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RF Hazard Evaluation Report on the ALPHA Meter Model: A0001SC4200

FCC ID:	I7JA001SC42
GRANTEE:	Electricity Metering, ABB Inc. 208 S. Rogers Lane Raleigh, NC 27610
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Ave Sunnyvale, CA 94086
REPORT DATE:	May 8, 2002
FINAL TEST DATE:	April 25, 2002
AUTHORIZED SIGNATORY:	Juan Martinez EMC Engineer

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GENERAL INFORMATION

Applicant: Electricity Metering, ABB Inc.
208 S. Rogers Lane
Raleigh, NC 27610

FCC ID: I7JA001SC42

Technical Description

The electric meter with the ICM is intended to provide access to the metering information via the Public Switched Telephone Network. With the internal antenna, there is no physical wiring to gain access to the communication medium. The metering assembly with sensors is available in various platforms and configuration. There is a requirement for access to the metering information other than a physical visit to the metering site. There are many methods for gaining access to the metering information, both landline and wireless. When integrated with the meter platform, the ICM provides access to the meter with minimal installation and uses the existing infrastructure of the Public Switched Telephone Network.

Trucker Antenna: 3dBi gain
Comprod Communications Internal Antenna (Model: F-3973): 0dBi gain

Frequency Range

CRM 4200 radio modules:
Transmitter: 824.01 – 848.97 MHz
Receiver: 869.01 – 893.97 MHz

Range of Operation Power

600-mW maximum power output

SCOPE

RF Hazard Evaluation testing was performed for the equipment mentioned in this report. OET Bulletin 65 or the ANSI/IEEE C95.3, "IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave" were used as a test procedure guideline to perform the required test. MPE measurements were performed for this product.

The intentional radiator above was tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

OBJECTIVE

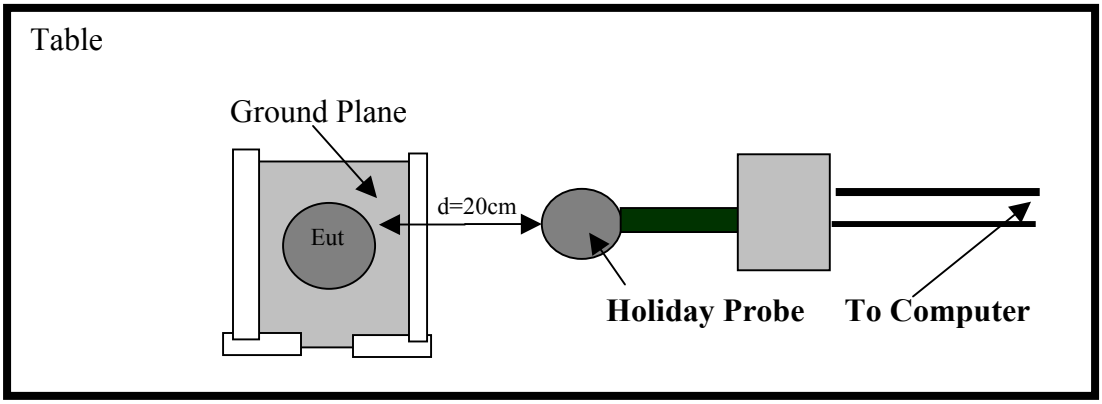
The primary objective of the manufacturer is compliance with Section 2.1091. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to FCC. FCC issues a grant of equipment authorization and a certification number upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units subsequently manufactured.

TEST RESULTS

Section 2.1091: Radiofrequency radiation exposure evaluation: Mobile devices.

Test Setup for the Internal Antenna

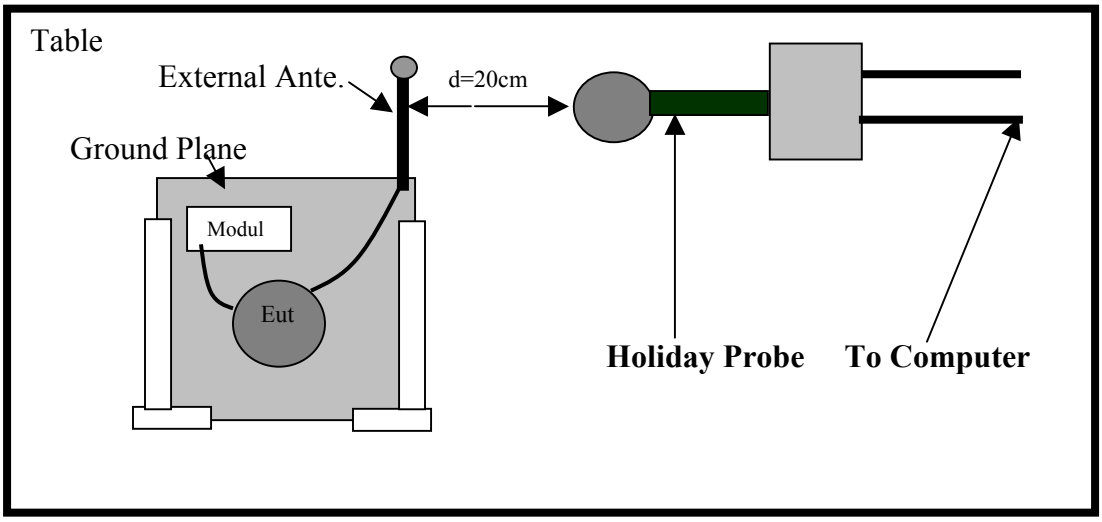


MPE Evaluation was performed using the OET Bulletin 65 or the ANSI/IEEE C95.3, "IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave" test procedure, for mobile devices.

A test fixture was built to test the EUT, with the internal antenna, mounted on a ground plane. The ground plane was grounded by braided wire to a known ground source. This configuration will demonstrate the RF exposure levels of the antenna mounted on a ground plane.

The EUT was set to transmit at maximum power, this was verified with a spectrum analyzer. The EUT was set to transmit and the Fundamental frequency set to the middle of the EUT's frequency range. The EUT and its antenna were placed on top of a table, located in a shielded room. The measuring probe was place 20-cm away from the EUT's antenna. The probe was moved around the antenna, while keeping the 20-cm separation. At the same time the probe was raised and lowered in height to measure the maximum points of the antenna(s). The top of the antenna(s) was also measured, 20-cm away. The probe was connected to a computer, which displayed the measured levels in mW/cm^2.

Test Setup for the External Antenna



MPE Evaluation was performed using the OET Bulletin 65 or the ANSI/IEEE C95.3, "IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave" test procedure, for mobile devices.

A test fixture was built to test the EUT, with the External antenna, mounted on a ground plane. The ground plane was grounded by braided wire to a known ground source. This configuration will demonstrate the RF exposure levels of the antenna mounted on a ground plane.

The EUT was set to transmit at maximum power, this was verified with a spectrum analyzer. The EUT was set to transmit and the Fundamental frequency set to the middle of the EUT's frequency range. The EUT and its antenna were placed on top of a table, located in a shielded room. The measuring probe was place 20-cm away from the EUT's antenna. The probe was moved around the antenna, while keeping the 20-cm separation. At the same time the probe was raised and lowered in height to measure the maximum points of the antenna(s). The top of the antenna(s) was also measured, 20-cm away. The probe was connected to a computer, which displayed the measured levels in mW/cm^2.

Please, refer to data included under **Exhibit 2**: Test Measurement Data

EQUIPMENT UNDER TEST (EUT) DETAILS

The EUT is a Wireless Gas Meter, which is designed to provide data for the Utility Companies. The EUT consisted of the following component(s):

Manufacturer/Model/Description	Serial Number
ABB/ALPHA meter/Electric Meter	N/A

SUPPORT EQUIPMENT

The following equipment was used as remote support equipment for emissions testing:

Manufacturer/Model/Description	**Serial Number**	**FCC ID Number**
N/A		

EXTERNAL I/O CABLING

The I/O cabling configuration during emissions testing was as follows:

Cable Description	Length (m)	From Unit/Port	To Unit/Port
N/A			

TEST SOFTWARE

Internal software was used to configure the EUT properly for the required tests.

TEST MODES

During testing the EUT was set to transmit at maximum power.

EXHIBIT 1: Test Equipment Calibration Data

Radiated Emissions, 1000 - 9000 MHz, 07-May-02
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Hewlett Packard	High Pass filter, 1.5GHz	P/N 84300-80037	1158	12	3/4/2002	3/4/2003
Filtek	High Pass Filter, 1GHz	HP12/1000-5BA	956	12	3/12/2002	3/12/2003
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	1242	12	10/9/2001	10/9/2002
Miteq	Pre-amp, 1-18GHz	AFS44	1346	12	1/7/2002	1/7/2003
Hewlett Packard	Spectrum Analyzer 9KHz - 26GHz	8563E	284	12	3/21/2002	3/21/2003

Radiated Emissions, 1000-9000 MHz, 07-May-02
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Hewlett Packard	Signal Generator (sweep) 0.01 - 26.5 GHz	8340A	1244	N/A		

MPE RF Hazard Measurements, 08-May-02
Engineer: jmartinez

Manufacturer	Description	Model #	Assett #	Cal interval	Last Calibrated	Cal Due
Holaday Industries	Field Probe 200KHz - 40GHz	HI-4455	910	12	8/8/2001	8/8/2002

EXHIBIT 2: Test Measurement Data

The following data includes conducted and radiated emission measurements of the unit.

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EMC Test Data

Client:	Electricity Metering, ABB Inc.	Job Number:	J47046
Model:	A0001SC4200	T-Log Number:	T47058
		Proj Eng:	Juan Martinez
Contact:	Bill A. Melvin		
Emissions Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A
Immunity Spec:	-	Environment:	-

EMC Test Data

For The

Electricity Metering, ABB Inc.

Model

A0001SC4200

Client:	Electricity Metering, ABB Inc.	Job Number:	J47046
Model:	A0001SC4200	T-Log Number:	T47058
		Proj Eng:	Juan Martinez
Contact:	Bill A. Melvin		
Emissions Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A
Immunity Spec:	-	Environment:	-

EUT INFORMATION

General Description

The EUT is a Wireless Gas Meter which is designed to provided data for the Utility Companies. Normally, the EUT would be placed on a table top during operation. The EUT was, therefore, treated as table-top equipment during testing to simulate the end user environment. The electrical rating of the EUT is 240V, 60 Hz, .5 Amps.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Electricity Metering, ABB Inc.	A0001SC4200	Wireless Gas Meter	N/A	I7J-A0001SC4200

Other EUT Details

The EUT contains an approved module (FCC ID: APV09002). The EUT is marketed with two antennas. One is a 0 dBi internal antenna and the other is a 3 dBi external antenna.

EUT Enclosure

The EUT enclosure is primarily constructed of fabricated sheet steel. It measures approximately 13 cm wide by 11 cm deep by 14 cm high.

Modification History

Mod. #	Test	Date	Modification
1			
2			
3			

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EMC Test Data

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		Proj Eng:	Juan Martinez
Contact:	Bill A. Melvin		
Emissions Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A
Immunity Spec:	-	Environment:	-

Test Configuration #1

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
AC	208 Vac	Multiwire	Unshielded	1.8

EUT Operation During Emissions

Continously transmitting at full power at the middle of the cellular frequency range.

Client:	Electricity Metering, ABB Inc.	Job Number:	J47046
Model:	A0001SC4200	T-Log Number:	T47058
		Proj Eng:	Juan Martinez
Contact:	Bill A. Melvin		
Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A

MPE Routine Evaluation: Per Section 2.1091

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 4/25/2002
Test Engineer: jmartinez
Test Location: Chamber #2
Config. Used: 1
Config Change: None
EUT Voltage: 5 Vdc

General Test Configuration

The EUT was located on the turntable for MPE evaluation testing. The transmit antenna was placed in the middle of the table. The Probe was placed 20 cm from the antenna. Tests were performed inside a Chamber.

Ambient Conditions:

Temperature: 21°C
Rel. Humidity: 45%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	MPE Routing Evaluation	.549 mW/cm^2	Pass	Refer to individual runs
2	MPE Routing Evaluation	.549 mW/cm^2	Pass	Refer to individual runs

Modifications Made During Testing: None

Client:	Electricity Metering, ABB Inc.	Job Number:	J47046
Model:	A0001SC4200	T-Log Number:	T47058
		Proj Eng:	Juan Martinez
Contact:	Bill A. Melvin		
Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A

Section 1.1310 RF Hazard MPE limits
Uncontrolled/polupoated

Frequency (MHz)	**Limit (mW/cm^2)**
300 - 1500 MHz	Freq. **/** 1500

824 MHz / 1500 = .549 mw/cm^2

Run #1: RF Hazard Evaluation Test
Fundamental frequency: 831.99 MHz
3 dBi antenna. Antenna tested over a ground plane.

Measured	Position	1.1310		Comment
mW/cm^2	Degrees	Limit (mW/c	Margin	Note
0.092	0	0.549	-0.457	1 and 2
0.102	90	0.549	-0.447	1 and 2
0.096	180	0.549	-0.453	1 and 2
0.098	270	0.549	-0.451	1 and 2

Note 1:	Measured at 20 cm distance as required by OET 65 C, procedure for RF Hazard evaluation for mobile devices
Note 2:	Transmitter set to Maximum Power. Antenna metal holder grounded by means of a ground braid.
Note 3:	The total loss from cable and matching network was 4 dB.
Note 4:	Power Checked with Spectrum Analyzer

Client:	Electricity Metering, ABB Inc.	Job Number:	J47046
Model:	A0001SC4200	T-Log Number:	T47058
		Proj Eng:	Juan Martinez
Contact:	Bill A. Melvin		
Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A

Run #2: RF Hazard Evaluation Test
Fundamental frequency: 831.99 MHz
0 dBi Antenna. Meter tested over a ground plane

Measured	Position	1.1310		Comment
mW/cm^2	Degrees	Limit (mW/c	Margin	Note
0.092	0	0.549	-0.457	1 and 2
0.090	90	0.549	-0.459	1 and 2
0.098	180	0.549	-0.451	1 and 2
0.097	270	0.549	-0.452	1 and 2

Note 1:	Measured at 20 cm distance as required by OET 65 C, procedure for RF Hazard evaluation for mobile devices
Note 2:	Transmitter set to Maximum Power. Metal plane grounded by means of a ground braid.
Note 3:	Power Checked with Spectrum Analyzer