

## EVALUATION OF HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS

According to standard:

EN 50364:2001

Equipment under test:

ON BOARD banknote card reloader BBR415

Company:

ACS-INC

Diffusion: Mrs DEJOUX

(Company: ACS-INC)

Number of pages: 8 including 1 annex

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*NAME OF THE EQUIPMENT UNDER TEST (E.U.T):* ON BOARD banknote card reloader BBR415

*Serial number:* Proto 1

*Part number:* None

*Software Version:* None

*MANUFACTURER'S NAME:* ACS-INC

*APPLICANT'S ADRESS:*

*Company:* ACS-INC

*Adress:* Rue Claude Chappe  
BP 345  
07500 GUILHERAND-GRANGES  
FRANCE

*Person present during the tests:* Mr VILLERET

*Responsible:* Mrs DEJOUX

*DATES OF TESTS:* From 11<sup>th</sup> to 15<sup>th</sup> of December, 2006

*TESTS LOCATION:* Emitech Grand Sud Laboratory in Vendargues (34)

*TESTS OPERATOR:* Augustin ALVAREZ

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## 1. INTRODUCTION

This report presents the results of the measurements performed on **BBR 415** in order to verify the compliance of this product with the European standard EN 50364 (01) which requirements are derived from the European recommendation 99/519/EC

## 2. REFERENCE DOCUMENTS

EN 50364:2001	Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 10 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications.
EN 50357:2001	Evaluation of human exposure to electromagnetic fields from devices used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications.
Recommendation	Limitation of exposure of the general public to electromagnetic fields <b>99/519/EC</b> of 12 july 1999

## 3. EQUIPMENT UNDER TEST CONFIGURATION AND DESCRIPTION

Equipment under test description (E.U.T): BBR 415

Cycle and operating mode during emission tests: Modulated permanent emission

## 4. SUMMARY OF TEST RESULTS

Tests designation	Results satisfying?	Comments
EMISSION		
Averaged spatial measurement	YES	
Limb and contact currents measurements	YES	

N.P.: Not Performed.

N.A.: Not Applicable.

▪ **In emission:** Sample subject to the test complies with prescriptions of the standard EN 50364:2001 according to limits specified in this test report.

**5. AVERAGED SPATIAL MEASUREMENT**

The Derived Reference Levels are based on spatially averaged values over the entire body of the exposed individual. The measurement was performed to verify the compliance of the EUT with the derived reference levels in the frequencies of interest.

The fundamental frequency of emission of EUT is 13.56MHz. The compliance with radio standard EN 300 330 imposes that harmonics are low and spurious much lower, in consequence all the records are performed at fundamental frequency.

Moreover the type of tested equipment emits a near field inductive field and electric component of the electromagnetic field is lower than in plane wave.

So only H field is taken into account in the measurements and the SAR\* calculated with this value will be an overvaluation of the actual SAR\* (see § 4.2.2 of the EN 50357).

The limit defined for H field is 73 mA/m at 13.56 MHz.

(\*) *Specific absorption rate*

Test configuration according to table 1 of the standard: 2h

Test apparatus list:

CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Spectrum Analyzer	Hewlett Packard	HP 8590L	2001
Antenna	Loop	Loop 7.5 CM	2464

Climatic Conditions:

Date	Temperature (°C)	Humidity (%HR)	Pressure (hPa)
12/12/06	20	30	1019

E.U.T mode: Permanent modulated emission

Results: See Board in annexe: H= 0.77 mA/m

Test Conclusion: Sample subject to the test complies with prescriptions of the standard according to limits specified in this test report.

## 6. LIMB AND CONTACT CURRENTS MEASUREMENTS

Body current measurements under consideration are those defined by ICNIRP with frequencies up to 110 MHz.

Two types of current are mentioned:

-limb current

-contact current.

Both limb and contact current arise from a person touching a metallic object isolated from the ground and charged by electromagnetic field or a charged person isolated from the ground and touching a grounded metallic object.

The limb current is set to prevent excessive SAR\* in the wrists, elbows, ankle and knees. The limit is 45 mA for the relevant frequency.

The contact current is set to prevent the risk of shock, or burn from light contact of the fingers with the external object. The limit of contact current is 20 mA for the relevant frequency.

The limb and contact current assume different contact impedance.

(\*) *Specific absorption rate*

### Test apparatus list:

CATEGORY	BRAND	MODEL NUMBER	N° EMITECH
Measurement clamp	FCC	F-80	2535
Spectrum Analyzer	Hewlett Packard	HP 8590L	2001

### Climatic Conditions:

Date	Temperature (°C)	Humidity (%HR)	Pressure (hPa)
12/12/06	20	30	1019

E.U.T mode: Permanent modulated emission

Results: See Board in annexe: H (max) = 0.46 mA

Test Conclusion: Sample subject to the test complies with prescriptions of the standard according to limits specified in this test report.

□□□ End of report – 1 annex to be forwarded □□□

# **ANNEX: EMF BOARD**

customer : ACS-INC  
configuration : 2h

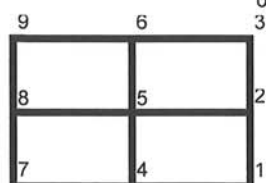
product : BBR 415

devis : DG-06-91271  
distance X : 0,2m  
a/b/c 0,15 m

date 12/12/06  
T 20  
Hr 30  
Pa 1019  
operator: AA/CB/EV

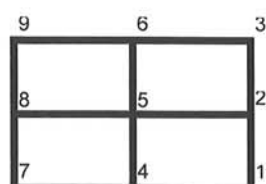
EUT height 100cm

point	measure height	measure (dBuV)	field (mA/m)
1	85cm	48.8	0.7
2		54.9	1.5
3		52.7	1.2
4		41.7	0.3
5		44.0	0.4
6		43.0	0.4
7		36.4	0.2
8		36.3	0.2
9		36.3	0.2

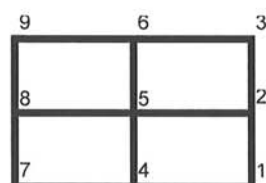


EUT

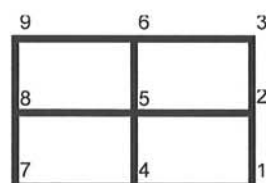
point	measure height	measure (dBuV)	field (mA/m)
1	100cm	51.6	1.0
2		60.0	2.7
3		58.9	2.4
4		42.6	0.4
5		46.2	0.5
6		45.2	0.5
7		35.6	0.2
8		37.3	0.2
9		36.6	0.2



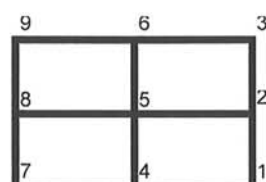
point	measure height	measure (dBuV)	field (mA/m)
1	115cm	47.0	0.6
2		55.5	1.6
3		53.9	1.3
4		40.0	0.3
5		42.6	0.4
6		42.5	0.4
7		33.0	0.1
8		34.4	0.1
9		34.6	0.1



point	measure height	measure (dBuV)	field (mA/m)
1	130cm	44.1	0.4
2		50.8	0.9
3		48.1	0.7
4		37.5	0.2
5		41.0	0.3
6		41.0	0.3
7		31.3	0.1
8		33.9	0.1
9		34.0	0.1



point	measure height	measure (dBuV)	field (mA/m)
1	145cm	39.0	0.2
2		42.9	0.4
3		41.9	0.3
4		34.7	0.1
5		37.5	0.2
6		36.4	0.2
7		29.3	0.1
8		31.0	0.1
9		31.6	0.1



Spatially averaged measure:

0.77 mA/m

limits  
73 mA/m

measure on harm 67.2  
measure on foot 56.9

current (mA) limits (mA)  
0.46 mA 45  
0.14 mA 45

measure at 1cm 102.8  
in front of antenna

field at 1cm : 369.9 mA/m  
in front of antenna (for information)

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