



LCIE

# TEST REPORT

N°: 148478-703119-A (FILE#931008)

Version : 03

## 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

**SCHNEIDER ELECTRIC**  
38TEC - Building T11 - 28 rue Henri Tarzes  
38000 – Grenoble  
FRANCE

## Apparatus under test

↗ Product Wireless Thermal & Rh sensor  
↗ Trade mark **SCHNEIDER ELECTRIC**  
↗ Manufacturer **SCHNEIDER ELECTRIC**  
↗ Model under test **Easergy CL110**  
**FL2017W15300009**  
↗ Serial number **FL2017W15400011**  
**FL2017W15300005**  
**2AHP8-130729**  
**21245-130729**  
↗ FCCID  
↗ IC

## Conclusion

See Test Program chapter §1

## Test date

May 5, 2017 to May 10, 2017

## Test location

MOIRANS

## IC Test site

6500A-1 & 6500A-3

## Composition of document

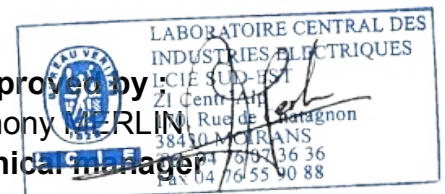
53 pages

## Document issued on

July 11, 2017

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## PUBLICATION HISTORY

| Version | Date                         | Author        | Modification                                                                       |
|---------|------------------------------|---------------|------------------------------------------------------------------------------------|
| 01      | June 16 <sup>th</sup> , 2017 | Jonathan PAUC | Creation of the document                                                           |
| 02      | June 20 <sup>th</sup> , 2017 | Jonathan PAUC | Fix error in Conducted sample serial number<br>FL2017W154000011 => FL2017W15400011 |
| 03      | July 11, 2017                | Jonathan PAUC | Modification of address                                                            |



## SUMMARY

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## 1. TEST PROGRAM

**Standard:**

- FCC Part 15, Subpart C 15.247
- ANSI C63.10 (2013)
- RSS-247 Issue 2.0 – May 2015
- RSS-Gen Issue 4 – Nov 2014
- 558074 D01 DTS Measurement Guidance v04

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

## 2. SYSTEM TEST CONFIGURATION

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

#### Equipment under test (EUT):

SCHNEIDER ELECTRIC Easergy CL110

Serial Number: FL2017W15400011  
FL2017W15300005  
FL2017W15300009



*Equipment Under Test*

#### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 3VDC

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 | 3Vdc   | Panasonic Coin cell primary 3V<br>1000mA/h part number : BR2477A/FBN | /                 |
| Supply1_bis | <input type="checkbox"/> AC <input type="checkbox"/> DC <input checked="" type="checkbox"/> Battery | 3vdc   | 2 x AA Battery                                                       | Set only for test |

#### Inputs/outputs - Cable:

| Access      | Type                                                                           | Length used (m) | Declared <3m | Shielded | Under test | Comments          |
|-------------|--------------------------------------------------------------------------------|-----------------|--------------|----------|------------|-------------------|
| Supply1_bis | Power supply from two AA battery, in order to have enough autonomy during test | /               | /            | /        | /          | Set only for test |

#### Auxiliary equipment used during test:

| Type                    | Reference                    | Sn        | Comments                    |
|-------------------------|------------------------------|-----------|-----------------------------|
| Laptop                  | LENOVO T460                  | PC0G-620d | Used to send command to EUT |
| Zigbee Test Board (USB) | ATMEL ATMEGA256RF2 X Plained | f         | Used to send command to EUT |



### Equipment information:

|                                                          |                                                                                                                                                                                            |                                                       |                                                               |                                             |
|----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------|
| Type:                                                    | <input checked="" type="checkbox"/> ZIGBEE                                                                                                                                                 |                                                       | <input type="checkbox"/> RF4CE                                |                                             |
| Frequency band:                                          | [2400 – 2483.5] MHz                                                                                                                                                                        |                                                       |                                                               |                                             |
| Spectrum Modulation:                                     | <input checked="" type="checkbox"/> DSSS                                                                                                                                                   |                                                       |                                                               |                                             |
| Number of Channel:                                       | 16                                                                                                                                                                                         |                                                       |                                                               |                                             |
| Spacing channel:                                         | 5MHz                                                                                                                                                                                       |                                                       |                                                               |                                             |
| Channel bandwidth:                                       | 2MHz                                                                                                                                                                                       |                                                       |                                                               |                                             |
| 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: 0                                                                                                                                                                                  |                                                       |                                                               |                                             |
| 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 checked="" type="checkbox"/> Yes (Load Based)                                                                                                                                       | <input type="checkbox"/> Off mode                     | <input type="checkbox"/> No                                   |                                             |
|                                                          | Clear Channel Assessment Time:                                                                                                                                                             |                                                       |                                                               | -                                           |
| Duty cycle:                                              | <input type="checkbox"/> Continuous duty                                                                                                                                                   | <input checked="" 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"/> -25°C   |
|                                                          | Tnom:                                                                                                                                                                                      | 20°C                                                  |                                                               |                                             |
|                                                          | Tmax:                                                                                                                                                                                      | <input type="checkbox"/> 35°C                         | <input type="checkbox"/> 55°C                                 | <input checked="" type="checkbox"/> 105°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"/> 3Vdc    |
| Geo-location capability:                                 | <input type="checkbox"/> Yes (The geographical location determined by the equipment is not accessible to the end user as defined in section 4.3.2.12.2 of ETSI EN 300 328 V2.1.1 standard) |                                                       | <input checked="" type="checkbox"/> No                        |                                             |
| Minimum performance criteria for Receiver blocking test: | <input checked="" type="checkbox"/> PER less than or equal to 10%                                                                                                                          |                                                       | <input type="checkbox"/> Alternative performance criteria (4) |                                             |

(4): Description of the alternative performance criteria:

NC: Not communicated by customer

### 2.2. EQUIPMENT MODIFICATIONS

☒ None      ☐ Modification:



| CHANNEL PLAN    |                 |
|-----------------|-----------------|
| Channel         | Frequency (MHz) |
| <b>Cmin: 11</b> | 2405            |
| 12              | 2410            |
| 13              | 2415            |
| 14              | 2420            |
| 15              | 2425            |
| 16              | 2430            |
| 17              | 2435            |
| <b>Cmid: 18</b> | 2440            |
| 19              | 2445            |
| 20              | 2450            |
| 21              | 2455            |
| 22              | 2460            |
| 23              | 2465            |
| 24              | 2470            |
| 25              | 2475            |
| <b>Cmax: 26</b> | 2480            |

| DATA RATE        |                 |                                     |
|------------------|-----------------|-------------------------------------|
| Data Rate (Mbps) | Modulation Type | Worst Case Modulation               |
| 0.25             | O-QPSK          | <input checked="" type="checkbox"/> |

### 2.3. EUT CONFIGURATION

TX Mode (Radiated Sample FL2017W15300009  
/ Conducted Sample FL2017W15400011):

The EUT is set in the following modes during tests with simulator / software  
 (CL110\_FCC\_1.0.1\_ATmega328PB\_Rf233.hex):

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

All tests are performed at Cmin, Cmid and Cmax

```
ch      <channel>
pwr     <tx_power>
ant      <antenna>
trim     <value>
ccnum    <value>
ccband   <value>
txflt    <value>

set      [<duration>] [<side>]
pulse    <on_time> <off_time>

cw       [<side>] [<duration>]
prbs     [<duration>]
data     [<size>] [<interval>]
stop

rcv      [<duration>]

> []
```

Functionnal mode (Sample : FL2017W15300005)

EUT is set normal hopping mode & data acquisition (Temperature, level of battery

### 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 52.5dBμV is obtained. The antenna factor of 7.4 and a cable factor of 1.1 are added. The amplifier gain of 29dB is subtracted, giving a field strength of 32 dBμV/m.

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

The 32 dBμV/m value can be mathematically converted to its corresponding level in μV/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. RADIATED EMISSION DATA

#### 3.1. ENVIRONMENTAL CONDITIONS

Date of test : May 5, 2017  
 Test performed by : Jonathan PAUC  
 Atmospheric pressure (hPa) : 992  
 Relative humidity (%) : 34  
 Ambient temperature (°C) : 21

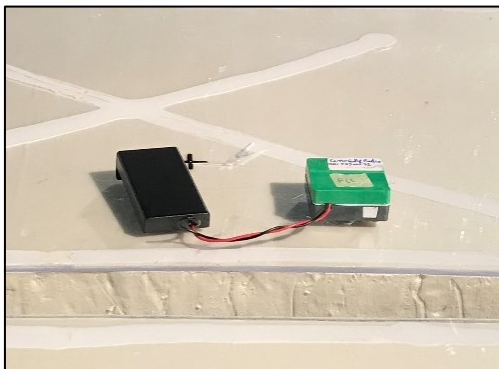
#### 3.2. TEST SETUP

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)

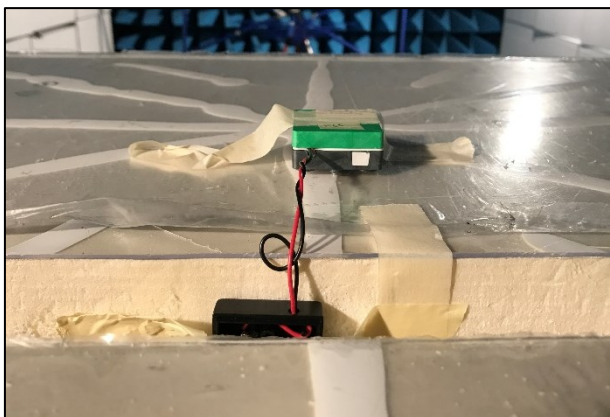
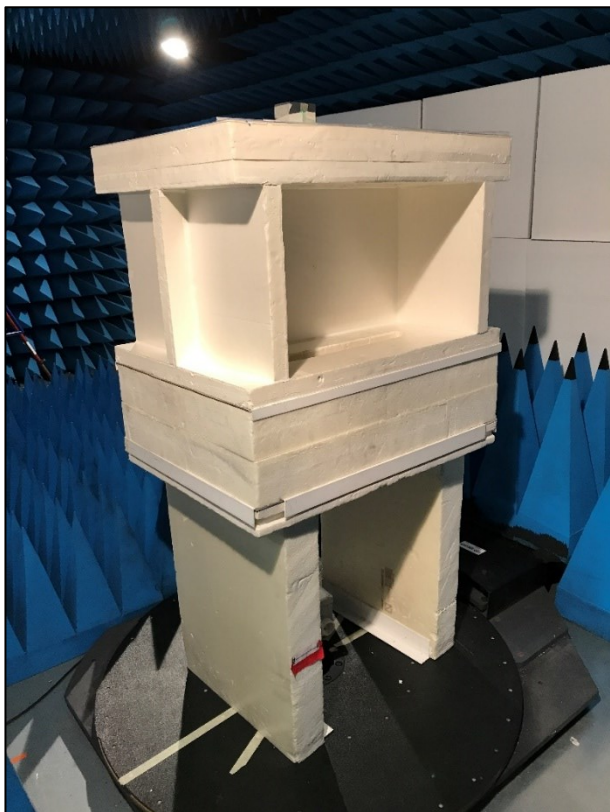
The EUT is powered by  $V_{nom}$ .



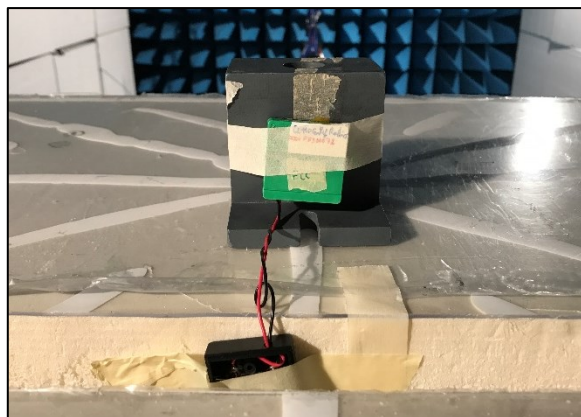
Test setup in anechoic chamber < 1GHz (Axis XY)



Test setup in anechoic chamber < 1GHz (Axis Z)



Test setup in anechoic chamber > 1GHz (Axis XY)



Test setup in anechoic chamber > 1GHz (Axis Z)



### 3.3. TEST METHOD

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

#### Pre-characterisation measurement: (9kHz – 12.75GHz)

A pre-scan of all the setup has been performed in a 3 meters semi-anechoic chamber for frequency from 30MHz to XGHz. 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 12.75GHz.

#### 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.



### 3.4. TEST EQUIPMENT LIST

| DESCRIPTION                          | MANUFACTURER    | MODEL      | N° LCIE  | Cal_Date | Cal_Due  |
|--------------------------------------|-----------------|------------|----------|----------|----------|
| Amplifier 1-13GHz                    | LCIE SUD EST    | -          | A7102067 | 04/16    | 05/17    |
| Antenna Bi-log                       | CHASE           | CBL6111A   | C2040172 | 06/16    | 06/18    |
| Antenna horn 18GHz                   | EMCO            | 3115       | C2042029 | 08/16    | 08/18    |
| Attenuator 10dB                      | AEROFLEX        | -          | A7122206 | 06/17    | 06/18    |
| Cable Measure @3m 18GHz              | -               | -          | A5329038 | 10/16    | 10/17    |
| Cable Measure @3m                    | -               | -          | A5329206 | 06/17    | 06/18    |
| Cable Measure @1m                    | STORMFLEX       | 0          | A5329680 | 01/16    | 01/17**  |
| Cable Measure Analyzer-Amplifier SMA | STORMFLEX       | 0          | A5329681 | 05/16    | 05/17    |
| Cable Measure @1m                    | STORMFLEX       | 0          | A5329682 | 01/16    | 01/17 ** |
| Semi-Anechoic chamber #3             | SIEPEL          | -          | D3044017 | 03/16    | 03/19    |
| HF Radiated emission comb generator  | LCIE SUD EST    | -          | A3169088 | -        | -        |
| Spectrum analyzer                    | ROHDE & SCHWARZ | FSV 30     | A4060050 | 08/16    | 08/17    |
| BAT EMC                              | NEXIO           | v3.9.0.10  | L1000115 | -        | -        |
| RSCommander                          | R&S             | v1.6.4     | L1000116 | -        | -        |
| Thermo-hygrometer (C3)               | OREGON          | BAR206     | B4204078 | 10/16    | 10/17    |
| Thermo-hygrometer (PM2)              | KIMO            | HQ 210     | B4206022 | 08/16    | 08/17    |
| Turntable chamber (Cage#3)           | ETS Lingren     | Model 2165 | F2000371 | -        | -        |
| Table                                | LCIE            | -          | F2000461 | -        | -        |
| Turntable controller (Cage#3)        | ETS Lingren     | Model 2090 | F2000444 | -        | -        |

\*\* : Under Derogation

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

☒ None ☐ Divergence:

### 3.6. TEST RESULTS

#### 3.6.1. 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 |
| Emr# 3           | H & V        | TX               | Axis XY      | Mid     | See annex 1 |
| Emr# 4           | H & V        | TX               | Axis Z       | Mid     | See annex 1 |
| Emr# 5           | H & V        | TX               | Axis XY      | Max     | See annex 1 |
| Emr# 6           | H & V        | TX               | Axis Z       | Max     | See annex 1 |
| Emr# 7           | H & V        | Functionnal Mode | Axis XY      | Min     | See annex 1 |
| Emr# 8           | H & V        | Functionnal Mode | Axis Z       | Min     | See annex 1 |

### 3.6.1. Pre-characterization at 3 meters [1GHz-12.75GHz]

See graphs for 1GHz-12.75GHz:

| Graph identifier |    | Polarization | Mode             | EUT position | Channel | Comments    |
|------------------|----|--------------|------------------|--------------|---------|-------------|
| Emr#             | 9  | H            | TX               | Axis XY      | Min     | See annex 1 |
| Emr#             | 10 | V            | TX               | Axis XY      | Min     | See annex 1 |
| Emr#             | 11 | H            | TX               | Axis Z       | Min     | See annex 1 |
| Emr#             | 12 | V            | TX               | Axis Z       | Min     | See annex 1 |
| Emr#             | 13 | H            | TX               | Axis XY      | Mid     | See annex 1 |
| Emr#             | 14 | V            | TX               | Axis XY      | Mid     | See annex 1 |
| Emr#             | 15 | H            | TX               | Axis Z       | Mid     | See annex 1 |
| Emr#             | 16 | V            | TX               | Axis Z       | Mid     | See annex 1 |
| Emr#             | 17 | H            | TX               | Axis XY      | Max     | See annex 1 |
| Emr#             | 18 | V            | TX               | Axis XY      | Max     | See annex 1 |
| Emr#             | 19 | H            | TX               | Axis Z       | Max     | See annex 1 |
| Emr#             | 20 | V            | TX               | Axis Z       | Max     | See annex 1 |
| Emr#             | 21 | H            | Functionnal Mode | Axis XY      | Min     | See annex 1 |
| Emr#             | 22 | V            | Functionnal Mode | Axis Z       | Min     | See annex 1 |
| Emr#             | 23 | H            | Functionnal Mode | Axis XY      | Min     | See annex 1 |
| Emr#             | 24 | V            | Functionnal Mode | Axis Z       | Min     | See annex 1 |

For frequencies from 12.75GHz to 25GHz see § Bandedge measurement.

### 3.6.2. 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 (dBμV/m) | Measure Quasi-Peak (dBμV/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)*

### 3.6.3. Characterization on 3meters anechoic chamber from 1GHz to 12.75GHz

#### 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/Av) | Polarity (V/H) | Azimuth (Degrees) | Antenna Height (cm) | Transducer Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Axis |
|----------------------|----------------------|------------------|----------------|-------------------|---------------------|------------------------|----------------|----------------|-------------|------|
| 2484.009             | 78.9                 | Pk               | V              | 333               | 150.0               | -15.2                  | 63.7           | 74.0           | -10.3       | Z    |
| 2485.165             | 79.8                 | Pk               | V              | 333               | 150.0               | -15.2                  | 64.6           | 74.0           | -9.4        | Z    |
| 2486.155             | 74.7                 | Pk               | V              | 333               | 150.0               | -15.2                  | 59.5           | 74.0           | -14.5       | Z    |
| 2487.015             | 69.5                 | Pk               | V              | 333               | 150.0               | -15.2                  | 54.3           | 74.0           | -19.7       | Z    |
| 2488.059             | 66.0                 | Pk               | V              | 333               | 150.0               | -15.2                  | 50.8           | 74.0           | -23.2       | Z    |
| 2489.005             | 63.6                 | Pk               | V              | 333               | 150.0               | -15.2                  | 48.4           | 74.0           | -25.6       | Z    |
| 2489.993             | 62.5                 | Pk               | V              | 333               | 150.0               | -15.2                  | 47.3           | 74.0           | -26.7       | Z    |
| 2491.014             | 61.1                 | Pk               | V              | 333               | 150.0               | -15.2                  | 45.9           | 74.0           | -28.1       | Z    |
| 2492.046             | 60.5                 | Pk               | V              | 333               | 150.0               | -15.2                  | 45.3           | 74.0           | -28.7       | Z    |
| 2493.037             | 58.2                 | Pk               | V              | 333               | 150.0               | -15.2                  | 43.0           | 74.0           | -31.0       | Z    |
| 2493.986             | 57.9                 | Pk               | V              | 333               | 150.0               | -15.2                  | 42.7           | 74.0           | -31.3       | Z    |
| 2495.193             | 55.9                 | Pk               | V              | 333               | 150.0               | -15.2                  | 40.7           | 74.0           | -33.3       | Z    |
| 2496.006             | 57.4                 | Pk               | V              | 333               | 150.0               | -15.2                  | 42.2           | 74.0           | -31.8       | Z    |
| 2497.193             | 55.5                 | Pk               | V              | 333               | 150.0               | -15.2                  | 40.3           | 74.0           | -33.7       | Z    |
| 2498.121             | 53.2                 | Pk               | V              | 333               | 150.0               | -15.2                  | 38.0           | 74.0           | -36.0       | Z    |
| 2499.081             | 53.1                 | Pk               | V              | 333               | 150.0               | -15.2                  | 37.9           | 74.0           | -36.1       | Z    |
| 4809.190             | 56.0                 | Pk               | V              | 329               | 150                 | -11.1                  | 44.9           | 74.0           | -29.1       | XY   |
| 4879.055             | 56.0                 | Pk               | V              | 329               | 150                 | -11.0                  | 45.0           | 74.0           | -29.0       | XY   |
| 4961.650             | 57.5                 | Pk               | V              | 329               | 150                 | -10.8                  | 46.7           | 74.0           | -27.3       | XY   |
| 7216.640             | 48.2                 | Pk               | V              | 329               | 150                 | -8.2                   | 40.0           | 74.0           | -34.0       | XY   |
| 7322.060             | 48.0                 | Pk               | V              | 329               | 150                 | -8.1                   | 39.9           | 74.0           | -34.1       | XY   |
| 7441.550             | 48.3                 | Pk               | V              | 329               | 150                 | -7.9                   | 40.4           | 74.0           | -33.6       | XY   |



| Test Frequency (MHz) | Meter Reading dB(μV) | Detector (Pk/Av) | Polarity (V/H) | Azimuth (Degrees) | Antenna Height (cm) | Transducer Factor (dB) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Axis |
|----------------------|----------------------|------------------|----------------|-------------------|---------------------|------------------------|----------------|----------------|-------------|------|
| 2484.009             | 65.0                 | Av               | V              | 333               | 150.0               | -15.2                  | 49.8           | 54.0           | -4.2        | Z    |
| 2485.165             | 64.7                 | Av               | V              | 333               | 150.0               | -15.2                  | 49.5           | 54.0           | -4.5        | Z    |
| 2486.155             | 65.6                 | Av               | V              | 333               | 150.0               | -15.2                  | 50.4           | 54.0           | -3.6        | Z    |
| 2487.015             | 58.8                 | Av               | V              | 333               | 150.0               | -15.2                  | 43.6           | 54.0           | -10.4       | Z    |
| 2488.059             | 55.6                 | Av               | V              | 333               | 150.0               | -15.2                  | 40.4           | 54.0           | -13.6       | Z    |
| 2489.005             | 53.8                 | Av               | V              | 333               | 150.0               | -15.2                  | 38.6           | 54.0           | -15.4       | Z    |
| 2489.993             | 52.4                 | Av               | V              | 333               | 150.0               | -15.2                  | 37.2           | 54.0           | -16.8       | Z    |
| 2491.014             | 50.9                 | Av               | V              | 333               | 150.0               | -15.2                  | 35.7           | 54.0           | -18.3       | Z    |
| 2492.046             | 49.7                 | Av               | V              | 333               | 150.0               | -15.2                  | 34.5           | 54.0           | -19.5       | Z    |
| 2493.037             | 48.2                 | Av               | V              | 333               | 150.0               | -15.2                  | 33.0           | 54.0           | -21.0       | Z    |
| 2493.986             | 47.1                 | Av               | V              | 333               | 150.0               | -15.2                  | 31.9           | 54.0           | -22.1       | Z    |
| 2495.193             | 46.0                 | Av               | V              | 333               | 150.0               | -15.2                  | 30.8           | 54.0           | -23.2       | Z    |
| 2496.006             | 48.4                 | Av               | V              | 333               | 150.0               | -15.2                  | 33.2           | 54.0           | -20.8       | Z    |
| 2497.193             | 44.9                 | Av               | V              | 333               | 150.0               | -15.2                  | 29.7           | 54.0           | -24.3       | Z    |
| 2498.121             | 43.7                 | Av               | V              | 333               | 150.0               | -15.2                  | 28.5           | 54.0           | -25.5       | Z    |
| 2499.081             | 43.2                 | Av               | V              | 333               | 150.0               | -15.2                  | 28.0           | 54.0           | -26.0       | Z    |
| 4809.190             | 45.8                 | Av               | V              | 329               | 150                 | -11.1                  | 34.7           | 54.0           | -19.3       | XY   |
| 4879.055             | 46.8                 | Av               | V              | 329               | 150                 | -11.0                  | 35.8           | 54.0           | -18.2       | XY   |
| 4961.650             | 47.0                 | Av               | V              | 329               | 150                 | -10.8                  | 36.2           | 54.0           | -17.8       | XY   |
| 7216.640             | 37.5                 | Av               | V              | 329               | 150                 | -8.2                   | 29.3           | 54.0           | -24.7       | XY   |
| 7322.060             | 37.6                 | Av               | V              | 329               | 150                 | -8.1                   | 29.5           | 54.0           | -24.5       | XY   |
| 7441.550             | 37.4                 | Av               | V              | 329               | 150                 | -7.9                   | 29.5           | 54.0           | -24.5       | XY   |

### 3.7. CONCLUSION

Radiated emission data measurement performed on the sample of the product Easergy CL110, SN: FL2017W15300005 & FL2017W15300009

in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



#### 4. BANDWIDTH (15.247)

##### 4.1. TEST CONDITIONS

Date of test : May 5, 2017  
Test performed by : Jonathan PAUC  
Atmospheric pressure (hPa) : 992  
Relative humidity (%) : 34  
Ambient temperature (°C) : 21

##### 4.2. 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 11.6dB

☐ **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.

##### 4.3. TEST EQUIPMENT LIST

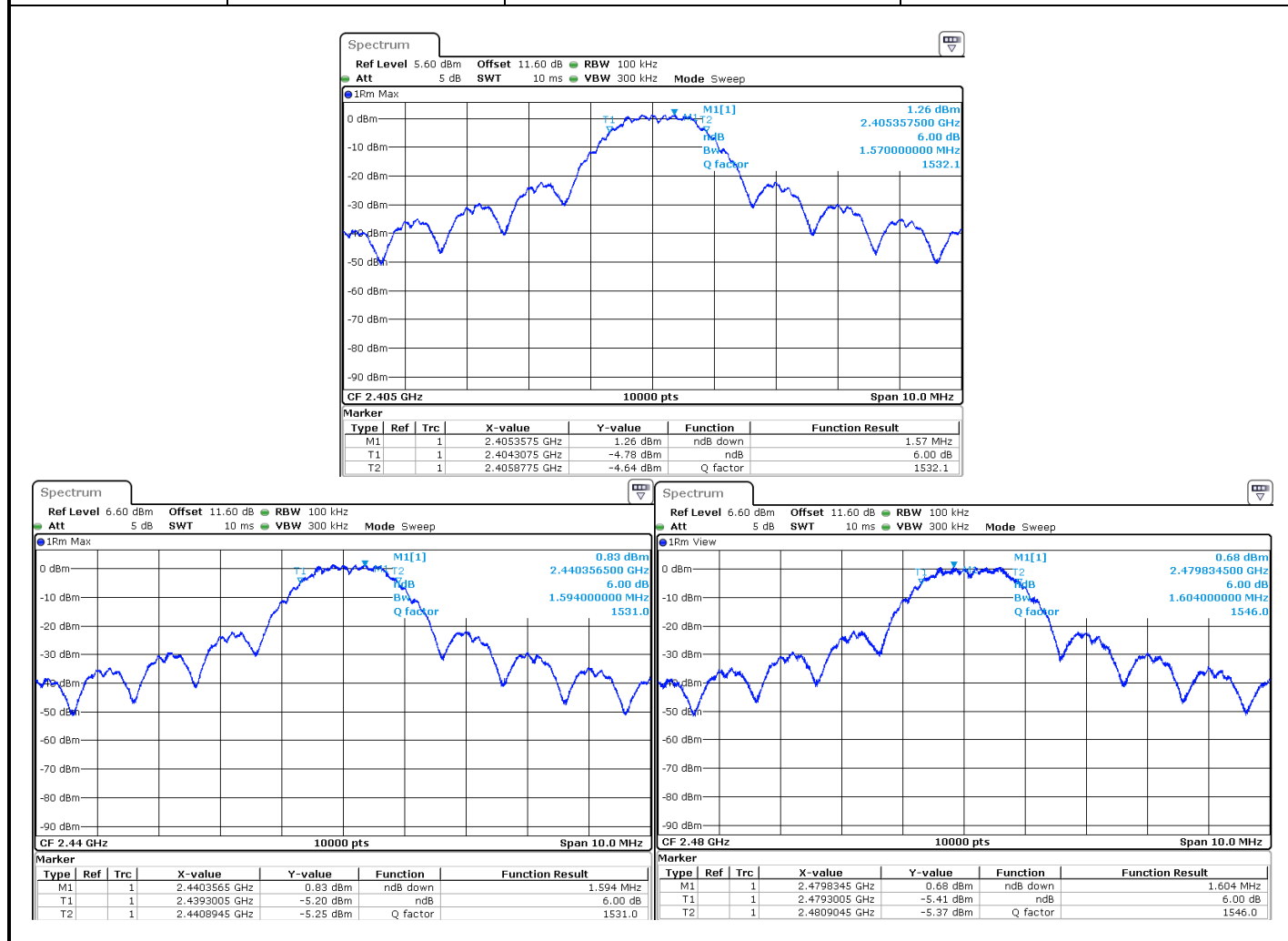
| DESCRIPTION          | MANUFACTURER    | MODEL  | N° LCIE  | Cal_Date | Cal_Due |
|----------------------|-----------------|--------|----------|----------|---------|
| Attenuator 10dB      | JFW             | -      | A7122166 | 12/16    | 12/17   |
| Cable 40GHz 2m coudé | -               | -      | A5329720 | 05/16    | 05/17   |
| Spectrum analyzer    | ROHDE & SCHWARZ | FSV 30 | A4060050 | 08/16    | 08/17   |

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

☒ None ☐ Divergence:

#### 4.5. TEST SEQUENCE AND RESULTS

| Channel | Channel Frequency (MHz) | 6dB Bandwidth (MHz) | Bandwidth Limit (MHz) |
|---------|-------------------------|---------------------|-----------------------|
| 11      | 2405                    | 1.570               | >0.5                  |
| 18      | 2440                    | 1.594               | >0.5                  |
| 26      | 2480                    | 1.604               | >0.5                  |



#### 4.6. CONCLUSION

Bandwidth measurement performed on the sample of the product Easergy CL110, SN: FL2017W15400011 in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 5. MAXIMUM PEAK OUTPUT POWER (15.247)

### 5.1. TEST CONDITIONS

Date of test : May 5, 2017  
Test performed by : Jonathan PAUC  
Atmospheric pressure (hPa) : 992  
Relative humidity (%) : 34  
Ambient temperature (°C) : 21

### 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.

Offset: Attenuator+cable 11.6dB

☐ **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:

$$E = \frac{\sqrt{30 P G}}{d}$$

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:

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



### 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  $\geq$  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.

- a) Set the RBW  $\geq$  DTS bandwidth.
- b) Set VBW  $\geq 3 \times$  RBW.
- c) Set span  $\geq 3 \times$  RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) 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.

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

### 5.3. TEST EQUIPMENT LIST

| DESCRIPTION          | MANUFACTURER    | MODEL  | N° LCIE  | Cal_Date | Cal_Due |
|----------------------|-----------------|--------|----------|----------|---------|
| Attenuator 10dB      | JFW             | -      | A7122166 | 12/16    | 12/17   |
| Cable 40GHz 2m coudé | -               | -      | A5329720 | 05/16    | 05/17   |
| Spectrum analyzer    | ROHDE & SCHWARZ | FSV 30 | A4060050 | 08/16    | 08/17   |

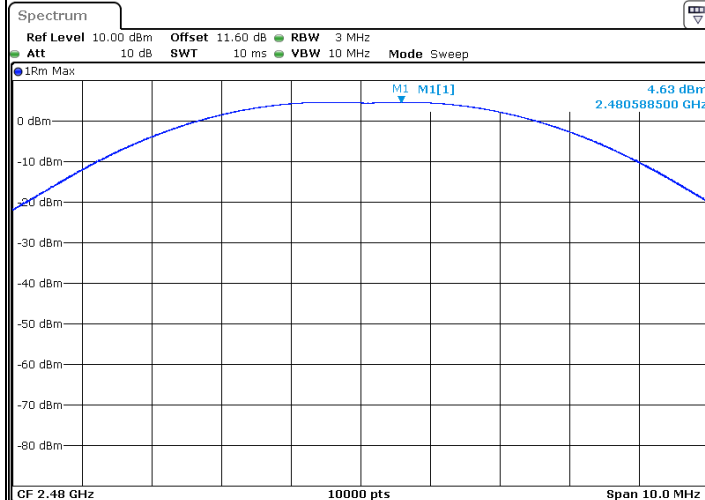
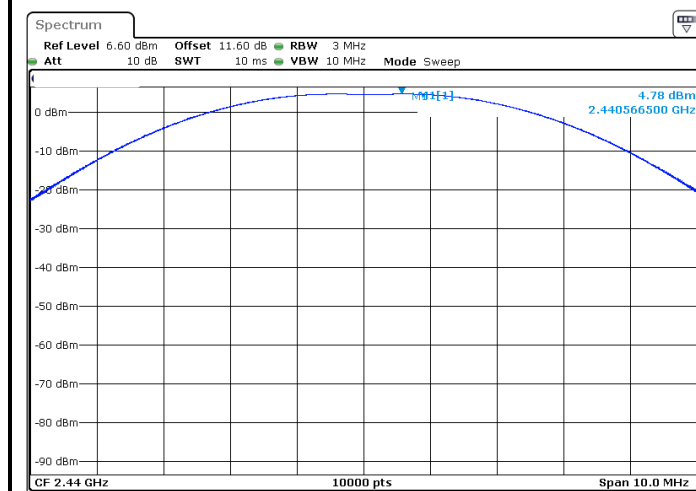
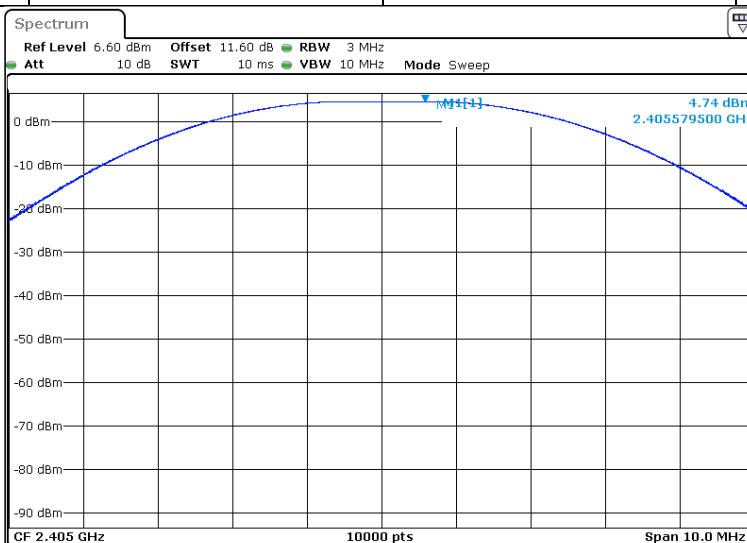
### 5.4. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

- ☒ None ☐ Divergence:

## 5.5. TEST SEQUENCE AND RESULTS

### Modulation:

| Channel | Channel Frequency (MHz) | Peak Output Power (dBm) | Power Limit (dBm) |
|---------|-------------------------|-------------------------|-------------------|
| 11      | 2405                    | 4.7                     | 30.0              |
| 18      | 2440                    | 4.8                     | 30.0              |
| 26      | 2480                    | 4.6                     | 30.0              |



## 5.6. CONCLUSION

Maximum Peak Output Power measurement performed on the sample of the product Easergy CL110, SN: FL2017W1540011 in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 6. POWER SPECTRAL DENSITY (15.247)

### 6.1. TEST CONDITIONS

Date of test : May 5, 2017  
Test performed by : Jonathan PAUC  
Atmospheric pressure (hPa) : 992  
Relative humidity (%) : 34  
Ambient temperature (°C) : 21

### 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 11.6dB

☐ **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.

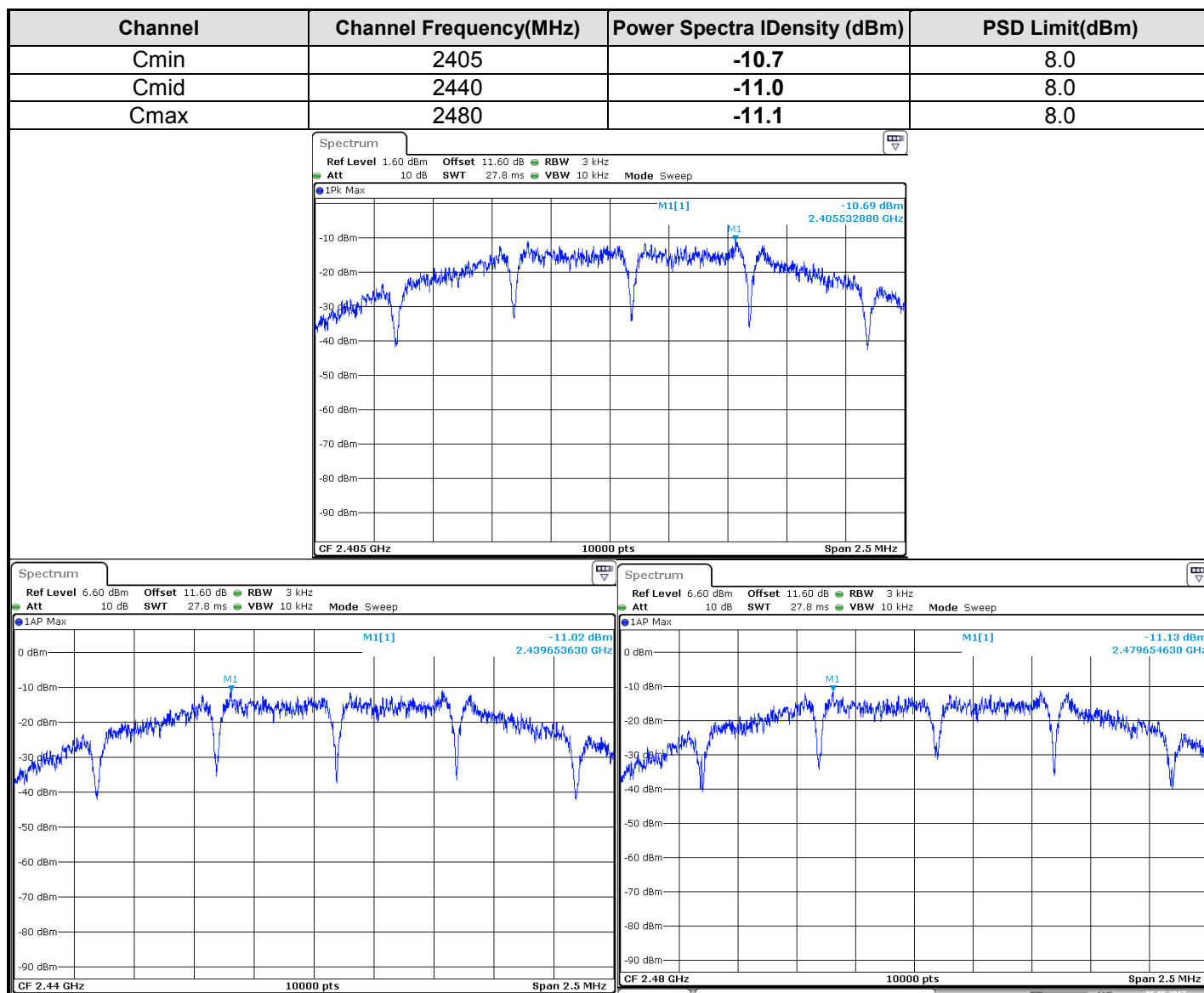
### 6.1. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

## 6.2. TEST EQUIPMENT LIST

| DESCRIPTION          | MANUFACTURER    | MODEL  | N° LCIE  | Cal_Date | Cal_Due |
|----------------------|-----------------|--------|----------|----------|---------|
| Attenuator 10dB      | JFW             | -      | A7122166 | 12/16    | 12/17   |
| Cable 40GHz 2m coudé | -               | -      | A5329720 | 05/16    | 05/17   |
| Spectrum analyzer    | ROHDE & SCHWARZ | FSV 30 | A4060050 | 08/16    | 08/17   |

## 6.3. TEST SEQUENCE AND RESULTS



## 6.4. CONCLUSION

Power Spectral Density measurement performed on the sample of the product Easergy CL110, SN: FL2017W15400011 in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 7. BAND EDGE MEASUREMENT (15.247)

### 7.1. TEST CONDITIONS

Date of test : May 5, 2017  
Test performed by : Jonathan PAUC  
Atmospheric pressure (hPa) : 992  
Relative humidity (%) : 34  
Ambient temperature (°C) : 21

### 7.2. 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.

### 7.3. 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

### 7.4. TEST EQUIPMENT LIST

| DESCRIPTION          | MANUFACTURER    | MODEL  | N° LCIE  | Cal_Date | Cal_Due |
|----------------------|-----------------|--------|----------|----------|---------|
| Attenuator 10dB      | JFW             | -      | A7122166 | 12/16    | 12/17   |
| Cable 40GHz 2m coudé | -               | -      | A5329720 | 05/16    | 05/17   |
| Spectrum analyzer    | ROHDE & SCHWARZ | FSV 30 | A4060050 | 08/16    | 08/17   |

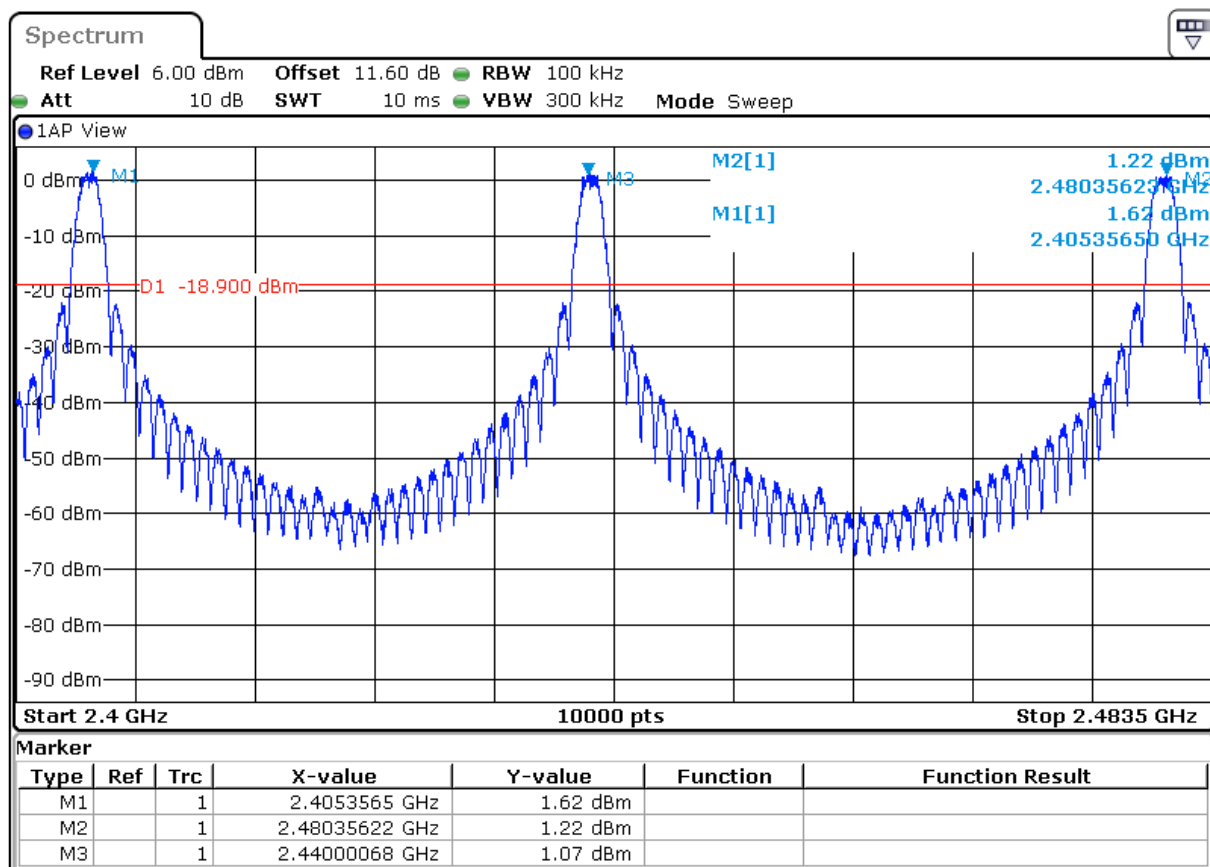
### 7.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

☒ None ☐ Divergence:

## 7.6. TEST SEQUENCE AND RESULTS

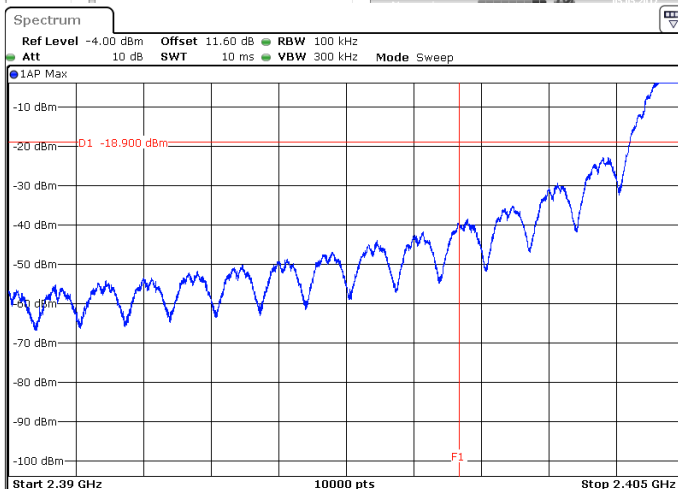
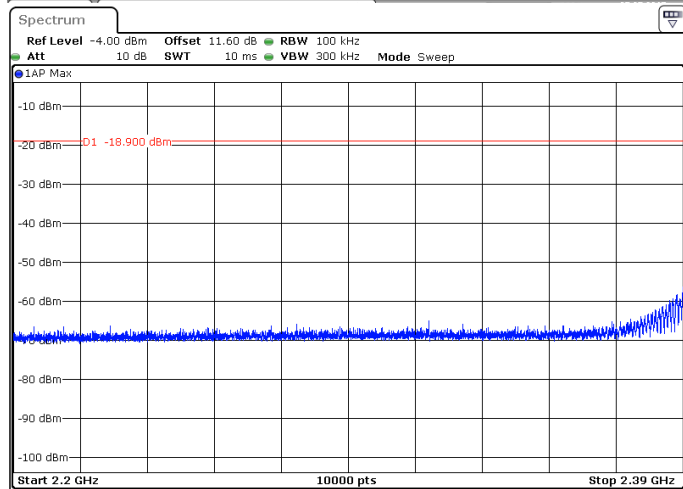
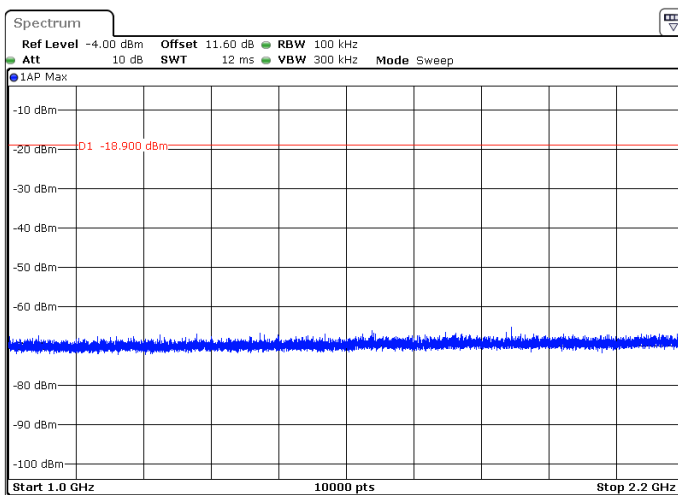
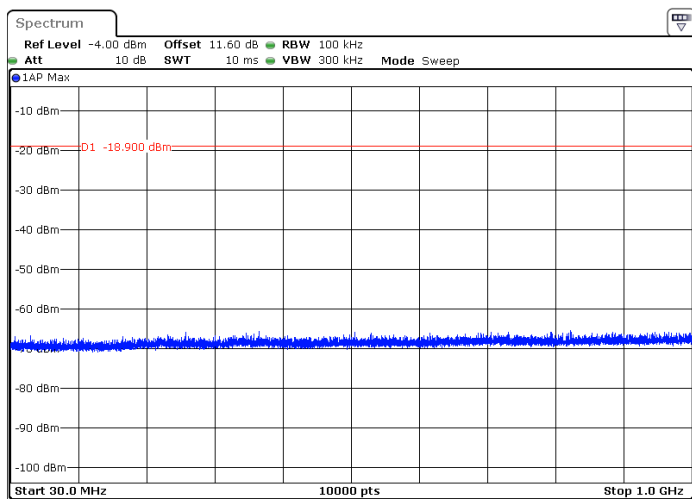
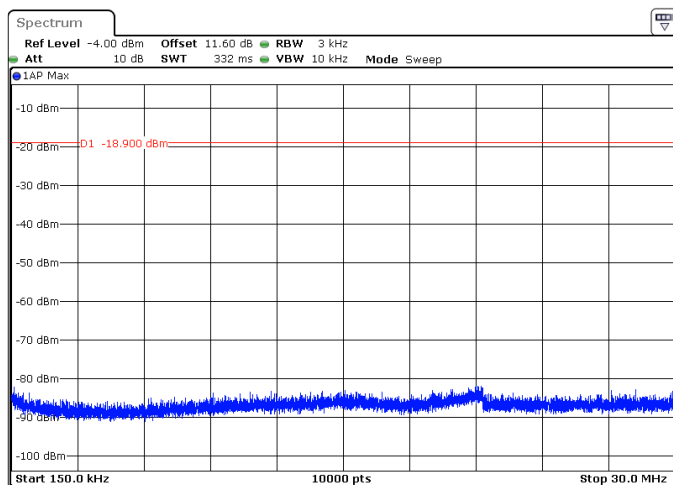
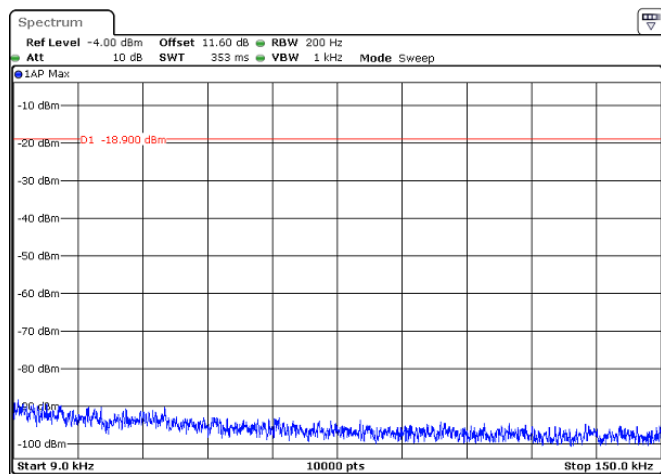
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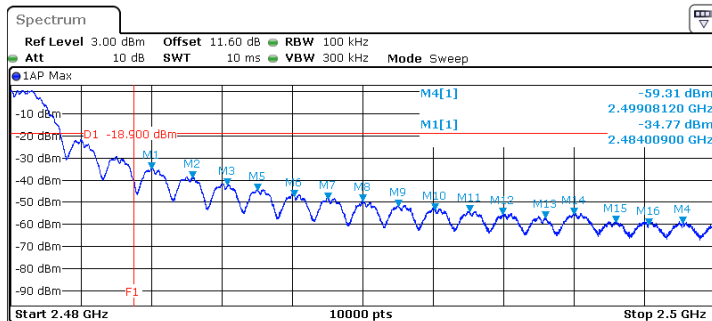
GRAPH / MODULATION.



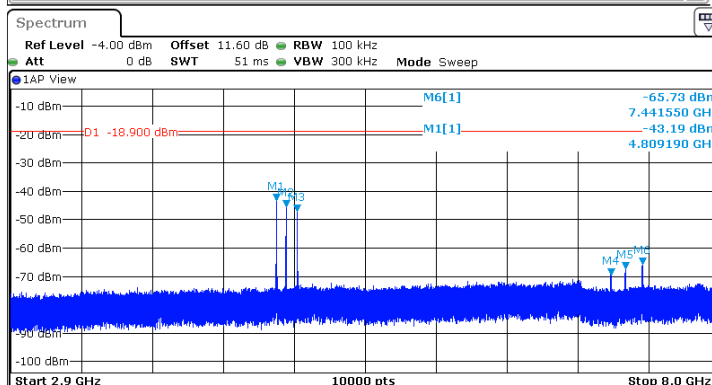
-20dBc limit used:

Worst case : Channel Min, limit at : -18.9dBm

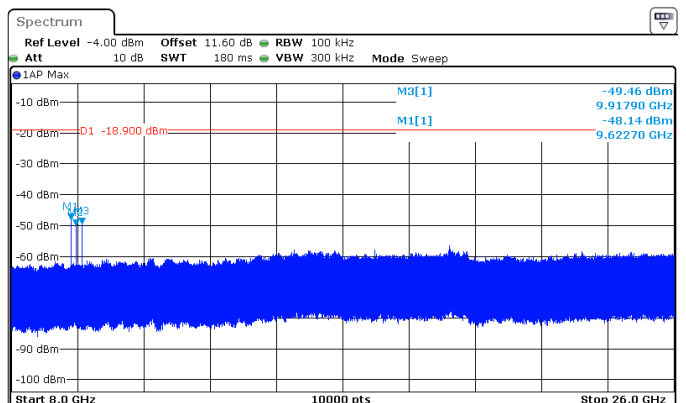
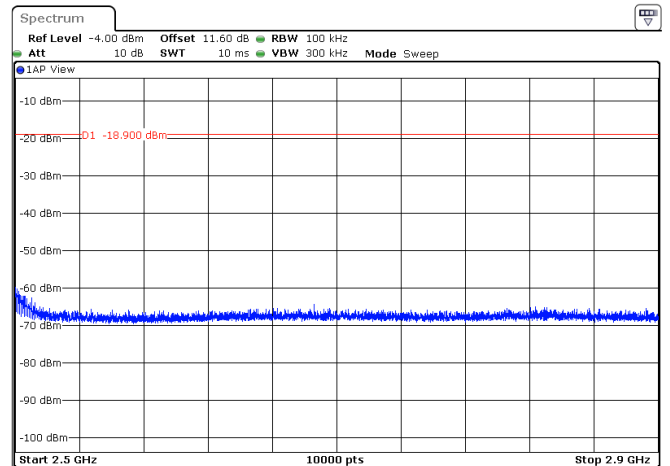




| Marker | Type | Ref | Trc | X-value      | Y-value    | Function | Function Result |
|--------|------|-----|-----|--------------|------------|----------|-----------------|
| M1     | 1    |     |     | 2.484009 GHz | -34.77 dBm |          |                 |
| M2     | 1    |     |     | 2.485165 GHz | -39.03 dBm |          |                 |
| M3     | 1    |     |     | 2.486154 GHz | -42.36 dBm |          |                 |
| M4     | 1    |     |     | 2.490012 GHz | -59.31 dBm |          |                 |
| M5     | 1    |     |     | 2.487014 GHz | -44.65 dBm |          |                 |
| M6     | 1    |     |     | 2.488059 GHz | -47.38 dBm |          |                 |
| M7     | 1    |     |     | 2.489005 GHz | -48.45 dBm |          |                 |
| M8     | 1    |     |     | 2.489993 GHz | -49.32 dBm |          |                 |
| M9     | 1    |     |     | 2.491013 GHz | -51.75 dBm |          |                 |
| M10    | 1    |     |     | 2.492045 GHz | -53.29 dBm |          |                 |
| M11    | 1    |     |     | 2.493037 GHz | -54.40 dBm |          |                 |
| M12    | 1    |     |     | 2.493985 GHz | -55.53 dBm |          |                 |
| M13    | 1    |     |     | 2.495193 GHz | -57.12 dBm |          |                 |
| M14    | 1    |     |     | 2.496005 GHz | -55.36 dBm |          |                 |
| M15    | 1    |     |     | 2.497193 GHz | -59.10 dBm |          |                 |
| M16    | 1    |     |     | 2.498121 GHz | -60.19 dBm |          |                 |



| Marker | Type | Ref | Trc | X-value      | Y-value    | Function | Function Result |
|--------|------|-----|-----|--------------|------------|----------|-----------------|
| M1     | 1    |     |     | 4.80919 GHz  | -43.19 dBm |          |                 |
| M2     | 1    |     |     | 4.879055 GHz | -45.40 dBm |          |                 |
| M3     | 1    |     |     | 4.961165 GHz | -46.91 dBm |          |                 |
| M4     | 1    |     |     | 7.21664 GHz  | -69.43 dBm |          |                 |
| M5     | 1    |     |     | 7.32206 GHz  | -67.15 dBm |          |                 |
| M6     | 1    |     |     | 7.44155 GHz  | -65.73 dBm |          |                 |



| Marker | Type | Ref | Trc | X-value    | Y-value    | Function | Function Result |
|--------|------|-----|-----|------------|------------|----------|-----------------|
| M1     | 1    |     |     | 9.6227 GHz | -48.14 dBm |          |                 |
| M2     | 1    |     |     | 9.7577 GHz | -49.95 dBm |          |                 |
| M3     | 1    |     |     | 9.9179 GHz | -49.46 dBm |          |                 |

## 7.7. CONCLUSION

Band Edge Measurement performed on the sample of the product Easergy CL110, SN: FL2017W15400011 in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 8. OCCUPIED BANDWIDTH

### 8.1. TEST CONDITIONS

Date of test : May 5, 2017  
Test performed by : Jonathan PAUC  
Atmospheric pressure (hPa) : 992  
Relative humidity (%) : 34  
Ambient temperature (°C) : 21

### 8.2. 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 11.6dB

☐ **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

Performed with sample **FL2017W15400011**

### 8.3. TEST EQUIPMENT LIST

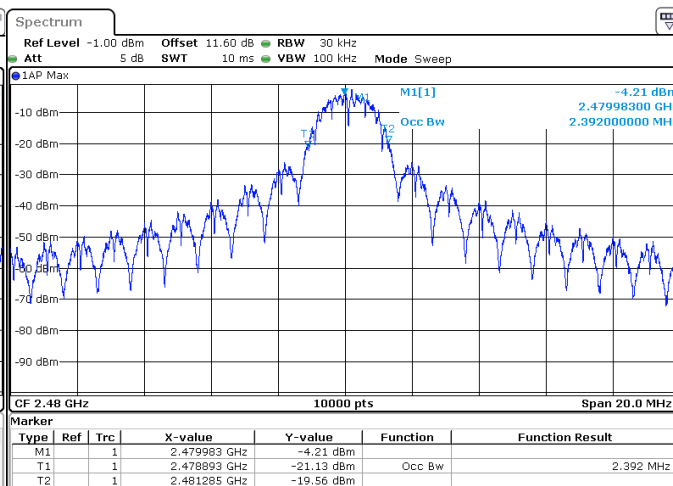
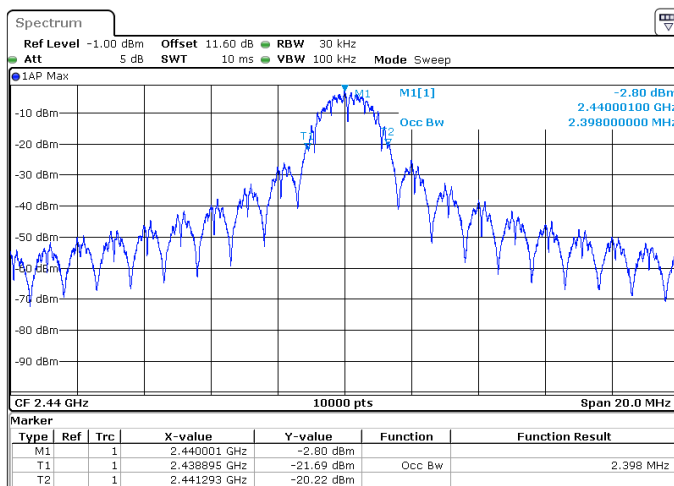
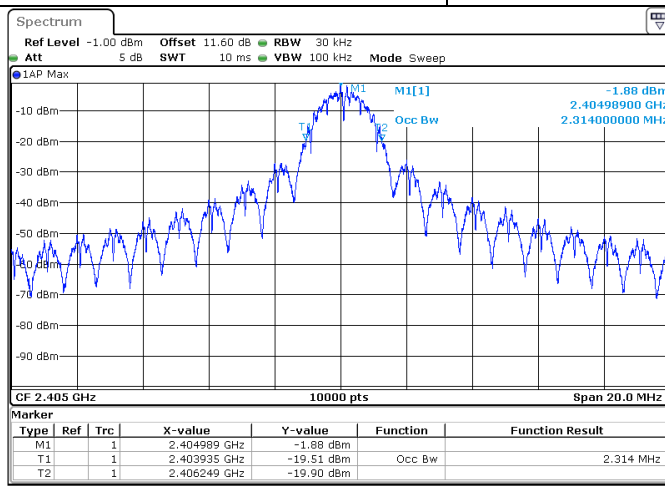
| DESCRIPTION          | MANUFACTURER    | MODEL  | N° LCIE  | Cal_Date | Cal_Due |
|----------------------|-----------------|--------|----------|----------|---------|
| Attenuator 10dB      | JFW             | -      | A7122166 | 12/16    | 12/17   |
| Cable 40GHz 2m coudé | -               | -      | A5329720 | 05/16    | 05/17   |
| Spectrum analyzer    | ROHDE & SCHWARZ | FSV 30 | A4060050 | 08/16    | 08/17   |

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

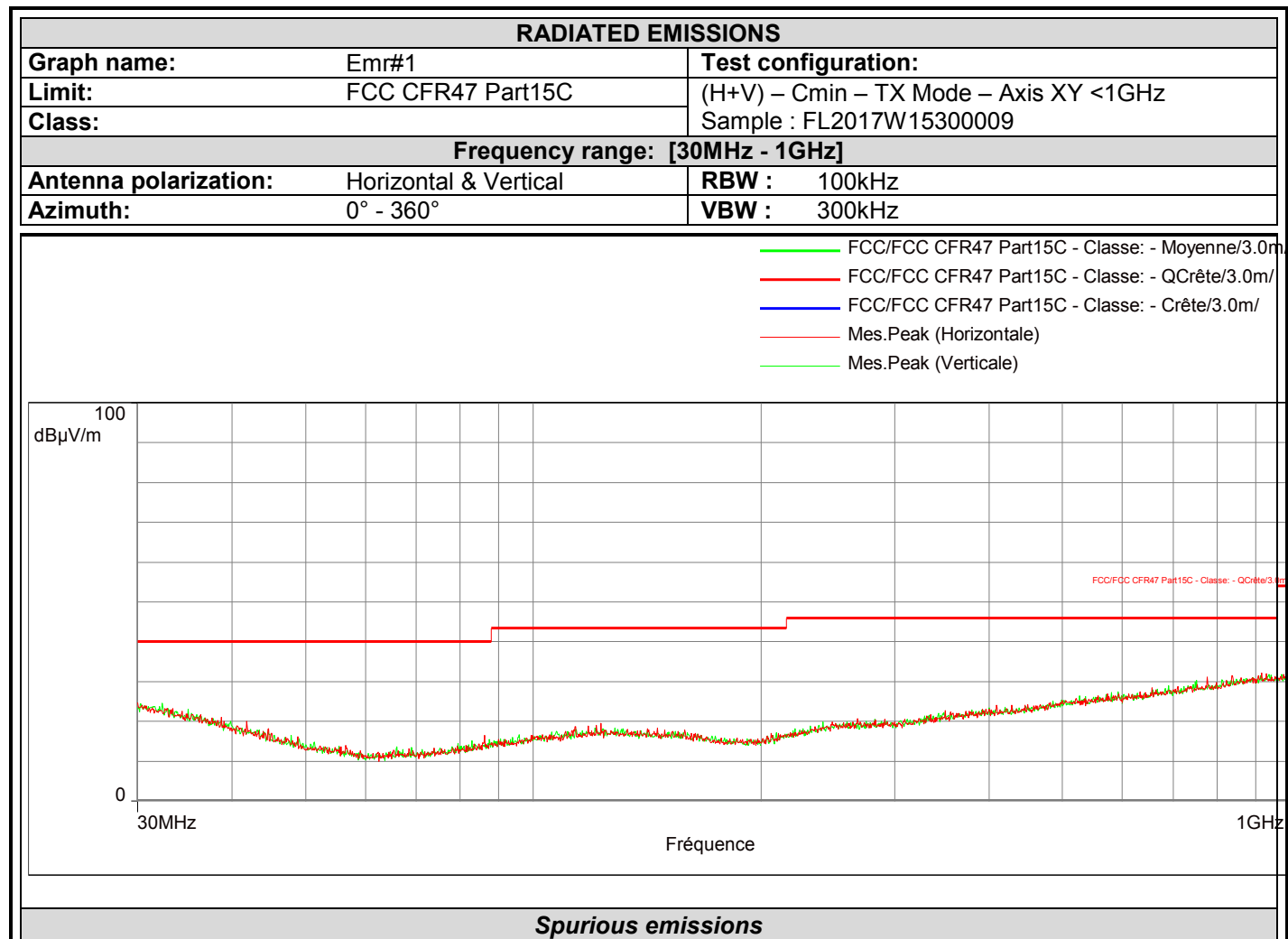
☒ None ☐ Divergence:

## 8.5. TEST SEQUENCE AND RESULTS

| Channel | Channel Frequency (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-------------------------|------------------------------|
| 11      | 2405                    | 2.314                        |
| 18      | 2440                    | 2.398                        |
| 26      | 2480                    | 2.392                        |



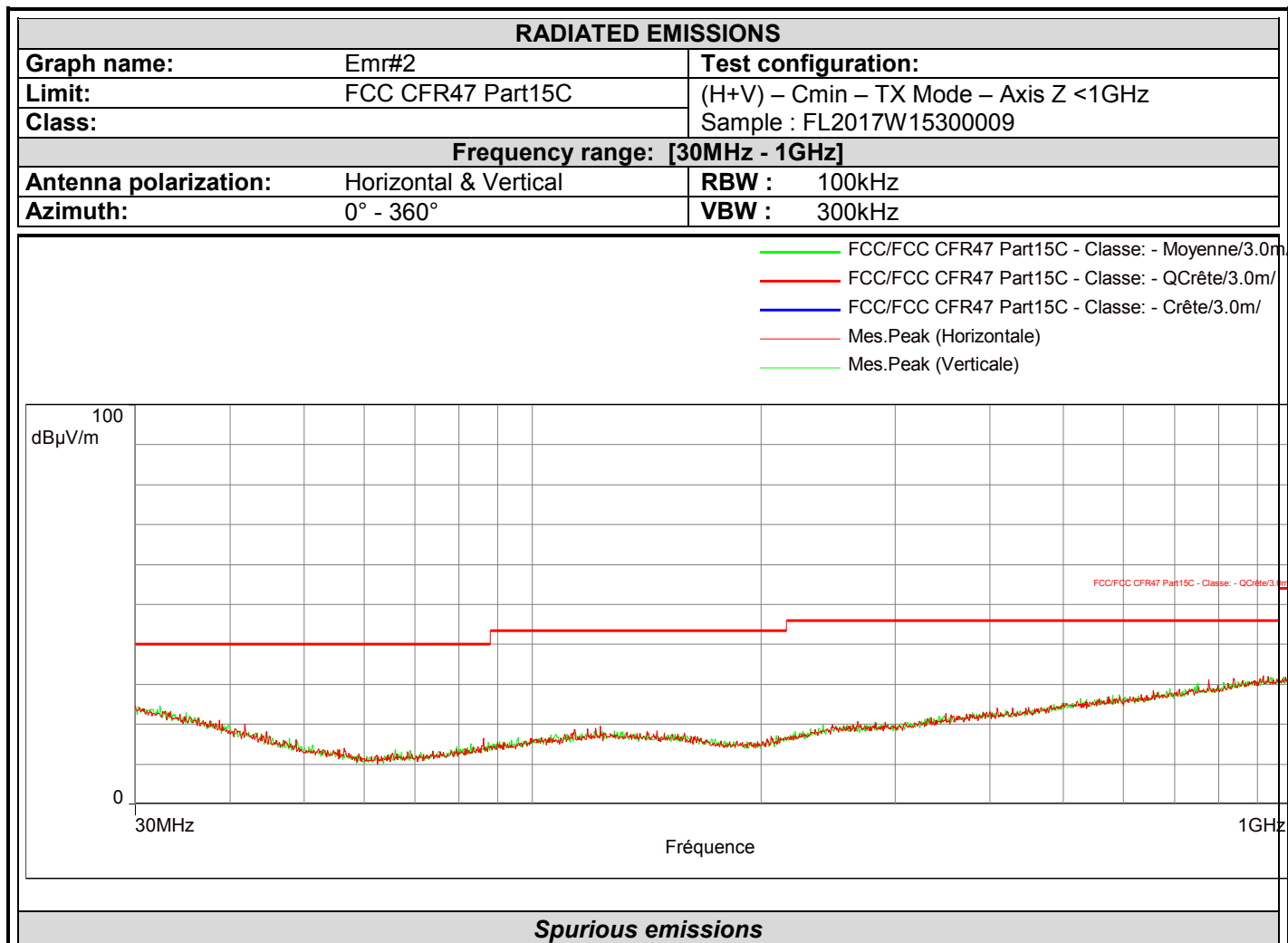
## 9. ANNEX 1 (GRAPHS)



*No significant frequency observed*



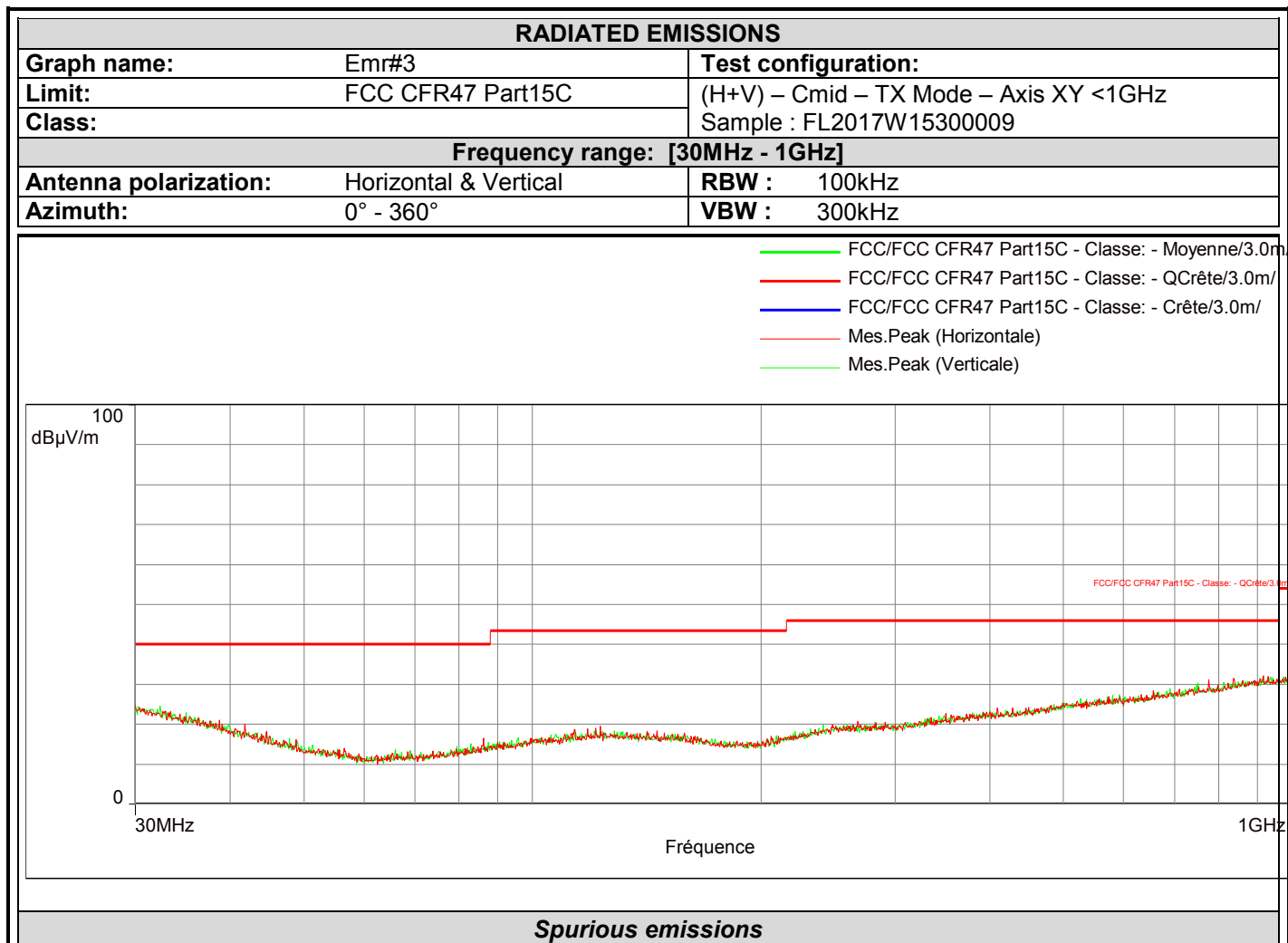
L C I E



No significative frequency observed



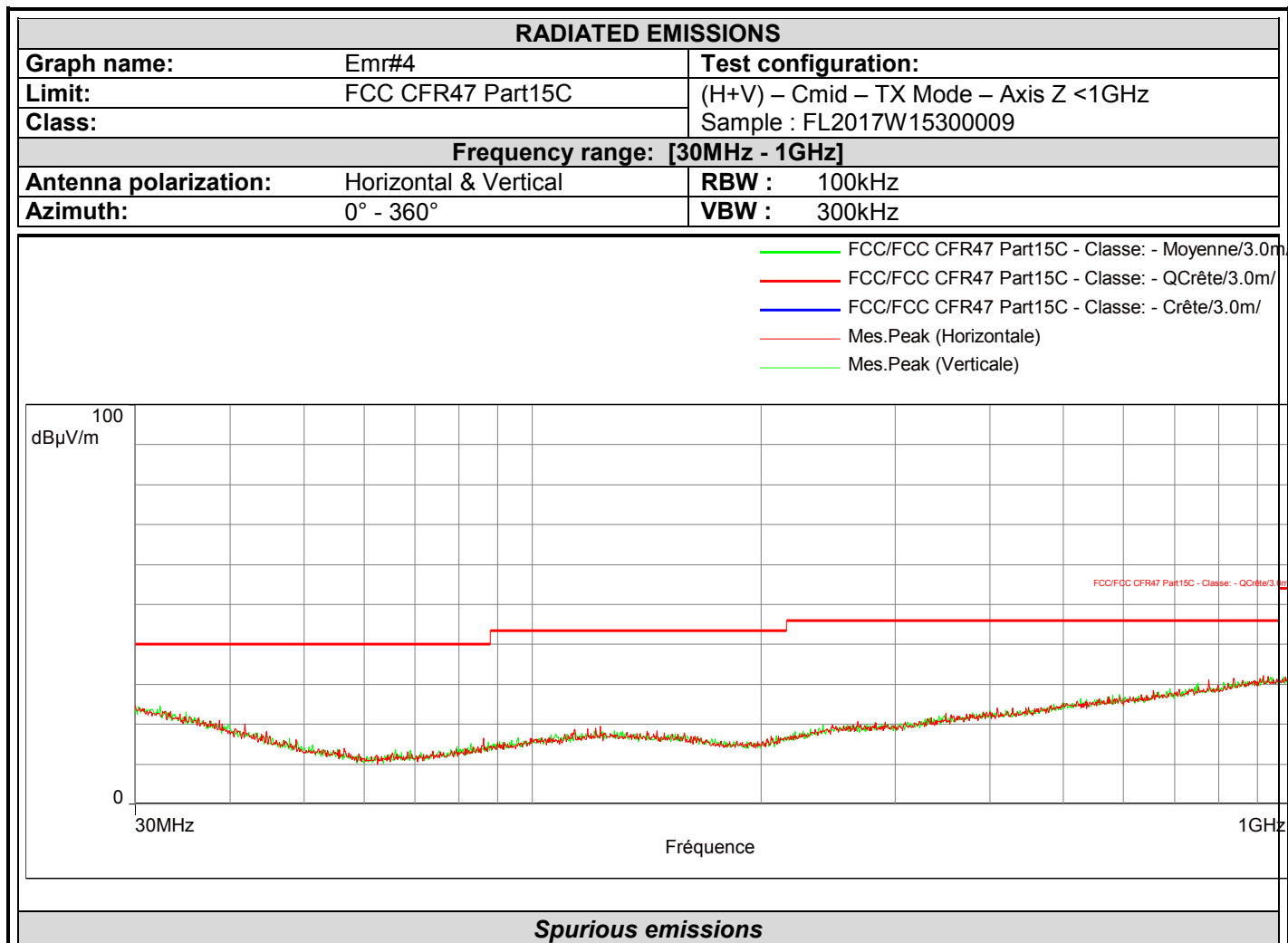
L C I E



No significative frequency observed



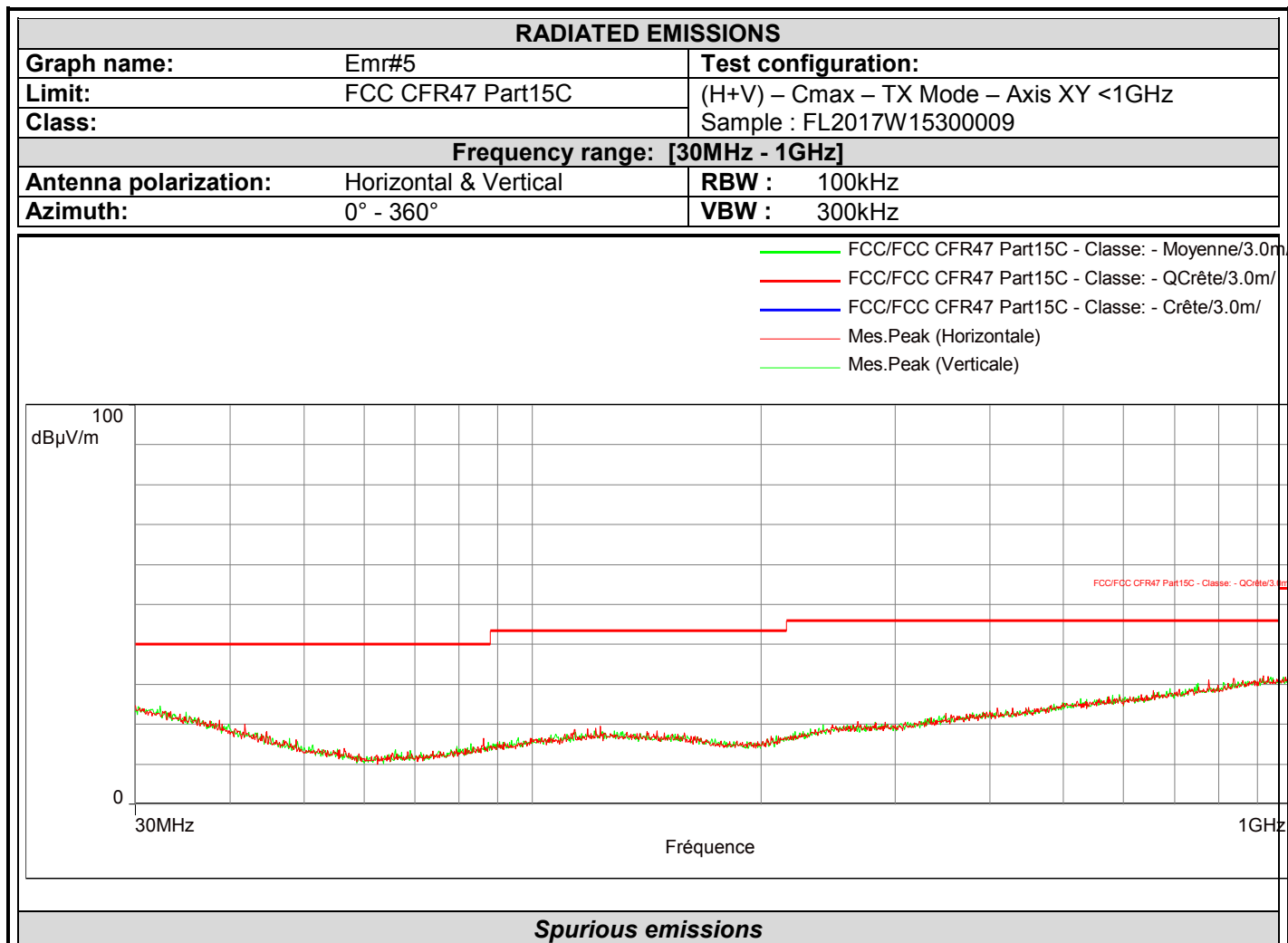
L C I E



No significant frequency observed



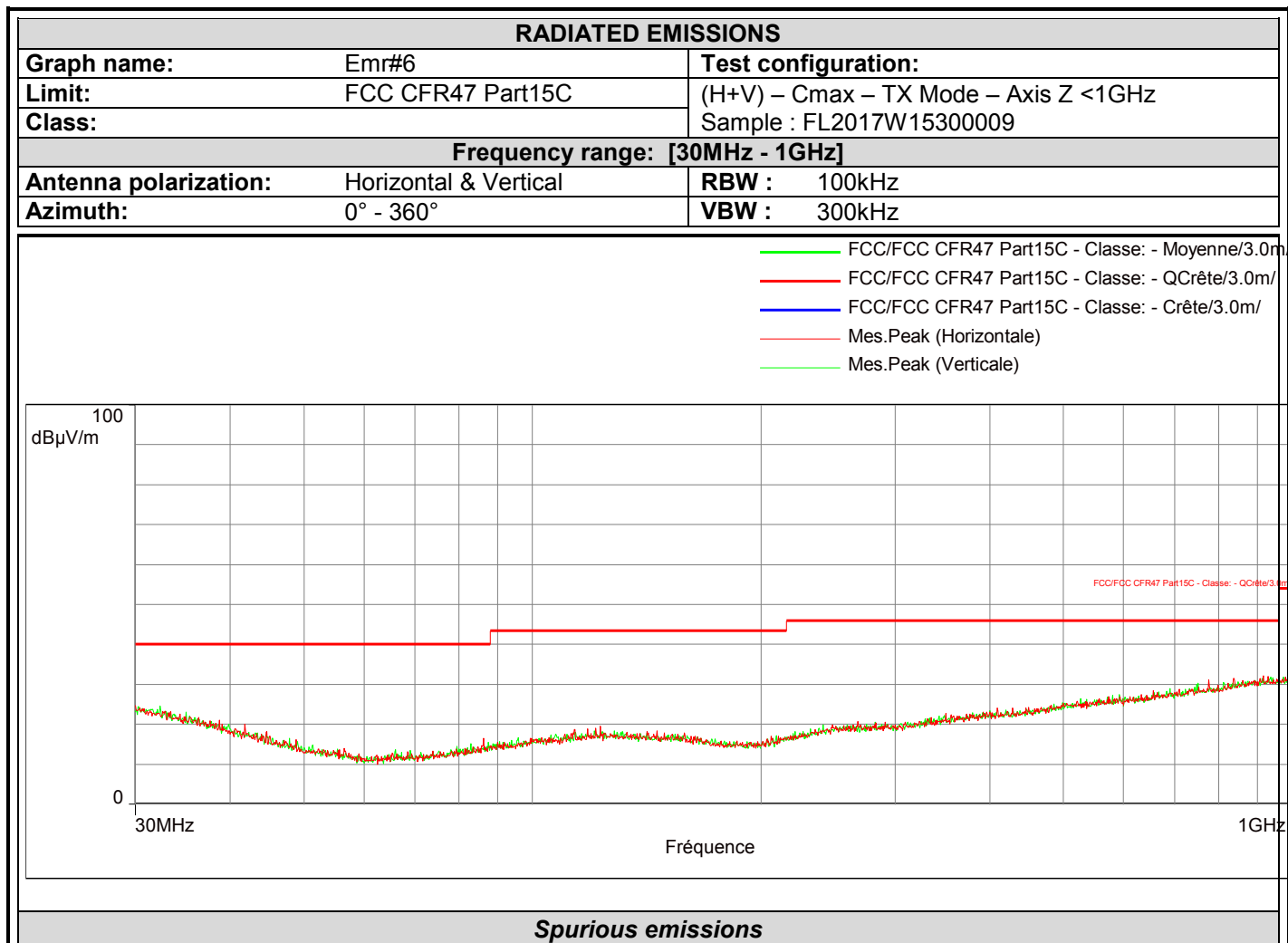
L C I E



No significative frequency observed



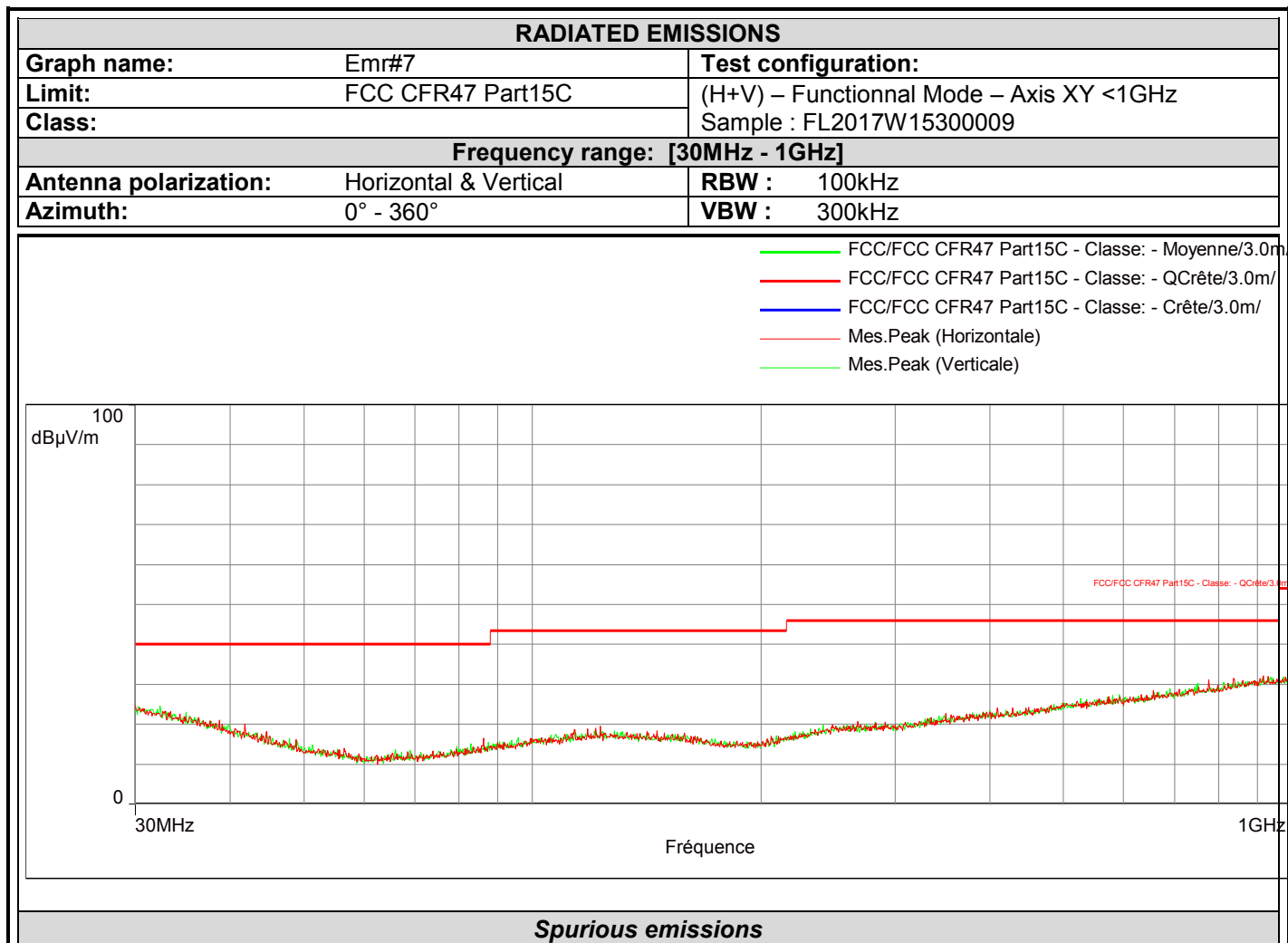
L C I E



No significative frequency observed



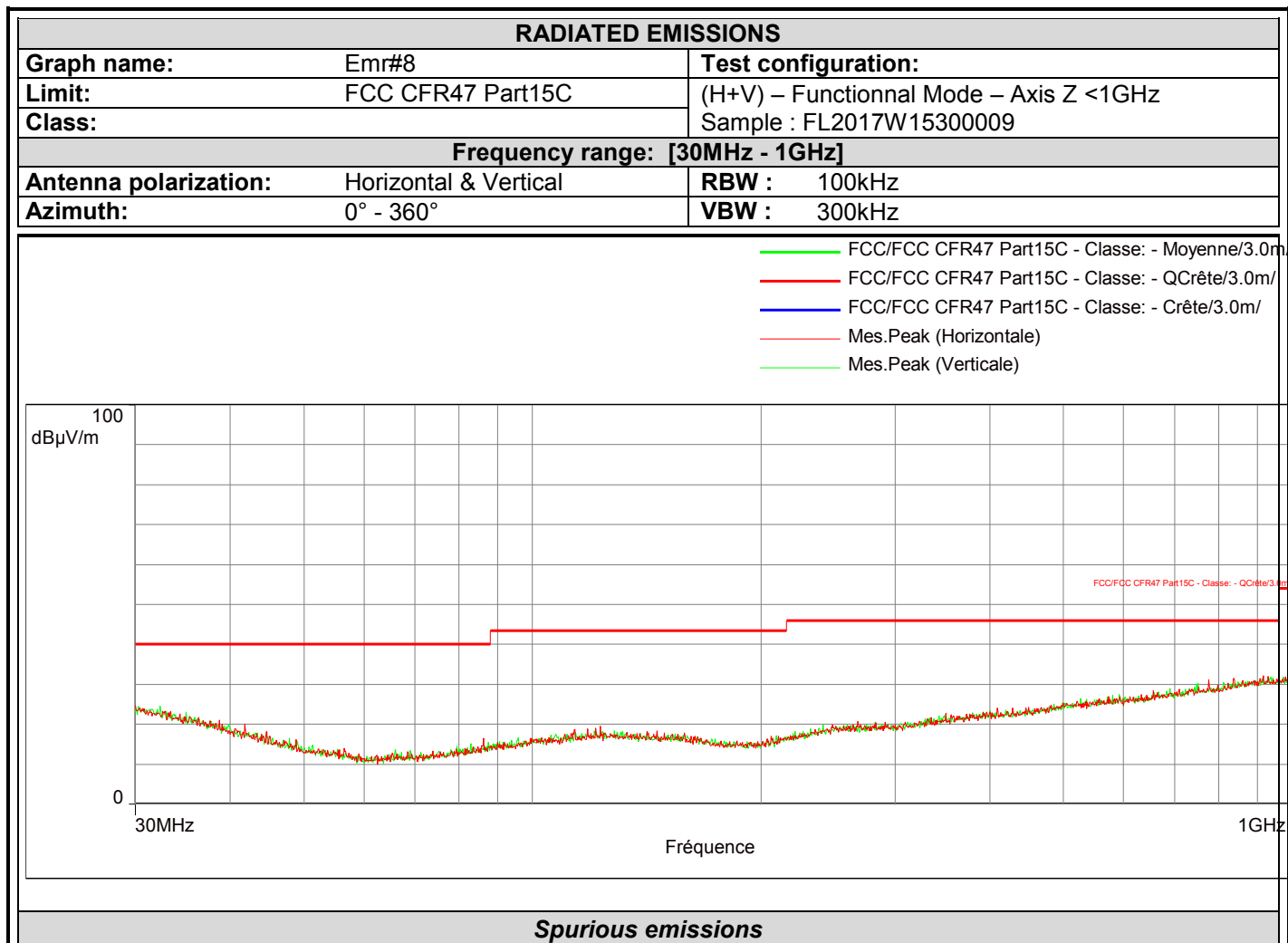
L C I E



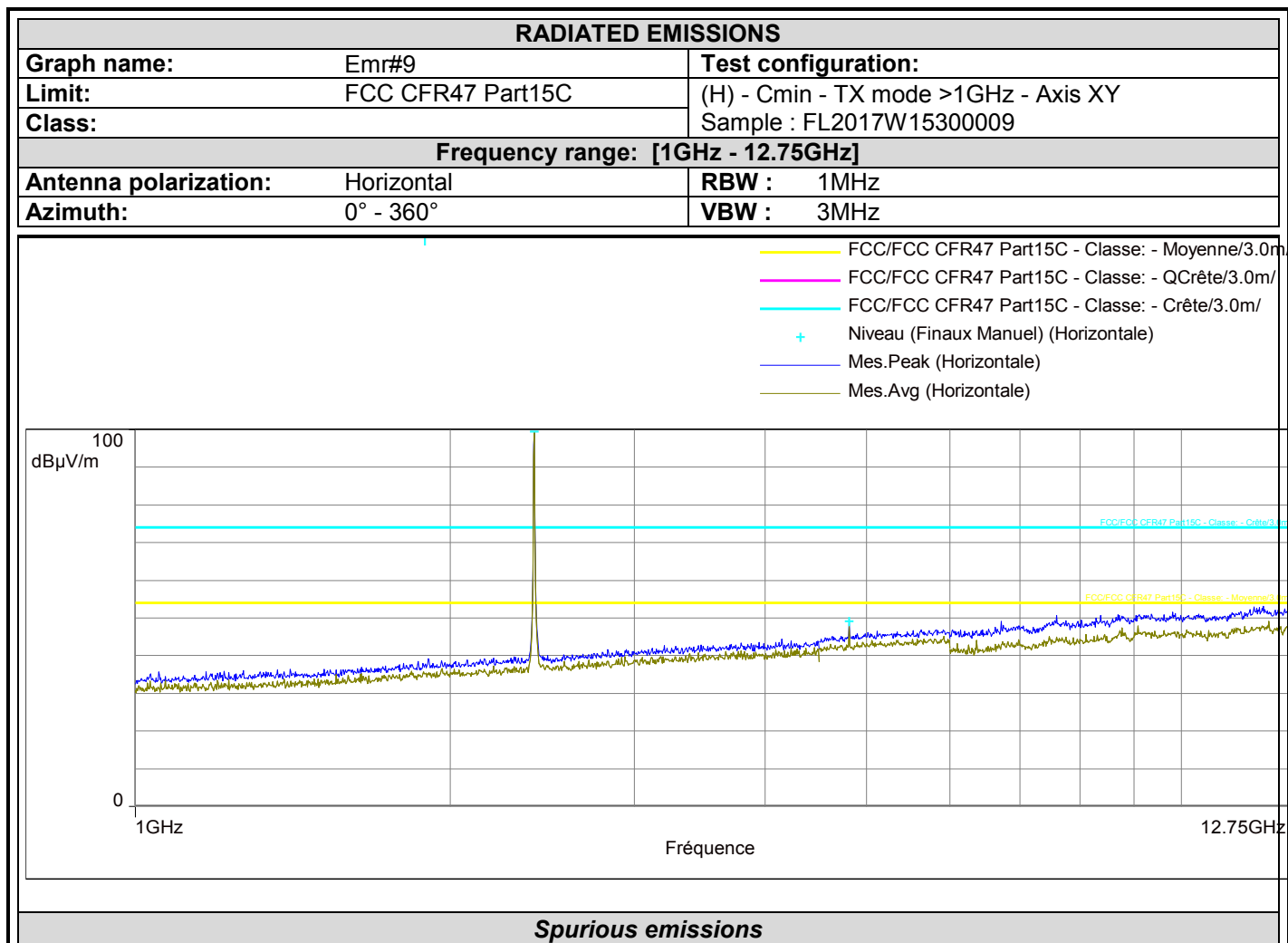
No significative frequency observed



L C I E

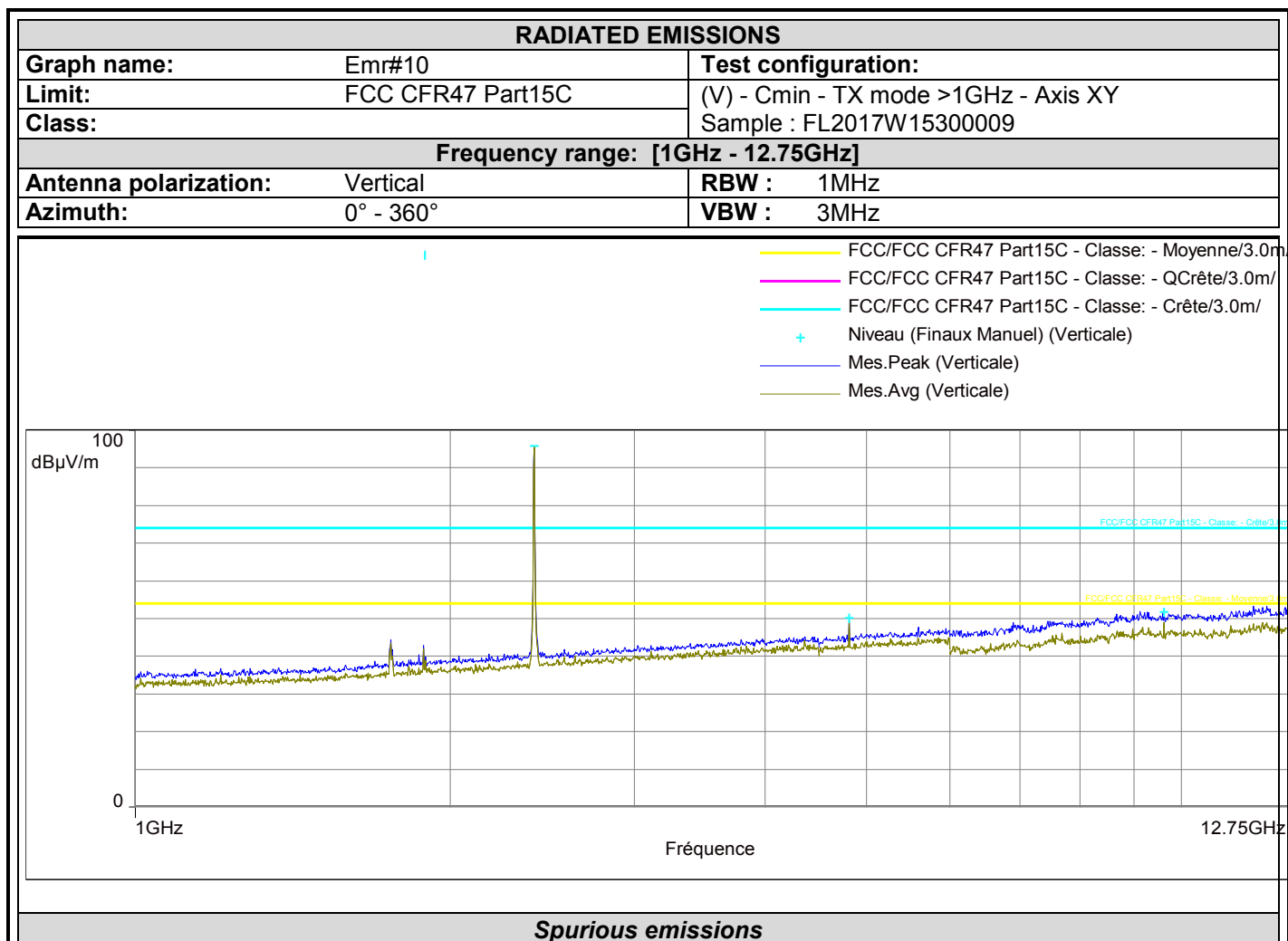


No significative frequency observed





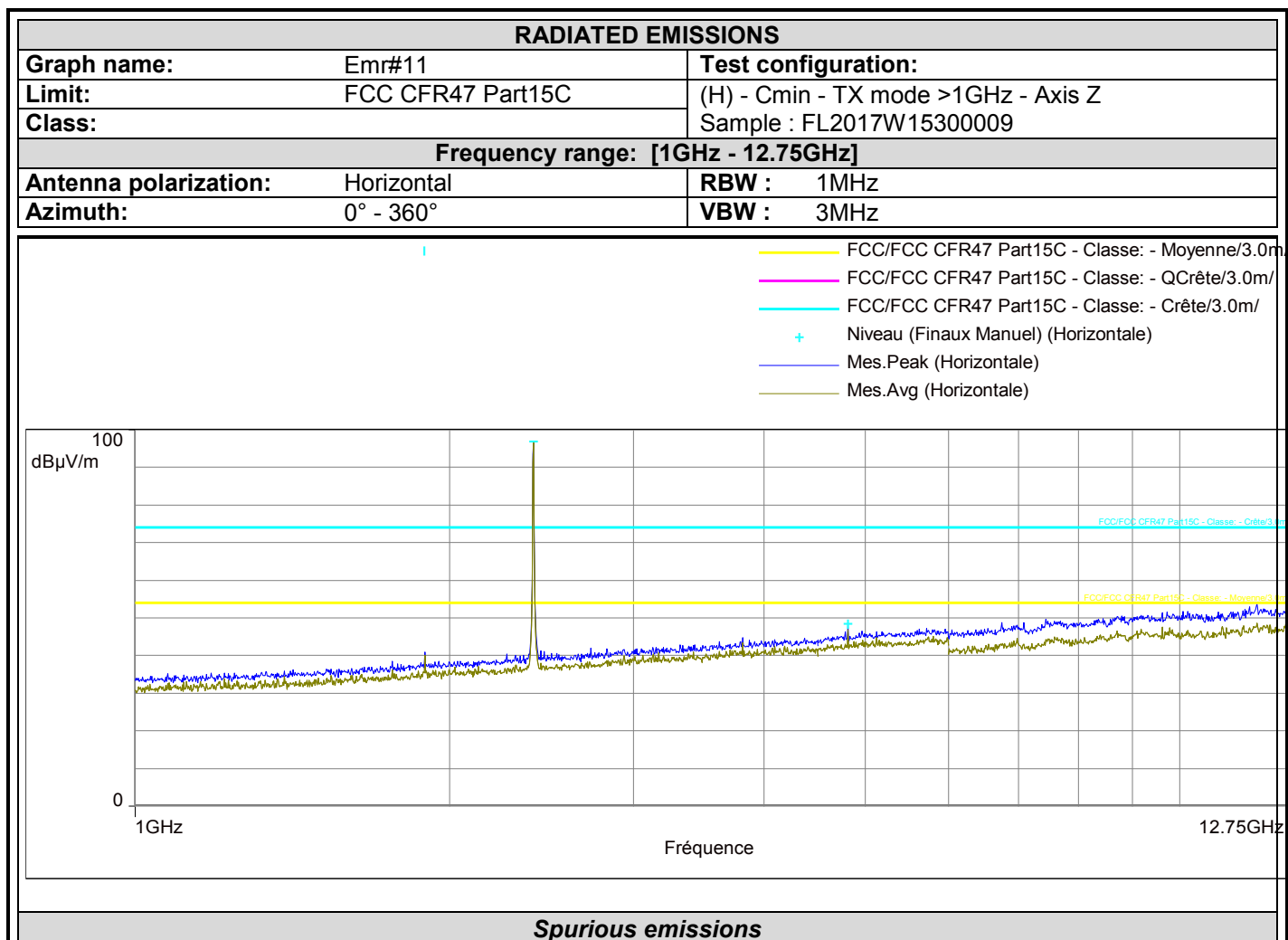
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2405.741        | 95.8                | Vertical     |
| 4809.181        | 50.2                | Vertical     |
| 9618.362        | 51.7                | Vertical     |



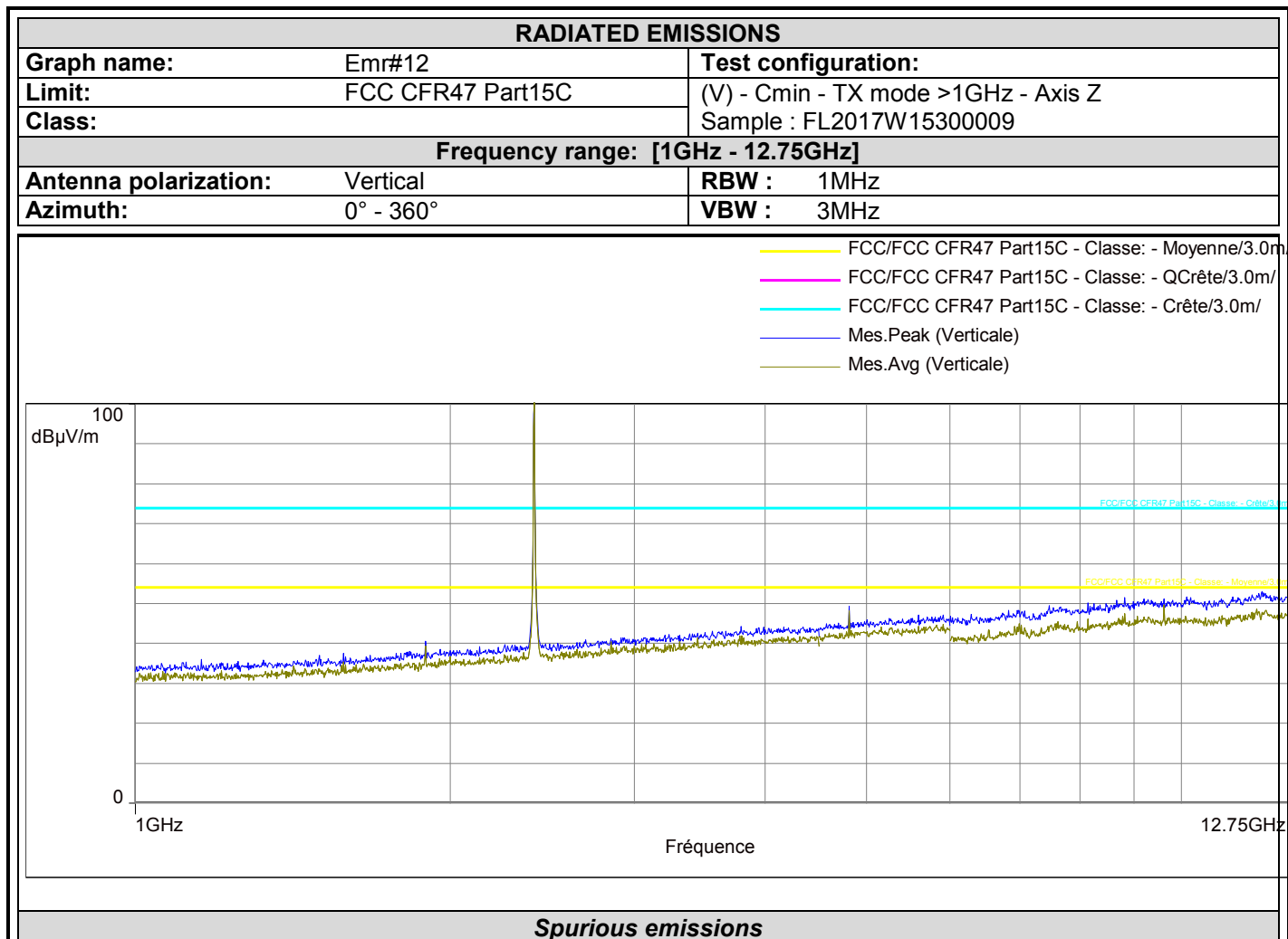
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2405.741        | 96.9                | Horizontal   |
| 4809.481        | 48.4                | Horizontal   |



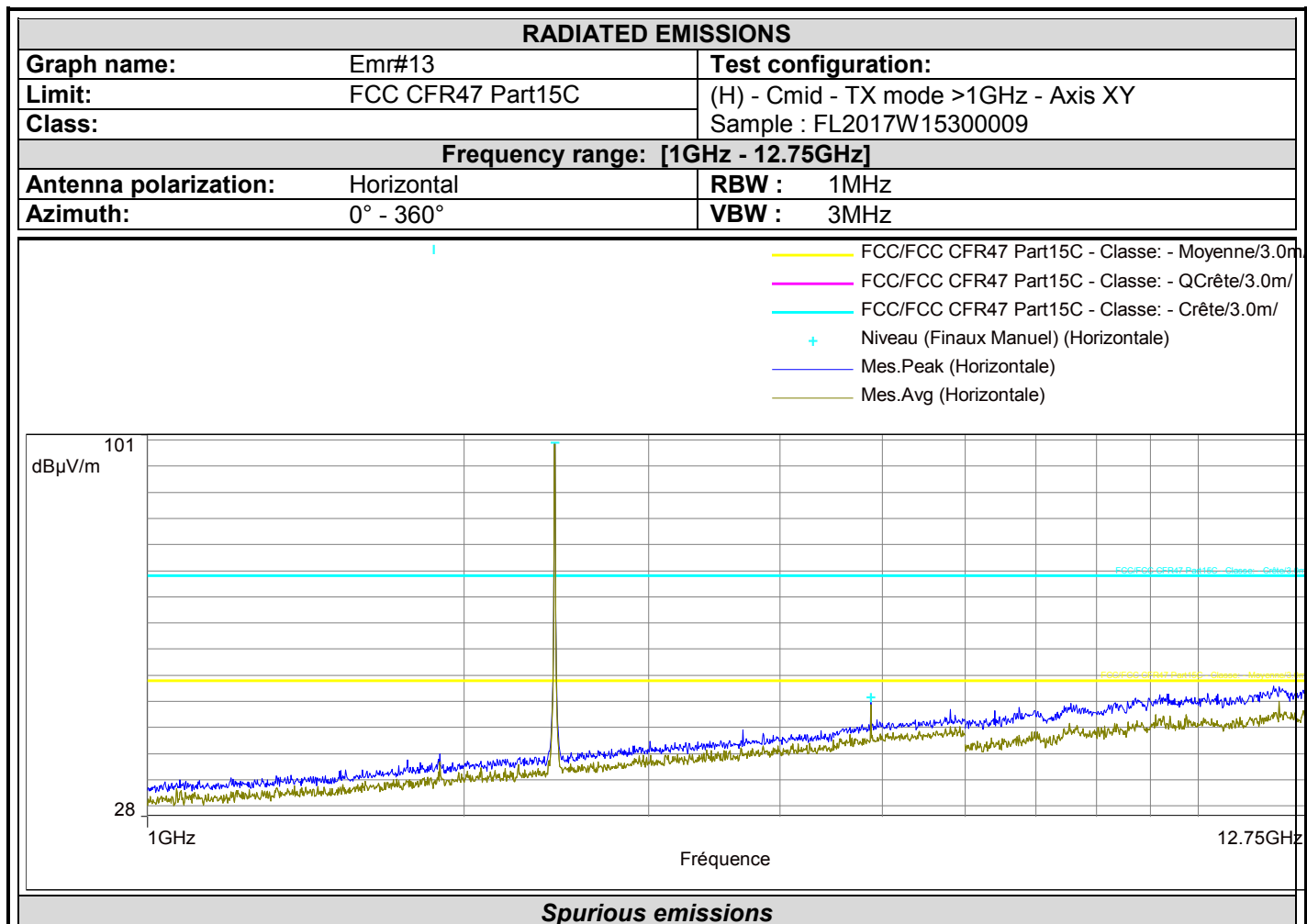
L C I E



No significant frequency observed



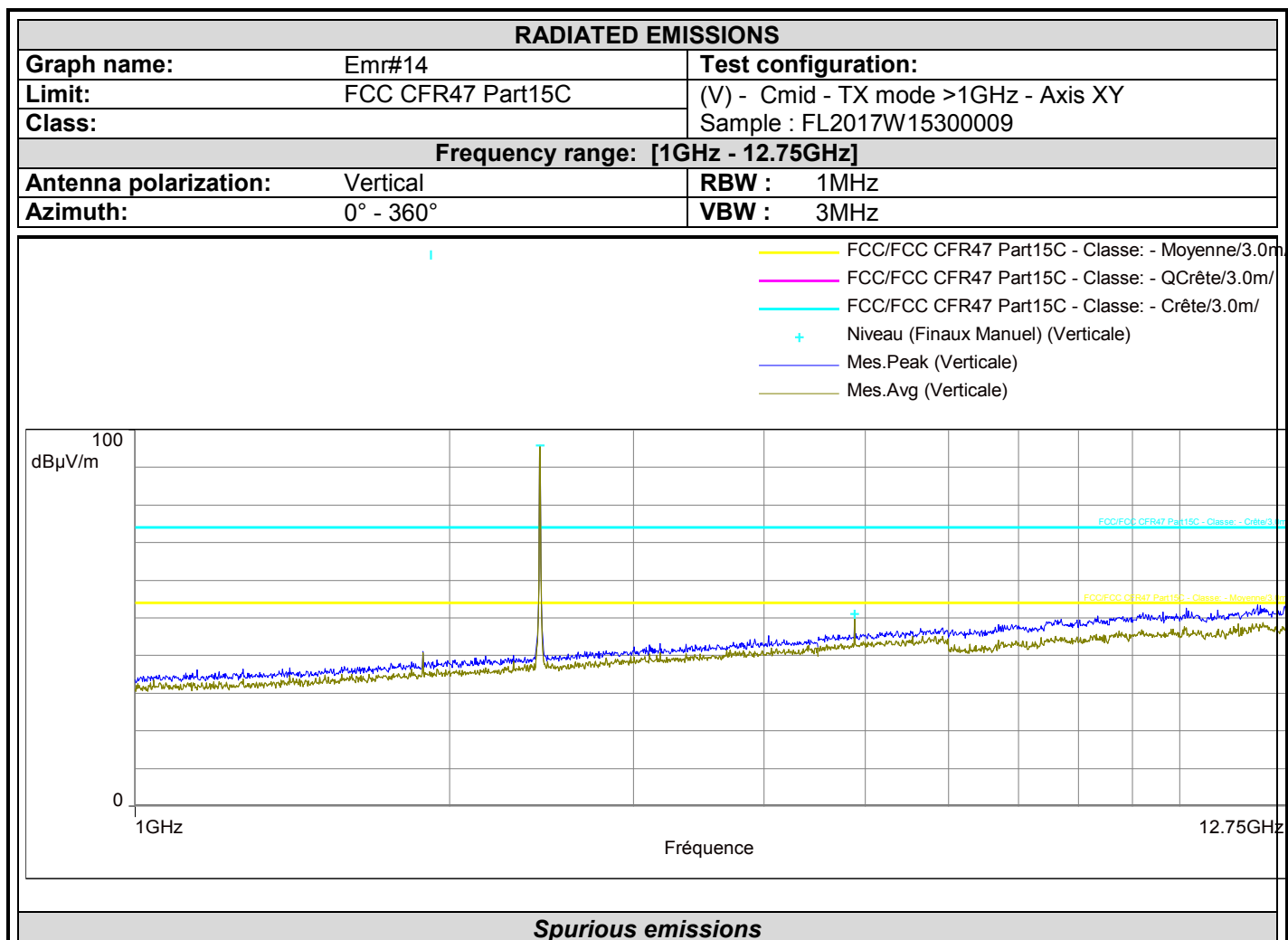
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2440.744        | 99.5                | Horizontal   |
| 4881.338        | 50.8                | Horizontal   |



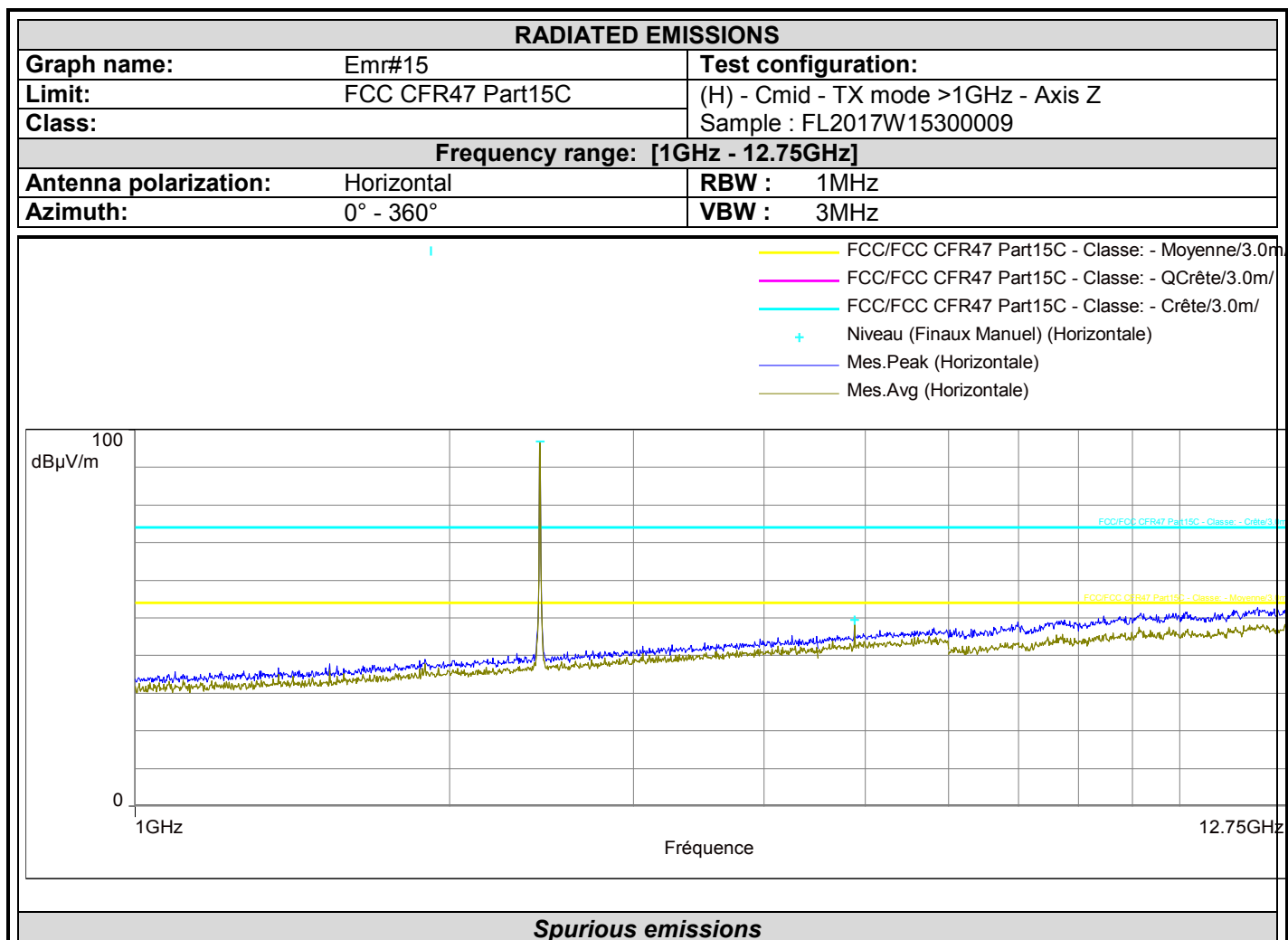
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2440.744        | 95.9                | Vertical     |
| 4881.038        | 51.0                | Vertical     |



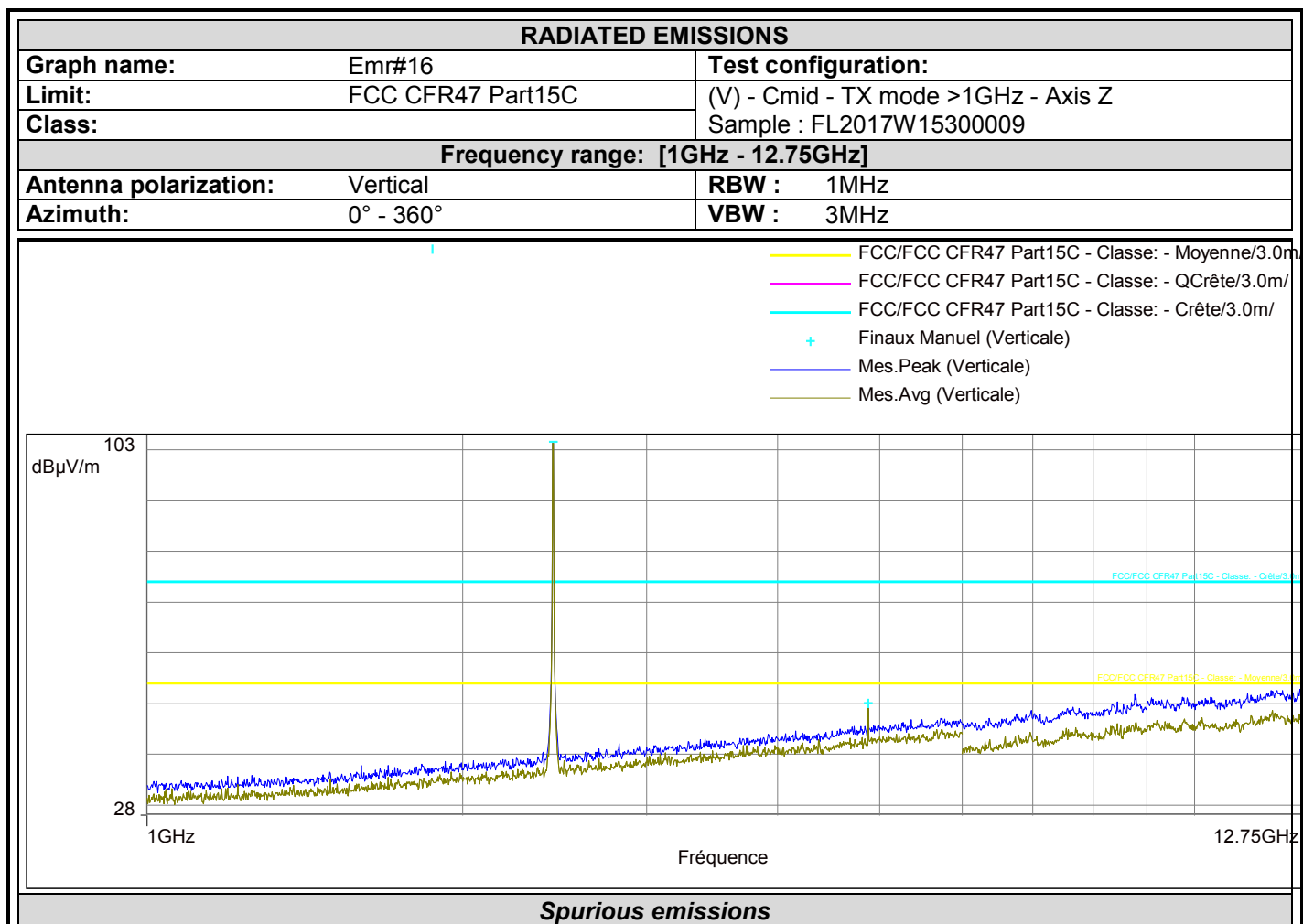
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2440.744        | 96.8                | Horizontal   |
| 4881.338        | 49.5                | Horizontal   |



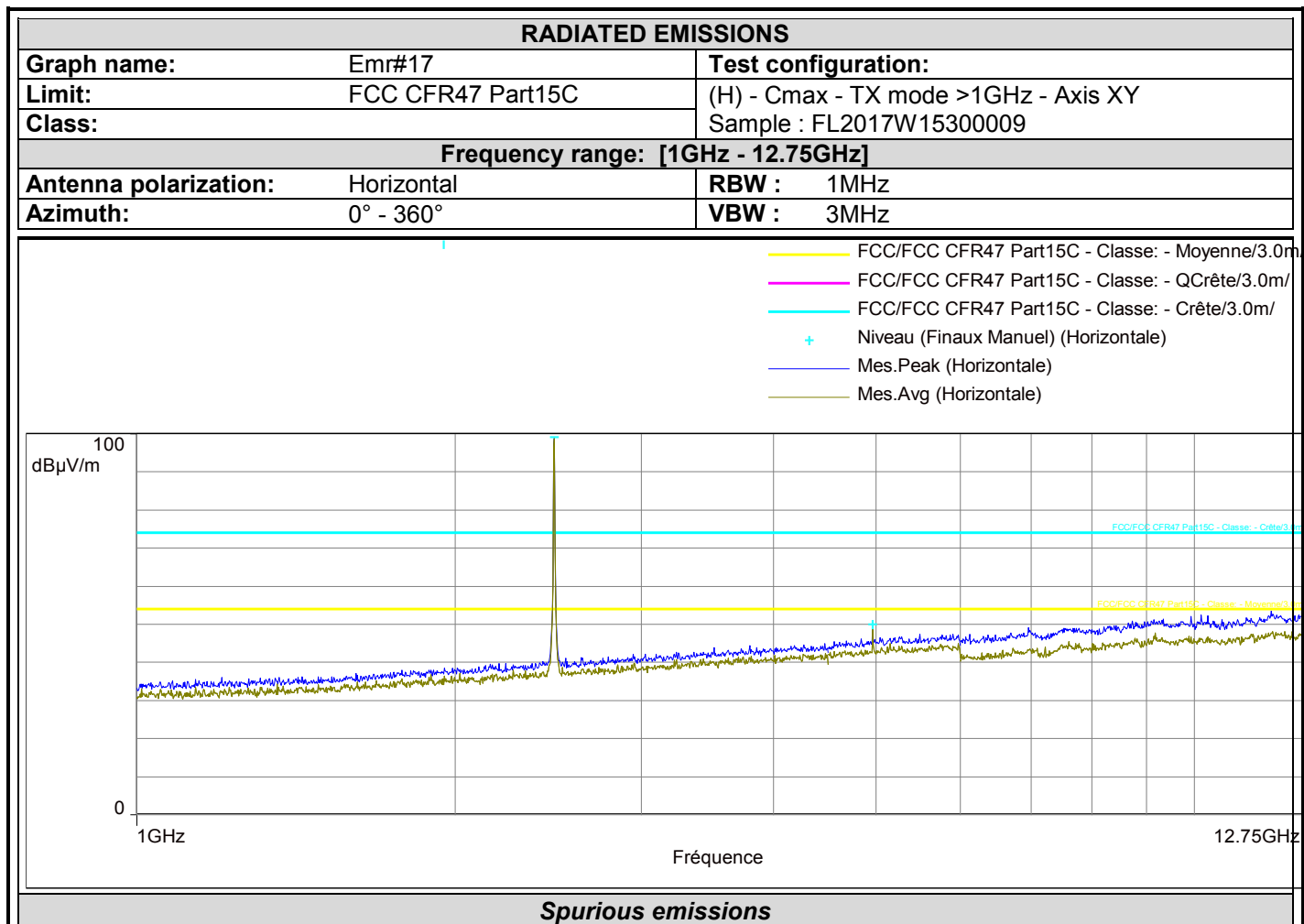
L C I E



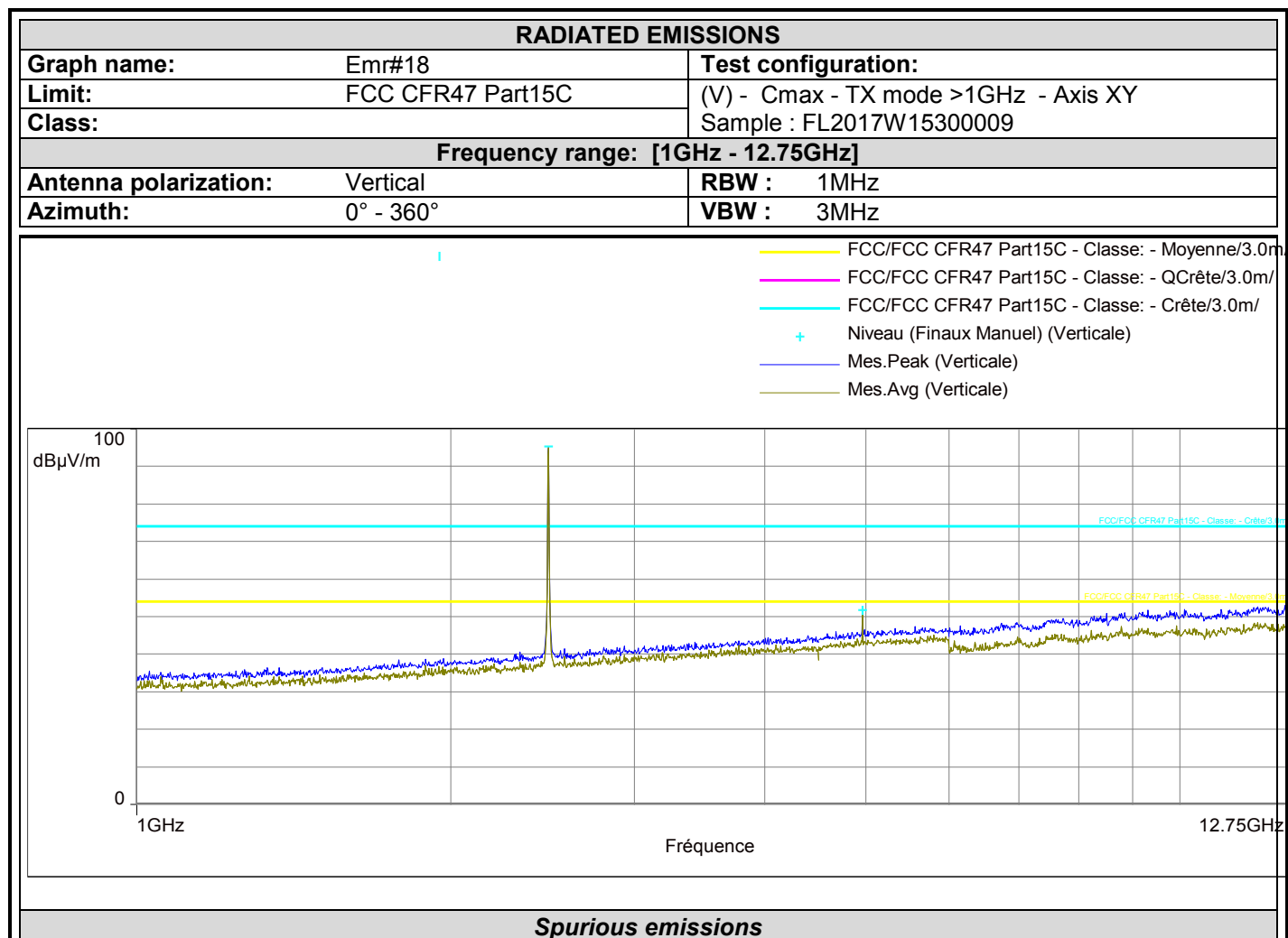
| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2440.744        | 101.5               | Vertical     |
| 4879.538        | 50.1                | Vertical     |



L C I E



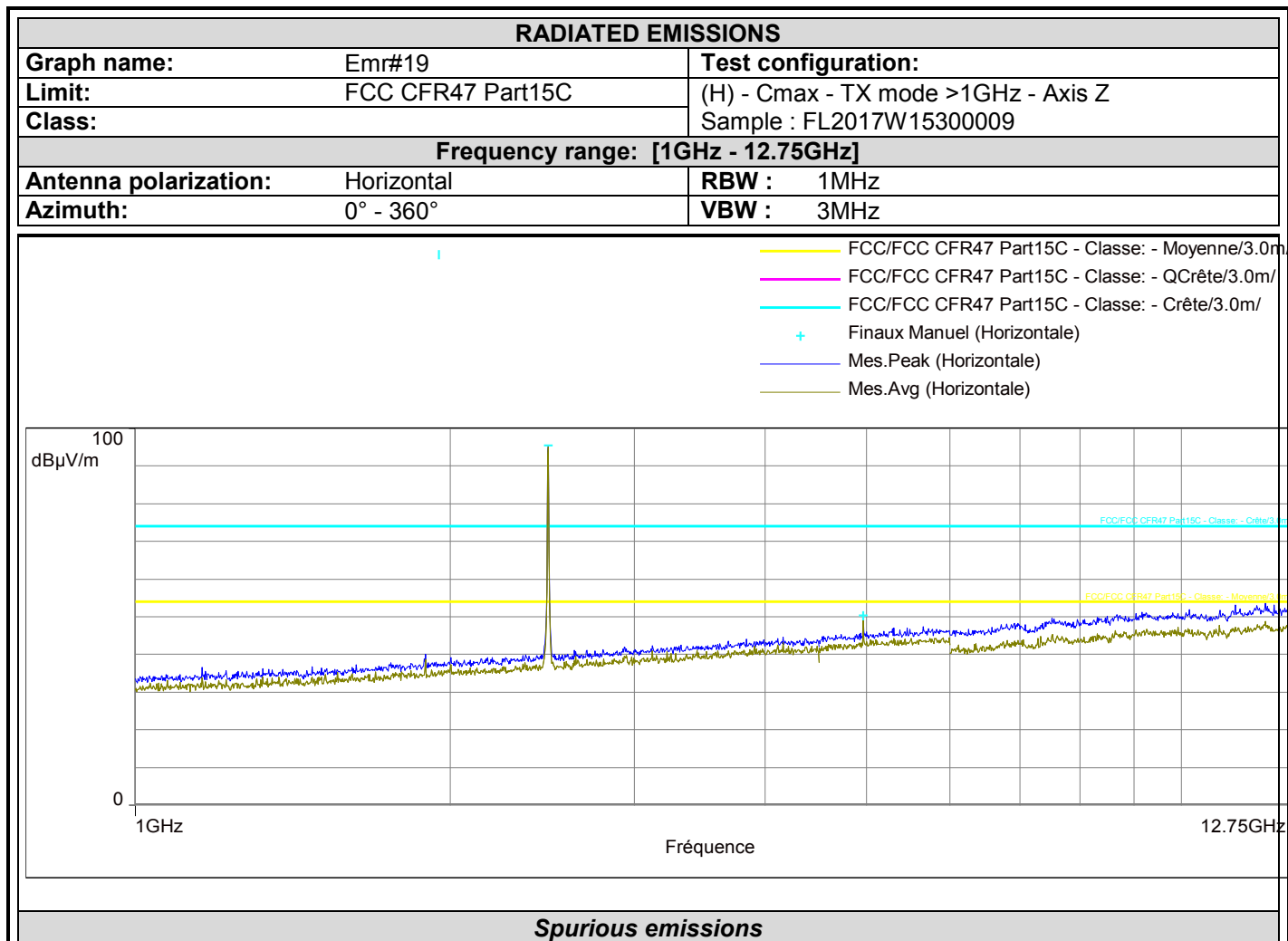
| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2480.648        | 99.0                | Horizontal   |
| 4961.296        | 50.1                | Horizontal   |



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2480.648        | 95.3                | Vertical     |
| 4961.446        | 51.7                | Vertical     |



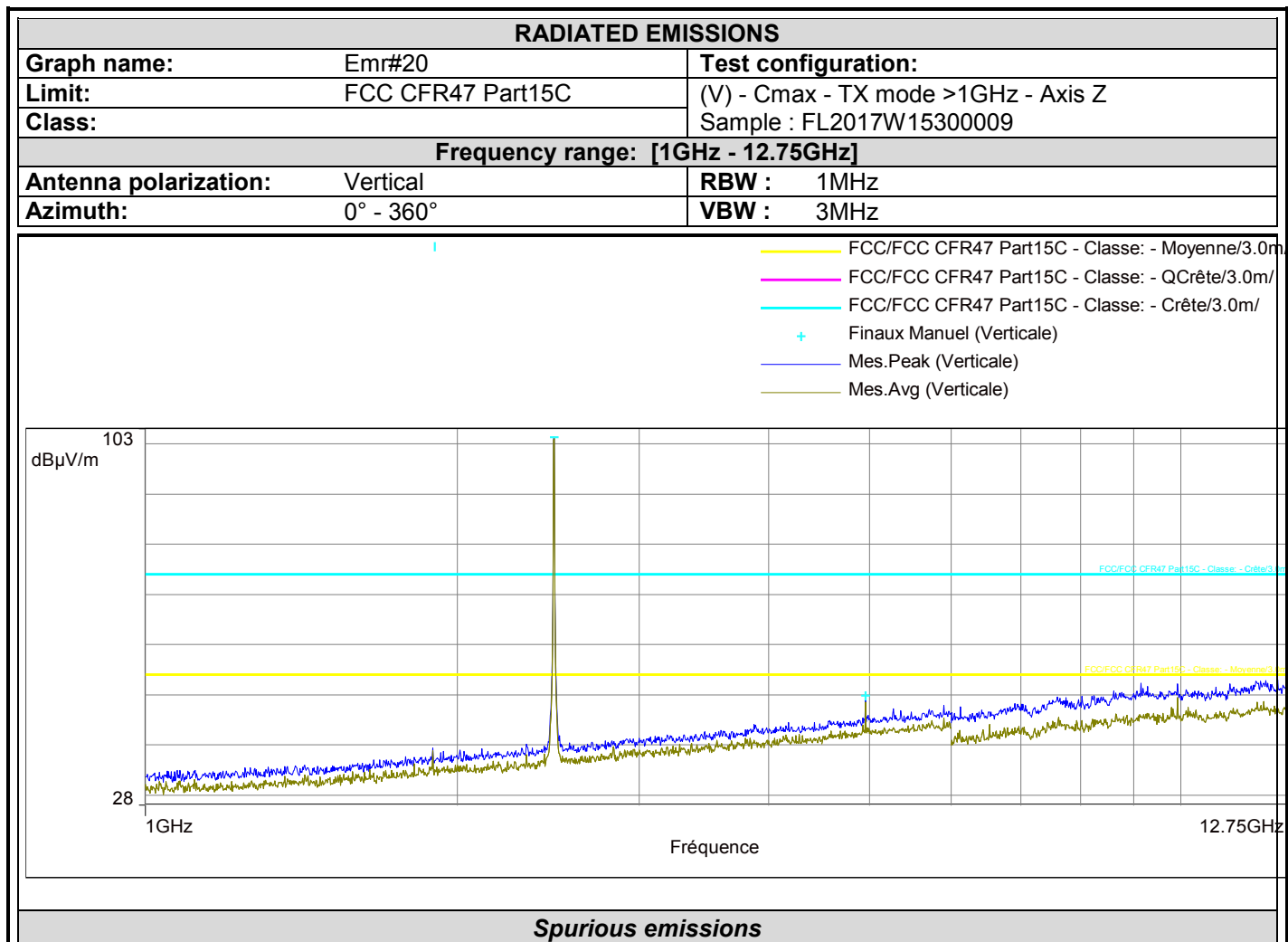
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2479.948        | 95.5                | Horizontal   |
| 4959.046        | 50.4                | Horizontal   |



L C I E

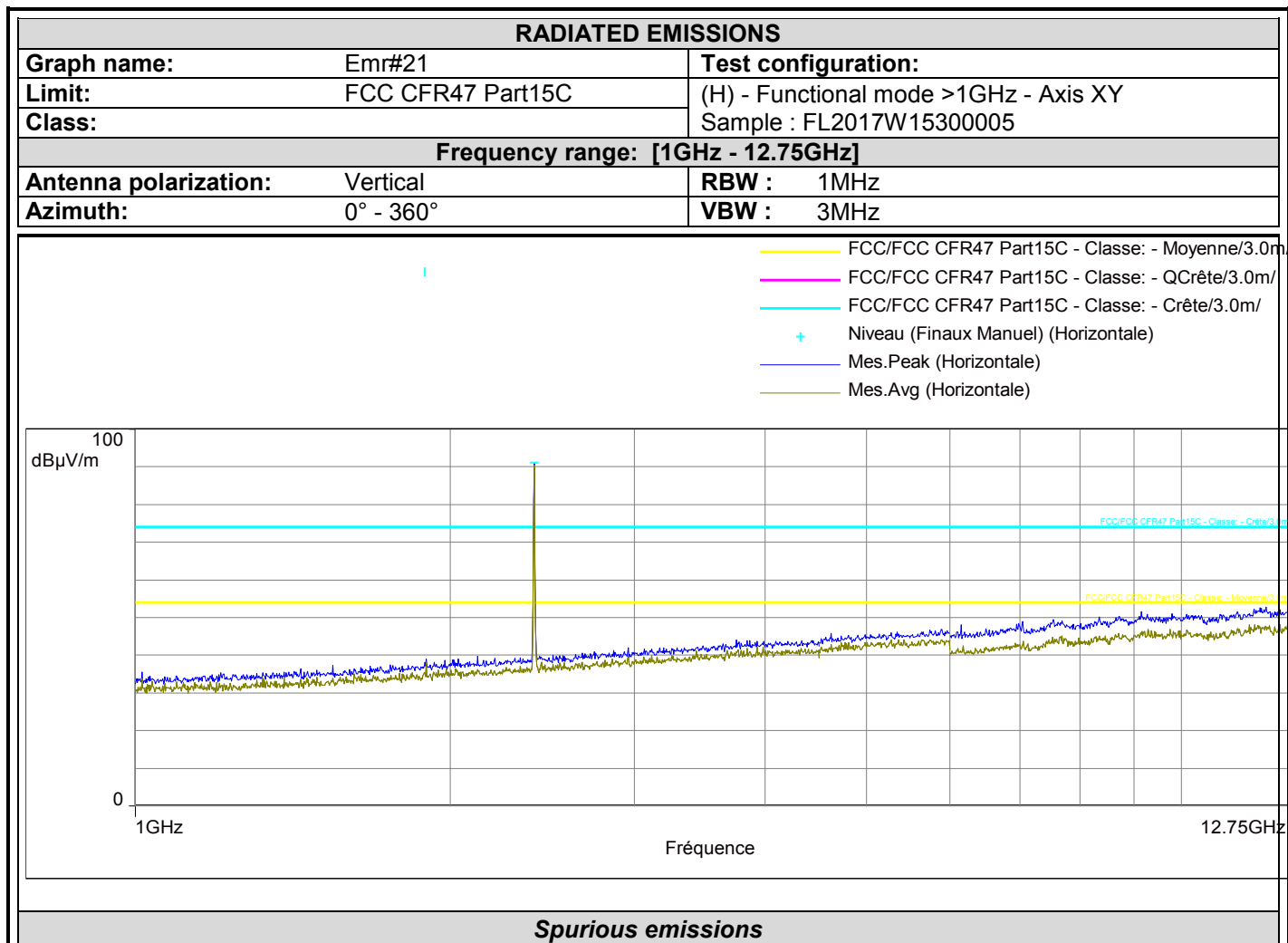


Tous les finaux

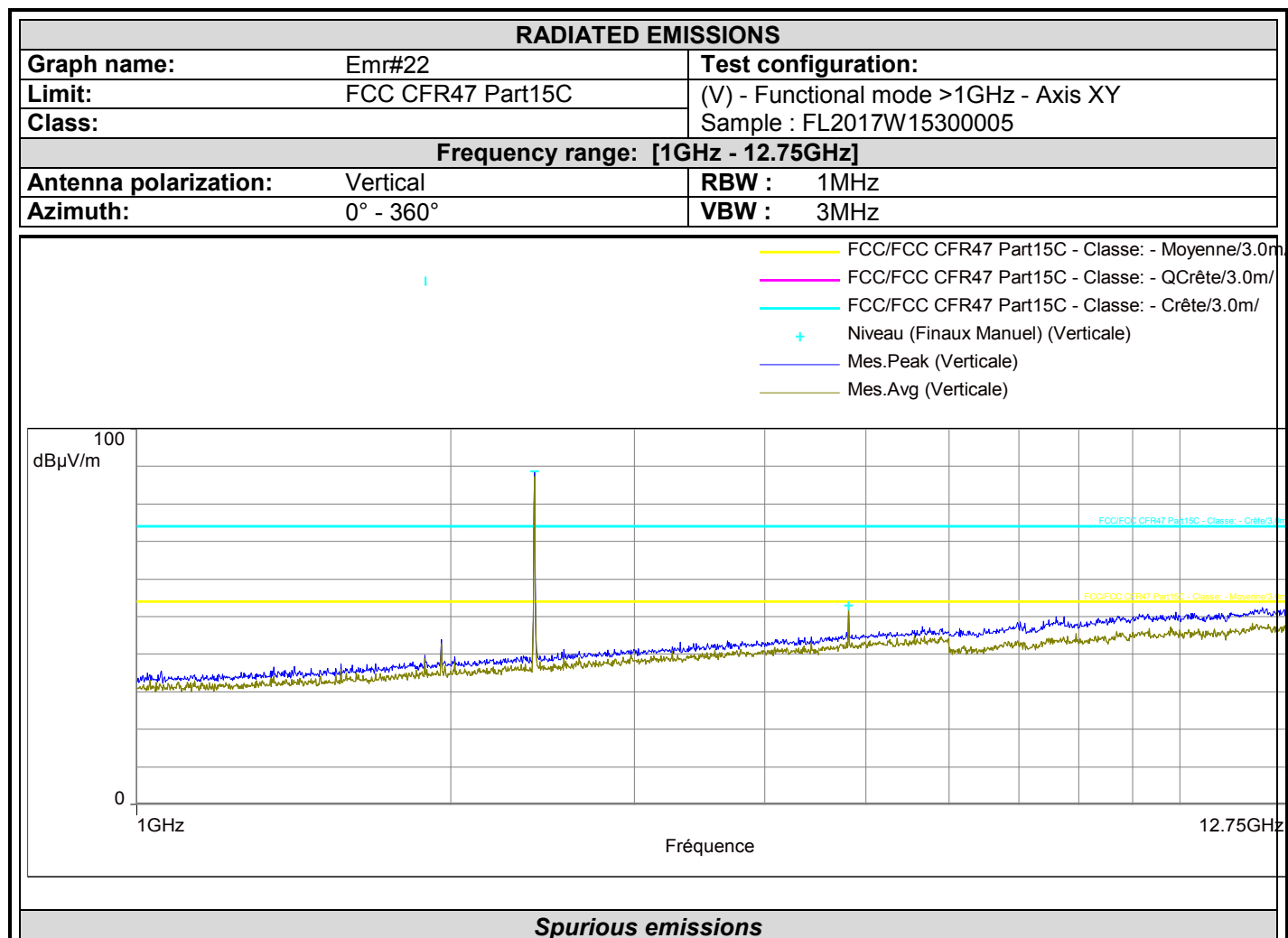
| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2480.648        | 101.4               | Vertical     |
| 4959.196        | 49.8                | Vertical     |



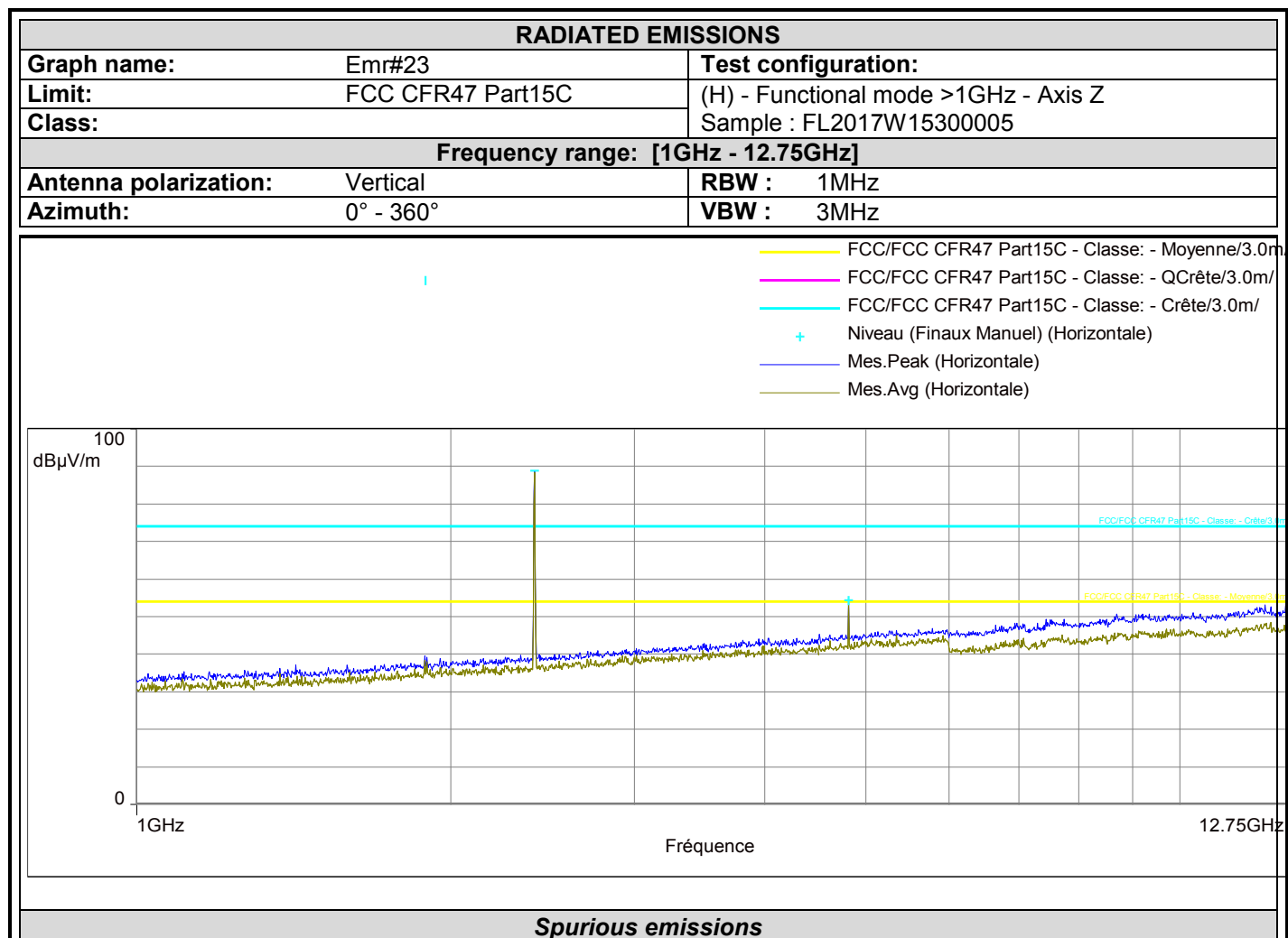
L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2405.391        | 91.1                | Horizontal   |



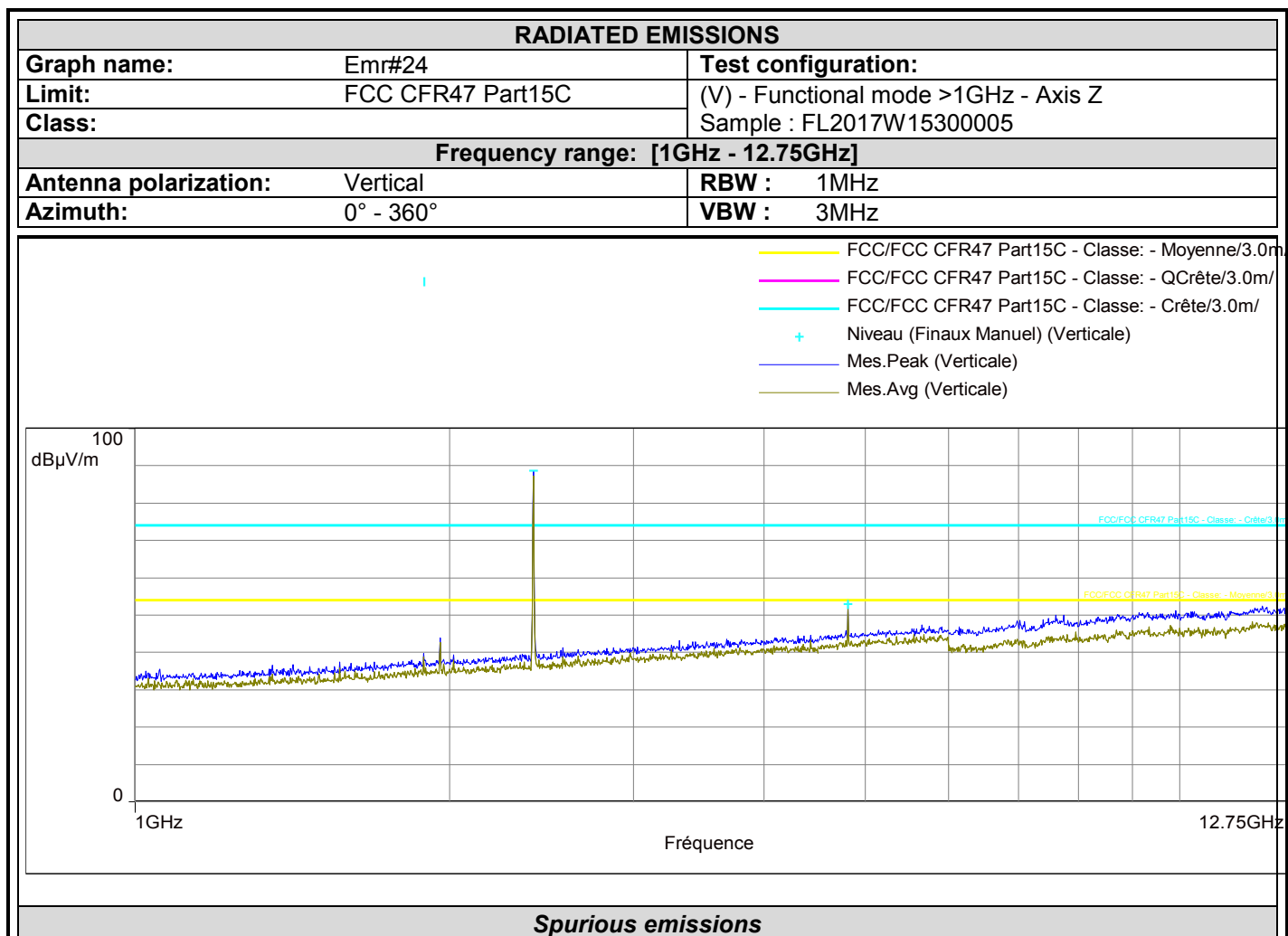
| Frequency (MHz) | Peak Level (dBµV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2404.690        | 88.8                | Vertical     |
| 4811.281        | 53.0                | Vertical     |



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2405.741        | 88.9                | Horizontal   |
| 4809.481        | 54.4                | Horizontal   |



L C I E



| Frequency (MHz) | Peak Level (dBμV/m) | Polarization |
|-----------------|---------------------|--------------|
| 2404.690        | 88.8                | Vertical     |
| 4811.281        | 53.0                | Vertical     |

## 10. UNCERTAINTIES CHART

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