



Excellence in Compliance Testing

## Transceiver Certification Test Report

**FCC ID: SDBIDTB001  
IC ID: 2220A-IDTB1**

**FCC Rule Part: CFR 47 Part 24 Subpart D, Part 90 Subpart I, Part 101  
Subpart C  
IC Standards Specification: RSS-119, RSS-134**

**ACS Report Number: 07-0486-LD-BW**

Applicant: Sensus Metering Systems  
Model: IDTB001

Test Begin Date: November 27, 2007  
Test End Date: January 10, 2008

Report Issue Date: January 15, 2008



FOR THE SCOPE OF ACCREDITATION UNDER LAB Code 200612-0

This report is not be used to claim certification, approval, or endorsement by NVLAP, NIST or any government agency.

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**This report contains 10 pages**

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## 1.0 GENERAL

### 1.1 Purpose

The purpose of this report is to demonstrate compliance with FCC Part 2 Subpart J, Part 24 Subpart D, Part 90 Subpart I, and Part 101 Subpart C of the FCC's Code of Federal Regulations and IC RSS-119 and RSS-134 for a Permissive Change.

The permissive change is based on the addition of two new modulation formats.

### 1.2 Product Description

The Sensus AMDS Integrated Display Transceiver (IDTB) is a printed circuit board that provides wireless communication capability to the Sensus iCon family of electric utility meters. The device mounts into existing iCon meters and acts as the "Integrated Communications Device". The device monitors meter reading and diagnostic information via an interface to the Sensus Sensor board, which is also housed and operational in the included equipment. The IDTB communicates via the AMDS fixed wireless telemetry network to provide electric meter readings and diagnostic data from the meter to the utility provider via a two-way radio link. The device utilizes a printed circuit board antenna that is integral to the IDTB circuit board.

The Sensus AMDS Integrated Display Transceiver (IDTB) operates on 901-902 MHz, 930-931 MHz, and 940-941 MHz in accordance to Part 24 Narrowband PCS; on 896-901 MHz and 935-940 MHz in accordance to Part 90; and on 928.85-929 MHz, 932-932.5 MHz, 941-941.5 MHz, and 959.85-960 MHz in accordance to Part 101.

Manufacturer Information:  
Sensus Metering Systems  
8601 six forks Road  
Raleigh, NC 27615

Factory Contact:  
Bob Davis  
Sensus Metering Systems  
114 Northpark Blvd  
Suite 10  
Covington, LA 70433  
985-773-1236

#### Test Sample Condition:

The IDTB001 was supplied in working condition with no visible defects.

Test Sample Serial Number(s): 6

### 1.3 Emission Designators

The IDTB001 transmitter produces/supports six distinct modulation formats. Normal Mode, Half-Baudrate Mode, Boost Mode, and MPass Mode where included in the original certification. The two new formats include Priority Mode and Double Density Mode.

The emissions designators for the modulation formats for the IDTB001 are as follows:

#### EMISSIONS DESIGNATORS:

Normal Mode:	9K60F2D (7-FSK)
Half-Baudrate Mode:	4K80F2D (7-FSK)
Boost Mode:	1K10F2D
MPass Mode:	5K90F1D
Priority Mode:	4K80F2D (13-FSK)
Double Density Mode:	9K60F2D (13-FSK)

## 1.4 Test Methodology and Configurations

### 1.4.1 Test Methodology

This report provides data which represents the new modulation formats (Priority Mode: 4K80F2D (13-FSK) & Double Density Mode: 9K60F2D (13-FSK)). Characteristics not presented in this report have not changed or have improved when compared to what was originally reported.

### 1.4.2 In-Band Testing Methodology

For testing in accordance with 47 CFR 2.1046-2.1057, OET/Lab recommends that the following be used to select test frequencies for licensed devices:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
10 to 100 MHz	3	1 near top, 1 near middle and 1 near bottom

The IDTB001 is designed to operate in multiple bands under the requirements of CFR 47 Parts 24, 90, and 101. The following is a list of the frequency bands of operation sorted based on the FCC rule parts in which the band is associated.

CFR Title 47 Rule Part	Frequency Band of Operation (MHz)
24D	901.0 - 902.0
24D	930.0 - 931.0
24D	940.0 - 941.0
90	896.0125 - 901.0
90	935.0 - 940.0
101	928.85 - 929.0
101	932.0 - 932.5
101	941.0 - 941.5
101	959.85 - 960.0

Based on the requirements set forth in accordance 47 CFR 2.1046-2.1057 as stated above, the methodology in selecting the places to test in the bands of operation is outlined in the following table.

CFR Title 47 Rule Part	Frequency Band of Operation (MHz)	Location in the Range of Operation
90	896.0125 - 901.0	1 near top and 1 near bottom
24D	901.0 - 902.0	Middle
101	928.85 - 929.0	Middle
24D	930.0 - 931.0	Middle
101	932.0 - 932.5	Middle
90	935.0 - 940.0	1 near top and 1 near bottom
24D	940.0 - 941.0	
101	941.0 - 941.5	
101	959.85 - 960.0	

The additional modulation formats only operate in the frequency bands highlighted above (mobile bands) therefore only data presenting those frequency bands are provided in this report. The data provided in this report is sorted based on the rule part.

## 2.0 TEST FACILITIES

### 2.1 Location

The radiated and conducted emissions test sites are located at the following address:

Advanced Compliance Solutions  
5015 B.U. Bowman Drive  
Buford, GA 30518  
Phone: (770) 831-8048  
Fax: (770) 831-8598

### 2.2 Laboratory Accreditations/Recognitions/Certifications

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site have been fully described, submitted to, and accepted by the FCC, Industry Canada and the Japanese Voluntary Control Council for Interference by information technology equipment. In addition, ACS is compliant to ISO 17025 as certified by the National Institute of Standards and Technology under their National Voluntary Laboratory Accreditation Program. The following certification numbers have been issued in recognition of these accreditations and certifications:

FCC Registration Number: 894540  
Industry Canada Lab Code: IC 4175  
VCCI Member Number: 1831  
- VCCI OATS Registration Number R-1526  
- VCCI Conducted Emissions Site Registration Number: C-1608  
NVLAP Lab Code: 200612-0

## 3.0 APPLICABLE STANDARD REFERENCES

The following standards were used:

- 1 - ANSI C63.4-2003: Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9KHz to 40GHz - 2003
- 2 - US Code of Federal Regulations (CFR): Title 47, Part 2, Subpart J: Equipment Authorization Procedures - 2006
- 3 - US Code of Federal Regulations (CFR): Title 47, Part 24, Subpart D: Personal Communication Service - 2006
- 4 - US Code of Federal Regulations (CFR): Title 47, Part 90, Subpart I: Private Land Mobile Radio Services - 2006
- 5 - US Code of Federal Regulations (CFR): Title 47, Part 101, Subpart C: Fixed Microwave Services – 2006
- 6 - TIA-603-C: Land Mobile FM or PM - Communications Equipment - Measurement and Performance Standards – 2004
- 7 - Industry Canada Radio Standards Specification: RSS-119 - Land Mobile and Fixed Radio Transmitters and Receivers Operating in the Frequency Range 27.41-960 MHz - Issue 9, June 2007
- 8 - Industry Canada Radio Standards Specification: RSS-134 - 900 MHz Narrowband Personal Communications Services - Issue 1, Revision 1, March 25, 2000

#### 4.0 LIST OF TEST EQUIPMENT

All test equipment used for regulatory testing is calibrated yearly or according to manufacturer's specifications.

**Table 4-1: Test Equipment**

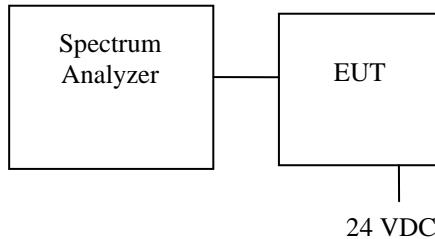
Equipment Calibration Information					
ACS#	Mfg.	Eq. type	Model	S/N	Cal. Due
168	Hewlett Packard	Attenuator	11947A	44829	03-13-2008
283	Rohde & Schwarz	Spectrum Analyzer	FSP40	1000033	11-09-2008

#### 5.0 SUPPORT EQUIPMENT

**Table 5-1: Support Equipment**

Manufacturer	Equipment Type	Model Number	Serial Number
Sensus	EUT	IDTB001	6
OK Industries	DC Power Supply	PS732	36095

#### 6.0 EQUIPMENT UNDER TEST SETUP AND BLOCK DIAGRAM



**Figure 6-1: EUT Test Setup**

For RF conducted measurements, the IDTB001 was modified with an external RF connector to the PCB.

## 7.0 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

### 7.1 Occupied Bandwidth (Emission Limits) - FCC Section 2.1049

#### 7.1.1 Measurement Procedure

The RF output of the equipment under test was directly connected to the input of the Spectrum Analyzer through a 20 dB passive attenuator. The spectrum analyzer resolution and video bandwidths were set to 300 Hz. The internal correction factors of the spectrum analyzer were employed to correct for any cable or attenuator losses. Results of the test are shown below for all modes of operation.

#### 7.1.2 Measurement Results – Part 24.133 a(1), a(2)

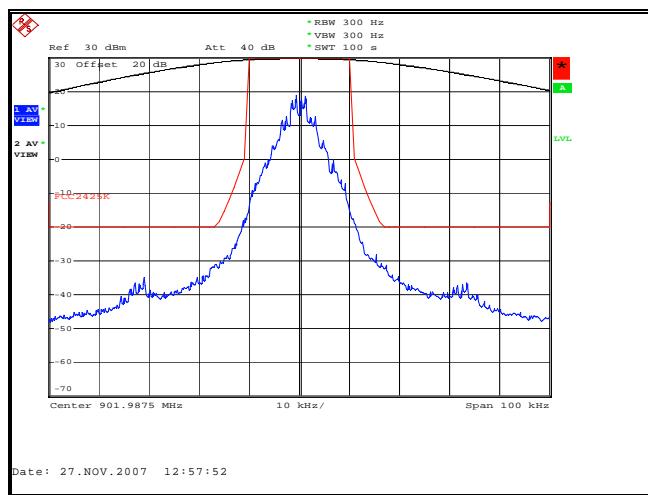


Figure 7.1.2-1: Double Density Mode – 901.9875 MHz – 25 kHz Channel

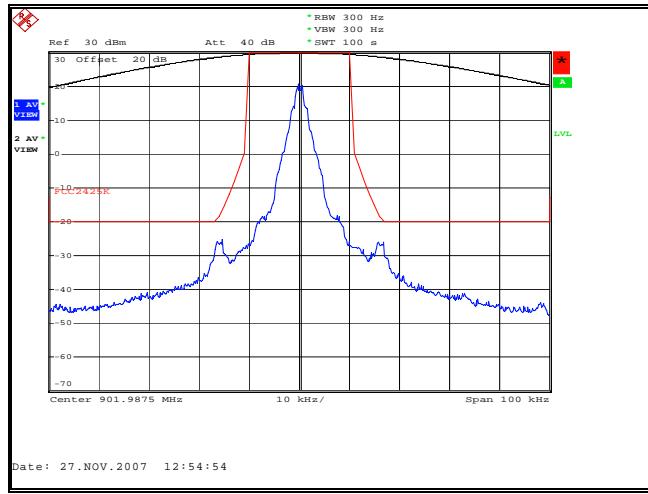


Figure 7.1.2-2: Priority Mode – 901.9875 MHz – 25 kHz Channel

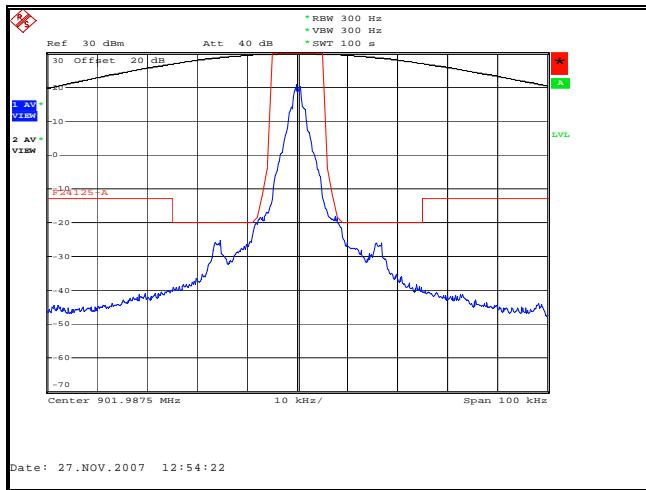


Figure 7.1.2-3: Priority Mode – 901.9875 MHz – 12.5 kHz Channel

### 7.1.3 Measurement Results – Part 90.210 (j)

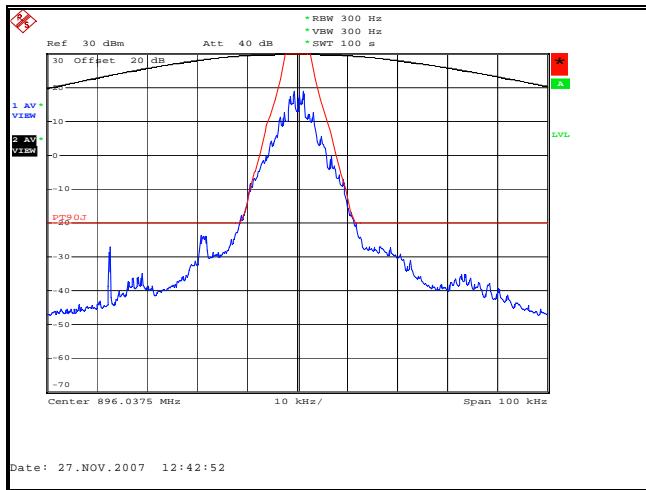


Figure 7.1.3-1: Double Density Mode – 896.0375 MHz

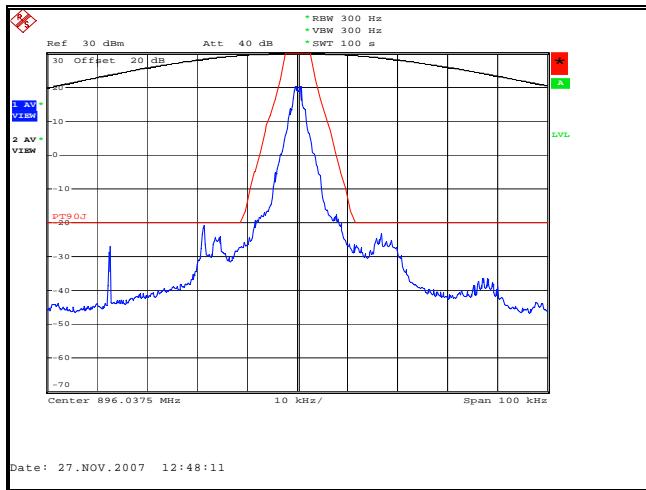
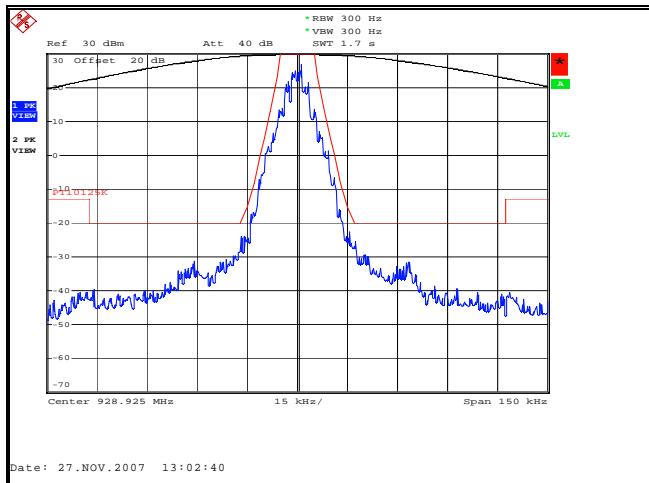
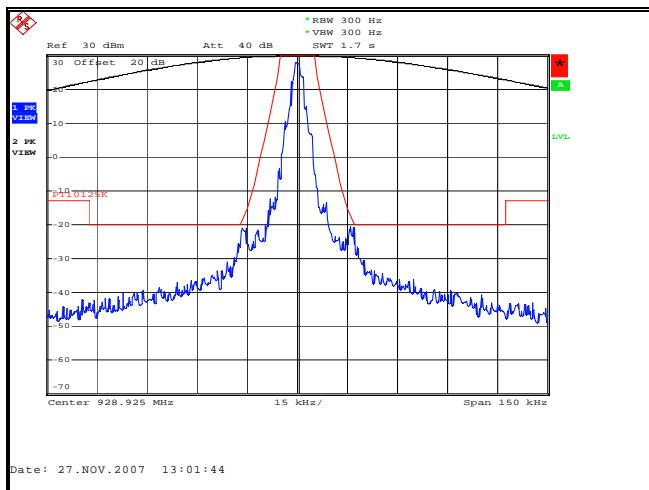


Figure 7.1.3-2: Priority Mode – 896.0375 MHz

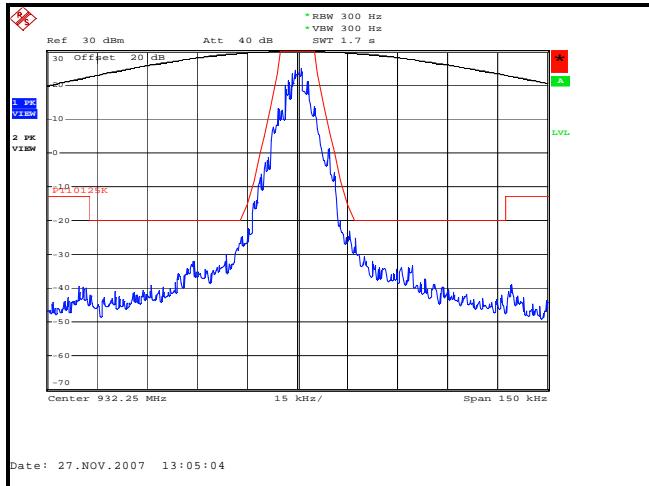
#### **7.2.4 Measurement Results – Part 101.111 a(6)**



**Figure 7.1.4-1: Double Density Mode – 928.925 MHz**



**Figure 7.1.4-2: Priority Mode – 928.925 MHz**



**Figure 7.1.4-3: Double Density Mode – 932.25 MHz**

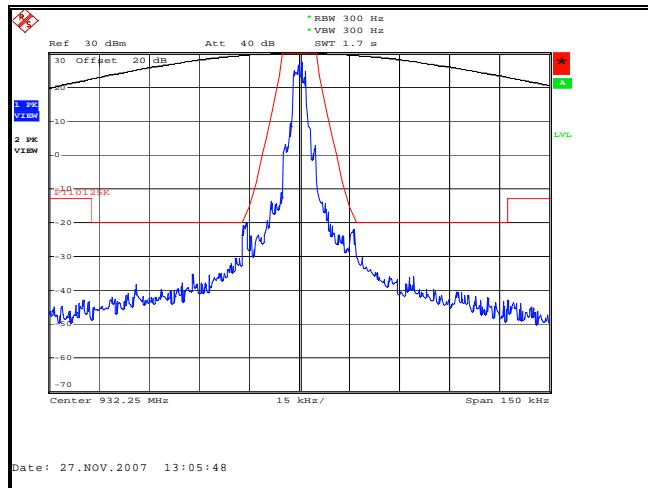


Figure 7.1.4-4: Priority Mode – 932.25 MHz

## 8.0 CONCLUSION

In the opinion of ACS, Inc. the model IDTB001, manufactured by Sensus Metering Systems, meets all the requirements of FCC Part 24, 90, and 101 as well as IC RSS-119 and RSS-134 as applicable.

End of Report