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	**Payment Terminal**
Trade mark	**INGENICO**
Manufacturer	**INGENICO**
Model under test	**Self/4000 CL**
Serial number	**193407313031143912221149**
FCC ID	**XKB-SELF4000**
IC	**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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PUBLICATION HISTORY

Version	Date	Author	Modification
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

1. TEST PROGRAM 4
2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER) 5
3. OCCUPIED BANDWIDTH 9
4. FREQUENCY TOLERANCE 12
5. AC POWER LINE CONDUCTED EMISSIONS 15
6. FIELD STRENGTH OUTSIDE OF THE BANDS 13.110-14.010 MHZ 22
7. FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHZ 31
8. UNCERTAINTIES CHART 36

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	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
AC Power Line Conducted Emission	☑ **PASS**	☐ **FAIL**	☐ **NA(2)**	☐ **NP(1)**
Frequency Tolerance	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Field strength within the band 13.110-14.010MHz	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Field strength outside of the bands 13.110-14.010 MHz	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Receiver Radiated Emissions	☐ **PASS (3)**	☐ **FAIL**	☑ **NA**	☐ **NP(1)**
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: 19340731303114391222114 9**

Equipment Under Test

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	☐ AC ☑ DC ☐ Battery	12		

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
2	USB A	-	☐	☐	☐	
1	RJ45	-	☐	☐	☐	
2	RJ11	-	☐	☐	☐	
1	USB B	-	☐	☐	☐	
1	Power Supply	-	☐	☐	☐	

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop			Use to set the EUT

Equipment information:

Type:	☑ **RFID**			
Frequency band:	[13.553 to 13.567] MHz			
Number of Channel:	1			
Antenna Type:	☑ Integral	☐ External	☐ Dedicated	
Transmit chains:	1			
Receiver chains	1			
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Equipment arrangement:	☐ Tabletop	☐ Floor-standing	☐ Multiple orientations	
Equipment type:	☐ Production model	☐ Pre-production model		
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C	☑ -20°C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☐ 50°C	☑ 65°C
Operating voltage:	Vmin:	☐ 102V/60Hz	☑ 9Vdc	
	Vnom:	☐ 120V/60Hz	☑ 12Vdc	
	Vmax:	☐ 138V/60Hz	☑ 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	☑ Test mode 1	☐ Alternative test mode()
Frequency Tolerance	☑ Test mode 1	☐ Alternative test mode()
AC Power Line Conducted Emission	☑ Test mode 1	☐ Alternative test mode()
Field strength within the band 13.110-14.010MHz	☑ Test mode 1	☐ Alternative test mode()
Field strength outside of the bands 13.110-14.010 MHz	☑ Test mode 1	☐ Alternative test mode()
Receiver Radiated Emissions	☑ Test mode 2 (1)	☐ 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 52.5dBµV 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 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/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

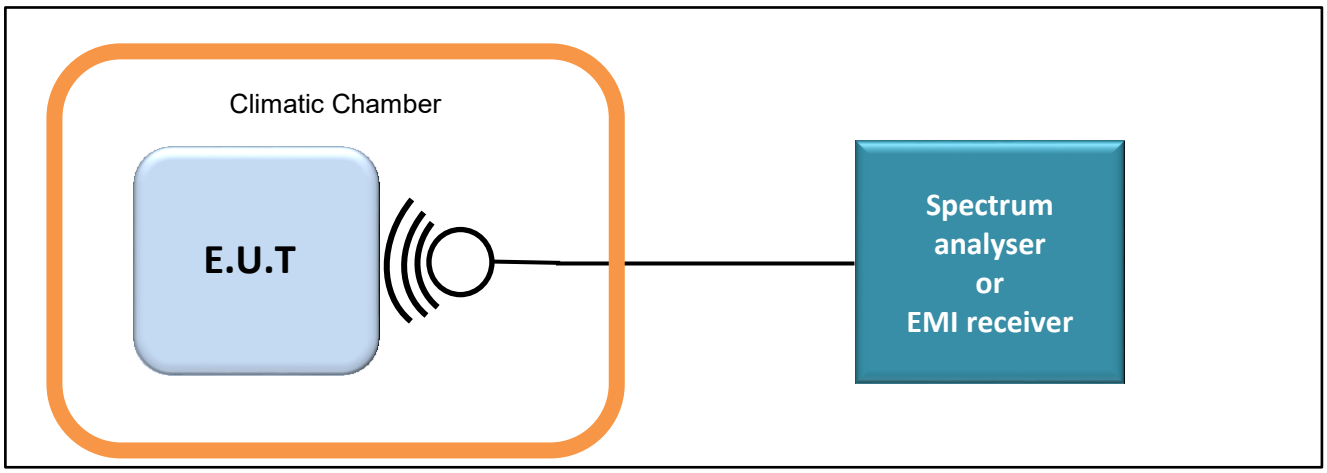
Test performed by	: Mounir BOUAMARA
Date of test	: May 25, 2020 to May 29, 2020
Ambient temperature	: 23 °C
Relative humidity	: 39 %

3.2. TEST SETUP

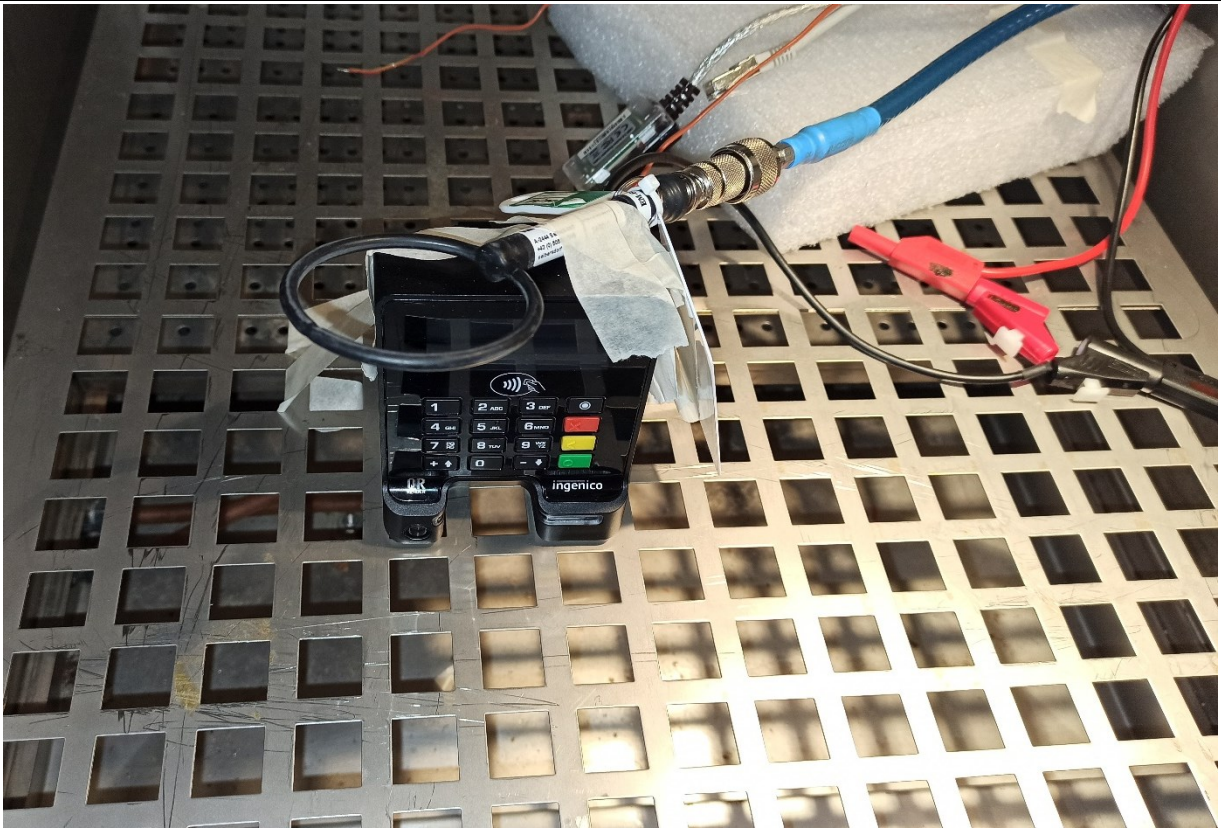
- The Equipment Under Test is installed:
☐ On a table
☑ In a climatic chamber
☐ In an anechoic chamber

- 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
- RBW used in the range of 1% to 5% of the anticipated emission bandwidth
- Set the video bandwidth (VBW) ≥ 3 x RBW.
- Detector = Peak.
- Trace mode = Max Hold.
- Sweep = Auto couple.
- Allow the trace to stabilize.
- OBW 99% function of spectrum analyzer used



Test set up of Occupied Bandwidth



Photograph for Occupied bandwidth

3.3. LIMIT

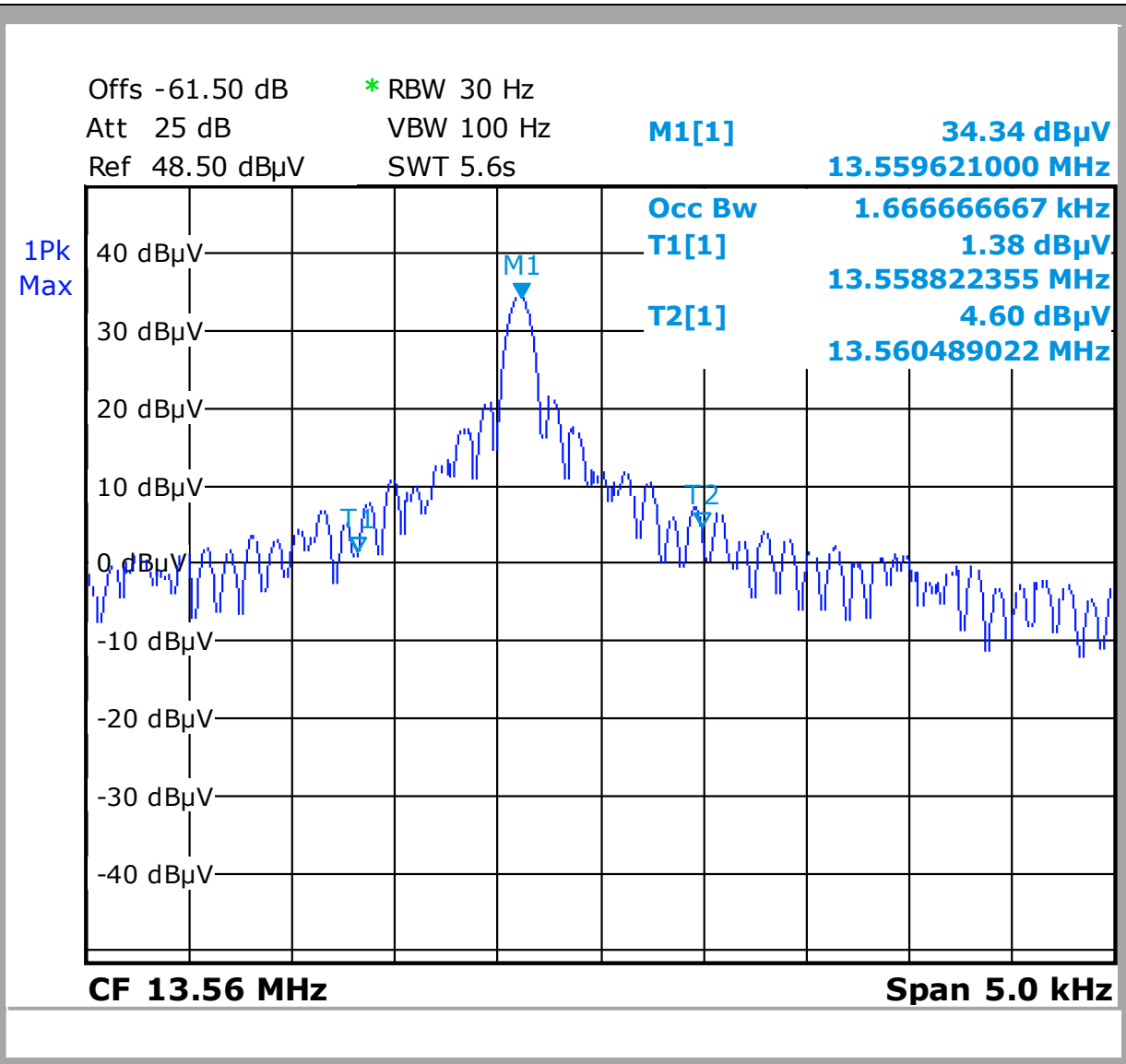
None

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 (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

3.5. RESULTS

Occupied Bandwidth
13.56MHz



Frequency(MHz)	Occupied Bandwidth (MHz)
13.56MHz	0.001666666667

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

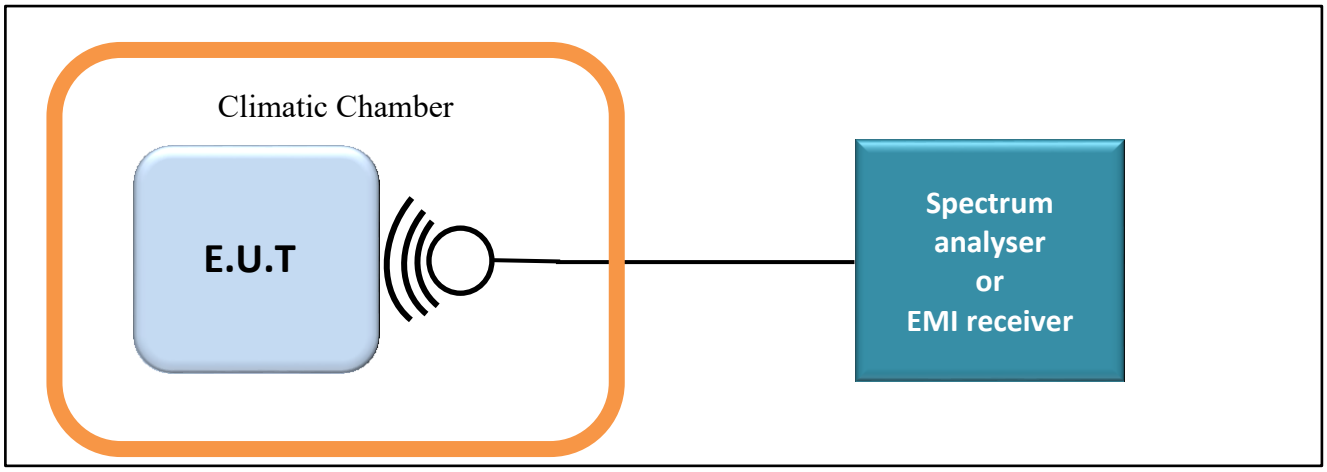
Test performed by	: Mounir BOUAMARA
Date of test	: May 25, 2020 to May 29, 2020
Ambient temperature	: 23 °C
Relative humidity	: 39 %

4.2. TEST SETUP

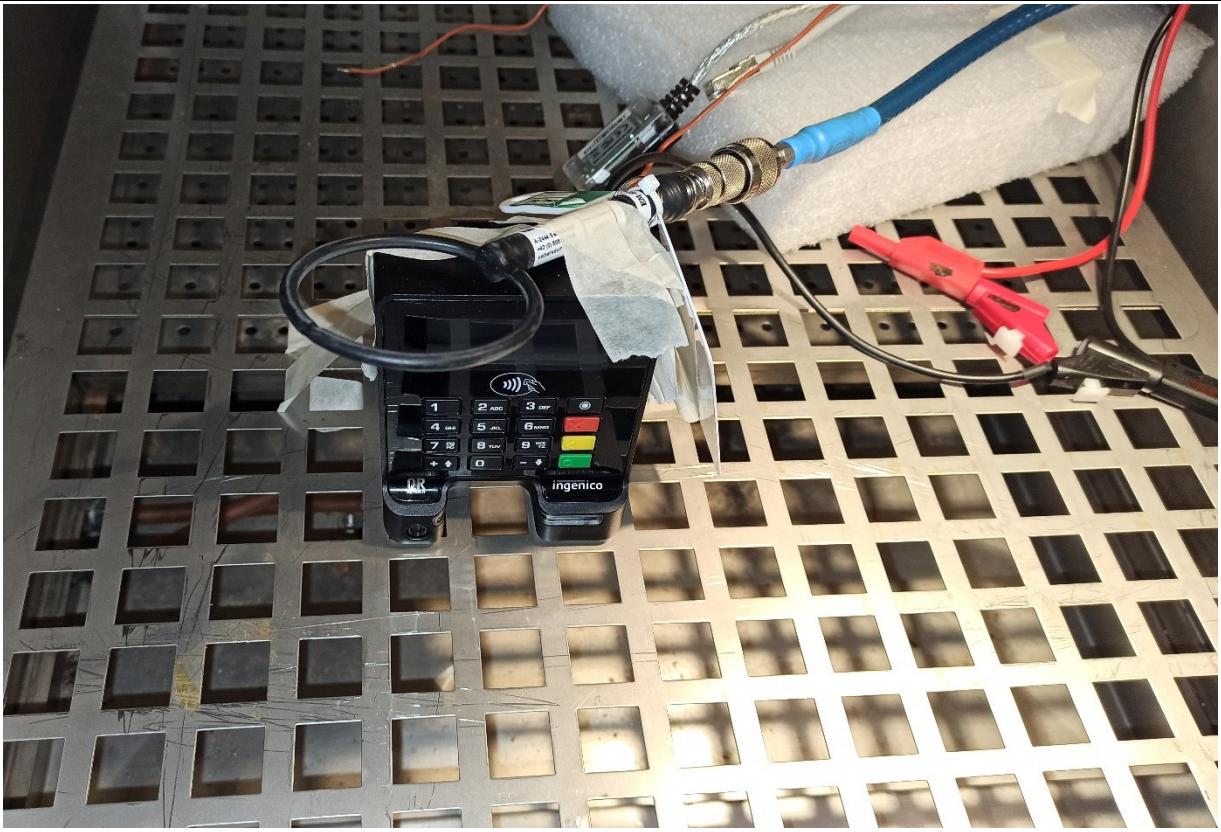
- The Equipment Under Test is installed:
☐ On a table
☑ In a climatic chamber
☐ In an anechoic chamber

- 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)

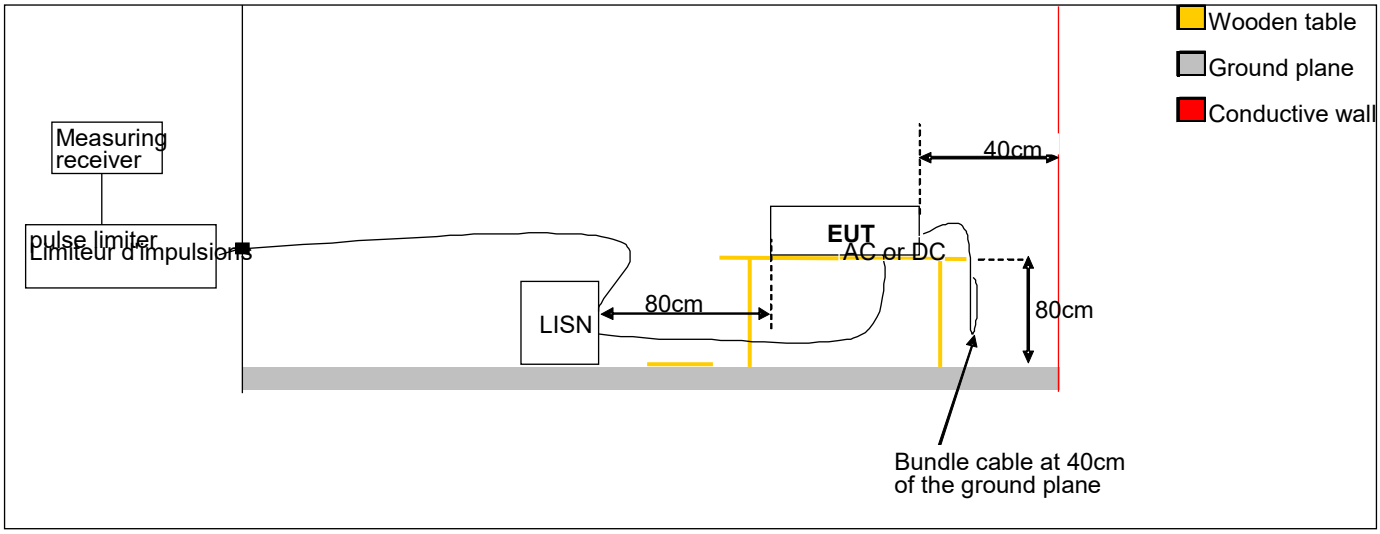
☐ 40cm above the horizontal ground on the non-conducting table (Table-top equipment)

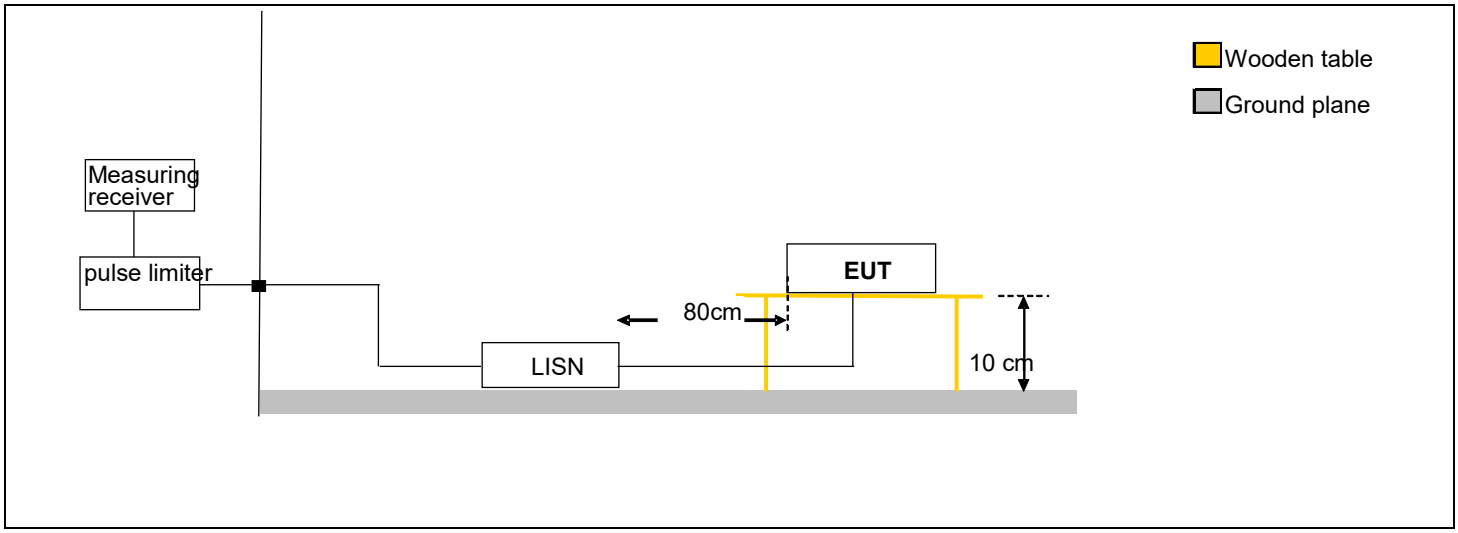
☐ 10cm above the ground on isolating support (Floor standing equipment)

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

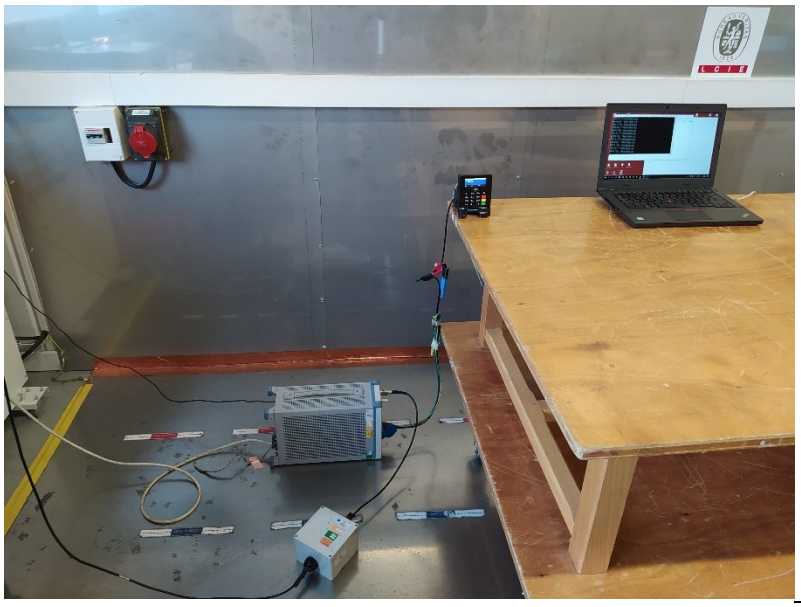
The EUT is powered by V_{nom}.

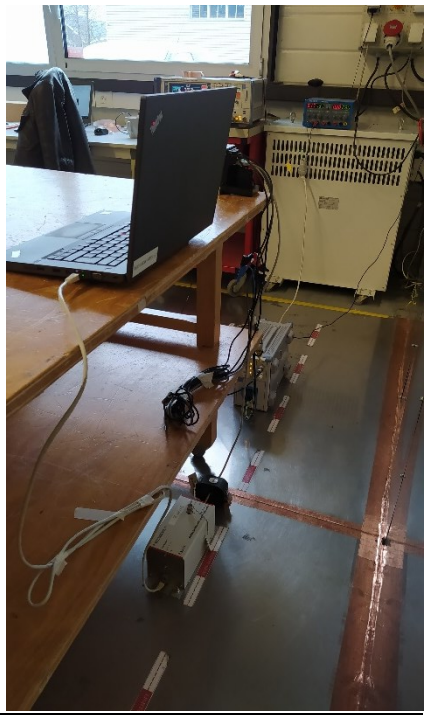
The EUT is powered through a LISN (measure). Auxiliaries are powered by another LISN.





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 150Ω 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:

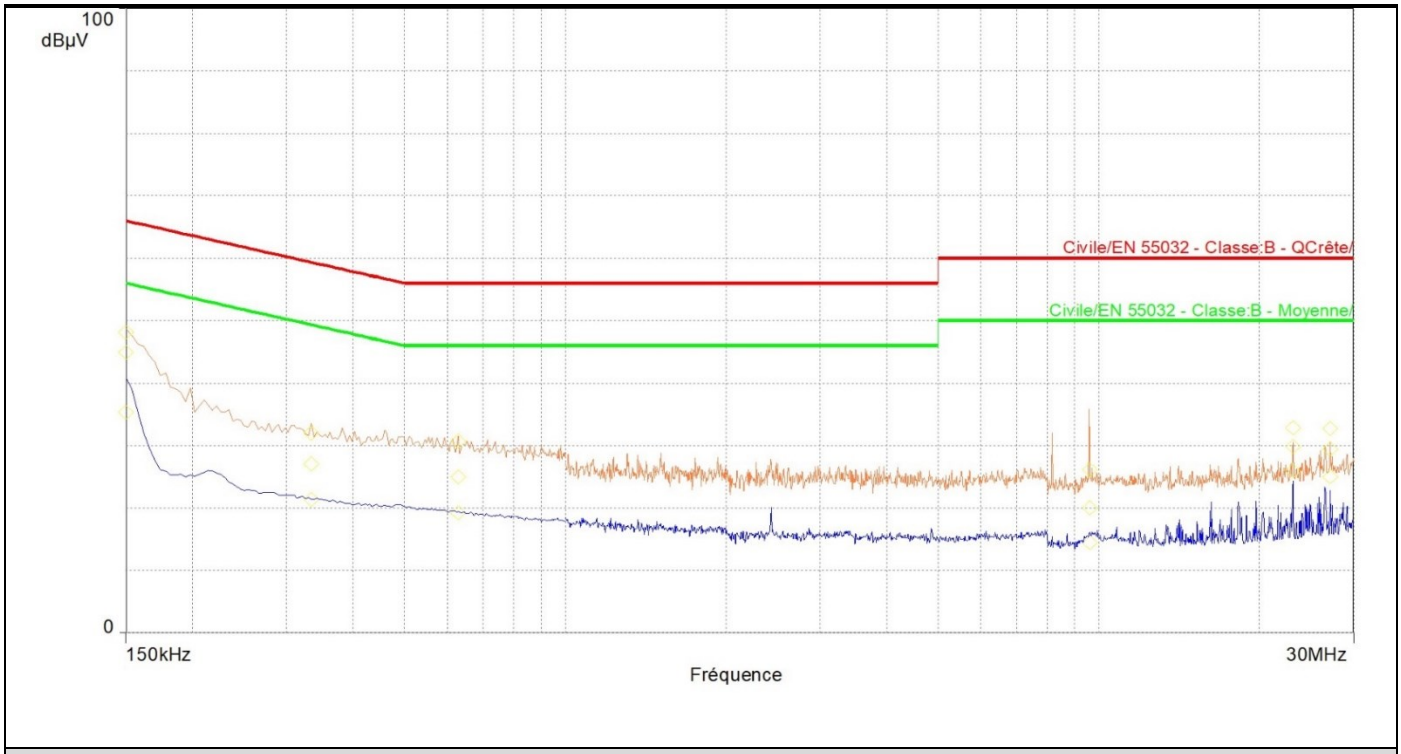
5.5. *TEST RESULTS*

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

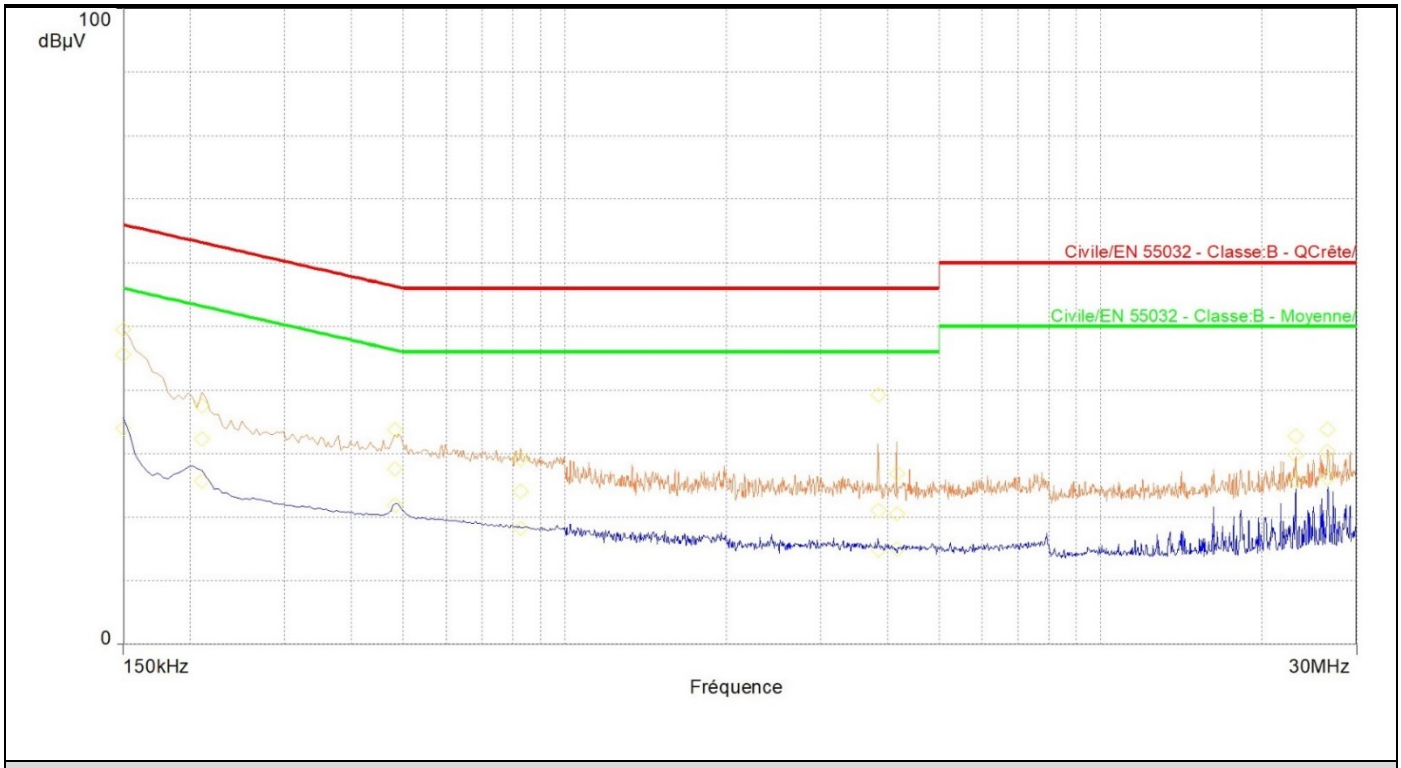
CONDUCTED EMISSIONS			
Graph name:	Power supply	**Test configuration:**	
Limit:	EN 55032	ESU8 - P +24VDC (RSIL)	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	24VDC	**RBW :**	10kHz
Line:	Phase	**VBW :**	30kHz



Spurious emissions

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

CONDUCTED EMISSIONS			
Graph name:	Power supply	**Test configuration:**	
Limit:	EN 55032	ESU8 - 0VDC (RSIL)	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	24VDC	**RBW :**	10kHz
Line:	Neutral	**VBW :**	30kHz



Spurious emissions

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	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.

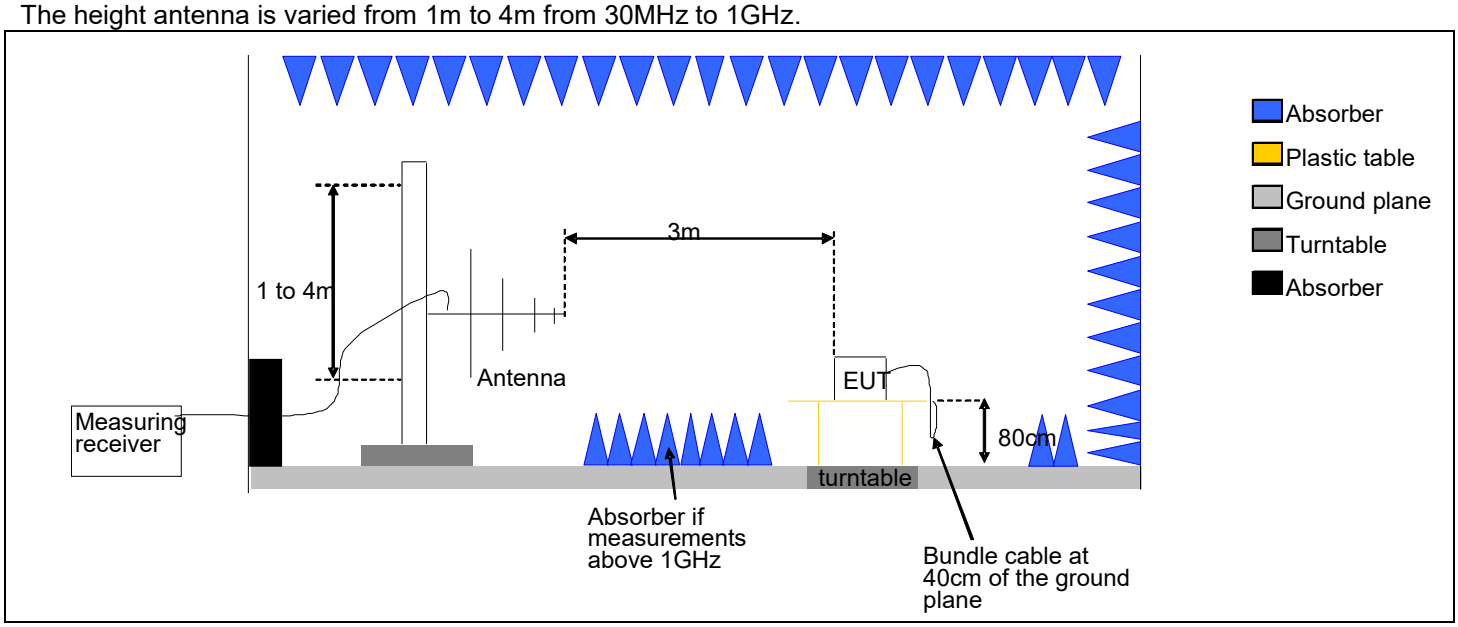
6. FIELD STRENGTH OUTSIDE OF THE BANDS 13.110-14.010 MHZ

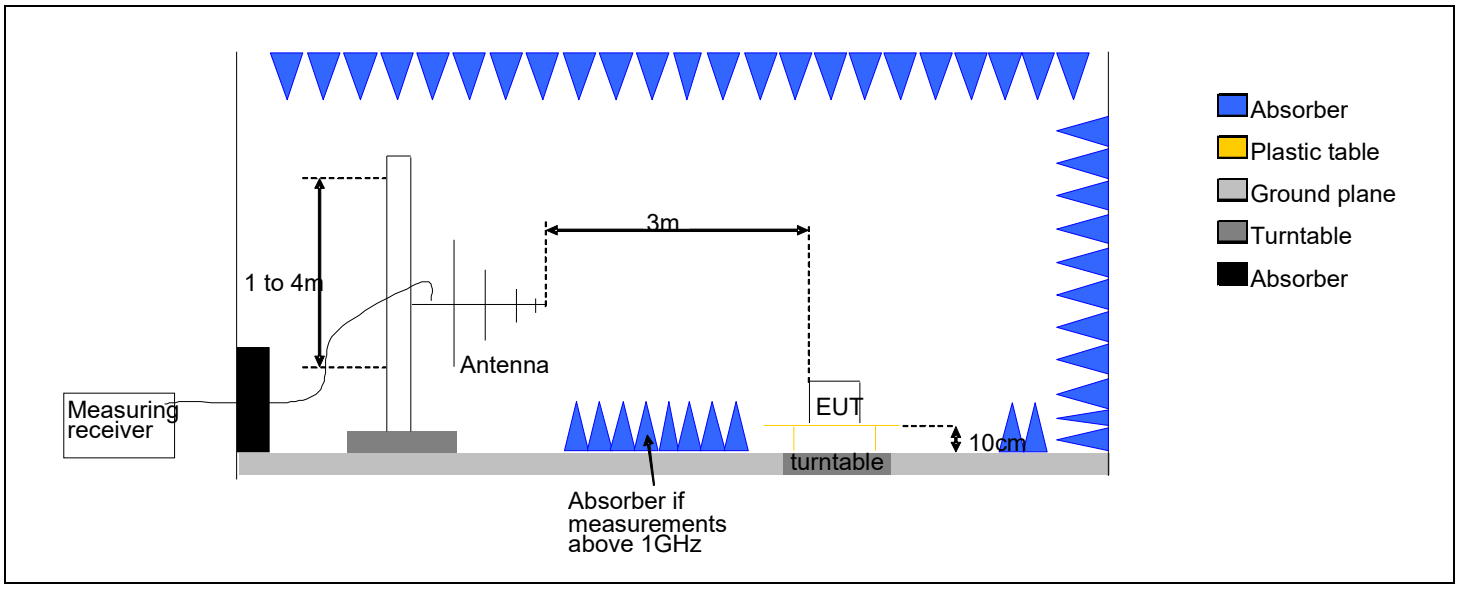
6.1. TEST CONDITIONS

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

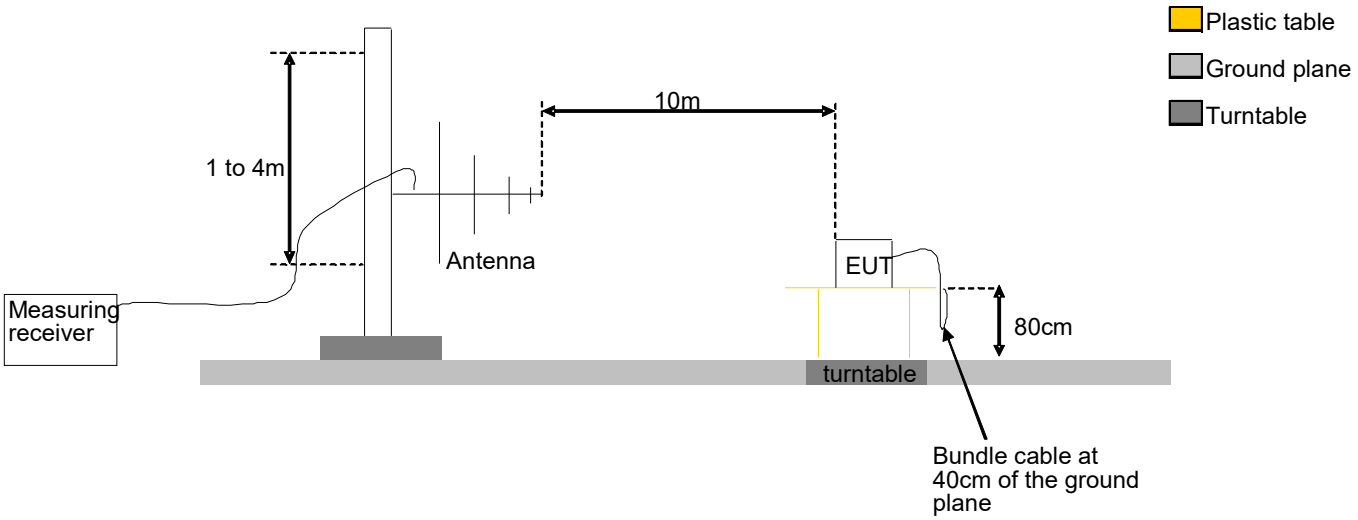
6.2. TEST SETUP

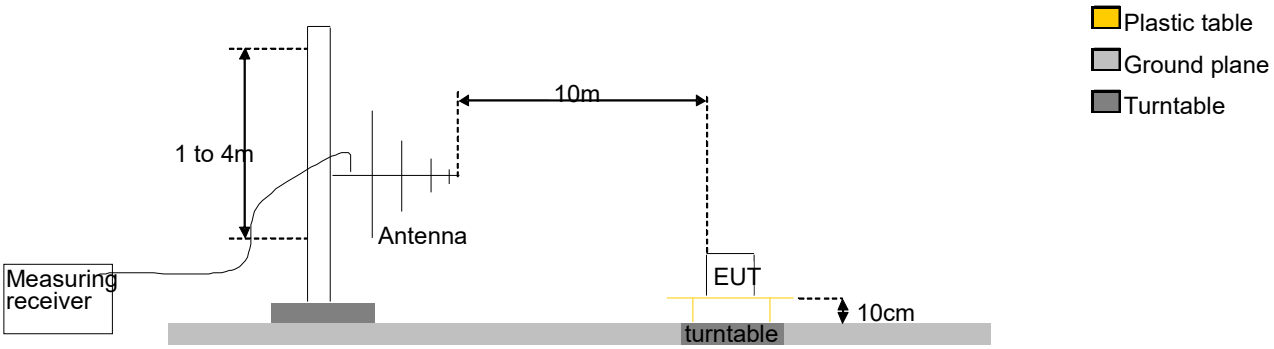
The product has been tested according to ANSI C63.10 and FCC part 15 subpart C.
Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz. Measurement bandwidth was 200Hz below 150kHz and 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable 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 place 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.



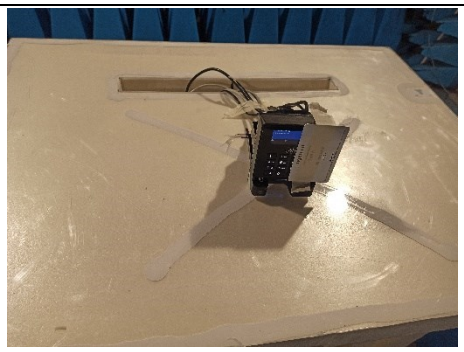
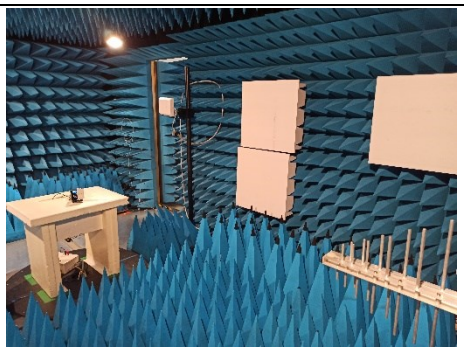


Test set up of Unwanted Emissions in Restricted Frequency Bands in semi anechoic chamber





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

6.3. LIMIT

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

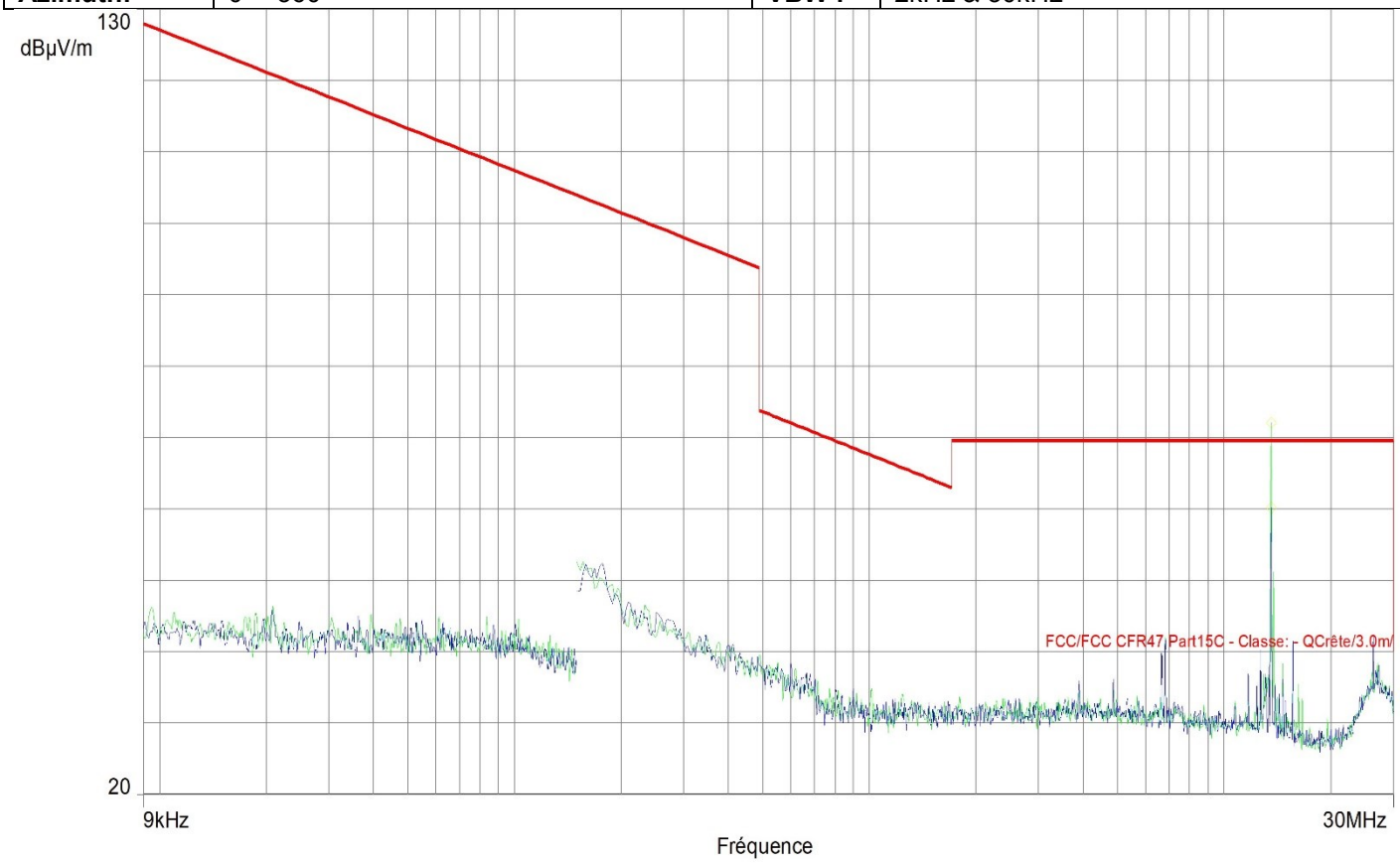
6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

6.6. RESULTS

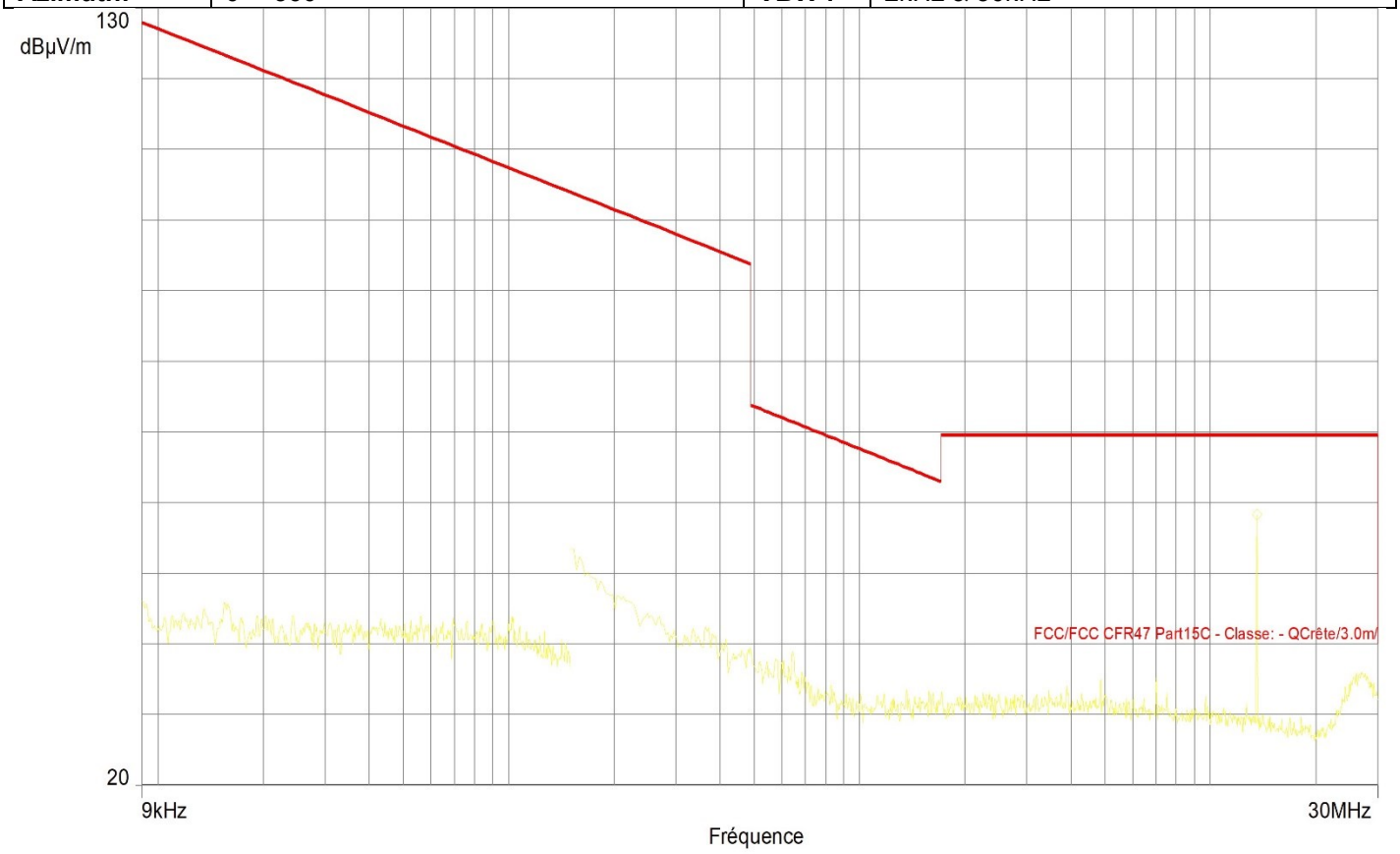
TYPE A Configuration

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



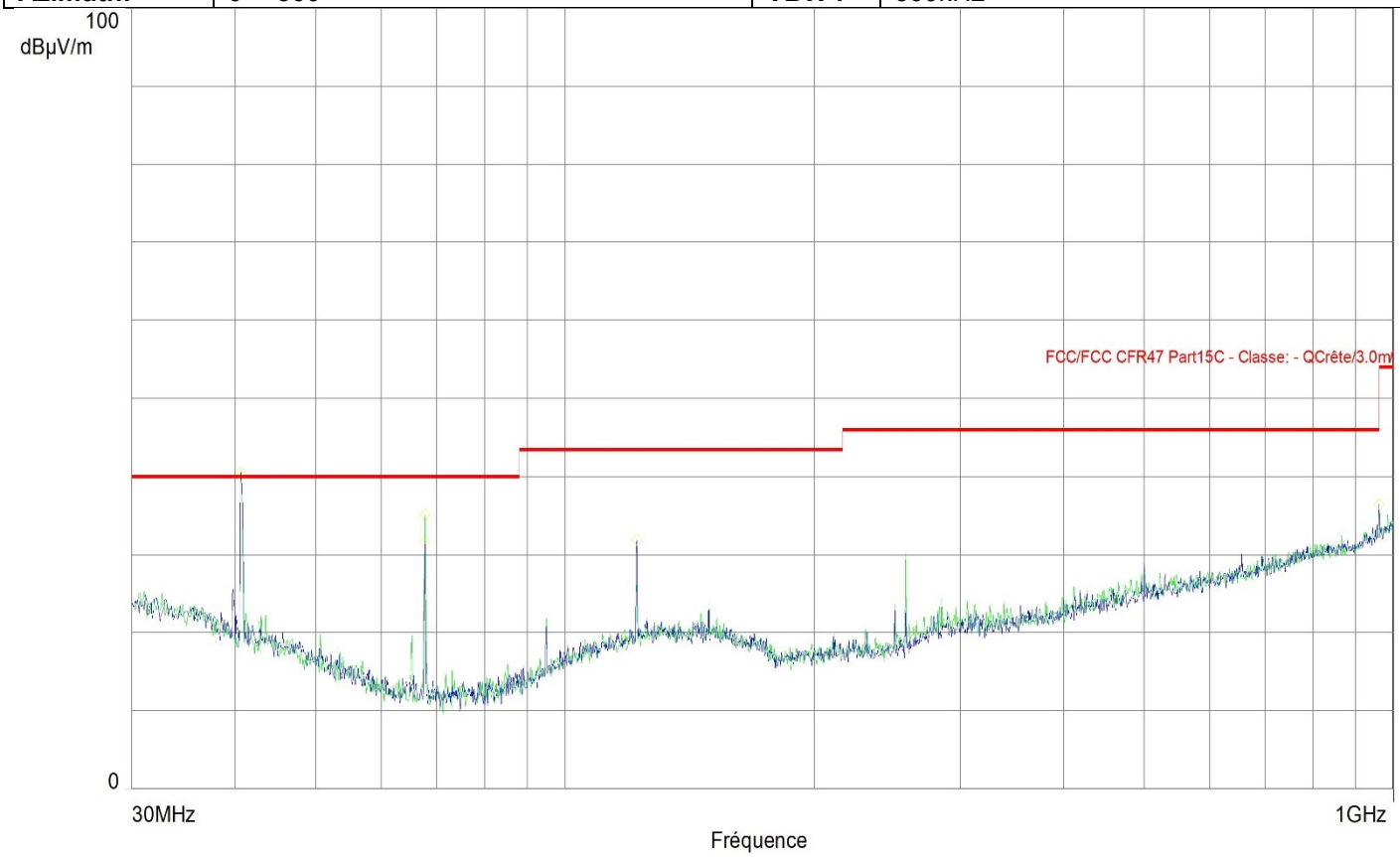
Spurious emissions					
Frequency (MHz)	**Peak (dBµV/m)**	**LimQP (dBµV/m)**	**Peak-LimQP (dB)**	**Polarization**	**Correction (dB)**
13.559	60.1	69.5	-9.4	0°	37.7
13.559	72.0	69.5	2.5	90°	37.7

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

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

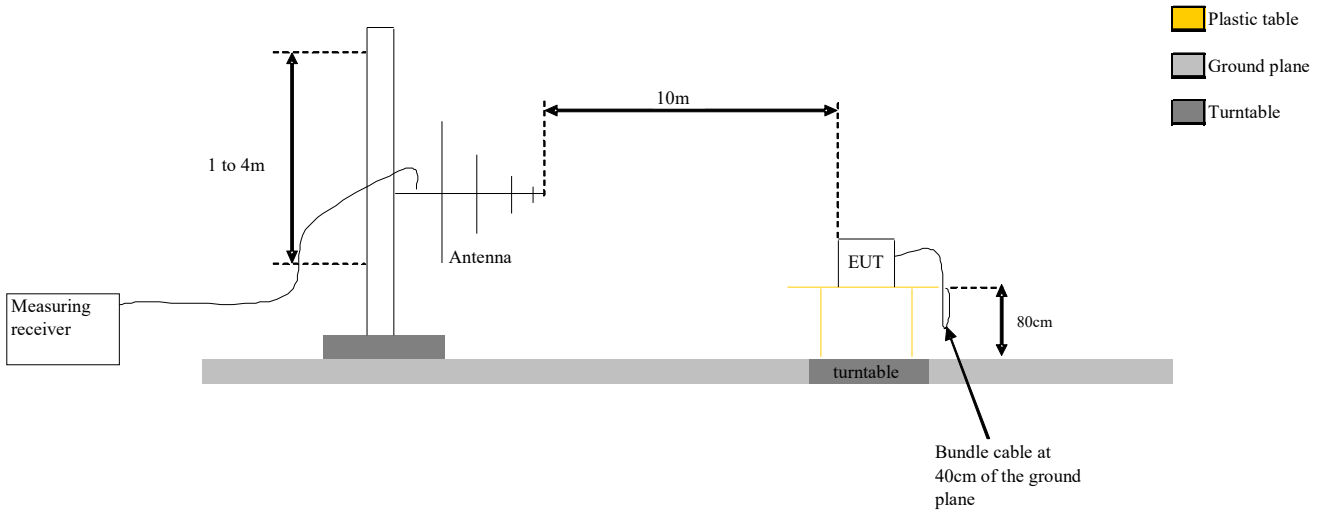
Test performed by	: Mounir BOUAMARA
Date of test	: May 25, 2020 to May 29, 2020
Ambient temperature	: 23 °C
Relative humidity	: 39 %

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.



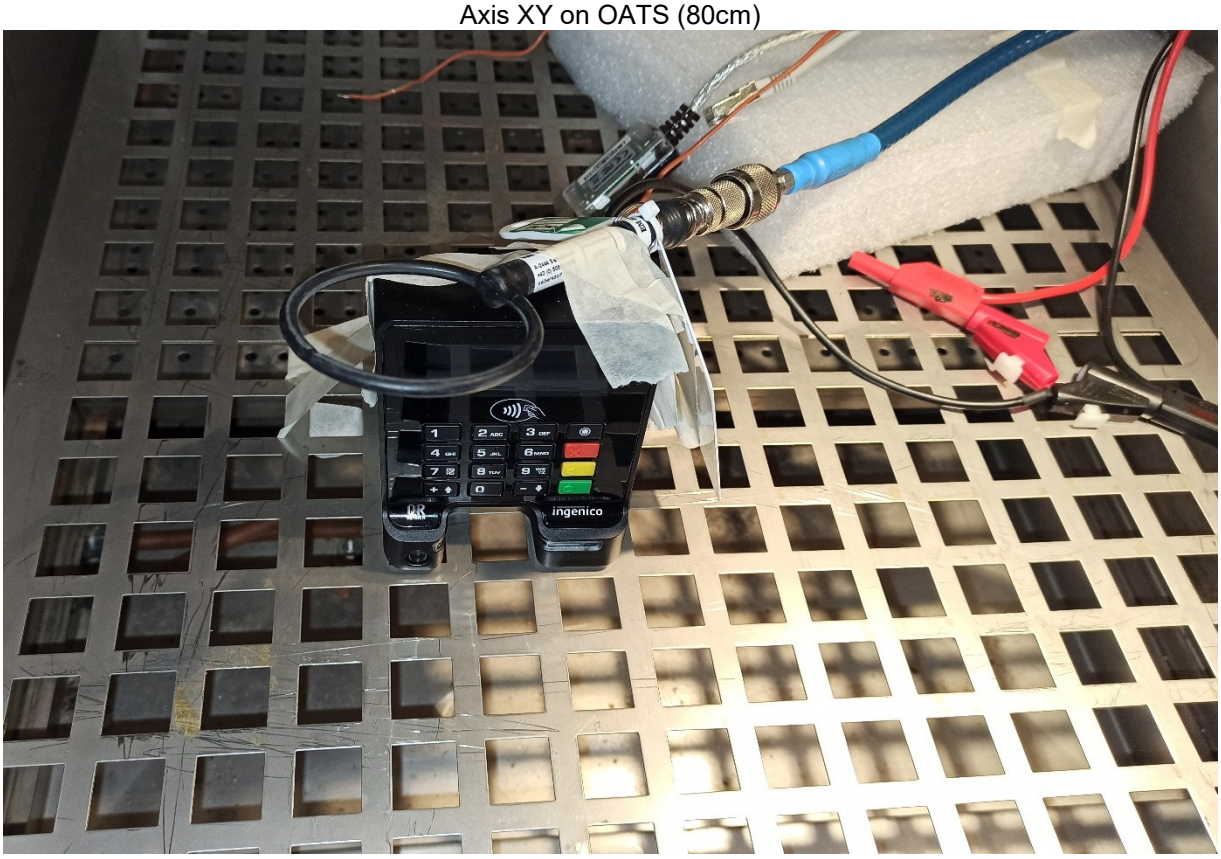
Test Set up for radiated measurement in open area test site

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 (µV/m) @30m	Field strength (dBµV/m) @30m	Field strength (dBµV/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		

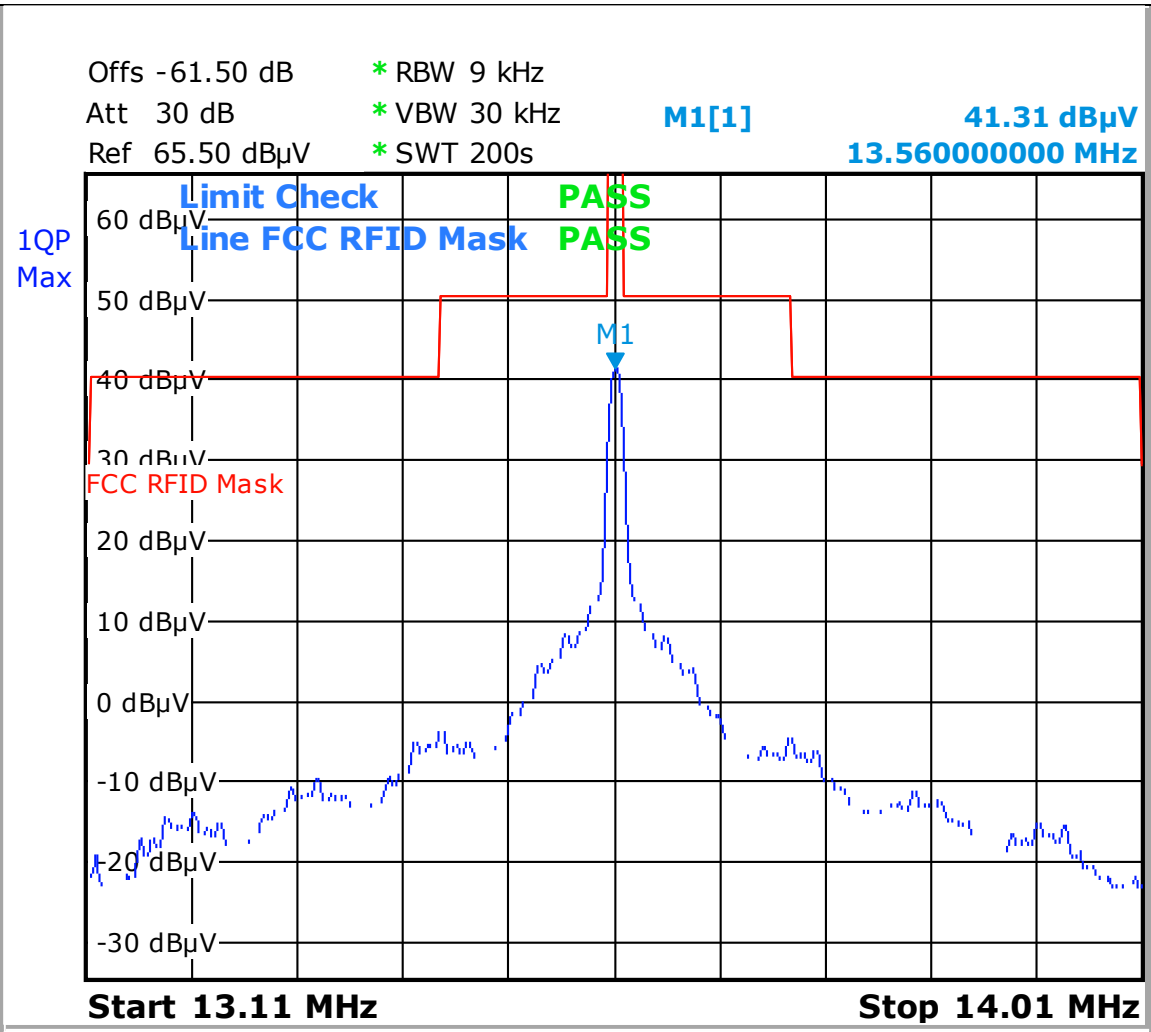
7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

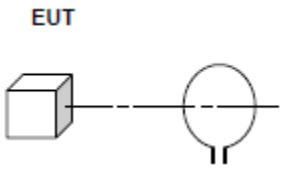
☑ None ☐ Divergence:

7.6. RESULTS

Plots (Worst case presented)

Parallel Axis





Parallel Axis

Frequency (MHz)	QPeak Limit (dBµV/m) @ 30m	Qpeak (dBµV/m) @ 30m	Margin (Mes-Lim) (dB)	Angle Table (deg)	Pol Ant.	Ht Ant. (cm)	Correc. Factor (dB)	Comments
13.56	84	41.1	**42.9**	89	90°	150	35.4	

Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e) (M@30m = M@10m-19.1dB)

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 (Ecuelles)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuelles)	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 (Ecuelles)	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