

EMISSION -- TEST REPORT

Test Report File No. : **T 22696-1-00 AA** Date of issue : November 25, 2002

Type Designation : spectrum 3 - MSB

Kind of Product : Remote Control Transmitter

Applicant : HBC-radiomatic GmbH

Manufacturer : HBC-radiomatic GmbH

Licence holder : HBC-radiomatic GmbH

Address : Haller Str. 49-53

74564 Crailsheim

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

Positive

This test report with attachment consists of **32** 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 - class A
- o - Group 2
- o - class B

- o - EN 55014 / 4.1993

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

- o - EN 55014 / A2:1990
- o - EN 55104 / 5.1995

Category:

- o - EN 55015 / A1:1990
- o - EN 55015 / 12.1993

- o - EN 55022 / 5.1995

- o - class A
- o - class B

- o - prEN 55103-1 / 3.1995
- o - prEN 50121-3-2 / 3.1995
- o - EN 60601-1-2 / 4.1994

- o - VCCI
- o - Part 15 Subpart C (15.209)
- - Part 15 Subpart C (15.249)

- o - class 1
- o - class 2

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	<input type="radio"/> 230V/50 Hz / 1 ϕ	<input checked="" type="checkbox"/> 6 VDC
	<input type="radio"/> 400V/50 Hz 3PE	<input type="radio"/> 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 spectrum 3 - MSB transmitter is designed to transmit command instructions for controlling industrial cranes and hoists as well as operating machines and plants.

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

Serial Number: Prototype

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.

DISCOVERY OF WORST CASE MEASUREMENT CONDITION:

The spectrum 3 – MSB transmitter was equipped with three different modules (902, 910, 918 MHz).

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

- Measurement of the radiated fieldstrength of all three operating frequencies 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 channels. This test results are documented in the following sections of the testreport.

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

<p>■ - Test not applicable</p>

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 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

_____ MHz

Min. limit margin

_____ dB

_____ MHz

Remarks:

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

o - Test not applicable

Test location :

- - 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 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:**Module 902 MHz**

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]
451.0	16.6	13.5	12.9	24.3	40.9	37.8	37.2	54.0

Module 910 MHz

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]
455.0	14.4	9.3	10.5	24.4	38.8	33.7	34.9	54.0

Module 918 MHz

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]
459.0	12.7	6.2	12.1	24.5	37.2	30.7	36.6	54.0

Test result:

The requirements are

■ - MET**○ - NOT MET**

Min. limit margin

16.8 dB451.0 MHz

Max. limit exceeding

 dB MHzRemarks: 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 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:**Module 902 MHz**

Frequency [MHz]	L: PK [dBµV]	L: AV [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	Limit [dBµV/m]
1355.0	53.5	41.0	-15.0	38.5	26.0	54.0
1806.0	65.9	54.7	-13.3	52.6	41.4	54.0
2257.0	58.5	47.6	-10.9	47.6	36.7	54.0
2707.0	52.7	42.4	-10.0	42.7	32.4	54.0
3158.0	57.6	47.8	-9.3	48.3	38.5	54.0

Module 910 MHz

Frequency [MHz]	L: PK [dBµV]	L: AV [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	Limit [dBµV/m]
1361.0	53.5	41.4	-15.0	38.5	26.4	54.0
1818.0	67.3	56.1	-12.8	44.5	43.3	54.0
2275.0	54.0	43.9	-11.1	42.9	32.8	54.0
2732.0	53.8	44.8	-10.1	43.7	34.7	54.0
3188.0	55.6	45.0	-9.2	46.4	35.8	54.0

Module 918 MHz

Frequency [MHz]	L: PK [dBµV]	L: AV [dBµV]	Correct. [dB]	L: PK [dBµV/m]	L: AV [dBµV/m]	Limit [dBµV/m]
1379.0	55.0	41.7	-15.1	39.9	26.6	54.0
1836.0	66.4	56.6	-12.9	53.5	43.7	54.0
2293.0	55.4	42.6	-11.3	44.1	31.3	54.0
2755.0	55.0	44.4	-10.2	44.8	34.2	54.0
3212.0	54.4	42.1	-9.3	45.1	32.8	54.0

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

10.3 dB1836.0 MHz

Max. limit exceeding

 dB MHzRemarks: The measurement was performed up to the 10th harmonic (9180 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 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:**Module 902 MHz**

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]
902.00	59.9	54.3	56.1	32.6	92.5	86.9	88.7	94.0

Module 910 MHz

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]
910.01	58.9	50.5	57.6	32.8	91.7	83.3	90.4	94.0

Module 918 MHz

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]
918.01	57.8	50.5	56.1	33.1	90.9	83.6	89.2	94.0

Testresult

The requirements are

■ - MET

○ - NOT MET

Min. limit margin

3.6 dB910.01 MHz

Max. limit exceeding

 dB MHzRemarks: 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: _____

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:

<input type="radio"/> - _____	Type : _____
<input type="radio"/> - _____	Type : _____
<input type="radio"/> - _____	Type : _____
<input type="radio"/> - _____	Type : _____
<input type="radio"/> - _____	Type : _____
<input type="radio"/> - _____	Type : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables

MBPS.No.:

☐ - customer specific cables

☐ - _____

☐ - _____

S U M M A R Y

GENERAL REMARKS:

The product spectrum 3 - MSB has been tested with three different modules on the following frequencies:

TX-Mode: 902.0 MHz
910.0 MHz
918.0 MHz

The unit measurements met 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

■ - **Fulfil**s the general approval requirements according to page 3.

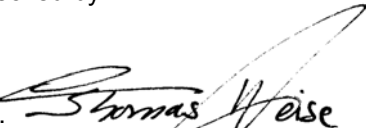
o - Does not fulfil the general approval requirements according to page 3.

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


Testing start date : October 15, 2002

Testing end date : October 16, 2002

Checked by:

i. A. 
Günter Mikes
Dipl.Ing.(FH)

Tested by:

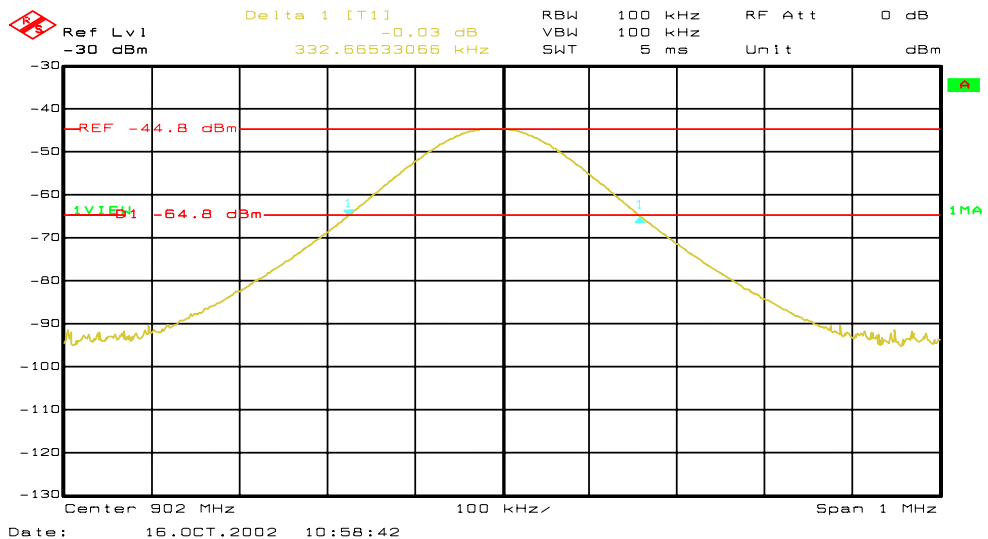
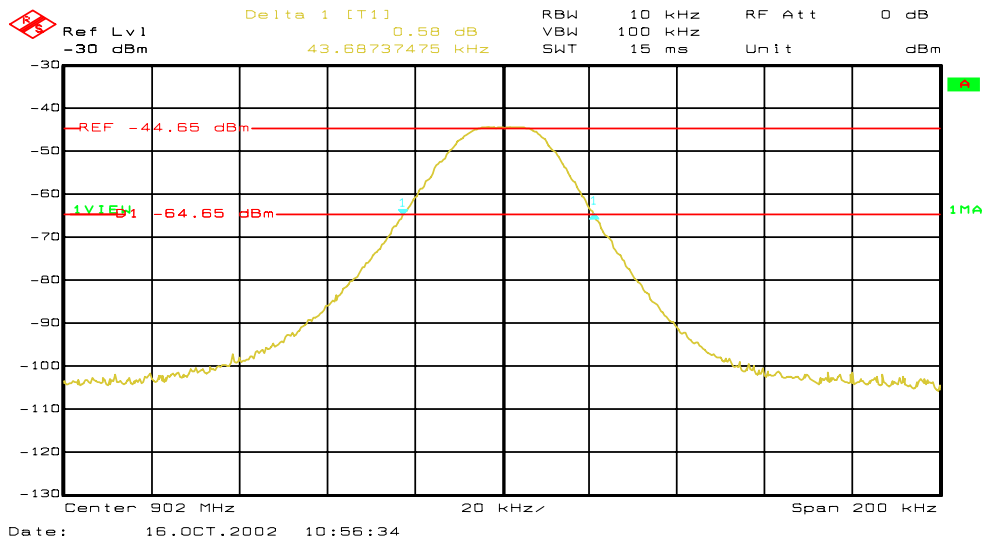
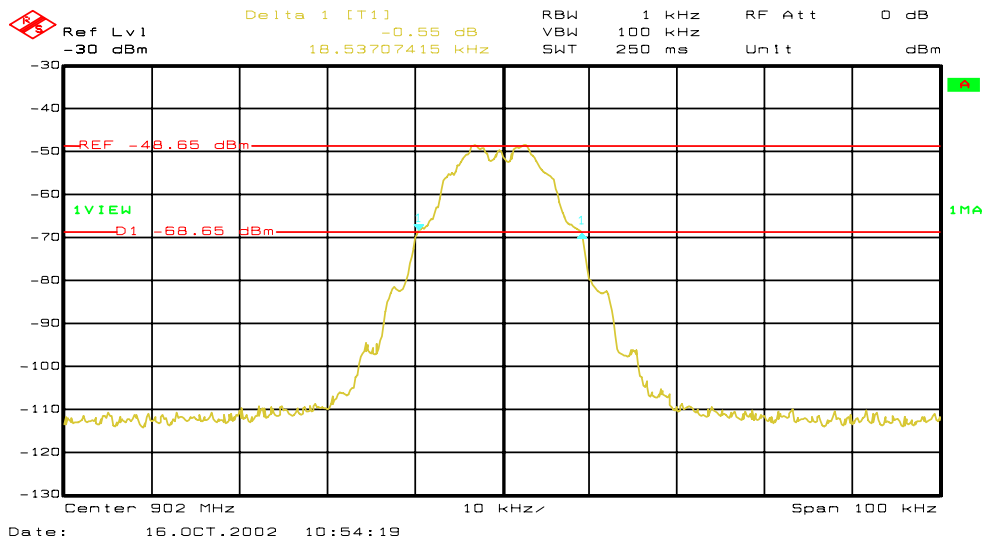

Anton Altmann
Dipl.Ing.(FH)

Attachment A1

spectrum 3 - MSB FCC ID: NO9MSB004

File No. T 22696-00 AA

Module 902 MHz

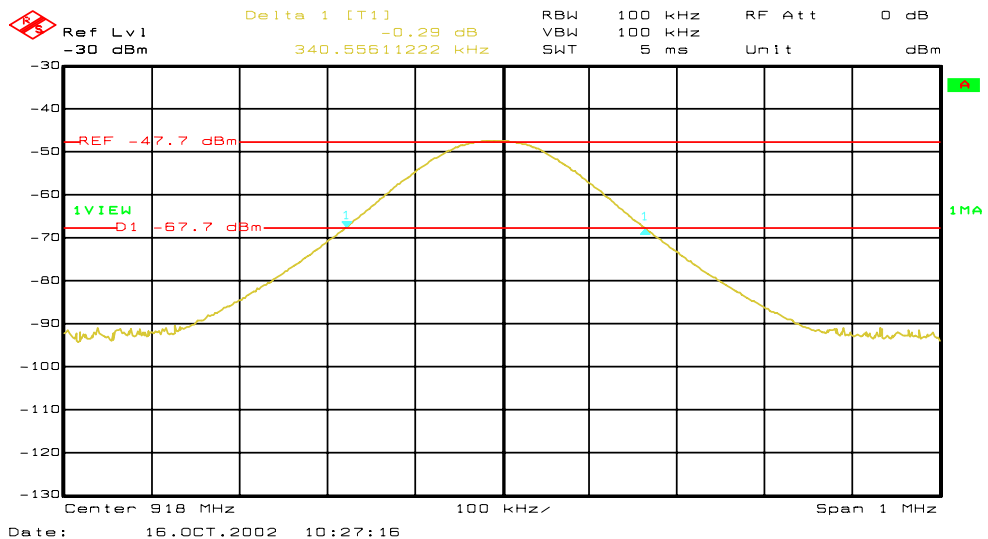
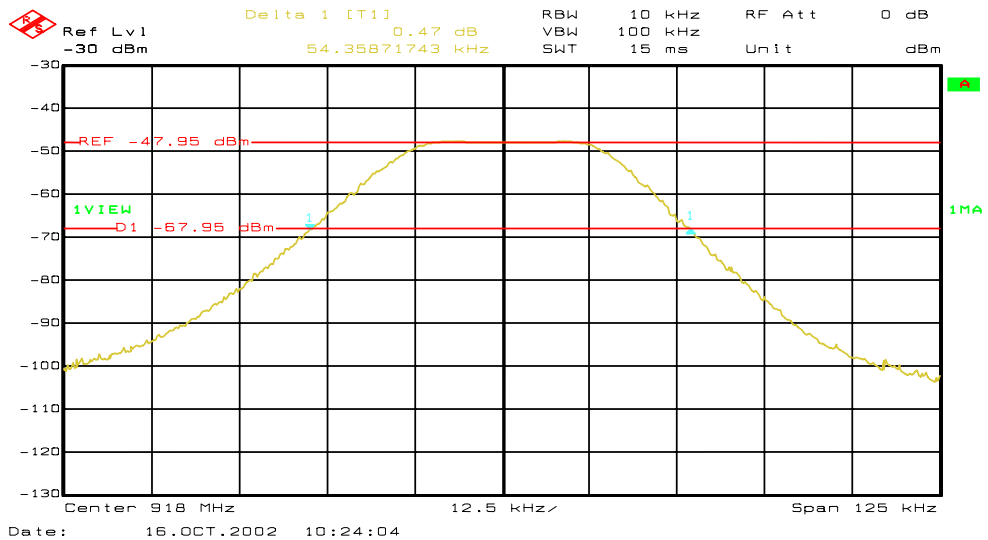
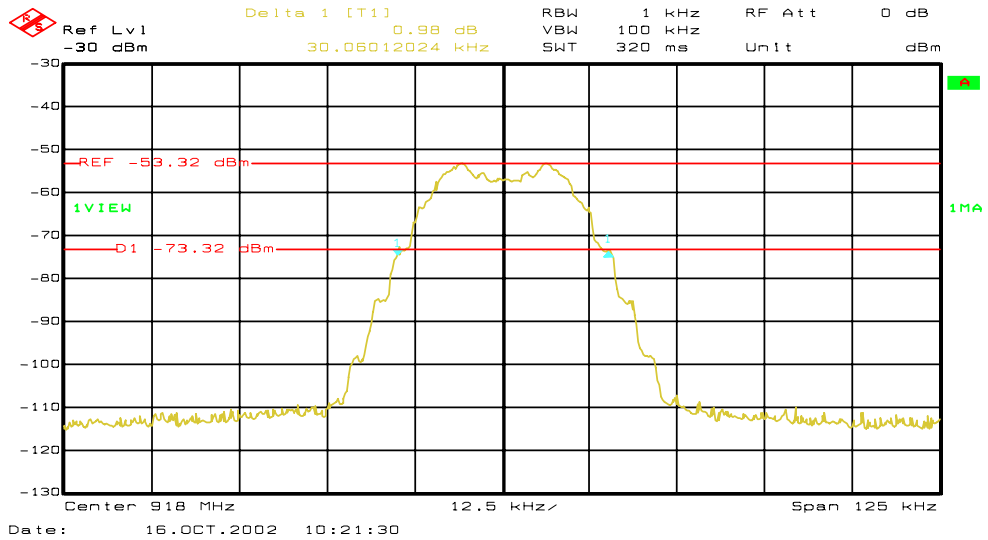


Attachment A2

spectrum 3 - MSB FCC ID: NO9MSB004

File No. T 22696-00 AA

Module 918 MHz



List of Test Equipment

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

Test Report No: T 22696-1-00 AA
 Beginning of Testing: 15.Oktober.2002
 End of Testing: 16.Oktober.2002

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.	Next Cal. Date
CPR2	Controller for Turntable	Controller	EMISYS Vertriebs GmbH	04-07/59-89-157	n/a
	HCC	Controller Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001	n/a
	RG 214/U	RF Cable 2 m	Huber+Suhner	04-07/60-89-463	n/a
	HF 7/8 inch	Antenna Cable 13 m	Huber+Suhner	04-07/60-99-001	n/a
	HF 7/8 inch	Antenna Cable 20 m	Huber+Suhner	04-07/60-99-002	n/a
	HF 7/8 inch	Antenna Cable 40 m	Huber+Suhner	04-07/60-99-003	n/a
	KR - 200	Coax Antenna Switch	Rosenberger HF-Technik	04-07/60-99-004	n/a
	VULB - 9165	Super Broadband Antenn	Schwarzbeck Mess-Elektronik	04-07/62-00-001	19.11.03
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008	18.02.03
	ESVP-EZM	Spectrum Monitor	Rohde & Schwarz München	04-07/74-86-016	n/a
	Turntable 2 m	Turntable	EMISYS Vertriebs GmbH	04-07/92-89-156	n/a
	Antenna Mast	Antenna Mast	Rohde & Schwarz München	04-07/92-97-001	n/a
MB	UHF	Telescopic Rod Antenna	Conrad Electronic GmbH	04-07/62-01-008	n/a
	FSEM 30	Spectrum Analyser	Rohde & Schwarz München	04-07/74-97-001	08.01.04
SER2	Controller for Turntable	Controller	EMISYS Vertriebs GmbH	04-07/59-89-157	n/a
	HCC	Controller Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001	n/a
	RG 214/U	RF Cable 2 m	Huber+Suhner	04-07/60-89-463	n/a
	HF 7/8 inch	Antenna Cable 13 m	Huber+Suhner	04-07/60-99-001	n/a
	HF 7/8 inch	Antenna Cable 20 m	Huber+Suhner	04-07/60-99-002	n/a
	HF 7/8 inch	Antenna Cable 40 m	Huber+Suhner	04-07/60-99-003	n/a
	KR - 200	Coax Antenna Switch	Rosenberger HF-Technik	04-07/60-99-004	n/a
	VULB - 9165	Super Broadband Antenn	Schwarzbeck Mess-Elektronik	04-07/62-00-001	19.11.03
	ESVP	Test Receiver	Rohde & Schwarz München	04-07/63-89-008	18.02.03
	ESVP-EZM	Spectrum Monitor	Rohde & Schwarz München	04-07/74-86-016	n/a
	Turntable 2 m	Turntable	EMISYS Vertriebs GmbH	04-07/92-89-156	n/a
	Antenna Mast	Antenna Mast	Rohde & Schwarz München	04-07/92-97-001	n/a
SER3	MDCON-201	Mast/Turntable Controlle	SBF electronic	04-07/59-01-001	n/a
	Sucoflex 104, SMA	RF Cable 2 m	Huber+Suhner	04-07/60-97-485	n/a
	Sucoflex 104, N	RF Cable 3 m	Huber+Suhner	04-07/60-97-492	n/a
	Model 3115	Horn Antenna	EMCO Elektronik GmbH	04-07/62-96-458	n/a
	AWT-4534	Microwave Amplifier	TransTech Hochfrequenztechni	04-07/66-90-217	n/a
	AMF-4B-040130-25P	Microwave Amplifier	TransTech Hochfrequenztechni	04-07/66-97-001	n/a
	FSEM 30	Spectrum Analyser	Rohde & Schwarz München	04-07/74-97-001	08.01.04
	Turntable 2 m	Turntable	EMISYS Vertriebs GmbH	04-07/92-89-160	n/a

CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT

Licence holder:	HBC-radiomatic GmbH		
Address:	74564 Crailsheim Haller Str. 49-53		
Manufacturer:	HBC-radiomatic GmbH		
Address:	74564 Crailsheim Haller Str. 49-53		
Type:	Remote Control Transmitter		
Model:	spectrum 3 - MSB		
Serial-No.:	prototype	Protection class:	IP 55

Additional informations to the above named model:

Antenna: transmitter:	Type: quarter wave antenna		
	Length/size: approx. 3 inch		
receiver:	Type:		
	Length/size:		
Power supply of the transmitter: Type:	DC	nominal voltage:	6,0 V
		lowest voltage:	5,7 V
		highest voltage:	7,2 V
		current consumption	appr. 50 mA
Power supply of the receiver: Type:		nominal voltage:	V
		current consumption	A

Ancillary equipment:

Description:	NC-Battery	Type:	FuB 10 AA	Serial-no.:	-
Description:	Charger	Type:	FLG 110/115	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
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no
	<input type="radio"/> yes <input type="radio"/> no		<input type="radio"/> yes <input type="radio"/> no

O If applicable, if necessary complete overleaf

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Type designation: spectrum 3 - MSB			
Name and type designation of individual units comprising the radio equipment:			
FuS 680/3 902-918 MHz 25/50 KHz channel spacing			
Type of equipment:			
<input type="checkbox"/> Radiotelephone equipment	<input checked="" type="checkbox"/> Remote-control equipment	<input type="checkbox"/> Radiomaritime equipment	<input type="checkbox"/> LPD
<input type="checkbox"/> One-way radiotelephone equipment	<input type="checkbox"/> Inductive loop system	<input type="checkbox"/> Inland waterways equipment	<input type="checkbox"/> RLAN
<input type="checkbox"/> Personal paging system	<input type="checkbox"/> Radio-relay system	<input type="checkbox"/> Radionavigation equipm.	<input type="checkbox"/>
<input type="checkbox"/> Satellite earth station	<input type="checkbox"/> CB radiotelephone equipment	<input type="checkbox"/> Antenna	<input type="checkbox"/>
<input type="checkbox"/> Data transmission equipment	<input type="checkbox"/> Movement detector	<input type="checkbox"/> Aeronautical equipment	<input type="checkbox"/>
Technical characteristics:			
	Transmitter-receiver	Transmitter	Receiver
Frequency range		See above	
Maximum no. of channels		128	
Channel spacing		12,5, 20, 25 kHz	
Class of emission (type of modulation)		F2D	
Maximum RF output power		-	
Maximum effective radiated power (ERP)		40 mV/m	
Output power variable		-	
Channel switching frequency range		W4: 902,000-905,175 W5: 905,200-908,375 W6: 908,400-911,575 W7: 911,600-914,775 W8: 914,800-917,975	
Method of frequency generation			
	<input checked="" type="checkbox"/> Synthesizer <input type="checkbox"/> Crystal <input type="checkbox"/> Other		
Frequency generation TX	f_{Synthesizer} · 2		
Frequency generation RX			
IF	1st IF	2nd IF	3rd IF
Integral selective calling			
Audio-frequency interface level at external data socket			
Modes of operation			
	<input type="checkbox"/> Duplex mode <input type="checkbox"/> Semi-duplex mode <input checked="" type="checkbox"/> Simplex mode		
Power source			
	<input type="checkbox"/> Mains <input type="checkbox"/> Vehicle-regulated <input checked="" type="checkbox"/> Integral		
Antenna socket			
	<input type="checkbox"/> BNC <input type="checkbox"/> M <input checked="" type="checkbox"/> None	<input type="checkbox"/> TNC <input type="checkbox"/> UHF <input type="checkbox"/>	<input type="checkbox"/> N <input type="checkbox"/> Adapter <input type="checkbox"/>
Test specifications:			

O If applicable, if necessary complete overleaf

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Declarations:

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

HBC-radiomatic GmbH
Haller Str. 49-53 · 74564 Crailsheim
Telefon (07951) 393-0 · Fax 393-50

Crailsheim, date 4.12.2002
place of issue

i.V. S. Ullrich
Seal and signature of applicant