



LCIE

Rapport d'essai / Test report

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France

Objet / Subject : Essais de compatibilité électromagnétique conformément aux normes :
Electromagnetic compatibility tests according to the standards:
FCC CFR 47 Part 15, Subpart B.
ANSI C63.4 (2003)

Matériel testé / Apparatus under test :

- Produit / Product : Lecteur empreintes digitales USB / USB Fingerprint reader
- Marque / Trade mark : ID3 Semiconductors
- Constructeur / Manufacturer : ID3 Semiconductors
- Type / Model : CERTIS 2
- N° de série / serial number : N° 01366242

Date des essais / Test date : 28 mai 2007 / May 28th, 2007

Lieu d'essai / Test location : LCIE
ZI des Blanchisseries
38500 VOIRON - France

Test réalisé par / Test performed by : Laurent CHAPUS

Ce document comporte / Composition of document: 14 pages.

VOIRON, LE 6 JUIN 2007 / JUNE 6TH, 2007

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**1. TEST PROGRAM****1.1. REQUIREMENTS FOR DISTURBANCE EMISSIONS**

Standard:

- FCC Part 15, Subpart B (Digital Devices)
- ANSI C63.4 (2003)

EMISSION TEST	LIMITS			RESULTS (Comments)
Limits for conducted disturbance at mains ports 150kHz-30MHz	Frequency	Quasi-peak value (dB μ V)	Average value (dB μ V)	COMPLY
	150-500kHz	66 to 56	56 to 46	
	0.5-5MHz	56	46	
	5-30MHz	60	50	
Radiated emissions 30MHz-1GHz	Measure at 3m 30MHz-88MHz : 40 dB μ V/m 88MHz-216MHz : 43.5 dB μ V/m 216MHz-960MHz : 46.0 dB μ V/m Above 960MHz : 54.0 dB μ V/m			COMPLY

NA: Not Applicable

NP: Not Performed



2. APPARATUS UNDER TEST: CONFIGURATION

2.1. JUSTIFICATION

The system was configured for testing in a typical fashion (as a customer would normally use it). The USB reader is connected to a PC.

2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES)

- Equipment under test (EUT):**

CERTIS 2

Serial Number: N°01366242

FCC ID: TPD7P217

P/N: 087P217

- Internal frequencies: 12MHz, 2MHz

- Inputs/outputs:**

- USB port (cable 1m, shielded, attached on EUT)

- Auxiliaries equipment used during test:**

Trade Mark – Model Number (Serial number)	FCC ID	Description	Cable description
CERTIS 2 * (sn : N°01366242)	IGTUAX220MIC	Professional USB Audio Interface	USB cable 1m
COMPAQ Deskpro PIII (Win XP) Sn: 8146FR4Z02GN	DoC	Personal computer	Power cord unshielded. All other cable shielded.
Hewlett Packard P/N:D2846 (sn: JP74001000)	DoC	Monitor	Power cord unshielded. Video cable shielded with ferrites
LOGITEK M-C43 (sn: Sn: B21A70LBUMFOAF)	DZL211146	Mouse	PS2 cable (1.5m)
COMPAQ M/N: KB-9963 (sn: B21A70LBUMFOAF)	DoC	Keyboard	PS2 cable (1.2m)
Hewlett Packard DESKJET 895cxi (sn: MY9761915S)	DoC	Parallel printer	Power cord unshielded. All other cable shielded.
TELEX 700373-000	None	Microphone	Audio cable (2m)

*: Equipment under test.

- Cables:**

Other cables used for the test are:

- 2x Standard power cords (1.5m) for PC and Monitor
- Video cable (1.5m), shielded
- Parallel printer cable (1.5m), shielded

2.3. RUNNING MODE

The biometric reader is connected to the USB port of a PC. The software used during the test permits the acquisition of fingerprints, taken on the tested CERTIS sensor.

Tests are performed while the reader is waiting for an acquisition.



2.4. EQUIPMENT MODIFICATIONS

None

2.5. SPECIAL ACCESSORIES

None

3. MEASUREMENT OF RADIATED EMISSION (30MHz TO 1GHz)

3.1. TEST CONDITIONS

Date of test : May 28th, 2007
Test performed by : L. Chapus

3.2. SETUP FOR RADIATED EMISSIONS MEASUREMENT

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

The EUT is set on the non-conducting table of 80 cm height.

The EUT is powered by 230Vac/50Hz.

Pre-characterisation measurement:

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.

The pre-characterization graphs are obtained in PEAK detection. During the max-hold measurement, the EUT is rotated on 360 degree range.

Characterization on 3 meters open site from 30MHz to 1GHz:

The product has been tested according to ANSI C63.4 (2003), FCC part 15 subpart C. Radiated Emissions were measured on an open area test site. A description of the facility is on file with the FCC.

The product has been tested at a distance of **3 meters** from the antenna and compared to the FCC part 15 subpart B §15.209 limits.

Measurement bandwidth was 120kHz from 30 MHz to 1GHz.

Antenna height search was performed from 1m to 4m for both horizontal and vertical polarization. Continuous linear turntable azimuth search was performed with 360 degrees range.

A summary of the worst case emissions found in all test configurations and modes is shown on clause 3.4 (Pre-characterization results).



3.3. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

**3.4. MEASUREMENTS RESULTS**

Pre-characterisation measurement: pre-scan measurement at 3m (PEAK detection, graph examples)

30MHz-1GHz Polarisation H: graph **Emr#H** (see annex 1)
Polarisation V: graph **Emr#V** (see annex 1)

QUALIFICATION: 3 meters measurement on the Open Area Test Site.

Frequency list has been created with anechoic chamber pre-scan results.
Measurements are performed using a QUASI-PEAK detection.

No	Frequency (MHz)	Limit Quasi-Peak (dBμV/m)	Measure Quasi-Peak (dBμV/m)	Margin (Mes-Lim) (dB)	Angle Table (deg)	Pol Ant.	Ht Ant. (cm)	Correc. factor (dB)	Comments
1	72.298	40	28.8	-11.2	275	H	260	9.5	
2	133.186	43.5	30.6	-12.9	180	V	120	15.5	
3	199.823	43.5	30.2	-13.3	255	H	150	20.4	
4	233.118	46	34.7	-11.3	35	H	200	15.0	
5	299.747	46	31.9	-14.1	305	H	130	18.1	
6	364.581	46	36.5	-9.5	155	H	100	18.9	
7	563.194	46	33.1	-12.9	115	H	120	23.3	
8	599.560	46	35.0	-11.0	25	V	180	23.8	
9	640.403	46	34.0	-12.0	275	V	200	25.0	
10	927.699	46	44.7	-1.3	40	V	130	29.9	

RESULT: PASS

3.5. 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 52.5dBμV 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 dBμV/m.

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

The 32 dBμV/m value can be mathematically converted to its corresponding level in μV/m.

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

4. MEASUREMENT OF CONDUCTED EMISSION (150kHz-30MHz)**4.1. TEST CONDITIONS**

Date of test : May 28th, 2007
Test performed by : L. Chapus

4.2. SETUP FOR CONDUCTED EMISSIONS MEASUREMENTMains terminals:

The EUT with its auxiliaries are set on a non-conducting 80cm above the ground reference plane.
The distance between the EUT and the LISN is 80cm. The EUT is 40cm away for the vertical ground plane.
The EUT is powered through a LISN 50 Ω / 50 μ H (measure). Auxiliaries are powered by another LISN.
Mains: 110V/60Hz.

**4.3. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION**

None

4.4. MEASUREMENTS RESULTS

Measurements are performed on the phase (L1) and neutral (N) of the power line of the PC

Results: (PEAK detection)

Measure on L1: graph **Emc#L1**

(see annex 1)

Measure on N : graph **Emc#N**

(see annex 1)

RESULT: PASS



5. TEST EQUIPMENT LIST

	N°LCIE	TYPE	COMPANY	REF	SN
RADIATED EMISSION MEASUREMENT					
	C2040057VO	Antenna monopole	AH SYSTEM	SAS-551	181
	A7102026VO	Amplifier 8-26GHz	ALDETEC	ALS01452	1
X	C4040009VO	Air Compressor	ATLAS COPCO	LX111	0615-038
X	A3169050VO	Radiated emission comb generator	BARDET		PR17B
X	C2040051VO	Antenna Bi-log	CHASE	CBL6111A	1628
	C2040052VO	Antenna Loop	ELECTRO-METRICS	EM-6879	690234
	C2042027VO	Antenna horn	EMCO	3115	6382
X	C2040050VO	Antenna biconic	EMCO	3104C	9401-4636
X	C2040056VO	Antenna log-periodic	EMCO	3146	2178
X	F2000286VO	Turntable controller	EMCO	1060-10	1217
X	F2000287VO	Antenna mast controller	EMCO	1050	8811-1295
X	F2000288VO	Antenna mast	EMCO	1050	
X	F2000289VO	Turntable	EMCO	1060	
X	F2000371VO	Turntable (Anechoic chamber)	ETS LINGREN	Model 2065	
X	F2000372VO	Turntable controller (Anechoic chb)	ETS LINGREN	Model 2090	
X	D3044009VO	Anechoic chamber	EUROSHIELD	RDF-F-60-060	1213
	A7102024VO	Amplifier 8 GHz	HEROTEK	A1080304A	222033
X	A4060016VO	Spectrum analyzer 9kHz –1.8GHz	HEWLETT PACKARD	8591E	3536A00384
X	A7102019VO	Amplifier 9 KHz – 1300 MHz	HEWLETT PACKARD	8447F Opt 64	3113A06394
	A4060018VO	Spectrum Analyzer 9KHz – 26.5GHz	HEWLETT PACKARD	8593E	3409u00537
X	A4049059VO	Adapter quasi-peak	HEWLETT PACKARD	HP85650A	2811A01134
X	A4060019VO	Spectrum analyzer display	HEWLETT PACKARD	HP85662A	2816A16603
X	A4060017VO	Spectrum analyzer	HEWLETT PACKARD	HP8568B	2732A04155
X	A4060027VO	Pre-selector RF	HEWLETT PACKARD	HP85685A	2837A00784
	A5329032VO	Absorption clamp	LUTHI	MDS21	2826
	A5329044VO	Absorption clamp	RHODE ET SCHWARZ	85024A	194.0100.50
	A2640011VO	Measurement receiver 9kHz–30MHz	ROHDE ET SCHWARZ	ESH3	972079/117
	C2042028VO	Antenna horn 26GHz	SCHWARZBECK	BBHA 9170	BBHA9170232
X	A5329045VO	Cable IMR&EMR (Anechoic chamber)	SMEE	KX13	
X	A5329048VO	Cable EMR OATS	SUCOFLEX	106G	553
	A5329038VO	Cable coaxial 3.5 m (Blue)	SUHNER	SUCOFLEX 106	26732/6
X	A5329056VO	Cable Radiat EMI (Pre-amp/Analyzer)			
X	A5329057VO	Cable Radiat. EMI (Pre-amp/cage)			
	A5329059VO	Cable OATS (Mast at 10m)			
X	A5329058VO	Cable OATS (Mast at 3m)			
CONDUCTED MEASUREMENT EMISSION					
X	A3169049VO	Conducted emission comb generator	BARDET		CGPR12
	A2320059VO	LISN 50Ω / 50μH	EMCO	3810/2SH	9511/1182
X	C2320068VO	LISN 50Ω / 50μH	EMCO	3825/2	9309/2122
X	A4049061VO	Transient limiter	HEWLETT PACKARD	11947A	3107A01596
X	A2120003VO	Programable PSU, HAR/FLK	HEWLETT PACKARD	6842A	3531A00109
	A4060016VO	Spectrum analyzer 9kHz –1.8GHz	HEWLETT PACKARD	8591E	3536A00384
	A5329036VO	Direct Injection Module 100 Ohms	LCIE	MID01-100 ohms	
	A5329042VO	Ferrite Tube	LUTHI	FTC 101	4485
	A1092042VO	Ferrite Tube	LUTHI	FTC101	4763
X	D3044010VO	Faraday Cage	RAY PROOF		4854
	C2320062VO	LISN tri-phase ESH2-Z5	RHODE ET SCHWARZ	33852.19.53	841223/008
	C2320063VO	LISN tri-phase ESH2-Z5	RHODE ET SCHWARZ	33852.19.53	841223/007
	C2320066VO	RSI 4 wires	RHODE ET SCHWARZ	ENY41	838119/023
	C2320067VO	RSI 2 x 2 wires	RHODE ET SCHWARZ	ENY22	836727/015
X	A2640011VO	Measurement receiver 9kHz–30MHz	ROHDE ET SCHWARZ	ESH3	972079/117
	A1290017VO	Current probe	SCHAFFNER	CSP9160	1097
	A5329034VO	Current injection probe	SCHAFFNER	CIP8213	52
	A4089117VO	Voltage probe	SMEE		
X	C2320061VO	LISN 50Ω / 50μH (Measure)	TELEMETER ELECTRONIC	NNB-2/16Z	98010
X	A5329061VO	Cable Conduct. EMI (Analyzer/cage)			
X	A5329060VO	Cable Conduct. EMI (LISN/cage)			

**6. UNCERTAINTIES CHART**

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) $\pm x$	Incertitude limite du CISPR / CISPR uncertainty limit $\pm y$
Mesure des perturbations conduites en tension sur le réseau d'énergie <i>Measurement of conducted disturbances in voltage on the power port</i>	3.57 dB	3.6 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication <i>Measurement of conducted disturbances in voltage on the telecommunication port.</i>	3.28 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension <i>Measurement of discontinuous conducted disturbances in voltage</i>	3.47 dB	3.6 dB
Mesure des perturbations conduites en courant <i>Measurement of conducted disturbances in current</i>	2.90 dB	A l'étude / Under consid.
Mesure du champ électrique rayonné sur le site en espace libre de Voiron <i>Measurement of radiated electric field on the Voiron open area test site</i>	5.07 dB	5.2 dB
Mesure du champ électrique rayonné IN SITU de 30 à 1000 MHz <i>IN SITU measurement of radiated electric field from 30 to 1000MHz</i>	A l'étude / Under consideration	5.2 dB
Mesure de la puissance perturbatrice / <i>Measurement of disturbance power</i>	3.37 dB	4.5 dB

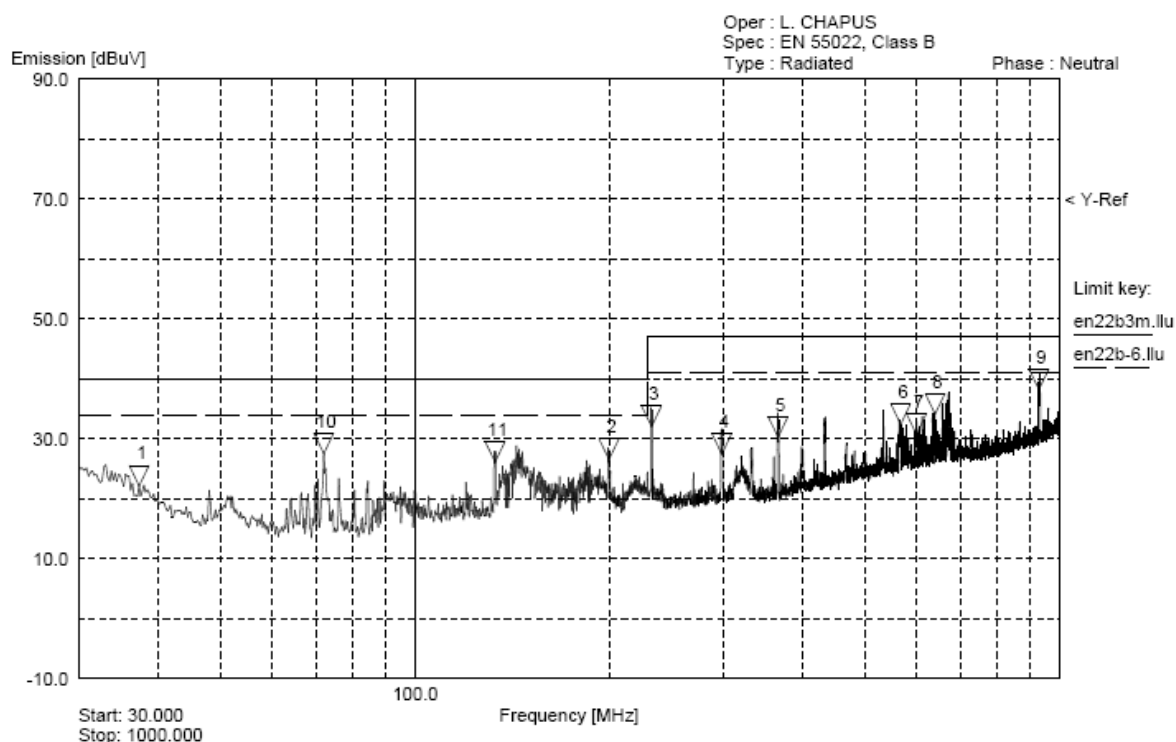
Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par le CISPR, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values.



7. ANNEX 1 (GRAPHS)

RADIATED EMISSIONS		Test configuration:
Graph name:	Emr#H	
Antenna polarisation	Horizontal	
Azimuth:	Max-hold measurement 0° to 360°	
RBW / VBW :	120kHz / 300kHz	

RADIATED EMISSIONS - ID3 SEMICONDUCTORS



10:05:40 28 May 2007

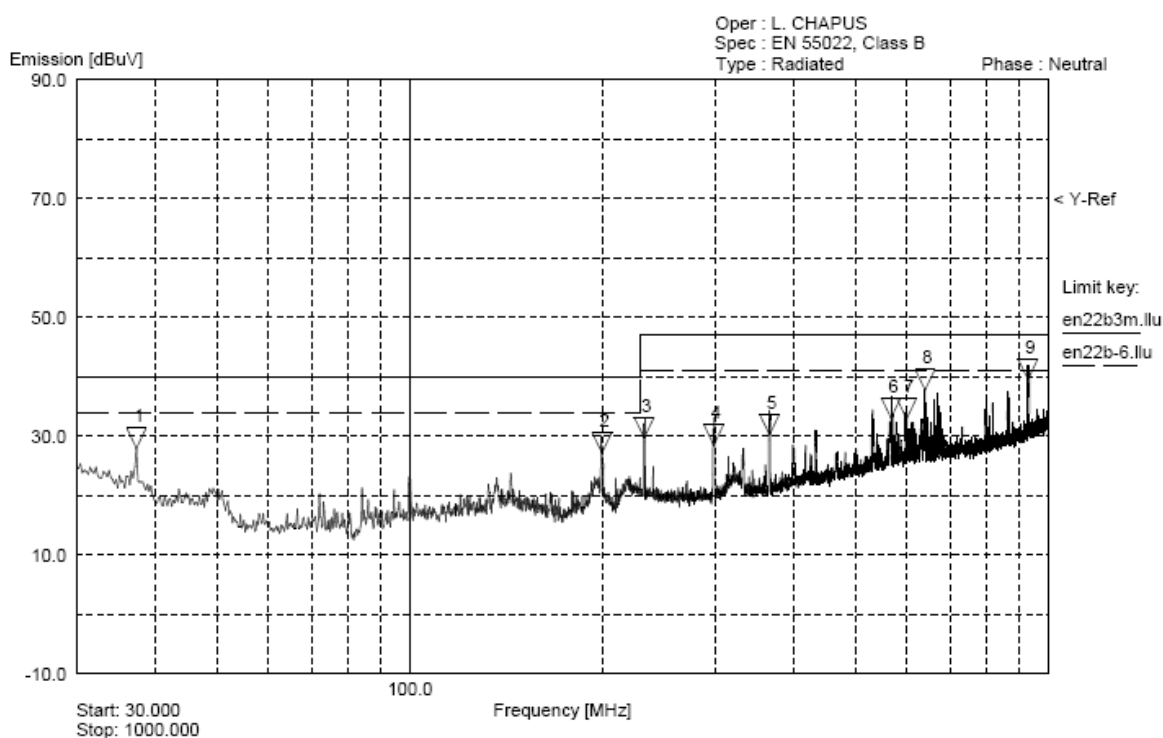
Device : CERTIS 2
Serial #: 0136624 (Pol H)

Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	37.28	22.15	-	-	40.00
2	199.8	26.57	-	-	40.00
3	232.6	32.07	-	-	47.00
4	299.0	27.44	-	-	47.00
5	365.5	30.29	-	-	47.00
6	566.4	32.42	-	-	47.00
7	599.2	30.74	-	-	47.00
8	640.4	34.12	-	-	47.00
9	928.4	38.23	-	-	47.00
10	72.11	27.54	-	-	40.00
11	133.0	26.12	-	-	40.00



RADIATED EMISSIONS		Test configuration:
Graph name:	Emr#V	
Antenna polarisation	Vertical	
Azimuth:	Max-hold measurement 0° to 360°	
RBW / VBW :	120kHz / 300kHz	

RADIATED EMISSIONS - ID3 SEMICONDUCTORS



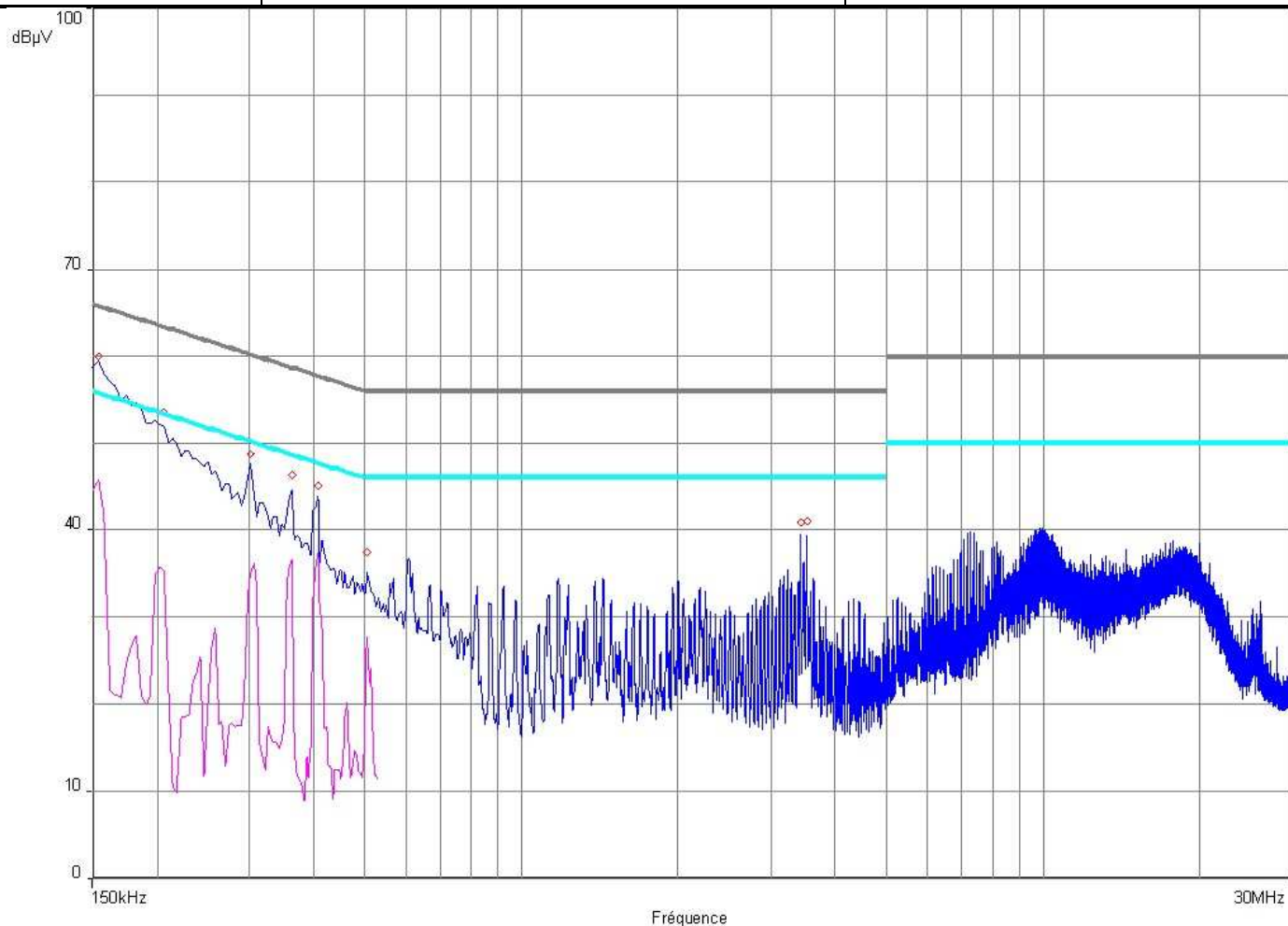
09:53:01 28 May 2007

Device : CERTIS 2
Serial #: 0136624 (Pol V)

Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	37.28	27.97	-	-	40.00
2	199.8	27.18	-	-	40.00
3	232.6	29.76	-	-	47.00
4	299.0	28.49	-	-	47.00
5	365.5	30.24	-	-	47.00
6	566.4	33.04	-	-	47.00
7	599.2	32.92	-	-	47.00
8	640.4	37.79	-	-	47.00
9	928.4	39.57	-	-	47.00



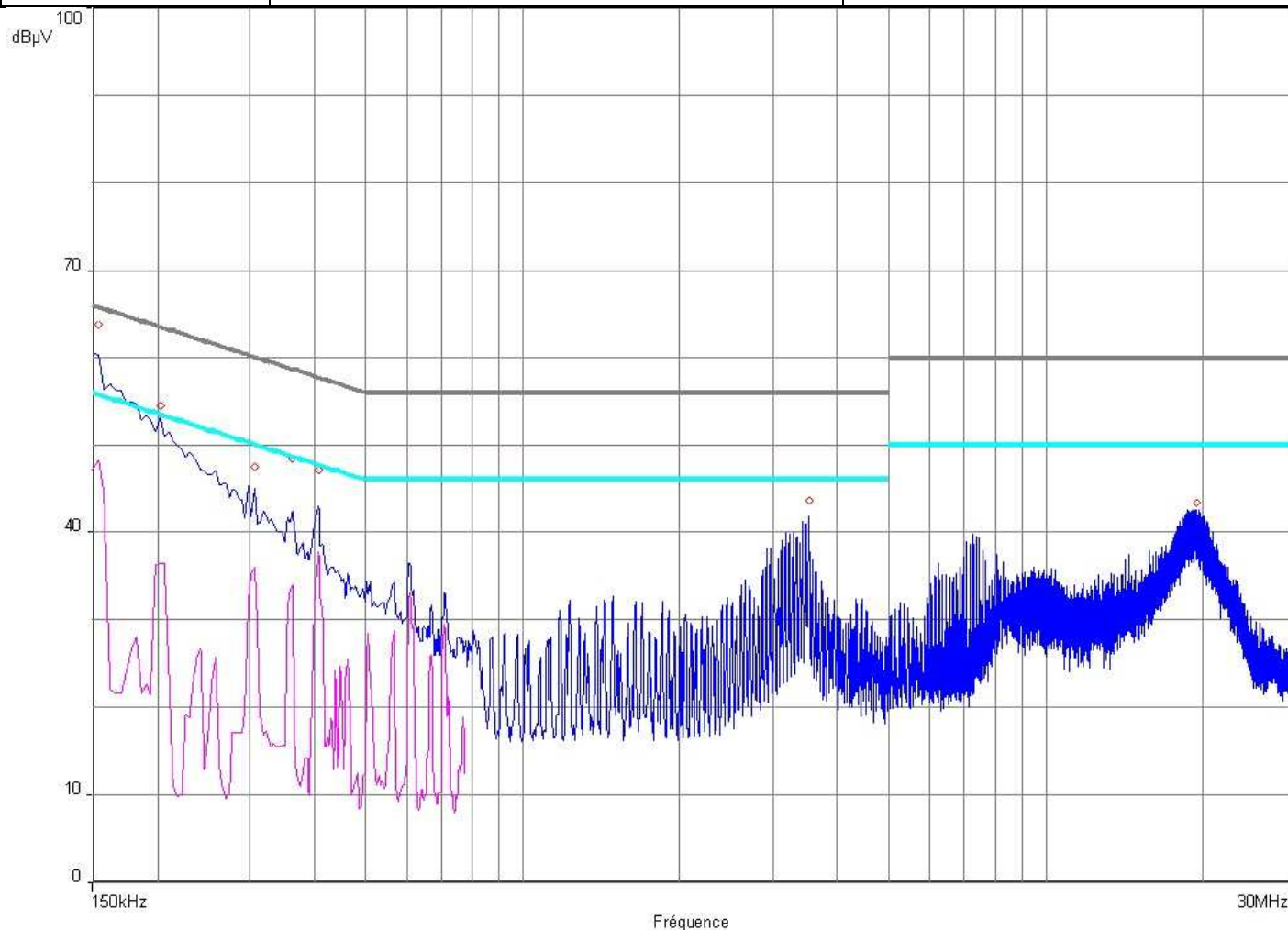
CONDUCTED EMISSIONS		Test configuration:
Graph name:	Emc#L1	
Voltage / Frequency	110Vac/60Hz	
Line/Port	Phase L1	
RBW / VBW :	9kHz / 30kHz	



Frequency (MHz)	Measure Peak dBμV	Measure Average dBμV	Limit Average dBμV	Avg-Lim (Margin) dB	Measure Quasi-Peak dBμV	Limit QPeak dBμV	QPeak-Lim (Margin) dB
0.154	60.0	45.2	55.8	-10.6	52.8	65.8	-13.0
0.206	53.6	35.8	53.4	-17.6	46.2	63.4	-17.2
0.302	48.7	36.1	50.2	-14.1	40.7	60.2	-19.5
0.362	46.3	36.3	48.7	-12.4	39.3	58.7	-19.4
0.406	45.1	37.6	47.7	-10.1	39.7	57.7	-18.0
0.506	37.5	27.5	46.0	-18.5	29.7	56.0	-26.3
3.434	40.9	29.3	46.0	-16.7	36.5	56.0	-19.5
3.534	41.1	29.5	46.0	-16.5	36.3	56.0	-19.7



CONDUCTED EMISSIONS		Test configuration:
Graph name:	Emc#N	
Voltage / Frequency	110Vac/60Hz	
Line/Port	Neutral (N)	
RBW / VBW :	9kHz / 30kHz	



Frequency (MHz)	Measure Peak dBμV	Measure Average dBμV	Limit Average dBμV	Avg-Lim (Margin) dB	Measure Quasi-Peak dBμV	Limit QPeak dBμV	QPeak-Lim (Margin) dB
0.154	63.8	48.6	55.8	-7.2	53.6	65.8	-12.2
0.202	54.5	37.0	53.5	-16.5	46.9	63.5	-16.6
0.306	47.4	36.1	50.1	-14.0	40.7	60.1	-19.4
0.362	48.5	33.2	48.7	-15.5	36.7	58.7	-22.0
0.406	47.2	37.6	47.7	-10.1	40.2	57.7	-17.5
3.538	43.7	32.0	46.0	-14.0	39.7	56.0	-16.3
19.486	43.4	35.3	50.0	-14.7	38.8	60.0	-21.2