

<b>COMPANY</b>	Tyco / Sensormatic Electronics Corp. 6600 Congress Ave Boca Raton, Florida 33487
<b>PRODUCT TESTED</b>	AMS-9050 FCC ID: BVCAMS9050 IC: 3506A-AMS9050
<b>FCC RULES</b>	15.207, 15.209
<b>IC SPECIFICATIONS</b>	RSS GEN, RSS 310
<b>TEST DATE</b>	December 2005, January 2006
<b>SUBMITTED BY</b>	William D. Owsley

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**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 GEN: 4.4.1	OCCUPIED BANDWIDTH	PROVIDED

**General Information**

**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.

**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.

**Test System Description.**

The AMS-9050 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-9050 is intended to be paired with the following Sensormatic transmit antenna systems families:

AMS-1100/1101 exit antenna(s)

AMS-1080 aisle antenna(s)

The worst-case radiated emissions data [below 30 MHz] was observed on the AMS-1100/1101 Antenna. The worst case configuration was a single loop and the data reported is to that configuration.

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

**15.203. Compliance**

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

**Conducted Emissions**

15.207. Conducted emissions data are presented in Data Section, 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.

## **Radiated Emissions**

15.209. Radiated emissions data for this product are presented in the Data Section, Part B, Radiated Emissions. The product demonstrated compliance with the requirements. Radiated emissions measurements were performed at 10 meters. Propagation loss was determined by measuring emissions at 10/20 meters. 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, coaxial to the radiating loop of the antenna structure.

Three different antenna configurations were investigated for maximum emissions. They are a single antenna, dual antennas, and triple antennas. The single antenna was found to be the worst case.

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

## **Occupied Bandwidth**

RSS GEN: 4.4.1. The 20 dB bandwidth measurements for this product are presented in Data Section, 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.

## List of Measuring Equipment

The equipment used for determining compliance of the AMS-9050 system 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
	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

## 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 Limit	Filename	AMS9050_CondEMI_120v_12-6-05.doc
EUT Name	AMS9050 Controller with 4 AMS-1101 Antennas	Serial Number	
Engineer	Guillermo Padula	Phone Number	
Date of Test	12/6/05 1:41:06 PM	Test Name	Conducted Emission
Reg. Technician	Stephen Krizmanich		

Comments	Line In: 120 V 60 Hz AMS-9050 Master Controller: P/N 0319-0011-01 Rev. B S/N: P3450542880695 AMS-9050 Slave Controller: P/N 0319-0011-01 Rev. B S/N: P3450542880656 AMS-1101 Antenna (1) P/N: 0304-2940-01 Rev.12 S/N: P3450544887562 I Top Coil 12.6A Bottom Coil 11.0A AMS-1101 Antenna (2) P/N: 0304-2940-01 Rev.12 S/N: P3450544887557 I Top Coil 10.5A Bottom Coil 11.0A AMS-1101 Antenna (3) P/N: 0304-2940-01 Rev.12 S/N: P3450544887543 I Top Coil 12.5A Bottom Coil 11.0A AMS-1101 Antenna (4) P/N: 0304-2940-01 Rev.12 S/N: P3450544887541 I Top Coil 12.0A Bottom Coil 11.0A
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Signal	Freq (MHz)	Peak Detector (dBuV)	QP Detector (dBuV)	Avg Detector (dBuV)	EN55022 Limits QP/Avg (dBuV)	Comments
1	.421	46.3	44.3	35.3	57.0 / 47.0	Complies
2	.170	49.7	41.6	40.1	63.5 / 53.5	Complies
3	3.20	47.8	42.6	17.8	56.0 / 46.0	Complies
4	3.55	40.5	33.7	8.3	56.0 / 46.0	Complies
5	.254	40.0	38.6	36.2	61.8 / 51.8	Complies

See Plots below.

Figure 1. L1 Full Range

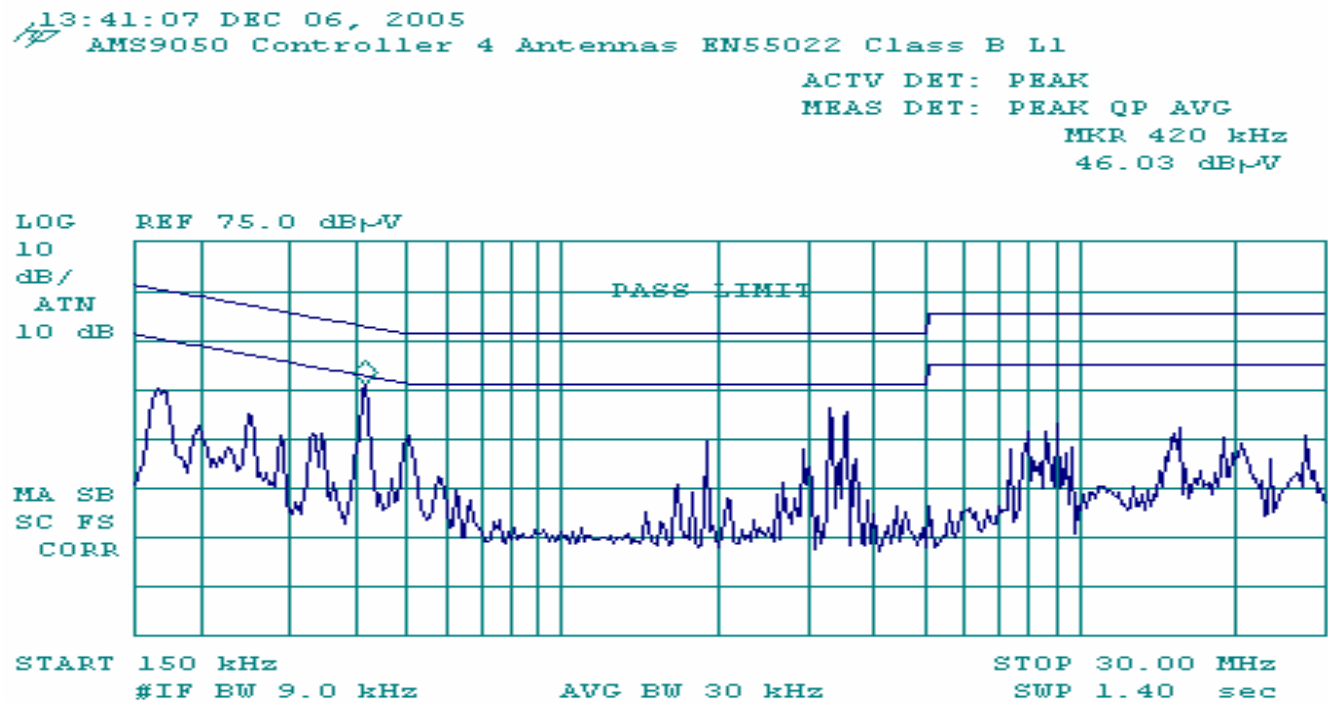
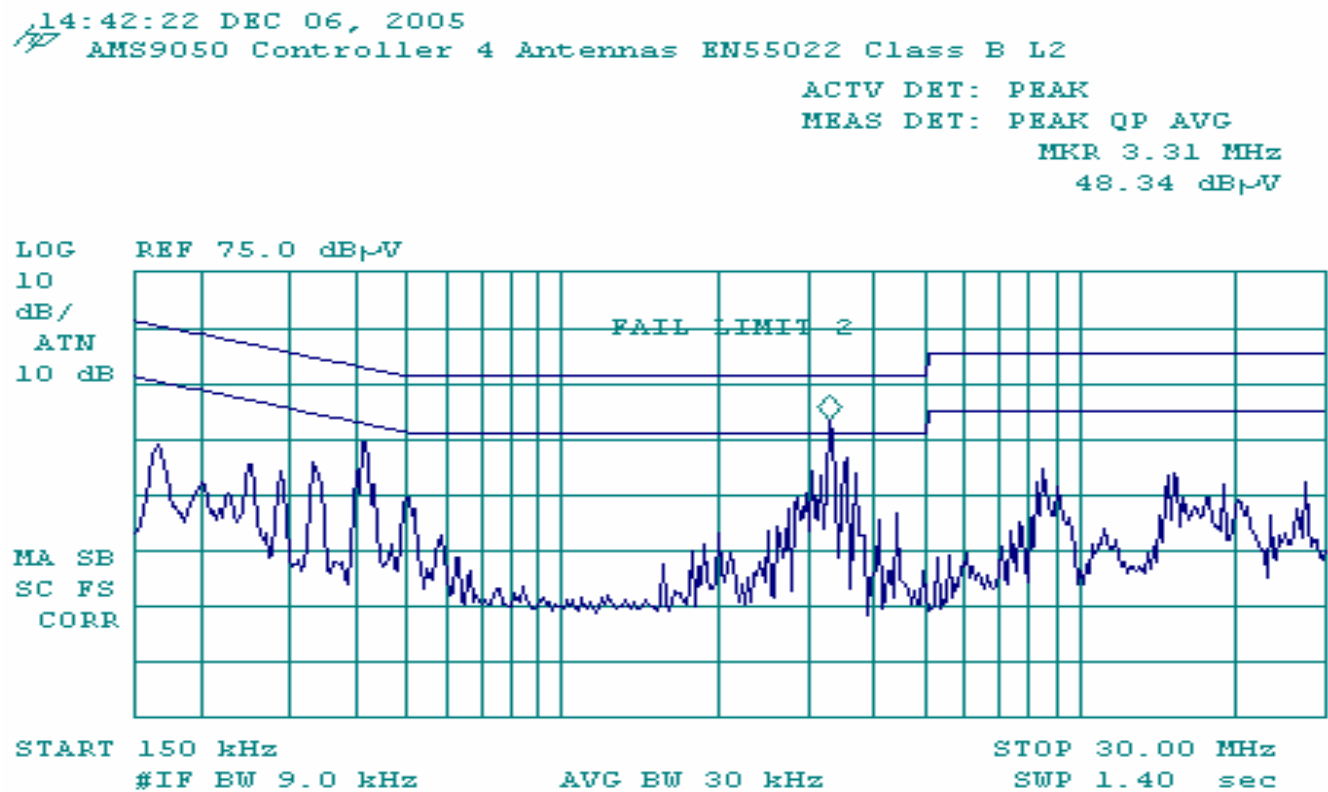


Figure 2. L2 Full Range





**Part B****H-field Radiated Emissions**

Project Name	Radiated Emissions
EUT Name	AMS 9050
Engineer	Stanley Strzelec
Date of Test	12/13/2005
Reg. Staff	Owsley / Krizmanich

Comments	1. 2 point extrapolation used. 2. Measurement distance 10 meters
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**AMS9050 Controller Single 1101 Ant**

Freq	S.A.	Det	BW	Ant Fact	F Fact	DCCF	DCF	Pk Cor	Actual	FCC Limit	Margin FCC Limit
kHz	dBuV			dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dB
58	68.2	pk	9kHz	62.3	0.0	-22.84	-89.80	40.7	17.9	32.3 @300m	14.4
116	18.3	pk	9kHz	56.7	1.9	-22.84	-89.80	-12.9	-35.7	26.3 @300m	62.0
174	13.6	pk	9kHz	53.2	0.8	-22.84	-89.80	-22.2	-45.0	22.8 @300m	67.8
232	15.7	pk	9kHz	50.6	0.5	-22.84	-89.80	-23.0	-45.8	20.3 @300m	66.1
290	15.1	pk	9kHz	48.7	0.4	-22.84	-89.80	-25.6	-48.5	18.4 @300m	66.9
348, nf	2.1	pk	9kHz	47.3	0.4	-22.84	-89.80	-40.0	-62.8	16.8 @300m	79.6
406	12.4	pk	9kHz	46.1	0.4	-22.84	-89.80	-30.9	-53.7	15.4 @300m	69.1
464	0.4	pk	9kHz	45.2	0.2	-22.84	-89.80	-44.0	-66.8	14.3 @300m	81.1
522, nf	11.4	qp	9kHz	44.4	0.2	-22.84	-29.00	27.0	4.2	33.3 @30m	29.1
580, nf	10.0	qp	9kHz	43.6	0.2	-22.84	-29.00	24.8	2.0	32.3 @30m	30.3

\* nf = noise floor

F Fact: Filter Factor: Insertion loss of High Pass Filter, excluding fundamental.

DCCF (duty cycle correction factor) =  $20 \log(\text{duty cycle}) = 20 \log(\text{pulse duration/pulse repetition period})$ DCCF = -22.84466 =  $20 \log(\text{on time / repeat time})$ DCF:  $\text{Dist\_Corr\_Factor} = 20 \log(\text{Test Dist} / 300)P = 20 P \log(\text{Test Dist} / 300)$ 

Where P is the roll-off exponent . P is found as follows:

 $P = (\text{dB Level(at Distance 1)} - \text{dB Level(at Distance 2)}) / 20 \log(\text{Distance 2} / \text{Distance 1})$ 

P = 3.471415 for 10/20 meters and field canceling antennas.

DCF = -102.554

Part C Occupied Bandwidth

Project Name	Occupied Bandwidth	Filename	AMS9050_BW_120v_1-20-06.doc
EUT Name	AMS9050	Serial Number	
Engineer	Guillermo Padula	Phone Number	
Date of Test	2/2/06 11:43:53 AM	Test Name	Occupied BandWidth
Reg. Technician	Stephen Krizmanich		
Comments	± 20dB of Carrier		

Figure 1.

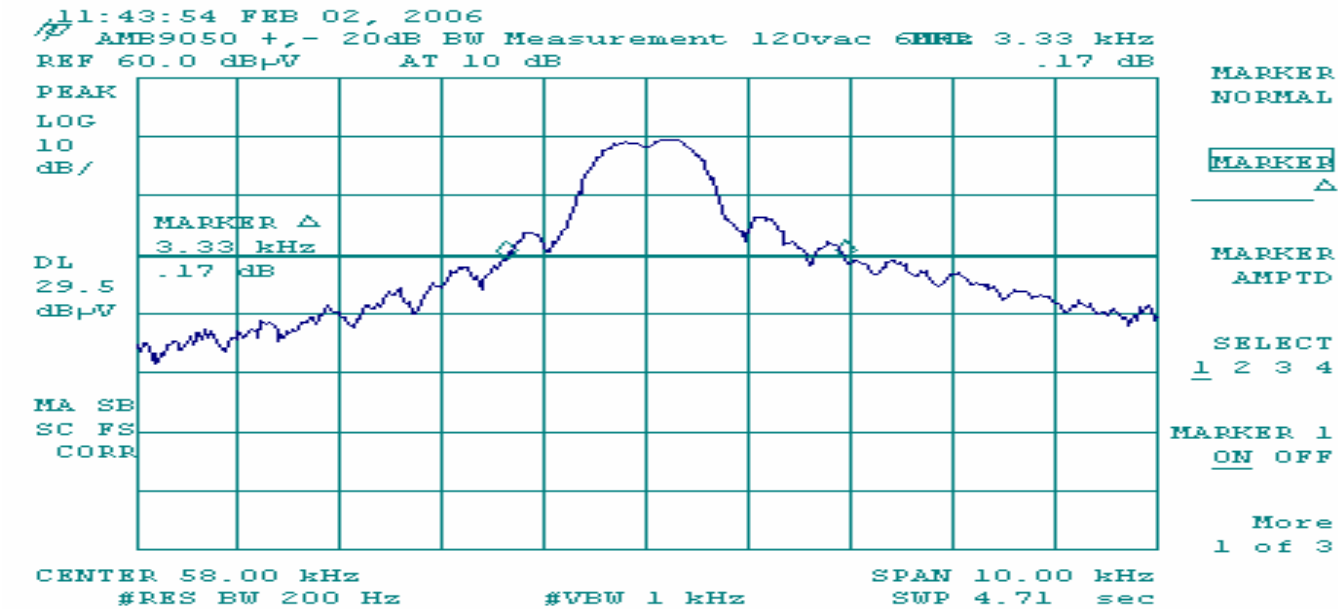
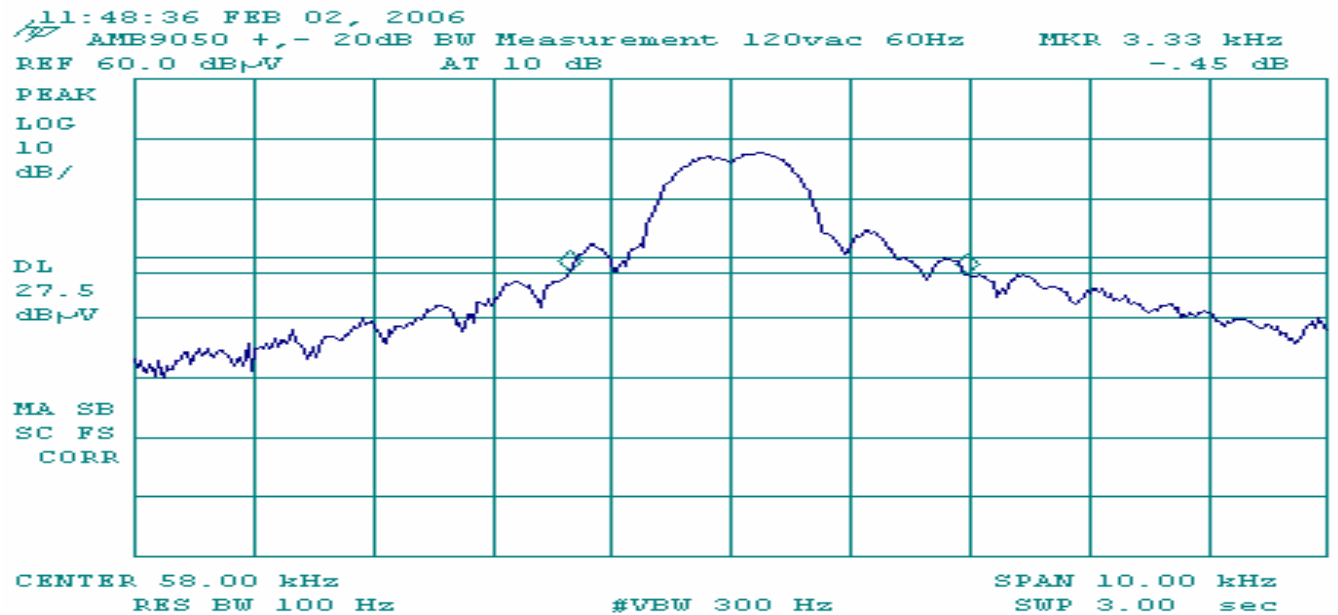


Figure 2.



Project Name	Industry Canada BW Measurement	Filename	AMS9050_BW-IndCanada_5-18-04.doc
EUT Name	AMS9050	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.

