



QUALIFICATION TEST REPORT



EMISSIONS -FCC Part 15

1350 County Road 16
P.O. Box 387
Rollinsville, CO 80474
(303) 258-0100 ph.
(303) 258-0775 fax
www.criteriontech.com

Test Report Number: FPT100032401 TX Date of Issue: 21 April 2000
Model No: RC Dash Transmitter Date of Test Article Receipt: 28 March 2000
Type of product: FCC Part 15.231
Manufacturer: Fisher-Price
Address: 636 Girard Avenue
East Aurora, N.Y. 14052

Test Results: ☒ [X] Complies ☐ [] Does Not Comply

Michael E. Mussler Lab Director

Michael E. Mussler Compliance Engineer

TEST REPORT

Disclaimers:

This report is the confidential property of the client. For the protection of our clients and ourselves, extracts from this test report cannot be produced without prior written approval from Criterion Technology. Reproduction of the complete report can be performed at the client's discretion.

The client is aware that Criterion Technology has performed testing in accordance with the applicable standard(s). Test data is accurate within ANSI parameters for Emissions testing, unless a specific level of accuracy has been defined in writing prior to testing, by Criterion Technology and the client.

Criterion Technology reports apply only to the specific Equipment Under Test (EUT) sample(s) tested under the test conditions described in this report. If the manufacturer intends to use this report as a document demonstrating compliance of this model, additional models of this product must have electrical and mechanical characteristics identical to the device tested for this report. Criterion Technology shall have no liability for any deductions, inferences, or generalizations drawn by the client or others from Criterion Technology issued reports.

Total liability is limited to the amount invoiced for the testing of this EUT and the contents of this report are not warranted.

Compliance with the appropriate governmental standards is the responsibility of the manufacturer. Any questions regarding this report should be directed to:

Laboratory Director
Criterion Technology
P.O. Box 387
1350 County Road 16
Rollinsville, Colorado 80474
Phone: 1-303-682-6600
Fax: 1-303-682-6672
email: Laboratory_Director@criteriontech.com

Criterion Technology has been accredited by the following groups: NVLAP, VCCI, BSMI, NMI (EU Competent Body Accreditation) and Industry Canada. The National Institute for Standards and Technology (NIST) has designated Criterion Technology a Conformity Assessment Body (CAB) for Taiwan (BSMI # SL2-IN-E-007R).

All Criterion Technology instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 9001, ISO Guide 25, ANSI/NCSL Z540-I-1994 and are traceable to national standards.

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Section 1 Executive Summary

The test article was in compliance with all the test standards listed below.

FCC Part 15 Subpart A

FCC Part 15 Subpart C Intentional Radiators

The transmitter was modified to meet the emissions requirement at the second harmonic by changing the Q1 bias series resistance to 10 K ohms and the shunt resistance to 12 K ohms. Test results reflect this change.

All test methods were performed in accordance with the standards listed above.

Section 2 Emissions Test Standards

The emissions tests were performed according to following standards:

FCC Part 15, Subpart C

Part 2.1 FCC Part 15 Subpart C –Intentional Radiated Fields

Measurement of *radiated emissions (electric field)* in the frequency range of 30 MHz-1000 MHz were tested in a horizontal and vertical polarization as indicated below:

Environmental conditions of the lab:

Date of Test: 28 March 2000
Temperature: 72°F
Rel. Humidity: 22%
Test Voltage: Battery Powered, 9 volts DC

Test location:

☒ Criterion Technology Open Area Test Site
☒ Pre-Scan In Semi-Anechoic Chamber
☐ In Situ

Test distance: (antenna to EUT)

<input type="checkbox"/> 1 meter	<input type="checkbox"/> Preliminary Measurement	<input type="checkbox"/> Final Measurement
<input checked="" type="checkbox"/> 3 meters	<input checked="" type="checkbox"/> Preliminary Measurement	<input checked="" type="checkbox"/> Final Measurement
<input type="checkbox"/> 10 meters	<input type="checkbox"/> Preliminary Measurement	<input type="checkbox"/> Final Measurement
<input type="checkbox"/> 30 meters	<input type="checkbox"/> Preliminary Measurement	<input type="checkbox"/> Final Measurement

Test instruments: (see Section 7 for calibration information)

☒ Hewlett Packard Spectrum Analyzer, Model 8566B
☒ Hewlett Packard Quasi Peak Adapter, Model 85650A
☐ Hewlett Packard Tracking Generator, Model 85645A
☐ Rohde and Schwarz Receiver, Model, ESHS-30
☒ Rohde and Schwarz Model Receiver, ESVS-30
☒ Chase, BiLog Antenna, Model 1121
☒ Antenna Research, Model 1181A (sn: 1056)
☒ Amp3 and High Freq. Cable Set
☒ Mini Circuits Pre-Amp, Amp 2
☒ EMCO Loop Antenna, Model 6502

Test accessories:

None

Test Results of Radiated Emissions: 30 MHz -1000 MHz

Test Status: ☒ PASS ☐ FAIL

Minimum margin to limit: 2.53 dB at 689.9220 MHz

Exceeded limit by: dB at MHz

Remarks: Reference Section 4 for Data Sheets

The transmitter and receiver were tested simultaneously. The data table contains measured radiated emissions for both receiver and transmitter. The transmitter emissions are denoted by 345 ck. followed by additional text in the Comments field.

Section 3 Test Setup Photographs







Section 4 Original Test Data / Plots

Radiated Emissions

Part 4.1 Radiated Emissions Data**Notes:**

The third column below contains alpha characters which pertain to the type of measurements made. The following are the definitions for those characters: q = Quasi Peak, m = Maximized (cable, rotation and antenna height), s = scanned but no data taken, and a = average. For the first character in column four, a '-' indicates that value is below the limit while an '*' indicates that value is above the limit

If the list is sorted using "I-sort", then quasi-peak and average levels are weighted higher than peak levels and are moved to the front of the scan list.

The following keys help to better understand the data:

TT: Turntable position in degrees

Hght: Height of antenna in centimeters

Az: Azimuth, V = Vertical, H= Horizontal

Criterion Technology

EUT: Model: RC Dash, Serial: FCC-1

Manufacturer: Fisher-Price Inc.

Tester: MEM

EUT Level: FEP (Pre-production), Modified for Continuous Transmit

EUT Information: EUT on Tabletop (Transmitter & Receiver Co-located)

Test information: Jumper on Micro., 3m, Battery Powered Units, FCC Sub C, Ind. Canada Cat. I

Fri Apr 21 15:17:07 2000

Special ID: FPT Q1656

Table 1: Scan List, sorted by margin to limit SPCL, -30.0dB filter

<u>Freq. MHz</u>	<u>Value</u>	<u>Sts</u>	<u>SPCL</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
689.9220	58.26	p	1.00*	283	121	H	345. ck, 2fo
1727.5474	52.44	m	-4.82	105	102	H	345. ck, 5fo
1036.5244	43.67	m	-13.59	30	100	H	345. ck, 3fo
2072.8942	39.30	m	-17.96	144	105	H	345. ck, 6fo
1382.0222	38.98	m	-18.28	30	100	H	345. ck, 4fo
2325.9999	36.55	a	-20.71	272	101	H	rcvr harmonic
1674.0000	36.15	p	-21.11	253	101	H	rcvr harmonic
1333.3500	31.65	p	-25.61	105	101	H	rcvr harmonic
3454.8237	31.57	m	-25.69	280	98	V	345. ck, 10fo
2418.3766	31.47	m	-25.79	360	100	V	345. ck, 7fo
2763.8589	27.55	m	-29.71	224	100	V	345. ck, 8fo

Table 2: Scan List for SPCL, sorted by Frequency, -30.0dB filter

<u>Freq. MHz</u>	<u>Value</u>	<u>Sts</u>	<u>SPCL</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
689.9220	58.26	p	1.00*	283	121	H	345. ck, 2fo

Table 2: Scan List for SPCL, sorted by Frequency, -30.0dB filter

<u>Freq. MHz</u>	<u>Value</u>	<u>Sts</u>	<u>SPCL</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Comment</u>
1036.5244	43.67	m	-13.59	30	100	H	345. ck, 3fo
1333.3500	31.65	p	-25.61	105	101	H	rcvr harmonic
1382.0222	38.98	m	-18.28	30	100	H	345. ck, 4fo
1674.0000	36.15	p	-21.11	253	101	H	rcvr harmonic
1727.5474	52.44	m	-4.82	105	102	H	345. ck, 5fo
2072.8942	39.30	m	-17.96	144	105	H	345. ck, 6fo
2325.9999	36.55	a	-20.71	272	101	H	rcvr harmonic
2418.3766	31.47	m	-25.79	360	100	V	345. ck, 7fo
2763.8589	27.55	m	-29.71	224	100	V	345. ck, 8fo
3454.8237	31.57	m	-25.69	280	98	V	345. ck, 10fo

Table 3: Complete Scan List Sorted by Frequency

<u>Freq, MHz</u>	<u>I-val</u>	<u>Final</u>	<u>Sts</u>	<u>TT</u>	<u>Hght</u>	<u>Az</u>	<u>Time</u>	<u>Comment</u>
337.3051	45.78	38.58	m	339	100	H	Tue Mar 28 19:11:49 2000	bb from rcvr
344.9587	68.80	61.89	p	335	101	H	Fri Apr 21 14:39:07 2000	tx fundamental
347.1452	38.96	32.14	m	339	100	H	Tue Mar 28 19:12:34 2000	upper rx bb hump
689.9220	57.92	58.26	p	283	121	H	Fri Apr 21 14:32:56 2000	345. ck, 2fo
1036.5244	59.56	43.67	m	30	100	H	Tue Mar 28 19:39:04 2000	345. ck, 3fo
1333.3500	45.32	31.65	p	105	101	H	Tue Mar 28 20:11:51 2000	rcvr harmonic
1382.0222	52.38	38.98	m	30	100	H	Tue Mar 28 19:40:41 2000	345. ck, 4fo
1674.0000	47.40	36.15	p	253	101	H	Tue Mar 28 20:17:06 2000	rcvr harmonic
1727.5474	63.20	52.44	m	105	102	H	Tue Mar 28 19:44:59 2000	345. ck, 5fo
2072.8942	44.57	39.30	m	144	105	H	Tue Mar 28 19:52:21 2000	345. ck, 6fo
2325.9999	42.42	36.55	a	272	101	H	Tue Mar 28 20:22:36 2000	rcvr harmonic
2418.3766	37.61	31.47	m	360	100	V	Tue Mar 28 19:55:38 2000	345. ck, 7fo
2763.8589	33.49	27.55	m	224	100	V	Tue Mar 28 19:58:32 2000	345. ck, 8fo
3109.3413	31.56	25.91	m	165	100	H	Tue Mar 28 20:02:41 2000	345. ck, 9fo
3454.8237	36.23	31.57	m	280	98	V	Tue Mar 28 20:05:17 2000	345. ck, 10fo

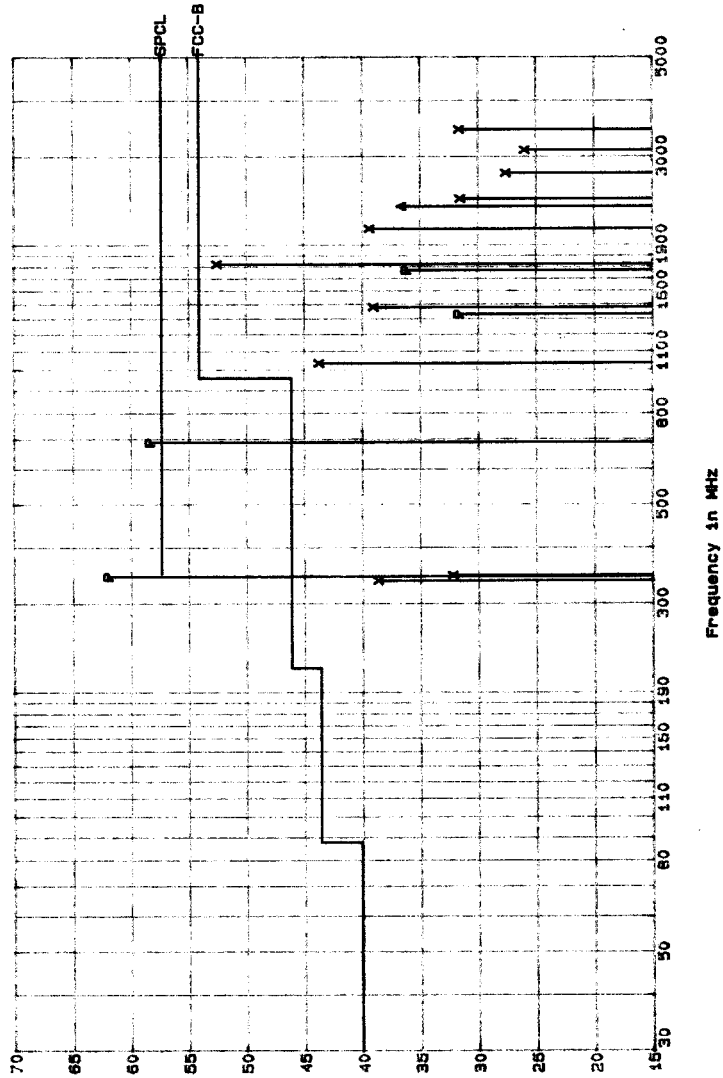
***NOTE: Level was measured with peak detector. Correction factor for average level is shown in Part 4.4 and meets the average specification limit.**

Part 4.2 Radiated Emissions Plot

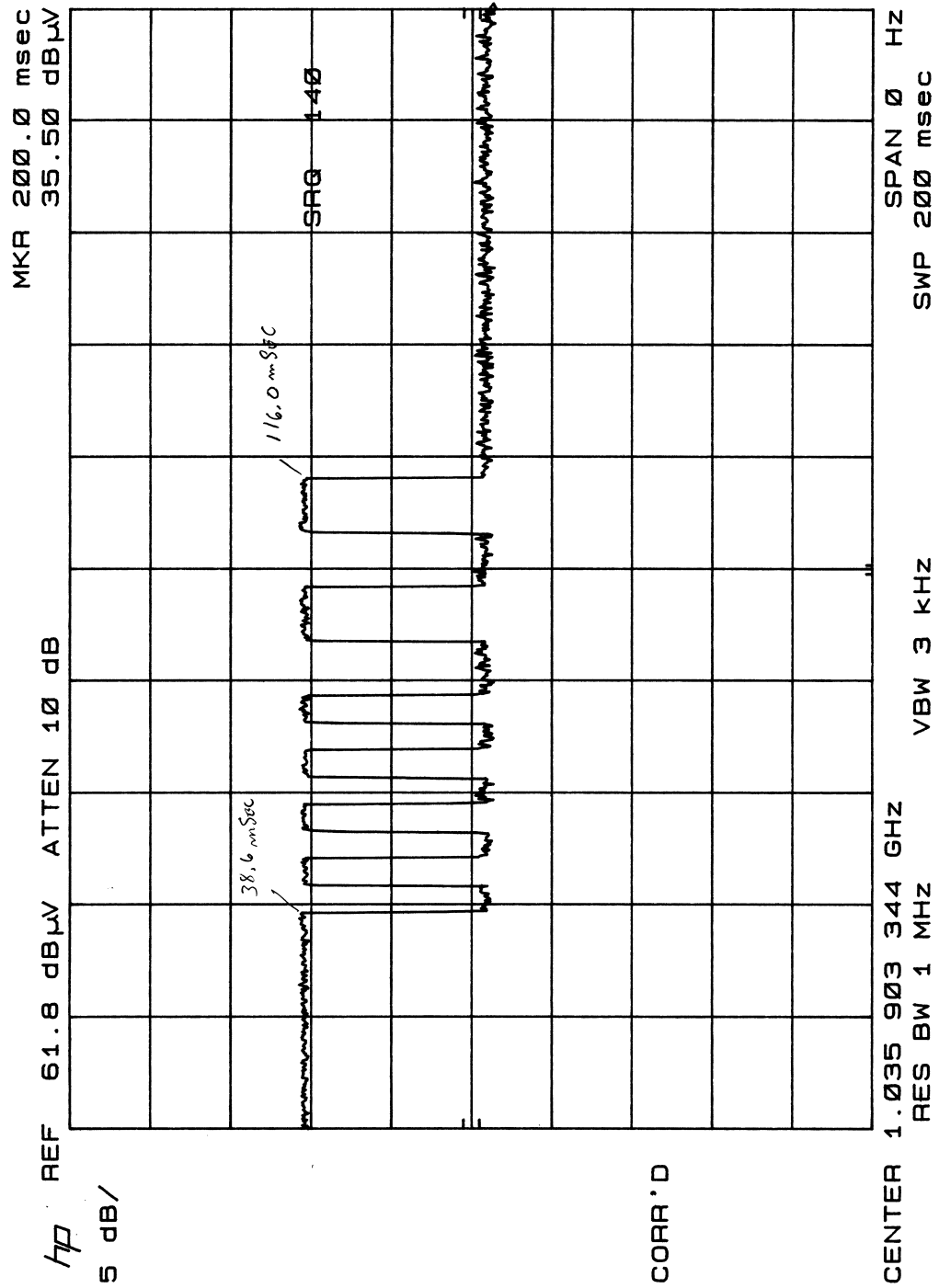
Criterion Technology
EUT: Model: RC Dash, Serial: FCC-1
Manufacturer: Fisher-Price Inc.
Tester: MEM SPID: FPT Q1656
EUT Level: FEP (Pre-production), Modified for Continuous Transmit
EUT Information: EUT on Tabletop (Transmitter & Receiver Co-located)
Test Information: Jumper on Micro.. 3m, Battery Powered Unite, FCC Sub C, Ind. Canada Cat. I

Date: Fri Apr 21 15:15:39 2000

Test Results (in dBuV/m)



Part 4.3 Transmitter Timing Characteristics



Part 4.4 Average Level Calculation

Test Number: FPT 100032401

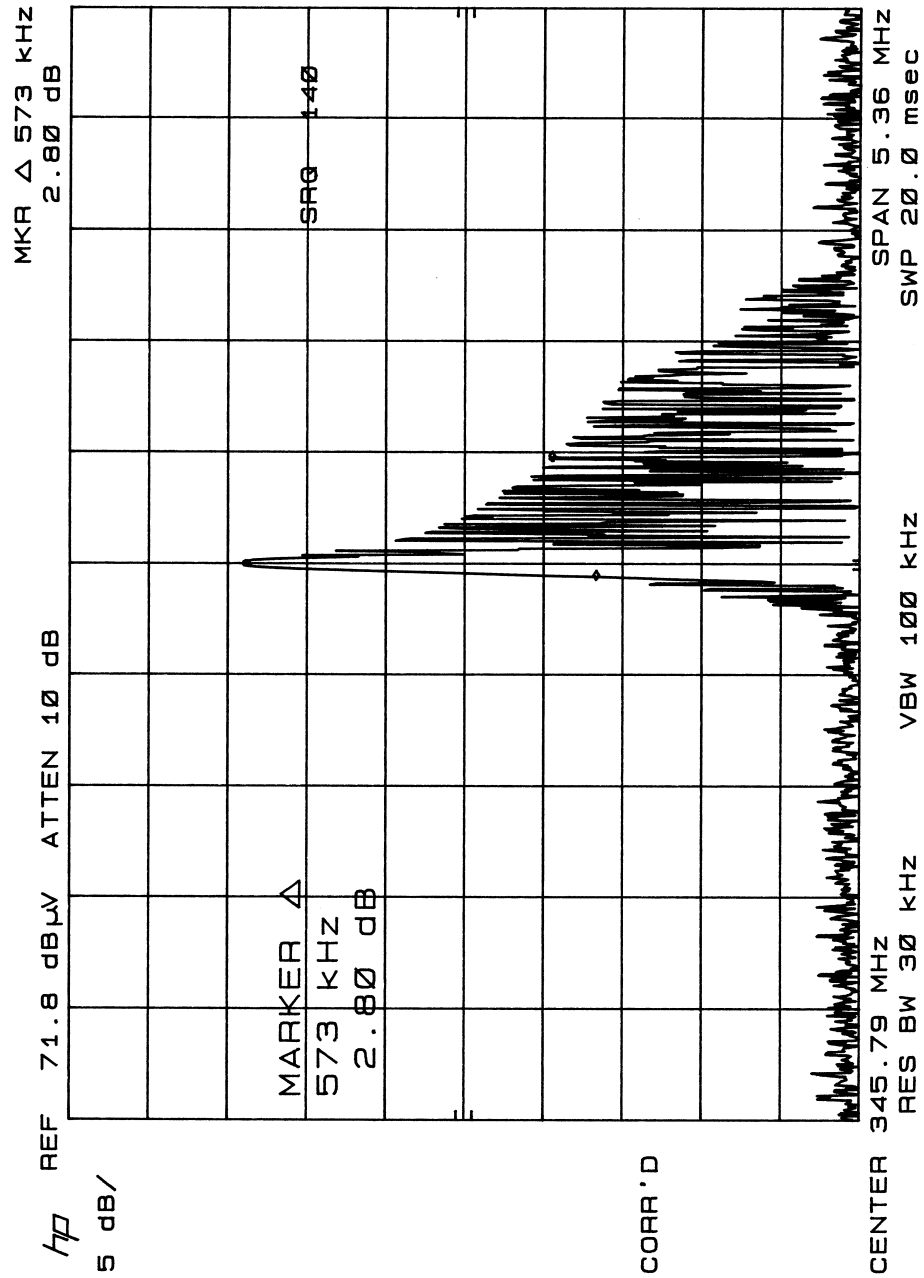
RC Dash Transmitter
Pulse Timing

Pulse No.	(milli sec.)		Pulse Train Duration (milli sec.) =
t1	38.600	Preamble	116
t2	4.838	Pulse	Pulse Train Duration (Pd) < 100 mSec
t3	4.838	Pulse	
t4	4.838	Pulse	
t5	4.838	Pulse	
t6	9.675	Pulse	Duty Cycle (%) = P total / Pd x 100
t7	9.675	Pulse	
P total	77.302		66.64

Correction Factor (dB) = 20 log (Duty Cycle)
-3.53

Freq. of Emission (MHz)	Measured Level (dBuV/m)	Detector	Avg. Corr. Factor (dB)	Average Level (dBuV/m)	Specification Limit (dBuV/m)	Specification Part 15 Paragraph	Comment	Spec. Margin (dB)
344.9587	61.89	p	-3.53	58.36	77.26	15.231(b)	fo	18.90
689.9220	58.26	p	-3.53	54.73	57.26	15.231(b)	2fo	2.53
1036.5244	43.67	p	-3.53	40.14	54.00	15.205	3fo	13.86
1382.0222	38.98	p	-3.53	35.45	54.00	15.205	4fo	18.55
1727.5474	52.44	p	-3.53	48.91	57.26	15.231(b)	5fo	8.35
2072.8942	39.30	p	-3.53	35.77	57.26	15.231(b)	6fo	21.49
2418.3766	31.47	p	-3.53	27.94	57.26	15.231(b)	7fo	29.32
2763.8590	27.55	p	-3.53	24.02	57.26	15.231(b)	8fo	33.24
3109.3413	25.91	p	-3.53	22.38	57.26	15.231(b)	9fo	34.88
3454.8237	31.57	p	-3.53	28.04	57.26	15.231(b)	10fo	29.22

Part 4.5 Transmitter Occupied Bandwidth Plot



*Occupied bandwidth measured less than 573 kHz at the 20 dB points.

Section 5 Equipment Calibration Informaton

Manufacturer	Name/Description	Model Number	Serial Number	Calibration Due
Antenna Research Associates	1-18 GHz Horn	DRG118/A	1056	5-22-00
Antenna Research Associates	1-18 GHz Horn	DRG118/A	1057	4-8-00
Chase	Bilog 30 - 1000 MHz	CB6111	1121	6-1-00
Dickson	Temperature/ RH Recorder	THDX	5300245	2-19-01
EMCO	Active Loop	6502	2626	9-22-00
EMCO	BiConnical 30-200 MHz	3108	2343	6-1-00
EMCO	Dipole	3121C	722	6-1-00
EMCO	Log Periodic 200 - 1000 MHz	3146	2763	6-1-00
EMCO	Log Periodic 200 - 1000 MHz	3146	3096	6-1-00
FCC	Current Probe	F-33-2	None	9-28-00
Fluke	Digital Multimeter	87	60800598	12-17-00
Hewlett Packard	Quasi Peak Adapter	HP 85650A	2521A00733	7-12-00
Hewlett Packard	Spectrum Analyzer	HP 8566B	2403A07322	7-12-00
Hewlett Packard	Spectrum Analyzer	HP 8566B	2421A00527	7-12-00
Hewlett Packard	Tracking Generator	HP 85645A	3210A00124	5-28-00
Microwave Instrumentation Technologies	18-26.5 GHz Horn	12A-18	115300	10-12-00
Microwave Instrumentation Technologies	26.5 - 40 GHz Horn	12A-26	20493E	4-8-00
Mini Circuits	Preamplifier (AMP2)			6-2-00
Rohde/Schwarz	HF Receiver	ESHS-30	82600/011	8-31-00
Rohde/Schwarz	LISN	ESH2-Z5	828739-001	7-23-00
Rohde/Schwarz	VHF/UHF Receiver	ESVS-30	8634221014	6-4-00
Solar	50 uH LISN	8012-50-R-24-BNC	892310	7-23-00
Solar	50 uH LISN	8612-50-TS-100N	967621	7-23-00
Solar	50 uH LISN	8612-50-TS-100N	967622	7-23-00
Solar	50 uH LISN	8612-50-TS-100N	967623	7-23-00
Solar	50 uH LISN	8612-50-TS-100N	967624	7-23-00
Tektronix	Oscilloscope	2467B	B051203	12-20-00
Veratech	Preamplifier (AMP3)			9-30-01

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Amplifier Research	Coupler	DC6080	19529	5-30-00
Amplifier Research	E-Field Probe	FP2000	19682	1-27-01
Amplifier Research	E-Field Probe	FP2080	20236	1-26-01
Amplifier Research	Power Amplifier	150A100A	20183	5-30-00
Amplifier Research	Power Amplifier	100W1000M1	20214	5-30-00
Amplifier Research	Power Amplifier	10S1G4	20155	5-30-00
Andrews Helix Cable	F2-50 Low Loss Coax	F2-50	N/A	5-4-00
EMCO	BiConnical 30-200 MHz	3108	2441	6-1-00
EMCO	Horn	3115	4003	Verif.
FCC	CDN	FCC-801-M3-25	9714	9-28-00
FCC	Current Probe	F-33-1	None	9-27-00
FCC	EM Clamp	F2031	309	4-1-01
Fluke	Digital Multimeter	87	66320753	12-17-00
Fluke	Digital Multimeter	87	68630334	12-17-00
Gigatronics	Power Meter	8541C	1830945	9-9-00
Gigatronics	Power Sensor	80301A-410	1831996	9-1-00
Haefely Trench	Coupling Network	IP6.2	083 957-02	9-20-00
Haefely Trench	De-coupling Network	DEC1A	080057-09	9-20-00
Haefely Trench	Dip Generator	PLINE1610	083 970-07	10-25-00
Haefely Trench	EFT Coupling Clamp	IP4A	080-011-06	4-1-01
Haefely Trench	EFT Tester	PEFT Junior	583-333-51	9-20-00
Haefely Trench	ESD Gun	PESD 1600	H605100	9-24-00
Haefely Trench	Impulse Module	PHV 30.2	083991-06	9-20-00
Haefely Trench	Power Supply	PHF555	080-419-05	2-28-01
Haefely Trench	Surge Generator	PSURGE 6.1	083 906-07	9-20-00
Haefely Trench	Surge Network	FP-SURGE 32.1	083925-05	9-20-00
Hewlett Packard	Pulse Generator	HP 8116A	2901G09493	9-22-00
Hewlett Packard	Signal Generator	HP 8648D	3642000145	4-13-00
Hewlett Packard	Spectrum Analyzer	HP 8594E	3412A01039	9-23-00
Lehman Chambers	Semi Anechoic Chamber	N/A	N/A	10-5-00
Tegam	Current Probe	925236-1	12588	9-27-00
Tegam	Current Probe Cal Fixture	95241-1	12634	9-27-00
Tektronix	Oscilloscope	2465A	B021016	12-21-00

Section 6 Product Information Form**CRITERION PRODUCT INFORMATION FORM**Date: **28 March 2000****General Information**

Company Name: **Fisher-Price**
Company Address: **636 Girard Avenue**
Company Address: **East Aurora, NY 14052**
Customer Contacts (and phone numbers):
Compliance Eng. **Steve Ernst**
Design Engineer: **Jim Meade**

General Instrument Information

Model: **RC Dash Transmitter**
Serial Number: **FEP 1**

Test Facility

Name: **Criterion Technology**
Location: **Rollinsville, Colorado 80474**

TEST DESCRIPTION: ☐ Development ☒ Initial Design Verification
 ☐ Design Change ☐ Production Model
Applicable Standards (EN50082-2, EN55011, etc) **FCC Part 15**

CIRCUIT BOARD

Oscillator Frequency: **345 MHz LC Free-running**
Oscillator Manufacturer: **Fisher-Price**
Clock Frequencies: _____
Other: _____

POWER

Power Supply Topology: (switching or linear)
Switching Frequency: **Battery Powered**
Power supply Primary Frequency and Voltage: **N/A**
Number of Input Phases: **N/A**
Current Draw: **Unknown**
Manufacturer: **N/A**
Model Number: **N/A**
Number of I/O cables: **None**
Length of I/O cables: **N/A**

Part 6.1 EUT Description and Block Diagram

FISHER-PRICE 71924 RC DASH TRANSMITTER DESCRIPTION OF OPERATION

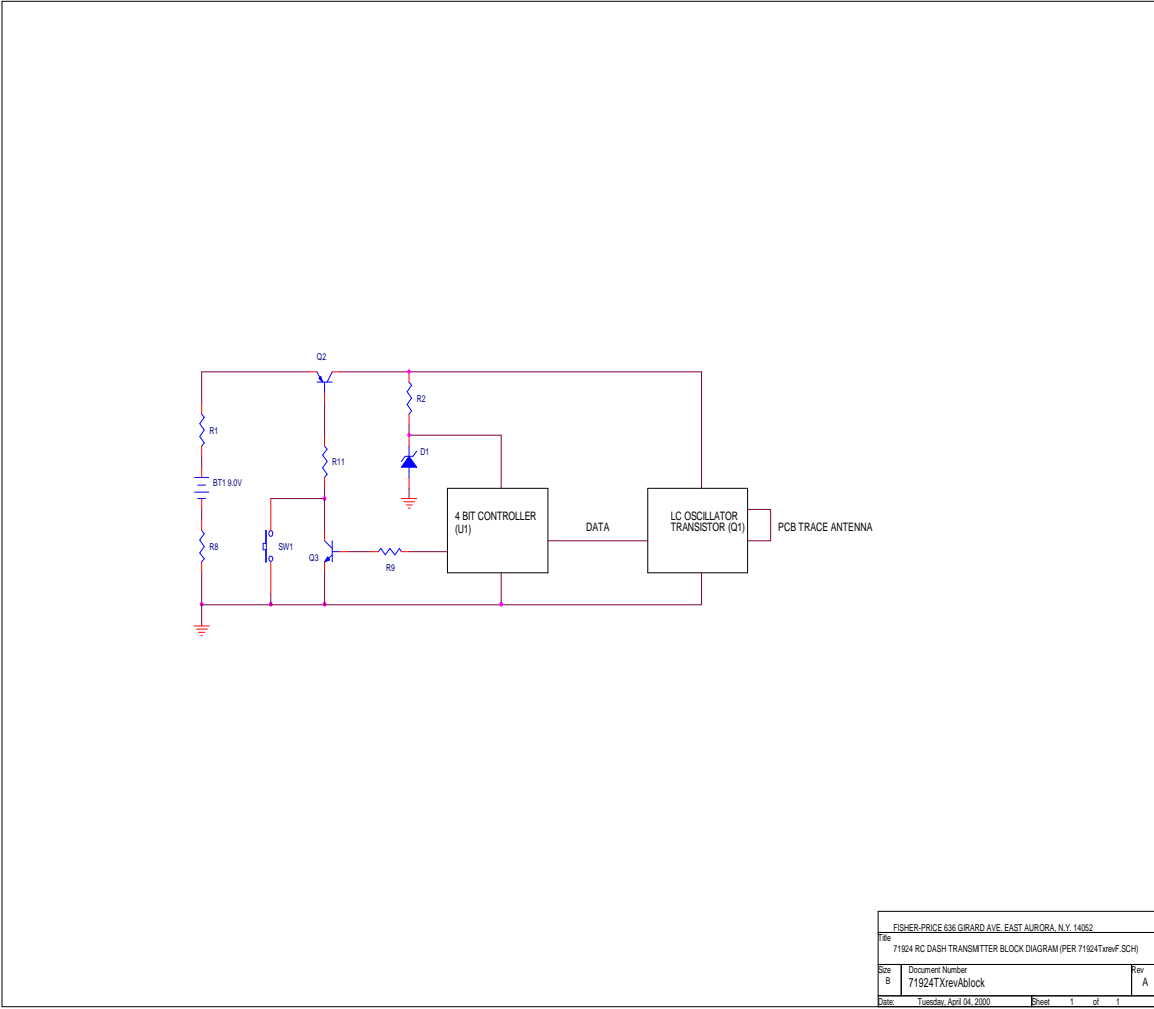
Transmitter Operation:

The transmitter is a parent operated intermittent duty transmission designed to accompany the associated receiver.

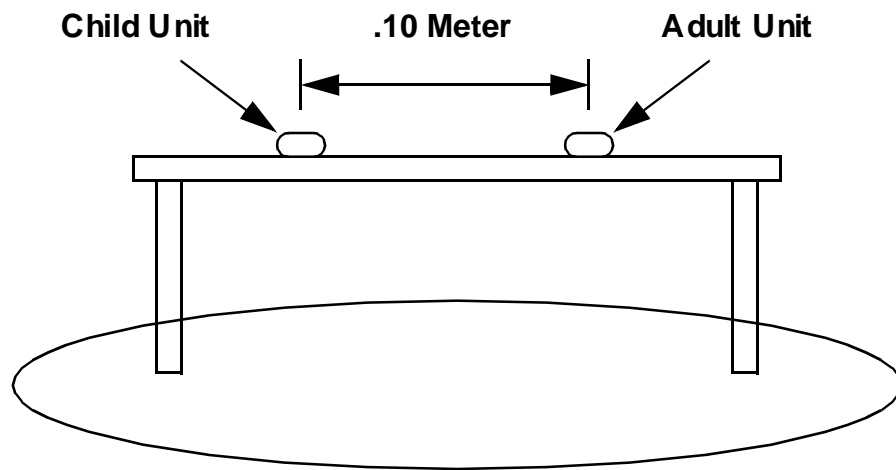
Principally the product is designed as an infant car seat soothing toy, allowing the parent's transmitter to remotely activate and change modes on the child's receiver unit.

The RF portion of the Transmitter consists of a simple transistor LC transmit oscillator defined by components: Q1, C5, C6, L1, C3, C4, C10, R7, C9, R4, R6. A trace leading from the resonant inductor (L1) forms the PCB antenna. The transmit frequency is trimmed by a variable capacitor (C4) and is set to 345MHz. To activate the transmitter the user depresses SW1 (Transmit) Switch. This biases Q2 turning on power to both the micro-controller (U1) and the LC transmit oscillator. The controller then turns on Q3, which in turns enables Q2 supplying system power independent of the SW1 state for the entire data transmission period of 120mS. This guarantees that a single complete data stream is transmitted regardless of the length of time SW1 is depressed. The controller outputs the data stream to the transmit oscillator and upon completion turns off Q3 thereby turning off power to the system. Should SW1 continue to remain closed (transmit state) the data stream will terminate after one complete transmission period, thereby automatically disabling the RF transmission. The transmit oscillator is ON/OFF modulated by the micro-controller data stream which gates the RF carrier by turning on the base bias to the transistor (Q1). System power is supplied by a replaceable 9.0V battery. U1 is voltage regulated by R2, D1. Resistors R1, R8 reduce the Q of the battery leads thus minimizing the unintentional radiation from these leads.

JPM, SE



Part 6.2 EUT Diagram as Tested



Front View of Test Setup