

Binatone Electronics International Limited

Application
For
Certification

2.4GHz Frequency Hopping Spread Spectrum Parent Unit

(FCC ID: VLJ-MBP10PU)

HK09080940-1
MN/cl
September 11, 2009

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MEASUREMENT/TECHNICAL REPORT

**Binatone Electronics International Limited - Model: MBP10PU, MBP10,
MBP10-2
FCC ID: VLJ-MBP10PU**

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.

Report reviewed by:

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**EXHIBIT 1
GENERAL DESCRIPTION**

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a 2.4GHz Frequency Hopping Spread Spectrum Parent Unit of Digital Baby Monitor operating at frequency range of 2401.056MHz to 2482.272MHz. There are total of 95 channels, and 19 channels are used for the communication environment. The EUT is powered by a 2.4V 600mAh "Ni-MH" type rechargeable battery pack and/or a 100-240VAC to 6VDC 300mA adaptor. It has a power button and volume up & down buttons to turn on the unit and adjust volume respectively. Based on its feature, it receives a baby's voice from the corresponding baby unit.

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

The parent unit of models: MBP10 and MBP10-2 are the same as the model: MBP10PU in hardware aspect. The difference between MBP10 and MBP10-2 is number of parent units in a package. The model: MBP10PU is an individual model number assigned for the parent unit.

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. The EUT was powered by 100-240VAC to 6VDC 300mA and/or fully charged battery pack.

For the measurements, the EUT is attached to a plastic stand if necessary and placed on the wooden turntable. If the parent 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.

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 Exhibit 3.7. 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) An AC adaptor (100-240VAC to 6VDC 300mA, Model: KSS05-060-0300U) (Supplied by Client)
- (2) Battery: A "Ni-MH" type rechargeable battery pack (2.4V, 600mAh) (Supplied by Client)

Description of Peripherals:

There are no special accessories necessary for compliance of this product.

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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 Binatone Electronics International Limited 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 Binatone Electronics International Limited*



Signature

September 11, 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
CF = 1.6 dB
AG = 29.0 dB
FS = RR + LF
FS = 23 + 9 = 32 dB μ V/m

RR = 23.0 dB μ V
LF = 9.0 dB

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 2440.800 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 0.6 dB margin compared with peak limit

TEST PERSONNEL:



Tester Signature

Koo Wai Ip, Engineer
Typed/Printed Name

September 11, 2009
Date

INTERTEK TESTING SERVICES

Company: Binatone Electronics International Limited Date of Test: August 24-27, 2009
 Model: MBP10PU
 Mode : TX-Channel 0

Table 1, Parent unit

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

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
V	2401.056	116.8	33	29.4	35.7	77.5	94.0	-16.5
V	*4802.112	51.5	33	34.9	35.7	17.7	54.0	-36.3
V	7203.168	53.7	33	37.9	35.7	22.9	54.0	-31.1
V	9604.224	50.8	33	40.4	35.7	22.5	54.0	-31.5
H	*12005.280	45.5	33	40.5	35.7	17.3	54.0	-36.7

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
V	2401.056	116.8	33	29.4	113.2	114.0	-0.8
V	*4802.112	51.5	33	34.9	53.4	74.0	-20.6
V	7203.168	53.7	33	37.9	58.6	74.0	-15.4
V	9604.224	50.8	33	40.4	58.2	74.0	-15.8
H	*12005.280	45.5	33	40.5	53.0	74.0	-21.0

- 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

INTERTEK TESTING SERVICES

Company: Binatone Electronics International Limited Date of Test: August 24-27, 2009
 Model: MBP10PU
 Mode : TX-Channel 46

Table 2, Parent unit

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

Polari- zation	Frequency (MHz)	Reading (dB μ V)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
V	2440.800	117.0	33	29.4	35.7	77.7	94.0	-16.3
V	*4881.600	51.3	33	34.9	35.7	17.5	54.0	-36.5
V	*7322.400	53.3	33	37.9	35.7	22.5	54.0	-31.5
V	9763.200	51.0	33	40.4	35.7	22.7	54.0	-31.3
H	*12204.000	45.6	33	40.5	35.7	17.4	54.0	-36.6

Polari- zation	Frequency (MHz)	Reading (dB μ V)	Pre- Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
V	2440.800	117.0	33	29.4	113.4	114.0	-0.6
V	*4881.600	51.3	33	34.9	53.2	74.0	-20.8
V	*7322.400	53.3	33	37.9	58.2	74.0	-15.8
V	9763.200	51.0	33	40.4	58.4	74.0	-15.6
H	*12204.000	45.6	33	40.5	53.1	74.0	-20.9

- 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

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Company: Binatone Electronics International Limited Date of Test: August 24-27, 2009
 Model: MBP10PU
 Mode : TX-Channel 94

Table 3, Parent unit

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

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dB μ V/m)	Average Limit at 3m (dB μ V/m)	Margin (dB)
V	2482.272	116.8	33	29.4	35.7	77.5	94.0	-16.5
V	*4964.544	51.7	33	34.9	35.7	17.9	54.0	-36.1
V	*7446.816	53.6	33	37.9	35.7	22.8	54.0	-31.2
V	9929.088	50.9	33	40.4	35.7	22.6	54.0	-31.4
H	*12411.360	45.7	33	40.5	35.7	17.5	54.0	-36.5

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB μ V/m)	Peak Limit at 3m (dB μ V/m)	Margin (dB)
V	2482.272	116.8	33	29.4	113.2	114.0	-0.8
V	*4964.544	51.7	33	34.9	53.6	74.0	-20.4
V	*7446.816	53.6	33	37.9	58.5	74.0	-15.5
V	9929.088	50.9	33	40.4	58.3	74.0	-15.7
H	*12411.360	45.7	33	40.5	53.2	74.0	-20.8

- 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

INTERTEK TESTING SERVICES

Company: Binatone Electronics International Limited Date of Test: August 24-27, 2009
Model: MBP10PU
Mode : Talk

Table 4, Parent unit

Radiated Emissions
Pursuant to FCC Part 15 Section 15.209 Requirements

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	36.500	39.9	16	10.0	33.9	40.0	-6.1
V	*73.000	42.6	16	7.0	33.6	40.0	-6.4
V	*109.500	36.1	16	14.0	34.1	43.5	-9.4
H	146.000	36.6	16	14.0	34.6	43.5	-8.9
H	182.500	29.4	16	20.0	33.4	43.5	-10.1
H	219.000	31.5	16	17.0	32.5	46.0	-13.5

- 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

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 0.470 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 15.44 dB margin compared with quasi-peak limit

TEST PERSONNEL:



Tester Signature

Koo Wai Ip, Engineer
Typed/Printed Name

September 11, 2009
Date

INTERTEK TESTING SERVICES

Company: Binatone Electronics International Limited Date of Test: August 24-27, 2009
Model: MBP10PU

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)

$$\begin{aligned}\text{Duty Cycle (DC)} &= \text{Maximum ON time in 100ms/100ms for DBD mode} \\ &= (0.820\text{ms} \times 2)/100\text{ms}\end{aligned}$$

$$\begin{aligned}\text{Average Factor (AF)} &= 20 \log (\text{DC}) \\ &= 20 * \log (0.0164) \\ &= -35.7 \text{ dB}\end{aligned}$$

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

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**EXHIBIT 4
EQUIPMENT LIST**

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4.0 Equipment List

1) Radiated Emissions Test

Equipment	Biconical Antenna	Double Ridged Guide Antenna	Broad-Band Horn Antenna with frequency range 14G - 40GHz
Registration No.	EW-0954	EW-1015	EW-1679
Manufacturer	EMCO	EMCO	SCHWARZBECK
Model No.	3104C	3115	BBHA9170
Calibration Date	Sep. 30, 2008	Jul. 28, 2008	Feb. 10, 2009
Calibration Due Date	Mar. 30, 2010	Jan. 28, 2010	Feb. 10, 2010

Equipment	Digital Multimeter	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-1237	EW-0014	EW-2188
Manufacturer	FLUKE	R&S	AGILENTTECH
Model No.	179	ESVS30	E4407B
Calibration Date	Sep. 01, 2008	Jun 01, 2009	Dec. 18, 2008
Calibration Due Date	Oct. 01, 2009	Jun 01, 2010	Dec. 18, 2009

Equipment	Log Periodic Antenna	Spectrum Analyzer
Registration No.	EW-0446	EW-2253
Manufacturer	EMCO	R&S
Model No.	3146	FSP40
Calibration Date	Oct. 02, 2008	Aug. 12, 2008
Calibration Due Date	Apr. 02, 2010	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