EMC TEST REPORT for Intentional Radiator

No. 150800408SHA-001

Applicant	:	Paragon Child Products Co., Ltd. No.20, Lufeng East Road, Lujia Town, Kunshan City, Jiangsu Province, China
Manufacturer	:	Paragon Child Products Co., Ltd. No.20, Lufeng East Road, Lujia Town, Kunshan City, Jiangsu Province, China
Product Name	:	Remote control transmitter
Type/Model	:	944217

SUMMARY

The equipment complies with the requirements according to the following standard(s):

47CFR Part 15 (2014): Radio Frequency Devices

ANSIC63.10 (2013): American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

RSS-210 Issue 8 (December 2010): Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

RSS-Gen Issue 4 (December 2014): General Requirements for Compliance of Radio Apparatus

Date of issue: Aug 17, 2015

Prepared by:	Reviewed by:
Jesse Xu (*Project Engineer*)	Daniel Zhao (*Reviewer*)

Description of Test Facility

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Content

1. General Information

1.1 Applicant Information

Applicant:	Paragon Child Products Co., Ltd. No.20, Lufeng East Road, Lujia Town, Kunshan City, Jiangsu Province, China
Name of contact:	Avril wan
Tel:	051257878767
Fax:	051257871383
Manufacturer:	Paragon Child Products Co., Ltd. No.20, Lufeng East Road, Lujia Town, Kunshan City, Jiangsu Province, China

Sample received date	:	Aug 08, 2015
Date of test	:	Aug 08, 2015 ~Aug 14, 2015

1.2 Identification of the EUT

Equipment:	Remote control transmitter
Type/model:	944217
FCC ID:	2AFLN000000
IC:	20490-000000

1.3 Technical specification

Operation Frequency Band:	2402-2480MHz
Modulation:	GFSK
Antenna Designation:	PCB antenna
Gain of Antenna:	0dBi
Rating:	Battery DC 2*1.5V
Description of EUT:	Here is one model. We tested the 2402CH , 2442CH and 2480CH and listed the worst data in this report. .

1.4 Mode of operation during the test / Test peripherals used

While testing transmitter mode of EUT, internal modulation was applied.
For the EUT can be configured in any axes as the user wants, it was set up in three axis (X, Y, Z) and performed test. The three axes were tested one by one while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded.

2. Test Specification

2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2014-10-21	2015-10-20
Test Receiver	ESIB 26	R&S	EC 3045	2014-10-20	2015-10-19
A.M.N.	ESH2-Z5	R&S	EC 3119	2015-1-9	2016-1-8
A.M.N.	ENV 216	R&S	EC 3393	2015-8-9	2016-8-8
A.M.N.	ENV 216	R&S	EC 3394	20145-8-9	2016-8-8
A.M.N.	ENV4200	R&S	EC3558	2015-8-9	2016-8-8
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2015-4-28	2017-4-27
Horn antenna	HF 906	R&S	EC 3049	2015-4-28	2017-4-27
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2015-4-12	2016-4-11
Semi-anechoic chamber	-	Albatross project	EC 3048	2015-5-12	2016-5-11
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2015-1-8	2016-1-7
Power sensor / Power meter	N1911A/N1921A	Agilent	EC4318	2015-04-12	2016-04-11
Loop Antenna	FMZB 1516	SCHWARZBECK	/	2014-11-29	2015-11-28
Temperature Camber	SETH-E	tayasaf	EC4315	2015-4-9	2016-4-9

2.2 Test Standard

47CFR Part 15 (2014)
ANSI C63.10 (2013)
RSS-210 Issue 8 (December 2010):
RSS-Gen Issue 4 (December 2014):

2.3 Test Summary

This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Radiated emission	15.249 & 15.205	RSS-210 Issue 8 Annex A2.9 &Clause 2.2	Pass
Assigned bandwidth (20dB bandwidth)	15.215(c)	-	Pass
Occupied bandwidth	-	RSS-Gen Issue 4 Clause 6.6	Tested
Power line conducted emission	15.207	RSS-Gen Issue 4 Clause 8.8	NA
Spurious emission for receiver	15B	RSS-Gen	NA

2.4 Data rate VS power

The data rate of EUT is fixed and cannot by adjusted.

3. Radiated emission

Test result: **PASS**

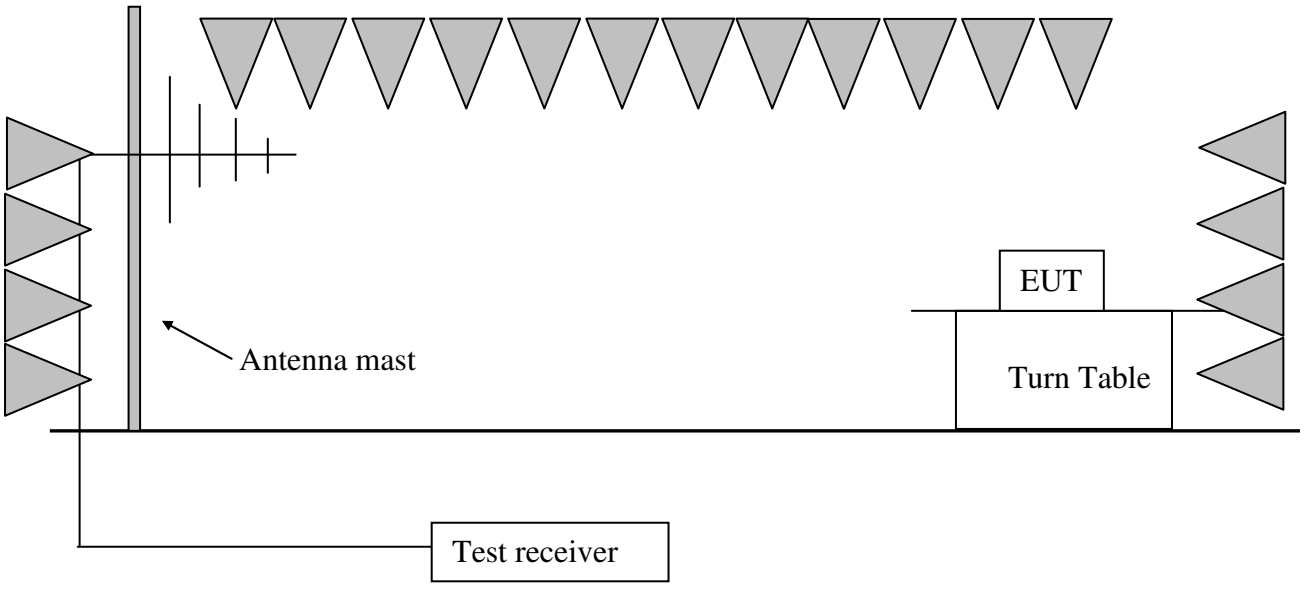
3.1 Test limit

Fundamental Frequency (MHz)	Fundamental limit (dBuV/m)	Harmonic limit (dBuV/m)
☐902 - 928	94	54
☒2400 - 2483.5	94	54
☐5725 - 5875	94	54
☐24000 - 24250	108	68

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

3.2 Test Configuration



3.3 Test procedure and test setup

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.
The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna which was mounted on an antenna mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The radiated emission was measured using the Spectrum Analyzer with the resolutions bandwidth set as:

RBW = 100kHz, VBW = 300kHz (30MHz~1GHz for PK)
RBW = 1MHz, VBW = 3MHz (>1GHz for PK);
RBW = 1MHz, VBW = 10Hz (>1GHz for AV);

3.4 Test protocol

CH	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2401.79	-11.50	88.10	94.00	5.90	PK
	V	35.83	15.10	26.21	40.00	13.79	PK
	V	45.55	19.70	25.98	40.00	24.02	PK
	V	4781.56	-3.60	56.30	74.00	17.70	PK
	V	4781.56	-3.60	34.70	54.00	19.30	AV
	H	2401.79	-11.50	86.23	94.00	7.77	PK
	H	294.34	13.44	30.70	46.00	15.30	PK
	H	399.92	19.70	32.20	46.00	13.80	PK
	H	4781.56	-3.60	57.60	74.00	16.40	PK
	H	4781.56	-3.60	35.40	54.00	18.60	AV
M	V	2440.86	-11.6	87.20	94.00	6.80	PK
	V	35.83	15.10	26.21	40.00	13.79	PK
	V	45.55	19.70	25.98	40.00	24.02	PK
	V	4883.76	-3.4	62.80	74.00	11.20	PK
	V	4883.76	-3.4	39.20	54.00	14.80	AV
	V	7302.60	2.4	54.40	74.00	19.60	PK
	V	7302.60	2.4	34.30	54.00	19.70	AV
	H	2440.86	-11.6	86.20	94.00	7.80	PK
	H	294.34	13.44	30.70	46.00	15.30	PK
	H	399.92	19.70	32.20	46.00	13.80	PK
	H	4883.76	-3.4	61.30	74.00	12.70	PK
	H	4883.76	-3.4	37.90	54.00	16.10	AV
	H	7302.60	2.4	55.60	74.00	18.40	PK
	H	7302.60	2.4	34.20	54.00	19.80	AV
H	V	2480.92	-11.50	91.38	94.00	2.62	PK
	V	35.83	15.10	26.21	40.00	13.79	PK
	V	45.55	19.70	25.98	40.00	24.02	PK
	V	4951.90	-3.30	59.90	74.00	14.10	PK
	V	4951.90	-3.30	34.70	54.00	19.30	AV
	V	7438.87	2.80	51.90	54.00	2.10	PK
	H	2480.92	-11.50	88.30	94.00	5.70	PK
	H	294.34	13.44	30.70	46.00	15.30	PK
	H	399.92	19.70	32.20	46.00	13.80	PK
	H	2389.83	-10.89	40.20	54.00	13.80	PK
	H	2483.68	-10.94	42.30	54.00	11.70	PK
	H	4951.90	-3.30	61.80	74.00	12.20	PK
	H	4951.90	-3.30	38.40	54.00	15.60	AV
	H	7438.87	2.80	55.70	74.00	18.30	PK
	H	7438.87	2.80	36.20	54.00	17.80	AV

Remark: 1. For fundamental emission test, no pre-amplifier is employed.
2. The Pulse-repetition frequency for fundamental emission is higher than 20Hz. Therefore, the QP detector can be applied for fundamental emission test.
3. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
4. Corrected Reading = Original Receiver Reading + Correct Factor
5. Margin = limit – Corrected Reading
6. If the PK reading is lower than AV limit, the AV test can be elided.
7. The shaded data is the fundamental emission.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB, Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10dBuV. Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m; Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 10.20dBuV/m, then Margin = 54 -10.20 = 43.80dBuV/m

4. Assigned bandwidth (20dB bandwidth)

Test result: **Pass**

4.1 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the allocated frequency band as clause 3.1 shows.

4.2 Test Configuration

See clause 3.2.

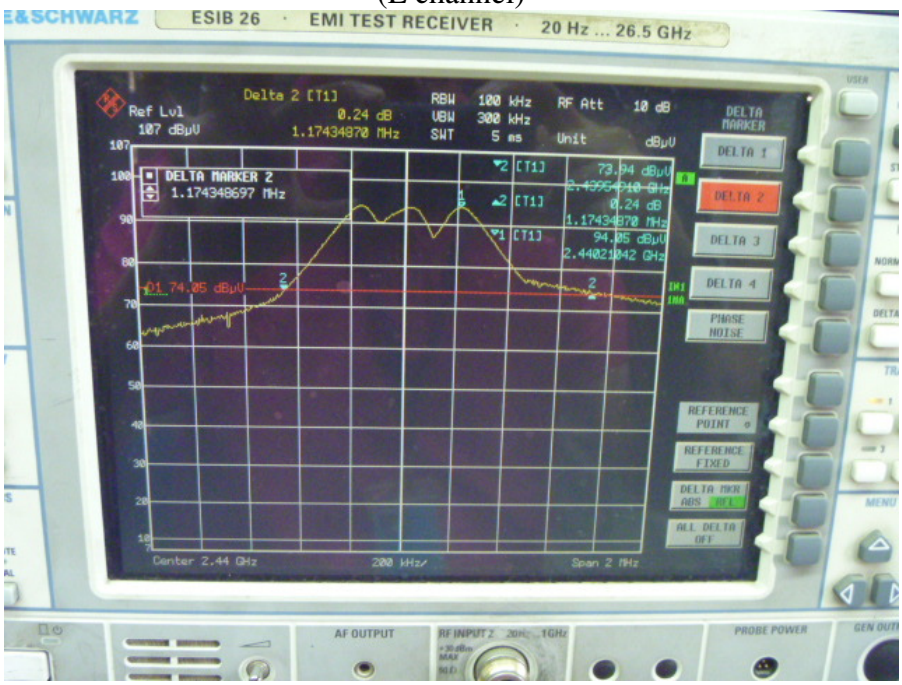
4.3 Test procedure and test setup

The 20dB Bandwidth per FCC §15.215(c) is measured using the Spectrum Analyzer.

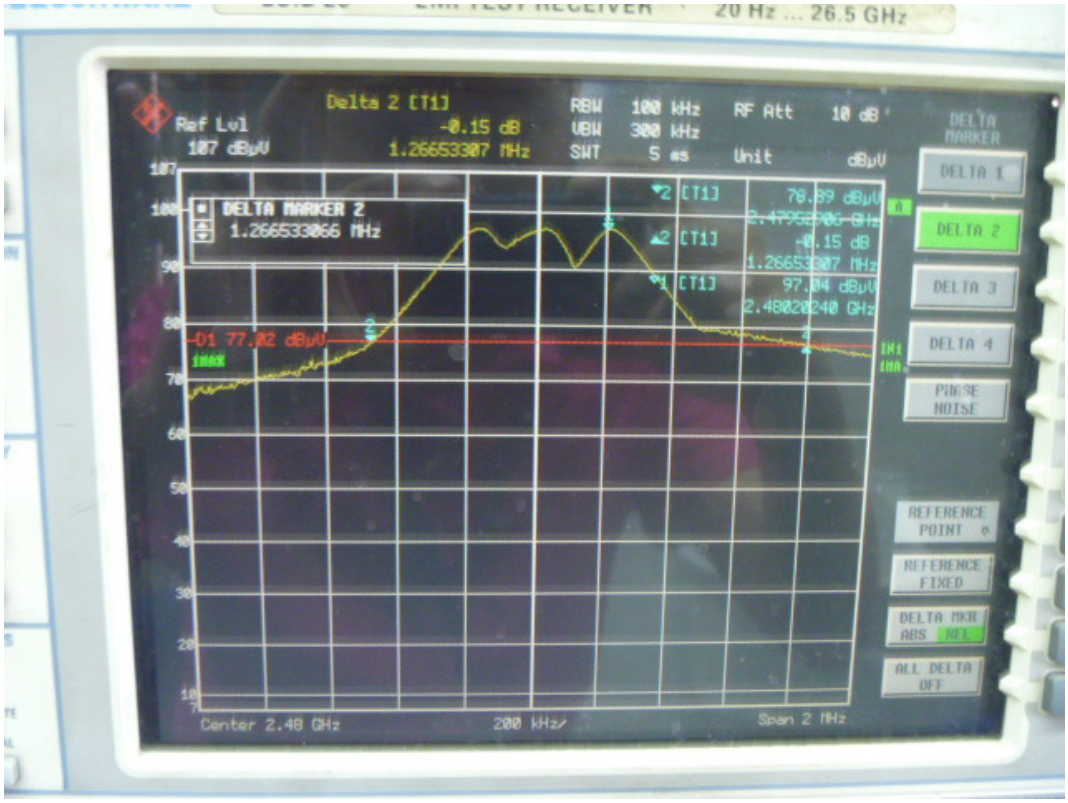
4.4 Test protocol

20dB bandwidth (MHz)	Permitted band (MHz)	Result
2401.5~2402.4(L)	2400.00-2483.50	Pass
2439.5~2440.6(M)	2400.00-2483.50	Pass
2479.5~2480.7 (H)	2400.00-2483.50	Pass

(L channel)



(Mid channel)


Delta 2 [T1]
-0.15 dB
1.26653307 MHz
RBW 100 kHz
VBW 300 kHz
SWT 5 ms
RF Att 10 dB
Unit dBµV
Ref Lvl
107 dBµV
DELTA MARKER 2
1.266533066 MHz
D1 77.02 dBµV
Center 2.48 GHz
200 kHz/
Span 2 MHz
DELTA MARKER
DELTA 1
DELTA 2
DELTA 3
DELTA 4
PHASE NOISE
REFERENCE POINT
REFERENCE FIXED
DELTA MKR ABS REL
ALL DELTA OFF

(High channe)

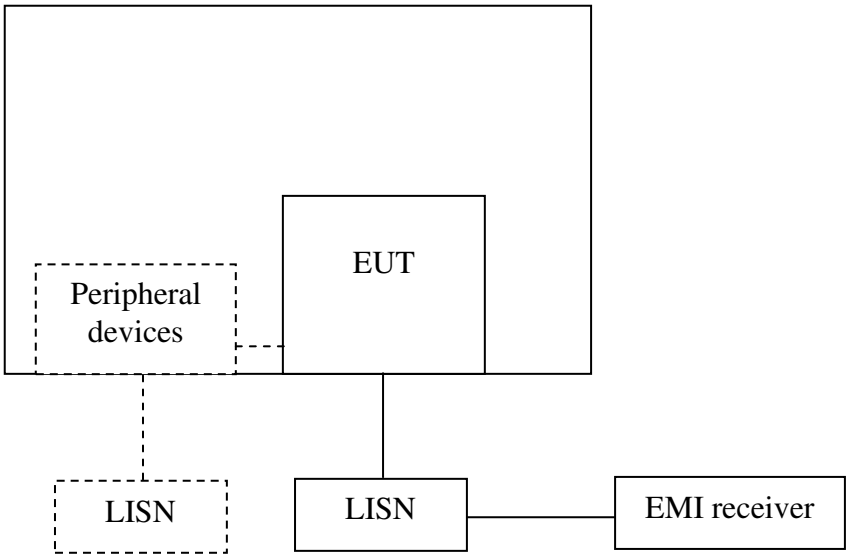
5. Power line conducted emission

Test result: **NA**

5.1 Limit

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	QP	AV
0.15-0.5	66 to 56*	56 to 46 *
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

5.2 Test configuration



☐ For table top equipment, wooden support is 0.8m height table

☐ For floor standing equipment, wooden support is 0.1m height rack.

5.3 Test procedure and test set up

The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50Ω/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50Ω/50uH coupling impedance with 50Ω termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 on conducted measurement.
The bandwidth of the test receiver is set at 9 kHz.

5.4 Test protocol

Frequency (MHz)	LISN Factor (dB)	Cable Loss (dB)	Corrected Reading (dBuV)		Limit (dBuV)		Margin (dB)	
			QP	AV	QP	AV	QP	AV
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
Remark: 1. Corrected Reading = LISN Factor (dB) + Cable Loss (dB) + receiver reading. 2. Margin (dB) = Limit - Corrected Reading.								

6. Occupied Bandwidth

Test Status: Tested

6.1 Test limit

None

6.2 Test Configuration

See clause 3.2.

6.3 Test procedure and test setup

The occupied bandwidth per RSS-Gen Issue 3 Clause 4.6.1 was measured using the Spectrum Analyzer.

6.4 Test protocol

Temperature :23 ℃
Relative Humidity :55 %

Channel	Occupied Bandwidth (KHz)	Max. Value (KHz)
2402	1002	1002
2442	1058	1058
2480	1134	1134

Remark: "Max. Value" is the maximum test result of all the measured occupied bandwidth.

7. Spurious emission for receiver

Test result: NA

7.1 Test limit

The spurious emission shall test through 3 times tuneable or local oscillator frequency whichever is the higher, without exceeding 40 GHz.
1) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2nW per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5nW above 1 GHz.
2) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

7.2 Test Configuration

Please refer to clause 3.2

7.3 Test procedure and test setup

Please refer to clause 3.2

7.4 Test protocol

Polarization	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)
2. Corrected Reading = Original Receiver Reading + Correct Factor
3. Margin = limit – Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,
Original Receiver Reading = 10dBuV.
Then Correct Factor = 30.20 + 2.00 = 32.20dB/m; Corrected Reading = 10dBuV + 32.20dB/m = 42.20dBuV/m
Assuming limit = 54dBuV/m, Corrected Reading = 42.20dBuV/m, then Margin = 54 -42.20 = 11.80dBuV/m