



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

Issued to

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

Apparatus under test

- ↳ Product DCIWA384 UHD Alt US
- ↳ Trade mark SAGEMCOM
- ↳ Manufacturer SAGEMCOM
- ↳ Model under test MiniBox (253697290)
- ↳ Serial number 616476080862
- ↳ FCC ID 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



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PUBLICATION HISTORY

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



SUMMARY

1. TEST PROGRAM	4
2. EQUIPMENT UNDER TEST: CONFIGURATION (DECLARED BY PROVIDER)	5
3. OCCUPIED BANDWIDTH.....	13
4. 6DB EMISSION BANDWIDTH	19
5. DUTY CYCLE	25
6. MAXIMUM CONDUCTED OUTPUT POWER	30
7. POWER SPECTRAL DENSITY	45
8. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS AT THE BAND EDGE	60
9. UNWANTED EMISSIONS INTO NON-RESTRICTED FREQUENCY BANDS.....	66
10. AC POWER LINE CONDUCTED EMISSIONS.....	74
11. UNWANTED EMISSIONS IN RESTRICTED FREQUENCY BANDS	83
12. UNCERTAINTIES CHART	114



L C I E

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 🔗	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
6dB Bandwidth 🔗	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
Duty Cycle 🔗	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Maximum Conducted Output Power 🔗	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Power Spectral Density 🔗	<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 🔗	<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 🔗	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA()	<input type="checkbox"/> NP(1)
AC Power Line Conducted Emission 🔗	<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 🔗	<input checked="" type="checkbox"/> PASS	<input type="checkbox"/> FAIL	<input type="checkbox"/> NA	<input type="checkbox"/> NP(1)
Receiver Radiated emissions 🔗	<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



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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



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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	-



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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 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



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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



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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)				
<input checked="" type="checkbox"/>	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"/>
<input checked="" 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	<input checked="" type="checkbox"/>
	17	3	QPSK			39	43.3	<input type="checkbox"/>
<input checked="" 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	<input type="checkbox"/>
	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
<input type="checkbox"/>	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
	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	65	72.2	<input type="checkbox"/>
	54	4	16-QAM	16-QAM	QPSK	78	86.7	<input type="checkbox"/>
	55	4	16-QAM	16-QAM	16-QAM	QPSK	91	101.1
	56	4	64-QAM	QPSK	QPSK	78	86.7	<input type="checkbox"/>
	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	64-QAM	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



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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)				
<input checked="" type="checkbox"/>	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"/>
<input checked="" 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"/>
<input checked="" 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	<input type="checkbox"/>
	40	3	16-QAM	16-QAM	QPSK	-	135	<input type="checkbox"/>
	41	3	64-QAM	QPSK	QPSK	-	135	<input type="checkbox"/>
	42	3	64-QAM	16-QAM	QPSK	-	162	<input type="checkbox"/>
	43	3	64-QAM	16-QAM	16-QAM	-	189	<input type="checkbox"/>
	44	3	64-QAM	64-QAM	QPSK	-	189	<input type="checkbox"/>
	45	3	64-QAM	64-QAM	16-QAM	-	216	<input type="checkbox"/>
	46	3	16-QAM	QPSK	QPSK	-	162	<input type="checkbox"/>
	47	3	16-QAM	16-QAM	QPSK	-	202.5	<input type="checkbox"/>
	48	3	64-QAM	QPSK	QPSK	-	202.5	<input type="checkbox"/>
	49	3	64-QAM	16-QAM	QPSK	-	243	<input type="checkbox"/>
	50	3	64-QAM	16-QAM	16-QAM	-	283.5	<input type="checkbox"/>
	51	3	64-QAM	64-QAM	QPSK	-	283.5	<input type="checkbox"/>
	52	3	64-QAM	64-QAM	16-QAM	-	324	<input type="checkbox"/>
<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	<input type="checkbox"/>
	54	4	16-QAM	16-QAM	QPSK	QPSK	162	<input type="checkbox"/>
	55	4	16-QAM	16-QAM	16-QAM	QPSK	189	<input type="checkbox"/>
	56	4	64-QAM	QPSK	QPSK	QPSK	162	<input type="checkbox"/>
	57	4	64-QAM	16-QAM	QPSK	QPSK	189	<input type="checkbox"/>
	58	4	64-QAM	16-QAM	16-QAM	QPSK	216	<input type="checkbox"/>
	59	4	64-QAM	16-QAM	16-QAM	16-QAM	243	<input type="checkbox"/>
	60	4	64-QAM	QPSK	QPSK	QPSK	216	<input type="checkbox"/>
	61	4	64-QAM	16-QAM	16-QAM	QPSK	243	<input type="checkbox"/>
	62	4	64-QAM	16-QAM	16-QAM	16-QAM	270	<input type="checkbox"/>
	63	4	64-QAM	64-QAM	64-QAM	QPSK	270	<input type="checkbox"/>
	64	4	64-QAM	64-QAM	64-QAM	16-QAM	297	<input type="checkbox"/>
	65	4	16-QAM	QPSK	QPSK	QPSK	202.5	<input type="checkbox"/>
	66	4	16-QAM	16-QAM	QPSK	QPSK	243	<input type="checkbox"/>
	67	4	16-QAM	16-QAM	16-QAM	QPSK	283.5	<input type="checkbox"/>
	68	4	64-QAM	QPSK	QPSK	QPSK	243	<input type="checkbox"/>
	69	4	64-QAM	16-QAM	QPSK	QPSK	283.5	<input type="checkbox"/>
	70	4	64-QAM	16-QAM	16-QAM	QPSK	324	<input type="checkbox"/>
	71	4	64-QAM	16-QAM	16-QAM	16-QAM	364.5	<input type="checkbox"/>
	72	4	64-QAM	64-QAM	QPSK	QPSK	324	<input type="checkbox"/>
	73	4	64-QAM	64-QAM	16-QAM	QPSK	364.5	<input type="checkbox"/>
	74	4	64-QAM	64-QAM	16-QAM	16-QAM	405	<input type="checkbox"/>
	75	4	64-QAM	64-QAM	64-QAM	QPSK	405	<input type="checkbox"/>
	76	4	64-QAM	64-QAM	64-QAM	16-QAM	445.5	<input type="checkbox"/>



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2.2. RUNNING MODE

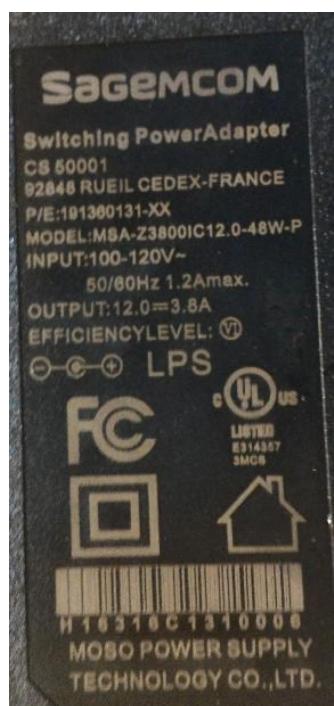
The EUT is set in the following modes during tests:

- 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:

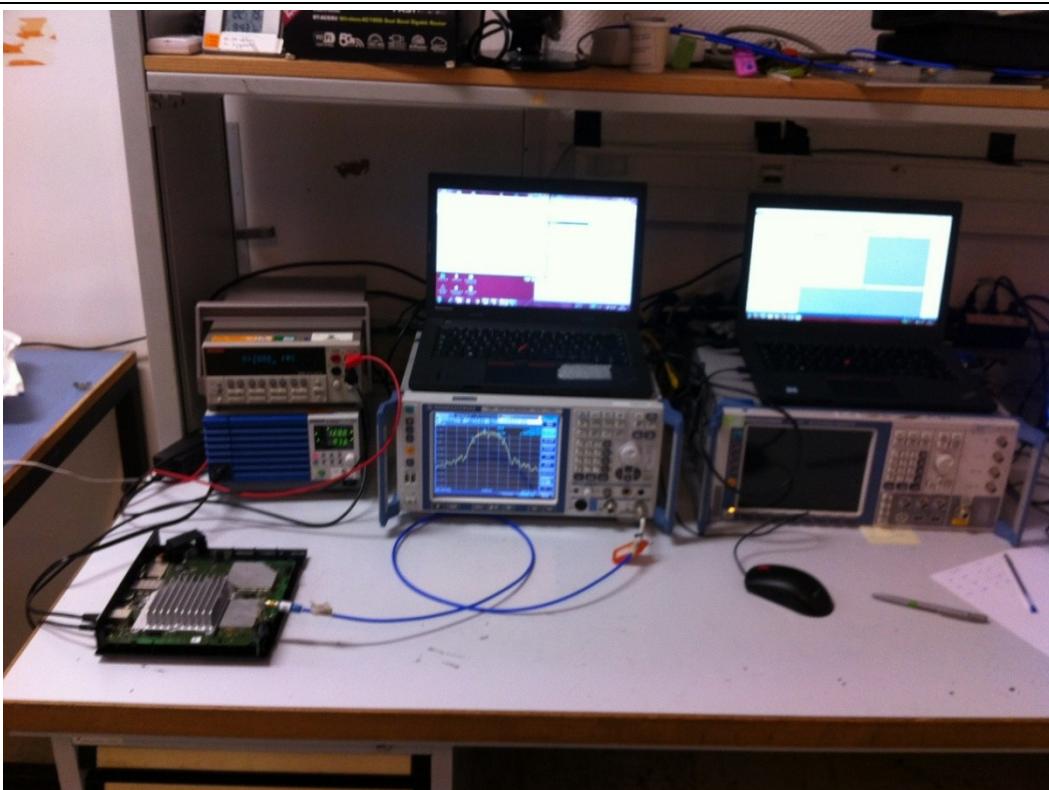
- On a table
- In an anechoic chamber

- 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

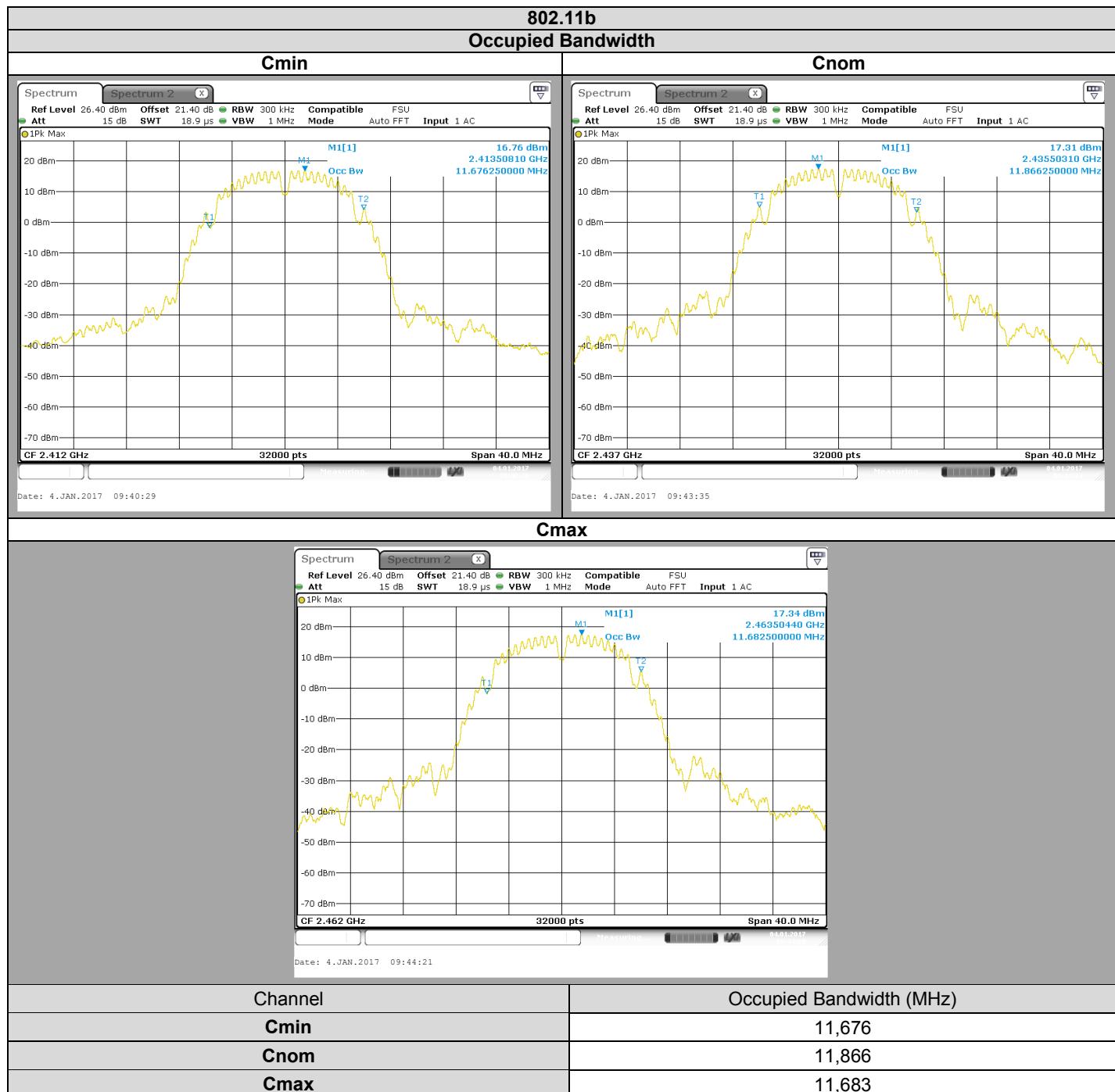
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF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



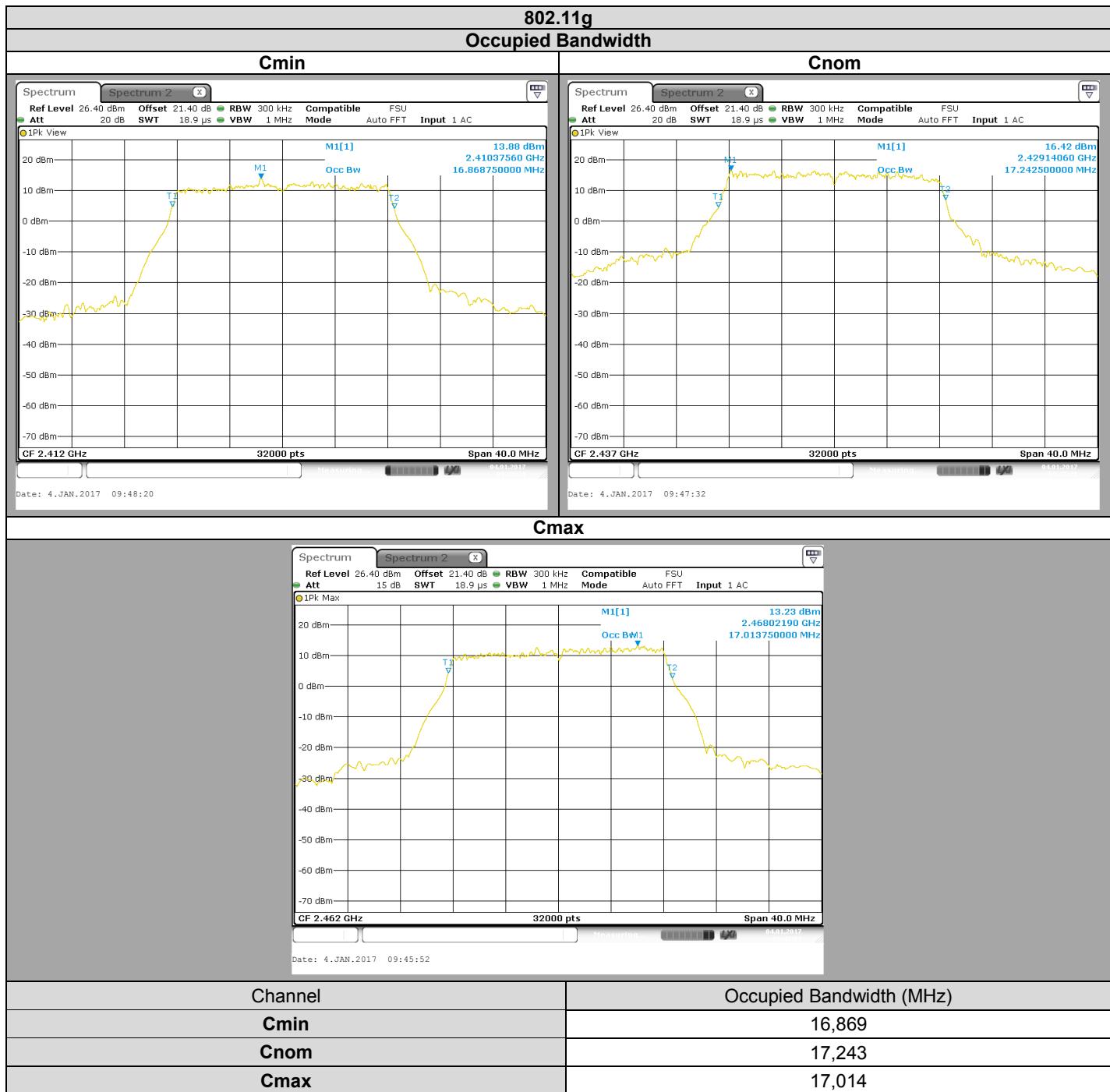
L C I E

3.3. RESULTS





L C I E



TEST REPORT

N° 146019-698067C

Version : 01

Page 16/114



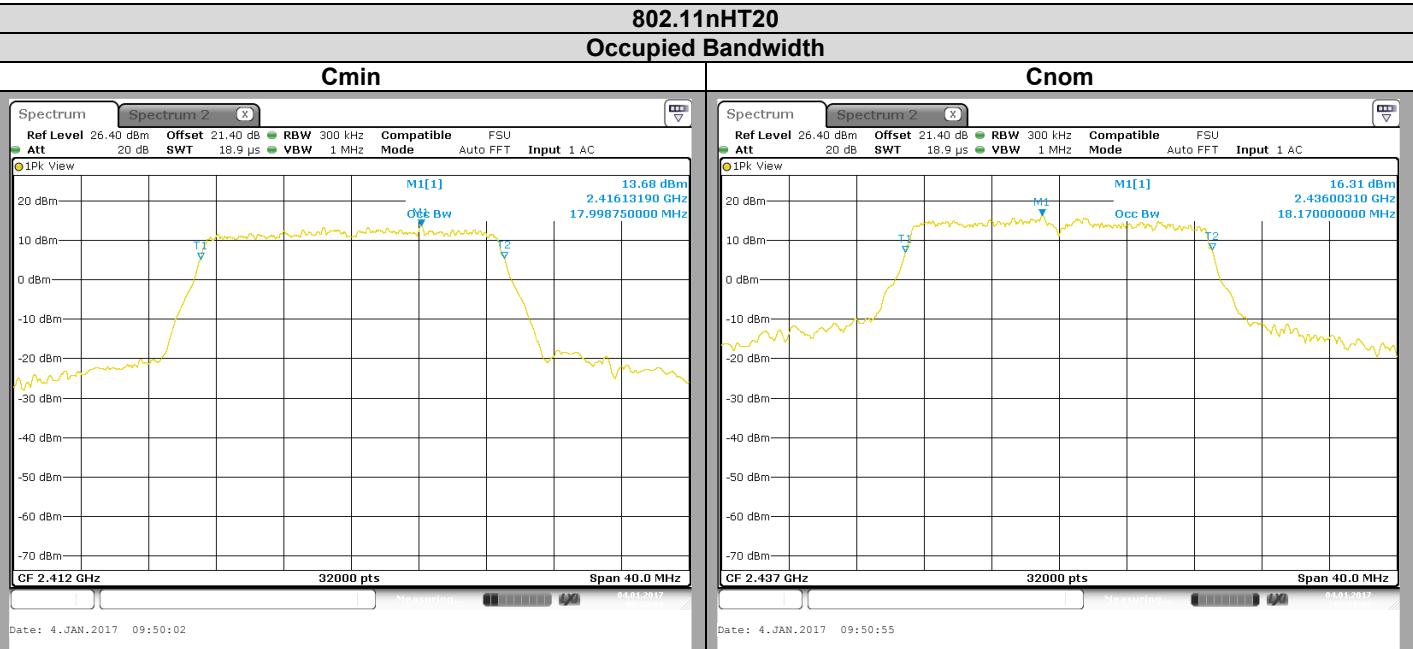
L C I E

802.11nHT20

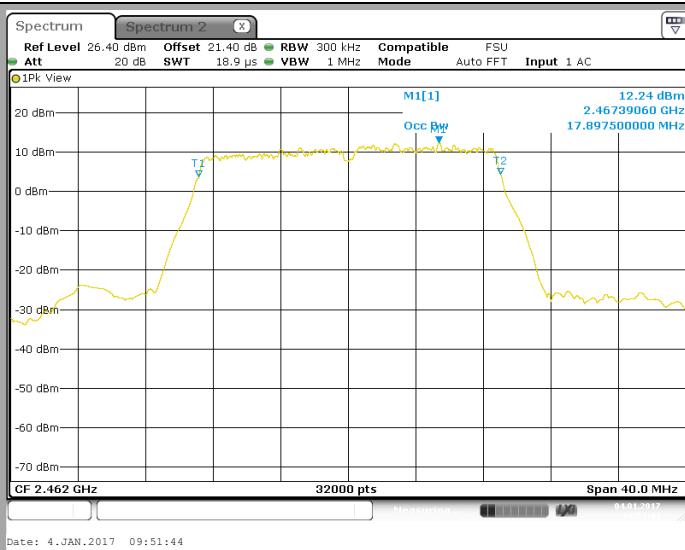
Occupied Bandwidth

Cmin

Cnom



Cmax



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

TEST REPORT

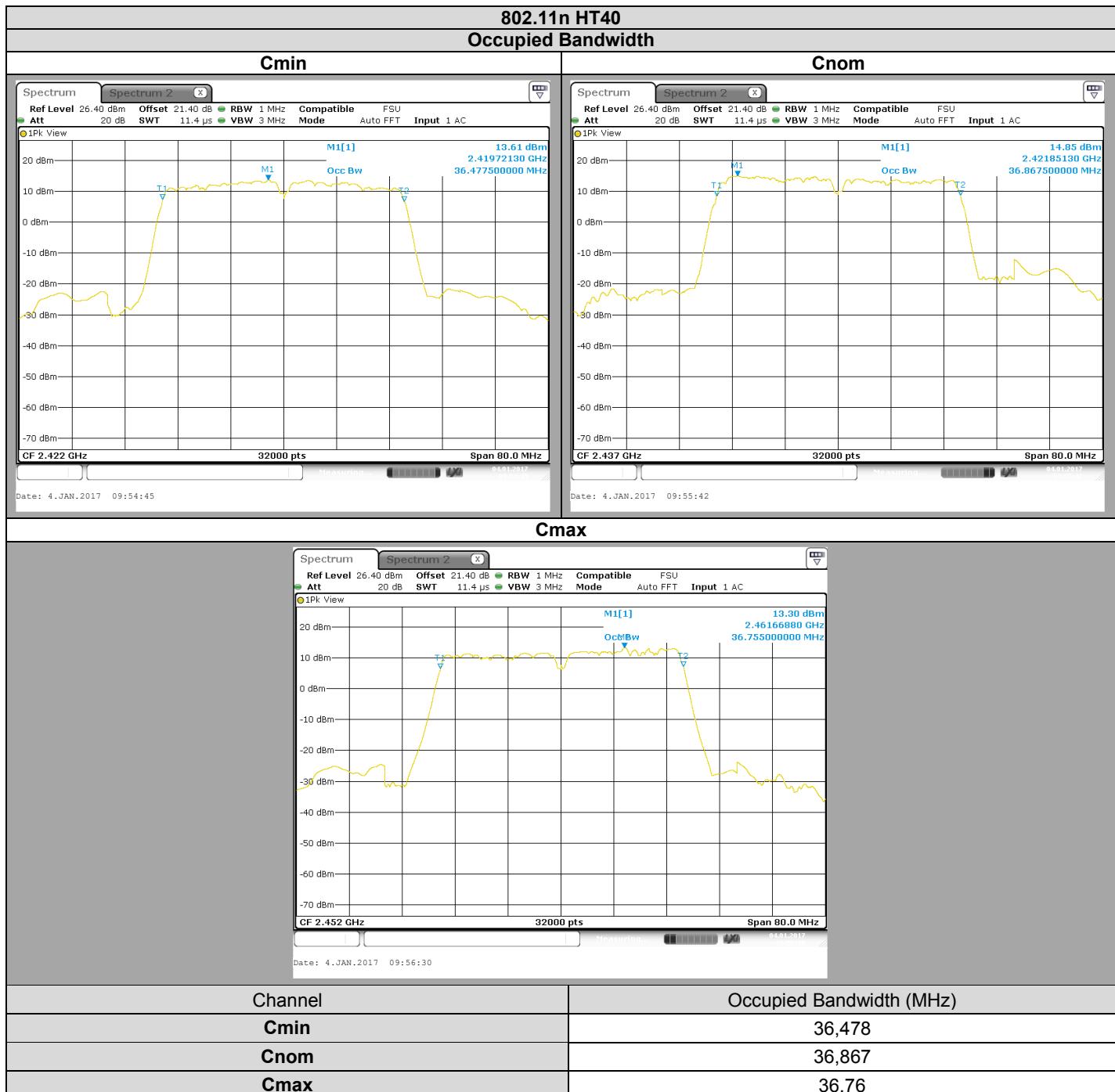
N° 146019-698067C

Version : 01

Page 17/114



L C I E



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.



L C I E

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:

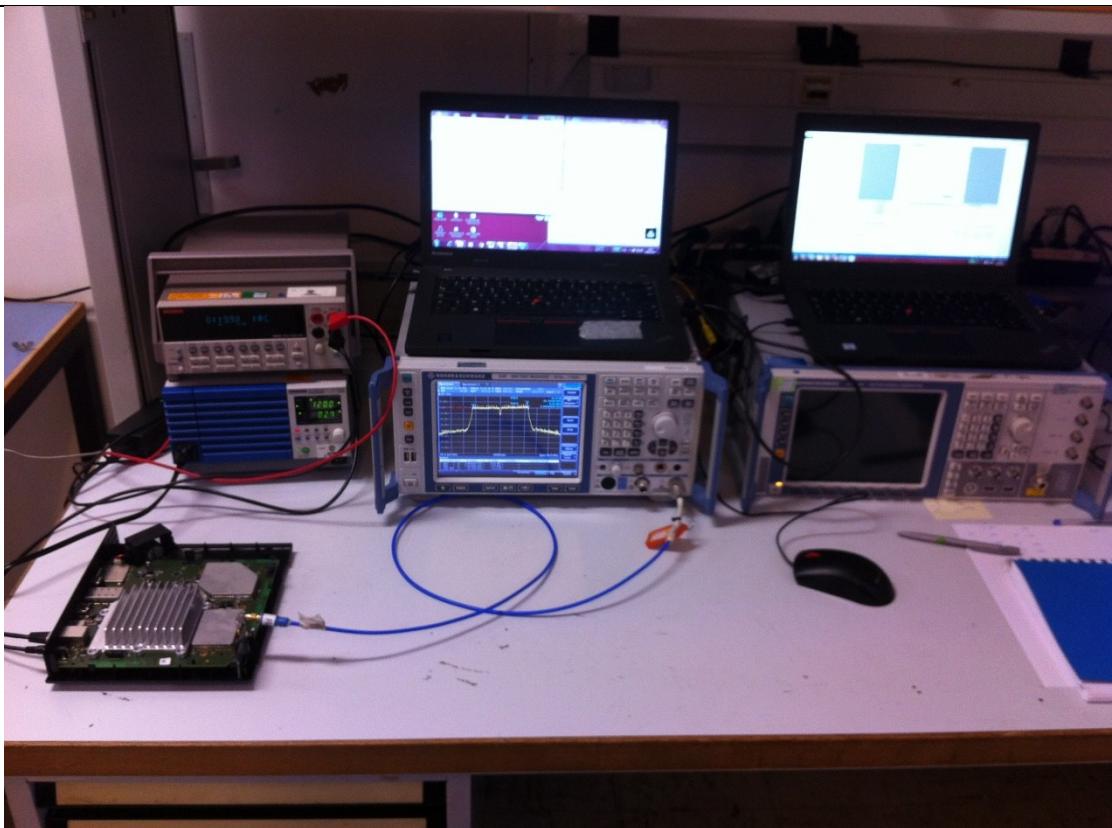
- On a table
- In an anechoic chamber

- 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

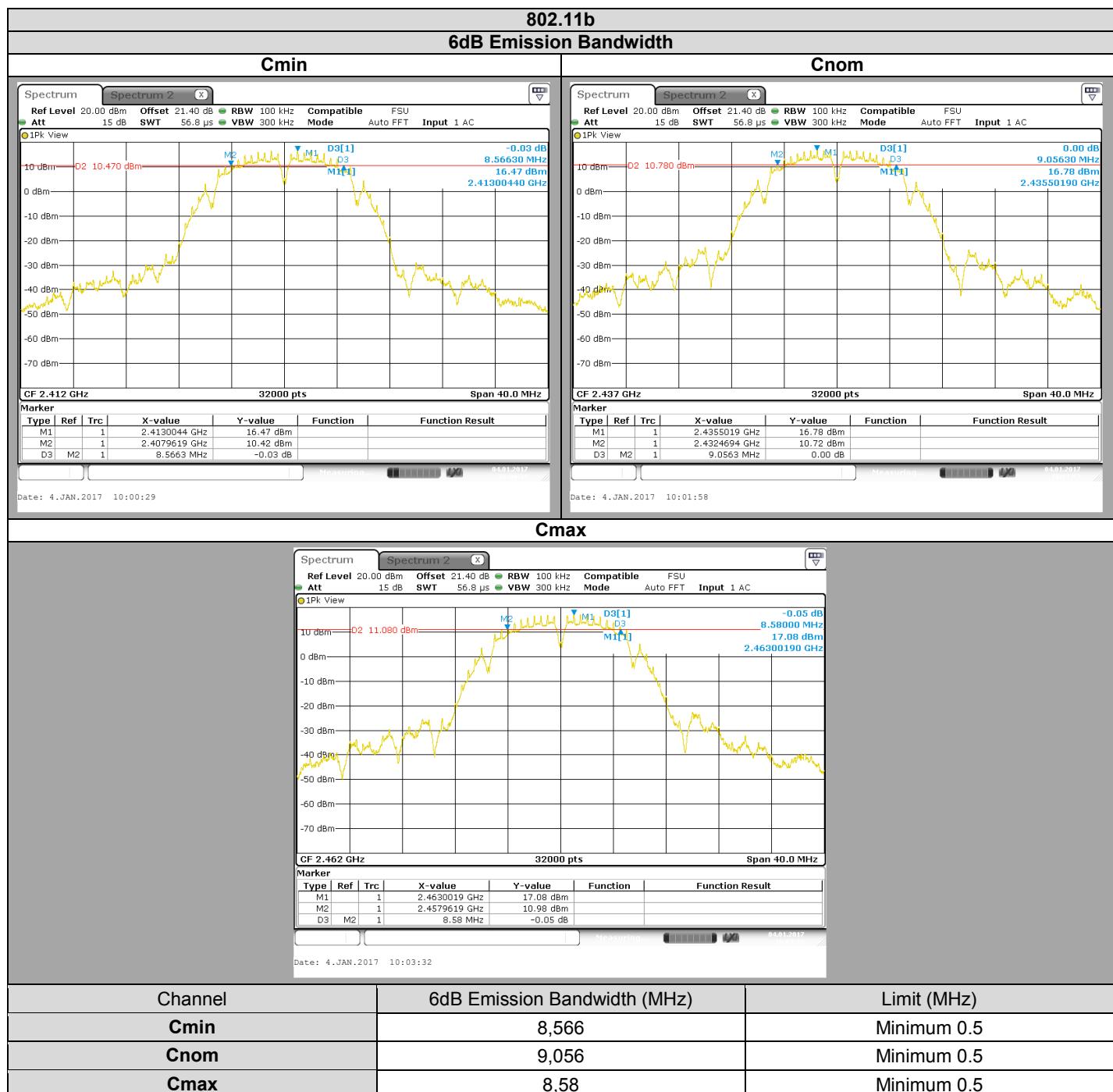
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF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



L C I E

4.5. RESULTS





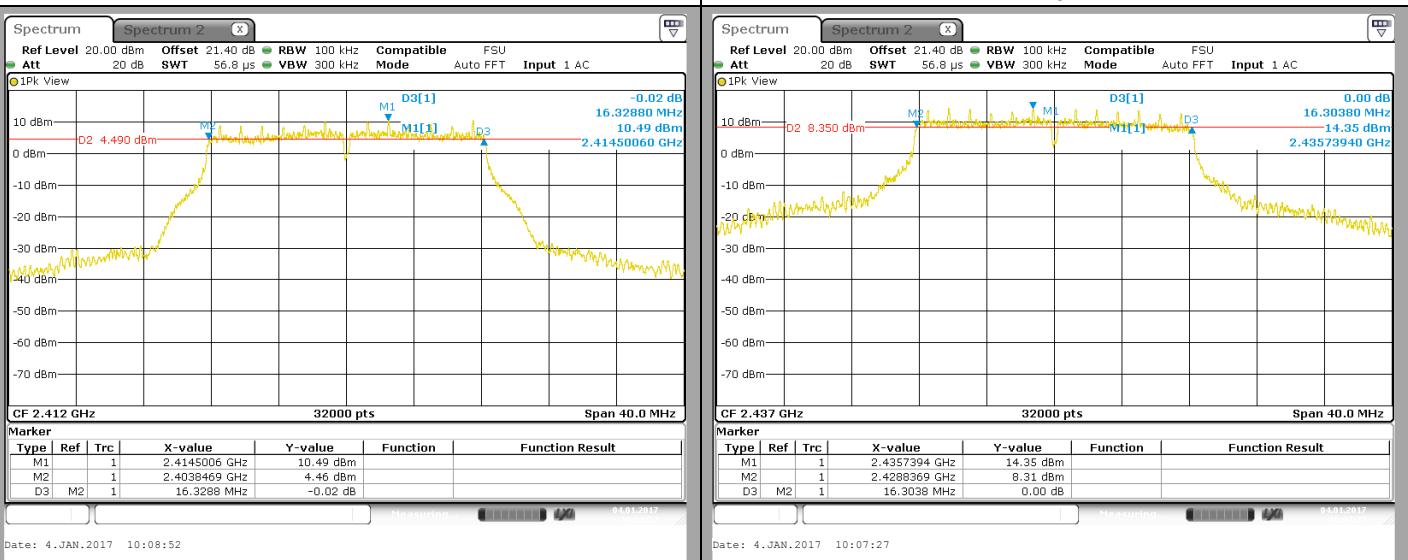
L C I E

802.11g

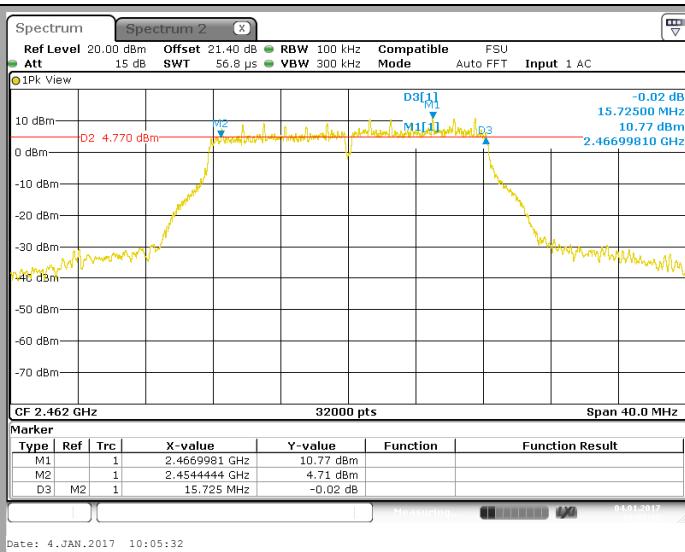
6dB Emission Bandwidth

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

TEST REPORT

N° 146019-698067C

Version : 01

Page 22/114

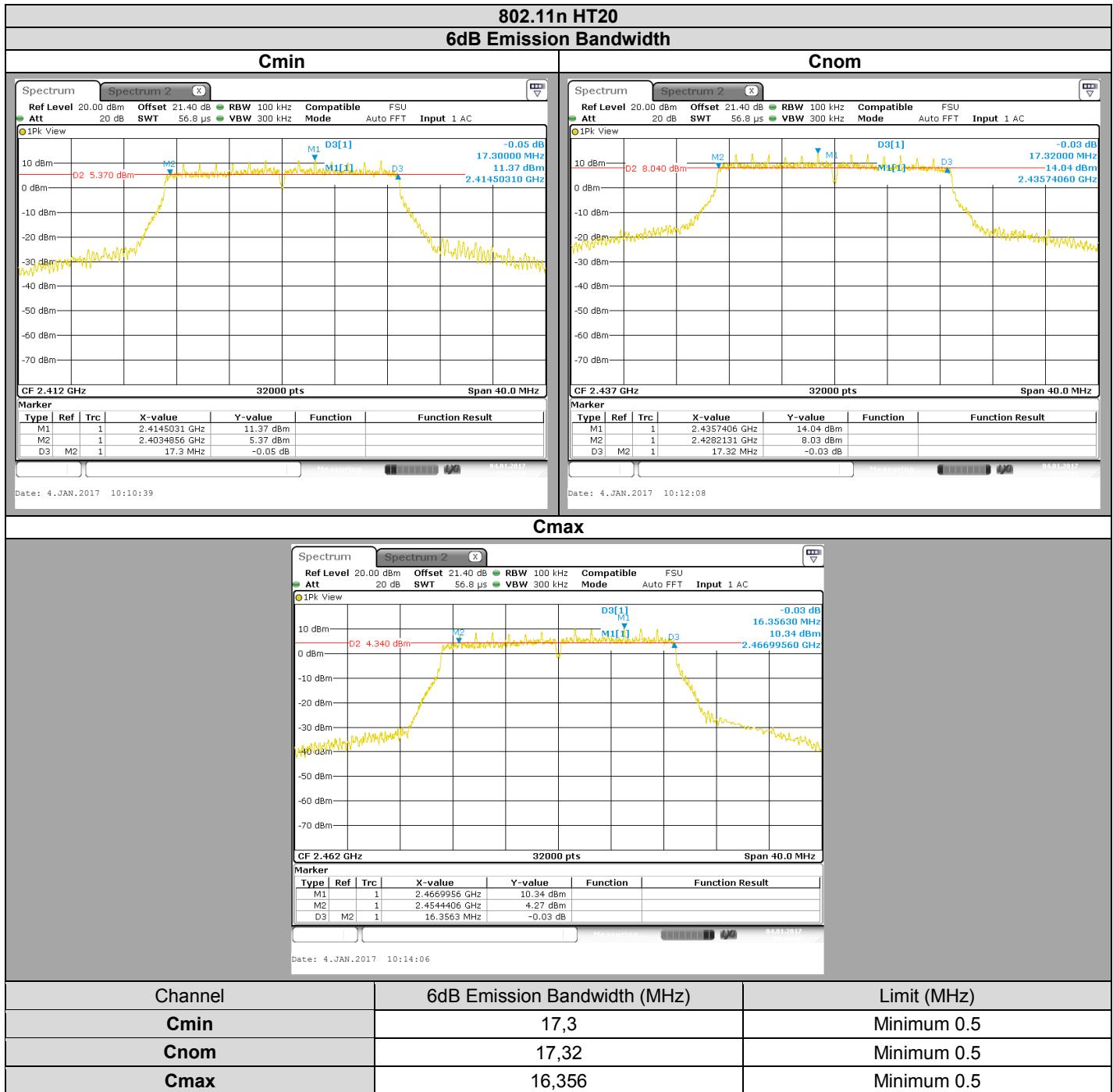


L C I E

TEST REPORT

N° 146019-698067C
Version : 01

Page 23/114

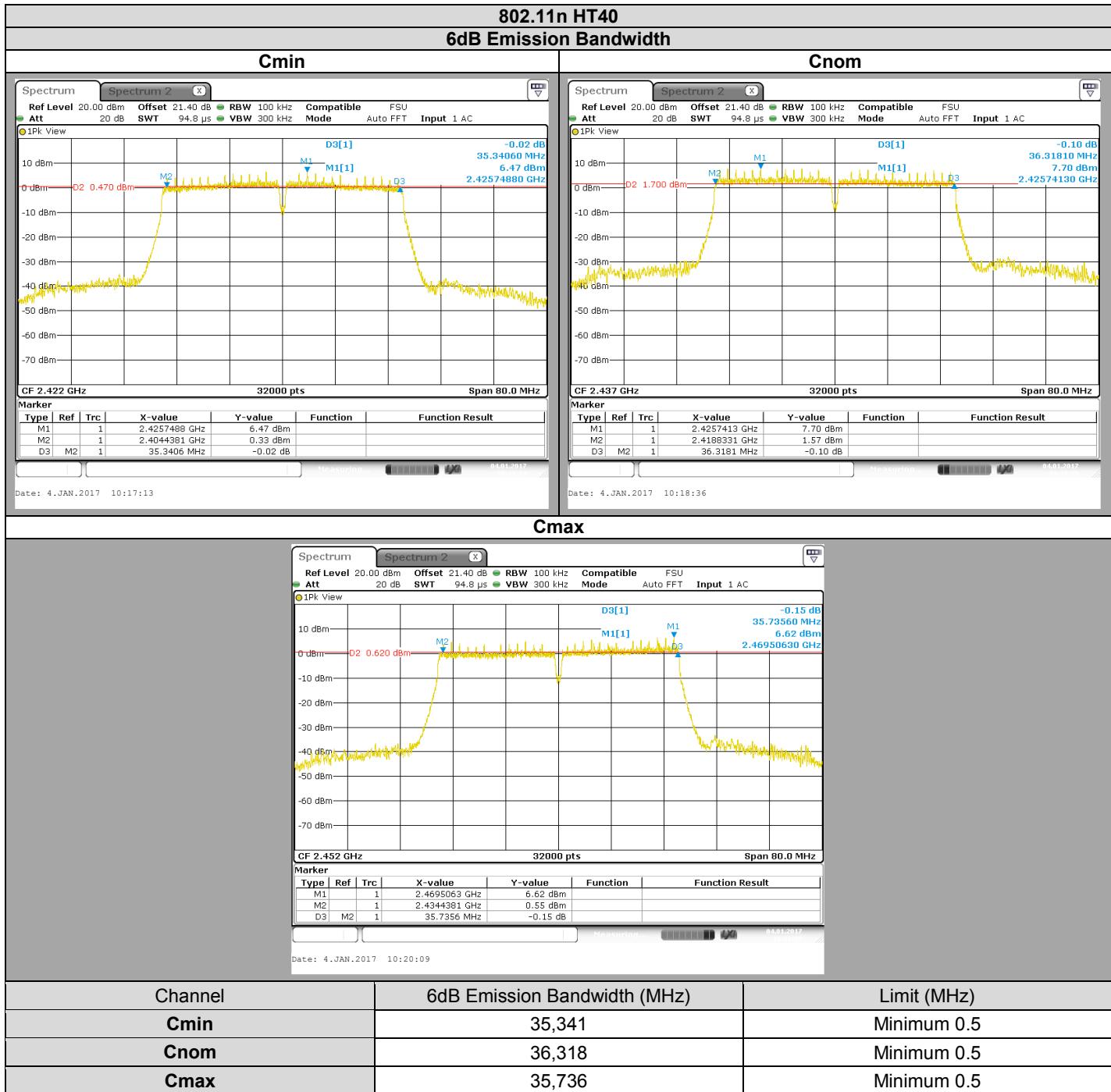


TEST REPORT

N° 146019-698067C



L C I E



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.



L C I E

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



L C I E

5.3. LIMIT

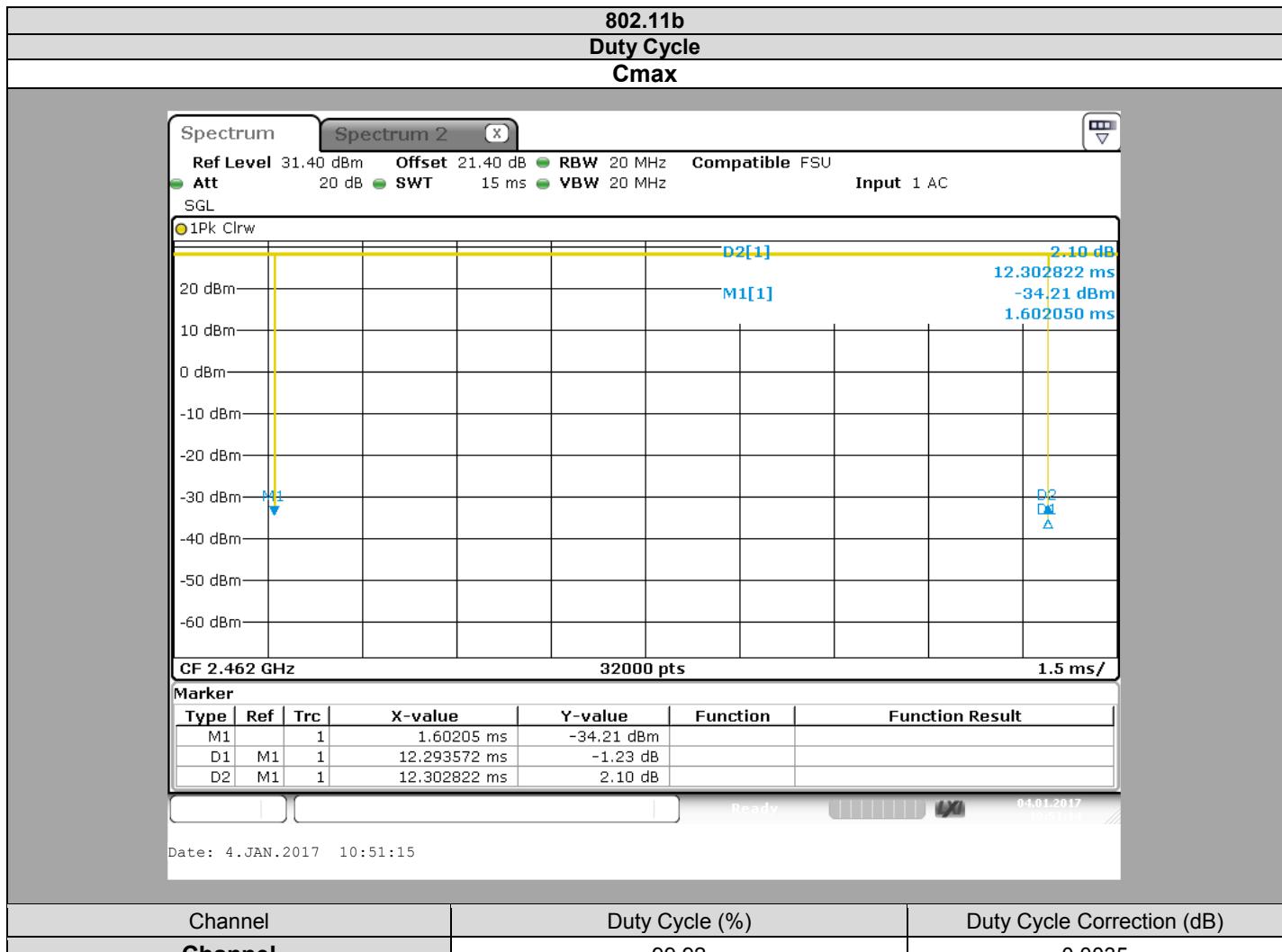
None

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

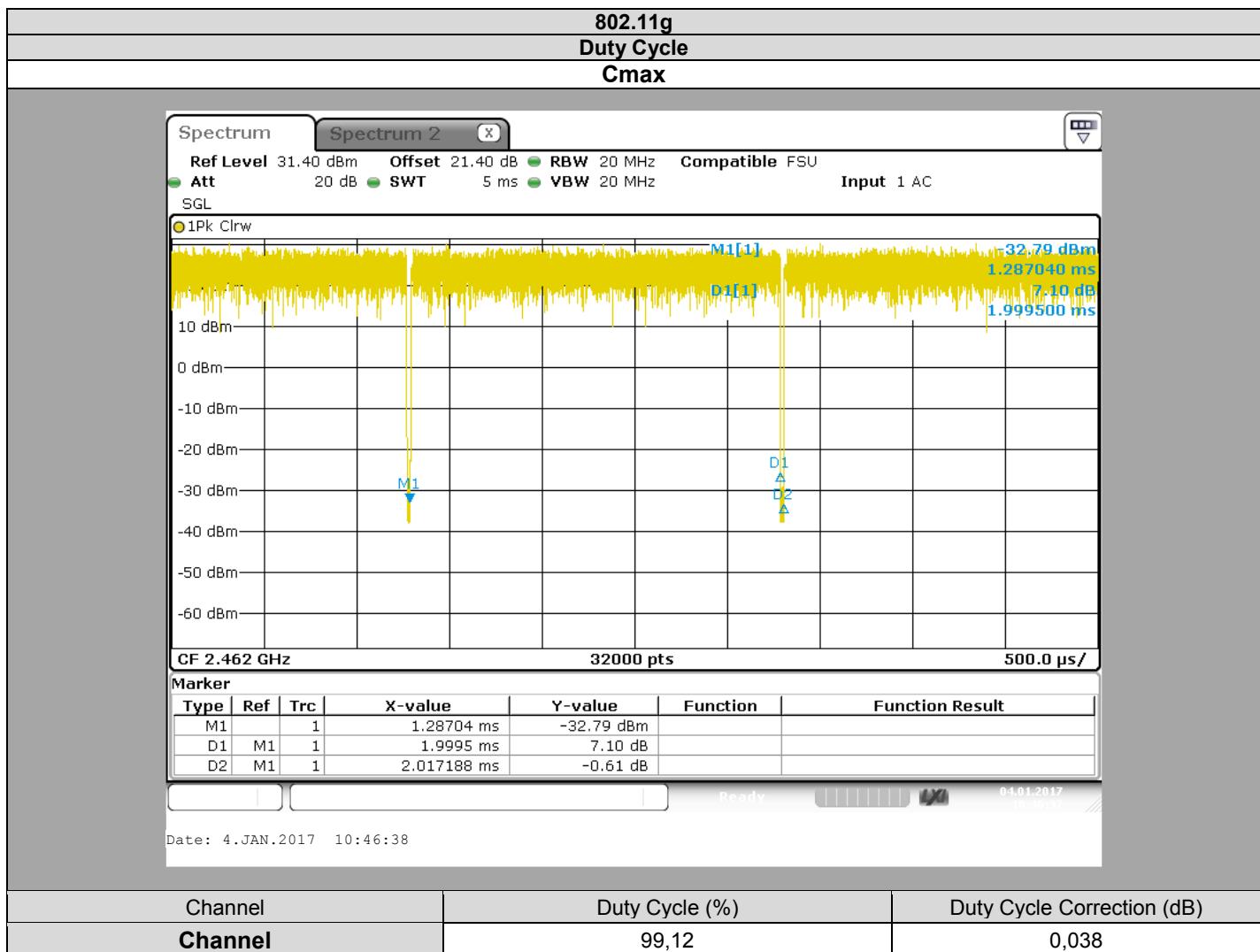
Note: In our quality system, the test equipment calibration due is more & less 2 months

5.5. RESULTS





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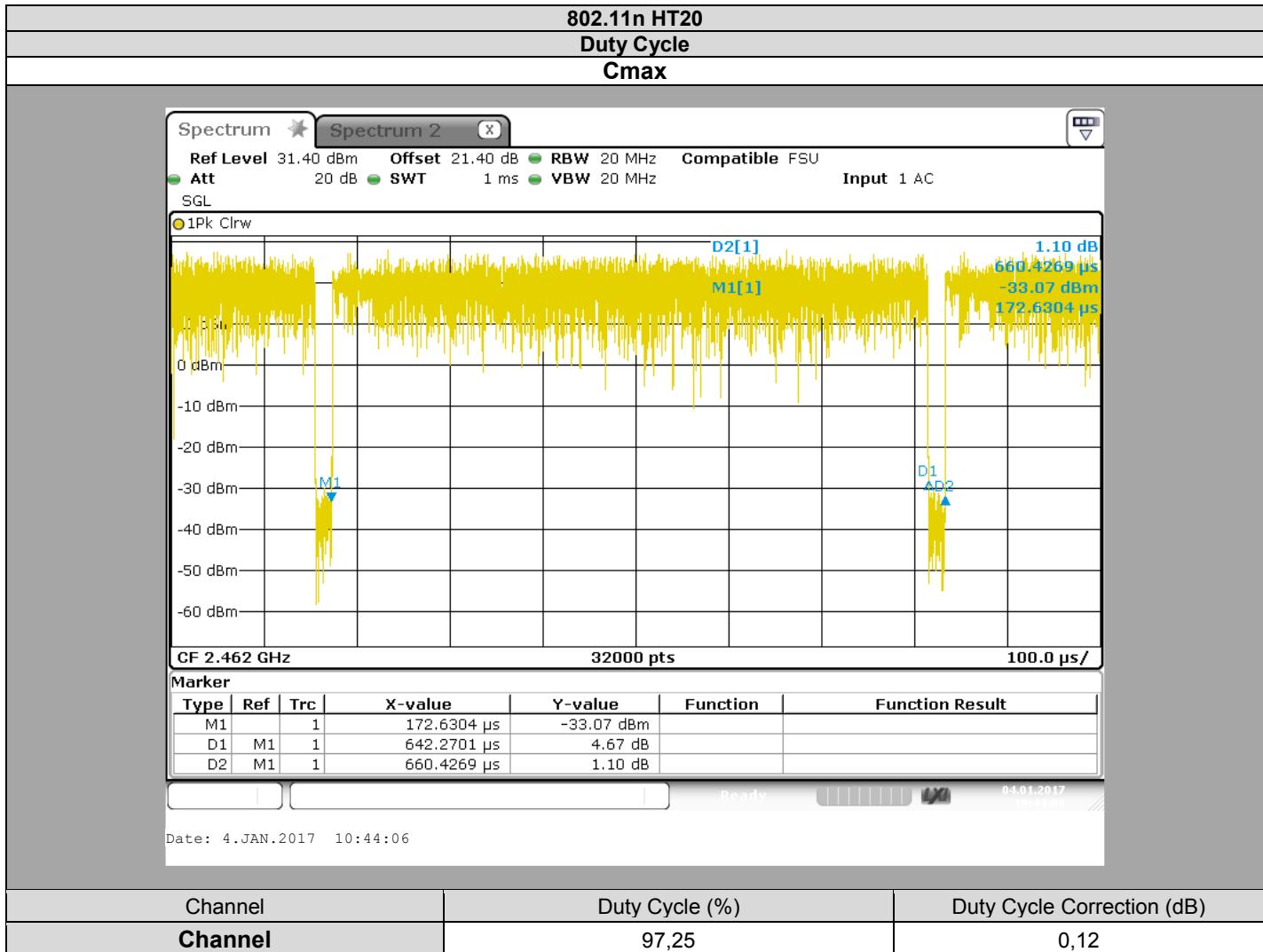


L C I E

802.11n HT20

Duty Cycle

Cmax



TEST REPORT

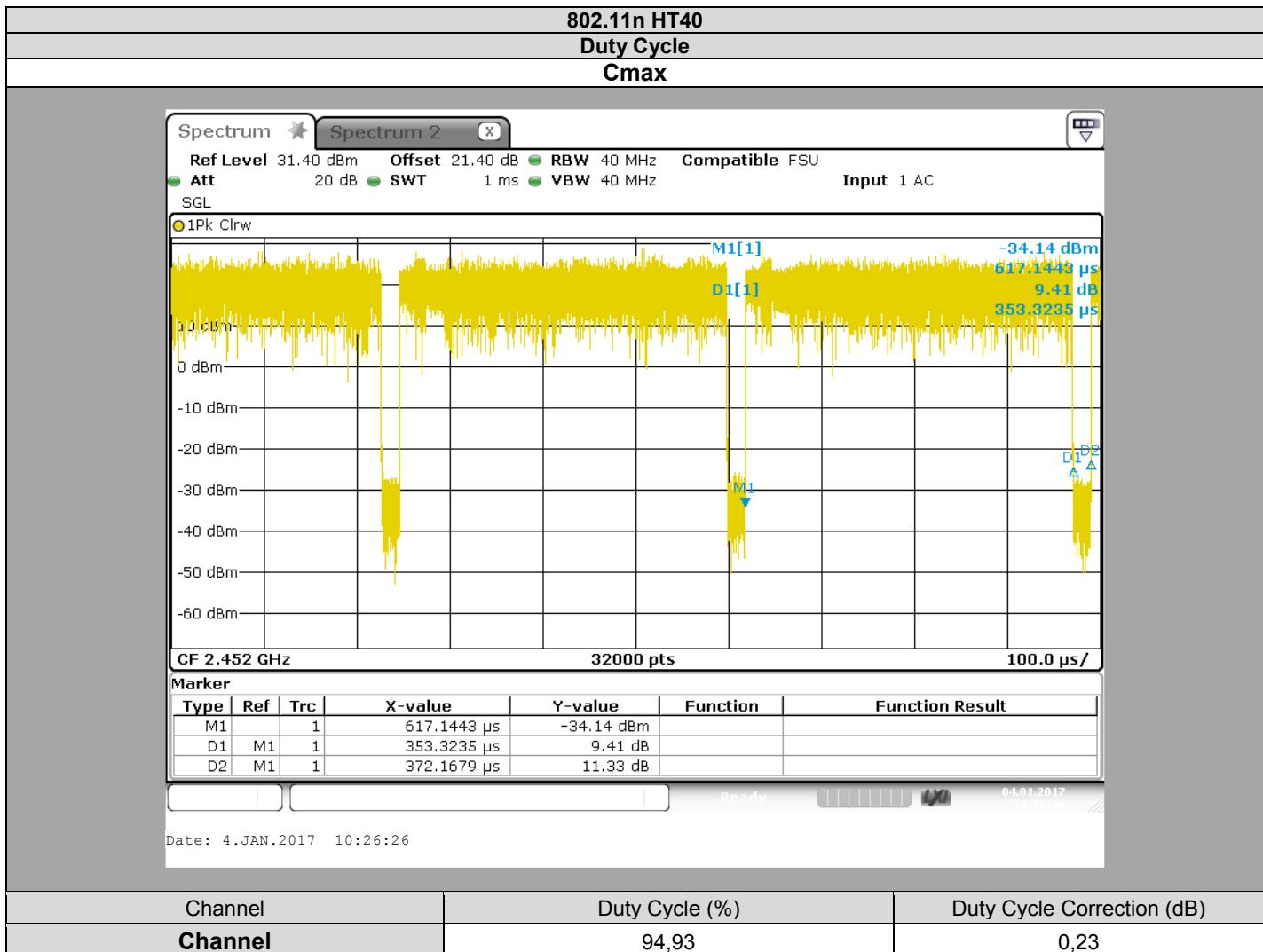
Version : 01

N° 146019-698067C

Page 28/114



L C I E



5.6. CONCLUSION

Duty Cycle 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.



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:

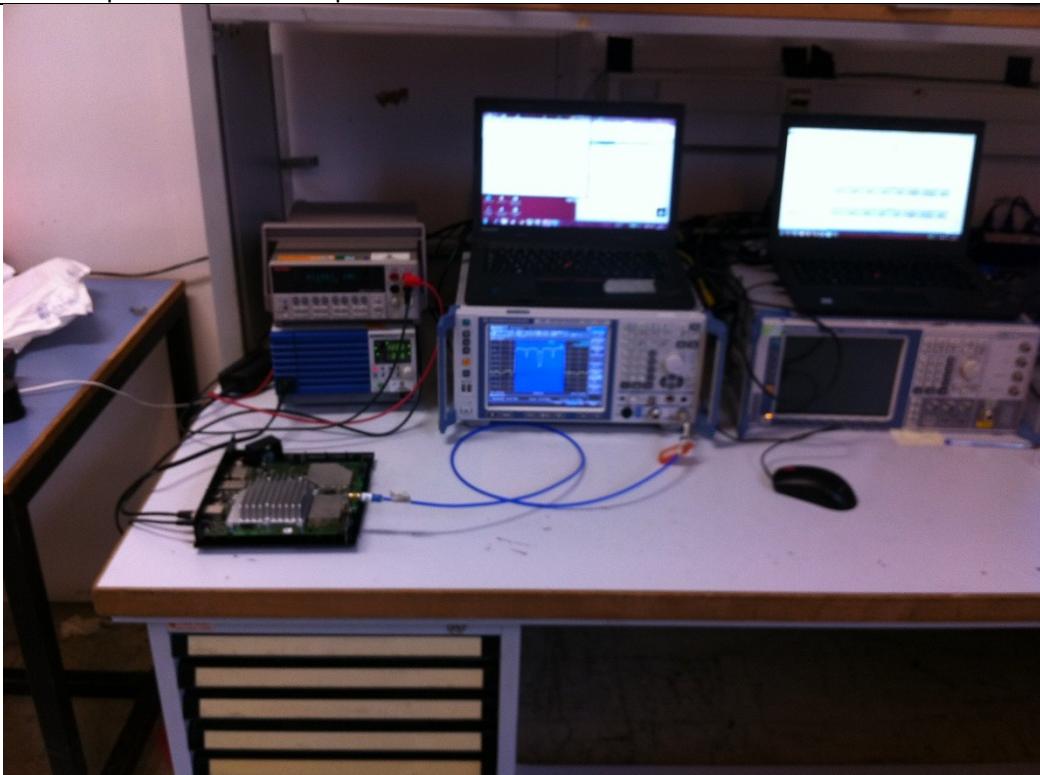
- On a table
- In an anechoic chamber

- 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

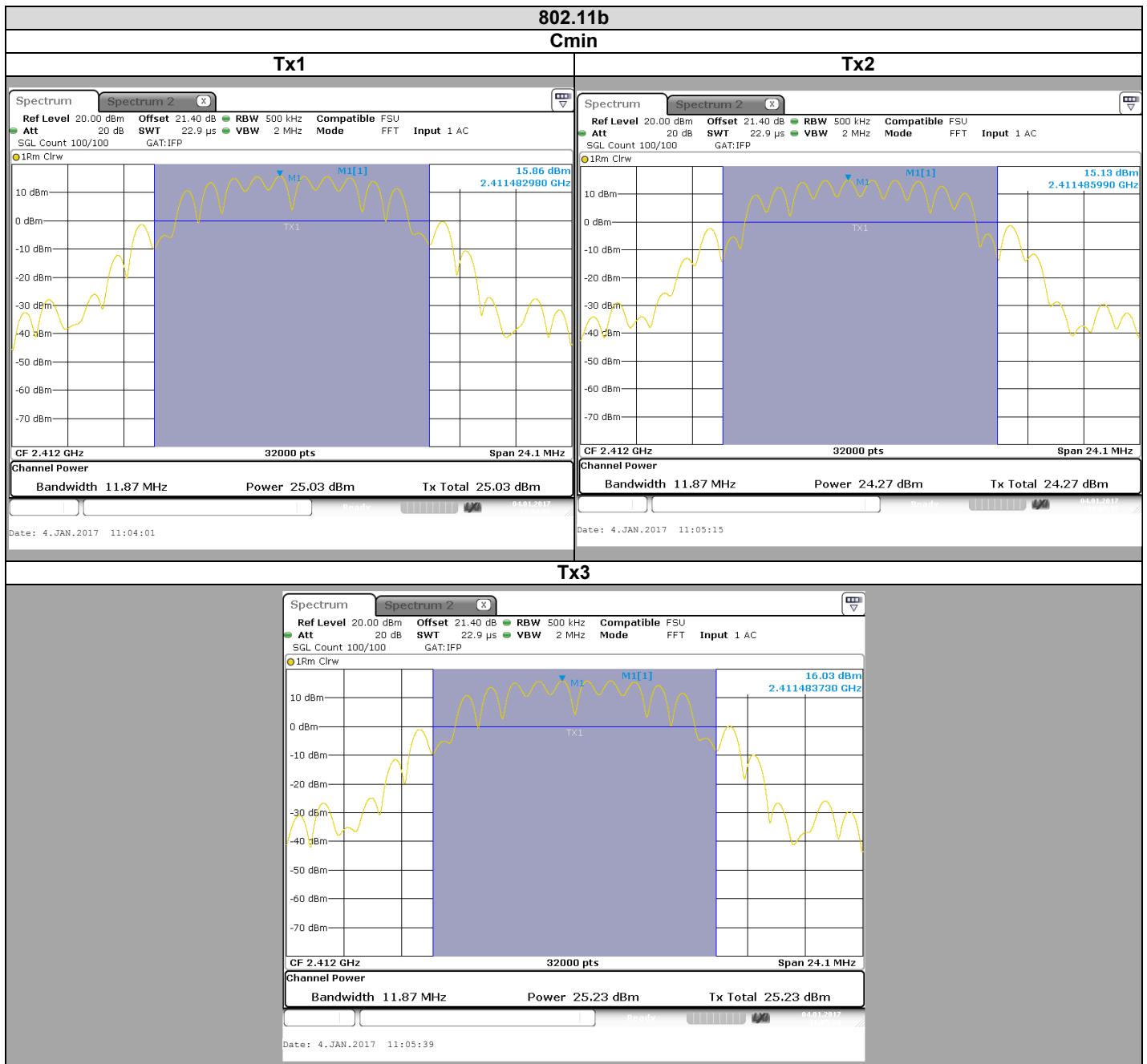
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF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



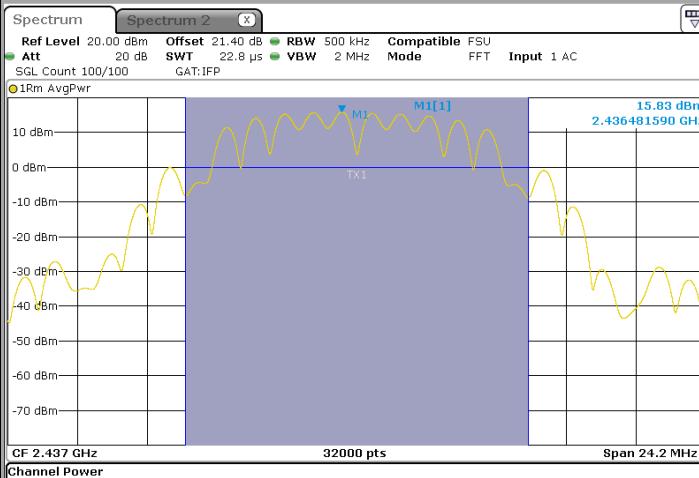


L C I E

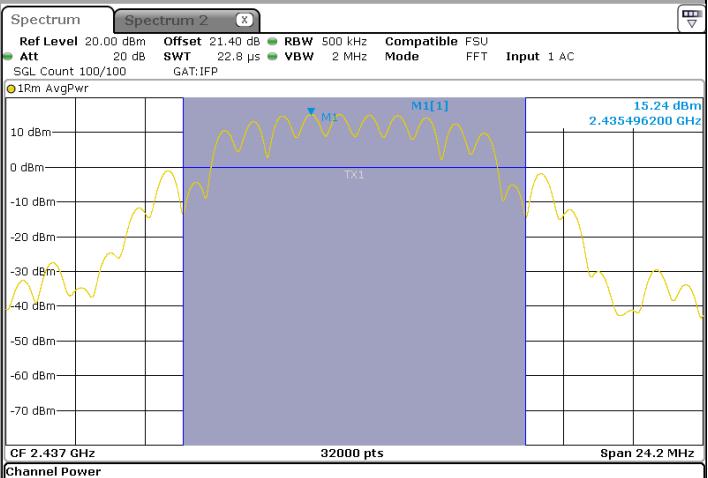
802.11b

Cnom

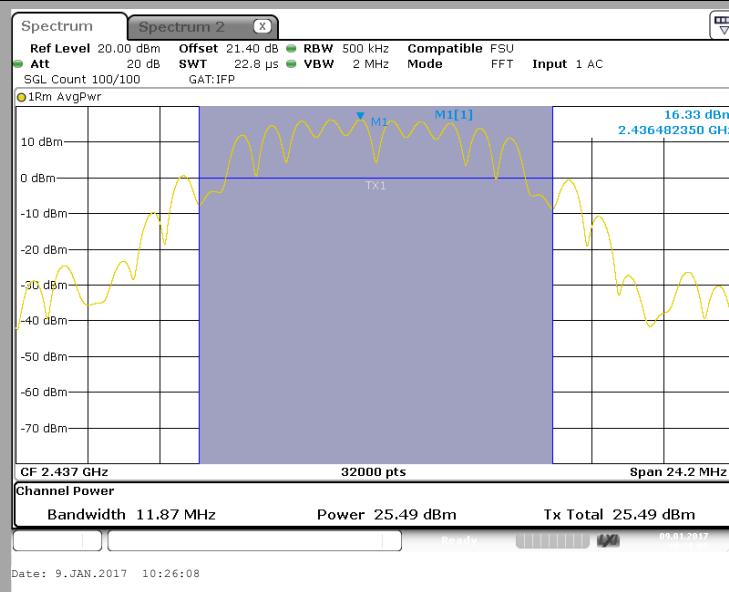
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 33/114

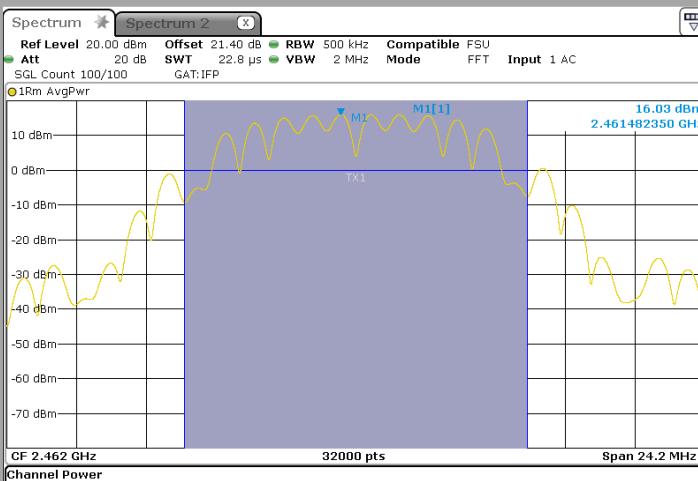


L C I E

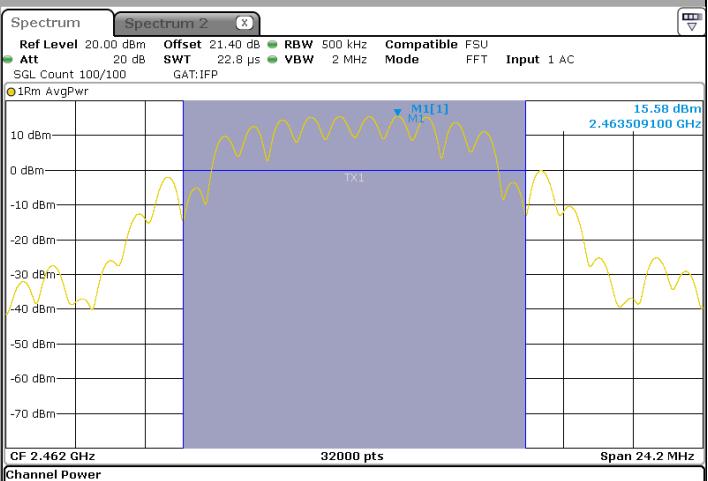
802.11b

Cmax

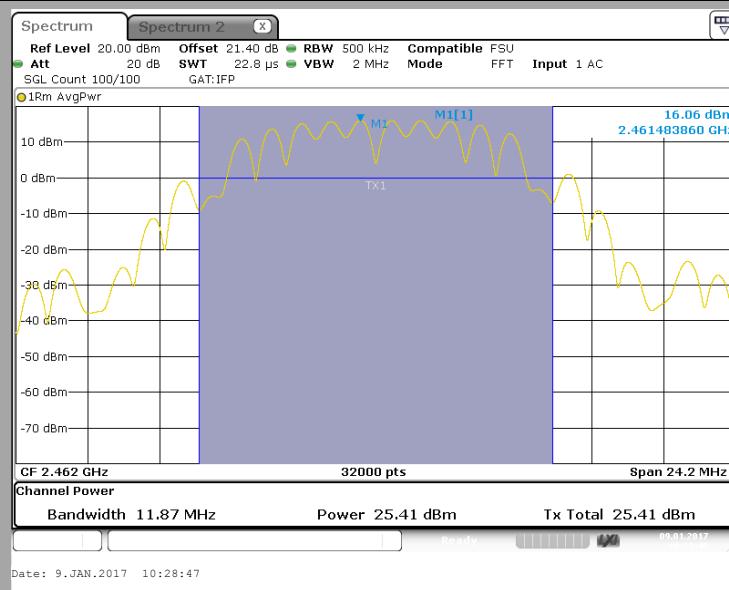
Tx1



Tx2



Tx3



TEST REPORT

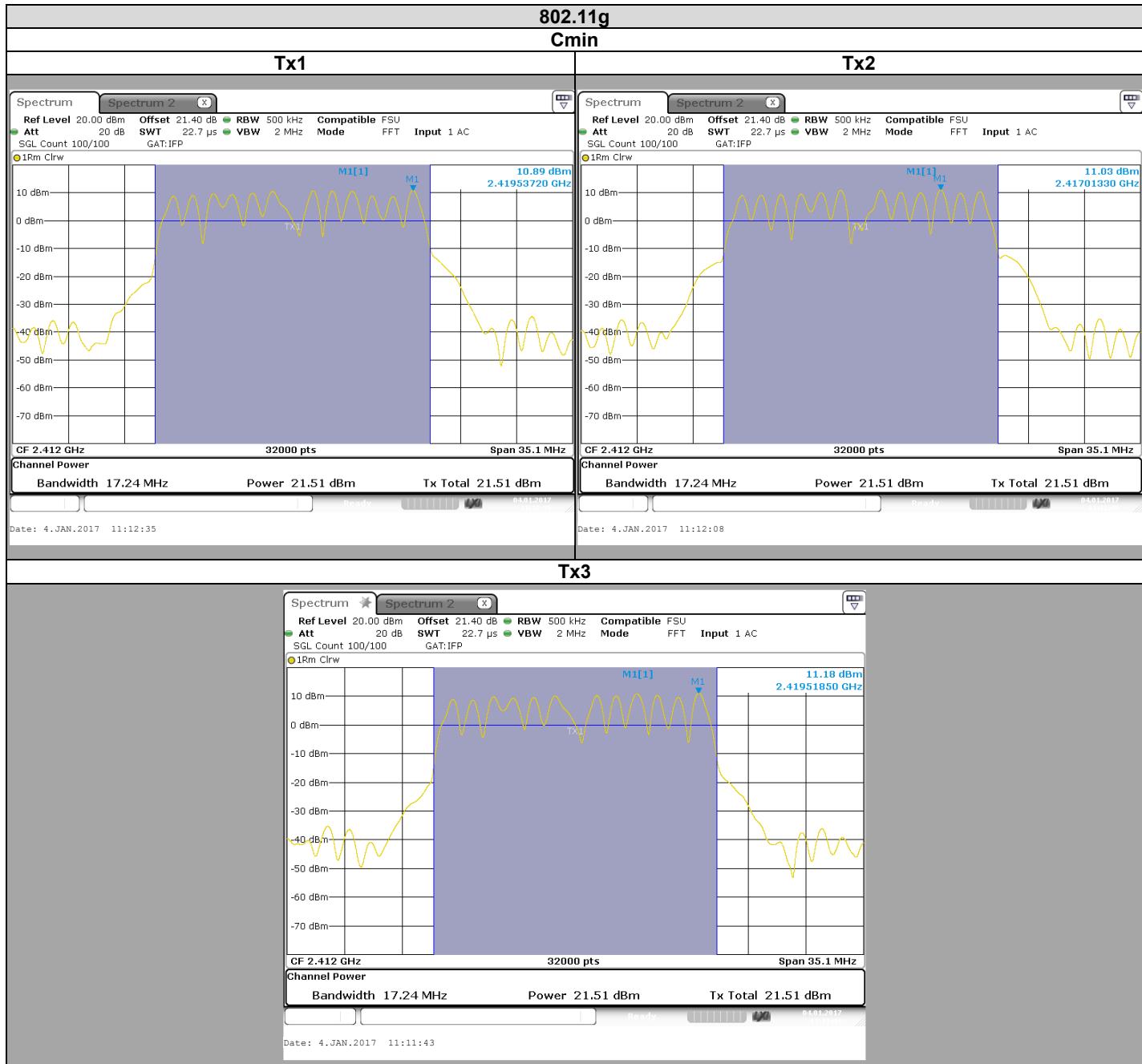
N° 146019-698067C

Version : 01

Page 34/114



L C I E



TEST REPORT

N° 146019-698067C

Version : 01

Page 35/114

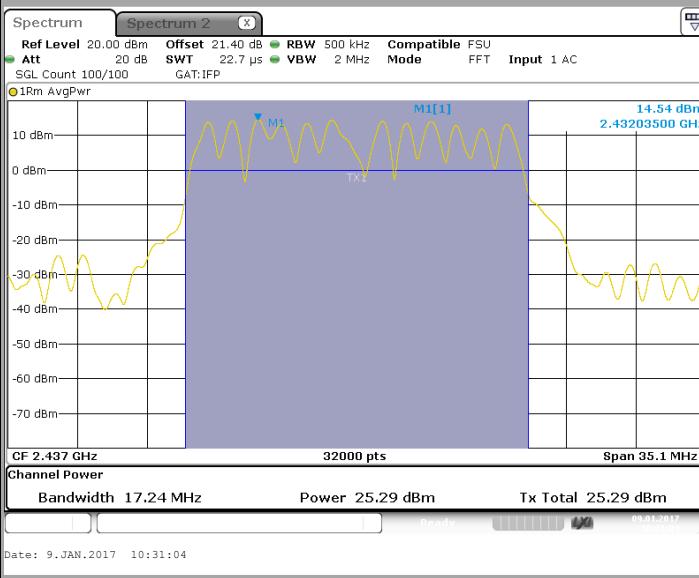


L C I E

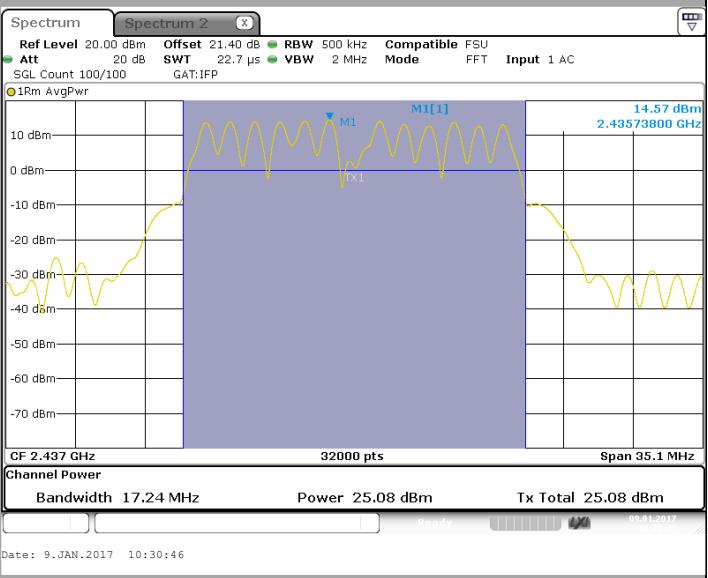
802.11g

Cnom

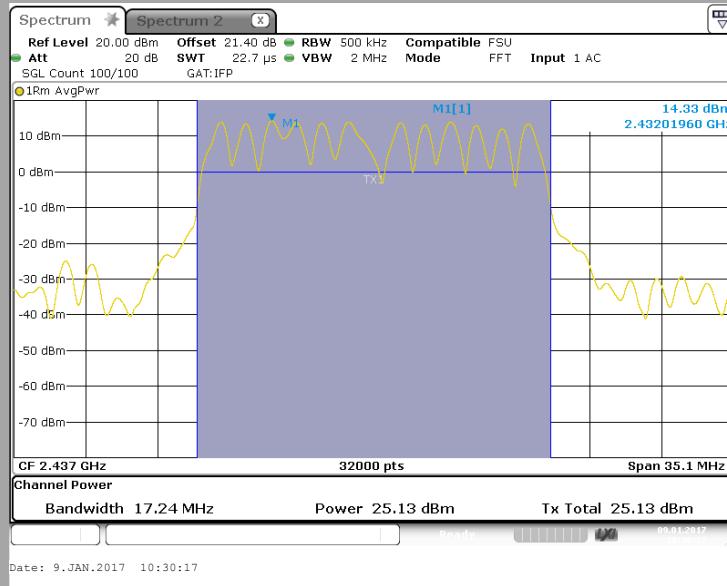
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 36/114

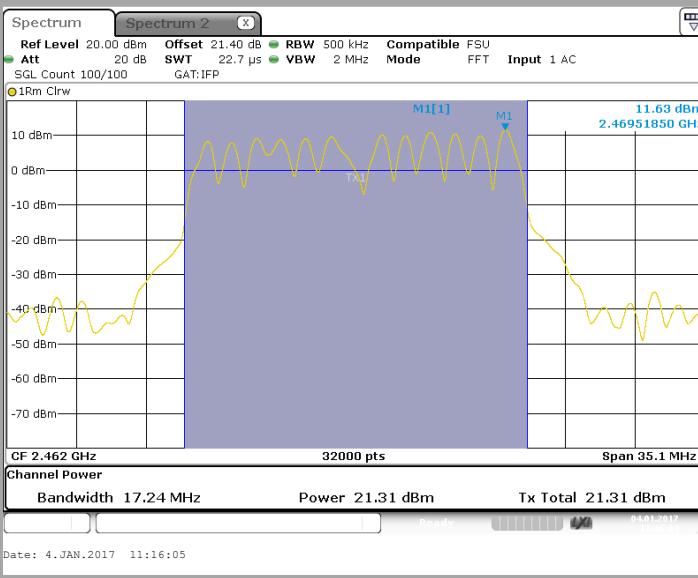


L C I E

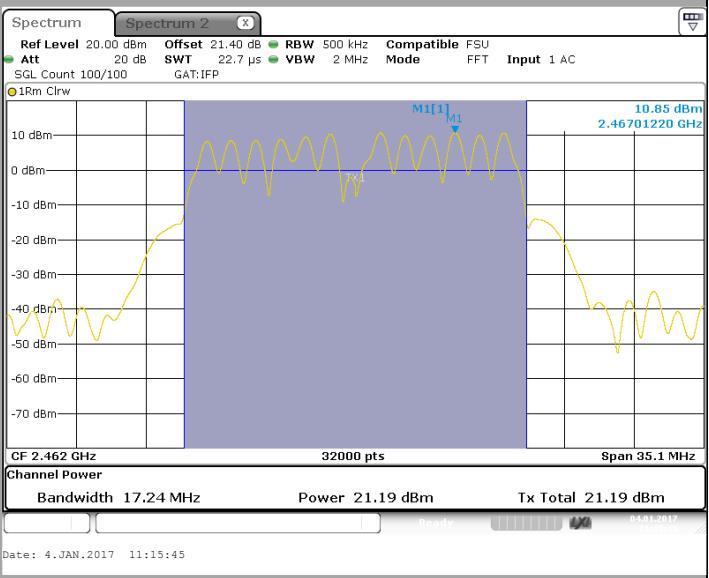
802.11g

Cmax

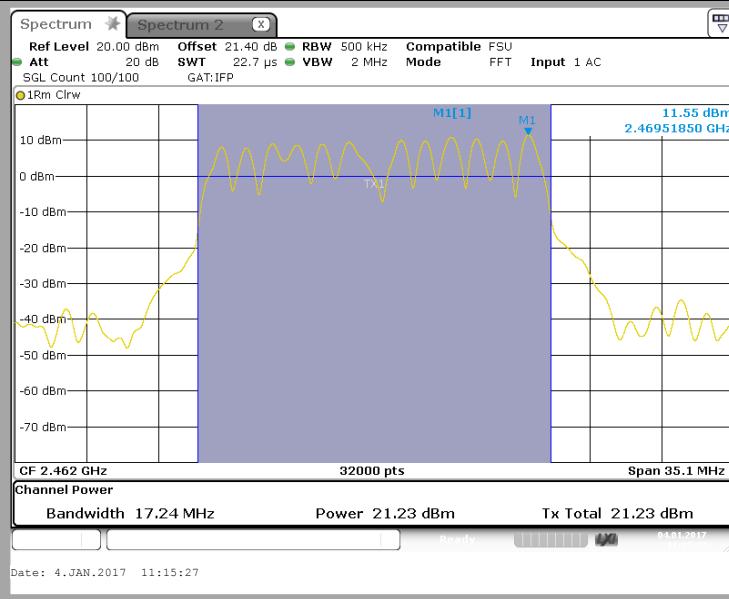
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 37/114

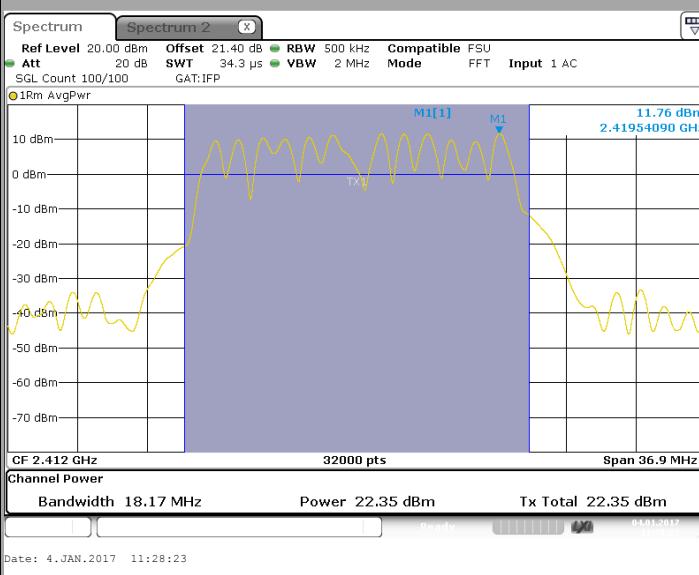


L C I E

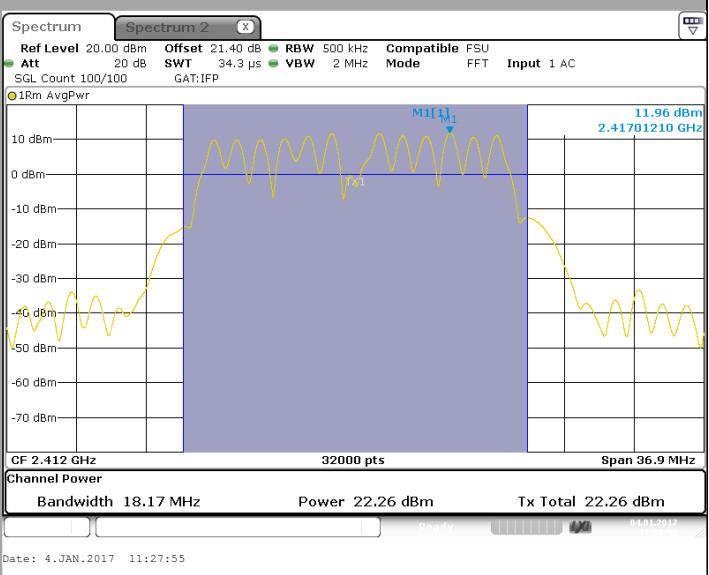
802.11nHT20

Cmin

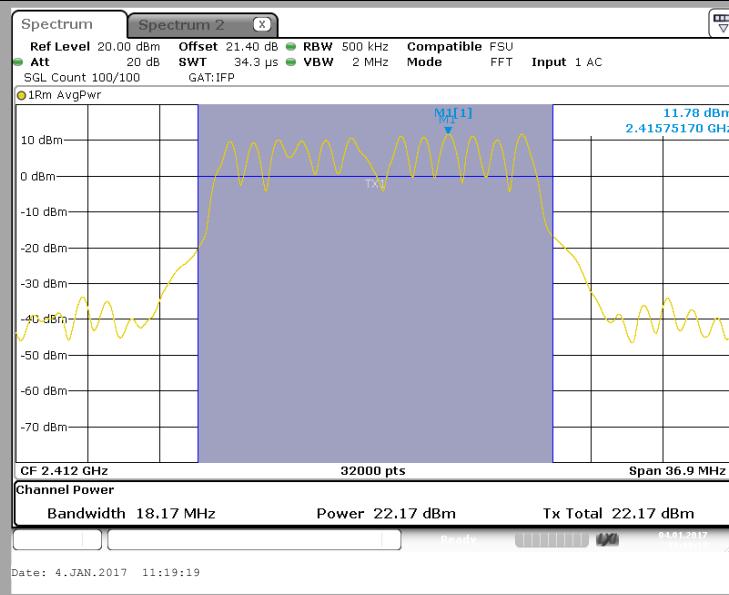
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 38/114

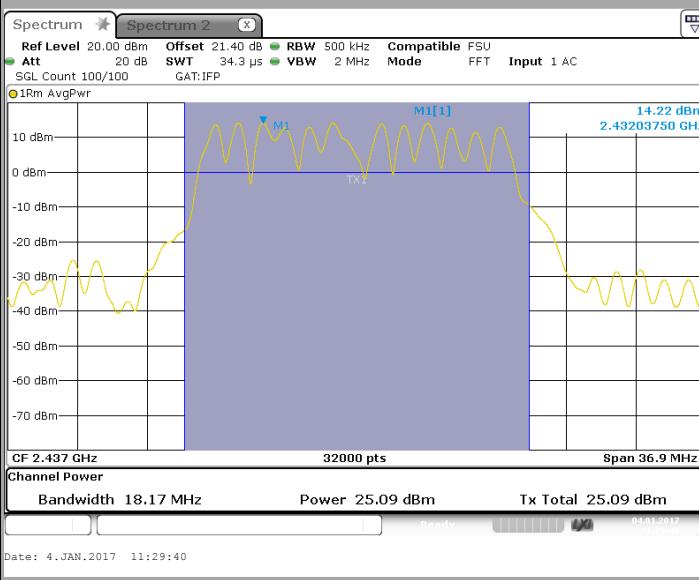


L C I E

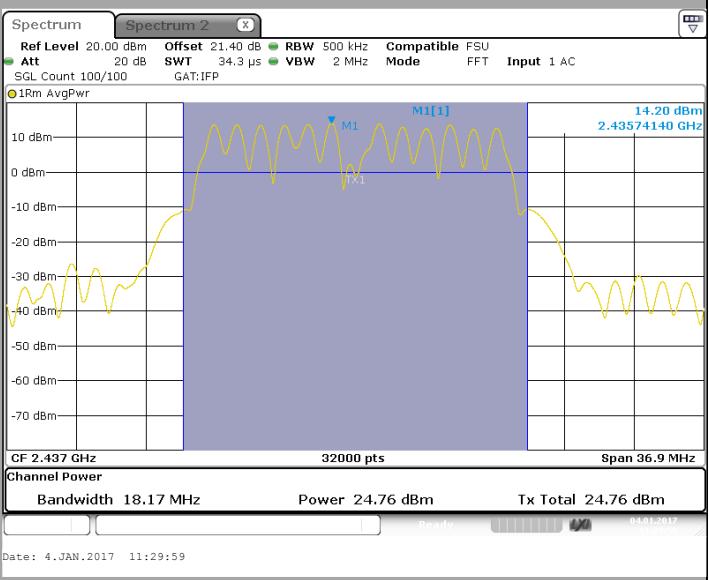
802.11nHT20

Cnom

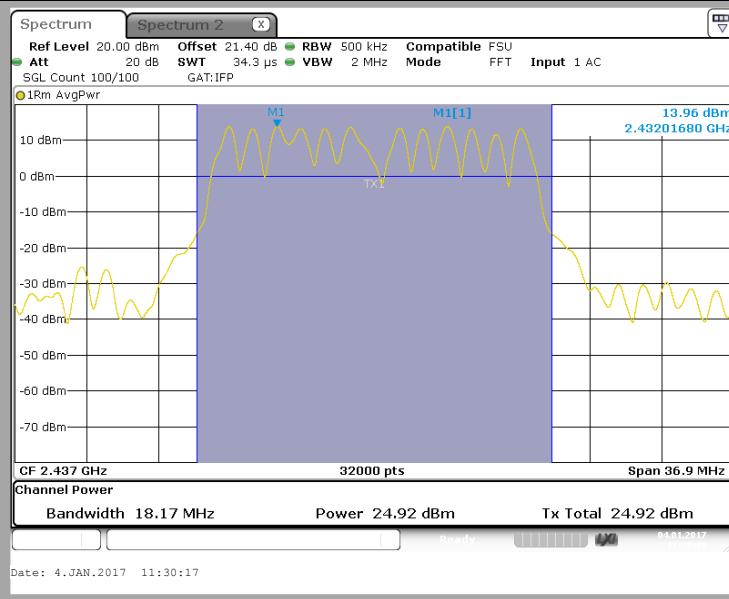
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 39/114

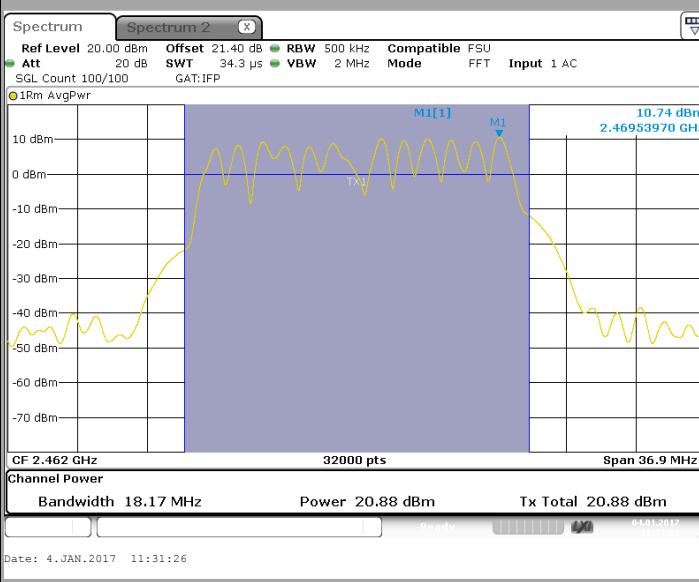


L C I E

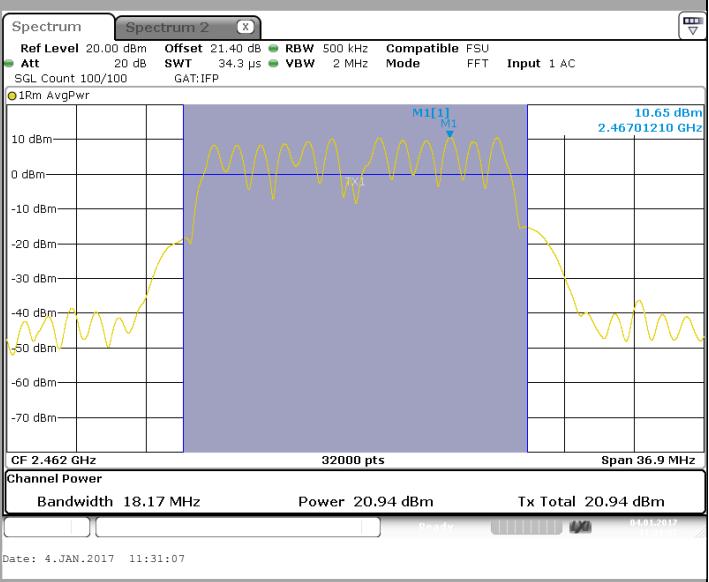
802.11nHT20

Cmax

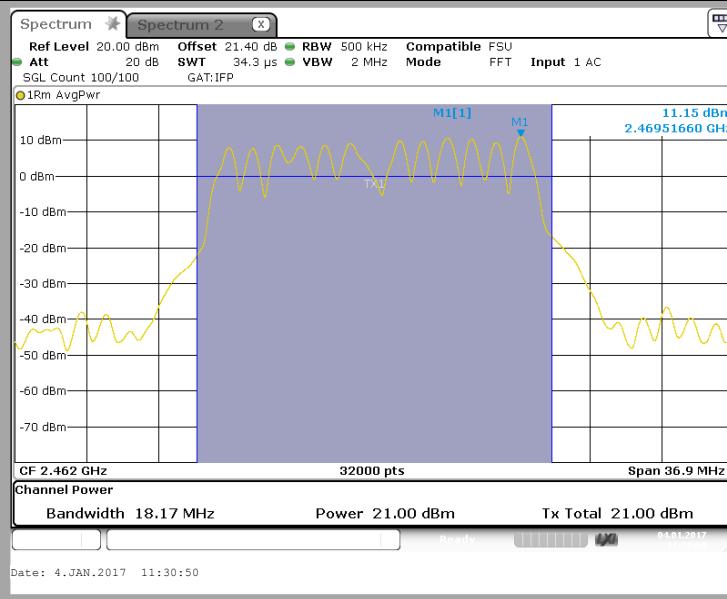
Tx1



Tx2



Tx3



TEST REPORT

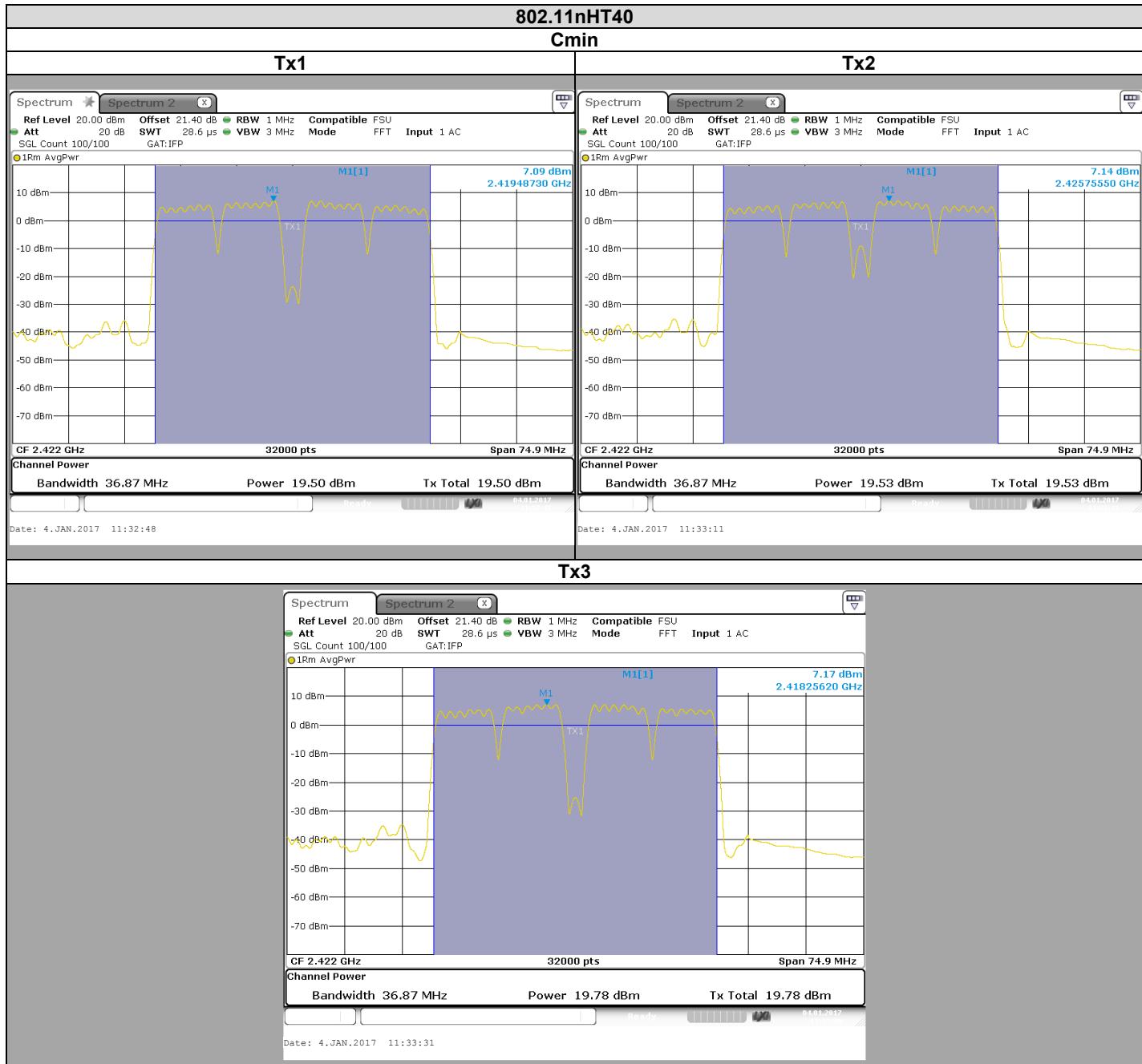
N° 146019-698067C

Version : 01

Page 40/114



L C I E



TEST REPORT

N° 146019-698067C

Version : 01

Page 41/114

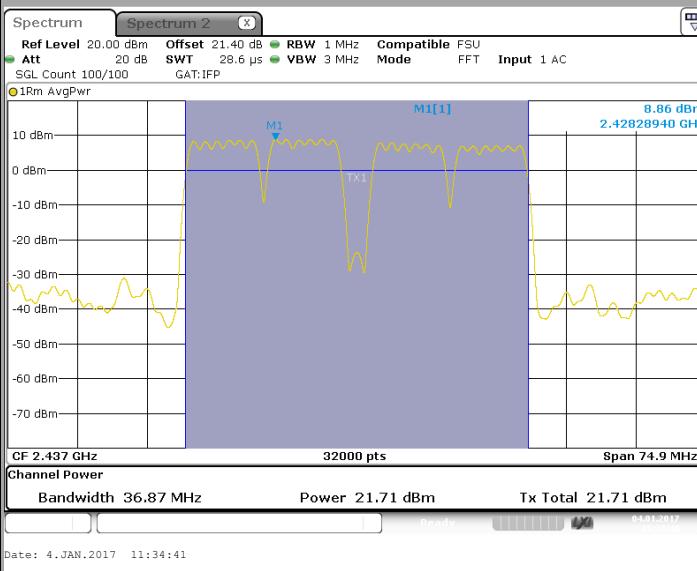


L C I E

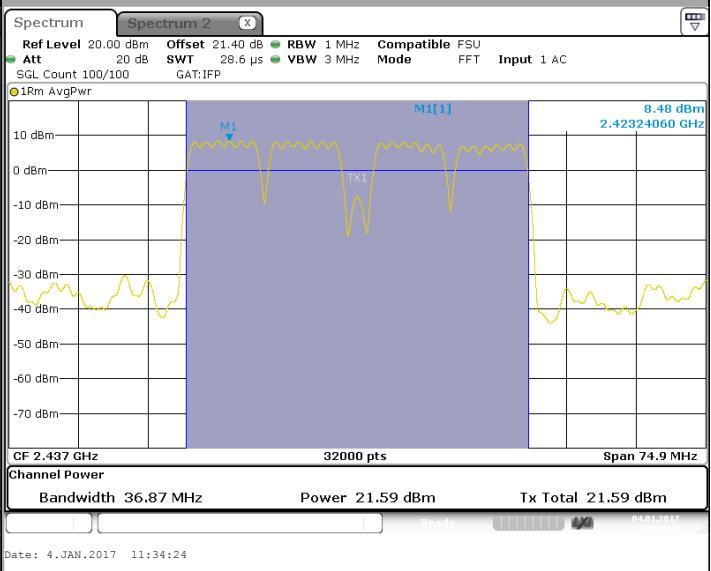
802.11nHT40

Cnom

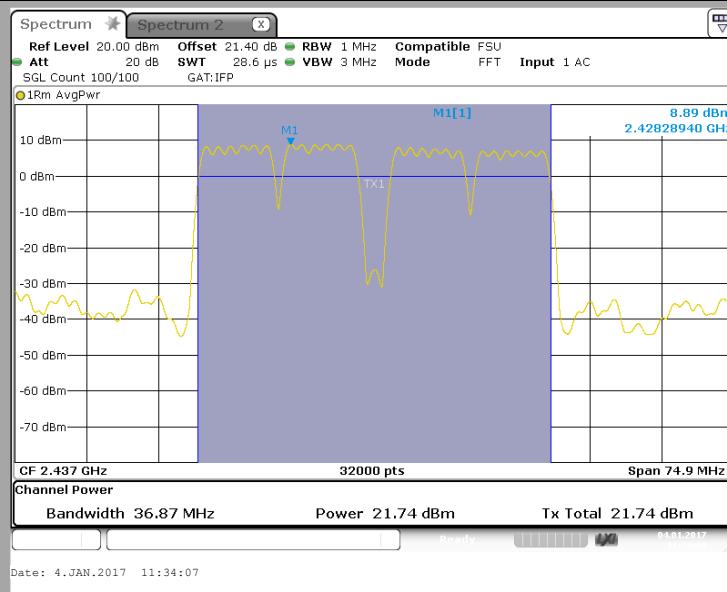
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 42/114

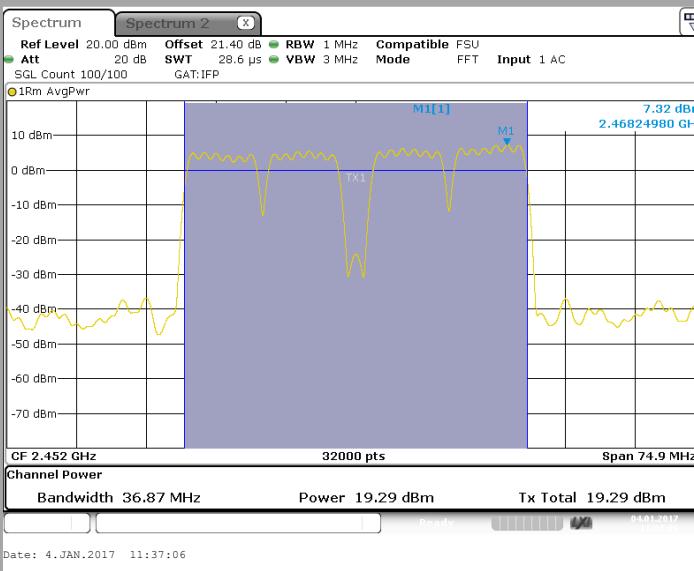


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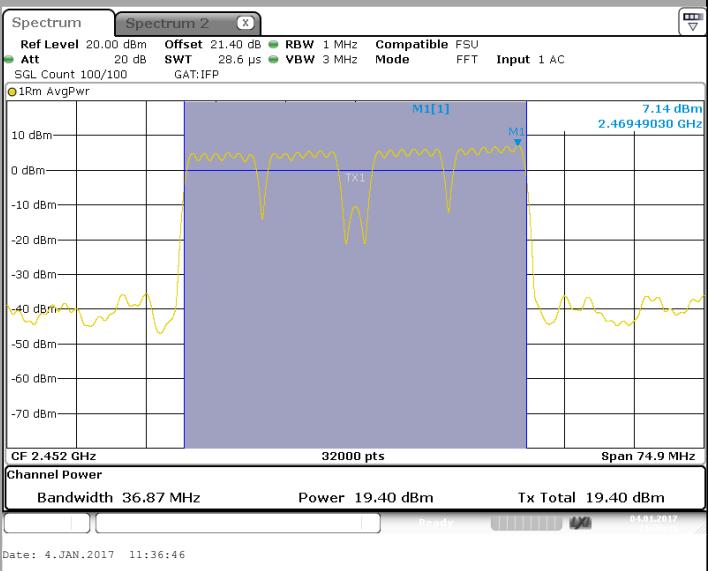
802.11nHT40

Cmax

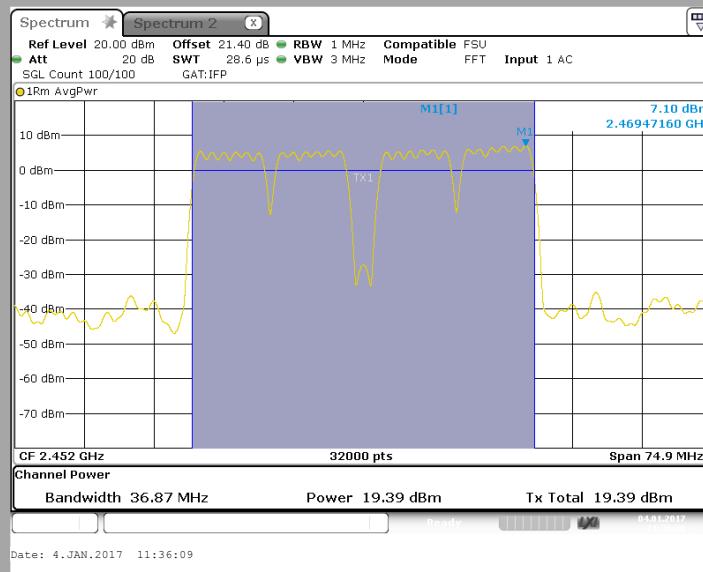
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 43/114



L C I E

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:

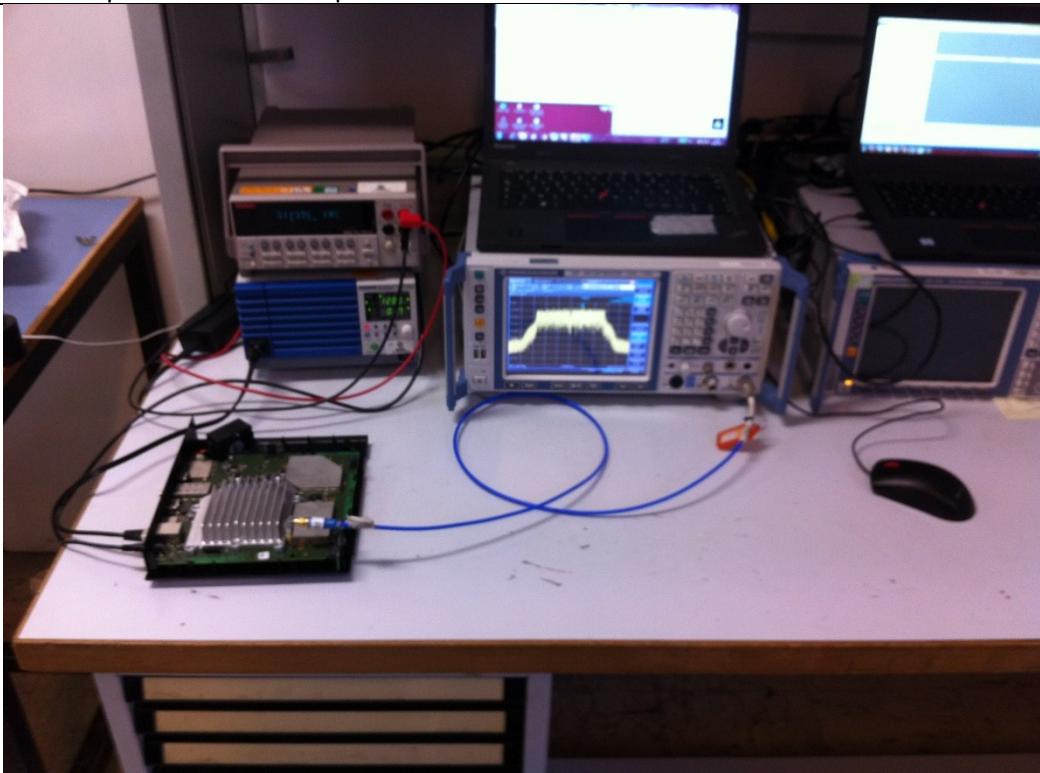
- On a table
- In an anechoic chamber

- 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

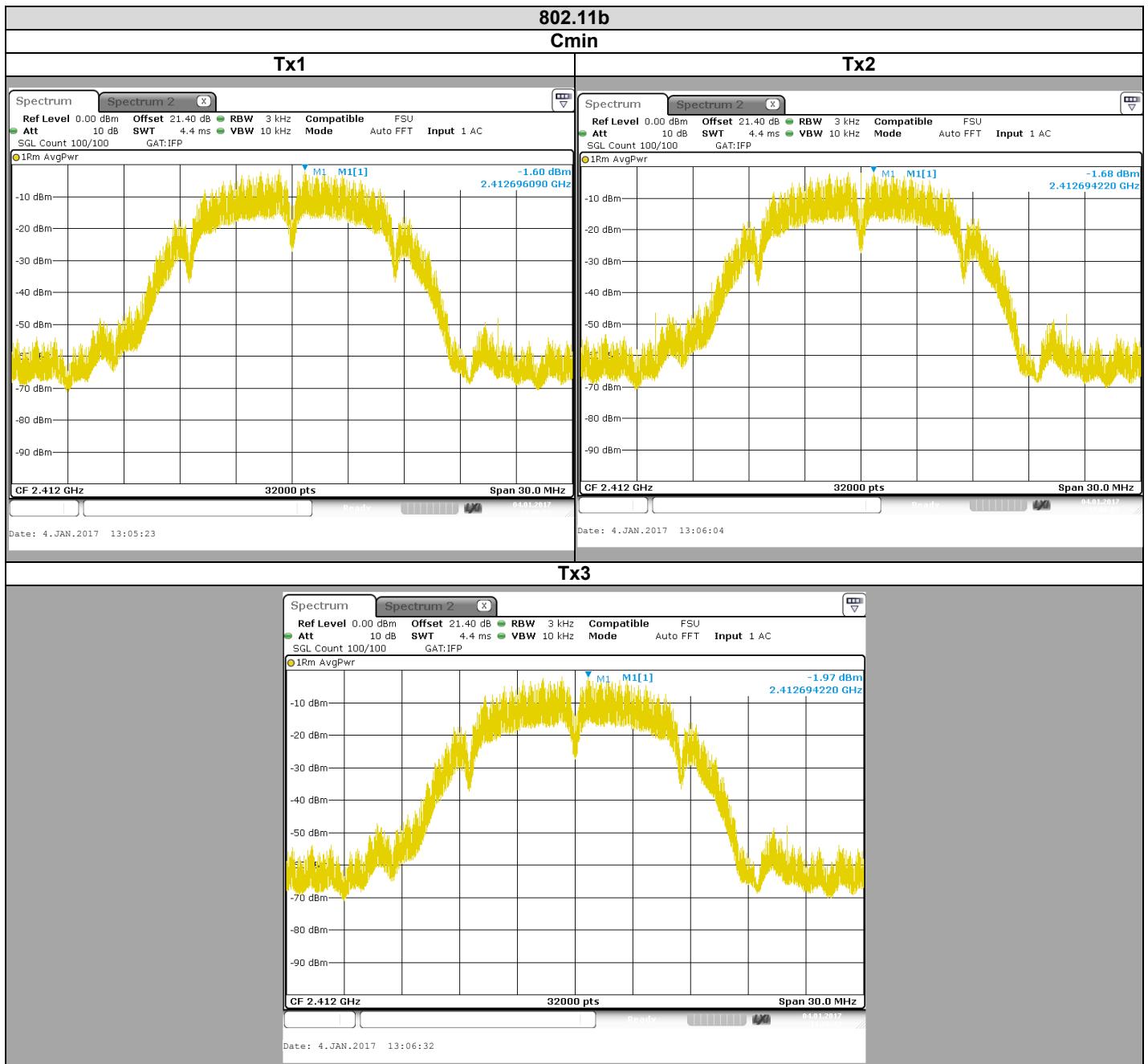
DESCRIPTION	MANUFACTURER	MODEL	N° LCIE	Cal_Date	Cal_Due
Multi-meter	KEITHLEY	2000	A1242090	2016/05	2018/05
Programmable AC/DC power supply	-; KIKUSUI	PCR500M	A7040079	Verified with calibrated multimeter	Verified with calibrated multimeter
EMI receiver	ROHDE & SCHWARZ	ESR 7	A2642023	2016/03	2017/03
RF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



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7.1. RESULTS



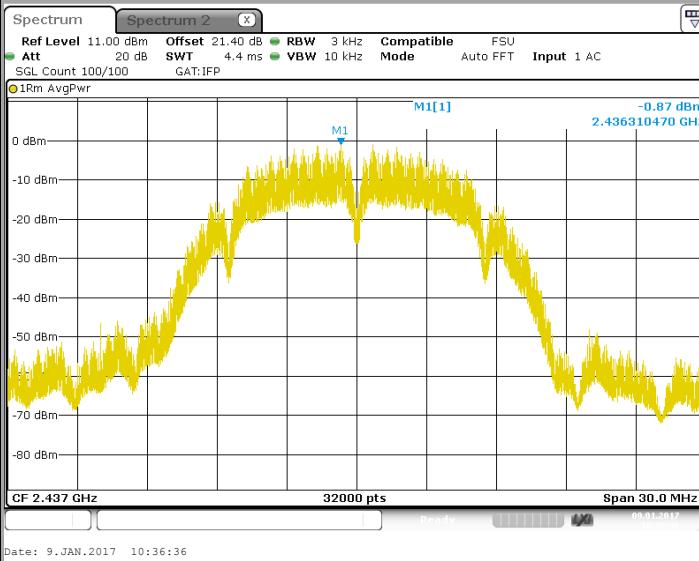


L C I E

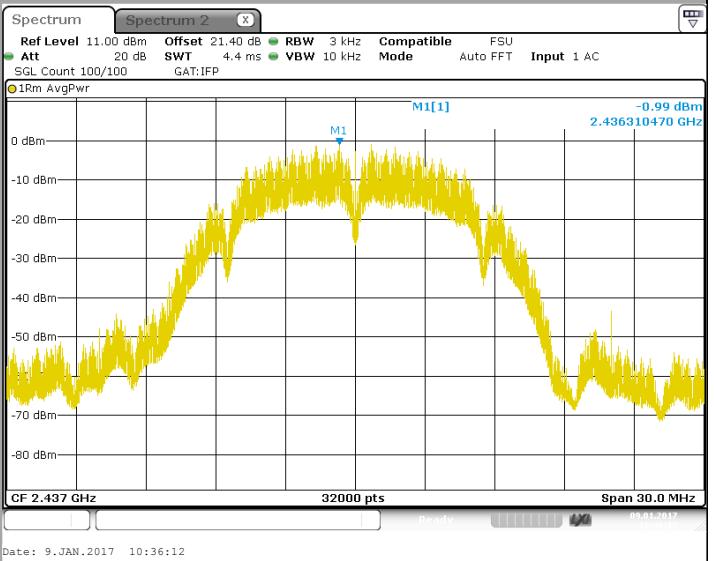
802.11b

Cnom

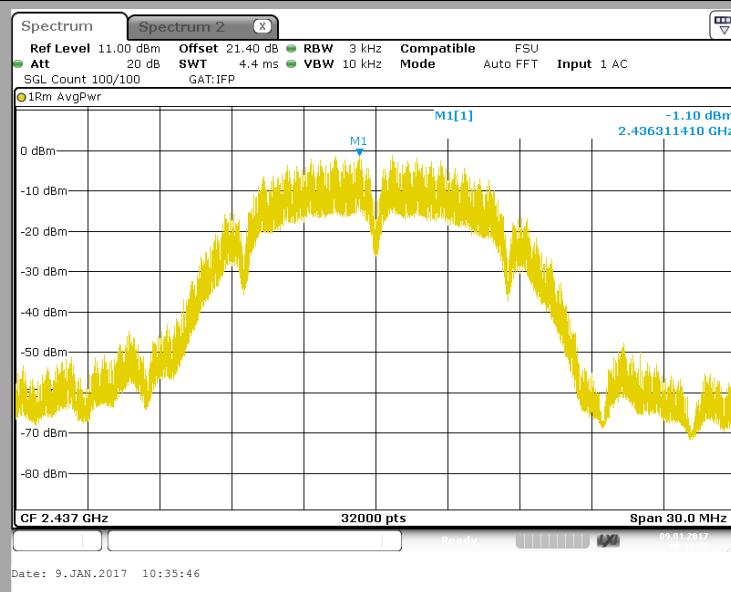
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 48/114

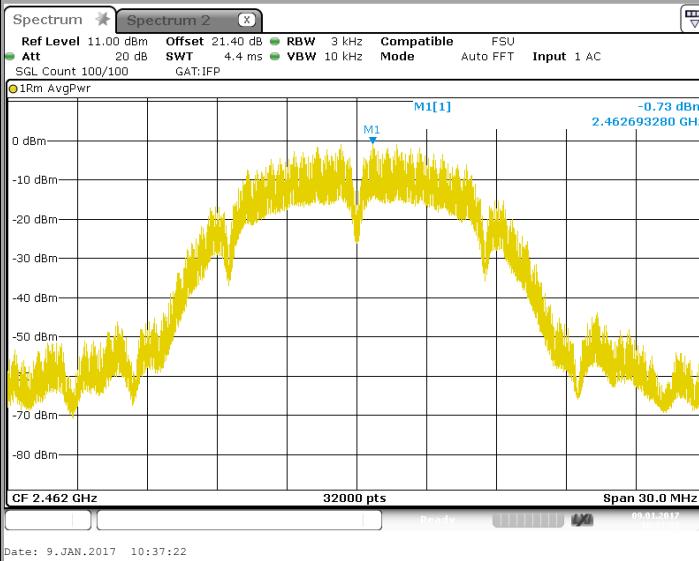


L C I E

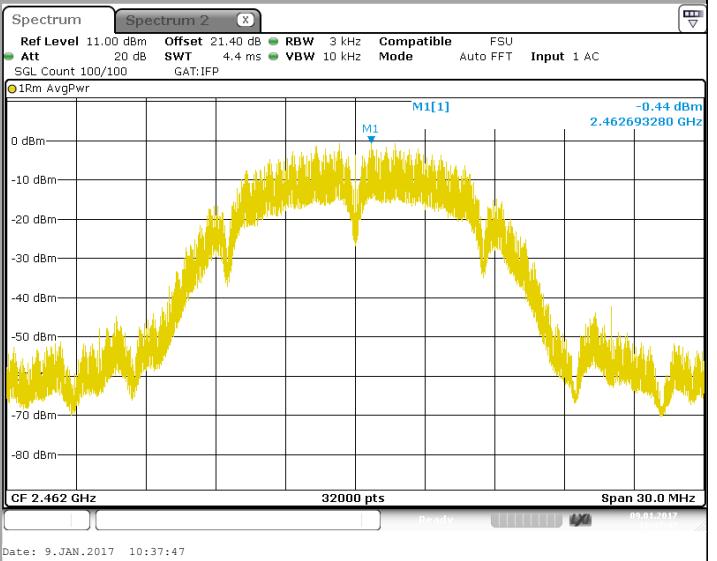
802.11b

Cmax

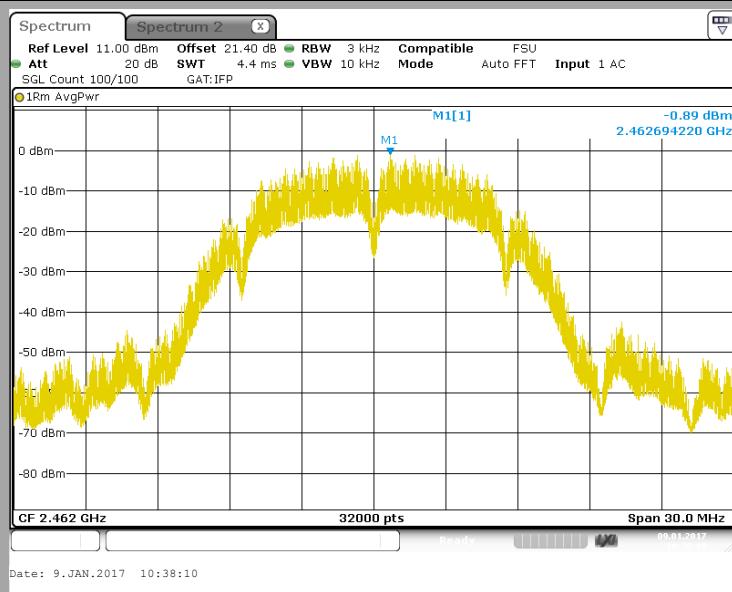
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 49/114

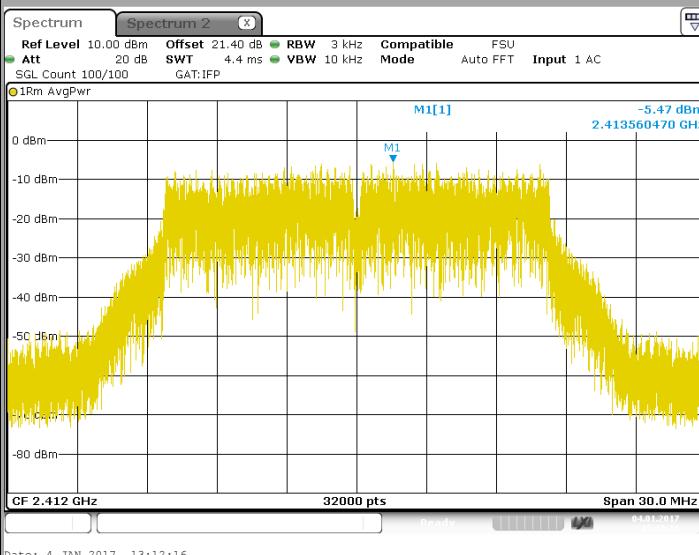


L C I E

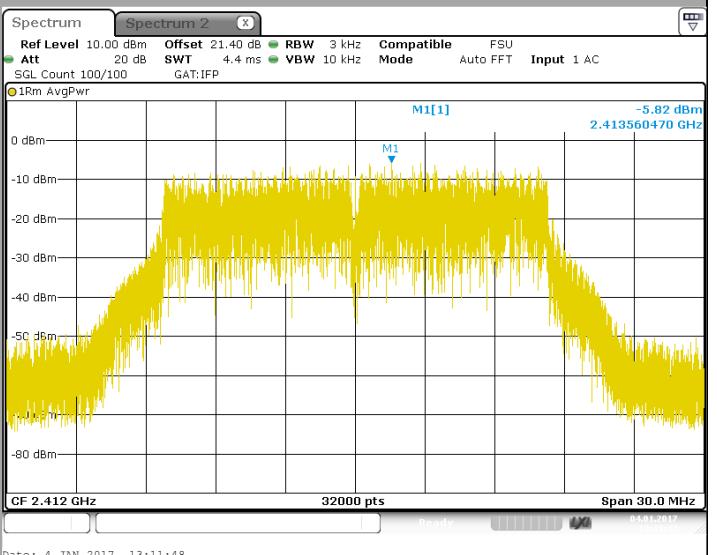
802.11g

Cmin

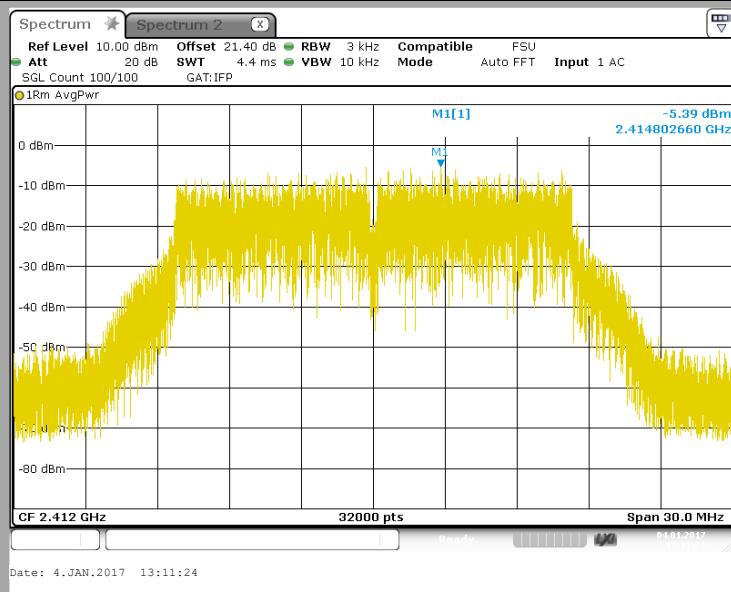
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 50/114

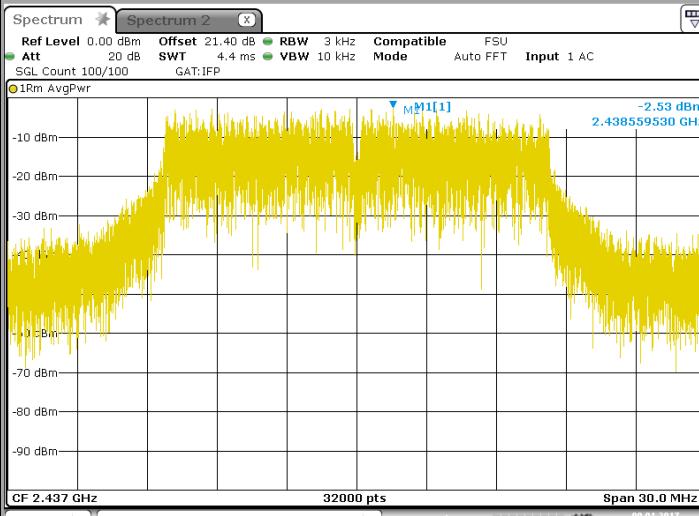


L C I E

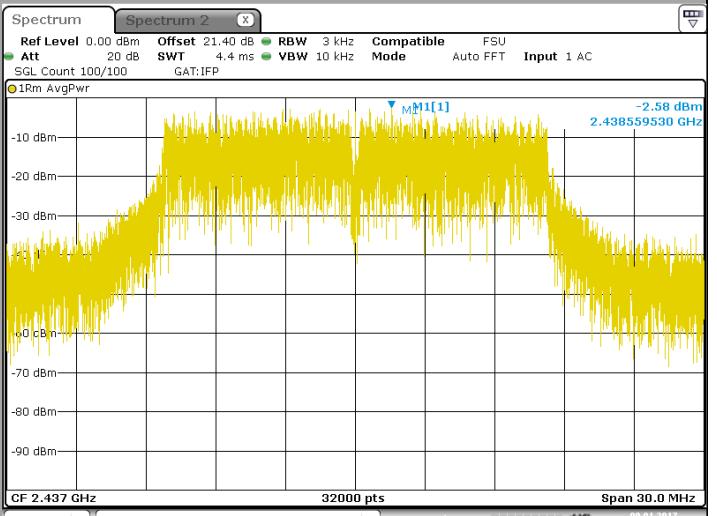
802.11g

Cnom

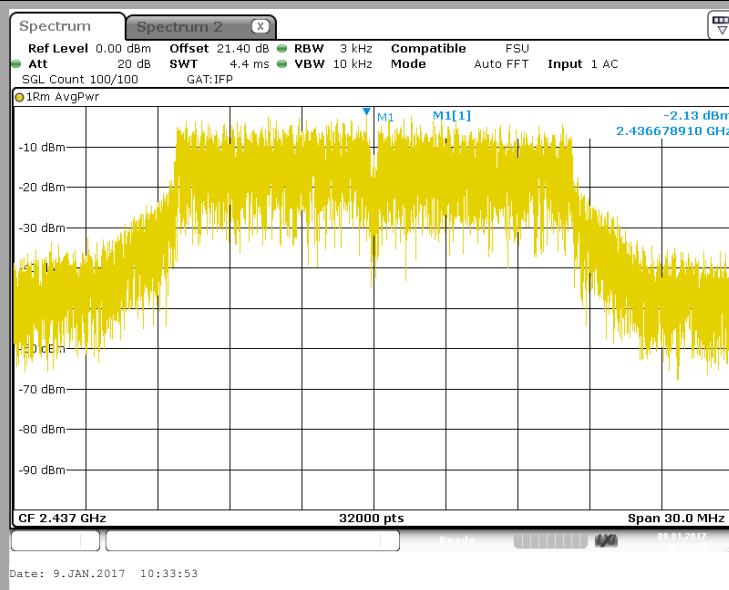
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 51/114

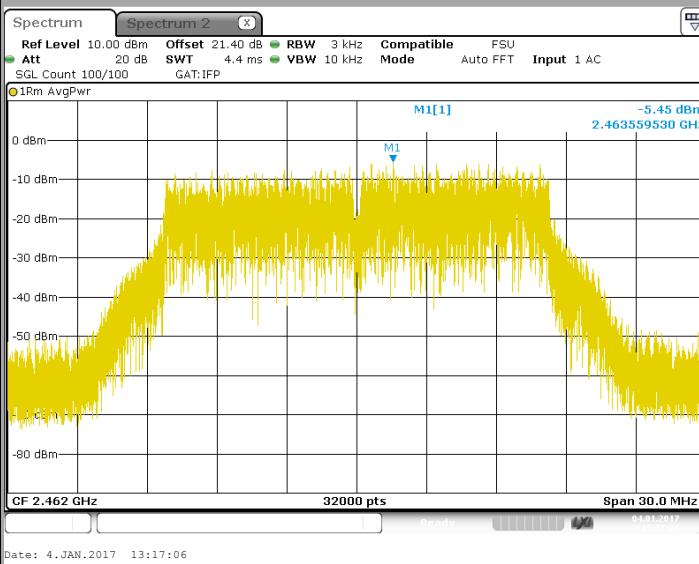


L C I E

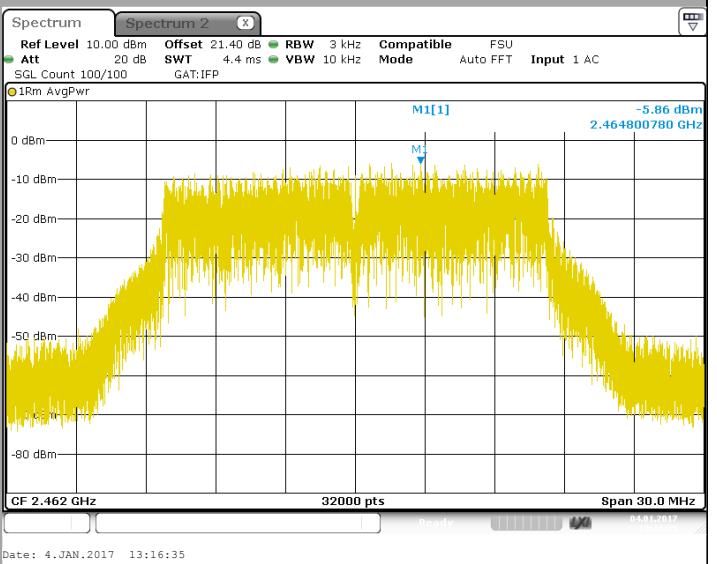
802.11g

Cmax

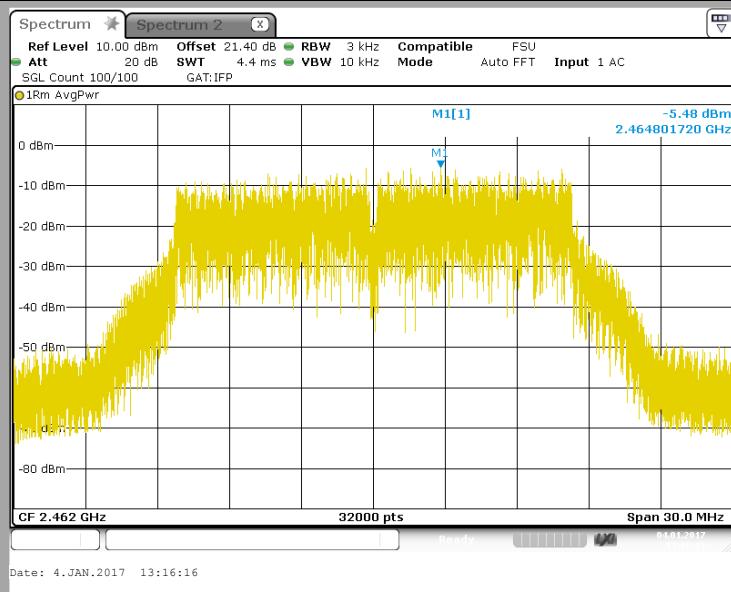
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 52/114

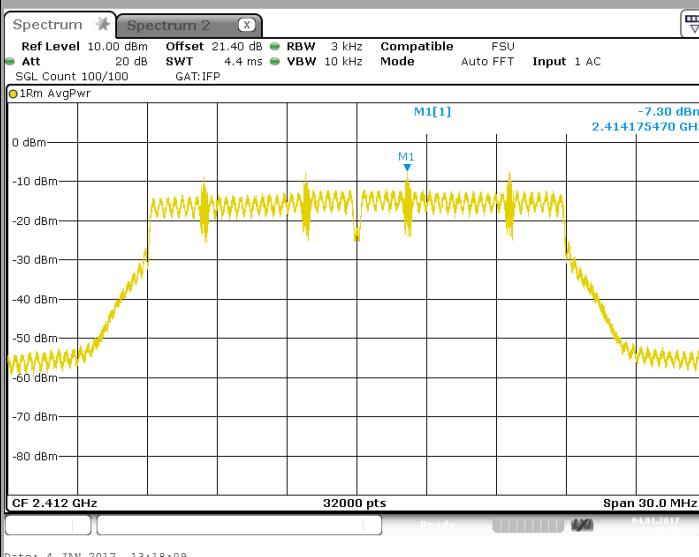


L C I E

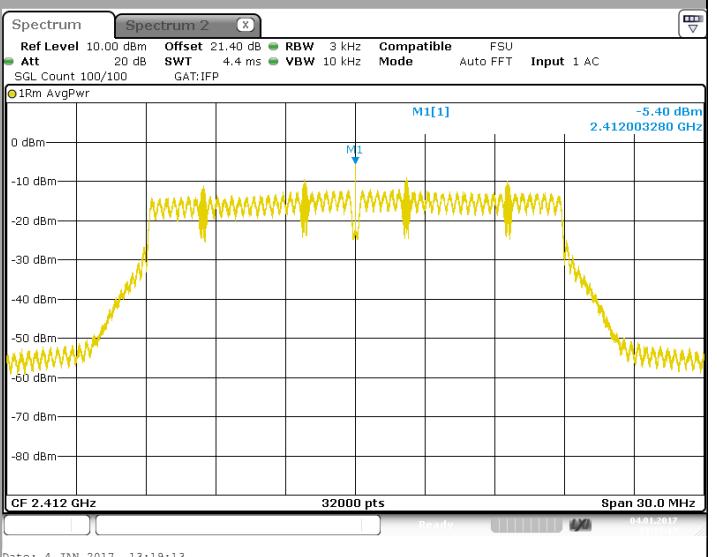
802.11nHT20

Cmin

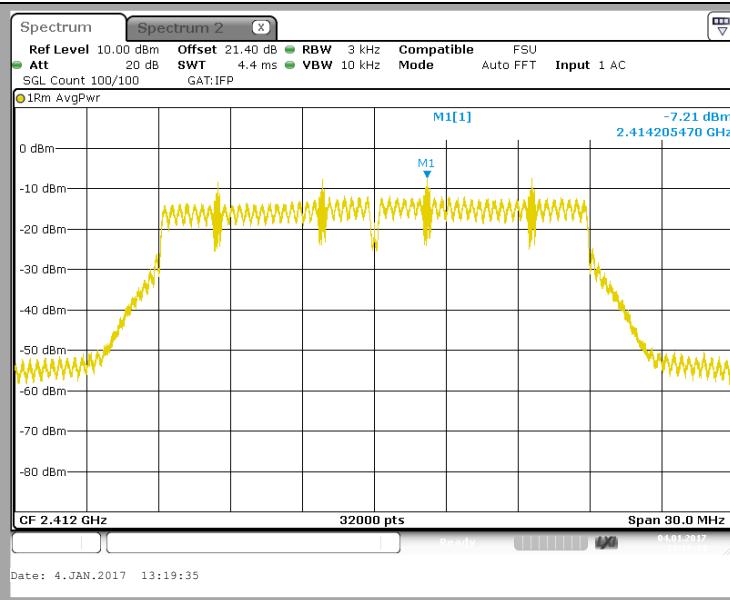
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 53/114

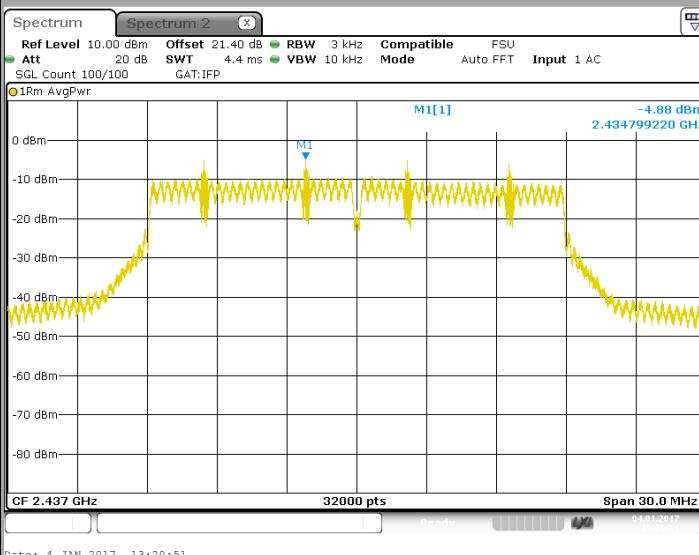


L C I E

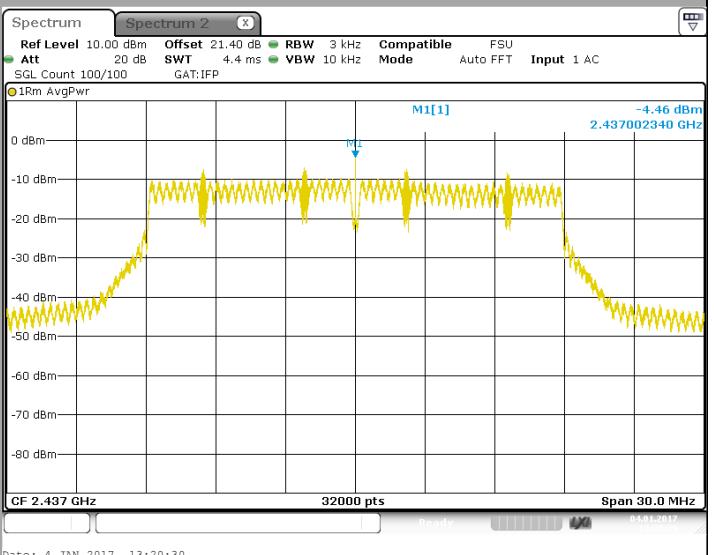
802.11nHT20

Cnom

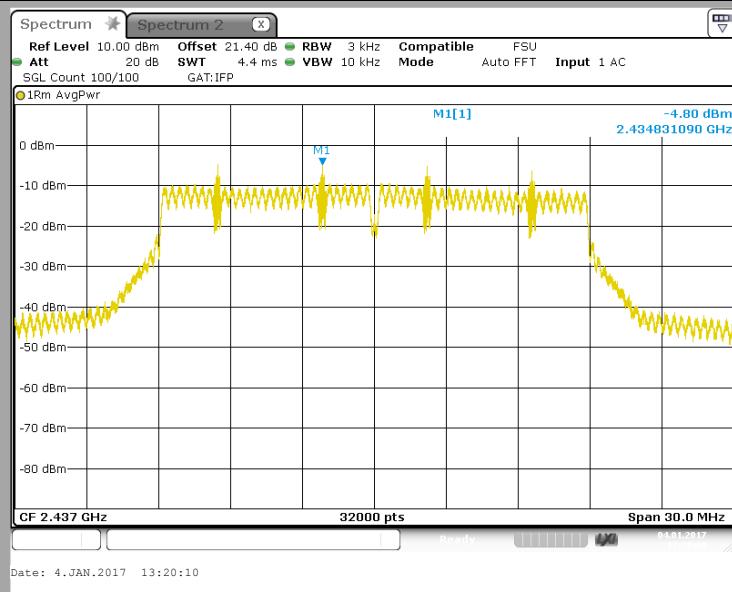
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 54/114

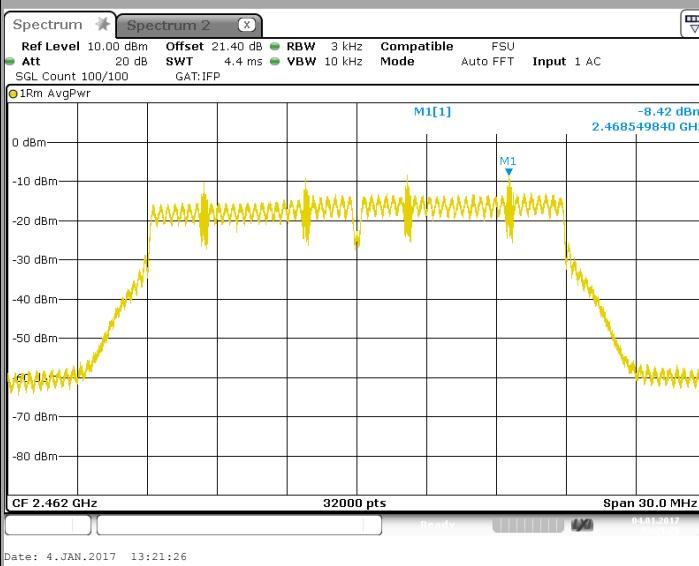


L C I E

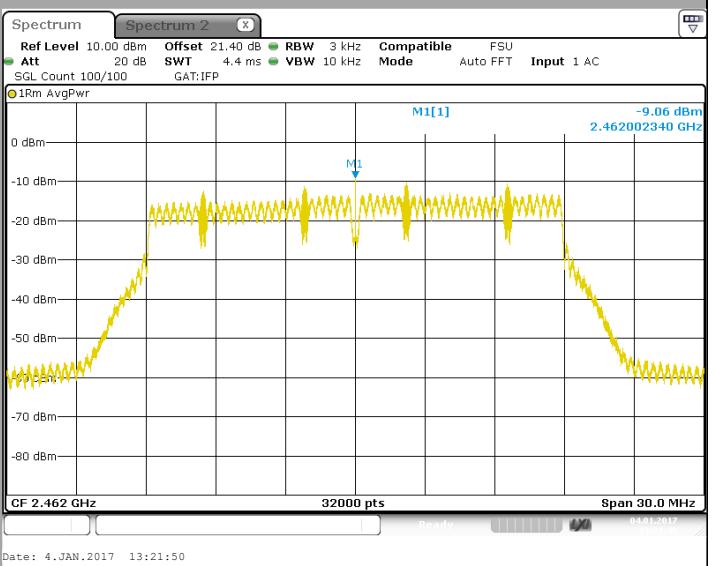
802.11nHT20

Cmax

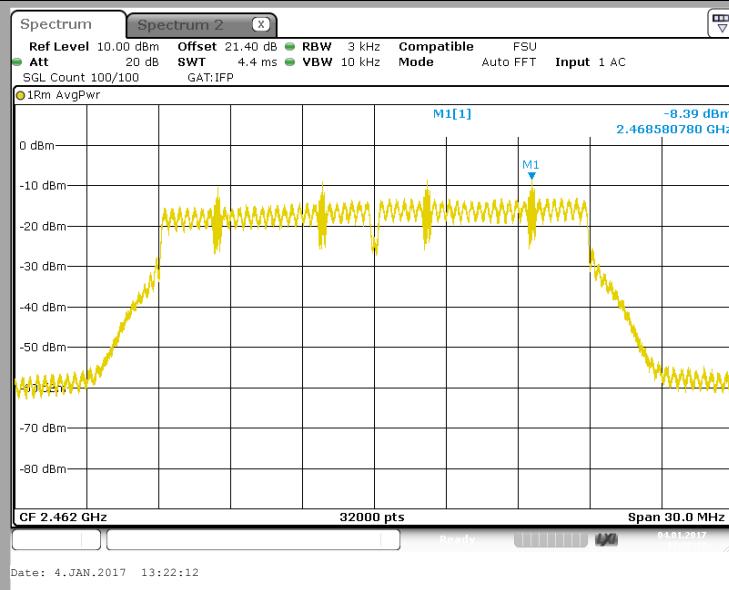
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 55/114

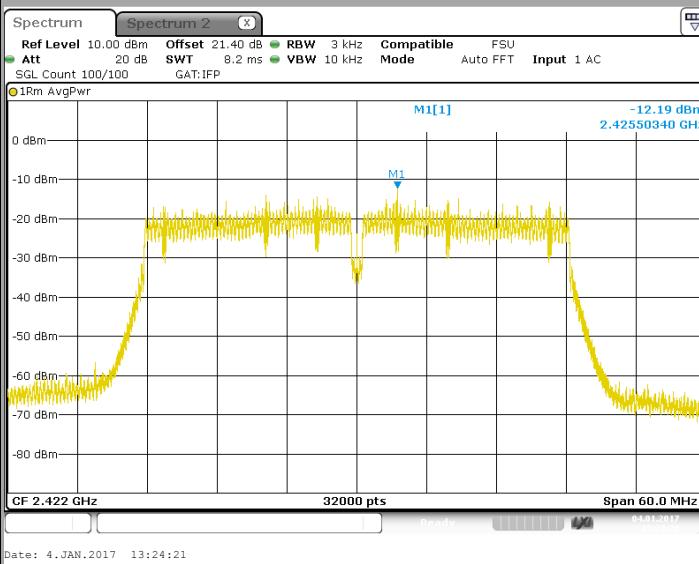


L C I E

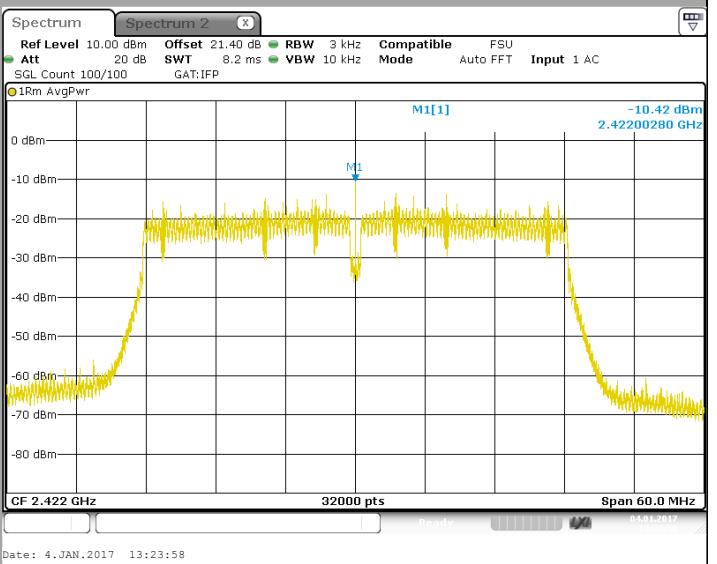
802.11nHT40

Cmin

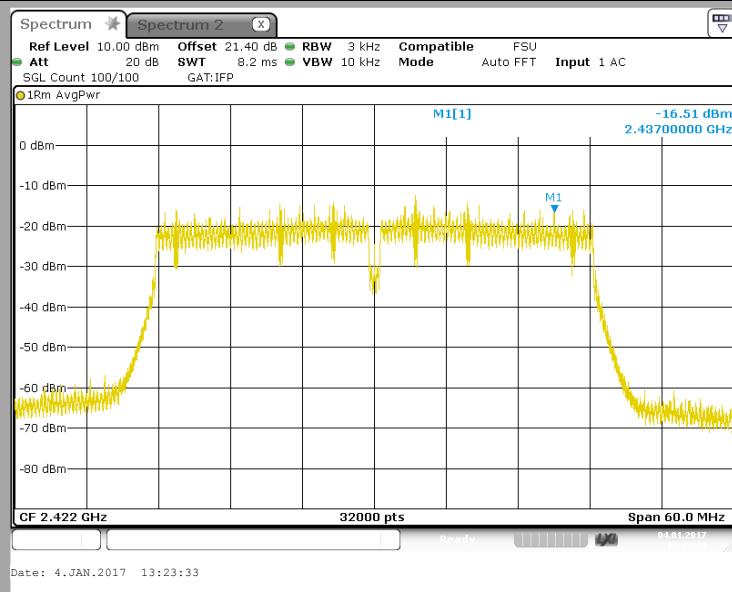
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 56/114

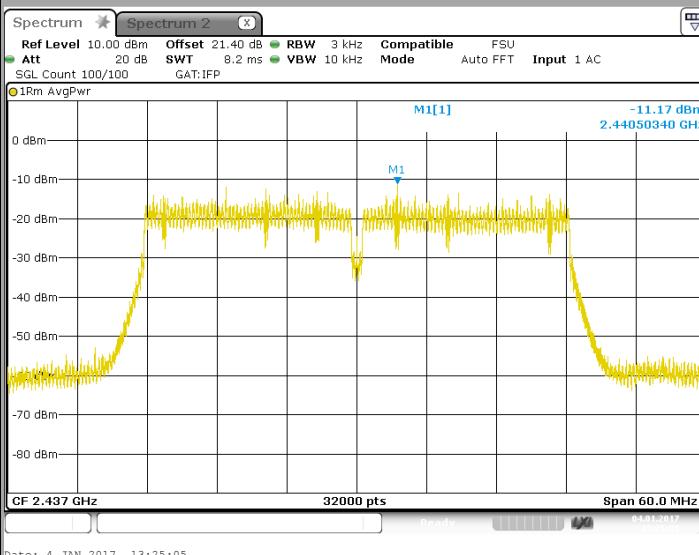


L C I E

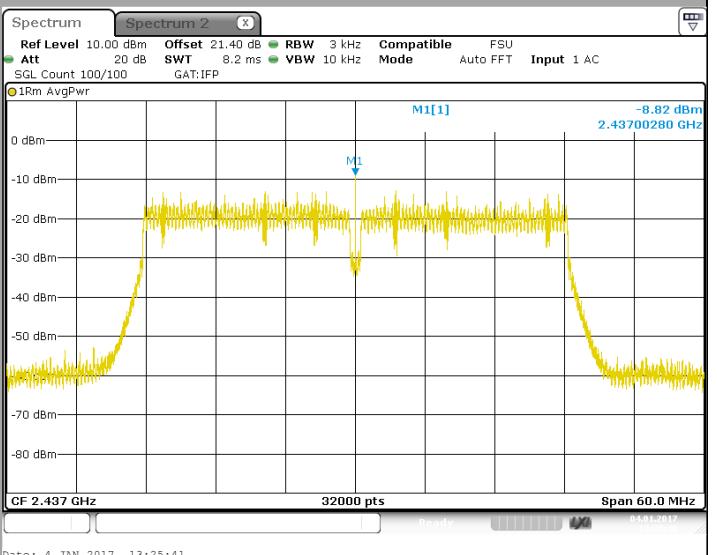
802.11nHT40

Cnom

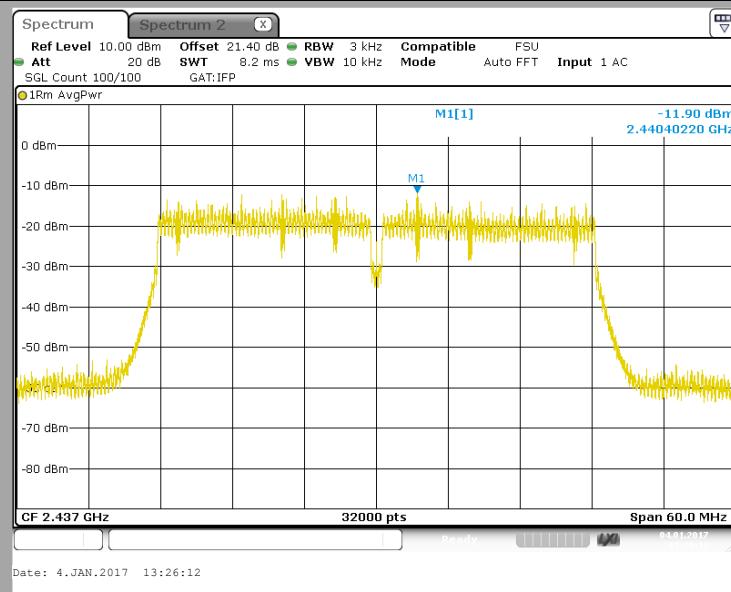
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 57/114

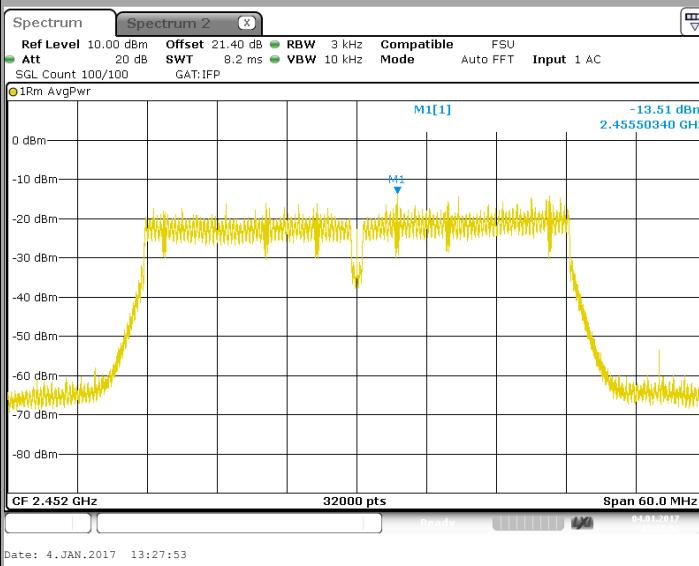


L C I E

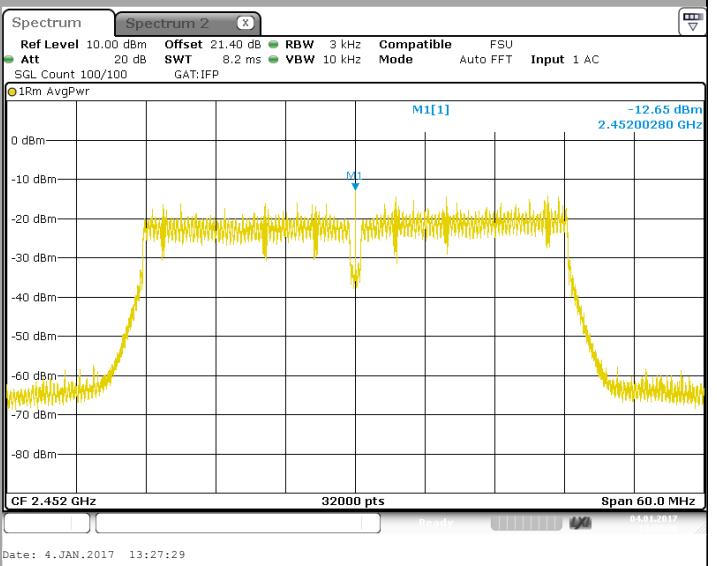
802.11nHT40

Cmax

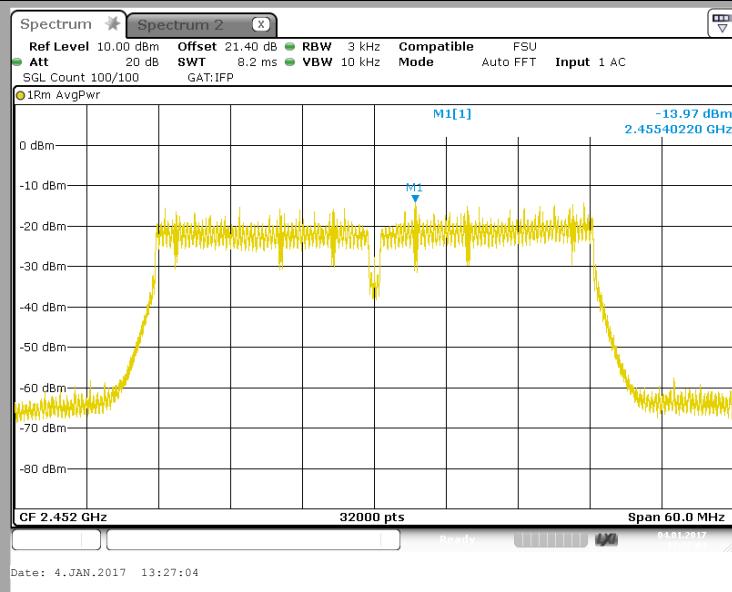
Tx1



Tx2



Tx3



TEST REPORT

N° 146019-698067C

Version : 01

Page 58/114



L C I E

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.