

Dorel Juvenile Group

Application
For
Certification

2.4GHz Frequency Hopping Spread Spectrum Baby Unit

(FCC ID: MNJ08096T)

HK09080338-1
MN/cl
September 07, 2009

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MEASUREMENT/TECHNICAL REPORT

Dorel Juvenile Group - Model: 08096T
FCC ID: MNJ08096T

This report concerns (check one:) Original Grant ☒ Class II Change ☐

Equipment Type : DXX - Lower Power Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

If yes, defer until : _____
date

Company Name agrees to notify the Commission
by: _____

date

of the intended date of announcement of the product so that the grant can be issued
on that date.

Transition Rules Request per 15.37 ? Yes ☐ No ☒

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-08
Edition] Provision.

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EXHIBIT 1 GENERAL DESCRIPTION

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1.0 General Description

1.1 Product Description

The 08096T is a 2.4GHz Frequency Hopping Spread Spectrum Baby Unit of Baby monitor operating at frequency range of 2402MHz to 2480MHz with 40 physical hopping channels and 20 logical hopping channels. The EUT is powered by a 100-240VAC to 9.0VDC 500mA adaptor and/or 4 x 1.5VDC "AA" batteries. It has a power button to turn on the unit, a video camera and a temperature sensor to sense the room temperature. After switching on the unit, it transmits baby's video and audio signals as well as temperature information to the corresponding parent unit.

The antenna used in unit is integral, and the tested sample is a prototype.

The circuit description is saved with filename: descri.pdf

1.2 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Preliminary radiated scans were performed in the Open Area Test Site only to determine worst case modes. All radiated measurements were performed in Open Area Test Sites. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

1.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data and conducted data are located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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EXHIBIT 2 SYSTEM TEST CONFIGURATION

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2.0 System Test Configuration

2.1 Justification

For emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

For the measurements, the EUT is attached to a plastic stand if necessary and placed on the wooden turntable. If the baby unit attaches to peripherals, they are connected and operational (as typical as possible).

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

Measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF*. The effective period (τ_{eff}) was referred to [txon.pdf](#). With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3 dB, the pulse desensitization factor was 0 dB.

2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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2.3 Details of EUT and Description of Peripherals

Details of EUT:

An AC adaptor and/or a battery (provided with the unit) were used to power the device. Their description are listed below.

- (1) Baby Unit: An AC adaptor (100-240VAC to 9.0VDC 500mA, Model: ZDA090050US) (Supplied by Client)
- (2) Backup Battery: 4 "AA" size 1.5VDC battery (Supplied by Intertek)

Description of Peripherals:

- (1) Parent Unit, Model: 08096R, FCC ID: MNJ08096R (Supplied by Client)
- (2) Parent Unit: An AC adaptor (100-240VAC to 9.0VDC 500mA, Model: ZDA090050US) (Supplied by Client)
- (3) Parent Unit: A "Ni-MH" type rechargeable battery (3.6V, 850mAh) (Supplied by Client)

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2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

2.5 Equipment Modification

Any modifications installed previous to testing by Dorel Juvenile Group will be incorporated in each production model sold/leased in the United States.

No modifications were installed by Commercial & Electrical Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

*Nip Ming Fung, Melvin
Supervisor
Intertek Testing Services
Agent for Dorel Juvenile Group*



Signature

September 07, 2009 Date

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EXHIBIT 3 EMISSION RESULTS

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3.0 Emission Results

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 Field Strength Calculation

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:-

$$FS = RR + LF$$

where FS = Field Strength in dB μ V/m
 RR = RA - AG in dB μ V
 LF = CF + AF in dB

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	RR = 23.0 dB μ V
CF = 1.6 dB	LF = 9.0 dB
AG = 29.0 dB	
FS = RR + LF	
FS = 23 + 9 = 32 dB μ V/m	

Level in μ V/m = Common Antilogarithm [(32 dB μ V/m)/20] = 39.8 μ V/m

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3.2 Radiated Emission Configuration Photograph

Worst Case Radiated Emission

at 2399.83 MHz

The worst case radiated emission configuration photographs are saved with filename: config photos.pdf

3.3 Radiated Emission Data

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 0.14 dB margin compared with average limit

TEST PERSONNEL:



Tester Signature

Koo Wai Ip, Engineer
Typed/Printed Name

September 07, 2009
Date

INTERTEK TESTING SERVICES

Company: Dorel Juvenile Group
Model: 08096T
Mode : TX-Channel 1

Date of Test: August 12-18, 2009

Table 1, Baby Unit

Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	2402.000	110.0	33	29.4	12.7	93.7	94.0	-0.3
V	*4804.000	52.3	33	34.9	12.7	41.5	54.0	-12.5
H	7206.000	45.7	33	37.9	12.7	37.9	54.0	-16.1
H	9608.000	42.8	33	40.4	12.7	37.5	54.0	-16.5
H	*12010.000	42.1	33	40.5	12.7	36.9	54.0	-17.1
H	14412.000	41.4	33	40.0	12.7	35.7	54.0	-18.3

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	2402.000	110.0	33	29.4	106.4	114.0	-7.6
V	*4804.000	52.3	33	34.9	54.2	74.0	-19.8
H	7206.000	45.7	33	37.9	50.6	74.0	-23.4
H	9608.000	42.8	33	40.4	50.2	74.0	-23.8
H	*12010.000	42.1	33	40.5	49.6	74.0	-24.4
H	14412.000	41.4	33	40.0	48.4	74.0	-25.6

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

Test Report Number: HK09080338-1
FCC ID: MNJ08096T

INTERTEK TESTING SERVICES

Company: Dorel Juvenile Group
Model: 08096T
Mode : TX-Channel 20

Date of Test: August 12-18, 2009

Table 2, Baby Unit

Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	2440.000	109.8	33	29.4	12.7	93.5	94.0	-0.5
V	*4880.000	52.1	33	34.9	12.7	41.3	54.0	-12.7
H	*7320.000	45.5	33	37.9	12.7	37.7	54.0	-16.3
H	9760.000	42.8	33	40.4	12.7	37.5	54.0	-16.5
H	*12200.000	42.5	33	40.5	12.7	37.3	54.0	-16.7
H	14640.000	43.8	33	38.4	12.7	36.5	54.0	-17.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	2440.000	109.8	33	29.4	106.2	114.0	-7.8
V	*4880.000	52.1	33	34.9	54.0	74.0	-20.0
H	*7320.000	45.5	33	37.9	50.4	74.0	-23.6
H	9760.000	42.8	33	40.4	50.2	74.0	-23.8
H	*12200.000	42.5	33	40.5	50.0	74.0	-24.0
H	14640.000	43.8	33	38.4	49.2	74.0	-24.8

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

Test Report Number: HK09080338-1
FCC ID: MNJ08096T

INTERTEK TESTING SERVICES

Company: Dorel Juvenile Group
Model: 08096T
Mode : TX-Channel 40

Date of Test: August 12-18, 2009

Table 3, Baby Unit

Radiated Emissions Pursuant to FCC Part 15 Section 15.249(a) Requirements

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	2480.000	109.9	33	29.4	12.7	93.6	94.0	-0.4
V	*4960.000	52.2	33	34.9	12.7	41.4	54.0	-12.6
H	*7440.000	45.4	33	37.9	12.7	37.6	54.0	-16.4
H	9920.000	42.6	33	40.4	12.7	37.3	54.0	-16.7
H	*12400.000	41.9	33	40.5	12.7	36.7	54.0	-17.3
H	14880.000	42.8	33	38.4	12.7	35.5	54.0	-18.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	2480.000	109.9	33	29.4	106.3	114.0	-7.7
V	*4960.000	52.2	33	34.9	54.1	74.0	-19.9
H	*7440.000	45.4	33	37.9	50.3	74.0	-23.7
H	9920.000	42.6	33	40.4	50.0	74.0	-24.0
H	*12400.000	41.9	33	40.5	49.4	74.0	-24.6
H	14880.000	42.8	33	38.4	48.2	74.0	-25.8

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

Test Report Number: HK09080338-1
FCC ID: MNJ08096T

INTERTEK TESTING SERVICES

Company: Dorel Juvenile Group
Model: 08096T
Mode : Talk

Date of Test: August 12-18, 2009

Table 4, Baby Unit

Radiated Emissions
Pursuant to FCC Part 15 Section 15.209 Requirements

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
V	36.012	39.4	16	10.0	33.4	40.0	-6.6
V	72.085	42.6	16	7.0	33.6	40.0	-6.4
H	180.062	30.8	16	20.0	34.8	43.5	-8.7
H	216.075	33.5	16	17.0	34.5	46.0	-11.5
H	336.025	28.4	16	24.0	36.4	46.0	-9.6
H	*408.025	27.4	16	24.0	35.4	46.0	-10.6
H	456.025	25.2	16	26.0	35.2	46.0	-10.8
H	504.025	24.9	16	26.0	34.9	46.0	-11.1

- NOTES: 1. Peak detector is used for the emission measurement.
2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
- * Emission within the restricted band meets the requirement of part 15.205.

Test Engineer: Koo Wai Ip

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3.4 Radiated Emission on the Bandedge, FCC Rule 15.249(d)

From the following plots, they show that the fundamental emissions are confined in the specified band (2400MHz to 2483.5MHz). In case of the fundamental emissions are within two standard bandwidths from the bandedge, the delta measurement technique is used for determining bandedge compliance. Standard bandwidth is the bandwidth specified by ANSI C63.4 (2003) for frequency being measured.

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

Radiated emission on bandedge plots are saved with filename: emission.pdf

Bandedge compliance is determined by applying marker-delta method, i.e.

Resultant field strength = Fundamental emissions - delta from the plot

Resultant field strength for the lowest and/or highest channel(s), with corresponding peak and average values are calculated as follows:

Lowest channel (peak) = $106.4\text{dB}\mu\text{V/m} - 39.84\text{dB} = 66.56\text{dB}\mu\text{V/m}$

Highest channel (peak) = $106.3\text{dB}\mu\text{V/m} - 42.69\text{dB} = 63.61\text{dB}\mu\text{V/m}$

Lowest channel (average) = $93.7\text{dB}\mu\text{V/m} - 39.84\text{dB} = 53.86\text{dB}\mu\text{V/m}$

Highest channel (average) = $93.6\text{dB}\mu\text{V/m} - 42.69\text{dB} = 50.91\text{dB}\mu\text{V/m}$

Therefore, the resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed $74\text{dB}\mu\text{V/m}$ and $54\text{dB}\mu\text{V/m}$ for peak and average limits respectively.

Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

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3.5 Line Conducted Configuration Photograph

Worst Case Line-Conducted Configuration

at 0.204 MHz

The worst case line conducted configuration photographs are saved with filename: config photos.pdf

3.6 Line Conducted Emission Data

The data on the following pages list the significant emission frequencies, the limit, and the margin of compliance.

Judgement : Passed by 12.96 dB margin compared with average limit

TEST PERSONNEL:



Tester Signature

Koo Wai Ip, Engineer
Typed/Printed Name

September 07, 2009
Date

INTERTEK TESTING SERVICES

Company: Dorel Juvenile Group
Model: 08096T

Date of Test: August 12-18, 2009

Conducted Emissions Pursuant to FCC Part 15 Section 15.207 Requirements

The conducted emission test result is saved with filename: conduct.pdf

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3.7 Transmitter Duty Cycle Calculation, FCC Rule 15.35(b, c)

Baby Unit: (For communicating with the parent unit)

$$\begin{aligned}\text{Duty Cycle (DC)} &= \text{Maximum ON time in 100ms/100ms} \\ &= (0.2\text{ms} + 22.8\text{ms})/100\text{ms}\end{aligned}$$

$$\begin{aligned}\text{Average Factor (AF)} &= 20 \log (\text{DC}) \\ &= 20 * \log (0.23) \\ &= -12.7 \text{ dB}\end{aligned}$$

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SPAN function on the analyzer was set to ZERO. The transmitter ON time was determined from the resultant time-amplitude display:

Please refer to the attached plots for more details:

The plots of Transmitter ON Time Measurements are saved as filename: txon.pdf

Please refer to Technical Description (descri.pdf) for more details.

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EXHIBIT 4 EQUIPMENT LIST

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4.0 Equipment List

1) Radiated Emissions Test

Equipment	Biconical Antenna	Log Periodic Antenna	EMI Test Receiver
Registration No.	EW-0954	EW-0446	EW-0014
Manufacturer	EMCO	EMCO	R&S
Model No.	3104C	3146	ESVS30
Calibration Date	Jun 01, 2009	Oct. 02, 2008	Jun 01, 2009
Calibration Due Date	Jun 01, 2010	Apr. 02, 2010	Jun 01, 2010

Equipment	Spectrum Analyzer	Broad-Band Horn Antenna with frequency range 14G - 40GHz	Double Ridged Guide Antenna
Registration No.	EW-2188	EW-1679	EW-1015
Manufacturer	AGILENTTECH	SCHWARZBECK	EMCO
Model No.	E4407B	BBHA9170	3115
Calibration Date	Dec. 18, 2008	Feb. 10, 2009	Jul. 28, 2008
Calibration Due Date	Dec. 18, 2009	Feb. 10, 2010	Jan. 28, 2010

Equipment	Digital Multimeter	Spectrum Analyzer 40GHz
Registration No.	EW-1237	EW-2253
Manufacturer	FLUKE	R&S
Model No.	179	FSP40
Calibration Date	Sep. 01, 2008	Aug. 12, 2008
Calibration Due Date	Oct. 01, 2009	Nov. 12, 2009

2) Conducted Emissions Test

Equipment	EMI Test Receiver	Pulse Limiter	Artificial Mains
Registration No.	EW-2251	EW-0698	EW-0192
Manufacturer	R&S	R&S	R&S
Model No.	ESCI	ESH3-Z2	ESH3-Z5
Calibration Date	Oct. 28, 2008	Feb. 03, 2009	Nov. 12, 2008
Calibration Due Date	Oct. 28, 2009	Feb. 03, 2010	Nov. 12, 2009