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Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 118 & FCC Part 22 Subpart H 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 7, 2002
FINAL TEST DATE:	April 25,2002
AUTHORIZED SIGNATORY:	Juan Martinez Sr. EMC Engineer

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FCC CERTIFICATION INFORMATION

The following information is in accordance with FCC Rules, 47CFR Part 2, Subpart J, Section 2.1033(C) & to Industry Canada RSP-100.

2.1033(c)(1) Applicant: Electricity Metering, ABB Inc.
208 S. Rogers Lane
Raleigh, NC 27610

2.1033(c)(2) & RSP-100 (4) FCC ID: I7JA001SC42

2.1033(c)(3) & RSP-100 (7.2(a)) Instructions/Installation Manual

Please refer to Exhibit 7: User Manual, Theory of Operation

2.1033(c)(4) & RSP-100 (7.2(b)(iii)) Type of emissions

AMPS: 40K0F8W
Wideband: 36K0F1D

2.1033(c)(5) & RSP-100 (7.2(a)) Frequency Range

Transmitter: 824.01 – 848.97 MHz
Receiver: 869.01 – 893.97 MHz

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

Maximum power: 600 mW (ERP) conducted at antenna terminal

2.1033(c)(6) & RSP-100 (7.2(a)) Range of Operation Power

Section 22.913: limited to 7 Watts ERP

2.1033(c)(8) & RSP-100 (7.2(a)) Applied voltage and currents into the final transistor elements

CRM4200: 5Vdc, Current 100 mA

2.1033(c)(9) & RSP-100 (7.2(a)) Tune-up Procedure

The Tune-Up procedure is located in pg. 20 of the Theory of Operations and in Specification manuals. Refer to Exhibit 7: User Manual, Theory of Operation, and Tune-up Procedure.

2.1033(c)(10) & RSP 100 (7.2(a)) Schematic Diagram of the Transmitter

Refer to Exhibit 6. The schematic diagram

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Frequency Stabilization

TCXO (QL03), main VCO (QP01). For more information refer to Exhibit 7: Theory of Operation page 5.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Suppression of Spurious radiation

A bandpass filter (FT01) is located before the final power amplifier stage to eliminate harmonic and spurious signals.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Modulation

The signal is passed trough a Soft limit circuit, BPF, LPF, Compressor circuit, Pre-emphasis circuit, and Hard limit circuit. For more information refer to Exhibit 7: Theory of Operation page 10.

2.1033(c)(10) & RSP-100 (7.2(a)) Means for Limiting Power

Power Detector (QT04), Radio interface IC (QL01), APC circuit (QT05). For more information refer to Exhibit 7: Theory of Operation page 14.

2.1033(c)(11) & RSP-100 (7.2(g)) Photographs or Drawing of the Equipment Identification Plate or Label

Refer to Exhibit 4

2.1033(c)(12) & RSP-100 (7.2(c)) Photographs of equipment

Refer to Exhibit 5

2.1033(c)(13) & RSP-100 (7.2(a)) Equipment Employing Digital Modulation

N/A

2.1033(c)(14) & RSP-100 (7.2(b)(ii)) Data taken per Section 2.1046 to 2.1057 and RSS-133 issue 2, Rev. 1.

Refer to Exhibit 2

SCOPE

FCC Part 22 Subpart H & IC RSS-118 testing was performed for the equipment mentioned in this report. The equipment was tested in accordance with the procedures specified in Sections 2.1046 to 2.1057 of the FCC Rules & in IC RCC-118. TIA-603 was also used as a test procedure guideline to perform some of the required tests.

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

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

OBJECTIVE

The primary objective of the manufacturer is compliance with the FCC Rules part 22 Subpart H & IC RSS-118. Certification of these devices is required as a prerequisite to marketing as defined in Section 2.1033 & RSP-100.

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.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product that may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

EMISSION TEST RESULTS

Section 2.1046: RF Power Output
RSS-118 (7.1): RF Power Output

The RF Power Output was tested to Section 22.913(a) and RSS-118 (7.1)

The following modulations were tested: AMPS

Procedure used: **A**

Result: Maximum Power is 27.8 dBm (Internal Antenna)
Result: Maximum Power is 26.8 dBm (External Antenna)

Refer to Setup Photo#1 & 2 in Exhibit 3 and the test data in Exhibit 2: Test Measurement Data for full details.

SECTION 2.1053: FIELD STRENGTH OF SPURIOUS RADIATION.
RSS-118 (7.3): FIELD STRENGTH OF SPURIOUS RADIATION.

The Field Strength was tested to Section FCC 22.917(d) and RSS-118 (7.3)

Procedure used: **N**

Result: -12.5dB @ 1647.92 MHz

Refer to Setup Photo#1 & 2 in Exhibit 3 and the test data in Exhibit 2: Test Measurement Data for full details.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on April 25, 2002 at the Elliott Laboratories Open Area Test Site #4 located at 684 West Maude Avenue, Sunnyvale, California. Pursuant to Section 2.948 of the FCC Rules, construction, calibration, and equipment data has been filed with the Commission.

Departmental Acknowledgement Number: IC2845 **SV4,** Dated July 19, 2001

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing are performed in conformance with Section 2 of FCC Rules. Measurements are made with the EUT connected to a spectrum analyzer through an attenuator to prevent overloading the analyzer.

RADIATED EMISSIONS CONSIDERATIONS

Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR 16-1 defined elliptical area.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers are capable of measuring over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the particular detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. If average measurements above 1000MHz are performed, the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz is used.

INSTRUMENT CONTROL COMPUTER

A personal computer is utilized to record the receiver measurements of the field strength at the antenna, which is then compared directly with the appropriate specification limit. The receiver is programmed with appropriate factors to convert the received voltage into filed strength at the antenna. Results are printed in a graphic and/or tabular format, as appropriate.

The test receiver also provides a visual display of the signal being measured.

POWER METER

A power meter and thermister mount may be used for output power measurements from transmitters as they provide a broadband indication of the power output.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or EUT and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transmitters and transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor drive to vary the antenna height.

The requirements of ANSI C63.4 were used for configuration of the equipment turntable. It specifies that the test height above ground for table-mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An appendix of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

General: For Transmitters with detachable antenna, direct measurements for output power, modulation characterization, occupied bandwidth, and frequency stability are performed with the antenna port of the EUT connected to either the power meter, modulation analyzer, or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the transmitter fundamental will not overload the front end of the measurement instrument.

For Transmitter with non-detachable antennas field strength measurements are performed. The substitution method is also performed for the appropriate test requirement.

Procedure A – Power Measurement (Radiated Method): The following procedure was used for transmitters that do not use external antennas.

1) Set the EUT to maximum power and to the lowest channel.
2) A spectrum analyzer was use to measure the power output. The search antenna was located 3 meter from the EUT.
3) The spectrum analyzer resolution and video bandwidth was set to 30 kHz to measure the power output. No amplifier was used since the fundamental will cause the amplifier to saturate.
4) The EUT was then rotated for a complete 360 degrees and the search antenna was raised and lowered to maximize the fundamental. Both vertical and horizontal polarizations were performed. All correction factors are applied to the fundamental.
5) Substitution is then performed. Substitution method is performed by replacing the EUT with a horn antenna, which factors can be reference to a half-wave dipole, and with a signal generator. The signal generator power level is adjusted until a similar level, which was measured, in step 4, is achieved on the spectrum analyzer. The level on the signal generator is than added to the antenna factor, in dBi, which will give the corrected value.
6) Steps 1 to 5 are repeated for the middle and the highest channel.

Procedure N - Field Strength Measurement: The EUT was set on the turntable and the search antenna position 3 meters away. The output antenna terminal was terminated with a 50-ohm terminator. The EUT was set at the low, middle, and high channel of the frequency band and set at maximum output power. Used a Resolution and Video Bandwidth of 1 MHz above 1 GHz and 120 kHz below 1 GHz.

For the first scan, a pre-liminary measurement is performed. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. One or more of these is with the antenna polarized vertically while the one or more of these are with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

For the final measurement, Substitution method is performed on spurious emissions not being 20-dB below the calculated radiated limit. Substitution method is performed by replacing the EUT with a horn antenna, which factors can be reference to a half-wave dipole, and with a signal generator. The signal generator power level was adjusted until a similar level, which was measured on the first scan, is achieved on the spectrum analyzer. The level on the signal generator is than added to the antenna factor, in dBi, which will give the corrected value.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

RADIATED EMISSIONS SPECIFICATION LIMITS

The limits for radiated emissions are based on the power of the transmitter at the operating frequency. Data is measured in the logarithmic form of decibels relative to one milliwatt (dBm) or one microvolt/meter (dBuV/m,). The field strength of the emissions from the EUT is measured on a test site with a receiver.

Below is a formula example used to calculate the attenuation requirement, relative to the transmitters power output, in dBuV/m. For this example an operating power range of 3 watts is used. The radiated emissions limit for spurious signals outside of the assigned frequency block is $43+10\text{Log}_{10}$(mean output power in watts) dB below the measured amplitude at the operating power.

CALCULATIONS – EFFECTIVE RADIATED POWER

$$E(V/m) = \frac{\sqrt{30 * P * G}}{d}$$

E= Field Strength in V/m
P= Power in Watts (for this example we use 3 watts)
G= Gain of antenna in numeric gain (Assume 1.64 for ERP)
d= distance in meters

$$E(V/m) = \frac{\sqrt{30 * 3 \text{ watts} * 1.64 \text{ dB}}}{3 \text{ meters}}$$

20 * log (4.049 V/m * 1,000,000) = 132.14 dBuV/m @ 3 meters

FCC Rules request an attenuation of 43 + 10 log (3) or 47.8 dB for all emissions outside the assigned block, the limit for spurious and harmonic emissions is:

132.1 dBuV/m – 47.8 dB = 84.3 dBuV/m @ 3 meter.

Note: Substitution Method is performed for spurious emission not being 20-dB below the calculated field strength.

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 Electricity Metering, ABB Inc., model: A0001SC4200.

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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

Client:	Electricity Metering, ABB Inc.	Job Number:	J47046
Model:	A0001SC4200	T-Log Number:	T47058
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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

Section 2.1046 & RSS-133 (6.2): RF Power

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: SVOATS #4
Config. Used: 1
Config Change: None
EUT Voltage: 5 Vdc

General Test Configuration

The EUT was located on the turntable for radiated field strength measurements and the local support equipment was located underneath the table.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT.

Ambient Conditions:

Temperature: 10°C
Rel. Humidity: 58%

Summary of Results

Run #	Test Performed	Limit	Result	Measurement
1	Radiated Output Power	22.913(a)	pass	27.8 dBm (EIRP)
2	Calculated Output Power	22.913(a)	pass	26.8 dBm (EIRP)

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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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		
Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A

Run #1a: Radiated Output Power (EIRP)
EUT with Internal Antenna.

Channel	Frequency (MHz)	Field Strength at 3m	Antenna Pol. (H/V)	Res BW
Low	824.01	123.5	V	30 kHz
Low	824.01	120.7	H	30 kHz
Middle	836.00	123.6	V	30 kHz
Middle	836.00	120.3	H	30 kHz
High	848.97	123.7	V	30 kHz
High	849.97	119.9	H	30 kHz

Note 1:	Add note here
Note 2:	

Run #1b: Output Power (Substitution Method)

			Substitution Note 1					Comments
Frequency	Level	Pol	Pin	Gain	EIRP	ERP	Limit	
MHz	dBµV/m	v/h	(dBm)	(dBi)	(dBm)	(dBm)	(dBm)	
824.01	123.5	v	21.2	6.4	27.6	25.4	38.4	
836.00	123.6	v	21.5	6.3	27.8	25.6	38.4	
848.97	123.7	v	21.4	6.3	27.7	25.5	38.4	

Note 1:	Field Strenght = Measured - reduced by dB = S.A. level that will be measured. The reduced by dB was then added to the signal generators (Pin) level to get the correct output power and then added the Gain (dBi) of the antenna.
Note 2:	Pin is the power input (dBm) to the substitution antenna to obtain the field strength recorded from the EUT. G is the gain (dBi) for the substitution antenna.ERP is the effective radiated power (Pin + GdBi - 2.2) from the substitution antenna. EIRP is calculated as follows (Pin+GdBi)

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: Calculated Radiated Output Power (ERP)
EUT with External Antenna.

Power	Loss (Note 1)	Gain of Antenna	Power EIRP	Power ERP
(dBm)	(dB)	(dBi)	(dBm)	(dBm)
27.8	4.0	3	26.8	24.6

Note 1:	The module is interconnected by a 1 dB loss in cable, plus the loss over the atennuator (3 dB). Total loss of system is 4 dB.
Note 2:	

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 2.1053 & RSS-133 (6.3): Field strength of Spurious emissions

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: SVOATS #4
Config. Used: 1
Config Change: None
EUT Voltage: 5 Vdc

General Test Configuration

The EUT was located on the turntable for radiated emissions testing.
On the OATS, the measurement antenna was located 3m from the EUT for the frequency range 1 - 20 GHz.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT. For any Spurious emission more than 20-dB substitution was performed. Substitution Method is not required for Spurious emissions 20-dB below the calculated field strength limit.

Ambient Conditions:

Temperature: 10° C
Rel. Humidity: 58%

Summary of Results

Run #	Test Performed	Limit	Result	Margin
1	RE, Preliminary Scan 30 - 1000 MHz	22.917(e)	Pass	Refer to individual runs

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

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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		
Spec:	FCC 22H, Part 2.1091 Mobile	Class:	N/A

Run #1: Maximized Radiated Emissions, Fundamental to 10th Harmonic

Frequency	Level	Pol	22.917(e)		Detector	Azimuth	Height	Comments
MHz	dBµV/m	v/h	Limit	Margin	Pk/QP/Avg	degrees	meters	
			(dBm)	(dB)				
Middile Channel								
1669.968	-25.7	V	-13.0	-12.7	Pk	338	1.3	
1669.948	-26.4	H	-13.0	-13.4	Pk	307	1.4	
2504.913	-33.0	V	-13.0	-20.0	Pk	83	1.3	
3339.881	-33.1	V	-13.0	-20.1	Pk	303	1.1	
2504.913	-34.2	H	-13.0	-21.2	Pk	110	1.4	
3339.890	-35.3	H	-13.0	-22.3	Pk	198	1.3	
4174.908	-40.6	H	-13.0	-27.6	Pk	300	1.3	
5010.007	-41.4	V	-13.0	-28.4	Pk	301	1.2	
4174.970	-43.9	V	-13.0	-30.9	Pk	320	1.2	
Low Channel								
1647.920	-25.5	H	-13.0	-12.5	Pk	155	1.2	
2472.045	-28.1	H	-13.0	-15.1	Pk	41	1.2	
1648.002	-28.2	V	-13.0	-15.2	Pk	356	0.0	
3295.945	-32.7	H	-13.0	-19.7	Pk	307	1.2	
3295.998	-32.9	V	-13.0	-19.9	Pk	192	1.0	
2471.975	-38.1	V	-13.0	-25.1	Pk	0	0.0	
4119.980	-42.2	H	-13.0	-29.2	Pk	60	1.3	
4943.967	-43.6	V	-13.0	-30.6	Pk	325	1.2	
4120.040	-44.5	V	-13.0	-31.5	Pk	327	1.4	
4943.922	-46.8	H	-13.0	-33.8	Pk	148	1.3	
High Channel								
1697.890	-30.2	H	-13.0	-17.2	Pk	259	1.1	
2546.870	-31.8	H	-13.0	-18.8	Pk	251	1.4	
1697.885	-33.7	V	-13.0	-20.7	Pk	0	1.2	
2546.847	-34.4	V	-13.0	-21.4	Pk	38	1.2	
4244.792	-47.0	H	-13.0	-25.7	Pk	0	0.0	
3395.835	-40.5	V	-13.0	-27.5	Pk	325	1.3	
3395.850	-41.4	H	-13.0	-28.4	Pk	91	1.4	
5093.755	-45.0	V	-13.0	-32.0	Pk	76	1.4	
4244.860	-47.0	V	-13.0	-34.0	Pk	76	1.4	

Note 1: No emission close to 20-dB of the limit detected beyond the 5th or 6th harmonic.