

EMISSIONS TEST REPORT

Report Number: 3117002BOX-001

Project Number: 3117002

Testing performed on the

10.525 GHz Toy Radar Gun

Model: J2358

To

FCC Part 15 Subpart C 15.245

Industry Canada's RSS-210 Issue 6 September 2005 Annex 7

For

Intertek ETL Semko – Hong Kong

On Behalf of

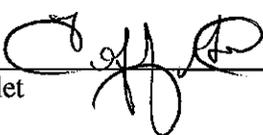
Lung Cheong Toys Limited

Test Performed by:
Intertek – ETL SEMKO
70 Codman Hill Road
Boxborough, MA 01719

Test Authorized by:
Intertek ETL SEMKO – Hong Kong
Co #68 Labtest Hong Kong Ltd.
6/F Garment Centre
576 Castle Peak Road
Kowloon, Hong Kong

Prepared by: 
Nicholas Abbondante

Date: 2/28/07

Reviewed by: 
Jeff Goulet

Date: 2-28-07

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to copy or distribute this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program. This report must not be used to claim product endorsement by A2LA, NIST nor any other agency of the U.S. Government.

1.0 Job Description

1.1 Client Information

This EUT has been tested at the request of:

Company: Intertek ETL SEMKO – Hong Kong
Co #68 Labtest Hong Kong Ltd.
6/F Garment Centre
576 Castle Peak Road
Kowloon, Hong Kong

Contact: Brandon Chuk
Telephone: 2173 8503
Fax: 2371 0521
Email: Brandon.chuk@intertek.com

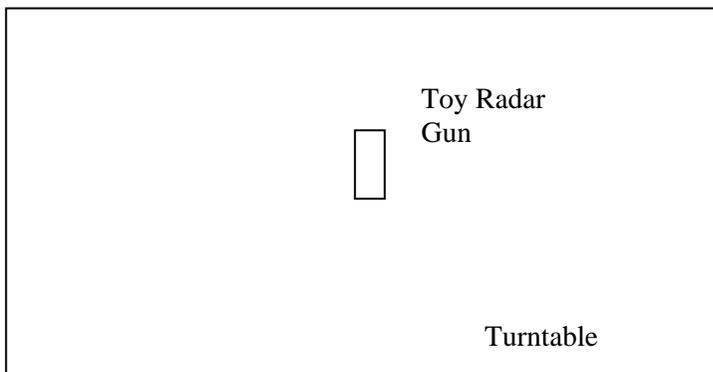
1.2 Equipment Under Test

Equipment Type: 10.525 GHz Toy Radar Gun
Model Number(s): J2358
Serial number(s): A
Manufacturer: Lung Cheong Toys Limited
EUT receive date: 01/31/2007
EUT received condition: Prototype in good condition
Test start date: 02/26/2007
Test end date: 02/28/2007

1.3 Test Plan Reference: Tested according to the standards listed, RSS-Gen Issue 1 September 2005, and ANSI C63.4:2003.

1.4 Test Configuration

1.4.1 Block Diagram



1.4.2. Cables:

Cable	Shielding	Connector	Length (m)	Qty.
None				

1.4.3. Support Equipment:

Name: None
Model No.:
Serial No.:

1.5 Mode(s) of Operation:

The EUT was transmitting continuously during testing, and was operated from fresh batteries at 6VDC.

2.0 Test Summary

TEST STANDARD	RESULTS	
FCC Part 15 Subpart C 15.245 Industry Canada's RSS-210 Issue 6 September 2005 Annex 7		
SUB-TEST	TEST PARAMETER	COMMENT
Fundamental Field Strength and Radiated Spurious Emissions FCC 15.109, 15.205, 15.209, 15.245 RSS-210 Annex 7, RSS-Gen Section 6	Fundamental field strength shall not exceed 2500 mV/m (128 dBuV/m) at 3 meters. Harmonic emission field strength shall not exceed 25 mV/m (88.5 dBuV/m) at 3 meters, unless in a restricted band above 17.7 GHz, in which case the harmonic field strength shall not exceed 7.5 mV/m (77.5 dBuV/m). All other emissions must be attenuated at least 50 dB below the level of the fundamental or below 15.209 and RSS-210 Table 2 limits, whichever is the lesser attenuation. Receiver Spurious Emissions must not exceed the RSS-Gen Section 6 Table 1 limits and the FCC Part 15 Subpart B Class B limits.	Pass
Radiated Spurious Emissions, 40 – 53 GHz FCC 15.205, 15.209, 15.245 No RSS-210 Requirement	Harmonic emission field strength shall not exceed 25 mV/m (88.5 dBuV/m) at 3 meters, unless in a restricted band above 17.7 GHz, in which case the harmonic field strength shall not exceed 7.5 mV/m (77.5 dBuV/m). All other emissions must be attenuated at least 50 dB below the level of the fundamental or below 15.209 limits, whichever is the lesser attenuation.	Pass
Occupied Bandwidth RSS-Gen Section 4.4	The 20 dB bandwidth must be recorded.	No Requirements
Duty Cycle FCC 15.35(c) RSS-Gen Section 4.3	Fundamental and harmonic emissions levels can be adjusted by a duty cycle correction factor.	No Requirements

REVISION SUMMARY – The following changes have been made to this Report:

<u>Date</u>	<u>Project</u>	<u>Project</u>	<u>Page(s)</u>	<u>Item</u>	<u>Description of Change</u>
	<u>No.</u>	<u>Handler</u>			

3.0 Sample Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength in dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- CF = Cable Attenuation Factor in dB
- AF = Antenna Factor in dB
- AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

RA = 52.0 dB μ V
 AF = 7.4 dB/m
 CF = 1.6 dB
 AG = 29.0 dB
 FS = 32 dB μ V/m

$$\text{Level in } \mu\text{V/m} = [10(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

The following is how net line-conducted readings were determined:

$$NF = RF + LF + CF + AF$$

Where

- NF = Net Reading in dB μ V
- RF = Reading from receiver in dB μ V
- LF = LISN Correction Factor in dB
- CF = Cable Correction Factor in dB
- AF = Attenuator Loss Factor in dB

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF/20)} \text{ where UF = Net Reading in } \mu\text{V}$$

Example:

$$NF = RF + LF + CF + AF = 28.5 + 0.2 + 0.4 + 20.0 = 49.1 \text{ dB}\mu\text{V}$$

$$UF = 10^{(49.1 \text{ dB}\mu\text{V} / 20)} = 254 \mu\text{V/m}$$

3.1 Measurement Uncertainty

Compliance of the product is based on the measured value. However, the measurement uncertainty is included for informational purposes.

The expanded uncertainty ($k = 2$) for radiated emissions from 30 to 1000 MHz has been determined to be:
 ± 3.5 dB at 10m, ± 3.8 dB at 3m

The expanded uncertainty ($k = 2$) for mains conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 2.6 dB

The expanded uncertainty ($k = 2$) for telecom port conducted emissions from 150 kHz to 30 MHz has been determined to be:

± 3.2 for ISN and voltage probe measurements

± 3.1 for current probe measurements

3.2 Site Description

Test Site(s): 2

Our OATS are 3m and 10m sheltered emissions measurement ranges located in a light commercial environment in Boxborough, Massachusetts. They meet the technical requirements of ANSI C63.4-2003 and CISPR 22:1993/EN 55022:1994 for radiated and conducted emission measurements. The shelter structure is entirely fiberglass and plastic, with outside dimensions of 33 ft x 57 ft. The structure resembles a quonset hut with a center ceiling height of 16.5 ft.

The testing floor is covered by a galvanized sheet metal groundplane that is earth-grounded via copper rods around the perimeter of the site. The joints between individual metal sheets are bridged with a 2 inch wide metal strips to provide low RF impedance contact throughout. The sheets are screwed in place with stainless steel, round-head screws every three inches. Site illumination and HVAC are provided from beneath the ground reference plane through flush entry ports, the port covers are electrically bonded to the ground plane.

A flush metal turntable with 12 ft. diameter and 5000 lb. load capacity (12,000 lb. in Site 3) is provided for floor-standing equipment. A wooden table 80 cm high is used for table-top equipment. The turntable is electrically connected to the ground plane with three copper straps. The straps are connected to the turntable at the center of it with ground braid. The copper strap is directly connected to the groundplane at the edges of the turntable. The turntable is located on the south end of the structure and the antennas are mounted 3 and 10 meters away to the north. The antenna mast is a non-conductive with remote control of antenna height and polarization. The antenna height is adjustable from 1 to 4 meters.

All final radiated emission measurements are performed with the testing personnel and measurement equipment located below the ground reference plane. The site has a full basement underneath the turntable where support equipment may be remotely located. Operation of the antenna, turntable and equipment under test is controlled by remote controls that manipulate the antenna height and polarization and with a turntable control. Test personnel are located below the ellipse when measurements are performed, however the site maintains the ability of having personnel manipulate cables while monitoring test equipment. Ambient radiated emissions are 6 dB or more below the relevant FCC emission limits.

AC mains power is brought to the equipment under test through a power line filter, to remove ambient conducted noise. 50 Hz (240 VAC single phase), 60 Hz power (120 VAC single phase, 208 VAC three phase), and 60 Hz (480 VAC three phase) are available. Conducted emission measurements are performed with a Line Impedance Stabilization Network (LISN) or Artificial Mains Network (AMN) bonded to the ground reference plane. A removable vertical groundplane (2 meter X 2 meter area) is used for line-conducted measurements for table top equipment. The vertical groundplane is electrically connected to the reference groundplane.

The EMC Lab has two Semi-anechoic Chambers and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference groundplanes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

Test Results: Pass

Test Standard: FCC Part 15 Subpart C 15.245, Industry Canada’s RSS-210 Annex 7 and RSS-Gen Section 6

Test: Fundamental Field Strength and Radiated Spurious Emissions, FCC 15.109, 15.205, 15.209, 15.245, RSS-210 Annex 7

Performance Criterion: Fundamental field strength shall not exceed 2500 mV/m (128 dBuV/m) at 3 meters. Harmonic emission field strength shall not exceed 25 mV/m (88.5 dBuV/m) at 3 meters, unless in a restricted band above 17.7 GHz, in which case the harmonic field strength shall not exceed 7.5 mV/m (77.5 dBuV/m). All other emissions must be attenuated at least 50 dB below the level of the fundamental or below 15.209 and RSS-210 Table 2 limits, whichever is the lesser attenuation. Receiver Spurious Emissions must not exceed RSS-Gen Section 6 Table 1 limits and FCC Part 15 Subpart B Class B limits.

Test Environment:

Environmental Conditions During Testing:	Humidity (%):	See Tables	Pressure (hPa):	See Tables	Ambient (°C):	See Tables
Pretest Verification Performed	Yes		Equipment under Test:		10.525 GHz Toy Radar gun	

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
2	HORN ANTENNA	EMCO	3115	9610-4980	06/12/2007
3	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	12/13/2007
4	ANTENNA	EMCO	3142	9701-1116	12/04/2007
5	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007
6	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL030	12/04/2007
7	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
8	3 Meter In floor cable for site 2	ITS	RG214B/U	S2 3M FLR	09/26/2007
9	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	11/13/2007
10	PREAMPLIFIER 1- 40 GHz	MITEQ	NSP4000-NF	507145	11/14/2007
11	EMI Receiver, 9kHz to 6.5GHz	Hewlett Packard	8546A	3410A00173	07/26/2007
12	EMI Filter	Hewlett Packard	85460A	344800203	07/26/2007

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

Test Details:

Notes: The average values shown at the harmonic and fundamental frequencies were obtained using the duty cycle averaging factor calculated in this report.

Transmitter Spurious Emissions

Special Radiated Emissions

Company: Intertek Hong Kong for Lung Cheong Toys Limited Antenna & Cables: LF Bands: N, LF, HF, SHF
 Model #: J2358 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Serial #: A N Antenna: NONE. NONE.
 Engineers: Nicholas Abbondante Location: Site 2 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Project #: 3117002 Date(s): 02/26/07 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt
 Standard: FCC Part 15 Subpart C 15.245/IC RSS-210 Annex 7 LF Cable(s): CBL029 12-04-2007.txt NONE.
 Receiver: R&S FSEK-30 (ROS001) Limit Distance (m): 3 N Cable(s): NONE. NONE.
 PreAmp: PRE8 11-14-07.txt Test Distance (m): 3 HF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 Barometer: BAR2 Temp/Humidity/Pressure: 20c 27% 999mB SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh Battery (6V) Frequency Range: Fundamental
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
PK	H	10522.800	71.6	41.8	3.1	0.0	0.0	116.6	148.0	-31.4	1/3 MHz		
AVG	H	10522.800	56.6	41.8	3.1	0.0	0.0	101.5	128.0	-26.5	1/3 MHz		

Special Radiated Emissions

Company: Intertek Hong Kong for Lung Cheong Toys Limited Antenna & Cables: N Bands: N, LF, HF, SHF
 Model #: J2358 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Serial #: A N Antenna: LOG1 12-04-2007 V3.txt LOG1 12-04-2007 H3.txt
 Engineers: Vathana Ven Location: Site 2 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Project #: 3117002 Date(s): 02/26/07 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt
 Standard: FCC Part 15 Subpart C 15.245/IC RSS-210 Annex 7 LF Cable(s): CBL029 12-04-2007.txt NONE.
 Receiver: R&S FSEK-30 (ROS001) Limit Distance (m): 3 N Cable(s): S2 3M FLR 9-26-07.txt NONE.
 PreAmp: PRE8 11-14-07.txt Test Distance (m): 3 HF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 Barometer: BAR2 Temp/Humidity/Pressure: 21c 26% 1003mB SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh Batteries (6V) Frequency Range: 30-1000 MHz
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
QP	V	116.000	12.0	7.3	1.5	0.0	0.0	20.8	43.5	-22.7	120/300 kHz	RB	RB
QP	V	120.000	13.8	6.8	1.4	0.0	0.0	22.0	43.5	-21.5	120/300 kHz	RB	RB
QP	V	240.000	10.0	12.3	2.2	0.0	0.0	24.5	46.0	-21.5	120/300 kHz	RB	RB
QP	V	280.000	11.0	13.3	2.4	0.0	0.0	26.7	46.0	-19.3	120/300 kHz	RB	RB
QP	V	320.000	22.1	14.3	2.5	0.0	0.0	38.9	51.5	-12.6	120/300 kHz		
QP	V	360.000	17.0	15.2	2.7	0.0	0.0	34.9	51.5	-16.6	120/300 kHz		
QP	V	400.000	12.0	15.2	2.8	0.0	0.0	29.9	46.0	-16.1	120/300 kHz	RB	RB

Radiated Emissions

Company: Intertek Hong Kong for Lung Cheong Toys Limited
 Model #: J2358
 Serial #: A
 Engineers: Nicholas Abbondante
 Project #: 3117002
 Standard: FCC Part 15 Subpart C 15.245/IC RSS-210 Annex 7
 Receiver: R&S FSEK-30 (ROS001)
 PreAmp: PRE8 11-14-07.txt
 Barometer: BAR2
 Temp/Humidity/Pressure: 21c 26% 1000mB
 PreAmp Used? (Y or N): Y
 Voltage/Frequency: Fresh Batteries (6V)
 Frequency Range: 1-18 GHz
 Antenna & Cables: HF Bands: N, LF, HF, SHF
 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 N Antenna: NONE.
 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt
 LF Cable(s): CBL029 12-04-2007.txt NONE.
 N Cable(s): NONE.
 HF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 Location: Site 2
 Date(s): 02/27/07
 Limit Distance (m): 3
 Test Distance (m): 3
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
Note: All readings are measurements of instrumentation noise floor; average readings obtained using an average detector													
PK	V	2805.600	26.9	30.9	2.9	20.4	0.0	40.3	74.0	-33.7	1/3 MHz	RB	RB
AVG	V	2805.600	14.4	30.9	2.9	20.4	0.0	27.9	54.0	-26.1	1/3 MHz	RB	RB
PK	V	6689.400	30.3	36.1	4.6	21.2	0.0	49.8	74.0	-24.2	1/3 MHz		
AVG	V	6689.400	20.0	36.1	4.6	21.2	0.0	39.6	54.0	-14.4	1/3 MHz		
PK	V	9210.400	28.9	39.5	5.5	18.9	0.0	55.1	74.0	-18.9	1/3 MHz		
AVG	V	9210.400	18.5	39.5	5.5	18.9	0.0	44.7	54.0	-9.3	1/3 MHz		
PK	V	12719.400	31.1	40.9	6.9	18.4	0.0	60.4	74.0	-13.6	1/3 MHz		
AVG	V	12719.400	21.7	40.9	6.9	18.4	0.0	51.0	54.0	-3.0	1/3 MHz		
PK	V	15070.100	30.6	43.4	7.9	20.4	0.0	61.4	74.0	-12.6	1/3 MHz		
AVG	V	15070.100	19.5	43.4	7.9	20.4	0.0	50.4	54.0	-3.6	1/3 MHz		
PK	V	17420.800	31.9	45.8	10.3	23.8	0.0	64.2	74.0	-9.8	1/3 MHz		
AVG	V	17420.800	20.5	45.8	10.3	23.8	0.0	52.7	54.0	-1.3	1/3 MHz		

Special Radiated Emissions

Company: Intertek Hong Kong for Lung Cheong Toys Limited
 Model #: J2358
 Serial #: A
 Engineers: Nicholas Abbondante
 Project #: 3117002
 Standard: FCC Part 15 Subpart C 15.245/IC RSS-210 Annex 7
 Receiver: R&S FSEK-30 (ROS001)
 PreAmp: PRE8 11-14-07.txt
 Barometer: BAR2
 Temp/Humidity/Pressure: 20c 27% 999mB
 PreAmp Used? (Y or N): Y
 Voltage/Frequency: Fresh Battery (6V)
 Frequency Range: 18-40 GHz
 Antenna & Cables: SHF Bands: N, LF, HF, SHF
 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 N Antenna: NONE.
 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt
 LF Cable(s): CBL029 12-04-2007.txt NONE.
 N Cable(s): NONE.
 HF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 Location: Site 2
 Date(s): 02/26/07
 Limit Distance (m): 3
 Test Distance (m): 3
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
Note: Also using 18-40 GHz High-Pass Filter REA006													
PK	H	21046.000	46.1	45.9	10.0	22.6	0.0	79.5	97.5	-18.0	1/3 MHz	RB	RB
AVG	H	21046.000	31.1	45.9	10.0	22.6	0.0	64.4	77.5	-13.1	1/3 MHz	RB	RB
PK	H	31568.800	60.0	47.9	14.0	42.2	0.0	79.8	97.5	-17.7	1/3 MHz	RB	RB
AVG	H	31568.800	45.0	47.9	14.0	42.2	0.0	64.7	77.5	-12.8	1/3 MHz	RB	RB

Receiver Spurious Emissions

Special Radiated Emissions

Company: Intertek Hong Kong for Lung Cheong Toys Limited Antenna & Cables: N Bands: N, LF, HF, SHF
 Model #: J2358 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Serial #: A N Antenna: LOG1 12-04-2007 V3.txt LOG1 12-04-2007 H3.txt
 Engineers: Vathana Ven Location: Site 2 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Project #: 3117002 Date(s): 02/26/07 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt
 Standard: FCC Part 15 Subpart B Class B/IC RSS-Gen Table 1 LF Cable(s): CBL029 12-04-2007.txt NONE.
 Receiver: R&S FSEK-30 (ROS001) Limit Distance (m): 3 N Cable(s): S2 3M FLR 9-26-07.txt NONE.
 PreAmp: PRE8 11-14-07.txt Test Distance (m): 3 HF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 Barometer: BAR2 Temp/Humidity/Pressure: 21c 26% 1003mB SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh Batteries (6V) Frequency Range: 30-1000 MHz
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

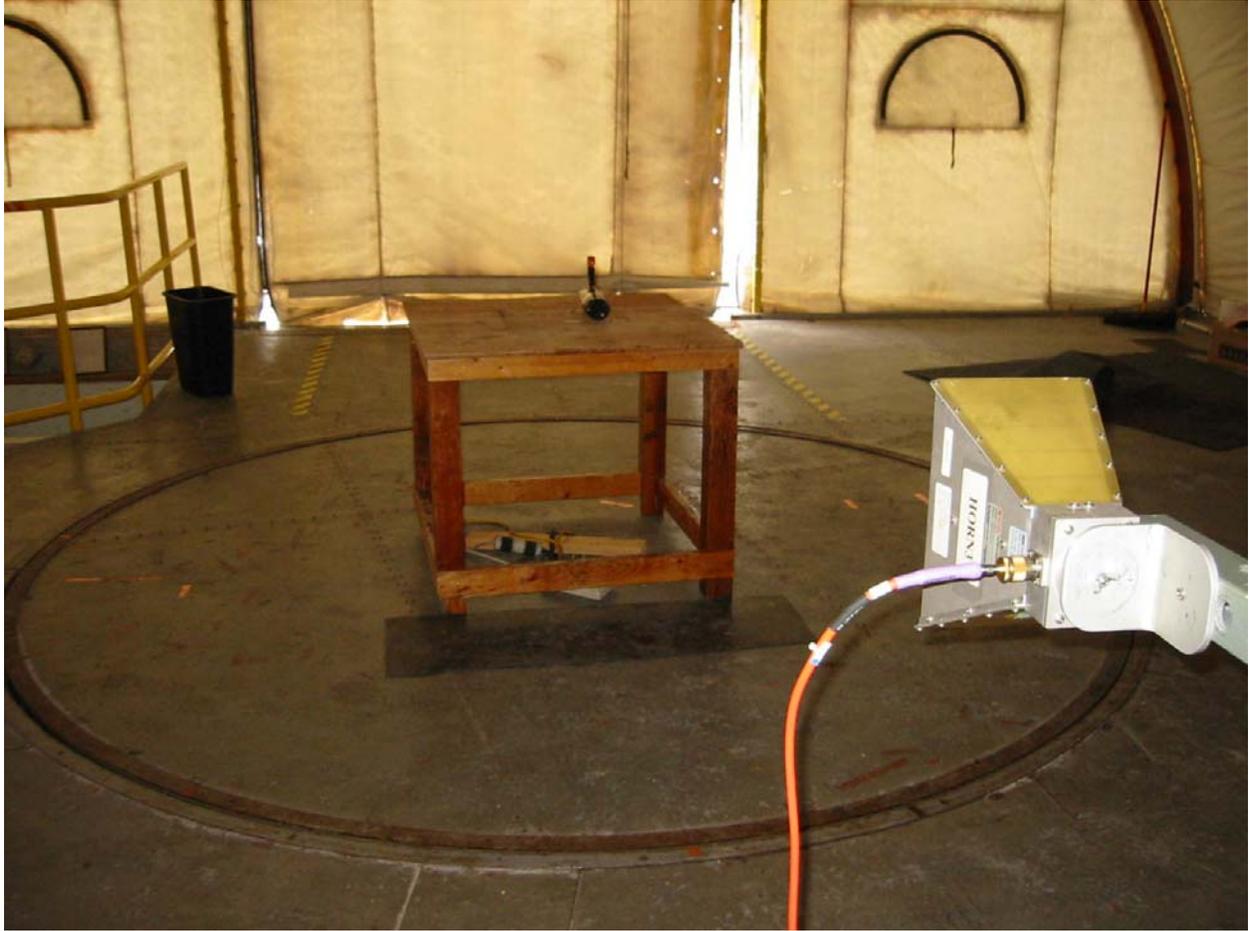
Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
QP	V	116.000	12.0	7.3	1.5	0.0	0.0	20.8	43.5	-22.7	120/300 kHz	RB	RB
QP	V	120.000	13.8	6.8	1.4	0.0	0.0	22.0	43.5	-21.5	120/300 kHz	RB	RB
QP	V	240.000	10.0	12.3	2.2	0.0	0.0	24.5	46.0	-21.5	120/300 kHz	RB	RB
QP	V	280.000	11.0	13.3	2.4	0.0	0.0	26.7	46.0	-19.3	120/300 kHz	RB	RB
QP	V	320.000	22.1	14.3	2.5	0.0	0.0	38.9	46.0	-7.1	120/300 kHz		
QP	V	360.000	17.0	15.2	2.7	0.0	0.0	34.9	46.0	-11.1	120/300 kHz		
QP	V	400.000	12.0	15.2	2.8	0.0	0.0	29.9	46.0	-16.1	120/300 kHz	RB	RB

Setup Photos









Test Results: Pass

Test Standard: FCC CFR47 Part 15 Subpart C 15.245

Test: Radiated Spurious Emissions, 40 – 53 GHz FCC 15.205, 15.209, 15.245

Performance Criterion: Harmonic emission field strength shall not exceed 25 mV/m (88.5 dBuV/m) at 3 meters, unless in a restricted band above 17.7 GHz, in which case the harmonic field strength shall not exceed 7.5 mV/m (77.5 dBuV/m). All other emissions must be attenuated at least 50 dB below the level of the fundamental or below 15.209 limits, whichever is the lesser attenuation.

Test Environment:

Environmental Conditions During Testing:	Humidity (%):	See Tables	Pressure (hPa):	See Tables	Ambient (°C):	See Tables
Pretest Verification Performed	N/A		Equipment under Test:	10.525 GHz Toy Radar Gun		

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007
2	Mixer / Antenna	Oleson Microwave Lab	M19HWA	U21011-1	Verified
3	Digital 4 Line Barometer	Mannix	0ABA116	BAR2	08/02/2007
4	High Frequency Cable 40GHz	Megaphase	TM40 K1K1 80	CBL029	12/04/2007

Software Utilized:

Name	Manufacturer	Version
EXCEL 2000	Microsoft Corporation	9.0.6926 SP-3
EMI BOXBOROUGH	Intertek	9/20/06 Revision

Test Details:

Notes: The values shown are noise floor readings at the harmonic frequencies. The EUT was also examined at a closer distance than the value reported in order to verify that no emissions could be detected. Antenna factors are calculated for the standard gain horn attached to the harmonic mixer used for testing.

Special Radiated Emissions

Company: Intertek Hong Kong for Lung Cheong Toys Limited Antenna & Cables: N Bands: N, LF, HF, SHF
 Model #: J2358 LF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Serial #: A N Antenna: NONE. NONE.
 Engineers: Nicholas Abbondante Location: Site 2 HF Antenna: HORN3 V3m 6-12-07.txt HORN3 H3m 6-12-07.txt
 Project #: 3117002 Date(s): 02/27/07 SHF Antenna: EMC04 V 1m 12-13-2007.txt EMC04 H 1m 12-13-2007.txt
 Standard: FCC Part 15 Subpart C 15.245 LF Cable(s): CBL029 12-04-2007.txt NONE.
 Receiver: R&S FSEK-30 (ROS001) Limit Distance (m): 3 N Cable(s): NONE. NONE.
 PreAmp: PRE8 11-14-07.txt Test Distance (m): 0.1 HF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 Barometer: BAR2 Temp/Humidity/Pressure: 22c 26% 1000mB SHF Cable(s): CBL029 12-04-2007.txt CBL030 12-04-2007.txt
 PreAmp Used? (Y or N): N Voltage/Frequency: Fresh Batteries (6V) Frequency Range: 40-60 GHz
 Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth	FCC	IC
PK	V	42091.200	37.2	38.7	0.7	0.0	29.5	47.0	74.0	-27.0	1/3 MHz	RB	
AVG	V	42091.200	28.9	38.7	0.7	0.0	29.5	38.7	54.0	-15.3	1/3 MHz	RB	
PK	V	52614.000	38.6	40.6	0.7	0.0	29.5	50.3	74.0	-23.7	1/3 MHz	RB	
AVG	V	52614.000	30.0	40.6	0.7	0.0	29.5	41.7	54.0	-12.3	1/3 MHz	RB	

Test Results: No Requirements

Test Standard: Industry Canada's RSS-Gen Section 4.4

Test: Occupied Bandwidth

Performance Criterion: The 20 dB bandwidth must be recorded.

Test Environment:

Environmental Conditions During Testing:	Humidity (%):	N/A	Pressure (hPa):	N/A	Ambient (°C):	N/A
Pretest Verification Performed	N/A		Equipment under Test:	Toy Radar Gun		

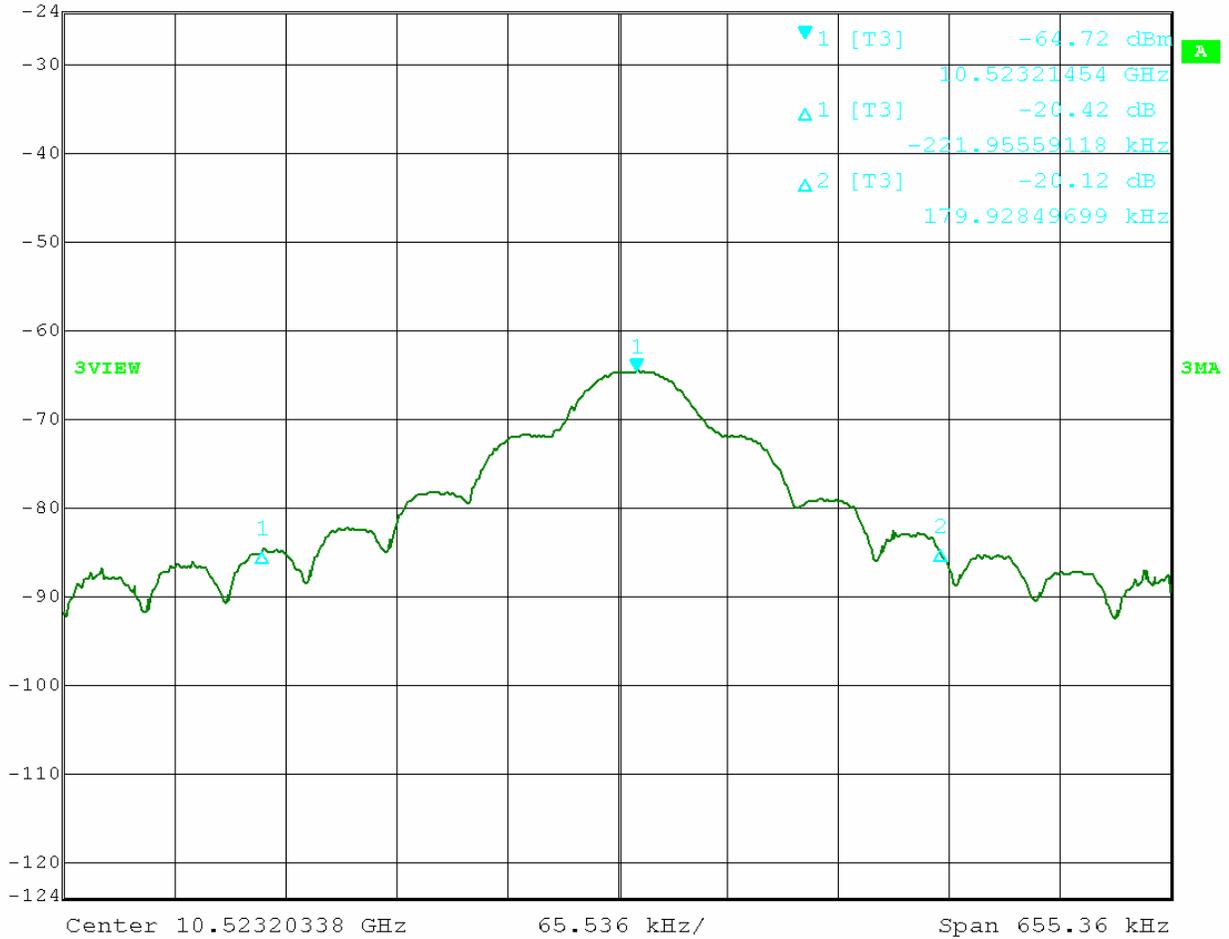
Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007

Test Details:



	Marker 1 [T3]	RBW	5 kHz	RF Att	0 dB
Ref Lvl	-64.72 dBm	VBW	20 kHz		
-24 dBm	10.52321454 GHz	SWT	66 ms	Unit	dBm



Date: 26.FEB.2007 19:55:29

20 dB Bandwidth 402 kHz

Test Results: No Requirements

Test Standard: FCC Part 15 Subpart C 15.245, Industry Canada’s RSS-210 Annex 7

Test: Duty Cycle

Performance Criterion: Fundamental and harmonic emissions levels can be adjusted by a duty cycle correction factor.

Test Environment:

Environmental Conditions During Testing:	Humidity (%):	N/A	Pressure (hPa):	N/A	Ambient (°C):	N/A
Pretest Verification Performed	N/A		Equipment under Test:	Toy Radar Gun		

Test Equipment Used:

TEST EQUIPMENT LIST					
Item	Equipment Type	Make	Model No.	Serial No.	Next Cal. Due
1	Spectrum Analyzer 20Hz - 40 GHz	Rohde & Schwartz	FSEK-30	100225	10/23/2007

Test Details:

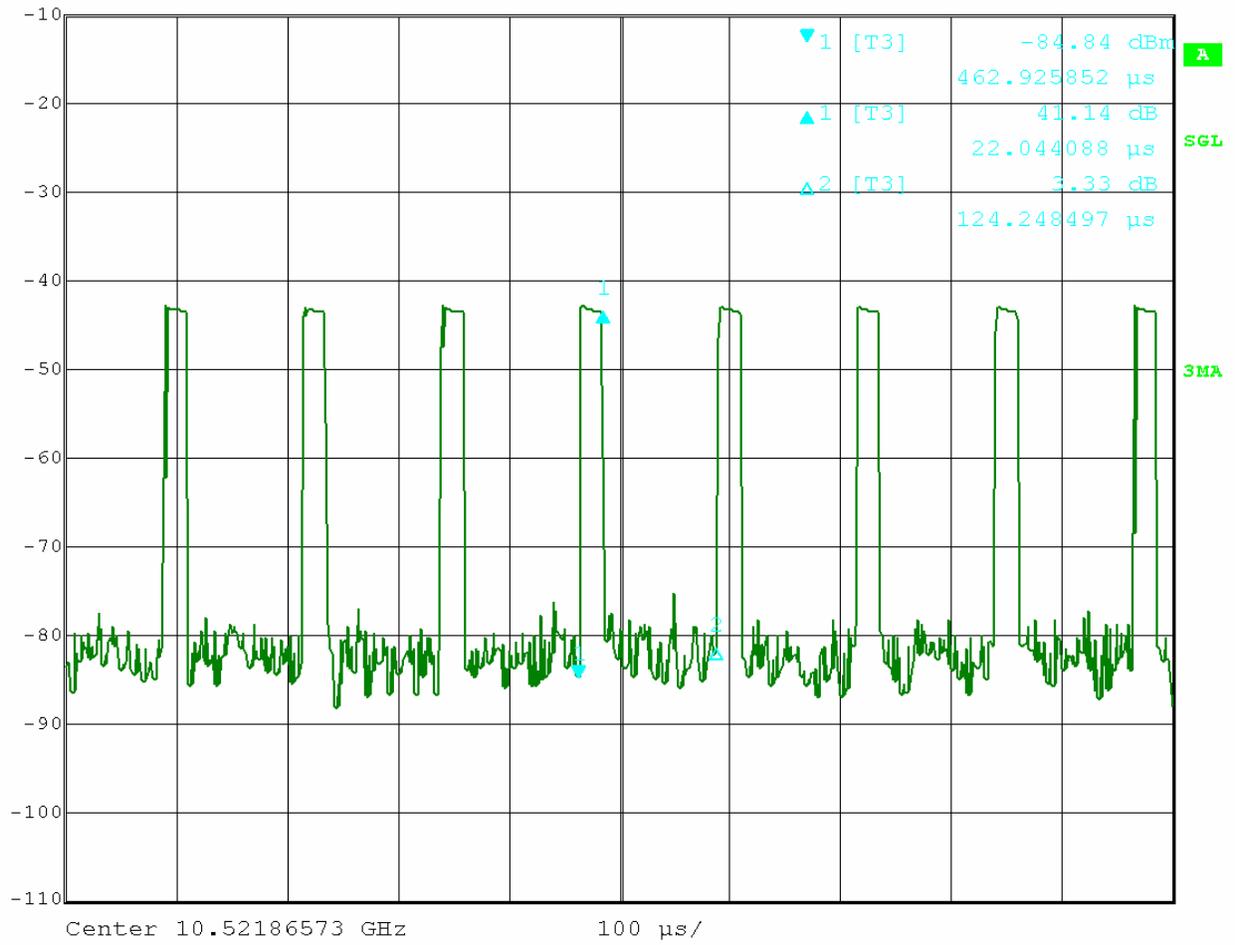
Notes: The EUT transmits a continuous train of words, each of 22.04 us, with an interval of 124.25 us. The duty cycle correction factor can be calculated using the formula:

$$\text{dB reduction} = 20 \text{ LOG (on-time / interval)}$$

Which yields a correction factor of -15.02 dB.



	Delta 1 [T3]	RBW	1 MHz	RF Att	0 dB
Ref Lvl	41.14 dB	VBW	3 MHz		
-10 dBm	22.044088 μ s	SWT	1 ms	Unit	dBm



Date: 26.FEB.2007 19:36:40

Word duration and interval