

FCC ID: A94-RC48T2-27



EMISSION -- TESTREPORT

Testreport file no. : **T 20670-1-01 NF** Date : July 17, 2001
of issue

Model / Type No. : RC48T1-27

Kind of product : Remote Control (Audio / Video Products)

Applicant : Bose Corporation

Manufacturer : Bose Corporation

Licence holder : Bose Corporation

Address : The Mountain
Framingham, MA, 01701, USA

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.

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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 - EN 55014 / 4.1993
 - o - EN 55014 / A2:1990
 - o - EN 55104 / 5.1995
 - o - EN 55015 / A1:1990
 - o - EN 55015 / 12.1993
 - o - EN 55022 / 5.1995
 - o - prEN 55103-1 / 3.1995
 - o - prEN 50121-3-2 / 3.1995
 - o - EN 60601-1-2 / 4.1994
 - o - VCCI
 - - Part 15 Subpart C (15.227)
 - o - Part 15 Subpart C (15.209)
- o - Group 1
 - o - class A
 - o - Household appliances and similar
 - o - tools
 - o - Semiconductor devices
 - Category:
 - o - class A
 - o - class B
 - o - class 1
 - o - class 2
- o - Group 2
 - o - class B

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 : Battery Unom = 6.0 V 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 ± 4 dB. 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 EUT is a Remote Control to operate audio and video units/systems.

Number of received/tested samples: 1 / 1

Serial Number: Preproduction Sample

DEFINITIONS FOR SYMBOLS USED IN THIS TEST REPORT

■ - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
○ - Blank box indicates that the listed condition, standard or equipment was not applicable for this Report.

M E A S U R E M E N T P R O T O C O L F O R F C C , V C C I
A N D A U S T E L

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 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 testresults.

DISCOVERY OF WORST CASE MEASUREMENT CONDITION:

The Remote Control RC48T1-27 is designed for the operation at a fixed transmitter frequency of 27.145 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 Remote Control.
- 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 Remote Control.

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:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

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 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

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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) 9 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: SER1

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.

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 (dBµV)	+	Factor (dB)	=	Level (dBµV/m)	Limit (dBµV/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

- MET

- NOT MET

Min. limit margin

_____ dB

_____ MHz

Min. limit margin

_____ dB

_____ MHz

Remarks:

SPURIOUS EMISSIONS (electric field) 30 MHz - 1000 MHz

- Test not applicable

- Open-site 1
- Open-site 2
- 3 meters
- 10 meters
- 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	Level	+	Factor	=	Level	Limit	=	Delta
(MHz)	(dBµV)		(dB)		(dBµV/m)	(dBµV/m)	(dB)	
719	75	+	32.6	=	107.6	110	=	-2.4

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]
81.7	21.0	1.0	17.0	13.5	34.5	14.5	30.5	40.0

SPURIOUS EMISSION 1 GHz - 18 GHz

■ - Test not applicable

Testlocation :

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

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

For TEST EQUIPMENT USED please refer to ATTACHMENT B: -----

Description of Measurement

The final level, expressed in dBµV/m, is arrived by taking the reading from the Spectrumalyzer 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	Correction	correction	Correction	corrected
1.8 GHz	EMCO 3115	Amplifier AWT 4534 + cable	Factor (summarized)	level
56 dBµV	+27.3 dB	-41.2 dB	-15.8 dB	42.1 dBµV/m

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]

Testresult

The requirements are

O - MET

O - NOT MET

Min. limit margin

_____ dB

_____ MHz

Min. limit margin

_____ dB

_____ MHz

Remarks: _____
NOT APPLICABLE

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								
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: 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 at a fixed frequency of 27.145 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 - _____

SUMMARY

GENERAL REMARKS:

The product RC48T1-27 has been tested on the following frequency:
TX-Mode: 27.145 MHz

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

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

Testing Start Date : May 30, 2001

Testing End Date : Juni 12, 2001

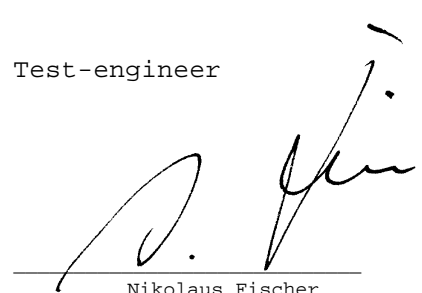
- MIKES BABT PRODUCT SERVICE GmbH -

i.v.



Günter Mikes
Dipl.-Ing. (FH)

Test-engineer



Nikolaus Fischer

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 20670-1-01 NF

Beginning of Testing: 30-Mai-2001

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.
CPR2	HCC	Controllor Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001
	RG 214 U	Antenna 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-Anten	Schwarzbeck G.	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
		Antennenmast	Antenna mast	Rohde & Schwarz München
MB	27 MHz-Antenna	Rod Antenna	MIKES PRODUCT SERVICE	04-07/62-97-001
	R 3162	Spectrum Analyzer	Advantest	04-07/74-00-001
SER2	HCC	Controllor Ant.-Mast	Rohde & Schwarz München	04-07/59-97-001
	RG 214 U	Antenna 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-Anten	Schwarzbeck G.	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
		Antennenmast	Antenna mast	Rohde & Schwarz München

CONSTRUCTIONAL DATAFORM FOR TESTING OF RADIO EQUIPMENT

Licence holder:	Bose Corporation		
Address:	The Mountain, Framingham, MA, 01701, USA		
Manufacturer:	Bose		
Address:			
Type:	Remote control		
Model:	RC28T1-27, RC28T2-27, RC28S2-27 RC48T1-27, RC48T2-27, RC48S2-27		
Serial-No.:		Protection class:	III

Additional informations to the above named model:

Antenna: transmitter:	Type: Internal		
	Length/size: 45mm		
receiver:	Type: Not applicable		
	Length/size: Not applicable		
Power supply of the transmitter: Type:	Battery (AAA x 4)	nominal voltage:	6.0 V
		lowest voltage:	V
		highest voltage:	V
Power supply of the receiver: Type:		nominal voltage:	V

Ancillary equipment:

Description:	None.	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.	<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

Page D1



Applicant: BOSE

Model-name: RC 28 / 48

Type designation: RC28T1-27, RC28T2-27, RC28S2-27 RC48T1-27, RC48T2-27, RC48S2-27			
Name and type designation of individual units comprising the radio equipment:			
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		27.145 MHz	
Maximum no. of channels		1	
Channel spacing		10 kHz	
Class of emission (type of modulation)		10K0A1D	
Maximum RF output power			
Maximum effective radiated power (ERP)		-10 dBm	
Output power variable		---	
Channel switching frequency range		---	
Method of frequency generation	<input type="checkbox"/> Synthesizer	<input checked="" type="checkbox"/> Crystal	<input type="checkbox"/> Other
Frequency generation TX			
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:			

0 If applicable, if necessary complete overleaf

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MIKES BABT PRODUCT SERVICE GmbH Ohmstr. 2-4 D-94342 Strasskirchen

Tel.: +49 94 24 94 07-0 Fax.: +49 94 24 94 07-60

Rev.No.: 3.2

Applicant: BOSE

Model-name: RC 28 / 48

Declarations:

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

Framingham, MA , date 28 JUN 01
place of issue

Jon J. Kante
Seal and signature of applicant

O If applicable, if necessary complete overleaf

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