

Test Report Prepared By:

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MPBT Report No.: I4-R-1835

Customer No.: 710860

**Test Report for FCC Part 15.231:1996
Testing of the Instantel Infant Tag**

Test Personnel: D.Raynes

Prepared for:

Instantel
362 Terry Fox Drive
Kanata, ON K2K 2P5

July 6, 1998
I4-R-1835

Client Acceptance
Authorized Signatory

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APPENDICES

Appendix A:	Instantel Infant Tag
Appendix B:	Test Report Data Sheets
Appendix C:	Test Equipment Report

Appendix D:

Photographs

1.0 INTRODUCTION

1.1 SCOPE

The purpose of this report is to present the findings and results of compliance testing performed, against FCC Part 15.231:1996.

1.2 APPLICANT

This test report has been prepared for:

Instantel Inc.
362 Terry Fox Drive
Kanata, ON K2K 2P5

1.3 APPLICABILITY

All test procedures, limits, and results defined in this document apply to the Instantel Infant Tag unit, which shall be referred to herein as the Equipment Under Test (**EUT**).

The results contained in this report relate only to the item(s) tested.

This report does not imply product endorsement by NVLAP or the Canadian or US governments.

1.4 TEST SAMPLE DESCRIPTION

The test sample, provided for testing by Instantel Inc., was an Infant Tag.

Product Type: Battery powered microprocessor controlled RF transmitter

Serial Number:

Model Number: PIC16LC558

Cables: N/A

Power Requirements: Battery Powered 3 Volt lithium button cell.

Peripheral Equipment: Detects signals from Instantel "Portal Exciter"

The Infant Tag is used as part of the Instantel Infant Protection System designed to ensure that infants in hospital maternity wards are not abducted.

1.5 GENERAL TEST CONDITIONS AND ASSUMPTIONS

The EUT was setup and exercised using the configurations, modes of operation and arrangements defined in this report only. All inputs and outputs to and from other equipment associated with the EUT were adequately simulated.

Where relevant, the EUT was only tested using the monitoring methods and test criteria defined in this report.

All testing, unless otherwise noted, was performed under the following environmental conditions

Temperature: 17 to 23 °C
Humidity: 45 to 75 %
Barometric Pressure: 68 to 106 kPa

1.6 SCOPE OF TESTING

Tests were performed in accordance with CFR 47 FCC Part 15.231 1996.

1.6.1 VARIATIONS IN TEST METHODS

There were no variations from the test procedures outlined above.

1.6.2 TEST SAMPLE MODIFICATIONS

There were no equipment modifications during test performance.

2.0 TEST CONCLUSION

The EUT was subjected to the following Electromagnetic Interference tests. Compliance status is designated by a **PASS** or **FAIL**.

The following table summarizes the test results and details the tests performed in terms of the specification and class or level applied, the unique test sample identification, and the EUT modification state, the mode of operation, configuration and cable arrangement (if applicable).

Summary Chart

Test Case	Test Type	Specification	Class/ Level	Test Sample	Mod. State	Config.	ENG. / QUAL.	Result
2.1	Radiated Emissions	CFR 47 FCC Part 15.231 1996	15.231b	Infant Tag	None	Normal	Qual.	PASS
2.2	Conducted Emissions	CFR 47 FCC Part 15/18: 1996	N/A	N/A	None	N/A	N/A	Not Tested

Test Results are traceable to NIST and NRC

MARGINAL MEASUREMENTS

Marginal measurements were not recorded during testing. Observations are recorded on the attached test report data sheets and noted on the individual test summary.

MEASUREMENT UNCERTAINTY

The following measurement uncertainty with 95% confidence level was calculated using the methods defined in North American standard NAMAS document NIS81: May 1994.

For Radiated E-Field Emissions

Frequency = $\pm 1 \times 10^{-3}$ MHz

Amplitude = ± 4.01 dB

For Conducted Emissions

Frequency = $\pm 1 \times 10^{-3}$ MHz

Amplitude = ± 3.25 dB

TEST SET UP

The photographs in Appendix D show the set up with maximized emission levels for each test.

2.1 RADIATED EMISSIONS

Test Summary	
Test Lab: Electronics Test Centre, Kanata	Product: InstanTel Infant Tag
Test Personnel: D.Raynes	
Test Date: July 6, 1998	

Test Description	
Objectives/Criteria	Specifications
The Radiated E-Field emissions proliferated by a system or sub-system, measured at a distance of 3m from the EUT, shall not exceed the limits for FCC Part 15.231 specifications as stated.	FCC Part 15:1996 30 MHz to 1 GHz Measurement Distance 3 m
Emission levels should meet the requirements with a margin of 6dB.	Radiated Emissions Limits dB μ V/m
	Frequency MHz Fundamental Spurious
	40.66-40.70 60 40
	70-130 54.0 34.0
	130-174 54.0-63.5 34.0-43.5
	174-260 63.5 43.5
	260-470 63.5-74.0 43.5-54.0
	>470 74.0 54.0
	Using a CISPR Quasi-Peak Adapter

Test Result

PASS

Comments

Vertical:	Horizontal:
217 MHz 33.6 dB μ V/m (313°)	217 MHz 49.2 dB μ V/m (201°)
217 MHz 12.4 dB μ V/m (262°)	217 MHz 47.7 dB μ V/m (358°)
79.99 MHz 14.7 dB μ V/m	109.97 MHz 15.7 dB μ V/m
160 MHz 14.5 dB μ V/m	169.96 MHz 13.9 dB μ V/m
179.97 MHz 10.0 dB μ V/m	129.99 MHz 9.9 dB μ V/m
109.97 MHz 9.0 dB μ V/m	159.96 MHz 9.2 dB μ V/m

Refer to Test Report Data sheets in appendix B

ANSI C63.4 1992

Duty Cycle Calculation: Total Data Train Duration \div 100 ms

Duty Cycle = 7.54 ms \div 100 ms

Duty Cycle = 0.0754 (refer to scope plots in data appendix)

Average Detector Field Strength = Duty Cycle x Peak Detector Measured Value

$$\mu\text{V/m (Avg)} = \text{Duty Cycle} \times \mu\text{V/m (Pk)}$$

Refer to oscillographs in Appendix B for EUT transmission modes.

2.2 BANDWIDTH

Test Summary	
Test Lab: Electronics Test Centre, Kanata Test Personnel: D.Raynes Test Date: July 6, 1998	Product: InstanTel Infant Tag

Test Description	
Objectives/Criteria	Specifications
The bandwidth of the EUT shall not exceed specified limits.	FCC Part 15 .231 1996 70 MHz - 900 MHz Bandwidth must be less than 0.25% of centre frequency

Test Result
PASS
Comments
Refer to Data Plots in Appendix

3.0 TEST FACILITY

3.1 LOCATION

The EUT was tested for Electromagnetic Compatibility at the Electronics Test Centre, located in Kanata, Ontario, Canada.

3.2 GROUNDING PLAN

The EUT was located on a wooden table 80 cm above the ground plane. The EUT was grounded according to the Clients specifications.

3.3 POWER

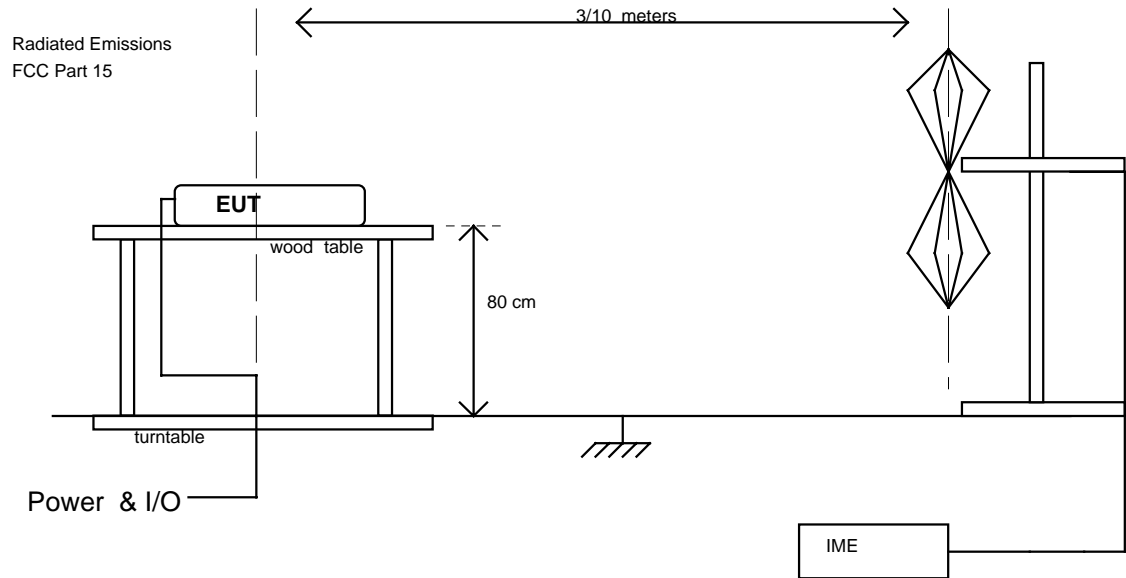
AC power was supplied via a CORCOM RFI feed through, 60 Ampere wall mounted filter. Bonding to hydro ground is via one inch grounding braid straps.

3.4 EMISSIONS PROFILE

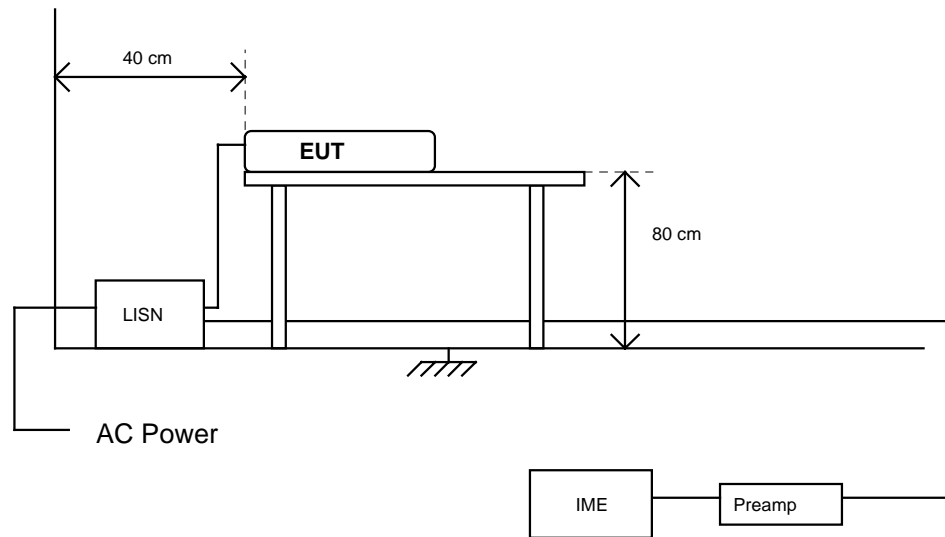
Ambient conducted and radiated electromagnetic emission profiles were generated throughout the tests and are included in the Test Report Data sheets.

3.5 TEST CONFIGURATION

The following diagrams illustrate the configuration of the EUT test and measurement equipment used for FCC Radiated and Conducted Emissions Testing.



Conducted Emissions FCC Part 15



4.0 TEST EQUIPMENT

The following equipment was utilized for this procedure. All measurement devices are calibrated annually, traceable to NIST:

4.1 RADIATED EMISSIONS

- a) Spectrum Analyzer
- b) Receiver with CISPR Quasi-peak Adapter
- c) Power Isolation Transformers
- d) Biconilog antenna (25 MHz to 2.5 GHz)
- e) Antenna mast positioner, and controller
- f) Flush-mounted turntable, and controller

4.2 CONDUCTED EMISSIONS

- a) Spectrum Analyzer
- b) Line Impedance Stabilization Network, 50 μ H
- c) CISPR Quasi-peak Adapter
- d) Power Isolation Transformer
- e) Personal Computer and EMI/EMC Software

4.3 EMI SPECTRUM ANALYZER AND RECEIVER

4.3.1 Spectrum Analyzer Range 1 of 2

Start Frequency	0.45 MHz
Stop Frequency	30 MHz
Transducer	LISN per ANSI C63.4
Quasi-Peak Bandwidth	9 kHz
Spectrum Analyzer BW	9 kHz
Video Bandwidth	100 kHz
Reference Level	100 dB μ V

Spectrum Analyzer Range 2 of 2

Start Frequency	30 MHz
Stop Frequency	1000 MHz
Transducer	Biconilog Antenna
Quasi-Peak Bandwidth	120 kHz
Spectrum Analyzer BW	120 kHz
Video Bandwidth	1 MHz
Reference Level	100 dB μ V

4.3.2 Receiver

Transducer	Biconilog Antenna
Quasi-Peak Bandwidth	120 kHz
Measurement Window	20 dB μ V

Appendix A

Instantel Infant Tag