



LCIE

RFID 13,56MHz Template: Release March 30<sup>th</sup>, 2020

# TEST REPORT

N°: 167401-751432-B-(FILE#1047427)

Version : 01

## Subject

Radio spectrum matters  
tests according to standards:  
47 CFR Part 15.225 & RSS 210 Issue 10 & RSS-Gen Issue 5

## Issued to

INGENICO  
9 avenue de la gare  
26958 - Valence cedex 9  
France

## Apparatus under test

- Product
- Trade mark
- Manufacturer
- Model under test
- Serial number
- FCC ID
- IC

Payment Terminal  
INGENICO  
INGENICO  
Self/4000 CL  
193407313031143912221149  
XKB-SELF4000  
2586D-SELF4000

## Conclusion

See Test Program chapter

## Test date

May 25, 2020 to May 29, 2020

## Test location

Moirans

## Test Site

6230B-1

## Sample receipt date

May 25, 2020

## Composition of document

36 pages

## Document issued on

June 18, 2020

Written by :  
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Tests operator

Approved by :  
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Technical manager



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01	May 29, 2020	Mounir BOUAMARA	Creation of the document

*Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.*



## SUMMARY

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## 1. TEST PROGRAM

### References

- 47 CFR Part 15.225 (2020)
- RSS 210 Issue 10
- RSS Gen Issue 5
- ANSI C63.10 (2013)

### Radio requirement:

Clause (47CFR Part 15.225 & RSS-210 Issue 9 & RSS-Gen Issue 5) Test Description	Test result - Comments			
Occupied Bandwidth	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA(2)</b>	<input type="checkbox"/> <b>NP(1)</b>
Frequency Tolerance	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Field strength within the band 13.110-14.010MHz	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Field strength outside of the bands 13.110-14.010 MHz	<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAIL</b>	<input type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
Receiver Radiated Emissions	<input type="checkbox"/> <b>PASS (3)</b>	<input type="checkbox"/> <b>FAIL</b>	<input checked="" type="checkbox"/> <b>NA</b>	<input type="checkbox"/> <b>NP(1)</b>
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

(1): Limited program

(2): EUT not directly or indirectly connected to the AC Power Public Network

(3) Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

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 UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)**

**2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):**

**Equipment under test (EUT):**  
INGENICO Self/4000 CL

**Serial Number: 193407313031143912221149**



Equipment Under Test

**Power supply:**

Name	Type	Rating	Reference / Sn	Comments
Supply1	<input type="checkbox"/> AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> Battery	12		

**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
2	USB A	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1	RJ45	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	RJ11	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1	USB B	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1	Power Supply	-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
Laptop			Use to set the EUT



**Equipment information:**

Type:	<input checked="" type="checkbox"/> <b>RFID</b>		
Frequency band:	[13.553 to 13.567] MHz		
Number of Channel:	1		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated
Transmit chains:	1		
Receiver chains:	1		
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input type="checkbox"/> Combined
Equipment arrangement:	<input type="checkbox"/> Tabletop	<input type="checkbox"/> Floor-standing	<input type="checkbox"/> Multiple orientations
Equipment type:	<input type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input type="checkbox"/> 0°C <input checked="" type="checkbox"/> -20°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 50°C <input checked="" type="checkbox"/> 65°C
Operating voltage:	Vmin:	<input type="checkbox"/> 102V/60Hz	<input checked="" type="checkbox"/> 9Vdc
	Vnom:	<input type="checkbox"/> 120V/60Hz	<input checked="" type="checkbox"/> 12Vdc
	Vmax:	<input type="checkbox"/> 138V/60Hz	<input checked="" type="checkbox"/> 16Vdc

Antenna Characteristic			
Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	0	Nc*	50

Modulation Type	
Nc*	
Nc*	

Hardware information		
Software (if applicable):	V. :	Nc*

Nc\*: Not communicated



## 2.2. RUNNING MODE

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
Test mode 2	Permanent reception

Test	Running mode
Occupied Bandwidth	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
Frequency Tolerance	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
Field strength within the band 13.110-14.010MHz	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
Field strength outside of the bands 13.110-14.010 MHz	<input checked="" type="checkbox"/> Test mode 1 <input type="checkbox"/> Alternative test mode()
Receiver Radiated Emissions	<input checked="" type="checkbox"/> Test mode 2 (1) <input type="checkbox"/> Alternative test mode()

(1) Note: The test can't be performed because the transmitter and receiver are operating at the same frequency and the transmitter cannot be switched off as the carrier is used as receiver injection signal

## 2.3. EQUIPMENT LABELLING



## 2.4. EQUIPMENT MODIFICATION

None       Modification:



## 2.5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

$$FS = RA + AF + CF - AG$$

Where

- FS = Field Strength
- RA = Receiver Amplitude
- AF = Antenna Factor
- CF = Cable Factor
- AG = Amplifier Gain

Assume a receiver reading of 52.5dB $\mu$ V is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dB $\mu$ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB $\mu$ V/m value can be mathematically converted to its corresponding level in  $\mu$ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m.}$$

## 2.6. CALIBRATION DATE

The calibration intervals are extended at 12+4 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period



### 3. OCCUPIED BANDWIDTH

#### 3.1. TEST CONDITIONS

Test performed by : Mounir BOUAMARA  
 Date of test : May 25, 2020 to May 29, 2020  
 Ambient temperature : 23 °C  
 Relative humidity : 39 %

#### 3.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In a climatic chamber
- In an anechoic chamber

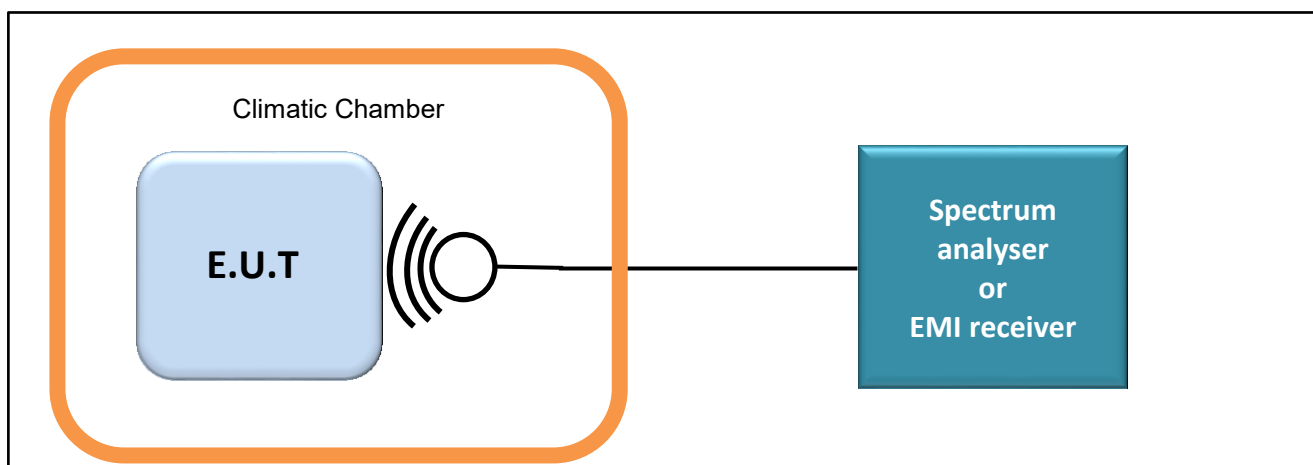
- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

- Test Procedure:

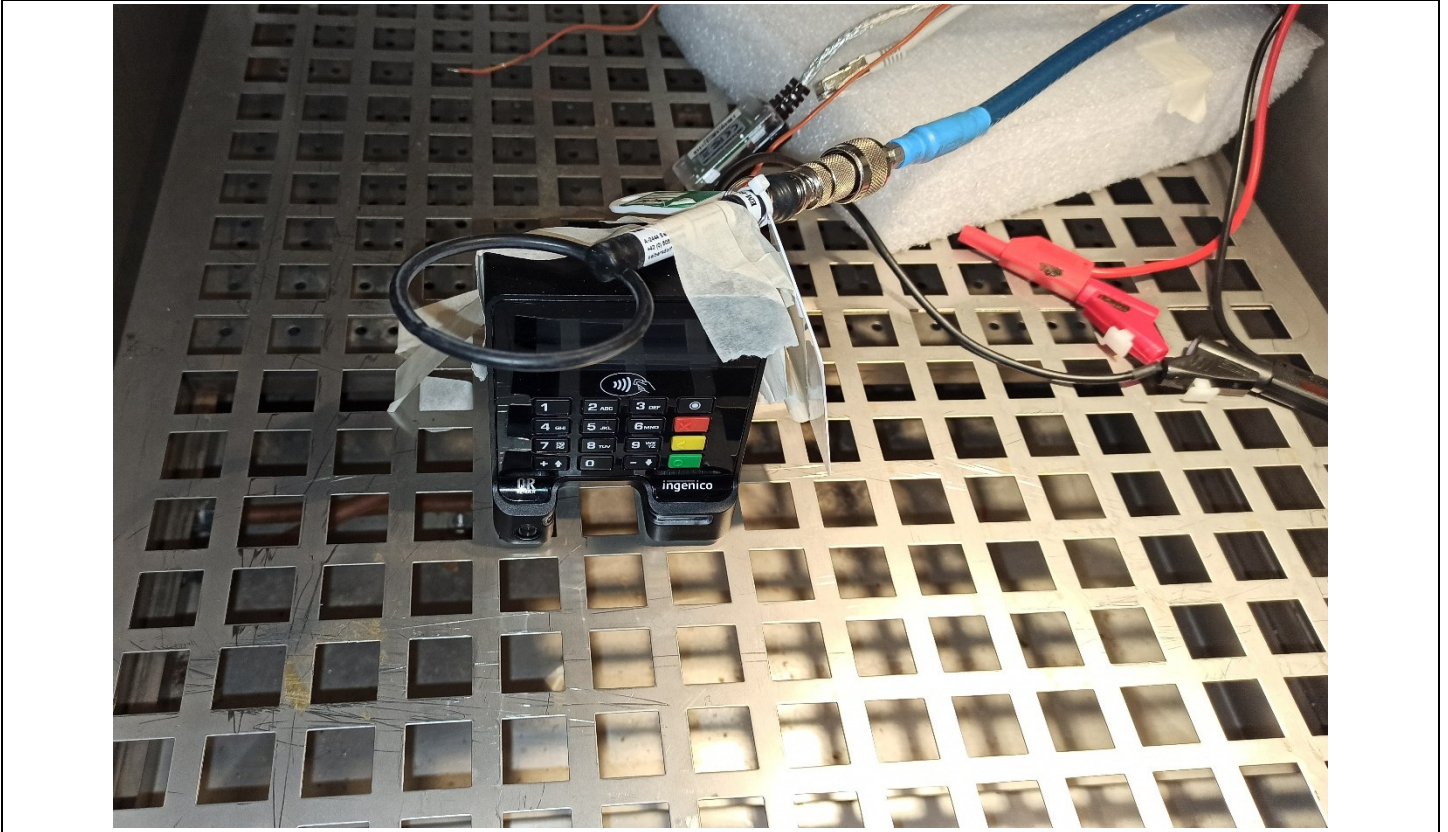
- RSS-Gen Issue 5 § 6.7
  - o RBW used in the range of 1% to 5% of the anticipated emission bandwidth
  - o Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
  - o Detector = Peak.
  - o Trace mode = Max Hold.
  - o Sweep = Auto couple.
  - o Allow the trace to stabilize.
  - o OBW 99% function of spectrum analyzer used



Test set up of Occupied Bandwidth



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Photograph for Occupied bandwidth

### 3.3. LIMIT

None

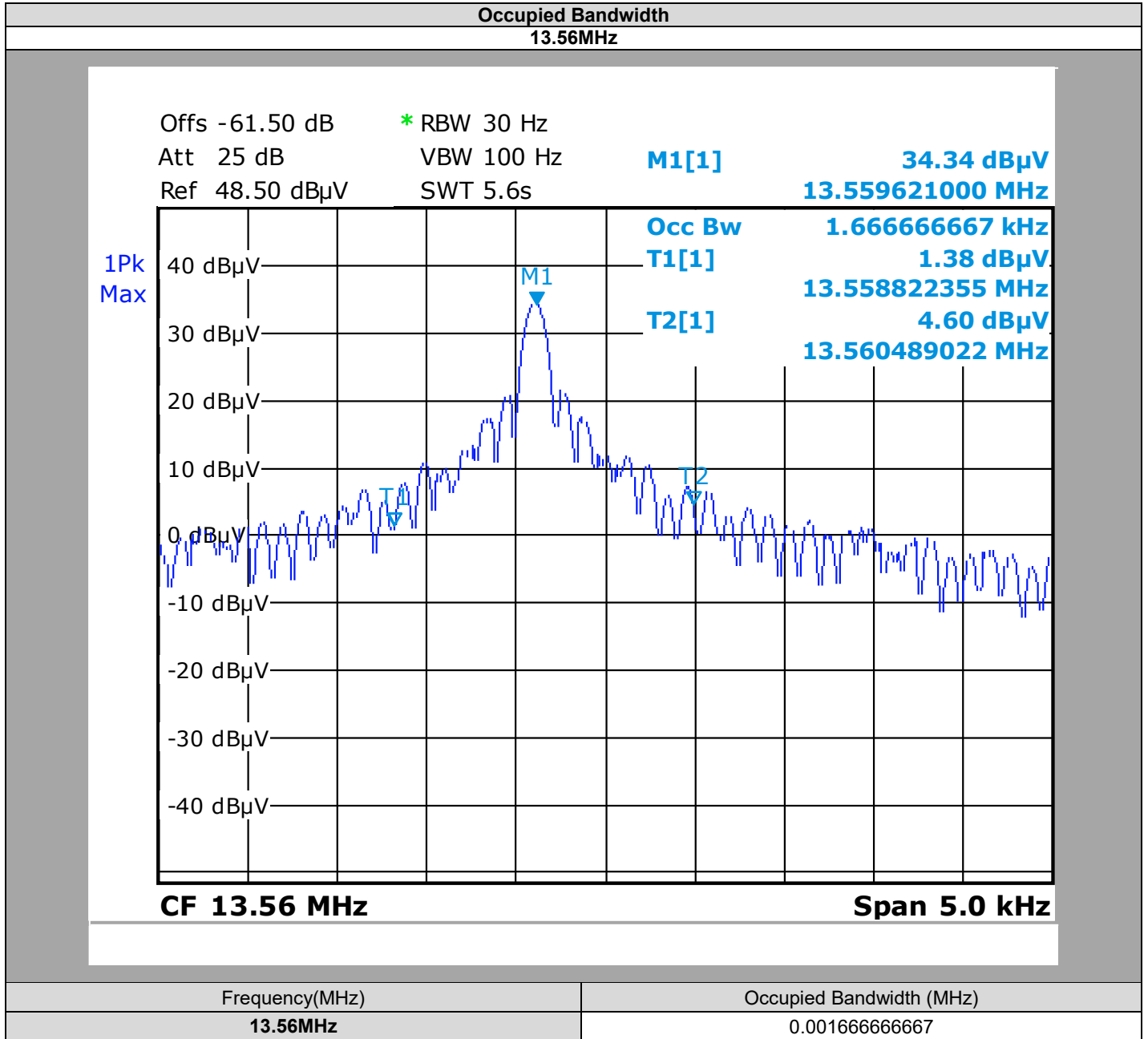
### 3.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
AC source 1kW	KEYSIGHT	AC6802A	A7042305		
Antenna Loop (near field)	ELECTRO-METRICS	EM-6993	C2040215	06/19	06/21
Climatic chamber	BIA CLIMATIC	CL 6-25	D1022117	02/19	06/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
SMA 1.5m	SUCOFLEX	18GHz	A5329863	11/18	06/20
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642020	06/18	06/20
Thermo-hygrometer (PM11/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Thermocouple K (radio)	FLUKE	Type K	B4045005	09/19	09/20
Thermocouple K (radio)	FLUKE	Type K	B4045004	09/19	09/20
Thermometer (radio)	FLUKE	52 II	B4043150	09/19	09/20



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### 3.5. RESULTS



### 3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **INGENICO Self/4000 CL**, SN: **193407313031143912221149**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN** limits.

## 4. FREQUENCY TOLERANCE

### 4.1. TEST CONDITIONS

Test performed by : Mounir BOUAMARA  
Date of test : May 25, 2020 to May 29, 2020  
Ambient temperature : 23 °C  
Relative humidity : 39 %

### 4.2. TEST SETUP

- The Equipment Under Test is installed:

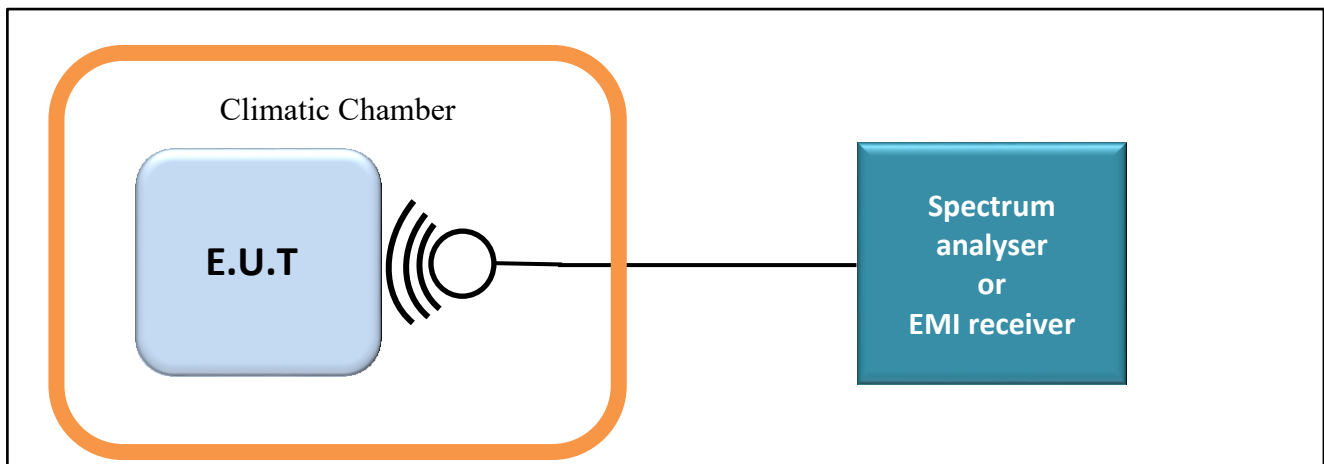
- On a table
- In a climatic chamber
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

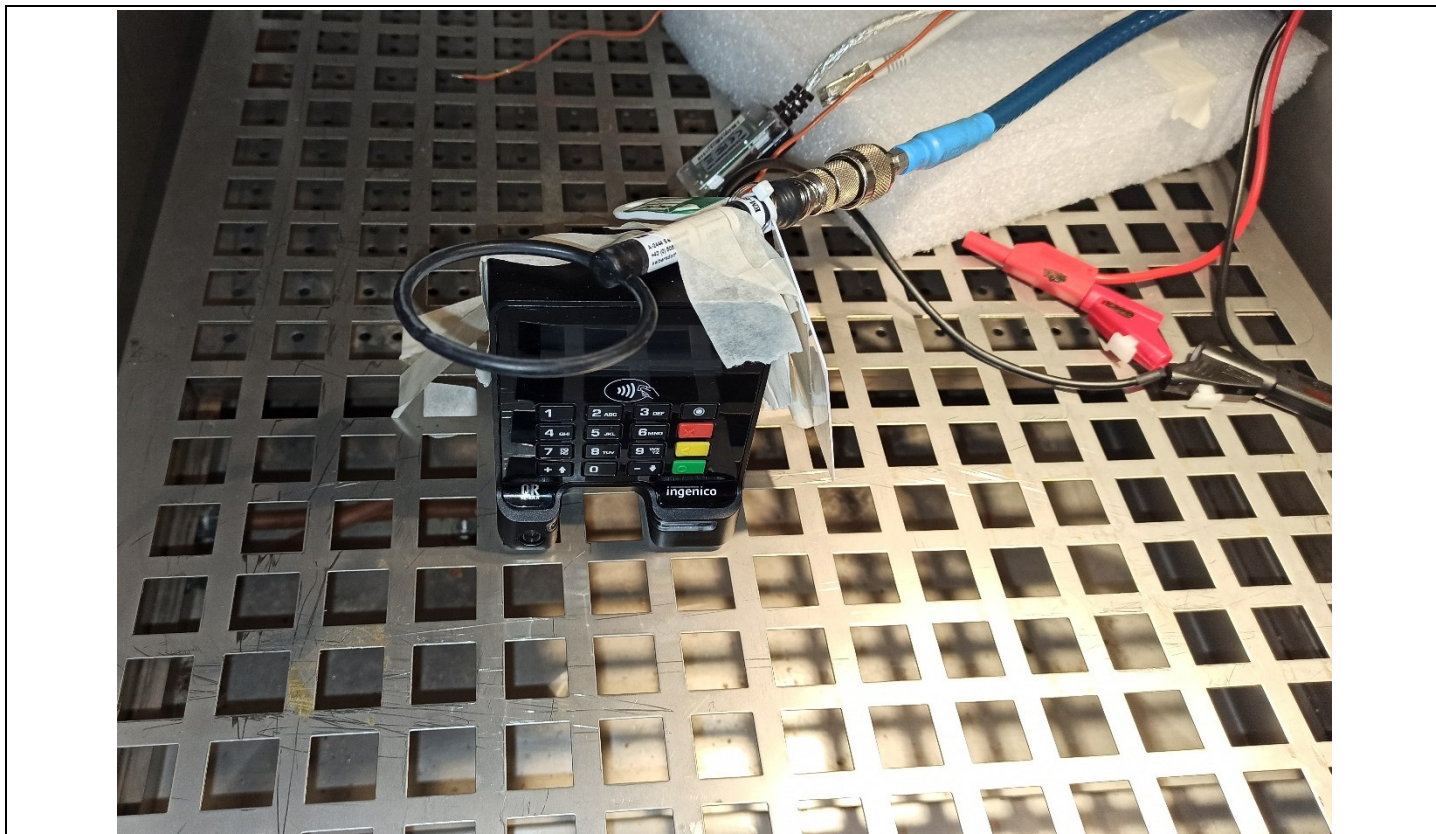
- Test Procedure:

- ANSI C63.10 § 6.8



Test set up of Frequency Tolerance





Photograph for Frequency Tolerance

### 4.3. LIMIT

±0.01% (± 100ppm)

### 4.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
AC source 1kW	KEYSIGHT	AC6802A	A7042305		
Antenna Loop (near field)	ELECTRO-METRICS	EM-6993	C2040215	06/19	06/21
Climatic chamber	BIA CLIMATIC	CL 6-25	D1022117	02/19	06/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
SMA 1.5m	SUCOFLEX	18GHz	A5329863	11/18	06/20
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A2642020	06/18	06/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Thermocouple K (radio)	FLUKE	Type K	B4045005	09/19	09/20
Thermocouple K (radio)	FLUKE	Type K	B4045004	09/19	09/20
Thermometer (radio)	FLUKE	52 II	B4043150	09/19	09/20



#### 4.5. RESULTS

EUT activation:	Startup									
Voltage:	Vnom									
Temperature:	-20°C	-10°C	0°C	10°C	20°C	35°C	45°C	55°C	65°C	
Frequency (MHz)	41.27	41.25	41.25	41.3	41.57	41.10	40.67	40.59	40.46	
Frequency Drift (%)	0.0022%	0.0022%	0.0022%	0.0022%	0.0026%	0.0029%	0.0028%	0.0024%	0.0024%	
EUT activation:	2min									
Voltage:	Vnom									
Temperature:	-20°C	-10°C	0°C	10°C	20°C	35°C	45°C	55°C	65°C	
Frequency (MHz)	41.27	41.25	41.25	41.3	41.57	41.10	40.67	40.59	40.46	
Frequency Drift (%)	0.0022%	0.0022%	0.0022%	0.0022%	0.0026%	0.0029%	0.0028%	0.0024%	0.0024%	
EUT activation:	5min									
Voltage:	Vnom									
Temperature:	-20°C	-10°C	0°C	10°C	20°C	35°C	45°C	55°C	65°C	
Frequency (MHz)	41.27	41.25	41.25	41.3	41.57	41.10	40.67	40.59	40.46	
Frequency Drift (%)	0.0022%	0.0022%	0.0022%	0.0022%	0.0026%	0.0029%	0.0028%	0.0024%	0.0024%	
EUT activation:	10min									
Voltage:	Vnom									
Temperature:	-20°C	-10°C	0°C	10°C	20°C	35°C	45°C	55°C	65°C	
Frequency (MHz)	41.27	41.25	41.25	41.3	41.57	41.10	40.67	40.59	40.46	
Frequency Drift (%)	0.0022%	0.0022%	0.0022%	0.0022%	0.0026%	0.0029%	0.0028%	0.0024%	0.0024%	

Temperature	Tnom		
Voltage:	Vmin	Vnom	Vmax
Frequency (MHz)	41.58	41.57	41.58
Frequency Drift (%)	13,559641	13,559641	13,559601

#### 4.6. CONCLUSION

Frequency tolerance measurement performed on the sample of the product **INGENICO Self/4000 CL**, SN: **193407313031143912221149**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 limits.

## 5. AC POWER LINE CONDUCTED EMISSIONS

### 5.1. ENVIRONMENTAL CONDITIONS

Date of test : February 19, 2020  
 Test performed by : Loïc BOURET  
 Atmospheric pressure (hPa) : January 1, 1900  
 Relative humidity (%) : 30  
 Ambient temperature (°C) : 21

### 5.2. TEST SETUP

#### Mains terminals

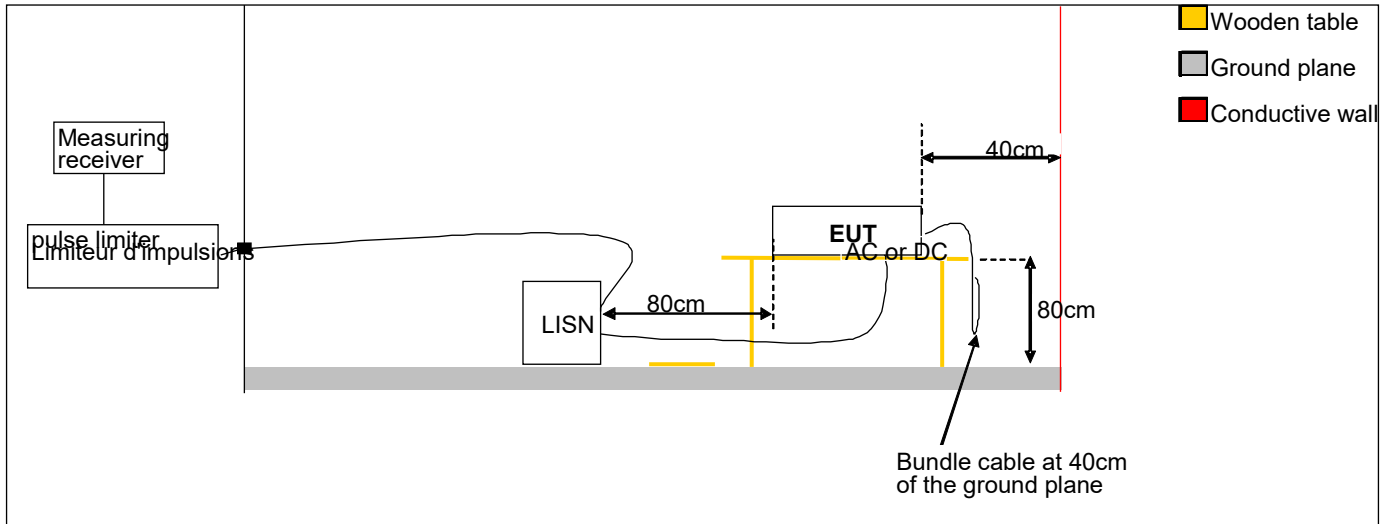
The EUT and auxiliaries are set:

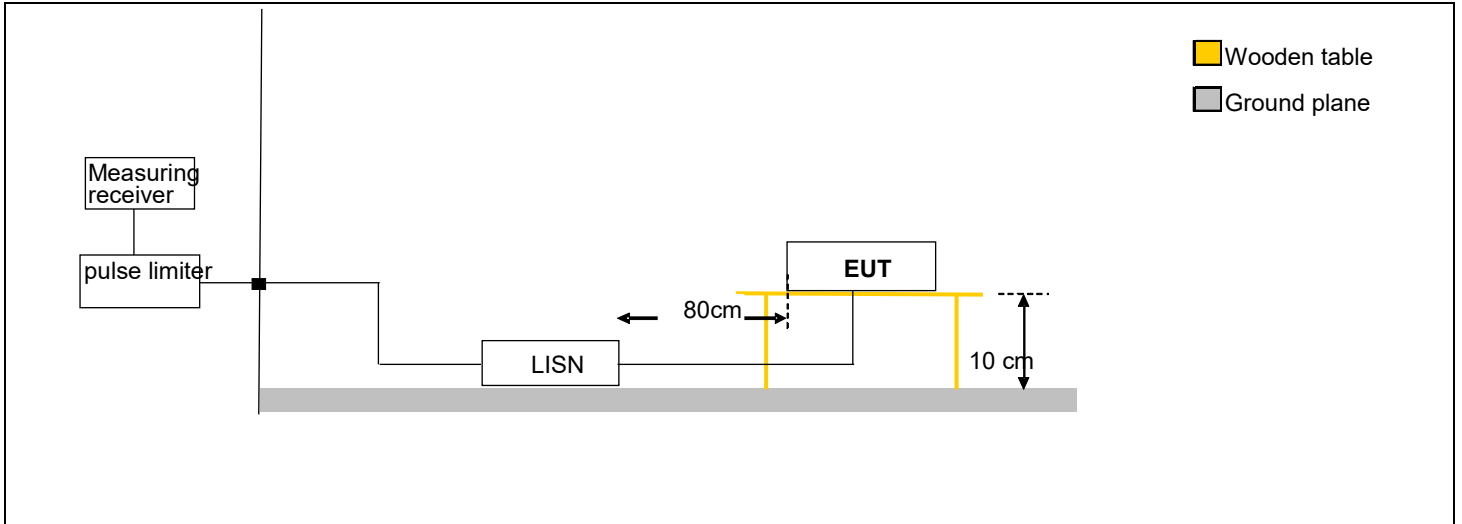
- 40cm from the vertical ground and 80cm above horizontal ground on the non-conducting table (Table-top equipment)
- 40cm above the horizontal ground on the non-conducting table (Table-top equipment)
- 10cm above the ground on isolating support (Floor standing equipment)

The distance between the EUT and the LISN is 80cm.

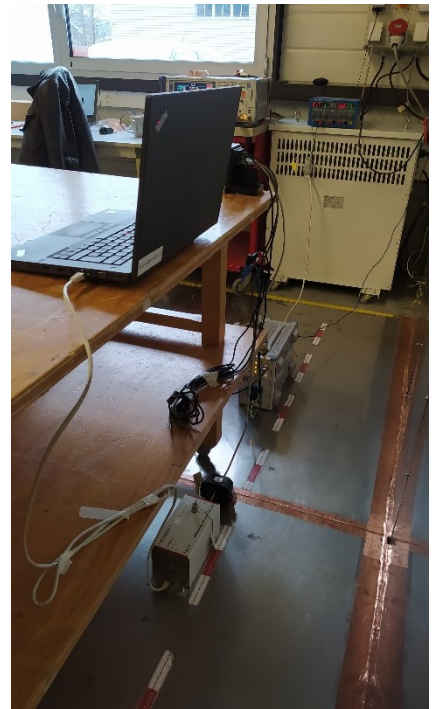
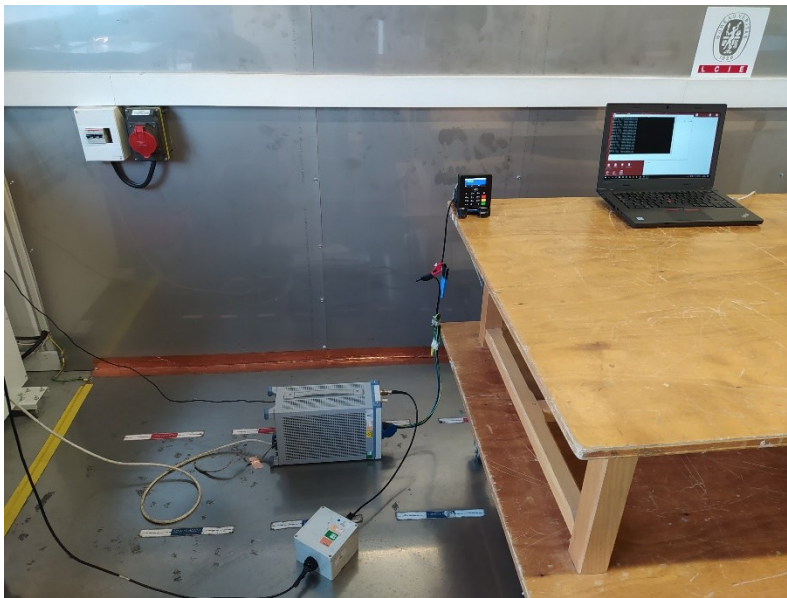
The EUT is powered by  $V_{nom}$ .

The EUT is powered through a LISN (measure). Auxiliaries are powered by another LISN.





Test set up of AC Power Line Conducted Emissions



Test setup



***Telecommunication line***

**Shielded cable:**

Measurement is performed with a current probe on the shield of the cable. A 150 $\Omega$  impedance is connected between the cable's shield and the ground reference plane.



Test setup



### 5.3. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
BAT EMC	NEXIO	v3.19.1.18	L1000115		
Cable + self	-	-	A5329585	12/18	06/20
EMC comb generator	LCIE SUD EST	-	A3169098		
LISN	ROHDE & SCHWARZ	ENV216	C2320291	02/19	06/20
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	12/17	06/20
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Transient limiter	ROHDE & SCHWARZ	ESH3-Z2	A7122204	02/19	06/20
Load 50Ω - N	AEROFLEX	-	A7152067	02/19	06/20
Load 50Ω - BNC	AEROFLEX	-	A7152074	02/19	06/20

### 5.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None                       Divergence:

### 5.5. TEST RESULTS

**Mains terminals:**

**Supply1**

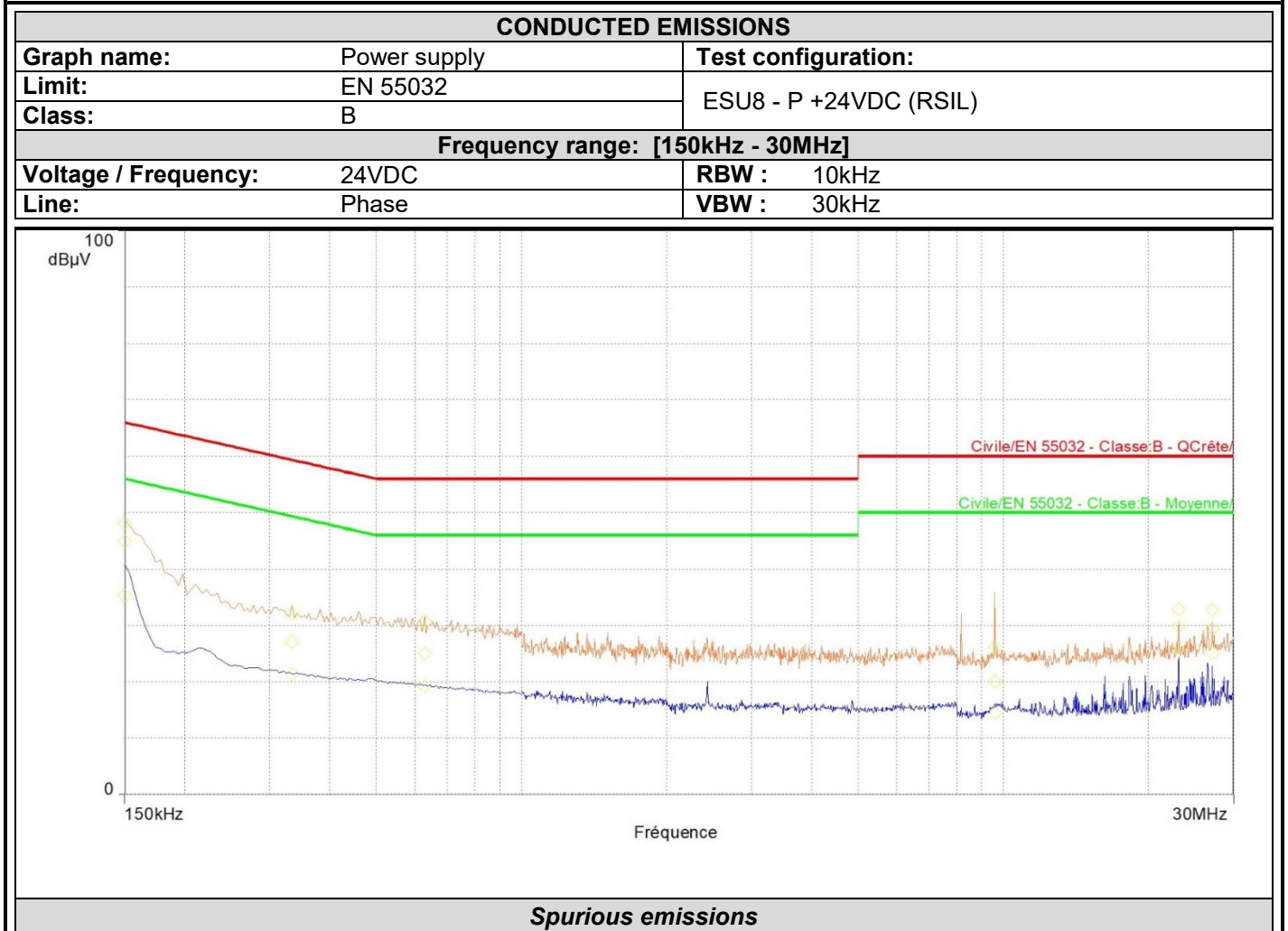
Measurements are performed on the phase (+24VDC) and neutral (0V) of the power line.

**Results: (PEAK detection)**

Graph identifier	Line	Comments
Emc# 1	Phase	- See below
Emc# 2	Neutral	- See below



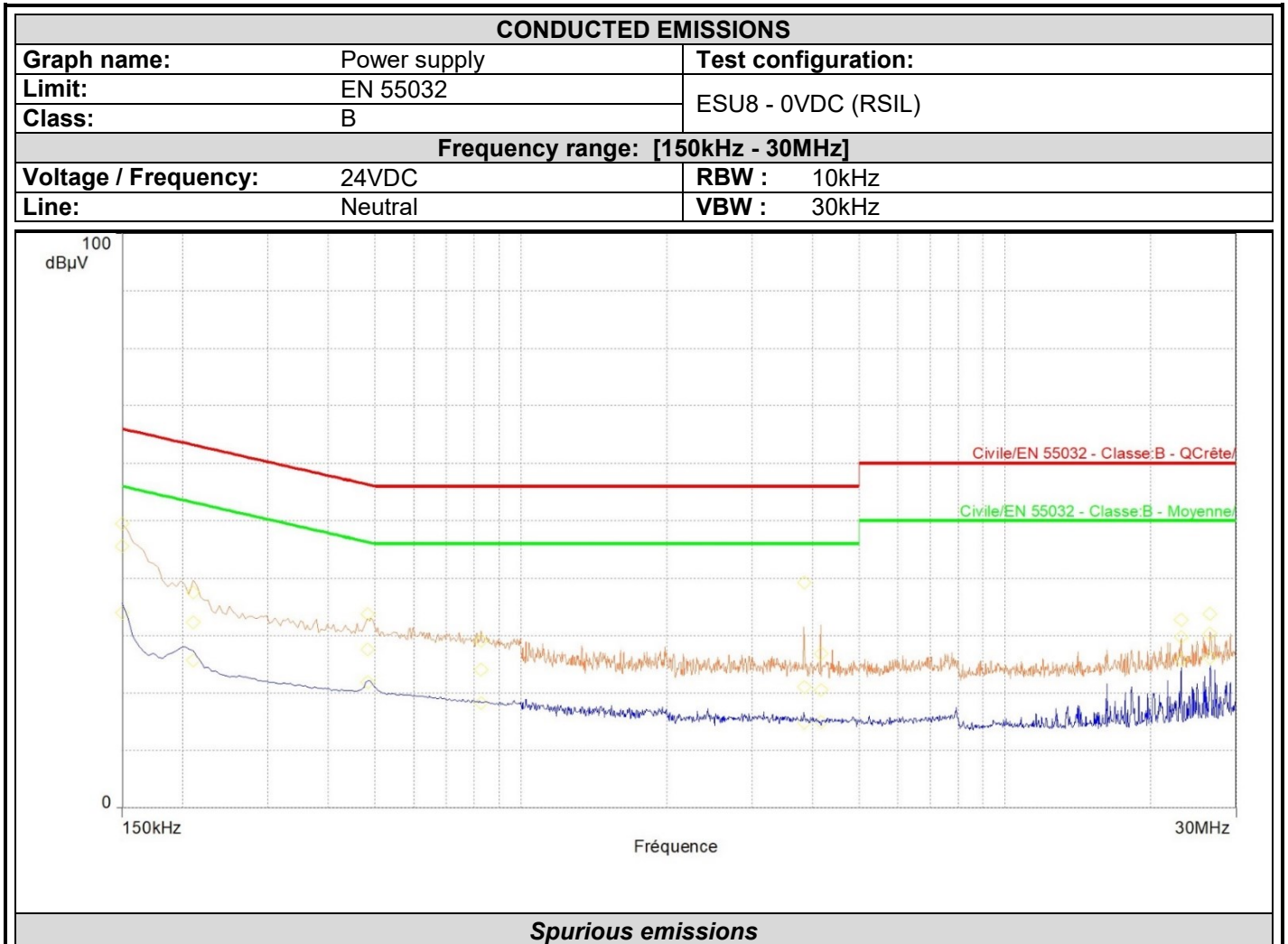
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Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.150	48.2	45.0	66.0	-21.0	35.3	56.0	-20.7	Phase 1	19.4
0.334	32.0	27.1	59.4	-32.3	21.4	49.4	-27.9	Phase 1	19.5
0.630	30.7	25.0	56.0	-31.0	19.3	46.0	-26.7	Phase 1	19.7
9.624	26.1	20.1	60.0	-39.9	14.5	50.0	-35.5	Phase 1	20.2
23.128	32.8	29.9	60.0	-30.1	26.0	50.0	-24.0	Phase 1	21.0
27.160	32.8	29.4	60.0	-30.6	25.0	50.0	-25.0	Phase 1	21.2



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Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPea k (dBµV)	LimQP (dBµV)	Mes.QPea k-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line	Correction (dB)
0.150	49.5	45.6	66.0	-20.4	34.0	56.0	-22.0	Neutre	19.4
0.210	37.5	32.4	63.2	-30.8	25.7	53.2	-27.5	Neutre	19.6
0.482	33.8	27.6	56.3	-28.7	21.9	46.3	-24.4	Neutre	19.6
0.826	29.2	24.1	56.0	-31.9	18.3	46.0	-27.7	Neutre	19.6
3.848	39.2	21.1	56.0	-34.9	14.9	46.0	-31.1	Neutre	19.8
4.172	26.9	20.6	56.0	-35.4	15.0	46.0	-31.0	Neutre	19.8
23.128	32.8	29.7	60.0	-30.3	25.9	50.0	-24.1	Neutre	21.0
26.488	33.8	30.4	60.0	-29.6	26.2	50.0	-23.8	Neutre	21.2



## 5.6. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **INGENICO Self/4000 CL**, SN: **193407313031143912221149**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS Gen limits.

## 6. FIELD STRENGTH OUTSIDE OF THE BANDS 13.110-14.010 MHz

### 6.1. TEST CONDITIONS

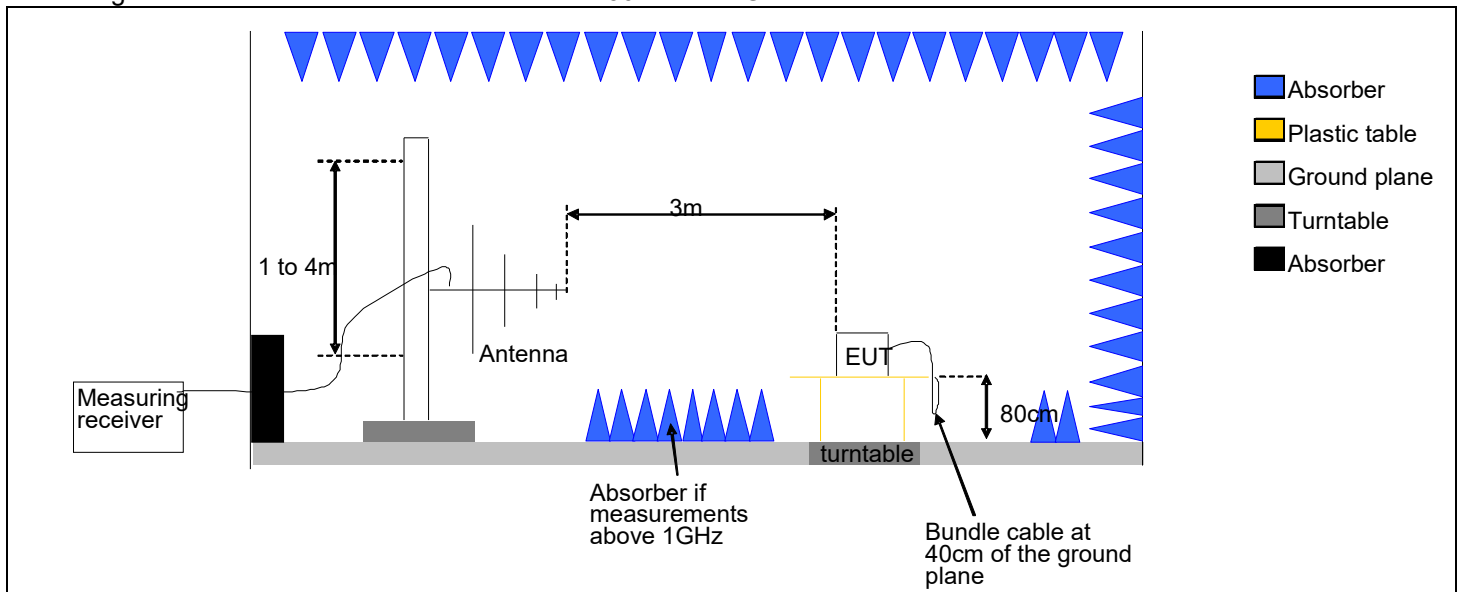
Test performed by : Mounir BOUAMARA  
 Date of test : May 25, 2020 to May 29, 2020  
 Ambient temperature : 23 °C  
 Relative humidity : 39 %

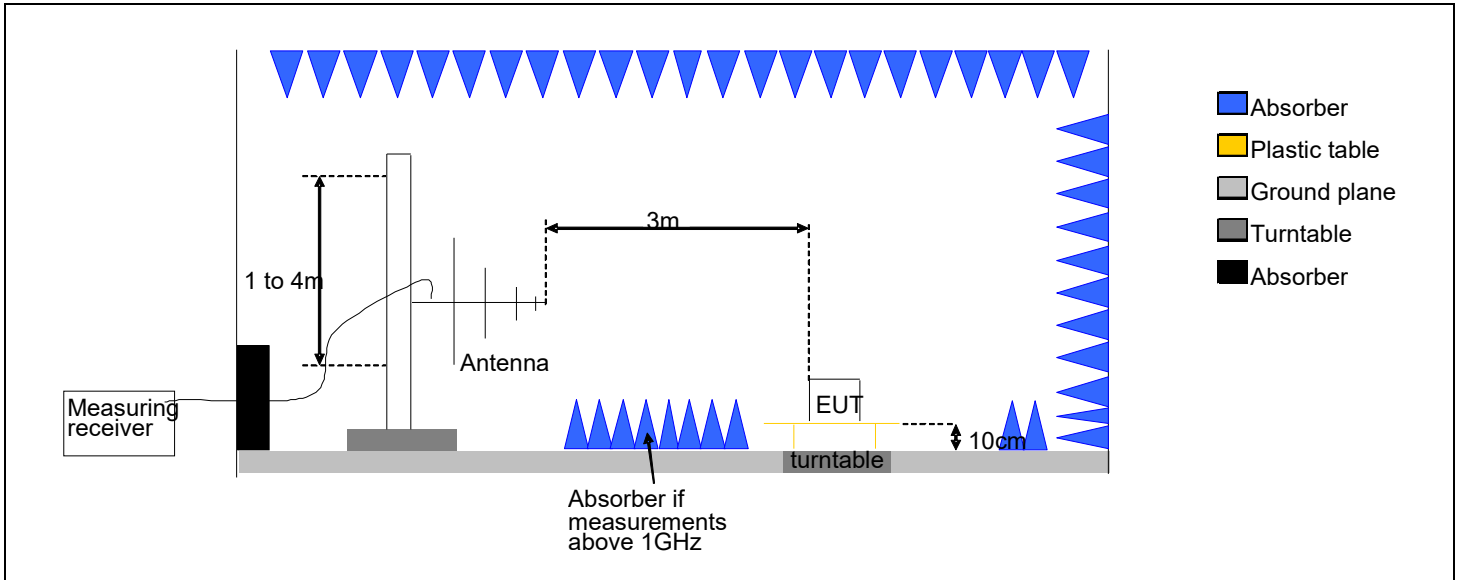
### 6.2. TEST SETUP

The product has been tested according to ANSI C63.10 and FCC part 15 subpart C.

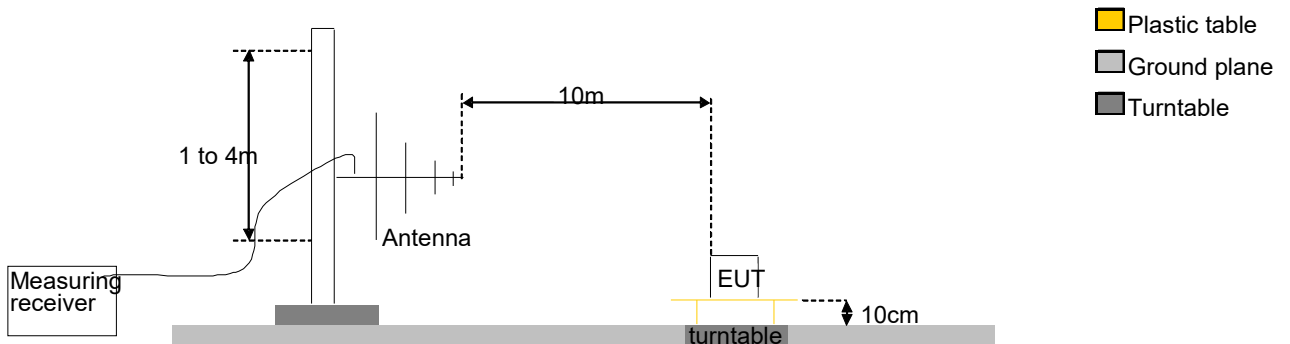
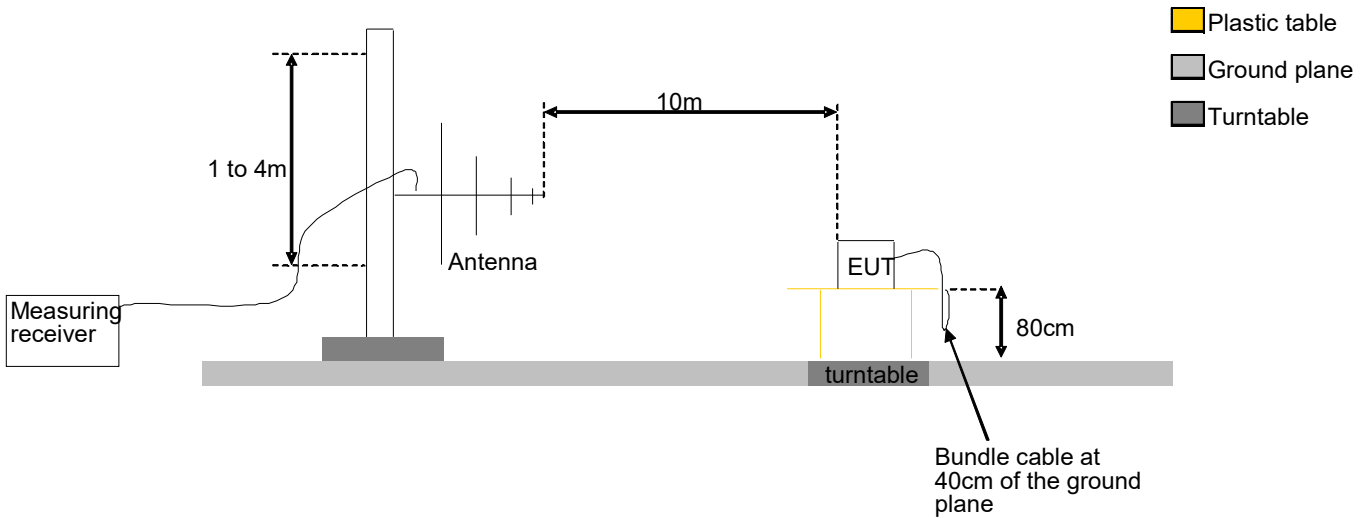
Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height was 1m. The EUT is placed **in a semi-anechoic chamber**. Distance between measuring antenna and the EUT is **3m**.

Test is performed in horizontal (H) and vertical (V) polarization with **biconic and bilog** between 30MHz & 1GHz. Measurement bandwidth was 120kHz below 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. The EUT is placed at 0.8m high under 1GHz. The EUT is placed **in a full anechoic chamber** from 30MHz to 1GHz. Distance between measuring antenna and the EUT is **Distance**. The height antenna is varied from 1m to 4m from 30MHz to 1GHz.



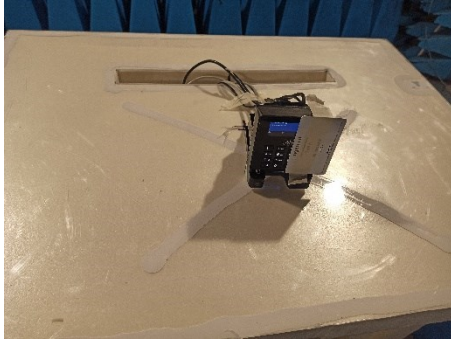
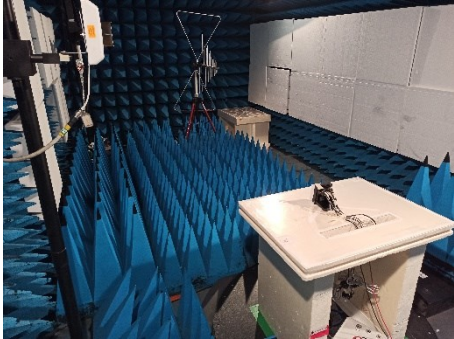


Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber



Test Set up for radiated measurement in open area test site





Axis XY on anechoic chamber (80cm)



Axis XY on OATS (80cm)

Photograph for Field strength outside of the bands 13.110-14.010 MHz





L C I E

### 6.3. LIMIT

Measure at 300m		
Frequency range	Level	Detector
9kHz-490kHz	67.6dB $\mu$ V/m /F(kHz)	QPeak
Measure at 30m		
Frequency range	Level	Detector
490kHz-1.705MHz	87.6dB $\mu$ V/m /F(kHz)	QPeak
1.705MHz-30MHz	29.5dB $\mu$ V/m	QPeak
Measure at 10m		
Frequency range	Level	Detector
30MHz to 88MHz	29.5dB $\mu$ V/m	QPeak
88MHz to 216MHz	33dB $\mu$ V/m	QPeak
216MHz to 960MHz	35.5B $\mu$ V/m	QPeak
960MHz to 1000MHz	43.5dB $\mu$ V/m	QPeak
Above 1000MHz	63.5dB $\mu$ V/m	Peak
	43.5dB $\mu$ V/m	Average
Measure at 3m		
Frequency range	Level	Detector
30MHz to 88MHz	40dB $\mu$ V/m	QPeak
88MHz to 216MHz	43.5dB $\mu$ V/m	QPeak
216MHz to 960MHz	46B $\mu$ V/m	QPeak
960MHz to 1000MHz	54dB $\mu$ V/m	QPeak
Above 1000MHz	74dB $\mu$ V/m	Peak
	54dB $\mu$ V/m	Average



#### 6.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Amplifier 9kHz - 40GHz	LCIE SUD EST	_	A7102082	10/18	06/20
Antenna Bi-Log	CHASE	UPA6192	C2040221	01/18	06/20
Antenna Loop	ELECTRO-METRICS	EM-6879	C2040052	06/19	06/21
BAT EMC	NEXIO	v3.19.1.18	L1000115		
Comb EMR HF	YORK	CGE01	A3169114		
Emission Cable (SMA 30cm)	TELEDYNE	26GHz	A5329873	01/19	07/20
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329562	08/19	08/20
Emission Cable <1GHz (Ampl <-> Cage)	-	18GHz	A5329907	08/19	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
Radiated emission comb generator	BARDET	_	A3169050		
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	12/17	06/20
Rehausse Table C3	LCIE	_	F2000511		
Semi-Anechoic chamber #3 (BF)	SIEPEL	_	D3044017_BF	12/19	12/22
Semi-Anechoic chamber #3 (VSWR)	SIEPEL	_	D3044017_VSWR	12/19	12/22
Spectrum analyzer	ROHDE & SCHWARZ	FSU 26	A4060058	09/19	09/21
Table C3	LCIE	_	F2000461		
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371		
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444		
Antenna Mat (OATS)	ETS Lingren	2071-2	F2000392		
Cable (OATS)	_	1GHz	A5329623	05/20	05/21
Emission Cable	SUCOFLEX	6GHz	A5329061	02/19	08/20
OATS	_	_	F2000409	04/20	04/21
Rehausse Table C1/OATS	LCIE	_	F2000512		
Table C1/OATS	LCIE	_	F2000445		
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372		

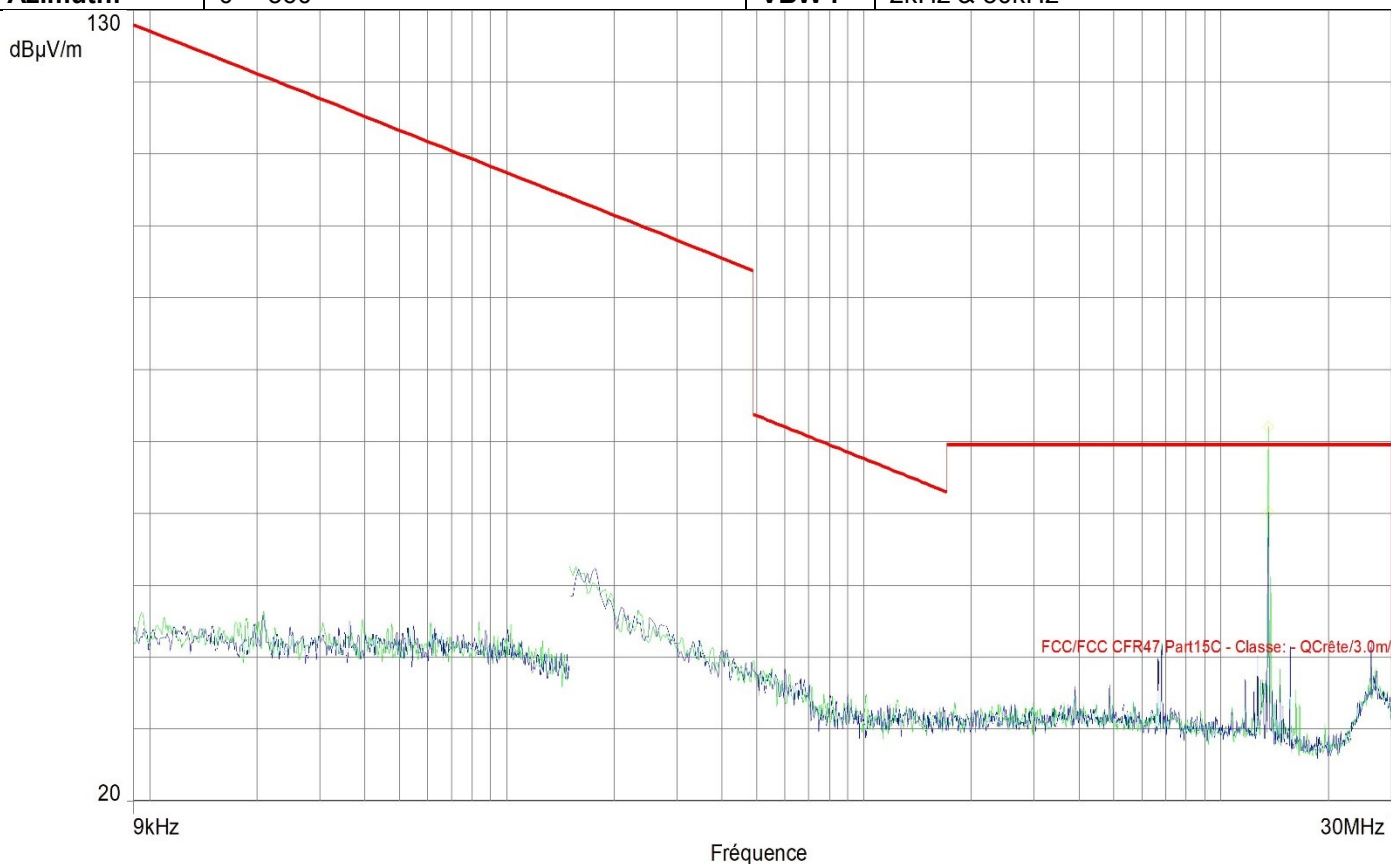
#### 6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:

## 6.6. RESULTS

TYPE A Configuration

RADIATED EMISSIONS			
<b>Graph name:</b>	Emr#1	<b>Test configuration:</b>	
<b>Limit:</b>	FCC CFR47 Part15C	(0°/90°) - Cnom - TX mode - Axis XY type A	
<b>Class:</b>			
<b>Frequency range: [9kHz - 30MHz]</b>			
<b>Antenna polarization:</b>	0/90°	<b>RBW :</b>	500Hz & 10kHz
<b>Azimuth:</b>	0° - 360°	<b>VBW :</b>	2kHz & 30kHz



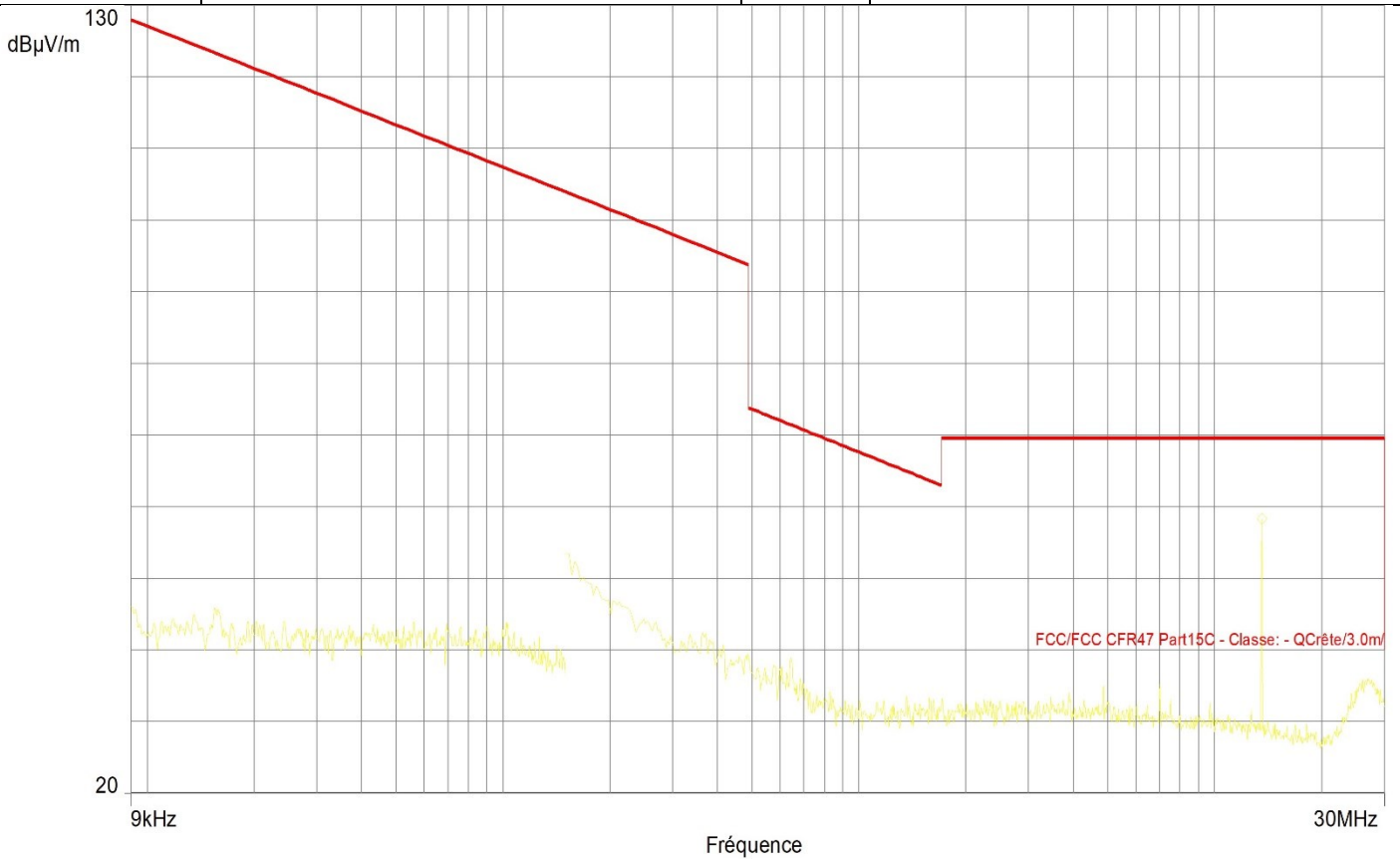
### Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
13.559	60.1	69.5	-9.4	0°	37.7
13.559	72.0	69.5	2.5	90°	37.7



L C I E

RADIATED EMISSIONS			
<b>Graph name:</b>	Emr#2	<b>Test configuration:</b>	
<b>Limit:</b>	FCC CFR47 Part15C	(180°) - Cnom - TX mode - Axis XY type A	
<b>Class:</b>			
Frequency range: [9kHz - 30MHz]			
<b>Antenna polarization:</b>	180°	<b>RBW :</b>	500Hz & 10kHz
<b>Azimuth:</b>	0° - 360°	<b>VBW :</b>	2kHz & 30kHz



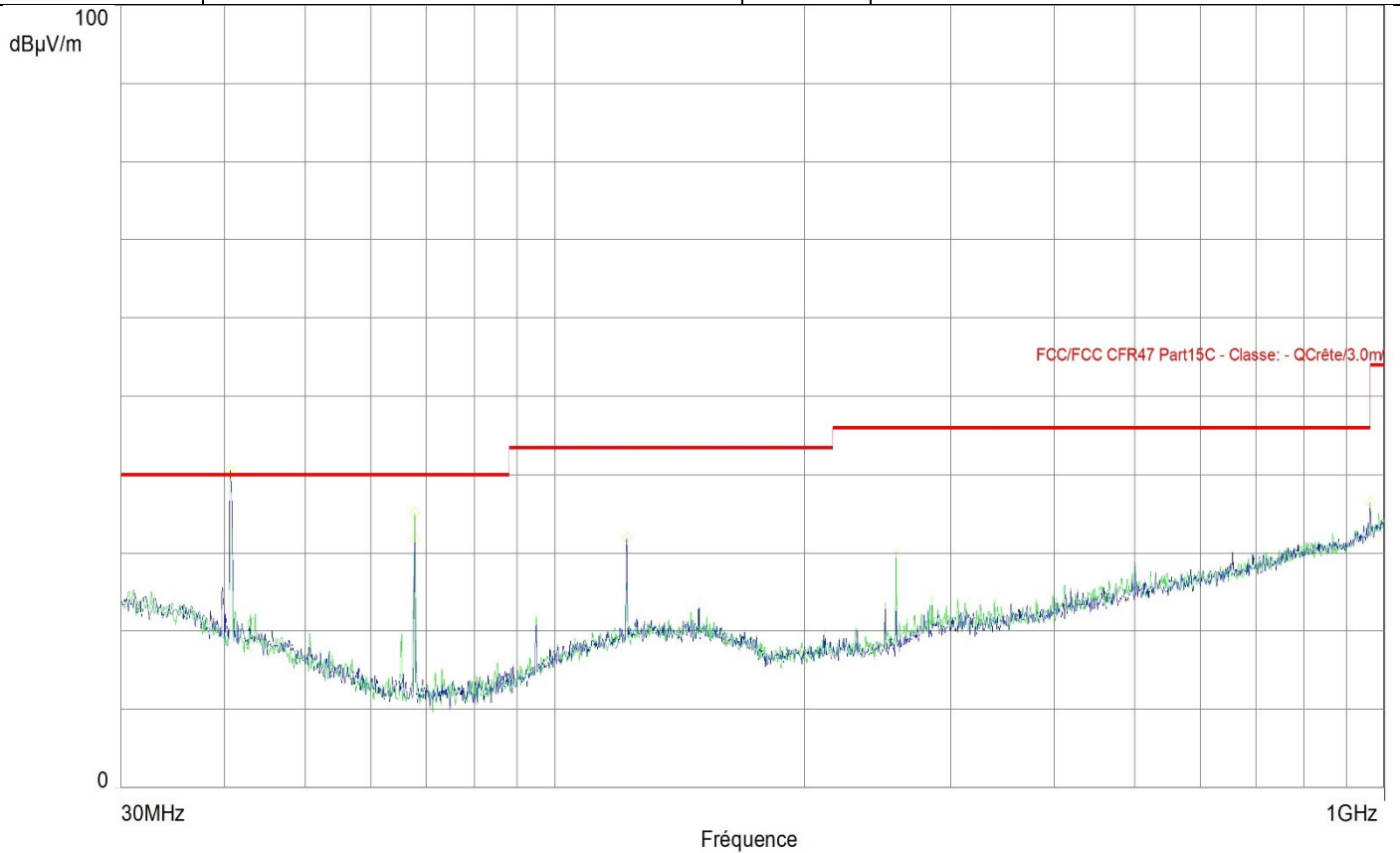
**Spurious emissions**

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
13.562	58.3	69.5	-11.2	180°	37.7



L C I E

RADIATED EMISSIONS			
<b>Graph name:</b>	Emr#3	<b>Test configuration:</b>	
<b>Limit:</b>	FCC CFR47 Part15C	(H+V) - CNom - TX mode - Axis XY type A	
<b>Class:</b>			
<b>Frequency range: [30MHz - 1GHz]</b>			
<b>Antenna polarization:</b>		<b>RBW :</b>	100kHz
<b>Azimuth:</b>	0° - 360°	<b>VBW :</b>	300kHz



**Spurious emissions**

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
67.733*	31.7	40.0	-8.3	Horizontal	11.2
67.733*	35.1	40.0	-4.9	Vertical	11.2



**Final measurement:**

9kHz to 30MHz					
Polarization	Frequency(MHz)	QPeak Level(dBµV/m)	Limit (dBµV/m)	Margin QPeak (dBµV/m)	Comment
Horizontal	27.12	20.7	29.5	-8.3	Type B

**Final measurement:**

30MHz to 1GHz					
Polarization	Frequency(MHz)	QPeak Level (dBµV/m)	Limit (dBµV/m)	Margin QPeak (dBµV/m)	Comment
Vertical	40.680	38.8	40.0	-1.2	Type B
Vertical	40.680	32.8	40.0	-7.2	Type A
Vertical	67.800	35.9	40.0	-4.1	Type B
Vertical	67.800	36.2	40.0	-3.8	Type A
Vertical	122.053	37.9	43.5	-5.6	Type B
Vertical	122.053	37.4	43.5	-6.1	Type A

**6.7. CONCLUSION**

Field strength outside of the bands 13.110-14.010 MHz measurement performed on the sample of the product **INGENICO Self/4000 CL**, SN: **193407313031143912221149**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS-Gen limits.

## 7. FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHZ

### 7.1. TEST CONDITIONS

Test performed by : Mounir BOUAMARA  
 Date of test : May 25, 2020 to May 29, 2020  
 Ambient temperature : 23 °C  
 Relative humidity : 39 %

### 7.2. TEST SETUP

Measurement procedure:

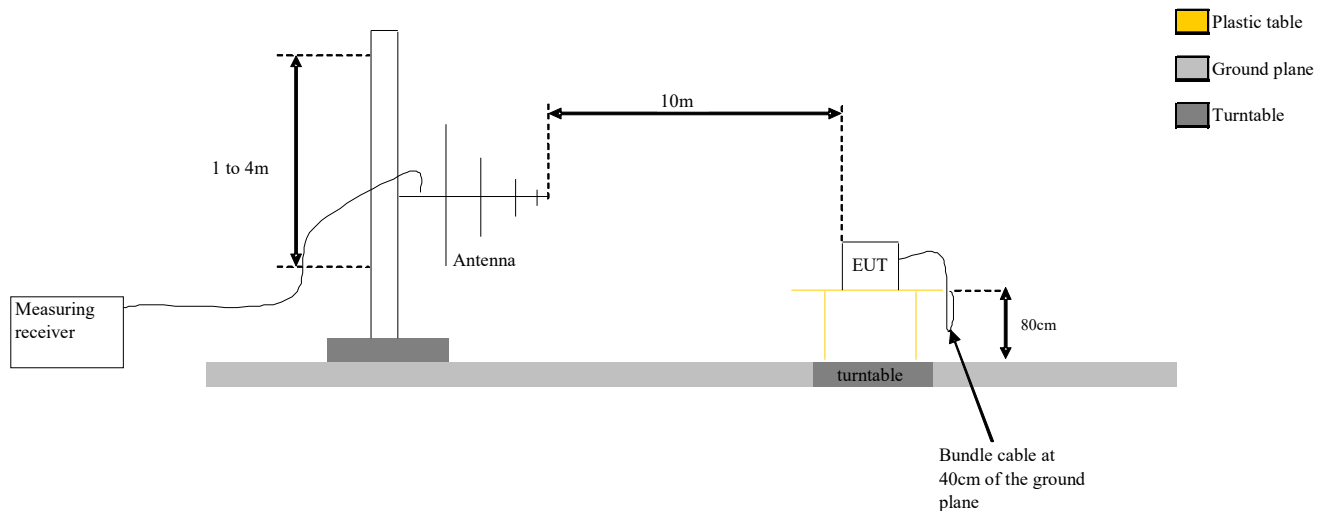
- Open Area Test Site
- Open Area Test Site + Test fixture in climatic chamber

The product has been tested according to ANSI C63.10.

The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **10m**.

Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz.

Measurement bandwidth was 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height search was performed from 1 to 4m. The EUT is place at 0.8m.



Test Set up for radiated measurement in open area test site

For measurement with test fixture is used, the power level calibration of the spectrum analyzer shall then be related to the power level or field strength measured with temperature during OATS measure taking in consideration in climatic chamber. The calculation will be used to calculate the absolute level of the sideband power.

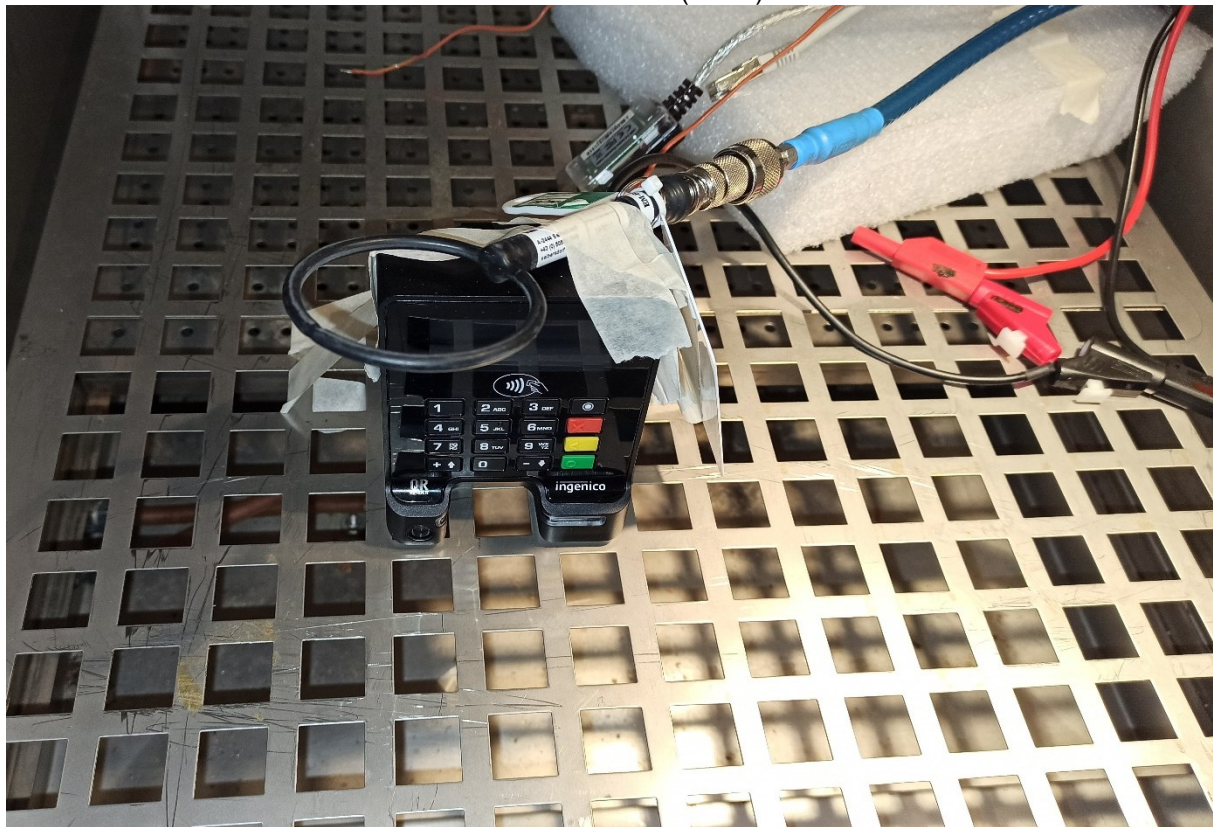
### Frequency band 13.110-14.010MHz

Following plots show radiated emission level in the frequency band 13.110-14.010MHz with a RBW of 9kHz and a quasi-peak detector. The graphs are obtained with a measuring receiver.





Axis XY on OATS (80cm)



Setup in climatic chamber

Photograph for Field strength within the band 13.110-14.010MHz





### 7.3. LIMIT

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ ) @30m	Field strength ( $\text{dB}\mu\text{V/m}$ ) @30m	Field strength ( $\text{dB}\mu\text{V/m}$ ) @3m
13.553-13.567	15 848	84.0	124.0
13.410-13.553 13.567-13.710	334.0	50.5	90.5
13.110-13.410 13.710-14.010	106.0	40.5	80.5
Below 13.110MHz Above 14.010MHz	30.0	29.5	69.5

### 7.4. TEST EQUIPMENT LIST

TEST EQUIPMENT USED					
Description	Manufacturer	Model	Identifier	Cal_Date	Cal_Due
Antenna Bi-log	CHASE	CBL6111A	C2040051	06/19	06/20
Antenna Mat (OATS)	ETS Lingren	2071-2	F2000392		
BAT EMC	NEXIO	v3.19.1.18	L1000115		
Cable (OATS)	–	1GHz	A5329623	05/20	05/21
Emission Cable	SUCOFLEX	6GHz	A5329061	02/19	08/20
Multimeter - CEM	FLUKE	87	A1240251	11/18	11/20
OATS	–	–	F2000409	04/20	04/21
Radiated emission comb generator	BARDET	–	A3169050		
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	12/17	04/20
Rehausse Table C1/OATS	LCIE	–	F2000512		
Table C1/OATS	LCIE	–	F2000445		
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/18	08/20
Turntable (OATS)	ETS Lingren	Model 2187	F2000403		
Turntable / Mast controller (OATS)	ETS Lingren	Model 2066	F2000372		

### 7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:





## 7.7. CONCLUSION

Field strength within the band 13.110-14.010MHz measurement performed on the sample of the product **INGENICO Self/4000 CL**, SN: **193407313031143912221149**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 limits.

## 8. UNCERTAINTIES CHART

47 CFR Part 15.209 & 15.207 Kind of test	Wide uncertainty laboratory (k=2) ±x(dB) / (Hz)/ ms	Uncertainty limit
Measurement of conducted disturbances in voltage on the AC power port (9 kHz – 150 kHz)	2,67	3.8
Measurement of conducted disturbances in voltage on the AC power port (150 kHz – 30 MHz)	2,67	3.4
Measurement of conducted disturbances in voltage on the telecommunication port. (AAN)	3,67	5.0
Measurement of conducted disturbances in current (current clamp)	2,73	2.9
Measurement of disturbance power	2,67	4.5
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC V01	4,48	/
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC C01	4,48	/
Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the OATS (Ecuellas)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuellas site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuellas)	4,99	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC C01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC C01	5,16	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC V01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC V01	5,15	6.3
Measurement of radiated electric field from 1 to 6 GHz C01	5,1	5.2
Measurement of radiated electric field from 1 to 6 GHz V01	4,85	5.2
Measurement of radiated magnetic field from 10kHz to 30MHz on the OATS (Ecuellas)	4,48	/

The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the CISPR. The conformity of the sample is directly established by the applicable limits values. This table includes all uncertainties maximum feasible for testing in the laboratory, whether or not made in this report