TEST REPORT

RADIO

Number	137897-678904BCr2016-02-11
Composition of document	14 pages
FCC Registration Number	166175 (FAR)
Industry Canada Number	6230B
Standards	47 CFR Part 15.225 (Limited program) RSS-210, Issue 8 (Limited program) RSS-Gen, Issue 4 (Limited program)
Issued to	INGENICO 28-32 boulevard de Grenelle 75015 PARIS
Apparatus under test	Payment terminal
Trade mark	INGENICO
Manufacturer	INGENICO
Type	ISC250-OPT
Serial number	15127SC80546119
IC	2586D-IS250NEWCL
FCC ID	XKB-ISC250NEWCL
Test date	2015/10/09
Tests performed by	Laurent DENEUX
Test site	Ecuelles
Initial Issue	2015/11/25
Date of issue	2016/02/11

Written by :
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Tests operator

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SUMMARY

1. TEST PROGRAM

- **References**

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

Standard Section	Test Description	TEST RESULT - Comments
RSS-Gen § 6.6	Occupied Bandwidth	NP(Limited program)
CFR 47 § 15.225 (e) RSS-210 § A2.6	Frequency tolerance	NP(Limited program)
CFR 47 § 15.207 RSS-Gen § 8.8	AC Power Line Conducted Emissions	PASS
CFR 47 § 15.225 (a) (b) (c) RSS-210 § A2.6 (a) (b) (c)	Field strength within the band 13.110-14.010 MHz	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)
RSS-Gen § 7	Receiver Radiated emissions	NA (Transceiver equipment. Include in Field strength test)

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

2.1. HARDWARE & SOFTWARE IDENTIFICATION

- **Equipment under test (EUT):**

Photograph of EUT

- **Auxiliary equipment (AE) used for testing:**

Photograph of AE

- **Input/output:**

- Input Power
- Usb

- **Equipment information:**

- External antenna connector: No
- Frequency band allocated: 13.553MHz to 13.567MHz
- Frequency band used: 13.56MHz
- Modulation: ASK100%
- Number of channel: 1
- Antenna type: Integral
- Stand By mode: No
- Type of power source: External power supply
- Power supply: Vmin: 102V/60Hz
  Vnom: 120V/60Hz
  Vmax: 138V/60Hz
- Temperature range: Tmin: -30°C (IC) -20°C (FCC)
  Tnom: 20°C
  Tmax: +50°C

2.2. RUNNING MODE

The EUT is set in the following modes during tests:
-Communication with a tag

2.3. EQUIPEMENT LABELLING

2.4. EQUIPMENT MODIFICATIONS

No equipment modification has been necessary during testing.

3. AC POWER LINE CONDUCTED EMISSIONS

3.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : 2015/10/09
Ambient temperature : 22°C
Relative humidity : 49%

3.2. TEST SETUP

The product has been tested according to ANSI C63.10-(2013) method. The EUT is placed on the ground reference plane, at 80cm from the LISN. The distance between the EUT and the vertical ground plane is 40cm. Auxiliaries are powered by another LISN. The cable has been shorted to 1meter length. The EUT is powered through the LISN. Measurement is made with a receiver in peak mode. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is 50Ω / 50µH. Interconnecting cables and equipment's were moved to position that maximized emission.

Photograph for AC Power Line Conducted Emissions (Front view)

Photograph for AC Power Line Conducted Emissions (Rear view)

3.3. RESULTS

Antenna Connected

Neutral Line

Frequency (MHz)	Peak measurements (dBµV)	Quasi-Peak measurements (dBµV)	Quasi-Peak limits (dBµV)	Average measurement (dBµV)	Average limits (dBµV)
0.159	45.5	-	65.5	29.5	55.5
0.318	46	-	59.7	40.5	49.7
0.590	36.4	-	56	25	46
0.918	37.2	-	56	25	46
8.948	38.3	-	60	30	50
13.45	44.4	-	60	43	50

Phase Line

Frequency (MHz)	Peak measurements (dBµV)	Quasi-Peak measurements (dBµV)	Quasi-Peak limits (dBµV)	Average measurement (dBµV)	Average limits (dBµV)
0.156	48.6		65.7	31.6	55.7
0.316	46.4	-	59.7	42	49.7
0.593	34.3	-	56	28	46
0.882	35	-	56	29.5	46
8.914	38.2	-	60	34	50
13.56	45.5	-	60	41	50

See annex for graphics

Result: PASS
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

*Decreases with the logarithm of the frequency

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

4.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : 2015/10/09
Ambient temperature : 22°C
Relative humidity : 49%

4.2. TEST SETUP

The EUT is placed on an open area test site. Distance between measuring antenna and the EUT is 10m for frequency above 30MHz.
Test is performed in horizontal (H) and vertical (V) polarization with bilog antenna between 30MHz & 1GHz and with a horn antenna above 1GHz. Measurement bandwidth was 120kHz below 1GHz and 1MHz above 1GHz. The level has been maximised by the turntable rotation of 360 degrees range on the 3 axis of EUT. Antenna height search was performed from 1 to 4m.

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

4.3. *RESULTS*

- **Characterization on an open test site (30MHz to 1GHz):**

Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit @10m (dBµV/m)
37.3	-	25.4	29.5
42	-	25	29.5
166.6	-	28.2	33
250	-	30.1	35.5
533.3	-	32.3	35.5
800	-	32.3	35.5
1000	-	34.7	43.5

See annex for graphics

Result: PASS

Limit: → 30MHz to 88MHz: 100µV/m (3m) or 29.5dBµV/m (10m) QPeak
88MHz to 216MHz: 150µV/m (3m) or 33dBµV/m (10m) QPeak
216MHz to 960MHz: 200µV/m (3m) or 35.5dBµV/m (10m) QPeak
960MHz to 1000MHz: 500µV/m (3m) or 43.5dBµV/m (10m) QPeak

5. TEST EQUIPMENT LIST

Field strength outside of the bands 13.110-14.010 MHz					
Apparatus	**Trade Mark**	**Type**	**Registration number**	**Calibration date**	**Calibration due**
Spectrum analyzer	ROHDE & SCHWARZ	ESU	A2642018	01/2015	01/2016
Bilog antenna	CHASE	CBL6112A	C2040040	03/2015	03/2016
Cable	-	-	A5329418	09/2014	09/2015 (Note 1)
Cable	-	-	A5329442	09/2014	09/2015 (Note 1)
Cable	-	-	A5329542	2015/02	02/2016
Cable	-	-	A5329449	03/2014	09/2016
cable	-	-	A5329368	03/2015	03/2016
cable	-	-	A5329444	09/2014	09/2015 (Note 1)
AC Power Line Conducted Emissions					
Apparatus	**Trade Mark**	**Type**	**Registration number**	**Calibration date**	**Calibration due**
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2015/01	2016/01
Pulse limiter	RHODE & SCHWARZ	ESH3-Z2	A2649008	2015/02	2016/02
V ISLN	ROHDE & SCHWARZ	ESH3-Z5	C2322003	2015/02	2016/02
Ground plan	LCIE	-	-	-	-
Cable	-	-	A5329417	2014/09	09/2015 (Note 1)

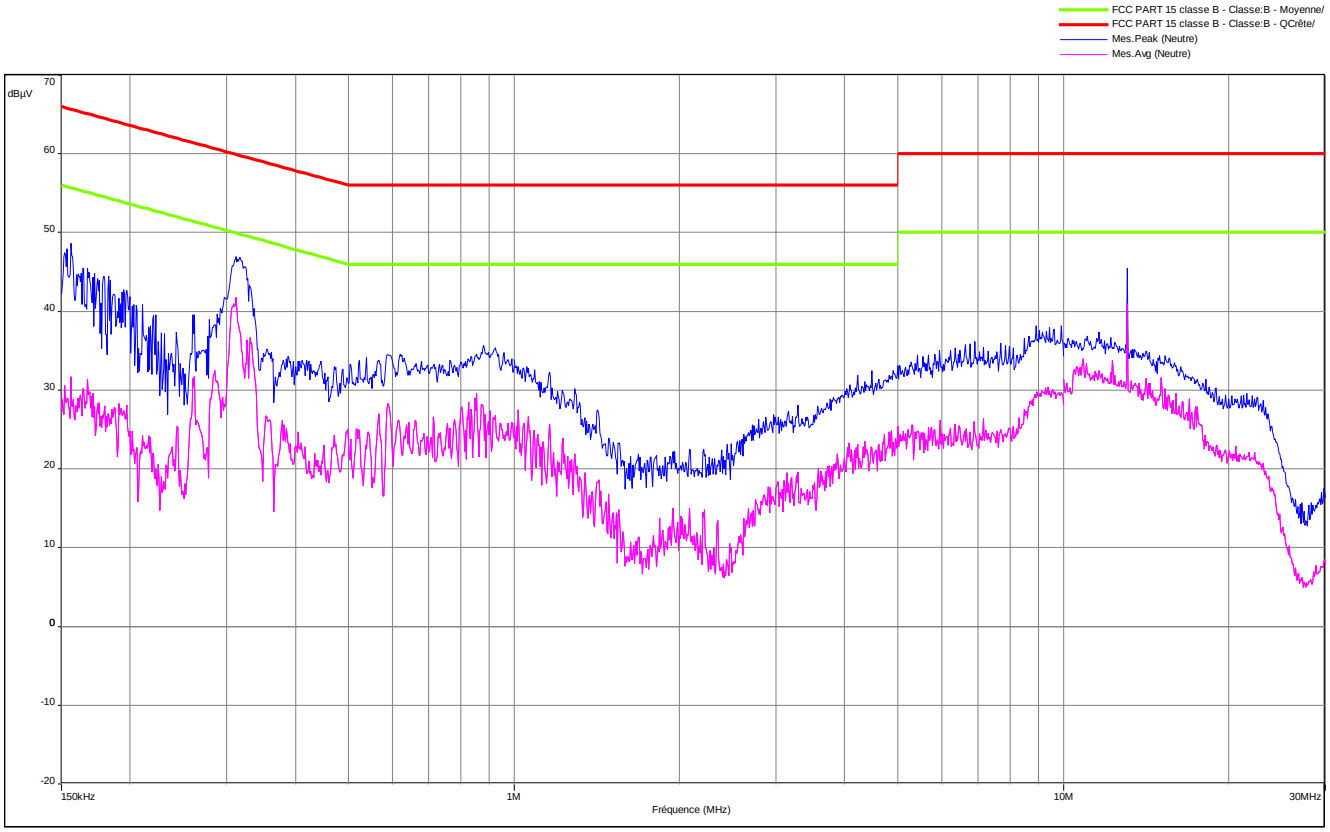
Note 1: In our system quality, the calibration due is more & less 2months.

6. UNCERTAINTIES CHART

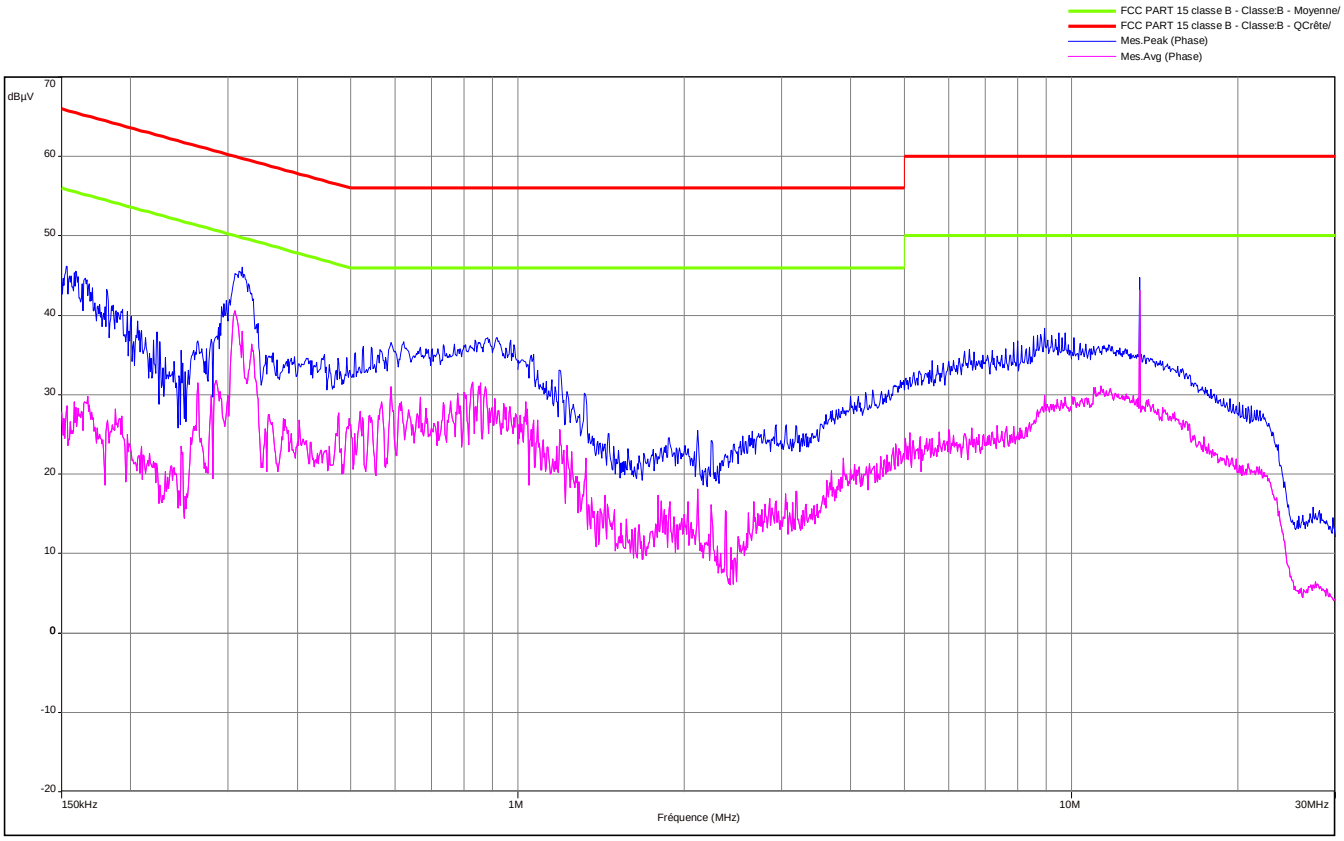
Kind of test	Measurement uncertainties (k=2) ±x(dB) / (Hz)	Limit for uncertainties ±y(dB)
TRANSMITTER REQUIREMENTS		
Radio frequency	$\pm 2.10^{-8}$ Hz	$\pm 1.10^{-7}$ Hz
RF Conducted power	±0.6 dB	±1.5 dB
Spurious emissions • Frequency < 1000 MHz • Frequency > 1000 MHz	 ±3.9 dB ±3.1 dB	±6 dB
Spurious in conduction	±1.6 dB	±3 dB
Temperature	±0.5°C	±1°C
Humidity	±2.5 %	±10 %

7. ANNEX (GRAPHS)

AC power line conduted emissions
Antenna Connected
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Neutral Line



AC power line conduted emissions
Antenna Connected
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
Phase Line



Transmitter Radiated Emissions both vertical and horizontal polarization
Frequency: Fnom
Temperature: Tnom
Voltage: Vnom
QPeak