



LCIE

TEST REPORT

N°: 679499CR2016-01-28

JDE : 137591

Subject

Electromagnetic compatibility (EMC) :
Publication CFR 47 PART 15.225; RSS-210 issue 8 & RSS-GEN issue 4 (Limited program)

FCC Registration number

166175

Industry Canada number

6230B

Issued to

INGENICO
28-32 Boulevard de Grenelle
75015 Paris
FRANCE

Apparatus under test

↳ **Product**

Payment terminal

↳ **Trade mark**

Ingenico

↳ **Manufacturer**

Ingenico

↳ **Model under test**

ISC480 INT

↳ **Serial number**

14197SC80301170

↳ **FCC ID**

XKB-ISC480CLINT

↳ **IC**

2586D-ISC480CLINT

Test date

November 15th, 2015 to November 26th, 2015

Test location

Fontenay Aux Roses

Test performed by

Armand Mahoungou & Laurent Deneux

Composition of document

18 pages

Initial issued on

January 12th, 2016

Modified on

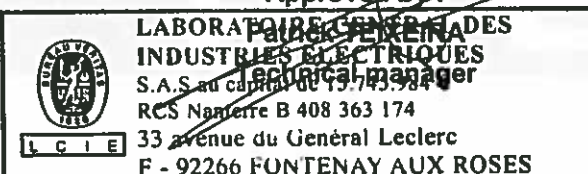
January 28th, 2016

Written by :

Armand MAHOUNGOU

Tests operator

Approved by :



This document shall not be reproduced, except in full, without the written approval of the LCIE. This document contains results related only to the item tested. It does not imply the conformity of the whole production to the items tested. Unless otherwise specified, the decision of conformity takes into account the uncertainty of measures.



SUMMARY

| | | |
|----|--|----|
| 1. | TEST PROGRAM | 3 |
| 2. | EQUIPMENT DESCRIPTION (DECLARED BY PROVIDER) | 4 |
| 3. | MEASUREMENT OF RADIATED EMISSIONS..... | 7 |
| 4. | MEASUREMENT OF CONDUCTED DISTURBANCE | 12 |
| 5. | UNCERTAINTIES CHART | 18 |



1. Test Program

References

- 47 CFR Part 15C
- RSS-210 issue 8
- RSS-Gen issue 4
- CISPR 16-4-2
- ANSI C63.10 (2013)

Emission tests:

| Test Description | Test Description | Test result - Comments |
|--|---|--|
| RSS-Gen § 6.6 | Occupied Bandwidth | <input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input checked="" type="checkbox"/> NP (Limited Program) |
| CFR 47 § 15.225 (e) RSS-210 § A2.6 | Frequency tolerance | <input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input checked="" type="checkbox"/> NP (Limited Program) |
| CFR 47 § 15.207 RSS-Gen § 8.8 | AC Power Line Conducted Emissions | <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program) |
| CFR 47 § 15.225 (a) (b) (c) RSS-210 § A2.6 (a) (b) (c) | Field strength within the band 13.110-14.010 MHz | <input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input checked="" type="checkbox"/> NP (Limited Program) |
| CFR 47 § 15.209 (a) CFR 47 § 15.225 (d) RSS-210 § A2.6 (d) | Field strength outside of the bands 13.110-14.010 MHz | <input checked="" type="checkbox"/> PASS (30MHz-1GHz only) <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program) |
| RSS-Gen § 7.1 | Receiver Radiated emissions | <input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA (Transceiver equipment. Include in Field strength test) <input type="checkbox"/> NP (Limited Program) |

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

2. Equipment Description (declared by provider)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT): ISC480 INT

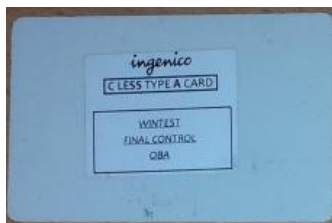
Serial Number: 14797SC80301170



EUT: ISC480 INT



EUT Power supply: PSM24W-080L6IN-R



RFID Card

Equipment Under Test



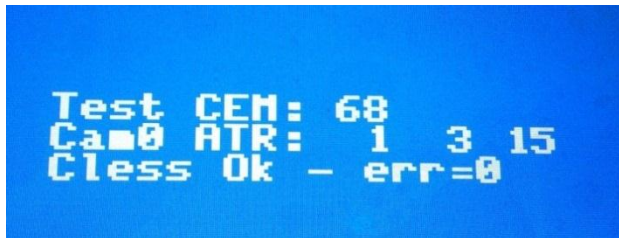
Inputs/outputs - Cable:

| Access | Type | Length used (m) | Declared <3m | Shielded | Under test | Comments |
|-----------------|------|-----------------|-------------------------------------|--------------------------|--------------------------|-------------------|
| Power supply AC | - | - | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Nothing to report |

Auxiliary equipment used during test:

| Type | Reference | Sn | Comments |
|------|-----------|----|----------|
| - | - | - | - |

Equipment information: (Declared by provider)

| | | | | |
|-----------------------|---|--|---|--|
| Apparatus Description | The ISC480 contactless interne is a payment terminal. | | | |
| Type of power source: | <input checked="" type="checkbox"/> AC power supply | <input type="checkbox"/> DC power supply | <input type="checkbox"/> Battery (Select Type) | |
| Test source voltage: | Vmin-Vmax: | <input checked="" type="checkbox"/> 120V -60Hz | <input type="checkbox"/> Vdc | |
| Operating Modes | Mode 1 | Loop increment:  | | |
| | | Operation frequency : 13.56MHz | | |



2.2. EQUIPMENT LABELLING

ISC480 - 11P2808A
2214198SC010586

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

MODEL / MODELE: ISC480 INT
FCC ID: XKB-ISC480CLINT
IC: 2586D-ISC480CLINT

CE FCC

Conform to
ANSI/UL 60950-1, Ed:2
Cert. to
CAN/CSA C22.2
No 60950-1-07, Ed:2

Intertek
4001517

POWER / ALIMENTATION: 8V 3A
For applicable power supplies see user manual
Pour les alimentations utilisables voir le manuel d'utilisation

Serial N°: 14197SC80301170
ISC480 - 11T2808A
MAC Adr: 547F54A9CEBD
Made In: MALAYSIA 01

ingenico CE

C98

ingenico®
AC ADAPTER
電源供應器 / 电源适配器
P/N: 296198809
MODEL No. 型號 (型号): PSM24W-080L6
INPUT 輸入 (输入): 100-240V ~ 50-60Hz
50-62VA 0.6A
OUTPUT 輸出 (输出): 8.0V = 3.0A

3081 8127643
UL LISTED
US LITE. POWER SUPPLY

CE E

RAM S

CCC

LPS

JET LYUDIA INC.

Self Declaration-Conforming to
IS 13252 (Part 1): 2010, R-XXXXXXX

CAUTION:
For use with Information Technology Equipment.
Risk of electric shock.
Indoor use only.

ATTENTION:
Pour une utilisation avec des équipements informatiques.
Risque de choc électrique.
Utilisation d'intérieur seulement.

注意:
使用於資訊技術設備
觸電危險
使用於乾燥處
僅限室內使用

注意:
使用於信息技术设备
触电危险
使用于干燥处
仅限室内使用 IN-R

MADE IN CHINA 中國製造/中国制造

2.3. EQUIPMENT MODIFICATIONS

☒ None ☐ Modification:



3. Measurement of radiated emissions

3.1. ENVIRONMENTAL CONDITIONS

Test performed by : Armand Mahoungou
Date of test : 2015/11/19
Ambient temperature : 21°C
Relative humidity : 46%

3.2. TEST SETUP

Specifications:

Frequency 30 – 1000 MHz RBW 120 kHz

Detector Peak and Quasi-Peak

Pre characterization in semi anechoic room is performed to define the critical frequencies

Operating conditions:

- The Equipment under Test is installed:

☒ Measure in semi anechoic room

☐ Measure in open area site

- Measuring distance:

☒ 3m

☐ 10m

- Deviation method:

☐ Yes

☒ No

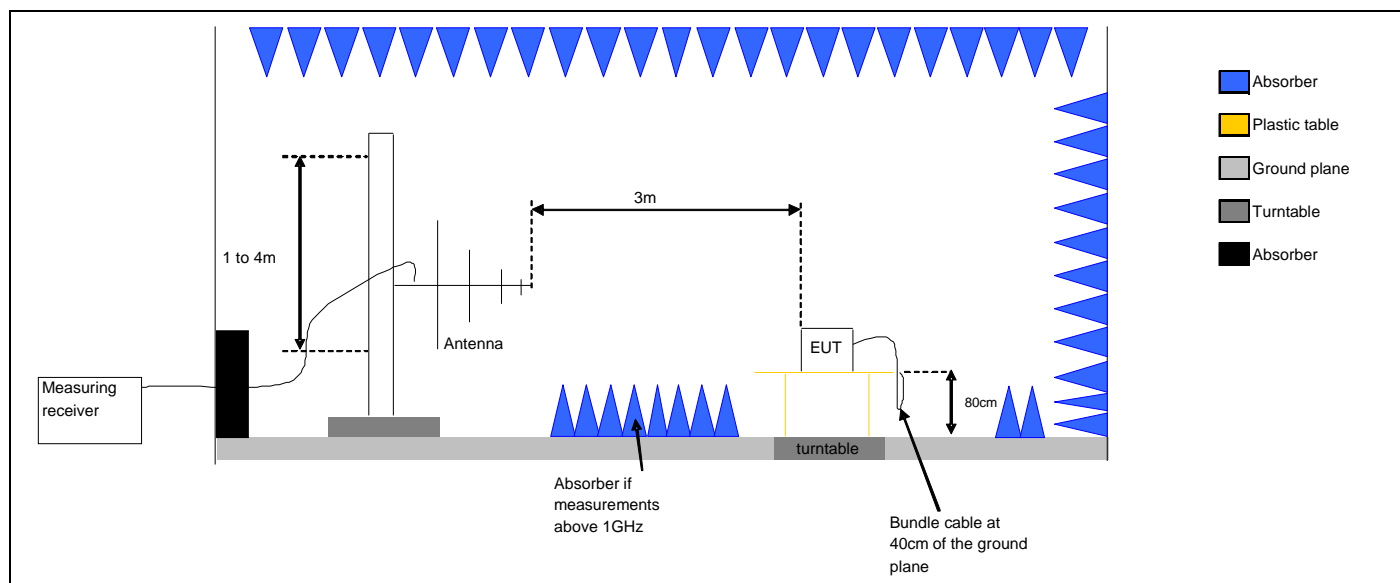
-Product installation:

☒ The EUT was tested as a tabletop equipment and was placed on a non-conducting platform the top of which is 0.8m above the metal ground plane.

☐ The EUT is at 10cm height from reference plane

Operating mode:

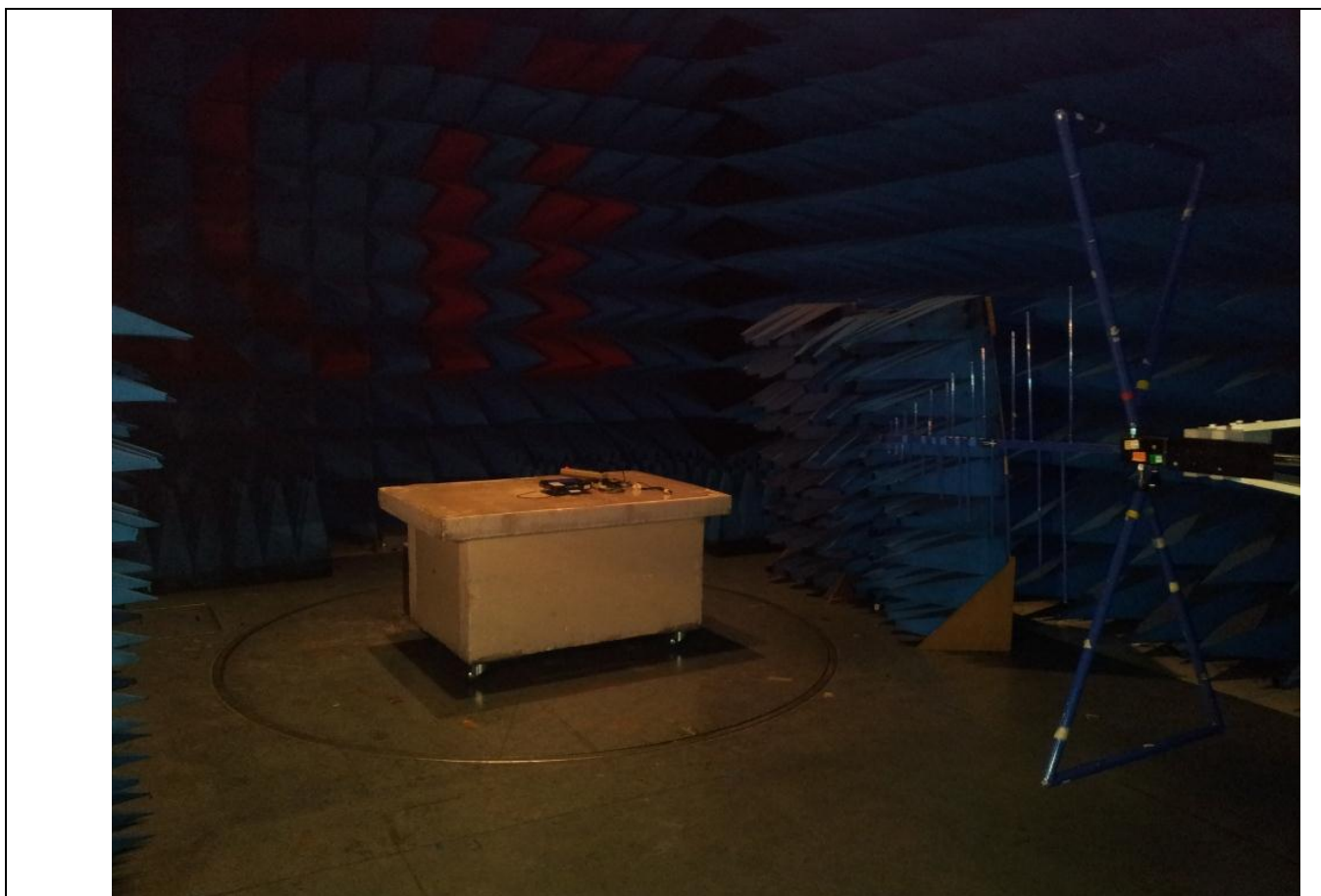
☒ Mode 1



Test Set up for radiated measurement in semi anechoic chamber



Measurement of radiated disturbances.



Measurement of radiated disturbances.

3.3. LIMIT

30MHz to 88MHz: 100 μ V/m (3m) or 40dB μ V/m (3m) QPeak
 88MHz to 216MHz: 150 μ V/m (3m) or 43,5dB μ V/m (3m) QPeak
 216MHz to 960MHz: 200 μ V/m (3m) or 46dB μ V/m (3m) QPeak
 960MHz to 1000MHz: 500 μ V/m (3m) or 54dB μ V/m (3m) QPeak

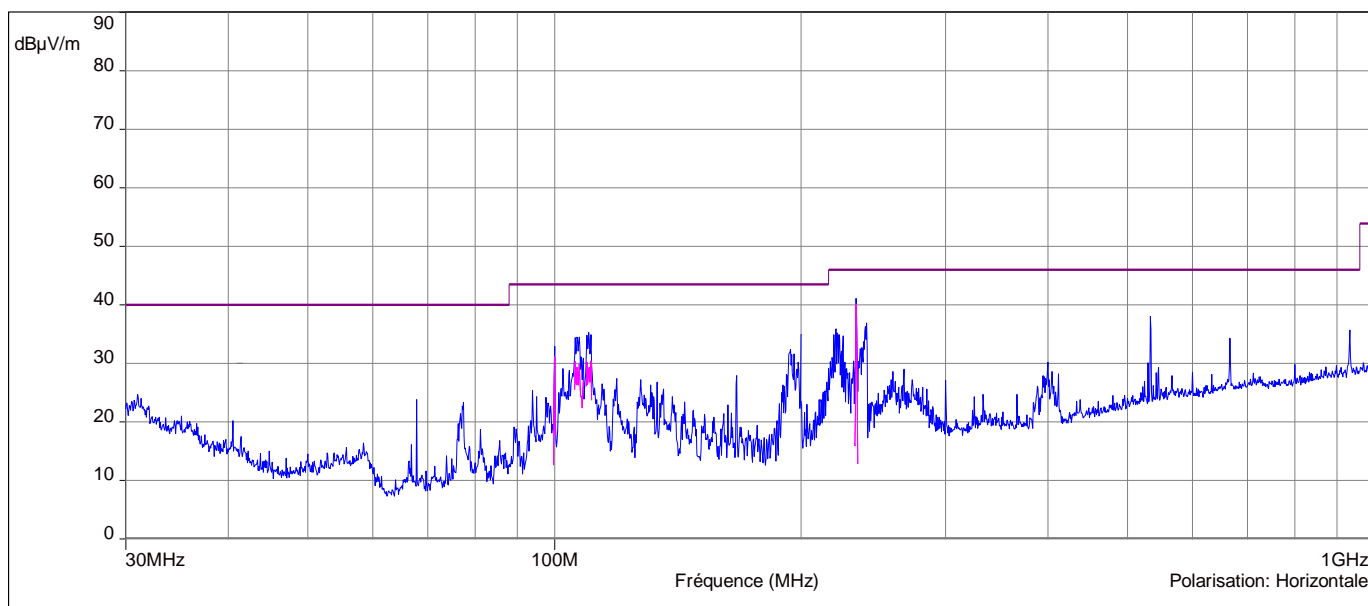
3.4. TEST EQUIPMENT LIST

| DESCRIPTION | MANUFACTURER | MODEL | N° LCIE | Cal. Date | Cal. Due |
|-----------------------|-----------------------|----------------------------------|----------|-----------|----------|
| EMI receiver | ROHDE & SCHWARZ | ESIB26 | A2642021 | 2015/01 | 2016/01 |
| Cable | CABLES & CONNECTIQUES | 3.5MD/CSU528AA-TDINOX/3.5MD/7000 | A5329457 | 2015/02 | 2016/02 |
| Cable | CABLES & CONNECTIQUES | 3.5MD/CSU528AA/3.5MD/4000 | A5329374 | 2015/06 | 2016/06 |
| Bilog antenna | CHASE | CBL6111C | C2040124 | 2014/11 | 2015/11 |
| Semi anechoic chamber | SIEPEL | - | D3044008 | 2014/11 | 2015/11 |
| Loop antenna | SCHWARZBECK | FMZB 1513 | A2040209 | 2014/11 | 2015/11 |

3.5. RESULTS

Diagram N°1
Horizontal Polarization (30MHz-1GHz)

- FCC/FCC 15.109 - Classe: - Moyenne/3.0m/
- FCC/FCC 15.109 - Classe: - QCrête/3.0m/
- FCC/FCC 15.109 - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.QPeak (Horizontale)
- Mes.Avg (Horizontale)

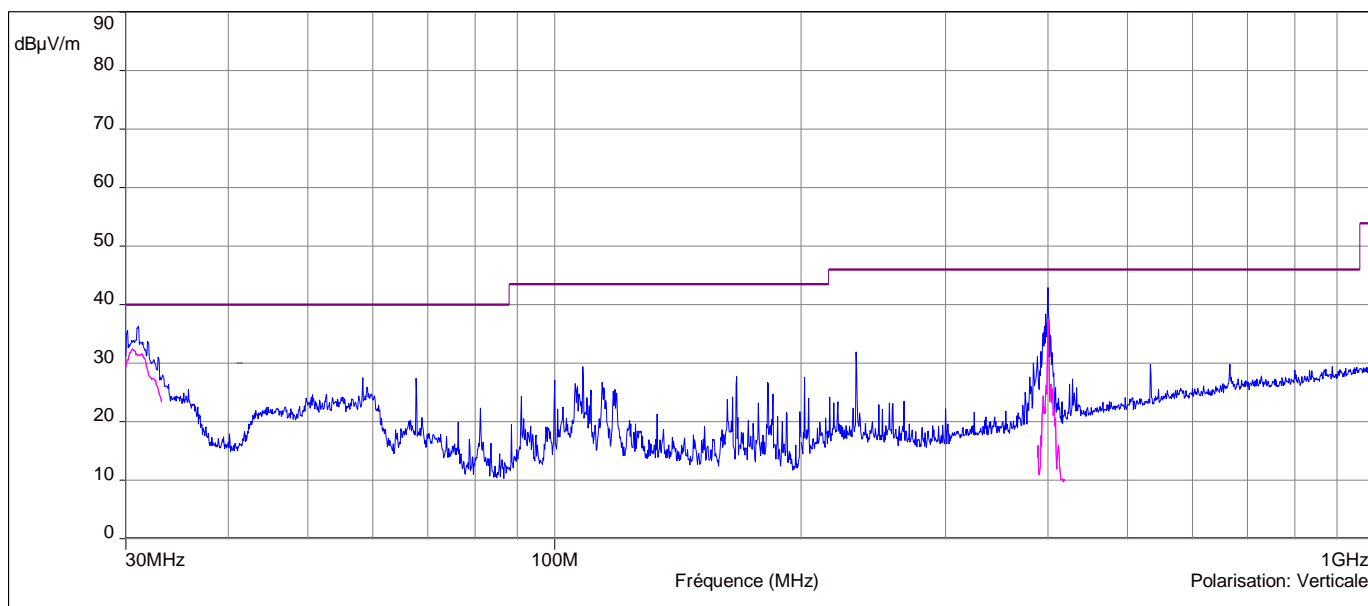


| Frequency (MHz) | Peak measurements (dBμV/m) | Quasi-Peak measurements (dBμV/m) | Quasi-Peak limits (dBμV/m) |
|--------------------|----------------------------------|--|----------------------------------|
| 100 | 32.883 | 31.138 | 43.5 |
| 110.1 | 35.258 | 30.370 | 43.5 |
| 233.36 | 41.15 | 40.144 | 46 |
| 533.42 | 37.981 | - | 46 |



Diagram N°2
Vertical Polarization (30MHz-1GHz)

- FCC/FCC 15.109 - Classe: - Moyenne/3.0m/
- FCC/FCC 15.109 - Classe: - QCrête/3.0m/
- FCC/FCC 15.109 - Classe: - Crête/3.0m/
- Mes.Peak (Verticale)
- Mes.QPeak (Verticale)
- Mes.Avg (Verticale)



| Frequency (MHz) | Peak measurements (dBμV/m) | Quasi-Peak measurements (dBμV/m) | Quasi-Peak limits (dBμV/m) |
|--------------------|----------------------------------|--|----------------------------------|
| 31.05 | 36.272 | 32.381 | 40 |
| 108.3 | 29.364 | - | 43.5 |
| 233.36 | 31.903 | - | 46.0 |
| 400.4 | 42.882 | 37.498 | 46.0 |

3.6. CONCLUSION

Measures of Radiated Emission, performed on the sample of the product **ISC480 INT**, SN: **14197SC80301170**, in configuration and description presented in this test report, show levels **conform to** the FCC part 15 & RSS-GEN §7.2.4 limits.



4. Measurement of conducted disturbance

4.1. ENVIRONMENTAL CONDITIONS

Test performed by : Laurent Deneux
Date of test : 2015/11/26
Ambient temperature : 21°C
Relative humidity : 46%

4.2. TEST SETUP

Specifications:

Frequency 0.15 – 30 MHz RBW 9 kHz
Detector Peak , Quasi Peak and average

The measurement is performed on power supply with a LISN and telecommunication lines with RSI or current clamp for shielded cables.

Operating conditions:

- Deviation method:

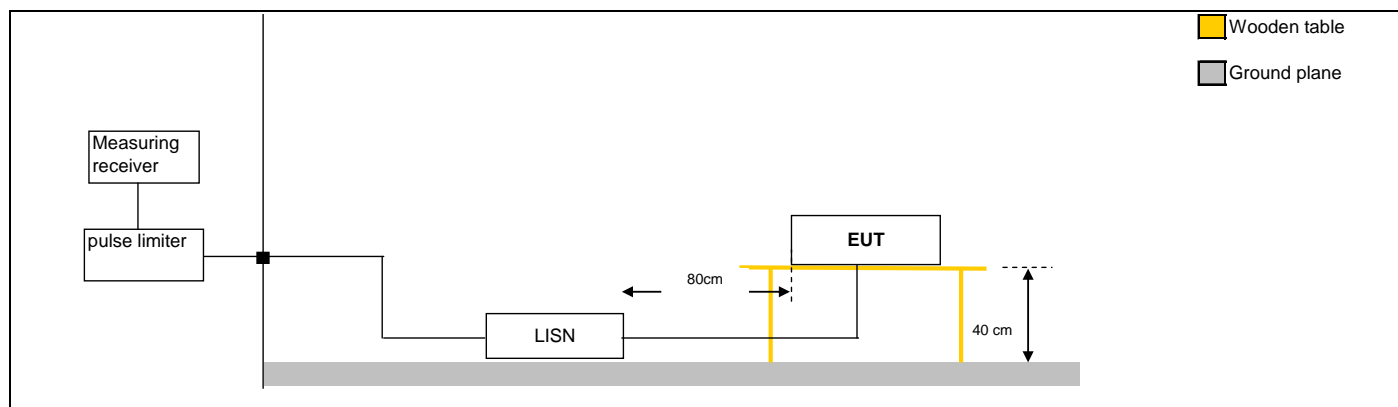
- ☐ Yes
☒ No

-Product installation:

- ☐ The EUT is installed on a wooden table 80 cm above the reference plane, at 80cm of the 50Ohm/50microhenry LISN and at 40cm of the vertical conductive wall
☒ The EUT is installed on a wooden table 40 cm above the reference plane, at 80cm of the 50Ohm/50microhenry LISN.
☐ The EUT is installed 10 cm above the reference plane, at 80cm of the 50Ohm/50microhenry LISN.

Operating mode:

- ☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ...



Test set up of conducted emission on power supply





Test set up of conducted emission on power supply

**4.3. LIMIT**☐ Power supply Class A

| Frequency Bands/frequencies | dBµV quasi-peak | dBµV average |
|-----------------------------|-----------------|--------------|
| 0.15-0.5MHz | 79 | 66 |
| 0.5-30 MHz | 73 | 60 |

☒ Power supply Class B

| Frequency Bands/frequencies | dBµV quasi-peak | dBµV average |
|-----------------------------|-----------------|--------------|
| 0.15-0.5MHz | 66-56 | 56-46 |
| 0.5-5 MHz | 56 | 46 |
| 5-30 MHz | 60 | 50 |

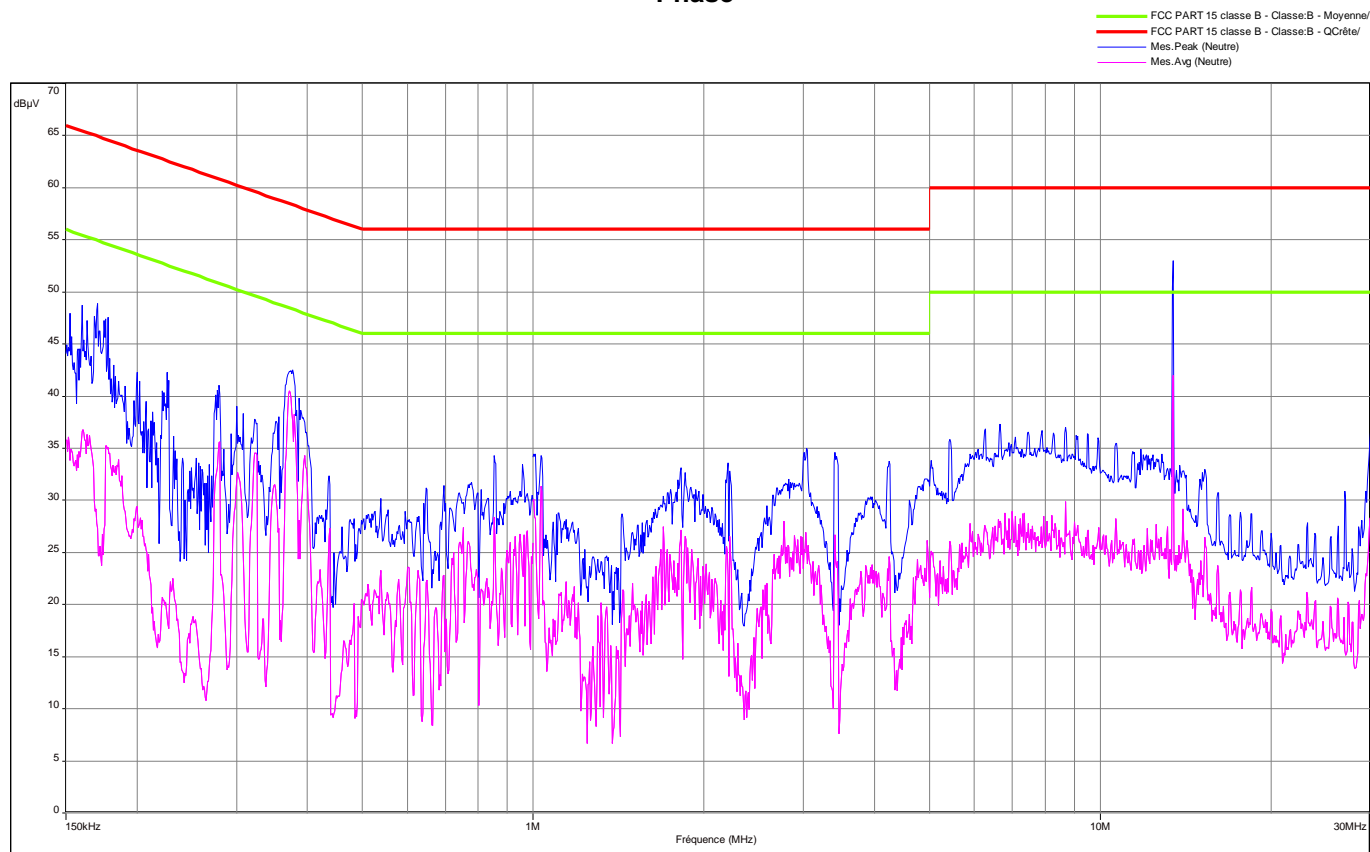
4.4. TEST EQUIPMENT LIST

| DESCRIPTION | MANUFACTURER | MODEL | N° LCIE | Cal. Date | Cal. Due |
|---|--------------------|---------|----------|-----------|----------|
| Reference ground plan 2 x 3m | L.C.I.E. | - | - | - | - |
| Recepteur/ Receiver | RHODE & SCHWARZ | ESU | A2642018 | 2015-01 | 2016-01 |
| Cable | - | - | A5329417 | 2015-10 | 2016-10 |
| Réseau V / V ISLN | ROHDE & SCHWARZ | ESH2-Z5 | C2322002 | 2015-06 | 2016-06 |
| Limiteur d'impulsion / Pulse limiter | ROHDE & SCHWARZ | ESH3-Z2 | A2649008 | 2015-02 | 2016-02 |



4.5. RESULTS

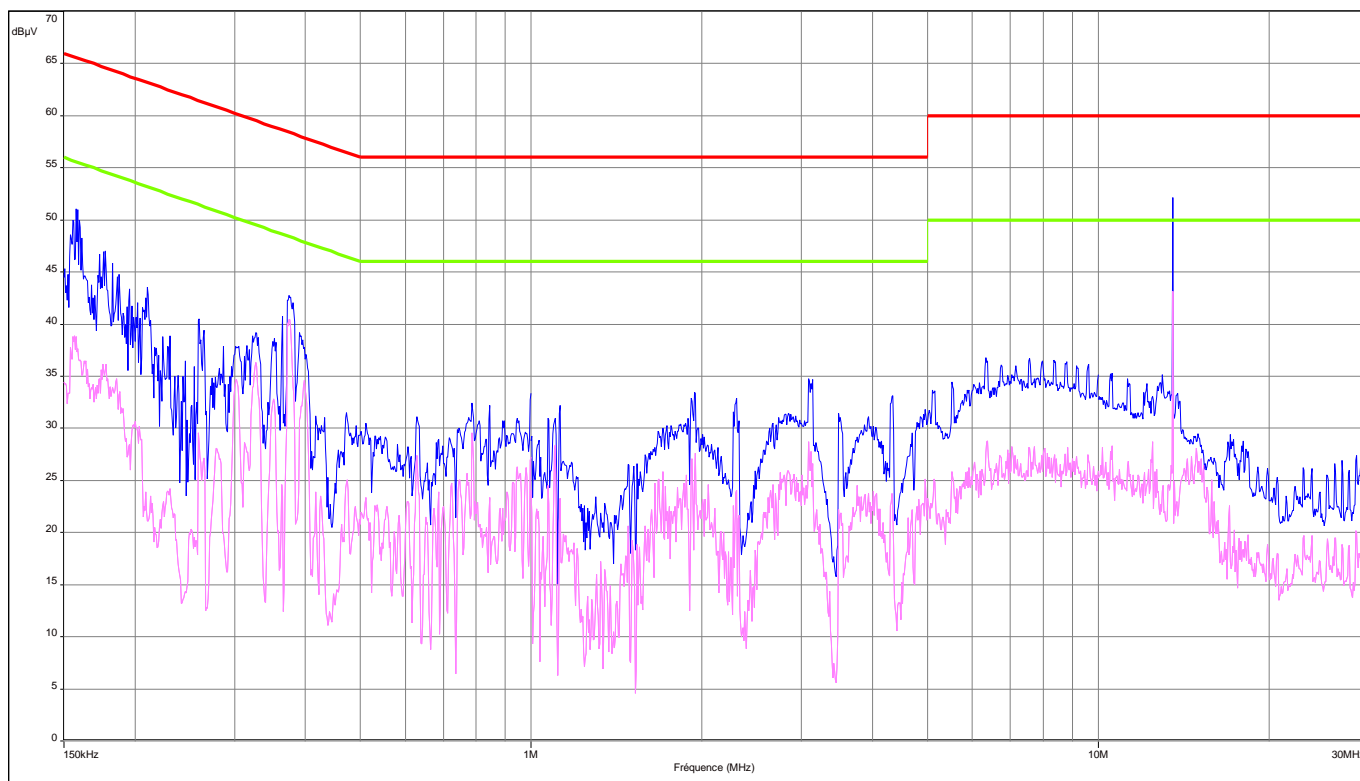
Diagram N°1
Phase



| Frequency (MHz) | Peak measurements (dBµV) | Quasi-Peak measurements (dBµV) | Quasi-Peak limits (dBµV) | Average measurement (dBµV) | Average limits (dBµV) |
|--------------------|--------------------------------|--------------------------------------|--------------------------------|----------------------------------|--------------------------|
| 0.170 | 49 | - | 64.8 | 36.7 | 54.8 |
| 0.376 | 42.5 | - | 58.4 | 40.5 | 48.4 |
| 3.04 | 35 | - | 56 | 27 | 46 |
| 13.56 | 53 | - | 60 | 42 | 50 |
| 30 | 37 | - | 60 | 28.5 | 50 |

Diagram N°2
Neutral

— FCC PART 15 classe B - Classe:B - Moyenne/
— FCC PART 15 classe B - Classe:B - QCRéte/
— Mes. Peak (Phase 1)
— Mes. Avg (Phase 1)



| Frequency (MHz) | Peak measurements (dBμV) | Quasi-Peak measurements (dBμV) | Quasi-Peak limits (dBμV) | Average measurement (dBμV) | Average limits (dBμV) |
|--------------------|--------------------------------|--------------------------------------|--------------------------------|----------------------------------|--------------------------|
| 0.157 | 51 | - | 65.6 | 39 | 55.6 |
| 0.374 | 42.7 | - | 58.4 | 40 | 48.4 |
| 3.08 | 34.7 | - | 56 | 29 | 46 |
| 13.56 | 52.1 | - | 60 | 43 | 50 |
| 30 | 34.6 | - | 60 | 29 | 50 |

4.6. CONCLUSION

Measures of Conducted Emission, performed on the sample of the product **ISC480 INT**, SN: **14197SC80301170**, in configuration and description presented in this test report, show levels **conform to** the FCC part 15 RSS-GEN §7.2.5 limits.



5. Uncertainties Chart

| Kind of measurement | Wide uncertainty laboratory (k=2) $\pm x$ (dB) | CISPR uncertainty limit $\pm y$ (dB) |
|---|--|--------------------------------------|
| Measurement of conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site. | 3.51 | 3.6 |
| Measurement of discontinuous conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site. (S48 room) | 3.45 | 3.6 |
| Measurement of conducted disturbances in voltage on the AC power port on the Ecuelles site. | 3.86 | 3.6 |
| In Situ measurement of conducted disturbances in voltage on the AC power port with ESH2 receiver | 3.51 | 3.6 |
| Measurement of conducted disturbances in voltage on the DC power port on the Fontenay-aux-Roses site. | 3.49 | 3.6 |
| Measurement of conducted disturbances in voltage on the DC power port on the Ecuelles site. | 3.72 | 3.6 |
| Measurement of conducted disturbances in voltage on the telecommunication port. | 3.26 | Under consideration |
| Measurement of conducted disturbances in voltage on the telecommunication port at Ecuelles Site. | 3.45 | Under consideration |
| Measurement of conducted disturbances in current | 3.09 | Under consideration |
| Measurement of radiated electric field from 30 to 200MHz on the Fontenay-aux-Roses site (with EATON 96002 antenna) | 5.2 | 5.2 |
| Measurement of radiated electric field from 200 to 1000MHz on the Fontenay-aux-Roses site | 5.3 | 5.2 |
| Measurement of radiated electric field from 1 to 18GHz on the Fontenay-aux-Roses site | 4.8 | Under consideration |
| Measurement of radiated electric field from 30 to 80MHz in horizontal position on the Ecuelles site (dipole antenna) | 3.77 | 5.2 |
| Measurement of radiated electric field from 30 to 80MHz in vertical position on the Ecuelles site (dipole antenna) | 4.12 | 5.2 |
| Measurement of radiated electric field from 80 to 1000MHz in horizontal position on the Ecuelles site (R&S HL023 A2 logper antenna) | 4.19 | 5.2 |
| Measurement of radiated electric field from 80 to 1000MHz in vertical position on the Ecuelles site (R&S HL023 A2 logper antenna) | 4.50 | 5.2 |
| Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the Ecuelles site (CBL6112 bilog antenna) | 4.24 | 5.2 |
| Measurement of radiated electric field from 30 to 1000MHz in vertical position on the Ecuelles site (CBL6112 bilog antenna) | 4.55 | 5.2 |
| Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site | 5.16 | Under consideration |
| Measurement of current harmonics | 11.11% | / |
| Flicker measurement | 9.26% | / |
| Measurement of disturbance power | 3.32 | 4.5 |
| Immunity to conducted disturbances, induced by radio-frequency fields | 2.36 | / |
| Immunity to conducted disturbances, induced by radio-frequency fields with injection clamp | 2.76 | / |
| Immunity to radiated electromagnetic field | 2.64 | / |
| EMF measurement according to EN62233 from 10KHz to 400KHz | 23,51% | / |

Unless otherwise specified, the decision of conformity takes into account the uncertainty of measures.

End of test report