TEST REPORT

N°: 168754-755284 **Version : 01**

Subject	**Radio spectrum matters** **tests according to standards:** **47 CFR Part 15.225 & RSS 210 Issue 10 & RSS-Gen Issue 5**
Issued to	BIOLOG ID 1 rue du commandant Robert Malrait 27300-BERNAY FRANCE

Apparatus under test

Product	**RFID TUNNEL**
Trade mark	**BIOLOG ID**
Manufacturer	**BIOLOG ID**
Model under test	**PRD_7320002A**
Serial number	**06BI2004000012**
FCC ID	**2AKUFPRD73202A**
IC	**23919-PRD73202A**

Conclusion	See Test Program chapter
Test date	: September 21, 2020 to September 24, 2020
Test location	Moirans
Test Site	6500A-1 & 6500A-3
Sample receipt date	September 17, 2020
Composition of document	42 pages
Document issued on	October 14, 2020

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	October 12th, 2020	Armand MAHOUNGOU	Creation of the document

Each new edition of this test report replaces and cancels the previous edition. The control of the old editions of report is under responsibility of client.

SUMMARY

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1. TEST PROGRAM

References

- **47 CFR Part 15.225 (2020)**
- **RSS 210 Issue 10**
- **RSS Gen Issue 5**
- **ANSI C63.10 (2013)**

Radio requirement:

Clause (47CFR Part 15.225 & RSS-210 Issue 10 & RSS-Gen Issue 5) Test Description	Test result - Comments			
Occupied Bandwidth	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
AC Power Line Conducted Emission	☑ **PASS**	☐ **FAIL**	☐ **NA(2)**	☐ **NP(1)**
Frequency Tolerance	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Field strength within the band 13.110-14.010MHz	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Field strength outside of the bands 13.110-14.010 MHz	☑ **PASS**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
Receiver Radiated Emissions	☑ **PASS (3)**	☐ **FAIL**	☐ **NA**	☐ **NP(1)**
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

(1): Limited program
(2): EUT not directly or indirectly connected to the AC Power Public Network
(3)Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

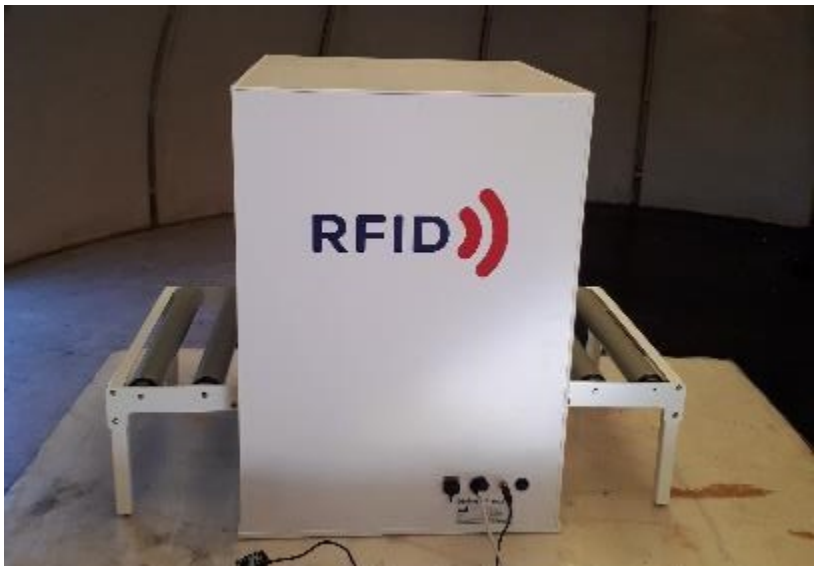
PASS: EUT complies with standard's requirement
FAIL: EUT does not comply with standard's requirement
NA: Not Applicable
NP: Test Not Performed

2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

BIOLOG ID PRD_7320002A **Serial Number: 06BI2004000012**



Equipment Under Test

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	☑ AC ☐ DC ☐ Battery	100-240V ; 50/60Hz		

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Mains power supply cable	2	☑	☐	☑	
2	Ethernet cable	5	☐	☑	☐	

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop			Use to set the EUT
Power supply	GTM96900P9024-T3		GLOBTECH

Equipment information:

Type:	☑ **RFID**			
Frequency band:	[13.553 to 13.567] MHz			
Number of Channel:	1			
Antenna Type:	☑ Integral	☐ External	☐ Dedicated	
Transmit chains:	1			
Receiver chains	1			
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Equipment arrangement:	☑ Tabletop	☐ Floor-standing	☐ Multiple orientations	
Equipment type:	☑ Production model	☐ Pre-production model		
Operating temperature range:	Tmin:	☐ -20°C	☐ 0°C	☑ -30°C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☑ 50°C	☐ X°C
Operating voltage:	Vmin:	☑ 102V/60Hz	☐ X VDC	
	Vnom:	☑ 120V/60Hz	☐ X VDC	
	Vmax:	☑ 138V/60Hz	☐ X VDC	

Hardware information		
Software (if applicable):	**V. :**	**To be defined by customer**

2.2. RUNNING MODE

Test mode	Description of test mode
Test mode 1	Permanent emission with modulation on a fixed channel in the data rate that produced the highest power

Test	Running mode	
Occupied Bandwidth	☑ Test mode 1 (1)	☐ Alternative test mode()
Frequency Tolerance	☑ Test mode 1 (1)	☐ Alternative test mode()
AC Power Line Conducted Emission	☑ Test mode 1 (1)	☐ Alternative test mode()
Field strength within the band 13.110-14.010MHz	☑ Test mode 1 (1)	☐ Alternative test mode()
Field strength outside of the bands 13.110-14.010 MHz	☑ Test mode 1 (1)	☐ Alternative test mode()

2.3. EQUIPMENT LABELLING

2.4. EQUIPMENT MODIFICATION

☑ None ☐ Modification:

2.5. *FIELD STRENGTH CALCULATION*

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

FS = RA + AF + CF – AG

Where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5dBµV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBµV/m.
FS = 52.5 + 7.4 + 1.1 – 29 = 32 dBµV/m
The 32 dBµV/m value can be mathematically converted to its corresponding level in µV/m.
Level in µV/m = Common Antilogarithm [(32dBµV/m)/20] = 39.8 µV/m.

2.6. *CALIBRATION DATE*

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period.

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

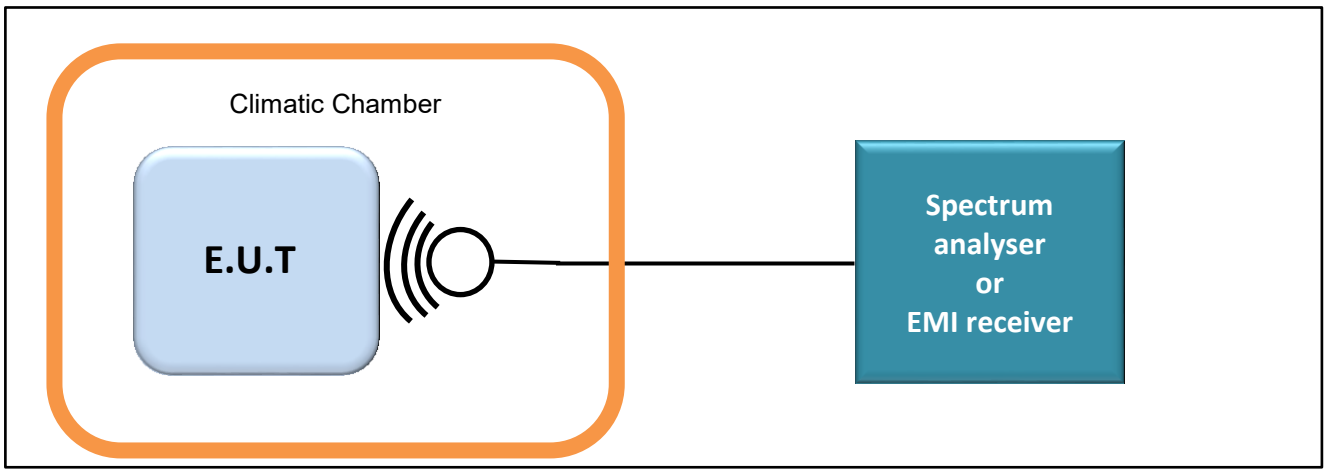
Test performed by	: Armand MAHOUNGOU
Date of test	: September 24, 2020
Ambient temperature	: 25°C
Relative humidity	: 49%

3.2. TEST SETUP

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

- Measurement is performed with a spectrum analyzer in:
☐ Conducted Method
☑ Radiated Method
The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

- Test Procedure:
☑ RSS-Gen Issue 5 § 6.7
- RBW used in the range of 1% to 5% of the anticipated emission bandwidth
- Set the video bandwidth (VBW) ≥ 3 x RBW.
- Detector = Peak.
- Trace mode = Max Hold.
- Sweep = Auto couple.
- Allow the trace to stabilize.
- OBW 99% function of spectrum analyzer used



Test set up of Occupied Bandwidth

Photograph for Occupied bandwidth in normal test condition

3.3. LIMIT

None

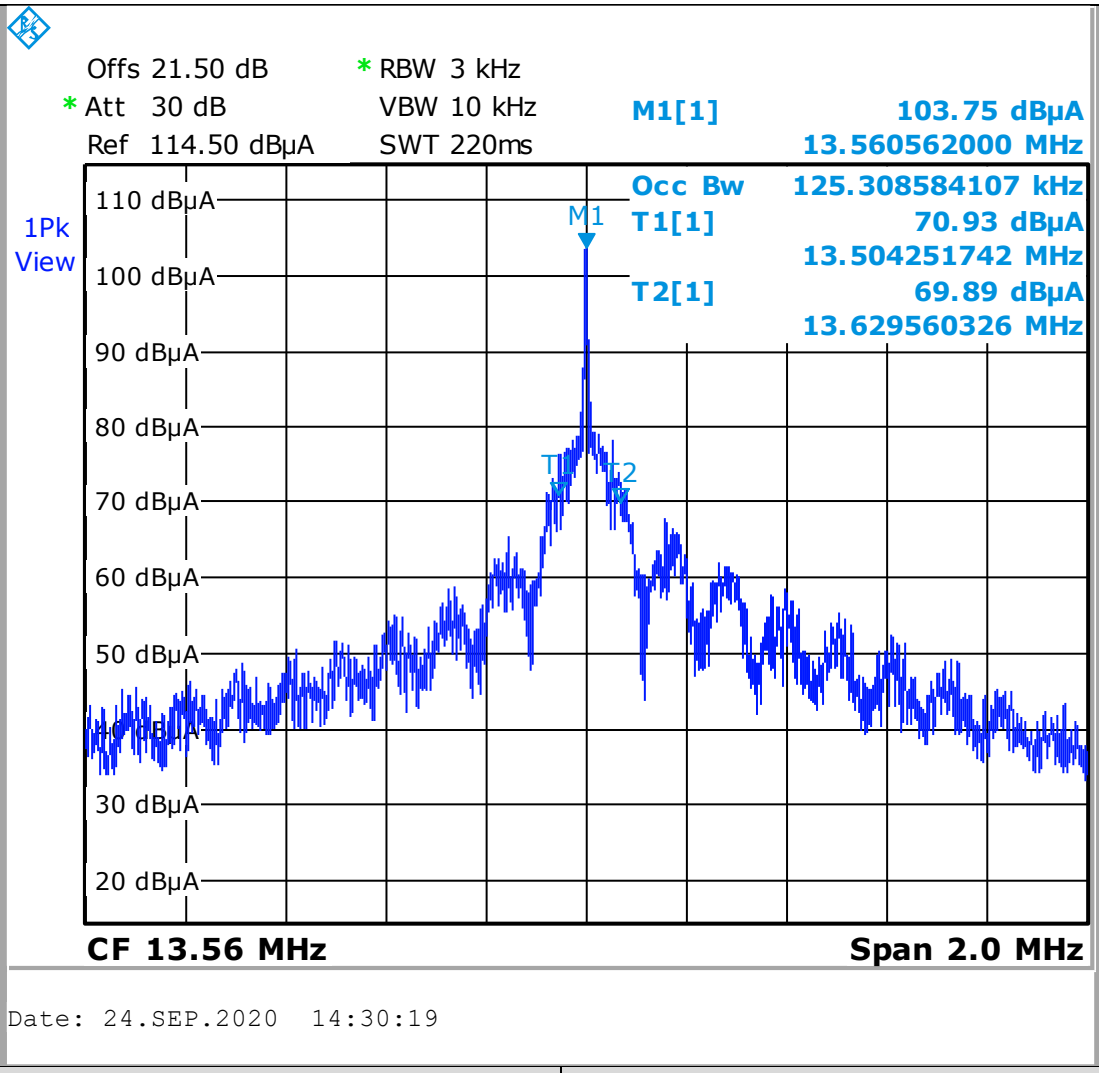
3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	VIESSMAN	-	D1025025	2020/08	2021/08
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2020/01	2022/01
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable	-	-	A5329372	2020/06	2021/06
Cable	CABLES & CONNECTIQUES	-	A5329422	Cal with Spectrum analyzer	

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

3.5. RESULTS

Occupied Bandwidth
13.56MHz



Frequency(MHz)	Occupied Bandwidth (KHz)
13.56MHz	125.308

3.6. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **BIOLOG ID PRD_7320002A**, SN: **06BI2004000012**, in configuration and description presented in this test report, show levels **compliant** to the **RSS-GEN** limits.

4. FREQUENCY TOLERANCE

4.1. TEST CONDITIONS

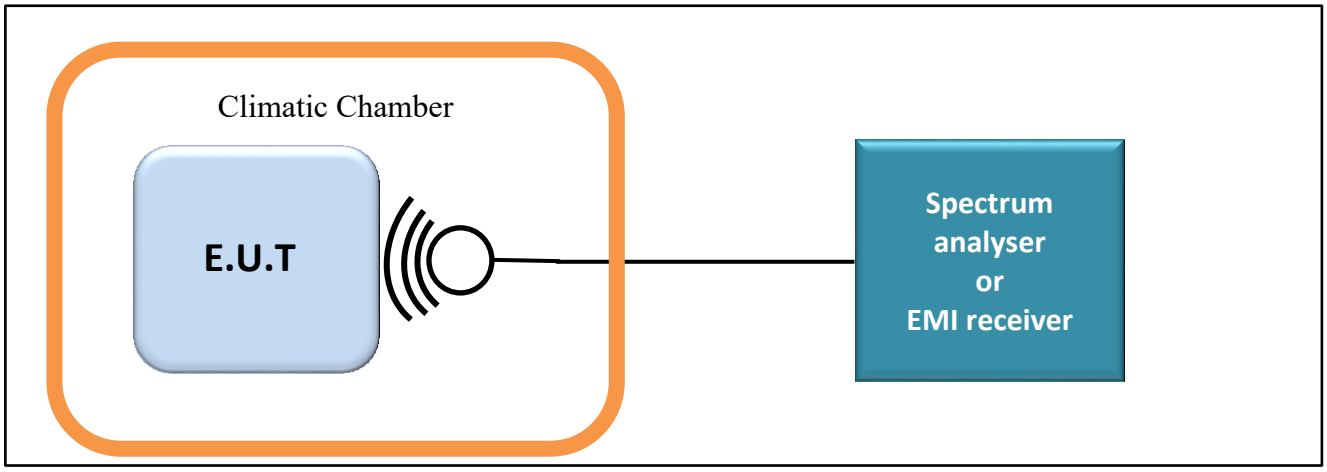
Test performed by	: Armand MAHOUNGOU
Date of test	: September 24, 2020
Ambient temperature	: 25°C
Relative humidity	: 49%

4.2. TEST SETUP

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

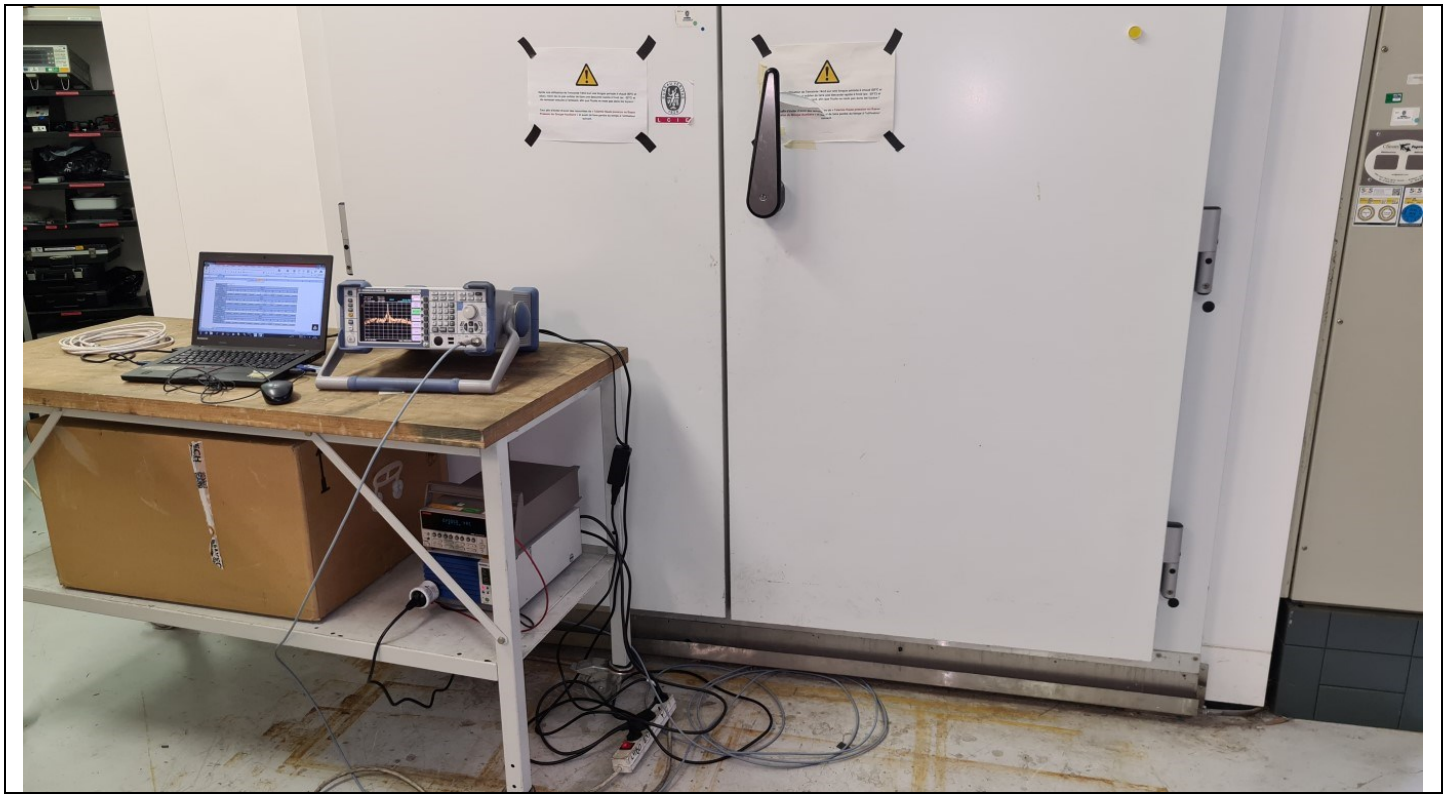
- Measurement is performed with a spectrum analyzer in:
☐ Conducted Method
☑ Radiated Method

- Test Procedure:
☑ ANSI C63.10 § 6.8



Test set up of Occupied Bandwidth

Photograph for Frequency Tolerance in normal test condition



Photograph for Frequency Tolerance in extreme test condition

4.3. LIMIT

±0.01% (± 100ppm)

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	VIESSMAN	-	D1025025	2020/08	2021/08
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2020/01	2022/01
Multimeter	KEITHLEY	2000	A1242090	2019/05	2021/05
Power supply	KIKUSUI	PCR500M	A7040079	See Multimeter	See Multimeter
Cable	-	-	A5329372	2020/06	2021/06
Cable	CABLES & CONNECTIQUES	-	A5329422	Cal with Spectrum analyzer	

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

4.5. RESULTS

EUT activation:	2min								
Voltage:	Vnom								
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Frequency (MHz)	13,5605312	13,5604937	13,5604562	13,5604562	13,5603781	13,5603781	13,5603781	13,5605312	13,5604562
Frequency Drift (%)	0,0039	0,0036	0,0034	0,0034	0,0028	0,0028	0,0028	0,0039	0,0034
EUT activation:	5min								
Voltage:	Tnom								
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Frequency (MHz)	13,5605312	13,5604937	13,5604562	13,5604562	13,5603781	13,5603781	13,5603781	13,5604969	13,5604937
Frequency Drift (%)	0,0039	0,0036	0,0034	0,0034	0,0028	0,0028	0,0028	0,0037	0,0036
EUT activation:	10min								
Voltage:	Tnom								
Temperature:	-30°C	-20°C	-10°C	0°C	10°C	20°C	30°C	40°C	50°C
Frequency (MHz)	13,5605312	13,5604937	13,5604562	13,5604562	13,5603781	13,5603437	13,5603781	13,5604937	13,5604562
Frequency Drift (%)	0,0039	0,0036	0,0034	0,0034	0,0028	0,0025	0,0028	0,0036	0,0034

Temperature	Tnom		
Voltage:	Vmin	Vnom	Vmax
Frequency (MHz)	13,5603781	13,5603781	13,5603781
Frequency Drift (%)	0,0028	0,0028	0,0028

4.6. CONCLUSION

Frequency tolerance measurement performed on the sample of the product **BIOLOG ID PRD_7320002A**, SN: **06BI2004000012**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 limits.

5. AC POWER LINE CONDUCTED EMISSIONS

5.1. TEST CONDITIONS

Test performed by	: Laurent DENEUX
Date of test	: September 21, 2020
Ambient temperature	: 21 °C
Relative humidity	: 52 %

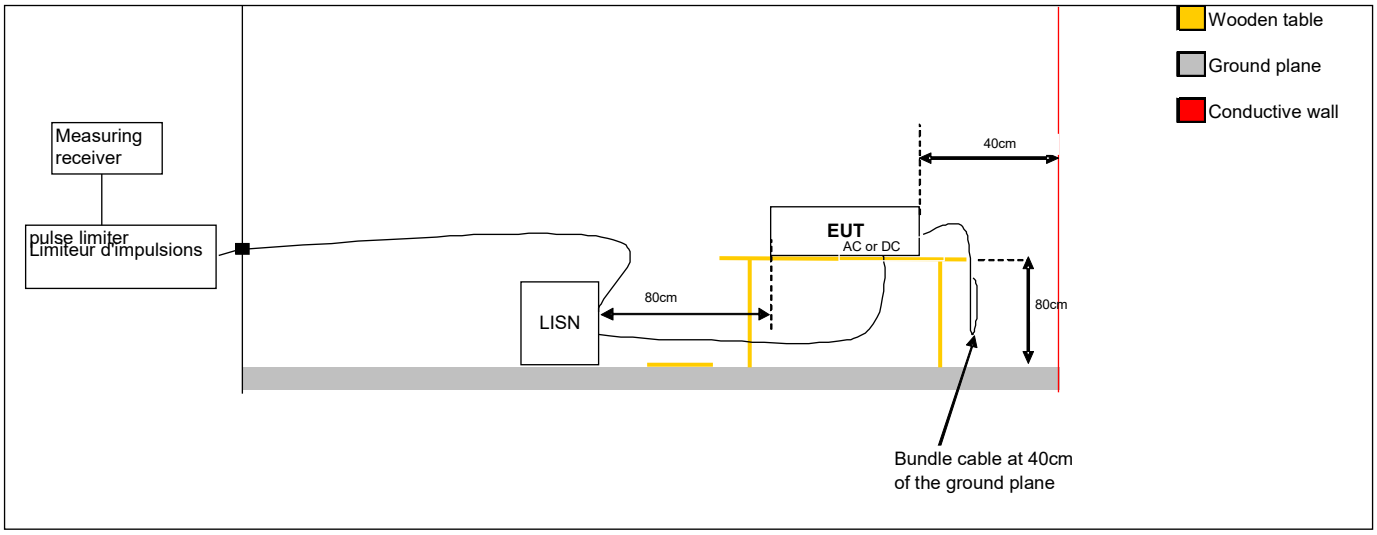
5.2. TEST SETUP

The product has been tested according to ANSI C63.10 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.

Voltage table used (for Power Line Conducted Emissions):

Type	Measurement performed:	
☑ AC / ☐ DC (Auxiliary used)	☑ 120VAC/60Hz	☑ 240VAC/50Hz
☐ USB (Laptop auxiliary)	☐ 120VAC/60Hz (Laptop auxiliary)	☐ 240VAC/50Hz(Laptop auxiliary)

Test set up of AC Power Line Conducted Emissions



Photograph for AC Power Line Conducted Emissions (Front view)

Photograph for AC Power Line Conducted Emissions (Rear view)

5.3. LIMIT

Frequency range	Level	Detector
0,15kHz to 0,5MHz	66dBµV to 56µV*	QPeak
	56dBµV to 46µV*	Average
0,5MHz to 5MHz	56dBµV	QPeak
	46dBµV	Average
5MHz to 30MHz	60BµV	QPeak
	50dBµV	Average

*Decreases with the logarithm of the frequency

5.4. TEST EQUIPMENT LIST

Test equipment used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Calibration date**	**Calibration due date**
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018/10	2020/10
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322002	2019/08	2020/08
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2020/05	2021/05
Cable	-	-	A5329417	2019/12	2020/12
absorber	LCIE	-	A5329589	2019/10	2020/10
Reference ground plan 2 x 3m	L.C.I.E.	-	-	-	-

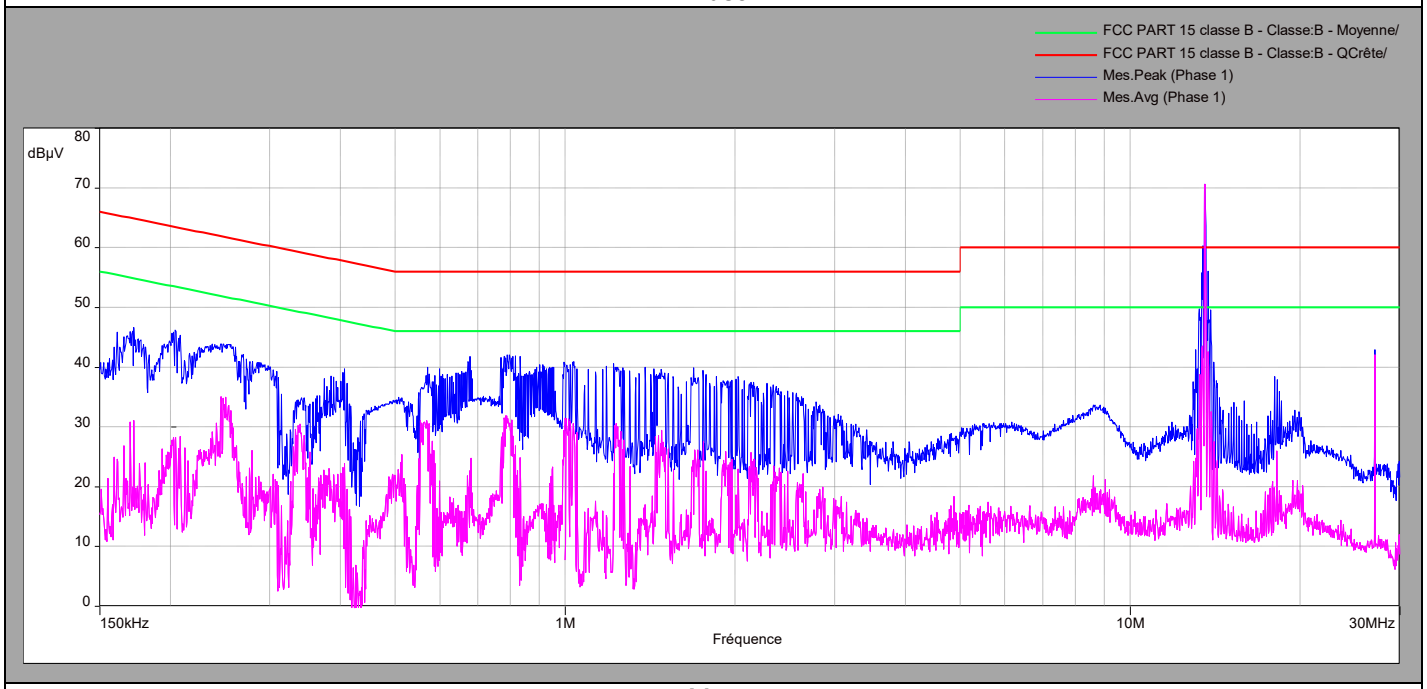
5.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

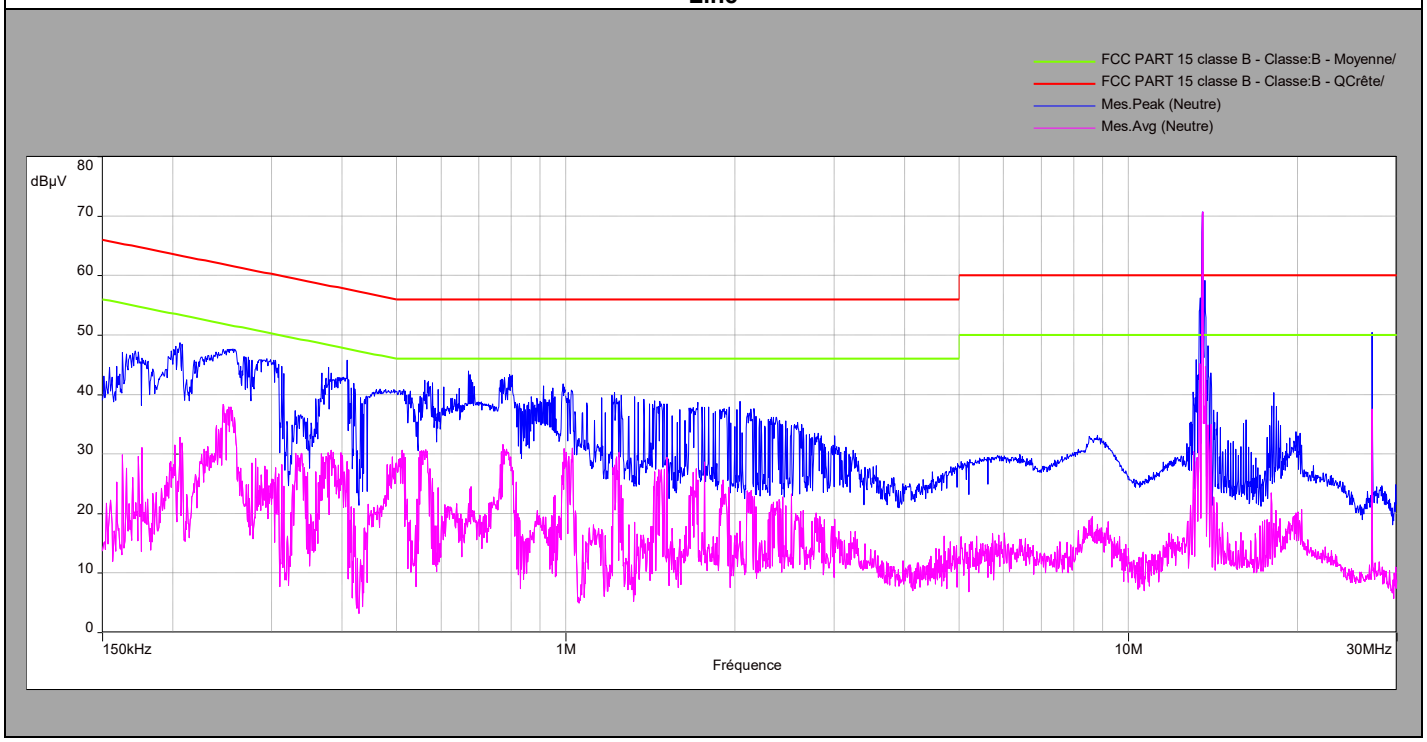
5.6. RESULTS

AC Power Line Conducted Emission 120V-50Hz (with antenna)

Phase



Line

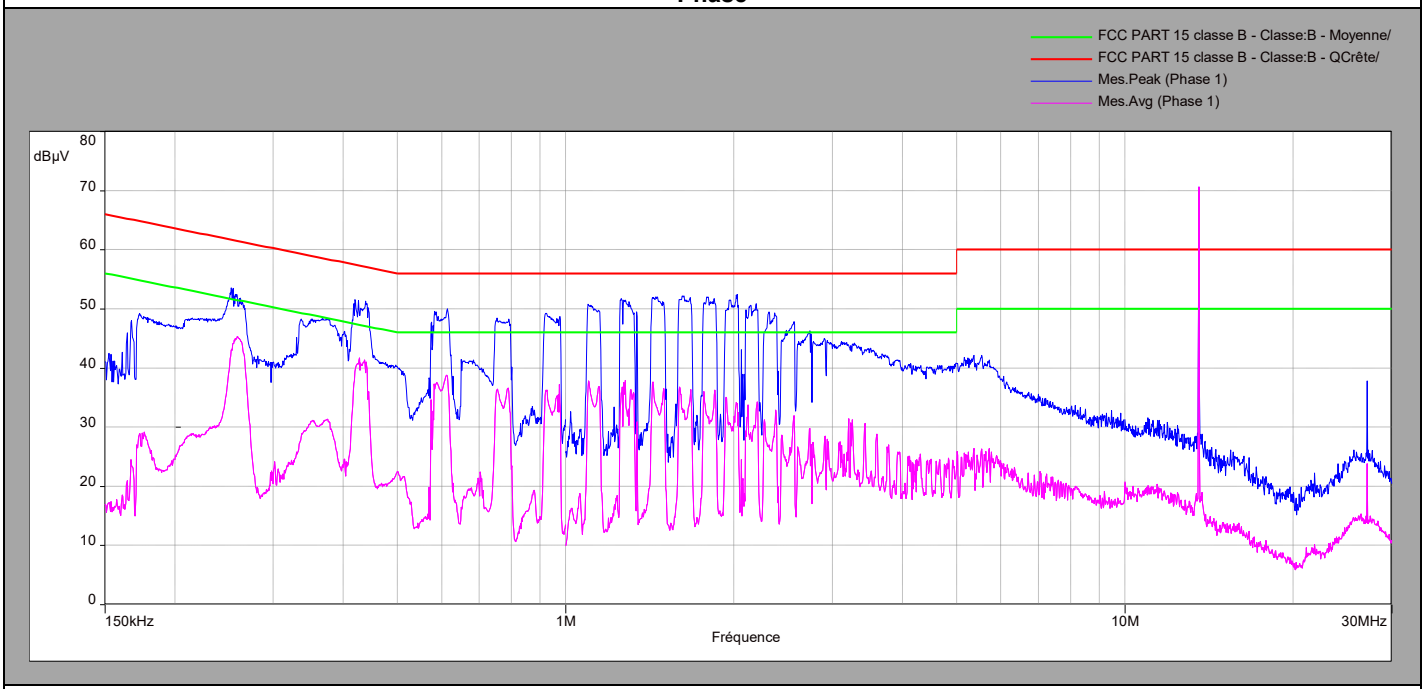


Phase Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,252	43,6	-	61,5	17,9	35	51,5	16,5
0,797	42	-	56	14	30	46	16
1,23	39,4	-	56	16,6	29,6	46	16,4
13,56	70,8	-	60	-10,8	70,4	50	-20,4
27,12	42,8	-	60	17,2	42	50	8

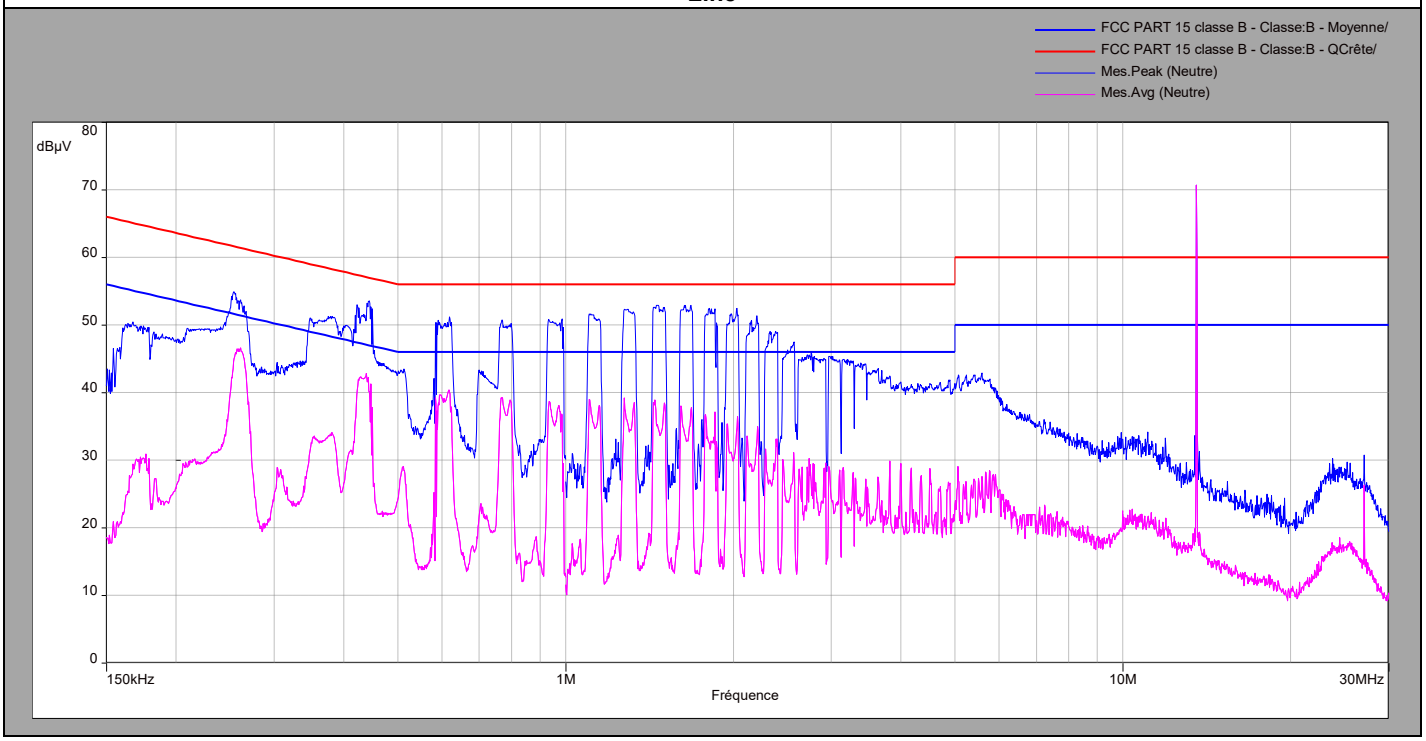
Neutral Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,252	47,5	-	61,5	14	37,8	51,5	13,7
0,561	42,3	-	56	13,7	31	46	15
1,71	38,7	-	56	17,3	27	46	19
13,56	71	-	60	-11	70,6	50	-20,6
27,12	50,4	-	60	9,6	37,5	50	12,5

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

Phase



Line

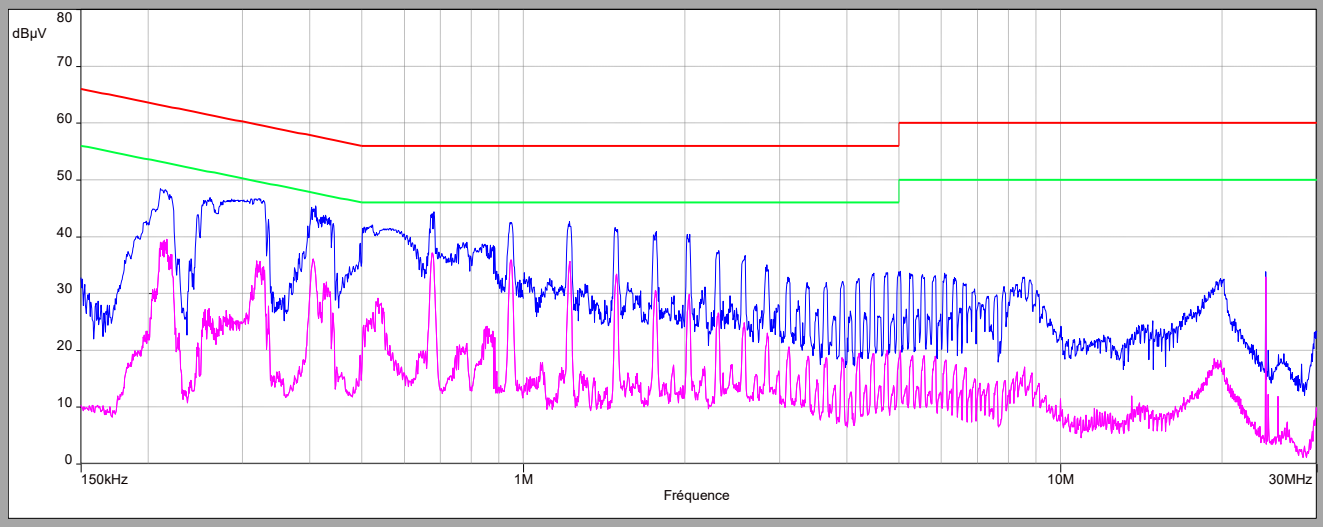


Phase Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,443	46,5	-	57,07	10,57	33,7	47,07	13,37
0,808	39	-	56	17	31,3	46	14,7
1,74	37,5	-	56	18,5	24,8	46	21,2
13,56	70,9	-	60	-10,9	70,5	50	-20,5
27,12	52,6	-	60	7,4	37,5	50	12,5

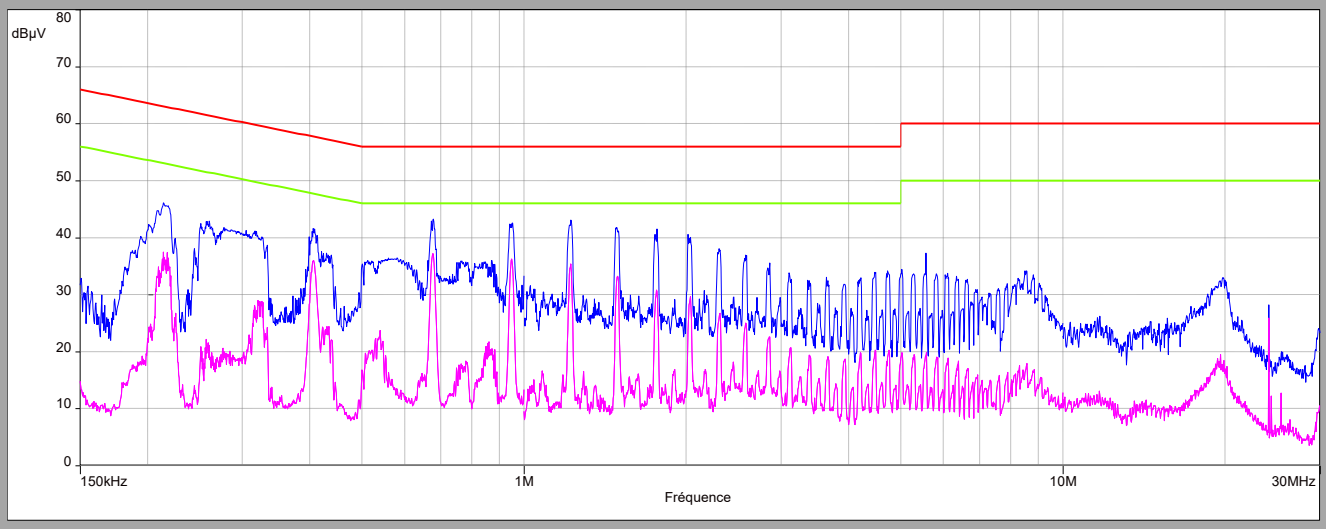
Neutral Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,446	39	-	56,9	17,9	26,9	46,9	20
0,809	39,6	-	56	16,4	31,2	46	14,8
2,37	35,6	-	56	20,4	24,7	46	21,3
13,56	70,6	-	60	-10,6	50	46	-4
27,12	56	-	60	4	40,8	50	9,2

AC Power Line Conducted Emission 120V-50Hz (without antenna)

Phase



Line

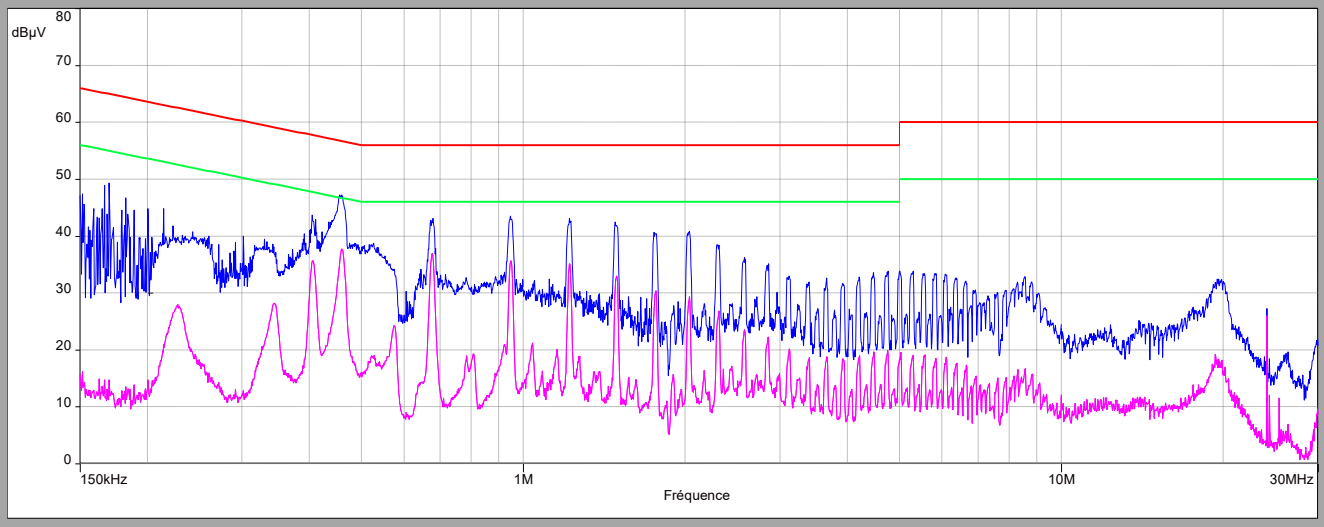


Phase Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,212	48,2	-	63	14,8	38,9	53	14,1
0,676	44	-	56	12	37,2	46	8,8
1,49	41	-	56	15	33,2	46	12,8
5	33,5	-	56	22,5	19,5	46	26,5
24	33,8	-	60	26,2	32,9	50	17,1

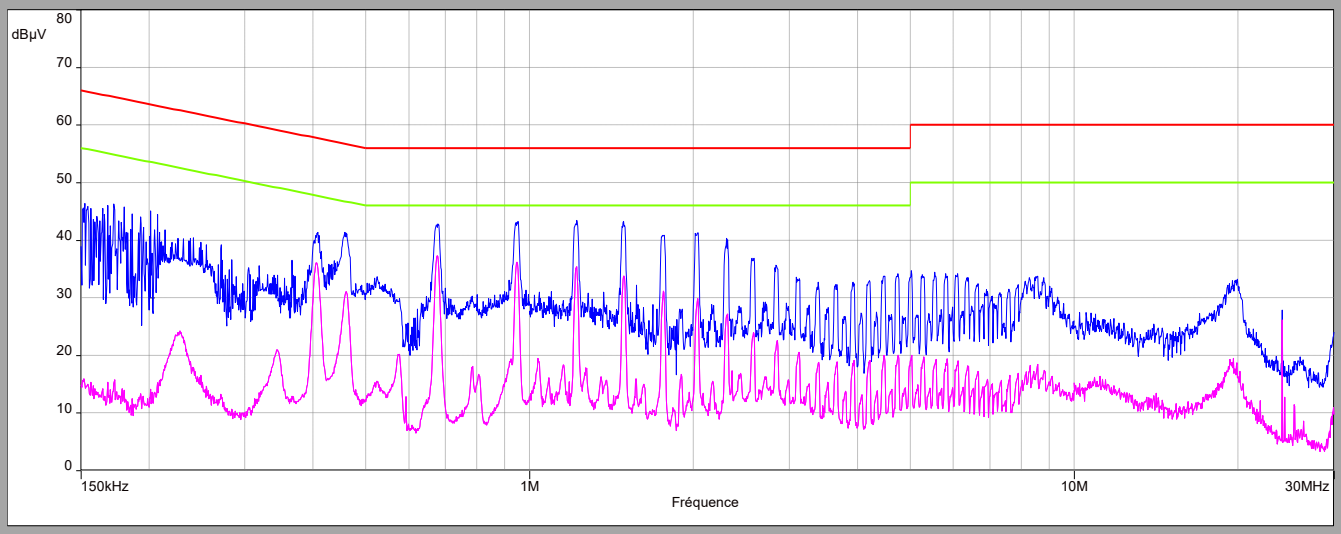
Neutral Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,212	45,5	-	63	17,5	37,4	53	15,6
0,678	43	-	56	13	37,6	46	8,4
1,22	42,3	-	56	13,7	35,4	46	10,6
5,57	37,3	-	60	22,7	18,8	50	31,2
24	28,2	-	60	31,8	25,8	50	24,2

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

Phase



Line



Phase Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,459	46,7	-	56,7	10	36,4	46,7	10,3
0,949	42,9	-	56	13,1	35,5	46	10,5
2,37	35,6	-	56	20,4	24,7	46	21,3
19,88	30,7	-	60	29,3	18	46	28
24	27,2	-	60	32,8	25,5	50	24,5

Neutral Line							
Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Margin Quasi-Peak (dBµV)	Average Level (dBµV)	Average Limit (dBµV)	Margin Average (dBµV)
0,231	40	-	62,4	22,4	23	52,4	29,4
0,68	42,6	-	56	13,4	37,3	46	8,7
1,48	43,3	-	56	12,7	33,7	46	12,3
19,88	33	-	60	27	18,6	50	31,4
24,12	27,6	-	60	32,4	26,2	50	23,8

5.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product **BIOLOG ID PRD_7320002A**, SN: **06BI2004000012**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS Gen limits.

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

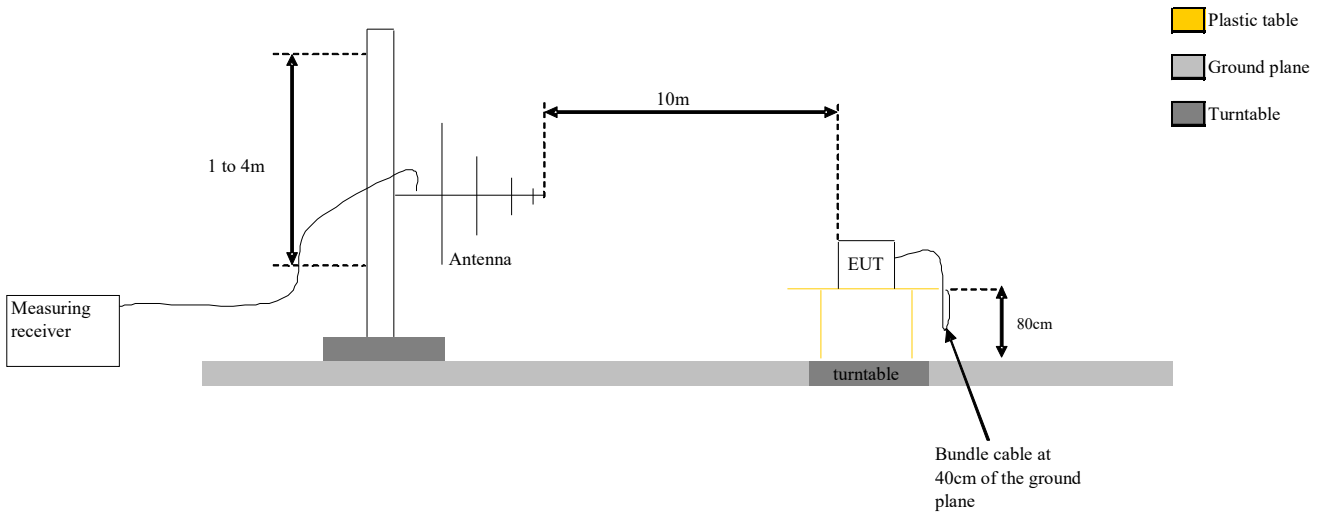
6.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
Date of test : September 21, 2020
Ambient temperature : 20 °C
Relative humidity : 47 %

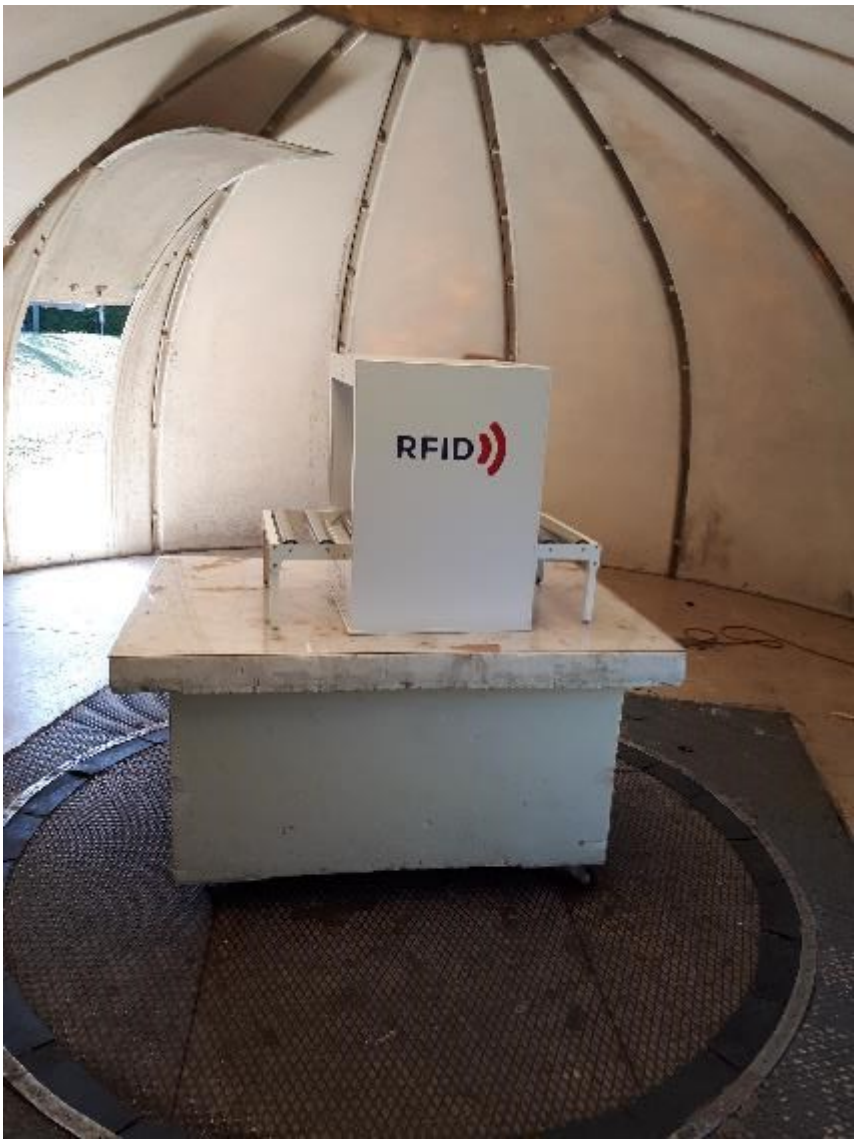
6.2. TEST SETUP

The product has been tested according to ANSI C63.10 and FCC part 15 subpart C:

Frequency range :	**Below 30MHz**	**From 30MHz to 1GHz**
Antenna Polarization :	Parallel, Perpendicular And Ground parallel	Horizontal And Vertical
Antenna Height :	1m	Varied from 1m to 4m
Antenna Type :	Loop	Bi-Log
RBW Filter :	200Hz below 150kHz 9kHz above 150kHz	120kHz
Maximization :	Turntable rotation of 360 degrees range	
EUT height :	0.8m	
Test site :	Open Aera Test Site	Open Aera Test Site
Distance EUT-Antenna :	3m	10m



Test Set up for radiated measurement in open area test site



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

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

6.4. TEST EQUIPMENT LIST

Test equipment used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Calibration date**	**Calibration due date**
Open test site	LCIE	-	F2000400	2020-09	2021-09
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
Cable	-	-	A5329444	2019-12	2020-12
Bilog antenna	CHASE	CBL 6112A	C2040040	2020-05	2021-05
Cable	-	-	A5329442	2019-12	2020-12
Cable	-	-	A5329876	2019-12	2020-12
Cable	-	-	A5329542	2019-08	2020-08
Preamplifier	HEWLETT PACKARD	8449B	A7080071	2019-08	2020-08
Horn	EMCO	3115	C2042016	2020-06	2021-06
loop antenna	SCHWARZBECK	FMZB1513	C2040209	2020-03	2022-03
Cable	-	-	A5329416	2019-12	2020-12

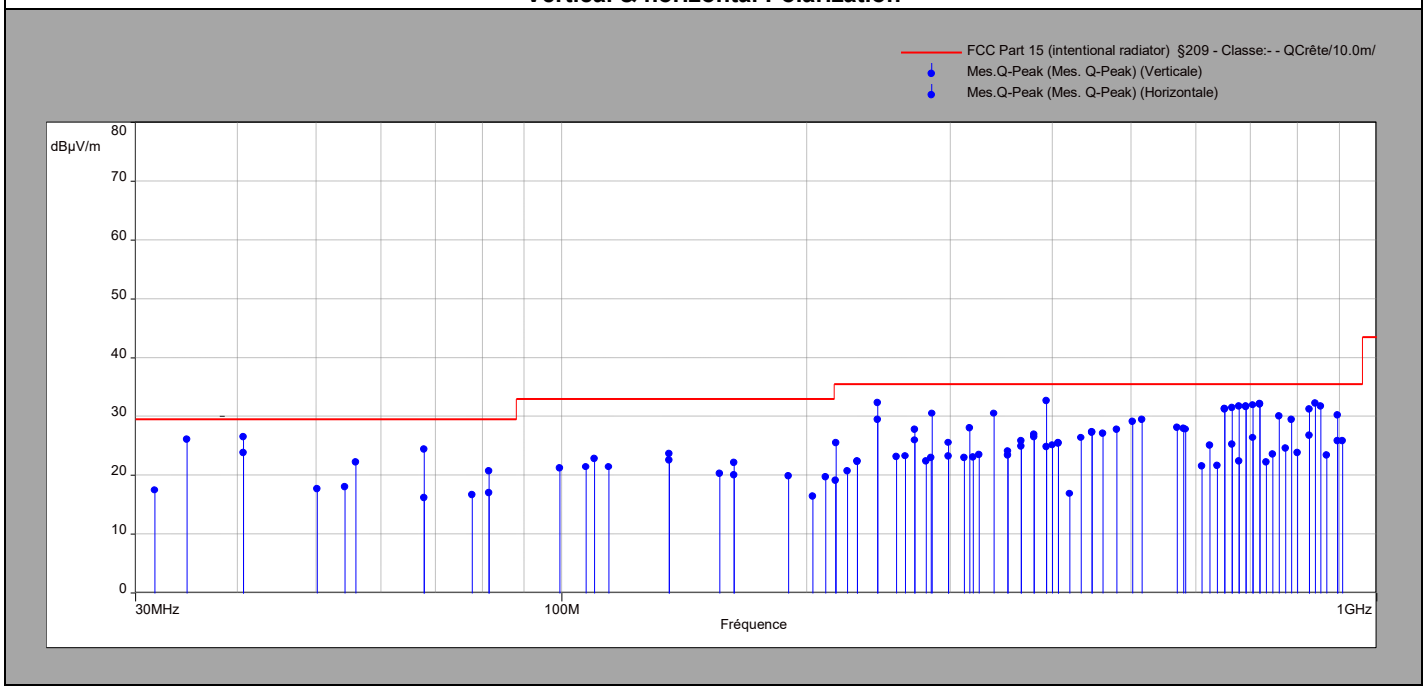
Note: In our quality system, the test equipment calibration due is more & less 3 months

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

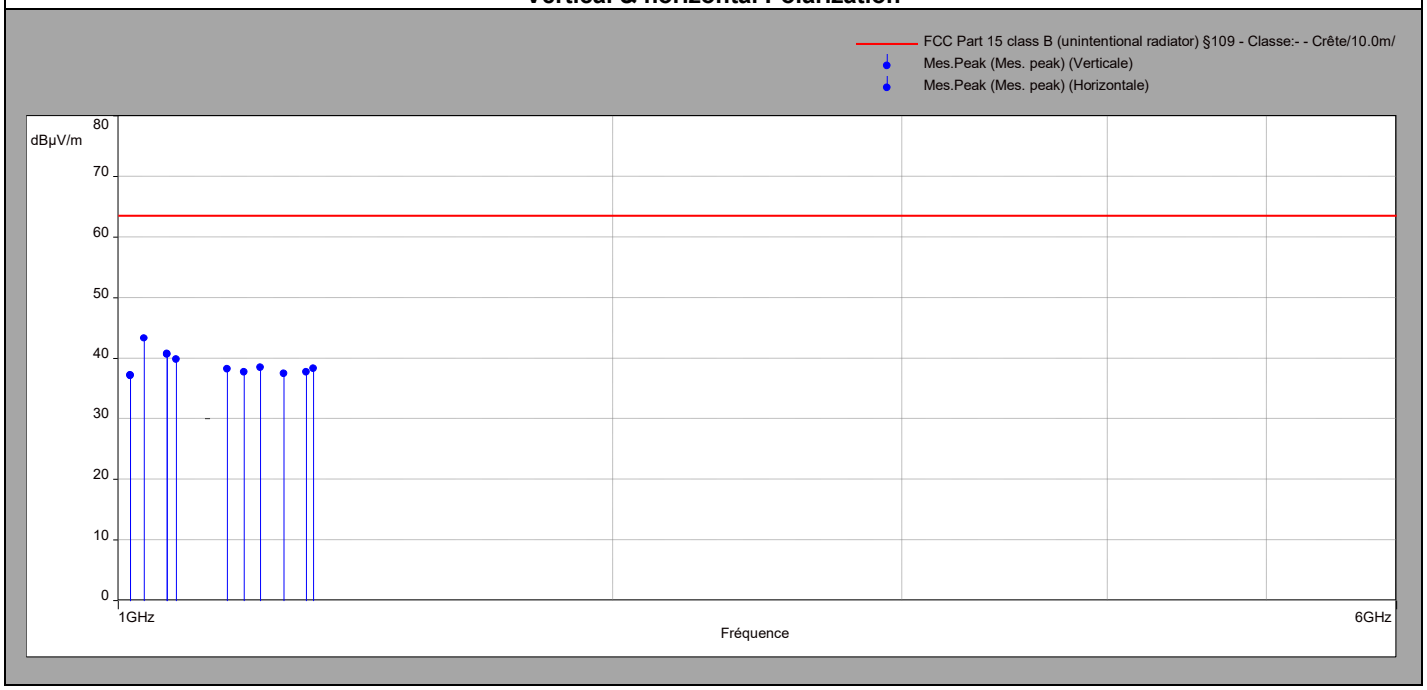
☐ None ☐ Divergence:

6.6. RESULTS

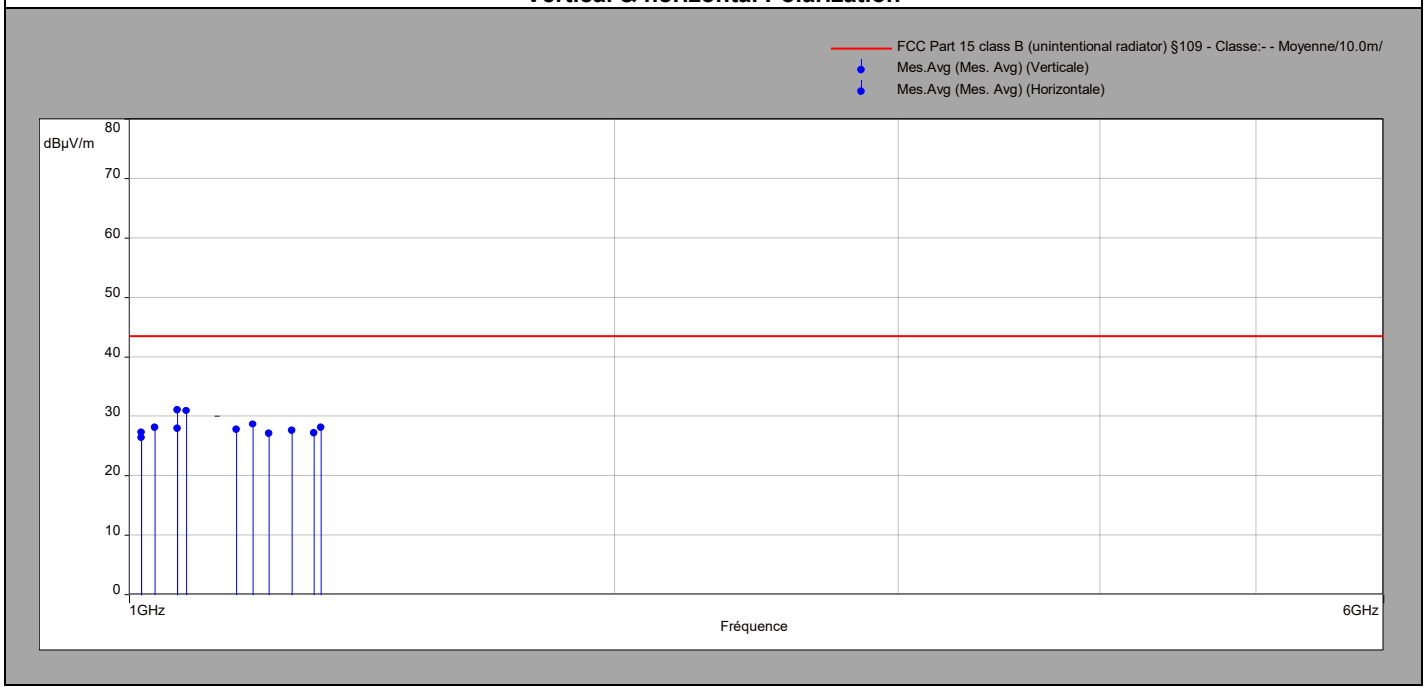
30MHz to 1GHz
Vertical & horizontal Polarization



1GHz to 6GHz
Peak measurement
Vertical & horizontal Polarization



1GHz to 6GHz
Average value measurement
Vertical & horizontal Polarization



9kHz to 30MHz					
Polarization	**Frequency (kHz)**	**Peak Level (dBµV/m)**	**QPeak Level (dBµV/m)**	**Limit (dBµV/m)**	**Margin QPeak (dBµV/m)**
Parallel	183,5	-	102,3	40,1	62,3
Parallel	192,0	-	101,9	55,4	46,5
Parallel	209,5	-	101,2	46,9	54,3
Parallel	244,5	-	99,8	57,7	42,1
Parallel	262,0	-	99,2	47,9	51,3
Parallel	305,5	-	97,9	45,8	52,1
Parallel	332,0	-	97,2	38,5	58,7
Parallel	1028,0	-	67,4	33,2	34,1
Parallel	1096,0	-	66,8	29,2	37,6
Parallel	1166,0	-	66,3	28,9	37,4
Parallel	7270,0	-	69,5	19,7	49,8
Parallel	8020,0	-	69,5	19,2	50,3
Parallel	8704,0	-	69,5	19,9	49,6
Parallel	9184,0	-	69,5	19,7	49,8
Parallel	9596,0	-	69,5	22,4	47,1
Parallel	9942,0	-	69,5	21,7	47,8
Parallel	10200,0	-	69,5	23,0	46,5
Parallel	10438,0	-	69,5	24,9	44,6
Parallel	10700,0	-	69,5	18,9	50,7
Parallel	11238,0	-	69,5	18,9	50,6
Parallel	11636,0	-	69,5	22,9	46,6
Parallel	12038,0	-	69,5	36,4	33,1
Parallel	12436,0	-	69,5	30,0	39,5
Parallel	14438,0	-	69,5	31,4	38,1
Parallel	14970,0	-	69,5	26,9	42,6
Parallel	15370,0	-	69,5	24,0	45,5
Parallel	15902,0	-	69,5	18,8	50,7
Parallel	16304,0	-	69,5	19,2	50,3
Parallel	16872,0	-	69,5	17,9	51,6
Parallel	17490,0	-	69,5	18,5	51,0
Parallel	18072,0	-	69,5	26,2	43,3
Parallel	18472,0	-	69,5	26,0	43,5
Parallel	18872,0	-	69,5	22,3	47,2
Parallel	19272,0	-	69,5	21,8	47,8
Parallel	20022,0	-	69,5	21,8	47,7
Parallel	27120	-	69.5	46.4	23.1

9kHz to 30MHz					
Polarization	**Frequency (kHz)**	**Peak Level (dBµV/m)**	**QPeak Level (dBµV/m)**	**Limit (dBµV/m)**	**Margin QPeak (dBµV/m)**
Perpendicular	176,5	-	102,7	48,9	53,7
Perpendicular	185,0	-	102,3	42,3	59,9
Perpendicular	200,5	-	101,6	59,0	42,6
Perpendicular	220,5	-	100,7	56,7	44,1
Perpendicular	244,0	-	99,9	58,4	41,5
Perpendicular	255,0	-	99,5	50,8	48,7
Perpendicular	290,0	-	98,4	38,6	59,8
Perpendicular	307,5	-	97,8	55,8	42,1
Perpendicular	333,5	-	97,1	44,1	53,0
Perpendicular	8546,0	-	69,5	20,9	48,6
Perpendicular	8888,0	-	69,5	19,2	50,4
Perpendicular	9096,0	-	69,5	20,2	49,3
Perpendicular	9440,0	-	69,5	20,2	49,3
Perpendicular	9716,0	-	69,5	20,2	49,3
Perpendicular	9924,0	-	69,5	20,8	48,7
Perpendicular	10160,0	-	69,5	22,8	46,7
Perpendicular	10424,0	-	69,5	22,4	47,1
Perpendicular	10694,0	-	69,5	18,8	50,7
Perpendicular	11096,0	-	69,5	19,7	49,8
Perpendicular	11366,0	-	69,5	31,7	37,8
Perpendicular	11628,0	-	69,5	37,6	31,9
Perpendicular	11896,0	-	69,5	40,8	28,7
Perpendicular	12296,0	-	69,5	26,8	42,7
Perpendicular	12530,0	-	69,5	31,0	38,5
Perpendicular	12794,0	-	69,5	35,8	33,7
Perpendicular	13004,0	-	69,5	38,8	30,7
Perpendicular	14268,0	-	69,5	34,3	35,2
Perpendicular	14534,0	-	69,5	28,4	41,1
Perpendicular	14934,0	-	69,5	26,2	43,3
Perpendicular	15768,0	-	69,5	40,2	29,3
Perpendicular	16432,0	-	69,5	18,3	51,2
Perpendicular	16566,0	-	69,5	18,3	51,2
Perpendicular	16966,0	-	69,5	18,5	51,1
Perpendicular	17900,0	-	69,5	19,6	49,9
Perpendicular	18300,0	-	69,5	21,2	48,3
Perpendicular	18968,0	-	69,5	20,0	49,5
Perpendicular	27120	-	69.5	57.7	11.8

30MHz to 1GHz					
Polarization	**Frequency (MHz)**	**Peak Level (dBµV/m)**	**QPeak Level (dBµV/m)**	**Limit (dBµV/m)**	**Margin QPeak (dBµV/m)**
Vertical	34.7	-	26.05	29.5	3.45
Vertical	40.7	-	26.47	29.5	3.03
Vertical	99.5	-	21.2	33	11.8
Vertical	107.2	-	21.44	33	11.56
Vertical	109.7	-	22.83	33	10.17
Vertical	114.3	-	21.45	33	11.55
Vertical	393.2	-	32.64	35.5	2.86
Vertical	691.5	-	31.69	35.5	3.81
Vertical	718.6	-	32.05	35.5	3.45
Vertical	840.7	-	32.21	35.5	3.29
Vertical	854.3	-	31.76	35.5	3.74
Horizontal	244.1	--	32.35	35.5	3.15
Horizontal	718.7	-	32.16	35.5	3.34

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)**
Vertical	1017		37.07	26.44	43.5	15.42	63.5	26.43
Vertical	1037		43.31	28.08	43.5	15.6	63.5	20.19
Vertical	1071.3		40.74	27.9	43.5	16.26	63.5	22.76
Horizontal	1017		37.16	27.24	43.5	12.48	63.5	26.34
Horizontal	1071.3		40.61	31.02	43.5	12.55	63.5	22.89
Horizontal	1084.8		39.76	30.95	43.5	15.7	63.5	23.74
Horizontal	1165		38.21	27.8	43.5	14.83	63.5	25.29
Horizontal	1193.3		37.69	28.67	43.5	16.4	63.5	25.81
Horizontal	1220.4		38.43	27.1	43.5	15.91	63.5	25.07
Horizontal	1261.1		37.44	27.59	43.5	16.28	63.5	26.06
Horizontal	1301.8		37.73	27.22	43.5	15.42	63.5	25.77
Horizontal	1315.3		38.31	28.08	43.5	15.42	63.5	25.19

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_7320002A**, SN: **06BI2004000012**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS-Gen limits.

7. FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHZ

7.1. TEST CONDITIONS

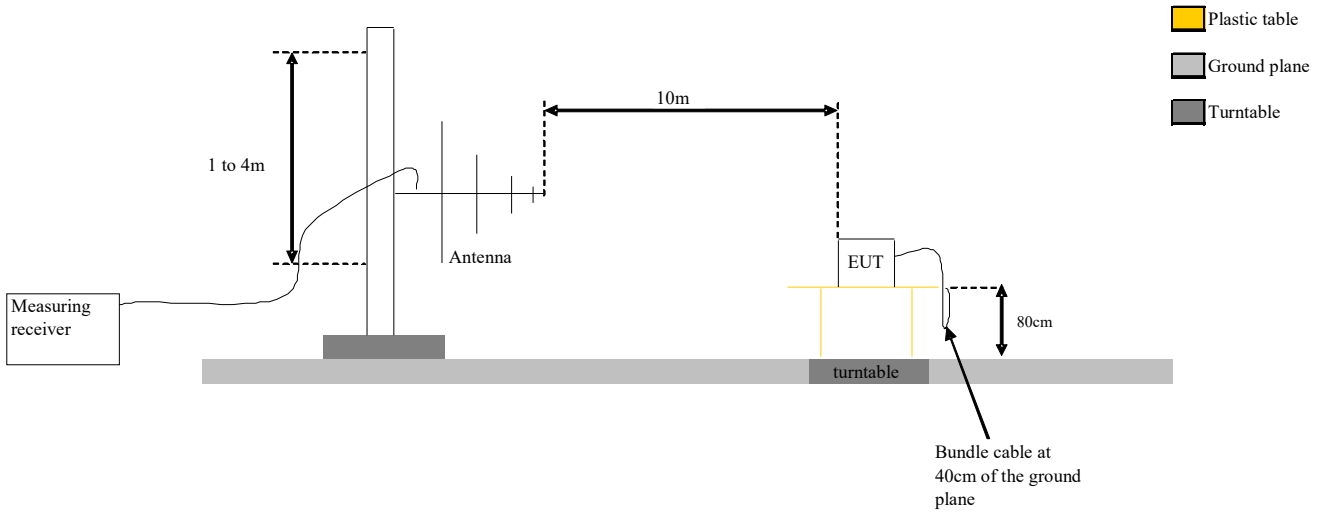
Test performed by	: Laurent DENEUX
Date of test	: September 21, 2020
Ambient temperature	: 20 °C
Relative humidity	: 47 %

7.2. TEST SETUP

Measurement procedure:

☑ Open Area Test Site
☐ Open Area Test Site + Test fixture in climatic chamber

The product has been tested according to ANSI C63.10.
The EUT is placed **on an open area test site**. Distance between measuring antenna and the EUT is **Distance**.
Test is performed in parallel, perpendicular and ground parallel axis with a loop antenna below 30MHz.
Measurement bandwidth was 9kHz between 150kHz & 30MHz. The level has been maximised by the turntable rotation of 360 degrees range on all axis of EUT used in normal configuration. Antenna height search was performed from 1 to 4m. The EUT is place at 0.8m.



Test Set up for radiated measurement in open area test site

For measurement with test fixture is used, the power level calibration of the spectrum analyzer shall then be related to the power level or field strength measured with temperature during OATS measure taking in consideration in climatic chamber. The calculation will be used to calculate the absolute level of the sideband power.

Frequency band 13.110-14.010MHz
Following plots show radiated emission level in the frequency band 13.110-14.010MHz with a RBW of 9kHz and a quasi-peak detector. The graphs are obtained with a measuring receiver.
Frequency band 13.553-13.567MHz
Following plots show radiated emission level in the frequency band 13.55.-13.567MHz with a RBW of 1kHz. The graphs are obtained with a measuring receiver.

Photograph for Field strength within the band 13.110-14.010MHz

7.3. LIMIT

Frequency (MHz)	Field strength (µV/m) @30m	Field strength (dBµV/m) @30m	Field strength (dBµV/m) @3m
13.553-13.567	15 848	84.0	124.0
13.410-13.553 13.567-13.710	334.0	50.5	90.5
13.110-13.410 13.710-14.010	106.0	40.5	80.5
Below 13.110MHz Above 14.010MHz	30.0	29.5	69.5

7.4. TEST EQUIPMENT LIST

Test equipment used					
Description	**Manufacturer**	**Model**	**Identifier**	**Last Calibration date**	**Calibration due date**
Open test site	LCIE	-	F2000400	2020-09	2021-09
EMI Test Receiver	ROHDE & SCHWARZ	ESIB26	A2642021	2018-10	2020-10
Cable	-	-	A5329442	2019-129	2020-12
Cable	-	-	A5329876	2019-12	2020-12
loop antenna	SCHWARZBECK	FMZB1513	C2040209	2020-03	2022-03
Cable	-	-	A5329416	2019-12	2020-12

7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☑ None ☐ Divergence:

7.6. RESULTS

Parallel Axis			
Frequency (MHz)	**Peak Level (dBµV/m) (3m)**	**QPeak Level (dBµV/m) (3m)**	**Limit (dBµV/m) (3m)**
Below 13.110	-	36.5	69.5
13.110 to 13.410	-	45.8	80.5
13.410 to 13.553	-	62.5	90.5
13.553 to 13.567	-	115.3	124.0
13.567 to 13.710	-	65.4	90.5
13.710 to 14.010	-	42.6	80.5
Above 14.010	-	35.4	69.5

Ground Parallel Axis			
Frequency (MHz)	**Peak Level (dBµV/m) (3m)**	**QPeak Level (dBµV/m) (3m)**	**Limit (dBµV/m) (3m)**
Below 13.110	-	31.5	69.5
13.110 to 13.410	-	38.9	80.5
13.410 to 13.553	-	41.8	90.5
13.553 to 13.567	-	79.4	124.0
13.567 to 13.710	-	39.7	90.5
13.710 to 14.010	-	35.4	80.5
Above 14.010	-	29.9	69.5

Perpendicular Axis			
Frequency (MHz)	**Peak Level (dBµV/m) (3m)**	**QPeak Level (dBµV/m) (3m)**	**Limit (dBµV/m) (3m)**
Below 13.110	-	35.4	69.5
13.110 to 13.410	-	45.7	80.5
13.410 to 13.553	-	58.9	90.5
13.553 to 13.567	-	108.5	124
13.567 to 13.710	-	57.1	90.5
13.710 to 14.010	-	43.5	80.5
Above 14.010	-	38.7	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_7320002A**, SN: **06BI2004000012**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 limits.

8. UNCERTAINTIES CHART

47 CFR Part 15.209 & 15.207 Kind of test	Wide uncertainty laboratory (k=2) ±x(dB) / (Hz)/ ms	Uncertainty limit
Measurement of conducted disturbances in voltage on the AC power port (9 kHz – 150 kHz)	2,67	3.8
Measurement of conducted disturbances in voltage on the AC power port (150 kHz – 30 MHz)	2,67	3.4
Measurement of conducted disturbances in voltage on the telecommunication port. (AAN)	3,67	5.0
Measurement of conducted disturbances in current (current clamp)	2,73	2.9
Measurement of disturbance power	2,67	4.5
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC V01	4,48	/
Measurement of radiated magnetic field from 10kHz to 30MHz in SAC C01	4,48	/
Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the OATS (Ecuelles)	4,88	6.3
Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site	5.16	/
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the OATS (Ecuelles)	4,99	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC C01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC C01	5,16	6.3
Measurement of radiated electric field from 30 to 1000MHz in horizontal position in SAC V01	5,08	6.3
Measurement of radiated electric field from 30 to 1000MHz in vertical position in SAC V01	5,15	6.3
Measurement of radiated electric field from 1 to 6 GHz C01	5,1	5.2
Measurement of radiated electric field from 1 to 6 GHz V01	4,85	5.2
Measurement of radiated magnetic field from 10kHz to 30MHz on the OATS (Ecuelles)	4,48	/

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