L C I E

TEST REPORT

N°: 678817CR2016-01-28 **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	ISC 480
Serial number	14197SC80301159
FCC ID	XKB-ISC480CL
IC	2586D-ISC480CL
Test date	November 27th 2015
Test location	Fontenay Aux Roses
Test performed by	Laurent Deneux & Fostoki Medjoudj
Composition of document	18 pages
Initial issued on	January 12th 2016
Modified on	January 28th, 2016

Written by :
Laurent Deneux
Tests operator

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Approved by :
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SUMMARY

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	☐ PASS ☐ FAIL ☐ NA ☑ NP (Limited Program)
CFR 47 § 15.225 (e) RSS-210 § A2.6	Frequency tolerance	☐ PASS ☐ FAIL ☐ NA ☑ NP (Limited Program)
CFR 47 § 15.207 RSS-Gen § 8.8	AC Power Line Conducted Emissions	☑ PASS ☐ FAIL ☐ NA ☐ 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	☐ PASS ☐ FAIL ☐ NA ☑ 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	☑ PASS (30MHz-1GHz only) ☐ FAIL ☐ NA ☐ NP (Limited Program)
RSS-Gen § 7.1	Receiver Radiated emissions	☐ PASS ☐ FAIL ☑ NA (Transceiver equipment. Include in Field strength test) ☐ 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): ISC 480

Serial Number: 14797SC80301170

EUT: ISC480

EUT Power supply: PSM32W-080L6IN-R

RFID Card

Equipment Under Test

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Power supply AC	-	-	☑	☐	☐	Nothing to report

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
-	-	-	-

Equipment information: (Declared by provider)

Apparatus Description	The ISC480 contactless is a payment terminal.			
Type of power source:	☑ AC power supply	☐ DC power supply	☐ Battery (Select Type)	
Test source voltage:	Vmin-Vmax:	☑ 120V -60Hz	☐ Vdc	
Operating Modes	Mode 1	Loop increment:  *Operation frequency : 13.56MHz*		

2.2. EQUIPMENT LABELLING

2.3. EQUIPMENT MODIFICATIONS

☑ None ☐ Modification:

3. Measurement of radiated emissions

3.1. ENVIRONMENTAL CONDITIONS

Test performed by : Laurent Deneux & Fostoki Medjoudj
Date of test : 2015/11/27
Ambient temperature : 21°C
Relative humidity : 46%

3.2. TEST SETUP

Specifications:

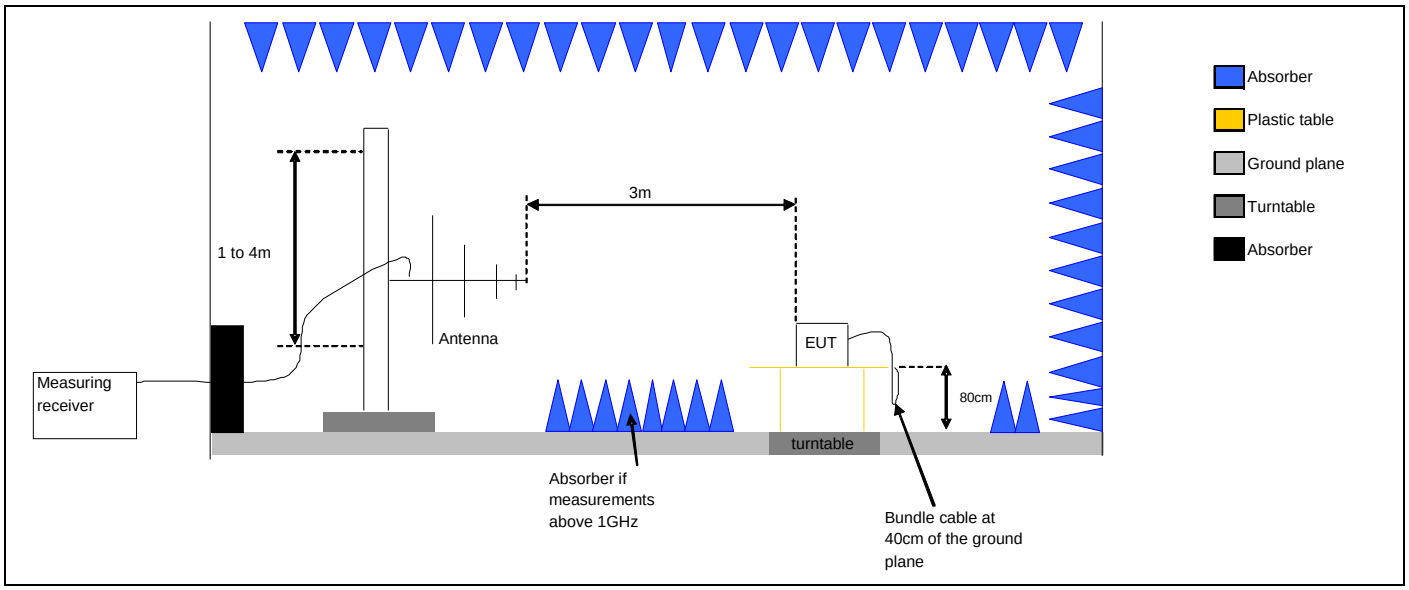
Frequency	30 – 1000 MHz	RBW 120 kHz
Detector	Peak and Quasi-Peak	

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

Operating conditions:

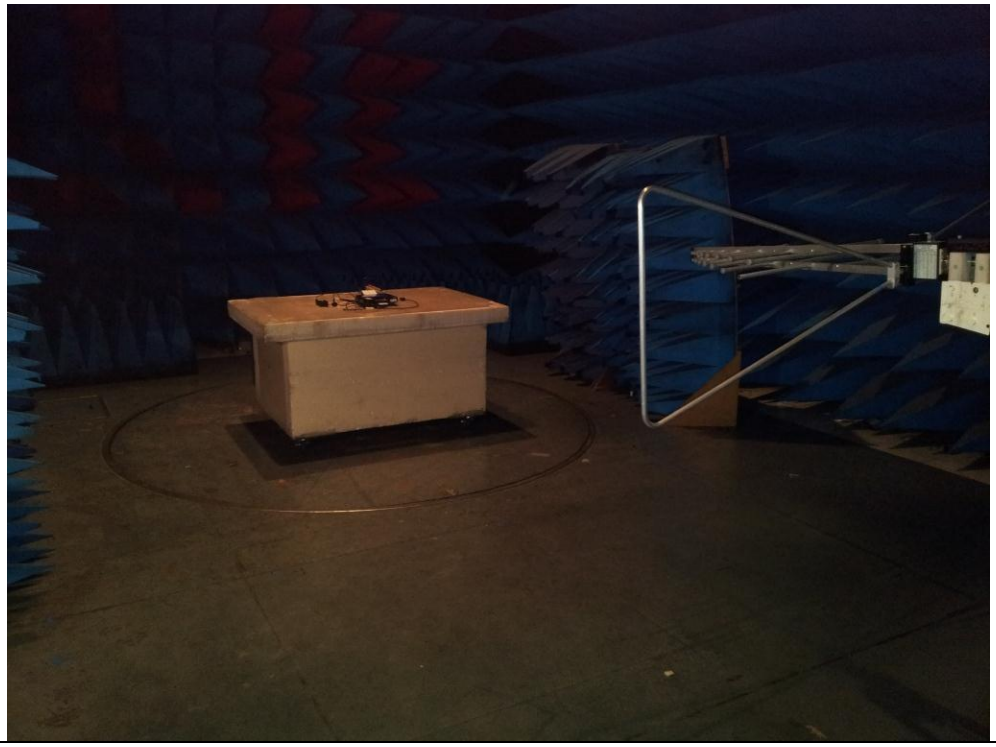
- The Equipment under Test is installed:
☑ Measure in semi anechoic room
☐ Measure in open area site
- Measuring distance:
☑ 3m
☐ 10m
- Deviation method:
☐ Yes
☑ No
-Product installation:
☑ The EUT was tested as a tabletop equipment and was placed on a non-conducting platform the top of which is 0.8m above the metal ground plane.
☐ The EUT is at 10cm height from reference plane

Operating mode:
☑ Mode 1 ☐ Mode 2 ☐ Mode 3 …



Test Set up for radiated measurement in semi anechoic chamber

Measurement of radiated disturbances.



Measurement of radiated disturbances.

3.3. LIMIT

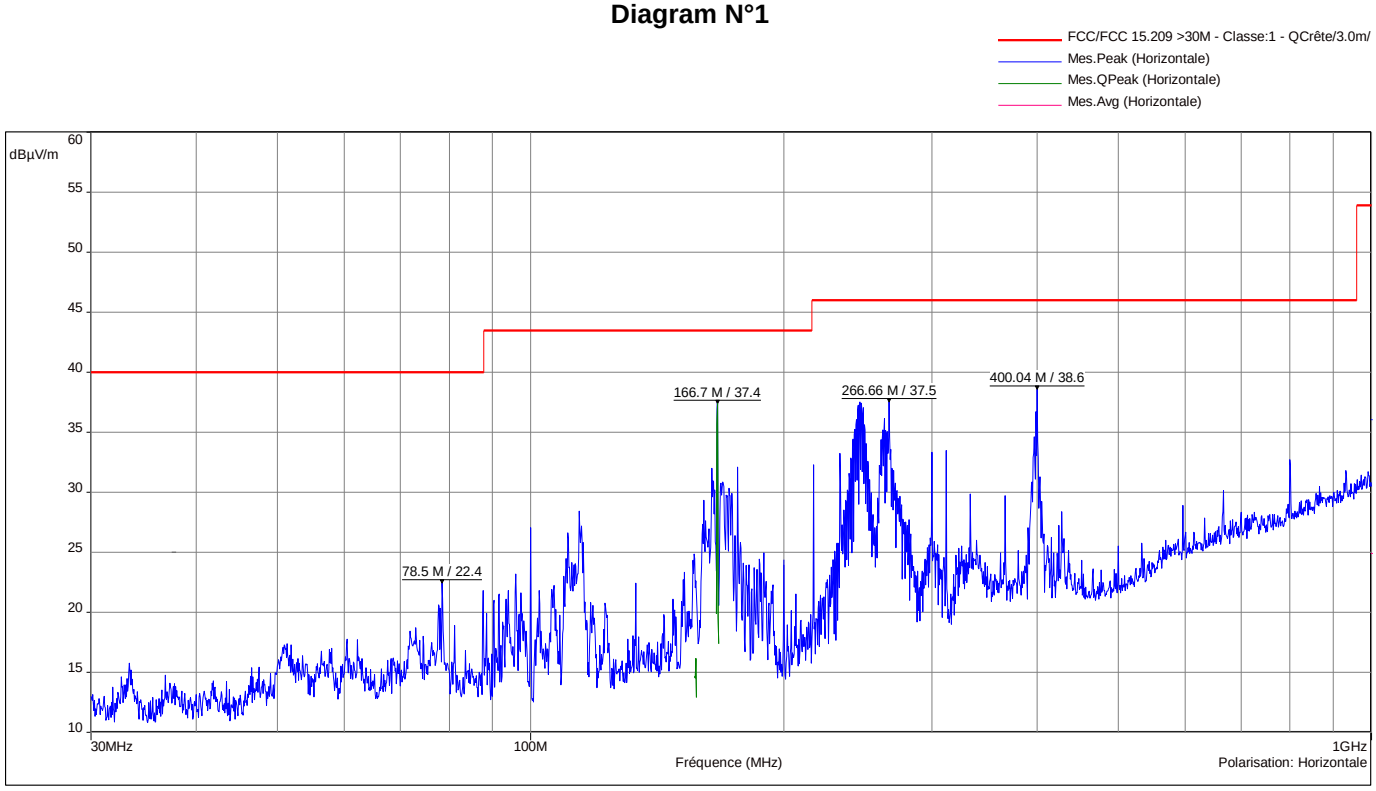
30MHz to 88MHz:	100µV/m (3m) or 40dBµV/m (3m) QPeak
88MHz to 216MHz:	150µV/m (3m) or 43,5dBµV/m (3m) QPeak
216MHz to 960MHz:	200µV/m (3m) or 46dBµV/m (3m) QPeak
960MHz to 1000MHz:	500µV/m (3m) or 54dBµV/m (3m) QPeak

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

3.5. RESULTS

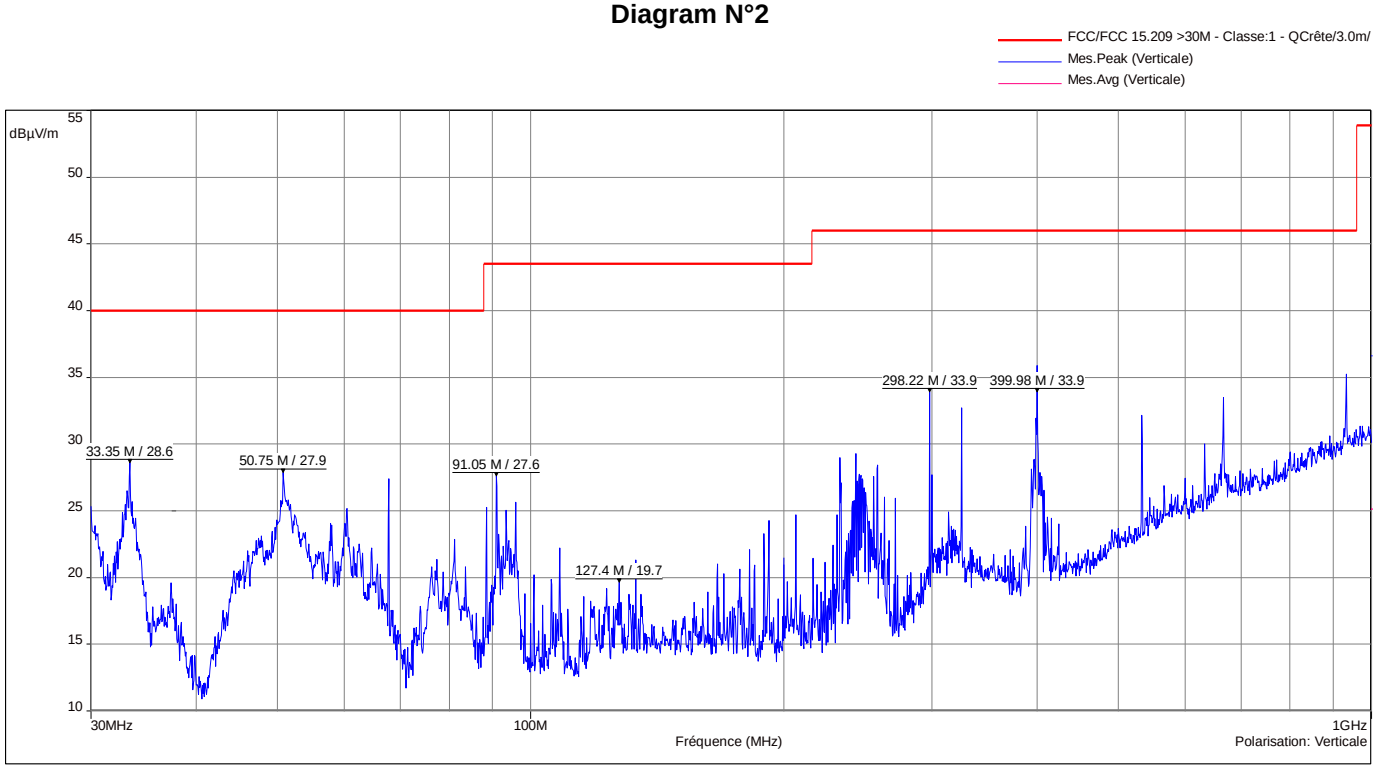
Diagram N°1



Horizontal Polarization (30MHz-1GHz)

Frequency (MHz)	Peak measurements (dBµV/m)	Quasi-Peak measurements (dBµV/m)	Quasi-Peak limits (dBµV/m)	Average measurement (dBµV/m)	Average limits (dBµV/m)
78.5	22.4	-	40	-	-
166.7	37.4	-	43.5	-	-
400.4	38.6	-	46	-	-

Diagram N°2



Vertical Polarization (30MHz-1GHz)

Frequency (MHz)	Peak measurements (dBµV/m)	Quasi-Peak measurements (dBµV/m)	Quasi-Peak limits (dBµV/m)	Average measurement (dBµV/m)	Average limits (dBµV/m)
33.36	28.6	-	40	-	-
50.75	27.9	-	40	-	-
91.05	27.6	-	43.5	-	-
298.22	33.9	-	46	-	-
399.98	33.9	-	46	-	-

3.6. CONCLUSION

Measures of Radiated Emission, performed on the sample of the product **ISC 480**, SN: **14197SC80301159**, 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 : 2015/11/27
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:

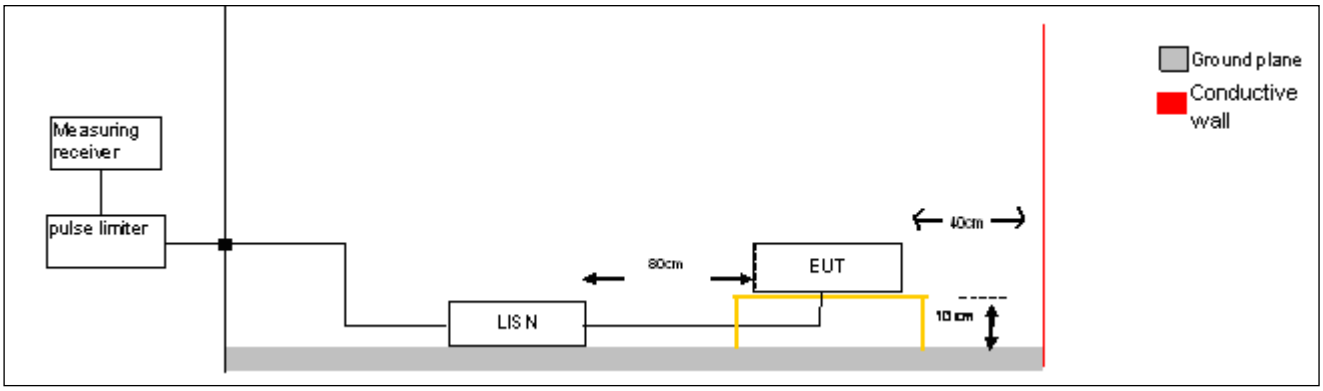
☐ The EUT is installed on a wooden table 80 cm above the reference plane, at 80cm of the 50Ohm/50microhenry LISN and at 40cm of the vertical conductive wall

☑ 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.

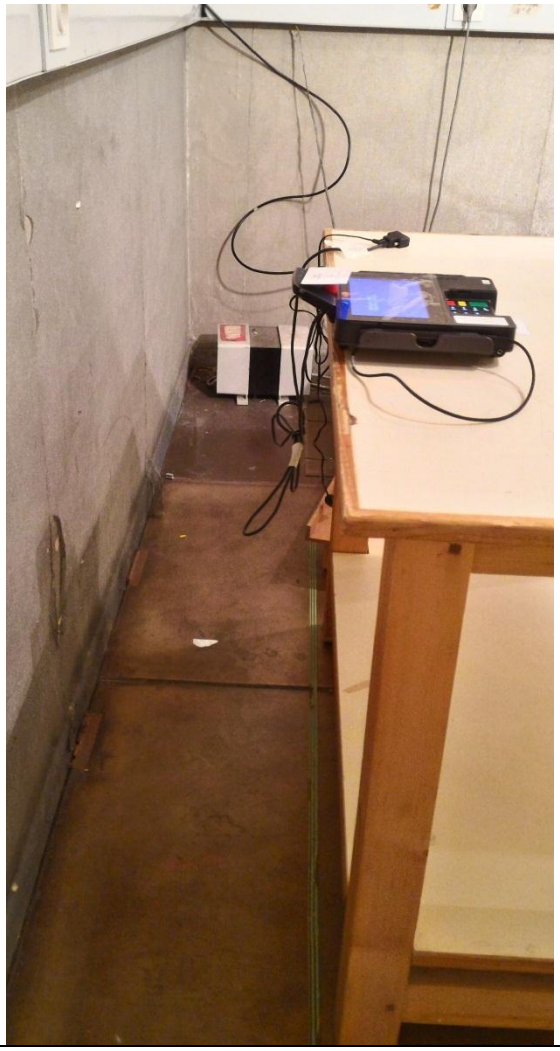
Operating mode:

☑ Mode 1 ☐ Mode 2 ☐ Mode 3 …



Test set up of conducted emission on power supply

Test set up of conducted emission on power supply



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

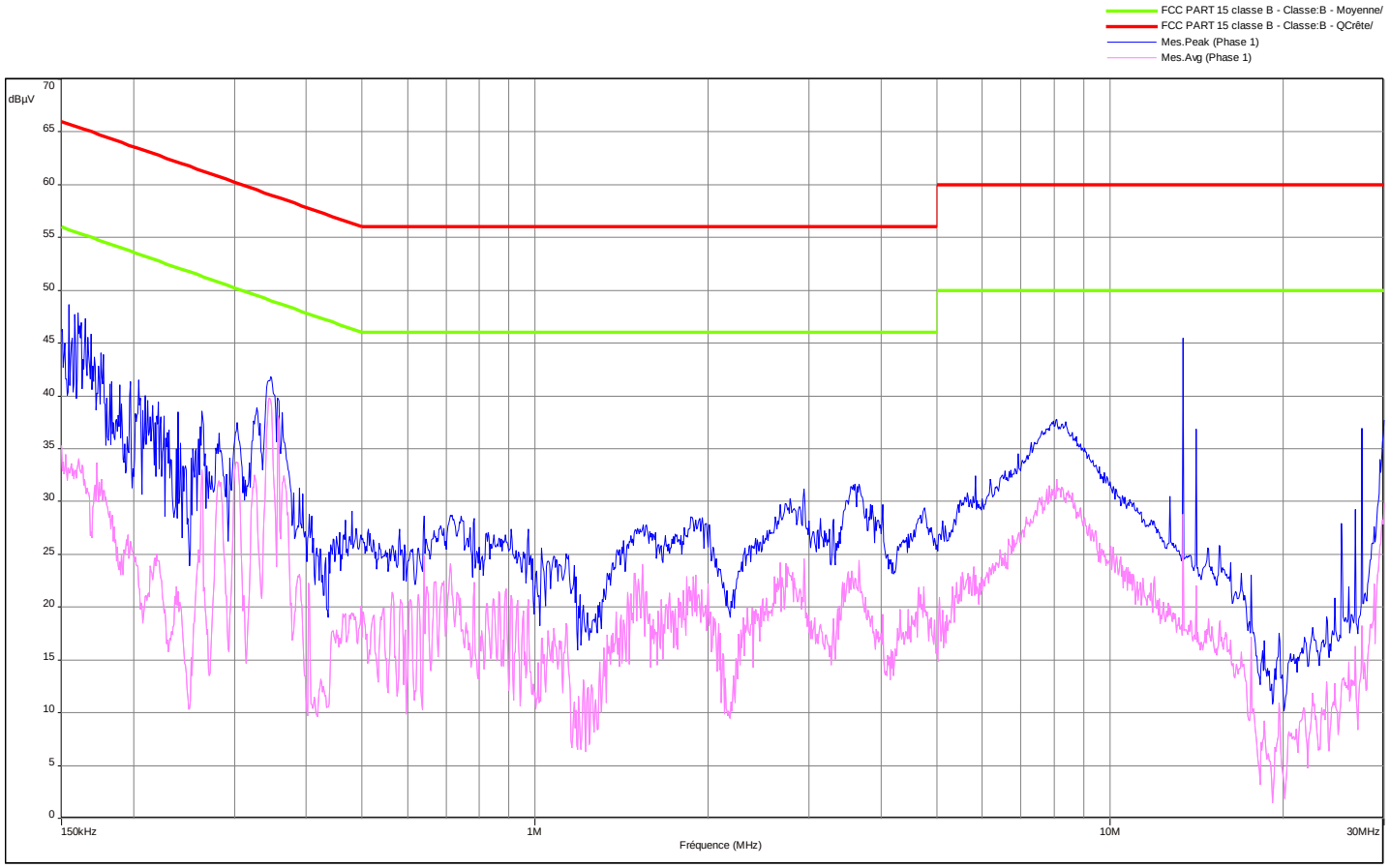
Frequency Bands/frequencies	dBµV quasi-peak	dBµV average
0.15-0.5MHz	66-56	56-46
0.5-5 MHz	56	46
5-30 MHz	60	50

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'impultion / Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2015-02	2016-02

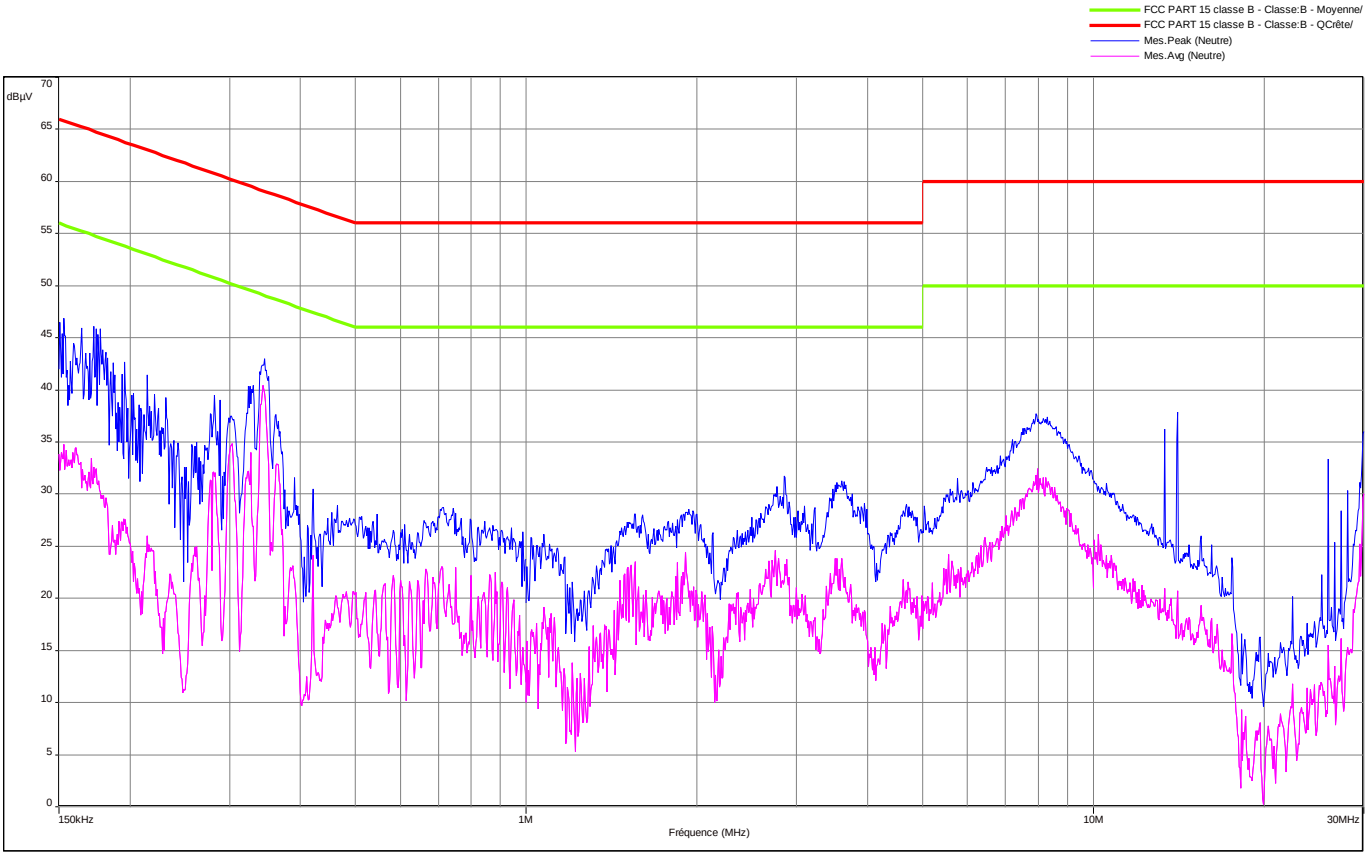
4.5. RESULTS

Diagram N°1
Phase



Frequency (MHz)	Peak measurements (dBµV)	Quasi-Peak measurements (dBµV)	Quasi-Peak limits (dBµV)	Average measurement (dBµV)	Average limits (dBµV)
0.160	48	-	65.5	34.5	55.5
0.346	41.8	-	59	39.5	49
8	38	-	60	32	50
13.56	45.5	-	60	28.7	50
27.12	37	-	60	27.4	50

Diagram N°2
Neutral



Frequency (MHz)	Peak measurements (dBµV)	Quasi-Peak measurements (dBµV)	Quasi-Peak limits (dBµV)	Average measurement (dBµV)	Average limits (dBµV)
0.164	46	-	65.2	35	55.2
0.346	43	-	59	40.5	49
8	36.6	-	60	32.4	50
13.56	38	-	60	21	50
30	35	-	60	30	50

4.6. CONCLUSION

Measures of Conducted Emission, performed on the sample of the product **ISC 480**, SN: **14197SC80301159**, 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) ±x(dB)	CISPR uncertainty limit ±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 uncertainly of measures.

End of test report