



LCIE

Test report

N°: 127624-656122A

Subject Radio spectrum Matters (ERM) tests according to standards:
47 CFR Part 15.247 & RSS-210, Issue 8 & RSS-Gen, Issue 3

Issued to SORIN
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Apparatus under test

☞ Product Orchestra plus link
☞ Trade mark SORIN Group
☞ Manufacturer SORIN Group
☞ Model KA351
☞ Serial number LA1403007
☞ FCC ID YSGKA351
☞ IC ID 10270A-KA351

Test date 2014/07/10 & 2014/09/05
Test location Fontenay Aux Roses
Test performed by Arnaud FAYETTE & Laurent DENEUX
Composition of document 54 pages

Modification of the last version None

Document issued on 2014/10/22

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Tests operator



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1. TEST PROGRAM

- References**

Standards: -47 CFR Part 15C
-RSS-210
-RSS-Gen
-ANSI C63.10

- Radio requirement:**

Standard Section	Test Description	TEST RESULT - Comments
CFR 47 § 15.247(a)(1) RSS-210 A8.4(2)	Number of Hopping Frequencies	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.247(a)(1) RSS-210 A8.1(b)	Carrier Frequency Separation	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.247(a)(1) RSS-210 A8.1(a)	Time of Occupancy	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
RSS-Gen § 4.6.1	Occupied Bandwidth	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.247 (a) (1) RSS-210 § A8.1(a)	20dB Bandwidth	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.247 (b)(1) RSS-210 § A8.1(b)	Peak Output Power	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.247 (d) RSS-210 § A8.5	Unwanted Emissions into Non-Restricted Frequency Bands	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.207 RSS-Gen § 7.2.4	AC Power Line Conducted Emissions	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
CFR 47 § 15.209 (a) CFR 47 § 15.205 (a) CFR 47 § 15.247 (d) RSS-210 § A8.5	Unwanted Emissions into Restricted Frequency Bands	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
RSS-Gen § 4.10	Receiver Radiated emissions	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA (No Receiver) <input type="checkbox"/> NP (Limited Program)

This table is a summary of test report, see conclusion of each clause of this test report for detail.

The product SORIN Group KA351, SN: LA1403007 is Compliant according to FCC 15.247, RSS-210, RSS-Gen standards.

PASS: EUT complies with standard's requirement
FAIL: EUT does not comply with standard's requirement
NA: Not Applicable
NP: Not Performed

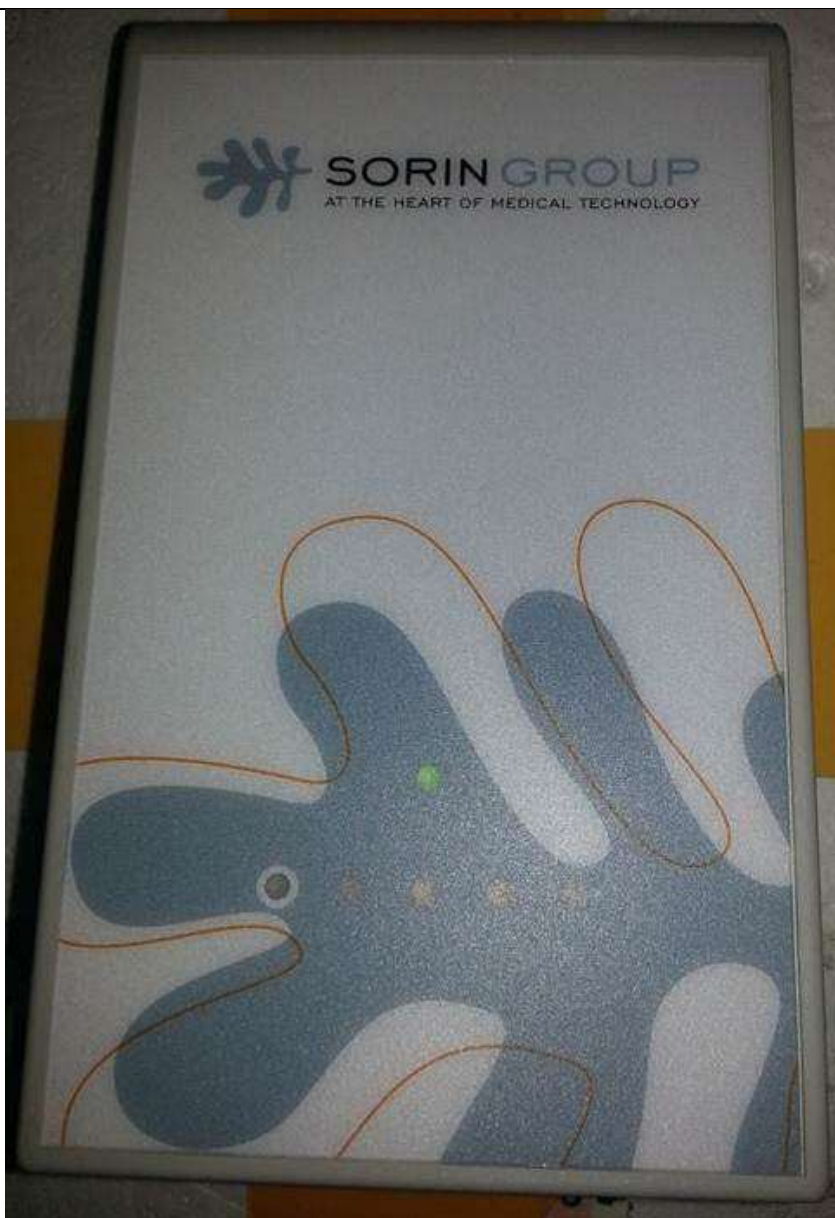
2. EQUIPMENT DESCRIPTION

2.1. GENERAL DESCRIPTION

-The SORIN Group KA351 is part of the RF Programmer System.
This system has been specially designed to program and interrogate Sorin Radio Frequency implantable medical devices. Sorin cardiac devices are equipped with a transceiver which receives clinical commands and sends clinical information and device parameters through the ORCHESTRA PLUS LINK Radio Frequency wireless technology.

2.2. HARDWARE & SOFTWARE IDENTIFICATION

- Equipment under test (EUT):



Photograph of EUT



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

- Inductive Head
- Orchestra Plus



Photograph of AE



• **Input/output:**

- USB

• **Software identification:**

-Software version: RF_FW_v1.5

• **Equipment information:**

- Modulation technology: FHSS modulation

- Transmit operating mode:

Multiples antenna without beam forming

Multiples antenna with beam forming

Single antenna: Equipment with 2 diversity antennas operating in switched mode by which at any moment in time only 1 antenna is used

- Number of transmit chains:

1 2 3 4

Symmetrical Asymmetrical

- Number of receiver chains:

1 2 3 4

- Antenna type:

Integral External

- Antenna Gain 1: -6dBi

- Antenna Gain 2: -5.5dBi

- Beamforming gain:

Yes No

- Type of the equipment:

Stand-alone equipment Plug-in radio device Combined equipment

- Test source voltage: Vnom:

120V/60Hz 5Vdc (USB)

- Type of power source:

Battery (Alkaline/Lithium-Ion/Lead acid/Other) Internal power supply

External power supply (USB) Car Charger

- Test sequence/test software used: See 2.2. Running Mode

- Ad-hoc mode:

Yes No

- Number of hopping frequency: 15

- Duty Cycle:

Continuous duty Intermittent duty Continuous operation

- Equipment type:

Representative production model Pre-production model



- Operating frequency range

Frequency Band (MHz)	
2400MHz to 2483,5MHz	<input checked="" type="checkbox"/>
5150MHz to 5350MHz	<input type="checkbox"/>
5470MHz to 5725MHz	<input type="checkbox"/>
402MHz to 405MHz	<input checked="" type="checkbox"/>

-Channel plan:

Channel	Frequency (MHz)
0	2421,1
1	2423,8
2	2426,5
3	2429,2
4	2431,9
5	2434,6
6	2437,3
7	2440
8	2442,7
9	2445,4
10	2448,1
11	2450,8
12	2453,5
13	2456,2
14	2458,9

-Data Rate:

Modulation Type
OOK



2.3. EQUIPMENT OF THE SAME FAMILY

-None

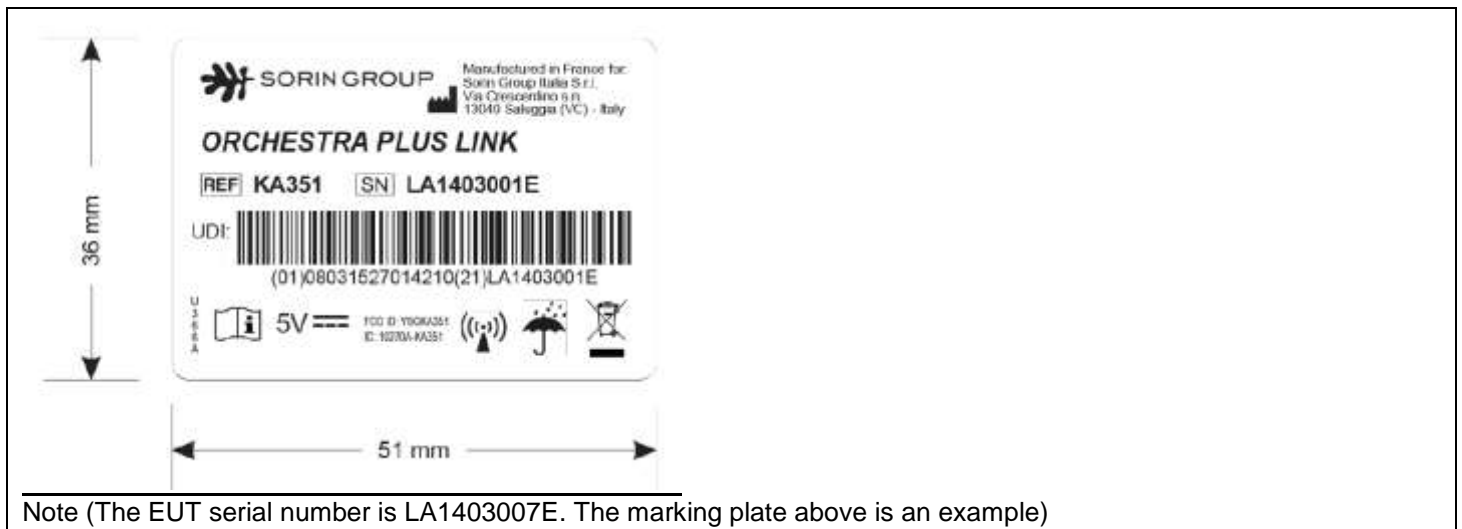
2.4. RUNNING MODE

The EUT is set in the following modes during tests:

- Permanent emission with modulation on a fixed channel at the highest power
- Permanent emission with modulation with hopping mode at the highest power

Following commands with the specific test software are used to set the product:
See MISC2285A document

2.5. EQUIPMENT LABELLING



2.6. EQUIPMENT MODIFICATIONS

- No equipment modification has been necessary during testing.
- Modification applied for following tests:

3. NUMBER OF HOPPING FREQUENCIES

3.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/07/10
Ambient temperature : 23°C
Relative humidity : 55%

3.2. TEST SETUP

- The Equipment under Test is installed:

- In the climatic chamber
- On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & hopping.



Photograph for Number of Hopping Frequencies



3.3. LIMIT

Number of Hopping Frequencies shall be at least 15 channels

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	ESR7	A2642023	2013/10	2014/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05

3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

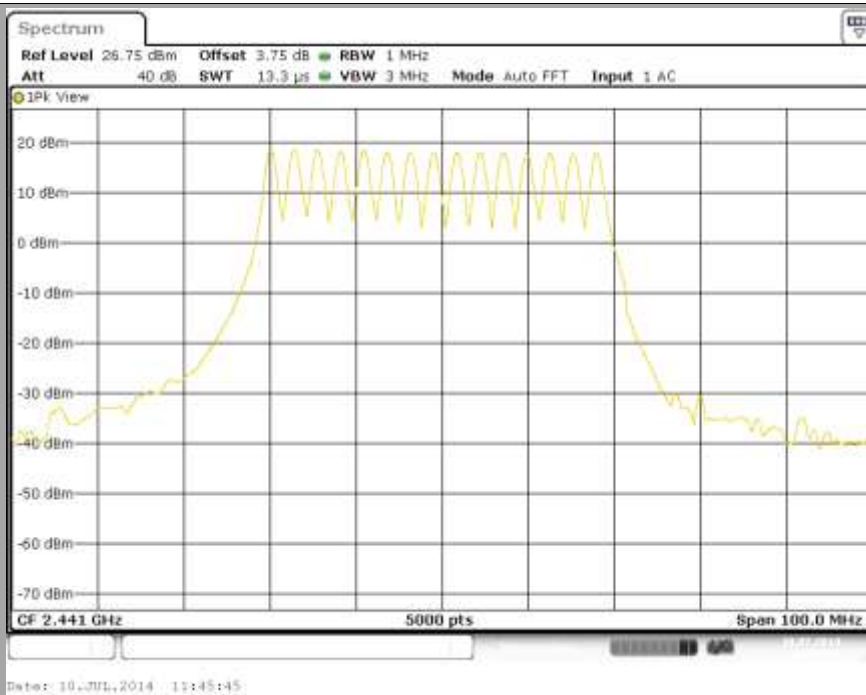
None

Divergence:

3.6. GRAPHICS & RESULTS

Antenna 1

Call



Antenna 2

Call





Antenna 1 :

Temperature	Tnom
Voltage	Vnom
Channel	Call
Number of Hopping Frequencies	15

Antenna 2 :

Temperature	Tnom
Voltage	Vnom
Channel	Call
Number of Hopping Frequencies	15

3.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the number of hopping frequencies measurement of FCC 15.247, RSS-210, RSS-Gen.

4. CARRIER FREQUENCY SEPARATION

4.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/07/10
Ambient temperature : 22°C
Relative humidity : 58%

4.2. TEST SETUP

- The Equipment under Test is installed:

- In the climatic chamber
 On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & hopping.



Photograph for Carrier Frequency Separation



4.3. LIMIT

Carrier Frequency Separation shall be at least two-thirds of the 20dB Bandwidth

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	ESR7	A2642023	2013/10	2014/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05

4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



4.6. GRAPHICS & RESULTS





Antenna 1:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Carrier Frequency Separation (MHz)	2.701	2.697	2.703

Antenna 2:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Carrier Frequency Separation (MHz)	2.701	2.437	2.703

4.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the carrier frequency separation measurement of FCC 15.247, RSS-210, RSS-Gen.



5. TIME OF OCCUPANCY

5.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2014/09/05
Ambient temperature : 23°C
Relative humidity : 45%

5.2. TEST SETUP

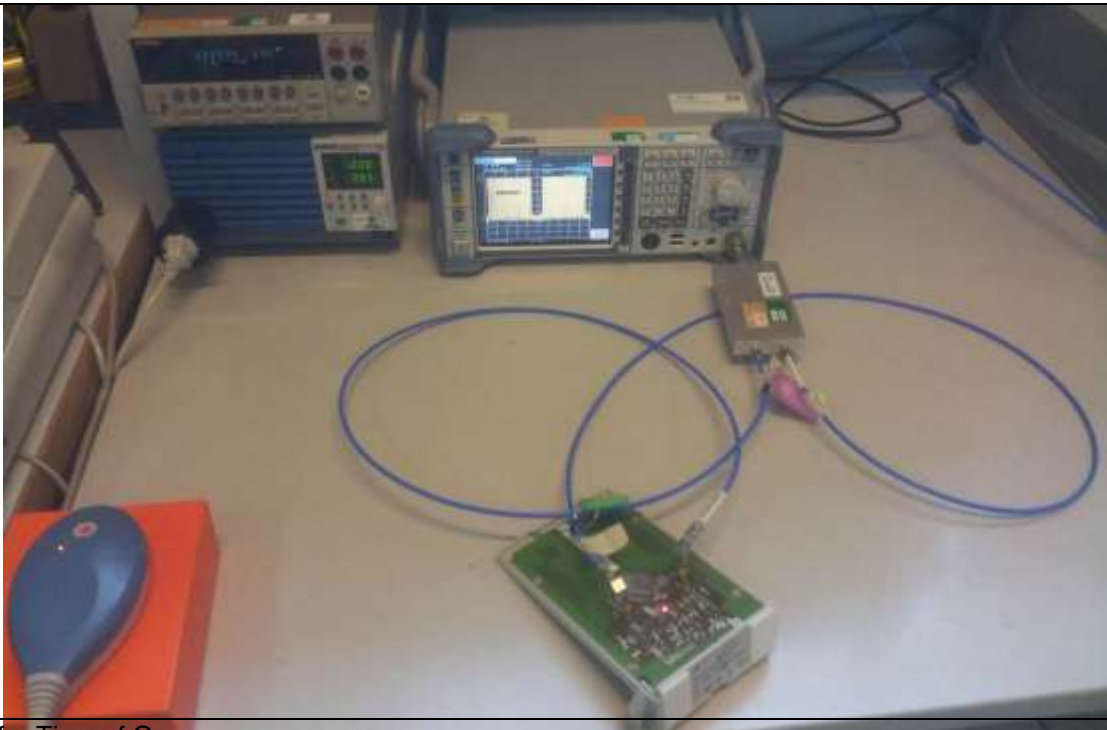
- The Equipment under Test is installed:

- In the climatic chamber
 On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the FCC DA 00-705
The EUT is set in permanent emission with modulation & hopping.



Photograph for Time of Occupancy



5.3. LIMIT

The Time of Occupancy shall not exceed 0.4s within any period of 0.4s multiplied by the number of hopping channels employed

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
RF cable	Télédyne	920-0202-048	A5329675	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122210	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	FSL 6	A4060032	2012/11	2014/11
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Splitter	MINI CIRCUITS	ZN2PD2-63-S+	A7132027	2014/09	2014/09

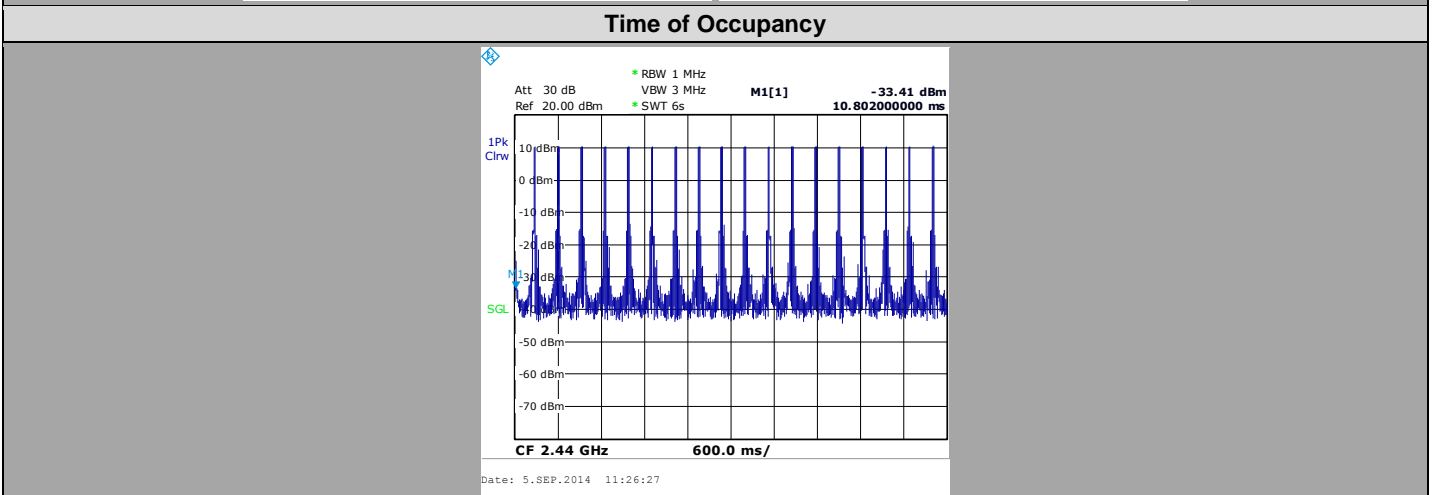
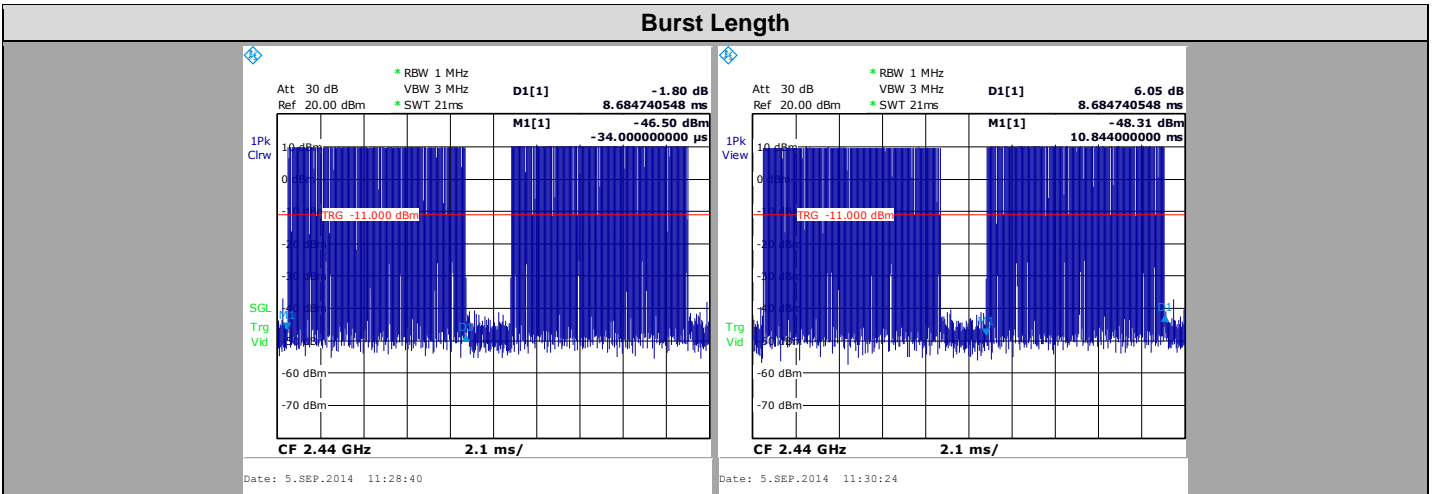
5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



5.6. GRAPHICS & RESULTS



Temperature	Tnom
Voltage	Vnom
Burst Length (ms)	8.68+8,68=17,36
Number of burst in 6s period	18
Time of Occupancy (ms)	312

5.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the time of occupancy measurement of FCC 15.247, RSS-210, RSS-Gen.

6. OCCUPIED BANDWIDTH

6.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE & Stéphane PHOUDIAH
Date of test : 2014/07/10 & 2014/09/05
Ambient temperature : 23°C
Relative humidity : 45%

6.2. TEST SETUP

- The Equipment under Test is installed:

- In the climatic chamber
 On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the RSS-GEN § 4.6.1 reference method.
The EUT is set in permanent emission with modulation & no hopping.



Photograph for Occupied Bandwidth



Photograph for Occupied Bandwidth

6.3. LIMIT

No Limit

6.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	ESR7	A2642023	2013/10	2014/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
RF cable	Télédyne	920-0202-048	A5329675	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122210	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	FSL 6	A4060032	2012/11	2014/11
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



Antenna 1:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.894	1.861	1.878

Antenna 2:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Occupied Bandwidth (MHz)	1.862	1.921	1.877

6.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the occupied bandwidth measurement of RSS-210, RSS-Gen.

7. 20dB BANDWIDTH

7.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2014/09/05
Ambient temperature : 23°C
Relative humidity : 45%

7.2. TEST SETUP

- The Equipment under Test is installed:

- In the climatic chamber
 On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & no hopping.



Photograph for 20dB Bandwidth



7.3. LIMIT

No Limit

7.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
RF cable	Télédyne	920-0202-048	A5329675	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122210	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	FSL 6	A4060032	2012/11	2014/11
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05

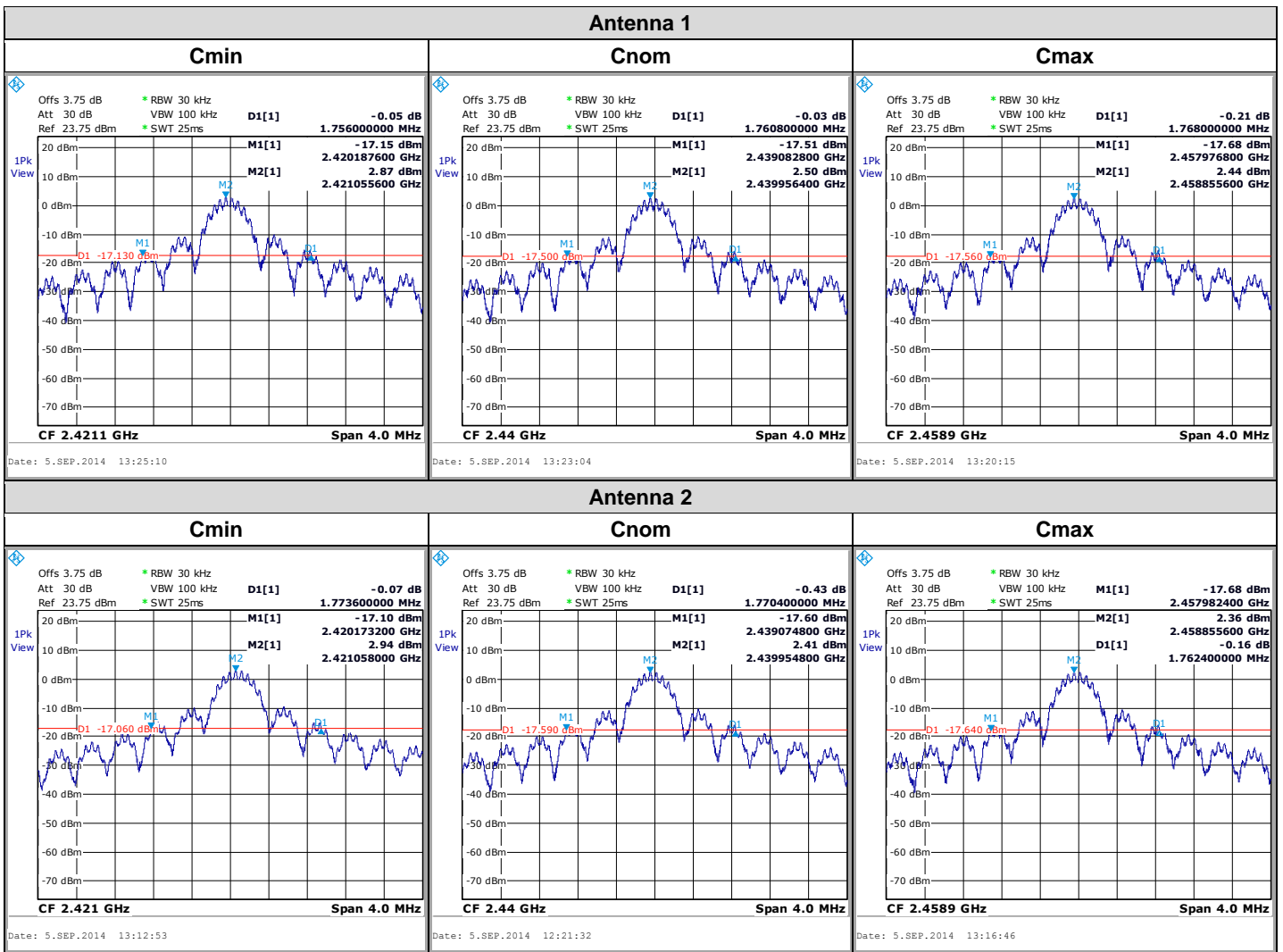
7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



7.6. GRAPHICS & RESULTS





Antenna 1:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
20dB Bandwidth (MHz)	1,756	1,761	1,768

Antenna 2:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
20dB Bandwidth (MHz)	1,773	1,770	1,762

7.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the 20dB bandwidth measurement of FCC 15.247, RSS-210, RSS-Gen.

8. PEAK OUTPUT POWER

8.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE
Date of test : 2014/07/10
Ambient temperature : 22°C
Relative humidity : 51%

8.2. TEST SETUP

- The Equipment under Test is installed:

- In the climatic chamber
 On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & no hopping.



Photograph for Peak Output Power



8.3. LIMIT

The Peak Output Power shall not exceed 21dBm

8.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	ESR7	A2642023	2013/10	2014/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05

8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



8.6. GRAPHICS & RESULTS





Antenna 1:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Peak Output Power (dBm)	18.31	17.92	17.62

Antenna 2:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Peak Output Power (dBm)	18.35	17.84	17.54

8.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the peak output power measurement of FCC 15.247, RSS-210, RSS-Gen.



9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS

9.1. TEST CONDITIONS

Test performed by : Arnaud FAYETTE & Stéphane PHOUDIAH
Date of test : 2014/07/10 & 2014/09/02
Ambient temperature : 22°C
Relative humidity : 52%

9.2. TEST SETUP

- The Equipment under Test is installed:

- In the climatic chamber
- On a table

-Measurement is performed with a spectrum analyzer

- On the EUT conducted access

The product has been tested according to the FCC DA 00-705 reference method.
The EUT is set in permanent emission with modulation & no hopping.



Photograph for Unwanted Emissions into Non-Restricted Frequency Bands



Photograph for Unwanted Emissions into Non-Restricted Frequency Bands

9.3. LIMIT

Unwanted Emissions into Non-Restricted Frequency Bands shall be at least 20dB below highest level of the radiated power in any 100kHz bandwidth outside the intentional radiation frequency band

9.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1241084	2014/02	2016/02
RF cable	Télédyne	920-0202-048	A5329661	2014/04	2015/04
Attenuator 3dB	MINI CIRCUITS	BW-S3W2+	A7122209	2014/04	2015/04
Spectrum Analyser	ROHDE & SCHWARZ	ESR7	A2642023	2013/10	2014/10
Programmable AC/DC power supply	KIKUSUI	PCR500M	A7040079	2014/05	2015/05
Receiver	ROHDE & SCHWARZ	ESI 40	A2642010	2014/02	2015/02
RF Cable	-	-	A5329592	2014/04	2015/04
Attenuator 3dB	WEINSCHEL	WA54-3-12	A7122223	2013/12	2014/12

9.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



9.6. GRAPHICS & RESULTS

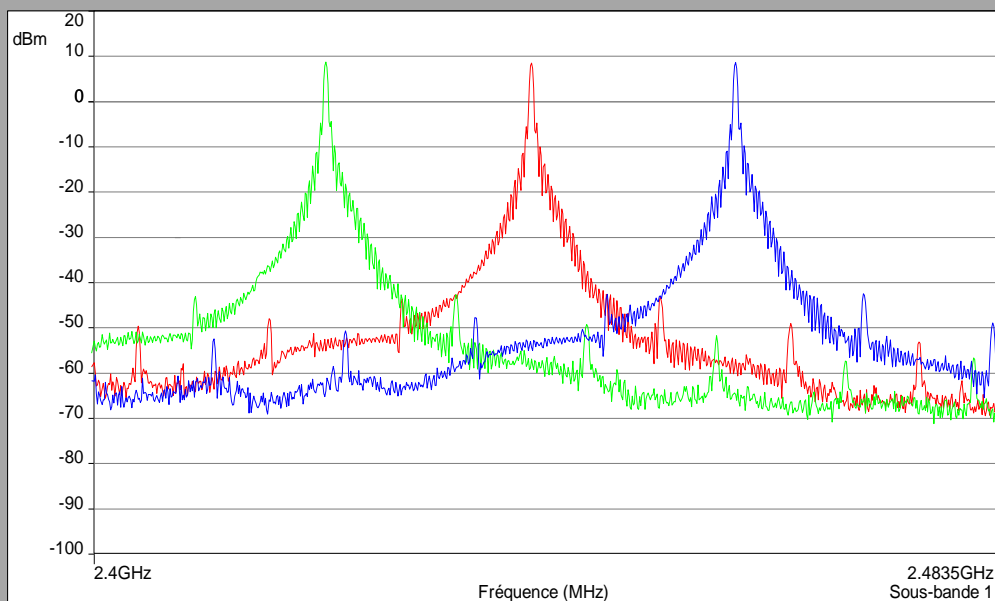
Antenna 1

Unwanted Emissions into Non-Restricted Bands

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes.Peak Channel 14
Mes.Peak Channel 0
Mes.Peak Channel 7

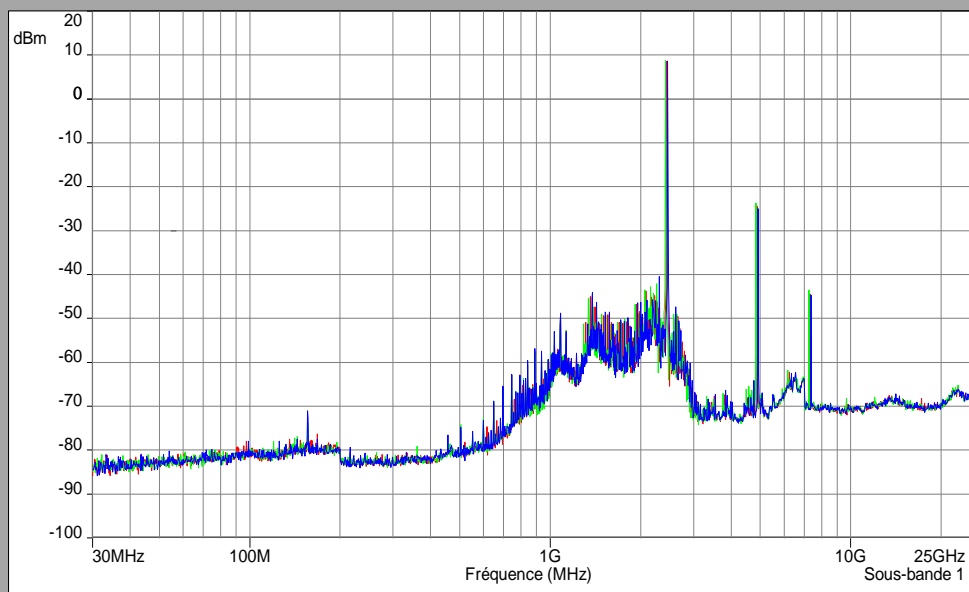


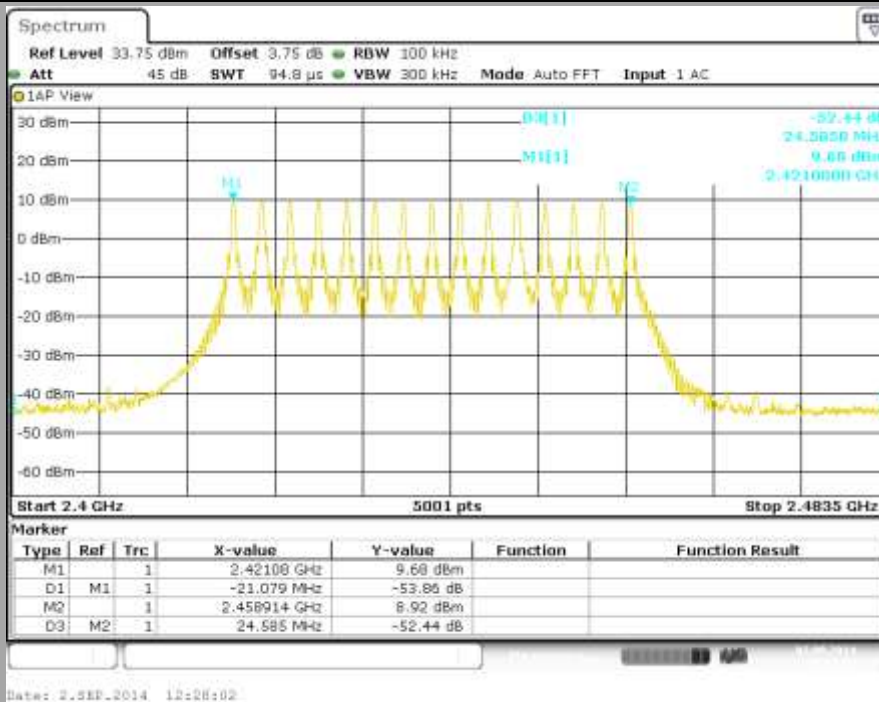
Unwanted Emissions into Non-Restricted Bands

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes.Peak Channel 14
Mes.Peak Channel 0
Mes.Peak Channel 7



Antenna 1
Unwanted Emissions into Non-Restricted Bands at the Band-Edge




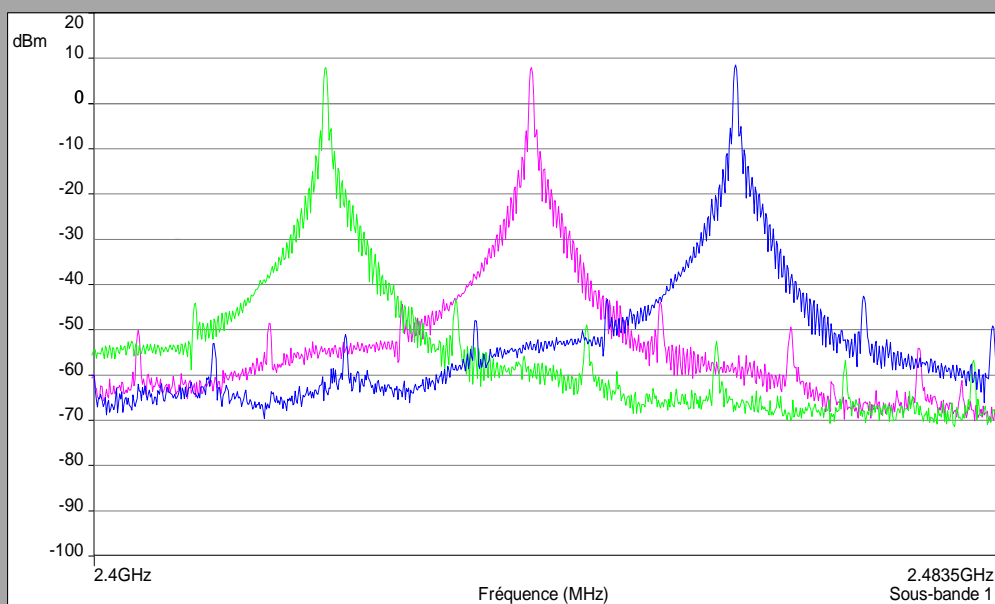
Antenna 2

Unwanted Emissions into Non-Restricted Bands at the Band-Edge

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes.Peak Channel 7
Mes.Peak Channel 0
Mes.Peak Channel 14

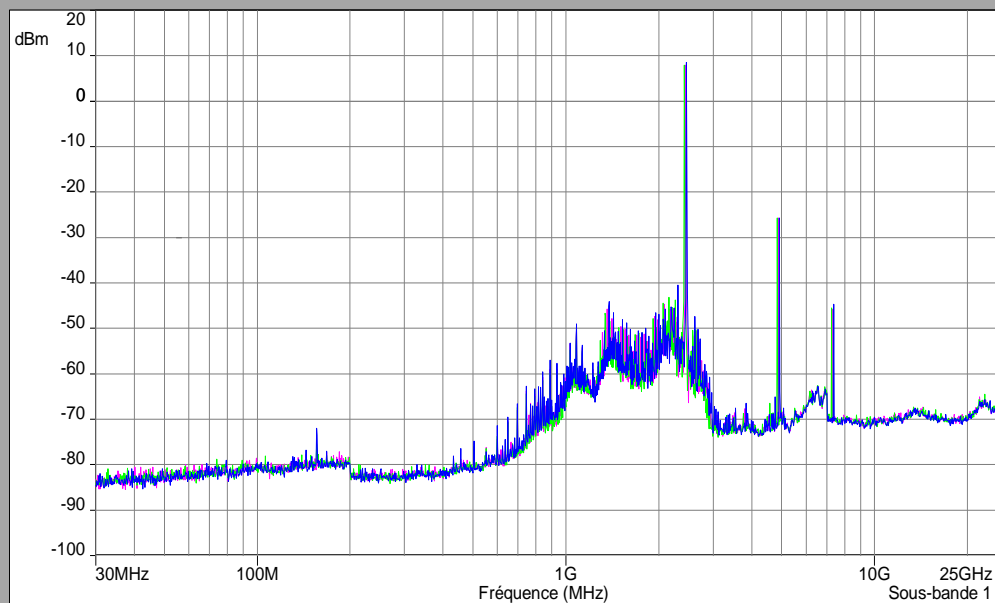


Unwanted Emissions into Non-Restricted Bands

Cmin & Cnom & Cmax

Description Sous-bande 1
Fréquences: 30 MHz - 25 GHz (Mode: Lin, Pas: 100 kHz)
Réglages: RBW: 100 kHz, VBW: 300 kHz, Temps de mesure : 1 ms/Pts, Nombre de Balayages : 1, Preamp : Off, LN Preamp : Off, Preselecteur: On

Mes.Peak Channel 7
Mes.Peak Channel 0
Mes.Peak Channel 14

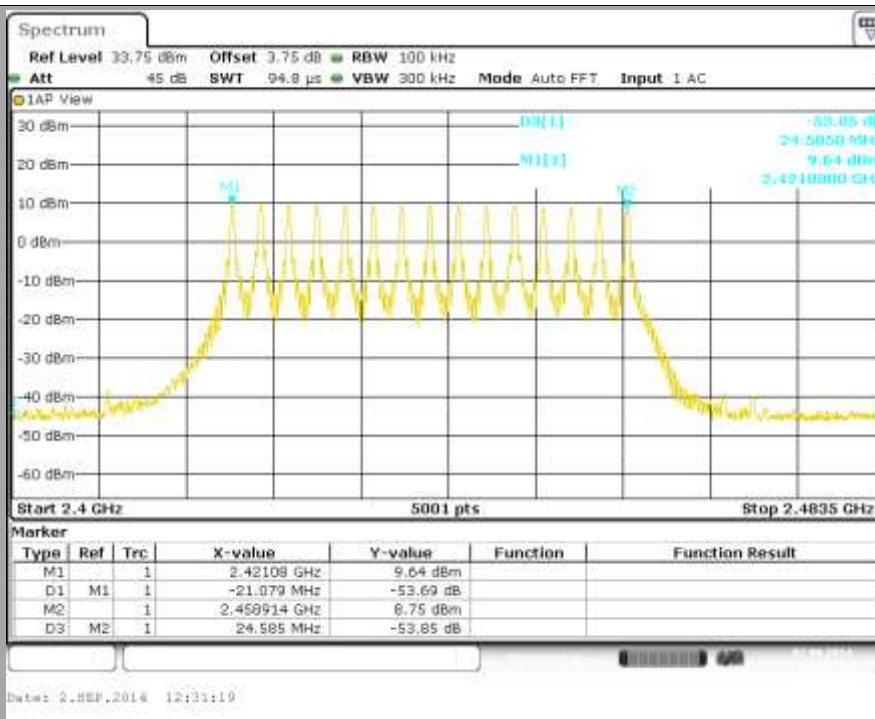




Antenna 2

Unwanted Emissions into Non-Restricted Bands at the Band-Edge

Call





Antenna 1:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Frequencies (MHz)	Level (dB)	Level (dB)	Level (dB)
2400	-53,9	-	-
2483,5	-	-	-52,5
4842,2	-33,7	-	-
4880	-	-34	-
4917,8	-	-	-34,4
7263,3	-53,7	-	-
7320	-	-54	-
7376,7	-	-	-54

Antenna 2:

Temperature	Tnom		
Voltage	Vnom		
Channel	Cmin	Cnom	Cmax
Frequencies (MHz)	Level (dB)	Level (dB)	Level (dB)
2400	-53,7	-	-
2483,5	-	-	-53,9
4842,2	-35,7	-	-
4880	-	-35	-
4917,8	-	-	-34,6
7263,3	-55,7	-	-
7320	-	-55,1	-
7376,7	-	-	-54,3

9.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the unwanted emission into non-restricted bands measurement of FCC 15.247, RSS-210, RSS-Gen.

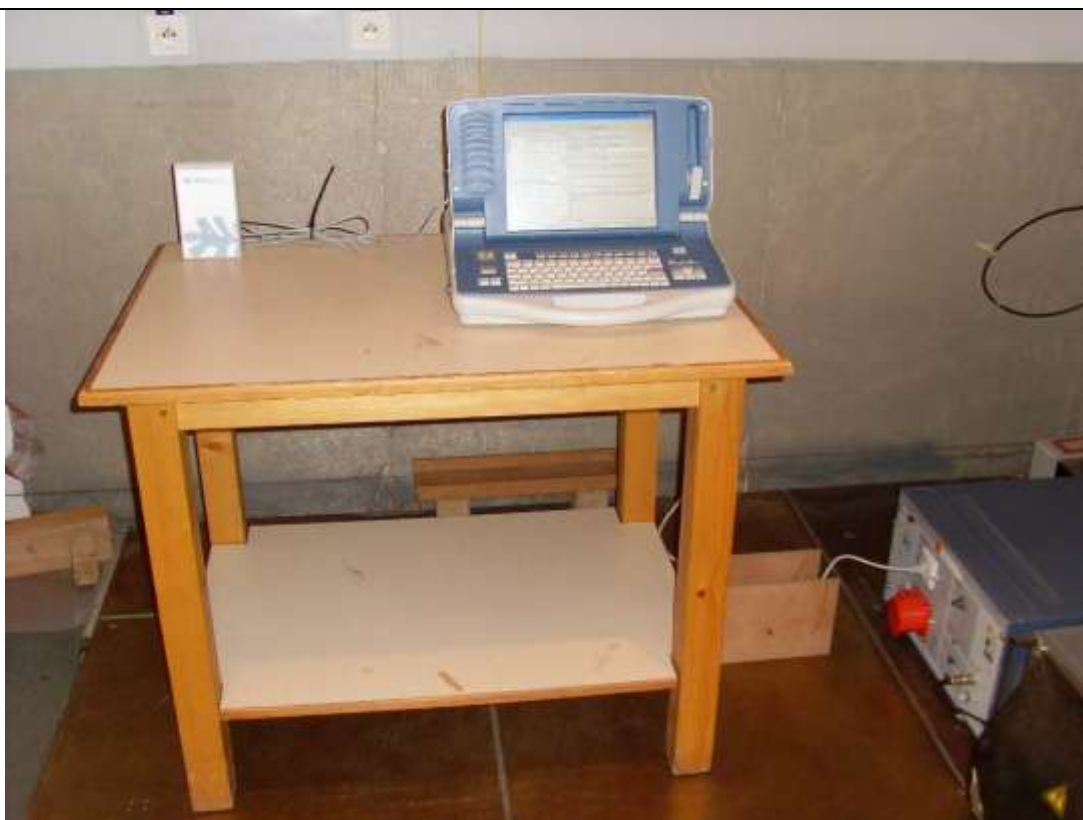
10. AC POWER LINE CONDUCTED EMISSIONS

10.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : 2014/07/10
Ambient temperature : 19 °C
Relative humidity : 64 %

10.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2009) 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 $50\Omega / 50\mu\text{H}$. 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 (Side View)



10.3. LIMIT

AC Power Line Conducted Emissions shall not exceed value below:

Quasi-Peak

0,15kHz to 0,5MHz: 66dB μ V to 56dB μ V*

0,5MHz to 5MHz: 56dB μ V

5MHz to 30MHz: 60dB μ V

Average

0,15kHz to 0,5MHz: 56dB μ V/m to 46dB μ V*

0,5MHz to 5MHz: 46dB μ V

5MHz to 30MHz: 50dB μ V

*Decreases with the logarithm of the frequency

10.4. TEST EQUIPMENT LIST

Apparatus	Trade Mark	Type	Registration number	Cal_Date	Cal_Due
Reference ground plane 2 x 3 m	LCIE	-	-	-	-
EMI receiver	ROHDE & SCHWARZ	ESCI	A2642017	2013/09	2014/09
pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2014/02	2015/02
Cable (current absorber)	LCIE	BNC I-ABS	A5329589	2013/07	2014/07
V LISN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	2014/03	2015/03

10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:



10.6. GRAPHICS & RESULTS

AC Power Line Conducted Emissions

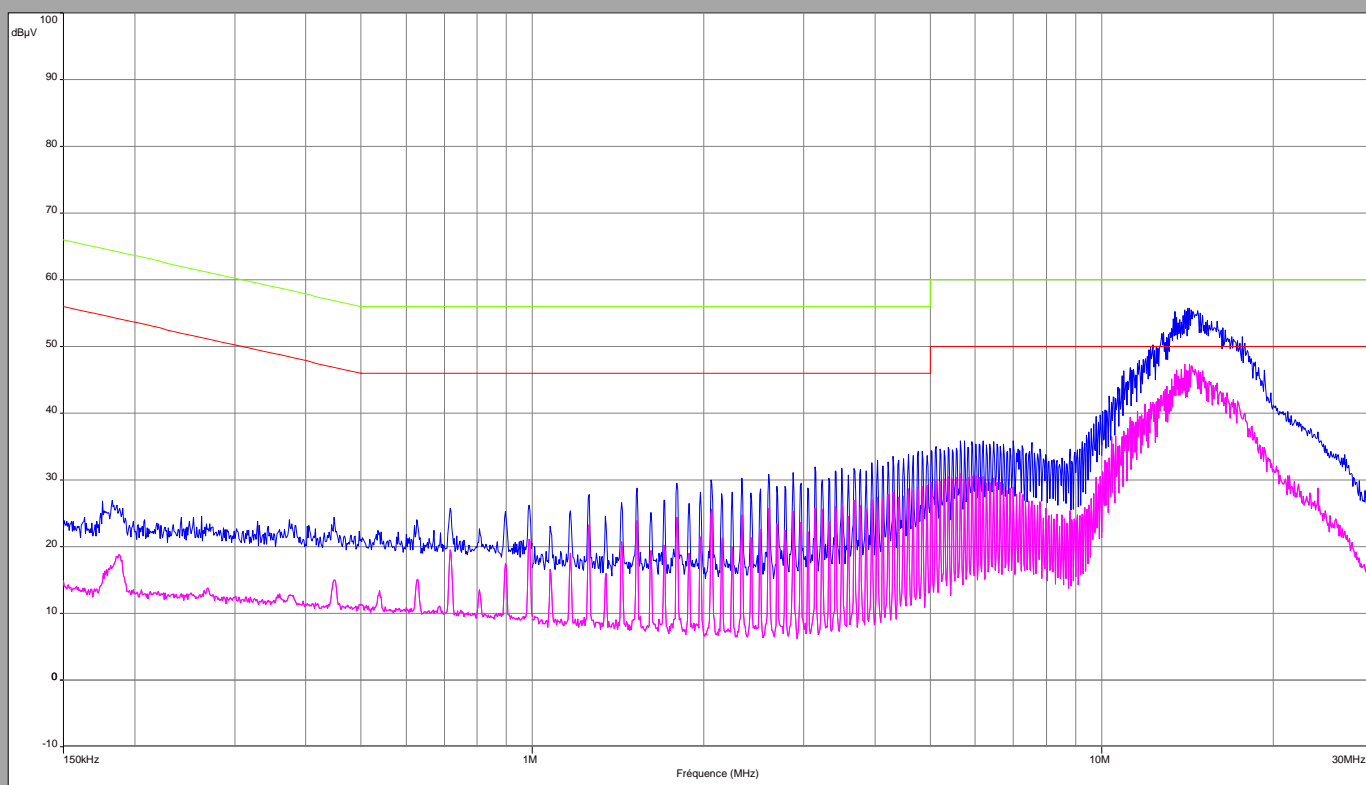
Phase Line

FCC Part.15 class B
SORIN
ANTENNA
TYPE: ORCHESTRA PLUS LINK
+ Programmer type :ORCHESTRA

CONDUCTOR 1 . 120V-60Hz
Mode 2400MHz transmitter

Peak and average value

— FCC PART 15 classe B - Classe:B - Moyenne/
— FCC PART 15 classe B - Classe:B - QCrête/
— Mes.Peak (Phase)
— Mes.Avg (Phase)



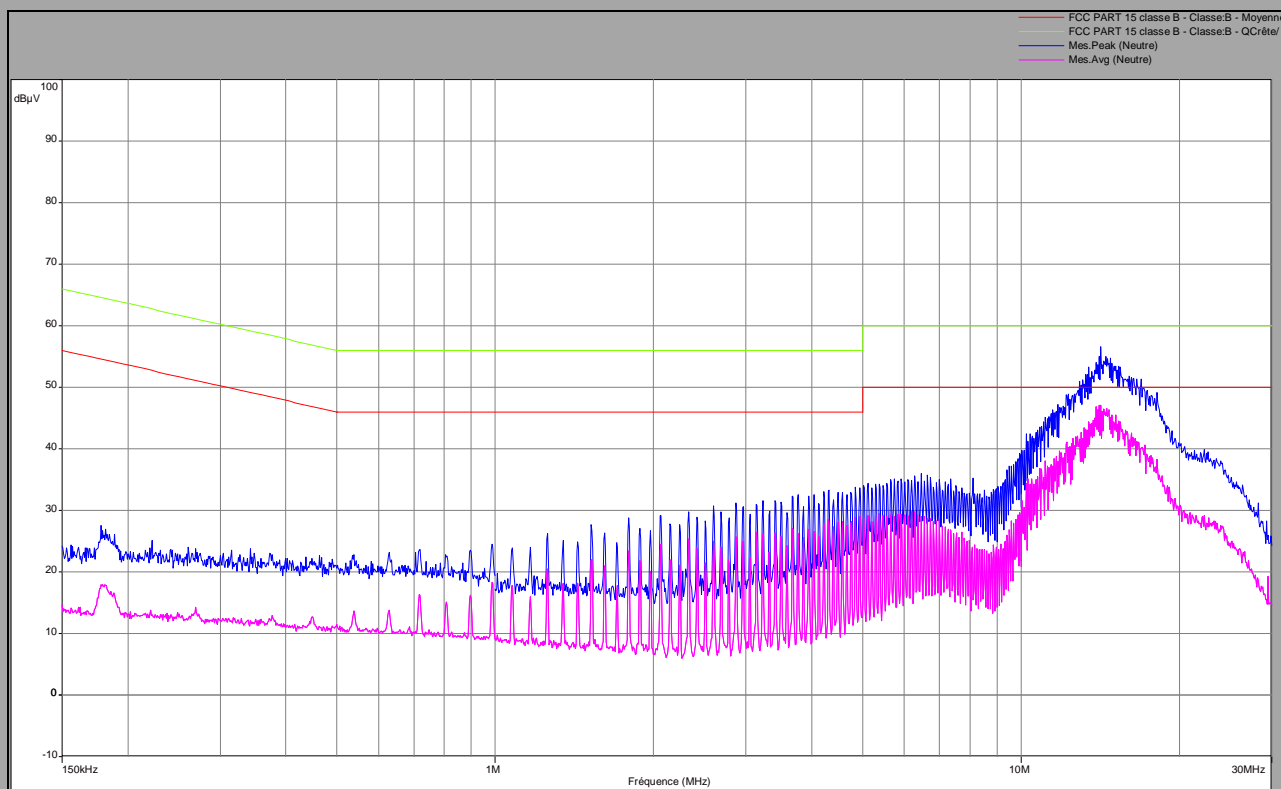


Neutral Line

FCC Part.15 class B
SORIN
ANTENNA
TYPE: ORCHESTRA PLUS LINK
+ Programmer type :ORCHESTRA

CONDUCTOR 2 . 120V-60Hz
Mode 2400MHz transmitter

Peak and average value





Phase Line					
Frequencies (MHz)	Peak Level (dB μ V/m)	Quasi-Peak Level (dB μ V/m)	Average Level (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
0.1825	28	19	54.3	-	64.3
5.652	35.8	31	50	-	60
14.190	55	47	50	-	60

Neutral Line					
Frequencies (MHz)	Peak Level (dB μ V/m)	Quasi-Peak Level (dB μ V/m)	Average Level (dB μ V/m)	Quasi-Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
0.178	27.5	18	54.5	-	64.5
6.466	36	30	50	-	60
14.182	56.6	47	50	-	60

10.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the AC Power line conducted emissions measurement of FCC 15.247, RSS-210, RSS-Gen.

11. UNWANTED EMISSIONS INTO RESTRICTED FREQUENCY BANDS

11.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : 2014/07/10
Ambient temperature : 18 °C
Relative humidity : 51 %

11.2. TEST SETUP

- The Equipment under Test is installed:

SAR OATS

- Distance between EUT and the measuring antenna is:

3m 10m

- Choice of measuring antenna below 1GHz:

Bilog Log periodic Biconic Dipole antenna

- Choice of measuring antenna above 1GHz:

Horn

The product has been tested according to ANSI C63.10 (2009). Test is performed in horizontal (H) and vertical (V) polarization. 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 Unwanted Emissions into Restricted Frequency Bands



Photograph for Unwanted Emissions into Restricted Frequency Bands



11.3. LIMIT

Unwanted Emissions into Restricted Frequency Bands shall not exceed value below:

30MHz to 88MHz: 29.5dB μ V/m QPeak
 88MHz to 216MHz: 33dB μ V/m QPeak
 216MHz to 960MHz: 35.5dB μ V/m QPeak
 960MHz to 1000MHz: 43.5dB μ V/m QPeak
 Above 1000MHz: 63.5dB μ V/m Peak
 43.5dB μ V/m Average

11.4. TEST EQUIPMENT LIST

Apparatus	Trade Mark	Type	Registration number	Cal_Date	Cal_Due
Preamplifier	HEWLETT PACKARD	HP8449B	A4069002	2014/03	2015/03
Cable	CABLES & CONNECTIQUES	ND/CSU718AA/ND/2000	A5329380	2013/09	2014/09
Cable	CABLES & CONNECTIQUES	ND/CSU718AA/ND/2000	A5329380	2013/09	2014/09
Cable	CABLES & CONNECTIQUES	3.5MD/CSU528AA-TDINOX/3.5MD/12000	A5329443	2013/10	2014/10
Cable	CABLES & CONNECTIQUES	3.5MD/CSU440AA-TDINOX/3.5MD/7000	A5329449	2013/09	2014/09
Cable	-	-	A5329542	2014/01	2015/01
Bilog antenna	AH SYSTEMS	SAS200/521	C2040025	2014/02	2015/02
Horn antenna	EMCO	3115	C2042016	2014/04	2015/04
Open area test site	LCIE	-	F2000400	2014/06	2015/06
EMI receiver	ROHDE & SCHWARZ	ESI40 1088 740K40	A2642010	2014/02	2015/02
Horn antenna 18-26,5GHz	AH SYSTEMS	SAS572	C2042026	2014/01	2016/01

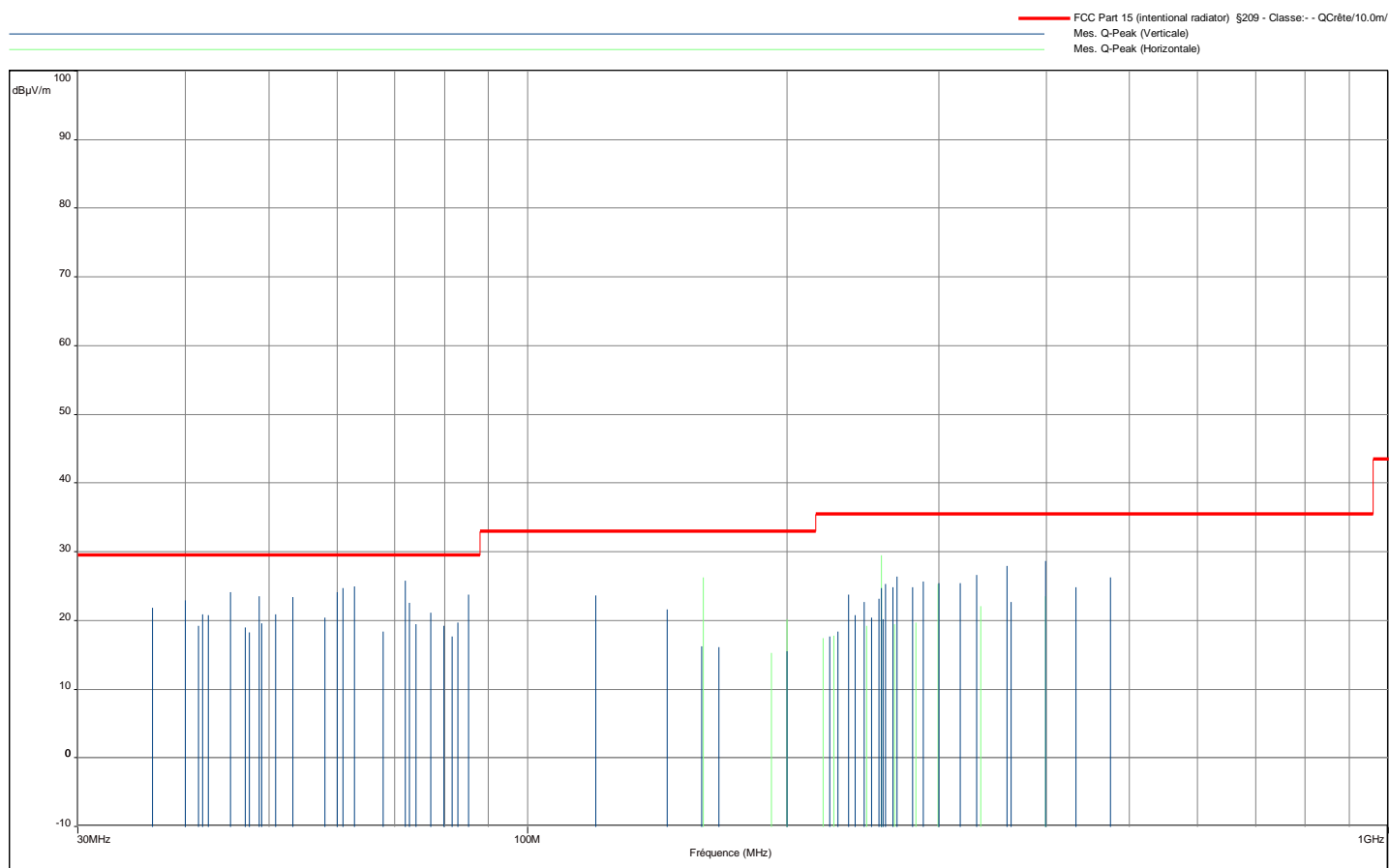
11.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:



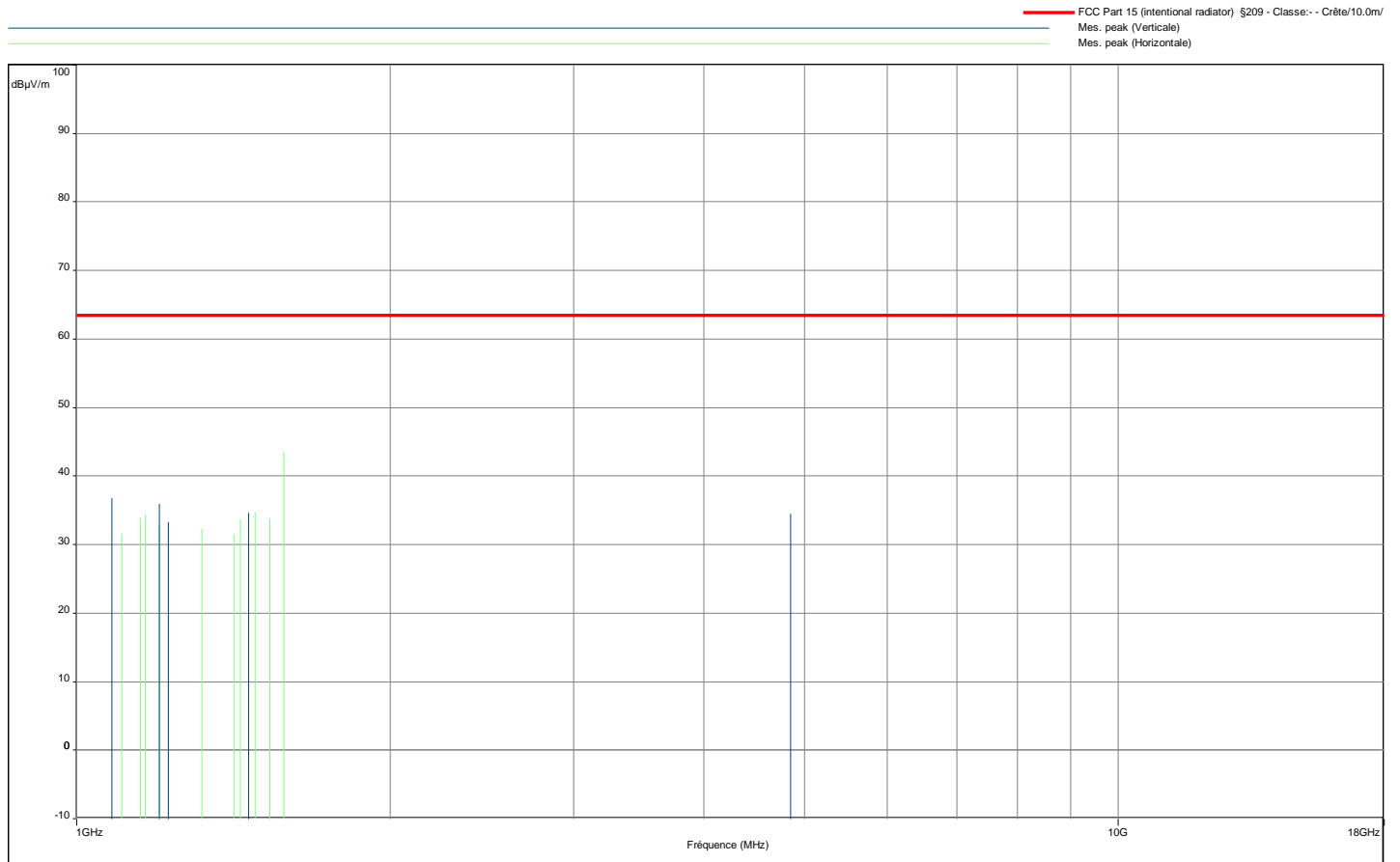
11.6. RESULTS

FCC Part.15 class B (30 to 1000MHz)
SORIN
ANTENNA
TYPE: ORCHESTRA PLUS LINK
Mode 2400MHz transmitter
Quasi Peak measurement





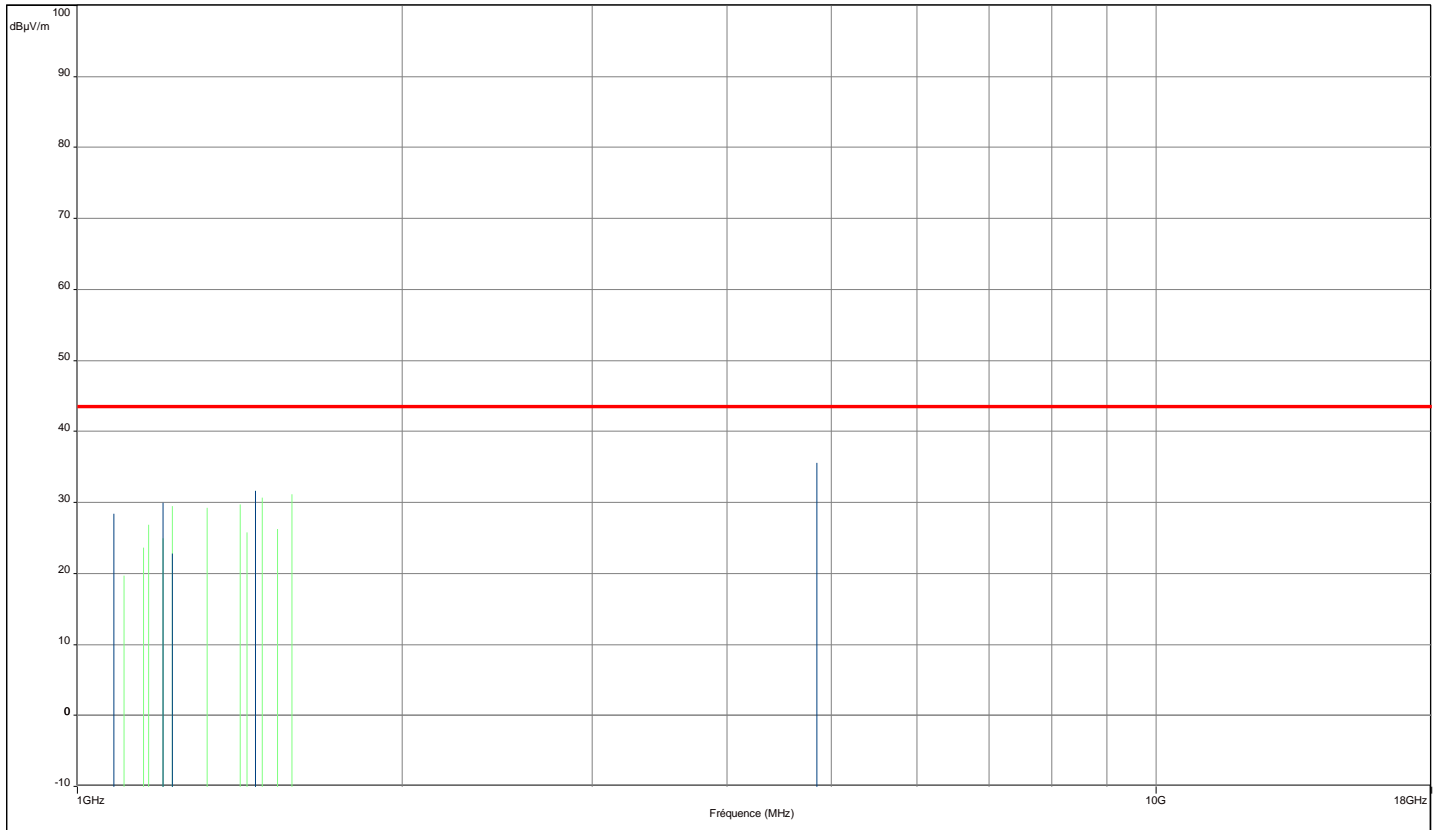
FCC Part.15 (1 to 18GHz)
SORIN
ANTENNA
TYPE: ORCHESTRA PLUS LINK
Mode 2400MHz transmitter
Peak measurement





FCC Part.15 (1 to 18GHz)
SORIN
ANTENNA
TYPE: ORCHESTRA PLUS LINK
Mode 2400MHz transmitter
Average value measurement
FCC Part.15 (1 to 18GHz)
SORIN
ANTENNA
TYPE: ORCHESTRA PLUS LINK
Mode 2400MHz transmitter
Average value measurement

— FCC Part 15 (intentional radiator) §209 - Classe:- - Moyenne/10.0m/
— Mes. Avg (Verticale)
— Mes. Avg (Horizontale)





Out of band transmitter unwanted emissions			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Vertical	265,6	24,9	35.5
Vertical	268,4	26,5	35.5
Vertical	280	24,9	35.5
Vertical	288	25,7	35.5
Vertical	300	25,5	35.5
Vertical	318	25,5	35.5
Vertical	332	26,7	35.5
Vertical	360	27,9	35.5
Vertical	364,4	22,7	35.5
Vertical	399,8	28,7	35.5
Vertical	433,1	24,9	35.5
Vertical	475	26,3	35.5
Horizontal	159,8	26,3	33
Horizontal	192	15,4	33
Horizontal	199,9	20,2	33
Horizontal	220,5	17,5	35.5
Horizontal	226,5	17,9	35.5
Horizontal	247,7	19,3	35.5
Horizontal	257,7	29,5	35.5
Horizontal	266,5	19,5	35.5
Horizontal	282,6	19,8	35.5
Horizontal	299,8	25,4	35.5
Horizontal	336	22,1	35.5
Horizontal	399,8	23,6	35.5



Out of band transmitter unwanted emissions			
Below 1GHz			
Polarization	Frequencies (MHz)	Quasi-Peak Level (dBµV/m)	Quasi-Peak Limit (dBµV/m)
Vertical	36,6	21,9	29.5
Vertical	40	22,9	29.5
Vertical	41,4	19,3	29.5
Vertical	41,9	21,0	29.5
Vertical	42,5	20,9	29.5
Vertical	45,1	24,2	29.5
Vertical	47	19,0	29.5
Vertical	47,5	18,4	29.5
Vertical	48,7	23,5	29.5
Vertical	49,1	19,6	29.5
Vertical	50,9	21,0	29.5
Vertical	53,3	23,4	29.5
Vertical	58,1	20,5	29.5
Vertical	60	24,1	29.5
Vertical	61	24,8	29.5
Vertical	62,9	25,0	29.5
Vertical	67,9	18,4	29.5
Vertical	72	25,8	29.5
Vertical	72,9	22,6	33
Vertical	74,2	19,5	33
Vertical	77,2	21,2	33
Vertical	79,8	19,2	33
Vertical	81,6	17,7	35.5
Vertical	82,9	19,7	35.5
Vertical	85,4	23,8	35.5
Vertical	119,9	23,6	35.5
Vertical	145,1	21,7	35.5
Vertical	159,1	16,3	35.5
Vertical	166,6	16,1	35.5
Vertical	199,9	15,5	35.5
Vertical	224,1	17,7	35.5
Vertical	229,1	18,4	35.5
Vertical	236	23,8	35.5
Vertical	240	20,9	35.5
Vertical	245,8	22,7	35.5
Vertical	250,6	20,4	35.5
Vertical	255,6	23,2	35.5
Vertical	257,7	24,7	35.5
Vertical	258,7	20,3	35.5
Vertical	260,5	25,4	35.5



Out of band transmitter unwanted emissions					
Above 1GHz					
Polarization	Frequencies (MHz)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Average Level (dBµV/m)	Average Limit (dBµV/m)
Vertical	1080	36,9	63,5	28,5	43,5
Vertical	1092	45,2	63,5	29,4	43,5
Vertical	1128	41,1	63,5	36,7	43,5
Vertical	1140	33,9	63,5	33,3	43,5
Vertical	1152	39,6	63,5	33,3	43,5
Vertical	1200	36,0	63,5	30,0	43,5
Vertical	1224	33,3	63,5	22,9	43,5
Vertical	1461,1	34,6	63,5	31,7	43,5
Vertical	1485,1	39,9	63,5	36,1	43,5
Vertical	4842,1	34,6	63,5	35,7	43,5
Vertical	1104	31,7	63,5	19,7	43,5
Vertical	1128	39,9	63,5	28,3	43,5
Horizontal	1152	33,9	63,5	23,7	43,5
Horizontal	1164	34,5	63,5	26,9	43,5
Horizontal	1200	32,8	63,5	25,1	43,5
Horizontal	1224	33,2	63,5	29,5	43,5
Horizontal	1296	38,8	63,5	33,9	43,5
Horizontal	1320	32,4	63,5	29,3	43,5
Horizontal	1416	31,6	63,5	29,8	43,5
Horizontal	1437,1	33,7	63,5	25,9	43,5
Horizontal	1461,1	33,5	63,5	31,7	43,5
Horizontal	1485,1	34,8	63,5	30,7	43,5
Horizontal	1533,1	33,9	63,5	26,3	43,5
Horizontal	1581,1	43,7	63,5	31,2	43,5

11.7. CONCLUSION

The product SORIN Group KA351, SN:LA1403007, in configuration and description presented in this test report, complies with the unwanted emission into restricted bands measurement of FCC 15.247, RSS-210, RSS-Gen.



12. UNCERTAINTIES CHART

Kind of test	Measurement uncertainties (k=2) $\pm x(\text{dB}) / (\text{Hz})$	Limit for uncertainties $\pm y(\text{dB})$
REQUIREMENTS		
RF output power, conducted	$\pm 0.6 \text{ dB}$	$\pm 1,5 \text{ dB}$
Power Spectral Density, conducted	$\pm 0.6 \text{ dB}$	$\pm 1,5 \text{ dB}$
Unwanted Emissions, conducted	$\pm 0.6 \text{ dB}$	$\pm 1,5 \text{ dB}$
Radiated emissions <ul style="list-style-type: none"> • Frequency < 1000 MHz • Frequency > 1000 MHz 	$\pm 3.9 \text{ dB}$ $\pm 3.1 \text{ dB}$	$\pm 6 \text{ dB}$
Temperature	$\pm 0.5^\circ\text{C}$	$\pm 1^\circ\text{C}$
Humidity	$\pm 2.5 \%$	$\pm 5 \%$