TEST REPORT

N°: 145064-694081C **Version : 02**

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	DGCI384 UHD Alt US
Trade mark	**SAGEMCOM**
Manufacturer	**SAGEMCOM**
Model under test	**TheBox (253697282)**
Serial number	**616400107098**
FCC ID	**VW3DGCI384**
Test date	: November 7, 2016 to November 25, 2016
Test location	Fontenay Aux Roses & Ecuelles
Composition of document	117 pages
Document issued on	January 19, 2017

Written by :
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Approved by :
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PUBLICATION HISTORY

Version	Date	Author	Modification
01	January 6, 2017	Mathieu CERISIER	Creation of the document
02	January 19, 2017	Mathieu CERISIER	Update: accumulated gain to 6.07dBi Update: limit for maximum output power & power spectral density

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	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
6dB Bandwidth	☑ PASS	☐ FAIL	☐ NA()	☐ NP(1)
Duty Cycle	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Maximum Conducted Output Power	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Power Spectral Density	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Conducted Spurious Emission at the Band Edge	☑ PASS	☐ FAIL	☐ NA()	☐ NP(1)
Unwanted Emissions into Non-Restricted Frequency Bands	☑ PASS	☐ FAIL	☐ NA()	☐ NP(1)
AC Power Line Conducted Emission	☑ PASS	☐ FAIL	☐ NA(2)	☐ NP(1)
Unwanted Emissions into Restricted Frequency Bands	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
Receiver Radiated emissions	☑ PASS	☐ FAIL	☐ NA	☐ NP(1)
This table is a summary of test report, see conclusion of each clause of this test report for detail.				

(1): Limited program
(2): EUT 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 TheBox **(253697282)** **Serial Number: 616400107098**

Equipment Under Test

Equipment Under Test

Inputs/outputs - Cable:

Access	Type	Length used (m)	Declared <3m	Shielded	Under test	Comments
1	Power Supply	-	☐	☐	☑	-

Auxiliary equipment used during test:

Type	Reference	Sn	Comments
Laptop	-	-	Use to set the EUT
Power supply°1	NBS60C120500M2	16366C25200017	P/N:191363252-xx
Power supply°2	LPL-C060120500ZS	1637215590020	P/N:191363559-XX
Power supply°3	MSA-Z5000IS12.0-60A-P	H16386E6950010	P/N:191363695-XX
Power supply°4	A15-060P1A	16413K72800092	P/N:191363728

Equipment information:

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

Antenna Characteristic			
Antenna assembly	**Gain (dBi)**	**Frequency Band (MHz)**	**Impedance(Ω)**
1	1.3dBi	2412-2472	50
2	1.3dBi	2412-2472	50
3	1.3dBi	2412-2472	50
Accumulated	6.07dBi (for CDD operation in 11b and 11g , MIMO uncorrelated signals for 11n)	2412-2472	50

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

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**

DATA RATE		
802.11b		
Data Rate (Mbps)	Modulation Type	Modulation Worst Case
1	DBPSK	☑
2	DQPSK	☐
5.5	DQPSK	☐
11	CCK	☐

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

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

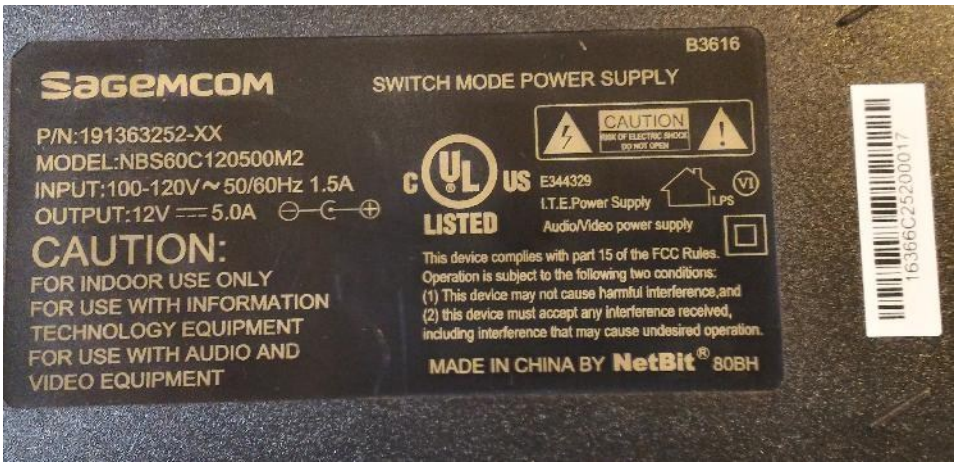
DATA RATE									
802.11n HT40									
Available for EUT	MCS Index	Spatial streams	Modulation				Data Rate (Mbps)		Worst Case Modulation
							(GI = 800ns)	(GI = 400ns)	
☑	0	1	BPSK				13	15	☑
	1	1	QPSK				27	30	☐
	2	1	QPSK				40.5	45	☐
	3	1	16-QAM				54	60	☐
	4	1	16-QAM				81	90	☐
	5	1	64-QAM				108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

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

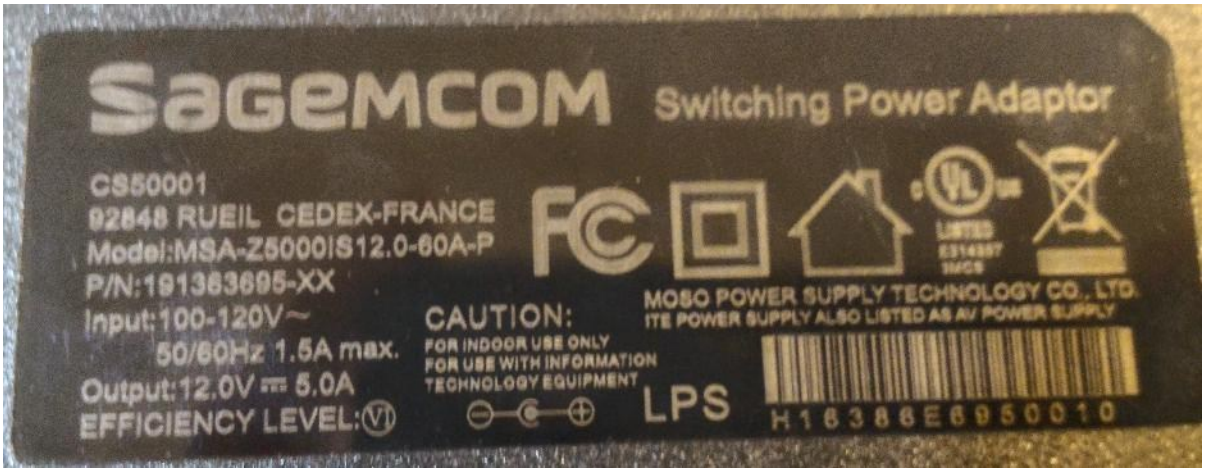
Following commands with the specific test software “TERATERM” are used to set the product:
- See document “EMTA62-3_WiFi_2.4G_Commandes_Nat_script.docx” for the command used during test

2.3. EQUIPMENT LABELLING



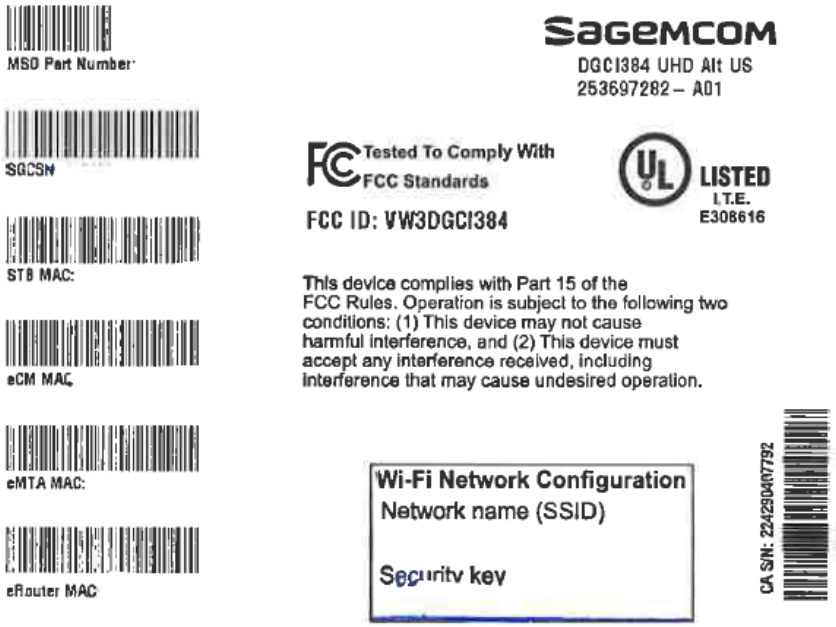
Power supply n° 1

Power supply n° 2



Power supply n° 3

Power supply n° 4



Example of the final labelling plate

2.4. EQUIPMENT MODIFICATION

☑ None ☐ Modification:

3. OCCUPIED BANDWIDTH

3.1. TEST CONDITIONS

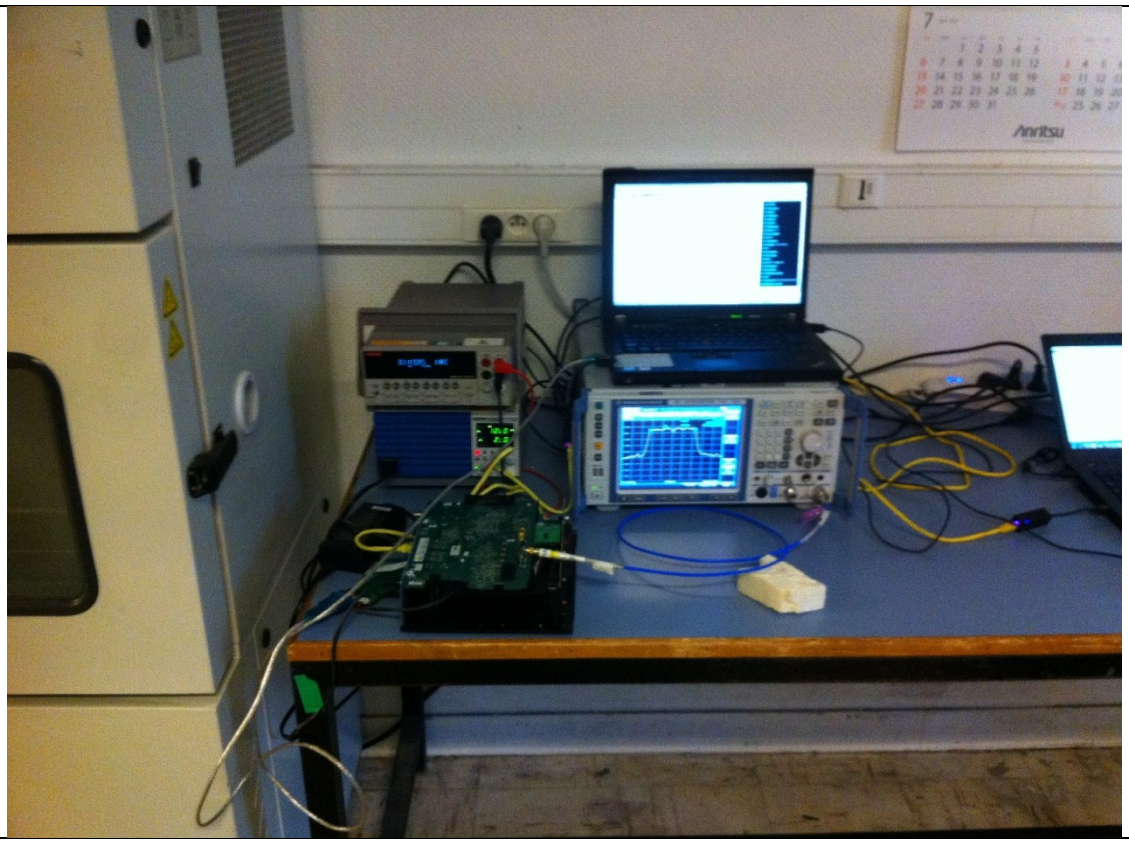
Test performed by	: Mathieu CERISIER
Date of test	: November 16, 2016
Ambient temperature	: 25 °C
Relative humidity	: 41 %

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	A5329674	2016/10	2017/10

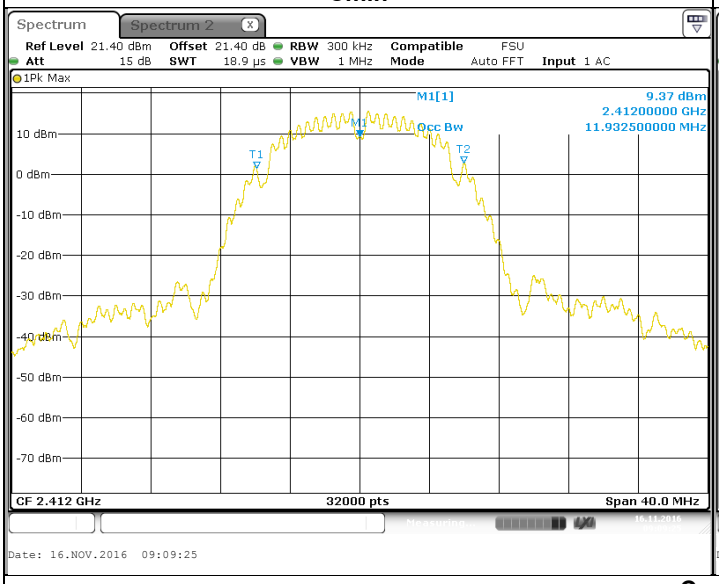
Note: In our quality system, the test equipment calibration due is more & less 2 months

3.3. RESULTS

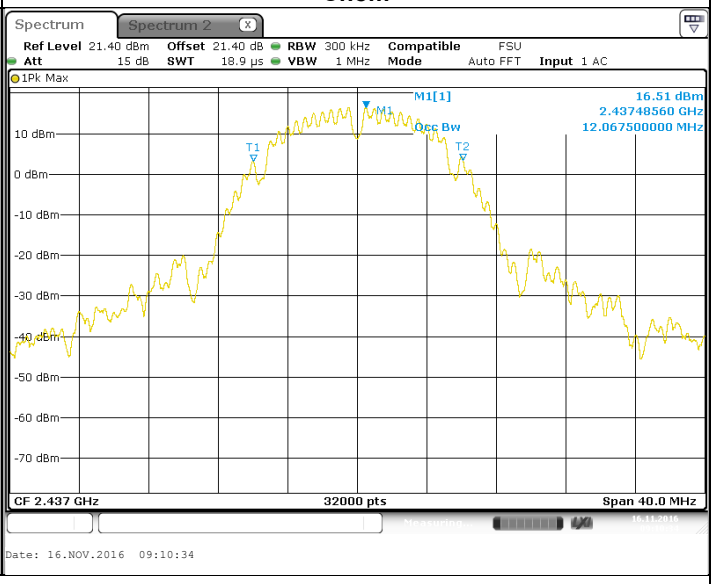
802.11b

Occupied Bandwidth

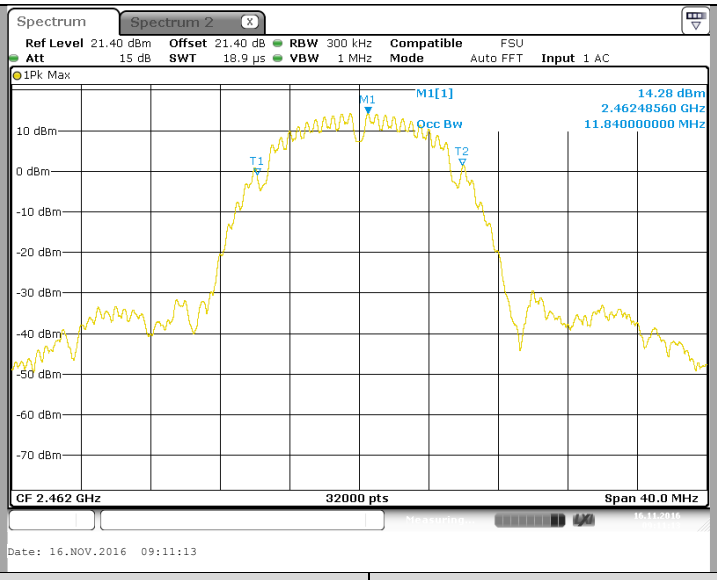
Cmin



Cnom



Cmax

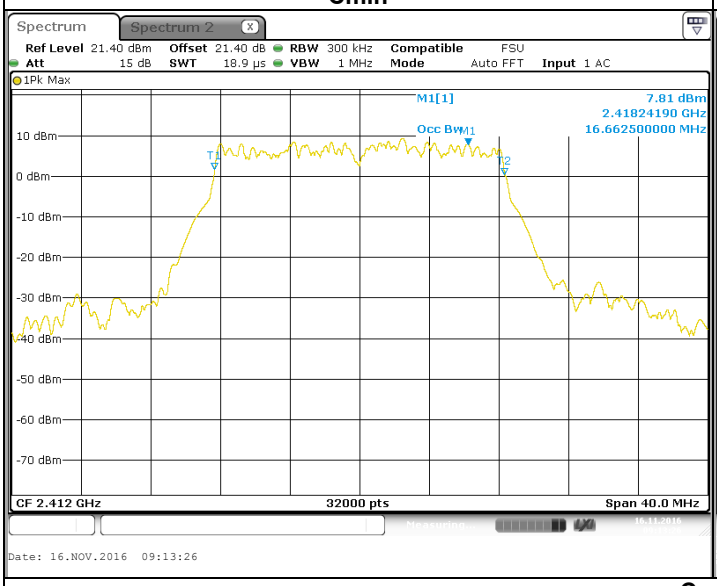


Channel	Occupied Bandwidth (MHz)
Cmin	11,935
Cnom	12,068
Cmax	11,84

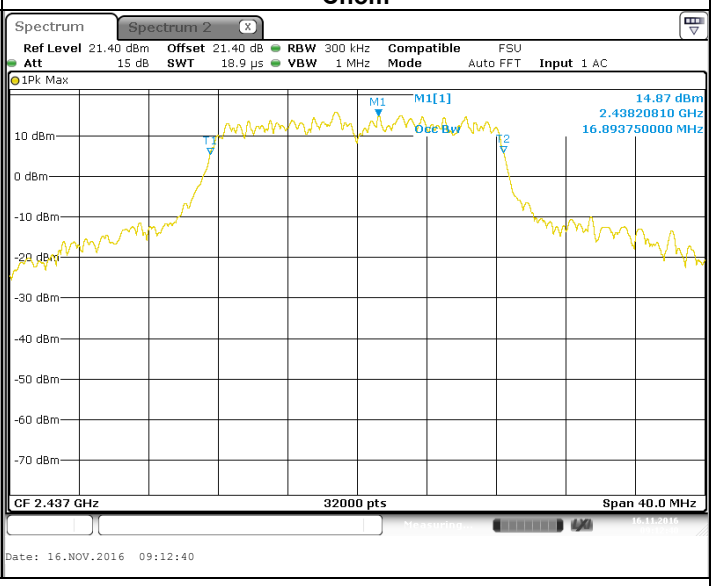
802.11g

Occupied Bandwidth

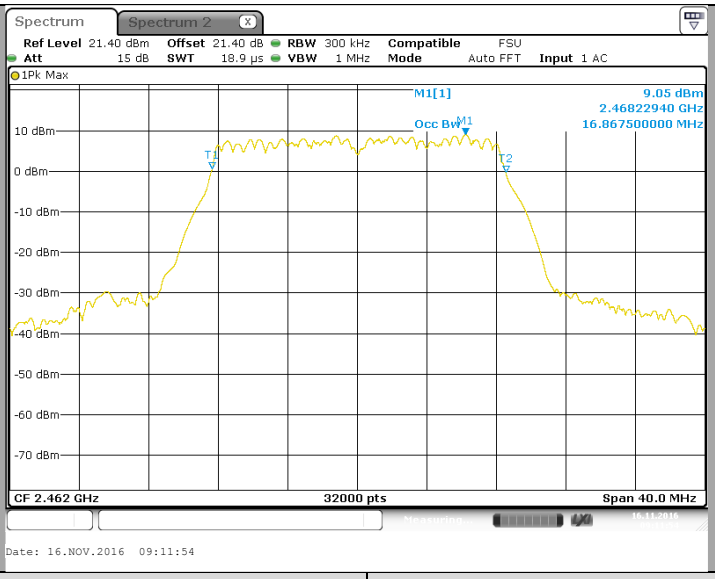
Cmin



Cnom



Cmax

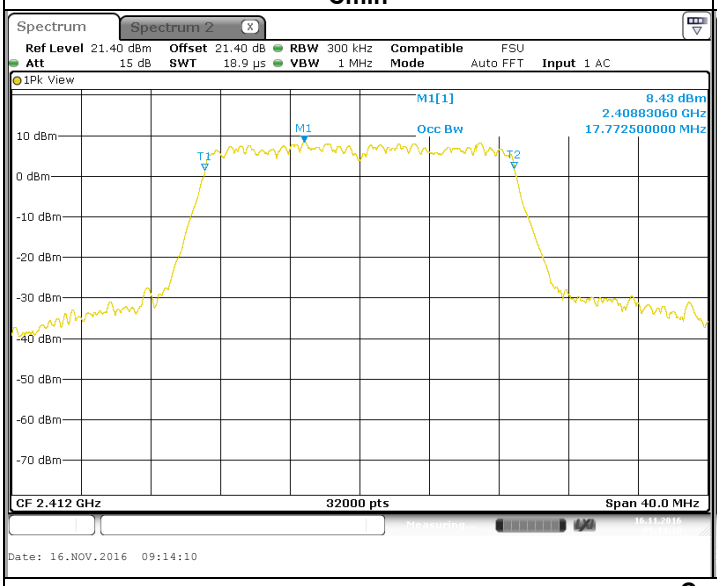


Channel	Occupied Bandwidth (MHz)
Cmin	16,663
Cnom	16,894
Cmax	16,868

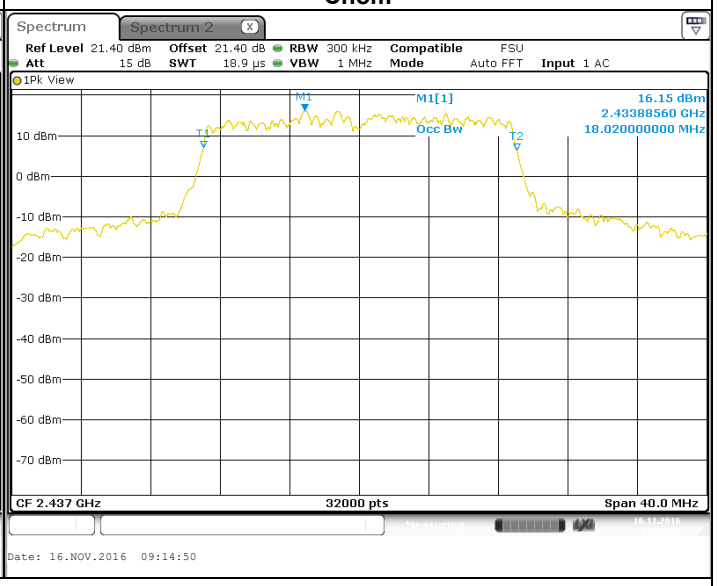
802.11nHT20

Occupied Bandwidth

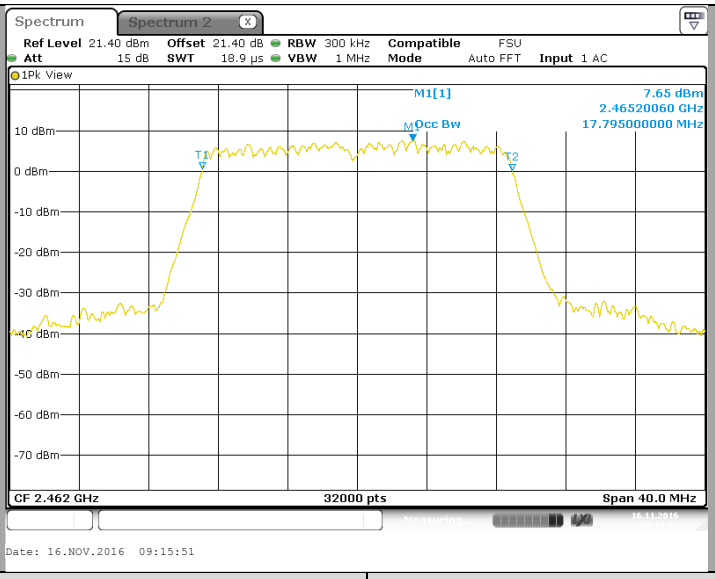
Cmin



Cnom



Cmax

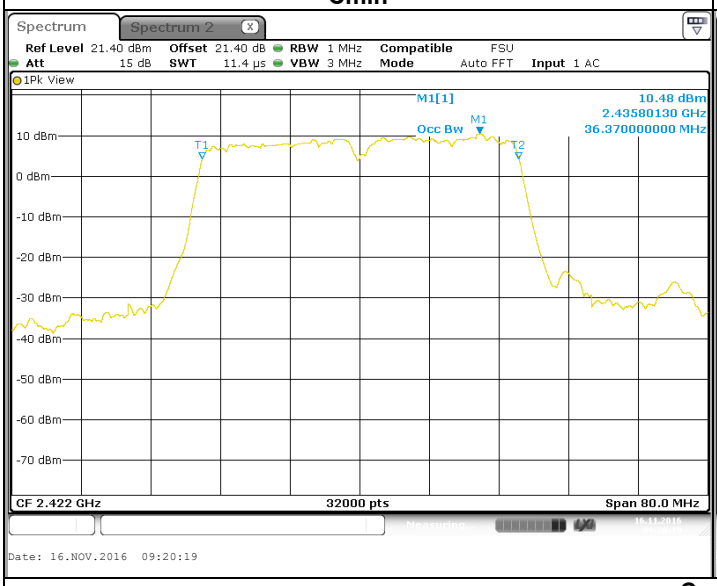


Channel	Occupied Bandwidth (MHz)
Cmin	17,773
Cnom	18,02
Cmax	17,8

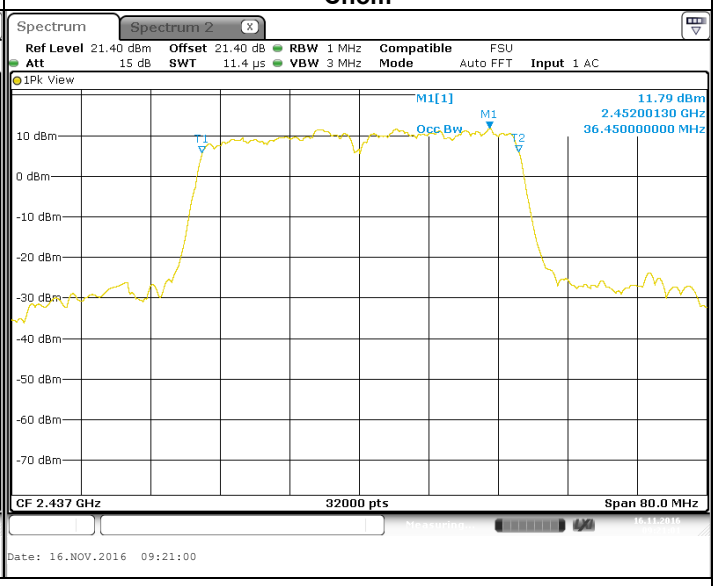
802.11n HT40

Occupied Bandwidth

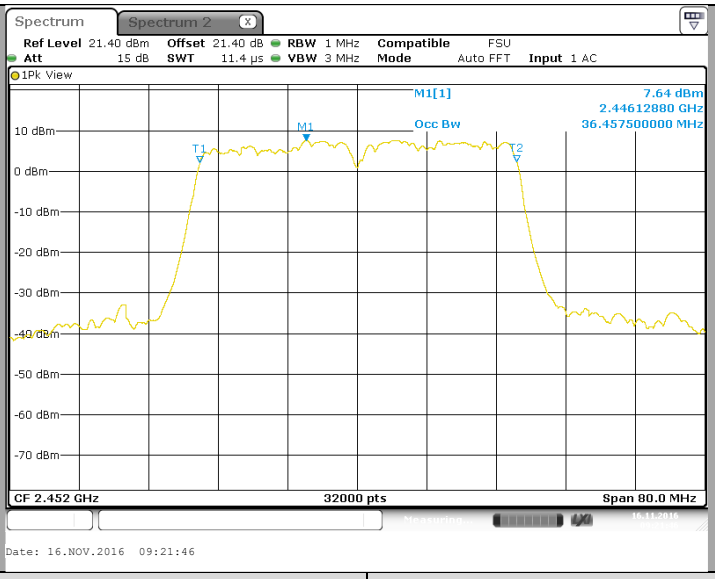
Cmin



Cnom



Cmax



Channel	Occupied Bandwidth (MHz)
Cmin	36,37
Cnom	36,45
Cmax	36,46

3.1. CONCLUSION

Occupied Channel Bandwidth measurement performed on the sample of the product **SAGEMCOM** TheBox **(253697282)**, SN: **616400107098**, 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

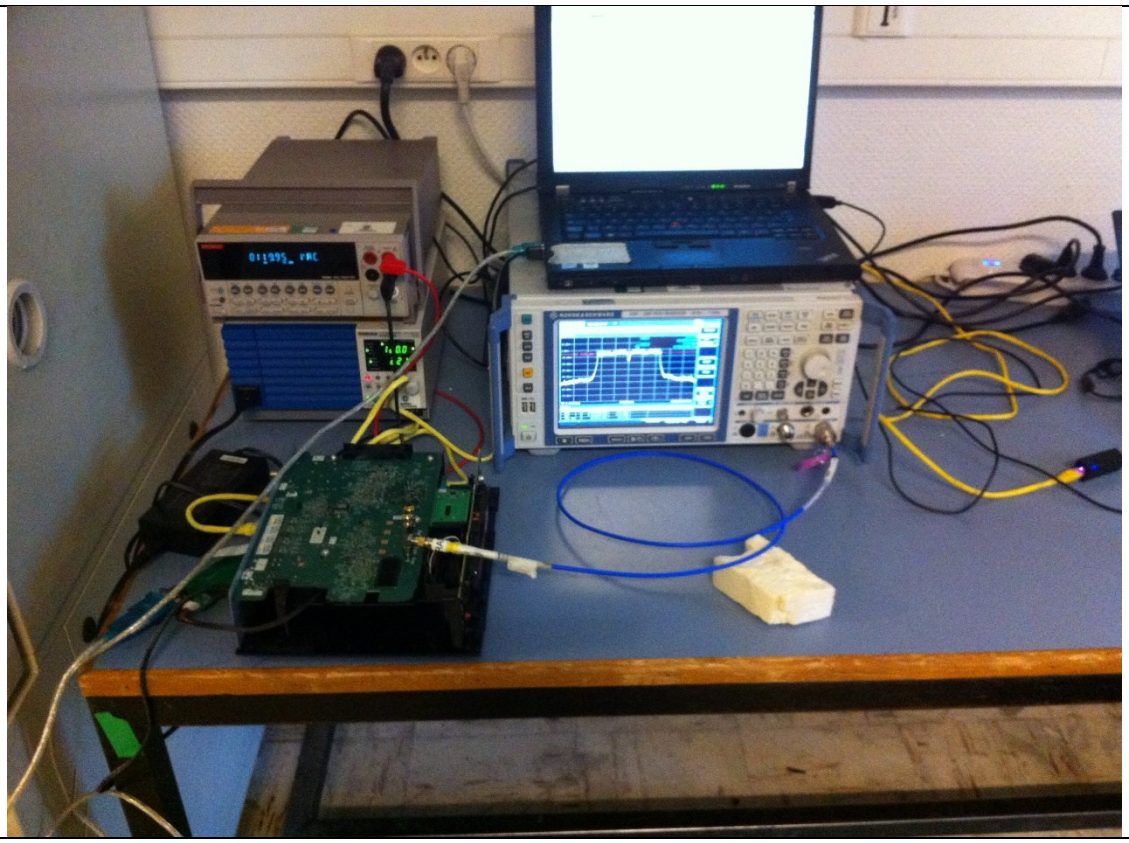
Test performed by	: Mathieu CERISIER
Date of test	: November 16, 2016
Ambient temperature	: 25 °C
Relative humidity	: 41 %

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	A5329674	2016/10	2017/10

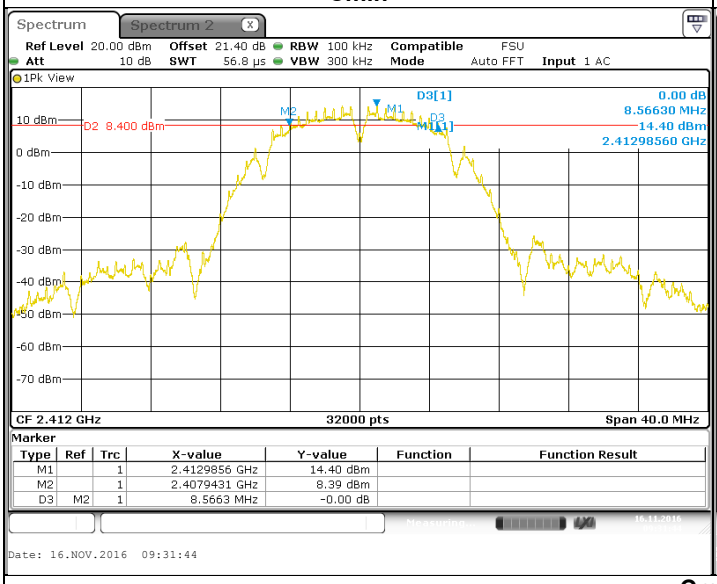
Note: In our quality system, the test equipment calibration due is more & less 2 months

4.5. RESULTS

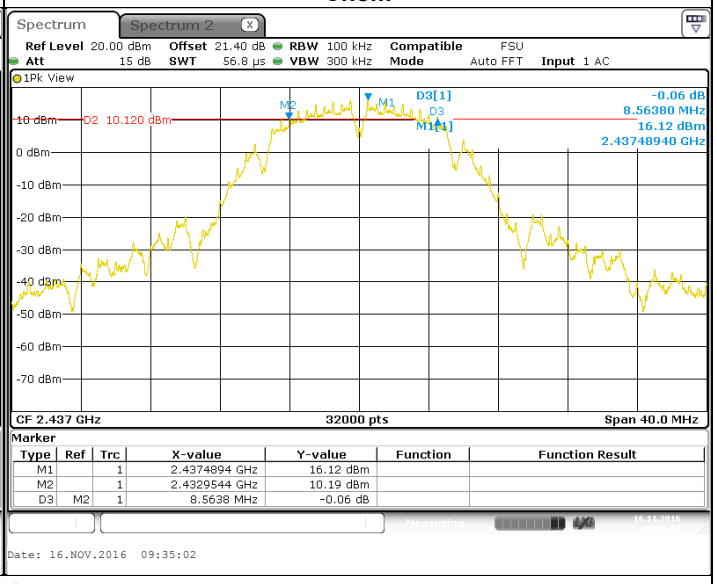
802.11b

6dB Emission Bandwidth

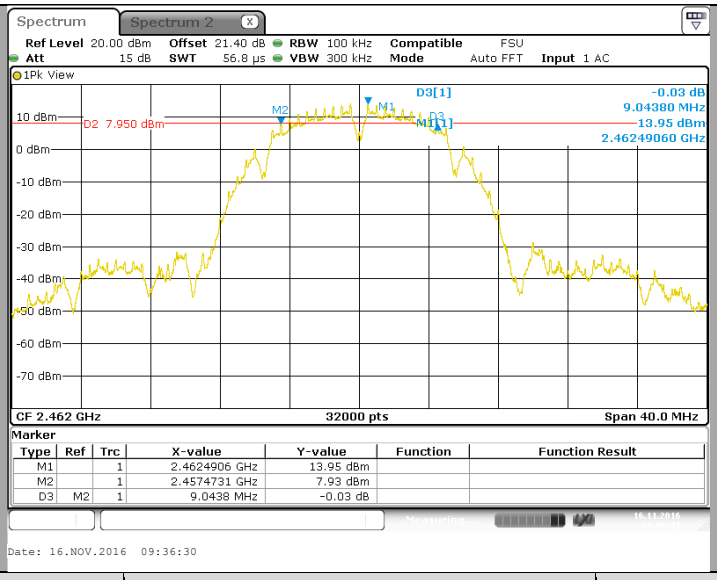
Cmin



Cnom



Cmax

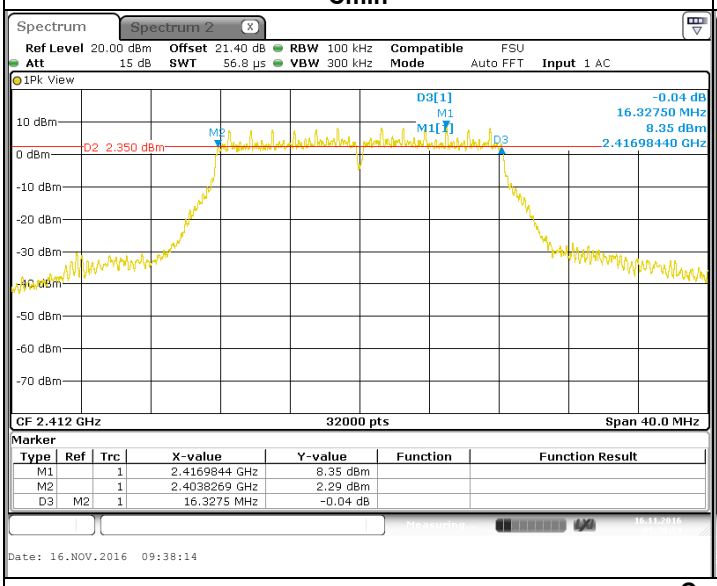


Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	8,566	Minimum 0.5
Cnom	8,564	Minimum 0.5
Cmax	9,044	Minimum 0.5

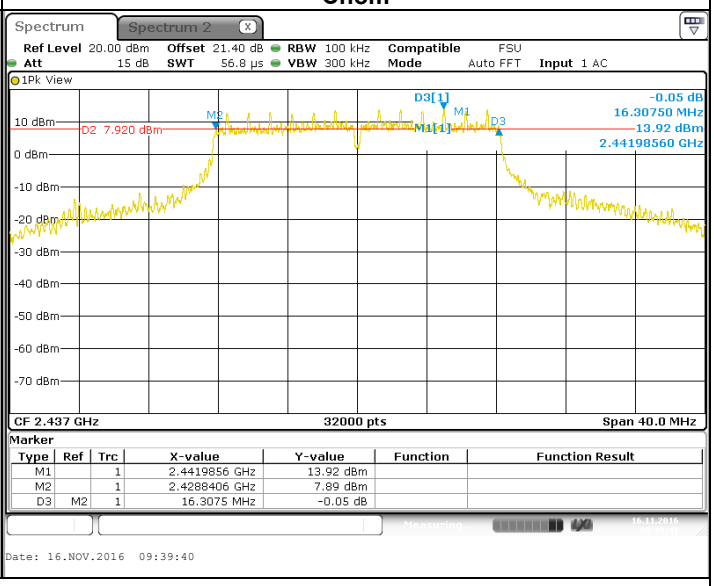
802.11g

6dB Emission Bandwidth

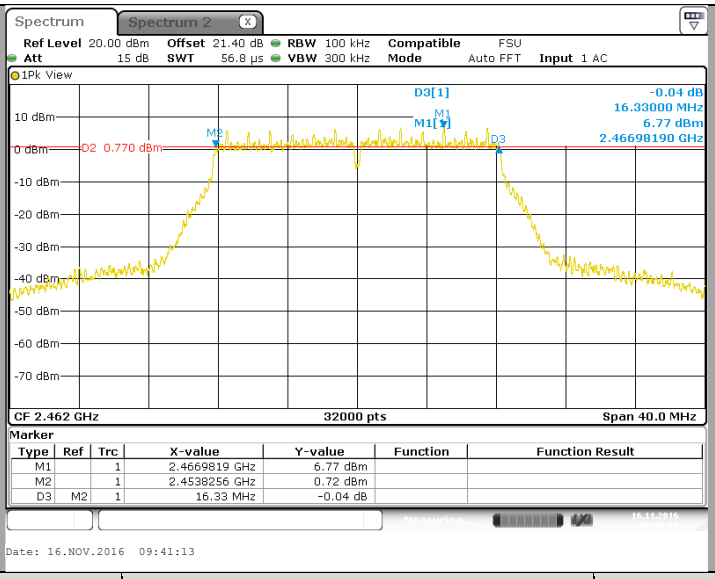
Cmin



Cnom



Cmax

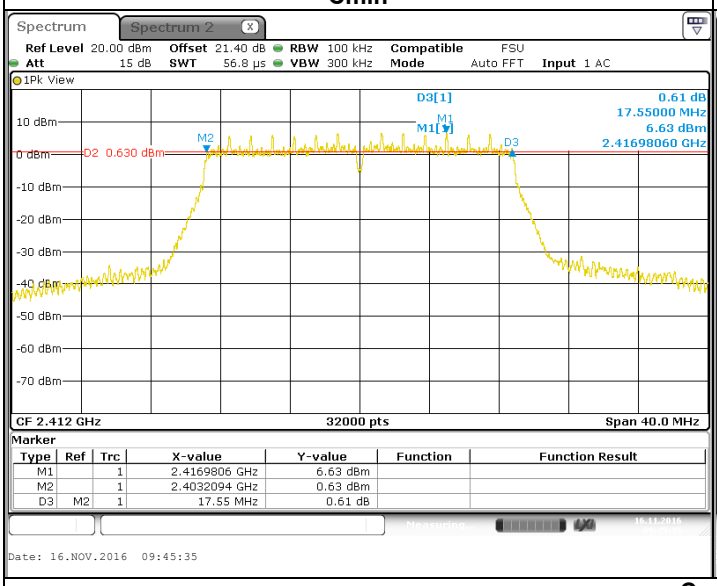


Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	16,323	Minimum 0.5
Cnom	16,308	Minimum 0.5
Cmax	16,33	Minimum 0.5

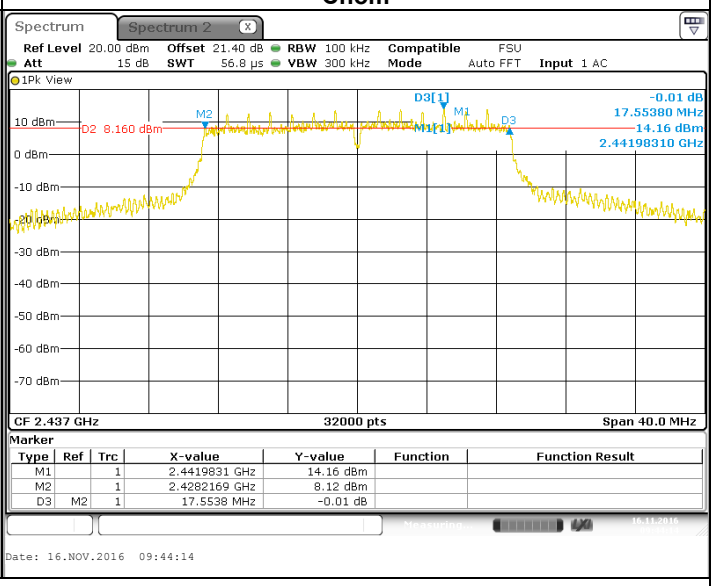
802.11n HT20

6dB Emission Bandwidth

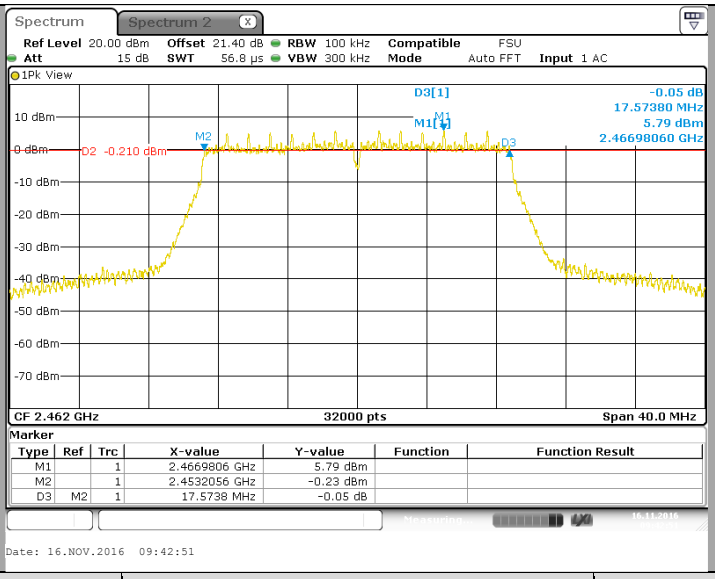
Cmin



Cnom



Cmax

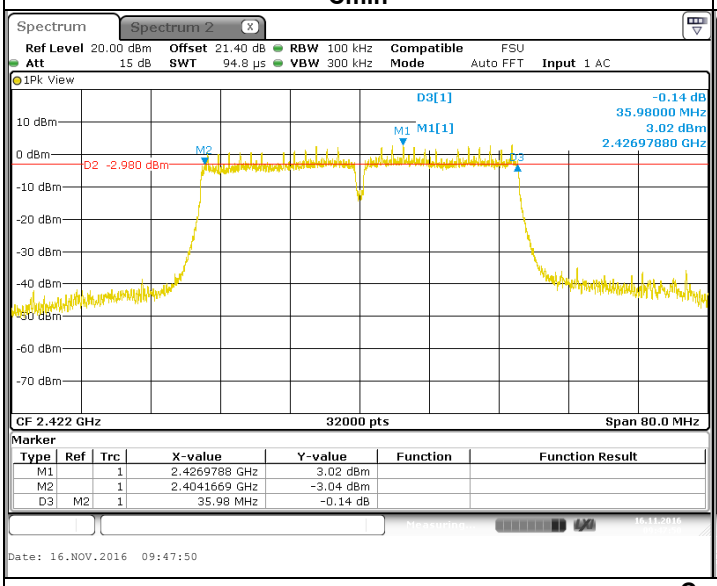


Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	17,55	Minimum 0.5
Cnom	17,554	Minimum 0.5
Cmax	17,574	Minimum 0.5

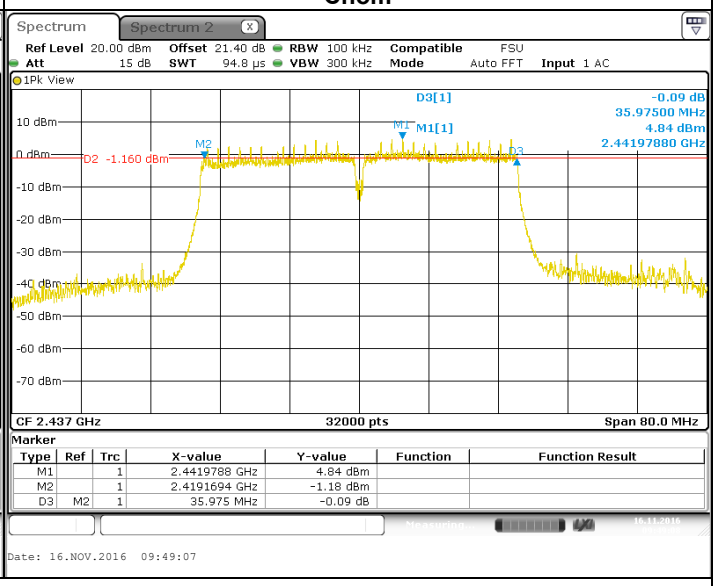
802.11n HT40

6dB Emission Bandwidth

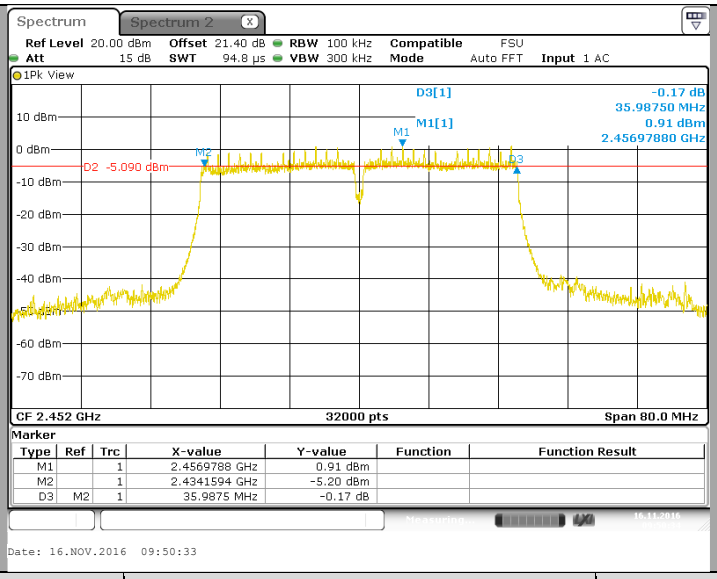
Cmin



Cnom



Cmax



Channel	6dB Emission Bandwidth (MHz)	Limit (MHz)
Cmin	35,98	Minimum 0.5
Cnom	35,975	Minimum 0.5
Cmax	35,988	Minimum 0.5

4.6. CONCLUSION

6dB Emission Bandwidth measurement performed on the sample of the product **SAGEMCOM** TheBox **(253697282)**, SN: **616400107098**, 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

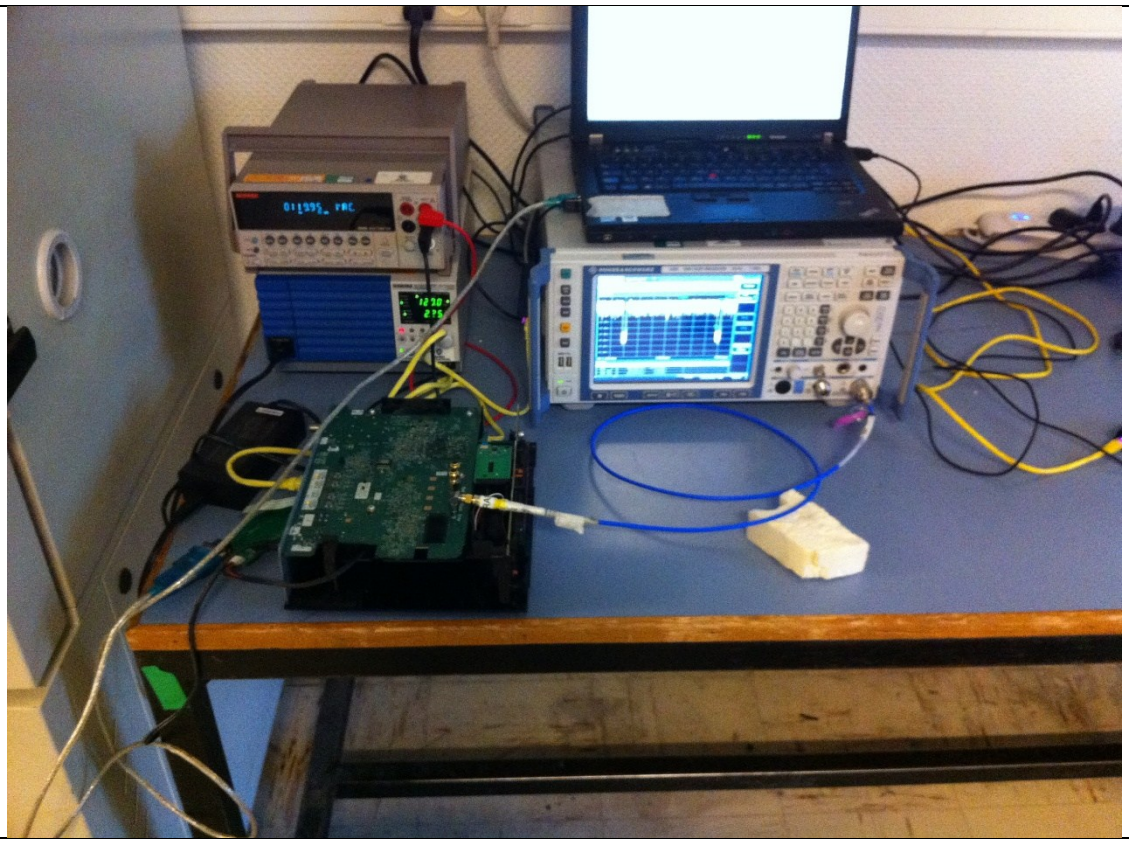
Test performed by	: Mathieu CERISIER
Date of test	: November 16, 2016
Ambient temperature	: 25 °C
Relative humidity	: 41 %

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	A5329674	2016/10	2017/10

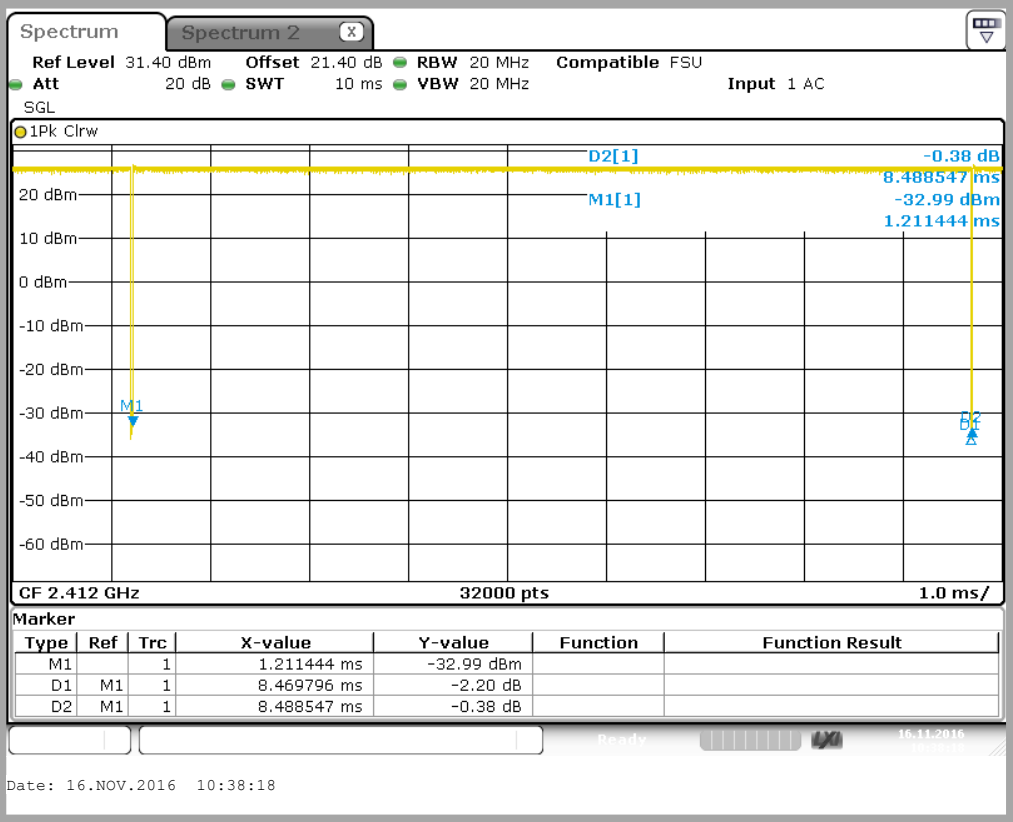
Note: In our quality system, the test equipment calibration due is more & less 2 months

5.5. RESULTS

802.11b

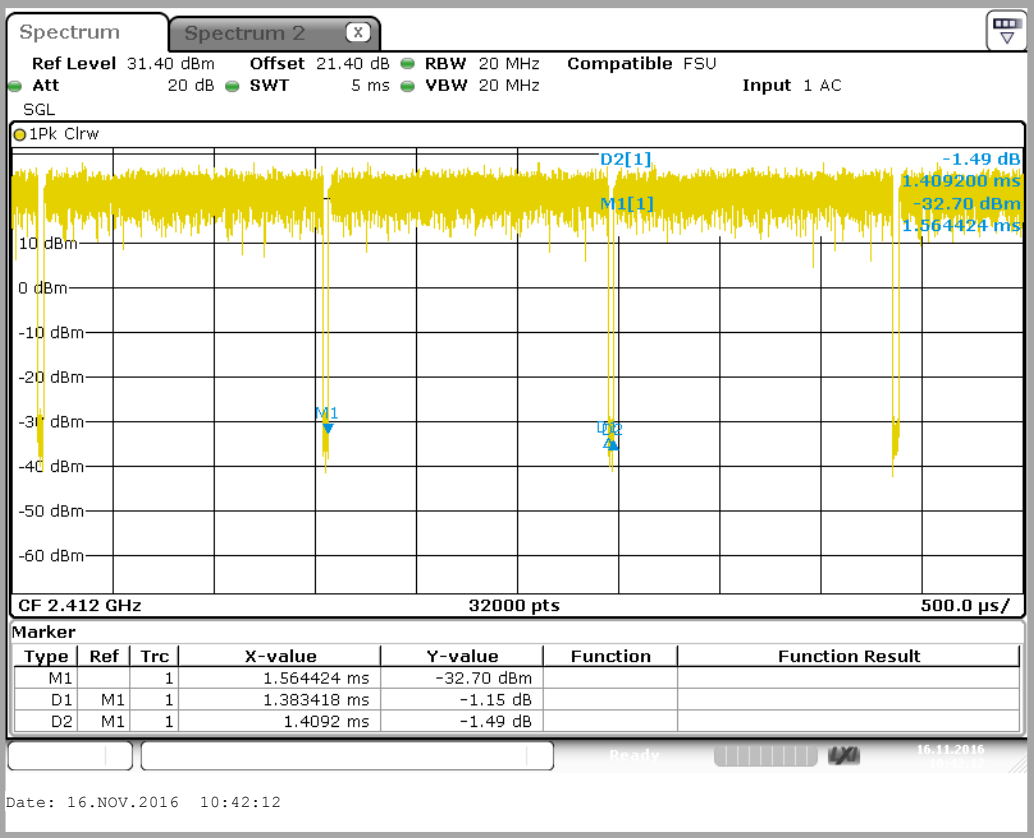
Duty Cycle

Cmin



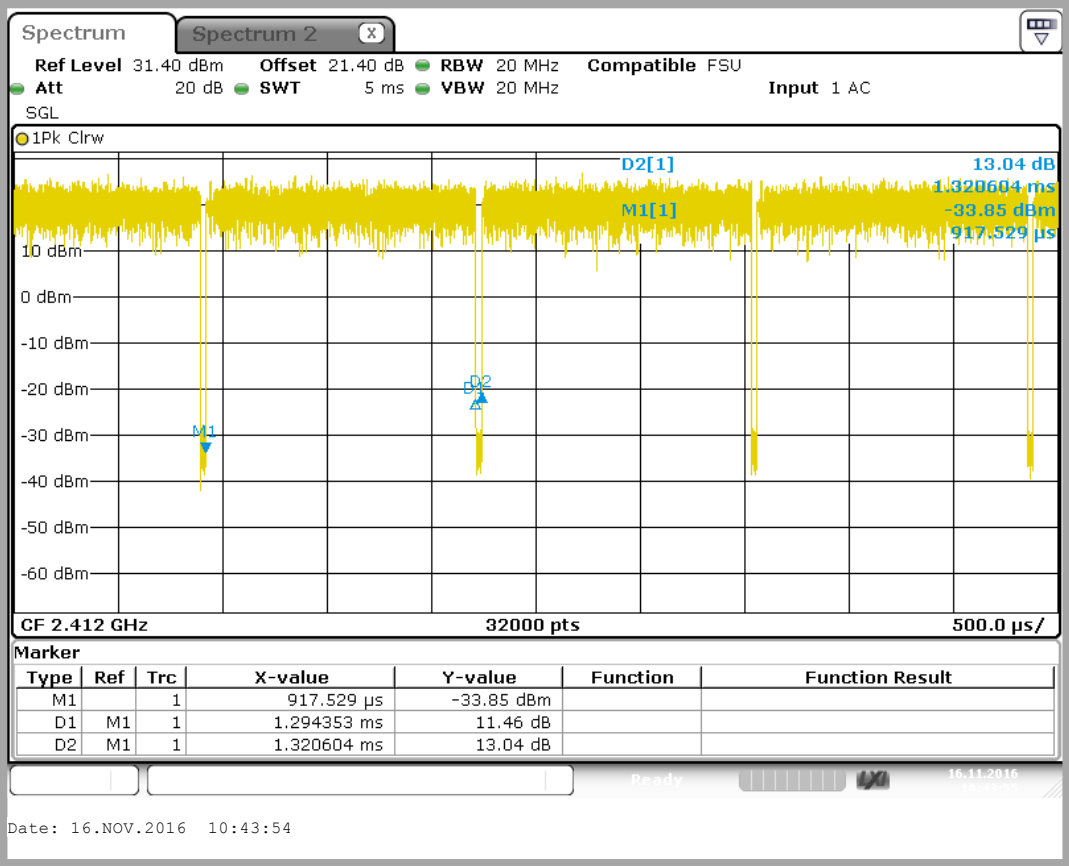
Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Cmin	99,78	0,01

802.11g
Duty Cycle
Cmin



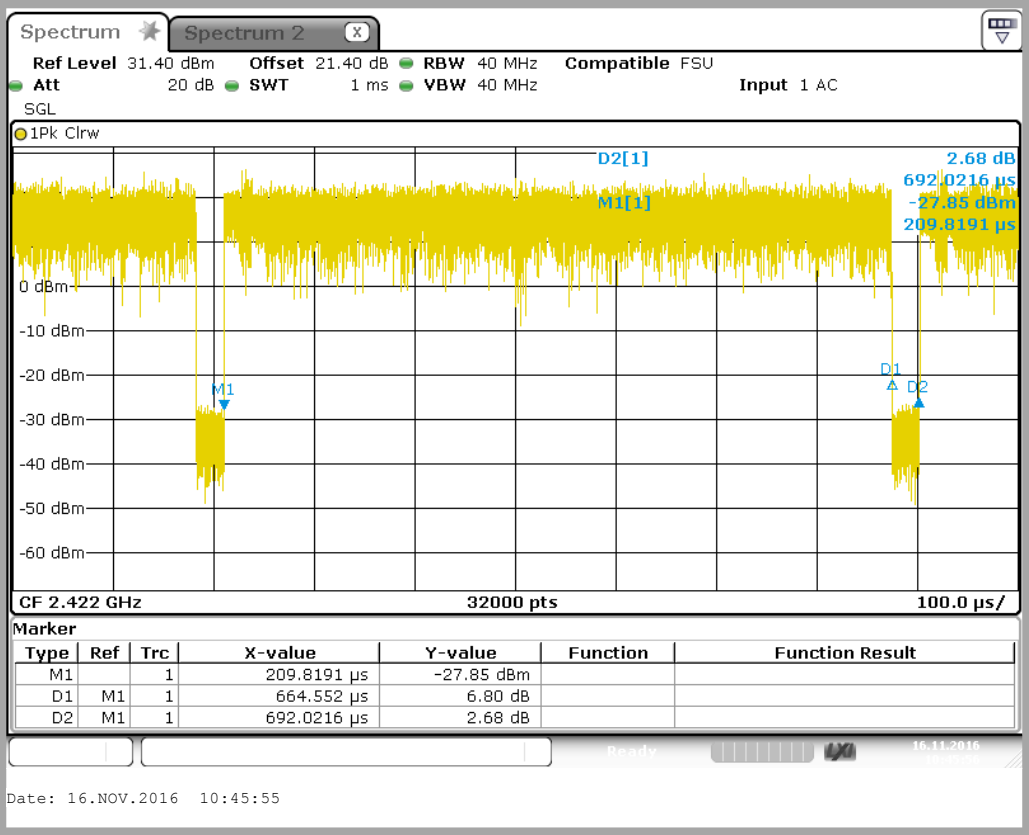
Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Cmin	98,2	0,08

802.11n HT20
Duty Cycle
Cmin



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Cmin	98	0,09

802.11n HT40
Duty Cycle
Channel



Channel	Duty Cycle (%)	Duty Cycle Correction (dB)
Cmin	96,03	0,18

CONCLUSION

Duty Cycle measurement performed on the sample of the product **SAGEMCOM** TheBox **(253697282)**, SN: **616400107098**, 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

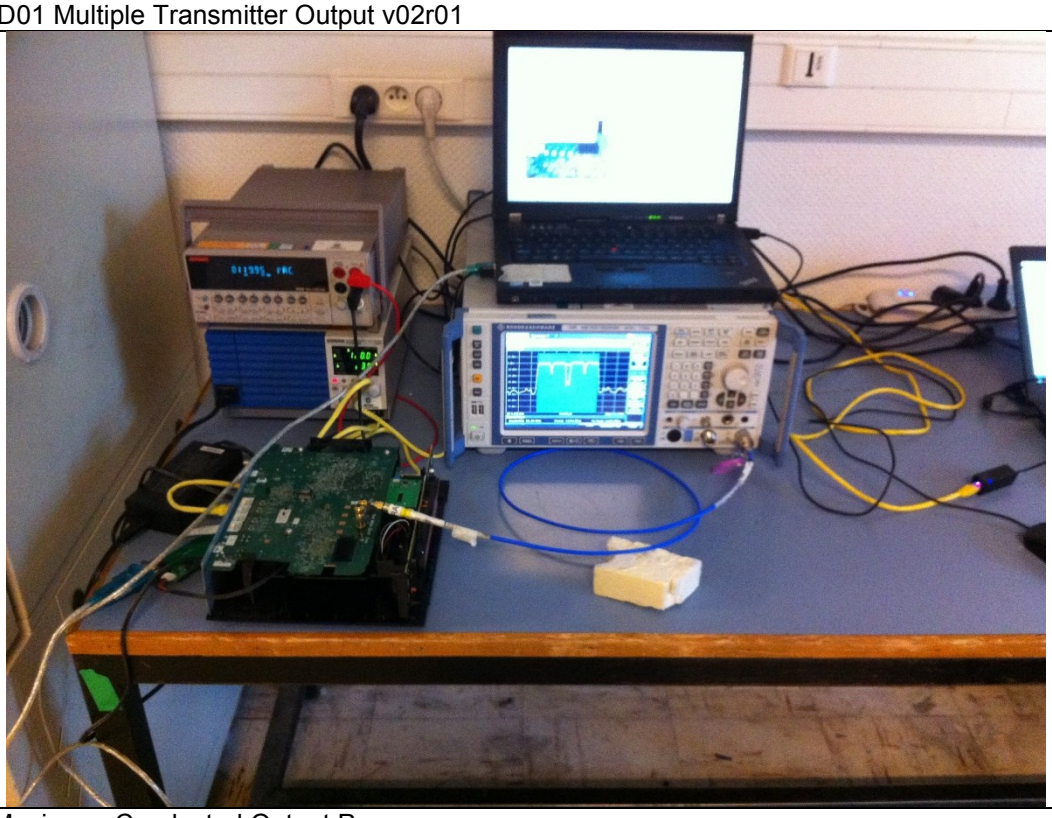
Test performed by	: Mathieu CERISIER
Date of test	: November 16, 2016
Ambient temperature	: 25 °C
Relative humidity	: 41 %

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	A5329674	2016/10	2017/10

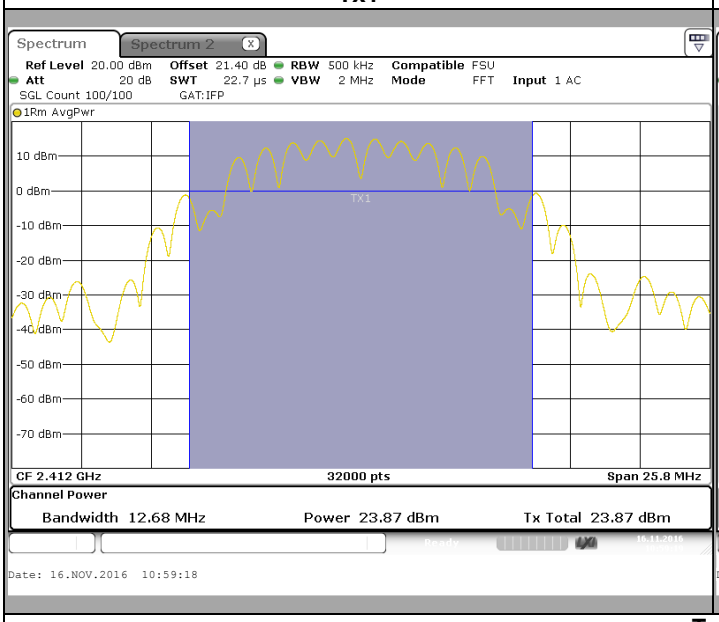
Note: In our quality system, the test equipment calibration due is more & less 2 months

6.5. RESULTS

802.11b

Cmin

Tx1



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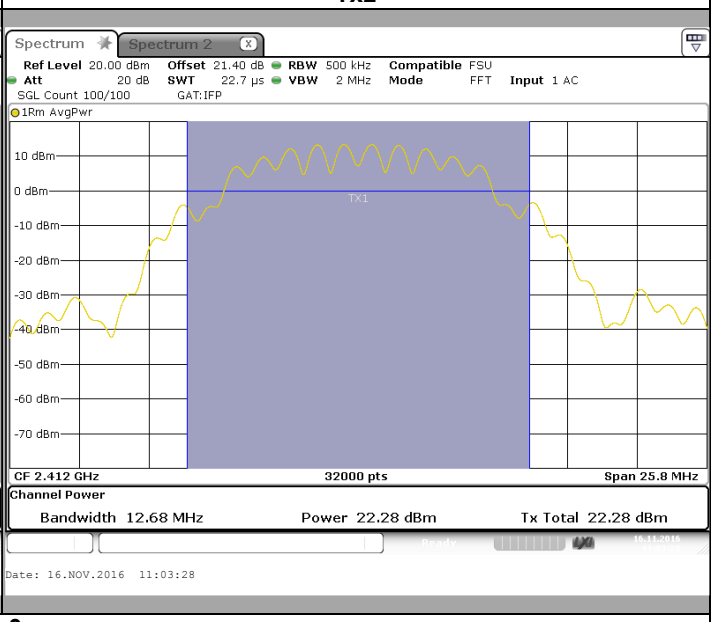
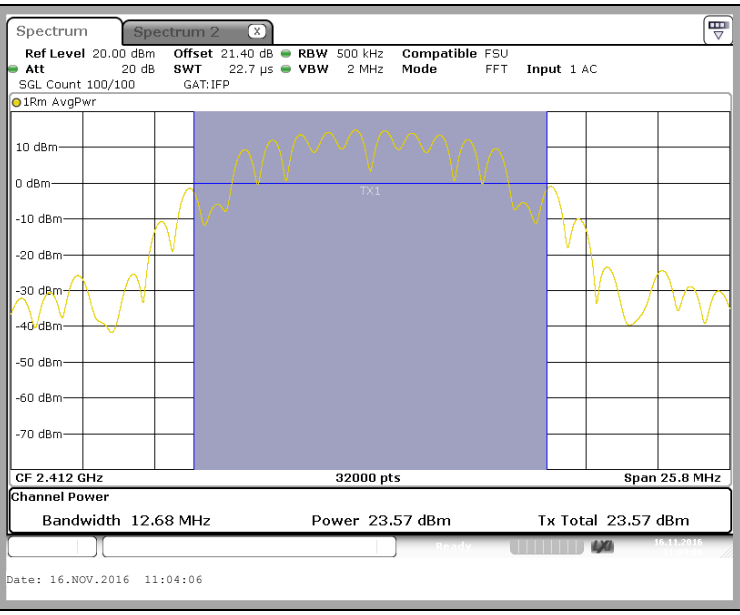
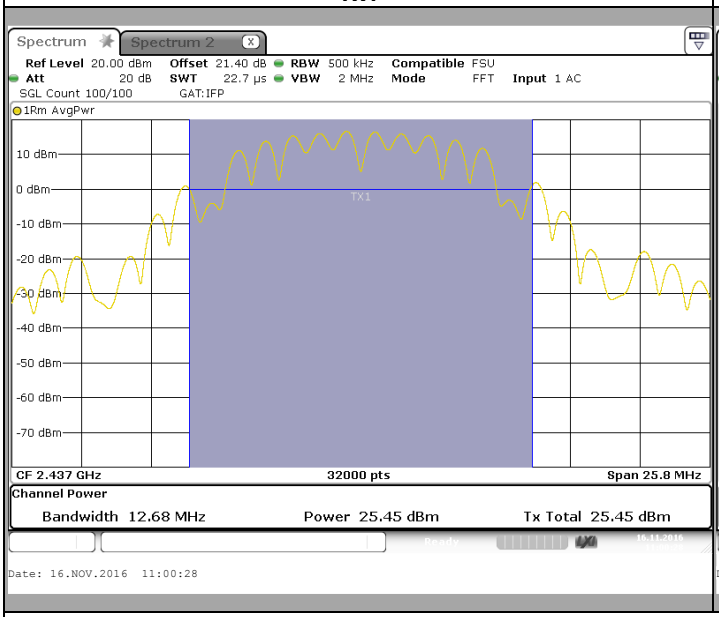
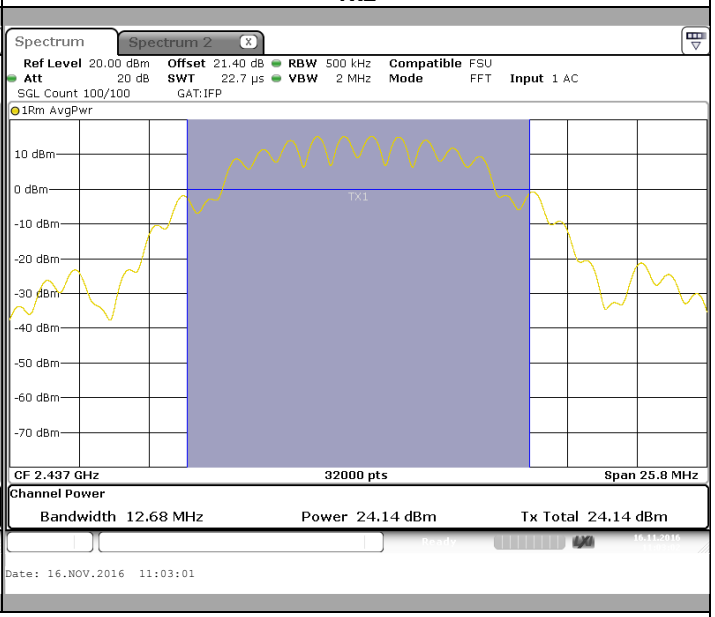


Tx3

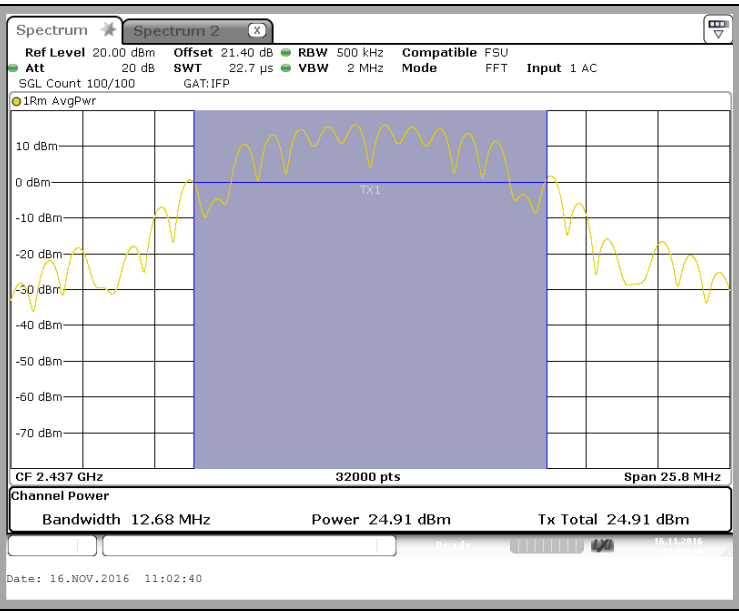


802.11b	
Cnom	
Tx1	Tx2

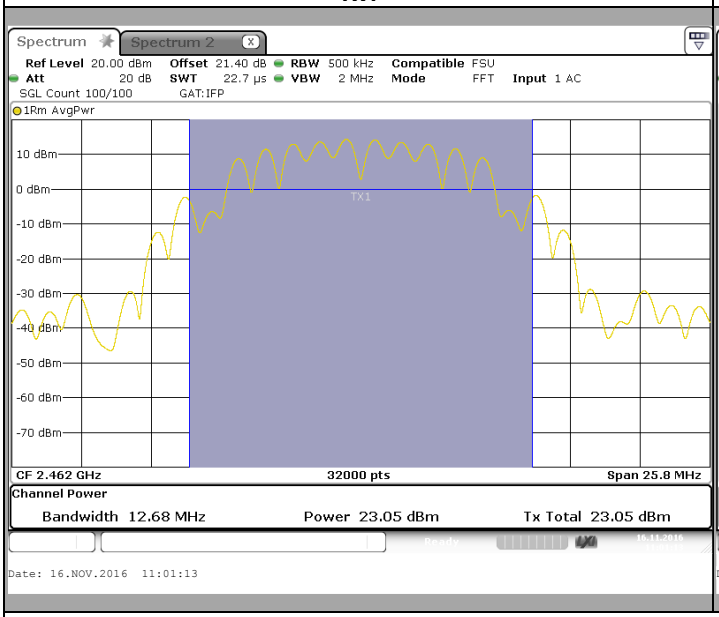


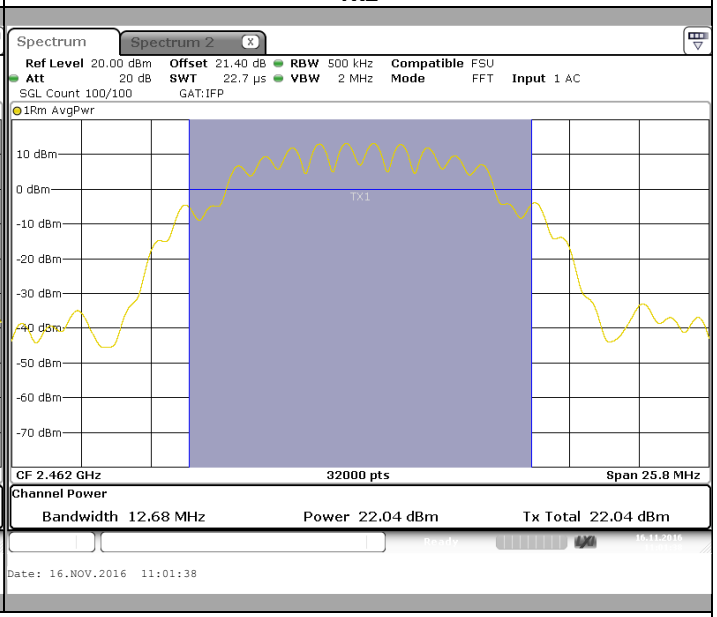


Tx3

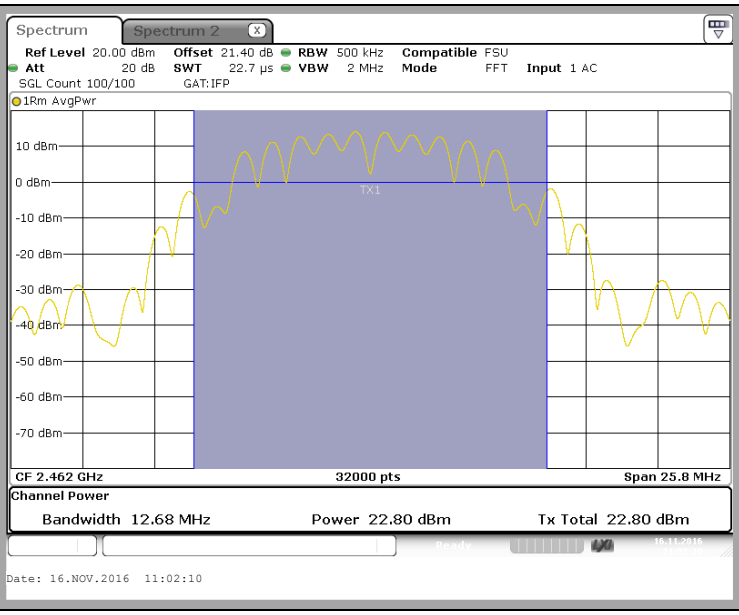


802.11b	
Cmax	
Tx1	Tx2





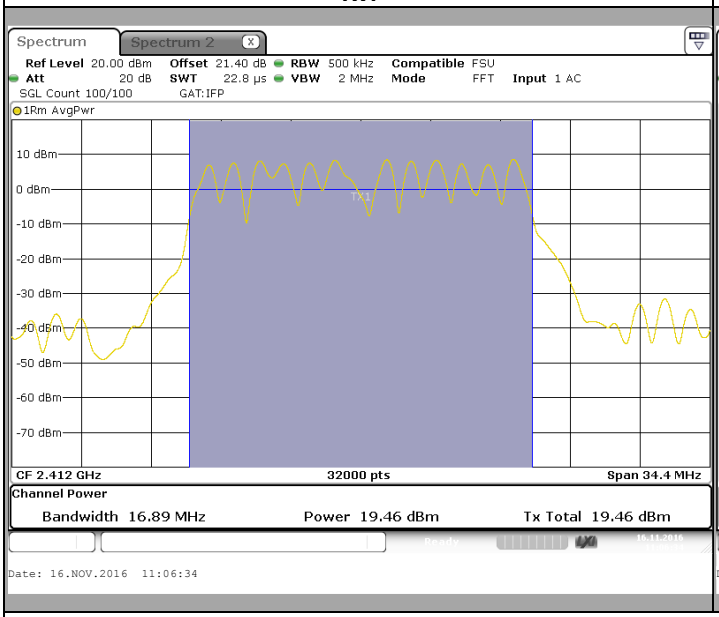
Tx3



802.11g

Cmin

Tx1



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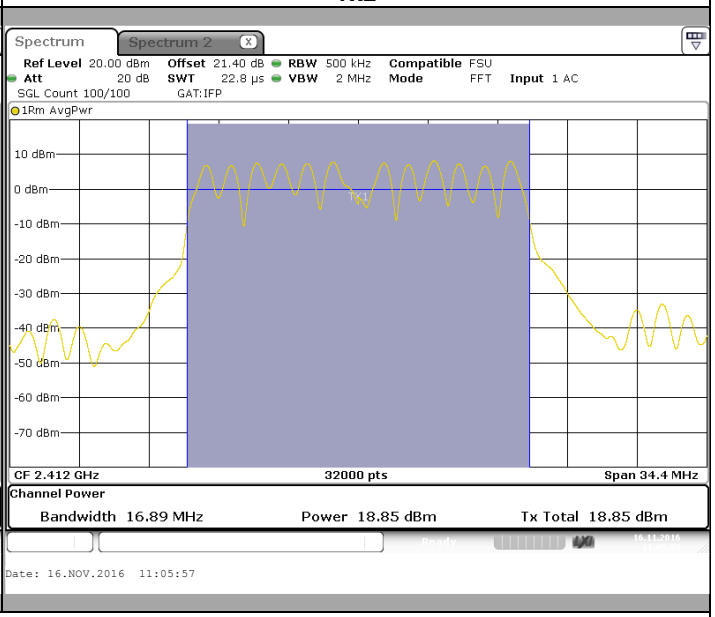
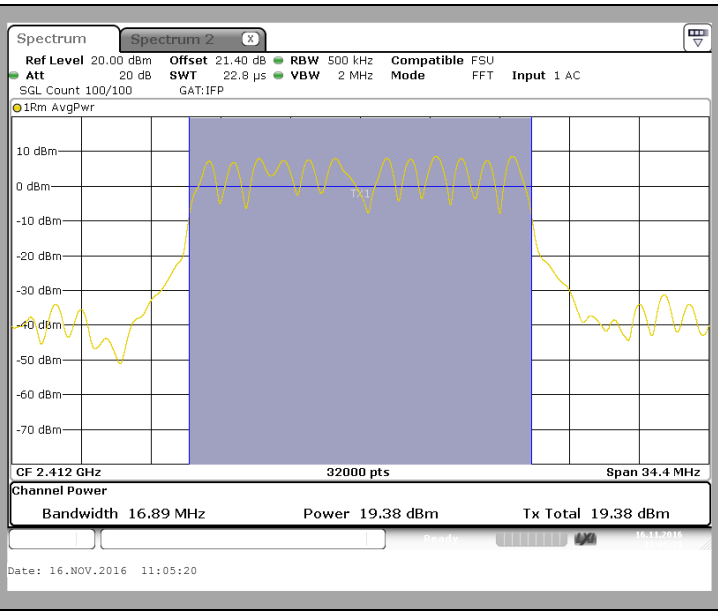
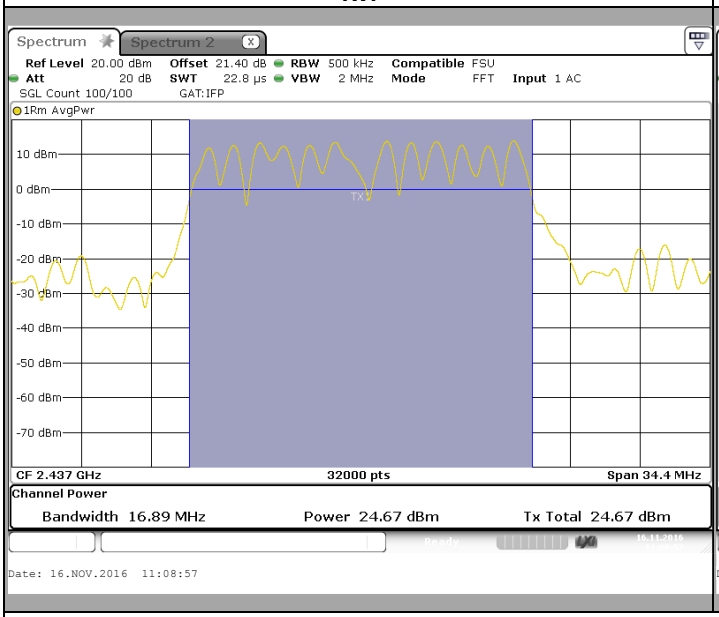
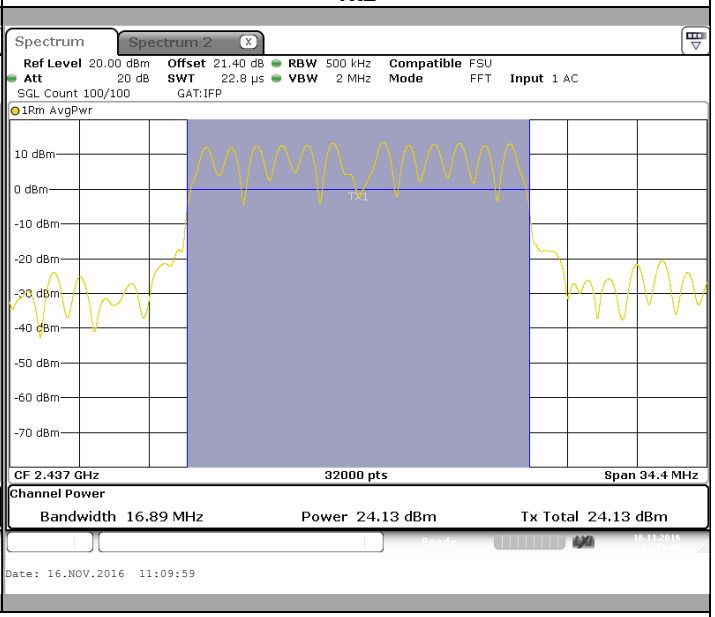


Tx3



802.11g	
Cnom	
Tx1	Tx2





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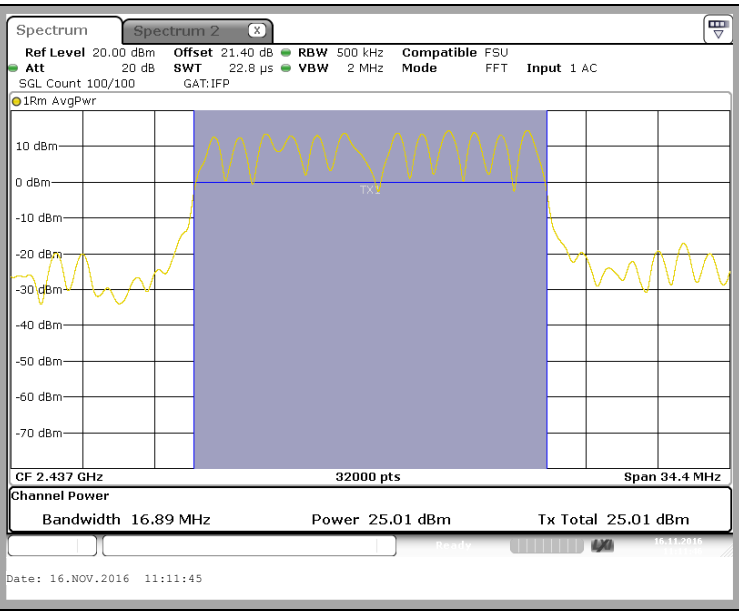

802.11g

Cmax

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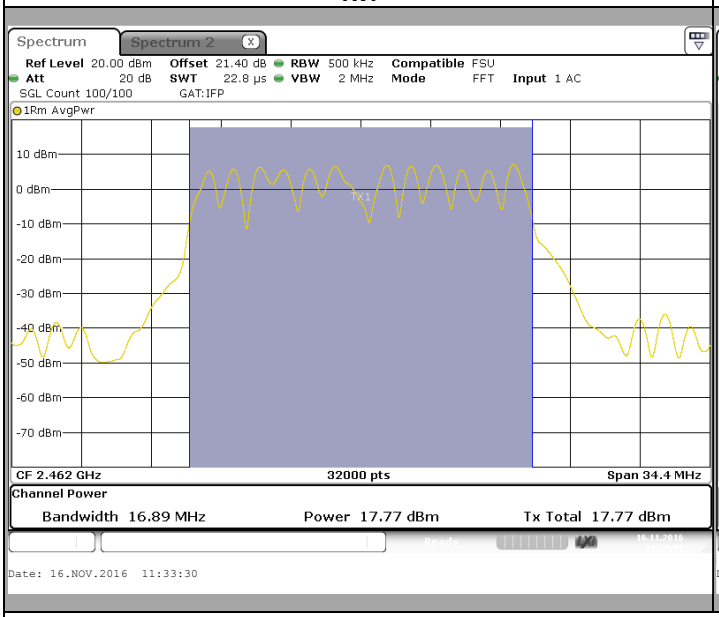

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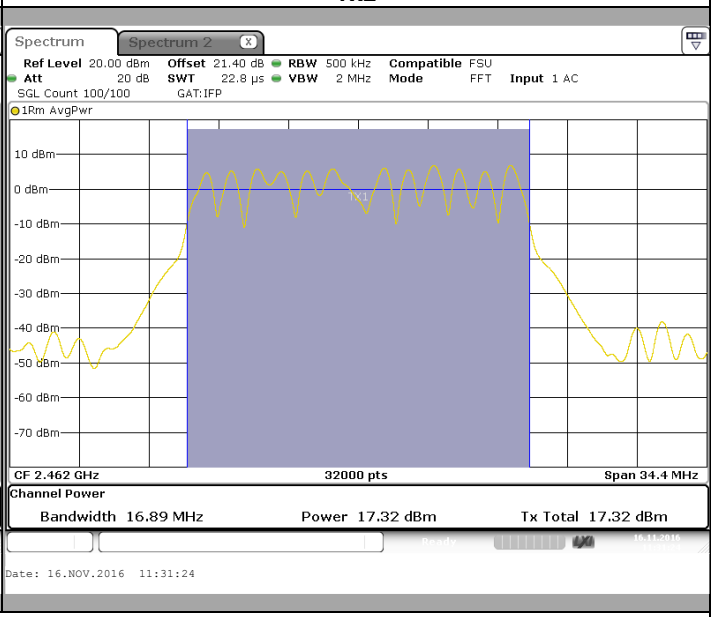

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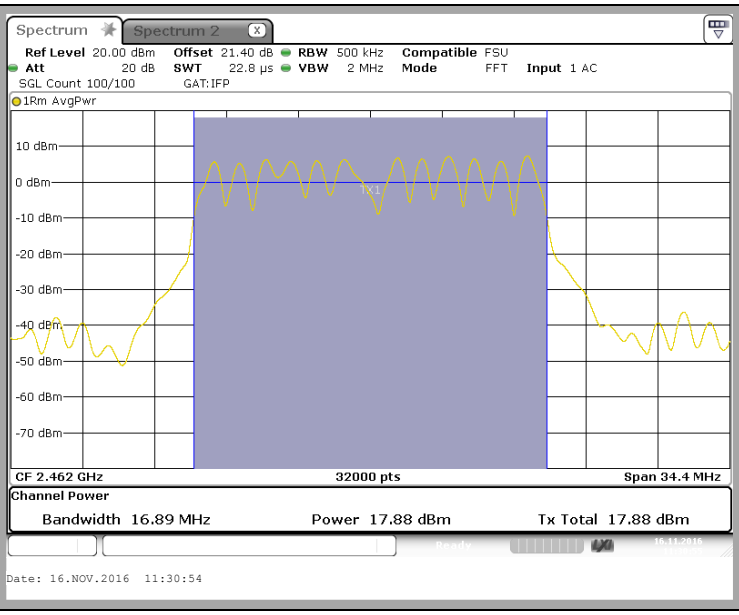

802.11nHT20

Cmin

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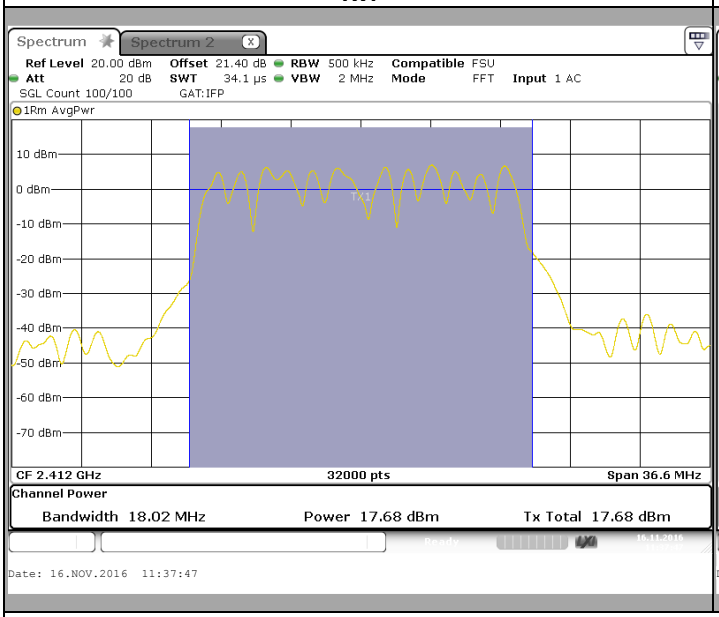

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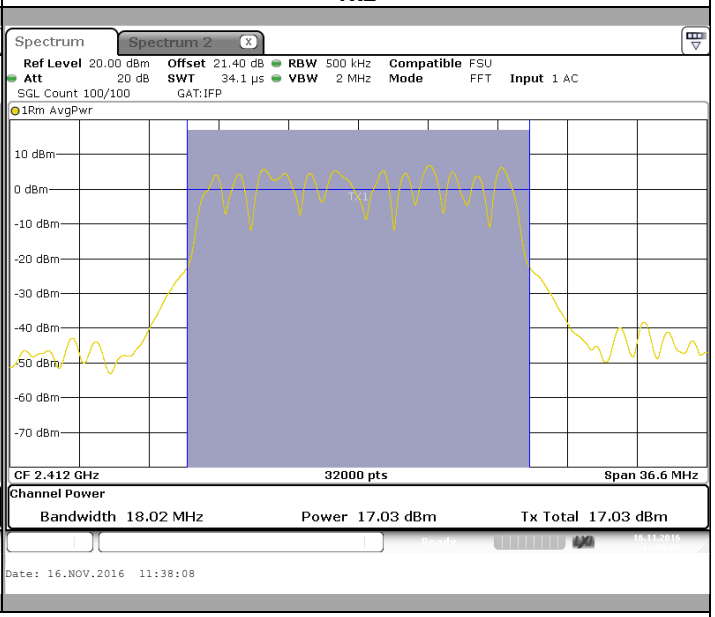

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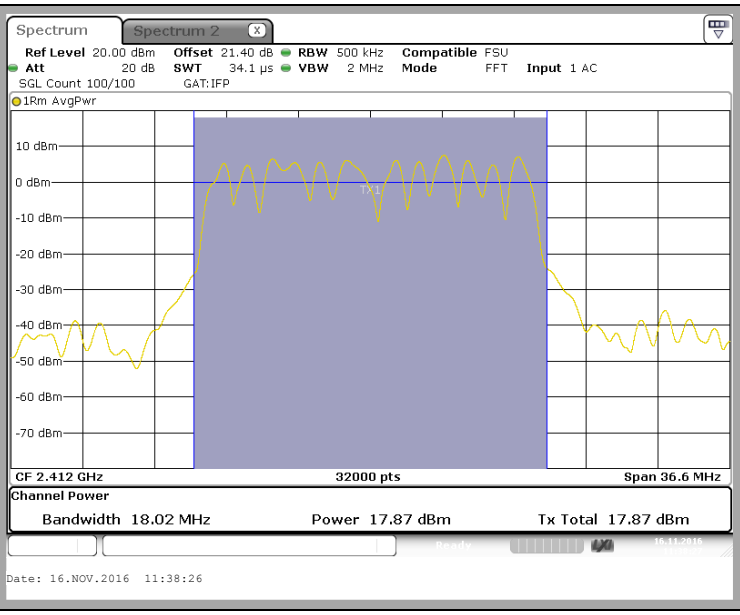

802.11nHT20

Cnom

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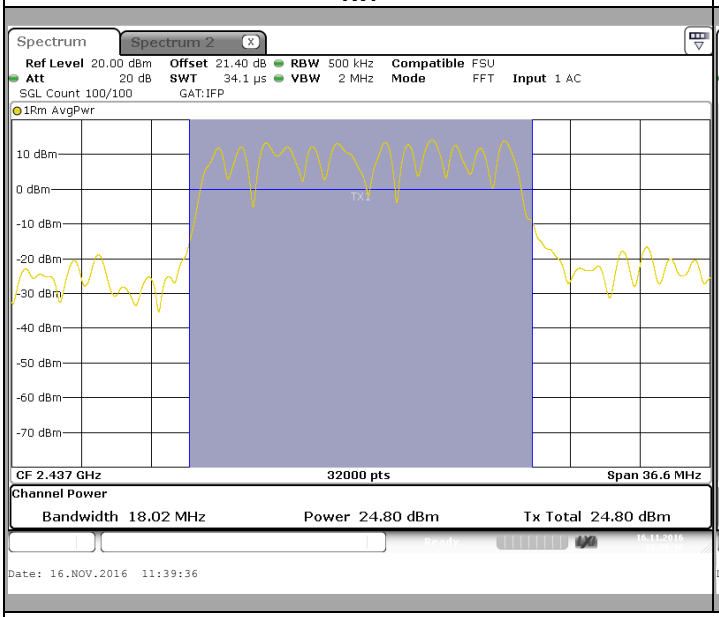

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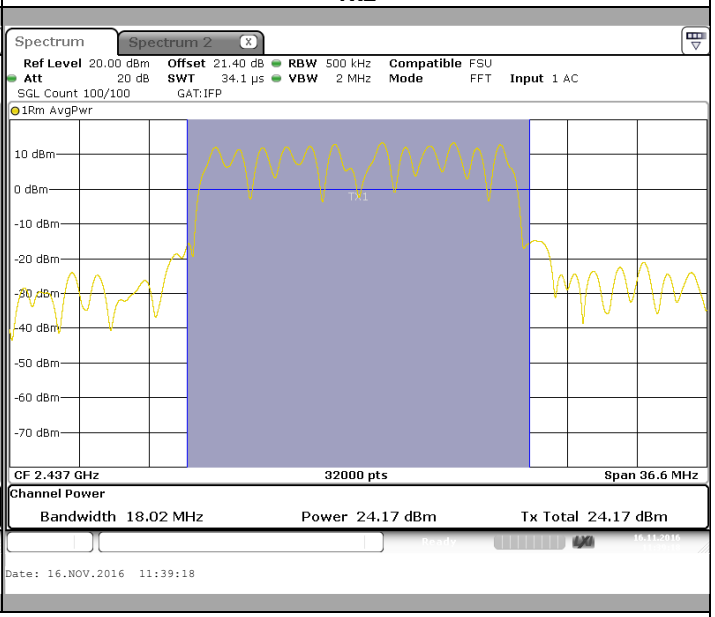

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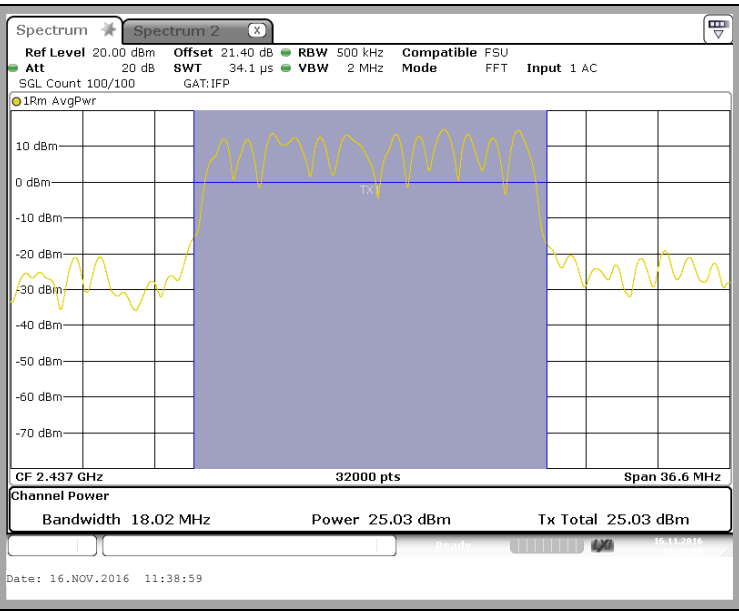
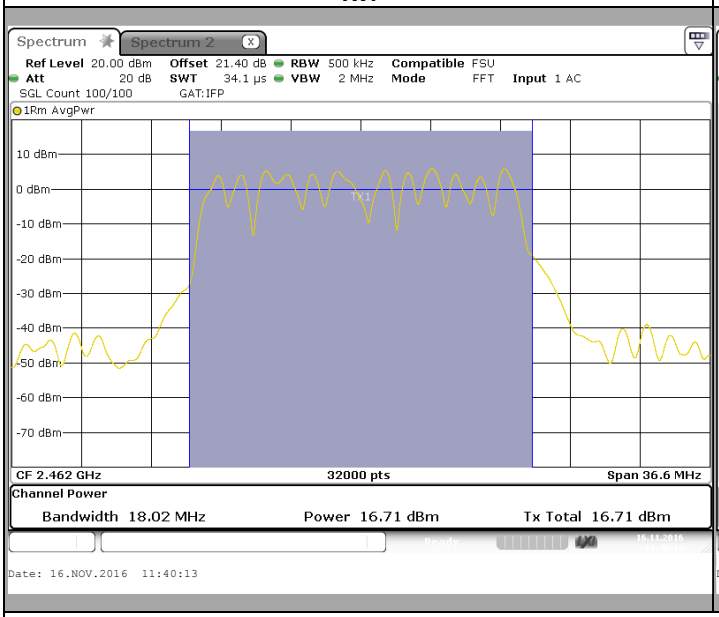
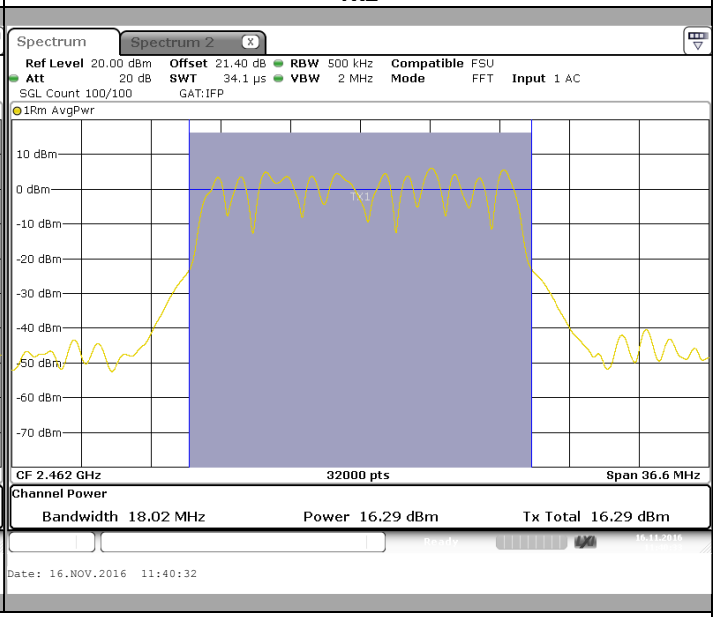


802.11nHT20	
Cmax	
Tx1	Tx2





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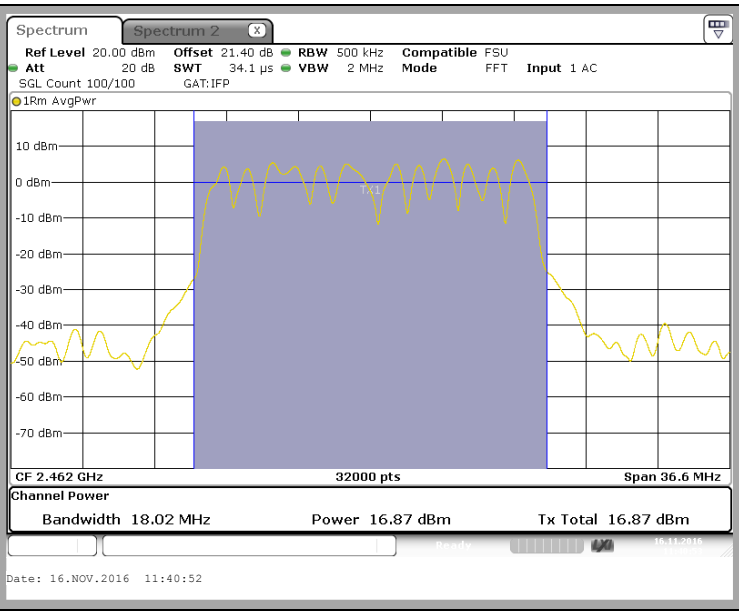
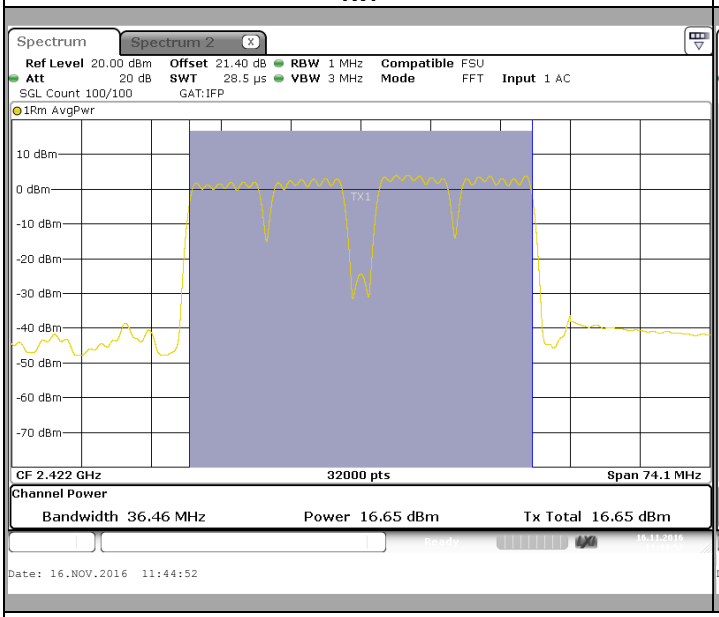
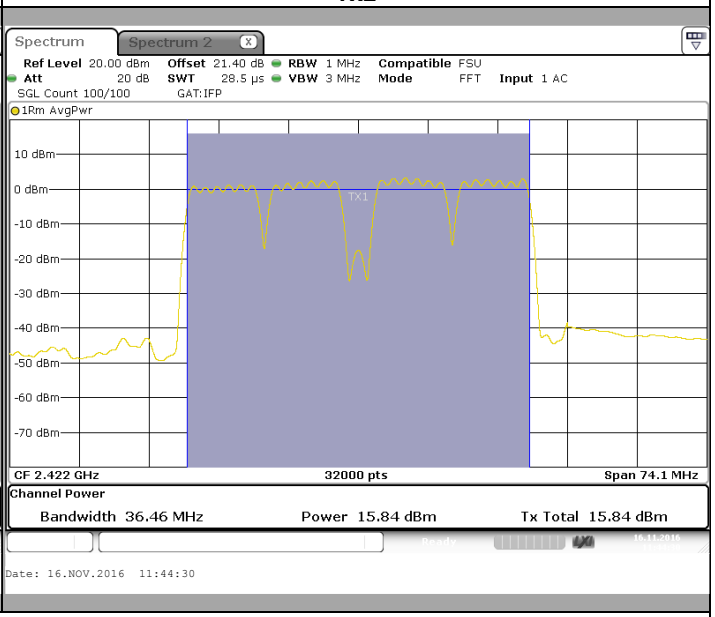


802.11nHT40	
Cmin	
Tx1	Tx2





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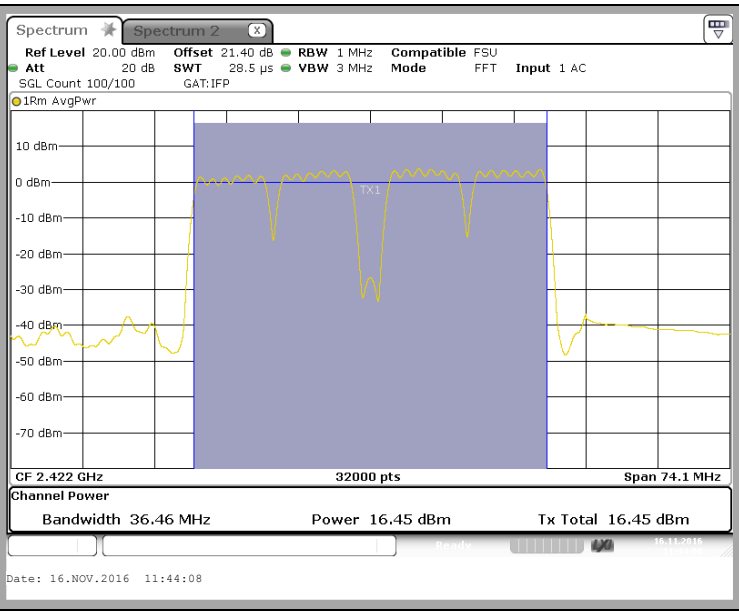
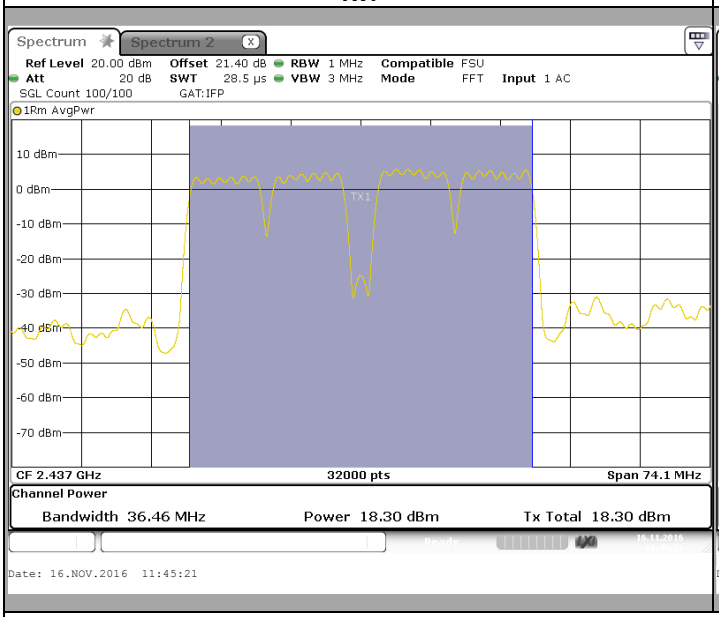
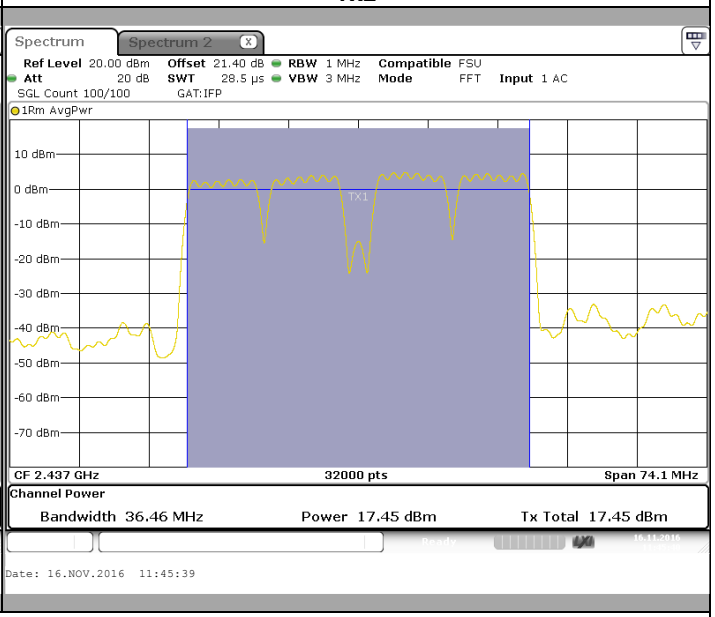


802.11nHT40	
Cnom	
Tx1	Tx2





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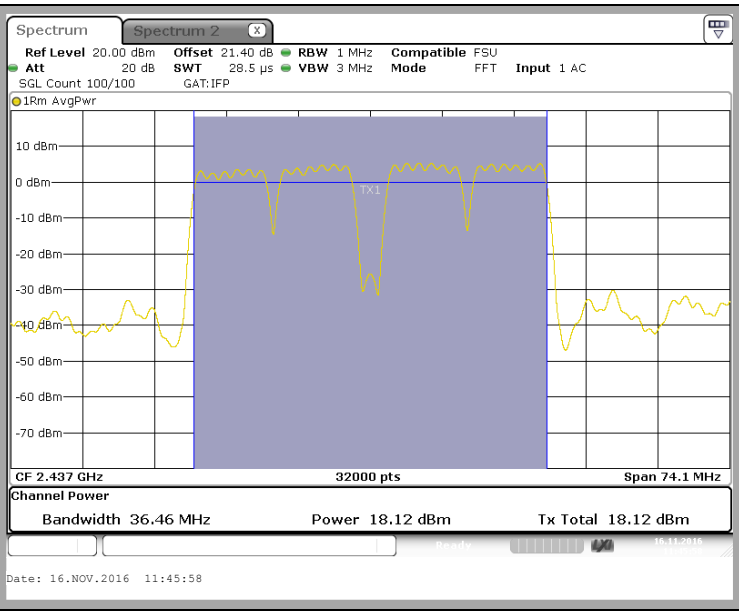
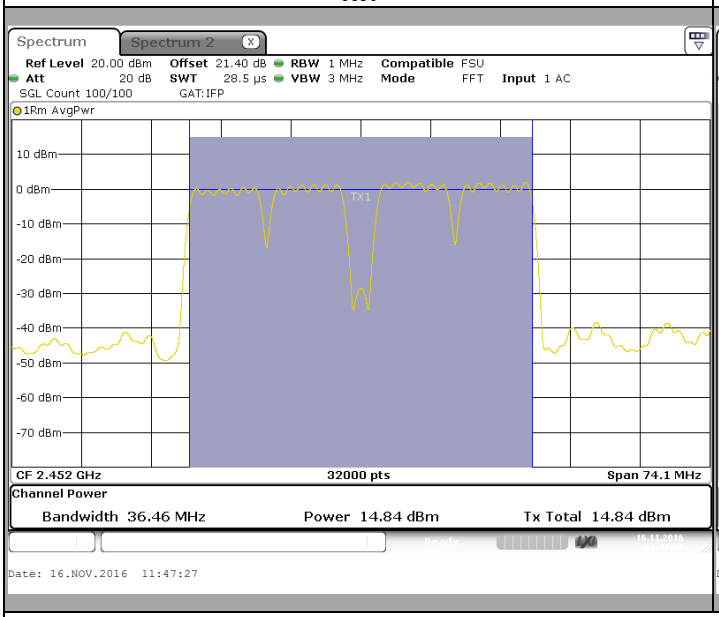


802.11nHT40

Cmax

Tx1



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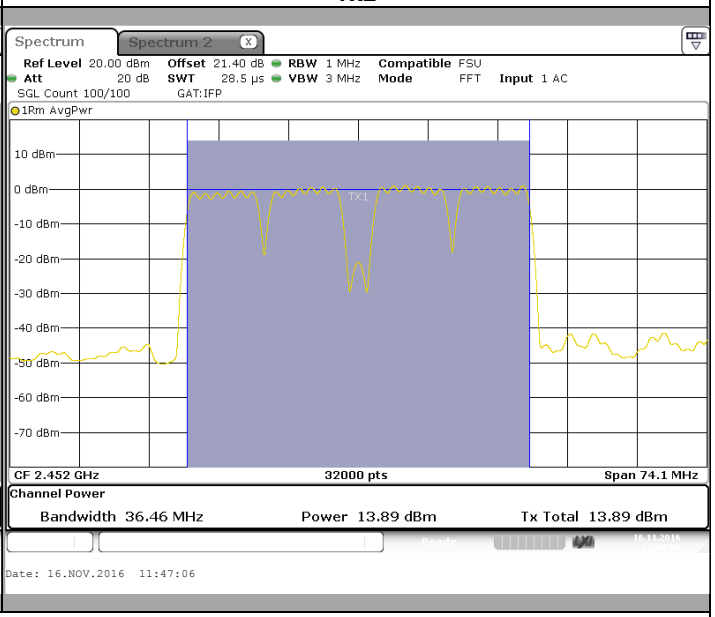

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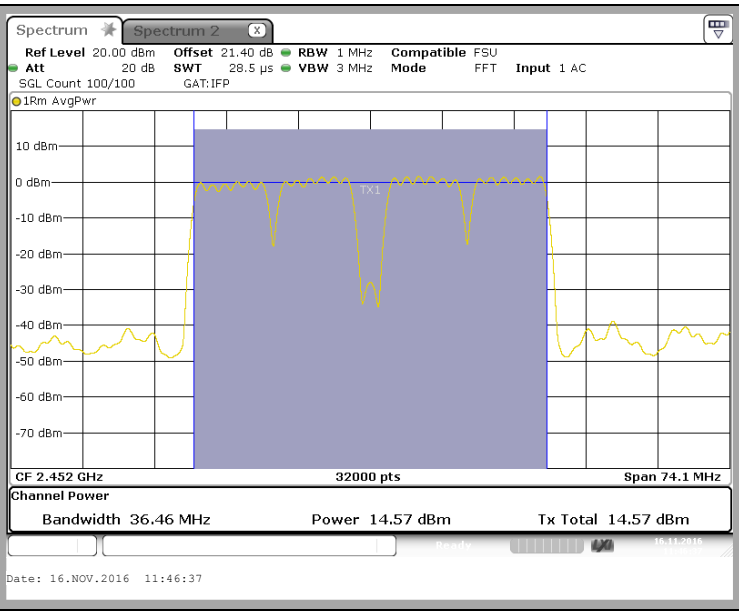


Spectrum Analyzer Offset:
Cable Loss1,4dB + 20dB Attenuator= 21,4dB

802.11b							
Channel	**Tx1 (dBm)**	**Tx2 (dBm)**	**Tx3 (dBm)**	**Tx4 (dBm)**	**Overall Antenna Gain (dBi)**	**Maximum Conducted Power (dBm)**	**Limit (dBm)**
Cmin	23,87	22,28	23,57		5,9	28,06	29,93
Cnom	25,45	24,14	24,91		5,9	29,64	29,93
Cmax	23,05	22,04	22,8		5,9	27,42	29,93

802.11g							
Channel	**Tx1 (dBm)**	**Tx2 (dBm)**	**Tx3 (dBm)**	**Tx4 (dBm)**	**Overall Antenna Gain (dBi)**	**Maximum Conducted Power (dBm)**	**Limit (dBm)**
Cmin	19,46	18,85	19,38		5,9	24,01	29,93
Cnom	24,67	24,13	25,01		5,9	29,39	29,93
Cmax	17,77	17,32	17,88		5,9	22,43	29,93

802.11n HT20							
Channel	**Tx1 (dBm)**	**Tx2 (dBm)**	**Tx3 (dBm)**	**Tx4 (dBm)**	**Overall Antenna Gain (dBi)**	**Maximum Conducted Power (dBm)**	**Limit (dBm)**
Cmin	17,68	17,03	17,87		5,9	22,31	29,93
Cnom	24,8	24,17	25,03		5,9	29,45	29,93
Cmax	16,71	16,29	16,87		5,9	21,4	29,93

802.11n HT40							
Channel	**Tx1 (dBm)**	**Tx2 (dBm)**	**Tx3 (dBm)**	**Tx4 (dBm)**	**Overall Antenna Gain (dBi)**	**Maximum Conducted Power (dBm)**	**Limit (dBm)**
Cmin	16,65	15,84	16,45		5,9	21,1	29,93
Cnom	18,3	17,45	18,12		5,9	22,74	29,93
Cmax	14,84	13,89	14,57		5,9	19,22	29,93

6.6. CONCLUSION

Maximum Conducted Output Power measurement performed on the sample of the product **SAGEMCOM** TheBox **(253697282)**, SN: **616400107098**, 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

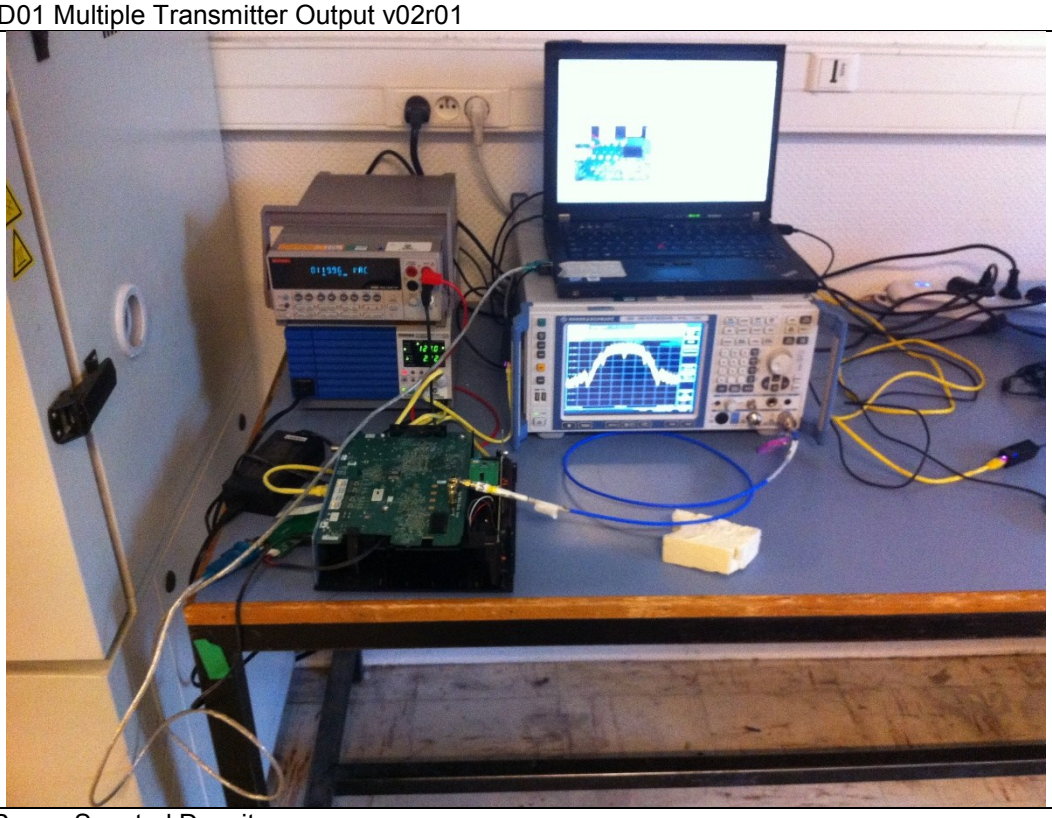
Test performed by	: Mathieu CERISIER
Date of test	: November 16, 2016
Ambient temperature	: 25 °C
Relative humidity	: 41 %

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	A5329674	2016/10	2017/10

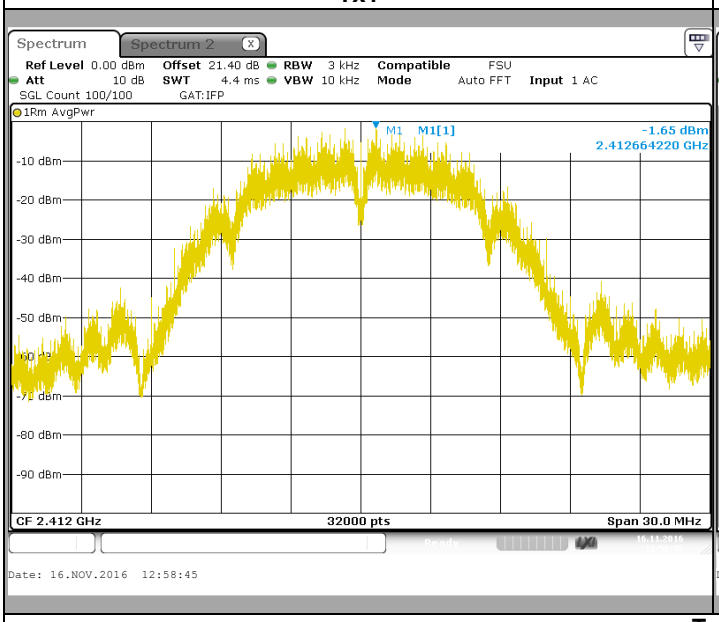
Note: In our quality system, the test equipment calibration due is more & less 2 months

7.1. RESULTS

802.11b

Cmin

Tx1



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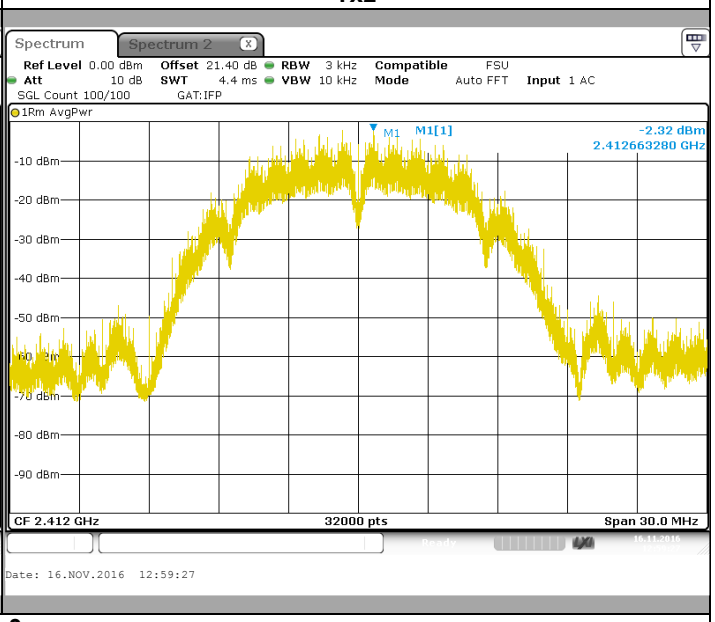

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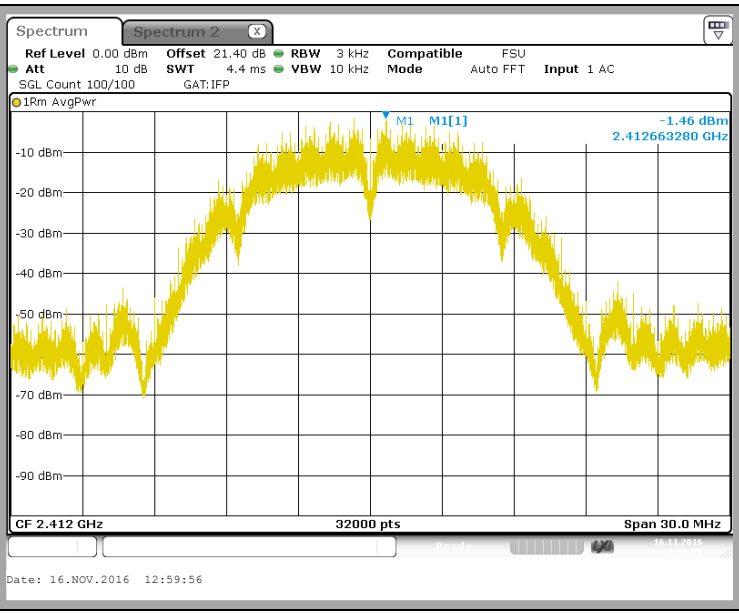
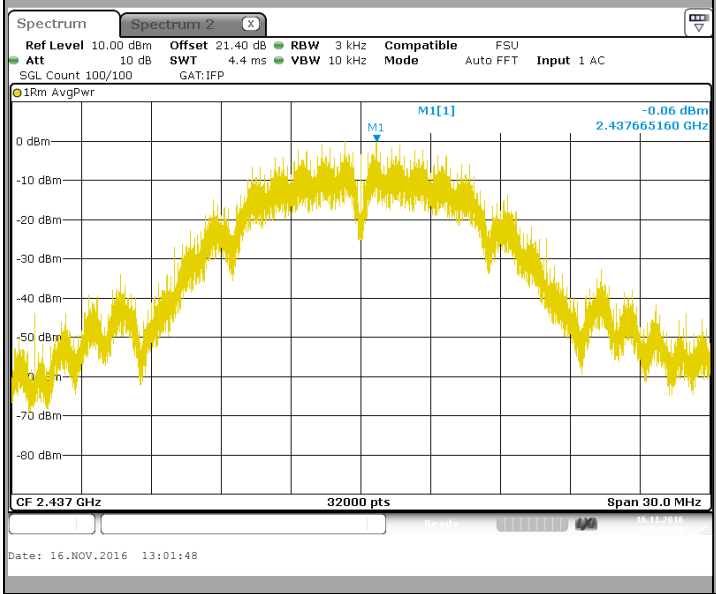
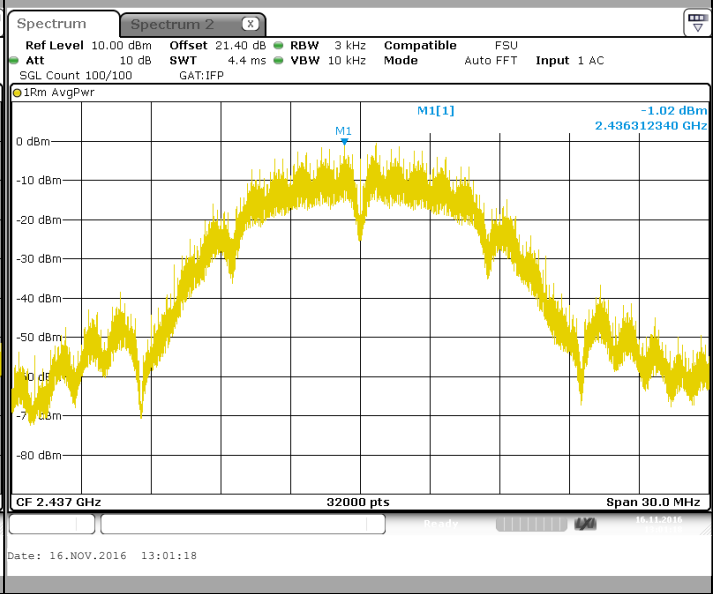


802.11b	
Cnom	
Tx1	Tx2





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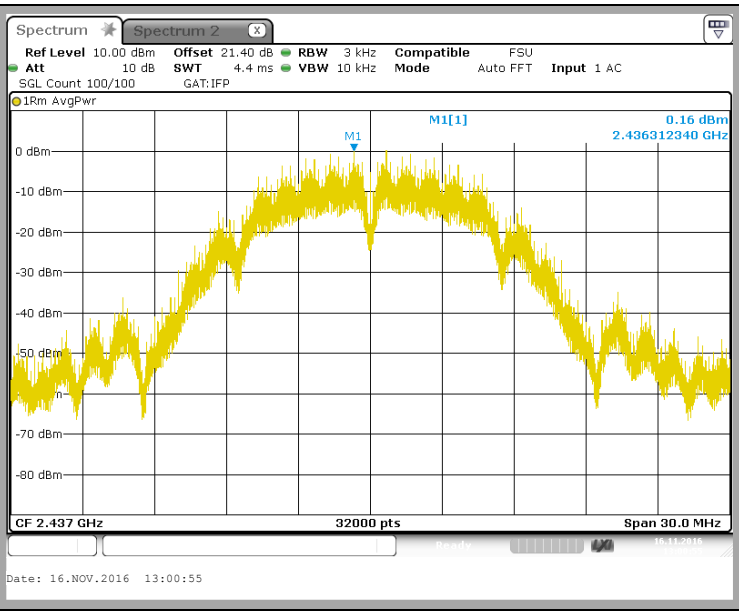
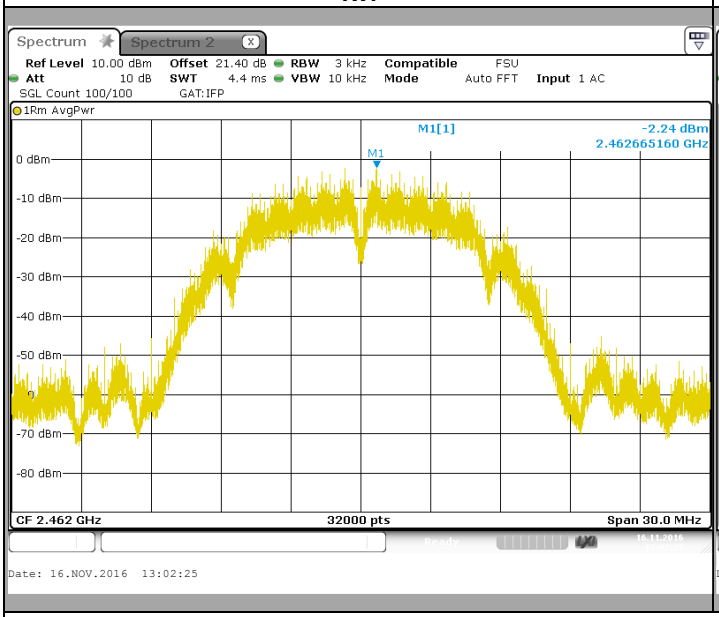


802.11b

Cmax

Tx1



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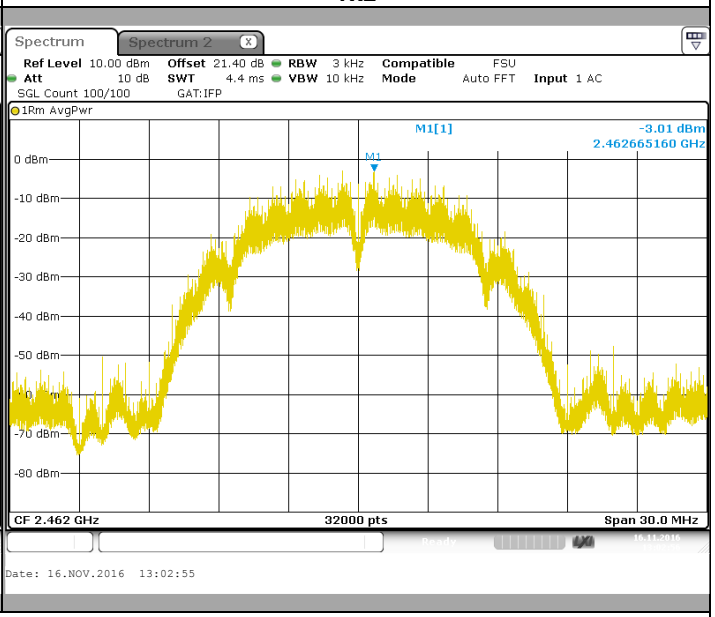

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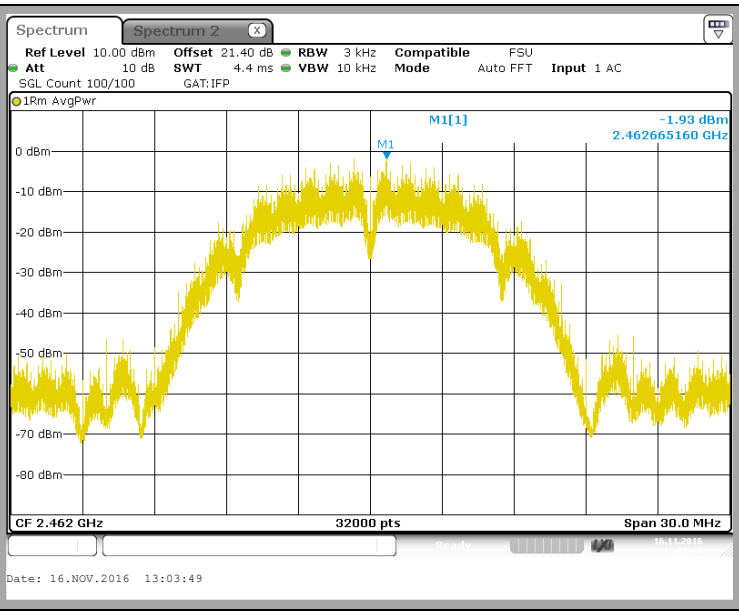
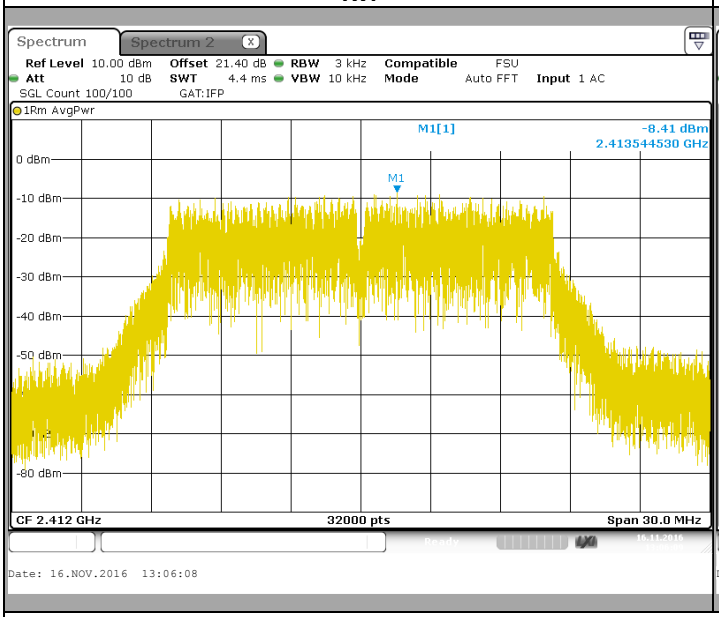


802.11g

Cmin

Tx1



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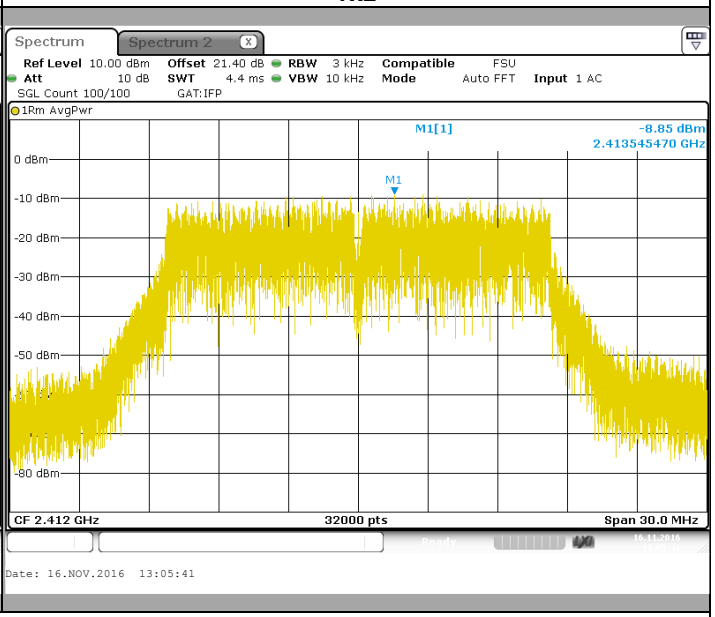

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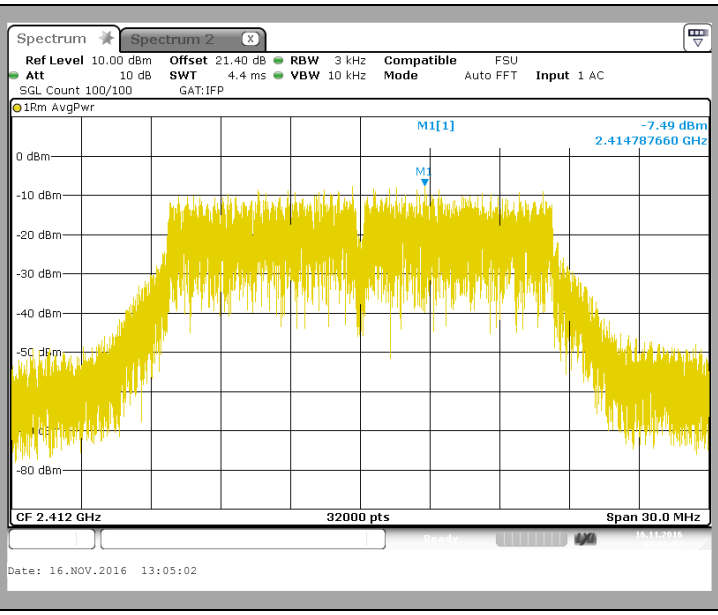
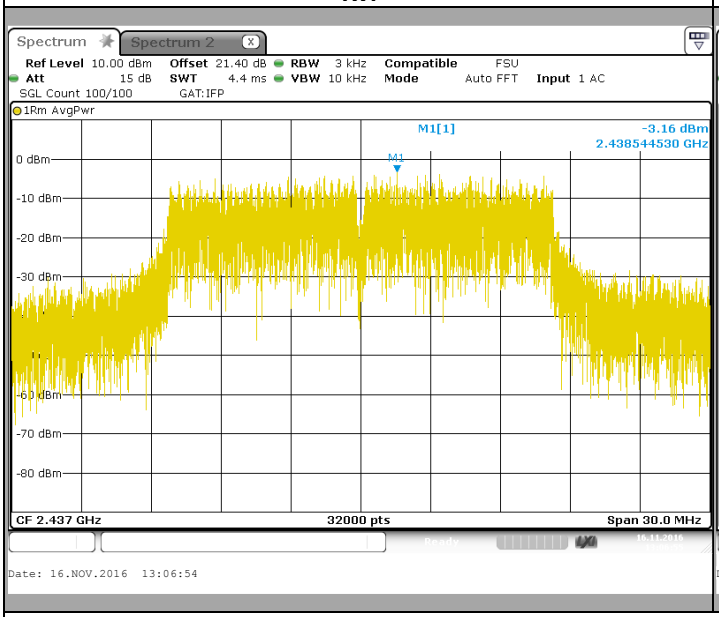
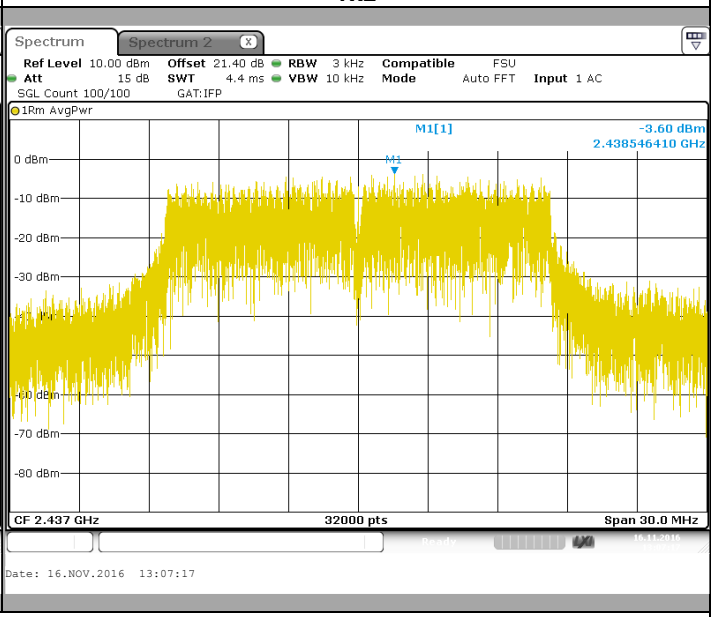
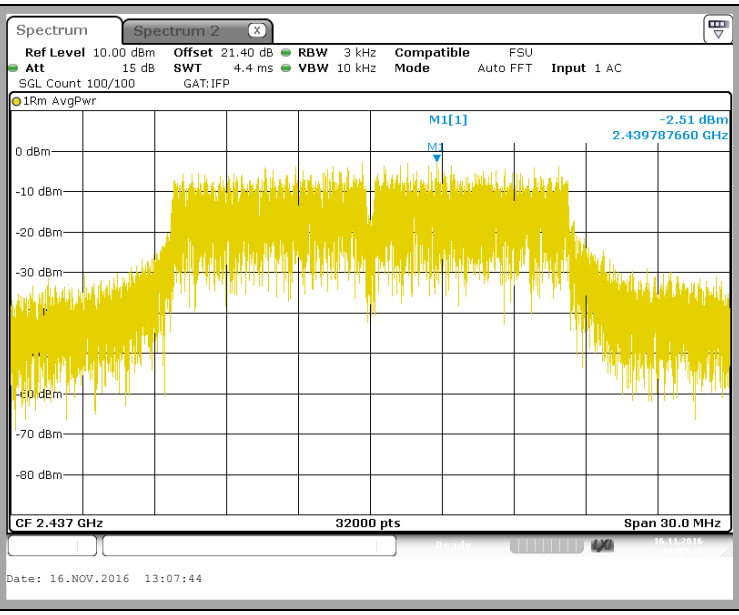


802.11g	
Cnom	
Tx1	Tx2





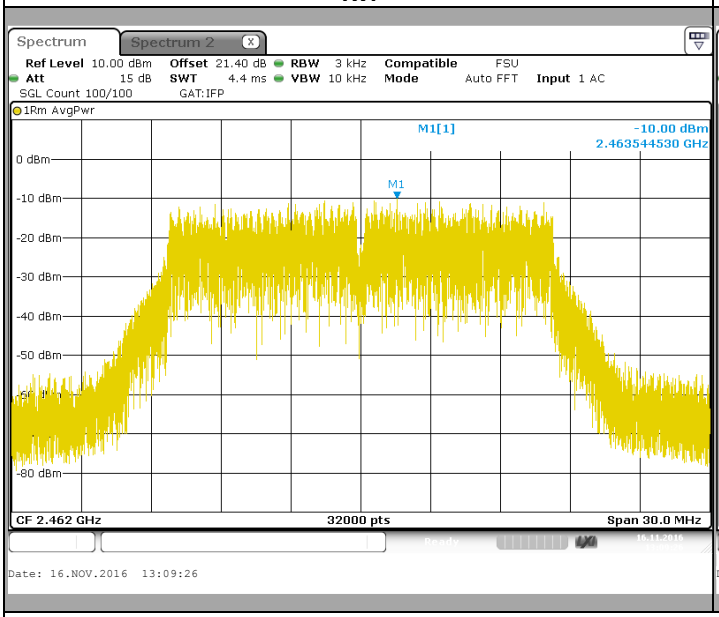
Tx3



802.11g

Cmax

Tx1



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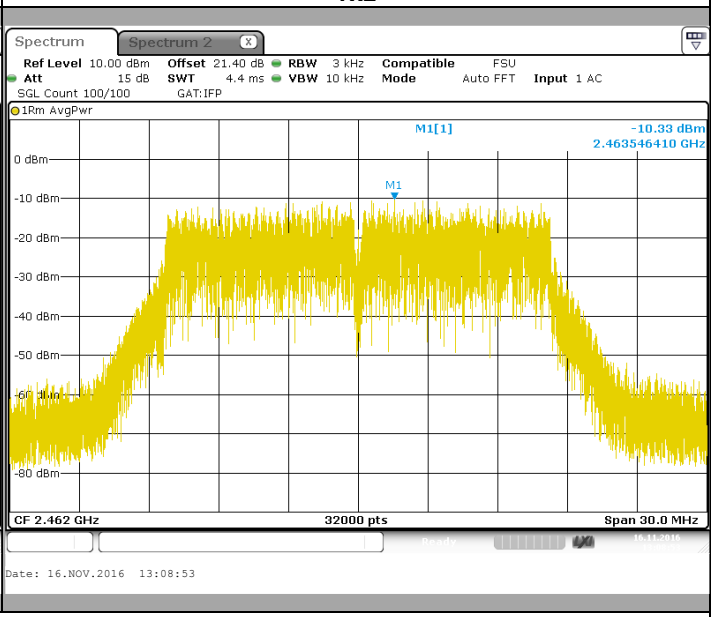

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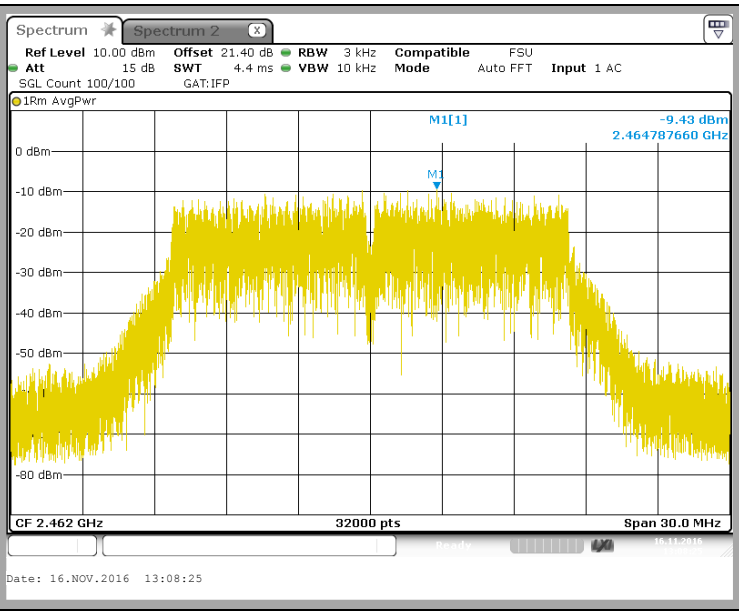

802.11nHT20

Cmin

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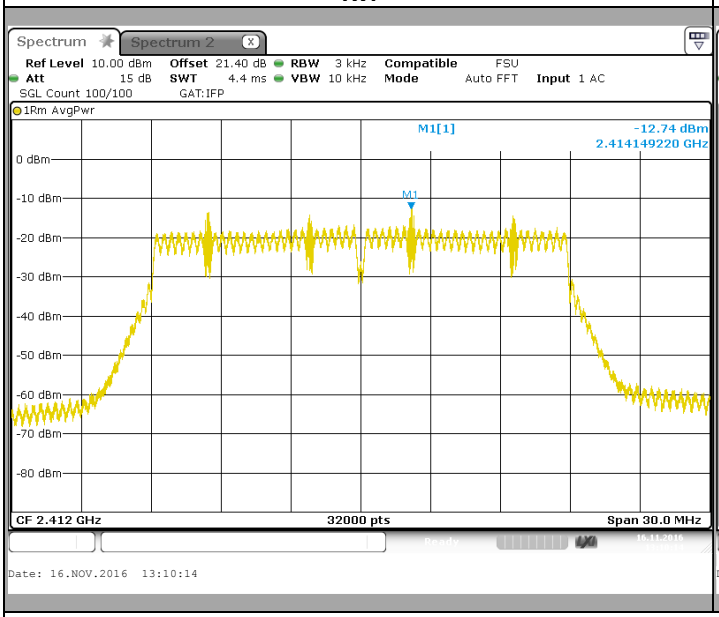
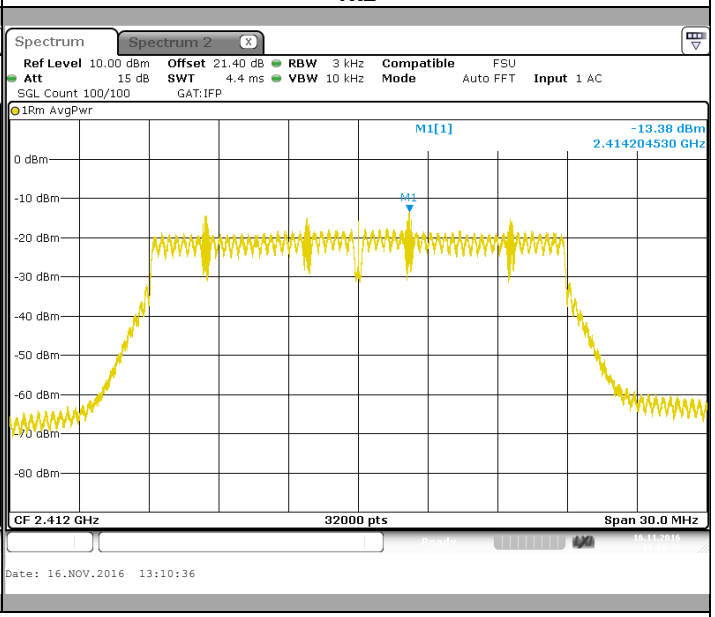
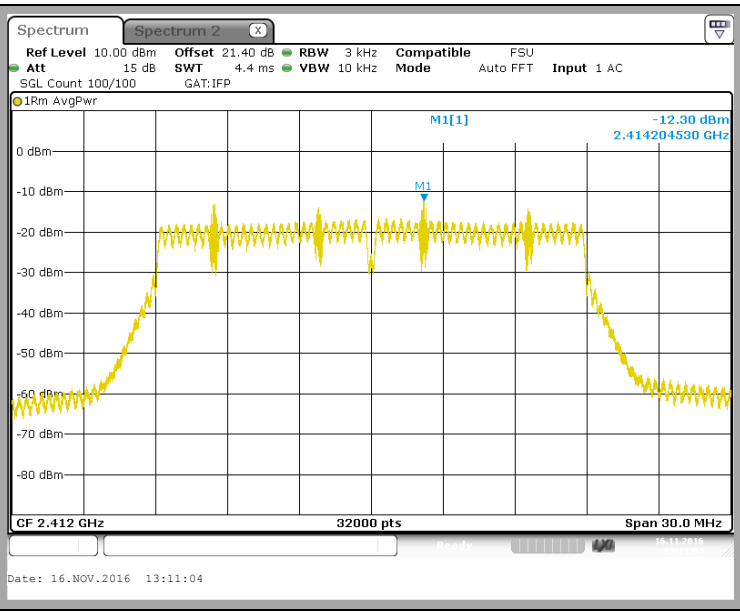
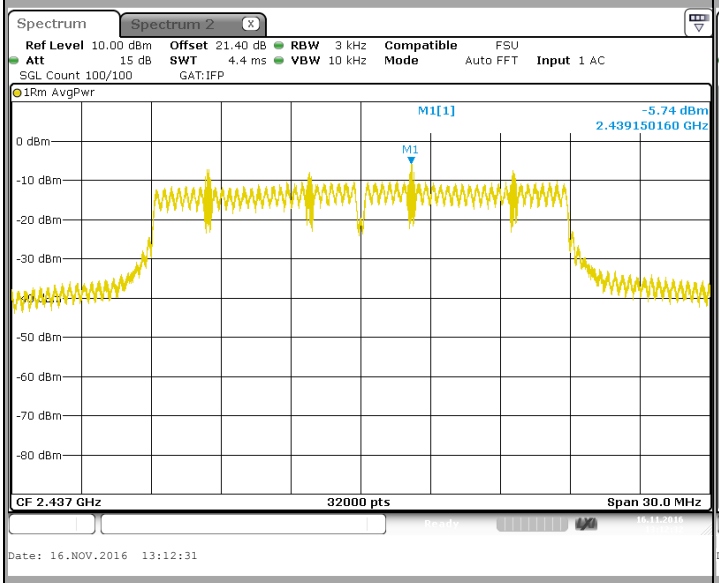
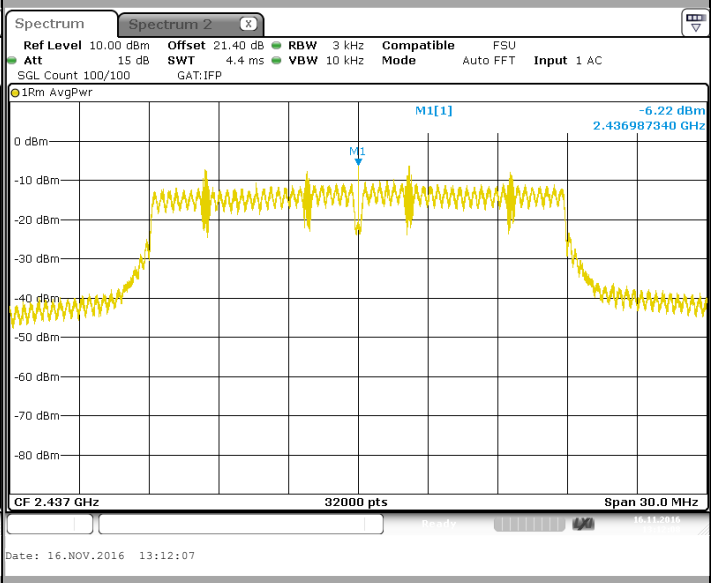
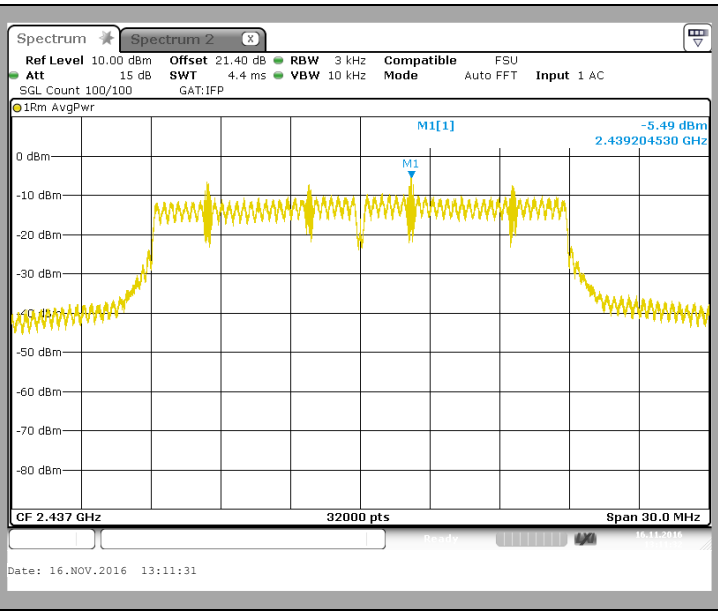


Tx2



Tx3

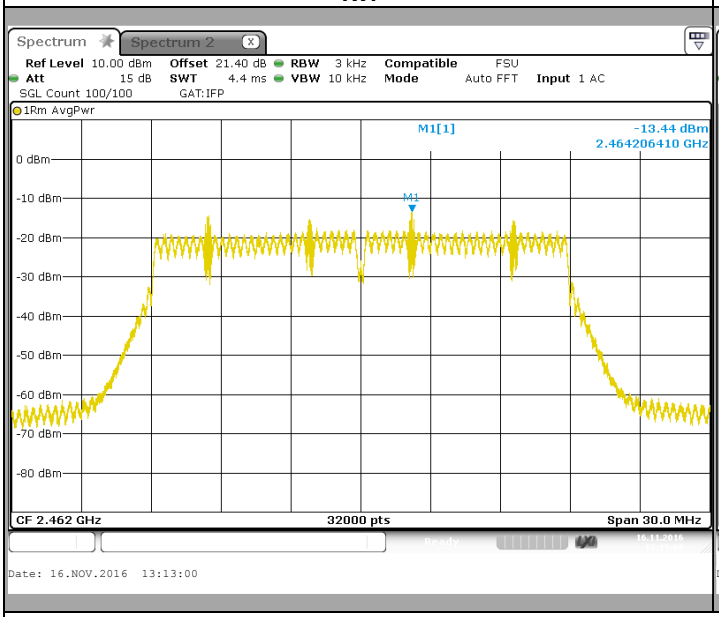


802.11nHT20	
Cnom	
Tx1	Tx2
	
Tx3	
	

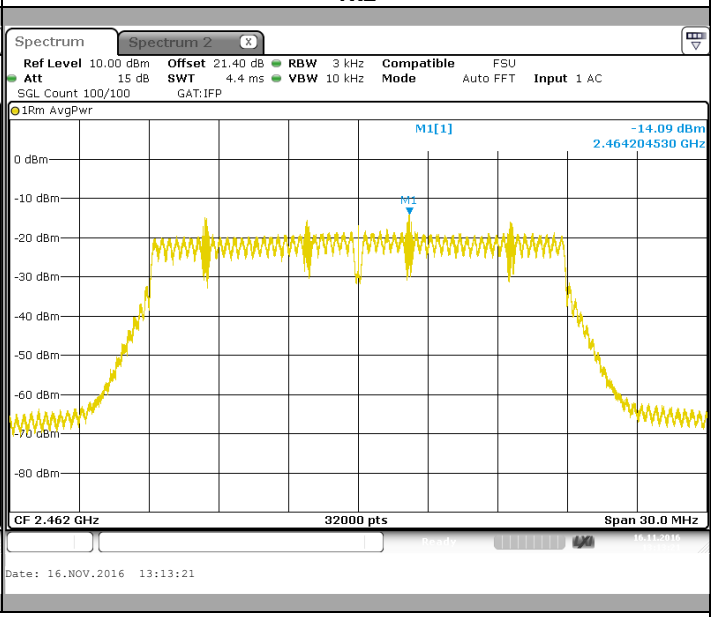
802.11nHT20

Cmax

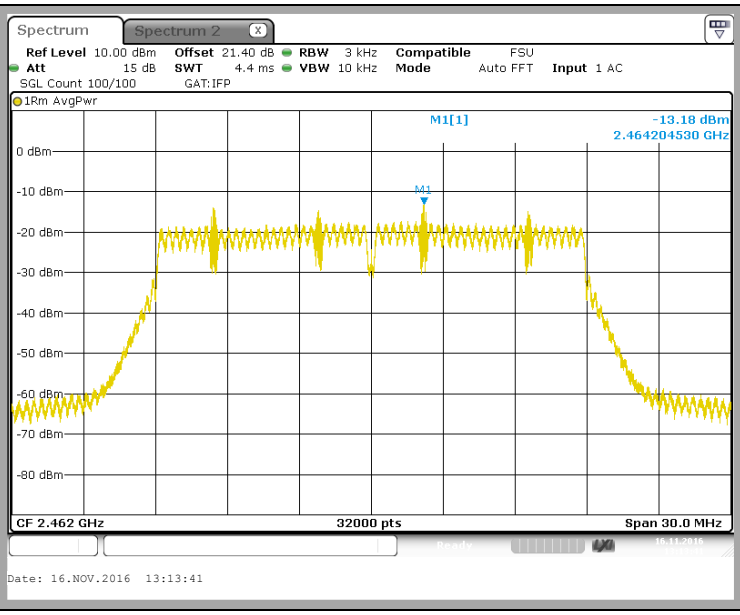
Tx1



Tx2



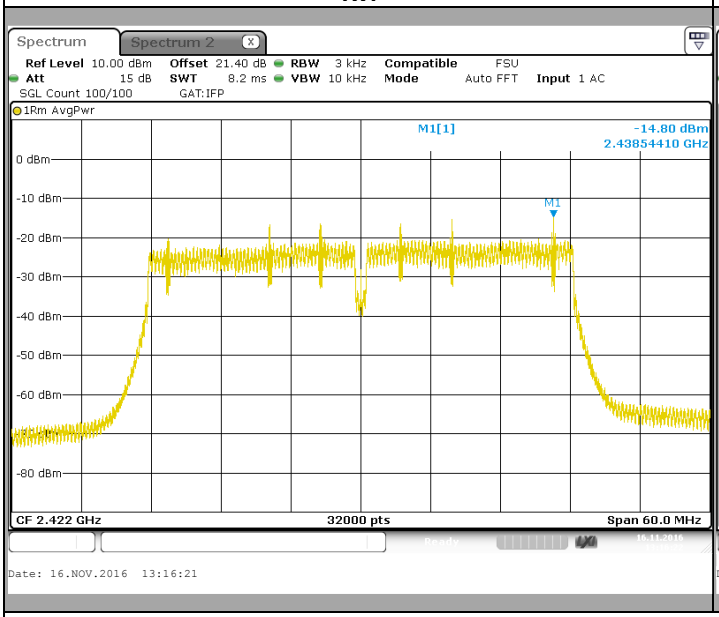
Tx3



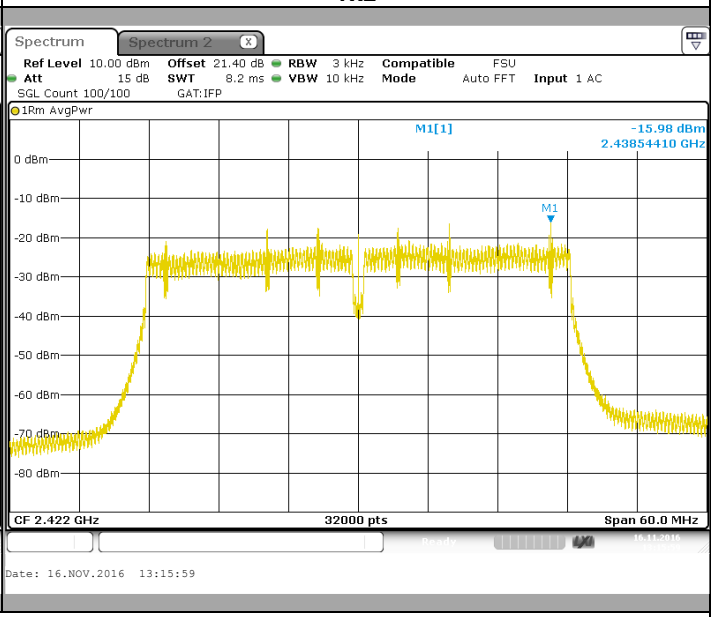
802.11nHT40

Cmin

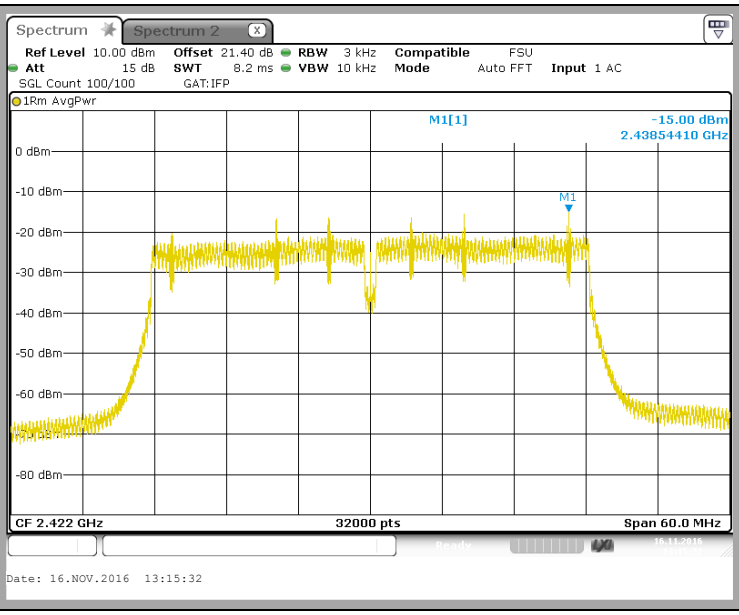
Tx1



Tx2



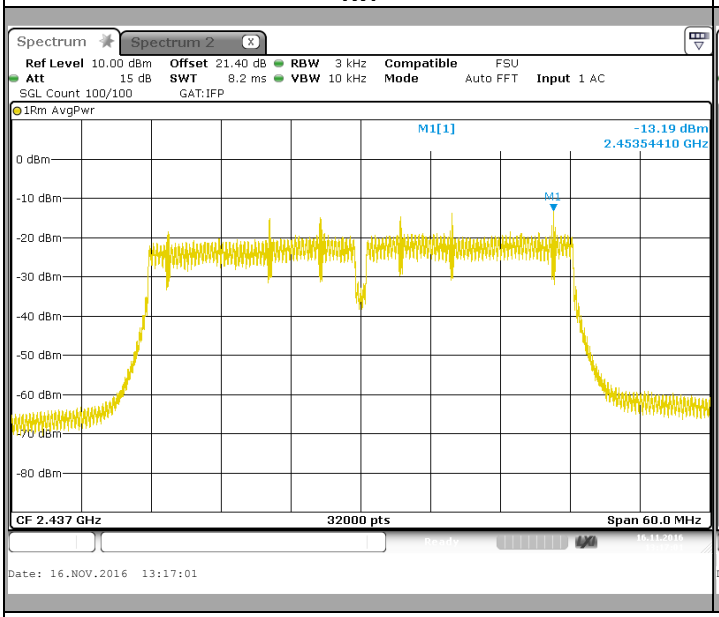
Tx3



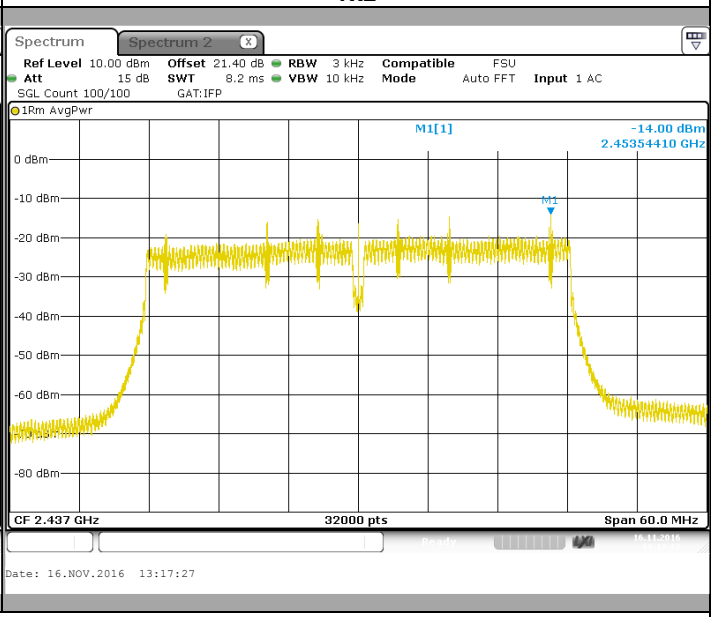
802.11nHT40

Cnom

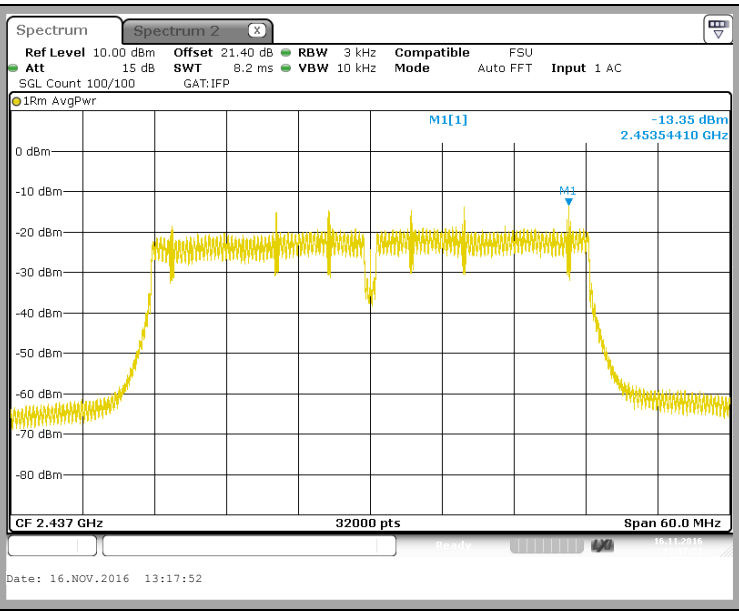
Tx1



Tx2



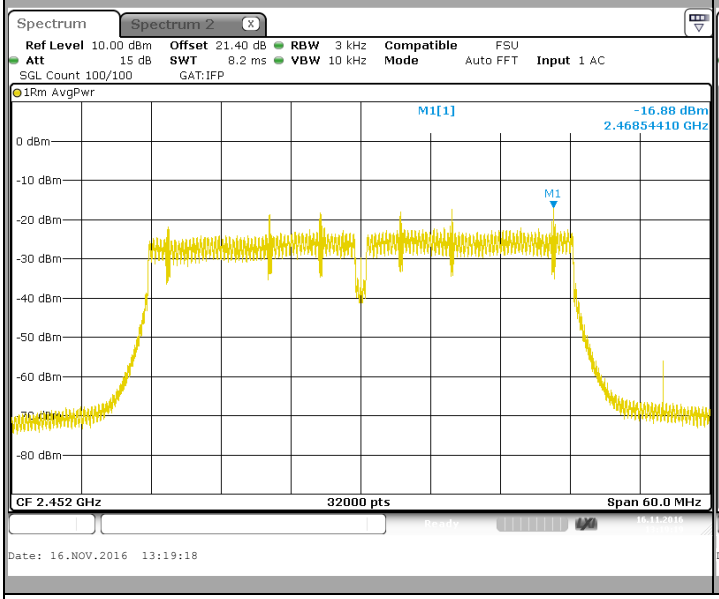
Tx3



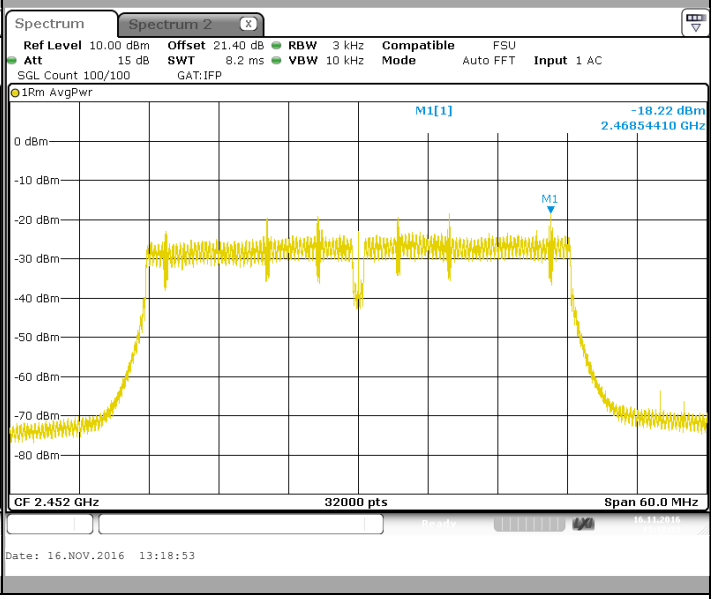
802.11nHT40

Cmax

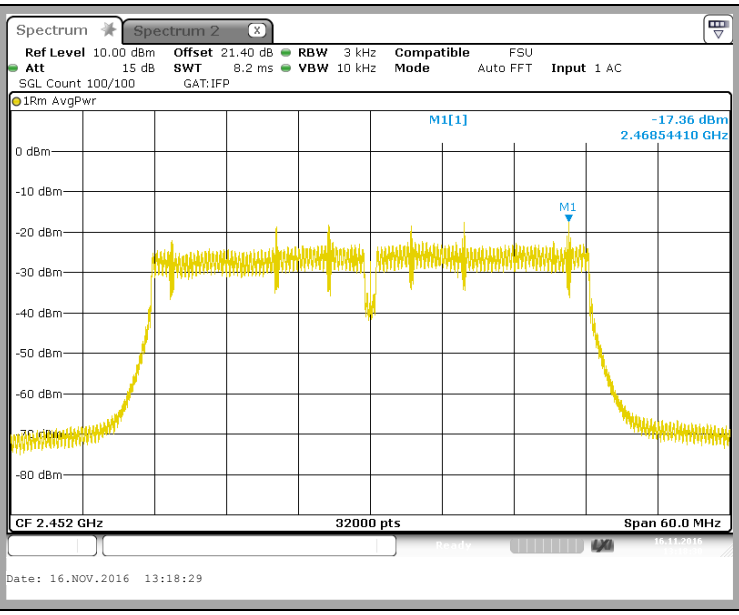
Tx1



Tx2



Tx3



Spectrum Analyzer Offset:
Cable Loss=1,4dB + 20dB Attenuator= 21,4dB

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	-1,65	-2,32	-1,46		5,9	2,98	7,93
Cnom	-0,06	-1,02	0,16		5,9	4,49	7,93
Cmax	-2,24	-3,01	-1,93		5,9	2,40	7,93

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	-8,41	-8,85	-7,49		5,9	-3,44	7,93
Cnom	-3,16	-3,6	-2,51		5,9	1,7	7,93
Cmax	-10	-10,33	-9,43		5,9	-5,13	7,93

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	-12,74	-13,38	-12,3		5,9	-8,01	7,93
Cnom	-5,74	-6,22	-5,49		5,9	-1,03	7,93
Cmax	-13,44	-14,09	-13,18		5,9	-8,78	7,93

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	-14,8	-15,98	-15		5,9	-10,46	7,93
Cnom	-13,19	-14	-13,35		5,9	-8,73	7,93
Cmax	-16,88	-18,22	-17,36		5,9	-12,68	7,93

7.2. CONCLUSION

Power Spectral Density measurement performed on the sample of the product **SAGEMCOM** TheBox **(253697282)**, SN: **616400107098**, in configuration and description presented in this test report, show levels **compliant** to the **47 CFR PART 15.247** limits.