



LCIE

# TEST REPORT

N°:150236-708356-A(FILE#970100)

Version : 02

**Subject** Electromagnetic compatibility and Radio spectrum Matters (ERM) tests according to standards:  
FCC CFR 47 Part 15, Subpart C  
RSS-247 Issue 2.0

**Issued to** OENONEO  
8 Chemin de l'Eglise  
38660 – Sainte Marie d'Alloix  
France

## Apparatus under test

↳ Product Wine Scanner  
↳ Trade mark MyOeno  
↳ Manufacturer SELNI EPIERRE  
↳ Model under test MyOeno Scan  
↳ Serial number MOS17070001  
↳ FCCID 2AM6Z-8385OENO

## Conclusion

See Test Program chapter

## Test date

August 31, 2017 to September 4, 2017

## Test location

MOIRANS

## IC Test site

6500A-1

## Composition of document

37 pages

**Document issued on** October 16, 2017

## Written by :

Gaetan DESCHAMPS

Tests operator

## Approved by :

Anthony MERLIN

Technical manager



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**LCIE**

Laboratoire Central des Industries Electriques  
Une société de Bureau Veritas

ZI Centr'Alp

170 rue de Chatagnon  
38430 Moirans FRANCE

Tél : +33 4 76 07 36 36

contact@lcie.fr  
www.lcie.fr



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## PUBLICATION HISTORY

Version	Date	Author	Modification
01	October 4, 2017	Gaetan DESCHAMPS	Creation of the document
02	October 16, 2017	Gaetan DESCHAMPS	Adding information about FCCID



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## 1. TEST PROGRAM

**Standard:**

- FCC Part 15, Subpart C 15.247
- ANSI C63.10 (2013)
- RSS-247 Issue 2.0
- RSS-Gen Issue 4
- 558074 D01 DTS Measurement Guidance v04

EMISSION TEST	LIMITS			RESULTS
	Frequency	Quasi-peak value (dB $\mu$ V)	Average value (dB $\mu$ V)	
Limits for conducted disturbance at mains ports 150kHz-30MHz	150-500kHz	66 to 56	56 to 46	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
	0.5-5MHz	56	46	
	5-30MHz	60	50	
Radiated emissions 9kHz-30MHz CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5	<b>Measure at 300m</b> 9kHz-490kHz : 67.6dB $\mu$ V/m /F(kHz) <b>Measure at 30m</b> 490kHz-1.705MHz : 87.6dB $\mu$ V/m /F(kHz) 1.705MHz-30MHz : 29.5 dB $\mu$ V/m			<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP
Radiated emissions 30MHz-25GHz* CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5 <b>Highest frequency :&lt;100MHz</b> (Declaration of provider)	<b>Measure at 3m</b> 30MHz-88MHz : 40 dB $\mu$ V/m 88MHz-216MHz : 43.5 dB $\mu$ V/m 216MHz-960MHz : 46.0 dB $\mu$ V/m Above 960MHz : 54.0 dB $\mu$ V/m			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Bandwidth 6dB CFR 47 §15.247 (a) (2) RSS-247 §5.2	<b>At least 500kHz</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Power spectral Density CFR 47 §15.247 (e) RSS-247 §5.2	<b>Limit: 8dBm/3kHz</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Maximum Peak Output Power CFR 47 §15.247 (b) RSS-247 §5.4	<b>Limit: 30dBm</b> Conducted or Radiated measurement			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Band Edge Measurement CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5	<b>Limit: -20dBc or</b> <b>Radiated emissions limits in restricted bands</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Occupied bandwidth RSS-Gen §4.6.1	<b>No limit</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Receiver Spurious Emission** RSS-Gen §4.10	<b>See RSS-Gen §4.10</b>			<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP

\*§15.33: The highest internal source of a testing device is defined like more the highest frequency generated or used in the testing device or on which the testing device works or agrees.

- If the highest frequency of the internal sources of the testing device is lower than 108 MHz, measurement must be only performed until 1GHz.
- If the highest frequency of the internal sources of the testing device ranges between 108 MHz and 500 MHz, measurement must be only performed until 2GHz.
- If the highest frequency of the internal sources of the testing device ranges between 500 MHz and 1 GHz, measurement must be only performed until 5GHz.

If the highest frequency of the internal sources of the testing device is above 1 GHz, measurement must be only performed until 5 times the highest frequency or 40 GHz, while taking smallest of both.

\*\*Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.



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## 2. SYSTEM TEST CONFIGURATION

### 2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

#### Equipment under test (EUT):

MyOeno Scan

Serial Number: MOS17070001



Photography of EUT

#### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 3.7VDC

For measurement with different voltage, it will be presented in test method.

Name	Type	Rating	Reference / Sn	Comments
Supply1	<input type="checkbox"/> AC <input type="checkbox"/> DC <input checked="" type="checkbox"/> Battery	3.7Vdc / 360mAh / 1.33Wh	KINETIC : LIP501646	



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**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Access1	μUSB	0.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

**Equipment information:**

Bluetooth LE Type:	<input checked="" type="checkbox"/> BLE	<input type="checkbox"/> v4.0	<input type="checkbox"/> v4.1	<input checked="" type="checkbox"/> v4.2
Frequency band:		[2400 – 2483.5] MHz		
Spectrum Modulation:		<input checked="" type="checkbox"/> DSSS (Tested like it)		
Number of Channel:		40		
Spacing channel:		2MHz		
Channel bandwidth:		1MHz		
Antenna Type:	<input checked="" type="checkbox"/> Integral	<input type="checkbox"/> External	<input type="checkbox"/> Dedicated	
Antenna connector:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Temporary for test	
Transmit chains:		1	Single antenna	
			Gain: 1.6dBi	
Beam forming gain:		No		
Receiver chains		1		
Type of equipment:	<input checked="" type="checkbox"/> Stand-alone	<input type="checkbox"/> Plug-in	<input type="checkbox"/> Combined	
Ad-Hoc mode:	<input type="checkbox"/> Yes		<input checked="" type="checkbox"/> No	
Adaptivity mode:	<input type="checkbox"/> Yes (Load Based)	<input type="checkbox"/> Off mode	<input checked="" type="checkbox"/> No	
		Clear Channel Assessment Time:		Xμs
Duty cycle:	<input type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input checked="" type="checkbox"/> 100% duty	
Equipment type:	<input type="checkbox"/> Production model		<input type="checkbox"/> Pre-production model	
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input type="checkbox"/> 0°C	<input checked="" type="checkbox"/> 5°C
	Tnom:		20°C	
	Tmax:	<input checked="" type="checkbox"/> 35°C	<input type="checkbox"/> 55°C	<input type="checkbox"/> X°C
Type of power source:	<input type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input checked="" type="checkbox"/> Battery	
Operating voltage range:	Vnom:	<input type="checkbox"/> 230V/50Hz	<input checked="" type="checkbox"/> 5Vdc	



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#### CHANNEL PLAN

Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>Cmin: 0</b>	2402	<b>Cmid: 20</b>	2442
1	2404	21	2444
2	2406	22	2446
3	2408	23	2448
4	2410	24	2450
5	2412	25	2452
6	2414	26	2454
7	2416	27	2456
8	2418	28	2458
9	2420	29	2460
10	2422	30	2462
11	2424	31	2464
12	2426	32	2466
13	2428	33	2468
14	2430	34	2470
15	2432	35	2472
16	2434	36	2474
17	2436	37	2476
18	2438	38	2478
19	2440	<b>Cmax: 39</b>	2480

#### DATA RATE

Data Rate (Mbps)	Modulation Type	Worst Case Modulation
1	GFSK	<input checked="" type="checkbox"/>



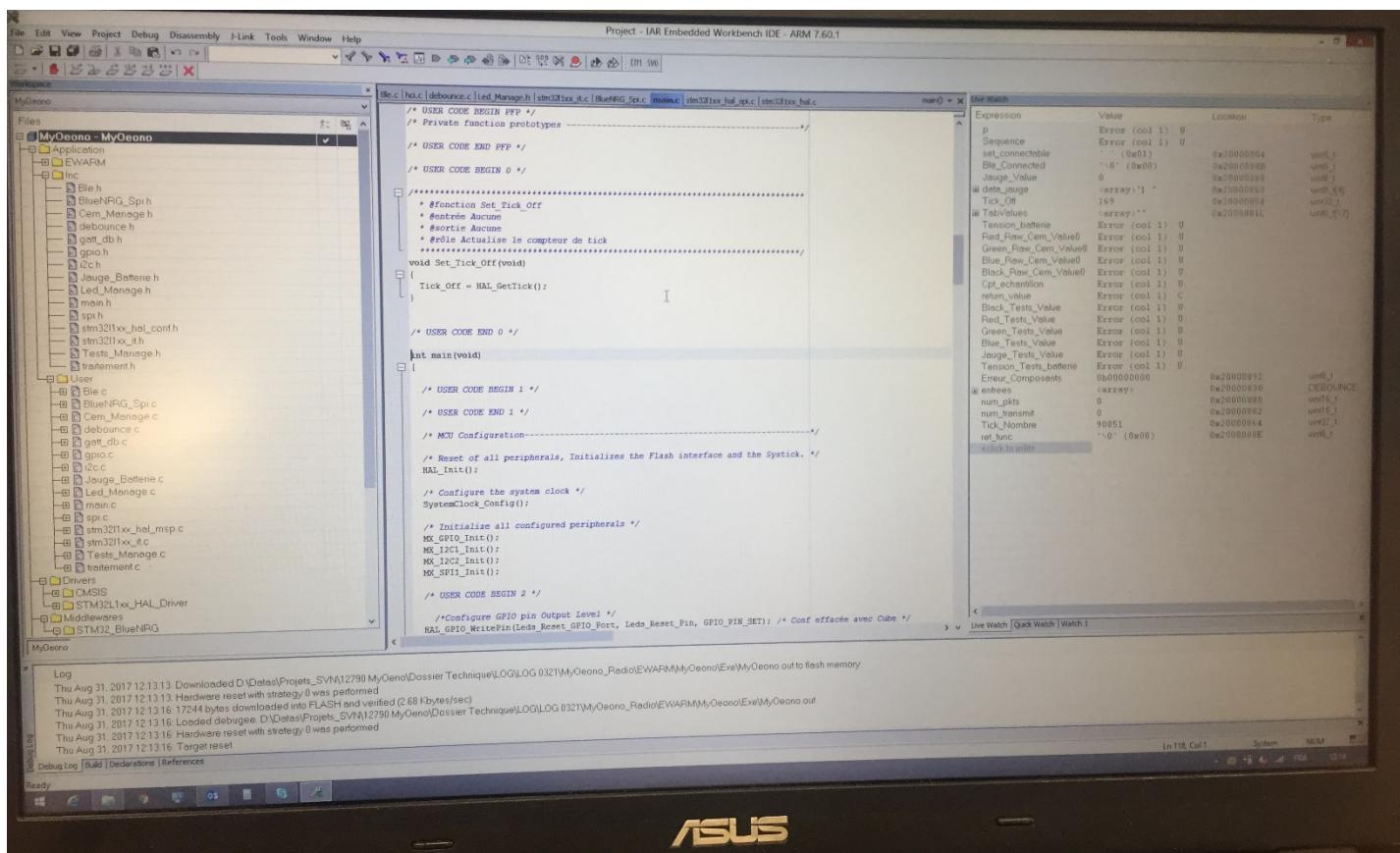
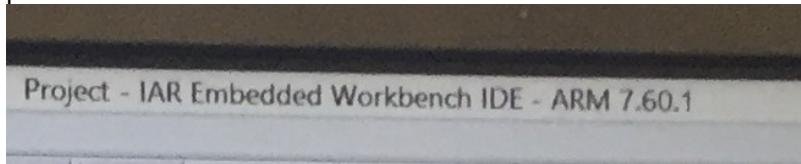
## 2.2. EUT CONFIGURATION

The EUT is set in the following modes during tests with simulator / software (v....):

- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception

All tests are performed at Cmin, Cmid and Cmax.

Following commands with the specific test software “IAR Embedded Workbench IDE – ARM 7.60.1 ” are used to set the product:



## 2.3. EQUIPMENT MODIFICATIONS

None

Modification:



## 2.4. 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 $\mu$ 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 $\mu$ V/m.

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

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

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

## 2.5. 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. CONDUCTED EMISSION DATA

#### 3.1. ENVIRONMENTAL CONDITIONS

Date of test : August 31, 2017 & September 4, 2017  
 Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
 Atmospheric pressure (hPa) : 995 - 998  
 Relative humidity (%) : 42 - 39  
 Ambient temperature (°C) : 23 - 24

#### 3.2. TEST SETUP

##### **Mains terminals**

The EUT and auxiliaries are set:

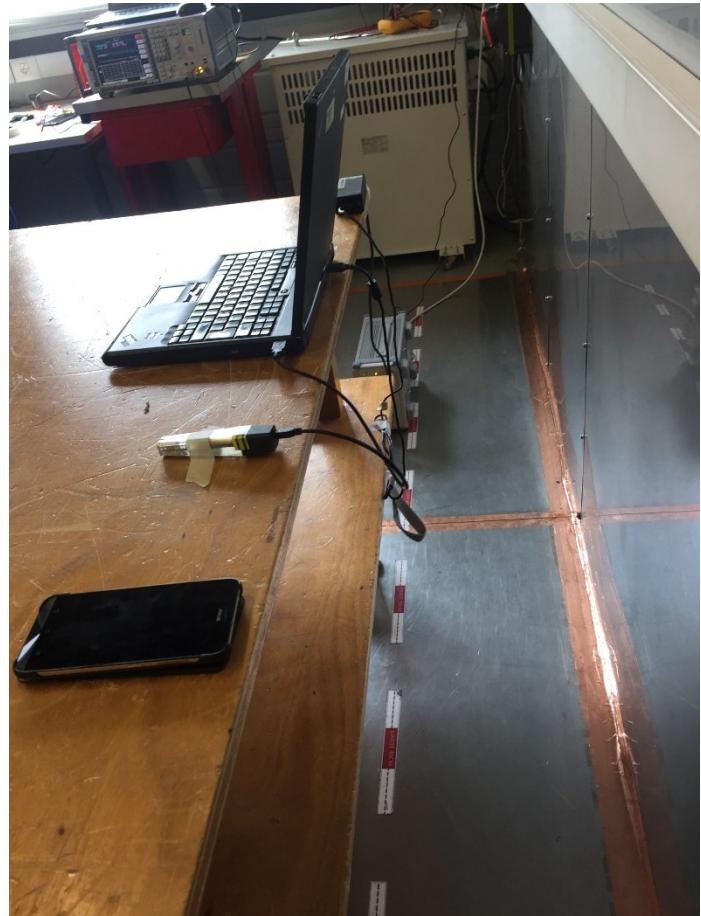
80cm above the ground on the non-conducting table (Table-top equipment)

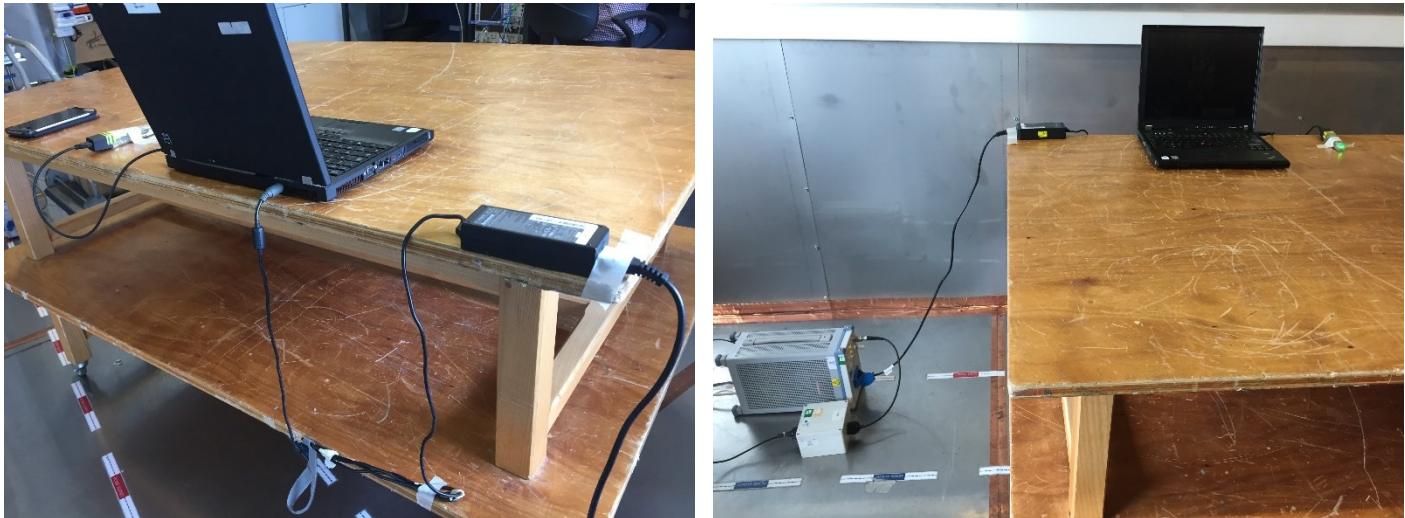
10cm above the ground on isolating support (Floor standing equipment)

The distance between the EUT and the LISN is 80cm. The EUT is 40cm away for the vertical ground plane.

The EUT is powered by  $V_{nom}$ .

The EUT is powered through a LISN (measure). Auxiliaries are powered by another LISN.





Test setup

### 3.3. TEST METHOD

The product has been tested according to ANSI C63.10 and FCC Part 15 subpart C. The product has been tested with 120V/60Hz power line voltage and compared to the FCC Part 15 limits. Measurement bandwidth was 9kHz from 150kHz to 30MHz. 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. The Peak data are shown on plots in annex 1. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured. Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

Measurements are performed on the phase (L1) and neutral (N) of power line voltage. Graphs are obtained in PEAK detection. Measures are also performed in Quasi-Peak and Average for any strong signal.

### 3.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable + self	-	-	A5329585	07/17	07/18
EMC comb generator	LCIE SUD EST	-	A3169098	-	-
LISN	RHODE & SCHWARZ	ENV216	C2320291	12/16	12/17
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	08/16	08/17
BAT EMC	NEXIO	v3.9.0.10	L1000115	-	-
Thermo-hygrometer	OREGON	BAR916	B4206011	10/16	10/17
Transient limiter	RHODE & SCHWARZ	ESH3-Z2	A7122204	01/17	01/18

### 3.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:



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### 3.6. TEST RESULTS

Measurements are performed on the phase (L1) and neutral (N) of the power line.

#### Results: (PEAK detection)

Measure on L1:

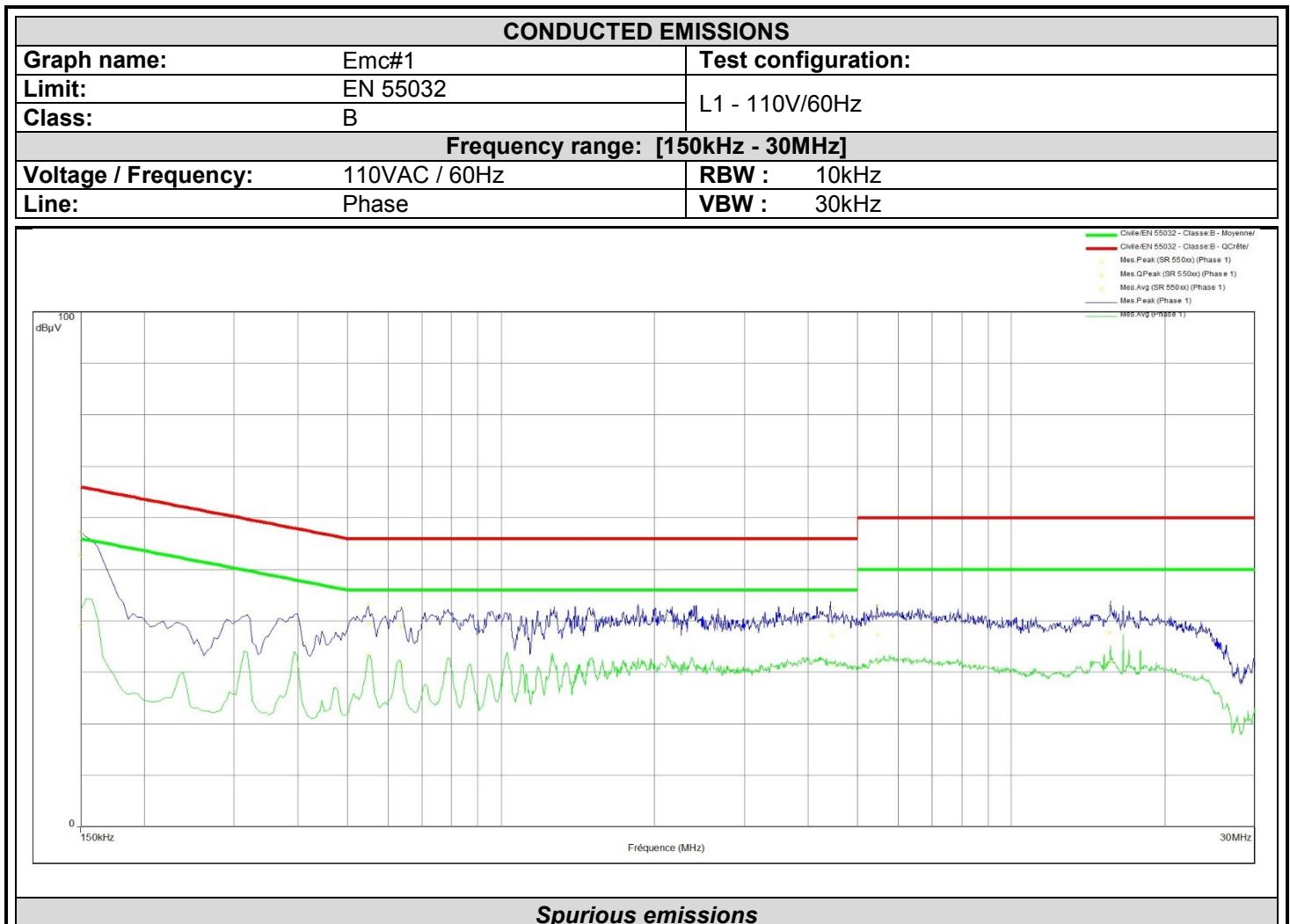
graph **Emc#1**

(see annex 1)

Measure on N:

graph **Emc#2**

(see annex 1)



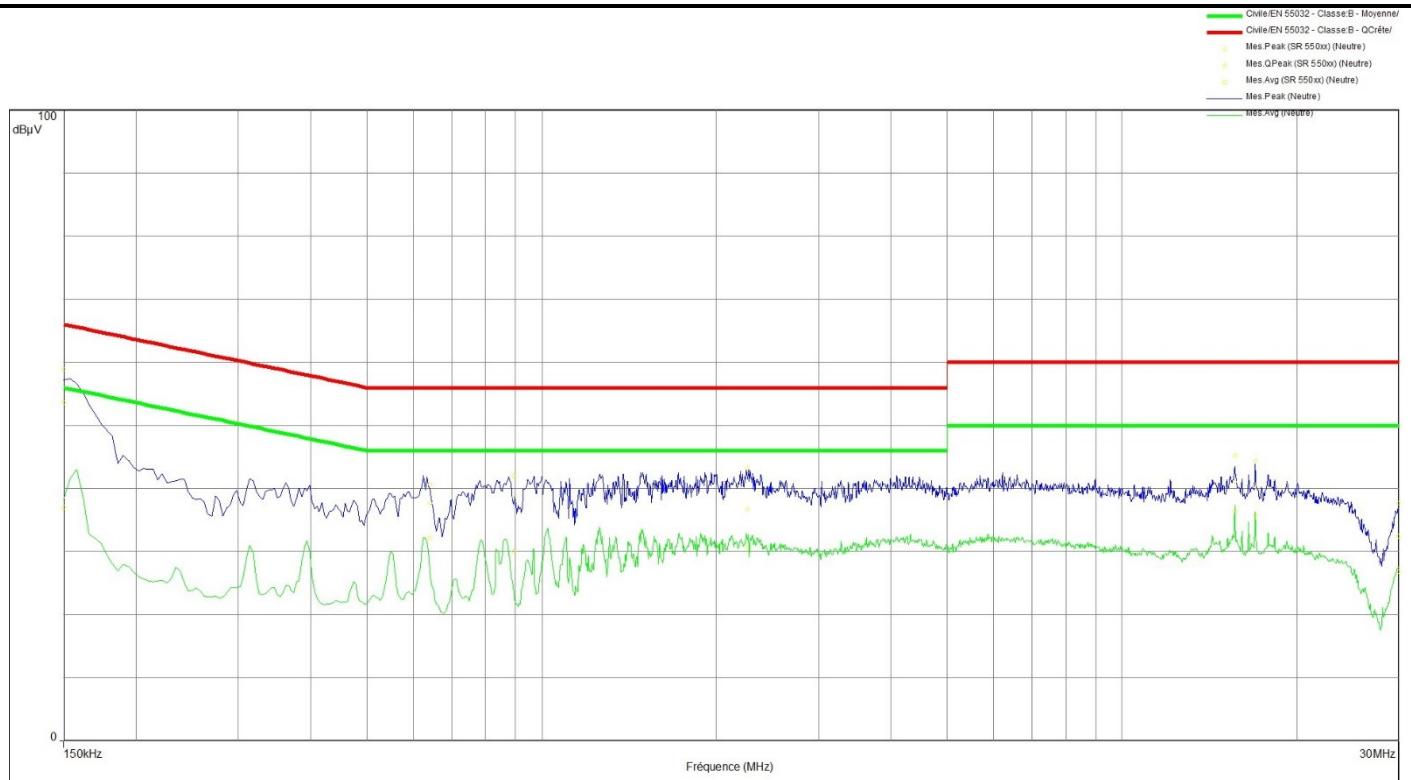
Frequency (MHz)	Mes. Peak (dB $\mu$ V)	Mes.QPeak (dB $\mu$ V)	LimQP (dB $\mu$ V)	Mes.QPeak-LimQP (dB)	Mes.Avg (dB $\mu$ V)	LimAvg (dB $\mu$ V)	Mes.Avg-LimAvg (dB)	Line
0.150	57.2	52.8	66.0	-13.2	39.2	56.0	-16.8	Phase 1
0.550	43.3	39.4	56.0	-16.6	33.5	46.0	-12.5	Phase 1
0.638	42.5	38.8	56.0	-17.2	31.2	46.0	-14.8	Phase 1
4.455	42.3	37.3	56.0	-18.7	31.5	46.0	-14.5	Phase 1
5.462	42.9	37.3	60.0	-22.7	31.7	50.0	-18.3	Phase 1
15.608	42.9	37.7	60.0	-22.3	31.9	50.0	-18.1	Phase 1



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### CONDUCTED EMISSIONS

Graph name:	Emc#2	Test configuration:
Limit:	EN 55032	N - 110V/60Hz
Class:	B	
<b>Frequency range: [150kHz - 30MHz]</b>		
Voltage / Frequency:	110VAC / 60Hz	RBW : 10kHz
Line:	Neutral	VBW : 30kHz



### Spurious emissions

Frequency (MHz)	Mes.Pea k (dBµV)	Mes.QPea k (dBµV)	LimQP (dBµV)	Mes.QPea k-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line
0.150	58.9	53.7	65.8	-12.1	37.0	55.8	-18.8	Neutre
0.641	40.7	37.6	56.0	-18.4	32.2	46.0	-13.8	Neutre
0.893	42.0	38.6	56.0	-17.4	30.0	46.0	-16.0	Neutre
2.260	43.3	36.8	56.0	-19.2	30.6	46.0	-15.4	Neutre
15.644	45.2	41.1	60.0	-18.9	36.4	50.0	-13.6	Neutre
16.988	44.4	40.2	60.0	-19.8	35.8	50.0	-14.2	Neutre
29.950	37.7	32.4	60.0	-27.6	26.9	50.0	-23.1	Neutre

### TEST REPORT

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### 3.7. CONCLUSION

Conducted emission data measurement performed on the sample of the product **MyOeno Scan**, SN: MOS17070001, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

## 4. RADIATED EMISSION DATA

### 4.1. ENVIRONMENTAL CONDITIONS

Date of test : August 31, 2017 & September 4, 2017  
 Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
 Atmospheric pressure (hPa) : 995 - 998  
 Relative humidity (%) : 42 - 39  
 Ambient temperature (°C) : 23 - 24

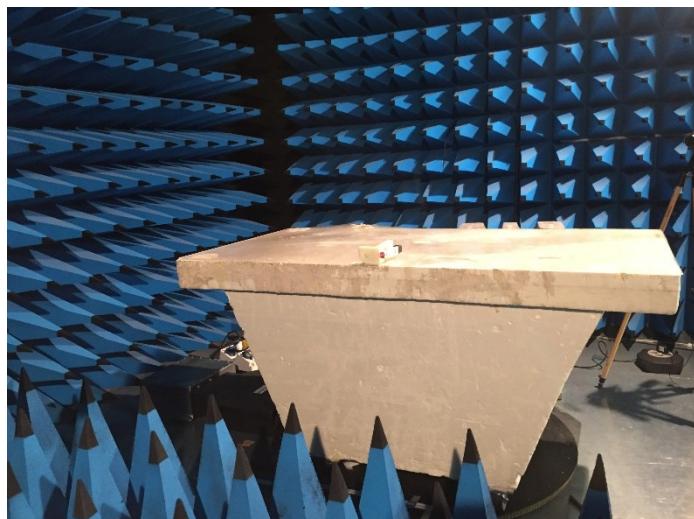
### 4.2. TEST SETUP

The installation of EUT is identical for pre-characterization measures in a 3 meters semi- anechoic chamber and for measures on the 10 meters Open site.

The EUT and auxiliaries are set:

- 80cm above the ground on the non-conducting table (Table-top equipment) - Below 1GHz
- 150cm above the ground on the non-conducting table (Table-top equipment) - Above 1GHz
- 10cm above the ground on isolating support (Floor standing equipment)

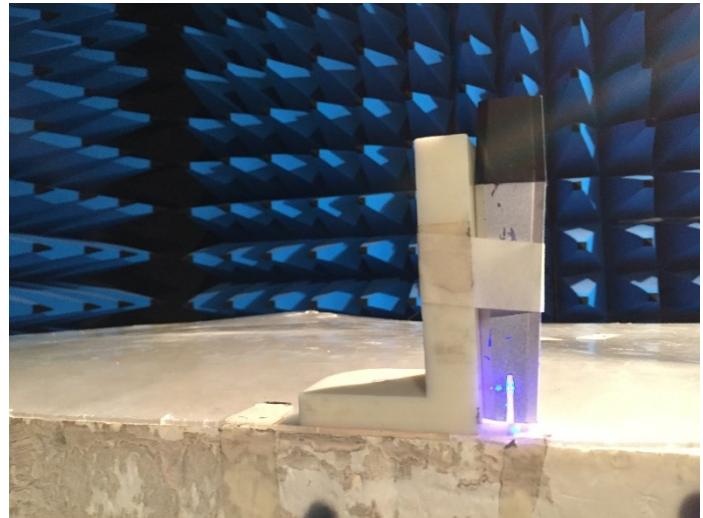
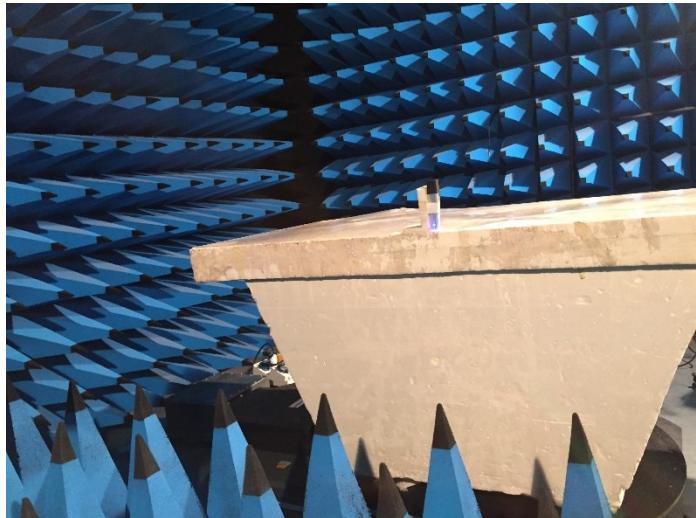
The EUT is powered by  $V_{nom}$ .



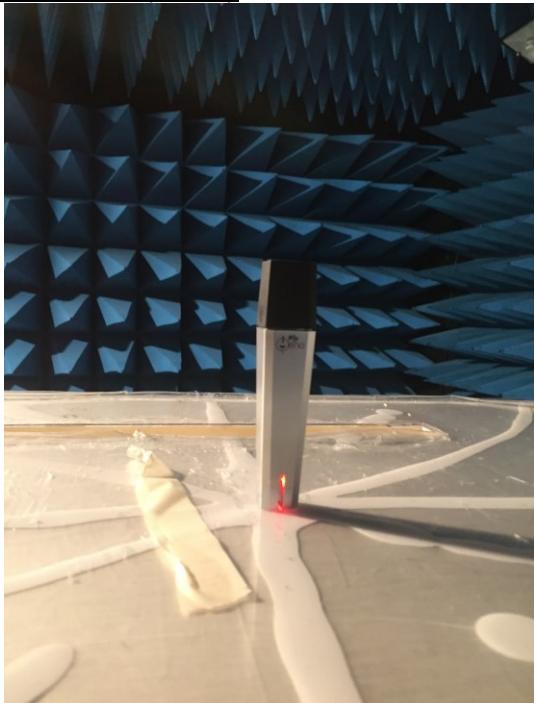
*Test setup in anechoic chamber (Axis XY)*



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Test setup in anechoic chamber (Axis Z)



1.5m setup



#### 4.3. TEST METHOD

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

##### Pre-characterisation measurement: (9kHz – 1GHz)

A pre-scan of all the setup has been performed in a 3 meters semi-anechoic chamber for frequency from 30MHz to 1GHz. Test is performed in horizontal (H) and vertical (V) polarization, the loop antenna was rotated during the test to maximize the emission measurement. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration.

The pre-characterization graphs are obtained in PEAK detection and PEAK/AVERAGE from 1GHz to 1GHz.

##### Characterization on 10 meters open site from 9kHz to 1GHz:

Radiated Emissions were measured on an open area test site. A description of the facility is on file with the FCC. The product has been tested at a distance of **10 meters** from the antenna and compared to the FCC part 15 subpart C limits. Measurement bandwidth was 9kHz below 30MHz and 120kHz from 30 MHz to 1GHz. Test is performed in horizontal (H) and vertical (V) polarization, the loop antenna was rotated during the test to maximize the emission measurement. The height antenna is varied from 1m to 4m. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration. A summary of the worst case emissions found in all test configurations and modes is shown.

Frequency list has been created with anechoic chamber pre-scan results.

##### Characterization on 3 meters full anechoic chamber from 1GHz to 25GHz:

The product has been tested at a distance of **3 meters** from the antenna and compared to the FCC part 15 subpart C limits. Measurement bandwidth was 1MHz from 1GHz to 25GHz.

Test is performed in horizontal (H) and vertical (V) polarization. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on all axis of EUT used in normal configuration. A summary of the worst case emissions found in all test configurations and modes is shown. The height antenna is

On mast, varied from 1m to 4m

Fixed and centered on the EUT (EUT smaller than the beamwidth of the measurement antenna, ANSI C63.10 §6.6.5)

Frequency list has been created with anechoic chamber pre-scan results.



#### 4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Amplifier 0.1MHz – 1300 MHz	HEWLETT PACKARD	8447D	A7085009	01/17	01/18
Amplifier 1-13GHz	LCIE SUD EST	-	A7102067	07/17	07/18
Antenna Bi-Log XWing	TESEQ	CBL6144	C2040146	03/17	03/19
Antenna horn 18GHz	EMCO	3115	C2042027	01/17	01/18
Emission Cable	MICRO-COAX	6GHz	A5329654	06/17	06/18
Emission Cable	MICRO-COAX	6GHz	A5329655	06/17	06/18
Emission Cable	MICRO-COAX	6GHz	A5329656	06/17	06/18
Semi-Anechoic chamber #2	SIEPEL	-	D3044015	04/17	04/18
Radiated emission comb generator	BARDET	-	A3169050	-	-
HF Radiated emission comb generator	LCIE SUD EST	-	A3169088	-	-
Spectrum Analyzer 9kHz - 6GHz	ROHDE & SCHWARZ	FSL6	A4060049	02/16	02/18
BAT EMC	NEXIO	v3.9.0.10	L1000115	-	-
Thermo-hygrometer (C2)	LACROSS Techn.	WS-2357	B4206015	10/16	10/17
Turntable controller (Cage#2)	ETS Lingren	Model 2066	F2000393	-	-
Turntable chamber (Cage#2)	ETS Lingren	Model 2165	F2000404	-	-
Table	LCIE	-	F2000438	-	-

#### 4.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:

#### 4.6. TEST RESULTS

##### 4.6.1. Pre-characterization at 3 meters [30MHz-1GHz]

See graphs for 30MHz-1GHz:

Graph identifier	Polarization	Mode	EUT position	Channel	Comments
Emr# 1	H/V	TX	Axis XY	Min	See annex 1
Emr# 2	H/V	TX	Axis Z	Min	See annex 1



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#### 4.6.2. Characterization on 10 meters open site from 30MHz to 1GHz

##### Worst case final data result:

Frequency list has been created with semi-anechoic chamber pre-scan results.  
Measurements are performed using a QUASI-PEAK detection.

No	Frequency (MHz)	Limit Quasi-Peak (dB $\mu$ V/m)	Measure Quasi-Peak (dB $\mu$ V/m)	Margin (Mes-Lim) (dB)	Angle Table (deg)	Pol Ant.	Ht Ant. (cm)	Correc. Factor (dB)	Comments
No significant frequency observed									

Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)  
(M@3m = M@10m+10.5dB)

#### 4.6.3. Characterization on 3meters anechoic chamber from 1GHz to 25GHz

##### Worst case final data result:

The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.  
Measurements are performed using a PEAK and AVERAGE detection.

##### See§8.6 test result Band Edge Measurement (15.247)

Test Frequency (MHz)	Meter Reading dB( $\mu$ V)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Remark
2338.200	39.3	Pk	H	0	150	-1.6	37.7	74.0	<b>-36.3</b>	Axis XY
2344.200	38.2	Pk	H	0	150	-1.6	36.6	74.0	<b>-37.4</b>	Axis XY
2354.200	37.9	Pk	H	350	150	-1.6	36.3	74.0	<b>-37.7</b>	Axis XY
2370.200	41.8	Pk	H	0	150	-1.6	40.2	74.0	<b>-33.8</b>	Axis XY
2376.200	39.2	Pk	H	0	150	-1.6	37.6	74.0	<b>-36.4</b>	Axis XY
2386.100	38.8	Pk	H	0	150	-1.6	37.2	74.0	<b>-36.8</b>	Axis XY
4804.200	62.3	Pk	H	20	150	4.5	66.8	74.0	<b>-7.2</b>	Axis XY
4880.000	61.8	Pk	H	20	150	4.5	66.3	74.0	<b>-7.7</b>	Axis XY
4960.000	62.6	Pk	H	0	150	4.6	67.2	74.0	<b>-6.8</b>	Axis XY

Test Frequency (MHz)	Meter Reading dB( $\mu$ V)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Remark
2338.200	32.0	Av	H	0	150	-1.6	30.4	54.0	<b>-23.6</b>	Axis XY
2344.200	31.2	Av	H	0	150	-1.6	29.6	54.0	<b>-24.4</b>	Axis XY
2354.200	30.9	Av	H	350	150	-1.6	29.3	54.0	<b>-24.7</b>	Axis XY
2370.200	32.5	Av	H	0	150	-1.6	30.9	54.0	<b>-23.1</b>	Axis XY
2376.200	31.6	Av	H	0	150	-1.6	30.0	54.0	<b>-24.0</b>	Axis XY
2386.100	30.5	Av	H	0	150	-1.6	28.9	54.0	<b>-25.1</b>	Axis XY
4804.200	46.6	Av	H	20	150	4.5	51.1	54.0	<b>-2.9</b>	Axis XY
4880.000	46.5	Av	H	20	150	4.5	51.0	54.0	<b>-3.0</b>	Axis XY
4960.000	46.2	Av	H	0	150	4.6	50.8	54.0	<b>-3.2</b>	Axis XY



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Test Frequency (MHz)	Meter Reading dB(µV)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
2338.200	38.7	Pk	V	0	150	-1.6	37.1	74.0	<b>-36.9</b>	Axis Z
2344.200	37.6	Pk	V	0	150	-1.6	36.0	74.0	<b>-38.0</b>	Axis Z
2354.200	37.5	Pk	V	0	150	-1.6	35.9	74.0	<b>-38.1</b>	Axis Z
2370.200	40.2	Pk	V	0	150	-1.6	38.6	74.0	<b>-35.4</b>	Axis Z
2376.200	38.9	Pk	V	0	150	-1.6	37.3	74.0	<b>-36.7</b>	Axis Z
2386.100	38.5	Pk	V	0	150	-1.6	36.9	74.0	<b>-37.1</b>	Axis Z
4804.200	60.2	Pk	V	0	150	4.5	64.7	74.0	<b>-9.3</b>	Axis Z
4880.000	60.1	Pk	V	0	150	4.5	64.6	74.0	<b>-9.4</b>	Axis Z
4960.000	59.8	Pk	V	0	150	4.6	64.4	74.0	<b>-9.6</b>	Axis Z

Test Frequency (MHz)	Meter Reading dB(µV)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Transducer Factor (dB)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
2338.200	31.5	Av	V	0	150	-1.6	29.9	54.0	<b>-24.1</b>	Axis Z
2344.200	30.8	Av	V	0	150	-1.6	29.2	54.0	<b>-24.8</b>	Axis Z
2354.200	30.5	Av	V	0	150	-1.6	28.9	54.0	<b>-25.1</b>	Axis Z
2370.200	32.1	Av	V	0	150	-1.6	30.5	54.0	<b>-23.5</b>	Axis Z
2376.200	31.2	Av	V	0	150	-1.6	29.6	54.0	<b>-24.4</b>	Axis Z
2386.100	30.4	Av	V	0	150	-1.6	28.8	54.0	<b>-25.2</b>	Axis Z
4804.200	47.4	Av	V	0	150	4.5	51.9	54.0	<b>-2.1</b>	Axis Z
4880.000	47.4	Av	V	0	150	4.5	51.9	54.0	<b>-2.1</b>	Axis Z
4960.000	47.6	Av	V	0	150	4.6	52.2	54.0	<b>-1.8</b>	Axis Z

Note: Measures have been done at 3m distance.

#### 4.7. CONCLUSION

Radiated emission data measurement performed on the sample of the product **MyOeno Scan**, SN: MOS17070001, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

## 5. BANDWIDTH (15.247)

### 5.1. TEST CONDITIONS

Date of test : August 31, 2017  
 Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
 Atmospheric pressure (hPa) : 995  
 Relative humidity (%) : 42  
 Ambient temperature (°C) : 23

### 5.2. SETUP

**Conducted measurement:**

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.

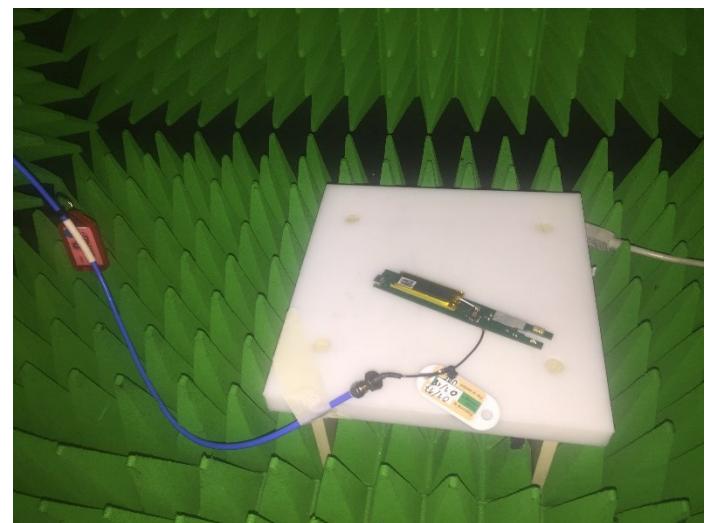
Offset: Attenuator+cable 10.3dB

**Radiated measurement:**

The EUT is placed in an anechoic chamber; 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, a delta marker is used to measure the frequency difference as the emission bandwidth.

**Measurement Procedure: §8.1 Option 1 (DTS Measurement Guidance)**

1. Set resolution bandwidth (RBW) = 100kHz.
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer.





### 5.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	TECHNIWAVE	-	A7122273	04/17	04/18
Cable SMA	-	-	A5329635	01/17	01/18
Cable SMA	-	-	A5329637	01/17	01/18
Full Anechoic Room	SIEPEL	-	D3044024	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	03/17	03/18
Thermo-hygrometer	OREGON	BAR916	B4206011	10/16	10/17

### 5.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

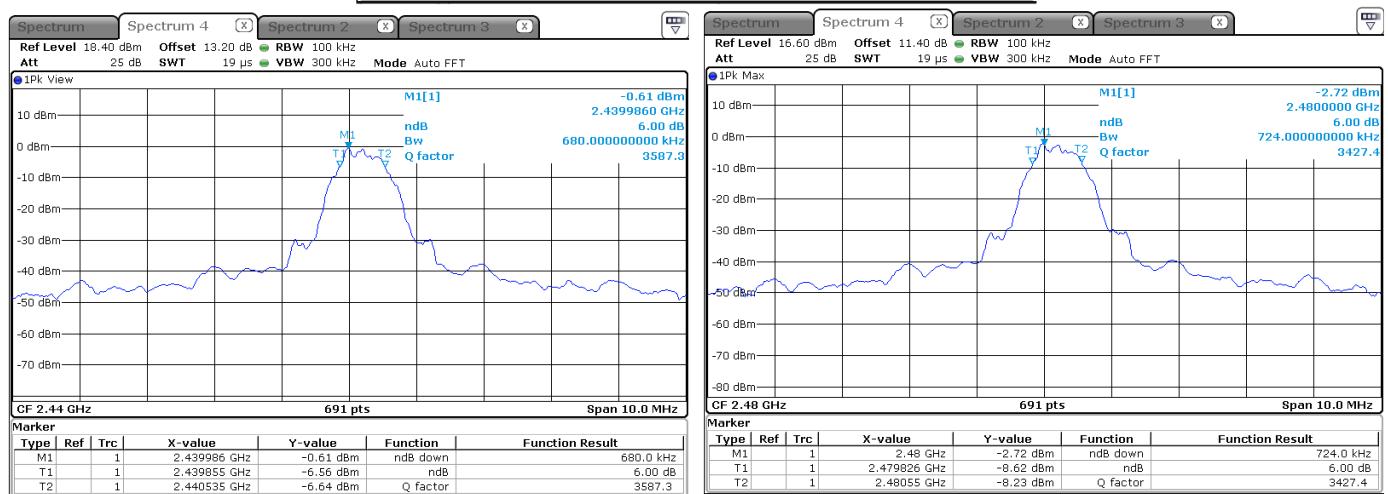
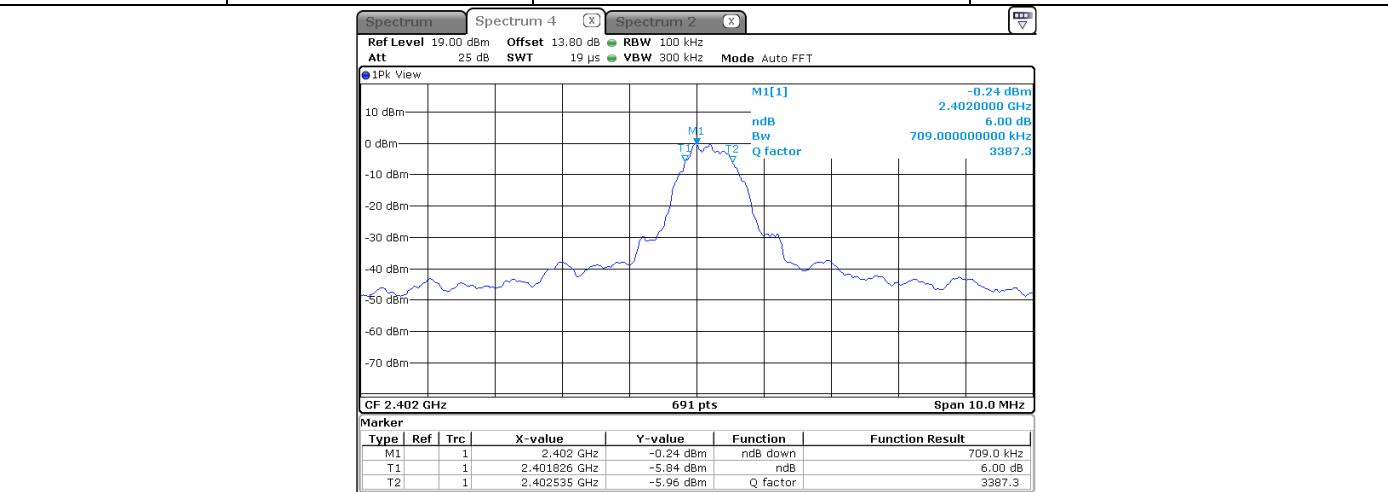
None       Divergence:



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## 5.5. TEST SEQUENCE AND RESULTS

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth Limit (MHz)
Cmin	2402	<b>0.709</b>	>0.5
Cmed	2440	<b>0.680</b>	>0.5
Cmax	2480	<b>0.724</b>	>0.5



## 5.6. CONCLUSION

Bandwidth measurement performed on the sample of the product **MyOeno Scan**, SN: MOS17070001, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

## 6. MAXIMUM PEAK OUTPUT POWER (15.247)

### 6.1. TEST CONDITIONS

Date of test : August 31, 2017  
 Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
 Atmospheric pressure (hPa) : 995  
 Relative humidity (%) : 42  
 Ambient temperature (°C) : 23

### 6.2. SETUP

**Conducted measurement:**

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency.

Offset: Attenuator+cable 10.3dB

**Radiated measurement:**

The EUT is placed in an anechoic chamber; the center frequency of the spectrum analyzer is set to the fundamental frequency.

The product has been tested at a distance of 3 meters from the antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on 3 axis of EUT. A summary of the worst case emissions found in all test configurations and modes is shown on following table. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

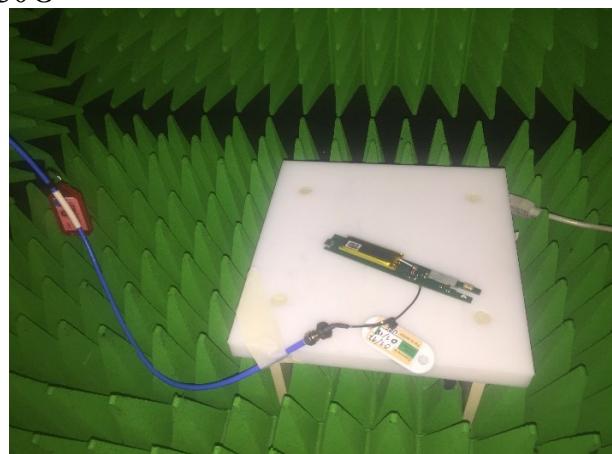
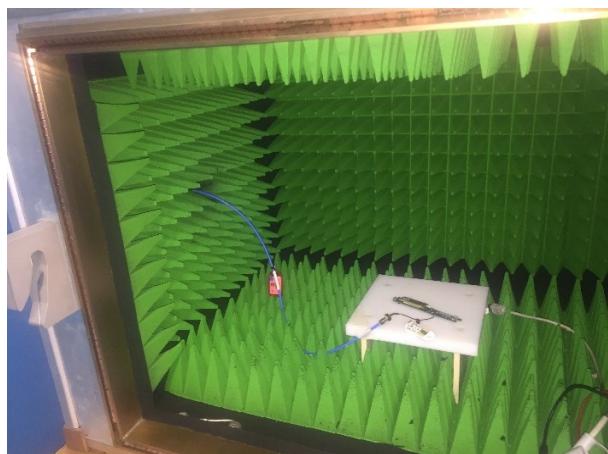
To demonstrate compliance with peak output power requirement of section 15.247 (b), the transmitter's peak output power is calculated using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where:

- E is the measured maximum fundamental field strength in V/m.
- G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
- d is the distance in meters from which the field strength was measured.
- P is the power in watts for which you are solving:

$$P = \frac{(Ed)^2}{30G}$$





### **Maximum peak conducted output power**

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

- **RBW ≥ DTS bandwidth      §9.1.1 (DTS Measurement Guidance)**

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- Set the RBW  $\geq$  DTS bandwidth.
- Set VBW  $\geq 3 \times$  RBW.
- Set span  $\geq 3 \times$  RBW
- Sweep time = auto couple.
- Detector = peak.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use peak marker function to determine the peak amplitude level.

- **Integrated band power method**

This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

- Set the RBW = 1 MHz.
- Set the VBW  $\geq 3 \times$  RBW
- Set the span  $\geq 1.5 \times$  DTS bandwidth.
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges

### **6.3. TEST EQUIPMENT LIST**

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	TECHNIWAVE	-	A7122273	04/17	04/18
Cable SMA	-	-	A5329635	01/17	01/18
Cable SMA	-	-	A5329637	01/17	01/18
Full Anechoic Room	SIEPEL	-	D3044024	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	03/17	03/18
Thermo-hygrometer	OREGON	BAR916	B4206011	10/16	10/17

### **6.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION**

None       Divergence:

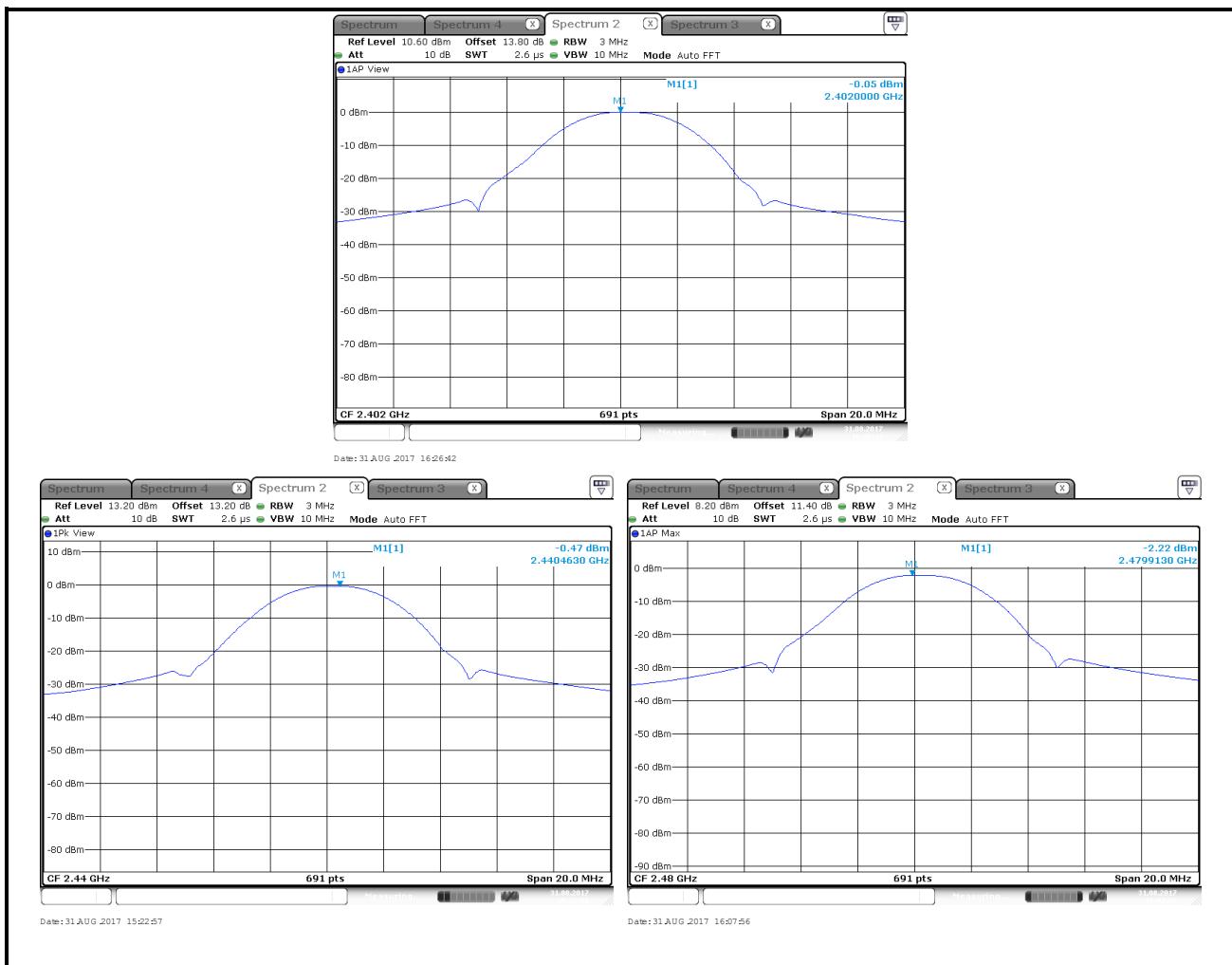


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## 6.5. TEST SEQUENCE AND RESULTS

### Modulation:

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
Cmin	2402	-0.05	30.0
Cmed	2440	-0.47	30.0
Cmax	2480	-2.22	30.0



## 6.6. CONCLUSION

Maximum Peak Output Power measurement performed on the sample of the product **MyOeno Scan**, SN: MOS17070001, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 7. POWER SPECTRAL DENSITY (15.247)

### 7.1. TEST CONDITIONS

Date of test : August 31, 2017  
Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
Atmospheric pressure (hPa) : 995  
Relative humidity (%) : 42  
Ambient temperature (°C) : 23

### 7.2. SETUP

**Conducted measurement:**

The EUT is turned ON and connected to measurement instrument; the center frequency of the spectrum analyzer is set to the fundamental frequency.

Offset: Attenuator+cable 10.3dB

**Radiated measurement:**

The EUT is placed in an anechoic chamber; the center frequency of the spectrum analyzer is set to the fundamental frequency.

The product has been tested at a distance of 3 meters from the antenna. Continuous linear turntable azimuth search was performed with 360 degrees range. Measurement performed on 3 axis of EUT. A summary of the worst case emissions found in all test configurations and modes is shown on following table. The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.

To demonstrate compliance with peak output power requirement of section 15.247 (b), the transmitter's peak output power is calculated using the following equation:

$$E = \frac{\sqrt{30PG}}{d}$$

Where:

- E is the measured maximum fundamental field strength in V/m.
- G is the numeric gain of the transmitting antenna with reference to an isotropic radiator.
- d is the distance in meters from which the field strength was measured.
- P is the power in watts for which you are solving:

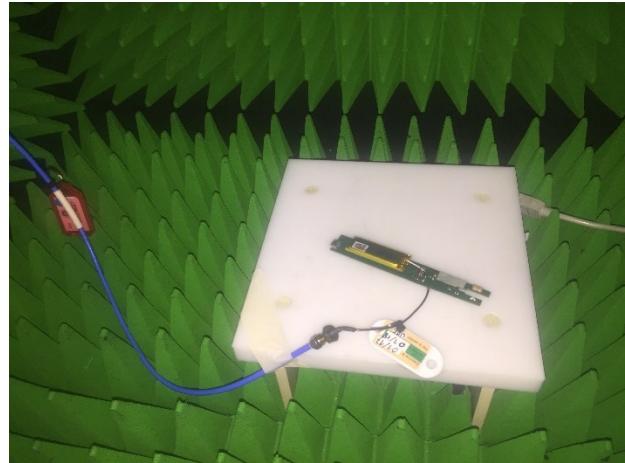
$$P = \frac{(Ed)^2}{30G}$$

**Measurement Procedure PKPSD: §10.2 (DTS Measurement Guidance)**

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to: 3 kHz.
- d) Set the VBW  $\geq 3 \times$  RBW.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.
- j) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



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### 7.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	TECHNIWAVE	-	A7122273	04/17	04/18
Cable SMA	-	-	A5329635	01/17	01/18
Cable SMA	-	-	A5329637	01/17	01/18
Full Anechoic Room	SIEPEL	-	D3044024	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	03/17	03/18
Thermo-hygrometer	OREGON	BAR916	B4206011	10/16	10/17

### 7.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:

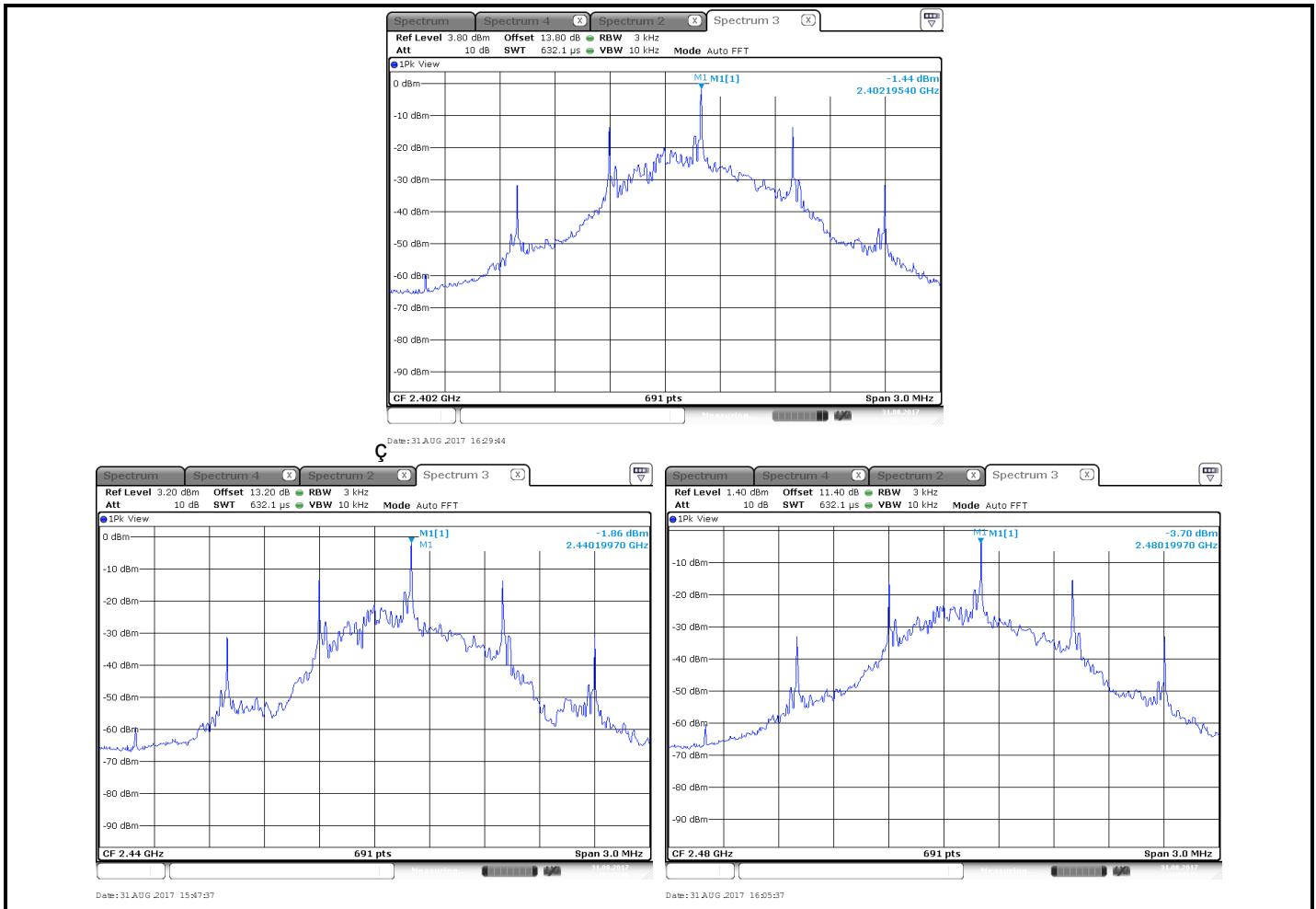


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## 7.5. TEST SEQUENCE AND RESULTS

### Modulation:

Channel	Channel Frequency (MHz)	Power Spectral Density (dBm)	PSD Limit (dBm)
Cmin	2402	-1.44	8.0
Cmed	2440	-1.86	8.0
Cmax	2480	-3.70	8.0



## 7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **MyOeno Scan**, SN: MOS17070001, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 8. BAND EDGE MEASUREMENT (15.247)

### 8.1. TEST CONDITIONS

Date of test : September 4, 2017  
Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
Atmospheric pressure (hPa) : 998  
Relative humidity (%) : 39  
Ambient temperature (°C) : 24

### 8.2. LIMIT

#### **RF antenna conducted test: § 11 (DTS Measurement Guidance)**

Set RBW = 100 kHz, Video bandwidth (VBW) > RBW, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB. *For -20dBc limit, lowest power output level is considered, worst case.*

#### **Radiated emission test: § 12 (DTS Measurement Guidance)**

Applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. For measurements above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See results in Radiated emissions section before.

### 8.3. SETUP

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with Peak Output Power measurement. The EUT is turn ON; the graphs of the restrict frequency band are recorded with a display line indicating the highest level and other the 20dB offset below to show compliance with 15.247 (d) and 15.205. The emissions in restricted bands are compared to 15.209 limits.

RBW: 100kHz

VBW: 300kHz

### 8.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	TECHNIWAVE	-	A7122273	04/17	04/18
Cable SMA	-	-	A5329635	01/17	01/18
Cable SMA	-	-	A5329637	01/17	01/18
Full Anechoic Room	SIEPEL	-	D3044024	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	03/17	03/18
Thermo-hygrometer	OREGON	BAR916	B4206011	10/16	10/17

### 8.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None

Divergence:

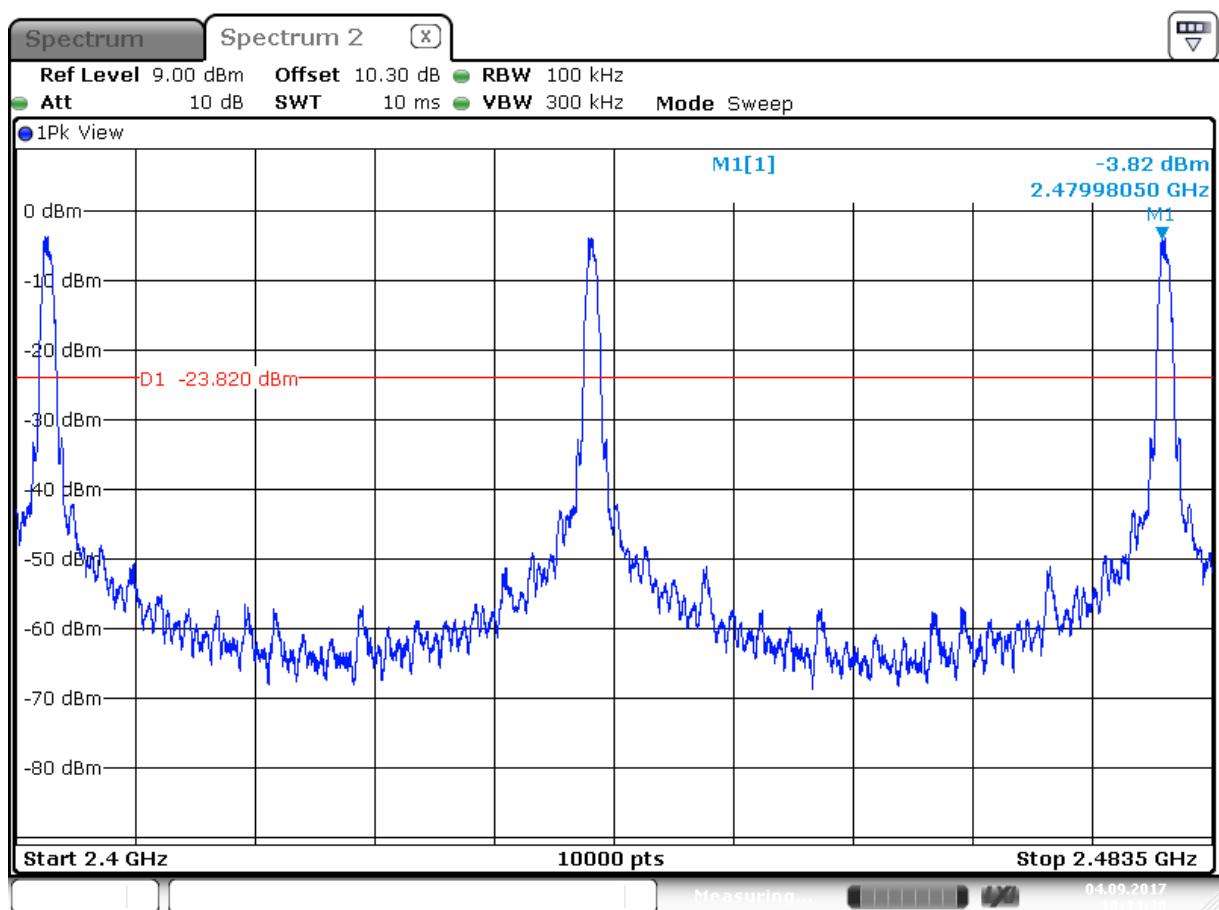


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## 8.6. TEST SEQUENCE AND RESULTS

Offset: Attenuator+cable 10.3dB

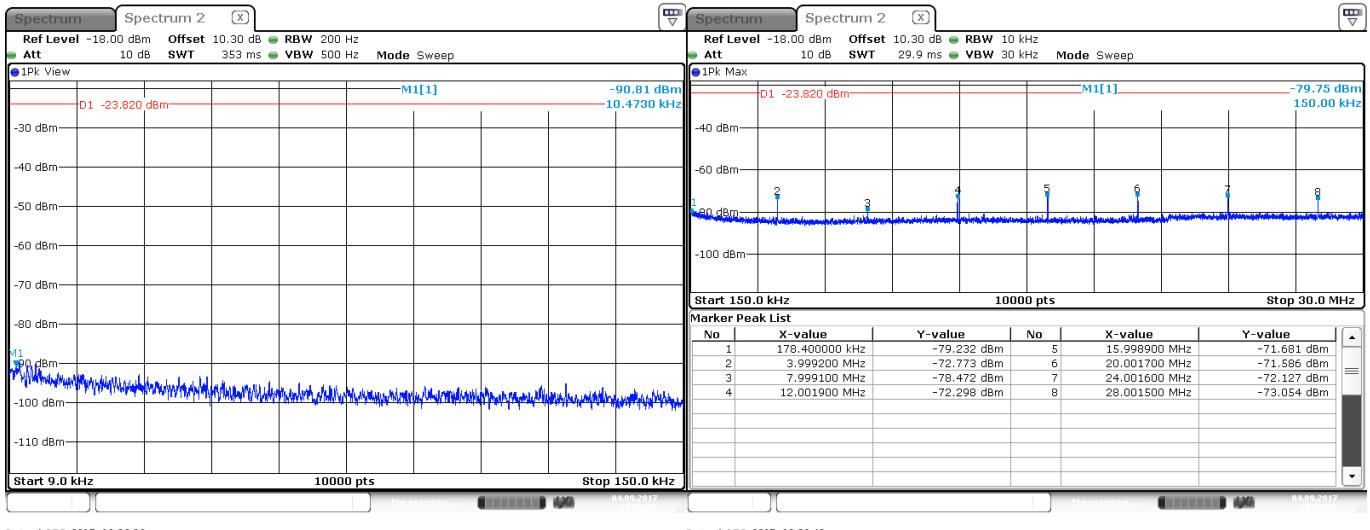
**GRAPH / MODULATION.**



Worst case in Cmax, display line set at -23.820dBm

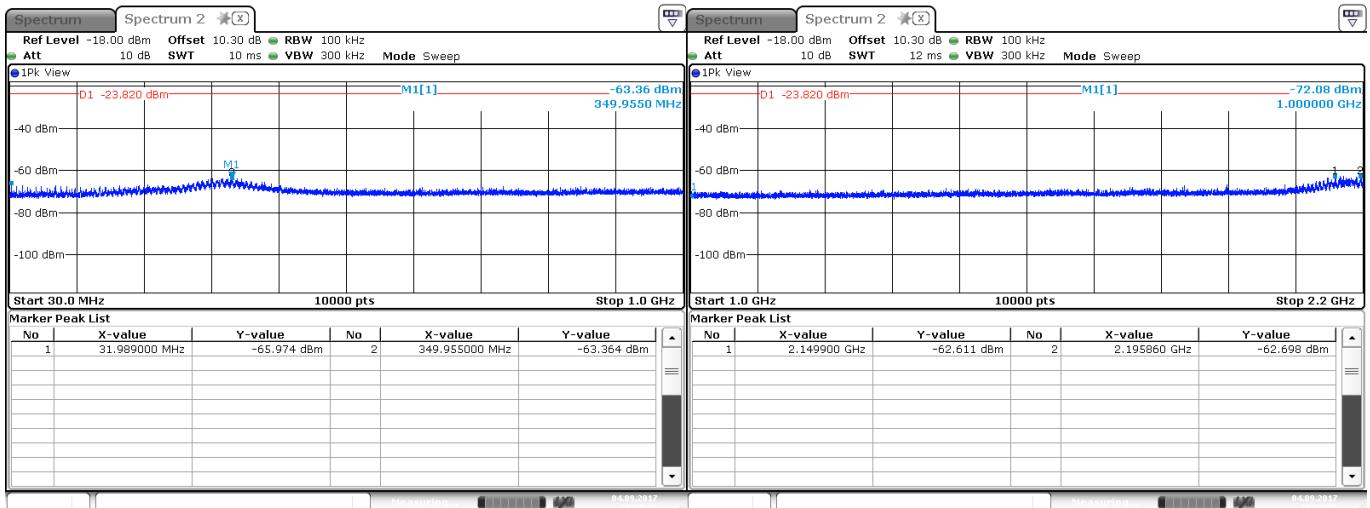


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Date: 4 SEP 2017 10:36:26

Date: 4 SEP 2017 10:39:42

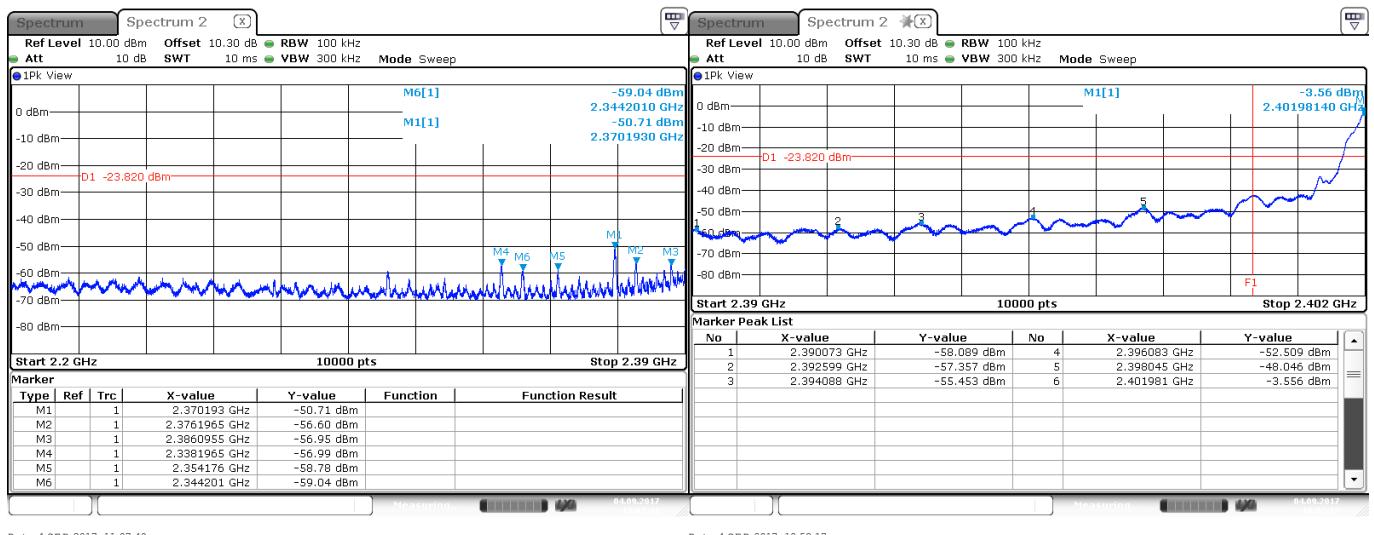


Date: 4 SEP 2017 10:41:27

Date: 4 SEP 2017 10:42:55

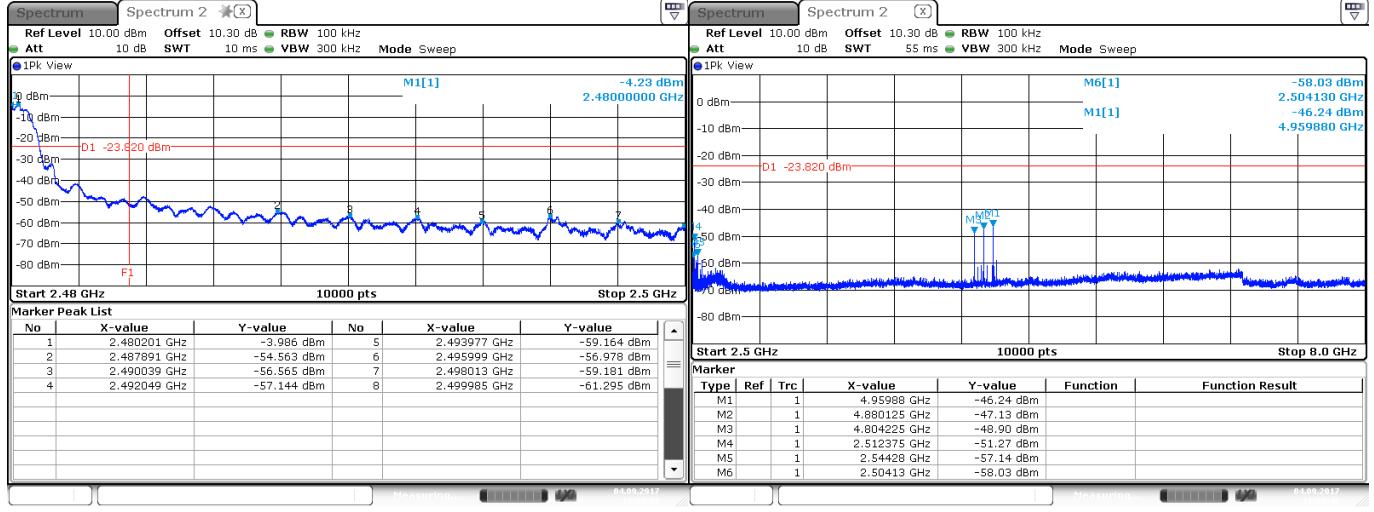


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Date: 4.SEP.2017 11:07:40

See final data result §4.6.3

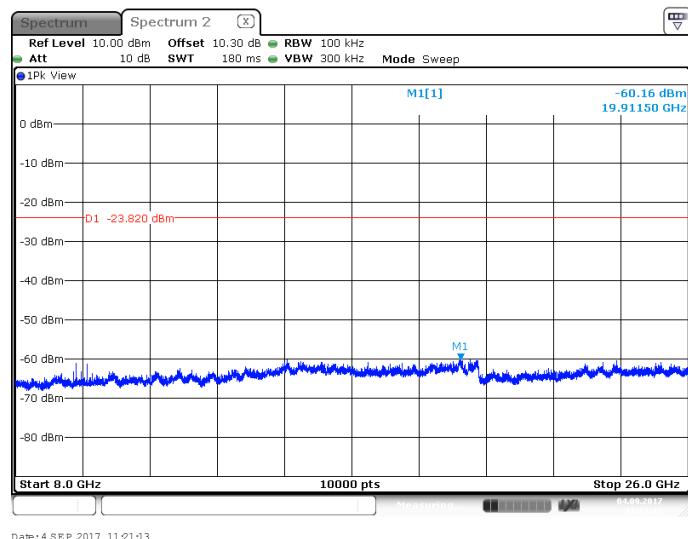


Date: 4.SEP.2017 10:55:00

See final data result §4.6.3



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## 8.7. CONCLUSION

Band Edge Measurement performed on the sample of the product **MyOeno Scan**, SN: MOS17070001, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 9. OCCUPIED BANDWIDTH

### 9.1. TEST CONDITIONS

Date of test : August 31, 2017  
Test performed by : Gaëtan DESCHAMPS / Majid MOURZAGH  
Atmospheric pressure (hPa) : 995  
Relative humidity (%) : 42  
Ambient temperature (°C) : 23

### 9.2. SETUP

**Conducted measurement:**

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.

Offset: Attenuator+cable 10.3dB

**Radiated measurement:**

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.

**Measurement Procedure:**

- RBW shall be in the range of 1% to 5% of the anticipated occupied bandwidth
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW
- SPAN = Capture all products of the modulation process
- Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Allow the trace to stabilize.
- OBW 99% function of spectrum analyzer used

### 9.3. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Attenuator 10dB	TECHNIWAVE	-	A7122273	04/17	04/18
Cable SMA	-	-	A5329635	01/17	01/18
Cable SMA	-	-	A5329637	01/17	01/18
Full Anechoic Room	SIEPEL	-	D3044024	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	03/17	03/18
Thermo-hygrometer	OREGON	BAR916	B4206011	10/16	10/17

### 9.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:



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## 9.5. TEST SEQUENCE AND RESULTS

Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)
Cmin	2402	1.071
Cmed	2440	1.057
Cmax	2480	1.057

Date: 31 AUG 2017 16:32:26

Date: 31 AUG 2017 16:32:31



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## 10. UNCERTAINTIES CHART

Type de mesure / Kind of measurement	Incertitude élargie laboratoire / Wide uncertainty laboratory (k=2) ± x	Incertitude limite du CISPR / CISPR uncertainty limit ± y
Mesure des perturbations conduites en tension sur le réseau d'énergie <i>Measurement of conducted disturbances in voltage on the power port</i>	3.51 dB	3.6 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication <i>Measurement of conducted disturbances in voltage on the telecommunication port.</i>	3.26 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension <i>Measurement of discontinuous conducted disturbances in voltage</i>	3.45 dB	3.6 dB
Mesure des perturbations conduites en courant <i>Measurement of conducted disturbances in current</i>	3.09 dB	A l'étude / Under consid.
Mesure du champ électrique rayonné sur le site en espace libre de Moirans <i>Measurement of radiated electric field on the Moirans open area test site</i>	5.20 dB	6.3 dB

Les valeurs d'incertitudes calculées du laboratoire étant inférieures aux valeurs d'incertitudes limites établies par la norme, la conformité de l'échantillon est établie directement par les niveaux limites applicables. / The uncertainty values calculated by the laboratory are lower than limit uncertainty values defined by the standard. The conformity of the sample is directly established by the applicable limits values.