



GEMPLUS

Voie Antiope - Athélia III - 13705 LA CIOTAT CEDEX - FRANCE

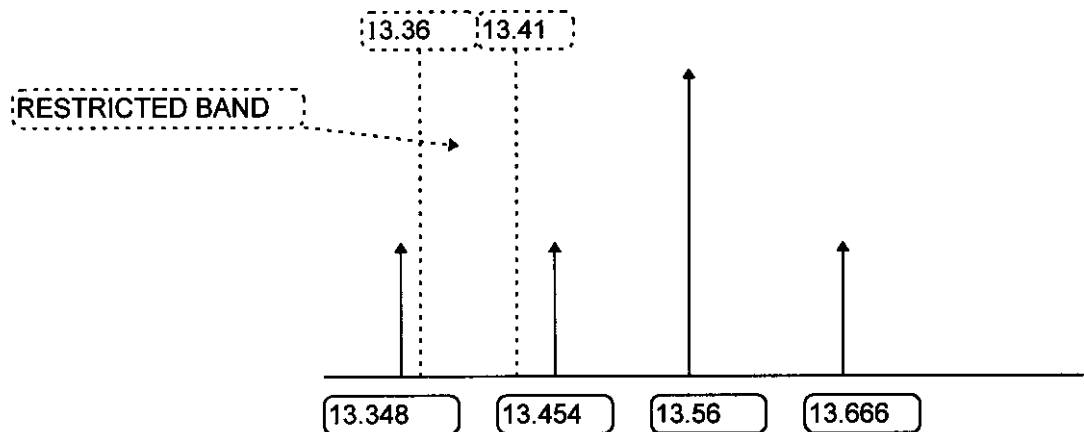
P-A COLLET FCC808.DOC 18/03/98

You find enclosed 2 graphics n° 1 & 2 from IBM LA GAUDE and an theoretical explanation from MIKRON.

N°1:

This graphic shows that there is no spurious emissions (noise only) in the restricted band 13.36-13.41 MHz.

The peaks we show around 13.3495 MHz are the second harmonic of the OOK modulation 106 kHz.



N°2:

This graphic shows that our product GCI680 complies with §15.225 and 15.209 in the band 13.553-13.567 Mhz.

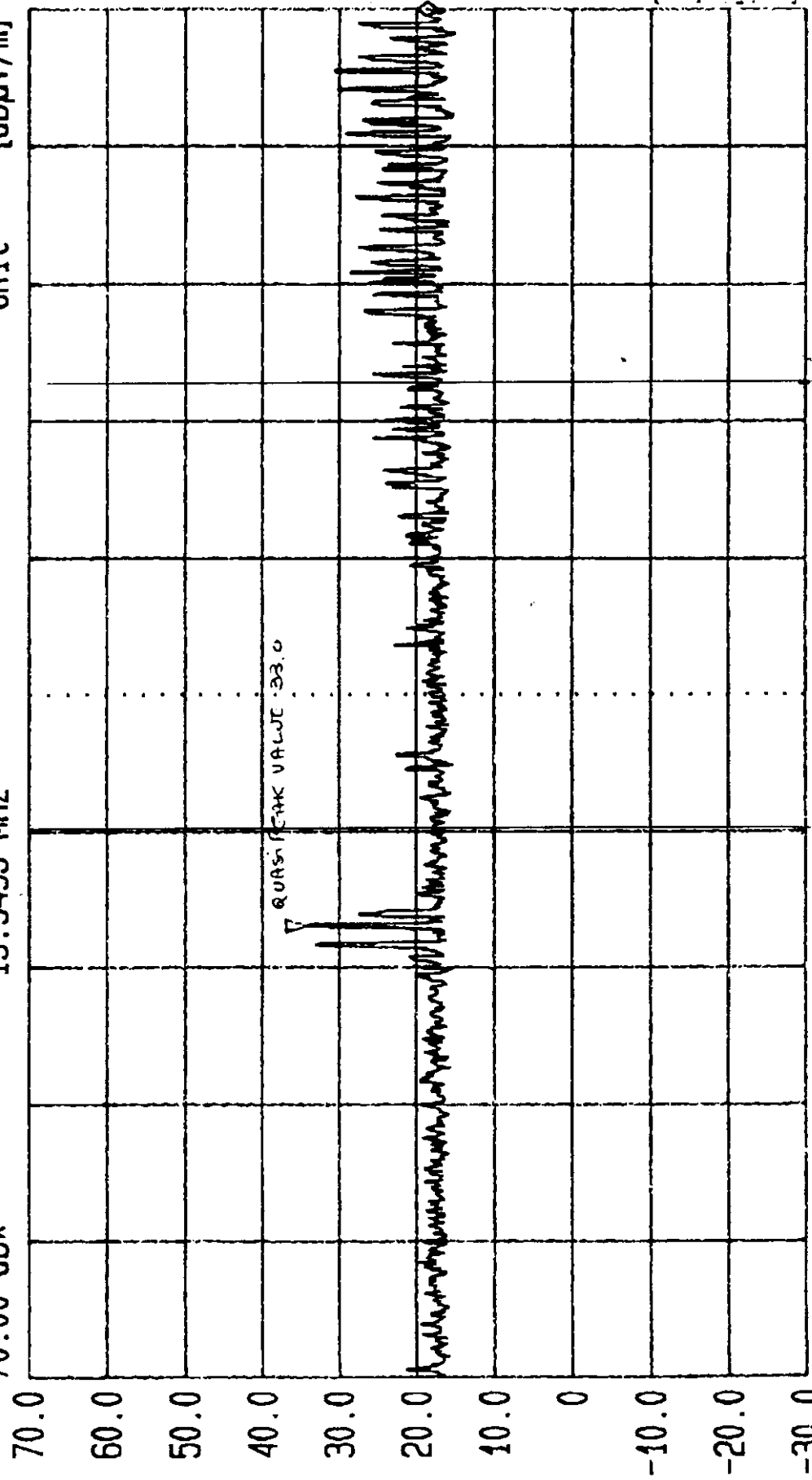
The field strength doesn't exceed 89.5 dB μ V/m at 10m (10,000 μ V/m at 30m) and at the bandwith limits +/- 7kHz it doesn't exceed the general level 39.5 dB μ V/m.

1



Date 08.Oct.'97 Time 16:20:54
Ref.Lvl 70.00 dB* Marker 34.00 dB*
13.3495 MHz

Res.BW 1.3 kHz [3dB] off
TG.Lvl 15.000 kHz
CF.Stp 10 dB
Vid.Bw 300 Hz
RF.Att [dBuV/m]



Start 13.3 MHz Stop 13.45 MHz
Span 150 kHz Sweep 1.16 s
Center 13.375 MHz

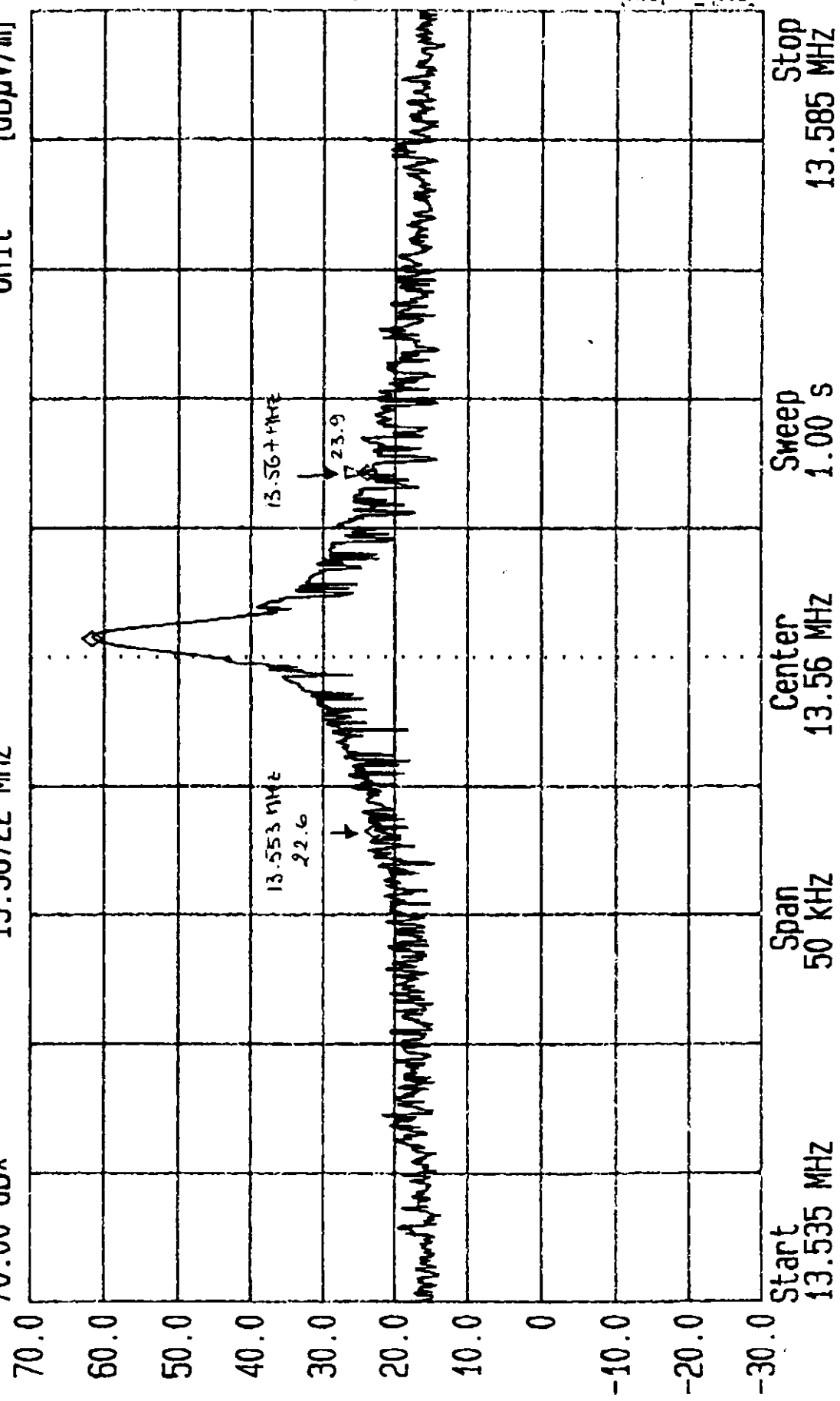
MES608ACC

2



Date 08.Oct.'97 Time 16:15:21
Ref.Lvl 70.00 dB* Marker 23.92 dB*
13.56722 MHz

Res.Bw 500.0 Hz [3dB] TG.Lvl off
CF.Stp 5.000 kHz RF.Att 10 dB
Unit [dBμV/m]



MES608ACC

Title: Analysis of 10% and 100% ASK with respect to FCC restricted bands

Introduction

In document N 132 it was stated that signals generated by modulation schemes discussed by TF2 have signals in restricted bands of FCC. The following document analysed whether those restricted bands are needed for the transfer of information or if they are not needed and can be considered as spurious emissions.

Conclusion

For both methods the following applies:

Signals not containing frequency components of the restricted bands can be easily detected. It is possible „to ensure the transmission of information at the rate and with the quality required“.

Thus:

Frequencies below 13.41 MHz are Spurious Emissions according to FCC and have to be below $30\mu\text{V/m}$.

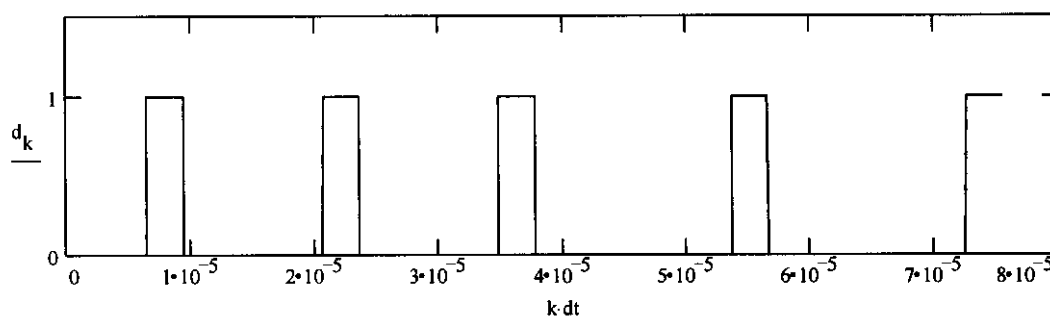
This can be achieved with both methods (100%ASK MM, 10%ASK NRZ)

Consequently with both methods FCC compliant systems can be built.

Filtering of modified miller coded signal

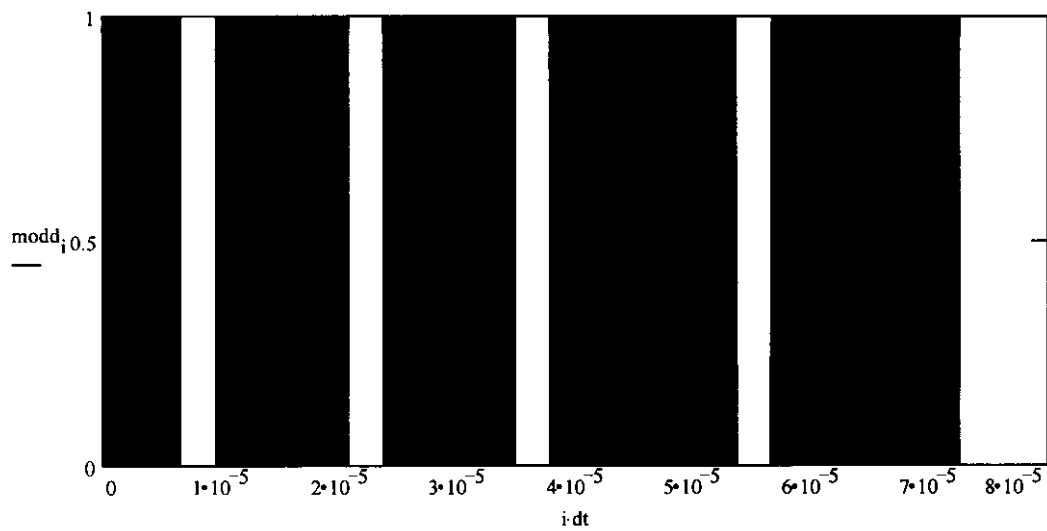
In order to check, if parts of the spectrum generated by modulating a carrier (100% ASK; 106 kbps, carrier: 13.56MHz) are spurious according to the FCC definition the following simulations have been performed:

Bitsequence:



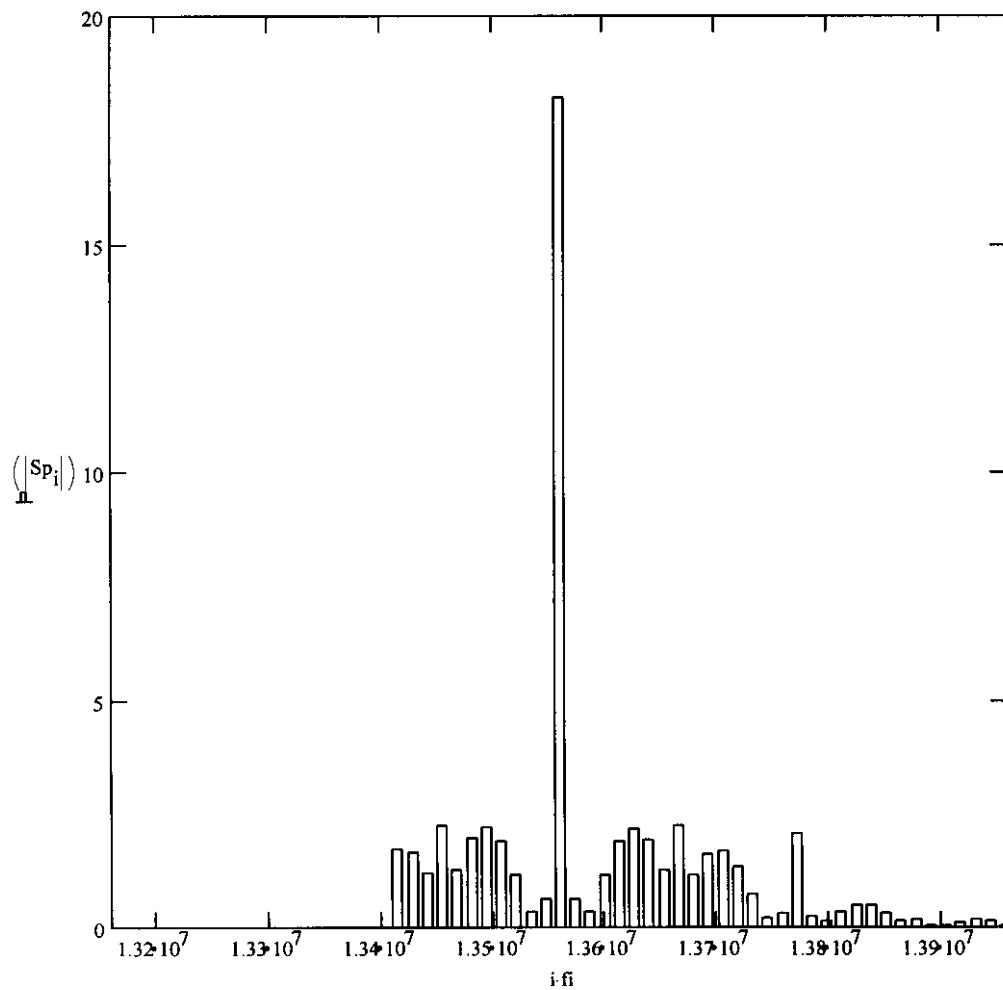
If $dk=1$ the carrier is modulated 100%

Modulated signal (ASK 100%)



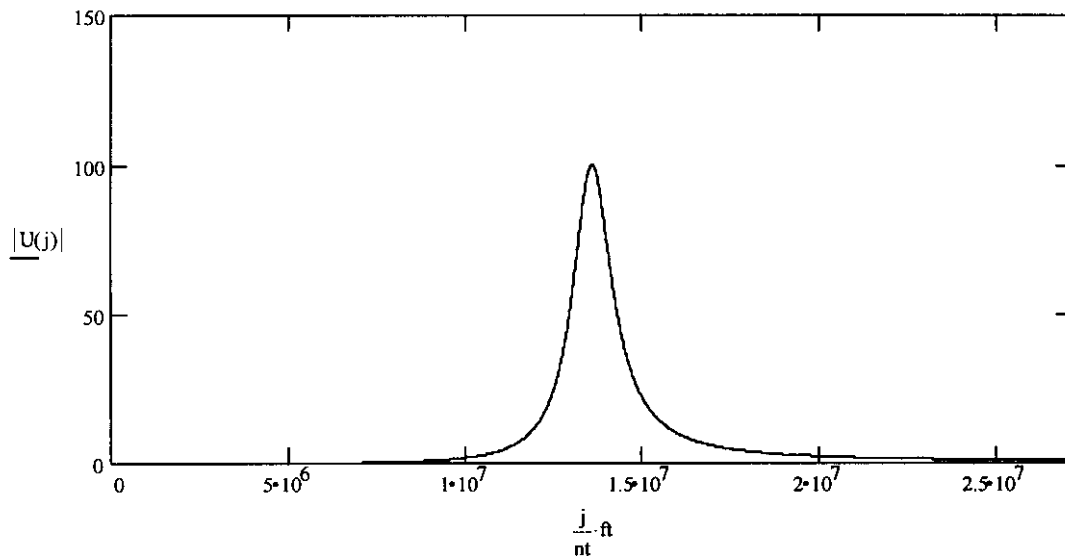
At a next step frequencies below 13.41 MHz is filtered completely

Below see resulting spectrum:

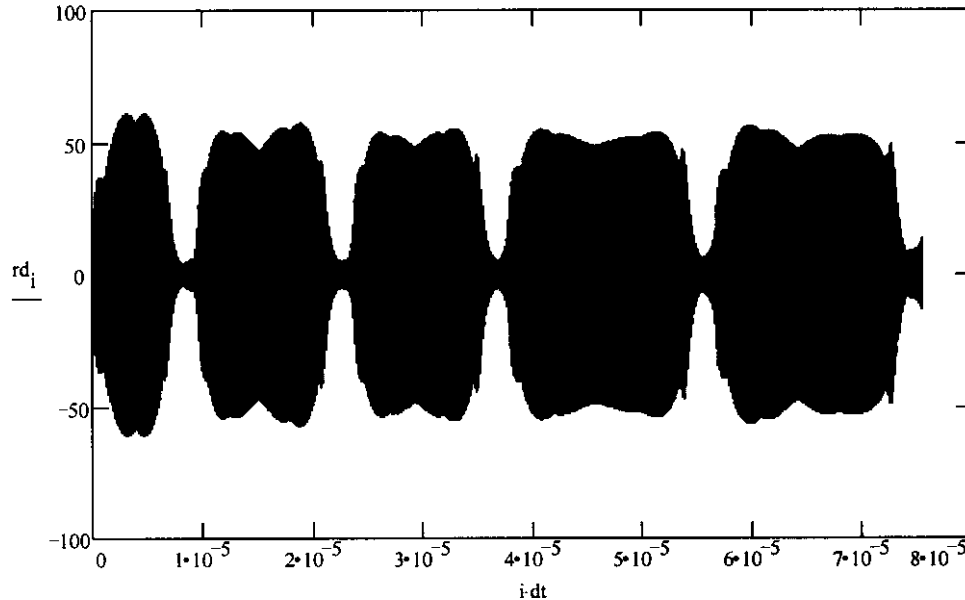


This signal is filtered by a reader antenna with linear characteristic.
The reader antennas function is the following

$$U(j) := \frac{i(j)^3}{1 + a \cdot i(j) + b \cdot i(j)^2 + a \cdot i(j)^3 + i(j)^4}$$



The resulting signal in the time domain looks like the following



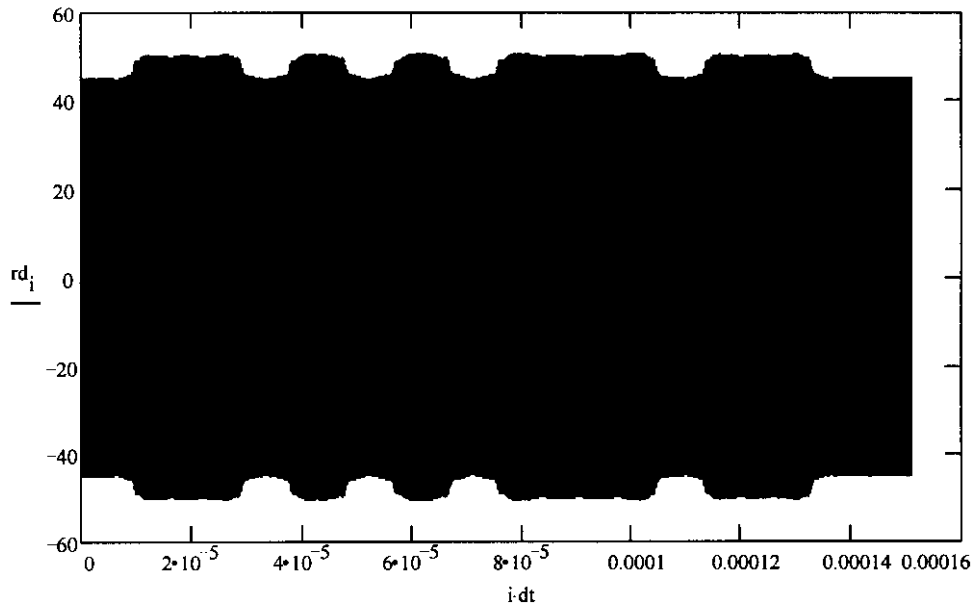
The demodulator detects pauses if the amplitude goes below approximately below 1/3 of the amplitude. Although the signal was filtered (the level of frequency components below 13.41 MHz was reduced and fully suppressed) the corresponding transmission of information has not been effected!

It can be easily seen that detection is possible.

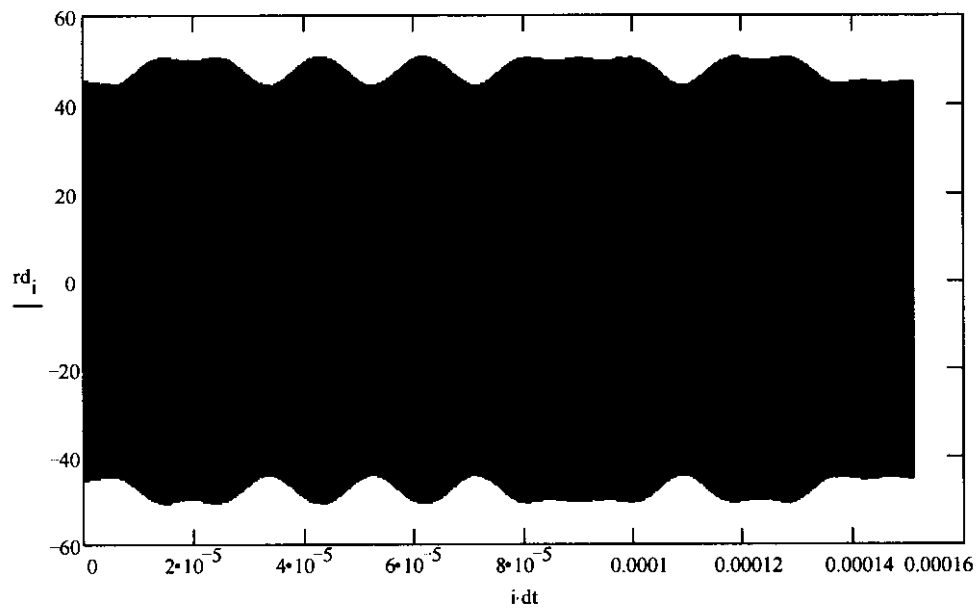
Thus frequencies below 13.41 MHz are Spurious Emissions according to FCC and have to be below 30μV/m.

Since the S/N ratio of this signal is of course better than at 10% ASK a more reliable communication is possible at 100% ASK.

Same method applied on 10%ASK/NRZ results in the following signal:



Filtering bands except first peak of $\sin x/x$ function results in the following signal





LABORATOIRE D'ESSAIS EN ENVIRONNEMENT

Centre d' Etudes et Recherches IBM
06610 La Gaude FRANCE
Tel (33) 04-92-11-43-14 Fax (33) 93-24-78-59

Laboratoire accrédité par le FCC sous le n° 31040/SIT 100/B3

FCC registration number 31040/SIT 100/B3

Laboratoire accrédité par le VCCI sous les n° R334-C348

VCCI registration number R334-C348

RAPPORT D'ESSAI

TEST REPORT

Lecteur de carte GEMACCESS 608

GEMACCESS 608 Card reader

RAPPORT N°GEM97101

FCC Part 15 Subpart B (1992)

Programme COFRAC 27-1

Client : GEMPLUS

Customer

représenté par : P.M.A. Collet

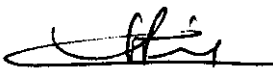
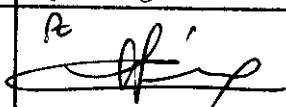
represented by

adresse : ZE Athelia III, Voie Antiope, 13705 LA CIOTAT CEDEX

address

La Gaude, le 29 octobre 1997.

La Gaude, October 29th, 1997.

Rédigé par: JM De Santis <i>Written by</i>	Vérifié par: G. Féraud <i>Checked by</i>	Approuvé par: JM. Legrand <i>Approved by</i>
Technicien CEM <i>EMC technician</i>	Ingénieur CEM <i>EMC engineer</i>	Chef de service <i>Dept manager</i>
		

Cie IBM France - Société Anonyme au capital de 3 122 712 320 F
Siège social Tour Septentrion, 20 Avenue André Prothin
la Défense 4, 92400 Courbevoie France
RCS Paris B 552 118 465 APE 741J

Accreditation
n° 1-0142
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2 Conformité / Compliance

Le produit est conforme en tous points à la norme FCC Part 15 Subpart B (1992) B.
The product is fully compliant with FCC Part 15 Subpart B (1992) class B.

3 Résultats des essais / Tests results

3.1 FCC Part 15 Subpart B (1992)

Perturbations conduites aux bornes Conducted disturbance

du réseau d'énergie <i>at AC mains</i>	Classe : B <i>Class</i>	Conforme <i>Complies</i>
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Perturbations rayonnées Radiated disturbance

Champ électrique <i>Electric field</i>	Classe : B <i>Class</i>	Conforme <i>Complies</i>
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4 Description du système / *System description*

Le GEMACCESS608 est un lecteur de carte sans contact. Il permet de lire et écrire à distance par l'intermédiaire d'une antenne boucle magnétique (antenne et coupleur intégrés). Pendant le test un logiciel de lecture et écriture émule le lecteur et permet de lire et écrire des données inscrites dans la carte à puce de façon répétitive.

The GEMACCESS608 is a no contact card reader. It allows to read and write away through a magnetic loop antenna (integrated antenna and coupler). During the test a read and write software emulates the read and allows to read and write data stored in the contactless card in repetitive way.

4.1 Configuration du produit / *Product configuration*

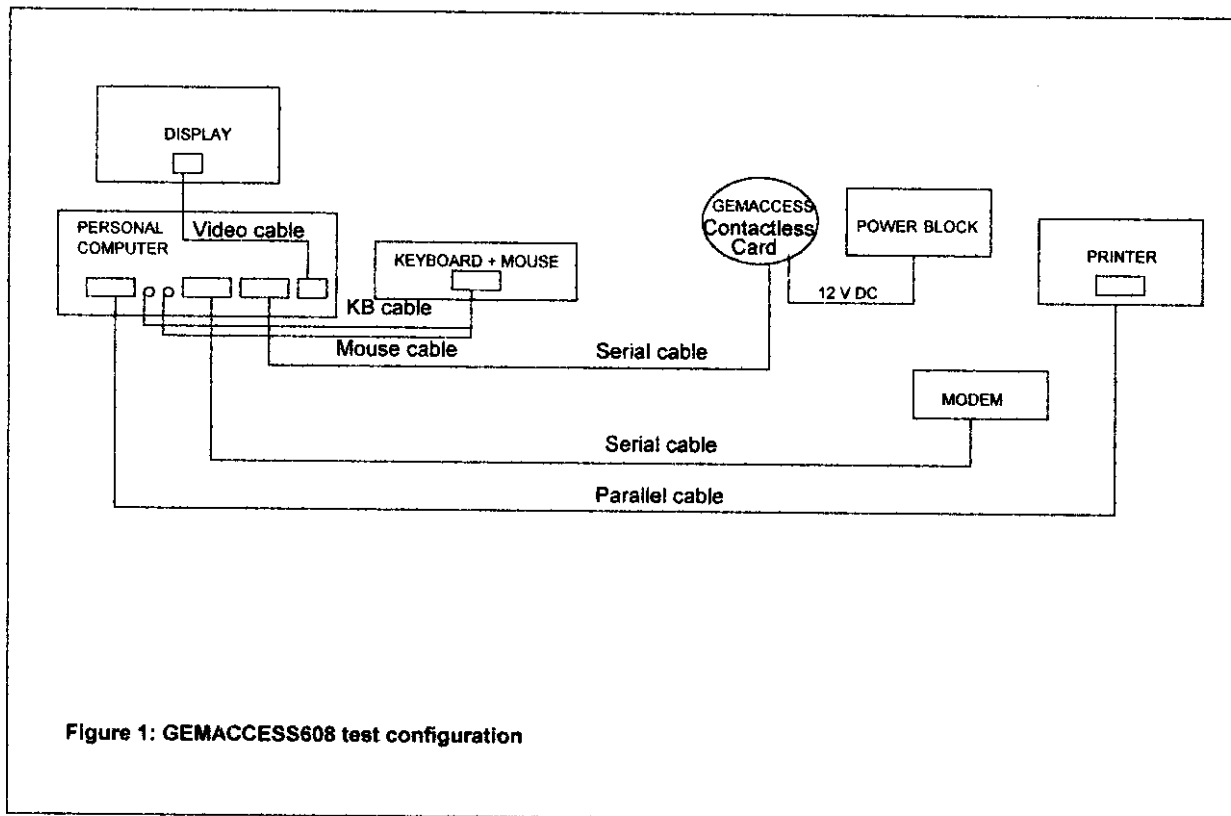


Figure 1: GEMACCESS608 test configuration

4.2 Equipements auxiliaires / *Ancillary equipments*

- Ecran
Display
IBM 6546-01N - S/N 55-WH25 - FCC ID A3LCGB560
- Ordinateur personnel
Personal computer
PS HP Vectra M2-4/66 - S/N 3452 F58773 - FCC ID HCJECTRAXXM2
- Clavier (avec souris intégrée)
Keyboard with integrated mouse
IBM M4-1 - S/N 1379590 - FCC ID IYL1379590
- Imprimante
Printer
LEXMARK 4077-201 - S/N 11-N6340 - FCC ID IYL4077
- Modem
Modem
IBM 7855-10 S/N 23-00 31988 - FCC ID AMQ 55101
- Bloc alimentation
Power block
AC 110V/DC 12V - Hitron HER 57-312 - S/N 960513002
- Carte à puce
Contactless card
MIFARE - W35/97 TR973502
- Ferrite
Ferrite
FAIR-RITE N° 0443167251
- Câble ferrité
Ferrite cable
EUPEN - Ref. IKU13B
- Câbles du clavier, de la souris
Keyboard and mouse cables
- 2 Câbles en série, 1 en parallèle
2 Serial, 1 parallel cables

5.1.4 Remarques / *Comments*

Aucune.

None.

Spécificité de la configuration:
Configuration specifics:

Sans carte à puce.

With no contactless card.

6.1.3 Résultat des mesurages / *Measurements results*

Fréquence Frequency (MHz)	Polarisation Polarization (H/V)	Mesure quasi-crête Quasi-peak measure (dBuV/m)	Limite quasi-crête Quasi-peak limit (dBuV/m)
48.5	V	27	40
95.99	H	28.9	43.5
100.22	H	30	43.5
200.43	H	34.8	43.5
233.86	H	41.5	46
267.3	H	30.6	46

6.1.4 Conditions de mesurage / *Measurement conditions*

Essai effectué par: JM. De Santis
Test performed by

Date de l'essai: 10/10/97
Date of test

Conditions environnementales:
Environment conditions

- Température: 22° Celsius
Temperature
- Hygrométrie: 58 % HR
Hygrometry

Tension secteur: 110 V 60 Hz
Main voltage

6.1.5 Configuration d'essai / *Test configuration*

Installation d'essai:
Test set-up:

Spécificité de la configuration:
Configuration specifics:

Avec carte à puce "MIFARE" espacée de 7 cm de l'antenne.

With "MIFARE" contactless card spaced 7cm from the antenna.

6.1.6 Résultat des mesurages / *Measurements results*

Fréquence Frequency (MHz)	Polarisation Polarization (H/V)	Mesure quasi-crête Quasi-peak measure (dBuV/m)	Limite quasi-crête Quasi-peak limit (dBuV/m)
102.22	V	36.8	40
200.44	H	40.6	43.5
233.85	H	44.4	46
247.84	H	28.8	46
267.24	H	36.6	46
289.12	H	35	46

6.1.7 Remarques / *Comments*

Aucune.

None.

7 Appareils de mesure utilisés / Test equipments used

Description	Type	Numéro	Vérifié le	(*)
Recepteur de mesure <i>Measurement receiver</i>	R&S ESH3	71986	07/97	X
Recepteur de mesure <i>Measurement receiver</i>	R&S ESVP	71424		
Recepteur de mesure <i>Measurement receiver</i>	R&S ESMI	73244	11/96	X
Affichage <i>Display</i>	R&S EZM	385752	07/97	X
Analyseur de spectre <i>Spectrum analyser</i>	HP 8568B	72159		
Affichage <i>Display</i>	HP 85662A	386077		
Adaptateur quasi-crête <i>Quasi-peak adapter</i>	HP 85650A	386076		
Preselecteur <i>Preselector</i>	HP 85685A	386078		
Analyseur de spectre <i>Spectrum analyser</i>	HP 8566B	73075	01/97	*
Affichage <i>Display</i>	HP 85662A	386319	01/97	*
Adaptateur quasi-crête <i>Quasi-peak adapter</i>	HP 85650A	70059	01/97	*
Preselecteur <i>Preselector</i>	HP 85685A	71953	01/97	*
Analyseur de spectre <i>Spectrum analyser</i>	HP 8568B	69740		
Affichage <i>Display</i>	HP 85662A	386074		
Adaptateur quasi-crête <i>Quasi-peak adapter</i>	HP 85650A	67046		
Preselecteur <i>Preselector</i>	HP 85685A	71081		
Antenne biconique 30-300 MHz <i>Biconical antenna 30-300 MHz</i>	EMCO 3108	386512	08/95	*
Antenne biconique 30-300 MHz <i>Biconical antenna 30-300 MHz</i>	EMCO 3108	386513		
Antenne Log-périodique 300-1000 MHz <i>Log-periodic antenna 300-1000 MHz</i>	Schwarzbeck UHALP 9107	72340		
Antenne Log-périodique 300-1000 MHz <i>Log-periodic antenna 300-1000 MHz</i>	Schwarzbeck UHALP 9107	386504		
Antenne Log-périodique 300-1000 MHz <i>Log-periodic antenna 300-1000 MHz</i>	Schwarzbeck SAS-200-512	386312	08/95	*
Antenne Cornet 1-2 GHz <i>Horn 1-2 GHz</i>	EMCO3661-018	73373	08/95	*
Antenne "Double Ridge" 1-18 GHz <i>Double Ridge 1-18 GHz</i>	EMCO 3115	73202		
Antenne Log-périodique 1-18 GHz <i>Log-periodic antenna 1-18 GHz</i>	ARA LPD118	73087		
Réseau fictif <i>Artificial main network</i>	Schwarzb.NLA8120	213679		
Réseau fictif <i>Artificial main network</i>	Schwarzb.NLA8120	830060		
Réseau fictif <i>Artificial main network</i>	Schwarzb.NLA8121	71052	09/96	*
Réseau fictif <i>Artificial main network</i>	PMM L3-25	218	11/96	*

(*) Appareils utilisés / Test equipments used