

SAGEM Morpho, Inc.

MA120

September 06, 2006

Report No. SAGM0008

Report Prepared By



www.nwemc.com
1-888-EMI-CERT

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EMC Test Report



22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test
Issue Date: September 06, 2006
SAGEM Morpho, Inc.
Model: MA120

Emissions				
Test Description	Specification	Test Method	Pass	Fail
Frequency Stability	FCC 15.225:2006	ANSI C63.4:2003	☒	☐
Field Strength of Fundamental	FCC 15.225:2006	ANSI C63.4:2003	☒	☐
Field Strength of Spurious Emissions	FCC 15.225:2006	ANSI C63.4:2003	☒	☐
Conducted Emissions	FCC 15.107:2006	ANSI C63.4:2003	☒	☐
Radiated Emissions	FCC 15.109:2006	ANSI C63.4:2003	☒	☐

Modifications made to the product

See the Modifications section of this report

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066
Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

Approved By:

Greg Kiemel, Director of Engineering

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

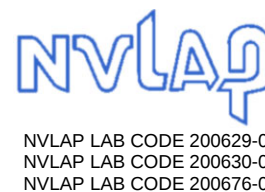
Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.

Revision Number	Description	Date	Page Number
00	None		

FCC: Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.



NVLAP: Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.



Industry Canada: Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.



CAB: Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.



TÜV Product Service: Included in TÜV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TÜV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TÜV's current Listing of CARAT Laboratories, available from TÜV. A certificate was issued to represent that this laboratory continues to meet TÜV's CARAT Program requirements. Certificate No. USA0401C.



TÜV Rheinland: Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.



NEMKO: Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).



Australia/New Zealand: The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



VCCI: Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Numbers. - Hillsboro: C-1071, R-1025, and R-2318, Irvine: C-2094 and R-1943, Sultan: R-871, C-1784 and R-1761).



BSMI: Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.



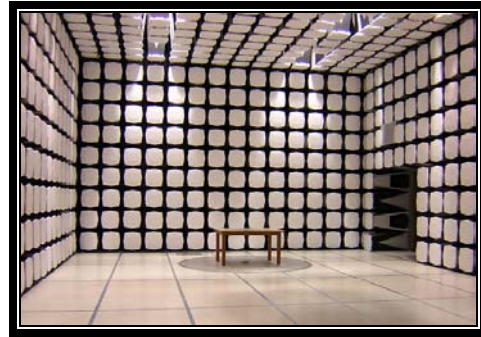
GOST: Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification



SCOPE

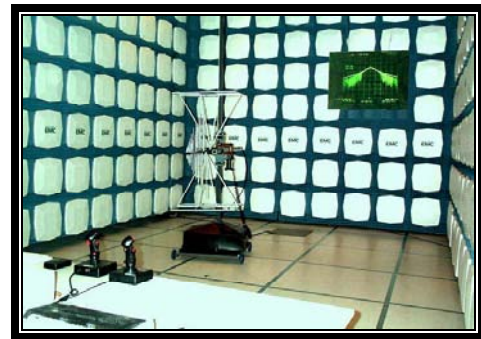
For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/scope.asp>



**California – Orange County Facility
Labs OC01 – OC13**

41 Tesla Ave. Irvine, CA 92618
(888) 364-2378 Fax: (503) 844-3826



**Oregon – Evergreen Facility
Labs EV01 – EV11**

22975 NW Evergreen Pkwy. Suite 400 Hillsboro, OR 97124
(503) 844-4066 Fax: (503) 844-3826



**Washington – Sultan Facility
Labs SU01 – SU07**

14128 339th Ave. SE Sultan, WA 98294
(888) 364-2378

Party Requesting the Test

Company Name:	SAGEM Morpho, Inc.
Address:	1145 Broadway Plaza, Suite 200
City, State, Zip:	Tacoma, WA 98402
Test Requested By:	John Prieve
Model:	MA120
First Date of Test:	8/11/2006
Last Date of Test:	8/31/2006
Receipt Date of Samples:	8/11/2006
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

Biometric (finger print) Reader

Testing Objective:

To satisfy the requirements for FCC.

EUT Photo

CONFIGURATION 1 SAGM0008

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Biometric (finger print) Reader	SAGEM Morpho, Inc.	MA120	061720199

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Power Adapter	Elpac Power Systems	FW3012	038389

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Computer	Dell	Optiplex GX150	C044G11

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Ethernet	No	10m	Yes	Biometric (finger print) Reader	Computer
Weigand	No	10m	Yes	Biometric (finger print) Reader	Computer
Power	PA	2m	Yes	Biometric (finger print) Reader	Power Adapter
AC Power	No	2m	No	Power Adapter	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	8/11/2006	Field Strength of Spurious Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	8/28/2006	Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	8/29/2006	Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	8/30/2006	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	8/31/2006	Field Strength of Fundamental	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Card reader active mode.

POWER SETTINGS INVESTIGATED

120VAC/60Hz

FREQUENCY RANGE INVESTIGATED

Start Frequency	13.553 MHz	Stop Frequency	13.567 MHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
EV01 cables c.g, h			EVA	3/30/2006	13
Antenna, Loop	EMCO	6502	AZC	4/12/2005	24
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12

MEASUREMENT BANDWIDTHS

	Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0
Measurements were made using the bandwidths and detectors specified. No video filter was used.				

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The antenna to be used with the EUT were tested. The EUT was transmitting at a single channel during the test. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992).

EUT:	MA120	Work Order:	SAGM0008
Serial Number:	061720199	Date:	08/30/06
Customer:	SAGEM Morpho, Inc.	Temperature:	24
Attendees:	none	Humidity:	33%
Project:	none	Barometric Pres.:	30.01
Tested by:	Holly Ashkannejhad	Power:	120VAC/60Hz
		Job Site:	EV01

TEST SPECIFICATIONS	Test Method
FCC 15.225:2006	ANSI C63.4:2003

TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

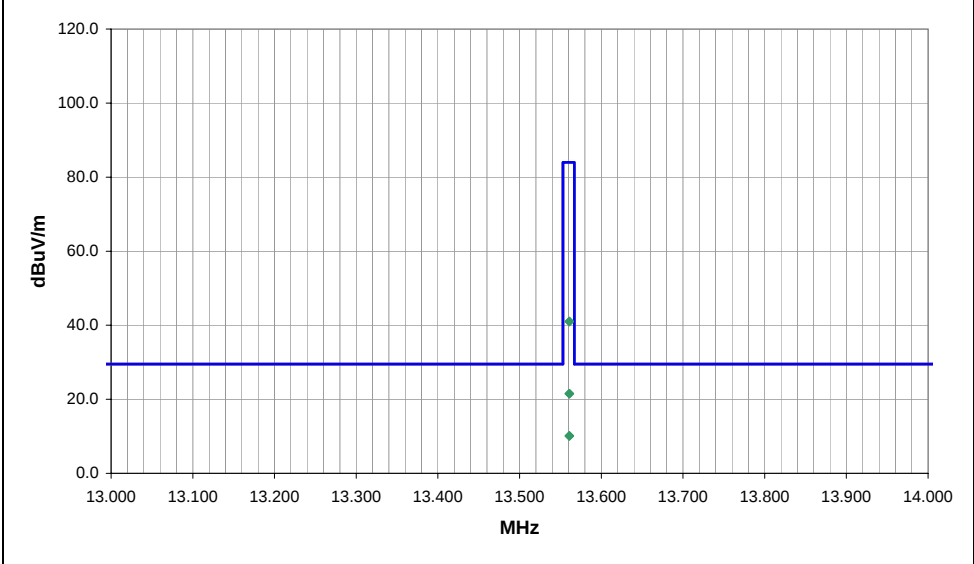
COMMENTS
Ethernet and weigand (com1) to remote pc.

EUT OPERATING MODES
Card reader active mode.

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	4	
Configuration #	1	
Results	Pass	NVLAP Lab Code 200630-0

Signature *Holly Ashkannejhad*

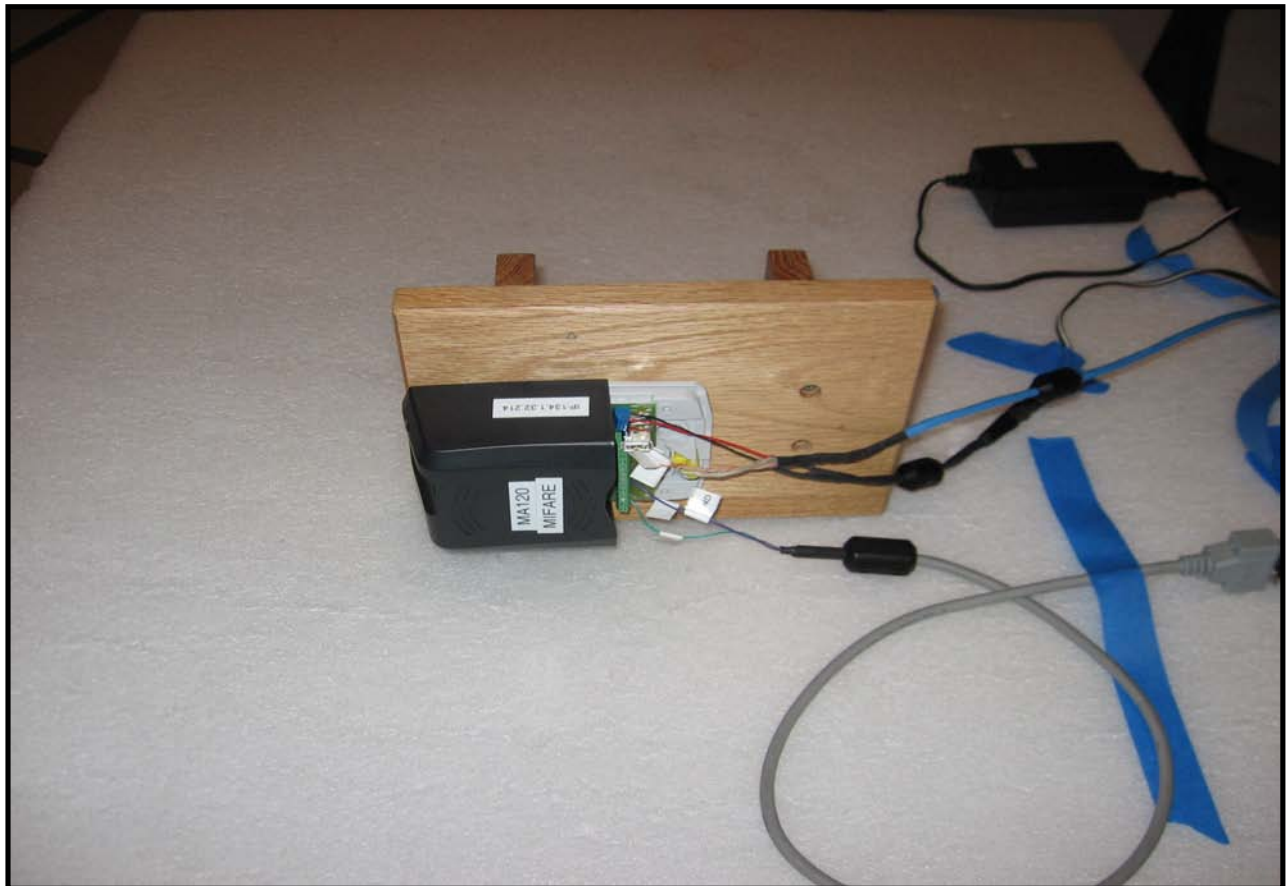


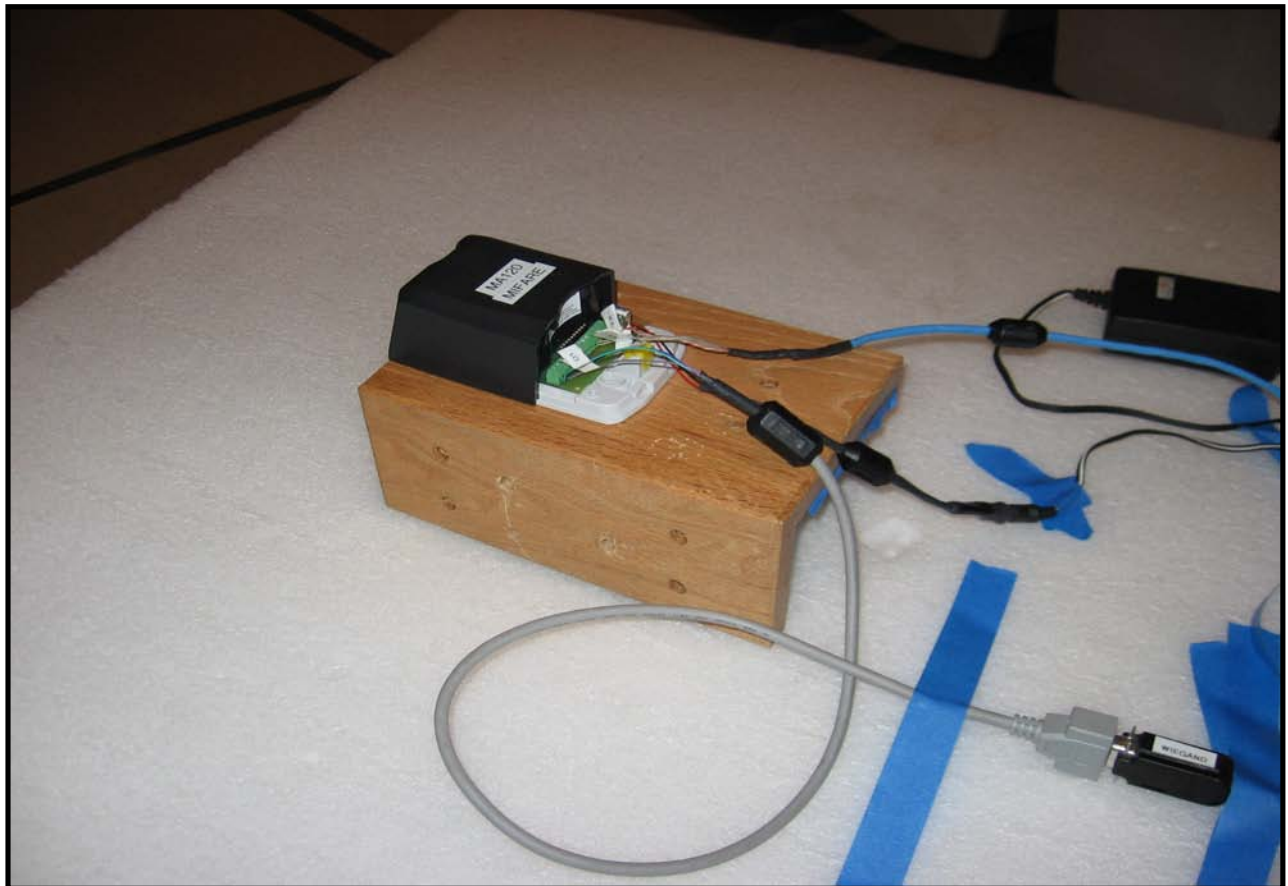
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)		Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
13.561	56.4	10.6	177.0	2.3	3.0	0.0		QP	45.5	21.5	84.0	-62.5	Antenna par to gnd, Perp to EUT.
13.561	46.3	10.6	173.0	2.5	5.0	0.0		QP	35.4	21.5	84.0	-62.5	Antenna par to gnd, Perp to EUT.
13.561	54.7	10.6	5.0	2.3	3.0	0.0		QP	24.3	41.0	84.0	-43.0	Antenna perp to gnd, Par to EUT.
13.561	49.3	10.6	203.0	2.3	5.0	0.0		QP	18.9	41.0	84.0	-43.0	Antenna perp to gnd, Par to EUT.
13.561	59.5	10.6	87.0	1.8	3.0	0.0		QP	60.0	10.1	84.0	-73.9	Antenna perp to gnd, Perp to EUT.
13.561	46.2	10.6	359.0	1.8	5.0	0.0		QP	46.7	10.1	84.0	-73.9	Antenna perp to gnd, Perp to EUT.

Distance Adjustment Factor for Radiated Emissions below 30 MHz

Method: Per 47 CFR 15.31(f)(2), the data was extrapolated based upon a the measured fall-off (at each frequency / polarity).
EUT: MA120
S/N:
Date: 8/30/2006
Job Number: SAGM0008

Frequency (MHz)	Loop Antenna Polarity	Test Distance (meters)	Adjusted Level (dBuV/m)	Fall-Off from 3 to 5 m (dB)	Extrapolation Factor for Specification Limit (dB / decade)	Test Distance of Spec. Limit (meters)	Distance Adjustment Factor (dB)
13.560	Par/Gnd, Perp/EUT	3	67.0	10.1	45.5	30.0	45.5
13.560	Par/Gnd, Perp/EUT	5	56.9				35.4
13.560	Perp/Gnd, Perp/EUT	3	70.1	13.3	60.0	30.0	60.0
13.560	Perp/Gnd, Perp/EUT	5	56.8				46.7
13.560	Perp/Gnd, Par/EUT	3	65.3	5.4	24.3	30.0	24.3
13.560	Perp/Gnd, Par/EUT	5	59.9				18.9







Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Card reader active mode.

POWER SETTINGS INVESTIGATED

120VAC/60Hz

FREQUENCY RANGE INVESTIGATED

Start Frequency	10kHz	Stop Frequency	1000MHz
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SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Pre-Amplifier	Miteq	AM-1616-1000	AOL	1/4/2006	13
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24
EV01 cables c,g, h			EVA	3/30/2006	13
Antenna, Loop	EMCO	6502	AZC	4/12/2005	24
Spectrum Analyzer	Agilent	E4446A	AAT	4/4/2006	12

MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(kHz)
	0.01 - 0.15	1.0	0.2	0.2
	0.15 - 30.0	10.0	9.0	9.0
	30.0 - 1000	100.0	120.0	120.0
	Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

The antenna to be used with the EUT was tested. The EUT was transmitting at a single available channel. While scanning, emissions from the EUT were maximized by rotating the EUT, adjusting the measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:1992).

NORTHWEST

EMC

FIELD STRENGTH OF SPURIOUS EMISSIONS

PSA 2006.05.30
EMI 2006.7.11

EUT: MA120				Work Order: SAGM0008			
Serial Number: 061720199				Date: 08/10/06			
Customer: SAGEM Morpho, Inc.				Temperature: 24			
Attendees: Scott De Witt				Humidity: 34%			
Project: None				Barometric Pres.: 30.03			
Tested by: Holly Ashkannejhad		Power: 120VAC/60Hz		Job Site: EV01			

TEST SPECIFICATIONS

FCC 15.225:2006

Test Method

ANSI C63.4:2003

TEST PARAMETERS

Antenna Height(s) (m)

1 - 4

Test Distance (m)

3 and 5 meters

COMMENTS

Loop antenna perpendicular to EUT, parallel to floor. Ethernet and weigand (com1) to remote pc. Measuring sideband of fundamental.

EUT OPERATING MODES

Card reader active mode.

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1	Signature <i>Holly Ashkannejhad</i>
Configuration #	1	
Results	Pass	

NVLAP Lab Code 200630-0

dBuV/m

120.0

100.0

80.0

60.0

40.0

20.0

0.0

13.567

13.587

13.607

13.627

13.647

13.667

13.687

13.707

MHz

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Detector	Distance Correction Factor (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
13.637	44.2	10.6	179.0	2.3	3.0	0.0	QP	27.9	26.9	50.0	-23.1	Antenna par to gnd, Perp to EUT.
13.637	38.0	10.6	150.0	2.0	5.0	0.0	QP	21.9	26.7	50.0	-23.3	Antenna par to gnd, Perp to EUT.
13.637	47.6	10.6	39.0	2.0	3.0	0.0	QP	48.7	9.5	50.0	-40.5	Antenna perp to gnd, Par to EUT.
13.637	36.8	10.6	28.0	2.1	5.0	0.0	QP	37.9	9.5	50.0	-40.5	Antenna perp to gnd, Par to EUT.
13.637	54.3	10.6	73.0	2.3	3.0	0.0	QP	34.3	30.6	50.0	-19.4	Antenna perp to gnd, Perp to EUT.
13.637	46.7	10.6	83.0	2.9	5.0	0.0	QP	26.7	30.6	50.0	-19.4	Antenna perp to gnd, Perp to EUT.

Distance Adjustment Factor for Radiated Emissions below 30 MHz

Method: Per 47 CFR 15.31(f)(2), the data was extrapolated based upon a the measured fall-off (at each frequency / polarity).
EUT: MA120
S/N:
Date: 8/10/2006
Job Number: SAGM0008

Frequency (MHz)	Loop Antenna Polarity	Test Distance (meters)	Adjusted Level (dBuV/m)	Fall-Off from 3 to 5 m (dB)	Extrapolation Factor for Specification Limit (dB / decade)	Test Distance of Spec. Limit (meters)	Distance Adjustment Factor (dB)
13.637	Par/Gnd, Perp/EUT	3	54.8	6.2	27.9	30.0	27.9
13.637	Par/Gnd, Perp/EUT	5	48.6				21.7
13.637	Perp/Gnd, Perp/EUT	3	64.9	7.6	34.3	30.0	34.3
13.637	Perp/Gnd, Perp/EUT	5	57.3				26.7
13.637	Perp/Gnd, Par/EUT	3	58.2	10.8	48.7	30.0	48.7
13.637	Perp/Gnd, Par/EUT	5	47.4				37.9

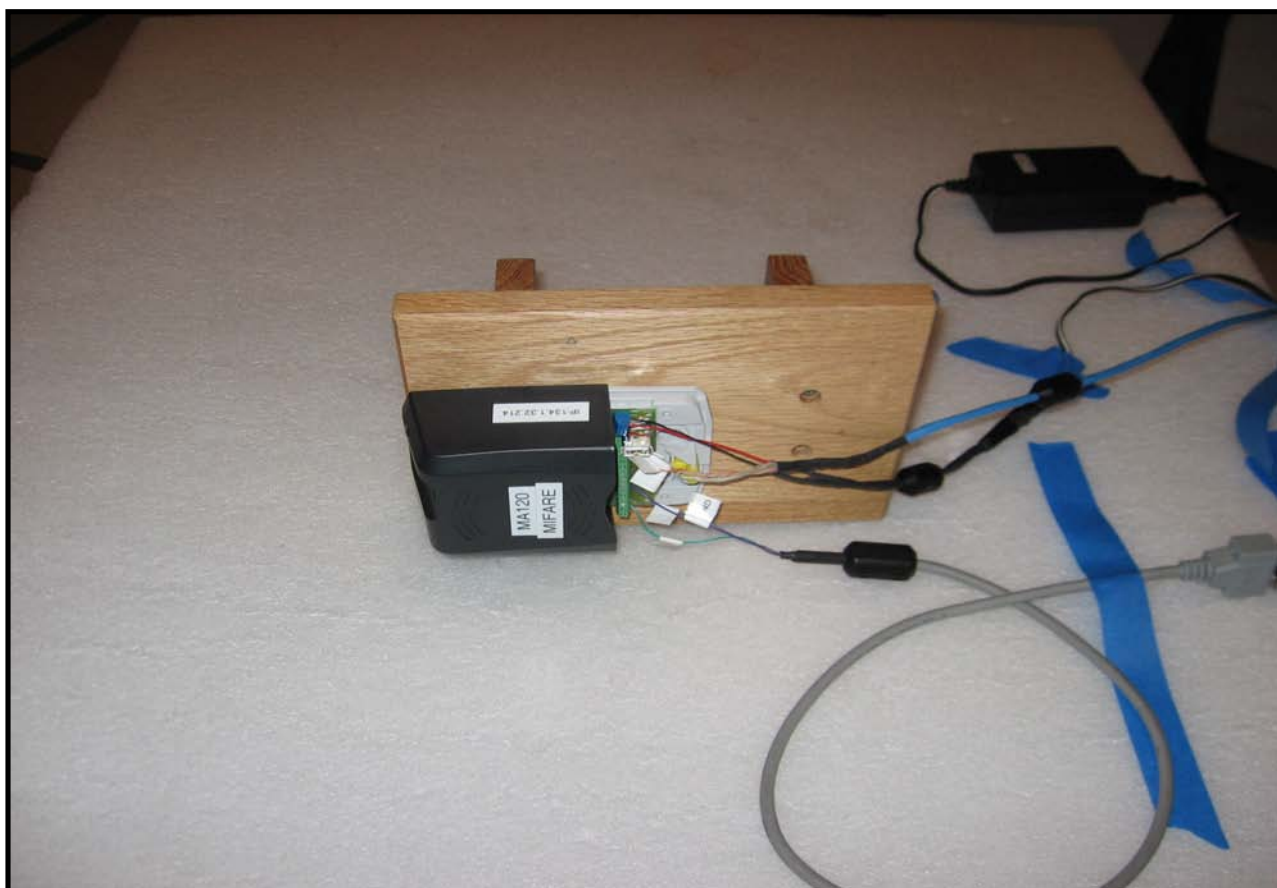
NORTHWEST		FIELD STRENGTH OF SPURIOUS EMISSIONS		PSA 2006.05.30									
EMC				EMI 2006.7.11									
EUT: MA120				Work Order: SAGM0008									
Serial Number: 061720199				Date: 08/10/06									
Customer: SAGEM Morpho, Inc.				Temperature: 24									
Attendees: Scott De Witt				Humidity: 34%									
Project: None				Barometric Pres.: 30.03									
Tested by: Holly Ashkannejhad				Power: 120VAC/60Hz									
				Job Site: EV01									
TEST SPECIFICATIONS				Test Method									
FCC 15.225:2006				ANSI C63.4:2003									
TEST PARAMETERS													
Antenna Height(s) (m)		1 - 4		Test Distance (m)									
				3									
COMMENTS													
Loop antenna perpindicular to EUT, parallel to floor. Ethernet and weigand (com1) to remote pc.													
EUT OPERATING MODES													
Card reader active mode.													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
Run #		2											
Configuration #		1											
Results		Pass		NVLAP Lab Code 200630-0									
Signature <i>Holly Ashkannejhad</i>													
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
216.977	47.1	-2.6	263.0	1.5	3.0	0.0	H-Bilog	QP	0.0	44.5	46.0	-1.5	EUT horizontal
216.976	45.7	-2.6	278.0	1.5	3.0	0.0	H-Bilog	QP	0.0	43.1	46.0	-2.9	EUT vertical
257.658	43.4	-1.3	264.0	1.2	3.0	0.0	H-Bilog	QP	0.0	42.1	46.0	-3.9	EUT horizontal
189.860	42.3	-3.8	275.0	1.5	3.0	0.0	H-Bilog	QP	0.0	38.5	43.0	-4.5	EUT horizontal
271.219	42.4	-0.9	242.0	1.2	3.0	0.0	H-Bilog	QP	0.0	41.5	46.0	-4.5	EUT horizontal
230.537	42.0	-2.2	260.0	1.2	3.0	0.0	H-Bilog	QP	0.0	39.8	46.0	-6.2	EUT horizontal
216.977	42.2	-2.6	171.0	1.5	3.0	0.0	H-Bilog	QP	0.0	39.6	46.0	-6.4	EUT on side
284.779	40.1	-0.7	258.0	1.5	3.0	0.0	H-Bilog	QP	0.0	39.4	46.0	-6.6	EUT horizontal
244.097	40.5	-1.7	257.0	1.2	3.0	0.0	H-Bilog	QP	0.0	38.8	46.0	-7.2	EUT horizontal
67.815	39.0	-7.3	65.0	1.0	3.0	0.0	V-Bilog	QP	0.0	31.7	40.0	-8.3	EUT on side
311.899	36.9	0.4	143.0	1.2	3.0	0.0	H-Bilog	QP	0.0	37.3	46.0	-8.7	EUT horizontal
216.977	38.7	-2.6	95.0	1.0	3.0	0.0	V-Bilog	QP	0.0	36.1	46.0	-9.9	EUT on side
257.657	37.4	-1.3	199.0	1.7	3.0	0.0	V-Bilog	QP	0.0	36.1	46.0	-9.9	EUT on side
216.978	38.5	-2.6	121.0	1.0	3.0	0.0	V-Bilog	QP	0.0	35.9	46.0	-10.1	EUT vertical
284.778	36.3	-0.7	271.0	1.0	3.0	0.0	V-Bilog	QP	0.0	35.6	46.0	-10.4	EUT on side
189.854	35.6	-3.8	310.0	1.0	3.0	0.0	V-Bilog	QP	0.0	31.8	43.0	-11.2	EUT on side
244.100	36.4	-1.7	166.0	1.0	3.0	0.0	V-Bilog	QP	0.0	34.7	46.0	-11.3	EUT on side
271.218	34.5	-0.9	169.0	1.7	3.0	0.0	V-Bilog	QP	0.0	33.6	46.0	-12.4	EUT on side
40.695	28.5	-1.8	173.0	1.0	3.0	0.0	V-Bilog	QP	0.0	26.7	40.0	-13.3	EUT on side
54.126	31.8	-5.4	107.0	1.0	3.0	0.0	V-Bilog	QP	0.0	26.4	40.0	-13.6	EUT on side

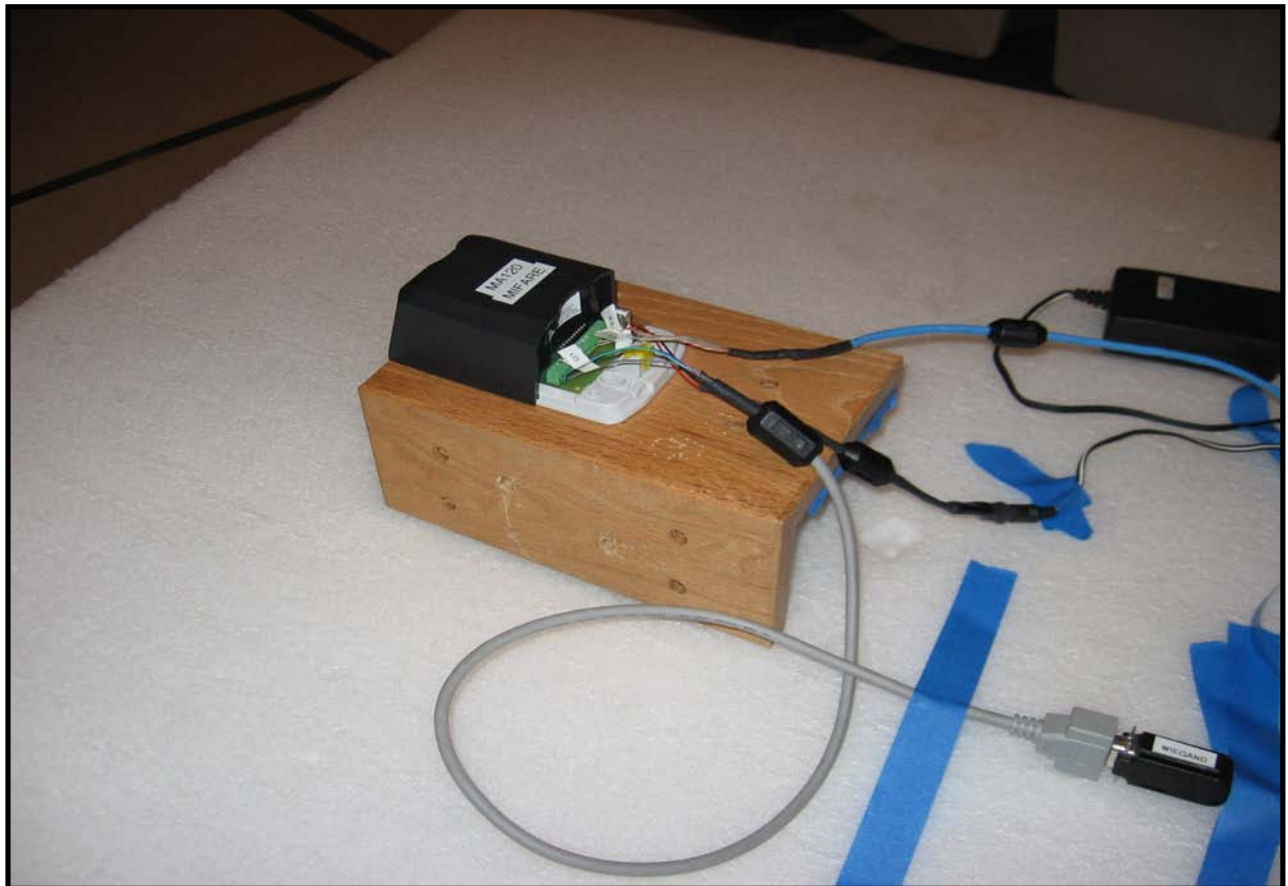
EMC FIELD STRENGTH OF SPURIOUS EMISSIONS										PSA 2006.05.30 EMI 2006.7.11			
EUT: MA120		Work Order: SAGM0008											
Serial Number: 061720199		Date: 08/10/06											
Customer: SAGEM Morpho, Inc.		Temperature: 24											
Attendees: none		Humidity: 34%											
Project: none		Barometric Pres.: 30.03											
Tested by: Holly Ashkannejhad		Power: 120VAC/60Hz		Job Site: EV01									
TEST SPECIFICATIONS										Test Method			
FCC 15.225:2006										ANSI C63.4:2003			
TEST PARAMETERS													
Antenna Height(s) (m)		1 - 4		Test Distance (m)		3 and 5 meters							
COMMENTS													
Loop antenna perpendicular to EUT, parallel to floor. Ethernet and weigand (com1) to remote pc.													
EUT OPERATING MODES													
Card reader active mode.													
DEVIATIONS FROM TEST STANDARD													
No deviations.													
Run #		3		<i>Holly Ashkannejhad</i> Signature									
Configuration #		1											
Results		Pass											
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)		Detector	Distance Correction Factor (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
17.170	22.1	10.3	222.0	1.8	5.0	0.0		QP	14.7	17.7	29.5	-11.8	Antenna par to gnd, Perp to EUT.
17.170	26.3	10.3	186.0	1.7	3.0	0.0		QP	18.9	17.7	29.5	-11.8	Antenna par to gnd, Perp to EUT.
17.170	18.7	10.3	181.0	2.1	5.0	0.0		QP	11.9	17.1	29.5	-12.4	Antenna perp to gnd, Par to EUT.
17.170	22.1	10.3	200.0	1.7	3.0	0.0		QP	15.3	17.1	29.5	-12.4	Antenna perp to gnd, Par to EUT.
17.170	25.4	10.3	196.0	1.8	5.0	0.0		QP	13.3	22.4	29.5	-7.1	Antenna perp to gnd, Perp to EUT.
17.170	29.2	10.3	209.0	1.7	3.0	0.0		QP	17.1	22.4	29.5	-7.1	Antenna perp to gnd, Perp to EUT.
21.957	13.0	9.7	342.0	2.8	5.0	0.0		QP	0.4	22.3	29.5	-7.2	Antenna par to gnd, Perp to EUT.
21.957	13.1	9.7	328.0	3.1	3.0	0.0		QP	0.5	22.3	29.5	-7.2	Antenna par to gnd, Perp to EUT.
21.957	16.5	9.7	295.0	2.3	5.0	0.0		QP	0.7	25.5	29.5	-4.0	Antenna perp to gnd, Par to EUT.
21.957	16.7	9.7	284.0	2.3	3.0	0.0		QP	0.9	25.5	29.5	-4.0	Antenna perp to gnd, Par to EUT.
21.957	13.0	9.7	350.0	2.8	5.0	0.0		QP	0.4	22.3	29.5	-7.2	Antenna perp to gnd, Perp to EUT.
21.957	13.1	9.7	342.0	2.1	3.0	0.0		QP	0.5	22.3	29.5	-7.2	Antenna perp to gnd, Perp to EUT.

Distance Adjustment Factor for Radiated Emissions below 30 MHz

Method: Per 47 CFR 15.31(f)(2), the data was extrapolated based upon a the measured fall-off (at each frequency / polarity).
EUT: MA120
S/N:
Date: 8/10/2006
Job Number: SAGM0008

Frequency (MHz)	Loop Antenna Polarity	Test Distance (meters)	Adjusted Level (dBuV/m)	Fall-Off from 3 to 5 m (dB)	Extrapolation Factor for Specification Limit (dB / decade)	Test Distance of Spec. Limit (meters)	Distance Adjustment Factor (dB)
21.957	Par/Gnd, Perp/EUT	3	22.8	0.1	0.5	30.0	0.5
21.957	Par/Gnd, Perp/EUT	5	22.7				0.4
21.957	Perp/Gnd, Perp/EUT	3	22.8	0.1	0.5	30.0	0.5
21.957	Perp/Gnd, Perp/EUT	5	22.7				0.4
21.957	Perp/Gnd, Par/EUT	3	26.4	0.2	0.9	30.0	0.9
21.957	Perp/Gnd, Par/EUT	5	26.2				0.7
17.170	Par/Gnd, Perp/EUT	3	36.6	4.2	18.9	30.0	18.9
17.170	Par/Gnd, Perp/EUT	5	32.4				14.7
17.170	Perp/Gnd, Perp/EUT	3	39.5	3.8	17.1	30.0	17.1
17.170	Perp/Gnd, Perp/EUT	5	35.7				13.3
17.170	Perp/Gnd, Par/EUT	3	32.4	3.4	15.3	30.0	15.3
17.170	Perp/Gnd, Par/EUT	5	29.0				11.9







Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Hewlett-Packard	8593E	AAN	1/25/2006	13
DC Power Supply	Topward	TPS-2000	TPD	NCR	0
Multimeter	Tektronix	DMM912	MMH	12/8/2005	13
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZH-32-2-2-H/AC	TBA	7/31/2006	12
Chamber Temp. & Humidity Controlle	ESZ / Eurotherm	Dimension II	TBC	7/31/2006	12

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Variation of Supply Voltage

The primary supply voltage was varied from 85% to 115% of nominal. The DC lab supply was used to vary the supply voltage up to 115% of 12V and down to 85% of 12V.

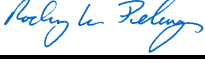
Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-20° to +50° C) and at 10°C intervals.

The antenna is integral to the EUT, so a radiated measurement was made using a spectrum analyzer and a near field probe. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

EMC

FREQUENCY STABILITY

EUT: MA120		Work Order: SAGM0008	
Serial Number: 061720199		Date: 08/30/06	
Customer: SAGEM Morpho, Inc.		Temperature: 23°C	
Attendees: None		Humidity: 33%	
Project: NA		Barometric Pres.: 30.13	
Tested by: Rod Peloquin		Power: 12 Vdc	Job Site: EV09
TEST SPECIFICATIONS		Test Method	
FCC 15.225:2006		ANSI C63.4:2003	
COMMENTS			
DEVIATIONS FROM TEST STANDARD			
Configuration #	1	Signature 	
		Value	Limit
FREQUENCY STABILITY		33.26 ppm	100 ppm
		Results	Pass

FREQUENCY STABILITY

FREQUENCY STABILITY

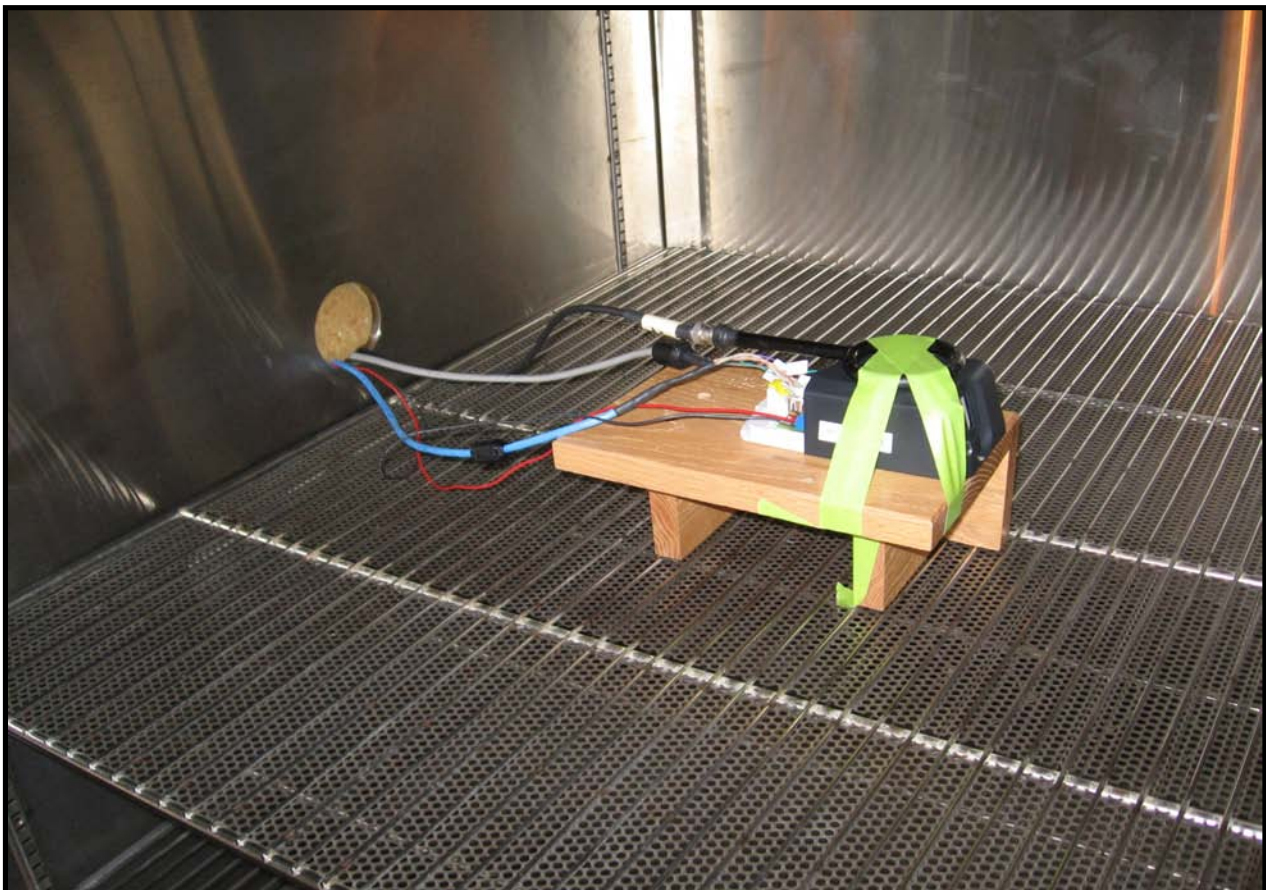
Result: Pass

Value: 33.26 ppm

Limit: 100 ppm

Temp (°C)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
50	13.560000	13.560286	21.09	100
40	13.560000	13.560291	21.46	100
30	13.560000	13.560316	23.30	100
20	13.560000	13.560320	23.60	100
10	13.560000	13.560354	26.11	100
0	13.560000	13.560397	29.28	100
-10	13.560000	13.560426	31.42	100
-20	13.560000	13.560451	33.26	100

Voltage (Vdc)	Assigned Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Specification (ppm)
10.2	13.560000	13.560315	23.23	100
12.0	13.560000	13.560320	23.60	100
13.8	13.560000	13.560315	23.23	100





Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Card reader in active mode

MODE USED FOR FINAL DATA

Card reader in active mode

POWER SETTINGS INVESTIGATED

120V/60Hz

POWER SETTINGS USED FOR FINAL DATA

120V/60Hz

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	1000 MHz
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SAMPLE CALCULATIONS

$$\text{Radiated Emissions: Field Strength} = \text{Measured Level} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain} + \text{Distance Adjustment Factor} + \text{External Attenuation}$$
TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Pre-Amplifier	Miteq	AM-1551	AOY	4/5/2006	13
Antenna, Biconilog	EMCO	3142	AXB	1/6/2005	24
Spectrum Analyzer	Agilent	E4443A	AAS	12/8/2005	12

MEASUREMENT BANDWIDTHS

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

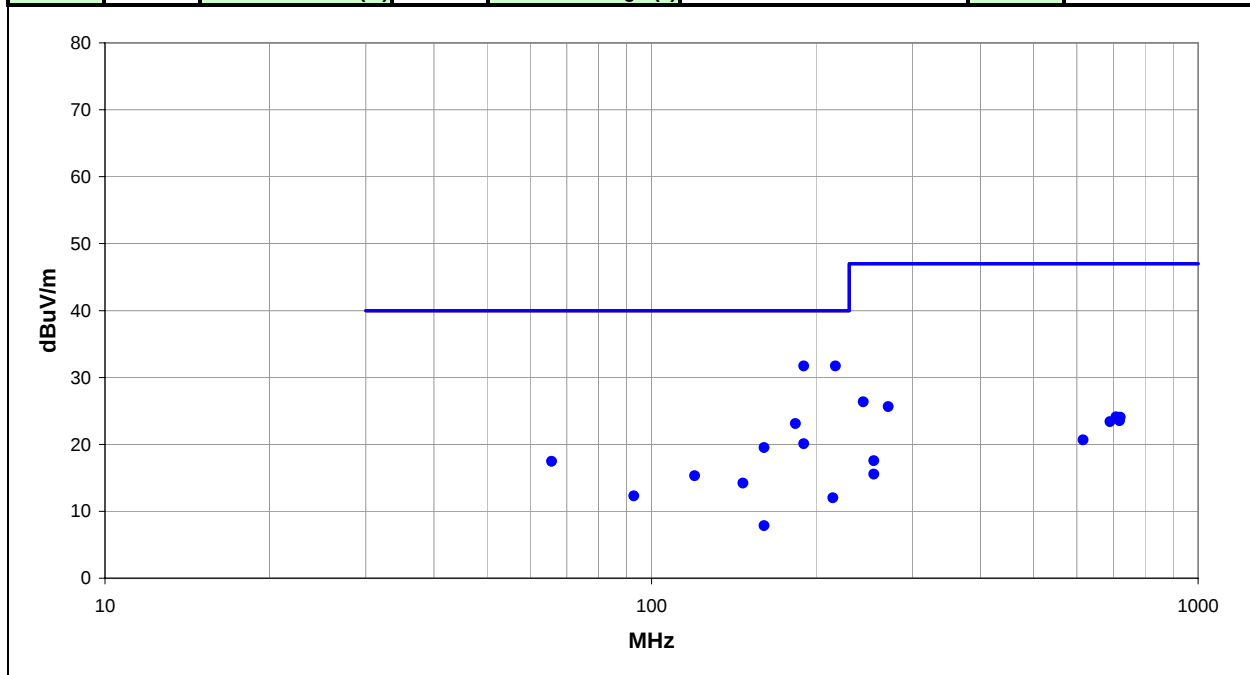
EMC

RADIATED EMISSIONS

NVLAP Lab Code 200630-0

Work Order:	SAGM0008	Date:	08/29/06	
Project:	NA	Temperature:	25C	
Job Site:	EV11	Humidity:	0.45	
Serial Number:	61720199	Barometric Pres.:	30.01"	
EUT:	MA120			
Configuration:	1			
Customer:	SAGEM Morpho, Inc.			
Attendees:	None			
EUT Power:	120V/60Hz			
Operating Mode:	Card reader in active mode			
Deviations:	No deviations			
Comments:	None			

Test Specifications				Class A		Test Method	
FCC 15.109(g) (CISPR 22:1997) Class A						ANSI C63.4	
Run #	1	Test Distance (m)	10	Antenna Height(s)	1-4m	Results	Pass



Freq	Amplitude	Factor	Antenna Height	Azimuth (degrees)	Test Distance	External Attenuation	Polarity/ Transducer Type	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec. (dB)
189.855	55.2	-23.5	1.0	175.0	0.0	0.0	Vert	QP	0.0	31.7	40.0	-8.3
216.987	54.1	-22.4	1.0	26.0	0.0	0.0	Vert	QP	0.0	31.7	40.0	-8.3
183.396	46.8	-23.7	1.0	-1.0	0.0	0.0	Vert	QP	0.0	23.1	40.0	-16.9
189.856	43.6	-23.5	3.0	135.0	0.0	0.0	Horz	QP	0.0	20.1	40.0	-19.9
160.649	44.1	-24.6	1.5	-1.0	0.0	0.0	Vert	QP	0.0	19.5	40.0	-20.5
244.108	47.6	-21.2	3.5	83.0	0.0	0.0	Horz	QP	0.0	26.4	47.0	-20.6
271.228	46.4	-20.8	3.0	270.0	0.0	0.0	Horz	QP	0.0	25.6	47.0	-21.4
65.685	44.5	-27.0	2.0	-1.0	0.0	0.0	Vert	QP	0.0	17.5	40.0	-22.5
708.020	35.0	-10.9	2.0	354.0	0.0	0.0	Vert	QP	0.0	24.1	47.0	-22.9
721.126	34.8	-10.8	2.0	-1.0	0.0	0.0	Vert	QP	0.0	24.0	47.0	-23.0
718.454	34.3	-10.8	2.5	2.0	0.0	0.0	Vert	QP	0.0	23.5	47.0	-23.5
690.538	34.6	-11.2	2.0	32.0	0.0	0.0	Vert	QP	0.0	23.4	47.0	-23.6
119.899	42.2	-26.9	1.0	-1.0	0.0	0.0	Vert	QP	0.0	15.3	40.0	-24.7
147.040	39.9	-25.7	1.0	-1.0	0.0	0.0	Vert	QP	0.0	14.2	40.0	-25.8
616.271	33.2	-12.5	3.0	-1.0	0.0	0.0	Vert	QP	0.0	20.7	47.0	-26.3
92.804	39.5	-27.2	1.5	-1.0	0.0	0.0	Vert	QP	0.0	12.3	40.0	-27.7
214.808	34.5	-22.5	3.5	-1.0	0.0	0.0	Horz	QP	0.0	12.0	40.0	-28.0
255.299	38.5	-20.9	3.0	-1.0	0.0	0.0	Horz	QP	0.0	17.6	47.0	-29.4
255.293	36.5	-20.9	1.0	-1.0	0.0	0.0	Vert	QP	0.0	15.6	47.0	-31.4
160.637	32.4	-24.6	3.5	-1.0	0.0	0.0	Horz	QP	0.0	7.8	40.0	-32.2



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

MODES OF OPERATION

Card reader active mode.

POWER SETTINGS INVESTIGATED

120V/60Hz

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator	Coaxicom	66702 2910-20	AUA	5/2/2006	13
Receiver	Rohde & Schwartz	ESCI	ARG	6/22/2006	13
LISN	Solar	9252-50-R-24-BNC	LIQ	12/13/2005	13
High Pass Filter	T.T.E.	7766	HFG	12/19/2005	13

MEASUREMENT BANDWIDTHS

Frequency Range	Peak Data	Quasi-Peak Data	Average Data
(MHz)	(kHz)	(kHz)	(kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

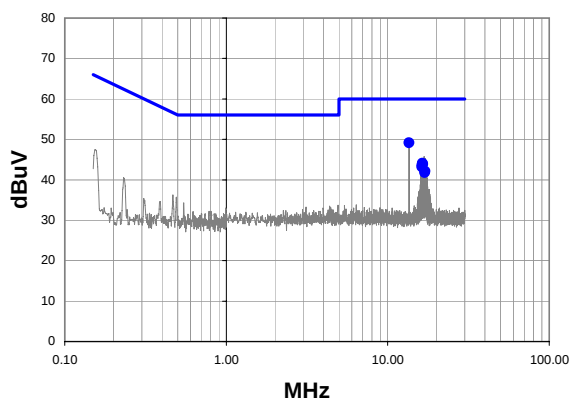
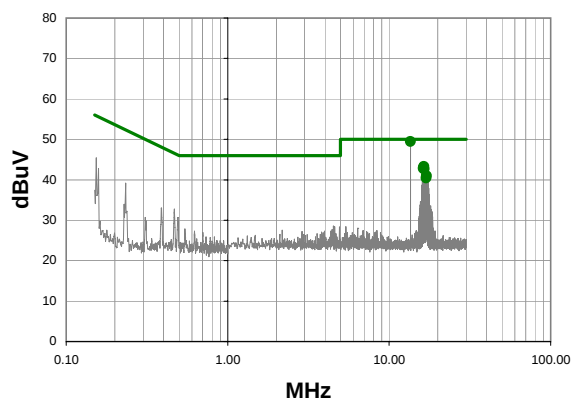
TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50 Ω .

EMC**CONDUCTED EMISSIONS**

NVLAP Lab Code 200630-0

Work Order:	SAGM0008	Date:	08/28/06	<i>David DiVergigelis</i>			
Project:	NA	Temperature:	25C				
Job Site:	EV07	Humidity:	45%				
Serial Number:	61720199	Barometric Pres.:	30.11"				
EUT:	MA120						
Configuration:	1						
Customer:	SAGEM Morpho, Inc.						
Attendees:	None						
EUT Power:	120V/60Hz						
Operating Mode:	Card reader active mode.						
Deviations:	No deviations						
Comments:							
Test Specifications FCC 15.107 Class B		Class B		Test Method ANSI C63.4			
Run #	2	Line:	High Line	Ext. Attenuation:	20	Results	Pass

Quasi-Peak**Average****Quasi Peak Data - vs - Quasi Peak Limit**

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
13.560	28.7	0.5	49.2	60.0	-10.8
16.426	23.6	0.5	44.1	60.0	-15.9
16.502	23.4	0.5	43.9	60.0	-16.1
16.350	23.2	0.5	43.7	60.0	-16.3
16.270	22.7	0.5	43.2	60.0	-16.8
17.050	21.6	0.5	42.1	60.0	-17.9
16.970	21.3	0.5	41.8	60.0	-18.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
13.560	29.0	0.5	49.5	50.0	-0.5
16.426	22.8	0.5	43.3	50.0	-6.7
16.350	22.5	0.5	43.0	50.0	-7.0
16.270	22.3	0.5	42.8	50.0	-7.2
16.502	22.2	0.5	42.7	50.0	-7.3
17.050	20.5	0.5	41.0	50.0	-9.0
16.970	20.0	0.5	40.5	50.0	-9.5

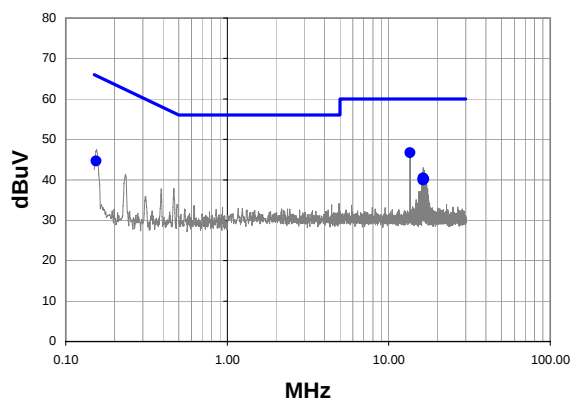
EMC

CONDUCTED EMISSIONS

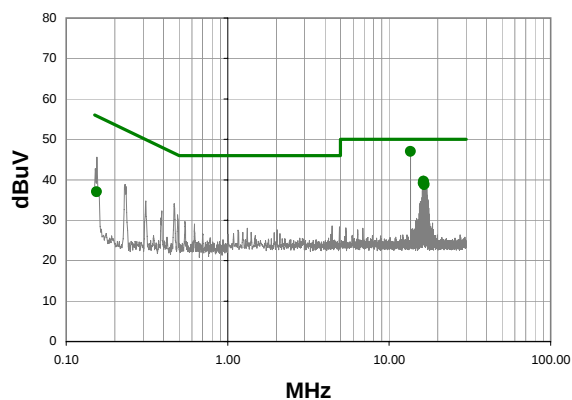
NVLAP Lab Code 200630-0

Work Order:	SAGM0008	Date:	08/28/06	<i>David DiVergigelis</i> Tested by: David DiVergigelis	
Project:	NA	Temperature:	25C		
Job Site:	EV07	Humidity:	45%		
Serial Number:	61720199	Barometric Pres.:	30.11"		
EUT:	MA120				
Configuration:	1				
Customer:	SAGEM Morpho, Inc.				
Attendees:	None				
EUT Power:	120V/60Hz				
Operating Mode:	Card reader active mode.				
Deviations:	No deviations				
Comments:					
Test Specifications FCC 15.107 Class B		Class B		Test Method ANSI C63.4	
Run #	3	Line:	Neutral	Ext. Attenuation: 20	Results Pass

Quasi-Peak



Average



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
13.560	26.2	0.5	46.7	60.0	-13.3
16.344	20.0	0.5	40.5	60.0	-19.5
16.420	19.8	0.5	40.3	60.0	-19.7
16.500	19.6	0.5	40.1	60.0	-19.9
16.264	19.5	0.5	40.0	60.0	-20.0
0.154	22.7	1.9	44.6	65.8	-21.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted dBuV	Spec. Limit dBuV	Compared to Spec. (dB)
13.560	26.5	0.5	47.0	50.0	-3.0
16.344	19.2	0.5	39.7	50.0	-10.3
16.264	18.7	0.5	39.2	50.0	-10.8
16.420	18.7	0.5	39.2	50.0	-10.8
16.500	18.3	0.5	38.8	50.0	-11.2
0.154	15.1	1.9	37.0	55.8	-18.8

