

FCC PART 15.239



EMI MEASUREMENT AND TEST REPORT

For

Dipa Products Limited

2-301 Building #12 Fengheyuan, Lakeside Garden, Wenyi Road,
Hangzhou, Zhejiang, China

FCC ID: T29060306DPV-156

This Report Concerns: <input checked="" type="checkbox"/> Original Report	Equipment Type: Wireless FM Transmitter
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Report No.: R0601255	
Report Date: 2006-03-03	
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TABLE OF CONTENTS

GENERAL INFORMATION.....	3
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT)	3
OBJECTIVE	3
RELATED SUBMITTAL(S)/GRANT(S)	3
TEST METHODOLOGY	3
TEST FACILITY	3
SYSTEM TEST CONFIGURATION.....	4
JUSTIFICATION	4
EUT EXERCISE SOFTWARE	4
SPECIAL ACCESSORIES	4
SCHEMATICS / BLOCK DIAGRAM.....	4
EQUIPMENT MODIFICATIONS	4
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS	4
INTERFACE PORTS AND CABLING.....	4
CONFIGURATION OF TEST SYSTEM	5
TEST SETUP BLOCK DIAGRAM	5
SUMMARY OF TEST RESULTS	6
§15.203 - ANTENNA REQUIREMENT.....	7
STANDARD APPLICABLE	7
§15.205 & §15.209 - SPURIOUS RADIATED EMISSION.....	8
MEASUREMENT UNCERTAINTY	8
EUT SETUP	9
SPECTRUM ANALYZER SETUP	9
TEST EQUIPMENT LIST AND DETAILS.....	9
TEST PROCEDURE	10
CORRECTED AMPLITUDE & MARGIN CALCULATION	10
ENVIRONMENTAL CONDITIONS	10
SUMMARY OF TEST RESULTS	10
§15.239 (A) – FREQUENCY RANGE	13
MEASUREMENT UNCERTAINTY	13
TEST PROCEDURE	13
TEST EQUIPMENT LIST AND DETAILS.....	13
PLOT(S) OF TEST DATA	13

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The Dipa Products Limited's product, FCC ID: *T29060306DPV-156*, Model: DPV-156-001 or the "EUT" as referred to this report is a Wireless FM Transmitter, which measures approximately 80mmL x 47mmW x 20mmH.

** The test data gathered are from typical production sample, serial number: 001 provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of Dipa Products Limited in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules, section 15.209 & 15.239 rules.

Related Submittal(s)/Grant(s)

No Related Submittals.

Test Methodology

All measurements contained in this report were conducted with 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.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by BACL to collect radiated and conducted emission measurement data is located in the chamber of the building at 1274 Anvilwood Ave., Sunnyvale, California 94089, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm>

SYSTEM TEST CONFIGURATION

Justification

The host system was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the normal (native) operating mode to represent *worst-case* results during the final qualification test.

EUT Exercise Software

This program was designed to exercise the system components during the radiated emission test. Once loaded, the EUT was set to transmit from low to mid and high channels for testing.

Special Accessories

As shown in the following test block diagram, all interface cables used for compliance testing are shielded.

Schematics / Block Diagram

Please refer to Appendix A.

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
JNC	USB MP3 Player	NVPIO	None	

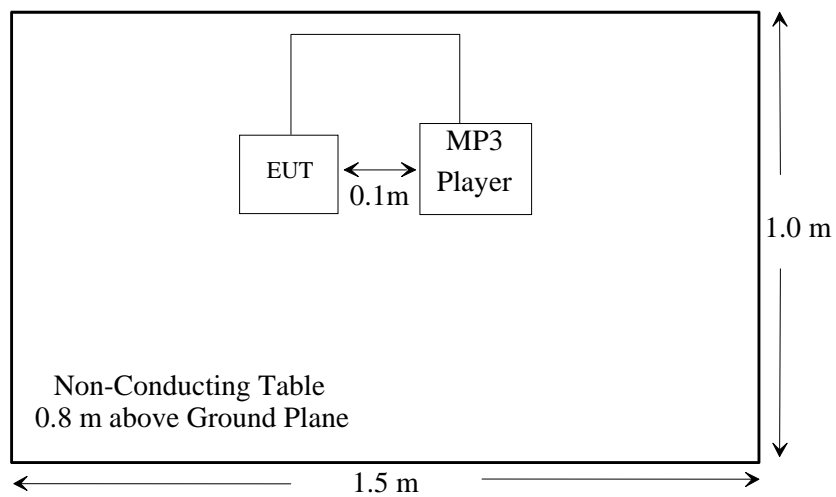
Interface Ports and Cabling

Cable Description	Length (M)	From	To
Audio Input Cable	150mm	FM Transmitter	JNC MP3 Player

Configuration of Test System



Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC RULES	DESCRIPTION OF TEST	RESULT
§ 15.203	Antenna Requirement	Pass
§ 15.205	Restricted Bands of Operation	Pass
§ 15.207	AC Line Conduction	N/A*
§ 15.205, § 15.209, § 15.239(b)(c)	Radiated Emission	Pass
§ 15.239(a)	Frequency Range	Pass

*: Due to the fact that the EUT does not include an AC adapter, AC Line conducted emission test is not applicable.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

For intentional device, according to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The antenna used with the EUT is an integral antenna.

§15.205 & §15.209 - SPURIOUS RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ± 4.0 dB.

According to §15.205, except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
¹ 0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.57725	240 – 285	3345.8 – 3358	36.43 – 36.5
13.36 – 13.41	322 – 335.4	3600 – 4400	(²)

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510MHz

² Above 38.6

Except as provided in paragraph (d) and (e), the filed strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

According to §15.209, the device shall meet radiated emission general requirements.

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of Emission (MHz)	Field Strength (Microvolts/meter)	Measurement Distance (Meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The EUT was powered up using two AAA alkali batteries.

Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the frequency was investigated from 300 KHz to 1000 MHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>Video B/W</i>
Below 30MHz	10 kHz	10 kHz
30 – 1000MHz	100 kHz	100 kHz
Above 1000MHz	1MHz	1MHz

For Average measurement: RBW = 1MHz, VBW = 10Hz (above 1000MHz)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Sonoma Instrument	Amplifier, Pre (0.1-2.5GHz)	317	260407	02/03/2006
Sunol Science	30MHz – 3 GHz Antenna	JB3	A020106-3 / S006628	02/14/2006
HP	Spectrum Analyzer	8568B	2403A06544	08/19/2005
HP	Adapter, Quasi-Peak	85650A	2043A00326	09/01/2005

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

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

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within -4 dB μ V of specification limits), and are distinguished with a "Qp" in the data table.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

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

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC 15.209 Limit}$$

Environmental Conditions

Temperature:	20°C
Relative Humidity:	52%
ATM Pressure:	1004mbr

**Testing was performed by Taylor Tsai on 2006-02-28.*

Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.209 & 15.239, and had the worst margin of:

Primary scan for Fundamental Frequency

-7.2 dB at **88.10MHz** in the **Horizontal** polarization, Low Channel

-6.6 dB at **98.0MHz** in the **Horizontal** polarization, Mid Channel

-9.1 dB at **107.90MHz** in the **Horizontal** polarization, High Channel

Scan Frequency outside operational bandwidth (i.e. 88.1 ~ 107.9 MHz)

-4.3 dB at **176.10MHz** in the **Horizontal** polarization, Low Channel

-7.9 dB at **304.79MHz** in the **Horizontal** polarization, Mid Channel

-6.4 dB at **215.76MHz** in the **Horizontal** polarization, High Channel

Radiated Emission Test Result, 30 – 1000MHz*Primary scan for Fundamental Frequency*

Frequency	Reading	PK/AV	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Corrected Reading	15.239	15.239
MHz	dBuV		Degree	Meter	H / V	dB	dB	dB	dBuV	Limit	Margin
Low Channel 88.1 MHz											
88.10	70.0	AVE	96	2.2	H	7.9	1.0	38.1	40.8	47.96	-7.2
88.10	64.0	AVE	0.75	1.7	V	7.9	1.0	38.1	34.8	47.96	-13.2
88.10	73.2	PK	93.25	2.1	H	7.9	1.0	38.1	44.0	67.96	-24.0
88.10	66.7	PK	0.75	2.1	V	7.9	1.0	38.1	37.5	67.96	-30.5
Middle Channel 98.0 MHz											
98.00	69.6	AVE	263.25	1.9	H	8.7	1.2	38.1	41.4	47.96	-6.6
98.00	65.5	AVE	181.75	2.9	V	8.7	1.2	38.1	37.3	47.96	-10.7
98.00	72.7	PK	263.25	1.9	H	8.7	1.2	38.1	44.5	67.96	-23.5
98.00	68.7	PK	181.75	2.9	V	8.7	1.2	38.1	40.5	67.96	-27.5
High Channel 107.9 MHz											
107.90	64.7	AVE	241	1.6	H	11.0	1.2	38.1	38.8	47.96	-9.1
107.90	58.4	AVE	326.5	1.0	V	11.0	1.2	38.1	32.5	47.96	-15.4
107.90	65.6	PK	241	1.6	H	11.0	1.2	38.1	39.7	67.96	-28.2
107.90	59.7	PK	326.5	1.0	V	11.0	1.2	38.1	33.8	67.96	-34.1

Scan Frequency outside operational bandwidth (i.e. 88.1 ~ 107.9 MHz)

Frequency	Reading	PK/QP	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Corrected Reading	15.239	15.239
MHz	dBuV		Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit	Margin
Low Channel 88.1 MHz											
176.10	64.4	PK	271.3	1.8	H	11.8	1.1	38.1	39.2	43.52	-4.3
352.58	57.8	PK	273	2.6	H	14.5	1.8	38.1	36.0	46.02	-10.0
264.21	58.7	PK	246.3	3.8	H	12.3	1.3	38.1	34.2	46.02	-11.8
176.10	54.9	PK	0	2.6	V	11.8	1.1	38.1	29.7	43.52	-13.8
352.54	53.7	PK	189.5	1.9	V	14.5	1.8	38.1	31.9	46.02	-14.1
304.79	50.8	PK	200	3.2	V	13.6	1.5	38.1	27.9	46.02	-18.2
Middle Channel 98.0 MHz											
304.79	61.1	PK	108.75	1.0	H	13.6	1.5	38.1	38.2	46.02	-7.9
338.65	52.8	PK	72	1.0	H	14.2	1.1	38.1	30.0	46.02	-16.0
195.95	52.4	PK	111.25	1.7	H	11.6	1.3	38.1	27.2	43.52	-16.3
304.79	51.3	PK	211.75	2.7	V	13.6	1.5	38.1	28.4	46.02	-17.7
195.92	46.0	PK	155.5	1.6	V	11.6	1.3	38.1	20.8	43.52	-22.7
High Channel 107.9 MHz											
215.76	66.3	PK	257.5	1.0	H	10.6	0.8	38.1	39.6	46.02	-6.4
323.65	62.5	PK	72.75	3.4	H	14.1	1.0	38.1	39.6	46.02	-6.5
215.83	66.0	PK	78.8	1.1	H	10.6	0.8	38.1	39.3	46.02	-6.7
323.69	58.9	PK	186	2.9	V	14.1	1.0	38.1	36.0	46.02	-10.1
215.76	57.0	PK	150.25	1.4	V	10.6	0.8	38.1	30.3	46.02	-15.7
215.76	57.0	PK	150.25	1.4	V	10.6	0.8	38.1	30.3	46.02	-15.7

§15.239 (a) – FREQUENCY RANGE

Measurement Uncertainty

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz.

The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma Instrument	Amplifier, Pre (0.1-2.5GHz)	317	260407	02/03/2006
Sunol Science	30MHz – 3 GHz Antenna	JB3	A020106-3 / S006628	02/14/2006
HP	Spectrum Analyzer	8565EC	3946A00131	01/11/2006
HP	Adapter, Quasi-Peak	85650A	2043A00326	09/01/2005

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

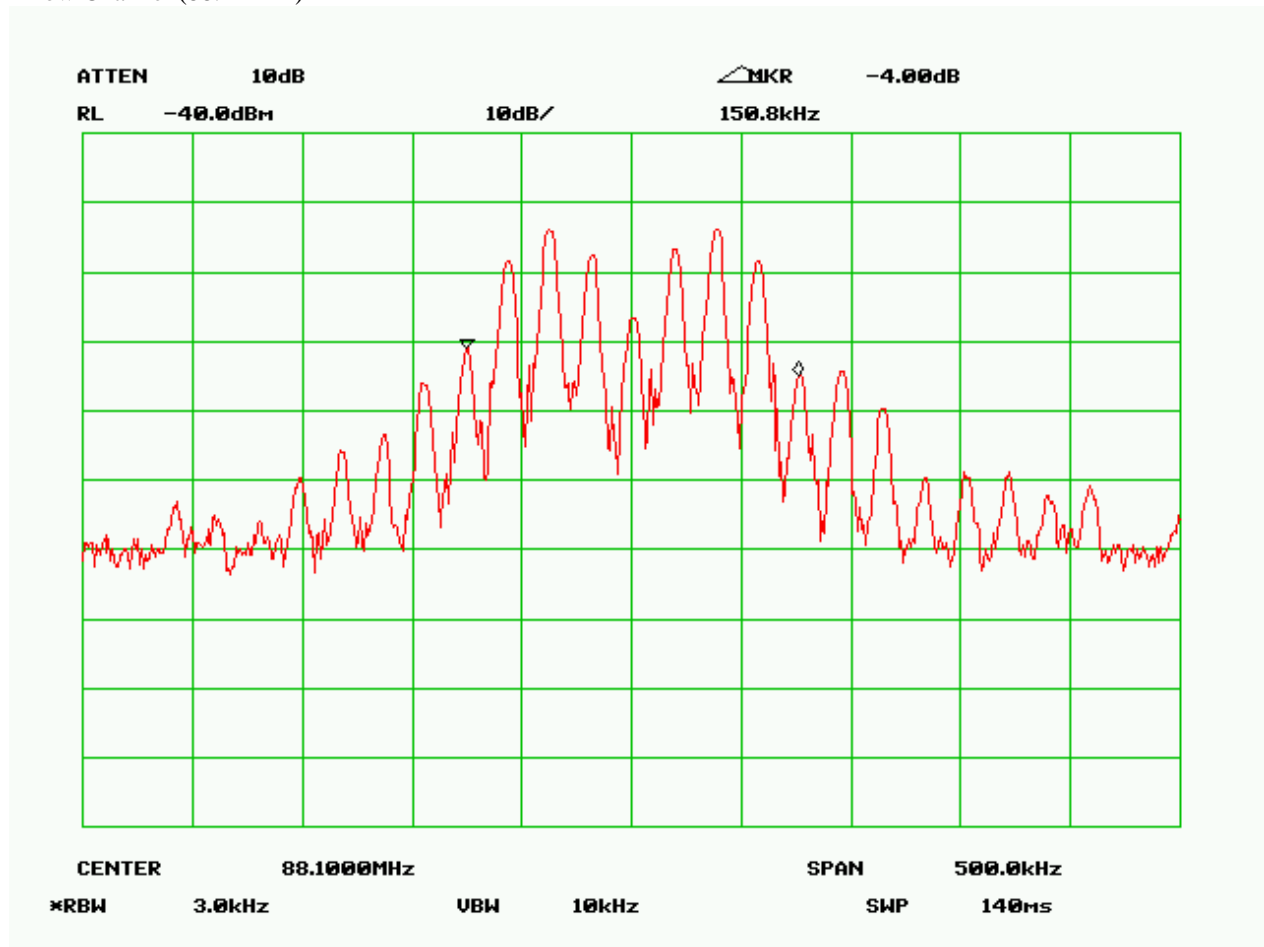
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.

Test Result: Pass

Plots of Captured Wave Form

Low Channel (88.1 MHz)



High Channel (107.9 MHz)

