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TEST REPORT

N°: 172657-765443-B

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	SMART STORAGE AGITATEUR
↪ Trade mark	BIOLOG ID
↪ Manufacturer	BIOLOG ID
↪ Model under test	PRD-7150200A
↪ Serial number	01BI2124000001
↪ FCC ID	2AKUFSSTA30
↪ IC	23919-SSTA30

Conclusion

See Test Program chapter

Test date

June 28, 2021 to July 6, 2021

Test location

Moirans

Test Site

6500A-1 & 6500A-3

Registration Number

197516

Designation Number

FR0008

Sample receipt date

June 28, 2021

Composition of document

46 pages

Document issued on

July 13, 2021

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	July 13, 2021	J. PALARD	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 9 & RSS-Gen Issue 5) Test Description	Test result - Comments			
Occupied Bandwidth	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
20dB Bandwidth	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA(2)	<input type="checkbox"/> NP(1)
Frequency Tolerance	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Field strength within the band 13.110-14.010MHz	<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	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated Emissions	<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-7150200A

Serial Number: 01BI212400001



Equipment Under Test

Power supply:

Name	Type	Rating	Reference / Sn	Comments
Supply1	<input checked="" type="checkbox"/> AC <input type="checkbox"/> DC <input type="checkbox"/> Battery	100-240V ; 50-60Hz	GTM96900P9015-T2	-

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power supply	1.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
2	Ethernet	5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
3	CAN bus	2.5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	-	-	Use to set the EUT



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Equipment information (declaration of provider):

Type:	<input checked="" type="checkbox"/> RFID		
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
Antenna Requirements §15.203	Select Antenna Requirements		
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 arrangement:	<input checked="" type="checkbox"/> Tabletop	<input type="checkbox"/> Floor-standing	<input type="checkbox"/> Multiple orientations
Equipment type:	<input checked="" type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input checked="" type="checkbox"/> -30°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 50°C	<input checked="" type="checkbox"/> 55°C
Operating voltage:	Vmin (85% Vnom):	<input checked="" type="checkbox"/> 102V/60Hz	<input checked="" type="checkbox"/> 10,8Vdc
	Vnom:	<input checked="" type="checkbox"/> 120V/60Hz	<input checked="" type="checkbox"/> 15Vdc
	Vmax (115% Vnom):	<input checked="" type="checkbox"/> 138V/60Hz	<input checked="" type="checkbox"/> 16Vdc

Hardware information

Software (if applicable):	V. :	-
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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 mode 2	Permanent reception

Test	Running mode	
Occupied Bandwidth	<input checked="" type="checkbox"/> Test mode 1 (1)	<input type="checkbox"/> Alternative test mode()
Frequency Tolerance	<input checked="" type="checkbox"/> Test mode 1 (1)	<input type="checkbox"/> Alternative test mode()
AC Power Line Conducted Emission	<input checked="" type="checkbox"/> Test mode 1 (1)	<input type="checkbox"/> Alternative test mode()
Field strength within the band 13.110-14.010MHz	<input checked="" type="checkbox"/> Test mode 1 (1)	<input type="checkbox"/> Alternative test mode()
Field strength outside of the bands 13.110-14.010 MHz	<input checked="" type="checkbox"/> Test mode 1 (1)	<input type="checkbox"/> Alternative test mode()
Receiver Radiated Emissions	<input checked="" type="checkbox"/> Test mode 2 (2)	<input type="checkbox"/> Alternative test mode()

(1) Note: The test can't be performed because the transmitter and receiver are operating at the same frequency and the transmitter cannot be switched off as the carrier is used as receiver injection signal



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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 52.5dB μ V 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 dB μ V/m.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dB}\mu\text{V/m}$$

The 32 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32\text{dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}.$$

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 : Julien PALARD
Date of test : July 6, 2021
Ambient temperature : 25 °C
Relative humidity : 41 %

3.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In a climatic chamber
- In an anechoic chamber

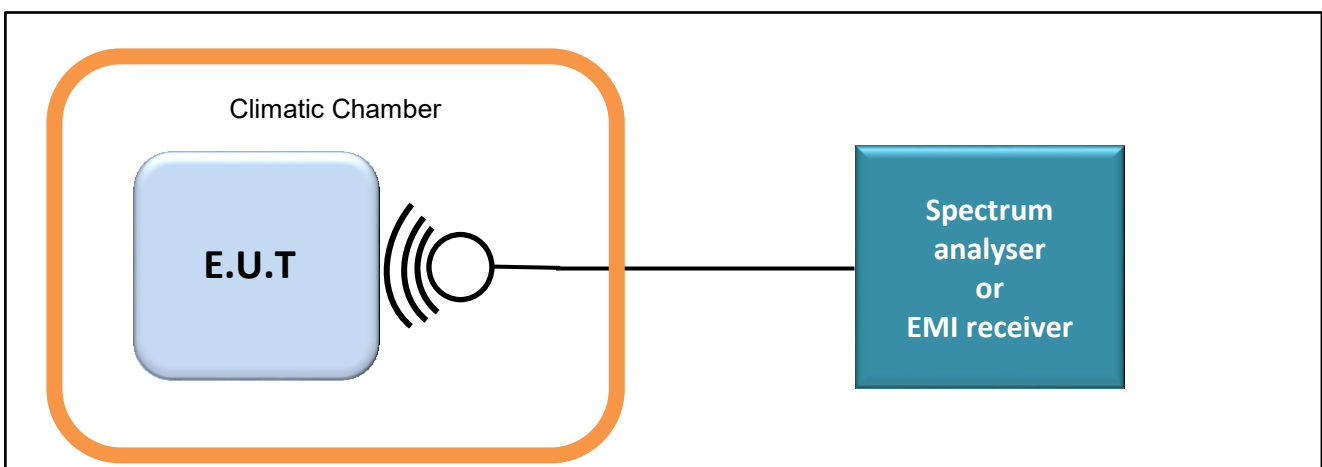
- Measurement is performed with a spectrum analyzer in:

- 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) $\geq 3 \times$ 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



Photograph for Occupied bandwidth



3.3. LIMIT

None

3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	SECASI	14M3	D10250259	See Hygrometer	See Hygrometer
Hygrometer	AOIP	TM360	B4041042	2021/04	2023/04
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2020/01	2022/01
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
Power supply	ROHDE & SCHWARZ	NGSM 32/10	A7040074	See Multimeter	See Multimeter
13,56MHz Test fixture Antenna	-	-	A5329422	See EMI Receiver	See EMI Receiver

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

4. 20dB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Julien PALARD
Date of test : July 6, 2021
Ambient temperature : 25 °C
Relative humidity : 41 %

4.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In a climatic chamber
- In an anechoic chamber

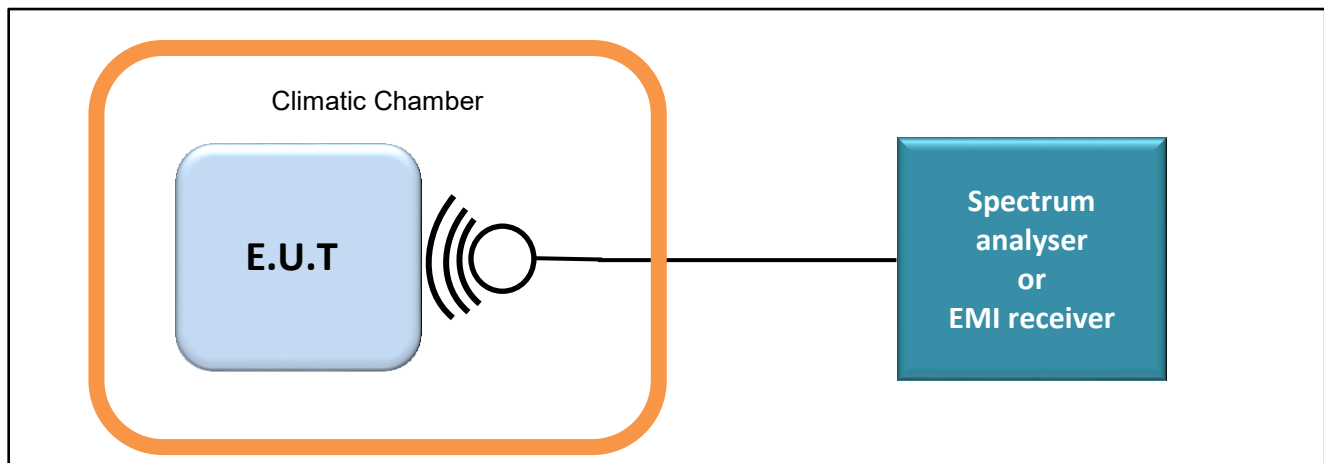
- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- ANSI C63.10 § 6.9.2:

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the frequency separation of two frequencies that were attenuated 20dB from the Peak Output Power level. A delta marker is used to measure the frequency difference as the emission bandwidth.



Test set up of 20dB Emission Bandwidth



Photograph for 20dB emission bandwidth



Photograph for 20dB emission bandwidth



4.3. LIMIT

No Limit

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	SECASI	14M3	D10250259	See Hygrometer	See Hygrometer
Hygrometer	AOIP	TM360	B4041042	2021/04	2023/04
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2020/01	2022/01
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
Power supply	ROHDE & SCHWARZ	NGSM 32/10	A7040074	See Multimeter	See Multimeter
13,56MHz Test fixture Antenna	-	-	A5329422	See EMI Receiver	See EMI Receiver

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

5. FREQUENCY TOLERANCE

5.1. TEST CONDITIONS

Test performed by : Julien PALARD
Date of test : July 6, 2021
Ambient temperature : 25 °C
Relative humidity : 41 %

5.2. TEST SETUP

- The Equipment Under Test is installed:

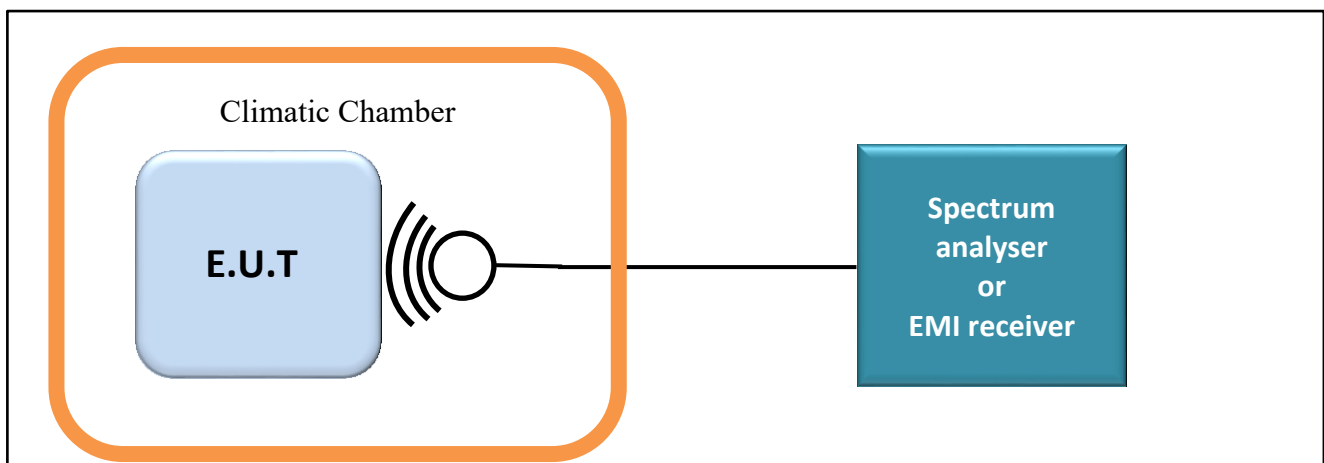
- On a table
- In a climatic chamber
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

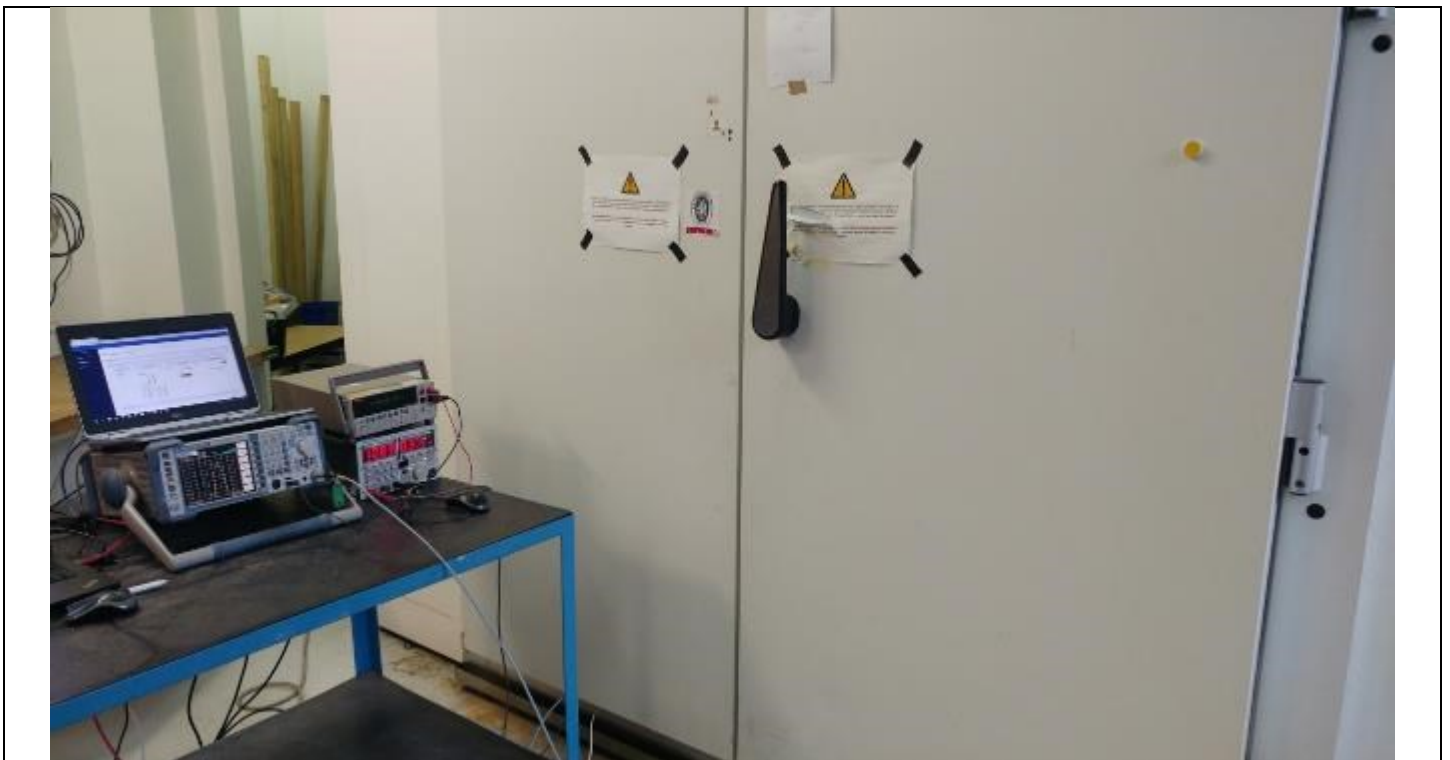
- ANSI C63.10 § 6.8



Test set up of Occupied Bandwidth



Photograph for Frequency Tolerance



Photograph for Frequency Tolerance



5.3. LIMIT

±0.01% (± 100ppm)

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Climatic chamber	SECASI	14M3	D10250259	See Hygrometer	See Hygrometer
Hygrometer	AOIP	TM360	B4041042	2021/04	2023/04
Spectrum analyzer	ROHDE & SCHWARZ	FSL6	A4060032	2020/01	2022/01
Multimeter	KEITHLEY	2000	A1242090	2021/03	2023/03
Power supply	ROHDE & SCHWARZ	NGSM 32/10	A7040074	See Multimeter	See Multimeter
13,56MHz Test fixture Antenna	-	-	A5329422	See EMI Receiver	See EMI Receiver

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



5.5. RESULTS

Results for DC Power Supply

Frequency	13,56									
EUT ACTIVATION	Start up									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602315	13,5603034	13,5603353	13,5603393	13,5603234	13,5602914	13,5602435	13,5602076	13,5601836	13,5601836
Frequency Drift (%)	0,0017	0,0022	0,0025	0,0025	0,0024	0,0021	0,0018	0,0015	0,0014	0,0014
EUT ACTIVATION	2min									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602515	13,5603074	13,5603393	13,5603353	13,5603154	13,5602794	13,5602355	13,5602076	13,5601836	13,5601836
Frequency Drift (%)	0,0019	0,0023	0,0025	0,0025	0,0023	0,0021	0,0017	0,0015	0,0014	0,0014
EUT ACTIVATION	5min									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602555	13,5603154	13,5603393	13,5603353	13,5603154	13,5602794	13,5602315	13,5602036	13,5601796	13,5601836
Frequency Drift (%)	0,0019	0,0023	0,0025	0,0025	0,0023	0,0021	0,0017	0,0015	0,0013	0,0014
EUT ACTIVATION	10min									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602555	13,5603154	13,5603393	13,5603353	13,5603154	13,5602794	13,5602315	13,5601996	13,5601796	13,5601836
Frequency Drift (%)	0,0019	0,0023	0,0025	0,0025	0,0023	0,0021	0,0017	0,0015	0,0013	0,0014

Voltage	Vmin	Vnom	Vmax
Temperature	Tnom		
Frequency (MHz)	13,5602754	13,5602794	13,5602754
Frequency Drift (%)	0,0020	0,0021	0,0020



Results for AC Power Supply

Frequency	13,56									
EUT ACTIVATION	Start up									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602415	13,5603094	13,5603368	13,5603346	13,5603284	13,5602879	13,5602465	13,5602115	13,5601875	13,5601798
Frequency Drift (%)	0,0018	0,0023	0,0025	0,0025	0,0024	0,0021	0,0018	0,0016	0,0014	0,0013
EUT ACTIVATION	2min									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602565	13,5603064	13,5603425	13,5603333	13,5603164	13,5602835	13,5602387	13,5602095	13,5601869	13,5601815
Frequency Drift (%)	0,0019	0,0023	0,0025	0,0025	0,0023	0,0021	0,0018	0,0015	0,0014	0,0013
EUT ACTIVATION	5min									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602565	13,5603134	13,5603425	13,5603333	13,5603174	13,5602856	13,5602329	13,560204	13,5601814	13,5601805
Frequency Drift (%)	0,0019	0,0023	0,0025	0,0025	0,0023	0,0021	0,0017	0,0015	0,0013	0,0013
EUT ACTIVATION	10min									
Voltage	Vnom									
Temperature	-30	-20	-10	0	10	20	30	40	50	55
Frequency (MHz)	13,5602565	13,5603054	13,5603435	13,5603343	13,5603183	13,5602827	13,5602345	13,5601856	13,5601823	13,5601845
Frequency Drift (%)	0,0019	0,0023	0,0025	0,0025	0,0023	0,0021	0,0017	0,0014	0,0013	0,0014

Voltage	Vmin	Vnom	Vmax
Temperature	Tnom		
Frequency (MHz)	13,5602796	13,5602825	13,5602785
Frequency Drift (%)	0,0021	0,0021	0,0021

5.6. CONCLUSION

Frequency tolerance measurement performed on the sample of the product **BIOLOG ID PRD-7150200A**, SN: **01BI2124000001**, in configuration and description presented in this test report, show levels **compliant** to the 47 CFR PART 15.225 & RSS 210 limits.

6. AC POWER LINE CONDUCTED EMISSIONS

6.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : June 28, 2021
 Ambient temperature : 21 °C
 Relative humidity : 48 %

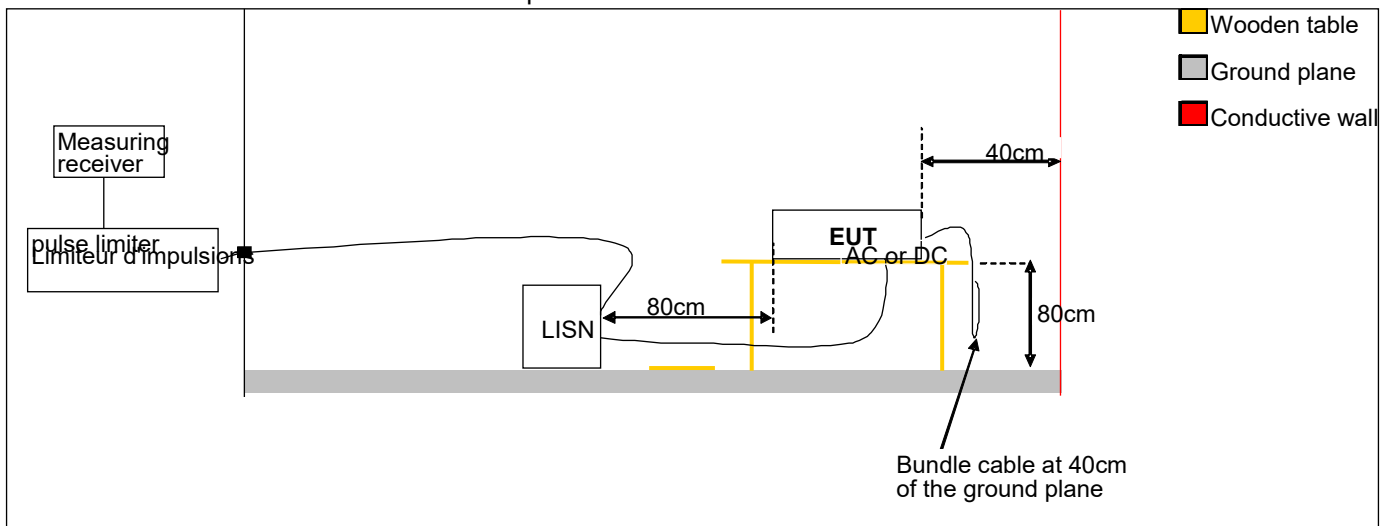
6.2. TEST SETUP

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:	
<input checked="" type="checkbox"/> AC / <input type="checkbox"/> DC (Auxiliary used)	<input checked="" type="checkbox"/> 120VAC/60Hz	<input checked="" type="checkbox"/> 240VAC/50Hz
<input type="checkbox"/> USB (Laptop auxiliary)	<input type="checkbox"/> 120VAC/60Hz (Laptop auxiliary)	<input type="checkbox"/> 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)

6.3. LIMIT

Frequency range	Level	Detector
0,15kHz to 0,5MHz	66dB μ V to 56 μ V*	QPeak
	56dB μ V to 46 μ V*	Average
0,5MHz to 5MHz	56dB μ V	QPeak
	46dB μ V	Average
5MHz to 30MHz	60B μ V	QPeak
	50dB μ V	Average

*Decreases with the logarithm of the frequency

6.4. TEST EQUIPMENT LIST

Test equipment used					
Description	Manufacturer	Model	Identifier	Last Calibration date	Calibration due date
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020-10	2022-10
V ISLN	ROHDE & SCHWARZ	ESH2-Z5	C2322002	2020-10	2021-10
Pulse limiter	ROHDE & SCHWARZ	ESH3-Z2	A2649008	2020-05	2021-05
Cable	-	-	A5329417	2020-12	2021-12
Cable	LCIE	-	A5329589	2020-11	2021-11
Reference ground plan 3 x 3m	L.C.I.E.	-	-	-	-

6.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

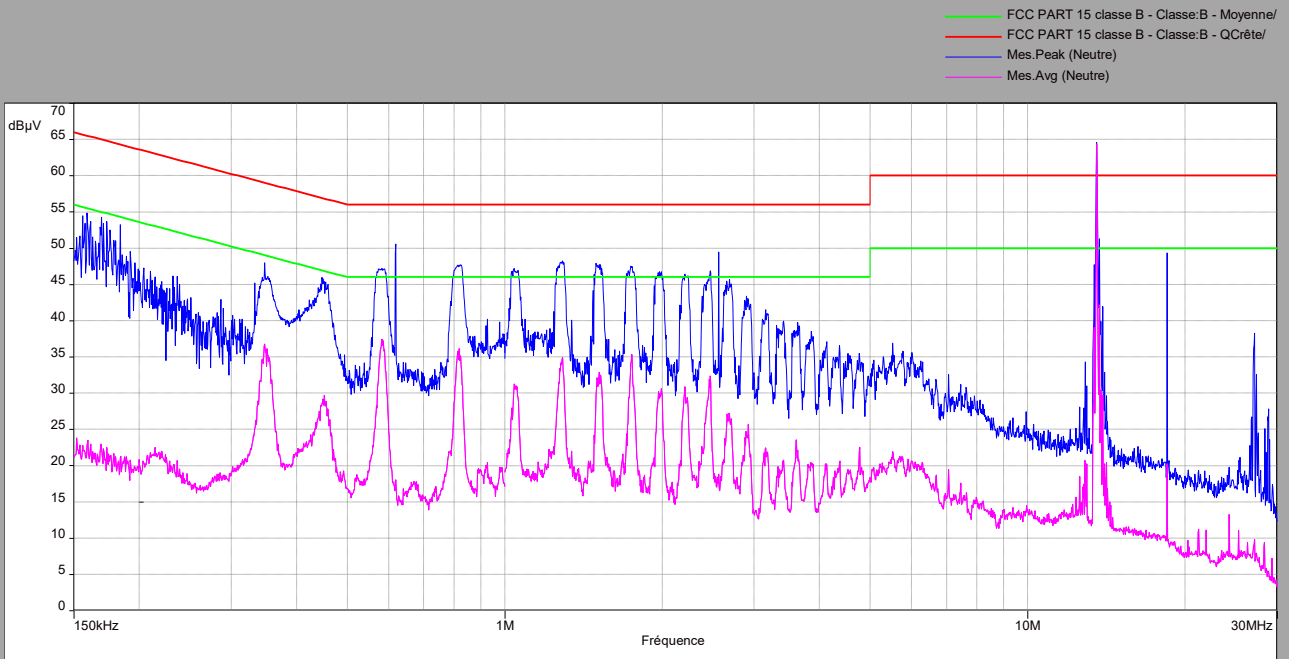
None Divergence:



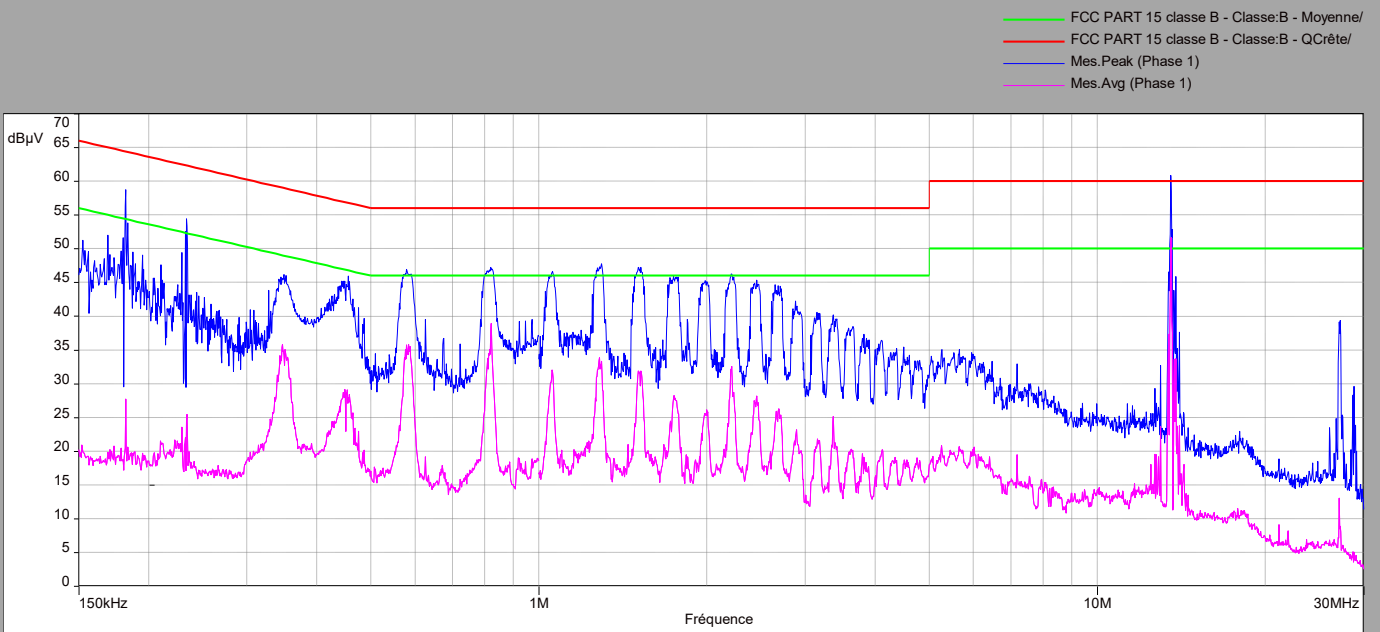
L C I E

6.6. RESULTS

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



Line 240V-50Hz





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,159	54,7	-	39,02	15,68	22,7	55,52	32,82
0,3475	47,7	-	44,42	3,28	35,05	49,02	13,97
0,6195	46,9	-	24,46	22,44	36,5	46	9,5
0,824	47,1	-	44,41	2,69	35,3	46	10,7
13,56	64,6	-	12,48	52,12	62,6	50	-12,6

Neutral Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,182	58	-	39,5	18,5	27	54,39	27,39
0,5745	47,7	-	42,32	5,38	34,4	46	11,6
0,821	46,62	-	44,22	2,4	39	46	7
13,53	60,37	-	50,05	10,32	51,6	50	-1,6
27,218	36,13	-	19,65	16,48	13	50	37

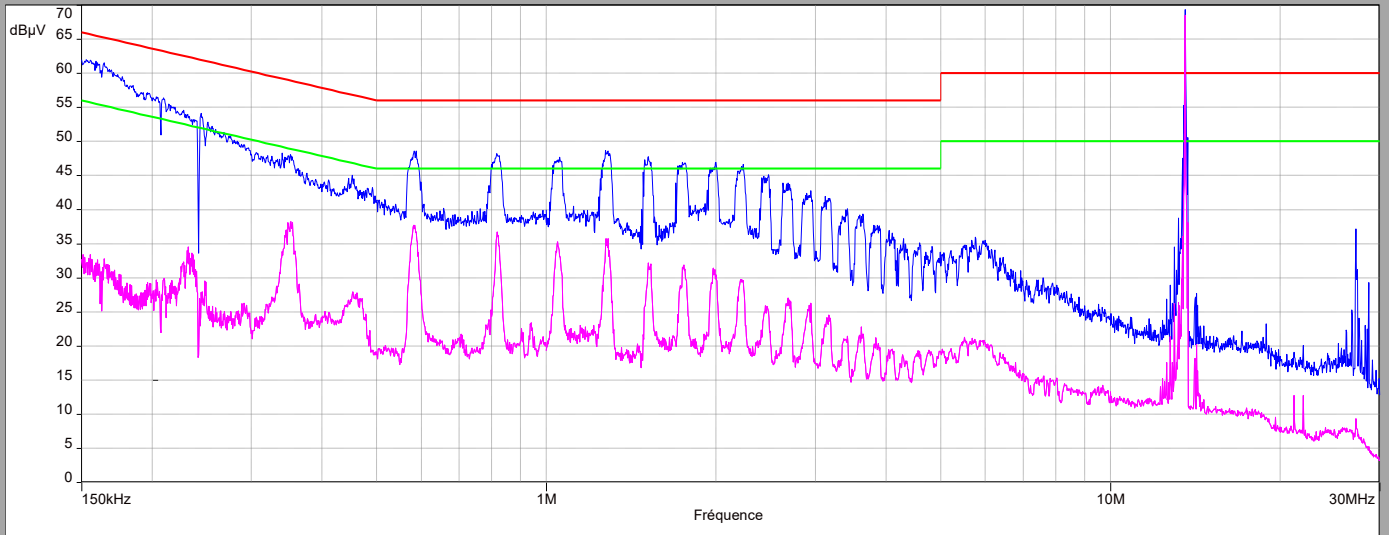


L C I E

AC Power Line Conducted Emission (with antenna)

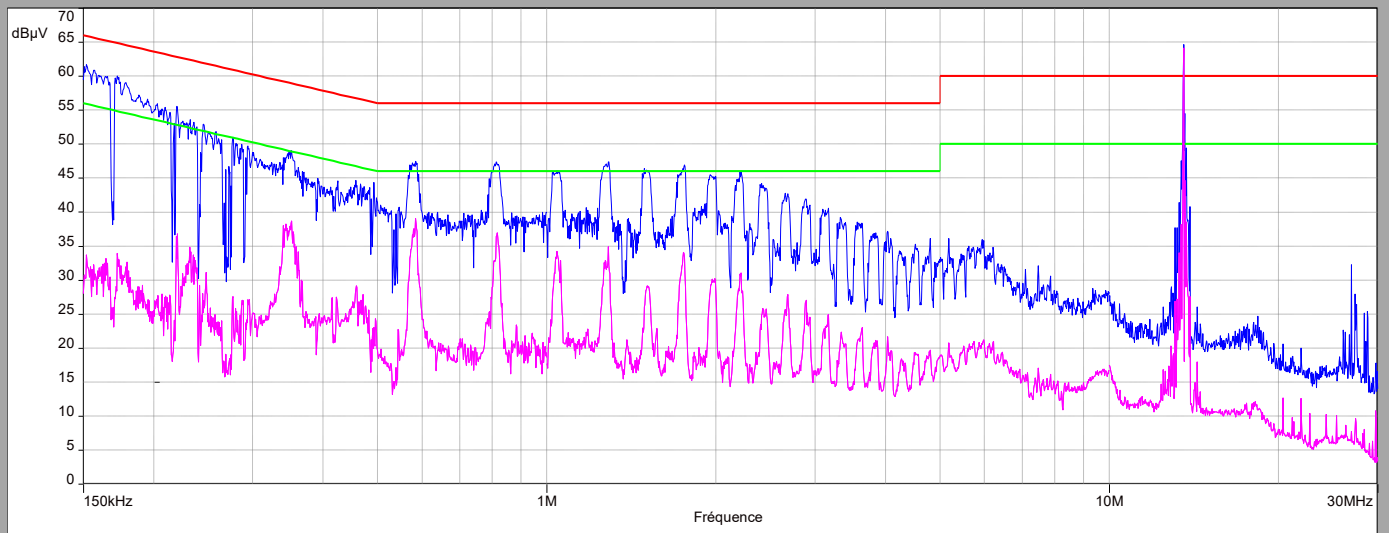
Phase 120V-60Hz

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



Line 120V-60Hz

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





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,153	58,46	-	52,78	5,68	31,32	55,84	24,52
0,8175	47,7	-	45,35	2,35	34,11	46	11,89
5,764	34,13	-	27,07	7,06	18,31	50	31,69
13,56	68,6	-	12,33	56,27	68,4	50	-18,4
27,12	37,2	-	19,18	18,02	10	50	40

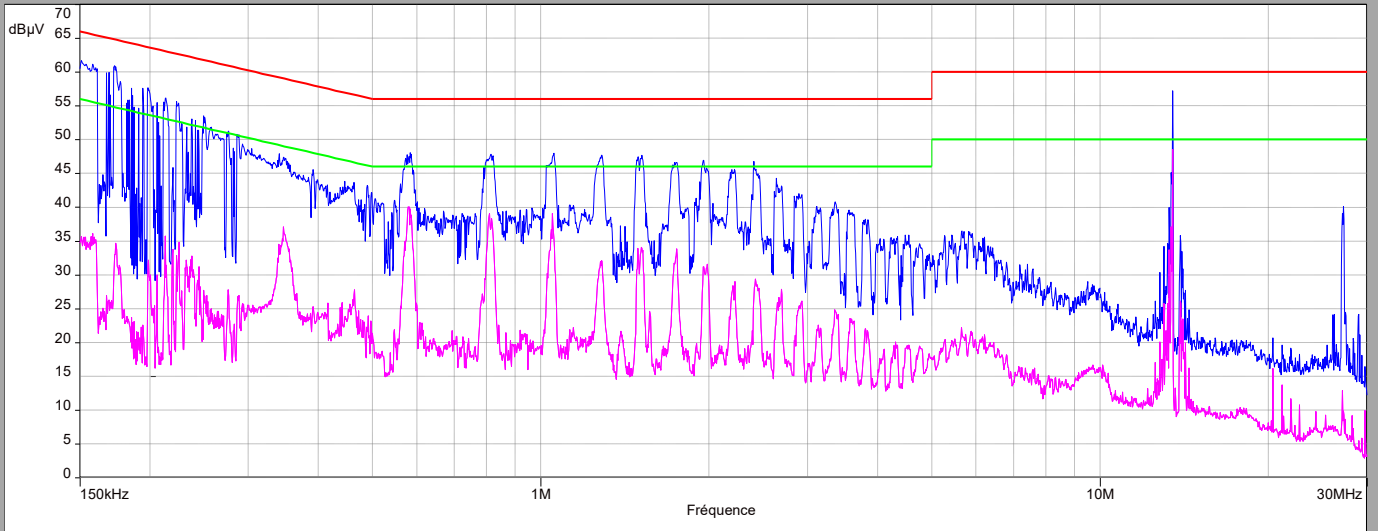
Neutral Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,219	55	-	62,8	-7,8	36,4	52,8	-16,4
0,584	46	-	56	-10	39	46	-7
1,042	46	-	56	-10	34	46	-12
1,75	46,3	-	60	-13,7	34	50	-16
13,496	64,3	-	60	4,3	64	50	14



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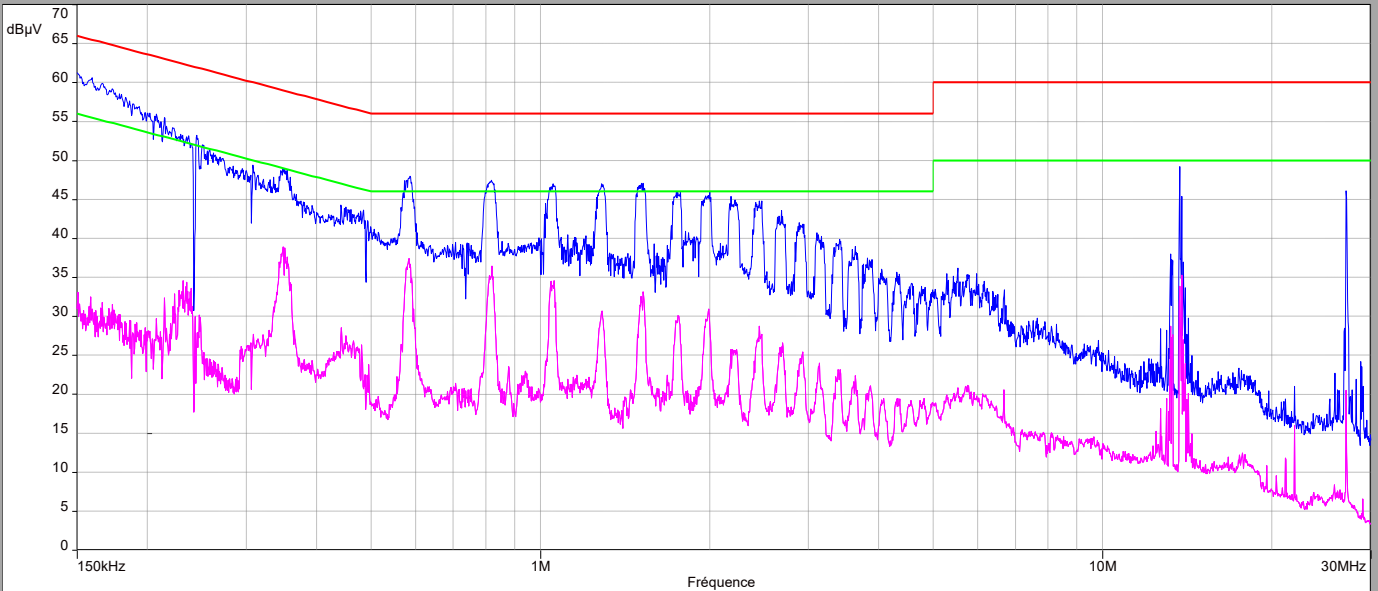
AC Power Line Conducted Emission (without antenna) Phase 120V-60Hz

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



Line 120V-60Hz

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





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Phase Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,15	57,92	-	52,03	5,89	30,93	56	25,07
0,573	47,7	-	41,34	6,36	37,1	46	-10,1
0,5865	47,48	-	44,57	2,91	34,68	46	11,32
0,818	46,47	-	44,23	2,24	31,73	46	14,27
13,56	48,94	-	40,97	7,97	35	50	15

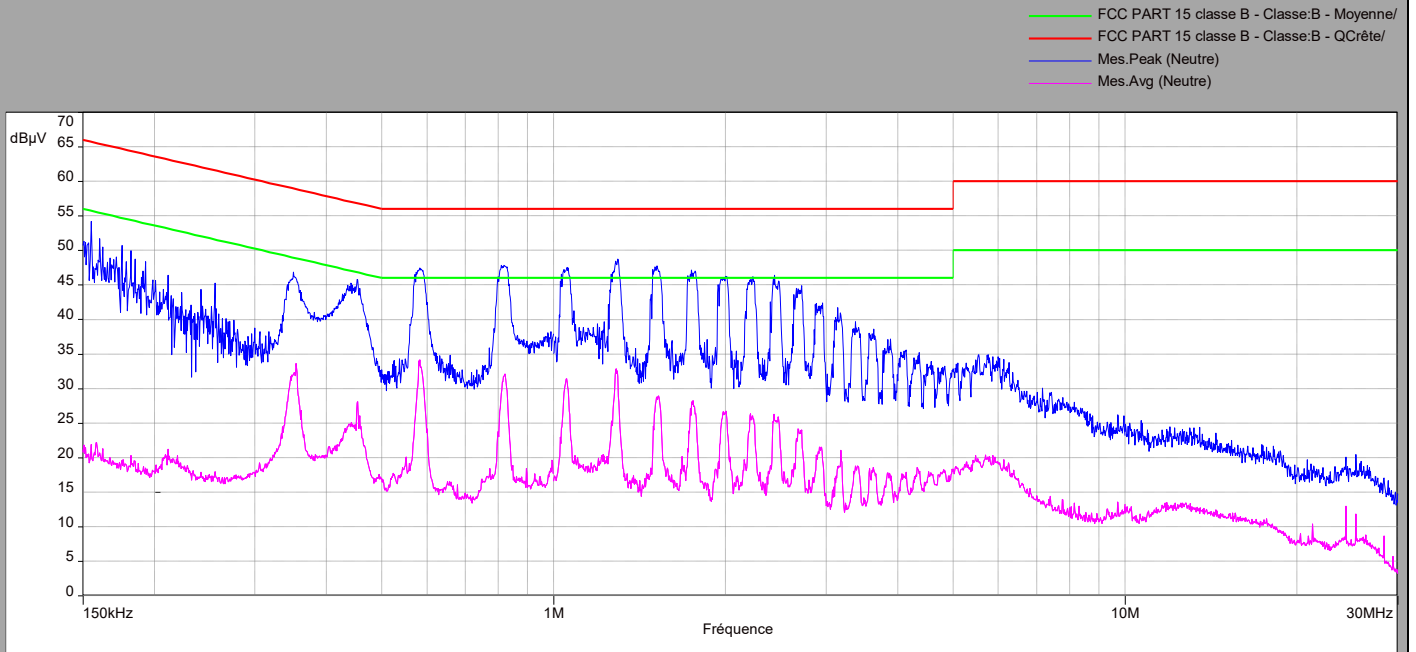
Neutral Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,151	58,09	-	65,94	-7,85	25,69	55,94	-30,25
0,584	47,55	-	56	-8,45	35,96	46	-10,04
1,056	46,94	-	56	-9,06	30,34	46	-15,66
5,664	33,87	-	60	-26,13	17,9	50	-32,1
13,56	57,2	-	60	-2,8	48,5	50	-1,5



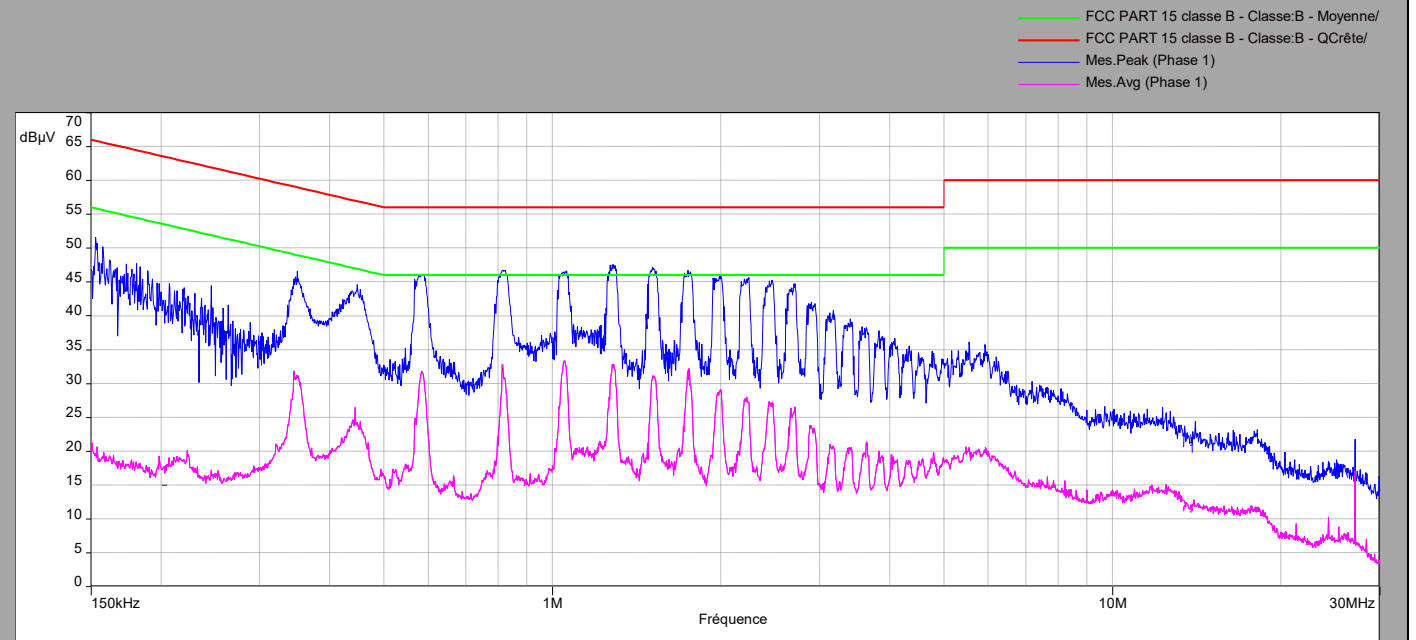
L C I E

AC Power Line Conducted Emission (without antenna)

Phase 240V-50Hz



Line 240V-50Hz





L C I E

Phase Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,155	49,35	-	36,65	12,7	18,61	55,73	37,12
0,3505	46,2	-	44,22	1,98	31,67	48,95	17,28
0,583	46,59	-	44,45	2,14	31,96	46	14,04
1,296	46,98	-	43,12	3,86	28,67	46	17,33
3,372	38,48	-	30,45	8,03	16,66	46	29,34

Neutral Line							
Frequency (MHz)	Peak Level (dB μ V)	Quasi-Peak Level (dB μ V)	Quasi-Peak Limit (dB μ V)	Margin Quasi-Peak (dB μ V)	Average Level (dB μ V)	Average Limit (dB μ V)	Margin Average (dB μ V)
0,159	46,9	-	35,05	11,85	17,33	55,52	38,19
0,5755	44,72	-	39,9	4,82	25,28	46	20,72
0,587	45,75	-	43,61	2,14	31,19	46	14,81
0,816	46,57	-	44,22	2,35	32,52	46	13,48
18,148	20,26	-	14,55	5,71	8,25	50	41,75

6.7. CONCLUSION

Ac Power Line Conducted Emission measurement performed on the sample of the product BIOLOG ID PRD-7150200A, SN: 01BI2124000001, 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 OUTSIDE OF THE BANDS 13.110-14.010 MHz

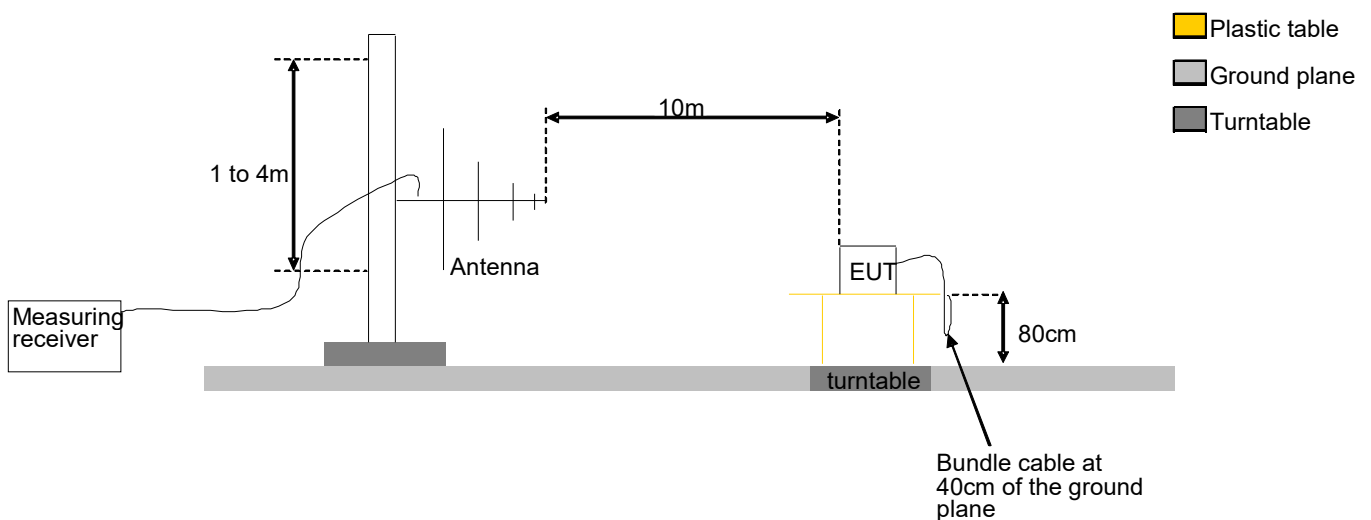
7.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : June 28, 2021 to June 29, 2021
 Ambient temperature : 21 °C
 Relative humidity : 49 %

7.2. 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	Above 1GHz
Antenna Polarization :	Parallel, Perpendicular And Ground parallel	Horizontal And Vertical	Horizontal And Vertical
Antenna Height :	1m	Varied from 1m to 4m	Varied from 1m to 4m
Antenna Type :	Loop	Bi-Log	Horn
RBW Filter :	200Hz below 150kHz 9kHz above 150kHz	120kHz	1MHz
Maximization :	Turntable rotation of 360 degrees range		
EUT height :	0.8m		1.5m
Test site :	Open Aera Test Site	Open Aera Test Site	Open Aera Test Site
Distance EUT-Antenna :	3m	10m	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



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



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7.3. LIMIT

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



7.4. TEST EQUIPMENT LIST

Test equipment used					
Description	Manufacturer	Model	Identifier	Last Calibration date	Calibration due date
Open test site	LCIE	-	F2000400	2021-02	2022-02
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020-10	2022-10
Cable	-	-	A5329442	2020-12	2021-12
Loop antenna	R&S	HFH2-Z2	C2040269	2020-09	2022-09
Cable	-	-	A53291007	2021-02	2022-02
Antenne bilog	CHASE	CBL 6112A	C2040040	2021-04	2022-04
Cable	-	-	A5329876	2020-12	2021-12
Cable	-	-	A5329449	2020-12	2021-12
Signal Generator	R&S	SMR20	A5444002	2020-07	2022-07
Cable	-	-	A5329542	2020-11	2021-11
Antenne cornet	EMCO	.3115	C2042016	2021-04	2023-04
Preamplifier	HP	8449B	A4069002	2020-09	2022-09

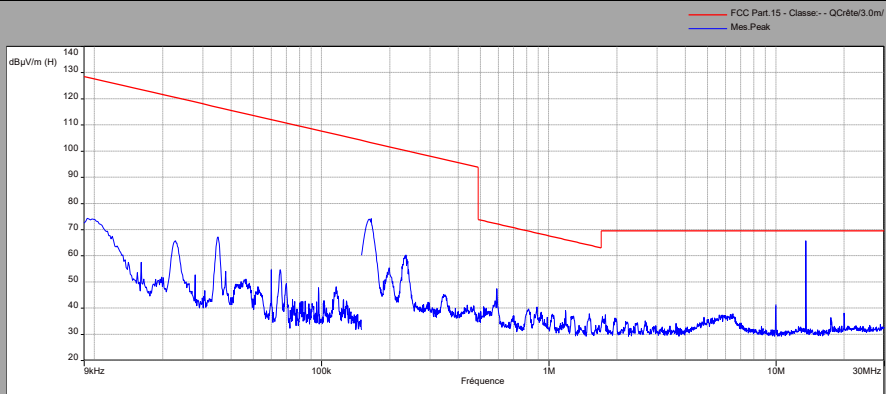
Note: In our quality system, the test equipment calibration due is more & less 2 months

7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

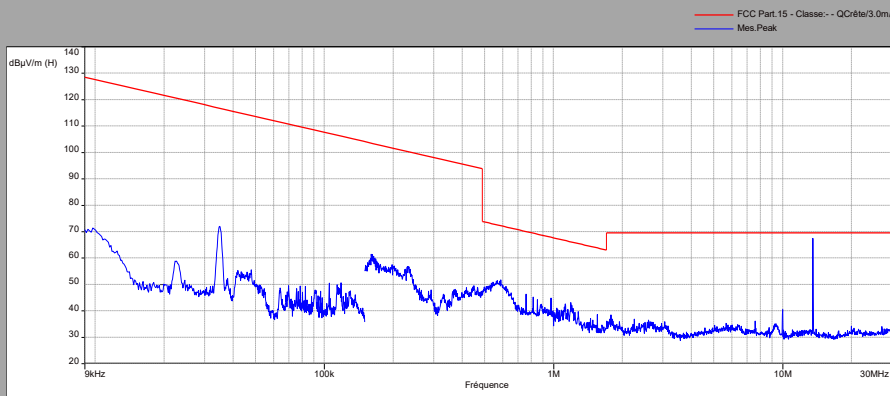
None Divergence:

7.6. RESULTS

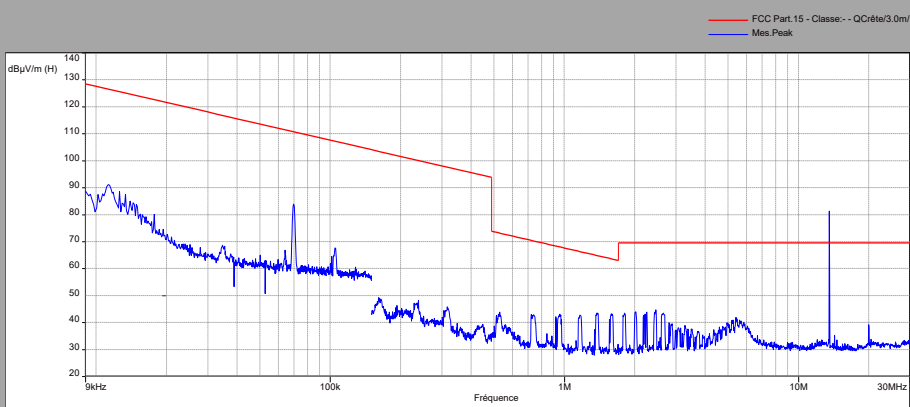
9kHz to 30MHz Parallel Axis



Perpendicular Axis



Ground Parallel Axis



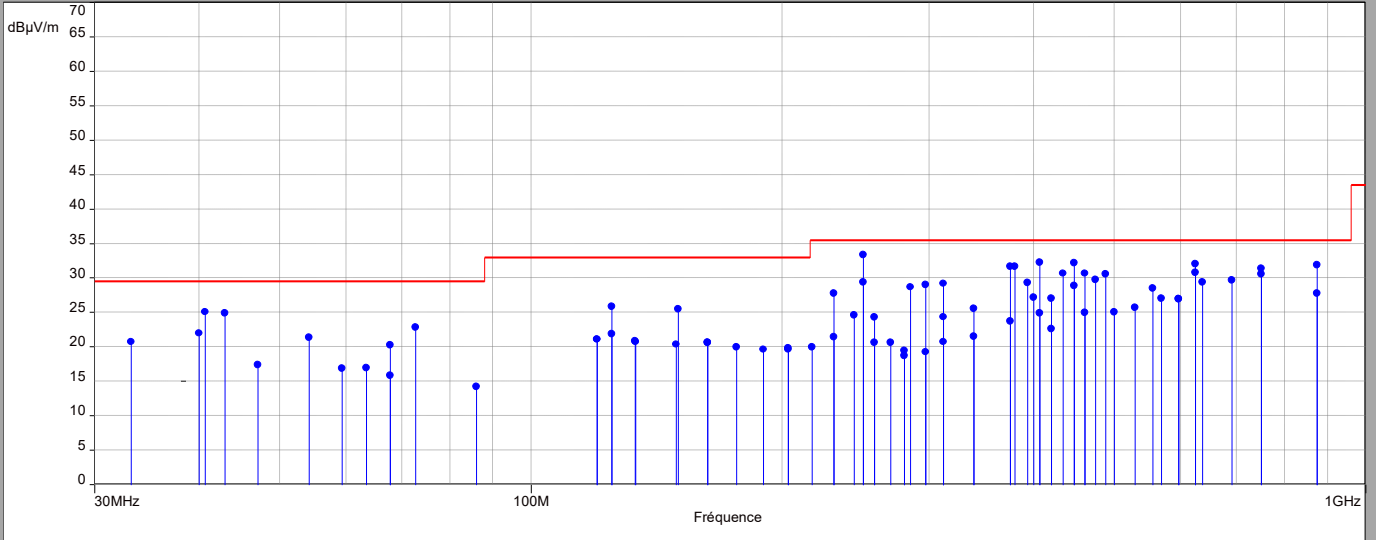


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30MHz to 1GHz

Vertical & horizontal Polarization

- FCC Part 15 (intentional radiator) §209 - Classe:- - QCrête/10.0m/
- Mes.Q-Peak (Mes. Q-Peak) (Verticale)
- Mes.Q-Peak (Mes. Q-Peak) (Horizontale)





Final measurement:

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

Final measurement:

	Frequency (MHz)	level (dB μ V/m)	limit FCC class B	Margin Fcc Part class B
vertical	40.67	25.1	29.5	4.4
vertical	125.00	25.85	33	7.15
vertical	375.01	31.68	35.5	3.82
vertical	406.80	32.28	35.5	3.22
vertical	625.02	32.03	35.5	3.47
horizontal	250.01	33.36	35.5	2.14
horizontal	447.49	32.15	35.5	3.35
horizontal	750.03	31.34	35.5	4.16
horizontal	875.00	31.9	35.5	3.6

Above 1GHz, all emissions were greater than 20 dB below the limit.

7.7. CONCLUSION

Field strength outside of the bands 13.110-14.010 MHz measurement performed on the sample of the product BIOLOG ID PRD-7150200A, SN: 01BI2124000001, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.225 & RSS-Gen limits.

8. FIELD STRENGTH WITHIN THE BAND 13.110-14.010MHz

8.1. TEST CONDITIONS

Test performed by : Laurent DENEUX
 Date of test : June 28, 2021
 Ambient temperature : 21 °C
 Relative humidity : 48 %

8.2. TEST SETUP

Measurement procedure:

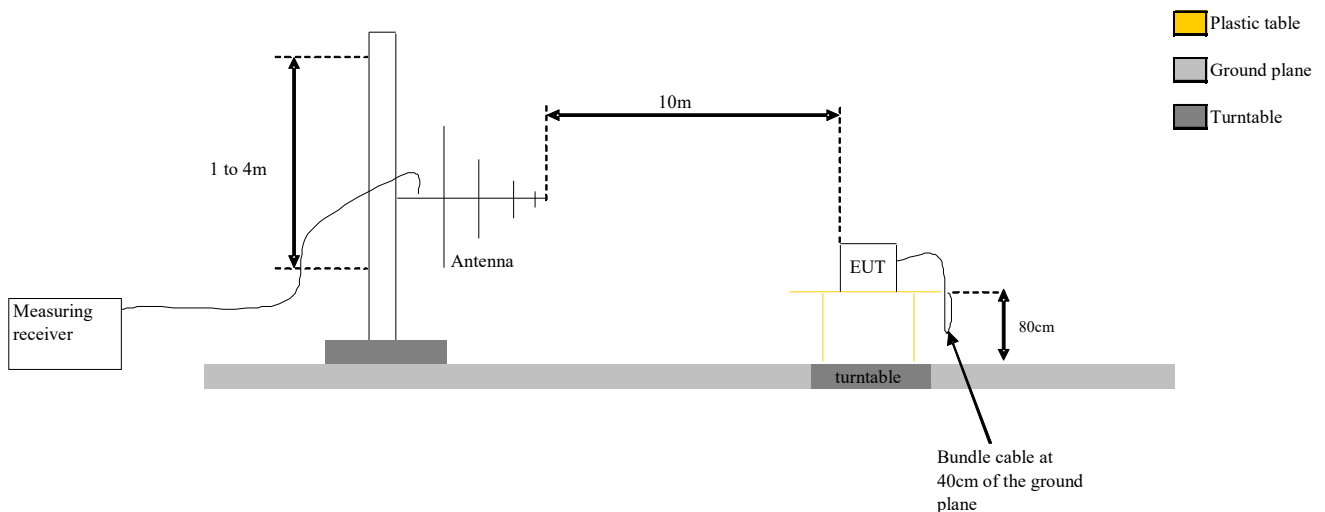
- Open Area Test Site
- Open Area Test Site + Test fixture in climatic chamber

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.



Photograph for Field strength within the band 13.110-14.010MHz



8.3. LIMIT

Frequency (MHz)	Field strength ($\mu\text{V/m}$) @30m	Field strength ($\text{dB}\mu\text{V/m}$) @30m	Field strength ($\text{dB}\mu\text{V/m}$) @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

8.4. TEST EQUIPMENT LIST

Test equipment used					
Description	Manufacturer	Model	Identifier	Last Calibration date	Calibration due date
Open test site	LCIE	-	F2000400	2021-02	2022-02
EMI Test Receiver	ROHDE & SCHWARZ	ESU	A2642018	2020-10	2022-10
Cable	-	-	A5329442	2020-12	2021-12
Loop antenna	R&S	HFH2-Z2	C2040269	2020-09	2022-09
Cable	-	-	A53291007	2021-02	2022-02

8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None Divergence:

8.6. RESULTS

Parallel Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	31.2	69.5
13.110 to 13.410	-	35.4	80.5
13.410 to 13.553	-	45.1	90.5
13.553 to 13.567	-	72.3	124.0
13.567 to 13.710	-	42.4	90.5
13.710 to 14.010	-	35.6	80.5
Above 14.010	-	30.4	69.5

Ground Parallel Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	32.1	69.5
13.110 to 13.410	-	34.5	80.5
13.410 to 13.553	-	44.8	90.5
13.553 to 13.567	-	73.2	124.0
13.567 to 13.710	-	46.2	90.5
13.710 to 14.010	-	34.5	80.5
Above 14.010	-	31.8	69.5

Perpendicular Axis			
Frequency (MHz)	Peak Level (dB μ V/m) (3m)	QPeak Level (dB μ V/m) (3m)	Limit (dB μ V/m) (3m)
Below 13.110	-	30.3	69.5
13.110 to 13.410	-	34.5	80.5
13.410 to 13.553	-	39.8	90.5
13.553 to 13.567	-	62.3	124
13.567 to 13.710	-	40.1	90.5
13.710 to 14.010	-	33.6	80.5
Above 14.010	-	29.8	69.5

8.7. CONCLUSION

Field strength within the band 13.110-14.010MHz measurement performed on the sample of the product BIOLOG ID PRD-7150200A, SN: 01BI2124000001, in configuration and description presented in this test report, show levels compliant to the 47 CFR PART 15.225 & RSS 210 limits.

9. 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