

Summer Infant, Inc.

Application
For
Certification

Secure Sounds 2.4GHz Digital Monitor

(FCC ID: PZK-02170)

05209411
TL/ Ann Choy
October 27, 2005

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MEASUREMENT/TECHNICAL REPORT

Summer Infant, Inc. - Model: 02170
FCC ID: PZK-02170

This report concerns (check one:) Original Grant X Class II Change

Equipment Type : DXT - Pt 15 Low Pwr Transceiver, Rx Verified

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

If yes, defer until :
date

Company Name agrees to notify the Commission
by:

date

of the intended date of announcement of the product so that the grant can be issued
on that date.

Transition Rules Request per 15.37 ? Yes No X

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-04
Edition] Provision.

Report prepared by:

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List of attached file

Exhibit type	File Description	filename
Test Report	Test Report	report.pdf
Operation Description	Technical Description	descri.pdf
Test Setup Photo	Radiated Emission for Baby	config photos.doc
Test Setup Photo	Radiated Emission for Parent	config photos.doc
Test Report	Emission Plot	emission.pdf
Test Setup Photo	Conducted Emission	config photos.doc
Test Report	Conducted Emission Test Result	conduct.pdf
External Photo	External Photo	external photos.doc
Internal Photo	Internal Photo	internal photos.doc
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
User Manual	FCC Information	fcc information.pdf

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EXHIBIT 1 GENERAL DESCRIPTION

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1.0 General Description

1.1 Product Description

The Equipment Under Test (EUT) is a 2.4GHz Digital Monitor operating at 2433.199MHz to 2454.394MHz with 16 channels. Both units are powered by 120VAC to 9VDC 200mA adaptor, and the baby unit and the parent unit are also operated with 3 x "AAA" size 1.5VDC battery and 4.8V 600mAh "Ni-MH" type rechargeable battery respectively. Both units have a ON/OFF button for switching on itself. In addition, the parent unit has two adjust volume buttons. After switching on both units, the baby unit transmits a baby's voice to the corresponding parent unit with a channel selected among 16 channels. During the automatic channel selection, the parent unit sends a request to the baby unit in order to get the clearest channel.

Antenna Type : Integral, Internal

For electronic filing, the brief circuit description is saved with filename: descri.pdf.

1.2 Related Submittal(s) Grants

This is an application for certification of a baby monitor system. Two transmitters are included in this application. This specific report details the emission characteristics of each transmitter.

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1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the “**Justification Section**” of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the emission data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

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**EXHIBIT 2
SYSTEM TEST CONFIGURATION**

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2.0 System Test Configuration

2.1 Justification

For emissions testing, the equipment under test (EUT) was setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions.

For the measurement, the unit was operated standalone and placed in the center of the turntable.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9kHz to 25kHz.

All relevant operation modes have been tested, and the worst case data is included in this report.

2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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2.3 Support Equipment List and Description

The FCC ID's for all equipment, plus descriptions of all cables used in the tested system are:

HARDWARE:

The unit was operated standalone. An AC adapter (provided with the unit) was used to power the device. Its description is listed below.

- (1) Two AC adaptors for Baby and Parent Unit (120VAC to 9VDC 200mA, Model: PA-0920-DUL)

CABLES:

There are no special accessories necessary for compliance of this product.

OTHERS:

- (1) Alternative Operated Source for Baby Unit: 3 x "AAA" size 1.5VDC battery
- (2) Alternative Operated Source for Parent Unit 4.8V 600mAh "Ni-MH" type rechargeable battery

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2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty test has been considered.

2.5 Equipment Modification

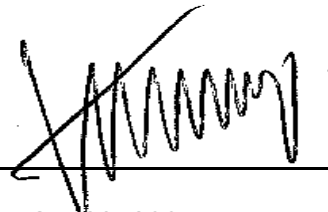
Any modifications installed previous to testing by Summer Infant, Inc. will be incorporated in each production model sold/leased in the United States.

No modifications were installed by ETL Division, Intertek Testing Services Hong Kong Ltd.

All the items listed under section 2.0 of this report are confirmed by:

Confirmed by:

*Tommy Leung
Assistant Manager
Intertek Testing Services
Agent for Summer Infant, Inc.*



Signature

Oct 29, 2005 Date

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EXHIBIT 3 EMISSION RESULTS

3.0 **Emission Results**

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

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3.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Example

Assume a receiver reading of 62.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 + (-10) = 32 \text{ dB}\mu\text{V/m}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

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3.2 Radiated Emission Configuration Photograph - Baby Unit

Worst Case Radiated Emission

at 4866.399 MHz & 7299.598 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

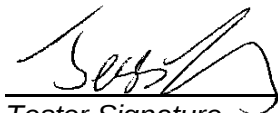
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3.3 Radiated Emission Data - Baby Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 2.7 dB margin

TEST PERSONNEL:



Tester Signature

Jess Tang, Lead Engineer
Typed/Printed Name

October 28, 2005
Date

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170
Mode : TX-Channel 1

Date of Test: September 30-October 14, 2005

Table 1, Baby unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	2433.199	91.6	34	29.4	87.0	94	-7.0
V	*4866.399	50.4	34	34.9	51.3	54	-2.7
H	*7299.598	47.4	34	37.9	51.3	54	-2.7
H	9732.798	41.6	34	40.4	48.0	54	-6.0
H	*12165.997	41.7	34	40.5	48.2	54	-5.8

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170
Mode : TX-Channel 8

Date of Test: September 30-October 14, 2005

Table 2, Baby unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	2449.196	90.9	34	29.4	86.3	94	-7.7
V	*4898.391	49.9	34	34.9	50.8	54	-3.2
H	*7347.587	46.7	34	37.9	50.6	54	-3.4
H	9796.782	41.7	34	40.4	48.1	54	-5.9
H	*12245.978	41.8	34	40.5	48.3	54	-5.7

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170
Mode : TX-Channel 16

Date of Test: September 30-October 14, 2005

Table 3, Baby unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
H	2454.394	90.6	34	29.4	86.0	94	-8.0
V	*4908.789	49.8	34	34.9	50.7	54	-3.3
H	*7363.183	46.8	34	37.9	50.7	54	-3.3
H	9817.577	41.9	34	40.4	48.3	54	-5.7
H	*12271.971	42.0	34	40.5	48.5	54	-5.5

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Jess Tang

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3.4 Radiated Emission Configuration Photograph - Parent Unit

Worst Case Radiated Emission

at 7363.183 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: config photos.doc

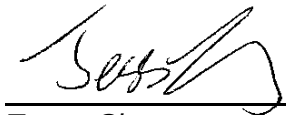
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3.5 Radiated Emission Data - Parent Unit

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Judgement : Passed by 0.3 dB margin

TEST PERSONNEL:



Tester Signature

Jess Tang, Lead Engineer
Typed/Printed Name

October 28, 2005
Date

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170
Mode : TX-Channel 1

Date of Test: September 30-October 14, 2005

Table 4, Parent Unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	2433.199	95.2	34	29.4	90.6	94	-3.4
H	*4866.399	52.2	34	34.9	53.1	54	-0.9
H	*7299.598	49.7	34	37.9	53.6	54	-0.4
H	9732.798	42.0	34	40.4	48.4	54	-5.6
H	*12165.997	41.7	34	40.5	48.2	54	-5.8

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170
Mode : TX-Channel 8

Date of Test: September 30-October 14, 2005

Table 5, Parent Unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	2449.196	94.2	34	29.4	89.6	94	-4.4
H	*4898.391	52.3	34	34.9	53.2	54	-0.8
H	*7347.587	49.5	34	37.9	53.4	54	-0.6
H	9796.782	42.2	34	40.4	48.6	54	-5.4
H	*12245.978	41.8	34	40.5	48.3	54	-5.7

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Jess Tang

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170
Mode : TX-Channel 16

Date of Test: September 30-October 14, 2005

Table 6, Parent Unit

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dB μ V)	Pre- Amp (dB)	Antenna Factor (dB)	Net at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
V	2454.394	94.1	34	29.4	89.5	94	-4.5
H	*4908.789	52.4	34	34.9	53.3	54	-0.7
H	*7363.183	49.8	34	37.9	53.7	54	-0.3
H	9817.577	42.3	34	40.4	48.7	54	-5.3
H	*12271.971	41.9	34	40.5	48.4	54	-5.6

- Notes:
1. Peak detector is used for the emission measurement.
 2. All measurements were made at 3 meter. Harmonic emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
 3. Negative value in the margin column shows emission below limit.
 4. Horn antenna is used for the emission over 1000MHz.
- * Emission within the restricted band fulfil the requirement of Section 15.209.

Test Engineer: Jess Tang

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3.6 Line Conducted Configuration Photograph - Baby and Parent Unit

Worst Case Line-Conducted Configuration

For electronic filing, the worst case line conducted configuration photographs are saved with filename: config photos.doc

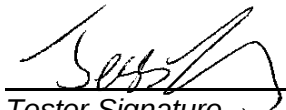
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3.7 Line Conducted Emission Data - Baby and Parent Unit

The data on the following pages list the significant emission frequencies, the limit, and the margin of compliance.

Judgement : Passed by more than 20 dB margin

TEST PERSONNEL:



Tester Signature

Jess Tang, Lead Engineer
Typed/Printed Name

October 28, 2005
Date

INTERTEK TESTING SERVICES

Company: Summer Infant, Inc.
Model: 02170

Date of Test: September 30-October 14, 2005

Conducted Emissions

For electronic filing, the conducted emission test result is saved with filename:
conduct.pdf

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**EXHIBIT 4
EQUIPMENT PHOTOGRAPHS**

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4.0 Equipment Photographs

For electronic filing, the photographs are saved with filename: external photos.doc & internal photos.doc

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EXHIBIT 5 PRODUCT LABELLING

5.0 **Product Labelling**

For electronic filing, the FCC ID label artwork and location is saved with filename:
label.pdf

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**EXHIBIT 6
TECHNICAL SPECIFICATIONS**

6.0 Technical Specifications

For electronic filing, the block diagram and circuit diagram are saved with filename: block.pdf and circuit.pdf respectively.

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EXHIBIT 7 INSTRUCTION MANUAL

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7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf

Please note that the required FCC Information to the User is saved with filename: fcc information.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.

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EXHIBIT 8 MISCELLANEOUS INFORMATION

8.0 **Miscellaneous Information**

This miscellaneous information includes details of the bandedge plot, the test procedure and calculation of factors such as pulse desensitization and averaging factor.

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8.1 **Radiated Emission on the Bandedge**

From the following plots, the field strength of any emissions appearing between the band edges and up to 10kHz above and below the band edges are attenuated at least 50dB below the level of the unmodulated carrier. The first two plots show the fundamental emission when modulated with 1kHz and 100dBSPL, 10cm from the Microphone of the Baby Unit and unmodulated. They fulfil the requirement of 15.249(d).

Please refer to the following plots for radiated emission on the bandedge:

Plot B1A: Baby Unit - Low Channel Emissions

Plot B1B: Baby Unit - High Channel Emissions

Plot P1A: Parent Unit - Low Channel Emissions

Plot P1B: Parent Unit - High Channel Emissions

For electronic filing, the above plots are saved with filename: emission.pdf

8.2 Discussion of Pulse Desensitization

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

8.3 **Emissions Test Procedures**

The following is a description of the test procedure used by Intertek Testing Services in the measurements of transmitters operating under Part 15, Subpart C rules.

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.4 - 2003.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower. For line conducted emissions, the range scanned is 150 kHz to 30 MHz.

8.3 **Emissions Test Procedures (cont'd)**

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements are made as described in ANSI C63.4 - 2003.

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.2). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.