SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch

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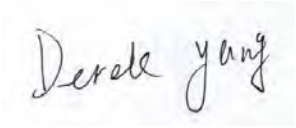
FCC TEST REPORT

Application No:	SZEM1807006549RG
Applicant:	Huawei Technologies Co., Ltd.
Address of Applicant	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer:	Huawei Technologies Co., Ltd.
Address of Manufacturer	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Product Name:	Smart Phone
Model No.(EUT):	HMA-L29, HMA-L09
Trade Mark:	HUAWEI
FCC ID:	QISHMA-LX9
Standards:	47 CFR Part 15, Subpart C
Test Method	KDB 558074 D01 DTS Meas Guidance v04 ANSI C63.10 (2013)
Date of Receipt:	2018-07-10
Date of Test:	2018-07-11 to 2018-08-20
Date of Issue:	2018-09-03
Test Result:	**PASS ***

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Derek Yang
Wireless Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2018-09-03		Original

Authorized for issue by:				
Tested By		Mike Hu **(Mike Hu) /Project Engineer**		2018-09-03 **Date**
Checked By		David Chen **(David Chen) /Reviewer**		2018-09-03 **Date**

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2013	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS

Remark:

According to the declaration from the applicant, the differences between HMA-L29 and HMA-L09 are identical except for HMA-L09 support single SIM card which deleted by software. Therefore we only test HMA-L29 in this report

Contents

4 General Information

4.1 Client Information

Applicant:	Huawei Technologies Co., Ltd.
Address of Applicant:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Manufacturer:	Huawei Technologies Co., Ltd.
Address of Manufacturer:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

4.2 General Description of EUT

Product Name:	Smart Phone
Model No.:	HMA-L29, HMA-L09
Trade Mark:	HUAWEI
Hardware Version:	HL1HIMAM
Software Version:	9.0.0.46(C432E55R1P7log)
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK,BPSK)
Sample Type:	Portable Device
Antenna Type:	PIFA
Antenna Gain:	-1.45dBi(ANT1);-5dBi(ANT2)
Power Supply	Battery Model: HB436486ECW Rated capacity: 3900mAh Nominal Voltage: ⎓ +3.82V Charging Voltage: ⎓ +4.40V
AC adaptor:	Model: HW-050450B00 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A Output: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A Model: HW-050450E00 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A Output: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A Model: HW-050450U00 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A

	Output: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A Model: HW-050450A00 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A Output: 5V ⎓ 2A OR4.5V ⎓ 5A OR 5V ⎓ 4.5A Model: HW-050450E01 Manufacturer: Huawei Technologies Co., Ltd. Input: 100V-240V~50/60Hz, 0.75A Output: 5V ⎓ 2A OR 9V ⎓ 2A

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Operation Frequency each of channel (802.11n HT40)						
Channel	Frequency	Channel	Frequency	Channel	Frequency	
3	2422MHz	6	2437MHz	9	2452MHz	
4	2427MHz	7	2442MHz			
5	2432MHz	8	2447MHz			

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency for 802.11b/g/n (HT20)	Frequency for 802.11n (HT40)
The Lowest channel	2412MHz	2422MHz
The Middle channel	2437MHz	2437MHz
The Highest channel	2462MHz	2452MHz

4.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	50 % RH
Atmospheric Pressure:	101.30 KPa
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

4.4 Description of Support Units

The EUT has been tested independent unit.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• VCCI

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• FCC –Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

4.10 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	Radiated Spurious emission test	±4.5dB (30MHz-1GHz)
		±4.8dB (1GHz-25GHz)
5	Conduct emission test	±3.12 dB (9KHz- 30MHz)
6	Temperature test	±1°C
7	Humidity test	±3%
8	DC and low frequency voltages	±0.5%

4.11 Equipment List

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Duedate (yyyy-mm-dd)
1	Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017/10/09	2018/10/09
2	LISN	Rohde & Schwarz	ENV216	SEM007-01	2018/02/14	2019/02/13
3	LISN	ETS-LINDGREN	3816/2	SEM007-02	2017/09/28	2018/09/28
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	2017/09/28	2018/09/28
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	2017/09/28	2018/09/28
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	2018/02/14	2019/02/13
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2017/10/09	2018/10/09
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017/10/09	2018/10/09

RF conducted test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Duedate (yyyy-mm-dd)
1	Dual Output Mobile Communication DC Source	Agilent Technologies Inc	66311B	W009-09	2018/04/28	2019/04/28
2	Signal Analyzer	Rohde &Schwarz	FSV	W025-02	2018/03/13	2019/03/12
3	Signal Generator	Rohde &Schwarz	SML03	SEM006-02	2018/02/14	2019/02/13
4	Power Meter	Rohde &Schwarz	NRVS	SEM014-02	2017/10/09	2018/10/09
5	Power Sensor	Agilent Technologies	U2021XA	SEM009-01	2017/10/09	2018/10/09

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2018/03/10	2019/03/09
2	EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2017/10/09	2018/10/09
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/11/01	2020/11/01
4	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015/10/17	2018/10/17
5	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2017/11/24	2020/11/24
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018/02/14	2019/02/13
7	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2017/10/17	2018/10/17
8	Pre-Amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018/03/14	2019/03/14
9	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
10	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017/10/09	2018/10/09
11	Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2018/03/10	2019/03/09

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date (yyyy-mm-dd)	Cal. Due date (yyyy-mm-dd)
1	10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2018/03/10	2019/03/09
2	EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2018/02/14	2019/02/13
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016/06/29	2019/06/29
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2018/04/28	2019/04/28
5	.Loop Antenna	ETS-Lindgren	6502	SEM003-08	2018/08/14	2021/08/14

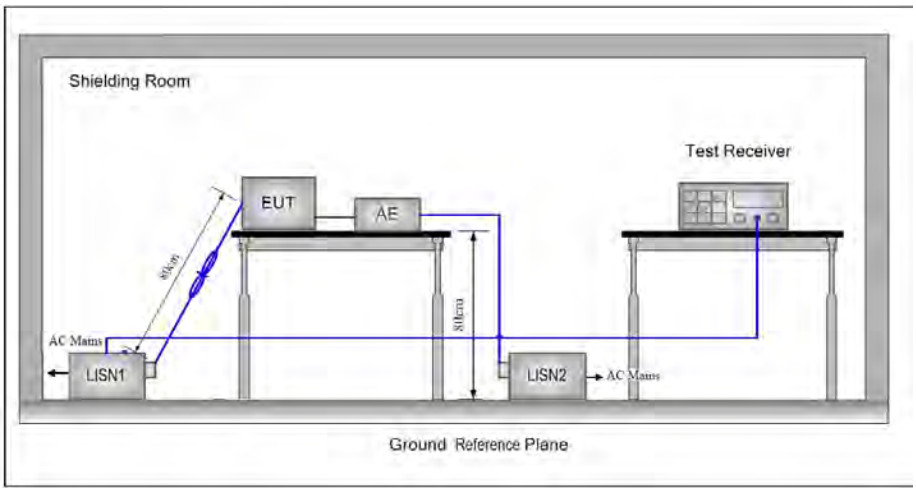
RE in Chamber						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal. date (yyyy-mm-dd)**	**Cal.Due date (yyyy-mm-dd)**
1	3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	20180/3/10	2019/03/09
2	EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2018/06/18	2019/06/17
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017/11/15	2020/11/15
4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2017/10/09	2018/10/09
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/05/14	2020/05/13
6	Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2017/11/24	2020/11/24
7	HornAntenna (26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2017/10/17	2020/10/16
8	Low Noise Amplifier	Black Diamond Series	BDLNA-0118-352810	SEM005-05	2017/10/09	2018/10/09
9	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018/02/14	2019/02/13
10	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2017/10/17	2018/10/17
11	Pre-Amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2018/03/14	2019/03/14
12	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -1.45dBi(ANT1);-5dBi(ANT2)	

5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	150kHz to 30MHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test Procedure:	1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.
Test Setup:	

Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel. Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11b at lowest channel is the worst case. Charge + Transmitting mode. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

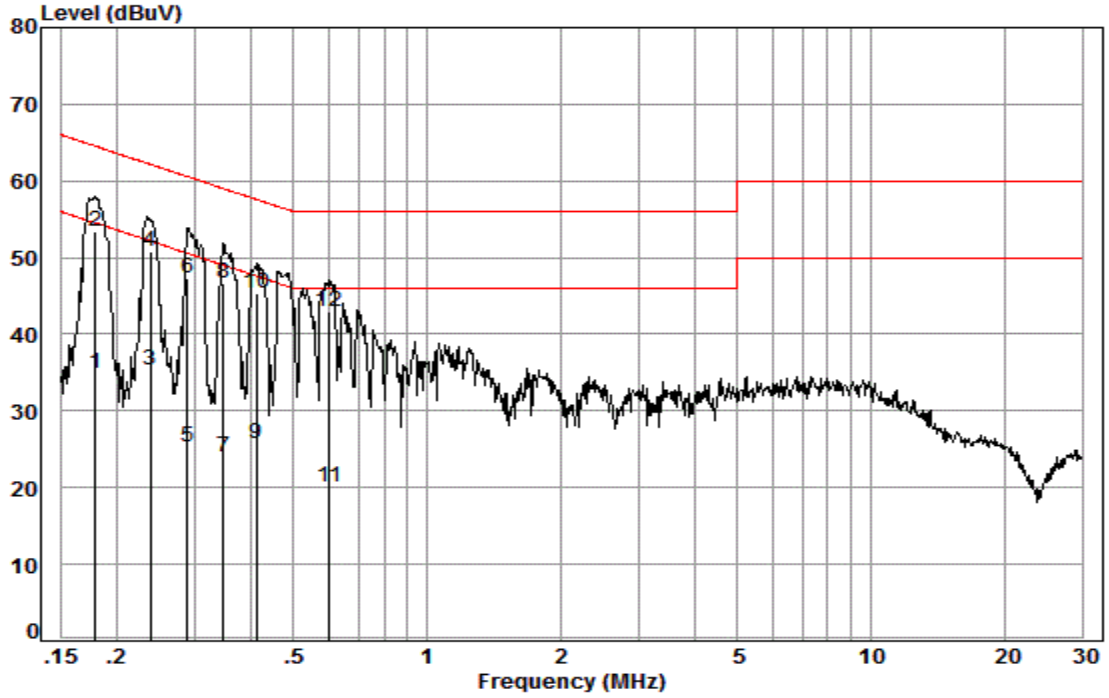
Mode d=2.4G WiFi Conducted Emission

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

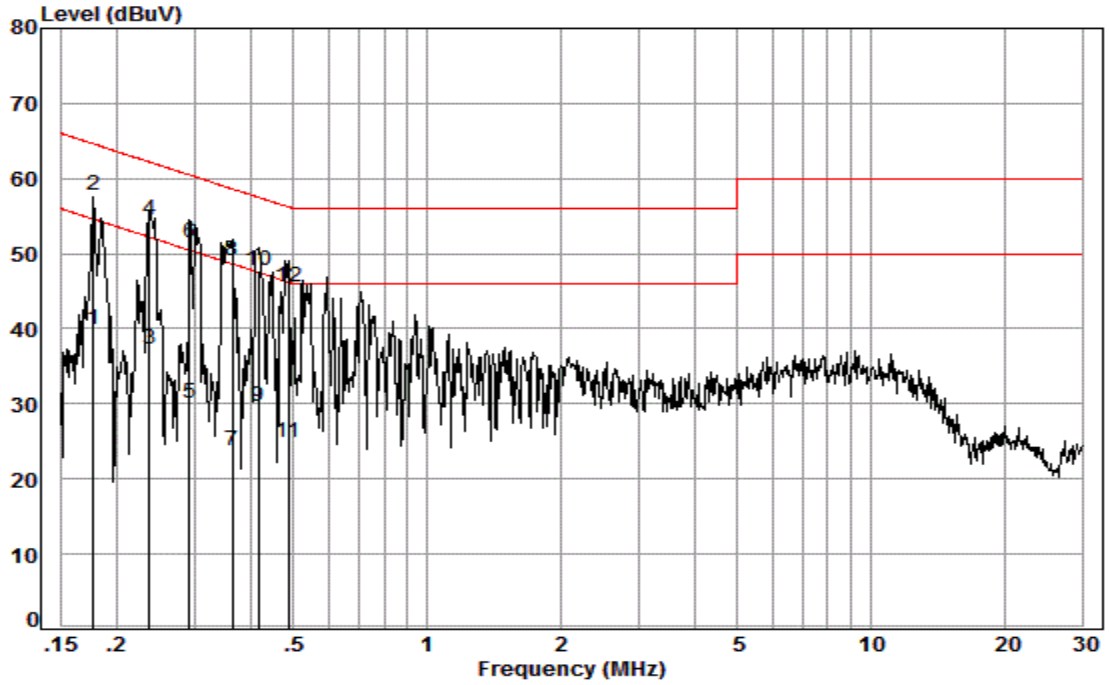
Live Line:



Site : Shielding Room
Condition: Line
Job No. : 06549RG
Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.18	0.03	9.51	25.45	34.99	54.55	-19.56	Average
2	0.18	0.03	9.51	43.92	53.46	64.55	-11.09	QP
3	0.24	0.03	9.51	25.72	35.26	52.17	-16.91	Average
4	0.24	0.03	9.51	41.26	50.80	62.17	-11.37	QP
5	0.29	0.03	9.51	15.71	25.25	50.59	-25.34	Average
6	0.29	0.03	9.51	37.77	47.31	60.59	-13.28	QP
7	0.35	0.03	9.50	14.46	23.99	49.00	-25.01	Average
8	0.35	0.03	9.50	37.03	46.56	59.00	-12.44	QP
9	0.41	0.04	9.49	16.27	25.80	47.59	-21.79	Average
10	0.41	0.04	9.49	35.75	45.28	57.59	-12.31	QP
11	0.60	0.06	9.53	10.48	20.07	46.00	-25.93	Average
12	0.60	0.06	9.53	33.42	43.01	56.00	-12.99	QP

Neutral Line:



Site : Shielding Room
Condition: Neutral
Job No. : 06549RG
Test mode: d

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.18	0.03	9.59	30.27	39.89	54.64	-14.75	Average
2	0.18	0.03	9.59	48.05	57.67	64.64	-6.97	QP
3	0.24	0.03	9.58	27.62	37.23	52.22	-14.99	Average
4	0.24	0.03	9.58	44.96	54.57	62.22	-7.65	QP
5	0.29	0.03	9.58	20.37	29.98	50.50	-20.52	Average
6	0.29	0.03	9.58	41.80	51.41	60.50	-9.09	QP
7	0.37	0.03	9.58	14.18	23.79	48.61	-24.82	Average
8	0.37	0.03	9.58	39.36	48.97	58.61	-9.64	QP
9	0.42	0.04	9.59	19.94	29.57	47.51	-17.94	Average
10	0.42	0.04	9.59	38.04	47.67	57.51	-9.84	QP
11	0.49	0.04	9.60	15.25	24.89	46.23	-21.34	Average
12	0.49	0.04	9.60	35.83	45.47	56.23	-10.76	QP

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

5.3 Duty Cycle

5.3.1 Part I - Test Results

SISO_ANT1

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 1: CH6	100
11G	Ant 1: CH6	98
11N_20	Ant 1: CH6	98
11N_40	Ant 1: CH6	96

SISO_ANT2

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11B	Ant 2: CH6	100
11G	Ant 2: CH6	98
11N_20	Ant 2: CH6	98
11N_40	Ant 2: CH6	96

CDD&MIMO_ANT1

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11G_CDD	Ant 1: CH6	98
11N_20	Ant 1: CH6	97
11N_40	Ant 1: CH6	92

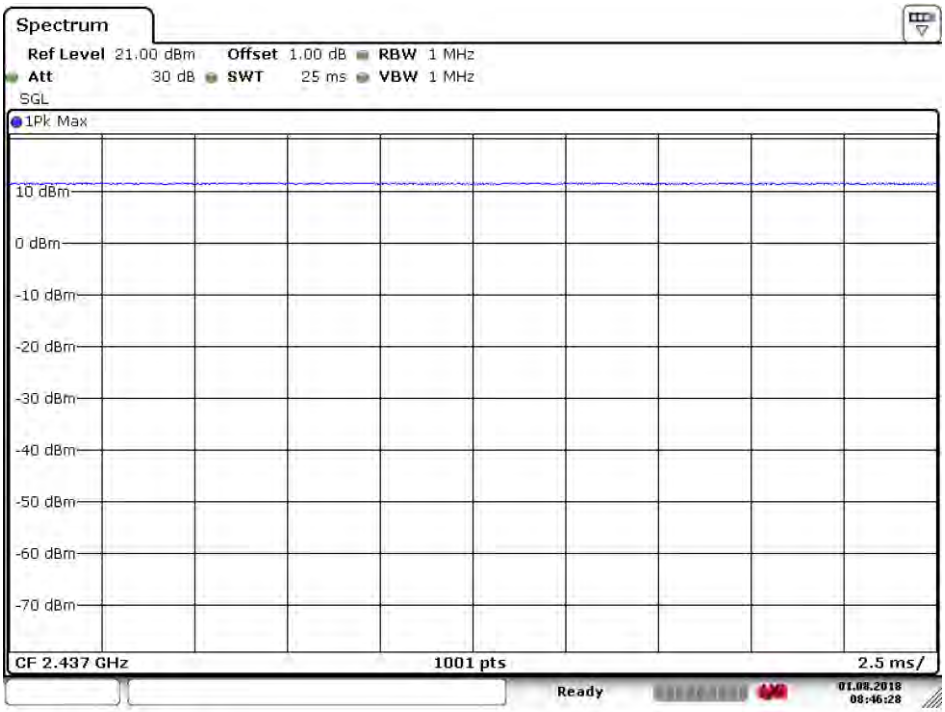
CDD&MIMO _ANT2

Test Mode	TX Freq. [MHz]	Duty cycle [%]
11G_CDD	Ant 2: CH6	98
11N_20	Ant 2: CH6	97
11N_40	Ant 2: CH6	92

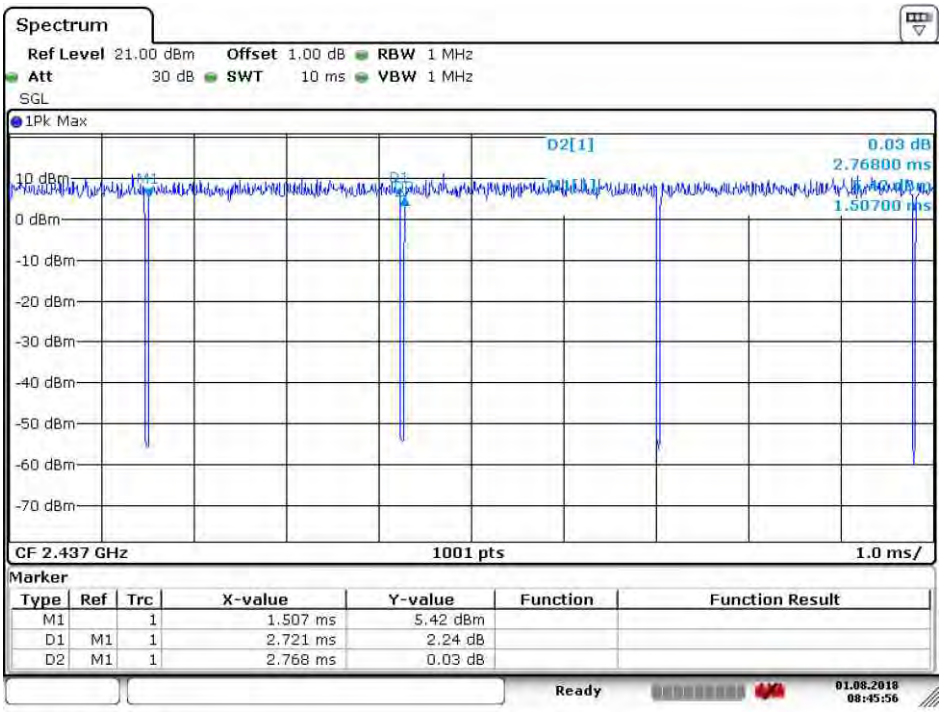
5.3.2 Part II - Test Plots

SISO_ANT1

5.3.2.1 11B @Ant 1

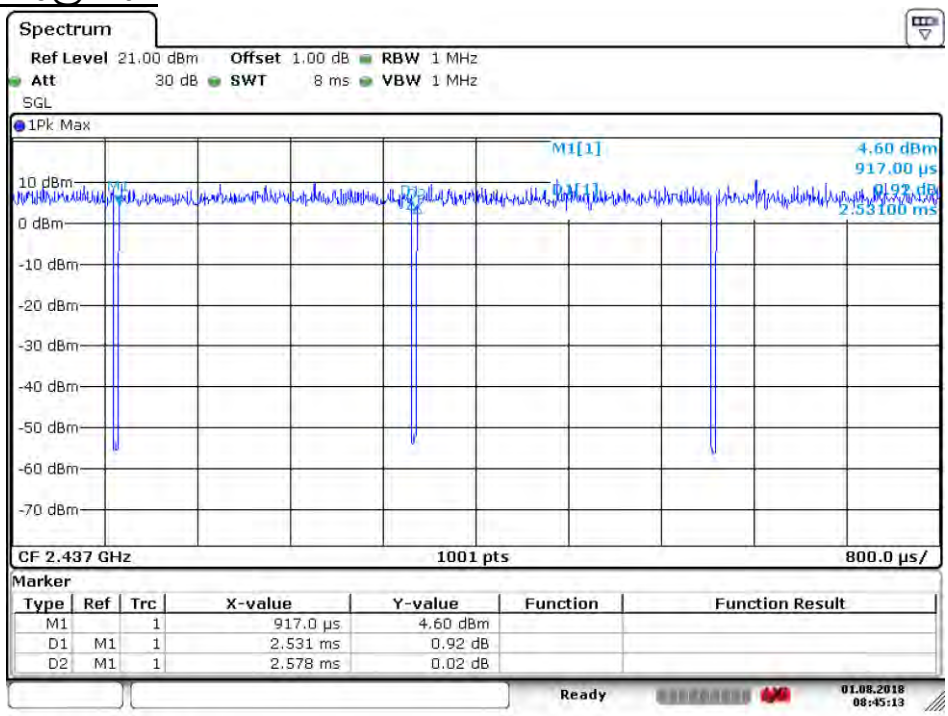


5.3.2.2 11G@Ant 1



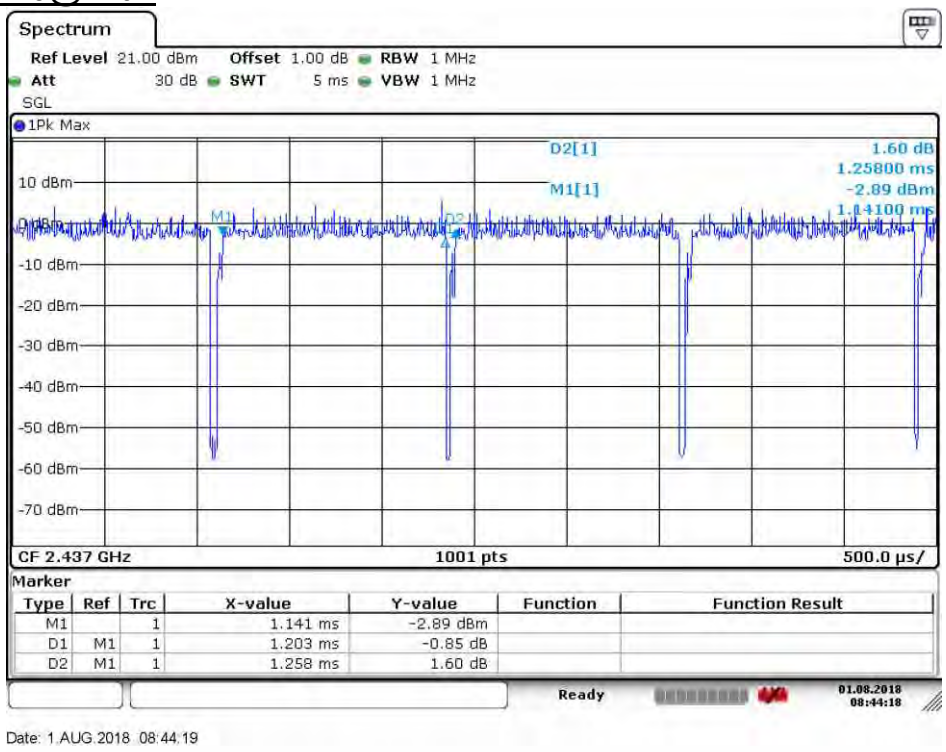
Date: 1.AUG.2018 08:45:57

5.3.2.3 11N20@Ant 1



Date: 1.AUG.2018 08:45:13

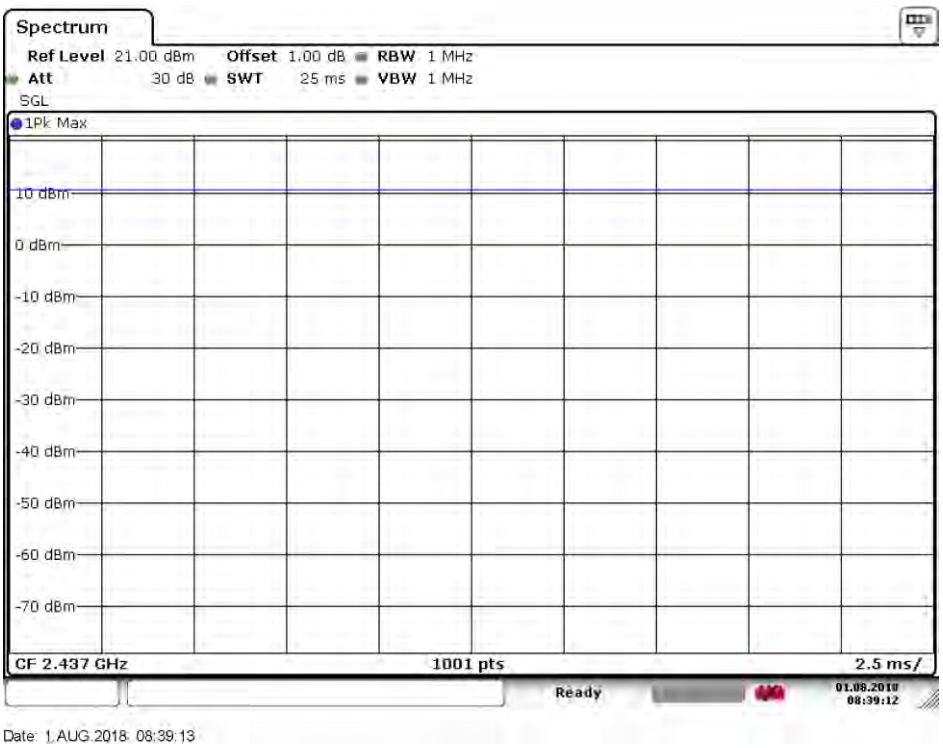
5.3.2.4 11N40@Ant 1



Date: 1.AUG.2018 08:44:19

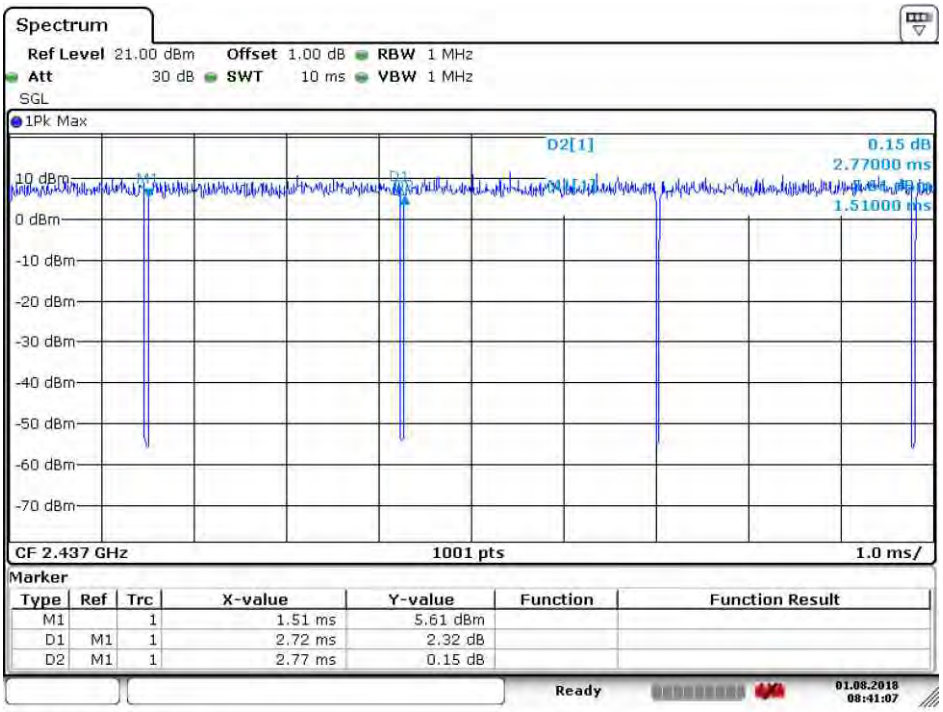
SISO_ANT2

5.3.2.5 11B @Ant 2



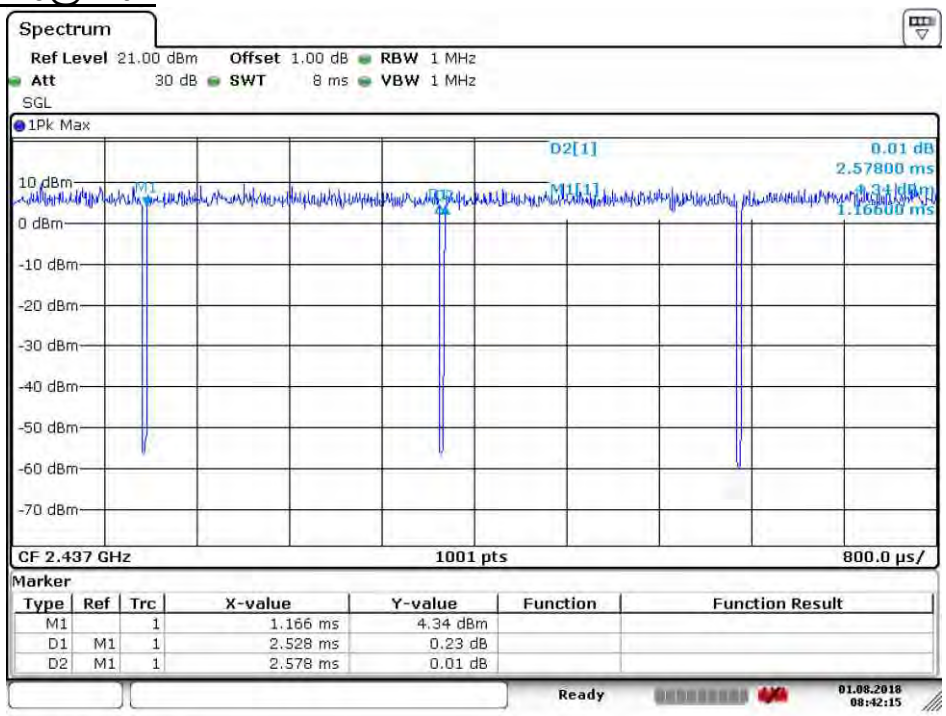
Date: 1.AUG.2018 08:39:13

5.3.2.6 11G@Ant 2



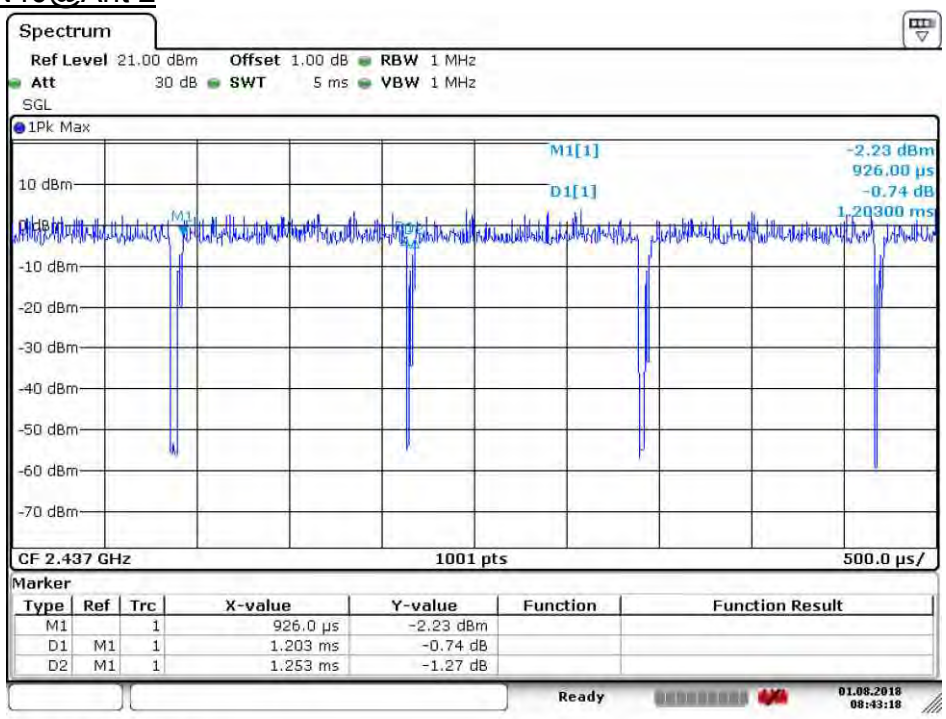
Date: 1.AUG.2018 08:41:07

5.3.2.7 11N20@Ant 2



Date: 1.AUG.2018 08:42:15

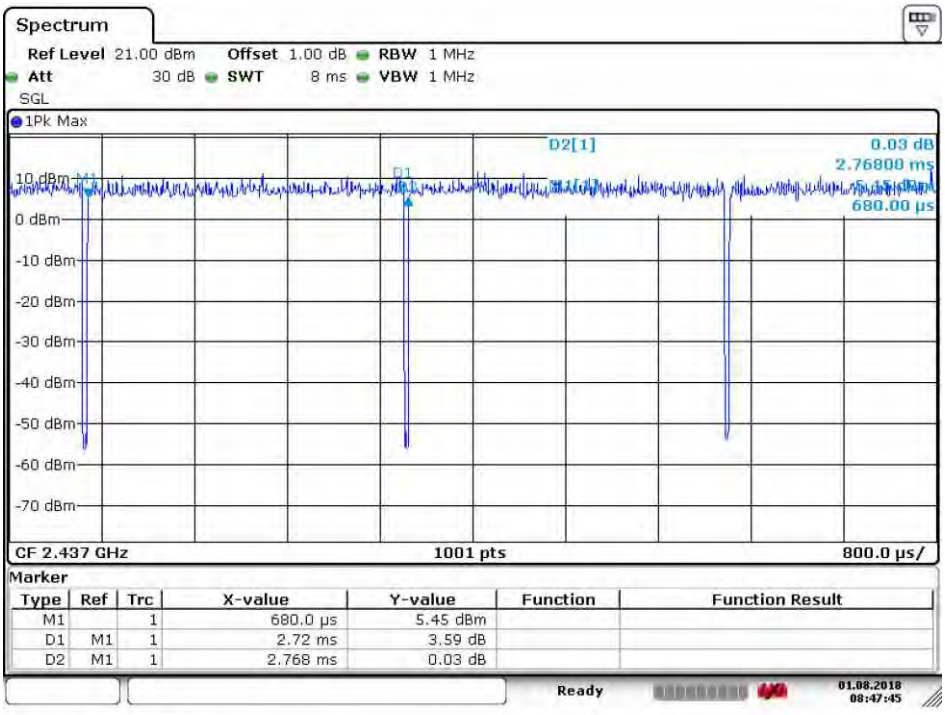
5.3.2.8 11N40@Ant 2



Date: 1.AUG.2018 08:43:18

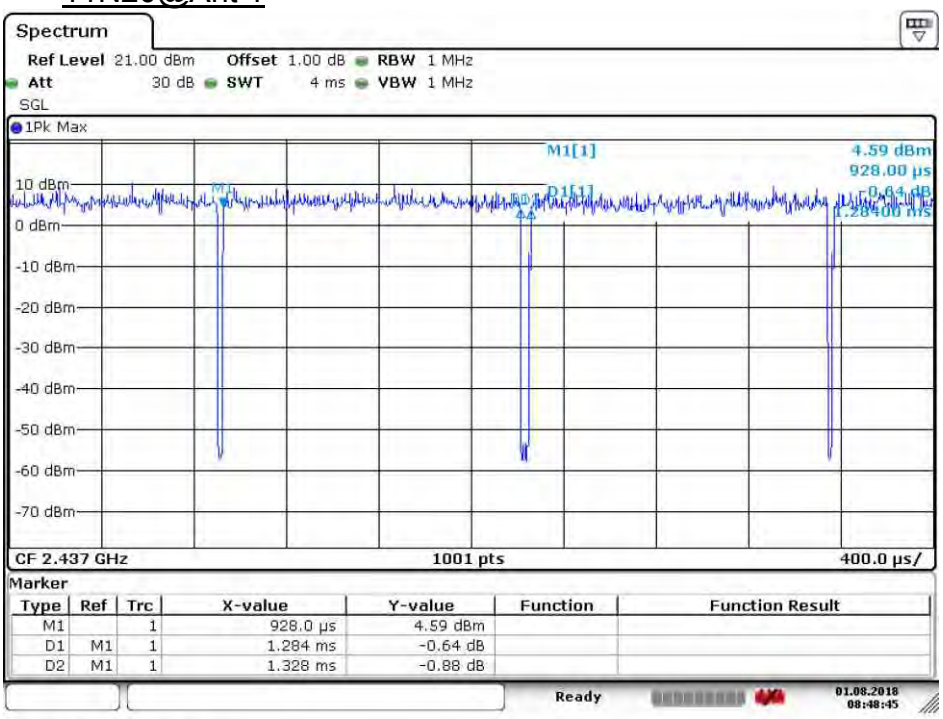
CDD&MIMO_ANT1

5.3.2.9 11G@Ant 1



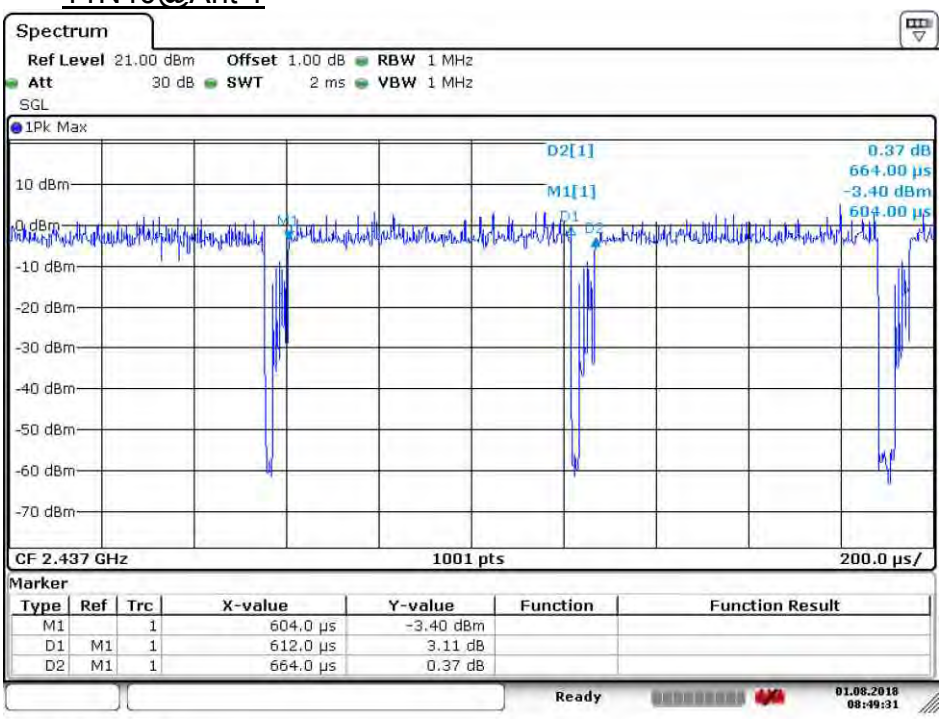
Date: 1.AUG.2018 08:47:46

5.3.2.10 11N20@Ant 1



Date: 1.AUG.2018 08:48:46

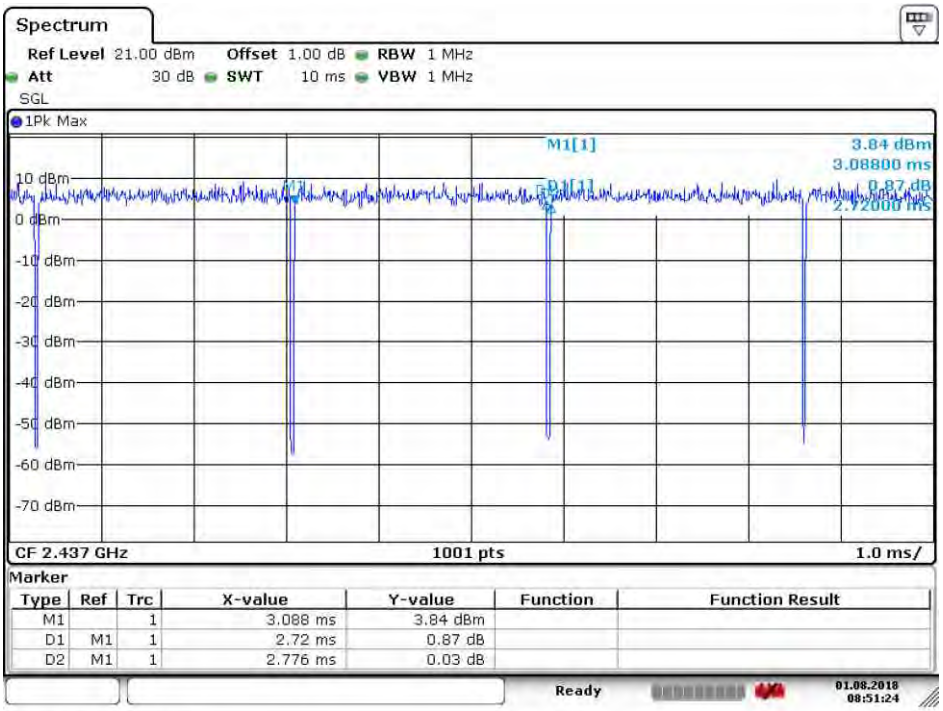
5.3.2.11 11N40@Ant 1



Date: 1.AUG.2018 08:49:31

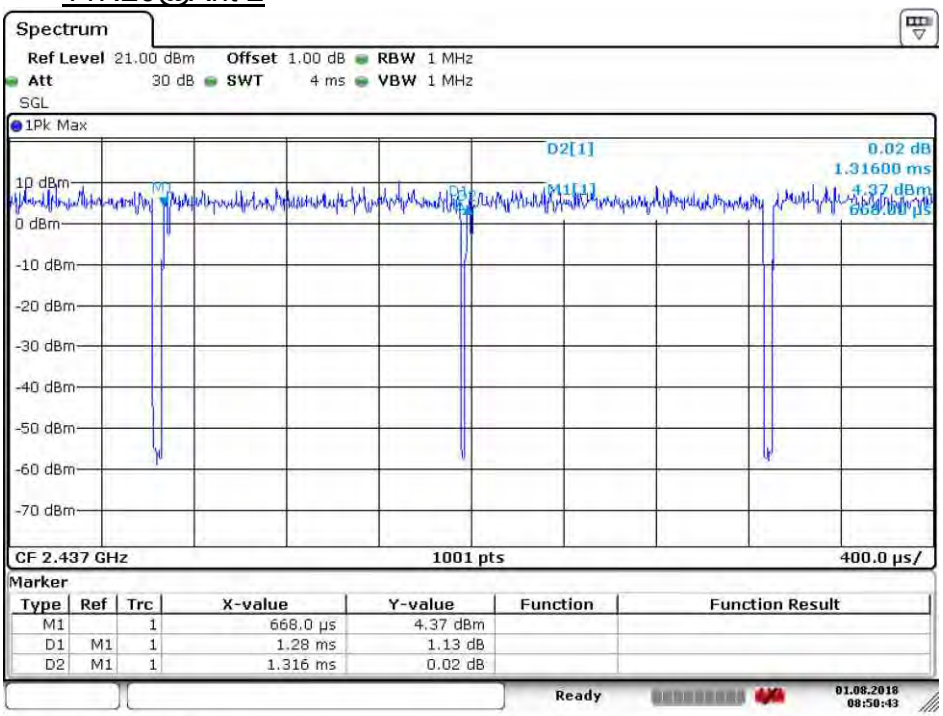
CDD&MIMO_ANT2

5.3.2.12 11G@Ant 2



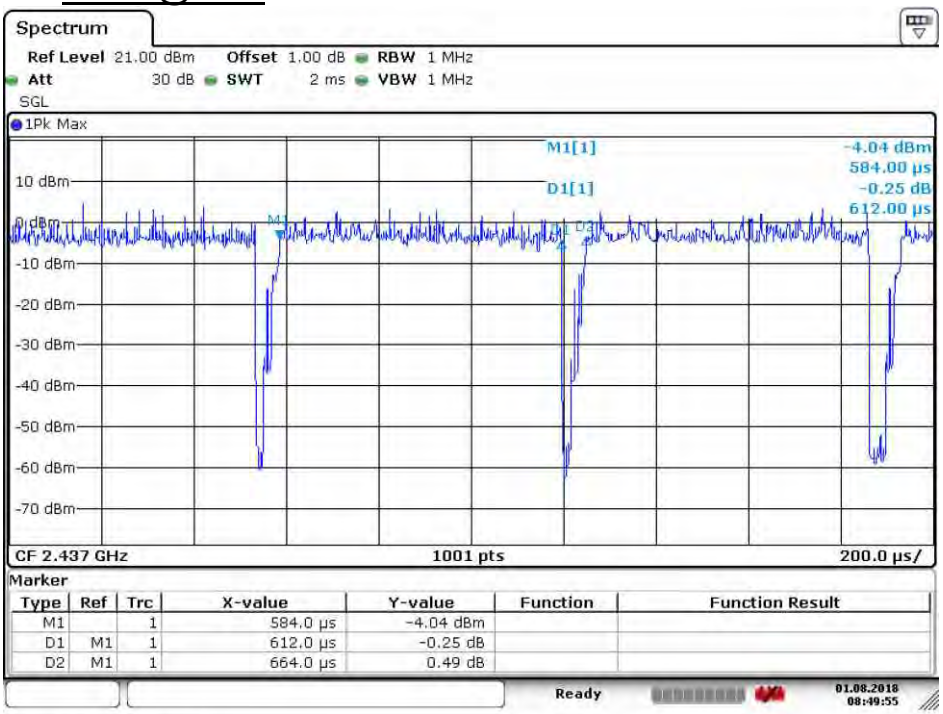
Date: 1.AUG.2018 08:51:25

5.3.2.13 11N20@Ant 2



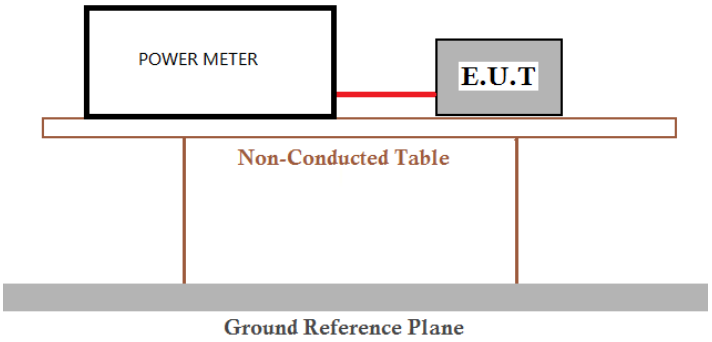
Date: 1.AUG.2018 08:50:43

5.3.2.14 11N40@Ant 2



Date: 1.AUG.2018 08:49:55

5.4 Conducted Peak Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10 :2013 Section 11.9.1.3
Test Setup:	
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20);13.5Mbps of rate is the worst case of 802.11n(HT40).
Limit:	30dBm
Test Results:	Pass

Measurement Data

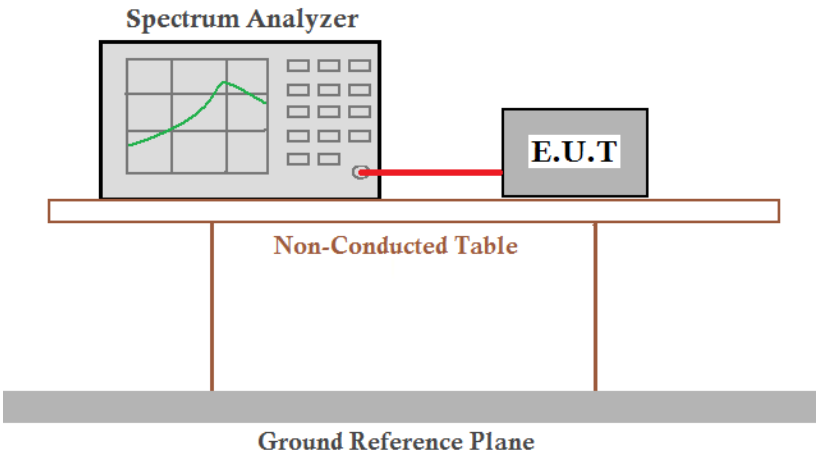
SISO_ANT1_802.11b mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	20.76	30.00	Pass
Middle	20.58	30.00	Pass
Highest	20.25	30.00	Pass
SISO_ANT1_802.11g mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.84	30.00	Pass
Middle	23.72	30.00	Pass
Highest	23.86	30.00	Pass
SISO_ANT1_802.11n(HT20)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	22.80	30.00	Pass
Middle	22.75	30.00	Pass
Highest	22.72	30.00	Pass
SISO_ANT1_802.11n(HT40)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.79	30.00	Pass
Middle	23.72	30.00	Pass
Highest	23.72	30.00	Pass

SISO_ANT2_802.11b mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	20.43	30.00	Pass
Middle	20.47	30.00	Pass
Highest	20.87	30.00	Pass
SISO_ANT2_802.11g mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.76	30.00	Pass
Middle	23.74	30.00	Pass
Highest	23.77	30.00	Pass
SISO_ANT2_802.11n(HT20)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	22.76	30.00	Pass
Middle	22.84	30.00	Pass
Highest	22.98	30.00	Pass
SISO_ANT2_802.11n(HT40)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.85	30.00	Pass
Middle	23.95	30.00	Pass
Highest	23.83	30.00	Pass

CDD_ANT1 802.11g mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.83	30.00	Pass
Middle	23.45	30.00	Pass
Highest	23.48	30.00	Pass
MIMO_ANT1 802.11n(HT20)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	22.27	30.00	Pass
Middle	22.13	30.00	Pass
Highest	22.15	30.00	Pass
MIMO_ANT1_802.11n(HT40)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	22.62	30.00	Pass
Middle	22.80	30.00	Pass
Highest	22.80	30.00	Pass

CDD_ANT2_802.11g mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.85	30.00	Pass
Middle	23.97	30.00	Pass
Highest	24.02	30.00	Pass
MIMO_ANT2_802.11n(HT20)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	22.98	30.00	Pass
Middle	23.00	30.00	Pass
Highest	23.20	30.00	Pass
MIMO_ANT2_802.11n(HT40)mode			
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result
Lowest	23.94	30.00	Pass
Middle	24.19	30.00	Pass
Highest	24.39	30.00	Pass

5.5 6dB Emission Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013 Section 11.8.1 Option 1
Test Setup:	
Instruments Used:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).
Limit:	≥ 500 kHz
Test Results:	Pass

Measurement Data

SISO_ANT1

802.11b mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	8.66	≥500	Pass
Middle	8.66	≥500	Pass
Highest	9.11	≥500	Pass
802.11g mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	16.06	≥500	Pass
Middle	16.06	≥500	Pass
Highest	16.27	≥500	Pass
802.11n(HT20) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	17.08	≥500	Pass
Middle	17.17	≥500	Pass
Highest	17.35	≥500	Pass
802.11n(HT40) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	36.32	≥500	Pass
Middle	36.32	≥500	Pass
Highest	36.32	≥500	Pass

SISO_ANT2

802.11b mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	8.69	≥500	Pass
Middle	8.69	≥500	Pass
Highest	9.17	≥500	Pass
802.11g mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	15.94	≥500	Pass
Middle	16.24	≥500	Pass
Highest	16.24	≥500	Pass
802.11n(HT20) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	17.32	≥500	Pass

Middle	17.41	≥500	Pass
Highest	17.44	≥500	Pass
802.11n(HT40) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	36.44	≥500	Pass
Middle	36.44	≥500	Pass
Highest	36.38	≥500	Pass

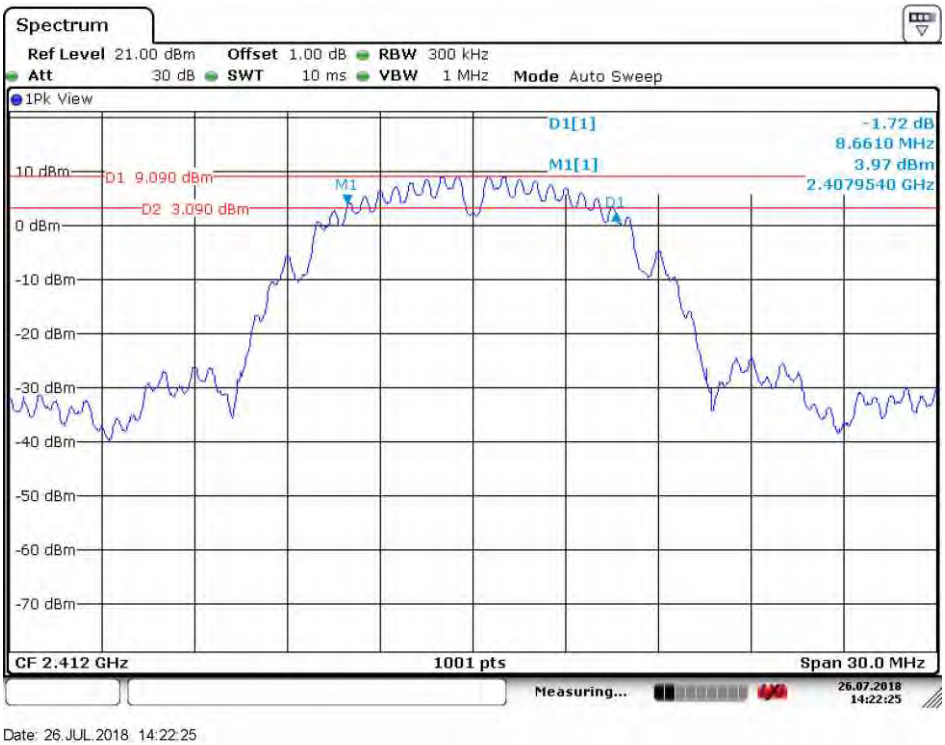
CDD_ANT1_802.11g mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	15.94	≥500	Pass
Middle	15.97	≥500	Pass
Highest	16.21	≥500	Pass
MIMO_ANT1_802.11n(HT20) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	16.57	≥500	Pass
Middle	16.81	≥500	Pass
Highest	17.32	≥500	Pass
MIMO_ANT1_802.11n(HT40) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	36.00	≥500	Pass
Middle	36.26	≥500	Pass
Highest	36.04	≥500	Pass

CDD_ANT2802.11g mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	15.85	≥500	Pass
Middle	16.18	≥500	Pass
Highest	15.97	≥500	Pass
MIMO_ANT2_802.11n(HT20) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	17.02	≥500	Pass
Middle	17.14	≥500	Pass
Highest	17.14	≥500	Pass
MIMO_ANT2_802.11n(HT40) mode			
Test channel	6dB Emission Bandwidth (MHz)	Limit (kHz)	Result
Lowest	36.33	≥500	Pass
Middle	36.02	≥500	Pass
Highest	35.94	≥500	Pass

Test plot as follows:

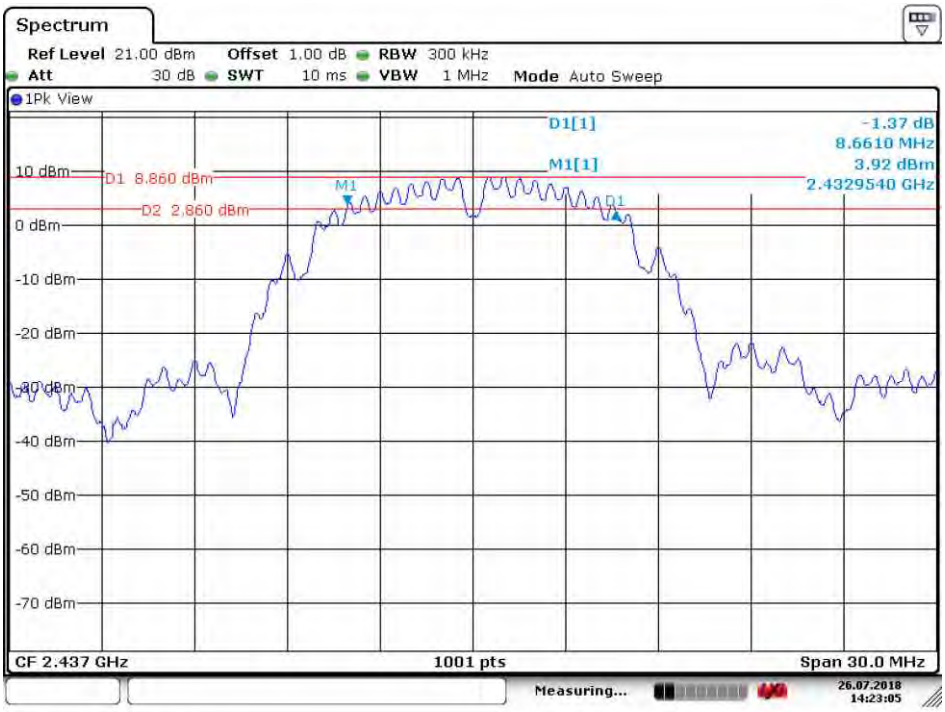
SISO_ANT1

Test mode:	802.11b	Test channel:	Lowest



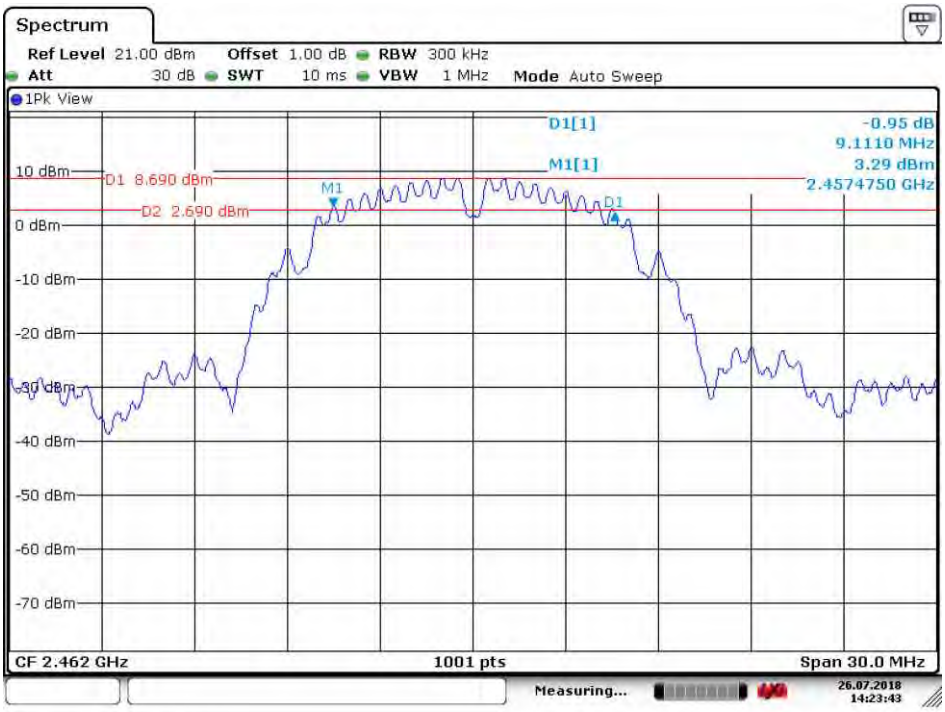
Date: 26.JUL.2018 14:22:25

Test mode:	802.11b	Test channel:	Middle



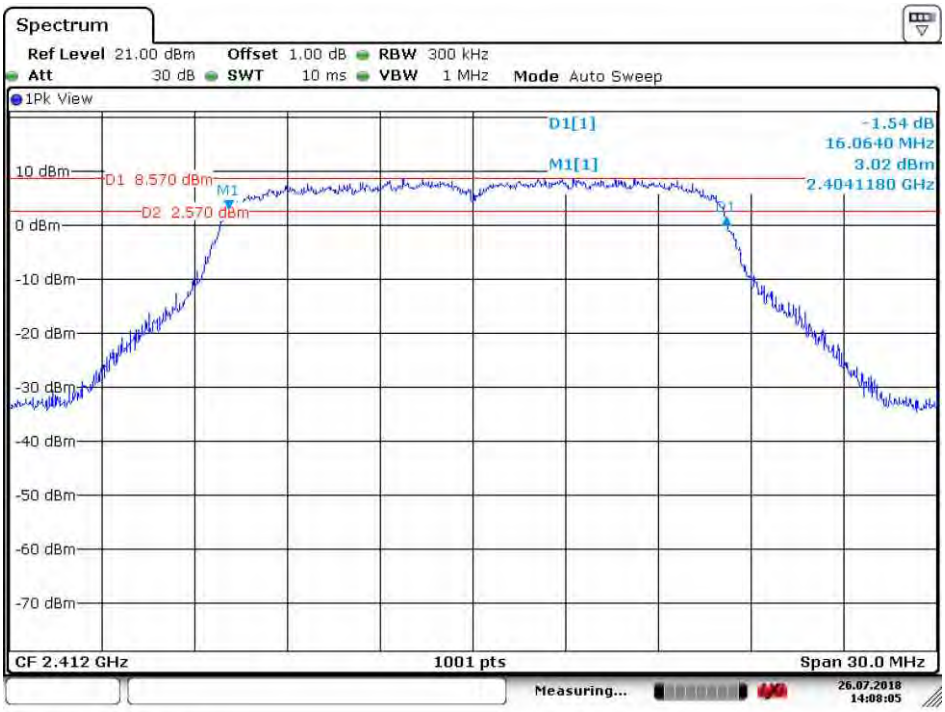
Date: 26.JUL.2018 14:23:06

Test mode:	802.11b	Test channel:	Highest



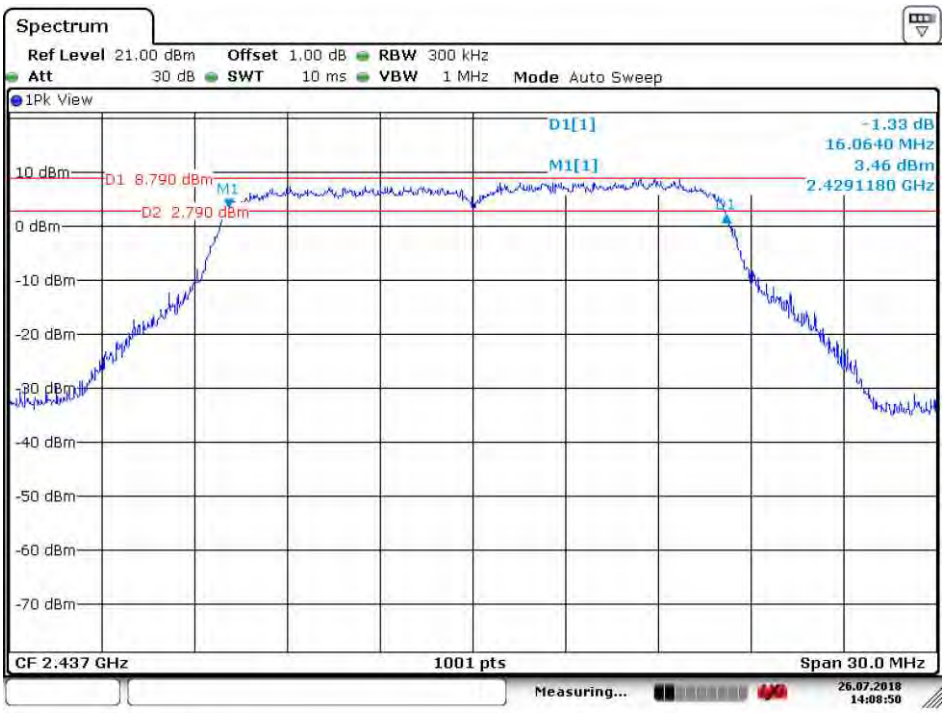
Date: 26.JUL.2018 14:23:43

Test mode:	802.11g	Test channel:	Lowest



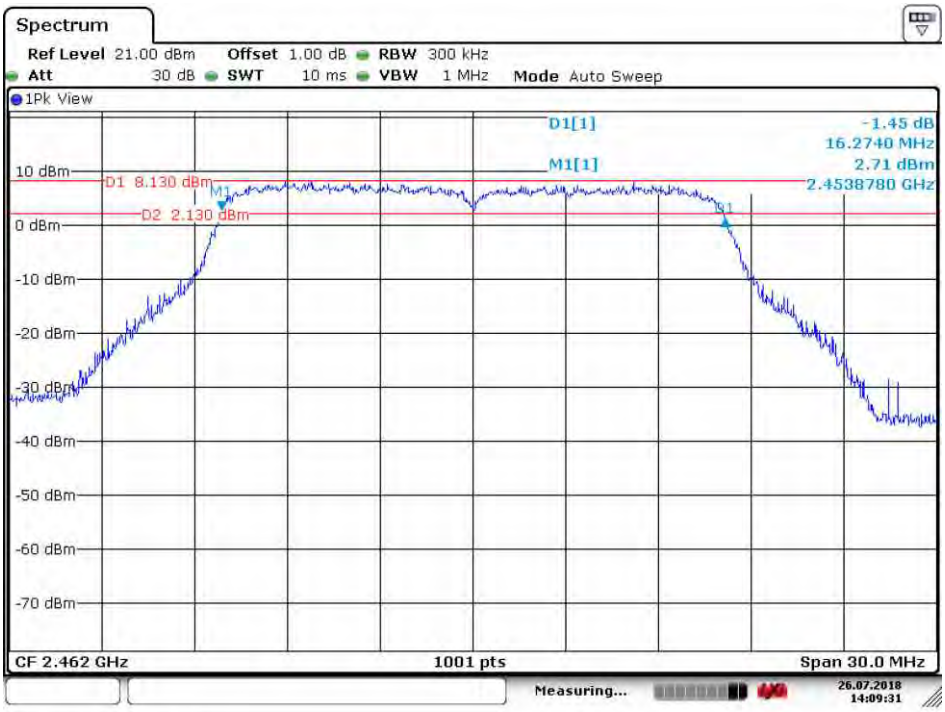
Date: 26.JUL.2018 14:08:05

Test mode:	802.11g	Test channel:	Middle



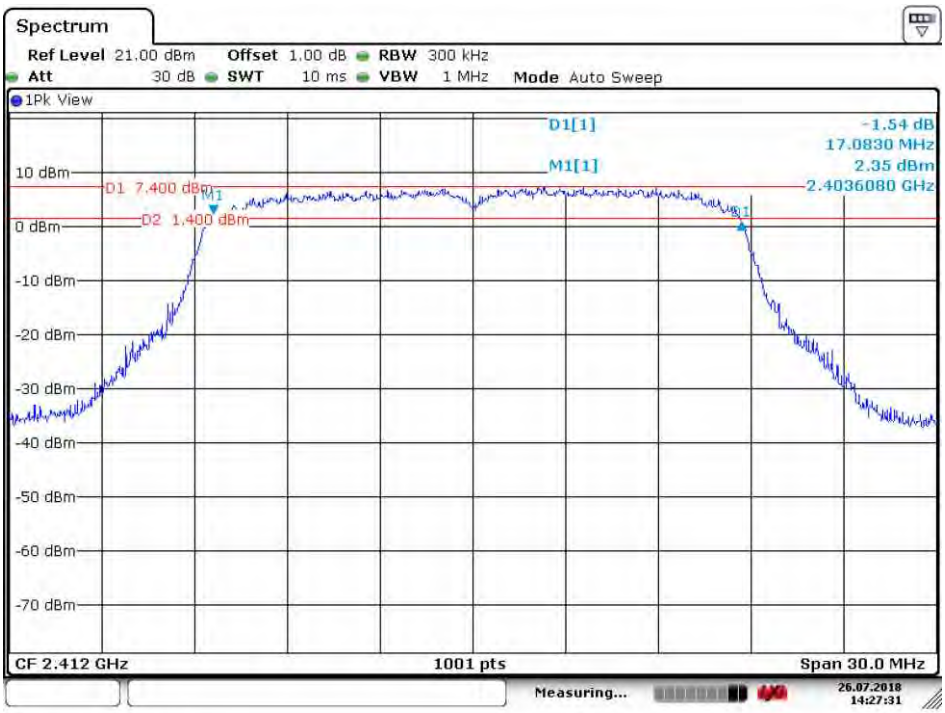
Date: 26.JUL.2018 14:08:50

Test mode:	802.11g	Test channel:	Highest



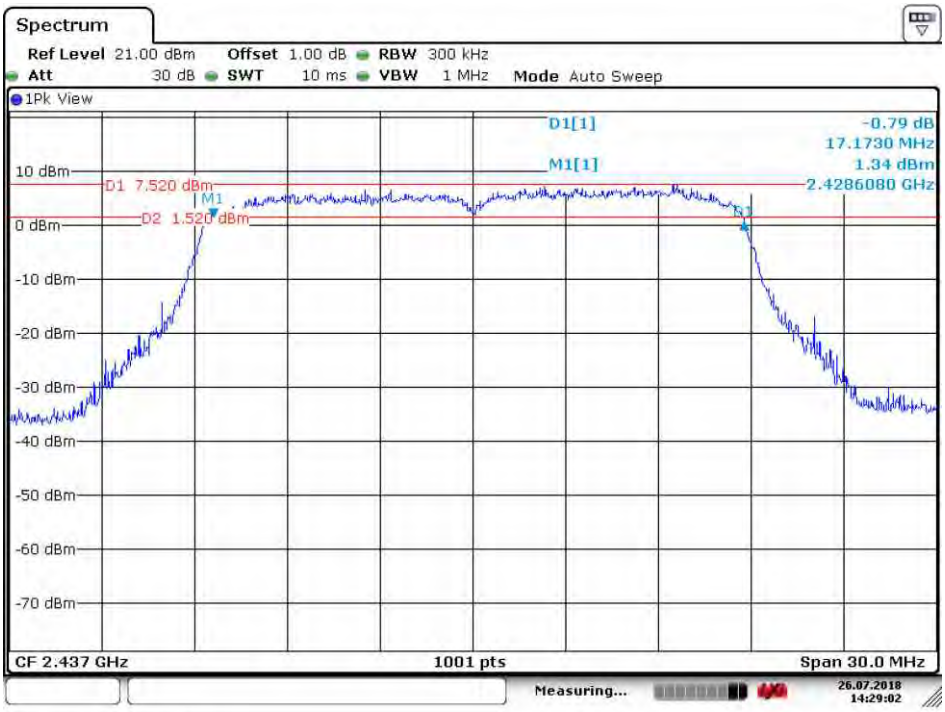
Date: 26.JUL.2018 14:09:32

Test mode:	802.11n(HT20)	Test channel:	Lowest



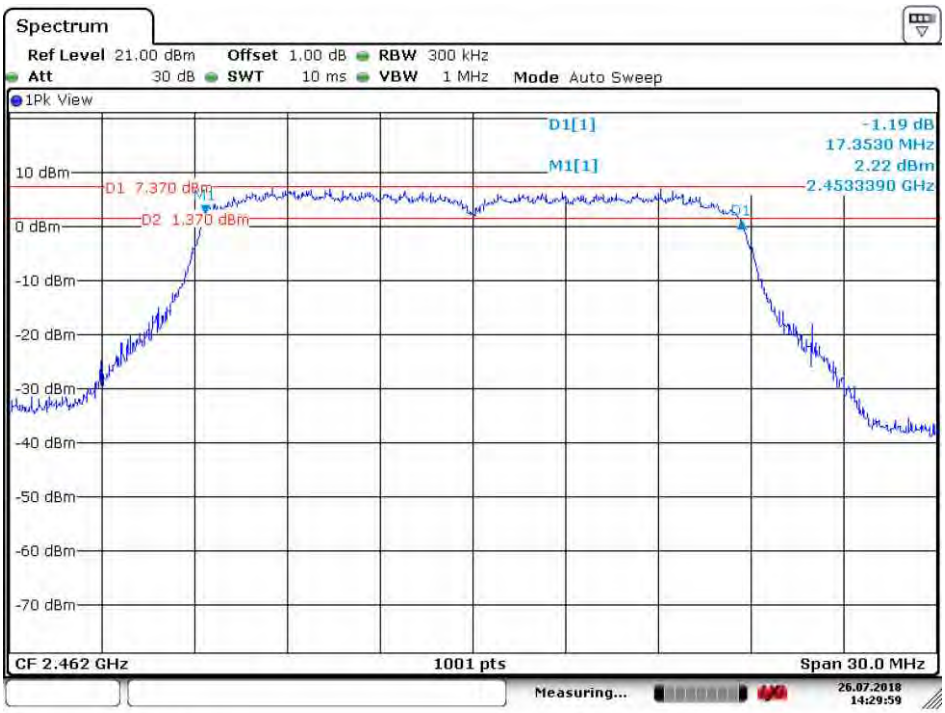
Date: 26.JUL.2018 14:27:31

Test mode:	802.11n(HT20)	Test channel:	Middle



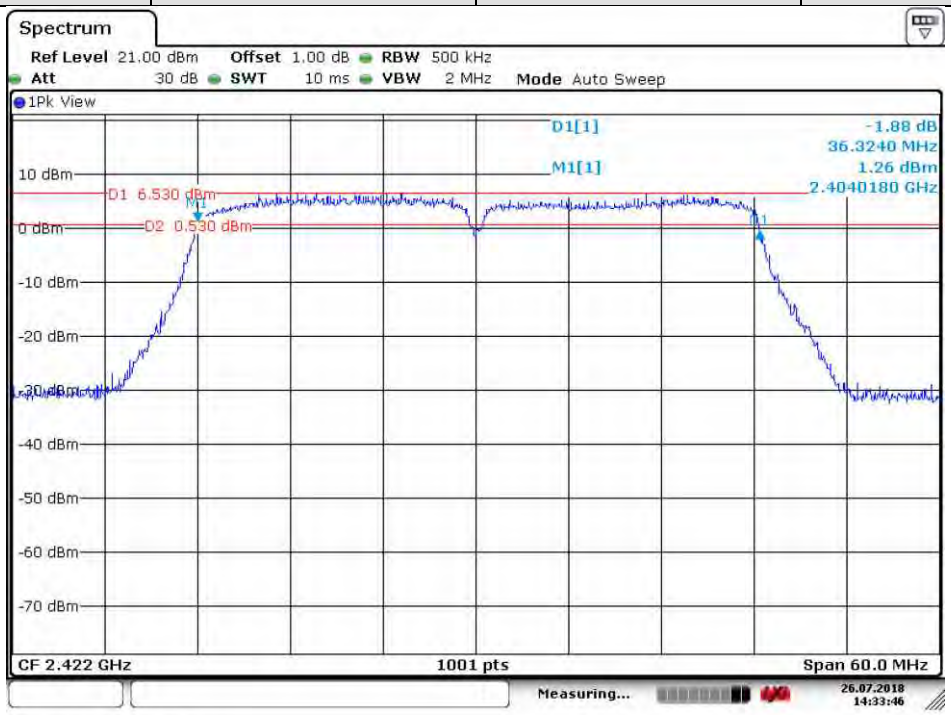
Date: 26.JUL.2018 14:29:03

Test mode:	802.11n(HT20)	Test channel:	Highest



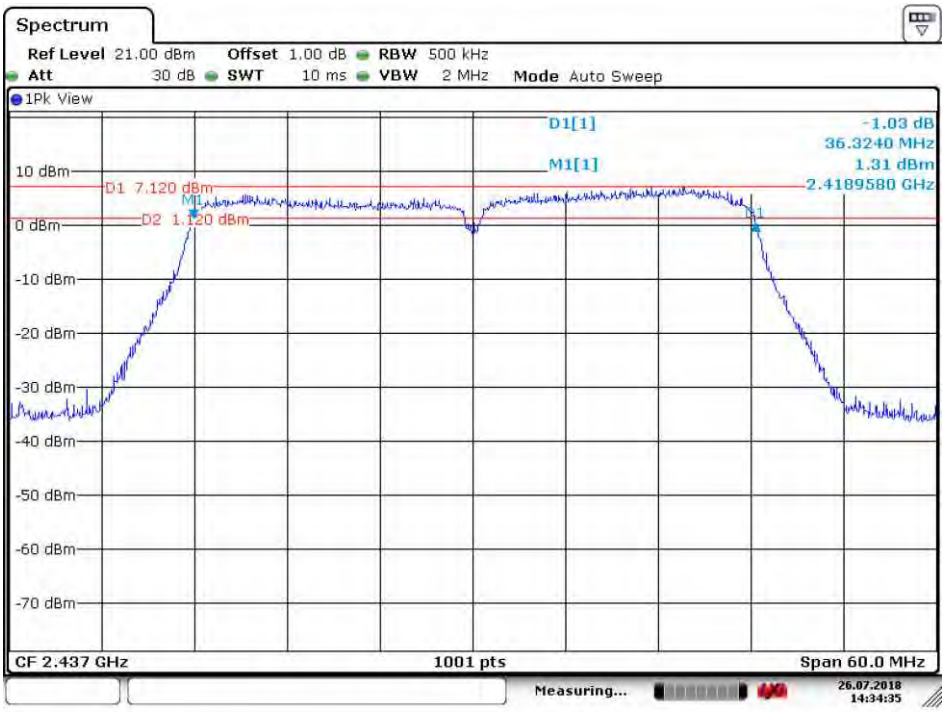
Date: 26.JUL.2018 14:29:59

Test mode:	802.11n(HT40)	Test channel:	Lowest



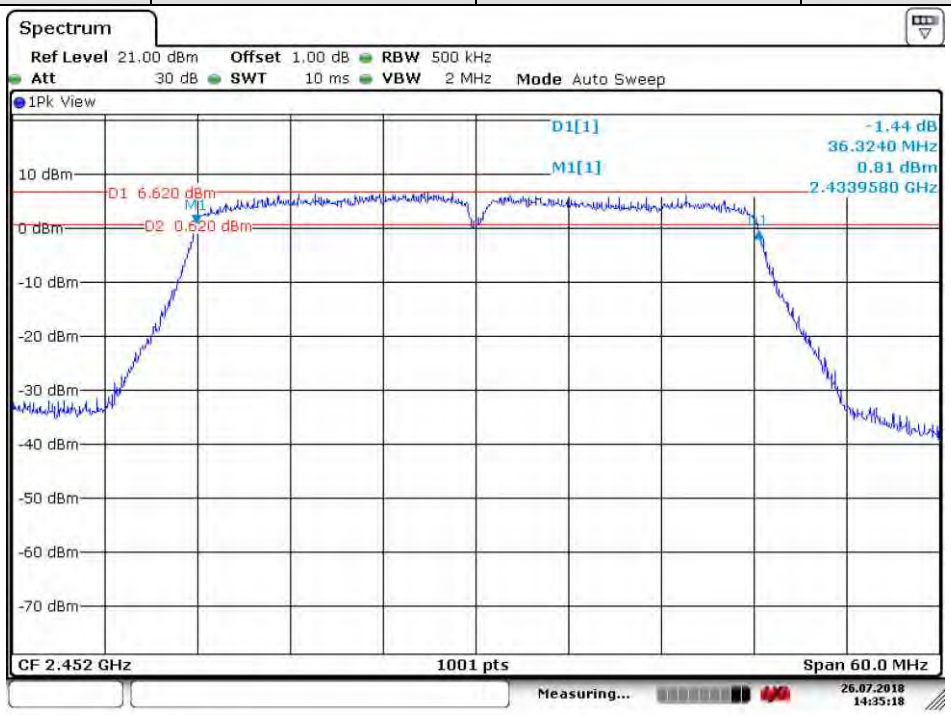
Date: 26.JUL.2018 14:33:46

Test mode:	802.11n(HT40)	Test channel:	Middle



Date: 26.JUL.2018 14:34:35

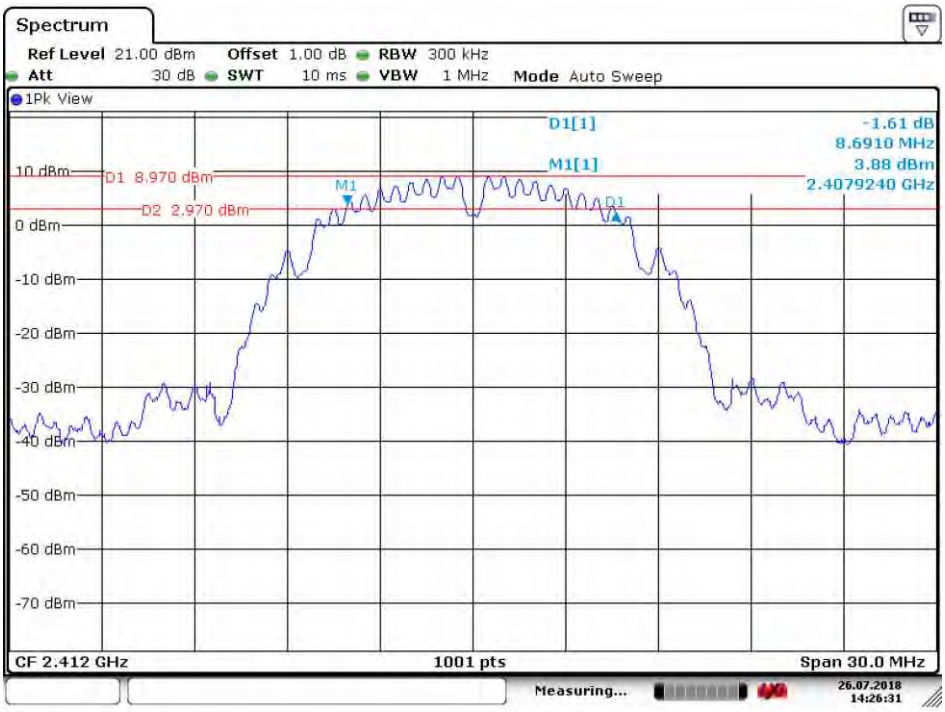
Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 26.JUL.2018 14:35:19

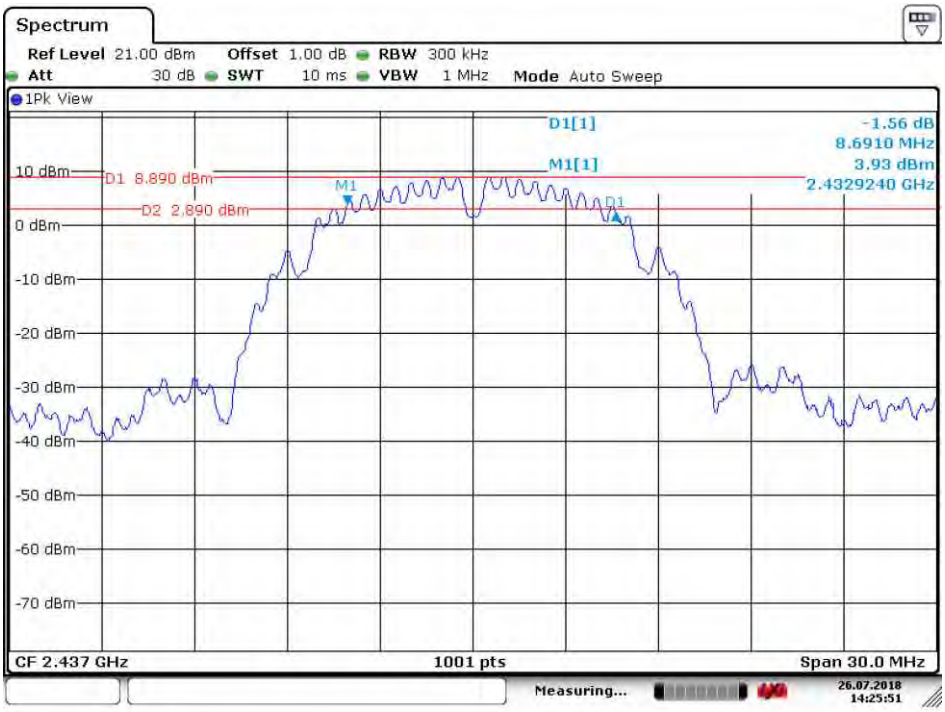
SISO_ANT2

Test mode:	802.11b	Test channel:	Lowest



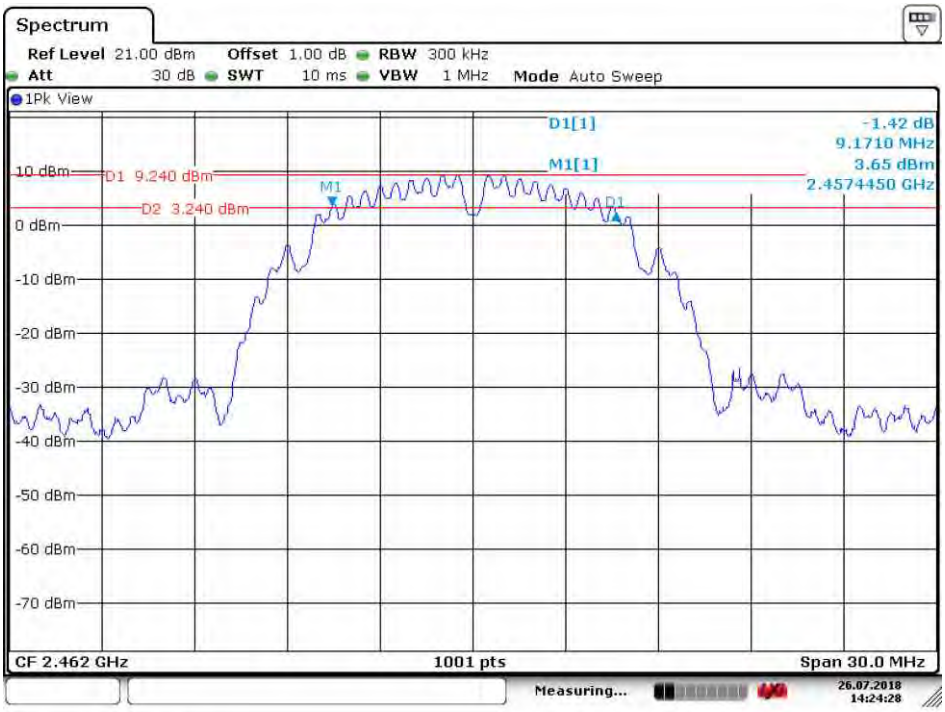
Date: 26.JUL.2018 14:26:31

Test mode:	802.11b	Test channel:	Middle



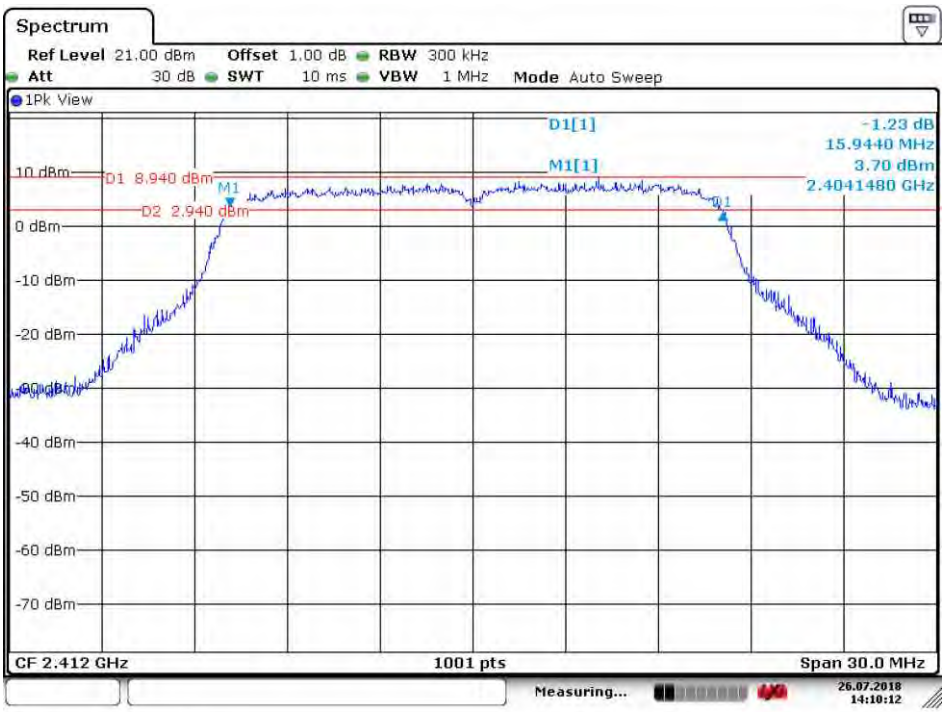
Date: 26.JUL.2018 14:25:51

Test mode:	802.11b	Test channel:	Highest



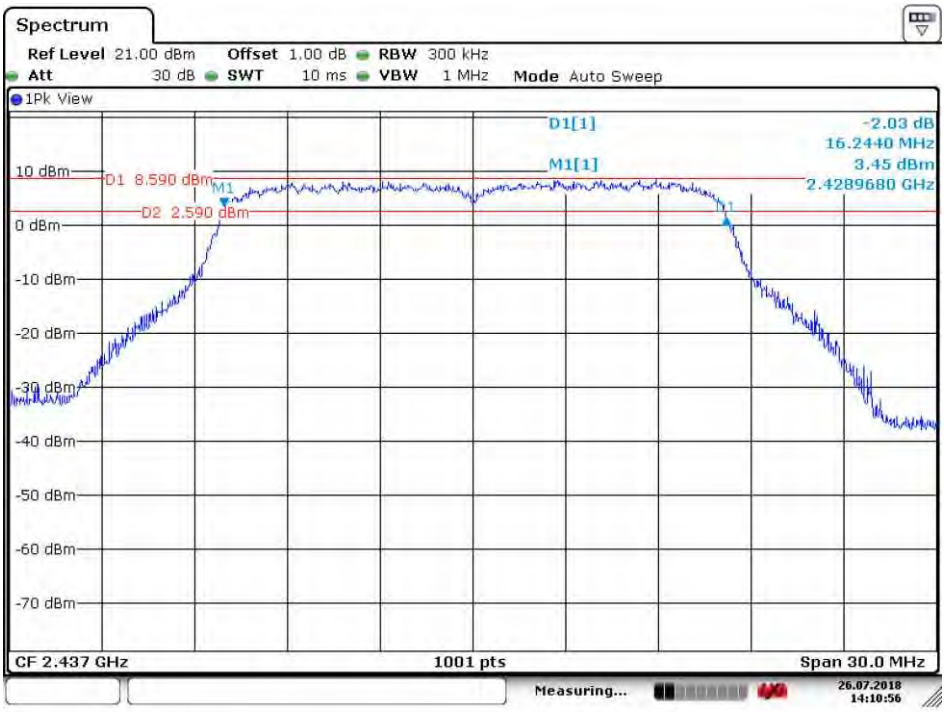
Date: 26.JUL.2018 14:24:29

Test mode:	802.11g	Test channel:	Lowest



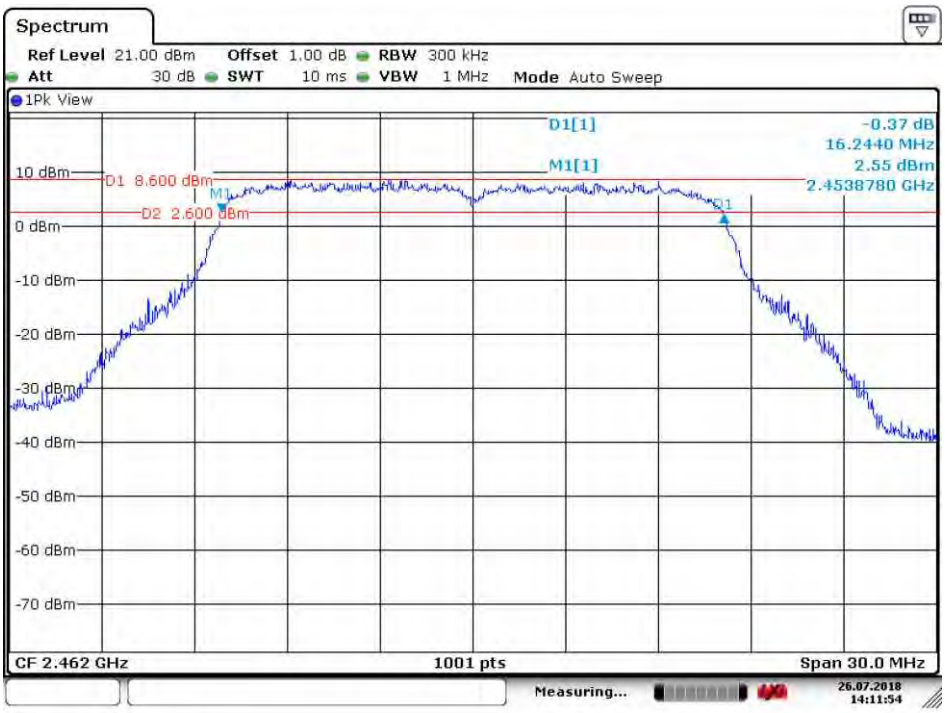
Date: 26.JUL.2018 14:10:13

Test mode:	802.11g	Test channel:	Middle



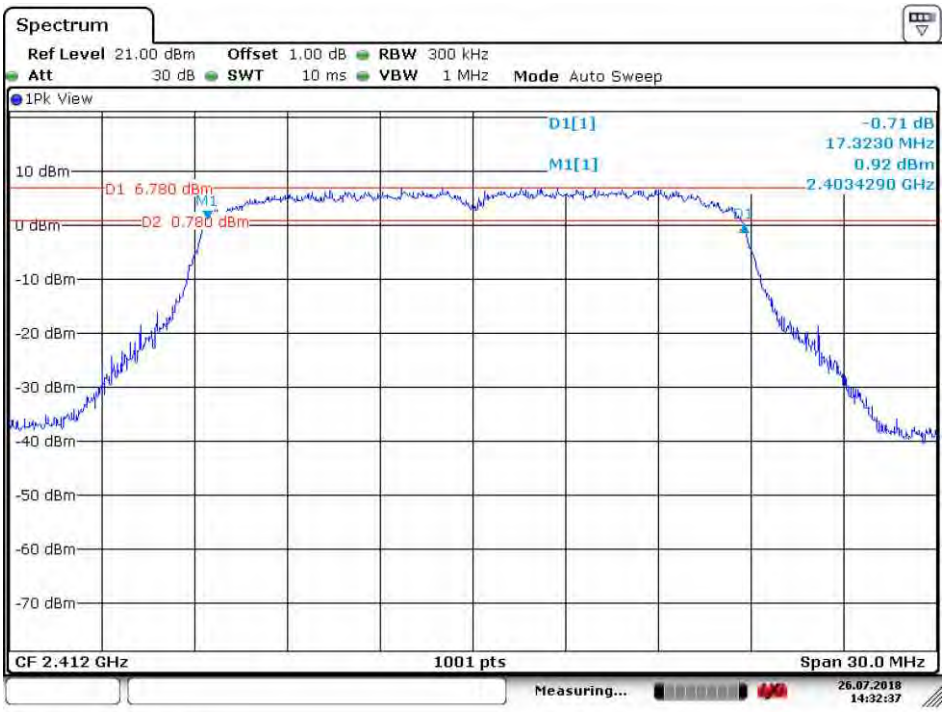
Date: 26.JUL.2018 14:10:56

Test mode:	802.11g	Test channel:	Highest



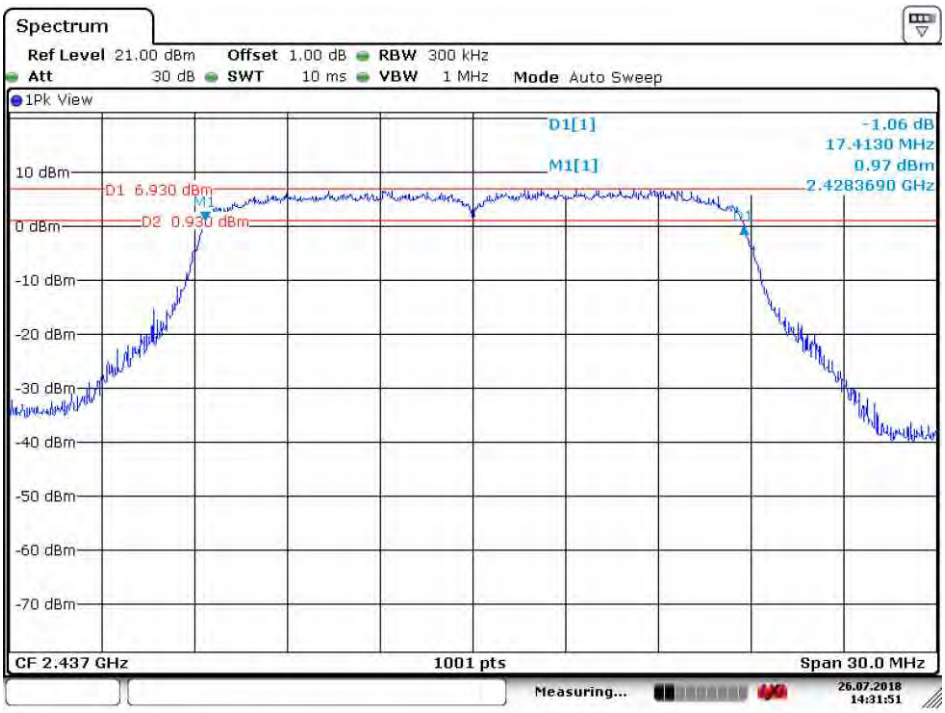
Date: 26.JUL.2018 14:11:54

Test mode:	802.11n(HT20)	Test channel:	Lowest



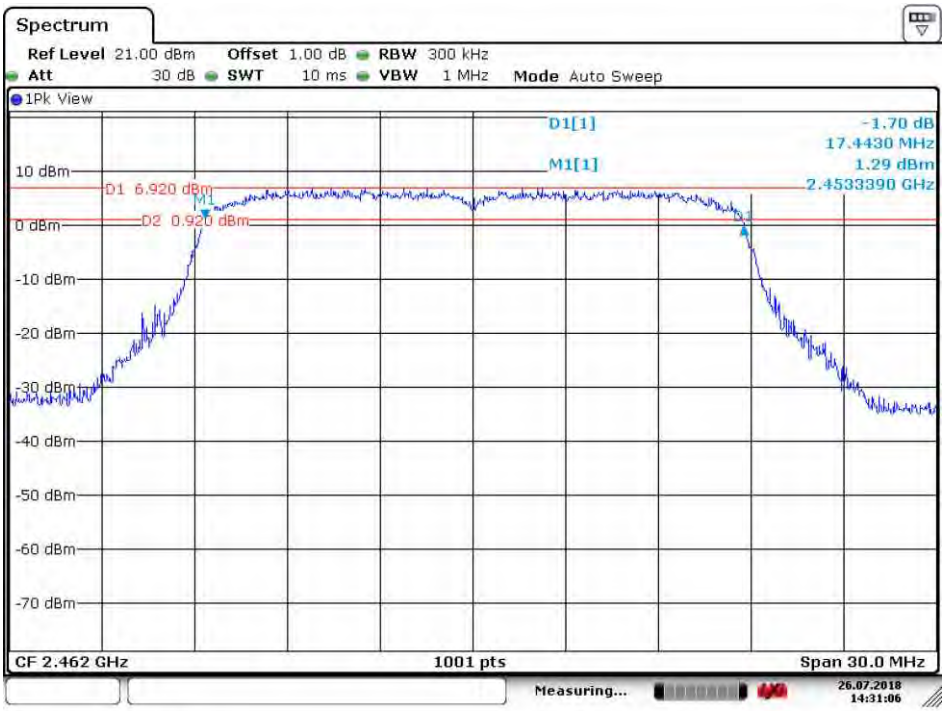
Date: 26.JUL.2018 14:32:37

Test mode:	802.11n(HT20)	Test channel:	Middle



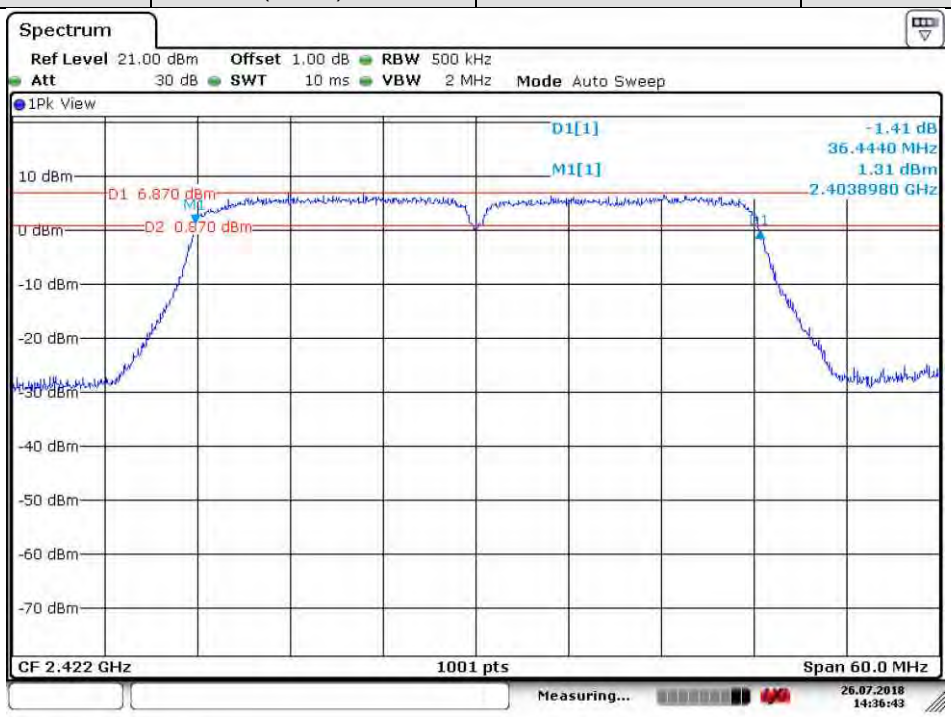
Date: 26.JUL.2018 14:31:52

Test mode:	802.11n(HT20)	Test channel:	Highest



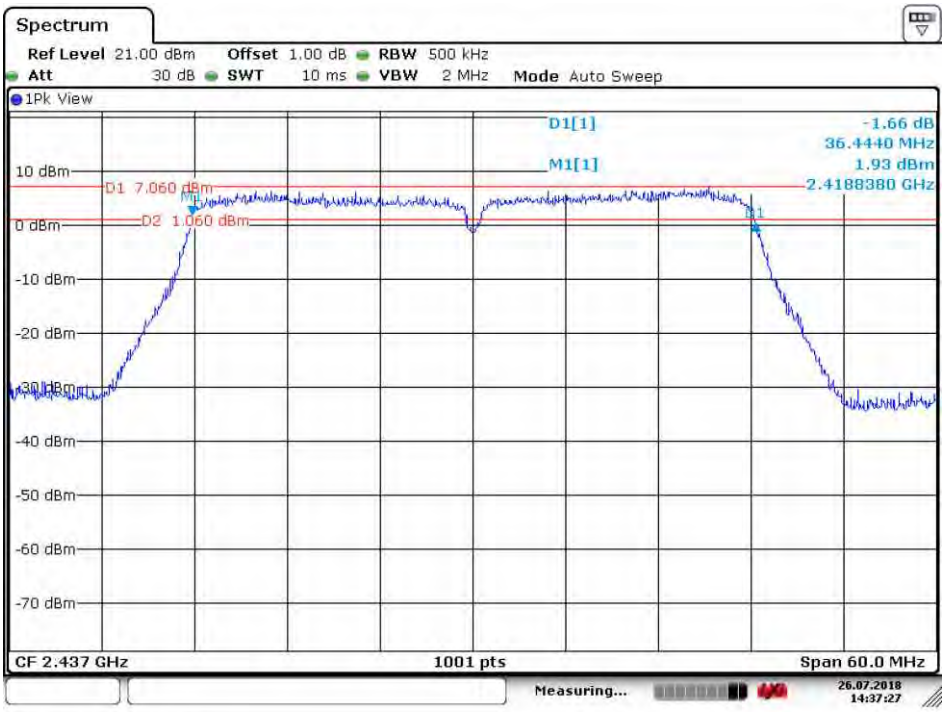
Date: 26.JUL.2018 14:31:07

Test mode:	802.11n(HT40)	Test channel:	Lowest



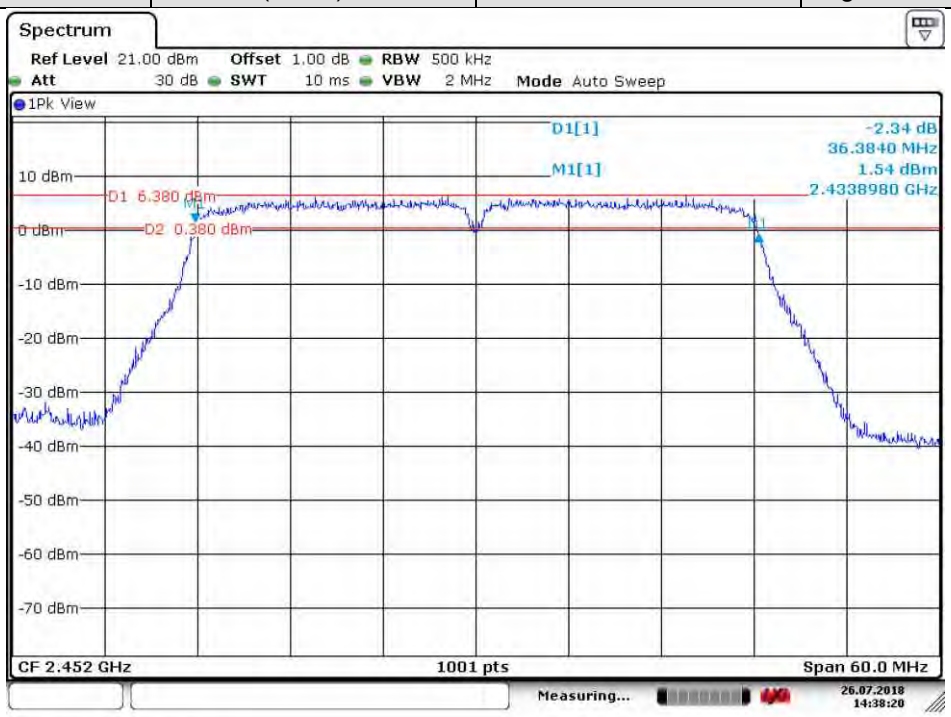
Date: 26.JUL.2018 14:36:44

Test mode:	802.11n(HT40)	Test channel:	Middle



Date: 26.JUL.2018 14:37:27

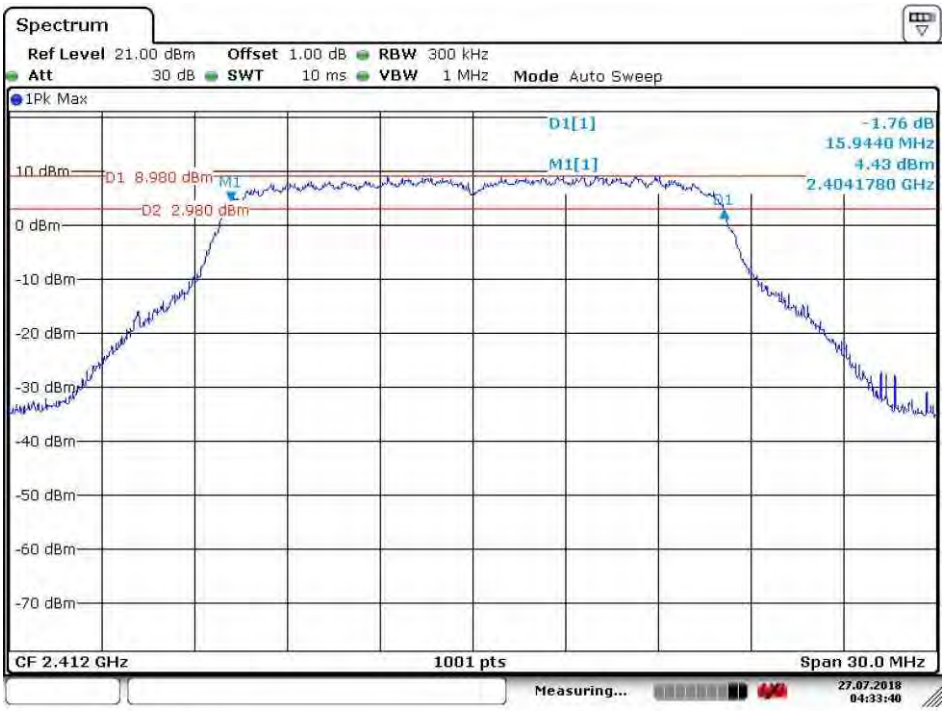
Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 26.JUL.2018 14:38:20

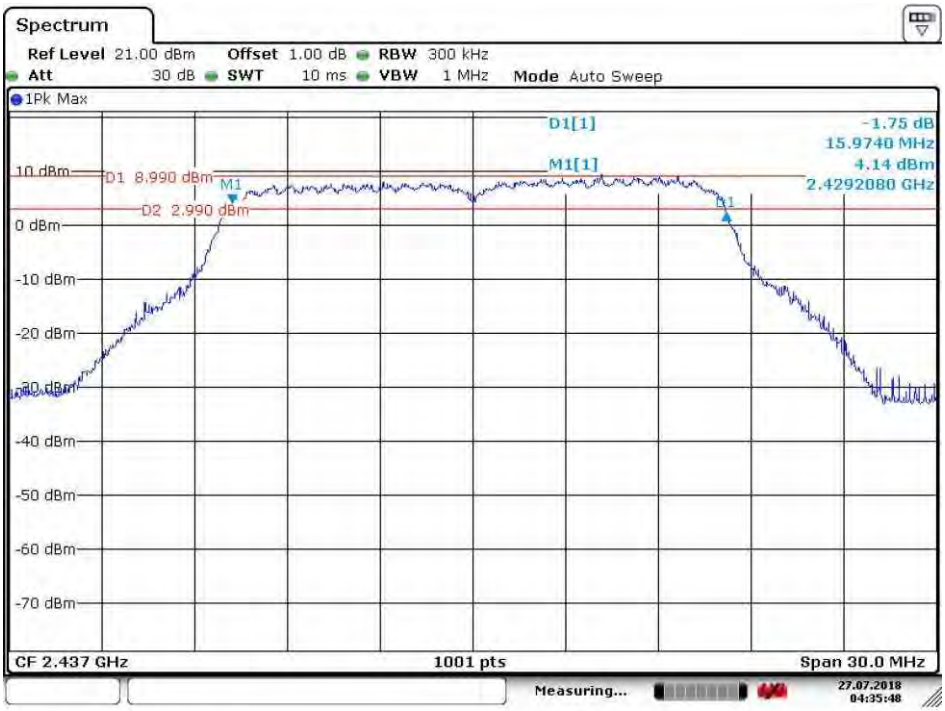
CDD_ANT1

Test mode:	802.11g	Test channel:	Lowest



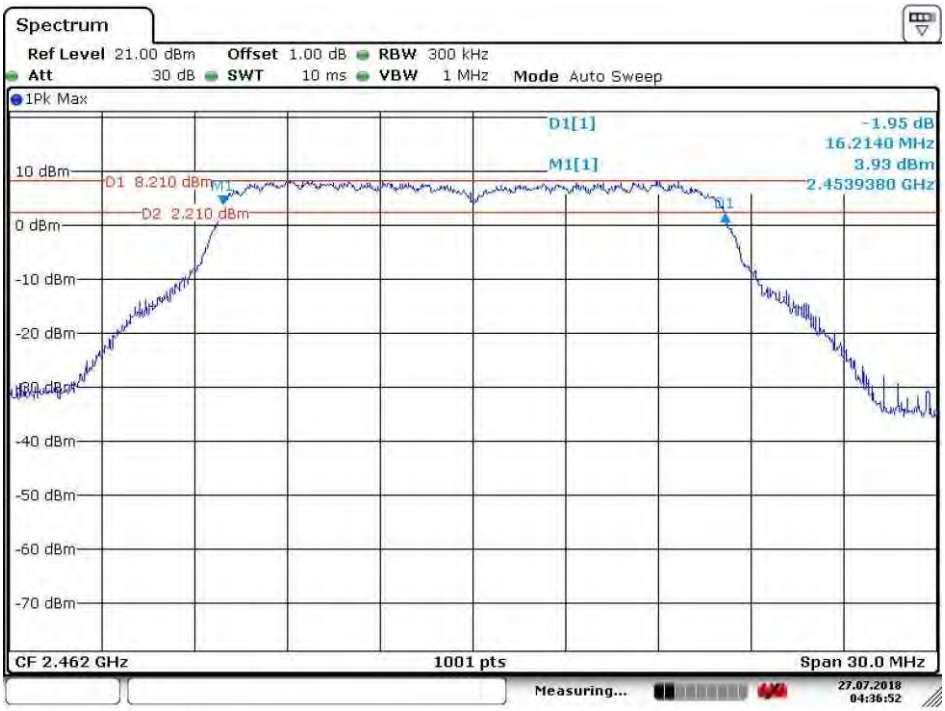
Date: 27.JUL.2018 04:33:40

Test mode:	802.11g	Test channel:	Middle



Date: 27.JUL.2018 04:35:49

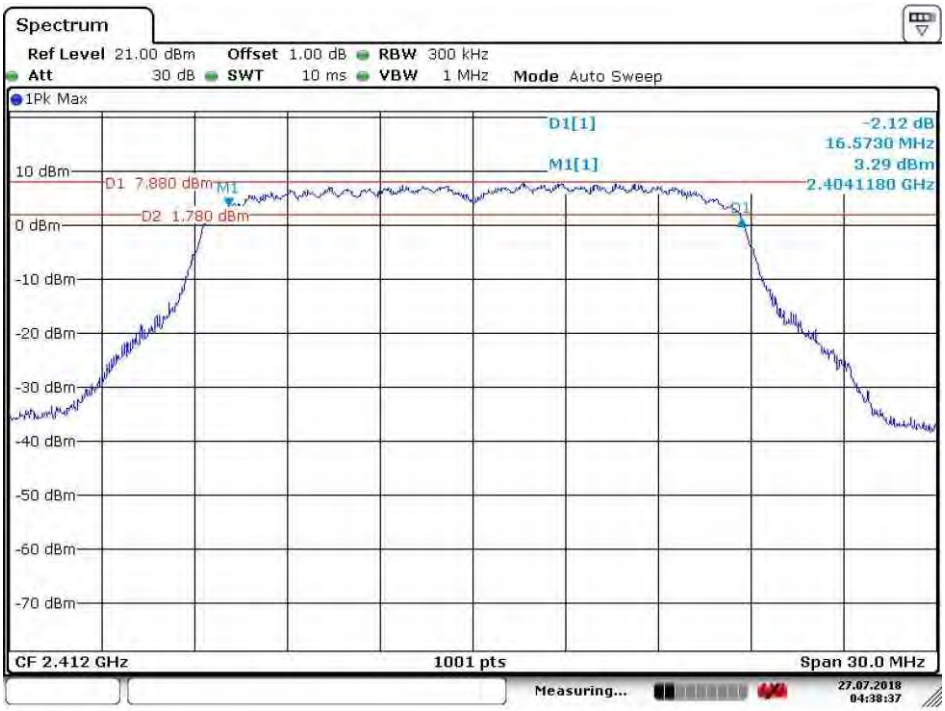
Test mode:	802.11g	Test channel:	Highest



Date: 27.JUL.2018 04:36:52

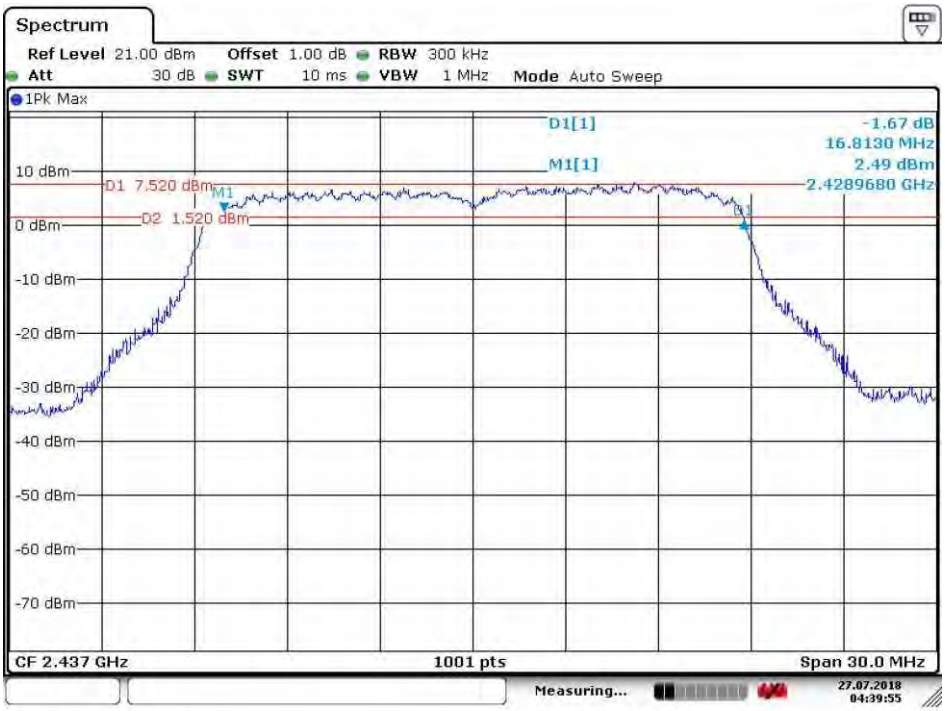
MIMO_ANT1

Test mode:	802.11n(HT20)	Test channel:	Lowest



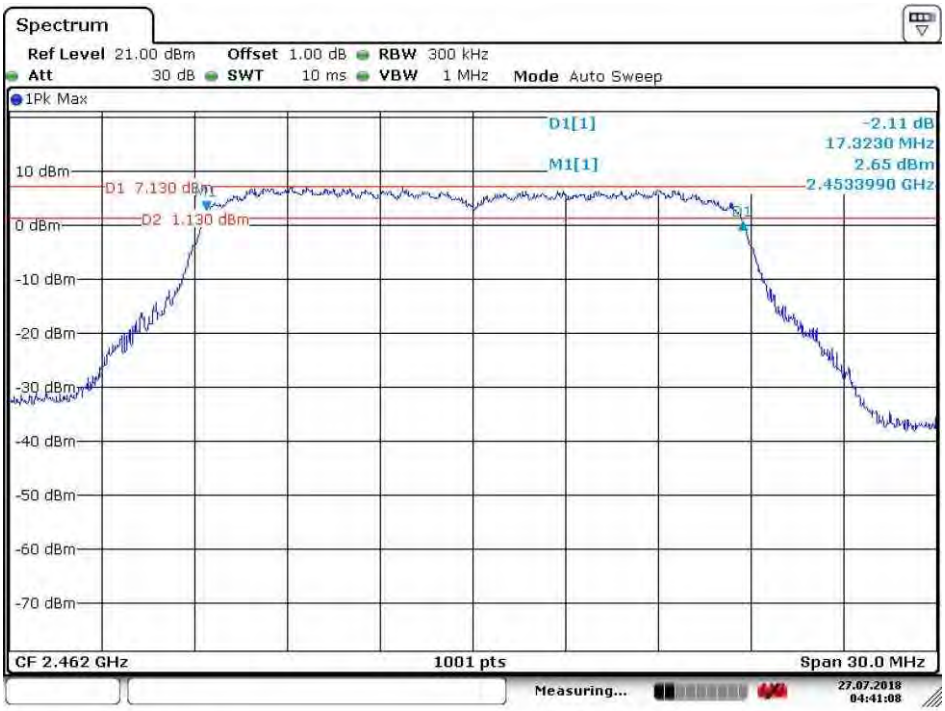
Date: 27.JUL.2018 04:38:37

Test mode:	802.11n(HT20)	Test channel:	Middle



Date: 27.JUL.2018 04:39:55

Test mode:	802.11n(HT20)	Test channel:	Highest

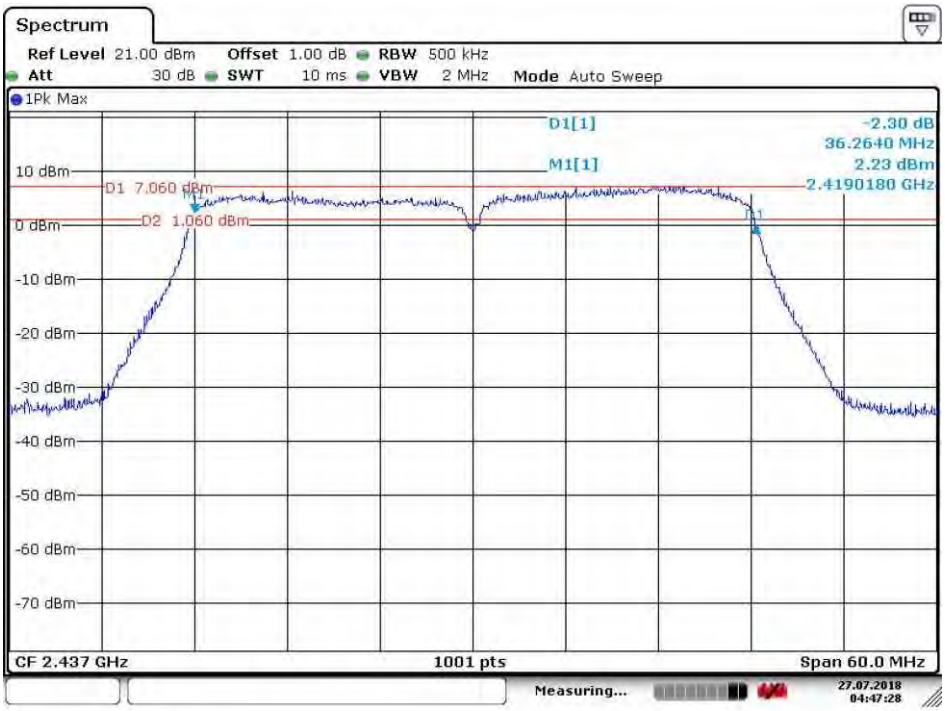


Date: 27.JUL.2018 04:41:08

Test mode:	802.11n(HT40)	Test channel:	Lowest

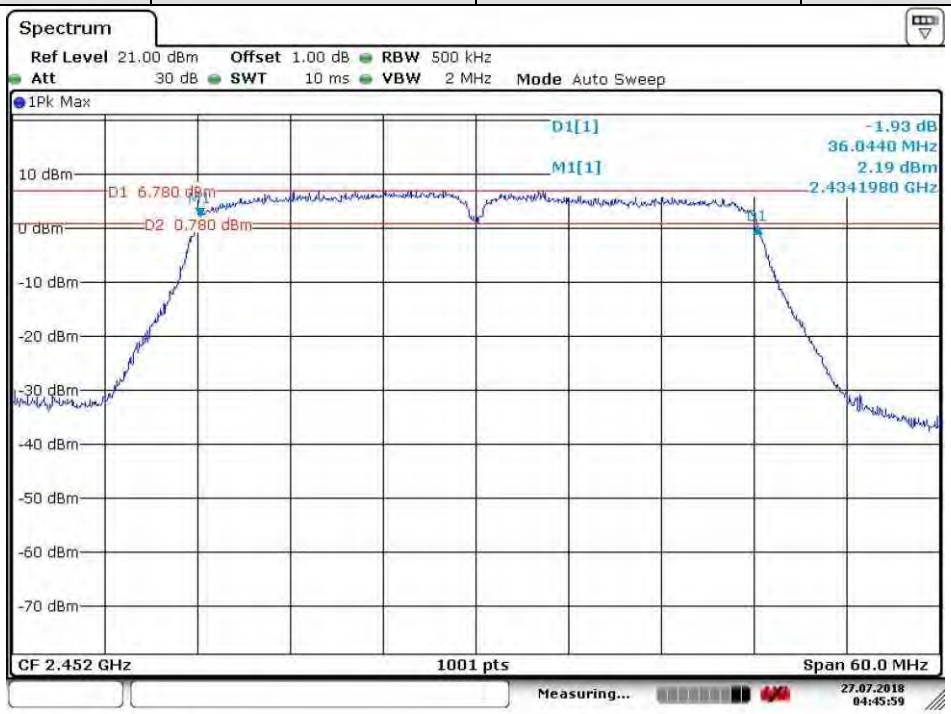
Date: 27.JUL.2018 04:48:26

Test mode:	802.11n(HT40)	Test channel:	Middle



Date: 27.JUL.2018 04:47:28

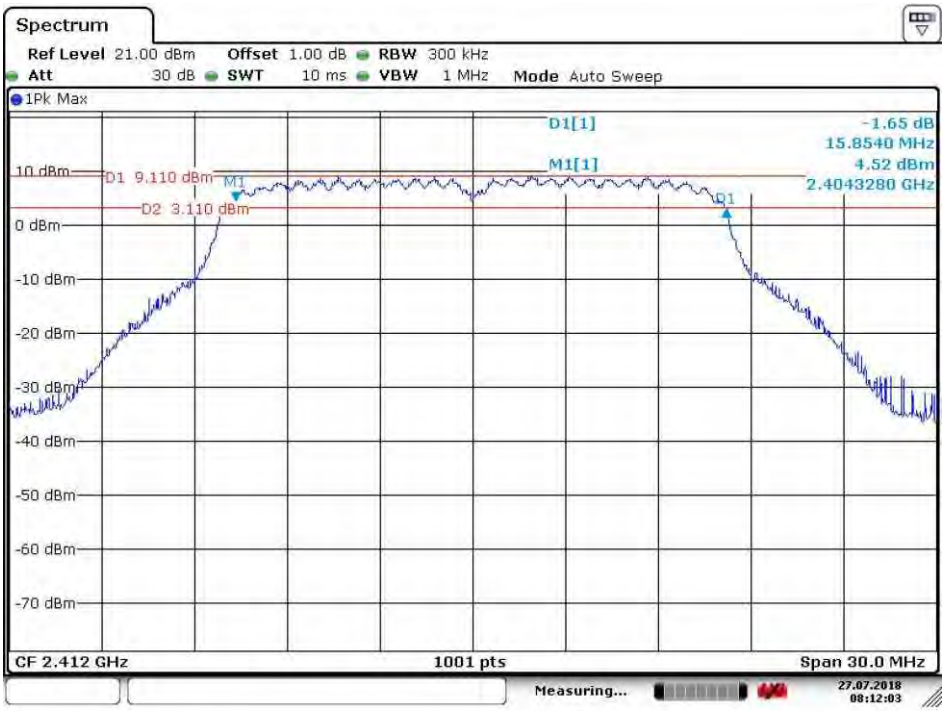
Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 27.JUL.2018 04:46:00

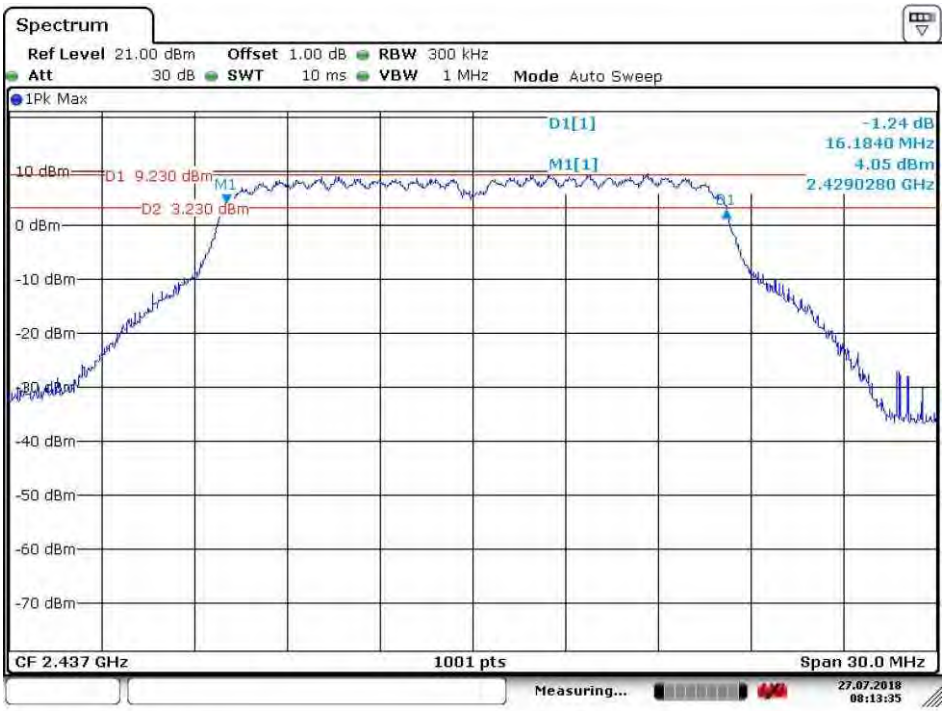
CDD_ANT2

Test mode:	802.11g	Test channel:	Lowest



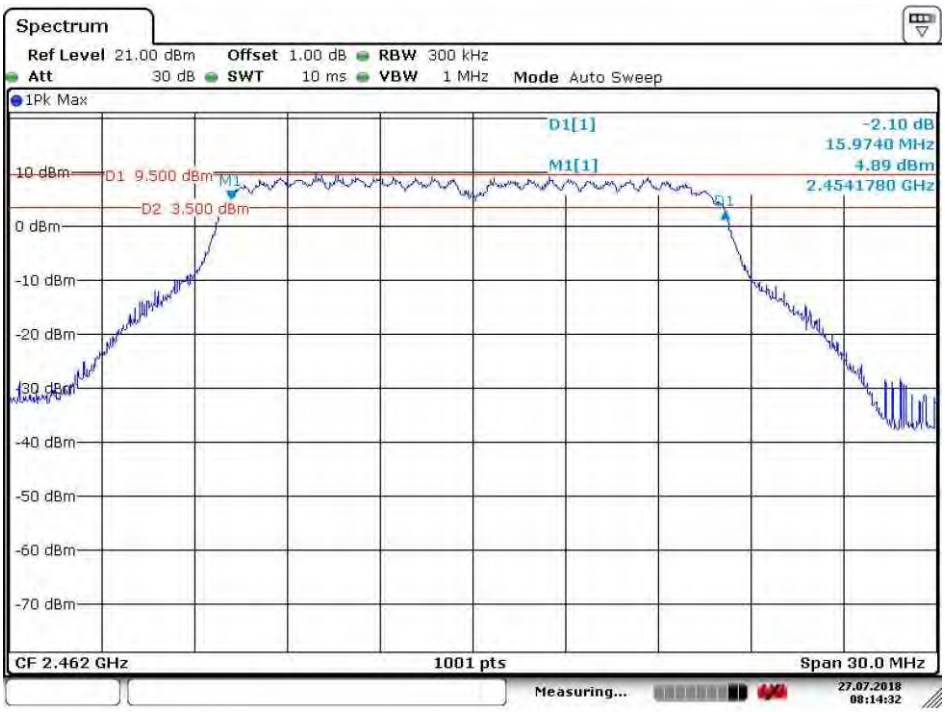
Date: 27.JUL.2018 08:12:04

Test mode:	802.11g	Test channel:	Middle



Date: 27.JUL.2018 08:13:36

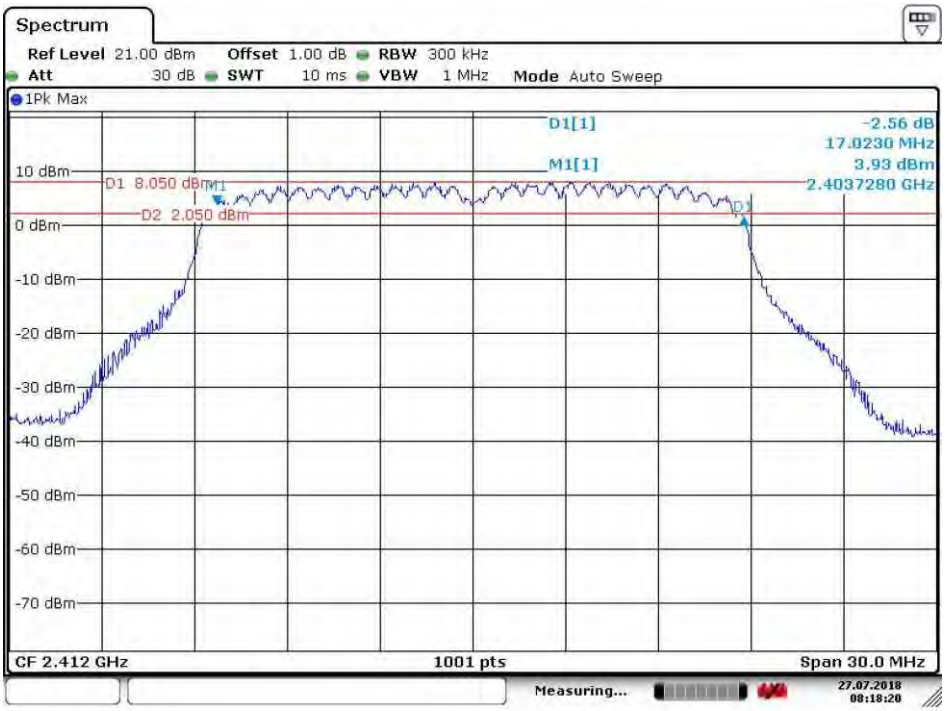
Test mode:	802.11g	Test channel:	Highest



Date: 27.JUL.2018 08:14:32

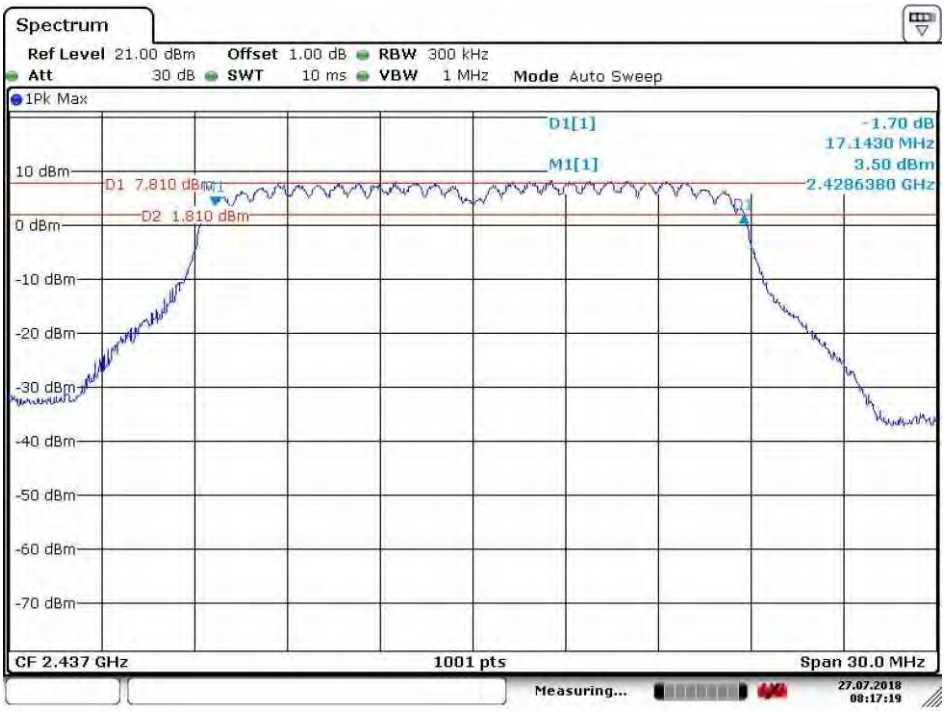
MIMO_ANT2

Test mode:	802.11n(HT20)	Test channel:	Lowest



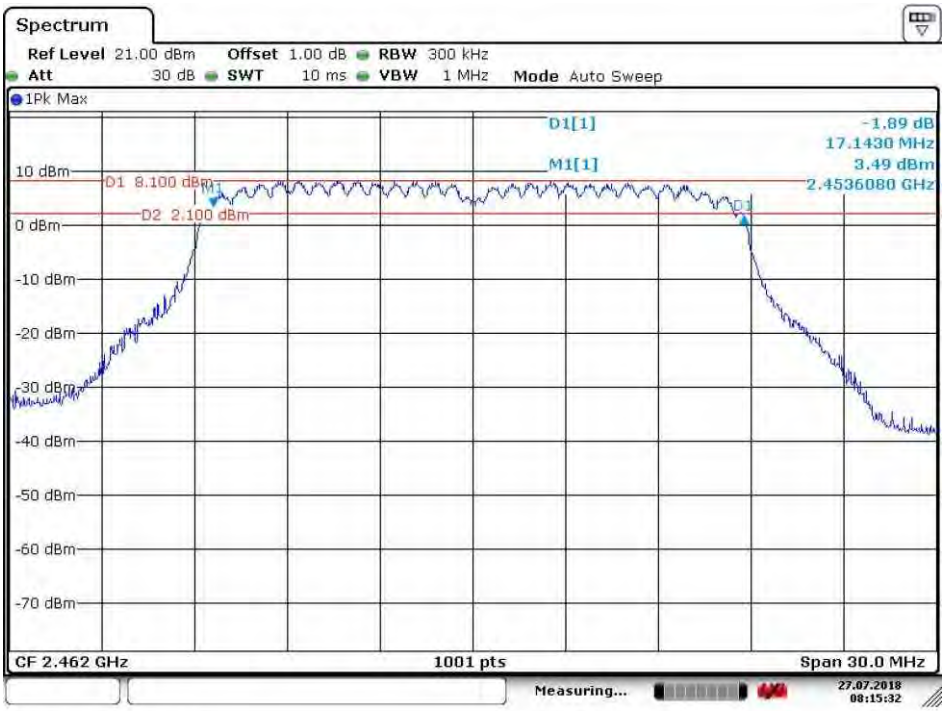
Date: 27.JUL.2018 08:18:21

Test mode:	802.11n(HT20)	Test channel:	Middle



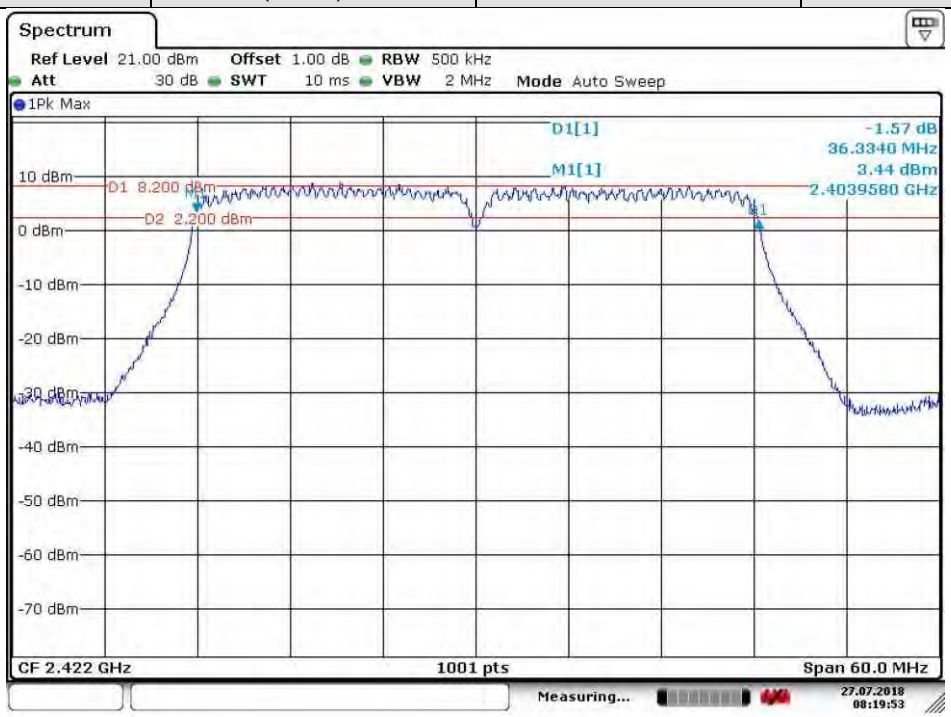
Date: 27.JUL.2018 08:17:20

Test mode:	802.11n(HT20)	Test channel:	Highest



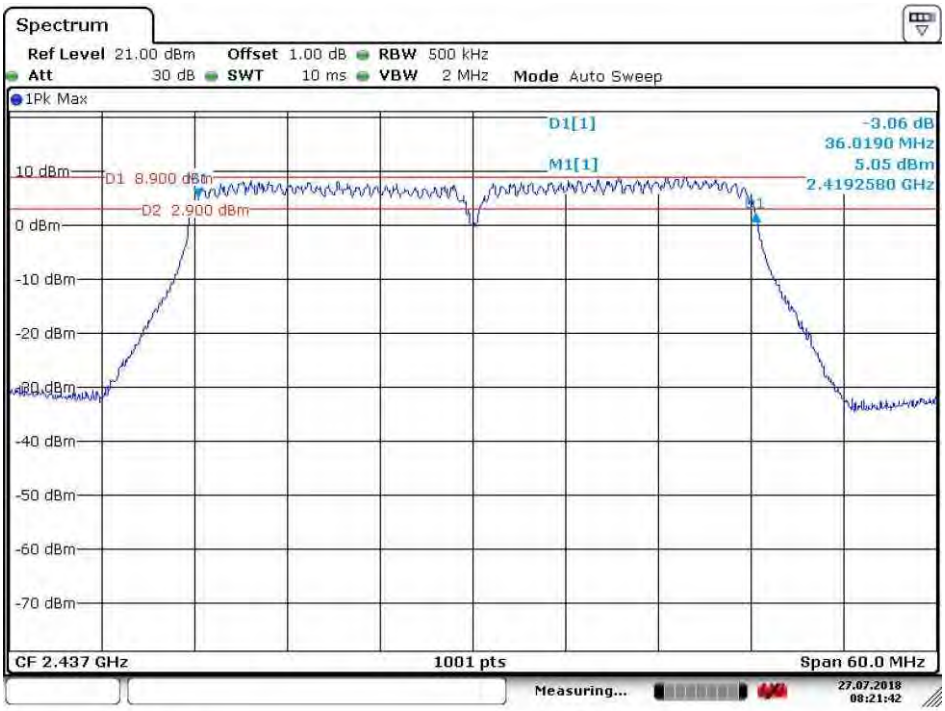
Date: 27.JUL.2018 08:15:32

Test mode:	802.11n(HT40)	Test channel:	Lowest



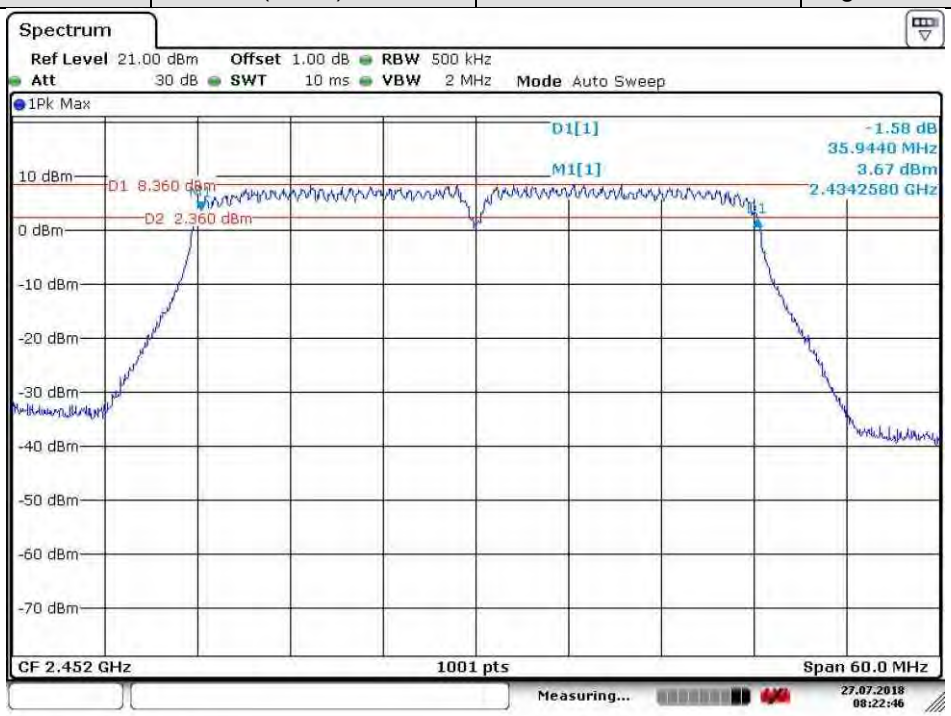
Date: 27.JUL.2018 08:19:54

Test mode:	802.11n(HT40)	Test channel:	Middle



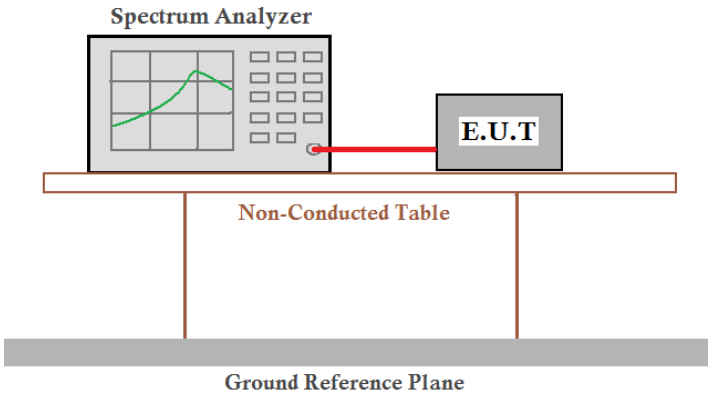
Date: 27.JUL.2018 08:21:42

Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 27.JUL.2018 08:22:46

5.6 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10 :2013 Section 11.10.2
Test Setup:	
Test Instruments:	Refer to section 5.10 for details
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g ; 6.5Mbps of rate is the worst case of 802.11n(HT20);13.5Mbps of rate is the worst case of 802.11n(HT40).
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

Measurement Data

SISO_ANT1

802.11b mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-4.71	≤8.00	Pass
Middle	-5.41	≤8.00	Pass
Highest	-3.07	≤8.00	Pass
802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-6.91	≤8.00	Pass
Middle	-7.89	≤8.00	Pass
Highest	-7.54	≤8.00	Pass
802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-8.58	≤8.00	Pass
Middle	-9.37	≤8.00	Pass
Highest	-9.79	≤8.00	Pass
802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-12.87	≤8.00	Pass
Middle	-11.67	≤8.00	Pass
Highest	-12.01	≤8.00	Pass

SISO_ANT2

802.11b mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-5.30	≤8.00	Pass
Middle	-3.90	≤8.00	Pass
Highest	-3.77	≤8.00	Pass
802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-7.16	≤8.00	Pass
Middle	-7.74	≤8.00	Pass
Highest	-6.55	≤8.00	Pass
802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-9.15	≤8.00	Pass

Middle	-7.85	≤8.00	Pass
Highest	-8.89	≤8.00	Pass
802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-12.22	≤8.00	Pass
Middle	-11.73	≤8.00	Pass
Highest	-12.57	≤8.00	Pass

CDD_ANT1_802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-6.59	≤8.00	Pass
Middle	-7.85	≤8.00	Pass
Highest	-7.64	≤8.00	Pass
MIMO_ANT1_802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-7.09	≤8.00	Pass
Middle	-7.75	≤8.00	Pass
Highest	-8.29	≤8.00	Pass
MIMO_ANT1_802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-11.61	≤8.00	Pass
Middle	-12.02	≤8.00	Pass
Highest	-11.63	≤8.00	Pass

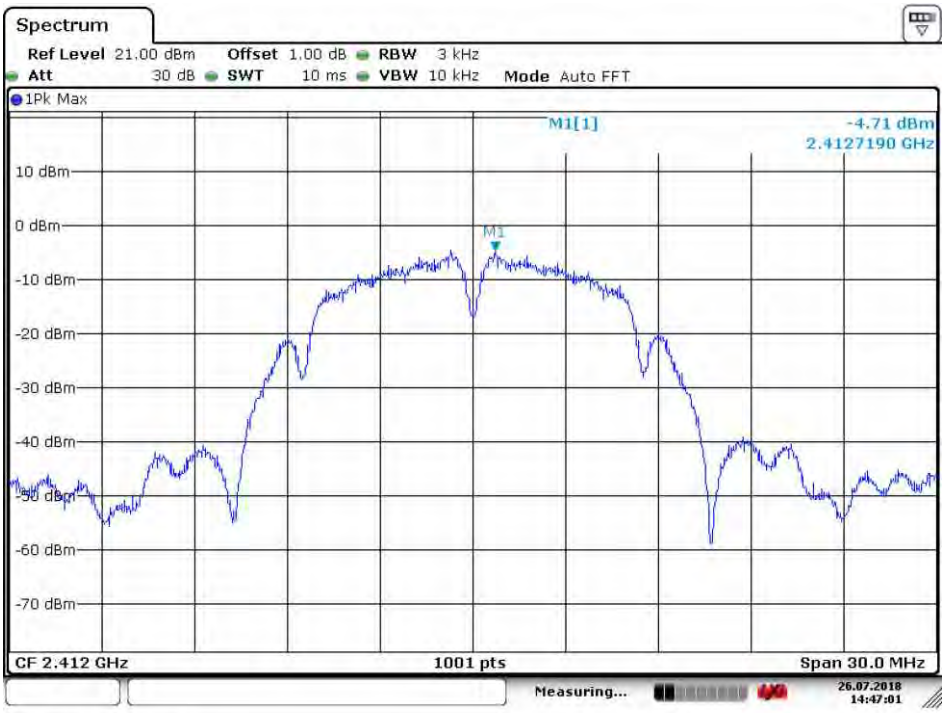
CDD_ANT2_802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-7.28	≤8.00	Pass
Middle	-7.48	≤8.00	Pass
Highest	-7.66	≤8.00	Pass
MIMO_ANT2_802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-8.49	≤8.00	Pass
Middle	-8.68	≤8.00	Pass
Highest	-8.80	≤8.00	Pass

MIMO_ANT2_802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-12.18	≤8.00	Pass
Middle	-11.62	≤8.00	Pass
Highest	-12.29	≤8.00	Pass

Test plot as follows:

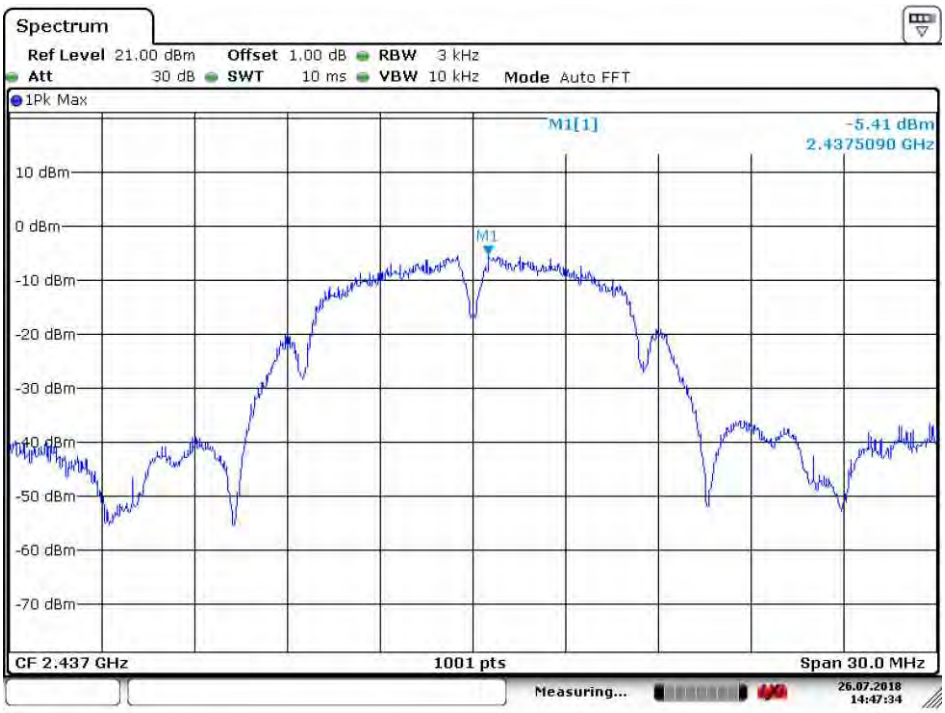
SISO_ANT1

Test mode:	802.11b	Test channel:	Lowest



Date: 26.JUL.2018 14:47:01

Test mode:	802.11b	Test channel:	Middle

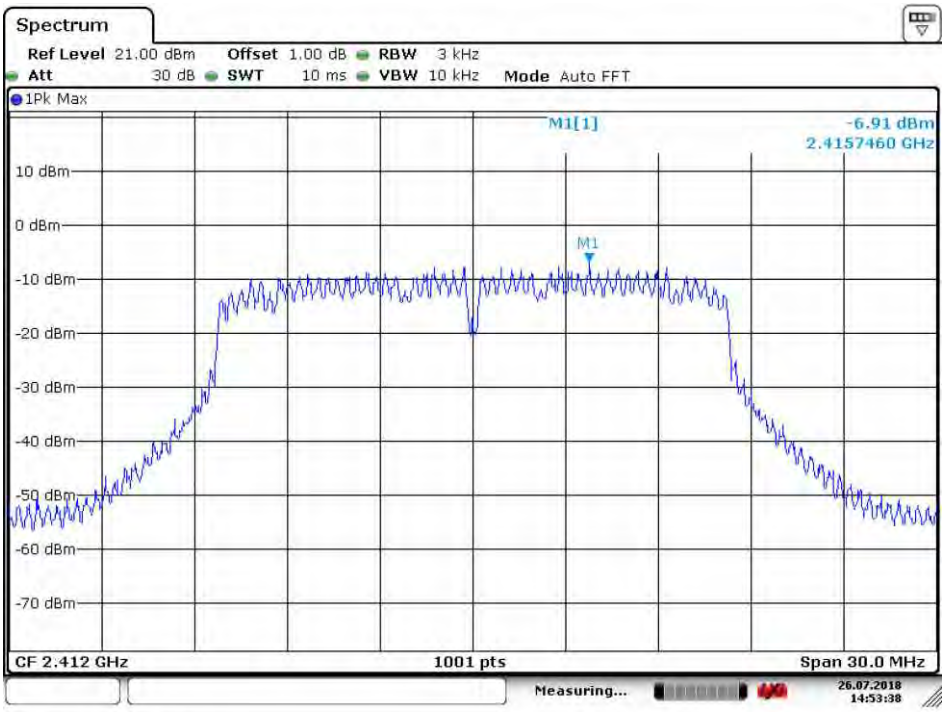


Date: 26.JUL.2018 14:47:35

Test mode:	802.11b	Test channel:	Highest

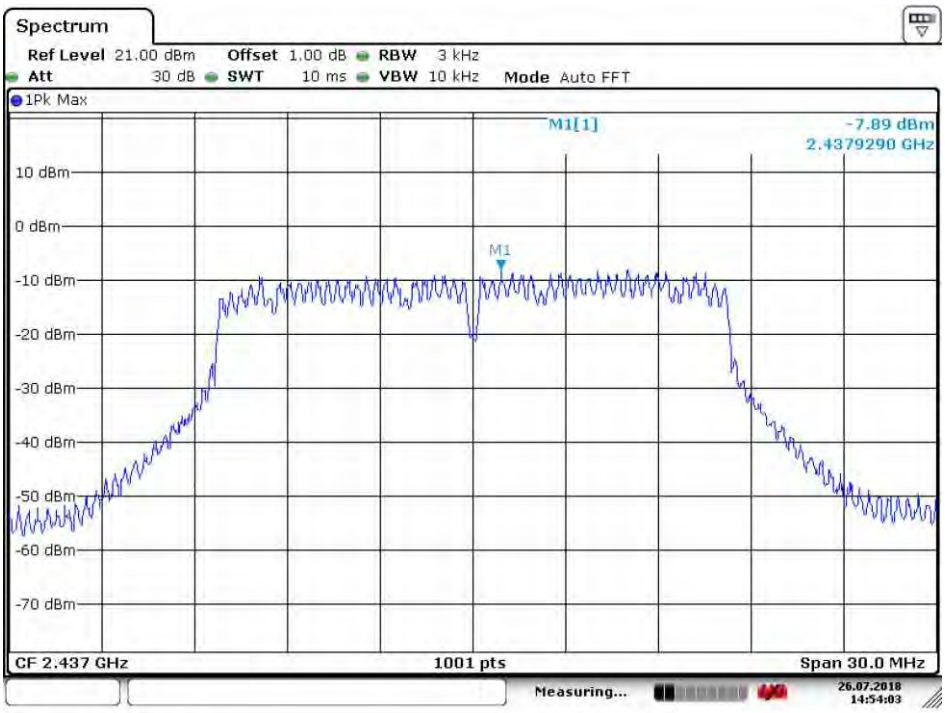
Date: 26.JUL.2018 14:48:24

Test mode:	802.11g	Test channel:	Lowest



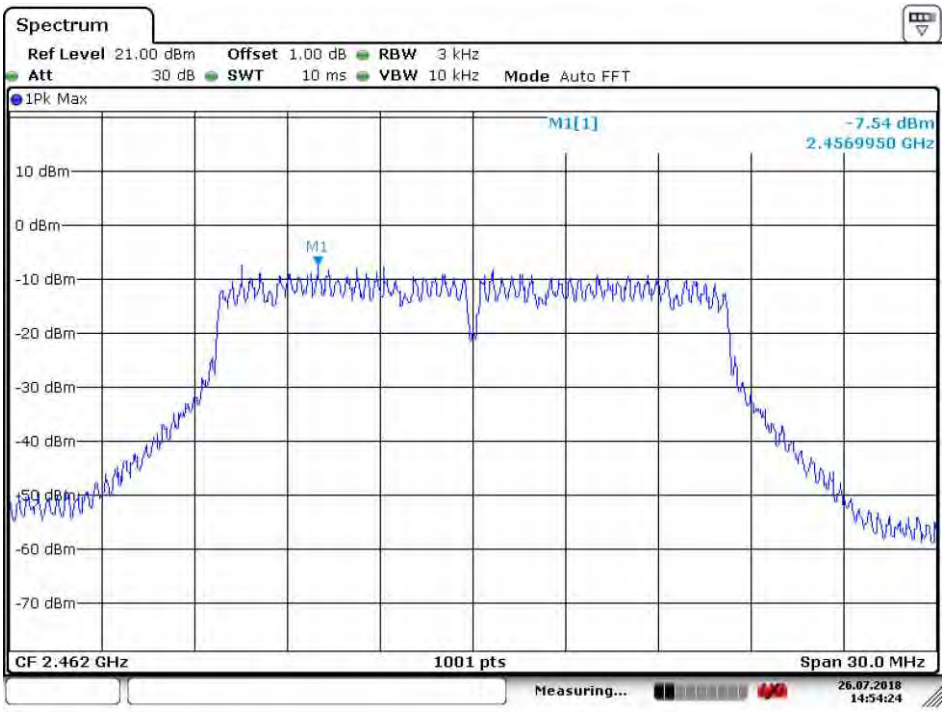
Date: 26.JUL.2018 14:53:39

Test mode:	802.11g	Test channel:	Middle



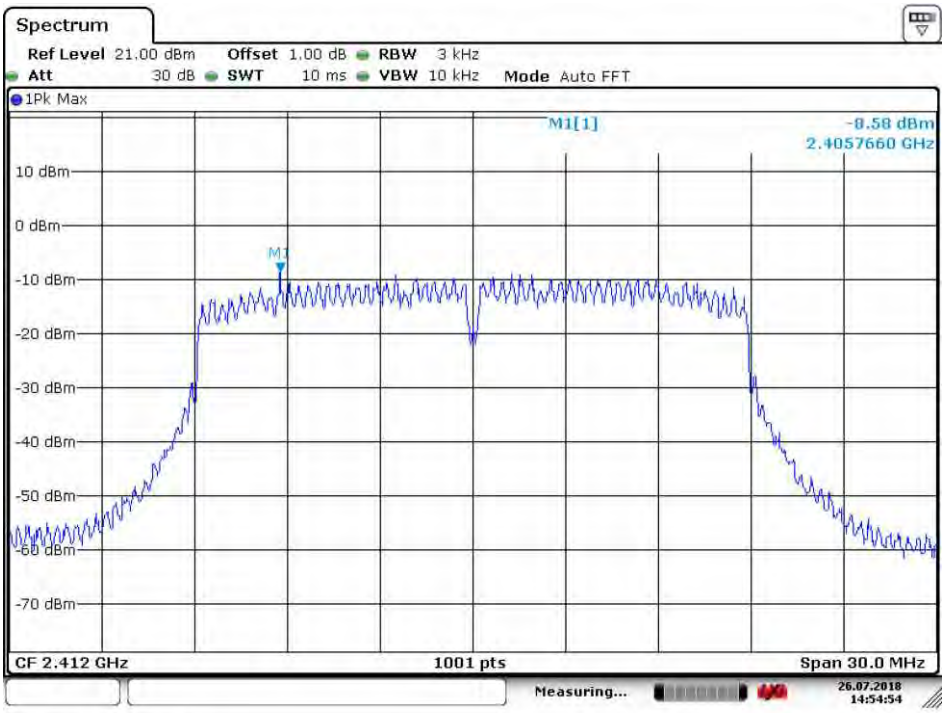
Date: 26.JUL.2018 14:54:03

Test mode:	802.11g	Test channel:	Highest



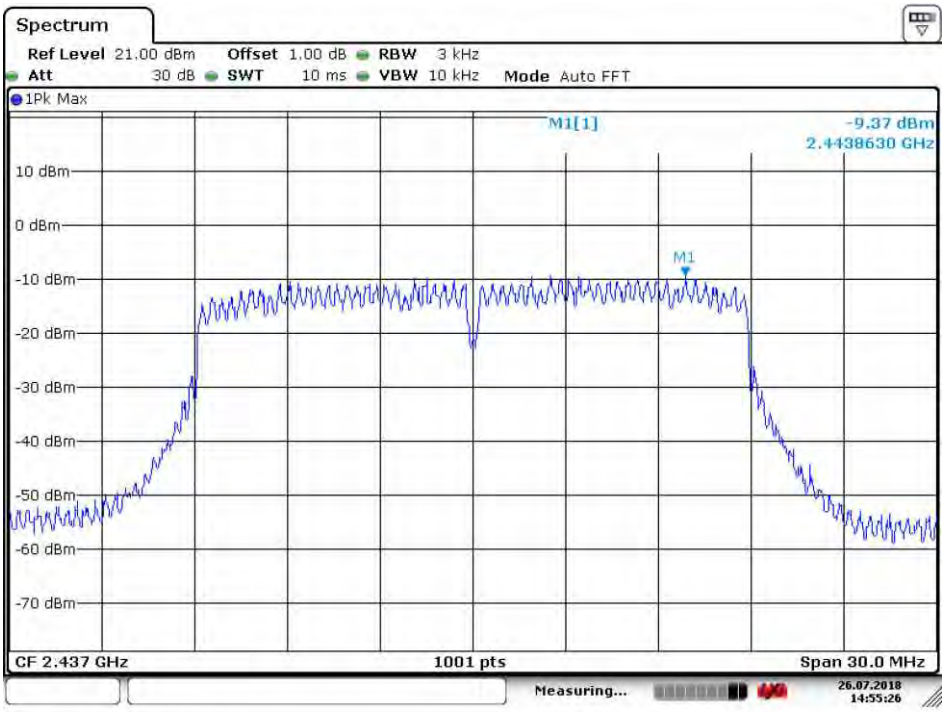
Date: 26.JUL.2018 14:54:24

Test mode:	802.11n(HT20)	Test channel:	Lowest



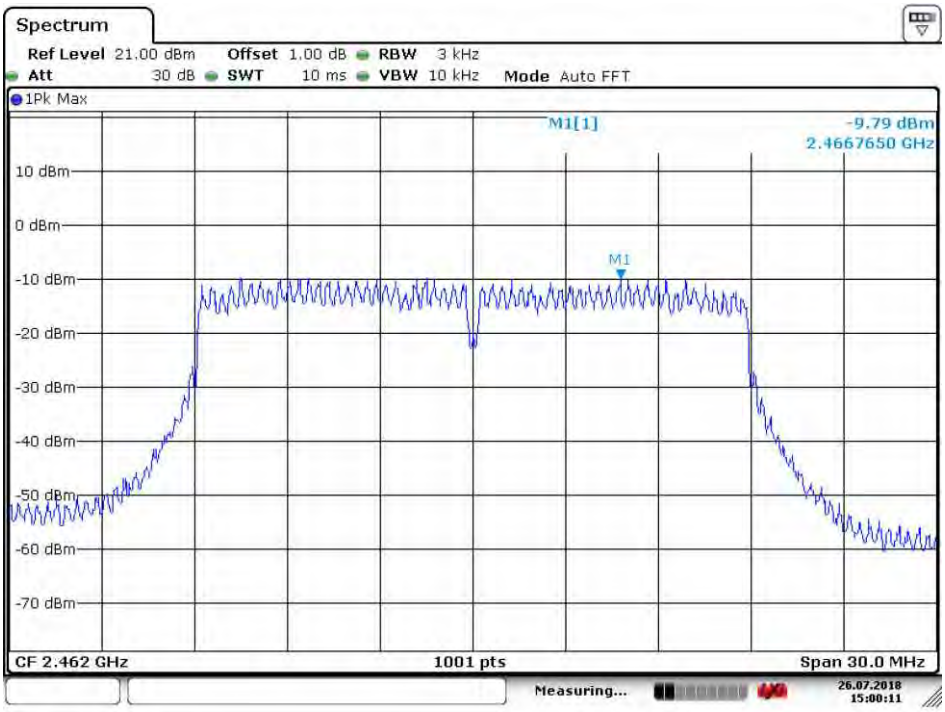
Date: 26.JUL.2018 14:54:55

Test mode:	802.11n(HT20)	Test channel:	Middle



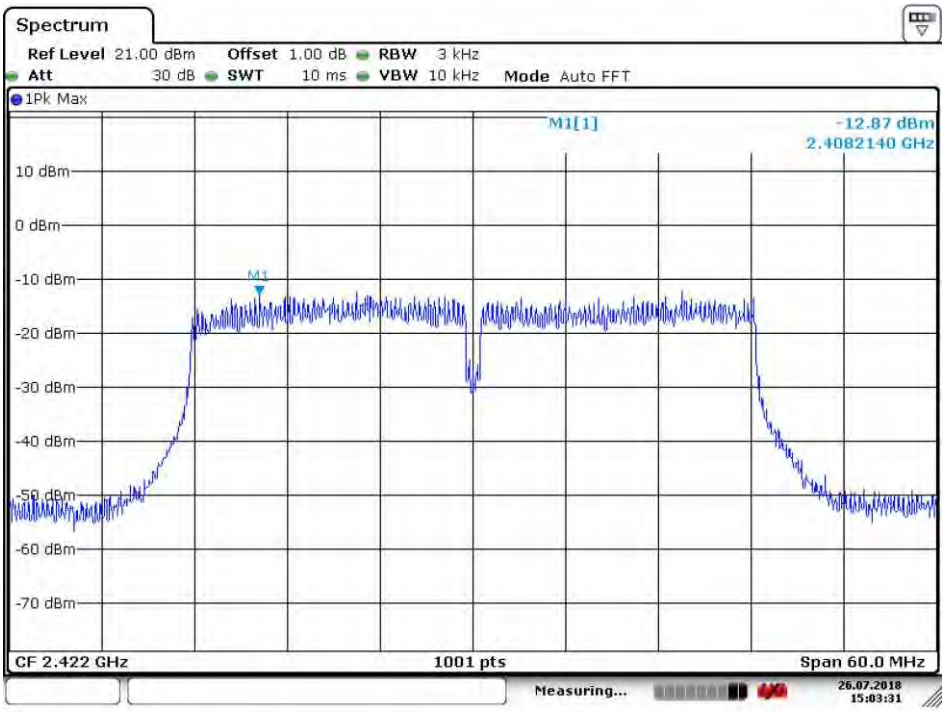
Date: 26.JUL.2018 14:55:26

Test mode:	802.11n(HT20)	Test channel:	Highest



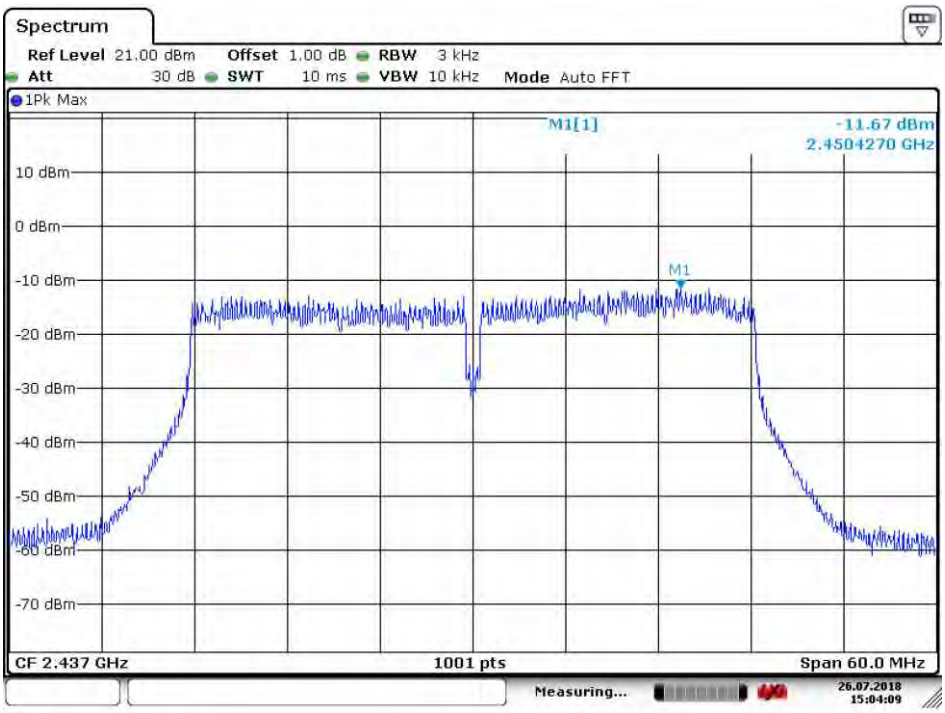
Date: 26.JUL.2018 15:00:11

Test mode:	802.11n(HT40)	Test channel:	Lowest



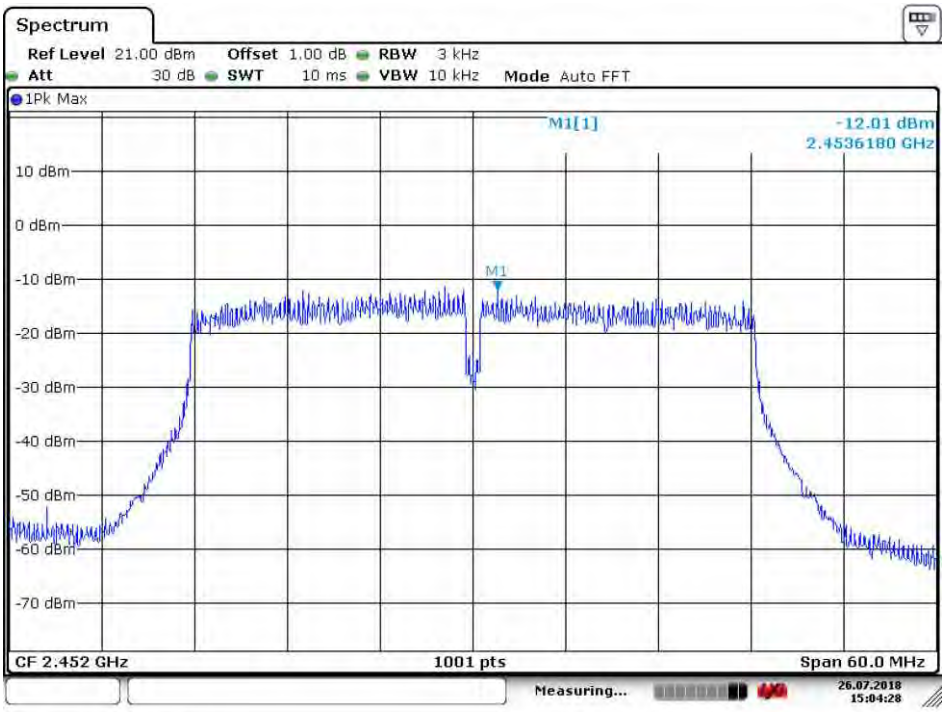
Date: 26.JUL.2018 15:03:31

Test mode:	802.11n(HT40)	Test channel:	Middle



Date: 26.JUL.2018 15:04:09

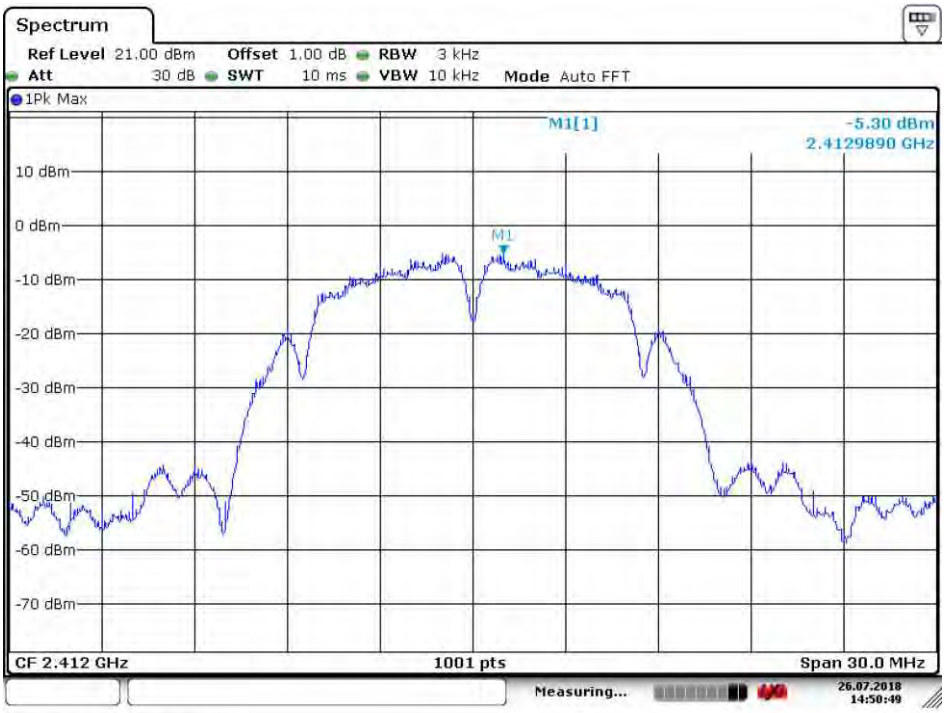
Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 26.JUL.2018 15:04:29

SISO_ANT2

Test mode:	802.11b	Test channel:	Lowest

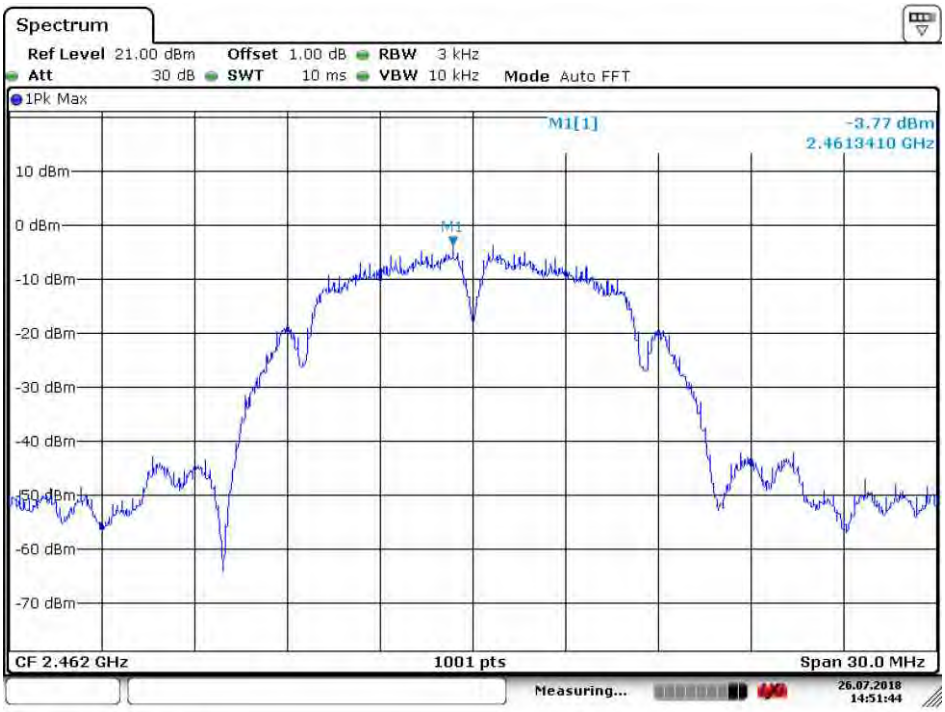


Date: 26.JUL.2018 14:50:49

Test mode:	802.11b	Test channel:	Middle

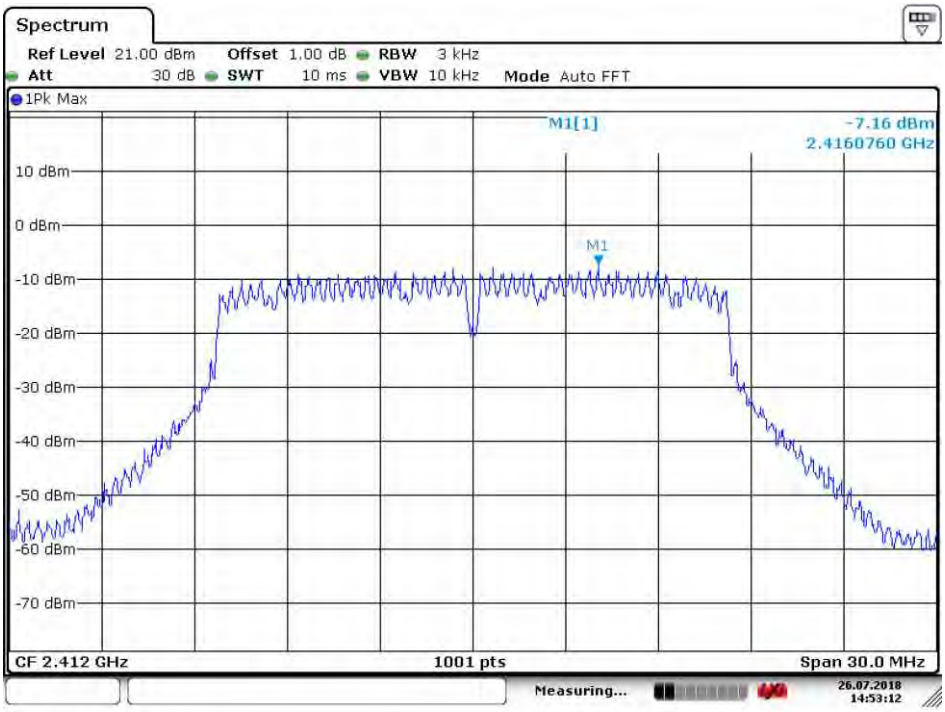
Date: 26.JUL.2018 14:51:19

Test mode:	802.11b	Test channel:	Highest



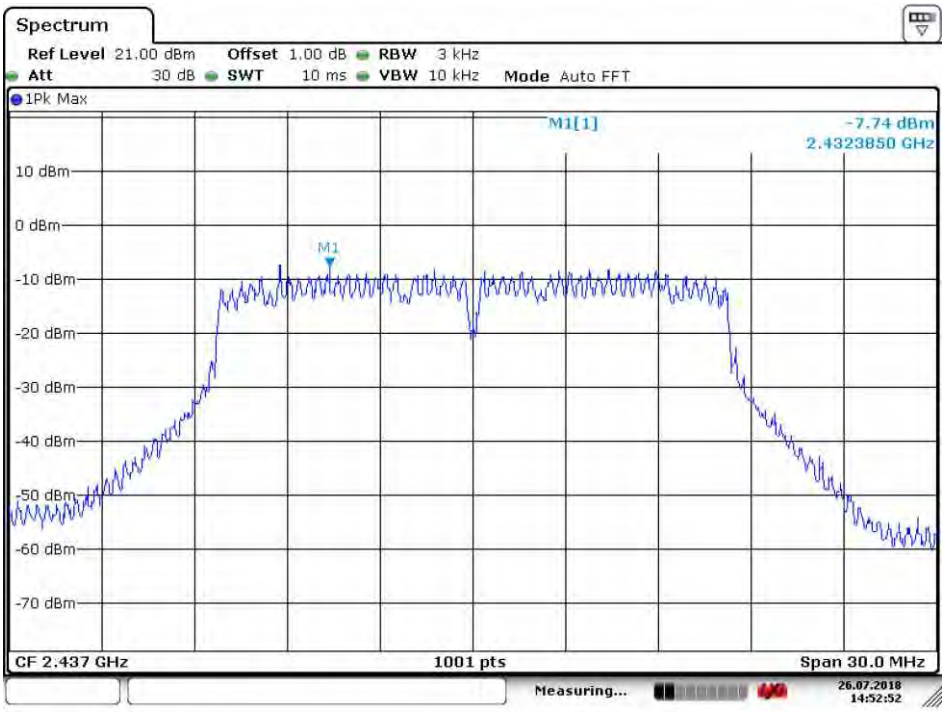
Date: 26.JUL.2018 14:51:44

Test mode:	802.11g	Test channel:	Lowest



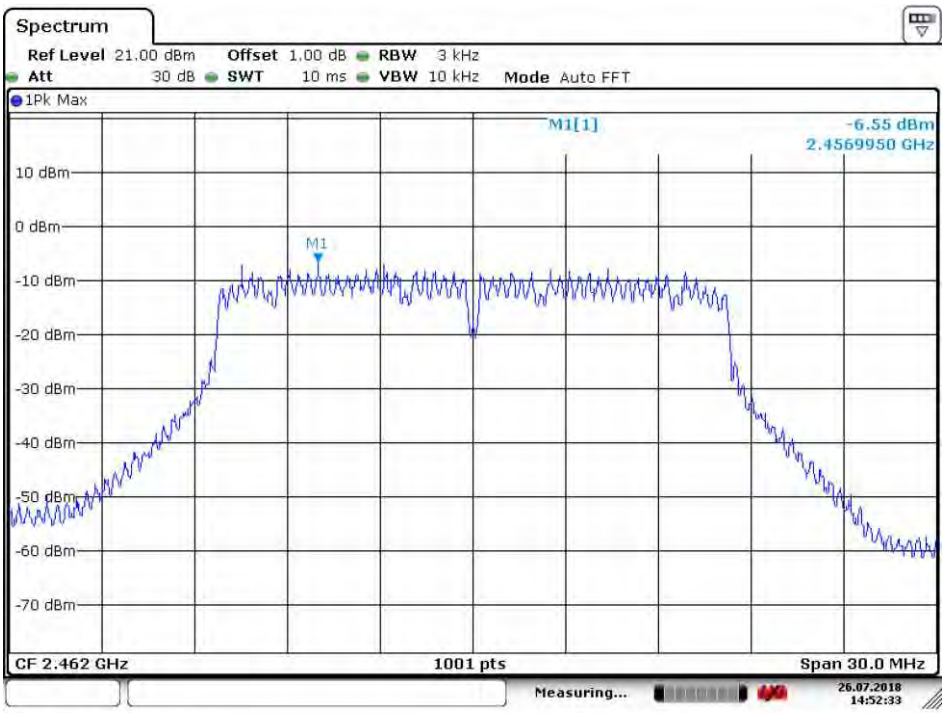
Date: 26.JUL.2018 14:53:13

Test mode:	802.11g	Test channel:	Middle



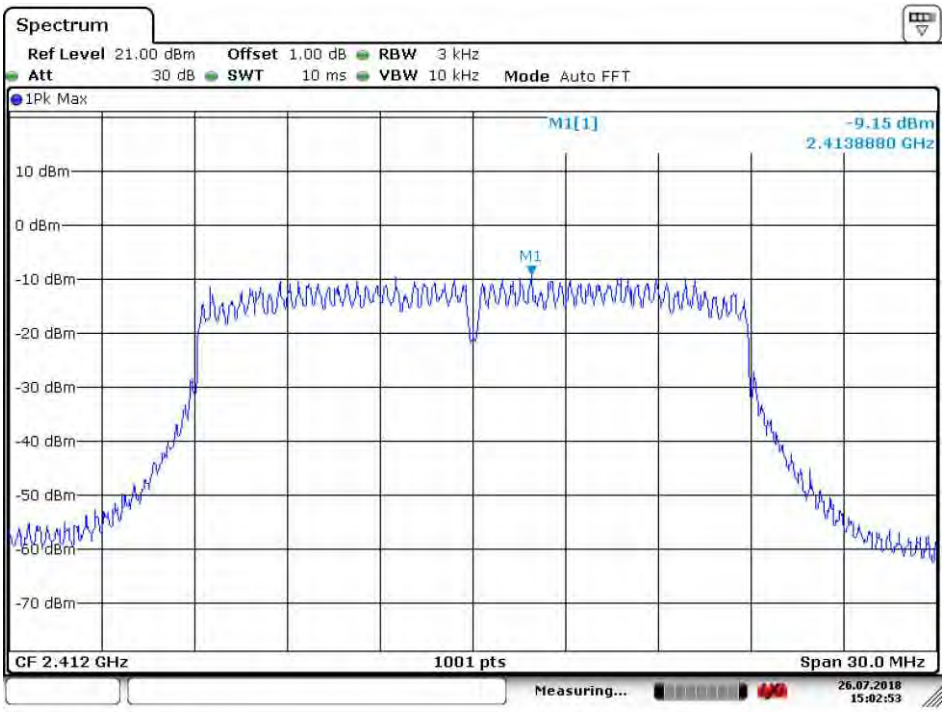
Date: 26.JUL.2018 14:52:53

Test mode:	802.11g	Test channel:	Highest



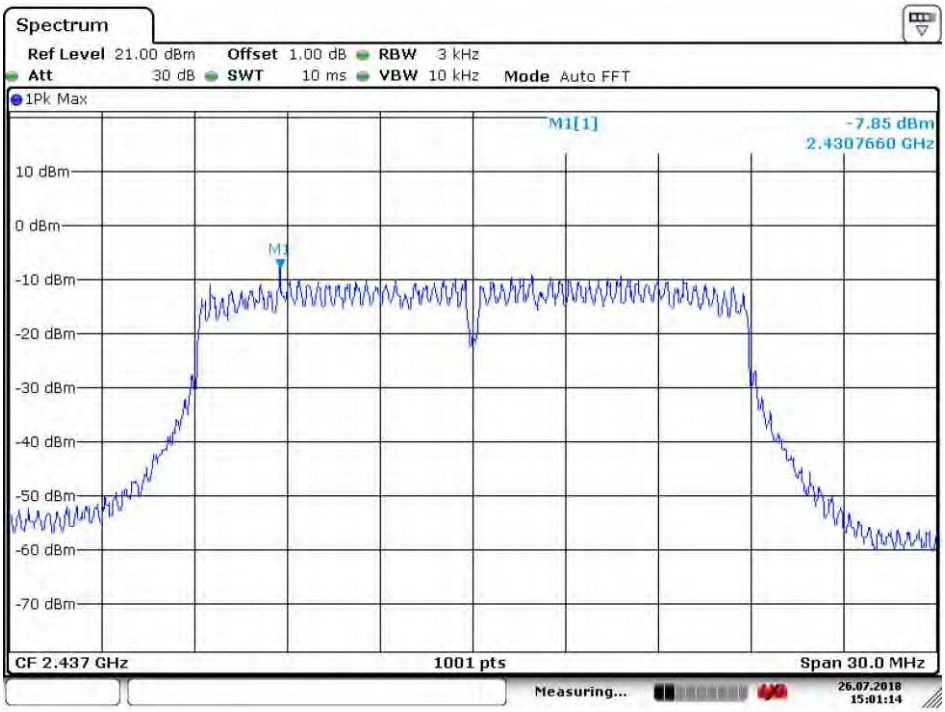
Date: 26.JUL.2018 14:52:33

Test mode:	802.11n(HT20)	Test channel:	Lowest



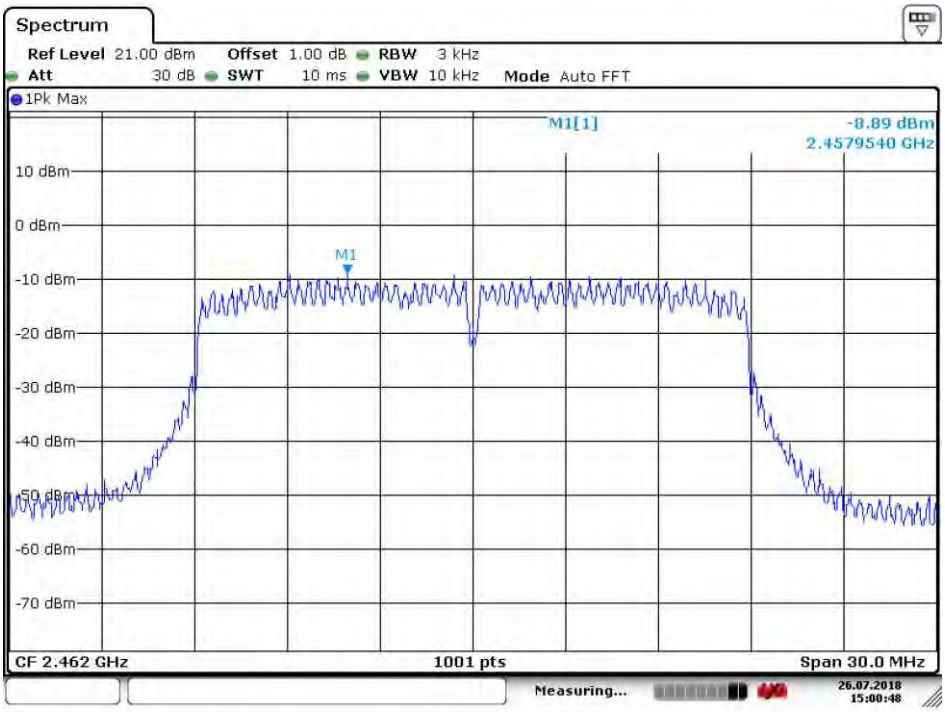
Date: 26.JUL.2018 15:02:53

Test mode:	802.11n(HT20)	Test channel:	Middle



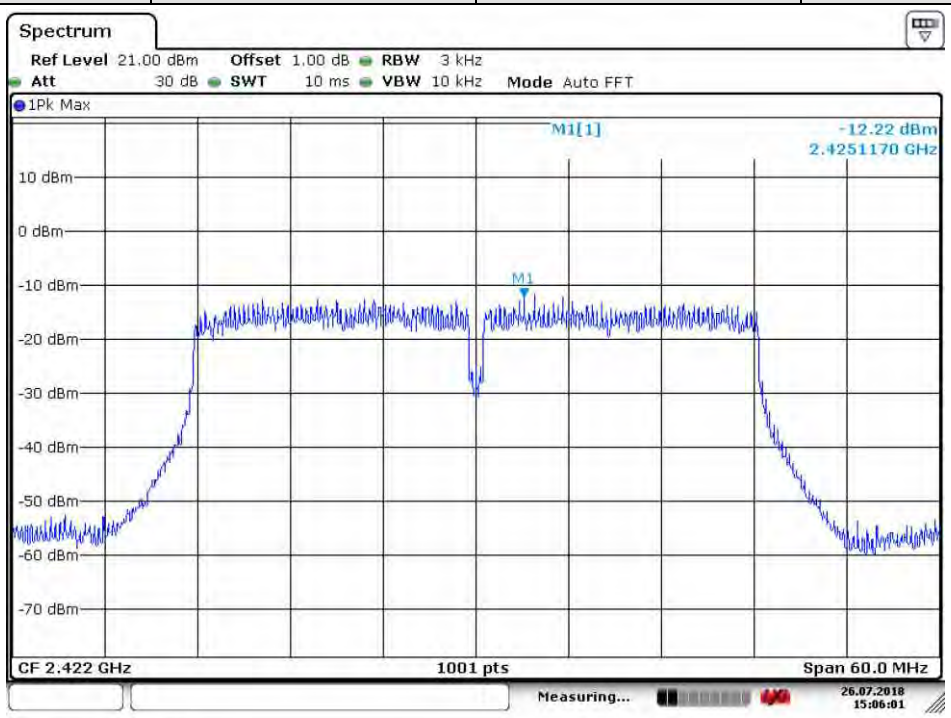
Date: 26.JUL.2018 15:01:14

Test mode:	802.11n(HT20)	Test channel:	Highest



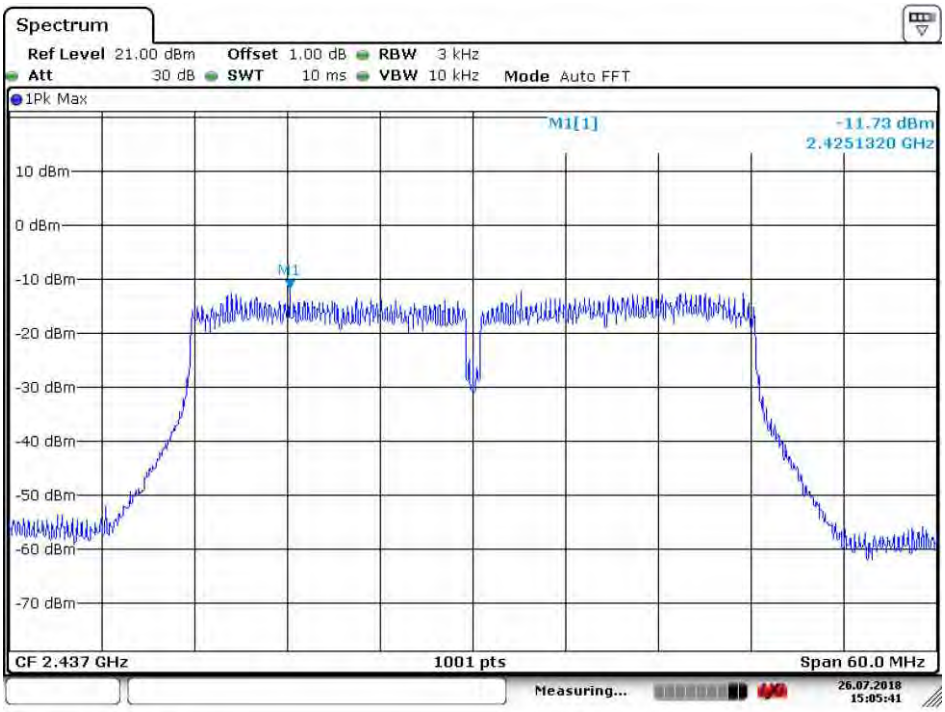
Date: 26.JUL.2018 15:00:49

Test mode:	802.11n(HT40)	Test channel:	Lowest



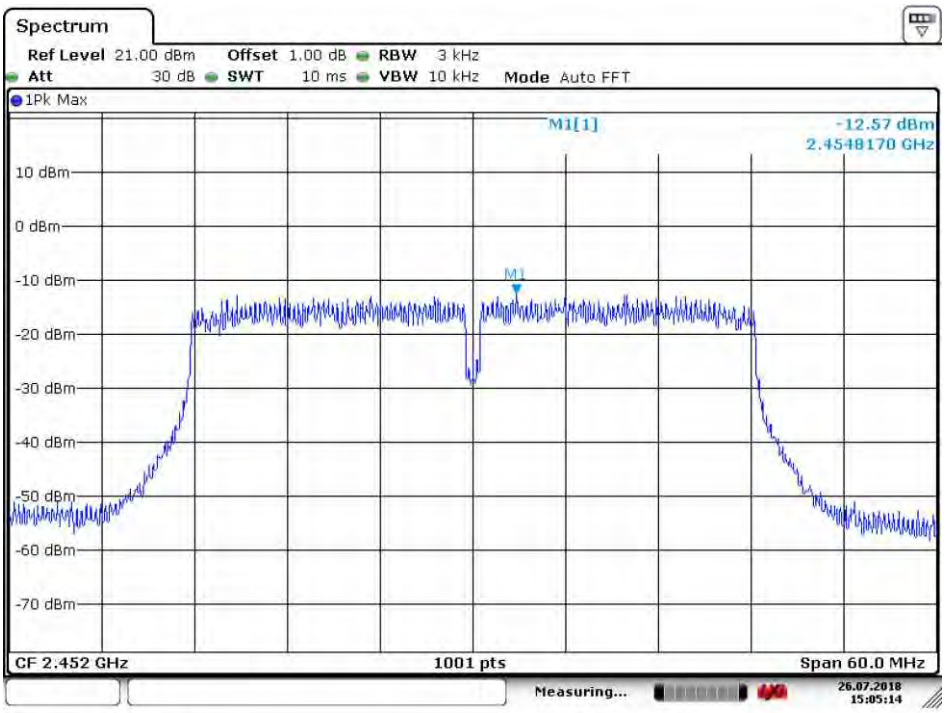
Date: 26.JUL.2018 15:06:01

Test mode:	802.11n(HT40)	Test channel:	Middle



Date: 26.JUL.2018 15:05:42

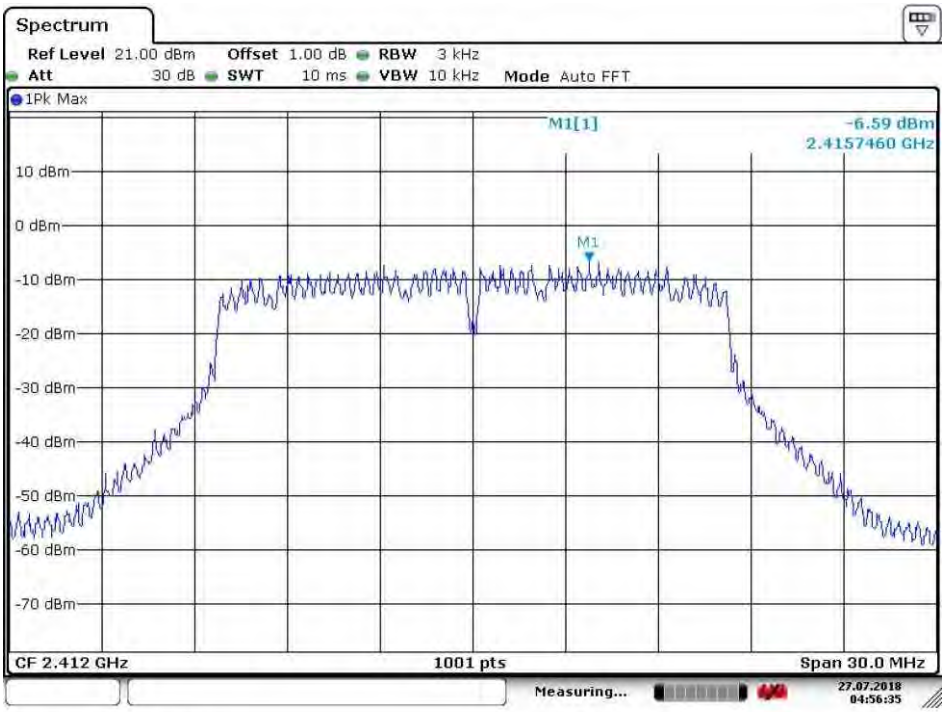
Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 26.JUL.2018 15:05:15

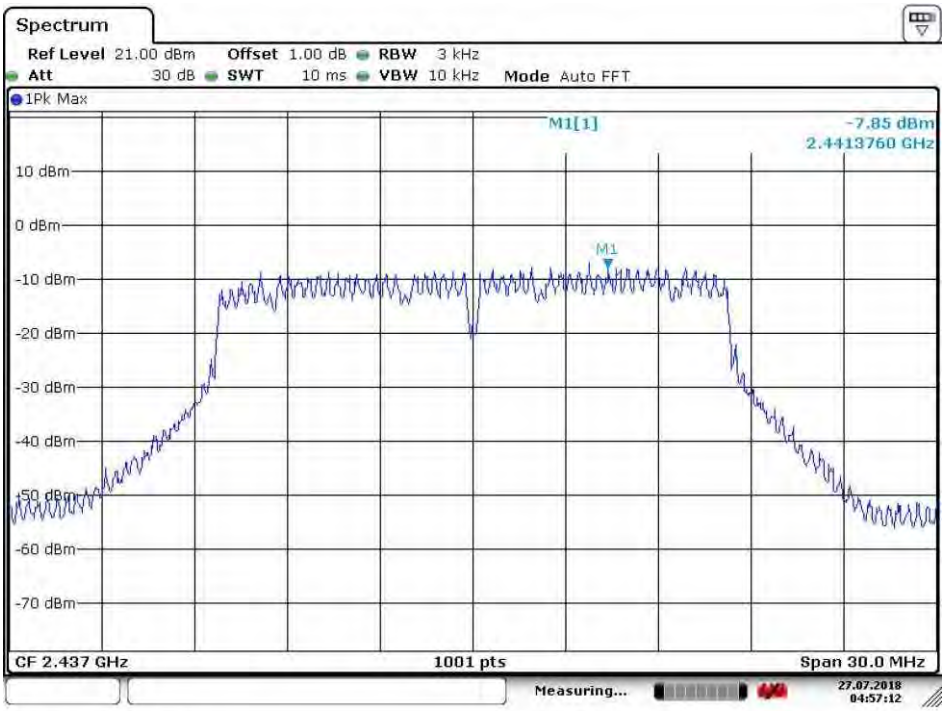
CDD_ANT1

Test mode:	802.11g	Test channel:	Lowest



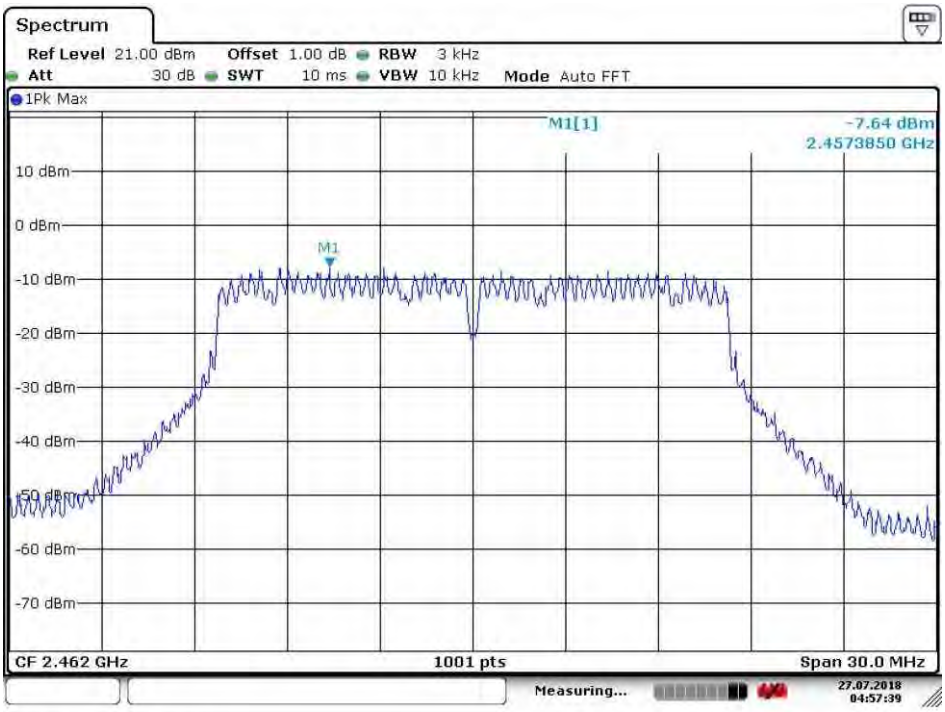
Date: 27.JUL.2018 04:56:35

Test mode:	802.11g	Test channel:	Middle



Date: 27.JUL.2018 04:57:13

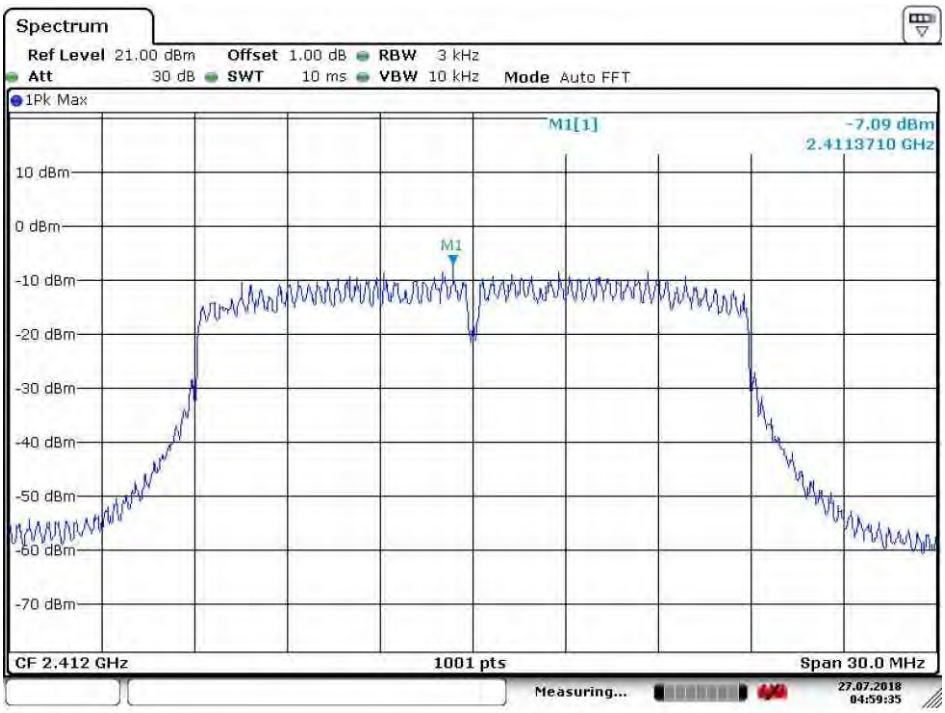
Test mode:	802.11g	Test channel:	Highest



Date: 27.JUL.2018 04:57:39

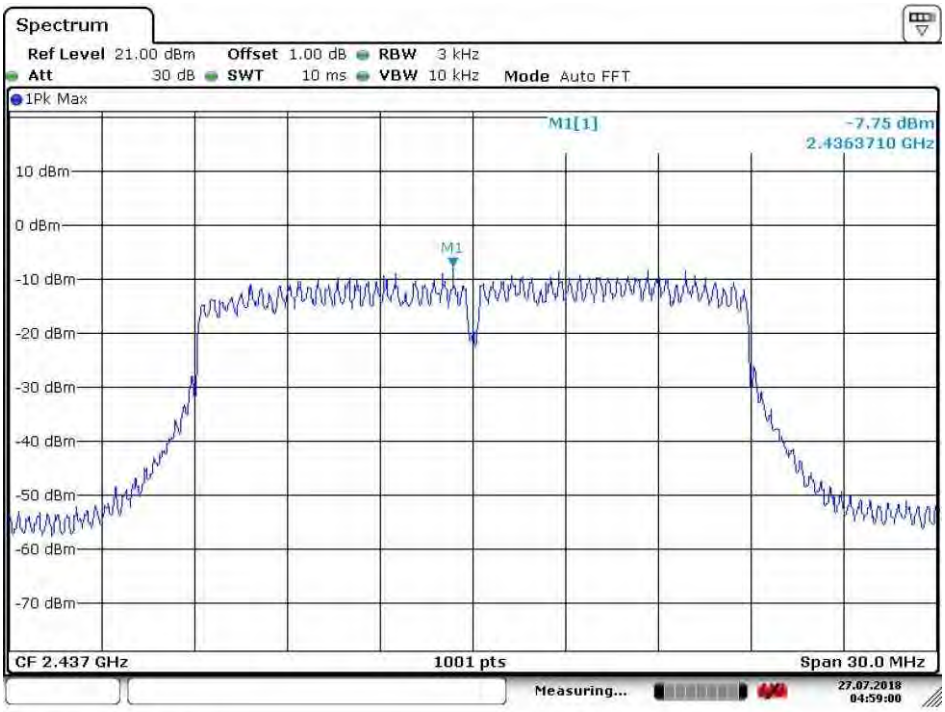
MIMO_ANT1

Test mode:	802.11n(HT20)	Test channel:	Lowest



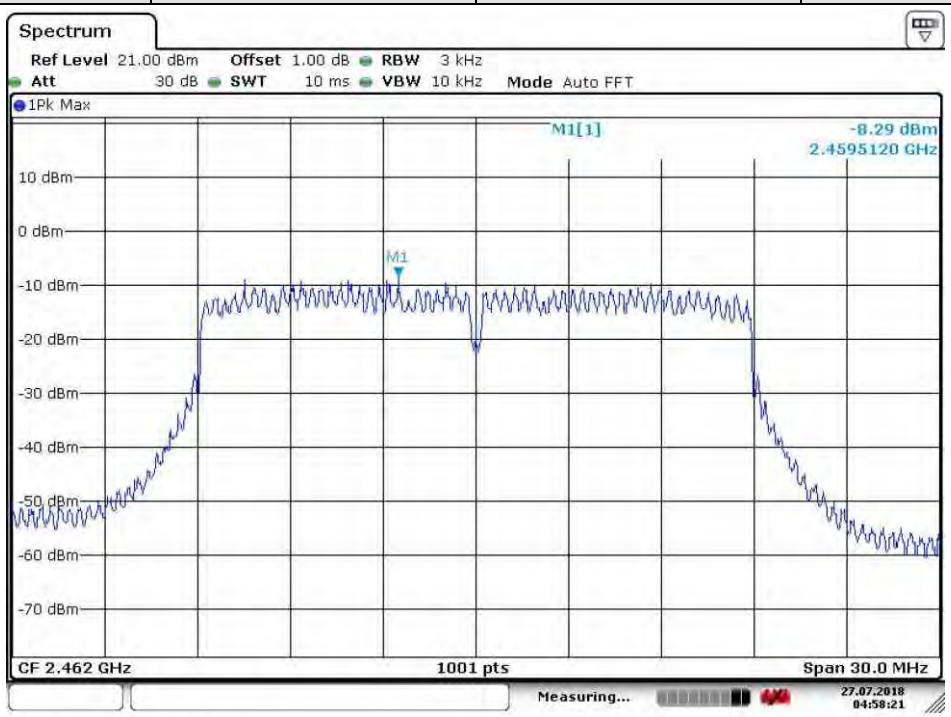
Date: 27.JUL.2018 04:59:36

Test mode:	802.11n(HT20)	Test channel:	Middle



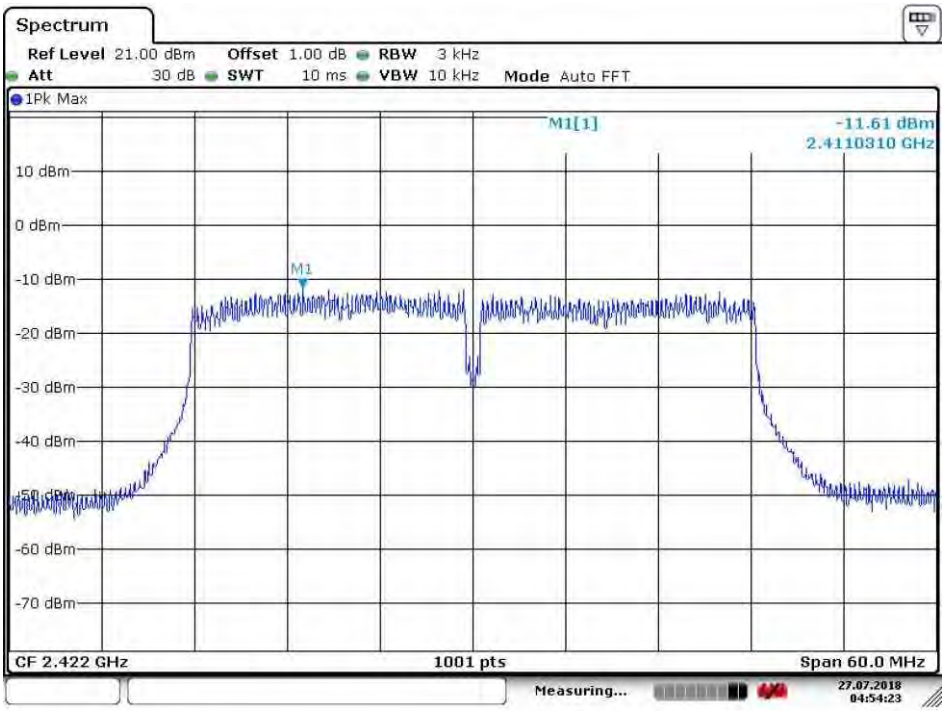
Date: 27.JUL.2018 04:59:00

Test mode:	802.11n(HT20)	Test channel:	Highest



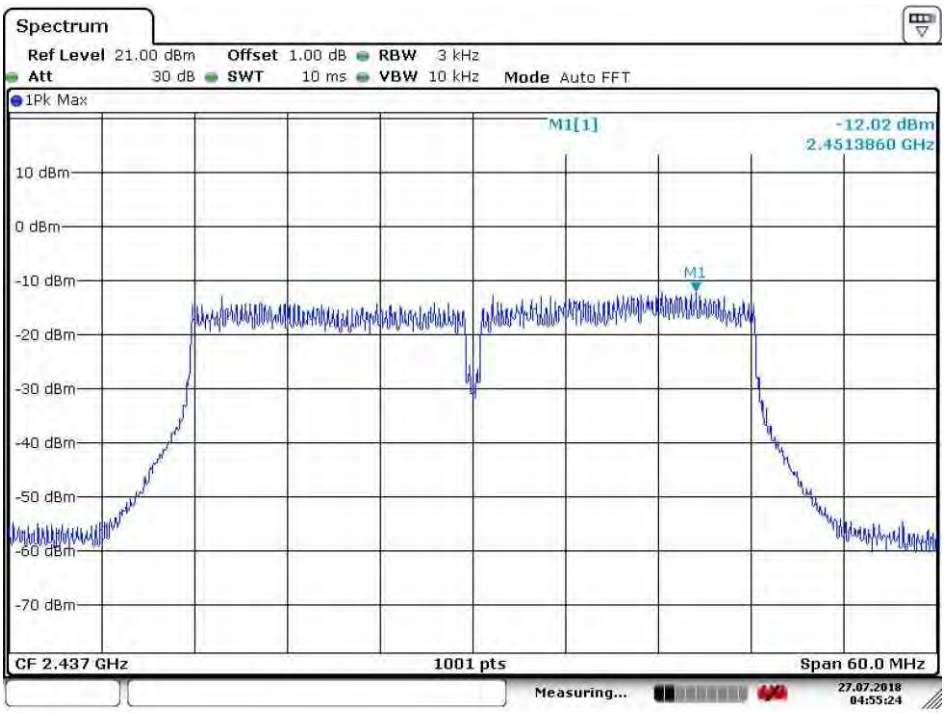
Date: 27.JUL.2018 04:58:22

Test mode:	802.11n(HT40)	Test channel:	Lowest



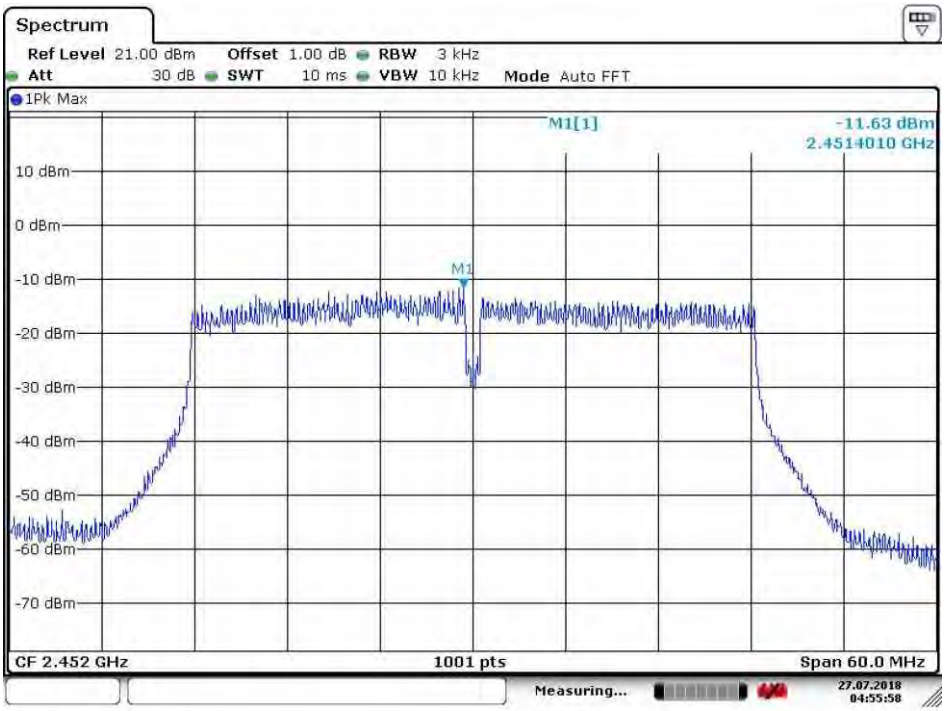
Date: 27.JUL.2018 04:54:23

Test mode:	802.11n(HT40)	Test channel:	Middle



Date: 27.JUL.2018 04:55:25

Test mode:	802.11n(HT40)	Test channel:	Highest



Date: 27.JUL.2018 04:55:58