

# Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

## **YINRUN PLASTIC CRAFTS CO.,LTD**

Product description: TOY-R/C SAVAGE

Model No.: 8008

FCC ID: R6U8008-27M

**Prepared for: YINRUN PLASTIC CRAFTS CO.,LTD**

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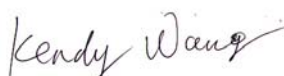
**Report No.: BCT08DC-194E**

**Issue Date:** March 31, 2008

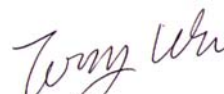
**Test Date:** March 25~28, 2008

**Test by:**

**Reviewed By:**



Kendy Wang



Tony Wu

**TABLE OF CONTENTS**

**1. GENERAL INFORMATION..... 3**

1.1 Product Description for Equipment Under Test (EUT)..... 3

1.2 Related Submittal(s) / Grant (s) ..... 3

1.3 Test Methodology ..... 3

1.4 Test Facility..... 4

**2. SYSTEM TEST CONFIGURATION ..... 5**

2.1 EUT Configuration ..... 5

2.2 EUT Exercise ..... 5

2.3 General Test Procedures..... 5

2.4 List of Measuring Equipments Used ..... 6

**3. SUMMARY OF TEST RESULTS ..... 7**

**4. TEST OF CONDUCTED EMISSION ..... 8**

4.1 Applicable Standard..... 8

4.2 Test Setup Diagram ..... 8

**5- RADIATED EMISSIONS ..... 9**

5.1 Limit of Radiated Emissions..... 9

5.2 Test Equipment Used ..... 9

5.3 EUT Setup ..... 10

5.4 Test Procedure ..... 11

5.5 Test Result..... 11

**6- EMISSIONS WITHIN BAND EDGES..... 16**

6.1 Limit of Emissions within Band Edges ..... 16

6.2 Test Equipment Used ..... 16

6.3 Test Procedure ..... 16

6.4 Emissions within Band Edges Test Result..... 16

# 1. GENERAL INFORMATION

## 1.1 Product Description for Equipment Under Test (EUT)

Applicant:	<b>YINRUN PLASTIC CRAFTS CO., LTD</b>
Address of applicant:	Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City, Guangdong, China
Manufacturer:	<b>YINRUN PLASTIC CRAFTS CO., LTD</b>
Address of manufacturer:	Yinrun Ind, Garden, Laimei, Zone,Chenghai,Shantou City, Guangdong, China
EUT Description:	TOY-R/C SAVAGE
Trade Name:	N/A
Model No.:	8008
Rated Voltage	DC 9V laminated battery for Transmitter
Frequency range	27.145MHz
Number of channels	1
Channel Separation	None
Product Class:	Low Power Communication Device Transmitter
Measurement Procedure	ANSI C63.4-2003

Remark: \* The test data gathered are from the production sample provided by the manufacturer.

## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, section 15.227 rules.

## 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 - 2003, 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. Radiated testing was performed at an antenna to EUT distance 3 meters.

## **1.4 Test Facility**

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

The test facility is recognized, certified, or accredited by the following organizations:

### **FCC – Registration No.: 338263**

Bontek Compliance Testing Laboratory Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 338263, March 24, 2008.

## **2. SYSTEM TEST CONFIGURATION**

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

### **2.1 EUT Configuration**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

### **2.2 EUT Exercise**

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

### **2.3 General Test Procedures**

**Conducted Emissions** The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode.

**Radiated Emissions** The EUT is a placed on as turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

## 2.4 List of Measuring Equipments Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2007/11/17	1 Year
2	EMI Test Receiver	R&S	ESPI7	100097	2007/11/17	1 Year
3	Amplifier	HP	8447D	1937A024 92	2007/11/17	1 Year
4	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07101	2007/11/17	1 Year
5	3 phase Artificial Mains (L.I.S.N)	SCHWARZBECK	NSLK 8128	8128247	2007/11/17	1 Year
6	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2007/11/17	1 Year
7	Horn Antenna	SCHWARZBECK	BBHA9120A	D69250	2007/11/17	1 Year
8	Loop Antenna	DAZE	ZN30900A	8411	2008/2/26	1 Year
9	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2007/11/17	1 Year
10	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2007/11/17	1 Year
11	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2007/11/17	1 Year
12	Power Clamp	SCHWARZBECK	MDS-21	3812	2007/11/17	1 Year
13	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2007/11/17	1 Year
14	Teo Line Single Phase Module	FCC	FCC-LISN-50-25-2-01	06061	2007/11/17	1 Year

### 3. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
15.207	Disturbance Voltage at The Mains Terminals	N/A, without AC power supply
15.227	Radiation Emission	Pass
15.227	Emissions within Band Edges	Pass

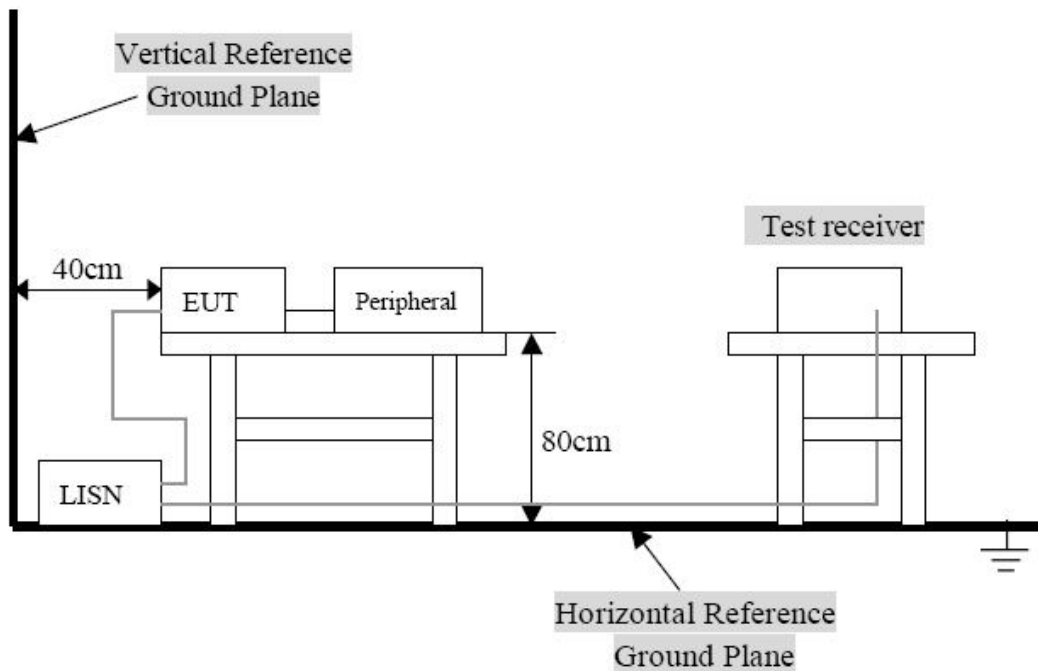
## 4. TEST OF CONDUCTED EMISSION

### 4.1 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency Range (MHz)	Limits ( dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

### 4.2 Test Setup Diagram



- Remark: 1. The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC 15.207 limits.
2. The EUT is excluded from investigation of Disturbance Voltage at The Mains Terminals, for it is powered by DC 9V laminated bettary. According to the Section 15.207(d), measurement to demonstrate compliance with the limits of Disturbance Voltage at The Mains Terminals are not required to the devices which only employed bettary power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.



## 5- RADIATED EMISSIONS

### 5.1 Limit of Radiated Emissions

Limit of Field Strength of Fundamental Emissions (Fcc 47cfr 15.227):

Frequency Range (MHz)	Field Strength of Fundamental Emission (Peak) ( $\mu\text{V/m}$ )	Field Strength of Fundamental Emission (Average) ( $\mu\text{V/m}$ )
26.96-27.28	100,000 $\mu\text{V/m}$ (100dB $\mu\text{V/m}$ )	10,000 $\mu\text{V/m}$ (80dB $\mu\text{V/m}$ )

Limits of Spurious Emissions (Fcc 47 Cfr 15.209 Class B):

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu\text{V/m}$ )
30 ~ 88	3	40
88~216	3	43.5
216 ~ 960	3	46
960 ~ 1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

(2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### 5.2 Test Equipment Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2007/11/17	1 Year
2	EMI Test Receiver	R&S	ESPI7	100097	2007/11/17	1 Year
3	Amplifier	HP	8447D	1937A024 92	2007/11/17	1 Year
4	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2007/11/17	1 Year
5	Loop Antenna	DAZE	ZN30900A	8411	2008/2/26	1 Year

### 5.3 EUT Setup

#### Radiated Measurement Setup

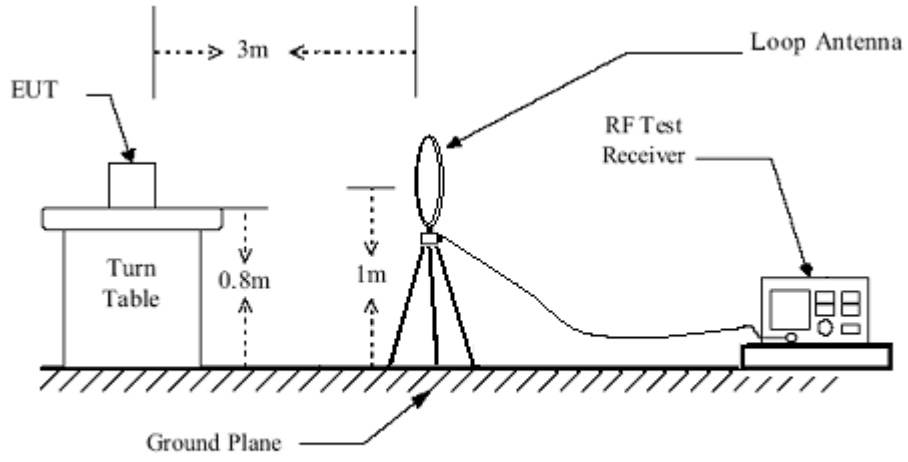


Figure 2 : Frequencies measured below 30 MHz configuration

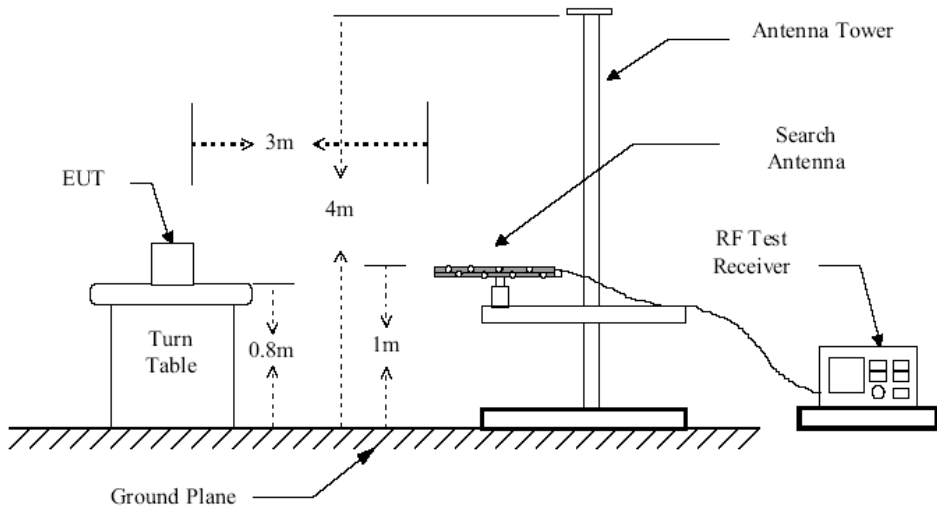


Figure 1 : Frequencies measured below 1 GHz configuration

## 5.4 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

- 1). Configure the EUT according to ANSI C63.4:2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The receiving antenna was placed 3 meters far away from the turntable.
- 4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 5). For Spurious Emissions test, The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
- 6). For Field Strength of Fundamental Emissions test, Positioned the loop antenna with its plane vertical at the specified distance of 3 meters between its center and the EUT. The center of the loop antenna is set with 1m above the grounded plane. Then rotated about its vertical axis for finding out the maximum emission level of the EUT.

## 5.5 Test Result

Temperature ( °C ) : 22~23

EUT: TOY-R/C SAVAGE

Humidity (%RH) : 50~54

M/N: 8008

Barometric Pressure ( mbar ) : 950~1000

Operation Condition: Continuous Transmitting

### Fundamental Emission Test Data

Peak Measurement					
Test Frequency (MHz)	Measuring Level (dB $\mu$ V/m)		Limits (dB $\mu$ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
27.1452	82.81	75.44	100	17.19	24.56
Average Measurement					
27.1452	76.97	69.60	80	3.03	10.40

### Remark: Duty Cycle Correction

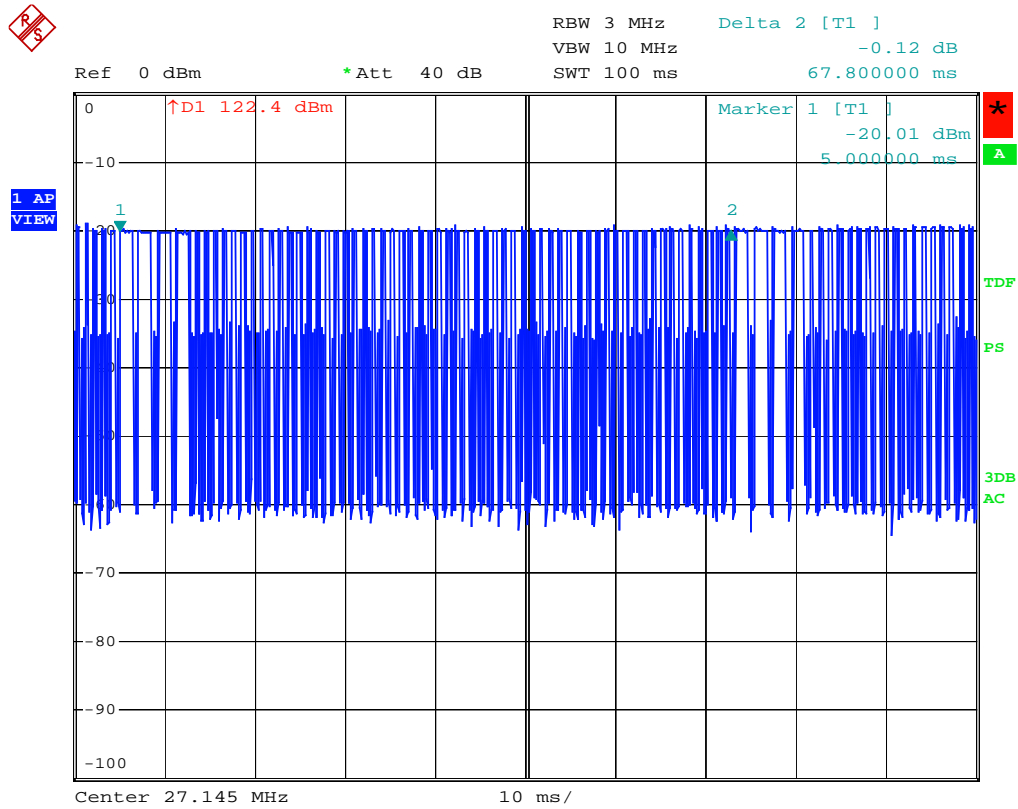
Each function key sends a different series of characters, but each packet period (67.8msec) never exceeds a series of 4 long (1.48msec) and 62 short (0.46msec) pulses. Assuming any combination of short and long pulses may be obtained due to encoding the worst case transmit duty cycle would be considered  $4 \times 1.48\text{msec} + 62 \times 0.46\text{msec}$  per 67.8msec = 51% duty cycle. Figure A through C show the characteristics of the pulse train for one of these functions.

Duty Cycle Correction =  $20\log(0.51) = -5.84\text{dB}$

The following figures show the characteristics of the pulse train for one of these functions.

So, the radiation(average)=  $82.81+20*\log(0.51)=76.97(\text{dB}\mu\text{V}/\text{m})$

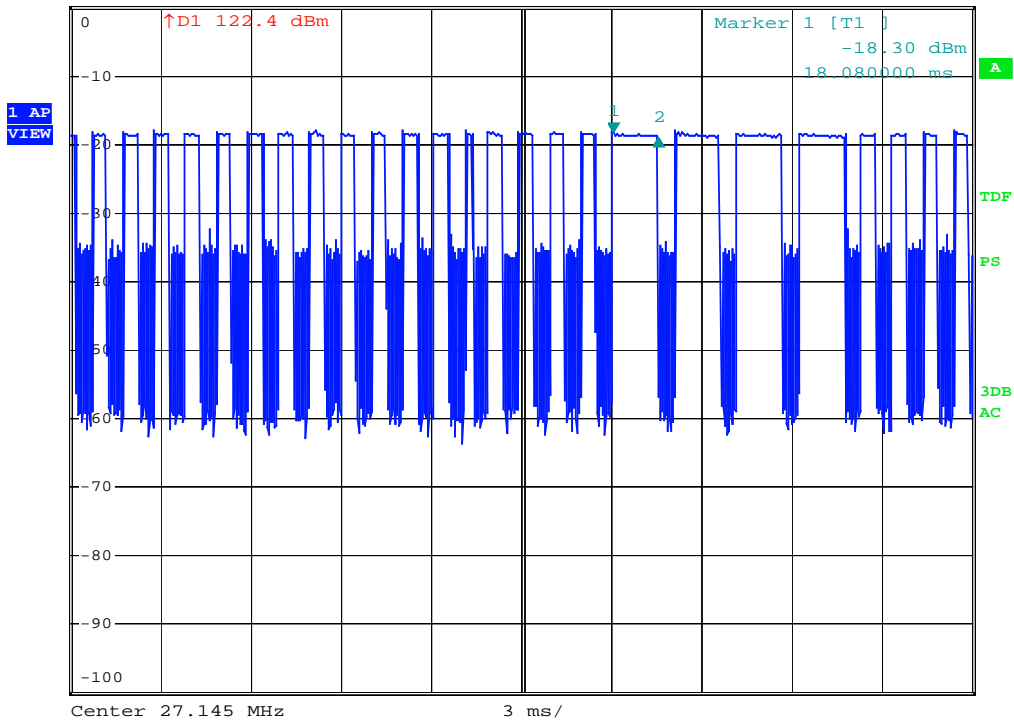
**Result:** The field strength of any emission within the operation band did not exceed  $80(\text{dB}\mu\text{V}/\text{m})$  for average value or  $100 \text{ dB}(\text{dB}\mu\text{V}/\text{m})$  for peak value.



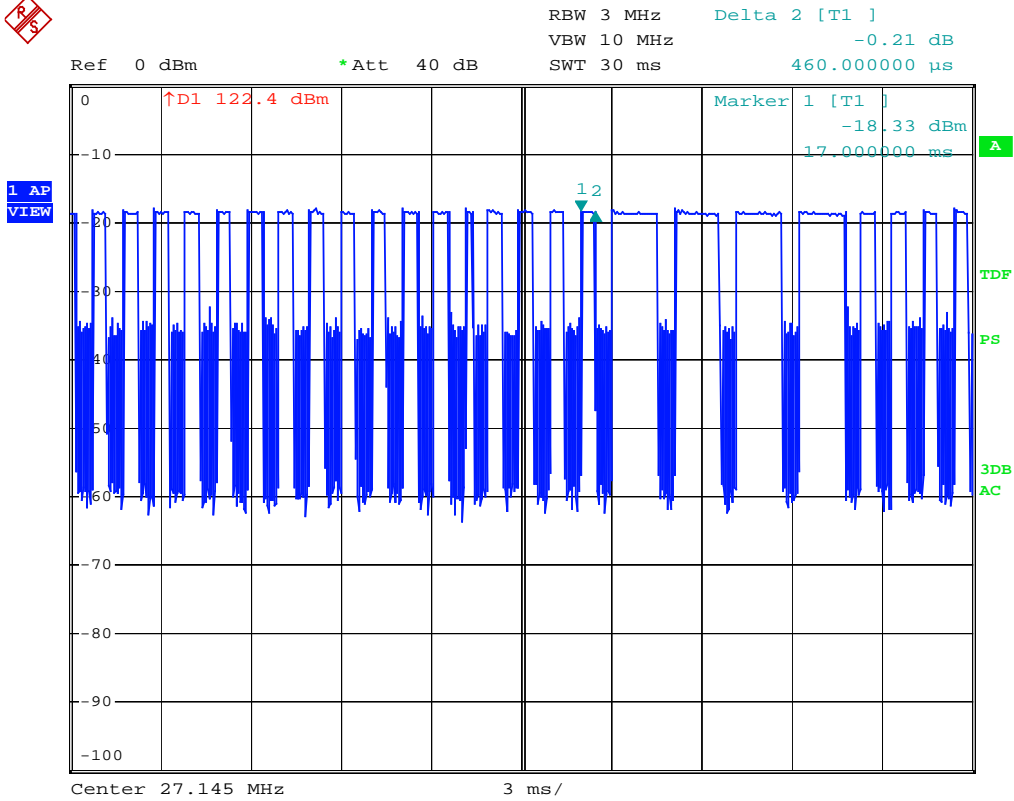
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RBW 3 MHz    Delta 2 [T1 ]  
VBW 10 MHz    -0.73 dB  
Ref 0 dBm    \*Att 40 dB    SWT 30 ms    1.480000 ms



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## Harmonics & Spurious Emission

Spurious Emission							
Maximum Frequency (MHz)	Position and Level					Limit	Margin
	Polarity	Antenna Height m	Value dBµV/m	Transd	Result dBµV/m	dBµV/m	dBµV/m
54.290	V	1.4	28.9	7.9	36.8	40	3.2
81.435	V	1.4	21.8	10.8	32.6	40	7.4
108.580	V	1.2	21.9	11.2	33.1	43.5	10.4
135.725	V	2.7	17.0	10.9	27.9	43.5	15.6
162.871	V	2.4	17.9	10.5	28.4	43.5	15.1
190.015	V	1.8	14.4	11.3	25.7	43.5	17.8
217.161	V	1.4	11.5	12.6	24.1	46	21.9
244.305	V	1.4	13.2	13.7	26.9	46	19.1
271.451	V	1.2	10.6	14.1	24.7	46	21.3
---	---	---	---	---	---	---	---
Maximum Frequency (MHz)	Position and Level					Limit	Margin
	Polarity	Antenna Height m	Value dBµV/m	Transd	Result dBµV/m	dBµV/m	dBµV/m
54.290	H	1.3	17.7	8.1	25.8	40	14.2
81.435	H	2.5	9.7	10.5	20.2	40	19.8
108.580	H	3.1	7.6	11.8	19.4	43.5	24.1
135.725	H	2.7	7.4	10.7	18.1	43.5	25.4
162.871	H	1.4	9.2	11.3	20.5	43.5	23.0
190.015	---	---	---	---	---	---	---
217.161	---	---	---	---	---	---	---
244.305	---	---	---	---	---	---	---
271.451	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---
Remark:							
--- Means that The emission level of the rest measuring harmonic up to 5GHz are so low below applicable limit in operation mode, so the result were not recorded.							

**Remark:** The 'Transd.' in the above table is the Corrected Amplitude calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Transd.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

## 6- EMISSIONS WITHIN BAND EDGES

### 6.1 Limit of Emissions within Band Edges

According to the section 15.227 of FCC Part 15 Subpart C, The field strength of any emission within this band shall not exceed 10,000 microvolts/ meter at 3 meter. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

### 6.2 Test Equipment Used

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2007/11/17	1 Year
2	EMI Test Receiver	R&S	ESPI7	100097	2007/11/17	1 Year
3	Amplifier	HP	8447D	1937A024 92	2007/11/17	1 Year
4	TRILOG Broadband Test- Antenna	SCHWARZBECK	VULB9163	9163-324	2007/11/17	1 Year
5	Loop Antenna	DAZE	ZN30900A	8411	2008/2/26	1 Year

### 6.3 Test Procedure

Positioned the loop antenna with its plane vertical at the specified distance of 3 meters between its center and the EUT. The center of the loop antenna is set with 1m above the grounded plane. Then rotated about its vertical axis for finding out the maximum emission level of the EUT. (Details refer to the relevant sections of the standard ANSI C63.4-2003 'Methods of Measurement of Radio Noise Emissions from Low -Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz'.)

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

### 6.4 Emissions within Band Edges Test Result

Temperature ( °C ) : 22~23

Humidity (%RH) : 50~54

Barometric Pressure ( mbar ) : 950~1000

EUT: TOY-R/C SAVAGE

M/N: 8008

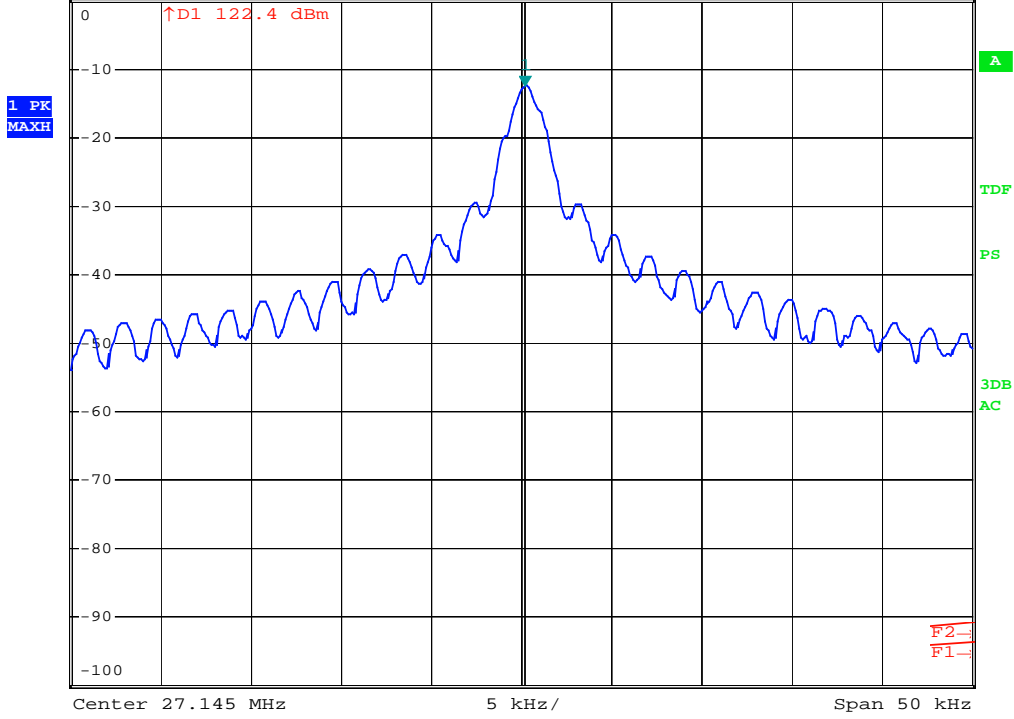
Operation Condition: Continuous Transmitting

Test plots see following:





Ref 0 dBm      \*Att 40 dB      RBW 1 kHz      Marker 1 [T1 ]  
VBW 3 kHz      -12.56 dBm  
SWT 50 ms      27.145200000 MHz



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