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

EMC TEST REPORT

Nr 3740-FCC

This test report applies only on equipment described hereafter.

Proposal number : 200512-2867

Date of test..... : December 13th, 2005

Location..... : LCIE Laboratory - 38 VOIRON

Performed by..... : Jacques LORQUIN

Customer..... : **DIGIGRAM SA**
430, rue Aristide Berges
F- 38330 MONTBONNOT SAINT MARTIN
FRANCE

Product..... : **PCX924HRmic / PCX924HR / PCX22HR**
VX222HRmic / VX222HR

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

Applied standards or specification: EN55022 (1998) +/A1(2000) +/A2(2003)
CISPR22 (1997) +/A1(2000) +/A2(2002)

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 (class B), in radiated and conducted emissions.**

Written by..... : Jacques LORQUIN

Approved by ..... : Jacques LORQUIN

Date: April 19th,2006

1. System test configuration

1.1. Justification

It has been decided that it will be the PCX924HR-mic which will be tested, as it's the most complete configuration. Consequently, all test results contained in this test report are from the PCX924HR-Mic.

1.2. HARDWARE IDENTIFICATION:

Equipment Under Test (EUT): PCX924HR-mic PCI BUS CARD Sn :

- Size : 123x113x15mm
- I/O :
  - 1X SubD15
    - 2x analog audio input
    - 2X analog audio output
    - 1x micro
  - 1X SubD15HD
    - 2x digital audio input
    - 1x digital audio output
    - 1x time code input
    - 2x GPIO input / 2x GPIO output
  - 1x jack connector (headset)
- Frequencies :
  Crystal: 28.224MHz, 66MHz, 100MHz

1.3. Running mode:

For testing the PCX924HR-mic, I/O are loaded by dummy loads (load box) in order to simulate typical load on each ports:

Digital IN → 110ohms
Digital OUT → 110ohms
L & R OUT → 13kohms
L & R IN → 47ohms
Mic IN → 47ohms
Time code → 89ohms (RCA cable)

An audio signal is playing in loop (sinus 1kHz)

1.4. Software :

PC soft: Windows 2000
Test software play sound in loop.

1.5. Auxiliaries

The FCC IDs for all equipment, plus description of all cables used in the tested system are :

Trade Mark – Model Number (Serial number)	FCC ID	Description	Cable description
DIGIGRAM PCX924HR-mic* (sn:)	**IGTPCX924HR**	**Audio PCI card**	I/0 cable, shielded
HEWLETT PACKARD pn:D2846 (sn: JP74001000)	D.o.C.	monitor	Standard power cable unshielded, Video cable with ferrite at each end.
HEWLETT PACKARD pn:C4734-60111 (sn: M971168931)	GYUR38SK	Keyboard	
HEWLETT PACKARD pn:C4736-60101 (sn: LZA93024031)	JNZ201213	Mouse	
DELL pn:DMC (sn: 3MJRL1J)	D.o.C.	Personnel computer	I/0 cable, shielded Standard power cable unshielded,
Sennheiser HD 545 reference (sn: none)	none	Headset	I/0 cable, shielded Standard power cable unshielded,
Hewlett Packard pn:C6410A (sn: MY9761915T)	D.o.C.	Parallel printer	I/0 cable, shielded Standard power cable unshielded,
Hewlett Packard 48GX (sn: ID83802369)	none	Graphic calculator	Serial cable shielded with ferrite.
Labtec C324 (sn: none)	none	Headphone	
INTEL YC76 (sn: 0045143)	EDUYC76	WEBCAM	Personnel computer
DIGIGRAM	None	Load box	Standard power cable unshielded

*** : Equipment under test**

1.6. I/O cables

- 3x Power cord (PC, monitor & printer), unshielded, length: 2m
- 1x Video cable with ferrite at each end, shielded, length:2m
- 8x audio cables (XLR), shielded, length: 1.5m
- 1x parallel cable HP#C2950AHP, shielded, length: 2m
- 1x Serial cable for graphic calculator, shielded with ferrite, length: 1.5m
- 1x LAN cable STP Cat5e, shielded, length: 2m
- 1x RCA cable, shielded, length: 2m
- 1x SubD15HD/XLR cable, shielded, length: 0.6m
- 1x SubD15/XLR cable, shielded, length: 0.6m

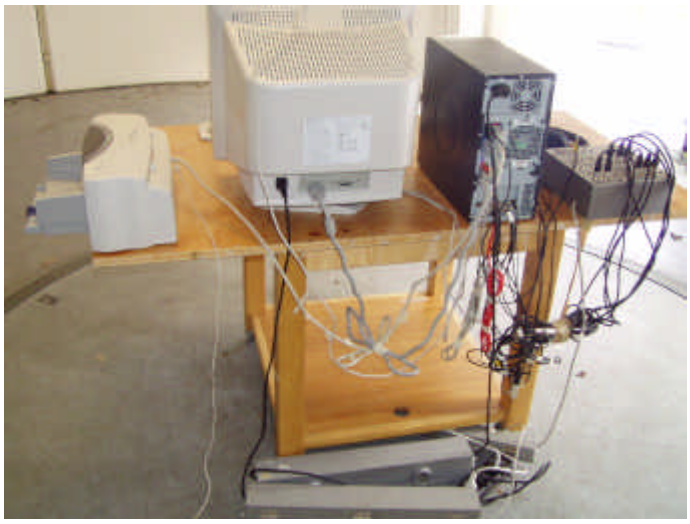
1.7. Equipment modifications

None

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 equipement under test and auxiliaries is 10cm.



Equipment configuration and running mode:

- The graphic calculator is connected on serial port of the PC;
- The headset Sennheiser is connected on the jack of the EUT;
- All other device is connected at each relevant ports of the PC
- PC and EUT are ON;
- software is running;

2.2. TEST EQUIPMENT

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
Tube ferrite	LÜTHI	FTC101	4485
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
Tube ferrite	LÜTHI	FTC101	4485
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.

Azimuth 0° : Polarization H--> graph named **\2867\m#1.dat** (see page 12/19).
Polarization V--> graph named **\2867\m#2.dat** (see page 13/19).

Azimuth 90° : Polarization H--> graph named **\2867\m#3.dat** (see page 14/19).
Polarization V--> graph named **\2867\m#4.dat** (see page 15/19).

Azimuth 180° : Polarization H--> graph named **\2867\m#5.dat** (see page 16/19).
Polarization V--> graph named **\2867\m#6.dat** (see page 17/19).

Azimuth 270° : Polarization H--> graph named **\2867\m#7.dat** (see page 18/19).
Polarization V--> graph named **\2867\m#8.dat** (see page 19/19).

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

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 (dBµV/m)	QPeak (dBµV/m)	QPeak-Lmt (dB)	Pol	Hgt (cm)	Angle (deg)	Tot Corr (dB)	Comments
1	31.946	30.0	22.7	**-7.3**	V	120	225	12.2	
2	158.944	30.0	18.4	**-11.6**	H	370	175	16.6	
3	196.600	30.0	19.9	**-10.1**	V	180	15	18.7	
4	198.000	30.0	27.2	**-2.8**	H	370	70	18.8	
5	233.151	37.0	24.7	**-12.3**	H	310	265	14.9	
6	565.705	37.0	30.5	**-6.5**	H	170	165	22.3	
7	864.131	37.0	31.7	**-5.3**	H	280	240	26.9	

3. Conducted emission data

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 & 230V/50Hz

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 / 50µH) and auxiliaries are powered by another LISN. The distance between the EUT and each auxiliary is 10cm.

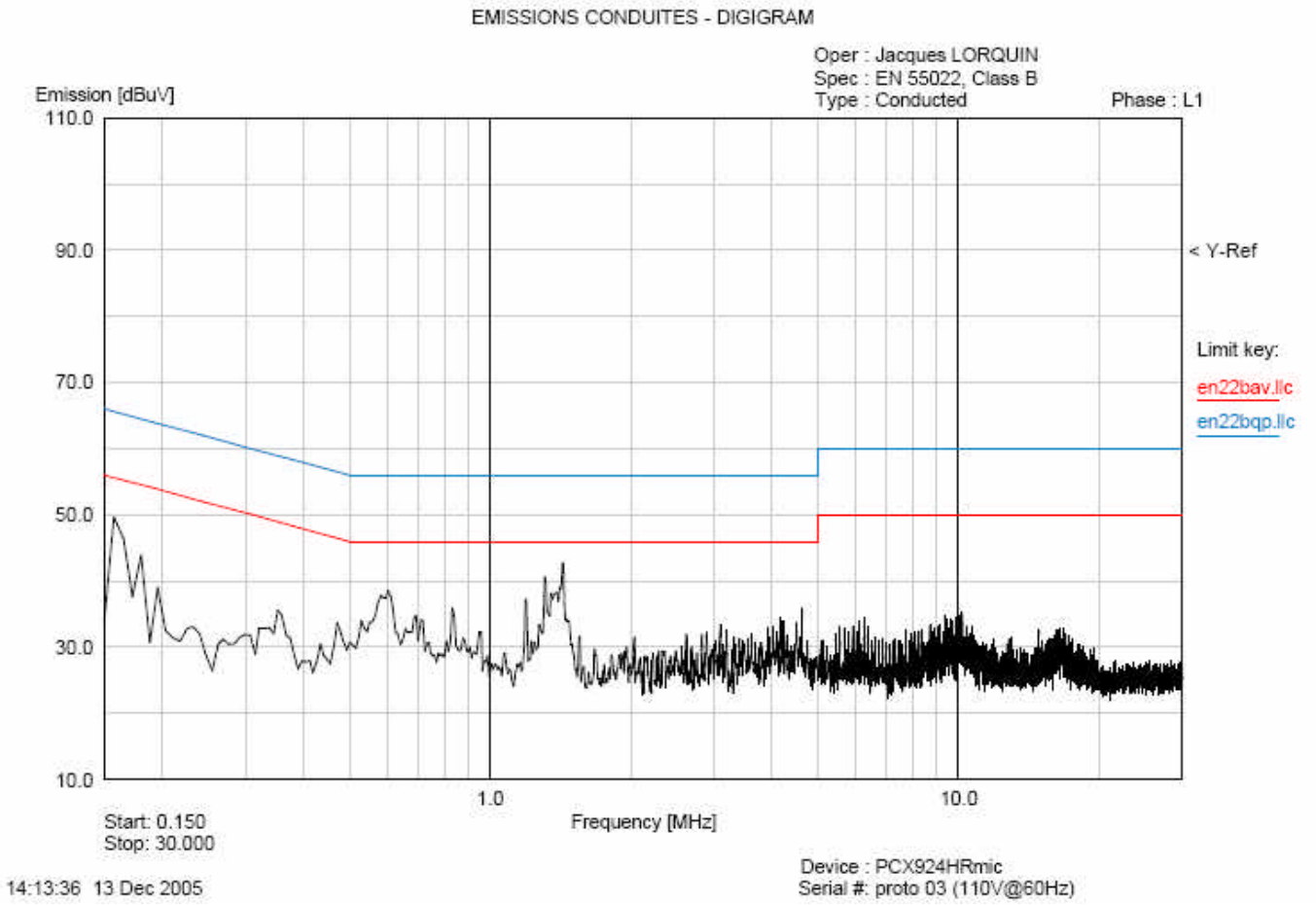
3.2. TEST EQUIPMENT

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) 50Ω / 50µH	Telemeter Electronis	TGmbH NNB 2/16	9511-11821628
Faraday room	Rayproof		4854

3.3. TEST SEQUENCE AND RESULTS

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

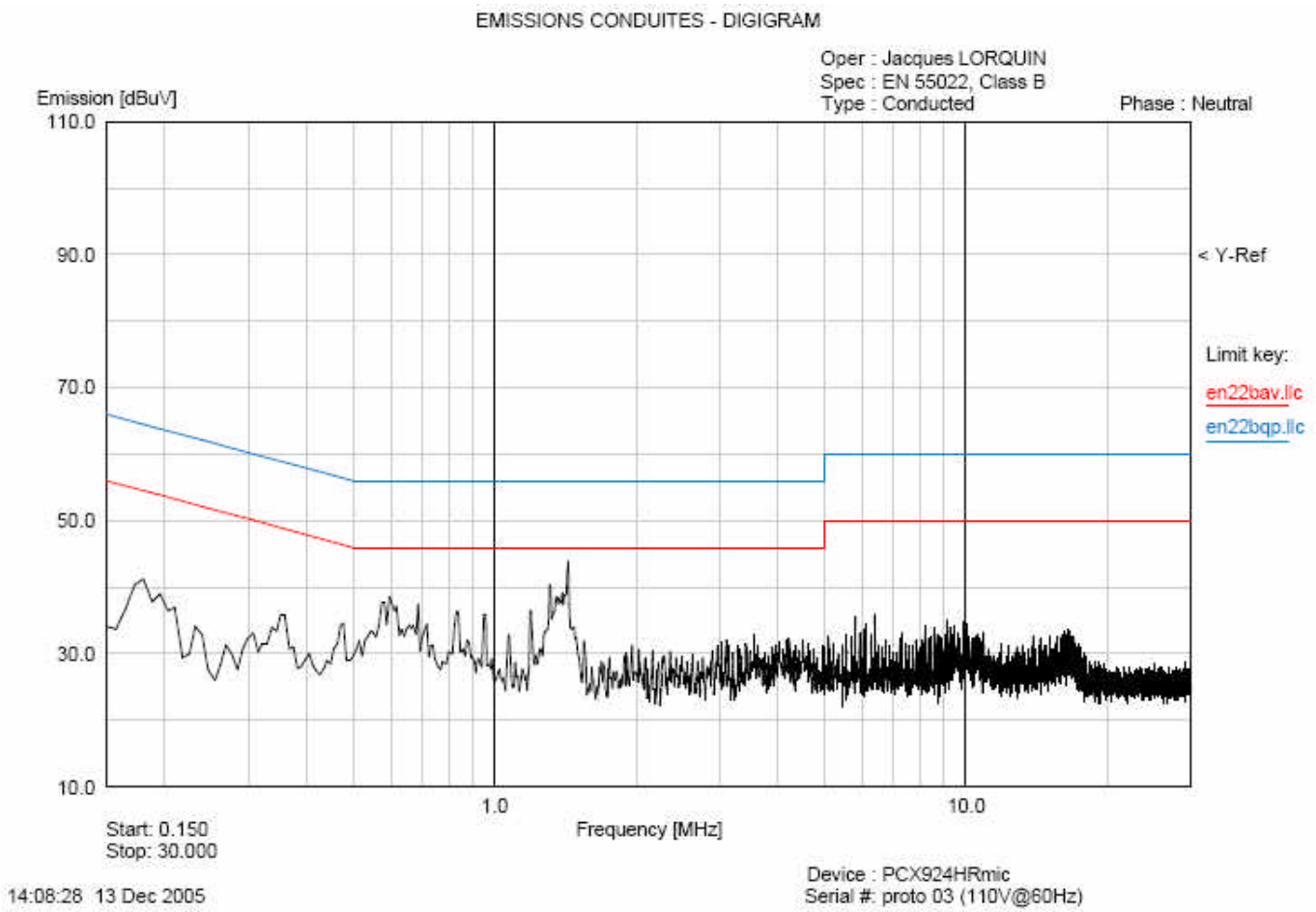
3.3.1.Line conducted emission data on PCX924HR-mic (110V@60Hz)



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	0.160	50.74	44.20	22.75	54.00
2	0.180	48.12	40.81	29.04	54.00
3	0.360	36.01	32.31	28.57	48.00
4	0.600	39.62	35.02	27.78	46.00
5	1.190	38.48	36.81	28.98	46.00
6	1.320	41.37	38.70	33.86	46.00
7	1.430	44.38	41.38	35.71	46.00

RBW = 9kHz / VBW = 30kHZ

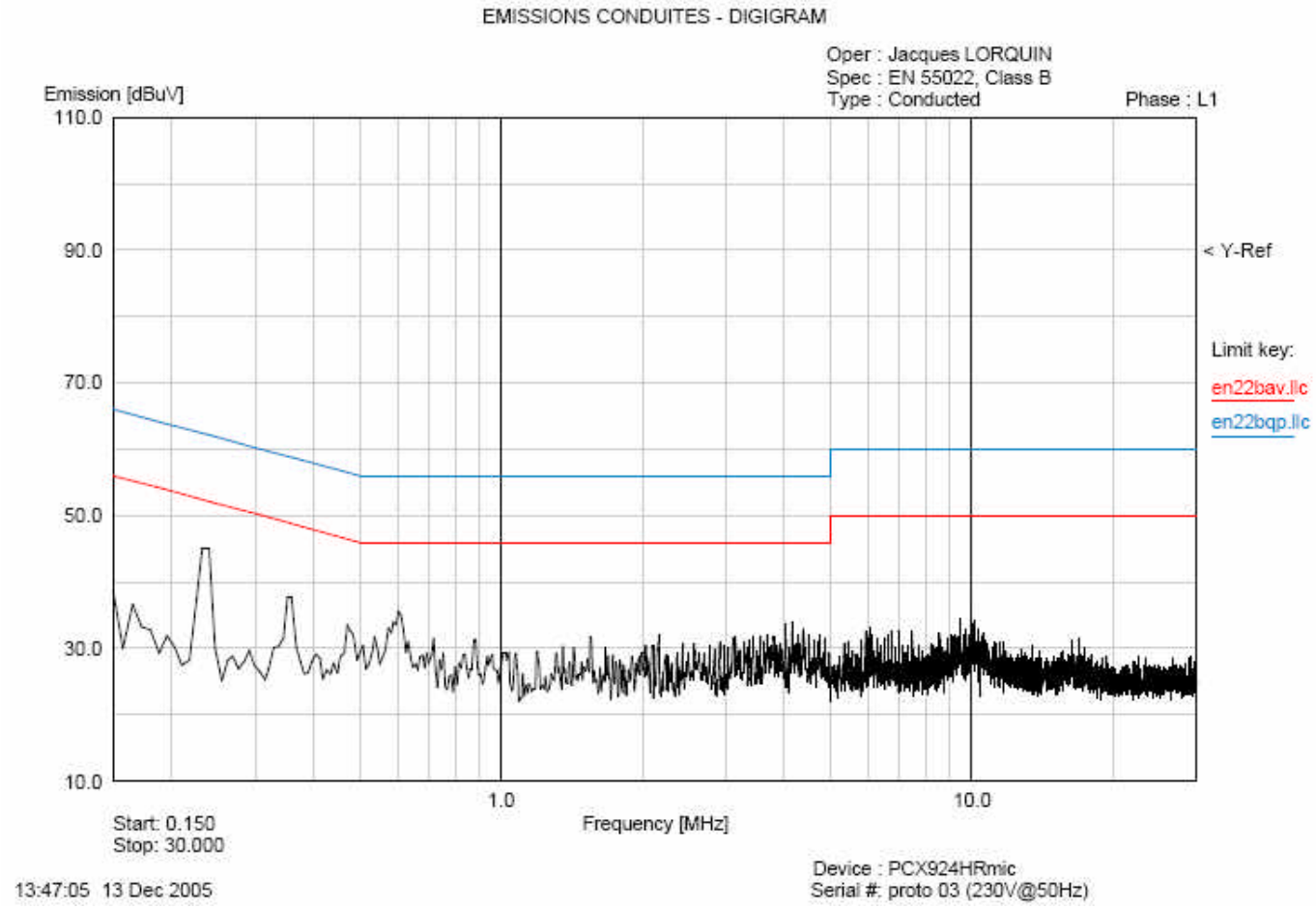
3.3.2.Neutral conducted emission data on PCX924HR-mic (110V@60Hz)



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	0.180	46.46	39.43	23.79	54.00
2	0.360	37.24	33.88	30.62	48.00
3	0.600	38.84	36.61	29.65	46.00
4	1.190	41.32	36.11	27.20	46.00
5	1.310	40.97	38.39	33.36	46.00
6	1.430	44.94	42.29	36.46	46.00

RBW = 9kHz / VBW = 30kHZ

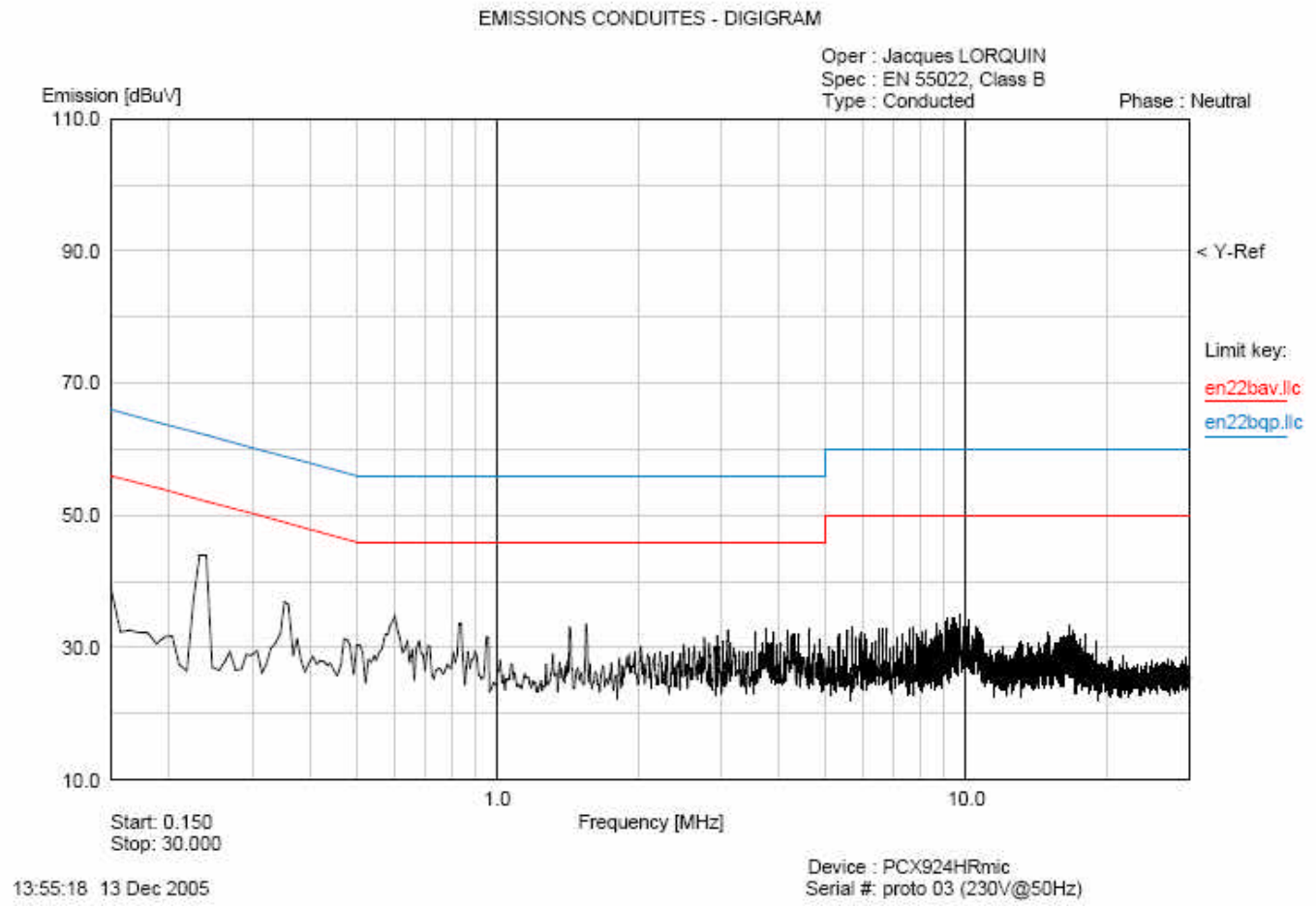
3.3.3.Line conducted emission data on PCX924HR-mic(230V@50Hz)



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	0.230	45.43	44.26	43.59	52.00
2	0.350	38.80	37.67	35.70	48.00
3	0.470	34.78	32.69	29.57	46.00
4	0.610	37.02	32.00	21.92	46.00

RBW = 9kHz / VBW = 30kHZ

3.3.4.Neutral conducted emission data on PCX924HR-mic(230V@50Hz)



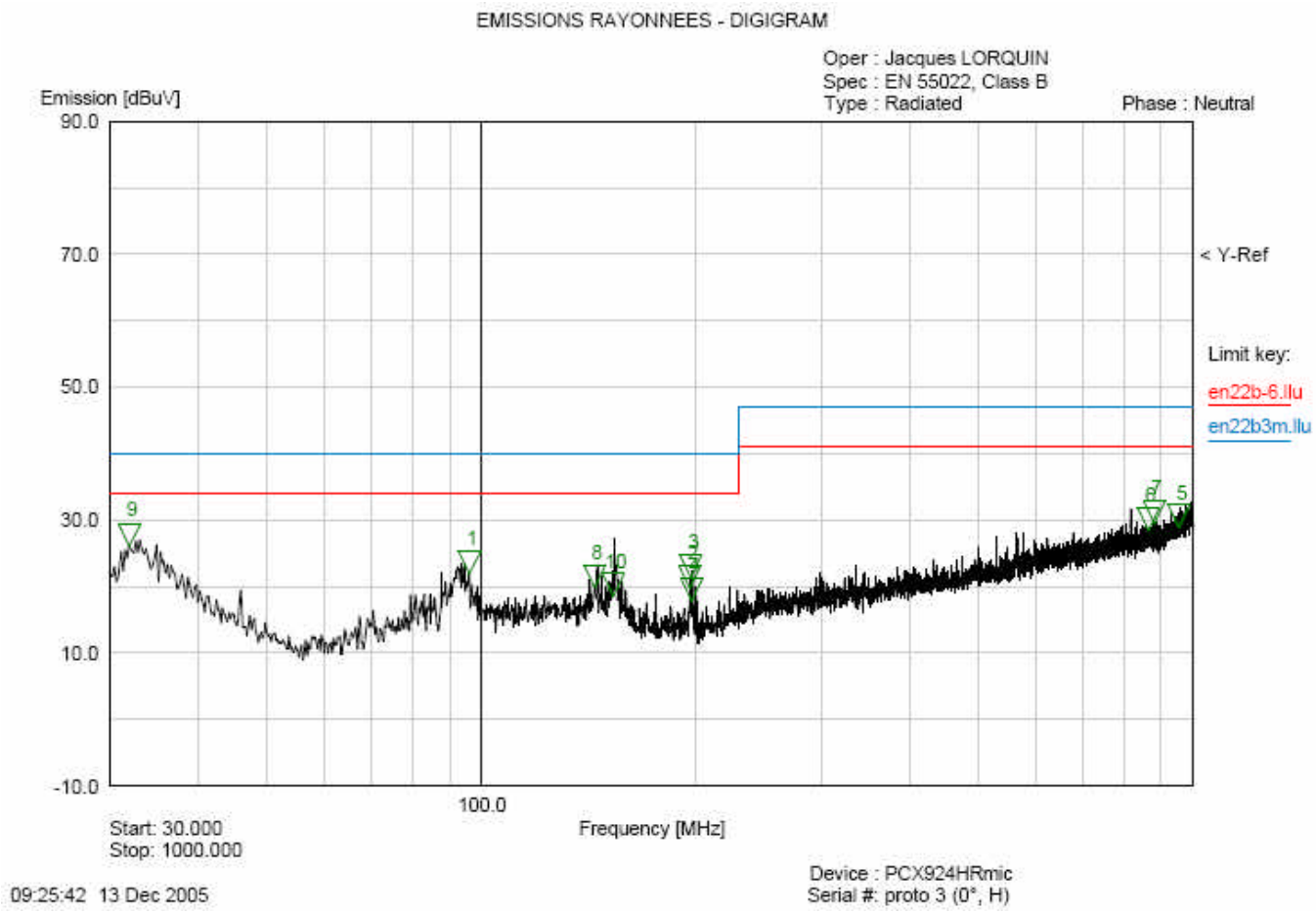
Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	0.150	42.49	35.41	23.94	54.00
2	0.230	44.77	43.35	42.69	52.00
3	0.350	37.63	36.16	33.61	48.00
4	0.480	34.39	30.79	26.89	46.00
5	0.610	36.14	32.66	23.08	46.00
6	1.550	35.70	32.75	23.65	46.00

RBW = 9kHz / VBW = 30kHZ

End of Tests

\2867\m#1.dat

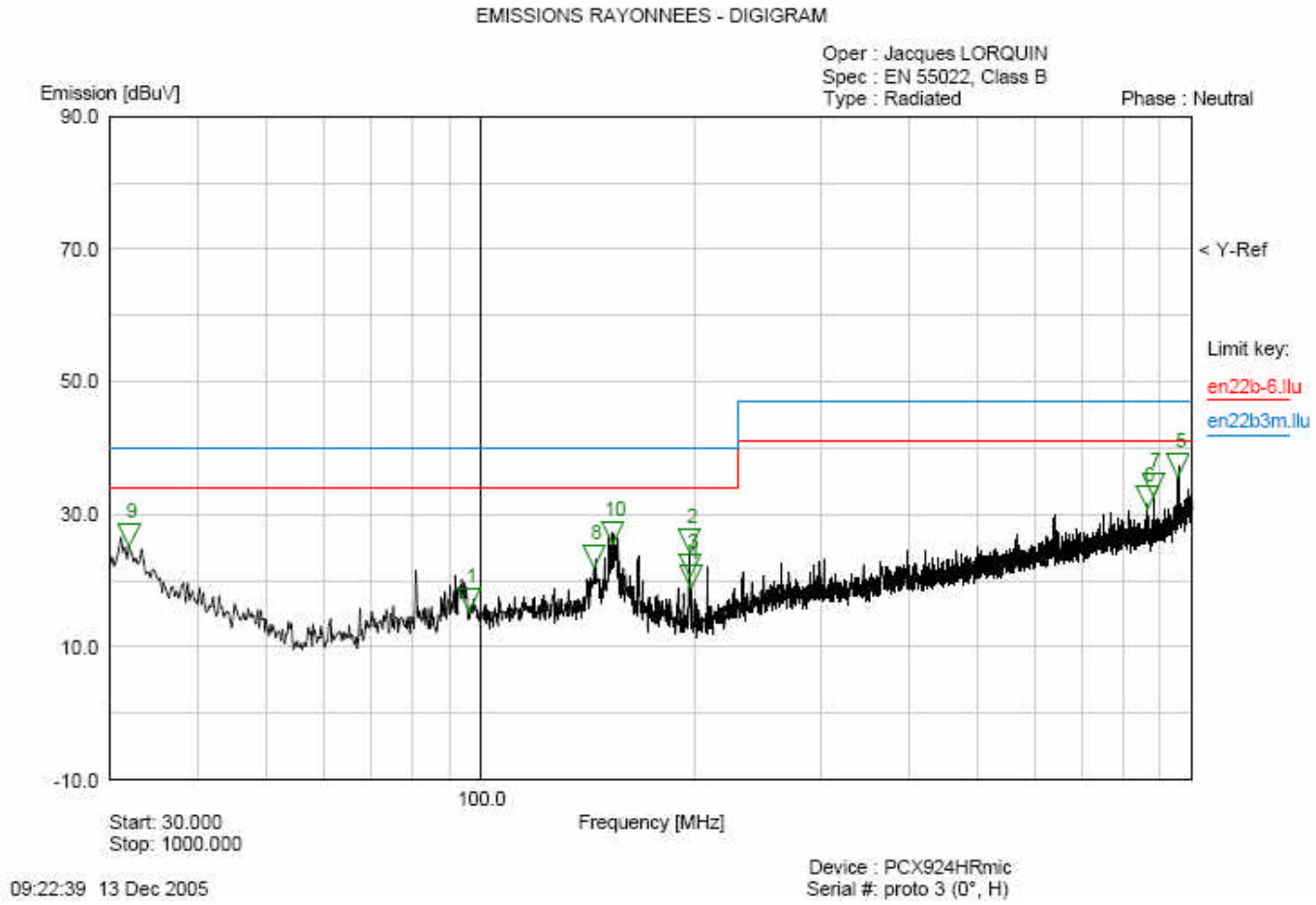
RBW : 120kHz VBW : 300kHz



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	22.01	-	-	34.00
2	196.0	19.78	-	-	34.00
3	196.7	21.32	-	-	34.00
4	197.5	17.84	-	-	34.00
5	955.5	28.91	-	-	41.00
6	864.2	28.51	-	-	41.00
7	881.2	29.54	-	-	41.00
8	144.0	19.87	-	-	34.00
9	31.98	26.11	-	-	34.00
10	153.2	18.57	-	-	34.00

\2867\m#2.dat

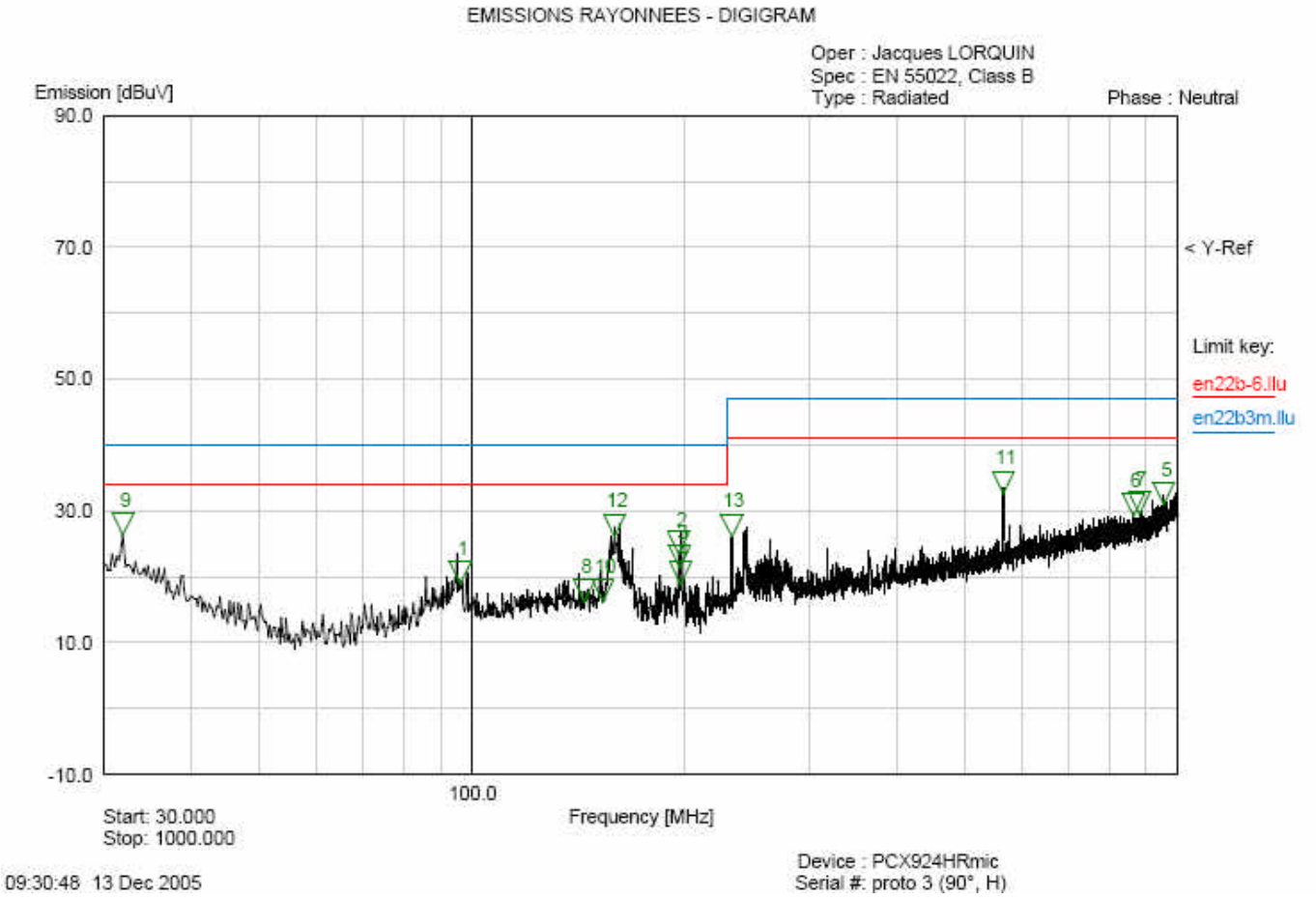
RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	15.53	-	-	34.00
2	196.0	24.45	-	-	34.00
3	196.7	20.66	-	-	34.00
4	197.5	18.90	-	-	34.00
5	955.5	35.73	-	-	41.00
6	864.2	30.75	-	-	41.00
7	881.2	32.68	-	-	41.00
8	144.0	21.93	-	-	34.00
9	31.98	25.18	-	-	34.00
10	153.2	25.56	-	-	34.00

\2867\m#3.dat

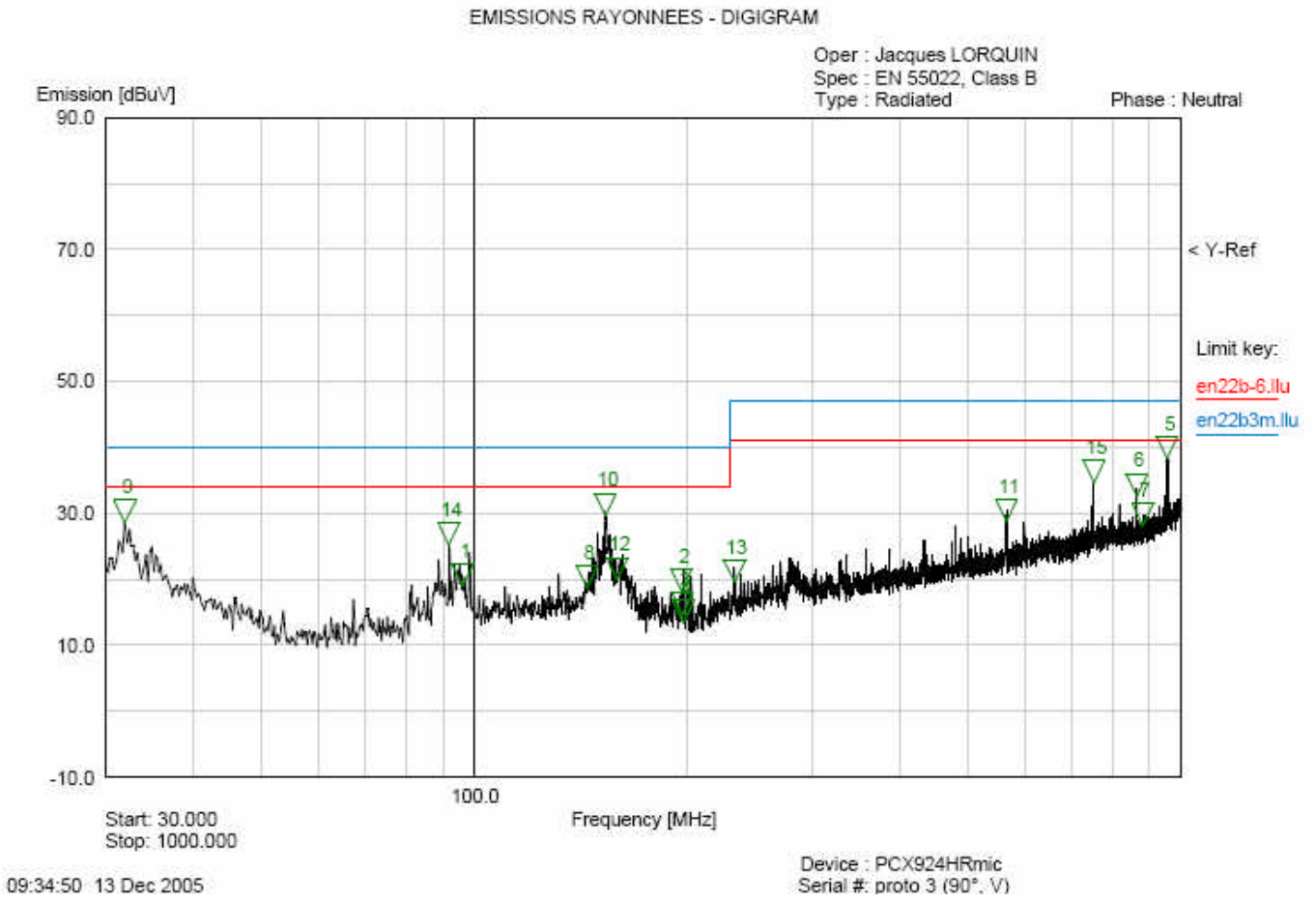
RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	18.97	-	-	34.00
2	196.0	23.38	-	-	34.00
3	196.7	21.39	-	-	34.00
4	197.5	18.85	-	-	34.00
5	955.5	30.98	-	-	41.00
6	864.2	29.26	-	-	41.00
7	881.2	29.54	-	-	41.00
8	144.0	16.19	-	-	34.00
9	31.98	26.37	-	-	34.00
10	153.2	16.22	-	-	34.00
11	565.9	32.65	-	-	41.00
12	159.0	26.11	-	-	34.00
13	233.0	26.14	-	-	41.00

\2867\m#4.dat

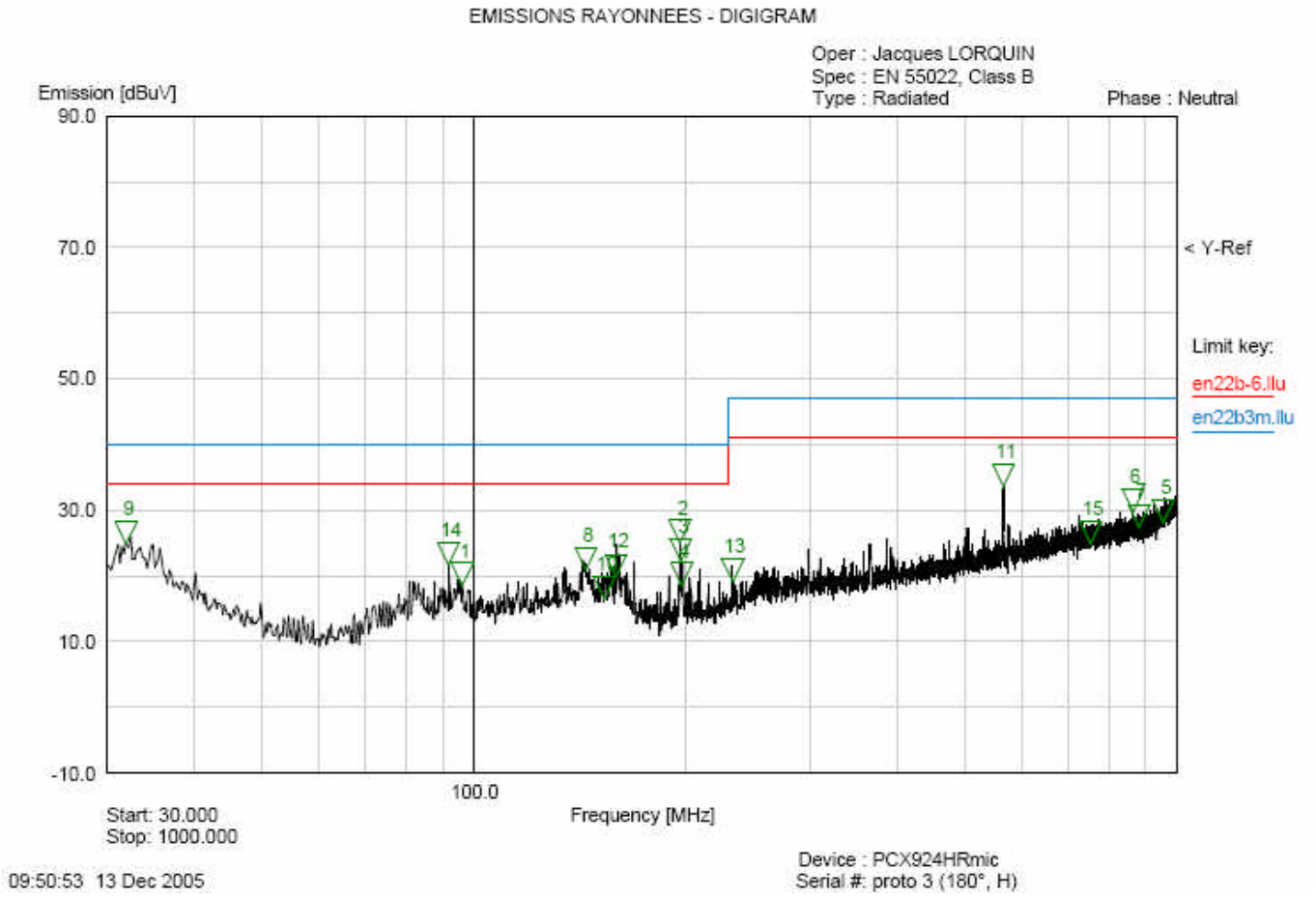
RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	19.02	-	-	34.00
2	196.0	18.28	-	-	34.00
3	196.7	14.66	-	-	34.00
4	197.5	13.33	-	-	34.00
5	955.5	38.31	-	-	41.00
6	864.2	32.65	-	-	41.00
7	881.2	28.23	-	-	41.00
8	144.0	18.71	-	-	34.00
9	31.98	28.62	-	-	34.00
10	153.2	29.68	-	-	34.00
11	565.9	28.78	-	-	41.00
12	159.0	19.94	-	-	34.00
13	233.0	19.61	-	-	41.00
14	91.95	25.18	-	-	34.00
15	752.0	34.67	-	-	41.00

\2867\m#5.dat

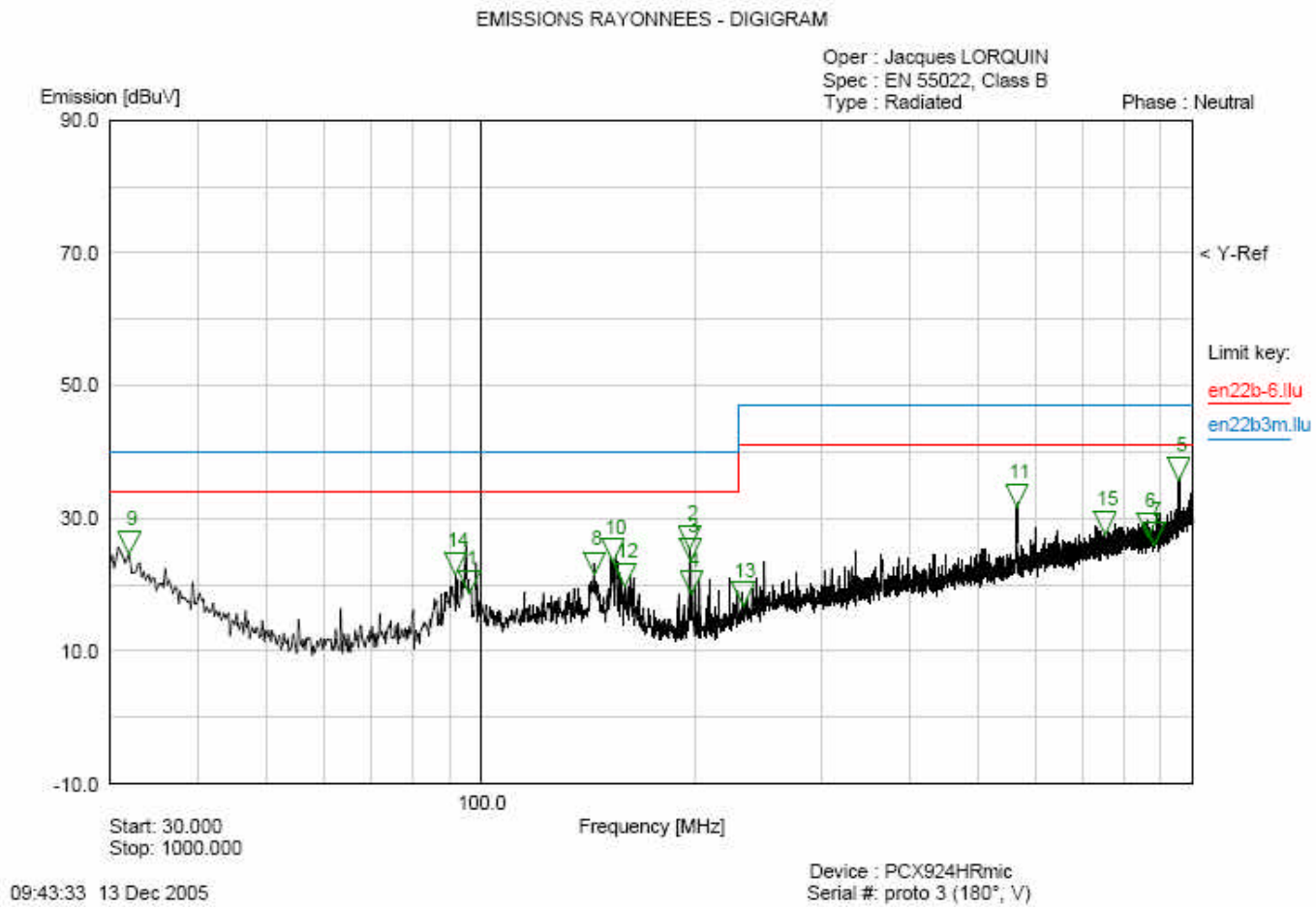
RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	18.55	-	-	34.00
2	196.0	25.04	-	-	34.00
3	196.7	22.28	-	-	34.00
4	197.5	18.57	-	-	34.00
5	955.5	28.18	-	-	41.00
6	864.2	29.82	-	-	41.00
7	881.2	27.47	-	-	41.00
8	144.0	20.93	-	-	34.00
9	31.98	24.88	-	-	34.00
10	153.2	16.45	-	-	34.00
11	565.9	33.54	-	-	41.00
12	159.0	19.96	-	-	34.00
13	233.0	19.17	-	-	41.00
14	91.95	21.61	-	-	34.00
15	752.0	24.96	-	-	41.00

\2867\m#6.dat

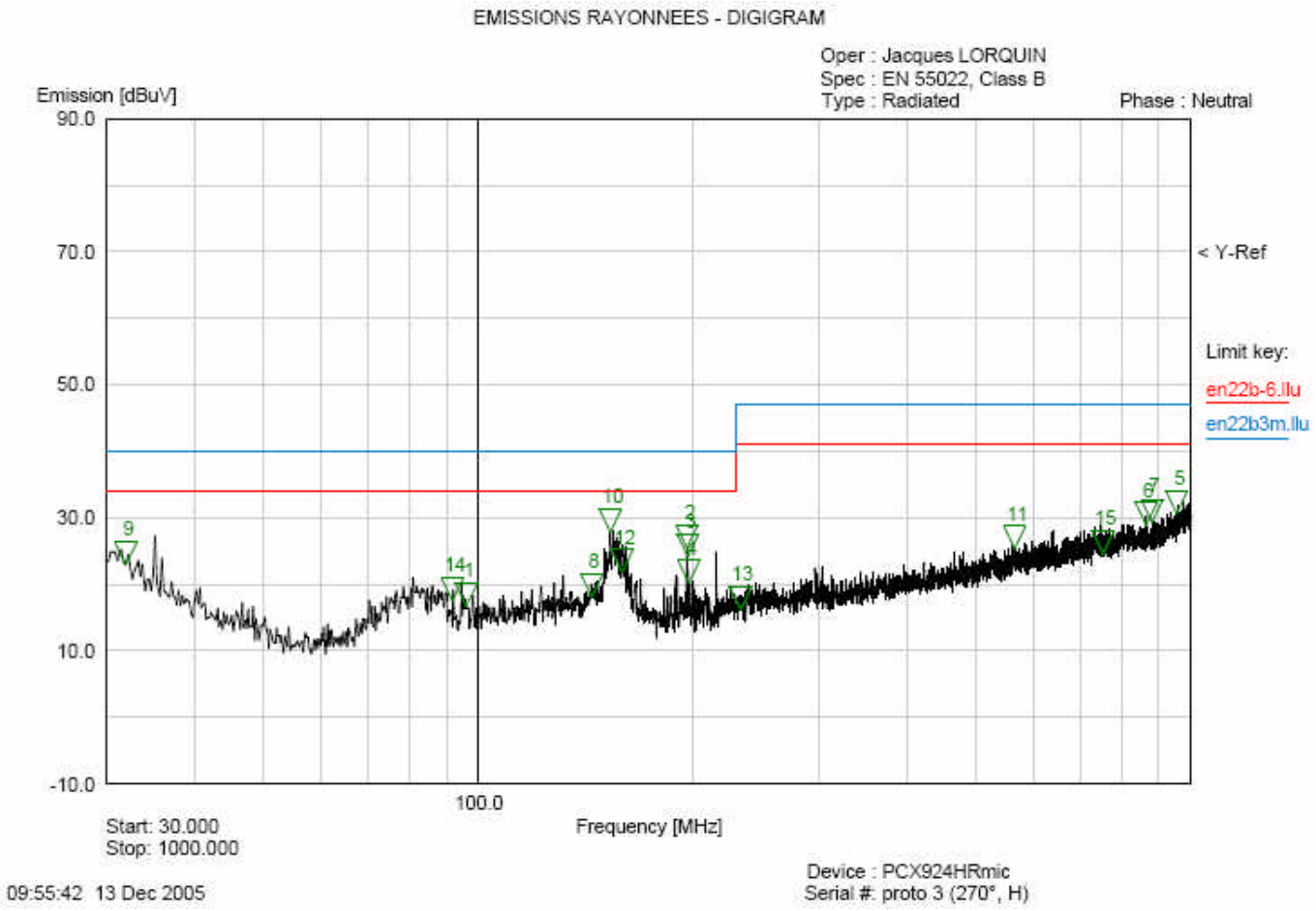
RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	18.76	-	-	34.00
2	196.0	25.40	-	-	34.00
3	196.7	23.64	-	-	34.00
4	197.5	18.57	-	-	34.00
5	955.5	35.73	-	-	41.00
6	864.2	27.30	-	-	41.00
7	881.2	25.94	-	-	41.00
8	144.0	21.59	-	-	34.00
9	31.98	24.56	-	-	34.00
10	153.2	23.42	-	-	34.00
11	565.9	31.73	-	-	41.00
12	159.0	19.68	-	-	34.00
13	233.0	16.87	-	-	41.00
14	91.95	21.50	-	-	34.00
15	752.0	27.52	-	-	41.00

\2867\m#7.dat

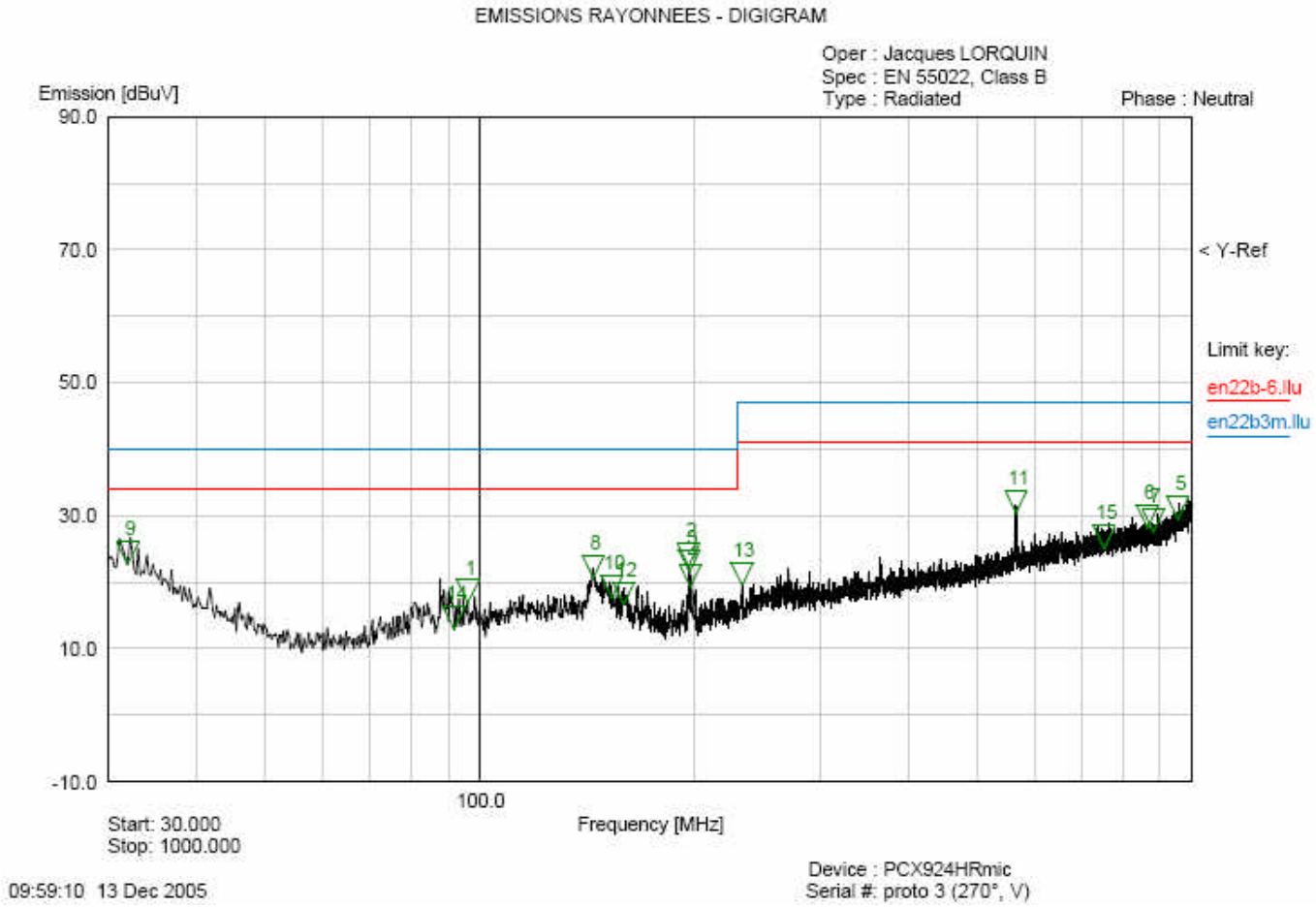
RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	16.81	-	-	34.00
2	196.0	25.45	-	-	34.00
3	196.7	24.11	-	-	34.00
4	197.5	20.18	-	-	34.00
5	955.5	30.62	-	-	41.00
6	864.2	28.91	-	-	41.00
7	881.2	29.38	-	-	41.00
8	144.0	18.08	-	-	34.00
9	31.98	22.92	-	-	34.00
10	153.2	27.84	-	-	34.00
11	565.9	25.29	-	-	41.00
12	159.0	21.78	-	-	34.00
13	233.0	16.17	-	-	41.00
14	91.95	17.57	-	-	34.00
15	752.0	24.66	-	-	41.00

\2867\m#8.dat

RBW : 120kHz **VBW : 300kHz**



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	96.14	16.95	-	-	34.00
2	196.0	22.43	-	-	34.00
3	196.7	21.46	-	-	34.00
4	197.5	19.24	-	-	34.00
5	955.5	29.52	-	-	41.00
6	864.2	28.08	-	-	41.00
7	881.2	27.52	-	-	41.00
8	144.0	20.70	-	-	34.00
9	31.98	22.74	-	-	34.00
10	153.2	17.68	-	-	34.00
11	565.9	30.37	-	-	41.00
12	159.0	16.58	-	-	34.00
13	233.0	19.56	-	-	41.00
14	91.95	12.95	-	-	34.00
15	752.0	25.10	-	-	41.00