany**Test Result** according to the
standards listed in clause 1 test
standards:**POSITIVE**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test
results without the written permission of the test
laboratory.

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1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart C - Intentional Radiators (October 01, 2004)

Part 15, Subpart C, Section 15.249	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz
Part 15, Subpart C, Section 15.35(c)	Correction for Pulse Operation (Duty Cycle)
Part 15, Subpart C, Section 15.203	Antenna requirement
Part 15, Subpart C, Section 15.204	External radio frequency power amplifiers and antenna modifications
Part 15, Subpart C, Section 15.209(a)	Radiated emissions, general requirements
ANSI C63.4-2003, Section 13.1.7	Occupied bandwidth measurements

FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (October 01, 2004)

2 SUMMARY

GENERAL REMARKS:

None

FINAL ASSESSMENT:

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 05. January 2006

Testing concluded on : 11. January 2006

Checked by:

Tested by:

Klaus Gegenfurtner
Dipl.-Ing.(FH)
Manager: Radio Group

Huber Markus

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3 EQUIPMENT UNDER TEST

3.1 Photo documentation of the EuT

5WK49266

External Photo
Front view



FCC ID:KR55WK49266

5WK49266

External Photo
Rear view



FCC ID:KR55WK49266

5WK49266

External Photo
Side view left



FCC ID:KR55WK49266

5WK49266

External Photo
Side view right



FCC ID:KR55WK49266

5WK49266

External Photo
Top view



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FCC ID:KR55WK49266

5WK49266

External Photo
Bottom view



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5WK49266

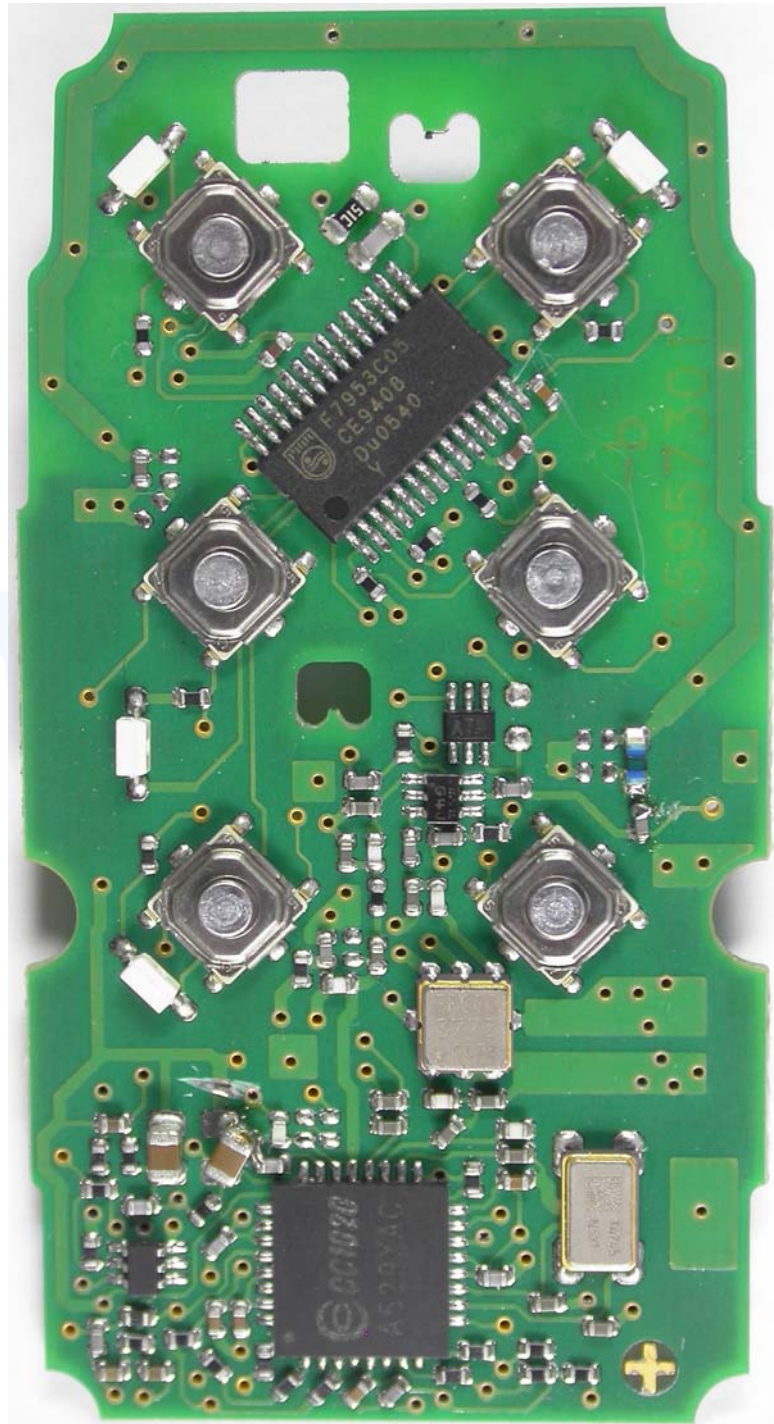
Internal Photo
Rear view of open battery cover



FCC ID:KR55WK49266

5WK49266

Internal Photo
Front view PCB



FCC ID:KR55WK49266

5WK49266

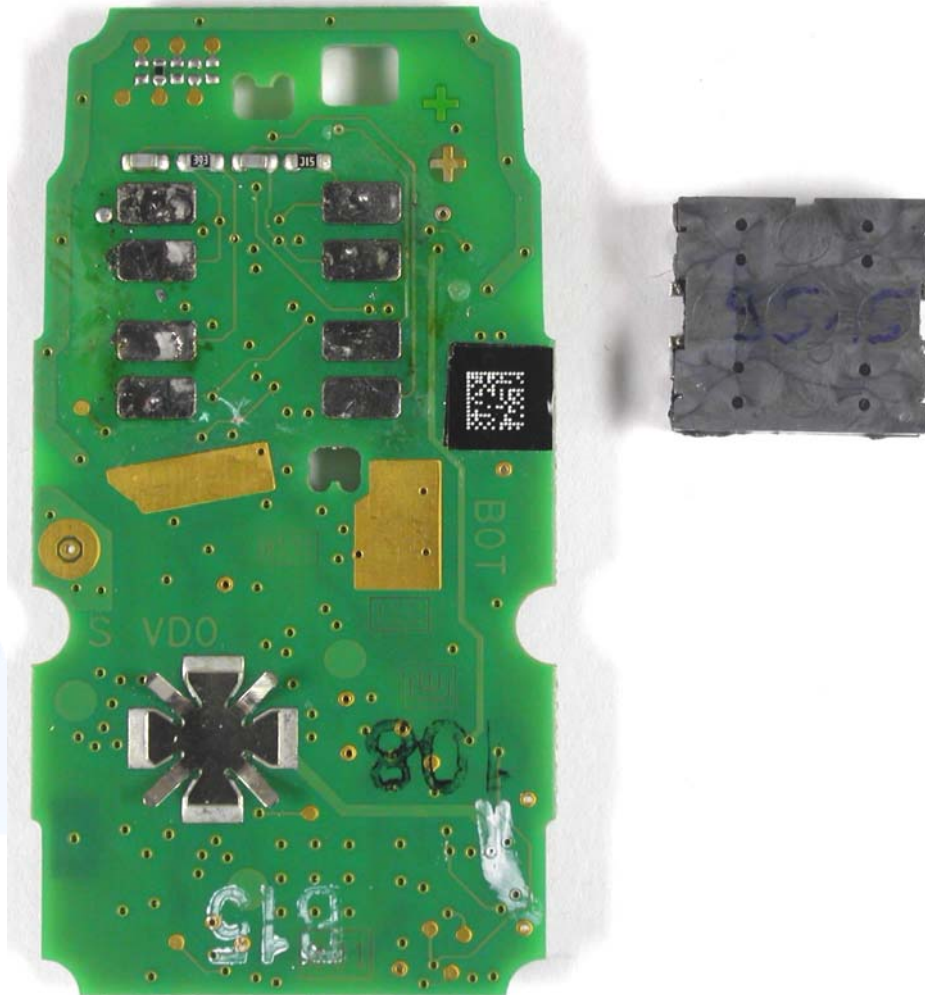
Internal Photo
Rear view PCB



FCC ID:KR55WK49266

5WK49266

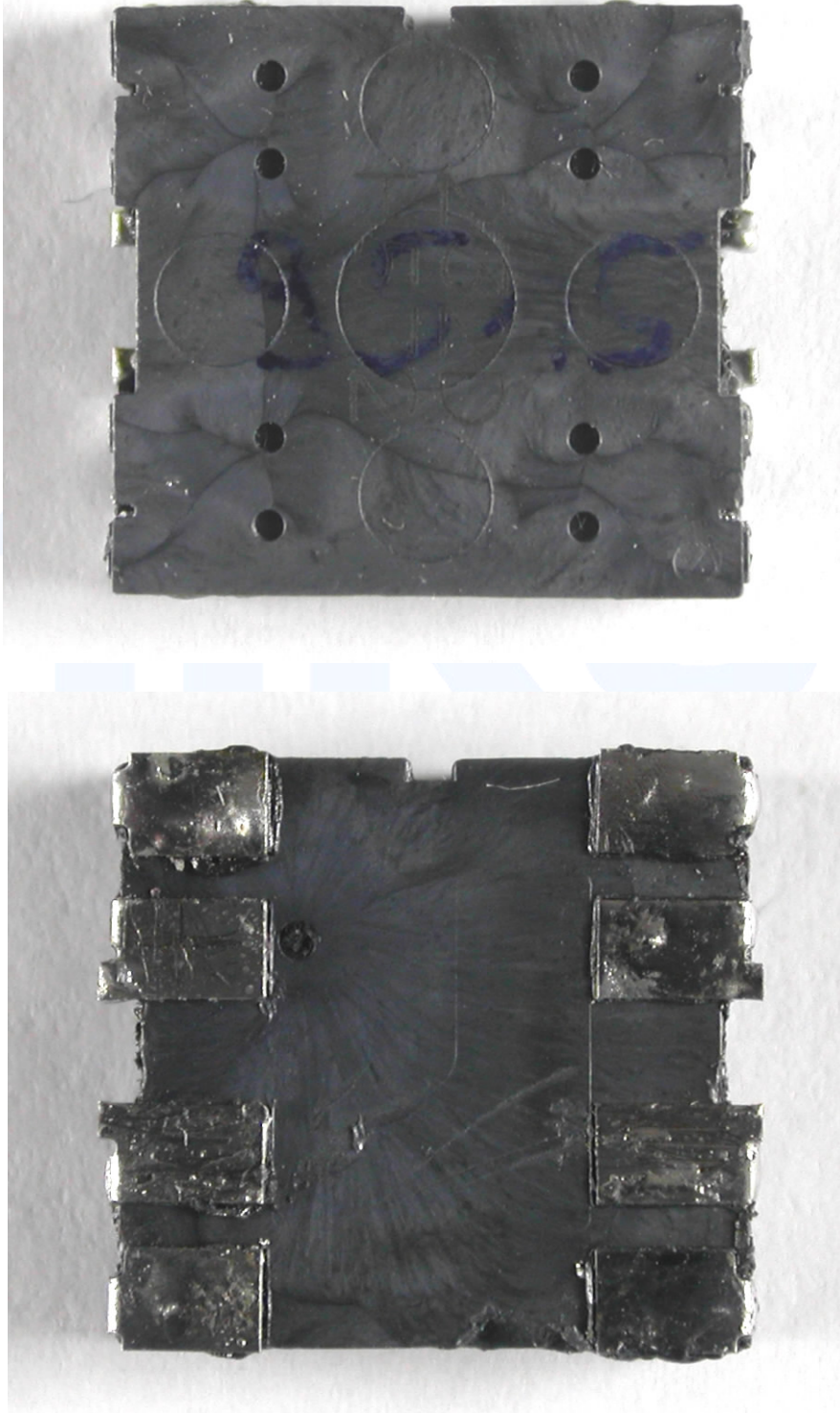
Internal Photo
Rear view PCB without Rx Antenna



FCC ID:KR55WK49266

5WK49266

Internal Photo
Rx Antenna



3.2 Power supply system utilised

Power supply voltage : 3,0 V / DC lithium battery (CR 2430)

3.3 Short description of the Equipment under Test (EuT)

The EuT is a hand held wireless transmitter of a remote control system for vehicles. The system consist of a remote key which is a RF transmitter/receiver and a RF transmitter/receiver unit at the vehicle.

The remote key is used to transmit information for unlocking or locking the vehicle by a bidirectional RF transmission line for normal remote operation by pressing a button.

If the telegram which was received from the vehicle unit is not corrupted the vehicle unit will send an acknowledgement message to the remote key. If the acknowledgement message is not received by the remote key, the remote key will repeat the transmission at the second channel.

The RF transmitter/receiver is mechanically integrated in the head of the key.

Number of tested samples: 1

Serial number: Prototype

EuT operation mode:

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

- Tx Mode at 902,16MHz and 903,575MHz

- Standby / Receiving mode

-

EuT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- _____	Model : _____
- _____	Model : _____
- _____	Model : _____
- _____	Model : _____
- _____	Model : _____
- _____	Model : _____

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

mikes-testingpartners gmbh
Ohmstrasse 2-4
94342 Strasskirchen
Germany

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the 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. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 /11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. 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.

4.4 Measurement Protocol for FCC, VCCI and AUSTEL

4.4.1 GENERAL INFORMATION

4.4.1.1 Test Methodology

Conducted and radiated disturbance testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1997), 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 (1997). 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 C63.4-2003 procedures and using the CISPR 22 Limits.

4.4.1.2 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 it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum disturbances from the unit.

4.4.2 DETAILS OF TEST PROCEDURES

4.4.2.1 General Standard Information

The test methods used comply with CISPR Publication 22 (1997), EN 55022 (2001) and AS 3548 (1992) - "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment" and with ANSI C63.4-2003 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

mikes

5 TEST CONDITIONS AND RESULTS

5.1 Conducted emissions

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location:

5.1.2 Photo documentation of the test set-up

5.1.3 Description of Measurement

The final level, expressed in dB μ 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 μ V and μ 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 quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeter's above the floor and is positioned 40 centimeter's 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 quasi-peak and average detection and recorded on the data sheets.

5.1.4 Test result

Frequency range:

Min. limit margin

Remarks: The measurement is not applicable.

The EuT is battery powered.

5.2 Radiated power of the fundamental wave

For test instruments and accessories used see section 6 Part CPR 2.

5.2.1 Description of the test location

Test location: OATS1

Test distance: 3 metres

5.2.2 Photo documentation of the test set-up



5.2.3 Description of Measurement

The radiated power of the fundamental wave from the EUT is measured in the frequency range of 30 to 1000 MHz 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 quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003.

The Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres 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 polarization's and the EuT are rotated 360 degrees.

The final level, expressed in dB μ V/m, is arrived by taking the reading from the EMI receiver (Level dB μ 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.

The radiated power of the fundamental wave from the EUT is measured in the frequency range above 1 GHz using a tuned receiver (Spectrum Analyser) and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003.

The Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres 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 horizontally from the EuT.

Measurement are made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution as well as video bandwidth set to 1 MHz. All tests are performed at a test-distance of 3 meters. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration procedure the highest emission relative the limit and therefore shall be used for final testing. During the tests the EUT is rotated all around to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions. When the EuT is larger than the beamwidth of the measuring antenna, the measurement antenna will be moved over the surfaces for the four sides or the test distance will be reduced to demonstrate that emissions were at maximum at the limit distance.

The resolution bandwidth during the measurement is as follows:

30 MHz – 1000 MHz:	ResBW: 120 kHz
1000 MHz – 40 GHz	ResBW: 1 MHz

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5.2.4 Test result

Channel1:

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
902,16	60,5	59,6	120	27,4	87,9	87,0	94,0	6,1

Channel 2:

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
903,575	62,3	60,1	120	27,4	89,7	87,4	94,0	4,3

Quasipeak-Limit according to FCC Subpart 15.249(a) for fundamental and harmonics

Frequency (MHz)	Fieldstrength of fundamental		Fieldstrength of harmonics	
	(mV/m)	dB (μV/m)	(μV/m)	dB (μV/m)
902-928	50	94	500	54
2400-2483.5	50	94	500	54
5725-5875	50	94	500	54

The requirements are **FULFILLED**.

Remarks:

5.3 Radiated emissions (electric field) 30 MHz – 40 GHz

For test instruments and accessories used see section 6 Part SER 2, SER 3.

5.3.1 Description of the test location

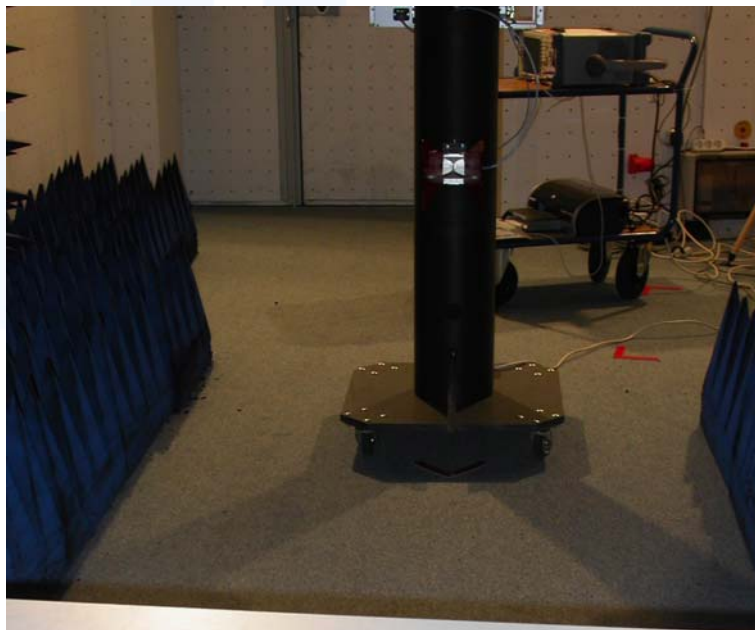
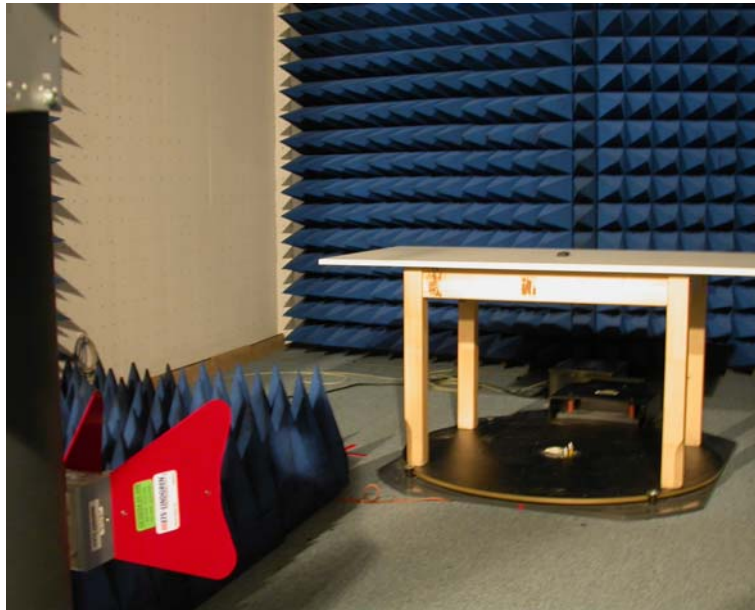
Test location: OATS1
Test location: Anechoic Chamber A2

Test distance: 3 metres

5.3.2 Photo documentation of the test set-up



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5.3.3 Description of Measurement

Radiated spurious emissions from the EuT are measured in the frequency range of 30 MHz to 1000 MHz 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 quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003. The Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres 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 polarization's and the EuT are rotated 360 degrees.

The final level, expressed in dB μ V/m, is arrived by taking the reading from the EMI receiver (Level dB μ 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.

The radiated emissions from the EuT are measured in the frequency range of 1 GHz to maximum frequency as specified in section 15.33, using a tuned receiver (Spectrum Analyser) and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The set up of the Equipment under test will be in accordance to ANSI C63.4-2003.

The Interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimetres 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 horizontally from the EuT.

Measurement are made in both the horizontal and vertical planes of polarization in a fully anechoic room using a spectrum analyzer with the detector function set to peak and resolution as well as video bandwidth set to 1 MHz. All tests are performed at a test-distance of 3 meters. Hand-held or body-worn devices are rotated through three orthogonal axes to determine which attitude and configuration procedure the highest emission relative the limit and therefore shall be used for final testing. During the tests the EUT is rotated all around to find the maximum levels of emissions. The cables and equipment were placed and moved within the range of position likely to find their maximum emissions. When the EuT is larger than the beamwidth of the measuring antenna, the measurement antenna will be moved over the surfaces for the four sides or the test distance will be reduced to demonstrate that emissions were at maximum at the limit distance.

The resolution bandwidth during the measurement is as follows:

30 MHz – 1000 MHz:	ResBW: 120 kHz
1000 MHz – 40000 MHz	ResBW: 1 MHz

5.3.4 Test result

Testresult in detail: (<1GHz)

Channel1: Center frequency: 902,16 MHz

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
30-1000			120		<30			>20

Channel 2: Center frequency: 903,575 MHz

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
30-1000			120		<30			>20

Testresult in detail:(>1GHz)

Corrected field strength of fundamental wave as reference for radiated emissions:

87,9 dBμV/m

Channel 1									
Frequency [MHz]	Reading Level PK [dBμV]	Level AV [dBμV]	Bandwidth [kHz]	Correct. Factor [dB]	Corrected Level PK [dBμV/m]	Corrected Level AV [dBμV/m]	Limit PK [dBμV/m]	Limit AV [dBμV/m]	Delta [dB]
1804,32	62,4	50,0	1000	-13,1	49,3	36,9	74,0	54,0	17,1
2706,48	50,9	41,4	1000	-9,4	41,5	32,0	74,0	54,0	22,0
3608,64	50,5	38,4	1000	-8,5	42,0	29,9	74,0	54,0	24,1

Corrected field strength of fundamental wave as reference for radiated emissions:

89,7 dBμV/m

Channel 2									
Frequency [MHz]	Reading Level PK [dBμV]	Level AV [dBμV]	Bandwidth [kHz]	Correct. Factor [dB]	Corrected Level PK [dBμV/m]	Corrected Level AV [dBμV/m]	Limit PK [dBμV/m]	Limit AV [dBμV/m]	Delta [dB]
1807,15	66,9	52,7	1000	-13,1	53,8	39,6	74,0	54,0	14,4
2710,73	52,6	43,5	1000	-9,4	43,2	34,1	74,0	54,0	19,9
3614,31	51,7	38,8	1000	-8,5	43,2	30,3	74,0	54,0	23,7

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Average-Limit according to FCC Subpart 15.249(a)

Frequency (MHz)	Fieldstrength of harmonics	
	($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)
902-928	500	54
2400-2483.5	500	54
5725-5875	500	54

Peak-Limit according to FCC Subpart 15.249(a), Subpart 15.249(e)

Frequency (MHz)	Fieldstrength of harmonics	
	($\mu\text{V/m}$)	dB ($\mu\text{V/m}$)
902-928	5000	74
2400-2483.5	5000	74
5725-5875	5000	74

Average-Limit according to FCC Subpart 15.249(d) for spurious emissions outside of the specified frequency band:

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Channel 1:

Frequency [MHz]	50dB below of the fundamental [dB $\mu\text{V/m}$]	15.209 Limits [dB $\mu\text{V/m}$]	General Radiated Limits [dB $\mu\text{V/m}$]
30-88	44	40	44
88-216	44	43,5	44
216-960	44	46	46
Above 960	44	54	54

Channel 2:

Frequency [MHz]	50dB below of the fundamental [dB $\mu\text{V/m}$]	15.209 Limits [dB $\mu\text{V/m}$]	General Radiated Limits [dB $\mu\text{V/m}$]
30-88	44	40	44
88-216	44	43,5	44
216-960	44	46	46
Above 960	44	54	54

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Restricted bands of operation:

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209

MHz	MHz	GHz
25.5 – 25.67	960 – 1240	4.5 – 5.15
37.5 – 38.25	1300 – 1427	5.35 – 5.46
73 – 74.6	1435 – 1626.5	7.25 – 7.75
74.8 – 75.2	1645.5 – 1646.5	8.025 – 8.5
108 – 121.94	1660 – 1710	9.0 – 9.2
123 – 138	1718.8 – 1722.2	9.3 – 9.5
149.9 – 150.05	2200 – 2300	10.6 – 12.7
156.52475 – 156.52525	2310 – 2390	13.25 – 13.4
156.7 – 156.9	2483.5 – 2500	14.47 – 14.5
162.0125 – 167.17	2655 – 2900	15.35 – 16.2
167.72 – 173.2	3260 – 3267	17.7 – 21.4
240 – 285	3332 – 3339	22.01 – 23.12
322 – 335.4	3345.8 – 3358	23.6 – 24.0
399.9 – 410	3600 – 4400	31.2 – 31.8
608 – 614		36.43 – 36.5

The requirements are **FULFILLED**.

Remarks: During the test, the Eut was set into continuous transmitting mode.

The measurement was performed up to the 10th harmonic of channel 2 (9035,75 MHz).

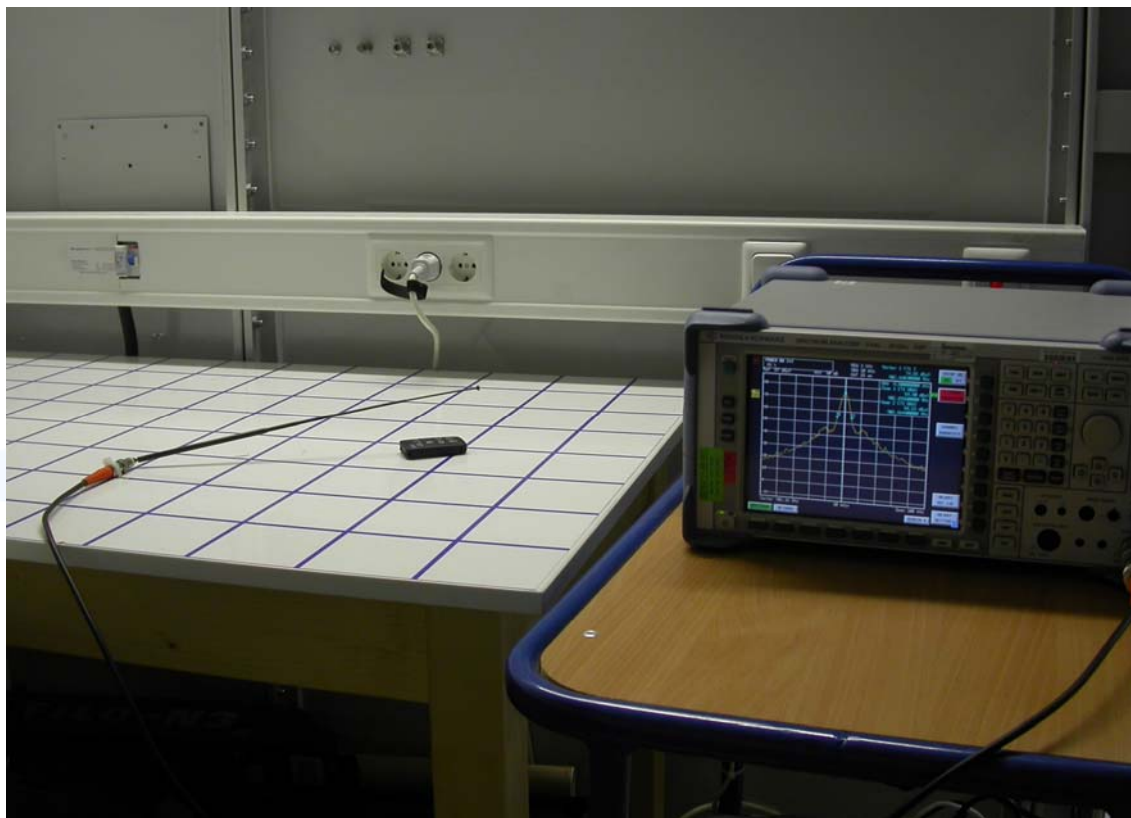
5.4 Emission Bandwidth

For test instruments and accessories used see section 6 Part MB.

5.4.1 Description of the test location

Test location: Shielded Room S4

5.4.2 Photo documentation of the test set-up



5.4.3 Description of Measurement

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio of -20 dB. The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or the first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical.

The resolution bandwidth of measuring instrument was set to a value as shown in the following table below according to ANSI C63.4-2003.

Fundamental frequency	Minimum resolution bandwidth
9 kHz to 30 MHz	1kHz
30 to 1000 MHz	10 kHz
1000 MHz to 40 GHz	100 kHz

5.4.4 Test result

Channel Frequency [MHz]	20 dB Bandwidth [kHz]
902,16	41,0

Channel Frequency [MHz]	20 dB Bandwidth [kHz]
903,575	39,0

Remarks: For detailed test result please refer to following test protocol.

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Channel 1: Center frequency:902,16 MHz

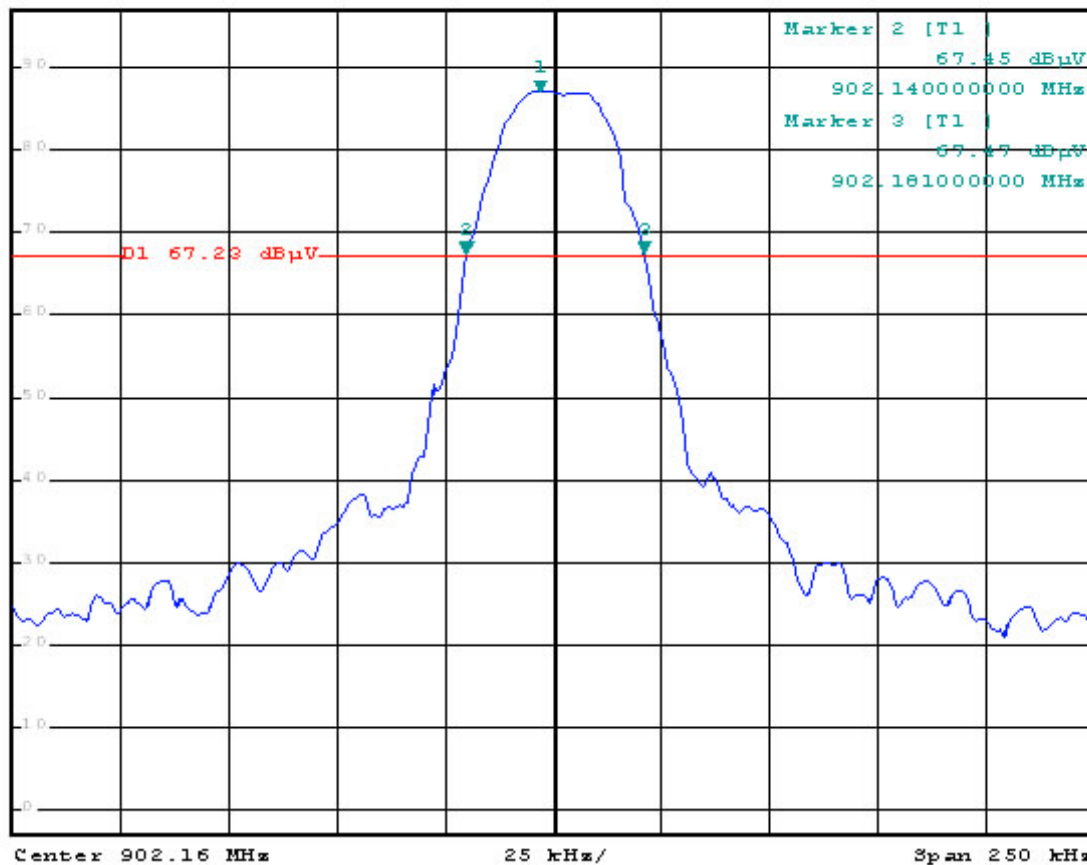


* RBW 10 kHz Marker 1 [T1]
VBW 30 kHz 67.23 dBμV
SWT 2.5 ms 902.157000000 MHz

Ref 97 dBμV

Att 20 dB

1 PR
VIEW



Center 902.16 MHz

25 kHz/

Span 250 kHz

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Channel 1: Center frequency:902,16 MHz



RBW 10 kHz Marker 1 [T1]
VBW 30 kHz 66.61 dBμV
SWT 2.5 ms 903.581000000 MHz

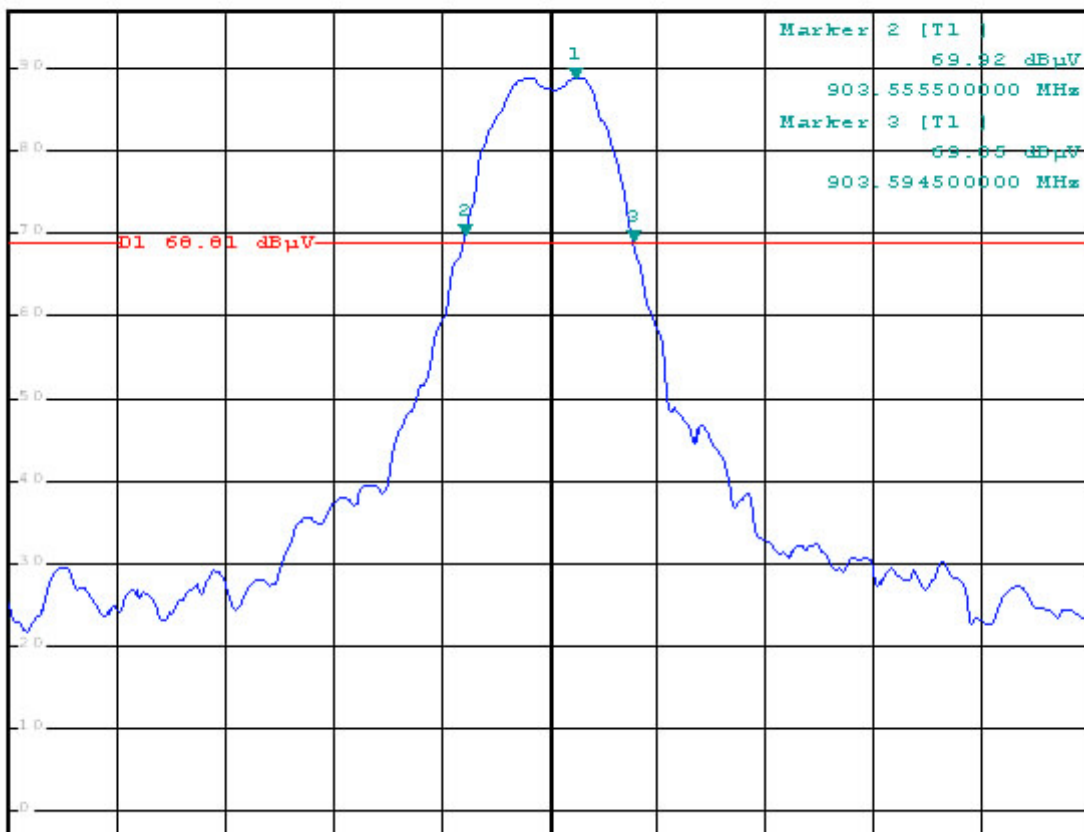
Ref 97 dBμV

Att 20 dB

SWT 2.5 ms

903.581000000 MHz

1 PE
VIEW



Center 903.575 MHz

25 kHz/

Span 250 kHz

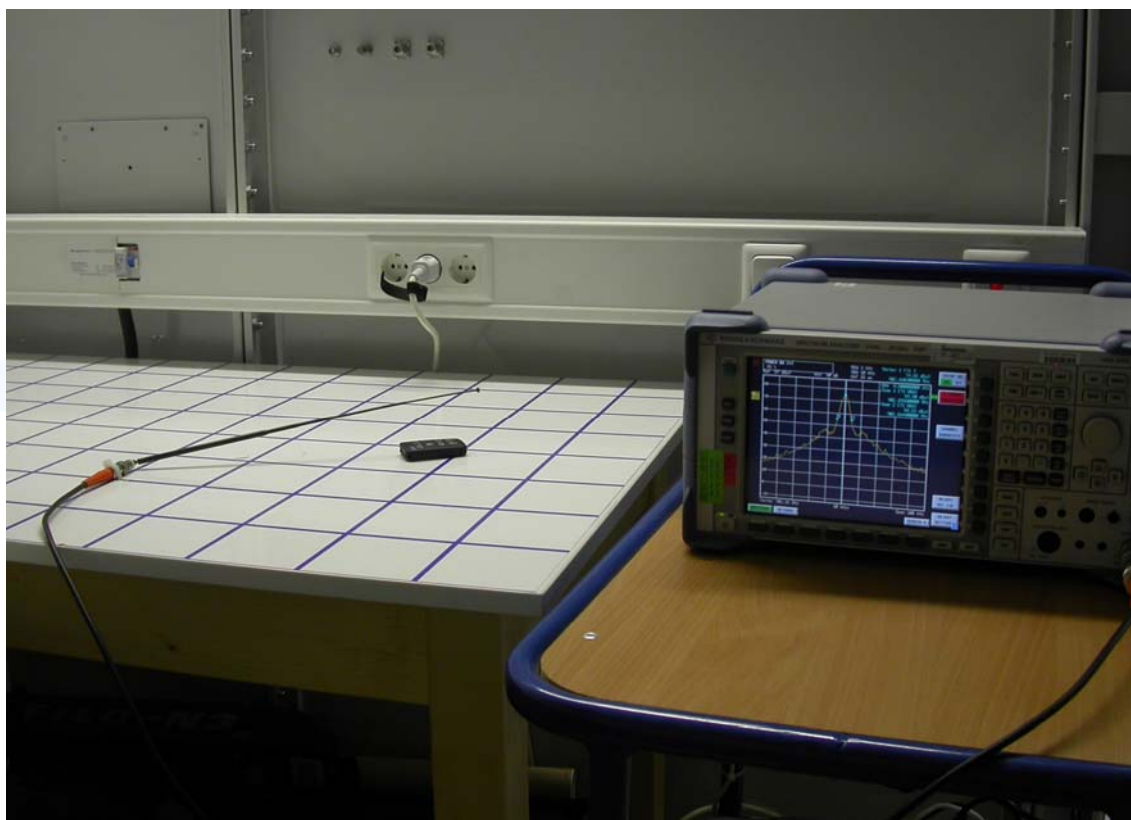
5.5 Band edge test

For test instruments and accessories used see section 6 Part MB.

5.5.1 Description of the test location

Test location: Shielded Room S4

5.5.2 Photo documentation of the test set-up



5.5.3 Description of Measurement

The EuT was connected to the spectrum analyzer with a suitable attenuator. The span of the spectrum analyzer was set wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation. The highest amplitude appearing on spectral display was measured and it was set as the reference level for the emission mask. It was allowed the trace to stabilize and after then it was set the emission mask on the reference level to show the compliance with the bandedge requirements.

Further settings on the spectrum analyzer:

RBW: $\geq 1\%$ of the span

VBW: $\geq$ RBW

Sweep: Auto

Detector function: Peak

5.5.4 Test result

Frequency [MHz]	Peak Power Output [dBμV]	Spurious emission read value [dBμV]	Result of Band edge [dBc]	Band edge LIMIT [dBc]
< 902,0	88,64	33,38	55,26	>50
> 906,0	88,13	18,95	69,18	>50

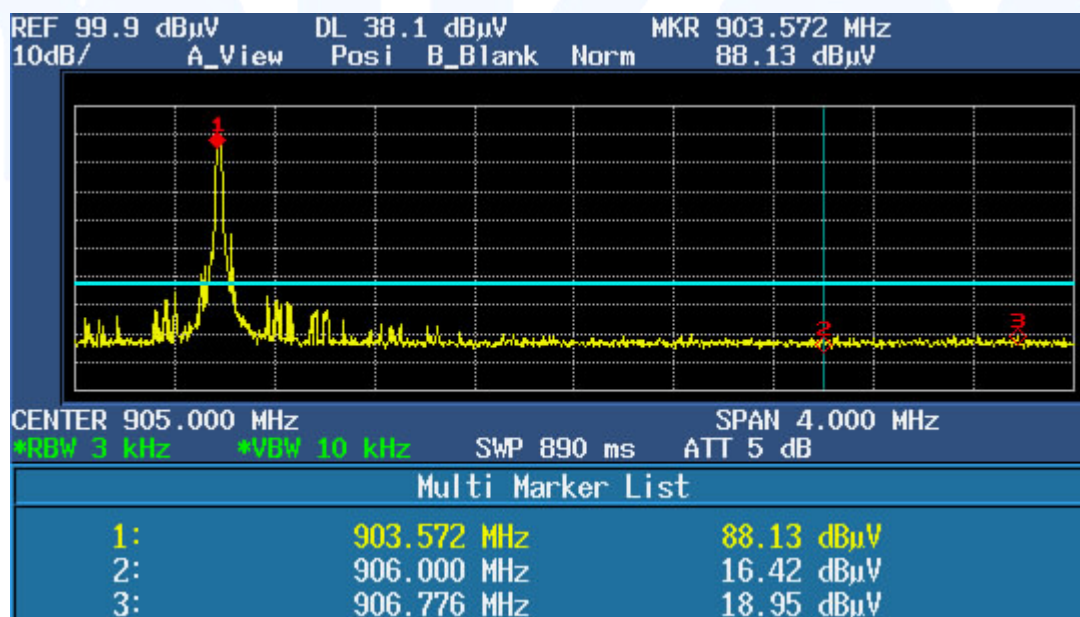
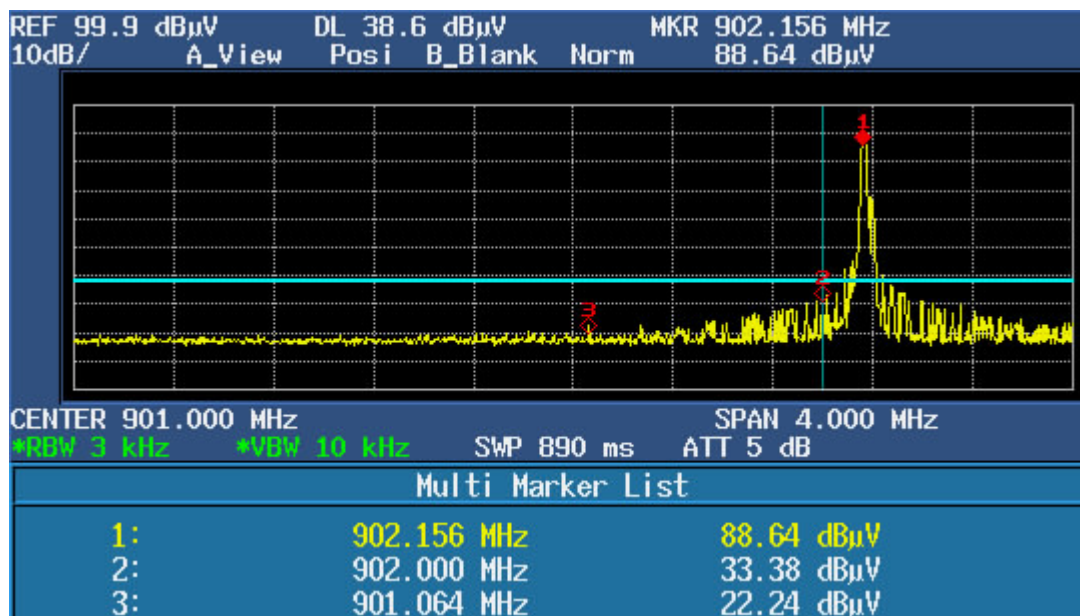
Peak-Limit according to FCC Subpart 15.249(d)

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocol.

5.5.5 Test protocol



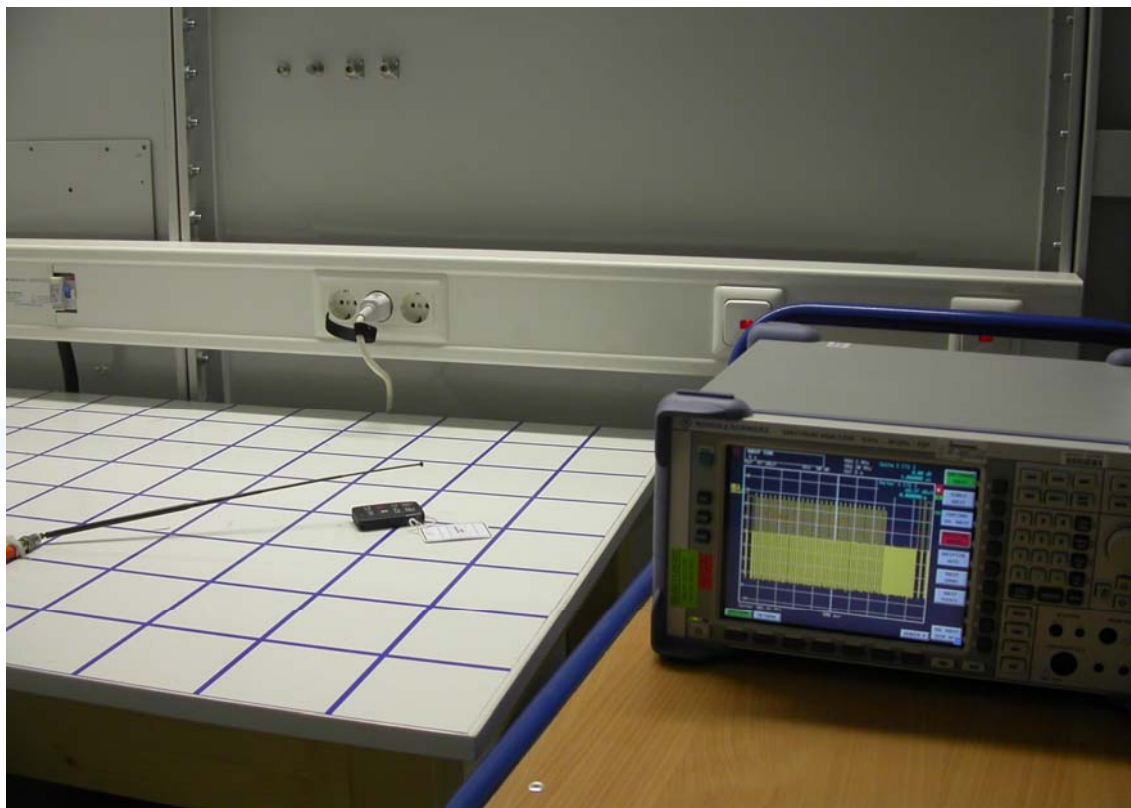
5.6 Correction for Pulse Operation (Duty Cycle)

For test instruments and accessories used see section 6 Part DC.

5.6.1 Description of the test location

Test location: Shielded Room S4

5.6.2 Photo documentation of the test set-up



5.6.3 Description of Measurement

The Duty cycle factor, expressed in dB, is arrived by taking the following formula:

$$KE = 20 \log [(t_{iB} \cdot p) / T_w]$$

KE: pulse operation correction factor [dB]
 t_{iw} pulse duration for one complete pulse track [msec]
 t_{iB} pulse duration for one pulse [μ sec]
 T_w a period of the pulse track [msec]
 p number of pulses in one train

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5.6.4 Test result

tiw [sec]	Tw [msec]	tib [µsec]	p	KE [dB / %]
7,9	100		1	0,0 / 100

Remarks: The pulse train [Tw] exceeds 100 ms, therefore the duty cycle have been calculated by averaging the sum of the pulsewidths over the 100 ms width with the highest average value.

For detailed results, please see the test protocol below.

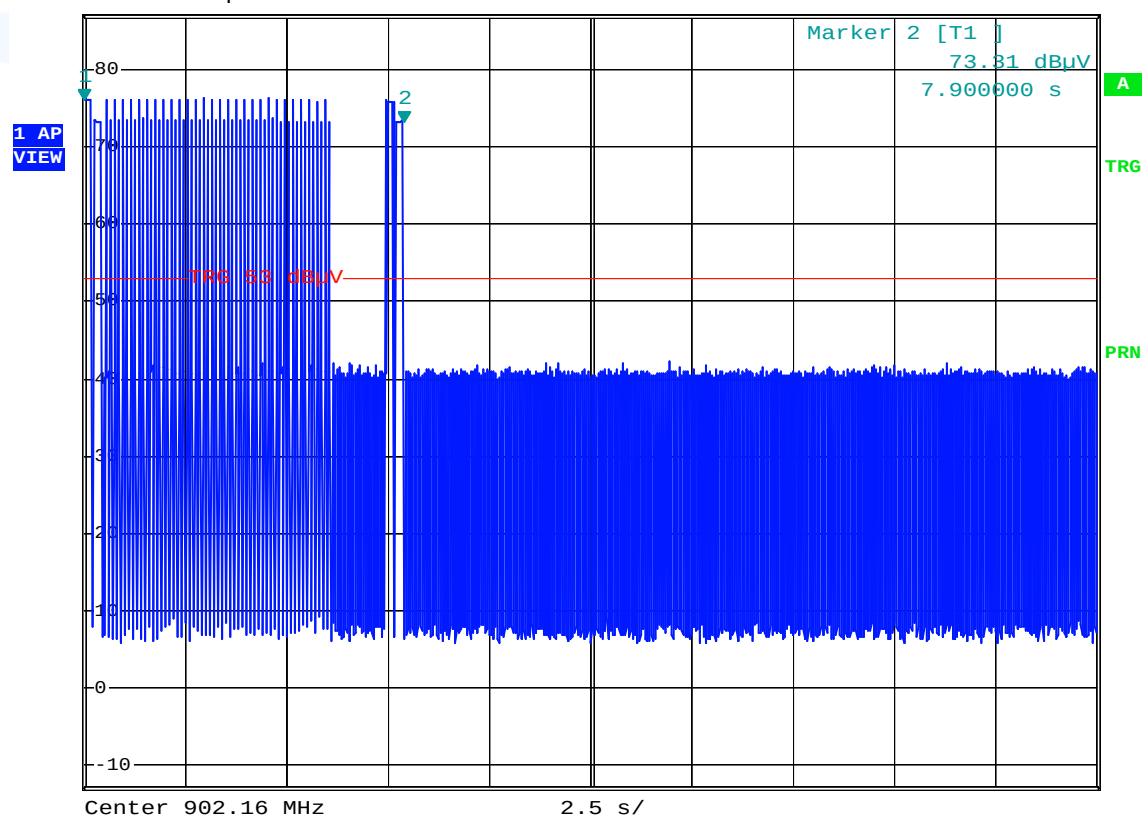
5.6.5 Test protocol

Correction for Pulse Operation (Duty Cycle)

FCC Part 15 Subpart 15.35(c)

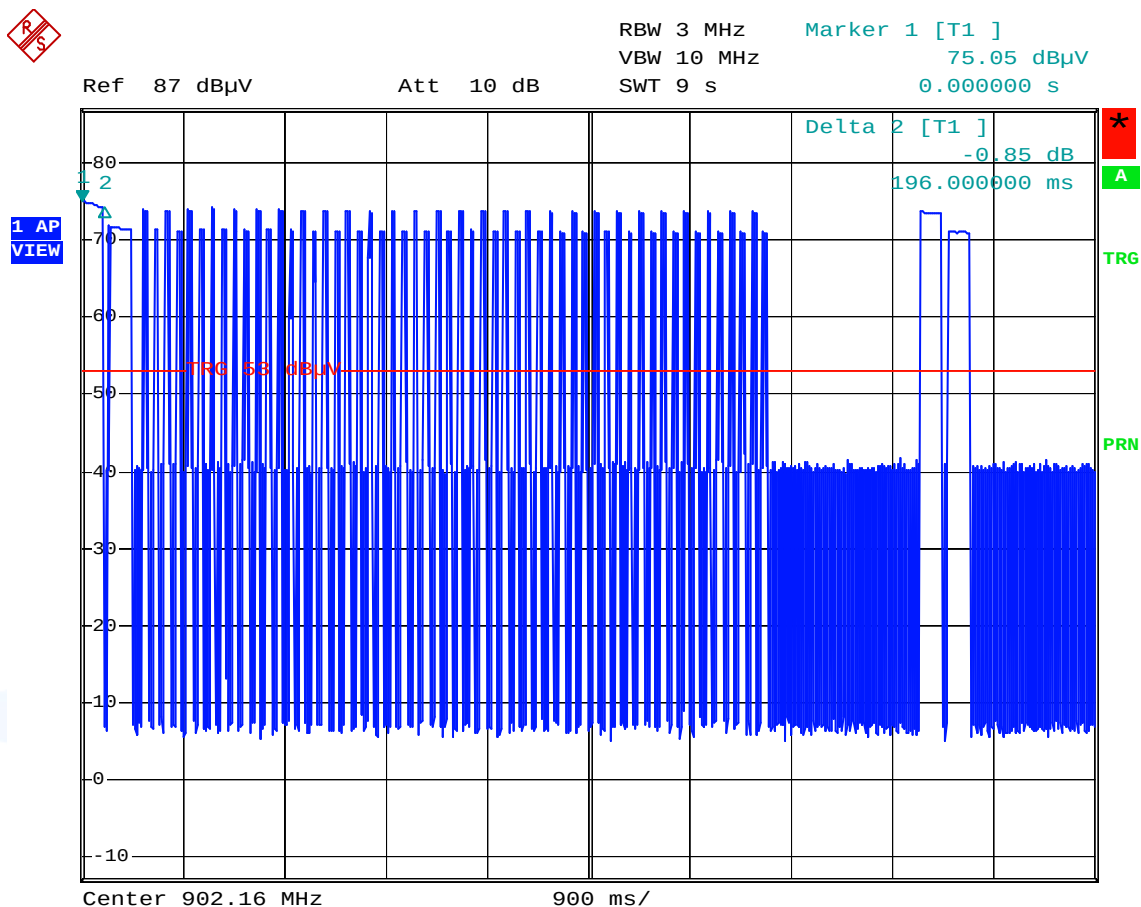


Ref 87 dBµV Att 10 dB RBW 3 MHz Marker 1 [T1] 76.12 dBµV
VBW 10 MHz 0.000000 s
SWT 25 s



Date: 5. JAN. 2006 14:21:10

FCC ID:KR55WK49266



Date: 5. JAN. 2006 14:24:09

5.7 Antenna application

5.7.1 Antenna requirements

The EUT's antenna is met the requirement of FCC Part 15 C section 15.203 and 15.204

5.7.2 Result

The EUT used a PCB loop antenna and is printed on the PCB. The gain of antenna is -3dBi and no other antenna than that furnished by the responsible party are be used with the device.

mikes

5.8 Receiver conducted disturbances 0.15 - 30 MHz

For test instruments and accessories used see section 6 Part A 4.

5.8.1 Description of the test location

Test location:

5.8.2 Photo documentation of the test set-up

5.8.3 Description of Measurement

The final level, expressed in dB μ 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 μ V and μ 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 quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeter's above the floor and is positioned 40 centimeter's 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 quasi-peak and average detection and recorded on the data sheets.

5.8.4 Test result

Frequency range:

Min. limit margin

Remarks: The measurement is not applicable.

The EuT is battery powered.

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5.9 Receiver radiated emissions (electric field) 30 MHz - 40 GHz

For test instruments and accessories used see section 6 Part SER2 and SER3.

5.9.1 Description of the test location

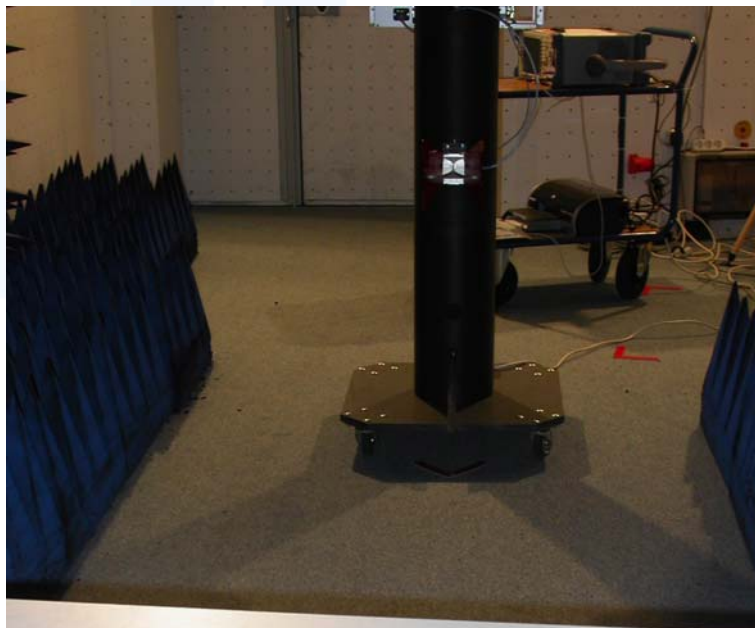
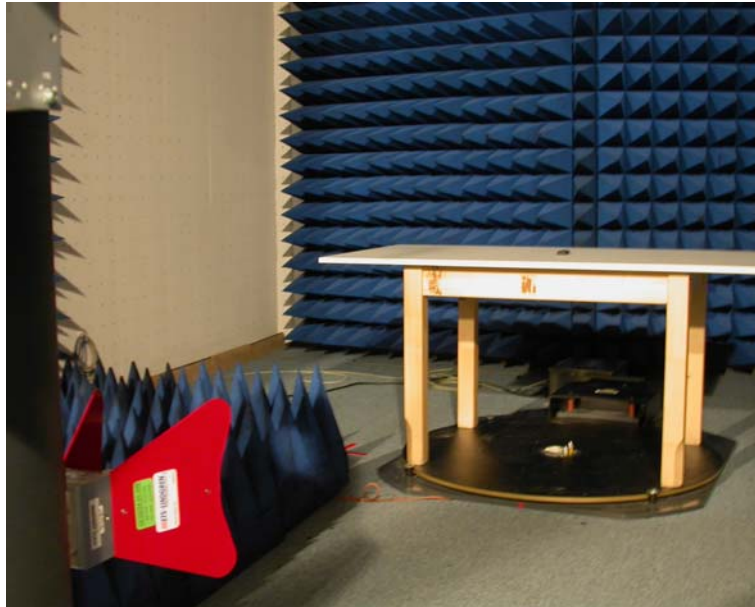
Test location: OATS1
Test location: Anechoic Chamber A2

Test distance: 3 metres

5.9.2 Photo documentation of the test set-up



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5.9.3 Test result

Testresult in detail: (<1GHz)

Channel1: Center frequency: 902,16 MHz

Frequency [MHz]	L: QP [dBμV]	L: AV [dBμV]	Bandwidth [kHz]	Correct. [dB]	L: QP [dBμV/m]	L: AV [dBμV/m]	Limit [dBμV/m]	Delta [dB]
30-1000			120		<30			

Test result >1GHz

Channel1: Center frequency: 902,16 MHz						
Frequency [GHz]	Reading Level PK [dBμV]	Bandwidth [kHz]	Correct. factor [dB]	Corrected Level PK [dBμV/m]	Limit [dBμV/m]	Delta [dB]
1-10		1000		<50		

Limit according to FCC Subpart 15.109(a)

Frequency of emission [MHz]	Field strength Limits [μV/m]	Field strength Limits [dBμV/m]
30-88	100	40
88-216	150	44
216-960	200	46
Above 960	500	54

The requirements are **FULFILLED**.

Remarks: The Limits are met.

During the test, the Eut was set into continuous receiving mode.

The measurement was performed up to the 5th harmonic (9021,6 MHz).

6 USED TEST EQUIPMENT AND ACCESSORIES

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

The calibration intervals and the calibration history will be given out on request.

Test Report No: T30484-00-00HU
Beginning of Testing: 05 Januar 2006
End of Testing: 11 Januar 2006

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR 2	ESVS 30	EMI Test Receiver	Rohde & Schwarz München	02-02/03-05-006
	VULB 9168	Trilog Antenna	Schwarzbeck Elektronik	02-02/24-05-005
	S10162-B	RF Cable 33m	Huber + Suhner	02-02/50-05-031
	KK-EF393-21N-16	RF Cable 20m	Huber + Suhner	02-02/50-05-033
	NW-2000-NB	RF Cable	Huber + Suhner	02-02/50-05-113
DC	FSP 30	Spectrum Analyzer	Rohde & Schwarz München	02-02/11-05-001
MB	FSP 30	Spectrum Analyzer	Rohde & Schwarz München	02-02/11-05-001
	R 3162	Spectrum Analyzer	Advantest	02-02/11-05-003
SER 2	ESVS 30	EMI Test Receiver	Rohde & Schwarz München	02-02/03-05-006
	VULB 9168	Trilog Antenna	Schwarzbeck Elektronik	02-02/24-05-005
	S10162-B	RF Cable 33m	Huber + Suhner	02-02/50-05-031
	KK-EF393-21N-16	RF Cable 20m	Huber + Suhner	02-02/50-05-033
	NW-2000-NB	RF Cable	Huber + Suhner	02-02/50-05-113
SER 3	FSP 30	Spectrum Analyzer	Rohde & Schwarz München	02-02/11-05-001
	AFS4-01000400	RF Amplifier 1-4 GHz	PARZICH GMBH	02-02/17-05-003
	AMF-4F-04001200	RF Amplifier 4-12 GHz	PARZICH GMBH	02-02/17-05-004
	3117	Horn Antenna 1-18 GHz	EMCO Elektronik GmbH	02-02/24-05-009
	Sucoflex N-1600-SMA	RF Cable	novotronik	02-02/50-05-073
	Sucoflex N-2000-SMA	RF Cable	novotronik	02-02/50-05-075