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TEST REPORT

N°: 666826C

JDE : 132717

Subject **Electromagnetic compatibility (EMC) :**
Publication CFR 47 PART 15.225 RSS-210 & RSS-GEN (Limited program)

FCC Registration number **166175**
Industry Canada number **6230B**

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Apparatus under test

↳ **Product** **Payment terminal**
↳ **Trade mark** **Ingenico**
↳ **Manufacturer** **Ingenico**
↳ **Model under test** **ISC480**
↳ **Serial number** **14197SC80301159**
↳ **FCC ID** **XKB-ISC480CL**
↳ **IC** **2586D-ISC480CL**

Test date **January 08th, 2015 to January 16th, 2015**

Test location **Fontenay Aux Roses**

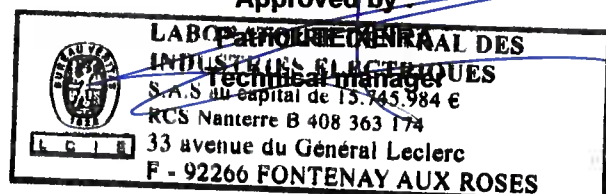
Test performed by **F.MEDJOU DJ**

Composition of document **18 pages**

Document issued on **February 09th, 2015**

Written by :
Fostoki MEDJOU DJ
Tests operator

Approved by :



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1. Test Program

References

- 47 CFR Part 15C
- RSS-210
- RSS-Gen
- CISPR 16-4-2
- ANSI C63.4

Emission tests:

Test Description	Test Description	Test result - Comments
RSS-Gen § 4.6.1	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 § 7.2.4	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-6GHz only) <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
RSS-Gen § 4.10	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. EQUIPMENT OF THE SAME FAMILY

-Tests are performed on the most complete product "ISC480 SN: 14197SC80301159". See Table below for difference between products.

<p style="text-align: center;">DELTA* Old power supply</p>	<p style="text-align: center;">PHIHONG** New power supply</p>
 <p>DELTA ELECTRONICS, INC. 182006919 MODEL No. 115-200V-50-400 INPUT: 115-230V 50/60Hz OUTPUT: 5.0V 4.0A LPS CAUTION: For use with Information Technology Equipment ATTENTION: Pour usage avec l'équipement informatique N17908 V1276 S/N: ABET1215000272 MODEL REV : 00</p>	 <p>ingenico 電源供應器/電源适配器 MODEL No. 型号(型号): PSM32W-000 INPUT 输入(输入): 115-230V ~ 50-60Hz 0.5A OUTPUT 输出(输出): 5.0V ~ 4.0A LISTED ADAPTED LPS EFFICIENCY LEVEL CAUTION: For use with Information Technology Equipment 注意: 仅供与信息技术设备 MADE IN CHINA Z44300060A1</p>

*The product was certified with the old power supply DELTA in June 2013.

**EUT's power supply have changed, the new tests were carried out with the new power supply PHIHONG



2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT): ISC480

Serial Number: 14197SC80301159



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)

<p>Apparatus Description</p>	<p>On the ISC480 internal Cless the antenna zone is on the top module:</p>			
				
<p>Type of power source:</p>	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery (Select Type)	
<p>Test source voltage:</p>	Vmin-Vmax:	<input checked="" type="checkbox"/> 120V -60Hz		<input type="checkbox"/> Vdc
<p>Operating Modes</p>	Mode 1	<p>Loop increment:</p>  <p>Operation frequency : 13.56MHz</p>		
<p>Performance level defined by the manufacturer (only for immunity tests)</p>	-			



2.3. EQUIPMENT LABELLING

Equipment under test



PHIHONG power Supply



2.4. EQUIPMENT MODIFICATIONS

- None Modification:



3. Measurement of radiated emissions

3.1. ENVIRONMENTAL CONDITIONS

Test performed by : Fostoki MEDJOU DJ
Date of test : January 8th, 2014
Ambient temperature : 21°C
Relative humidity : 46%

3.2. TEST SETUP

Specifications:

Frequency	0.15 – 30 MHz	RBW 9 kHz
	30 – 1000 MHz	RBW 120 kHz
	1-6GHz	RBW 1MHz
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:

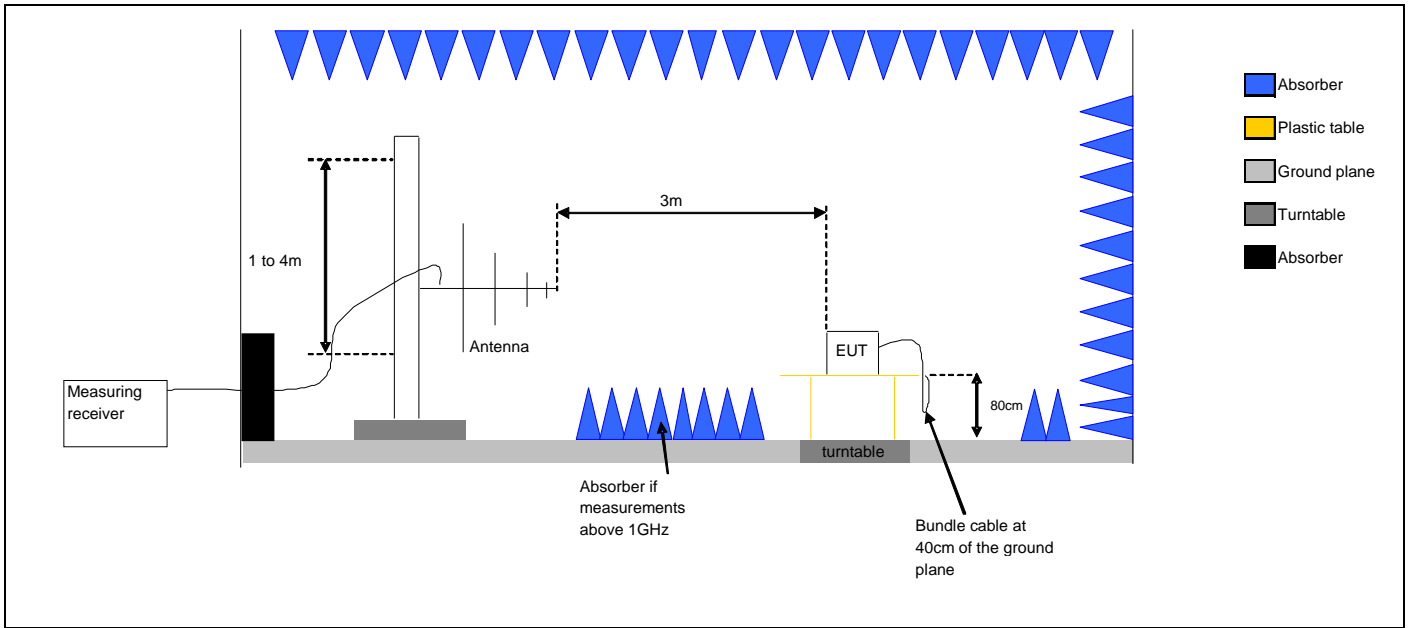
- Yes
- No

-Product installation:

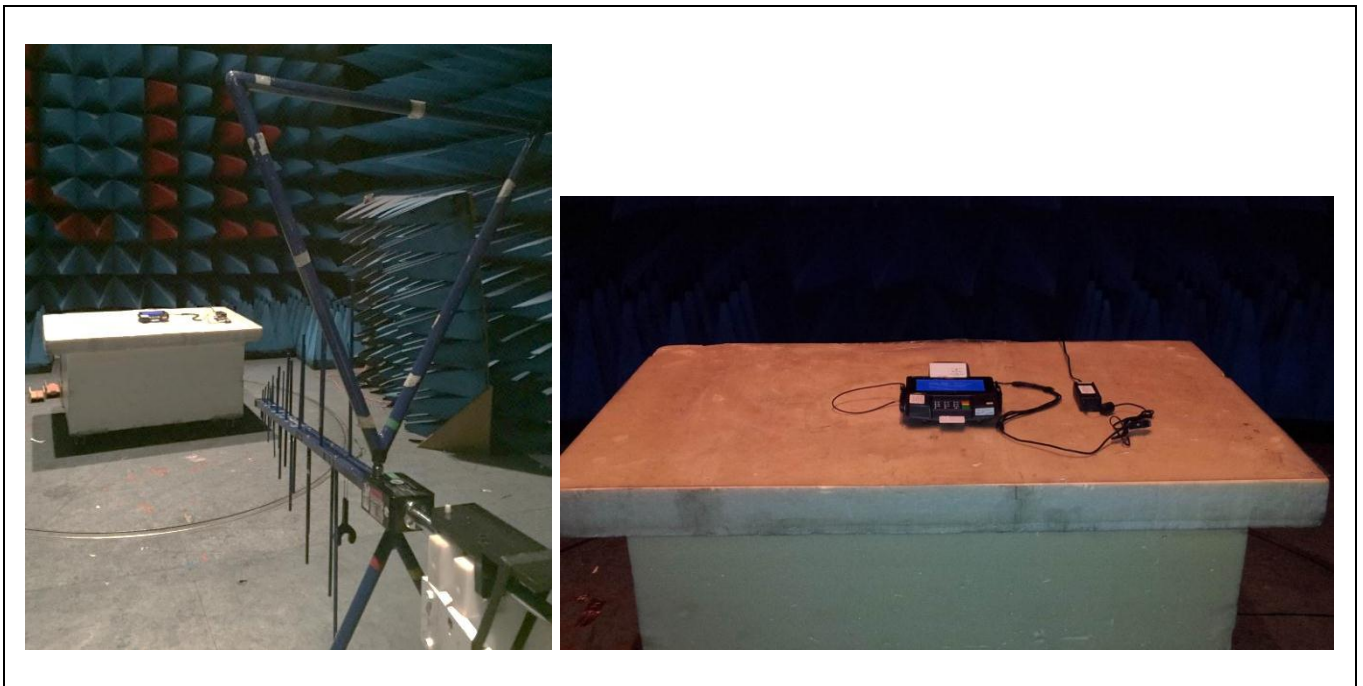
- The EUT was tested as a tabletop equipment and was placed on a non-conducting platform the top of which is 0.8m above the metal ground plane.
- The EUT is at 10cm height from reference plane

Operating mode:

- Mode 1 Mode 2 Mode 3 ...



Test Set up for radiated measurement in semi anechoic chamber



Measurement of radiated disturbances.



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
Above 1000MHz:	5012µV/m (3m) or 74dBµV/m Peak
	500µV/m (3m) or 54dBµV/m (3m) Average

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Semi anechoic chamber	SIEPEL	-	D3044008	2014/06	2015/06
EMI receiver	ROHDE & SCHWARZ	ES140 1088 740K40	A2642010	2014/02	2015/02
Preamplifier	BONN Elektronik	BLNA 3018-8F305	A7080053	2014/01	2015/01
Bilog antenna	CHASE	CBL6111C	C2040124	2014/03	2015/03
Horn antenna	EMCO	3115	C2042018	2014/07	2015/07

3.5. RESULTS

Diagram N°1

Horizontal Polarization (30MHz-6GHz)

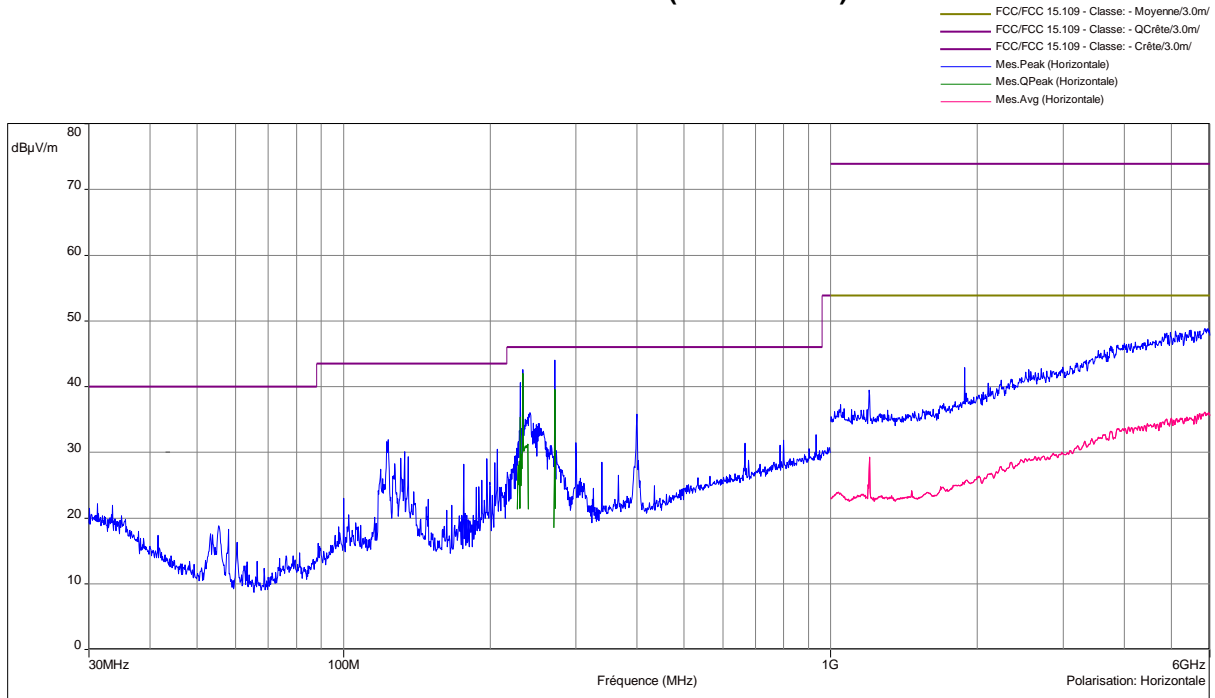
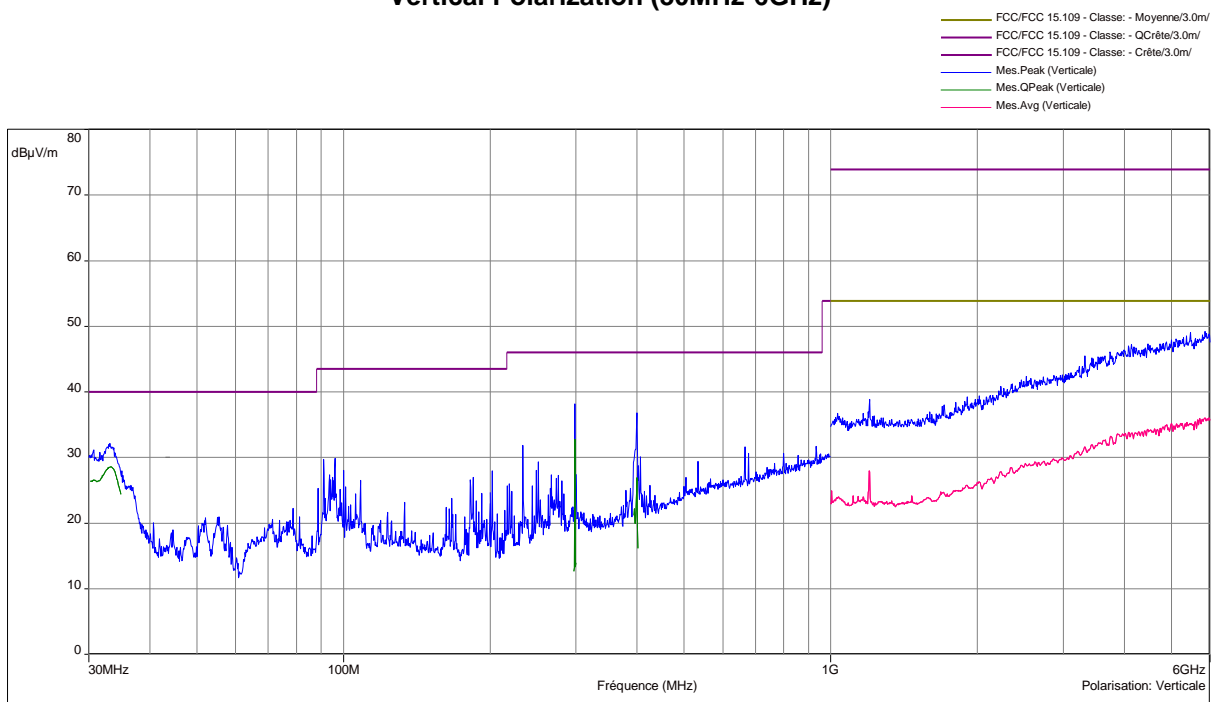


Diagram N°2

Vertical Polarization (30MHz-6GHz)





3.6. CONCLUSION

Measures of Radiated Emission, performed on the sample of the product **ISC480**, 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 : Fostoki MEDJOUDJ
Date of test : January 8th, 2014
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:

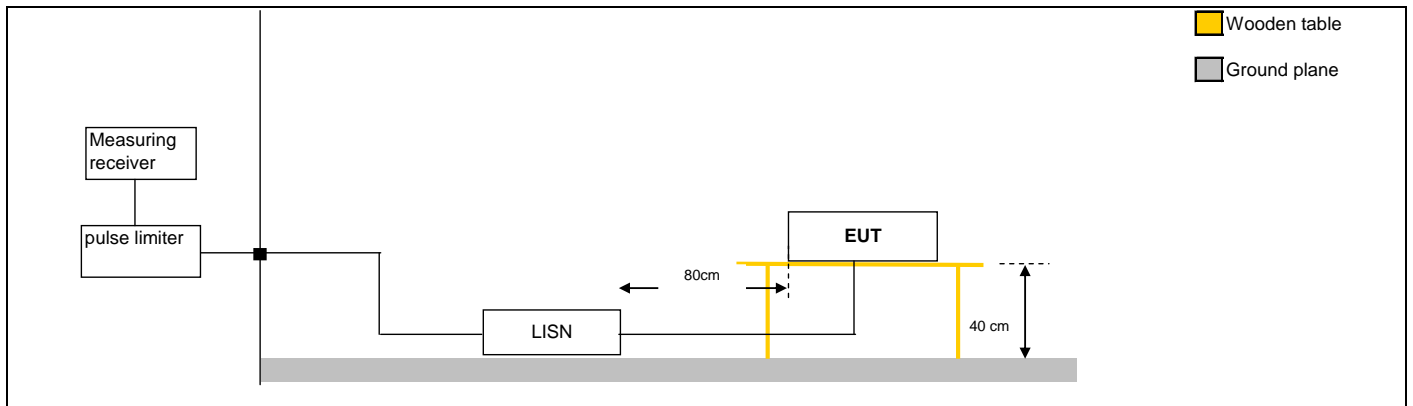
- Yes
 No

-Product installation:

- The EUT is installed on a wooden table 80 cm above the reference plane, at 80cm of the 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 LISN.
 The EUT is installed 10 cm above the reference plane, at 80cm of the 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	dB ($\mu\text{V}/\text{m}$) quasi-peak	dB ($\mu\text{V}/\text{m}$) average
0.15-0.5MHz	79	66
0.5-30 MHz	73	60

Power supply Class B

Frequency Bands/frequencies	dB ($\mu\text{V}/\text{m}$) quasi-peak	dB ($\mu\text{V}/\text{m}$) 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
EMI receiver	ROHDE & SCHWARZ	ESI40	A2642010	2014/02	2015/02
V LISN	ROHDE & SCHWARZ	ENV216	C2320163	2013/12	2014/12
Semi anechoic chamber	SIEPEL	C01	D3044008	2014/06	2015/06

4.5. RESULTS

**Diagram N°1
Phase**

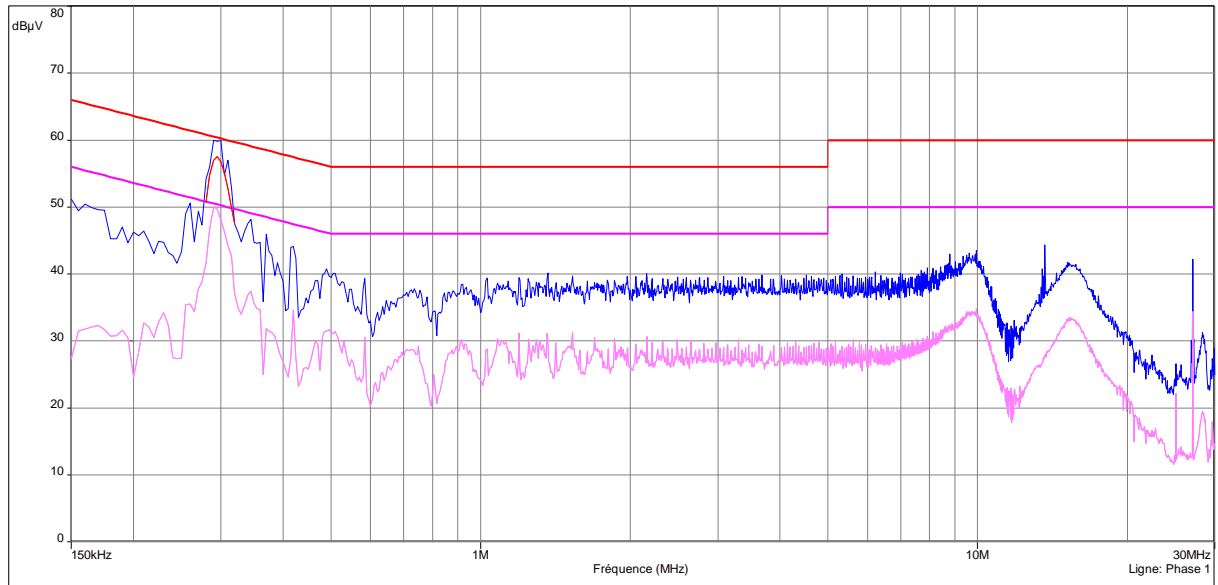
Description Sous-bande 1

Fréquences: 150 kHz - 30 MHz (Mode: Lin, Pas: 5 kHz)

Réglages: RBW: 9 kHz, VBW: Auto, Temps de mesure : 50 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Ligne:Phase 1

- Civil 55022/EN 55022 Conduit Alim - Classe:B - Moyenne/
- Civil 55022/EN 55022 Conduit Alim - Classe:B - QCrête/
- Mes.Peak (Phase 1)
- Mes.QPeak (Phase 1)
- Mes.Avg (Phase 1)



**Diagram N°2
Neutral**

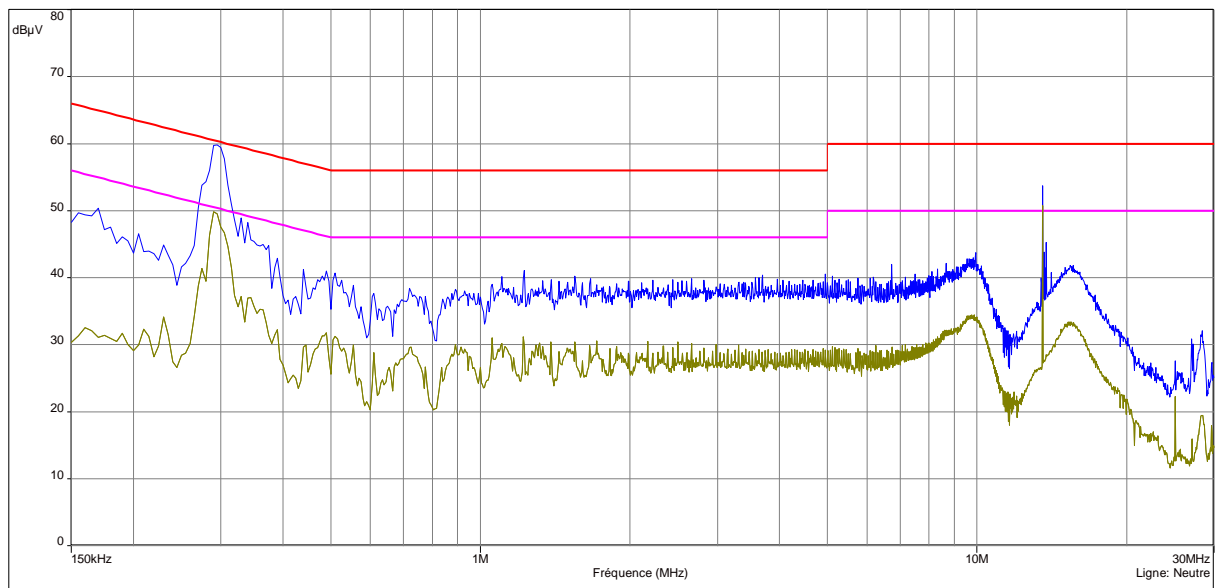
Description Sous-bande 2

Fréquences: 150 kHz - 30 MHz (Mode: Lin, Pas: 5 kHz)

Réglages: RBW: 9 kHz, VBW: Auto, Temps de mesure : 50 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Ligne:Neutre

- Civil 55022/EN 55022 Conduit Alim - Classe:B - Moyenne/
- Civil 55022/EN 55022 Conduit Alim - Classe:B - QCrête/
- Mes.Peak (Neutre)
- Mes.Avg (Neutre)





4.6. CONCLUSION

Measures of Conducted Emission, performed on the sample of the product **ISC480**, 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 uncertainty of measures.

End of test report