

Marstech Limited

11 Kelfield Street, Etobicoke, Ontario, Canada, M9W 5A1

Telephone (416) 246-1116, Fax (416) 246-1020

Authorized by:
President and Proprietor
Ontario



Engineering &
Administrative



Testing For FCC
Submissions/Verifications

Approved Test Facility



TEST REPORT

REPORT DATE:	12 March 2001		REPORT NO:	21048D
CONTENTS:	See Table of Contents			
SUBMITTOR:	HASBRO INC. 443 Shaker Road East Longmeadow, MA 01028 USA			
SUBJECT:	Model No: 40060			
	FCC ID: PGN 40060			
TEST SPECIFICATION	CFR 47 FCC Part 15 Sections: 15.35, 15.109, 15.209 and 15.249 NOTE: Tests Conducted Are "Type" Tests.			
DATE SAMPLE RECEIVED:	6 March 2001	DATE TESTED:	8 March 2001	
RESULTS:	Equipment tested complies with referenced specification.			
ALTERATIONS:	Refer to schematic drawing [Exhibit C(2)-1 (Detail of Change)]			
Tested by:	Edward Chang	Approved by:	Robert G. Marshall, P. Eng.	
	Edward Chang	Date:	March 14/01	

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TECHNICAL REPORT - FCC 2.1033(b)

Applicant

HASBRO INC.
443 Shaker Road
East Longmeadow, MA
01028 USA

FCC Identifier

PGN 40060

Manufacturer

Song Gang Kin Yat Industrial Toys Factory
Luo Tian Village, Songgang Town
Bao An District, Shenzhen, China

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EXHIBIT D

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

"Report of Measurements"

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TEST REPORT CONTAINING:

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PRODUCT DESCRIPTION

The Model 40060 is a battery operated electronic transceiver operating in the 315 MHz band and consisting of a low power OOK transmitter and a super-regenerative receiver. The antennae used for transmitter and receiver are permanently attached to the UUT.

TEST EQUIPMENT LIST

- 1 Spectrum Analyzer: HP 8591EM, S/N 3639A00995, Cal. March 2000.
- 2 Spectrum Analyzer: ANRITSU 2601A, S/N MT64544, Cal. May 2000.
- 3 Spectrum Analyzer: IFR AN940, S/N 635001039, Cal. March 2000.
- 4 Spectrum Analyzer: Advantest R3271A, S/N J001279, Cal. due May 2001.
- 5 Preamp: HP 8449B, S/N 3008A00378, Cal. March 2000.
- 6 Bilog Antenna: Chase CBL6121A, S/N 1039, Cal. July 2000.
- 7 Dipole Antenna Kit: Compliance Design A100, S/N 00430, Cal. due Sept. 2004.
- 8 Horn Antenna: Q-PAR 6878/24, S/N 1721, 1.5-18GHz.
- 8 Line Impedance Stabilization Network: Marstech, Cal. July 2000.

TEST PROCEDURE

GENERAL:

A test program was run which simulated a normal transmission.

BANDWIDTH 20dB:

The measurements were made with the spectrum analyzer's resolution bandwidth (RBW)=100KHz and the video bandwidth (VBW)=1.0MHz and the span set as shown on the plot.

POWER OUTPUT:

The radiated output power was measured, with the spectrum analyzer and Bilog Antenna, in the test mode which simulated normal operation.

RADIATION INTERFERENCE:

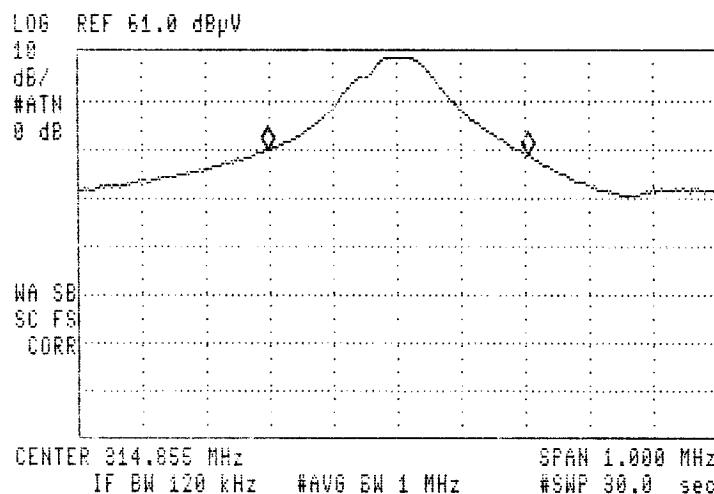
The test procedure used was ANSI STANDARD C63.4-1992 using an appropriate spectrum analyzer, as listed in the Test Equipment List. The bandwidth (RBW) of the spectrum analyzer was 100KHz/120KHz up to 1GHz with an appropriate sweep speed. The RBW above 1.0GHz was = 1MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 24°F with a humidity of 60%. The UUT was tested from 30MHz to 3.5GHz.

BANDWIDTH

The 20dB bandwidth is 408KHz (refer to D(1)-6) which is less than the limit (.25% of 315MHz = 787.5KHz).

10:34:44 MAR 13, 2001
/P

SWEETIME ACTV DET: PEAK
30.0 sec MERS DET: PEAK QP AVG
MKRa 400 kHz
-.96 dB



15.231

FIELD STRENGTH OF EMISSIONS

Requirements:

<u>Field Strength of Fundamental</u>	<u>Field Strength of Harmonics</u>	<u>S15.209</u>
		30-88MHz
315MHz 67dB μ V	47dB μ V/m@ 3m	40 dB μ V/m@ 3m
		88-216MHz
		43.5
		216-960 MHz
		46
		Above 960 MHz
		54

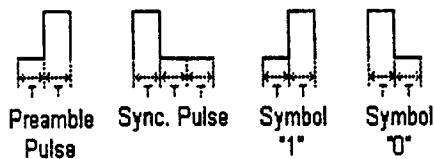
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in 15.209, whichever is the lesser attenuation.

Emissions that fall in the restricted bands (15.205) must be less than 54dB μ V/m

FIELD STRENGTH OF EMISSIONS

MODULATION AND CODING

FREQUENCY	315MHz *	
MODULATION	On Off Keyed	
BIT FORMATTING	MANCHESTER CODE **	
DATA RATE	1.17kbpss	
CRC Used	CCITT CRC	
TOTAL PAYLOAD	A) Preamble - 135 Pulses - $854\mu\text{s} \times 135 = 115.29 \text{ mS}$ B) Sync. Pulse - 1 Pulse = 1.281 mS	
TOTAL TIME	253.211 mS	
RETRANSMITTED RATE	(11 + X) Seconds where X < 6	



where $T = 427\mu\text{s}$

15.231(e)

The Model 40060 operates at nominally 315 MHz.

CARRIER

The limit for the carrier is given according to the formula:

$$F_S (\mu\text{V/M}) = 16.67 \times F - 2833.33$$

(Field Strength)

The limit for the 40060 = $16.67 \times 315 - 2833.33 = 2417.72 \mu\text{V/M}$ or $67.67 \text{ dB}\mu\text{V/M}$.

UNWANTED EMISSIONS

The limit for unwanted emissions is 1/10 of the maximum carrier field strength or $241.77 \mu\text{V/M}$ which converts to $47.7 \text{ dB}\mu\text{V/M}$. Unwanted emissions above 960 MHz may use the general limit of $54 \text{ dB}\mu\text{V/M}$. [15.231(b)(3)]

15.231(e) AUTOMATIC TRANSMISSION LIMITATION

(refer to Modulation & Coding [Exhibit D(1)-9])

The re-transmission rate is $11 + X$ seconds where X is less than 6. The silent period is therefore greater than $30 \times .253 \text{ S} = 7.6$ seconds and is always longer than the 10 seconds minimum.

15.231(b)(2); 15.35(c)

PEAK TO AVERAGE RATIO (refer to Modulation & Coding [Exhibit D(1)-9])

The total on time is 253.211 mSeconds which is less than the 1 Second period allowed.

The pulse on time vs pulse off time is nominally 50% or 0.5.

The peak to average ratio is therefore $20 \log 0.5 = -6 \text{ dB}$

15.231(d)

New batteries were used for the measurements.