RFID 13,56MHz Template: Release October 10th, 2016

TEST REPORT

N°: 146947-699381F **Version : 01**

Subject	**Radio spectrum matters tests according to standards: 47 CFR Part 15.225 & Part 15.210 Issue 9 & RSS-Gen Issue 4**
Issued to	**SAFRAN IDENTITY & SECURITY 11 Boulevard Gallieni 92130 - ISSY-LES-MOULINEAUX France**

Apparatus under test

Product	**MorphoAccess® SIGMA EXTREME Series**
Trade mark	**Safran Identity and Security**
Manufacturer	**Safran Identity and Security**
Model under test	**MPH-AC002B**
Serial number	**17001OMX0000002**
FCC ID	**ZBW-MPHAC002B**
IC ID	**11472A-MPHAC002B**

Test date	: March 9, 2017 to March 14, 2017
Test location	Fontenay Aux Roses & Ecuelles
Composition of document	35 pages
Document issued on	March 30, 2017

Written by :
Armand MAHOUNGOU
Tests operator

Approved by :
Claude FAYETTE
Technical manager

PUBLICATION HISTORY

Version	Date	Author	Modification
01	March 15, 2017	Armand MAHOUNGOU	Creation of the document

SUMMARY

1. TEST PROGRAM

References

- **47 CFR Part 15.225**
- **RSS 210 Issue 9**
- **RSS Gen Issue 4**
- **ANSI C63.10-2013**

Radio requirement:

Clause (47CFR Part 15.225 & RSS-210 Issue 9 & RSS-Gen Issue 4) 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. INFORMATIONS

Morpho Access SIGMA Extreme — MA SIGMA Extreme is a biometric access controller terminal.
MorphoAccess® Sigma Extreme device family standard models:

			RFID			Fake Finger Detection (FFD)
Model	**Name**	**Part#**	**iClass**	**Mifare/ Desfire**	**Prox**	
MPH-AC002B	MorphoAccess® SIGMA Extreme iClass	293696150	✓			
	MorphoAccess® SIGMA Extreme Multi	293696168		✓		
	MorphoAccess® SIGMA Extreme FFD iClass	293696189	✓			✓
	MorphoAccess® SIGMA Extreme FFD Multi	293696192		✓		✓

MPH-AC002B: Tests are performed on the most complete Product. Tests are performed on the most complete Product.MorphoAccess® SIGMA Extreme iClass FFD
The product tested is the most representative product with radio 13.56MHz with iClass tag reading functionality and the FFD function.

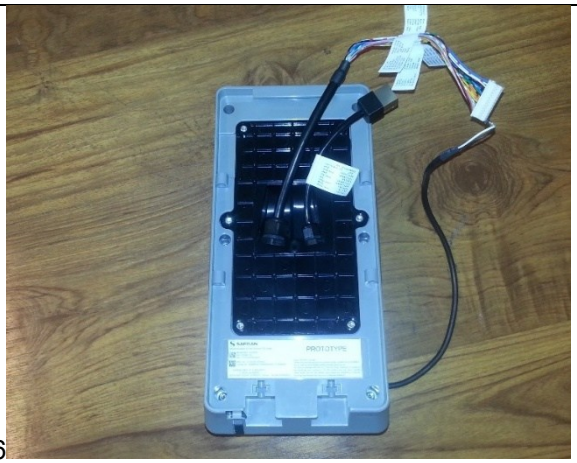
The three other products are based on MorphoAccess® SIGMA Extreme iClass FFD where functionality aren't populated (FFD function, iClass function).

Product with iClass function and Multi function have the same RFID PCB and RF components. Only digital components are added to support iclass feature.

2.2. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):
Safran Identity and Security **Serial Number: 17001OMX0000002**

Front face



Back face

Equipment Under Test

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Ethernet	10	☐	☑	☑	Cable > 30m telecommunication port
2	USB Mini B	na	☑	☑	☐	Cable < 3m
3	USB micro AB	na	☑	☑	☐	Cable < 3m Service Only
4	RS422/ RS484	na	☐	☐	☐	Cable > 30m not a telecommunication port
5	Wiegand	na	☐	☐	☐	Cable > 30m not a telecommunication port
6	GPI/GPO	na	☐	☐	☐	Cable > 30m static signals

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
POE Injector – Zyxel 	POE-12HP	-	Not sold with the product

Equipment information:

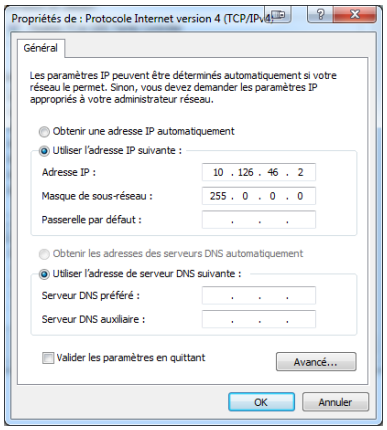
Type:	☑ **RFID**			
Frequency band:	[13.553 to 13.567] MHz			
Number of Channel:	1			
Antenna Type:	☑ Integral	☐ External	☐ Dedicated	
Transmit chains:	1			
Receiver chains	1			
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Equipment type:	☑ Production model		☐ Pre-production model	
Operating temperature range:	Tmin:	☑ -30°C IC ☑ -20°C FCC	☐ 0°C	☐ X°C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☐ 50°C	☑ 60°C
Type of power source:	☑ AC power supply	☐ DC power supply	☐ Battery	
Operating voltage range:	Vmin:	☑ 102V/60Hz	☐ XVdc	
	Vnom:	☑ 120V/60Hz	☐ XVdc	
	Vmax:	☑ 138V/60Hz	☐ XVdc	

2.3. RUNNING MODE

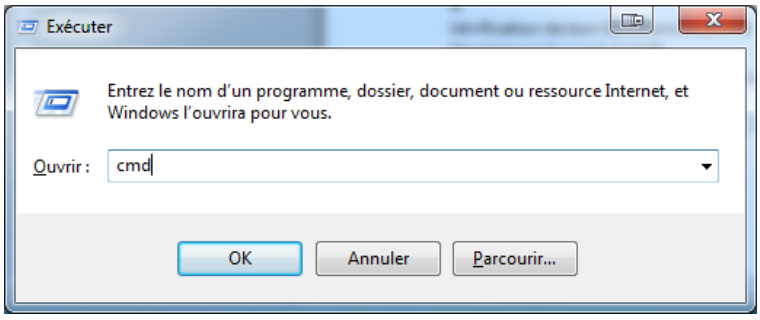
The EUT is set in the following modes during tests:
- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception

During the test, products must be ON and communication with a PC through ***ping*** command.
To send the ping command, the laptop must be configured previously as below:

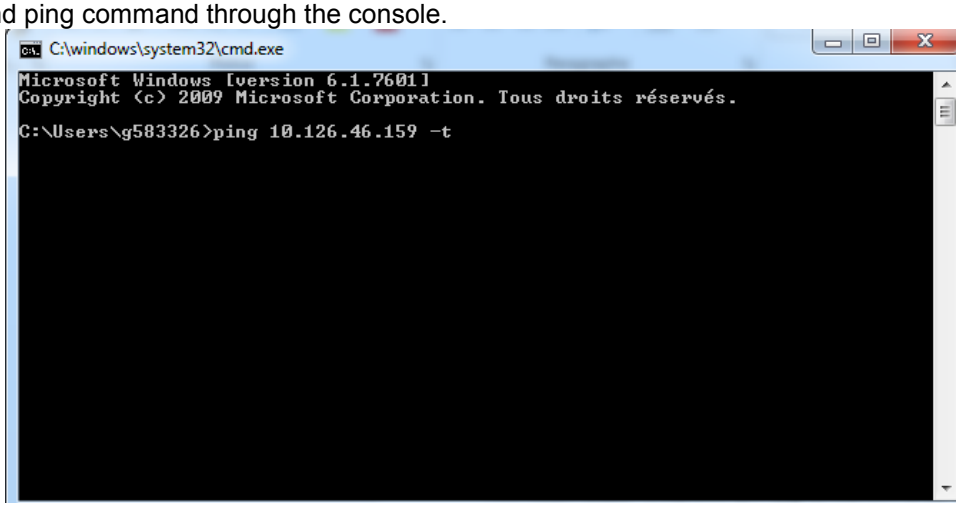
1. Modify IP adress of the laptop (Windows 7 procedure) :
   - Click on« *Demarrer* » menu
   - Click on *Panneau de configuration* → *Centre Réseau et partage*
   - Click on « *Modifier les paramètres de la carte* »
   - Double click on « Connexion au réseau local »
   - Double click on « *Protocol Internet version 4 (TCP/IPv4)* »
   - Enter fields as below and click on "*OK"* button :



2. Open a windows console by clicking simultaneously on Windows button on the keyboard and "R" button.
3. The window below will open. Enter cmd in the field as below and click OK



4. Finally, send ping command through the console.



There are two different IP addresses according to the product under test.

- MPH-AC002A - MA-Extreme Prox FFD: IP address = 10.126.46.**159**
- MPH-AC002B - MA-Extreme iClass FFD: IP address = 10.126.46.**159**

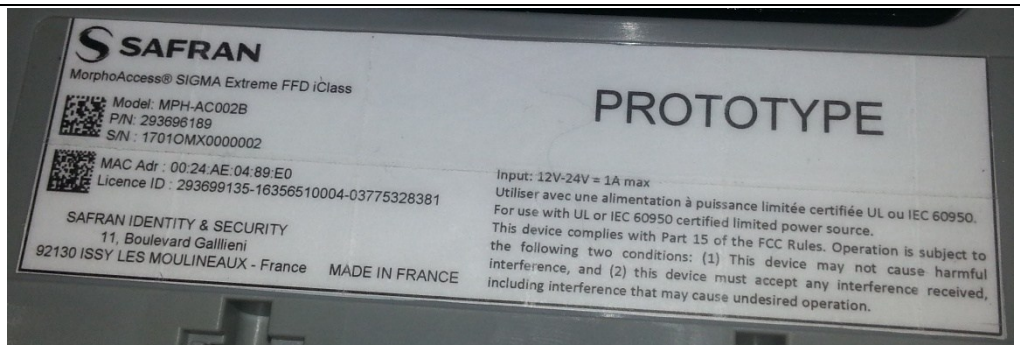
So one of the two commands below must be sent to the good product:

- **MPH-AC002A : *ping 10.126.46.159 –t***
- **MPH-AC002B : *ping 10.126.46.159 –t***

To validate that the product works properly, procedure here under must be followed:

- Check Ping command response on the laptop. Command response must be successful.
  Response awaited for MPH-AC002x product:
  Réponse de 10.126.46.159 : octets=32 temps<1ms TTL=64
- Place your finger on the biometric sensor and after several seconds a closed door must appear on the screen or a second try window then a closed door must appear.
- Place a RFID card below biometric sensor and after several seconds a closed door or a Hold Card pop up must appear on the screen.

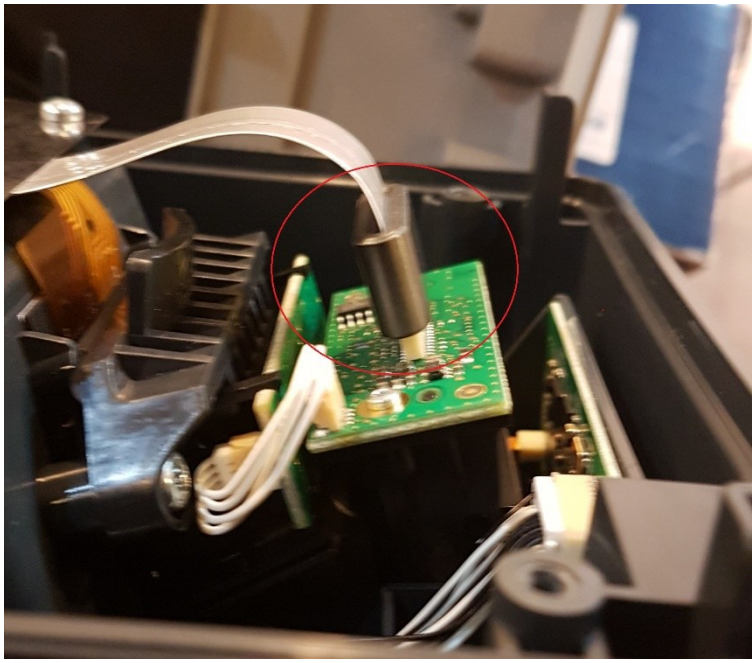
2.4. EQUIPMENT LABELLING



2.5. EQUIPMENT MODIFICATION

☐ None ☑ Modification:

-adding a ferrite reference 7427226 on a flat cable.



3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

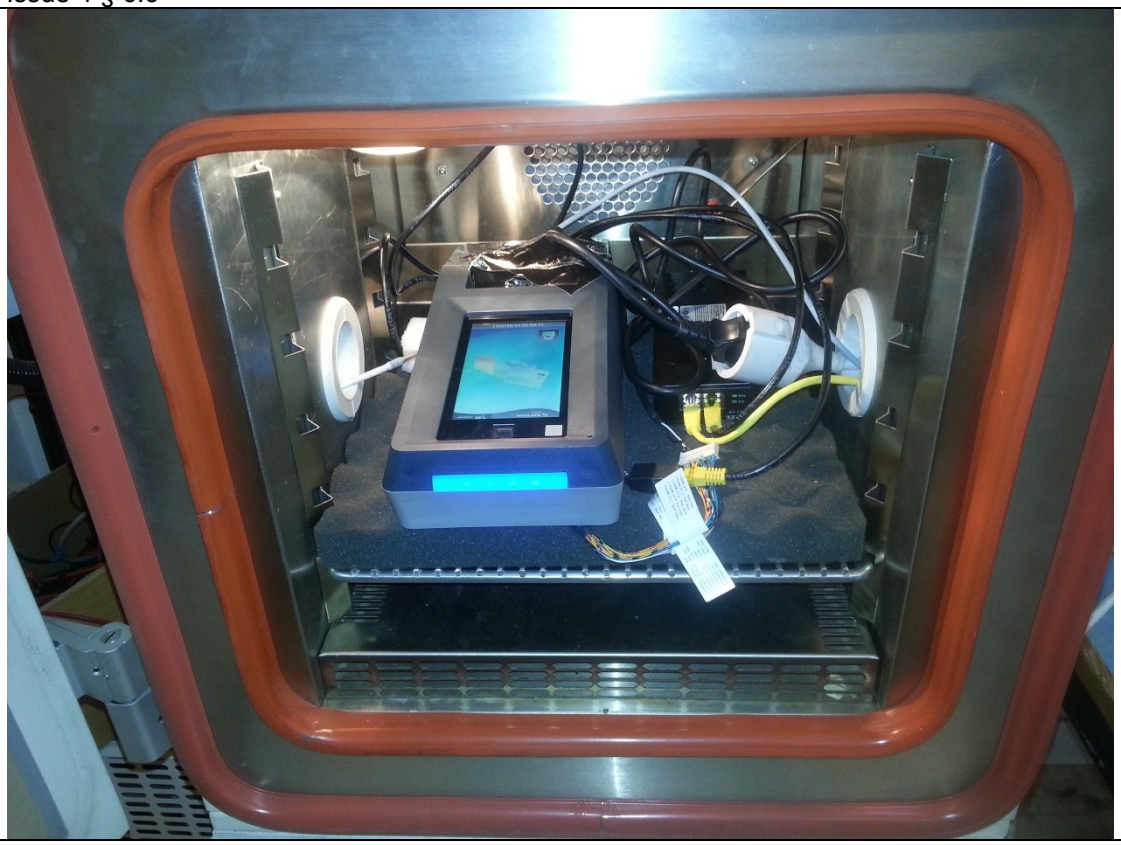
Test performed by : Armand MAHOUNGOU
Date of test : March 13, 2017
Ambient temperature : 26 °C
Relative humidity : 44 %

3.2. TEST SETUP

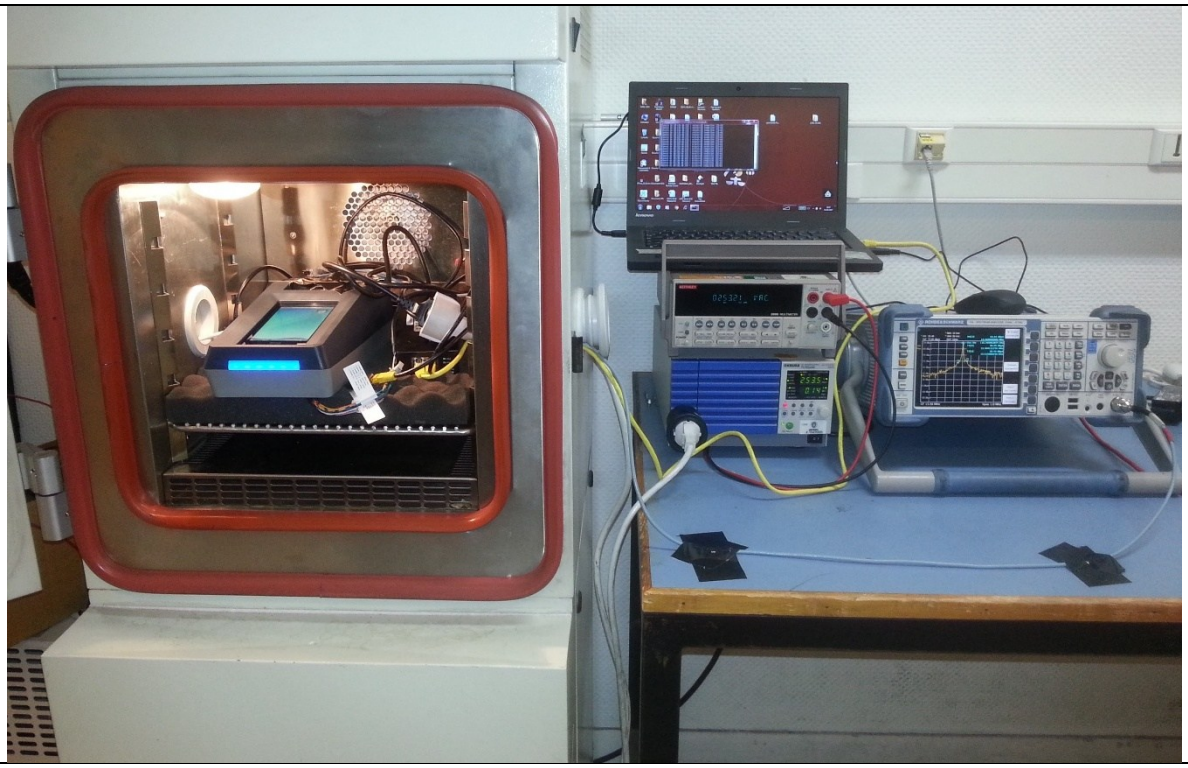
- The Equipment Under Test is installed:
☐ On a table
☑ In a climatic chamber
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ RSS-Gen Issue 4 § 6.6



Photograph for Occupied bandwidth in normal test condition



Photograph for Occupied bandwidth in normal test condition

Photograph for Occupied bandwidth in normal test condition

3.1. LIMIT

None

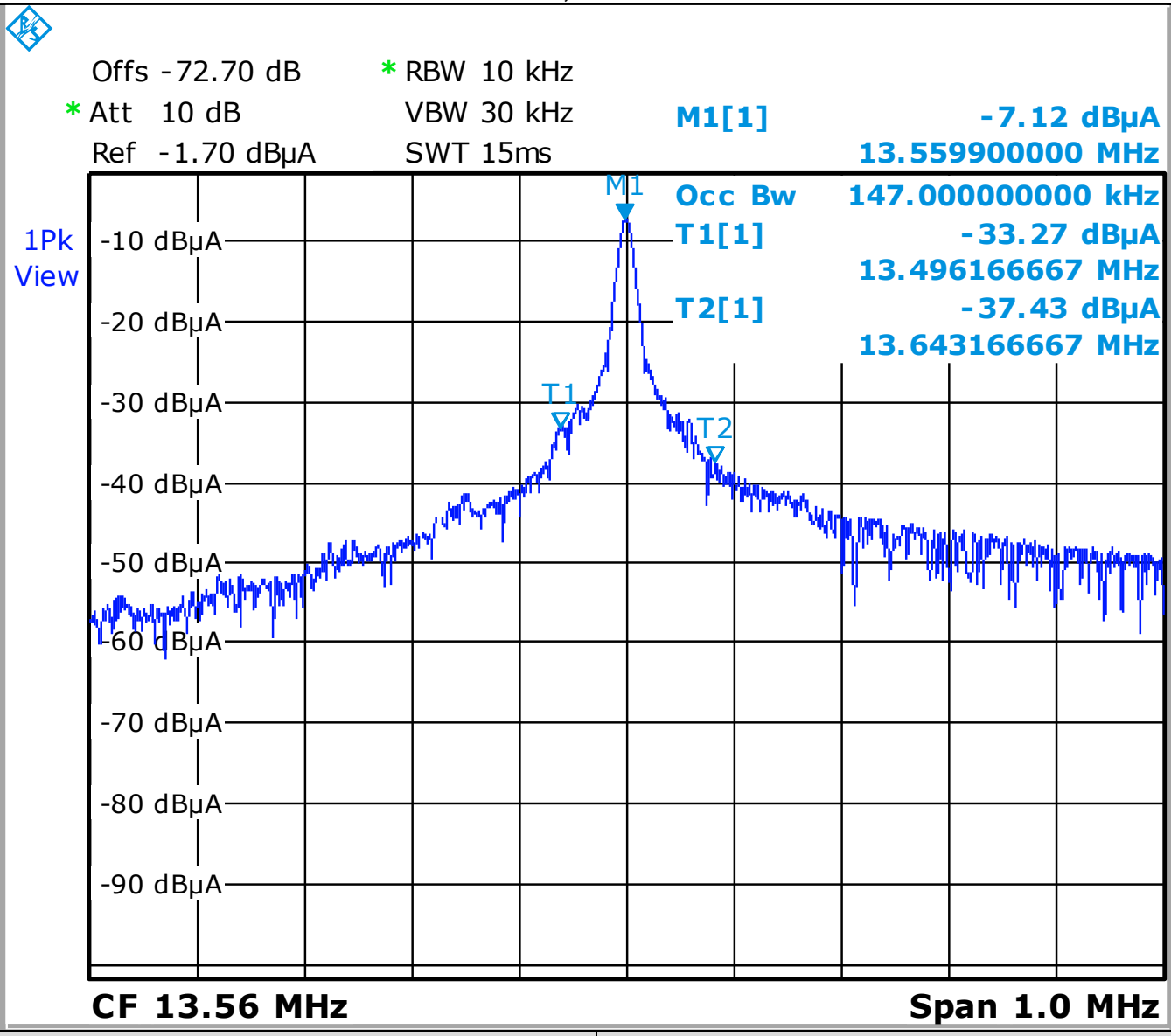
3.2. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	SECASI Technologies	SLT-34	D1024029	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2015/04	2017/04
Thermometer	AOIP	TM 6630	B4041042	2016/09	2018/03
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
Cable	CABLES & CONNECTIQUES	-	A5329422	-	-

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

3.3. RESULTS

Occupied Bandwidth
13,56MHz



Frequency(MHz)	Occupied Bandwidth (MHz)
13,56MHz	0.147

3.1. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **Safran Identity and Security** SN: **17001OMX0000002**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN ISSUE 4** limits.

4. FREQUENCY TOLERANCE

4.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU
Date of test : March 13, 2017
Ambient temperature : 23 °C
Relative humidity : 45 %

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

Photograph for Frequency Tolerance in normal test condition

Photograph for Frequency Tolerance in extreme test condition

4.3. LIMIT

The Center Frequency shall be inside +/-0.01MHz

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	SECASI Technologies	SLT-34	D1024029	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2015/04	2017/04
Thermometer	AOIP	TM 6630	B4041042	2016/09	2018/03
Multi-meter	KEITHLEY	2000	A1242090	2016/06	2018/06
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2016/06	2018/06
Cable	CABLES & CONNECTIQUES	-	A5329422	-	-

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

4.5. RESULTS

EUT activation:	0min									
Voltage:	Vnom									
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
Frequency (MHz)	13,5598	13,5598	13,5598	13,5599	13,5599	13,5599	13,5599	13,5598	13,5599	13,5599
Frequency Drift (%)	-0,0018	-0,0017	-0,0013	-0,0011	-0,0011	-0,0011	-0,0011	-0,0018	-0,0011	-0,0011
EUT activation:	2min									
Voltage:	Vnom									
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
Frequency (MHz)	13,5598	13,5598	13,5598	13,5599	13,5599	13,5599	13,5598	13,5599	13,5599	13,5598
Frequency Drift (%)	-0,0018	-0,0016	-0,0017	-0,0011	-0,0011	-0,0011	-0,0018	-0,0011	-0,0011	-0,0018
EUT activation:	5min									
Voltage:	Tnom									
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
Frequency (MHz)	13,5598	13,5598	13,5598	13,5599	13,5599	13,5599	13,5598	13,5598	13,5598	13,5598
Frequency Drift (%)	-0,0018	-0,0017	-0,0013	-0,0011	-0,0011	-0,0011	-0,0018	-0,0018	-0,0018	-0,0018
EUT activation:	10min									
Voltage:	Tnom									
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C	60°C
Frequency (MHz)	13,5598	13,5598	13,5598	13,5599	13,5599	13,5599	13,5599	13,5599	13,5598	13,5599
Frequency Drift (%)	-0,0018	-0,0017	-0,0017	-0,0011	-0,0011	-0,0011	-0,0011	-0,0011	-0,0018	-0,0011

Temperature	Tnom		
Voltage:	Vmin	Vnom	Vmax
Frequency (MHz)	13,5599	13,5599	13,5599
Frequency Drift (%)	-0,0011	-0,0011	-0,0011

4.6. CONCLUSION

Frequency tolerance measurement performed on the sample of the product **Safran Identity and Security** SN: **17001OMX0000002**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 ISSUE 9 limits.

5. AC POWER LINE CONDUCTED EMISSIONS

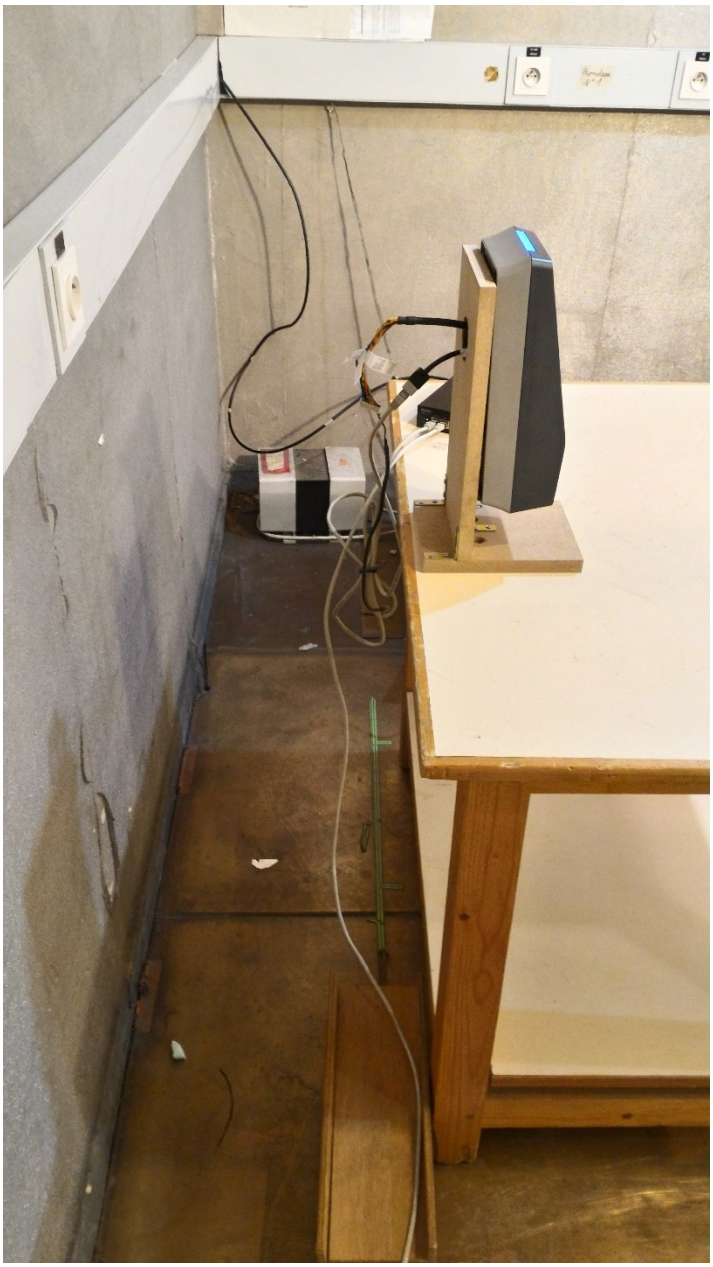
5.1. TEST CONDITIONS

Test performed by	: Laurent DENEUX
Date of test	: March 9, 2017 to March 10, 2017
Ambient temperature	: 21 °C
Relative humidity	: 53 %

5.2. 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)

5.3. LIMIT

Quasi-Peak
0,15kHz to 0,5MHz: 66dBµV to 56dBµV*
0,5MHz to 5MHz: 56dBµV
5MHz to 30MHz: 60dBµV

Average
0,15kHz to 0,5MHz: 56dBµV to 46dBµV*
0,5MHz to 5MHz: 46dBµV
5MHz to 30MHz: 50dBµV

*Decreases with the logarithm of the frequency

5.4. TEST EQUIPMENT LIST

Test Equipment Used					
Description	**Manufacturer**	**Model**	**Identifier**	**Cal. Date**	**Cal. Due**
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015-12	2017-12
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2016-05	2017-05
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2016-03	2017-03
Cable	-	-	A5329417	2016-10	2017-10
Cable	-	-	A5329589	2016-10	2017-10
Ground plane	LCIE	-	-	-	-

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

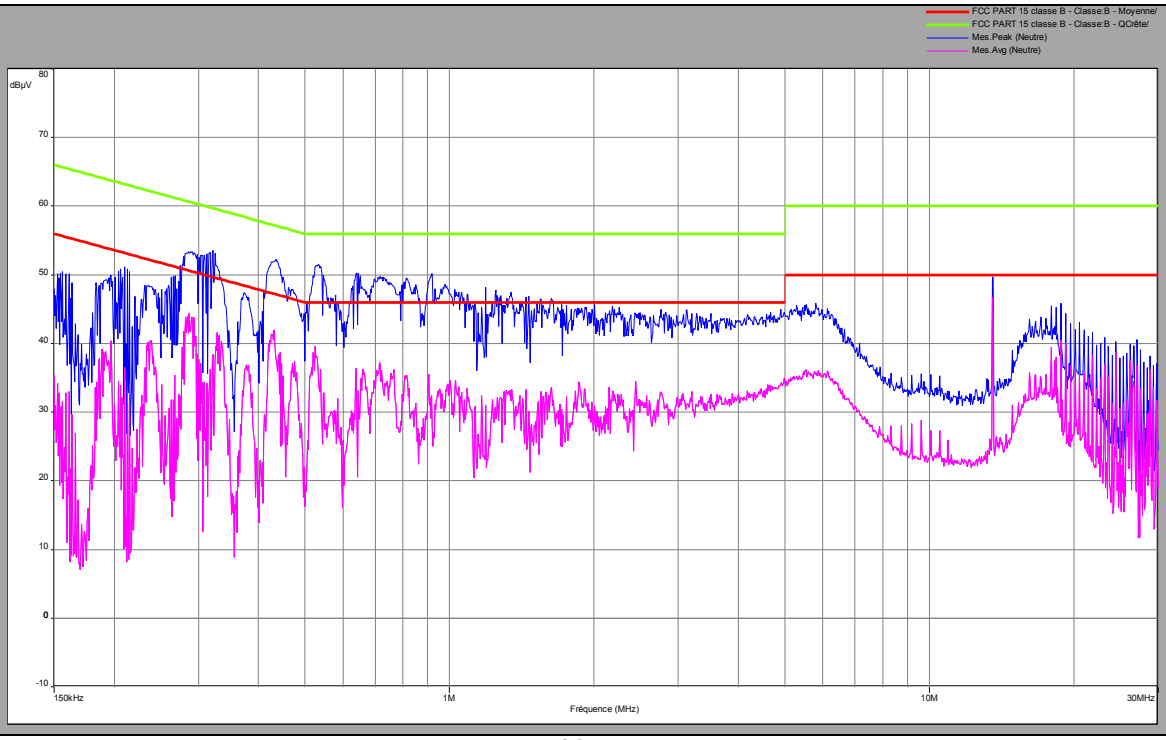
5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

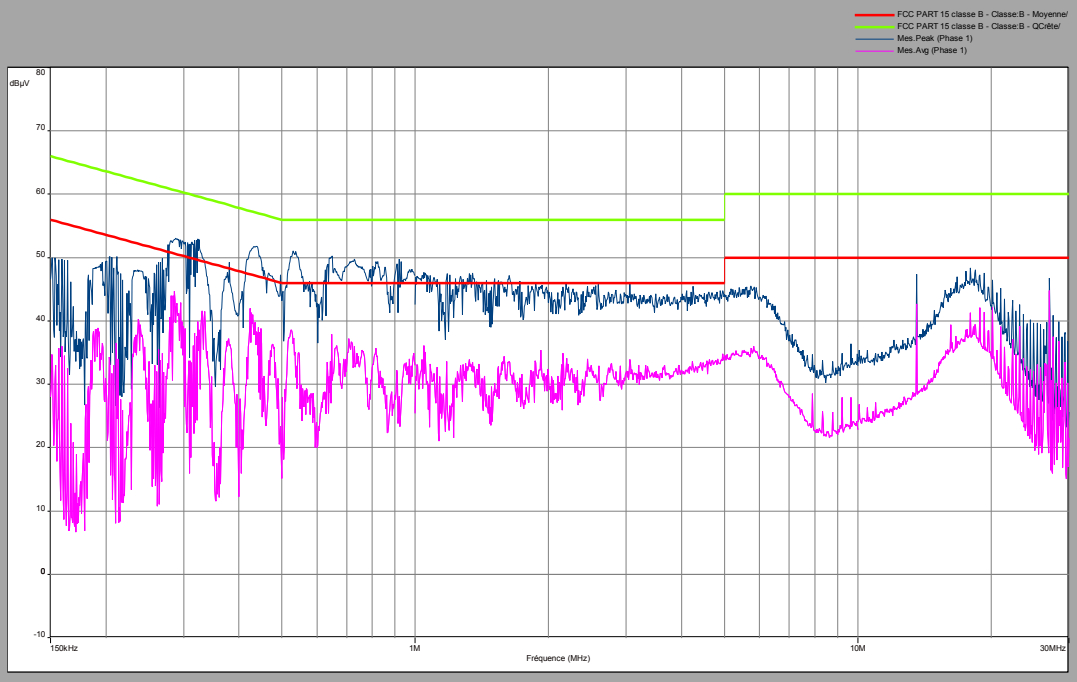
5.6. RESULTS

AC Power Line Conducted Emission

Phase



Line



Phase Line					
Frequency (kHz)	**Peak Level (dBµV)**	**Quasi-Peak Level (dBµV)**	**Quasi-Peak Limit (dBµV)**	**Average Level (dBµV)**	**Average Limit (dBµV)**
150	40	-	66	35.5	56
289	53	-	60.5	44.4	50.5
5792	46	-	60	35.8	50
13560	50	-	60	46.7	50
27120	40.5	-	60	36.7	50

Neutral Line					
Frequency (kHz)	**Peak Level (dBµV)**	**Quasi-Peak Level (dBµV)**	**Quasi-Peak Limit (dBµV)**	**Average Level (dBµV)**	**Average Limit (dBµV)**
150	50	-	66	35	56
289	52.8	-	60.5	44.5	50.5
1045	48	-	56	36	46
13560	47.4	-	60	42.6	50
27120	46.7	-	60	44.7	50

5.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **Safran Identity and Security** SN: **17001OMX0000002**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS Gen ISSUE 4 limits.

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

6.1. TEST CONDITIONS

Test performed by	: Laurent DENEUX
Date of test	: March 9, 2017 to March 10, 2017
Ambient temperature	: 18 °C
Relative humidity	: 47 %

6.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013). The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **3m**.
Test is performed in parrallel and perpendicular 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 the 3 axis of EUT. Antenna height was 1m.
Test is performed in horizontal (H) and vertical (V) polarization with **bilog** 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. The EUT is place at 1.5m high above 1GHz and at 0.8m high under 1GHz.

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

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

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

6.3. LIMIT

Limit at 3m:
9kHz to 0,490MHz: 2400/F(kHz)µV/m (300m) or 20log(2400/F(kHz))dBµV/m (3m) QPeak
0,490MHz to 1.705MHz: 240000/F(kHz)µV/m (30m) or 20log(240000/F(kHz))dBµV/m (3m) QPeak
1.705MHz to 30MHz: 30µV/m (30m) or dBµV/m (3m) QPeak
30MHz to 88MHz: 40dBµV/m QPeak
88MHz to 216MHz: 43,5dBµV/m QPeak
216MHz to 960MHz: 46dBµV/m QPeak
960MHz to 1000MHz: 54dBµV/m QPeak
Above 1000MHz: 74dBµV/m Peak
54dBµV/m Average

Limit at 10m:
30MHz to 88MHz: 29.5dBµV/m QPeak
88MHz to 216MHz: 33dBµV/m QPeak
216MHz to 960MHz: 35.5dBµV/m QPeak
960MHz to 1000MHz: 43.5dBµV/m QPeak
Above 1000MHz: 63.5BµV/m Peak
43.5BµV/m Average

6.4. TEST EQUIPMENT LIST

Apparatus	Trade Mark	Type	Registration number	Cal. Date	Cal. Due
Open test site	LCIE	-	F2000400	2016-05	2017-05
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015-12	2017-12
Preamplifier	HELWETT PACKARD	8449B	A7080071	2016-02	2017-02
Bilog antenna	CHASE	CBL 6112A	C2040040	2016-02	2017-02
Loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	2015-11	2017-11
Horn	ETS	3115	C2042023	2016-01	2017-01
Cable	-	-	A5329542	2016-03	2017-03
Cable	-	-	A5329449	2016-10	2017-10
Cable	-	-	A5329368	2016-05	2017-05
Cable	-	-	A5329444	2016-10	2017-10

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

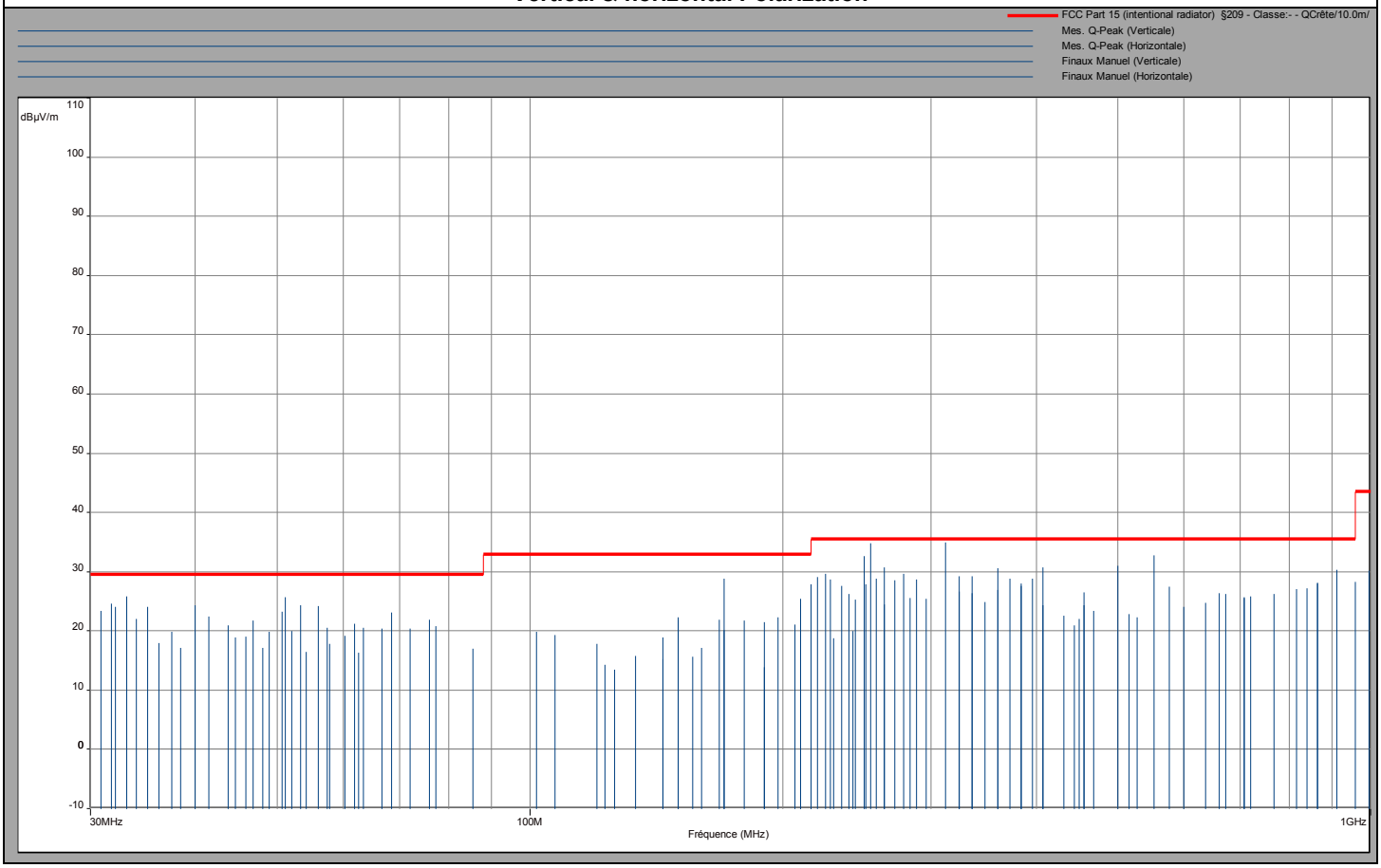
6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

6.6. RESULTS

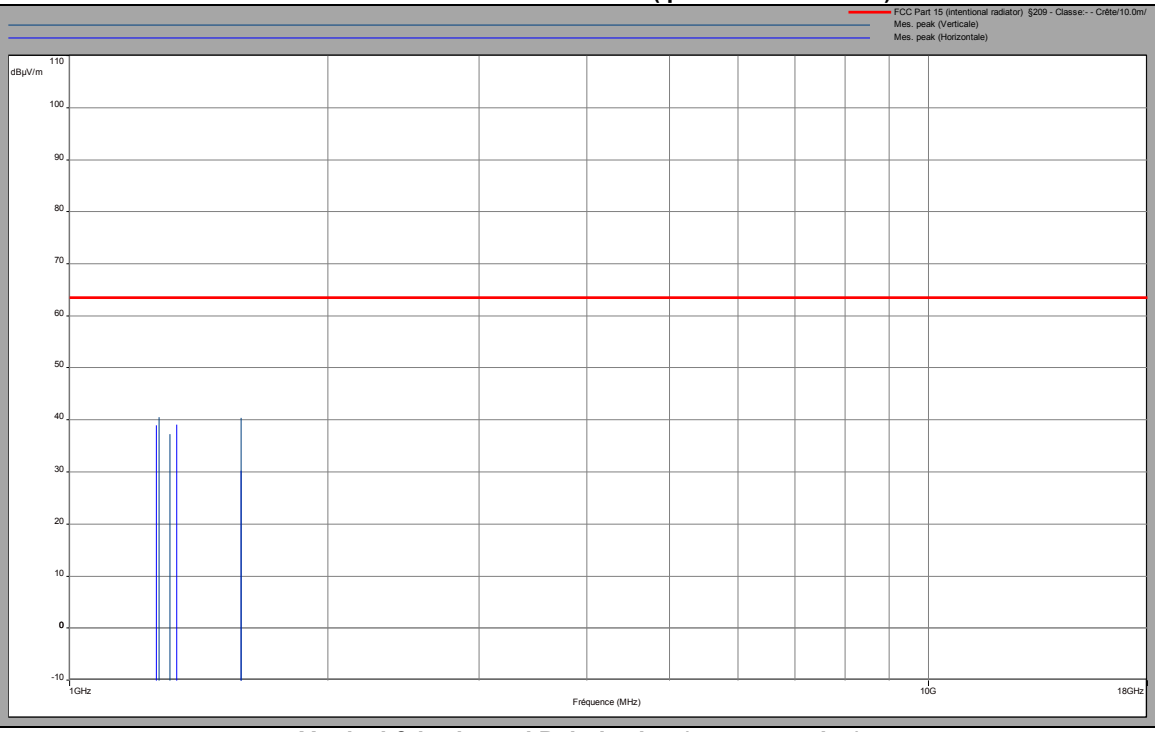
30MHz to 1GHz

Vertical & horizontal Polarization

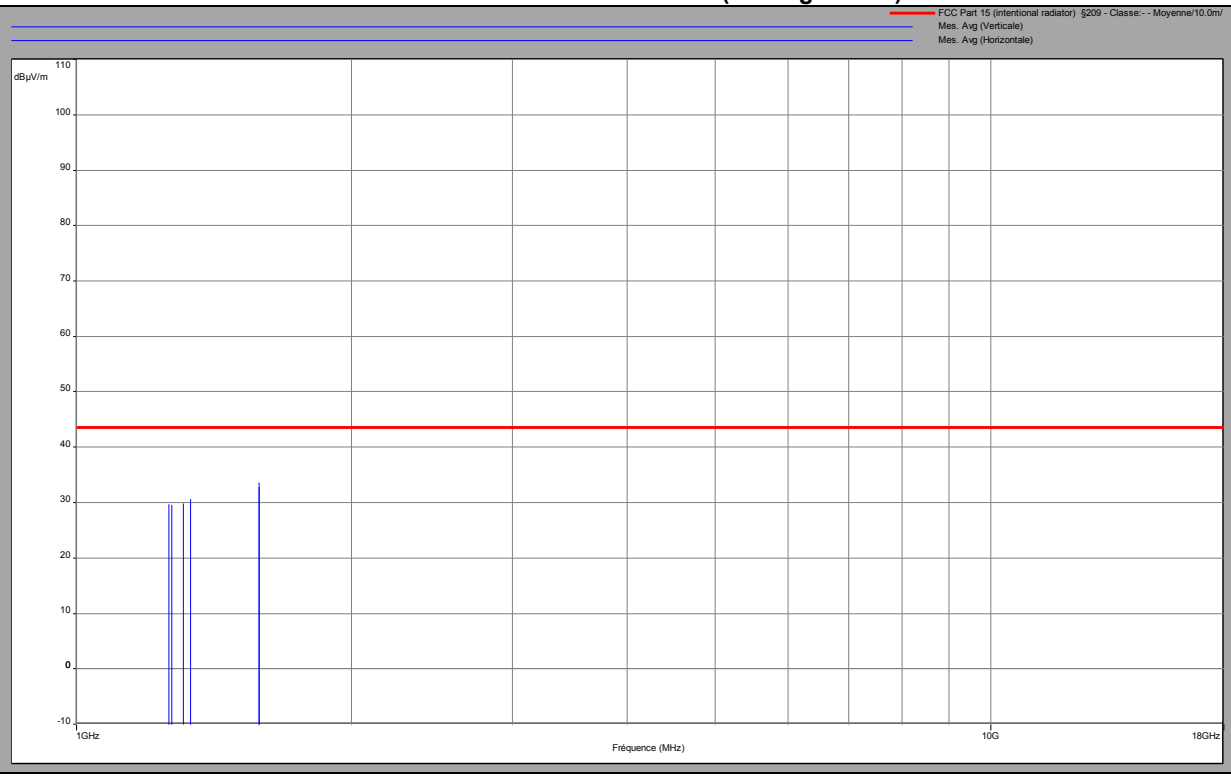


Above 1GHz

Vertical & horizontal Polarization (peak measurement)



Vertical & horizontal Polarization (average value)



Perpendicular antenna

Below 30MHz

Frequency (MHz)	QPeak Level (dBµV/m)	Limit (3m) (dBµV/m)
3.516	33	69.5
3.956	37.5	69.5
4.394	40.3	69.5
4.834	41.2	69.5
5.274	43.1	69.5
5.714	46.2	69.5
6.152	46.1	69.5
6.59	42.4	69.5
7.032	43.2	69.5
7.912	39.7	69.5
9.23	34.2	69.5
9.88	37.2	69.5
11.976	28.6	69.5
15.31	27.3	69.5
27.12	33.1	69.5

Paralell antenna

Frequency (MHz)	QPeak Level (dBµV/m)	Limit (3m) (dBµV/m)
3.524	36.3	69.5
3.968	40	69.5
4.408	42.2	69.5
4.85	43.2	69.5
5.29	44.2	69.5
5.73	45.9	69.5
6.166	43.5	69.5
6.61	42.9	69.5
7.05	41.6	69.5
7.49	39.4	69.5
7.932	38.6	69.5
9.256	36.3	69.5
9.88	35.3	69.5
11.98	30.2	69.5
15.3	28.9	69.5
27.12	30.2	69.5

30MHz to 1GHz			
Polarization	**Frequency (MHz)**	**QPeak Level (dBµV/m)**	**Limit (dBµV/m)**
Vertical	30.9	23.5	29.5
Vertical	31.8	24.6	29.5
Vertical	32.1	24.2	29.5
Vertical	33.1	25.9	29.5
Vertical	34	22.0	29.5
Vertical	35.1	24.1	29.5
Vertical	36.2	18.0	29.5
Vertical	37.5	19.9	29.5
Vertical	38.4	17.2	29.5
Vertical	40	24.4	29.5
Vertical	41.5	22.5	29.5
Vertical	43.7	21.0	29.5
Vertical	44.6	19.0	29.5
Vertical	45.9	19.1	29.5
Vertical	46.8	21.8	29.5
Vertical	48.1	17.2	29.5
Vertical	49	19.9	29.5
Vertical	50.7	23.2	29.5
Vertical	51.2	25.8	29.5
Vertical	52.1	20.1	29.5
Vertical	53.4	24.5	29.5
Vertical	54.2	16.5	29.5
Vertical	56	24.3	29.5
Vertical	57.4	20.6	29.5
Vertical	57.7	17.8	29.5
Vertical	60.2	19.3	29.5
Vertical	61.9	21.2	29.5
Vertical	63.4	20.6	29.5
Vertical	66.6	20.4	29.5
Vertical	68.4	23.2	29.5
Vertical	72	20.4	29.5
Vertical	75.9	22.0	29.5
Vertical	77.2	20.8	29.5
Vertical	85.6	17.1	29.5
Vertical	101.9	19.9	33
Vertical	107.1	19.4	33
Vertical	120	17.9	33
Vertical	126.2	13.5	33
Vertical	144	18.9	33
Vertical	150	21.9	33
Vertical	156	15.7	33
Vertical	160	17.2	33
Vertical	170.2	28.9	33
Vertical	190	21.5	33
Vertical	197.3	22.3	33

30MHz to 1GHz			
Polarization	**Frequency (MHz)**	**QPeak Level (dBµV/m)**	**Limit (dBµV/m)**
Vertical	206.7	21.2	33
Vertical	210	25.4	33
Vertical	216	28.0	33
Vertical	219.9	29.1	35.5
Vertical	224.9	29.7	35.5
Vertical	227.7	28.8	35.5
Vertical	234.7	27.6	35.5
Vertical	239.7	26.3	35.5
Vertical	243.9	25.4	35.5
Vertical	250	32.6	35.5
Vertical	254	34.8	35.5
Vertical	258.1	28.9	35.5
Vertical	264	30.8	35.5
Vertical	271.9	28.6	35.5
Vertical	278.3	29.7	35.5
Vertical	288	28.8	35.5
Vertical	312	35.0	35.5
Vertical	324	29.3	35.5
Vertical	336	29.3	35.5
Vertical	348	25.0	35.5
Vertical	360	30.6	35.5
Vertical	372	28.9	35.5
Vertical	384	28.0	35.5
Vertical	396	28.9	35.5
Vertical	408	30.8	35.5
Vertical	432	22.6	35.5
Vertical	444	21.0	35.5
Vertical	450	22.1	35.5
Vertical	456	26.6	35.5
Vertical	468	23.5	35.5
Vertical	500	31.0	35.5
Vertical	516	22.9	35.5
Vertical	528	22.3	35.5
Vertical	552	32.8	35.5
Vertical	576	27.5	35.5
Vertical	600	24.1	35.5
Vertical	636	24.8	35.5
Vertical	660	26.4	35.5
Vertical	708	25.7	35.5
Vertical	840	27.2	35.5
Vertical	864	28.2	35.5
Vertical	912	30.4	35.5
Vertical	960	28.3	35.5
Vertical	996	30.2	43.5

30MHz to 1GHz			
Polarization	**Frequency (MHz)**	**QPeak Level (dBµV/m)**	**Limit (dBµV/m)**
Horizontal	62.5	16.3	29.5
Horizontal	122.9	14.3	33
Horizontal	133.4	15.8	33
Horizontal	144	15.3	33
Horizontal	150	22.4	33
Horizontal	168	22.0	33
Horizontal	170	20.1	33
Horizontal	180	21.9	33
Horizontal	190.1	13.9	33
Horizontal	210	24.4	33
Horizontal	216	25.1	33
Horizontal	229.9	18.8	35.5
Horizontal	242	20.1	35.5
Horizontal	250.9	28.0	35.5
Horizontal	264	24.5	35.5
Horizontal	283	25.6	35.5
Horizontal	296	25.4	35.5
Horizontal	324	26.7	35.5
Horizontal	336	26.4	35.5
Horizontal	360	27.0	35.5
Horizontal	384	27.7	35.5
Horizontal	408	24.3	35.5
Horizontal	456	24.4	35.5
Horizontal	672	26.2	35.5
Horizontal	708	25.7	35.5
Horizontal	720	25.9	35.5
Horizontal	768	26.3	35.5
Horizontal	816	27.1	35.5
Horizontal	864	28.1	35.5

Above 1GHz						
Polarization	**Frequency (MHz)**	**Duty cycle correction (dB)**	**Average Level (dBµV/m)**	**Average Limit (dBµV/m)**	**Peak Level (dBµV/m)**	**Peak Limit (dBµV/m)**
Vertical	1272	0	29.7	43.5	40.6	63.5
Vertical	1308	0	29.9	43.5	37.2	63.5
Vertical	1584	0	32.9	43.5	40.4	63.5
Horizontal	1262	0	29.7	43.5	39.0	63.5
Horizontal	1332	0	30.6	43.5	39.1	63.5
Horizontal	1584	0	33.6	43.5	30.2	63.5

6.7. CONCLUSION

Field strength outside of the bands 13.110-14.010 MHz measurement performed on the sample of the product **Safran Identity and Security** SN: **17001OMX0000002**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS-Gen ISSUE 4 limits.

7. FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHz

7.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : March 9, 2017 to March 10, 2017
Ambient temperature : 18 °C
Relative humidity : 47 %

7.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013). The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **3m**.
Test is performed in parrallel and perpendicular 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 the 3 axis of EUT. Antenna height was 1m.
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. The EUT is place at 0.8m.

Photograph for Field strength within the band 13.110-14.010MHz

7.3. LIMIT

Limit:

Below 13.110MHz:	30µV/m (30m) or 69.5dBµV/m (3m) QPeak
13.110MHz to 13.410MHz:	106µV/m (30m) or 80.5dBµV/m (3m)
13.410MHz to 13.553MHz:	334µV/m (30m) or 90.5dBµV/m (3m)
13.553MHz to 13.567MHz:	15848µV/m (30m) or 124dBµV/m (3m)
13.567MHz to 13.710MHz:	334µV/m (30m) or 90.5dBµV/m (3m)
13.710MHz to 14.010MHz:	106µV/m (30m) or 80.5dBµV/m (3m)
Above 14.010MHz:	30µV/m (30m) or 69.5dBµV/m (3m) QPeak

7.4. TEST EQUIPMENT LIST

Apparatus	Trade Mark	Type	Registration number	Cal. Date	Cal. Due
Open test site	LCIE	-	F2000400	2016-05	2017-05
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2015-12	2017-12
Loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	2015-11	2017-11
Cable	-	-	A5329542	2016-03	2017-03
Cable	-	-	A5329449	2016-10	2017-10
Cable	-	-	A5329368	2016-05	2017-05
Cable	-	-	A5329444	2016-10	2017-10

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

7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

7.6. RESULTS

Parallel Axis		
Frequency (MHz)	**QPeak Level (dBµV/m) (3m)**	**Limit (dBµV/m) (3m)**
Below 13.110	28.5	69.5
13.110 to 13.410	31.6	80.5
13.410 to 13.553	39	90.5
13.553 to 13.567	70.5	124
13.567 to 13.710	33.4	90.5
13.710 to 14.010	29.2	80.5
Above 14.010	25.3	69.5

Perpendicular Axis		
Frequency (MHz)	**QPeak Level (dBµV/m) (3m)**	**Limit (dBµV/m) (3m)**
Below 13.110	31.7	69.5
13.110 to 13.410	33.9	80.5
13.410 to 13.553	37.8	90.5
13.553 to 13.567	67	124
13.567 to 13.710	35.8	90.5
13.710 to 14.010	31.9	80.5
Above 14.010	28	69.5

7.7. CONCLUSION

Field strength within the band 13.110-14.010MHz measurement performed on the sample of the product **Safran Identity and Security** SN: **17001OMX0000002**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 ISSUE 9 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