



LCIE

TEST REPORT

N°: 135376-672302BCR2015-10-07

Subject Electromagnetic compatibility (EMC) :
Publication CFR 47 Part 15 of 2013 Subpart C - Radio frequency devices - Intentional radiators standards (15.231 & 15.207)

FCC Registration Number 166175

Issued to BodyCap
6, Rue de la girafe
14000 Caen
FRANCE

Apparatus under test

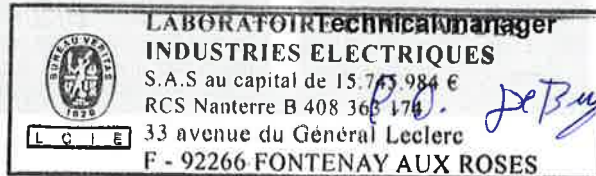
↪ Product	Monitor
↪ Trade mark	BodyCap
↪ Manufacturer	BodyCap
↪ Model under test	Aniview / 03201
↪ Serial number	-

Test date	May 7th, 2015 to May 26th, 2015
Test location	Fontenay Aux Roses
Test performed by	Fostoki MEDJOU DJ & Stéphane PHOUDIAH
Composition of document	28 pages

Document issued on	August 3rd, 2015
Document issued on	October 07th, 2015

Written by :
Fostoki MEDJOU DJ & Stéphane PHOUDIAH
Tests operator

Approved by :
Patrick TEIXEIRA
Technical manager



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SUMMARY

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1. Test Program

References

- ✓ **CFR 47 Part 15 Subpart C - Radio frequency devices - Intentional radiators standards (15.231 & 15.205 & 15.207 & 15.209)**
- ✓ **ANSI C63.10(2009)**
- ✓ **CISPR 16-4-2**

Emission tests:

Test Description	Main characteristics	Test result - Comments
FCC Part 15.207	AC Power Line Conducted Emissions	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
FCC Part 15.231 (a) (1) (2) (3) (4) (5)	Periodic operation	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
FCC Part 15.231 (b) (1) (2) (3) FCC Part 15.205 FCC Part 15.209	Field strength of fundamental & spurious emission	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
FCC Part 15.231 (c)	20dB Bandwidth	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
FCC Part 15.231 (d)	Frequency tolerance	<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)
FCC Part 15.231 (b) (1) (2) (3) (e) & FCC Part 15.205 FCC Part 15.209	Field strength of fundamental & spurious emission & Limiting operation	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP (Limited Program)

The product is Compliant according to CFR 47 Part 15 of 2013 Subpart C - Radio frequency devices - Intentional radiators standards (15.231 & 15.207)

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 Description (declared by provider)

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT): Aniview / 03201

Serial Number: -



Equipment Under Test


Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
PowersupplyAC	Input: 100-240V~ 50/60Hz 110mA Output: 5Vdc 1A	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Charger: TCUMINI1A1USBV2 / BB2709

Auxiliary equipment used during test:

Personal computer to set the EUT

Equipment information: (Declared by provider)

Apparatus Description	<p>The device is composed of an ingestible capsule, swallowed by the animal, which uses wireless telemetry to detect and transmit the animal's core body temperature to an external monitor (which is also provided).</p>  <p>The monitor allows information collection</p>														
	<table border="1"> <thead> <tr> <th>Frequency (MHz)</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Cmin:433.22 MHz</td> <td rowspan="9">RF Communication</td> </tr> <tr> <td>433.42 MHz</td> </tr> <tr> <td>433.62 MHz</td> </tr> <tr> <td>433.82 MHz</td> </tr> <tr> <td>Cnom:434.02 MHz</td> </tr> <tr> <td>434.22 MHz</td> </tr> <tr> <td>434.42 MHz</td> </tr> <tr> <td>Cmax:434.62 MHz</td> </tr> <tr> <td></td> </tr> </tbody> </table>				Frequency (MHz)	Description	Cmin:433.22 MHz	RF Communication	433.42 MHz	433.62 MHz	433.82 MHz	Cnom:434.02 MHz	434.22 MHz	434.42 MHz	Cmax:434.62 MHz
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433.82 MHz															
Cnom:434.02 MHz															
434.22 MHz															
434.42 MHz															
Cmax:434.62 MHz															
Type of power source:	<input checked="" type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input checked="" type="checkbox"/> Battery (Lithium)												
Test source voltage:	Vmin-Vmax:	<input checked="" type="checkbox"/> 120V -60Hz		<input type="checkbox"/> Vdc											
Operating Modes	Mode 1	Permanent emission													
	Mode 2	Permanent emission-reception													



2.2. EQUIPMENT LABELLING

MONITOR



CHARGER



2.3. EQUIPMENT MODIFICATIONS

- None Modification:



3. Field strength of fundamental & Field strength of spurious emission

3.1. ENVIRONMENTAL CONDITIONS

Test performed by : Stéphane CAMBOUE
Date of test : 2015/05/26
Ambient temperature : 20°C
Relative humidity : 38%

3.2. TEST SETUP

Specifications:

Frequency	30 – 1000 MHz	RBW 120 kHz
	1-6GHz	RBW 1MHz
Detector	Peak and Quasi-Peak	

Pre characterization in semi anechoic room is performed to define the critical frequencies

Operating conditions:

- The Equipment under Test is installed:

- Measure in semi anechoic room
- Measure in open area site

- Measuring distance:

- 3m
- 10m

- Deviation method:

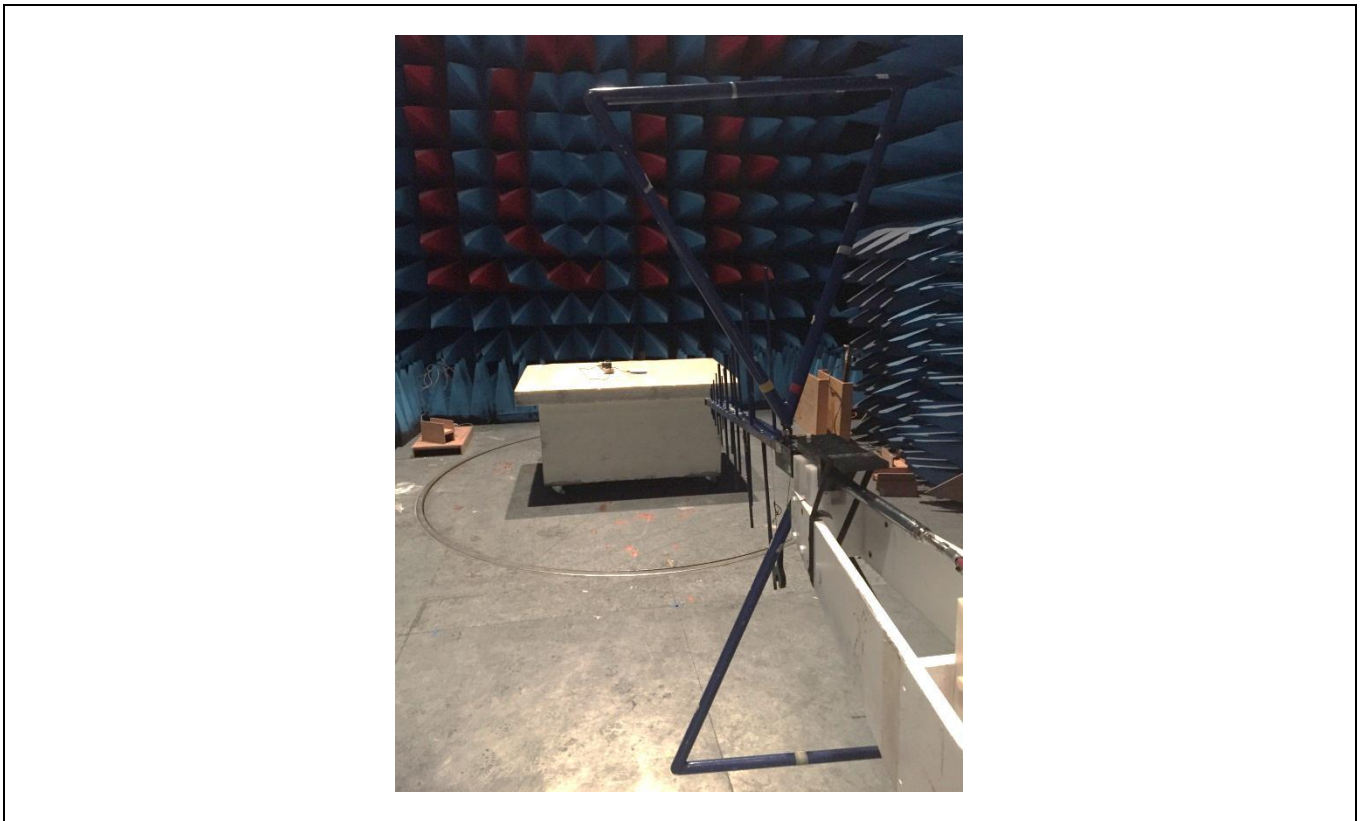
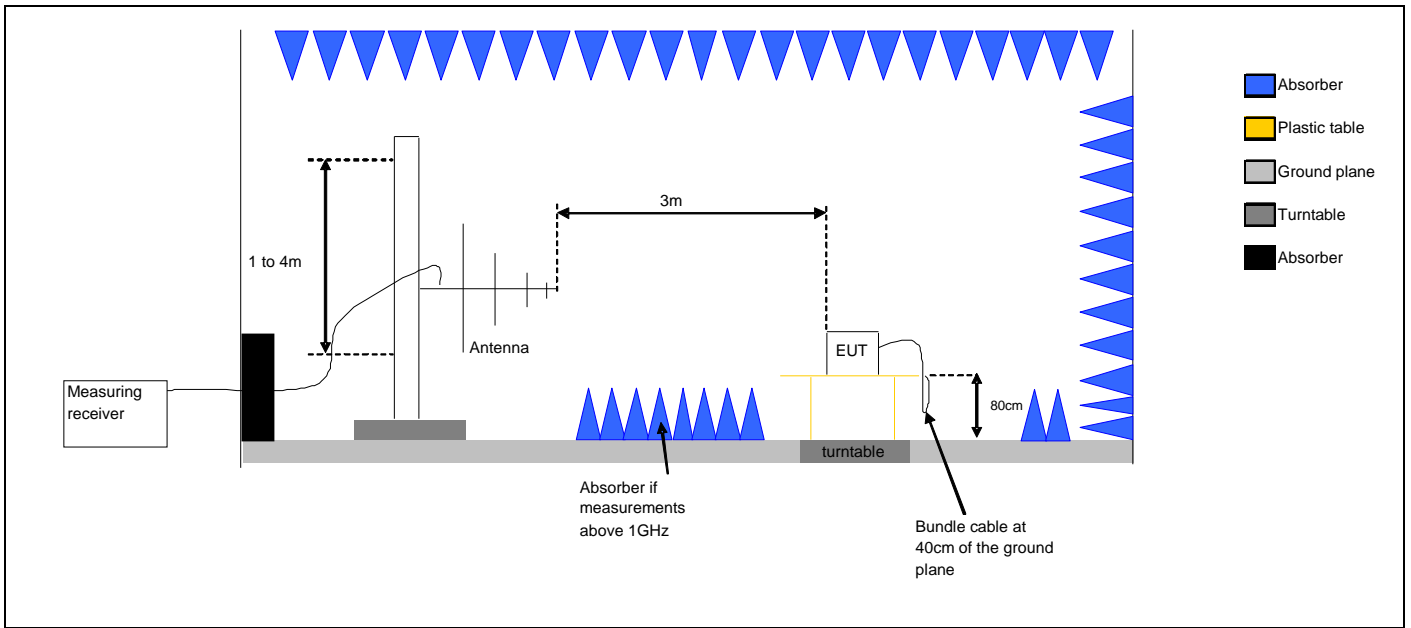
- Yes
- No

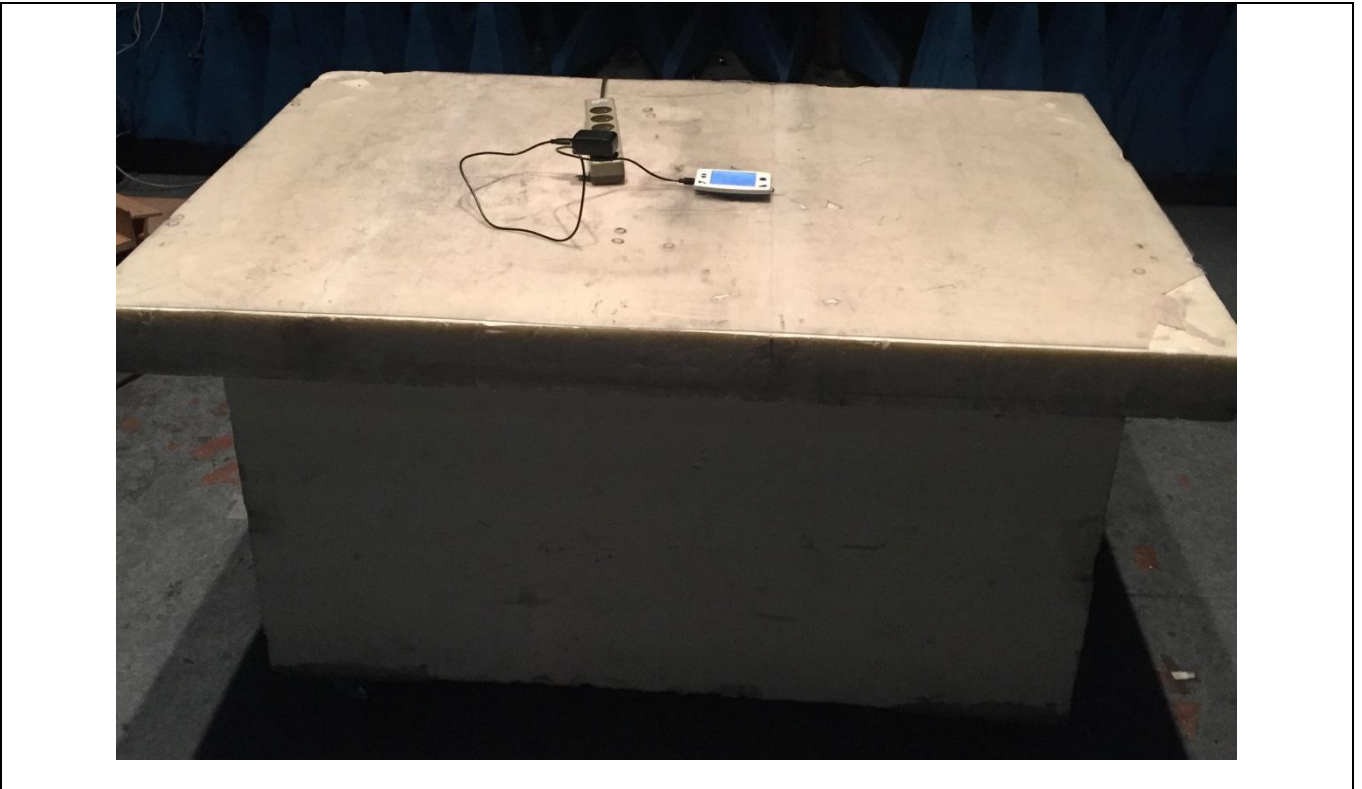
-Product installation:

- The EUT was tested as a tabletop equipment and was placed on a non-conducting platform the top of which is 0.8m above the metal ground plane.
- The EUT is at 10cm height from reference plane

Operating mode:

- Mode 1





Measurement of radiated disturbances.

3.3. LIMIT

Frequency Bands/frequencies	dB ($\mu\text{V}/\text{m}$) quasi-peak	dB ($\mu\text{V}/\text{m}$) peak	dB ($\mu\text{V}/\text{m}$) average
30-88MHz	40	-	-
88 – 216MHz	43.5	-	-
216 – 960 MHz	46	-	-
960 – 1000 MHz	53.9	-	-
1000-6000MHz	-	73.9	53.9



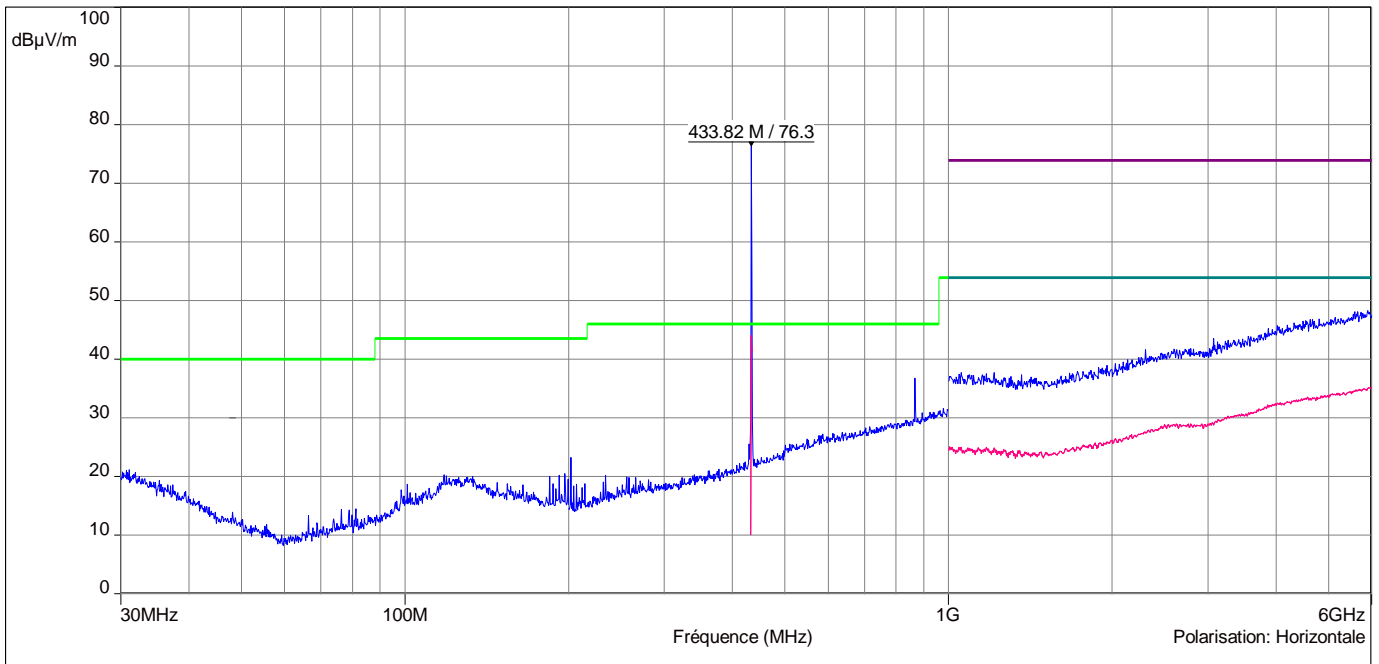
3.4. TEST EQUIPMENT LIST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi anechoic chamber 11,8x8,1x9,5m	SIEPEL	C01	D3044008	2014/09	2015/09
Bilog antenna	CHASE	CBL6111C	C2040124	2014/09	2015/09
Spectrum analyzer	ROHDE & SCHWARZ	ESIB26	A2642021	2015/01	2016/01
Horn antenna	EMCO	3115	C2042018	2015/05	2016/05
Preamplifier	LCIE	-	A7086012	2015/05	2016/05
Cable	CABLES & CONNECTIQUES	3.5MD/CSU528AA/3.5MD/4000	A5329374	2014/06	2015/06
Cable	CABLES & CONNECTIQUES	3.5MD/CSU528AA-TDINOX/3.5MD/7000	A5329459	2014/06	2015/06
Cable	-	-	A5329261	2014/06	2015/06
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2015/03	2016/03

3.5. RESULTS

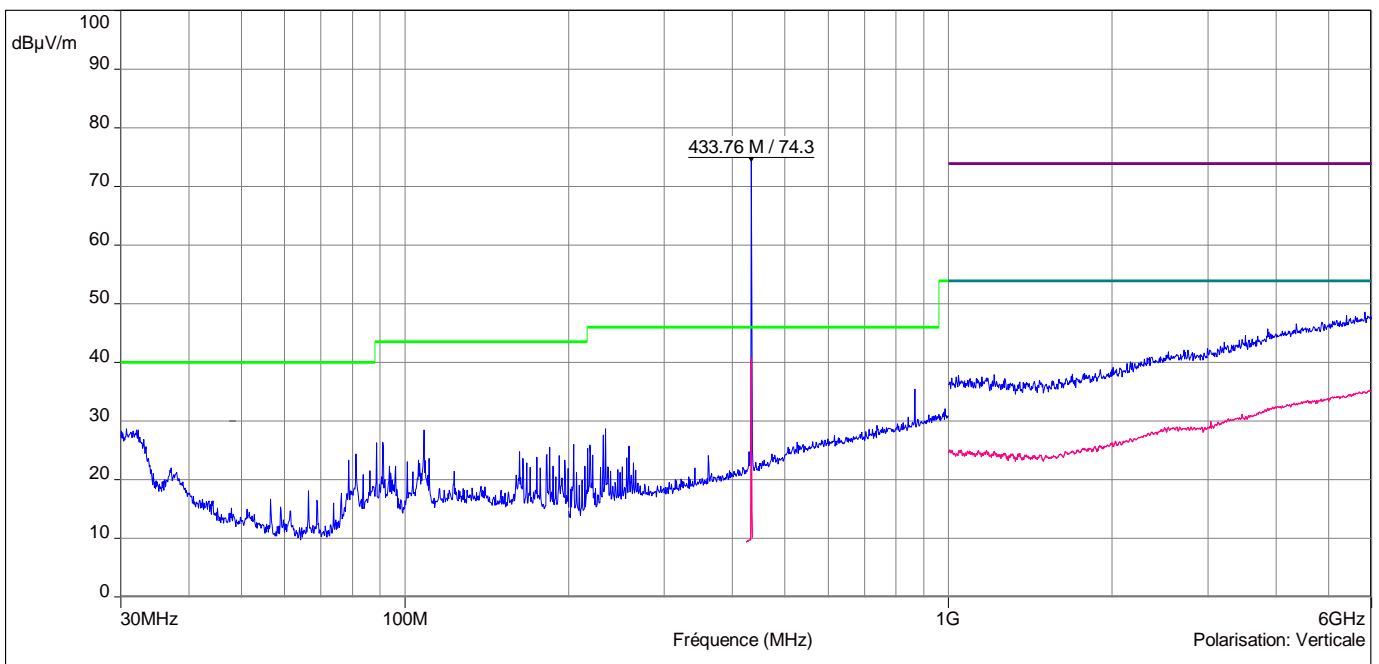
**Cmin
Horizontal Polarization (30MHz-6GHz)**

- FCC/FCC 15.209 >30M - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 >30M - Classe:1 - QCrête/3.0m/
- FCC/FCC 15.209 >30M - Classe:1 - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



**Cmin
Vertical Polarization (30MHz-1GHz)**

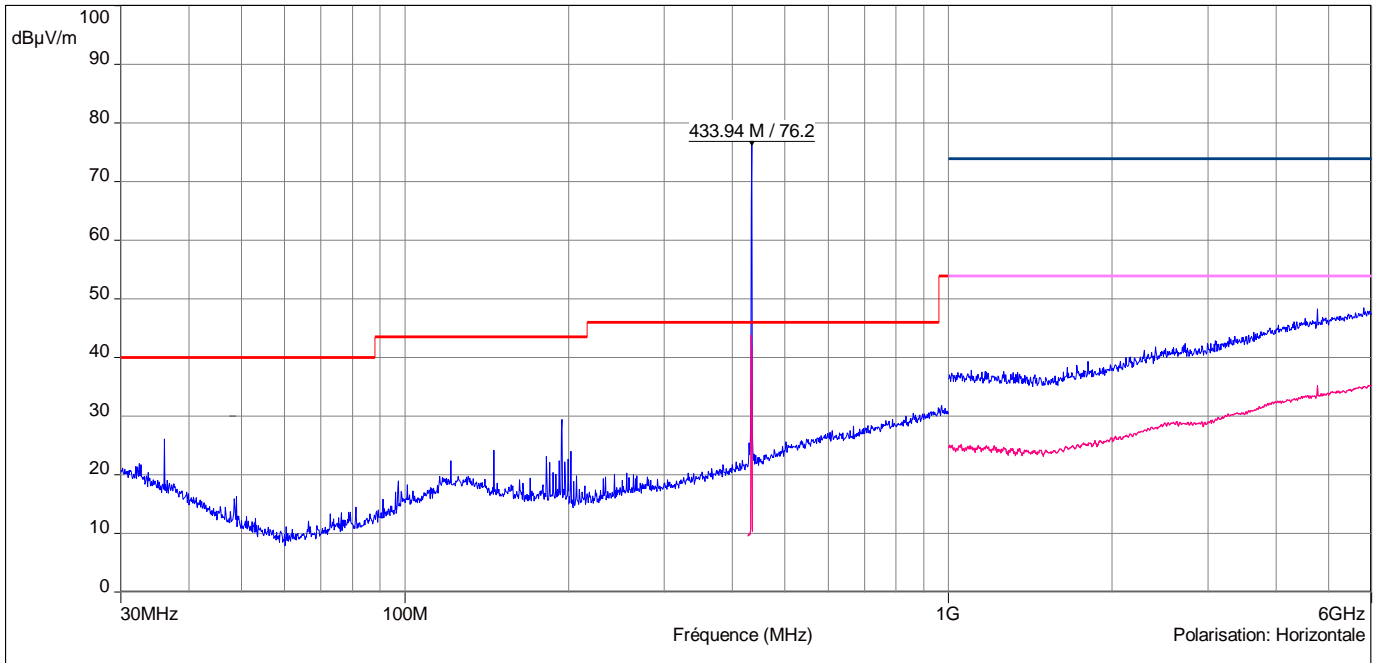
- FCC/FCC 15.209 >30M - Classe:1 - Moyenne/3.0m/
- FCC/FCC 15.209 >30M - Classe:1 - QCrête/3.0m/
- FCC/FCC 15.209 >30M - Classe:1 - Crête/3.0m/
- Mes.Peak (Verticale)
- Mes.Avg (Verticale)





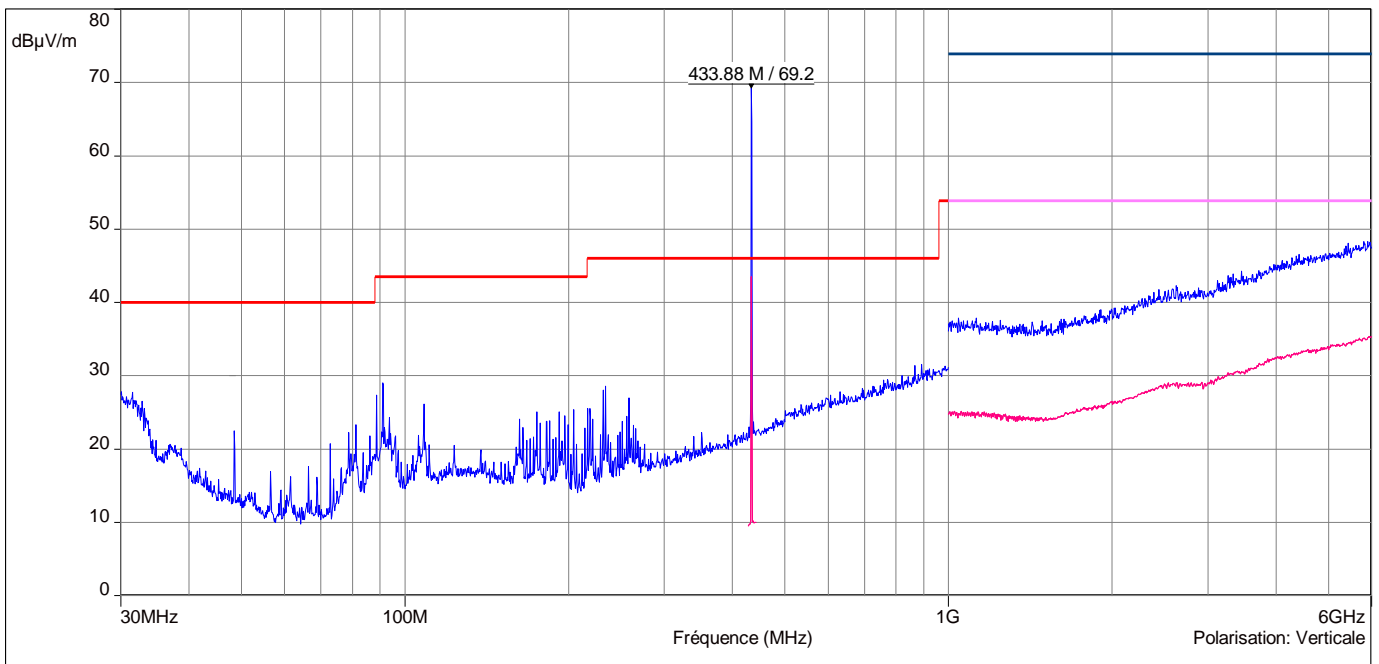
Cmax Horizontal Polarization (30MHz-6GHz)

- FCC/FCC 15.109 - Classe: - Moyenne/3.0m/
- FCC/FCC 15.109 - Classe: - QCrête/3.0m/
- FCC/FCC 15.109 - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Avg (Horizontale)



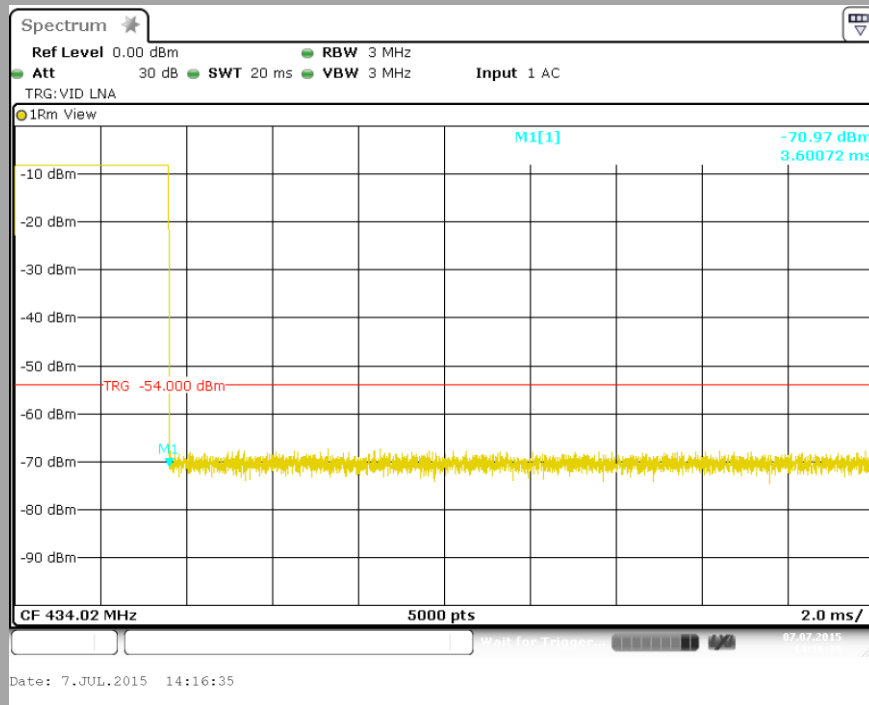
Cmax Vertical Polarization (30MHz-1GHz)

- FCC/FCC 15.109 - Classe: - Moyenne/3.0m/
- FCC/FCC 15.109 - Classe: - QCrête/3.0m/
- FCC/FCC 15.109 - Classe: - Crête/3.0m/
- Mes.Peak (Verticale)
- Mes.Avg (Verticale)

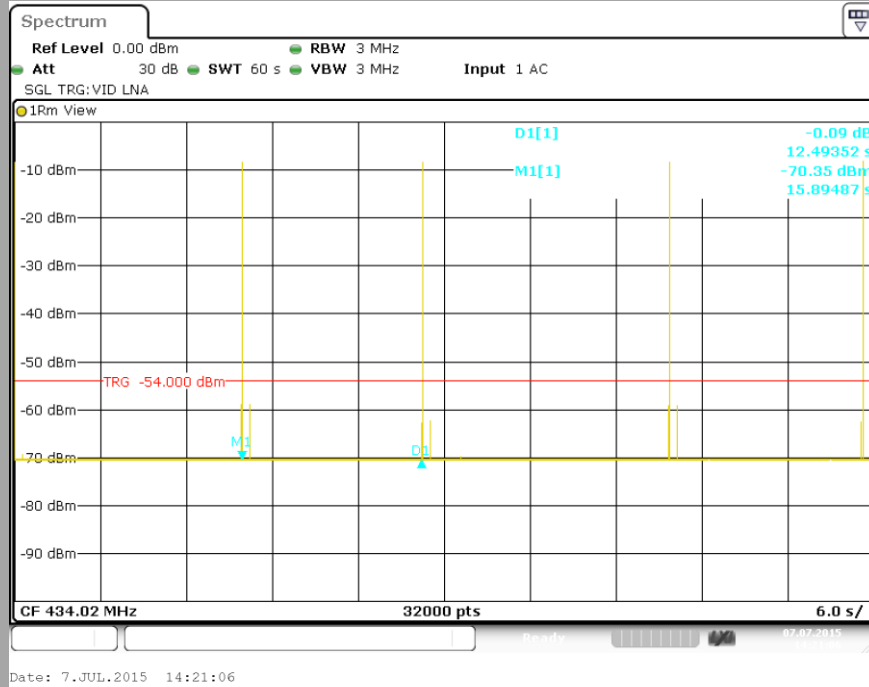




Duty cycle factor
Ton



Toff



Temperature	Tnom
Voltage	Vnom
Ton (ms)	3.6
Toff (ms)	12493
Tperiod average (ms)	100
Duty cycle factor (dB)	-28.87

Duty cycle factor= 20*log(Ton/Tperiod average)



Polarisation	Frequency (MHz)	Peak Level (dBµV/m)	QPeak Level (dBµV/m)	Average Limit (dBµV/m)
Vertical	91.05	29	-	40
Horizontal	36.1	26.05	-	43.5
Vertical	258.4	27	-	46
Vertical	233.8	28.04	-	46
Horizontal	859.7	30.5	-	46
Horizontal	1000	37.3	-	53.9

Channel	Frequency (MHz)	Peak Level (dBµV/m)	Duty cycle factor (dB)	Average Level (dBµV/m)	Average Limit (dBµV/m)
Cmin	433.22	75.15	-28.87	46.28	72.8
Cmax	434.62	68.8	-28.87	39.93	72.8

3.6. CONCLUSION

Measures of Field strength of fundamental & spurious domain, performed on the sample of the product Aniview / 03201, SN: -, in configuration and description presented in this test report, show levels conform to the FCC part 15.231e limits.

4. AC Power Line Conducted Emissions

4.1. ENVIRONMENTAL CONDITIONS

Test performed by : Fostoki MEDJOU DJ
 Date of test : 2015/05/07
 Ambient temperature : 20°C
 Relative humidity : 38%

4.2. TEST SETUP

Specifications:

Frequency 0.15 – 30 MHz RBW 9 kHz
 Detector Peak , Quasi Peak and average

The measurement is performed on power supply with a LISN and telecommunication lines with RSI or current clamp for shielded cables.

Operating conditions:

- Deviation method:

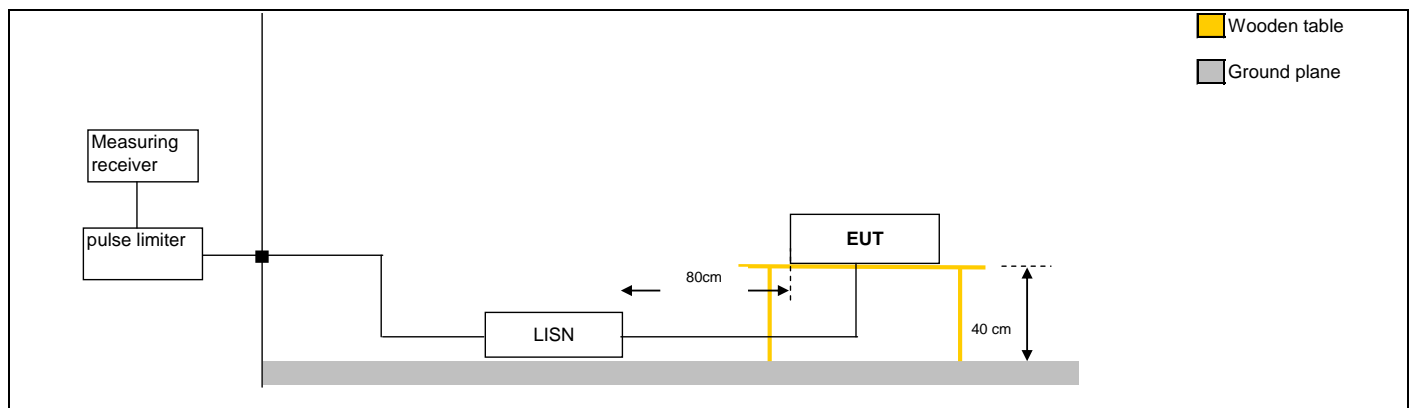
- Yes
- No

-Product installation:

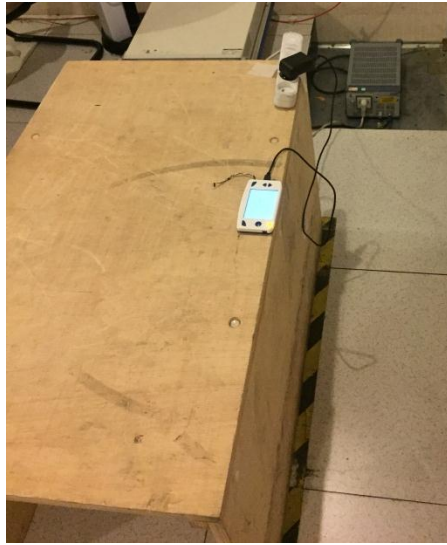
- The EUT is installed on a wooden table 80 cm above the reference plane, at 80cm of the LISN and at 40cm of the vertical conductive wall
- The EUT is installed on a wooden table 40 cm above the reference plane, at 80cm of the LISN.
- The EUT is installed 10 cm above the reference plane, at 80cm of the LISN..

Operating mode:

- Mode 1



Test set up of conducted emission on power supply



Test set up of conducted emission on power supply



4.3. LIMIT

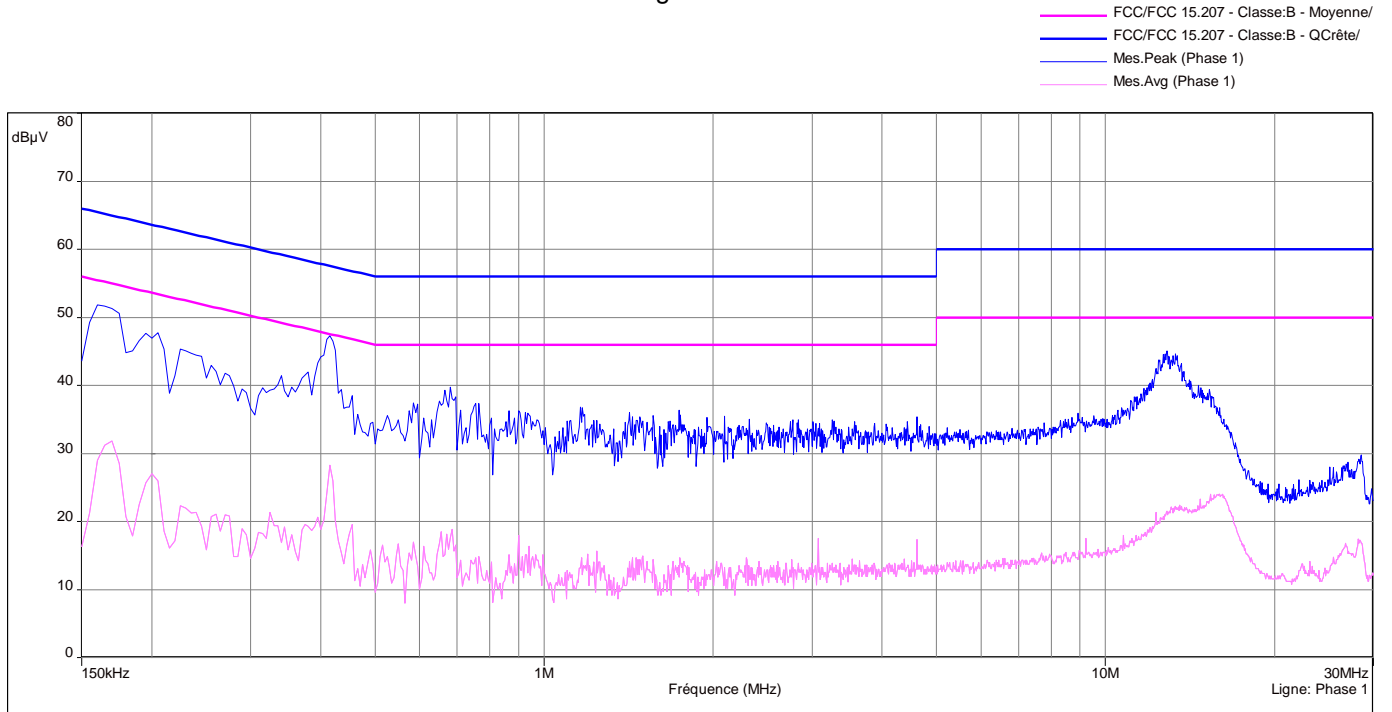
Frequency Bands/frequencies	dB (μ V/m) quasi-peak	dB (μ V/m) average
0.15-0.5MHz	66-56	56-46
0.5-5 MHz	56	46
5-30 MHz	60	50

4.4. TEST EQUIPMENT LIST

Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum analyzer	ROHDE & SCHWARZ	ESIB26	A2642021	2015/01	2016/01
V ISLN	ROHDE & SCHWARZ	ENV216	C2320162	2015/04	2016/04
Semi anechoic chamber 11,8x8,1x9,5m	SIEPEL	C01	D3044008	2014/09	2015/09
Cable	-	-	A5329411	2014/06	2015/06
Cable	-	-	A5329530	2014/06	2015/06

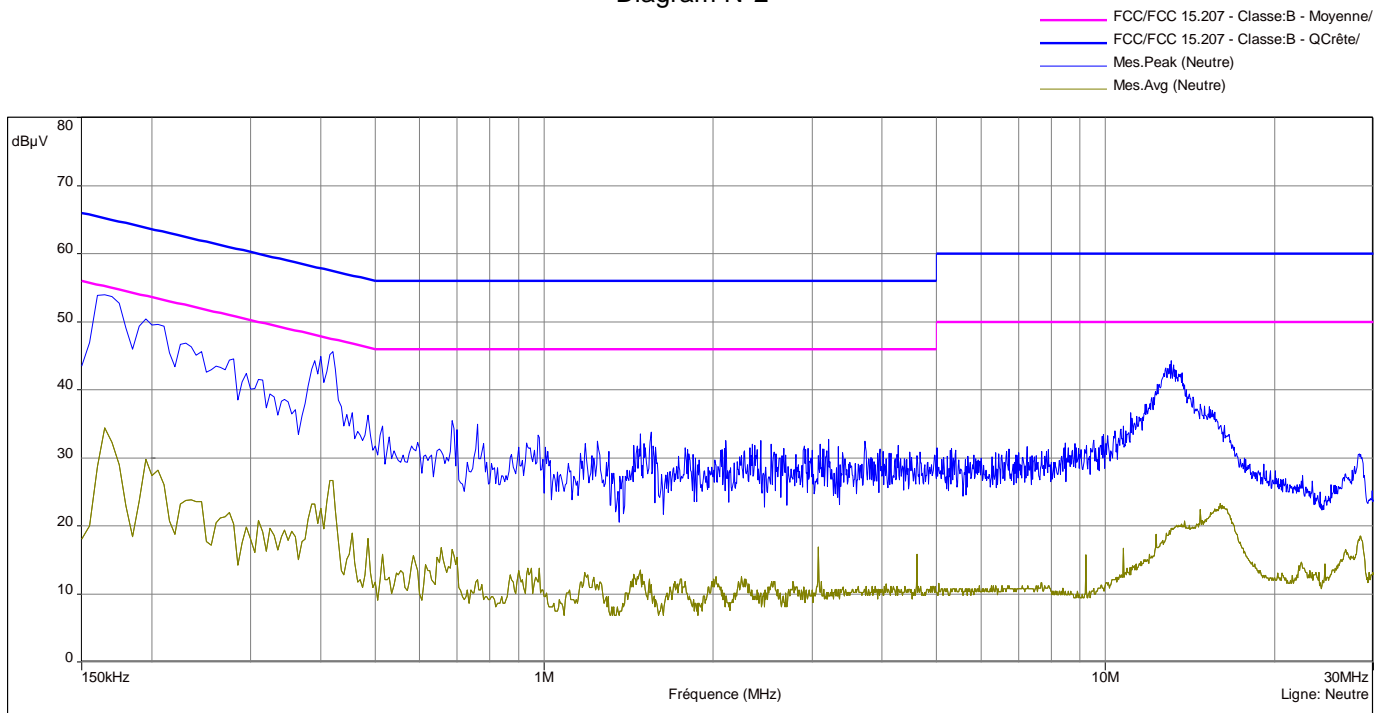
4.5. RESULTS

Diagram N°1



Phase

Diagram N°2



Neutral



Phase Line

Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.16	51.8	-	65.5	31.2	55.5
1.74	36.3	-	56	10.7	46
12.8	45	-	60	22	50

Neutral Line

Frequency (MHz)	Peak Level (dBµV)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.16	53.9	-	65.2	34.4	55.2
1.55	33.8	-	56	13.5	46
13.09	44.2	-	60	20.8	50

4.6. CONCLUSION

Measures of Conducted Emission, performed on the sample of the product Aniview / 03201, SN: -, in configuration and description presented in this test report, show levels conform to the FCC part 15.207 limits.

5. EMISSION BANDWIDTH

5.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2015/05/06
Ambient temperature : 22°C
Relative humidity : 42%

5.2. TEST SETUP

- The Equipment under Test is installed:

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

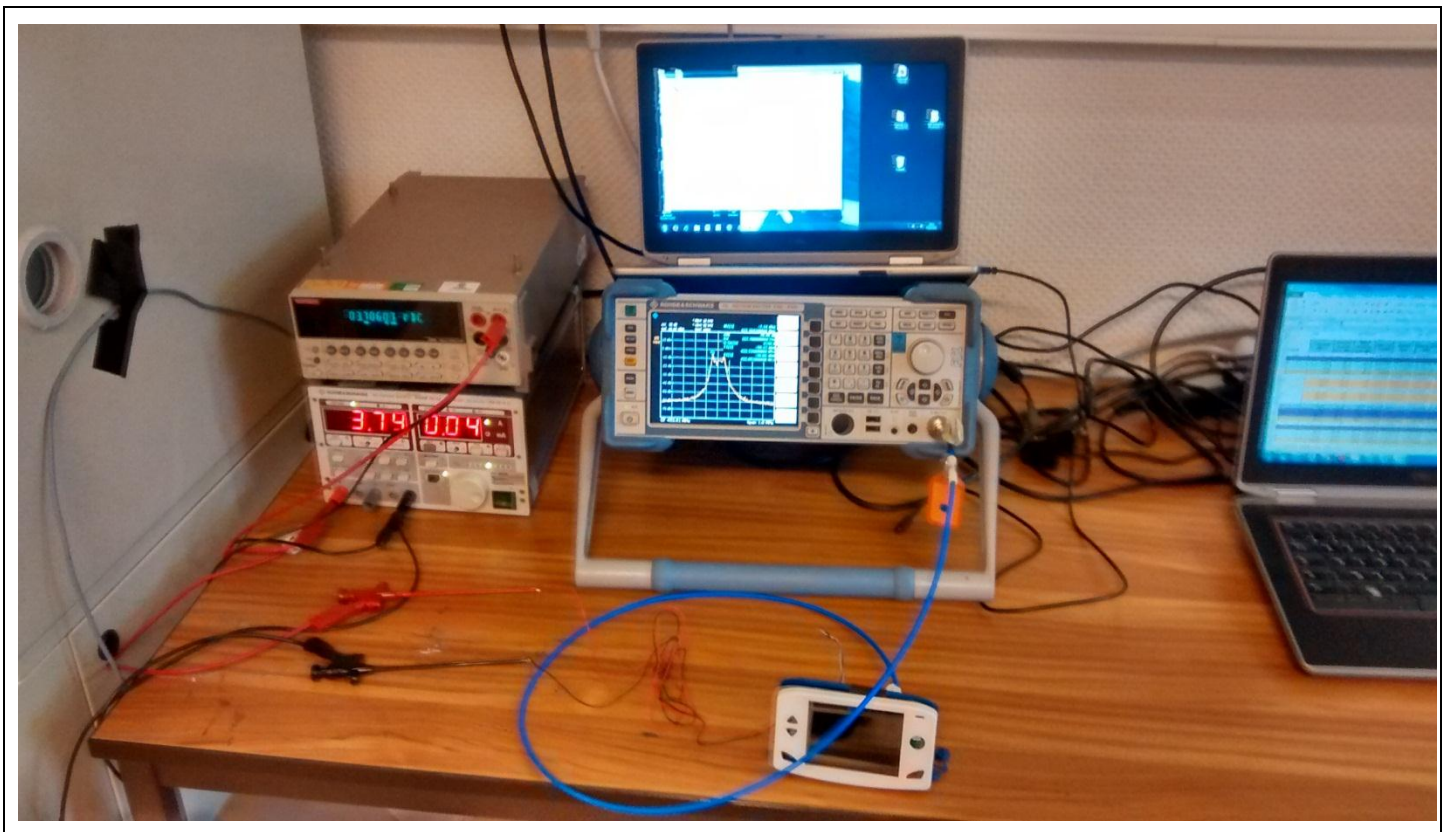
-Measurement is performed with a spectrum analyzer

- On the EUT conducted access
- With a test fixture

The spectrum analyzer is used to find the emission bandwidth.
Detector peak

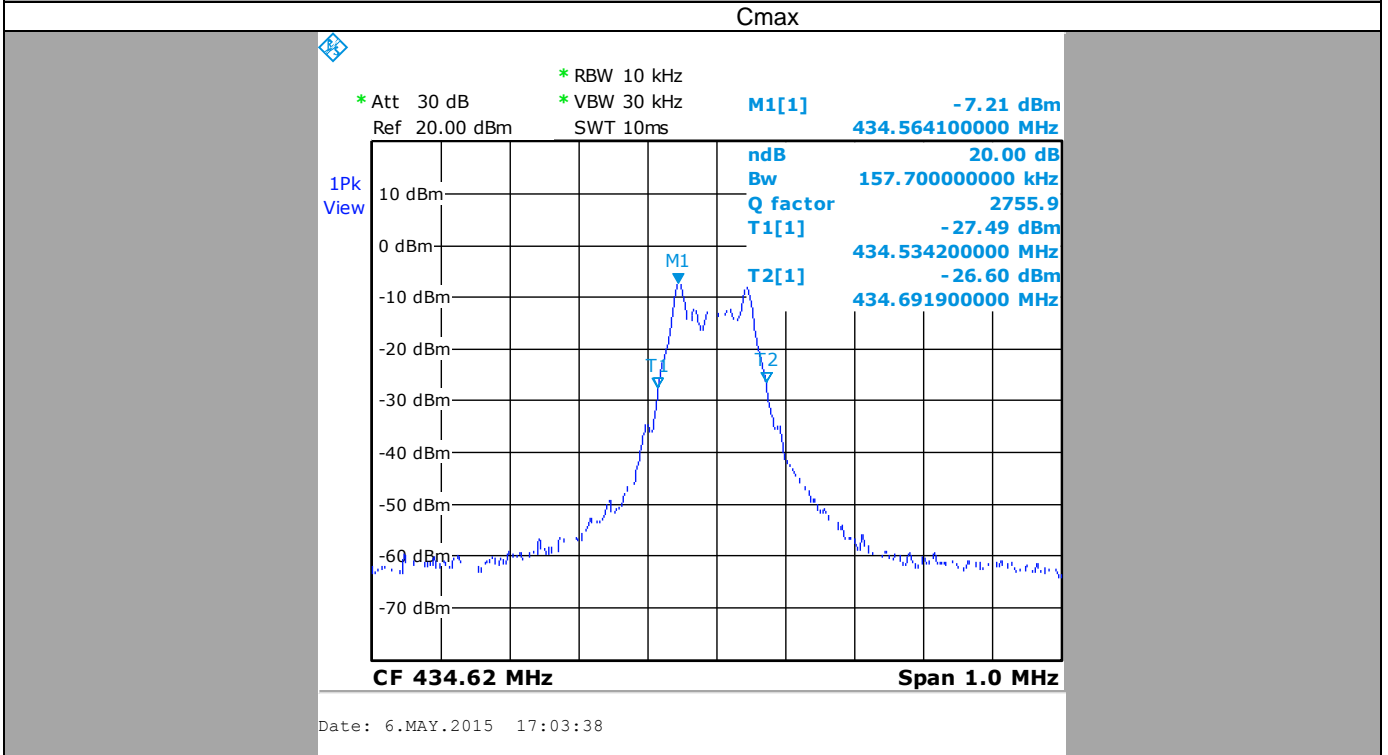
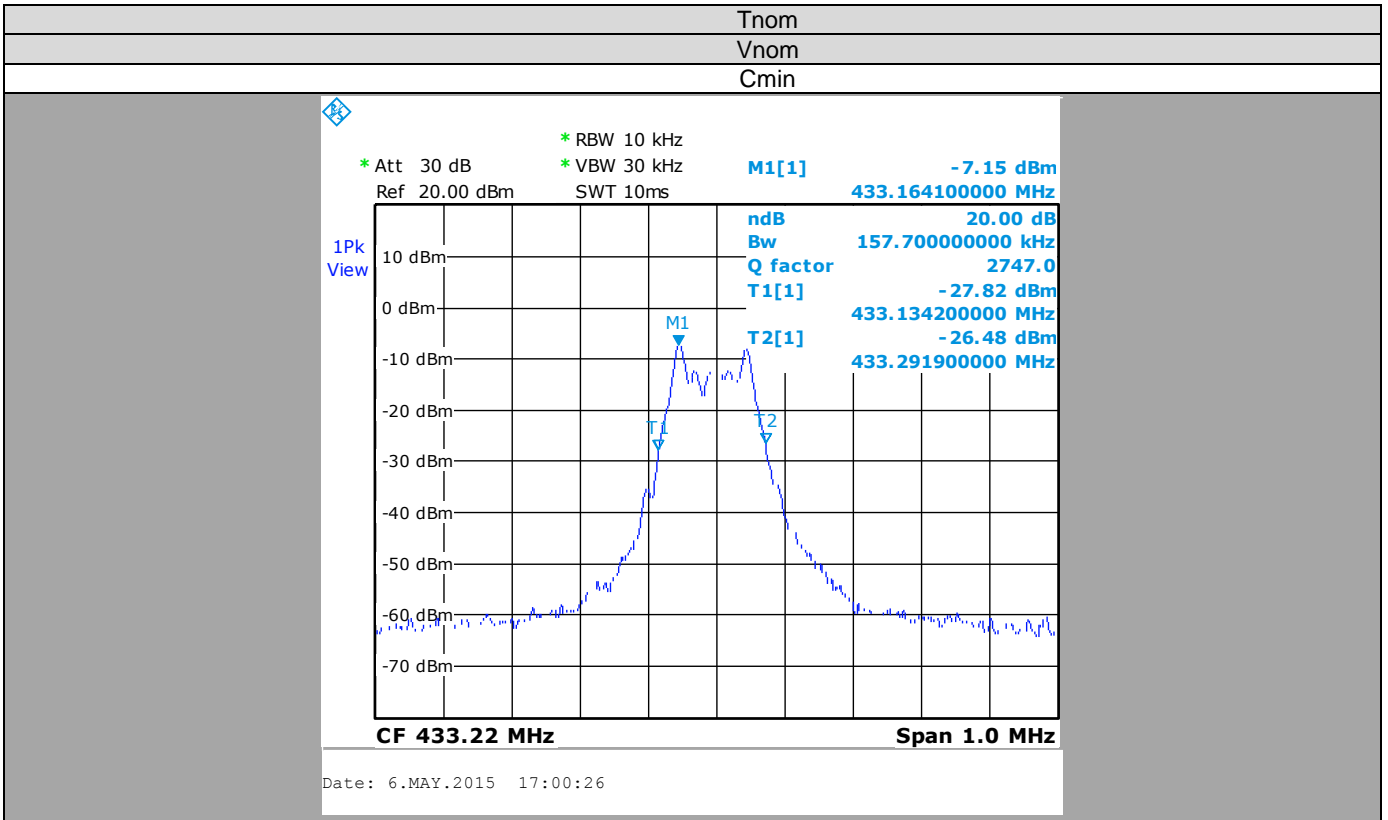
Operating mode:

- Mode 1



Photograph for Emission Bandwidth

5.6. GRAPHICS & RESULTS





L C I E

Temperature	Tnom	
Voltage	Vnom	
Channel	Cmin	Cmax
Emission bandwidth (kHz)	157.7	157.7
Limit (kHz)	1083,05	1086,55

5.7. CONCLUSION

Emission bandwidth measurement performed on the sample of the product Aniview / 03201, SN: -, in configuration and description presented in this test report, show levels conform to the FCC part 15.231d limits.

6. LIMITING OPERATION

6.1. TEST CONDITIONS

Test performed by : Stéphane PHOUDIAH
Date of test : 2015/07/07
Ambient temperature : 24°C
Relative humidity : 47%

6.2. TEST SETUP

- The Equipment under Test is installed:

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

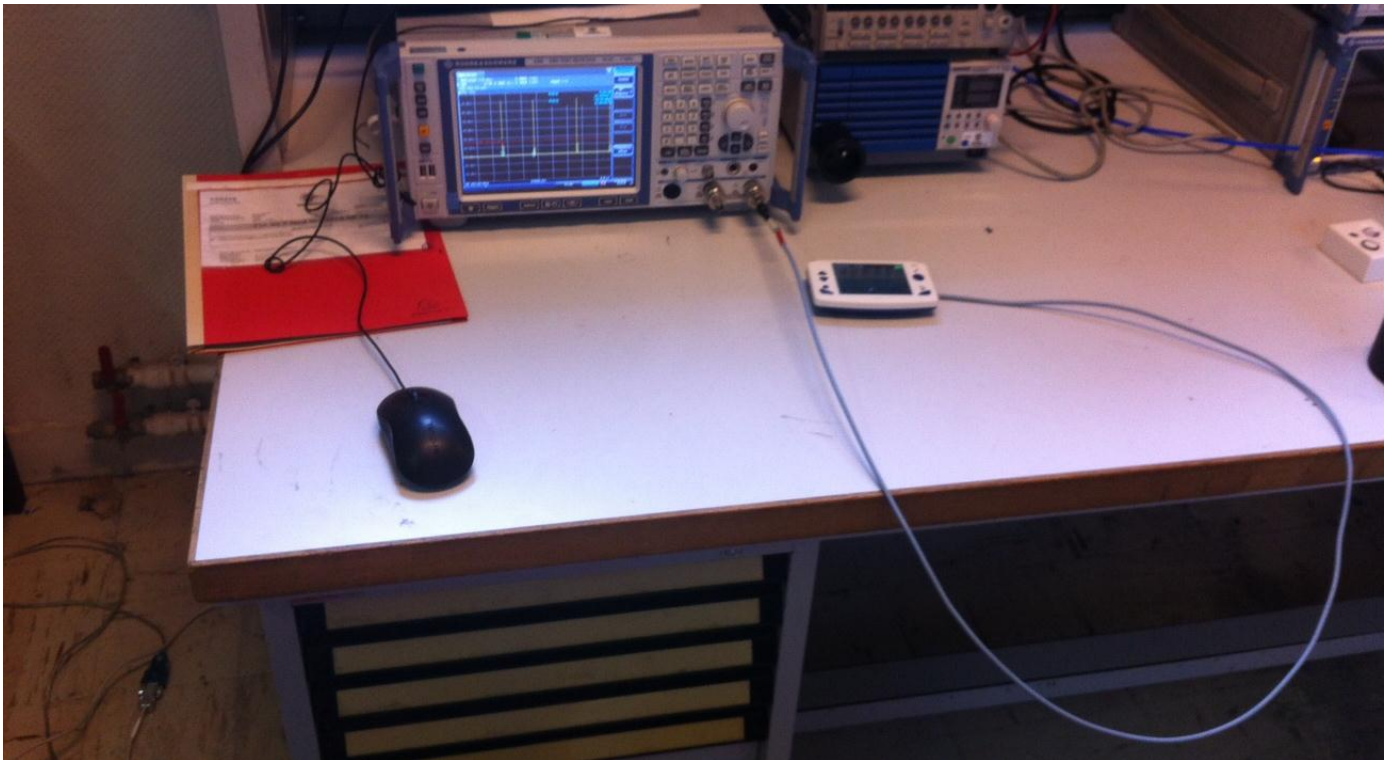
-Measurement is performed with a spectrum analyzer

- On the EUT conducted access
- With a test fixture

The spectrum analyzer is used in span 0 to find the limiting operation.
Detector peak

Operating mode:

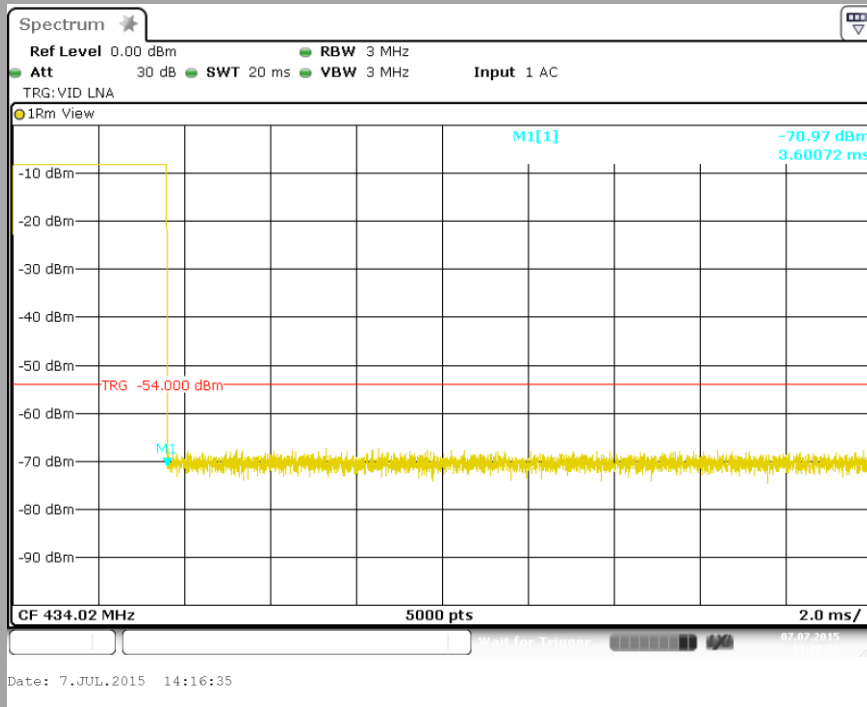
- Mode 2



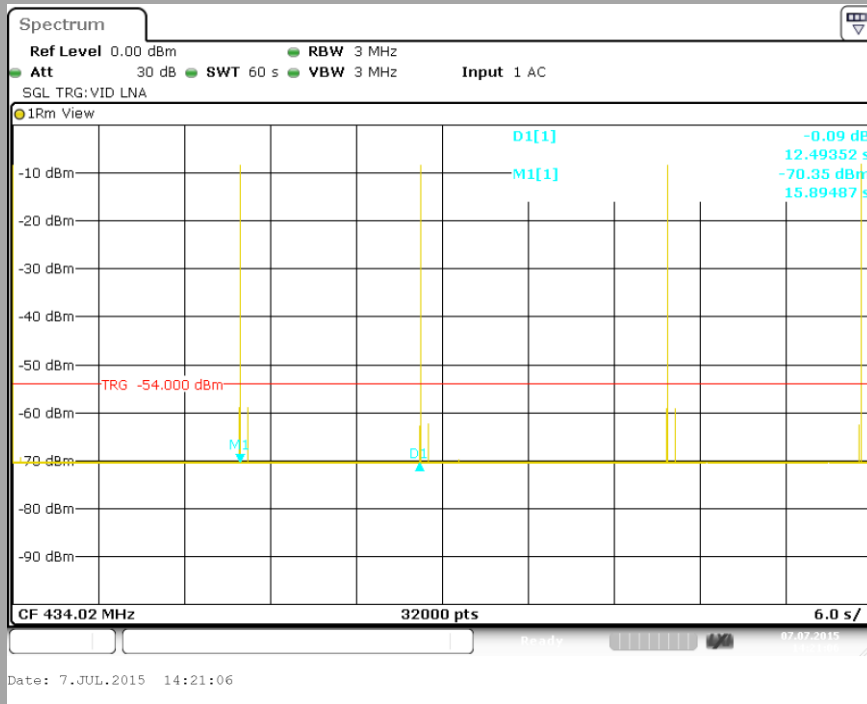
Photograph for Limited Operation

6.6. GRAPHICS & RESULTS

Tnom
Vnom
Cnom
Transmitting time



Silent time





Temperature	Tnom
Voltage	Vnom
Channel	Cnom
Transmitting time (s)	0.0036
Silent time (s)	12.49

6.7. CONCLUSION

Limiting operation measurement performed on the sample of the product Aniview / 03201, SN: -, in configuration and description presented in this test report, show levels conform to the FCC part 15.231e limits.



7. Uncertainties Chart

Kind of measurement	Wide uncertainty laboratory (k=2) ±x(dB)	CISPR uncertainty limit ±y(dB)
Measurement of conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site.	3.51	3.6
Measurement of discontinuous conducted disturbances in voltage on the AC power port on the Fontenay-aux-Roses site. (S48 room)	3.45	3.6
Measurement of conducted disturbances in voltage on the AC power port on the Ecuelles site.	3.86	3.6
In Situ measurement of conducted disturbances in voltage on the AC power port with ESH2 receiver	3.51	3.6
Measurement of conducted disturbances in voltage on the DC power port on the Fontenay-aux-Roses site.	3.49	3.6
Measurement of conducted disturbances in voltage on the DC power port on the Ecuelles site.	3.72	3.6
Measurement of conducted disturbances in voltage on the telecommunication port.	3.26	Under consideration
Measurement of conducted disturbances in voltage on the telecommunication port at Ecuelles Site.	3.45	Under consideration
Measurement of conducted disturbances in current	3.09	Under consideration
Measurement of radiated electric field from 30 to 200MHz on the Fontenay-aux-Roses site (with EATON 96002 antenna)	5.2	5.2
Measurement of radiated electric field from 200 to 1000MHz on the Fontenay-aux-Roses site	5.3	5.2
Measurement of radiated electric field from 1 to 18GHz on the Fontenay-aux-Roses site	4.8	Under consideration
Measurement of radiated electric field from 30 to 80MHz in horizontal position on the Ecuelles site (dipole antenna)	3.77	5.2
Measurement of radiated electric field from 30 to 80MHz in vertical position on the Ecuelles site (dipole antenna)	4.12	5.2
Measurement of radiated electric field from 80 to 1000MHz in horizontal position on the Ecuelles site (R&S HL023 A2 logper antenna)	4.19	5.2
Measurement of radiated electric field from 80 to 1000MHz in vertical position on the Ecuelles site (R&S HL023 A2 logper antenna)	4.50	5.2
Measurement of radiated electric field from 30 to 1000MHz in horizontal position on the Ecuelles site (CBL6112 bilog antenna)	4.24	5.2
Measurement of radiated electric field from 30 to 1000MHz in vertical position on the Ecuelles site (CBL6112 bilog antenna)	4.55	5.2
Measurement of radiated electric field from 1 to 18GHz on the Ecuelles site	5.16	Under consideration
Measurement of current harmonics	11.11%	/
Flicker measurement	9.26%	/
Measurement of disturbance power	3.32	4.5
Immunity to conducted disturbances, induced by radio-frequency fields	2.36	/
Immunity to conducted disturbances, induced by radio-frequency fields with injection clamp	2.76	/
Immunity to radiated electromagnetic field	2.64	/
EMF measurement according to EN62233 from 10KHz to 400KHz	23,51%	/