TEST REPORT

ELECTROMAGNETIC COMPATIBILITY TEST

FCC.TR. 06.048

Prima Ricerca & Sviluppo Srl soggetta a direzione e coordinamento da parte della Giovanni Maspero & C. S.p.A. – C.I. 02634780130
Sede legale : 22100 Tavernola (CO) Via Conciliazione, 1 Cod. FISC. e N. R.I. CO 02635860139
Sede operativa : Laboratori Via Campagna, 92 22020 Faloppio fraz. Gaggino (CO) Tel. +39 03135000.11 Fax +39 031991309

EQUIPMENT UNDER TEST :
APPARECCHIO IN PROVA :

SAFETY SECURE DIGITAL I/O model Oberon SSD/IO

DERIVED MODELS :
APPARECCHI DERIVATI:

SAFETY SECURE DIGITAL model Oberon SSD90xx

REFERENCE STANDARDS :
NORME DI RIFERIMENTO :

FCC 47CFR Part 15

CUSTOMER:
RICHIEDENTE:

- **Dept. / Firm :** *Ente / Società':* *OBERON SERVICE S.r.l.*
- **Mr.:** *Sig.:* *Massimo Mantovan*
- **Address:** *Indirizzo:* *Via Meda, 28 - 20141 Milano (MI) - Italy*
- **Tel.** : *Telefono :* ++39 *02.84800612*
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- **E-mail:** *e-mail* *Massimo.mantovan@oberon.it*

Site of test execution: Via Campagna, 92 - 22020 Gaggino Faloppio (CO) – Italy
Località esecuzione prove:

Date of test samples receipt: 20/01/2006
Data ricevimento campioni:

Date of start test: 23/01/2006
Data inizio prove:

Date of end test: 23/01/2006
Data fine prove:

Witness to the test:
Presenti alle prove:

Nobody / Nessuno
.....

Signature of the engineers:
Firma esecutore prove:

.....
Francesco Barbierato

Signature of the Laboratory Director:
Firma Direttore Laboratori:

.....
Furfari Roberto

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0 CONTENTS

Abbreviations used in the test report :

E.U.T.	Equipment Under Test
EMC	Electromagnetic Compatibility
N.A.	Not Applicable
N.R.	Not requested by the client

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1 TECHNICAL INFORMATION OF EQUIPMENT UNDER TEST (EUT)

1.1 E.U.T. identification

Brand name:	after marked (Toshiba, Samsung, ST, HYNIX)
Manufacturer :	OBERON SERVICE Srl
Model name or No. :	Oberon SSD/IO
Part number / Serial No.:	Not present
FCC ID :	FCC ID: UKZSSD901XX
Country of manufacturer:	Italy

1.2 E.U.T. classification

Equipment Classification :	For home or office use
Equipment Class :	Class B
Highest frequency generated or used in the device or on which the device operates :	20 MHz 24,5 MHz
Supply voltage:	2,0 ÷ 3,6 Vdc (basic communication)
Input Power / Current :	< 500 mA
Single or Multiple Unit :	single
EUT Dimensions :	24,0 x 47,0 x 5,6 mm
EUT standing:	Inside of portable appliance and inside of Personal Computer. The EUT implemented a serial interface in order to connect it to external devices.
Indoor / outdoor cables	Indoor

1.3 Modifications incorporated in E.U.T.

The following items are the modifications introduced in the equipment under test :

- None

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1.4 Ports identification

This section contains descriptions of all signal ports and AC/DC power input/output ports, the maximum length and the type of the cable provided by manufacturer needed for the tests.

Moreover it is specified if the ports are ever or optionally connected.

Port		***Description***	***Connection***
1	Enclosure	*Plastic cover*	Ultrasonic soldering
2	AC power input/output ports	Not present	----------
3	DC power input/output ports	Micro SD card power supply 2,0 ÷ 3.6 Vdc	Micro SD pads
4	Signals ports	RS232 serial communication line. Max. cable long = 50 cm	MOLEX 8-PIN 1mm PITCH Header
Note: During the tests all cables must be what provided the manufacturer or the same that used in the real employment of the EUT.			

1.5 Auxiliary equipment (AE)

- Laptop PC COMPAQ mod. EVO7023N
- SD/MMC with USB plug to direct connection to PC

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1.6 Operating test modes and test Conditions

The equipment has been tested according to the operative conditions described in the user/installation manual provided by the manufacturer and by following reference standards :

Reference Standard:

- FCC Part 15, Subpart B

In the following table there are the operating conditions adopted during tests identified by an indicator (#..) at which has been referred the item “Operating condition of the equipment under test” of all technical sheets of the tests (see Section 3)

Operating condition (#)	*Description of the mode of operation*
#1	The EUT is inserted to an AE system composed by a SSD/IO card reader connected to Laptop PC via USB. The EUT is written and read repeatedly by an ad-hoc routine running in the Laptop PC.
#2	Serial RS 232 I/O operational mode

1.7 Test overview

Sample tested is the main model of a complete set of Safety Secure Digital (SSD/IO).
The appliance is classified as “unintentional radiator” in conformity to FCC Part 15 Sub. B §15.109, §15.107 , and it is subject to “Declaration of Conformity” procedure.
The application is mainly used as mass portable read/write storage device.
The Oberon SD has the capability to communicate with devices using RS232 or driving/sensors using 2 Digital – I - O pins.

2 REFERENCE STANDARD FOR PERFORMED TESTS

Reference standard :	Title :
FCC Part 15 part A	Code of Regulations Part 15 (Radio Frequency Devices), Subpart A (General) of the Federal Communication Commission (FCC)
FCC Part 15 part B	Code of Regulations Part 15 (Radio Frequency Devices), Subpart B (Unintentional Radiators) of the Federal Communication Commission (FCC)
ANSI C63.4	American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz – 40 GHz

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3 SUMMARY OF TEST RESULTS

3.1 EMISSION TESTS

Phenomenon	Application	Basic standard	Operating condition	Test result
Radiated disturbance	Enclosure	FCC 47CFR Part 15	#1, #2	Within the limit
Conducted emission	DC input/output port	FCC 47CFR Part 15	Not applicable[1]	
	AC mains input/output port	FCC 47CFR Part 15	#1, #2	Within the limit

[1] Not applicable: port not present

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3.2 TEST RESULTS

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TEST 1.

EMISSION OF MAINS TERMINAL DISTURBANCE VOLTAGE

REFERENCE DOCUMENT: FCC PART 15 subpart B

- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
  Siemens+Matsushita type B84117-D6019-T232
  Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESMI
  Artificial Network Rohde & Schwarz Mod. ESH3-Z5

- **TESTED PORT:** AC mains
- **FREQUENCY RANGE:** 0.15 - 30 MHz
- **EMISSION LIMITS:** Acc. to reference document 15.107
- **MEASUREMENT UNCERTAINTY:** Total uncertainty (k=2) ± 2.5 dB

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	**15 - 35 °C**		**24 ± 3 °C**
Ambient humidity :	**25 - 75 %rH**		**40 ± 5 %rH**
Pressure :	**85 - 106 kPa**	**(860 mbar - 1060 mbar)**	**950 ± 50 mbar**
Voltage :	**110Vac**		**110 Vac ± 3%**

OPERATING CONDITION (Rif. Section. 2) : *#1, #2*

RESULT: Within the limits

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SCAN TABLE : Voltage Mains

Unit :	dBµV	
	Detector :	Mode :
Curve 1:	MaxPeak	ClearWrite
Curve 2:	Average	ClearWrite

Start Frequency :	150.0 kHz		
Stop Frequency :	30.0 MHz	IF Bandwidth :	9 kHz
Measure Time :	10.0 ms	Step size :	6 kHz

Receiver :	*ESMI*	***Transducer :***	*ESH3-Z5_PRC*
Signal Path :	*Path 3*	***System Transducer :***	*Rfin1-CP2/X11*
Meas. Mode :	*Lin*	***Add. Transd. 1 :***	*W71.03*
Tracking Generator :	*Off*	***Add. Transd. 2 :***	*None*
Input :	*1AC*	***Add. Transd. 3 :***	*None*
Preamplifier :	*10 dB*	***Demodulation :***	*FM Broad*
RF Att. :	*Coupled*	***Volume :***	*0 %*
Ref. Level :	*-10 dBm*	***Squelch :***	*--*
Min. RF Att. :	*0 dB*	***Option :***	*None*
IF Att. :	*0 dB*		
Autorange :	*On*		
Curve 1 :	*On*	***Repetition :***	*Single*
Curve 2 :	*On*	***Stop Mark :***	*On*
		Stop Message :	*On*
		Stop Message :	*Connect EUT*

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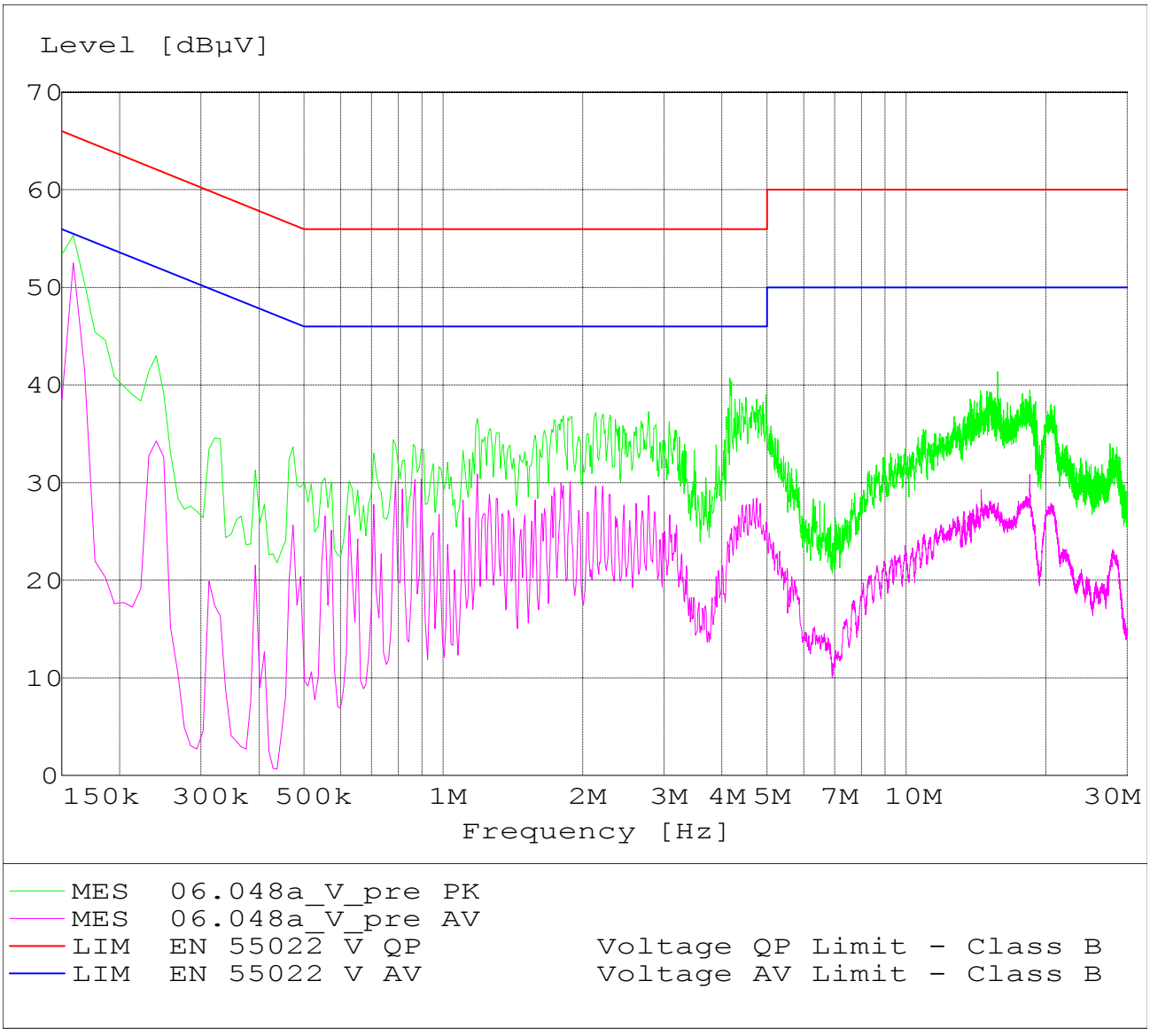
Only AE system without EUT connected to USB port (worst condition)



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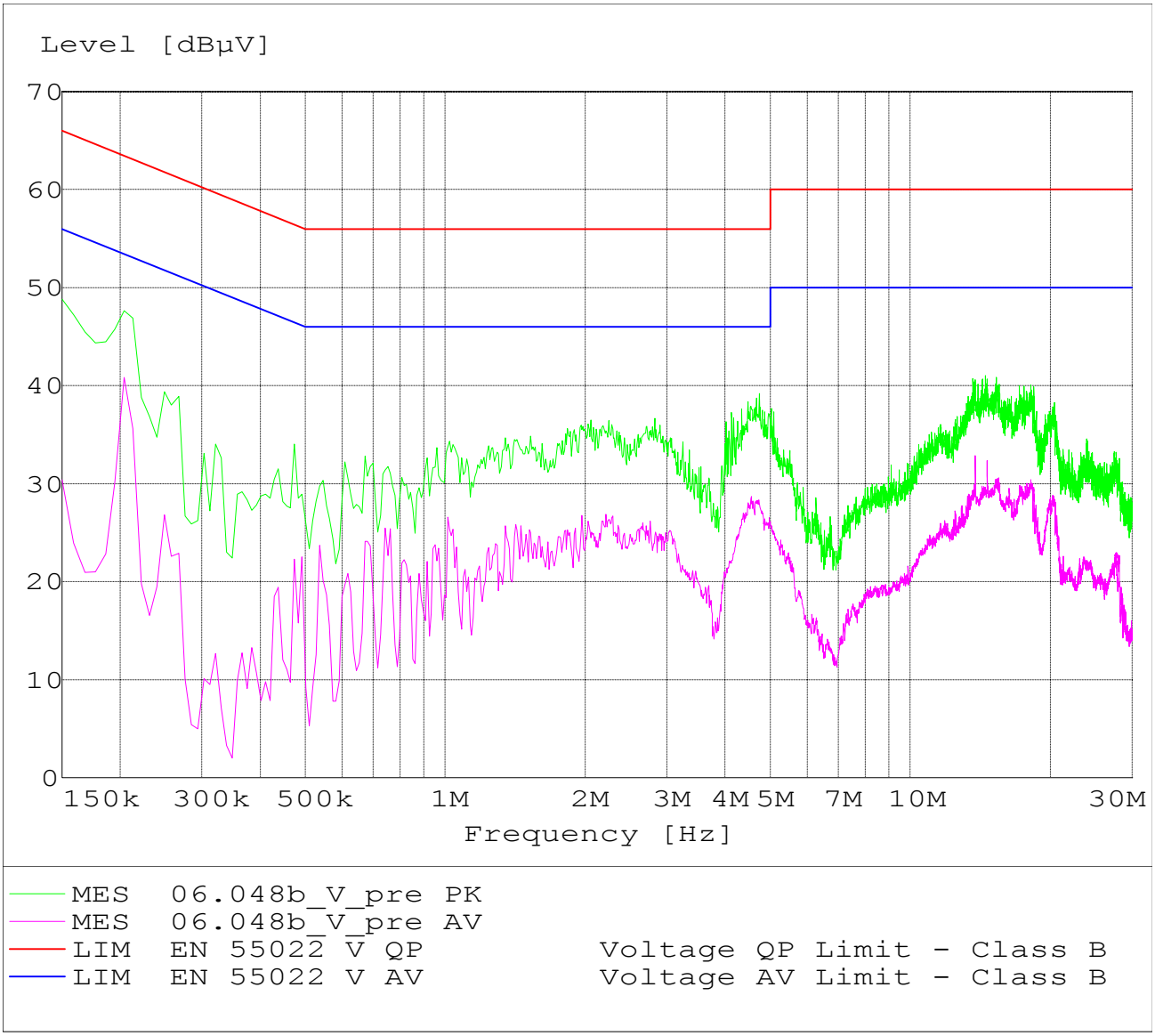
With EUT powered by a Personal computer COMPAQ model EVO N1020V
in oper. condition #1 (worst condition)



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TEST 2.

ELECTROMAGNETIC RADIATED FIELD DISTURBANCE EMISSION TEST

REFERENCE DOCUMENT: FCC47CFR Part 15

- **TEST SETUP:** According to reference standard
- **TEST LOCATION:** Semi-anechoic chamber (CISPR 16-1 :1993)
  Siemens+Matsushita type B84117-D6019-T232
  Measure distance 3 meters
- **TEST EQUIPMENT USED FOR TEST:** EMI receiver Rohde & Schwarz Mod. ESMI
  Chase Antenna Mod. CBL 6111 C

- **TESTED PORT:** Enclosure
- **FREQUENCY RANGE:** 30 - 1000 MHz
- **EMISSION LIMITS:** Section 15.109 of Standard
- **UNCERTAINTY OF MEASURE:** Combined uncertainty = ± 1.75 dB
  Total uncertainty = (k=2) ± 3.5 dB

TEST CONDITIONS:			**MEASURED**
Ambient temperature :	15 - 35 °C		24 ± 3 °C
Ambient humidity :	25 - 75 %rH		33 ± 5 %rH
Pressure :	85 - 106 kPa	(860 mbar - 1060 mbar)	950 ± 50 mbar
Voltage :	2,7 ÷ 3.6 Vdc		by auxiliary equipment powered with USB port

OPERATING CONDITION (Rif. Section. 2) : #1, #2

RESULT: WITHIN THE LIMIT

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SCAN TABLE : "Radiated Emission"

Unit:	dBμV/m		
	Detector : Mode:		
Curve1:	MaxPeak ClearWrite		
Curve2:	-- ClearWrite		
Subrange1:			
Start Frequency:	30.0 MHz	Step Size:	80 kHz
Stop Frequency:	1000.0 MHz	IF Bandwidth:	120 kHz
Measure Time:	10 ms		
Receiver:	ESXI	Probe Transducer:	CHASE_6111_PRC
Signal Path:	Path 4	System Transducer:	RFin2-CP1/X11
Scan Mode:	Lin	Add. Transducer:	W71.01
Tracking Gen.:	Off		
Input:	2 DC		
Preamplifier:	10 dB	Demodulation:	FM Broad
RF att.:	Coupled	Volume:	0.0%
Ref. Level:	-50 dBm	Squelch:	--
Min. RF att.:	0 dBm	Option:	None
Autorange:	On		
Curve 1:	On	Repetition:	Single
Curve 2:	Off	Stop Mark:	On
		Stop Message:	On
		Text:	Connect antenna

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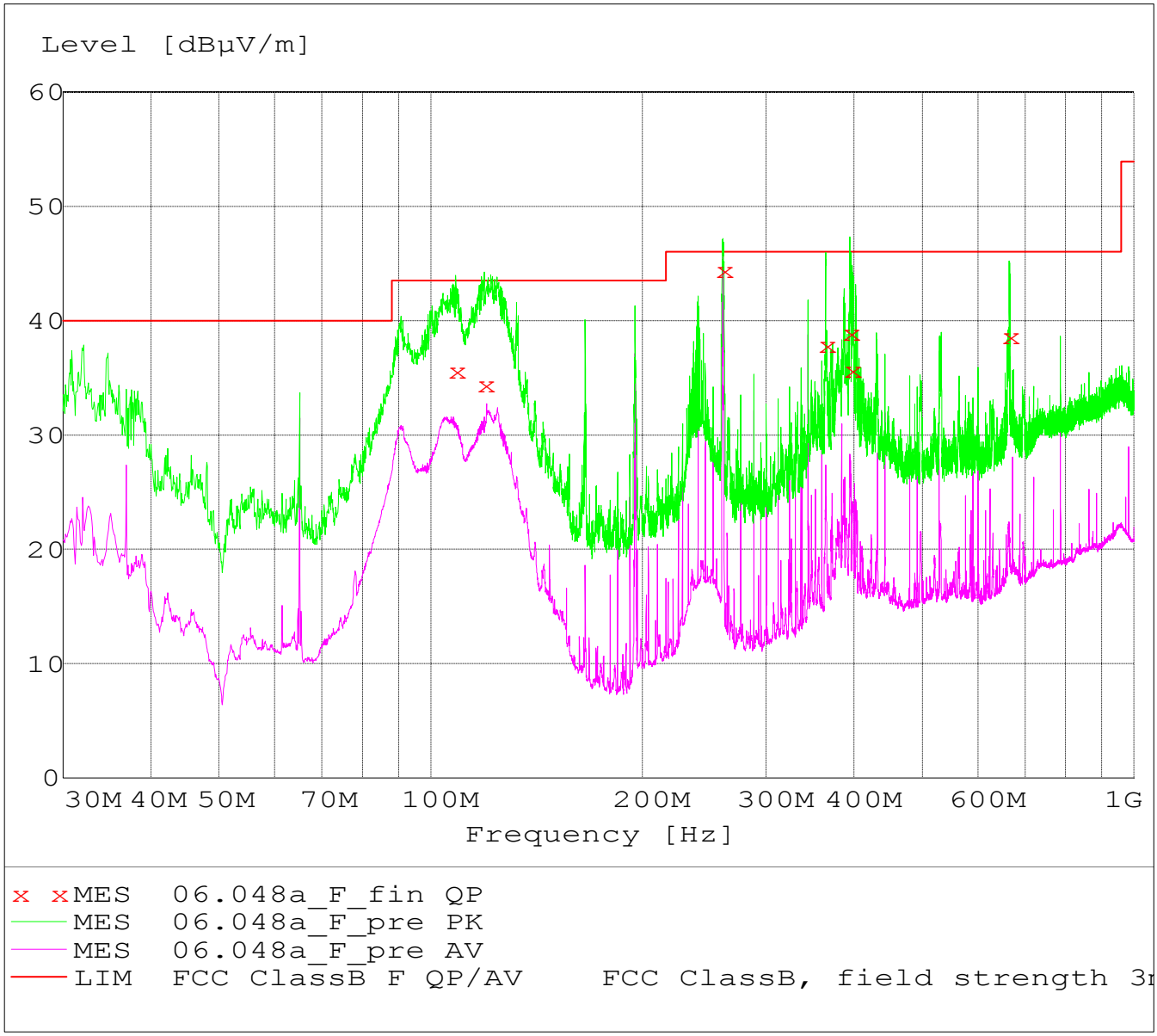
#1 (worst condition)



MEASUREMENT RESULTS (QUASI PEAK DETECTOR)

Frequency	Level	Transd	Limit	Margin	Height	Azimuth	Polarisation
MHz	dBµV/m	dB	dBµV/m	dB	cm	deg	
108.480000	35.60	13.10	43.50	7.90	300.0	180.00	HORIZONTAL
119.120000	34.40	13.90	43.50	9.10	305.0	177.00	HORIZONTAL
260.320000	44.40	16.40	46.00	31.60	287.0	147.00	HORIZONTAL
364.400000	37.90	18.60	46.00	28.10	160.0	315.00	HORIZONTAL
394.320000	39.00	19.60	46.00	27.00	151.0	242.00	HORIZONTAL
396.480000	35.70	19.70	46.00	16.30	100.0	66.00	HORIZONTAL
665.200000	38.70	24.80	46.00	22.30	170.0	225.00	HORIZONTAL

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4 EUT TECHNICAL DOCUMENTATION

4.1 Wiring diagrams

	Document reference (n., edition, date, ...)
WIRING DIAGRAM	Oberon Service Srl title : Secure Digital Card & I/O Dwg. No. 001-050707-OberonSD Rev. 1.0 Date : 2005-11-08 Sheet no. 1
PART LIST	Oberon Service Srl title : Secure Digital Card & I/O Rev. 0.0 Date : 2005-07-08 Sheet no. 1

4.2 Technical manual

	Document reference (n., edition, date, ...)
API Developers Guide	SSD/SSDIO API Developers Guide Manual release : 1.3B Manual date: December 2005

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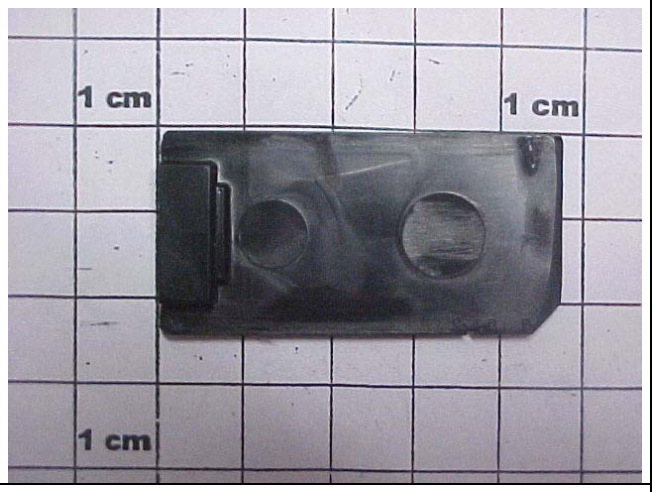
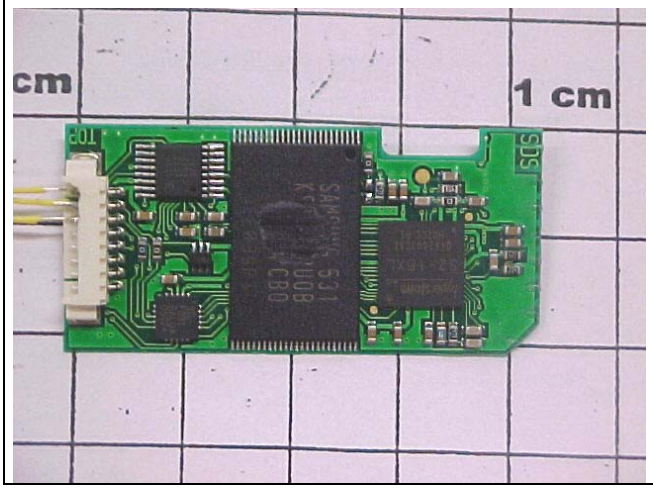
4.3 Photographic documentation

PHOTO N° 1 : EUT IDENTIFICATION





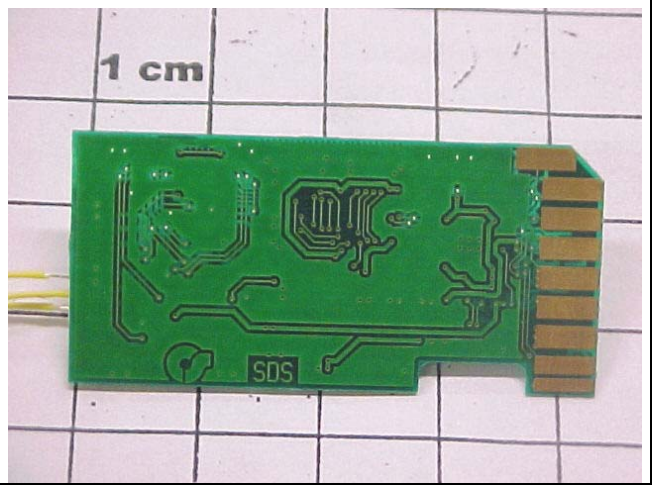


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PHOTO N° 2: SET-UP FOR RADIATED EMISSION TEST

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5 TECHNICAL REPORT OF ANALYSIS OF DERIVED PRODUCTS

EQUIPMENT under ANALYSIS		**Manufacturer**
BASIC MODEL	**SAFETY SECURE DIGITAL I/O model Oberon SSD/IO**	OBERON SERVICE
DERIVED MODELS	**SAFETY SECURE DIGITAL model Oberon SSD90xx**	

Prima Ricerca & Sviluppo, just on the basis of the following technical documents :

1.	Wiring diagram	Oberon Service Srl title : Secure Digital Card & I/O Dwg. No. 001-050707-OberonSD Rev. 1.0 - Date : 2005-11-08 - Sheet no. 1
2.	Mounting plain / PCB layout	------
3.	Part list	Oberon Service Srl title : Secure Digital Card & I/O Rev. 0.0 - Date : 2005-07-08 - Sheet no. 1

We state as follows :

- the basic model and the derived models have the same enclosure
- the basic model and the derived models have the same printed circuit board, the same wiring diagram
- the derived models does not mount the I/O circuit and related parts
- The differences between the basic model and the derived models are DENSITY and CMOS NAND E2EPROM type (128, 256, 512 MBIT and 1 or 2 GBIT on NAND flash devices TSOP 48 pins)

On this basis, Prima Ricerca & Sviluppo considers the basic model equally critical to the derived models, from the EMC point of view.

Therefore, all the measures performed on the basic model and carried in this test report, are completely extendable to the derived models.