Singapore
Productivity and
Standards Board

SINGAPORE PRODUCTIVITY AND STANDARDS BOARD
1 Science Park Drive, Singapore 118221
Tel (65) 7729721, Fax (65) 7759725

CERTIFICATE OF COMPLIANCE

Graco Children's Products Inc.,
51 South Pine Street P.O. Box 100
Elverson, PA 19520, USA

Date of Test: May, 1998
Test Report No.:EMC/R/0779
Job No.:B2-00911

FCC IDENTIFIER **FCC ID : M6Y002020049T**

NAME OF APPLICANT **Graco Children's Products Inc.**

FCC Rule Part(s)	·Part 15; Docket 87-389 (Note Code#37)
Equipment Class	·Class C Intentional radiators
EUT Type	·Baby monitor (Transmitter & Receiver)·16.615&16.62OMHz
Crystal/Oscillator(s)	·16.615 & 16.20 Mhz
Model No.	·2710LE

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63 4 (1992).

I attest to the accuracy of data and all measurements reported herein which were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

PSB certifies that no party of this application has been denied the FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S. C. 853(a).

Colin Gan
Head

TEST REPORT

Your Ref

Our Ref EMC/R/00779 (Please quote our ref. no. in reply)

DiD **7729721**

Page
1 of 14

Fax 7759725

PSB

SiNGAPORE

(PSB is established as a statutory and testing authonty by an Act of Parliament, the PSB Act No 1 of 1996)

FORMAL REPORT ON TESTING IN ACCORDANCE WITH

FCC PART 15B:1996 (CLASS B) & FCC PART 15C:1996

OFA

BABY MONITOR (TRANSMITTER & RECEIVER)

[Model :2710LE]

[FCC IDs: M6Y002020049T & M6Y002020049R]

TEST FACILITY

FCC FILING ACCREDITATION

PSB EMC Test Centre
1 Science Park Drive
Singapore 118221

31040/SIT 1300B3

The EMC Test Centre is accredited under LJKAS and SINGLAS to carry out the above-mentioned test(s) The results reported herein have been performed in accordance with the laboratory's terms of accreditation.
LJKASCertNo 1372

PREPARED FOR

TEST JOB NO.

TEST PERIOD SINGLAS Cert No: 5L971 10-E
Graco Children's Products Inc.
B2-0091 1

15 -19 May 1998

PREPARED BY

N.Somou Suresh Engineer (EMC Test Centre)
Cohn
Head (EMC Test Centre)

This Report is issued under the following conditions:

1 Results of the testing/calibration in the form of a report will be issued immediately after the service has been completed or terminated.

2 Unless otherwise requested, a report shall contain only technical results. Analysis and interpretation of the results and professional opinion and recommendations expressed thereupon, if required, shall be clearly indicated and additional fee paid for, by the Client.

3 The sample/s mentioned in this report is/are submitted by the Client. PSB's officers are not involved in the sampling and the selection. PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any other information supplied.

4 Additional copies of the report are available to the Client at an additional fee. No third party can obtain a copy of this report through PSB, unless the Client has authorised PSB in writing to do so.

5 PSB may at its sole discretion add to or amend the conditions ofthis report at the time ofissue ofthe report and such report and such additions or amendments shall be binding on the Client.

6 All copyright in the report shall remain with PSB and the Client shall, upon payment of PSBs fees for the cartying out of the tests/calibrations, be granted a licence to use or publish the report to the third parties subject to the terms and conditions herein, provided always that PSB may at its absolute discretion be entitled to impose such conditions on the licence as it sees fit.

Singapore
Productivity and
Standards Board

SINGAPORE PRODUCTIVITY AND STANDARDS BOARD

1 Science Park Drive, Singapore 118221
Tel (65) 7729721, Fax (65) 7759725

CERTIFICATE OF COMPLIANCE

Graco Children's Products Inc., 51 South Pine Street P.O. Box 100 Elverson, PA 19520, USA

FCC IDENTIFIER
NAME OF APPLICANT
FCC Rule Part(s)
Equipment Class
EUT Type
Crystal/Oscillator(s)
Model No.
C ID M6Y002020049 Gräco~ChiIdren's ProductsIn~.

- Part 15; Docket 87-389 (Note Code#37)
- Class C Intentional radiators Baby monitor (Transmitter & Receiver)
  16.615 & 16.620 MHz
- 2710LE

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI 063.4 (1992).
I attest to the accuracy of data and all measurements reported herein which were performed by me or were made under my supervision and are correct to the best of my knowledge and belief I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them
PSB certifies that no party of this application has been denied the FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1988, 21 USC. 853(a).
Cohn
Head
Date of Test. May, 1998
Test Report No.: EMCIF~J0 779 Job No.: B2-0091 I

TABLE OF CONTENTS

Singapore
Productivity and
Standards Board

TEST SUMMARY

The tests were carried out in accordance with the customer's specifications. From the results obtained, the **Baby Monitor (Transmitter & Receiver) [model 2710LE]** with **FCC IDs M6Y002020049T & M6Y002020049R** respectively, was found to comply with FCC Part 1 5B 1996 (Class B) and FCC Part 1 5C: 1996 requirements for Intentional Radiators

Modifications

No modification were made.

PRODUCT DESCRIPTION

ELJT Description

The Equipment Under Test (ELJT) **is a Baby monitor.** This unit is used for nursery monitoring purposes. This device is designed only to monitor the sounds of the child and it will not alert the parents during the baby's silent activities. It operates in two channels at Transmitting frequencies of 49 845MHz and 49.890MHz. The unit is powered by an a.c-d c adapter powered by 11 5V a c power

EUT Manufacturer EUT Model Number

Graco Children's Products Inc 271 OLE

EUT Serial Number Microprocessor

Operating Frequency

Clock/Oscillator Frequency

Port/Connectors

Power Adapter AC input

49 845MHz & 49 890MHz

16.615MHz & 16.620MHz

External DC input port

ll5Vac, 60Hz

TEST CONFIGURATION DESCRIPTION

Supporting Equipment Description

The EUT and the following supporting equipment formed the required test system.

DescriDtion & Model
FCC ID & Serial No
Cable descriltlon

Baby Monitor Transmitter Model#. 2710LE

Baby Monitor Receiver Model#. 2710LE

AC-DC adapter 11 5V
(for transmitter)
Model #. DV-9100S

AC-DC adapter 11 5V
(for receiver)
Model# DV-9100S
S/NO Nil FCC ID. M6Y002020049T

S/NO: Nil FCC ID. M6Y002020049R
S/NO: Nil FCC ID Nil

S/NO: Nil FCC ID Nil
1 8m unshielded cable

1.8m unshielded cable

Test Configuration

The Transmitter and Receiver was placed side by side and powered by the adapters and set to identical channels The Receiver volume control was set to medium level.

The ELJT was powered from 1 15V a c., 60Hz mains supply through adapter

TEST OPERATING CONDITIONS

Conducted and Radiated Emissions

The EUT was exercised in the following manner during the conducted and radiated emission tests The ELJT (transmitter and receiver) was set to identical channel's to establish the communication link throughout the test

The ELJT was tested for two channel's X (49.845 MHZ) and Y (49.890 MHZ).

TEST INSTRUMENTATION

The following test instrumentation were used

Conducted Emissions Test Instrumentation (1Dm OATS)

Instrument	Model	S/No	Cal Due Date
HP EMI Receiver System	8572A	3506A01498	10 Sep 1998
EMCO LISN (for EUT)	3825/2	**9309-2127**	3 Sep 1998
Kyoritsu LISN (for others)	KNW-4030	8-1236-4	NA

Radiated Emissions (Spurious signal) Test Instrumentation (lOin OATS)

Instrument	Model	**S/No**	Cal Due Date
HP Receiver System	8572A	3506A0 1498	10 Sep 1998
EMCO Biconical Antenna	3109	9310-2759	**22 Oct 1998**
EMCO Log-periodic Antenna	3146	9110-3240	**22 Oct 1998**

Radiated Emissions (Intentional signal) Test Instrumentation (lOin OATS)

Instrument	Model	**S/No**	Cal Due Date
EMCO Biconical Antenna	3109	9310-2759	**22 Oct 1998**
R&S ESVP EMI Receiver	3543000	862773-020	25 Mar 1999

CONDUCTED EMISSIONS TEST DESCRIPTION

Test Setup

1 The test setup was in accordance with ANSI 063.4 1992.

2 The EUT and other supporting equipment were arranged on top of a I 5m x lm x O.8m high table, as shown in Appendix B.

3 The 5OQI5O~tH EUT LISN was connected to filtered mains.

4. The a c power supply for the EUT was tapped from the EUT LISN.

5. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.

6 All other supporting equipment were powered separately from another LISN

Test Method

The test was performed in the following manner

1 The EUT was switched on and allowed to warm up to its normal operating condition.

2 A quick scan, from 450kHz to 30MHz, was made on the NEUTRAL line

3 High peaks. relative to the limit line, over the frequency range were then selected

4 The EMI test receiver was then tuned to the selected frequencies CISPR quasi-peak measurements with a receiver bandwidth setting of 10kHz, were taken.

5. Steps 2 to 4 were then repeated for the LIVE line.

RADIATED EMISSIONS (SPURIOUS SIGNAL) TEST DESCRIPTION

EUT Characterisation

EUT characterisation, over the frequency range 30MHz to 1GHz, was done in order to minimise radiated emission testing time while stHl maintaining high confidence in the test results.

The EUT was placed in a shield room, at a height of about lm on a turntable, and its radiated emissions frequency profile was observed, using a spectrum analyzer with the appropriate broadband antenna placed 1 m away from the EUT Radiated emissions from the EUT were maximised by rotating the turntable manually, changing the antenna polarisation and manipulating the EUT cables while observing the frequency profile on the spectrum analyzer. Frequency points at which maximum emissions occurred, clock frequencies and operating frequencies were then noted for the formal radiated emissions test at PSB's Open Area Test Site (OATS)

Test Setup

1 The test setup was in accordance with ANSI C63 4.1992

2 The EUT and other supporting equipment were setup on a 1 5m X 1.Om X 0 8m high table placed on top of a turntable as shown in Appendix B.

3. The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the ground plane

4 The relevant broadband antenna was set at the required test distance away from the EUT and supporting equipment boundary

Test Method

The test was performed in the following manner.

1. The EUT was switched on and allowed to warm up to its normal operating condition

2 The test was carried out at the selected frequency points obtained from the EUT characterisation. Emission maximization was carried out by varying the antenna polarization, antenna height and turntable direction in the following manner

a Vertical or horizontal polarisation (whichever gave the higher emission level) was chosen

b. The turntable was rotated to the direction that gave maximum emissions.

c. The antenna height was adjusted to the height that gave maximum emissions

3. A quasi-peak measurement was then made at the frequency point.

4 Steps 2 and 3 were then repeated for the next frequency point.

5. The frequency range covered was from 30MHz to 1GHz, using the biconical antenna for frequencies up to 200MHz, and the log-periodic antenna for frequencies above 200MHz

RADIATED EMISSIONS (INTENTIONAL SIGNAL) TEST DESCRIPTION

in accordance with FCC part 15 C, the EUT (Transmitter and Receiver) was tested as described below;

Test Setup

1. The test setup was in accordance with ANSI C63 4:1992

2 The EUT and other supporting equipment were setup on a 1 Sm X 1.Om X 0 8m high tab~e placed on top of a turntable as shown in Appendix B.

3 The filtered power supply for the EUT and supporting equipment were tapped from the appropriate power sockets located on the ground plane.

4 The bicon antenna was set at the required 3m distance away from the EUT and supporting equipment boundary.

Test Method

The test was performed in the following manner:

1 The EUT was switched on and allowed to warm up to its normal operating condition.

2 The test was carried out at the selected frequency points obtained from the EUT characterisation Emission maximization was carried out by varying the antenna polarization

3 An average measurement was then made at two frequencies respectively x,y channels using a receiver.

Conducted Emissions FCC Part 15B:1996 (Class B) Results (Transmitter)

FREQUENCY (MHz)	CHANNEL	Q-P VALUE (dB~.tV)	Q-P MARGIN (dB)	LINE
04998	X	16.9	-31 0	LIVE
2.2440	X	17 0	-30.9	NEUTRAL
22630	Y	17.3	-306	LIVE
5.8410	Y	19.1	-28.8	LIVE
58660	X	175	-304	NEUTRAL
5.9150	Y	171	-308	NEUTRAL

Conducted Emissions FCC Part 15B:1996 (Class B) Results (Receiver)

FREQUENCY (MHz)	CHANNEL	Q-P VALUE (dB~iV)	Q-P MARGIN (dB)	LINE
04853	Y	186	-29.3	LIVE
2.2070	X	17.1	-30.8	NEUTRAL
47560	X	17.3	-306	NEUTRAL
48770	X	17.6	-303	LIVE
56960	Y	166	-313	LIVE
5.8410	X	187	-292	NEUTRAL

NOTES

1 All possible modes of operation were investigated, and only the 6 worst case emissions measured, using a CISPR quasi-peak detector, are reported. All other emissions were insignificant

2. The Conducted Emissions FCC Part 15C 1996 Class B limit is 250pV(47 9dB~iV) from 450kHz to 30MHz.

3 A -ye' Q-P indicates a PASS as it refers to the margin present below the limit line at the particular frequency

4 All measuring equipment are calibrated with traceability to NPL (UK) or NIST (USA)

MEASUREMENT UNCERTAINTIES

All test measurements carried out are traceable to UK National Standards where obtainable The uncertainty of the measurement is ±2 4dB at a confidence level of approximately 95%, with a coverage factor of 2

Conducted emissions (Voltage)
9 kHz .30 MHz (Average and Quasi-peak) ±2 4dB

TEST RESULTS

Radiated Emissions FCC Part 15B:1996 (Class B) Results (Spurious Signal)

FREQUENCY (MHz)	CHANNEL	Q-P VALUE *(dBi.tVIm)*	Q-P MARGIN (dB)	POL (hA,)	HEIGHT (in)	AZIMUTH (Degrees)
1153633	Y	29.1	-143	H	2.21	305
140.2926	X	323	-112	H	185	61
1477324	Y	34.8	-87	V	2.41	29
185.2751	X	33.7	-98	V	1.87	*117*
275.2368	X	30.0	-16.0	V	1 75	292
3650880	Y	337	-123	H	101	153

NOTES

1. All possible modes of operation were investigated, and only the 6 worst case emission~, measured, using a CISPR quasi-peak detector, are reported. All other emissions were Insignificant.
2 The above Q-P values were measured at a 3m test distance.
3. The Radiated Emissions FCC Part 15C 1996 (Class B) limit **(@** 3m) is:

1 OOpV/m (40.OdBpV/m) from
150p Vim (43.SdBpNim) from
200pV/m (46.OdBpV/m) from
500pV/m (54.OdBpV/m) above
30MHz to 88MHz
88MHz to 216MHz
216MHz to 960MHz
960MHz

4 A we Q-P margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency
5. All measuring equipment are calibrated with traceability to NPL (UK) or NIST (USA).

MEAsUREMENT UNCERTAINTIES

All test measurements carried out are traceable to UK National Standards where obtainable The uncertainty of the measurement is ±4 3dB at a confidence level of approximately 95%, with a coverage factor of 2

Radiated **emissions (OATS)**
30MHz-i GHz (OP only @ 3m and 10 m)
±4 3dB (For EUT not bigger than 0 Sm X 0 5m X 0 Sm)

TEST RESULTS

Radiated Emissions FCC Part 15C:1996 Results (Intentional Signal)

NOTES

1.
2.
3.

The intentional radiating signal was measured, using a CISPR average detector.

The above Average values were measured at a 3m test distance.

The Radiated Emissions FCC Part 15C 1996 limit **(@** 3m) is.

10000 microvolts/meter (80dB pV/m) from 49-50MHz

4 A "-ye" AVG margin indicates a PASS as it refers to the margin present below the limit line at the particular frequency

5. All measuring equipment are calibrated with traceabflity to NPL (UK) or NIST (USA).

SAMPLE CALCULATIONS

dBpV 20 log (~iV)

dB~.tV/m=20log(~.tV/m)

ExamDle 1 . For Conducted Emissions
At 20 MHz Class B limit 250 ~tV 47 96 dB~iV

Transducer factor of LISN, pulse limiter & cable loss at 20 MHz 11.2 dB

Q-P reading obtained directly from EMI Receiver = 40 dBpV
(Calibrated for system losses)

Therefore, Q-P margin 40 . 47 96 = -7.96

i.e **7.96 dB below limit**

ExamDle 2 . For Radiated Emissions
At 300 MHz Class B limit 200 pV/m 46 dBp V/rn

Log-periodic antenna factor & cable loss at 300 MHz = 18 511 dB

Q-P reading obtained directly from EMI Receiver = 40 dBpVlm
(Calibrated level including antenna factors & cable losses)

Therefore, Q-P margin 40 -46 = -6

i e. 6 dB below limit