# E.M.C Test Report

**According to the standard:**

FCC PART 15 Edition 2005

**Equipment under test:**
NABAZTAG AT 2.4 GHz
Ref. : MAC : 00039D402BCD

**Company:**
VIOLET SARL

**DISTRIBUTION:** Mr MEVEL

**(Company:** VIOLET SARL**)**

**Number of pages:** 44 with 4 annexes

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EMITECH C129 Rév.0

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*TEST CERTIFICATION FOR:* Fcc Verification

*NAME OF THE EQUIPMENT UNDER TEST*: NABAZTAG
Type : MAC : 00039D402BCD

*NAME OF THE MANUFACTURER:* VIOLET SARL

*ADDRESS OF THE APPLICANT:*

*Company:* VIOLET SARL

*Address:* 8 rue du Dahomey
75011 PARIS
FRANCE

*Person in charge:* Mr MEVEL

*Person present during the tests:* Mr MEVEL

*DATES OF TESTS:* The 27th and 28th October 2005

*TESTS LOCATIONS:* EMITECH laboratory in Montigny le Bretonneux (78)
Open area test site in Aunainville (28)

*TESTS OPERATOR:* F. LHEUREUX

# TABLE OF CONTENTS


1. *INTRODUCTION* ____ **4**

2. *REFERENCE DOCUMENT* ____ **4**

3. *EQUIPMENT UNDER TEST (EUT) CONFIGURATION* ____ **4**

4. *SUMMARY OF TEST RESULTS* ____ **6**

5. *MAXIMUM PEAK POWER MEASUREMENT* ____ **8**

6. *POWER SPECTRAL DENSITY MEASUREMENT* ____ **13**

7. *6 dB BANDWIDTH MEASUREMENT* ____ **16**

8. *BAND EDGE MEASUREMENT* ____ **19**

9. *UNINTENTIONAL RADIATED EMISSIONS IN THE BAND 30 MHZ – 25 GHZ* ____ **21**

10. *MEASUREMENT OF CONDUCTED EMISSION ON AC MAINS PORTS* ____ **25**

*Annex 1: Hopping timing measurement*
*Annex 2: Customer's questionnaire*
*Annex 3: Antenna factors, insertion losses and amplifier values*
*Annex 4: Test setup photographs*

## 1. *INTRODUCTION*

This document submits the results of Electromagnetic Compatibility tests performed on the equipment «*NABAZTAG AT 2.4 GHz ref. : MAC : 00039D402BCD*» herein referred to as the EUT, according to the document listed below.

## 2. *REFERENCE DOCUMENT*

FCC Part 15 Edition 2005:
Code of Federal Regulations
Title 47 – Telecommunication
Chapter 1 – Federal Communication Commission
Part 15 – Radio frequency devices
Subpart C – Intentional Radiators

## 3. *EQUIPMENT UNDER TEST (EUT) CONFIGURATION*

See photographs next page.

See customer's questionnaire in annex.

See antenna factors, insertion losses and amplifier values in annex.

Modification of the equipment during the tests: No.

*Photographs of the equipment under test (EUT)*

## 4. *SUMMARY OF TEST RESULTS*

The following table summarizes test results of the EUT.

| Test procedure | Designation of test | Test results | | | | Comments |
|---|---|---|---|---|---|---|
| | | Pass | Fail | N.A. | N.P. | |
| 15.205 and 15.209 | Unintentional radiated emissions in the band 30 MHz – 25 GHz | x | | | | |
| 15.207 | Conducted emissions on AC mains ports | x | | | | |
| 15.247 (a) (1) | Hopping mode | | | x | | Note 1 |
| 15.247 (a) (1) (iii) | Hopping timing | x | | | | Note 2 |
| 15.247 (a) (2) | 6 dB bandwidth measurement | x | | | | |
| 15.247 (b) (1) | Maximum peak power measurement | x | | | | Note 3 |
| 15.247 (d) | Band edge measurement | x | | | | |
| 15.247 (e) | Power spectral density measurement | x | | | | Note 3 |
| 15.247 | RF exposure compliance | | | x | | Note 4 |

N.A.: Not Applicable
N.P.: Not Performed

Note 1: Not applicable for Wifi equipment.

Note 2: The frequency hopping system use more than 15 min overlapping channels.
The transmitter transmits every 16,72 ms (see annex n° 1) during 390 µs with 15 channels x 0.4 s (part 15) = 6 s.
The transmitter for 6 s transmits 359 times, then 359 x 390 µs = 140 ms, thus the average time of occupancy on any channel is less than 400 ms within a period of 0.4 s multiplied by the number of hopping channel employed.

Note 3: Conducted measurement is not possible (integrated antenna) so we used the substitution method in open field.

Note 4: This type of equipment use less than 0.5 W of output power with a high signal transmitting duty factor the SAR measurement is not necessary.

In emission:

The tested sample "*NABAZTAG AT 2.4 GHz ref.: MAC: 00039D402BCD*" complies with the requirements of the standard:

- FCC PART 15 Edition 2005

according to the limits specified in the present report.

## 5. *MAXIMUM PEAK POWER MEASUREMENT*

Standard: FCC PART 15 Edition 2005

Section: 15.247 (b) (1)

Instrumentation test list:

| Meter | NoEmitech | Category | Mark | Type |
|---|---|---|---|---|
| 25 | 04/003 | Synthesizer | Hewlett Packard | 8672 A |
| 187 | 16/004 | OATS | Emitech | Site champ libre |
| 890 | 05/036 | Oscilloscope | Tektronix | TDS 310/OPT14 |
| 1097 | 18/082 | Filter | Trilithic | 6HC1300-2.5-KK |
| 2186 | 35/061 | Cable | Cable&Connectique | 4M-18GHz |
| 2205 | 02/068 | Spectrum analyzer | Agilent | E7405A |
| 2341 | 19/018 | Antenna mast | HD GmbH | MA 240 |
| 2342 | 19/019 | Mast controller | HD GmbH | HD 100 |
| 2896 | 35/273 | Cable | - | N-13M |
| 3374 | 24/604 | Horn antenna | Emco | 3115 |

Test procedure:

The measurement was performed with the substitution method. The measurement antenna was connected to a scope through an amplifier and a large band diode detection. The level was maximised in antenna hight, azimuth and polarization. The maximum level measured on the scope was recorded. Then the product was replaced by a substitution chain to determine the equivalent is tropically radiated peak power.

Measure condition:

Ambient temperature (°C): 22
Relative humidity (%): 34

| | | |
|---|---|---|
| For RF peak level: | Resolution bandwidth: | 1 MHz |
| | Video bandwidth: | 1 MHz |
| For RF average level: | Resolution bandwidth: | 1 MHz |
| | Video bandwidth: | 30 kHz |

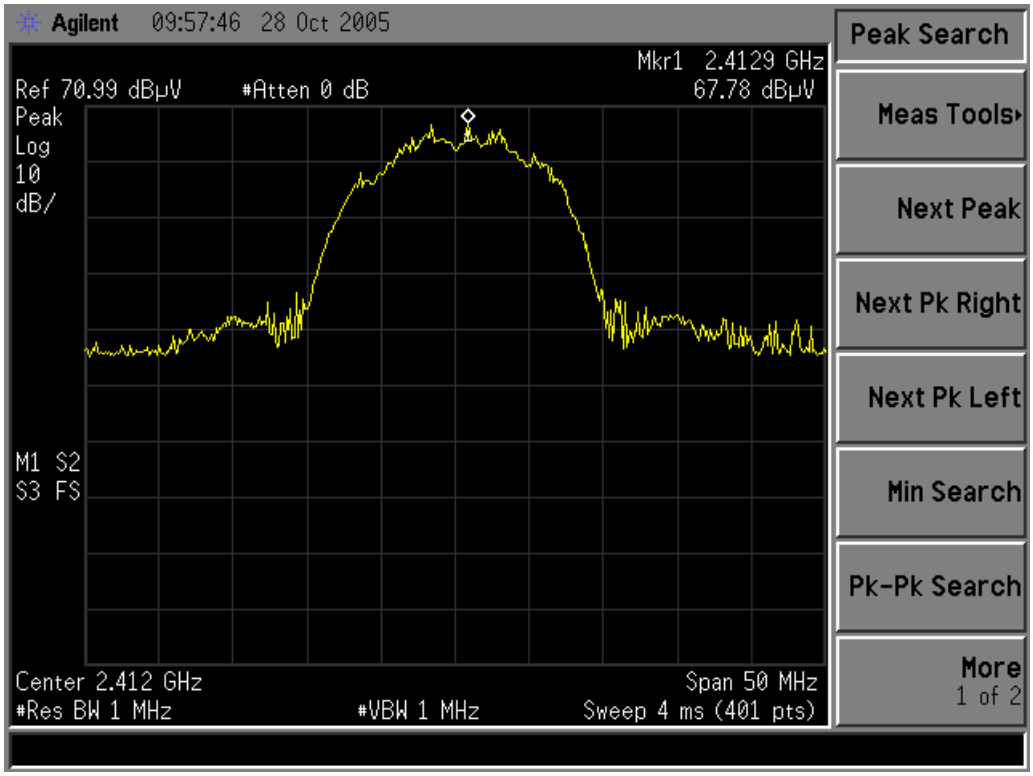
Results:

| Channel | Channel frequency (MHz) | RF peak power level (dBm) | RF peak level (dBµV/m) | RF average level (dBµV/m) | Maximum limit (dBm) |
|---|---|---|---|---|---|
| 1 | 2412 | 16.1 | 99.9 (curve 1) | 95.2 (curve 4) | 30 |
| 7 | 2442 | 16.0 | 96.5 (curve 2) | 91.2 (curve 5) | 30 |
| 11 | 2462 | 20.2 | 102.1 (curve 3) | 98.4 (curve 6) | 30 |

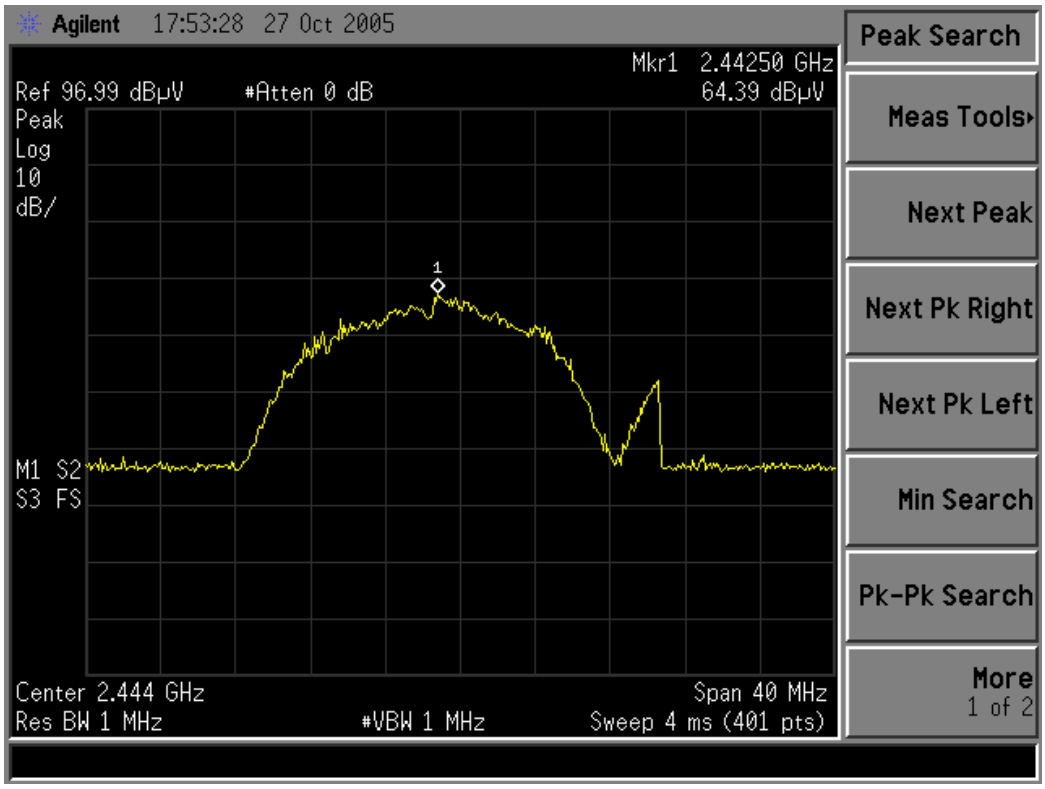
Measurement uncertainties: 4.2 dB

Test conclusion: Respect the standard.

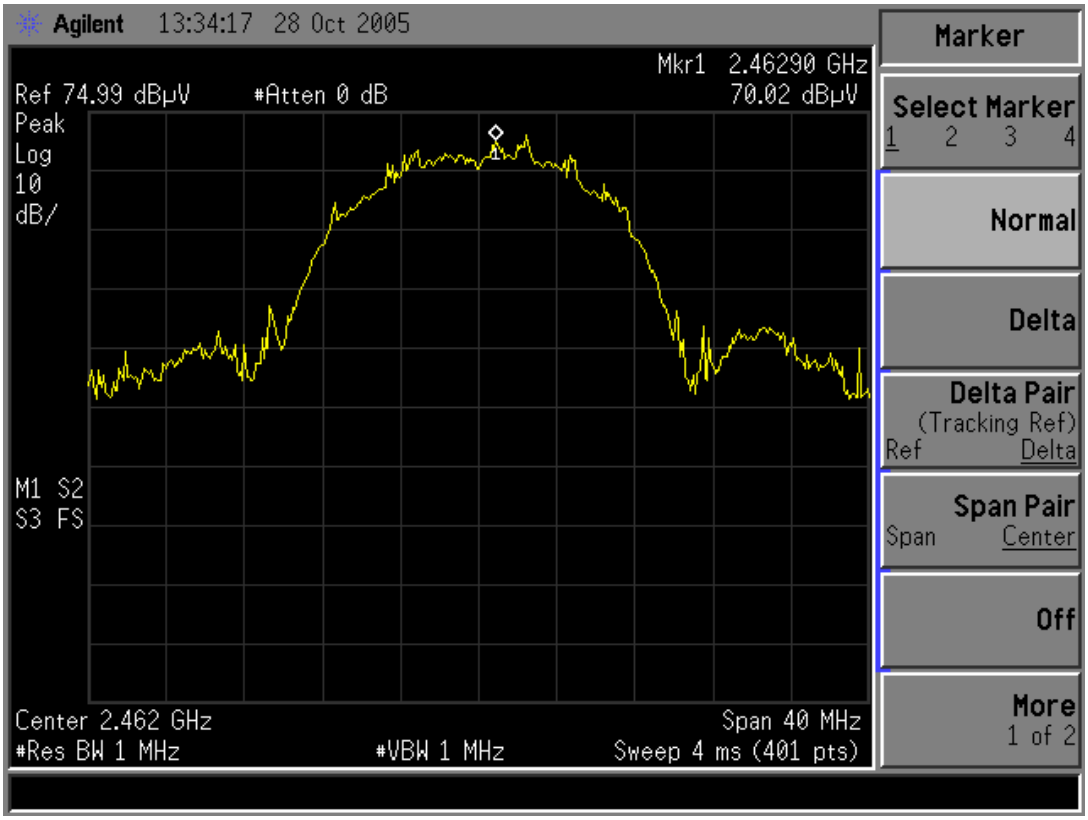
*Curve 1*



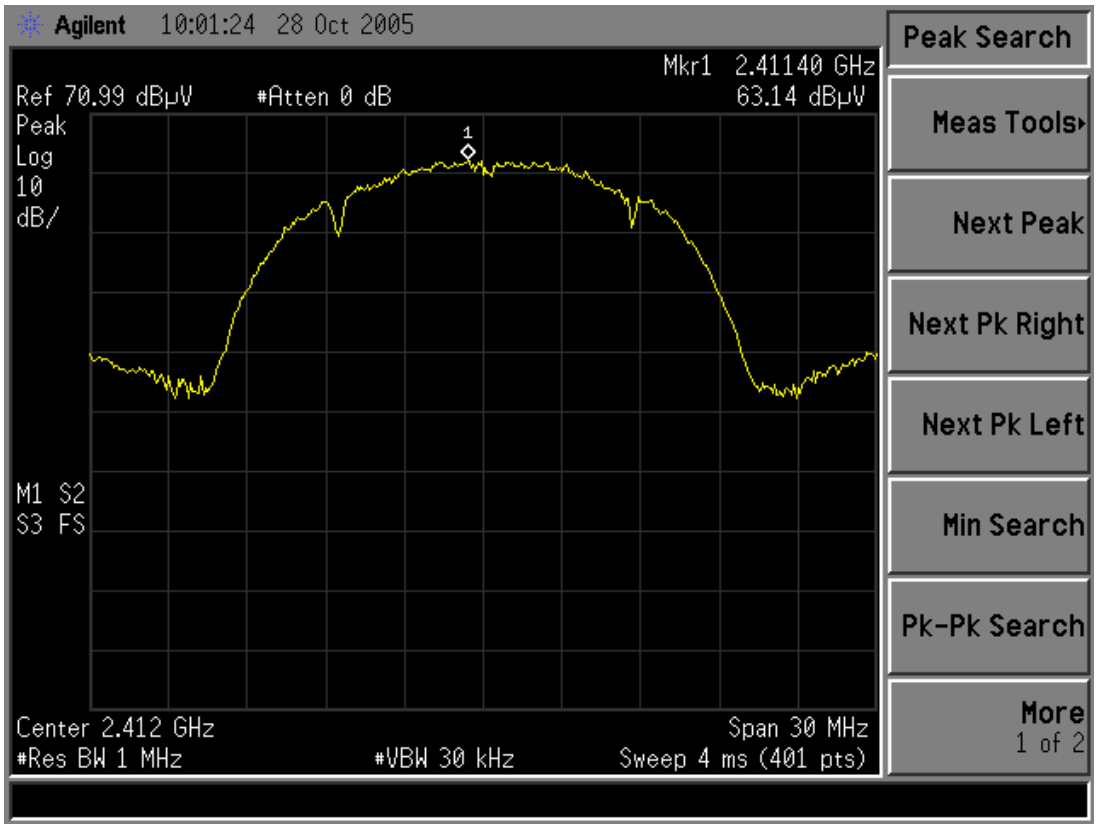

*Curve 2*



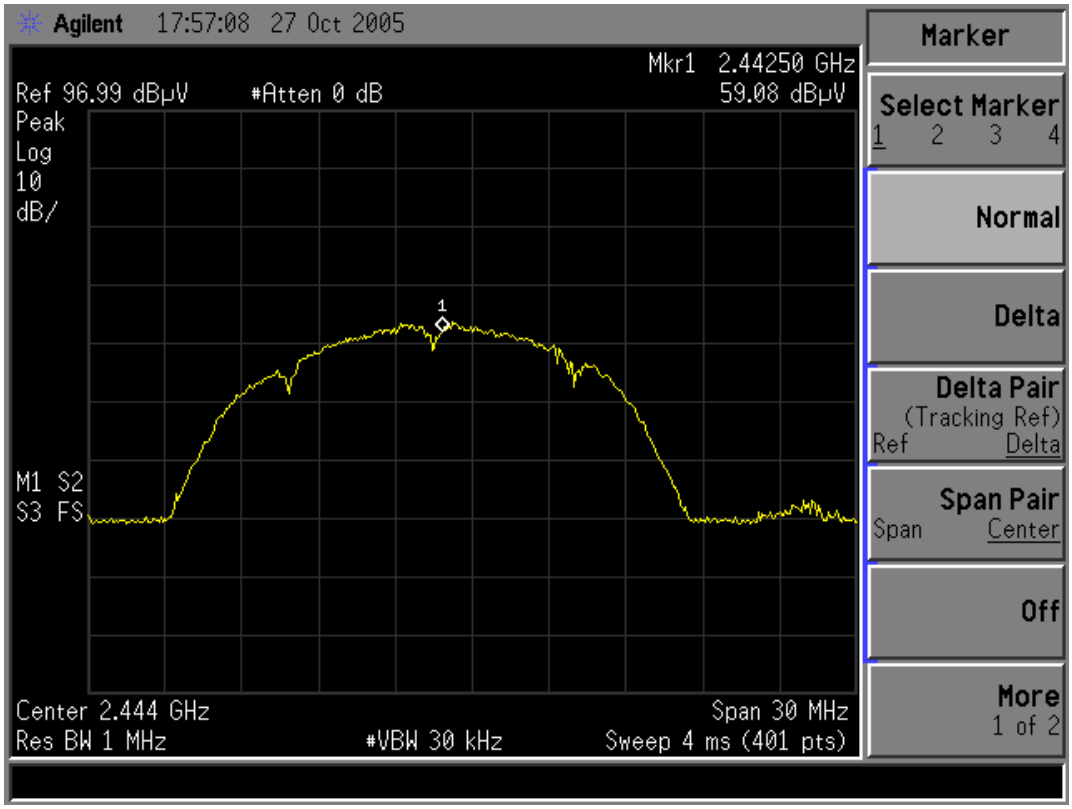
*Curve 3*



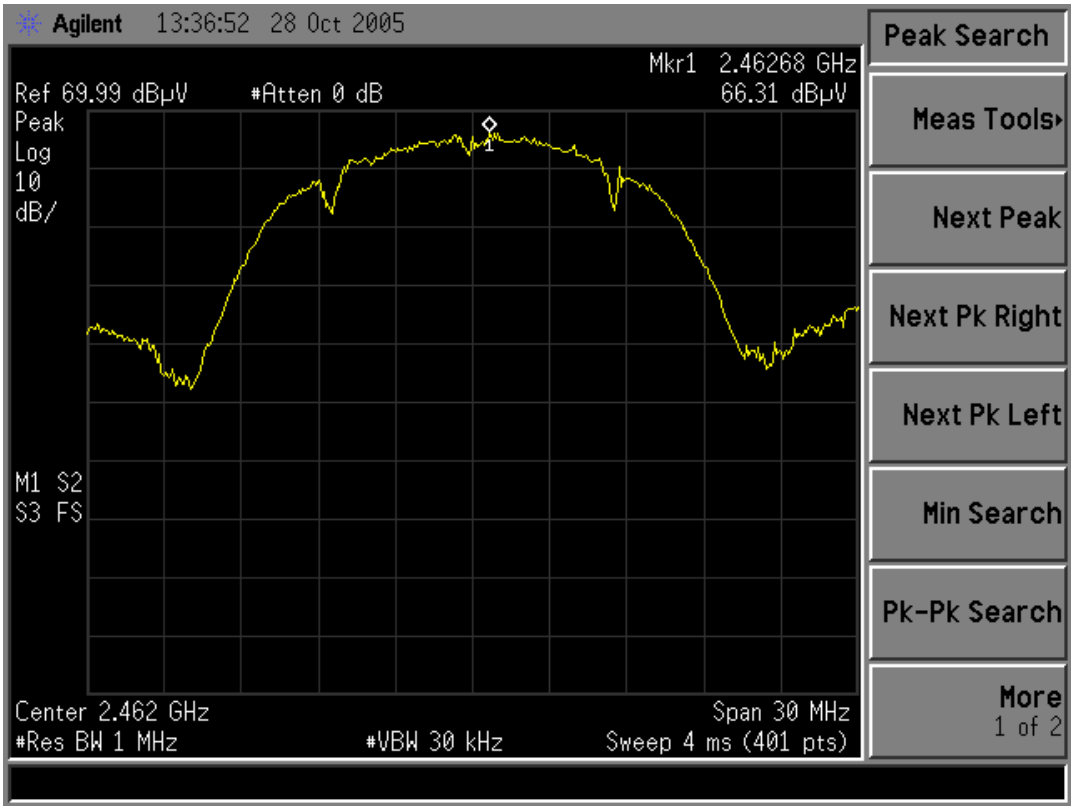

*Curve 4*



*Curve 5*




*Curve 6*



## 6. *POWER SPECTRAL DENSITY MEASUREMENT*

Standard: FCC PART 15 Edition 2005

Section: 15.247 (e)

Instrumentation test lis:

| Meter | NoEmitech | Category | Mark | Type |
|---|---|---|---|---|
| 25 | 04/003 | Synthesizer | Hewlett Packard | 8672 A |
| 187 | 16/004 | OATS | Emitech | Site champ libre |
| 941 | 24/149 | Horn antenna | Emco | 3115 |
| 2185 | 35/060 | Cable | Cable &connectique | 4M-18GHz |
| 2205 | 02/068 | Spectrum analyzer | Agilent | E7405A |
| 2896 | 35/273 | Cable | - | N-13M |
| 3374 | 24/604 | Horn antenna | Emco | 3115 |

Test procedure:

The measurement was performed with the substitution method. The measurement antenna was connected to the spectrum analyser.
The level was maximised in antenna hight, azimuth and polarization.
The maximum level measured on the analyser was recorded. Then the product was replaced by a substitution chain to determine the equivalent isotropically radiated power density.

Measured condition: Resolution bandwidth: 3 kHz.
Video bandwidth: 3 kHz.
SPAN: 1.5 MHz.
Sweep: 500 seconds.
Ambiant temperature C°: 22
Relative humidity (%): 34

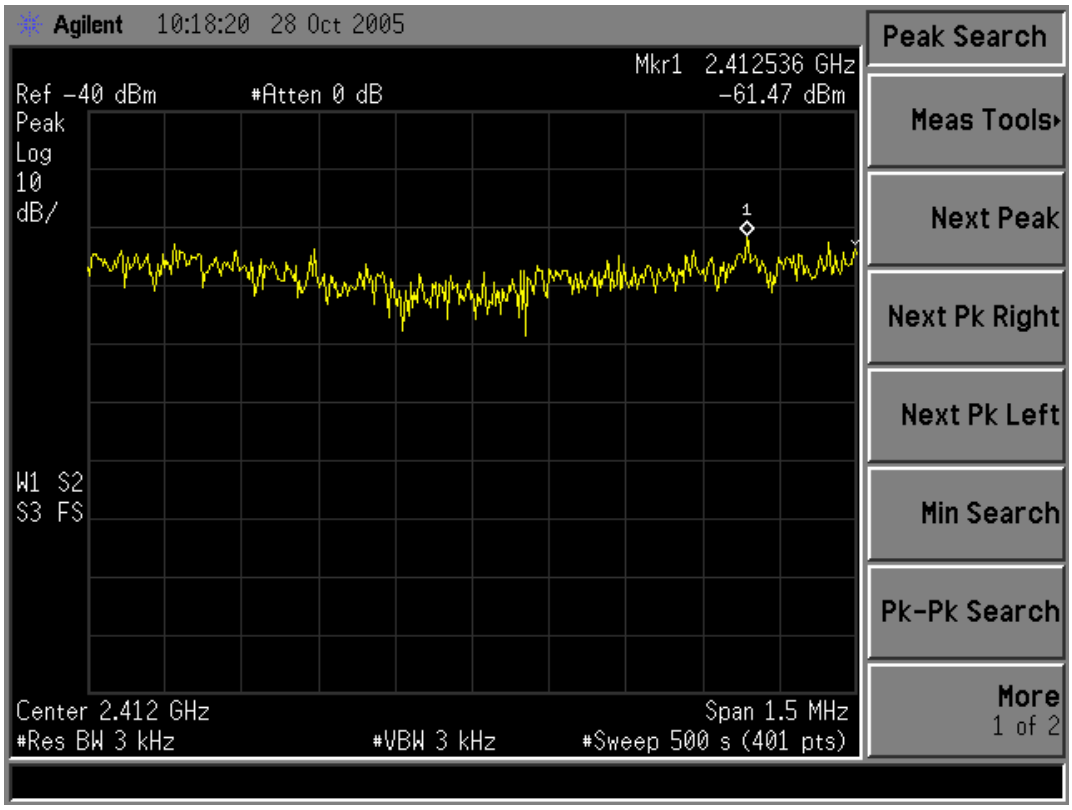
Result:

| Channel | Channel frequency (MHz) | RF power level (dBm) | Limit (dBm) | Curve reference |
|---|---|---|---|---|
| 1 | 2412 | - 11.7 | 8.0 | Curve 7 |
| 7 | 2442 | - 10.6 | 8.0 | Curve 8 |
| 11 | 2462 | - 5.4 | 8.0 | Curve 9 |

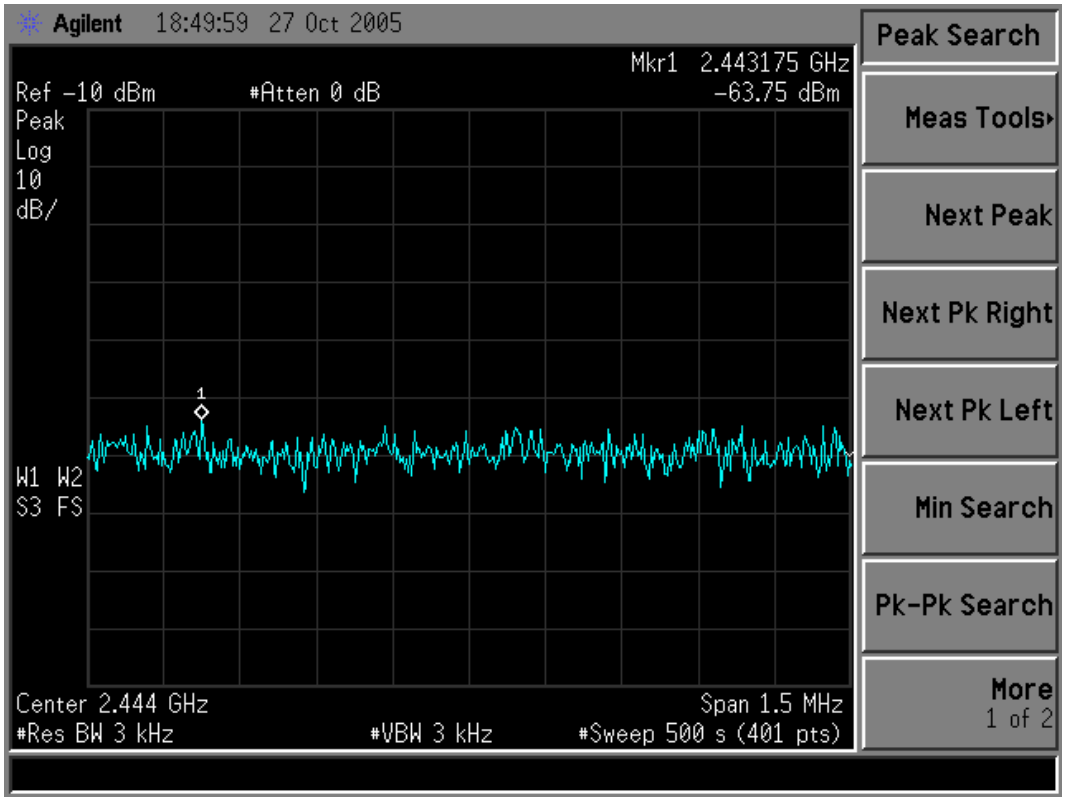
Test conclusion: Respect the standard.

Measurement uncertainties: 4.2 dB

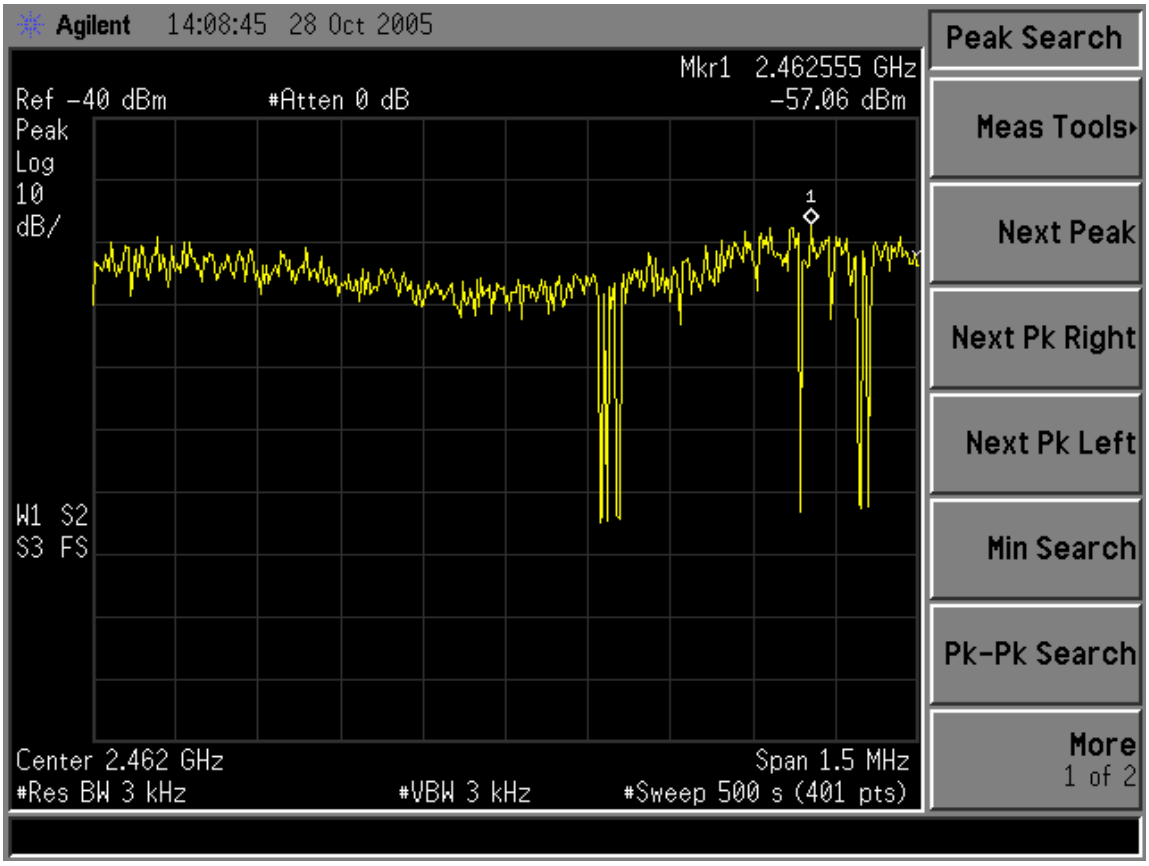
*Curve 7*




*Curve 8*



*Curve 9*


Agilent 14:08:45 28 Oct 2005
Mkr1 2.462555 GHz
Ref -40 dBm #Atten 0 dB -57.06 dBm
Peak
Log
10
dB/
1
W1 S2
S3 FS
Center 2.462 GHz
Span 1.5 MHz
#Res BW 3 kHz
#VBW 3 kHz
#Sweep 500 s (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

## 7. *6 dB BANDWIDTH MEASUREMENT*

Standard: FCC PART 15 Edition 2005

Section: 15.247 (a) (2)

Instrumentation test list:

| Meter | NoEmitech | Category | Mark | Type |
|---|---|---|---|---|
| 187 | 16/004 | OATS | Emitech | Site champ libre |
| 2205 | 02/068 | Spectrum analyzer | Agilent | E7405A |
| 3374 | 24/604 | Horn antenna | Emco | 3115 |

Test procedure:

The level was maximised in antenna hight, azimut and polarization.
Then the 6 dB bandwidth is measured with the analyser.

Measure condition:

Resolution bandwidth: 100 kHz
Video bandwidth: 100 kHz

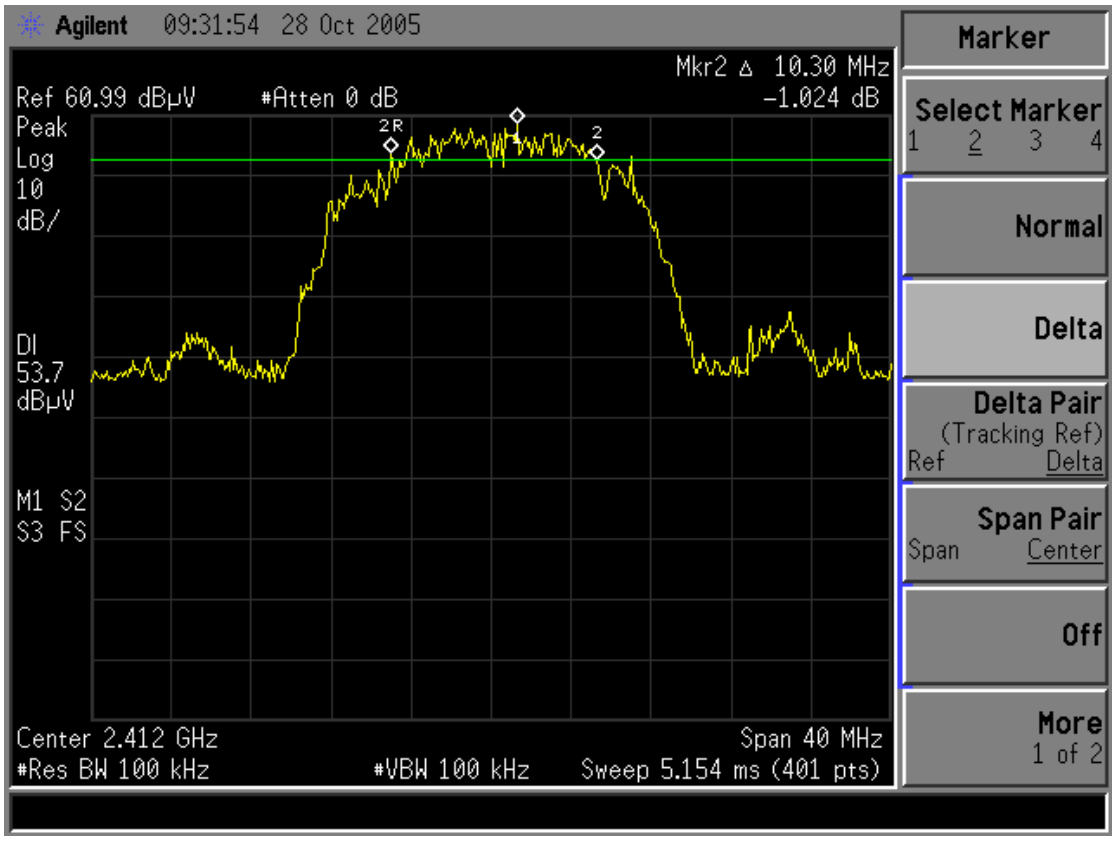
Ambient temperature (°C): 22
Relative humidity (%): 34

Results:

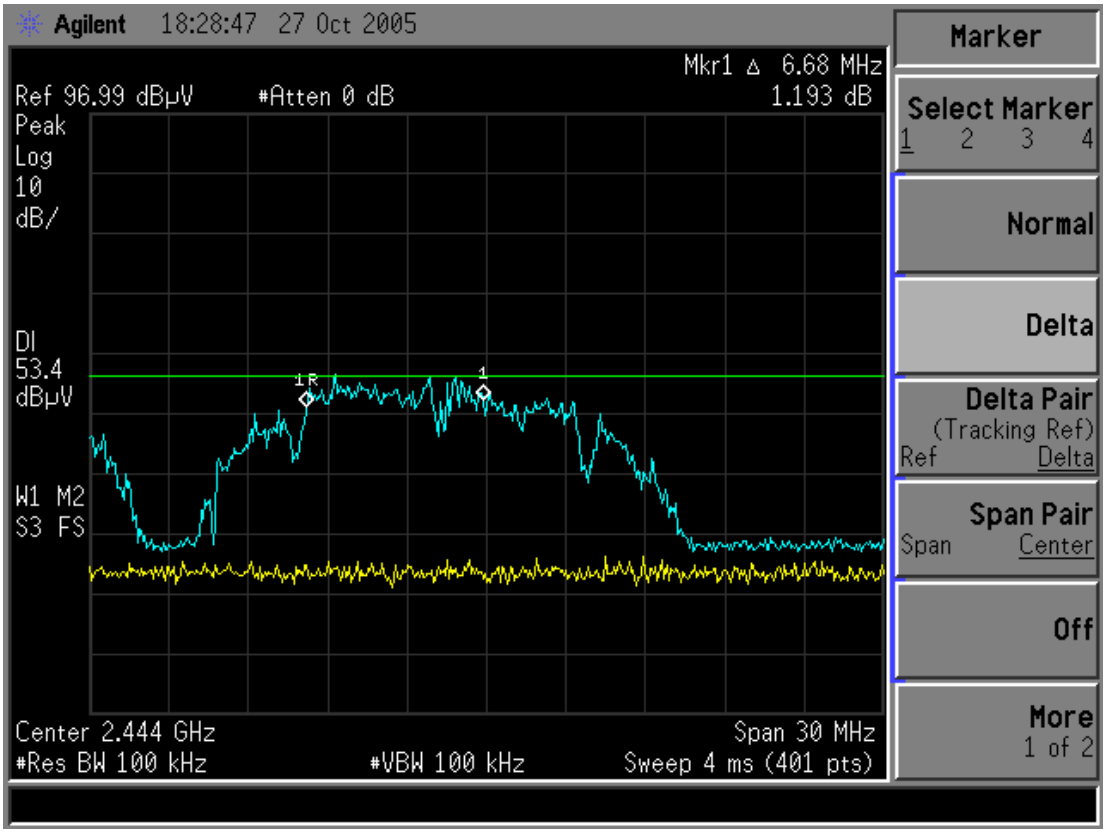
| Channel | Channel frequency (MHz) | Limit (kHz) | 6 dB bandwidth (MHz) | Curve reference |
|---|---|---|---|---|
| 1 | 2412 | > 500 | 10.30 | Curve 10 |
| 7 | 2442 | > 500 | 6.68 | Curve 11 |
| 11 | 2462 | > 500 | 9.30 | Curve 12 |

Test conclusion: Respect the standard.

*Curve 10*




*Curve 11*



*Curve 12*

Agilent 13:40:58 28 Oct 2005
Mkr2 Δ 9.30 MHz
0.354 dB
Ref 69.99 dBµV
#Atten 0 dB
Peak
Log
10
dB/
DI
59.6
dBµV
M1 S2
S3 FS
2R
2
Center 2.462 GHz
#Res BW 100 kHz
#VBW 100 kHz
Span 40 MHz
Sweep 5.154 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

## 8. *BAND EDGE MEASUREMENT*

Standard: FCC PART 15 Edition 2005

Section: 15.247 (d)

Instrumentation test list:

| Meter | NoEmitech | Category | Mark | Type |
|---|---|---|---|---|
| 187 | 16/004 | OATS | Emitech | Site champ libre |
| 2205 | 02/068 | Spectrum analyzer | Agilent | E7405A |
| 3374 | 24/604 | Horn antenna | Emco | 3115 |

Test procedure:

The level was maximised in antenna height, azimuth and polarization for channel 1 and channel 11. Then the level at 20 dB under the maximum level on the analyser was recorded.

Measure condition:

Resolution bandwidth: 100 kHz
Video bandwidth: 100 kHz

Ambient temperature (°C): 22
Relative humidity (%): 34

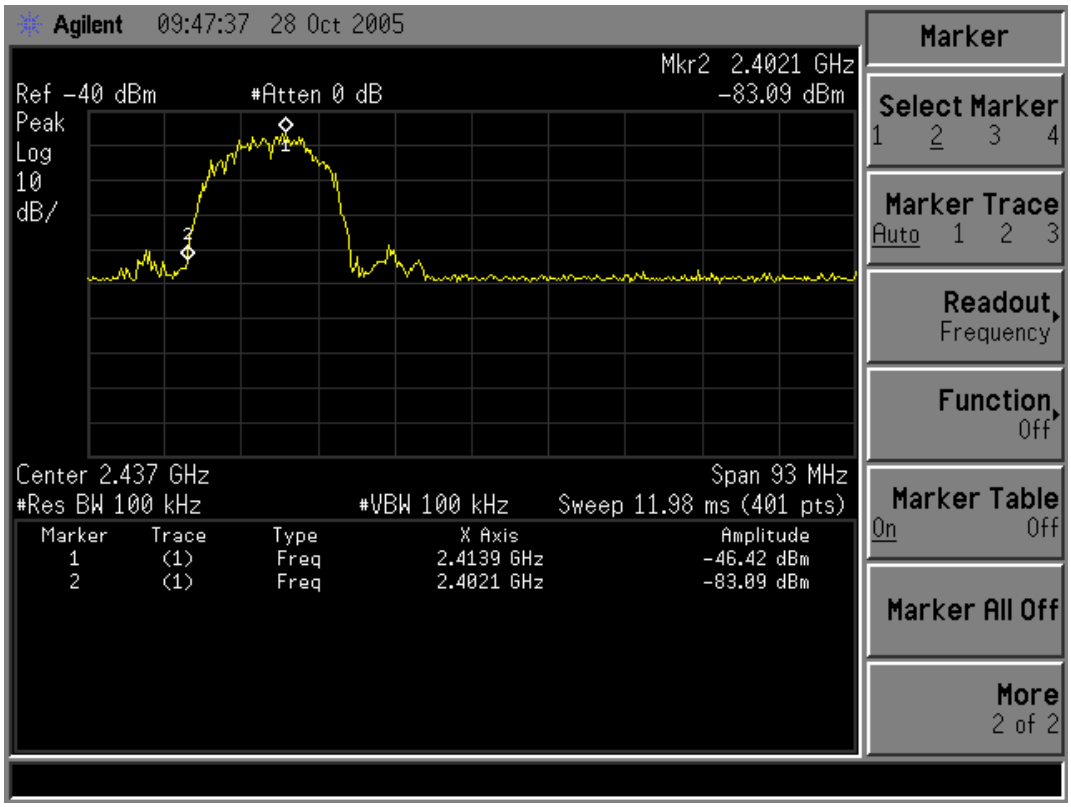
Results:

Lowest frequency limit: Curve 13
Highest frequency limit: Curve 14

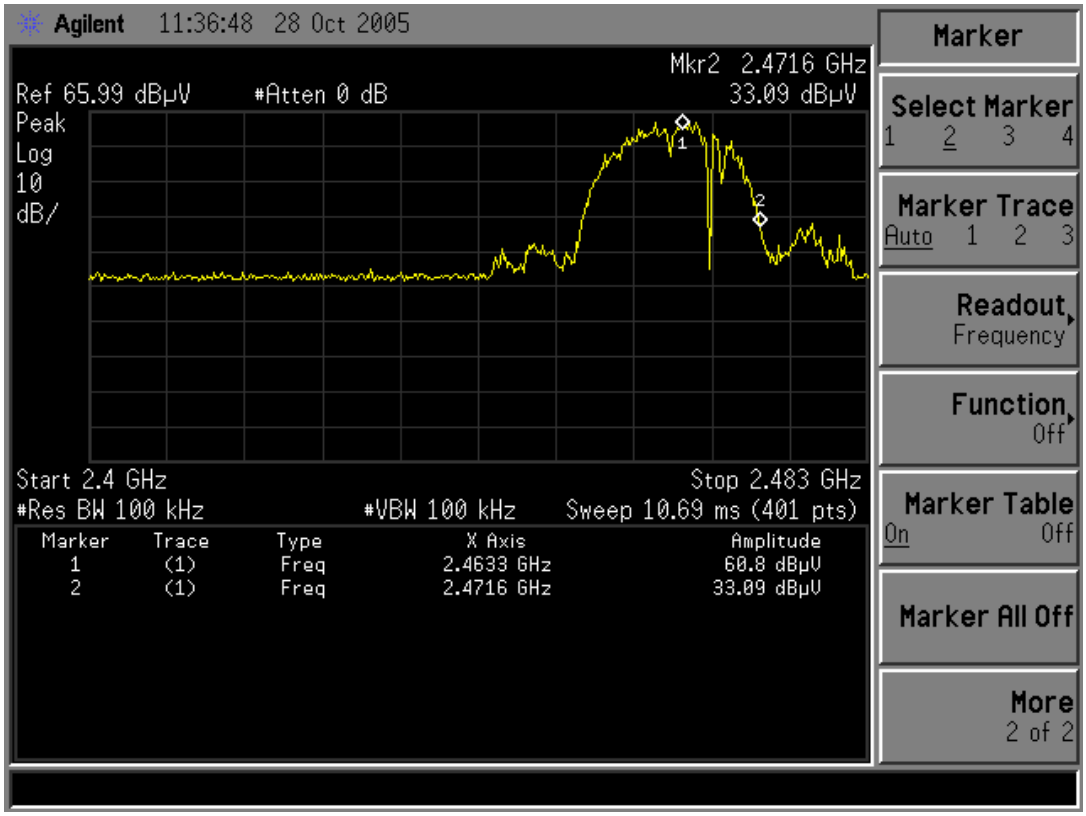
Test conclusion:

Respect the standard.

*Curve 13*




*Curve 14*



## 9. *UNINTENTIONAL RADIATED EMISSIONS IN THE BAND 30 MHZ – 25 GHZ*

Standard: FCC PART 15 Edition 2005

Section: 15.205 and 15.209

Equipment under test arrangement:

The equipment under test (EUT) is placed on a non-conductive test table at 0.8 m above the horizontal metal ground plane.

For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization. The frequency azimuth and antenna height are presented in the tables on the next pages.

Tests are performed with EUT on channel 7.

Frequency range: 30 MHz - 1 GHz
1 GHz - 25 GHz

Detection mode: Quasi-peak for 30 MHz - 1 GHz
Average for 1 GHz - 25 GHz

Resolution bandwidth: 120 kHz for 30 MHz - 1 GHz
1 MHz for 1 GHz - 25 GHz

Measurement distance: 3 meters.

Limit: For restrictives bands (see paragraph 15.205), the EUT must satisfy requirements of the section 15.209 as shown in table below.

| Frequency range (MHz) | Limit (dBµV/m) |
|---|---|
| 30 to 88 | 40.0 |
| 88 to 216 | 43.5 |
| 216 to 960 | 46.0 |
| 960 to 1000 | 54.0 |
| 1000 to 25000 | 54.0 |

Out of restrictives bands, the limit is 20 dB under the maximum level of the fundamental (see paragraph 5).

Limit for average detection: 78.4 dBµV/m.
Limit for peak detection: 82.1 dBµV/m

Instrumentation test list:

| Meter | NoEmitech | Category | Mark | Type |
|---|---|---|---|---|
| 187 | 16/004 | OATS | Emitech | Site champ libre |
| 1045 | 24/161 | Horn antenna | Oritel | CM 42/25 |
| 1057 | 02/045 | Receiver | Rohde & Schwarz | ESVP |
| 1097 | 18/082 | Filter | Trilithic | 6HC1300-2.5-KK |
| 1144 | 24/195 | Biconical antenna | Schwarzbeck | VHBA 9123 |
| 2102 | 14/066 | Power supply | Secas | CF1000 50/60 |
| 2205 | 02/068 | Spectrum analyzer | Agilent | E7405A |
| 2341 | 19/018 | Antenna mast | HD GmbH | MA 240 |
| 2342 | 19/019 | Mast controller | HD GmbH | HD 100 |
| 2450 | 35/070 | Cable | Cables & Connectiques | HF 12m |
| 2452 | 35/072 | Cable | Cables & Connectiques | HF 13m |
| 2643 | 18/233 | High pass filter | Filtek | HP12/3200-5AA |
| 2862 | 35/239 | Cable | Câbles & Connectiques | N-2m |
| 2896 | 35/273 | Cable | - | N-13M |
| 3106 | 24/571 | Log periodic antenna | Schwarzbeck | UHALP 9108 |
| 3229 | 01/127 | Preamplifier | Miteq | AMF-6D-010250-70-7P |
| 3374 | 24/604 | Horn antenna | Emco | 3115 |

Results:

| Table reference | Comments |
|---|---|
| Table 1 | Measurement in vertical polarization |
| Table 2 | Measurement in horizontal polarization |

Observation during the test:

The equipment complies with the requirements of the standard FCC PART 15.205 and 15.209 Edition 2005.

TEST SITE: Open area test site TABLE 1

RADIATED EMISSION: Electric field

STANDARD: FCC Part 15.209 and 15.205 Edition 2005

TEST DISTANCE: 3 m

POLARIZATION: Vertical

MODEL: NABAZTAG AT 2.4 GHz ref.: MAC: 00039D402BCD

| FREQUENCY (MHz) | ANTENNA HEIGHT (cm) | AZIMUTH (degrees) | MEASUREMENT (dBµV/m) | LIMIT (dBµV/m) | MARGIN (dB) |
|---|---|---|---|---|---|
| 30.398 | 105 | 30 | 32.1 | 82.1 | 50.0 |
| 42.447 | 100 | 310 | 37.2 | 82.1 | 44.9 |
| 44.109 | 105 | 330 | 36.5 | 82.1 | 45.6 |
| 118.589 | 100 | 230 | 26.5 | 43.5 | 17.0 |
| 167.561 | 105 | 290 | 19.0 | 82.1 | 63.1 |
| 228.212 | 105 | 310 | 26.0 | 82.1 | 56.1 |
| 339.149 | 105 | 30 | 22.0 | 82.1 | 60.1 |
| 439.993 | 160 | 140 | 35.0 | 82.1 | 47.1 |
| 451.187 | 300 | 0 | 22.3 | 82.1 | 59.8 |
| 483.992 | 250 | 0 | 36.7 | 82.1 | 45.4 |
| 563.322 | 105 | 150 | 25.1 | 82.1 | 57.0 |
| 2067.88 | 153 | 120 | 46.2 | 78.4 | 32.2 |
| 2156.83 | 221 | 0 | 40.4 | 78.4 | 38.0 |

No significant frequency has been found other than those given above between 30 MHz and 25 GHz.

TABLE 2

TEST SITE: Open area test site

RADIATED EMISSION: Electric field

STANDARD: FCC Part 15.209 and 15.205 Edition 2005

TEST DISTANCE: 3 m

POLARIZATION: Horizontal

MODEL: NABAZTAG AT 2.4 GHz ref.: MAC: 00039D402BCD

| FREQUENCY (MHz) | ANTENNA HEIGHT (cm) | AZIMUTH (degrees) | MEASUREMENT (dBµV/m) | LIMIT (dBµV/m) | MARGIN (dB) |
|---|---|---|---|---|---|
| 30.000 | 130 | 200 | 33.3 | 82.1 | 48.8 |
| 42.267 | 380 | 300 | 33.0 | 82.1 | 49.1 |
| 43.355 | 350 | 300 | 33.5 | 82.1 | 48.6 |
| 228.020 | 105 | 250 | 32.5 | 82.1 | 49.6 |
| 341.113 | 105 | 220 | 31.6 | 82.1 | 50.5 |
| 454.884 | 400 | 80 | 22.3 | 82.1 | 59.8 |

No significant frequency has been found other than those given above between 30 MHz and 25 GHz.

## *10. MEASUREMENT OF CONDUCTED EMISSION ON AC MAINS PORTS*

Standard: FCC Part 15 Edition 2005

Section: 15.207

Equipment under test arrangement:

Category of equipment: Table-top equipment

The equipment under test (EUT) is operating on a non conductive test table at 0.8 m above the horizontal metal ground plane and at 0.4 m above the vertical metal ground plane.

The EUT is supplied through LISN (Line Impedance Stabilization Network) bonded to the ground reference plane.

Test configuration photographs:

Frequency range: 150 kHz - 30 MHz.

Detection mode: Peak / Average

Resolution:

| Frequency range | Resolution bandwidth | Video bandwidth |
|---|---|---|
| 150 kHz - 30 MHz | 10 kHz | 30 kHz |

Limit: The EUT must satisfy requirements of the section 15.207 as shown in table below.

| Frequency range (MHz) | Limit (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0,15 to 0,5 | 66 - 56 | 56 - 46 |
| 0,5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Operating mode during the test: In communication Wifi.

Instrumentation test list:

| Meter | NoEmitech | Category | Mark | Type |
|---|---|---|---|---|
| 0 | 34/073 | Software | Nexio | V 3.1.7.1 |
| 19 | 02/016 | Spectrum analyzer | Hewlett Packard | 8568 B |
| 326 | 24/069 | LISN | Rohde et Schwarz | ESH2-Z5 |
| 825 | 02/037 | Receiver | Rohde & Schwarz | ESH3 |
| 1094 | 18/080 | Transient limiter | Hewlett Packard | 11947A |
| 1804 | 16/020 | Test enclosure | Emitech | JD |
| 2808 | 35/185 | Cable | - | N-4m |
| 2881 | 35/258 | Cable | - | N-2m |
| 3771 | 14/119 | Power supply | Kikusui | PCR4000L |

Results:

| Curve reference | Comments |
|---|---|
| Curve 15 | Measurement of peak detection on wire 1 |
| Curve 16 | Measurement of peak detection on wire 2 |
| Curve 17 | Measurement of average detection on wire 2 |

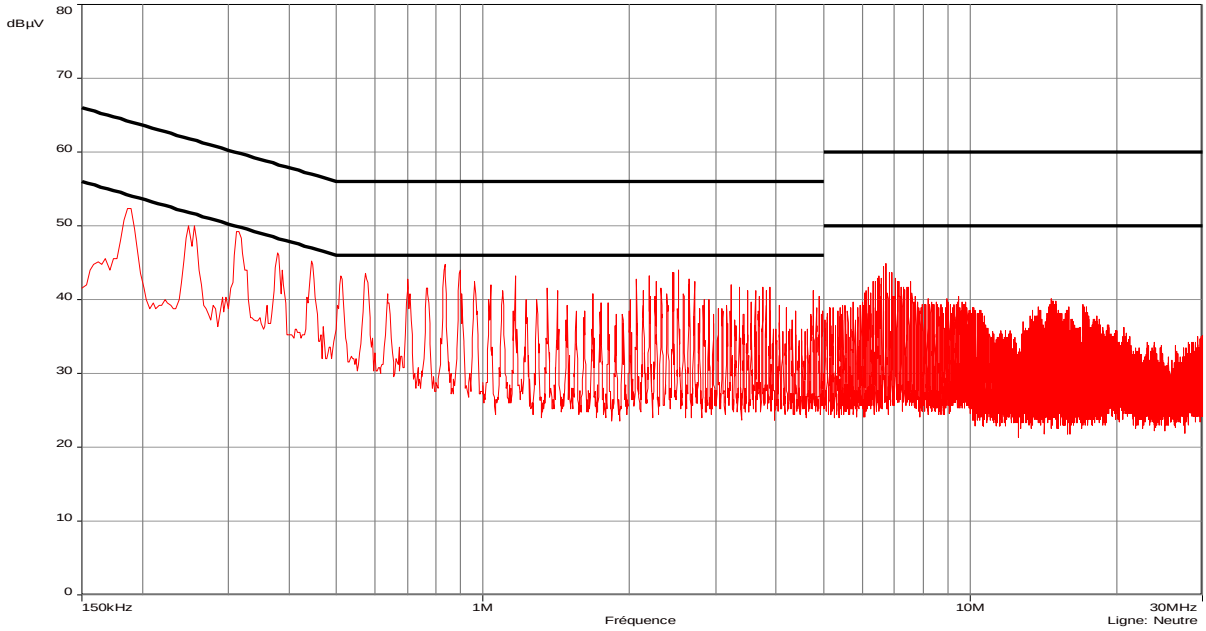
Observation during the test:

The equipment complies with the requirements of the standard FCC PART 15.207 Edition 2005.

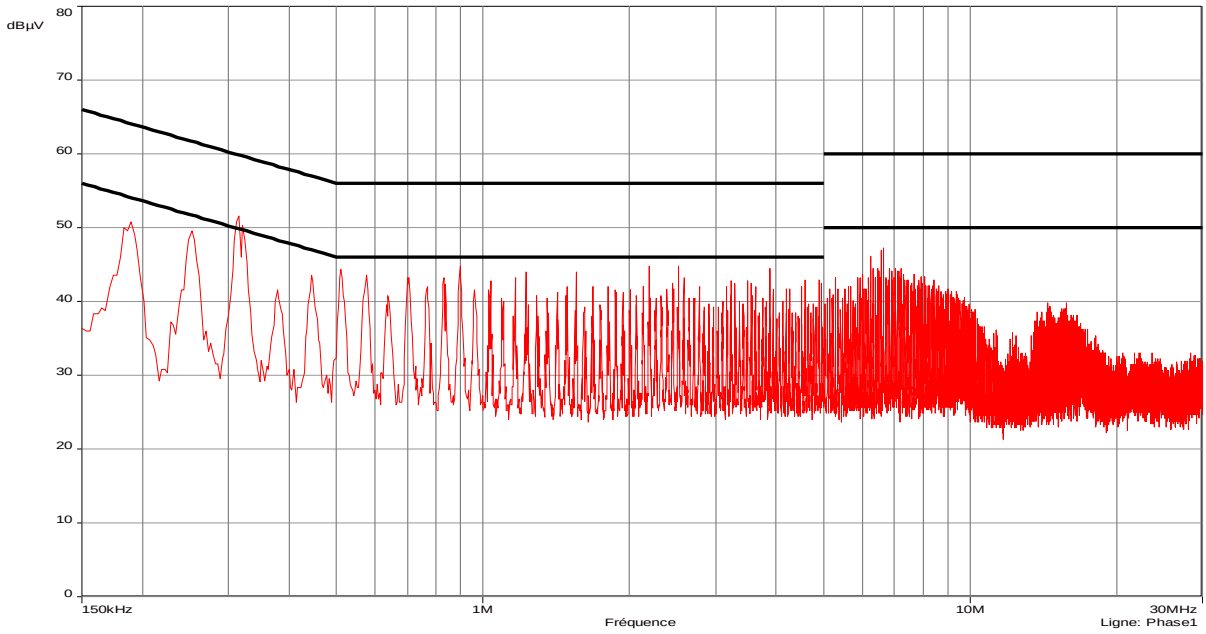
# NABAZTAG WIFI AT 2.4 GHz

Conducted emission on power supply
Peak detection
In communication WIFI
27/10/2005

*CURVE 15*



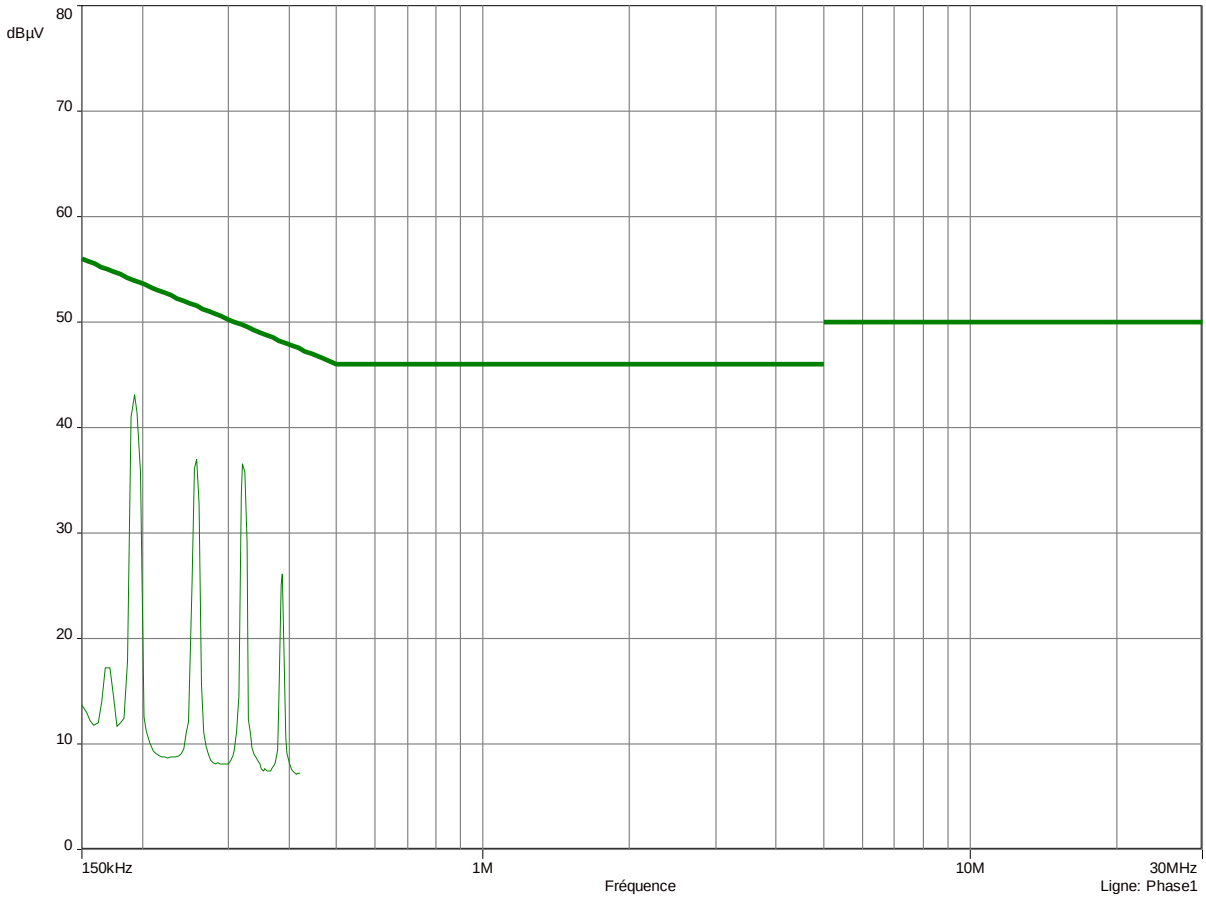

*CURVE 16*



# NABAZTAG WIFI AT 2.4 GHz

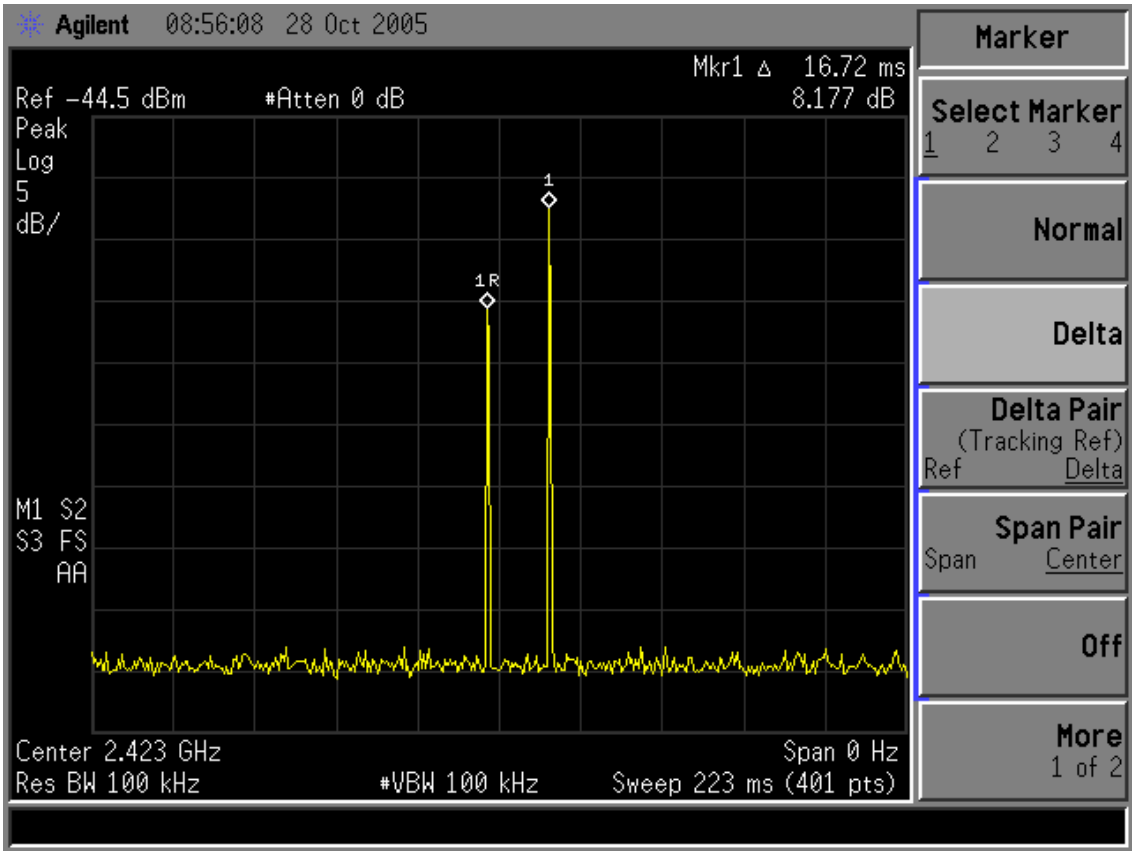
Conducted emission on power supply
Average value detection
In communication WIFI
27/10/2005

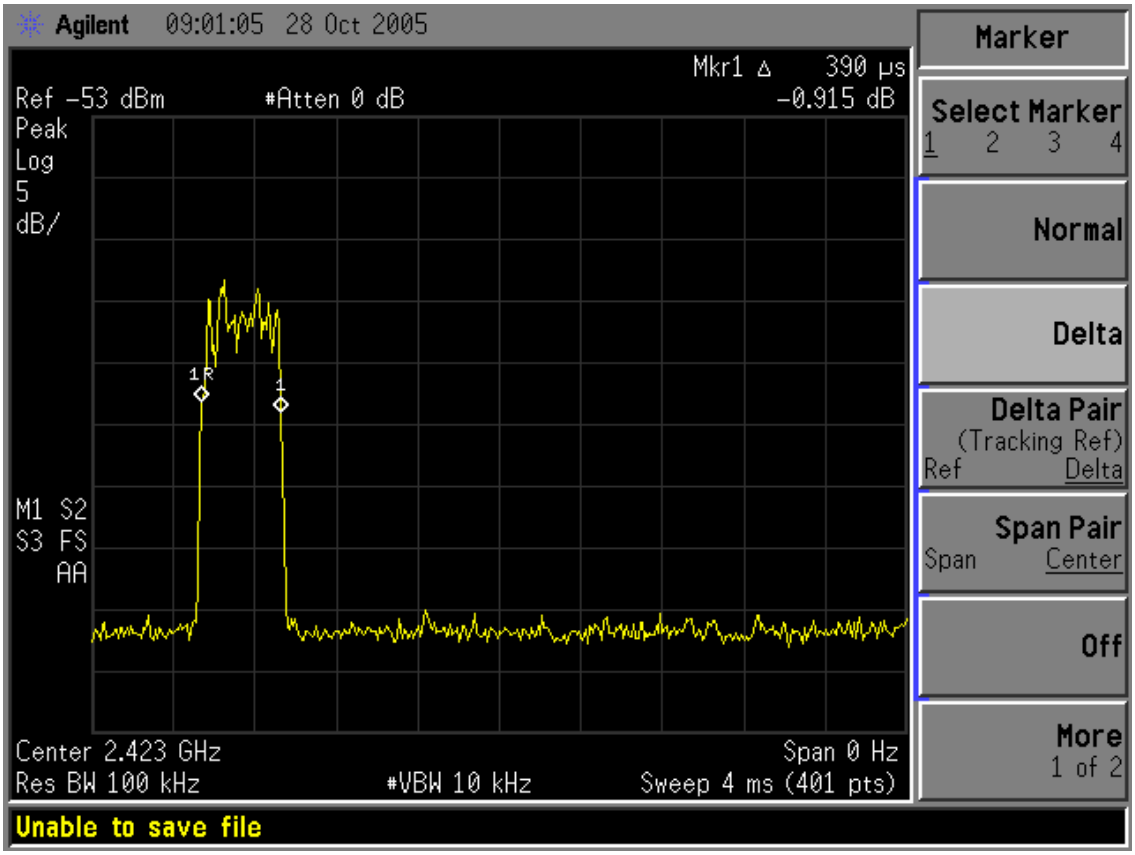
*CURVE 17*




□□□ *End of report, 3 appendixes to be forwarded* □□□

# ANNEX 1


Agilent 08:56:08 28 Oct 2005
Mkr1 Δ 16.72 ms
8.177 dB
Ref -44.5 dBm
#Atten 0 dB
Peak
Log
5
dB/
1
1R
M1 S2
S3 FS
AA
Center 2.423 GHz
Span 0 Hz
Res BW 100 kHz
#VBW 100 kHz
Sweep 223 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent 09:01:05 28 Oct 2005
Mkr1 Δ 390 µs
-0.915 dB
Ref -53 dBm
#Atten 0 dB
Peak
Log
5
dB/
1R
1
M1 S2
S3 FS
AA
Center 2.423 GHz
Span 0 Hz
Res BW 100 kHz
#VBW 10 kHz
Sweep 4 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
Unable to save file

# ANNEX 2

*Customer's questionnaire*

# - A - PARTIE ADMINISTRATIVE
## Administrative Part

**Formulaire à retourner par courriel au :**
*Please, return this form by e-mail to:*

**Nom contact EMITECH** :
*EMITECH contact's name :*

***(Il est important de remplir complètement les questionnaires dans chaque langue du rapport désiré, car ils sont nécessaires à l'établissement de notre proposition technique et financière ainsi qu'au bon déroulement de la prestation).***
***( It's very important to fill in properly the forms in every language of required report, because they are necessary for the quotation and for a good progress of tests).***

**A 1- Client (pour lequel l'essai ou la certification est demandé) :**
*Client (for whom the testing/certification is requested)*

**Société**/*Company* **:VIOLET SARL**
Contact/Contact name : **OLIVIER MEVEL**
Adresse/*Address* : **8 RUE DU DAHOMEY - 75011 PARIS - FRANCE**

Tél : **0155255250** Fax : **0155255251** Email :**OMEVEL@VIOLET.NET**

**A 2- Représentant ou Mandataire (pour le client ci-dessus si différent du client) :**
*Authorised Representative (if different than client)*

**Société**/*Company* **:**
Contact/Contact name :
Adresse/*Adress* :

Tél : Fax : Email :

**A 3- Fabricant (si différent du client) :**
*Manufacturer (if different than client)*

**Société**/*Company* **:ROOTLAND**
Contact/Contact name :
Adresse/*Adress* : **CHINE**

Tél : Fax : Email :

***Nota important*** *: Ce formulaire A (administratif) ainsi que le formulaire B (parties techniques) et les questionnaires spécifiques CEM & Radio seront intégrés dans le rapport d'essai*

***Important notice:****This form A (administrative)and the form B (technical part) and the specific EMC & Radio forms will be integrate in the test report.*

# -B - PARTIE TECHNIQUE

*Technical part (for all types of equipment)*

**Descriptif de la configuration à tester (joindre des photos et/ou des schémas)**
*Equipment's specification to test (join photos and/or schemes)*

**Désignation/fonction : OBJET COMMUNICANT**
Designation/*function:*

**Marque commerciale/*Trade mark* : NABAZTAG**
Référence/Modèle/Type :

**Produit/*product* :** ☒ **OUI** ☐ **NON** **Système/*system* :** ☐ **OUI** ☐ **NON**

**Nbre d'éléments (si système)/*Nb of element (if system)* :**

**Gamme de produits/*product's range :*** série/serial : ☒ **OUI** ☐ **NON**
présérie/pilot run : ☐ **OUI** ☐ **NON**
prototype/prototype : ☐ **OUI** ☐ **NON**

**Alimentation/*supply* :** mono : Vac tri : Vac avec ou sans neutre :
**with or without neutral:**

Batterie/*battery :* Vdc adaptateur secteur/adaptor :
autre/*other* :
préciser/*specify* :

Plage de tension/*voltage range* : **110-230V**
Fréquence ou plage de fréquence/*frequency range* : **50-60Hz**
Courant nominal/*nominal current* : **1** A
Puissance/*power* : W ou/or VA

Si le produit est embarqué/*has the equipment been fitted* :
Type de véhicule/*kind of vehicle* :

Connexion à un réseau de télécommunication/*connection to telecom network* :
RTC/*CRT* : ☐ **OUI** ☐ **NON**
RNIS/ISDN : ☐ **OUI** ☐ **NON**
ADSL : ☐ **OUI** ☐ **NON**
Ethernet : ☐ **OUI** ☐ **NON**
Fonction/liaison radio/*function/radio link* : ☒ **OUI** ☐ **NON**
Autres/*others* :

Poids/*weight* : **1 Kg** Taille/*size* : (L x l x h): **10x10x20**
Température max. d'utilisation/*max. temperature use* :
Présence de liquide (ou produit dangereux)/*liquid's presence (or dangerous product)* :
Connexions particulières (eau, gaz…)/*specific connection (water,gas…)* :

**Legende/*legend* :** ☐ **cocher la case appropriée/<u>put a cross if appropriate</u>**
**OUI for YES**
**NON for NO**

# -B- PARTIE TECHNIQUE (suite)

*Technical part (continued)*

Préciser le type de câbles d'entrées/sorties/*state the input/output cable's type*

| | Blindé/*shielded* ? O (yes) /N (no) | Si/*if* L > 3 m préciser la longueur/ *state the length* |
|---|---|---|
| Câble/*cable* Cable entre l'alimentation externe et le produit | N | |
| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |
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| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |
| Câble/*cable* | | |

# ANNEX 3

*Antenna factors, insertion losses and amplifier values*

## BILL OF MATERIAL

The test antenna used for the radiated emission between 30 MHz and 300 MHz is the biconical antenna n° 1144. Antenna factors are given in table 1.

The test antenna used for the radiated emission between 300 MHz and 1 GHz is the log-periodic antenna n° 3106. Antenna factors are given in table 2.

The measuring receiver n° 1057 used in the frequency range 30 MHz to 1 GHz has an integrated preamplifier.

The test cable used between 9 kHz and 1 GHz to connect the antennas to the receiver/analyzer for measurements at a distance of 3 meters.

The test antennas used for the radiated emission between 1 GHz and 24 GHz art the horn antenna n° 3374 and 1045. Antenna factors are given in table 3.

The amplifier n° 3229 and its cable used to connect the spectrum analyzer to the test cable has gain values given in the table 4.

The test cable used between 1 GHz and 24 GHz to connect the horn antenna to the amplifier for measurements at a distance of 3 meters has losses given in table 5.

| Frequency (MHz) | Antenna factor (dB/m) | Frequency (MHz) | Antenna factor (dB/m) |
|---|---|---|---|
| 30 | 12.6 | 120 | 12.3 |
| 35 | 10.7 | 125 | 12.3 |
| 40 | 10.5 | 140 | 13.1 |
| 45 | 9.1 | 150 | 13.8 |
| 50 | 9.0 | 160 | 14.5 |
| 60 | 9.8 | 175 | 15.9 |
| 70 | 10.1 | 180 | 16.4 |
| 80 | 10.7 | 200 | 17.6 |
| 90 | 10.6 | 250 | 21.3 |
| 100 | 11.6 | 300 | 24.6 |

TABLE 1: BICONICAL ANTENNA WITH LOSS CABLE

| Frequency (MHz) | Antenna factor (dB/m) | Frequency (MHz) | Antenna factor (dB/m) |
|---|---|---|---|
| 300 | 18.6 | 700 | 25.0 |
| 400 | 19.7 | 800 | 26.1 |
| 500 | 21.6 | 900 | 27.5 |
| 600 | 23.7 | 1000 | 29.2 |

TABLE 2: LOG-PERIODIC ANTENNA WITH LOSS CABLE

| Frequency (GHz) | Antenna factor (dB/m) | Frequency (GHz) | Antenna factor (dB/m) | Frequency (GHz) | Antenna factor (dB/m) |
|---|---|---|---|---|---|
| 1.0 | 24.2 | 7.0 | 35.4 | 14 | 40.8 |
| 1.5 | 25.4 | 7.5 | 36.6 | 15 | 4.08 |
| 2.0 | 27.3 | 8.0 | 36.8 | 16 | 38.4 |
| 2.5 | 28.6 | 8.5 | 37.5 | 17 | 39.7 |
| 3.0 | 30.1 | 9.0 | 37.8 | 18 | 45.2 |
| 3.5 | 31.3 | 9.5 | 37.9 | 18 | 31.2 |
| 4.0 | 32.7 | 10.0 | 38.0 | 19 | 31.8 |
| 4.5 | 32.8 | 10.5 | 38.1 | 20 | 31.7 |
| 5.0 | 33.4 | 11.0 | 38.3 | 21 | 31.2 |
| 5.5 | 34.2 | 11.5 | 38.6 | 22 | 31.4 |
| 6.0 | 34.4 | 12.0 | 39.0 | 23 | 31.0 |
| 6.5 | 34.4 | 13.0 | 39.5 | 24 | 31.1 |

TABLE 3 : HORN ANTENNA 3374 (1 to 18 GHz) and 1045 (18 to 25 GHz)

| Frequency (GHz) | Antenna factor (dB/m) | Frequency (GHz) | Antenna factor (dB/m) | Frequency (GHz) | Antenna factor (dB/m) |
|---|---|---|---|---|---|
| 1.0 | 30.4 | 7.0 | 31.8 | 14 | 32.6 |
| 1.5 | 30.9 | 7.5 | 31.8 | 15 | 30.5 |
| 2.0 | 30.6 | 8.0 | 31.2 | 16 | 27.4 |
| 2.5 | 30.1 | 8.5 | 30.2 | 17 | 27.9 |
| 3.0 | 29.3 | 9.0 | 29.3 | 18 | 28.3 |
| 3.5 | 29.0 | 9.5 | 29.0 | 20 | 27.6 |
| 4.0 | 28.7 | 10.0 | 29.1 | 22 | 28.4 |
| 4.5 | 28.5 | 10.5 | 29.4 | 24 | 29.2 |
| 5.0 | 29.0 | 11.0 | 29.7 | 26 | 30.7 |
| 5.5 | 29.5 | 11.5 | 30.1 | | |
| 6.0 | 30.5 | 12.0 | 31.2 | | |
| 6.5 | 31.4 | 13.0 | 32.9 | | |

TABLE 4: AMPLIFIER (1 – 26 GHz)

| Frequency (GHz) | Loss (dB) | Frequency (GHz) | Loss (dB) | Frequency (GHz) | Loss (dB) |
|---|---|---|---|---|---|
| 1.0 | 2.5 | 4.5 | 5.2 | 18 | 11.3 |
| 1.5 | 3.0 | 5 | 5.6 | 21 | 13.0 |
| 20. | 3.5 | 6 | 6.2 | 24 | 14.1 |
| 2.5 | 3.9 | 8 | 7.3 | | |
| 3.0 | 4.2 | 10 | 8.1 | | |
| 3.5 | 4.5 | 12 | 8.9 | | |
| 4.0 | 5.0 | 15 | 10.0 | | |

TABLE 5: TEST CABLE FOR 3 M MEASUREMENT

# ANNEX 4

*Test setup photographs*