EMC
TEST REPORT

Report No. : EME-020094
Model No. : GDR01
Issued Date : Feb. 18, 2002

Applicant : Rexon Industrial Corp., Ltd.
No. 261, Jen Hwa Road, Tali, Taichung,
Taiwan, R.O.C.

Test By : Intertek Testing Services Taiwan Ltd.
No. 11, Ko-Tze-Nan Chia-Tung Li, Shiang-Shan District,
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Test Engineer

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Approved By

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1. General information

1.1 Identification of the EUT

Manufacturer	: Rexon Industrial Crop. Ltd.
Product	: Garage Door Opener
Model No.	: GDR01
FCC ID.	: P66GDR01
Operation Frequency	: 390MHz
Type of Modulation	: ASK
Power Supply	: 12Vdc Battery
Power Cord	: N/A
Sample Received	: Jan. 10, 2002
Test Date(s)	: Jan. 11, 2002 to Jan. 21, 2002

1.2 Additional information about the EUT

The EUT is garage door opener. It has been designed and tested to offer safe service provided it is installed, operated, maintained and tested in strict accordance with the instructions and warnings contained in instruction manual.

For more detail features, please refer to instruction Manual.

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain	: N/A
Antenna Type	: Integral Loop antenna

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section 15.231.

2.2 Operation mode

EUT was used a new 12Vdc battery. Key in four random number and then press key "Enter".
Once the button releasing, the transmission will be stopped within 1 second.
The EUT transmitted continuously during all the tests.

2.3 Modifications required for compliance

No modification were installed during test performance to bring the product into compliance (Please note that this list does not include changes made specifically by Rexon Industrial Corp., Ltd. Prior to compliance testing.)

2.4 Test equipment

Equipment	Brand	Model No.	Series No.
EMI Receiver	Rohde & Schwarz	ESCS 30	825788/014
EMI Spectrum	Rohde & Schwarz	ESMI	825428/005
Pre-Amplifier	Advantest	BB525C	83120047
Horn Antenna	EMCO	3115	9906-5822
Turn Table	Electro-Metrics	EM4710	350101
Bilog Antenna	Electro-Metrics	EM-6917-1	N/A
Antenna Tower	Electro-Metrics	EM-4720	410109

Note:
1. The calibration interval of the above instruments is 12 months.

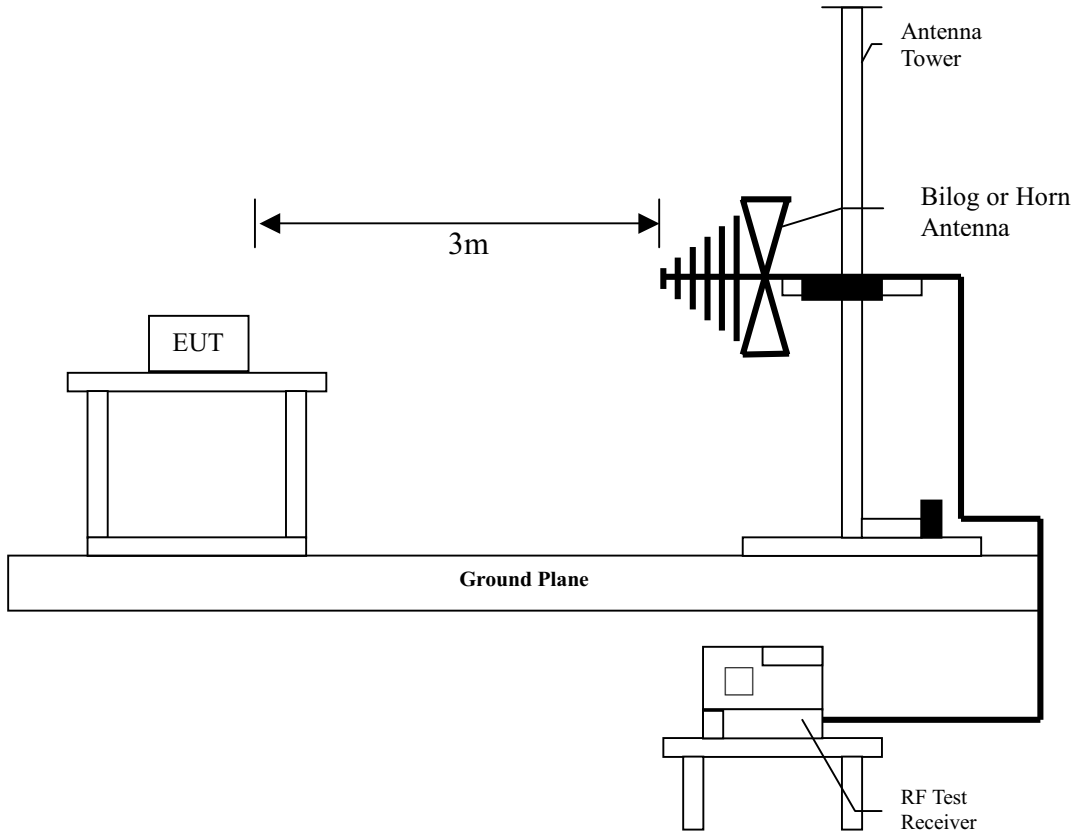
3. Radiated emission test FCC 15.231 (b)

3.1 Operating environment

Temperature:	20	℃
Relative Humidity:	56	%

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



The signal is maximized through rotation and placement in the three orthogonal axes. Radiated emission measurement were performed from 30MHz to the tenth harmonic of the highest fundamental frequency.
The EUT and its peripherals are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4/1992 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter is 120kHz and above 1GHz is 1MHz.

3.3 Radiated emission limit

3.3.1 Fundamental and harmonics emission limits

Frequency (MHz)	Field Strength of Fundamental		Field Strength of Harmonics	
	(uV/m@3m)	(dBuV/m@3m)	(uV/m@3m)	(dBuV/m@3m)
390	9166.68	79.20	916.67	59.2

3.3.2 General radiated emission limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	50dB below of the fundamental (dB μ V/m @3m)	15.209 Limits (dB μ V/m@3m)	General Radiated Limits (dB μ V/m@3m)
30-88	40	40	40
88-216	43.5	43.5	43.5
216-960	44	46	46
Above 960	44	54	54

Remark:
1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

   Uncertainty was calculated in accordance with NAMAS NIS 81. In the General Radiated Emission Test, the uncertainty is within ±2.5dB

3.4 Radiated emission test data FCC 15.231

Worst case radiated emission
at Vertical Polarization 1167.41 MHz, margin: -8.96 dB

3.4.1 Fundamental & Harmonics (Spurious) Radiated Emission Data

EUT : GDR01
Test Condition : Transmitter Mode

Freq. (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Average Factor (dB)	Reading Level (dBuV)	Corrected Reading (dBuV/m)	Limit At 3m (dBuV/m)	Margin (dB)
55.121	PK	V	0	12.9	-8.49	25	29.41	40	-10.59
119.601	PK	V	0	12.9	-8.49	11.2	15.61	43.5	-27.89
389.854	PK	V	0	16.7	-8.49	50.27	58.48	79.2	-20.72
389.129	PK	H	0	16.7	-8.49	47.1	55.31	79.2	-23.89
778.34	PK	V	0	23.7	-8.49	30.34	45.55	59.2	-13.65
778.21	PK	H	0	23.7	-8.49	29.62	44.83	59.2	-14.37
*1167.41	PK	V	0	29.43	-8.49	24.1	45.04	54	-8.96
*1167.12	PK	H	0	29.43	-8.49	23.2	44.14	54	-9.86
*1555.89	PK	V	0	35.22	-8.49	15.81	42.54	54	-11.46
*1556.21	PK	H	0	35.22	-8.49	15.89	42.62	54	-11.38
1945.15	PK	V	0	39.54	-8.49	9.56	40.61	59.2	-18.59
1945.88	PK	H	0	39.54	-8.49	8.99	40.04	59.2	-19.16

Remark:
1. Corrected Reading = Reading Level + Correction Factor + Average Factor + Preamp
2. All Readings below 1GHz are Peak, above are average value
3. All the Harmonics don't show on the above table were undetectable.
4. "-" means the value was undetectable.
5. "*" means the emission within the restricted band meets the requirement of part 15.205. The corresponding limit as per 15.209 is based on Quasi peak detector data for frequencies below 1000 MHz and average detector data for frequencies over 1000MHz.

4. Measured bandwidth FCC 15.231(C)

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

B.W(20dBc) Limit = 0.25% × f(MHz) = 0.25% × 390MHz = 0.975MHz

From the plot, the bandwidth is observed to be 268kHz, at 20dBc where the bandwidth limit is 0.975MHz and the plot is saved with file name: 20dB bandwidth plot.pdf