

Marstech Limited

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TEST REPORT

REPORT DATE: 12 February 2001		REPORT NO: 21018D	
CONTENTS:		See Table of Contents	
SUBMITTOR:		GRACO CHILDREN'S PRODUCTS INC. 51 South Pine Street, P. O. Box 100 Elverson, PA 19520 USA	
SUBJECT:		Model No: 2760 [Baby Unit/Parent Unit]	
		FCC ID: M6Y002020900	
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:		24 January 2001	DATE TESTED: 6 February 2001
RESULTS:		Equipment tested complies with referenced specification.	
ALTERATIONS		None	
Tested by:		Edward Chang	Approved by: Robert G. Marshall, P. Eng. Date: Feb 12/01
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 Engineering & Administrative
 Testing For FCC Submissions/Certifications
 Approved Test Facility
 Qualified Test Facility

MARSTECH LIMITED

TECHNICAL REPORT - FCC 2.1033(b)

Applicant

GRACO CHILDREN's PRODUCTS INC.
51 South Pine Street, P. O. Box 100
Elverson, PA
19520 USA

FCC Identifier

M6Y002020900

Manufacturer

Tru Tech Electronics (M) Sdn Bhd
Kawasan Perindustrian
Kota Tinggi Batu 2 Jalan Lombong
81900 Kota Tinggi
Johor, Malaysia

TABLE OF CONTENTS

<u>Exhibit Description</u>	<u>FCC Ref.</u>	<u>Page</u>
A Installation and Operating Instructions Furnished to the User.	2.1033(b)(3)	Exhibit A Exhibit A(1)-1
B Description of Circuit Functions	2.1033(b)(4)	Exhibit B Exhibit B(1)-1
C Block Diagram Schematic Diagram	2.1033(b)(5)	Exhibit C Exhibit C(1)-1 Exhibit C(2)-1 to -8
D Report of Measurements	2.1033(b)(6)	Exhibit D
E Photographs Label Equipment - External Photos Internal Photos	2.1033(b)(7)	Exhibit E Exhibit E(1)-1 to -2 Exhibit E(2)-1 to -2 Exhibit E(2)-3 to -5

EXHIBIT D

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

"Report of Measurements"

Exhibit D(1)-1 to D(1)-15 - Test Report
Exhibit D(2)-1 to D(2)-2 - Test Set Up Photo
Exhibit D(3) - Measurement Facility (3 Meter Site)

TABLE OF CONTENTS

TEST REPORT CONTAINING:

Exhibit D(1)-2	Product Description
Exhibit D(1)-3 to -4	Test Equipment List
Exhibit D(1)-5	Test Procedure
Exhibit D(1)-6 to -10	Power Line Conducted Interference
Exhibit D(1)-11 to -12	Band Edges
Exhibit D(1)-12	Bandwidth
Exhibit D(1)-13 to -15	Field Strength of Emissions
Exhibit D(2)-1 to -2	Test Setup Photos
Exhibit D(3)	Measurement Facility (3 meter site)

PRODUCT DESCRIPTION

The Model 2760 is a one-way baby monitor consisting of Baby Unit and Parent Unit which operates in the 902 MHz to 928 MHz band. The antenna used for the baby monitor is permanently attached to the UUT. Its actual frequency range is **925.70 to 927.50 MHz**.

TEST FACILITY AND EQUIPMENT LIST

FACILITIES

- Radiated ANSI C63.4 (FCC OET/55) open field 3 meter test range. This test range is protected from the cold and moisture by a non-conductive enclosure.
- Conducted 2.5m Anechoic Chamber

EQUIPMENT

Hewlett-Packard spectrum analyzer # 8554 RF & 141T video.
Anritsu 2601 A spectrum analyzer.
Advantest R3261A Spectrum Analyzer
Hewlett-Packard RF generator # 8640 B with an 002 doubler
Hewlett-Packard attenuator 30 dB # 11708A.
Narda 20 watt (20 dB) attenuator
Compliance Design P950 Preamp 16dB 25 MHz - 1.0 GHz
A.H. Systems biconical antenna; 20 MHz - 330 MHz
A.H. Systems log periodic antenna; 300 MHz - 1.8 GHz
Eaton dipole antennas; T1, T2, T3 25 MHz - 1.0 GHz
CDI Roberts dipole antennas; T1, T2, T3 & T4 25 MHz - 1.0 GHz

NOTE:

The Anritsu 2601 A spectrum analyzer, the Hewlett-Packard spectrum analyzer and the Advantest R3261A spectrum analyzer are calibrated annually, and that calibration is directly traceable to the National Research Council of Canada (NRC). This equipment is only used by qualified technicians and only for the purpose of EMI measurements. The three meter test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

TEST EQUIPMENT LIST

- 1 Spectrum Analyzer: IFR AN940, S/N 635001039, Cal. March 2000.
- 2 Preamp: HP 8449B, S/N 3008A00378, Cal. March 2000.
- 3 Horn Antenna: Q-PAR 6878/24, S/N 1721, 1.5-18GHz.
- 4 Line Impedance Stabilization Network: Marstech, Cal. July 2000.
- 5 Dipole Antenna Kit: Compliance Design A100, S/N 00430, Cal. due Sept. 2004.

TEST PROCEDURE

GENERAL:

Shielded interface cables were used in all cases except for cables connecting to the telephone line and the power cords. A test program was run which simulated a normal transmission.

POWER LINE CONDUCTED INTERFERENCE:

The procedure used was ANSI STANDARD C63.4 1992 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 9KHz QP with an appropriate sweep speed. The ambient temperature of the UUT was 24°F with a humidity of 60%.

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 plot.

POWER OUTPUT:

The radiated output power was measured with the spectrum analyzer and Dipole Antenna.

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%.

15.107 (a) POWER LINE CONDUCTED INTERFERENCE

Requirements: 0.45 - 30MHz 250 μ V or 47.96dB μ V

Test Procedure: ANSI STANDARD C63.4-1992.
The spectrum was scanned from 0.45 to 30MHz.

Test Data:

THE HIGHEST EMISSION READ FOR LINE 1 WAS 19.36 dB μ V @ 7.12 MHz.

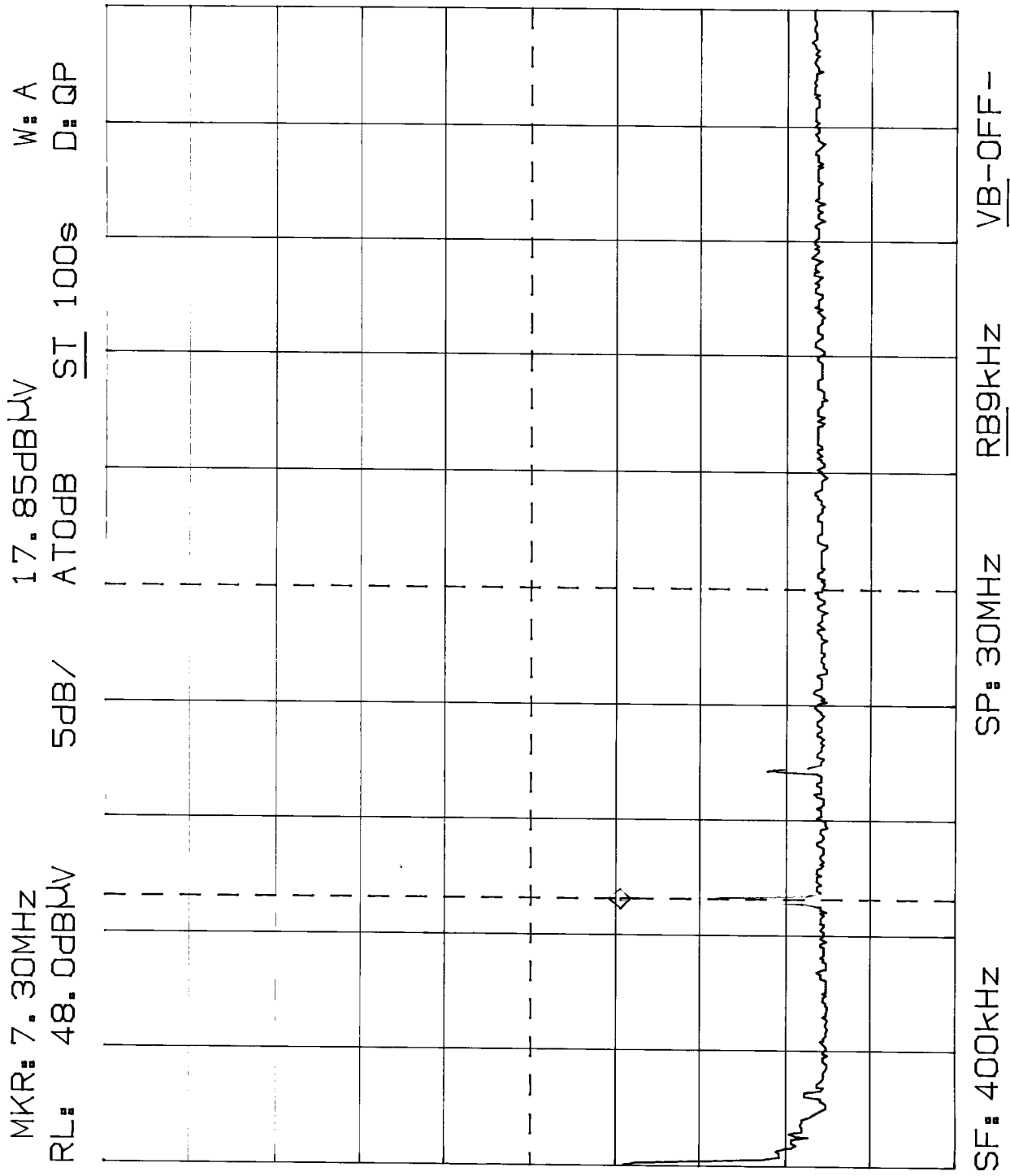
THE HIGHEST EMISSION READ FOR LINE 2 WAS 19.84 dB μ V @ 7.15 MHz

The graphs in Exhibits D(1)-7 and -10 represent the emissions taken for this device.

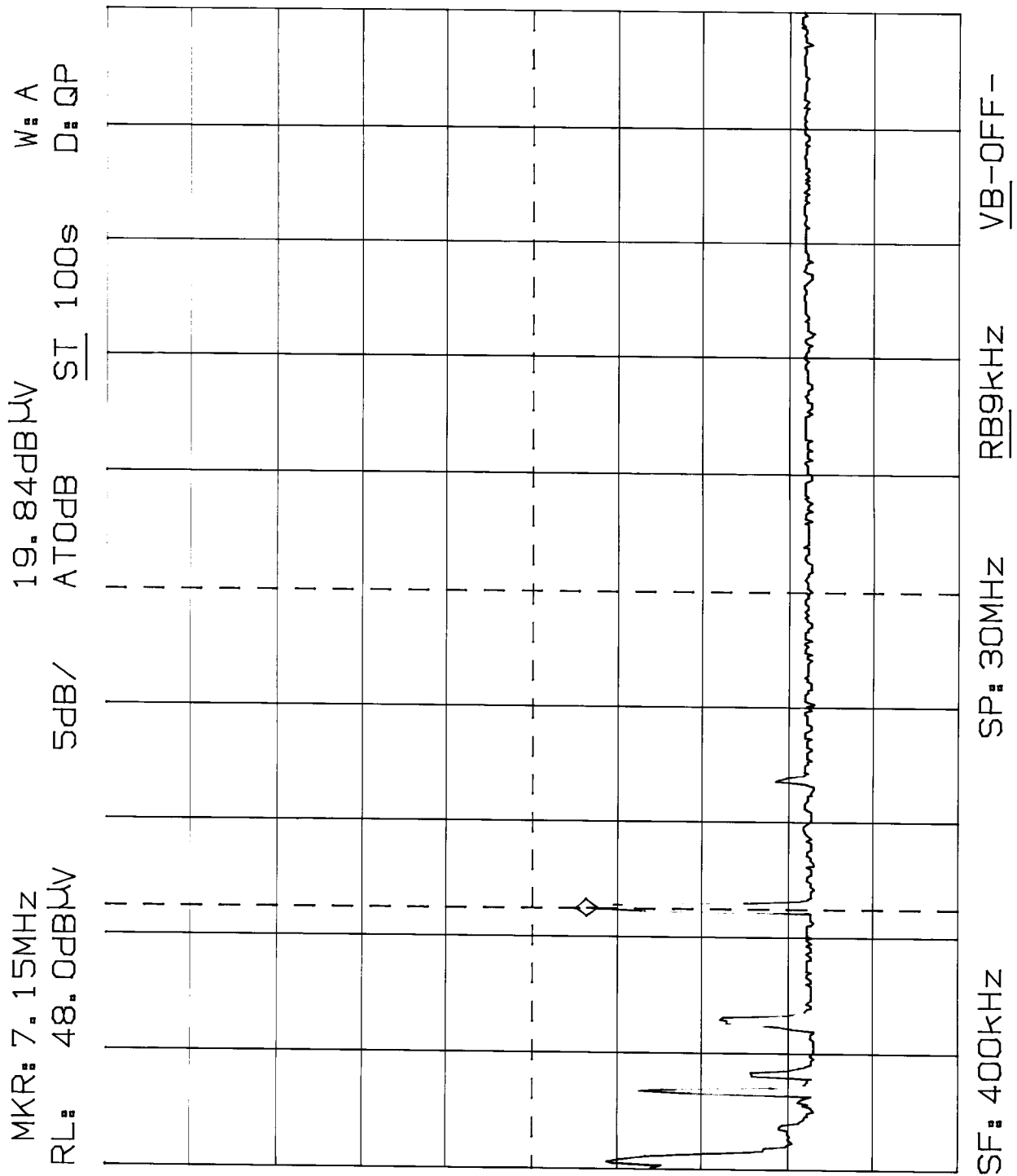
Test Results:

Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

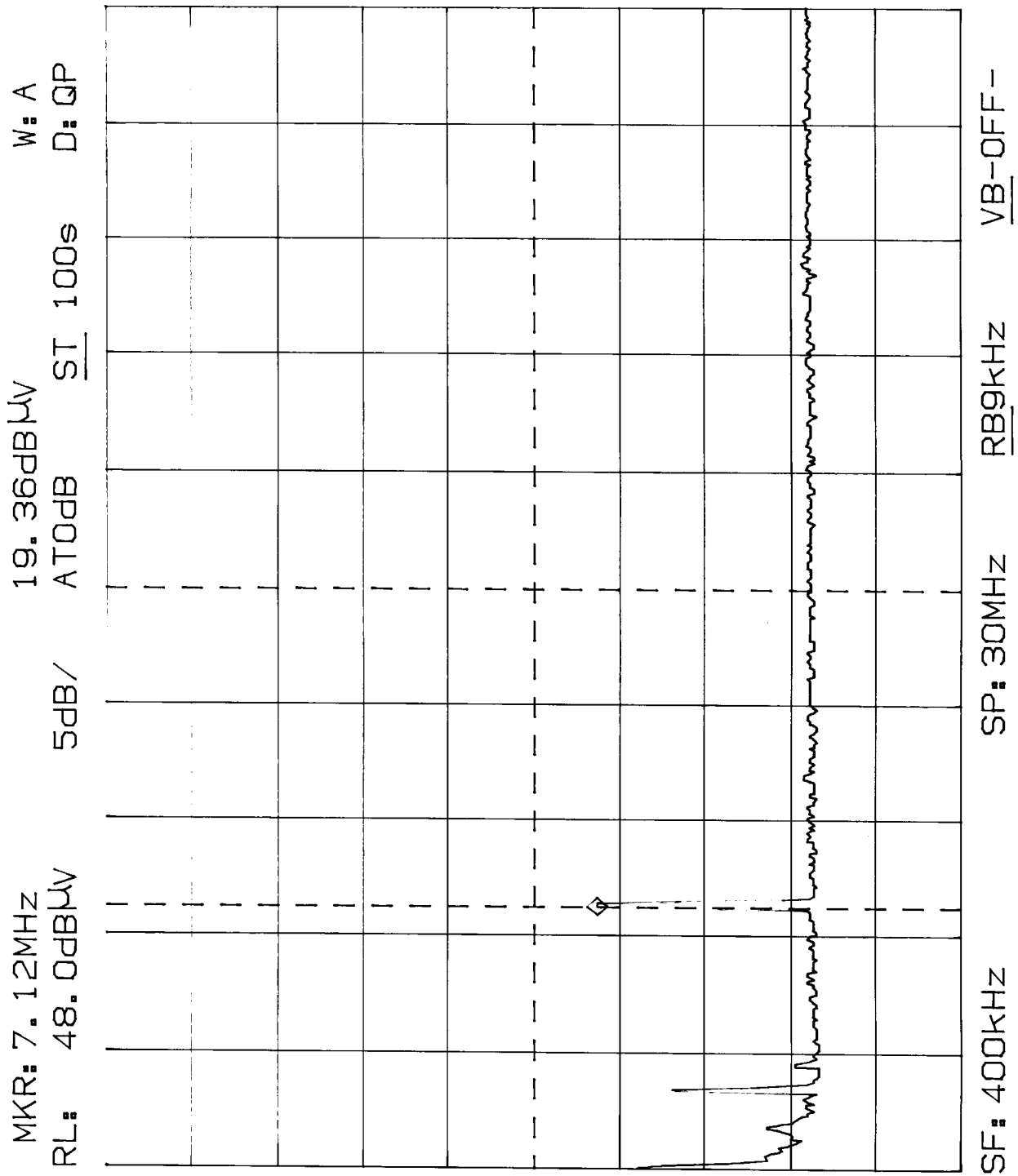
POWER LINE CONDUCTED EMISSIONS
MODEL 2760 (Baby Unit); LINE 1



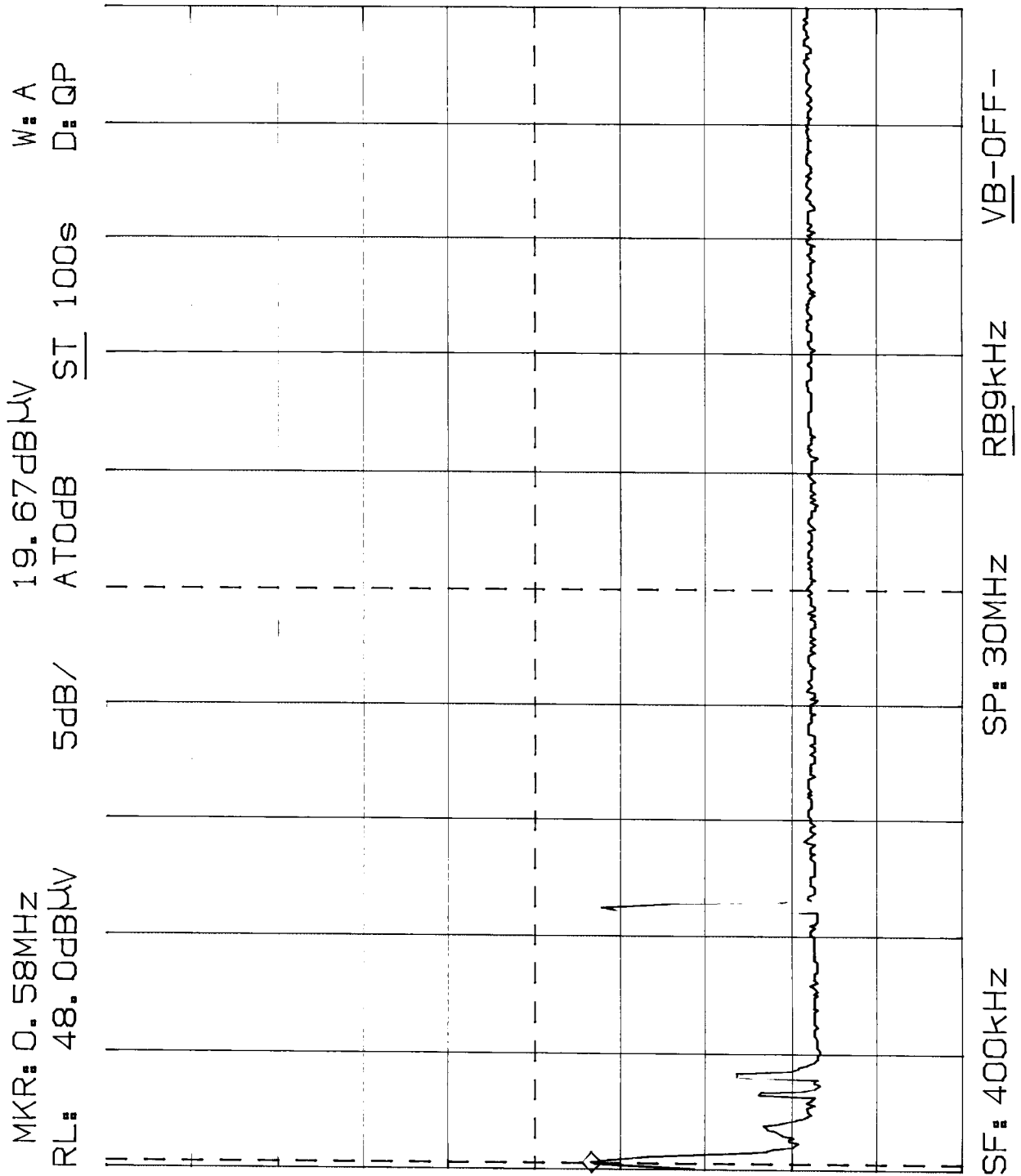
POWER LINE CONDUCTED EMISSIONS
MODEL 2760 (Baby Unit); LINE 2



POWER LINE CONDUCTED EMISSIONS
MODEL 2760 (Parent Unit); LINE 1



POWER LINE CONDUCTED EMISSIONS
MODEL 2760 (Parent Unit); LINE 2



15.249 (c) BAND EDGES

Requirements: Emissions outside of the frequency band 902 to 928 MHz must be attenuated 50dB below the fundamental.

Measurement: The unit was attenuated by 50 dB.

Measurement Data: See Plots on next page.

BANDWIDTH MODEL 2760

12:44:20 JAN 26, 2001

~~17~~

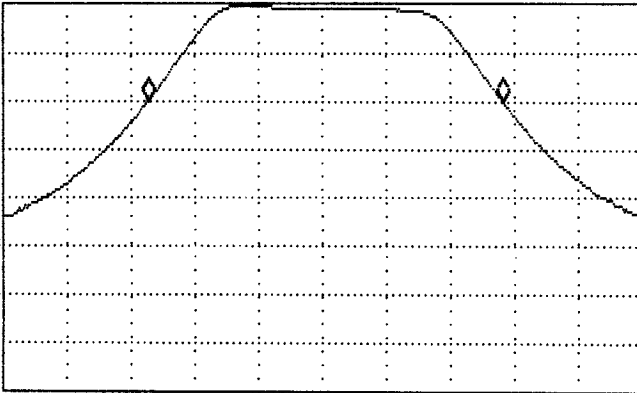
MARKER Δ
555 kHz
.00 dB

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ 555 kHz
.00 dB

LOG REF 71.0 dB μ V

10
dB/
#ATN
0 dB

WA SB
SC FS
CORR



CENTER 927.514 MHz SPAN 1.000 MHz
IF BW 120 kHz #AVG BW 1 MHz #SMP 20.0 sec

12:47:01 JAN 26, 2001

~~17~~

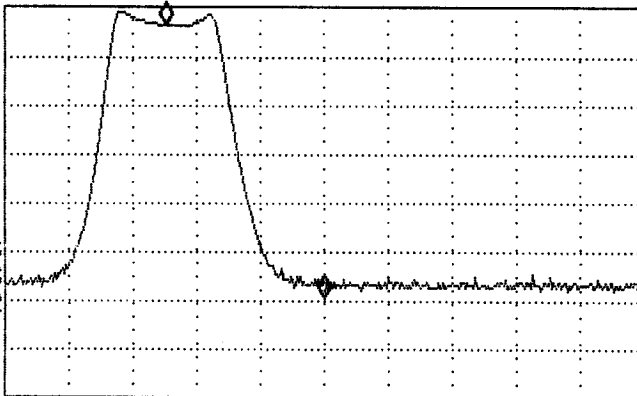
SWEPTIME
20.0 sec

ACTV DET: PEAK
MEAS DET: PEAK QP AVG
MKR Δ -495 kHz
55.82 dB

LOG REF 71.0 dB μ V

10
dB/
#ATN
0 dB

WA SB
SC FS
CORR



CENTER 929.000 MHz SPAN 2.000 MHz
#IF BW 30 kHz #AVG BW 1 MHz #SMP 20.0 sec

BAND EDGE ATTENUATION MODEL 2760

FCC ID: M6Y002020900
Marstech Report No. 21018D
EXHIBIT D(1)-12

15.249 (a) and 15.249 (b)
FIELD STRENGTH OF EMISSIONS

Requirements:

<u>Field Strength of Fundamental</u>	<u>Field Strength of Harmonics</u>	<u>15.209</u>
		30-88 MHz 40 dB μ V/m@ 3m
902 to 928MHz 94dB μ V	54dB μ V/m@ 3m	88-216 MHz 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**Test Data:****BABY UNIT (TX)**

Emission Frequency MHz	Meter Reading @3m dB μ V	Antenna	Cable and ACF dB	Field Strength dB μ V/M	FCC Limit dB μ V/M	Margin dB	Detector & BW Khz
925.70	59.85	RT.4 V	33.44	93.29	94	-0.71	PK 1000
1851.40	---						
2777.10	11.03	Horn V	34.19	45.22	54	-8.78	PK 1000
3702.80	12.42	Horn H	35.33	47.75	54	-6.25	PK 1000
4628.50	9.72	Horn V	37.51	47.23	54	-6.77	PK 1000
5554.20	---						
6479.90	---						
7405.60	---						
8331.30	---						
9257.00	---						
927.50	59.85	RT.4 V	33.45	93.05	94	-0.95	PK 1000
1855.00	---						
2782.50	9.03	Horn V	34.19	43.22	54	-10.78	PK 1000
3710.00	11.42	Horn H	35.32	46.74	54	-7.26	PK 1000
4637.50	10.72	Horn V	37.53	48.25	54	-5.75	PK 1000
5565.00	---						
6492.50	---						
7420.00	---						
8347.50	---						
9275.00	---						

FIELD STRENGTH OF EMISSIONS**Test Data:****PARENT UNIT (RX)**

Emission Frequency MHz	Meter Reading @3m dBμV	Antenna	Cable and ACF dB	Field Strength dBμV/M	FCC Limit dBμV/M	Margin dB	Detector & BW Khz
936.43	12.50	LP V	31.40	43.90	46	-2.10	QP 120
1872.90	10.92	Horn V	33.14	44.06	54	-9.94	PK 1000
938.21	12.20	LP V	31.50	43.70	46	-2.30	QP 120
1876.42	9.92	Horn V	33.12	43.04	54	-10.94	PK 1000