Testing Tomorrow's Technology

July 13, 2011

Ms. Silvia Leyva
Onity, A UTC Fire & Security Company
2232 Northmont Parkway, Suite 100
Duluth GA, 30096

Dear Ms. Leyva:

Enclosed please find Onity's file copy of the FCC Subpart C, Part 15.225 Certification Report and Application for the Onity HT Model: HTRFID also known as the AP11000F and referred to herein as the AP11000F.

Please note it is our opinion that the test data gathered in this report demonstrates that the AP11000F complies with the requirements of the above subparts and standards.

If you have any questions, please don't hesitate to call. Thank you for your business.

Sincerely,

Alan Ghasiani
President – Consulting Engineer

3505 Francis Circle Alpharetta, GA 30004
PH: 770-740-0717 Fax: 770-740-1508
www.ustech-lab.com

Application for Certification

Per

Title 47 USC Part 2, Subpart J, Equipment Authorization Procedures, Paragraph 2.907, Certification and Part 15, Subpart C, Intentional Radiators, Paragraph 15.225, Operation within the band 13.110 MHz to 14.010 MHz for the

ONITY

Model: AP11000F

UST Project(s): 11-0146 and 11-0147
Issue Date: July 13, 2011

Number of Pages in this report: 29

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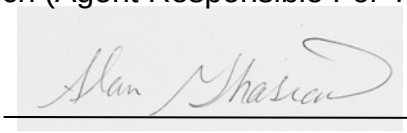
I certify that I am authorized to sign for the test facility and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US Tech (Agent Responsible For Test):

By: 

Name: Alan Ghasiani

Title: President – Consulting Engineer

Date: July 13, 2011

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MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Onity, A UTC Fire & Security Company**

MODEL: AP11000F

FCC ID: R32-HTRFIDMFR01
IC ID: 5058A-HTRFIDMFR01

DATE: July 13, 2011

This report concerns (check one): Original grant X
Class II change_____

Equipment type: ONITY RFID wireless module

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No X

If yes, defer until:_____
date

__N.A.__ agrees to notify the Commission by__N.A.__
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

US Tech
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

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1. General Information

The information contained in this report is presented for FCC Equipment Authorization of Certification of the Equipment Under Test (EUT).

1.1 Product Description

The AP11000F lock is a standalone electromagnetic lock that provides access control functionality to the door it is installed on. It consists of a MIFARE reader module and a lock Control Module. The AP11000F lock supports MIFARE Classic 1K and 4K credentials based on ISO14443A protocol, at the operating frequency of 13.56 MHz.

The AP11000F lock is powered by four AA batteries. The lock has a sensing circuit to detect when a card is in proximity and wake up the rest of the lock components to read and validate the card.

1.2 Characterization of Test Sample

The sample used for testing was received by US Tech on July 05, 2011 in good operating condition.

1.3 Related Submittal(s)/Grant(s)

The EUT will be used to wirelessly send/receive data. The transceiver presented in this report will be used with other like transceivers.

1.4 The EUT is subject to the following authorizations:

a) Certification of the transmitter part of the transceiver module per Part 15.225
b) Verification of the non-transmitter part of the transceiver as a Digital Device.

2 Tests and Measurements

2.1 Configuration of Tested System

The Test sample was tested per *ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2003).* Radiated emissions data were taken according to paragraph 8.0 with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. There were no interconnecting cables to manipulate in an attempt to maximize emissions; however, the physical position of the EUT was varied through the three mutually exclusive orthogonal planes in an attempt to maximize the emissions. The worse case position is the position used for final measurements and is gathered in this test report. A block diagram of the tested system is shown in Figure 1. All test configuration photographs are shown in separate Annex.

2.2 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA. This site has been fully described and registered with the FCC, under designation number US5117. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1 and is also a NVLAP accredited test lab; lab code 200162-0.

2.3 Test Equipment

Table 1. EUT and Peripherals

PERIPHERAL AND MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Lock assembly Onity (EUT)	AP11000F	Engineering Sample	R32-HTRFIDMFR01	None

P = Power D = data S = Shielded U = Unshielded

Table 2. Test Instruments

TYPE	MANUFACTURER	MODEL	SN.	Cal Date.
SPECTRUM ANALYZER	HEWLETT-PACKARD	8566B	2430A00523	10/29/10
RF PREAMP	HEWLETT-PACKARD	8447D	2944A07436	9/07/10
LOOP ANTENNA	AH Systems	SAS 200/560	142	12/01/09 (2 Yrs)
BICONICAL ANTENNA	Electro Metrics	BIA-25	2451	12/29/09 (2 Yrs)
LISN X 2	Solar Electronics	9247-50-TS-50-N	955824-955825	1/27/11
LOG PERIODIC ANTENNA	EMCO	3146	3236	1/22/10 (2 Yrs)
Calculation Program	N/A	N/A	EMCCALC	N/A

Note: The calibration interval of the above test instruments is 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

2.4 Modifications to Equipment

No modifications were required. The unit passed; all emissions measured were within the FCC limits.

2.5 Test Procedure

The EUT was configured as shown in the following block diagram(s) and photograph(s). The sample was tested per ANSI C63.4, Methods of Measurement for Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2003) following US Tech's procedures paragraph 7 for conducted and paragraph 8 for radiated. Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter on the spectrum analyzer was OFF throughout the evaluation process. Interconnecting cables were manipulated as necessary to maximize emissions. The EUT was rotated 360 degrees with the turntable to maximize emissions. The physical position of the EUT was varied through the three mutually exclusive orthogonal planes in an attempt to maximize the emissions. The final setup description is found in the test section of this report.

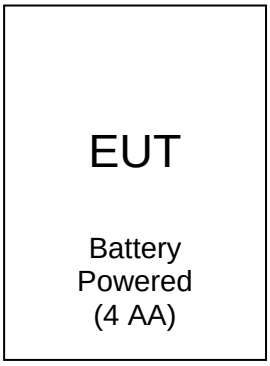

Figure 1. Test Configuration

2.6 EUT Antenna Description (FCC Sec. 15.203)(RSS Gen 7.2)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The Onity HTRFID incorporates the following antenna(s) only.

Table 3. Antenna Description for the Onity AP11000F

MANUFACTURER	TYPE	MODEL	GAIN dB_i
Onity, A UTC Fire & Security Company	Printed PCB coil antenna	N/A	1.0

2.6.1 Transmitter output power (RSS Gen 4.8)

Transmitter output power measurements shall be carried out before the unwanted emissions test. The transmitter output power value, obtained from this test, serves as the reference level used to determine the unwanted emissions. For comparative purposes, the measurements of emission power and unwanted emissions can be in peak or average provided that the same parameter is used when measuring both.

If the antenna is detachable, the transmitter output power may be measured at the antenna port using conducted measurement.

If the antenna is not detachable, field strength measurements shall be made using a calibrated open area test site or alternative test site.

The following formula may be used to convert field strength (FS) in volts/meter to transmitter output power (TP) in watts:

TP = (FS x D)2 / (30 x G)

where D is the distance in meters between the two antennas and G is the antenna numerical gain referenced to isotropic gain.

FS = 60.96 dBuV per Table 4, D = 3 meters, G= 1.0 dBi per Table 3.

TP= ((60.96x 3)^2)/(30x1)

Transmitter Power (TP) = 0.000297mW

2.7 Intentional Radiator, Power Lines Conducted Emissions (47 CFR 15.207) (RSS Gen 4.9)

The power line conducted voltage emission measurements have been carried out in accordance with CFR 15.207, per ANSI C63.4, Paragraph 7, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmission.

The worst-case results for conducted emissions can be seen below in section 2.13.

2.8 Field Strength of Fundamental (47 CFR 15.209, 15.225) (RSS Gen 4.9)

The results of the measurements for peak fundamental emissions are given in Table 5. The EUT emissions measurement was started by setting up the Log-periodic Antenna (L-pA) or generally, any antenna, in the vertical orientation at a distance of 3 meters from the EUT and at a height of 1.0 meters above the ground. The EUT packages' major axis was set normal to the direction of the measuring antenna.

The Spectrum Analyzer (SA) displays were set to: Channel A free-running, Channel B to Max-Hold. Choose a frequency or frequency range and scan it at a coupled rate. When a suspicious signal is found, center the signal on the screen and raise the L-pA to the 4-meter height while observing the SA display for changes to the max-hold and free-running display. Next, the antenna is lowered to 1 meter height above the ground plane while observing the channel A and B displays. The display having max-hold shows the maximum signal seen across the height range of 1 to 4 meters. The next action is to raise or lower the antenna until the free-running display matches the Max-hold display's magnitude on the SA screen. When this occurs, the signal is maximized for antenna height. Record the antenna height on the data sheet corresponding to the present frequency.

When the antenna height has been maximized, the next step in the measurement process is to maximize the EUT direction with respect to the receiving antenna. Rotate the turn-table through 360 degrees with one SA channel set for max-hold and the other channel in free-run mode. The object is to find that azimuth direction where the free-running indication just matches the greatest max-hold indication. This is the direction where the signal is peaked for azimuth. Record the direction on the data sheet next to the frequency.

2.8 Field Strength of Fundamental (47 CFR 15.209, 15.225) (cont'd)

When all signals have been maximized for antenna height and direction, the EUT case is carefully maneuvered in each of the three mutually exclusive orthogonal planes while observing the same Max-hold/free-running SA display indication. When the EUT position is found that allows a maximized signal to be read from the display, then that signals' magnitude is recorded on the data sheet for that particular frequency.

Next, re-orient the measurement antenna to Horizontal polarization at 1 meter height and repeat the above antenna and directional maximization processes for the greatest signals found across the frequency spectrum of interest. Record all signals within 6 dB of the limit.

Finally, Input the collected data into the calculation spread sheet. The spread sheet is designed to calculate for the true value that is collected. The spread sheet takes into account the SA reading, the antenna correction factor, cable losses and duty cycle factors. See the data tables herein.

2.9 Limits for Operation within the Band 13.110-14.010 MHz (CFR15.225)(RSS 210 A2.6)

This limit versus frequency table is as follows (test distance = 3.0 meters):

Frequency (MHz)	Field Strength @ 30m (uV/m)	Field Strength @ 30m (dBuV/m)	Field Strength @ 3m (dBuV/m)
13.553-13.567	15848	84	124
13.410-13.553	334	50.5	90.5
13.567-13.710	334	50.5	90.5
13.110-13.410	106	40.5	80.5
13.710-14.010	106	40.5	80.5
Any emissions outside of the band 13.110-14.010 MHz shall not exceed the limits in 15.209			

Note: formula 1: dBuV/m= 20 log (uV/m)
2: 3m distance = (dBuV/m@30m) + 40 log (30/3)

The frequency spectrum above the fundamental to its 10th harmonic shall be examined and measured for signals falling into the restricted bands of 15.205. If average emissions measurements are employed, the provisions in 15.35 for averaging pulsed emissions and for limiting peak emissions apply. Spurious and harmonics shall meet the requirements of the above table or the requirements of 15.209, whichever requirement permits a higher field strength.

2.10 Radiated Spurious Emissions, 9 KHz to 1000 MHz (47 CFR 15.205, 15.209, 15.225)(RSS Gen 4.9, RSS 210 A2.6)

The peak radiated spurious emissions were measured over the frequency range of 9 KHz to 1000 MHz. The spurious emissions have been recorded and can be seen in the Test Table herein.

Table 4. Intentional Radiator Radiated Emissions 9 KHz to 30 MHz

Intentional Radiator Radiated Emissions 9 KHz to 30 MHz							
Test By: JCW	Test: Part 15B, Para 15.209,15.225			Client: Onity			
	Project: 11-0146 and 11-0147	Class: B		Model: AP11000F			
Frequency (MHz)	Peak Test Data (dBuV)	AF+CL-PA (dB/m)	Peak Corrected Results (dBuV/m)	Limits (dBuV/m)	Application Test Distance/ Polarization	Margin (dB)	Detector Used
Measurements were made over the frequency range of 9 KHz to 30 MHz							
13.56	54.00	6.96	60.96	124.0	3m/LOOP	63.0	**PK**
27.12	13.60	10.10	23.70	69.5	3m/LOOP	45.8	**PK**
No other emissions found more than 6 dB above the noise floor							

* frequency falls in restricted band of CFR 15.205.

Note: Measurements made at 1m were extrapolated back to 3m by subtracting 9.5.

Tested from Fundamental to 10th Harmonic

SAMPLE CALCULATIONS: At 13.56 MHz = 54.00 + (6.96) = 60.96 dBuV

Test Date: July 06, 2011

Tested By Signature:  Name: John Wynn

Table 5. Intentional Radiator Radiated Emissions 30 MHz to 1000 MHz

Intentional Radiator Radiated Emissions 30 MHz to 1000 MHz							
Test By: JCW	Test: Part 15B, Para 15.209,15.225			Client: Onity			
	Project: 11-0146 and 11-0147	Class: B		Model: AP11000F			
Frequency (MHz)	Peak Test Data (dBuV)	AF+CL-PA (dB/m)	Peak Corrected Results (dBuV/m)	Limits (dBuV/m)	Application Test Distance/ Polarization	Margin (dB)	Detector Used
Measurements were made over the frequency range of 30MHz to 1 GHz							
40.68	-3.20	11.80	8.60	40.0	3m./	31.4	**PK**
40.68	3.80	10.70	14.50	40.0	3m./	25.5	**PK**
54.40	-3.70	10.00	6.30	40.0	3m./	33.7	**PK**
54.40	3.80	9.20	13.00	40.0	3m./	27.0	**PK**
No other emission found more than 6 dB above the noise floor							

* frequency falls in restricted band of CFR 15.205.

Note: Tested from Fundamental to 10th Harmonic

SAMPLE CALCULATIONS: At 40.68 MHz = (-3.20) + (11.80) = 8.60 dBuV

Test Date: July 06, 2011

Tested By
Signature: _____ Name: John Wynn

2.11 Bandwidth of Fundamental (CFR15.215 (c))(RSS Gen 4.6)

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage.

Frequency (MHz)	20 dB Bandwidth (KHz)	99% Occupied Bandwidth (KHz)
13.56	5.26	5.26

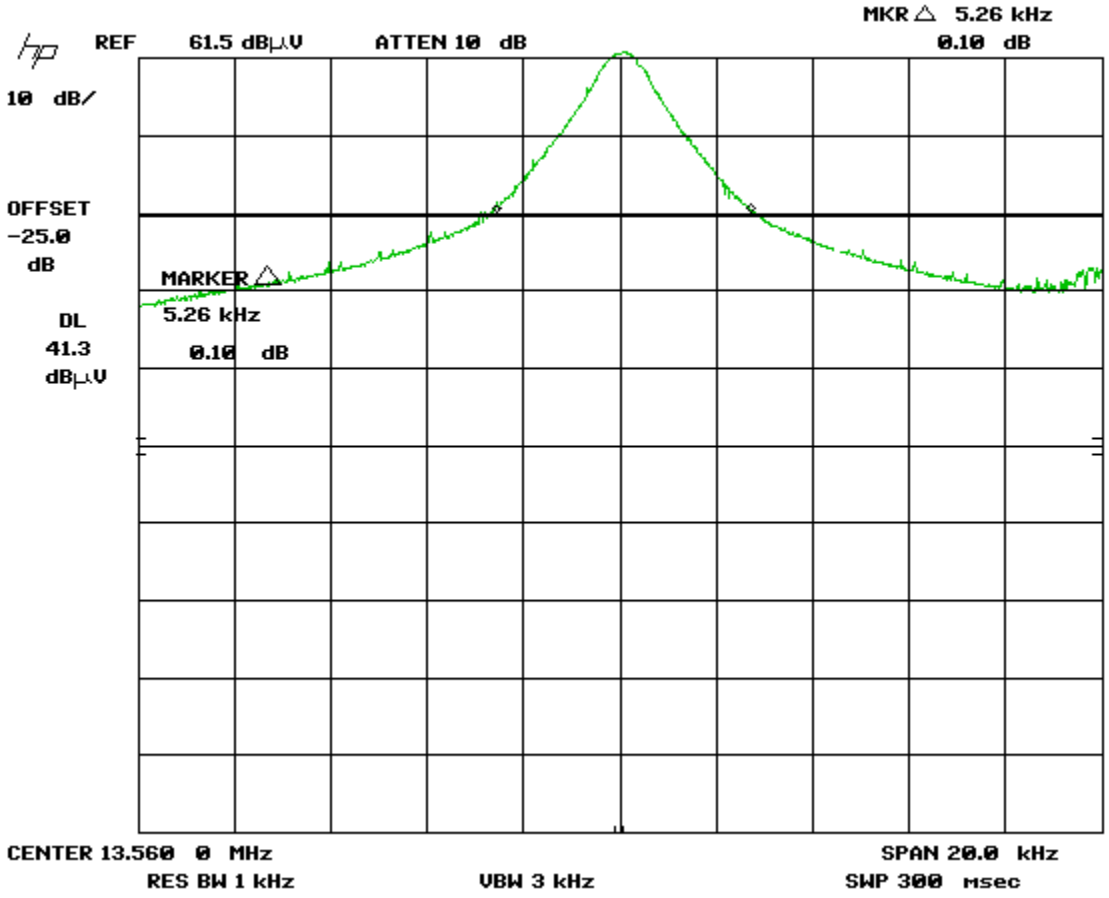

Figure 2. 20 dB Bandwidth of Fundamental

2.12 Frequency Stability (CFR 2.1055, 15.225(e))(RSS Gen 7.2.6)

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment test shall be performed using a new battery.

New Batteries were used during this test.

FCC Certification

Test Results Reviewed By:

Frequency Stability vs. Temperature (At Startup)

John Wynn and George Yang

Temperature (degrees C)	Measured Frequency (MHz)	Deviation (ppm)
-30		
-20	13.5601	-2.1
-10	13.5601	-1.5
0	13.5601	-0.7
10	13.5601	0.0
20	13.5601	0.0
30	13.5601	-2.2
40	13.5601	-3.7
50	13.5600	-5.3

Actual TX Frequency was: 13.5601 MHz

Maximum Deviation = 0.001% or 10ppm
Reference Point from 20 degrees C: ____13.560110____

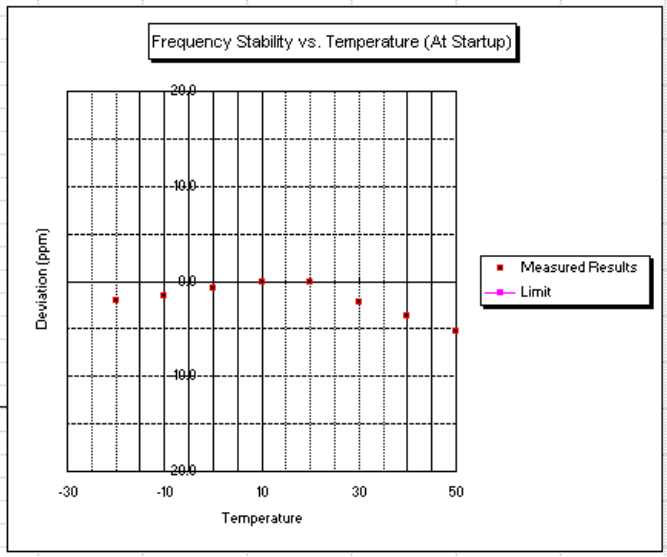

Figure 3. Frequency Stability

Test Date: July 08, 2011

Tested By Signature: _____ Name: John Wynn

2.13 Power Line Conducted Emissions for Transmitter and Receiver/Digital Apparatus.(47 CFR 15.107, 15.207)(RSS Gen 7.2.4)

Power line conducted voltage emission measurements have been carried out in accordance with CFR 15.107 and 15.207, per ANSI C63.4, Paragraph 7, with a spectrum analyzer connected to an LISN and the EUT placed into a non-transmit and a continuous mode of transmission. Of the two procedures only the procedure with the worst case emission is shown here.

Note: The unit is battery powered. Test is not applicable.

Table 6. Power Line Conducted Emissions Test Data (47 CFR 15.107, 15.207)

CONDUCTED EMISSIONS						
Tested By: JCW	Specification Requirement: FCC Part 15, P15.107, P15.207		Project No.: 11-0146 and 11-0147	Manufacturer: Onity Model: AP11000F		
Frequency (MHz)	Test Data (dBuV)	LISN+CL-PA (dB)	Corrected Results (dBuV)	Avg Limits (dBuV)	Margin (dB)	Detector
Test is not applicable.						

Tested from 150 kHz to 30 MHz

Test Date: July 06, 2011

Tested By Signature: _____ Name: John Wynn

2.14 Unintentional Radiator Radiated Emissions (47 CFR 15.109(a))(RSS Gen 4.10)

The test data is provided herein to support the Verification requirement for digital devices. Radiated emissions coming from the EUT in a non-transmit state were evaluated from 30 MHz to 1 GHz per ANSI C63.4, Paragraph 8.

Measurements were made with the analyzer's resolution bandwidth set to 120 kHz for measurements made below 1 GHz and 1 MHz for measurements made above 1 GHz. The video bandwidth was set to three times the resolution bandwidth. The test data were maximized for magnitude by rotating the turn-table through 360 degrees and raising and lowering the receiving antenna between 1 to 4 meters in height as a part of the measurement procedure. All measured signals were at least 6 db below the specification limit.

The worst-case results for radiated emissions were 2.4 dB within the limit at 49.8450 MHz. All other radiated emissions measurements were at least 5.6 dB or more from the limits. Those results are given in Table 8.

Table 7. Unintentional Radiator Radiated Emissions Data (47 CFR 15.109 (a))

Unintentional Radiator Radiated Emissions							
Test By: JCW	Test: Part 15B, Para 15.109			Client: Onity			
	Project: 11-0146 and 11-0147	Class: B		Model: AP11000F			
Frequency (MHz)	**Peak Test Data (dBuV)**	**AF+CL-PA (dB/m)**	**Peak Corrected Results (dBuV/m)**	**Average Limits (dBuV/m)**	**Application Test Distance/ Polarization**	**Margin (dB)**	**Detector Used**
Measurements were made over the frequency range of 30 MHz – 1 GHz							
49.8450	27.00	10.57	37.57	40.0	m./	2.4	**PK**
113.9880	12.20	13.39	25.59	43.5	m./	17.9	**PK**
306.4460	6.70	19.22	25.92	46.0	m./	20.1	**PK**
584.3210	17.00	23.39	40.39	46.0	m./	5.6	**PK**
174.3160	21.40	15.69	37.09	43.5	m./	6.4	**PK**
330.5830	7.30	18.06	25.36	46.0	m./	20.6	**PK**
630.5140	12.20	24.69	36.89	46.0	m./	9.1	**PK**

Tested from 30 MHz to 1000 MHz
SAMPLE CALCULATIONS: At 49.8450 MHz = 27.00 + (10.57) = 37.57 dBuV

Test Date: July 06, 2011

Tested By
Signature: _____ Name: John Wynn

2.15 Measurement Uncertainty

2.15.1 Conducted Emissions Measurement Uncertainty

Measurement Uncertainty (within a 95% confidence level) for this test is ±2.8 dB.

This test is not applicable; EUT is battery powered only.

2.15.2 Radiated Emissions Measurement Uncertainty

For a measurement distance of 3 m the measurement uncertainty (with a 95% confidence level) for this test using a Biconical Antenna (30 MHz to 200 MHz) is ±5.3 dB. This value includes all elements of measurement.

The measurement uncertainty (with a 95% confidence level) for this test using a Log Periodic Antenna (200 MHz to 1000 MHz) is ±5.1 dB.

The measurement uncertainty (with a 95% confidence level) for this test using a Horn Antenna is ±5.1 dB.

The data listed in this test report does not have sufficient margin to negate the effects of uncertainty, therefore, this test is conditionally acceptable.

3.0 Photographs

3.1 Test Setup

Figure 4. Front View of EUT (radiated emissions testing)

Figure 5. Rear View of EUT (radiated emissions testing)

Figure 6. Rear View of EUT (radio testing)