

Etablissement de Voiron
Z.I. des Blanchisseries
38500 Voiron
Siret 408 363 174 00090

Tél. : +33 4 76 65 09 08
Fax : +33 4 76 66 18 30
Labo.voiron@lcie.fr



LCIE

EMC TEST REPORT

Nr 3511-FCC

This test report applies only on equipment described hereafter.

Proposal number : 200509-2761

Date of test: October 3rd, 2005

Location: LCIE Laboratory - 38500 VOIRON - France

Performed by: Jacques LORQUIN

Customer.....: **ID3 Semiconductors**
5 rue de la verrerie
38120 Le Fontanil Cornillon
FRANCE

Product.....: **BIOTHENTIC**

Type of test: **Radiated and Conducted Emission Test**

Applied standards or specification: EN55022 (1999) +/A1: (2000) +/A1: (2003)
CISPR22 (2003)
FCC part 15 subpart B

Level: Class B

Test objective: Qualification

Results: **Samples tested in configuration and description presented in this test report complies with prescriptions and limits of EN 55022, CISPR22 and FCC part 15 subpart B standard, in radiated and conducted emissions.**

The reproduction of this test report is authorized only under its entire form. This report contents 10 pages

Written by: Jacques LORQUIN

Approved by: Jacques LORQUIN

Date: October 10th, 2005



1. System test configuration

1.1. Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). The soft test read SAM and smart card, and fingerprint in loop.

1.2. HARDWARE IDENTIFICATION:

- Equipment Under Test (EUT): Biothentic pn:08G352A 1 Sn : 00921411.
- Size : 84x133x40mm
- I/O :
 - 1X USB connector
- Frequencies :
Crystal: 6MHz, 10MHZ, 20MHz

1.3. Running mode:

For testing Biothentic, the software Xlog2M001 v1.10 running in loop under Windows XP pro.

Test Commands:

- SCardConnect (shared, T=0)
- ScardBegin Transaction
- Blink
- SAM PowerOn
- SAM Negotiate
- SAM Exchange (GetChallenge)
- SAM Power Off
- Blink
- ScardTransmit (T=0, getchallenge)
- GetImage (Normal/4BPP)
- Waitfor response (1000)
- Display image (Normale/4BPP)
- Blink
- Scard End Transaction (leave_card)
- Scard Disconnect (leave_card)



1.4. Auxiliaries

The FCC IDs for all equipment, plus description of all cables used in the tested system (including inserted cards, which have grants) are :

Trade Mark - Model Number (Serial number)	FCC ID	Description	Cable description
ID3 pn:08G352A 1* (sn: 00921411)	TPD2G352	Smart card and fingerprint reader	USB cable, shielded
HEWLETT PACKARD pn:PE199ET#ABF (sn: HUB43809JS)	D.O.C.	Personnel computer	I/O Shielded cable Standard power cable unshielded
Compaq pn:235212-102INTL (sn: 1zr62ecf2af)	CMYKPQ6987	Keyboard PS/2	Shielded cable
Compaq pn: 334684-108 (sn:5187-1786)	JNZ211443	Mouse PS/2	Shielded cable
PHILIPS pn: 17B6822N (sn: TY009717020677)	none	Monitor	Shielded cable with ferrite at the end.

* : Equipment under test

1.5. I/O cables

- 2x Power cord (PC & Monitor), unshielded, length: 2m
- 1x USB cable with ferrite at each end, shielded, length: 2m

1.6. Equipment modifications

No modifications are necessary for achieved test.

2. Radiated emission data from 30MHz to 1GHz

2.1. SET-UP

Mains: 230V@50Hz

The equipment under test and auxiliaries are set on a non-conducted table of 80cm height, above the ground plane. The distance between equipment under test and auxiliaries is 10cm.



2.2. TEST EQUIPMENT



Test Equipment from 30MHz to 1GHz on 10 meters open site:

The installation of EUT is identical for pre-characterization measures in a 3 meters full anechoic chamber and for measures on a 10 meters Open site.

Test Equipment from 30MHz to 1GHz on 10 meters open site:

Equipment	Company	Model	Serial
Spectrum Analyzer	HP	8568B	2732A04140
Quasi-Peak adapter	HP	85650A	2811A01136
RF Pre-selector	HP	85685A	2833A00773
Biconical Antenna	EMCO	3104C	9401-4636
Log Periodic Antenna	EMCO	3146	2178
Absorbing clamp	LÜTHI	MDS21	194.0100.50
Absorbing clamp	LÜTHI	MDS21	2826

EMCO-1050, 6 meters height antenna mast & EMCO-1060, 3 meters diameter Turntable.
A 10 meters Open site located in LCIE - Voiron (FRANCE).



Pre-scan, test Equipment from 30MHz to 1GHz:

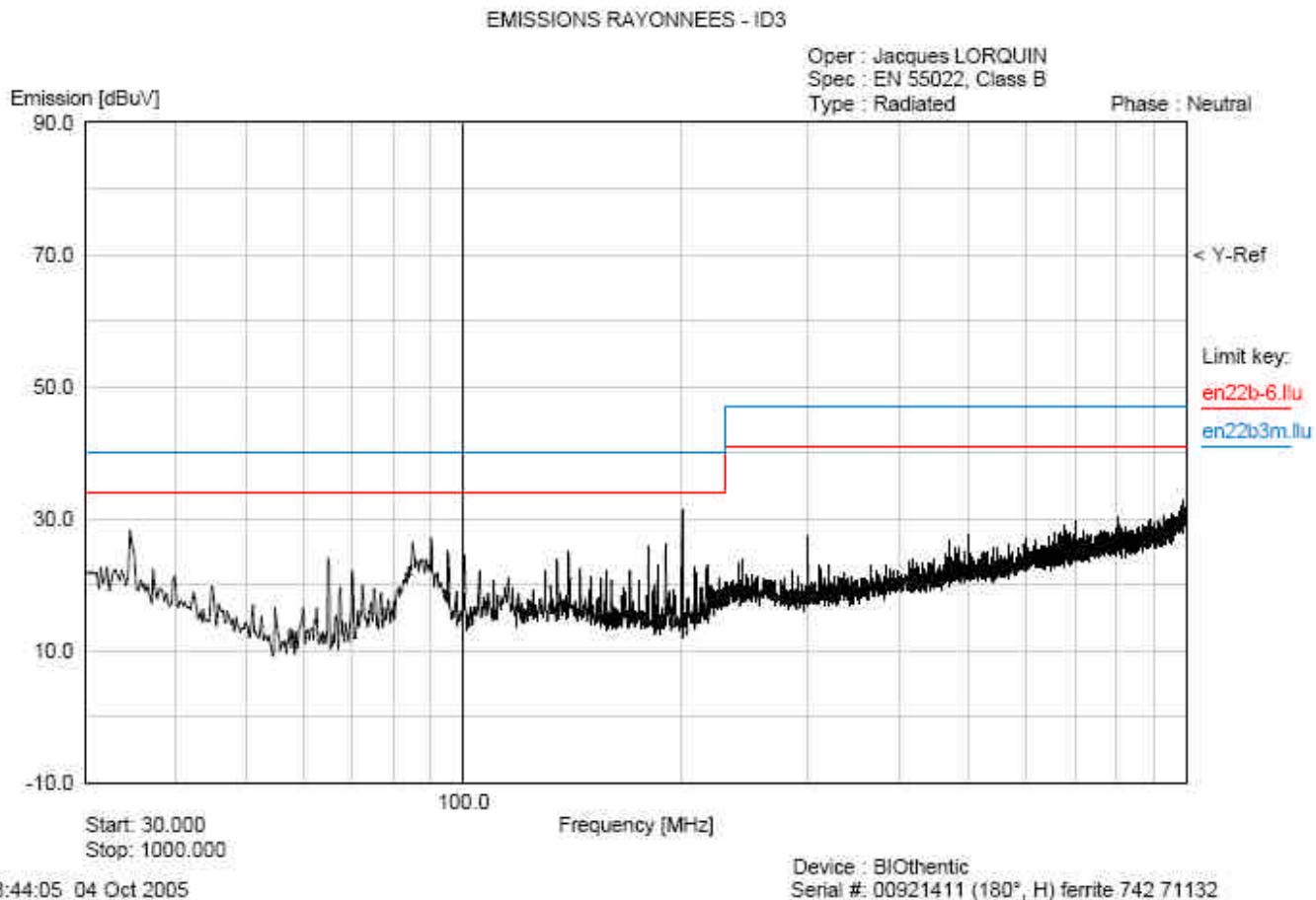
Equipment	Company	Model	Serial
EMC Analyzer	HP	8591EM	3536A00384
Amplifier	HP	8447F H64	3113A06394
Antenna (30MHz-1GHz)	CHASE	CBL6111A	1628
Absorbing clamp	LÜTHI	MDS21	194.0100.50
Absorbing clamp	LÜTHI	MDS21	2826

2.3. TEST SEQUENCE AND RESULTS

2.3.1. Pre-characterization at 3 meters

A pre-scan of all the setup has been performed in a 3 meters full anechoic chamber.

The distance between EUT and antenna is 3 meters. Test is performed in horizontal (H) and vertical (V) polarization, and on 4 faces of the EUT. See below for graph examples.





LCIE

2.3.2. Characterization on 10 meters open site from 30MHz to 1GHz

The product has been tested according to ANSI C63.4-(2003), CISPR22-2003 and EN55022:1998/A1:2000/A1:2003. Radiated Emission was measured on an open area test site. A description of the facility is on file with the FCC.

Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on clause 2.1.

Frequency list has been created with anechoic chamber pre-scan results.

No	Frequency (MHz)	QPeak Lmt (dB μ V/m)	QPeak (dB μ V/m)	QPeak-Lmt (dB)	Pol	Hgt (cm)	Angle (deg)	Tot Corr (dB)	Comments
1	85.004	30.0	29.3	-0.7	V	160	35	9.6	
2	130.007	30.0	20.7	-9.3	H	360	155	14.7	
3	140.027	30.0	25.5	-4.5	V	120	290	14.5	
4	180.029	30.0	21.5	-8.5	V	160	15	18.0	
5	190.005	30.0	24.0	-6	V	120	330	18.7	
6	200.020	30.0	29.7	-0.3	V	130	310	13.1	
7	500.016	37.0	31.2	-5.8	H	150	80	21.4	
8	700.011	37.0	34.3	-2.7	V	270	145	25.2	
9	900.022	37.0	34.6	-2.4	V	210	125	27.1	

2.4. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

$$FS = RA + AF + CF - AG$$

Where FS = Field Strength
 RA = Receiver Amplitude
 AF = Antenna Factor
 CF = Cable Factor
 AG = Amplifier Gain

Assume a receiver reading of 52.5dB μ V is obtained. The antenna factor of 7.4 and a cable factor of 1.1 is added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dB μ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32 \text{ dB}\mu\text{V/m})/20] = 39.8 \text{ } \mu\text{V/m.}$$



3. Conducted emission data

The product has been tested according to ANSI C63.4-(2003), CISPR22:2003 and EN55022:1998/A1:2000/A1:2003

The product has been tested with 110V@60Hz and 230V@50Hz power line voltage and compared to the CISPR22 Class B limits. Measurement bandwidth was 9kHz from 150kHz to 30MHz.

Measurement was initially made with an HP-8591EM Spectrum Analyzer in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement with the Rohde & Schwarz ESH3 receiver for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

The Peak data are shown on the following plots. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured.

Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

3.1. SET-UP

Mains: 110V/60Hz



The equipment under test with its auxiliaries are set 80cm above the ground reference plane on a non-conducting table. The distance between the EUT and the LISN is 80cm.

The distance between the EUT with its auxiliaries and the vertical plane is 40cm. The EUT is powered through a LISN (measure - 50Ω / $50\mu\text{H}$) and auxiliaries are powered by another LISN.

The distance between the EUT and each auxiliary is 10cm.



3.2. TEST EQUIPMENT

Equipment	Company	Model	Serial
EMC Analyzer	HP	8591EM	3536A00384
Test receiver	Rohde&Schwarz	ESH3	872079/117
Transient Limiter	HP	11947A	3107A01596
LISN(auxiliaries)	EMCO	3825/2	9309-2122
LISN(measure)	Telemeter	TGmbH	9511-11821628
50Ω / 50µH	Electronis	NNB 2/16	
Faraday room	Rayproof		4854

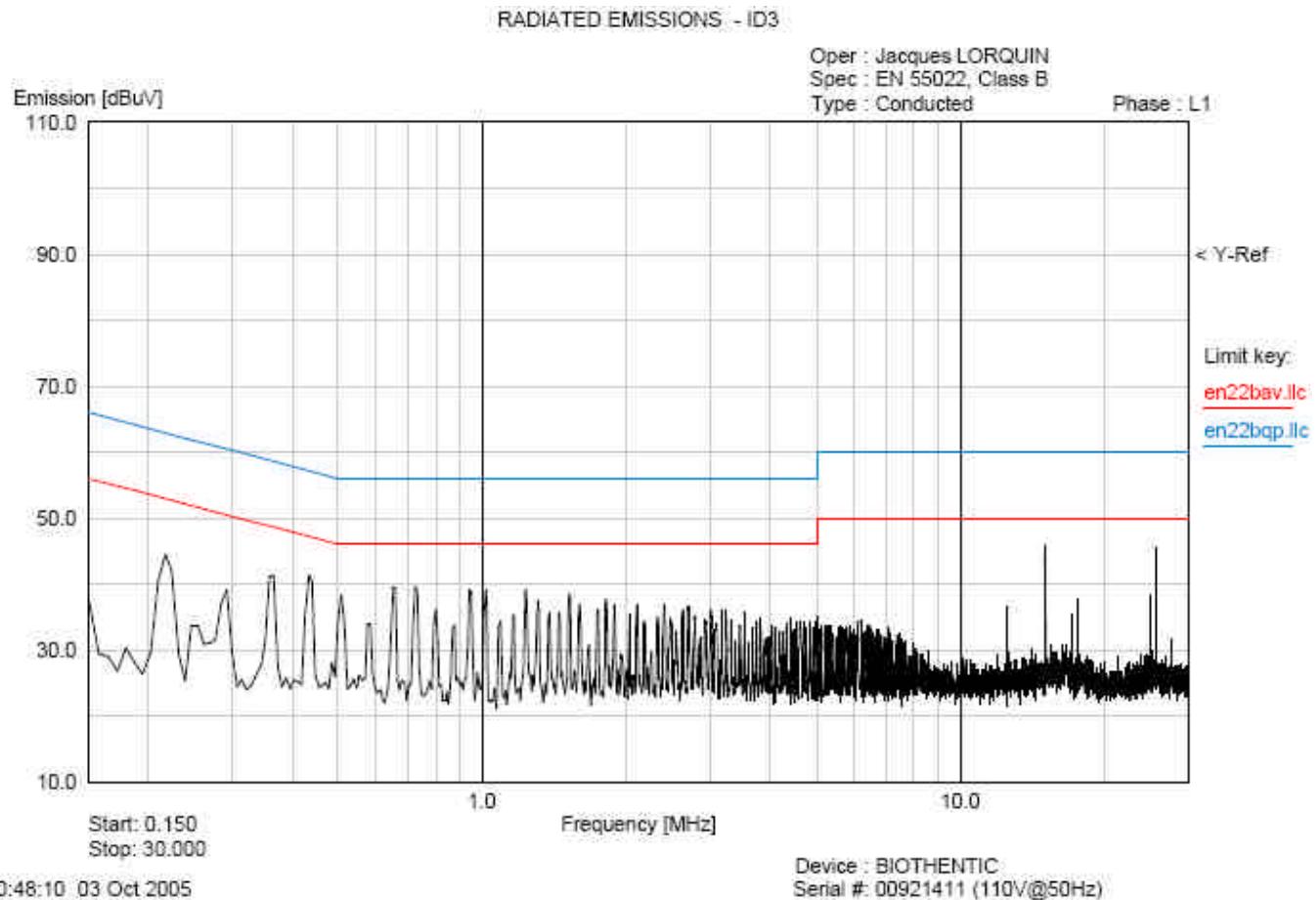


LCIE

3.3. TEST SEQUENCE AND RESULTS

The measures are made on the two lines of the power supply of the PC.

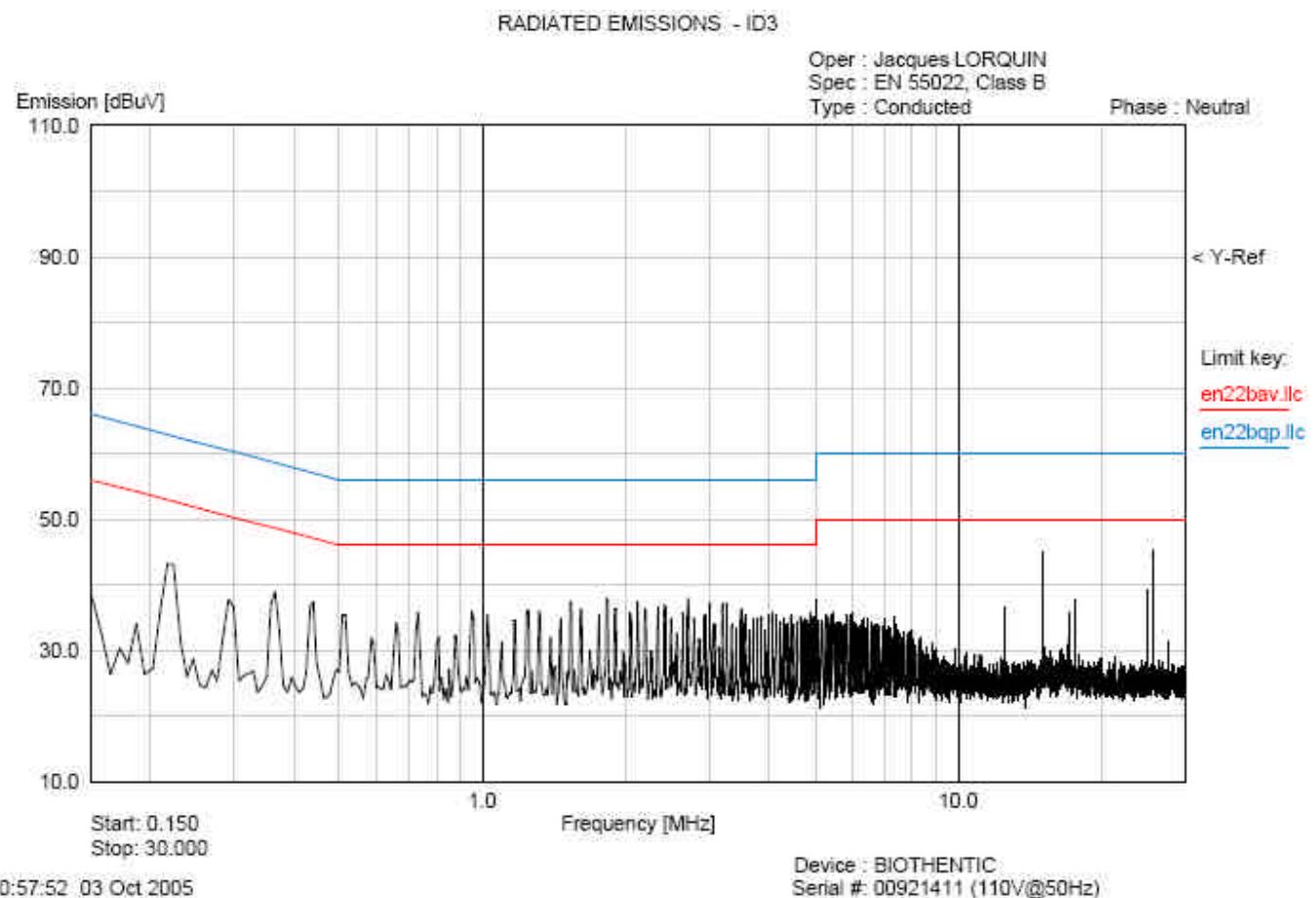
3.3.1. Line conducted emission data (110V@60Hz)



Marker ▼	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	0.220	46.23	44.04	42.38	52.00
2	0.290	39.93	38.70	37.00	50.00
3	0.360	42.91	39.23	40.69	48.00
4	0.440	41.55	38.69	40.13	46.00
5	0.650	39.77	38.10	36.54	46.00
6	0.730	41.13	37.69	39.00	46.00
7	15.03	30.50	23.05	18.79	50.00
8	25.62	41.48	37.81	33.66	50.00



3.3.2. Neutral conducted emission data (110V@60Hz)



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	0.220	43.99	41.81	40.81	52.00
2	0.300	40.54	36.44	35.53	50.00
3	0.370	40.43	36.40	38.45	48.00
4	0.440	38.44	33.41	35.78	46.00
5	15.03	28.76	24.17	17.91	50.00
6	25.60	45.46	35.40	37.41	50.00

End of Tests