FCC ID: MYT3X8326

Deutscher Akkreditierungs Rat DAR

TTI - P-G 009 / 98-00
TTI - P-G 089 / 94-50

E M I S S I O N -- T E S T R E P O R T

Testreport file no. : **T 19734-1-00 NF** Date of issue : Dec.08, 2000

Model : 3X8326

Type : Electronic Key

Applicant : TEMIC TELEFUNKEN microelectronic GmbH

Manufacturer : TEMIC TELEFUNKEN microelectronic Phils.Inc.

Licence holder : TEMIC TELEFUNKEN microelectronic GmbH

Address : Ringlerstraße 17

85057 Ingolstadt

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

This testreport with appendix consists of 29 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.

DIRECTORY

TESTREGULATIONS

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

■ - Part 15 Subpart C (15.231)

ADDRESS OF THE TEST LABORATORY

■ - **MIKES 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 : Battery Unom = 3.0V DC

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 ±4dB. 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 Electronic Key is part of a vehicle security system. The key is for lock and unlock the doors and the trunk by remote control.

Number of received/tested samples: 1/1

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

■ - Black box 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 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 it’s 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 Electronic Key 3X8326 is designed for the operation on the fixed transmitter frequency of approx. 315 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 key.
- 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 key.

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.

TESTRESULT

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:

dBµV = 20(log µV)
µV = Inverse log(dBµV/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) 10 kHz - 30 MHz

■ **- Test not applicable**

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

For TEST EQUIPMENT USED please refer to ATTACHMENT B:

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.

Example:

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

Testresult in detail:

Frequency MHz	L: QP dBµV	L: AV dBµV	Correct.	L: QP dBµV/m	L: AV dBµV/m	Limit dBµV/m

The requirements are **O - MET** **O - NOT MET**

Min. limit margin _____ dB _____ MHz

Max. limit margin _____ dB _____ MHz

Remarks: NOT APLLICABLE

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 B: SER2

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

Testresult in detail:

Frequency MHz	**L: QP dBµV**	**L: AV dBµV**	**Correct.**	**L: QP dBµV/m**	**L: AV dBµV/m**	**Limit dBµV/m**
630	13.5	11.8	27.0	40.5	38.8	55.6
945	10.3	6.1	35.0	45.3	41.1	55.6

Testresult

The requirements are ■ **- MET** **O - NOT MET**

Min. limit margin 10.3 dB at 945 MHz

Max. limit exceeding _____ dB at _____ MHz

Remarks: The limits are kept.

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 EQUIPMENT USED please refer to ATTACHMENT B: SER3

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the Spectrumanalyzer 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 GHz	Bandw. kHz	L: PK dBµV	L: AV dBµV	CorrectdB	L: Pk dBµV/m	L: AV dBµV/m	Limit dBµV/m
1.573	1000	54.7	46.9	-15.2	39.5	31.7	54.0
1.888	1000	51.7	46.7	-12.8	38.9	33.9	55.6
2.518	1000	56.1	51.1	-10.6	45.5	40.5	55.6

The measurement was performed up to the 10th harmonic (3.15 GHz).

Testresult

The requirements are	■ **- MET**			**O - NOT MET**	
Min. limit margin	15.1	dB	at	2.518	GHz
Max. limit exceeding	_____	dB	at	_____	GHz

Remarks: The limits are met.

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 EQUIPMENT USED please refer to ATTACHMENT B: CPR2

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

Testresult in detail:

Frequency MHz	Bandw. kHz	L: PK dBµV	L: QP dBµV	L: AV dBµV	CorrectdB	L: Pk dBµV/m	L: QP dBµV/m	L: AV dBµV/m	Limit dBµV/m
315.0	120	55.5	55.0	54.3	19	74.5	74.0	73.3	75.6

Testresult

The requirements are ■ **- MET** **O - NOT MET**

Min. limit margin 1.6 dB at 315.0 MHz

Max. limit exceeding _____ dB at _____ 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 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								
Tempera-ture/°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)

o - Testprogram (customer specific)

■ - Transmit frequency 315 MHz

o -

o -

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

o - Type :

o - Type :

o - Type :

o - Type :

o - Type :

o - Type :

o - unshielded power cable

o - unshielded cables

o - shielded cables MPS.No.:

o - customer specific cables

o -

o -

S U M M A R Y

GENERAL REMARKS:

The product 3X8326 has been tested on the following frequency:
TX-Mode: 315 MHz
The Electronic Key „3X8326“ is used together with the receiver model „ZKE Control Unit“, Testreport No.: T 19728-1-01 NF.

The unit measurements mets also the bandwidth requirements.

FINAL JUDGEMENT:

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

■ - met.

o - **not** met.

The equipment under test

■ - **Fulfills** the general approval requirements cited on page 3.

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

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

Testing Start Date : November 26, 2000

Testing End Date : November 28, 2000

- MIKES BABT PRODUCT SERVICE GmbH -

i.V. Thomas Weise

Günter Mikes
Dipl.-Ing.(FH)

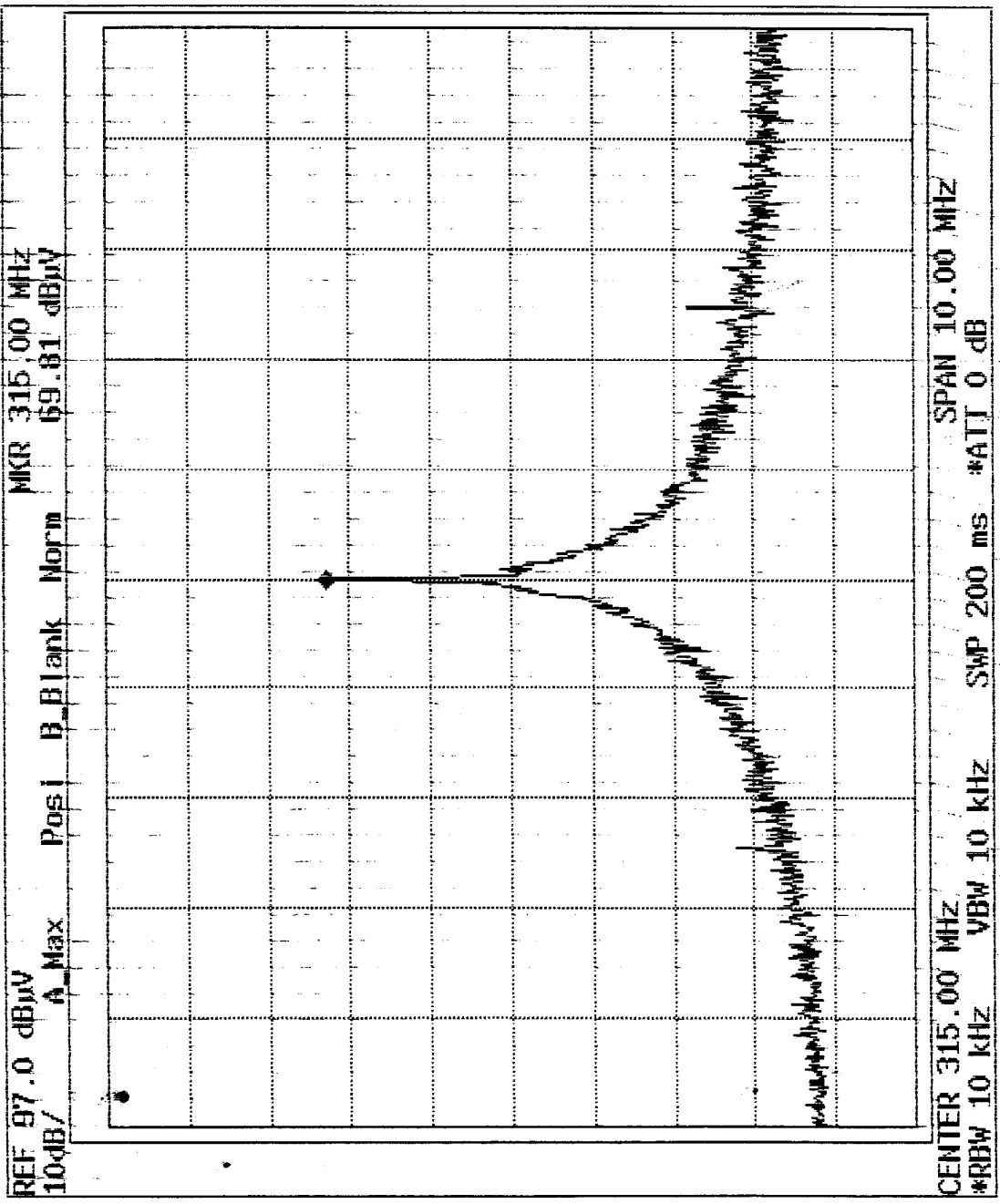
Test-engineer

Nikolaus Fischer

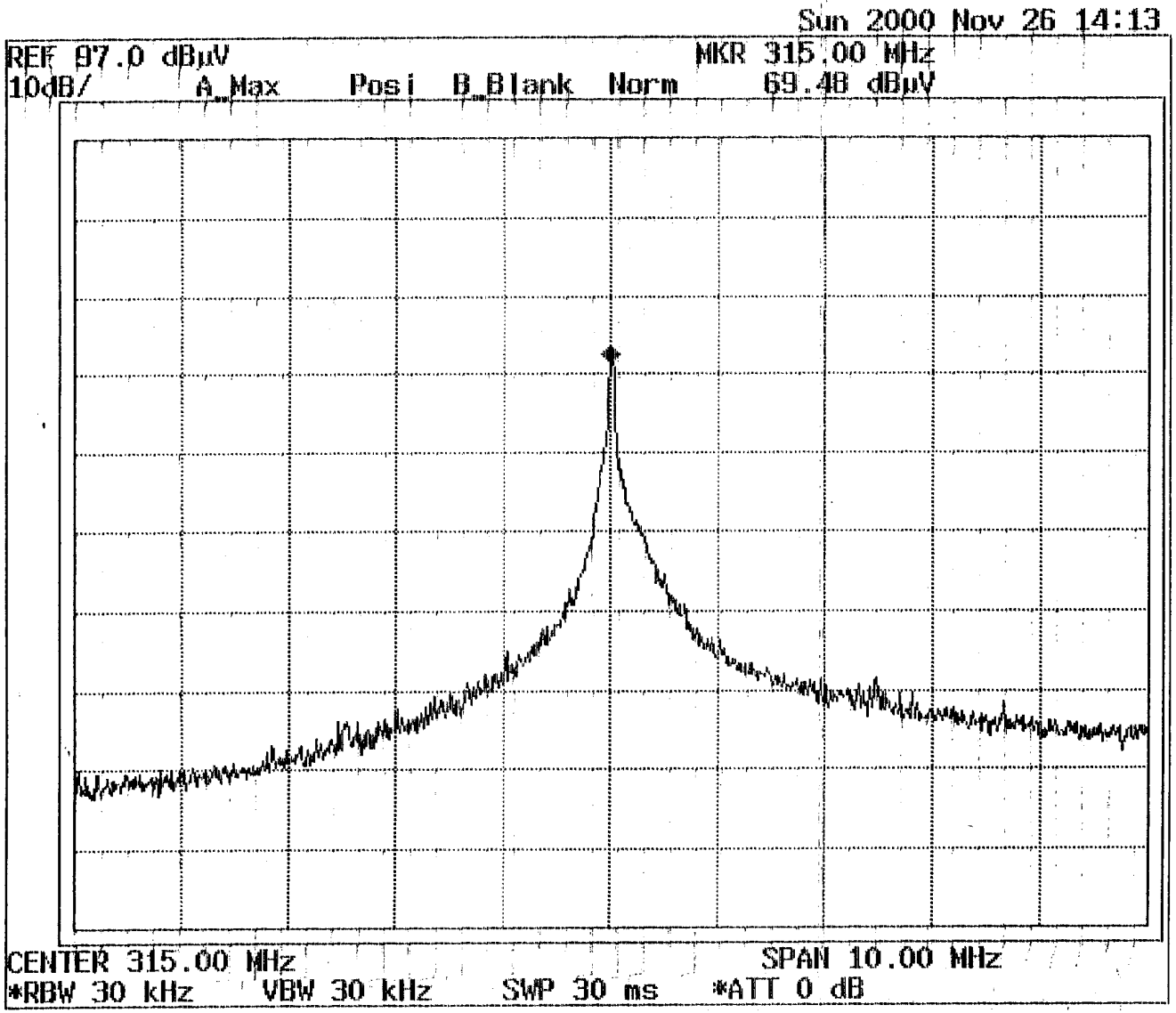
Auftragsnr.:	T19734
Kunde:	Tenyu
Gerät:	Wireless Key
Modell:	820 837 237 C
Ser.Nr.:	3X8326
Norm:	
Unterpunkt:	
Messung:	RBW
Bemerkung:	

Frequ. (MHz)	Ablw. (dBm)	Pol.	Korr.F (dB)	ERG. (dBm)	Lim (dBm)

RBW
10K



A1



Auftragsnr.:	T19734
Kunde:	TEMIC
Gerät:	WIRELESS KEY
Modell:	820 837 231 C
Ser.Nr.:	3 x 8326
Norm:	
Unterpunkt:	
Messung:	MBW
Bemerkung:	

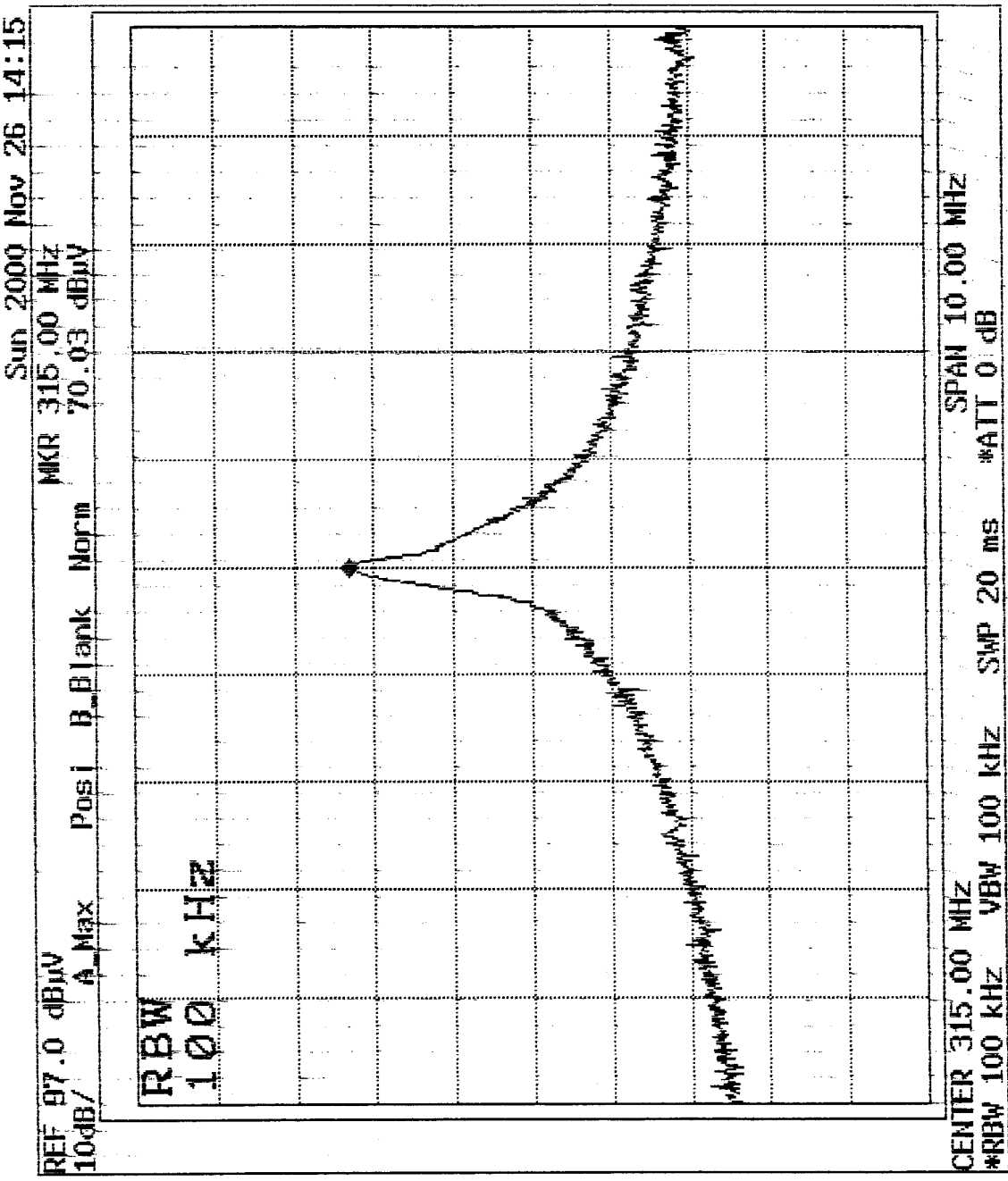
Frequ. (MHz)	Ablw. (dBm)	Pol.	Korr.F (dB)	ERG. (dBm)	Lim (dBm)

A2

MBW
30K

Auftragsnr.:	T 19734
Kunde:	Tchic
Gerät:	Wireless Key
Modell:	820 837237 C
Ser.Nr.:	3x 8326
Norm:	
Unterpunkt:	
Messung:	RBW
Bemerkung:	

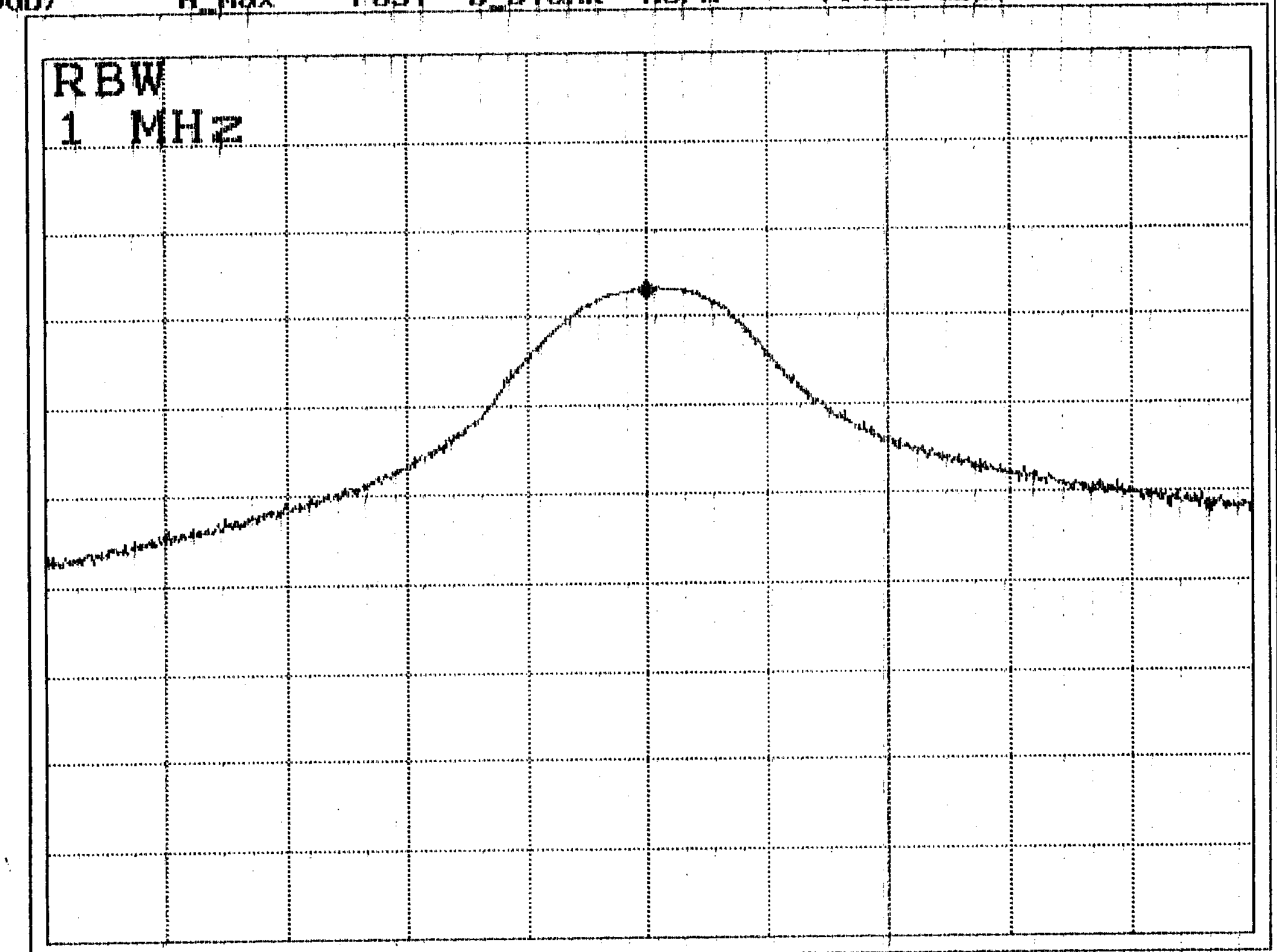
Frequ. (MHz)	Ablw. (dBm)	Pol.	Korr.F (dB)	ERG. (dBm)	Lim (dBm)



413W

100k

A3



Auftragsnr.:	T 19734
Kunde:	TEMIC
Gerät:	WIRELESS KEY
Modell:	8Z0 837 231 C
Ser.Nr.:	3 X 8326
Norm:	
Unterpunkt:	
Messung:	MBW
Bemerkung:	

Frequ. (MHz)	Ablw. (dBm)	Pol.	Korr.F (dB)	ERG. (dBm)	Lim (dBm)

MBW
1000k

A4

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 19734-1-00 NF
Beginning of Testing: 26-November-2000

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR2	VULB - 9165	Super-Broadband-Anten	Schwarzbeck G.	04-07/62-00-001
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008
MB	UHALP-9108A	Antenna	Schwarzbeck G.	04-07/62-97-009
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
SER2	VULB - 9165	Super-Broadband-Anten	Schwarzbeck G.	04-07/62-00-001
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008
SER3	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
	Model 3115	Hornantenna	EMCO Elektronik GmbH	04-07/62-96-458
	AWT-4534	Microwave-Amplifier	TransTech Hochfrequenztechn	04-07/66-90-217
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001

CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT

Licence holder:	TEMIC TELEFUNKEN microelectronic GmbH		
Address:	Germany, 85057 Ingolstadt, Ringlerstraße 17		
Manufacturer:	TEMIC TELEFUNKEN microelectronic Phils. Inc.		
Address:	Telefunken Building, Bagsakan Rd., FTI-Estate, 1630 Taguig, Metro Manila, Philippinen		
Type:	Keyless Entry System		
Model:	Transmitter 315 MHz		
Serial-No.:	8Z0 837 231 C	Protection class:	

Application for getting
☒ national approval in the following countries: see attached country list
☐ EC-type examination

Additional informations to the above named model:

Antenna:			
transmitter:	Type: printed antenna		
	Length/size: loop antenna about 8 cm		
receiver:	Type: -----		
	Length/size: -----		
Power supply of the transmitter:			
Type:	**1 x Lithium battery**	nominal voltage:	**3,0 V**
		lowest voltage:	**2,2 V**
		highest voltage:	**3,5 V**
Power supply of the receiver:			
Type:		nominal voltage:	**V**

Ancillary equipment:

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

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
none			

O If applicable, if necessary complete overleaf

MIKES PRODUCT SERVICE GmbH Ohmstr. 2-4 D-94342 Strasskirchen
Tel.: +49 94 24 94 07-0 Fax.: +49 94 24 94 07-60

Applicant: TEMIC TELEFUNKEN microelectronic GmbH Model-Name: Transmitter 315 MHz

Type designation: Transmitter 315 MHz (8Z0 837 231 C)

Name and type designation of individual units comprising the radio equipment:

Transmitter 315 MHz for keyless entry systems

Type of equipment:

☐ Radiotelephone equipment	☒ Remote-control equipment	☐ Radiomaritime equipment	☐ LPD
☐ One-way radiotelephone equipment	☐ Inductive loop system	☐ Inland waterways equipment	☐ RLAN
☐ Personal paging system	☐ Radio-relay system	☐ Radionavigation equipm.	☐
☐ Satellite earth station	☐ CB radiotelephone equipment	☐ Antenna	☐
☐ Data transmission equipment	☐ Movement detector	☐ Aeronautical equipment	☐

Technical characteristics:

	Transmitter-receiver	Transmitter	Receiver
Frequency range		**315 MHz**	-----
Maximum no. of channels		**1**	-----
Channel spacing		-----	-----
Class of emission (type of modulation)		**K1D**	-----
Maximum RF output power		-----	-----
Maximum effective radiated power (ERP)		**0,030mW**	-----
Output power variable		-----	-----
Channel switching frequency range		-----	-----

Method of frequency generation	crystal stabilized PLL-oscillator		
Frequency generation TX	9.8437 MHz crystal		
Frequency generation RX	-----		
IF	1st IF	2nd IF	3rd IF
Integral selective calling			
Audio-frequency interface level at external data socket			
Modes of operation	☐ Duplex mode	☐ Semi-duplex mode	☒ Simplex mode
Power source	☐ Mains	☐ Vehicle-regulated	☒ Integral
Antenna socket	☐ BNC ☐ M ☒ None	☐ TNC ☐ UHF ☐ edge connector	☐ N ☐ Adapter ☐

Type approval specifications: ETS 300220, ETS 300683

O If applicable, if necessary complete overleaf

MIKES PRODUCT SERVICE GmbH Ohmstr. 2-4 D-94342 Strasskirchen
Tel.: +49 94 24 94 07-0 Fax.: +49 94 24 94 07-60

Applicant: TEMIC TELEFUNKEN microelectronic GmbH Model-Name: Transmitter 315 MHz

Declarations:

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

Ingolstadt **15, September 2000**
place of issue

TEMIC
TELEFUNKEN microelectronic GmbH
Ringlerstr. 17
D-85057 Ingolstadt
.....
Seal and signature of applicant

Country list
Argentinien
Bahrain
Jordanien
China
Saudi Arabien
Singapur
Hong Kong
Brasilien
Mexiko
Brunei
Malaysia
Taiwan
USA
Kanada

O If applicable, if necessary complete overleaf

MIKES PRODUCT SERVICE GmbH Ohmstr. 2-4 D-94342 Strasskirchen
Tel.: +49 94 24 94 07-0 Fax.: +49 94 24 94 07-60