



L C I E

# TEST REPORT

N°: 143160-689135-B(FILE#916702)

Version : 02

**Subject** Electromagnetic compatibility and Radio spectrum Matters  
(ERM) tests according to standards:  
FCC CFR 47 Part 15, Subpart C  
RSS-247 Issue 1.0

**Issued to** **INGENICO**  
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**Apparatus under test**

- ↪ Product
- ↪ Trade mark
- ↪ Manufacturer
- ↪ Model under test
- ↪ Reference
- ↪ Serial number
- ↪ FCCID
- ↪ IC

**Payment terminal**  
**INGENICO**  
**INGENICO**  
**Desk/5000 CL/Eth/Mod/WiFi/BT**  
**TCA33310133A**  
**160587313331013301015991**  
**160587313331013301015987**  
**XKB-D5000CLWIBT**  
**2586D-D5000CLWIBT**

**Conclusion** See Test Program chapter  
**Test date** August 1, 2016 to September 29, 2016  
**Test location** MOIRANS  
**IC Test site** 6500A-1 & 6500A-3  
**Composition of document** 50 pages  
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01	September 30, 2016	Gaetan DESCHAMPS	Creation of the document
02	December 19, 2016	Gaetan DESCHAMPS	Modification of the document further to review



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## 1. SYSTEM TEST CONFIGURATION

- Standard:**
- FCC Part 15, Subpart C 15.247
  - ANSI C63.10 (2013)
  - RSS-247 Issue 1.0 – May 2015
  - RSS-Gen Issue 4 – Nov 2014
  - 558074 D01 DTS Measurement Guidance v03r05

EMISSION TEST	LIMITS			RESULTS (Comments)
	Frequency	Quasi-peak value (dB $\mu$ V)	Average value (dB $\mu$ V)	
Limits for conducted disturbance at mains ports 150kHz-30MHz	150-500kHz	66 to 56	56 to 46	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
	0.5-5MHz	56	46	
	5-30MHz	60	50	
Radiated emissions 9kHz-30MHz CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5	<b>Measure at 300m</b> 9kHz-490kHz : 67.6dB $\mu$ V/m /F(kHz) <b>Measure at 30m</b> 490kHz-1.705MHz : 87.6dB $\mu$ V/m /F(kHz) 1.705MHz-30MHz : 29.5 dB $\mu$ V/m			<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA <input type="checkbox"/> NP
Radiated emissions 30MHz-25GHz* CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5 <b>Highest frequency : 510MHz (Declaration of provider)</b>	<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 960MHz-1GHz : 54.0 dB $\mu$ V/m 1GHz – 25GHz: 54.0 dB $\mu$ V/m (AV) 74.0 dB $\mu$ V/m (PK)			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Maximum Peak Output Power CFR 47 §15.247 (b) RSS-247 §5.4	<b>Limit: 21dBm</b> Conducted or Radiated measurement			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Hopping Channel Separation CFR 47 §15.247 (a) (1) RSS-247 §5.1	<b>Minimum between:</b> Two-third 20dB Bandwidth or 25kHz Whichever is greater			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Number of Hopping Frequencies CFR 47 §15.247 (a) (1) (iii) RSS-247 §5.1	<b>At least 15 channels used</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Time of Occupancy (Dwell Time) CFR 47 §15.247 (a) (1) (iii) RSS-247 §5.1	<b>Maximum 0.4 sec within 31.6sec</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Band Edge Measurement CFR 47 §15.209 (a) CFR 47 §15.247 (d) RSS-247 §5.5	<b>Limit: -20dBc</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Occupied bandwidth RSS-Gen §4.6.1	<b>No limit</b>			<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL <input type="checkbox"/> NA <input type="checkbox"/> NP
Receiver Spurious Emission** RSS-Gen §4.10	<b>See RSS-Gen §4.10</b>			<input type="checkbox"/> PASS <input type="checkbox"/> FAIL <input checked="" type="checkbox"/> NA** <input type="checkbox"/> NP

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

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

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

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

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

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

## 2. SYSTEM TEST CONFIGURATION

### 2.1. JUSTIFICATION

The EUT can be used with different configuration :

- ✓ **Initial functionalities**
  - Cless Interface (RFID)
  - Bluetooth chipset: CSR8811 (CSR)
  - SAM1 & SAM2 readers
  - Host or slave ( $\mu$ USB connector)
  - USB Host (Type A connector)
  - RS232 (COM1)
  - Modem RTC
  - Ethernet
- ✓ **With option card (internal)**
  - RS232-COM2
  - Jack Audio
  - SAM3
  - Bluetooth chipset: CSR8811 (CSR)
  - Chipset Marvell 88W8782
- ✓ **1 power supply**
  - PSM32W-080L6IN-R-

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

#### Equipment under test (EUT):

Desk/5000 CL/Eth/Mod/WiFi/BT

Serial Number: 160587313331013301015991 & 160587313331013301015987



Photography of EUT

#### Power supply:

During all the tests, EUT is supplied by  $V_{nom}$ : 8VDC

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

Name	Type	Rating	Reference / Mark	Comments
Supply1	<input checked="" type="checkbox"/> AC <input type="checkbox"/> DC <input type="checkbox"/> Battery	100-240VAC to 8VDC, 50/60Hz 0.9 A to 4A	PSM32W-080L6IN-R- / PHIHONG	-



**Inputs/outputs - Cable:**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply1	Input AC, 2 wires	1.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Output DC, Jack	1.8	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Twist cable to Magicbox	Power supply Jack	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Supply Terminal
	RJ11					COM0
	RJ45					Ethernet line
	RJ11					Modem line
SAM1	SAM card	/	/	/	<input checked="" type="checkbox"/>	/
SAM2	SAM card	/	/	/	<input checked="" type="checkbox"/>	/
SAM3	SAM card	/	/	/	<input checked="" type="checkbox"/>	/
CAM0	SAM card	/	/	/	<input checked="" type="checkbox"/>	/
USB	USB port (Micro-B)	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/
USB HOST	USB port (Type A)	1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/
MicroSD	Micro SD port	/	/	/	<input checked="" type="checkbox"/>	/
COM2	Mini USB	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/
Audio	Audio Jack 3.5mm	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	/
SIM1	SIM CARD	/	/	/	<input checked="" type="checkbox"/>	/
SIM2	SIM CARD	/	/	/	<input checked="" type="checkbox"/>	/

**Inputs/outputs & Cable: Magicbox 51/2014 CUST P/N: 296165425 INGELEC P/N : MUL0885C**

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
Supply Magicbox	Power supply Jack	1.5	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
COM0	RJ11	3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Ethernet	RJ45	5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Modem	RJ11	5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/
Magicbox cable twisted	Twist cable	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	/

**Auxiliary equipment used during test:**

Type	Reference	Model	Comments
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007
Contactless card	-	-	-



**Equipment information:**

Bluetooth Classic Type:	<input type="checkbox"/> v1.2	<input type="checkbox"/> v2.0	<input type="checkbox"/> v2.1+EDR	<input type="checkbox"/> v3.0+HS
	<input type="checkbox"/> v4.0	<input checked="" type="checkbox"/> v4.1		<input type="checkbox"/> v4.2
Frequency band:	[2400 – 2483.5] MHz			
Sub-band REC7003:	Annex 3 (a)			
Spectrum Modulation:	<input checked="" type="checkbox"/> FHSS			
Number of Channel:	Maximum:	79	Minimum:	20
Spacing channel:	1 MHz			
Channel bandwidth:	1 MHz			
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 checked="" type="checkbox"/> Temporary for test	
Transmit chains:	<input checked="" type="checkbox"/> 1			
	Single antenna Gain: 0 dBi			
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	
Dwell time:	400ms			
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 checked="" type="checkbox"/> -20°C	<input type="checkbox"/> 0°C	<input type="checkbox"/> X°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input checked="" type="checkbox"/> 55°C	<input type="checkbox"/> X°C
Type of power source:	<input type="checkbox"/> AC power supply	<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery	
Operating voltage range:	Vnom:	<input checked="" type="checkbox"/> 230V/50Hz	<input type="checkbox"/> XVdc	
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 4.3.1.13.2 of ETSI EN 300 328 V1.9.1 standard)			<input checked="" type="checkbox"/> No

**CHANNEL PLAN**

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
<b>Cmin: 0</b>	<b>2402</b>	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	<b>Cmid: 39</b>	<b>2441</b>	66	2468
13	2415	40	2442	67	2469



L C I E

14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	<b>Cmax: 78</b>	<b>2480</b>
25	2427	52	2454		
26	2428	53	2455		

**DATA RATE**

Available for EUT	Modulation type	Max. Data Rate (Mbps)	Packet type	Worst Case Modulation
<input checked="" type="checkbox"/>	GFSK	1	1-DM1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	GFSK	1	1-DH1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	GFSK	1	1-DM3	<input type="checkbox"/>
<input checked="" type="checkbox"/>	GFSK	1	1-DH3	<input type="checkbox"/>
<input checked="" type="checkbox"/>	GFSK	1	1-DM5	<input type="checkbox"/>
<input checked="" type="checkbox"/>	GFSK	1	1-DH5	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	GFSK	1	AUX1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	$\pi/4$ DQPSK	2	2-DH1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	$\pi/4$ DQPSK	2	2-DH3	<input type="checkbox"/>
<input checked="" type="checkbox"/>	$\pi/4$ DQPSK	2	2-DH5	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	8DPSK	3	3-DH1	<input type="checkbox"/>
<input checked="" type="checkbox"/>	8DPSK	3	3-DH3	<input type="checkbox"/>
<input checked="" type="checkbox"/>	8DPSK	3	3-DH5	<input checked="" type="checkbox"/>





### 2.3. EUT CONFIGURATION

The EUT is set in the following modes during tests with CBT Bluetooth Tester:

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

All tests are performed at Cmin, Cmid and Cmax.

Firmware / Software version of EUT: SDK\_OS 03.20.08

### 2.4. EQUIPMENT MODIFICATIONS

None       Modification:

### 2.5. FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follow:

$$FS = RA + AF + CF - AG$$

Where      FS = Field Strength  
              RA = Receiver Amplitude  
              AF = Antenna Factor  
              CF = Cable Factor  
              AG = Amplifier Gain

Assume a receiver reading of 52.5dB $\mu$ 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.

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

### 2.6. CALIBRATION DATE

The calibration intervals are extended at 12+2 months. This extended interval is based on the fact that there is sufficient calibration data to statistically establish a trend or based on experience of use of the test equipment to assure good measurement results for a longer period

### 3. CONDUCTED EMISSION DATA

#### 3.1. ENVIRONMENTAL CONDITIONS

Date of test : September 23, 2016  
Test performed by : Jonathan Sarto  
Atmospheric pressure (hPa) : 1003  
Relative humidity (%) : 32  
Ambient temperature (°C) : 20

#### 3.2. TEST SETUP

##### **Mains terminals**

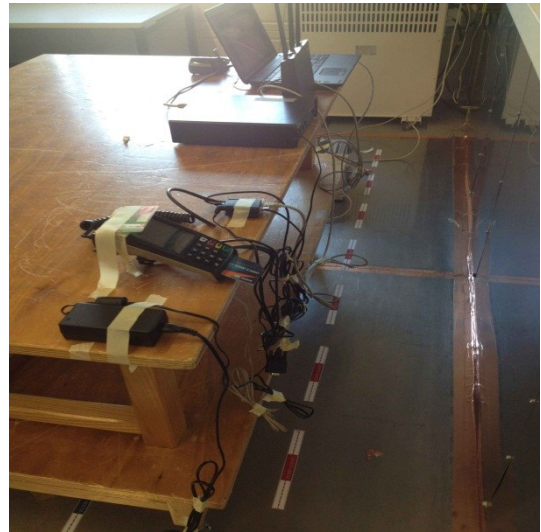
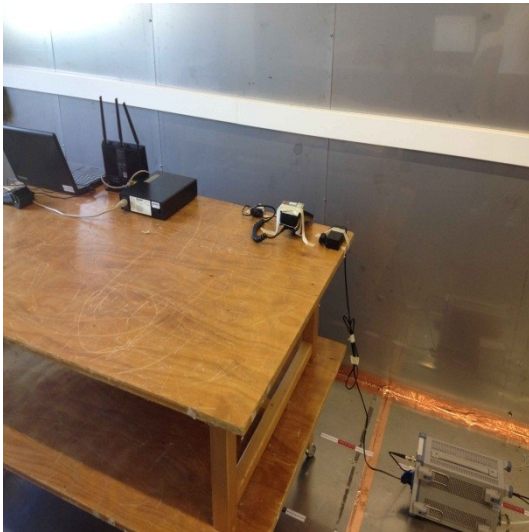
The EUT and auxiliaries are set:

- 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	04/16	04/17
Conducted emission comb generator	BARDET	-	A3169049	-	-
LISN	RHODE & SCHWARZ	ENV216	C2320123	02/16	02/17
LISN	RHODE & SCHWARZ	ENV216	C2320291	11/15	11/16
Load 50Ω	-	-	A7152030	04/16	04/17
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	08/16	08/17
BAT EMC	NEXIO	v3.9.0.10	L1000115	-	-
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16
Transient limiter	RHODE & SCHWARZ	ESH3-Z2	A7122204	01/16	01/17

### 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)

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 **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: 160587313331013301015991, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

## 4. RADIATED EMISSION DATA

### 4.1. ENVIRONMENTAL CONDITIONS

Date of test : August 2, 2016  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 999  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

### 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.

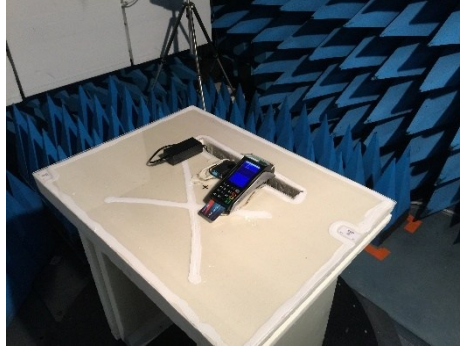
The EUT and auxiliaries are set:

- 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)

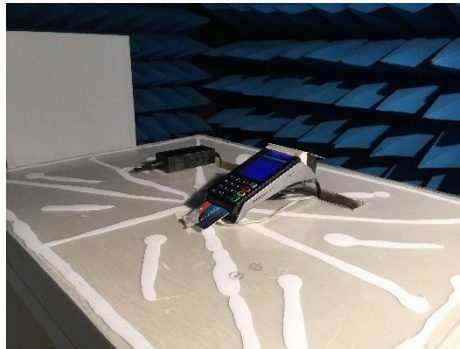
The EUT is powered by  $V_{nom}$ .



Test setup on OATS



Test setup in anechoic chamber  
(Below 1GHz)



Test setup in anechoic chamber  
(Above 1GHz)

#### 4.3. TEST METHOD

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

##### Pre-characterisation measurement: (9kHz – 5GHz)

A pre-scan of all the setup has been performed in a 3 meters semi-anechoic chamber for frequency from 30MHz to 5GHz. 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 2GHz.

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

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

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



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

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

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

On mast, varied from 1m to 4m

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

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

**4.4. TEST EQUIPMENT LIST**

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Amplifier 1-13GHz	LCIE SUD EST	-	A7102067	04/16	04/17
Antenna Bi-log	CHASE	CBL6111A	C2040051	06/16	06/18
Antenna horn 18GHz	EMCO	3115	C2042027	11/15	11/16
Cable Measure @3m 18GHz	-	-	A5329038	08/15	08/16
Cable Measure @3m	-	-	A5329206	04/16	04/17
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
Radiated emission comb generator	BARDET	-	A3169050	-	-
HF Radiated emission comb generator	LCIE SUD EST	-	A3169088	-	-
OATS	-	-	F2000409	06/15	06/16
Receiver 20Hz – 8GHz	ROHDE & SCHWARZ	ESU8	A2642019	04/16	04/17
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
BAT EMC	NEXIO	v3.9.0.10	L1000115	-	-
Thermo-hygrometer (C3)	OREGON	BAR206	B4204078	04/16	04/17
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16
Turntable chamber (Cage#3)	ETS Lingren	Model 2165	F2000371	-	-
Turntable / Mast controller (OATS)	ETS Lindgren	Model 2066	F2000372	-	-
Antenna mast (OATS)	ETS Lindgren	2071-2	F2000392	-	-
Turntable (OATS)	ETS Lindgren	Model 2187	F2000403	-	-
Table	MATURO Gmbh	-	F2000437	-	-
Table	LCIE	-	F2000461	-	-
Turntable controller (Cage#3)	ETS Lingren	Model 2090	F2000444	-	-

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

None

Divergence:



#### 4.6. TEST RESULTS

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

See graphs for 30MHz-1GHz:

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

##### 4.6.2. Pre-characterization at 3 meters [1GHz-5GHz]

See graphs for 1GHz-5GHz:

Graph identifier	Polarization	Mode	EUT position	Comments
Emr# 2	H/V	TX	Axis XY	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/Av)	Polarit y (V/H)	Azimuth (Degrees)	Antenn a Height (cm)	Gain/Loss Factor (dB)	Transducer Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margi n (dB)	Remar k
37.531	23.5	QP	V	360	100	-	16.0	39.5	40.0	-0.5	
40.680	25.2	QP	V	360	100	-	14.3	39.5	40.0	-0.5	
81.204	18.7	QP	V	135	120	-	8.9	27.6	40.0	-12.4	
467.497	22.9	QP	V	280	100	-	21.3	44.2	46.0	-1.8	
743.700	12.0	QP	V	170	250	-	26.6	38.6	46.0	-7.4	
960.000	15.6	QP	H	61	100	-	30.2	45.8	46.0	-0.2	

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



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

##### Worst case final data result:

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

Test Frequency (MHz)	Meter Reading dB(μV)	Detector (Pk/QP/Av)	Polarit y (V/H)	Azimuth (Degrees)	Antenn a Height (cm)	Gain/Lo ss Factor (dB)	Transduc er Factor (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margi n (dB)	Remar k
4804.000	49.2	Pk	V	0	150	-	4.6	53.8	74.0	-20.2	
4882.000	49.3	Pk	V	0	150	-	4.7	54.0	74.0	-20.0	
4960.000	49.2	Pk	V	0	150	-	4.9	54.1	74.0	-19.9	
4804.000	33.4	Av	V	0	150	-	4.6	38.0	54.0	-16.0	
4882.000	33.6	Av	V	0	150	-	4.7	38.3	54.0	-15.7	
4960.000	33.5	Av	V	0	150	-	4.9	38.4	54.0	-15.6	
7323.000	40.0	Pk	V	0	150	-	8.3	48.3	74.0	-25.7	
7440.000	40.0	Pk	V	0	150	-	8.5	48.5	74.0	-25.5	

Note: Measures have been done at 3m distance.

#### 4.7. CONCLUSION

Radiated emission data measurement performed on the sample of the product **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160587313331013301015991**, in configuration and description presented in this test report, show levels above the FCC CFR 47 Part 15 and RSS-247 limits.



## 5. MAXIMUM PEAK OUTPUT POWER (15.247)

### 5.1. ENVIRONMENTAL CONDITIONS

Date of test : August 25, 2016  
 Test performed by : Gaëtan DESCHAMPS  
 Atmospheric pressure (hPa) : 1002  
 Relative humidity (%) : 32  
 Ambient temperature (°C) : 23

### 5.2. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented  
 Hopping sequence:  ON  OFF

### 5.3. TEST 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 and using 3MHz RBW and 10MHz VBW.

The captured power is measured and recorded; the measurement is repeated until all frequencies required were complete.



**Radiated measurement:**

The product has been tested at a distance of 3 meters from the antenna and using 3MHz RBW and 10MHz VBW. Antenna height search was performed from 1m to 4m for both horizontal and vertical polarization. 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, utilizing a RBW  $\geq$  the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-1992 with respect to maximizing the emission.
- 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:

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

#### 5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna horn 18GHz	AINFO	LB	C2042055	08/16	08/17
Cable SMA	-	18G	A5329373	10/15	10/16
Cable 40GHz 2m coudé	-	-	A5329720	05/16	05/17
Cable 40GHz 2m coudé	-	-	A5329721	05/16	05/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

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

None       Divergence:

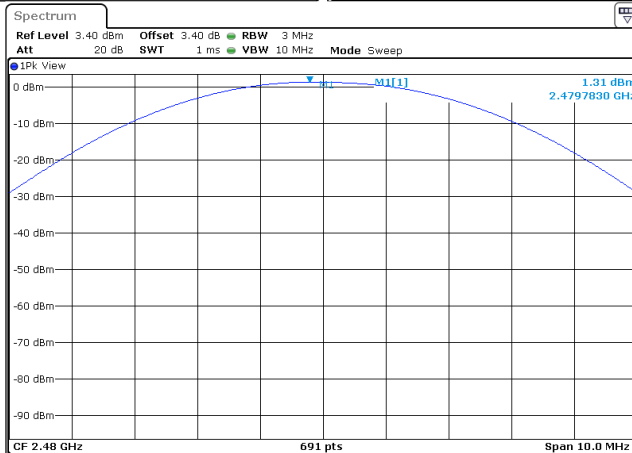
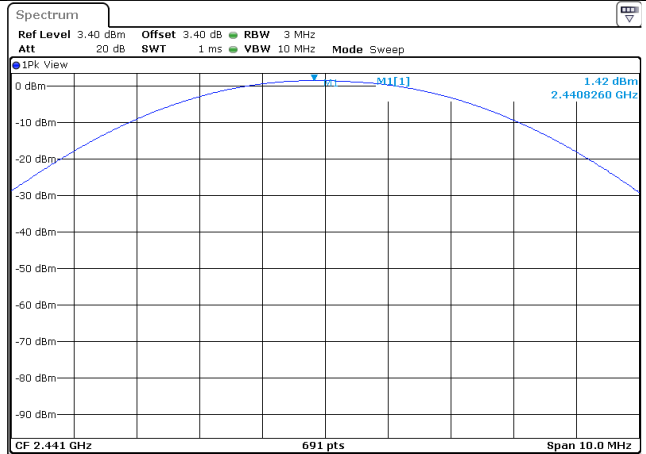
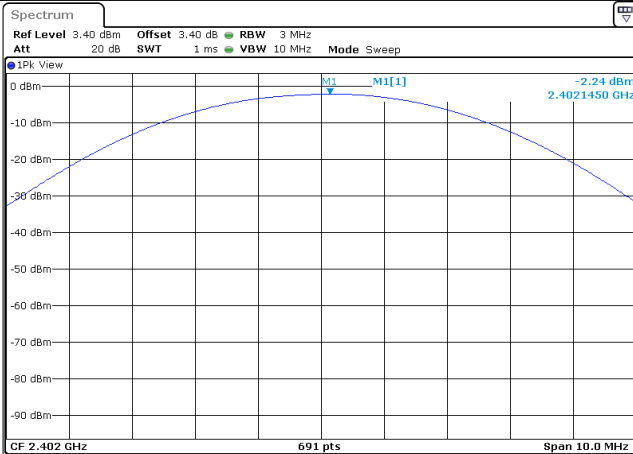


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5.6. TEST RESULTS

GFSK DH5

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
0	2402	-2.24	21
39	2441	1.42	21
78	2480	1.31	21

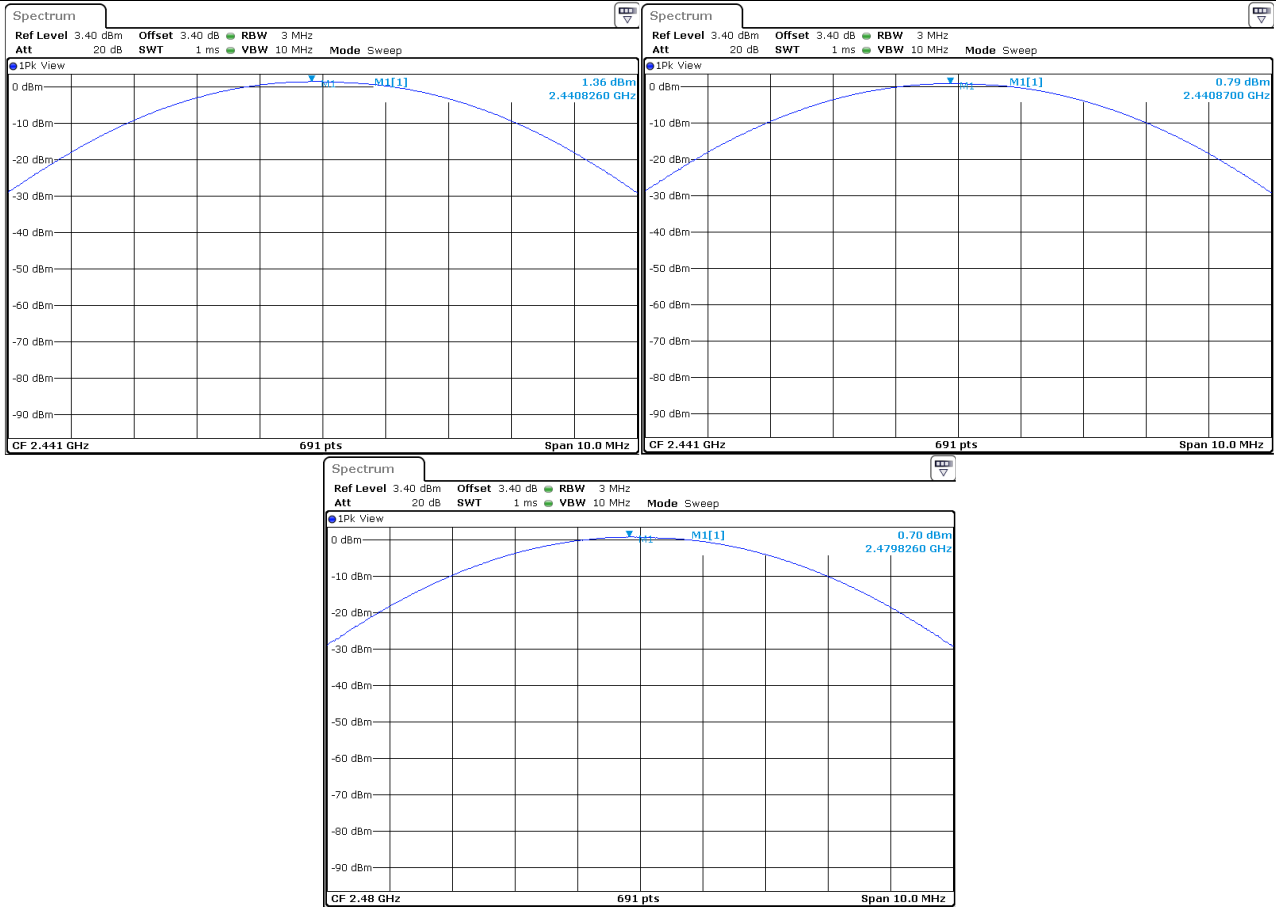




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$\pi/4$  DQPSK 2-DH5

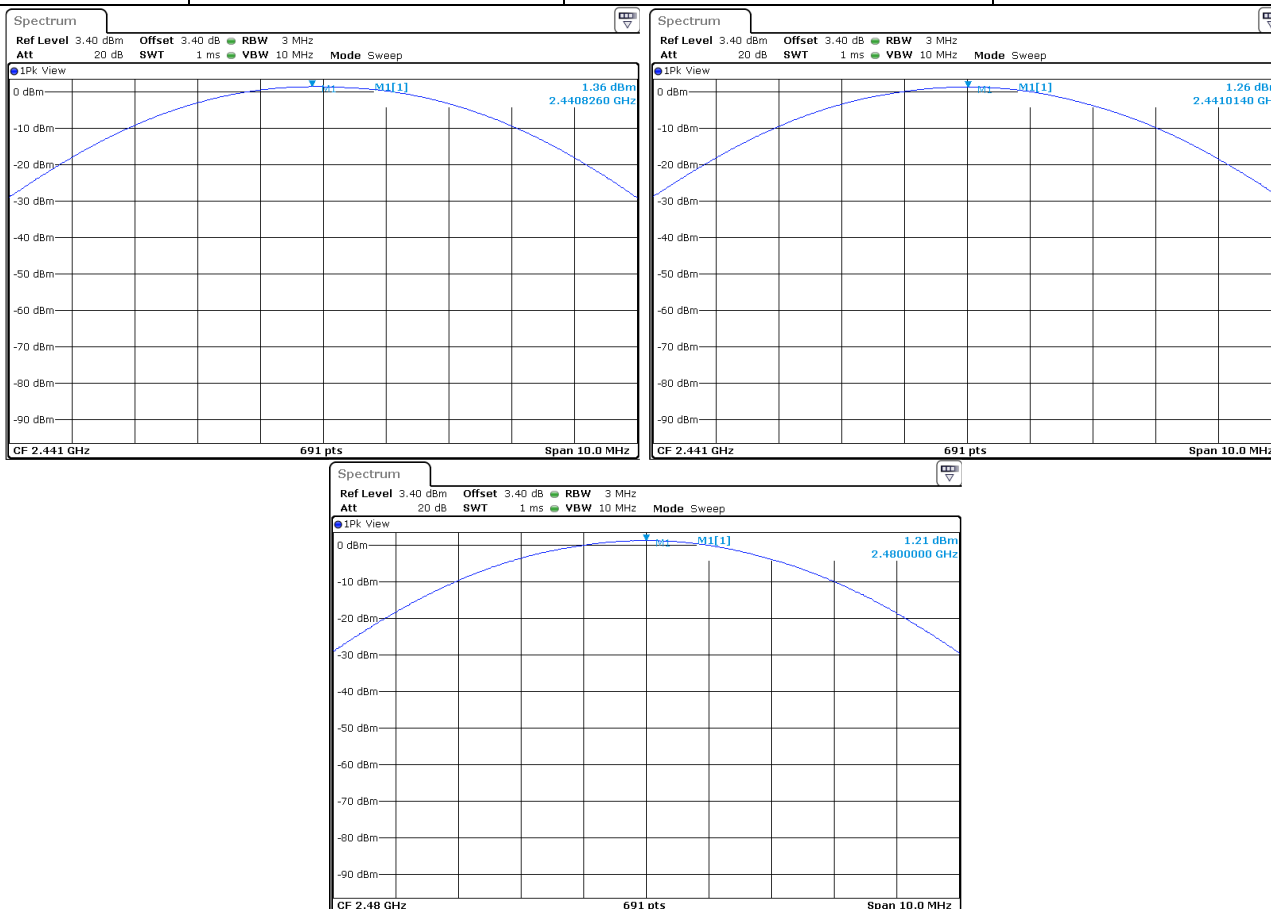
Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
0	2402	1.36	21
39	2441	0.79	21
78	2480	0.70	21





### 8DPSK 3-DH5

Channel	Channel Frequency (MHz)	Peak Output Power (dBm)	Power Limit (dBm)
0	2402	1.36	21
39	2441	1.26	21
78	2480	1.21	21



### 5.7. CONCLUSION

Maximum Peak Output Power measurement performed on the sample of the product **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160587313331013301015991**, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

## 6. HOPPING CHANNEL SEPARATION (15.247)

### 6.1. ENVIRONMENTAL CONDITIONS

Date of test : August 25, 2016  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1002  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

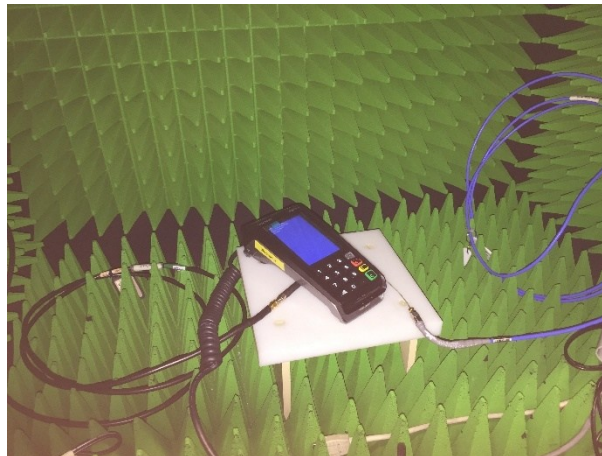
### 6.2. LIMIT

For frequency hopping system, hopping channel carrier frequencies must be separated by a minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is greater.

For frequency hopping system operating in the 2400-2483.5MHz, if the 20dB bandwidth of hopping channel is greater than 25kHz, two-thirds 20dB Bandwidth of hopping channel shall be a minimum limit for the hopping channel separation.

### 6.3. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5  
Hopping sequence:  ON  OFF



### 6.4. SETUP – 20DB BANDWIDTH

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

### 6.5. SETUP – ADJACENT CHANNEL SEPARATION

The EUT is placed in an anechoic chamber; levels have been corrected to be in compliant with the Peak Output Power measured. The EUT is turn ON and using the MaxHold function, the separation of two adjacent channels is recorded. A delta marker is used to measure the frequency difference.



## 6.6. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna horn 18GHz	AINFO	LB	C2042055	08/16	08/17
Cable SMA	-	18G	A5329373	10/15	10/16
Cable 40GHz 2m coudé	-	-	A5329720	05/16	05/17
Cable 40GHz 2m coudé	-	-	A5329721	05/16	05/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

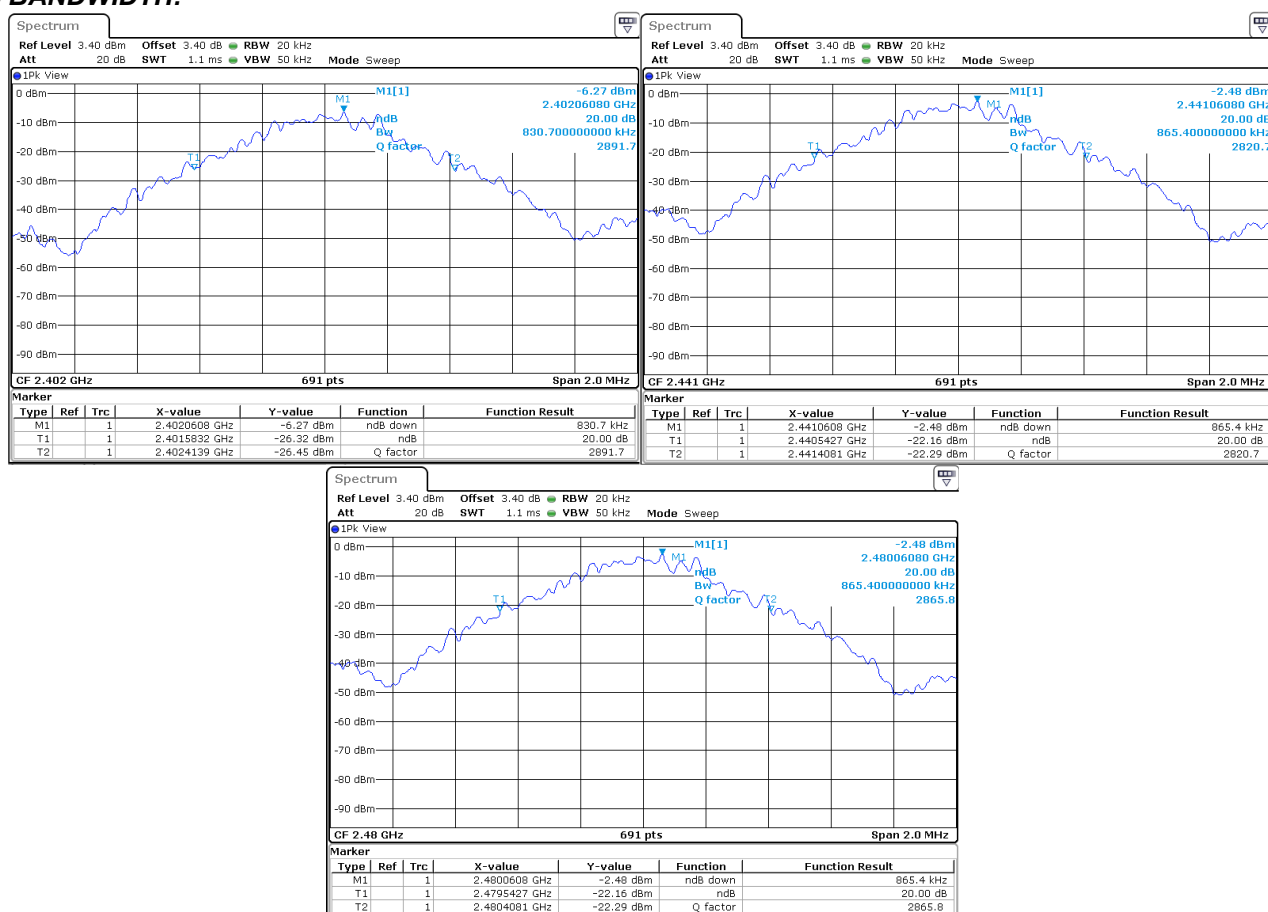
## 6.7. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

None       Divergence:

## 6.8. TEST SEQUENCE AND RESULTS

### GFSK DH5:

### 20DB BANDWIDTH:

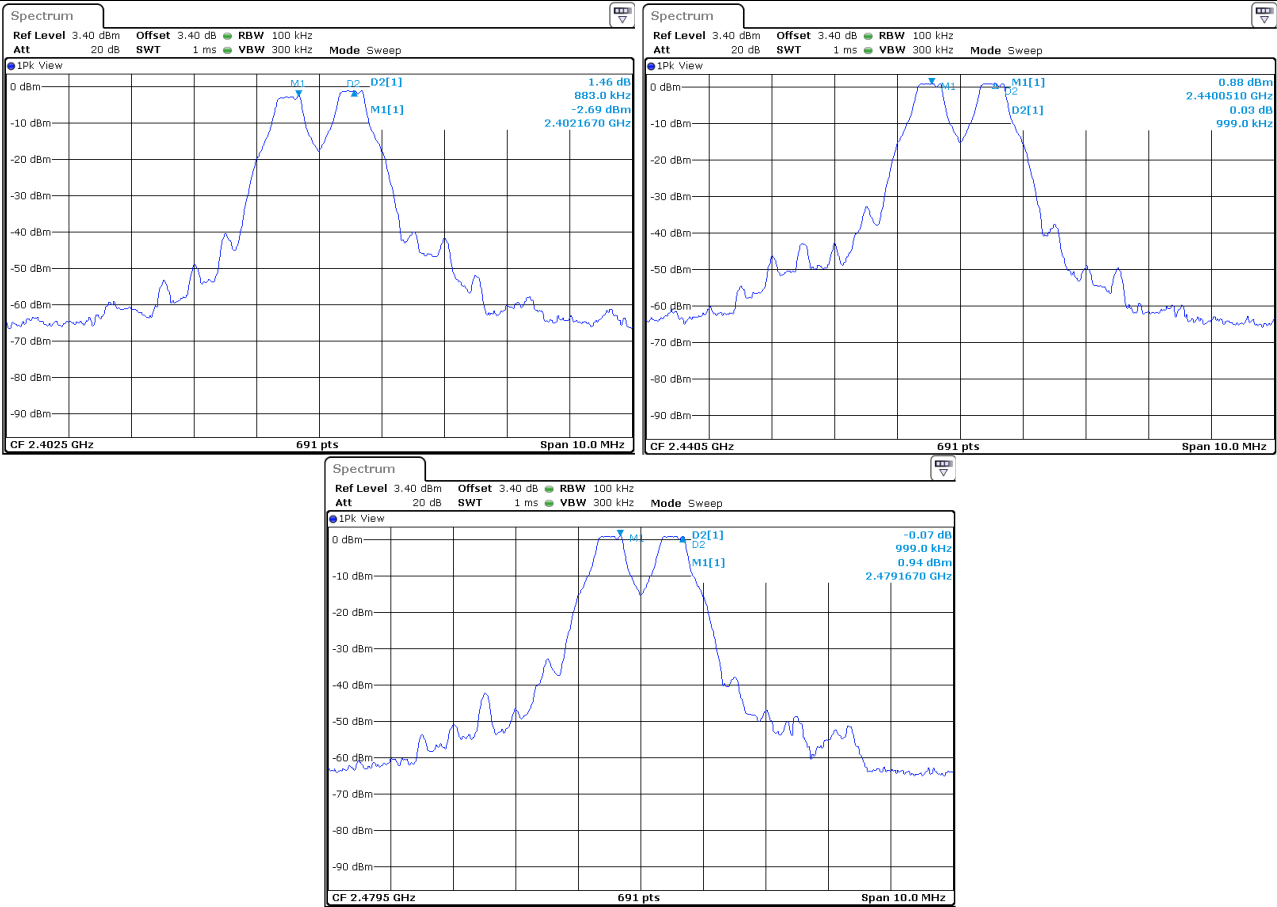




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**Modulation:**

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (kHz)	20dB Bandwidth (kHz)	Minimum Limit (kHz)
Cmin	2402	883.00	830.70	553.80
Cmid	2441	999.00	865.40	576.93
Cmax	2480	999.00	865.40	576.93



Limit used: Two-third 20dB Bandwidth

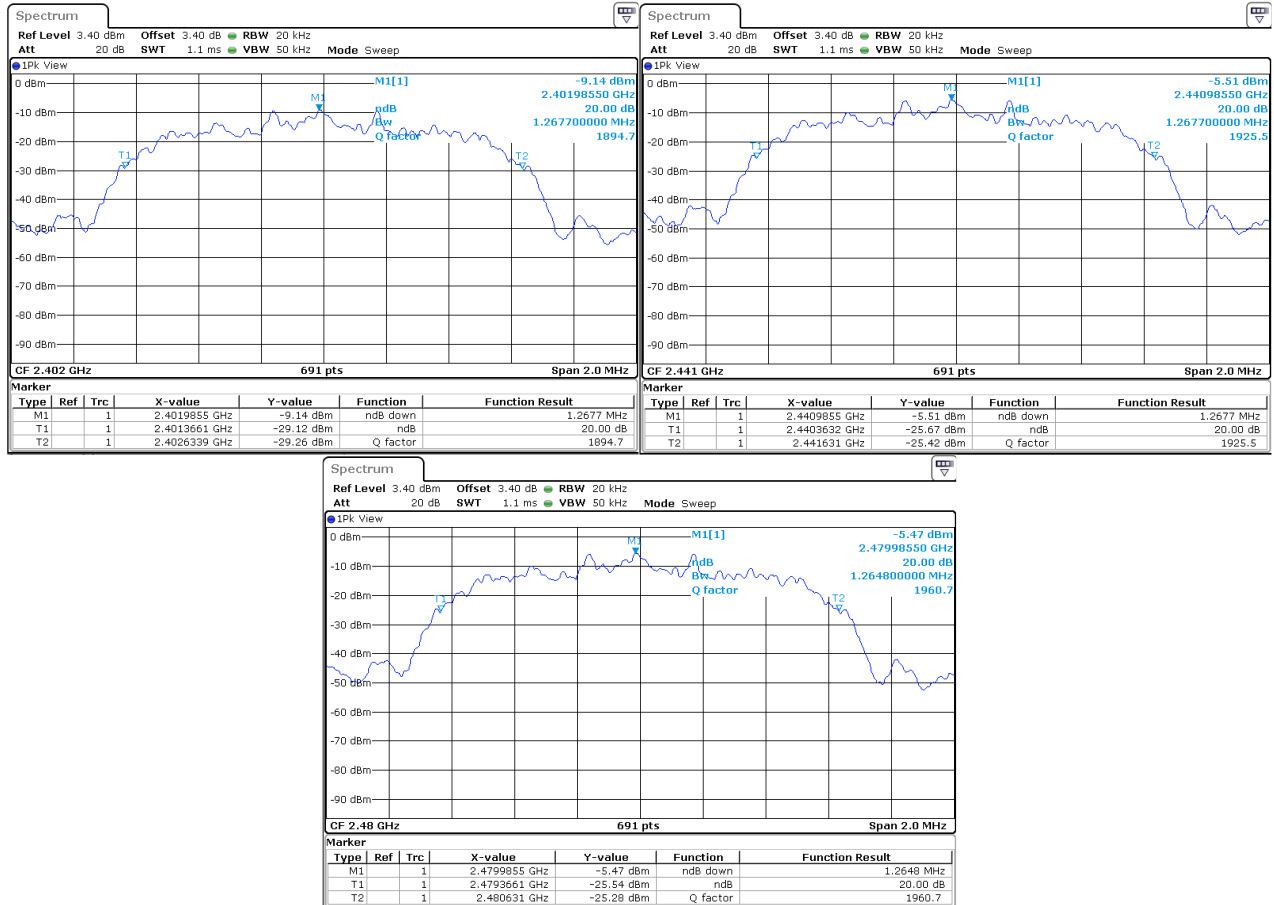




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**$\pi/4$  DQPSK 2-DH5:**

**20DB BANDWIDTH:**

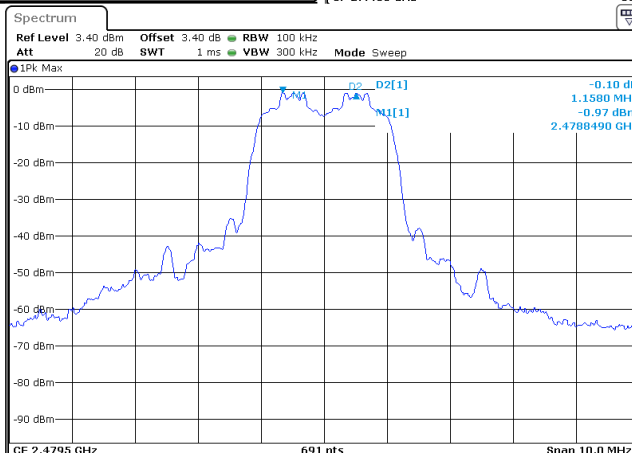
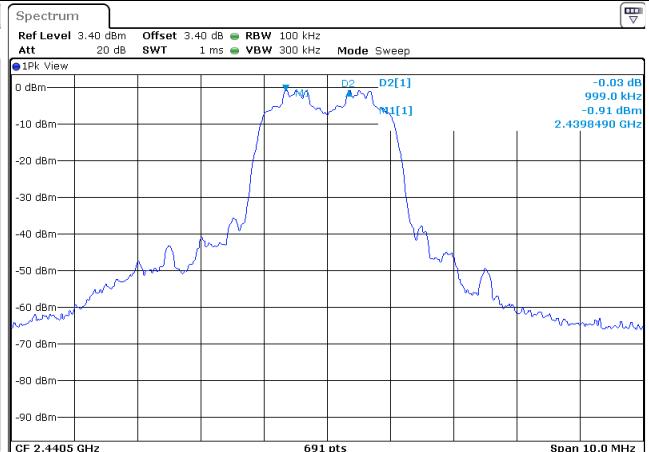
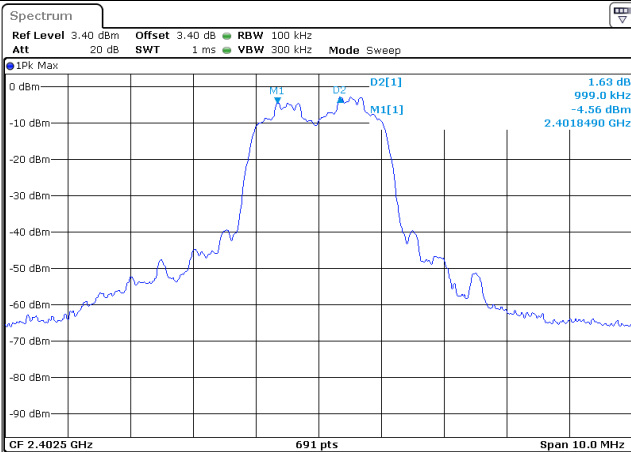




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**Modulation:**

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (kHz)	20dB Bandwidth (kHz)	Minimum Limit (kHz)
Cmin	2402	999.00	1267.70	845.13
Cmid	2441	999.00	1267.70	845.13
Cmax	2480	1158.00	1264.48	842.93



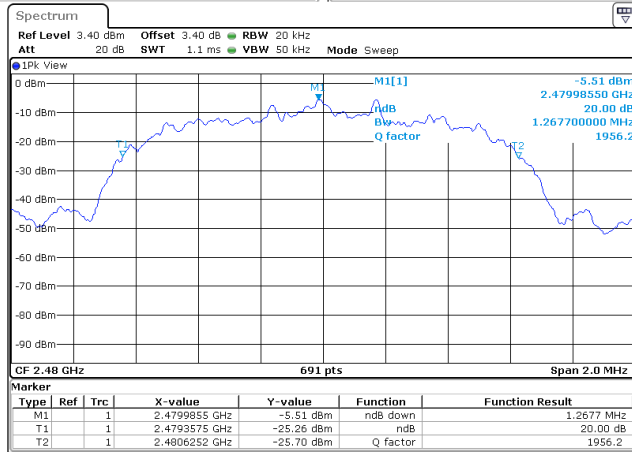
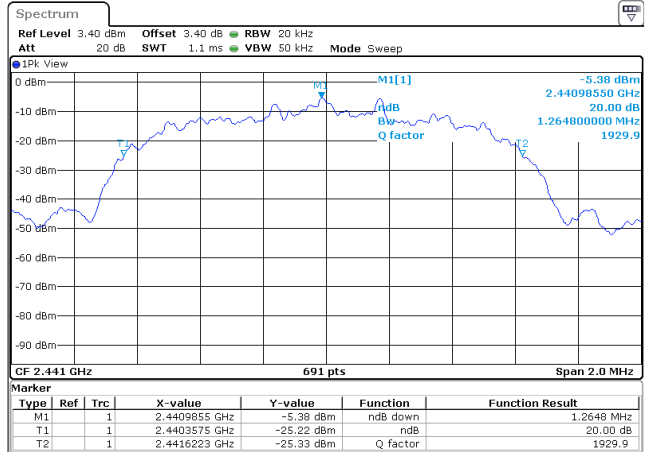
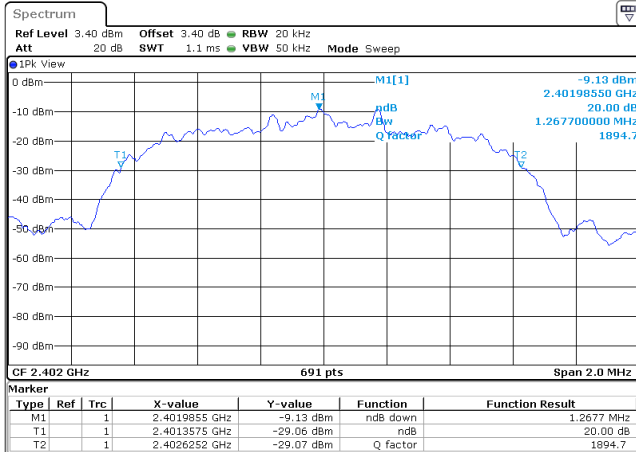
Limit used: Two-third 20dB Bandwidth



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**8DPSK 3-DH5:**

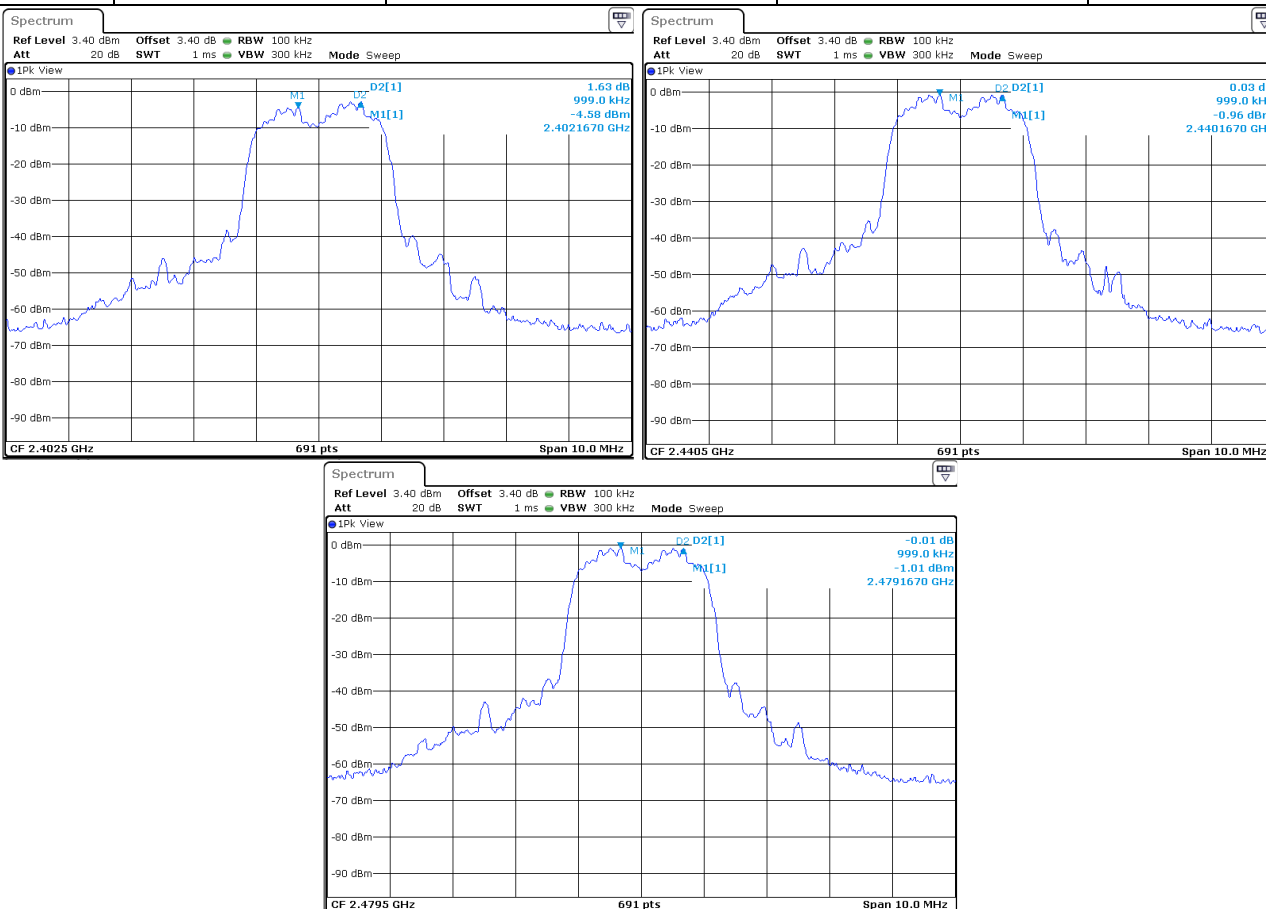
**20DB BANDWIDTH:**





**Modulation:**

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (kHz)	20dB Bandwidth (kHz)	Minimum Limit (kHz)
Cmin	2402	999.00	1267.70	845.13
Cmid	2441	999.00	1264.80	843.20
Cmax	2480	999.00	1267.70	845.13



Limit used: Two-third 20dB Bandwidth

**6.9. CONCLUSION**

Hopping Channel Separation measurement performed on the sample of the product **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160587313331013301015991**, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

## 7. NUMBER OF HOPPING FREQUENCIES (15.247)

### 7.1. ENVIRONMENTAL CONDITIONS

Date of test : August 25, 2016  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1002  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

### 7.2. LIMIT

For frequency hopping system operating in the 2400-2483.5MHz, at least 15 channels frequencies must be used and should be equally spaced.

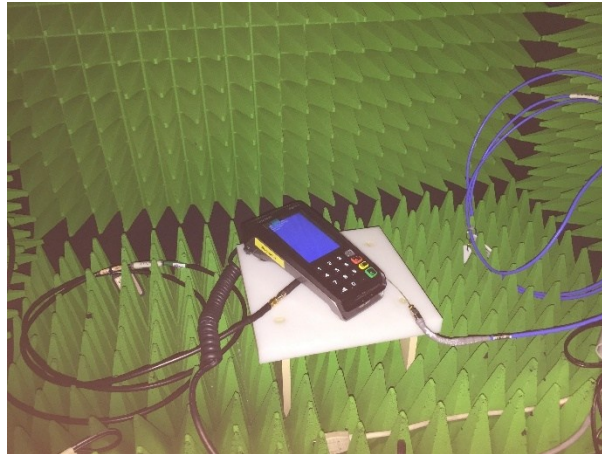
### 7.3. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5  
Hopping sequence:  ON  OFF

### 7.4. SETUP

The EUT is placed in an anechoic chamber. The EUT is turn ON and using the MaxHold function and a delta marker the number of frequencies used for this FHSS system is recorded, see following graphs.

RBW: 100kHz  
VBW: 300kHz





**7.5. TEST EQUIPMENT LIST**

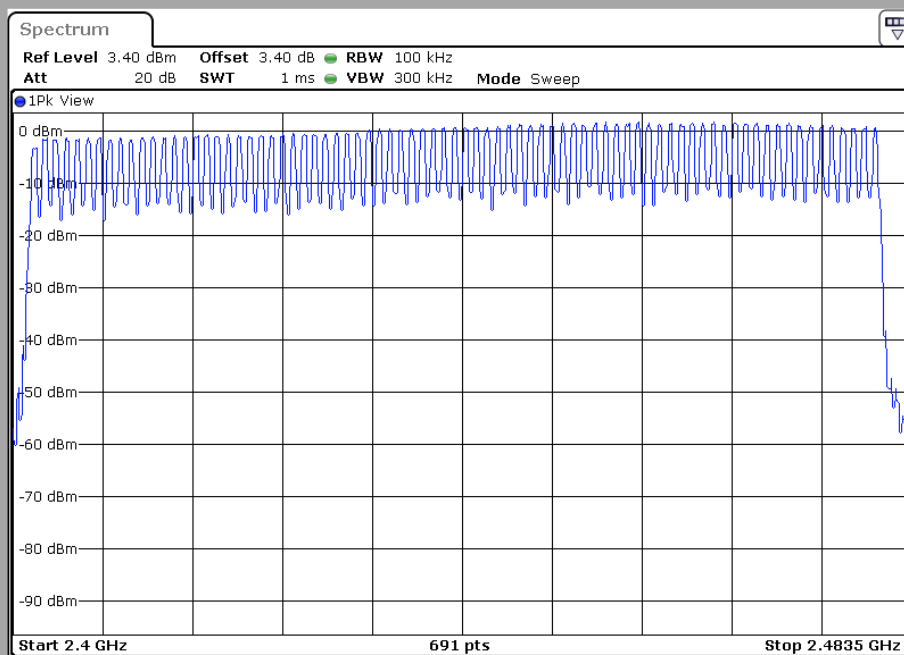
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna horn 18GHz	AINFO	LB	C2042055	08/16	08/17
Cable SMA	-	18G	A5329373	10/15	10/16
Cable 40GHz 2m coudé	-	-	A5329720	05/16	05/17
Cable 40GHz 2m coudé	-	-	A5329721	05/16	05/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

**7.6. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION**

None       Divergence:

**7.7. TEST SEQUENCE AND RESULTS**

**GFSK DH5**



Hopping Sequence

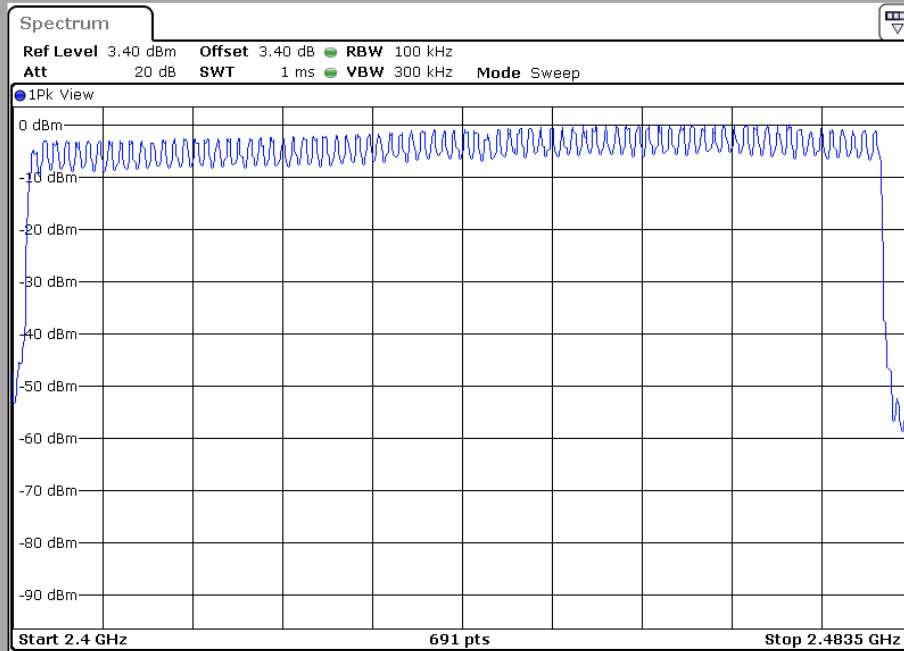
79

Channels



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### $\pi/4$ DQPSK 2-DH5



Hopping Sequence

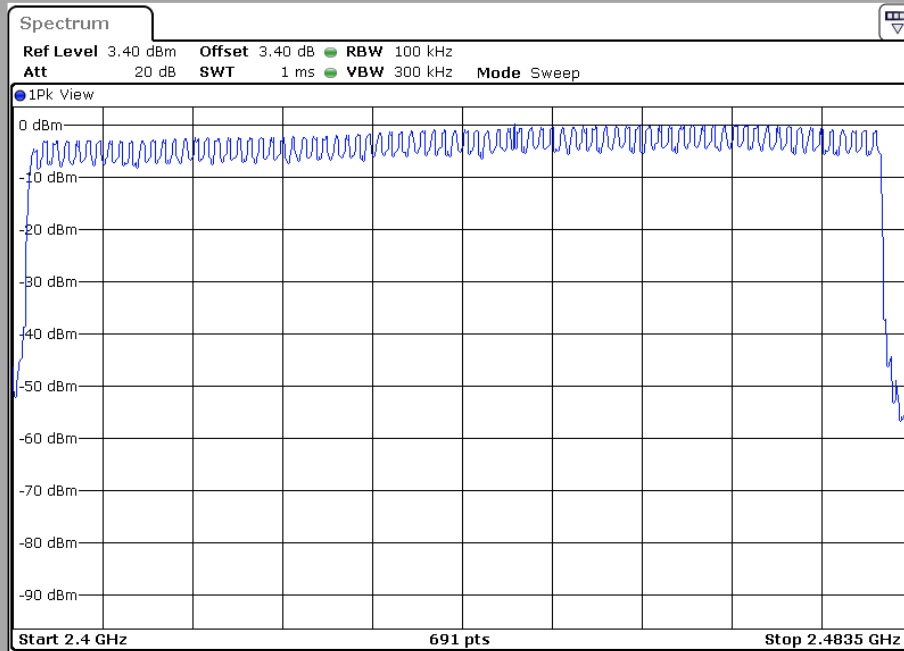
79

Channels



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### 8DPSK 3-DH5



Hopping Sequence

79

Channels

### 7.8. CONCLUSION

Number of hopping frequencies measurement performed on the sample of the product **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160587313331013301015991**, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.





## 8. TIME OF OCCUPANCY (DWELL TIME) (15.247)

### 8.1. ENVIRONMENTAL CONDITIONS

Date of test : August 25, 2016  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1002  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

### 8.2. LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within period of 0.4 seconds multiplied by the number of hopping channels employed.

### 8.3. EQUIPMENT CONFIGURATION

Packet type: 3-DH1 / 3-DH3 / 3-DH5 worst case presented  
Hopping sequence:  ON  OFF

### 8.4. 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 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:**

Dwell Time is measured and calculated using the zero SPAN mode on a channel frequency and a SWEEP with an adapter value to measure the number of transmission within a period and the time of transmission

RBW: 100kHz

VBW: 300kHz

### 8.5. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna horn 18GHz	AINFO	LB	C2042055	08/16	08/17
Cable SMA	-	18G	A5329373	10/15	10/16
Cable 40GHz 2m coudé	-	-	A5329720	05/16	05/17
Cable 40GHz 2m coudé	-	-	A5329721	05/16	05/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

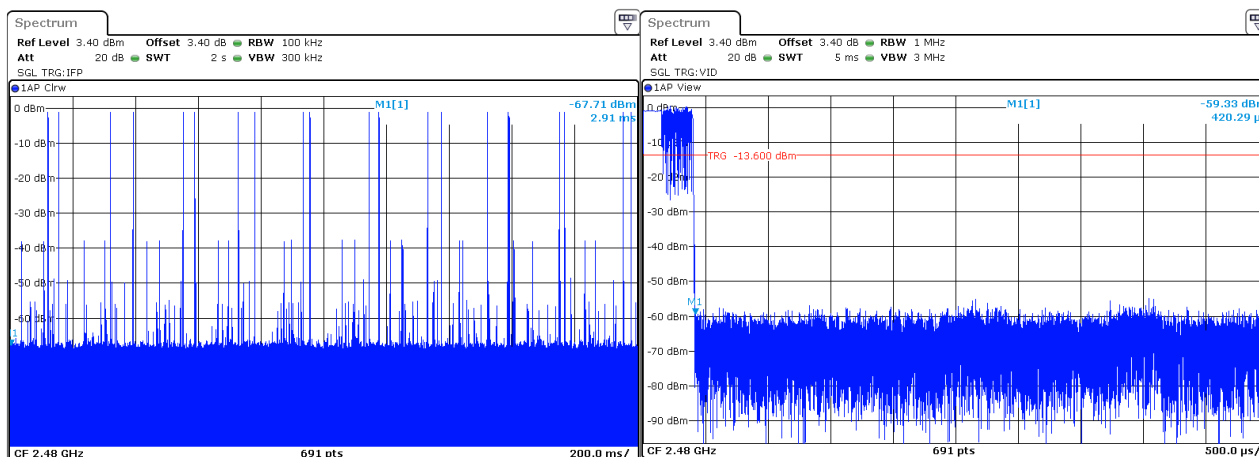


### 8.6. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION

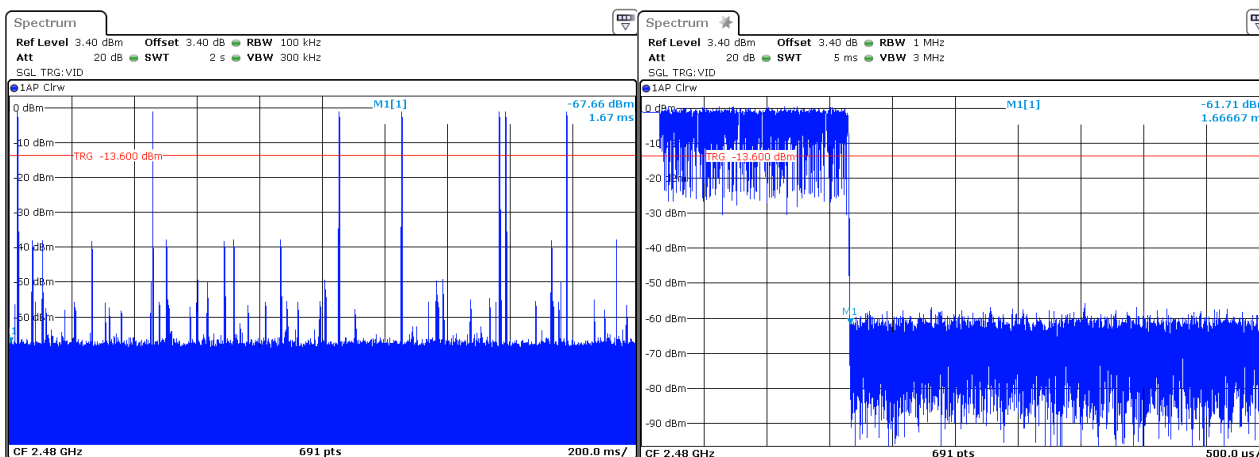
None       Divergence:

### 8.7. TEST SEQUENCE AND RESULTS

Packet Mode	Number of transmission in the period	Length of transmission time (ms)	Result (ms)	Limit (ms)
3-DH1	20 (times/ 2 sec) * 15.8	0.420	132.720	400.000

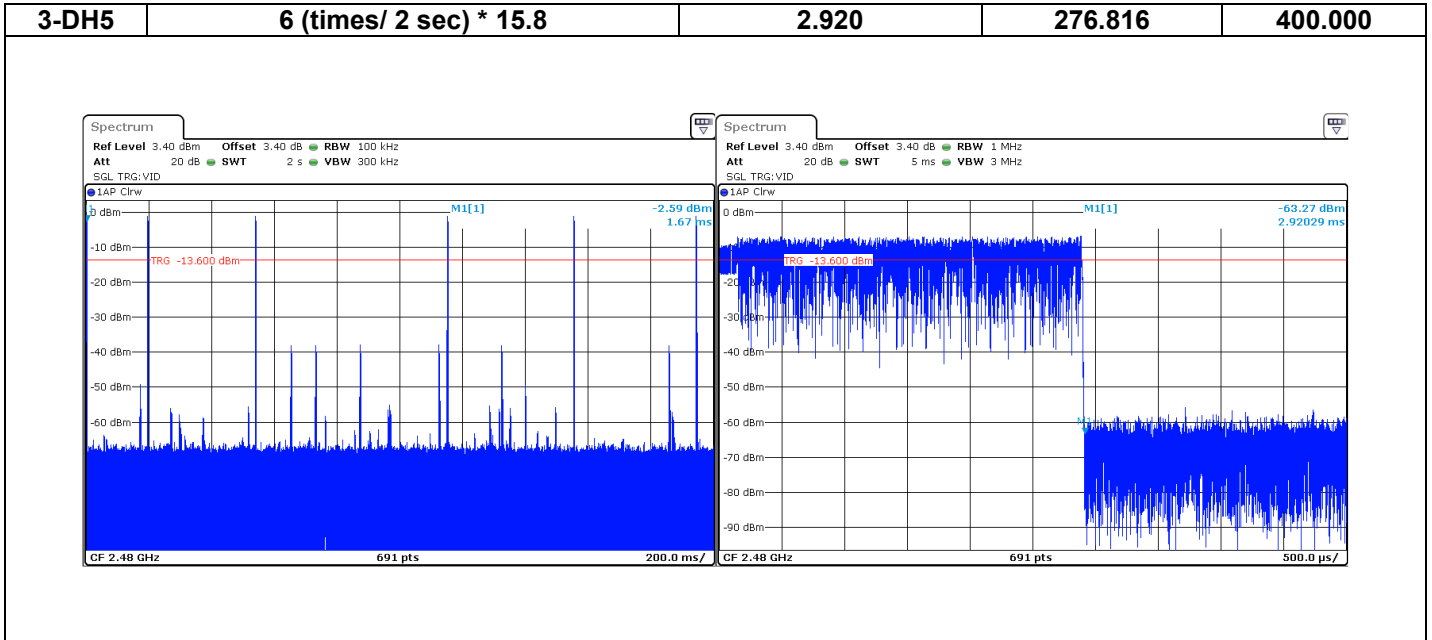


3-DH3	7 (times/ 2 sec) * 15.8	1.667	184.370	400.000
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**Note:** Period of 31.6 seconds (79 channels x 0.4)

### 8.8. CONCLUSION

Time of occupancy measurement performed on the sample of the product **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160587313331013301015991**, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 9. BAND EDGE MEASUREMENT (15.247)

### 9.1. ENVIRONMENTAL CONDITIONS

Date of test : August 25, 2016  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1002  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

### 9.2. LIMIT

#### **RF antenna conducted test:**

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:**

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.

### 9.3. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5 Worst case presented  
Hopping sequence:  ON  OFF

### 9.4. 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



### 9.5. TEST EQUIPMENT LIST

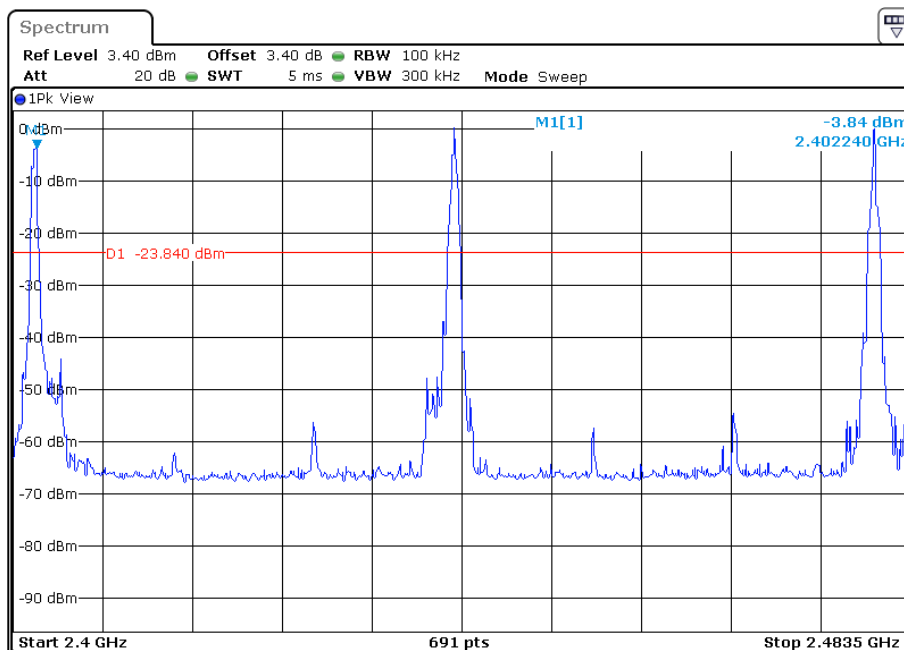
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna horn 18GHz	AINFO	LB	C2042055	08/16	08/17
Cable SMA	-	18G	A5329373	10/15	10/16
Cable 40GHz 2m coudé	-	-	A5329720	05/16	05/17
Cable 40GHz 2m coudé	-	-	A5329721	05/16	05/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

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

None       Divergence:

### 9.7. TEST SEQUENCE AND RESULTS

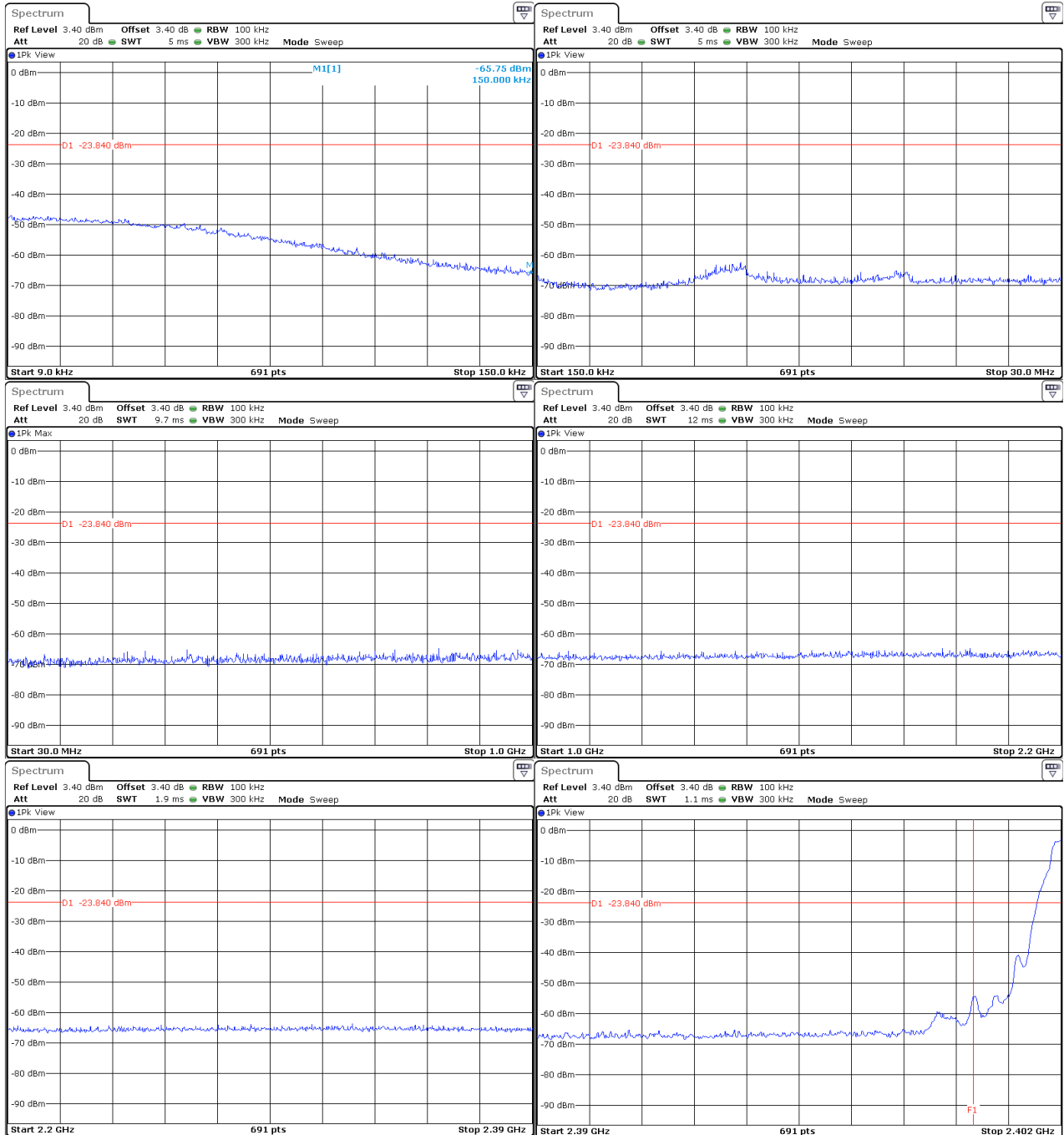
#### GRAPH / MODULATION. GFSK DH5:



Worst case: Cmin and dysplay line at -23.84dBm.

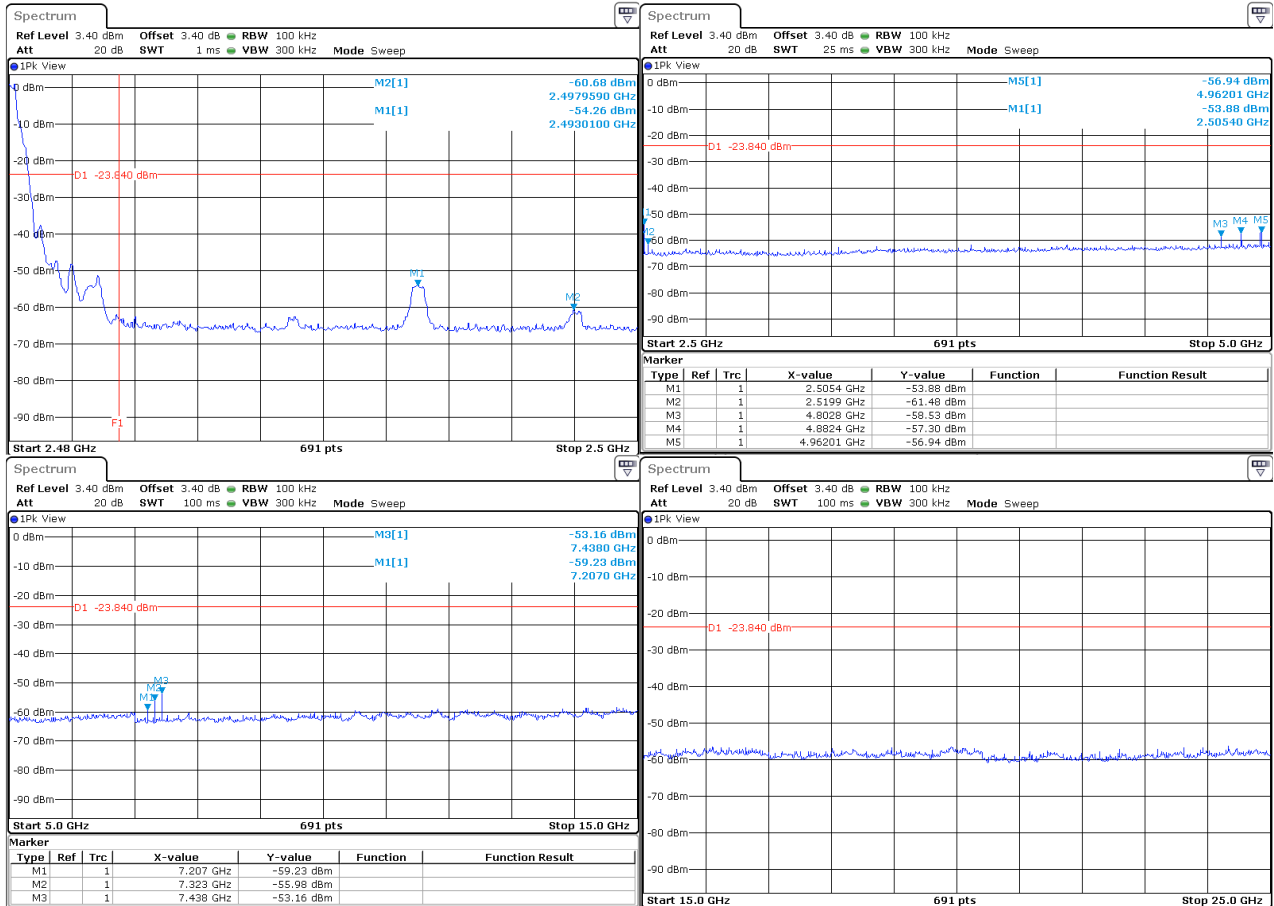


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## 9.8. CONCLUSION

Band edge measurement performed on the sample of the product **Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160587313331013301015991**, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.



## 10. OCCUPIED BANDWIDTH

### 10.1. ENVIRONMENTAL CONDITIONS

Date of test : August 25, 2016  
Test performed by : Gaëtan DESCHAMPS  
Atmospheric pressure (hPa) : 1002  
Relative humidity (%) : 32  
Ambient temperature (°C) : 23

### 10.2. EQUIPMENT CONFIGURATION

Packet type: 1-DH5 / 2-DH5 / 3-DH5 worst case presented  
Hopping sequence:  ON  OFF

### 10.3. 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 3.4dB

**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:**

1. RBW used in the range of 1% to 5% of the anticipated emission bandwidth
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. OBW 99% function of spectrum analyzer used

### 10.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Antenna horn 18GHz	AINFO	LB	C2042055	08/16	08/17
Cable SMA	-	18G	A5329373	10/15	10/16
Cable 40GHz 2m coudé	-	-	A5329720	05/16	05/17
Cable 40GHz 2m coudé	-	-	A5329721	05/16	05/17
Bluetooth Tester	ROHDE & SCHWARZ	CBT	A2440007	-	-
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16



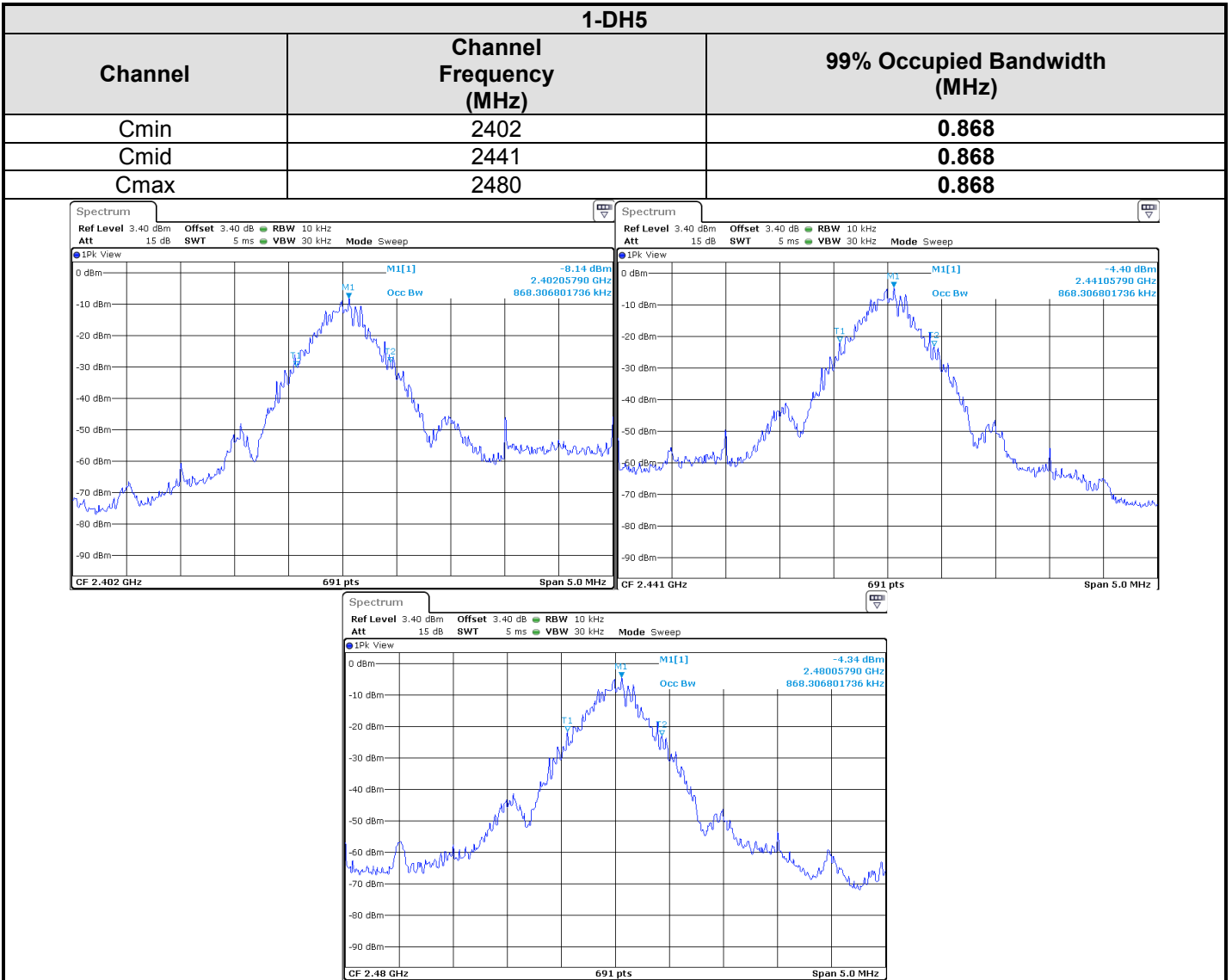


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**10.5. DIVERGENCE, ADDITION OR SUPPRESSION ON THE TEST SPECIFICATION**

None       Divergence:

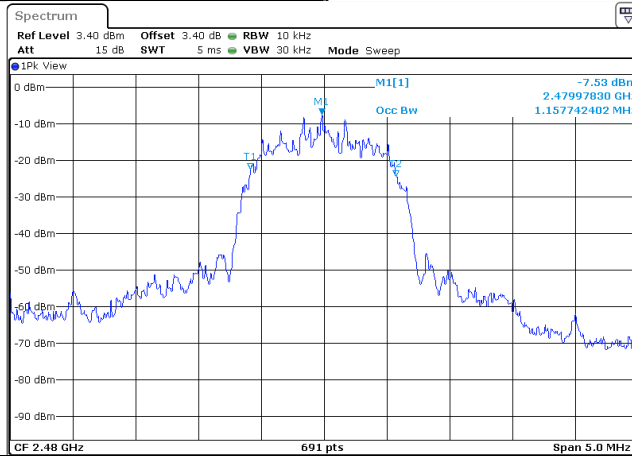
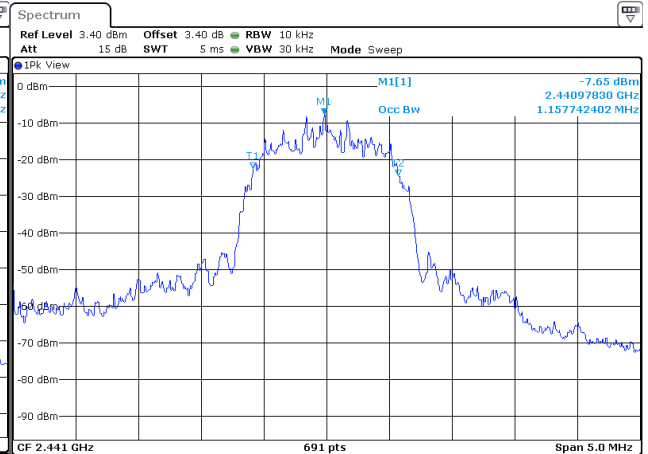
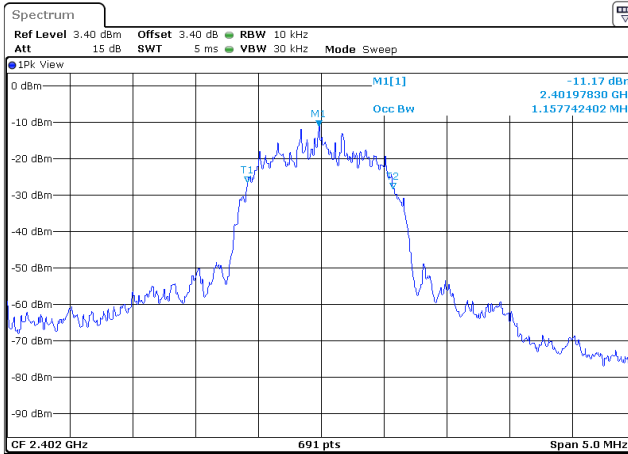
**10.6. TEST SEQUENCE AND RESULTS**





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2-DH5		
Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)
Cmin	2402	1.157
Cmid	2441	1.157
Cmax	2480	1.157

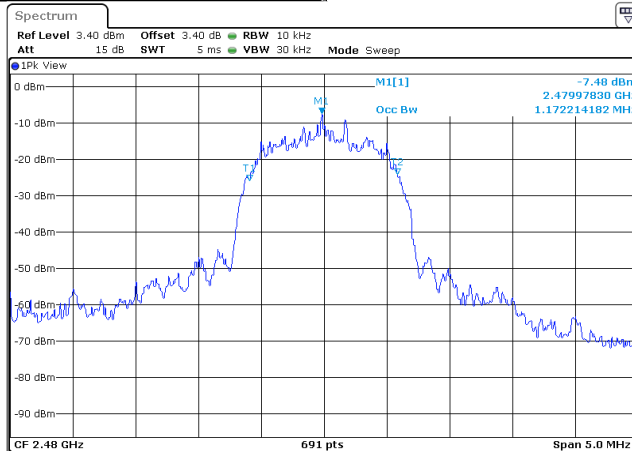
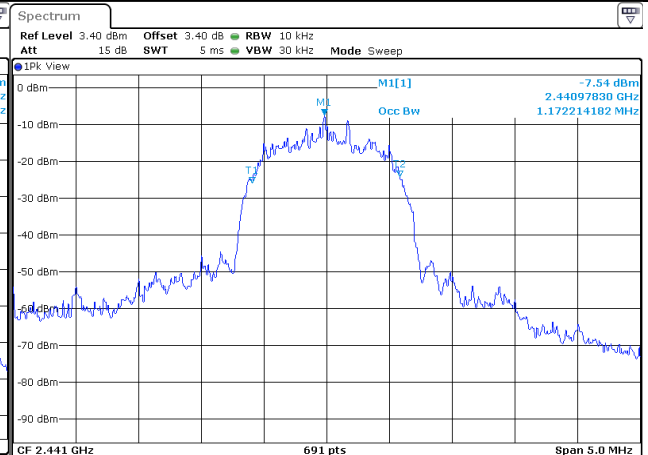
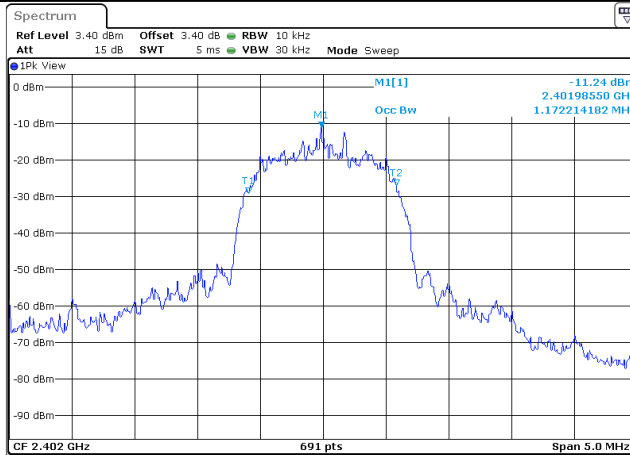




L C I E

3-DH5

Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (MHz)
Cmin	2402	1.172
Cmid	2441	1.172
Cmax	2480	1.172



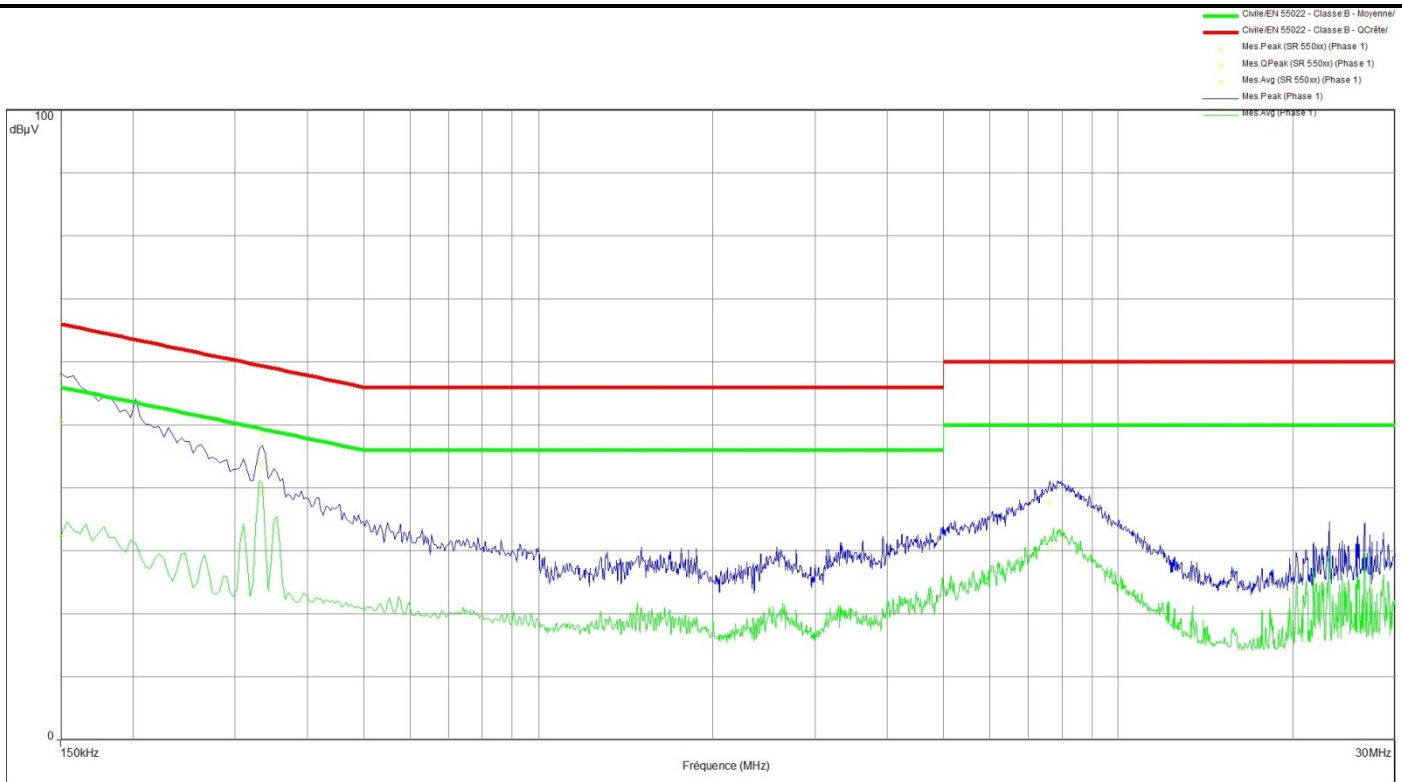


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**11. ANNEX 1 (GRAPHS)**

**CONDUCTED EMISSIONS**

<b>Graph name:</b>	Emc#1	<b>Test configuration:</b>	
<b>Limit:</b>	EN 55022	Phase FCC	
<b>Class:</b>	B		
<b>Frequency range: [150kHz - 30MHz]</b>			
<b>Voltage / Frequency:</b>	110VAC / 60Hz	<b>RBW :</b>	10kHz
<b>Line:</b>	Phase	<b>VBW :</b>	30kHz

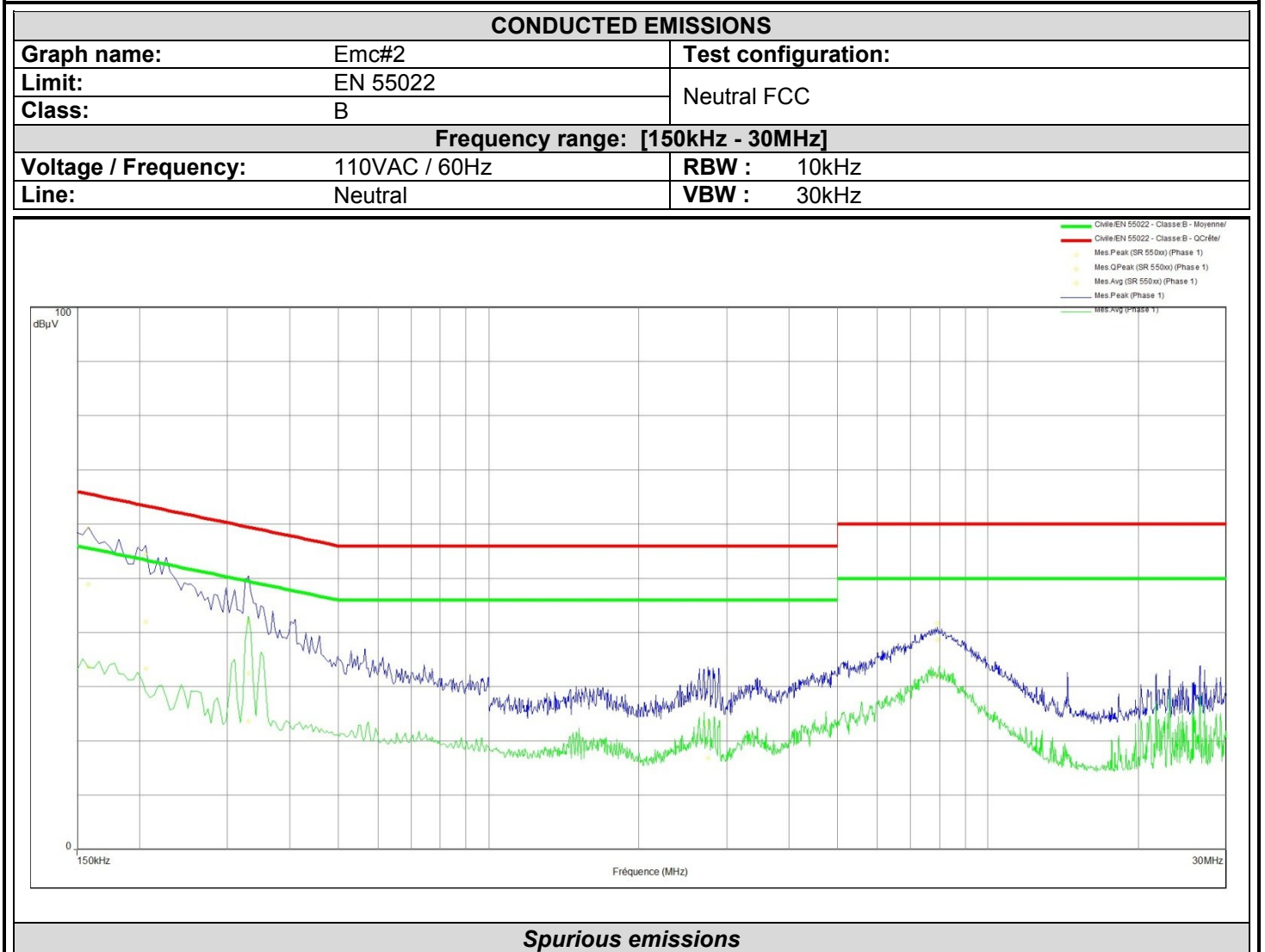


**Spurious emissions**

Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line
0.150	57.7	50.5	66.0	-15.5	32.2	56.0	-23.8	Phase 1
0.334	48.3	43.7	59.4	-15.7	39.4	49.4	-10.0	Phase 1
7.632	40.8	37.6	60.0	-22.4	30.2	50.0	-19.8	Phase 1



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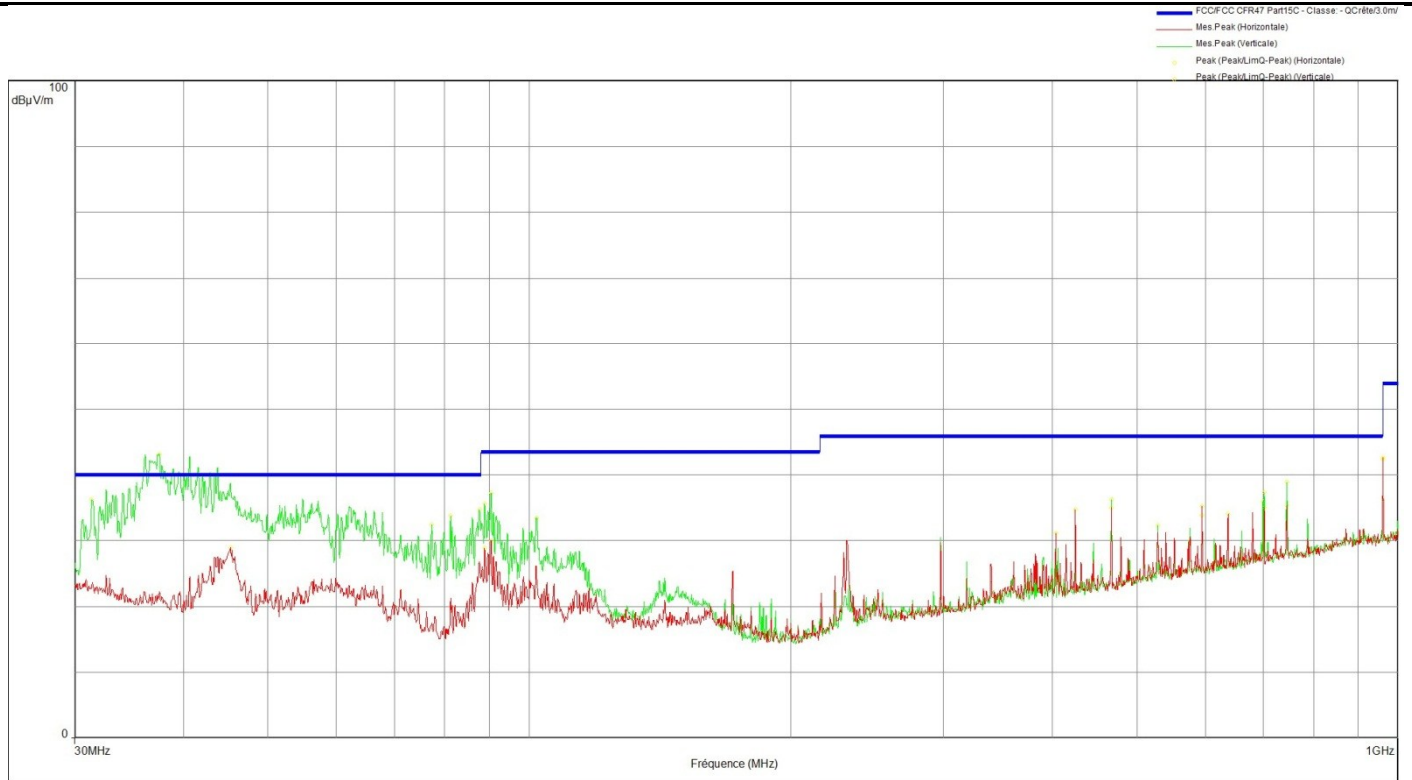
Frequency (MHz)	Mes.Peak (dBµV)	Mes.QPeak (dBµV)	LimQP (dBµV)	Mes.QPeak-LimQP (dB)	Mes.Avg (dBµV)	LimAvg (dBµV)	Mes.Avg-LimAvg (dB)	Line
0.158	59.2	48.8	65.6	-16.8	33.6	55.6	-21.9	Phase 1
0.206	54.4	41.9	63.4	-21.5	33.3	53.4	-20.0	Phase 1
0.330	42.0	32.6	59.4	-26.9	23.7	49.4	-25.8	Phase 1
2.752	28.3	23.2	56.0	-32.8	16.9	46.0	-29.1	Phase 1
7.908	41.7	38.7	60.0	-21.3	31.9	50.0	-18.1	Phase 1



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**RADIATED EMISSIONS**

<b>Graph name:</b>	Emr#1	<b>Test configuration:</b>
<b>Limit:</b>	FCC CFR47 Part15C	(H+V) - Configuration 1 <1GHz
<b>Class:</b>		
<b>Frequency range: [30MHz - 1GHz]</b>		
<b>Antenna polarization:</b>	Horizontal & Vertical	<b>RBW :</b> 100kHz
<b>Azimuth:</b>	0° - 360°	<b>VBW :</b> 300kHz



**Spurious emissions**

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization
45.317	28.9	40.0	-11.1	Horizontal
88.871	29.0	43.5	-14.5	Horizontal
90.367	30.0	43.5	-13.5	Horizontal
403.760	31.1	46.0	-14.9	Horizontal
425.000	34.8	46.0	-11.2	Horizontal
467.520	35.1	46.0	-10.9	Horizontal
595.000	35.3	46.0	-10.7	Horizontal
637.480	34.1	46.0	-11.9	Horizontal
701.240	35.1	46.0	-10.9	Horizontal
743.760	35.4	46.0	-10.6	Horizontal
960.000	42.7	46.0	-3.3	Horizontal
31.377	36.2	40.0	-3.8	Vertical
37.531	43.2	40.0	3.2	Vertical
77.209	32.4	40.0	-7.6	Vertical



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Frequency (MHz)	Peak (dB $\mu$ V/m)	LimQP (dB $\mu$ V/m)	Peak-LimQP (dB)	Polarization
81.204	33.8	40.0	-6.2	Vertical
87.630	34.8	40.0	-5.2	Vertical
88.871	35.6	43.5	-7.9	Vertical
90.367	37.3	43.5	-6.2	Vertical
101.927	33.4	43.5	-10.1	Vertical
467.520	36.4	46.0	-9.6	Vertical
528.880	32.3	46.0	-13.7	Vertical
595.040	33.9	46.0	-12.1	Vertical
698.880	36.0	46.0	-10.0	Vertical
701.240	37.4	46.0	-8.6	Vertical
743.720	38.9	46.0	-7.1	Vertical
960.000	42.5	46.0	-3.5	Vertical

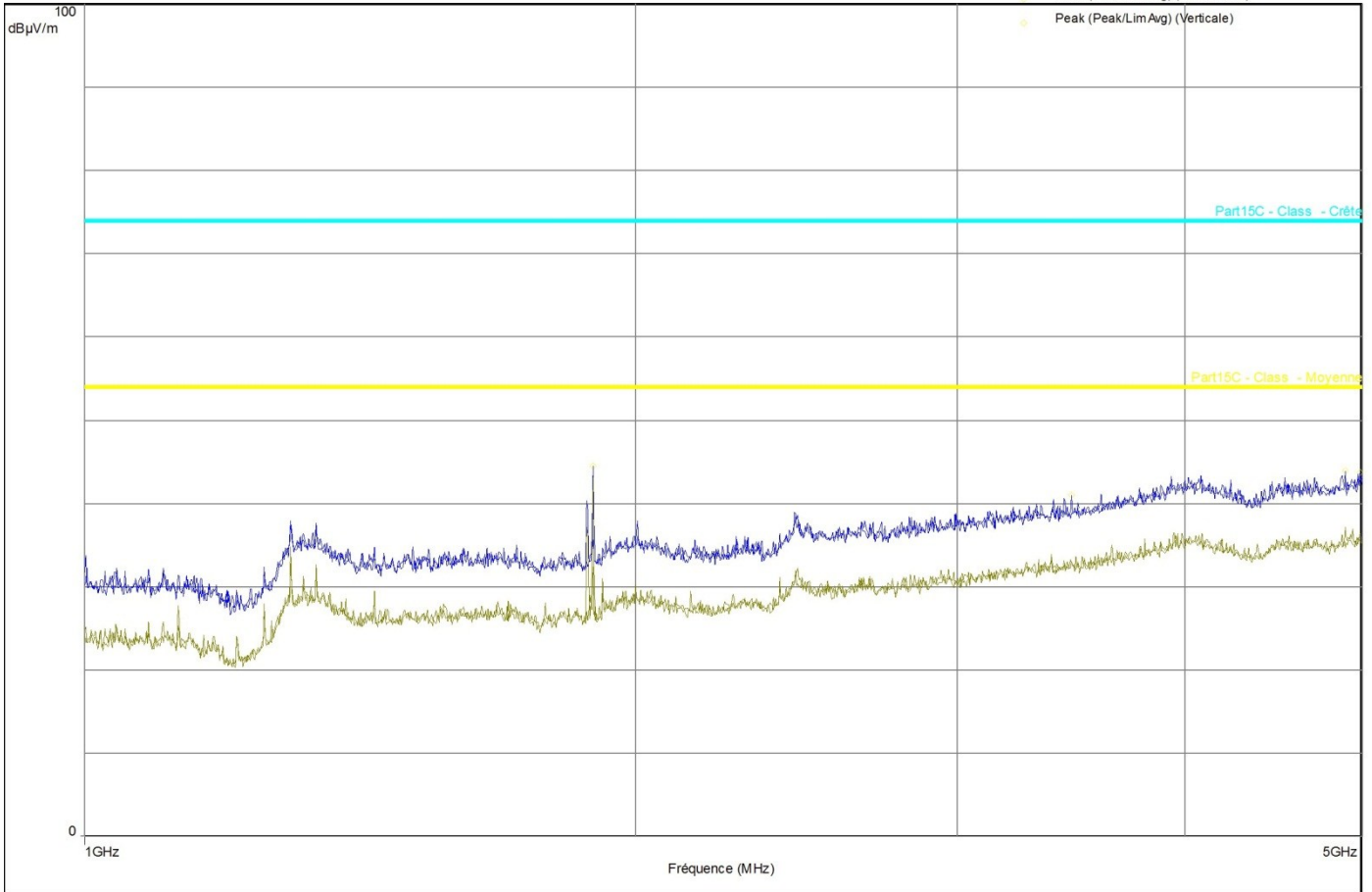


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**RADIATED EMISSIONS**

<b>Graph name:</b>	Emr#2	<b>Test configuration:</b>
<b>Limit:</b>	FCC CFR47 Part15C	(H+V) - Configuration FCC >1GHz
<b>Class:</b>		
<b>Frequency range: [1GHz - 5GHz]</b>		
<b>Antenna polarization:</b>	Horizontal & Vertical	<b>RBW :</b> 1MHz
<b>Azimuth:</b>	0° - 360°	<b>VBW :</b> 3MHz

- FCC/FCC CFR47 Part15C - Classe: - Moyenne/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - QCrête/3.0m/
- FCC/FCC CFR47 Part15C - Classe: - Crête/3.0m/
- Mes.Peak (Horizontale)
- Mes.Peak (Verticale)
- Mes.Avg (Horizontale)
- Mes.Avg (Verticale)
- Peak (Peak/Lim Avg) (Horizontale)
- Peak (Peak/Lim Avg) (Verticale)



**Spurious emissions**

Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
1897.250	44.5	54.0	-9.5	Horizontal
4894.100	43.9	54.0	-10.1	Horizontal





**L C I E**

<b>Frequency (MHz)</b>	<b>Peak (dB<math>\mu</math>V/m)</b>	<b>LimM (dB<math>\mu</math>V/m)</b>	<b>Peak-LimM (dB)</b>	<b>Polarization</b>
3468.250	41.0	54.0	-13.0	Vertical
4986.950	43.8	54.0	-10.2	Vertical



## 12. 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.