ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT

For

FM TRANSMITTER

MODEL No.: CF2028F

Brand Name: CRAIG, MusicBaby

FCC ID: PVDCF2028F

REPORT NO: LW-SZ0603001E

ISSUE DATE: March 29, 2006

Prepared for

SHEN ZHEN JWL ELECTRONIC CO., LTD
ROOM B-OP, 27/F WINDOW TO MODERNIZATION BUILDING
HUA QIANG ROAD NORTH, FUTIAN DISTRICT
SHENZHEN, GUANGDONG, CHINA

Prepared by

LONGWAY(SHENZHEN) CERTIFICATION SERVICE CO., LTD

d.b.a.

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VERIFICATION OF COMPLIANCE

Applicant:	Shen Zhen JWL Electronic Co., Ltd. Room B-OP, 27/F Window to modernization Building Hua Qiang Road North, Futian District Shenzhen, Guangdong, China
Manufacturer:	Shen Zhen JWL Electronic Co., Ltd. Room B-OP, 27/F Window to modernization Building Hua Qiang Road North, Futian District Shenzhen, Guangdong, China
Product Description:	FM Transmitter
Brand Name:	CRAIG, MusicBaby
Model Number:	CF2028F, FMT-300
Serial Number:	N/A
File Number:	LW-SZ0603001E
Date of Test:	March 22, 2006 ~ March 29, 2006

We hereby certify that:

The EUT was assessed by LONGWAY (SHENZHEN) CERTIFICATION SERVICE CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.239.

The test results of this report relate only to the tested sample identified in this report.

Approved By

King Chen / Q.A. Manager
LONGWAY(SHENZHEN) CERTIFICATION SERVICE CO., LTD

Table of Contents

1. GENERAL INFORMATION

1.1 Product Description

The Shen Zhen JWL Electronic Co.,Ltd, Model: CF2028F (referred to as the EUT in this report) The EUT is an short range, lower power, FM Transmitter designed as an " Output Device". It is designed by way of utilizing the FM modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

A). Operation Frequency: 88.1 MHz ~ 107.9 MHz
B). Modulation: FM
C). Antenna Designation: Integral
D). Power Supply: DC12V

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: PVDCF2028F filing to comply with Section 15.239 of the FCC Part 15, Subpart C Rules.

1.3 Test Methodology

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

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on No. 6, Jinao industrial park, No.35 Jukeng Road, Dashuikeng Village, Guanlan Town, Baoan District, Shenzhen, China. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements.

1.5 Special Accessories

Not available for this EUT intended for grant.

1.6 Equipment Modifications

Not available for this EUT intended for grant.

System Test Configuration

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 which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions (Not Applicable)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4-2001.Conducted emissions from the EUT measured in the **frequency range between 0.15 MHz and 30MHz** using **CISPR Quasi-Peak and average detector mode**.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table 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 max. emission.

2.4 Limitation

(1) Conducted Emission (Not Applicable)

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	**Average**
0.15 to 0.50	**66 to 56**	**56 to 46**
0.50 to 5	**56**	**46**
5 to 30	**60**	**50**
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

(2) Radiated Emission

a. The field strength of any emission within this band (section 15.239 frequency between 88MHz –108MHz) shall not exceed 250 micro volts/meter at 3 meters. (47.96dBμV at 3m) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in section 15.35 for limiting peak emissions apply.

b. The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in section 15.209(Intentional Radiators general limit).as below.

Frequency (MHz)	Field strength μV/m	Distance(m)	Field strength at 3m dBμV/m
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205
4. Emission spurious frequency which appearing within the Restricted Bands specified in provision of ξ15.205, then the general radiated emission limits in ξ 15.209 apply.

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System Powered By Battery

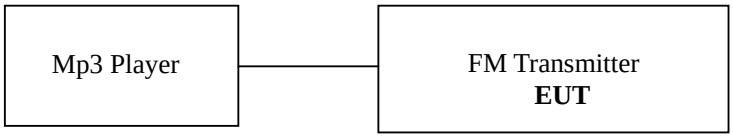


Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	FM Transmitter	CRAIG MusicBaby	CF2028F	PVDCF2028F	N/A	***EUT***
E-2	Mp3	SONY	N/A	N/A	N/A	

Summary Of Test Results

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Emission	Not Applicable
§ 15.239	Radiated Emission	Compliant
§ 15.239	26 dB Bandwidth	Compliant

1. Description of test modes

1. The EUT (FM Transmitter) was powered by DC 12V as usual. Configuring all the necessary peripherial devices(Mp3 player) as intended.
2. Power on all the devices then use the Mp3 player to send audio signal to the EUT.
3. Set the EUT to transmit on the top channel, the middle channel and the bottom channel respectively.
4. Make sure the EUT work normally during individual assessment.

Conducted Emissions Test (Not Applicable)

5.1 Measurement Procedure:
N/A

5.2 Test SET-UP (Block Diagram of Configuration)
N/A

5.3 Measurement Equipment Used:
N/A

5.4 Measurement Result:
N/A

5.5 Conducted Measurement Photos:
N/A

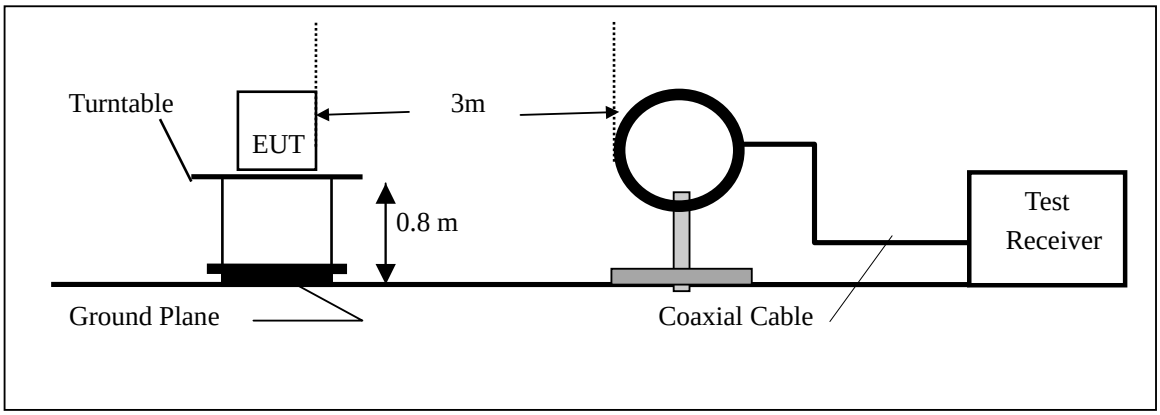
6. Radiated Emission Test

6.1 Measurement Procedure

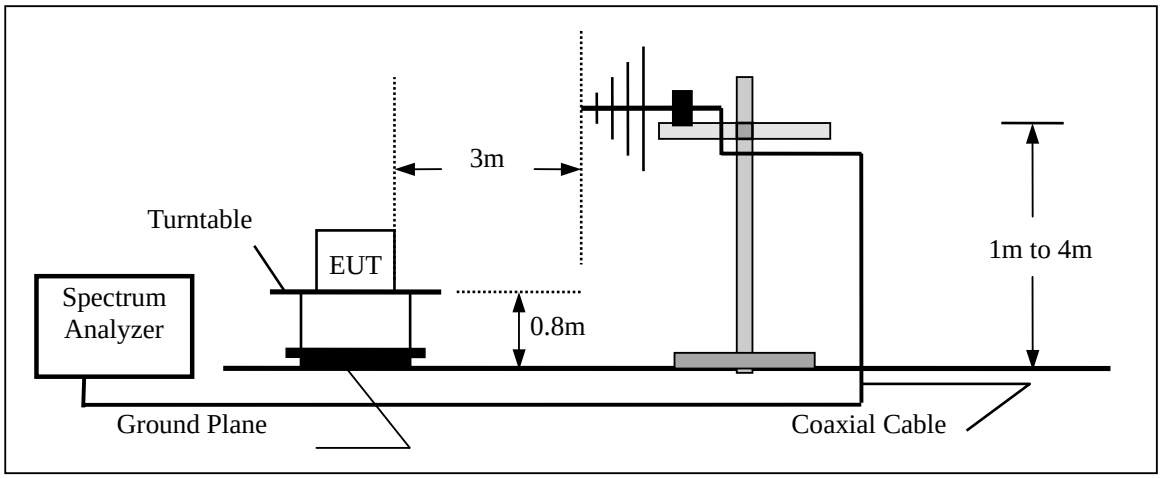
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on at least twelve highest emissions to ensure EUT's compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequencies measured were completed.

6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



6.3 Measurement Equipment Used:

Open Area Test Site # 3					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	ADVANTEST	R3132	120901472	06/07/2005	06/06/2006
EMI Test Receiver	R&S	ESCI 30	N/A	06/07/2005	06/06/2006
Pre-Amplifier	HP	8447D	2944A07999	06/07/2005	06/06/2006
Bi-log Antenna	EMCO	3142	9910-1436	06/07/2005	06/06/2006

6.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

6.5 Measurement Result

Operation Mode:	Transmitting Mode At Normal Operation	Test Date :	March 25, 2006
Fundamental Frequency:	88.1 MHz	Test By:	Army
Temperature :	24 ℃	Pol:	Ver & Hor
Humidity :	56 %		

Judgement：Passed by -1.72 dB at 88.1 MHz Ant.Pol. Hor.

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
88.100	V	Peak	32.05	10.33	42.38	47.96	-5.58	F
88.100	H	Peak	35.91	10.33	46.24	47.96	-1.72	F
176.470	V	Peak	26.96	11.32	38.28	43.50	-5.22	H
176.470	H	Peak	30.33	11.32	41.65	43.50	-1.85	H
264.230	V	Peak	18.81	16.36	35.17	46.00	-10.83	H
264.230	H	Peak	20.57	16.36	36.93	46.00	-9.07	H
352.500	V	Peak	13.55	15.57	29.12	46.00	-16.88	H
352.500	H	Peak	15.75	15.57	31.32	46.00	-14.68	H

Remark：

(1) Measuring frequencies from 30 MHz to the 1GHz。

(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Datum of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz.

Operation Mode:	Transmitting Mode At Normal Operation	Test Date :	March 25, 2006
Fundamental Frequency:	98 MHz	Test By:	Army
Temperature :	24 ℃	Pol:	Ver & Hor
Humidity:	56 %		

Judgement: Passed by -1.55 dB at 98 MHz Ant.Pol. Hor.

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
98.000	V	Peak	34.19	11.55	45.74	47.96	-2.22	F
98.000	H	Peak	34.86	11.55	46.41	47.96	-1.55	F
196.050	V	Peak	28.04	10.08	38.12	43.50	-5.38	H
196.050	H	Peak	30.51	10.08	40.59	43.50	-2.91	H
293.925	V	Peak	26.12	12.88	39.00	46.00	-7.00	H
293.925	H	Peak	25.77	12.88	38.65	46.00	-7.35	H
392.750	V	Peak	11.11	17.50	28.61	46.00	-17.39	H
392.750	H	Peak	15.55	17.50	33.05	46.00	-12.95	H

Remark：

(1) Measuring frequencies from 25 MHz to the 1GHz.

(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz.

Operation Mode:	Transmitting Mode At Normal Operation	Test Date :	March 25, 2006
Fundamental Frequency:	107.9 MHz	Test By:	Army
Temperature :	24 ℃	Pol:	Ver & Hor
Humidity :	56 %		

Judgement：Passed by -1.24 dB at 107.9 MHz Ant.Pol. Hor

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit3m (dBuV/m)	Safe Margin (dB)	Note
107.900	V	Peak	33.64	12.33	45.97	47.96	-1.99	F
107.900	H	Peak	34.39	12.33	46.72	47.96	-1.24	F
215.630	V	Peak	27.17	7.41	34.58	43.50	-8.92	H
215.630	H	Peak	30.50	7.41	37.91	43.50	-5.59	H
324.500	V	Peak	16.21	19.64	35.85	46.00	-10.15	H
324.500	H	Peak	17.43	19.64	37.07	46.00	-8.93	H
433.000	V	Peak	12.88	15.29	28.17	46.00	-17.83	H
433.000	H	Peak	14.51	15.29	29.80	46.00	-16.20	H

Remark：

(1) Measuring frequencies from 30 MHz to the 1GHz。

(2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Datas of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz.

7. Occupied Bandwidth

7.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Set EUT as normal operation
3. Set SPA Center Frequency = Fundamental Frequency , RBW,VBW= 1KHz, Span =500KHz.
4. Set SPA Max hold. Mark peak, -26dB.

7.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.2 Radiated Emission Measurement.

7.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

7.4 Measurement Results:

Measurement Result for the Bottom Channel(88.1 MHz):

26 dB Bandwidth =116.0 KHz

The bottom frequency covered by the 26 dB bandwidth is 88.036 MHz

Measurement Result for the Middle Channel (98 MHz):

26 dB Bandwidth =82.0 KHz

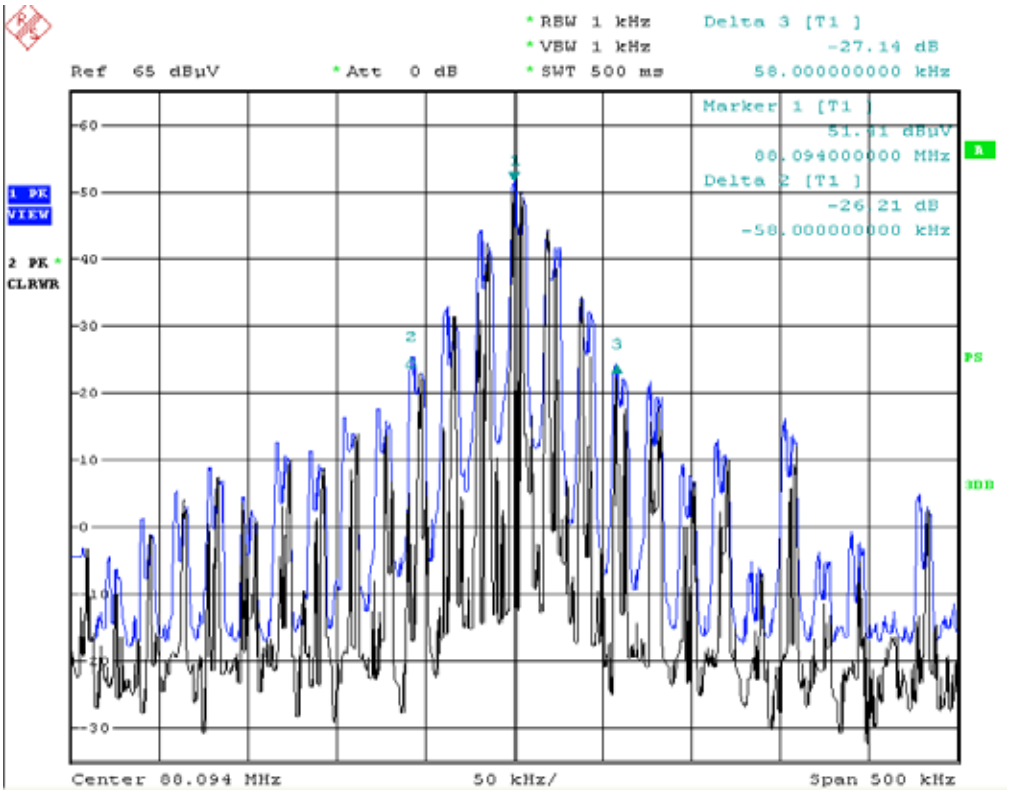
Measurement Result for the Top Channel(107.9 MHz):

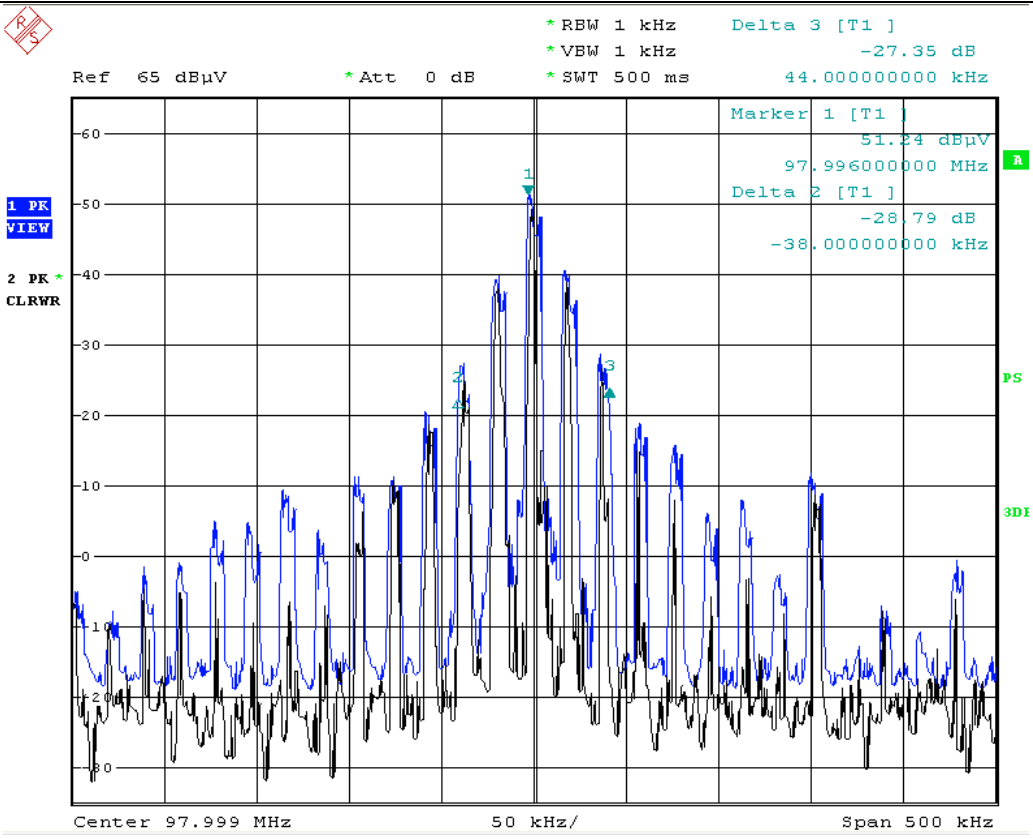
26 dB Bandwidth =80.0 KHz

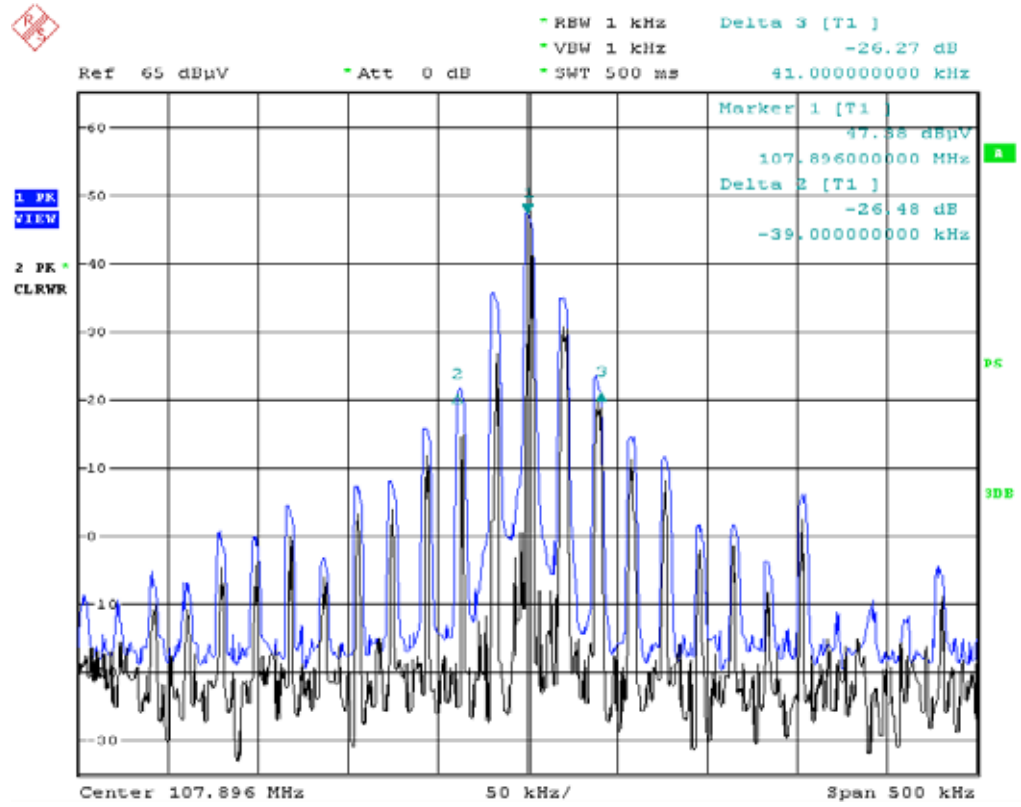
The top frequency covered by the 26 dB bandwidth is 107.937 MHz

Refer to attached data chart.

26dB Bandwidth Test Data :




RBW 1 kHz
VBW 1 kHz
SWT 500 ms
Delta 3 [T1]
-27.35 dB
44.000000000 kHz
Ref 65 dBµV
Att 0 dB
Marker 1 [T1]
51.24 dBµV
97.996000000 MHz
Delta 2 [T1]
-28.79 dB
-38.000000000 kHz
1 PK VIEW
2 PK CLRWR
PS
3DB
Center 97.999 MHz
50 kHz/
Span 500 kHz


RBW 1 kHz
VBW 1 kHz
SWT 500 ms
Delta 3 [T1]
-26.27 dB
41.000000000 kHz
Ref 65 dBµV
Att 0 dB
Marker 1 [T1]
47.38 dBµV
107.896000000 MHz
Delta 2 [T1]
-26.48 dB
-39.000000000 kHz
1 PK VIEW
2 PK CLRWR
PS
3DB
Center 107.896 MHz
50 kHz/
Span 500 kHz

APPENDIX 1

PHOTOGRAPHS OF SET UP

Radiated Emission Setup Photo

APPENDIX 2

PHOTOGRAPHS OF EUT

Top View of TX

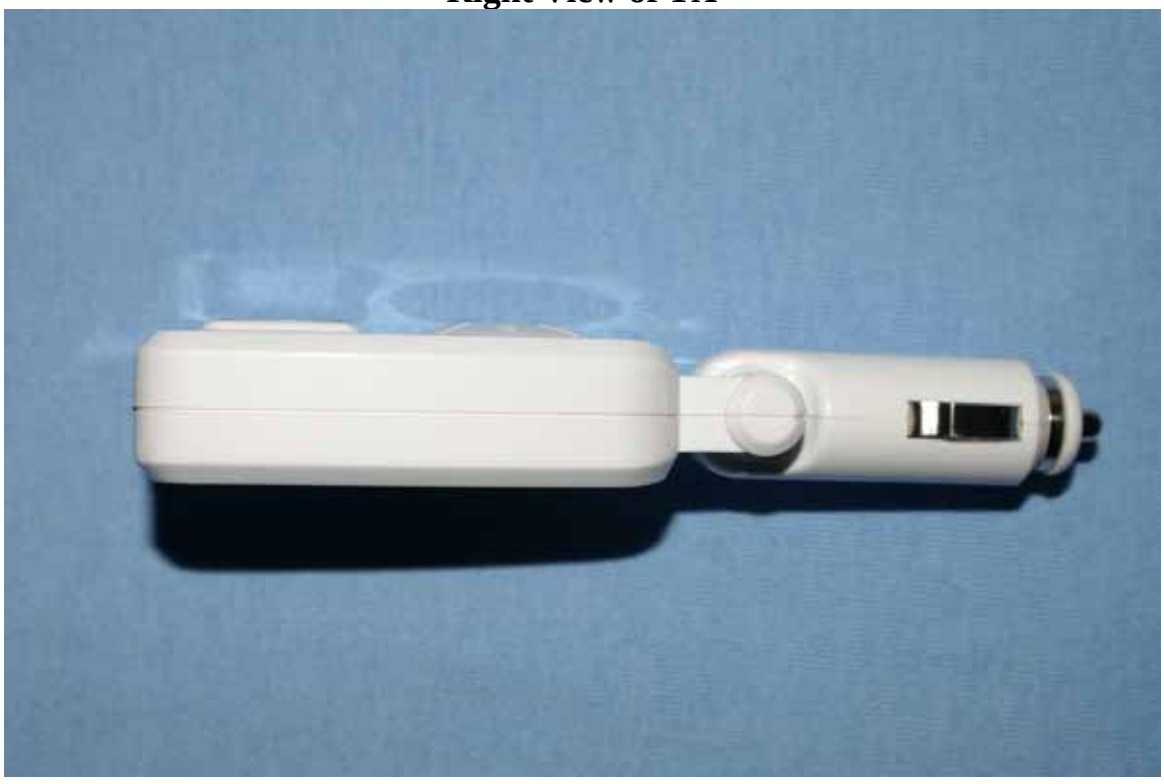
Bottom View of TX

Front View of TX

Back View of TX

Left View of TX

Right View of TX



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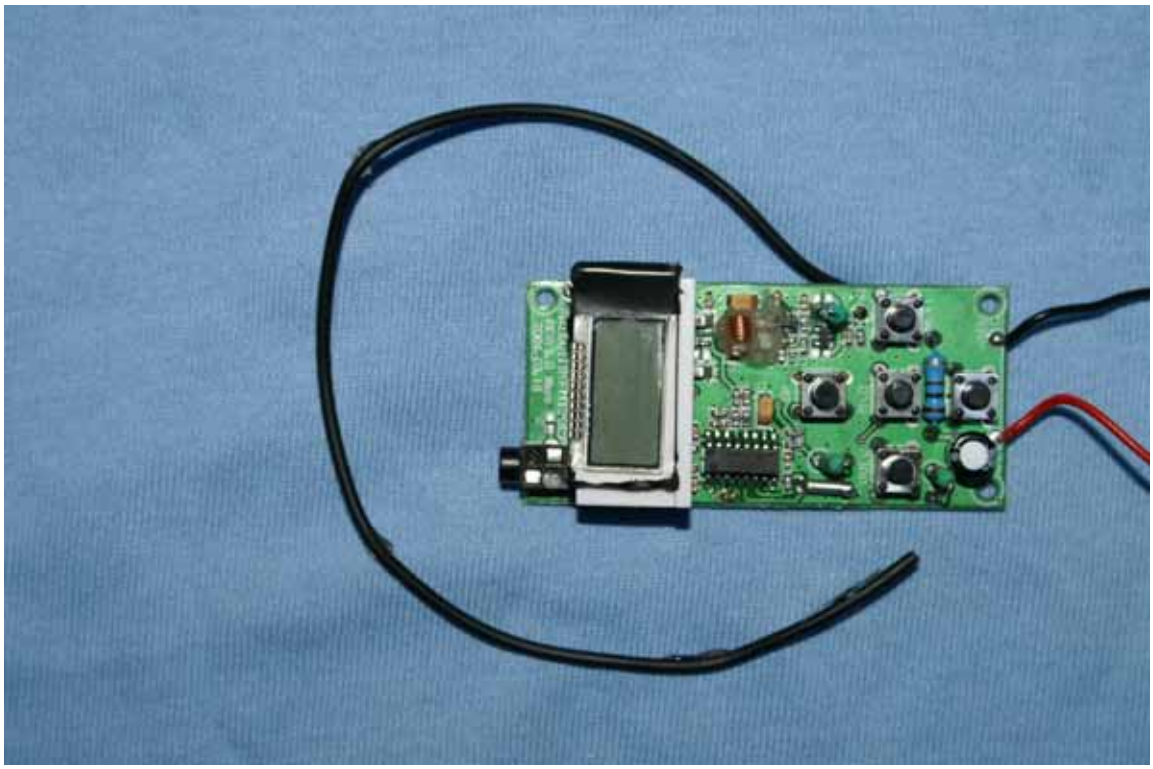

Internal of TX– 2