Engineering and Testing for EMC and Safety Compliance

APPLICATION FOR FCC CLASS B CERTIFICATION
UNLICENSED TRANSMITTER

MODEL: i-D2 NA
FCC ID: 02E-ILR-ID2NA

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March 10, 2003

STANDARDS REFERENCED FOR THIS REPORT	
PART 2: 1999	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS
PART 15: 1999	RADIO FREQUENCY DEVICES
ANSI C63.4-1992	STANDARD FORMAT MEASUREMENT/TECHNICAL REPORT PERSONAL COMPUTER AND PERIPHERALS
RSS-210	LOW POWER LICENSE-EXEMPT RADIO COMMUNICATION DEVICES (ALL FREQUENCY BANDS)

FCC Rules Parts	Frequency Range (MHz)	Output Power (W)	Frequency Tolerance	Emission Designator
15.249	916.5	0.00075	N/A	N/A

REPORT PREPARED BY:

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Administrative Writer: Daniel Baltzell

Rhein Tech Laboratories, Inc.

Document Number: 2003025

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1 GENERAL INFORMATION

The following application for FCC Type Certification of a Transceiver is prepared on behalf of Identec Solutions, Inc. in accordance with Part 2, and Part 15, Subparts A and B of the Federal Communications Commissions rules and regulations and Industry Canada RSS-210. The Equipment Under Test (EUT) was Model i-D2 NA, FCC ID: 02E-ILR-ID2NA. The test results reported in this document relate only to the item that was tested.

All measurements contained in this Application were conducted in accordance with ANSI C63.4 Methods of Measurement of Radio Noise Emissions, 1992. The instrumentation utilized for the measurements conforms to the ANSI C63.4 standard for EMI and Field Strength Instrumentation. Some accessories are used to increase sensitivity and prevent overloading of the measuring instrument. Calibration checks are performed regularly on the instruments, and all accessories including the high pass filter, preamplifier, and cables.

All radiated emissions measurements were performed manually at Rhein Tech Laboratories. The radiated emissions measurements required by the rules were performed on the three-meter, open field; test range maintained by Rhein Tech Laboratories, 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. A complete description and Site attenuation measurement data have been placed on file with the Federal Communications Commission. The power line conducted emissions measurements were performed in a shielded enclosure also located at the Herndon, Virginia facility. The FCC accepts Rhein Tech Laboratories, Inc. as a facility available to do measurement work for others on a contractual basis.

1.1 MODIFICATIONS

No modifications were made during testing.

1.2 RELATED SUBMITTAL (S)/GRANT (S)

This is an original certification submission.

1.3 TEST METHODOLOGY

Radiated testing was performed according to the procedures in ANSI C63.4 1992. Radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.4 TEST FACILITY

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report, submitted to and approved by the Federal Communications Commission, to perform AC line conducted and radiated emissions testing (ANSI C63.4 1992).

2 CONFORMANCE STATEMENT

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I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described above. Modifications were not made during testing to the equipment in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the ANSI C63.4 test methodology.

Signature: 

Date: March 10, 2003

Typed/Printed Name: Desmond A. Fraser

Position: President
(NVLAP Signatory)

NVLAP *Accredited by the National Voluntary Accreditation Program for the specific scope of accreditation under Lab Code 20061-0.*

Note: This report may not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.

3 SYSTEM TEST CONFIGURATION

3.1 JUSTIFICATION

To complete the test configuration required by the FCC, the transmitter was initiated by shorting a pad on the PCB. The EUT's crystal oscillators and harmonics of each were investigated. Conducted emissions are not required since the device is operated from a 3VDC battery. Furthermore, the EUT was tested and investigated in three orthogonal planes.

3.2 EXERCISING THE EUT

The i-D2 NA is a transmitter designed to function at 916.5 MHz. When a correct command from an interrogator is received, the transponder responds with a respective answer; this is a 110 (msec) burst, which is representative for a scan answer. A pseudo random generator changes the data content of this burst, so that each response is different. A pad on the PCB was shorted in order to activate the transmitter circuitry.

3.3 TEST SYSTEM DETAILS

The FCC Identifiers for all equipment, plus descriptions of all cables used in the tested system are:

TABLE 1: EQUIPMENT UNDER TEST (EUT)

PART	MANUFACTURER	MODEL	SERIAL NUMBER	FCC ID	CABLE DESCRIPTION	RTL BAR CODE
UHF INDUSTRIAL TAG SAMPLE #1	IDENTEC SOLUTIONS, INC.	i-D2	0.100.001.537	02E-ILR-ID2NA	N/A	015056
UHF INDUSTRIAL TAG SAMPLE #2	IDENTEC SOLUTIONS, INC.	i-D2	0.100.001.536	02E-ILR-ID2NA	N/A	015057
UHF INDUSTRIAL TAG SAMPLE #3	IDENTEC SOLUTIONS, INC.	i-D2	0.100.001.538	02E-ILR-ID2NA	N/A	015058
UHF PERSONNEL TAG	IDENTEC SOLUTIONS, INC.	i-D2	N/A	02E-ILR-ID2NA	N/A	015059

3.4 CONFIGURATION OF TESTED SYSTEM

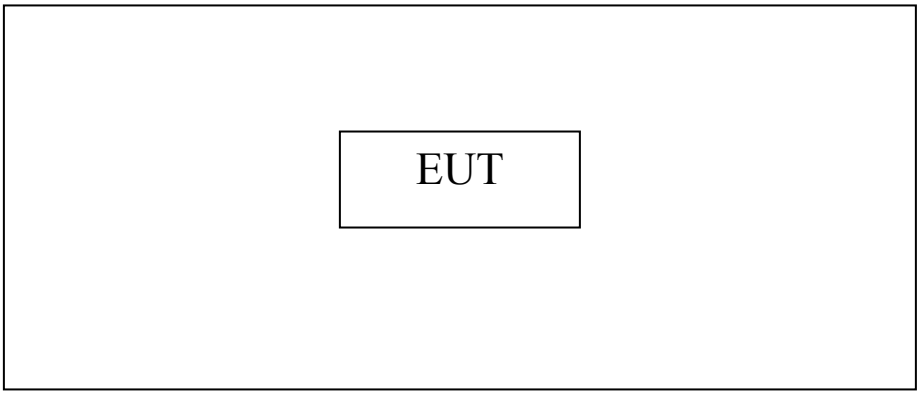


FIGURE 1: TEST SYSTEM CONFIGURATION

4 CONDUCTED EMISSIONS

AC conducted emissions is not required since the device under test is not powered from AC mains, but has a 3 VDC input requirement.

5 RADIATED EMISSIONS

5.1 TEST METHODOLOGY FOR RADIATED EMISSIONS MEASUREMENTS

Before final measurements of radiated emissions were made on the open-field three/ten meter range, the EUT was scanned indoors at one meter and three meter distances, in order to determine its emissions spectrum signature. The physical arrangement of the test system and associated cabling was varied in order to determine the effect on the EUT's emissions in amplitude, direction and frequency. This process was repeated during final radiated emissions measurements on the open-field range, at each frequency, in order to ensure that maximum emission amplitudes were attained.

Final radiated emissions measurements were made on the three-meter, open-field test site. The EUT was placed on a nonconductive turntable approximately 0.8 meters above the ground plane. The spectrum was examined from 30 MHz to 1000 MHz using a spectrum analyzer, a quasi-peak adapter, and EMCO log periodic and biconical antenna. In order to gain sensitivity, a preamplifier was connected in series between the antenna and the input of the spectrum analyzer.

At each frequency, the EUT was rotated 360 degrees, and the antenna was raised and lowered from one to four meters in order to determine the maximum emission levels. Measurements were taken using both horizontal and vertical antenna polarizations. The spectrum analyzer's 6 dB bandwidth was set to 120 kHz, and the analyzer was operated in the CISPR quasi-peak detection mode. No video filter less than 10 times the resolution bandwidth was used. The second harmonic of the highest LO was tested. The highest emission amplitudes relative to the appropriate limit were measured and recorded in this report.

Note: Rhein Tech Laboratories, Inc. has implemented procedures to minimize errors that occur from test instruments, calibration, procedures, and test setups. Test instrument and calibration errors are documented from the manufacturer or calibration lab. Other errors have been defined and calculated within the Rhein Tech Quality Manual, section 6.1. Rhein Tech implements the following procedures to minimize errors that may occur: yearly as well as daily calibration methods, technician training, and emphasis to employees on avoiding error.

5.2 RADIATED EMISSION DATA

TABLE 2: FUNDAMENTAL RADIATED EMISSIONS: FCC PART 15.249

Temperature: 25°F Humidity: 32%									
Emission Frequency (MHz)	**Test Detector**	**Antenna Polarity (H/V)**	**Turntable Azimuth (deg)**	**Antenna Height (m)**	**Analyzer Reading (dBuV)**	**Site Correction Factor (dB/m)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
916.500	Qp	V	0	1.0	75.7	-4.8	70.9	94.0	-23.1
916.500	Pk	V	0	1.0	95.2	-4.8	90.4	114.0	-23.6

TABLE 3: HARMONIC RADIATED EMISSIONS: FCC PART 15.249

Temperature: 25°F Humidity: 32%									
Emission Frequency (MHz)	**Test Detector**	**Antenna Polarity (H/V)**	**Turntable Azimuth (deg)**	**Antenna Height (m)**	**Analyzer Reading (dBuV)**	**Site Correction Factor (dB/m)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
1833.000	Av	V	0	1.0	36.4	5.6	42.0	54.0	-12.0
1833.000	Pk	V	0	1.0	64.0	5.6	69.6	74.0	-4.4
2749.500	Av	V	0	1.0	33.4	10.3	43.7	54.0	-10.3
2749.500	Pk	V	0	1.0	43.7	10.3	54.0	74.0	-20.0
3666.000	Av	V	0	1.0	32.2	9.0	41.2	54.0	-12.8
3666.000	Pk	V	0	1.0	44.6	9.0	53.6	74.0	-20.4
4582.500	Av	V	0	1.0	29.6	13.5	43.1	54.0	-10.9
4582.500	Pk	V	0	1.0	41.5	13.5	55.0	74.0	-19.0
5499.000	Av	V	0	1.0	29.3	13.8	43.1	54.0	-10.9
5499.000	Pk	V	0	1.0	39.8	13.8	53.6	74.0	-20.4
6415.500	Av	V	0	1.0	29.7	12.5	42.2	54.0	-11.8
6415.500	Pk	V	0	1.0	40.7	12.5	53.2	74.0	-20.8
7332.000	Av	V	0	1.0	34.1	11.6	45.7	54.0	-8.3
7332.000	Pk	V	0	1.0	45.5	11.6	57.1	74.0	-16.9
8248.500	Av	V	0	1.0	35.5	17.3	52.8	54.0	-1.2
8248.500	Pk	V	0	1.0	46.4	17.3	63.7	74.0	-10.3
9165.000	Av	V	0	1.0	34.7	17.4	52.1	54.0	-1.9
9165.000	Pk	V	0	1.0	45.1	17.4	62.5	74.0	-11.5

TABLE 4: DIGITAL RADIATED EMISSIONS; FCC PART 15.209

Temperature: 25°F Humidity: 32%									
Emission Frequency (MHz)	**Test Detector**	**Antenna Polarity (H/V)**	**Turntable Azimuth (deg)**	**Antenna Height (m)**	**Analyzer Reading (dBuV)**	**Site Correction Factor (dB/m)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**
429.620	Qp	V	0	1.0	33.5	-11.2	22.3	46.0	-23.7
429.620	Pk	V	0	1.0	35.6	-11.2	24.4		
486.901	Qp	V	0	1.0	33.2	-10.1	23.1	46.0	-22.9
486.901	Pk	V	0	1.0	35.5	-10.1	25.4		
887.874	Qp	V	0	1.0	33.4	-5.0	28.4	46.0	-17.6
887.874	Pk	V	0	1.0	33.5	-5.0	28.5		
973.807	Qp	V	0	1.0	33.5	-3.8	29.7	54.0	-24.3
973.807	Pk	V	0	1.0	33.7	-3.8	29.9		
1374.782	Av	V	0	1.0	31.8	1.4	33.2	54.0	-20.8
1374.782	Pk	V	0	1.0	34.9	1.4	36.3		
1680.575	Av	V	0	1.0	36.3	3.9	40.2	54.0	-13.8
1680.575	Pk	V	0	1.0	47.0	3.9	50.9		

**All readings are quasi-peak, unless stated otherwise.*

TEST PERSONNEL:

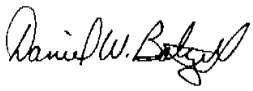
Signature:  Date: March 10, 2003 Typed Name: Daniel W.Baltzell

TABLE 5: EQUIPMENT USED FOR TESTING

Radiated Emissions					
RTL Asset #	**Manufacturer**	**Model**	**Part Type**	**Serial Number**	**Calibration Date**
900931	Hewlett Packard	8566B	Spectrum Analyzer (100 Hz - 22 GHz)	3138A07771	5/10/03
900930	Hewlett Packard	85662A	Spectrum Analyzer Display Section	3144A20839	5/10/03
901053	Schaffner &Chase	CBL6112B	Bilog antenna (20 MHz - 2 GHz)	2648	05/24/03
900905	Rhein Tech Laboratories, Inc.	PR-1040	Pre Amplifier 40dB (10 MHz – 2 GHz)	1006	N/A
900969	Hewlett Packard	85650A	Quasi-Peak Adapter	2412A00414	5/10/03
901215	Hewlett Packard	8596EM (9kHz - 12.8GHz)	EMC Analyzer	3826A00144	8/23/03
900932	Hewlett Packard	8449B OPT H02	Preamplifier 1-26.5 GHz	3008A00505	N/A
900772	EMCO	3161-02	Horn Antenna, 2 - 4 GHz	9804-1044	N/A
900323	EMCO	3160-07	Horn Antenna, 8.2-12.4 GHz	9605-1054	N/A
900321	EMCO	3161-03	Horn Antenna, 4.0-8.2 GHz	9508-1020	N/A

* Note: The preamplifier's gain is included in the site correction factor.

6 CONCLUSION

The data in this measurement report shows that the Identec Solutions, Inc. Model i-D2 NA, FCC ID: 02E-ILR-ID2NA, complies with all the requirements of Parts 2 and 15.249 of the FCC Rules and Industry Canada RSS-210.