TEST REPORT

GemAccess 608

FCC ID: MES608ACC

1   SYSTEM TEST CONFIGURATION

1.1   Justification

The system was configured for testing in a typical fashion (as a customer would normally use it).
The worst case position of the transmitter has been fund in vertical position, as shown on photographs. The card is set up at 5cm from the card reader, which simulates the current position when the card is held by hand.

1.2   EUT Exercise software

A read and write software emulates the read and allows to read and write data stored in the contactless card in repetitive way.
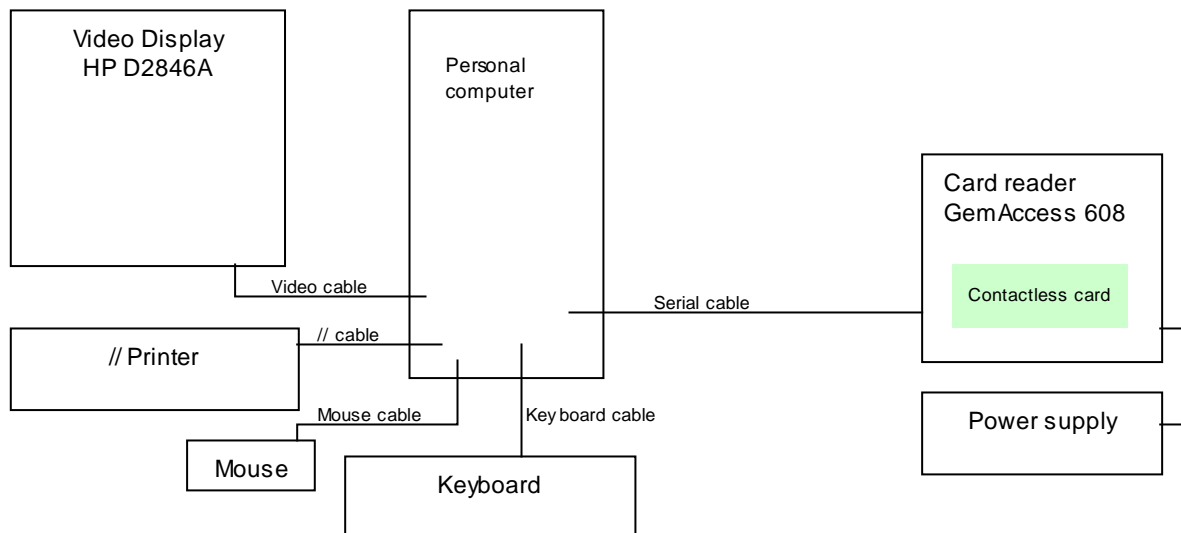
1.3   Special accessories

No special accessories were necessary to perform the test.

1.4   Equipment modifications

No equipment modification has been necessary during testing to achieve compliance to FCC Part15, Subpart C levels. The unit tested was a production unit.

1.5   Configuration of tested system.

1.6 Tested System Details

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
GEMPLUS GemAccess608	MES608ACC	Contactless card reader	Shielded signal cables
COMATEC AL0120-120-IT	NA	Linear Power supply for GemAccess608 (12VDC, 1.2A)	Unshielded power cord, 2 poles
HP VECTRA 515 Series D4136A (FR62365527)	B94VECTRA500T	Personal computer	Unshielded power cord
HP C3751B (LZA62831289)	DZL211029	Mouse	Shielded cable
HP C2106A (3041S18664)	B94C2106X	DESKJET 500 Parallel printer	HP24542D – Shielded cable
HP C4737-60101 (M97060565)	GYUR38SK	Keyboard	Shielded cable
HP D2846A [(2)] (JP74001000)	NA – DoC procedure	21" video monitor	Shielded video cable

(1) EUT submitted for grant

2   RADIATED EMISSION DATA

2.1   Test Procedure (15.225)

The product has been tested according to ANSI C63.4-1992 and FCC PART15, Subpart C, Section 15.225.

In first, the frequencies are identified in the full anechoic chamber and then are measured on the Open Area Test Site.
The plots on the following page shown only the frequency identification.
The table just after shown the measured levels.

Measured levels are in dBµV/m, then they are corrected in µV/m in order to compare them to the FCC limit.
The following conversion is used :

L (µV/m) = inv log (L(dBµV/m) / 20)

From 30 to 1000 MHz, the product has been tested at a distance of 3 meters from the antenna and compared to the FCC Part15, Subpart C, chapter 15.209 limits. Measurement bandwidth was 120 KHz from 30 MHz to 1 GHz.

From 1.705 to 30 MHz, the product has been tested at a distance of 10 meters from the antenna and compared to the FCC Part15, Subpart C, chapter 15.209 limits. Measurement bandwidth was 120 KHz from 30 MHz to 1 GHz. Requirements of 15.209.e) have been observed.

Under 1GHz, measurement are Quasi Peak measurements, according to CISPR requirements.

Above 30MHz, antenna height search was performed from 0.9m to 4m for both horizontal and vertical polarization.
Continuous linear turntable azimuth search was performed with 360 degrees range.
Under 30MHz, a rod antenna has been used, according to provisions of ANSI C63.4

A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

Test Equipment:
HP-8568B Analyzer + HP-85650A Quasi-Peak adapter + HP-85685A RF Preselector
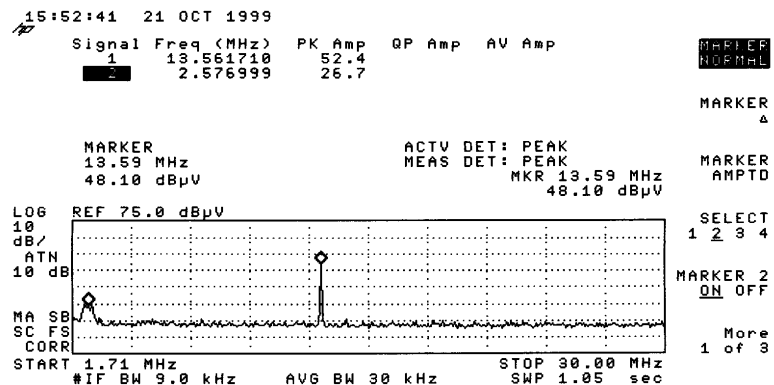HP 8591EM Spectrum analyzer
HP 8546A EMI Receiver
CHASE CBL6111A Antenna, 30-1000 MHz
AILTECH 94607-1, sn119, preamplifier associated with EATON 92197-3 ROD Antenna for frequencies identification.
ElectroMetrics Model RVR-30M, sn 593, Passive Rod Antenna for final results measurement.

2.2 Radiated emission data (15.225.b)

Plot of frequencies from 1.705 to 30 MHZ

```
15:52:41  21 OCT 1999

     Signal Freq (MHz)  PK Amp   QP Amp   AV Amp
        1   13.561710    52.4
        2    2.576999    26.7                          MARKER
                                                        NORMAL

                                                       MARKER
                                                          Δ
    MARKER                  ACTV DET: PEAK
    13.59 MHz               MEAS DET: PEAK             MARKER
    48.10 dBµV                      MKR 13.59 MHz      AMPTD
                                       48.10 dBµV
 LOG   REF 75.0 dBµV                                   SELECT
  10                                                   1 2 3 4
  dB/
  ATN
  10 dB                                                MARKER 2
                                                        ON OFF

 MA SB
 SC FS                                                   More
  CORR                                                  1 of 3
 START 1.71 MHz                        STOP 30.00 MHz
   #IF BW 9.0 kHz     AVG BW 30 kHz    SWP 1.05  sec
```

No signal appears in the restricted bands from 1.705 to 30 MHz.

Plot of frequencies from 30MHz to 1GHZ
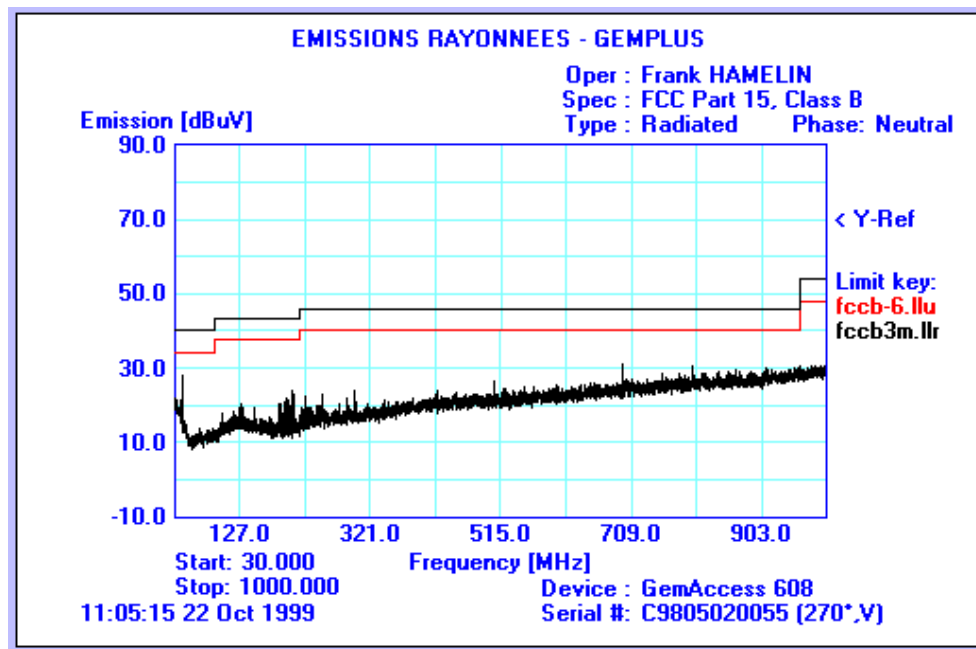
Final result:

Frequency (MHz)	Restricted bands	Limits (Lmt) (uV/m)	Measurement Distance	Measure* (Mea) (uV/m)	Mea-Lmt (µV/m)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (µV/m)	Comments
2.57	No	30	30*[1]	Not traceable signal						
13.56	No	10000	30*[1]	124.45	9875.55	3	V	1m	14.22	Fundamental - 15.225 limits
40.68	No	100	3	94.4	5.6	112	V	103	3.59	15.209 limits
54.268	No	100	3	21.87	78.13	125	V	102	3.84	15.209 limits
67.785	No	100	3	27.22	72.78	123	V	102	3.23	15.209 limits
81.383	No	100	3	17.99	82.01	149	V	113	2.98	15.209 limits
108.480	No	100	3	13.33	86.67	103	V	102	6.45	15.209 limits
144.080	No	100	3	45.70	54.3	141	V	129	6.02	15.209 limits
196.140	No	150	3	30.20	119.8	204	H	160	10.47	15.209 limits
204.143	No	150	3	42.66	107.34	213	H	155	5.13	15.209 limits
212.153	No	150	3	43.15	106.85	71	H	121	5.31	15.209 limits

Frequency (MHz)	Restricted bands	Limits (Lmt) (uV/m)	Measurement Distance	Measure* (Mea) (uV/m)	Mea-Lmt (µV/m)	Angle (deg)	Pol	Hgt (cm)	Tot Corr (µV/m)	Comments
288.217	No	150	3	41.21	108.79	87	H	101	7.58	15.209 limits
298.842	No	150	3	24.55	125.45	91	H	112	8.03	15.209 limits
595..629	No	200	3	26	174	202	H	261	16.22	15.209 limits

* : (A) denotes an average unit, (Q) denotes a Quasi Peak unit, (P) denotes a peak unit.
*[1] : Measurement have been done at 10m distance and corrected following requirements of 15.209.e).

2.3 Field Strength Calculation (15.225.a & b)

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.

2.4 Fundamental field strength (15.225.a)

Emission frequency is : 13.56 MHz
Limit level is 10000µV/m at 30m.

Measured level = 124.45 µV/m

2.5 Fundamental Frequency tolerance (15.225.c)

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.
Fundamental = 13.56 MHz
13.56 +0.01% = 13.57356 MHz
13.56 – 0.01% = 13.54644 MHz

2.5.1 Voltage fluctuation

The power supply has been set at 85% and 115% of nominal voltage, at 20°C.

	Nominal voltage (230V)	85% nom. Volt. (195.5V)	115% nom. Volt. (264.5V)
Fundamental (MHz)	13.5613	13.5586	13.5618
Result	-	PASS	PASS

2.5.2 Temperature fluctuation

The temperature has been set at –20°C and +50°C, at nominal voltage

	20°C	-20°C	+50°C
Fundamental (MHz)	13.56	13.54850	13.5655
Result	-	PASS	PASS