WIFI 5GHz Template: Release May 01st, 2016

TEST REPORT

N°: 143160-689135-D(FILE#916702) **Version : 02**

Subject	**Radio spectrum matters tests according to standards: 47 CFR Part 15.407 & RSS-247 Issue 1 & RSS-Gen Issue 4 (RF Test Only)**
Issued to	**INGENICO** **9 Avenue de la Gare Rovaltain TGV** **26300 – VALENCE - FRANCE**
Apparatus under test	
Product	**Payment terminal**
Trade mark	**INGENICO**
Manufacturer	**INGENICO**
Model under test	**Desk/5000 CL/Eth/Mod/WiFi/BT**
Reference	**TCA33310133A**
Serial number	**160287313331013301014523&** **16028731333101330101 6014**
FCCID	**XKB-D5000CLWIBT**
IC	**2586D-D5000CLWIBT**
Conclusion	See Test Program chapter
Test date	August 31, 2016 to November 17, 2016
Test location	Moirans
Composition of document	63 pages
Document issued on	December 19, 2016

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	November 17, 2016	Gaetan DESCHAMPS	Creation of the document
02	December 19, 2016	Gaetan DESCHAMPS	Modification further to review

SUMMARY

1. TEST PROGRAM

References

- **47 CFR Part 15.407**
- **RSS 247 Issue 1**
- **RSS Gen Issue 4**
- **KDB 789033 D02 General U-NII Tests Procedures New Rules v01r02**
- **KDB 662911 D01 Multiple Transmitter Output v02r01**
- **ANSI C63.10-2013**

Radio requirement:

Clause (47CFR Part 15.407 & RSS-247 Issue 1 & RSS-Gen Issue 4) Test Description	Test result - Comments			
Occupied Bandwidth	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
26dB Bandwidth	☑ PASS	☐ FAIL	☐ NA(2)	☐ NP(1)
6dB Bandwidth	☑ PASS	☐ FAIL	☐ NA(3)	☐ NP(1)
Duty Cycle	☐ PASS	☐ FAIL	☑ NA	☐ NP(1)
EIRP	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Maximum Conducted Output Power	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Power Spectral Density	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Transmit Power Control	☐ PASS	☐ FAIL	☑ NA(4)	☐ NP(1)
AC Power Line Conducted Emission	☑ PASS	☐ FAIL	☐ NA(5)	☐ NP(1)
Unwanted Emissions & Undesirable Emission	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Frequency Stability	☑ PASS (6)	☐ FAIL	☐ NA	☐ NP(1)
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

(1): Limited program
(2): EUT only operates outside the 5725MHz-5850MHz band
(3): EUT only operates inside the 5725MHz-5850MHz band
(4): EIRP below 27dBm or EUT only operates inside 5150MHz-5250MHz or/and 5725MHz-5850MHz bands
(5): EUT not directly or indirectly connected to the AC Power Public Network
(6): The Manufacturer declares the EUT emission is maintained within the band of operation under all conditions of normal operation as specified in the user manual

2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)

2.1. INFORMATIONS

The EUT can be used with different configuration :

- ✓ **Initial functionnalities**
  - Cless Interface (RFID)
  - Bluetooth chipset: CSR8811 (CSR)
  - SAM1 & SAM2 readers
  - Host or slave (µUSB 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):

INGENICO Desk/5000 CL/Eth/Mod/WiFi/BT **Serial Number:** **160287313331013301014523**
160287313331013301016014

Equipment Under Test

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	☑ AC ☐ DC ☐ 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	☑	☐	☑	
	Output DC, Jack	1.8	☑	☐	☑	
Twist cable to Magicbox	Power supply Jack	2	☑	☐	☑	Supply Terminal
	RJ11					COM0
	RJ45					Ethernet line
	RJ11					Modem line
SAM1	SAM card	/	/	/	☑	/
SAM2	SAM card	/	/	/	☑	/
SAM3	SAM card	/	/	/	☑	/
CAM0	SAM card	/	/	/	☑	/
USB	USB port (Micro-B)	1	☑	☑	☑	/
USB HOST	USB port (Type A)	1	☑	☑	☑	/
MicroSD	Micro SD port	/	/	/	☑	/
COM2	Mini USB	1	☐	☑	☑	/
Audio	Audio Jack 3.5mm	1	☐	☑	☑	/
SIM1	SIM CARD	/	/	/	☑	/
SIM2	SIM CARD	/	/	/	☑	/

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	☑	☐	☑	/
COM0	RJ11	3	☐	☐	☑	/
Ethernet	RJ45	5	☐	☐	☑	/
Modem	RJ11	5	☐	☐	☑	/
Magicbox cable twisted	Twist cable	2	☑	☐	☑	/

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Access point	ASUS	-	-
TOSHIBA Laptop	Satellite	-	-

Equipment information:

Type:	WIFI			
Frequency band:	☑ 5150MHz-5250MHz	☑ 5250MHz-5350MHz	☑ 5470MHz-5725MHz	
Standard:	☑ 802.11a	☑ 802.11n HT20	☑ 802.11n HT40	
	☐ 802.11ac VHT20	☐ 802.11ac VHT40	☐ 802.11ac VHT80	
	☐ 802.11ac VHT160			
Spectrum Modulation:	☑ OFDM			
Channel bandwidth:	☑ 20MHz	☑ 40MHz	☐ 80MHz	☐ 160MHz
Antenna Type:	☑ Integral	☐ External	☐ Dedicated	
Antenna connector:	☐ Yes	☑ No	☑ Temporary for test	
Transmit chains:	☑ 1	☐ 2	☐ 3	☐ 4
	☐ 5	☐ 6	☐ 7	☐ 8
	☑ Single antenna	☐ Symmetrical	☐ Asymmetrical	
	Gain 1: 1.5dBi	Gain 2: X dBi	Gain 3: X dBi	Gain 4: X dBi
	Gain 5: X dBi	Gain 6: X dBi	Gain 7: X dBi	Gain 8: X dBi
	Accumuled Gain: 1.5 dBi			
Beam forming gain:	☐ Yes: X dB		☑ No	
TPC:	☐ Yes		☑ No	
Receiver chains	☑ 1	☐ 2	☐ 3	☐ 4
	☐ 5	☐ 6	☐ 7	☐ 8
Type of equipment:	☑ Stand-alone	☐ Plug-in	☐ Combined	
Ad-Hoc mode:	☐ Yes		☑ No	
Duty cycle:	☑ Continuous duty	☐ Intermittent duty	☐ 100% duty	
Unmodulated mode:	☐ Yes		☑ No	
Equipment type:	☑ Production model		☐ Pre-production model	
Operating temperature range:	Tmin:	☑ -20°C	☐ 0°C	☐ X °C
	Tnom:	20°C		
	Tmax:	☐ 35°C	☑ 55°C	☐ X °C
Type of power source:	☑ AC power supply	☐ DC power supply	☑ Battery Battery Type	
Operating voltage range:	Vmin:	☑ 207V/50Hz	☐ 3.2 Vdc	
	Vnom:	☑ 230V/50Hz	☐ 3.7 Vdc	
	Vmax	☑ 253V/50Hz	☐ 4.2 Vdc	
Mode:	☐ Master	☐ Slave with radar detection	☑ Slave without radar detection	
Fixed outdoor P to P/M application:	☐ Yes		☑ No	
System architectures:	☑ IP based		☐ Frame based	
Off-channel CAC function:	☐ Yes (Off-Channel CAC Time: X hours)		☑ No	
Fixed outdoor P to P/M application:	☐ Yes		☑ No	
User access restriction:	☐ Yes (The DFS settings are not accessible to the end user if changing those settings result in no longer being compliant with DFS requirement in clause 4.7 of ETSI EN 301 893 V1.8.1)		☑ No	
Geo-location capability:	☐ Yes (The geographical location determined by the equipment is not accessible to the end user as defined in section 4.10.2 of ETSI EN 301 893 V1.8.1 standard)		☑ No	

CHANNEL PLAN		
802.11a / 802.11n HT20/ 802.11ac VHT20		
Channel	**Frequency (MHz)**	**Available Channel**
C1=36	5180	☑
C2=40	5200	☑
44	5220	☑
C3=48	5240	☑
C4=52	5260	☑
56	5280	☑
C5=60	5300	☑
C6=64	5320	☑
C7=100	5500	☑
104	5520	☑
108	5540	☑
112	5560	☑
C8=116	5580	☑
120	5600	☐
124	5620	☐
128	5640	☐
132	5660	☑
136	5680	☑
C9=140	5700	☑
C10=144	5720	☐
C11=149	5745	☐
153	5765	☐
C12=157	5785	☐
161	5805	☐
C13=165	5825	☐

CHANNEL PLAN		
802.11n HT40/ 802.11ac VHT40		
Channel	Frequency (MHz)	Available Channel
C14=36+40	5190	☑
C15=44+48	5230	☑
C16=52+56	5270	☑
C17=60+64	5310	☑
C18=100+104	5510	☑
C19=108+112	5550	☑
116+120	5590	☐
124+128	5630	☐
C20=132+136	5670	☑
C21=140+144	5710	☐
C22=149+153	5755	☐
C23=157+161	5795	☐

CHANNEL PLAN		
802.11ac VHT80		
Channel	Frequency (MHz)	Available Channel
C24=36+40+44+48	5210	☐
C25=52+56+60+64	5290	☐
C26=100+104+108+112	5530	☐
C27=116+120+124+128	5610	☐
C28=132+136+140+144	5690	☐
C29=149+153+157+161	5775	☐

CHANNEL PLAN		
802.11ac VHT160		
Channel	Frequency (MHz)	Available Channel
C30=36+40+44+48+52+56+60+64	5250	☐
C31=100+104+108+112+116+120+124+128	5570	☐

No DFS Channel
DFS Channel
Weather DFS Channel (Not Authorised for RSS-247)

DATA RATE		
802.11a		
Data Rate (Mbps)	**Modulation Type**	**Modulation Worst Case**
6	BPSK	☑
9	BPSK	☐
12	QPSK	☐
18	QPSK	☐
24	16-QAM	☐
36	16-QAM	☐
48	64-QAM	☐
54	64-QAM	☐

DATA RATE									
802.11n HT20									
Available for EUT	MCS Index	Spatial streams	Modulation				Data Rate (Mbps)		Worst Case Modulation
							(GI = 800ns)	(GI = 400ns)	
☑	0	1	BPSK				6.5	7.2	☑
☑	1	1	QPSK				13	14.4	☐
☑	2	1	QPSK				19.5	21.7	☐
☑	3	1	16-QAM				26	28.9	☐
☑	4	1	16-QAM				39	43.3	☐
☑	5	1	64-QAM				52	57.8	☐
☑	6	1	64-QAM				58.5	65	☐
☑	7	1	64-QAM				65	72.2	☐
☐	8	2	BPSK				13	14.4	☐
☐	9	2	QPSK				26	28.9	☐
☐	10	2	QPSK				39	43.3	☐
☐	11	2	16-QAM				52	57.8	☐
☐	12	2	16-QAM				78	86.7	☐
☐	13	2	64-QAM				104	115.6	☐
☐	14	2	64-QAM				117	130.3	☐
☐	15	2	64-QAM				130	144.4	☐
☐	16	3	BPSK				19.5	21.7	☐
☐	17	3	QPSK				39	43.3	☐
☐	18	3	QPSK				58.5	65	☐
☐	19	3	16-QAM				78	86.7	☐
☐	20	3	16-QAM				117	130	☐
☐	21	3	64-QAM				156	173.3	☐
☐	22	3	64-QAM				175.5	195	☐
☐	23	3	64-QAM				195	216.7	☐
☐	24	4	BPSK				26	28.9	☐
☐	25	4	QPSK				52	57.8	☐
☐	26	4	QPSK				78	86.7	☐
☐	27	4	16-QAM				104	115.6	☐
☐	28	4	16-QAM				156	173.3	☐
☐	29	4	64-QAM				208	231.1	☐
☐	30	4	64-QAM				234	260	☐
☐	31	4	64-QAM				260	288.9	☐
☐	32	1	BPSK	-	-	-	-	-	☐
☐	33	2	16-QAM	QPSK	-	-	39	43.3	☐
☐	34	2	64-QAM	QPSK	-	-	52	57.8	☐
☐	35	2	64-QAM	16-QAM	-	-	65	72.2	☐
☐	36	2	16-QAM	QPSK	-	-	58.5	65	☐
☐	37	2	64-QAM	QPSK	-	-	78	86.7	☐
☐	38	2	64-QAM	16-QAM	-	-	97.5	108.3	☐
☐	39	3	16-QAM	QPSK	QPSK	-	52	57.8	☐
☐	40	3	16-QAM	16-QAM	QPSK	-	65	72.2	☐
☐	41	3	64-QAM	QPSK	QPSK	-	65	72.2	☐
☐	42	3	64-QAM	16-QAM	QPSK	-	78	86.7	☐
☐	43	3	64-QAM	16-QAM	16-QAM	-	91	101.1	☐
☐	44	3	64-QAM	64-QAM	QPSK	-	91	101.1	☐
☐	45	3	64-QAM	64-QAM	16-QAM	-	104	115.6	☐
☐	46	3	16-QAM	QPSK	QPSK	-	78	86.7	☐
☐	47	3	16-QAM	16-QAM	QPSK	-	97.5	108.3	☐
☐	48	3	64-QAM	QPSK	QPSK	-	97.5	108.3	☐
☐	49	3	64-QAM	16-QAM	QPSK	-	117	130	☐
☐	50	3	64-QAM	16-QAM	16-QAM	-	136.5	151.7	☐
☐	51	3	64-QAM	64-QAM	QPSK	-	136.5	151.7	☐
☐	52	3	64-QAM	64-QAM	16-QAM	-	156	173.3	☐
☐	53	4	16-QAM	QPSK	QPSK	QPSK	65	72.2	☐
☐	54	4	16-QAM	16-QAM	QPSK	QPSK	78	86.7	☐
☐	55	4	16-QAM	16-QAM	16-QAM	QPSK	91	101.1	☐
☐	56	4	64-QAM	QPSK	QPSK	QPSK	78	86.7	☐
☐	57	4	64-QAM	16-QAM	QPSK	QPSK	91	101.1	☐
☐	58	4	64-QAM	16-QAM	16-QAM	QPSK	104	115.6	☐
☐	59	4	64-QAM	16-QAM	16-QAM	16-QAM	117	130	☐
☐	60	4	64-QAM	QPSK	QPSK	QPSK	104	115.6	☐
☐	61	4	64-QAM	16-QAM	16-QAM	QPSK	117	130	☐
☐	62	4	64-QAM	16-QAM	16-QAM	16-QAM	130	144.4	☐
☐	63	4	64-QAM	64-QAM	64-QAM	QPSK	130	144.4	☐
☐	64	4	64-QAM	64-QAM	64-QAM	16-QAM	143	158.9	☐
☐	65	4	16-QAM	QPSK	QPSK	QPSK	97.5	108.3	☐
☐	66	4	16-QAM	16-QAM	QPSK	QPSK	117	130	☐
☐	67	4	16-QAM	16-QAM	16-QAM	QPSK	136.5	151.7	☐
☐	68	4	64-QAM	QPSK	QPSK	QPSK	117	130	☐
☐	69	4	64-QAM	16-QAM	QPSK	QPSK	136.5	151.7	☐
☐	70	4	64-QAM	16-QAM	16-QAM	QPSK	156	173.3	☐
☐	71	4	64-QAM	16-QAM	16-QAM	16-QAM	175.5	195	☐
☐	72	4	64-QAM	64-QAM	QPSK	QPSK	156	173.3	☐
☐	73	4	64-QAM	64-QAM	16-QAM	QPSK	175.5	195	☐
☐	74	4	64-QAM	64-QAM	16-QAM	16-QAM	195	216.7	☐
☐	75	4	64-QAM	64-QAM	64-QAM	QPSK	195	216.7	☐
☐	76	4	64-QAM	64-QAM	64-QAM	16-QAM	214.5	238.3	☐

DATA RATE									
802.11n HT40									
Available for EUT	MCS Index	Spatial streams	Modulation				Data Rate (Mbps)		Worst Case Modulation
							(GI = 800ns)	(GI = 400ns)	
☑	0	1	BPSK				13	15	☑
☑	1	1	QPSK				27	30	☐
☑	2	1	QPSK				40.5	45	☐
☑	3	1	16-QAM				54	60	☐
☑	4	1	16-QAM				81	90	☐
☑	5	1	64-QAM				108	120	☐
☑	6	1	64-QAM				121.5	135	☐
☑	7	1	64-QAM				135	150	☐
☐	8	2	BPSK				27	30	☐
☐	9	2	QPSK				54	60	☐
☐	10	2	QPSK				81	90	☐
☐	11	2	16-QAM				108	120	☐
☐	12	2	16-QAM				162	180	☐
☐	13	2	64-QAM				216	240	☐
☐	14	2	64-QAM				243	270	☐
☐	15	2	64-QAM				270	300	☐
☐	16	3	BPSK				40.5	45	☐
☐	17	3	QPSK				81	90	☐
☐	18	3	QPSK				121.5	135	☐
☐	19	3	16-QAM				162	180	☐
☐	20	3	16-QAM				243	270	☐
☐	21	3	64-QAM				324	360	☐
☐	22	3	64-QAM				364.5	405	☐
☐	23	3	64-QAM				405	450	☐
☐	24	4	BPSK				54	60	☐
☐	25	4	QPSK				108	120	☐
☐	26	4	QPSK				162	180	☐
☐	27	4	16-QAM				216	240	☐
☐	28	4	16-QAM				324	360	☐
☐	29	4	64-QAM				432	480	☐
☐	30	4	64-QAM				486	540	☐
☐	31	4	64-QAM				540	600	☐
☐	32	1	BPSK	-	-	-	6.0	6.7	☐
☐	33	2	16-QAM	QPSK	-	-	81	90.0	☐
☐	34	2	64-QAM	QPSK	-	-	108	120	☐
☐	35	2	64-QAM	16-QAM	-	-	135	150	☐
☐	36	2	16-QAM	QPSK	-	-	121.5	135	☐
☐	37	2	64-QAM	QPSK	-	-	162	180	☐
☐	38	2	64-QAM	16-QAM	-	-	202.5	225	☐
☐	39	3	16-QAM	QPSK	QPSK	-	108	120	☐
☐	40	3	16-QAM	16-QAM	QPSK	-	135	150	☐
☐	41	3	64-QAM	QPSK	QPSK	-	135	150	☐
☐	42	3	64-QAM	16-QAM	QPSK	-	162	180	☐
☐	43	3	64-QAM	16-QAM	16-QAM	-	189	210	☐
☐	44	3	64-QAM	64-QAM	QPSK	-	189	210	☐
☐	45	3	64-QAM	64-QAM	16-QAM	-	216	240	☐
☐	46	3	16-QAM	QPSK	QPSK	-	162	180	☐
☐	47	3	16-QAM	16-QAM	QPSK	-	202.5	225	☐
☐	48	3	64-QAM	QPSK	QPSK	-	202.5	225	☐
☐	49	3	64-QAM	16-QAM	QPSK	-	243	270	☐
☐	50	3	64-QAM	16-QAM	16-QAM	-	283.5	315	☐
☐	51	3	64-QAM	64-QAM	QPSK	-	283.5	315	☐
☐	52	3	64-QAM	64-QAM	16-QAM	-	324	360	☐
☐	53	4	16-QAM	QPSK	QPSK	QPSK	135	150	☐
☐	54	4	16-QAM	16-QAM	QPSK	QPSK	162	180	☐
☐	55	4	16-QAM	16-QAM	16-QAM	QPSK	189	210	☐
☐	56	4	64-QAM	QPSK	QPSK	QPSK	162	180	☐
☐	57	4	64-QAM	16-QAM	QPSK	QPSK	189	210	☐
☐	58	4	64-QAM	16-QAM	16-QAM	QPSK	216	240	☐
☐	59	4	64-QAM	16-QAM	16-QAM	16-QAM	243	270	☐
☐	60	4	64-QAM	QPSK	QPSK	QPSK	216	240	☐
☐	61	4	64-QAM	16-QAM	16-QAM	QPSK	243	270	☐
☐	62	4	64-QAM	16-QAM	16-QAM	16-QAM	270	300	☐
☐	63	4	64-QAM	64-QAM	64-QAM	QPSK	270	300	☐
☐	64	4	64-QAM	64-QAM	64-QAM	16-QAM	297	330	☐
☐	65	4	16-QAM	QPSK	QPSK	QPSK	202.5	225	☐
☐	66	4	16-QAM	16-QAM	QPSK	QPSK	243	270	☐
☐	67	4	16-QAM	16-QAM	16-QAM	QPSK	283.5	315	☐
☐	68	4	64-QAM	QPSK	QPSK	QPSK	243	270	☐
☐	69	4	64-QAM	16-QAM	QPSK	QPSK	283.5	315	☐
☐	70	4	64-QAM	16-QAM	16-QAM	QPSK	324	360	☐
☐	71	4	64-QAM	16-QAM	16-QAM	16-QAM	364.5	405	☐
☐	72	4	64-QAM	64-QAM	QPSK	QPSK	324	360	☐
☐	73	4	64-QAM	64-QAM	16-QAM	QPSK	364.5	405	☐
☐	74	4	64-QAM	64-QAM	16-QAM	16-QAM	405	450	☐
☐	75	4	64-QAM	64-QAM	64-QAM	QPSK	405	450	☐
☐	76	4	64-QAM	64-QAM	64-QAM	16-QAM	445.5	495	☐

DATA RATE: 802.11ac VHT20							
Available for EUT	MCS Index	Nbr of spatial streams	Modulation (Stream 1/2/3/4)	Coding rate	GI = 800ns	GI = 400ns	Worst Case Modulation
☐	0	1	BPSK	1/2	6,5	7,2	☐
☐	1	1	QPSK	1/2	13	14,4	☐
☐	2	1	QPSK	3/4	19,5	21,7	☐
☐	3	1	16-QAM	1/2	26	28,9	☐
☐	4	1	16-QAM	3/4	39	43,3	☐
☐	5	1	64-QAM	2/3	52	57,8	☐
☐	6	1	64-QAM	3/4	58,5	65	☐
☐	7	1	64-QAM	5/6	65	72,2	☐
☐	8	1	256-QAM	3/4	78	86,7	☐
☐	9	1	256-QAM	5/6	N/A	N/A	☐
☐	10	2	BPSK	1/2	13	14,4	☐
☐	11	2	QPSK	1/2	26	28,8	☐
☐	12	2	QPSK	3/4	39	43,4	☐
☐	13	2	16-QAM	1/2	52	57,8	☐
☐	14	2	16-QAM	3/4	78	86,6	☐
☐	15	2	64-QAM	2/3	104	115,6	☐
☐	16	2	64-QAM	3/4	117	130	☐
☐	17	2	64-QAM	5/6	130	144,4	☐
☐	18	2	256-QAM	3/4	156	173,4	☐
☐	19	2	256-QAM	5/6	N/A	N/A	☐
☐	20	3	BPSK	1/2	19,5	21,6	☐
☐	21	3	QPSK	1/2	39	43,2	☐
☐	22	3	QPSK	3/4	58,5	65,1	☐
☐	23	3	16-QAM	1/2	78	86,7	☐
☐	24	3	16-QAM	3/4	117	129,9	☐
☐	25	3	64-QAM	2/3	156	173,4	☐
☐	26	3	64-QAM	3/4	175,5	195	☐
☐	27	3	64-QAM	5/6	195	216,6	☐
☐	28	3	256-QAM	3/4	234	260,1	☐
☐	29	3	256-QAM	5/6	N/A	N/A	☐
☐	30	4	BPSK	1/2	26	28,8	☐
☐	31	4	QPSK	1/2	52	57,6	☐
☐	32	4	QPSK	3/4	78	86,8	☐
☐	33	4	16-QAM	1/2	104	115,6	☐
☐	34	4	16-QAM	3/4	156	173,2	☐
☐	35	4	64-QAM	2/3	208	231,2	☐
☐	36	4	64-QAM	3/4	234	260	☐
☐	37	4	64-QAM	5/6	260	288,8	☐
☐	38	4	256-QAM	3/4	312	346,8	☐
☐	39	4	256-QAM	5/6	N/A	N/A	☐
☐	40	5	BPSK	1/2	32,5	36	☐
☐	41	5	QPSK	1/2	65	72	☐
☐	42	5	QPSK	3/4	97,5	108,5	☐
☐	43	5	16-QAM	1/2	130	144,5	☐
☐	44	5	16-QAM	3/4	195	216,5	☐
☐	45	5	64-QAM	2/3	260	289	☐
☐	46	5	64-QAM	3/4	292,5	325	☐
☐	47	5	64-QAM	5/6	325	361	☐
☐	48	5	256-QAM	3/4	390	433,5	☐
☐	49	5	256-QAM	5/6	N/A	N/A	☐
☐	50	6	BPSK	1/2	39	43,2	☐
☐	51	6	QPSK	1/2	78	86,4	☐
☐	52	6	QPSK	3/4	117	130,2	☐
☐	53	6	16-QAM	1/2	156	173,4	☐
☐	54	6	16-QAM	3/4	234	259,8	☐
☐	55	6	64-QAM	2/3	312	346,8	☐
☐	56	6	64-QAM	3/4	351	390	☐
☐	57	6	64-QAM	5/6	390	433,2	☐
☐	58	6	256-QAM	3/4	468	520,2	☐
☐	59	6	256-QAM	5/6	N/A	N/A	☐
☐	60	7	BPSK	1/2	45,5	50,4	☐
☐	61	7	QPSK	1/2	91	100,8	☐
☐	62	7	QPSK	3/4	136,5	151,9	☐
☐	63	7	16-QAM	1/2	182	202,3	☐
☐	64	7	16-QAM	3/4	273	303,1	☐
☐	65	7	64-QAM	2/3	364	404,6	☐
☐	66	7	64-QAM	3/4	409,5	455	☐
☐	67	7	64-QAM	5/6	455	505,4	☐
☐	68	7	256-QAM	3/4	546	606,9	☐
☐	69	7	256-QAM	5/6	N/A	N/A	☐
☐	70	8	BPSK	1/2	52	57,6	☐
☐	71	8	QPSK	1/2	104	115,2	☐
☐	72	8	QPSK	3/4	156	173,6	☐
☐	73	8	16-QAM	1/2	208	231,2	☐
☐	74	8	16-QAM	3/4	312	346,4	☐
☐	75	8	64-QAM	2/3	416	462,4	☐
☐	76	8	64-QAM	3/4	468	520	☐
☐	77	8	64-QAM	5/6	520	577,6	☐
☐	78	8	256-QAM	3/4	624	693,6	☐
☐	79	8	256-QAM	5/6	N/A	N/A	☐

DATA RATE: 802.11ac VHT40							
Available for EUT	MCS Index	Nbr of spatial streams	Modulation (Stream 1/2/3/4)	Coding rate	GI = 800ns	GI = 400ns	Worst Case Modulation
☐	0	1	BPSK	1/2	13,5	15	☐
☐	1	1	QPSK	1/2	27	30	☐
☐	2	1	QPSK	3/4	40,5	45	☐
☐	3	1	16-QAM	1/2	54	60	☐
☐	4	1	16-QAM	3/4	81	90	☐
☐	5	1	64-QAM	2/3	108	120	☐
☐	6	1	64-QAM	3/4	121,5	135	☐
☐	7	1	64-QAM	5/6	135	150	☐
☐	8	1	256-QAM	3/4	162	180	☐
☐	9	1	256-QAM	5/6	180	200	☐
☐	10	2	BPSK	1/2	27	30	☐
☐	11	2	QPSK	1/2	54	60	☐
☐	12	2	QPSK	3/4	81	90	☐
☐	13	2	16-QAM	1/2	108	120	☐
☐	14	2	16-QAM	3/4	162	180	☐
☐	15	2	64-QAM	2/3	216	240	☐
☐	16	2	64-QAM	3/4	243	270	☐
☐	17	2	64-QAM	5/6	270	300	☐
☐	18	2	256-QAM	3/4	324	360	☐
☐	19	2	256-QAM	5/6	360	400	☐
☐	20	3	BPSK	1/2	40,5	45	☐
☐	21	3	QPSK	1/2	81	90	☐
☐	22	3	QPSK	3/4	121,5	135	☐
☐	23	3	16-QAM	1/2	162	180	☐
☐	24	3	16-QAM	3/4	243	270	☐
☐	25	3	64-QAM	2/3	324	360	☐
☐	26	3	64-QAM	3/4	364,5	405	☐
☐	27	3	64-QAM	5/6	405	450	☐
☐	28	3	256-QAM	3/4	486	540	☐
☐	29	3	256-QAM	5/6	540	600	☐
☐	30	4	BPSK	1/2	54	60	☐
☐	31	4	QPSK	1/2	108	120	☐
☐	32	4	QPSK	3/4	162	180	☐
☐	33	4	16-QAM	1/2	216	240	☐
☐	34	4	16-QAM	3/4	324	360	☐
☐	35	4	64-QAM	2/3	432	480	☐
☐	36	4	64-QAM	3/4	486	540	☐
☐	37	4	64-QAM	5/6	540	600	☐
☐	38	4	256-QAM	3/4	648	720	☐
☐	39	4	256-QAM	5/6	720	800	☐
☐	40	5	BPSK	1/2	67,5	75	☐
☐	41	5	QPSK	1/2	135	150	☐
☐	42	5	QPSK	3/4	202,5	225	☐
☐	43	5	16-QAM	1/2	270	300	☐
☐	44	5	16-QAM	3/4	405	450	☐
☐	45	5	64-QAM	2/3	540	600	☐
☐	46	5	64-QAM	3/4	607,5	675	☐
☐	47	5	64-QAM	5/6	675	750	☐
☐	48	5	256-QAM	3/4	810	900	☐
☐	49	5	256-QAM	5/6	900	1000	☐
☐	50	6	BPSK	1/2	81	90	☐
☐	51	6	QPSK	1/2	162	180	☐
☐	52	6	QPSK	3/4	243	270	☐
☐	53	6	16-QAM	1/2	324	360	☐
☐	54	6	16-QAM	3/4	486	540	☐
☐	55	6	64-QAM	2/3	648	720	☐
☐	56	6	64-QAM	3/4	729	810	☐
☐	57	6	64-QAM	5/6	810	900	☐
☐	58	6	256-QAM	3/4	972	1080	☐
☐	59	6	256-QAM	5/6	1080	1200	☐
☐	60	7	BPSK	1/2	94,5	105	☐
☐	61	7	QPSK	1/2	189	210	☐
☐	62	7	QPSK	3/4	283,5	315	☐
☐	63	7	16-QAM	1/2	378	420	☐
☐	64	7	16-QAM	3/4	567	630	☐
☐	65	7	64-QAM	2/3	756	840	☐
☐	66	7	64-QAM	3/4	850,5	945	☐
☐	67	7	64-QAM	5/6	945	1050	☐
☐	68	7	256-QAM	3/4	1134	1260	☐
☐	69	7	256-QAM	5/6	1260	1400	☐
☐	70	8	BPSK	1/2	108	120	☐
☐	71	8	QPSK	1/2	216	240	☐
☐	72	8	QPSK	3/4	324	360	☐
☐	73	8	16-QAM	1/2	432	480	☐
☐	74	8	16-QAM	3/4	648	720	☐
☐	75	8	64-QAM	2/3	864	960	☐
☐	76	8	64-QAM	3/4	972	1080	☐
☐	77	8	64-QAM	5/6	1080	1200	☐
☐	78	8	256-QAM	3/4	1296	1440	☐
☐	79	8	256-QAM	5/6	1440	1600	☐

DATA RATE: 802.11ac VHT80							
Available for EUT	MCS Index	Nbr of spatial streams	Modulation (Stream 1/2/3/4)	Coding rate	GI = 800ns	GI = 400ns	Worst Case Modulation
☐	0	1	BPSK	1/2	29.3	32.5	☐
☐	1	1	QPSK	1/2	58.5	65	☐
☐	2	1	QPSK	3/4	87.8	97.5	☐
☐	3	1	16-QAM	1/2	117	130	☐
☐	4	1	16-QAM	3/4	175.5	195	☐
☐	5	1	64-QAM	2/3	234	260	☐
☐	6	1	64-QAM	3/4	263.3	292.5	☐
☐	7	1	64-QAM	5/6	292.5	325	☐
☐	8	1	256-QAM	3/4	351	390	☐
☐	9	1	256-QAM	5/6	390	433.3	☐
☐	10	2	BPSK	1/2	58.6	65	☐
☐	11	2	QPSK	1/2	117	130	☐
☐	12	2	QPSK	3/4	175.6	195	☐
☐	13	2	16-QAM	1/2	234	260	☐
☐	14	2	16-QAM	3/4	351	390	☐
☐	15	2	64-QAM	2/3	468	520	☐
☐	16	2	64-QAM	3/4	526.6	585	☐
☐	17	2	64-QAM	5/6	585	650	☐
☐	18	2	256-QAM	3/4	702	780	☐
☐	19	2	256-QAM	5/6	780	866.6	☐
☐	20	3	BPSK	1/2	87.9	97.5	☐
☐	21	3	QPSK	1/2	175.5	195	☐
☐	22	3	QPSK	3/4	263.4	292.5	☐
☐	23	3	16-QAM	1/2	351	390	☐
☐	24	3	16-QAM	3/4	526.5	585	☐
☐	25	3	64-QAM	2/3	702	780	☐
☐	26	3	64-QAM	3/4	789.9	877.5	☐
☐	27	3	64-QAM	5/6	877.5	975	☐
☐	28	3	256-QAM	3/4	1053	1170	☐
☐	29	3	256-QAM	5/6	1170	1299.9	☐
☐	30	4	BPSK	1/2	117.2	130	☐
☐	31	4	QPSK	1/2	234	260	☐
☐	32	4	QPSK	3/4	351.2	390	☐
☐	33	4	16-QAM	1/2	468	520	☐
☐	34	4	16-QAM	3/4	702	780	☐
☐	35	4	64-QAM	2/3	936	1040	☐
☐	36	4	64-QAM	3/4	1053.2	1170	☐
☐	37	4	64-QAM	5/6	1170	1300	☐
☐	38	4	256-QAM	3/4	1404	1560	☐
☐	39	4	256-QAM	5/6	1560	1733.2	☐
☐	40	5	BPSK	1/2	146.5	162.5	☐
☐	41	5	QPSK	1/2	292.5	325	☐
☐	42	5	QPSK	3/4	439	487.5	☐
☐	43	5	16-QAM	1/2	585	650	☐
☐	44	5	16-QAM	3/4	877.5	975	☐
☐	45	5	64-QAM	2/3	1170	1300	☐
☐	46	5	64-QAM	3/4	1316.5	1462.5	☐
☐	47	5	64-QAM	5/6	1462.5	1625	☐
☐	48	5	256-QAM	3/4	1755	1950	☐
☐	49	5	256-QAM	5/6	1950	2166.5	☐
☐	50	6	BPSK	1/2	175.8	195	☐
☐	51	6	QPSK	1/2	351	390	☐
☐	52	6	QPSK	3/4	526.8	585	☐
☐	53	6	16-QAM	1/2	702	780	☐
☐	54	6	16-QAM	3/4	1053	1170	☐
☐	55	6	64-QAM	2/3	1404	1560	☐
☐	56	6	64-QAM	3/4	1579.8	1755	☐
☐	57	6	64-QAM	5/6	1755	1950	☐
☐	58	6	256-QAM	3/4	2106	2340	☐
☐	59	6	256-QAM	5/6	2340	2599.8	☐
☐	60	7	BPSK	1/2	205.1	227.5	☐
☐	61	7	QPSK	1/2	409.5	455	☐
☐	62	7	QPSK	3/4	614.6	682.5	☐
☐	63	7	16-QAM	1/2	819	910	☐
☐	64	7	16-QAM	3/4	1228.5	1365	☐
☐	65	7	64-QAM	2/3	1638	1820	☐
☐	66	7	64-QAM	3/4	1843.1	2047.5	☐
☐	67	7	64-QAM	5/6	2047.5	2275	☐
☐	68	7	256-QAM	3/4	2457	2730	☐
☐	69	7	256-QAM	5/6	2730	3033.1	☐
☐	70	8	BPSK	1/2	234.4	260	☐
☐	71	8	QPSK	1/2	468	520	☐
☐	72	8	QPSK	3/4	702.4	780	☐
☐	73	8	16-QAM	1/2	936	1040	☐
☐	74	8	16-QAM	3/4	1404	1560	☐
☐	75	8	64-QAM	2/3	1872	2080	☐
☐	76	8	64-QAM	3/4	2106.4	2340	☐
☐	77	8	64-QAM	5/6	2340	2600	☐
☐	78	8	256-QAM	3/4	2808	3120	☐
☐	79	8	256-QAM	5/6	3120	3466.4	☐

DATA RATE: 802.11ac VHT160							
Available for EUT	MCS Index	Nbr of spatial streams	Modulation (Stream 1/2/3/4)	Coding rate	GI = 800ns	GI = 400ns	Worst Case Modulation
☐	0	1	BPSK	1/2	58,5	65	☐
☐	1	1	QPSK	1/2	117	130	☐
☐	2	1	QPSK	3/4	175,5	195	☐
☐	3	1	16-QAM	1/2	234	260	☐
☐	4	1	16-QAM	3/4	351	390	☐
☐	5	1	64-QAM	2/3	468	520	☐
☐	6	1	64-QAM	3/4	526,5	585	☐
☐	7	1	64-QAM	5/6	585	650	☐
☐	8	1	256-QAM	3/4	702	780	☐
☐	9	1	256-QAM	5/6	780	866,6	☐
☐	10	2	BPSK	1/2	117	130	☐
☐	11	2	QPSK	1/2	234	260	☐
☐	12	2	QPSK	3/4	351	390	☐
☐	13	2	16-QAM	1/2	468	520	☐
☐	14	2	16-QAM	3/4	702	780	☐
☐	15	2	64-QAM	2/3	936	1040	☐
☐	16	2	64-QAM	3/4	1053	1170	☐
☐	17	2	64-QAM	5/6	1170	1300	☐
☐	18	2	256-QAM	3/4	1404	1560	☐
☐	19	2	256-QAM	5/6	1560	1733,3	☐
☐	20	3	BPSK	1/2	175,5	195	☐
☐	21	3	QPSK	1/2	351	390	☐
☐	22	3	QPSK	3/4	526,5	585	☐
☐	23	3	16-QAM	1/2	702	780	☐
☐	24	3	16-QAM	3/4	1053	1170	☐
☐	25	3	64-QAM	2/3	1404	1560	☐
☐	26	3	64-QAM	3/4	1579,5	1755	☐
☐	27	3	64-QAM	5/6	1755	1950	☐
☐	28	3	256-QAM	3/4	2106	2340	☐
☐	29	3	256-QAM	5/6	-	-	☐
☐	30	4	BPSK	1/2	234	260	☐
☐	31	4	QPSK	1/2	468	520	☐
☐	32	4	QPSK	3/4	702	780	☐
☐	33	4	16-QAM	1/2	936	1040	☐
☐	34	4	16-QAM	3/4	1404	1560	☐
☐	35	4	64-QAM	2/3	1872	2080	☐
☐	36	4	64-QAM	3/4	2106	2340	☐
☐	37	4	64-QAM	5/6	2340	2600	☐
☐	38	4	256-QAM	3/4	2808	3120	☐
☐	39	4	256-QAM	5/6	3120	3466,7	☐
☐	40	5	BPSK	1/2	292,5	325	☐
☐	41	5	QPSK	1/2	585	650	☐
☐	42	5	QPSK	3/4	877,5	975	☐
☐	43	5	16-QAM	1/2	1170	1300	☐
☐	44	5	16-QAM	3/4	1755	1950	☐
☐	45	5	64-QAM	2/3	2340	2600	☐
☐	46	5	64-QAM	3/4	2632,5	2925	☐
☐	47	5	64-QAM	5/6	2925	3250	☐
☐	48	5	256-QAM	3/4	3510	3900	☐
☐	49	5	256-QAM	5/6	3900	4333,3	☐
☐	50	6	BPSK	1/2	351	390	☐
☐	51	6	QPSK	1/2	702	780	☐
☐	52	6	QPSK	3/4	1053	1170	☐
☐	53	6	16-QAM	1/2	1404	1560	☐
☐	54	6	16-QAM	3/4	2106	2340	☐
☐	55	6	64-QAM	2/3	2808	3120	☐
☐	56	6	64-QAM	3/4	3159	3510	☐
☐	57	6	64-QAM	5/6	3510	3900	☐
☐	58	6	256-QAM	3/4	4212	4680	☐
☐	59	6	256-QAM	5/6	4680	5200	☐
☐	60	7	BPSK	1/2	409,5	455	☐
☐	61	7	QPSK	1/2	819	910	☐
☐	62	7	QPSK	3/4	1228,5	1365	☐
☐	63	7	16-QAM	1/2	1638	1820	☐
☐	64	7	16-QAM	3/4	2457	2730	☐
☐	65	7	64-QAM	2/3	3276	3640	☐
☐	66	7	64-QAM	3/4	3685,5	4095	☐
☐	67	7	64-QAM	5/6	4095	4550	☐
☐	68	7	256-QAM	3/4	4914	5460	☐
☐	69	7	256-QAM	5/6	5460	6066,7	☐
☐	70	8	BPSK	1/2	468	520	☐
☐	71	8	QPSK	1/2	936	1040	☐
☐	72	8	QPSK	3/4	1404	1560	☐
☐	73	8	16-QAM	1/2	1872	2080	☐
☐	74	8	16-QAM	3/4	2808	3120	☐
☐	75	8	64-QAM	2/3	3744	4160	☐
☐	76	8	64-QAM	3/4	4212	4680	☐
☐	77	8	64-QAM	5/6	4680	5200	☐
☐	78	8	256-QAM	3/4	5616	6240	☐
☐	79	8	256-QAM	5/6	6240	6932,3	☐

2.3. RUNNING MODE

There are 2 configuration tests:

- Configuration digital device (only used in §6 and §7):

The EUT is set in the following modes during tests:
Backlight : **Yes**
Printer : **Yes** -> Ticket **No**
Modem : **Yes**
Cless : **No**
WIFI : **Yes**
Bluetooth : **No**
Ethernet : **Yes**
Sam1 : **Yes**
Sam2 : **Yes**
Sam3 : **Yes**
Cam0 : **Yes**
Com0 : **Yes**
Com2 : **Yes**
USB : **Yes** (reloop cable between host and slave)
MMC : **No**
Swipe: **No**

- Configuration radio device(used in §3, §4, §5 and §7):

The EUT is set in the following modes during tests:
- Permanent emission with modulation on a fixed channel in the data rate that produced the highest power
- Permanent emission with modulation on a fixed channel in the data rate that produced the lowest power
- Permanent emission without modulation on a fixed channel in the data rate that produced the highest power
- Permanent reception
- Emission-reception with a duty cycle above 30% in the data rate that produced the highest output power

To set the commands in EUT, the product should be connected with her base in Ethernet and then the following commands with the specific test software “DutApiBRIDGEETH8782” are used to set the product:

There are 2 order powers (see §2.4):

- **Command 23:**

  For TX mode:

  802.11a :
  - 1 : Connexion
  - 30 1 : WIFI 5GHZ
  - 12 36 : Set canal 36
  - 22 36 23 1: Set the calibration on the canal 36 with the order power at 23dBm and the “1”is used to specify 802.11a.
  - 17 1 6: Sets the device for continuous transmission of a modulated waveform with data rate at 6Mbps.

  802.11nHT20 :
  - 1 : Connexion
  - 30 1 : WIFI 5GHZ
  - 112 0: For HT20
  - 12 36 : Set canal 36
  - 22 36 23 1: Set the calibration on the canal 36 with the order power at 23dBm
  - 17 1 15: Sets the device for continuous transmission of a modulated waveform with data rate at 6.5Mbps in MCS0.

  802.11nHT40 :
  - 1 : Connexion
  - 30 1 : WIFI 5GHZ
  - 112 1: For HT40
  - 12 38 : Set canal 38
  - 22 38 23 1: Set the calibration on the canal 38 with the order power at 23dBm
  - 17 1 15: Set the device for continuous transmission of a modulated waveform with data rate at 13.5Mbps in MCS0.

For RX mode:
802.11b :
- 1 : Connexion
- 30 1 : WIFI 5GHZ
- 12 36 : Set canal 36
- 22 36 23 0: Set the calibration on the canal 36 with the order power at 23dBm and the “0”is used to specify 802.11a.
- 31: Rx Start and packet counter actived.

- **Command 11:**

For TX mode:
802.11b :
- 1 : Connexion
- 30 1 : WIFI 5 GHZ
- 12 36 : Set canal 36
- 22 36 11 2: Set the calibration on the canal 1 with the order power at 11dBm and the “1”is used to specify 802.11a.
- 17 1 6: Sets the device for continuous transmission of a modulated waveform with data rate at 6Mbps.

802.11nHT20 :
- 1 : Connexion
- 30 1 : WIFI 5GHZ
- 112 0: For HT20
- 12 36 : Set canal 36
- 22 36 11 1: Set the calibration on the canal 36 with the order power at 11dBm
- 17 1 15: Sets the device for continuous transmission of a modulated waveform with data rate at 6.5Mbps in MCS0.

802.11nHT40 :
- 1 : Connexion
- 30 1 : WIFI 5GHZ
- 112 1: For HT40
- 12 38 : Set canal 38
- 22 38 11 1: Set the calibration on the canal 38 with the order power at 11dBm
- 17 1 15: Set the device for continuous transmission of a modulated waveform with data rate at 13.5Mbps in MCS0.

For RX mode:
802.11b :
- 1 : Connexion
- 30 1 : WIFI 5GHZ
- 12 36 : Set canal 36
- 22 36 11 1: Set the calibration on the canal 36 with the order power at 11dBm and the “0”is used to specify 802.11a.
- 31: Rx Start and packet counter actived.

Firmware / Software version of EUT: SDK_OS 03.20.08

2.4. EQUIPMENT MODIFICATION

☐ None ☑ Modification: There are 2 order powers that have been tested. The first in worst case and the second as the original command:

- Command 23: Worst case, tested in the test §3 Occupied Bandwitdh, §4 26dB Emission Bandwidth.
  ⇨ §7 Radiated emission Data doesn’t comply with this command power, so provider reduced power command for following tests.
- Command 11: Reduced command, for the test §6 Conducted and §7 Radiated emission Data, §5 Maximum Conducted Output Power.

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

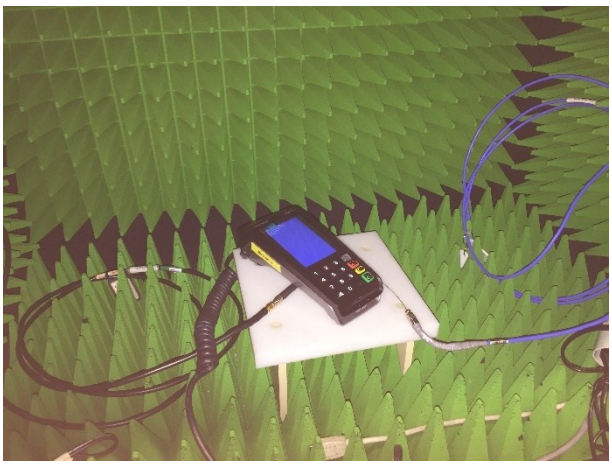
Test performed by : Gaetan DESCHAMPS
Date of test : August 31, 2016
Ambient temperature : 22 °C
Relative humidity : 32 %

3.2. TEST SETUP

- The Equipment Under Test is installed:
☑ In FAR ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method ☐ Radiated Method

- Test Procedure:
☑ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § D



Photograph for Occupied bandwidth

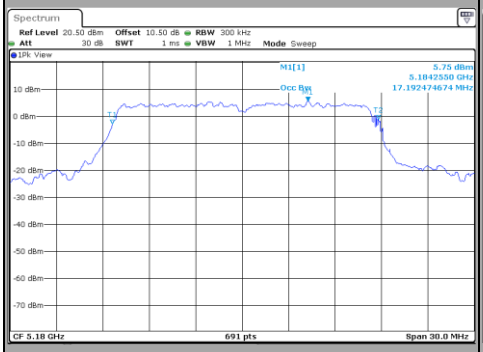
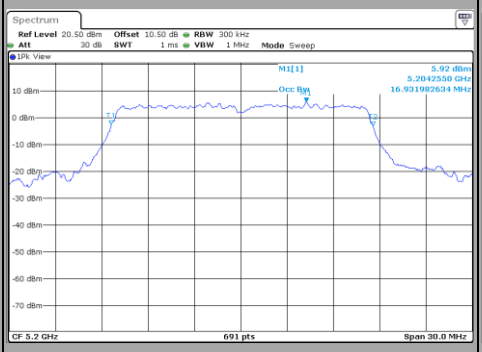
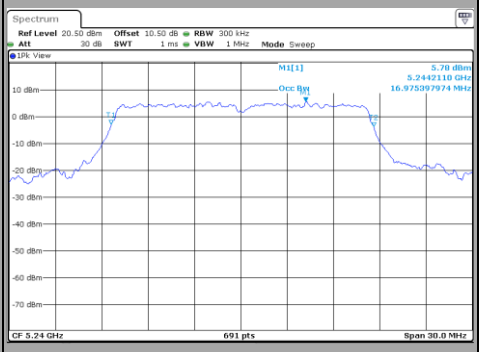
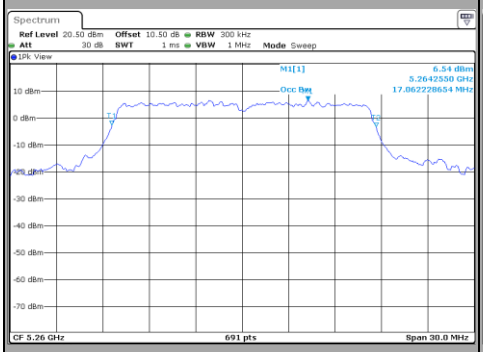
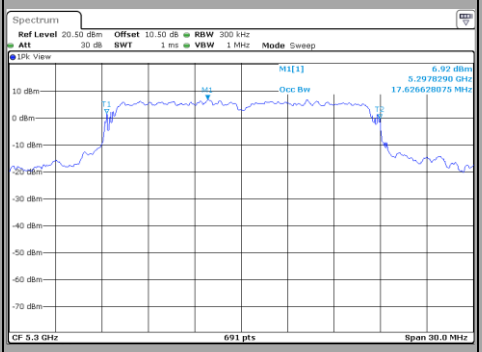
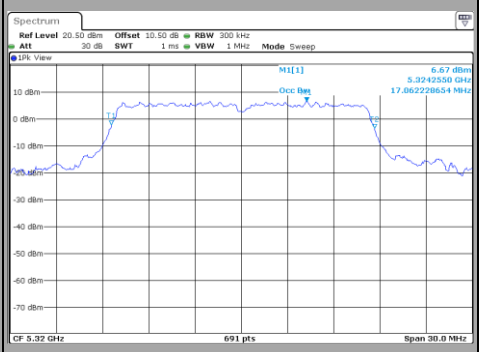
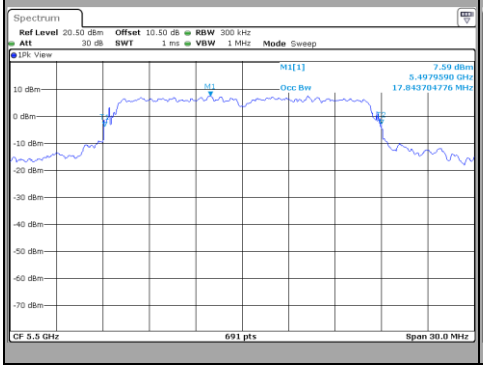
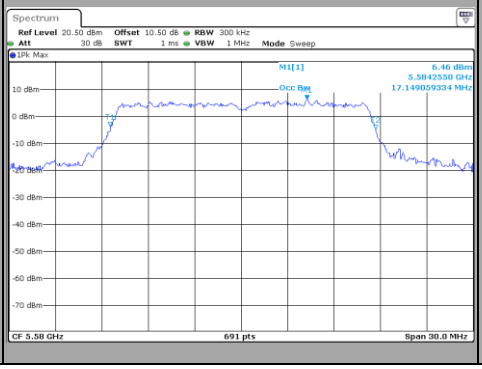
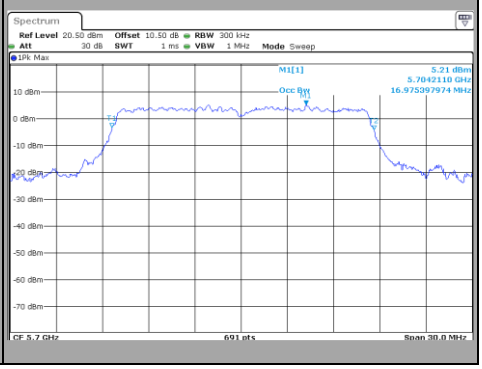
3.1. LIMIT

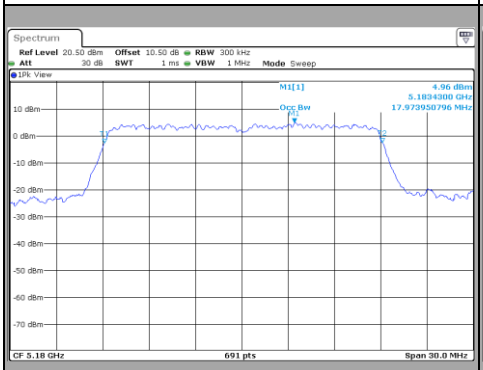
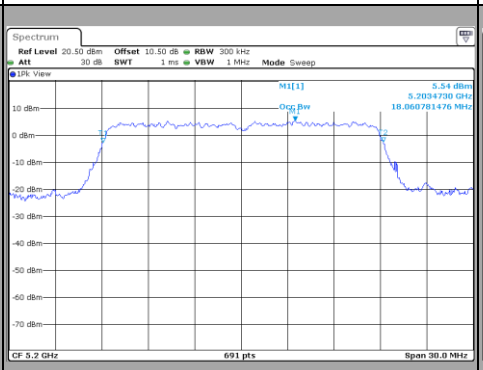
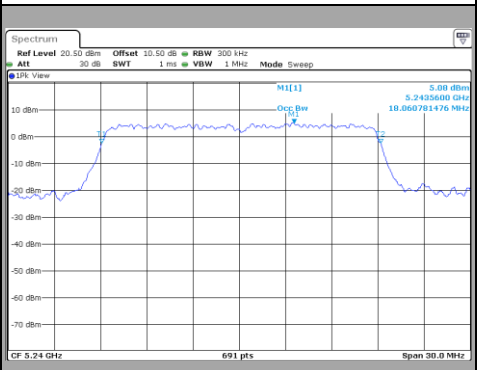
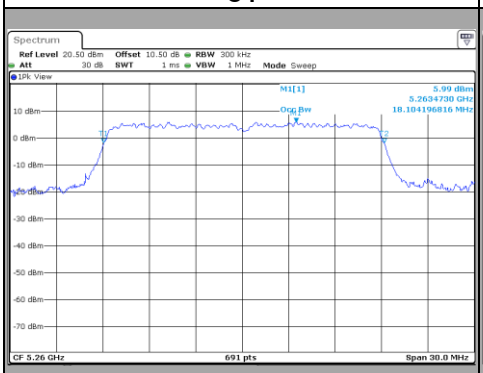
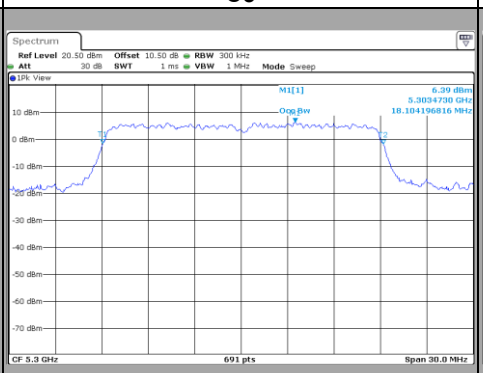
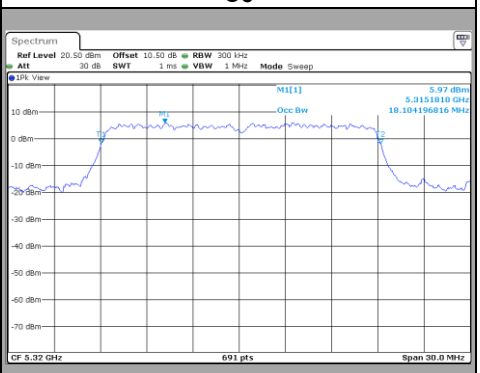
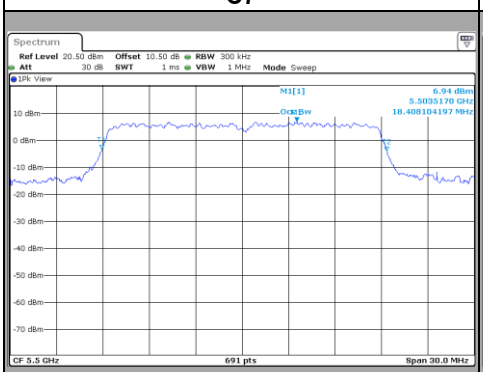
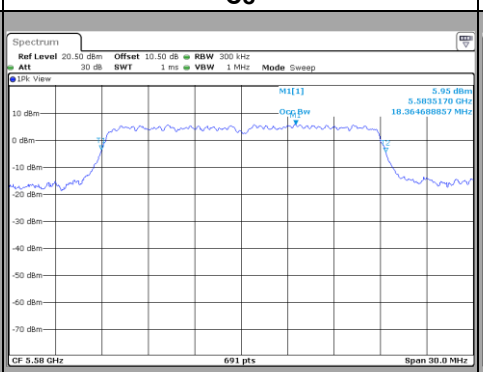
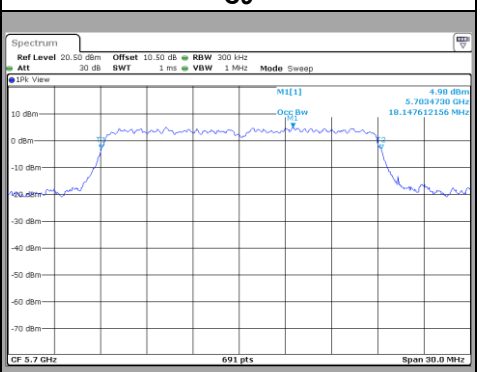
None

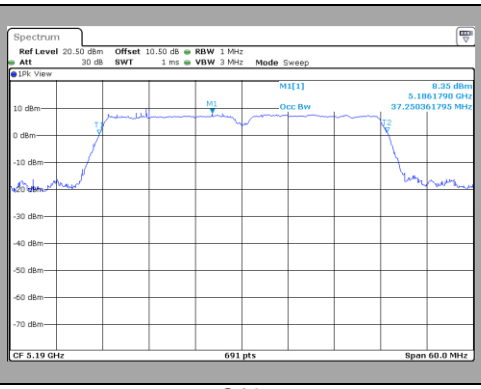
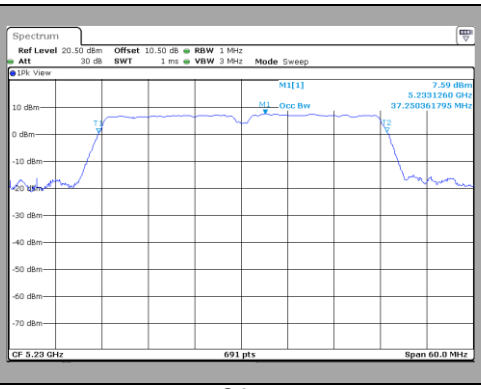
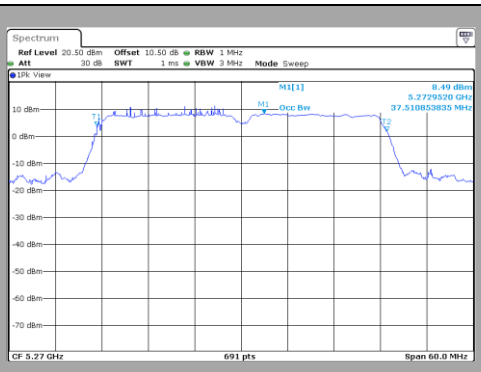
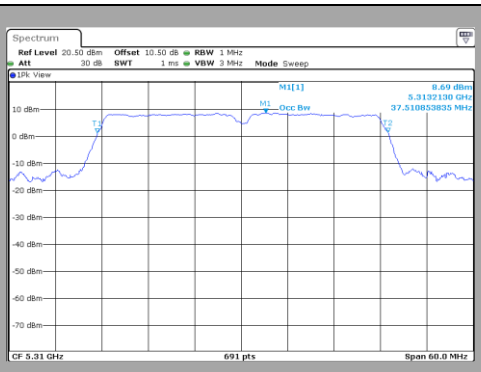
3.2. TEST EQUIPMENT LIST

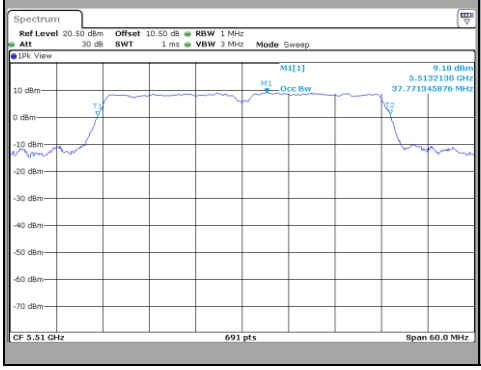
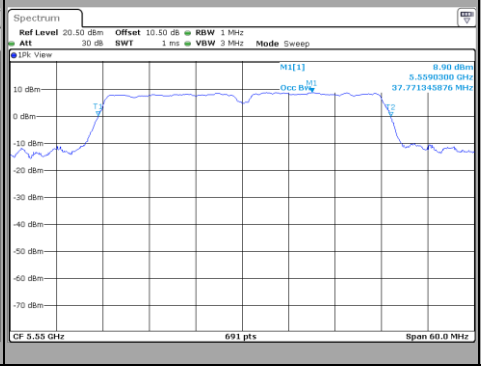
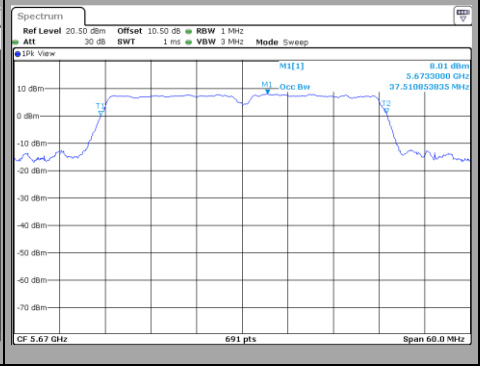
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable Measure Analyzer-Amplifier SMA	STORMFLEX	0	A5329681	05/16	05/17
Attenuator 10dB	AEROFLEX	-	A7122268	06/16	06/17
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

3.3. RESULTS

802.11a		
C1	**C2**	**C3**
		
C4	**C5**	**C6**
		
C7	**C8**	**C9**
		

802.11n HT20		
C1	C2	C3
		
C4	C5	C6
		
C7	C8	C9
		

802.11n HT40	
C14	C15
	
C16	C17
	

C18	C19	C20
		

3.1. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **INGENICO Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160287313331013301014523**, in configuration and description presented in this test report, show levels **Select Result** to the **47 CFR PART 15.407 & RSS-GEN ISSUE 4** limits.

4. 26DB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

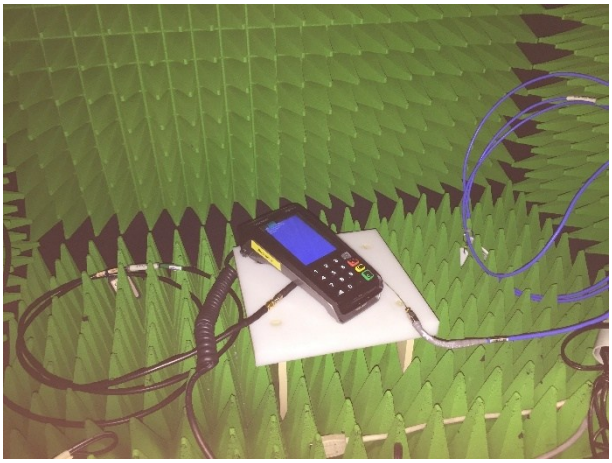
Test performed by : Gaetan DESCHAMPS
Date of test : August 31, 2016
Ambient temperature : 22 °C
Relative humidity : 32 %

4.2. TEST SETUP

-- The Equipment Under Test is installed:
☑ In FAR ☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method ☐ Radiated Method

- Test Procedure:
☑ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § C2



Photograph for 26dB emission bandwidth

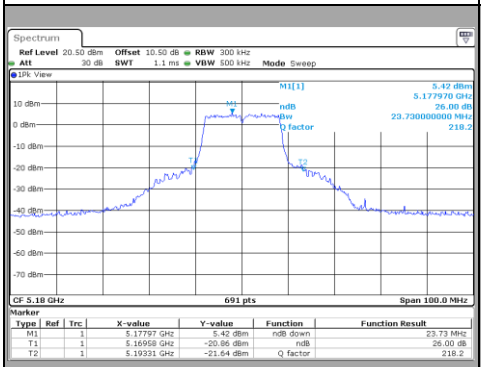
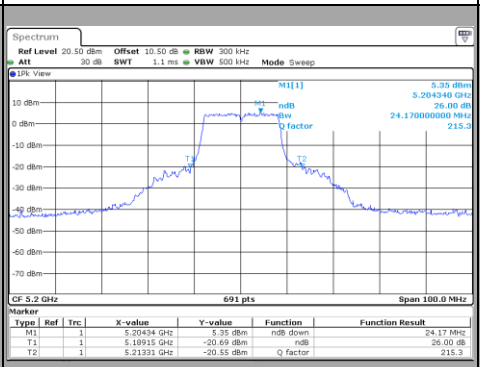
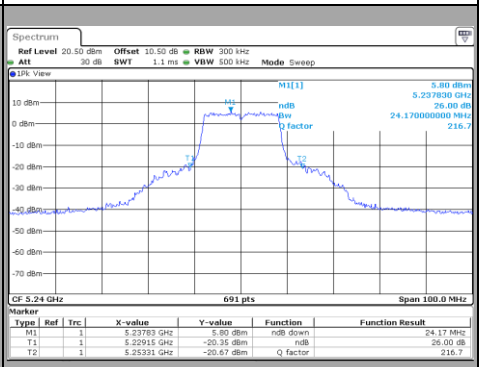
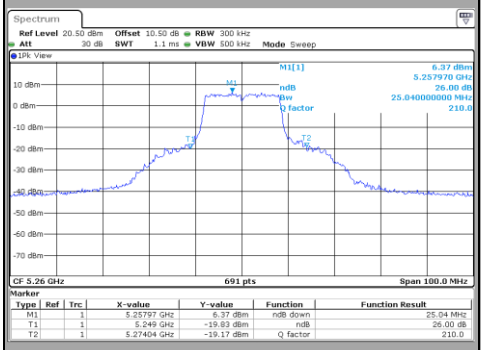
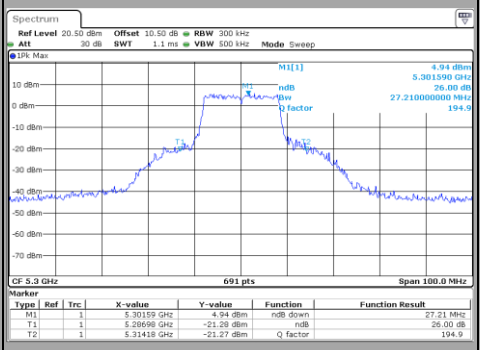
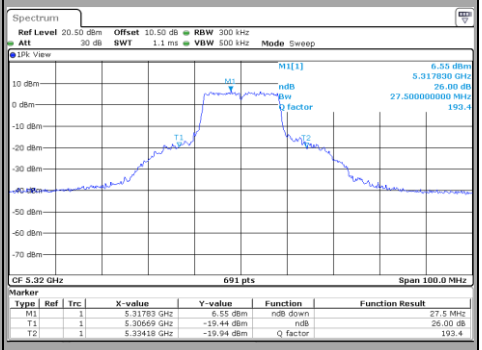
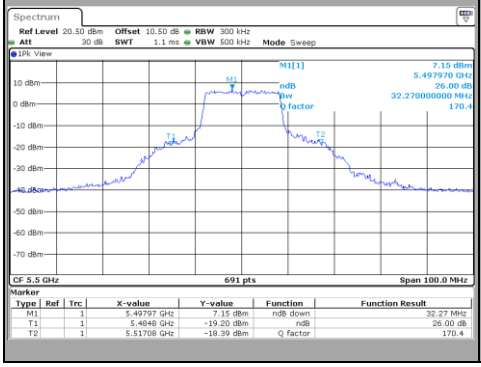
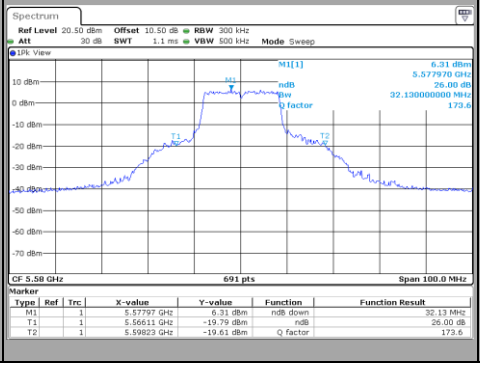
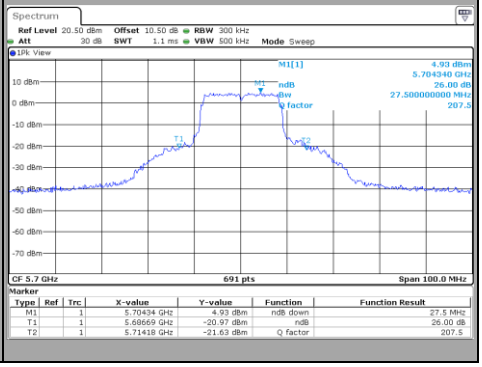
4.3. LIMIT

None

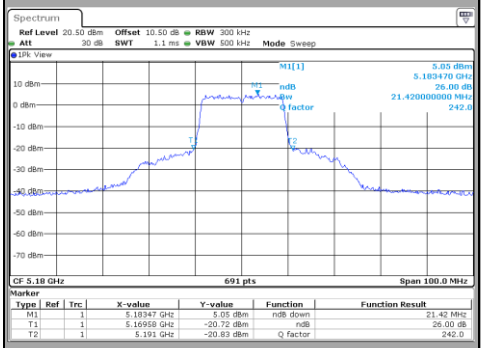
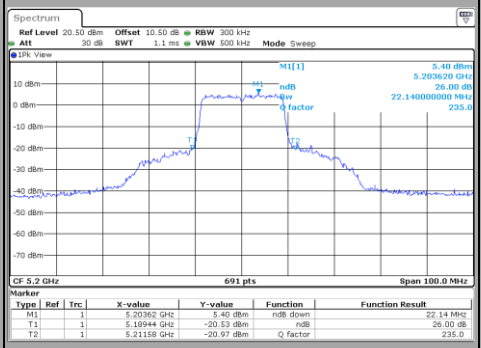
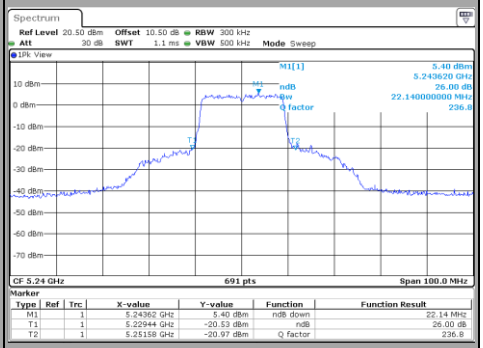
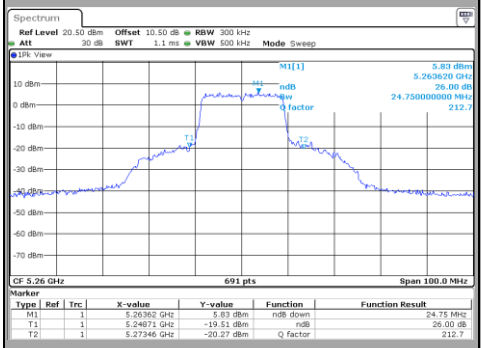
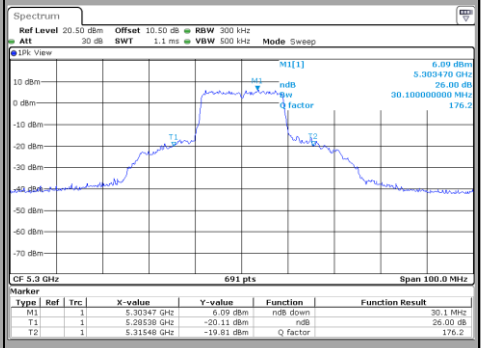
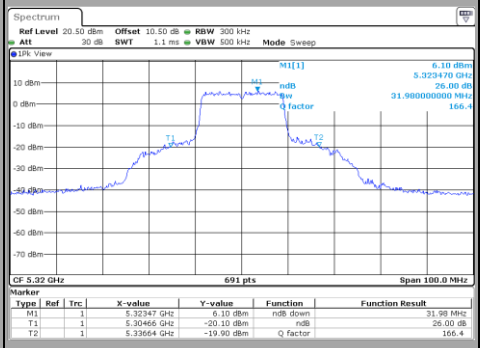
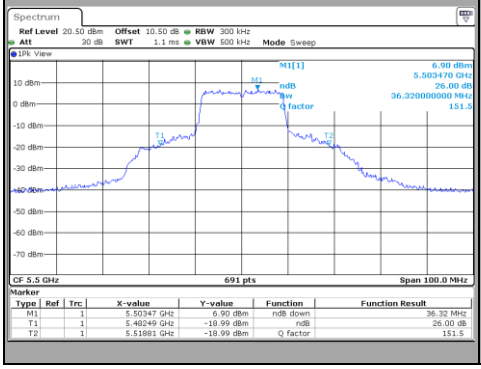
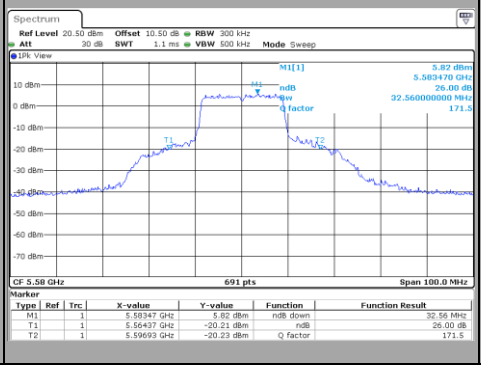
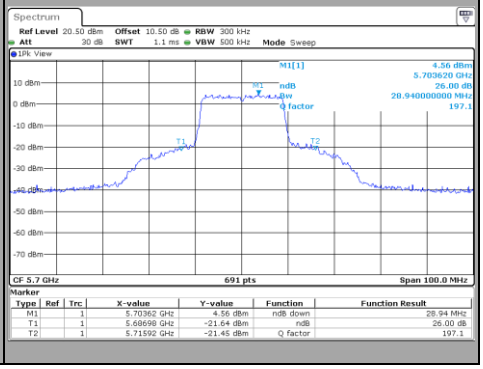
4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable Measure Analyzer-Amplifier SMA	STORMFLEX	0	A5329681	05/16	05/17
Attenuator 10dB	AEROFLEX	-	A7122268	06/16	06/17
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

4.5. RESULTS

802.11a		
C1	**C2**	**C3**
		
C4	**C5**	**C6**
		
C7	**C8**	**C9**
		

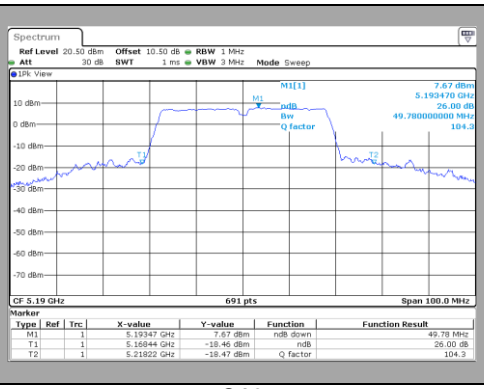
Channel	26dB Emission Bandwidth (MHz)
C1	23.73
C2	24.17
C3	24.17
C4	25.04
C5	27.21
C6	27.50
C7	32.27
C8	32.13
C9	27.50

802.11n HT20		
C1	**C2**	**C3**
		
C4	**C5**	**C6**
		
C7	**C8**	**C9**
		

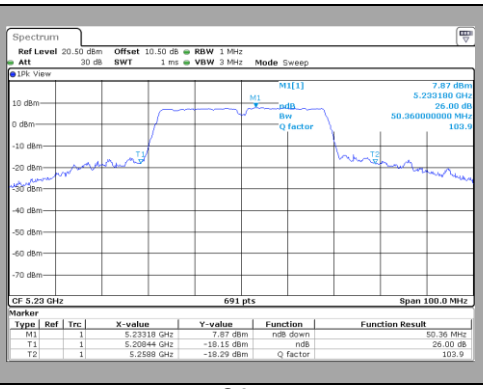
Channel	26dB Emission Bandwidth (MHz)
C1	21.42
C2	22.14
C3	22.14
C4	24.75
C5	30.10
C6	31.98
C7	36.32
C8	32.56
C9	28.94

802.11n HT40

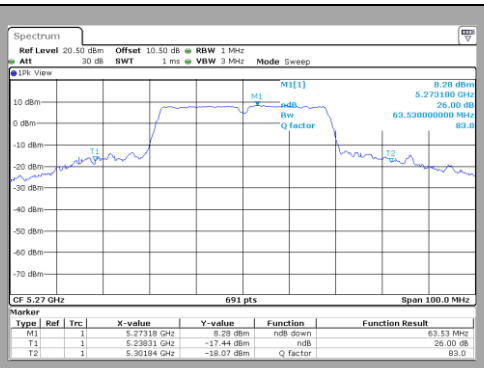
C14



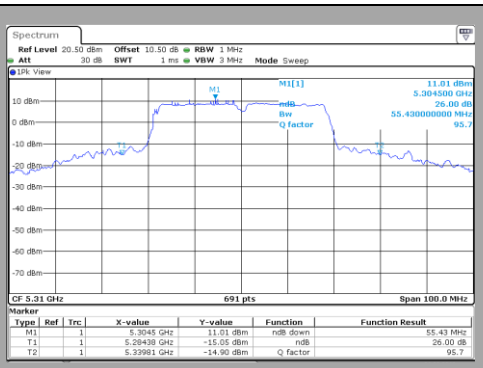
C15



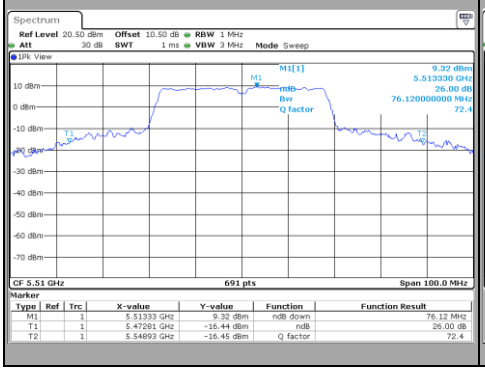
C16



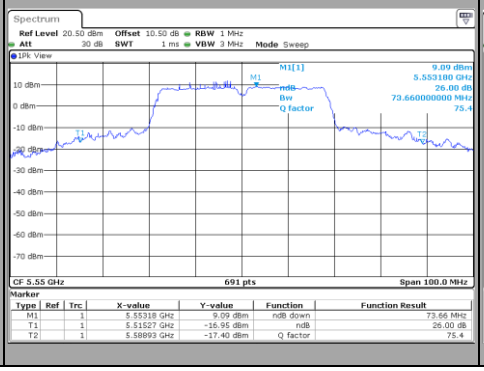
C17



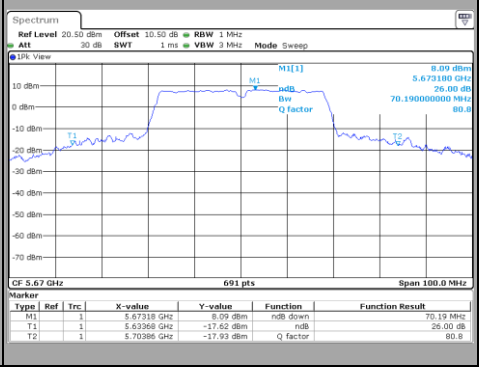
C18



C19



C20



Channel	26dB Emission Bandwidth (MHz)
C14	49.78
C15	50.36
C16	63.53
C17	55.43
C18	76.12
C19	73.66
C20	70.19

4.6. CONCLUSION

26dB Emission Bandwidth measurement performed on the sample of the product **INGENICO Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160287313331013301014523**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.407 & RSS 247 ISSUE 1** limits.

5. MAXIMUM CONDUCTED OUTPUT POWER, MAXIMUM POWER SPECTRAL DENSITY, MAXIMUM EIRP, MAXIMUM EIRP SPECTRAL DENSITY

5.1. TEST CONDITIONS

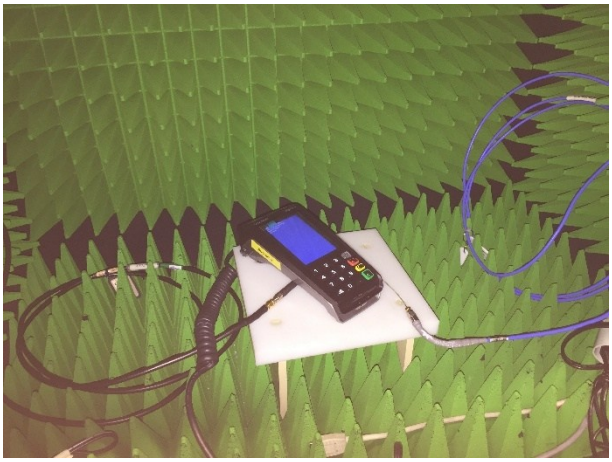
Test performed by : Gaetan DESCHAMPS
Date of test : October 7, 2016
Ambient temperature : 23 °C
Relative humidity : 32 %

5.2. TEST SETUP

- The Equipment Under Test is installed:
☑ In FAR
☐ In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:
☑ Conducted Method
☐ Radiated Method

- Test Procedure:
☑ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § E2 b) (Method SA-1) & F
☐ KDB 789033 D02 General UNII Test Procedures New Rules v01r02 § E2 c) (Method SA-2) & F
☐ KDB 662911 D01 Multiple Transmitter Output v02r01
☐ KDB 644545 D03 Guidance for IEEE 802.11ac v01



Photograph for Maximum Conducted Output Power

5.3. LIMIT

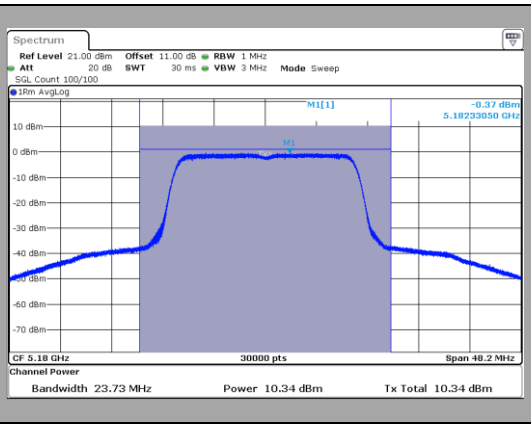
FCC Part 15.407
Maximum Conducted Output power:
5150MHz-5250MHz: Shall not exceed 30dBm for Indoor Access Point devices & 24dBm for Client devices
5250MHz-5350MHz: Shall not exceed 24dBm or 11dBm +10*log (-26dB Bandwidth (MHz))
5470MHz-5725MHz: Shall not exceed 24dBm or 11dBm +10*log (-26dB Bandwidth (MHz))
5725MHz-5850MHz: Shall not exceed 30dBm
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

5.4. TEST EQUIPMENT LIST

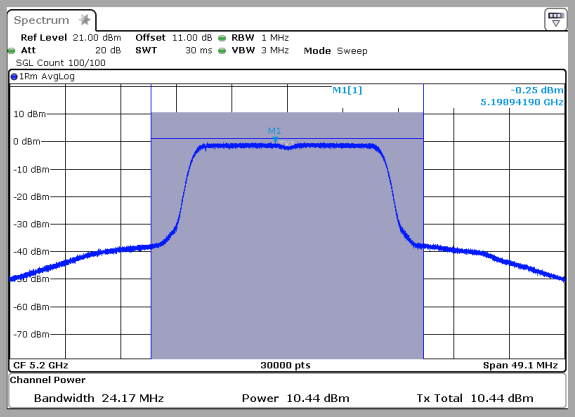
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Cable Measure Analyzer-Amplifier SMA	STORMFLEX	0	A5329681	05/16	05/17
Attenuator 10dB	AEROFLEX	-	A7122268	06/16	06/17
Spectrum analyzer	ROHDE & SCHWARZ	FSV 30	A4060051	11/15	11/16
Thermo-hygrometer (PM2)	OREGON	BAR916HG-G	B4206011	09/15	09/16

5.5. RESULTS

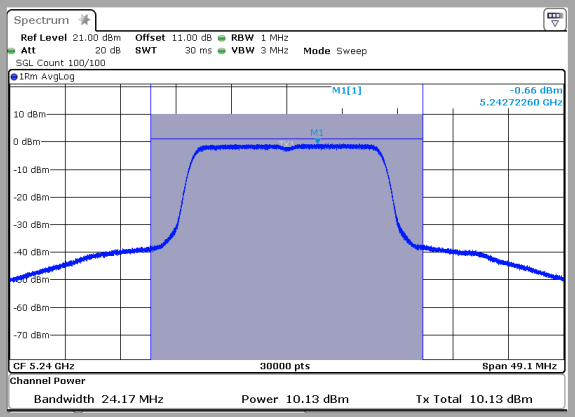
802.11a
Tx1
C1



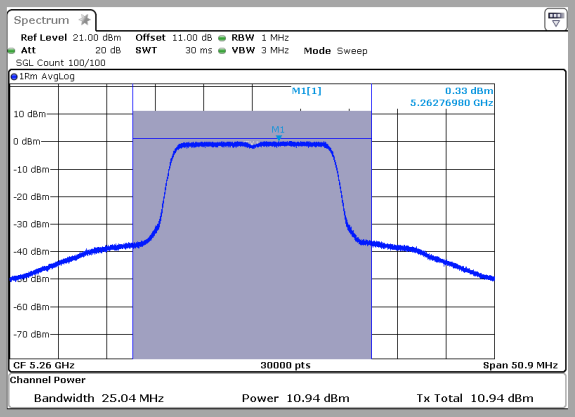
C2


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] -0.25 dBm
5.19894190 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.2 GHz 30000 pts Span 49.1 MHz
Channel Power
Bandwidth 24.17 MHz Power 10.44 dBm Tx Total 10.44 dBm

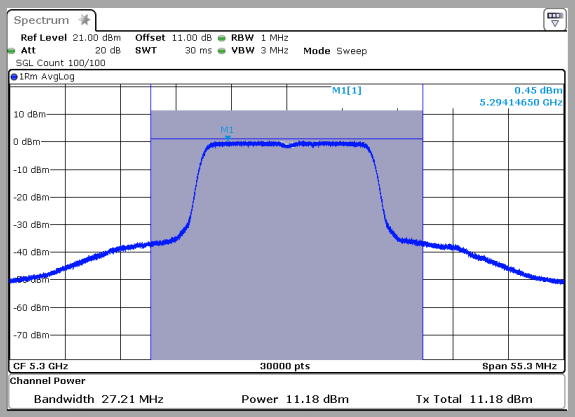
C3


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] -0.66 dBm
5.24272260 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.24 GHz 30000 pts Span 49.1 MHz
Channel Power
Bandwidth 24.17 MHz Power 10.13 dBm Tx Total 10.13 dBm

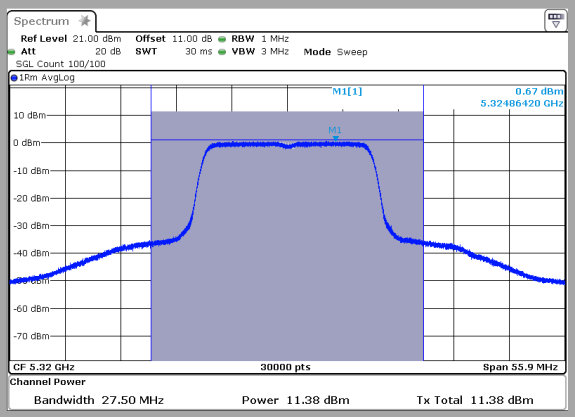
C4


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 0.33 dBm
5.26276980 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-60 dBm
-70 dBm
CF 5.26 GHz 30000 pts Span 50.9 MHz
Channel Power
Bandwidth 25.04 MHz Power 10.94 dBm Tx Total 10.94 dBm

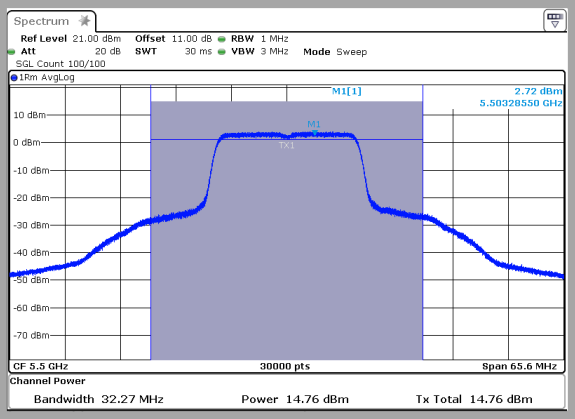
C5


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 0.45 dBm
5.29414650 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-60 dBm
-70 dBm
CF 5.3 GHz 30000 pts Span 55.3 MHz
Channel Power
Bandwidth 27.21 MHz Power 11.18 dBm Tx Total 11.18 dBm

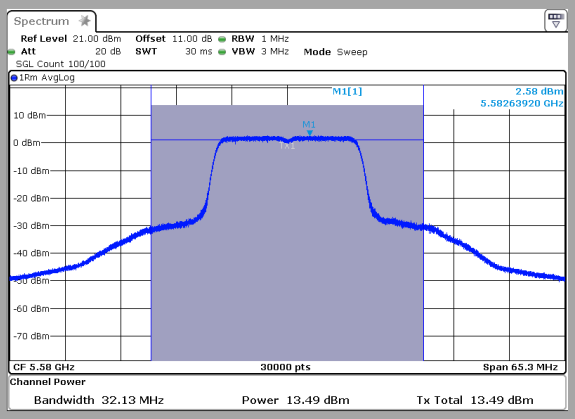
C6


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 0.67 dBm
5.32486420 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-60 dBm
-70 dBm
CF 5.32 GHz 30000 pts Span 55.9 MHz
Channel Power
Bandwidth 27.50 MHz Power 11.38 dBm Tx Total 11.38 dBm

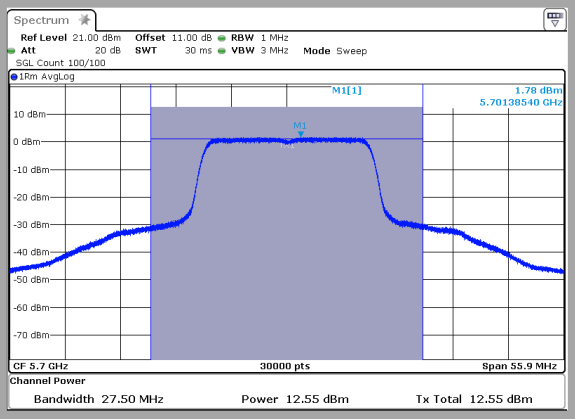
C7


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 2.72 dBm
5.50328550 GHz
CF 5.5 GHz 30000 pts Span 65.6 MHz
Channel Power
Bandwidth 32.27 MHz Power 14.76 dBm Tx Total 14.76 dBm

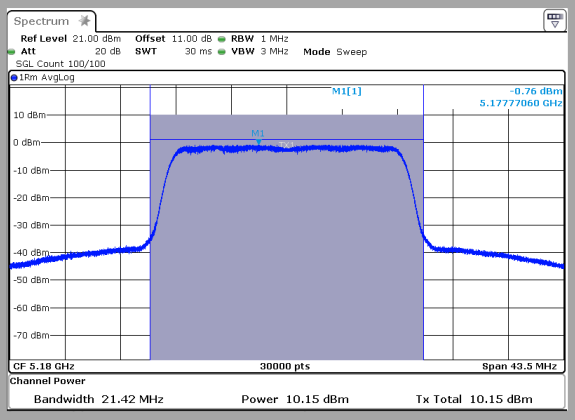
C8


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 2.58 dBm
5.58263920 GHz
CF 5.58 GHz 30000 pts Span 65.3 MHz
Channel Power
Bandwidth 32.13 MHz Power 13.49 dBm Tx Total 13.49 dBm

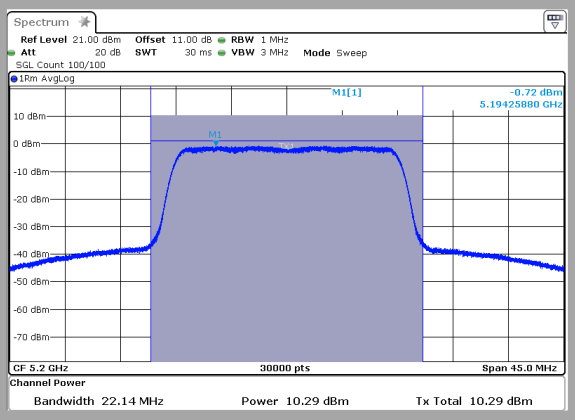
C9


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 1.78 dBm
5.70138540 GHz
CF 5.7 GHz 30000 pts Span 55.9 MHz
Channel Power
Bandwidth 27.50 MHz Power 12.55 dBm Tx Total 12.55 dBm

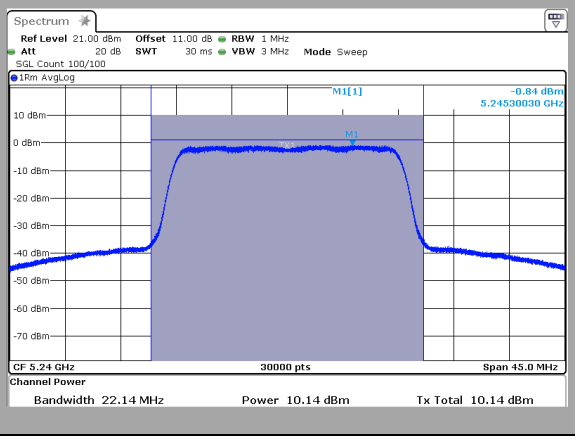
802.11n HT20
Tx1
C1



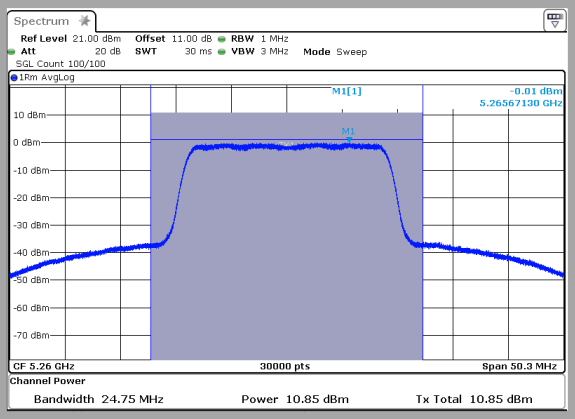
C2



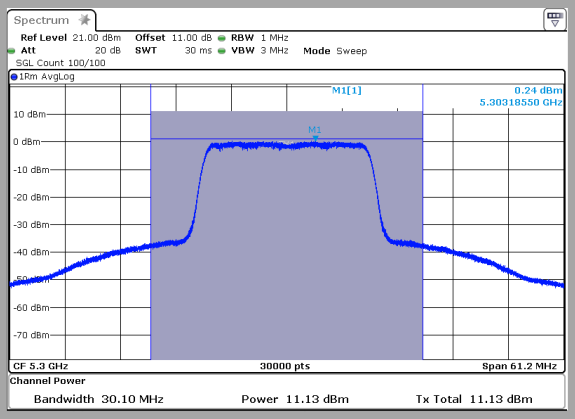
C3



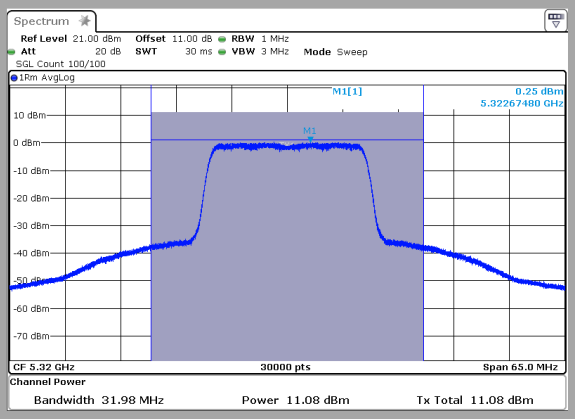
C4


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] -0.01 dBm
5.26567130 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.26 GHz 30000 pts Span 50.3 MHz
Channel Power
Bandwidth 24.75 MHz Power 10.85 dBm Tx Total 10.85 dBm

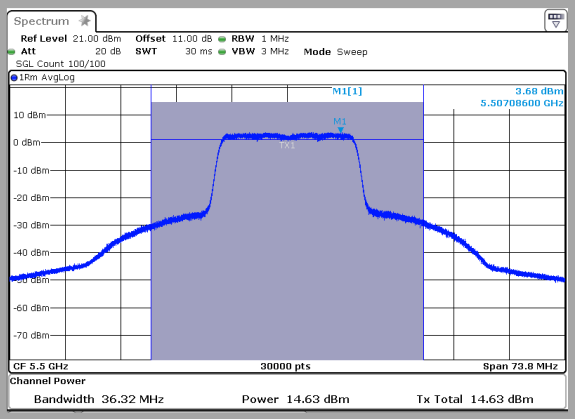
C5


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 0.24 dBm
5.30318550 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.3 GHz 30000 pts Span 61.2 MHz
Channel Power
Bandwidth 30.10 MHz Power 11.13 dBm Tx Total 11.13 dBm

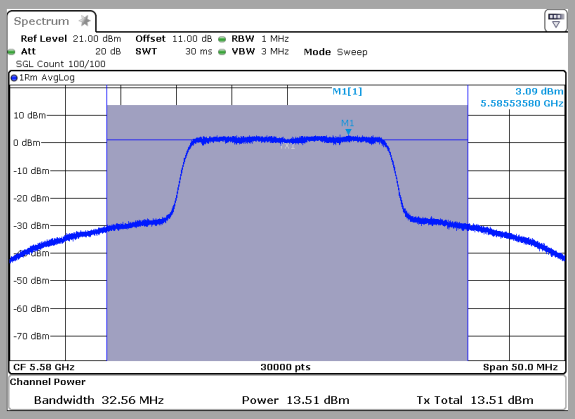
C6


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 0.25 dBm
5.32267480 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.32 GHz 30000 pts Span 65.0 MHz
Channel Power
Bandwidth 31.98 MHz Power 11.08 dBm Tx Total 11.08 dBm

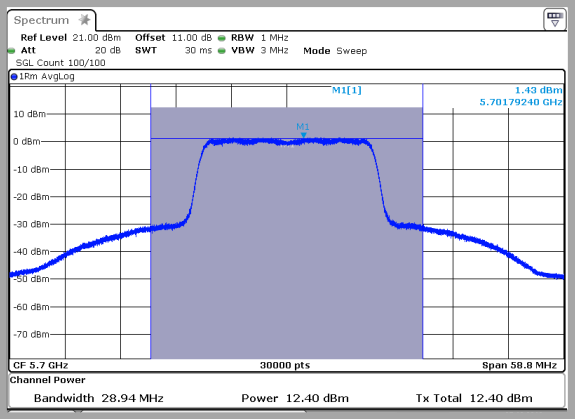
C7

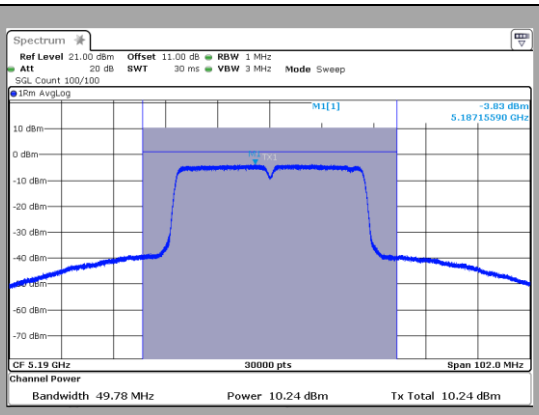
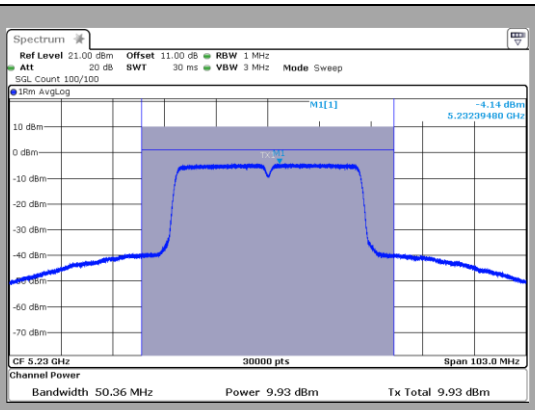
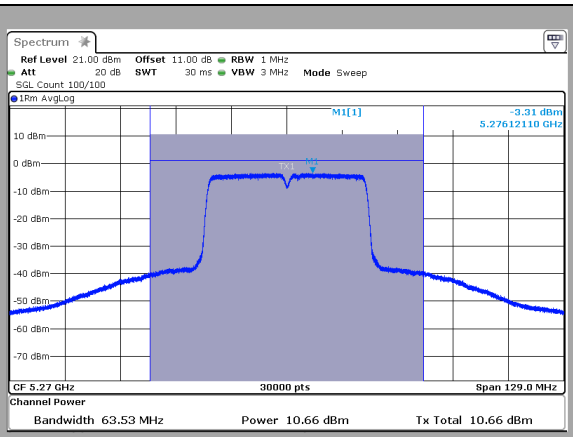

Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 3.68 dBm
5.50708600 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.5 GHz 30000 pts Span 73.8 MHz
Channel Power
Bandwidth 36.32 MHz Power 14.63 dBm Tx Total 14.63 dBm

C8

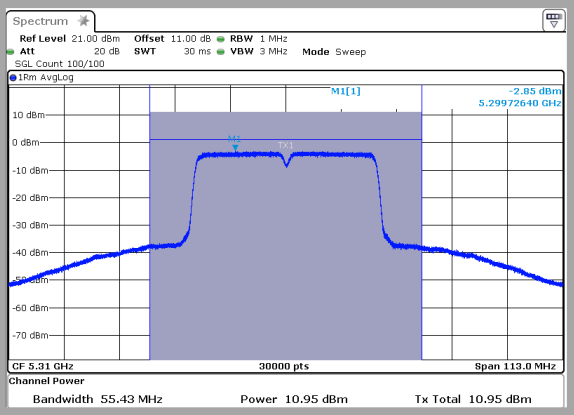

Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 3.09 dBm
5.58553580 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.58 GHz 30000 pts Span 50.0 MHz
Channel Power
Bandwidth 32.56 MHz Power 13.51 dBm Tx Total 13.51 dBm

C9

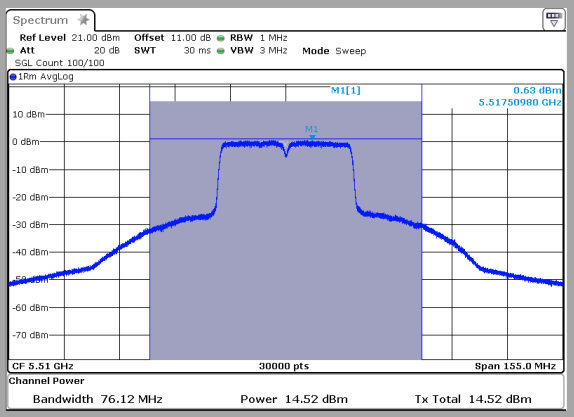

Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 1.43 dBm
5.70179240 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.7 GHz 30000 pts Span 58.8 MHz
Channel Power
Bandwidth 28.94 MHz Power 12.40 dBm Tx Total 12.40 dBm

802.11n HT40
Tx1
C14

C15

C16


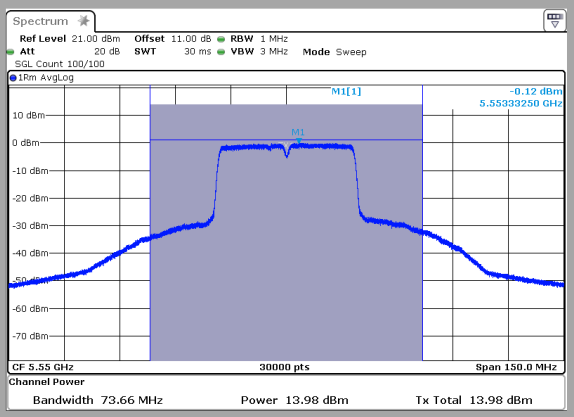
C17

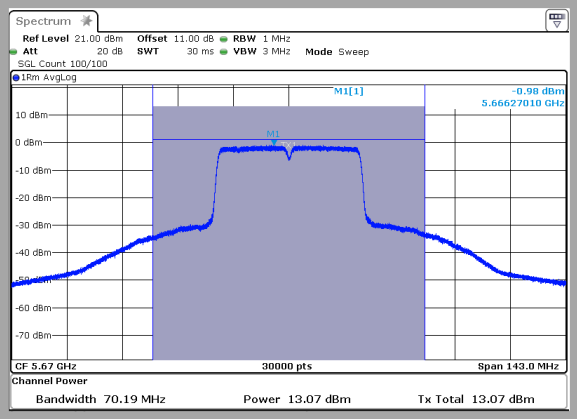

Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] -2.85 dBm
5.29972640 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.31 GHz 30000 pts Span 113.0 MHz
Channel Power
Bandwidth 55.43 MHz Power 10.95 dBm Tx Total 10.95 dBm

C18


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] 0.63 dBm
5.51750980 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.51 GHz 30000 pts Span 155.0 MHz
Channel Power
Bandwidth 76.12 MHz Power 14.52 dBm Tx Total 14.52 dBm

C19


Spectrum
Ref Level 21.00 dBm Offset 11.00 dB RBW 1 MHz
Att 20 dB SWT 30 ms VBW 3 MHz Mode Sweep
SGL Count 100/100
1Rm AvgLog
M1[1] -0.12 dBm
5.55333250 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.55 GHz 30000 pts Span 150.0 MHz
Channel Power
Bandwidth 73.66 MHz Power 13.98 dBm Tx Total 13.98 dBm

C20


Results:

802.11a

Channel	Tx1 (dBm)	AG (dBi)	Tx Limit FCC (dBm)	Tx EIRP (dBm)	EIRP Limit RSS (dBm)
C1	10.34	1.5	24	11.8	23
C2	10.44	1.5	24	11.9	23
C3	10.13	1.5	24	11.6	23
C4	10.94	1.5	24	12.4	30
C5	11.18	1.5	24	12.7	30
C6	11.38	1.5	24	12.9	30
C7	14.76	1.5	24	16.3	30
C8	13.49	1.5	24	15.0	30
C9	12.55	1.5	24	14.1	30

802.11n HT20

Channel	Tx1 (dBm)	AG (dBi)	Tx Limit FCC (dBm)	Tx EIRP (dBm)	EIRP Limit RSS (dBm)
C1	10.15	1.5	24	11.7	23
C2	10.29	1.5	24	11.8	23
C3	10.14	1.5	24	11.6	23
C4	10.85	1.5	24	12.4	30
C5	11.13	1.5	24	12.6	30
C6	11.08	1.5	24	12.6	30
C7	14.63	1.5	24	16.1	30
C8	13.51	1.5	24	15.0	30
C9	12.40	1.5	24	13.9	30

802.11n HT40

Channel	Tx1 (dBm)	AG (dBi)	Tx Limit FCC (dBm)	Tx EIRP (dBm)	EIRP Limit RSS (dBm)
C14	10.24	1.5	24	11.7	23
C15	9.93	1.5	24	11.4	23
C16	10.66	1.5	24	12.2	23
C17	10.95	1.5	24	12.5	30
C18	14.52	1.5	24	16.0	30
C19	13.98	1.5	24	15.5	30
C20	13.07	1.5	24	14.6	30

802.11a

Channel	Tx1 (dBm/MHz)	AG (dBi)	Tx Limit FCC (dBm/MHz)	Tx Limit RSS (dBm/MHz)	Tx EIRP (dBm/MHz)	EIRP Limit RSS (dBm/MHz)
C1	-0.37	1.5	11		-0.4	10
C2	-0.25	1.5	11		-0.3	10
C3	-0.66	1.5	11		-0.7	10
C4	0.33	1.5	11	11	0.3	
C5	0.45	1.5	11	11	0.5	
C6	0.67	1.5	11	11	0.7	
C7	2.72	1.5	11	11	2.7	
C8	2.58	1.5	11	11	2.6	
C9	1.78	1.5	11	11	1.8	

802.11n HT20

Channel	Tx1 (dBm/MHz)	AG (dBi)	Tx Limit FCC (dBm/MHz)	Tx Limit RSS (dBm/MHz)	Tx EIRP (dBm/MHz)	EIRP Limit RSS (dBm/MHz)
C1	-0.76	1.5	11.0		-0.8	10
C2	-0.72	1.5	11.0		-0.7	10
C3	-0.84	1.5	11.0		-0.8	10
C4	-0.01	1.5	11	11	-0.0	
C5	0.24	1.5	11	11	0.2	
C6	0.25	1.5	11	11	0.3	
C7	3.68	1.5	11	11	3.7	
C8	3.09	1.5	11	11	3.1	
C9	1.43	1.5	11	11	1.4	

802.11n HT40

Channel	Tx1 (dBm/MHz)	AG (dBi)	Tx Limit FCC (dBm/MHz)	Tx Limit RSS (dBm/MHz)	Tx EIRP (dBm/MHz)	EIRP Limit RSS (dBm/MHz)
C14	-3.83	1.5	11		-3.8	10
C15	-4.14	1.5	11		-4.1	10
C16	-3.31	1.5	11	24	-3.3	
C17	-2.87	1.5	11	24	-2.9	
C18	0.63	1.5	11	24	0.6	
C19	0.12	1.5	11	24	0.1	
C20	-0.98	1.5	11	24	-1.0	

5.6. CONCLUSION

Maximum Conducted Output Power, Maximum Power Spectral Density, Maximum EIRP, Maximum EIRP Power Spectral Density measurement performed on the sample of the product **INGENICO Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: **160287313331013301014523**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.407 & RSS 247 ISSUE 1** limits.

6. CONDUCTED EMISSION DATA

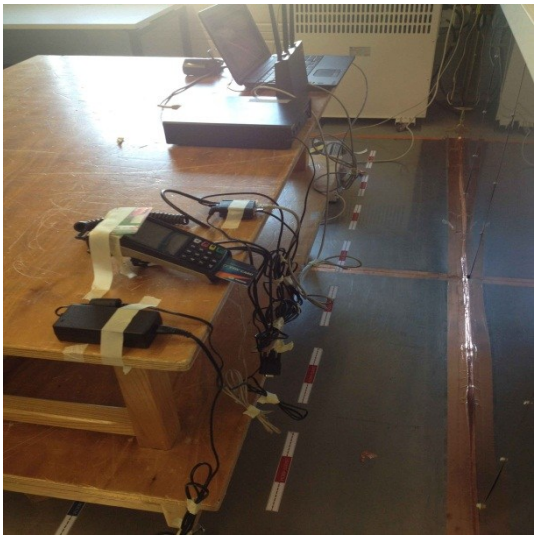
6.1. *ENVIRONMENTAL CONDITIONS*

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

6.2. *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

6.3. *TEST METHOD*

The product has been tested according to ANSI C63.10 and FCC Part 15 subpart C. The product has been tested with 120V/60Hz power line voltage and compared to the FCC Part 15 limits. Measurement bandwidth was 9kHz from 150kHz to 30MHz. This was followed by a Quasi-Peak, i.e. CISPR measurement for any strong signal. If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary. The LISN (measure) is 50Ω / 50µH. The Peak data are shown on plots in annex 1. Quasi-Peak and Average measurements are detailed in a table with frequencies and levels measured. Interconnecting cables and equipment's were moved to position that maximized emission. A summary of the worst case emissions found in all test configurations and modes is shown on the following page.

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

6.4. *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

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

☑ None ☐ Divergence:

6.6. *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)

6.7. *CONCLUSION*

Conducted emission data measurement performed on the sample of the product **INGENICO Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: 160287313331013301014523, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

7. RADIATED EMISSION DATA

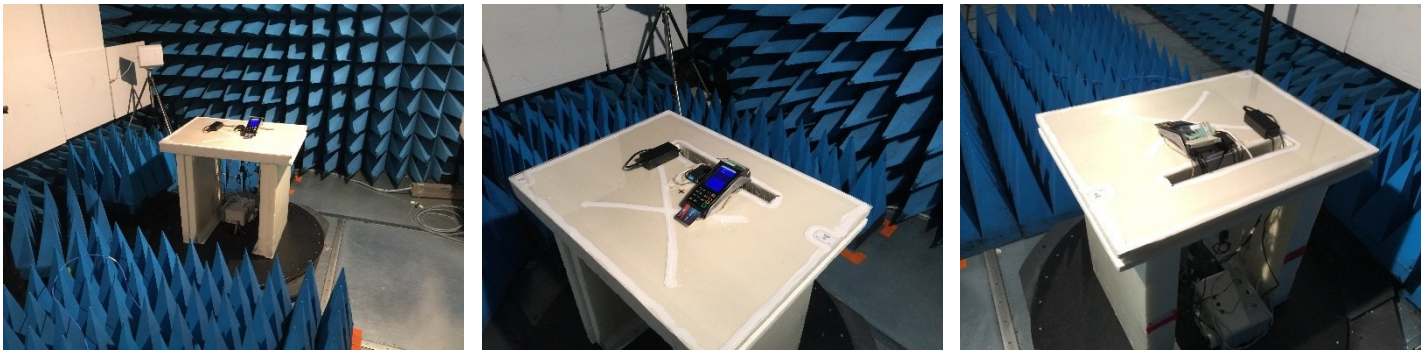
7.1. *ENVIRONMENTAL CONDITIONS*

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

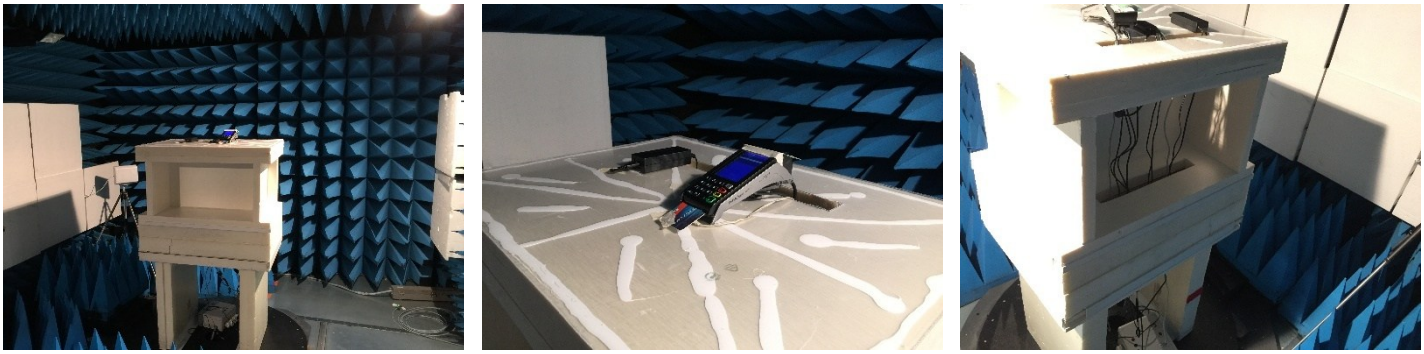
7.1. *TEST SETUP*

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)

7.2. *TEST METHOD*

The product has been tested according to ANSI C63.10, FCC part 15 subpart C and E.
The product has been tested according to the FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r02.
The following factor is applied to convert E[dBµV/m] to EIRP[dBm]. EIRP[dBm]= E[dBµV/m] + 20 log (d[meters]) -104.77

Pre-characterisation measurement: (9kHz – 13GHz)
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 13GHz.

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 40GHz:
The product has been tested at a distance of **3 meters** from the antenna and compared to the FCC part 15 subpart C and E limits. Measurement bandwidth was 1MHz from 1GHz to 40GHz.
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.

7.3. *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	-	-

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

☑ None ☐ Divergence:

7.5. *TEST RESULTS*

7.5.1. Pre-characterization at 3 meters [1GHz-40GHz]

Configuration digital device:
See graphs for 1GHz-5GHz:

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

Configuration radio device:
See graphs for 1GHz-13GHz, worst cases presented:
For channel C14-C20, radiated emissions data are below following channels:

Graph identifier	Polarization	Mode	EUT position	Channel	Comments
Emr# 2	H/V	TX	Axis XY	C1	See annex 1
Emr# 3	H/V	TX	Axis XY	C2	See annex 1
Emr# 4	H/V	TX	Axis XY	C3	See annex 1
Emr# 5	H/V	TX	Axis XY	C4	See annex 1
Emr# 6	H/V	TX	Axis XY	C5	See annex 1
Emr# 7	H/V	TX	Axis XY	C6	See annex 1
Emr# 8	H/V	TX	Axis XY	C7	See annex 1
Emr# 9	H/V	TX	Axis XY	C8	See annex 1
Emr# 10	H/V	TX	Axis XY	C9	See annex 1

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

Worst case final data result (Configuration digital device):

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)	Polarity (V/H)	Azimuth (Degrees)	Antenna Height (cm)	Gain/Loss Factor (dB)	Transducer Factor (dB)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Remark
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)

7.5.3. Characterization on 3meters anechoic chamber from 1GHz to 40GHz

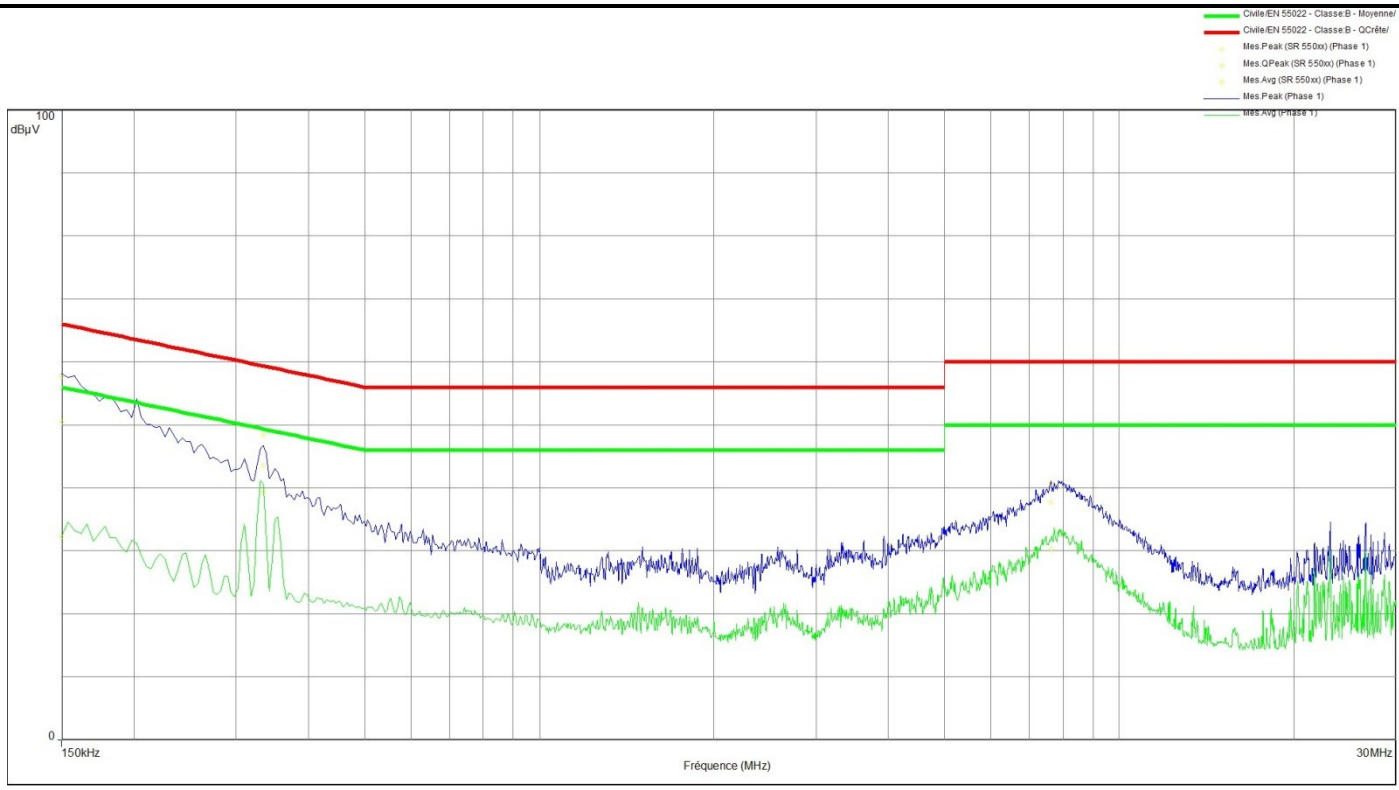
Worst case final data result (Configuration radio device)::
The frequency list is created from the results obtained during the pre-characterization in anechoic chamber.
Measurements are performed using a PEAK and AVERAGE detection.
No significant frequency observed (see results for each Channel in Annex 1)
Note: Measures have been done at 3m distance.

7.6. *CONCLUSION*

Radiated emission data measurement performed on the sample of the product **INGENICO Desk/5000 CL/Eth/Mod/WiFi/BT**, SN: 160287313331013301014523, in configuration and description presented in this test report, show levels below the FCC CFR 47 Part 15 and RSS-247 limits.

8. ANNEX 1 (GRAPHS)

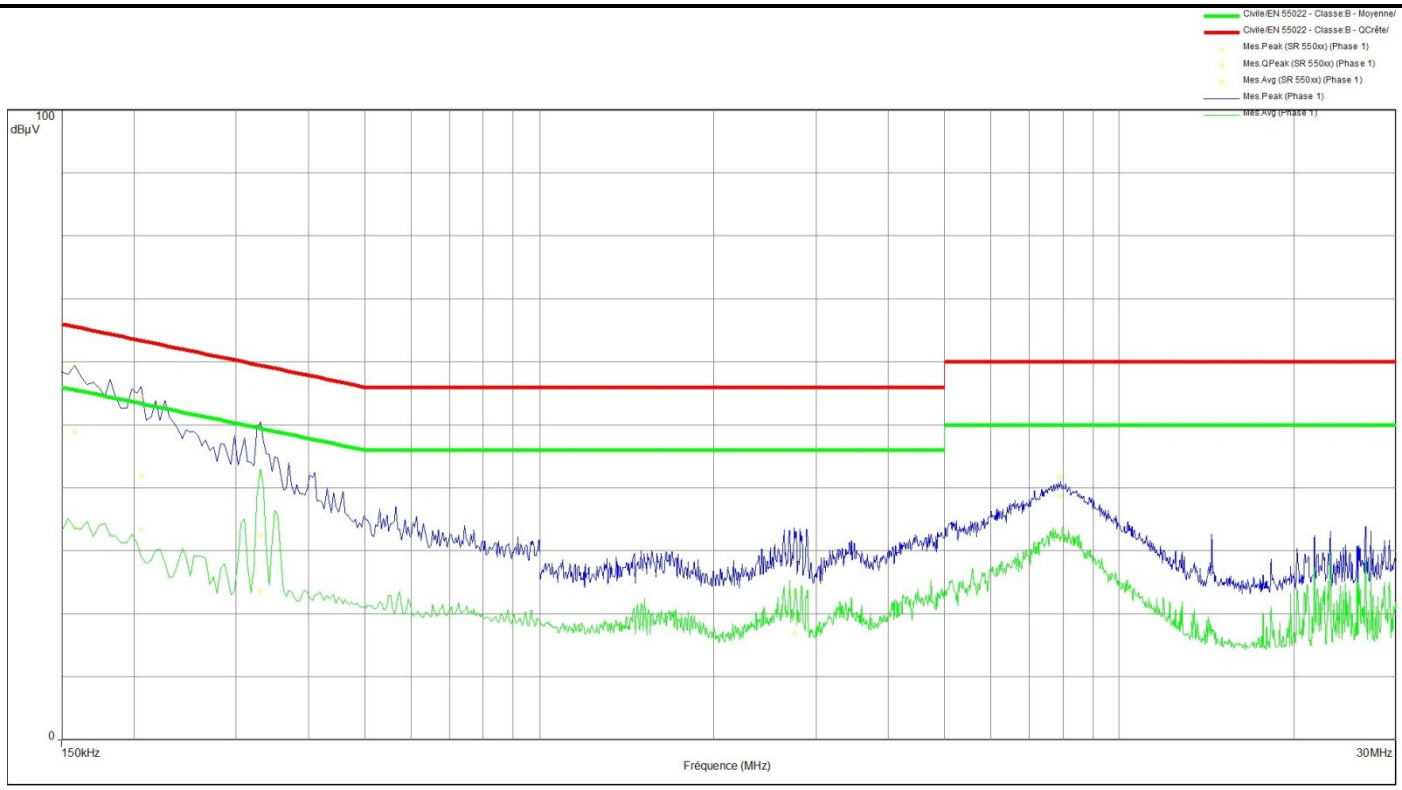
CONDUCTED EMISSIONS			
Graph name:	Emc#1	**Test configuration:**	
Limit:	EN 55022	Phase FCC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	110VAC / 60Hz	**RBW :**	10kHz
Line:	Phase	**VBW :**	30kHz



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

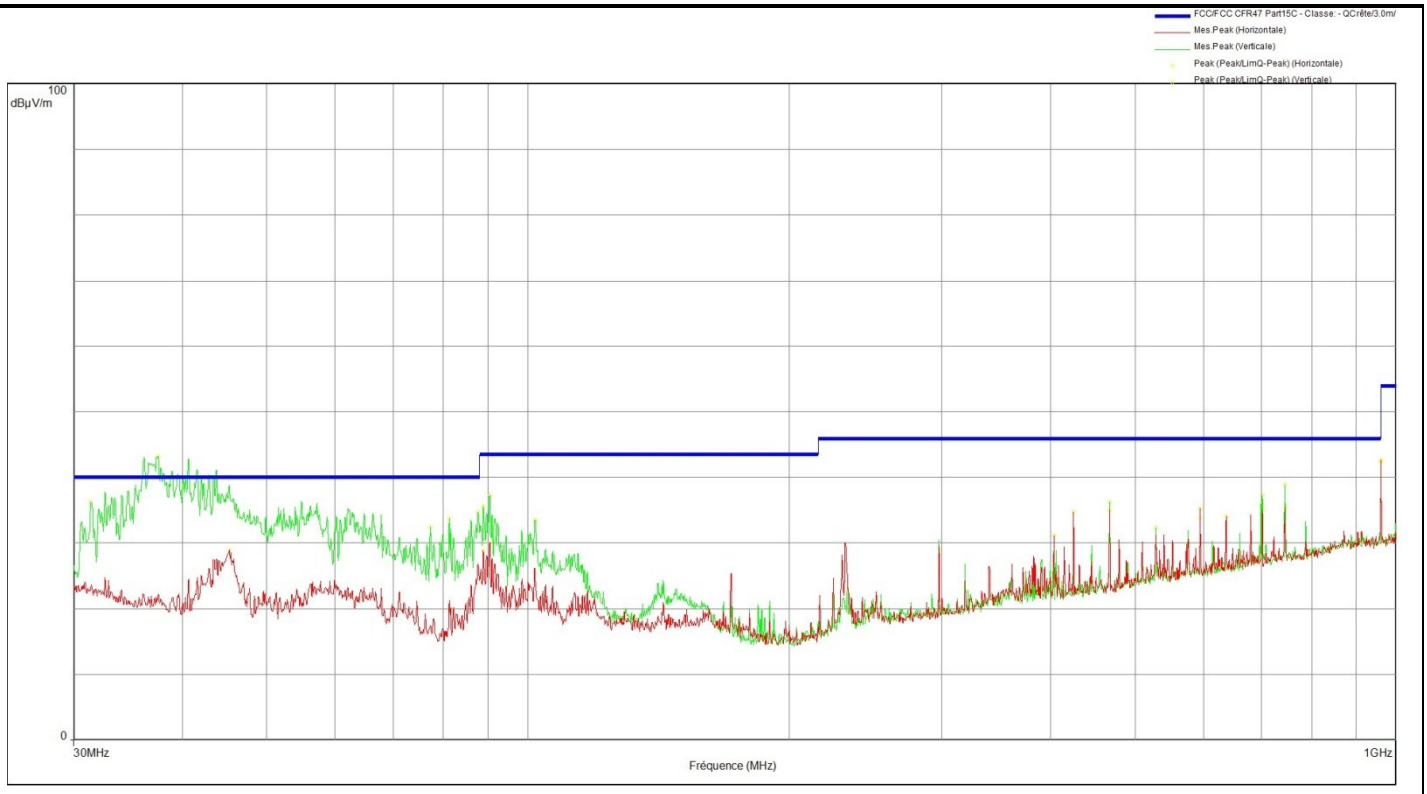
CONDUCTED EMISSIONS			
Graph name:	Emc#2	**Test configuration:**	
Limit:	EN 55022	Neutral FCC	
Class:	B		
Frequency range: [150kHz - 30MHz]			
Voltage / Frequency:	110VAC / 60Hz	**RBW :**	10kHz
Line:	Neutral	**VBW :**	30kHz



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
0.158	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

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

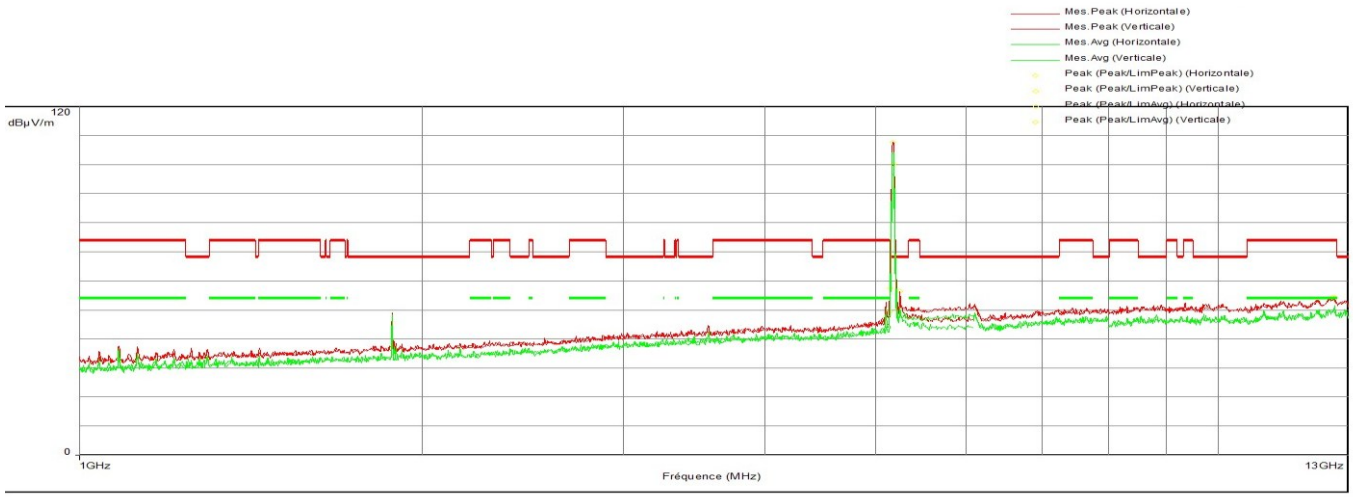


Spurious emissions

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

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/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

RADIATED EMISSIONS			
Graph name:	Emr#2	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C1 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

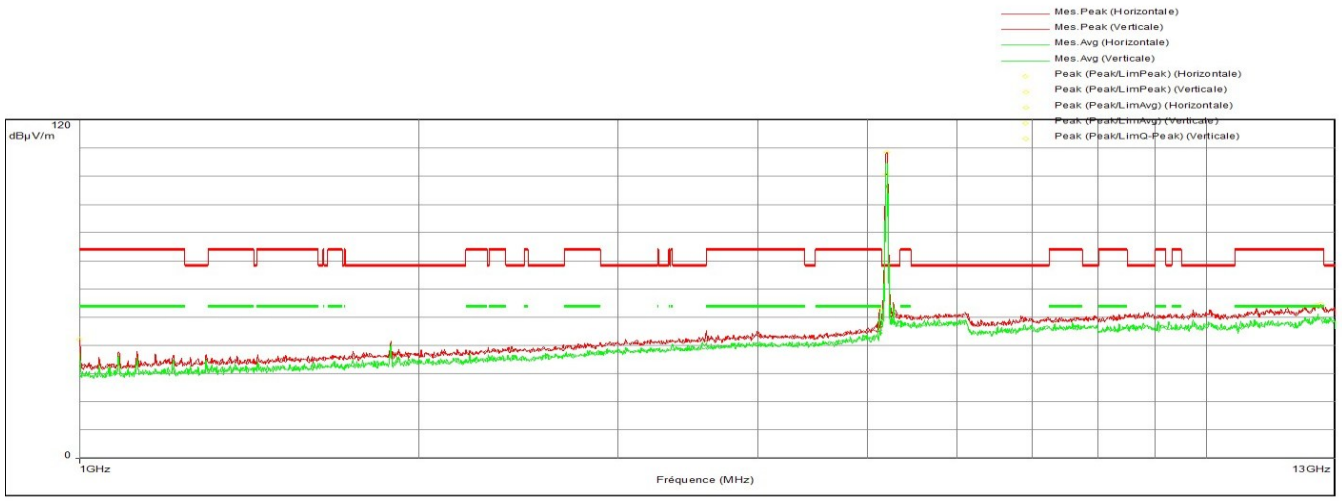
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
5150.000	49.5	54.0	-4.5	Horizontal

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5185.815*	100.3	68.2	32.1	Horizontal
5173.085*	107.7	68.2	39.5	Vertical
5252.600	56.4	68.2	-11.8	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#3	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C2 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	LimQP (dBµV/m)	Peak-LimQP (dB)	Polarization
1000.000	42.2	54.0	-11.8	Vertical

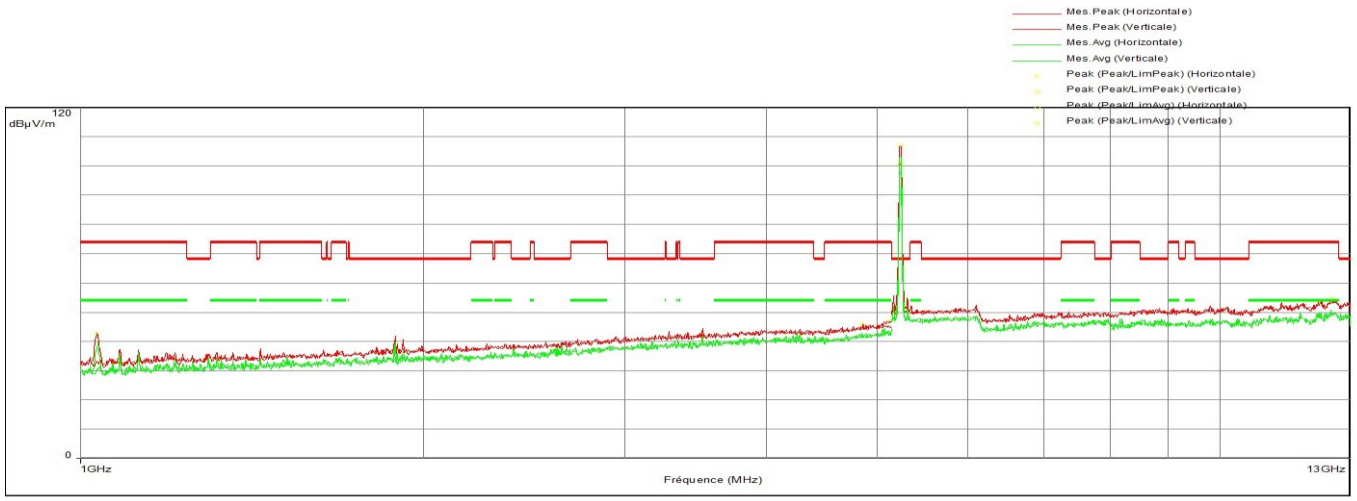
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
5128.420	47.6	54.0	-6.4	Horizontal
5128.005	52.8	54.0	-1.2	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5194.175	100.9*	68.2	32.6	Horizontal
5194.270	108.4*	68.2	40.2	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#4	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C3 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

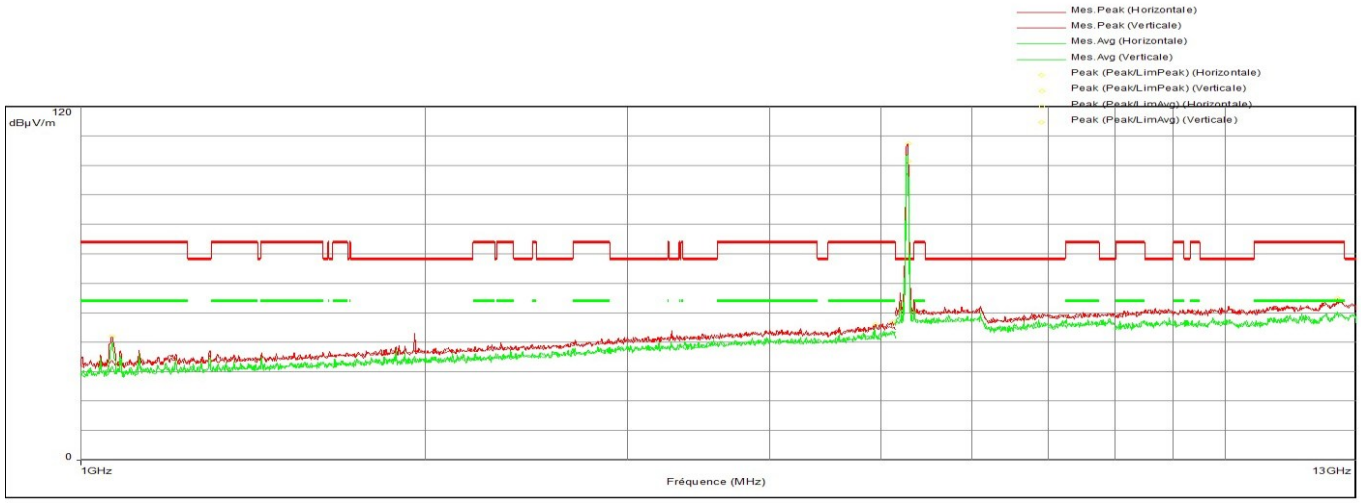
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
4855.350	45.9	54.0	-8.1	Horizontal
1034.445	42.6	54.0	-11.4	Vertical
5128.835	47.0	54.0	-7.0	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5241.960*	100.8	68.2	32.6	Horizontal
5238.350*	107.0	68.2	38.8	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#5	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C4 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

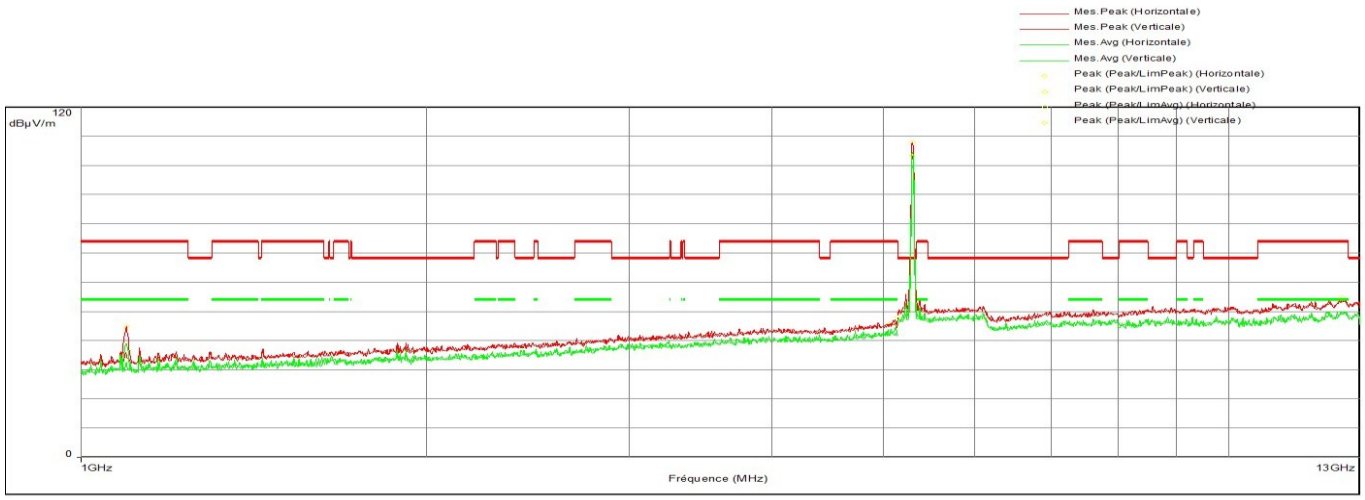
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
4951.215	46.1	54.0	-7.9	Horizontal
1065.570	42.0	54.0	-12.0	Vertical
5120.950	46.9	54.0	-7.1	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5277.110*	101.4	68.2	33.2	Horizontal
5277.205*	107.4	68.2	39.2	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#6	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C5 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

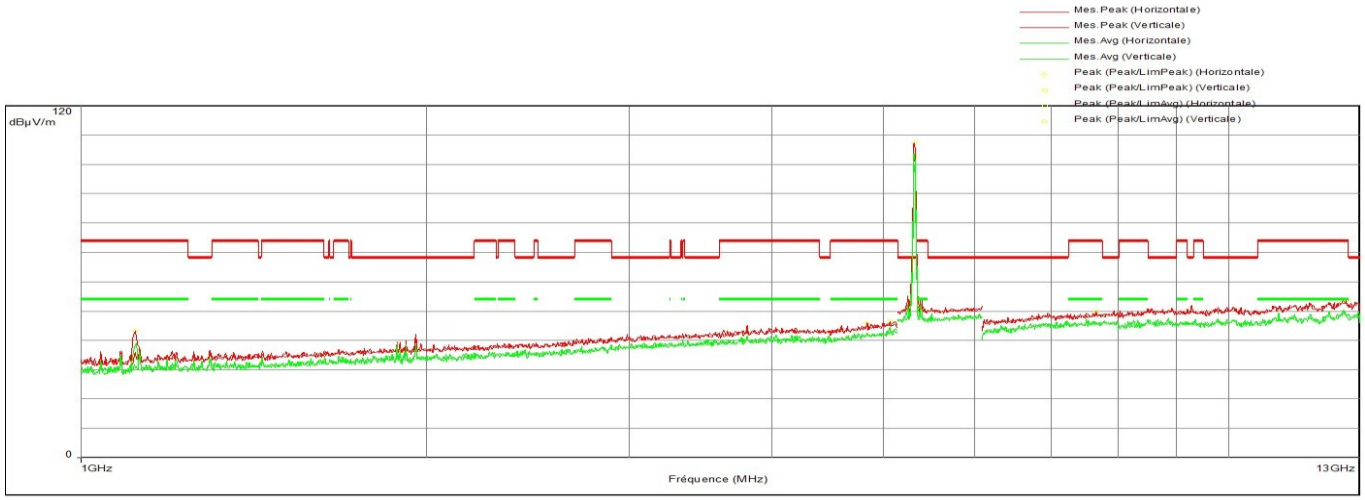
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
5062.020	45.8	54.0	-8.2	Horizontal
1096.695	44.8	54.0	-9.2	Vertical
5148.340	48.1	54.0	-5.9	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5296.395	103.3*	68.2	35.1	Horizontal
5303.425	107.9*	68.2	39.6	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#7	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C6 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

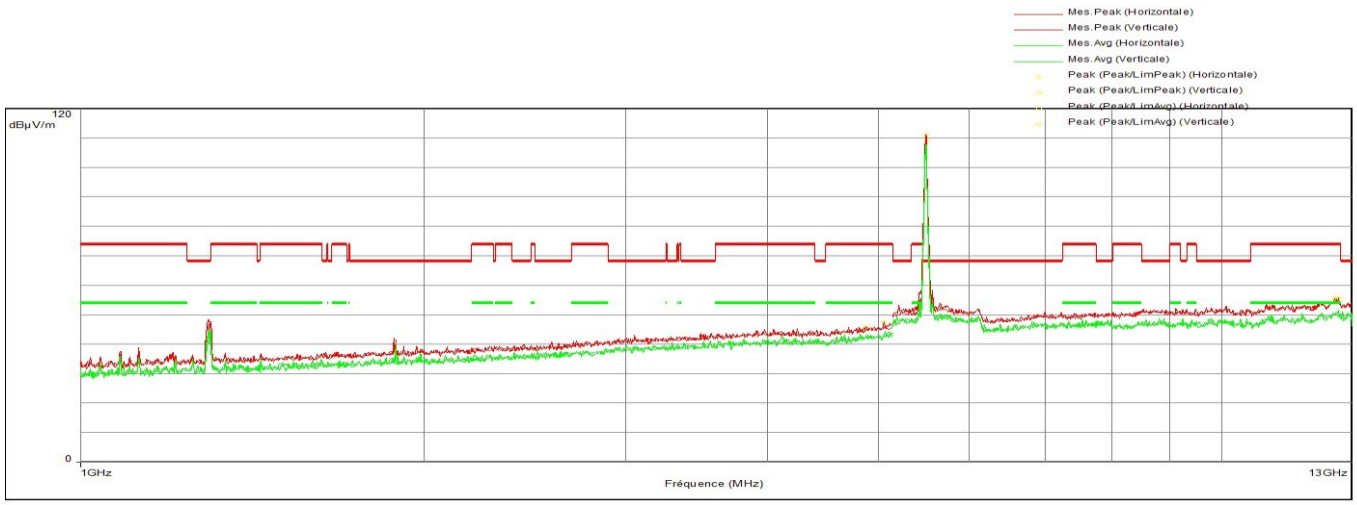
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
4839.580	46.0	54.0	-8.0	Horizontal
1114.955	43.2	54.0	-10.8	Vertical
5067.415	46.5	54.0	-7.5	Vertical
7658.190	49.7	54.0	-4.3	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5325.655	102.6*	68.2	34.4	Horizontal
5323.565	107.4*	68.2	39.2	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#8	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C7 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

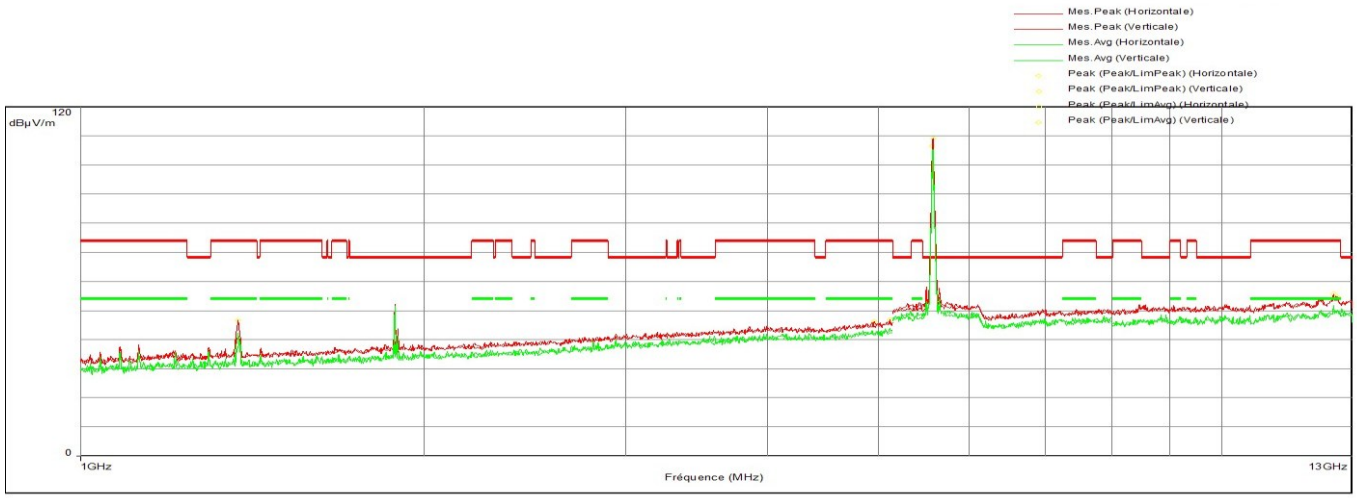
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
4873.610	46.0	54.0	-8.0	Horizontal
5052.060	47.6	54.0	-6.4	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5505.775	109.0*	68.2	40.8	Horizontal
5501.500	111.1*	68.2	42.9	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#9	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C8 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

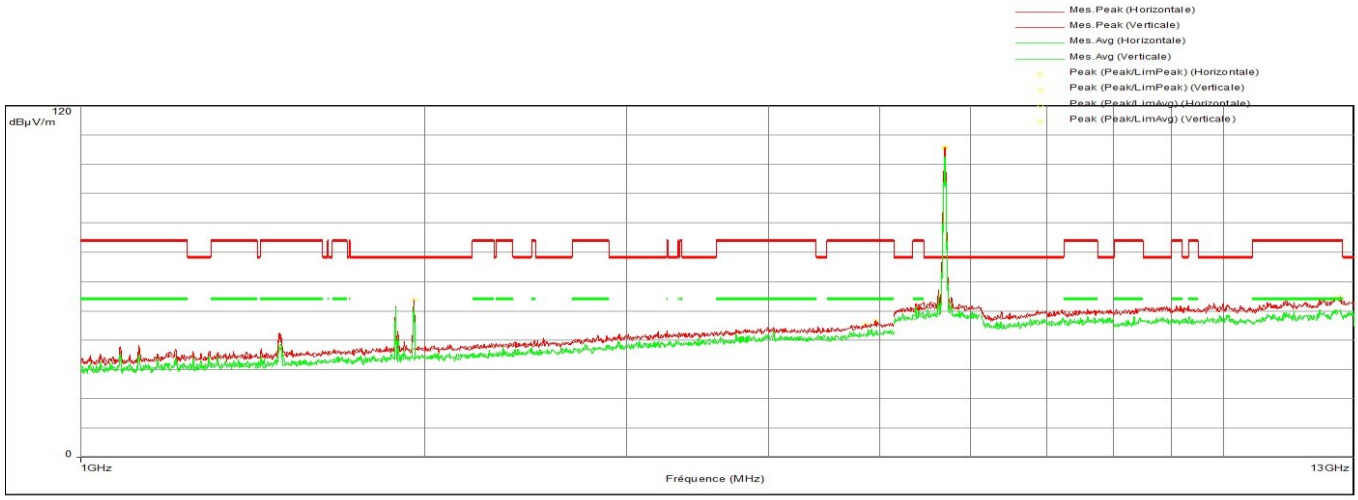
Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
5118.045	46.9	54.0	-7.1	Horizontal
1375.990	46.7	54.0	-7.3	Vertical
4958.270	46.1	54.0	-7.9	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
5574.745	106.6*	68.2	38.4	Horizontal
5578.640	109.0*	68.2	40.8	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

RADIATED EMISSIONS			
Graph name:	Emr#10	**Test configuration:**	
Limit:	FCC CFR47 Part15 C and E	(H+V) - C9 - TX mode - Axis XY	
Class:			
Frequency range: [1GHz - 13GHz]			
Antenna polarization:	Horizontal & Vertical	**RBW :**	1MHz
Azimuth:	0° - 360°	**VBW :**	3MHz



Spurious emissions

Frequency (MHz)	Peak (dBµV/m)	LimM (dBµV/m)	Peak-LimM (dB)	Polarization
4859.915	45.6	54.0	-8.4	Horizontal
4953.705	46.7	54.0	-7.3	Vertical

Frequency (MHz)	Peak (dBµV/m)	LimPeak (dBµV/m)	Peak-LimPeak (dB)	Polarization
1956.575	53.8	68.2	-14.4	Horizontal
5696.440	105.3*	68.2	37.1	Horizontal
5694.350	105.9*	68.2	37.7	Vertical

*Carrier frequency, in Wifi band

No significant frequency observed between 13 and 40 GHz.

9. 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 *Measurement of conducted disturbances in voltage on the power port*	3.51 dB	3.6 dB
Mesure des perturbations conduites en tension sur le réseau de télécommunication *Measurement of conducted disturbances in voltage on the telecommunication port.*	3.26 dB	A l'étude / Under consid.
Mesure des perturbations discontinues conduites en tension *Measurement of discontinuous conducted disturbances in voltage*	3.45 dB	3.6 dB
Mesure des perturbations conduites en courant *Measurement of conducted disturbances in current*	3.09 dB	A l'étude / Under consid.
Mesure du champ électrique rayonné sur le site en espace libre de Moirans *Measurement of radiated electric field on the Moirans open area test site*	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.*