

**FCC PART 15.239**  
**EMI MEASUREMENT AND TEST REPORT**



For

**First International Digital , Inc.**

135 W. Central Rd , Schaumburg IL, USA

**FCC ID: RFG410FM**

January 20, 2005

<b>This Report Concerns:</b> <input checked="" type="checkbox"/> Original Report	<b>Equipment Type:</b> Portable low power FM Transmitter (410FM)
<b>Test Engineer:</b> Jandy Su 	
<b>Report No.:</b> RSZ05011201	
<b>Test Date:</b> January 18, 2005	
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**Note:** The test report is specially limited to the above company and the product model only.  
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## GENERAL INFORMATION

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

The First International Digital, Inc. 's product, model X268 or the "EUT" as referred to in this report is a Portable low power FM Transmitter (410FM), the frequency range is 88 MHz to 108 MHz, which measures approximately 7.0cm L x 5.0cm W x 2.0cm H, rated input voltage: DC 3V battery.

*\* The test data gathered are from an engineering sample, serial number: 0501006, provided by the manufacturer.*

### Objective

This document 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, and section 15.209, 15.35, 15.205, and 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

Test site at Bay Area Compliance Laboratory Corporation 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 file 31040/SIT 1300F2 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.

**Local Support Equipment List and Details**

Manufacturer	Description	Model	Serial Number	FCC ID
NANYAN	Audio Generator	NY2201	007727	DoC

**External I/O Cable**

Cable Description	Length (M)	From/Port	To
Shielded Detachable Audio Cable	1.0	Audio input port	EUT

## SYSTEM TEST CONFIGURATION

### Description of Test Configuration

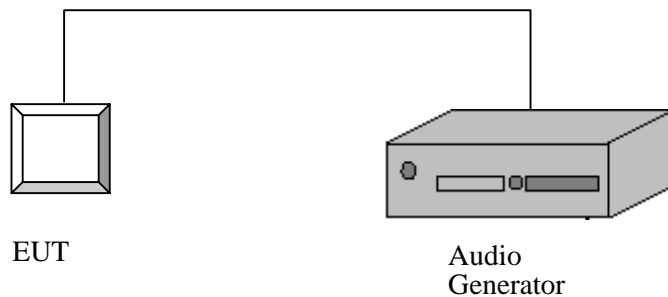
The EUT was configured for testing according to ANSI C63.4 - 2003.

The final qualification test was performed with the EUT operating at normal operation mode

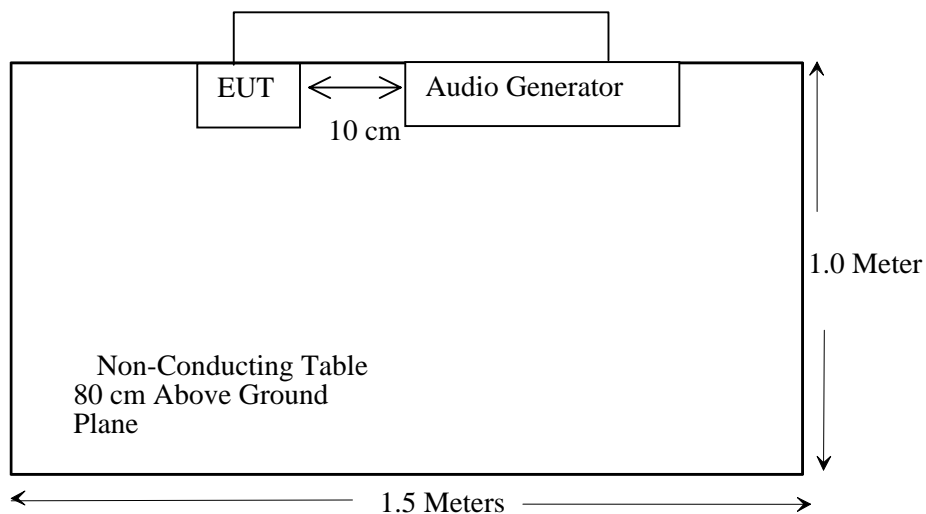
### Equipment Modifications

No modifications were made to the EUT.

### Configuration of Test System



### Test Setup Block Diagram



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**SUMMARY OF TEST RESULTS**

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FCC RULES	DESCRIPTION OF TEST	RESULT
§15.209/§15.35/§15.239	Radiated Emission	Pass
§15.239	Frequency range	Pass
§15.205	Restricted Band of operation	Pass

## §15.209/§15.35/§15.239- RADIATED EMISSION

### Standard Applicable

The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

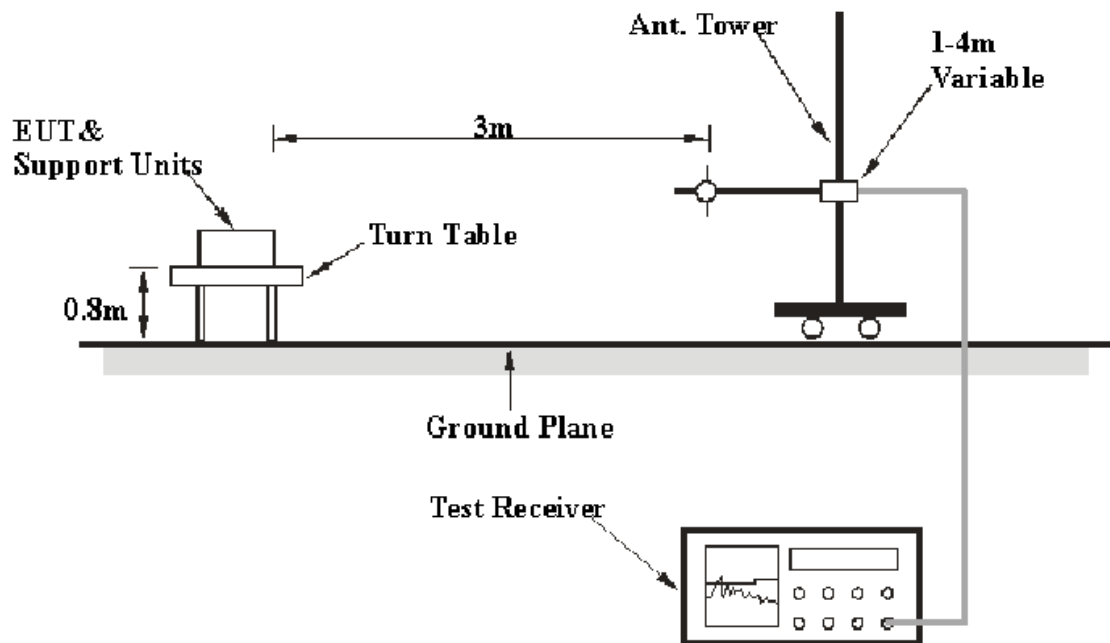
The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in §15.209.

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. 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  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3-meter chamber, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC 15.209 and 15 .239 Limits.

## Spectrum Analyzer Setup

The system was investigated from 30 MHz to 1 GHz.

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

<i><b>Frequency Range</b></i>	<i><b>RBW</b></i>	<i><b>VBW</b></i>
30 – 1000 MHz	100 kHz	100 kHz

## Test Equipment List and Details

<b>Manufacturer</b>	<b>Description</b>	<b>Model</b>	<b>Serial Number</b>	<b>Calibration Date</b>	<b>Calibration Due Date</b>
Sunol Sciences	Antenna	JB1	A040904-1	2004-4-19	2005-4-18
HP	Spectrum Analyzer	8593A	29190A00242	2004-4-19	2005-4-18
THERMAX	Coaxial Cable	RGS-142	EC002	2004-11-20	2005-11-19
HP	Preamplifier	8449B	3008A00277	2004-10-30	2005-10-29

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

## 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. The equation for margin calculation is as follows:

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



**Test Data**

Date of Test: January 18, 2005      Temperature: 25°C  
 EUT: Portable low power FM      Humidity: 50%  
       Transmitter (410FM)  
 M/N: X268      Operating Mode: High Channel  
 S/N: 0501006      Test Engineer: Jandy Su

Frequency	Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC 15.239	FCC 15.239
MHz	dBuV/m	PK/AV	Degree	Meter	H / V	dB/m	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
33.790	40.4	PK	60	1.0	h	24.1	0.6	26.29	40.8	40.00	-1.2
33.250	40.45	PK	60	1.2	v	24.1	0.6	26.29	41.2	40.00	-1.2
143.090	44.38	PK	45	1.0	h	13.8	1.1	25.58	33.7	43.50	-9.8
143.090	44.38	PK	45	1.0	v	13.8	1.1	25.58	33.7	43.50	-9.8
40.820	38.77	PK	45	1.2	v	14.3	0.6	26.25	27.4	40.00	-12.6
139.840	39.84	PK	45	1.0	h	14.2	1.1	25.74	29.4	43.50	-14.1
50.560	42.21	PK	45	1.2	h	8.5	0.7	26.24	25.2	40.00	-14.8
215.590	40.73	PK	180	1.2	h	11.4	1.3	25.06	28.4	43.50	-15.1
146.870	35.77	PK	90	1.2	v	13.4	1.1	25.60	24.7	43.50	-18.8
107.500 (FUND)	43.10	AV	45	1.0	h	11.0	1.0	25.89	29.2	47.96	-18.8
107.500 (FUND)	40.00	AV	45	1.0	v	11.0	1.0	25.89	26.1	47.96	-21.9
215.590	33.58	PK	180	1.2	v	11.4	1.3	25.06	21.2	43.50	-22.3
107.500 (FUND)	43.93	PK	45	1.0	h	11.0	1.0	25.89	30.0	67.96	-37.9
107.370 (FUND)	41.98	PK	270	1.0	v	11.0	1.0	25.89	28.1	67.96	-39.9

Date of Test: January 18, 2005      Temperature: 25°C  
 EUT: Portable low power FM Transmitter (410FM)      Humidity: 50%  
 M/N: X268      Operating Mode: Low Channel  
 S/N: 0501006      Test Engineer: Jandy Su

Frequency	Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC 15.239	FCC 15.239
MHz	dBuV/m	PK/AV	Degree	Meter	H / V	dB/m	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
33.790	40.58	PK	192	1.2	h	24.1	0.6	26.29	39.0	40.00	-1.0
144.710	53.02	PK	60	1.0	v	13.8	1.1	25.58	42.3	43.50	-1.2
139.300	52.55	PK	267	1.0	h	14.2	1.1	25.74	42.1	43.50	-1.4
144.710	51.33	PK	60	1.2	h	13.8	1.1	25.58	40.7	43.50	-2.9
33.250	36.76	PK	40	1.0	v	24.1	0.6	26.29	35.1	40.00	-4.9
140.380	44.83	PK	47	1.2	h	13.8	1.1	25.58	34.2	43.50	-9.4
140.920	42.25	PK	47	1.2	v	13.8	1.1	25.58	31.6	43.50	-11.9
40.820	38.75	PK	192	1.2	v	14.3	0.6	26.25	27.4	40.00	-12.7
88.500	46.40	AV	267	1.0	v	8.1	0.9	25.94	29.5	47.96	-18.5
50.020 (FUND)	38.55	PK	46	1.0	v	8.5	0.7	26.24	21.5	40.00	-18.5
88.500 (FUND)	45.10	AV	40	1.0	v	8.1	0.9	25.94	28.2	47.96	-19.8
149.040	34.70	PK	46	1.0	h	13.4	1.1	25.6	23.6	43.50	-19.9
88.500 (FUND)	47.80	PK	267	1.0	v	8.1	0.9	25.94	30.9	67.96	-37.1
88.500 (FUND)	46.20	PK	267	1.2	h	8.1	0.9	25.94	29.3	67.96	-38.7

Test Result: Pass

## §15.239 –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

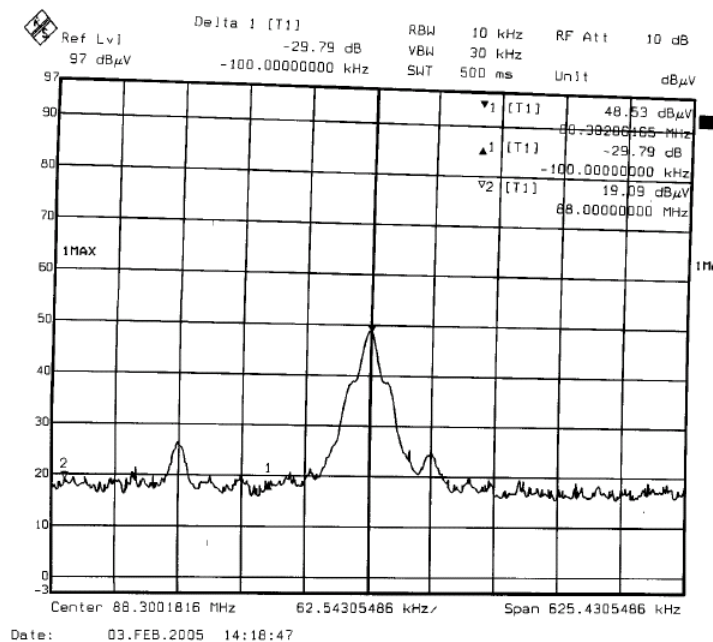
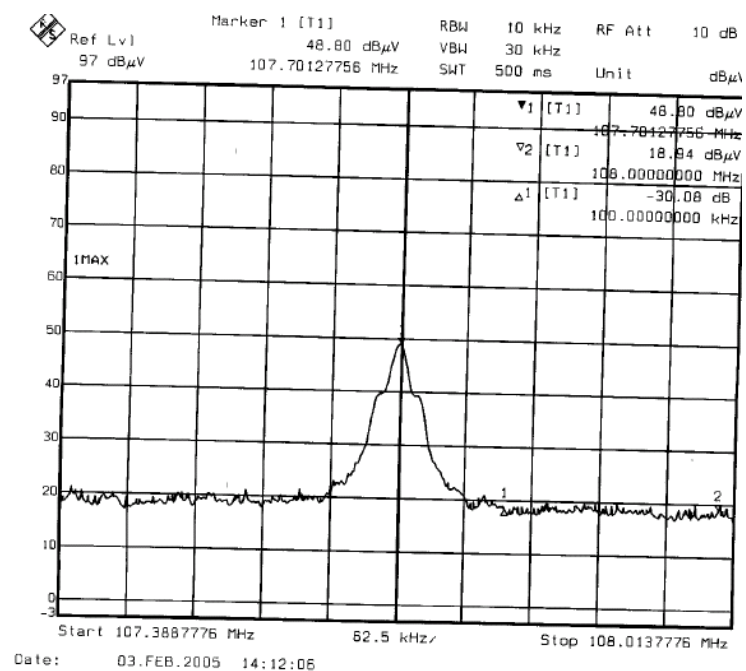
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB1	A040904-1	2004-4-19	2005-4-18
R/S	Spectrum Analyzer	FSEM30	849739/009	2004-4-19	2005-4-18
THERMAX	Coaxial Cable	RGS-142	EC002	2004-11-20	2005-11-19
HP	Preamplifier	8447E	1937A01046	2004-8-24	2005-8-23

\* **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



Note: The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band is below the general radiated emission limits in §15.209.