

Test Site File-No.
IC 3009

EMISSION -- TEST REPORT

Test Report File No.

: **T 22499-1-00 AA**

Date : November 11, 2002
of issue

Type Designation

: Personal Identification Device (PID)

Kind of Product

: Transmitter

Applicant

: TÜV Product Service Ltd

Manufacturer

: Premier Geografix Limited

Licence holder

: Premier Geografix Limited

Address

: Hurricane Way, Norwich

Norfolk NR6 6EW

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

:

Positive

This test report with attachment consists of **24** pages.

The test result only corresponds to the tested sample. It is not permitted
to copy this report, in part or in full, without the permission of the test laboratory.

D I R E C T O R Y

	Page
<u>Documentation</u>	
Directory	2
Test regulations	3
General information	4-5
Discovery of worst case condition	6
Equipment under Test	14
Summary	15
 <u>Test data</u>	
Conducted emissions 10/150 kHz - 30 MHz	7
Spurious emissions (magnetic field) 9 kHz - 30 MHz	8-9
Spurious emissions (electric field) 30 MHz - 1000 MHz	10
Spurious emissions (electric field) 1 GHz - 18 GHz	11
Radiated power of the fundamental wave	12
Conducted power of the fundamental wave measured on the antenna terminals	13
 <u>Attachment</u>	
A) Test data	A1
B) List of Test Equipment	B1-B2
C) Photos of the test setup	C1-C2
D) Technical description of the test sample (e.g. CDF, Declaration)	--
E) Photos of the EuT	E1-E4
F) Measurement Protocol for FCC, VCCI and AUSTEL	--

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 - Group 2
		o - class A	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
■ - RSS-210 Issue 3, Rev.1; February 5, 2000			

ADDRESS OF THE TEST LABORATORY

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

o -

ENVIRONMENTAL CONDITIONS

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

POWER SUPPLY SYSTEM UTILIZED

Power supply system

- 230V/50 Hz / 1φ
- 400V/50 Hz 3PE
- 3.6 VDC
- o 400V/50 Hz 3NPE

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. The measurement uncertainty was calculated for all measurements listed in this test report accdg. to NIS 81 /5.1994 „The Treatment of Uncertainty in EMC Measurements“ and is documented in the MIKES BABT Product Service quality system accdg. to EN 45001. 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 transmitter PID is worn by a subject to register his or her presence within the boundaries of their place of curfew by means of a radio signal which can be detected by an on-site SMU, GSMU or portable FMU.

Number of received/tested samples: **2 / 1**

Serial Number: ID 82537

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

- The black square indicates that the listed condition, standard or equipment is applicable for this report.
- o Blank box indicates that the listed condition, standard or equipment was not applicable for this report.

MEASUREMENT PROTOCOL FOR FCC, VCCI AND AUSTEL

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 Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ± 4.5 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." The Open Area test site is a listed Open Site under the Canadian Test-Sites File-No:

IC 3009

For detailed description of each measurement please refer to section test results.

DISCOVERY OF WORST CASE MEASUREMENT CONDITION:

The radio controlled transmitter is designed for the operation on the fixed transmitter frequency range of 433.87 MHz.

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 transmitter.
- 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 transmitter.

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

TEST RESULT

CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz

■ - Test not applicable

Test location :

- 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 instruments and test accessories used please see attachment B A4

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.

Test result:

The requirements are

o - MET

o - NOT MET

Min. limit margin

_____ dB at _____ MHz

Max. limit exceeding

_____ dB at _____ MHz

Remarks:

SPURIOUS EMISSION

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 quasi-peak 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 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. 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.

SPURIOUS EMISSION (MAGNETIC FIELD) 9 kHz - 30 MHz

■ - Test not applicable

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

For test instruments and test accessories used please see attachment B SER1

Description of Measurement

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

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

Testresult in detail:

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

The requirements are

o - MET**o - NOT MET**

Min. limit margin

_____ dB

MHz

Min. limit margin

_____ dB

MHz

Remarks:

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

- Test not applicable

Test location :

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

For test instruments and test accessories used please see attachment B SER2

Description of Measurement

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 24 - 25. The CISPR 22 limit is equivalent to the Australian AS 3548 limit.

Example:

Frequency (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level (dB μ V/m)	Limit (dB μ V/m)	=	Delta (dB)
719	75	+	32.6	=	107.6	110	=	-2.4

Testresult in detail:

Frequency [MHz]	L: PK [dB μ V]	L: AV [dB μ V]	L: QP [dB μ V]	Correct. [dB]	L: PK [dB μ V/m]	L: AV [dB μ V/m]	L: QP [dB μ V/m]	Limit [dB μ V/m]
867.62	-3.9	-11.0	6.7	34.3	30.4	23.3	41.0	60.8

Test result:

The requirements are

- MET

- NOT MET

Min. limit margin

19.8 dB

867.62 MHz

Max. limit exceeding

 dB

 MHz

Remarks: The limits are met.

SPURIOUS EMISSION 1 GHz - 18 GHz

o - Test not applicable

Testlocation :

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

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

For test instruments and test accessories used please see attachment B SER3

Description of Measurement

The final level, expressed in dB μ V/m, is arrived by taking the reading from the Spectrumanalyzer in dB μ V 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 dB μ V	+27.3 dB	-41.2 dB	-15.8 dB	42.1 dB μ V/m

Testresult in detail:

Frequency [MHz]	L: PK [dB μ V]	L: AV [dB μ V]	Correct. [dB]	L: PK [dB μ V/m]	L: AV [dB μ V/m]	Limit [dB μ V/m]
2172.0	58.8	46.8	-11.3	47.5	35.5	60.8

Testresult

The requirements are

■ - MET

o - NOT MET

Min. limit margin

25.3 dB

2172.0 MHz

Max. limit exceeding

dB

MHz

Remarks: The measurement was performed up to the 10th harmonic (4340.0 MHz).

FIELD STRENGTH OF THE FUNDAMENTAL WAVE

[o - Test not applicable]

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

For test instruments and test accessories used please see attachment B CPR2

Description of Measurement

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 24 - 25. The CISPR 22 limit is equivalent to the Australian AS 3548 limit.

Example:

Frequency (MHz)	Level (dB μ V)	+	Factor (dB)	=	Level (dB μ V/m)	-	Limit (dB μ V/m)	=	Delta (dB)
315	45	+	22.5	=	67.5	-	74.3	=	-6.8

Testresult in detail:

Frequency [MHz]	L: PK [dB μ V]	L: AV [dB μ V]	L: QP [dB μ V]	Correct. [dB]	L: PK [dB μ V/m]	L: AV [dB μ V/m]	L: QP [dB μ V/m]	Limit [dB μ V/m]
433.87	17.9	-11.0	49.9	24.2	42.1	13.2	74.1	80.8

Testresult

The requirements are

■ - MET

o - NOT MET

Min. limit margin 6.7 dB 433.87 MHz

Max. limit exceeding dB MHz

Remarks: The limits are kept.

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 instruments and test accessories used please see attachment B CPC2

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						
-30								
-20								
-10								
0								
+10								
+20								
+30								
+40								
+50								

Remarks:

EQUIPMENT UNDER TEST

Operation - mode of the EuT.:

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

- Standby
- Test program (H - Pattern)
- Test program (colour bar)
- Test program (customer specific)

Continuous transmitting

Configuration of the equipment under test: see attachment D

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

- _____ Type : _____

- unshielded power cable

- unshielded cables

- shielded cables MBPS.No.:

- customer specific cables

- _____

- _____

S U M M A R Y

GENERAL REMARKS:

The product PID has been tested on the following frequency:

TX-Mode: 433.87 MHz

The unit measurements met also the bandwidth requirements.

The EuT complies with the requirements described under 15.231(a) regarding the activation/deactivation of the transmitter. The transmitter on time is smaller than 5 seconds after activation.

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 according to page 3.

- Does not fulfill the general approval requirements according to page 3.

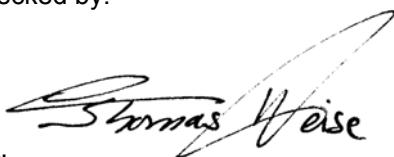
Date of receipt of test sample : accdg. to storage record of MBPS

Testing start date : September 27, 2002

Testing end date : October 08, 2002

Checked by:

i. A.



Günter Mikes
Dipl.Ing.(FH)

Tested by:

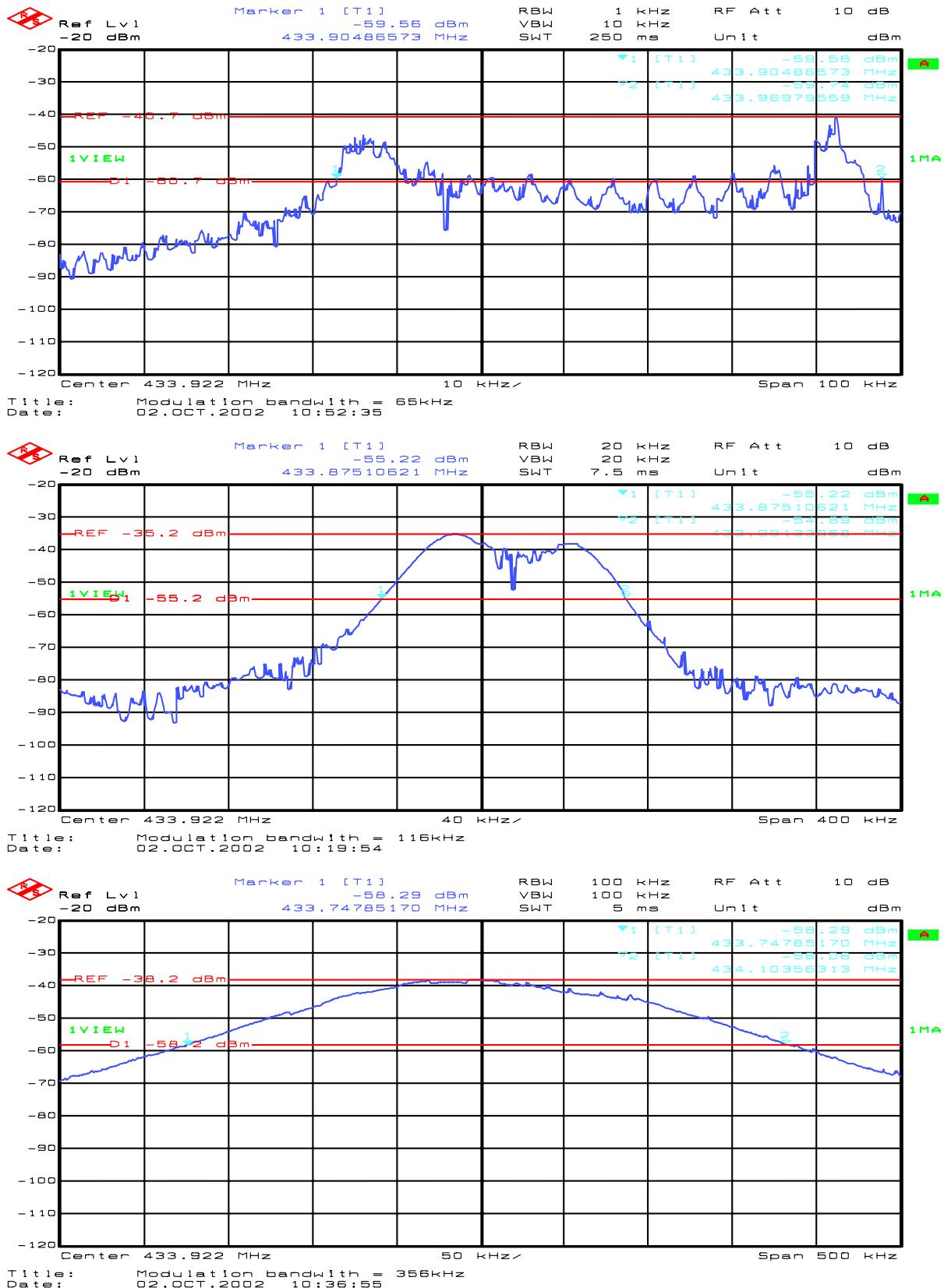


Anton Altmann
Dipl.Ing.(FH)

Attachment A1

PID

File No. T 22499-00 AA



Attachment : B

List of Test Equipment

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

Test Report No:	T 22499-1-00 AA
Beginning of Testing:	27 September 2002
End of Testing:	08 Oktober 2002

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR2	Controller for Turntable	Controller	EMISYS Vertriebs GmbH	04-07/59-89-157
	HCC	Controller Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001
	RG 214/U	RF Cable 2 m	Huber+Suhner	04-07/60-89-463
	HF 7/8 inch	Antenna Cable 13 m	Huber+Suhner	04-07/60-99-001
	HF 7/8 inch	Antenna Cable 20 m	Huber+Suhner	04-07/60-99-002
	HF 7/8 inch	Antenna Cable 40 m	Huber+Suhner	04-07/60-99-003
	KR - 200	Coax Antenna Switch	Rosenberger HF-Technik	04-07/60-99-004
	VULB - 9165	Super Broadband Antenn	Schwarzbeck Mess-Elektronik	04-07/62-00-001
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008
	ESVP-EZM	Spectrum Monitor	Rohde & Schwarz München	04-07/74-86-016
	Turntable 5 m	Turntable	EMISYS Vertriebs GmbH	04-07/92-88-155
	Antenna Mast	Antenna Mast	Rohde & Schwarz München	04-07/92-97-001
MB	UHF	Telescopic Rod Antenna	Conrad Elektronic GmbH	04-07/62-01-008
	FSEM 30	Spectrum Analyser	Rohde & Schwarz München	04-07/74-97-001
SER2	Controller for Turntable	Controller	EMISYS Vertriebs GmbH	04-07/59-89-157
	HCC	Controller Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001
	RG 214/U	RF Cable 2 m	Huber+Suhner	04-07/60-89-463
	HF 7/8 inch	Antenna Cable 13 m	Huber+Suhner	04-07/60-99-001
	HF 7/8 inch	Antenna Cable 20 m	Huber+Suhner	04-07/60-99-002
	HF 7/8 inch	Antenna Cable 40 m	Huber+Suhner	04-07/60-99-003
	KR - 200	Coax Antenna Switch	Rosenberger HF-Technik	04-07/60-99-004
	VULB - 9165	Super Broadband Antenn	Schwarzbeck Mess-Elektronik	04-07/62-00-001
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008
	ESVP-EZM	Spectrum Monitor	Rohde & Schwarz München	04-07/74-86-016
	Turntable 5 m	Turntable	EMISYS Vertriebs GmbH	04-07/92-88-155
	Antenna Mast	Antenna Mast	Rohde & Schwarz München	04-07/92-97-001
SER3	MDCON-201	Mast/Turntable Controll	SBF electronic	04-07/59-01-001
	Sucoflex 104, SMA	RF Cable 2 m	Huber+Suhner	04-07/60-97-485
	Sucoflex 104, N	RF Cable 3 m	Huber+Suhner	04-07/60-97-492
	BBHA-9120	Horn Antenna	Schwarzbeck Mess-Elektronik	04-07/62-88-212
	613A/643	Horn Antenna	TransTech Hochfrequenztechn	04-07/62-90-213

Test Report No: T 22499-1-00 AA
Beginning of Testing: 27 September 2002
End of Testing: 08 Oktober 2002

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
SER3	AWT-4534	Microwave Amplifier	TransTech Hochfrequenztechn	04-07/66-90-217
	AMF-4B-040130-25P	Microwave Amplifier	TransTech Hochfrequenztechn	04-07/66-97-001
	FSEM 30	Spectrum Analyser	Rohde & Schwarz München	04-07/74-97-001
	Turtable 2 m	Turtable	EMISYS Vertriebs GmbH	04-07/92-89-160

Attachment C1 of C2: Photo documentation

Test-Set-up:

Radiated Emission 30 MHz – 1000 MHz (front view)



Test-Set-up:

Radiated Emission 30 MHz – 1000 MHz (rear view)



File No.:T 22499-1-00 AA

Attachment C2 of C2: Photo documentation

Test-Set-up:
Radiated Emission 1000 MHz – 4340 MHz (front view)



Test-Set-up:
Radiated Emission 1000 MHz – 4340 MHz (rear view)



Attachment E1
PID
File No. T 22499-00 AA



Attachment E2

PID

File No. T 22499-00 AA



Attachment E3

PID

File No. T 22499-00 AA



Attachment E4

PID

File No. T 22499-00 AA

