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EMC TEST REPORT

Nr 3475A-FCC

This test report applies only on equipment described hereafter.

Proposal number : 200509-2771

Date of test..... : September 19th, & November 15th, 2005

Location ..... : LCIE Laboratory - 38500 VOIRON
France

Performed by ..... : Jacques LORQUIN

Customer..... : **GEMPLUS**
ZI Athelia III
Voie Antiope
F- 13705 La Ciotat Cedex 8
FRANCE

Product..... : **Gem Pocket**

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

Applied standards or specification: EN55022 (1998) +/A1: (2000) +/A2: (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 emissions.**

Written by..... : Jacques LORQUIN

Approved by..... : Jacques LORQUIN

Date: November 15th,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). A typical Gem Pocket is set on the table, a typical smart card is insert into the Gem pocket. The soft CEM.

1.2. HARDWARE IDENTIFICATION:

- **Equipment Under Test (EUT):** Gem Pocket **Sn : EPR1 050802#264**
- Size : 90x65x15mm
- I/O : none
- Frequencies :
  Crystal: 6MHz
  PLL : 32.768KhZ? 1.5MHz

1.3. Running mode:

The EUT exercise program (Soft CEM) used during radiated and conducted testing was designed to exercise the Gem Pocket in a manner similar to a typical use :

Read ATR and shut down the power in loop.

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
Gem Pocket * (sn: EPR1050802#264)	**MESGMP**	**Smart Card Reader**	none
Gem Pocket ** (sn: R05A071861)	**MESGMP**	**Smart Card Reader**	none
Gem safe Logon (sn: 000050006a01249)	none	Smart Card	none

*** : Equipment under test**
****: Equipment under test for Y & Z Axis**

1.5. I/O cables

None

1.6. Equipment modifications

No modifications are necessary for achieved test.

2. Radiated emission data from 30MHz to 1GHz

2.1. SET-UP

Mains: on batteries
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.

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
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

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.

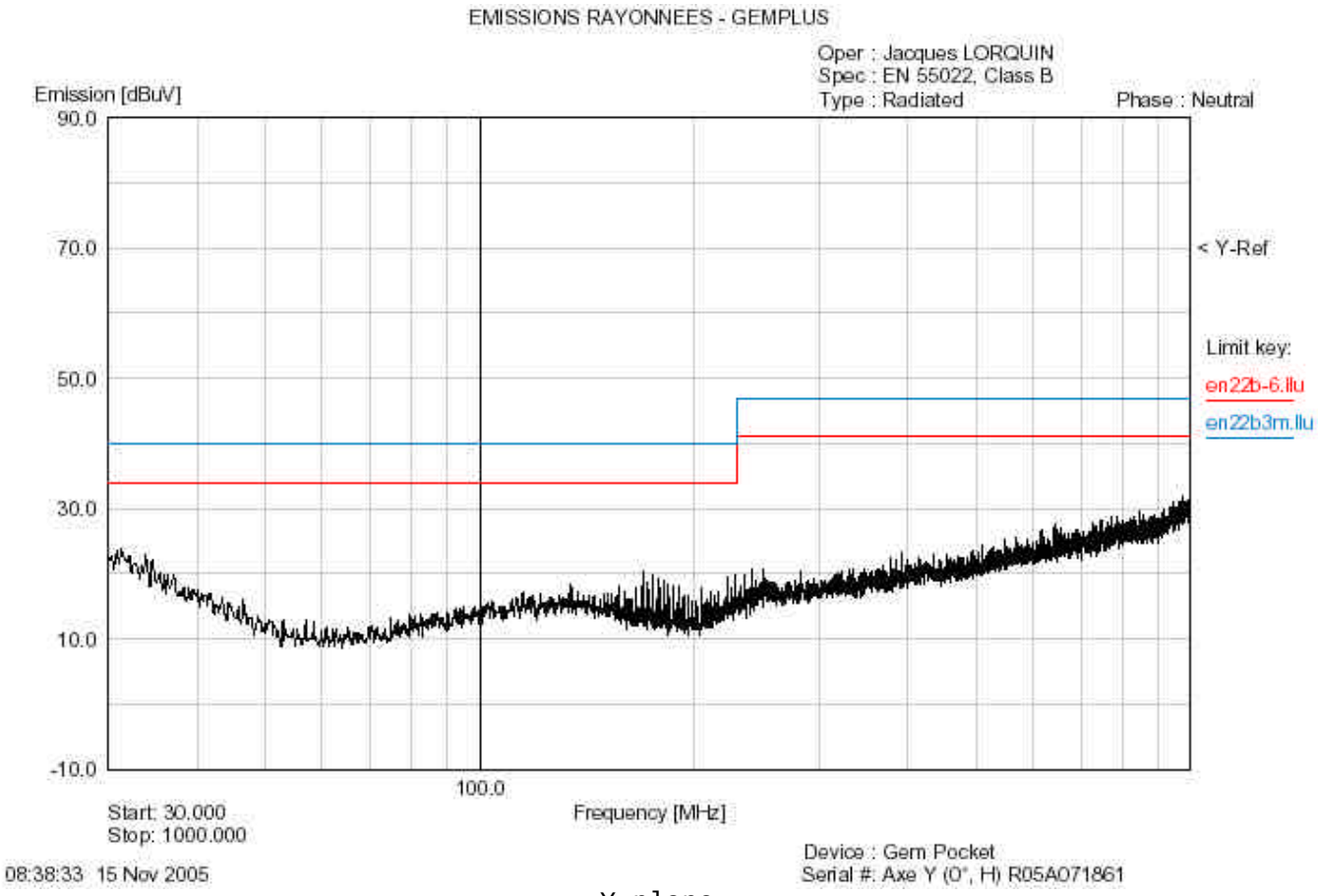
Azimuth 0° : Polarization H ⇒ graph named **\2771\m#1** (see page 9/16)
Polarization V ⇒ graph named **\2771\m#2** (see page 10/16)

Azimuth 90° : Polarization H ⇒ graph named **\2771\m#3** (see page 11/16)
Polarization V ⇒ graph named **\2771\m#4** (see page 12/16)

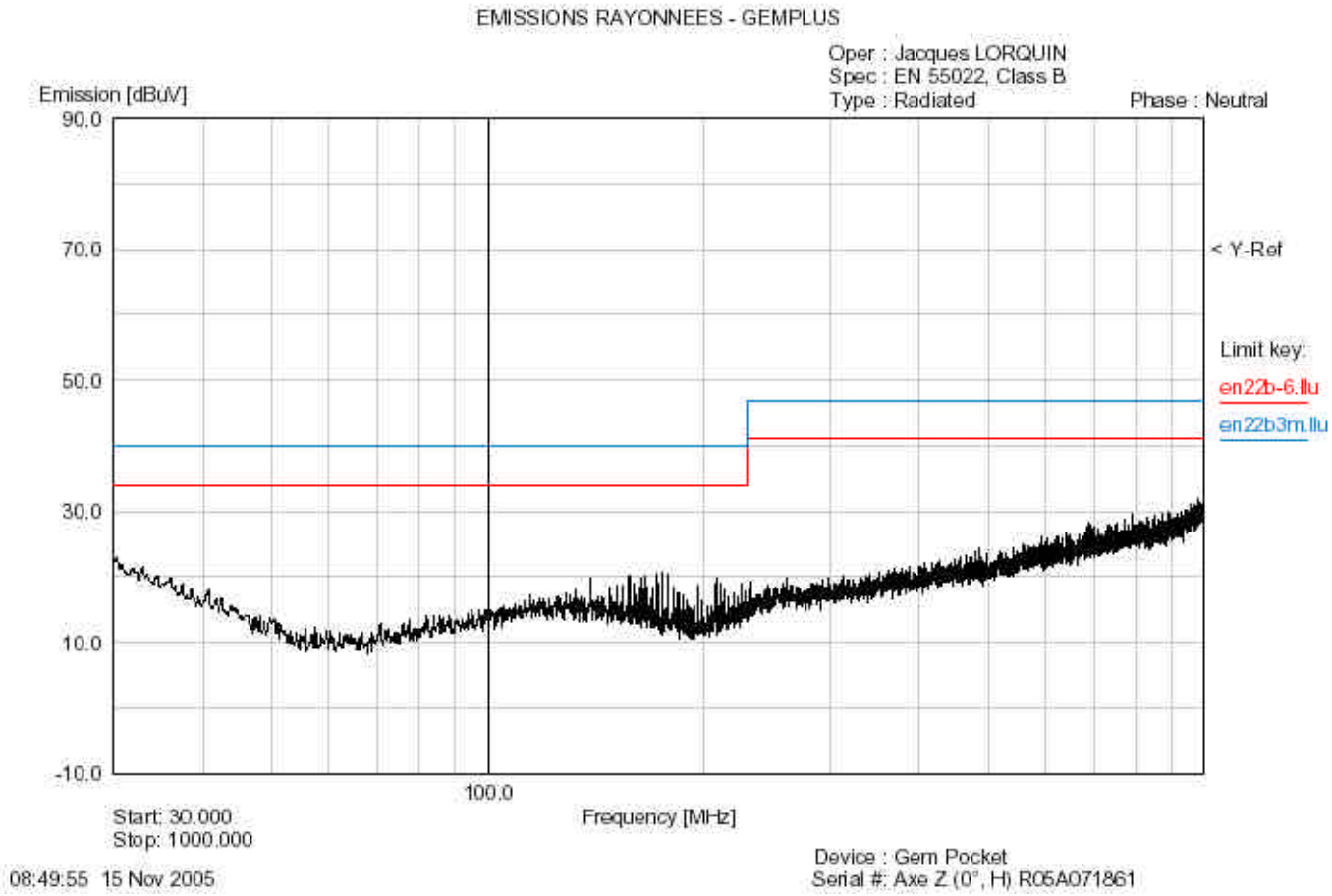
Azimuth 180° : Polarization H ⇒ graph named **\2771\m#5** (see page 13/16)
Polarization V ⇒ graph named **\2771\m#6** (see page 14/16)

Azimuth 270° : Polarization H ⇒ graph named **\2771\m#7** (see page 15/16)
Polarization V ⇒ graph named **\2771\m#8** (see page 16/16)

The prescan has been also performed on Y and Z orthogonal planes. See bellow for graph example:



Y plane



Z plane

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. The 3 orthogonal planes are measured. 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
no traceable signal									*

* - At the sight of the pre-characterization test, no frequencies have been measured on the open area test.
Due to

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 52.5dBµV 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 dBµV/m

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

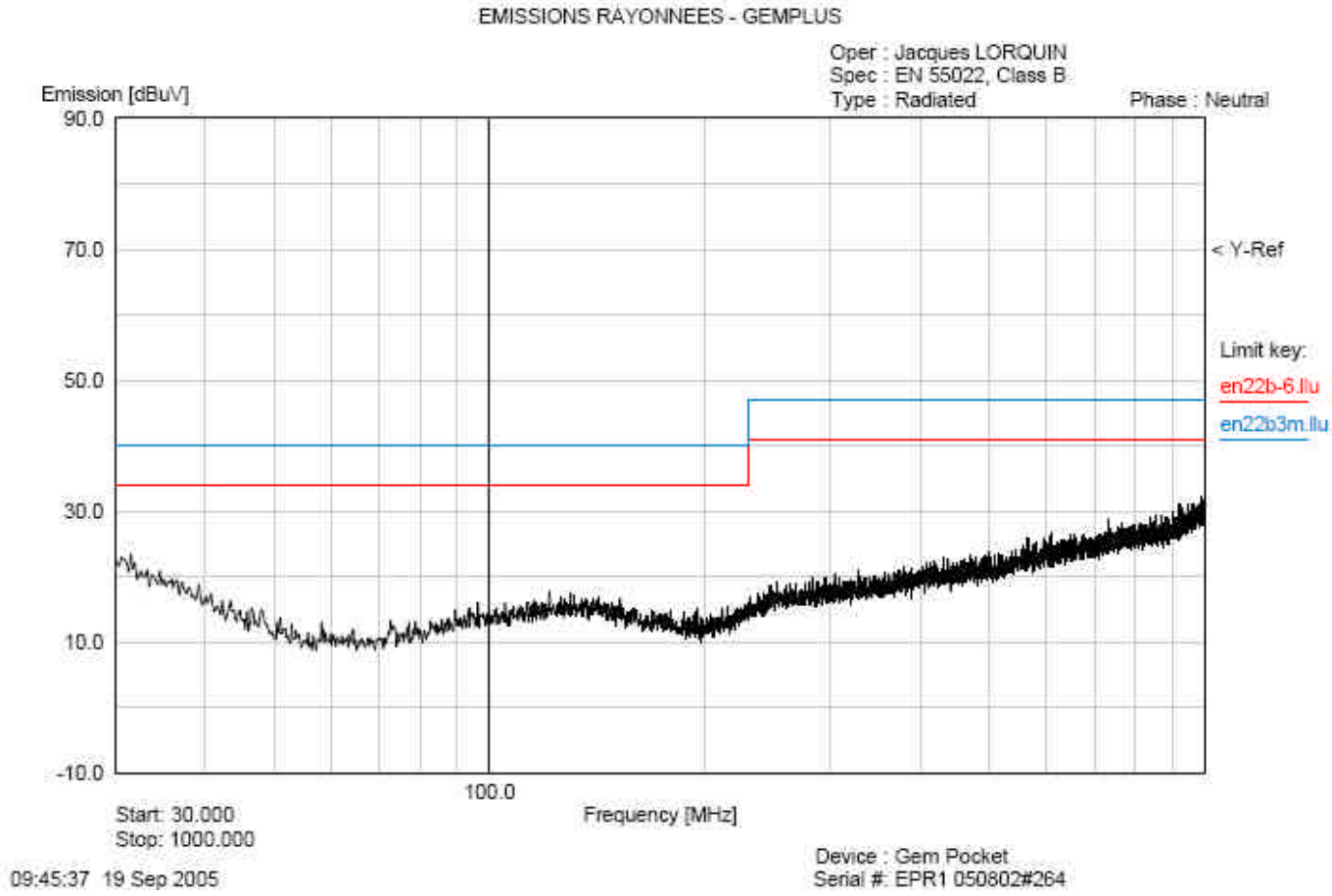
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

3. Conducted emission data

Not performed

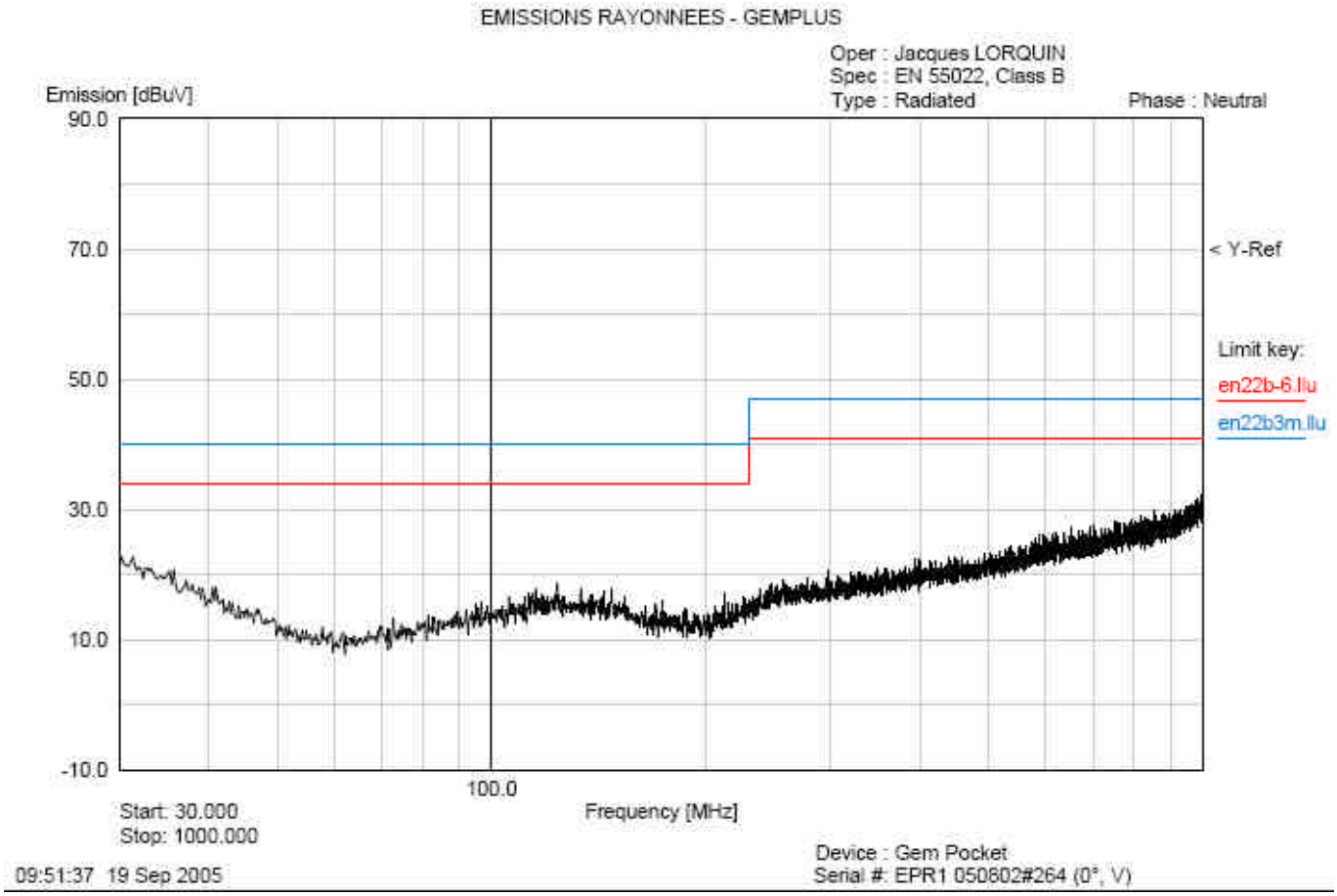
\2771\m#1

RBW = 120kHz / VBW = 300kHZ



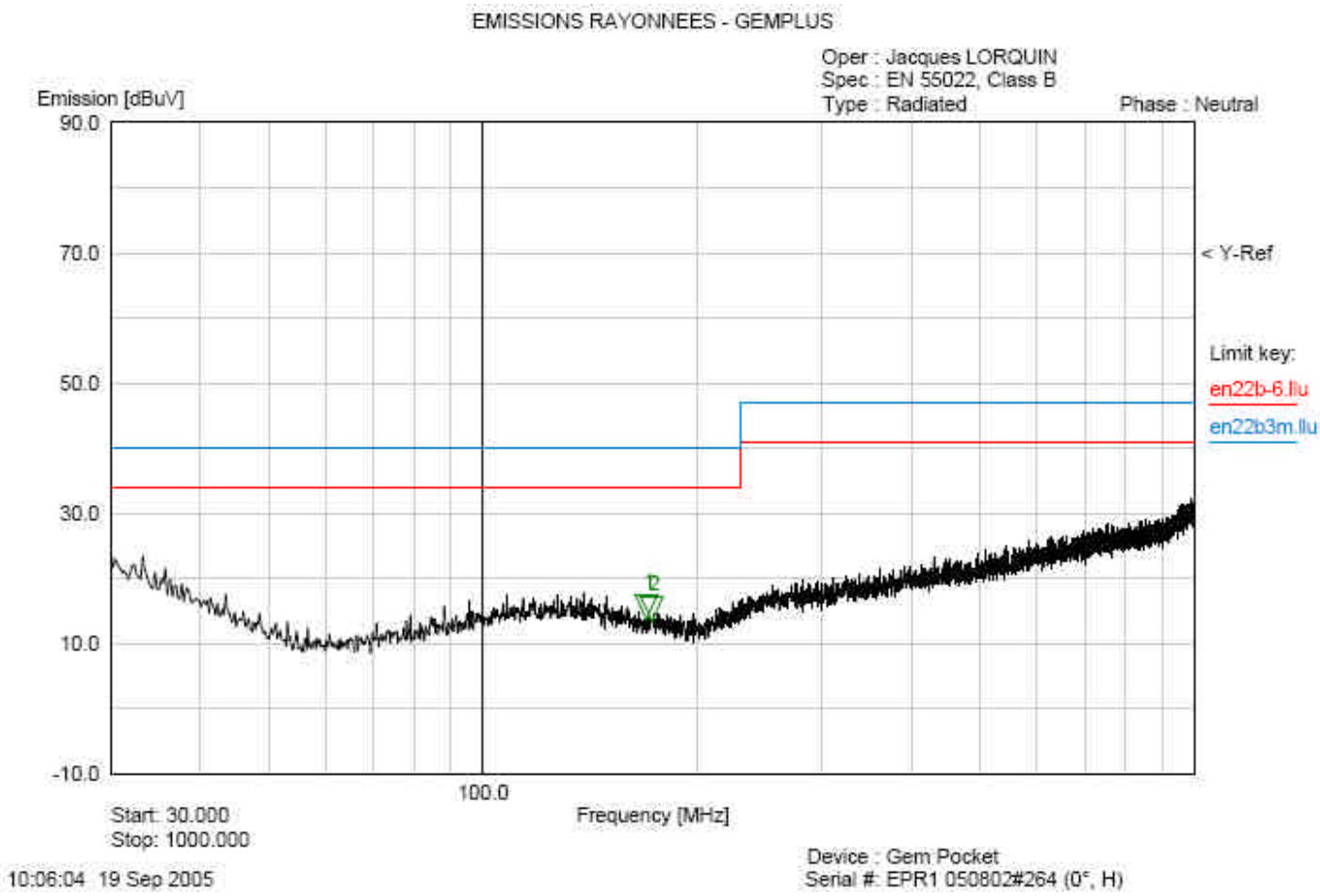
\2771\m#2

RBW = 120kHz / VBW = 300kHZ



\2771\m#3

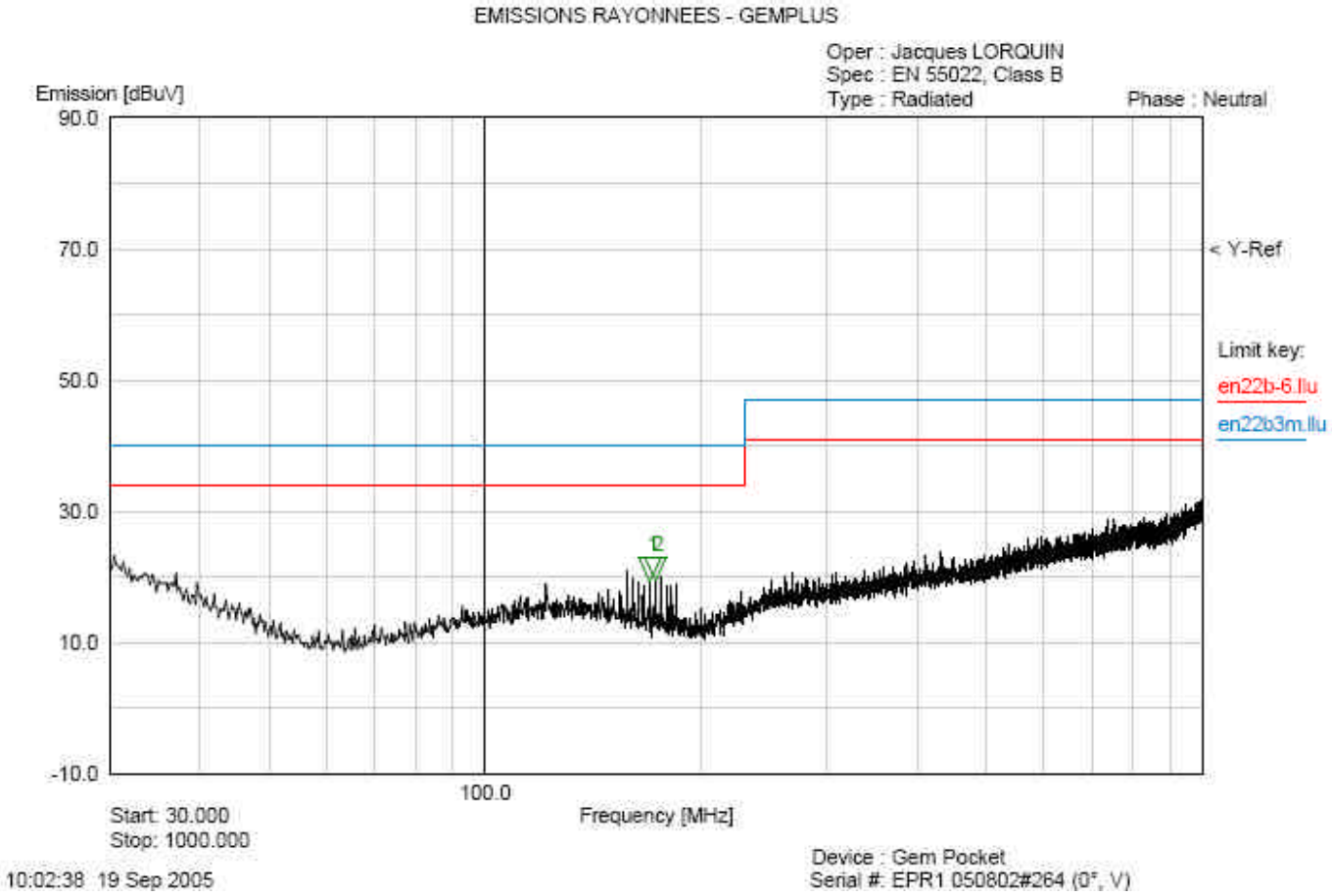
RBW = 120kHz / VBW = 300kHZ



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	169.8	13.72	-	-	34.00
2	172.6	13.45	-	-	34.00

\2771\m#4

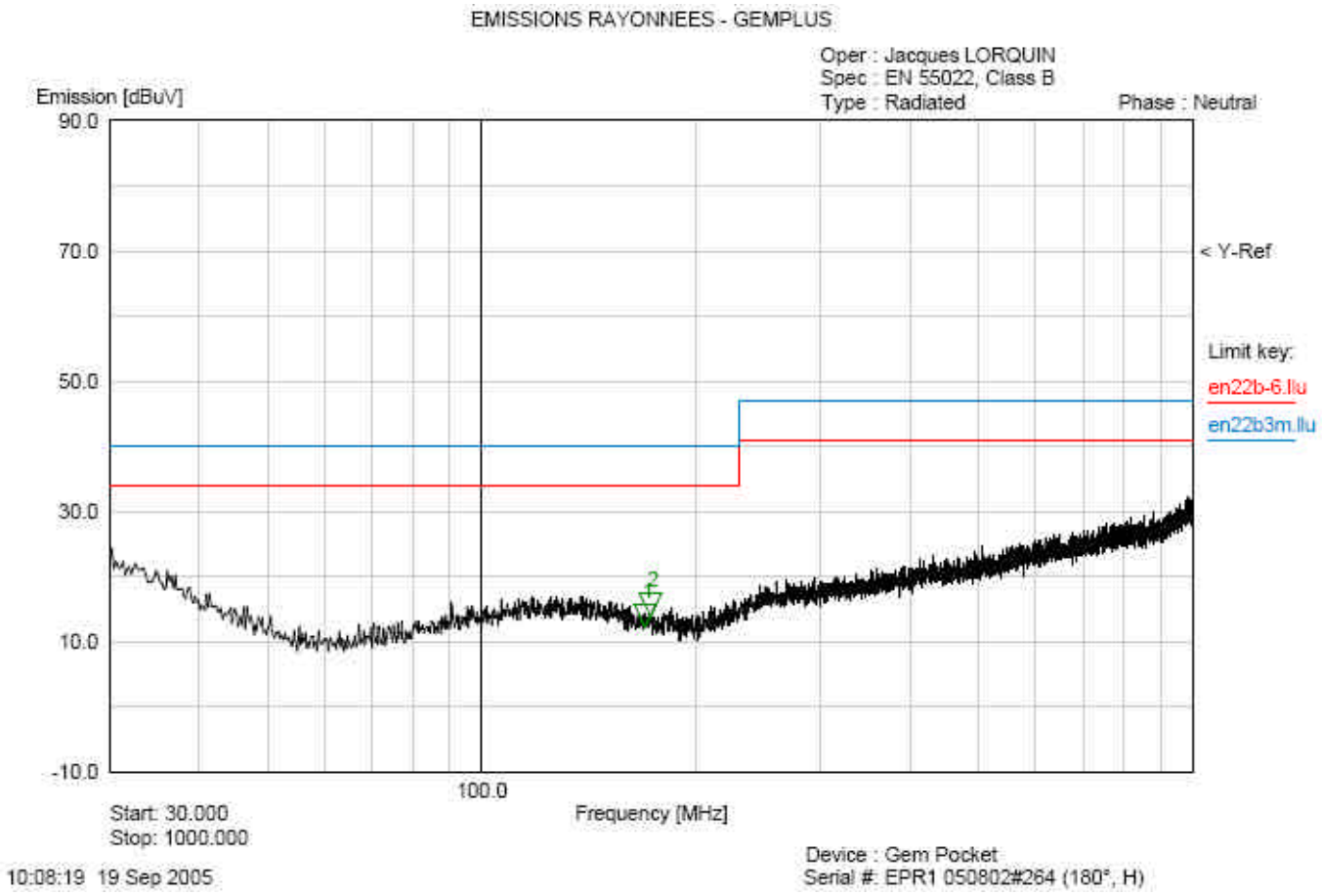
RBW = 120kHz / VBW = 300kHZ



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	169.8	19.20	-	-	34.00
2	172.6	19.42	-	-	34.00

\2771\m#5

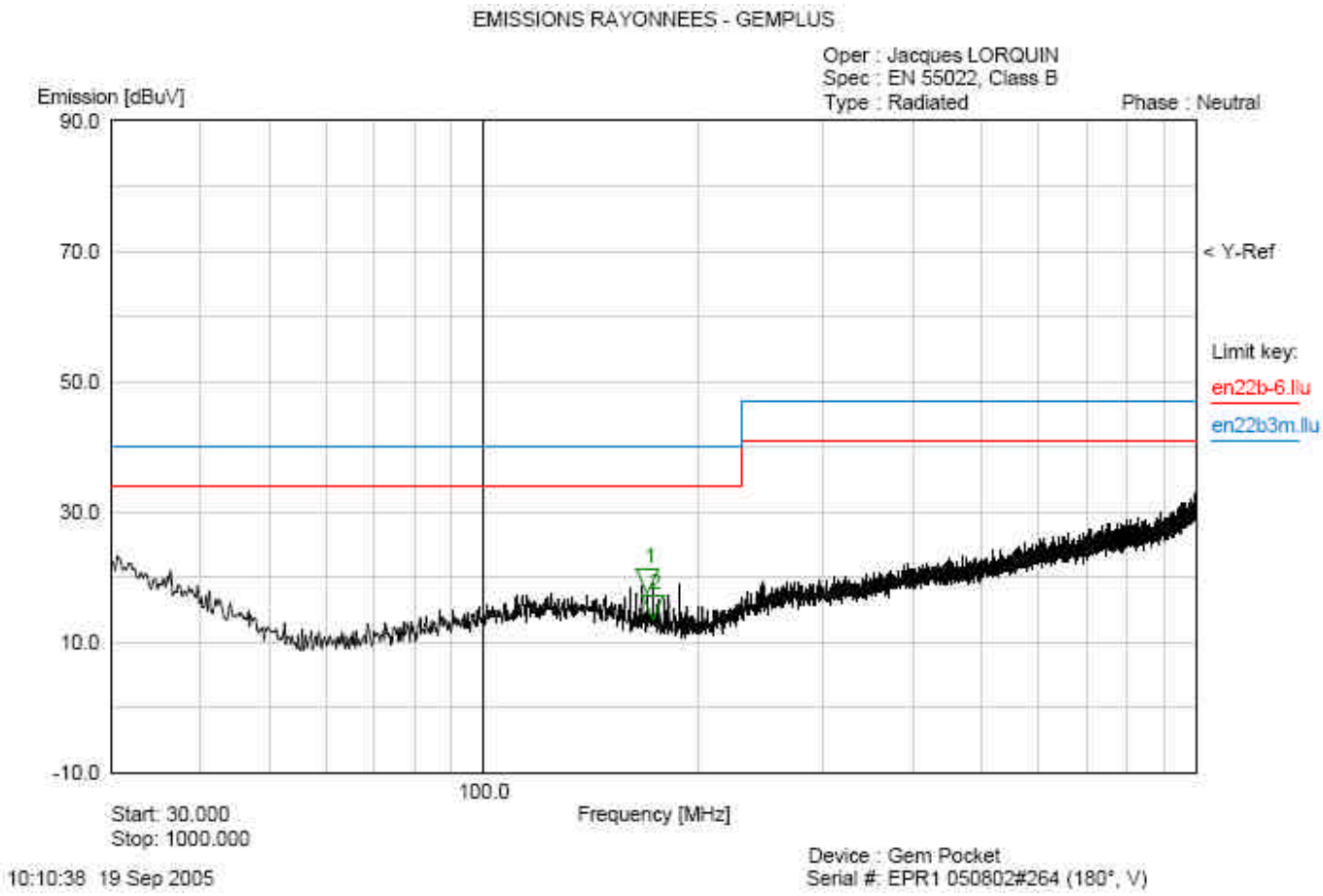
RBW = 120kHz / VBW = 300kHZ



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	169.8	12.08	-	-	34.00
2	172.6	13.74	-	-	34.00

\2771\m#6

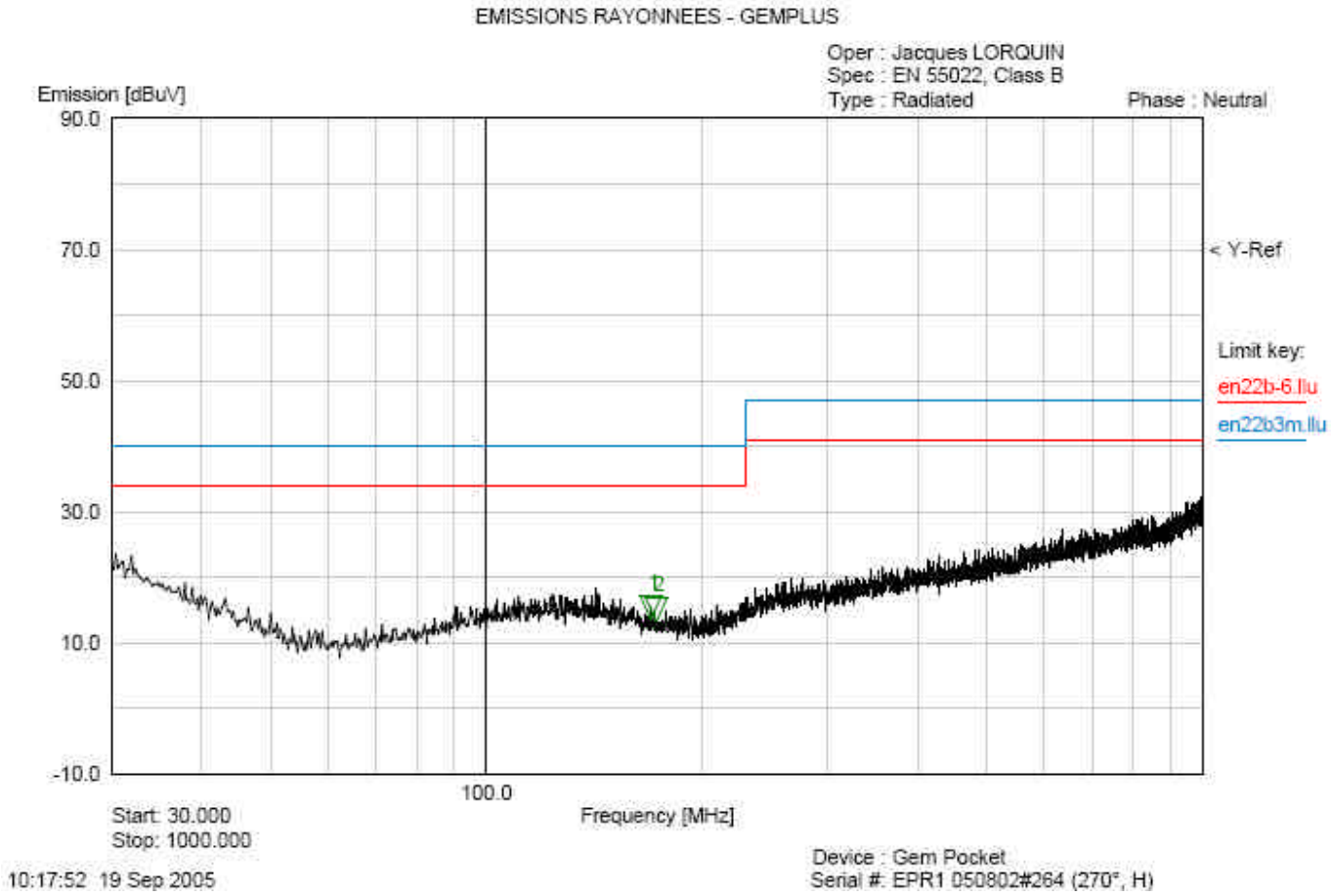
RBW = 120kHz / VBW = 300kHZ



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	169.8	17.43	-	-	34.00
2	172.6	13.50	-	-	34.00

\2771\m#7

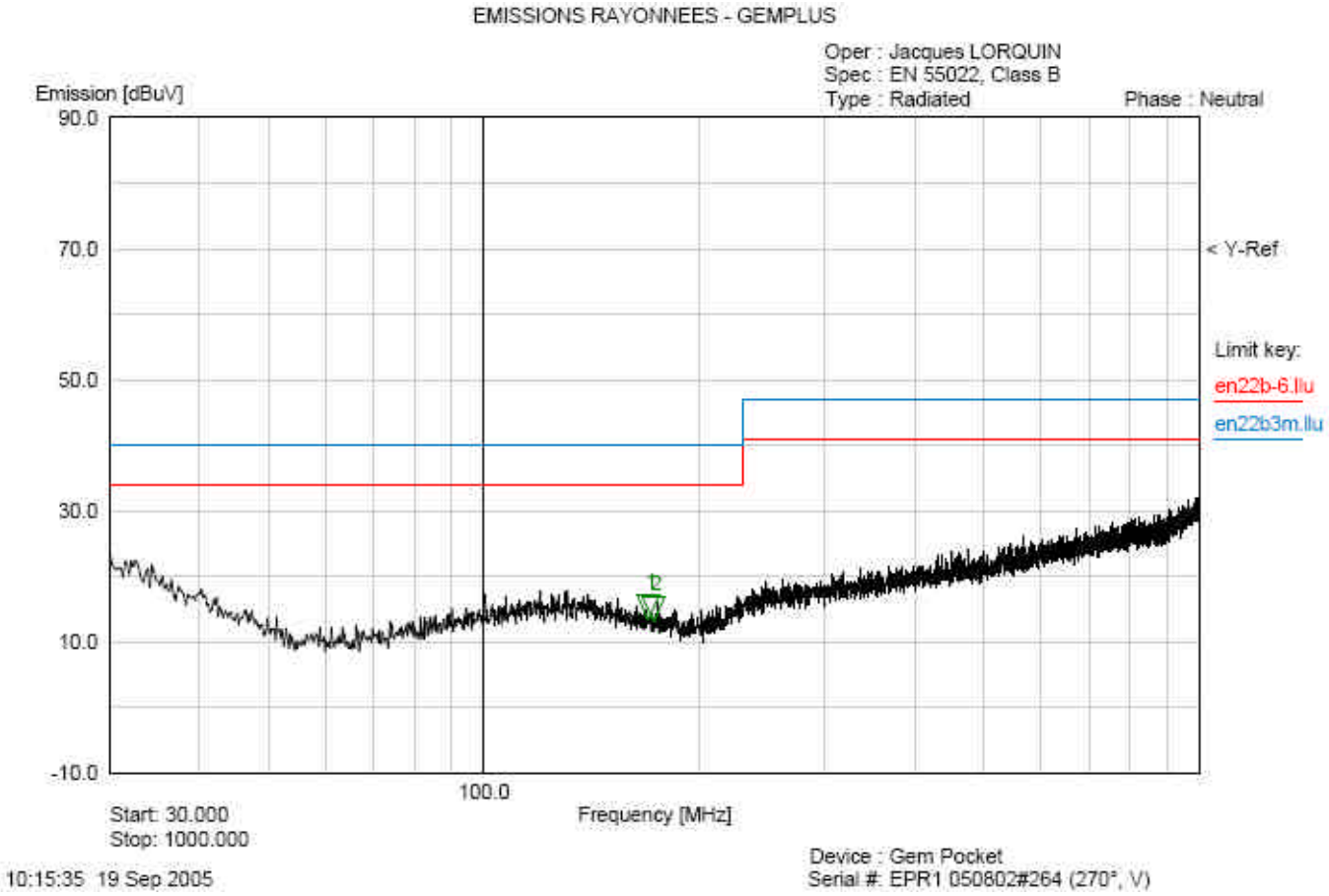
RBW = 120kHz / VBW = 300kHZ



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	169.8	13.49	-	-	34.00
2	172.6	13.20	-	-	34.00

\2771\m#8

RBW = 120kHz / VBW = 300kHZ



Marker ▽	Frequency [MHz]	Peak [dBuV]	Q-Peak [dBuV]	Average [dBuV]	Limit [dBuV]
1	169.8	13.46	-	-	34.00
2	172.6	13.17	-	-	34.00