



FCC PART 15, SUBPART C COMPLIANCE TEST REPORT

for

Electromagnetic Emissions

of

DUAL MODE READER

**Model Number: DS2805AD
Serial Number: Prototype
FCC ID: C4PDS2805AD**

MJO#: SN9B-003.1

Prepared for:

**WSE
47102 Mission Falls Court
Fremont, CA 94539**

Prepared by:

**EMC Technology Services, Incorporated
49000 Milmont Drive
Fremont, CA 94538
(510) 440-3838**

REPORT DATE: FEBRUARY 16, 1999



MJO #: SN9B-003.1
FCC ID: C4PDS2805AD

**FCC PART 15, SUBPART C
COMPLIANCE TEST REPORT**

FOR

**DUAL MODE READER
MODEL DS2805AD**

Prepared for:

WSE
Fremont, CA 94539

Prepared by: EMC Technology Services, Inc.

TEST TECHNICIAN

Dominic Griego

Date

2-22-99

TEST SUPERVISOR

Daryl Smith

2-22-99

Q.C. MANAGER/
FINAL RELEASE

Susan Pelletier

2-22-99

CUSTOMER APPROVAL

Representative for
WSE

2-22-99

LIST OF REVISIONS

<u>REVISION NUMBER AND DATE</u>	<u>PAGE CHANGED</u>	<u>PAGE SUBSTITUTED</u>	<u>PAGE ADDED</u>
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VERIFICATION OF COMPLIANCE

Equipment Under Test: Dual Mode Reader

Model Number: DS2805AD

Serial Number: Prototype

Company: WSE
47102 Mission Falls Ct.
Fremont, CA 94539

Test Standard: CFR 47, Part 15.209, Subpart C (1997)

Type of Test: Conducted 450 kHz - 30 MHz
Radiated 9 kHz - 1 GHz

Performance Criteria: For conducted tests, emissions shall not exceed the level of 250 μ V.
For radiated tests, emissions shall not exceed the level in Table 15.209 (a).

Deviation: None

Date Tested: February 9, 1999

Tested By: Dominic Griego

The above equipment was tested by EMC Technology Services, Inc., for compliance with the requirements set forth in the FCC Part 15, Subpart C Rules and Regulations. This said equipment in the configuration described in the report shows, that maximum emission levels emanating from the equipment are within the compliance requirements.

GENERAL INFORMATION

Customer: WSE
47102 Mission Falls Ct.
Fremont, CA 94539

Contact Person: Thong Nguyen

Phone Number: (510) 360-7906

Equipment Under Test: Dual Mode Reader

Model Number: DS2805AD

Serial Number: Prototype

FCC ID Number: C4PDS2805AD

Test Standard: CFR 47, Part 15.209, Subpart C (1997)

Type of Test: Conducted 450 kHz - 30 MHz
Radiated 9 kHz - 1 GHz

Performance Criteria: For conducted tests, emissions shall not exceed the level of 250 μ V. For radiated tests, emissions shall not exceed the level in Table 15.209 (a).

Deviation: None

REPRODUCTION CLAUSE:

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SYSTEM DESCRIPTION

Equipment Under Test

Dual Mode Reader

Offsite Support Equipment

ACU (Access Control Unit)

DC Power Supply (x2)

EUT Test Program: Continuous Running.

COMPANY CONFIDENTIAL

**DS2805AD
Engineering Specification**

Mixed Mode Reader

Part Number 7500028

Revision A

PROPRIETARY INFORMATION NOTICE

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DS2805AD

Engineering Specification

Revision Chart

November 9, 1998 Jim Collins Initial description of mixed mode reader operation.

DS2805AD

Engineering Specification

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DS2805AD

Engineering Specification

1. Introduction

1.1. Purpose

This Engineering Specification describes the functional requirements for the DS2805AD Analog/Digital Mixed Mode Reader.

1.2. Scope

This specification covers the overall system design requirements for the DS2805AD Mixed Mode Reader. It is to be viewed as an accessory to the 818SC Access Control Unit. The remainder of this specification describes features and functions of the DS2805AD.

1.3. Definitions, Acronyms, and Abbreviations

ACU- Access Control Unit

1.4. References

DS2805AD Engineering Specification, Part Number 7500028.

S-Net Communications Protocols, Part Number 75108970001

DS2805AD

Engineering Specification

2. The General Description

2.1. Summary

The Mixed Mode Reader System provides both analog and digital key reading by a single device at the door. This reader is only needed for user convenience since the 818SC can accommodate two reader types at a door. This system allows one reader with analog and digital capability to be connected to the acu.

2.1.1. Feature Summary

Summary of Product Features

Enclosure Size:	7" x 7" x 1.75" overall
Configuration:	Separate analog and digital reader assemblies with integrated data multiplexer
Analog Keys: Read Range: Read Speed:	1030/1040/1050/1060 0 to 1" less than 2 seconds
Digital Keys: Read Range: Read Speed:	Quadrakey, Keymate, Durakey 0 to 2" for Dual coil key 0 to 1" for Single coil key less than 2 seconds
Digital reader (Snet) Interface:	Via terminal screws on case
Analog reader Interface:	Coax, 75 ohm, F style
Rugged enclosure:	Water resistant
Mounting position:	Wall mountable with rear coax connector
Audible response:	Beeper activate with valid key read
Visual indicator:	Green-yellow-red LED for status

DS2805AD

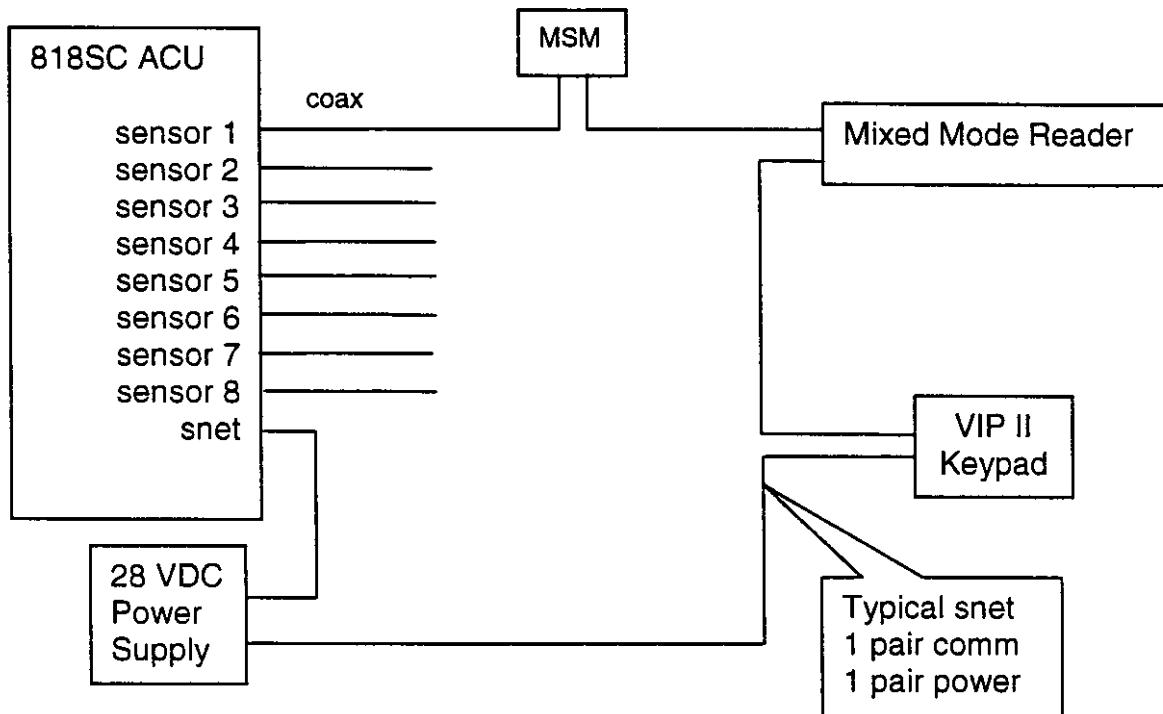
Engineering Specification

2.2. Theory of Operation

The DS2805AD Mixed Mode Reader is an 818SC Access Control Unit product that accepts both analog and digital cards at the same device.

The unit consists of an Analog reader and Digital reader in one enclosure.

2.2.1. System Configuration



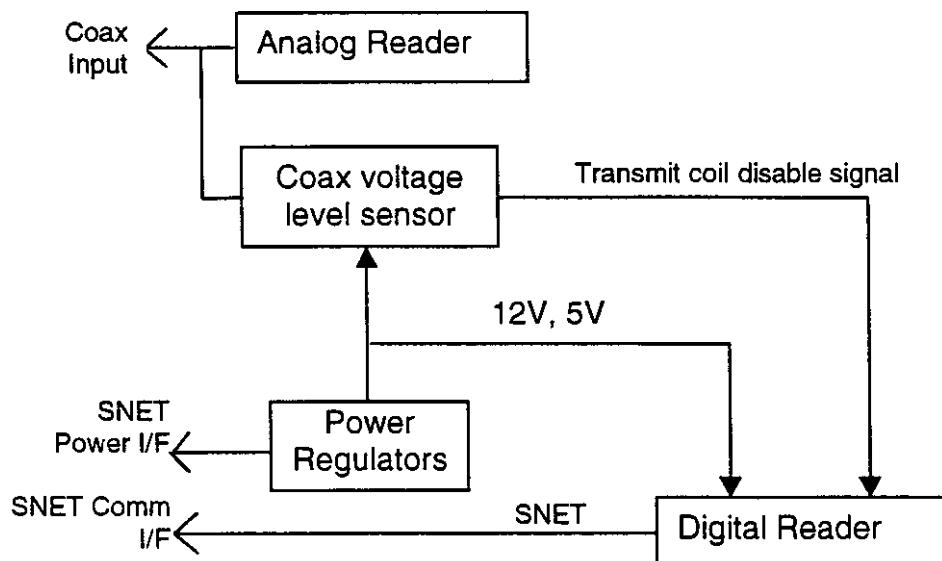
Block Diagram: Typical 818SC Mixed Mode Reader Configuration

DS2805AD

Engineering Specification

2.2.2. Mixed Mode Reader

The Mixed Mode Reader consists of a digital key reader (DKR), an analog key reader, a power regulator, and a coax voltage level sensor. The voltage level sensor detects an active analog sweep and signals the processor in the digital reader to turn off its transmit antenna.



Block Diagram: Mixed Mode Reader

2.2.2.1. Digital Reader

The digital reader is comprised of a microprocessor (16C73A), an RS485 transceiver circuit, and a transmit/receive coil interface circuit that powers and decodes the digital key id.

The microprocessor controls all digital reader functions. Its clock is generated by an 11.0592 MHz crystal. The microprocessor in turn generates the 140 KHz signal for the digital antenna and accepts the serial key data from the key receive circuit. The microprocessor communicates with the 818SC ACU using the WSE proprietary S-Net communication protocol via an RS485 transceiver circuit. Digital key reports are repeated only if the key is kept in the field for more than 5 seconds (unless key repeat is enabled).

DS2805AD

Engineering Specification

2.2.2.2. Analog Reader

The analog reader consists of a transmit/sense coil antenna, a hybrid transformer, a high gain amplifier, and a peak detector. It is connected via coax cable directly to the 818SC analog front end. The 818 generates a signal sweep that starts at 30 MHz and ends at 2.7 MHz. During the RF sweep any field imbalance presented at the hybrid transformer is amplified and driven back onto the coax as a very fast pulse. The field imbalance is initially caused by presenting an LC resonant circuit into the field. The analog key consists of multiple LC resonances at selected frequencies. The 818SC ACU takes the frequency bands that contain pulses and converts this collection into a key id.

2.2.2.3. Power

The analog part of the reader is powered by the analog sweep signal. The digital part however is powered by 28VDC input. Two regulators are employed to generate 5VDC for the digital reader microprocessor and 12VDC to power the beeper.

2.2.2.4. Coax Voltage Level Sensor

The analog sweep signal consists of a dc voltage level combined with the RF sweep signal. The dc level changes when the RF data is present. This dc level is detected by a comparator that signals the microprocessor to disable the digital transmitter during the RF sweep.

DS2805AD

Engineering Specification

3. Specific Requirements

This section contains the design specifications for the DS2805AD Mixed Mode Reader.

3.1. Digital Key Requirements

The digital key reader portion of the DS2805AD Mixed Mode Reader is designed as a single door reader that powers a WSE Digital Command Key at a distance of up to 2 inches and receives its ID code.

The DS2805AD generates a 140 kHz signal which drives a loop antenna. When a Digital Command Key is within proximity, its coil picks up the 140 kHz magnetic field, which is rectified to power the key ASIC. The key then emits its own unique ID code in the form of a 10 msec, 70 kHz Phase shift keyed (PSK) signal. The DS2805AD is required to decode the ID and pass it along to the ACU when interrogated. In addition, the DKR will silence its antenna when it receives an disable signal from the coax voltage level sensor.

3.2. Analog Key Requirements

The unit must read all WSE analog key types including 1030, 1040, 1050 and 1060 at a range of up to 1 inch. These keys present resonance impedance changes at various frequencies in the range of 3-30 MHz. The 818SC detects the impedance changes and converts them into unique key codes.

3.3. Mechanical Requirements

3.3.1. Size

The size of the DS2805AD is 7" H x 7" W x 1.75" D.

3.3.2. Weight

The weight of the DS2805AD is 12 oz.

3.3.3. Mounting

The DS2805AD mounts on a wall surface.

DS2805AD

Engineering Specification

3.3.4. Wiring connections

The DS2805AD analog interface is connected using coaxial style F connector.

The digital interface requires dual twisted pair wiring suitable for use on the S-Net. This wiring consists of power (1 pair) and communications (1 pair). Clearly labeled screw terminals on the rear of the case are provided for this interface.

3.4. Hardware Requirement

3.4.1. Input voltage and current

The DS2805AD digital section is powered from a normal 28 VDC power input. The total current consumption is less than 60 mA. A suitable power supply such as the WSE Power Inserter can be used.

The analog section receives its power directly from the coaxial cable. The signal is nominally 12 volt dc with a analog signal 3-30MHz riding on it.

3.4.2. Communications

The DS2805AD digital section communicates with an access control unit via twisted pair wiring utilizing RS485 electrical interface and the WSE S-Net communications protocol. The communication rate is 9600 BPS asynchronous serial data format.

3.4.3. Status indicators

The DS2805AD provides a tri-color LED as a visual indicator and a buzzer as an audio indicator.

3.5. Software Requirement

The DS2805AD microprocessor provides the following capabilities :

- reads a Digital Command Keys when present within the read range
- communicates with an 818SC ACU providing information such as key ID and responding to LED and buzzer commands using the S-Net communications protocol
- provide visual and audio indications to show the operational status of the DS2805AD

DS2805AD

Engineering Specification

3.5.1. System behavior

The DS2805AD has three main modes of operation :

3.5.1.1. On-line

The DS2805AD enters this mode when communication is established with the ACU.

3.5.1.2. Off-line Mode:

The DS2805AD enters this mode when no communication is established with the ACU, this also includes the power-up condition.

3.5.1.3. Demo Mode:

The DS2805AD enters this mode when the address is set to \$FF.

Summary of system behavior :

	On-line		Off-line		Demo	
	LED	Buzzer	LED	Buzzer	LED	Buzzer
No key present	steady red	off	flash red for 4 sec, steady yellow for 4 sec, off for 52 sec	off	steady red	
Valid key read	under host control	on for 100 msec	flash yellow for 4 sec	on for 100 msec 4 times	green for 100 msec	on for 100 msec
Valid key read when repeat function enabled	under host control	under host control	flash yellow	off	green for 100 msec	on for 100 msec
Door unlock/open	steady green for door open time	on for time in TUNE command	n/a	n/a	n/a	n/a

DS2805AD

Engineering Specification

3.6. Environmental Characteristics

3.6.1. The DS2805AD DigiReader is designed to operate in an indoor or outdoor environment.

3.6.2. Operating Temperature

-35° C to +66° C

3.6.3. Humidity

5 to 100 % relative humidity including surface condensation

3.6.4. Vibration

Vibration seen in a normal environment will not cause damage or cause the unit to malfunction under normal circumstances.

3.6.5. Shock

Shock experienced in a normal installation or encountered in shipment by normal commercial common carrier will not cause damage to the unit. However, it is designed to be mounted on stationary objects such as walls, not doors.

3.6.6. Shake

N/A

3.6.7. Drop

The unit, when packaged for shipment, is capable of surviving a 4 foot vertical drop without damage.

3.7. Regulatory Requirements

3.7.1. FCC

The DS2805AD DigiReader card reader and its peripheral components are in compliance with FCC emission standards. The device complies with Part 15, Equipment Classification for Low power transmitter.

The labeling of the product, as well as the manuals supplied to the end user and dealer, shall be compliant with the applicable portions of the FCC regulations.

DS2805AD

Engineering Specification

3.7.2. CE Mark

The DS2805AD Mixed Mode Reader is designed to comply with CE requirements for access control equipment.

3.7.3. UL standards

The DS2805AD Mixed Mode Reader is designed to comply with UL-294 requirements for access control equipment.

3.7.4. American Disability Act

The DS2805AD Mixed Mode Reader is designed to comply with the American Disability Act using an LED for visual and Buzzer for audio indication of reader activities.

DS2805AD

Engineering Specification

3.8. Reliability Requirements

3.8.1. Reliability

The DS2805AD Mixed Mode Reader will have been thoroughly tested at time of delivery to operations. All User Interface and operational features will have been exercised.

The DS2805AD shall be designed to achieve high reliability, consistent with total manufacturing cost guidelines. The MTBF of the system will be calculated by the Quality Assurance Dept. upon design completion.

3.8.2. Robustness

The DS2805AD Mixed Mode Reader will continue to function accurately upon recovery from normal power glitches and abnormal power disturbances, bogus DigiKey cards and unintended (not installed) large metal objects.

3.9. Produceability Requirements

3.9.1. Packaging

The DS2805AD Mixed Mode Reader shall utilize standard WSE packaging for shipment; special boxes are not required but may be used.

3.9.2. Security

The contents of the CPU of the DS2805AD Mixed Mode Reader is protected with the on chip security fuse to prevent unauthorized read of PROM contents.

3.9.3. Documentation

The following items shall be made available to Manufacturing in order to facilitate the manufacture of the DS2805AD.

3.9.3.1. Specifications

This document shall be made available for use in validation of the hardware and software.

3.9.3.2. Test Procedures

Production Test Procedures shall be made available to manufacturing according to company standards at the time of release.

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Westinghouse Security Electronics Inc
5452 Betsy Ross Drive
Santa Clara, CA 95054

Date of Grant: April 9, 1997

File No.: 31010/EQU 4-3-2

Application dated: February 13, 1997

Attention: William E. Blasdell

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER

C4PDR4203

Name of Grantee

Westinghouse Security Electronics Inc

FCC Rule Part(s): 15

Frequency (MHz) : 0.140

Equipment Class : Low Power Transmitter Below 1705 kHz

Card Reader Transmitter w/Serial Port

If the subject device requires shielded interface cables to ensure compliance, the user's manual must advise the user of this requirement.

This device has shown compliance with new rules adopted under Docket 87-389 and is not affected by Section 15.37, transition rule.

[Handwritten signature]

APPENDIX B

TEST FACILITY

TEST FACILITY

Location: 11825 Niles Canyon Road
Sunol, CA 94586

Description: At the Sunol facility, there are four 3/10 m open area test sites, two line conducted labs and two indoor conducted/radiated engineering labs. The OATS and the LC labs are constructed and calibrated to meet the FCC requirements in documents OST-55/MP-4 and ANSI C63.4 1992.

Accreditation: EMC Technology Services Inc., has been accredited by A2LA to do EMC testing, including FCC DoC testing on personal computers and their peripherals.

FCC has also accepted EMC Technology Services, Inc., facility site for filing applications for certification and notification.

Certification: EMC Technology Services, Inc., has the following test/lab sites certified by VCCI and Industry Canada (IC):

Open Area Test Site #1: VCCI No. R-802 and IC 2816-1

Open Area Test Site #2: VCCI No. R-376 and IC 2816-2

Open Area Test Site #3: VCCI No. R-377 and IC 2816-3

Open Area Test Site #4: VCCI No. R-378 and IC 2816-4

Line Conducted Lab #1: VCCI No. C-392

Line Conducted Lab #2: VCCI No. C-427



MJO #: SN9B-003.1
FCC ID: C4PDS2805AD

APPENDIX C

TEST EQUIPMENT

MEASURING INSTRUMENT SETTINGS

TEST TYPE	DETECTOR	FREQUENCY RANGE	RESOLUTION BANDWIDTH	VIDEO BANDWIDTH
Conducted	Peak/Avg	10 kHz-150 kHz	300 Hz/3 kHz	100 kHz/3 kHz
Conducted	Peak/QP/Avg	150 kHz-30 MHz	10 kHz/100 kHz	100 kHz
Radiated	Peak/Avg	60 Hz-1 kHz	10 Hz	100 kHz
Radiated	Peak/Avg	1 kHz-10 kHz	100 Hz	100 kHz
Radiated	Peak/Avg	10 kHz-150 kHz	300 Hz	100 kHz/300 Hz
Radiated	Peak/QP/Avg	150 kHz-30 MHz	10 kHz	100 kHz/10 kHz
Radiated	Peak/QP/Avg	30 MHz-1 GHz	100 kHz	100 kHz/10 kHz
Radiated	Peak/Avg	Above 1 GHz	1 MHz	1 MHz/300 kHz

Note: All readings on data pages are taken with the detector in peak mode unless otherwise stated.

TEST EQUIPMENT LIST

EQUIPMENT TYPE	* MFR	MODEL NUMBER	SERIAL NUMBER	LAST ** CAL.	CAL. DUE
Biconical Antenna	EMCO	3110	9210-1581	09-01-98	09-01-99
Log Periodic Antenna	Schwarzbeck	UHALP 9107	9107384	09-25-98	09-25-99
Rod Antenna	Eaton	94607-1	305	04-21-98	04-21-99
Receiver RF Section	Hewlett Packard	85462A	3807A00456	07-06-98	07-06-99
RF Filter Section	Hewlett Packard	85460A	3704A00424	07-06-98	07-06-99

* MFR = Manufacturer

** CAL. = Calibration

APPENDIX D

TEST METHODS

TEST METHODS (LINE CONDUCTED TEST)

- 1) The equipment will be set up according to the test specification to simulate typical actual usage. When the EUT is a table-top system, a wooden table with a height of 0.8 meters is used which is placed on the ground plane according to the test specification. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, will be placed according to the test specification.
- 3) All I/O cables are positioned to simulate typical actual usage according to the test specification.
- 4) The EUT receives AC power through a Line Impedance Stabilization Network (LISN) which is grounded to the ground plane.
- 5) Support equipment, if used, will receive AC power through a second LISN.
- 6) Emissions are measured on each current carrying line of the EUT using a spectrum analyzer connected to the LISN powering the EUT.
- 7) During the emission measurement, the I/O cable placement position is adjusted in order to maximize the emission measurement level.
- 8) Emission frequency and amplitude are recorded into a computer in which correction factors are used to calculate the emission level and compare the reading to the applicable limit.

Data Sample:

Freq. MHz	Corr'd dB μ V	Site CF	Limit dB μ V	Margin dB μ V	Line
2.47	46.0	6.0	48.0	-2.0	L1

Freq. = Emission frequency in MHz
 Corr'd dB μ V = RAW reading converted to dB μ V and CF added
 Site CF = Correction Factors for pad/cable losses
 Limit dB μ V = Limit stated in standard
 Margin dB μ V = Reading in reference to limit
 Note = Current carrying line of reading

TEST METHODS (RADIATED TEST)

- 1) The equipment will be set up according to the test specification to simulate typical actual usage. When the EUT is a table-top system, a wooden table with a height of 0.8 meters is used which is placed on the ground plane according to the test specification. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm covering to insulate the EUT from the ground plane.
- 2) Support equipment, if needed, will be placed according to the test specification.
- 3) All I/O cables are positioned to simulate typical actual usage according to the test specification.
- 4) The antenna is placed at some given distance away from the EUT as stated in the test specification. The antenna connects to the analyzer via a cable and at times a preamp is used.
- 5) Emissions are scanned and measured rotating the EUT to 360 degrees, positioning cable placement, and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarizations in order to maximize the emission reading level.
- 6) Emission frequency, amplitude, antenna position, polarization, and table position are recorded into a computer in which correction factors are used to calculate the emission level and compare the reading to the applicable limit.

Data Sample:

Freq. MHz	Corr'd dB μ V	Site CF	Limit dB μ V	Margin dB μ V	Table Pos.	Ant Pos.
76.57	44.2	-12.8	40.0	-5.3	180	1.5V

Freq.	= Emission frequency in MHz
Corr'd dB μ V	= RAW reading converted to dB μ V and CF added
Site CF	= Correction Factors for pad/cable losses
Limit dB μ V	= Limit stated in standard
Margin dB μ V	= Reading in reference to limit
Table Position	= EUT placement in reference to antenna
Antenna Position	= Antenna polarization and height above ground plane

APPENDIX E

CLASS TYPES

FCC CLASS TYPES

CLASS A COMPUTING DEVICE

A computing device which is marketed for use in a commercial or business environment; exclusive of a device which is marketed for use by the general public, or which is intended to be used in the home. Reference: Section 15.3 (h).

CLASS B COMPUTING DEVICE

A computing device that is marketed for use in a residential environment notwithstanding use in a commercial, business, or industrial environment. Examples of such devices include, but are not limited to: electronic games, personal computers, calculators, and similar devices that are marketed for the general public. Reference: Section 15.3 (i).

NOTE: A manufacturer may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B computing device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B computing device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a computing device as a Class B computing device, regardless of its intended use.

APPENDIX F

LABELING REQUIREMENTS

FCC CLASS B LABELING REQUIREMENT

Section 15.19 of the Code of Federal Regulation

A) The Class B computing device subject to certification by the Commission shall be identified pursuant to par. 2.925 et seq of this Chapter. In addition, the label shall include the following statement:

FCC ID: C4PDS2805AD
THIS DEVICE COMPLIES WITH PART 15 OF THE
FCC RULES. OPERATION IS SUBJECT TO THE
FOLLOWING TWO CONDITIONS:
(1) THIS DEVICE MAY NOT CAUSE HARMFUL
INTERFERENCE, AND (2) THIS DEVICE MUST
ACCEPT ANY INTERFERENCE RECEIVED,
INCLUDING INTERFERENCE THAT MAY CAUSE
UNDESIRABLE OPERATION.

B) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified in this Section is required to be affixed only to the main control unit.

C) When the device is so small or for such use that it is not practicable to place the statement specified in this Section on it, the information required by these paragraphs shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

D) The label shall not be a stick-on paper label. The label on these products shall be permanently affixed to the product and shall be readily visible to the purchaser at the time of purchase. "Permanently affixed" means that the label is etched, engraved, stamped, silkscreened, indelibly printed, or otherwise permanently marked on a permanently attached part of the equipment or a nameplate of metal, plastic, or other material fastened to the equipment by welding, riveting, or use of a permanent adhesive. The label must be designed to last the expected lifetime of the equipment in the environment in which the equipment may be operated and must not be readily detachable.

APPENDIX G

DATA READINGS

LINE CONDUCTED DATA

 COMPANY: WSE
 EQUIP. UNDER TEST: Dual Mode Reader

 MODEL NUMBER: DS2805AD
 TEST PROCEDURE: CFR 47 Part 15.209
 MEASUREMENT SETUP: LISN #823...120Vac 60Hz
 SUPPORT EQUIPMENT: Access Control Unit/Power Supply x2

 TESTED BY: Dominic Griego
 DATE TESTED: February 9, 1999

 TIME: 4:00pm Control Rm Temp: 62 Deg.F Humidity: 44 %RH
 EUT Room Temp: 58 Deg.F Humidity: 40 %RH

FREQ MHz	RAW dBm	SITE CF	CORR'D dBuV	LIMIT A	LIMIT B	EUT A	MARGIN B	NOTE
Westinghouse Security Electronics Mod#3018S								
0.767	-84.0PK	6.0	29.0	60.0	48.0	-31.0	-19.0	L1
2.120	-84.0PK	6.0	29.0	69.5	48.0	-40.5	-19.0	L1
11.690	-81.5PK	6.0	31.5	69.5	48.0	-38.0	-16.5	L1
22.100	-64.0PK	6.0	49.0	69.5	48.0	-20.5	+1.0	L1
22.100	-77.8QP	6.0	35.2	69.5	48.0	-34.3	-12.8	L1
28.160	-77.0PK	6.0	36.0	69.5	48.0	-33.5	-12.0	L1
1.110	-84.6PK	6.0	28.4	60.0	48.0	-31.6	-19.6	L2
2.020	-84.7PK	6.0	28.3	69.5	48.0	-41.2	-19.7	L2
11.600	-81.7PK	6.0	31.3	69.5	48.0	-38.2	-16.7	L2
22.100	-63.0PK	6.0	50.0	69.5	48.0	-19.5	+2.0	L2
22.100	-78.2QP	6.0	34.8	69.5	48.0	-34.7	-13.2	L2
28.150	-78.1PK	6.0	34.9	69.5	48.0	-34.6	-13.1	L2

 L1 = LINE ONE (HOT SIDE)
 L2 = LINE TWO (NEUTRAL SIDE)

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 ===== END OF CONDUCTED TEST =====
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LINE CONDUCTED DATA
COMPANY: WSE
EQUIP. UNDER TEST: Dual Mode Reader

MODEL NUMBER: DS2805AD
TEST PROCEDURE: CFR 47 Part 15.209
MEASUREMENT SETUP: LISN #823...120Vac 60Hz
SUPPORT EQUIPMENT: Access Control Unit/Power Supply x2

TESTED BY: Dominic Griego
DATE TESTED: February 9, 1999

TIME: 4:00pm **Control Rm Temp:** 62 Deg.F **Humidity:** 44 %RH
EUT Room Temp: 58 Deg.F **Humidity:** 40 %RH

FREQ MHz	RAW dBm	SITE CF	CORR'D dBuV	LIMIT		EUT A	MARGIN A	NOTE
				A	B			
Westinghouse Security Electronics Mod#902-P1								
0.991	-78.5PK	6.0	34.5	60.0	48.0	-25.5	-13.5	L1
1.770	-84.5PK	6.0	28.5	69.5	48.0	-41.0	-19.5	L1
16.910	-83.0PK	6.0	30.0	69.5	48.0	-39.5	-18.0	L1
22.100	-76.2PK	6.0	36.8	69.5	48.0	-32.7	-11.2	L1
28.160	-77.1PK	6.0	35.9	69.5	48.0	-33.6	-12.1	L1
0.792	-76.3PK	6.0	36.7	60.0	48.0	-23.3	-11.3	L2
1.400	-83.7PK	6.0	29.3	60.0	48.0	-30.7	-18.7	L2
22.010	-77.5PK	6.0	35.5	69.5	48.0	-34.0	-12.5	L2
28.150	-79.5PK	6.0	33.5	69.5	48.0	-36.0	-14.5	L2

L1 = LINE ONE (HOT SIDE)
L2 = LINE TWO (NEUTRAL SIDE)

===== END OF CONDUCTED TEST =====

RADIATED EMISSION DATA

COMPANY: WSE

EQUIP. UNDER TEST: Dual Mode Reader

MODEL NUMBER: DS2805AD

TEST PROCEDURE: CFR 47 part 15.209

SUPPORT EQUIPMENT: Access Control Unit/ Power Supply (x2)

DATE: February 9, 1999

TEST BY: Dominic Griego

Site #: 4

Harmonics of 70 kHz & 140 kHz

0.070	-118	20.3	9.3	130.7	-121.4
0.138	-93	20.3	34.3	124.8	-90.5
0.280	-118	20.3	9.3	118.7	-109.4
0.418	-122	20.3	5.3	115.2	-109.9
0.700	-97	20.3	30.3	110.7	-80.4
0.840	-106	20.3	21.3	109.1	-87.8
0.980	-99	20.3	28.3	107.8	-79.5
1.120	-99	20.3	28.3	106.6	-78.3
1.260	-97.6	20.3	29.7	105.6	-75.9
1.400	-105	20.3	22.3	104.7	-82.4
1.540	-95	20.3	32.3	103.9	-71.6
1.680	-106	20.3	21.3	103.1	-81.8

Harmonics of 3 MHz

3.01	-84.3	20.3	43.0	49.5	-6.5
6.01	-84.5	20.3	42.8	49.5	-6.7
9.00	-82.9	20.3	44.4	49.5	-5.1
12.02	-85.7	20.3	41.6	49.5	-7.9
15.02	-87.3	20.3	40.0	49.5	-9.5
18.01	-90.3	20.3	37.0	49.5	-12.5
21.00	-97.3	20.3	30.0	49.5	-19.5
24.00	-98.2	20.3	29.1	49.5	-20.4
27.00	-97.3	20.3	30.0	49.5	-19.5
30.00	-97.6	20.3	29.7	49.5	-19.8

Fundamental Frequency of 28 MHz

28.17	-85.6	20.3	41.7	49.5	-7.8
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RADIATED EMISSION DATA

 COMPANY: WSE
 EQUIP. UNDER TEST: Dual Mode Reader

 MODEL NUMBER: DS2805AD
 TEST PROCEDURE: CFR 47 part 15.209
 SUPPORT EQUIPMENT: Access Control Unit/Power Supply (x2)

 TESTED BY: Dominic Griego TEST SITE 4
 DATE TESTED: February 9, 1999
 TIME: 9:30am Control RM Temp: 62 Deg.F Humidity: 44 %RH
 EUT Room Temp: 58 Deg.F Humidity: 40 %RH

30MHz TO 300MHz Biconical Antenna at 3 meters Vert.

FREQ MHz	RAW dBm	SITE CF	CORR'D dBuV	LIMIT		EUT	MARGIN	POSITION	
---	---	---	---	A	B	A	B	TBL	ANT
56.13	-94.3PK	+12.4	25.1	49.5	40.0	-24.4	-14.9	265	1.50
84.06	-90.0PK	+8.5	25.4	49.5	40.0	-24.1	-14.6	180	2.00
112.07	-101.9PK	+14.0	19.1	54.0	43.5	-34.9	-24.4	180	2.40
140.17	-100.8PK	+12.3	18.5	54.0	43.5	-35.5	-25.0	45	1.50
168.11	-102.9PK	+17.7	21.8	54.0	43.5	-32.2	-21.7	90	2.25
196.12	-105.5PK	+18.6	20.1	54.0	43.5	-33.9	-23.4	285	2.50
224.13	-107.5PK	+19.3	18.8	57.0	46.0	-38.2	-27.2	270	1.75
252.16	-105.2PK	+20.4	22.2	57.0	46.0	-34.8	-23.8	165	2.00
280.14	-108.6PK	+21.4	19.8	57.0	46.0	-37.2	-26.2	240	2.25

30MHz TO 300MHz Biconical Antenna at 3 meters Horz.

56.12	-99.1PK	+12.4	20.3	49.5	40.0	-29.2	-19.7	0	3.50
84.05	-96.7PK	+8.5	18.8	49.5	40.0	-30.7	-21.2	280	3.25
112.00	-101.9PK	+13.9	19.1	54.0	43.5	-34.9	-24.4	200	3.50
140.10	-106.6PK	+12.3	12.8	54.0	43.5	-41.2	-30.7	270	3.50
168.11	-107.1PK	+17.7	17.6	54.0	43.5	-36.4	-25.9	275	3.50
196.16	-109.4PK	+18.6	16.2	54.0	43.5	-37.8	-27.3	45	3.20
224.18	-106.2PK	+19.4	20.1	57.0	46.0	-36.9	-25.9	210	3.50
252.16	-106.0PK	+20.4	21.4	57.0	46.0	-35.6	-24.6	45	2.50
280.16	-108.9PK	+21.4	19.5	57.0	46.0	-37.5	-26.5	220	2.25

RADIATED EMISSION DATA

 COMPANY: WSE
 EQUIP. UNDER TEST: Dual Mode Reader

 MODEL NUMBER: DS2805AD
 TEST PROCEDURE: CFR 47 part 15.209
 SUPPORT EQUIPMENT: Access Control Unit/Power Supply (x2)

 TESTED BY: Dominic Griego TEST SITE 4
 DATE TESTED: February 9, 1999
 TIME: 11:15am Control RM Temp: 62 Deg.F EUT Room Temp: 58 Deg.F Humidity: 44 %RH
 EUT Humidity: 40 %RH

30MHz TO 300MHz Biconical Antenna at 3 meters Horz.

FREQ MHz	RAW dBm	SITE CF	CORR'D dBuV	LIMIT A	LIMIT B	EUT A	MARGIN B	POSITION TBL	POSITION ANT
30MHz TO 300MHz Biconical Antenna at 3 meters Horz.									
44.24	-96.7PK	+11.8	22.1	49.5	40.0	-27.4	-17.9	45	3.50
66.35	-88.8PK	+8.9	27.2	49.5	40.0	-22.3	-12.8	295	3.75
77.44	-81.3PK	+7.1	32.9	49.5	40.0	-16.6	-7.1	300	2.75
121.65	-93.3PK	+13.1	26.8	54.0	43.5	-27.2	-16.7	45	2.50
132.72	-90.9PK	+12.2	28.4	54.0	43.5	-25.6	-15.1	300	3.75
143.91	-101.2PK	+12.7	18.5	54.0	43.5	-35.5	-25.0	180	3.50
176.35	-91.4PK	+19.1	34.7	54.0	43.5	-19.3	-8.8	220	3.50
188.00	-93.6PK	+19.1	32.5	54.0	43.5	-21.5	-11.0	180	3.75
221.20	-101.2PK	+19.2	25.0	57.0	46.0	-32.0	-21.0	175	2.85
232.52	-97.6PK	+19.7	29.1	57.0	46.0	-27.9	-16.9	175	2.50
254.38	-98.5PK	+20.5	29.0	57.0	46.0	-28.0	-17.0	280	1.50

30MHz TO 300MHz Biconical Antenna at 3 meters Vert.									
FREQ MHz	RAW dBm	SITE CF	CORR'D dBuV	LIMIT A	LIMIT B	EUT A	MARGIN B	POSITION TBL	POSITION ANT
44.25	-95.9PK	+11.8	22.9	49.5	40.0	-26.6	-17.1	200	1.75
66.36	-78.6PK	+8.9	37.4	49.5	40.0	-12.1	-2.6	350	1.50
66.36	-81.2QP	+8.9	34.7	49.5	40.0	-14.8	-5.3	350	1.50
77.41	-77.1PK	+7.1	37.0	49.5	40.0	-12.5	-3.0	200	1.50
77.41	-78.5QP	+7.1	35.6	49.5	40.0	-13.9	-4.4	200	1.50
121.65	-96.4PK	+13.1	23.7	54.0	43.5	-30.3	-19.8	45	1.75
132.71	-87.8PK	+12.2	31.4	54.0	43.5	-22.6	-12.1	280	1.50
176.95	-92.5PK	+19.0	33.5	54.0	43.5	-20.5	-10.0	45	2.00

RADIATED EMISSION DATA
COMPANY: WSE
EQUIP. UNDER TEST: Dual Mode Reader

MODEL NUMBER: DS2805AD
TEST PROCEDURE: CFR 47 part 15.209
SUPPORT EQUIPMENT: Access Control Unit/Power Supply (x2)

TESTED BY: Dominic Griego **TEST SITE 4**
DATE TESTED: February 9, 1999
TIME: 12:20pm **Control RM Temp:** 62 Deg.F **Humidity:** 44 %RH
 EUT Room Temp: 58 Deg.F **Humidity:** 40 %RH

30MHz TO 300MHz Biconical Antenna at 3 meters Vert.

FREQ MHz	RAW dBm	SITE CF	CORR'D dBuV	LIMIT		EUT	MARGIN	POSITION	
---	---	---	---	A	B	A	B	TBL	ANT
188.00	-93.7PK	+19.1	32.4	54.0	43.5	-21.6	-11.1	145	1.50
232.25	-99.0PK	+19.6	27.6	57.0	46.0	-29.4	-18.4	145	2.00
254.38	-100.6PK	+20.5	26.9	57.0	46.0	-30.1	-19.1	175	2.00

300MHz to 1000MHz Log Periodic Antenna at 3 meters Horz.

387.09	-92.5PK	+18.3	32.9	57.0	46.0	-24.1	-13.1	0	2.00
420.27	-89.4PK	+18.9	36.5	57.0	46.0	-20.5	-9.5	180	2.00
541.93	-94.7PK	+20.7	33.0	57.0	46.0	-24.0	-13.0	340	2.50
687.93	-100.2PK	+22.7	29.6	57.0	46.0	-27.4	-16.4	200	1.50
829.48	-96.5PK	+25.2	35.7	57.0	46.0	-21.3	-10.3	350	2.00

300MHz to 1000MHz Log Periodic Antenna at 3 meters Vert.

387.09	-86.6PK	+18.3	38.8	57.0	46.0	-18.2	-7.2	200	1.50
420.27	-86.0PK	+18.9	39.9	57.0	46.0	-17.1	-6.1	220	1.25
541.93	-91.0PK	+20.7	36.6	57.0	46.0	-20.4	-9.4	230	1.25
687.92	-100.9PK	+22.7	28.8	57.0	46.0	-28.2	-17.2	265	1.50
829.48	-96.0PK	+25.2	36.1	57.0	46.0	-20.9	-9.9	90	1.75

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===== END OF RADIATED TEST =====

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