

COMPANY	Sensormatic Electronics Corp. 6600 Congress Ave Boca Raton, Florida 33487
PRODUCT TESTED	AMS-9040 FCC ID: BVCAMS9040 IC: 3506A-AMS9040
FCC RULES	15.207, 15.209
IC SPECIFICATIONS	RSS 210
TEST DATE	March 19 / April 21/ May 10, 2004
SUBMITTED BY	William M. Elliott

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I. Summary of Results

47 CFR 15.203	ANTENNA REQUIREMENTS	COMPLIES
47 CFR 15.207	CONDUCTED EMISSIONS	COMPLIES
47 CFR 15.209	RADIATED EMISSIONS	COMPLIES
RSS 210: 5.9.1	OCCUPIED BANDWIDTH	PROVIDED

II. General Information

1.1. Test Methodology

Both conducted and radiated emissions testing were performed according to the procedures in ANSI C63.4-1992, and the requirements of 15.31, 15.33, 15.35, 15.207, and 15.209. Radiated emissions measurements below 30MHz were performed at a distance 15 meters and the results were extrapolated to the distance specified per 15.31 and 15.209 invoking the 2-point extrapolation method.

1.2. Test Facility

Measurements per 15.207 and 15.209 were performed at Sensormatic Electronics Corporation.

The shielded room conducted emissions measurement facility and the radiated emissions Open Area Test Site are located at Sensormatic Electronics Corporation Headquarters at 6600 Congress Avenue, Boca Raton, Florida 33487. These sites have been found acceptable by and are on file with the FCC per FCC Registration Number 90925, and Industry Canada per file number IC 3506.

1.3. Test System Description.

The AMS-9040 is a controller capable of driving a pair of antennas to generate a magnetic field to excite tags, receive the signal and alarm when an acceptable tag signal is detected and verified. A single main PCB accommodates the Receiver, the Switching Amplifier Transmitter and the Power Supply.

The AMS-9040 is intended to be paired with the following Sensormatic transmit antenna systems families:

- Digital Door-Max
- Digital Floor-Max
- Digital Pro-Max
- Digital Euro Pro-Max
- Ultra•Loop

The worst-case radiated emissions data [below 30 MHz] was observed on the Ultra•Loop Antenna. The worst case configuration was the vertical loop and the data reported is to that configuration.

The product tested was a pre-production unit built to production drawings.

15.203. The antenna is a professionally installed external antenna employing a terminal style connector; therefore the antenna is compliant with the requirements of this clause.

III. Conducted Emissions

15.207. Conducted emissions data are presented in Section VIII “Data”, Part A, “Conducted Emissions”. The product demonstrated compliance with the requirements of 15.207. The product was tested at 120 V, 60 Hz with the device transmitting. The worst-case conducted emissions data was observed on the Digital Floor-Max antennas and the data reported is to that configuration.

IV. Radiated Emissions

15.209. Radiated emissions data for this product are presented in Section VIII “Data”, Part B, Radiated Emissions. The product demonstrated compliance with the requirements. Radiated emissions measurements were performed at 15 meters. Propagation loss was determined by measuring emissions at 15 and 30 m. The results were compared to the limits by extrapolating the results to 300 meters as per 15.31(f)(2), using the 2-point extrapolation method.

Maximum radiation was determined by first assessing symmetry. The product exhibited semi-circular symmetry. Measurements were taken at radials of 22.5° throughout two quadrants; the measurement antenna was rotated for maximum pickup about the vertical axis of the measurement antenna at each radial. The maximum emission was determined to be with the measurement loop antenna in the vertical polarization, parallel to the radiating loop of the antenna structure.

The product was tested at input voltages to the power supply ranging from 102 – 138V, 60Hz with no measurable change in transmitter output. See Section VIII, Part B.

V. Occupied Bandwidth

RSS 210:5.9.1. The 20 dB bandwidth measurements for this product are presented in Section VII “Data”, Part C, Occupied Bandwidth. A bandwidth requirement was not specified for 58kHz products, so the default 20dB bandwidth was measured. The HP 8591EM spectrum analyzer cannot measure a bandwidth over 1.8kHz in quasi-peak detection mode, so the bandwidth was measured in peak detection mode, providing a worst-case occupied bandwidth.

VI. LIST OF MEASURING EQUIPMENT

The equipment used for determining compliance of the AMS-9040 system with the requirements of 15.207 and 15.209 is marked with an “X” in the first column of the table below.

	<u>Model</u>	<u>Description</u>	<u>Vendor</u>	<u>Serial #</u>
X	ALP -70	Loop Antenna	Electro Metrics	163
X	3110B	Biconical Antenna	Electro Metrics	1017
	3146	Log Periodic Antenna	EMCO	3909
	3825/2	Line Imp Stable Network	EMCO	1562
X	3816/2NM	Line Imp Stable Network	EMCO	9703 1018
	6060B	Frequency Generator	Giga-tronics	5850202
	FM2000	Isotropic Field Monitor	Amplifier Research	15171
	FP2000	Isotropic Field Probe	Amplifier Research	15214
	888	Leveler	Amplifier Research	14998
	75A220	Low Band Amplifier	Amplifier Research	15208
	10W1000A	High Band Amplifier	Amplifier Research	15138
	PEFT Junior	EFT Generator	Haefely Trench	083 180-16
	PEFT Junior	Capacitive Cable Clamp	Haefely Trench	083-078-31
	NSG435	ESD Simulator	Schaffner	1197
	NSG431	ESD Simulator	Schaffner	1267
X	HP8591EM	EMC Analyzer	Hewlett - Packard	3520A00190
		Power Source	Pacific Instruments	
	F-2031	EM Injection Clamp	Fischer Cust. Comm.	30
	FCC-801-M3-16	Coupling Decoupling Nwk	Fischer Cust. Comm.	58
	FCC-801-M3-16	Coupling Decoupling Nwk	Fischer Cust. Comm.	59
	F-33-1	RF Current Probe	Fischer Cust. Comm.	304
	EM 7600	Transient Limiter	Electro-Metrics	187
	Roberts Ant	Tunable Dipole Set	Compliance Design	003282
	Roberts Ant	Tunable Dipole Set	Compliance Design	003283
	HP8594E	Spectrum Analyzer	Hewlett Packard	3246A00300
X	HP8447F Opt 64	Dual Preamplifier	Hewlett Packard	2805A03473

VII. Data

Part A contains conducted emissions data; Part B contains magnetic field radiated emissions data; Part C contains occupied bandwidth data.

Part A

Conducted Emissions

Project Name	Conducted Emissions EN55022 Class B	Filename	AMS9040_CondEMI_FCC_FM2_5-10-04.doc
EUT Name	AMS9040 with 2 FloorMax2 Antennas	Serial Number	105S0405035743
Engineer	Richard Herring	Phone Number	0311-0070-01 Rev4
Date of Test	05/10/2004 7:18:16 AM	Test Name	Conducted Emission
Reg. Technician	Stephen Krizmanich		

Comments	Line In: 120vac 60Hz: EN55022 Class B Limits Schaffner Line Filter FN9260 AMS9040 Power Pack Current in each FloorMax2 Antenna = 16A Frequency Hopping; Phase Flipping
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Signal List

Signal	Freq (MHz)	Peak Detector (dBuV)	QP Detector (dBuV)	Avg Detector (dBuV)	EN55022 Limits QP/Avg (dBuV)	Comments
1	12.13	59.3	57.4	45.3	60.0/50.0	Complies
2	8.66	65.2	56.0	40.5	60.0/50.0	Complies
3	.174	57.0	51.4	45.4	64.6/54.6	Complies
4	14.55	49.8	48.3	45.4	60.0/50.0	Complies
5	.406	51.5	47.6	21.8	57.8/47.8	Complies
6	18.96	49.8	46.9	46.6	60.0/50.0	Complies

Figure 1. L1 Full Range

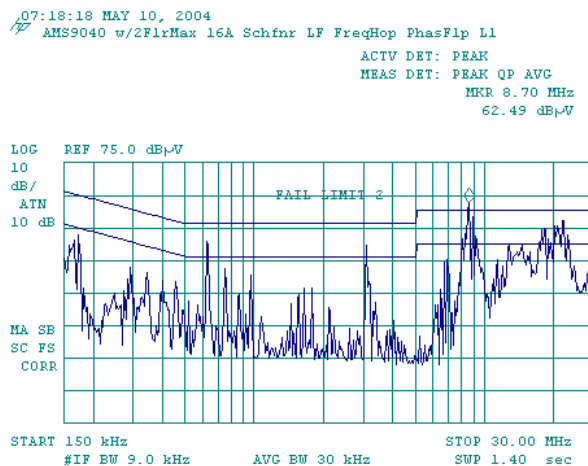
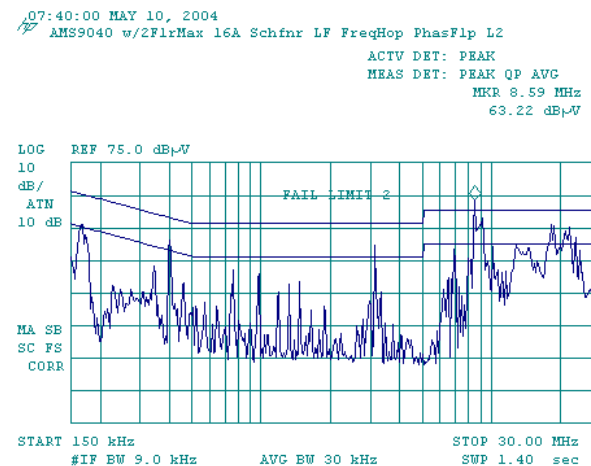


Figure 2. L2 Full Range



Part B**Radiated Emissions**

Project Name	Radiated Emissions
EUT Name	AMS 9040 w/ UltraLoop Antenna
Engineer	Stanley Strzelec
Date of Test	April 1 st , 2004
Reg. Staff	Elliott / Krizmanich

Comments	1. 2 point extrapolation used. 2. Measurement distance 15 meters
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Freq kHz	S.A. dBuV	Det	BW	Ant Fact dB	Filter Fact dB	DCCF dB	DCF dB	Pk Cor dBuV/m	Actual dBuV/m	Limit dBuV/m
58/15m	65.3 (pk)									
58/30m	46.9 (pk)									
58	65.3	pk	9kHz	62.3		-17.9	-80.7	46.9	29.1	32.3/300
116	42.0	pk	9kHz	56.7	1.9	-17.9	-80.7	19.9	2.1	26.3/300
174	54.2	pk	9kHz	53.2	0.1	-17.9	-80.7	26.8	9.0	22.8/300
232	27.9	pk	9kHz	50.6	0.5	-17.9	-80.7	-1.7	-19.5	20.3/300
290	43.0	pk	9kHz	48.7	0.4	-17.9	-80.7	11.4	-6.4	18.4/300
348	13.0	pk	9kHz	47.3	0.4	-17.9	-80.7	-20.0	-37.8	16.8/300
406	30.4	pk	9kHz	46.1	0.4	-17.9	-80.7	-3.7	-21.6	15.4/300
464	7.1	pk	9kHz	45.2	0.2	-17.9	-80.7	-28.2	-46.0	14.3/300
522*		qp	9kHz	44.4	0.2	-17.9	-18.7			33.3/30
580*		qp	9kHz	43.6	0.2	-17.9	-18.7			32.3/30

SA: Spectrum Analyzer Reading

Det: Detector

BW: Band Width

Ant Fact: Antenna Factor

DCCF: Duty Cycle Correction Factor
TX on time in 100 ms = 12.8ms [Eight 1.6 ms bursts with one blanking interval]
DCCF= $20 \cdot \log [1.6/100] = -17.9$

DCF: Distance Correction Factor
 $20 \cdot \log (\text{Test Dist} / 300)$
P is the roll-off exponent
 $P = [(\text{Level(at Distance 1)} - \text{Level(at Distance 2)}) / [20 \cdot \log (\text{Distance 2} / \text{Distance 1})]]$
 $P = [65.3 - 46.9] / [20 \cdot \log [15/30]] = 3.1$
DCF = $20 \cdot 3.1 \cdot \log [15/300] = -80.7$

Actual: Corrected Reading

* Measured spurious emissions below ambient noise levels and therefore not recorded.

Part C

Occupied Bandwidth

Project Name	Industry Canada BW Measurement	Filename	AMS9040_BW-IndCanada_5-18-04.doc
EUT Name	AMS9040	Serial Number	
Engineer	Herring / Fredrick	Phone Number	
Date of Test	5/18/04 12:39:59 PM	Test Name	Industry Canada BandWidth
Reg. Technician	Stephen Krizmanich		

Comments	Line Input:120vac 60hz
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Figure 1.

