



RR-032-C42-08-103330-12-A

## RADIO MEASUREMENT TESTS REPORT

**According to the standard:**  
FCC part 15 Edition 2007

**Equipment under test:**  
OMA521 Pack 2



**Company:**  
SAGEM SECURITE

**FCC listed: 910 701**

**Distribution:** Mr BERNARD

**(Company:** SAGEM SECURITE)

**Number of pages:** 19 with 2 annexes

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*NAME OF THE EQUIPMENT UNDER TEST (E.U.T.)* : BIOMETRIC ACCESS CONTROL TERMINAL

*Serial number* : OMA 521 : Pack 2 (motherboard V2 / camera card V2)

*Part number* : To see photographs

*Software Version* : Not communicated

*MANUFACTURER'S NAME* : SAGEM SECURITE

APPLICANT'S ADDRESS:

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*DATES OF TESTS* : 2008, 22<sup>nd</sup> and 27<sup>th</sup> of October

*TESTS LOCATIONS* : Laboratory EMITECH of Montigny-Le-Bretonneux (78) and open area test site of AUNAINVILLE (28)

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## 1. INTRODUCTION

This document submits the results of Electromagnetic Compatibility tests performed on the equipment «OMA 521» (denominated hereafter E.U.T.: equipment under test) according to documents listed below.

## 2. REFERENCE DOCUMENTS

### *FCC part 15 Edition 2007*

Code of federal regulations.

Title 47 – Telecommunication.

Chapter 1 – Federal communication commission.

Part 15 – Radio frequency devices.

Subpart B – Unintentional radiators.

Limits and methods of measurement of radio disturbance. Characteristic of information technology equipment.

### *Spectrum Management and Telecommunications Policy*

Interference-Causing Equipment Standard ICES-001 Issue 4 (draft) July 2004

Industrial, Scientific and Medical (ISM) Radio Frequency Generators.

### *Canadian Standards Association Standard CAN/CSA-CEI/IEC CISPR 11:04*

Industrial, Scientific and Medical (ISM) Radio-Frequency Equipment – Electromagnetic Disturbance Characteristics – Limits and Methods of Measurement.

## 3. EQUIPMENT UNDER TEST CONFIGURATION

### Equipment under test (E.U.T.) description:

Equipment under test is a biometric access control terminal. It is powered to mains 12Vdc (750mA) or POE switch.

### Cycle and operating mode during emission tests:

Communication Equipment.

Equipment modifications applied during tests: No.

Product Description:

ITU Emission code:	-
Class:	B
Operating frequency range:	13.110 MHz - 14.010MHz
Number of channels:	-
Channel spacing:	-
Frequency generation:	-
Modulation:	-
Power source:	12Vdc (750mA) or POE switch.

## 4. SUMMARY OF TEST RESULTS

Test procedure	Designation of test	Test results				Comments
		Pass	Fail	N.A.	N.P.	
15.107	Measurement of conducted emission on AC mains ports			X		
15.109	Unintentional radiated emissions in the band 9 kHz - 1 GHz	X				

N.P.: Not Performed.

N.A.: Not Applicable.

The tested sample "OMA521 Pack2" complies with the requirements of the standard:

- FCC PART 15:2007

According to the limits specified in the present report.

**5. RADIATED EMISSION IN OPEN AREA TEST SITE***Temperature (°C): 19**Humidity (%HR): 69**Air pressure (hPa): 997*Standard: FCC PART 15: 2007Sections: 15.109Equipment under test arrangement:

The equipment under test (EUT) is placed on a non-conductive test table at 0.8 m above the horizontal metal ground plane.

For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization. The frequency azimuth and antenna height are presented in the table on the next pages.

The equipment is in continuous transmission.

Frequency range: 9 kHz - 1 GHzDetection mode: Quasi-peak (for 9 kHz - 30 MHz)  
Quasi-peak (for 30 MHz - 1 GHz)Resolution bandwidth: 9 kHz (for 9 kHz - 30 MHz)  
120 kHz (for 30 MHz - 1 GHz)Measurement distance: 10 meters (for 9 kHz - 30 MHz)  
3 meters (for 30 MHz - 1 GHz)Test method deviation: In communication.

Limit:

Frequency range (MHz)	Limit (dB $\mu$ V/m)
30 to 88	40.0
88 to 216	43.5
216 to 960	46.0
960 to 5000	54.0

Test equipment list:

CATEGORY	BRAND	TYPE	Nr EMITECH
Antenna	Schwarzbeck	UHALP 9108	3106
Antenna	Schwarzbeck	VHBA 9123	1144
Antenna	Rohde & Schwarz	HFH2-Z2	0315
Antenna mast	HD GmbH	HD 100	2342
Antenna mast	HD GmbH	MA 240	2341
Cable	Câbles & Connectiques	N-13m	2452
Cable	Câbles & Connectiques	N-2m	2451
Cable HF	Câbles & Connectiques	HF-12m	2450
Cable	Cables & Connectiques	N-7m	6087
Cable	-	N-30m	4359
OATS	Emitech	Aunainville	0187
Receiver	Rohde & Schwarz	ESVP	1057
Receiver	Rohde & Schwarz	ESH3	0825
Power supply	SODILEC	SDR 60/10	0213
Spectrum Analyzer	Rohde & Schwarz	FSP40	5175



**Results:**

 ● Power supply 12Vdc:

FREQUENCY (MHz)	POLARIZATION	AZIMUT (degrees)	Gant (dBi)	Pcab (dB)	MEASURE (dB $\mu$ V/m)	LIMIT (dB $\mu$ V/m)
13.5602	⊥	250	-30.9	0.9	54.32	104
27.1197	⊥	0	-27.3	1.2	33.46	49

⊥: perpendicular

$$M \text{ (dB}\mu\text{V/m)} = V_{\text{max}} - G_{\text{ant}} + P_{\text{cab}} + 51.5$$

FREQUENCY (MHz)	POLARIZATION	ANTENNA HEIGHT (cm)	AZIMUT (degrees)	MEASURE (dB $\mu$ V/m)	LIMIT (dB $\mu$ V/m)
40.679	V	100	306	33.4	40.0
480.010	V	100	0	37.5	46.0
577.100	V	100	0	31.4	46.0
191.999	H	100	0	32.4	43.5
240.046	H	100	0	36.4	46.0
288.024	H	100	232	39.4	46.0
383.780	H	200	316	33.0	46.0

V: Vertical

H: Horizontal

● POE switch:

FREQUENCY (MHz)	POLARIZATION	AZIMUT (degrees)	Gant (dBi)	Pcab (dB)	MEASURE (dB $\mu$ V/m)	LIMIT (dB $\mu$ V/m)
13.5593	⊥	267	-30.9	0.9	53.5	104
27.1198	⊥	0	-27.3	1.2	34.64	49

⊥: perpendicular

M (dB $\mu$ V/m)= Vmax – Gant + Pcab + 51.5

FREQUENCY (MHz)	POLARIZATION	ANTENNA HEIGHT (cm)	AZIMUT (degrees)	MEASURE (dB $\mu$ V/m)	LIMIT (dB $\mu$ V/m)
40.679	V	150	315	30.6	40.0
120.653	V	100	105	30.7	43.5
480.010	V	100	0	36.9	46.0
577.100	V	100	332	31.9	46.0
191.999	H	100	0	32.7	43.5
240.046	H	100	0	34.2	46.0
288.024	H	100	227	39.1	46.0

V: Vertical

H: Horizontal

Test conclusion:

The equipment complies with the requirements of the standard FCC part 15.

□□□ End of report, 2 annexes to be forwarded □□□

# **ANNEX 1:**

## **ANTENNA FACTORS, INSERTION LOSSES AND AMPLIFIER VALUES**

### BILL OF MATERIAL

The test antenna used for the radiated emission between 30 MHz and 300 MHz is the biconical antenna n°1144. Antenna factors are given in table 1.

The test antenna used for the radiated emission between 300 MHz and 1 GHz is the log-periodic antenna n°3106. Antenna factors are given in table 2.

The test antenna used for the radiated emission between 9 kHz and 30 MHz is the frame antenna n°0315. Antenna factors are given in table 3.

The measuring receiver n°0825 used in the frequency range 9 kHz and 30 MHz has an integrated preamplifier.

The measuring receiver n°1057 used in the frequency range 30 MHz to 1 GHz has an integrated preamplifier.

The test cable used between 9 kHz and 30 MHz to connect the antennas to the receiver for measurements at a distance of 10 meters has losses given in table 4.

The test cable used between 30 MHz and 1 GHz to connect the antennas to the receiver for measurements at a distance of 3 meters has losses given in table 5.

Frequency (MHz)	Antenna factor (dB/m)	Frequency (MHz)	Antenna factor (dB/m)
30	12.5	120	10.9
35	10.4	-	-
40	9.3	140	11.1
45	8.9	-	-
50	8.4	160	12.9
60	8.5	-	-
70	8.5	180	14.1
80	9.2	200	15.8
90	9.5	-	-
100	10.0	-	-

TABLE 1 : BICONICAL ANTENNA

Frequency (MHz)	Antenna factor (dB/m)	Frequency (MHz)	Antenna factor (dB/m)
200	23.2	-	-
300	14.4	700	20.8
400	16.3	800	21.2
500	17.7	900	21.9
600	19.3	1000	22.5

TABLE 2 : LOG-PERIODIC ANTENNA

Frequency (MHz)	Antenna factor (dB $\mu$ A/m)	Frequency (MHz)	Antenna factor (dB $\mu$ A/m)
0.009	-24.3	10	-31.1
0.01	-24.9	15	-30.7
0.02	-28.4	20	-29.5
0.05	-30.5	25	-28.0
0.1	-31.1	30	-26.6
0.2	-31.2	-	-
0.5	-31.4	-	-
1	-31.4	-	-
2	-31.3	-	-
5	-31.4	-	-

TABLE 3 : FRAME ANTENNA

Frequency (MHz)	loss (dB)	Frequency (MHz)	loss (dB)
0.009	0.0	10	-0.7
0.05	0.4	13.56	-0.9
0.1	0.4	15	-1.1
0.5	0.4	20	-1.2
1	0.1	25	-1.3
5	-0.6	30	-1.4

TABLE 4 : TEST CABLE FOR 10M MEASUREMENT INTO 9kHz and 30MHz

Frequency (MHz)	loss (dB)	Frequency (MHz)	loss (dB)
30	0.8	160	2.0
35	0.9	180	2.2
40	1.0	200	2.3
45	1.1	250	2.6
50	1.1	300	2.8
60	1.2	400	3.3
70	1.3	500	3.7
80	1.4	600	4.0
90	1.5	700	4.3
100	1.6	800	4.7
120	1.7	900	5.0
140	1.9	1000	5.3

TABLE 5 : TEST CABLE FOR 3M MEASUREMENT INTO 30MHz and 1GHz

# ANNEX 2:

# PHOTOGRAPHIES

EQUIPMENT UNDER TEST (E.U.T.) PHOTOGRAPHIES

OMA 521

E.U.T. Photographies:





E.U.T. Photographies:



Measurement of electromagnetic field in open area test site:



Measurement of electromagnetic field in open area test site:

