

EMISSION -- TEST REPORT

Test Report File No. : **T 24275-02-03 XF** Date of issue : February 25, 2004

Type Designation : e-Flame

Kind of Product : Electronic remote ignition and control system

Applicant : Mertik Maxitrol GmbH & Co. KG

Manufacturer : Mertik Maxitrol GmbH & Co. KG

Licence holder : Mertik Maxitrol GmbH & Co. KG

Address : Warnstedter Strasse 3

06502 Thale, Germany

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

Positive

This test report with attachment consists of **29** 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.

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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 - 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 |
| o - Part 15 Subpart C (15.209) | | |
| ■ - Part 15 Subpart C (15.231) | | |

FCC ID: RTD-G6R

ADDRESS OF THE TEST LABORATORY

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

ENVIRONMENTAL CONDITIONS

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

POWER SUPPLY SYSTEM UTILIZED

Power supply system Transmitter: ■ 9,0 V DC

STATEMENT OF MEASUREMENT UNCERTAINTY

SHORT DESCRIPTION OF THE EQUIPMENT UNDER TEST (EuT)

The EuT is a transmitter for electronic remote ignition and control system. It is designed for gas appliances with pilot burners including ODS.

Number of received/tested samples: 2 / 2
Serial Number: G6R

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."

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

TEST RESULT**CONDUCTED EMISSIONS - 10/150 kHz - 30 MHz**

■ - Test not applicable

Test location :

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

For test 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 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 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 [dBµV]	L: AV [dBµV]	L: QP [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	L: QP [dBµV/m]	Limit [dBµV/m]

The requirements are

o - MET**o - NOT MET**

Min. limit margin

_____ dB at _____ MHz

Max. limit exceeding

_____ dB at _____ MHz

Remarks: _____

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

o - Test not applicable

Test location :

- - Open-site 1 (Landshuter Straße 211a, D-94315 Straubing)
- o - Open-site 2
- - 3 meters
- o - 10 meters
- o - 30 meters

For test instruments and test accessories used please see 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: 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]
630,0	31,3	30,4	30,5	24,5	55,8	54,9	55,0	55,6

Test result:

The requirements are

■ - MET

o - NOT MET

Min. limit margin

0,6 dB at 630,0 MHz

Max. limit exceeding

 dB at MHz

Remarks: The limits are met.

SPURIOUS EMISSION 1 GHz - 18 GHz

■ - Test not applicable

Testlocation :

- o - Open-site 1
- o - Open-site 2
- o - Anechoic chamber
- - Full compact chamber (Landshuter Straße 211a, D-94315 Straubing)

- 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 Spectrumalyzer 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]	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]
1258,0	-	45,2	45,7	-8,8	-	36,4	36,9	55,6

Testresult

The requirements are

■ - MET

o - NOT MET

Min. limit margin

18,7 dB at 1258,0 MHz

Max. limit exceeding

_____ dB at _____ MHz

Remarks: The limits are met.

The measurement was performed up to the 10th harmonic (3150 MHz).

FIELD STRENGTH OF THE FUNDAMENTAL WAVE

o - Test not applicable

- - Open-site 1 (Landshuter Straße 211a, D-94315 Straubing)
- 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 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]	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]
315,0	54,1	53,6	53,6	17,4	71,5	71,0	71,0	75,6

Testresult

The requirements are

■ - MET

o - NOT MET

Min. limit margin

4,6 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 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	Power dBm	Power dBm	Power dBm	Power dBm	Power dBm	Power dBm
-30								
-20								
-10								
0								
+10								
+20								
+30								
+40								
+50								

Remarks: The test is not applicable.

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)

The transmitter was during all test activated once with modulation and once without modulation.

Configuration of the equipment under test: see attachment D

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

- | | |
|-------------------------------|--------------|
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |
| ☐ - _____ | Type : _____ |

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MBPS.No.:

☐ - customer specific cables

☐ - _____

☐ - _____

SUMMARY

GENERAL REMARKS:

The product e-Flame has been tested on the following frequency:
TX-Mode: 315 MHz

The unit measurements met also the bandwidth requirements.

The EuT complies with the requirements described under 15.231(a) regarding the signal deactivation of the transmitter. The duration of the transmission is 12,06 milliseconds each time the button is pushed which meets the requirement of ceasing transmission within 5 seconds of the button being released.

FINAL JUDGEMENT:

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

- - met.
- o - **not** met.

The Equipment Under Test

- - **Fulfils** the general approval requirements according to page 3.
- o - **Does not** fulfil the general approval requirements according to page 3.

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

Testing Start Date : February 03, 2004

Testing End Date : February 25, 2004

Checked by:

i. A. 
Günter Mikes
Dipl.Ing.(FH)

Tested by:


Xaver Fischer

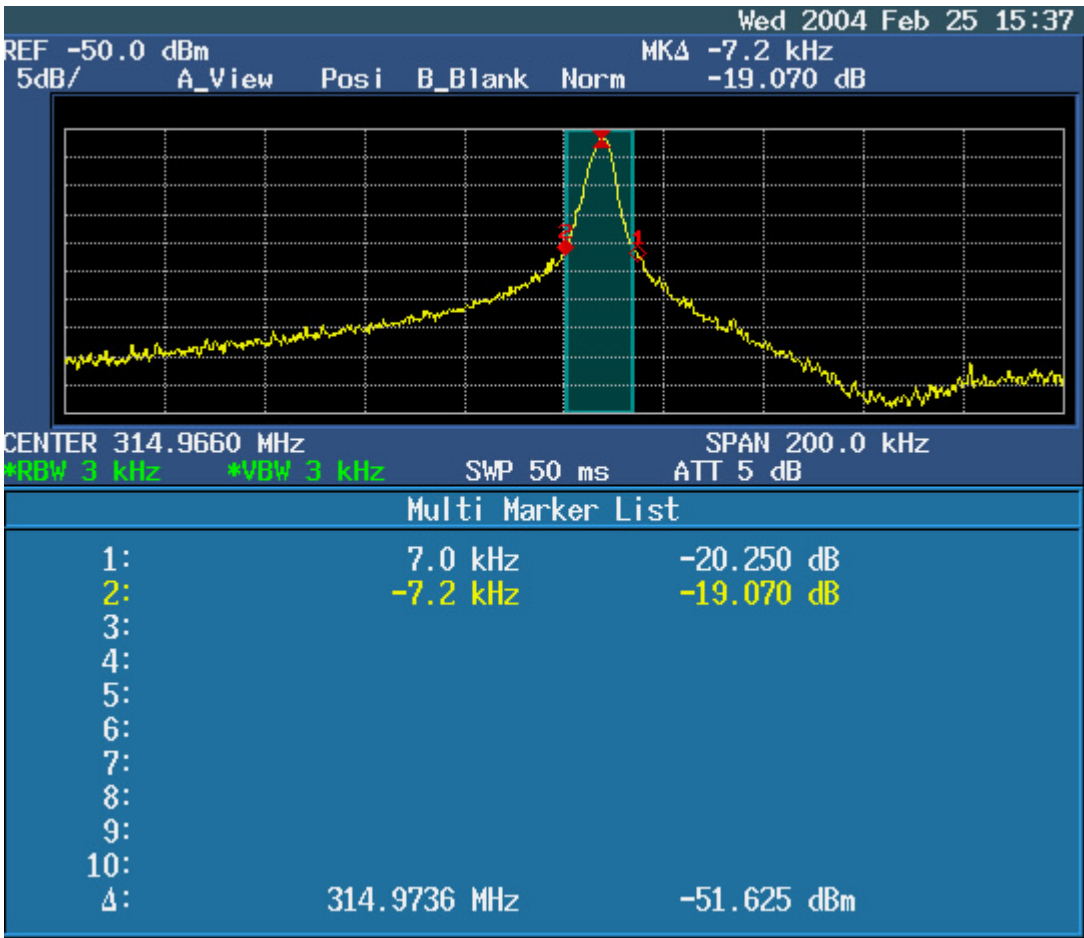
Attachment A: Test data

Occupied Bandwidth

FCC Part 15,231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Fundamental [MHz]	Duty Cycle	20dB Bandwidth F1	20dB Bandwidth F2	Measured Bandwidth	LIMIT Fundamental f*0,0025
315		314,9730	314,9588	14,2 kHz	787,5



Attachment B: List of test equipment

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR2	RG 217	RF Cable	Rosenberger HF-Technik	99-07/60-03-016
	RG 214	RF Cable	Rosenberger HF-Technik	99-07/60-03-017
	VULP 9163	Antenna	Schwarzbeck Mess-Elektronik	99-07/62-03-002
	ESVP	Test Receiver	Rohde & Schwarz München	99-07/63-03-002
MB	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
SER2	RG 217	RF Cable	Rosenberger HF-Technik	99-07/60-03-016
	RG 214	RF Cable	Rosenberger HF-Technik	99-07/60-03-017
	VULP 9163	Antenna	Schwarzbeck Mess-Elektronik	99-07/62-03-002
	ESVP	Test Receiver	Rohde & Schwarz München	99-07/63-03-002
SER3	FA210A0050M0000	GHz-Cable	Rosenberger HF-Technik	99-07/60-03-018
	3115	Horn Antenna	EMCO Elektronik GmbH	99-07/62-03-003
	AMF 40-005-180-24-10 P	18 GHz Amplifier	PARZICH GMBH	99-07/66-03-004
	FSP 30	Spectrum Analyzer	Rohde & Schwarz München	99-07/74-03-003

Attachment D: Constructional dataform for testing of radio equipment**US / CANADA**

Licence holder:	Merlik Maxitrol GmbH & Co. KG		
Address:	Warnstedter Strasse 3 06502 Thale, Germany		
Manufacturer:	Merlik Maxitrol GmbH & Co. KG		
Address:	Warnstedter Strasse 3 06502 Thale, Germany		
Type:	Remote control		
Model:	e -FLAME		
Serial-No.:	G6R	Protection class:	

Additional informations to the above named model:

Antenna:	transmitter:	Type: printed antenna on the circuit board	
		Length/size: 100mm	
receiver:		Type: Marconi antenna ($\lambda/4$)	
		Length/size: 240 mm	
Power supply of the transmitter:	Type:	9V battery	nominal voltage: 9 V
			lowest voltage: 3,5 V
			highest voltage: 9,5V
			current consumption: 2,5 mA
Power supply of the receiver:	Type:	a) 4x AA or C batteries	nominal voltage: 6 V
		b) regulated transformer	current consumption: <100µA

Ancillary equipment:

Description:	Gas control	Type:	GV6	Serial-no	
Description:	Electronic ignition	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
Thermo current cable 1	☐ yes ☒ no	0,35...0,8	☐ yes ☒ no
Thermo current cable 2	☐ yes ☒ no	0,35...0,8	☐ yes ☒ no
Connection receiver -gas valve (8xwires)	☐ yes ☒ no	0,35...0,8	☐ yes ☒ no
Ignition cable	☐ yes ☒ no	0,35...0,9	☐ yes ☒ no
Cable for switch panel (5 wires)	☒ yes ☐ no	0,35...0,8	☐ yes ☒ no

Attachment D: Constructional dataform for testing of radio equipment

US / CANADA

Type designation: Manual Control Transmitter			
Name and type designation of individual units comprising the radio equipment:			
Type of equipment:			
☐ Radiotelephone equipment	☒ Remote-control equipment	☐ Radiomarine equipment	☐ LPD
☐ One-way radiotelephone equipment	☐ Inductive loop system	☐ Inland waterways equipment	☐ RLAN
☐ Personal paging system	☐ Radio-relay system	☐ Radionavigation equipment	☐
☐ Satellite earth station	☐ CB radiotelephone equipment	☐ Antenna	☐
☐ Data transmission equipment	☐ Movement detector	☐ Aeronautical equipment	☐
Technical characteristics:			
	Transmitter-receiver	Transmitter	Receiver
Frequency range		315 ± 0,1 MHz	315 ± 0,3 MHz
Maximum no. of channels		1	1
Channel spacing		-	-
Class of emission (type of modulation)		AM	-
Maximum RF output power		< 10 mW	
Maximum effective radiated power (ERP)			
Output power variable		no	
Channel switching frequency range		no	
Method of frequency generation	☐ Synthesizer ☐ Crystal ☒ Other		
Frequency generation TX	1 Port SAW Resonator 315 MHz		
Frequency generation RX	VFO C-trim, thermal stable		
IF	1 st IF -	2 nd IF -	3 rd 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 Transmitter		
Antenna socket	☐ BNC ☐ TNC ☐ N ☐ M ☐ UHF ☐ Adapter ☒ None ☐		
Test specifications:			

Attachment D: Constructional dataform for testing of radio equipment

US / CANADA

Declarations:

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

e-Flame G6R


Gerd Möhring
Vice President Engineering/Production


Barbara Happe
Group leader development gas controls

Thale, 2004-01-26