



LCIE

# TEST REPORT

N°: 154815-719404-A(FILE#986417)

Version : 01

**Subject** Electromagnetic compatibility tests according to the standards:  
FCC CFR 47 Part 15, Subpart C  
RSS-247 Issue 2.0

**Issued to** KONTRON MODULAR COMPUTERS SA  
150 rue Marcellin Berthelot  
BP244 - 83078 – TOULON Cedex 9  
FRANCE

**Apparatus under test**

↳ Product LoRa Radio Module  
↳ Trade mark KONTRON  
↳ Manufacturer KONTRON  
↳ Model under test iC980A-K  
↳ Serial number 0274  
↳ FCCID 2AP2E-IC980AK  
↳ IC 23960-IC980AK

**Conclusion**

See Test Program chapter

**Test date**

May 15, 2018 to May 23, 2018

**Test location**

MOIRANS

**IC Test site**

6500A-1 & 6500A-3

**Composition of document**

34 pages

**Document issued on**

June 12, 2018

**Written by :**

Gaetan DESCHAMPS

Tests operator

**Approved by :**

Anthony MERLIN

Technical Manager



This document shall not be reproduced, except in full, without the written approval of the LCIE. This document contains results related only to the items tested. It does not imply the conformity of the whole production to the items tested. Unless otherwise specified, the decision of conformity takes into account the uncertainty of measurement. This document doesn't anticipate any certification decision.

**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



L C I E

## PUBLICATION HISTORY

Version	Date	Author	Modification
01	June 12, 2018	Gaetan DESCHAMPS	Creation of the document



L C I E

## SUMMARY

1. TEST PROGRAM .....	4
2. SYSTEM TEST CONFIGURATION.....	5
3. CONDUCTED EMISSION DATA.....	9
4. RADIATED EMISSION DATA .....	11
5. BANDWIDTH (15.247) .....	16
6. MAXIMUM PEAK OUTPUT POWER (15.247) .....	18
7. POWER SPECTRAL DENSITY (15.247) .....	21
8. BAND EDGE MEASUREMENT (15.247) .....	24
9. OCCUPIED BANDWIDTH.....	27
10. ANNEX 1 (GRAPHS) .....	29
11. UNCERTAINTIES CHART .....	34



L C I E

## 1. TEST PROGRAM

Standard:

- FCC Part 15, Subpart C 15.247
- ANSI C63.10 (2013)
- RSS-247 Issue 2.0
- RSS-Gen Issue 5
- 558074 D01 DTS Measurement Guidance v04

EMISSION TEST	LIMITS			RESULTS
	Frequency	Quasi-peak value (dB $\mu$ V)	Average value (dB $\mu$ V)	
<b>Limits for conducted disturbance at mains ports</b> 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	
<b>Radiated emissions</b> 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
<b>Radiated emissions</b> 30MHz-25GHz* CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5 <b>Highest frequency :133MHz</b> <i>(Declaration of provider)</i>	<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
<b>Bandwidth 6dB</b> 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
<b>Power spectral Density</b> 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
<b>Maximum Peak Output Power</b> 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
<b>Band Edge Measurement</b> 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
<b>Occupied bandwidth</b> RSS-Gen §6.7	<b>No limit</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
<b>Receiver Spurious Emission**</b> RSS-Gen §7.3	<b>See RSS-Gen §7.3</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.



L C I E

## 2. SYSTEM TEST CONFIGURATION

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

#### Equipment under test (EUT):

iC980A-K

Serial Number: 0274



Photography of EUT (iC980A-K)

#### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 5VDC

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

Name	Type	Rating	Reference / Sn		Comments
Supply1	<input type="checkbox"/> AC <input checked="" type="checkbox"/> DC <input type="checkbox"/> Battery	5VDC		-	Not provided by the manufacturer

#### Inputs/outputs - Cable:

EUT : iC980A-K

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	DC	0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-

#### Inputs/outputs - Cable:

Auxiliary: TRACe-LoRaMQTT-US

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	SAC-4P- 5,0-28R/FS SCO RAIL	2.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ref: 1407318
Access1	M12/RJ45 Metz-connect 142M2X15100	10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Access2	M12/RJ45 Metz-connect 142M2X15100	10	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Access3	Grounding strip	2.0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



L C I E

**Auxiliary equipment used during test:**

Type	Reference	Sn	Comments
TRACe-LoRaMQTT-US	BSP TRACe ID17313	2018091010001	ECLevel (00000) Supplied at 24VDC
Power supply DC	TDK	X445363	-
2 X RJ45 cable SFTP	-	-	-
Ethernet Switch	NETGEAR : GS108T	-	-
Laptop + USB mouse +USB keyboard	SHUTTLE 1519-1-1	-	-

**Equipment information:**

**iC980A-K**

Frequency band:	[902 – 928] MHz		
Spectrum Modulation:	<input checked="" type="checkbox"/> DTS		
Number of Channel:	8		
Spacing channel:	600kHz		
Channel bandwidth:	500kHz		
Antenna Type:	<input type="checkbox"/> Integral	<input checked="" type="checkbox"/> External	<input type="checkbox"/> Dedicated
Antenna connector:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Temporary for test
Transmit chains:	<input checked="" type="checkbox"/> 1 Single antenna Gain 1: < 1.2dBi		
Beam forming gain:	No		
Receiver chains	1		
Type of equipment:	<input type="checkbox"/> Stand-alone	<input checked="" type="checkbox"/> Plug-in	<input type="checkbox"/> Combined
Ad-Hoc mode:	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty	<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty
Equipment type:	<input checked="" 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"/> -40°C
	Tnom:	20°C	
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C <input checked="" type="checkbox"/> +85°C
Type of power source:	<input type="checkbox"/> AC power supply	<input checked="" type="checkbox"/> DC power supply	<input type="checkbox"/> Battery
Operating voltage range:	Vnom:	<input type="checkbox"/> 230V/50Hz	<input checked="" type="checkbox"/> 5Vdc

**CHANNEL PLAN:**

Channel Frequency  
 C1 (Cmin) 923.3MHz  
 C2 923.9 MHz  
 C3 924.5 MHz  
 C4 (Cmid) 925.1MHz  
 C5 925.7 MHz  
 C6 926.3 MHz  
 C7 926.9 MHz  
 C8 (Cmax) 927.5MHz



## 2.2. EUT CONFIGURATION

The EUT is set in the following modes during tests:

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

All tests are performed at Cmin (923.3MHz), Cmid (925.1MHz) and Cmax (927.5MHz).

The order power set at 18dBm

EUT Setting (configuration 1 and 2):

Pa\_gain : 2

Mix\_gain : 13

Dig\_gain : 1

Bw : 500

See the following capture of terminal control:

```
[root@vcsprod TRACe-LoRa]# python lora_tx_continuous.py -r
Choose frequency: 923.3
Kill previous script...
1410 ?      Ss      0:00 util_tx_continuous -f 923.3 -r 1257 --dig 1 --mix 13 --pa 2 --mod LORA --sf 10 --bw 500
PID: 1410
Reset LoRa gateway...
CMD: [reset_lgw.sh]
Launch LoRa TX test tool...
CMD: [util_tx_continuous -f 923.3 -r 1257 --dig 1 --mix 13 --pa 2 --mod LORA --sf 10 --bw 500]
INFO: concentrator started, packet can be sent
```

## 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 : May 16, 2018  
 Test performed by : Gaëtan DESCHAMPS  
 Atmospheric pressure (hPa) : 1020  
 Relative humidity (%) : 34  
 Ambient temperature (°C) : 23

#### 3.2. TEST SETUP

##### **Mains terminals**

The EUT and auxiliaries are set:

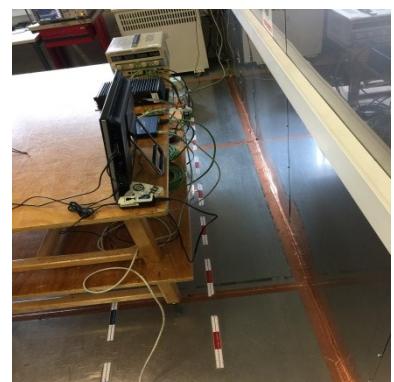
80cm above the ground on the non-conducting table (Table-top equipment)

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  $50\Omega / 50\mu\text{H}$ . 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	C2320123	05/17	05/18
LISN	RHODE & SCHWARZ	ENV216	C2320291	12/17	12/18
Load 50Ω	-	-	A7152030	02/18	02/19
Load 50Ω - N	AEROFLEX	-	A7152068	07/17	07/18
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	12/17	12/18
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18
Transient limiter	RHODE & SCHWARZ	ESH3-Z2	A7122204	02/18	02/19

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

None  Divergence:

### 3.6. TEST RESULTS

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

## Results: (PEAK detection)

## Configuration 1:

Measure on L1:

graph Emc#1

(see annex 1)

### Measure on $N$ :

## graph Emc#2

(see annex 1)

### 3.7. CONCLUSION

Conducted emission data measurement performed on the sample of the product **iC980A-K**, SN: 0274, 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 : May 15, 2018  
 Test performed by : Gaëtan DESCHAMPS  
 Atmospheric pressure (hPa) : 1002  
 Relative humidity (%) : 32  
 Ambient temperature (°C) : 21

### 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 on OATS



General Test setup in anechoic chamber >1GHz



#### 4.3. TEST METHOD

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

##### Pre-characterisation measurement: (9kHz – 6GHz)

A pre-scan of all the setup has been performed in a 3 meters semi-anechoic chamber for frequency from 30MHz to 6GHz. 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 6GHz.

##### 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 10GHz:

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 10GHz.

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.



LCIE

#### 4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna Bi-log	CHASE	CBL6111A	C2040172	06/16	06/18
Cable Measure @3m	-	1GHz	A5329206	06/17	06/18
Cable emission	-	-	A5329639	09/17	09/18
Semi-Anechoic chamber #3	SIEPEL	-	D3044017	03/16	03/19
Radiated emission comb generator	BARDET	-	A3169050	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/18
BAT EMC	NEXIO	v3.9.0.10	L1000115	-	-
Thermo-hygrometer (C3)	OREGON	BAR206	B4204078	10/16	10/18
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371	-	-
Table C3	LCIE	-	F2000461	-	-
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444	-	-
Antenna horn 18GHz	EMCO	3115	C2042029	08/16	08/18
Cable Measure @1m	STORMFLEX	26GHz	A5329680	12/17	12/18
Cable Measure @1m	STORMFLEX	26GHz	A5329682	12/17	12/18
High Pass (1-15GHz)	WAINRIGHT	WHKX 1.03/15G-10SS	A7484035	05/17	05/19
Antenna Bi-log	CHASE	CBL6111A	C2040051	01/18	01/19
Emission Cable	-	6GHz	A5329069	07/17	07/18
OATS	-	-	F2000409	10/17	10/18
Turntable / Mast controller (OATS)	ETS Lindgren	Model 2066	F2000372	-	-
Antenna mast (OATS)	ETS Lindgren	2071-2	F2000392	-	-
Turntable (OATS)	ETS Lindgren	Model 2187	F2000403	-	-
Rehausse Table C1/OATS	LCIE	-	F2000512	-	-

#### 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:

Configuration 1

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



L C I E

#### 4.6.2. Pre-characterization at 3 meters [1GHz-6GHz]

See graphs for 1GHz-6GHz:

Configuration 1

Graph identifier	Polarization	Mode	EUT position	Channel	Comments
Emr# 3	H/V	TX	Axis XY	Mid	See annex 1

#### 4.6.3. 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.

Test Frequency (MHz)	Meter Reading dB(µV)	Detector (Pk/QP/A v)	Polarity (V/H)	Azimuth (Degree s)	Antenna Height (cm)	Gain/Loss Factor (dB)	Transducer Factor (dB)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
44.399	2.3	QP	V	350	100	-	13.0	15.3	40.0	<b>-24.7</b>	
52.729	13.7	QP	V	150	100	-	9.1	22.8	40.0	<b>-17.2</b>	
63.184	6.6	QP	V	360	100	-	7.9	14.5	40.0	<b>-25.5</b>	
82.462	3.9	QP	V	40	100	-	10.0	13.9	40.0	<b>-26.1</b>	
265.940	23.1	QP	H	260	330	-	16.2	39.3	46.0	<b>-6.7</b>	
399.010	8.8	QP	V	0	100	-	19.8	28.6	46.0	<b>-17.4</b>	
532.010	16.0	QP	V	350	245	-	23.1	39.1	46.0	<b>-6.9</b>	
659.060	16.0	QP	V	0	400	-	25.6	41.6	46.0	<b>-4.4</b>	
798.010	52.8	QP	V	0°	120	-	-11.6	41.2	46	<b>-4.8</b>	Perfomed at 3m (Cage 3)
896.01	52.8	QP	V	0°	120	-	-9.5	43.3	46	<b>-2.7</b>	Perfomed at 3m (Cage 3)
968.815	0.0	QP	V	0	250	-	31.5	31.5	54.0	<b>-22.5</b>	

Note: Measure have been done at 10m distance and corrected according to requirements of 15.209.e)

(M@3m = M@10m+10.5dB)



L C I E

#### 4.6.4. Characterization on 3meters anechoic chamber from 1GHz to 10GHz

##### 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.

Test Frequency (MHz)	Meter Reading dB(µV)	Detector (Pk/QP/Av)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Gain/Loss Factor (dB)	Transducer Factor (dB)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
3700.500	13.2	Av	H	250	180	-	37.9	51.1	54.0	<b>-2.9</b>	Z canal 925.1
5500.000	2.4	Av	V	0	120	-	42.2	44.6	54.0	<b>-9.4</b>	Z canal 925.1
3700.500	12.3	Av	H	250	180	-	37.9	50.2	54.0	<b>-3.8</b>	XY canal 925.1
4625.000	5.8	Av	V	90	100	-	39.6	45.4	54.0	<b>-8.6</b>	XY canal 925.1
5551.000	2.4	Av	V	0	125	-	42.7	45.1	54.0	<b>-8.9</b>	XY canal 925.1
1064.000	15.8	Av	V	60	100	-	25.0	40.8	54.0	<b>-13.2</b>	XY canal 923.3
2770.000	12.3	Av	H	0	110	-	34.4	46.7	54.0	<b>-7.3</b>	XY canal 923.3
3693.000	15.0	Av	H	0	150	-	37.9	52.8	54.0	<b>-1.2</b>	XY canal 923.3
1064.000	14.0	Av	V	240		-	25.0	39.0	54.0	<b>-15.0</b>	Z canal 923.3
3693.500	14.8	Av	H	120		-	37.9	52.7	54.0	<b>-1.3</b>	Z canal 923.3
1064.000	13.9	Av	V			-	25.0	38.9	54.0	<b>-15.1</b>	Z canal 927.5
3710.000	14.9	Av	H	90	145	-	37.9	52.8	54.0	<b>-1.2</b>	Z canal 927.5
2782.500	12.1	Av	H	0	110	-	34.4	46.5	54.0	<b>-7.5</b>	Z canal 927.5
5564.000	3.1	Av	V			-	42.8	45.9	54.0	<b>-8.1</b>	Z canal 927.5
1064.000	16.4	Av	V	210	100	-	25.0	41.4	54.0	<b>-12.6</b>	XY canal 927.5
2783.000	14.5	Av	H	0	110	-	34.4	48.8	54.0	<b>-5.2</b>	XY canal 927.5
3710.000	15.1	Av	V	270	110	-	37.9	53.0	54.0	<b>-1.0</b>	XY canal 927.5
4637.500	7.3	Av	V	280	100	-	39.7	46.9	54.0	<b>-7.1</b>	XY canal 927.5
5564.500	6.8	Av	V	0	100	-	42.8	49.6	54.0	<b>-4.4</b>	XY canal 927.5

Note: Measures have been done at 3m distance.

#### 4.7. CONCLUSION

Radiated emission data measurement performed on the sample of the product **iC980A-K**, SN: 0274, 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 : May 22, 2018  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1020  
Relative humidity (%) : 32  
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.

#### **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	AEROFLEX	-	A7122269	12/17	12/18
Cable Measure	-	36G	A5329604	12/17	12/18
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/18
RSCommander	R&S	v1.6.4	L1000116	-	-
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18

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

None

Divergence:



L C I E

## 5.5. TEST SEQUENCE AND RESULTS

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Bandwidth Limit (MHz)
Cmin	923.3	<b>0.60684</b>	>0.5
Cmid	925.1	<b>0.60514</b>	>0.5
Cmax	927.5	<b>0.60444</b>	>0.5

CF 923.3 MHz

Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1	923.3139 MHz	6.98 dBm	ndB down	606.84 kHz		
T1	1	922.99673 MHz	0.97 dBm	ndB	6.00 dB		
T2	1	923.60357 MHz	0.98 dBm	Q factor	1521.5		

CF 925.1 MHz

Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1			925.1138 MHz	7.27 dBm	ndB down	605.14 kHz
T1	1			924.79773 MHz	1.27 dBm	ndB	6.00 dB
T2	1			925.40287 MHz	1.27 dBm	Q factor	1528.8

CF 927.5 MHz

Marker	Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1	1			927.4860000 MHz	7.30 dBm	ndB down	604.44 kHz
T1	1			927.19783 MHz	1.29 dBm	ndB	6.00 dB
T2	1			927.80227 MHz	1.30 dBm	Q factor	1534.5

## 5.6. CONCLUSION

Bandwidth measurement performed on the sample of the product **iC980A-K**, SN: 0274, 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 : May 22, 2018  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1020  
Relative humidity (%) : 32  
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 10.5dB

#### **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	AEROFLEX	-	A7122269	12/17	12/18
Cable Measure	-	36G	A5329604	12/17	12/18
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/18
RSCommander	R&S	v1.6.4	L1000116	-	-
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18

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

None

Divergence:

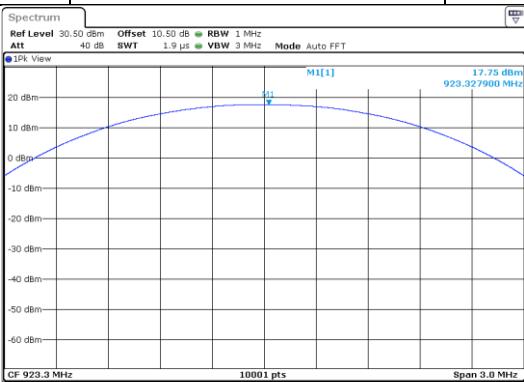


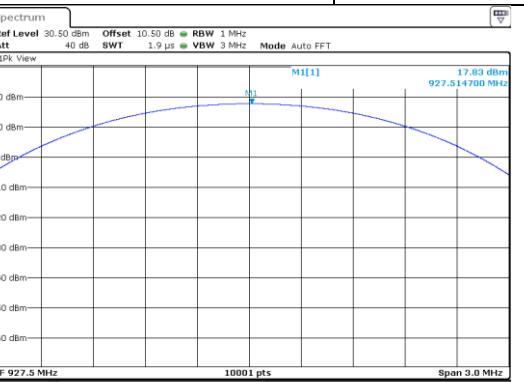
L C I E

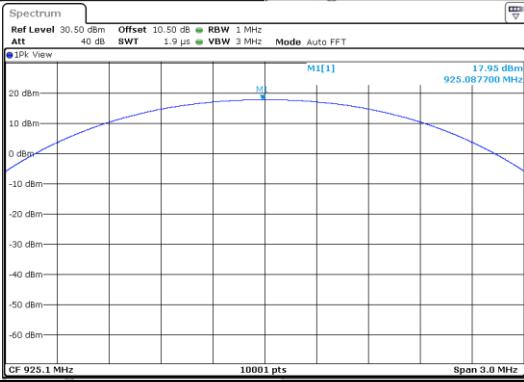
## 6.5. TEST SEQUENCE AND RESULTS

### Modulation:

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
Cmin	923.3	<b>17.75</b>	30.0
Cmid	925.1	<b>17.83</b>	30.0
Cmax	927.5	<b>17.95</b>	30.0







## 6.6. CONCLUSION

Maximum Peak Output Power measurement performed on the sample of the product **iC980A-K**, SN: 0274, 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 : May 23, 2018  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1020  
Relative humidity (%) : 32  
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 10.5dB

#### **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 x 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.



L C I E

### 7.3. TEST EQUIPMENT LIST

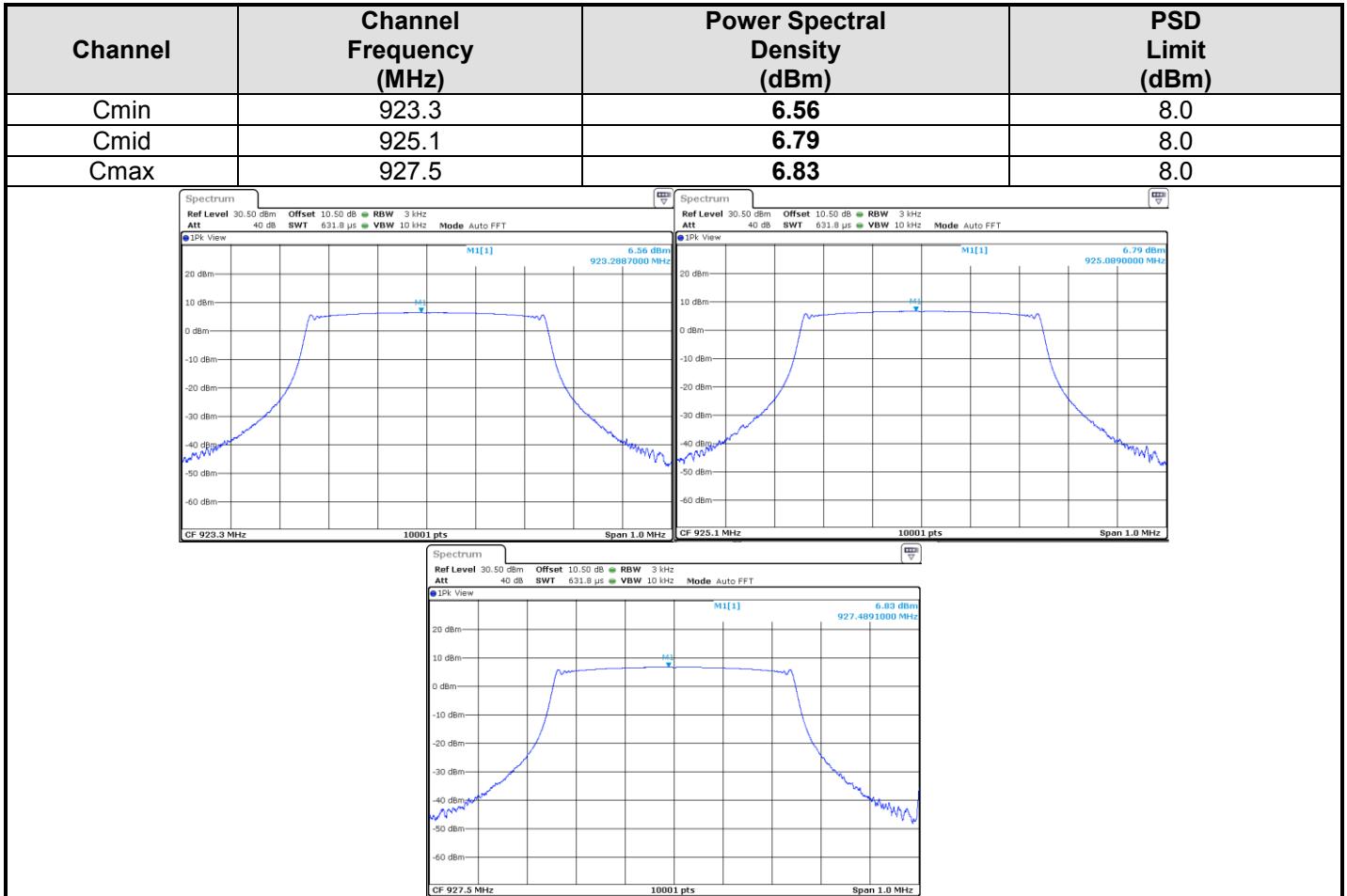
DESCRIPTION	MANUFACTURER	MODEL	Nº LCIE	Cal_Date	Cal_Due
Attenuator 10dB	AEROFLEX	-	A7122269	12/17	12/18
Cable Measure	-	36G	A5329604	12/17	12/18
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/18
RSCommander	R&S	v1.6.4	L1000116	-	-
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18

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

None       Divergence:

### 7.5. TEST SEQUENCE AND RESULTS

#### Modulation:





## 7.6. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **IC980A-K**, SN: 0274, 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 : May 23, 2018  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1020  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

### 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	AEROFLEX	-	A7122269	12/17	12/18
Cable Measure	-	36G	A5329604	12/17	12/18
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/18
RSCommander	R&S	v1.6.4	L1000116	-	-
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18

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

None

Divergence:

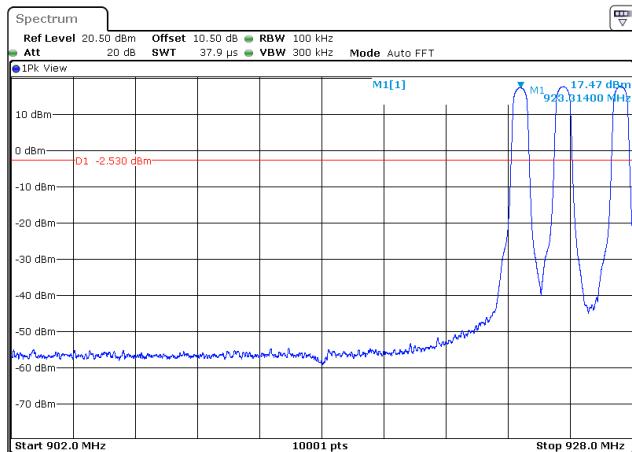


L C I E

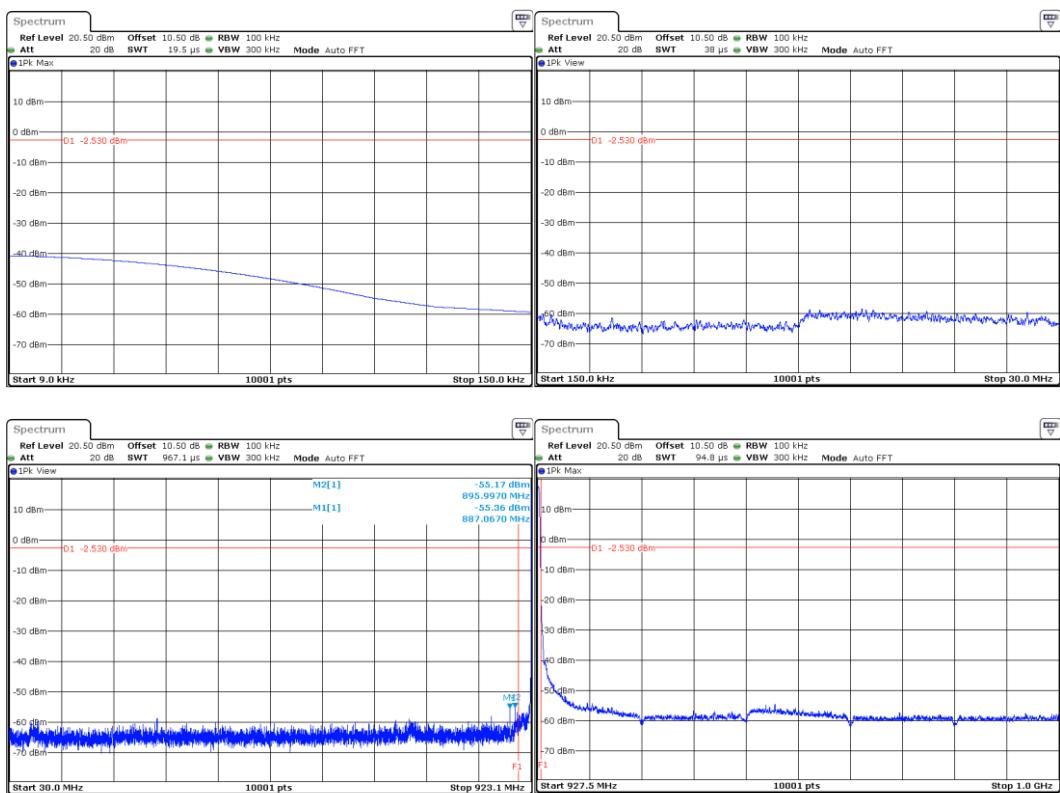
## 8.6. TEST SEQUENCE AND RESULTS

Offset: Attenuator+cable 10.5dB

GRAPH / MODULATION.

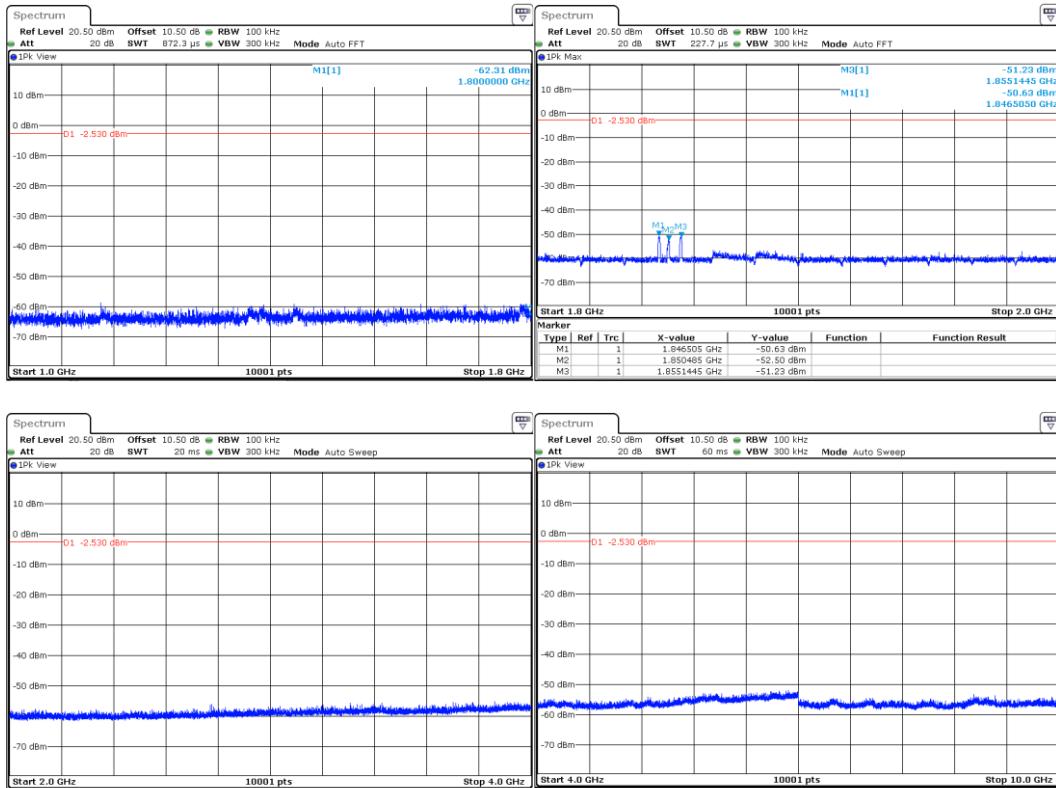


Display line set at -2.53dBm, worst case : Cmin.





L C I E



## 8.7. CONCLUSION

Band Edge Measurement performed on the sample of the product **iC980A-K**, SN: 0274, 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 : May 23, 2018  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1020  
Relative humidity (%) : 32  
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 10.5dB

#### **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	AEROFLEX	-	A7122269	12/17	12/18
Cable Measure	-	36G	A5329604	12/17	12/18
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060050	12/17	12/18
RSCommander	R&S	v1.6.4	L1000116	-	-
Thermo-hygrometer (PM1/2/3)	KIMO	HQ 210	B4206022	08/16	08/18

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

None

Divergence:



L C I E

## 9.5. TEST SEQUENCE AND RESULTS

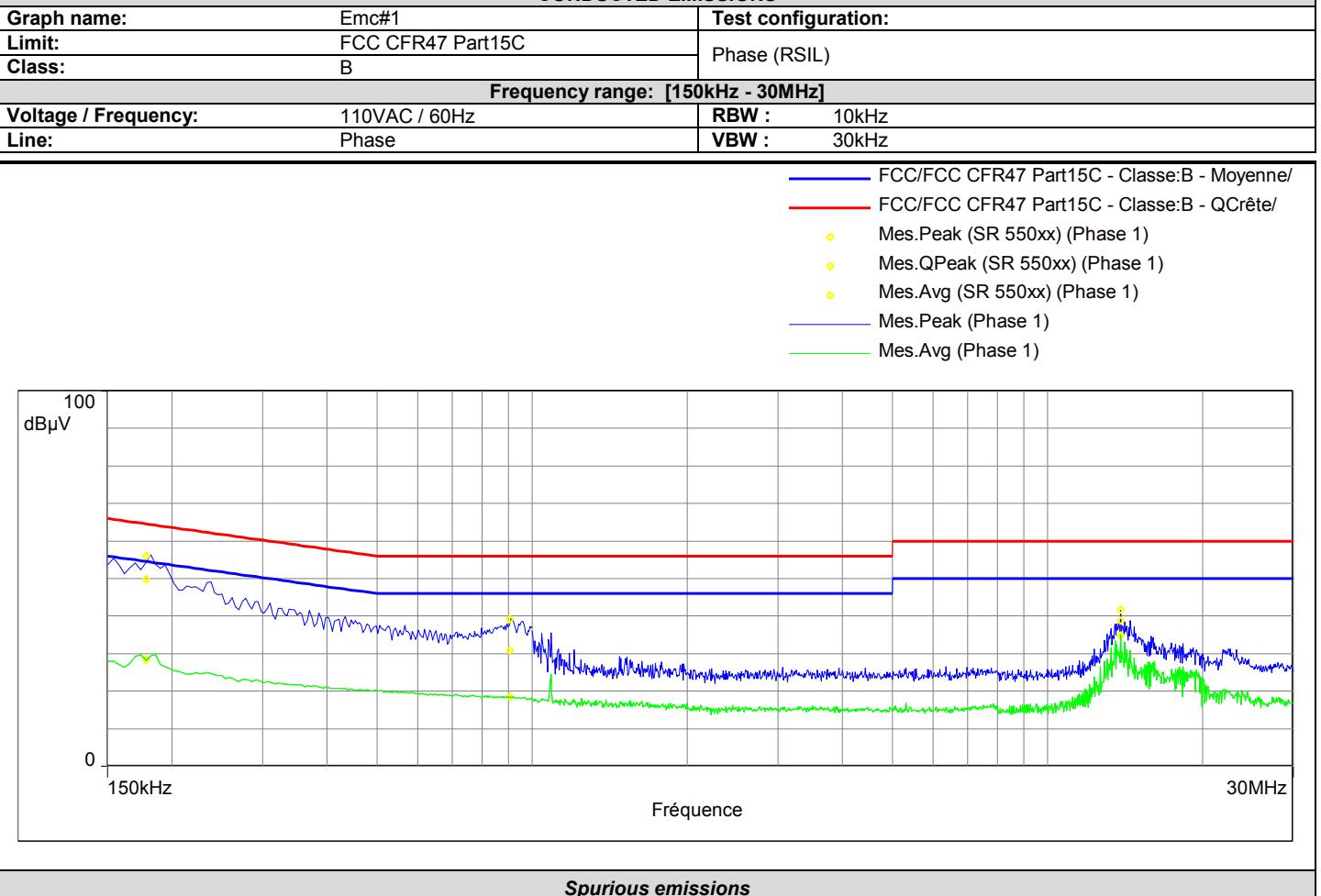
Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (kHz)
Cmin	923.3	489.951004900
Cmid	925.1	489.751024897
Cmax	927.5	489.851014899



L C I E

## 10. ANNEX 1 (GRAPHS)

### CONDUCTED EMISSIONS



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	Correction (dB)
0.178	55.9	49.8	64.6	-14.8	28.4	54.6	-26.2	Phase 1	19.4
0.906	39.2	30.8	56.0	-25.2	18.4	46.0	-27.6	Phase 1	19.5
13.884	41.8	38.9	60.0	-21.1	34.8	50.0	-15.2	Phase 1	20.4

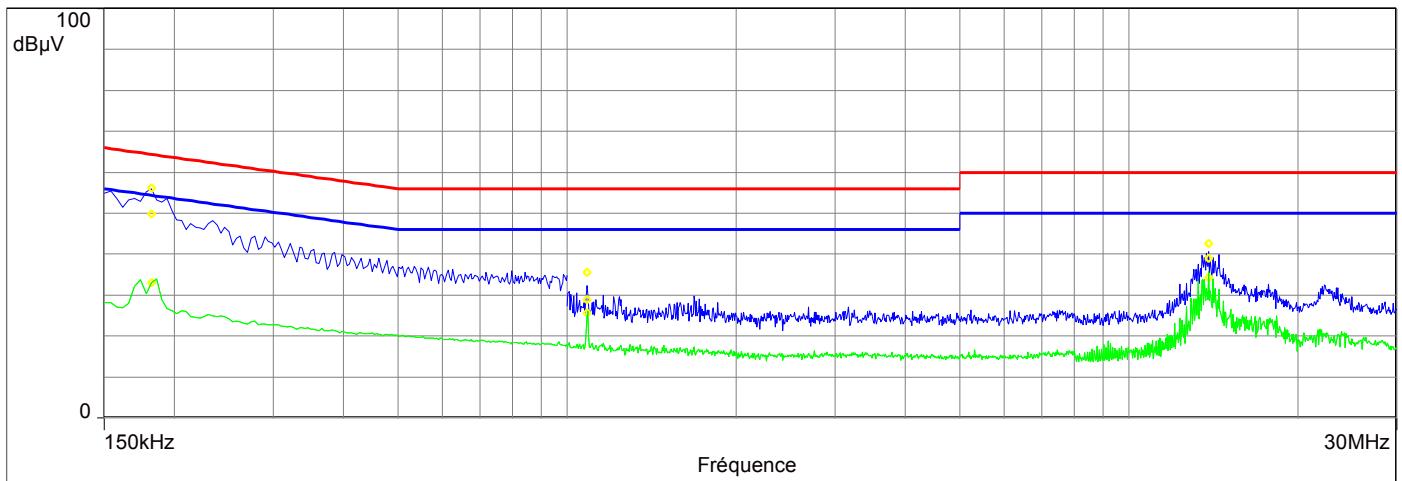


L C I E

#### CONDUCTED EMISSIONS

Graph name:	Emc#2	Test configuration:
Limit:	FCC CFR47 Part15C	Neutral (RSIL)
Class:	B	
<b>Frequency range: [150kHz - 30MHz]</b>		
Voltage / Frequency:	110VAC / 60Hz	RBW : 10kHz
Line:	Neutral	VBW : 30kHz

- FCC/FCC CFR47 Part15C - Classe:B - Moyenne/
- FCC/FCC CFR47 Part15C - Classe:B - QCréte/
- ◊ Mes.Peak (SR 550xx) (Neutre)
- ◊ Mes.QPeak (SR 550xx) (Neutre)
- ◊ Mes.Avg (SR 550xx) (Neutre)
- Mes.Peak (Neutre)
- Mes.Avg (Neutre)



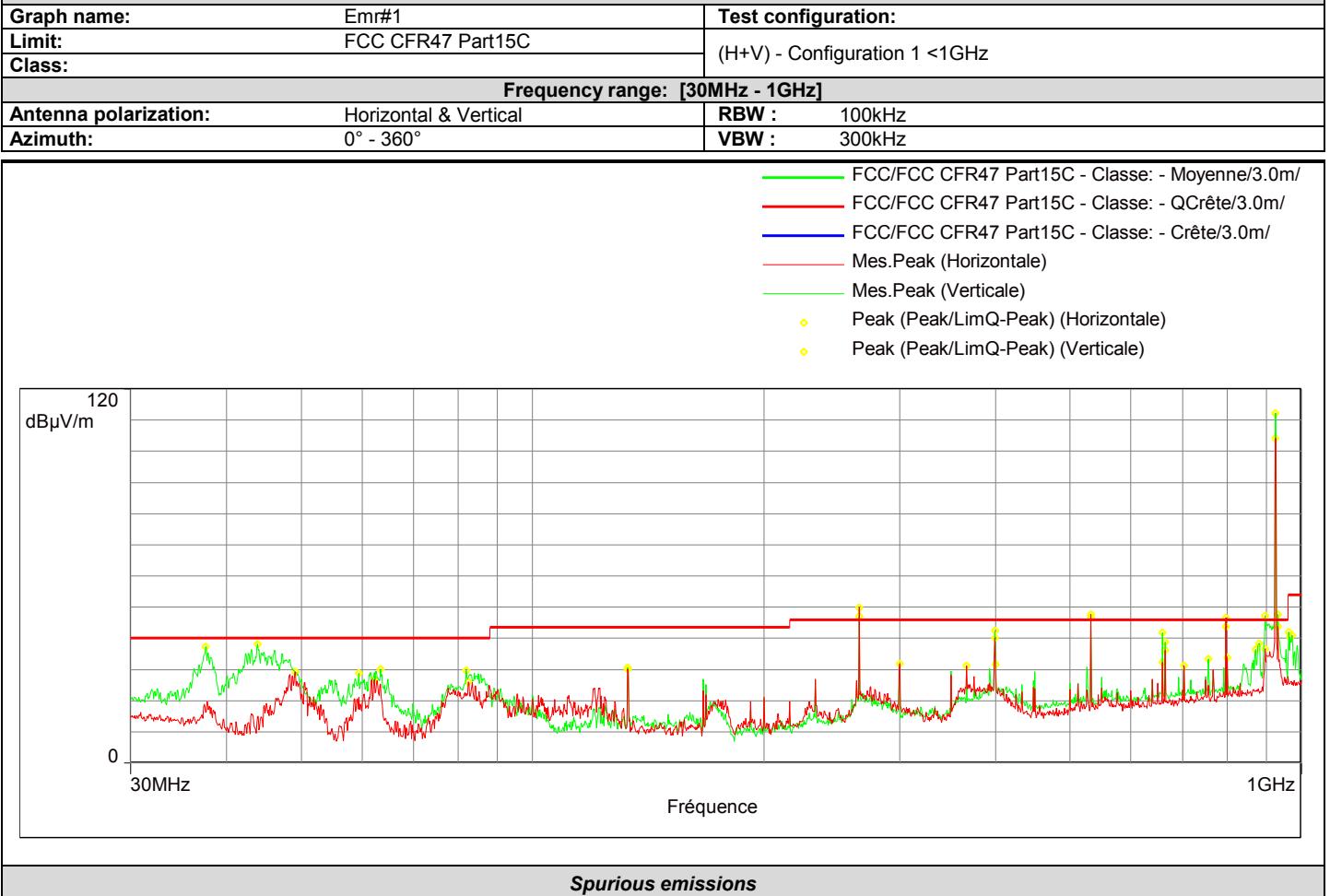
#### Spurious emissions

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	Correction (dB)
0.182	56.2	49.8	64.4	-14.6	33.1	54.4	-21.3	Neutre	19.5
1.084	35.6	28.9	56.0	-27.1	25.6	46.0	-20.4	Neutre	19.5
13.884	42.7	38.9	60.0	-21.1	34.4	50.0	-15.6	Neutre	20.4



L C I E

RADIATED EMISSIONS



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
49.091	29.3	40.0	-10.7	Horizontal	-25.2
62.232	26.8	40.0	-13.2	Horizontal	-27.8
82.530	26.1	40.0	-13.9	Horizontal	-25.9
133.003	30.1	43.5	-13.4	Horizontal	-21.8
265.940	49.9	46.0	3.9	Horizontal	-20.2
299.960	31.9	46.0	-14.1	Horizontal	-19.6
366.670	31.3	46.0	-14.7	Horizontal	-18.0
399.010	40.1	46.0	-5.9	Horizontal	-17.3
532.010	47.6	46.0	1.6	Horizontal	-14.8
659.060	32.2	46.0	-13.8	Horizontal	-13.0
665.010	36.2	46.0	-9.8	Horizontal	-13.0
704.000	31.2	46.0	-14.8	Horizontal	-12.5
798.010	46.6	46.0	0.6	Horizontal	-11.2
800.040	33.8	46.0	-12.2	Horizontal	-11.1
896.010	36.6	46.0	-9.4	Horizontal	-9.9
925.116	104.3	46.0	58.3	Horizontal	-9.6
930.987	43.9	46.0	-2.1	Horizontal	-9.6
37.582	37.2	40.0	-2.8	Vertical	-19.3
43.855	38.2	40.0	-1.8	Vertical	-22.7
59.410	28.8	40.0	-11.2	Vertical	-27.8
63.405	30.1	40.0	-9.9	Vertical	-27.8

TEST REPORT

Version : 01

N° 154815-719404-A

Page 31/34



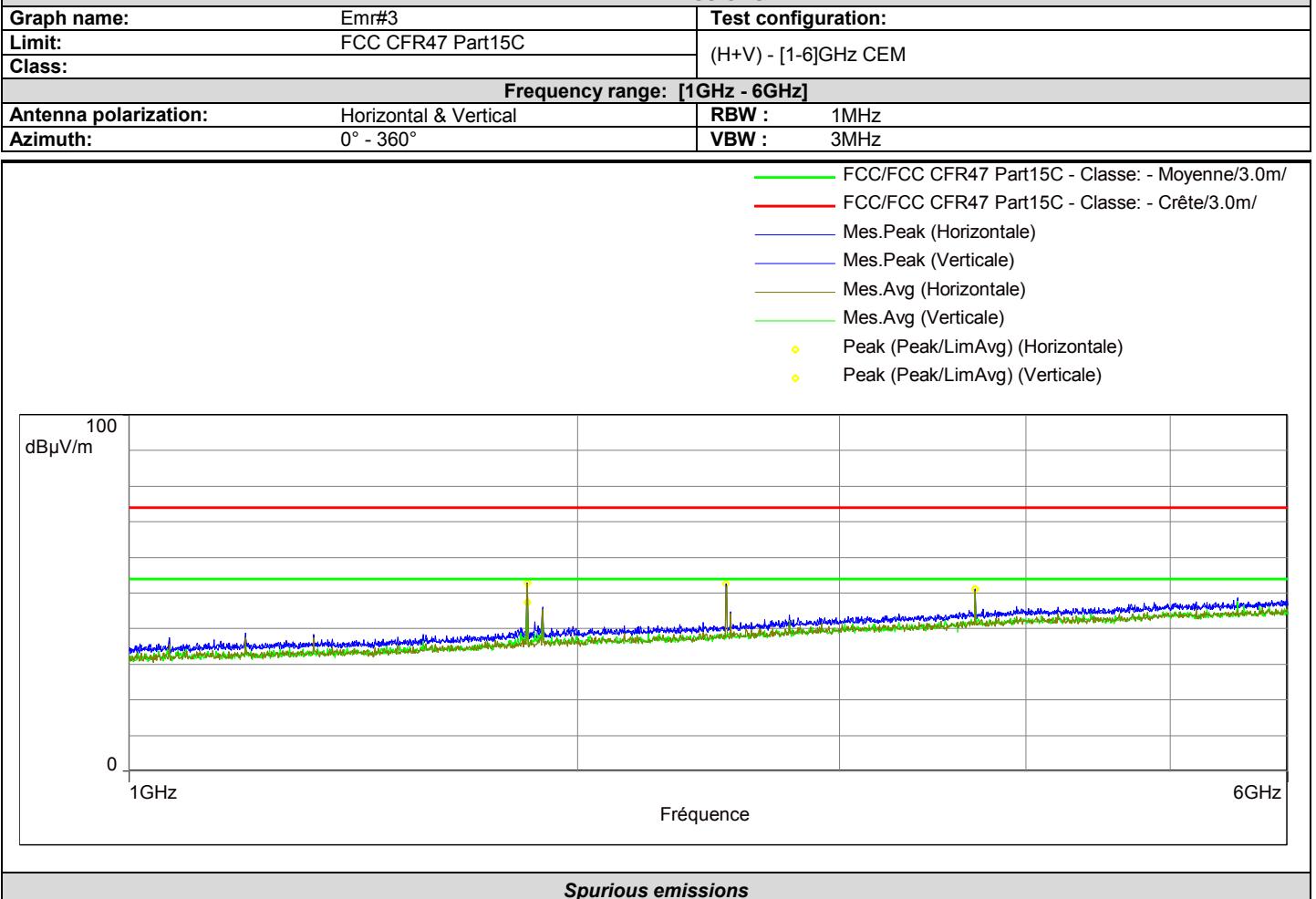
L C I E

Frequency (MHz)	Peak (dB $\mu$ V/m)	LimQP (dB $\mu$ V/m)	Peak-LimQP (dB)	Polarization	Correction (dB)
81.986	29.7	40.0	-10.3	Vertical	-26.0
133.003	30.6	43.5	-12.9	Vertical	-21.8
265.940	47.1	46.0	1.1	Vertical	-20.2
399.010	42.4	46.0	-3.6	Vertical	-17.3
399.990	31.7	46.0	-14.3	Vertical	-17.3
532.010	46.7	46.0	0.7	Vertical	-14.8
659.060	41.9	46.0	-4.1	Vertical	-13.0
665.010	38.8	46.0	-7.2	Vertical	-13.0
756.850	33.4	46.0	-12.6	Vertical	-11.7
798.010	43.7	46.0	-2.3	Vertical	-11.2
871.230	36.4	46.0	-9.6	Vertical	-10.2
879.910	38.4	46.0	-7.6	Vertical	-10.1
896.010	47.2	46.0	1.2	Vertical	-9.9
925.119	112.2	46.0	66.2	Vertical	-9.6
930.987	47.6	46.0	1.6	Vertical	-9.6
962.592	42.1	54.0	-11.9	Vertical	-9.3
965.952	40.2	54.0	-13.8	Vertical	-9.3
971.951	41.0	54.0	-13.0	Vertical	-9.2



L C I E

#### RADIATED EMISSIONS



#### Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization	Correction (dB)
1850.460	52.8	54.0	-1.2	Horizontal	-12.2
2517.100	52.7	54.0	-1.3	Horizontal	-9.8
3700.320	51.2	54.0	-2.8	Horizontal	-5.8
1850.460	47.4	54.0	-6.6	Vertical	-12.2
3700.320	51.0	54.0	-3.0	Vertical	-5.8



## 11. 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.