TEST REPORT

Report Number: 3179237ATL-005

July 31, 2009

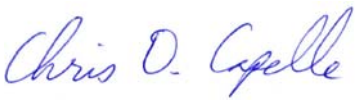
Product Designation: MiFare RFID Module

Standard: FCC Part 15, Subpart C, Intentional Radiators (15.225)
RSS-210, Issue 6 (Annex A2.6)

Tested by:
Intertek Testing Services NA Inc.
1950 Evergreen Blvd., Suite 100
Duluth, GA 30096

Client:
Onity Inc.
A UTC Fire & Security Company
2232 Northmont Parkway
Duluth, GA 30096
Contact: Mark Keating
Phone: 678.512.8104
Fax: 770.248.7544

Tests performed by:



Chris D. Capelle
Senior Project Engineer

Report reviewed by:

Jeremy O. Pickens
EMC Department Manager

1.0 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatum text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested complies with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested.

2.0 Test Summary

Section	Test Full Name	Test Date	Result
4.0	System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)		
5.0	Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)	05/21/2009	
6.0	Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)	04/27/2009	PASS
NA	Duty Cycle Determination (FCC 15A - 15.35(c)) was waived due to is not required for compliance.		
7.0	Measurement of frequency stability (Frequency Stability)	05/11/2009	PASS
NA	Conducted Emissions for Intentional Radiators (FCC 15C - 15.207) was waived due to the EUT is battery operated.		
NA	Additional provisions to the general radiated emission limitations. (FCC 15C - 15.215) was waived due to the EUT does not have any additional provisions.		

3.0 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
RFID Module	Onity Inc.	MiFare RFID Module	NA

EUT receive date:	04/27/2009
EUT receive condition:	Good

Description of EUT provided by Client:
The MiFare Transmit module is a limited module device designed for Onity products. The module is a 13.560MHz pulsed modulated device that is used to control Onity door lock systems.

Description of EUT exercising:
The module was tested with the transmitter continuously pulsing with modulation.

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Method:

Record the details of EUTcabling, document the support equipment, and show the interconnections in a block diagram.

Drawing:

Simplified Block Diagram

4.0 System setup including cable interconnection details, support equipment and simplified block diagram. (System Setup)

Data:

EUT Cabling						
					Connection	
ID	Description	Length	Shielding	Ferrites	From	To
None						

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
None			

5.0 Overview of EUT (Low Power Transmitters) (FCC 15C - EUT Overview)

Method:

Complete the overview spreadsheet.

Related Submittal(s) Grants: This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Tile - software profile for radiated and conducted emissions testing.	Software	Tile - Emissions	SW006	12/08/2008	12/08/2009

Data:

Applicant	Onity Incorporated
	2232 Northmount Pkwy
	Duluth, GA 30096
Trade Name & Model No.	MiFare RFID Module
FCC Identifier	R32-RFIDMIFARE01
IC Identifier	5058A-RFIDMIFARE01
Frequency Range (MHz)	13.56
Antenna Type (15.203)	Intergal Antenna
Manufacturer name & address	Onity Incorporated
	2232 Northmount Pkwy
	Duluth, GA 30096

Related Submittals and Grants:	This report is for use with an application for certification of a low power transmitter. One transmitter is included in the application.
Additions, deviations and exclusions from standards	None

6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Method:

Measurements shall be performed with a quasi-peak detector instrument that meets the requirements of Section One of CISPR 16.

Bandwidths:
30 MHz to 1000 MHz: 120 kHz RBW and 1 MHz VBW
Above 1000 MHz: 1 MHz RBW and 3 MHz VBW

Detectors:
Equal to or less than 1000 MHz: CISPR quasi-peak detector (alternative: peak detector)
Above 1000 MHz: Average detector (applies to average limit)
Above 1000 MHz: Peak detector (applies to peak limit)

Limits:
Equal to or less than 1000 MHz, the limits are specified as quasi-peak. If a peak detector is used, the limit does not change.
Above 1000 MHz, the limits are specified as average. The peak limit is 20 dB above the average limit. Both peak and average measurements are required to be reported.

Frequency range of radiated measurements
For an intentional radiator, the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1) through (a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this section, whichever is the higher frequency range of investigation.

Measurement antenna requirements:
Below 30 MHz - Loop antenna
30 to 1000 MHz - Biconical, Log Periodic, or equivalent
Above 1000 MHz - Horn or equivalent

Measurements of the radiated field are made with the antenna located at a distance of 3 or 10 meters from the EUT. The limit applied to the measurement shall be appropriate for the test distance. The test distance shall be indicated in the results section.

The EUT shall be arranged and connected with cables terminated in accordance with the product specification.

Exploratory tests should be carried out while varying the cable positions to determine the maximum or near-maximum emission level. During manipulation, cables shall not be placed under or on top of the system test components unless such placement is required by the inherent equipment design.

The antenna shall be adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth shall be varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) shall be varied during the measurements to find the maximum field-strength readings.

If the EUT is handheld, it shall be oriented in each of its othogonal axes.

If the EUT is intended for tabletop use, it shall be placed on a table whose top is 0.8m above the ground plane. The table shall be constructed of non-conductive materials. Its dimensions are at least 1m by 1.5m, but may be extended for larger EUT.

If EUT is floor standing, the EUT was placed on a horizontal metal ground plane and isolated from the ground plane by up to 12 mm of insulating material.

Equipment setup for radiated disturbance tests shall follow the guidelines of ANSI C63.4:2003.

TEST SITE
The test site for radiated emissions is located at 1950 Evergreen Blvd, Suite 100, Duluth, Georgia 30096.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, Active Loop (1kHz to 30 MHz)	EMCO	6507	213071	01/30/2009	01/30/2010

6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Antenna, BiLog, 20-2000MHz	Chase	CBL6112B	211386	09/26/2008	09/26/2009
Cable E13, 7m Ferrite (Formerly N8)	Belden	RG-58	E13	02/19/2009	02/19/2010
Cable E201, 18 GHz, N, 3m	Megaphase	TM18 NKNK 118	E201	01/29/2009	01/29/2010
Cable MP3, 18 GHz, N, 10m	Megaphase	G919-NKNK-394	MP3	05/04/2009	05/04/2010
EMI Receiver	Hewlett Packard	8546A	213109	09/29/2008	09/29/2009
EMI Receiver, Preselector section	Hewlett Packard	85460A	213108	09/29/2008	09/29/2009
Excel spreadsheet for radiated emissions	Software	Excel - RE Worksh	SW004	12/08/2008	12/08/2009
Preamplifier, 10 MHz to 2000 MHz, 27 dB gain	Mini-Circuits	ZKL-2	200074	10/20/2008	10/20/2009
Spectrum Analyzer, 20Hz-40GHz	Rohde & Schwarz	FSEK30	200062	10/10/2008	10/10/2009

Results: The sample tested was found to Comply.

Photo:

Test Setup - Front View

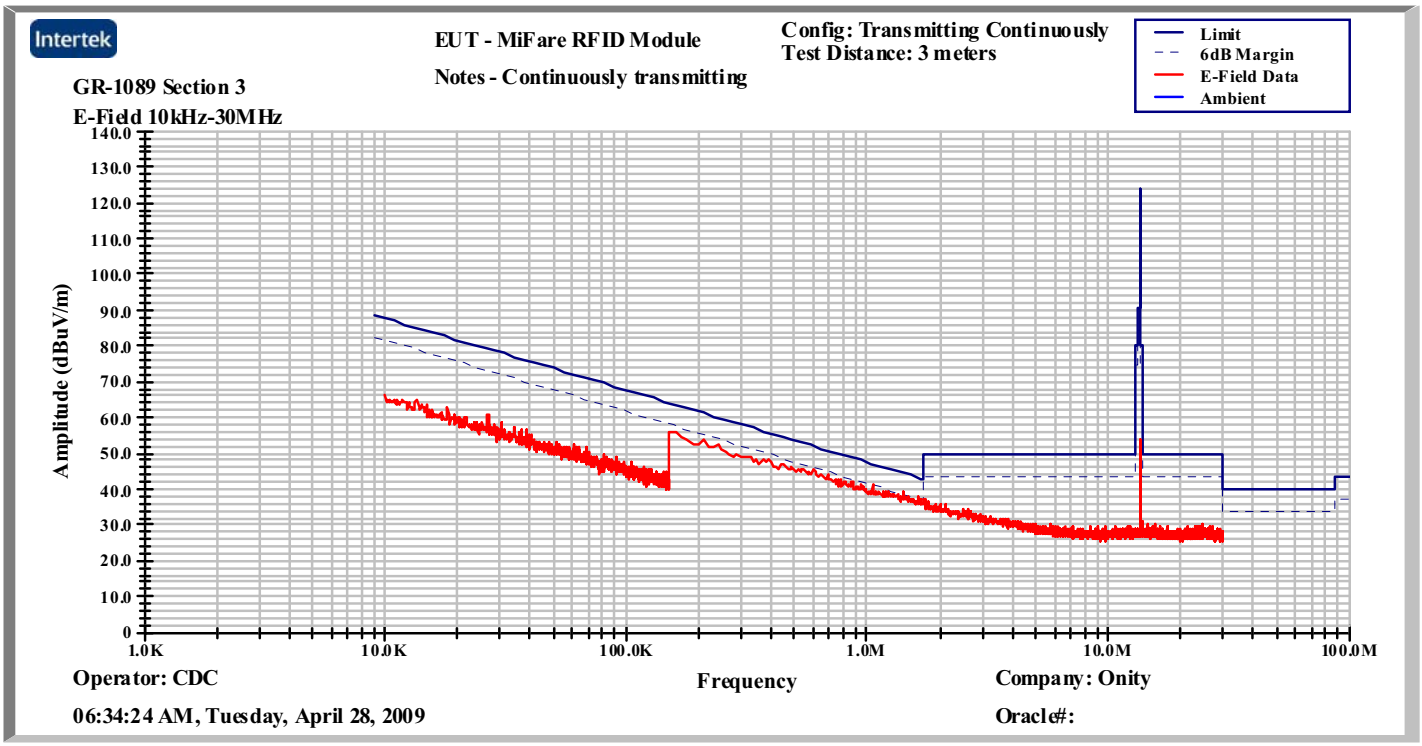
6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Photo:

Test Setup - Rear View

6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

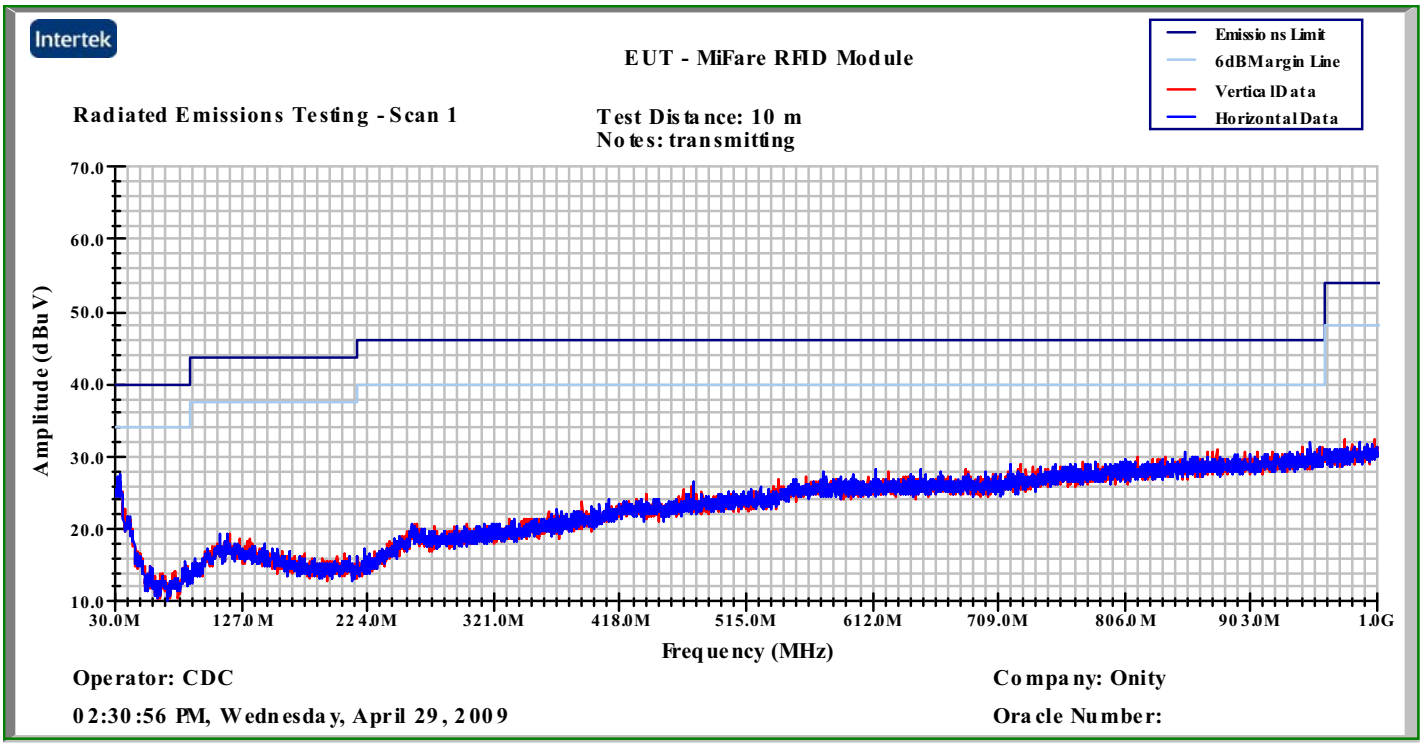
Plot:



Peak Plot - 9kHz-30MHz

6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Plot:



Peak Plot - 30-1000MHz

6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Data:

Frequency Range (MHz): .009 to 30 **Test Distance (m):** 3

Input power: Battery **Limit:** Limit_15_225 9k-4G_3m

Modifications for compliance (y/n): N

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**4G_3m Limit dB(uV/m)**	**Margin dB**	**Detectors / Bandwidths Det/RBW/VBW**
EUT Position: X-axis (orientation when mounted to a door or wall)									
Co-axial	13.559	49.0	17.7	0.9	0.0	67.6	124.0	-56.4	P/9k/30k
Co-planer	13.560	40.8	17.7	0.9	0.0	59.4	124.0	-64.6	P/9k/30k
EUT Position: Z-axis									
Co-planer	13.559	26.6	17.7	0.9	0.0	45.2	124.0	-78.8	P/9k/30k
Co-axial	13.560	42.5	17.7	0.9	0.0	61.1	124.0	-62.9	P/9k/30k
EUT Position: Y-axis									
Co-axial	13.560	48.3	17.7	0.9	0.0	66.9	124.0	-57.1	P/9k/30k
Co-planer	13.560	40.4	17.7	0.9	0.0	59.0	124.0	-65.0	P/9k/30k
Calculations		G=C+D+E-F		I=G-H					

Tabular Data - 9kHz - 30MHz

6.0 Radiated emissions (E-field) for low power intentional radiators. (Radiated Emissions LPD)

Data:

Frequency Range (MHz): .009 to 30 **Test Distance (m):** 3

Input power: Battery **Limit:** Limit_15_225 9k-4G_3m

Modifications for compliance (y/n): N

A	B	C	D	E	F	G	H	I	J
Ant. Pol. (V/H)	**Frequency MHz**	**Reading dB(uV)**	**Antenna Factor dB(1/m)**	**Cable Loss dB**	**Pre-amp Factor dB**	**Net dB(uV/m)**	**4G_3m Limit dB(uV/m)**	**Margin dB**	**Detectors / Bandwidths Det/RBW/VBW**
EUT Position: X-axis (orientation when mounted to a door or wall)									
V	352.7	33.3	15.2	5.4	27.9	26.1	46.0	-19.9	QP/120k/300k
V	379.685	30.5	16.0	5.7	27.9	24.3	46.0	-21.7	QP/120k/300k
V	406.818	30.1	16.9	6.0	27.9	25.1	46.0	-20.9	QP/120k/300k
V	515.300	29.0	18.1	6.8	27.8	26.1	46.0	-19.9	QP/120k/300k
V	759.370	33.2	20.4	8.5	27.5	34.6	46.0	-11.5	QP/120k/300k
V	786.478	33.4	20.6	8.7	27.5	35.3	46.0	-10.7	QP/120k/300k
Calculations		G=C+D+E-F		I=G-H					

Tabular Data - 30 - 1000MHz

7.0 Measurement of frequency stability (Frequency Stability)

Method:

Measure in accordance with Intertek Test Procedure "Procedure Frequency Stability."

Stability with Respect to Ambient Temperature
(1) Place the de-energized EUT in the environmental temperature test chamber. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber. Supply the EUT with nominal AC voltage or install a new or fully charged battery in the EUT. An antenna should be connected to the antenna output connector of the EUT if possible. Use of a dummy load could affect the output frequency of the EUT. If the EUT is equipped with or uses an adjustable-length antenna, it should be fully extended.
(2) Turn the EUT on and couple its output to a frequency counter or other frequency-measuring device of sufficient accuracy, considering the frequency tolerance with which the EUT must comply. Tune the EUT to one of the number of the test frequencies. Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
(3) Turn the EUT off and set the environmental chamber to the highest temperature specified by the procuring or regulatory agency. For devices that are normally operated continuously, the EUT may be energized while inside the test chamber. For devices that have oscillator heaters, energize only the heater circuit while the EUT is inside the chamber.
(4) Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup. Four measurements in total are made.
(5) If the EUT operates only at one operating frequency, proceed to step 6; otherwise, successively tune the EUT to each of the additional operating frequencies required and repeat step 4.
(6) Set the temperature chamber to the lowest temperature specified by the procuring or regulatory agency. Be sure to allow the environmental chamber temperature to stabilize before performing these measurements.
(7) Repeat Steps 4 and 5
(8) Prepare the final test report in accordance with clause 10 of ANSI C63.4.

Stability with Respect to Input Voltage
(1) This test may be made at ambient room temperature if it is within the range +15° to +25 °C; otherwise, an environmental temperature test chamber set for a temperature of +20 °C shall be used. If possible, connect an antenna to the output terminals of the EUT because use of a dummy load could affect the output frequency of the EUT. If the EUT is equipped with or uses an adjustable-length antenna, it should be fully extended.
(2) Supply the EUT with nominal AC voltage or install a new or fully charged battery in the EUT. Turn on the EUT and couple its output to a frequency counter.
(3) Tune the EUT to any one of the test frequencies. Adjust the location of the measurement antenna and the controls on the measuring instrument to obtain a suitable signal level (i.e., a level that will not overload the measuring instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Turn the EUT off and place it inside an environmental chamber. Allow sufficient time (approximately 30 min) for the chamber to stabilize at +20 °C before proceeding. Turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup. Four measurements in total are made.
(4) If measurements on only one operating frequency is required, proceed to step 5; otherwise, successively tune the EUT to each of the additional operating frequencies and repeat step 3.
(5) If the EUT is powered from the AC powerlines, supply it with 85% nominal AC voltage and repeat steps 3 and 4 before proceeding to step 6. If the EUT is battery powered, proceed to step 7.
(6) If the EUT is powered from the AC powerlines, supply it with 115% nominal AC voltage and repeat steps 3 and 4 before proceeding to step 7.

Test Equipment Used:

Description:	Manufacturer:	Model:	Asset Number:	Cal Date:	Cal Due:
Cable TT1, 6ft, N(Male) to N(Male)	Mini-Circuits	CBL-6FT-NMNM	TT1	05/04/2009	05/04/2010
Medium Enviromental Chamber	Thermotron	SM32C	013848	04/08/2009	04/08/2010
Multimeter	Fluke	87	213047	10/16/2008	10/16/2009
Spectrum Analyzer	Hewlett Packard	8593E	213180	09/29/2008	09/29/2009

Results: The sample tested was found to Comply.

7.0 Measurement of frequency stability (Frequency Stability)

Data:

Frequency Stability vs. Temperature

Assigned Carrier Frequency (ACF_{MHz}): 13.56
Nominal Input Voltage (Vac): Battery

Temperature °C	Input Voltage Vac	Measured Carrier Frequency MCF_{MHz}	Frequency Error ppm	Limit ppm	Margin ppm	Compliant Yes/No
60	Battery	13.559745	-18.8	100	81.2	Yes
20	Battery	13.55993	-5.2	100	94.8	Yes
-20	Battery	13.56022	16.2	100	83.8	Yes

$$ppm\_error = \left(\frac{MCF}{ACF} - 1\right) * 10^6$$