

Appendix

2.4GWIFI

TABLE OF CONTENTS

1	EQUIPMENT LIST	3
2	MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2).....	3
3	AC POWER LINE CONDUCTED EMISSIONS	4
4	DUTY CYCLE	6
4.1	TEST RESULTS	6
4.2	TEST PLOTS	6
5	CONDUCTED OUTPUT POWER.....	8
5.1	TEST RESULTS	8
6	DTS (6 DB) BANDWIDTH & 99% OCCUPIED BANDWIDTH.....	9
6.1	TEST RESULTS	9
6.2	TEST PLOTS	10
7	POWER SPECTRAL DENSITY	19
7.1	TEST RESULTS	19
7.2	TEST PLOTS	20
8	BAND-EDGE FOR RF CONDUCTED EMISSIONS	25
8.1	TEST PLOTS	25
9	RF CONDUCTED SPURIOUS EMISSIONS.....	29
9.1	TEST PLOTS	29

1 Equipment List

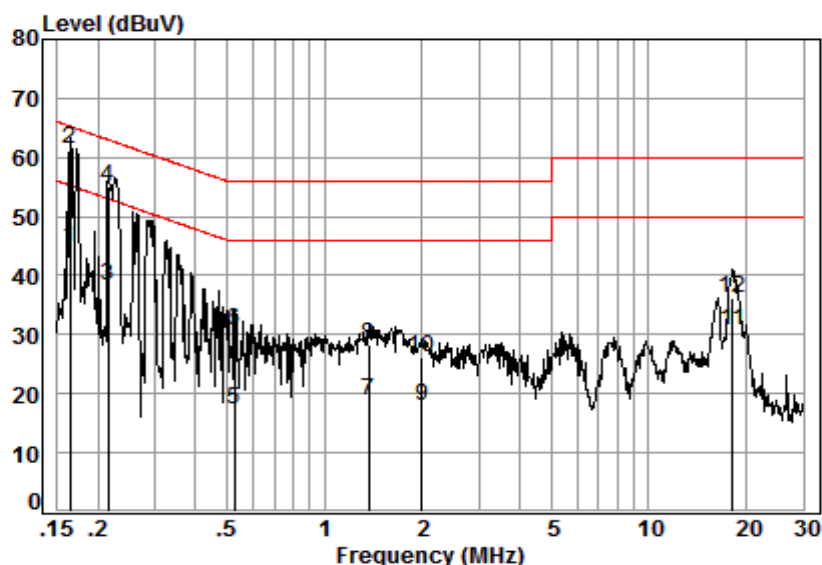
Conducted Emission					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(yyyy-mm-dd)	(yyyy-mm-dd)
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/5/10	2020/5/9
LISN	Rohde & Schwarz	ENV216	SEM007-01	2018/9/2	2019/9/2
LISN	ETS-LINDGREN	Feb-16	SEM007-02	2018/4/2	2019/4/1
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM024-01	2018/7/12	2019/7/11
2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2018/2/14	2019/2/13
EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018/4/2	2019/4/1
RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date	Cal.Duedate
				(yyyy-mm-dd)	(yyyy-mm-dd)
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2018/9/2	2019/9/2
Signal Analyzer	Rohde & Schwarz	FSV	W025-05	2018/3/13	2019/3/12
Coaxial Cable	SGS	N/A	SEM031-01	2018/7/13	2019/7/12
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2018/9/2	2019/9/2
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2018/9/2	2019/9/2

2 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.75dB
2	RF power density, conducted	±2.84dB
3	Spurious emissions, conducted	±0.75dB
4	Conduct emission test	±3.12 dB (9KHz- 30MHz)

3 AC Power Line Conducted Emissions

Live Line:



Site : Shielding Room

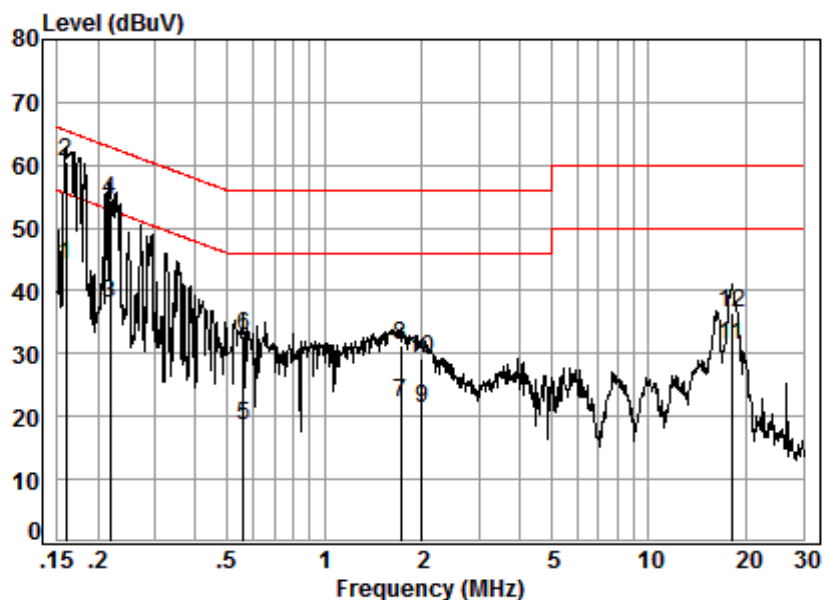
Condition: Line

Job No. : 10005

Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.66	35.02	44.69	55.25	-10.56	Average
2	0.16	0.01	9.66	51.68	61.35	65.25	-3.90	QP
3	0.22	0.03	9.66	28.56	38.25	53.01	-14.76	Average
4	0.22	0.03	9.66	45.28	54.97	63.01	-8.04	QP
5	0.53	0.06	9.67	7.51	17.24	46.00	-28.76	Average
6	0.53	0.06	9.67	20.85	30.58	56.00	-25.42	QP
7	1.37	0.12	9.73	9.12	18.97	46.00	-27.03	Average
8	1.37	0.12	9.73	18.56	28.41	56.00	-27.59	QP
9	1.99	0.16	9.72	7.97	17.85	46.00	-28.15	Average
10	1.99	0.16	9.72	16.21	26.09	56.00	-29.91	QP
11	18.14	0.23	10.16	20.36	30.75	50.00	-19.25	Average
12	18.14	0.23	10.16	25.76	36.15	60.00	-23.85	QP

Neutral Line:



Site : Shielding Room
 Condition: Neutral
 Job No. : 10005
 Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.16	0.01	9.63	34.44	44.08	55.52	-11.44	Average
2	0.16	0.01	9.63	50.87	60.51	65.52	-5.01	QP
3	0.22	0.03	9.64	28.33	38.00	52.88	-14.88	Average
4	0.22	0.03	9.64	44.89	54.56	62.88	-8.32	QP
5	0.56	0.07	9.64	8.88	18.59	46.00	-27.41	Average
6	0.56	0.07	9.64	23.28	32.99	56.00	-23.01	QP
7	1.72	0.14	9.70	12.52	22.36	46.00	-23.64	Average
8	1.72	0.14	9.70	21.61	31.45	56.00	-24.55	QP
9	2.00	0.16	9.69	11.41	21.26	46.00	-24.74	Average
10	2.00	0.16	9.69	19.29	29.14	56.00	-26.86	QP
11	18.04	0.23	10.20	20.82	31.25	50.00	-18.75	Average
12	18.04	0.23	10.20	26.02	36.45	60.00	-23.55	QP

Remarks:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

4 Duty Cycle

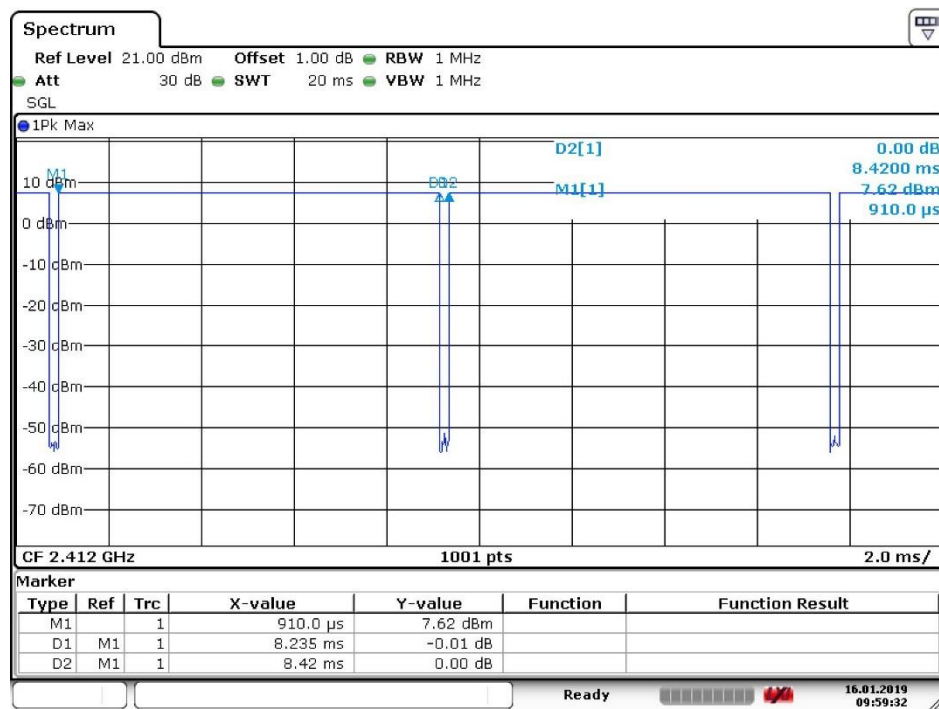
4.1 Test Results

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH1,CH6,CH11	97.80
11G	Ant 1: CH1,CH6,CH11	86.86
11N20	Ant 1: CH1,CH6,CH11	86.10

4.2 Test Plots

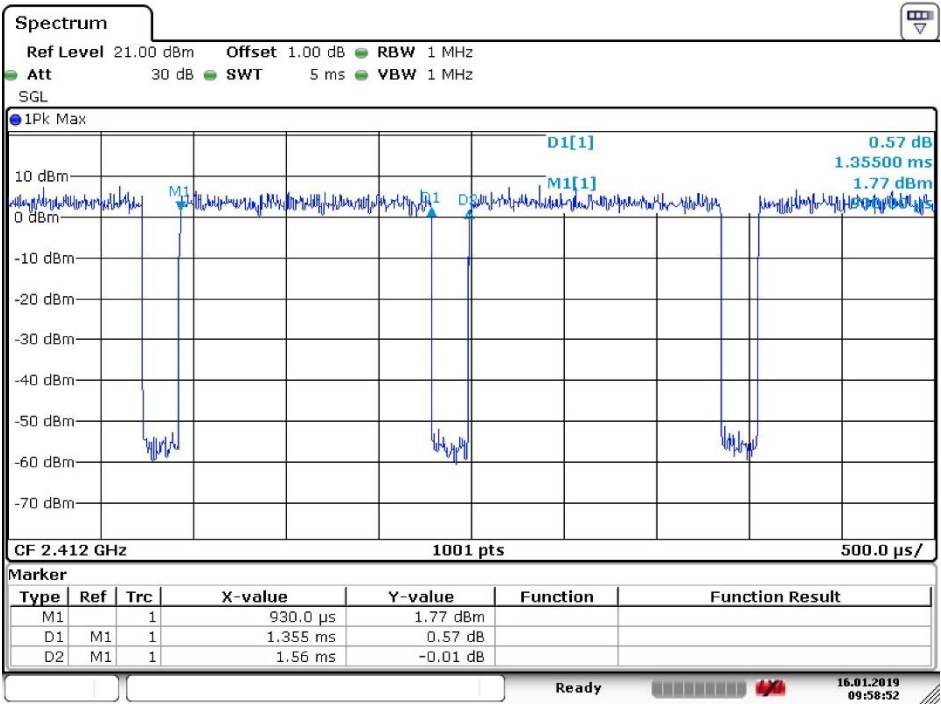
ANT1

11B



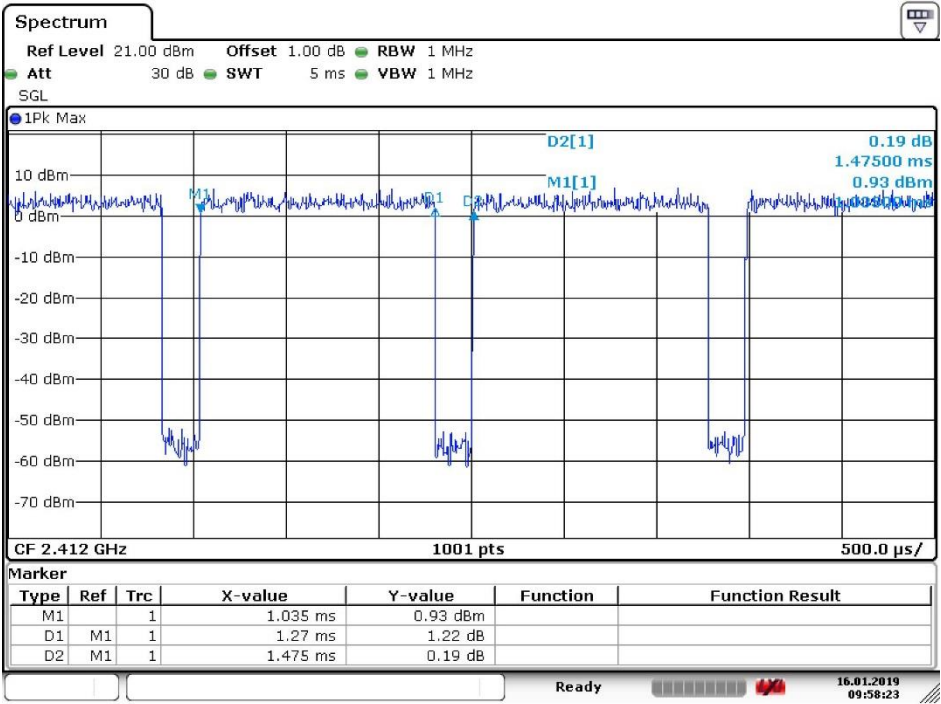
Date: 16 JAN.2019 09:59:32

11G



Date: 16.JAN.2019 09:58:53

11N20



Date: 16.JAN.2019 09:58:23

5 Conducted Output Power

5.1 Test Results

Measurement Data of Peak Power:

Mode	Test Channel	Peak Output Power (dBm)	Limit (dBm)	Result
802.11B	Lowest	17.56	30.00	Pass
	Middle	19.08	30.00	Pass
	Highest	18.37	30.00	Pass
802.11G	Lowest	21.18	30.00	Pass
	Middle	22.32	30.00	Pass
	Highest	21.86	30.00	Pass
802.11N20	Lowest	21.25	30.00	Pass
	Middle	22.62	30.00	Pass
	Highest	22.27	30.00	Pass

6 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

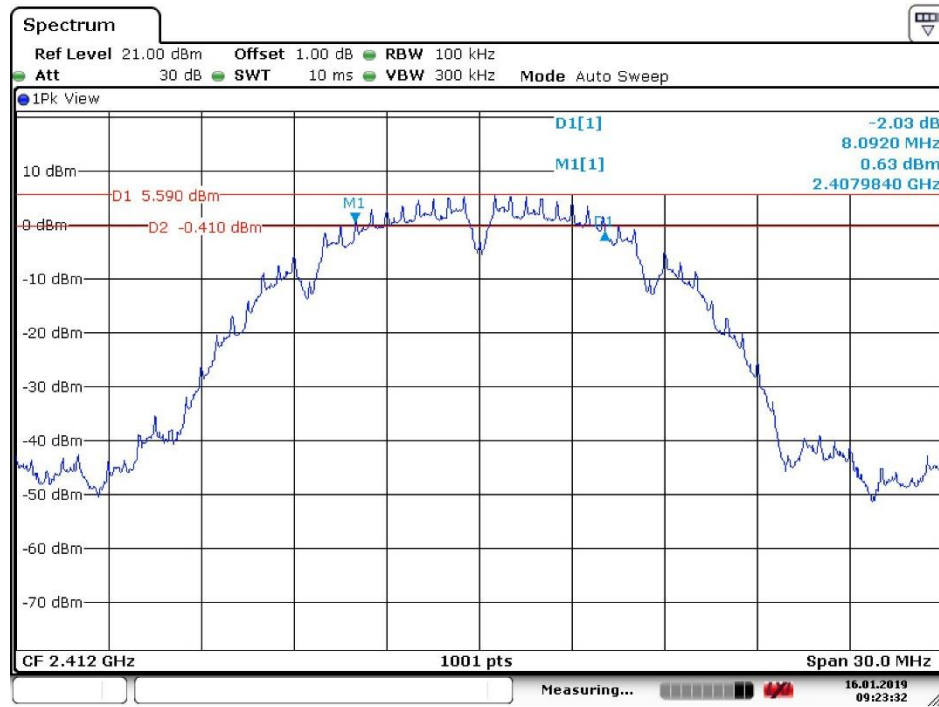
6.1 Test Results

Mode	Test Channel	Occupied Bandwidth (MHz)	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
802.11B	Lowest	13.277	8.092	≥500	Pass
	Middle	13.157	8.092	≥500	Pass
	Highest	13.247	9.051	≥500	Pass
802.11G	Lowest	16.843	16.244	≥500	Pass
	Middle	16.873	16.454	≥500	Pass
	Highest	16.843	16.394	≥500	Pass
802.11N20	Lowest	17.952	17.383	≥500	Pass
	Middle	17.952	17.682	≥500	Pass
	Highest	17.922	17.592	≥500	Pass

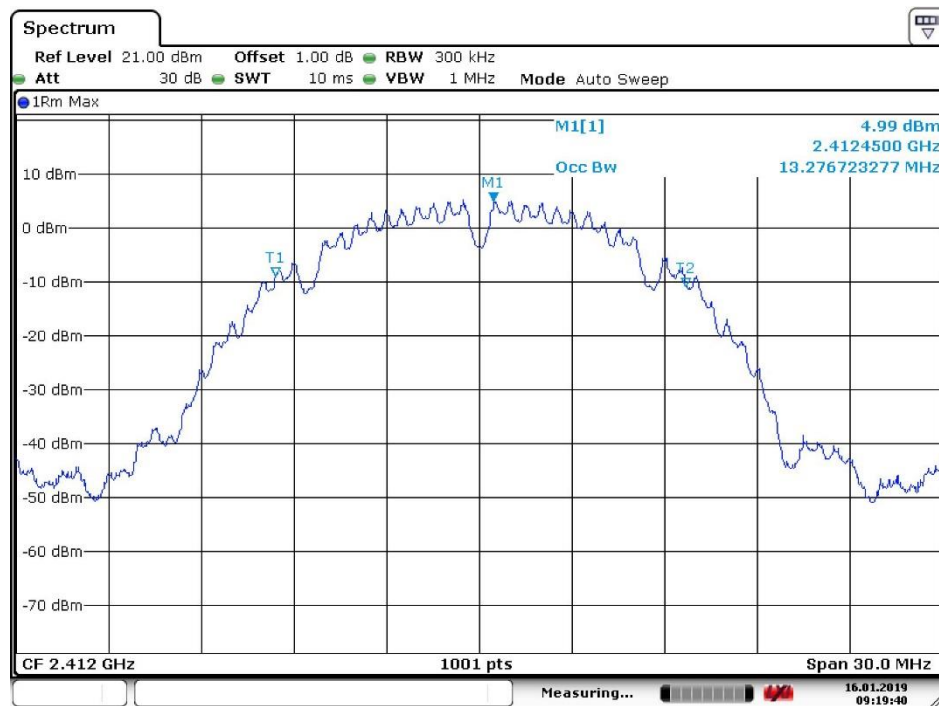
6.2 Test plots

ANT1

802.11B_Lowest Channel

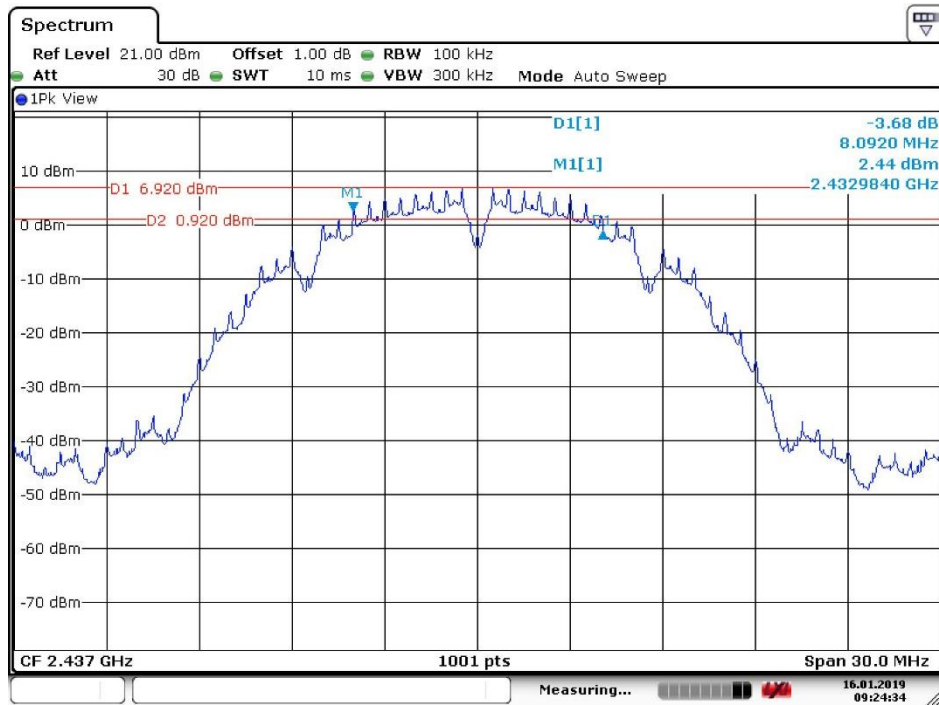


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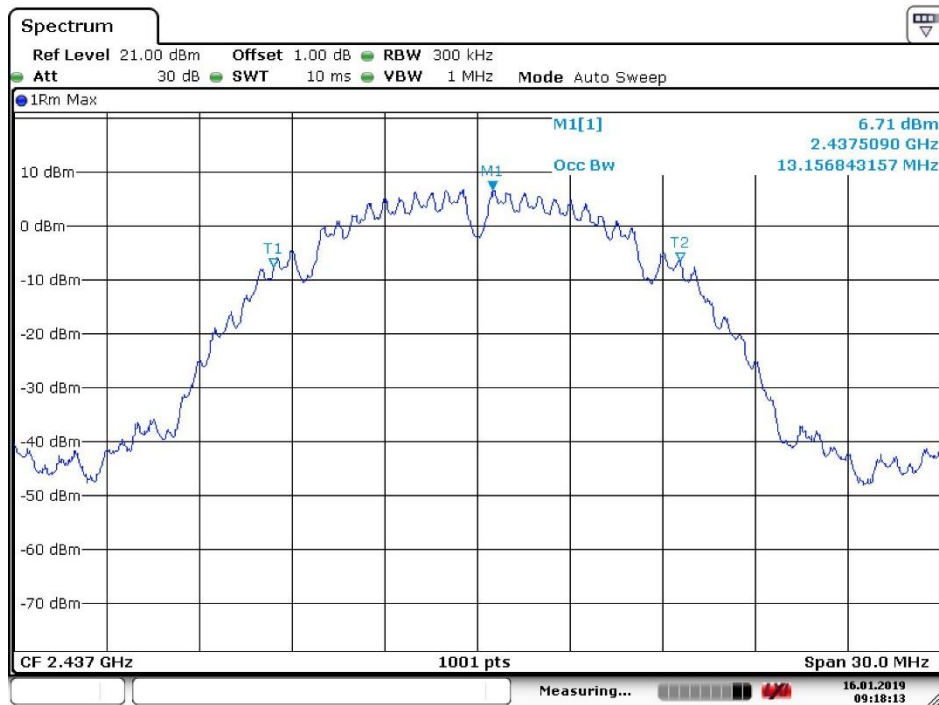


Date: 16.JAN.2019 09:19:41

802.11B_ Middle Channel

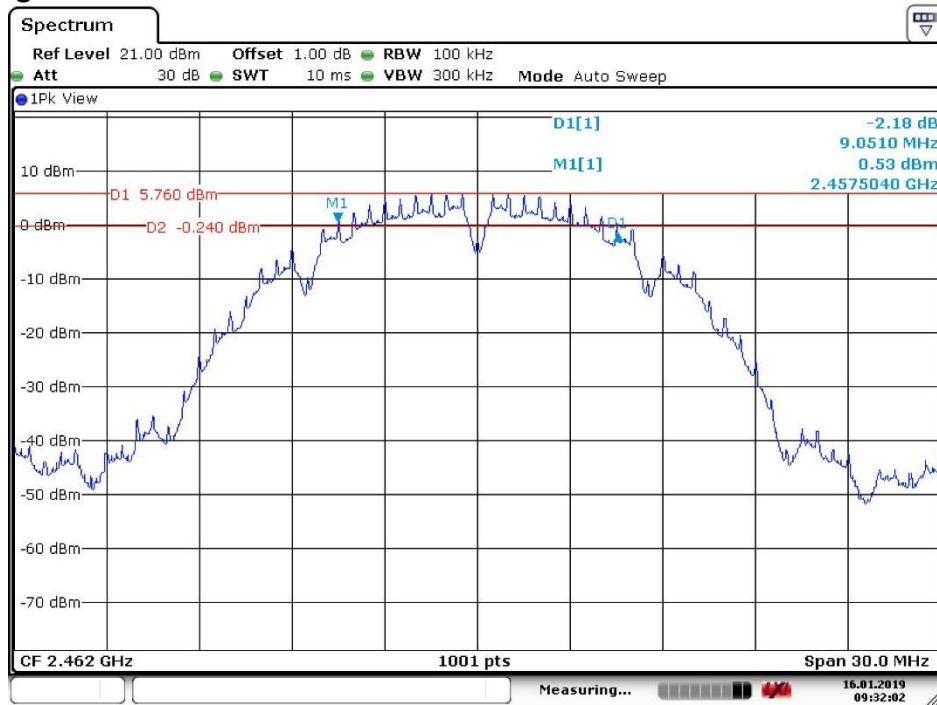


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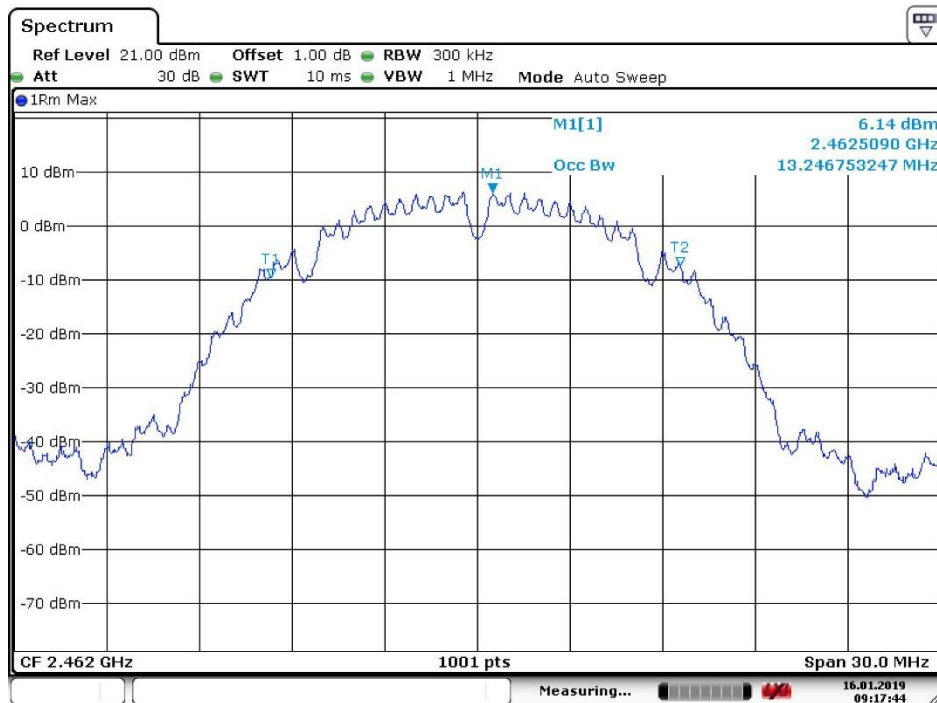


Date: 16.JAN.2019 09:18:13

802.11B_ Highest Channel

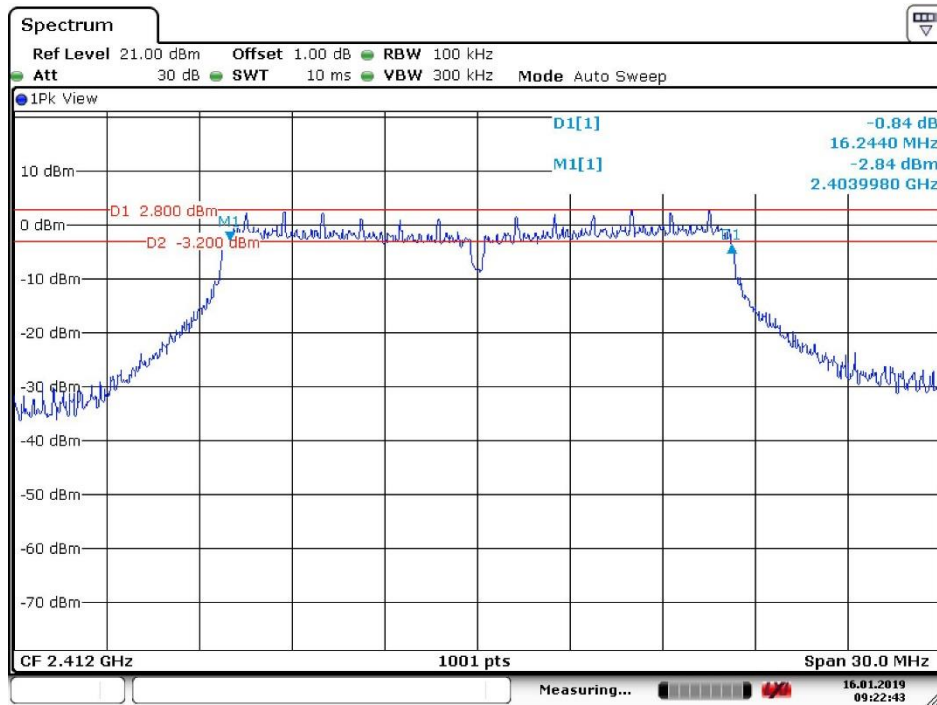


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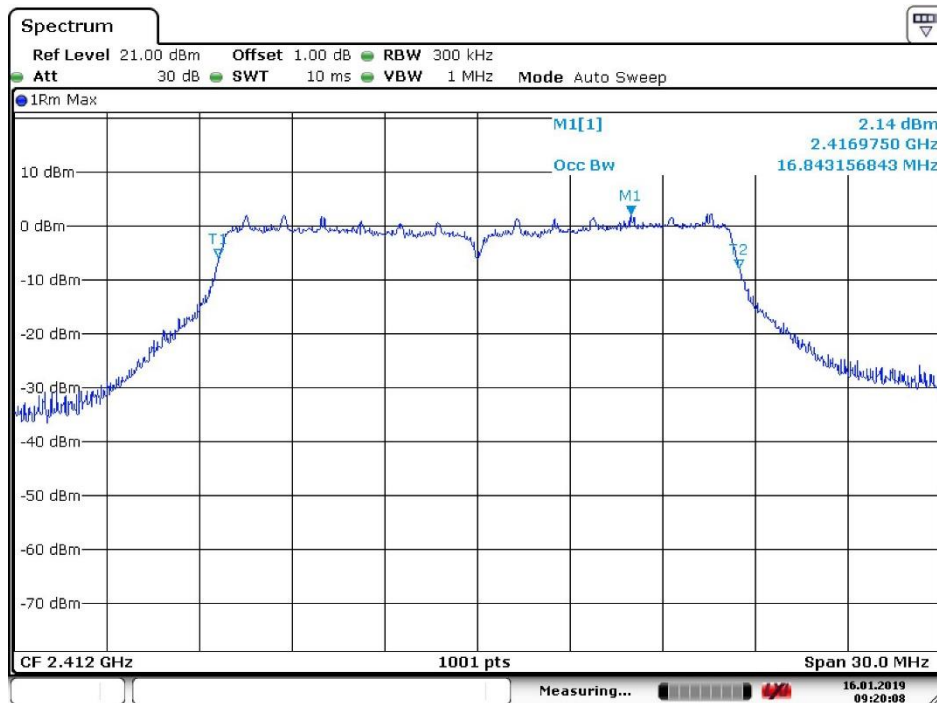


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802.11G_Lowest Channel

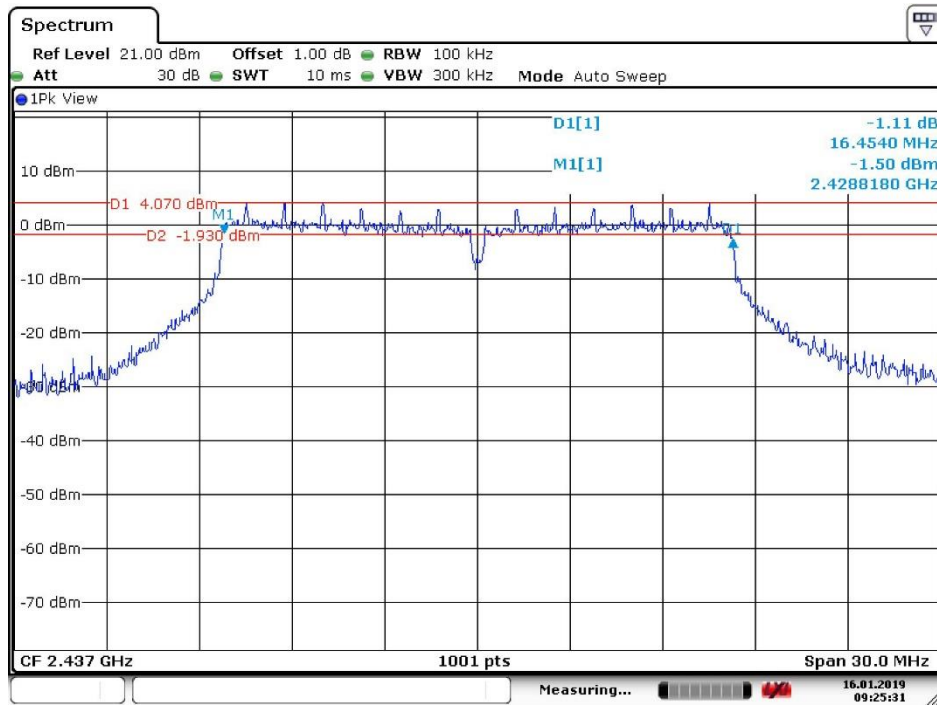


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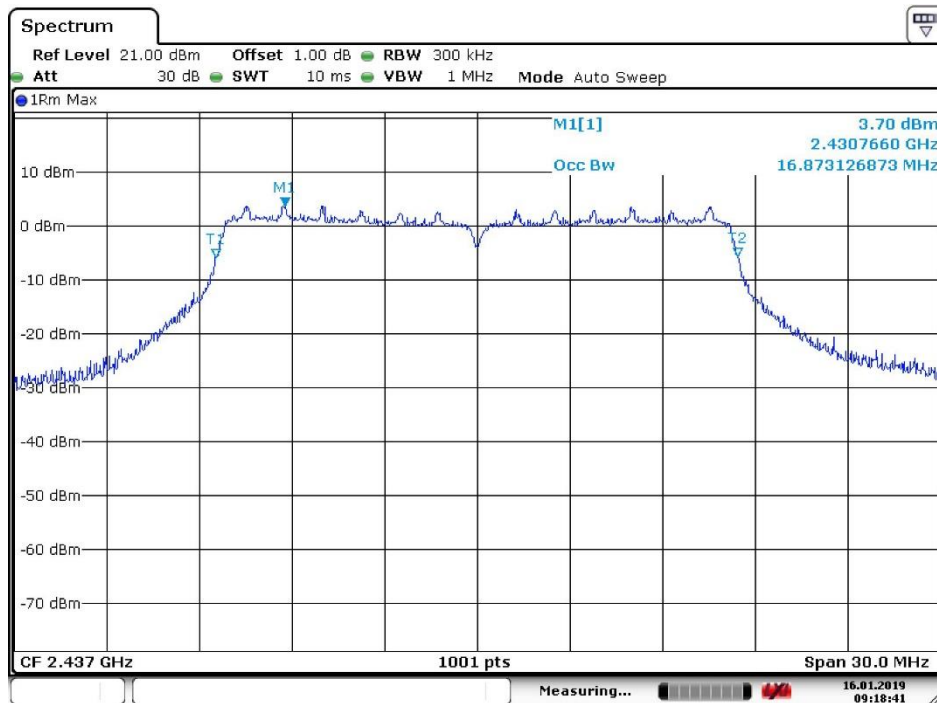


Date: 16.JAN.2019 09:20:08

802.11G_ Middle Channel

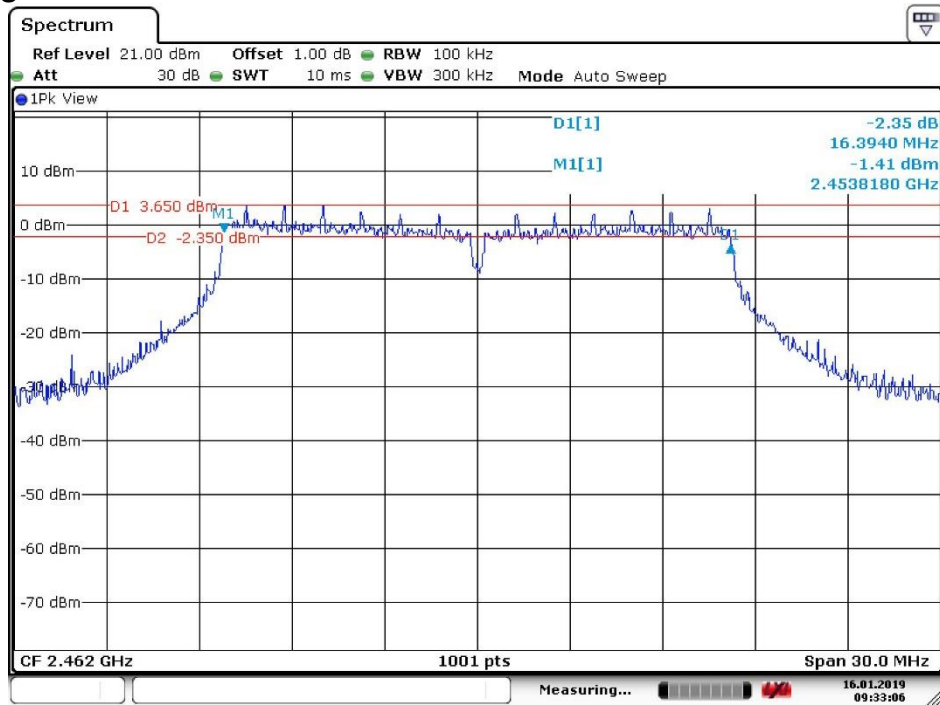


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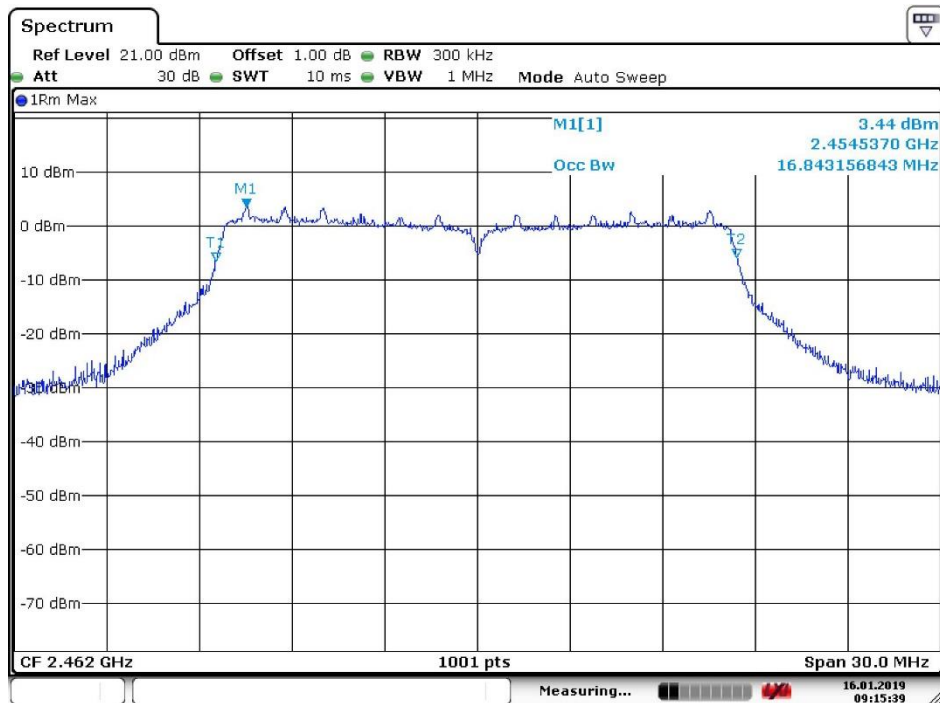


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802.11G_Highest Channel

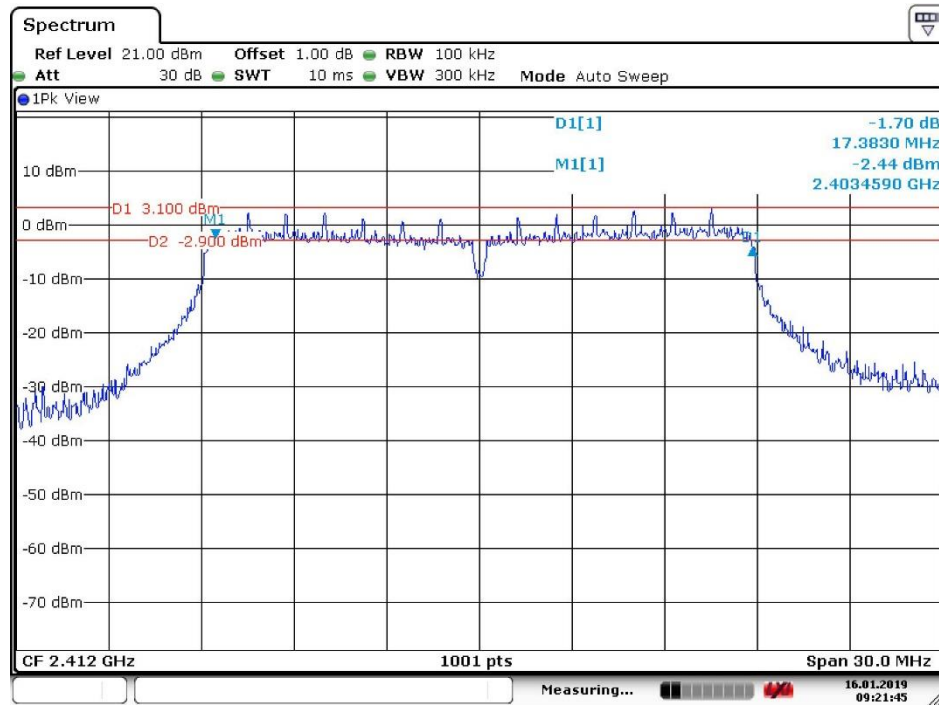


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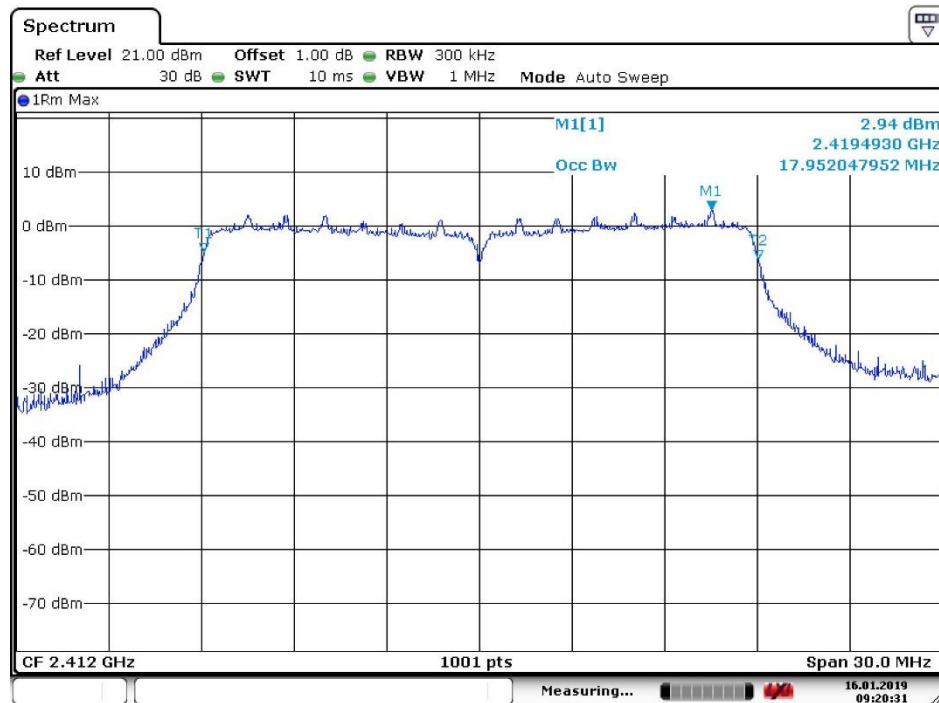


Date: 16.JAN.2019 09:15:40

802.11N20_Lowest Channel

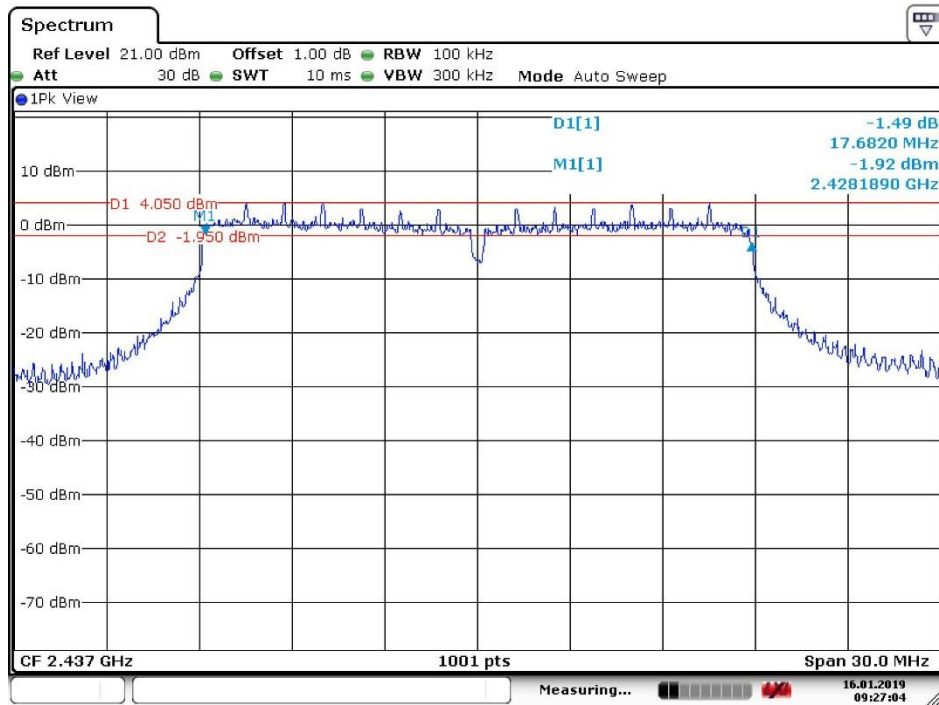


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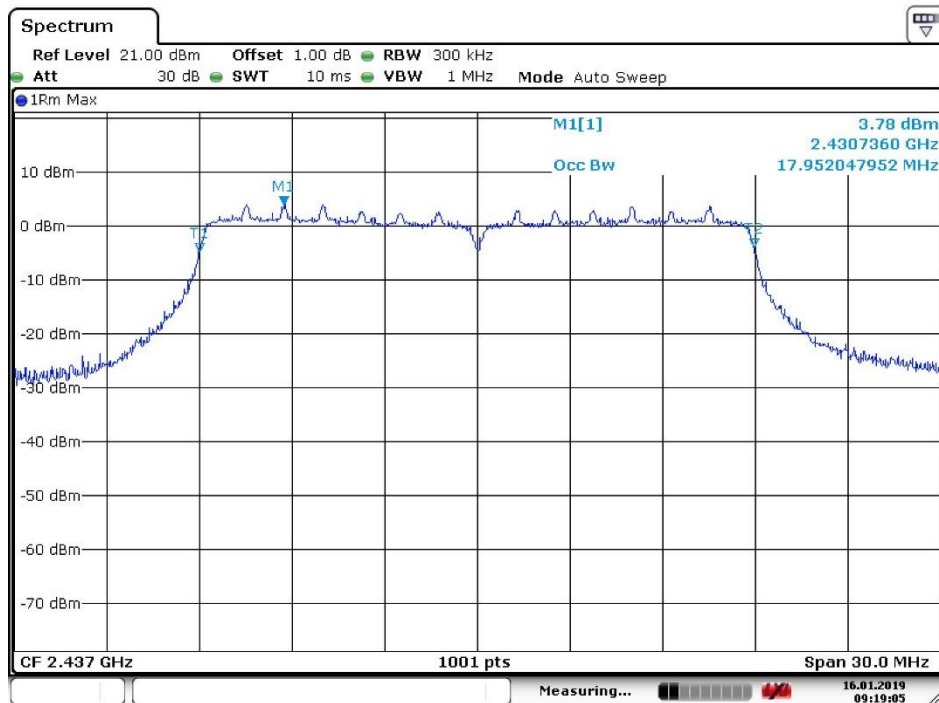


Date: 16.JAN.2019 09:20:32

802.11 N20 Middle Channel

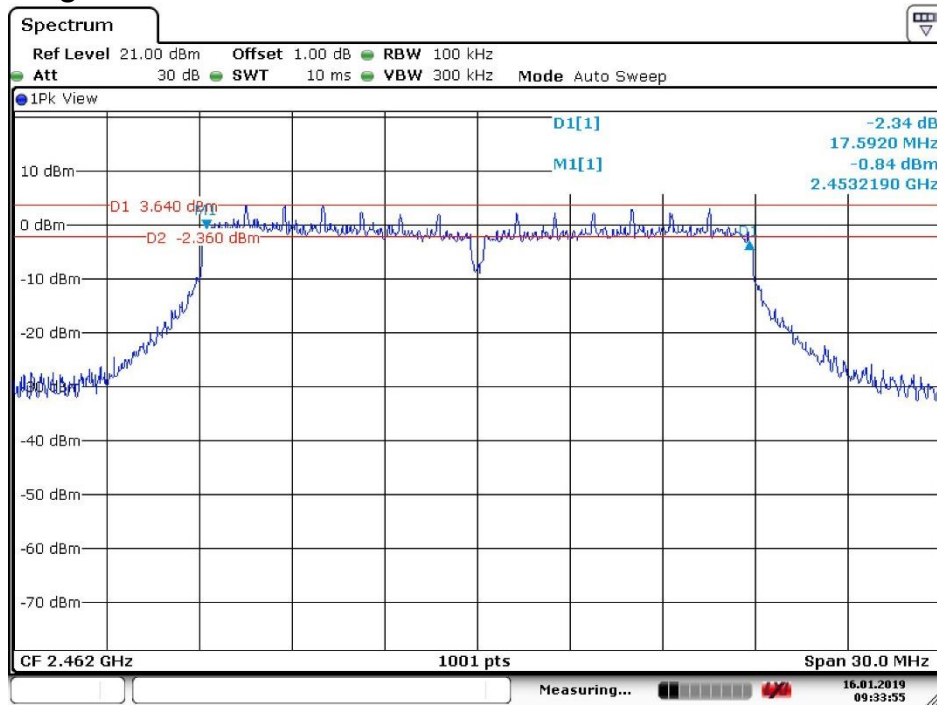


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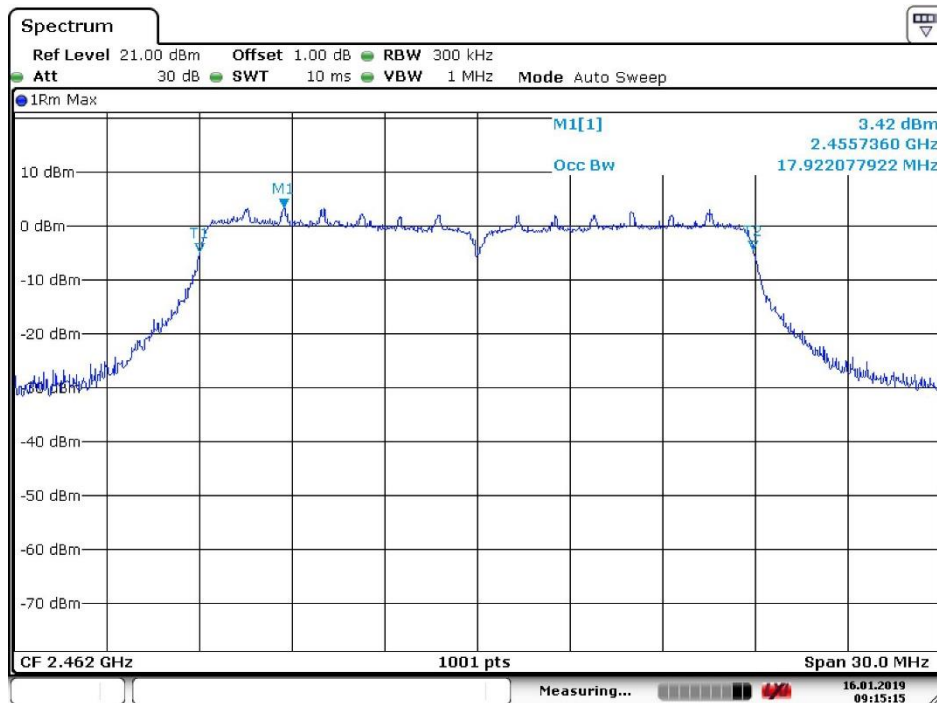


Date: 16.JAN.2019 09:19:06

802.11 N20_Highest Channel



Date: 16.JAN.2019 09:33:55



Date: 16.JAN.2019 09:15:15

7 Power Spectral Density

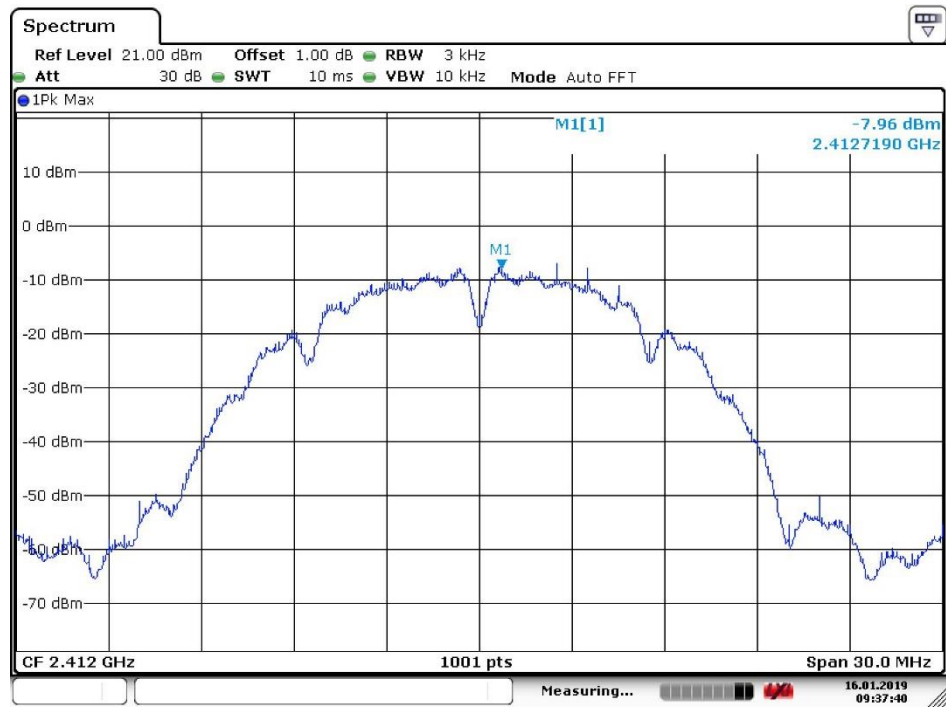
7.1 Test Results

Mode	Test Channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11B	Lowest	-7.96	≤8.00	Pass
	Middle	-6.51	≤8.00	Pass
	Highest	-7.02	≤8.00	Pass
802.11G	Lowest	-9.71	≤8.00	Pass
	Middle	-9.24	≤8.00	Pass
	Highest	-9.22	≤8.00	Pass
802.11N20	Lowest	-10.30	≤8.00	Pass
	Middle	-8.58	≤8.00	Pass
	Highest	-9.02	≤8.00	Pass

7.2 Test plots

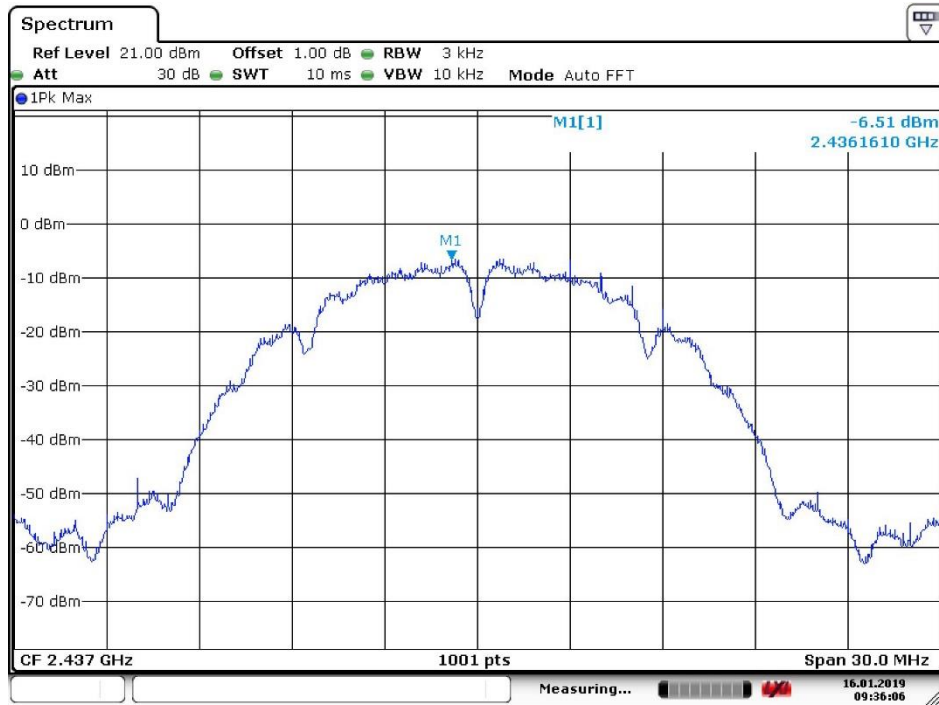
ANT1

802.11B_Lowest Channel



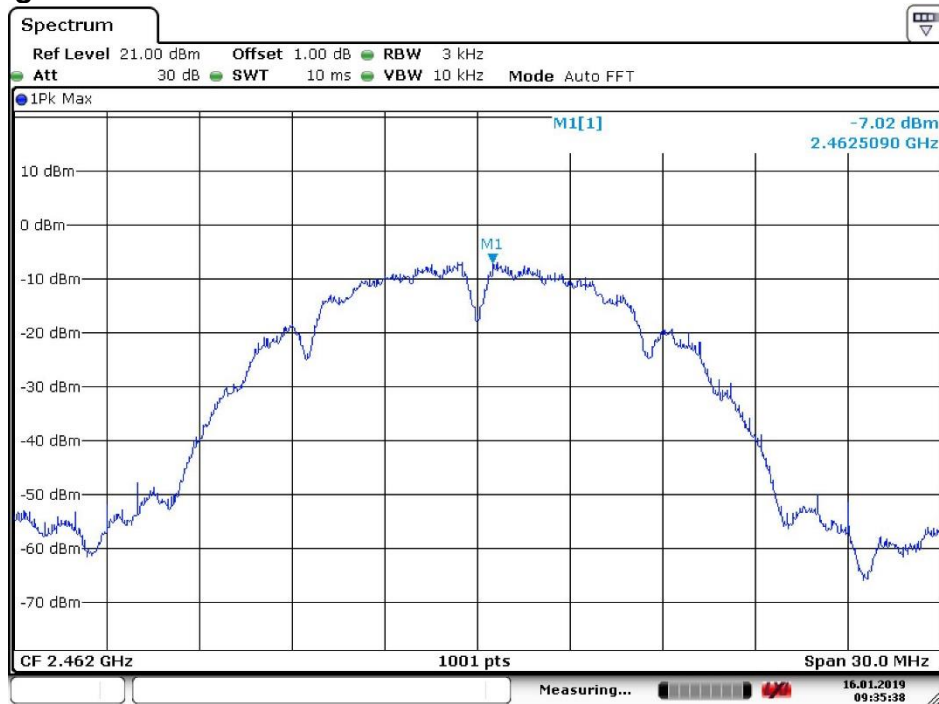
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802.11B_ Middle Channel



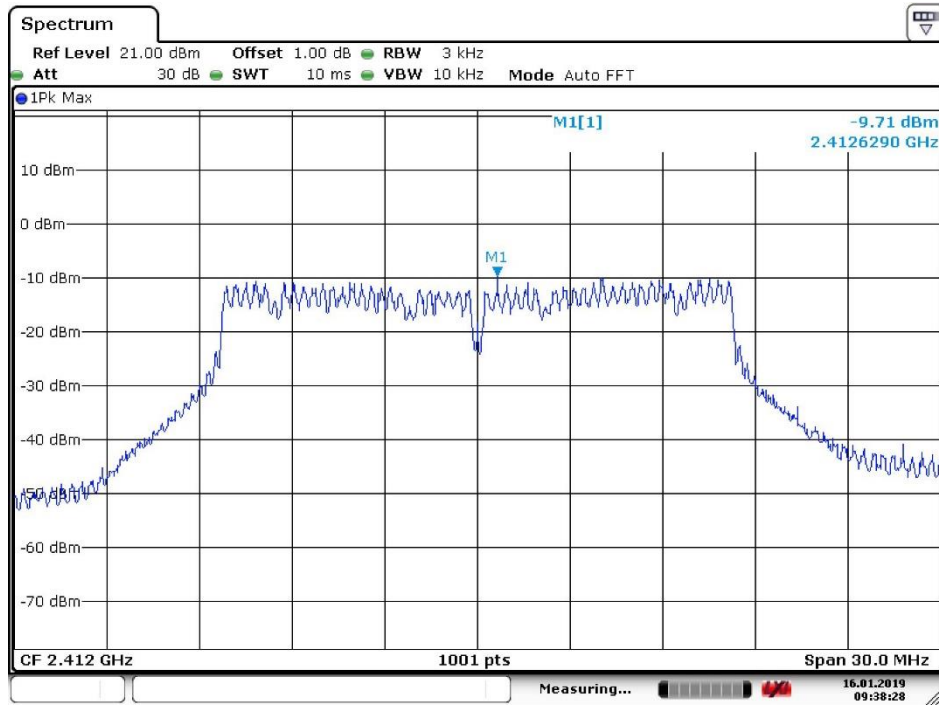
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802.11B_ Highest Channel



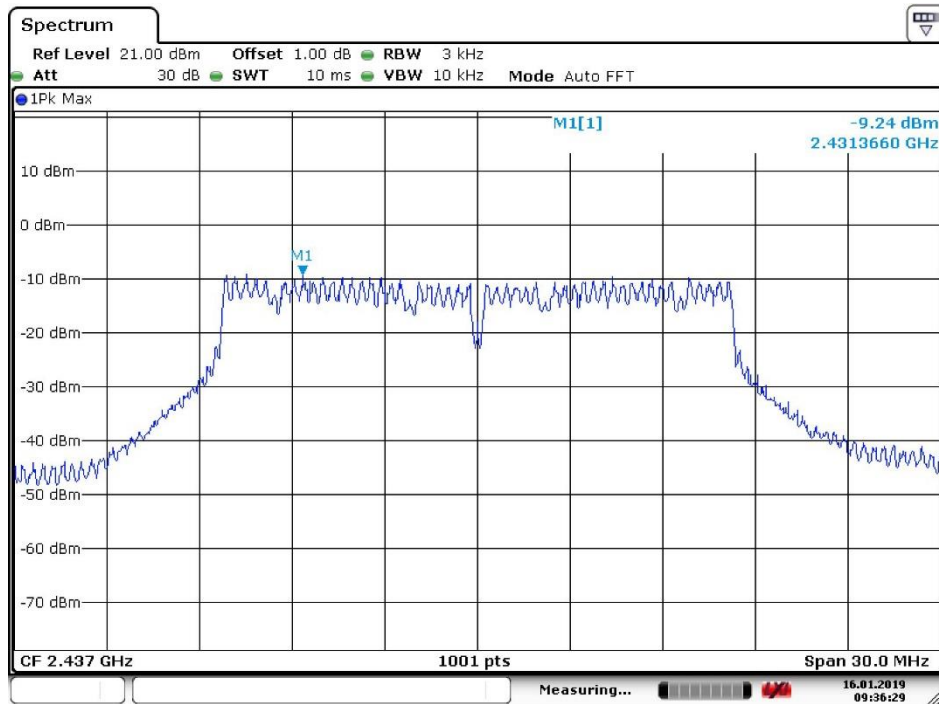
Date: 16.JAN.2019 09:35:38

802.11G_Lowest Channel



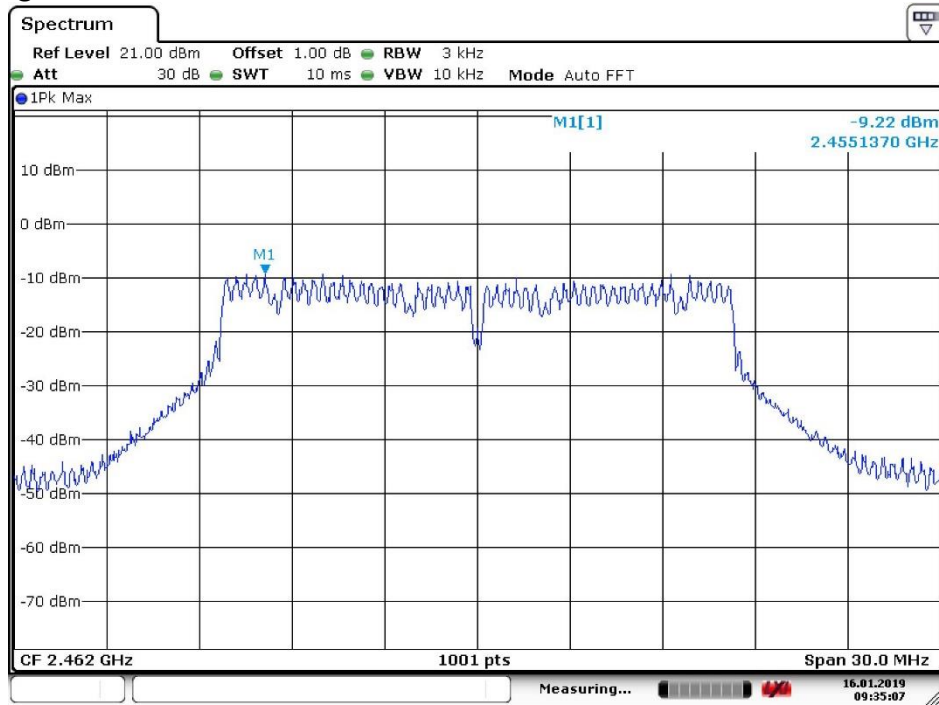
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802.11G_Middle Channel



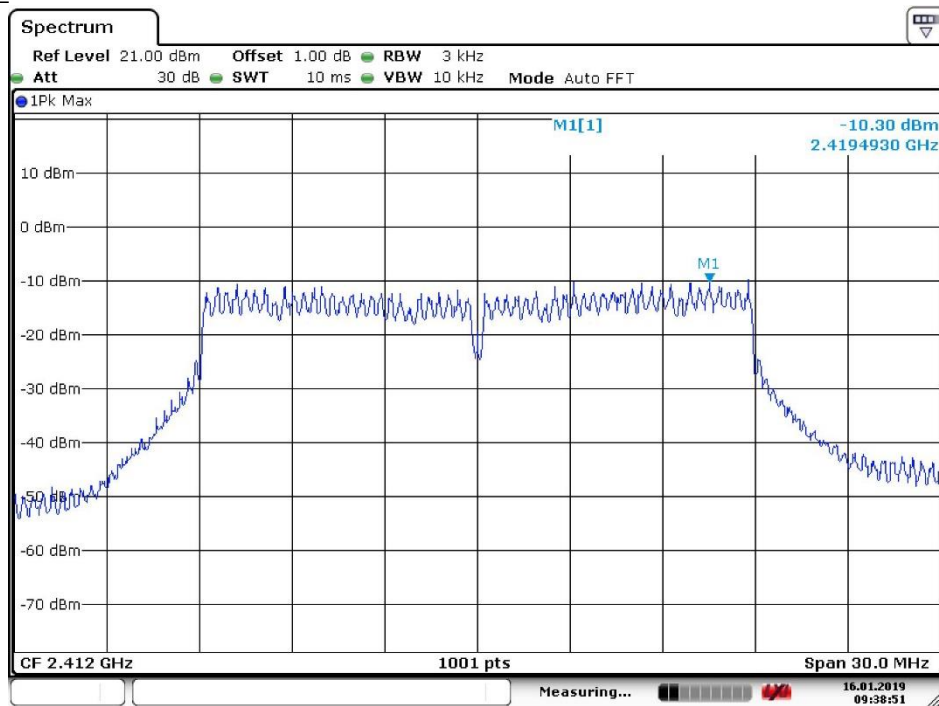
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802.11G_Highest Channel



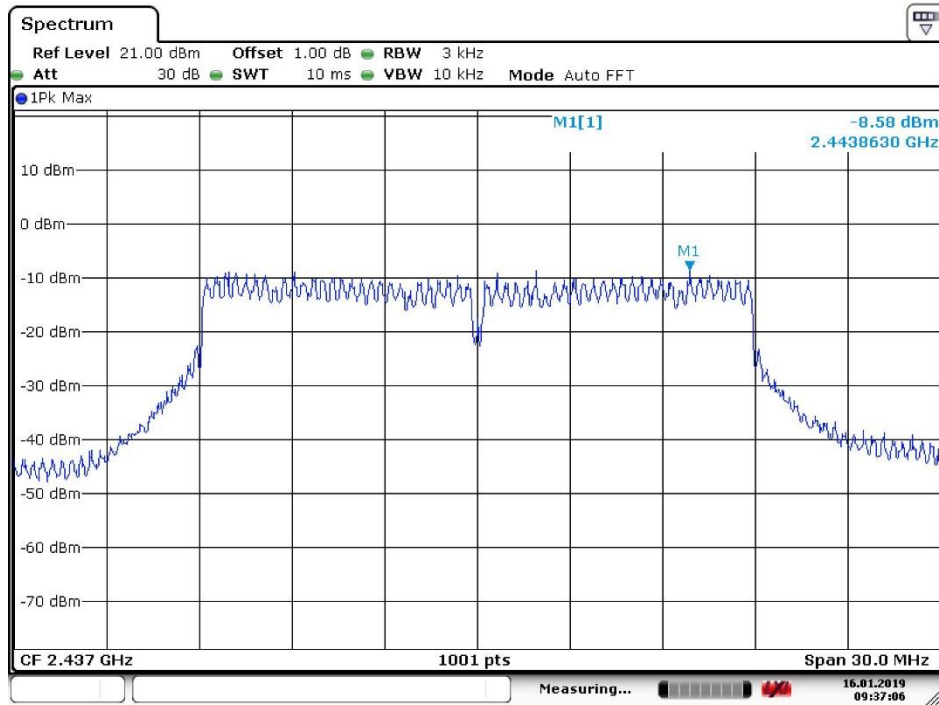
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802.11N20_Lowest Channel



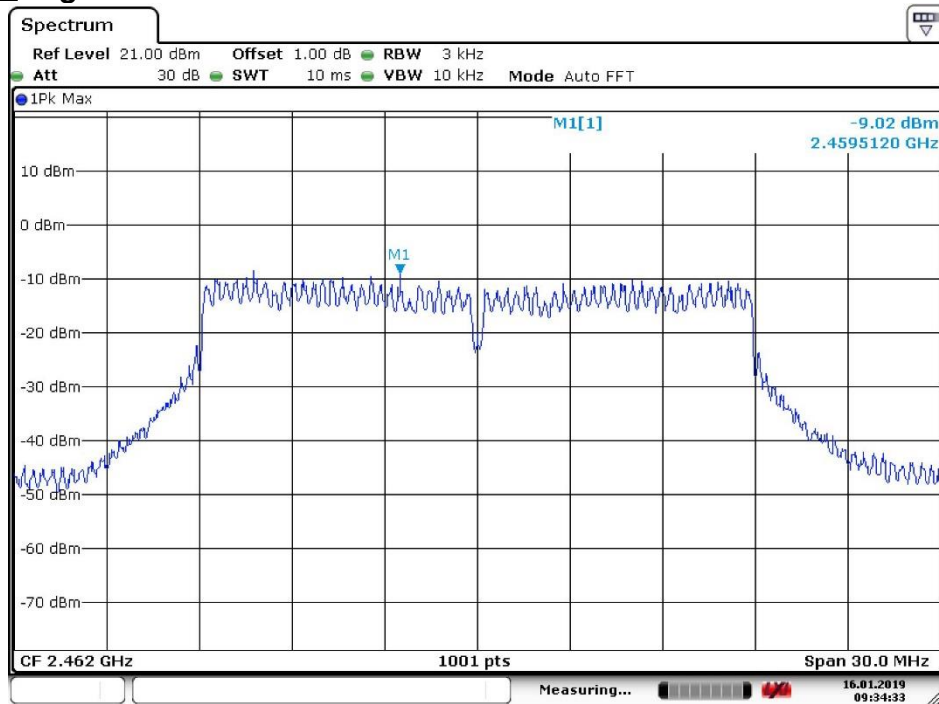
Date: 16.JAN.2019 09:38:52

802.11 N20_ Middle Channel



Date: 16.JAN.2019 09:37:06

802.11 N20_ Highest Channel



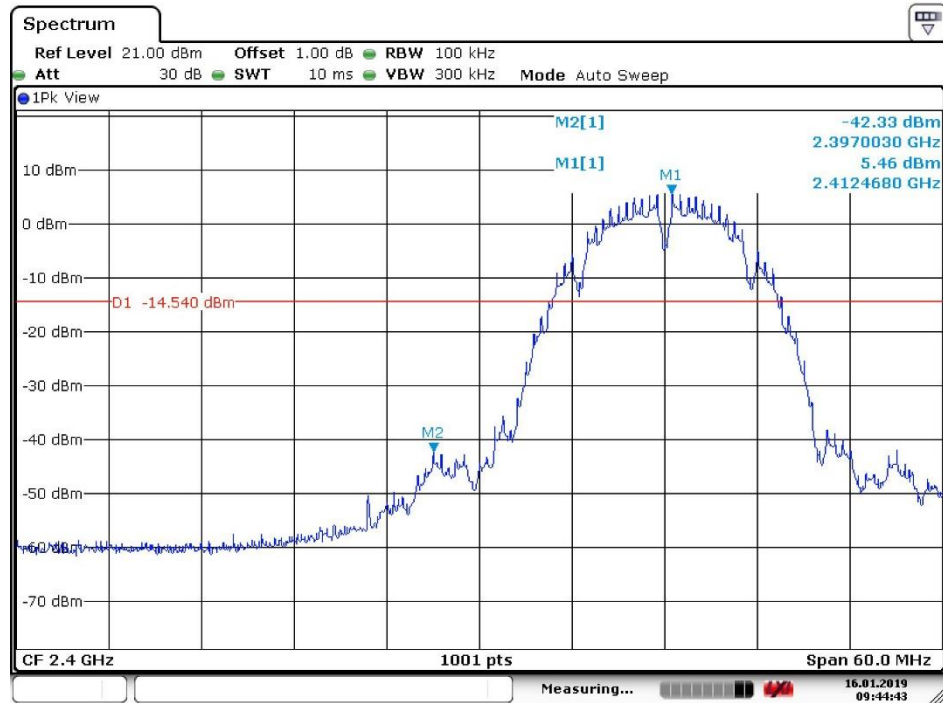
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8 Band-edge for RF Conducted Emissions

8.1 Test plots

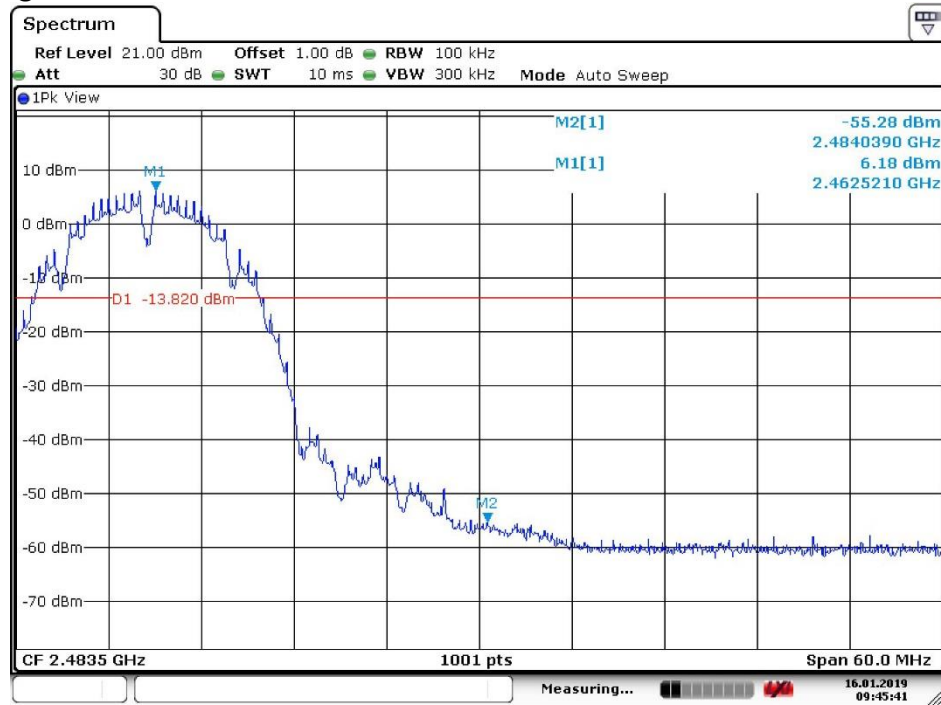
ANT1

802.11B_Lowest Channel



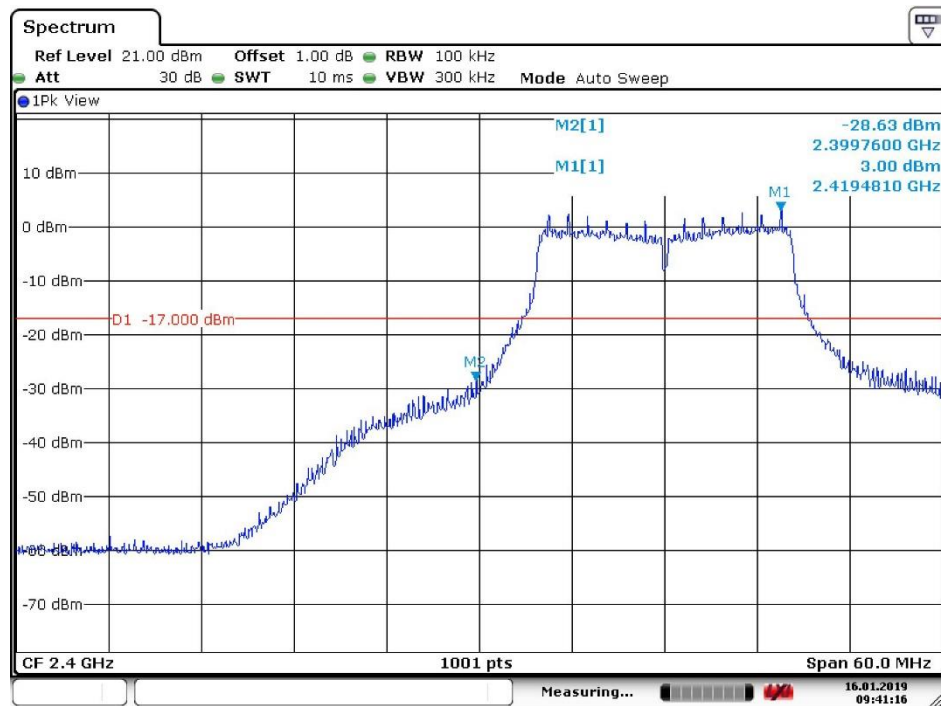
Date: 16 JAN.2019 09:44:44

802.11B_Highest Channel



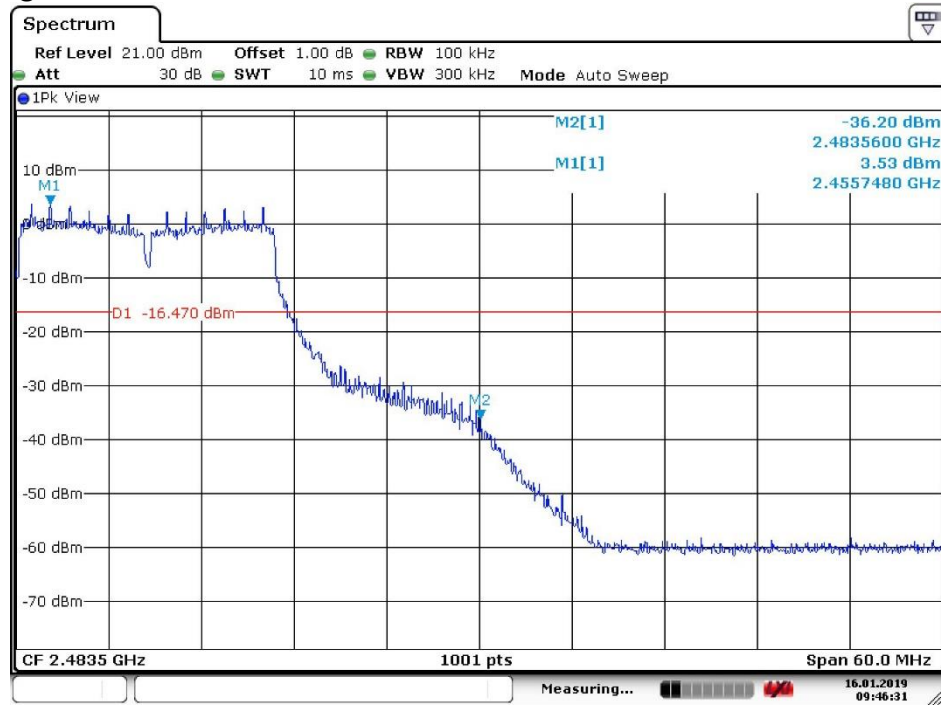
Date: 16.JAN.2019 09:45:41

802.11G_Lowest Channel

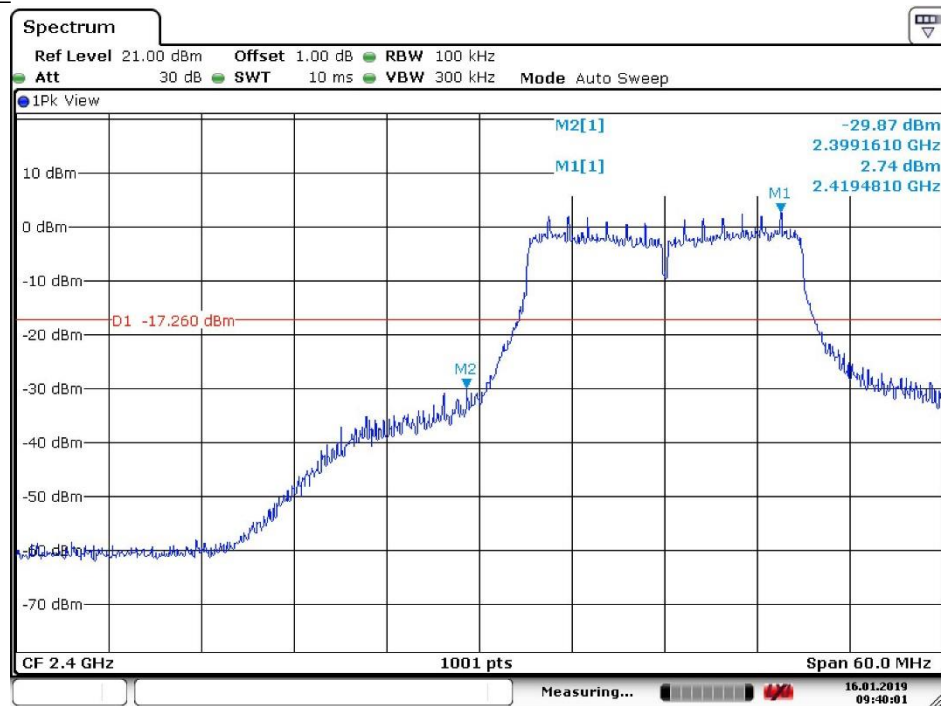


Date: 16.JAN.2019 09:41:17

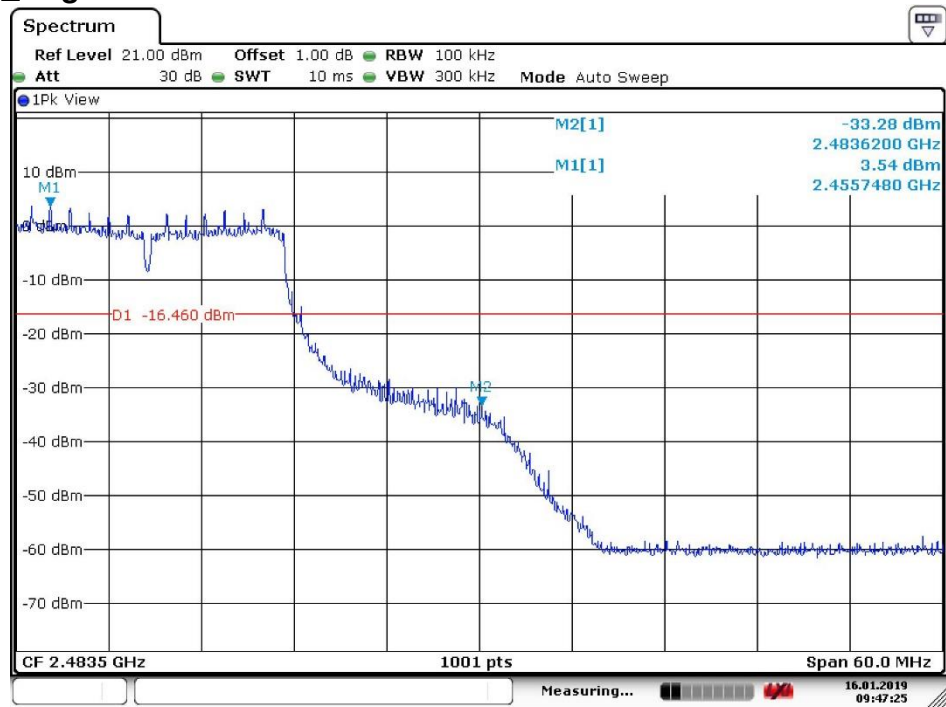
802.11G_Highest Channel



802.11N20_Lowest Channel



802.11 N20_Highest Channel



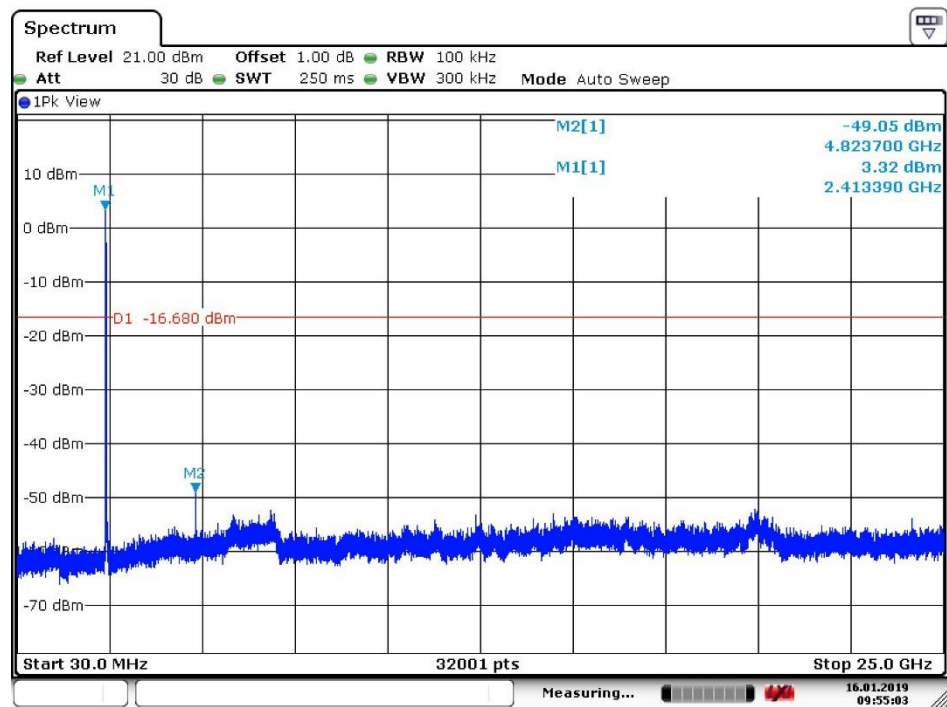
Date: 16.JAN.2019 09:47:26

9 RF Conducted Spurious Emissions

9.1 Test plots

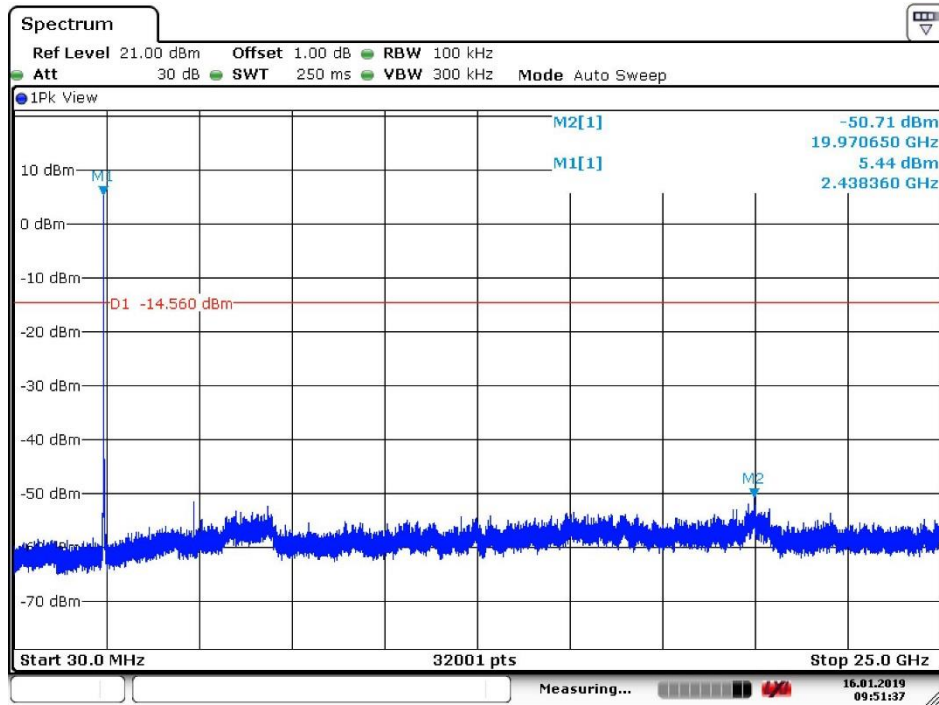
ANT1

802.11B_Lowest Channel



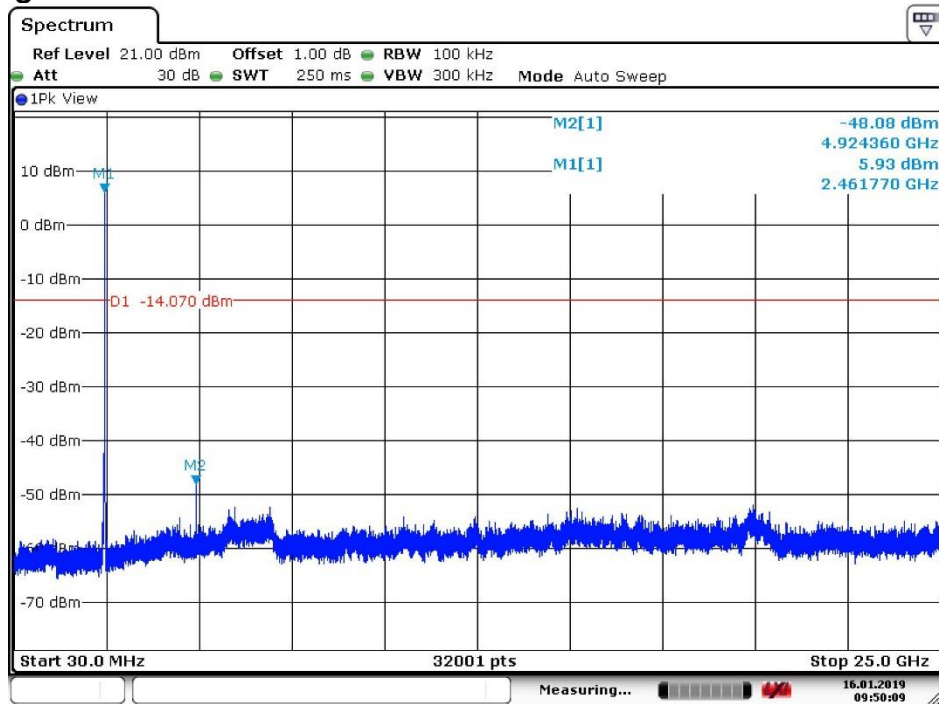
Date: 16.JAN.2019 09:55:03

802.11B_ Middle Channel



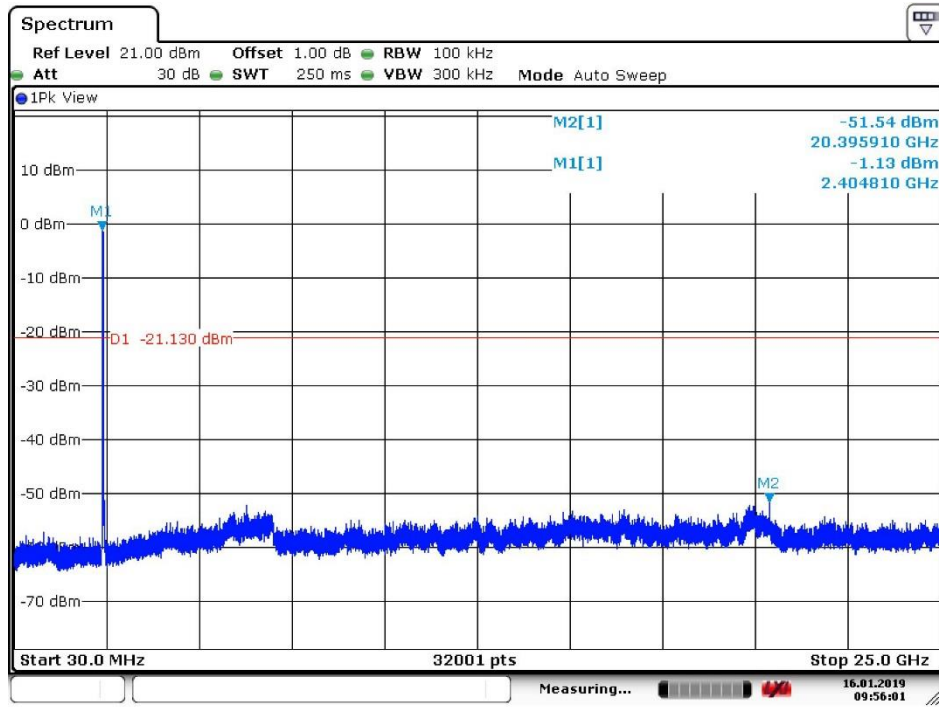
Date: 16.JAN.2019 09:51:37

802.11B_ Highest Channel



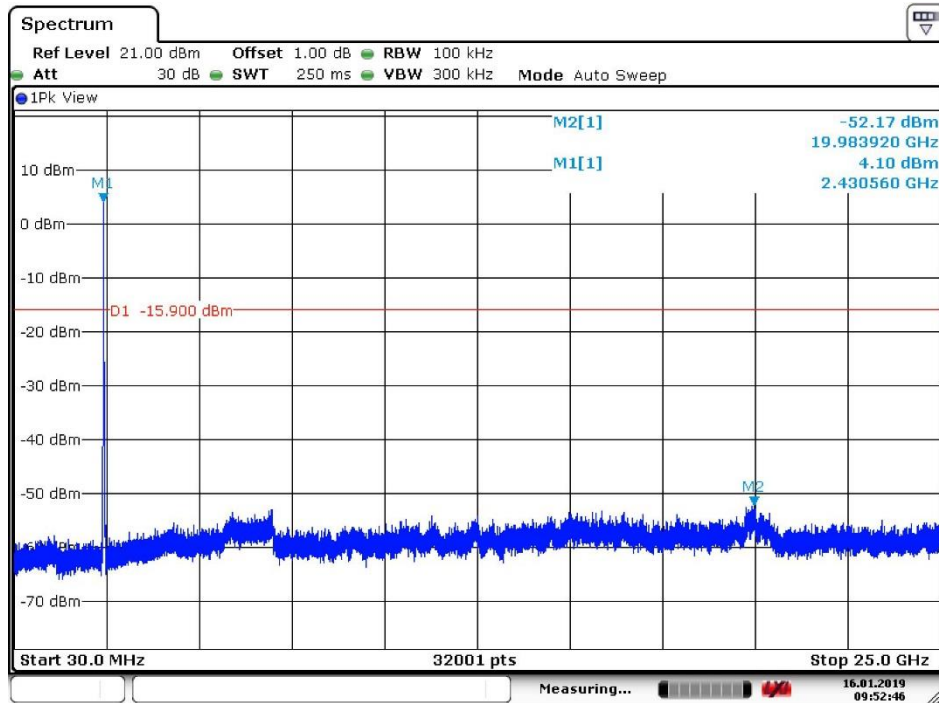
Date: 16.JAN.2019 09:50:09

802.11G_Lowest Channel



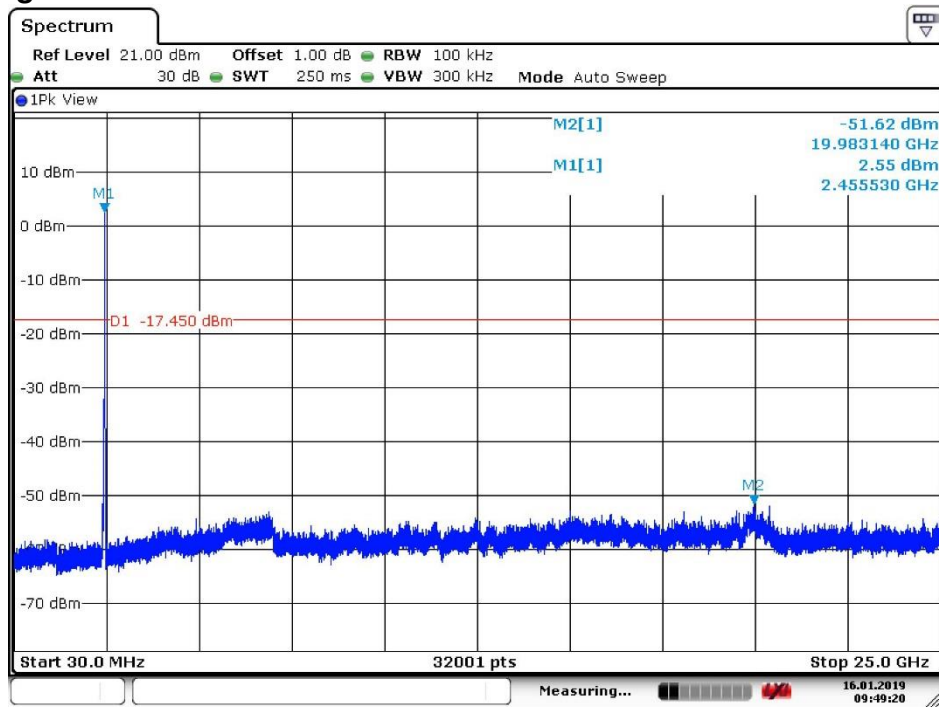
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802.11G_Middle Channel



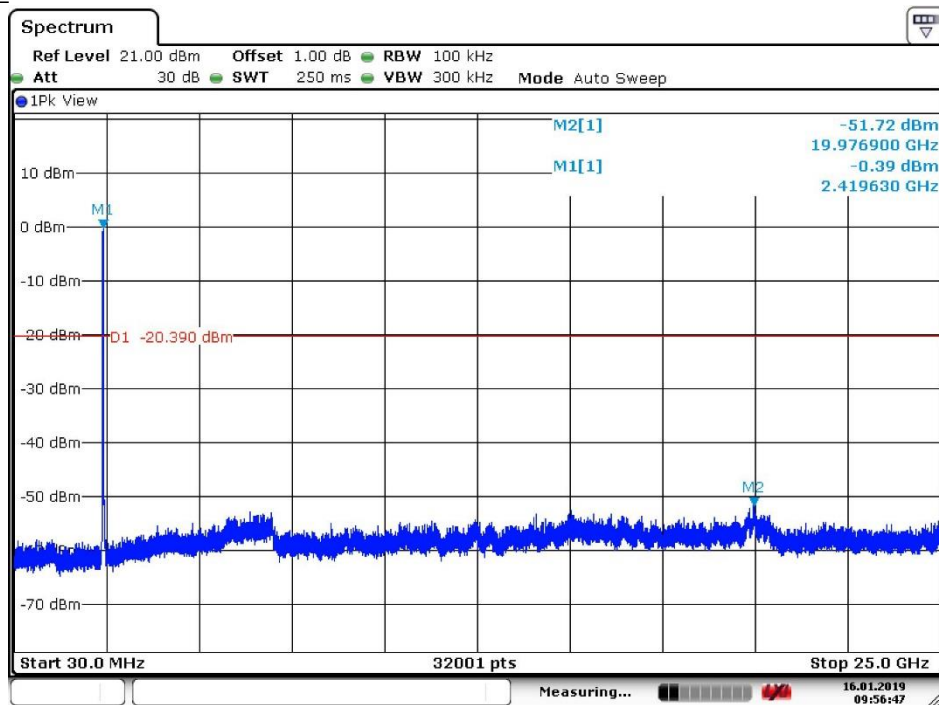
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802.11G_Highest Channel



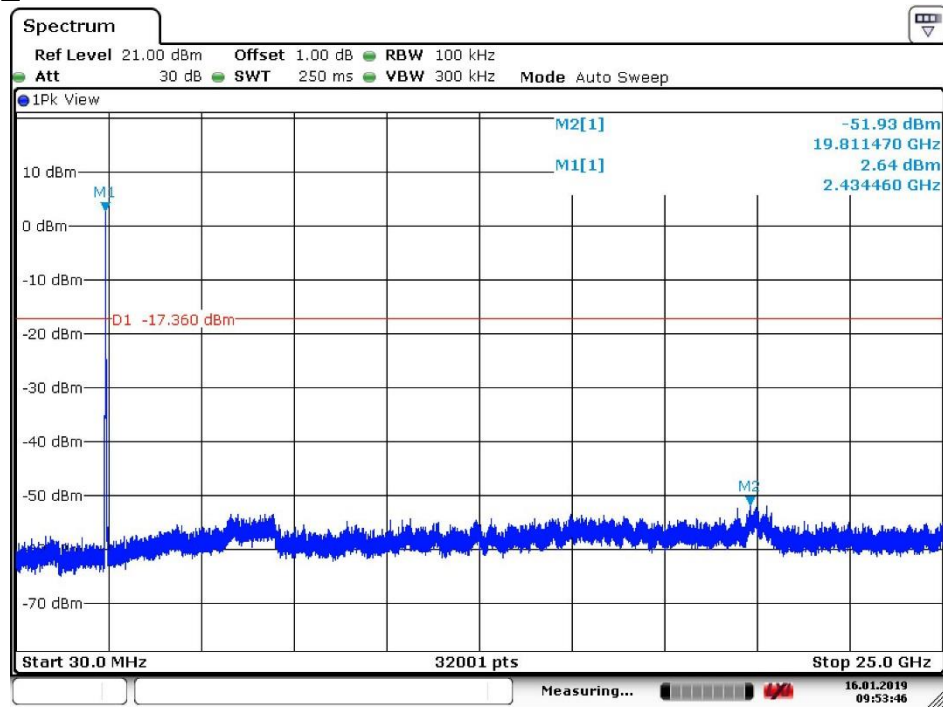
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802.11N20_Lowest Channel



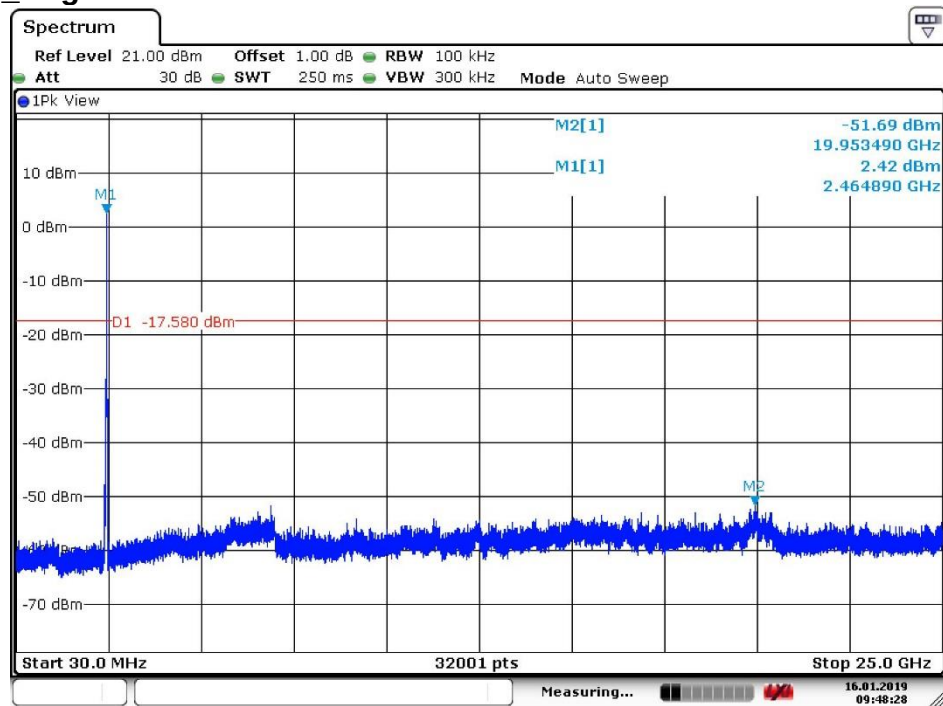
Date: 16.JAN.2019 09:56:48

802.11 N20_Middle Channel



Date: 16.JAN.2019 09:53:46

802.11 N20_Highest Channel



Date: 16.JAN.2019 09:48:28

Remark:

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.