



LCIE

WIFI 2,4GHz Template: Release October 10th, 2016

TEST REPORT

N°: 146019-698067C

Version : 01

Subject

Radio spectrum matters
tests according to standards:
47 CFR Part 15.247 [fb](#)

Issued to

SAGEMCOM BROADBAND SAS
250 Route de l' Empereur
92500 - RUEIL MALMAISON
FRANCE

Apparatus under test

- ↪ Product
- ↪ Trade mark
- ↪ Manufacturer
- ↪ Model under test
- ↪ Serial number
- ↪ FCC ID

DCIWA384 UHD AIt US
SAGEMCOM
SAGEMCOM
MiniBox (253697290)
616476080862
VW3DCIWA384

Test date

: December 5, 2016 to January 20, 2017

Test location

Fontenay Aux Roses & Ecuelles

Composition of document

114 pages

Document issued on

February 13, 2017

Written by :
Mathieu CERISIER
Tests operator



F. Fayette

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PUBLICATION HISTORY

Version	Date	Author	Modification
01	January 31, 2017	Mathieu CERISIER	Creation of the document



SUMMARY

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1. TEST PROGRAM

References

- 47 CFR Part 15.247
- KDB 558074 D01 DTS Meas Guidance v03r05
- KDB 662911 D01 Multiple Transmitter Output v02r01
- ANSI C63.10-2013

Radio requirement:

Clause (47CFR Part 15.247) Test Description	Test result - Comments			
Occupied Bandwidth ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
6dB Bandwidth ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Duty Cycle ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Maximum Conducted Output Power ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Power Spectral Density ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Conducted Spurious Emission at the Band Edge ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
AC Power Line Conducted Emission ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA(2)	<input type="checkbox"/> NP(1)
Unwanted Emissions into Restricted Frequency Bands ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated emissions ℱ	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> 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 not directly or indirectly connected to the AC Power Public Network

PASS: EUT complies with standard's requirement

FAIL: EUT does not comply with standard's requirement

NA: Not Applicable

NP: Test Not Performed

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

2.1. HARDWARE IDENTIFICATION (EUT AND AUXILIARIES):

Equipment under test (EUT):

SAGEMCOM MiniBox (253697290)

Serial Number: 616476080862



Equipment Under Test



Equipment Under Test

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power supply	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
2	Ethernet	2.5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	-	-	Use to set the EUT
Power supply°1	MSA-Z3800IC12.0-48W-P	191360131-XX	-
Power supply°2	NBS42C120380M2	191357366-XX	-
Power supply°3	LPL-C64612038026	191359307-XX	-



L C I E

Equipment information:

Type:	WIFI			
Frequency band:	2400MHz-2483.5MHz			
Standard:	<input checked="" type="checkbox"/> 802.11b	<input checked="" type="checkbox"/> 802.11g	<input checked="" type="checkbox"/> 802.11n HT20	<input checked="" type="checkbox"/> 802.11n HT40
Spectrum Modulation:	<input checked="" type="checkbox"/> DSSS		<input checked="" type="checkbox"/> OFDM	
Number of Channel:	11			
Spacing channel:	5MHz			
Channel bandwidth:	<input checked="" type="checkbox"/> 20MHz		<input checked="" type="checkbox"/> 40MHz	
Antenna Type:	<input checked="" type="checkbox"/> Integral		<input type="checkbox"/> External	<input type="checkbox"/> Dedicated
Antenna connector:	<input checked="" type="checkbox"/> Yes		<input type="checkbox"/> No	<input type="checkbox"/> Temporary for test
Transmit chains:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4
Beam forming gain:	<input type="checkbox"/> Yes: XdB		<input checked="" type="checkbox"/> No	
Receiver chains:	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input checked="" type="checkbox"/> 3	<input type="checkbox"/> 4
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	
Duty cycle:	<input checked="" type="checkbox"/> Continuous duty		<input type="checkbox"/> Intermittent duty	<input type="checkbox"/> 100% duty
Operating temperature range:	Tmin:	<input type="checkbox"/> -20°C	<input checked="" type="checkbox"/> 0°C	<input type="checkbox"/> X°C
	Tnom:	20°C		
	Tmax:	<input type="checkbox"/> 35°C	<input type="checkbox"/> 55°C	<input checked="" type="checkbox"/> 45°C
Type of power source:	<input checked="" type="checkbox"/> AC power supply		<input type="checkbox"/> DC power supply	<input type="checkbox"/> Battery
Operating voltage range:	Vnom:		<input checked="" type="checkbox"/> 120V/60Hz	<input type="checkbox"/> X Vdc

Antenna Characteristic			
Antenna assembly	Gain (dBi)	Frequency Band (MHz)	Impedance(Ω)
1	0.2	2412-2472	50
2	0.2	2412-2472	50
3	0.2	2412-2472	50
Accumulated	5.0	2412-2472	50

Note: Calculated according to KDB 662911 D01 Multiple Transmitter Output v02r01 F) 2) d) (i). All antennas can transmit simultaneously



L C I E

CHANNEL PLAN	
802.11b / 802.11g / 802.11n HT20	
Channel	Frequency (MHz)
Cmin: 1	2412
2	2417
3	2422
4	2427
5	2432
Cmid: 6	2437
7	2442
8	2447
9	2452
10	2457
Cmax: 11	2462

CHANNEL PLAN	
802.11n HT40	
Channel	Frequency (MHz)
Cmin: 3	2422
4	2427
5	2432
Cmid: 6	2437
7	2442
8	2447
Cmax: 9	2452



L C I E

DATA RATE		
802.11b		
Data Rate (Mbps)	Modulation Type	Modulation Worst Case
1	DBPSK	<input checked="" type="checkbox"/>
2	DQPSK	<input type="checkbox"/>
5.5	DQPSK	<input type="checkbox"/>
11	CCK	<input type="checkbox"/>

DATA RATE		
802.11g		
Data Rate (Mbps)	Modulation Type	Modulation Worst Case
6	BPSK	<input checked="" type="checkbox"/>
9	BPSK	<input type="checkbox"/>
12	QPSK	<input type="checkbox"/>
18	QPSK	<input type="checkbox"/>
24	16-QAM	<input type="checkbox"/>
36	16-QAM	<input type="checkbox"/>
48	64-QAM	<input type="checkbox"/>
54	64-QAM	<input type="checkbox"/>



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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	<input type="checkbox"/>
	1	1	QPSK				13	14.4	<input type="checkbox"/>
	2	1	QPSK				19.5	21.7	<input type="checkbox"/>
	3	1	16-QAM				26	28.9	<input type="checkbox"/>
	4	1	16-QAM				39	43.3	<input type="checkbox"/>
	5	1	64-QAM				52	57.8	<input type="checkbox"/>
	6	1	64-QAM				58.5	65	<input type="checkbox"/>
	7	1	64-QAM				65	72.2	<input type="checkbox"/>
☑	32	1	BPSK				-	-	<input type="checkbox"/>
	8	2	BPSK				13	14.4	<input type="checkbox"/>
	9	2	QPSK				26	28.9	<input type="checkbox"/>
	10	2	QPSK				39	43.3	<input type="checkbox"/>
	11	2	16-QAM				52	57.8	<input type="checkbox"/>
	12	2	16-QAM				78	86.7	<input type="checkbox"/>
	13	2	64-QAM				104	115.6	<input type="checkbox"/>
	14	2	64-QAM				117	130.3	<input type="checkbox"/>
	15	2	64-QAM				130	144.4	<input type="checkbox"/>
	33	2	16-QAM	QPSK	-	-	39	43.3	<input type="checkbox"/>
	34	2	64-QAM	QPSK	-	-	52	57.8	<input type="checkbox"/>
	35	2	64-QAM	16-QAM	-	-	65	72.2	<input type="checkbox"/>
	36	2	16-QAM	QPSK	-	-	58.5	65	<input type="checkbox"/>
	37	2	64-QAM	QPSK	-	-	78	86.7	<input type="checkbox"/>
	38	2	64-QAM	16-QAM	-	-	97.5	108.3	<input type="checkbox"/>
	☑	16	3	BPSK				19.5	21.7
17		3	QPSK				39	43.3	<input type="checkbox"/>
18		3	QPSK				58.5	65	<input type="checkbox"/>
19		3	16-QAM				78	86.7	<input type="checkbox"/>
20		3	16-QAM				117	130	<input type="checkbox"/>
21		3	64-QAM				156	173.3	<input type="checkbox"/>
22		3	64-QAM				175.5	195	<input type="checkbox"/>
23		3	64-QAM				195	216.7	<input type="checkbox"/>
39		3	16-QAM	QPSK	QPSK	-	52	57.8	<input type="checkbox"/>
40		3	16-QAM	16-QAM	QPSK	-	65	72.2	<input type="checkbox"/>
41		3	64-QAM	QPSK	QPSK	-	65	72.2	<input type="checkbox"/>
42		3	64-QAM	16-QAM	QPSK	-	78	86.7	<input type="checkbox"/>
43		3	64-QAM	16-QAM	16-QAM	-	91	101.1	<input type="checkbox"/>
44		3	64-QAM	64-QAM	QPSK	-	91	101.1	<input type="checkbox"/>
45		3	64-QAM	64-QAM	16-QAM	-	104	115.6	<input type="checkbox"/>
46		3	16-QAM	QPSK	QPSK	-	78	86.7	<input type="checkbox"/>
47		3	16-QAM	16-QAM	QPSK	-	97.5	108.3	<input type="checkbox"/>
48		3	64-QAM	QPSK	QPSK	-	97.5	108.3	<input type="checkbox"/>
49		3	64-QAM	16-QAM	QPSK	-	117	130	<input type="checkbox"/>
50		3	64-QAM	16-QAM	16-QAM	-	136.5	151.7	<input type="checkbox"/>
51	3	64-QAM	64-QAM	QPSK	-	136.5	151.7	<input type="checkbox"/>	
52	3	64-QAM	64-QAM	16-QAM	-	156	173.3	<input type="checkbox"/>	
☐	24	4	BPSK				26	28.9	<input type="checkbox"/>
	25	4	QPSK				52	57.8	<input type="checkbox"/>
	26	4	QPSK				78	86.7	<input type="checkbox"/>
	27	4	16-QAM				104	115.6	<input type="checkbox"/>
	28	4	16-QAM				156	173.3	<input type="checkbox"/>
	29	4	64-QAM				208	231.1	<input type="checkbox"/>
	30	4	64-QAM				234	260	<input type="checkbox"/>
	31	4	64-QAM				260	288.9	<input type="checkbox"/>
	53	4	16-QAM	QPSK	QPSK	QPSK	65	72.2	<input type="checkbox"/>
	54	4	16-QAM	16-QAM	QPSK	QPSK	78	86.7	<input type="checkbox"/>
	55	4	16-QAM	16-QAM	16-QAM	QPSK	91	101.1	<input type="checkbox"/>
	56	4	64-QAM	QPSK	QPSK	QPSK	78	86.7	<input type="checkbox"/>
	57	4	64-QAM	16-QAM	QPSK	QPSK	91	101.1	<input type="checkbox"/>
	58	4	64-QAM	16-QAM	16-QAM	QPSK	104	115.6	<input type="checkbox"/>
	59	4	64-QAM	16-QAM	16-QAM	16-QAM	117	130	<input type="checkbox"/>
	60	4	64-QAM	QPSK	QPSK	QPSK	104	115.6	<input type="checkbox"/>
	61	4	64-QAM	16-QAM	16-QAM	QPSK	117	130	<input type="checkbox"/>
	62	4	64-QAM	16-QAM	16-QAM	16-QAM	130	144.4	<input type="checkbox"/>
	63	4	64-QAM	64-QAM	64-QAM	QPSK	130	144.4	<input type="checkbox"/>
	64	4	64-QAM	64-QAM	64-QAM	16-QAM	143	158.9	<input type="checkbox"/>
	65	4	16-QAM	QPSK	QPSK	QPSK	97.5	108.3	<input type="checkbox"/>
	66	4	16-QAM	16-QAM	QPSK	QPSK	117	130	<input type="checkbox"/>
	67	4	16-QAM	16-QAM	16-QAM	QPSK	136.5	151.7	<input type="checkbox"/>
	68	4	64-QAM	QPSK	QPSK	QPSK	117	130	<input type="checkbox"/>
	69	4	64-QAM	16-QAM	QPSK	QPSK	136.5	151.7	<input type="checkbox"/>
	70	4	64-QAM	16-QAM	16-QAM	QPSK	156	173.3	<input type="checkbox"/>
	71	4	64-QAM	16-QAM	16-QAM	16-QAM	175.5	195	<input type="checkbox"/>
	72	4	64-QAM	64-QAM	QPSK	QPSK	156	173.3	<input type="checkbox"/>
73	4	64-QAM	64-QAM	16-QAM	QPSK	175.5	195	<input type="checkbox"/>	
74	4	64-QAM	64-QAM	16-QAM	16-QAM	195	216.7	<input type="checkbox"/>	
75	4	64-QAM	64-QAM	64-QAM	QPSK	195	216.7	<input type="checkbox"/>	
76	4	64-QAM	64-QAM	64-QAM	16-QAM	214.5	238.3	<input type="checkbox"/>	



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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	<input type="checkbox"/>
	1	1	QPSK				27	30	<input type="checkbox"/>
	2	1	QPSK				40.5	45	<input type="checkbox"/>
	3	1	16-QAM				54	60	<input type="checkbox"/>
	4	1	16-QAM				81	90	<input type="checkbox"/>
	5	1	64-QAM				108	120	<input type="checkbox"/>
	6	1	64-QAM				121.5	135	<input type="checkbox"/>
7	1	64-QAM				135	150	<input type="checkbox"/>	
32	1	BPSK	-	-	-	6.0	6.7	<input type="checkbox"/>	
☑	8	2	BPSK				27	30	<input type="checkbox"/>
	9	2	QPSK				54	60	<input type="checkbox"/>
	10	2	QPSK				81	90	<input type="checkbox"/>
	11	2	16-QAM				108	120	<input type="checkbox"/>
	12	2	16-QAM				162	180	<input type="checkbox"/>
	13	2	64-QAM				216	240	<input type="checkbox"/>
	14	2	64-QAM				243	270	<input type="checkbox"/>
	15	2	64-QAM				270	300	<input type="checkbox"/>
	33	2	16-QAM	QPSK	-	-	81	90.0	<input type="checkbox"/>
	34	2	64-QAM	QPSK	-	-	108	120	<input type="checkbox"/>
	35	2	64-QAM	16-QAM	-	-	135	150	<input type="checkbox"/>
	36	2	16-QAM	QPSK	-	-	121.5	135	<input type="checkbox"/>
	37	2	64-QAM	QPSK	-	-	162	180	<input type="checkbox"/>
	38	2	64-QAM	16-QAM	-	-	202.5	225	<input type="checkbox"/>
☑	16	3	BPSK				40.5	45	<input checked="" type="checkbox"/>
	17	3	QPSK				81	90	<input type="checkbox"/>
	18	3	QPSK				121.5	135	<input type="checkbox"/>
	19	3	16-QAM				162	180	<input type="checkbox"/>
	20	3	16-QAM				243	270	<input type="checkbox"/>
	21	3	64-QAM				324	360	<input type="checkbox"/>
	22	3	64-QAM				364.5	405	<input type="checkbox"/>
	23	3	64-QAM				405	450	<input type="checkbox"/>
	39	3	16-QAM	QPSK	QPSK	-	108	120	<input type="checkbox"/>
	40	3	16-QAM	16-QAM	QPSK	-	135	150	<input type="checkbox"/>
	41	3	64-QAM	QPSK	QPSK	-	135	150	<input type="checkbox"/>
	42	3	64-QAM	16-QAM	QPSK	-	162	180	<input type="checkbox"/>
	43	3	64-QAM	16-QAM	16-QAM	-	189	210	<input type="checkbox"/>
	44	3	64-QAM	64-QAM	QPSK	-	189	210	<input type="checkbox"/>
	45	3	64-QAM	64-QAM	16-QAM	-	216	240	<input type="checkbox"/>
	46	3	16-QAM	QPSK	QPSK	-	162	180	<input type="checkbox"/>
	47	3	16-QAM	16-QAM	QPSK	-	202.5	225	<input type="checkbox"/>
	48	3	64-QAM	QPSK	QPSK	-	202.5	225	<input type="checkbox"/>
	49	3	64-QAM	16-QAM	QPSK	-	243	270	<input type="checkbox"/>
	50	3	64-QAM	16-QAM	16-QAM	-	283.5	315	<input type="checkbox"/>
51	3	64-QAM	64-QAM	QPSK	-	283.5	315	<input type="checkbox"/>	
52	3	64-QAM	64-QAM	16-QAM	-	324	360	<input type="checkbox"/>	
☐	24	4	BPSK				54	60	<input type="checkbox"/>
	25	4	QPSK				108	120	<input type="checkbox"/>
	26	4	QPSK				162	180	<input type="checkbox"/>
	27	4	16-QAM				216	240	<input type="checkbox"/>
	28	4	16-QAM				324	360	<input type="checkbox"/>
	29	4	64-QAM				432	480	<input type="checkbox"/>
	30	4	64-QAM				486	540	<input type="checkbox"/>
	31	4	64-QAM				540	600	<input type="checkbox"/>
	53	4	16-QAM	QPSK	QPSK	QPSK	135	150	<input type="checkbox"/>
	54	4	16-QAM	16-QAM	QPSK	QPSK	162	180	<input type="checkbox"/>
	55	4	16-QAM	16-QAM	16-QAM	QPSK	189	210	<input type="checkbox"/>
	56	4	64-QAM	QPSK	QPSK	QPSK	162	180	<input type="checkbox"/>
	57	4	64-QAM	16-QAM	QPSK	QPSK	189	210	<input type="checkbox"/>
	58	4	64-QAM	16-QAM	16-QAM	QPSK	216	240	<input type="checkbox"/>
	59	4	64-QAM	16-QAM	16-QAM	16-QAM	243	270	<input type="checkbox"/>
	60	4	64-QAM	QPSK	QPSK	QPSK	216	240	<input type="checkbox"/>
	61	4	64-QAM	16-QAM	16-QAM	QPSK	243	270	<input type="checkbox"/>
	62	4	64-QAM	16-QAM	16-QAM	16-QAM	270	300	<input type="checkbox"/>
	63	4	64-QAM	64-QAM	64-QAM	QPSK	270	300	<input type="checkbox"/>
	64	4	64-QAM	64-QAM	64-QAM	16-QAM	297	330	<input type="checkbox"/>
	65	4	16-QAM	QPSK	QPSK	QPSK	202.5	225	<input type="checkbox"/>
	66	4	16-QAM	16-QAM	QPSK	QPSK	243	270	<input type="checkbox"/>
	67	4	16-QAM	16-QAM	16-QAM	QPSK	283.5	315	<input type="checkbox"/>
	68	4	64-QAM	QPSK	QPSK	QPSK	243	270	<input type="checkbox"/>
	69	4	64-QAM	16-QAM	QPSK	QPSK	283.5	315	<input type="checkbox"/>
	70	4	64-QAM	16-QAM	16-QAM	QPSK	324	360	<input type="checkbox"/>
	71	4	64-QAM	16-QAM	16-QAM	16-QAM	364.5	405	<input type="checkbox"/>
	72	4	64-QAM	64-QAM	QPSK	QPSK	324	360	<input type="checkbox"/>
73	4	64-QAM	64-QAM	16-QAM	QPSK	364.5	405	<input type="checkbox"/>	
74	4	64-QAM	64-QAM	16-QAM	16-QAM	405	450	<input type="checkbox"/>	
75	4	64-QAM	64-QAM	64-QAM	QPSK	405	450	<input type="checkbox"/>	
76	4	64-QAM	64-QAM	64-QAM	16-QAM	445.5	495	<input type="checkbox"/>	



2.2. RUNNING MODE

The EUT is set in the following modes during tests:

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

Following commands with the specific test software "MToolV3.0.0.1" are used to set the product:

- See document "WIFI compliance test command of M384-US-4L-1 FCC 5GHz V03" for the command used during test

2.3. EQUIPMENT LABELLING



Power supply n°1



Power supply n°2



Power supply n°3

2.4. EQUIPMENT MODIFICATION

- None Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : January 4, 2017
Ambient temperature : 22 °C
Relative humidity : 41 %

3.2. TEST SETUP

- The Equipment Under Test is installed:

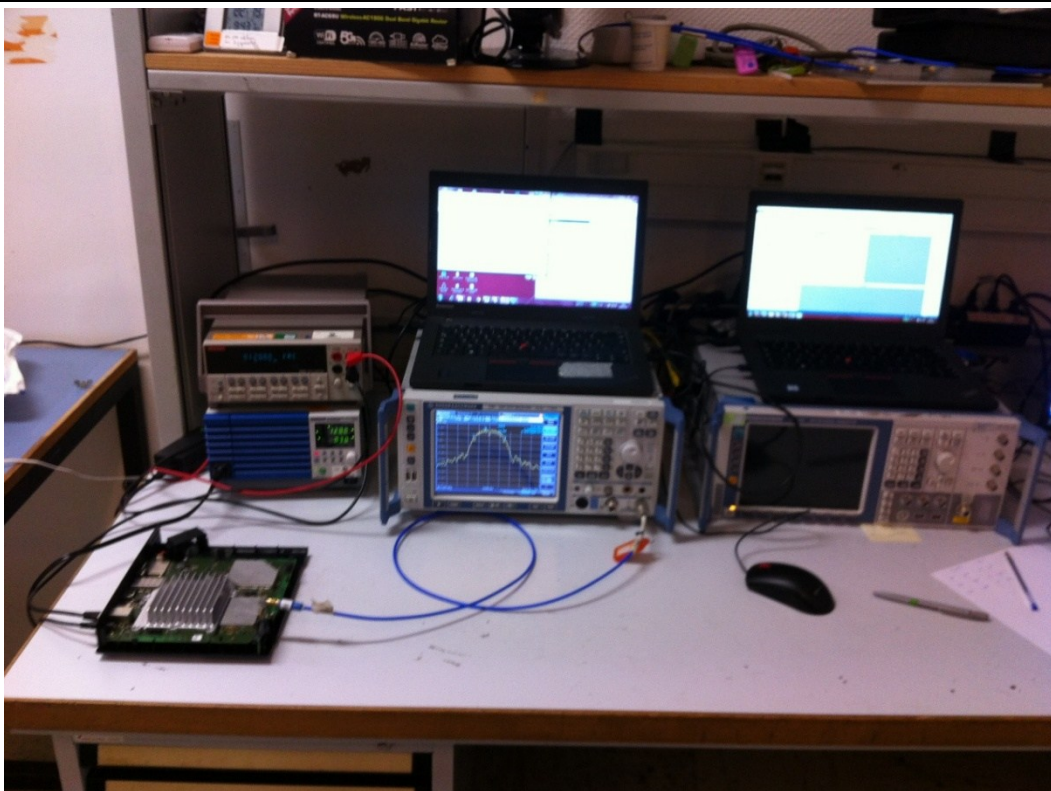
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- RSS-Gen Issue 4 § 6.6
- ANSI C63.10 § 6.9.2



Photograph for Occupied bandwidth



3.1. LIMIT

None

3.2. TEST EQUIPMENT LIST

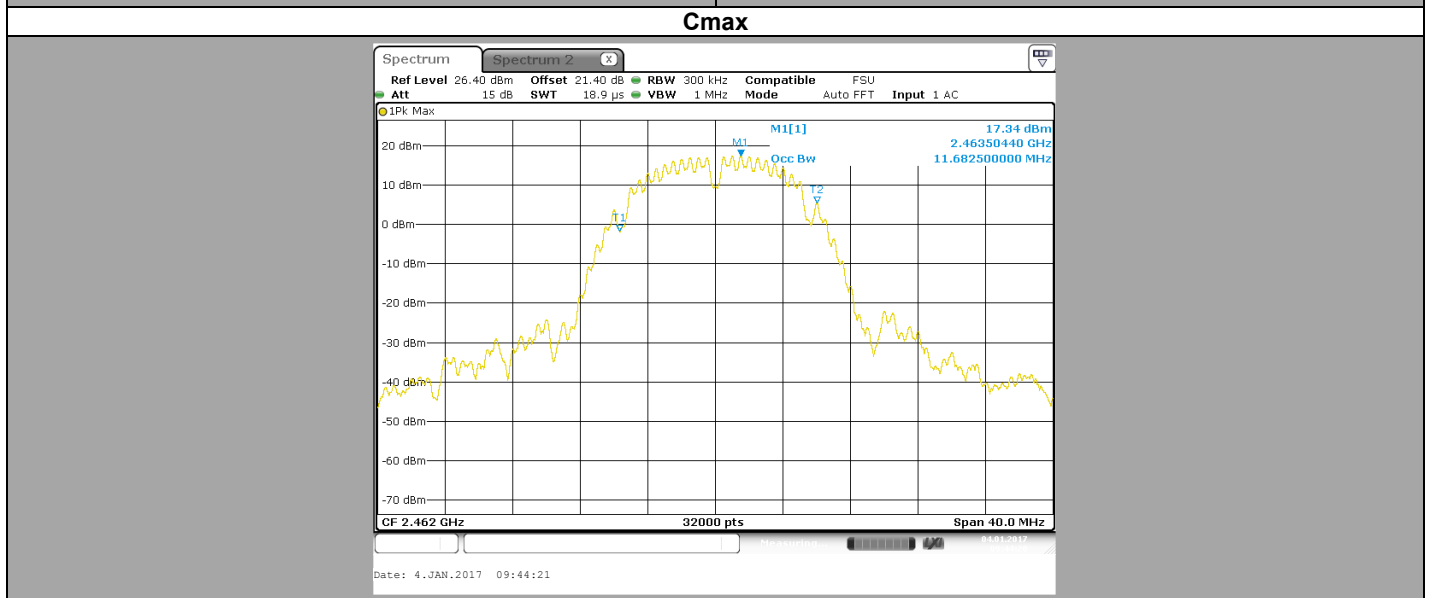
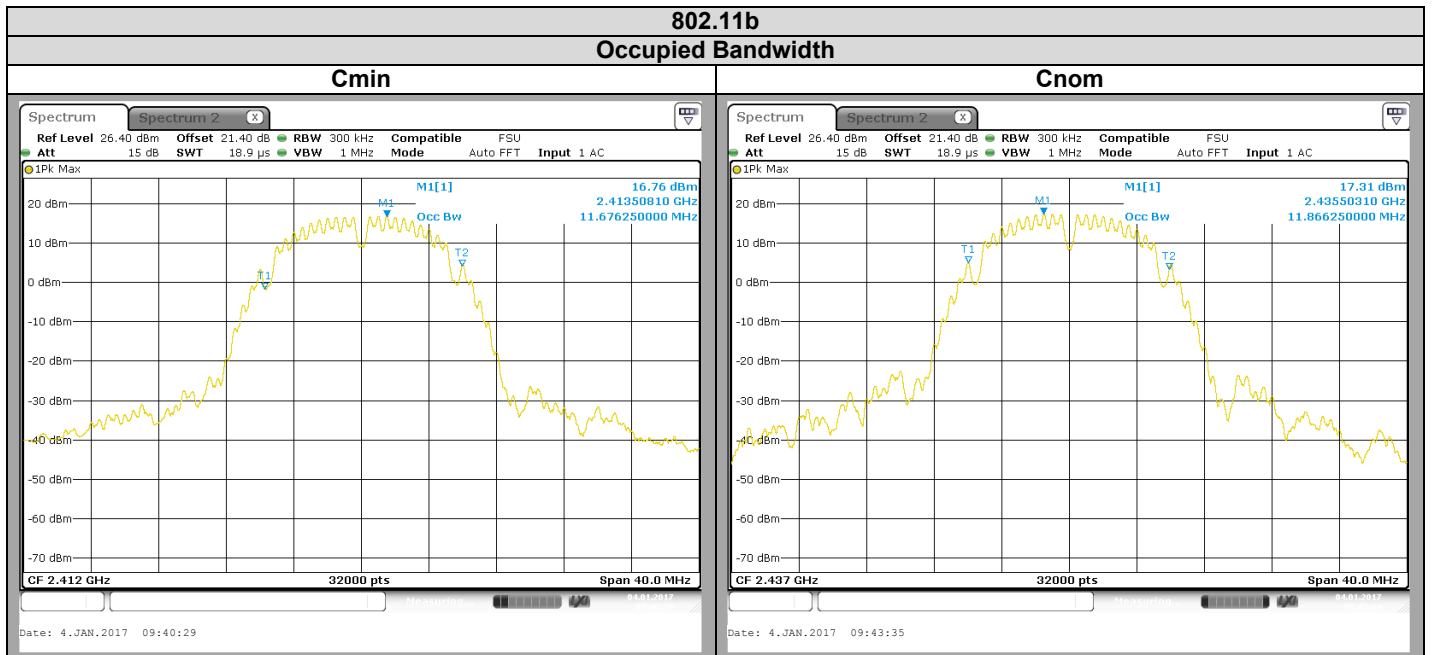
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2016/10	2017/10

Note: In our quality system, the test equipment calibration due is more & less 2 months



L C I E

3.3. RESULTS



Channel	Occupied Bandwidth (MHz)
Cmin	11,676
Cnom	11,866
Cmax	11,683

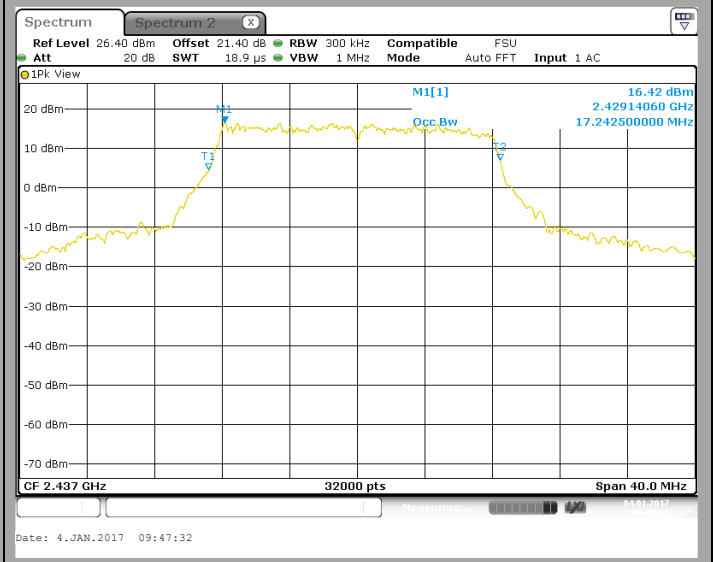
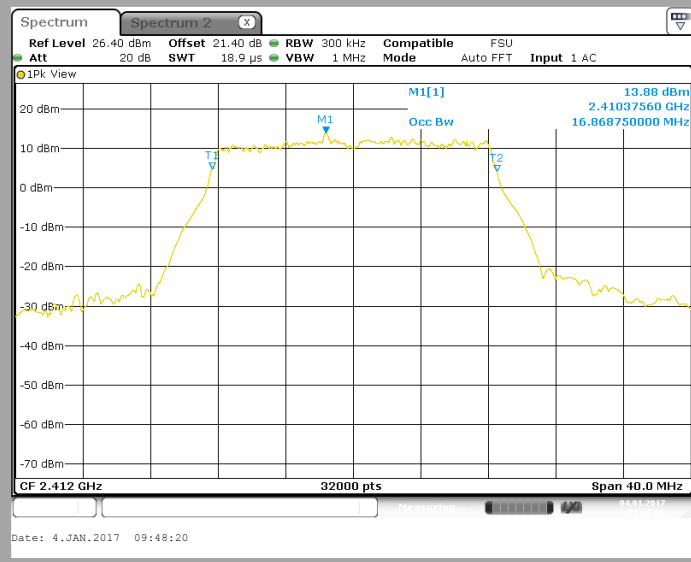


L C I E

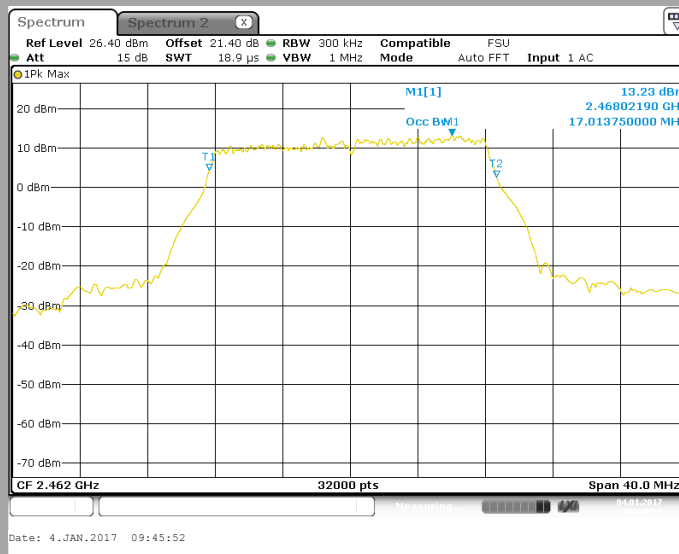
802.11g
Occupied Bandwidth

Cmin

Cnom



Cmax



Channel	Occupied Bandwidth (MHz)
Cmin	16,869
Cnom	17,243
Cmax	17,014



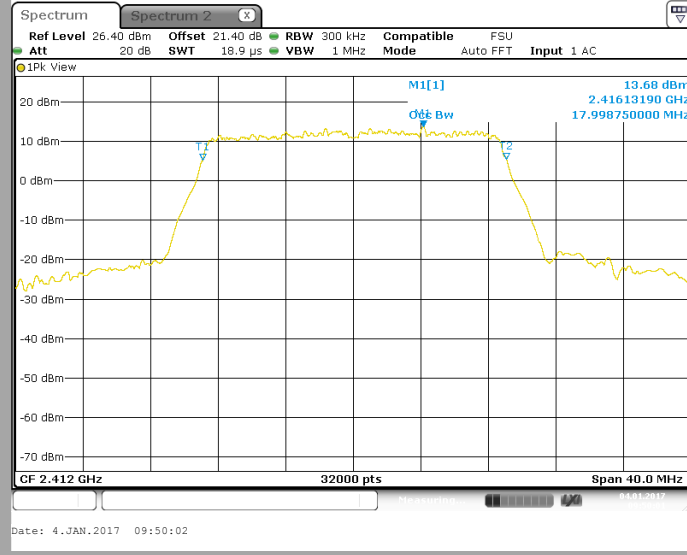
L C I E

802.11nHT20

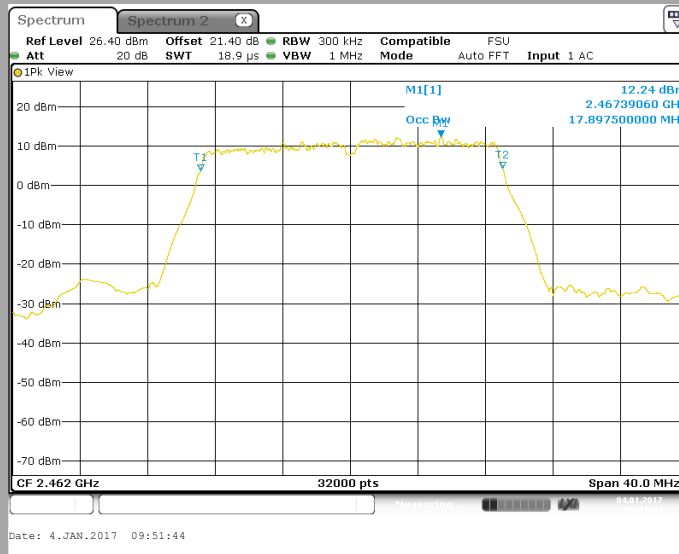
Occupied Bandwidth

Cmin

Cnom



Cmax



Channel	Occupied Bandwidth (MHz)
Cmin	17,999
Cnom	18,17
Cmax	17,898



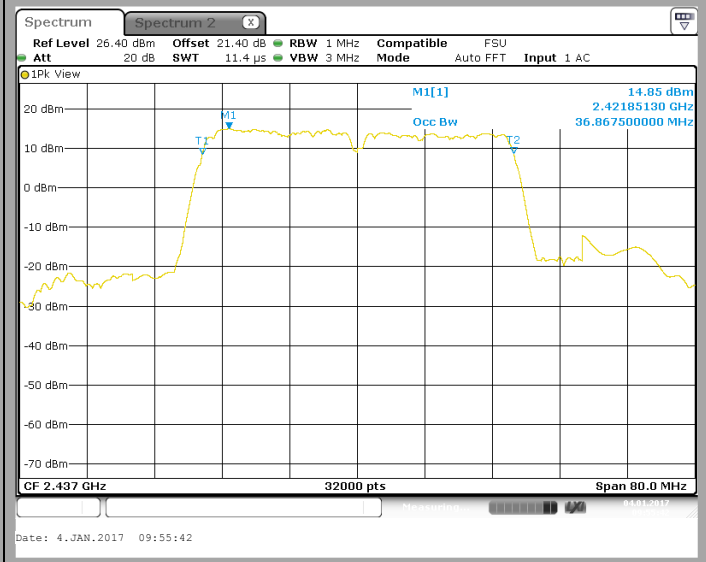
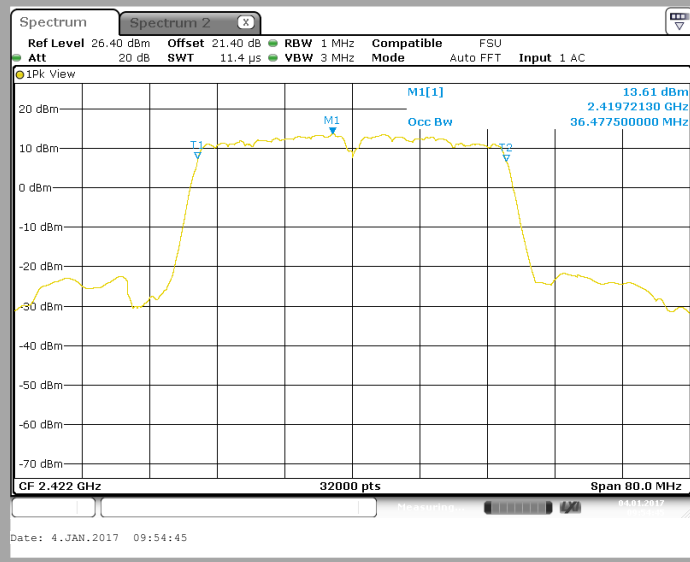
L C I E

802.11n HT40

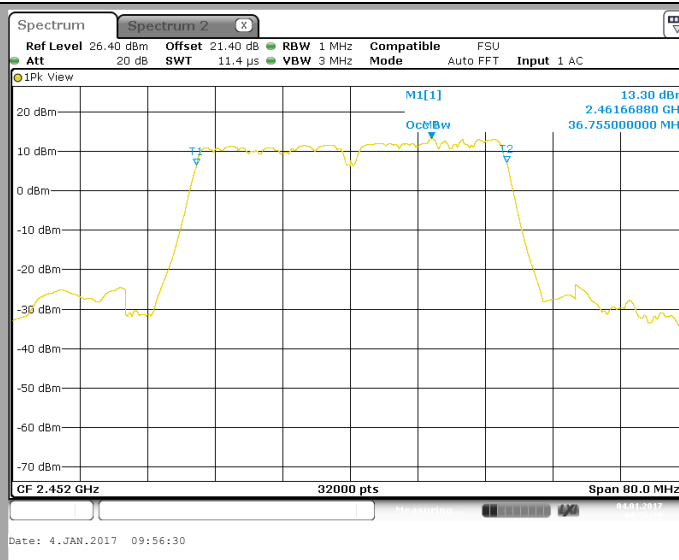
Occupied Bandwidth

Cmin

Cnom



Cmax



Channel	Occupied Bandwidth (MHz)
Cmin	36,478
Cnom	36,867
Cmax	36,76

3.1. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **SAGEMCOM** MiniBox (253697290), SN: **616476080862**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

4. 6DB EMISSION BANDWIDTH

4.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : January 4, 2017
Ambient temperature : 22 °C
Relative humidity : 41 %

4.2. TEST SETUP

- The Equipment Under Test is installed:

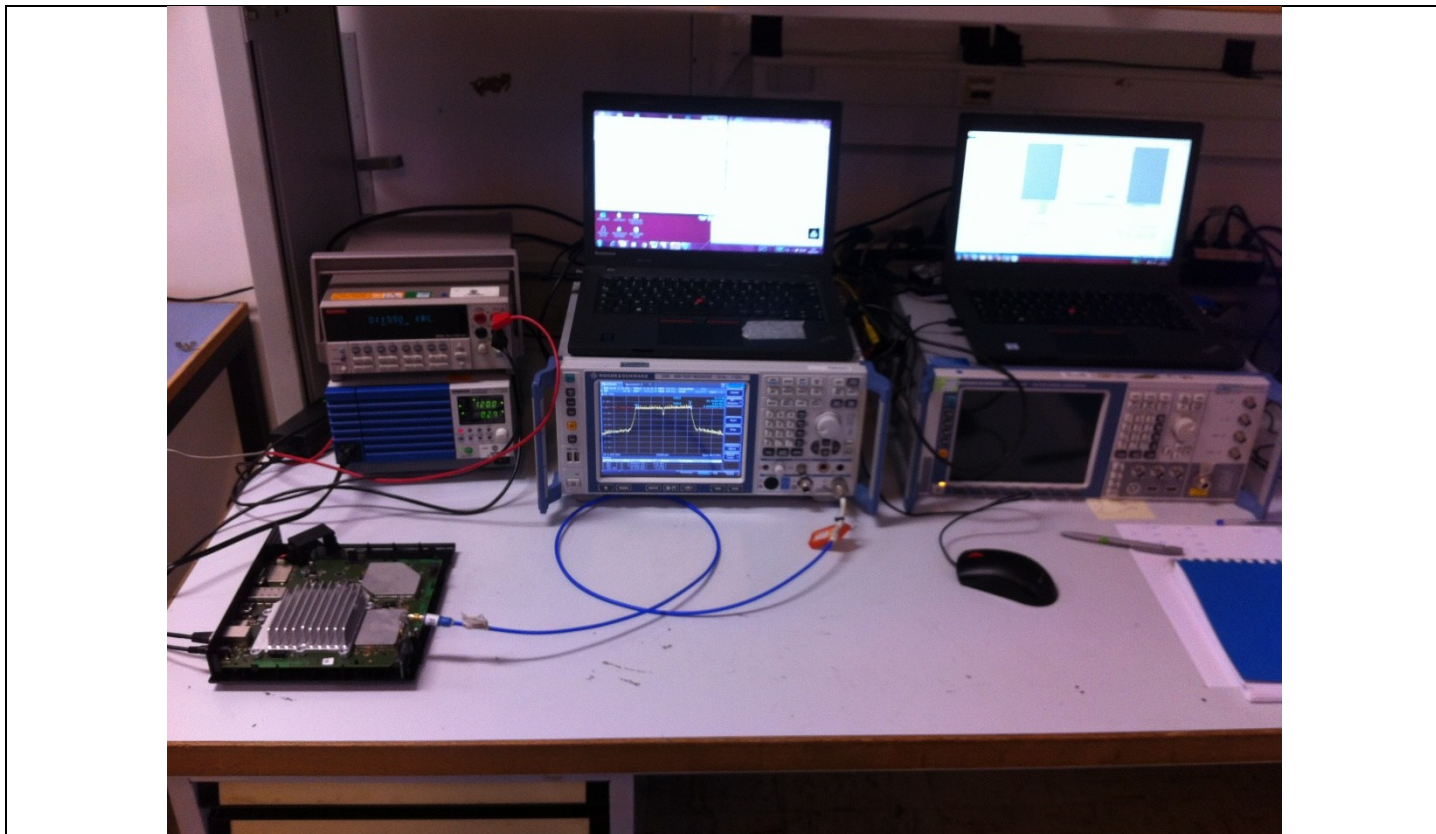
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 8.1
- KDB 558074 D01 DTS Meas Guidance v03r05 § 8.2



Photograph for 6dB emission bandwidth



4.3. LIMIT

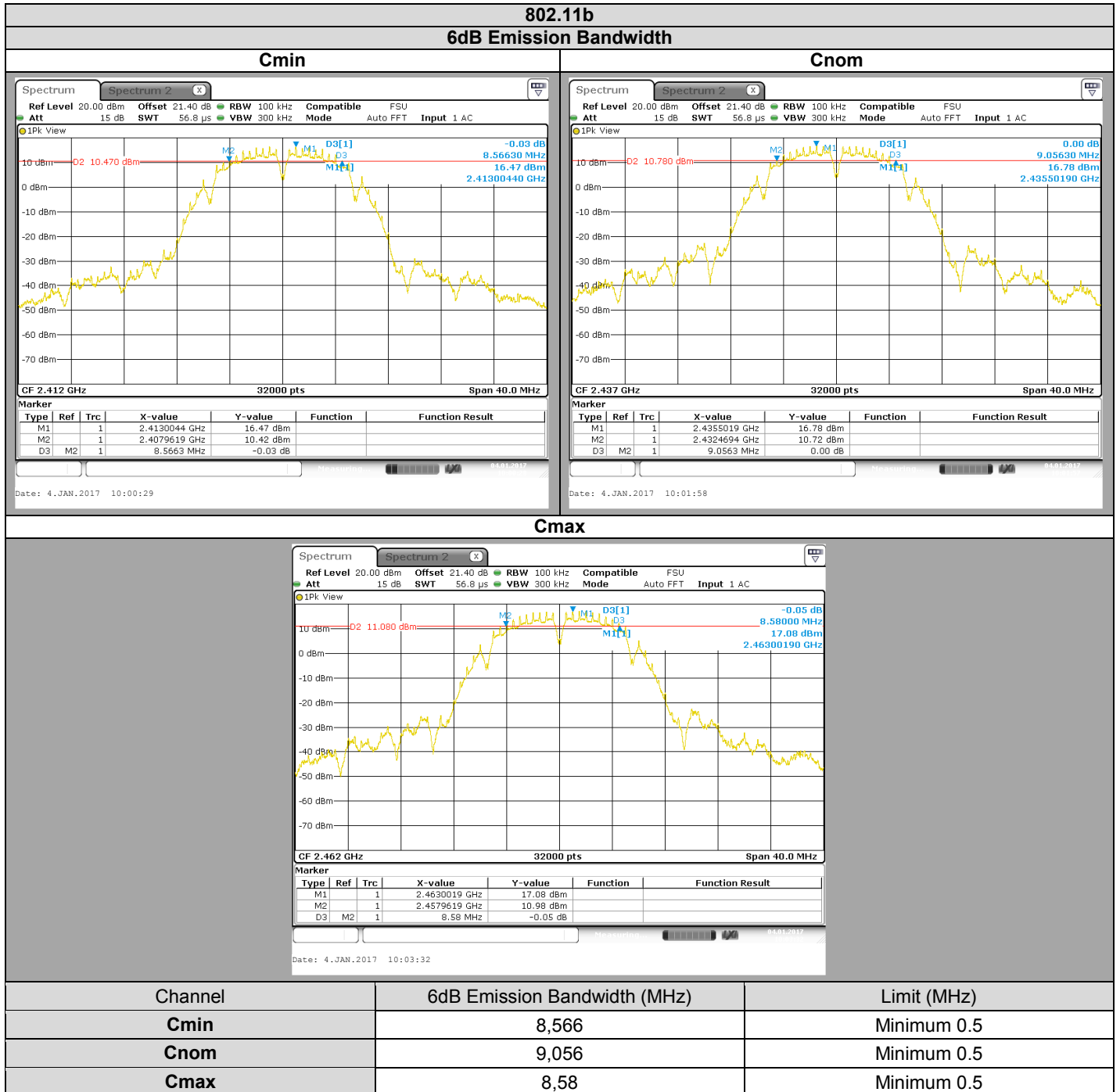
The 6dB bandwidth shall be at least 500kHz

4.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2016/10	2017/10

Note: In our quality system, the test equipment calibration due is more & less 2 months

4.5. RESULTS





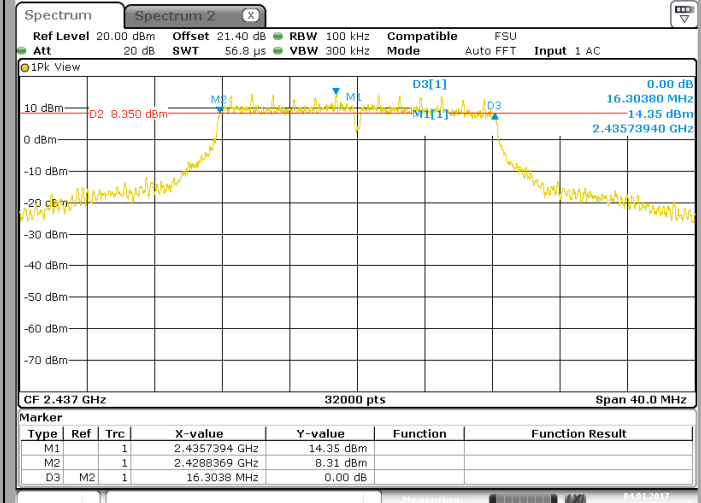
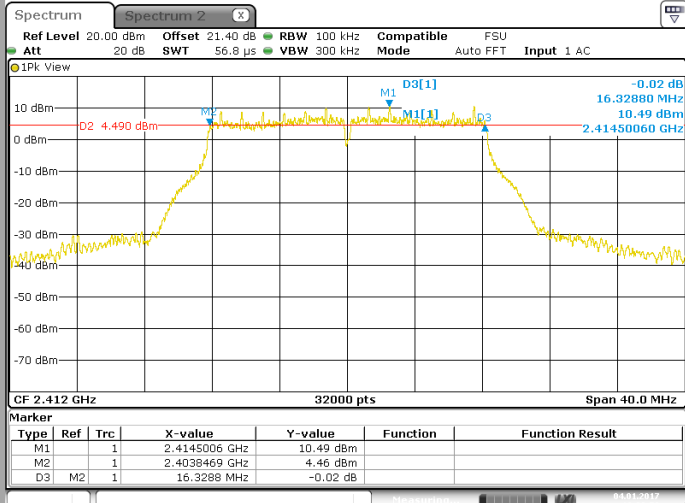
L C I E

802.11g

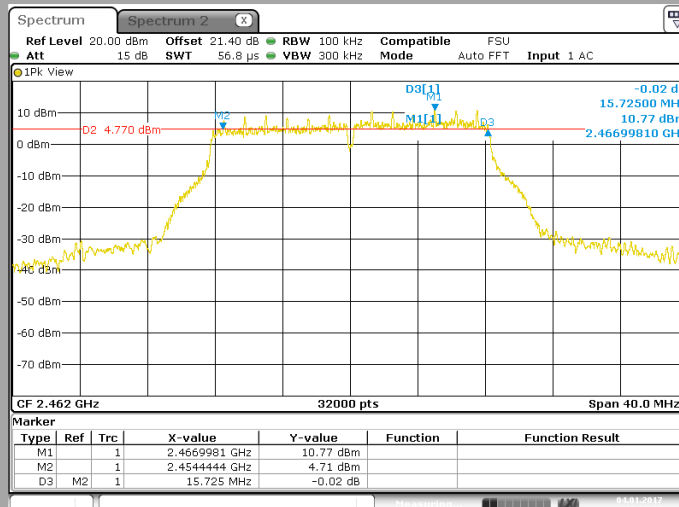
6dB Emission Bandwidth

Cmin

Cnom



Cmax



Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	16,323	Minimum 0.5
Cnom	16,304	Minimum 0.5
Cmax	15,725	Minimum 0.5



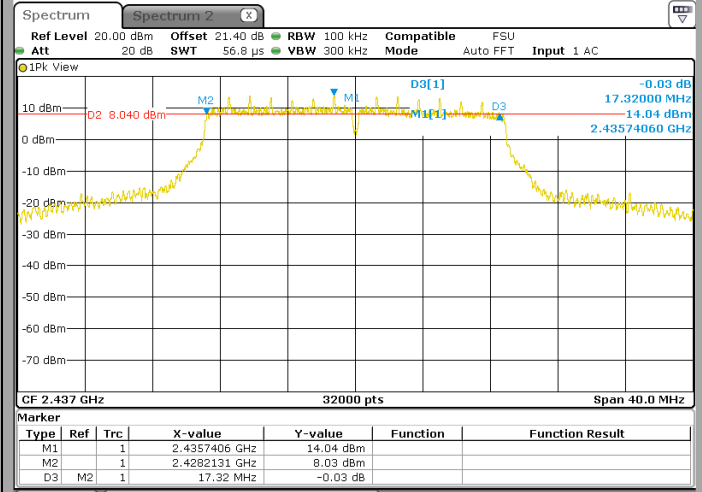
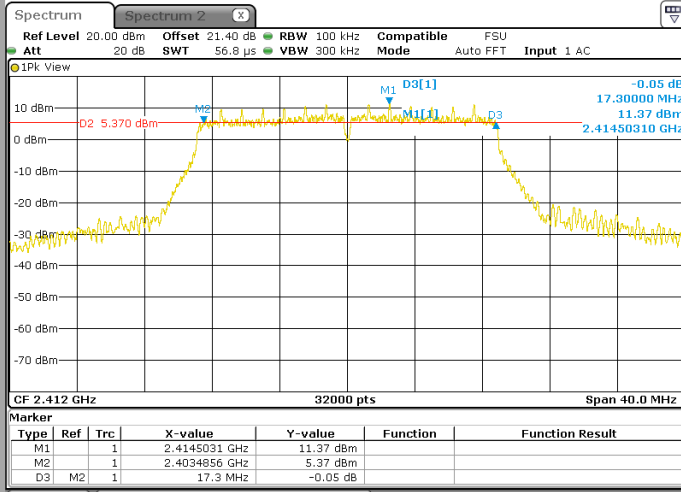
L C I E

802.11n HT20

6dB Emission Bandwidth

Cmin

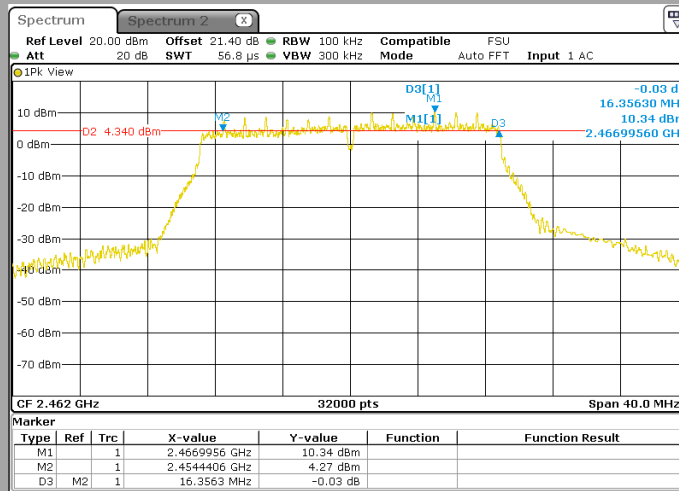
Cnom



Date: 4.JAN.2017 10:10:39

Date: 4.JAN.2017 10:12:08

Cmax



Date: 4.JAN.2017 10:14:06

Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	17,3	Minimum 0.5
Cnom	17,32	Minimum 0.5
Cmax	16,356	Minimum 0.5



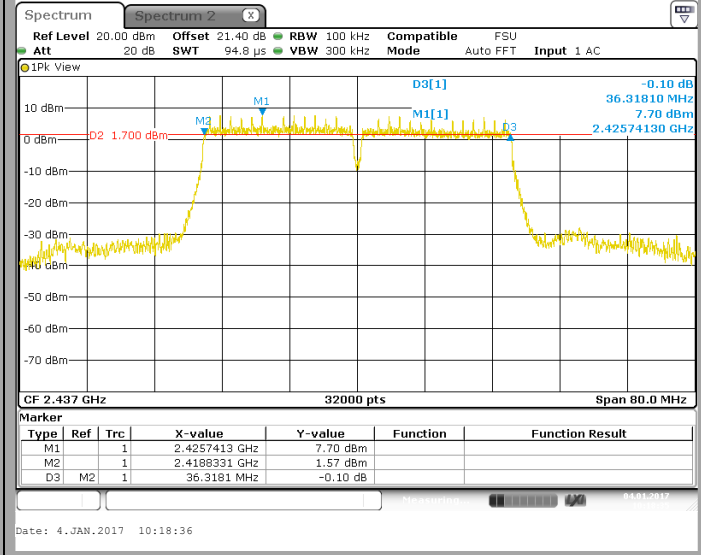
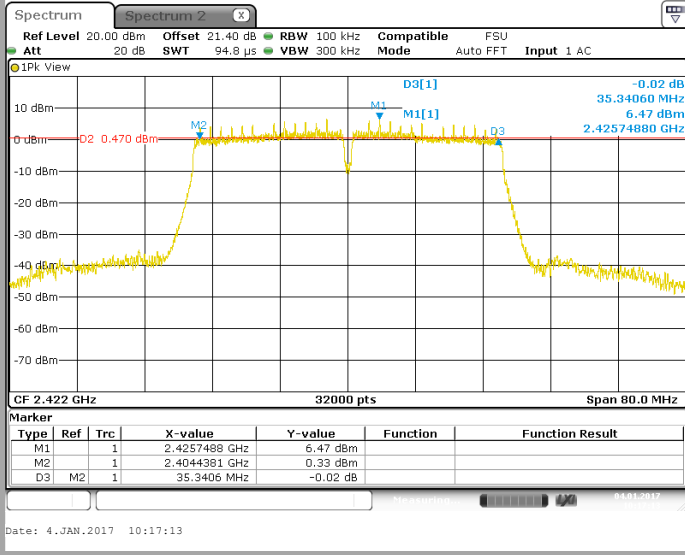
L C I E

802.11n HT40

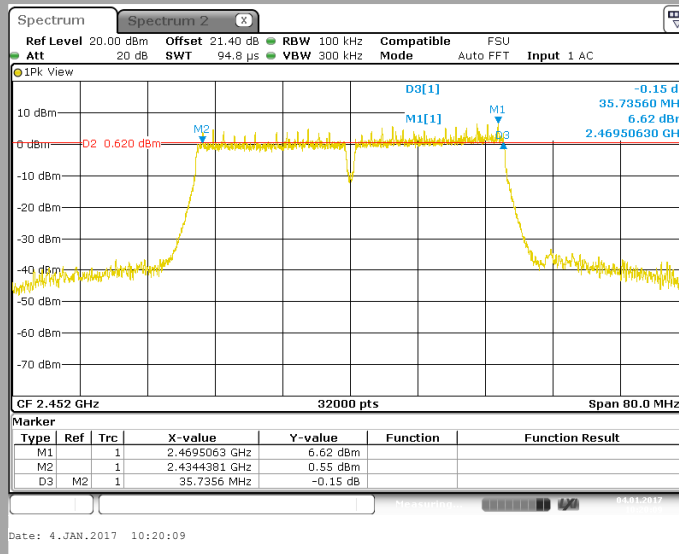
6dB Emission Bandwidth

Cmin

Cnom



Cmax



Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	35,341	Minimum 0.5
Cnom	36,318	Minimum 0.5
Cmax	35,736	Minimum 0.5

4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **SAGEMCOM** MiniBox (253697290), SN: **616476080862**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

5. DUTY CYCLE

5.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : January 4, 2017
Ambient temperature : 22 °C
Relative humidity : 41 %

5.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 6.0 b)



Photograph for Duty Cycle

5.3. LIMIT

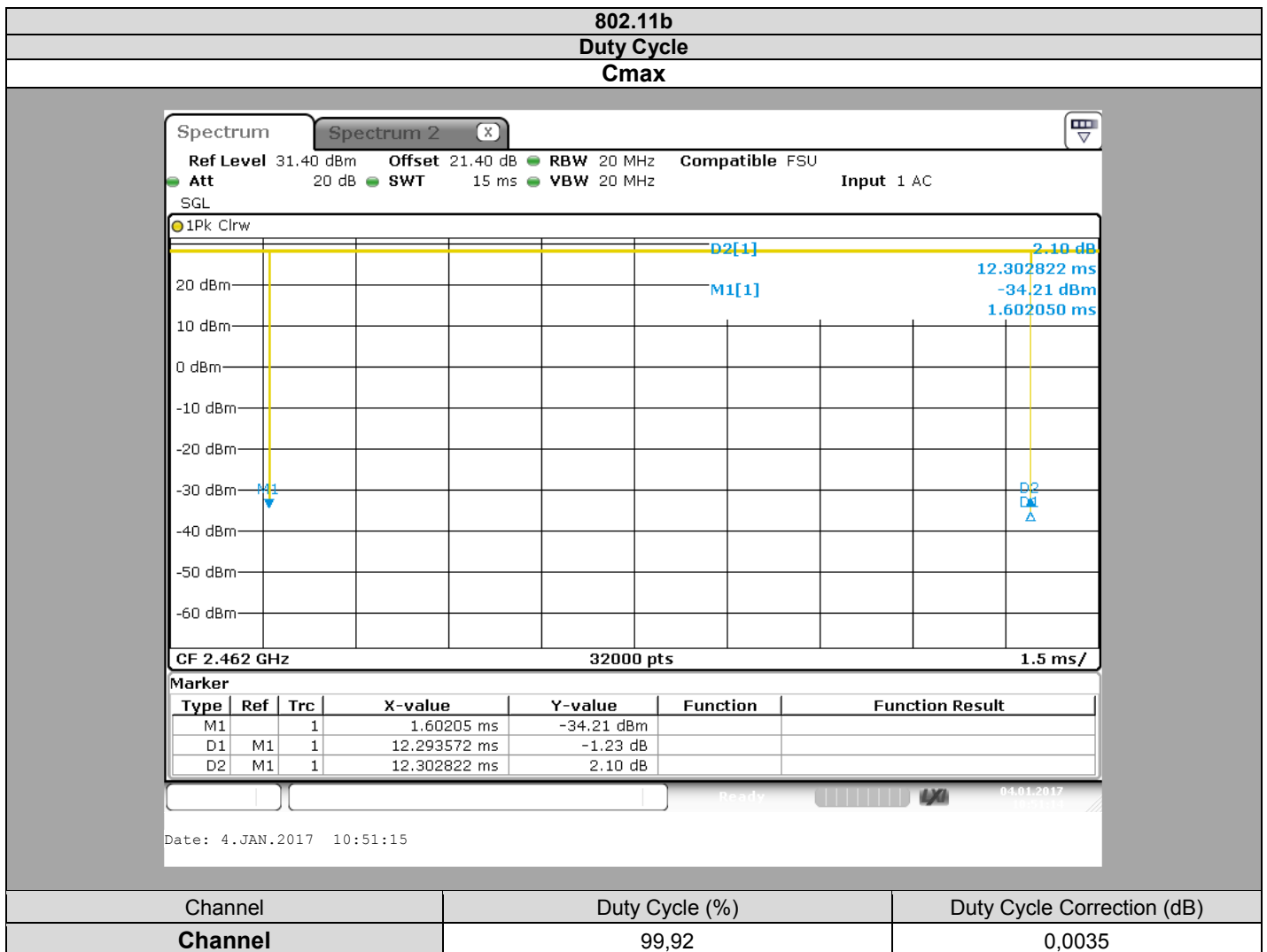
None

5.4. TEST EQUIPMENT LIST

DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2016/10	2017/10

Note: In our quality system, the test equipment calibration due is more & less 2 months

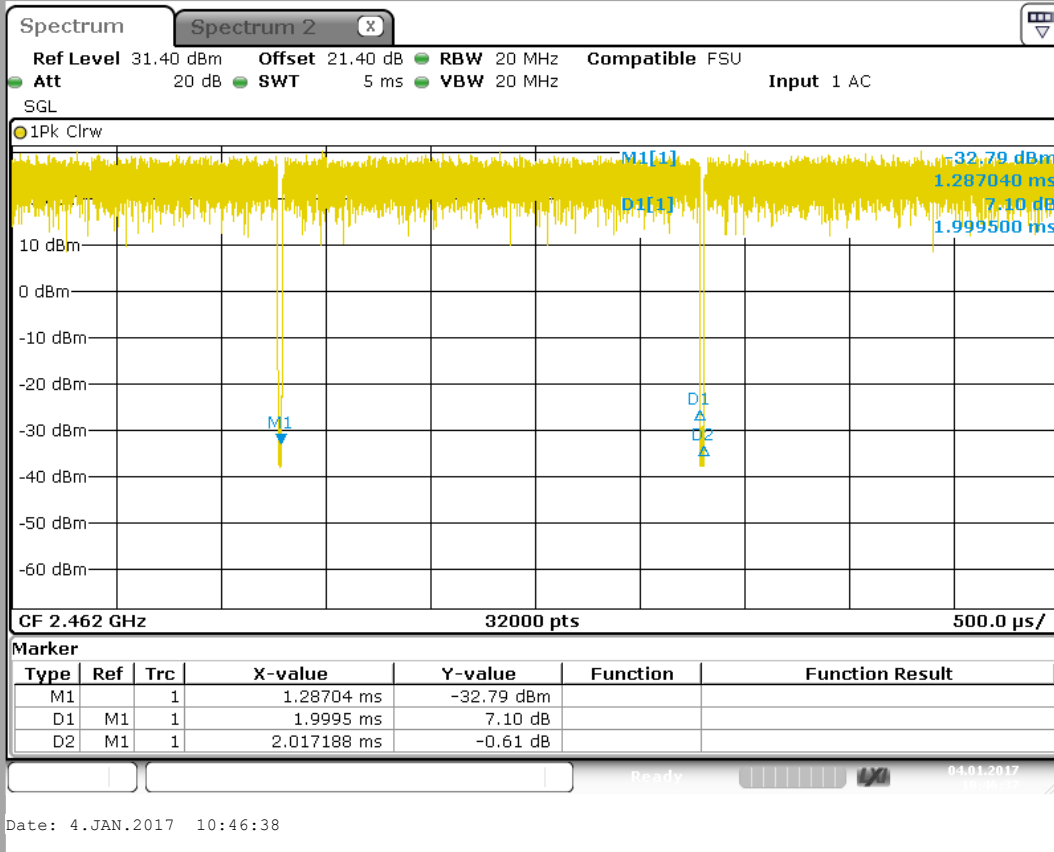
5.5. RESULTS





L C I E

802.11g
Duty Cycle
Cmax

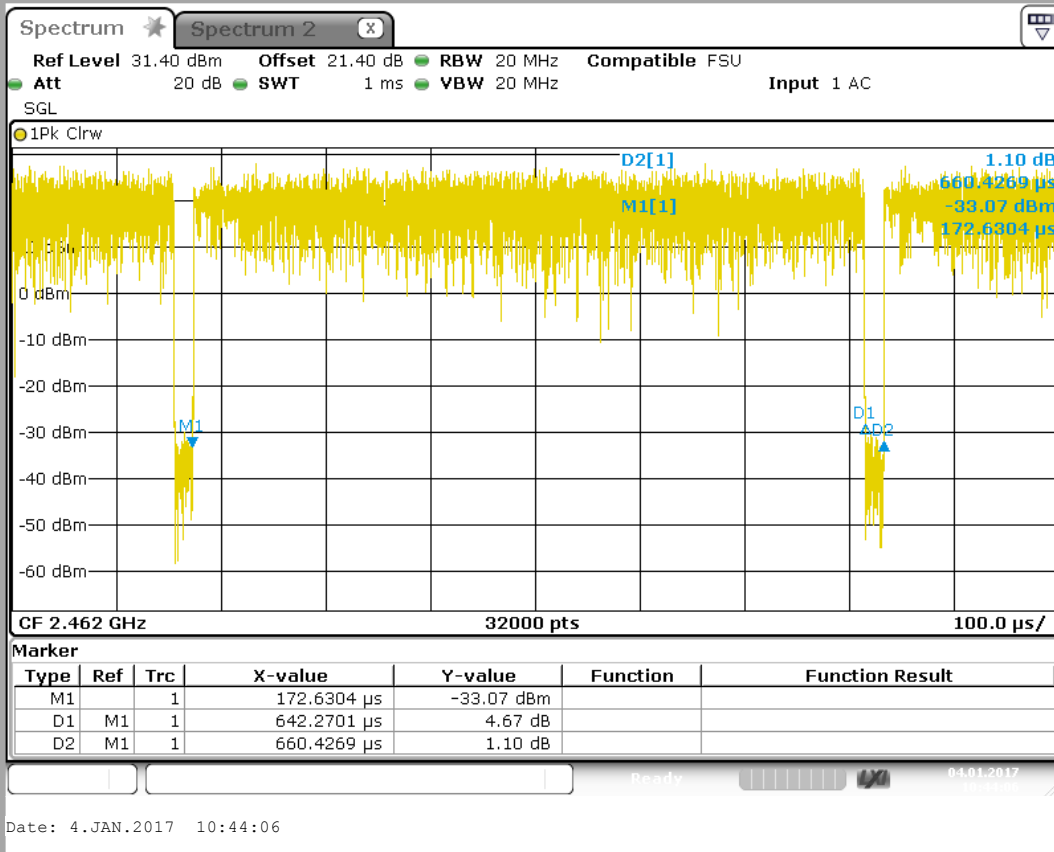


Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	99,12	0,038



L C I E

802.11n HT20
Duty Cycle
Cmax



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Channel	97,25	0,12

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : January 4, 2017 to January 9, 2017
Ambient temperature : 22 °C
Relative humidity : 41 %

6.2. TEST SETUP

- The Equipment Under Test is installed:

- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 9.2.2.2 (Method AVGSA-1)
- KDB 558074 D01 DTS Meas Guidance v03r05 § 9.2.2.4 (Method AVGSA-2)
- KDB 662911 D01 Multiple Transmitter Output v02r01



Photograph for Maximum Conducted Output Power



6.3. LIMIT

Maximum Conducted Output power:
2400MHz-2483.5MHz: Shall not exceed 30dBm
Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

6.4. TEST EQUIPMENT LIST

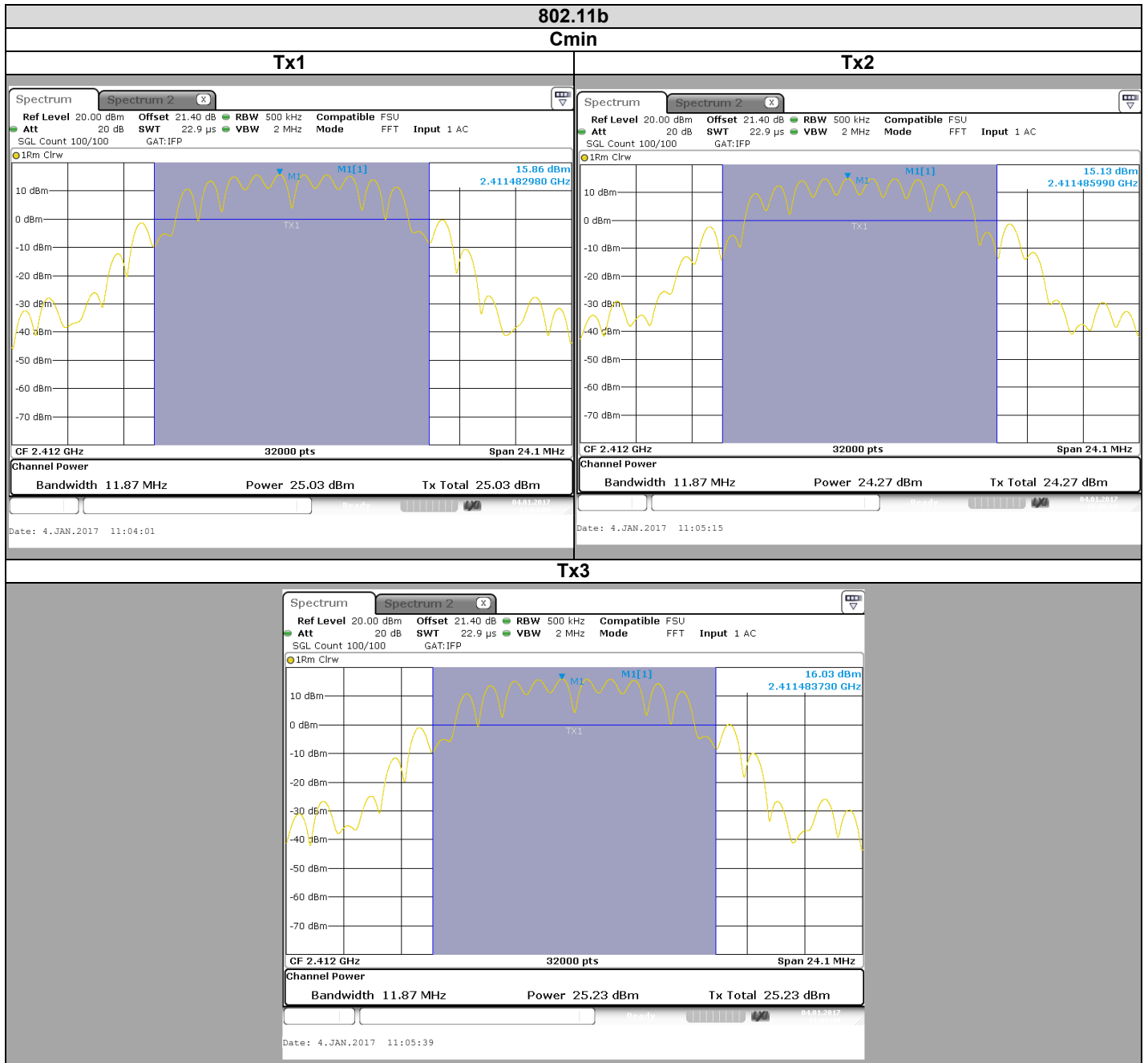
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2016/10	2017/10

Note: In our quality system, the test equipment calibration due is more & less 2 months



L C I E

6.1. RESULTS





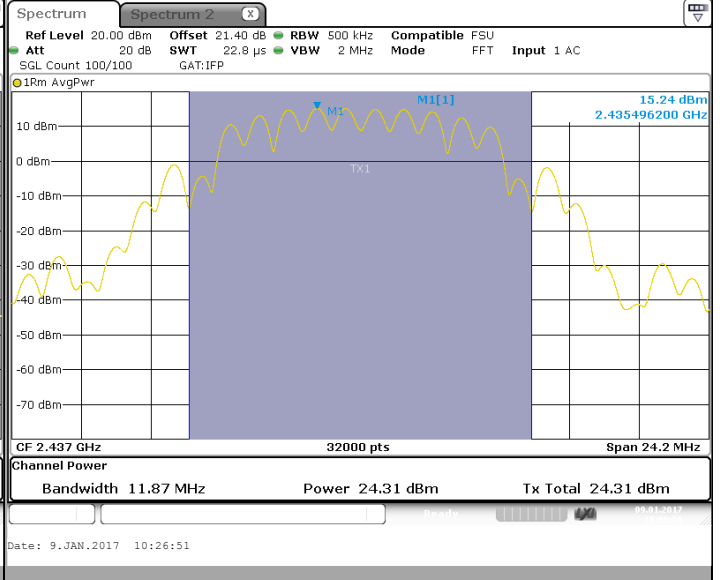
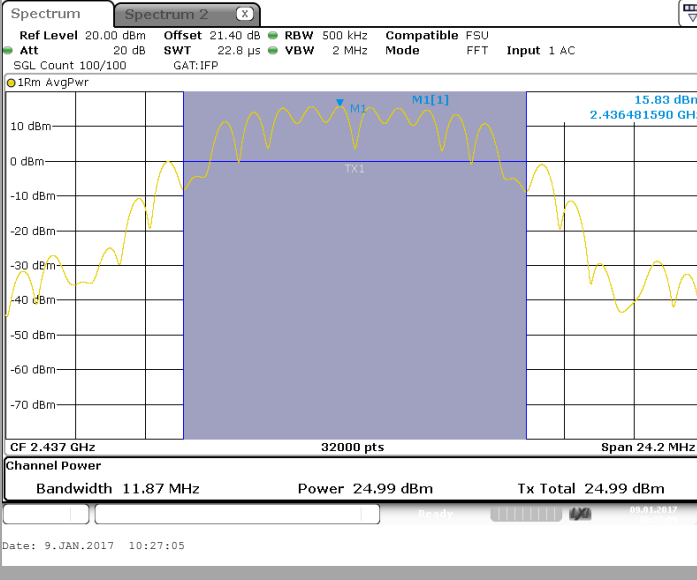
L C I E

802.11b

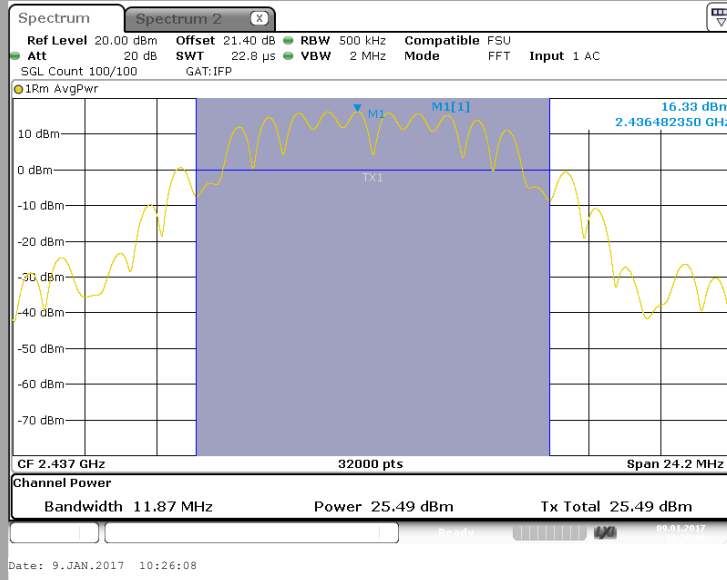
Cnom

Tx1

Tx2



Tx3





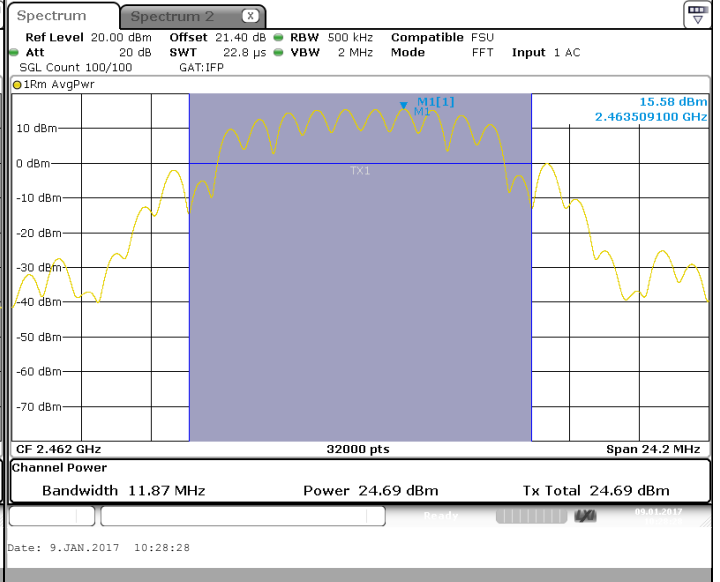
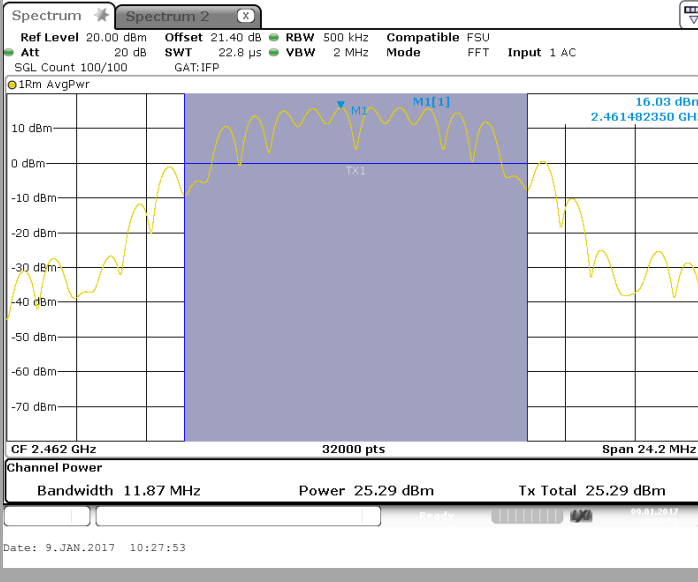
L C I E

802.11b

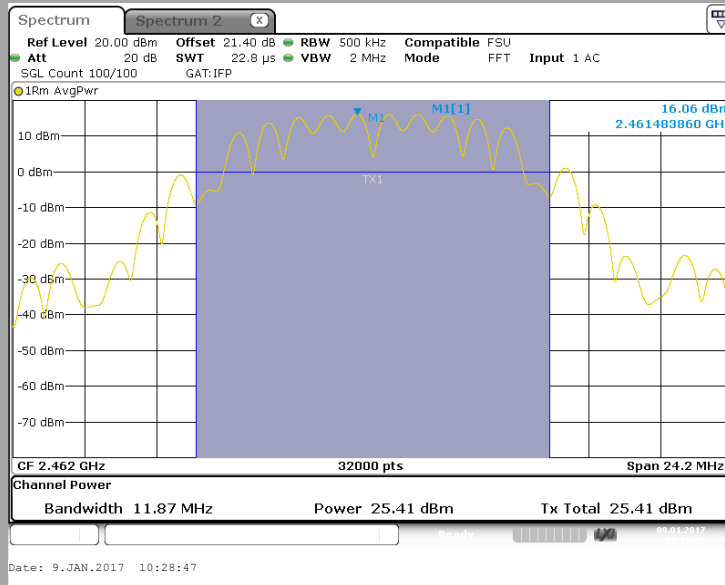
Cmax

Tx1

Tx2

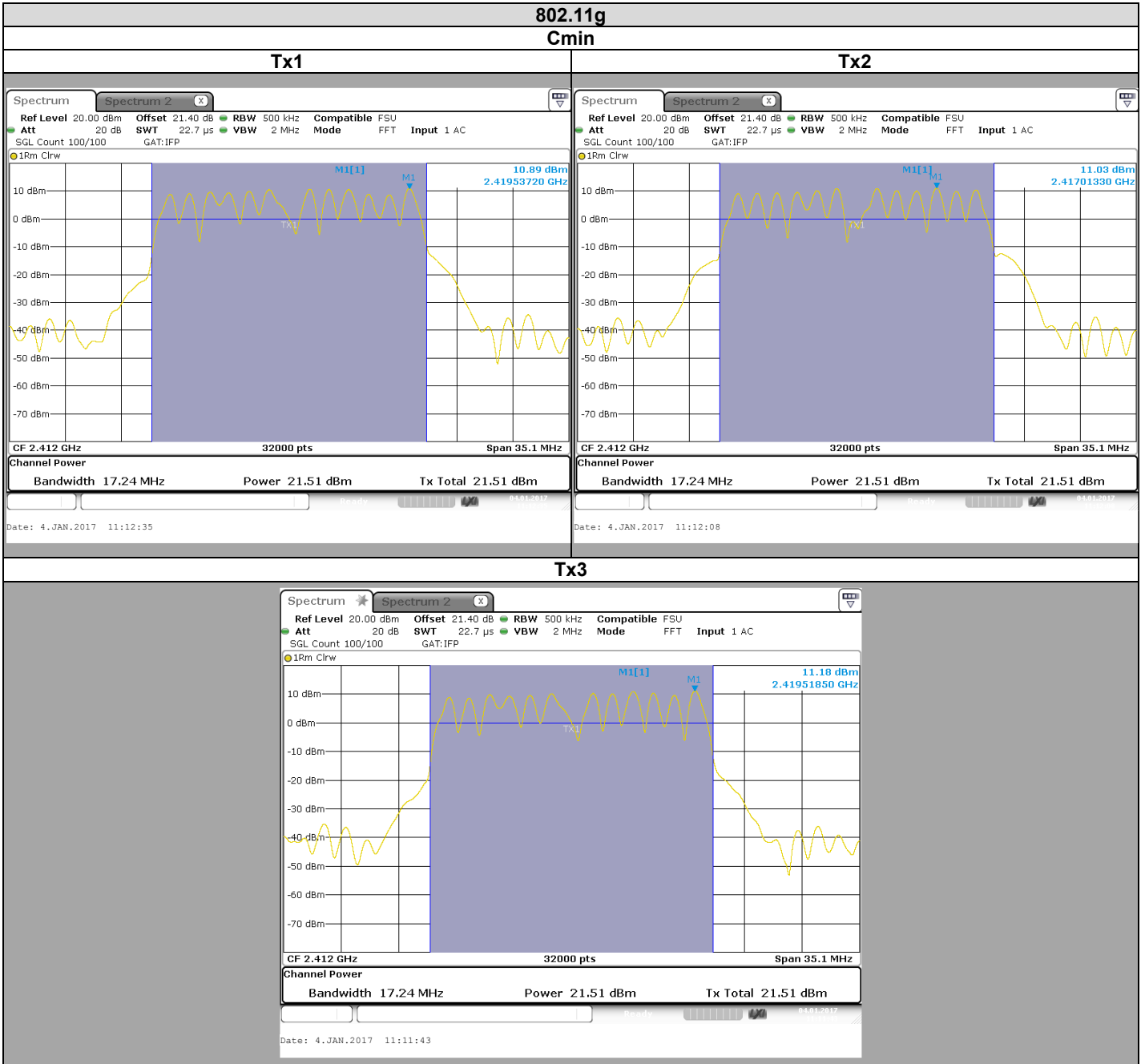


Tx3





L C I E





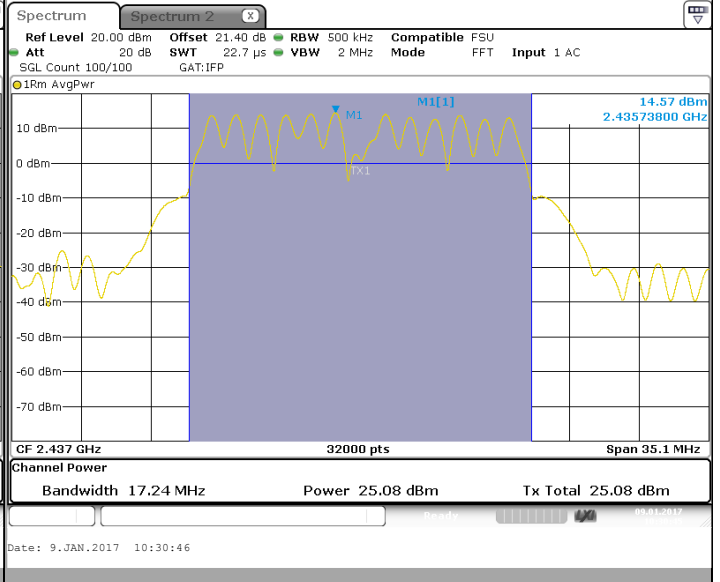
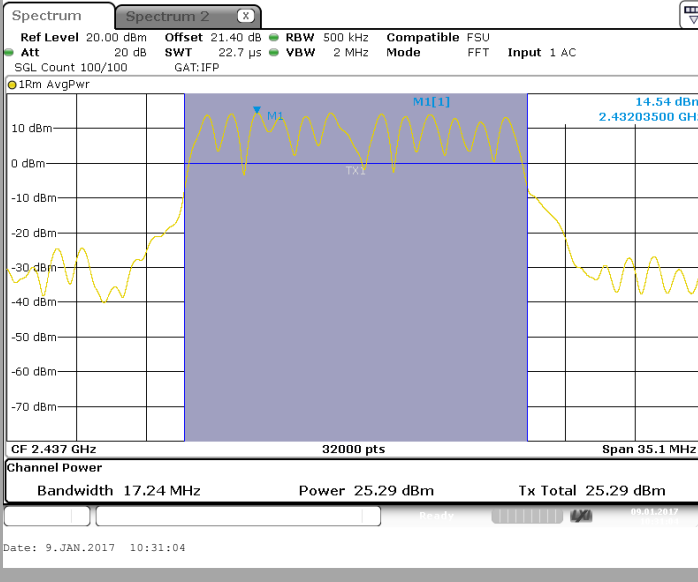
L C I E

802.11g

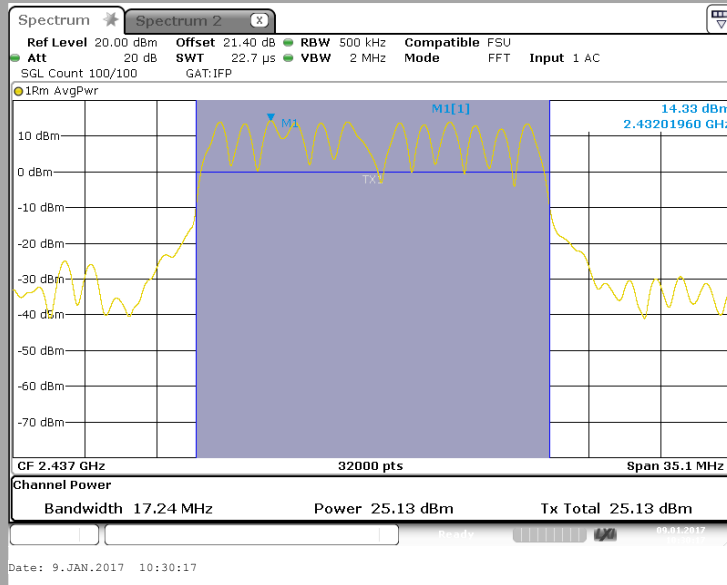
Cnom

Tx1

Tx2



Tx3





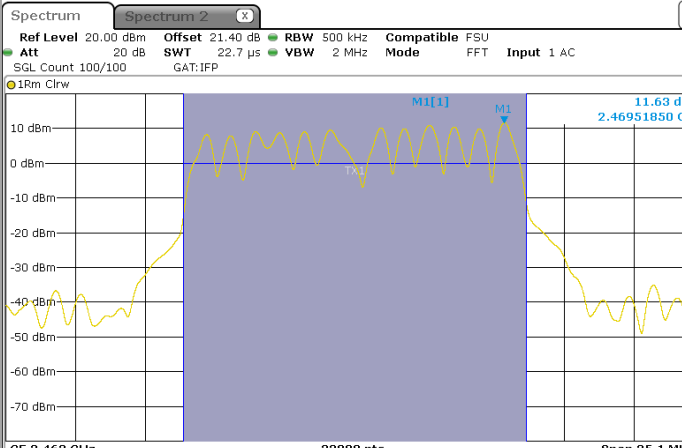
L C I E

802.11g

Cmax

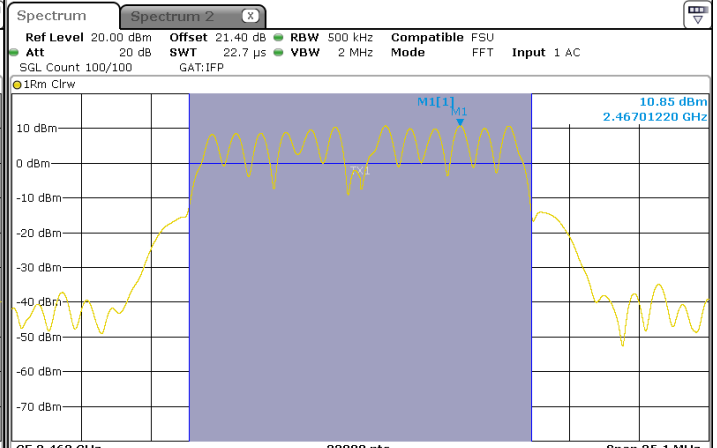
Tx1

Tx2



Channel Power
Bandwidth 17.24 MHz Power 21.31 dBm Tx Total 21.31 dBm

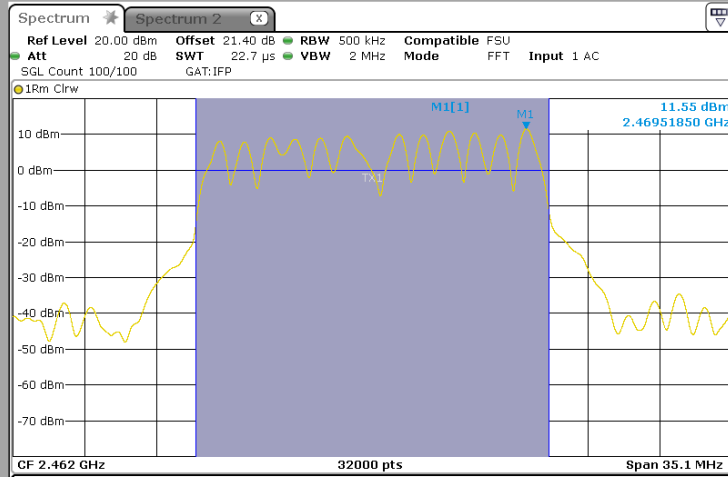
Date: 4. JAN. 2017 11:16:05



Channel Power
Bandwidth 17.24 MHz Power 21.19 dBm Tx Total 21.19 dBm

Date: 4. JAN. 2017 11:15:45

Tx3



Channel Power
Bandwidth 17.24 MHz Power 21.23 dBm Tx Total 21.23 dBm

Date: 4. JAN. 2017 11:15:27

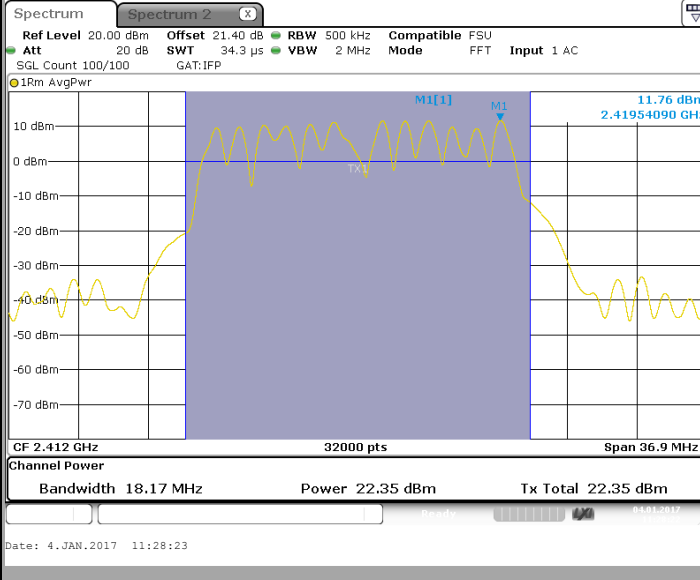


L C I E

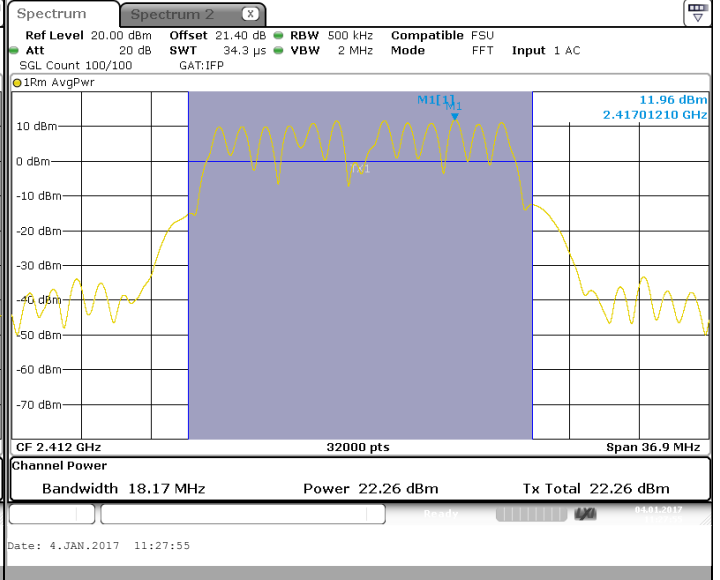
802.11nHT20

Cmin

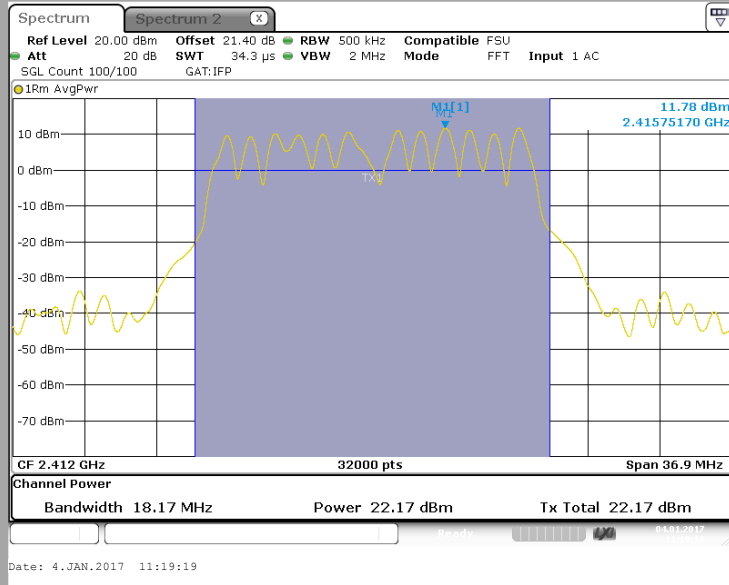
Tx1



Tx2



Tx3





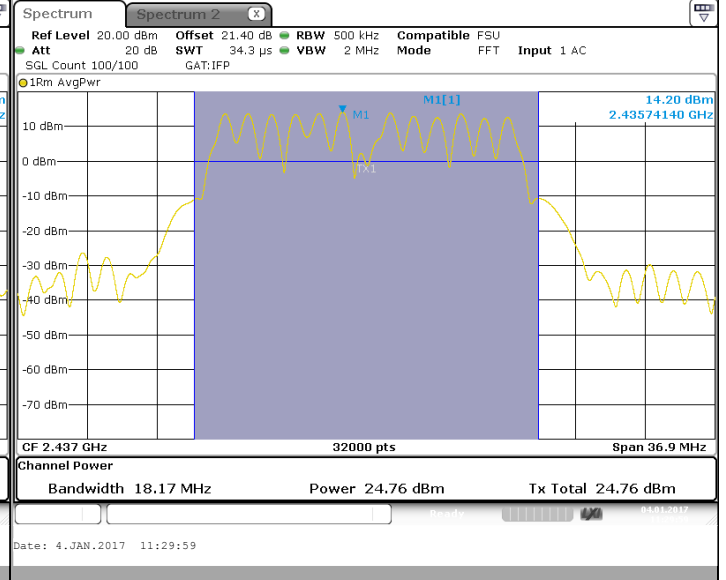
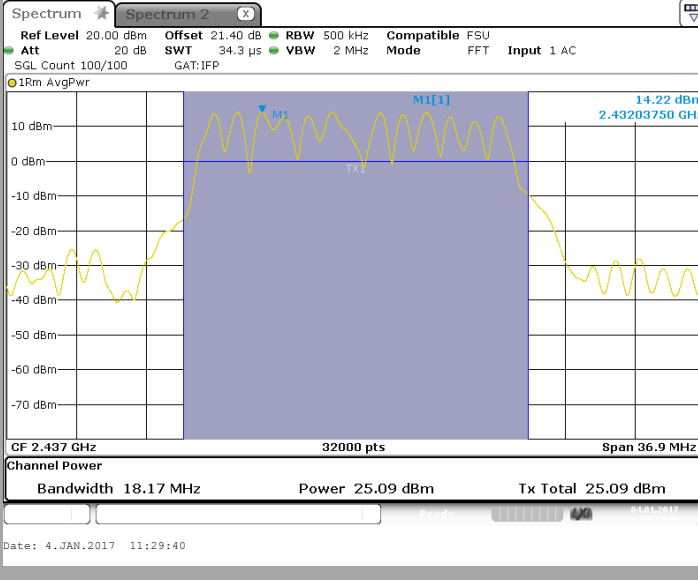
L C I E

802.11nHT20

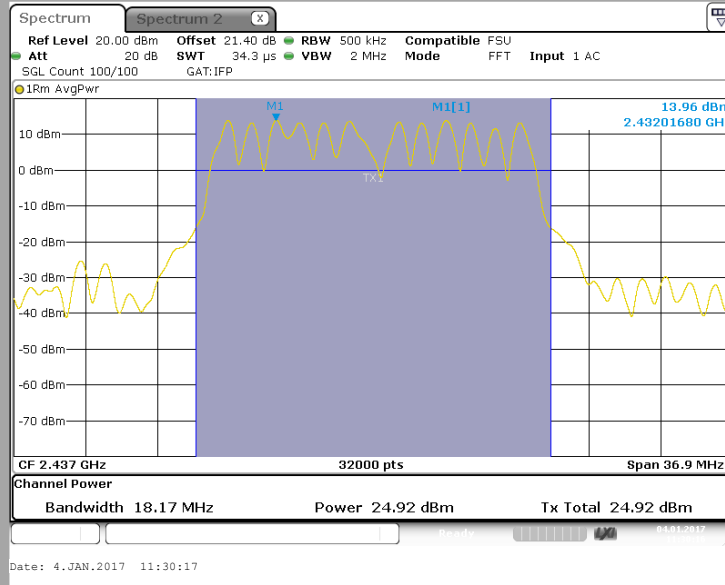
Cnom

Tx1

Tx2



Tx3



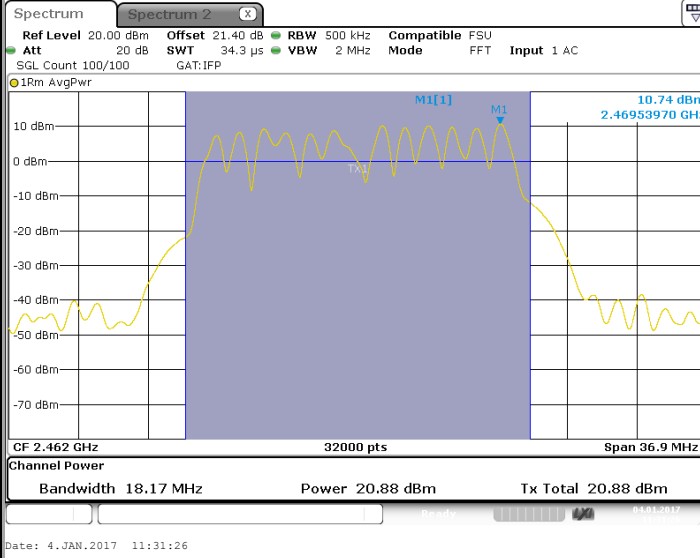


L C I E

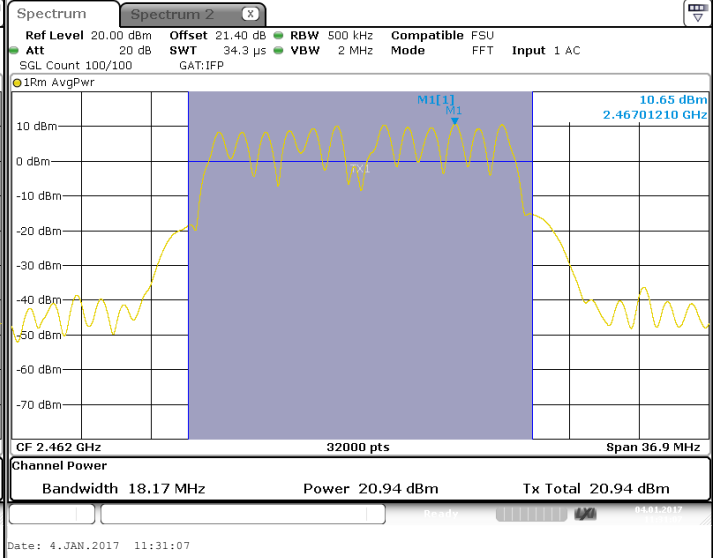
802.11nHT20

Cmax

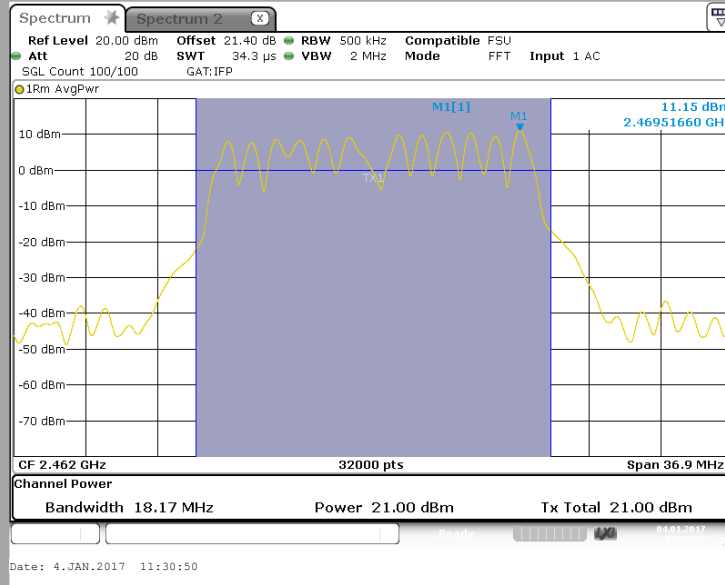
Tx1



Tx2



Tx3





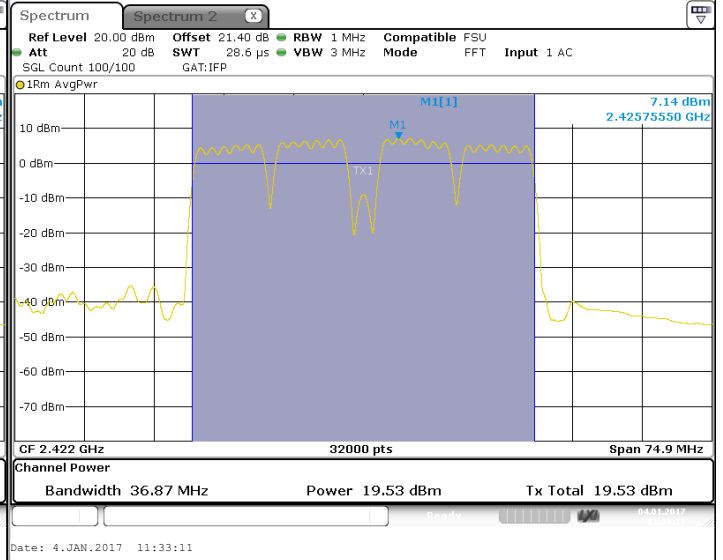
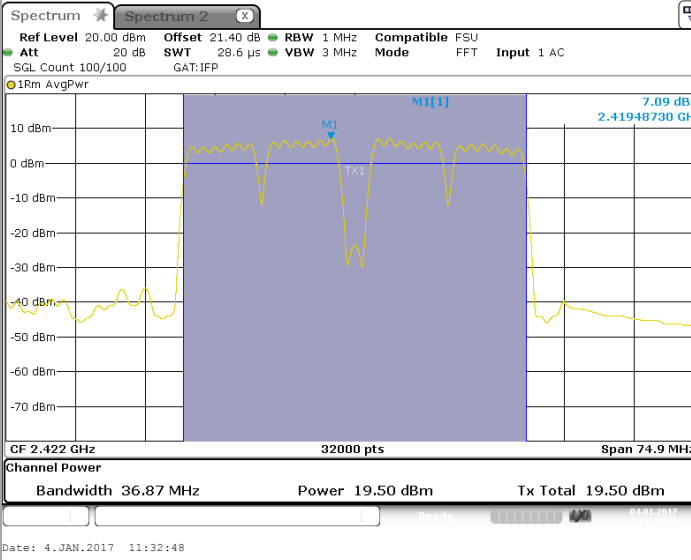
L C I E

802.11nHT40

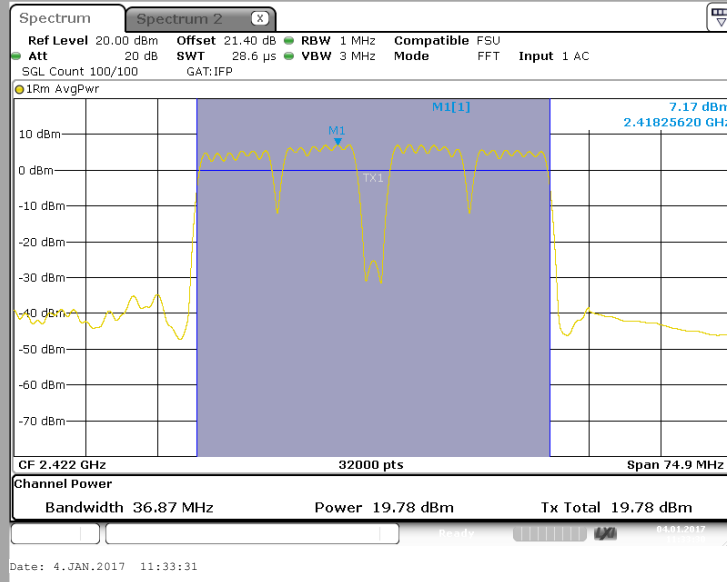
Cmin

Tx1

Tx2



Tx3





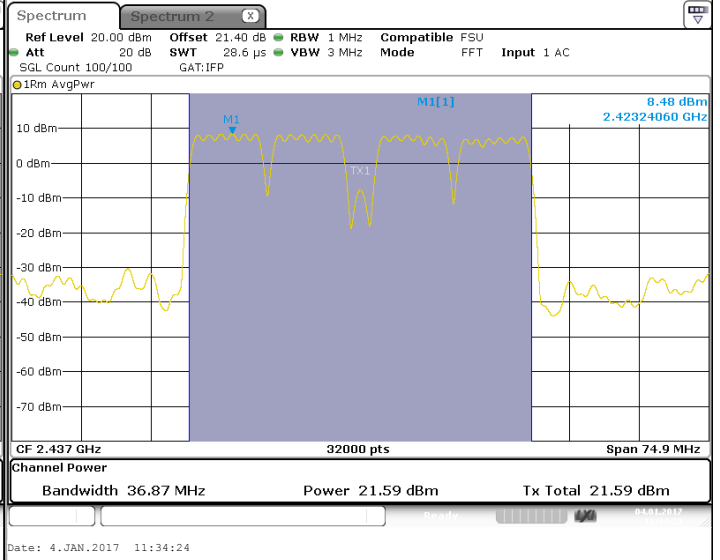
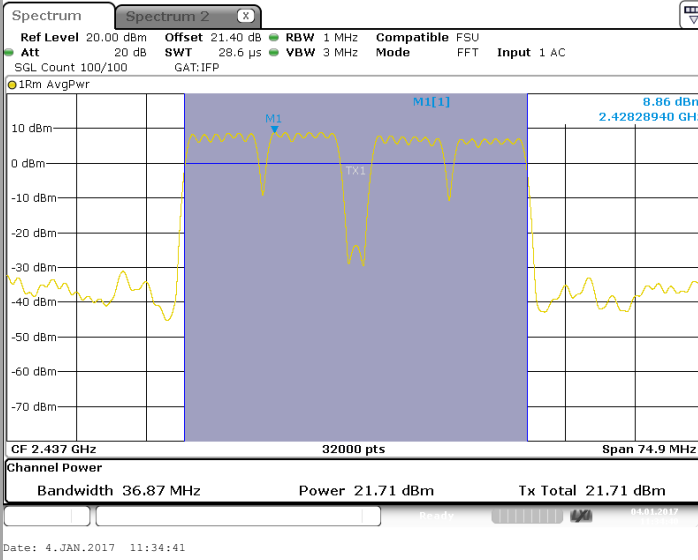
L C I E

802.11nHT40

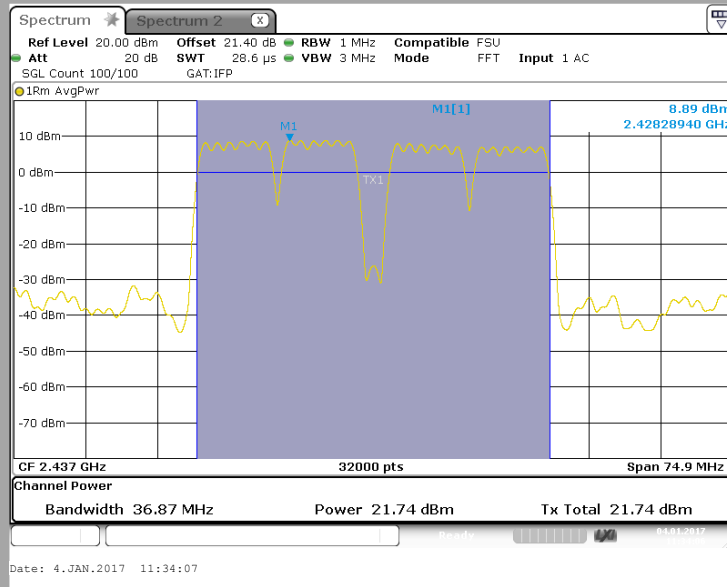
Cnom

Tx1

Tx2



Tx3





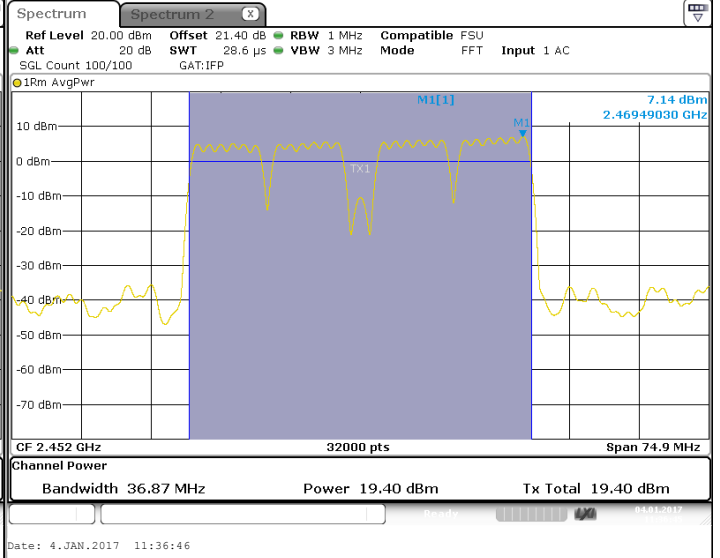
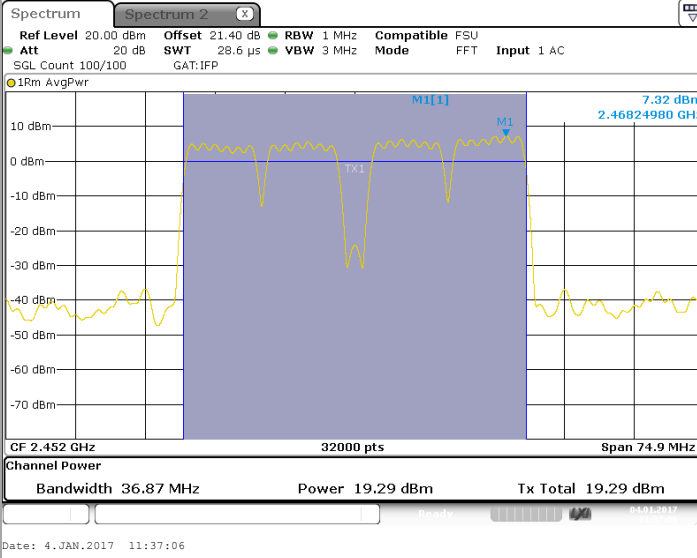
L C I E

802.11nHT40

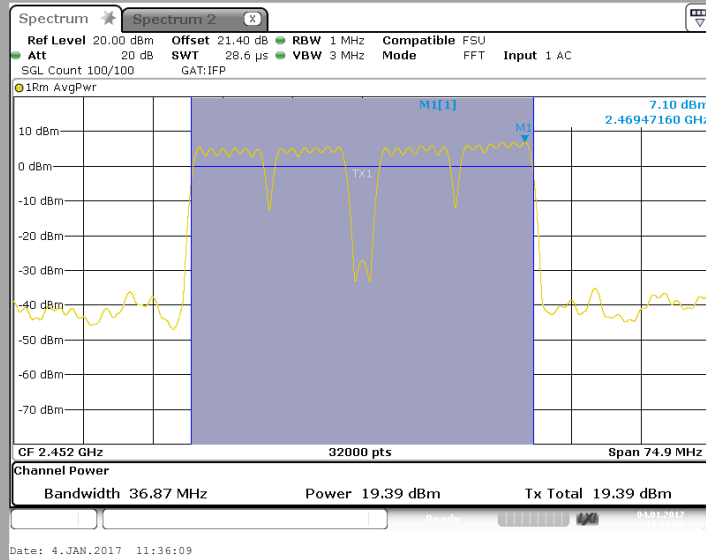
Cmax

Tx1

Tx2



Tx3



Spectrum Analyzer Offset:
Cable Loss=1,4dB + Attenuator= 21,4dB

802.11b							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	25,03	24,27	25,23		5,00	29,63	30
Cnom	24,99	24,31	25,49		5,00	29,73	30
Cmax	25,29	24,69	25,41		5,00	29,91	30

802.11g							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	21,51	21,51	21,51		5,00	26,28	30
Cnom	25,29	25,08	25,13		5,00	29,93	30
Cmax	21,31	21,19	21,23		5,00	26,01	30

802.11n HT20							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	22,35	22,26	22,17		5,00	27,03	30
Cnom	25,09	24,76	24,92		5,00	29,70	30
Cmax	20,88	20,94	21		5,00	25,71	30

802.11n HT40							
Channel	Tx1 (dBm)	Tx2 (dBm)	Tx3 (dBm)	Tx4 (dBm)	Overall Antenna Gain (dBi)	Maximum Conducted Power (dBm)	Limit (dBm)
Cmin	19,5	19,53	19,78		5,00	24,38	30
Cnom	21,71	21,59	21,74		5,00	26,45	30
Cmax	19,29	19,4	19,39		5,00	24,13	30

6.2. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SAGEMCOM** MiniBox (253697290), SN: **616476080862**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.

7. POWER SPECTRAL DENSITY

7.1. TEST CONDITIONS

Test performed by : Mathieu CERISIER
Date of test : January 4, 2017 to January 9, 2017
Ambient temperature : 22 °C
Relative humidity : 41 %

7.2. TEST SETUP

- The Equipment Under Test is installed:

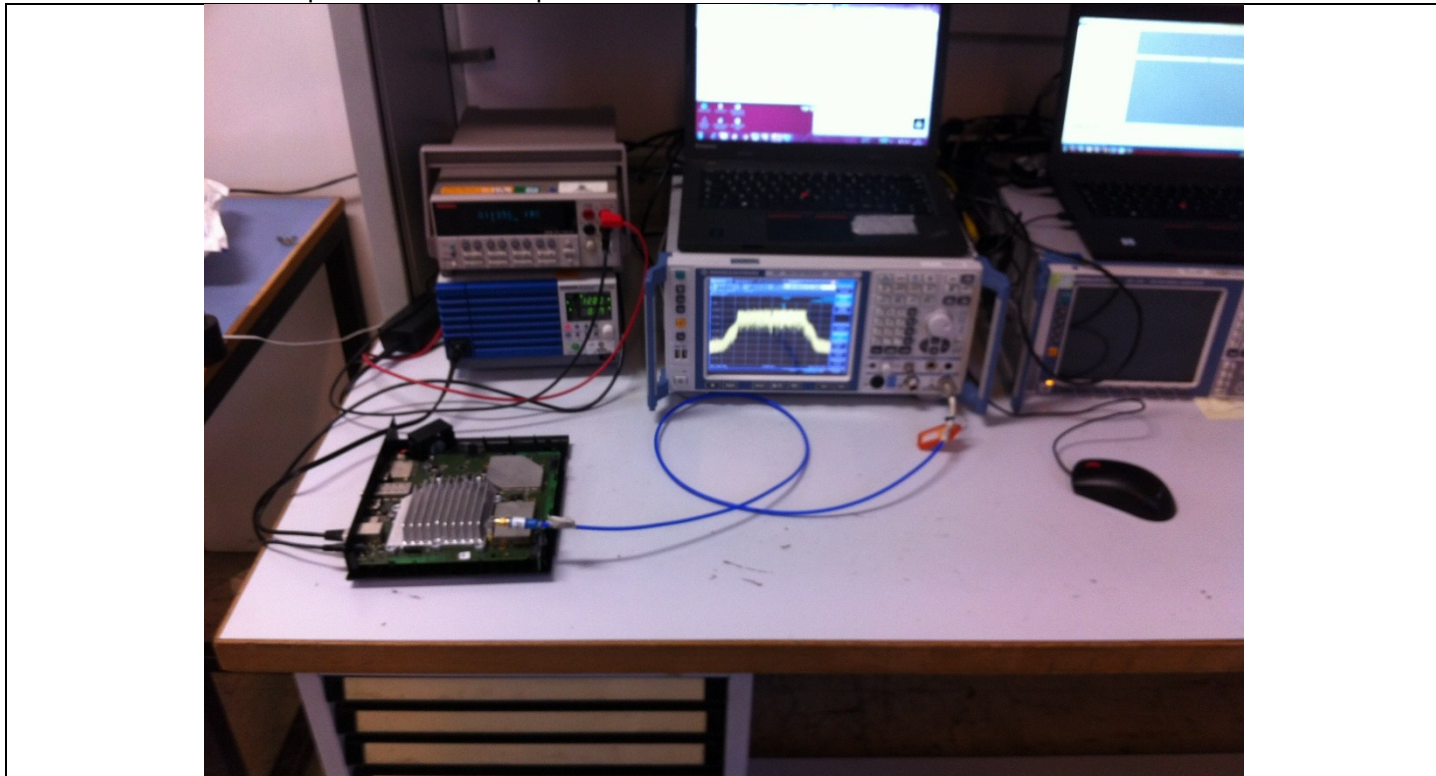
- On a table
- In an anechoic chamber

- Measurement is performed with a spectrum analyzer in:

- Conducted Method
- Radiated Method

- Test Procedure:

- KDB 558074 D01 DTS Meas Guidance v03r05 § 10.2 (Method PKPSD)
- KDB 558074 D01 DTS Meas Guidance v03r05 § 10.3 (Method AVGPSD-1)
- KDB 662911 D01 Multiple Transmitter Output v02r01



Photograph for Power Spectral Density



7.3. LIMIT

Power Spectral Density:

2400MHz-2483.5MHz: Shall not exceed 8dBm/3kHz

Limits are reduced by G-6dBi if Overall Antenna Gain above 6dBi

7.4. TEST EQUIPMENT LIST

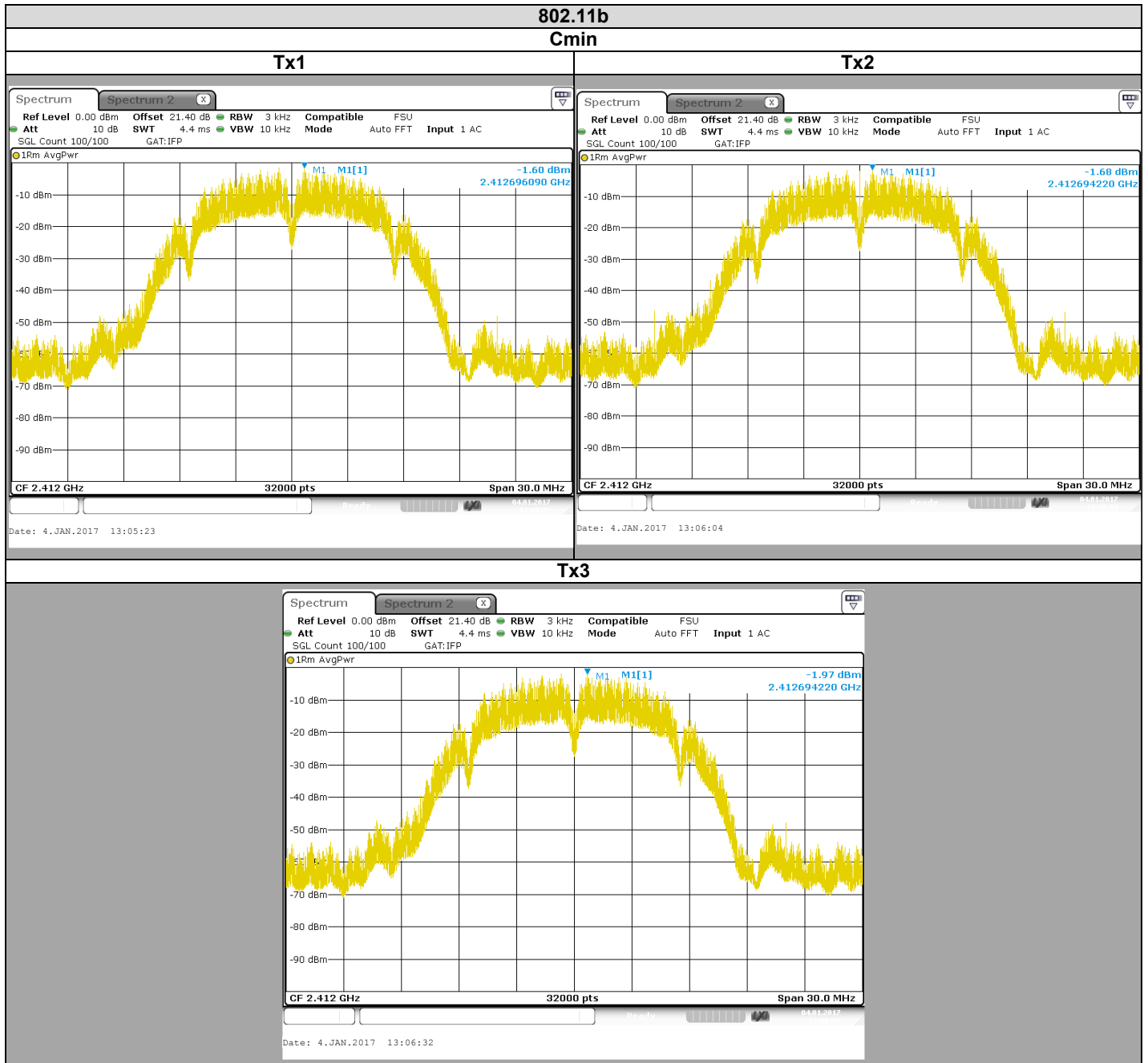
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF cable & 20 dB attenuator	Télédyne	920-0202-048	A5329675	2016/10	2017/10

Note: In our quality system, the test equipment calibration due is more & less 2 months



L C I E

7.1. RESULTS





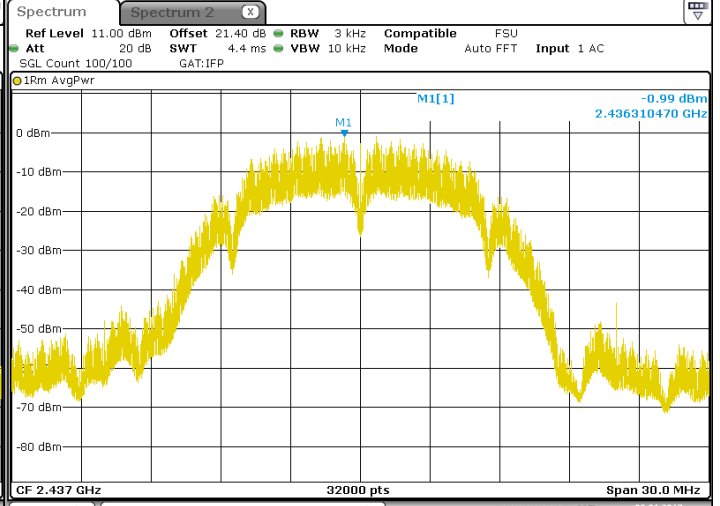
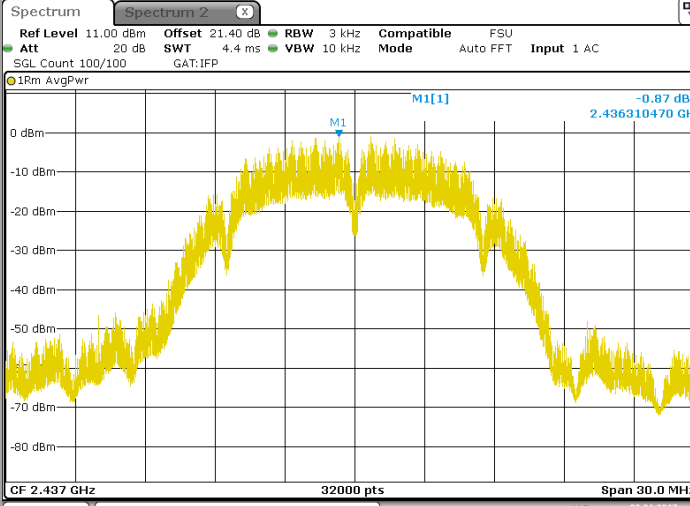
L C I E

802.11b

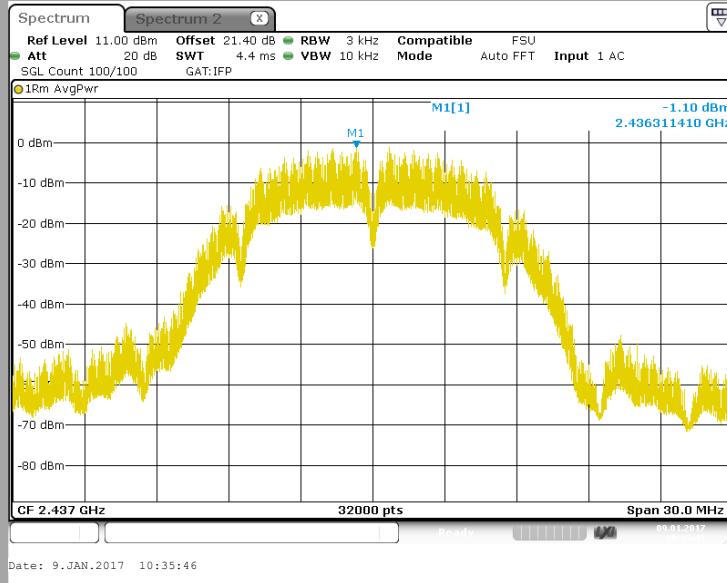
Cnom

Tx1

Tx2



Tx3





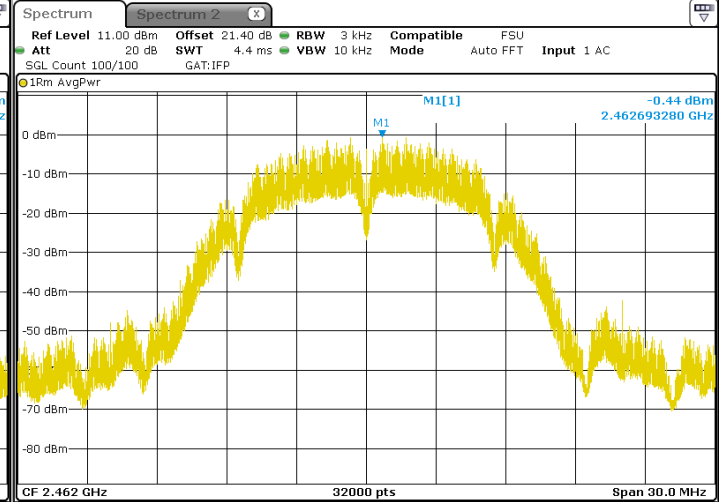
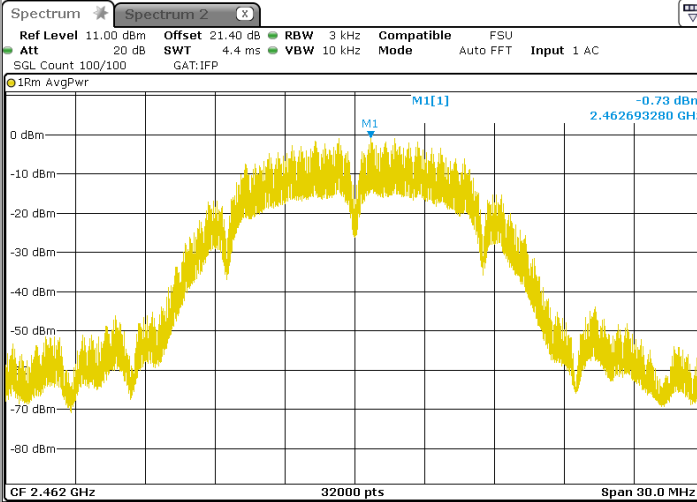
L C I E

802.11b

Cmax

Tx1

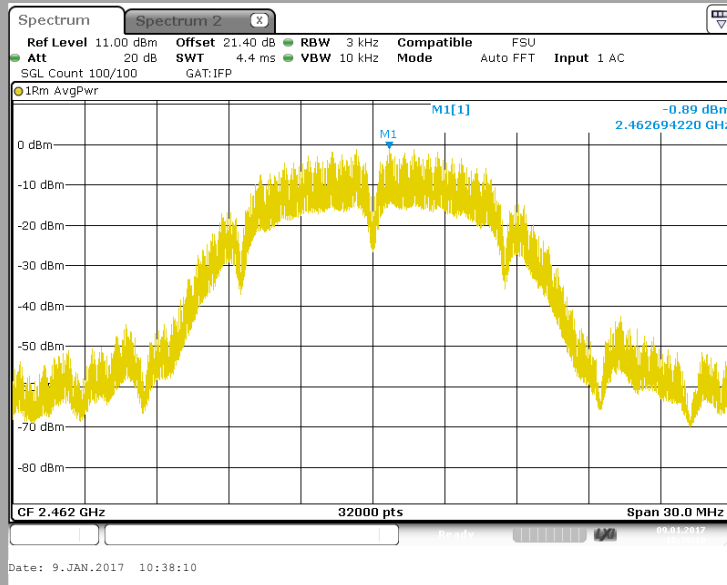
Tx2



Date: 9. JAN. 2017 10:37:22

Date: 9. JAN. 2017 10:37:47

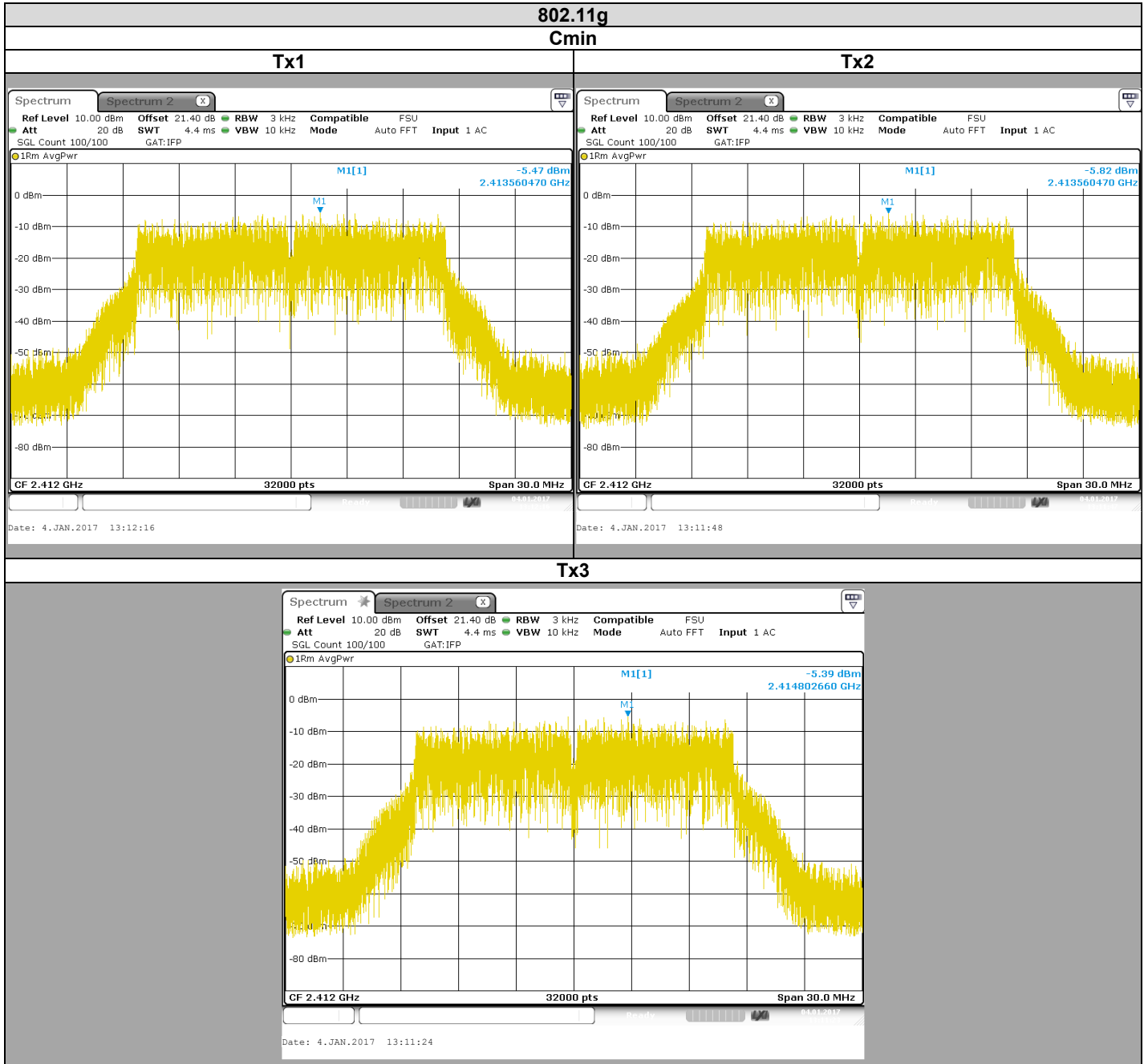
Tx3



Date: 9. JAN. 2017 10:38:10



L C I E



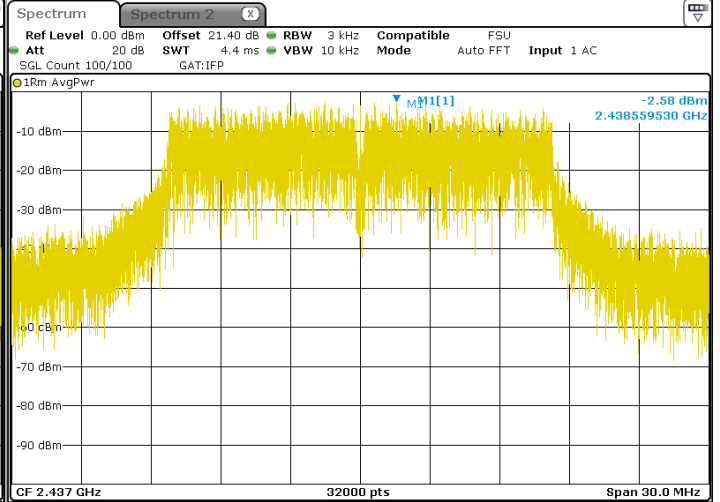
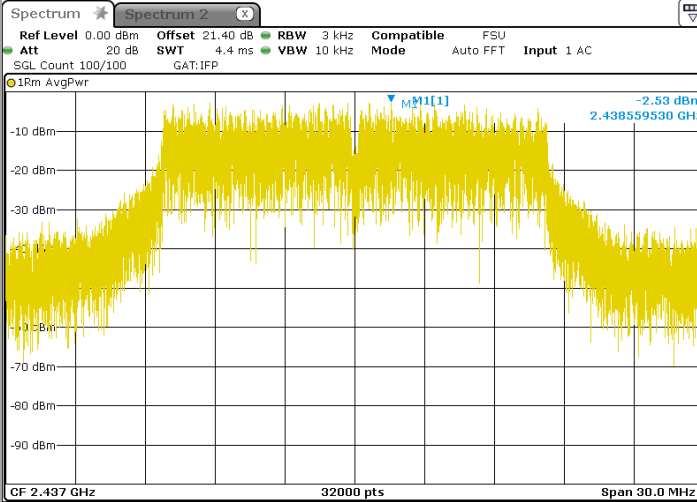


L C I E

802.11g Cnom

Tx1

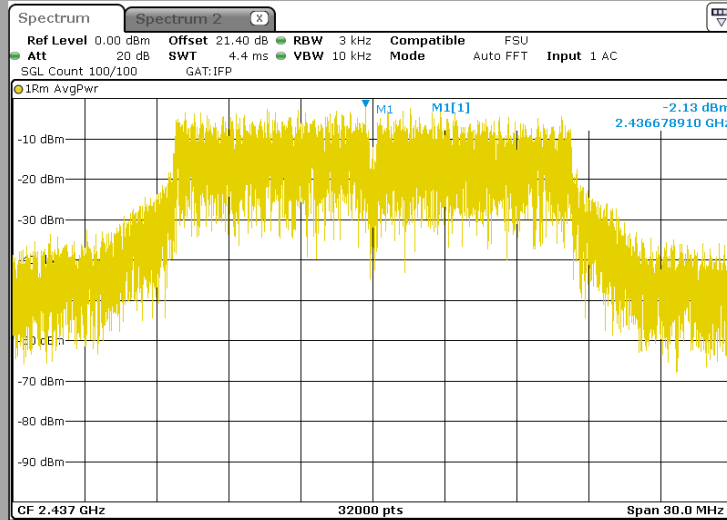
Tx2



Date: 9. JAN. 2017 10:32:37

Date: 9. JAN. 2017 10:33:15

Tx3



Date: 9. JAN. 2017 10:33:53



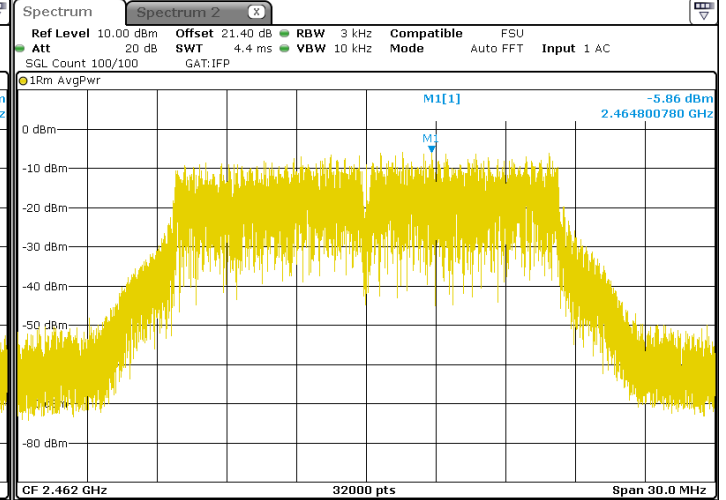
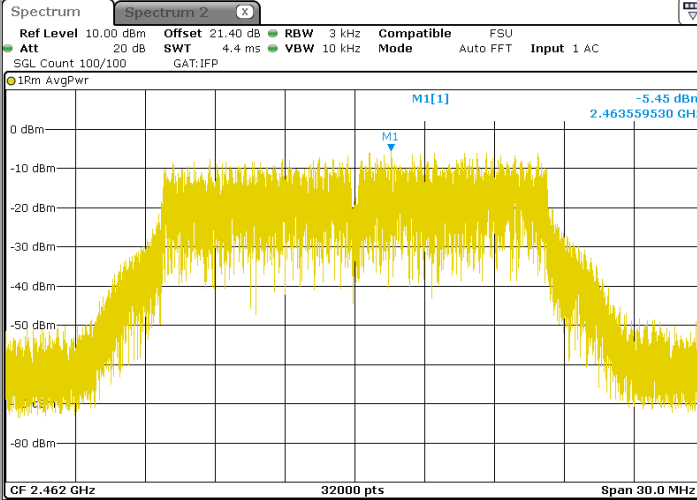
L C I E

802.11g

Cmax

Tx1

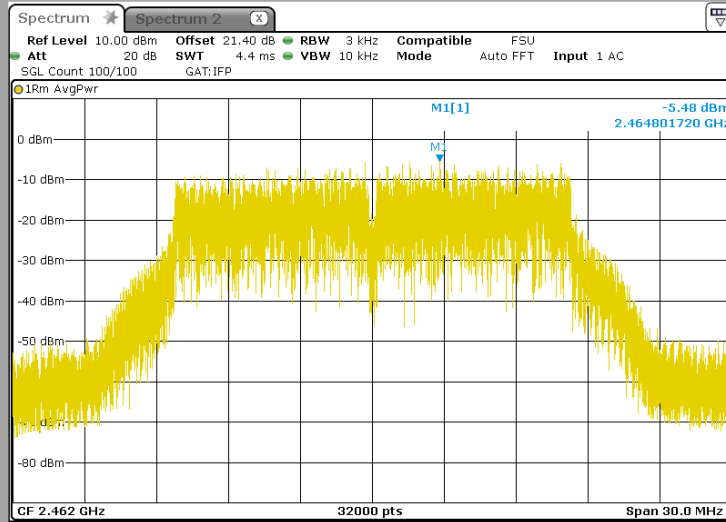
Tx2



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Date: 4. JAN. 2017 13:16:35

Tx3



Date: 4. JAN. 2017 13:16:16



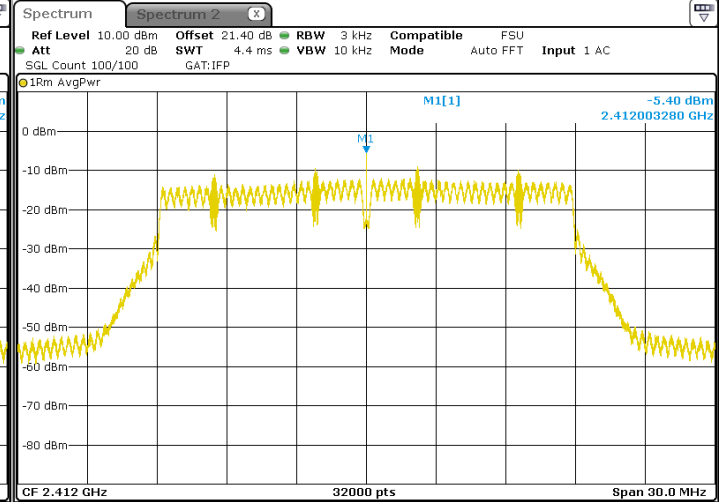
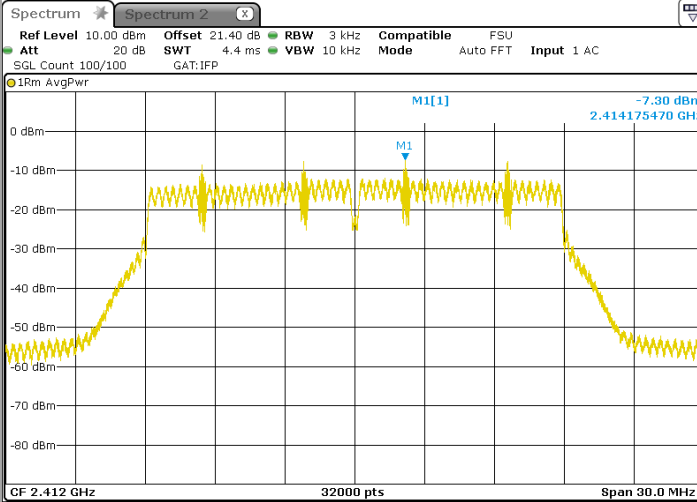
L C I E

802.11nHT20

Cmin

Tx1

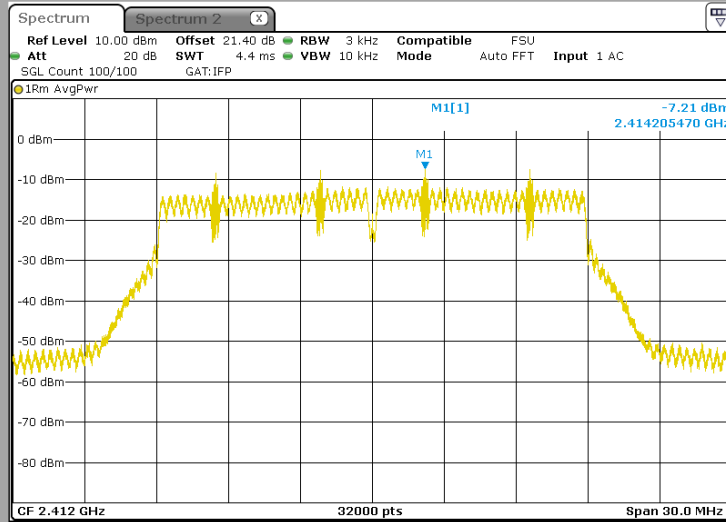
Tx2



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Date: 4. JAN. 2017 13:19:13

Tx3



Date: 4. JAN. 2017 13:19:35



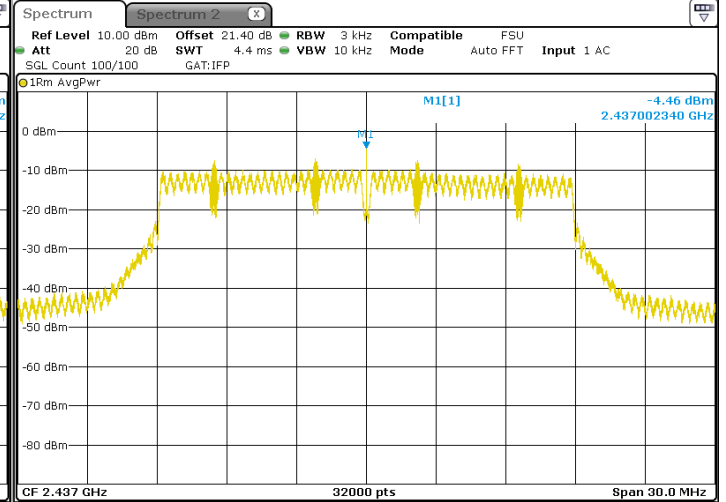
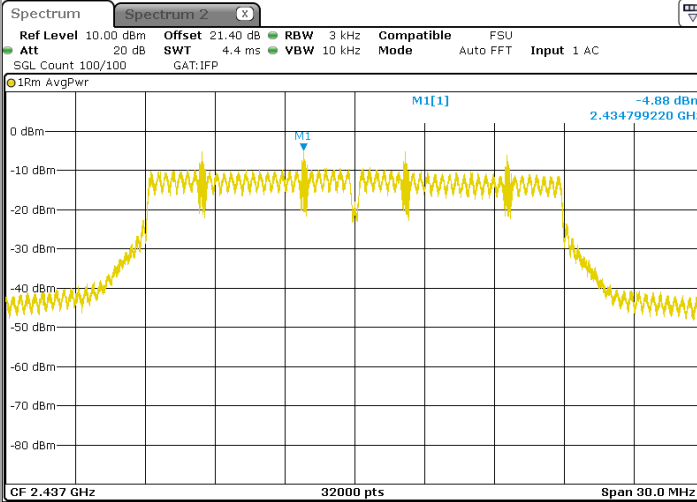
L C I E

802.11nHT20

Cnom

Tx1

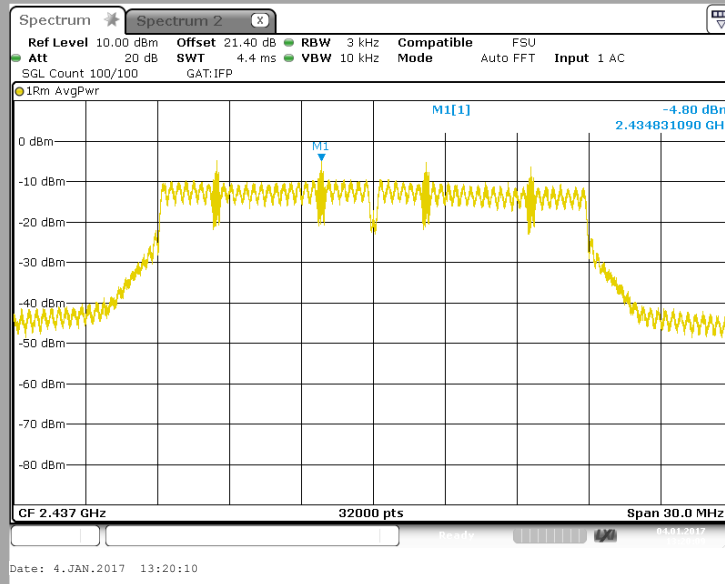
Tx2



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Date: 4. JAN. 2017 13:20:30

Tx3



Date: 4. JAN. 2017 13:20:10



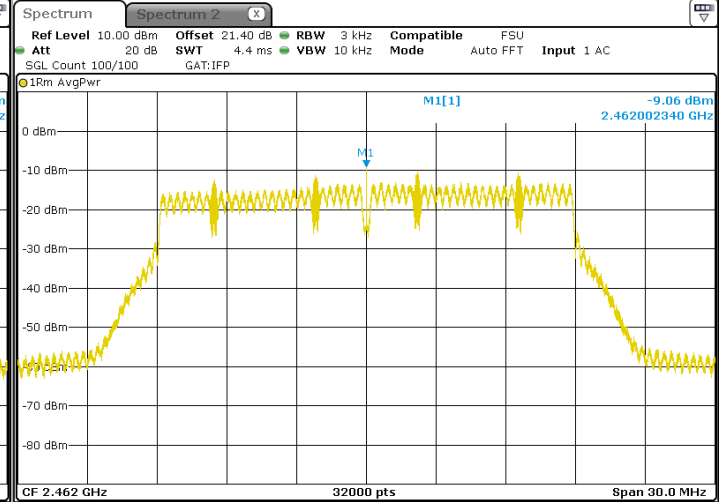
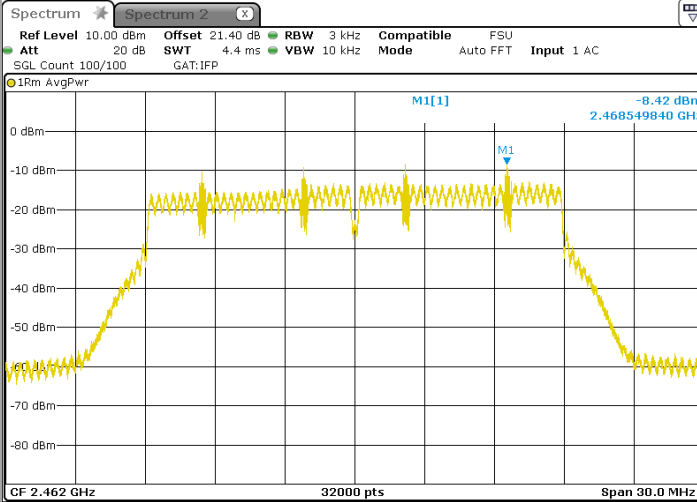
L C I E

802.11nHT20

Cmax

Tx1

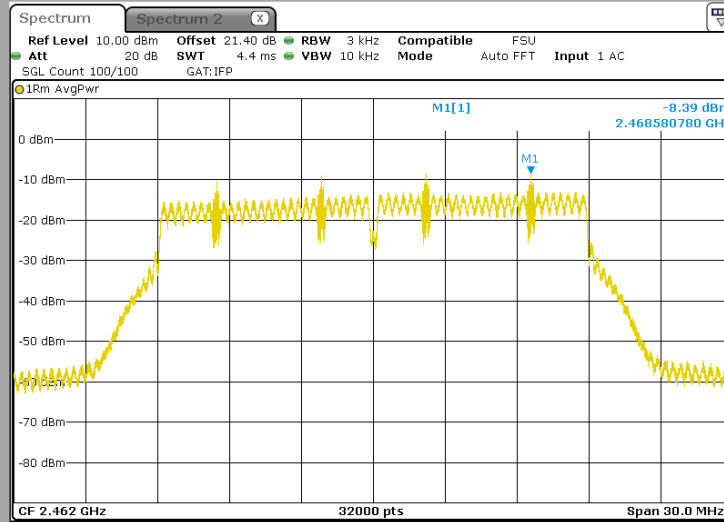
Tx2



Date: 4. JAN. 2017 13:21:26

Date: 4. JAN. 2017 13:21:50

Tx3



Date: 4. JAN. 2017 13:22:12



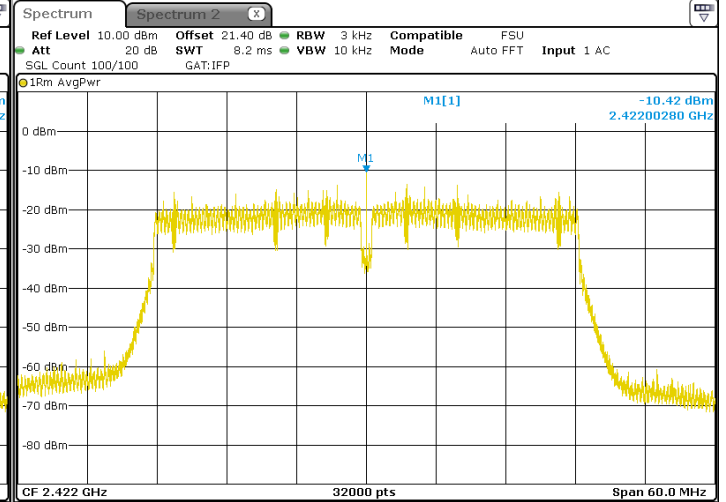
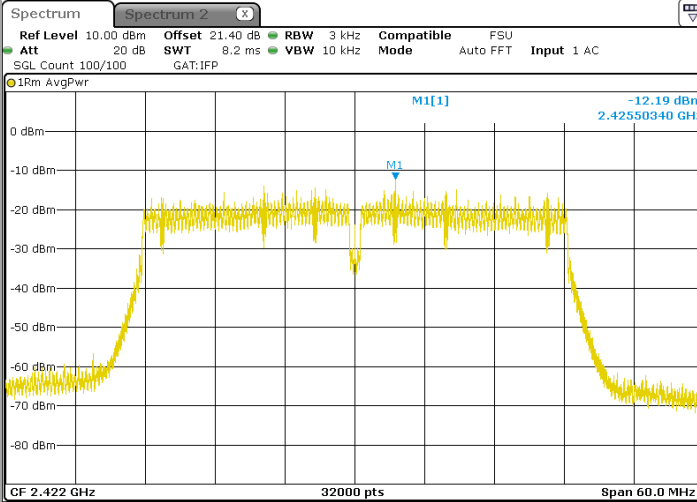
L C I E

802.11nHT40

Cmin

Tx1

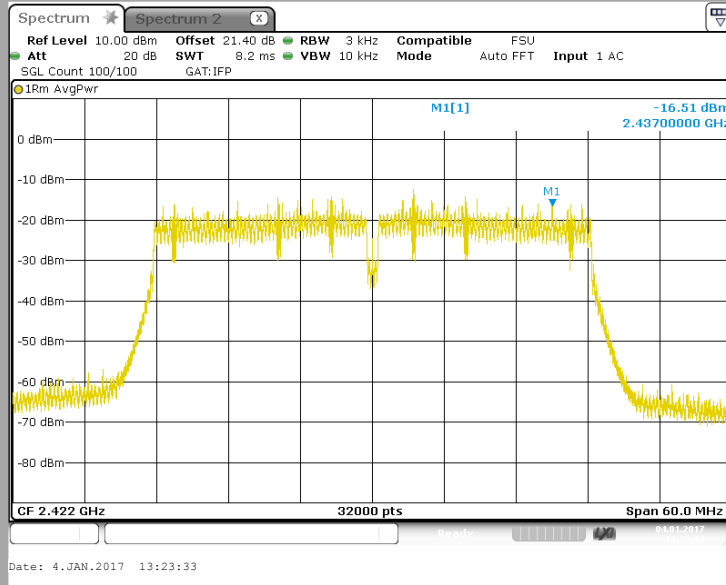
Tx2



Date: 4. JAN. 2017 13:24:21

Date: 4. JAN. 2017 13:23:58

Tx3



Date: 4. JAN. 2017 13:23:33

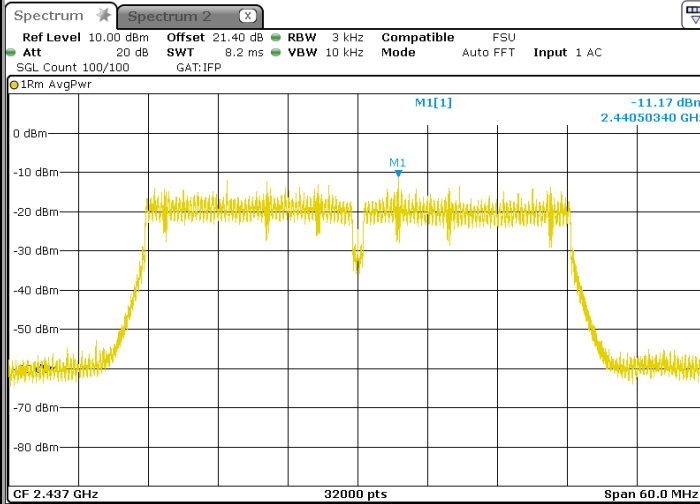


L C I E

802.11nHT40

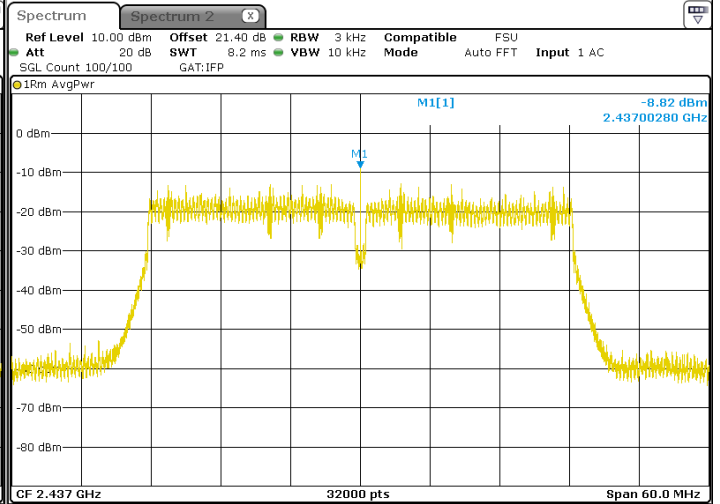
Cnom

Tx1



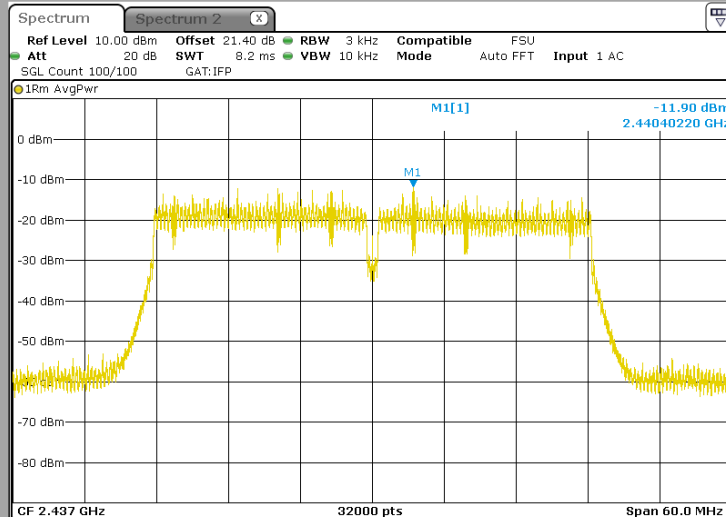
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Tx2



Date: 4. JAN. 2017 13:25:41

Tx3



Date: 4. JAN. 2017 13:26:12

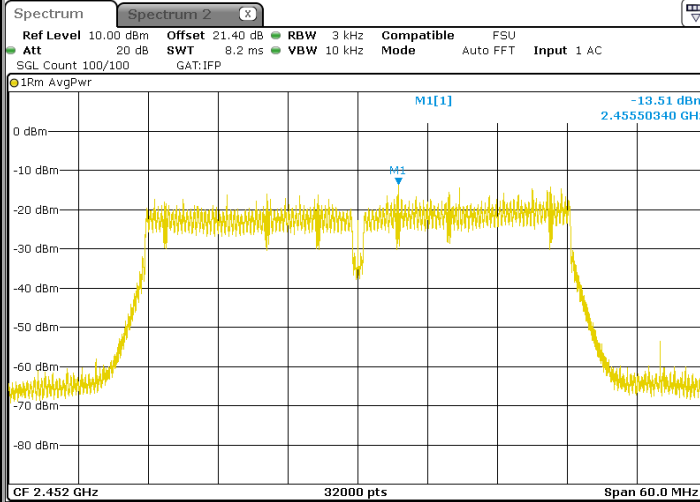


L C I E

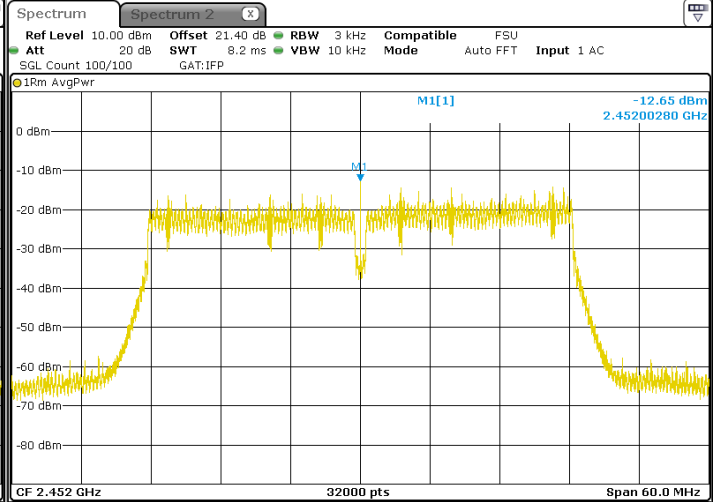
802.11nHT40

Cmax

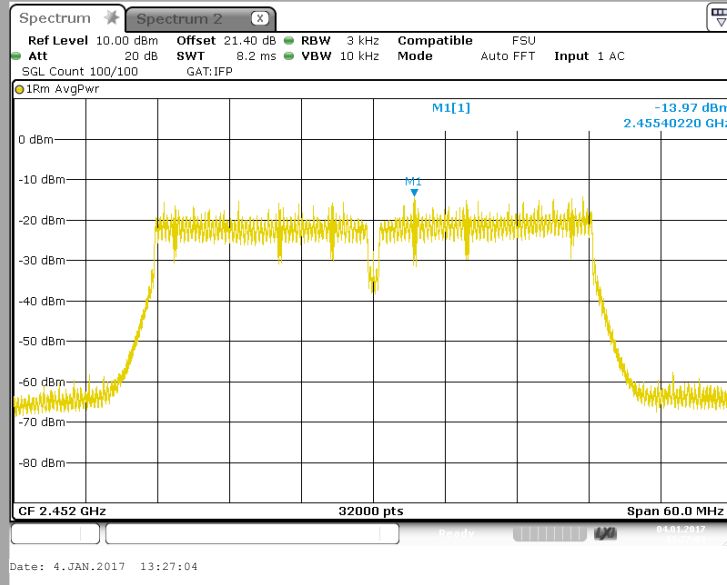
Tx1



Tx2



Tx3



Spectrum Analyzer Offset:
Cable Loss : 1,4dB Attenuator : 20.0dB

802.11b							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-1,6	-1,68	-1,97		5,00	3,02	8
Cnom	-0,87	-0,99	-1,1		5,00	3,79	8
Cmax	-0,73	-0,44	-0,89		5,00	4,09	8

802.11g							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-5,47	-5,82	-5,39		5,00	-0,78	8
Cnom	-2,53	-2,58	-2,13		5,00	2,36	8
Cmax	-5,45	-5,86	-5,48		5,00	-0,82	8

802.11n HT20							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-7,3	-5,4	-7,21		5,00	-1,77	8
Cnom	-4,88	-4,46	-4,8		5,00	0,06	8
Cmax	-8,42	-9,06	-8,39		5,00	-3,84	8

802.11n HT40							
Channel	Tx1 (dBm/3kHz)	Tx2 (dBm/3kHz)	Tx3 (dBm/3kHz)	Tx4 (dBm/3kHz)	Overall Antenna Gain (dBi)	Power Spectral Density (dBm)	Limit (dBm/3kHz)
Cmin	-12,19	-10,42	-16,51		5,00	-7,61	8
Cnom	-11,17	-8,82	-11,9		5,00	-5,65	8
Cmax	-13,51	-12,65	-13,97		5,00	-8,57	8

7.2. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SAGEMCOM** MiniBox (253697290), SN: **616476080862**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.