1 TEST REPORT

1.1 System test configuration

1.1.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it). A typical smart card was introduced in the GemPC410 reader, which was itself connected to a personal computer. It has been tested with a Hewlett Packard Vectra 515series D4136A Personal computer. Each ports of the Personal Computer were loaded with a typical peripheral device.

1.1.2 EUT Exercise software

The EUT exercise program (testcem 2.exe running under DOS) used during radiated and conducted testing was designed to exercise the GemPC410 reader in a manner similar to a typical use (reading the smart card in loop)

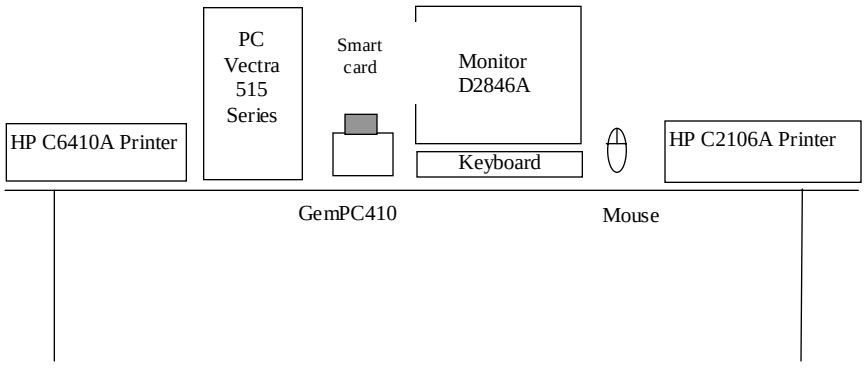
1.1.3 Special accessories

The cable used to connect the GemPC410 reader to the keyboard and RS232 ports of the Personal Computer is shielded and attached to the product. It is connected to Com 1; Serial plotter to Com2.
The smart card used in the GemPC410 is a GemPlus MPC0S64K-3DES.
As shown in Figure 3.1, all interfaces cables used for compliance testing are shielded as normally supplied. All these cables are normally recommended to be used with the Personal Computer.

1.1.4 Equipment modifications

No equipment modification has been necessary during testing to achieve compliance to Class B levels. The unit tested was representative to a production unit.

1.1.5 Configuration of tested system



1.2 Conducted emission data

1.2.1 Test procedure

The product has been tested according to ANSI C63.4-1992, CISPR22-1993/A1:1995 and EN55022:1994/A1:1995.

The product has been tested with 120V / 60Hz power line voltage and compared to the CISPR22 Class B limits. Measurement bandwidth was 9KHz from 150 KHz to 30 MHz.

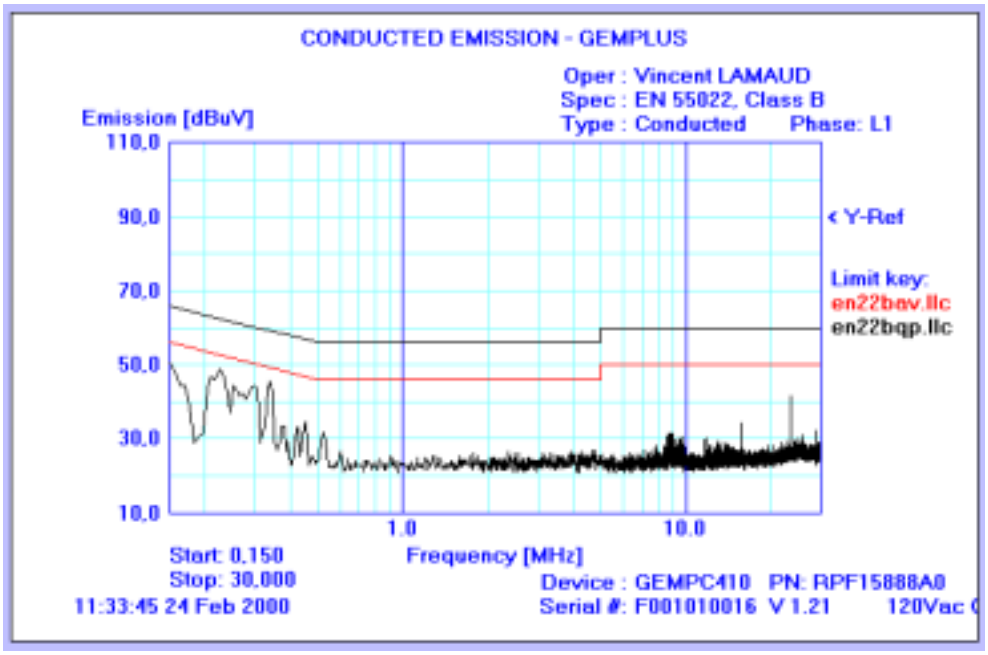
Measurement was initially made with an HP-8591EM Spectrum Analyzer in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement with the Rohde & Schwarz ESH3 receiver for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits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

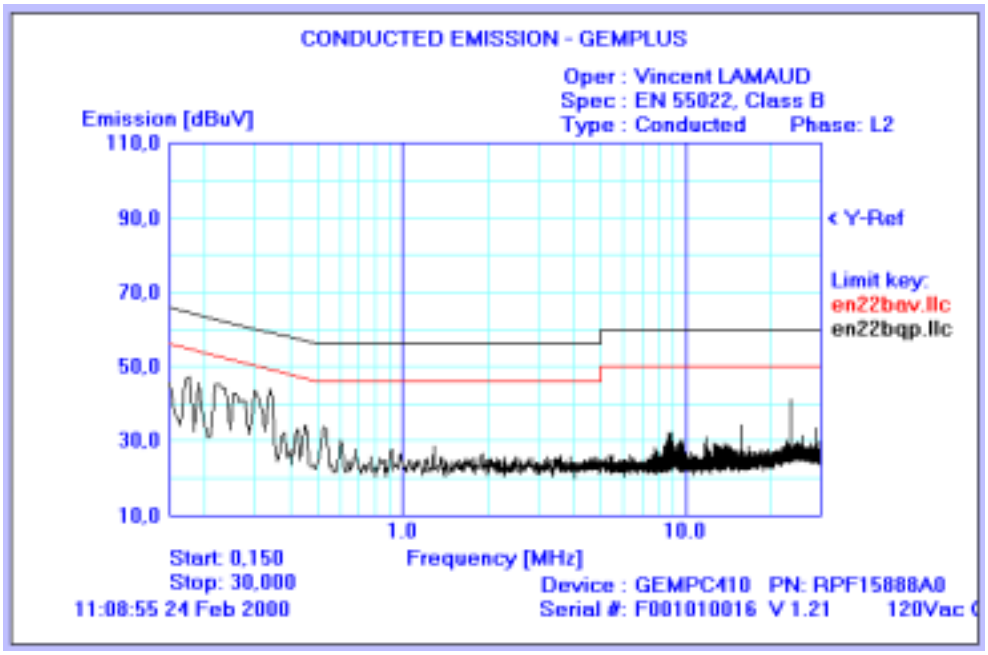
Test equipment :
HP 8591EM Spectrum Analyzer
Rhode & Schwarz ESH3 Receiver
EMCO 3810/2SH LISN N°1
TELEMETER NNB-2/16L LISN N°2

1.2.2 Neutral conducted emission data on GemPC410



Num.	Freq. [MHz]	Peak [dBµV]	Q-Peak [dBµV]	QP limit [dBµV]	***QP delta [dBµV]***	Average [dBµV]	AVG Limit [dBµV]	***AVG Delta [dBµV]***
1	0,150	53,08	48,17	64,00	-15,83	46,19	54,00	-7,81
2	0,230	50,43	48,67	62,00	-13,33	46,60	52,00	-5,40
3	0,300	45,66	43,30	60,00	-16,7	40,56	50,00	-9,44
4	0,340	46,41	45,72	58,00	-12,28	43,48	48,00	-4,52
5	0,380	31,69	23,66	58,00	-34,34	17,25	48,00	-30,75
6	0,430	34,17	32,43	56,00	-23,57	29,67	46,00	-16,33
7	0,450	35,01	32,31	56,00	-23,69	25,94	46,00	-20,06
8	15,60	35,37	25,98	60,00	-34,02	24,73	50,00	-25,27
9	23,36	41,00	37,61	60,00	-22,39	31,74	50,00	-18,26

1.2.3 Line conducted emission data on GemPC410



Num.	Freq. [MHz]	Peak [dBµV]	Q-Peak [dBµV]	QP limit [dBµV]	***QP delta [dBµV]***	Average [dBµV]	AVG Limit [dBµV]	***AVG Delta [dBµV]***
1	0,150	49,73	41,11	64,00	-22,89	23,24	54,00	-30,76
2	0,180	49,51	41,95	64,00	-22,05	27,87	54,00	-26,13
3	0,190	48,20	39,91	64,00	-24,09	19,60	54,00	-34,4
4	0,220	46,86	39,58	62,00	-22,42	34,11	52,00	-17,89
5	0,250	44,83	37,01	60,00	-22,99	26,85	50,00	-23,15
6	0,280	44,08	36,08	60,00	-23,92	25,55	50,00	-24,45
7	0,300	43,63	40,57	60,00	-19,43	36,73	50,00	-13,27
8	0,340	44,43	43,74	58,00	-14,26	41,53	48,00	-6,47
9	0,380	32,99	30,80	58,00	-27,2	27,26	48,00	-20,74
10	0,430	34,94	33,04	56,00	-22,96	30,50	46,00	-15,5
11	0,460	35,77	34,21	56,00	-21,79	31,27	46,00	-14,73
12	0,530	34,00	31,23	56,00	-24,77	23,75	46,00	-22,25
13	15,60	34,94	30,84	60,00	-29,16	19,48	50,00	-30,52
14	23,35	42,31	38,86	60,00	-21,14	30,13	50,00	-19,87

1.3 RADIATED EMISSION DATA

1.3.1 Test Procedure

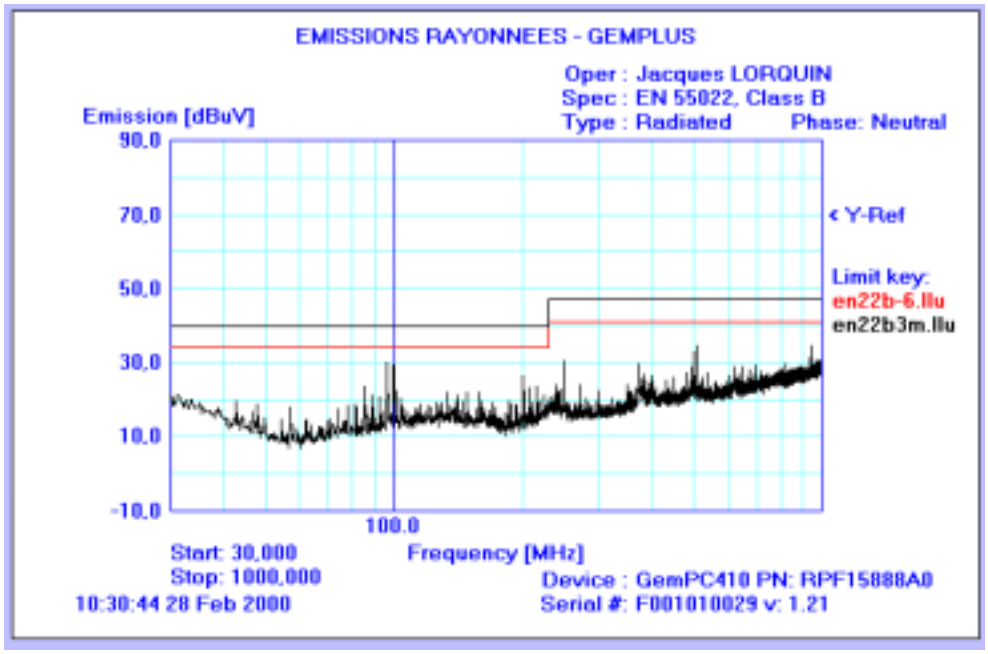
The product has been tested according to ANSI C63.4-1992, CISPR 22-1993/A1:1995 and EN55022:1994/A1:1995.
The product has been tested with 230V / 50Hz power line voltage, at a distance of 10 meters from the antenna and compared to the CISPR 22 Class B limits. Measurement bandwidth was 120 KHz from 30 MHz to 1 GHz. 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.
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.

Test Equipment: HP-8574A E.M.I Receiver
(HP-8568B Analyzer + HP-85650 Quasi-Peak adapter + HP-85685A RF Preselector).
EMCO 3104C Biconical Antenna & EMCO 3146 Log Periodic Antenna
EMCO-1050, 6 meters height antenna mast & EMCO-1060, 3 meters diameter Turntable.

1.3.2 Radiated emission data

Final result 30-1000 MHz

Graph example - 30-1000MHz



Frequency (MHz)	QPeak Lmt (dBµV/m)	QPeak (dBµV/m)	QPeak-Lmt (dB)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (dB)
42.95	30	20.8	-9.2	91	V	115	11.5
47.99	30	26.1	-3.9	268	V	102	11.8
85.02	30	23.3	-6.7	257	H	394	10.2
96.00	40	39.2	-0.8(1)	140	V	219	13.8 *
99.64	40	35.7	-4.3	310	V	213	15.2 *
133.02	30	25.8	-4.2	49	V	109	15.3
186.16	30	23.3	-6.7	65	V	102	19.4
199.23	30	23.7	-6.3	31	V	150	20.2
224.11	30	23.9	-6.1	257	H	347	14.3
249.04	37	29.0	-8.0	339	V	102	15.0
507.58	37	30.0	-7.0	196	H	345	22.4
647.47	37	31.7	-5.3	297	H	274	25.0
697.27	37	31.9	-5.1	140	V	219	27.1

(1): EUT - Ambiant noise = 3dB
*: due to ambiant noise, measure has been performed at 3 meters.

1.3.3 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.