

Marstech Limited

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Authorized by:
Professional Engineers
Ontario



Engineering &
Administrative



Testing For FCC
Submissions/Verifications

Approved Test Facility
Industry Canada
Innovation Canada



TEST REPORT

REPORT DATE: June 13, 2001

REPORT NO: 21245D

CONTENTS: See Table of Contents

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

SUBJECT: Model No: **TR300**
FCC ID: **PLJTR300**

TEST SPECIFICATION: FCC CFR 47 Part 15 Subpart "C" Intentional Radiators
Sections: 15.205, 15.231 A, B & C
NOTE: Tests Conducted Are "Type" Tests.

DATE SAMPLE RECEIVED: April 9, 2001

DATE TESTED: April 16, 2001

RESULTS: Equipment tested complies with referenced specification.

ALTERATIONS: None.

Tested by:

Ed Chang

Approved and
Certified by:

R. G. Marshall

Date:

June 28/01

Robert G. Marshall, P. Eng.

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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

PLJTR300

Manufacturer

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

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B	Description of Circuit Functions	2.1033(b)(4)	Exhibit B-1
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D	Report of Measurements Device Measured Test Facility and Equipment Test Results and Methods Test Set-up Photo	2.1033(b)(6)	Exhibit D Exhibit D(1) Exhibit D(2)-1 to -2 Exhibit D(3)-1 to -9 Exhibit D(3)-10
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EXHIBIT D

(FCC Ref. 2.1033(b)(6))

"Report of Measurements"

EXHIBIT D(1)

DEVICE MEASURED

(FCC Ref. 2.1033(b)(6))

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

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

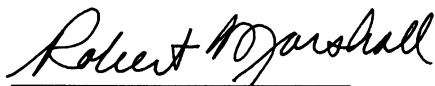
FCC IDENTIFIER: PLJTR300

MODEL NUMBER: TR300

SERIAL NO.: Not Marked

Marstech Limited
11 Kelfield Street
Etobicoke, Ontario
M9W 5A1 CANADA

TECHNICIANS:
Ed Chang
Jim Sims


Robert G. Marshall, P. Eng.

Date: June 28/01

EXHIBIT D(2)

TEST FACILITY AND EQUIPMENT LIST

FACILITIES

Radiated	ANSI C63.4 (FCC OET/55) open field 3 meter test range. This test range is protected from the cold and moisture by a non-conductive enclosure.
Conducted	2.5m Anechoic Chamber

EQUIPMENT

Hewlett-Packard spectrum analyzer # 8554 RF & 141T video.
Anritsu 2601 A spectrum analyzer.
Advantest R3261A Spectrum Analyzer
Hewlett-Packard RF generator # 8640 B with an 002 doubler
Hewlett-Packard RF voltmeter # 400 FL.
Hewlett-Packard attenuator 30 dB # 11708A.
Narda 20 watt (20 dB) attenuator
A.H. Systems biconical antenna; 20 MHZ - 330 MHZ
A.H. Systems log periodic antenna; 300 MHZ - 1.8 GHZ
Eaton dipole antennas; T1, T2, T3 25 MHZ - 1.0 GHZ
CDI Roberts dipole antennas; T1, T2, T3 & T4 25 MHZ - 1.0 GHZ

NOTE:

The Anritsu 2601 A spectrum analyzer, the Hewlett-Packard 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 meter test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD. 21046

September 20, 2000

Registration Number: 90578

Electrohome Electronics Ltd.
809 Wellington St. N.
Kitchener, Ontario N2G 4J6
Canada
Attention: Gerry Gallagher

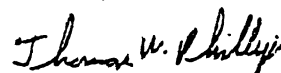
Re: Measurement facility located at Roseville
3 meter-site
Date of Listing: September 20, 2000

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

SUMMARY OF RESULTS

COMPLIANCE

(yes) (no)

FIELD STRENGTH OF THE CARRIER FREQUENCY

Transmitter: 15.231 b 9015.71 μ V/M @ 3 Meters @ 433.76MHz Limit 11,220 μ V/M (x) ()

BANDWIDTH [Exhibit D(3)-6 to -7]

Transmitter: 15.231 c 430KHz (x) ()

TRANSMITTER BAND RESTRICTIONS

Transmitter: 15.205 a 34.7 μ V/M @ 1301.29MHz Limit 501 μ V/M (x) ()

SPURIOUS RADIATION LEVELS

Transmitter: 15.231 b 129 μ V/M @ 867.48MHz Limit 1122 μ V/M (x) ()

LINE CONDUCTED RADIATION

Transmitter: N/A

PEAK TO AVERAGE RATIO

Transmitter: -12dB (x) ()

SPURIOUS RADIATED EMISSIONS

Page 1 of 2

RESULTS

The maximum field strength of any spurious emission or harmonic, from 25MHz to 2,00MHz, while transmitting was:

Model TR300

Transmitter: **Maximum field strength of 9015.71 μ V/M at 433.76MHz.**

TEST CONDITIONS

Equipment Positioning:

Receiver: N/A
Transmitter: Vertical

Antenna Polarization: Vertical

Measurement Bandwidth: 120KHz

Supply Voltage:

Transmitter: 9V battery
Receiver: N/A

METHODS OF MEASUREMENT

Transmitter:

The transmitter was placed individually on a one meter high non-metallic turntable. The EUTs were unmodified samples, as supplied by the manufacturer. All emissions were 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

Page 2 of 2

Test Data:TR300

Emission Frequency MHz	Meter Reading @3m dB μ V	Antenna	Cable and ACF dB	Field Strength dB μ V/M	Pk/Av Ratio (dB)	Corrected F.S.dB μ V/M	FCC Limit dB μ V/M	Margin dB	Detector & BW KHz
433.76	66.30	T4 V	24.80	91.10	12.00	79.10	81.00	-1.90	PK 100
867.48	25.00	LP H	29.20	54.20	12.00	42.20	61.00	-18.80	PK 100
1301.29	3.50	LP H	39.30	42.80	12.00	30.80	54.00	-23.20	PK 1000

PEAK TO AVERAGE RATIO

The peak to average ratio was measured and calculated as follows:

One complete cycle was 113mS (refer to Graph A)

One pulse has an on time of 1.32mS (refer to Graph D) and an off time of 0.6mS (refer to Graph C)

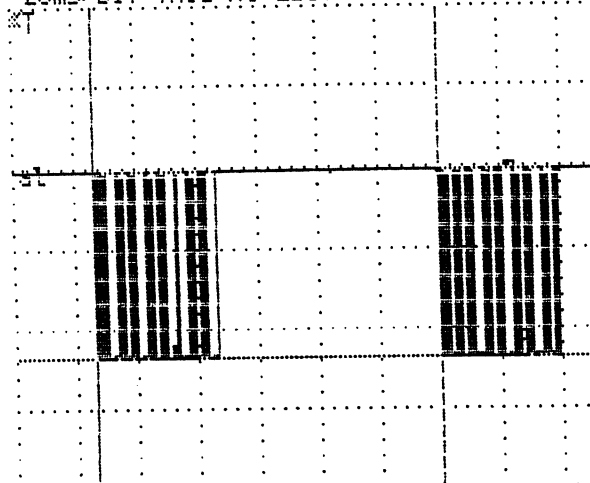
The total number of pulses in one cycle is 20 (refer to Graph B).

The peak to average ratio is the total on time ($1.32 \times 20 \approx 27\text{mS}$) divided by the total cycle time (113mS).

$$\text{Peak to average ratio: } \frac{27}{113} = 0.2389$$

$$\text{Peak to average ratio: } 20 \log 0.2389 = -12.43\text{dB} \text{ or } -12\text{dB}$$

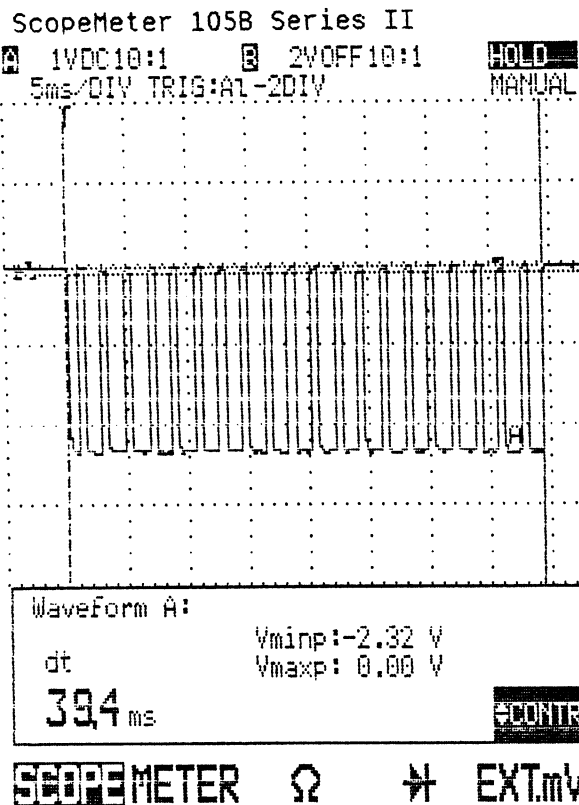
ScopeMeter 105B Series II
A 1VDC10:1 B 2VOFF10:1 HOLD
20ms/DIV TRIG:A1-2DIV MANUAL



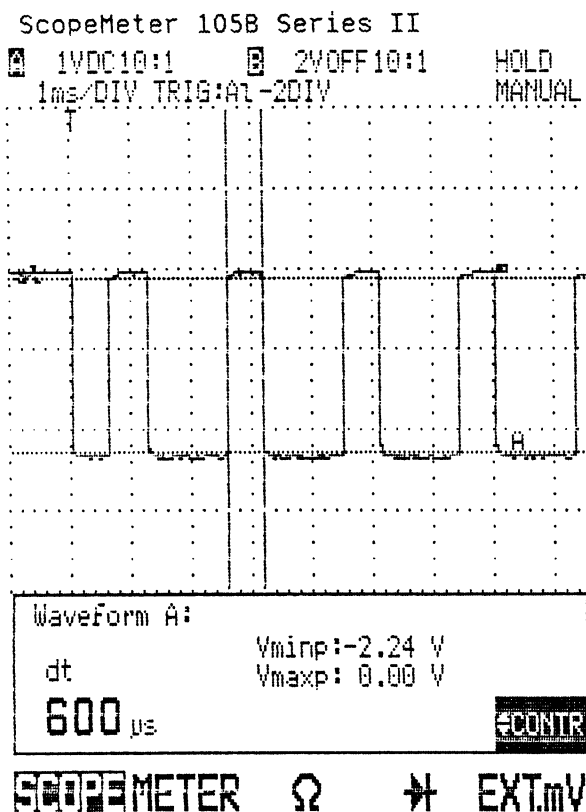
WaveForm A:
dt Vminp:-2.32 V
113 ms Vmaxp: 0.00 V

SCOPEMETER Ω $\rightarrow$ EXT.mV

GRAPH A
ONE COMPLETE CYCLE TIME
ON AND OFF

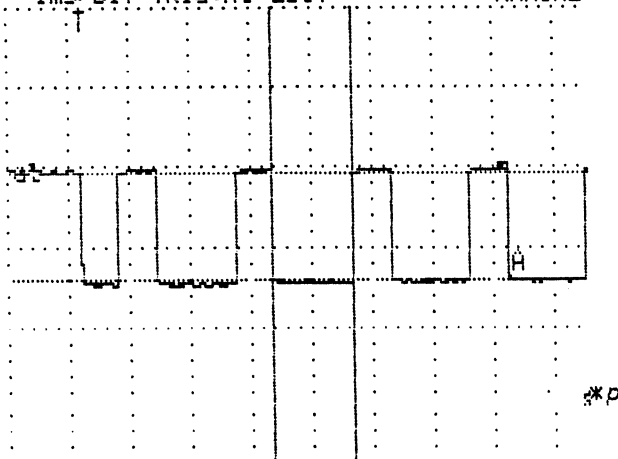


GRAPH B
COMPLETE ON CYCLE



GRAPH C
PULSE OFF TIME

ScopeMeter 105B Series II
A 1VAC10:1 B 2VOFF10:1 HOLD
1ms/DIV TRIG:A1-2DIV MANUAL



GRAPH D
PULSE ON TIME

WaveForm A:
dt Vminp:-1.40 V
1.32 ms Vmaxp:-40.0mV

SCOPE METER Ω ∇ EXT.mV

BANDWIDTH

The 20dB bandwidth was measured at 430KHz, which is less than 0.25% of 433MHz = 1,080KHz.

TR-300

20dB BANDWIDTH

16:04:55 JUN 18, 2001

✓

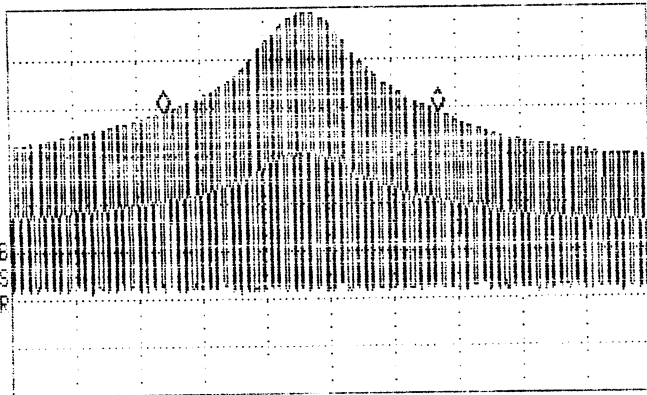
MARKER 1
480 kHz
-1.18 dB

ACTV DET: PEAK
MEAS DET: PEAK OP AVG
MKR1 480 kHz
-1.18 dB

LOG REF 76.0 dBuV

10
dB/
#ATN
0 dB

WA SB
SC FS
CORR



CENTER 480.879 MHz SPAN 1.000 MHz
#IF BW 120 kHz #AVG BW 1 MHz #SWP 10.0 sec