



LCIE

RFID 13,56MHz Template: Release October 25th, 2018

# TEST REPORT

N°: 160433-734084

Version : 01

## Subject

Radio spectrum matters  
tests according to standards:  
47 CFR Part 15.225 & RSS 210 Issue 9 & RSS-Gen Issue 5

## Issued to

BIOLOG ID  
1 rue du commandant Robert Malrait  
27300 BERNAY  
FRANCE

## Apparatus under test

↪ Product	SMART STORAGE FREEZE (SST-F)
↪ Trade mark	BIOLOG ID
↪ Manufacturer	BIOLOG ID
↪ Model under test	PRD_7140300A
↪ Serial number	BI 1835000234
↪ FCC ID	2AKUFSSTF
↪ IC	

Test date : March 14, 2019 to March 20, 2019

Test location : Ecuelles

Test Site : 6230B-1

Composition of document : 29 pages

Document issued on : March 25, 2019

Written by :  
Laurent DENEUX  
Tests operator



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## PUBLICATION HISTORY

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.

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Modification</b>
01	March 25 <sup>th</sup> ,2019	Laurent DENEUX	Creation of the document

Date of receipt of test item

March 13<sup>th</sup>, 2019



## SUMMARY

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## 1. TEST PROGRAM

### References

- 47 CFR Part 15.225
- RSS 210 Issue 9
- 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 <a href="#">P</a>	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input checked="" type="checkbox"/> NP(1)
AC Power Line Conducted Emission <a href="#">P</a>	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA(2)	<input type="checkbox"/> NP(1)
Frequency Tolerance <a href="#">P</a>	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input checked="" type="checkbox"/> NP(1)
Field strength within the band 13.110-14.010MHz <a href="#">P</a>	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Field strength outside of the bands 13.110-14.010 MHz <a href="#">P</a>	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated Emissions <a href="#">P</a>	<input checked="" type="checkbox"/> PASS (3)	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> 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):  
BIOLOG ID PRD\_7140300A

Serial Number: BI 1835000234



Equipment Under Test

**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Power supply	-	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
Ethernet cable	RJ45	10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
Temperature sensor	-	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-
CAN BUS cable	-	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-

**Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
Laptop computer	-	-	-

**Equipment information:**

Type:	<input checked="" type="checkbox"/> <b>RFID</b>		
Frequency band:	[13.553 to 13.567] MHz		
Number of Channel:	1		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated
Transmit chains:	1		
Receiver chains:	1		
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input type="checkbox"/> Combined
Equipment type:	<input checked="" type="checkbox"/> Production model	<input type="checkbox"/> Pre-production model	
Operating temperature range:	Tmin:	<input checked="" type="checkbox"/> -30°C IC <input checked="" type="checkbox"/> -20°C FCC	<input type="checkbox"/> 0°C <input type="checkbox"/> X°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input checked="" type="checkbox"/> 50°C <input type="checkbox"/> X°C
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery
Operating voltage range:	Vmin:	<input checked="" type="checkbox"/> 102V/60Hz	<input type="checkbox"/> XVdc
	Vnom:	<input checked="" type="checkbox"/> 120V/60Hz	<input type="checkbox"/> XVdc
	Vmax:	<input checked="" type="checkbox"/> 138V/60Hz	<input type="checkbox"/> XVdc
	Vmin:	<input checked="" type="checkbox"/> 204V/50Hz	<input type="checkbox"/> XVdc
	Vnom:	<input checked="" type="checkbox"/> 240V/50Hz	<input type="checkbox"/> XVdc
	Vmax:	<input checked="" type="checkbox"/> 276V/50Hz	<input type="checkbox"/> XVdc

## 2.2. 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 (setup : RF ON antenna 1 of the drawer 10)

## 2.3. EQUIPMENT LABELLING



## 2.4. EQUIPMENT MODIFICATION

None       Modification:

- Adding a ferrite reference 74272733 on DC power cable



- CAR71303C card (LED):
  - Remove the capacitors C3, C4, C5, C6, and C7.
  - Grounding GND pins 1, 9 and 10 of connector J1.
- CAR71402A card (RFID) :
  - Replacement of 5 Resistors R19, R20, R21, R22 and R23 by WURTH ferrites reference 742 861 210
  - Replacement of L7 ferrite with WURTH ferrite reference 742 792



### 3. OCCUPIED BANDWIDTH

#### 3.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : March 20, 2019  
Ambient temperature : 26°C  
Relative humidity : 47%

#### 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 5 § 6.7



Photograph for Occupied bandwidth



### 3.1. LIMIT

None

### 3.2. TEST EQUIPMENT LIST

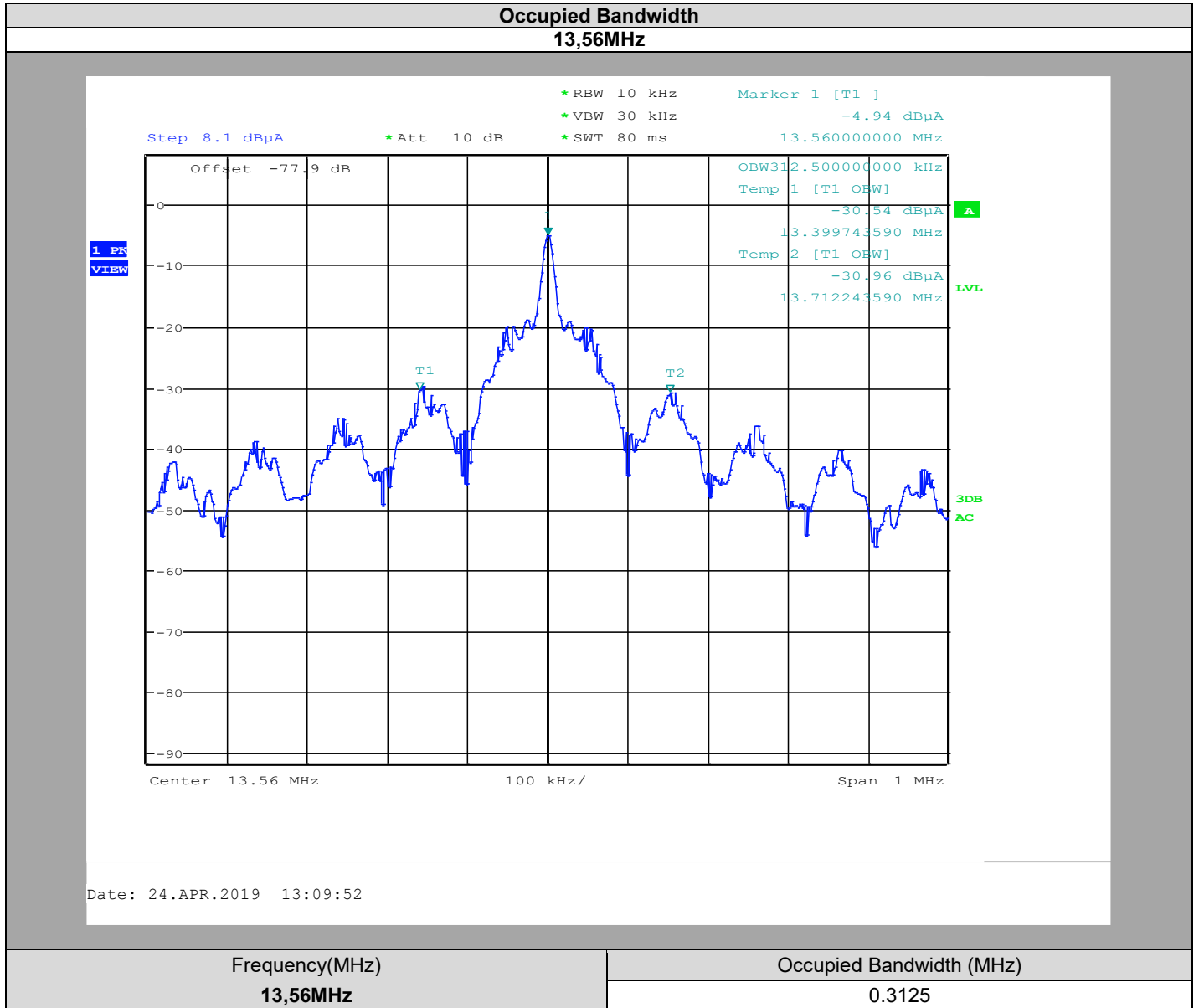
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	VIESSMAN	-	D1025030	See Hygrometer	See Hygrometer
Hygrometer	AOIP	TM360	B4041042	2018/12	2019/12
EMI Receiver	ROHDE & SCHWARZ	ESU26	A2642018	2018/10	2020/10
Multimeter	KEITHLEY	2000	A1242090	2017/05	2019/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable	-	-	A5329372	2018/06	2019/06
Cable	CABLES & CONNECTIQUES	-	A5329422	See EMI Receiver	See EMI Receiver

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



L C I E

### 3.3. RESULTS



### 3.4. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **BIOLOG ID PRD\_7140300A**, SN: **BI 1835000234**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN ISSUE 5** limits.

## 4. FREQUENCY TOLERANCE

### 4.1. TEST CONDITIONS

Test performed by : Armand MAHOUNGOU  
Date of test : March 20, 2019  
Ambient temperature : 26°C  
Relative humidity : 47%

### 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

$\pm 0.01\%$  ( $\pm 100\text{ppm}$ )

#### 4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	VISSMAN	-	D1025030	See Hygrometer	See Hygrometer
Hygrometer	AOIP	TM360	B4041042	2018/12	2019/12
EMI Receiver	ROHDE & SCHWARZ	ESU26	A2642018	2018/10	2020/10
Multimeter	KEITHLEY	2000	A1242090	2017/05	2019/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable	-	-	A5329372	2018/06	2019/06
Cable	CABLES & CONNECTIQUES	-	A5329422	See EMI Receiver	See EMI Receiver

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



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**4.5. RESULTS**

<b>EUT activation:</b>	<b>2min</b>								
<b>Voltage:</b>	<b>120V/60Hz</b>								
<b>Temperature:</b>	<b>-30°C</b>	<b>-20°C</b>	<b>-10°C</b>	<b>0°C</b>	<b>10°C</b>	<b>20°C</b>	<b>30°C</b>	<b>40°C</b>	<b>50°C</b>
Frequency (MHz)	13,56042858	13,56037518	13,56032143	13,56048067	13,56042849	13,56042846	13,56037557	13,56045778	13,56037519
Frequency Drift (%)	0,0032	0,0028	0,0024	0,0035	0,0032	0,0032	0,0028	0,0034	0,0028
<b>EUT activation:</b>	<b>5min</b>								
<b>Voltage:</b>	<b>120V/60Hz</b>								
<b>Temperature:</b>	<b>-30°C</b>	<b>-20°C</b>	<b>-10°C</b>	<b>0°C</b>	<b>10°C</b>	<b>20°C</b>	<b>30°C</b>	<b>40°C</b>	<b>50°C</b>
Frequency (MHz)	13,56042858	13,5603751	13,560375	13,56048067	13,56042845	13,56042846	13,56037577	13,56044958	13,56037557
Frequency Drift (%)	0,0032	0,0028	0,0028	0,0035	0,0032	0,0032	0,0028	0,0033	0,0028
<b>EUT activation:</b>	<b>10min</b>								
<b>Voltage:</b>	<b>120V/60Hz</b>								
<b>Temperature:</b>	<b>-30°C</b>	<b>-20°C</b>	<b>-10°C</b>	<b>0°C</b>	<b>10°C</b>	<b>20°C</b>	<b>30°C</b>	<b>40°C</b>	<b>50°C</b>
Frequency (MHz)	13,56042857	13,56037509	13,5603214	13,56048065	13,56042848	13,56042847	13,56037554	13,56045998	13,56037577
Frequency Drift (%)	0,0032	0,0028	0,0024	0,0035	0,0032	0,0032	0,0028	0,0034	0,0028

<b>Temperature</b>	<b>Tnom</b>		
<b>Voltage:</b>	<b>102V/60Hz</b>	<b>120V/60Hz</b>	<b>138V/60Hz</b>
Frequency (MHz)	13,56048077	13,5604808	13,56048066
Frequency Drift (%)	0,0035	0,0035	0,0035



L C I E

EUT activation:	2min								
Voltage:	240V/50Hz								
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Frequency (MHz)	13,56042858	13,56037518	13,56032143	13,56048067	13,56042849	13,56042846	13,56037557	13,56045778	13,56037519
Frequency Drift (%)	0,0032	0,0028	0,0024	0,0035	0,0032	0,0032	0,0028	0,0034	0,0028
EUT activation:	5min								
Voltage:	240V/50Hz								
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Frequency (MHz)	13,56042858	13,5603751	13,560375	13,56048067	13,56042845	13,56042846	13,56037577	13,56044958	13,56037557
Frequency Drift (%)	0,0032	0,0028	0,0028	0,0035	0,0032	0,0032	0,0028	0,0033	0,0028
EUT activation:	10min								
Voltage:	240V/50Hz								
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Frequency (MHz)	13,56042857	13,56037509	13,5603214	13,56048065	13,56042848	13,56042847	13,56037554	13,56045998	13,56037577
Frequency Drift (%)	0,0032	0,0028	0,0024	0,0035	0,0032	0,0032	0,0028	0,0034	0,0028

Temperature	Tnom		
Voltage:	204V/50Hz	240V/50Hz	276V/50Hz
Frequency (MHz)	13,56048077	13,5604808	13,56048066
Frequency Drift (%)	0,0035	0,0035	0,0035

**4.6. CONCLUSION**

Frequency tolerance measurement performed on the sample of the product **BIOLOG ID PRD\_7140300A**, SN: **BI 1835000234**, 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 14, 2019  
Ambient temperature : 21 °C  
Relative humidity : 49 %

### 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  $50\Omega / 50\mu\text{H}$ . Interconnecting cables and equipment's were moved to position that maximized emission.



Photograph for Power Line Conducted Emissions





L C I E





### 5.3. LIMIT

#### Quasi-Peak

0,15kHz to 0,5MHz: 66dB $\mu$ V to 56dB $\mu$ V\*

0,5MHz to 5MHz: 56dB $\mu$ V

5MHz to 30MHz: 60dB $\mu$ V

#### Average

0,15kHz to 0,5MHz: 56dB $\mu$ V to 46dB $\mu$ V\*

0,5MHz to 5MHz: 46dB $\mu$ V

5MHz to 30MHz: 50dB $\mu$ V

\*Decreases with the logarithm of the frequency

### 5.4. TEST EQUIPMENT LIST

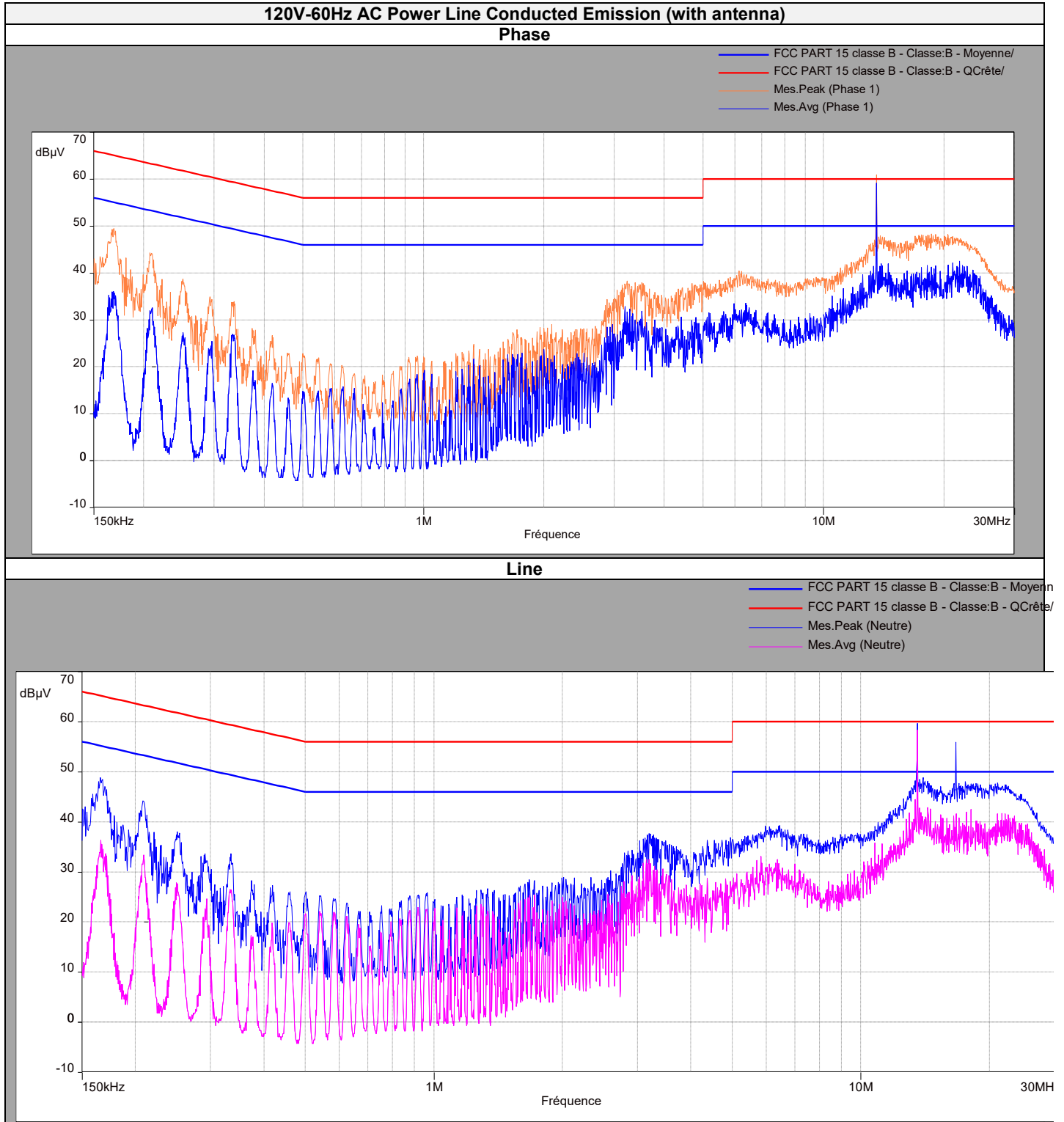
Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	10/2018	10/2020
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322001	08/2018	08/2019
Cable	-	-	A5329417	09/2018	09/2019
Cable	-	-	A5329589	09/2018	09/2019
Ground plane	LCIE	-	-	-	-

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





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak/Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,166	49,6	-	65,2	15,6	36	55,2	19,2
0,332	33,9	-	59,4	25,5	27,8	49,4	21,6
0,963	21,2	-	60	38,8	18,4	50	31,6
3,2	37,2	-	60	22,8	32,8	50	17,2
20,47	48	-	60	12	41,7	50	8,3

Neutral Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak/Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,166	48,2	-	65,2	17	36,3	55,2	18,9
0,332	33,6	-	59,4	25,8	26,4	49,4	23
0,963	25	-	60	35	22,5	50	27,5
13,4	48,2	-	60	11,8	44,8	50	5,2
20,92	47,7	-	60	12,3	41,6	50	8,4

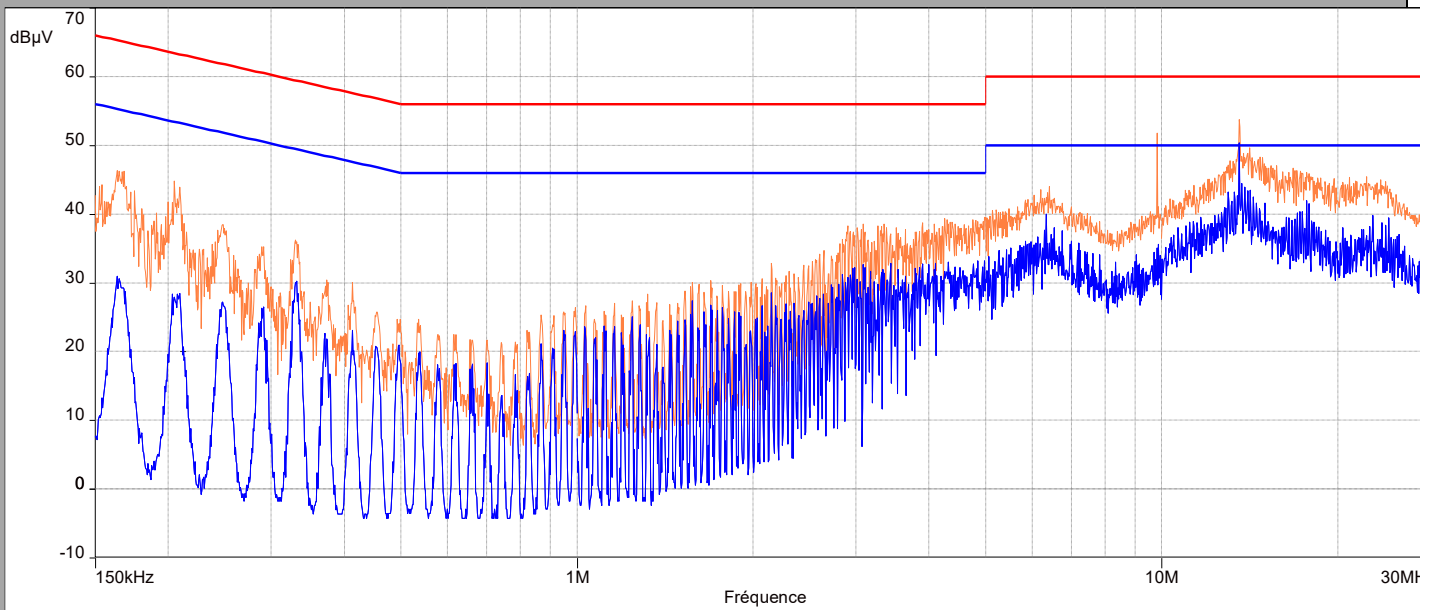


L C I E

### 240V-50Hz AC Power Line Conducted Emission (with antenna)

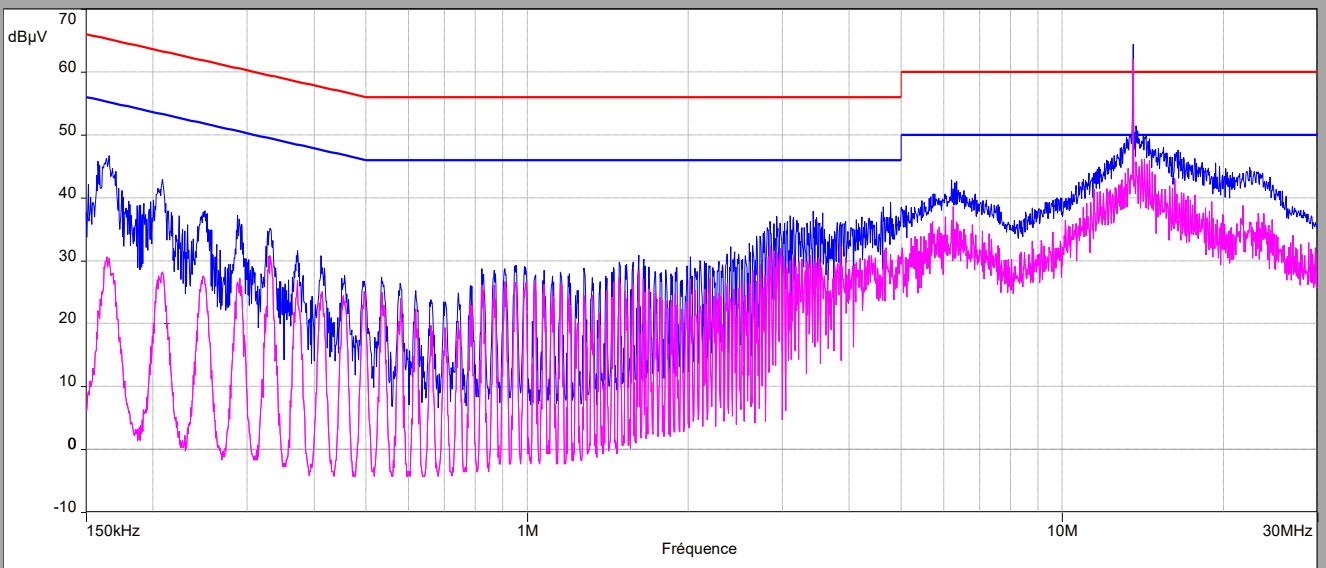
#### Phase

- FCC PART 15 classe B - Classe:B - Moyenne
- FCC PART 15 classe B - Classe:B - QCrête
- Mes.Peak (Phase 1)
- Mes.Avg (Phase 1)



#### Line

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





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak/Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,172	41,6	-	64,8	23,2	21,8	54,8	33
0,694	24,2	-	56	31,8	20,7	46	25,3
4,48	24	-	56	32	17,2	46	28,8
13,56	44,7	-	60	15,3	44,5	50	6,5
23,13	35,3	-	60	24,7	32	50	18

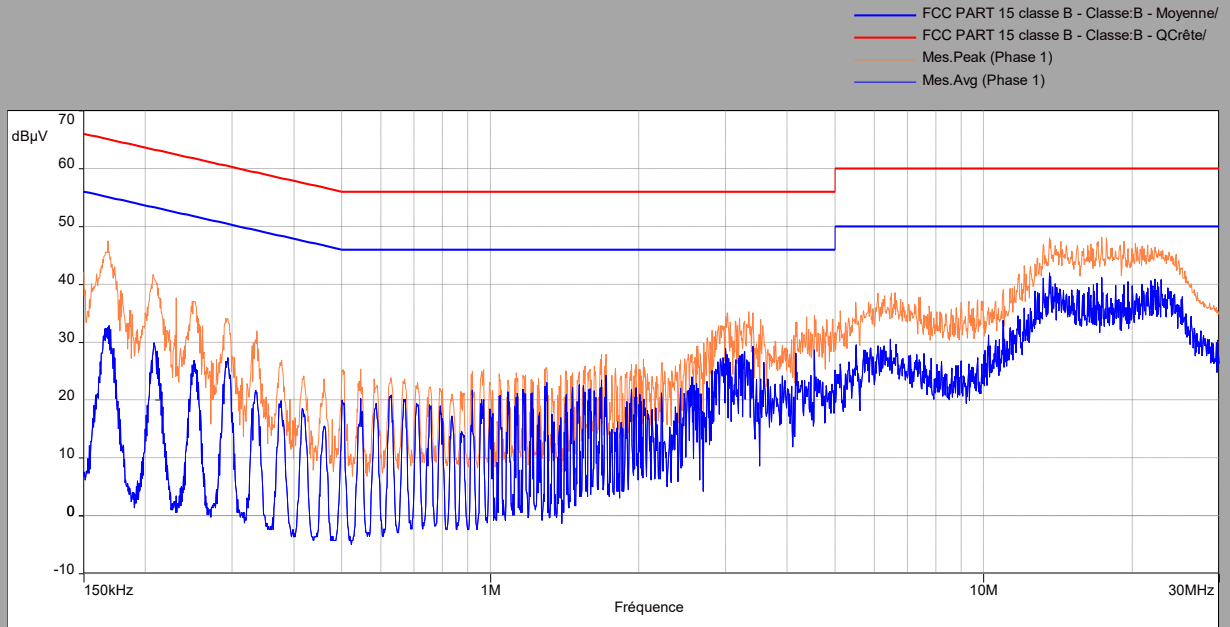
Neutral Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak/Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,169	42,3	-	64,8	22,5	21,2	54,8	33,6
0,694	25,2	-	56	30,8	15,2	46	30,8
3	23,6	-	56	32,4	11,7	46	34,3
13,56	45,2	-	60	14,8	44,6	50	5,4
23,13	35,2	-	60	24,8	31,3	50	18,7



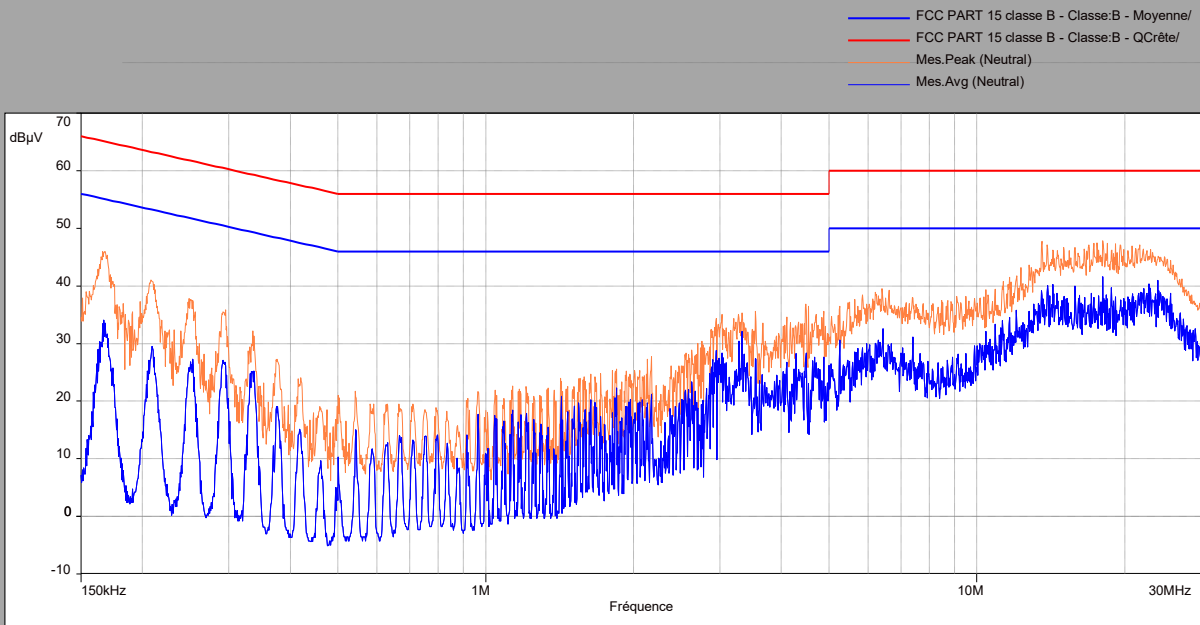
L C I E

### 120V-60Hz AC Power Line Conducted Emission (without antenna)

#### Phase



#### Line





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,166	47,5	-	65,2	17,7	42,6	55,2	12,6
0,332	34	-	59,4	25,4	27,3	49,4	22,1
0,961	25	-	60	35	20	50	30
3	34,4	-	60	25,6	28,9	50	21,1
13,61	48	-	60	12	40	50	10

Neutral Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,166	46	-	65,2	19,2	33,5	55,2	21,7
0,332	36	-	59,4	23,4	26	49,4	23,4
0,966	21,6	-	56	34,4	17,7	46	28,3
3,32	35,4	-	56	20,6	32,2	46	13,8
18,05	47,8	-	60	12,2	41,5	50	8,5



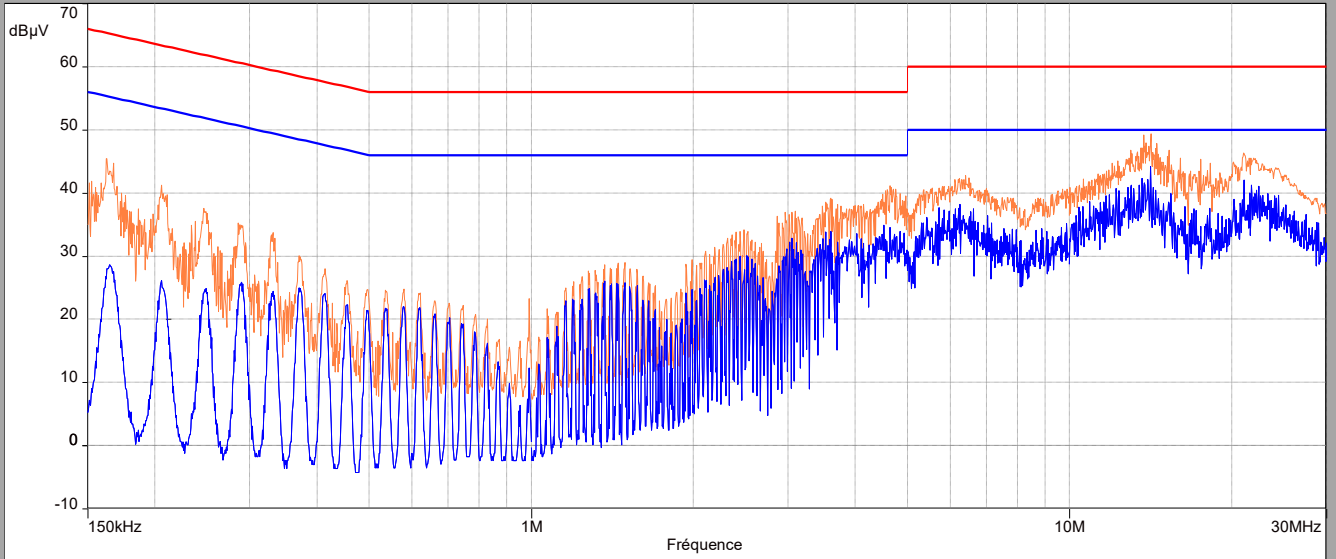


L C I E

### 240V-50Hz AC Power Line Conducted Emission (without antenna)

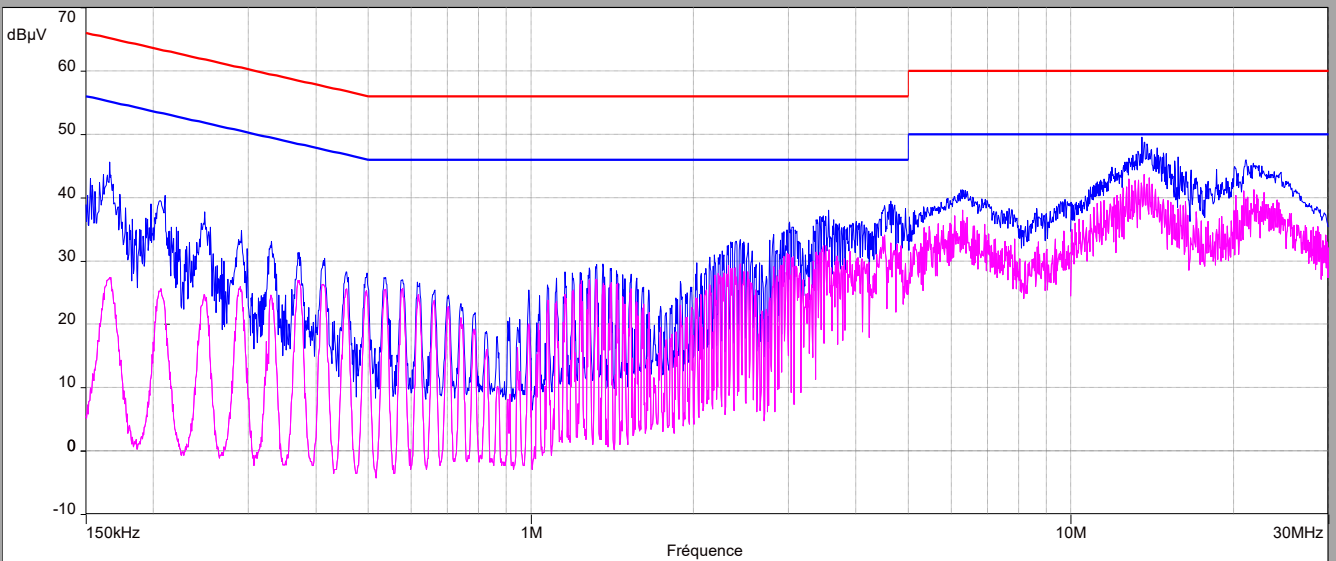
#### Phase

- FCC PART 15 classe B - Classe:B - Moyenne/
- FCC PART 15 classe B - Classe:B - QCrête/
- Mes.Peak (Phase 1)
- Mes.Avg (Phase 1)



#### Line

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





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,163	45,4	-	65,3	19,9	38	55,3	17,3
0,332	33,7	-	59,4	25,7	23,9	49,4	25,5
0,579	23,3	-	56	32,7	22	46	24
14,13	47,8	-	60	12,2	44,2	50	5,8
21,11	44,5	-	60	15,5	42	50	8

Neutral Line							
Frequency (MHz)	Peak Level (dB $\mu$ V)	Quasi-Peak Level (dB $\mu$ V)	Quasi-Peak Limit (dB $\mu$ V)	Margin Quasi-Peak (dB $\mu$ V)	Average Level (dB $\mu$ V)	Average Limit (dB $\mu$ V)	Margin Average (dB $\mu$ V)
0,164	45,6	-	65,3	19,7	26,4	55,3	28,9
0,332	33,2	-	59,4	26,2	24	49,4	25,4
1,32	26	-	56	30	26,4	46	19,6
13,67	46	-	60	14	43,6	50	6,4
18,6	44,4	-	60	15,6	35	50	15

## 5.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product BIOLOG ID PRD\_7140300A, SN: BI **1835000234**, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.225 & RSS Gen ISSUE 5 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 14, 2019  
Ambient temperature : 22 °C  
Relative humidity : 47 %

### 6.2. TEST SETUP

The product has been tested according to ANSI C63.10 (2013).

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 the 3 axis of EUT. Antenna height was 1m. The EUT is placed on an open area test site. Distance between measuring antenna and the EUT is 3m.

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. The EUT is placed on an open area test site above 1GHz and on an open area test site from 30MHz to 1GHz. Distance between measuring antenna and the EUT is 10m.



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) $\mu$ V/m (300m) or 20log(2400/F(kHz))dB $\mu$ V/m (3m) QPeak  
 0,490MHz to 1.705MHz: 240000/F(kHz) $\mu$ V/m (30m) or 20log(240000/F(kHz))dB $\mu$ V/m (3m) QPeak  
 1.705MHz to 30MHz: 30 $\mu$ V/m (30m) or dB $\mu$ V/m (3m) QPeak  
 30MHz to 88MHz: 40dB $\mu$ V/m QPeak  
 88MHz to 216MHz: 43,5dB $\mu$ V/m QPeak  
 216MHz to 960MHz: 46dB $\mu$ V/m QPeak  
 960MHz to 1000MHz: 54dB $\mu$ V/m QPeak  
 Above 1000MHz: 74dB $\mu$ V/m Peak  
 54dB $\mu$ V/m Average

#### Limit at 10m:

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

### 6.4. TEST EQUIPMENT LIST

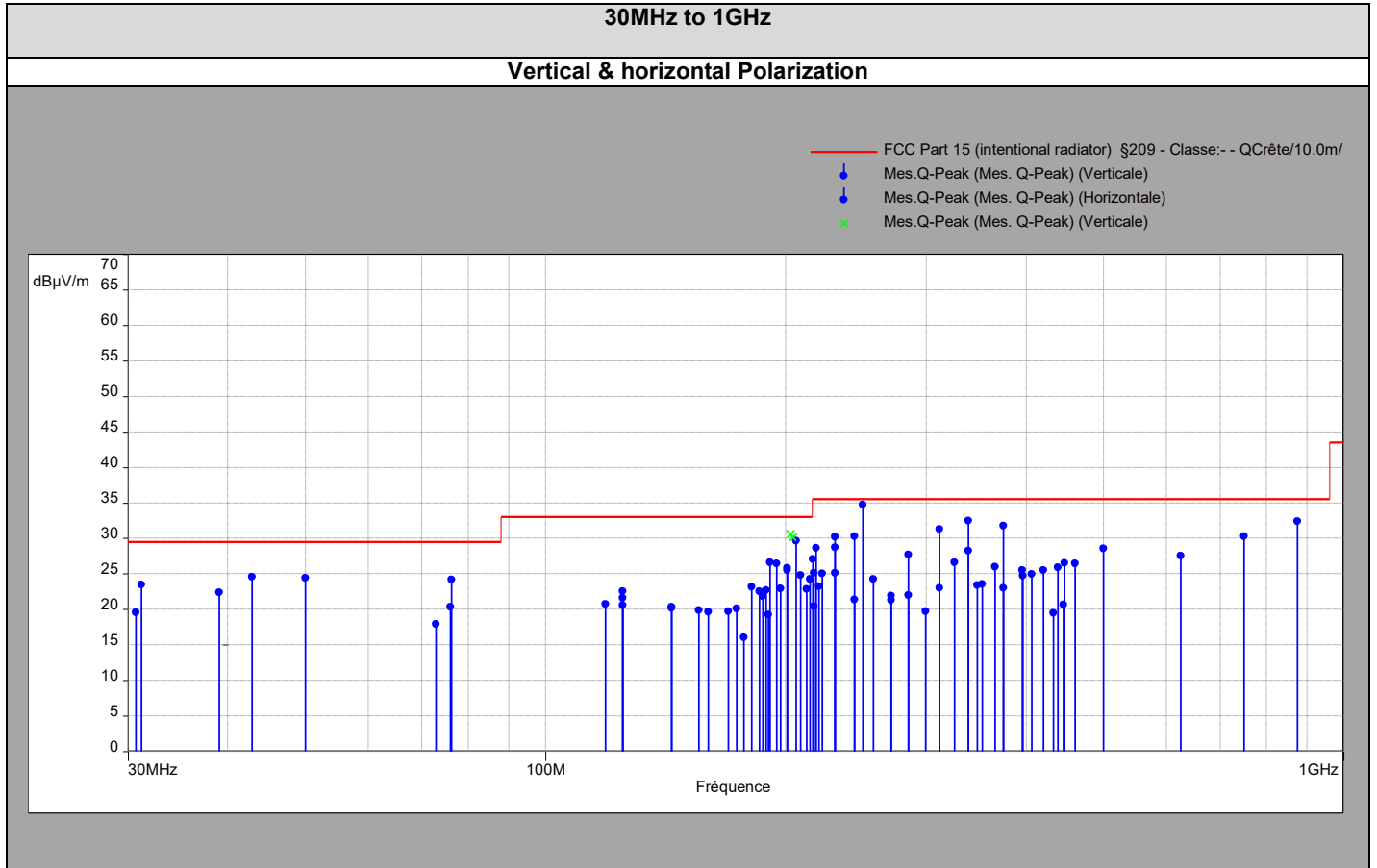
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Open test site	LCIE	-	F2000400	2018-06	2019-06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
Bilog antenna	CHASE	CBL 6112A	C2040040	2018-04	2019-04
loop antenna	RHODE & SCHWARZ	HFH2-Z2	C2040007	2018-11	2020-11
Horn antenna	EMCO	3115	C2042016	2018-04	2019-04
Preamplifier	HEWLETT PACKARD	8449B	A4069002	2018-04	2020-04
Cable	-	-	A5329442	2018-09	2019-09
Cable	-	-	A5329444	2018-09	2019-09
Cable	-	-	A5329876	2018-11	2019-11
Cable	-	-	A5326368	2018-12	2019-12
Cable	-	-	A5329416	2018-12	2019-12

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**





L C I E

9kHz to 30MHz					
Polarization	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Limit (dBµV/m)	Margin QPeak (dBµV/m)
all emissions were greater than 20 dB below the limit					

Below 1GHz			
Frequency (MHz)	level (dBµV/m)	limit FCC 15	Margin/ Fcc Part 15
42,9	24,59	29,5	4,91
50	24,43	29,5	5,07
76,3	24,2	29,5	5,3
206,2	29,66	33	3,34
230,5	30,23	35,5	5,27
244,1	30,31	35,5	5,19
250	34,75	35,5	0,75
311,9	31,3	35,5	4,2
339	32,47	35,5	3,03
375	31,79	35,5	3,71
875	32,39	35,5	3,11

Above 1GHz								
Polarization	Frequency (MHz)	Duty cycle correction (dB)	Average Level (dBµV/m)	Average Limit (dBµV/m)	Margin Average (dBµV/m)	Peak Level (dBµV/m)	Peak Limit (dBµV/m)	Margin Peak (dBµV/m)
all emissions were greater than 20 dB below the limit								

**6.7. CONCLUSION**

Field strength outside of the bands 13.110-14.010 MHz measurement performed on the sample of the product BIOLOG ID PRD\_7140300A, SN: BI **1835000234**, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.225 & RSS Gen ISSUE 5 limits.



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

### 7.1. TEST CONDITIONS

Test performed by : Laurent DENEUX  
Date of test : March 15, 2019  
Ambient temperature : 22 °C  
Relative humidity : 48 %

### 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 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 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: 30 $\mu$ V/m (30m) or 69.5dB $\mu$ V/m (3m) QPeak  
13.110MHz to 13.410MHz: 106 $\mu$ V/m (30m) or 80.5dB $\mu$ V/m (3m)  
13.410MHz to 13.553MHz: 334 $\mu$ V/m (30m) or 90.5dB $\mu$ V/m (3m)  
13.553MHz to 13.567MHz: 15848 $\mu$ V/m (30m) or 124dB $\mu$ V/m (3m)  
13.567MHz to 13.710MHz: 334 $\mu$ V/m (30m) or 90.5dB $\mu$ V/m (3m)  
13.710MHz to 14.010MHz: 106 $\mu$ V/m (30m) or 80.5dB $\mu$ V/m (3m)  
Above 14.010MHz: 30 $\mu$ V/m (30m) or 69.5dB $\mu$ V/m (3m) QPeak

### 7.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Open test site	LCIE	-	F2000400	2018-06	2019-06
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
loop antenna	ROHDE & SCHWARZ	HFH2-Z2	C2040007	2018-11	2020-11
Cable	-	-	A5329442	2018-09	2019-09
Cable	-	-	A5329444	2018-09	2019-09
Cable	-	-	A5329416	2018-12	2019-12

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:



L C I E

## 7.6. RESULTS

Parallel Axis			
Frequency (MHz)	Peak Level (dB $\mu$ V/m) (3m)	QPeak Level (dB $\mu$ V/m) (3m)	Limit (dB $\mu$ V/m) (3m)
Below 13.110	-	31.7	69.5
13.110 to 13.410	-	34.3	80.5
13.410 to 13.553	-	41.2	90.5
13.553 to 13.567	-	67.5	124
13.567 to 13.710	-	38.9	90.5
13.710 to 14.010	-	32.9	80.5
Above 14.010	-	31.2	69.5

Ground Parallel Axis			
Frequency (MHz)	Peak Level (dB $\mu$ V/m) (3m)	QPeak Level (dB $\mu$ V/m) (3m)	Limit (dB $\mu$ V/m) (3m)
Below 13.110	-	28.9	69.5
13.110 to 13.410	-	30.5	80.5
13.410 to 13.553	-	33.5	90.5
13.553 to 13.567	-	53.4	124
13.567 to 13.710	-	33.2	90.5
13.710 to 14.010	-	32.7	80.5
Above 14.010	-	29.8	69.5

Perpendicular Axis			
Frequency (MHz)	Peak Level (dB $\mu$ V/m) (3m)	QPeak Level (dB $\mu$ V/m) (3m)	Limit (dB $\mu$ V/m) (3m)
Below 13.110	-	31.7	69.5
13.110 to 13.410	-	32.9	80.5
13.410 to 13.553	-	41.2	90.5
13.553 to 13.567	-	62.5	124
13.567 to 13.710	-	38.9	90.5
13.710 to 14.010	-	33.5	80.5
Above 14.010	-	32.9	69.5



## 7.7. CONCLUSION

Field strength within the band 13.110-14.010MHz measurement performed on the sample of the product BIOLOG ID PRD\_7140300A, SN: BI 1835000234, 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 (Ecuellas)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuellas site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuellas)	4,99	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC C01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC C01	5,16	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC V01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC V01	5,15	6.3
Measurement of radiated electric field from 1 to 6 GHz C01	5,1	5.2
Measurement of radiated electric field from 1 to 6 GHz V01	4,85	5.2
Measurement of radiated magnetic field from 10kHz to 30MHz on the OATS (Ecuellas)	4,48	/

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