

Prüfbericht-Nr.: <i>Test report no.:</i>	50349168 001	Auftrags-Nr.: <i>Order no.:</i>	238106182	Seite 1 von 78 Page 1 of 78
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	10-Jun-2019	
Auftraggeber: <i>Client:</i>	AMPAK Technology Inc. 3F, No. 1, Jen AI Road, Hsinchu Industrial Park, Hsinchu 30352			
Prüfgegenstand: <i>Test item:</i>	Wi-Fi and Bluetooth module			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	AP6398XU			
Auftrags-Inhalt: <i>Order content:</i>	FCC Part 15C Test report (Wifi 2.4G)			
Prüfgrundlage: <i>Test specification:</i>	FCC 47CFR Part 15: Subpart C Section 15.247(DTS)			
Wareneingangsdatum: <i>Date of sample receipt:</i>	17-Oct-2019			
Prüfmuster-Nr.: <i>Test sample no.:</i>	A001008650-001			
Prüfzeitraum: <i>Testing period:</i>	17-Mar-2020- 22-May-2020			
Ort der Prüfung: <i>Place of testing:</i>	EMC/RF Laboratory Taipei			
Prüflaboratorium: <i>Testing laboratory:</i>	Taipei Testing laboratories			
Prüfergebnis*: <i>Test result*:</i>	Pass			
rüft von: <i>reviewed by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: 23-Jun-2020 <i>Date:</i>	Mars Y.J. Lin	Datum: 23-Jun-2020 <i>Date:</i>	Ryan W.T. Chen	
Stellung / Position:	Project Engineer	Stellung / Position:	Project Manager	
Sonstiges / Other:				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend N/A = nicht anwendbar	4 = ausreichend N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory N/A = not applicable	4 = sufficient N/T = not tested
<p>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i></p>				

TEST SUMMARY

5.1.1 ANTENNA REQUIREMENT*RESULT: Passed***5.1.2 PEAK OUTPUT POWER***RESULT: Passed***5.1.3 6dB BANDWIDTH AND 99% BANDWIDTH***RESULT: Passed***5.1.4 POWER DENSITY***RESULT: Passed***5.1.5 CONDUCTED SPURIOUS EMISSIONS AND FREQUENCY BAND EDGE MEASURED IN 100kHz BANDWIDTH***RESULT: Passed***5.1.6 SPURIOUS EMISSION***RESULT: Passed***5.2.1 MAINS CONDUCTED EMISSIONS***RESULT: Passed***6.1.1 ELECTROMAGNETIC FIELDS***RESULT: Passed*

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1. General Remarks

1.1 Complementary Materials

The following attachments are integral parts of this test report:

Appendix P: Photo Documentation internal view

(File Name: 50349168 001, 50349169 011, 50349170 001, 50349171 011 Appendix P)

Appendix D: Test Result of Radiated Emissions

(File Name: 50349168 001 Appendix D)

Test Specifications

Table 1: Applied Standard and Test Levels

Radio
FCC CFR47 Part 15: Subpart C Section 15.247 FCC 47CFR Part 2: Subpart J Section 2.1091 ANSI C63.10:2013 KDB662911 D01 Multiple Transmitter Output v02r01 KDB662911 D02 MIMO with Cross Polarized Antenna v01 KDB447498 D01 General RF Exposure Guidance v06 KDB558074 D01 DTS Meas Guidance v05

1.2 Decision Rule of conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing laboratories

No. 458-18, Sec 2, Fenliao., Linkou Dist.
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
IC Canada Registration No.: 25563

TAF Accredited NCC Test Lab. No.:3567

TAF ISO17025 Certification effective period: 6th-May-2019 to 05th-May-2022



Testing Laboratory
3567

2.3 List of Test and Measurement Instruments

Table 2: List of Test and Measurement Equipment

Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test Receiver	R&S	ESR7	102109	2020/3/30	2021/3/29
Spectrum Analyzer	R&S	FSV40	101508	2020/3/16	2021/3/15
Pre-Amplifier	Agilent	8447D	2727A05146	2020/2/17	2021/2/16
Pre-Amplifier	EMCI	EMC051845SE	980635	2020/2/11	2021/2/10
Pre-Amplifier	EMCI	EMC184045SE	980656	2020/2/11	2021/2/10
Bilog Antenna	SCHWARZBECK	VULB-9168	00950	2020/1/20	2021/1/19
Horn Antenna	ETS-Lindgren	3117	00218929	2019/11/27	2020/11/26
Horn Antenna	SCHWARZBECK	BBHA 9170	00896	2020/1/17	2021/1/16
Loop Antenna	EMCI	LPA600	287	2019/12/20	2020/12/19
Test Software	Audix	e3	Ver. 9	N/A	N/A
Test Cable	HUBER+SUHNER	SUCOFLEX 104EA	800057/4EA	2020/3/25	2021/3/24
Test Cable	HUBER+SUHNER	SUCOFLEX104	802244/4	2020/3/25	2021/3/24
Test Cable	HUBER+SUHNER	SUCOFLEX104	MY37203/4	2020/3/25	2021/3/24
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	800897/2EA	2020/3/25	2021/3/24
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	800902/2EA	2020/3/25	2021/3/24
Test Cable	HUBER+SUHNER	SUCOFLEX 102EA	801026/2EA	2020/3/25	2021/3/24
EMI Test Receiver	Rohde & Schwarz	ESCI7	100797	2020/03/13	2021/03/13
Two-Line V-Network	Rohde & Schwarz	ENV216	101262	2019/07/16	2020/07/16
Telecom ISN 4 Line	Fischer Custom Communications	FFCC-TLISN-T4-02-09	101168	2020/02/03	2021/02/03
Impedance Stabilization Network	TESEQ	ISN T800	51949	2020/02/25	2021/02/25
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	0357.8810.54-102102-HN	2019/07/25	2020/07/25

2.4 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.5 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular schedule using in house standards or comparisons.

2.6 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements .

Table 3: Emission Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 0.1 ppm
RF power/RF Exposure(MPE), conducted	± 1.5 dB
RF power density, conducted	± 3 dB
spurious emissions, conducted	± 3 dB
all emissions, radiated	± 6 dB
Temperature	± 1 °C
Humidity	± 5 %
DC and low frequency voltages	±3 %

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a Wi-Fi and Bluetooth module. It contains a 2.4GHz compatible chip enabling the user to communicate data through a Wireless interface.
 For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Table 4: Basic Information of EUT

Item	EUT information
Kind of Equipment	Wi-Fi and Bluetooth module
Type Designation	AP6398XU
FCC ID	ZQ6-AP6398XU

Table 5: Technical Specification of EUT

Technical Specification	Value
Operating Frequencies	802.11b/g/n20 : 2412MHz ~ 2462MHz 802.11n40 : 2422MHz ~ 2452MHz
Channel Spacing	5 MHz
Channel number	11 for 20MHz 7 for 40MHz
Operation Voltage	3.3Vdc
Modulation	802.11b : DSSS(BPSK, QPSK, CCK) 802.11g/n : OFDM(BPSK, QPSK, 16QAM, 64QAM)
Antenna gain	Antenna 1: 3.69 dBi Antenna 2: 2.57 dBi
Beamforming Mode	No support
Product Type	802.11b: WLAN (1TX, 1RX), only 1TX diversity. 802.11g: WLAN (2TX, 2RX) 802.11n: WLAN (2TX, 2RX)

3.3 Independent Operation Modes

Basic operation modes are:

- A. Transmitting
- B. Receiving

3.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.5 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The test modes were adapted accordingly in reference to the instructions for use.

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Table 6: Table for Parameters of Test Software Setting

Mode/ Data Rate	Channel Frequency		
	2412 MHz	2437 MHz	2462 MHz
802.11b 1M	74	73	73
802.11g 6M	65	66	66
802.11n HT20	62	66	62
Mode/ Data Rate	2422 MHz	2437 MHz	2452 MHz
802.11n HT40	60	67	62

** After 802.11b was evaluated, antenna 1 was the worst, so the test data for 802.11b only antenna 1 was show.

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with USB interface which makes it possible to control them through a test software installed on a computer.

This software putty.exe was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed in section 3.3 as appropriate.

The samples were used as follows:
A001008650-001

Full test was applied on all test modes, but only worst case was shown

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessories of EUT:

N/A

Support Unit:

Item No.	Kind of Equipment	Model Name	Serial Number	Brand Name
1	PC	N/A	N/A	DELL
2	Monitor	P2214Hb	CN-020C1Y-74261-5BL-0RL	Lenovo
3	USB Keyboard	KU-0225	762697	Lenovo
4	USB Mouse	SM-8823	8SS050L24506MT0047T3 812	N/A

Item No.	Kind of Equipment	Spec
A	Signal Cable	0.45m
B	Mini USB Cable	1.8m
C	USB Mouse Cable	1.8m
D	USB Keyboard Cable	1.8m
E	D-Sub Cable	1.8m

4.4 Countermeasures to achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Constructional Data Form or the Technical Construction File. No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test

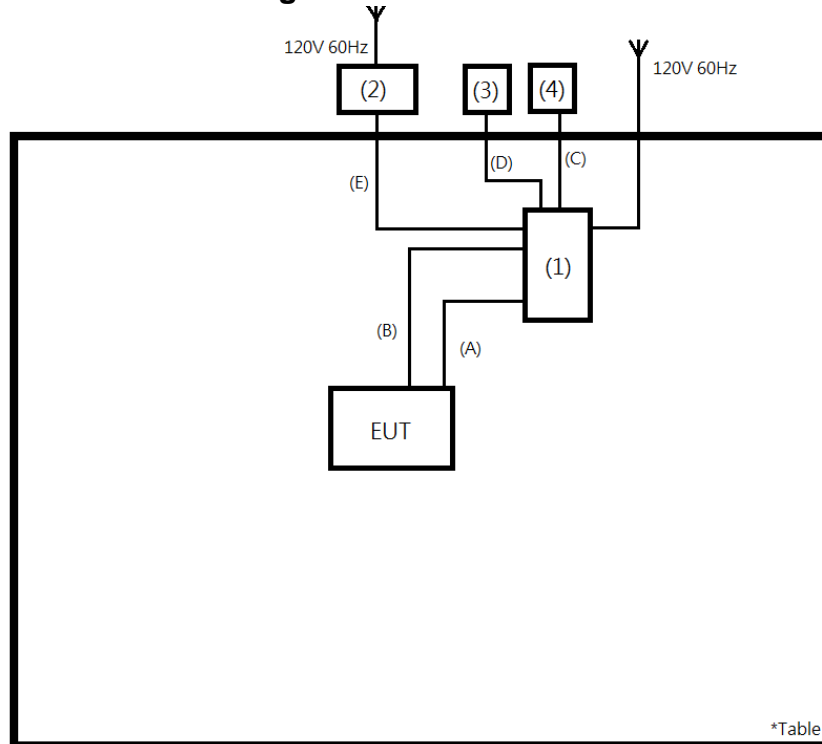


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement (if applicable)

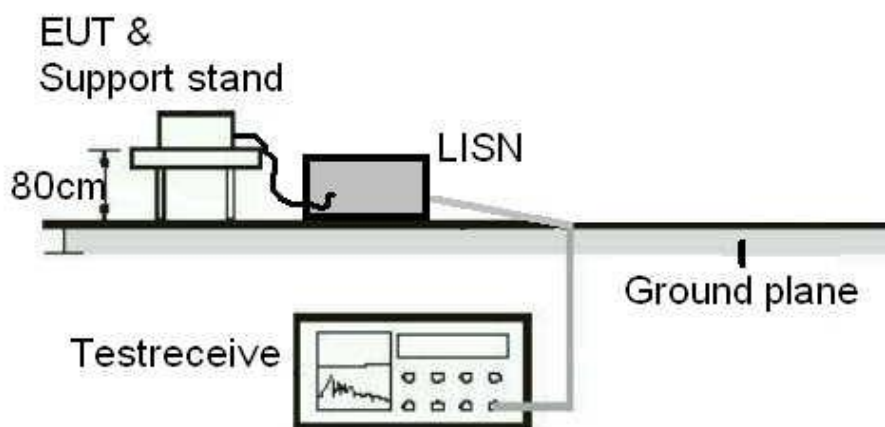
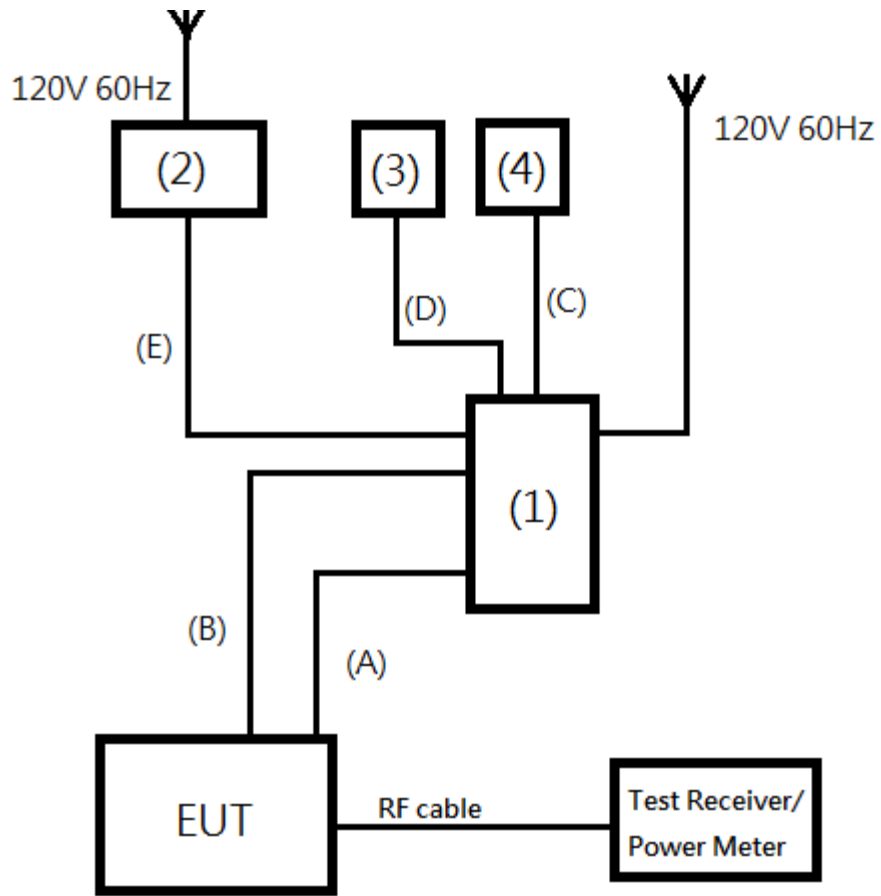


Diagram of Measurement Equipment Configuration for Conducted Transmitter Measurement



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT:**Passed**

Test standard : FCC Part 15.247(b)(4), Part 15.203

there are 2 antennas with different gain: 3.69 dBi for Antenna 1 and 2.57 dBi for Antenna 2. The directional gain is 3.69 dBi for conducted power and 6.18 dBi for power density for all mode excludes power density of 802.11b. The directional gain for power density of 802.11b mode is 3.69 dBi because the two antennas can't transmit simultaneously under 802.11b mode.

Refer to EUT photo for details.

5.1.2 Peak Output Power

RESULT:
Passed

Test standard : FCC Part 15.247(b)(3)
 Basic standard : ANSI C63.10:2013, KDB558074
 Limit : 1 Watt
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A

 Ambient temperature : 20-24 °C
 Relative humidity : 50-65 %
 Atmospheric pressure : 100-103 kPa

Table 7: Test result of Output Power

Mode	Channel Frequency	Peak Output Power (dBm)		Total Peak Output Power	Total Peak Output Power	Total Average Output Power	Limit
	(MHz)	Ant1	Ant2	(dBm)	(W)	(W)	(W)
802.11b	2412	20.43	-	20.43	0.11041	0.05224	1
	2437	20.45	-	20.45	0.11092	0.05358	1
	2462	20.17	-	20.17	0.10399	0.05012	1
802.11g	2412	26.24	26.45	29.36	0.86298	0.08974	1
	2437	26.47	26.11	29.30	0.85114	0.09528	1
	2462	26.13	25.77	28.96	0.78705	0.09311	1
802.11n HT20	2412	25.89	26.32	29.12	0.81658	0.06607	1
	2437	26.43	25.86	29.16	0.82414	0.08590	1
	2462	25.33	25.41	28.38	0.68865	0.06622	1
802.11n HT40	2422	23.62	24.13	26.89	0.48865	0.05768	1
	2437	24.73	25.02	27.89	0.61518	0.08650	1
	2452	24.33	23.21	26.82	0.48084	0.06531	1

5.1.3 6dB Bandwidth and 99% Bandwidth

RESULT:**Passed**

Test standard : FCC Part 15.247(a)(2)
Basic standard : ANSI C63.10:2013, KDB558074
Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
Operation Mode : A

Ambient temperature : 20-24°C
Relative humidity : 50-65%
Atmospheric pressure : 100-103 kPa

Table 8: Test result of 6dB Bandwidth

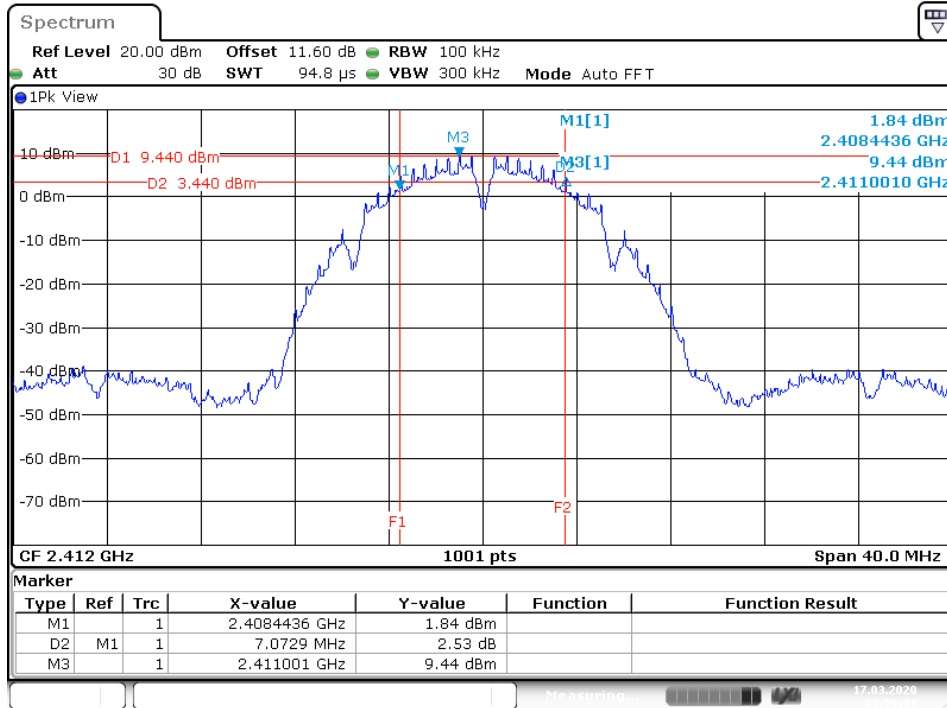
Mode	Channel Frequency	6dB Bandwidth (MHz)		Limit	Result
	(MHz)	Ant1	Ant2	(kHz)	
802.11b	2412	7.07	-	>500	Pass
	2437	7.07	-	>500	Pass
	2462	7.03	-	>500	Pass
802.11g	2412	16.30	16.30	>500	Pass
	2437	16.30	16.30	>500	Pass
	2462	16.30	16.30	>500	Pass
802.11n HT20	2412	17.58	17.54	>500	Pass
	2437	17.70	17.70	>500	Pass
	2462	17.58	17.58	>500	Pass
802.11n HT40	2422	36.36	36.44	>500	Pass
	2437	36.44	36.36	>500	Pass
	2452	36.44	36.44	>500	Pass

Table 9: Test result of 99% Bandwidth

Mode	Channel Frequency	99% Bandwidth (MHz)	
	(MHz)	Ant1	Ant2
802.11b	2412	10.27	-
	2437	10.23	-
	2462	10.23	-
802.11g	2412	16.98	16.66
	2437	16.82	16.70
	2462	16.82	16.66
802.11n HT20	2412	17.78	18.14
	2437	17.98	18.02
	2462	17.82	18.58
802.11n HT40	2422	36.92	36.68
	2437	36.76	36.76
	2452	36.84	37.32

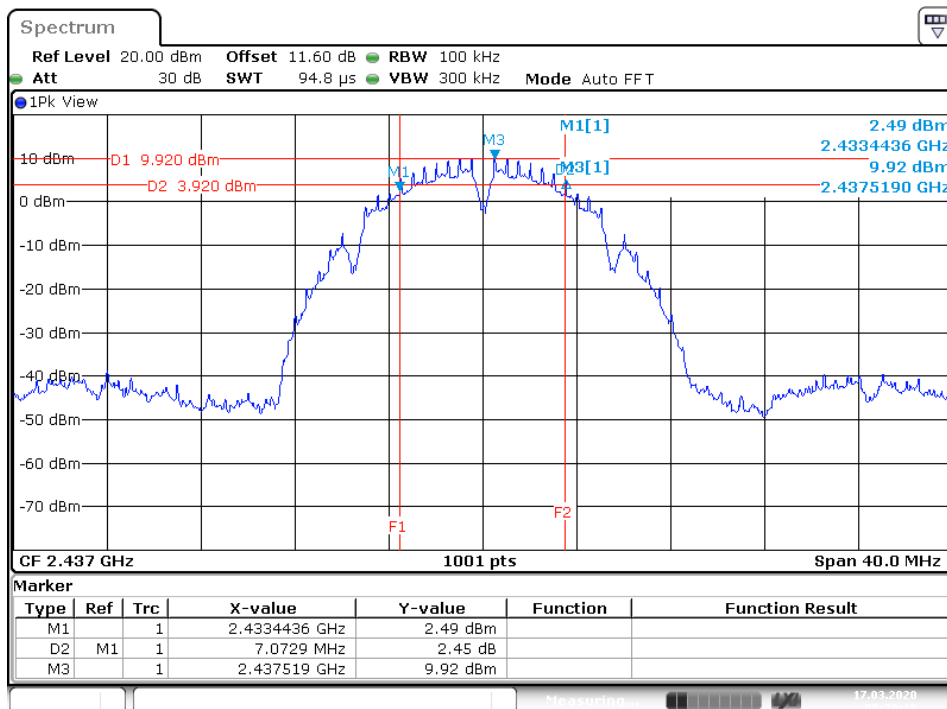
Test Plot of 6dB Bandwidth

802.11b, Ant 1 Low Channel

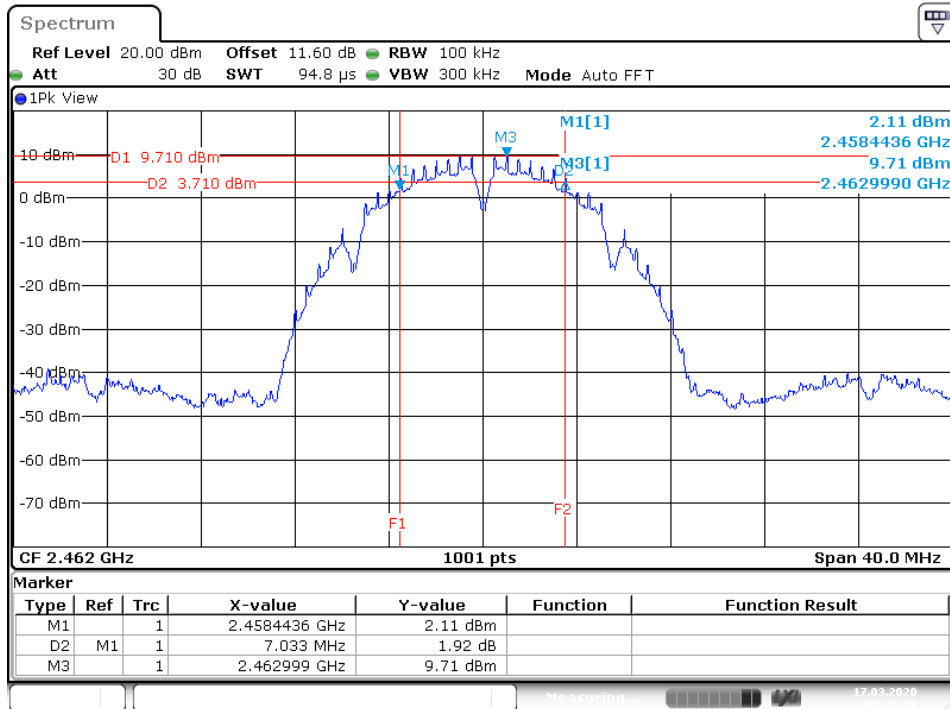
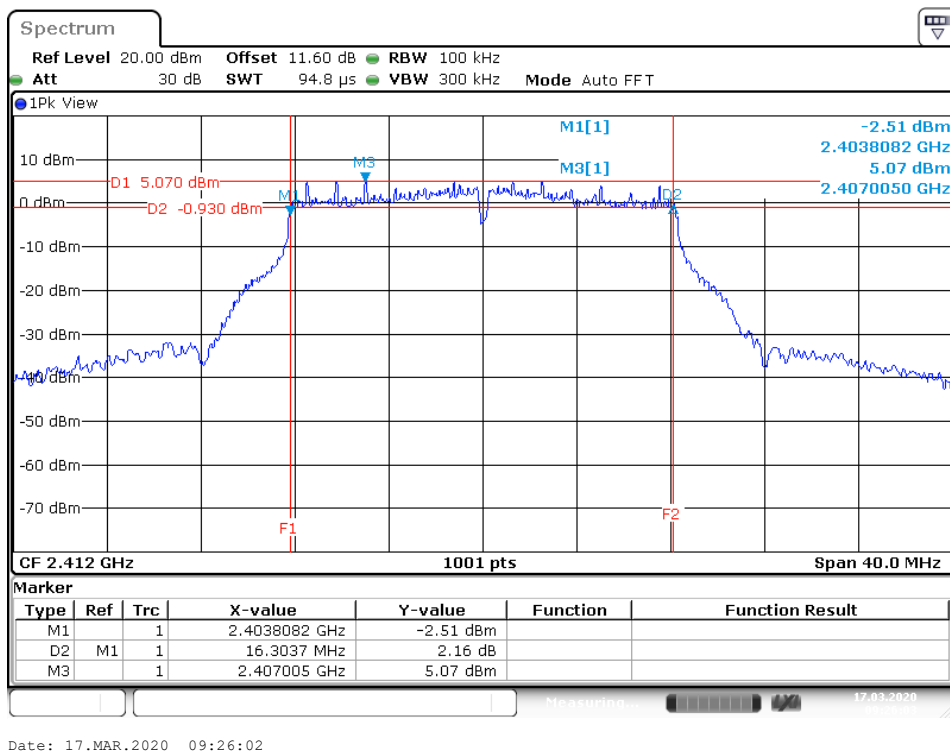


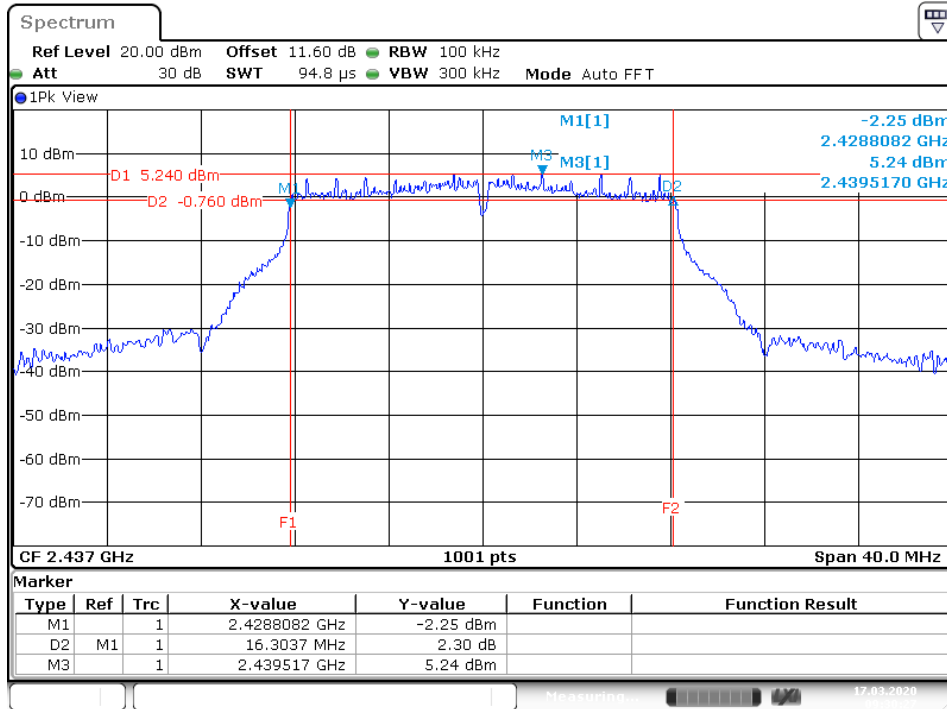
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Middle Channel

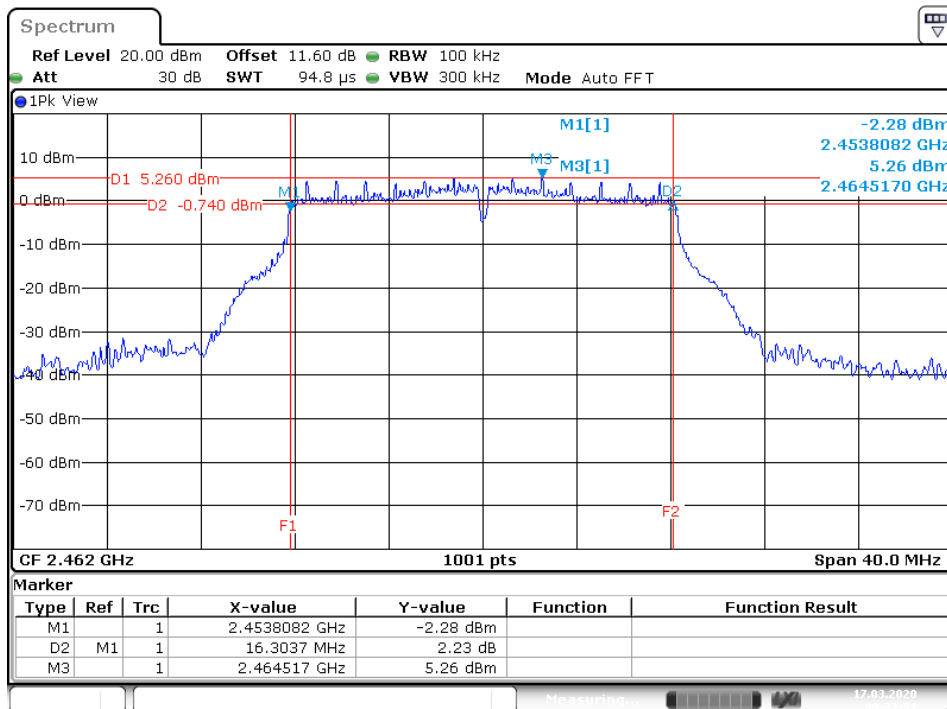


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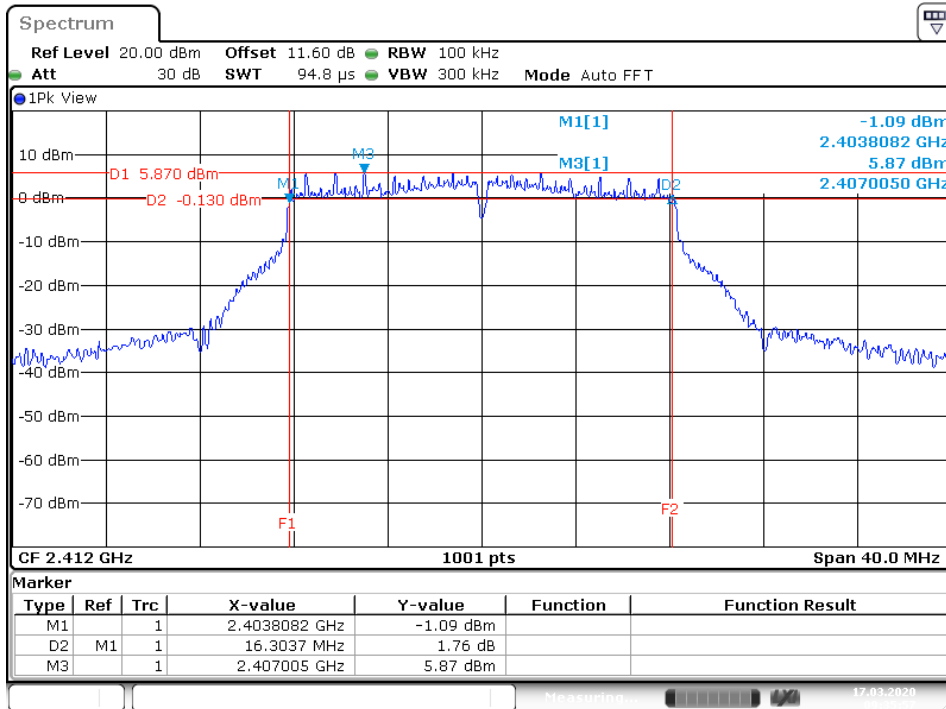
High Channel

802.11g. Ant 1
Low Channel


Middle Channel


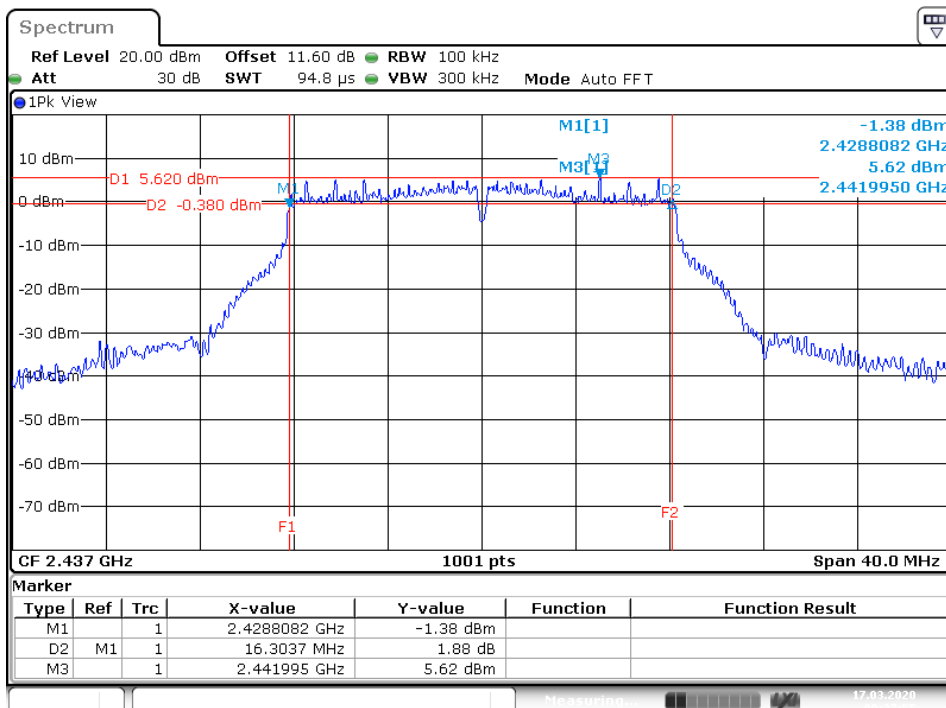
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High Channel


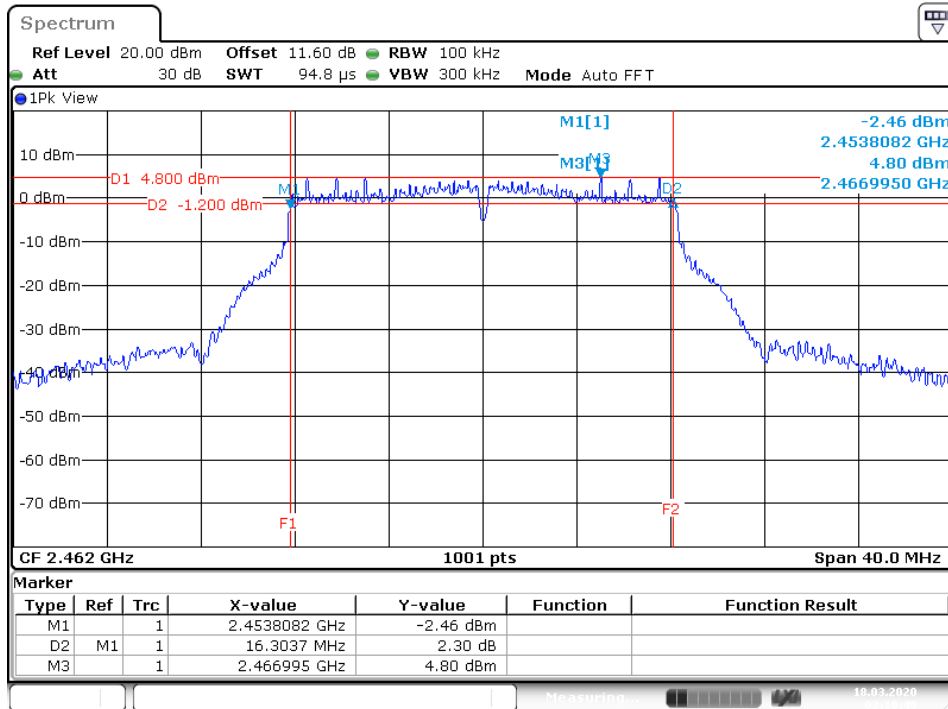
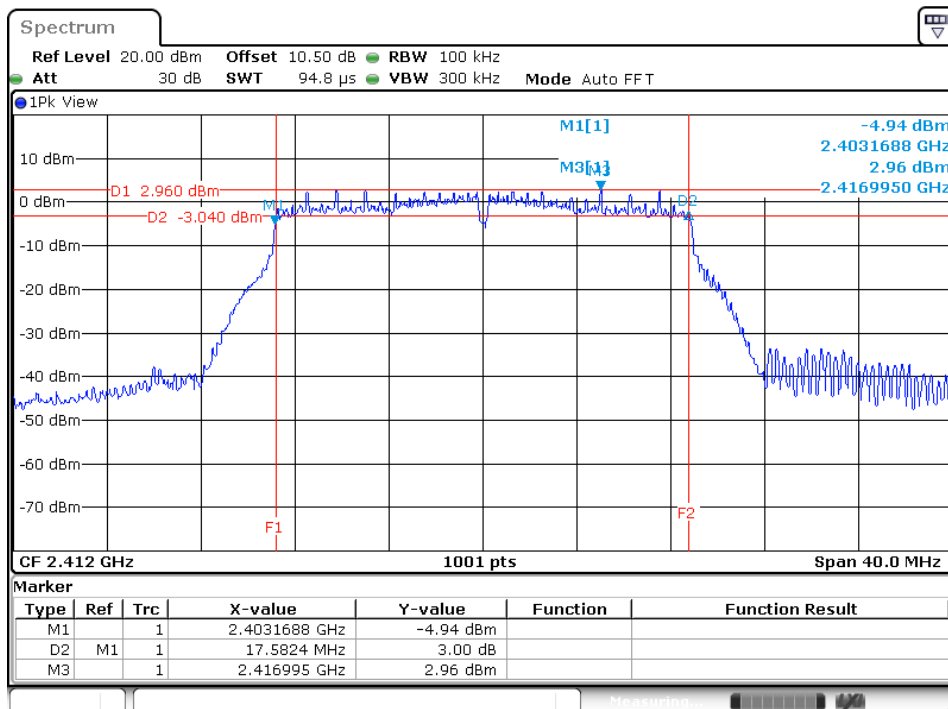
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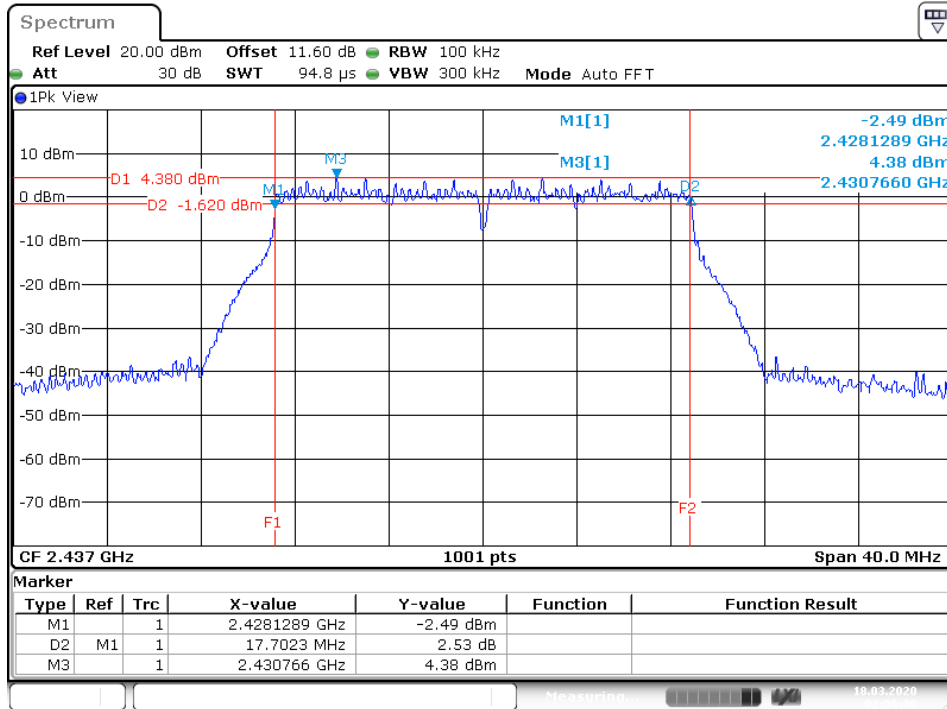
802.11g, Ant 2
Low Channel


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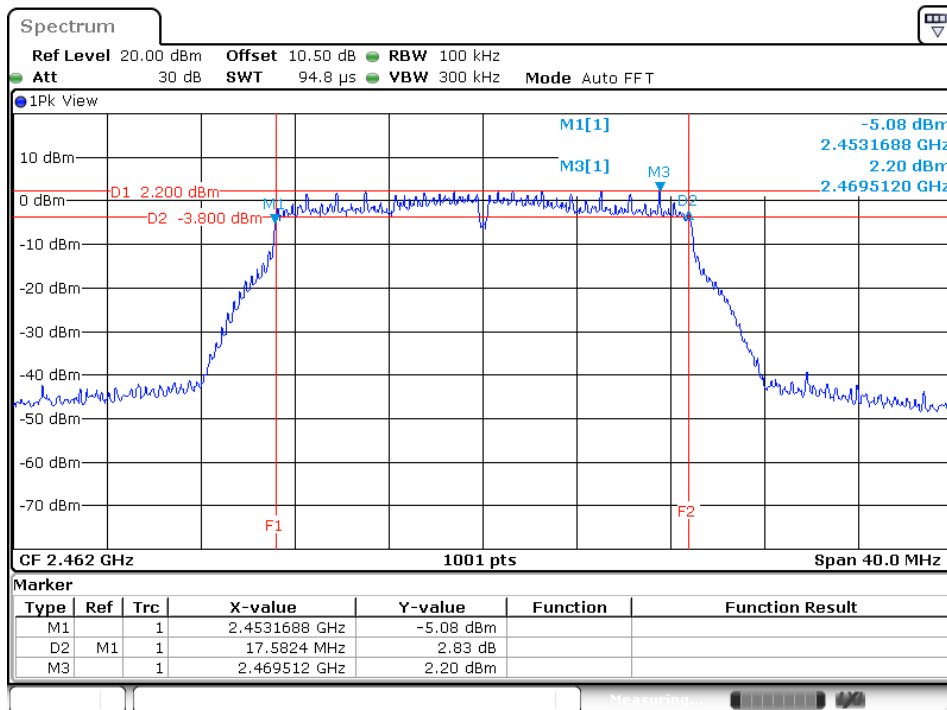
Middle Channel


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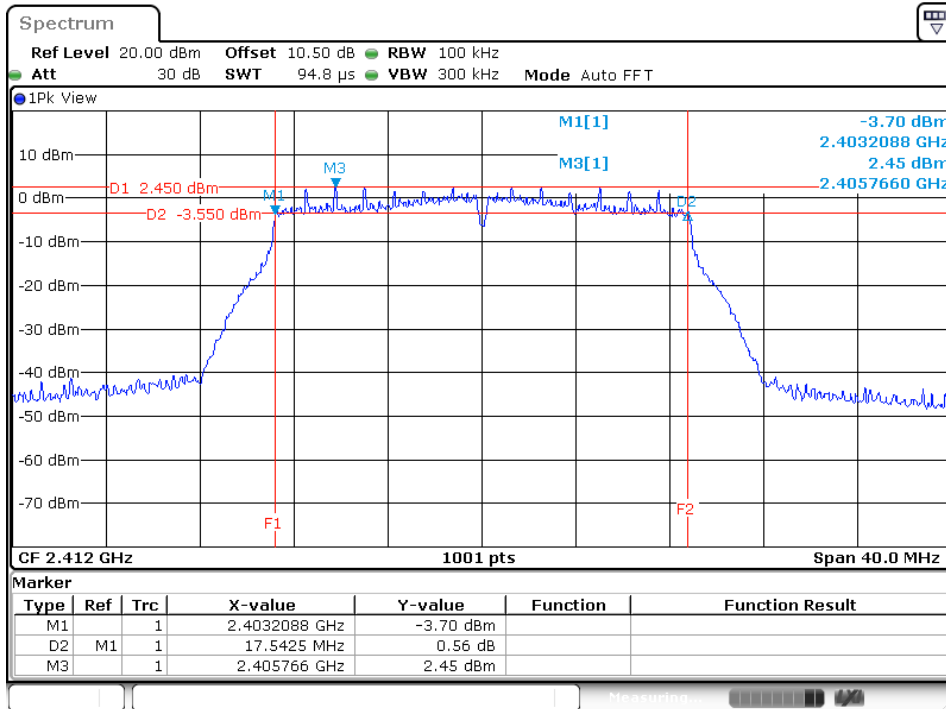
High Channel

802.11n HT20, Ant 1
Low Channel


Middle Channel


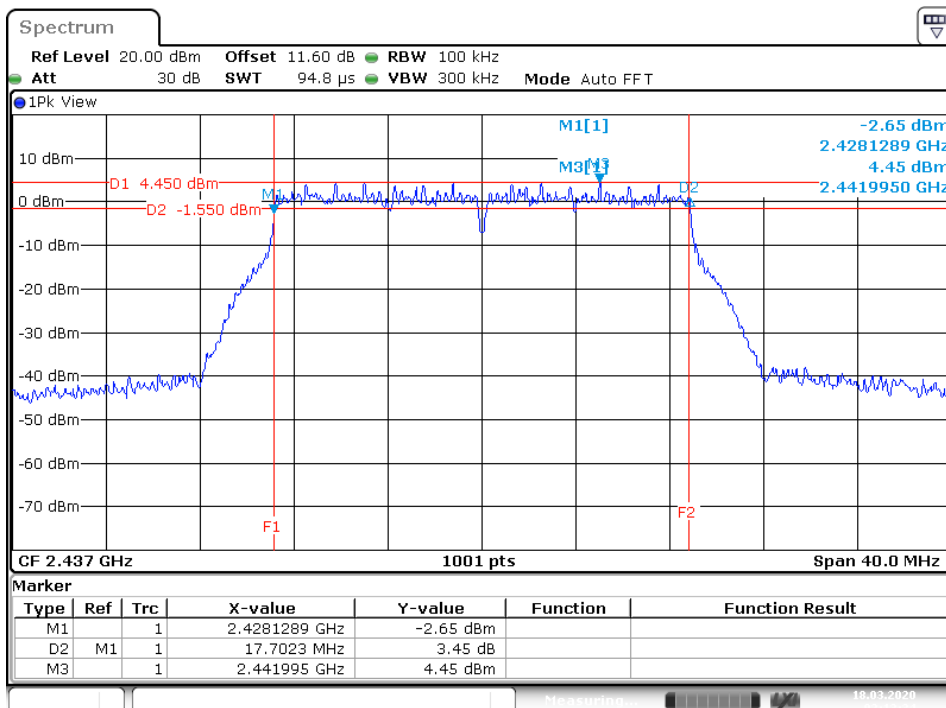
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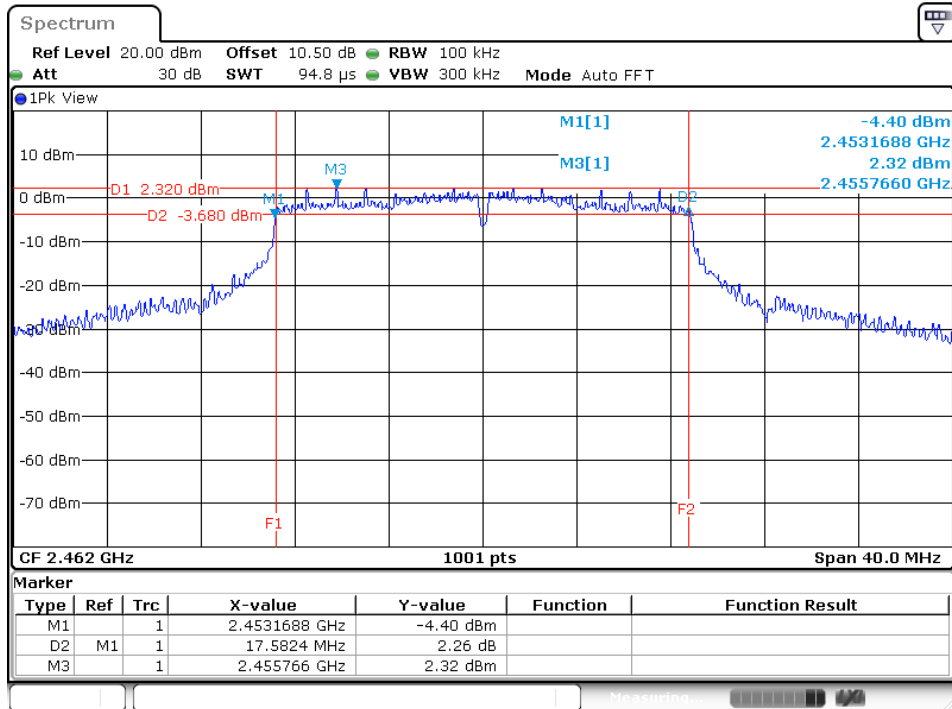
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802.11n HT20, Ant 2
Low Channel


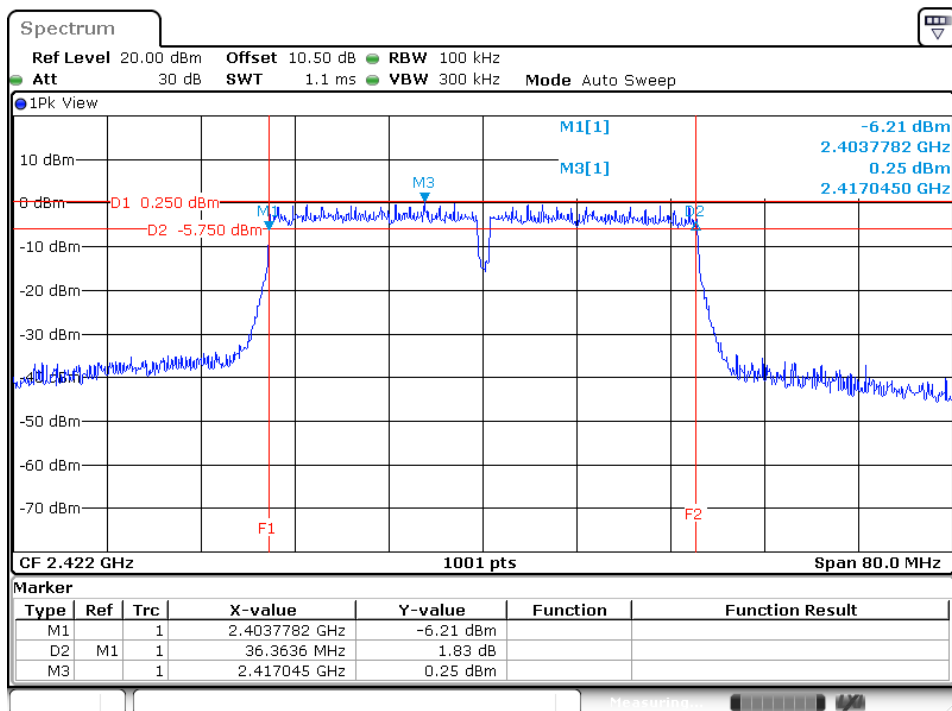
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Middle Channel


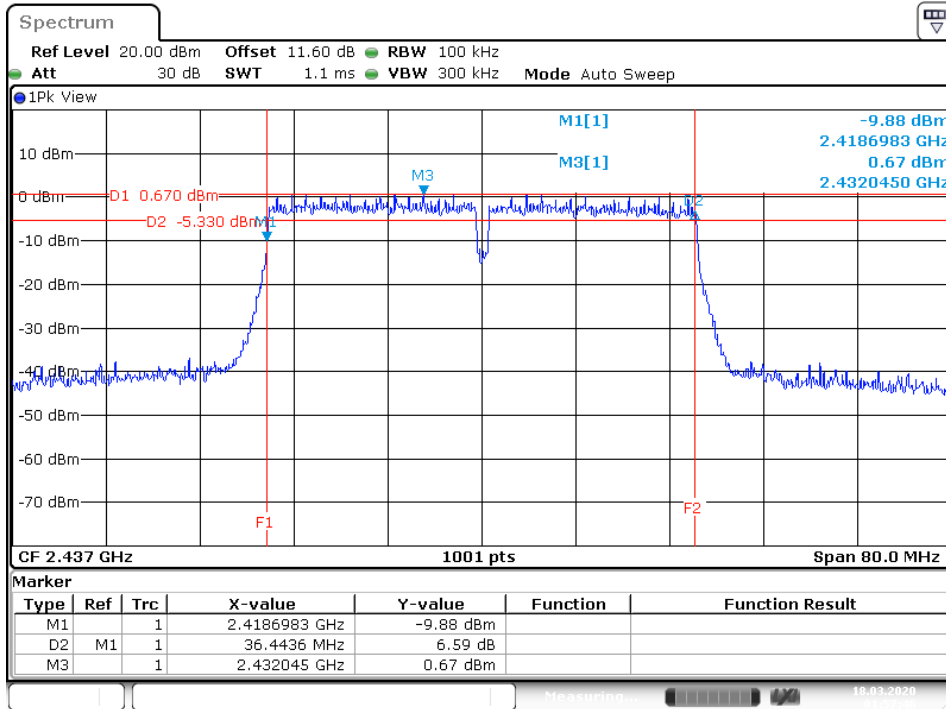
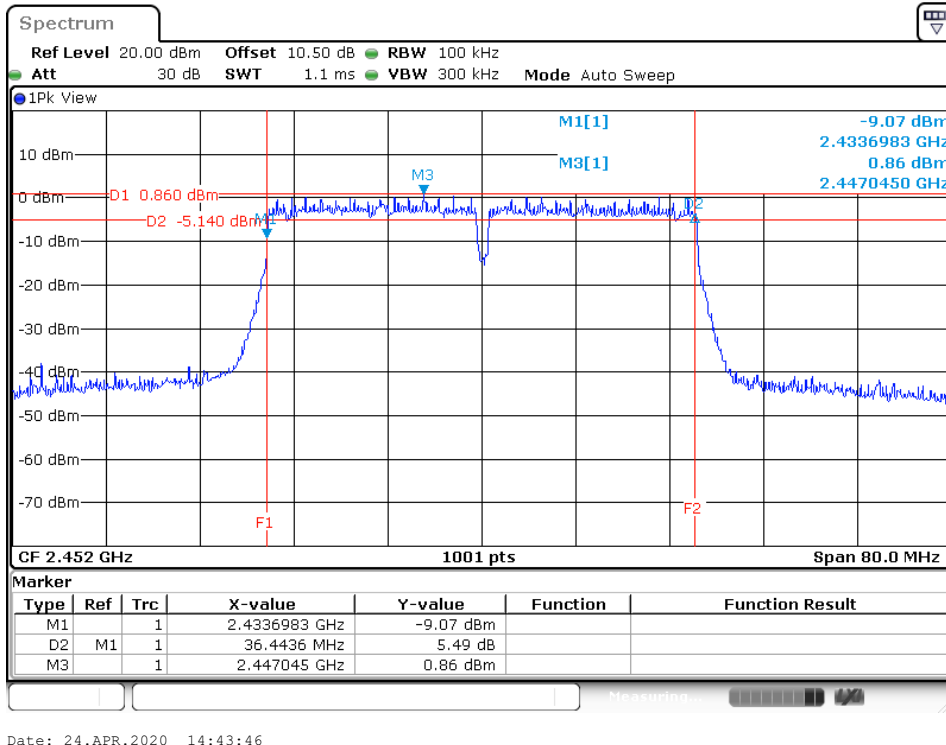
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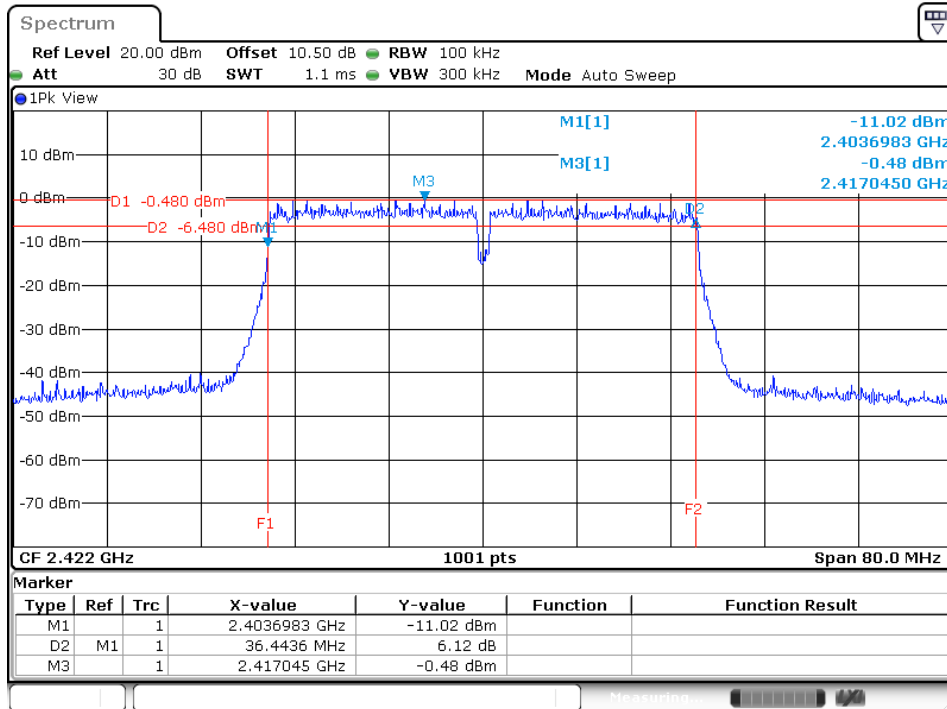
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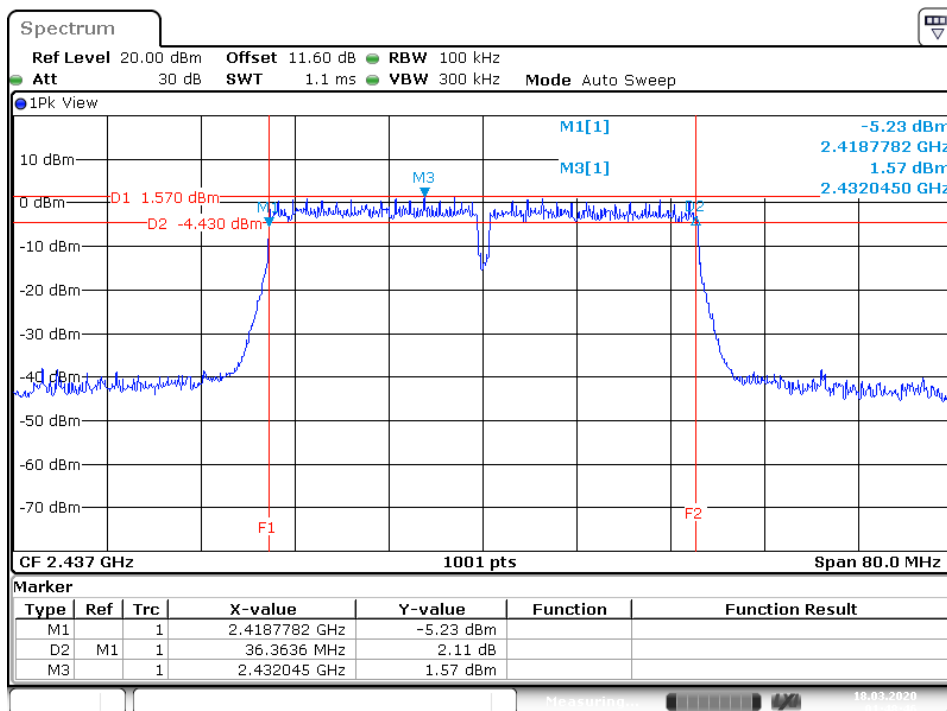
802.11n HT40, Ant 1
Low Channel


Date: 24.APR.2020 14:41:00

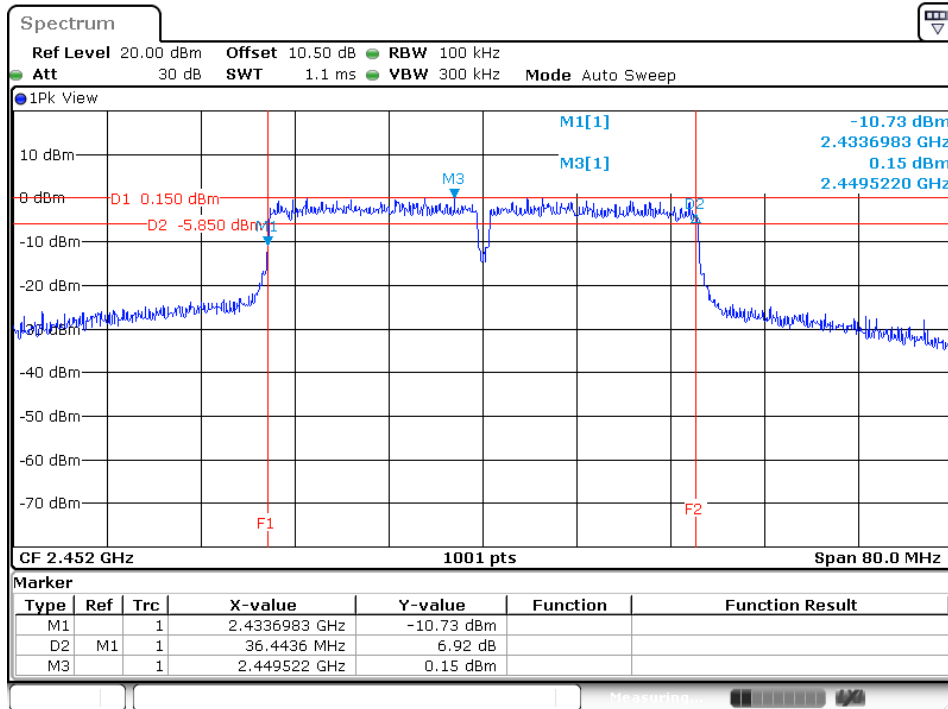
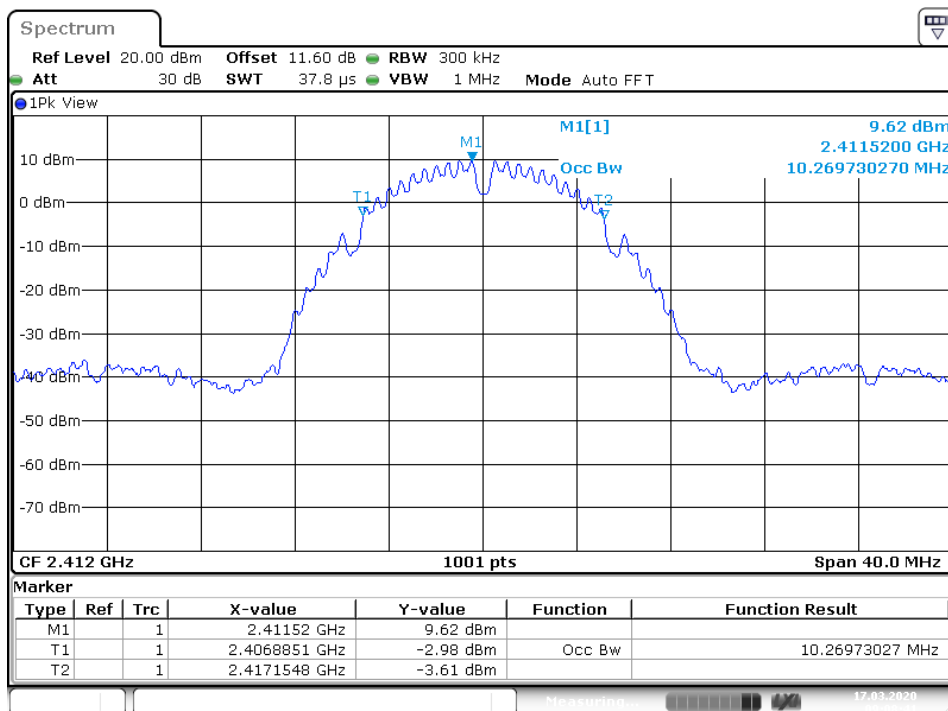
Middle Channel

High Channel


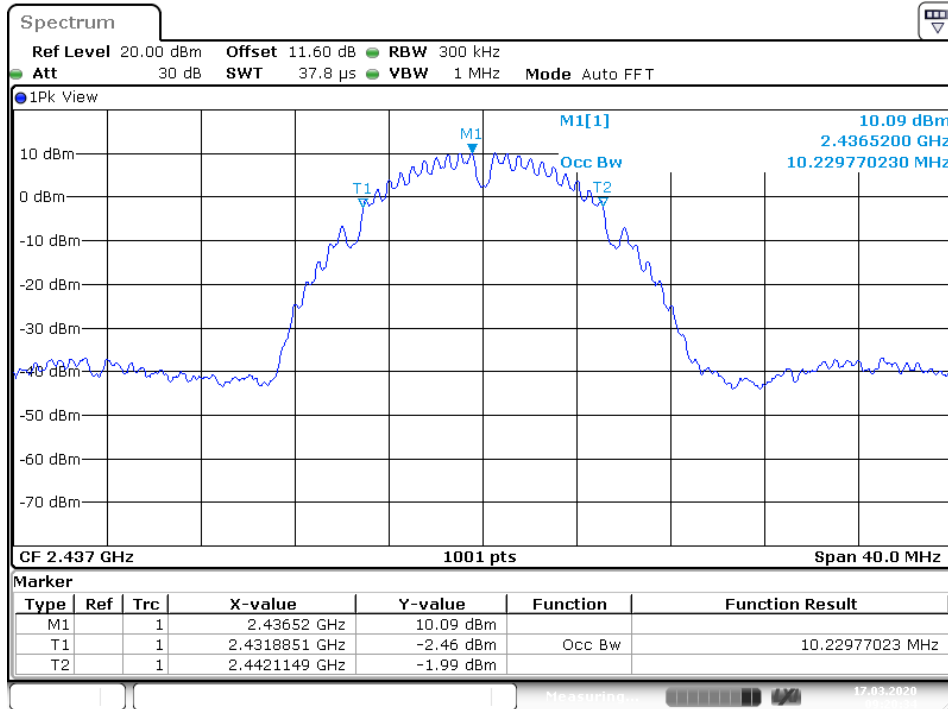
802.11n HT240, Ant 2
Low Channel


Date: 24.APR.2020 14:38:26

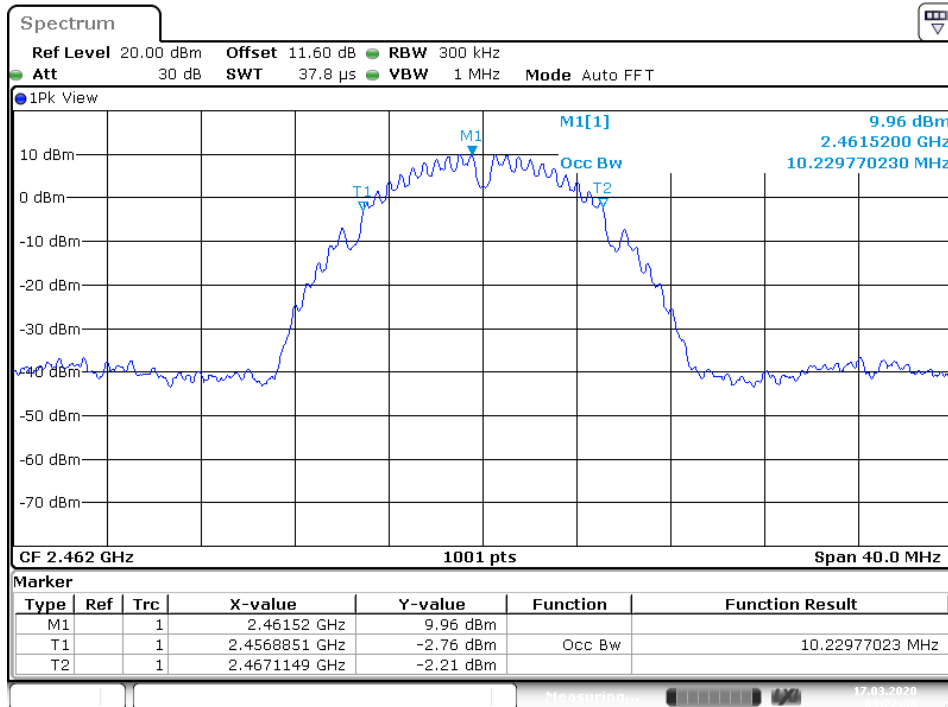
Middle Channel


Date: 18.MAR.2020 01:48:46

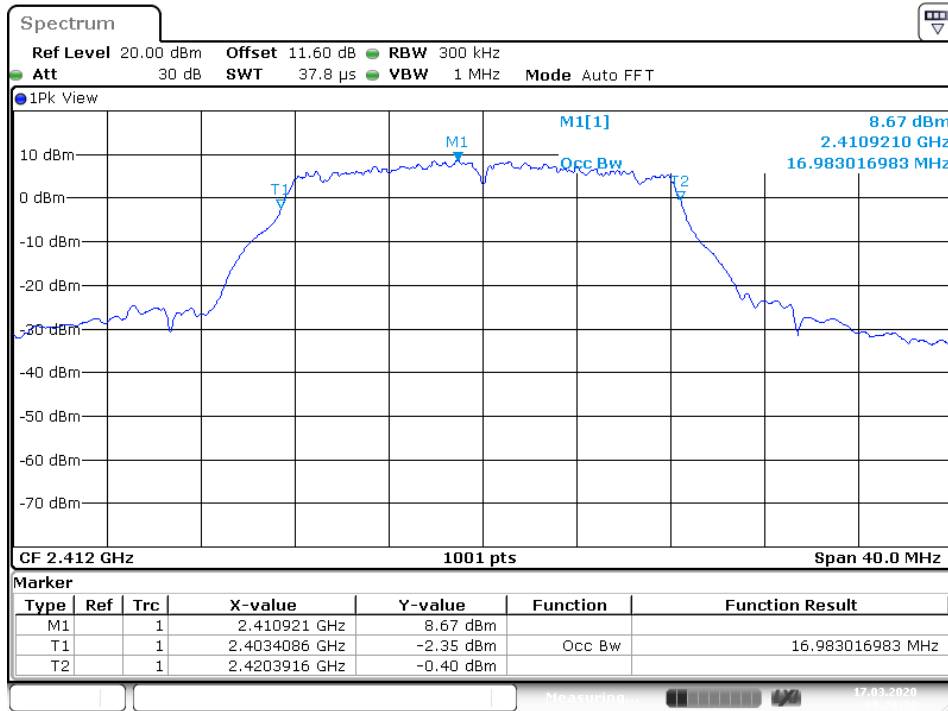
High Channel

Test Plot of 99% Bandwidth
802.11b, Ant 1
Low Channel


Middle Channel


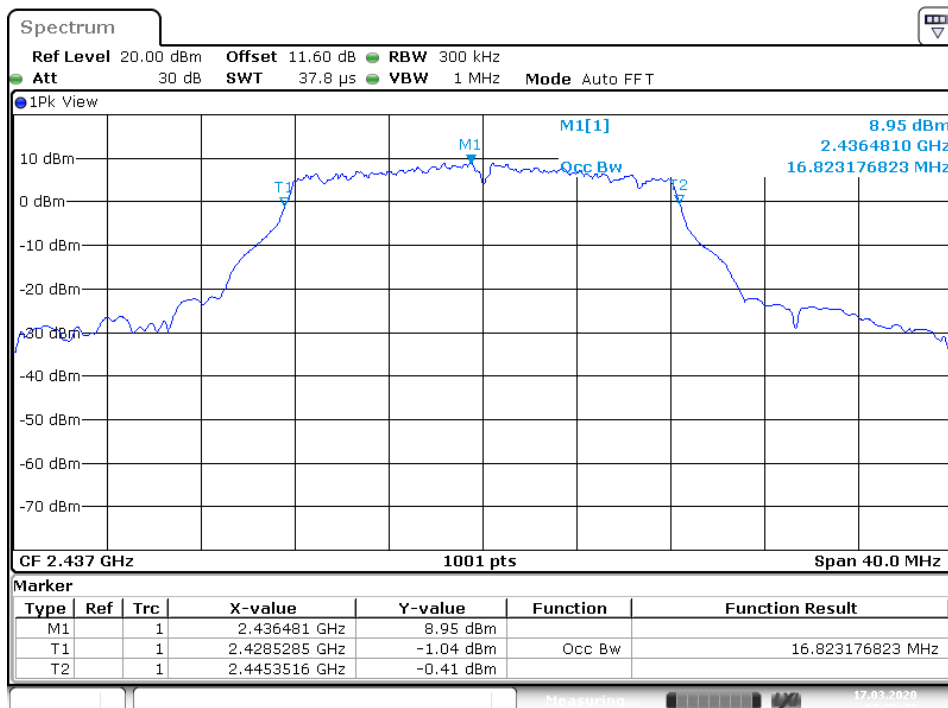
Date: 17.MAR.2020 09:20:34

High Channel


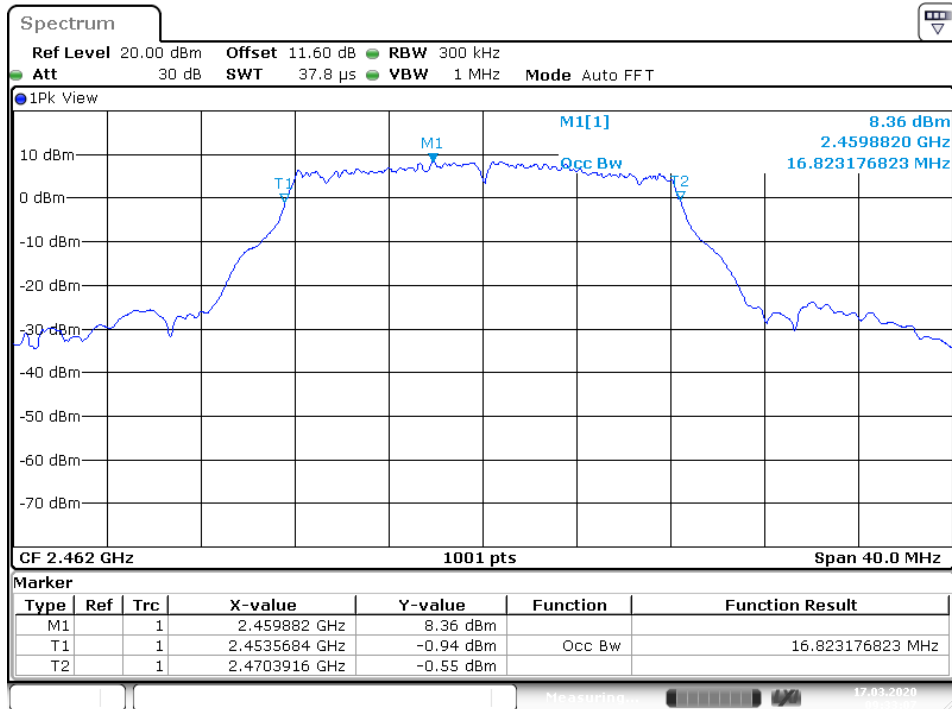
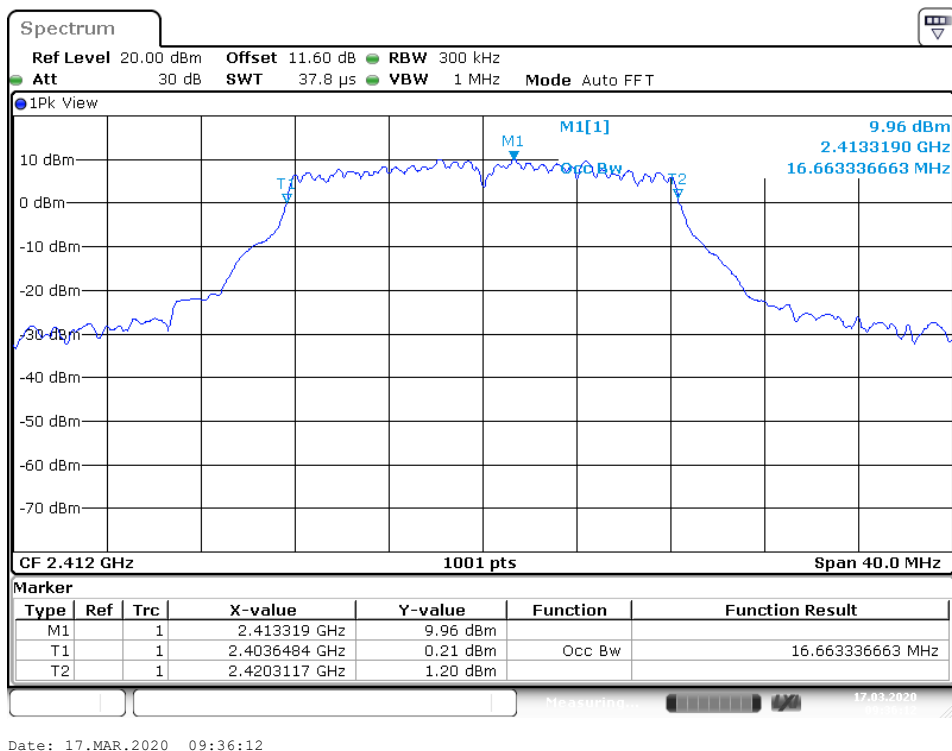
Date: 17.MAR.2020 09:22:38

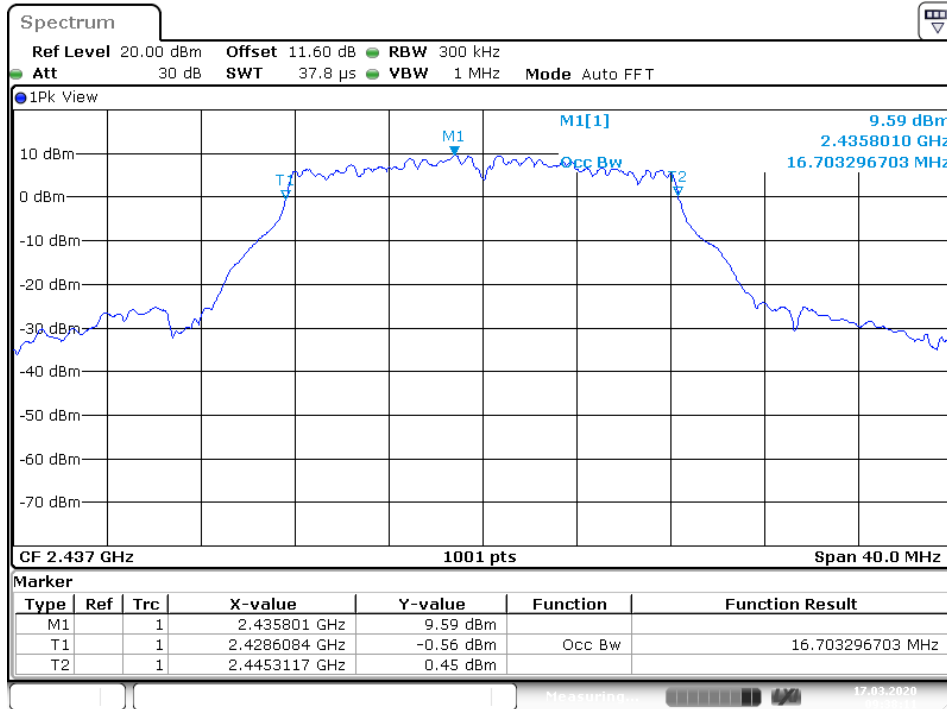
802.11g, Ant 1
Low Channel


Date: 17.MAR.2020 09:26:32

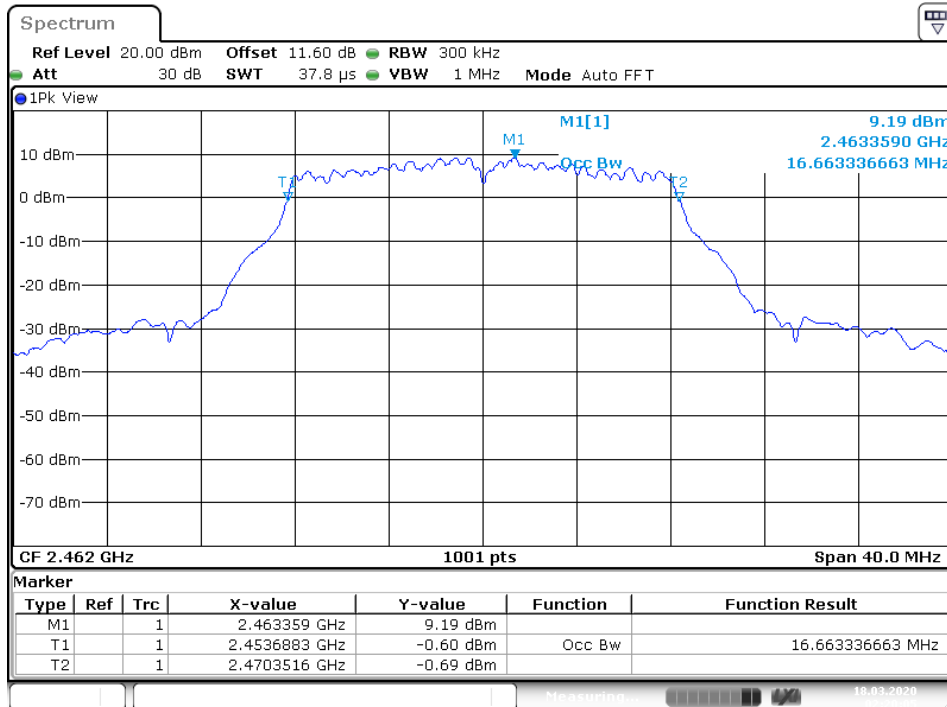
Middle Channel


Date: 17.MAR.2020 09:30:43

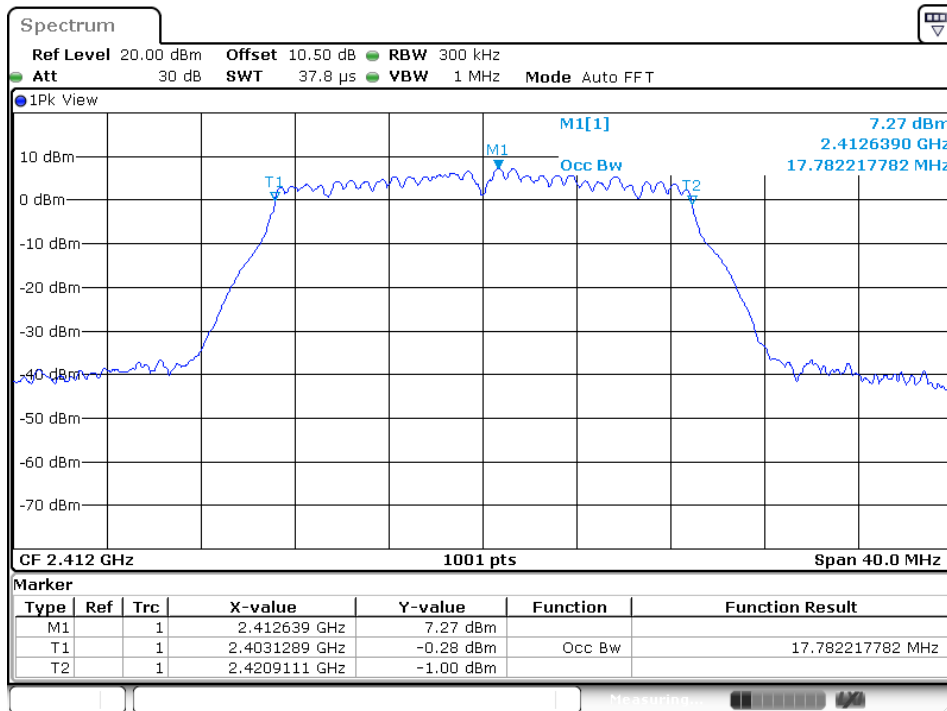
High Channel

802.11g. Ant 2
Low Channel


Middle Channel


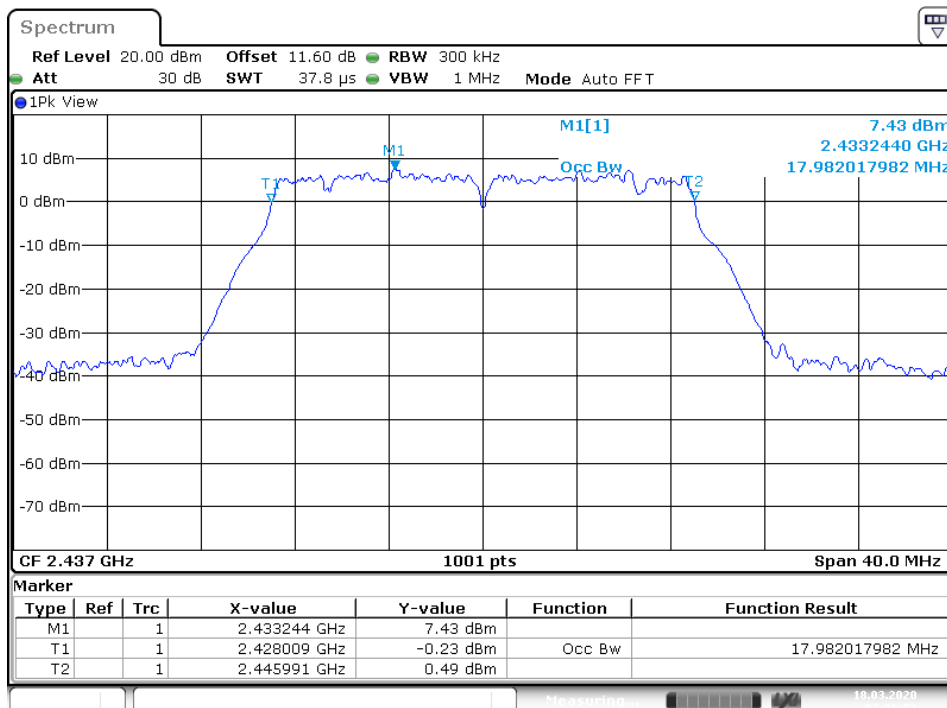
Date: 17.MAR.2020 09:38:11

High Channel


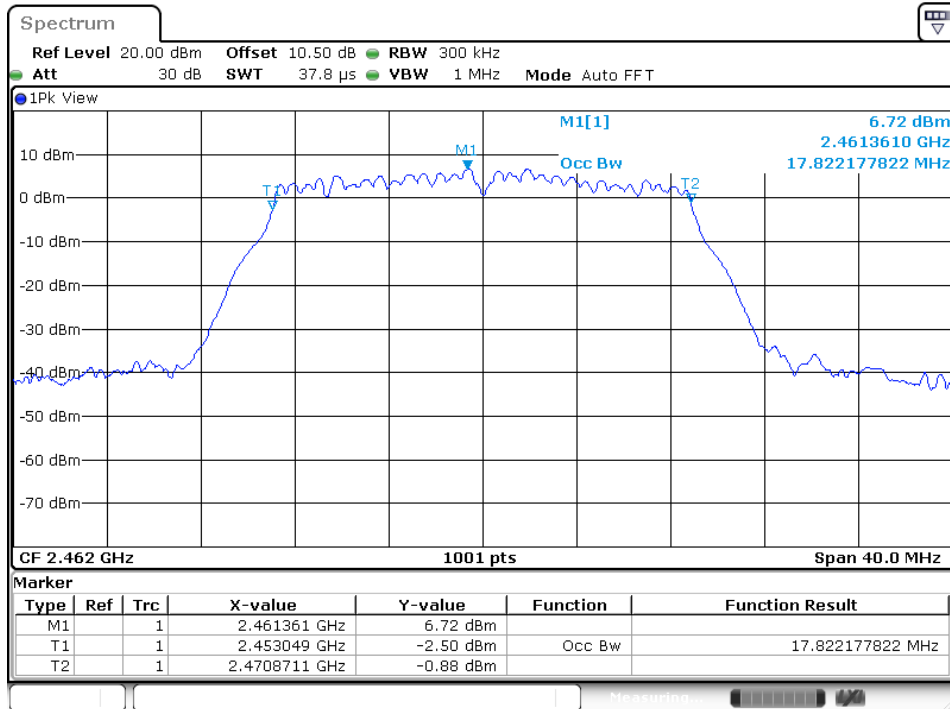
Date: 18.MAR.2020 02:20:06

802.11n HT20, Ant 1
Low Channel


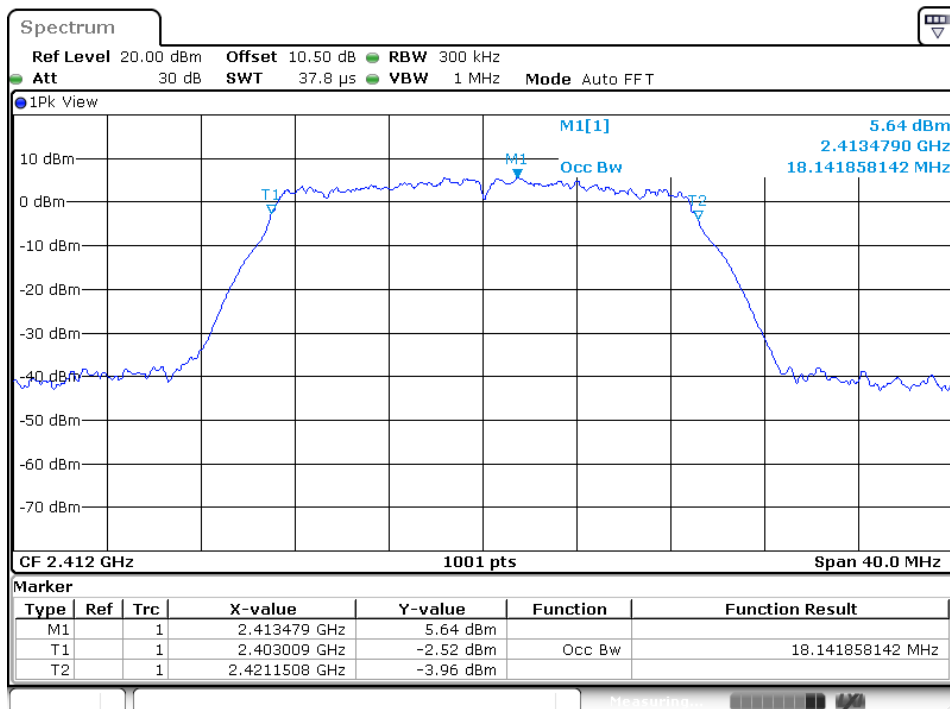
Date: 24.APR.2020 14:26:42

Middle Channel


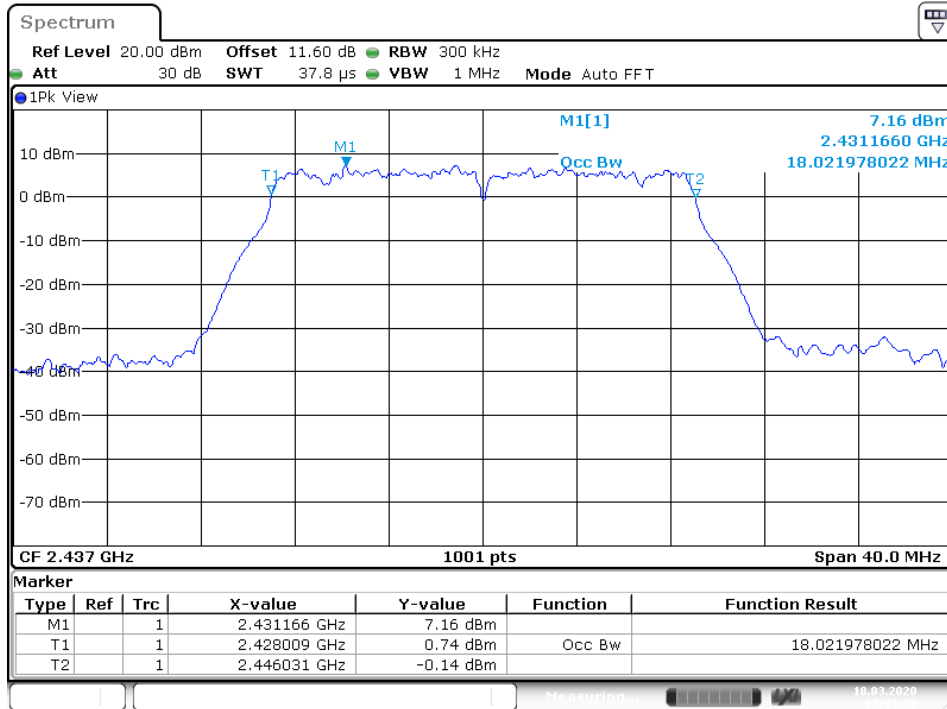
Date: 18.MAR.2020 02:06:52

High Channel


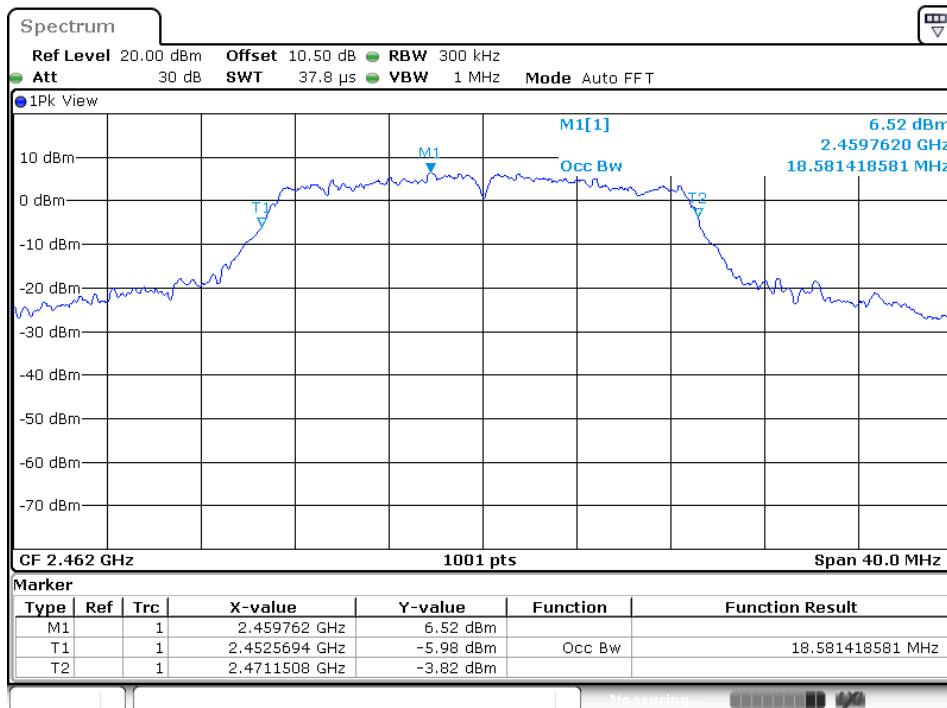
Date: 24.APR.2020 14:30:31

802.11n HT20, Ant 2
Low Channel


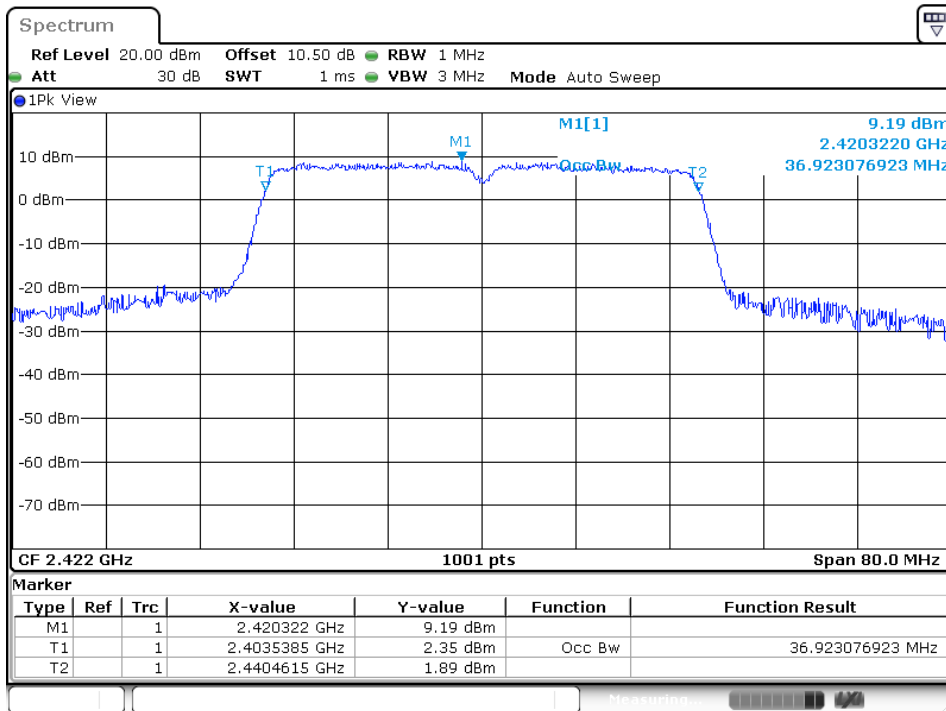
Date: 24.APR.2020 14:36:22

Middle Channel


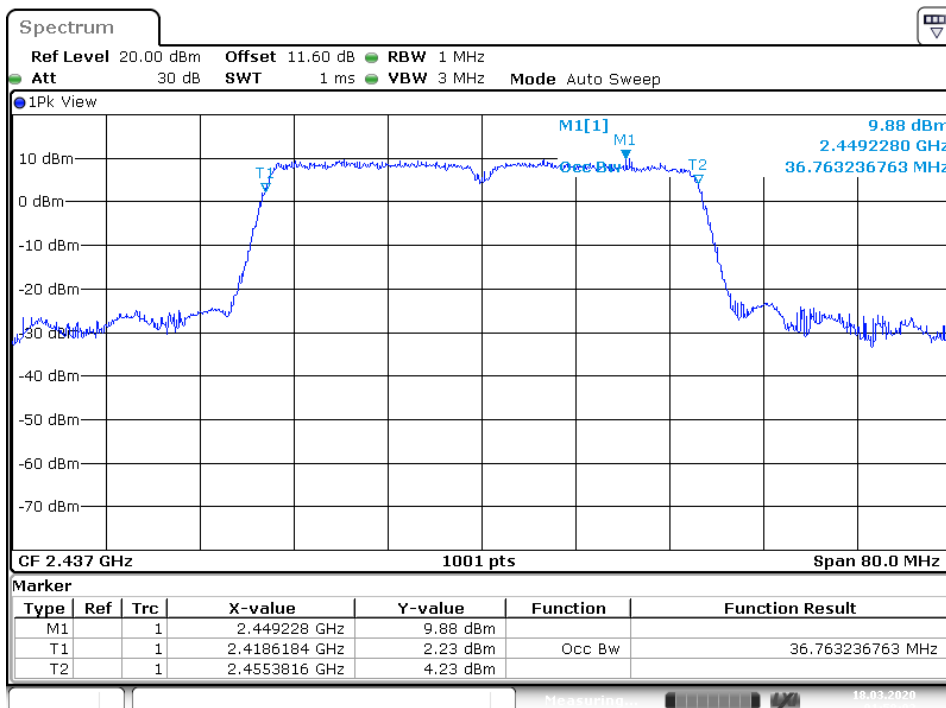
Date: 18.MAR.2020 02:13:51

High Channel


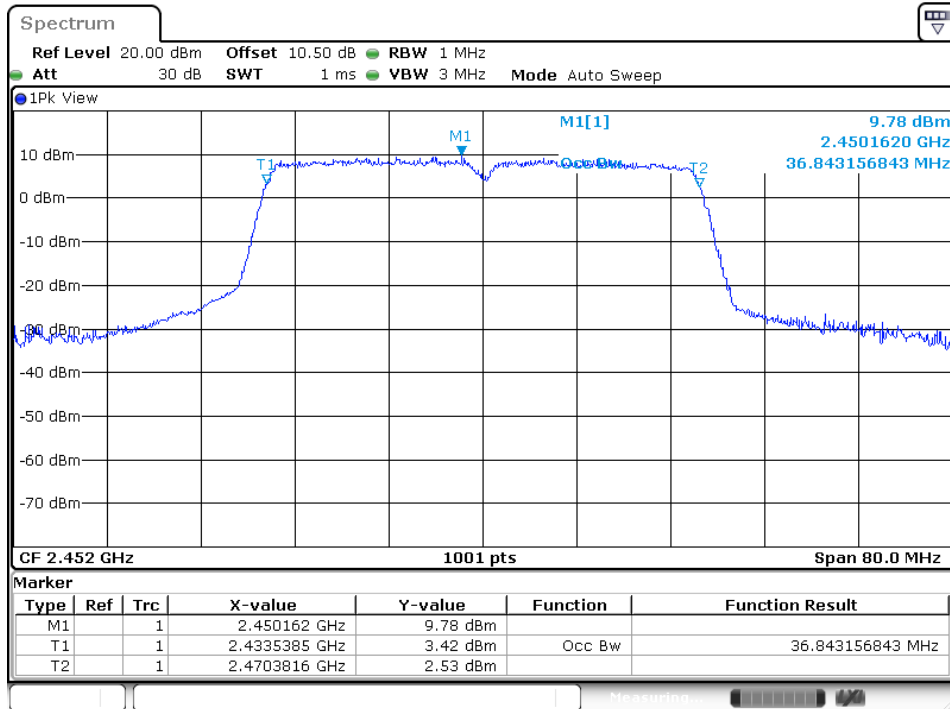
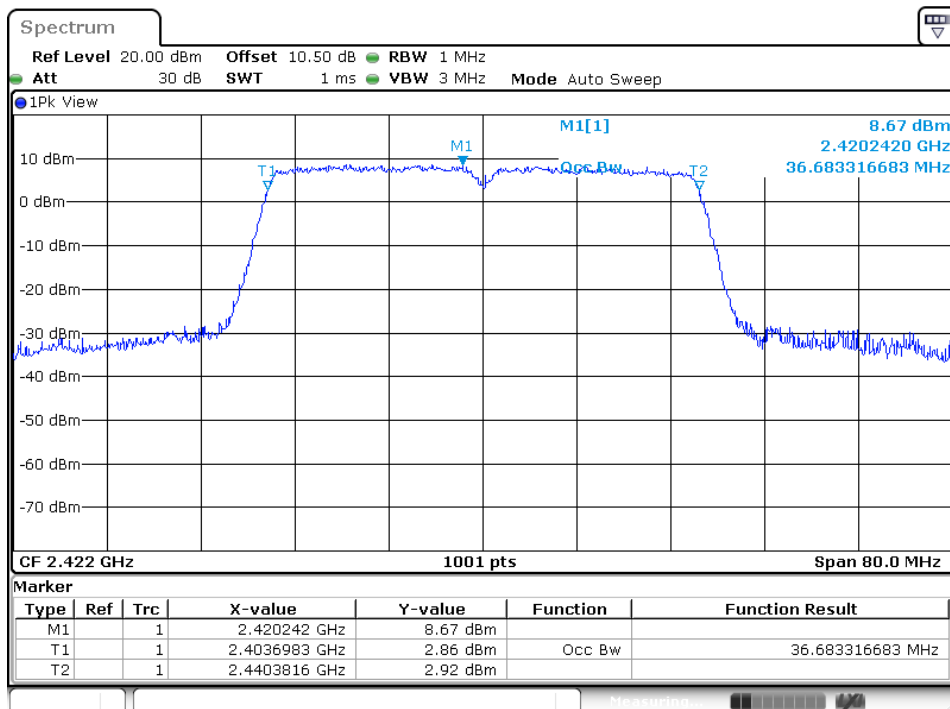
Date: 24.APR.2020 14:33:05

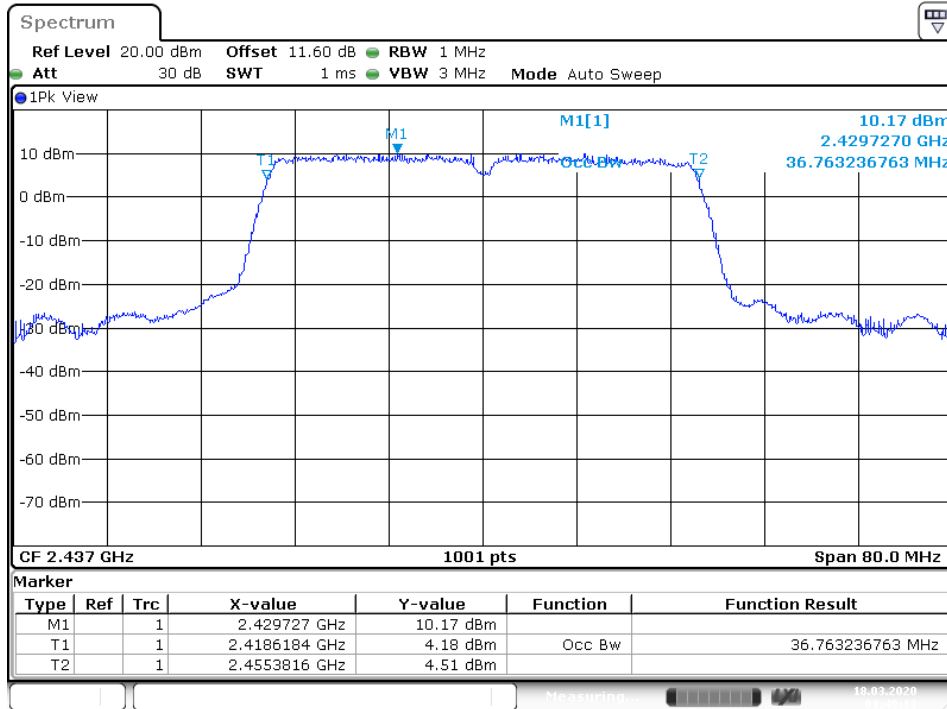
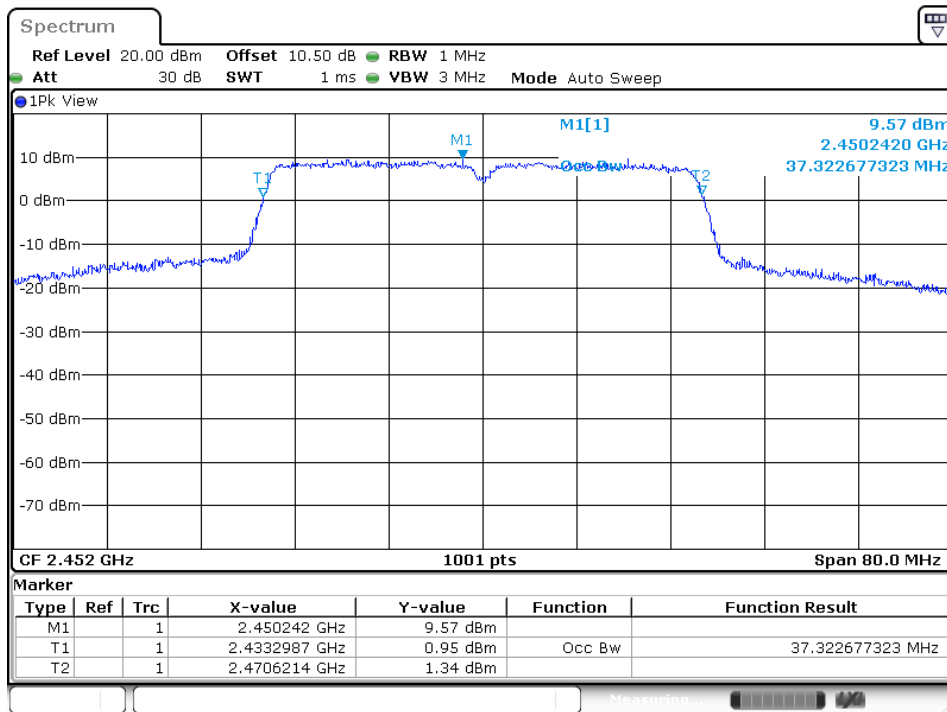
802.11n HT40, Ant 1
Low Channel


Date: 24.APR.2020 14:41:23

Middle Channel


Date: 18.MAR.2020 01:58:02

High Channel

802.11n HT40, Ant 2
Low Channel


Middle Channel

High Channel


5.1.4 Power Density

RESULT:
Passed

Test standard : FCC Part 15.247(e)
 Basic standard : ANSI C63.10:2013, KDB558074
 Kind of test site : Shielded room

Test setup

Test Channel : Low/ Middle/ High
 Operation Mode : A
 Ambient temperature : 20-24°C
 Relative humidity : 50-65%
 Atmospheric pressure : 100-103 kPa

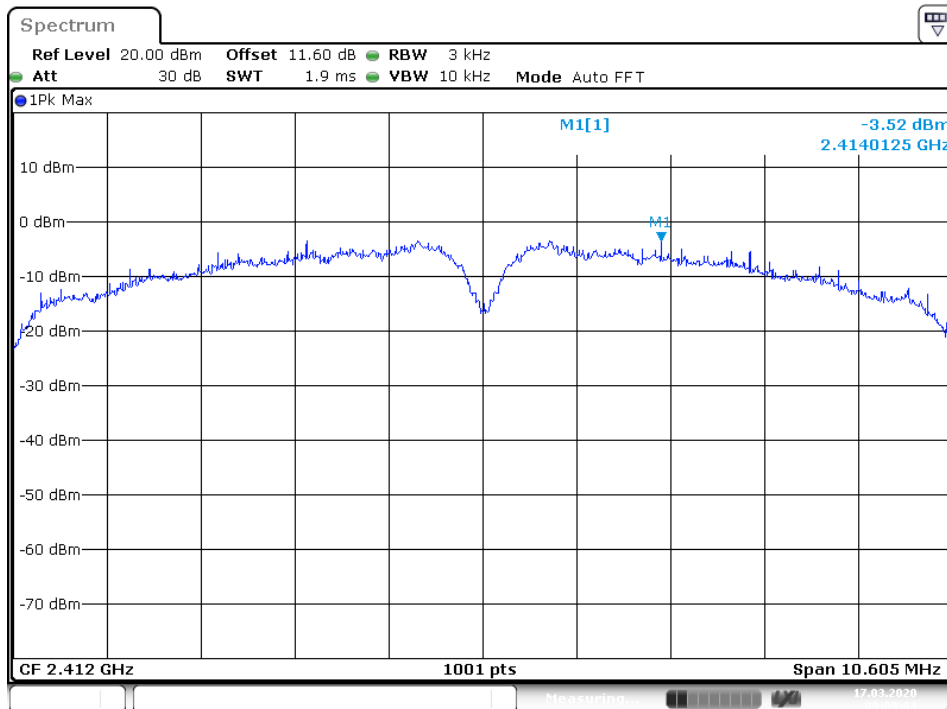
Table 10: Test result of Power Density

Mode	Channel Frequency	Power Density (dBm/3kHz)		Limit	Result
	(MHz)	Ant1	Ant2	(dBm/3kHz)	
802.11b	2412	-3.52	-	8	Pass
	2437	-2.18	-	8	Pass
	2462	-2.21	-	8	Pass
802.11g	2412	-7.05	-5.96	7.82	Pass
	2437	-6.78	-6.31	7.82	Pass
	2462	-7.00	-6.86	7.82	Pass
802.11n HT20	2412	-7.92	-9.54	7.82	Pass
	2437	-9.71	-9.36	7.82	Pass
	2462	-8.81	-9.12	7.82	Pass
802.11n HT40	2422	-12.44	-12.81	7.82	Pass
	2437	-13.95	-13.60	7.82	Pass
	2452	-11.97	-12.01	7.82	Pass

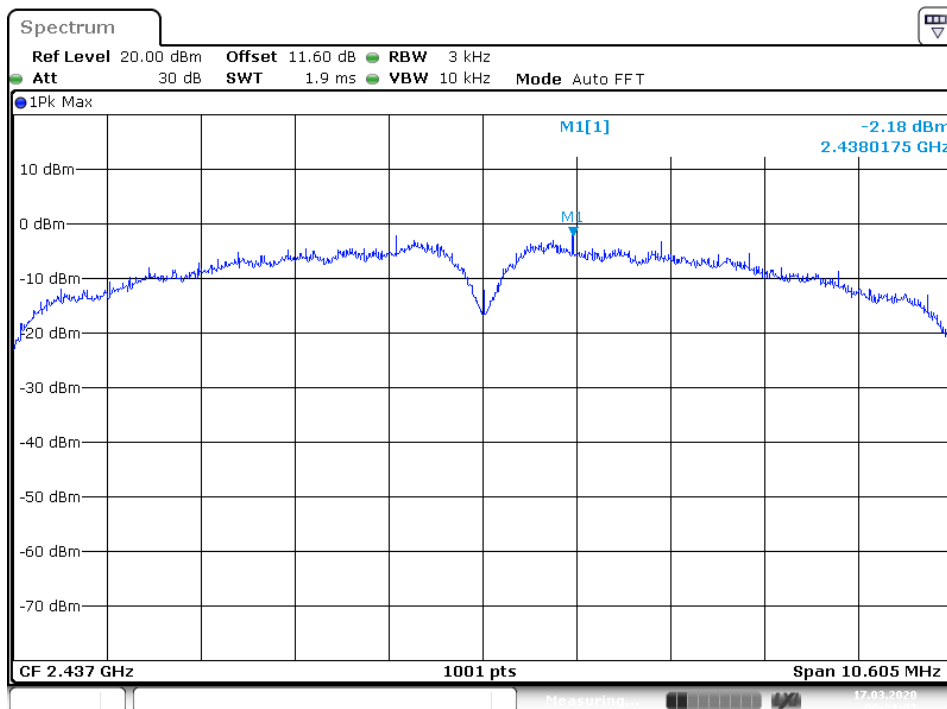
Note: 802.11g/n antenna gain value > 6dBi, so the limit is revised to 7.82dBm/3kHz
 $8+(6-6.18)=7.82$.

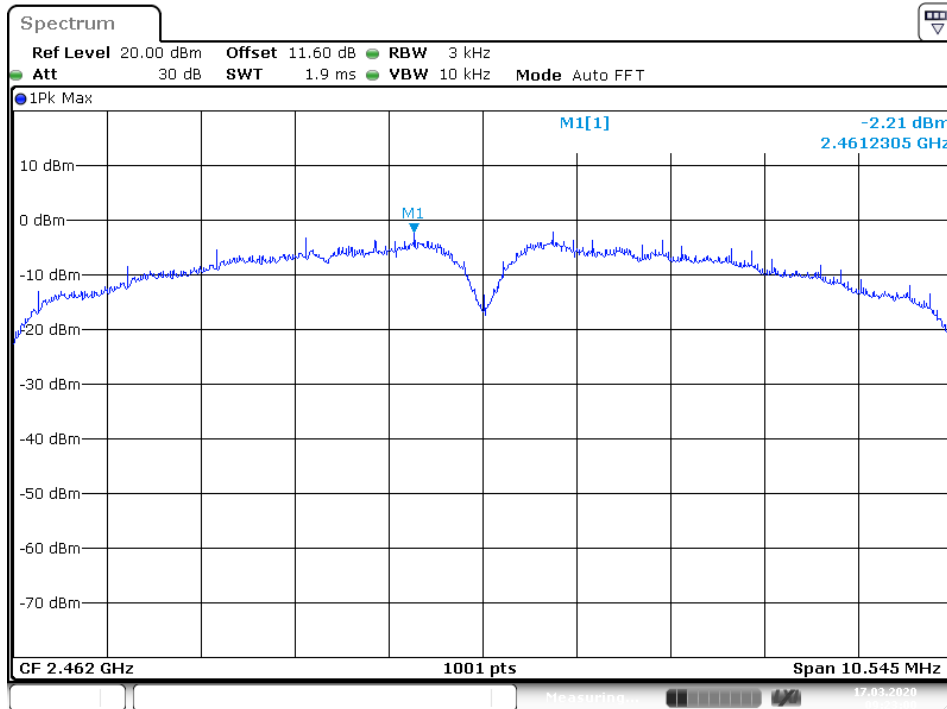
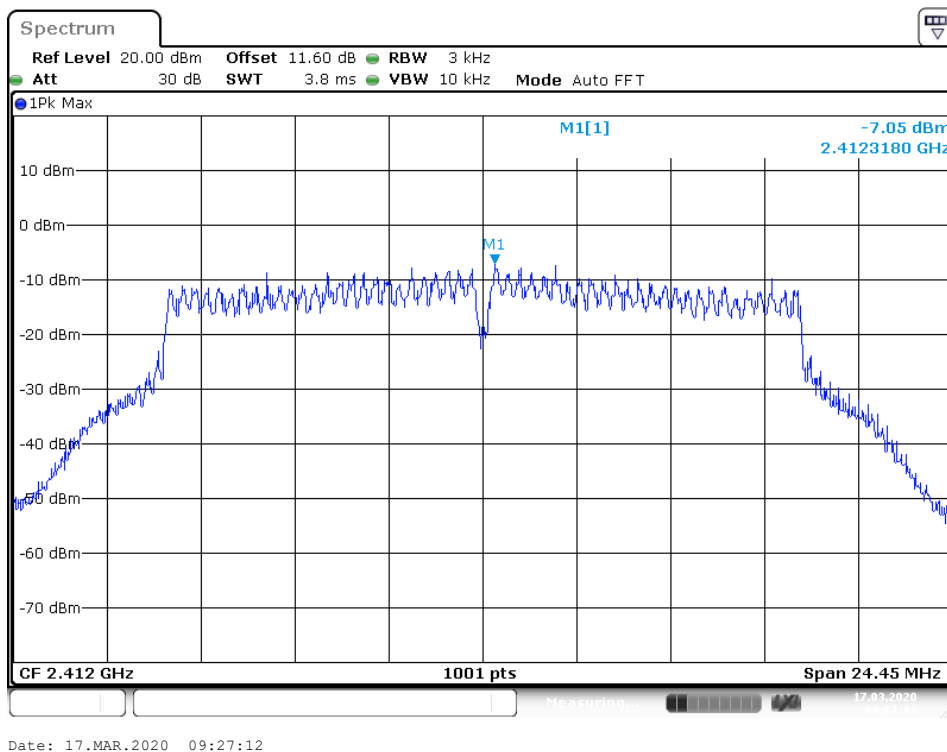
Test Plot of Power Density

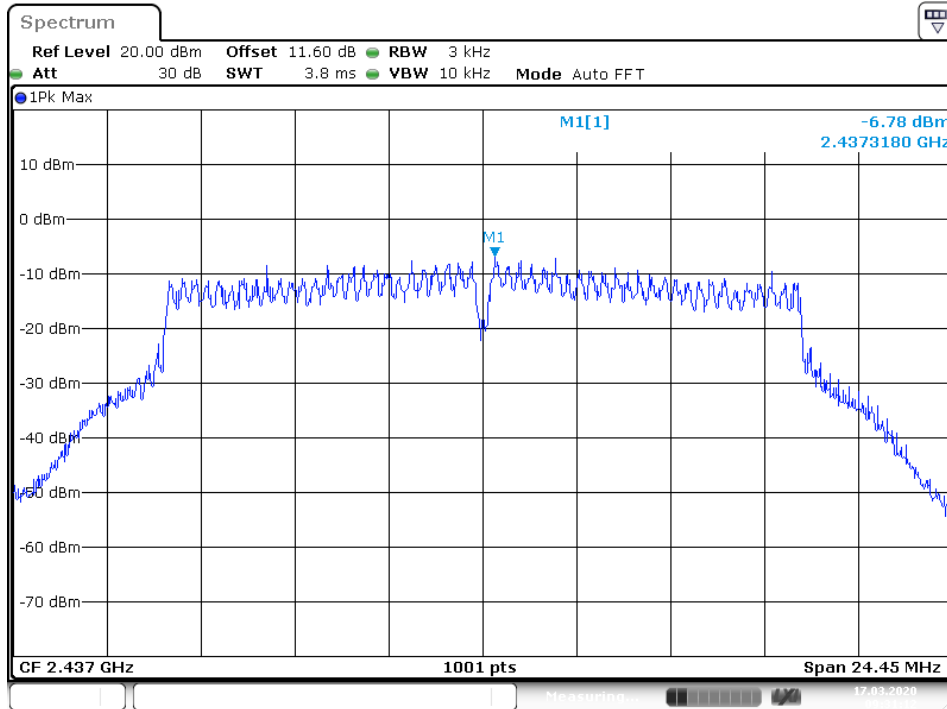
802.11b, Ant 1 Low Channel



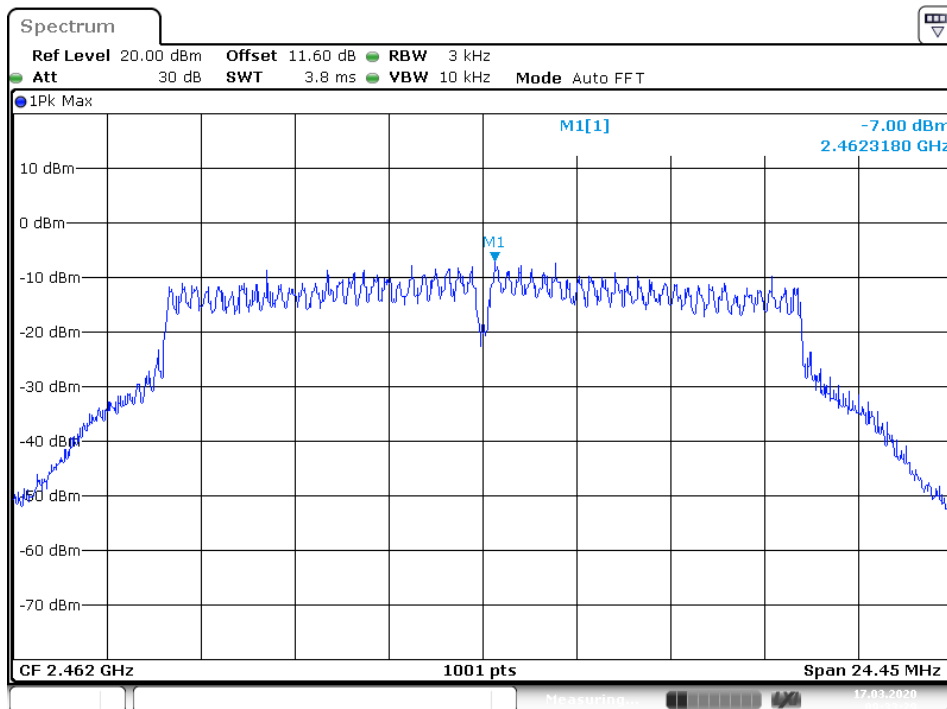
Middle Channel



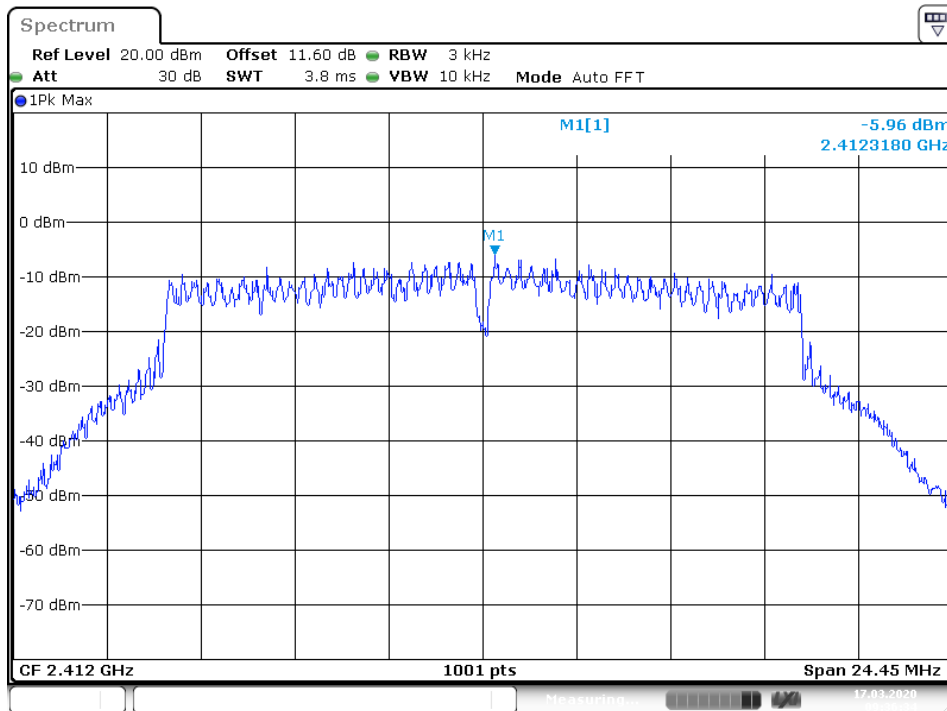
High Channel

802.11g, Ant 1
Low Channel


Middle Channel


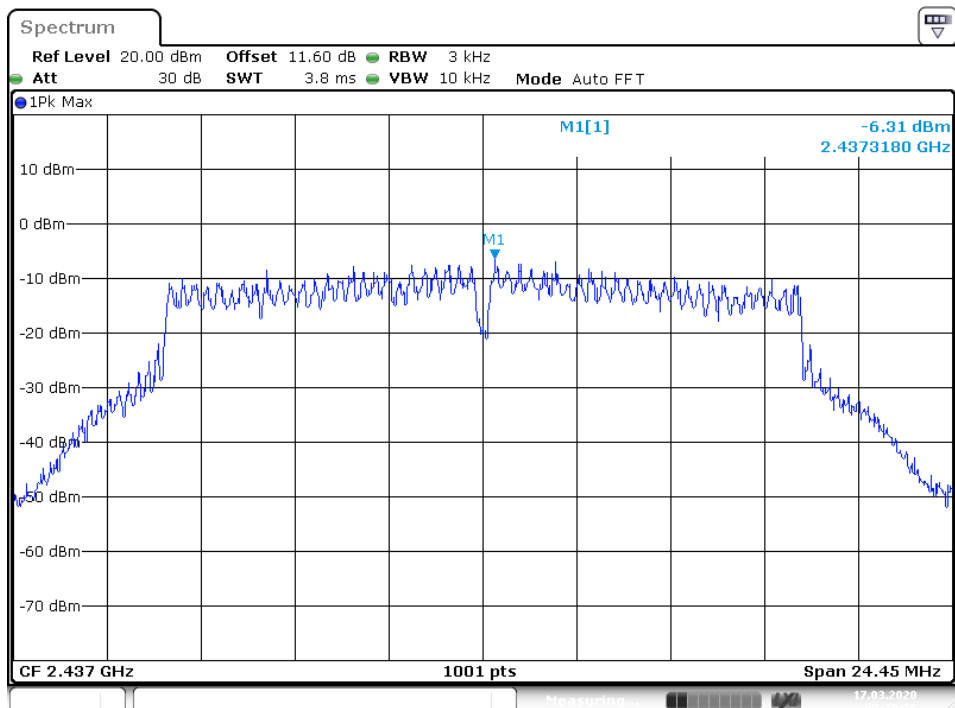
Date: 17.MAR.2020 09:31:12

High Channel


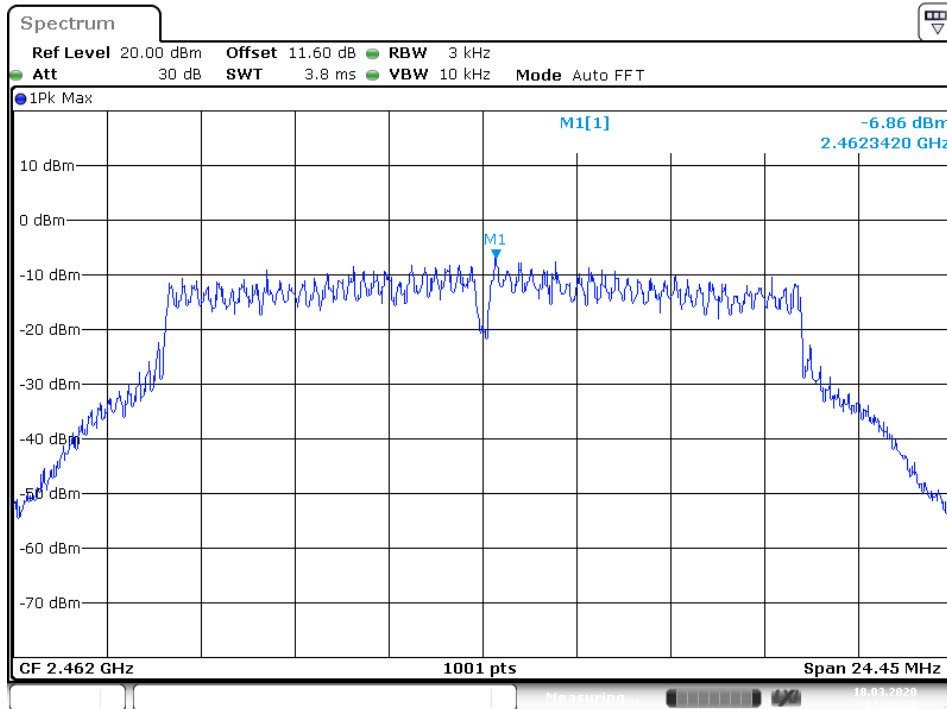
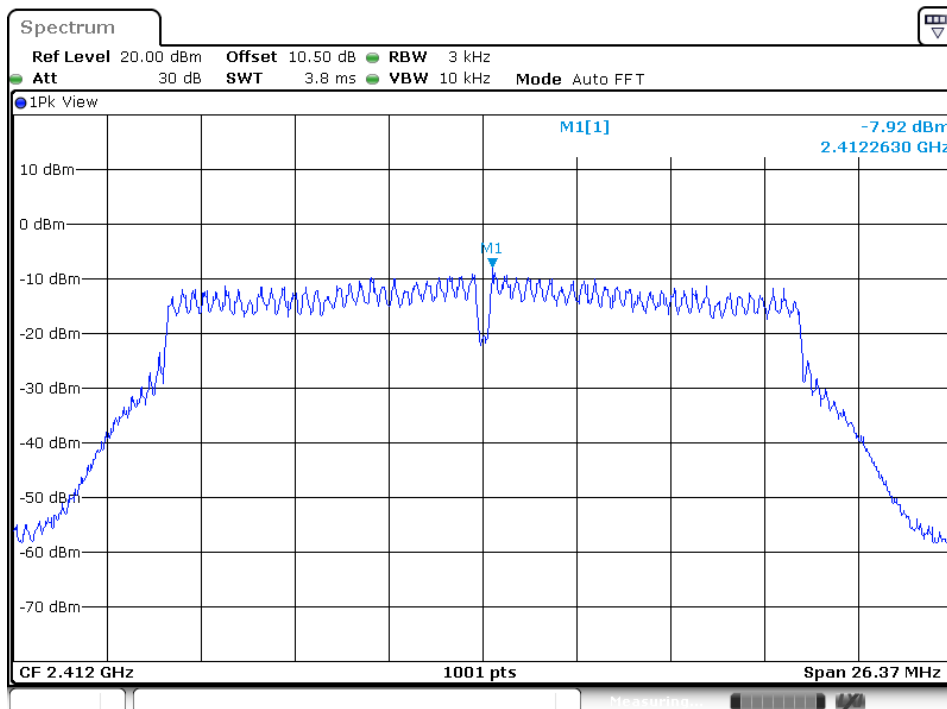
Date: 17.MAR.2020 09:33:29

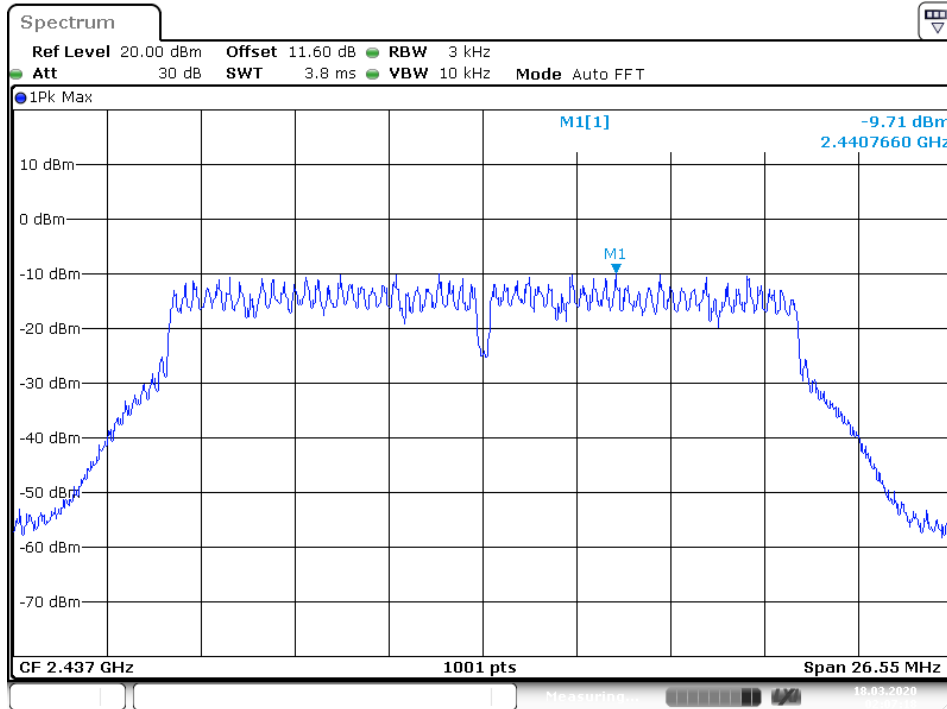
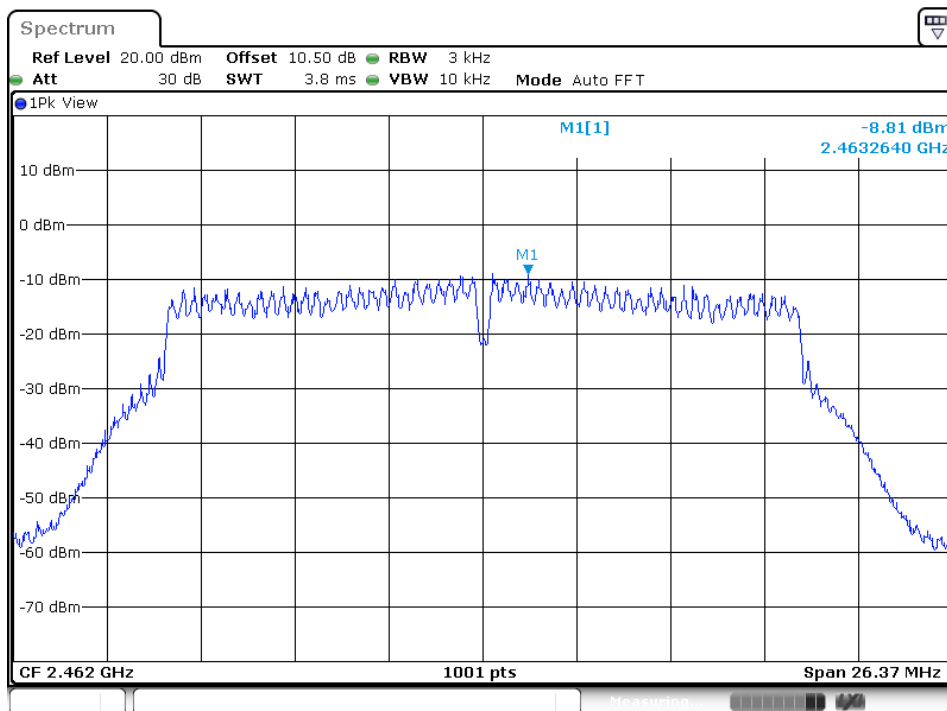
802.11g, Ant 2
Low Channel


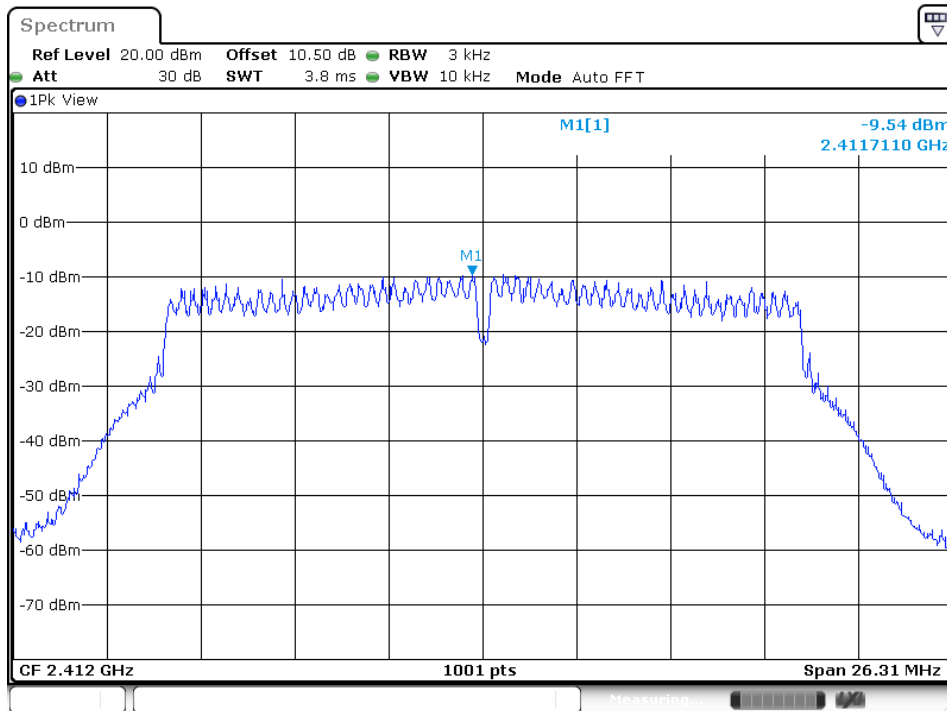
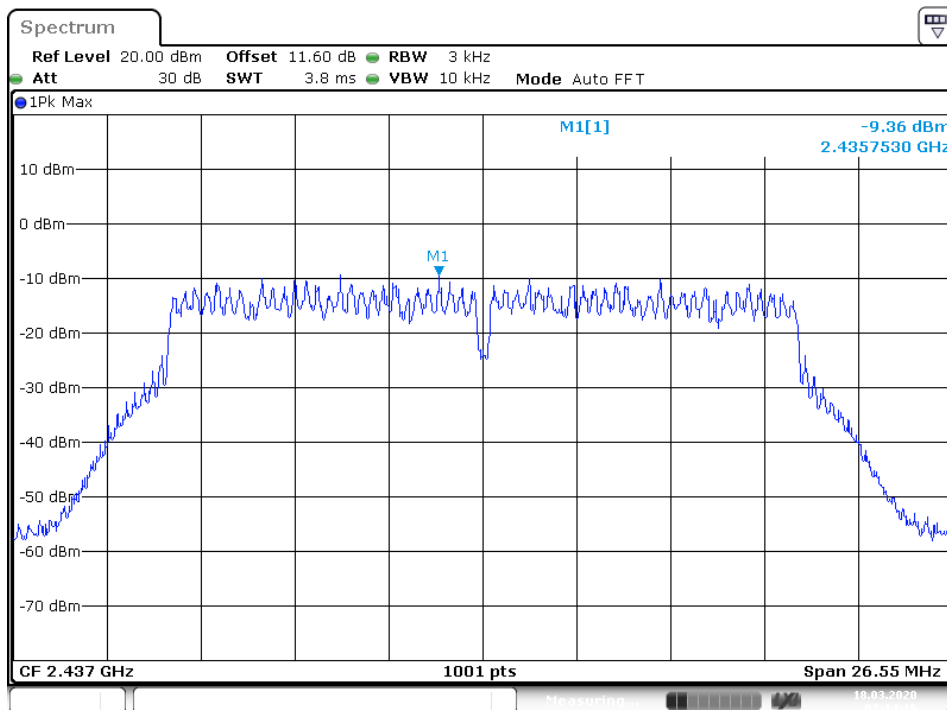
Date: 17.MAR.2020 09:36:34

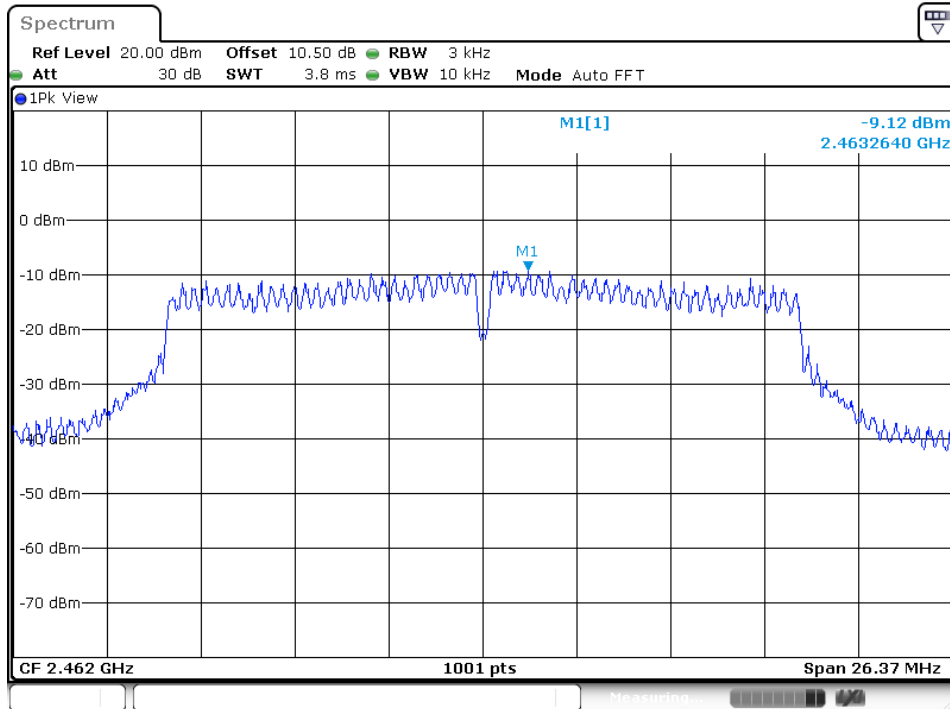
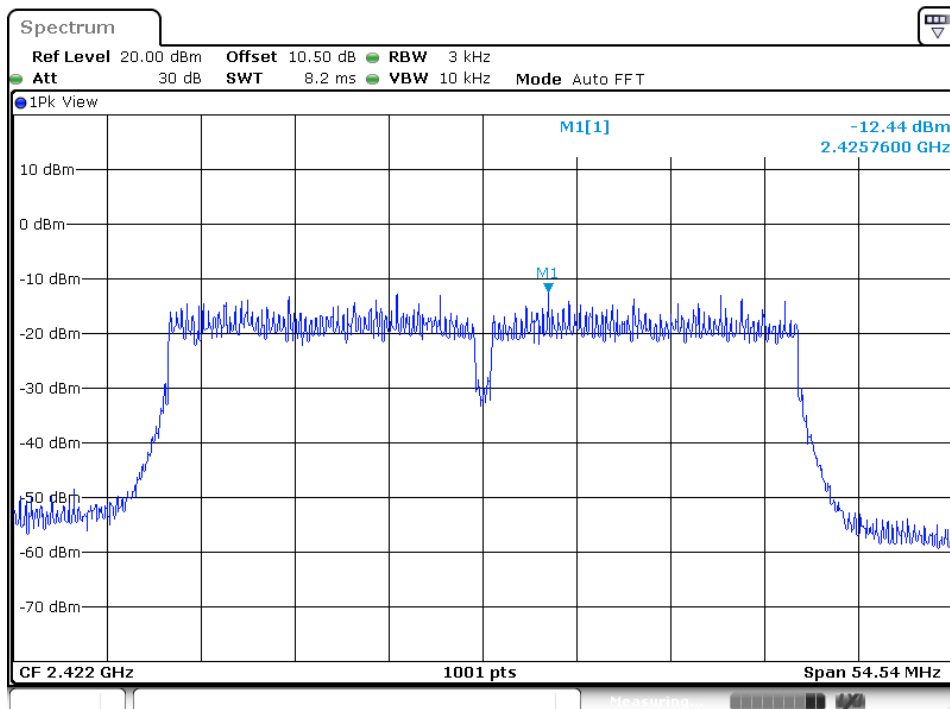
Middle Channel


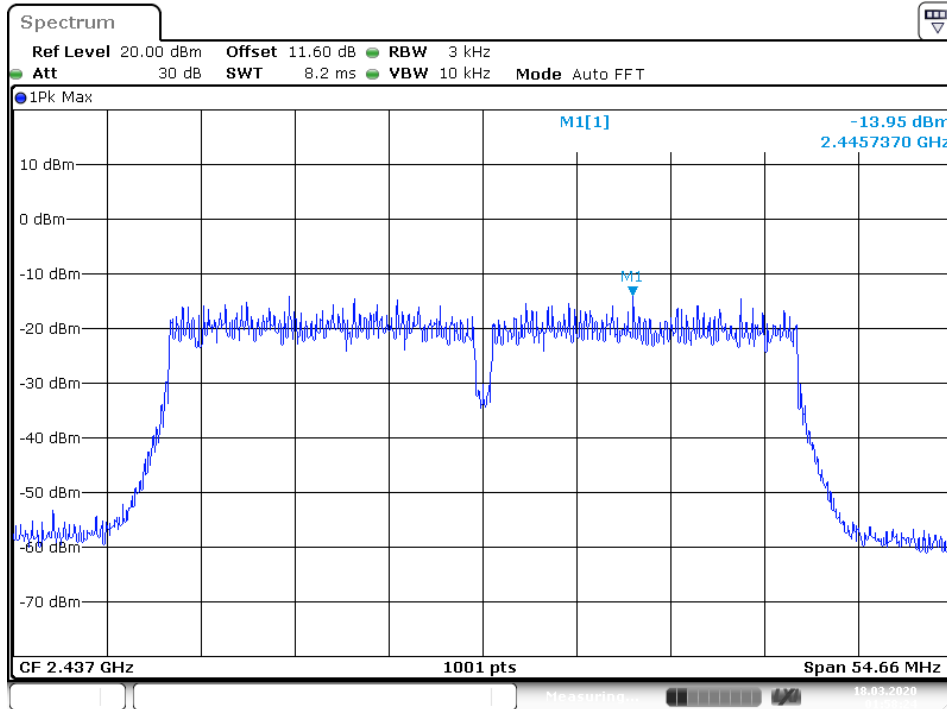
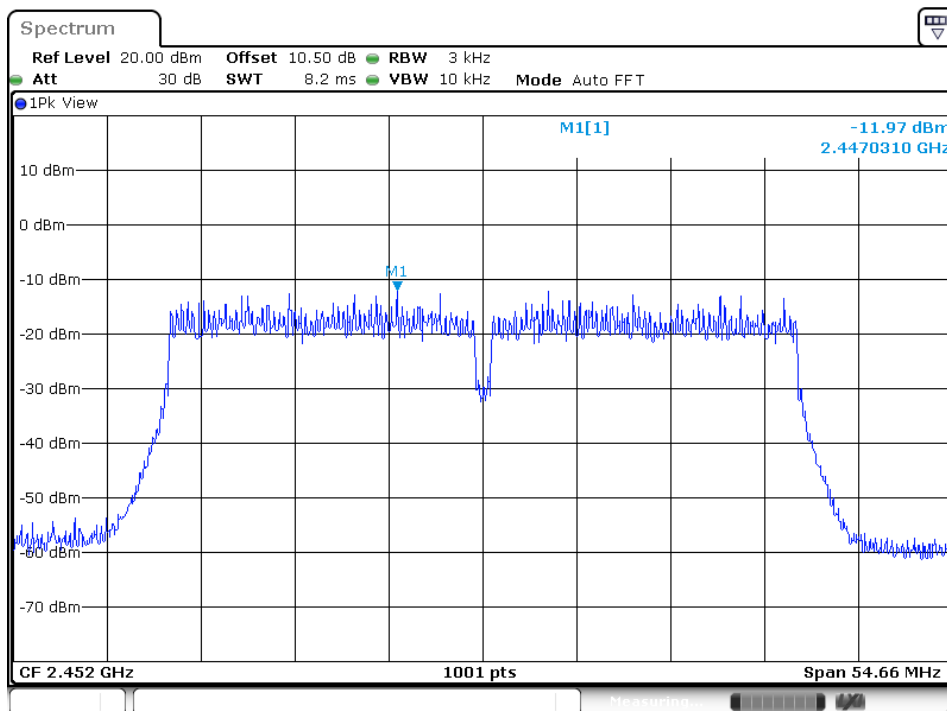
Date: 17.MAR.2020 09:38:36

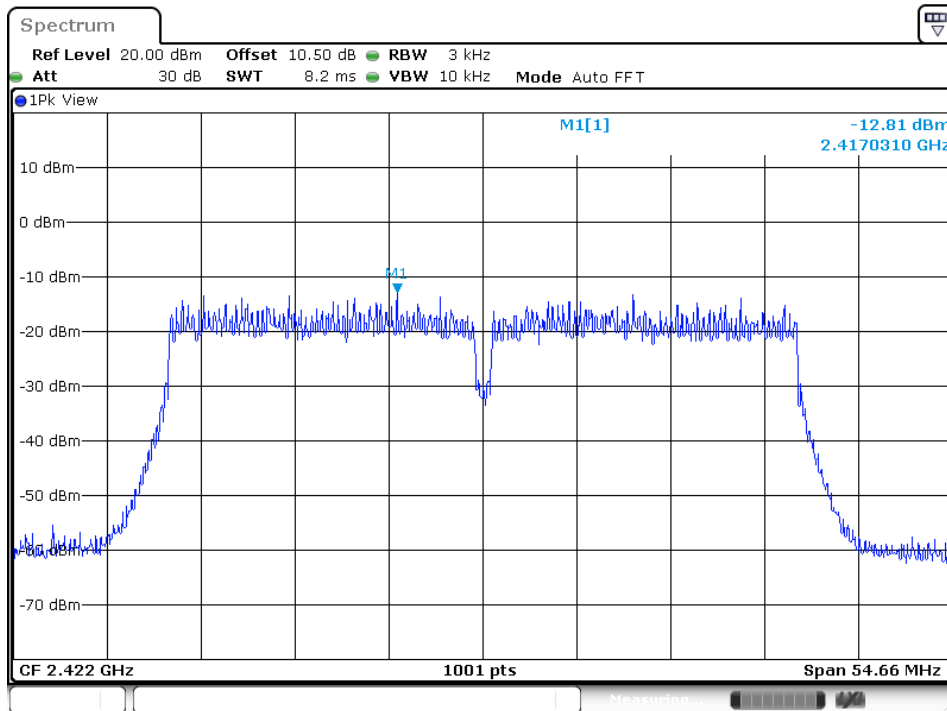
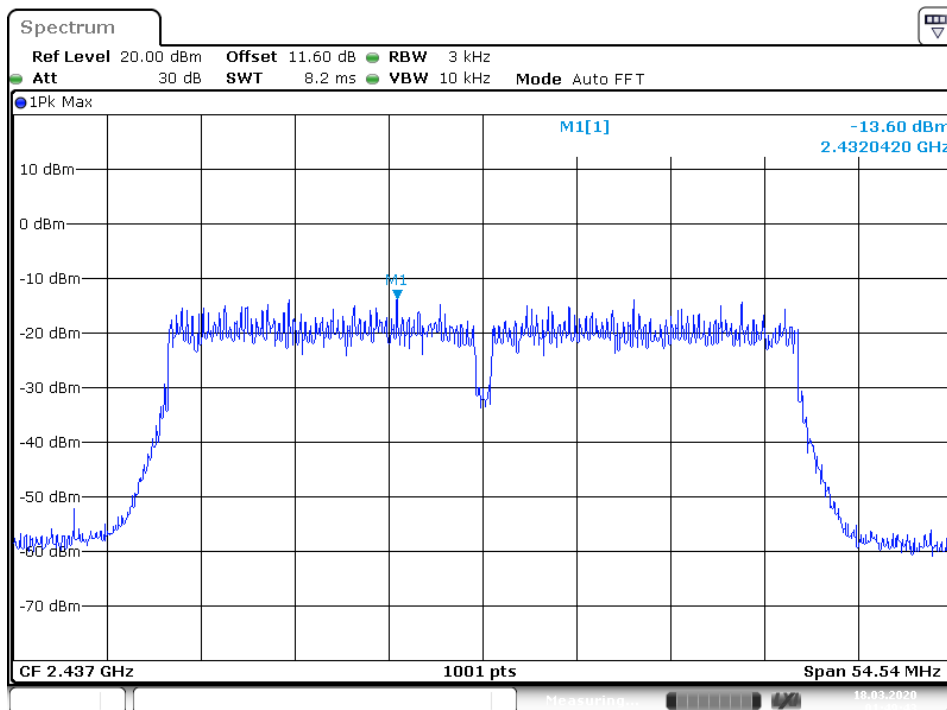
High Channel

802.11n HT20, Ant 1
Low Channel


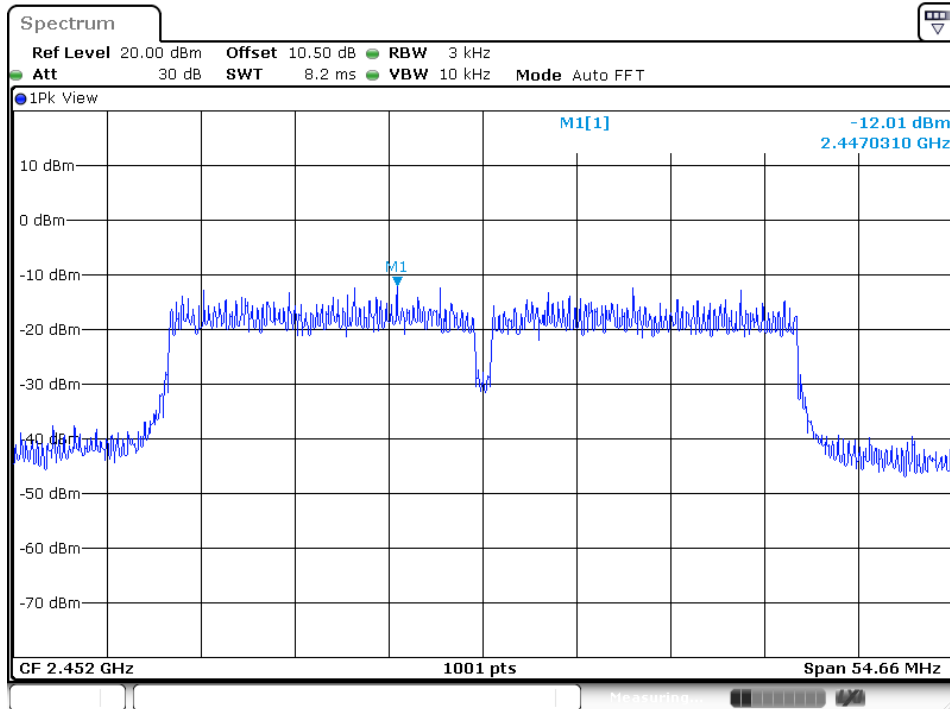
Middle Channel

High Channel


802.11n HT20, Ant 2
Low Channel

Middle Channel


High Channel

802.11n HT40, Ant 1
Low Channel


Middle Channel

High Channel


802.11n HT40, Ant 2
Low Channel

Middle Channel


High Channel


Date: 24.APR.2020 14:46:33

5.1.5 Conducted spurious emissions and Frequency Band Edge measured in 100kHz Bandwidth

RESULT:**Passed**

Test standard	:	FCC part 15.247(d)
Basic standard	:	ANSI C63.10:2013, KDB558074
Limit	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power)
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/ Middle/ High for Conducted Spurious Emissions Low/ High for Frequency Band Edge
Operation Mode	:	A
Ambient temperature	:	20-24°C
Relative humidity	:	50-65%
Atmospheric pressure	:	100-103 kPa

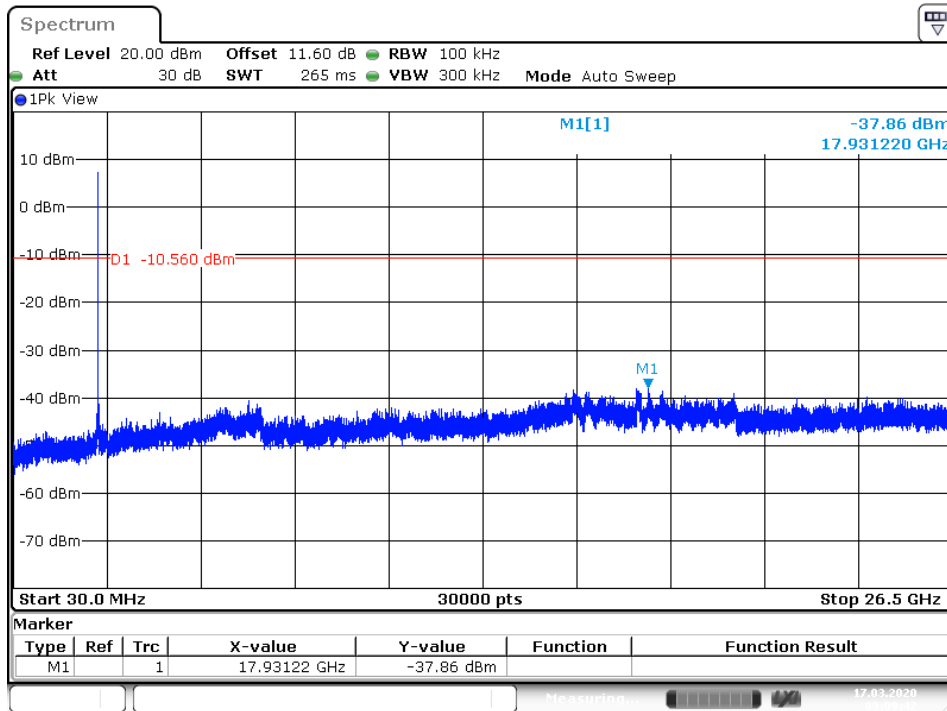
All emissions are more than 20dB below fundamental, details refer to following test plot, and compliance is achieved as well.

Due to the small size of the RF circuit and that there are no inductive components of significant size connected to the antenna port, 9kHz to 30MHz frequency range is not tested based on technical judgment.

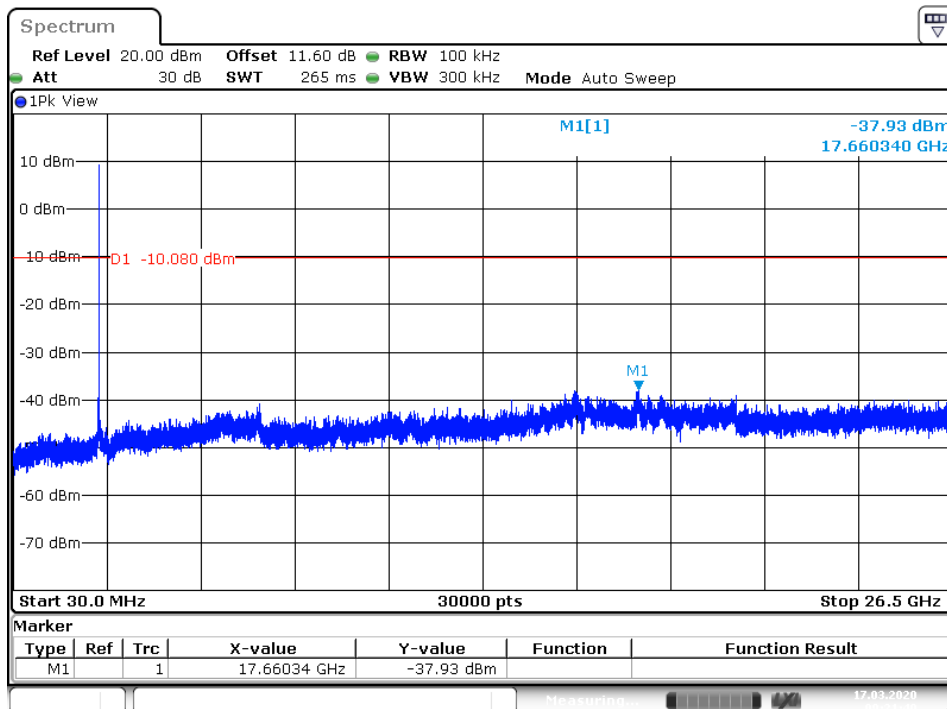
Test Plot 100kHz Conducted Emissions

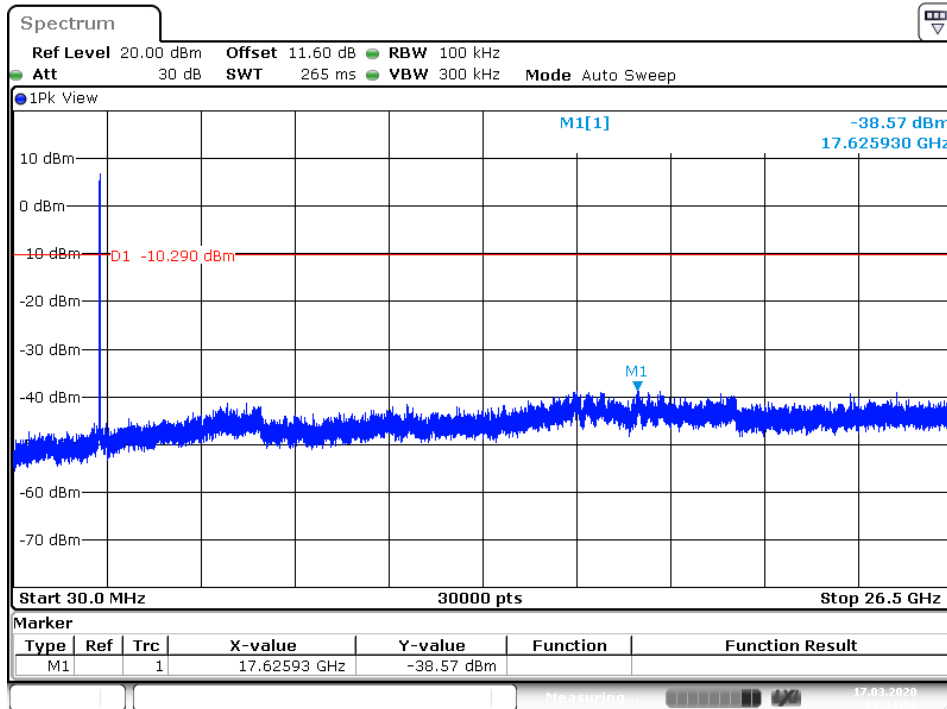
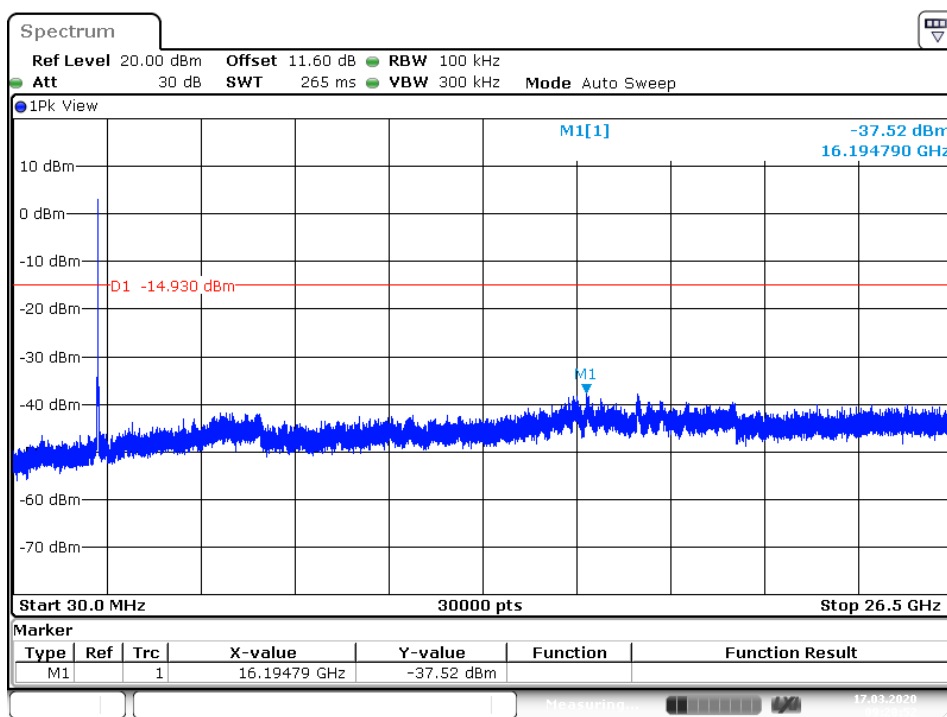
802.11b, Ant 1

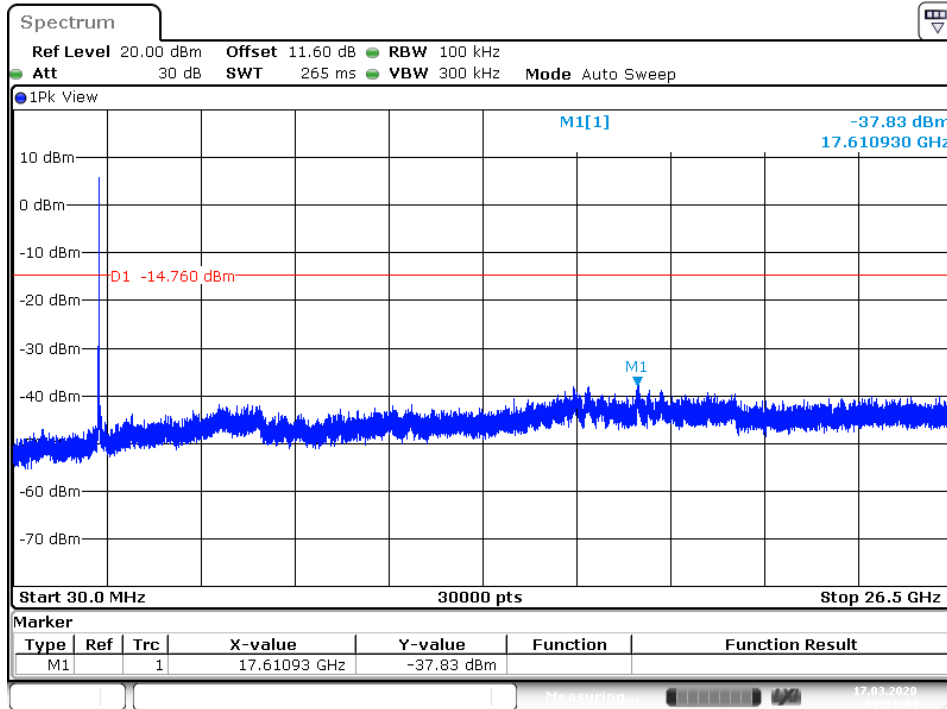
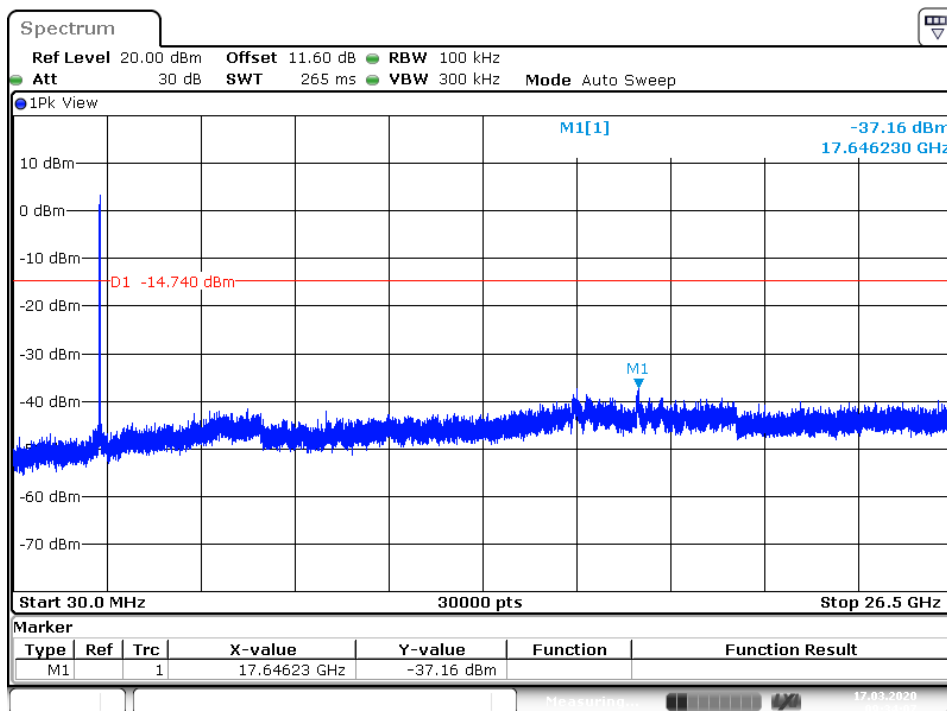
Low Channel

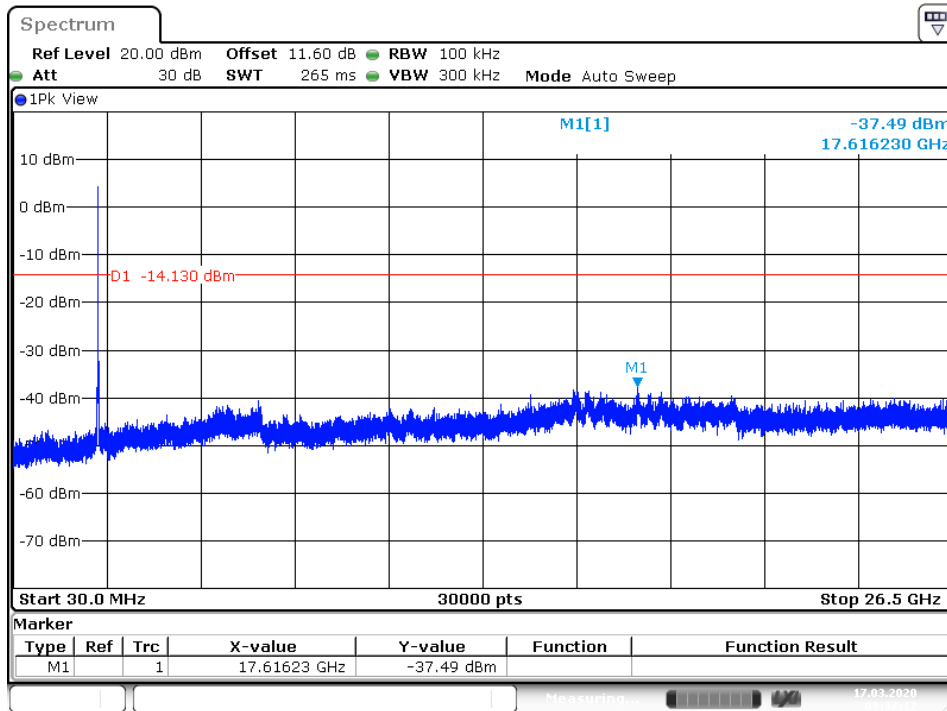
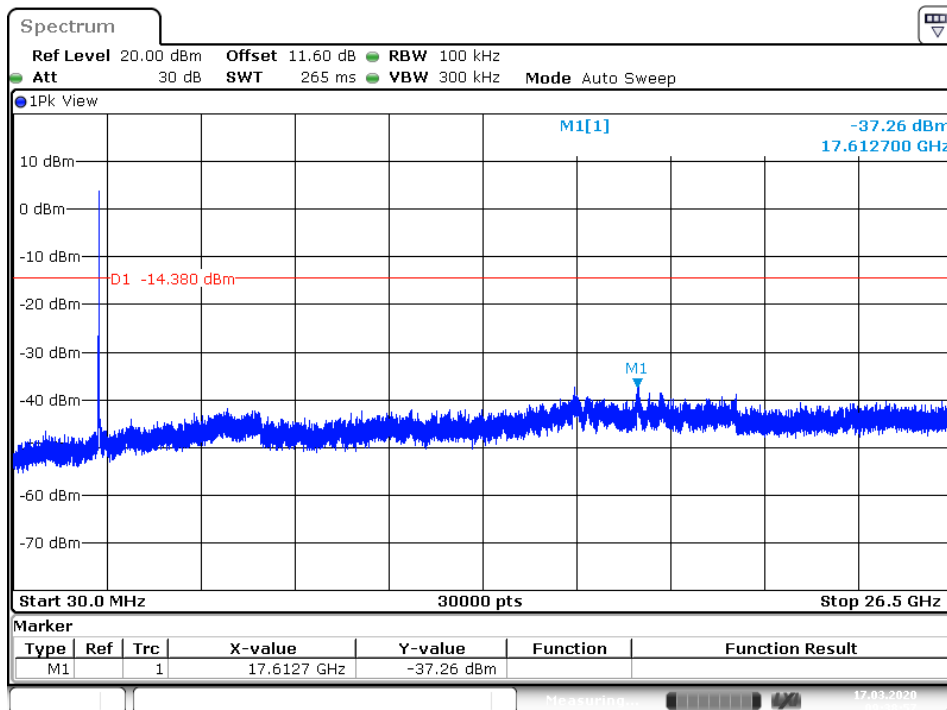


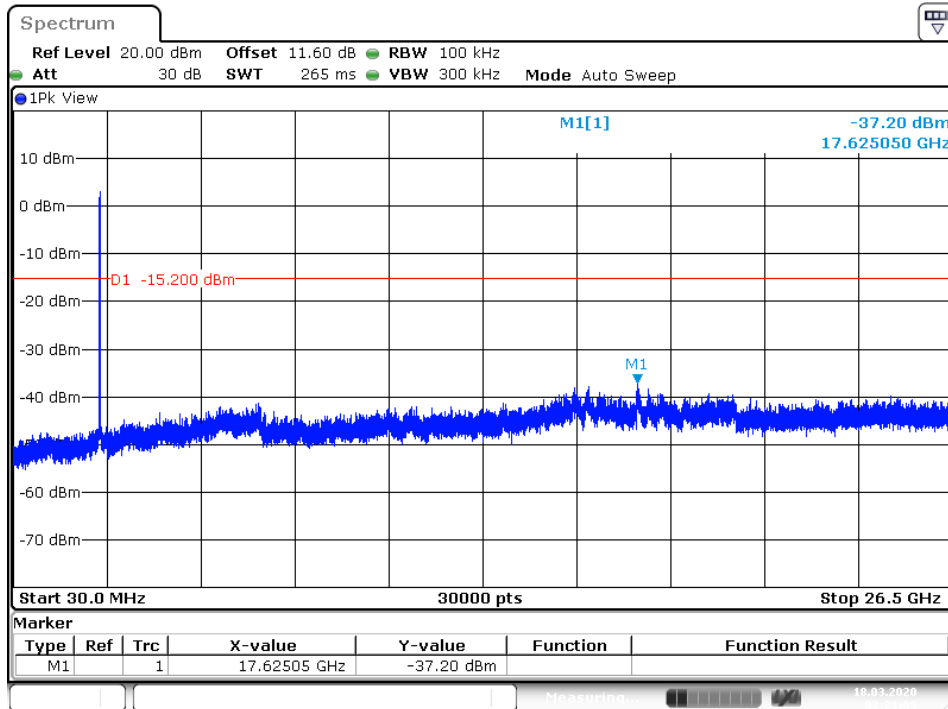
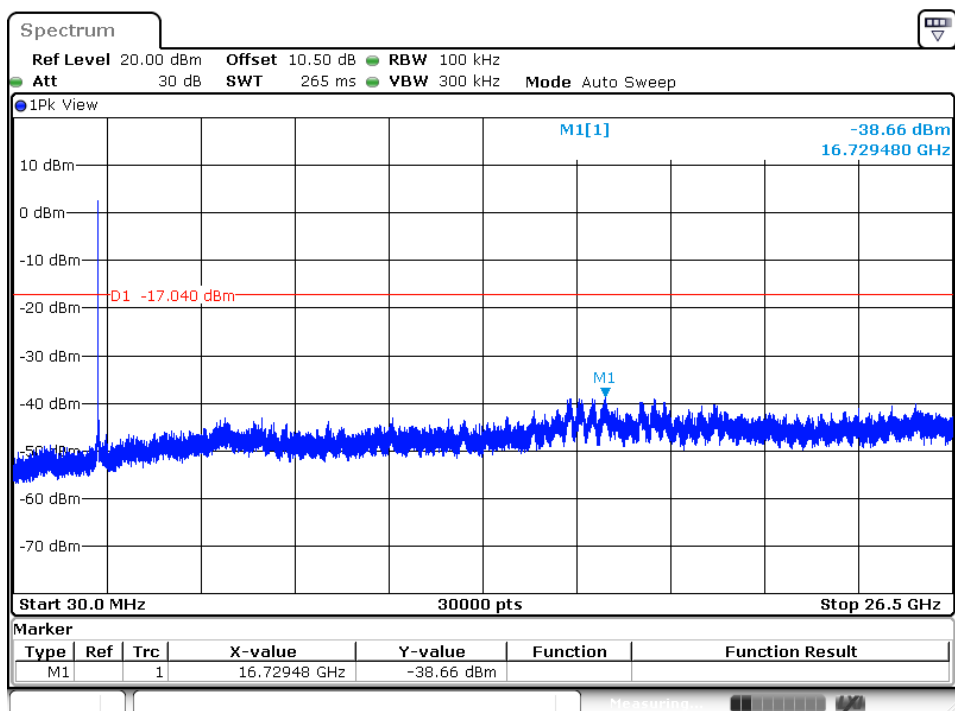
Middle Channel

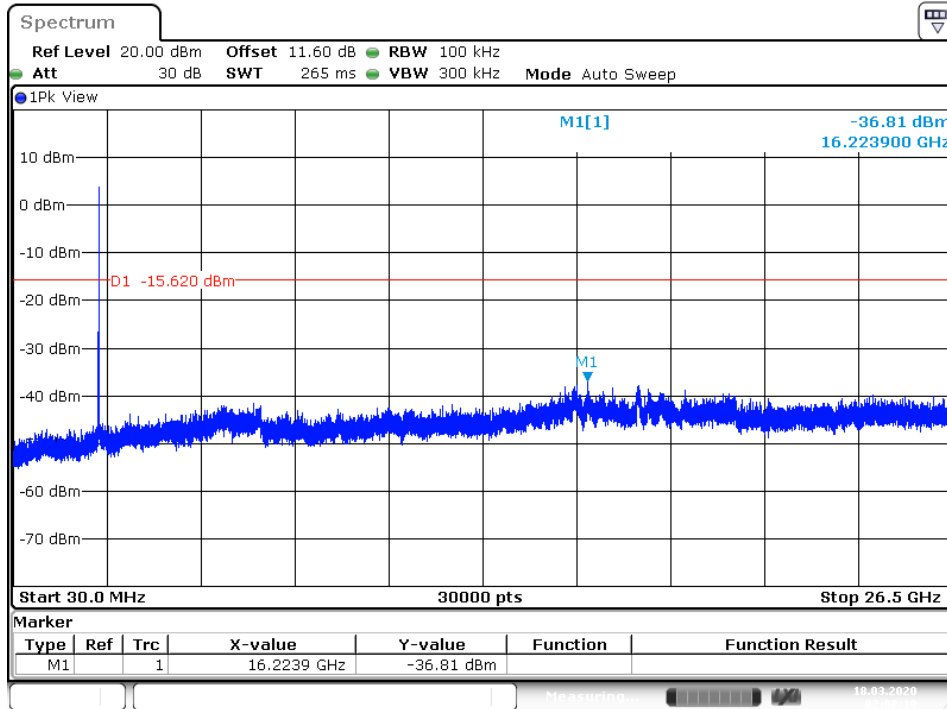
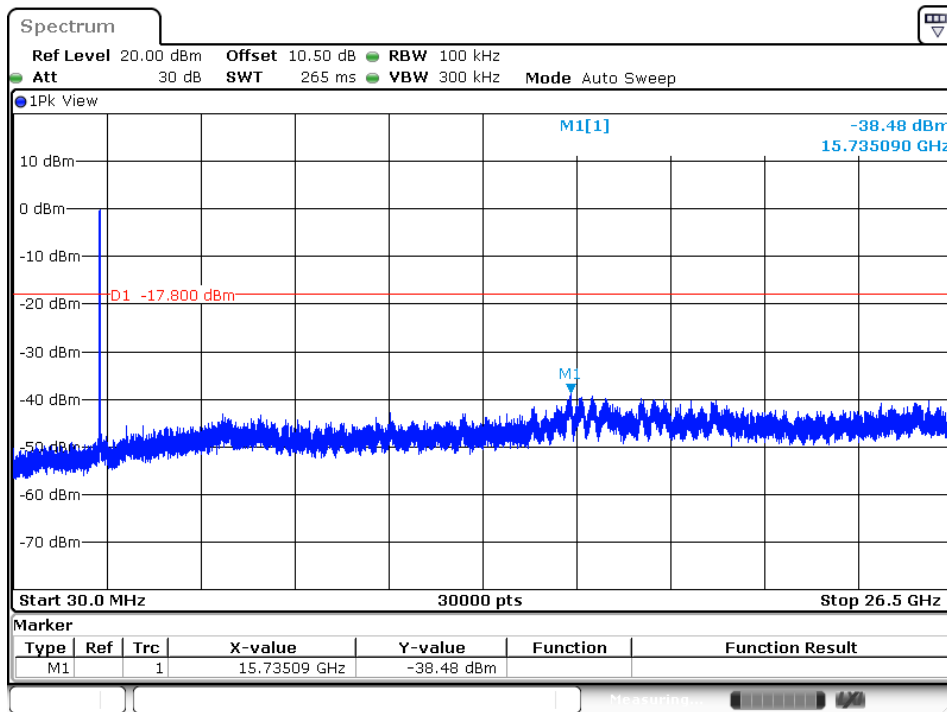


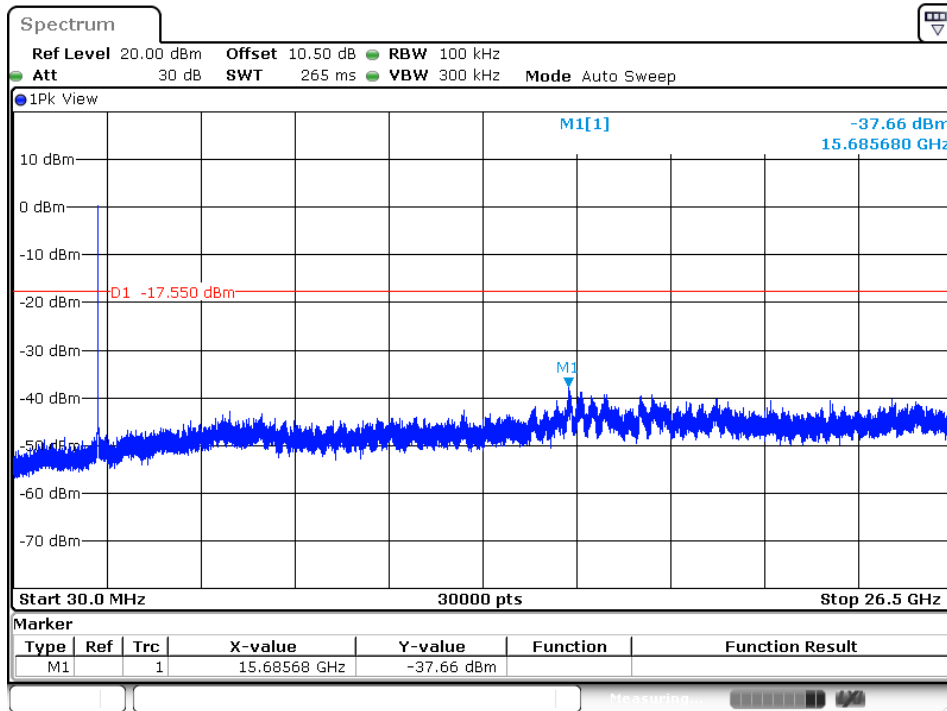
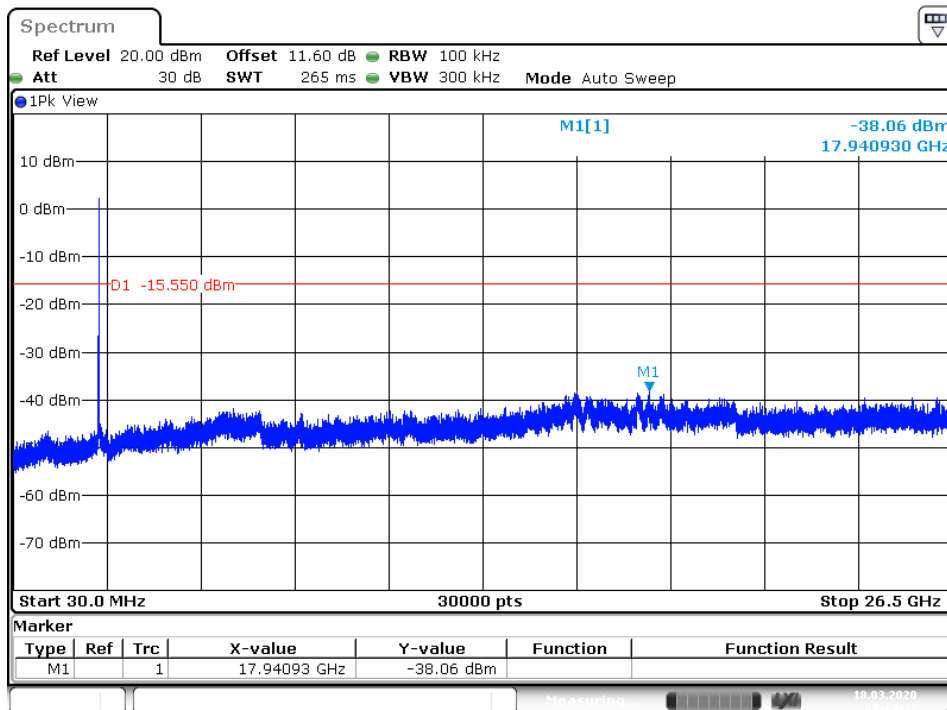
High Channel

802.11g. Ant 1
Low Channel


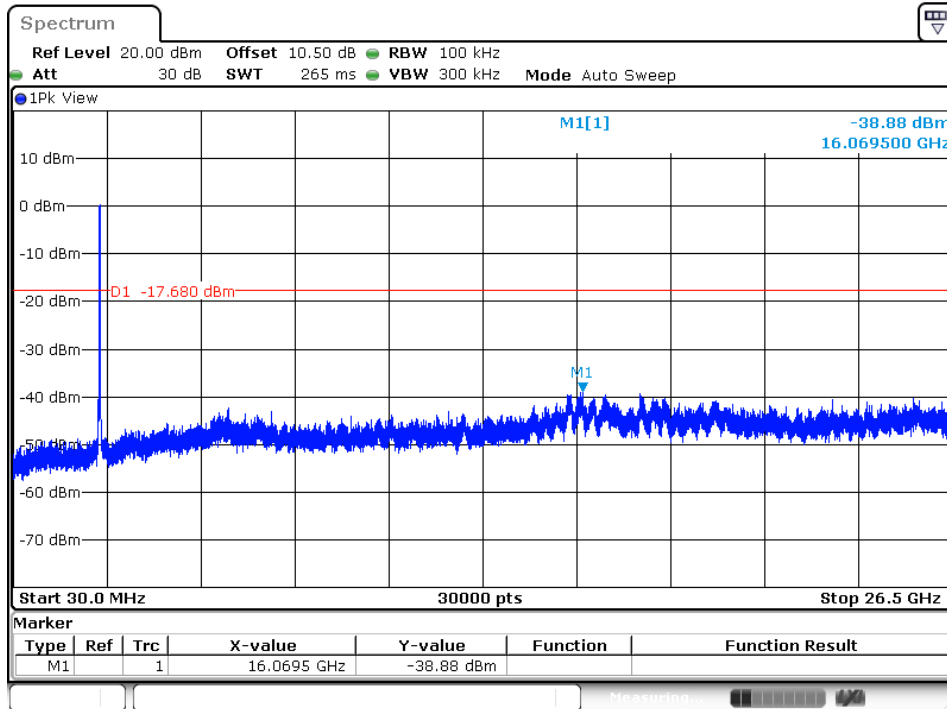
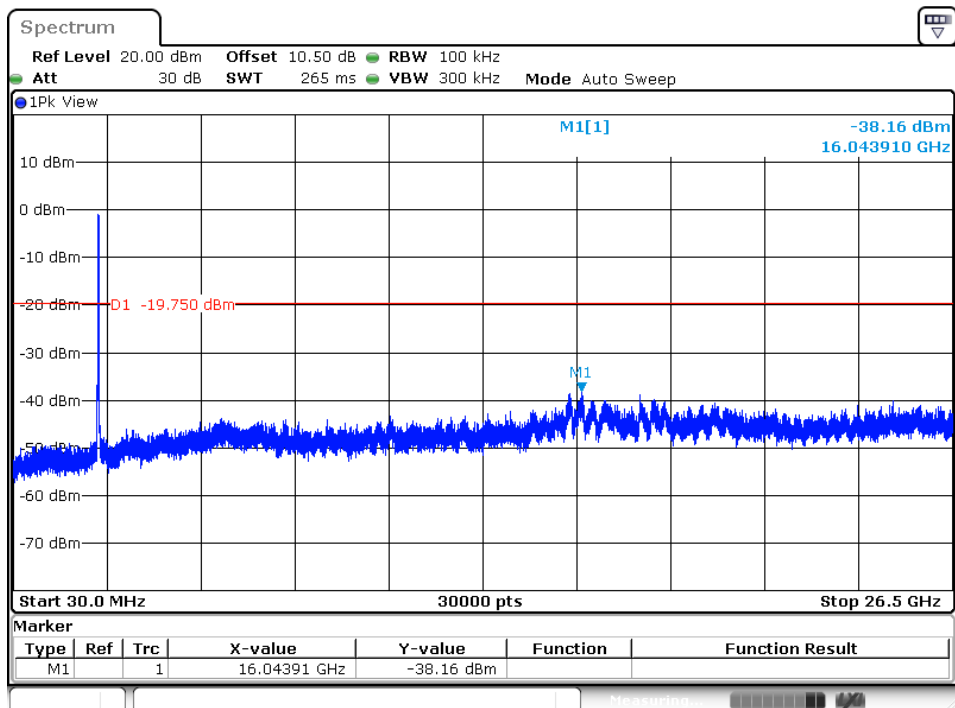
Middle Channel

High Channel


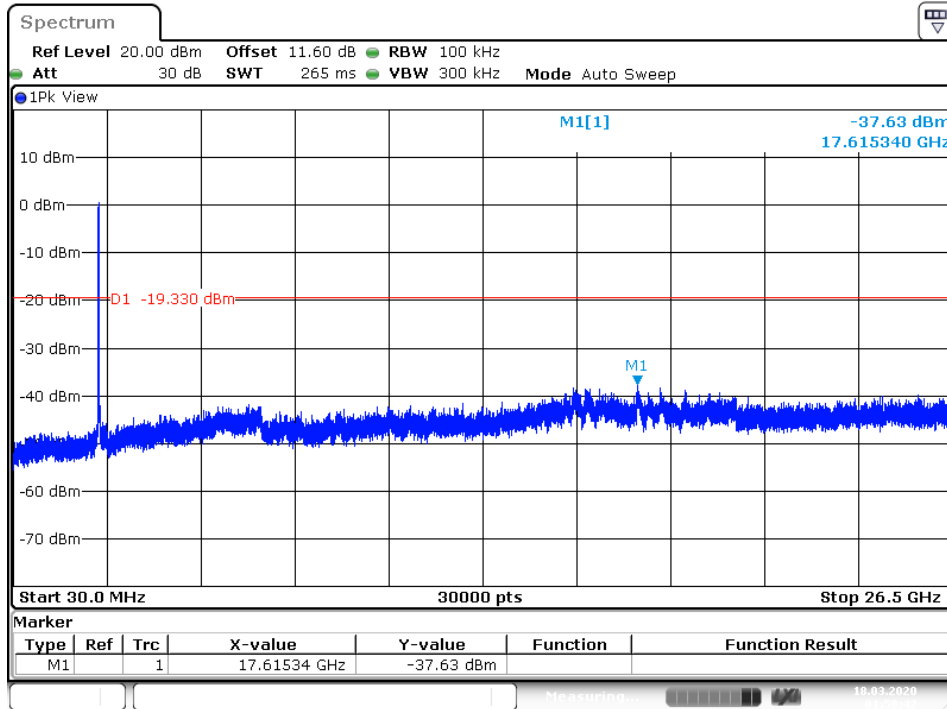
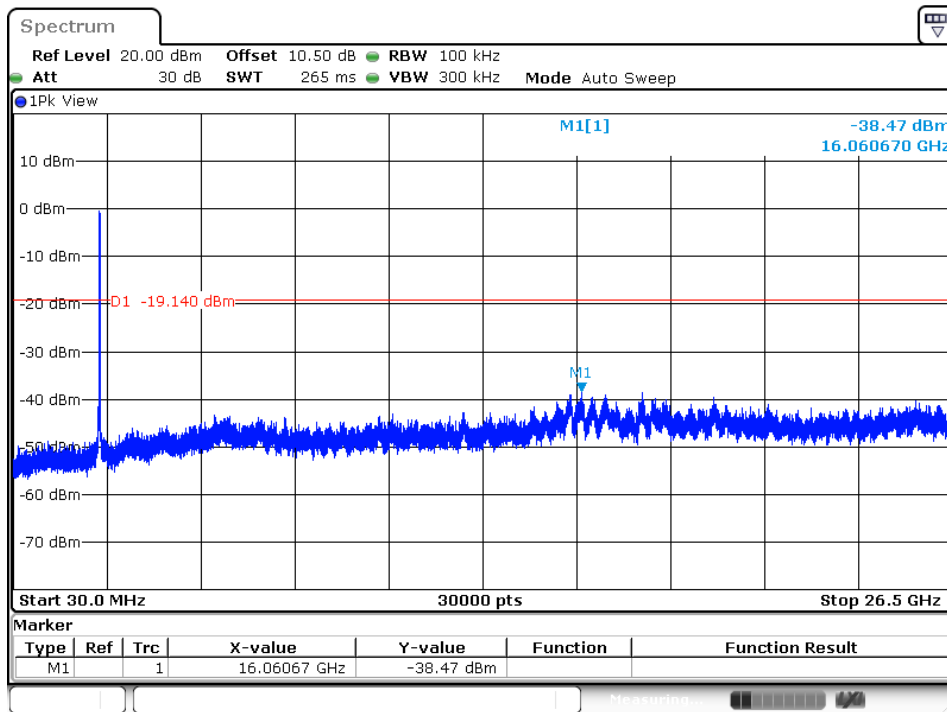
802.11g, Ant 2
Low Channel

Middle Channel


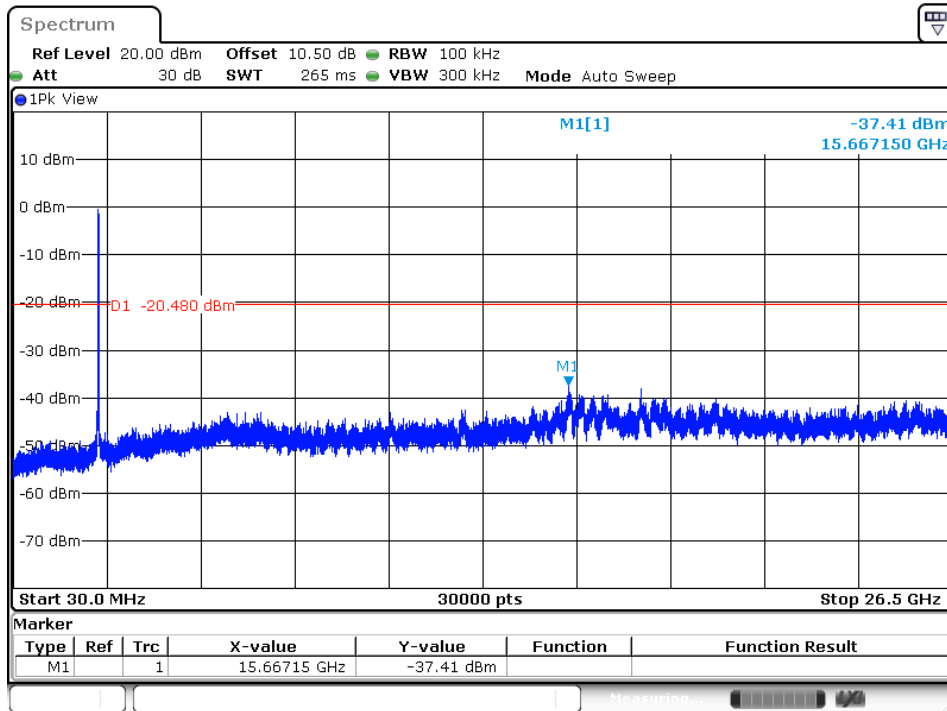
High Channel

802.11n HT20, Ant 1
Low Channel


Middle Channel

High Channel


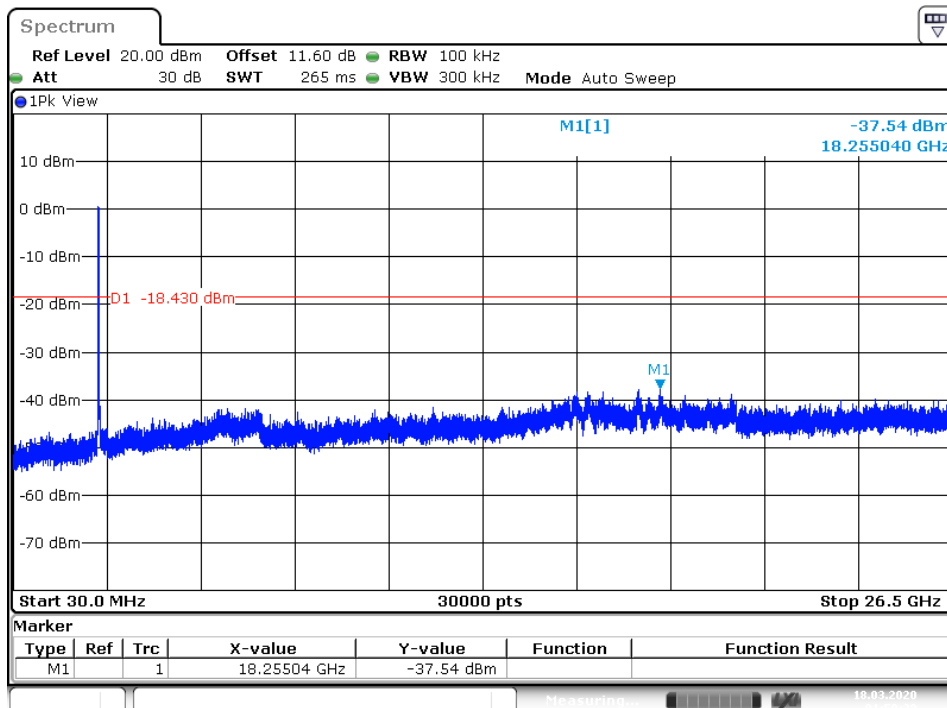
802.11n HT20, Ant 2
Low Channel

Middle Channel


High Channel

802.11n HT40, Ant 1
Low Channel


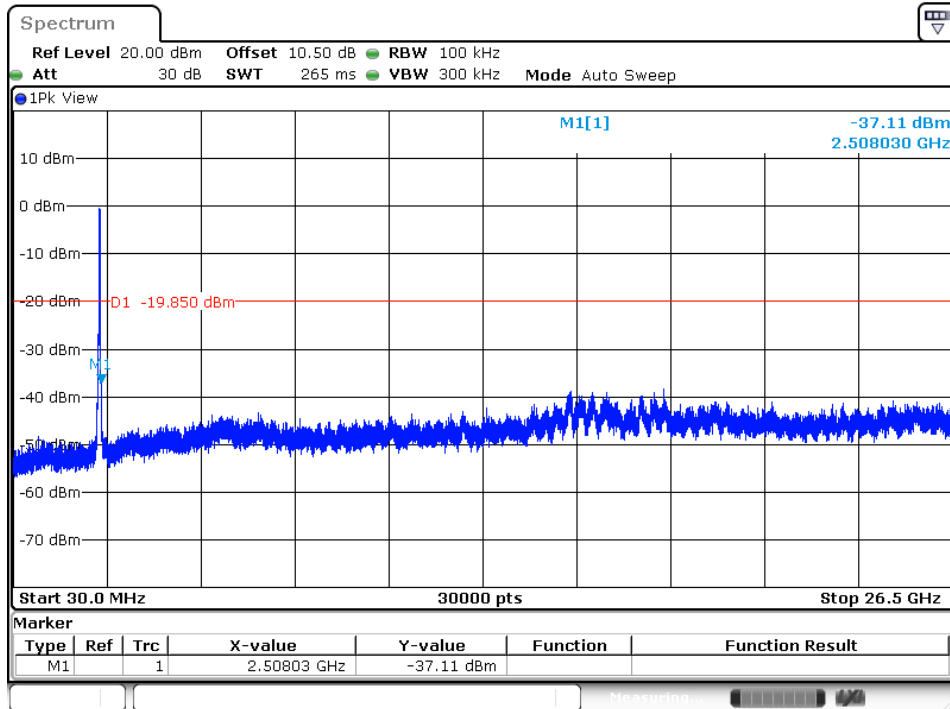
Middle Channel

High Channel


802.11n HT40, Ant 2
Low Channel


Date: 24.APR.2020 14:39:56

Middle Channel


Date: 18.MAR.2020 01:50:29

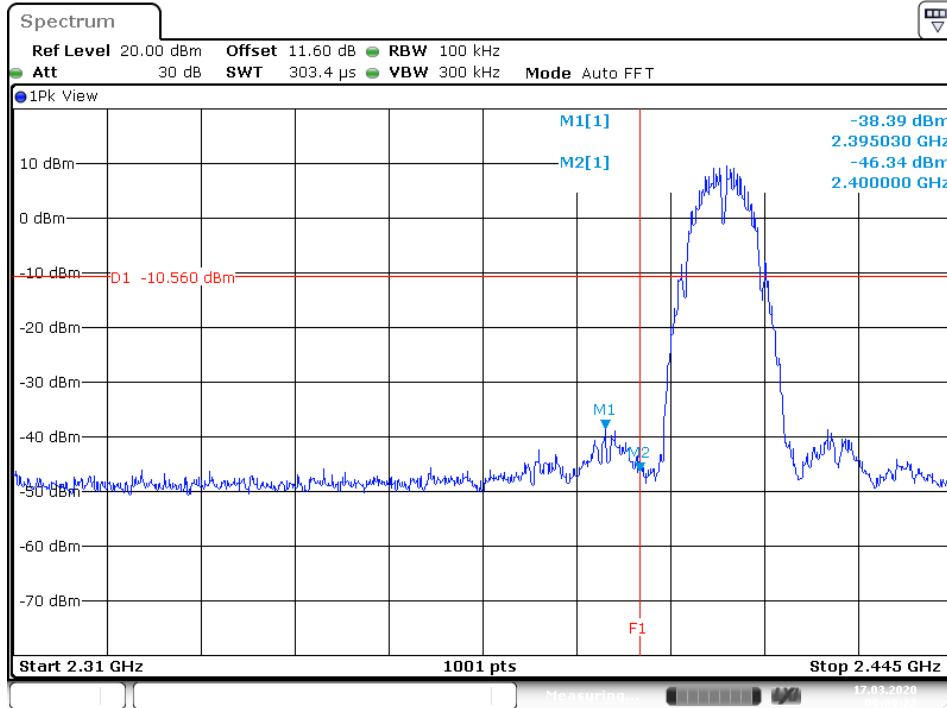
High Channel


Date: 24.APR.2020 14:47:14

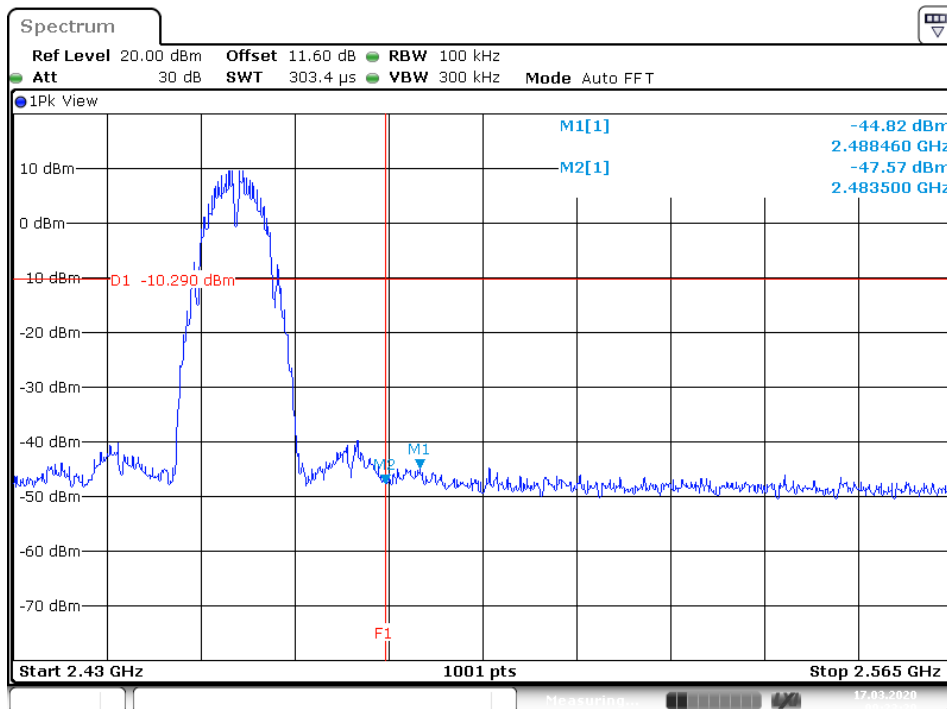
Test Plot 100kHz RBW of Band Edge

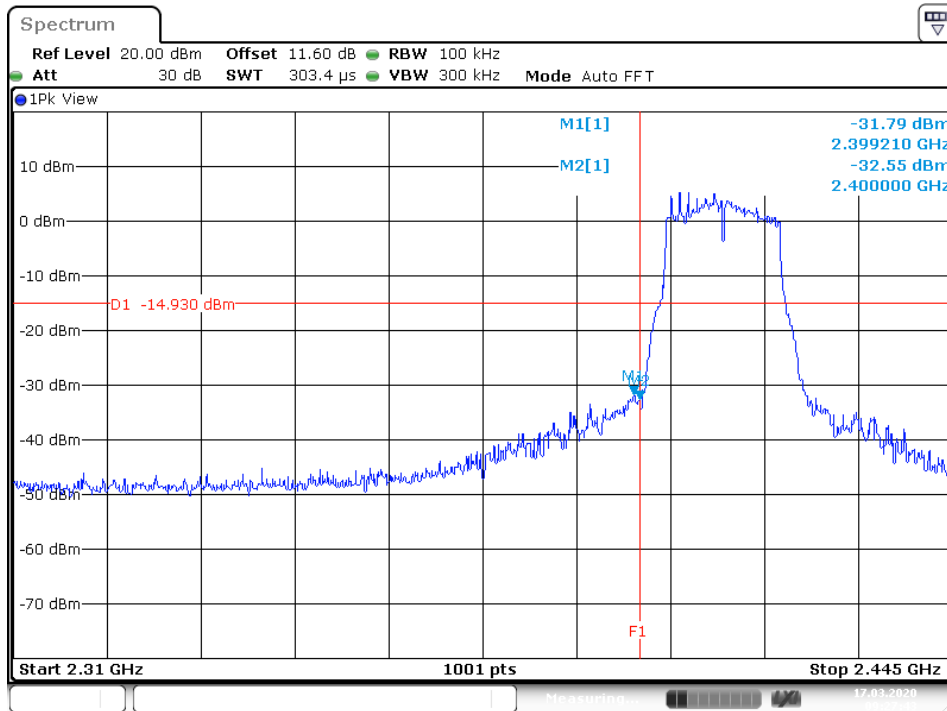
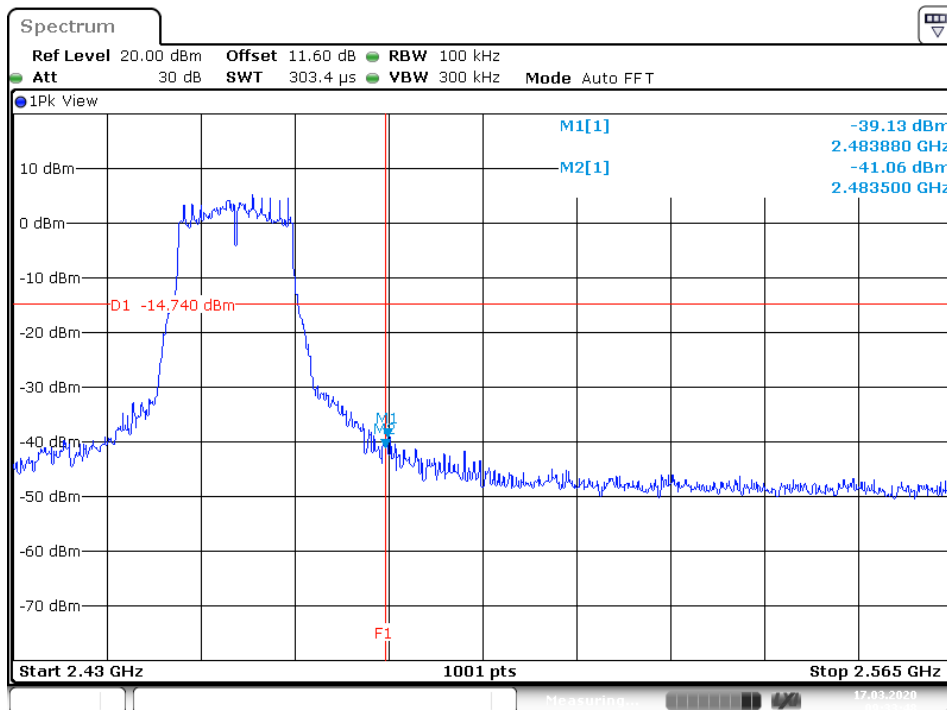
802.11b, Ant 1

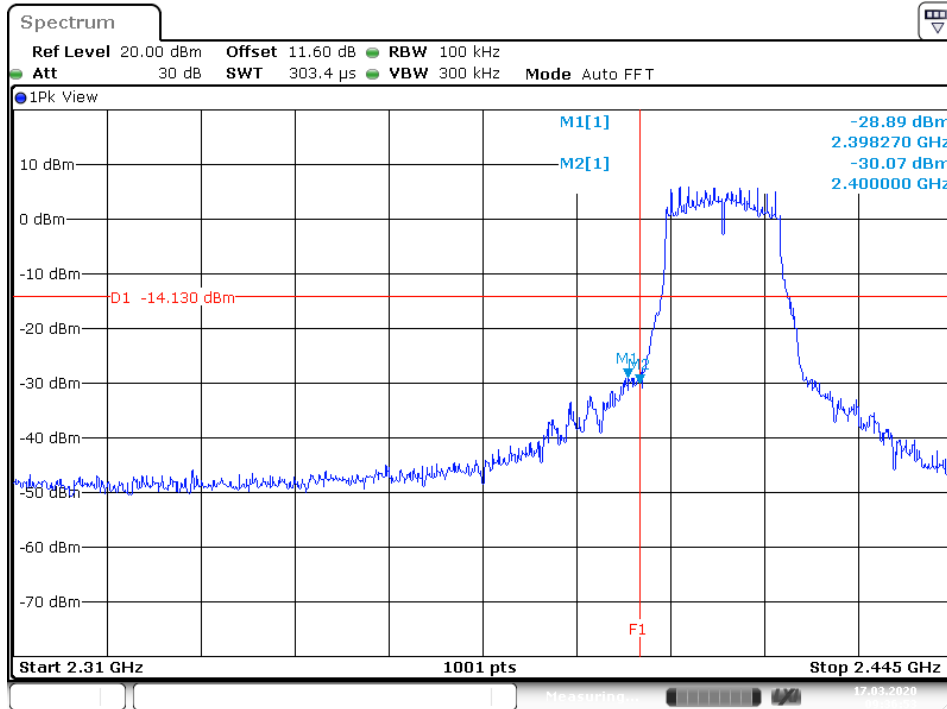
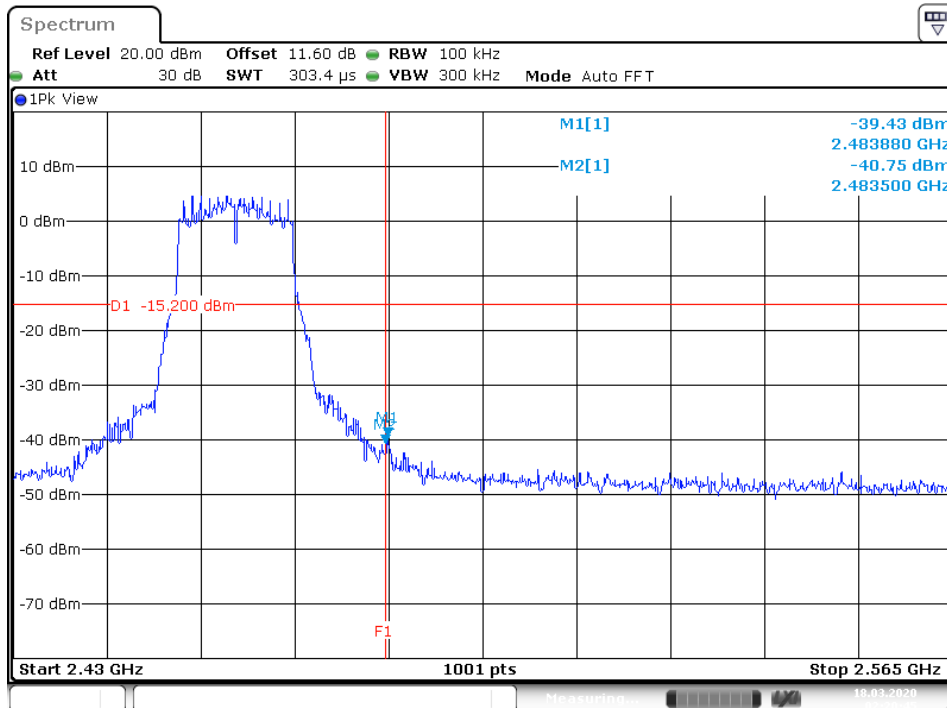
Low Channel

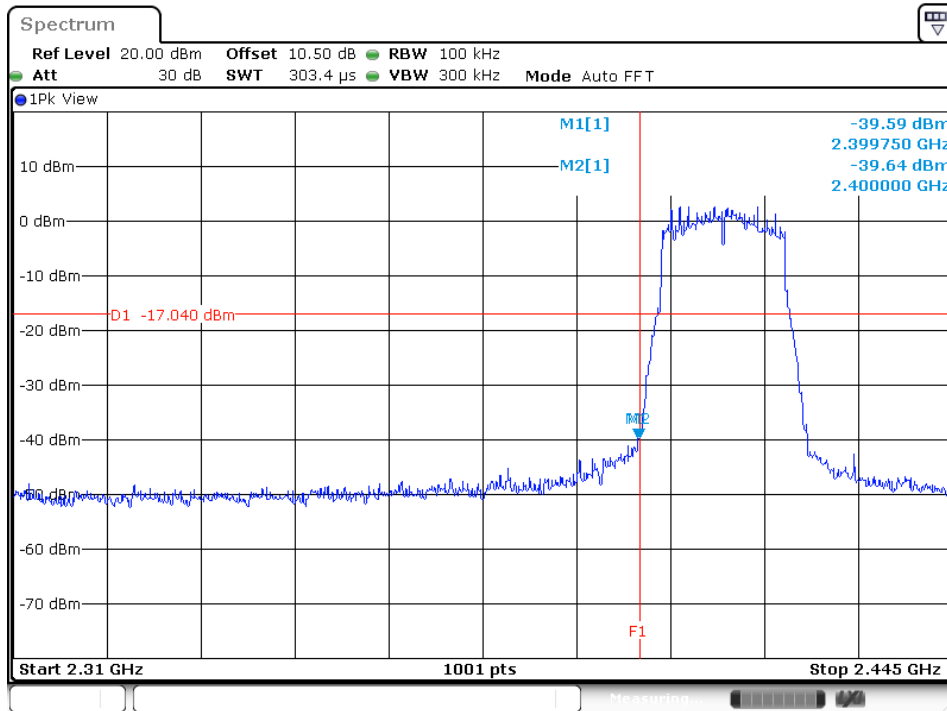
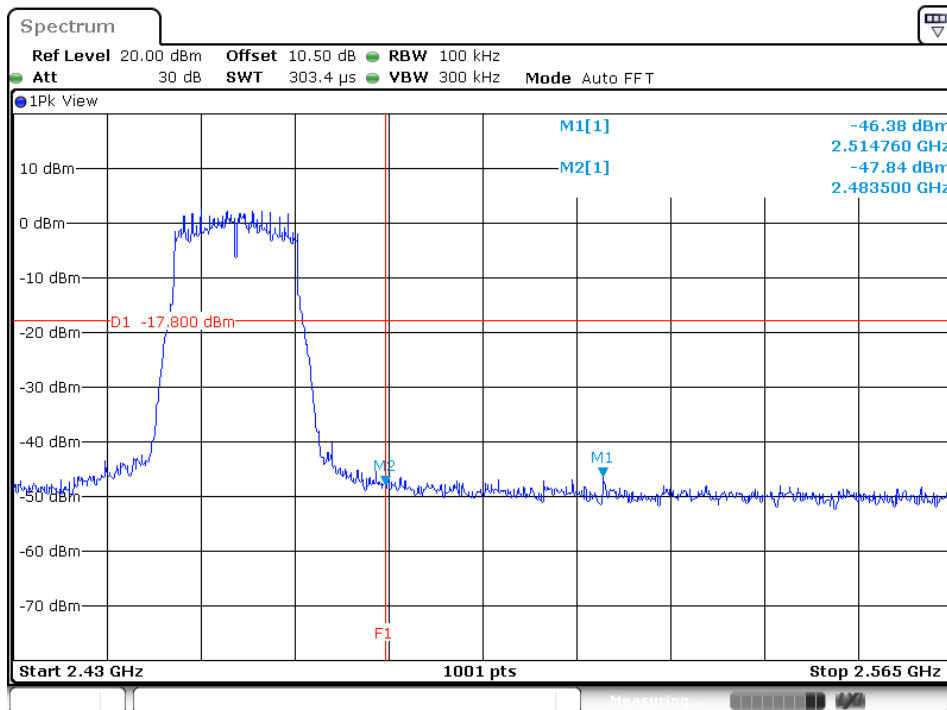


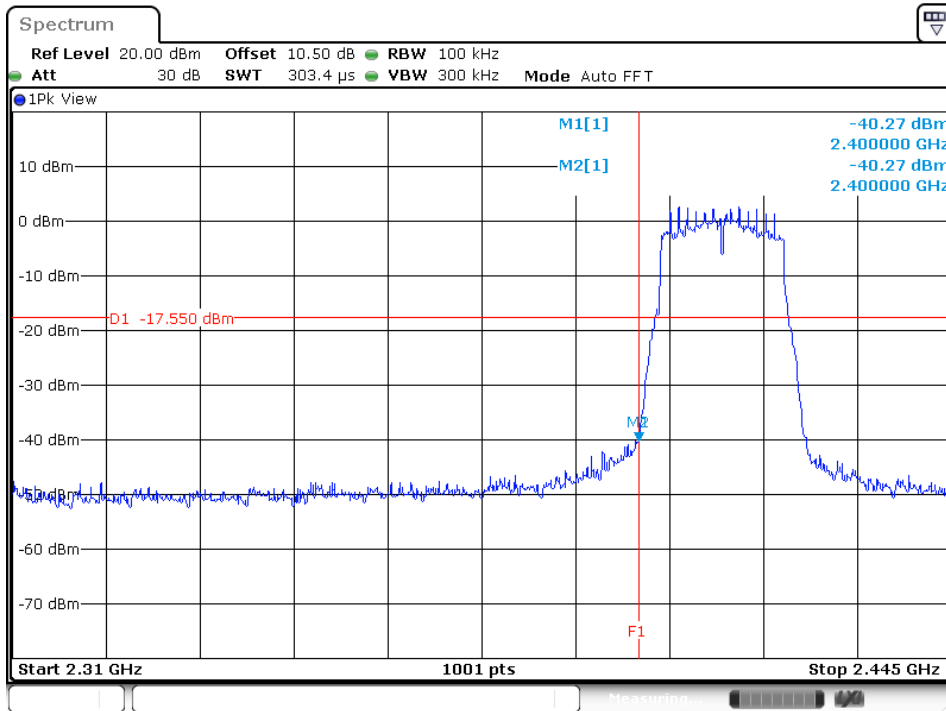
High Channel



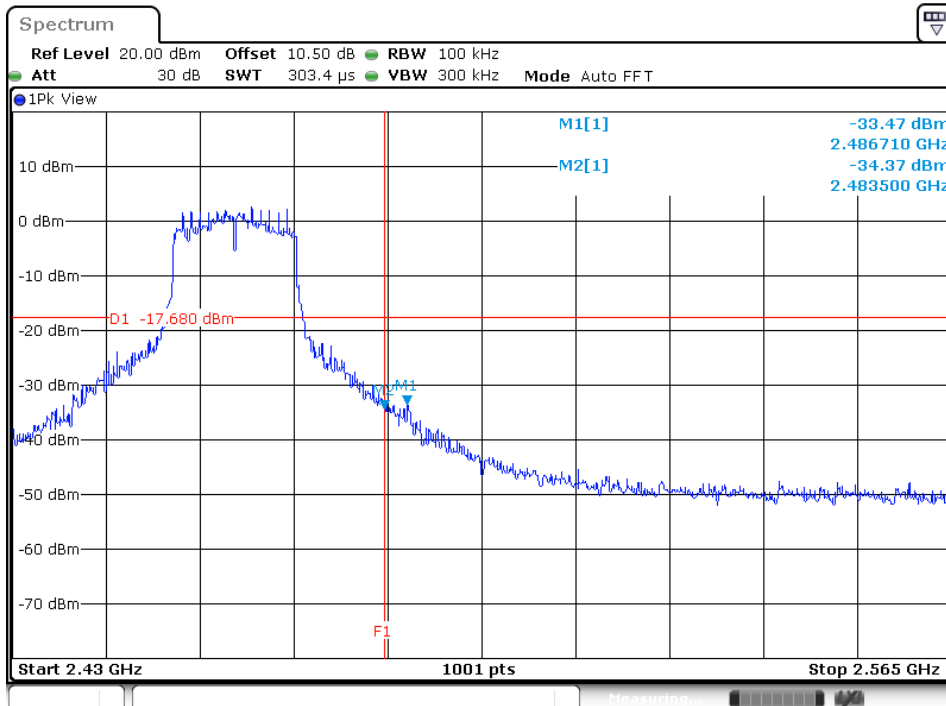
802.11g, Ant 1
Low Channel

High Channel


802.11g, Ant 2
Low Channel

High Channel


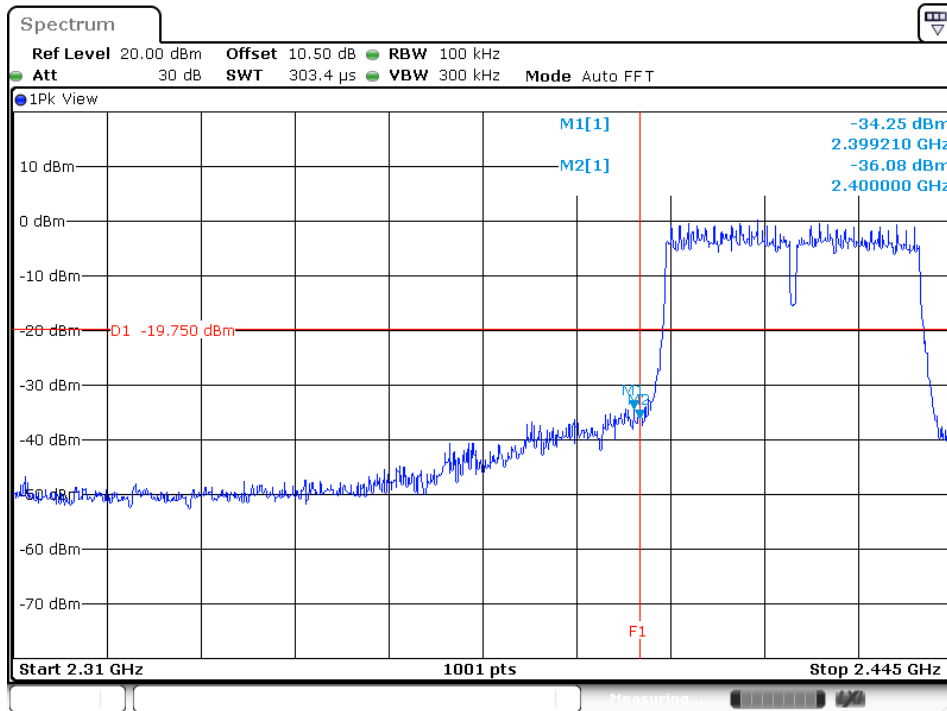
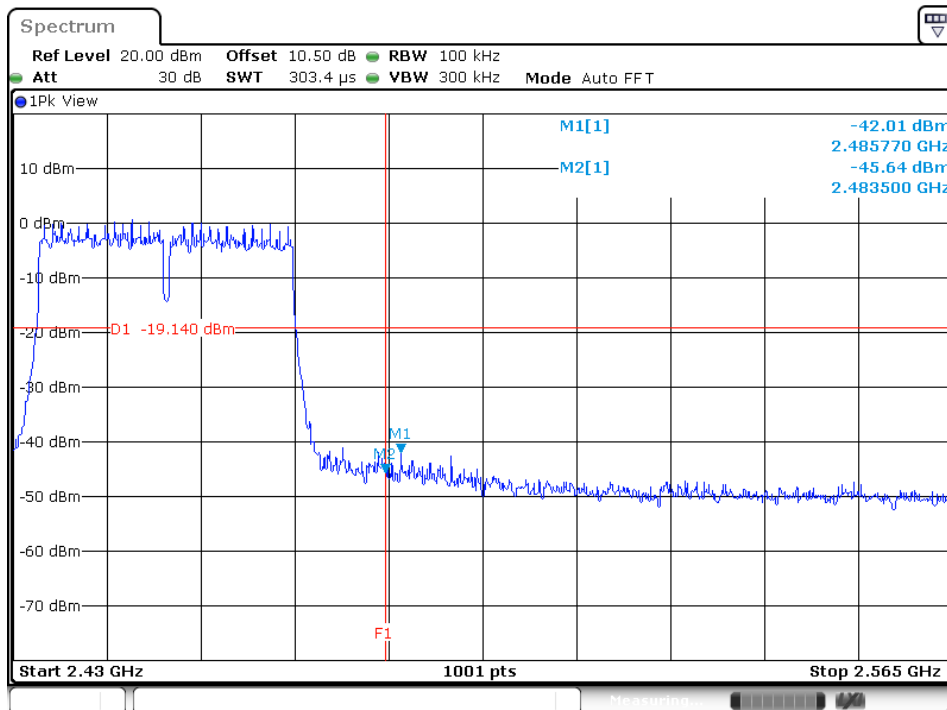
802.11n HT20, Ant 1
Low Channel

High Channel


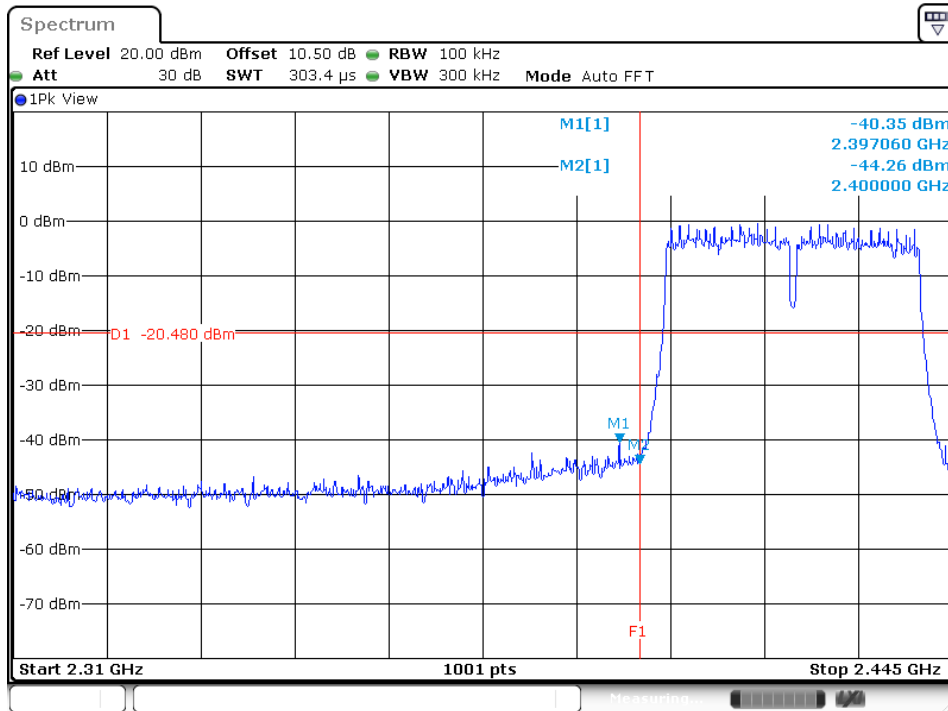
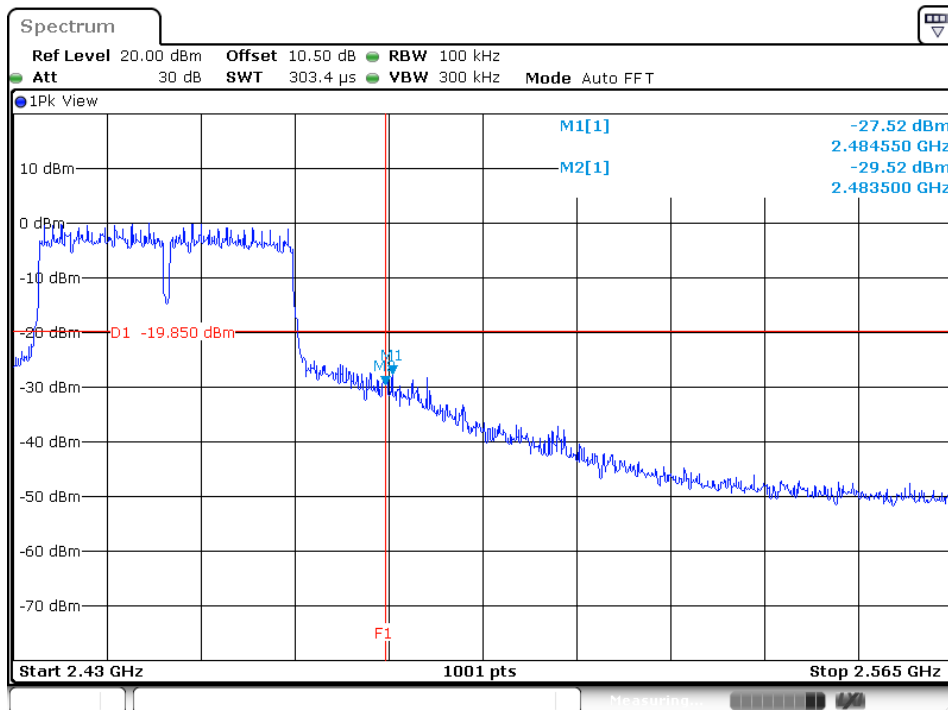
802.11n HT20, Ant 2
Low Channel


Date: 24.APR.2020 14:37:08

High Channel


Date: 24.APR.2020 14:34:09

802.11n HT40, Ant 1
Low Channel

High Channel


802.11n HT40, Ant 2
Low Channel

High Channel


5.1.6 Spurious Emission

RESULT:**Passed**

Test standard : FCC part 15.247(d), FCC 15.205, FCC 15.209
Basic standard : ANSI C63.10: 2013
Limits : Radiated emissions which fall in the restricted bands, as defined in FCC 15.205(a) must comply with the radiated emission limits specified in FCC 15.209(a). Emission radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in FCC15.247(d).
Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Refer to table 6
Antenna mode : 802.11b: SISO
802.11g/n: MIMO
Operation mode : A

Factor (dB/m)=Antenna Factor(dB/m)+Cable loss (dB)

Level(dBuV/m)=Reading(dBuV)+ Factor(dB/m)

Testing was carried out within frequency range 9kHz to the tenth harmonic. For details refer to Appendix D.

The Radiated Emissions testing was performed in the X, Y and Z axis orientation. The worst-case Axis orientation is recorded in this test report.

5.2 Mains Emissions

5.2.1 Mains Conducted Emissions

RESULT:**Passed**

Test standard : FCC Part 15.207
FCC Part 15.107
Limits : Mains Conducted emissions as defined in
above test standards must comply with the
mains conducted emission limits specified
Kind of test site : Shielded Room

Test setup

Test Channel : 802.11n HT40, 2422MHz
Operation mode : A
Ambient temperature : 20-24 °C
Relative humidity : 50-65 %
Atmospheric pressure : 100-103 kPa

Remark: For details refer to Appendix D.

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6. Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Passed**

Test standard : FCC CFR 47 Part 2 Subpart J Section 2.1091

Separation distance is more than 20 cm, thus mobile device exposure limits can be applied.

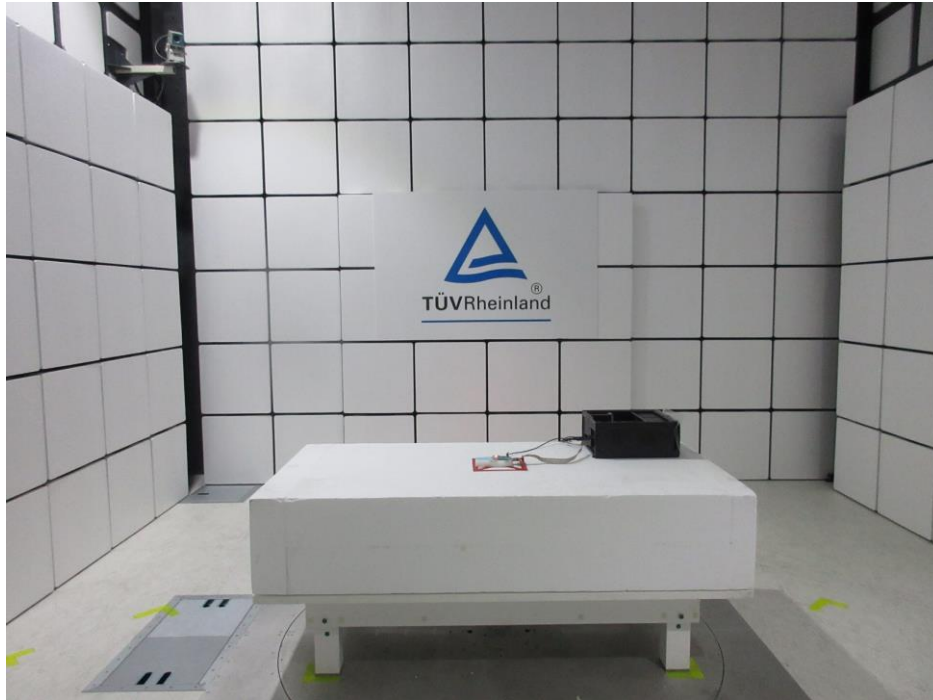
FCC Maximum Exposure:

Mode	Frequency (MHz)	Antenna Gain (dBi)	Antenna Gain (numeric)	Maximum Output Power (dBm)	Output Power (mW)	Power Density (S)(mW/cm ²)	Test Result
802.11g	2412	3.69	2.3388	29.3566	862.2971	0.401428	Pass

Limit FCC: 1500-100,000 MHz 1.0 mW/cm²

7. Photographs of the Test Set-Up

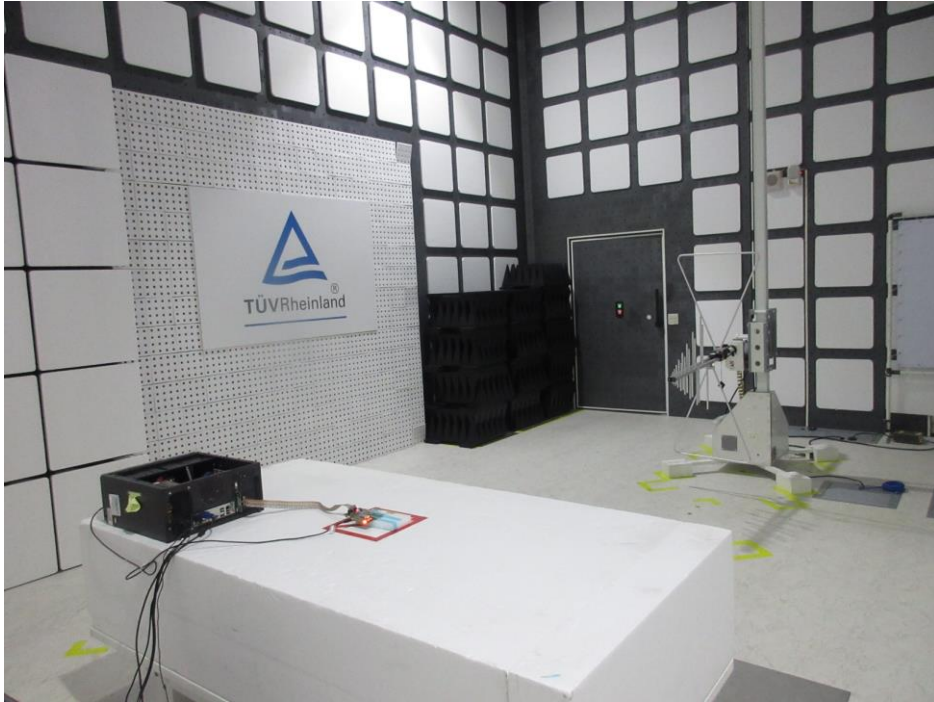
Photograph 1: Set-up for Spurious Emissions (Front View 1)



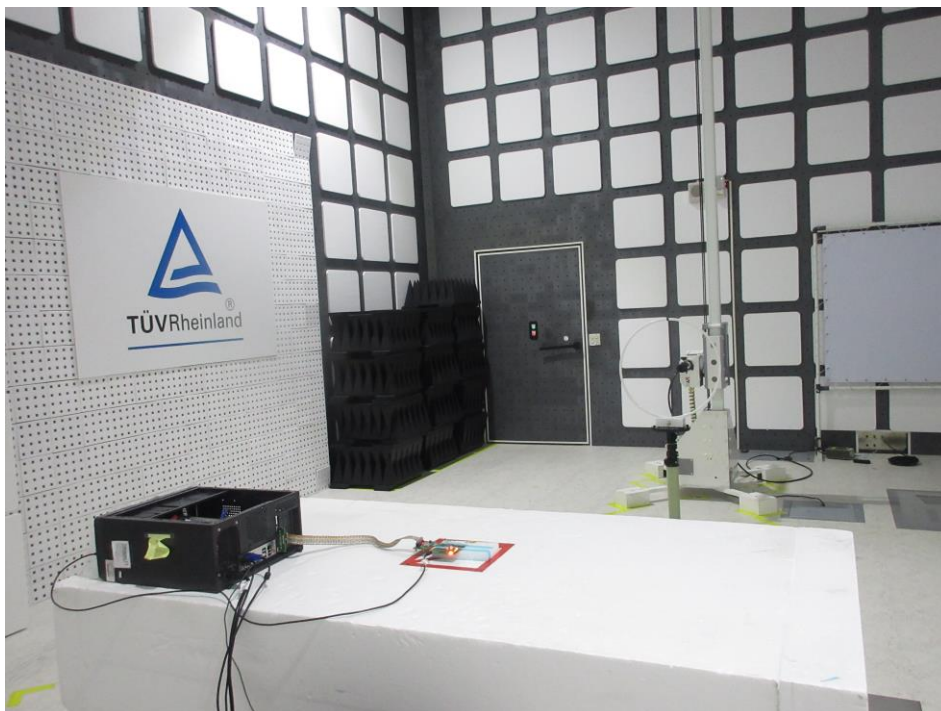
Photograph 2: Set-up for Spurious Emissions (Front View 2)



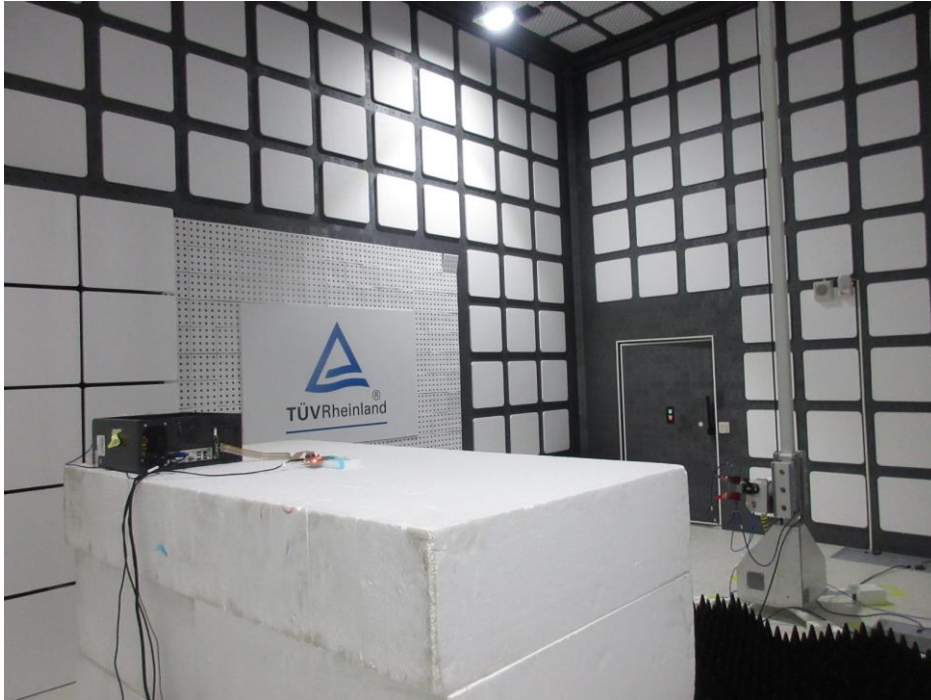
Photograph 3: Set-up for Spurious Emissions (Back View 1)



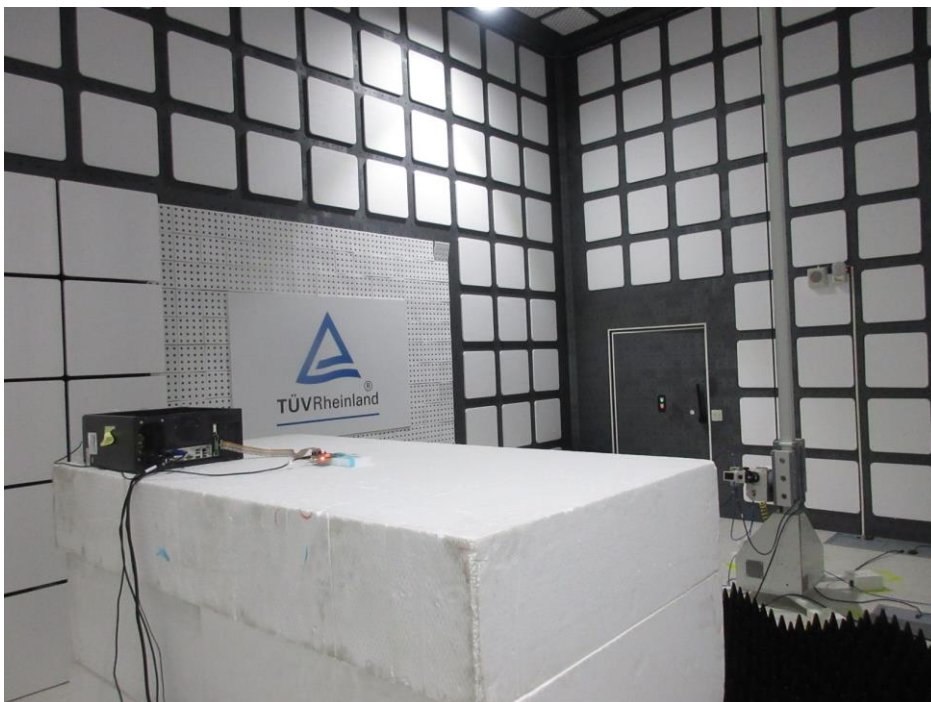
Photograph 4: Set-up for Spurious Emissions (Back View 2)



Photograph 5: Set-up for Spurious Emissions (Back View 3)



Photograph 6: Set-up for Spurious Emissions (Back View 4)



Photograph 7: Set-up for AC Mains (Front View)



Photograph 8: Set-up for AC Mains (Back View)



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