

Marstech Limited

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Authorized by:
Professional Engineers
Ontario



Engineering &
Administrative



Testing For FCC
Submissions/Verifications

Approved Test Facility



TEST REPORT

REPORT DATE:	26 June 2002	REPORT NO:	22174D
CONTENTS:	See Table of Contents		
SUBMITTOR:	Mandolyn Electronic Technology Inc. 250 Shields Court, Unit 10B Markham, Ontario L3R 9W7		
SUBJECT:	Model No:	RC420	
	FCC ID:	PLJRC420	
TEST SPECIFICATION:	FCC 47 CFR Part 15 Subpart "B" for and Unintentional Radiator NOTE: Tests Conducted Are "Type" Tests.		
DATE SAMPLE RECEIVED:	10 June 2002	DATE TESTED:	14 & 20 June 2002
RESULTS:	Equipment tested complies with referenced specification.		
ALTERATIONS:	None		
Tested by:	Edward Chang	Approved by:	Robert G. Marshall, P. Eng.
		Date:	July 17/02
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TECHNICAL REPORT - FCC 2.1033(b)Applicant

Mandolyn Electronic Technology Inc.
250 Shields Court, Unit 10B
Markham, Ontario
L3R 9W7

FCC Identifier

PLJRC420

Manufacturer

W. H. Mandolyn International Ltd.
Yen Yang Industrial City
Zhang Mu Tou Zhen
Dongguan, China

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PRODUCT DESCRIPTION

The Mandolyn Electronic Technology Inc., Model RC420 is an outdoor remote control receiver for appliances, operating at 433.92MHz.

TEST FACILITY AND EQUIPMENT LIST

FACILITIES:

Radiated: ANSI C63.4 (FCC OET/55) open field 3 metre test range. This test range is protected from the cold and moisture by a non-conductive enclosure.

Conducted: 2.5m Anechoic Chamber

EQUIPMENT

Anritsu 2601A Spectrum Analyzer
Advantest R3261A Spectrum Analyzer
Hewlett-Packard RF generator # 8640 B with an 002 doubler
A.H. Systems biconical antenna; 20 MHz to 330 MHz
A.H. Systems log periodic antenna; 300 MHz to 1.8 GHz
Eaton dipole antennas; T1, T2, T3 25 MHz to 1.0 GHz
Roberts dipole antennas; T1, T2, T3 & T4 25 MHz to 1.0 GHz
Compliance Design P950 Preamp (16 dB) ... 25 MHz to 1.0 GHz

NOTE:

The Anritsu 2601A Spectrum Analyzer and the Advantest R3261A Spectrum Analyzer are calibrated annually, and that calibration is directly traceable to the National Research Council of Canada. (NRC) This equipment is only used by qualified technicians and only for the purpose of EMI measurements. The three metre test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

ADDITIONAL TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8591EM, S/N 3639A00995, Calibrated April 2002
2. Spectrum Analyzer: ANRITSU 2601A, S/N MT64544, Calibrated May 2002
3. Spectrum Analyzer: IFR AN940, S/N 635001039, Calibrated March 2002
4. Preamp: HP 8449B, S/N 3008A00378, Calibrated August 2001
5. Horn Antenna: Q-PAR 6878/24, S/N 1721, 1.5-18GHz
6. Line Impedance Stabilization Network.: Marstech, Cal. July 2001

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD. 21046

September 20, 2000

Electrohome Electronics Ltd.
809 Wellington St. N.
Kitchener, Ontario N2G 4J6
Canada

Registration Number: 90578

Attention: Gerry Gallagher

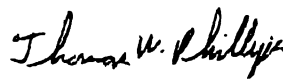
Re: Measurement facility located at Roseville
3 meter-site
Date of Listing: September 20, 2000

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.

If requested, the above mentioned facility has been added to our list of those who perform these measurement services for the public on a fee basis. An up-to-date list of such public test facilities is available on the Internet on the FCC Website at WWW.FCC.GOV, E-Filing, OET Equipment Authorization Electronic Filing.

Sincerely,



Thomas W Phillips
Electronics Engineer

15.107(a) POWER LINE CONDUCTED INTERFERENCE

Requirements:

0.45 - 30MHz 250 μ V or 47.96dB μ V

Test Procedure:

ANSI STANDARD C63.4-1992. using a 50uH LISN. Both lines were observed with the EUT transmitting. The bandwidth of the spectrum analyzer was 9KHz QP with an appropriate sweep speed. The ambient temperature of the EUT was 24°C with a humidity of 60%.

The spectrum was scanned from 0.45 to 30MHz.

Test Data:

The highest emission read for LINE was 17.26 dB μ V@ 7.14 MHz.

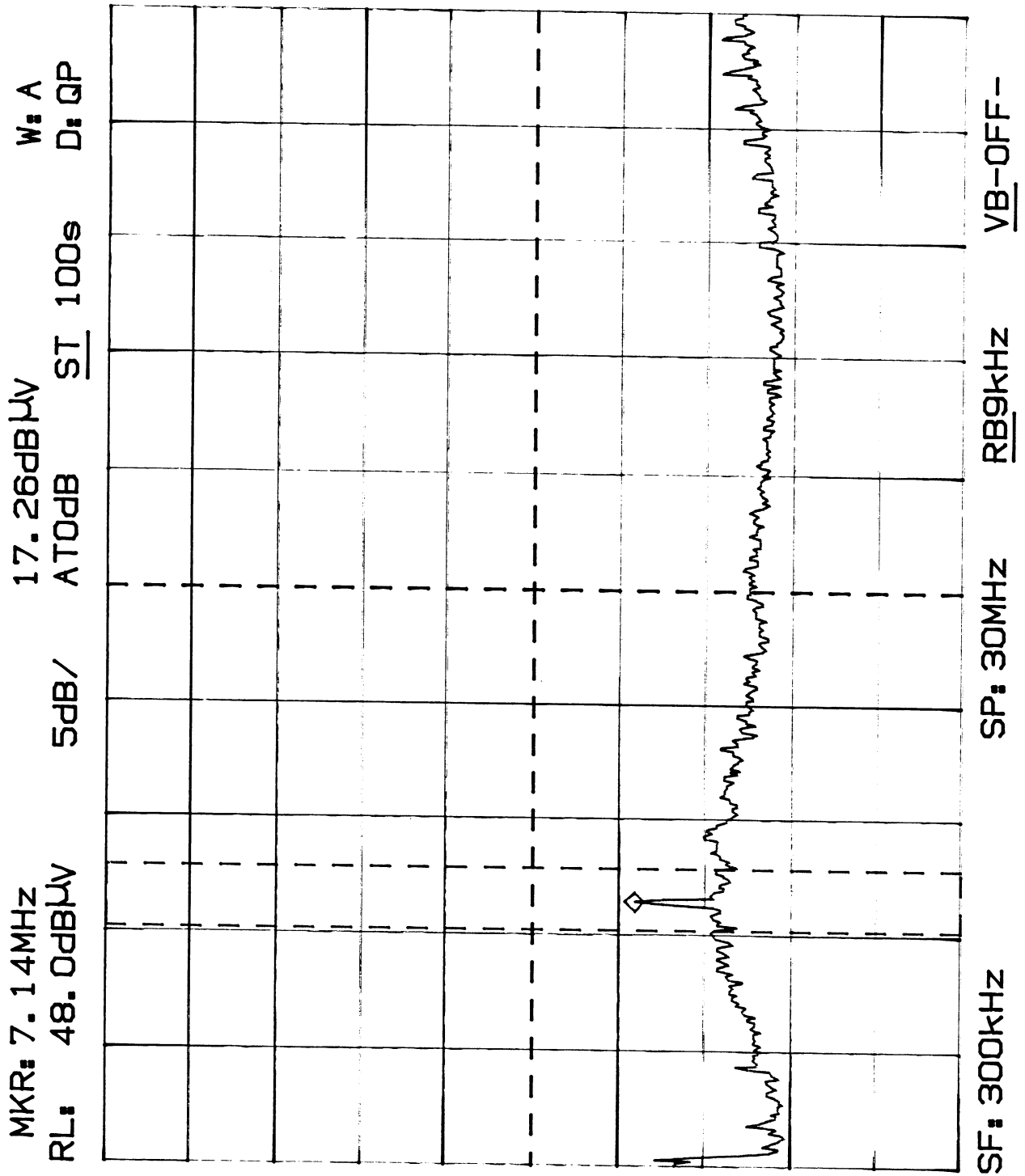
The highest emission read for NEUTRAL was 18.90 dB μ V@ 7.14 MHz.

The graphs on Exhibit D(1)-7 to -8 represent the emissions taken for this device.

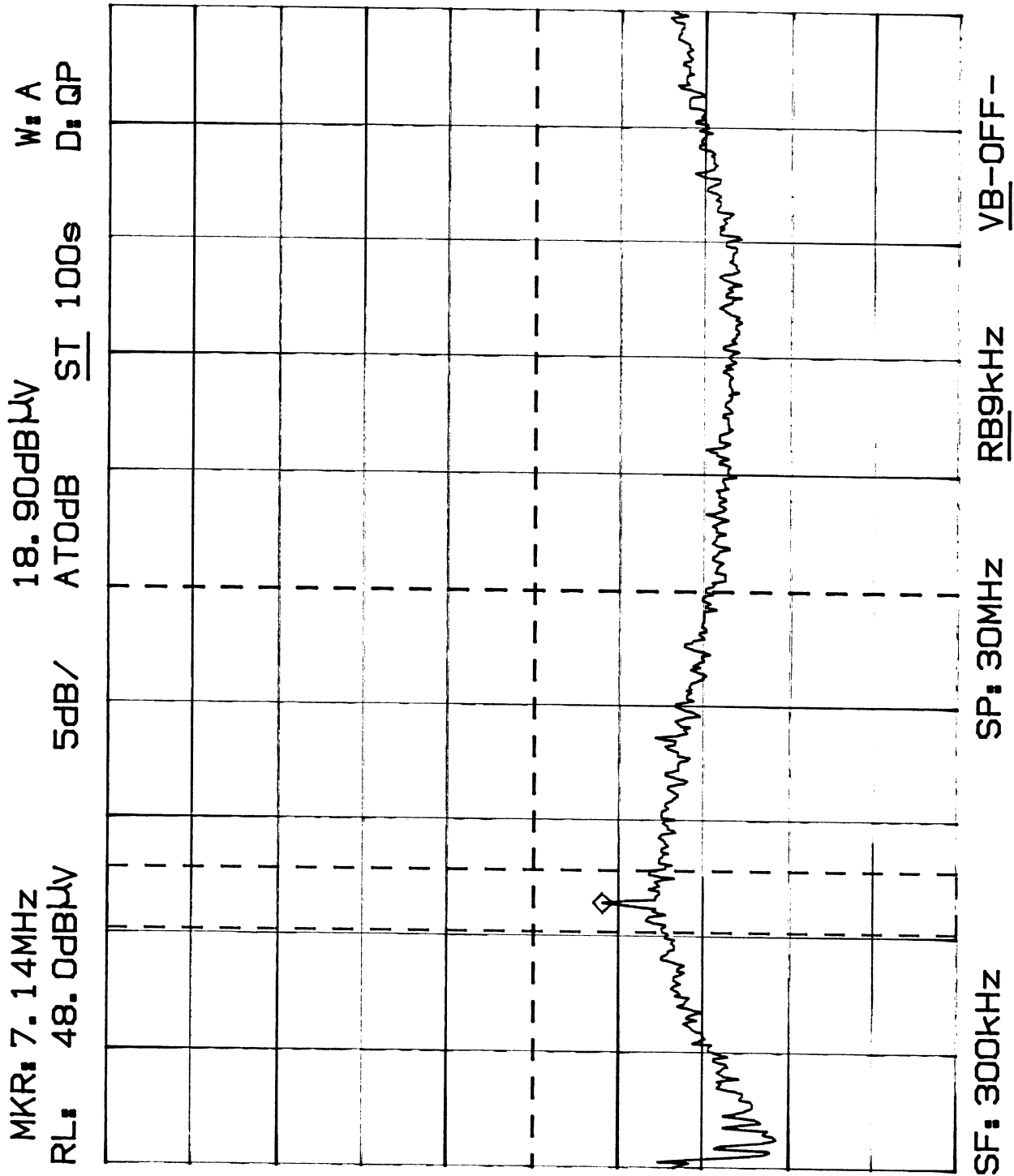
Test Results:

Both lines were observed. The measurements indicate that the unit DOES appear to meet the RSS-210 Issue 5 requirements for this class of equipment.

POWER LINE CONDUCTED EMISSIONS
 MODEL RC420; LINE
 (Dimmer at max. load / QP mode)



POWER LINE CONDUCTED EMISSIONS
 MODEL RC420; NEUTRAL
 (Dimmer at max. load / QP mode)



15.109 SPURIOUS RADIATED EMISSIONS

RESULTS

Model RC420

Receiver: **Maximum field strength:** **28.82 dB μ V/M at 440.18 MHz**

TEST CONDITIONS

Equipment Positioning:

Receiver: Laying on its back
Transmitter: N/A

Antenna Polarization: Horizontal

Measurement Bandwidth: 120KHz

Supply Voltage:

Transmitter: N/A
Receiver: 120 VAC, 60Hz

METHODS OF MEASUREMENT

Receiver:

The EUT was placed on a one meter high non-metallic turntable. The EUT was an unmodified sample, as supplied by the manufacturer. Power was supplied via a 120 VAC cable fed upward through the centre of a turntable. The EUT was set in the receive mode, and the entire spectrum up to 2,000MHz was searched for spurious emissions. All emissions were measured and recorded.

The receive frequency, 450MHz, was measured using an external unmodulated ambient RF carrier signal, tuned across the wideband of the receiver noise. The unmodulated carrier was emanating from an antenna in the proximity of the receiver. Care was taken so as not to overload the receiver, however the carrier level was varied in amplitude and frequency to obtain the highest level of spurious emissions from the receiver. This external signal was set to cause receiver "quieting" or to cohere the superregenerative receiver and cause single discrete noise components to appear. At this point, the largest emission or single frequency component within this band was measured and recorded.

For each of the above conditions, the turntable was rotated through 360 degrees, while the receiving antenna, at three (3) meters from the EUT, was varied in height from 1 to 4 meters, to find the maximum signal strength. The measured level was converted to a field strength using the antenna correction factors and cable losses.

FIELD STRENGTH OF EMISSIONS

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Test Data:**Pre-Amp: 16 dB**

Emission Frequency MHz	Meter Reading @3m dB μ V	Antenna	Cable and ACF dB	Field Strength dB μ V/M	FCC Limit dB μ V/M	Margin dB	Detector & BW KHz
440.18	9.720	LP H	19.10	28.82	46	-17.18	QP 120

RECEIVER SPURIOUS RADIATION
MODEL RC420
(Pre-Amp 16 dB)

