Shenzhen Huaxia Testing Technology Co., Ltd.

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640
Fax: +86-755-26648637
Website: www.cqa-cert.com

Report Template Version: V05
Report Template Revision Date: 2021-11-03

TEST REPORT

Report No.:	CQASZ20211101954E-02
Applicant:	Autel Intelligent Technology Corp.,Ltd
Address of Applicant:	7th-8th,10th Floor, Building B1, Zhiyuan, Xueyuan Road, Xili, Nanshan, Shenzhen, 518055, China
Equipment Under Test (EUT):	
Product:	AUTOMOTIVE DIAGNOSIS & ANALYSIS SYSTEM
Model No.:	MaxiSys MS906 Pro
Teat Model No.:	MaxiSys MS906 Pro
Brand Name:	AUTEL
FCC ID:	WQ8-MS906PRO2121
Standards:	47 CFR Part 15, Subpart C ANSI C63.10: 2013 KDB 558074 D01 15.247 Meas Guidance v05r02 KDB 662911 D01 Multiple Transmitter Output v02r01
Date of Receipt:	2021-11-09
Date of Test:	2021-11-09 to 2022-01-14
Date of Issue:	2022-03-31
Test Result :	**PASS***

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

Tested By: lewis zhou

(Lewis Zhou)

Reviewed By: Rock Huang

(Rock Huang)

Approved By:

(Jack Ai)

1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20211101954E-02	Rev.01	Initial report	2022-03-31

2 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 & Average 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

3 Contents

Page

1 VERSION 2
2 TEST SUMMARY 3
3 CONTENTS 4
4 GENERAL INFORMATION 5
4.1 CLIENT INFORMATION 5
4.2 GENERAL DESCRIPTION OF EUT 5
4.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD 5
4.4 TEST ENVIRONMENT AND MODE 8
4.5 DESCRIPTION OF SUPPORT UNITS 15
4.6 TEST LOCATION 15
4.7 TEST FACILITY 15
4.8 STATEMENT OF THE MEASUREMENT UNCERTAINTY 16
4.9 DEVIATION FROM STANDARDS 16
4.10 ABNORMALITIES FROM STANDARD CONDITIONS 16
4.11 OTHER INFORMATION REQUESTED BY THE CUSTOMER 16
4.12 EQUIPMENTS LIST 17
5 TEST RESULTS AND MEASUREMENT DATA 18
5.1 ANTENNA REQUIREMENT 18
5.2 CONDUCTED EMISSIONS 19
5.3 CONDUCTED PEAK & AVERAGE OUTPUT POWER 23
5.4 6DB OCCUPY BANDWIDTH 27
5.5 POWER SPECTRAL DENSITY 54
5.6 BAND-EDGE FOR RF CONDUCTED EMISSIONS 70
5.7 RF CONDUCTED SPURIOUS EMISSIONS 80
5.8 RADIATED SPURIOUS EMISSIONS 129
5.8.1 Radiated emission below 1GHz 132
5.8.2 Transmitter emission above 1GHz 134
5.9 RESTRICTED BANDS AROUND FUNDAMENTAL FREQUENCY 136

4 General Information

4.1 Client Information

Applicant:	Autel Intelligent Technology Corp.,Ltd
Address of Applicant:	7th-8th,10th Floor, Building B1, Zhiyuan, Xueyuan Road, Xili, Nanshan, Shenzhen, 518055, China
Manufacturer:	Autel Intelligent Technology Corp.,Ltd
Address of Manufacturer:	7th-8th,10th Floor, Building B1, Zhiyuan, Xueyuan Road, Xili, Nanshan, Shenzhen, 518055, China
Factory:	Autel Intelligent Technology Corp., Ltd. Guangming Branch
Address of Factory:	East Wing, Building 2, and 6F of Electronical Building, Yanxiang Industrial Zone, Gaoxin Rd, Dongzhou Community of Guangming New District, Shenzhen

4.2 General Description of EUT

Product Name:	AUTOMOTIVE DIAGNOSIS & ANALYSIS SYSTEM
Model No.:	MaxiSys MS906 Pro
Test Model No.:	MaxiSys MS906 Pro
Trade Mark:	AUTEL
Power Supply:	Model:GME36E-120300FDR I/P:100-240V~50-60Hz, 1.2A Output: DC 12.0V⎓ 3.0A 36.0W
Battery:	lithium battery:3.85V 11600mAh 44.66Wh
EUT Supports Radios application:	BT: 2402-2480MHz 2.4GHz: Wi-Fi: 802.11b/g/n(HT20): 2412MHz~2462MHz; 802.11n(HT40): 2422MHz~2452MHz 5GHz: Wi-Fi: U-NII-1: 5.15-5.25GHz; U-NII-3: 5.725-5.850GHz

4.3 Product Specification subjective to this standard

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)
Transfer Rate:	IEEE for 802.11b: 1Mbps/2Mbps/5.5Mbps/11Mbps IEEE for 802.11g : 6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps IEEE for 802.11n(HT20) : 6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps IEEE for 802.11n(HT40) : 13.5Mbps/27Mbps/40.5Mbps/54Mbps/81Mbps/108Mbps/121.5Mbps/135Mbps
Product Type:	☐ Mobile ☒ Portable ☐ Fix Location

Test Software of EUT:	Qualcomm Radio Control Tool
Antenna Type:	FPC antenna
Antenna Gain:	3.9dBi@2.4GHz: Wi-Fi:ant 1, 4.1dBi@2.4GHz: Wi-Fi: ant 2

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:

For 802.11b/g/n (HT20):

Channel	Frequency
The Lowest channel	2412MHz
The Middle channel	2437MHz
The Highest channel	2462MHz

For 802.11n (HT40):

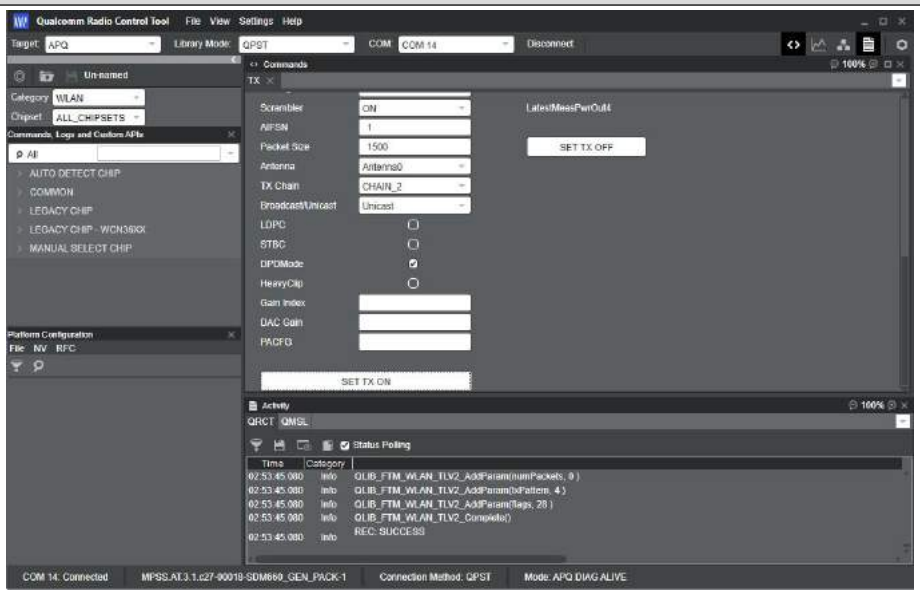
Channel	Frequency
The Lowest channel	2422MHz
The Middle channel	2437MHz
The Highest channel	2452MHz

Note:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.4 Test Environment and Mode

Operating Environment:	
Radiated Emissions:	
Temperature:	25.3 °C
Humidity:	55 % RH
Atmospheric Pressure:	1009 mbar
Conducted Emissions:	
Temperature:	25.6 °C
Humidity:	60 % RH
Atmospheric Pressure:	1009 mbar
Radio conducted item test (RF Conducted test room):	
Temperature:	25.5 °C
Humidity:	52 % RH
Atmospheric Pressure:	1009 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.
Run Software:	



Ant1

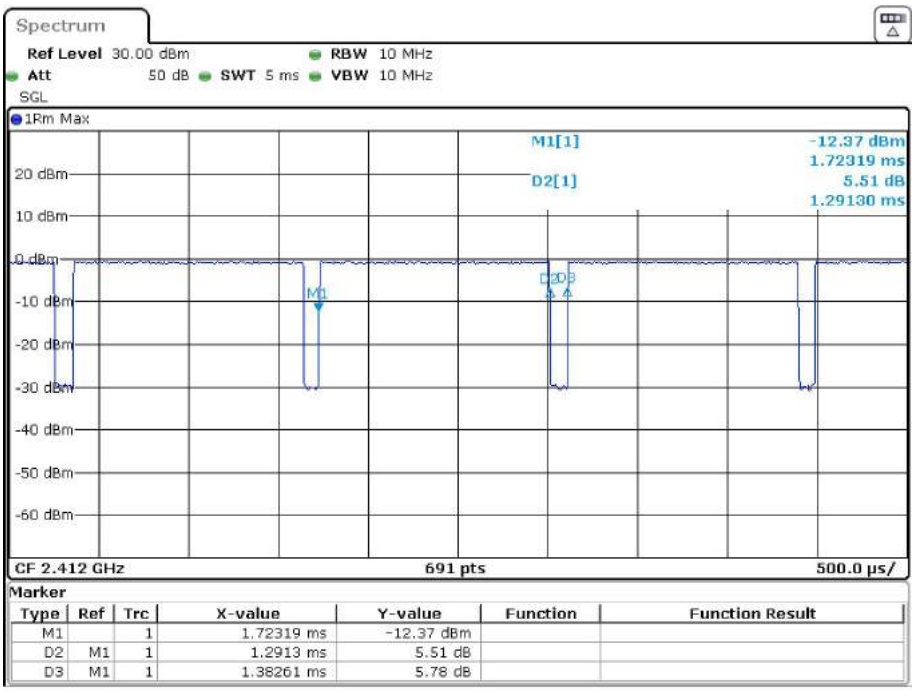
Operated Mode for Worst Duty Cycle:		
Test Mode	Duty Cycle(%)	Average correction factor(dB)
IEEE802.11b	93.40	0.3
IEEE802.11g	87.57	0.58
IEEE802.11n (HT20)	86.74	0.62
IEEE802.11n (HT40)	71.20	1.48

Remark:

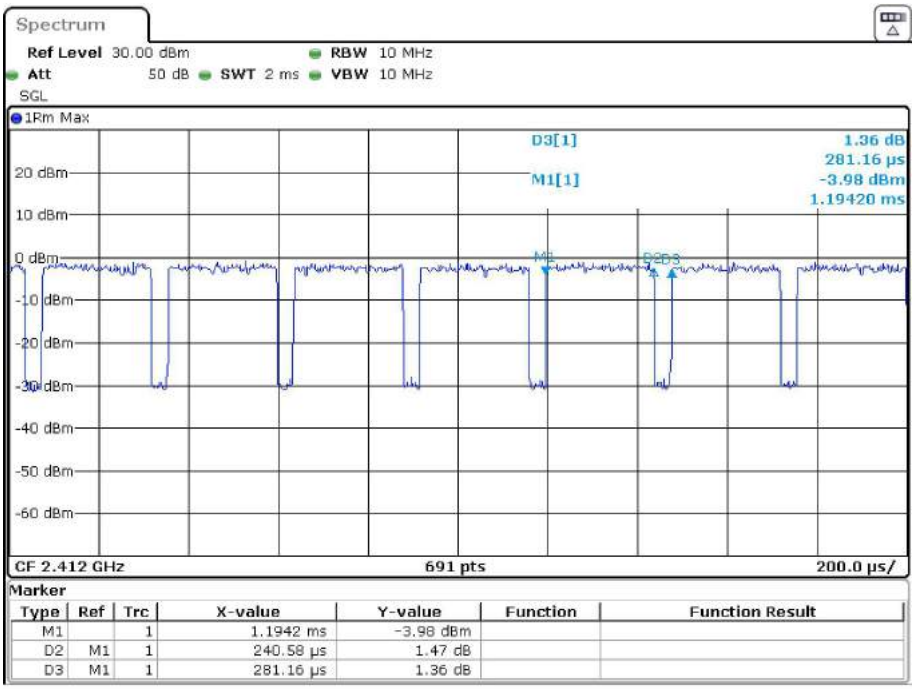
1) Duty cycle= On Time/ Period;

2) Duty Cycle factor = 10 * log(1/ Duty cycle);

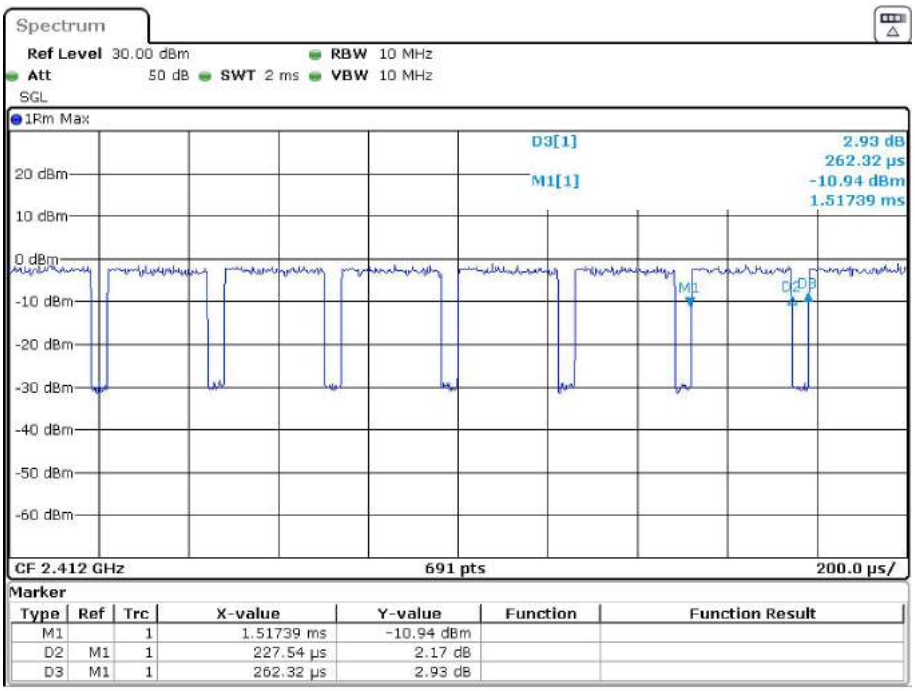
Test Graph_IEEE802.11b Duty Cycle:



Test Graph_IEEE802.11g Duty Cycle:

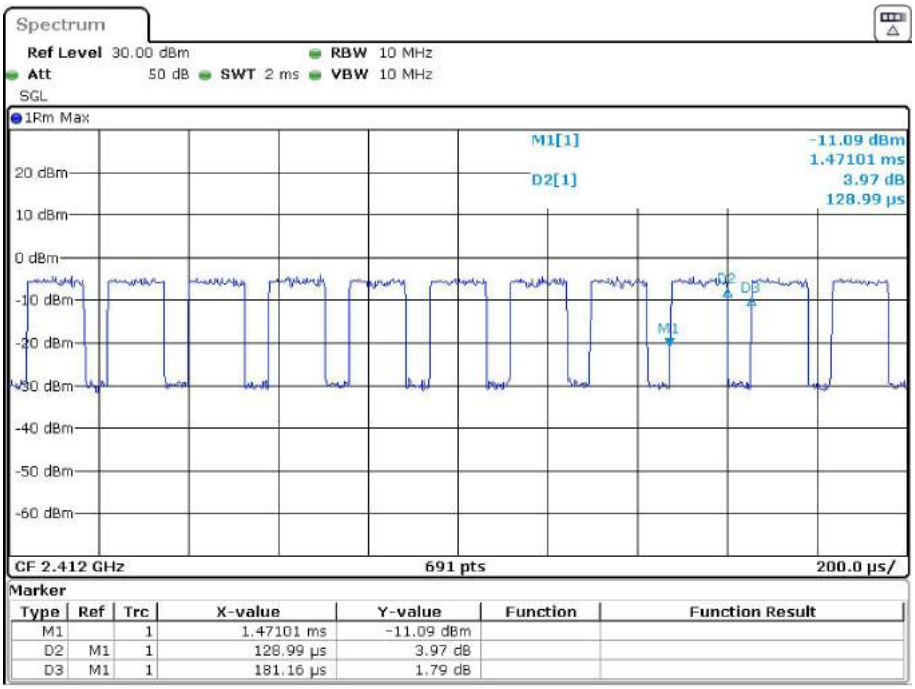


Test Graph_IEEE802.11 n (HT20) Duty Cycle:



Date: 20.JAN.2022 04:10:25

Test Graph_IEEE802.11 n (HT40) Duty Cycle:



Date: 20.JAN.2022 04:11:03

Ant2

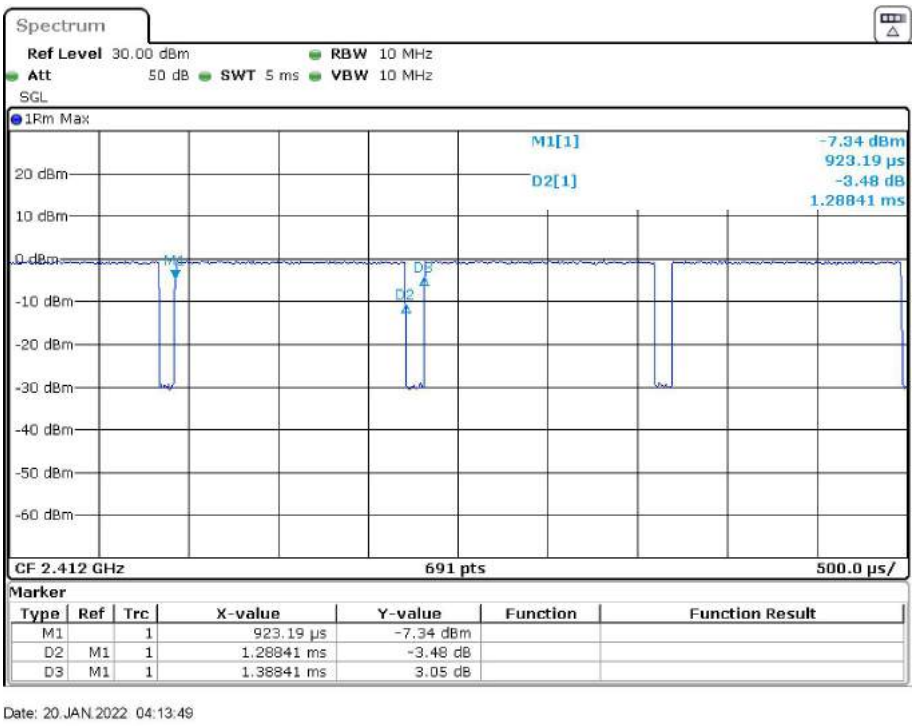
Operated Mode for Worst Duty Cycle:		
Test Mode	Duty Cycle(%)	Average correction factor(dB)
IEEE802.11b	92.80	0.32
IEEE802.11g	87.57	0.58
IEEE802.11n (HT20)	85.64	0.67
IEEE802.11n (HT40)	71.20	1.48

Remark:

1) Duty cycle= On Time/ Period;

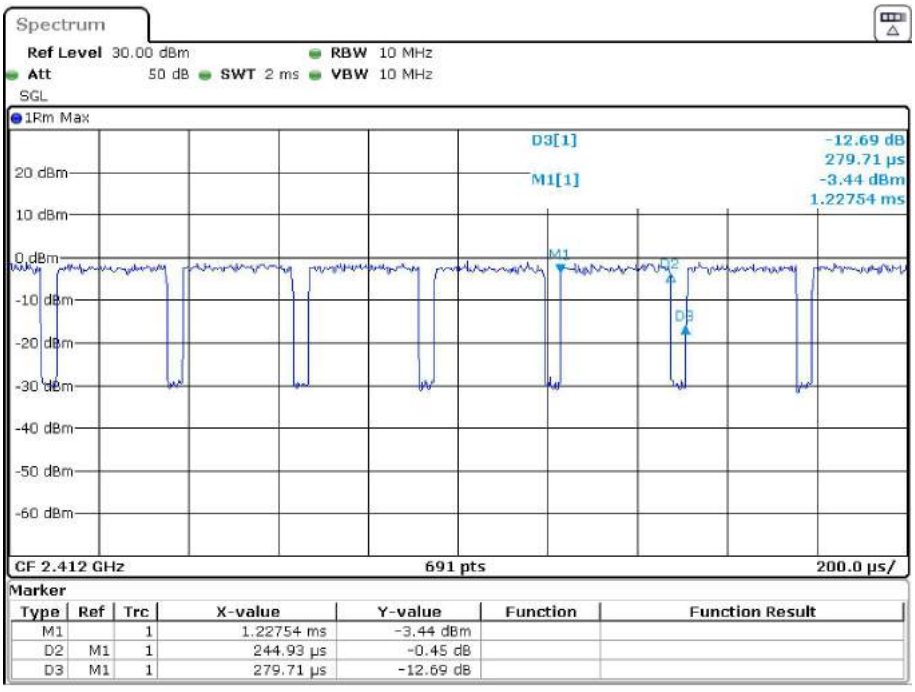
2) Duty Cycle factor = 10 * log(1/ Duty cycle);

Test Graph_IEEE802.11b Duty Cycle:



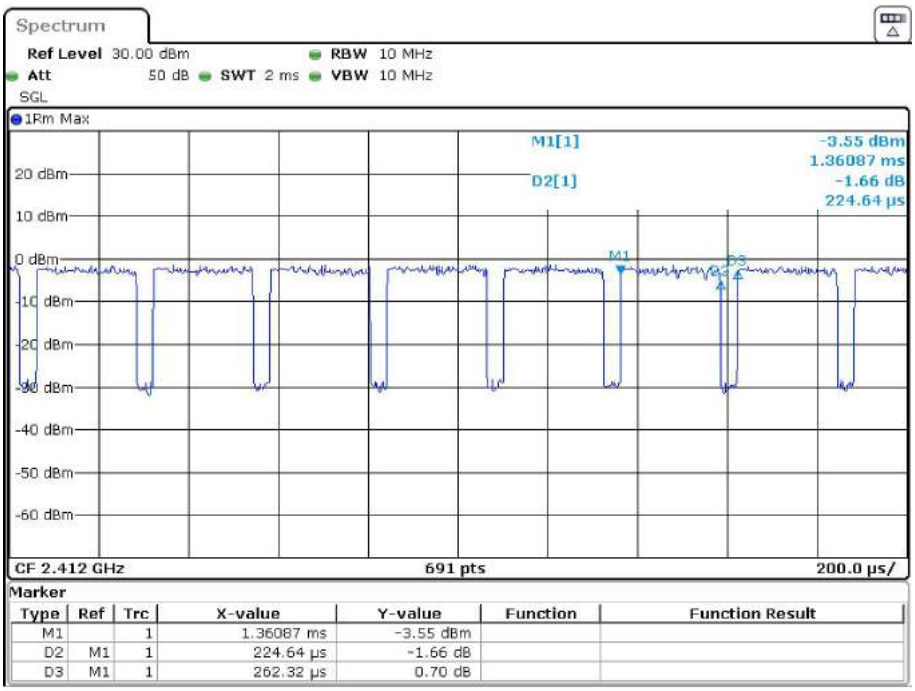
Date: 20.JAN.2022 04:13:49

Test Graph_IEEE802.11g Duty Cycle:

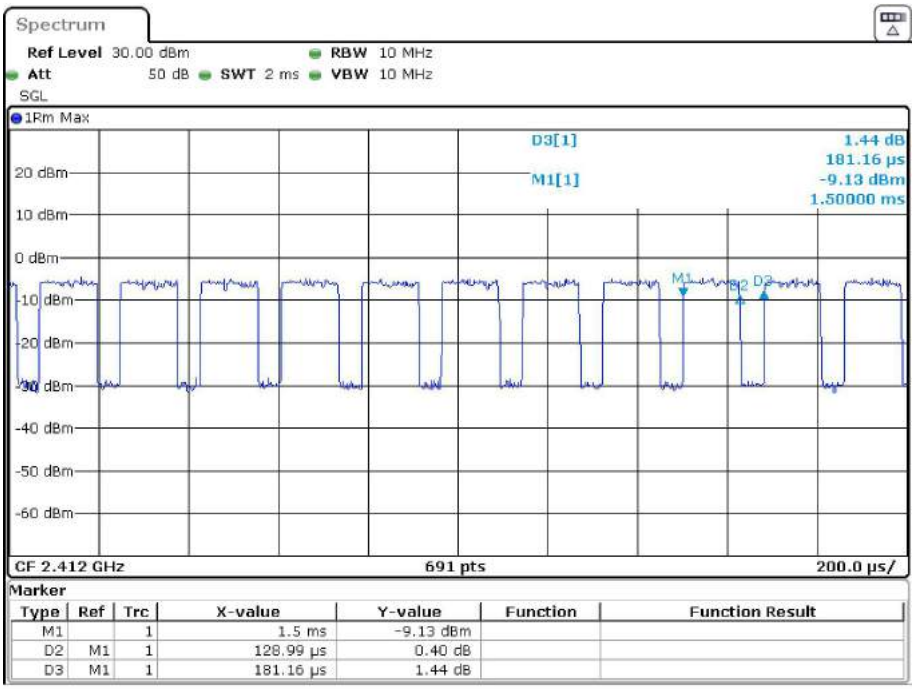


Date: 20.JAN.2022 04:13:08

Test Graph_IEEE802.11 n (HT20) Duty Cycle:



Test Graph_IEEE802.11 n (HT40) Duty Cycle:



4.5 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No.	Certification	Supplied by

2) Cable

Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by
/	/	/	/	/

4.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

4.7 Test Facility

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

• A2LA (Certificate No. 4742.01)

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

• FCC Registration No.: 522263

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

4.8 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	5.12dB	(1)
2	Radiated Emission (Above 1GHz)	4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	3.34dB	(1)
4	Radio Frequency	3×10^{-8}	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8℃	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	Frequency Error	5.5 Hz	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.9 Deviation from Standards

None.

4.10 Abnormalities from Standard Conditions

None.

4.11 Other Information Requested by the Customer

None.

4.12 Equipments List

Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2021/09/10	2022/09/09
Spectrum analyzer	R&S	FSU26	CQA-038	2021/09/10	2022/09/09
Spectrum analyzer	R&S	FSU40	CQA-075	2021/09/10	2022/09/09
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2021/09/10	2022/09/09
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2021/09/10	2022/09/09
Preamplifier	EMCI	EMC184055SE	CQA-089	2021/09/10	2022/09/09
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2021/09/16	2024/09/15
Bilog Antenna	R&S	HL562	CQA-011	2021/09/16	2024/09/15
Horn Antenna	R&S	HF906	CQA-012	2021/09/16	2024/09/15
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2021/09/16	2024/09/15
Coaxial Cable (Above 1GHz)	CQA	N/A	C007	2021/09/10	2022/09/09
Coaxial Cable (Below 1GHz)	CQA	N/A	C013	2021/09/10	2022/09/09
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2021/09/10	2022/09/09
Antenna Connector	CQA	RFC-01	CQA-080	2021/09/10	2022/09/09
Power Sensor	KEYSIGHT	U2021XA	CQA-30	2021/09/10	2022/09/09
N1918A Power Analysis Manager Power Panel	Agilent	N1918A	CQA-074	2021/09/10	2022/09/09
Power meter	R&S	NRVD	CQA-029	2021/09/10	2022/09/09
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2021/09/10	2022/09/09
EMI Test Receiver	R&S	ESR7	CQA-005	2021/09/10	2022/09/09
LISN	R&S	ENV216	CQA-003	2021/09/10	2022/09/09
Coaxial cable	CQA	N/A	CQA-C009	2021/09/10	2022/09/09
DC power	KEYSIGHT	E3631A	CQA-028	2021/09/10	2022/09/09

Test software:

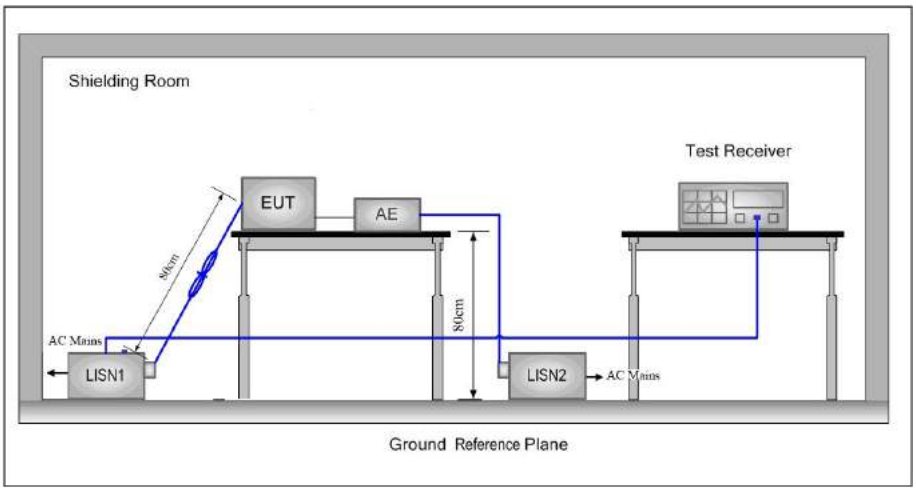
	Manufacturer	Software brand
Radiated Emissions test software	Tonscend	JS1120-3
Conducted Emissions test software	Audix	e3
RF Conducted test software	Audix	e3

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203
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.	
EUT Antenna:	Please refer to the photo documents.
The antenna is FPC antenna. 3.9dBi@2.4GHz: Wi-Fi:ant 1, 4.1dBi@2.4GHz: Wi-Fi: ant 2	

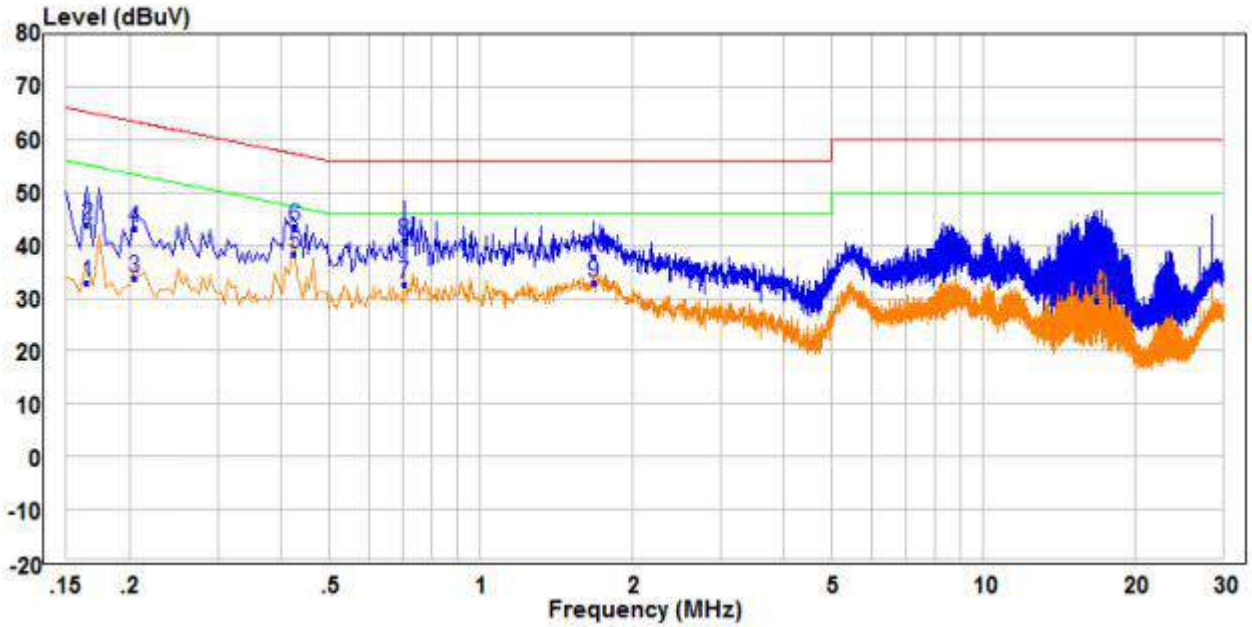
5.2 Conducted Emissions

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.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11b at middle channel is the worst case. Only the worst case is recorded in the report.
Test Voltage:	AC120V/60Hz
Test Results:	Pass

Measurement Data

Live Line:

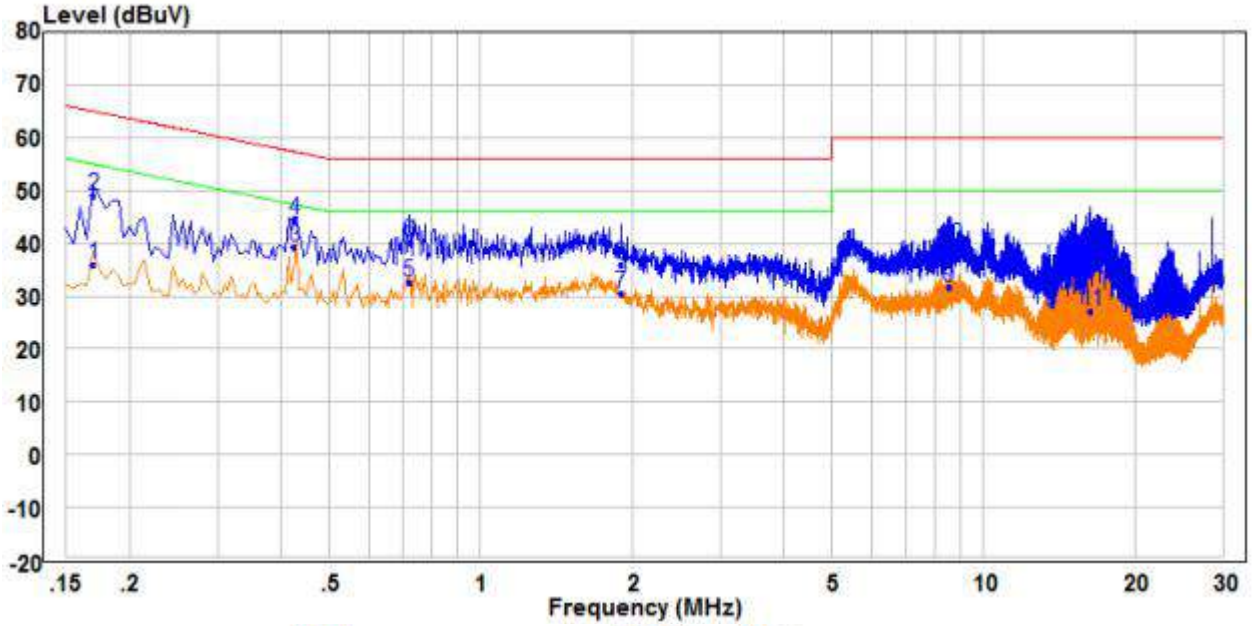


		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.165	23.40	9.49	32.89	55.21	-22.32	Average	Line
2		0.165	34.29	9.49	43.78	65.21	-21.43	QP	Line
3		0.205	24.24	9.49	33.73	53.41	-19.68	Average	Line
4		0.205	33.83	9.49	43.32	63.41	-20.09	QP	Line
5	PP	0.425	28.97	9.51	38.48	47.35	-8.87	Average	Line
6	QP	0.425	34.04	9.51	43.55	57.35	-13.80	QP	Line
7		0.705	22.69	9.87	32.56	46.00	-13.44	Average	Line
8		0.705	30.85	9.87	40.72	56.00	-15.28	QP	Line
9		1.680	23.46	9.52	32.98	46.00	-13.02	Average	Line
10		1.680	28.37	9.52	37.89	56.00	-18.11	QP	Line
11		16.770	19.56	9.96	29.52	50.00	-20.48	Average	Line
12		16.770	29.31	9.96	39.27	60.00	-20.73	QP	Line

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT.
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral Line:



		Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark	Pol/Phase
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.170	26.38	9.48	35.86	54.96	-19.10	Average	Neutral
2		0.170	39.66	9.48	49.14	64.96	-15.82	QP	Neutral
3	PP	0.425	29.72	9.56	39.28	47.35	-8.07	Average	Neutral
4	QP	0.425	34.97	9.56	44.53	57.35	-12.82	QP	Neutral
5		0.720	22.68	9.83	32.51	46.00	-13.49	Average	Neutral
6		0.720	30.32	9.83	40.15	56.00	-15.85	QP	Neutral
7		1.905	20.67	9.72	30.39	46.00	-15.61	Average	Neutral
8		1.905	26.27	9.72	35.99	56.00	-20.01	QP	Neutral
9		8.525	21.82	9.86	31.68	50.00	-18.32	Average	Neutral
10		8.525	29.73	9.86	39.59	60.00	-20.41	QP	Neutral
11		16.345	17.29	9.96	27.25	50.00	-22.75	Average	Neutral
12		16.345	26.91	9.96	36.87	60.00	-23.13	QP	Neutral

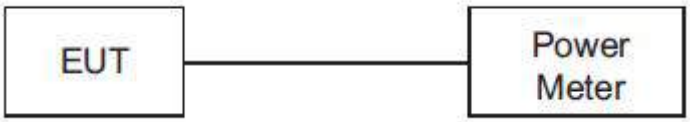
Remark:

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

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

3. If the Peak value under Average limit, the Average value is not recorded in the report.

5.3 Conducted Peak & Average Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10: 2013
Test Setup:	
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). Only the worst case is recorded in the report.
Limit:	30dBm
Test Results:	Pass

Measurement Data

Ant 1

802.11b mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	17.96	12.4	30.00	Pass
Middle	20.15	14.6	30.00	Pass
Highest	19.22	13.75	30.00	Pass
802.11g mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	17.29	12.29	30.00	Pass
Middle	19.97	13.66	30.00	Pass
Highest	19.10	12.80	30.00	Pass
802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	21.67	13.41	30.00	Pass
Middle	22.16	14.36	30.00	Pass
Highest	22.20	14.06	30.00	Pass
802.11n(HT40)mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	21.17	14.03	30.00	Pass
Middle	21.59	14.44	30.00	Pass
Highest	21.53	14.38	30.00	Pass
Remark: 1. Average Output Power was for reference only 2. Average Output Power had added duty cycle factor				

Ant 2

802.11b mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	18.32	12.95	30.00	Pass
Middle	19.99	14.52	30.00	Pass
Highest	18.90	13.43	30.00	Pass
802.11g mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	20.05	13.15	30.00	Pass
Middle	21.46	14.29	30.00	Pass
Highest	20.47	13.38	30.00	Pass
802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	21.62	13.34	30.00	Pass
Middle	22.52	14.23	30.00	Pass
Highest	21.84	13.70	30.00	Pass
802.11n(HT40)mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	21.62	13.34	30.00	Pass
Middle	22.62	14.33	30.00	Pass
Highest	21.84	13.70	30.00	Pass
Remark: 1. Average Output Power was for reference only 2. Average Output Power had added duty cycle factor				

Ant 1+Ant 2

802.11n(HT20)mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	24.66	16.39	28.99	Pass
Middle	26.10	17.71	28.99	Pass
Highest	25.03	16.89	28.99	Pass
802.11n(HT40)mode				
Test channel	Peak Output Power (dBm)	Average Output Power (dBm)	Limit (dBm)	Result
Lowest	24.91	16.87	28.99	Pass
Middle	25.82	17.64	28.99	Pass
Highest	25.20	17.17	28.99	Pass

Remark:

1. Average Output Power was for reference only

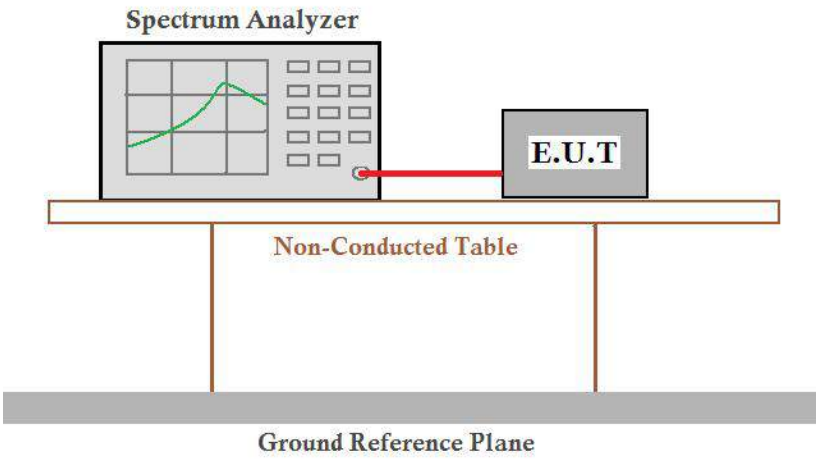
2. Average Output Power had added duty cycle factor

3. The EUT supports MIMO and transmit signals are correlated with each other, then

Directional gain = 10 log$[(10^{G1/20}+10^{G2/20}+\ldots+10^{GN/20})^2/N_{ANT}]$ dBi = 7.01 dBi,

The limit of output power is 30-(7.01-6) = 28.99dBm

5.4 6dB Occupy Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
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). Only the worst case is recorded in the report.
Limit:	≥ 500 kHz
Test Results:	Pass

Measurement Data

Ant 1

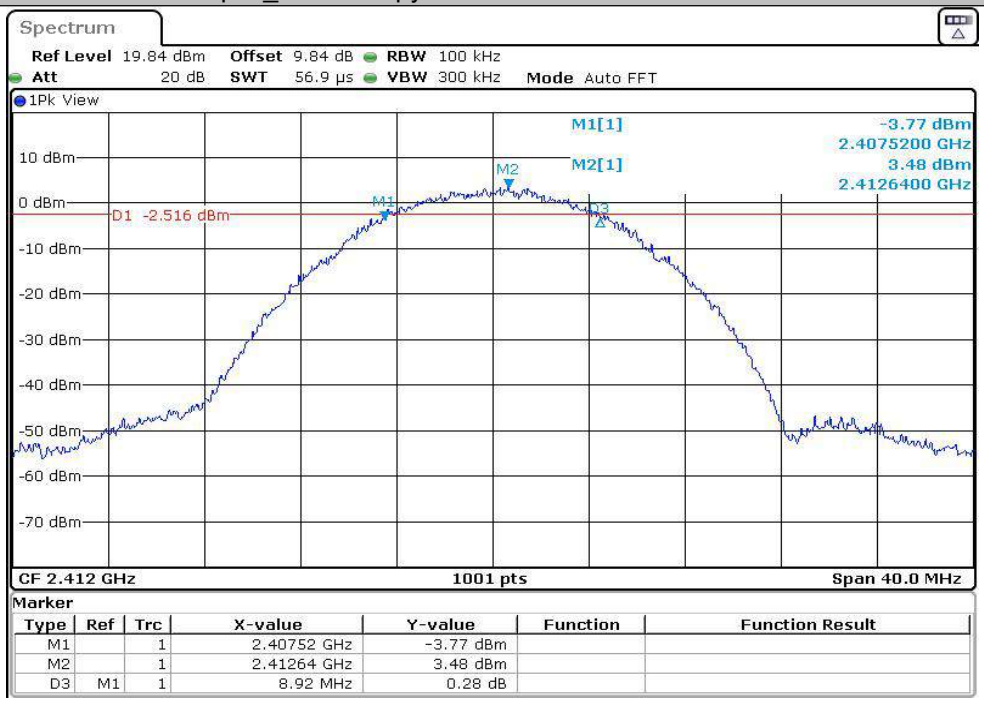
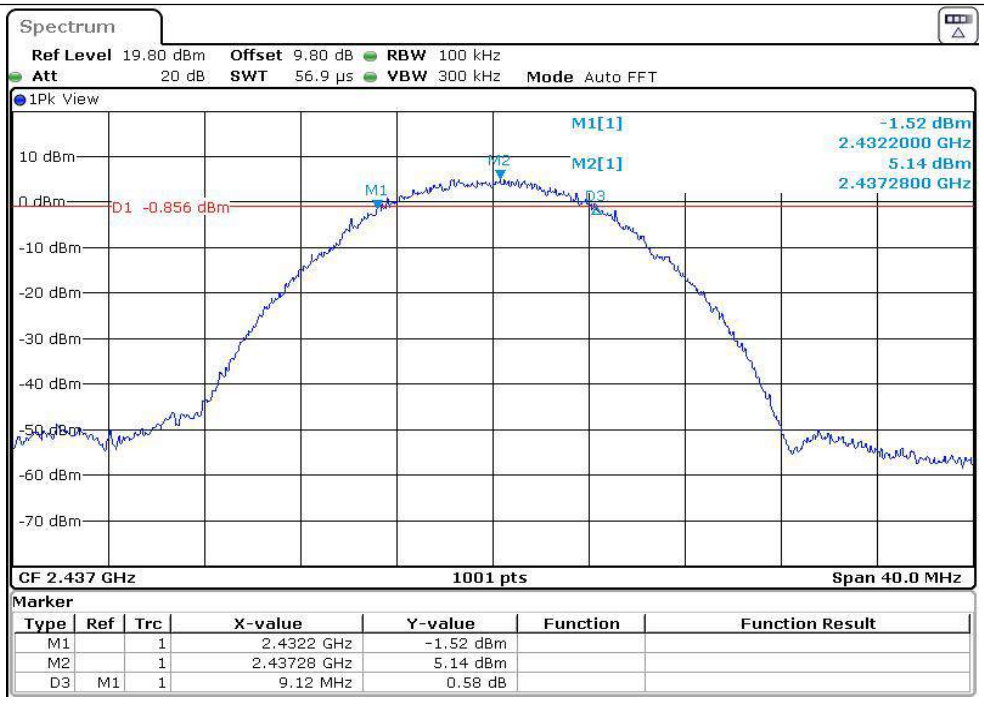
802.11b mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	8.920	13.866	≥500	Pass
Middle	9.120	13.347	≥500	Pass
Highest	9.160	13.626	≥500	Pass
802.11g mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	16.600	17.143	≥500	Pass
Middle	16.560	16.703	≥500	Pass
Highest	16.600	16.783	≥500	Pass
802.11n(HT20) mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	17.880	18.102	≥500	Pass
Middle	17.840	17.902	≥500	Pass
Highest	17.880	18.062	≥500	Pass
802.11n(HT40)mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	36.640	36.843	≥500	Pass
Middle	36.160	36.763	≥500	Pass
Highest	36.560	36.923	≥500	Pass
Remark: 1. 99% OBW was for reference only				

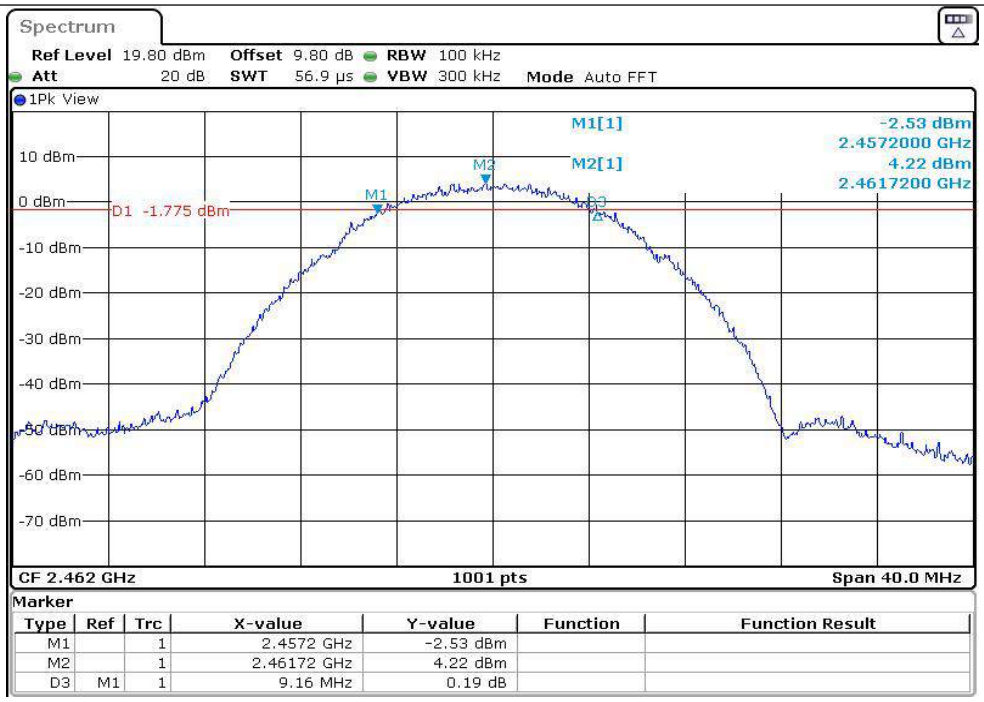
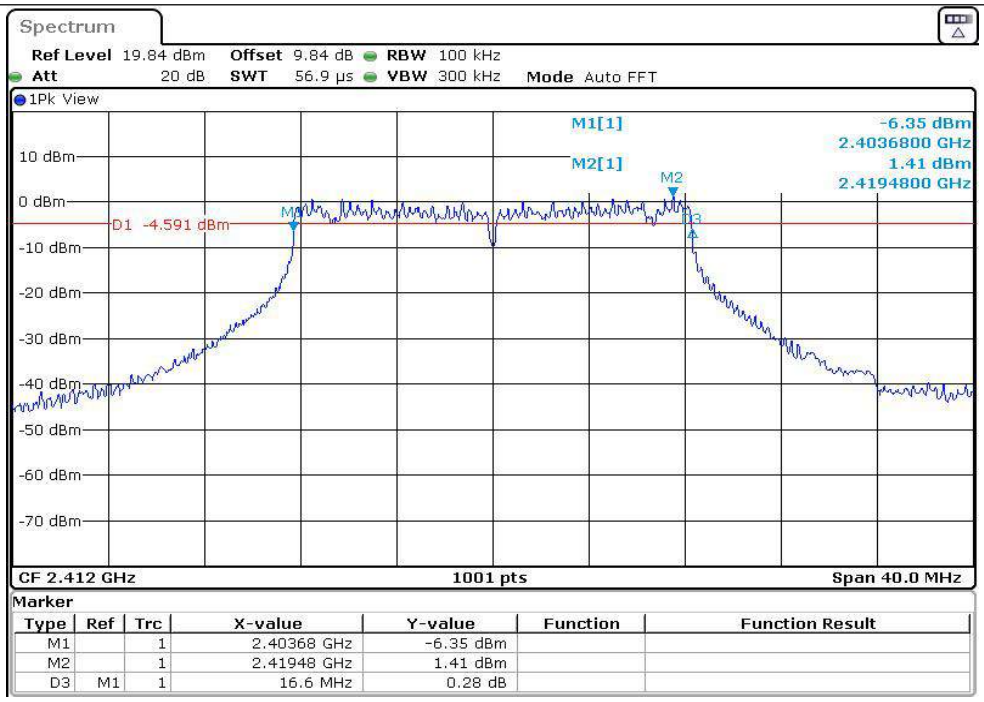
Ant 2

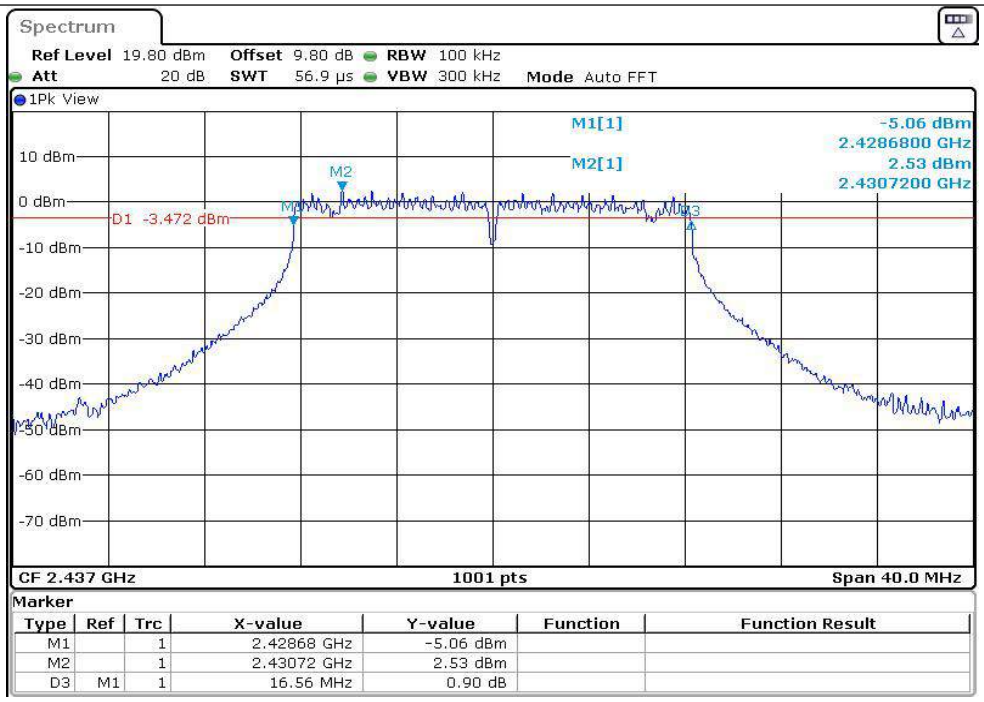
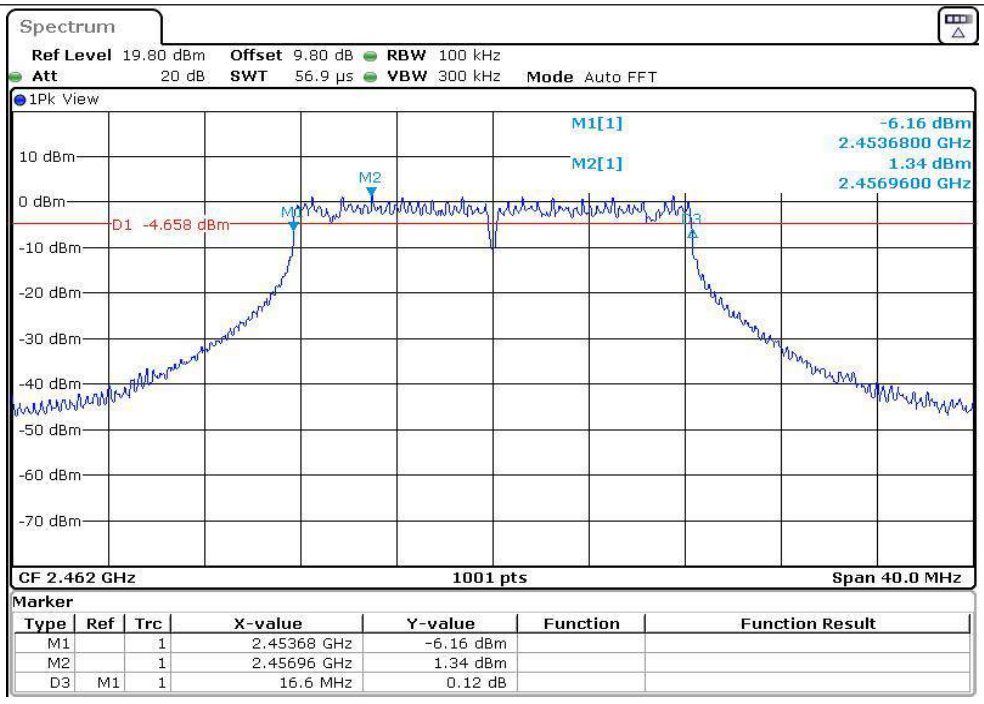
802.11b mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	8.800	13.906	≥500	Pass
Middle	9.120	13.387	≥500	Pass
Highest	9.120	13.586	≥500	Pass
802.11g mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	16.600	16.943	≥500	Pass
Middle	16.560	16.863	≥500	Pass
Highest	16.600	16.823	≥500	Pass
802.11n(HT20) mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	17.880	18.062	≥500	Pass
Middle	17.840	17.942	≥500	Pass
Highest	17.840	17.942	≥500	Pass
802.11n(HT40)mode				
Test channel	6dB Occupy Bandwidth (MHz)	99% OBW [MHz]	Limit (kHz)	Result
Lowest	36.640	37.163	≥500	Pass
Middle	36.560	36.763	≥500	Pass
Highest	36.560	37.003	≥500	Pass
Remark: 1. 99% OBW was for reference only				

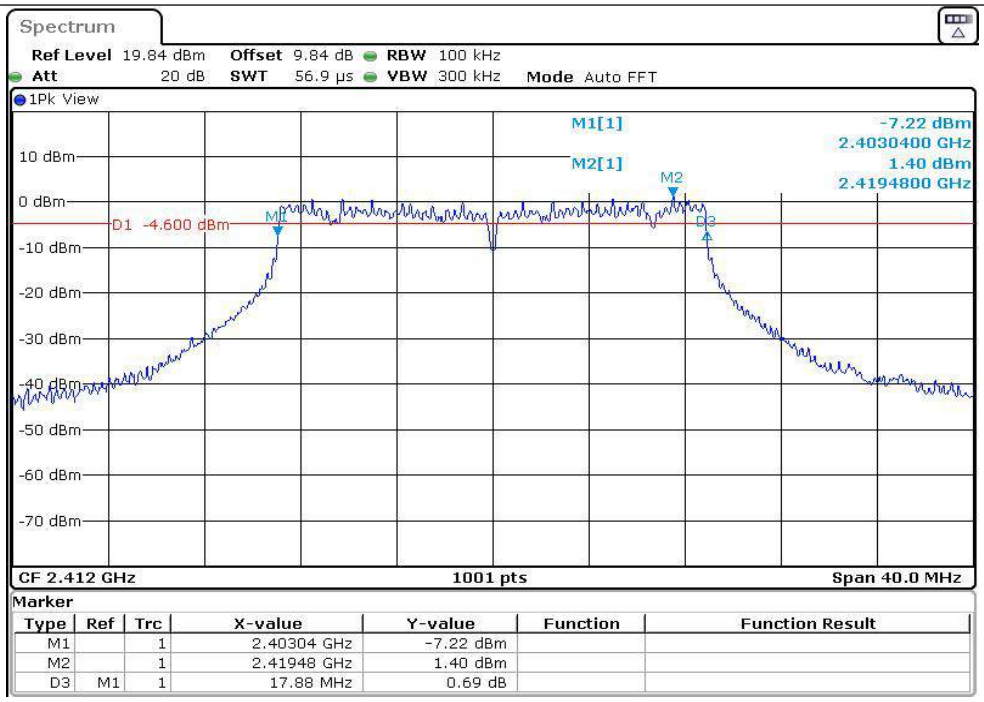
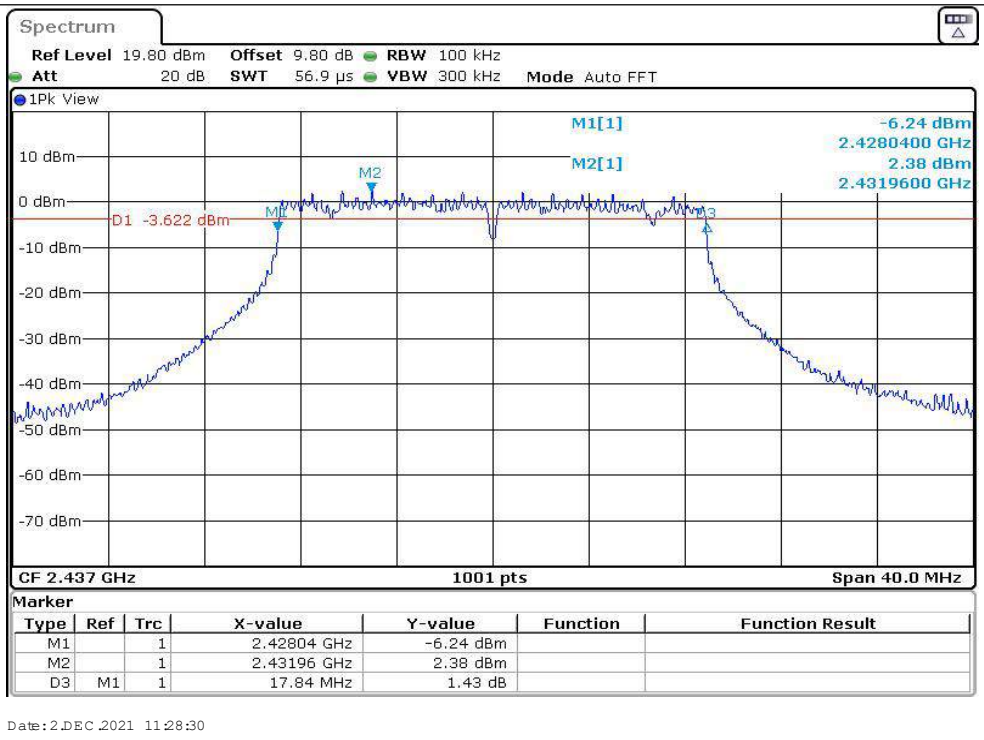
Test plot as follows:

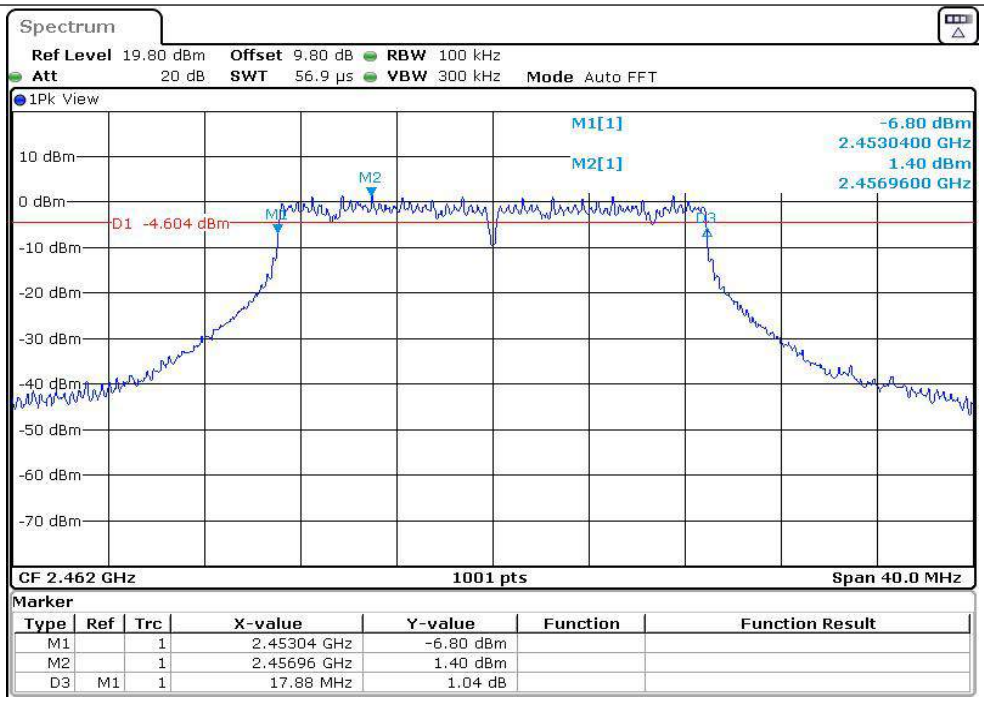
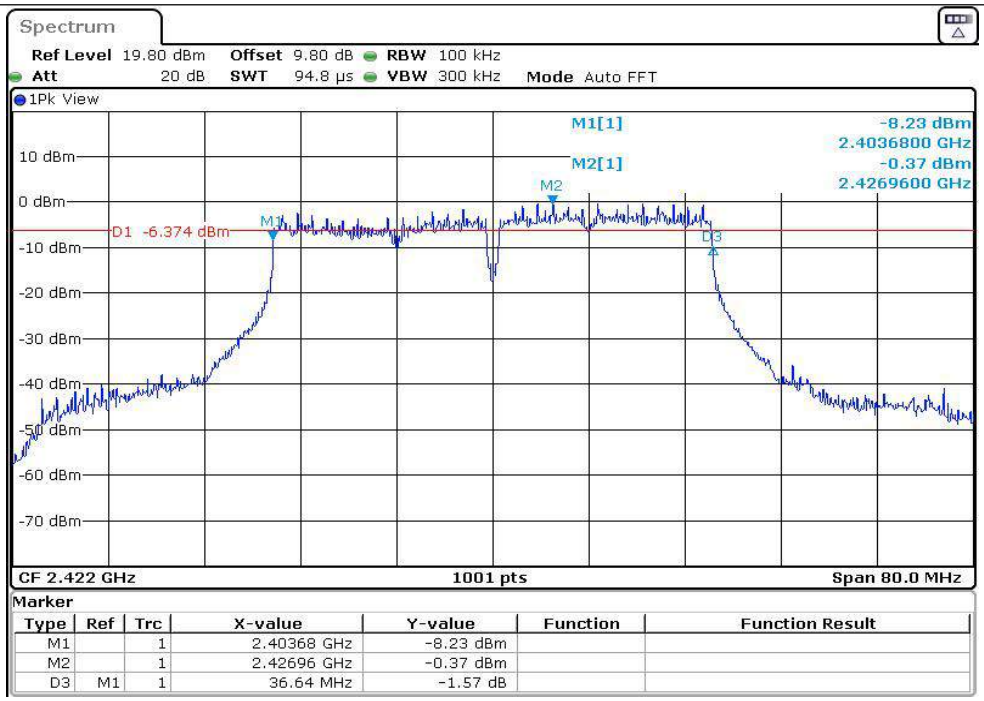
Ant1

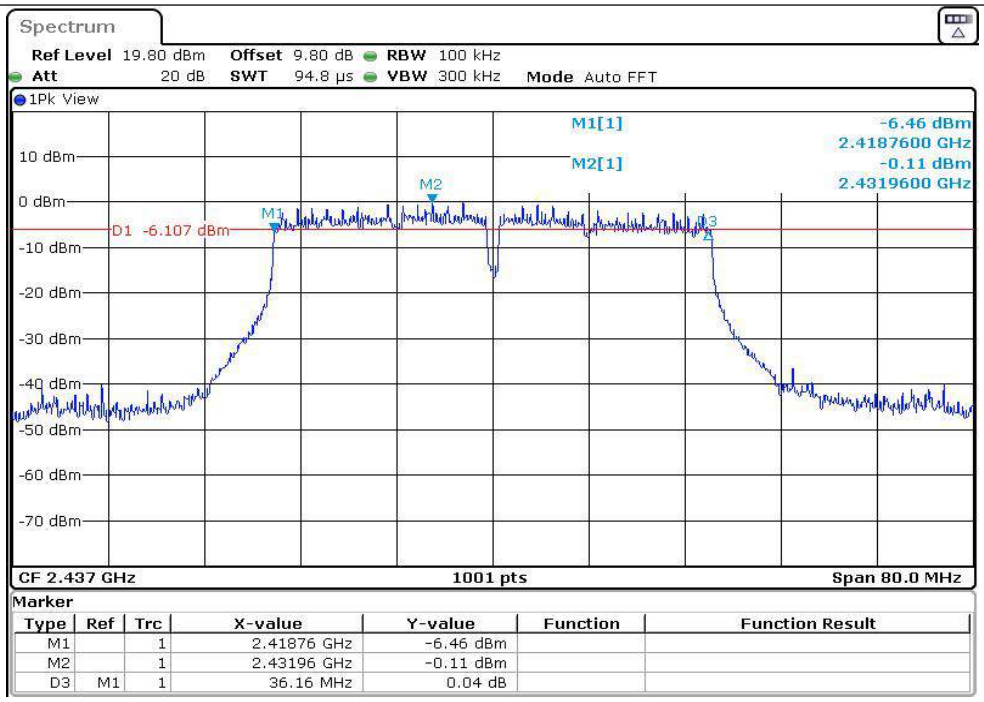
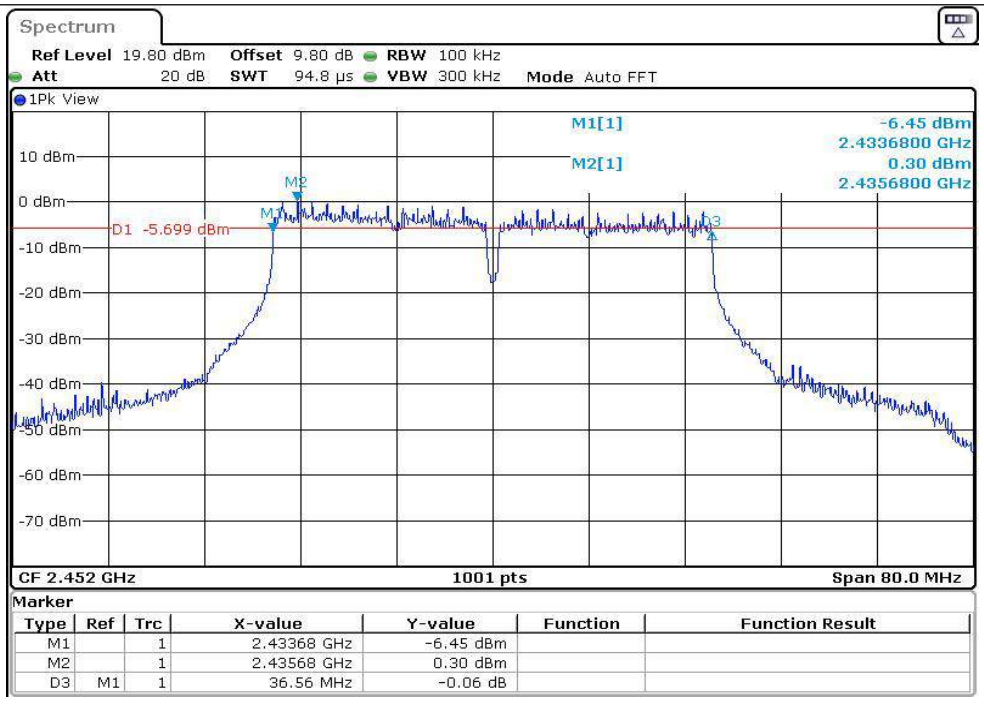
Graphs_6dB Occupy Bandwidth	
11B/LCH	
11B/MCH	

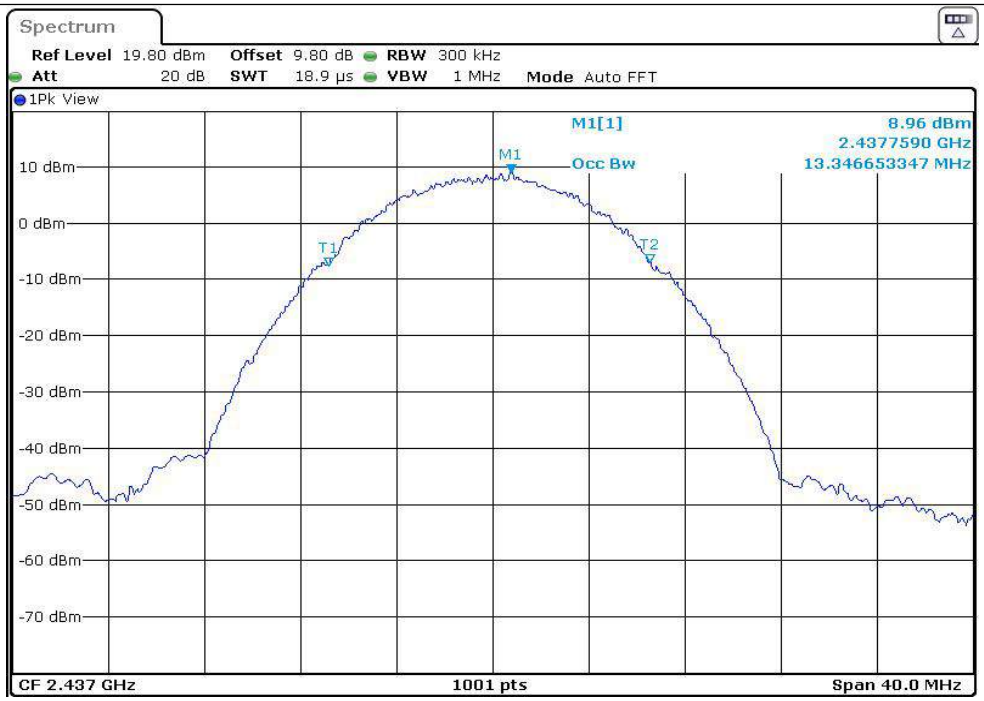
11B/HCH	
11G/LCH	

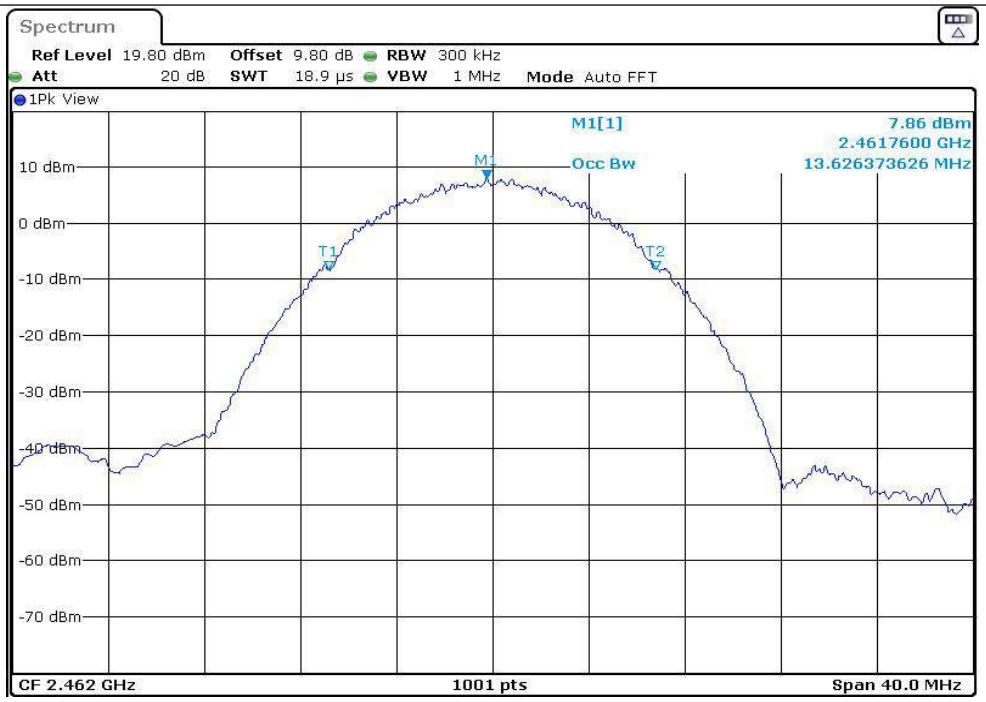
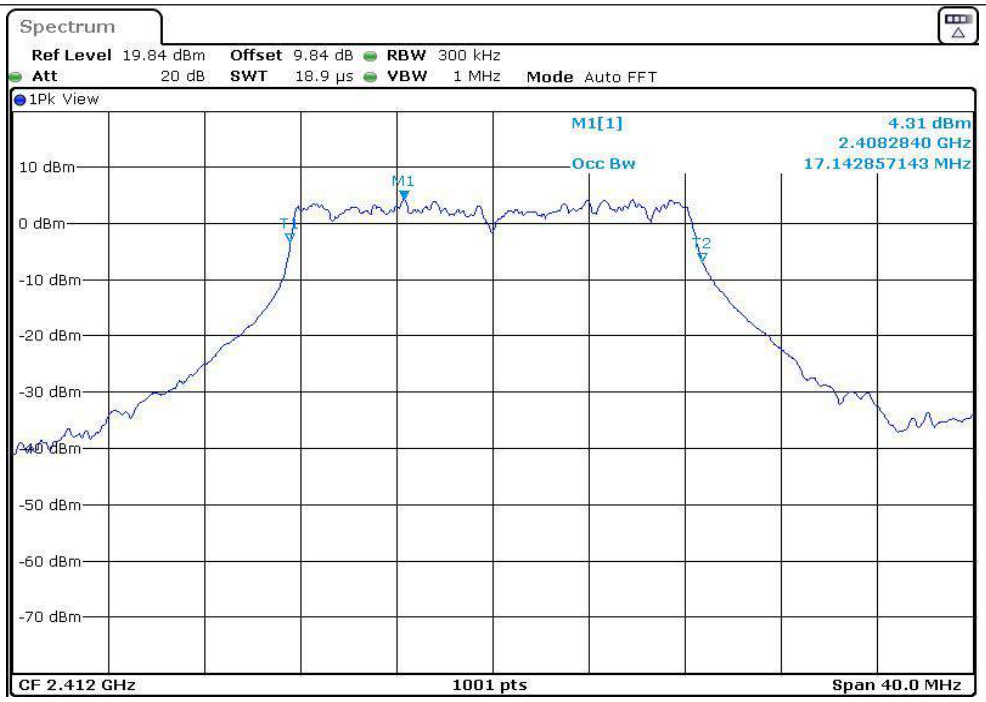
11G/MCH	
11G/HCH	

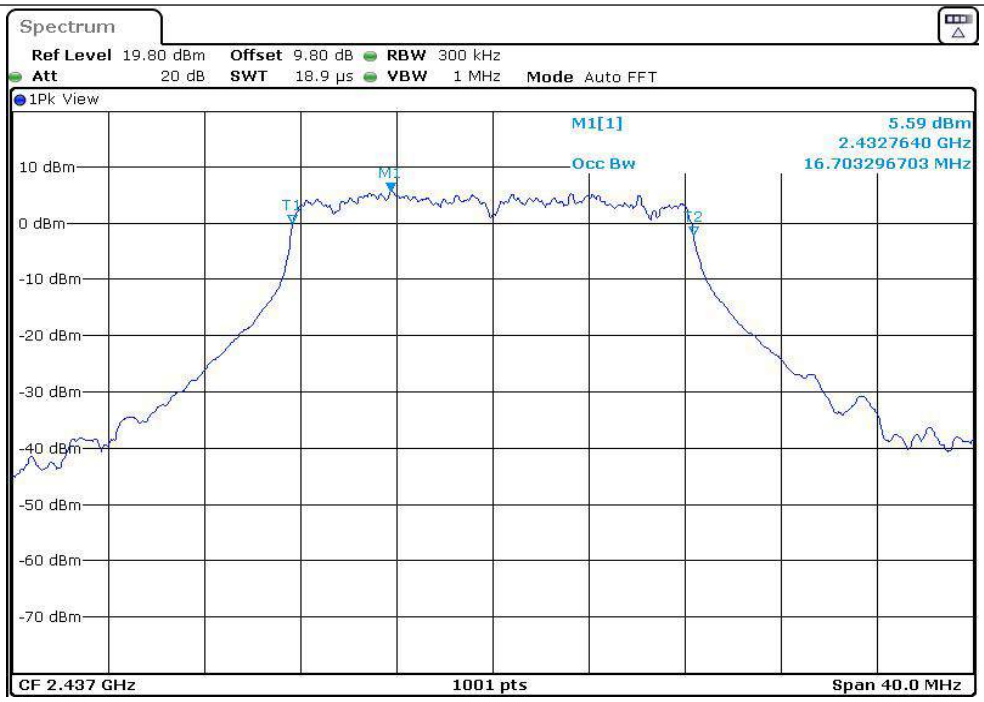
11N20SISO/LCH	
11N20SISO/MCH	

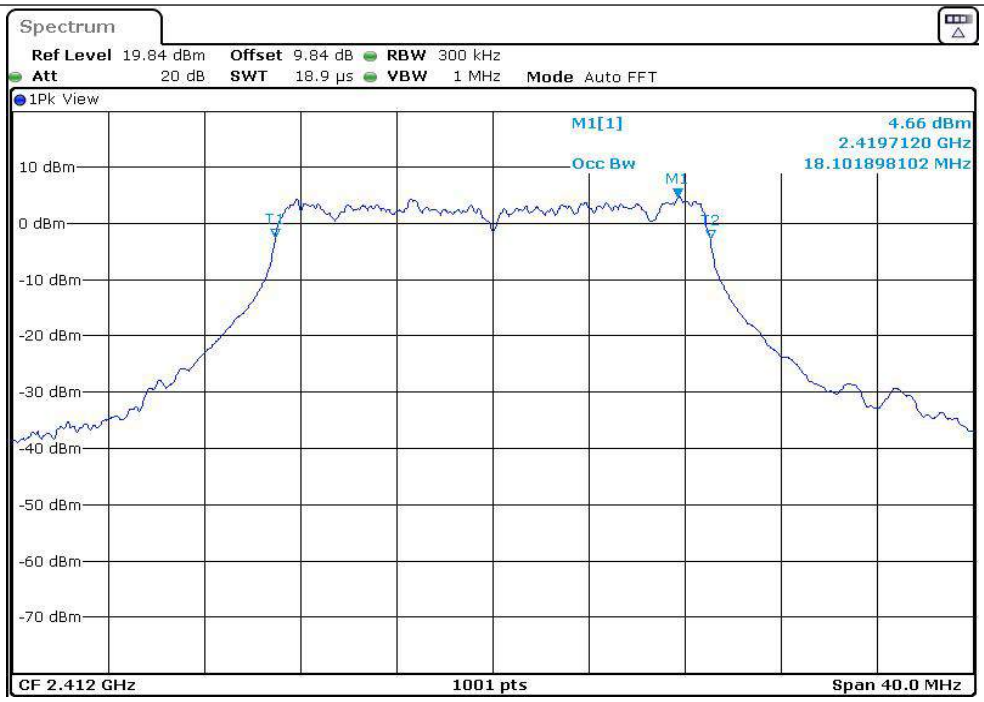
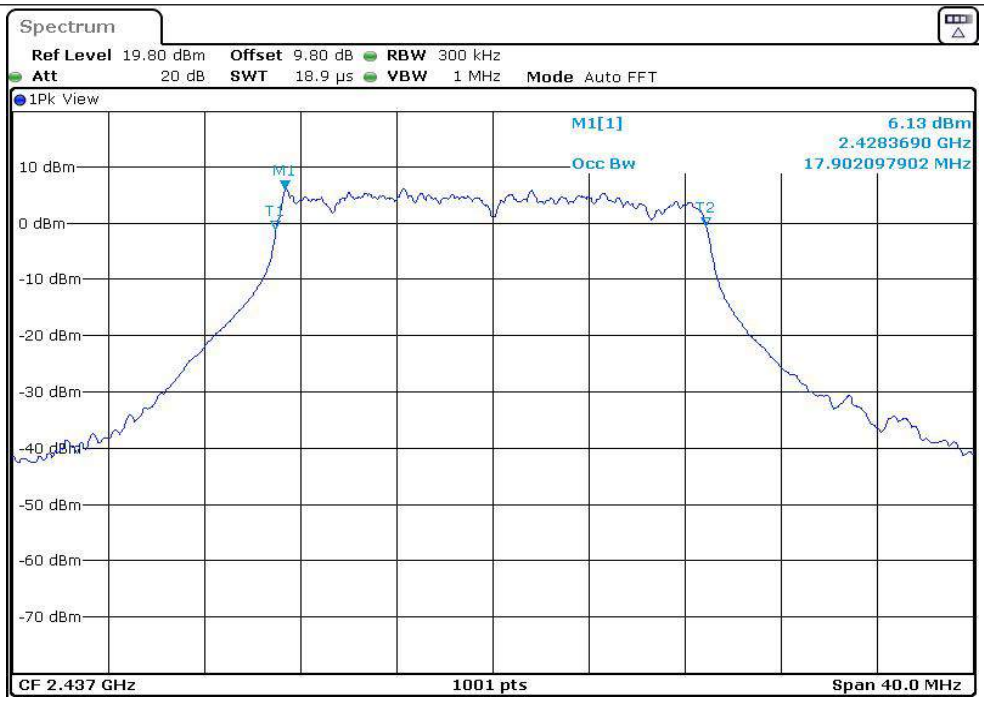
11N20SISO/HCH	
11N40SISO/LCH	

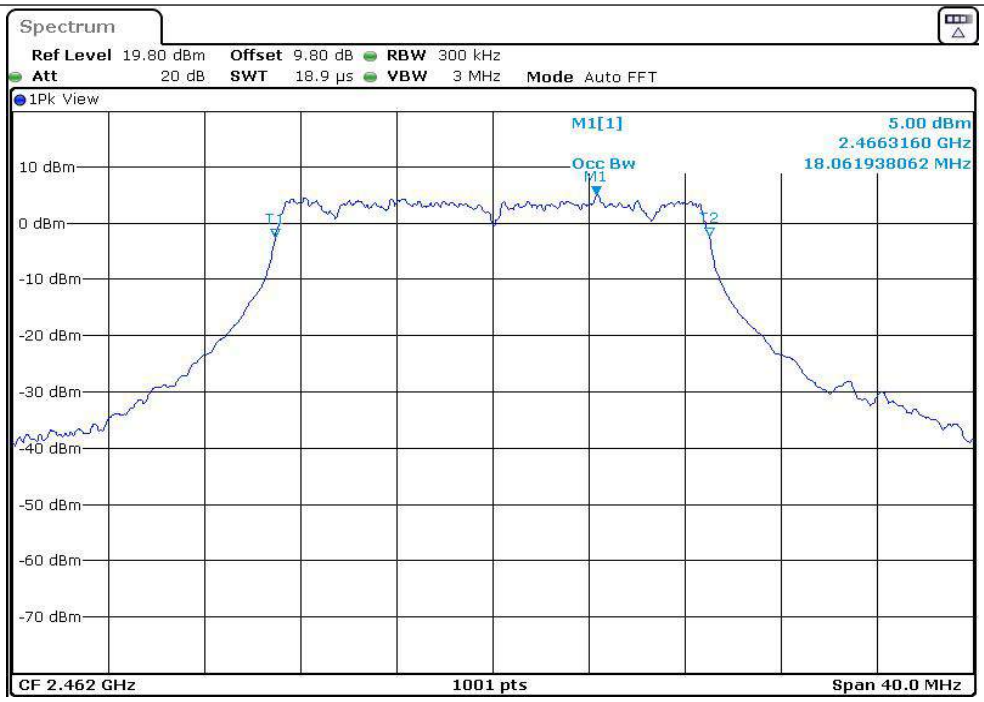
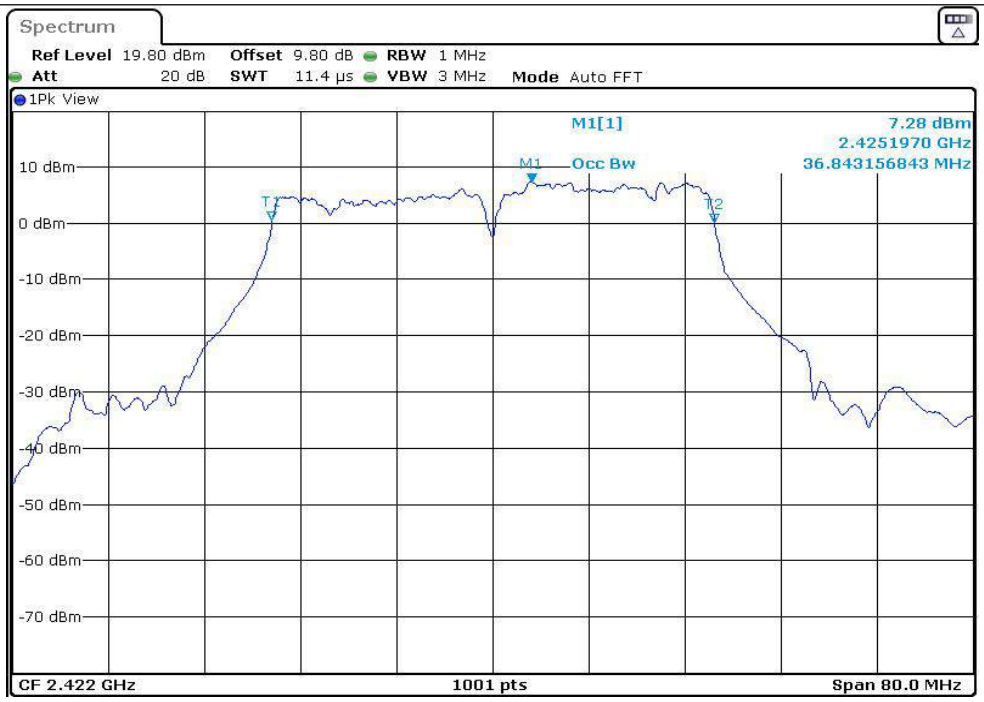
11N40SISO/MCH	
11N40SISO/HCH	

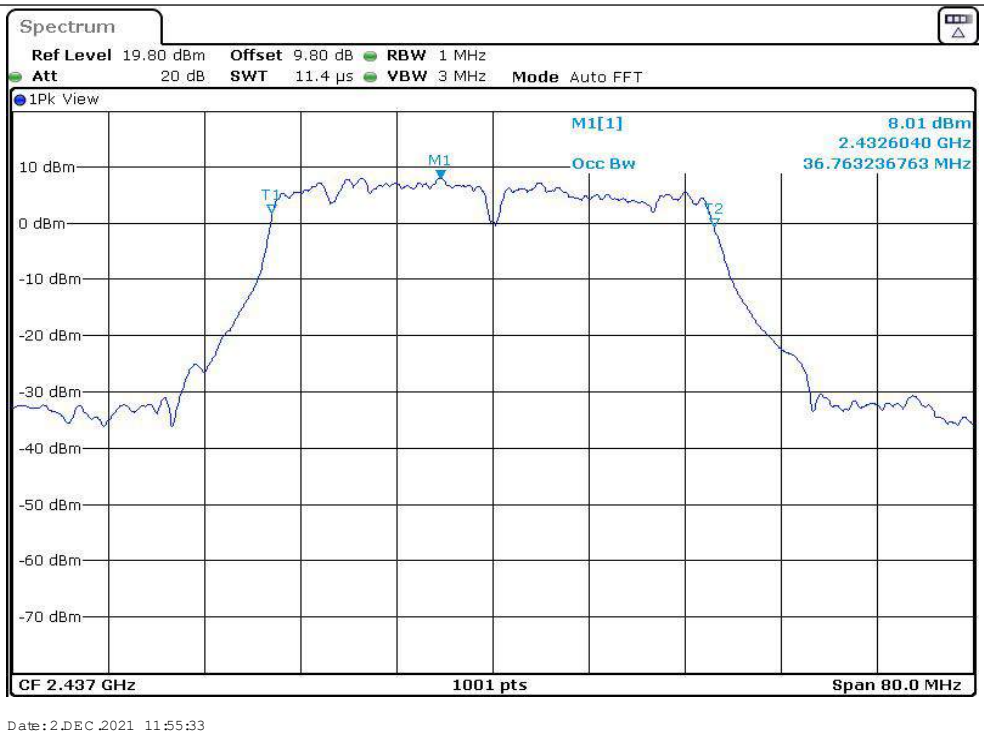
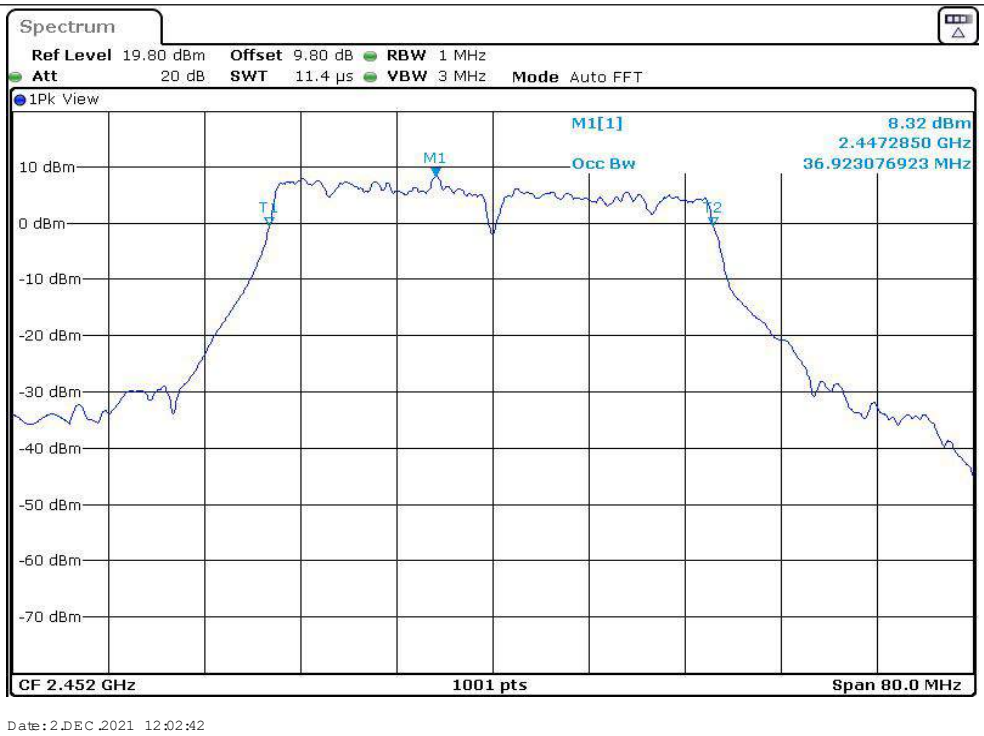
Graphs_99% OBW	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

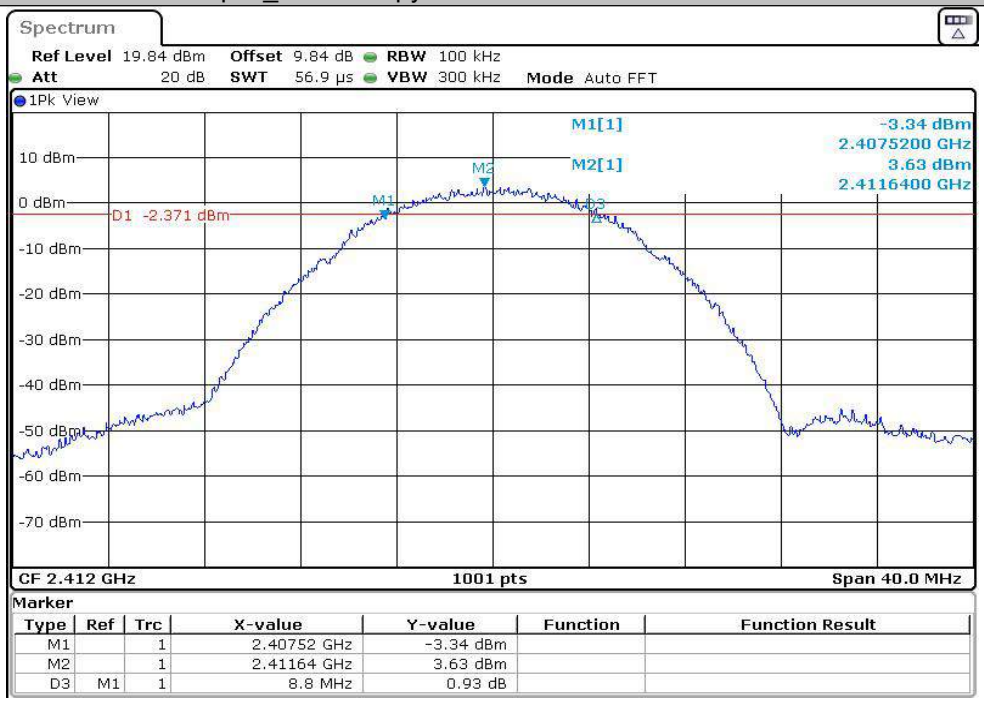
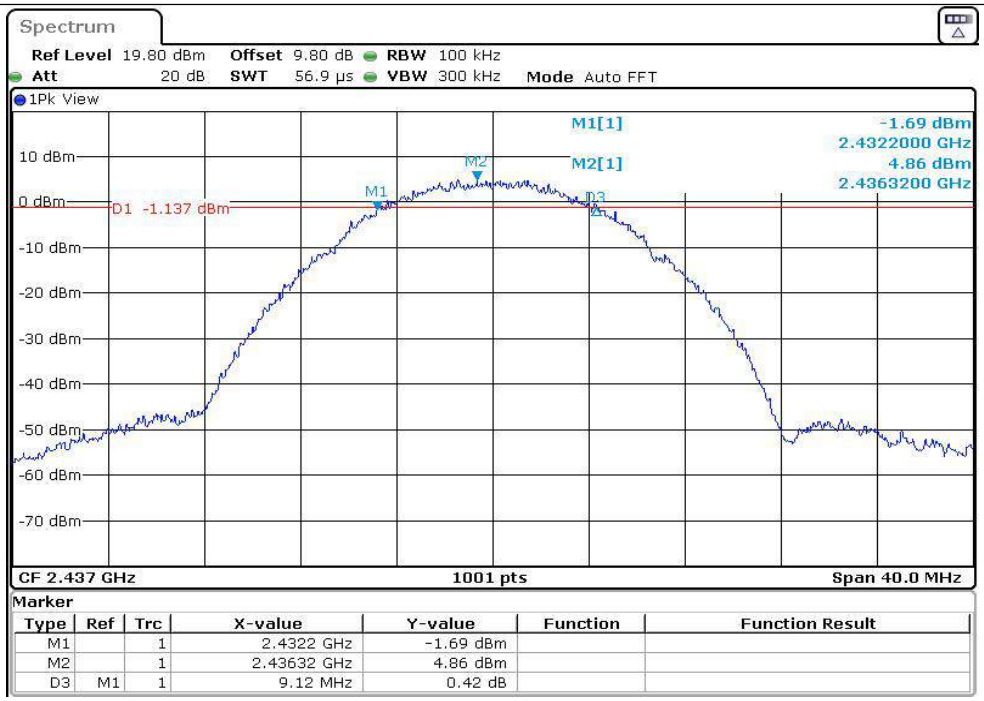
11G/MCH	
11G/HCH	

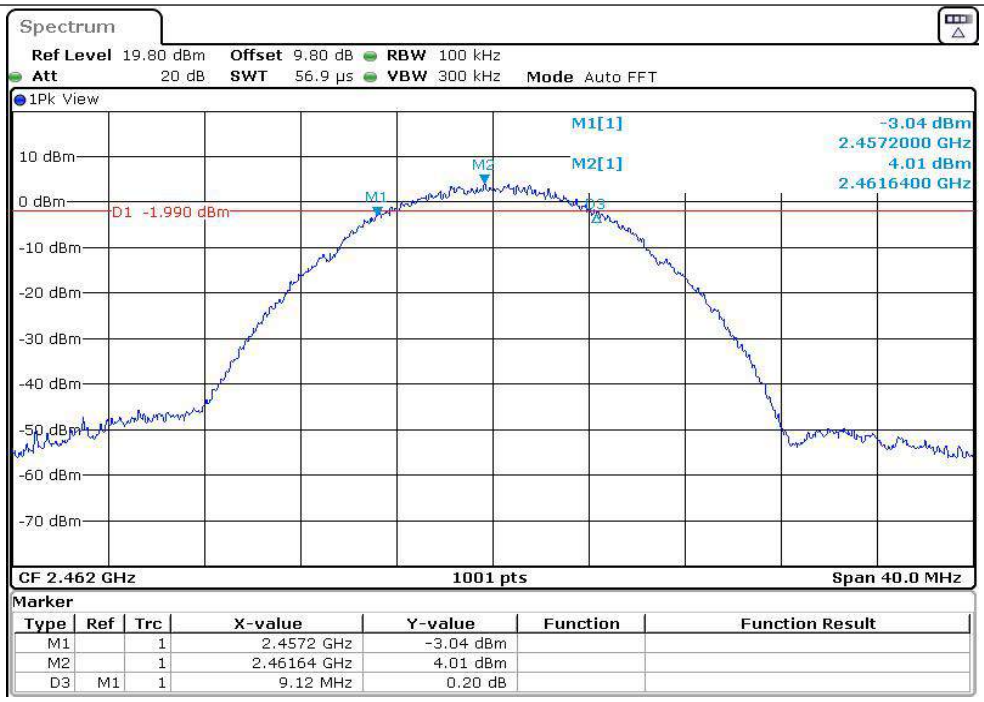
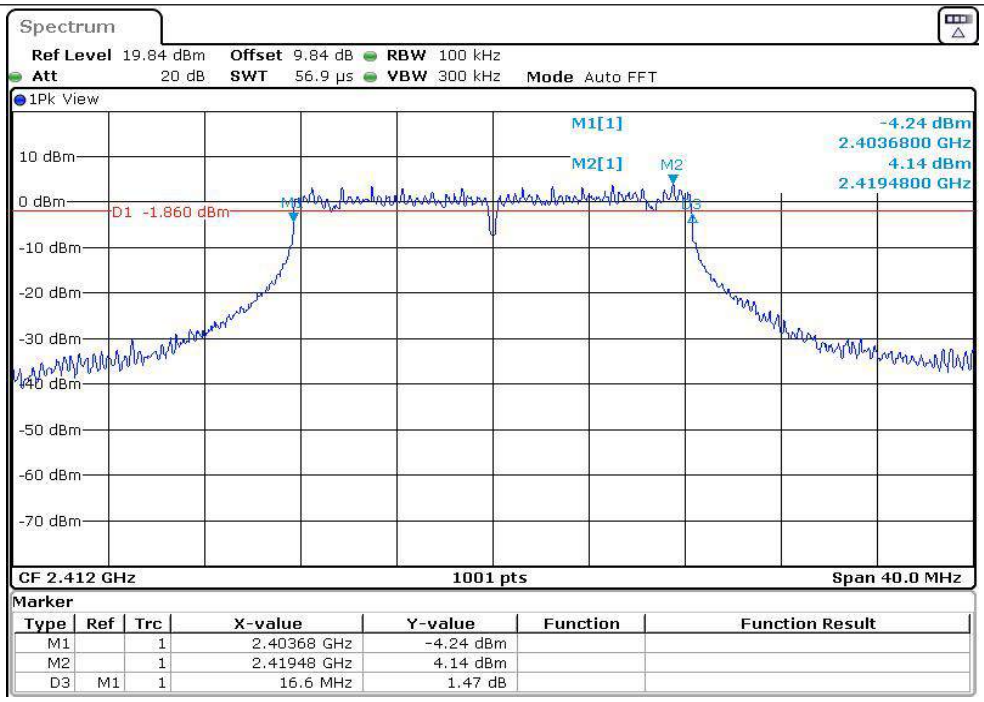
11N20SISO/LCH	
11N20SISO/MCH	

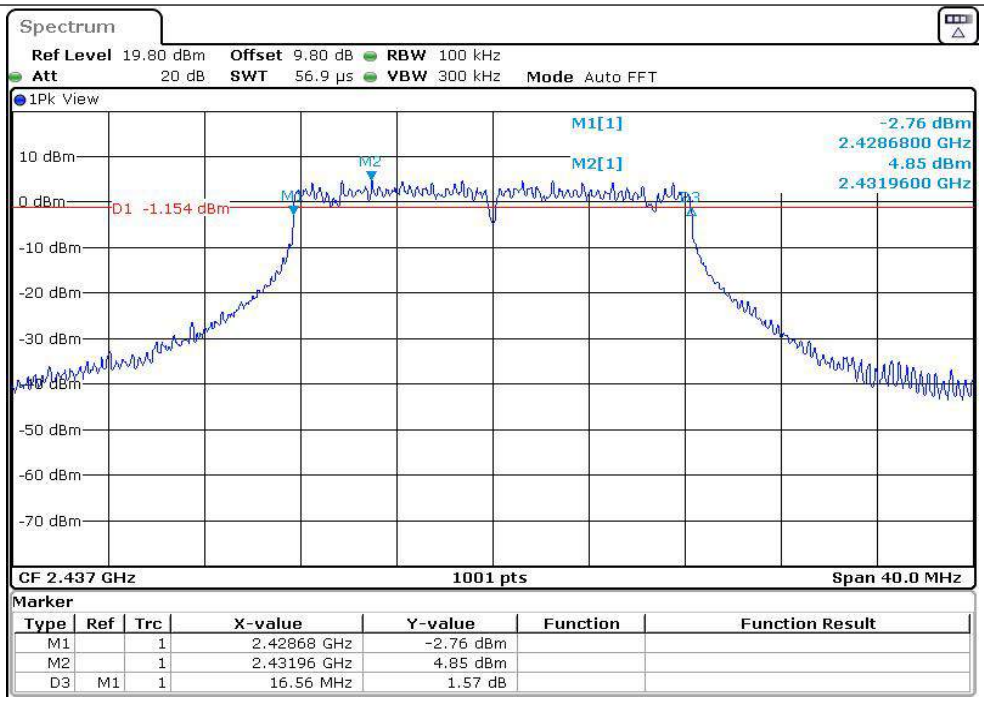
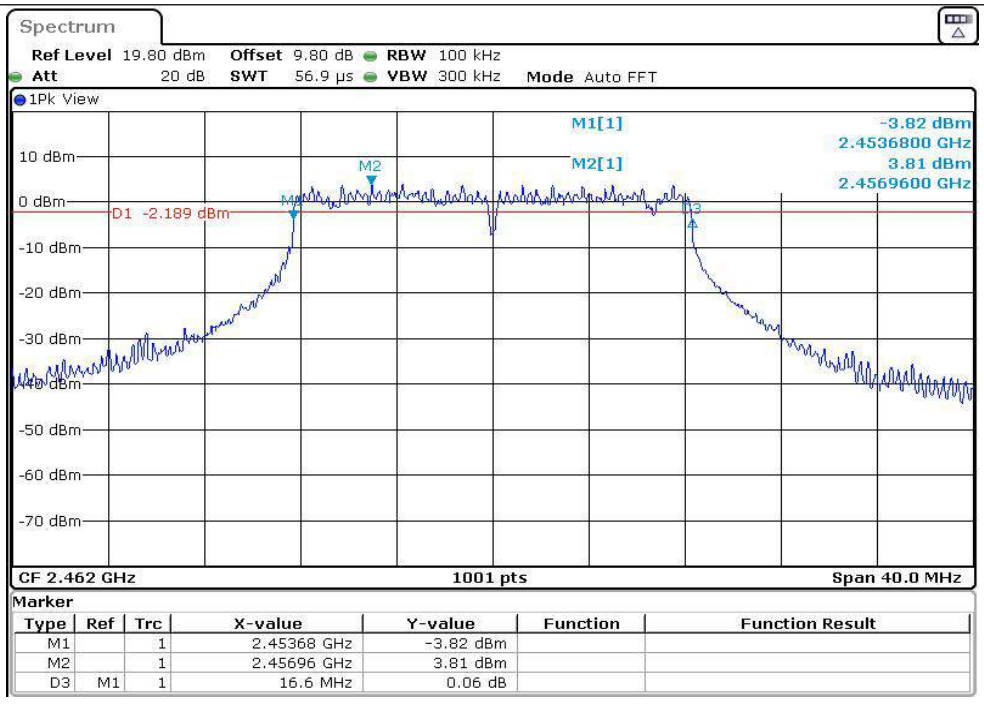
11N20SISO/HCH	
11N40SISO/LCH	

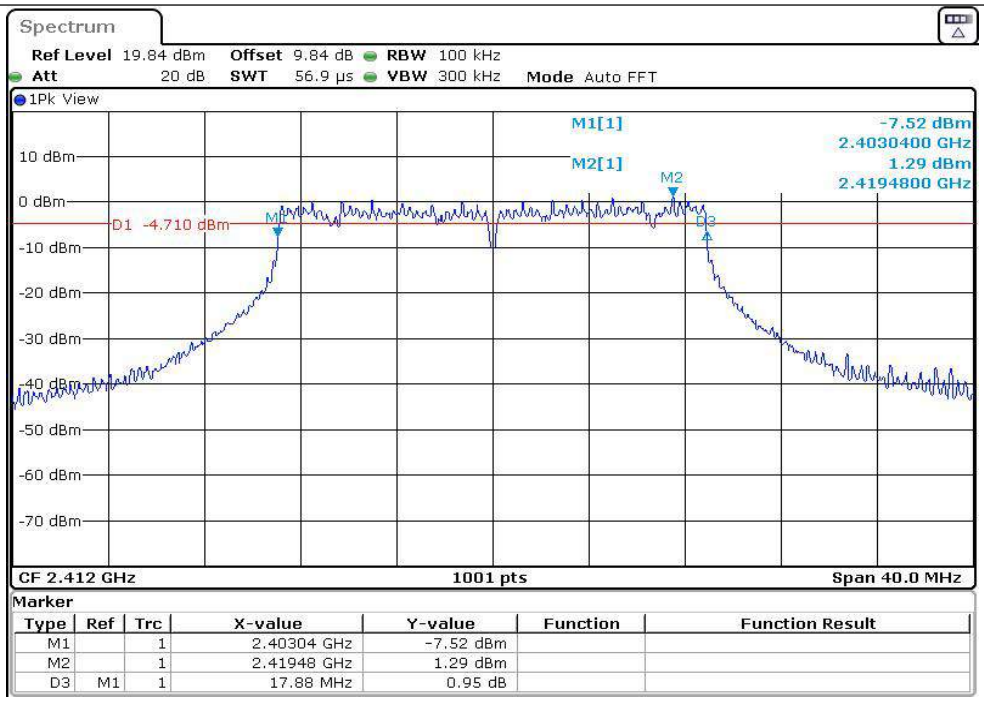
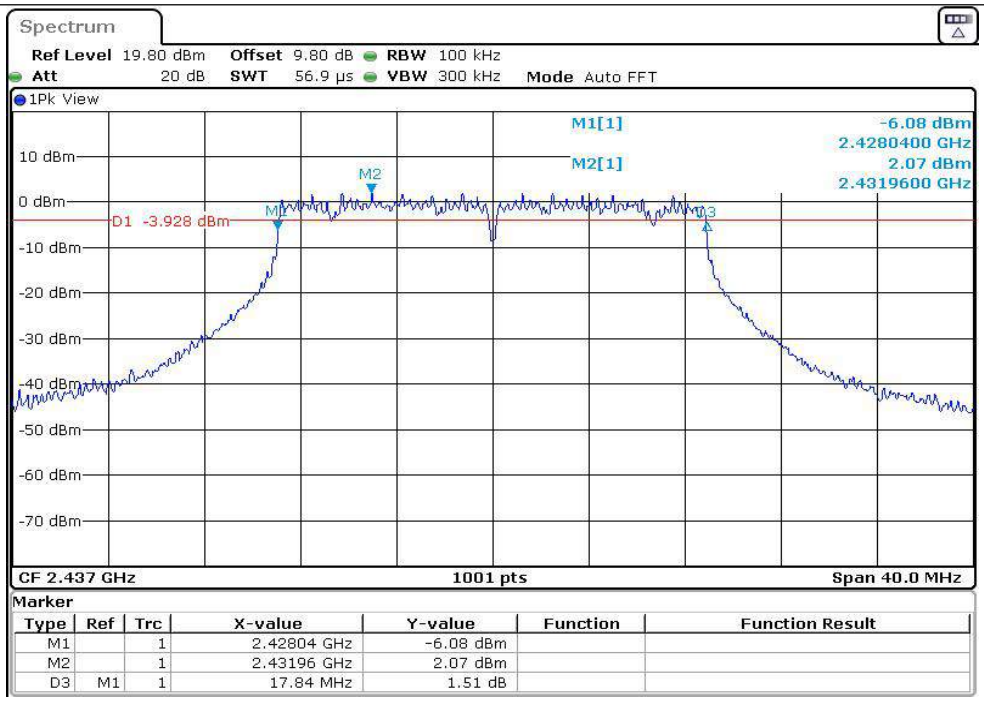
11N40SISO/MCH	
11N40SISO/HCH	

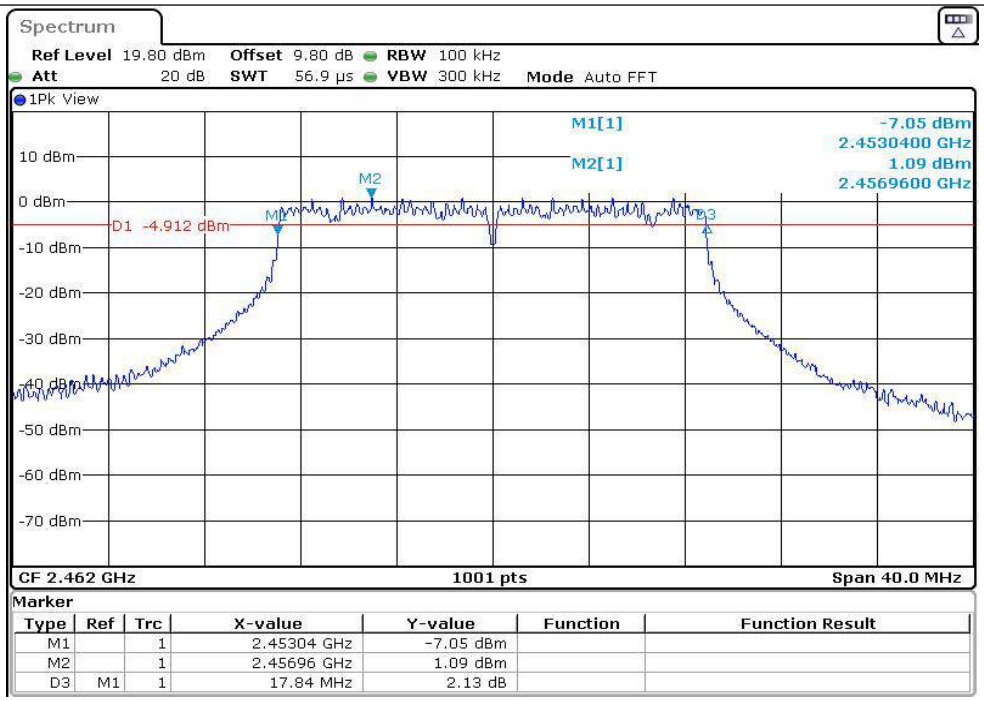
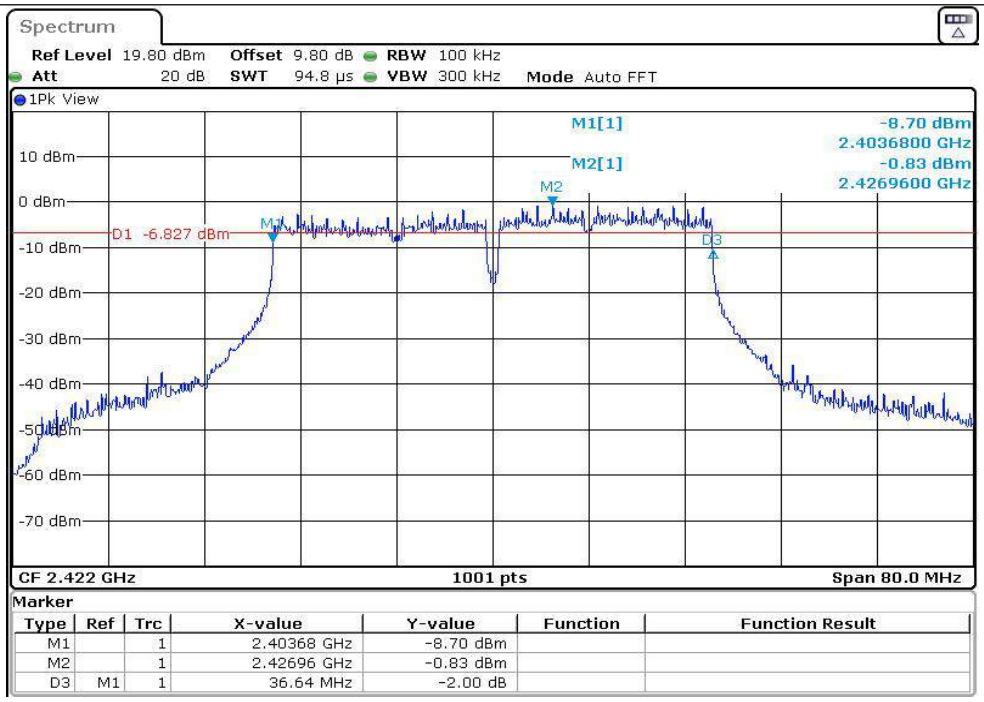
Ant2

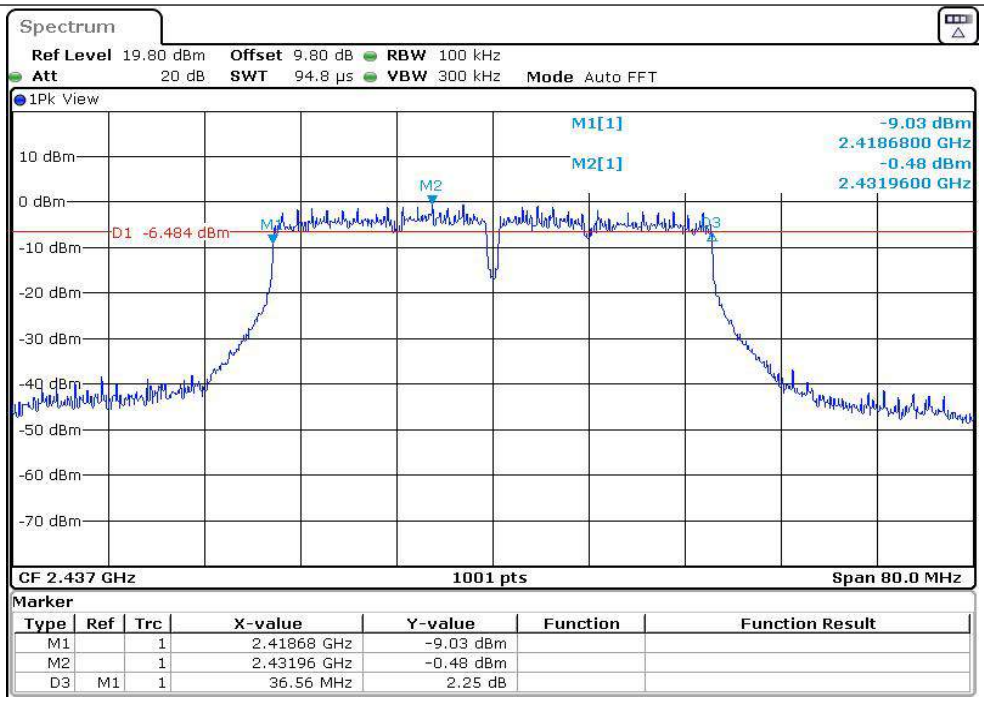
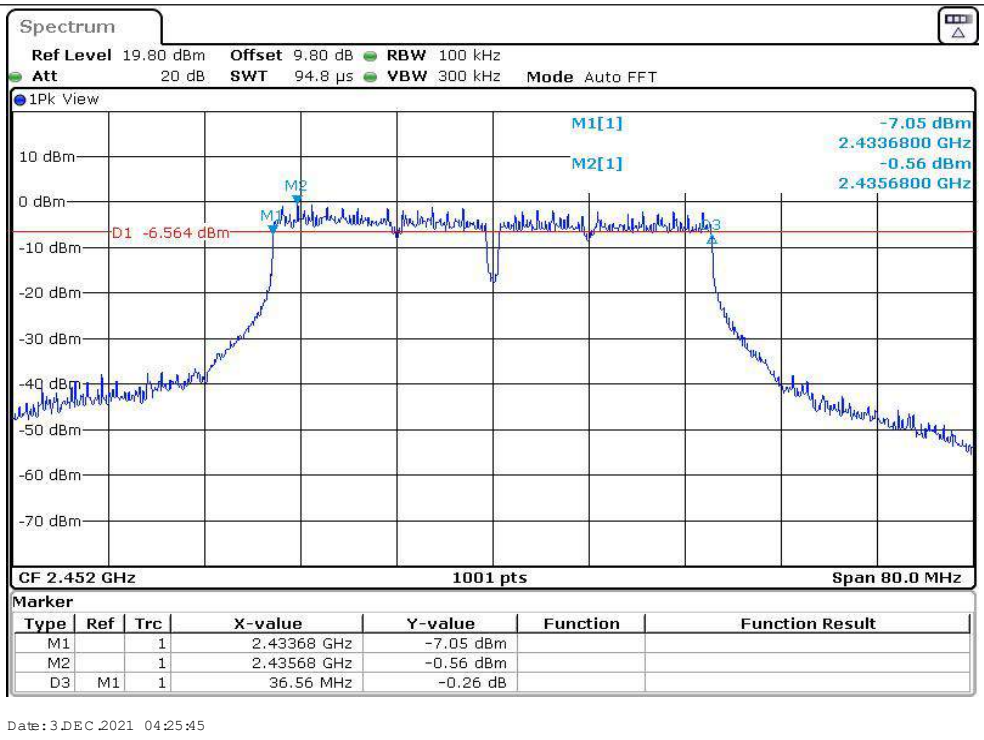
Graphs_6dB Occupy Bandwidth	
11B/LCH	
11B/MCH	

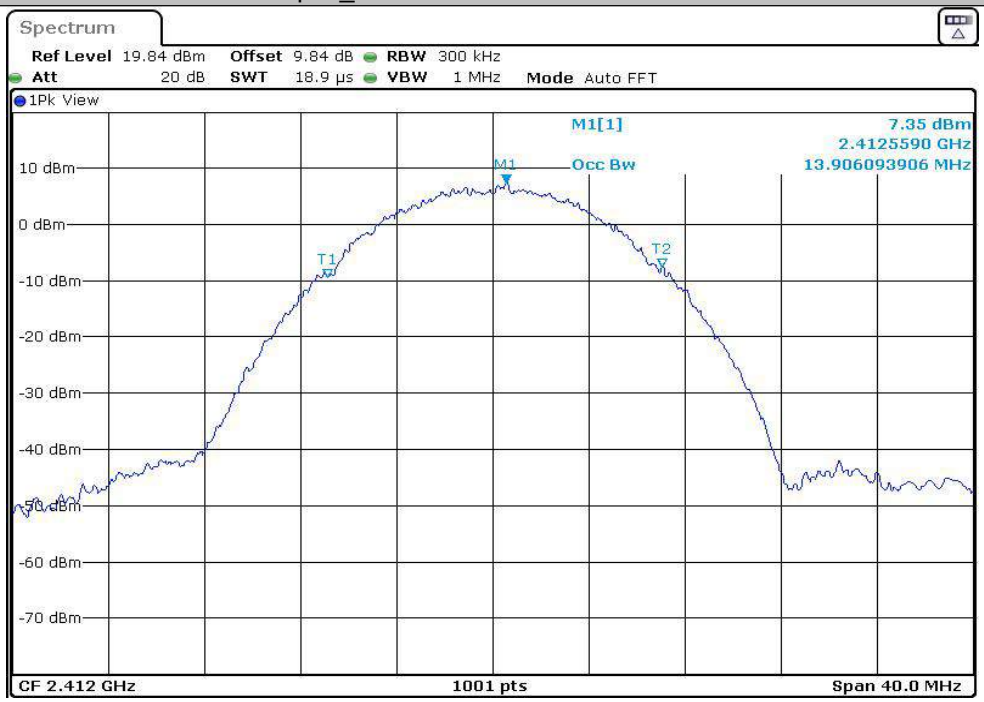
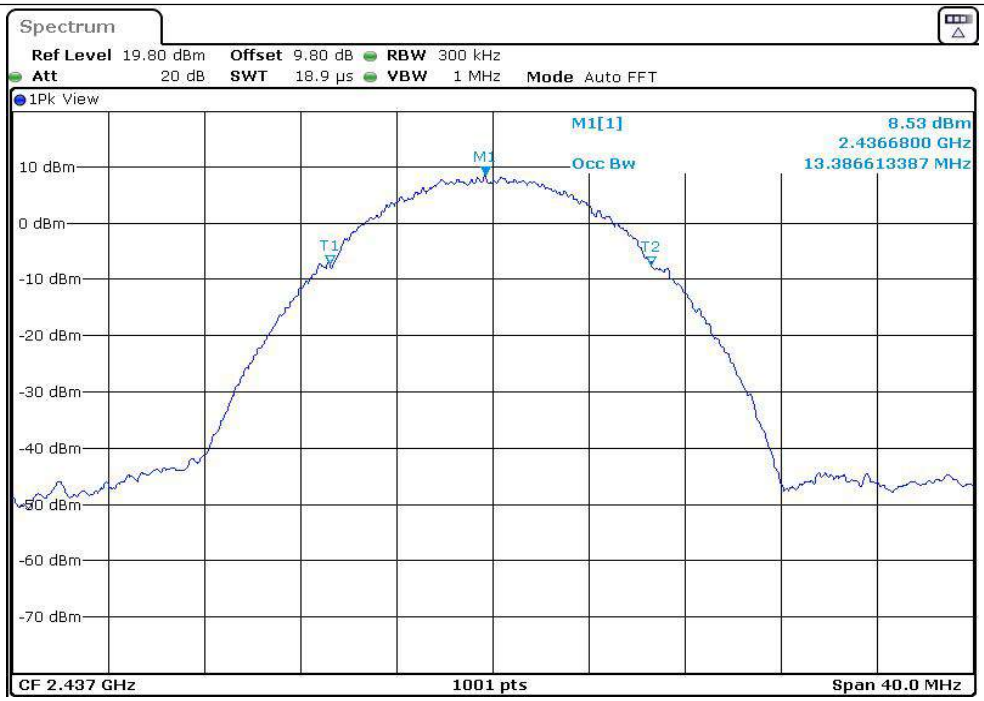
11B/HCH	
11G/LCH	

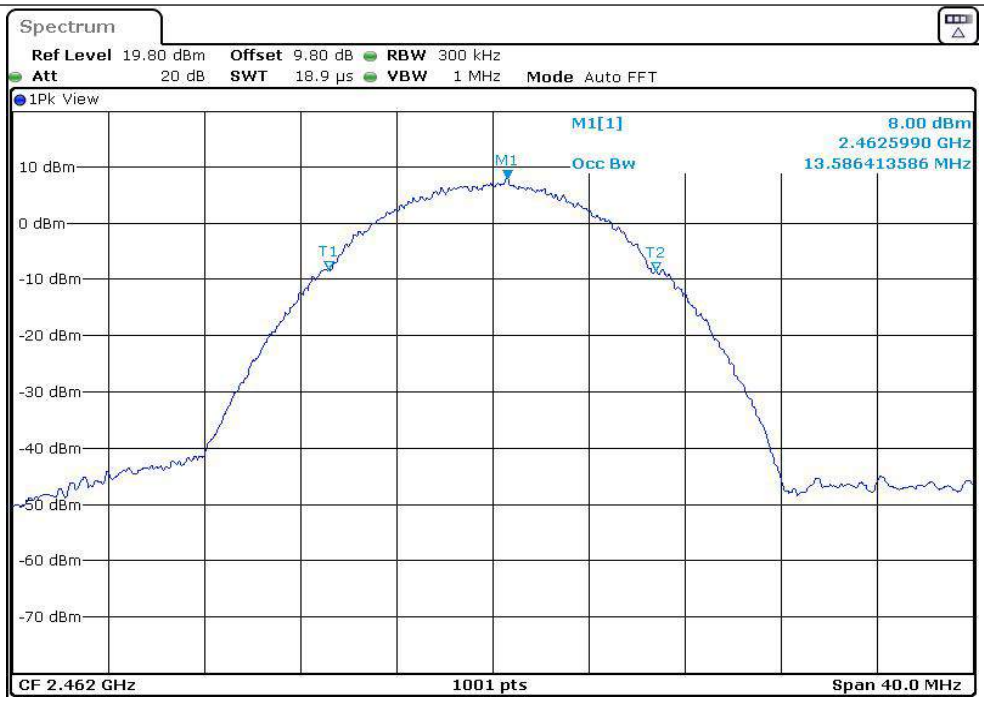
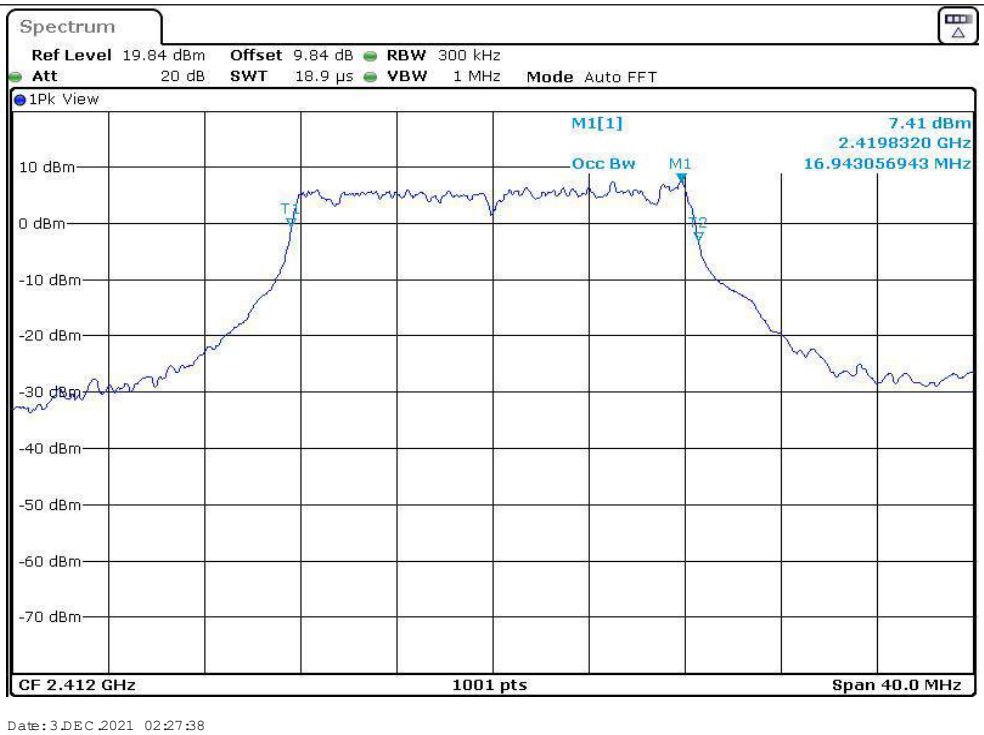
11G/MCH	
11G/HCH	

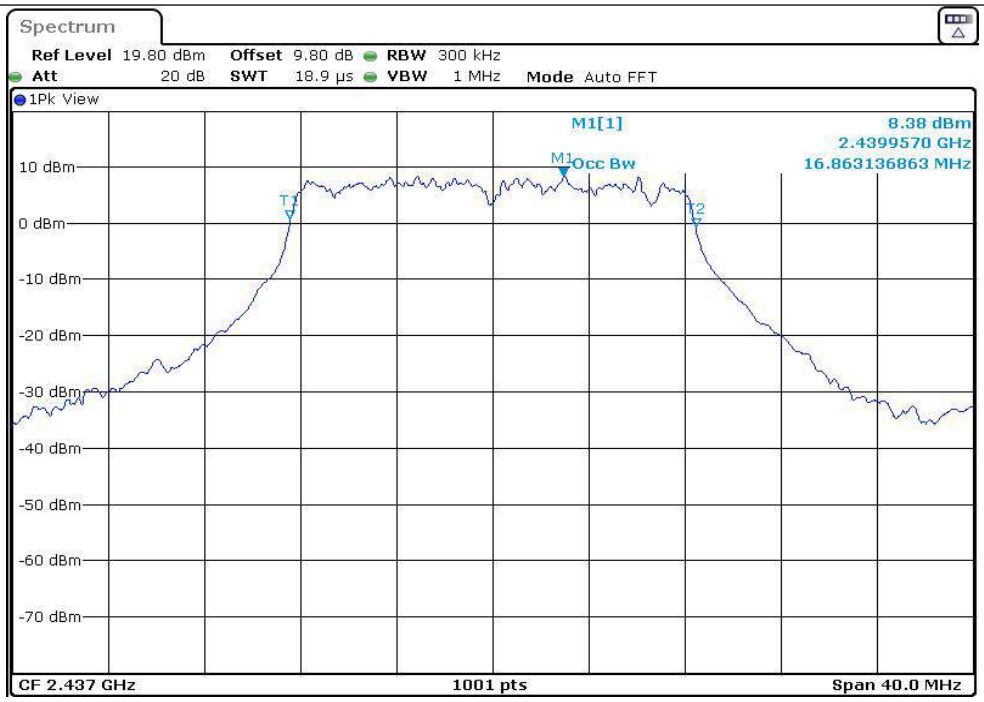
11N20SISO/LCH	
11N20SISO/MCH	

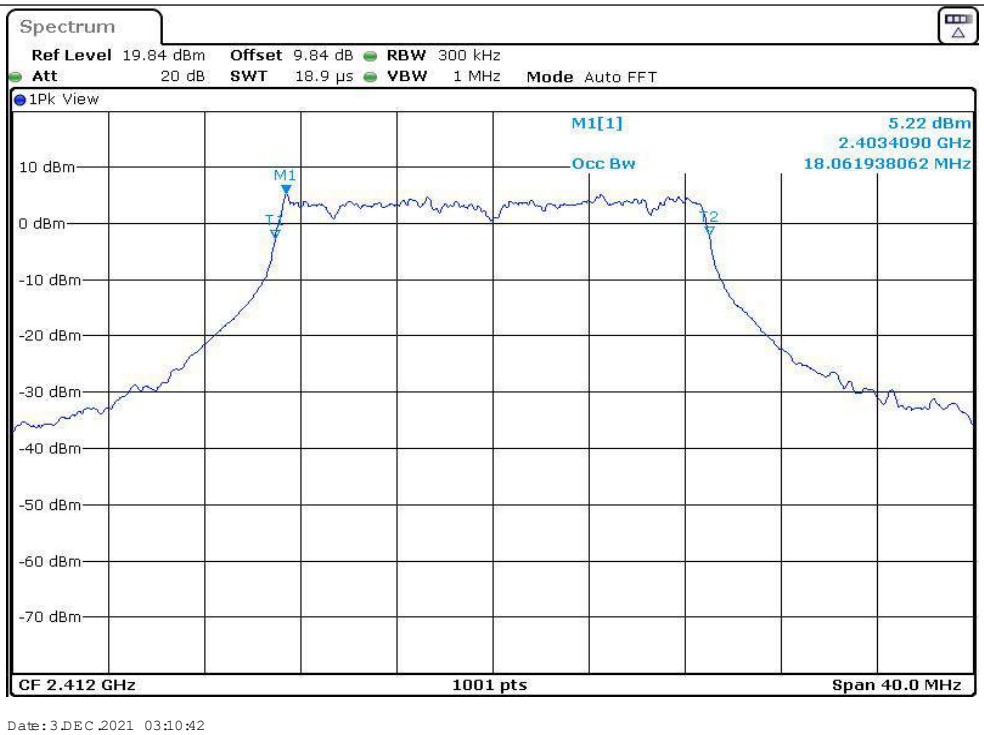
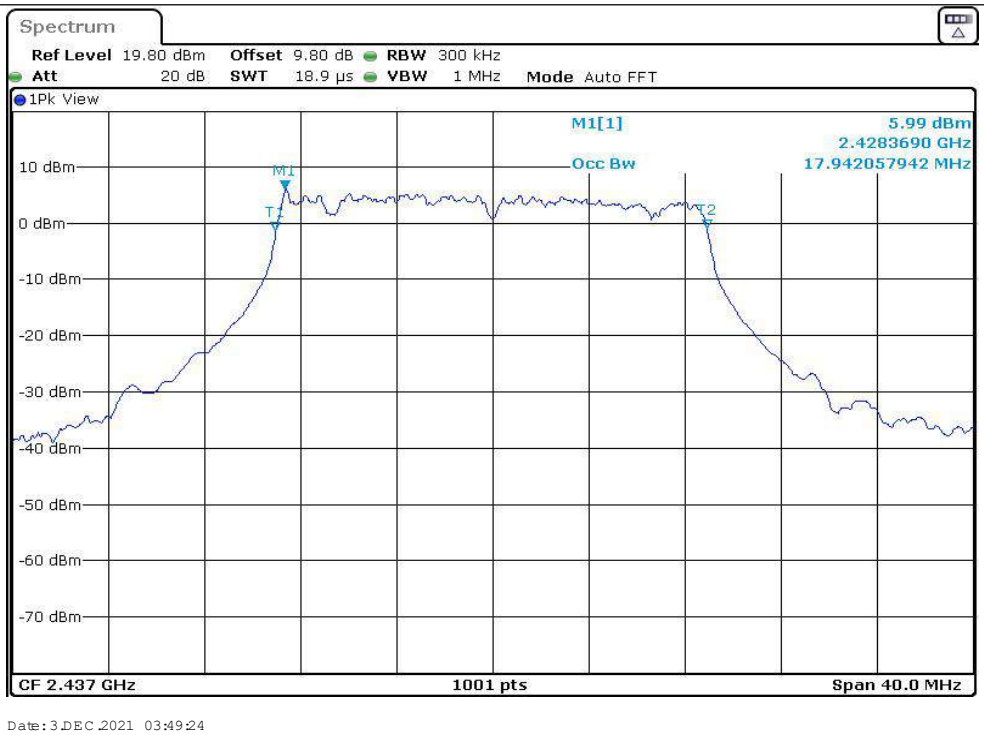
11N20SISO/HCH	
11N40SISO/LCH	

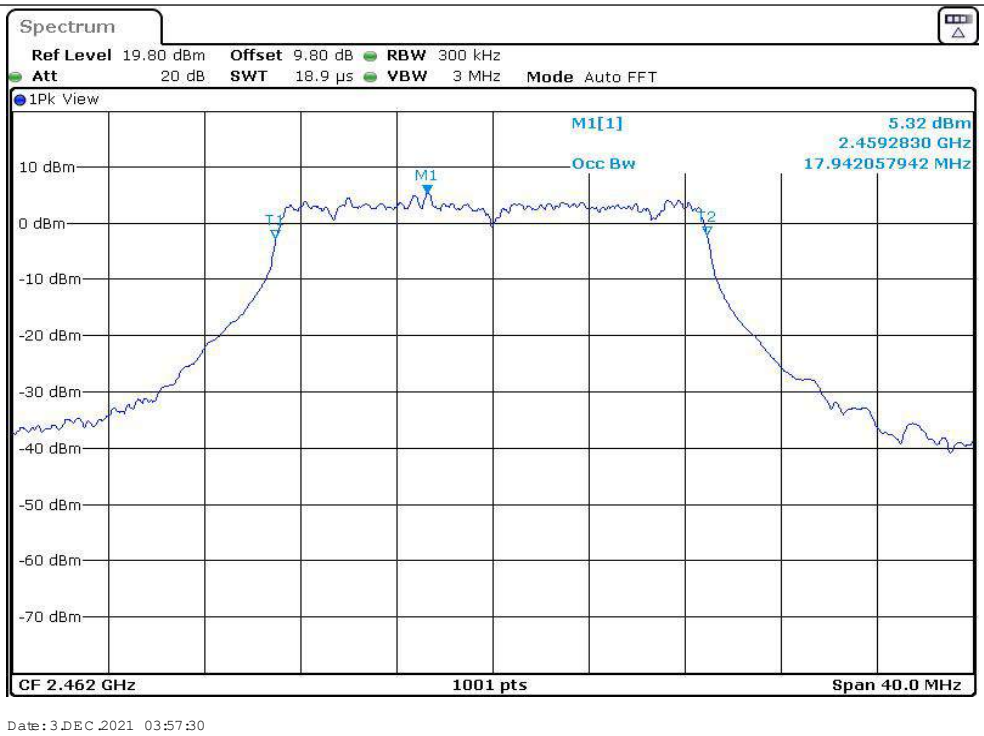
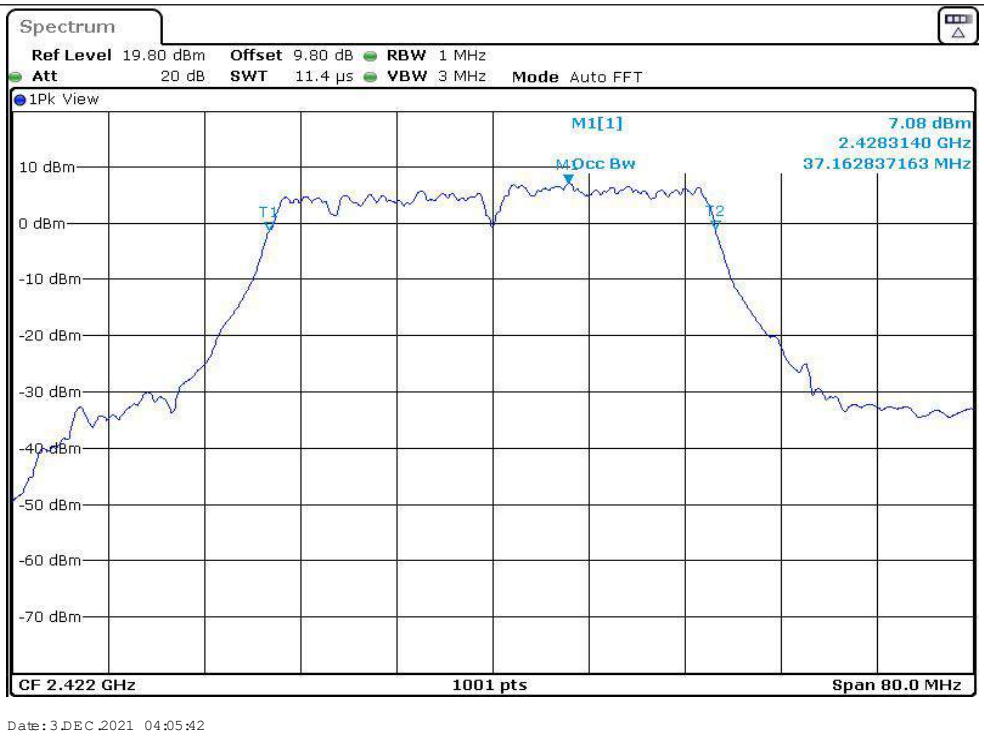
11N40SISO/MCH	
11N40SISO/HCH	

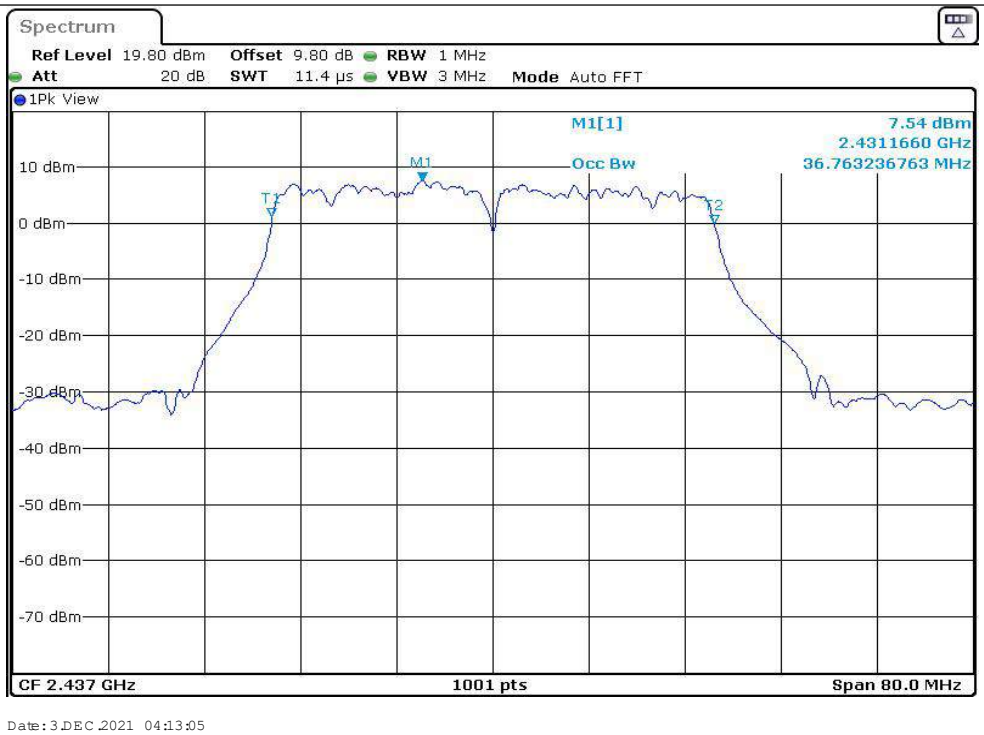
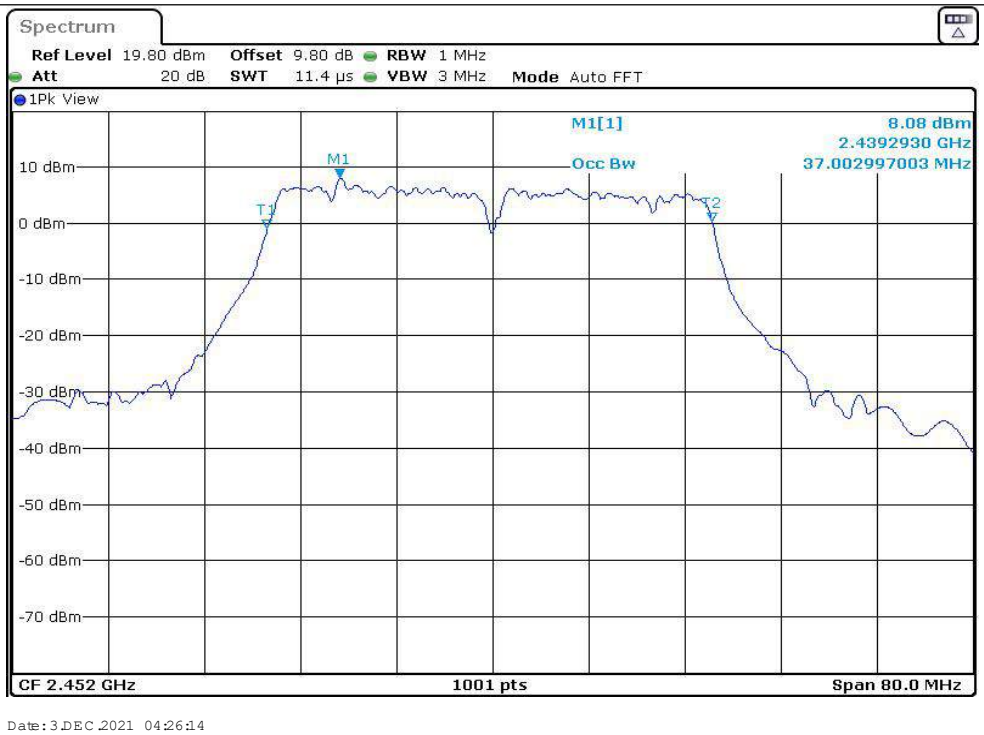
Graphs_99% OBW	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

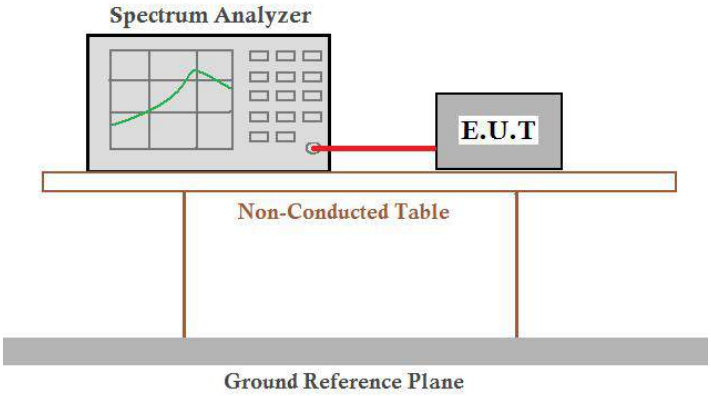
11G/MCH	
11G/HCH	

11N20SISO/LCH	
11N20SISO/MCH	

11N20SISO/HCH	
11N40SISO/LCH	

11N40SISO/MCH	
11N40SISO/HCH	

5.5 Power Spectral Density

Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
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). Only the worst case is recorded in the report.
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

Measurement Data

Ant1

802.11b mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-4.160	≤8.00	Pass
Middle	-2.060	≤8.00	Pass
Highest	-3.080	≤8.00	Pass
802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-11.670	≤8.00	Pass
Middle	-10.210	≤8.00	Pass
Highest	-11.050	≤8.00	Pass
802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-12.140	≤8.00	Pass
Middle	-11.130	≤8.00	Pass
Highest	-12.100	≤8.00	Pass
802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-13.230	≤8.00	Pass
Middle	-13.110	≤8.00	Pass
Highest	-12.890	≤8.00	Pass

Ant2

802.11b mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-3.860	≤8.00	Pass
Middle	-2.250	≤8.00	Pass
Highest	-5.210	≤8.00	Pass
802.11g mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-9.230	≤8.00	Pass
Middle	-7.750	≤8.00	Pass
Highest	-8.820	≤8.00	Pass
802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-12.190	≤8.00	Pass
Middle	-11.460	≤8.00	Pass
Highest	-12.370	≤8.00	Pass
802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-13.640	≤8.00	Pass
Middle	-13.530	≤8.00	Pass
Highest	-13.660	≤8.00	Pass

Ant1+Ant2

802.11n(HT20) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-9.15	≤6.99	Pass
Middle	-8.28	≤6.99	Pass
Highest	-9.22	≤6.99	Pass
802.11n(HT40) mode			
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
Lowest	-10.42	≤6.99	Pass
Middle	-10.31	≤6.99	Pass
Highest	-10.25	≤6.99	Pass

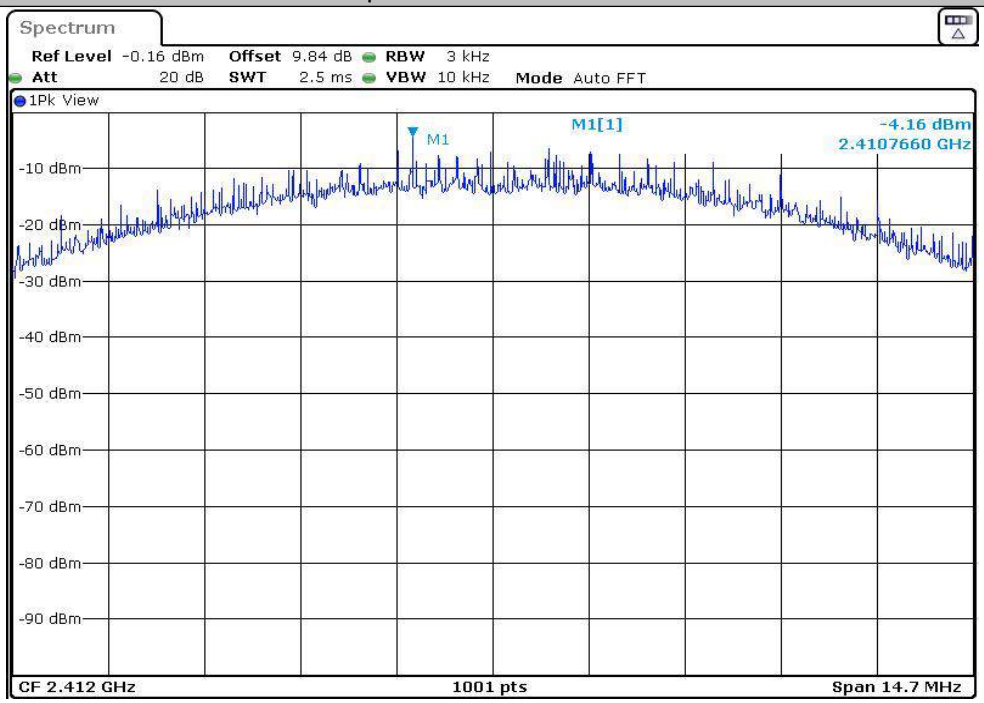
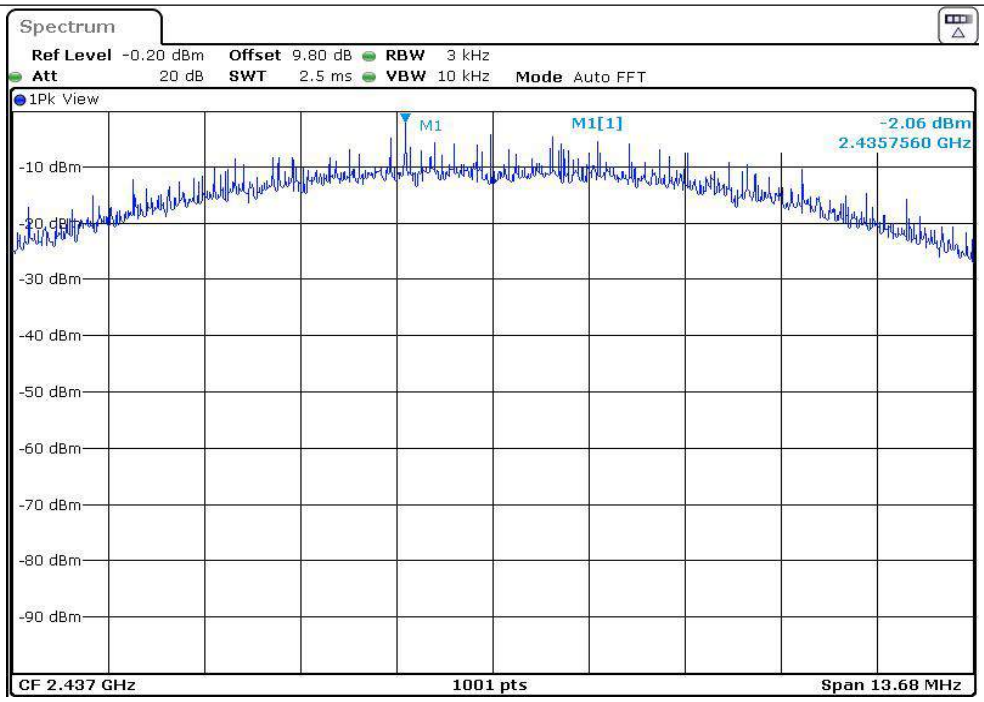
Note: The EUT supports MIMO and transmit signals are correlated with each other, then

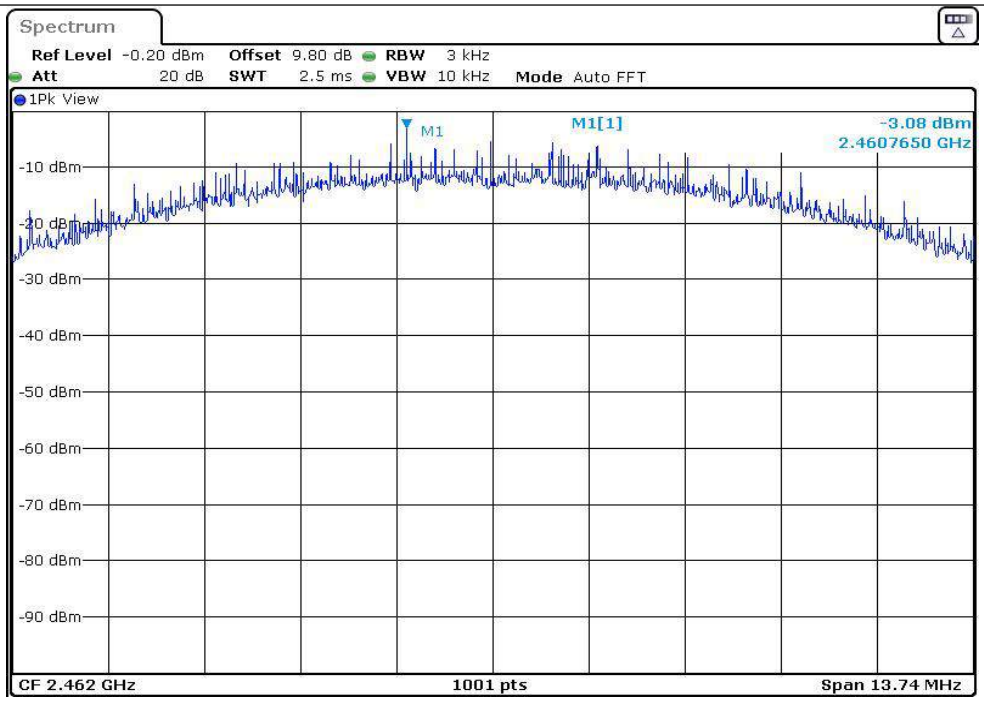
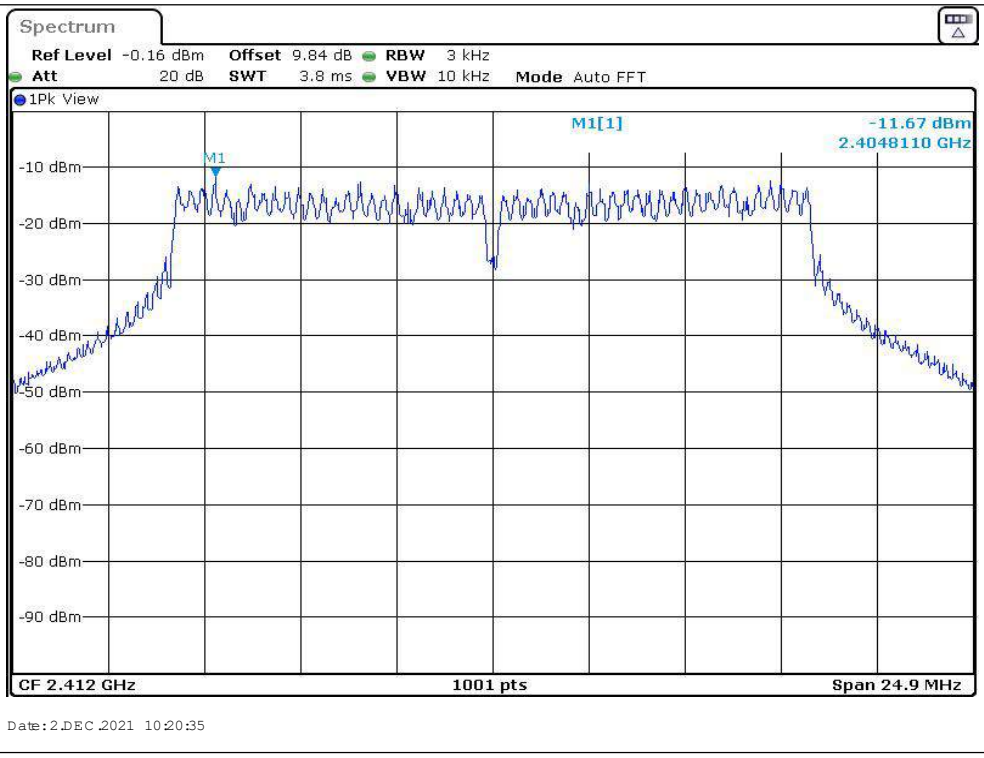
Directional gain = 10 log$[(10^{G1/20}+10^{G2/20}+\ldots+10^{GN/20})^2/N_{ANT}]$ dBi = 7.01 dBi,

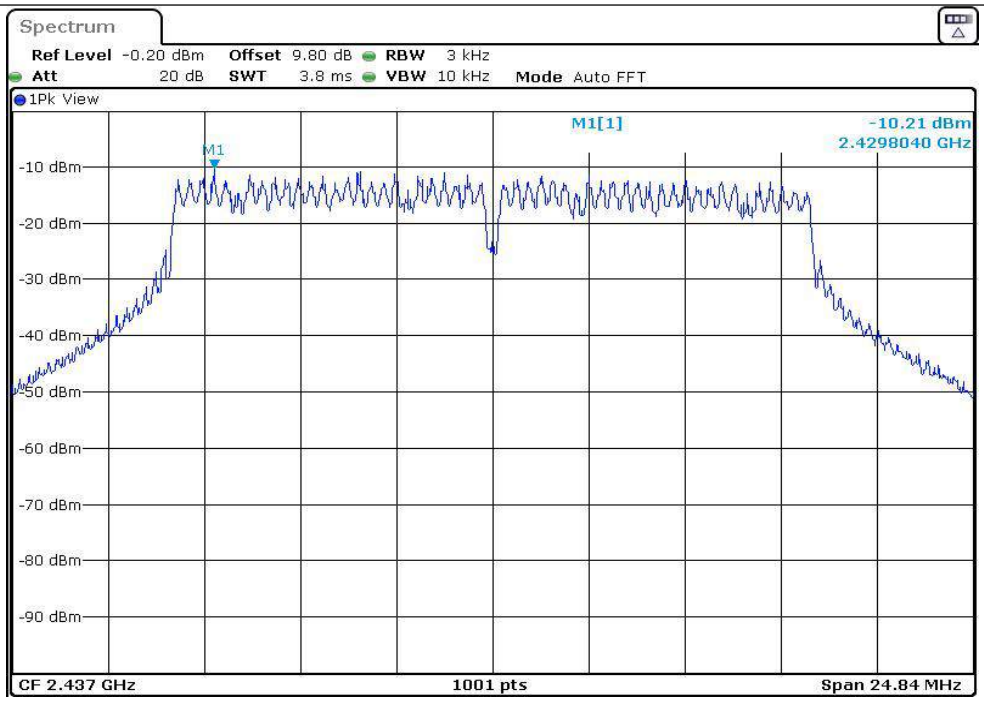
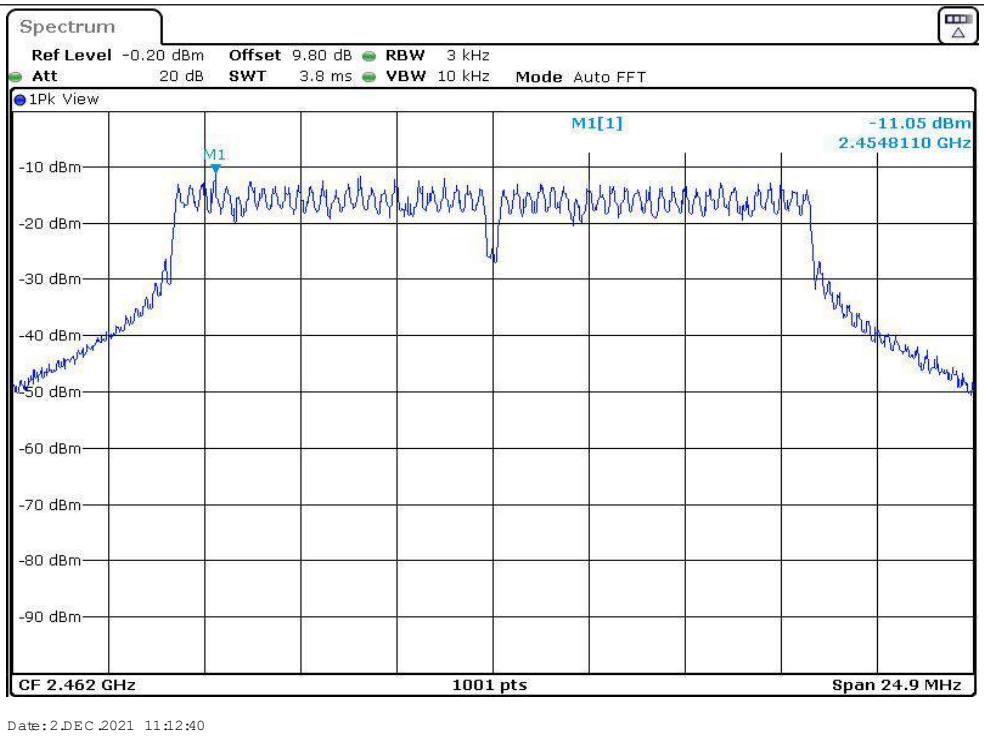
The limit of PSD is 8-(7.01-6) = 6.99dBm.

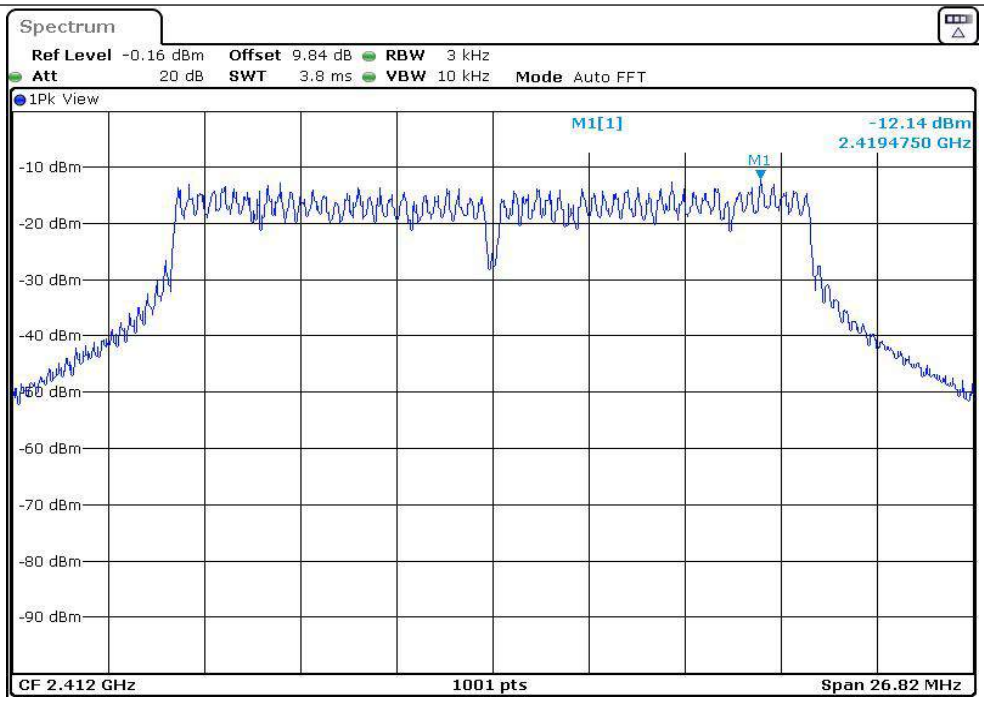
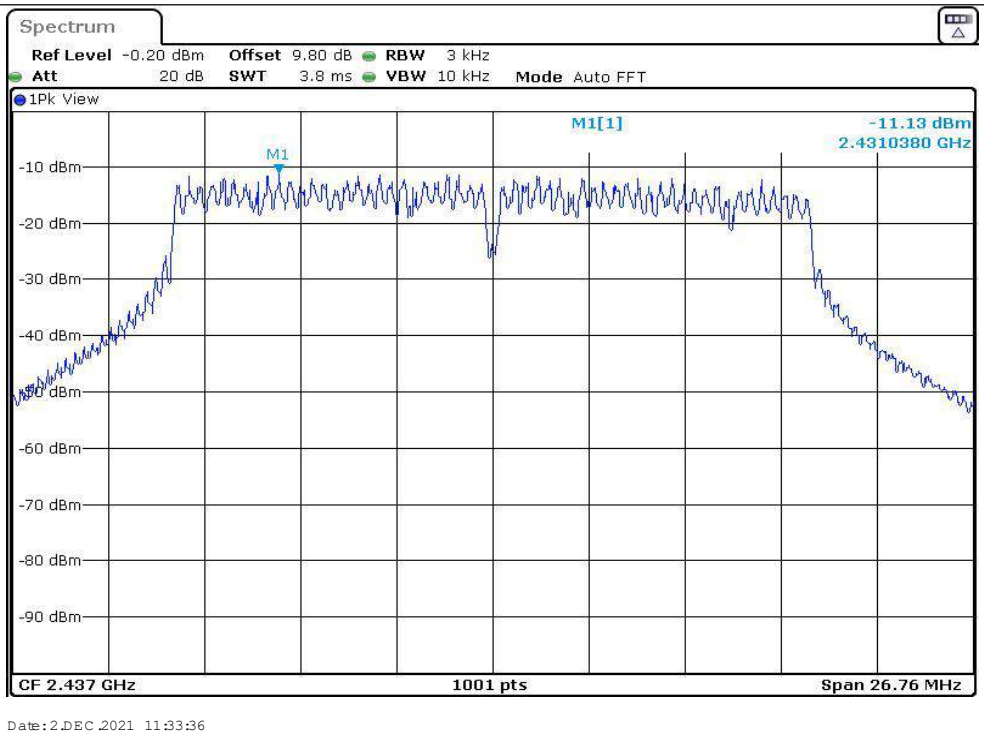
Test plot as follows:

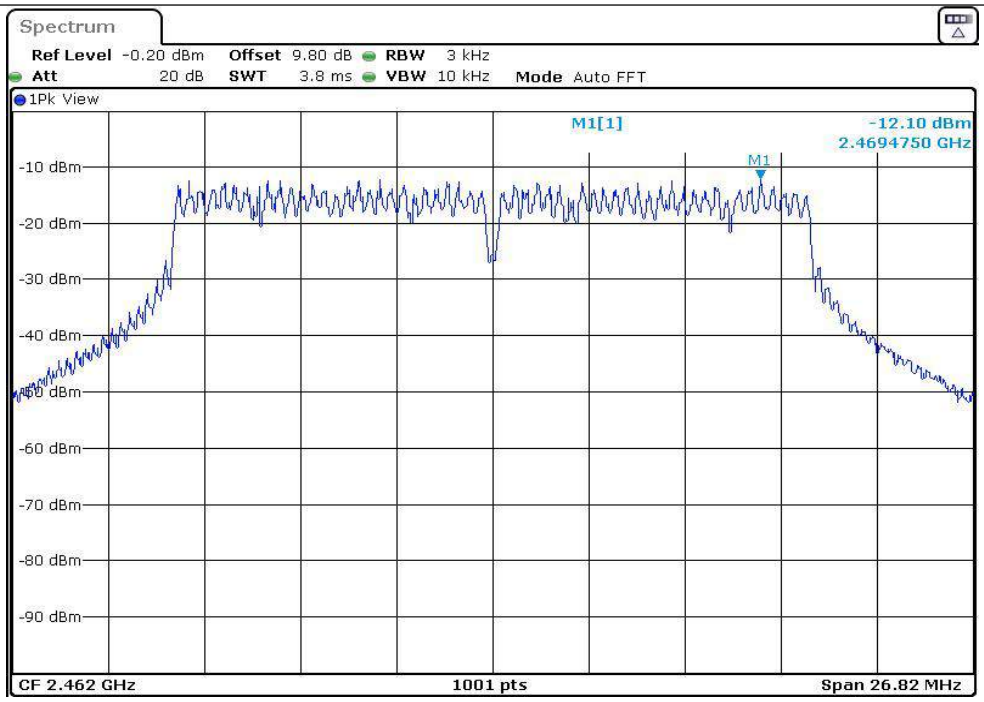
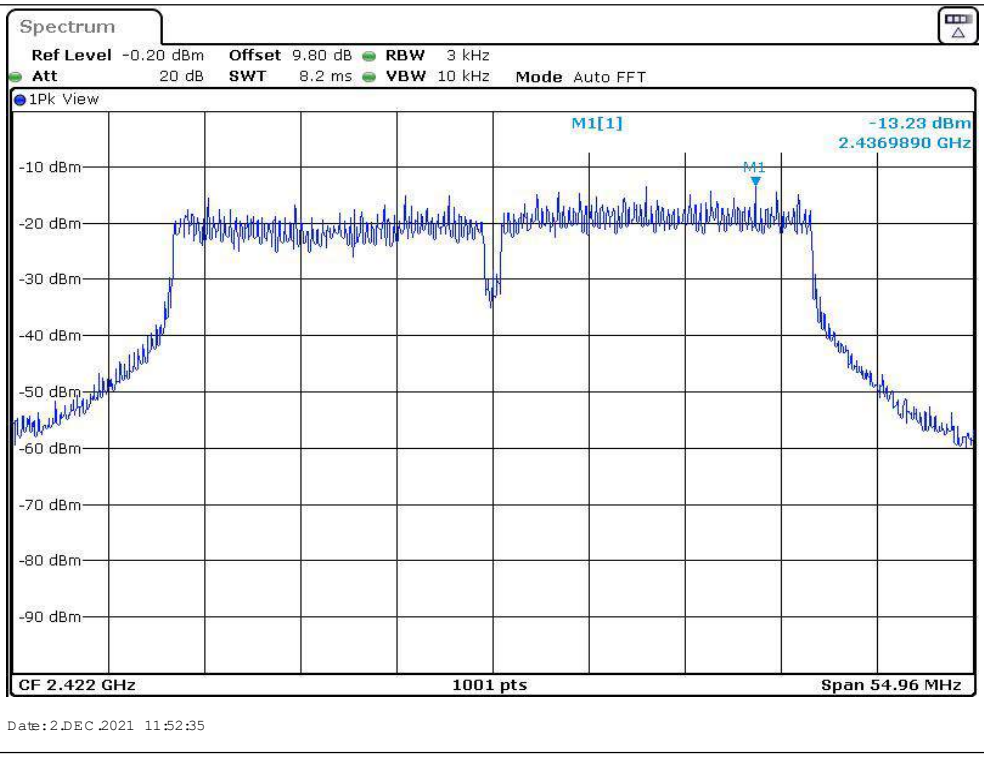
Ant1

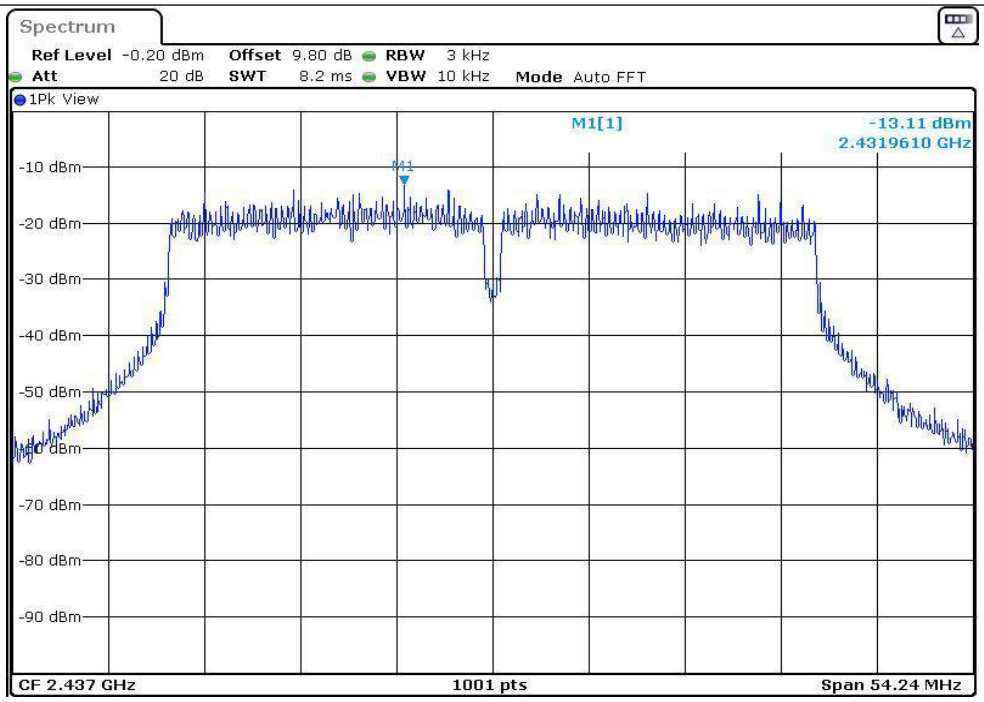
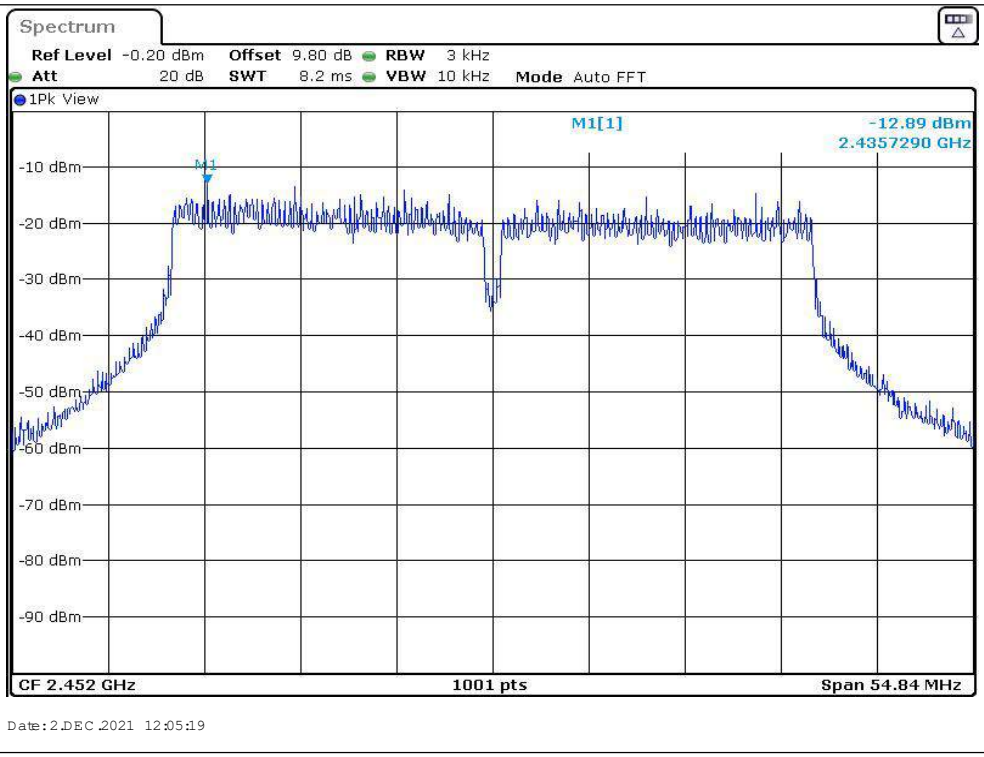
Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

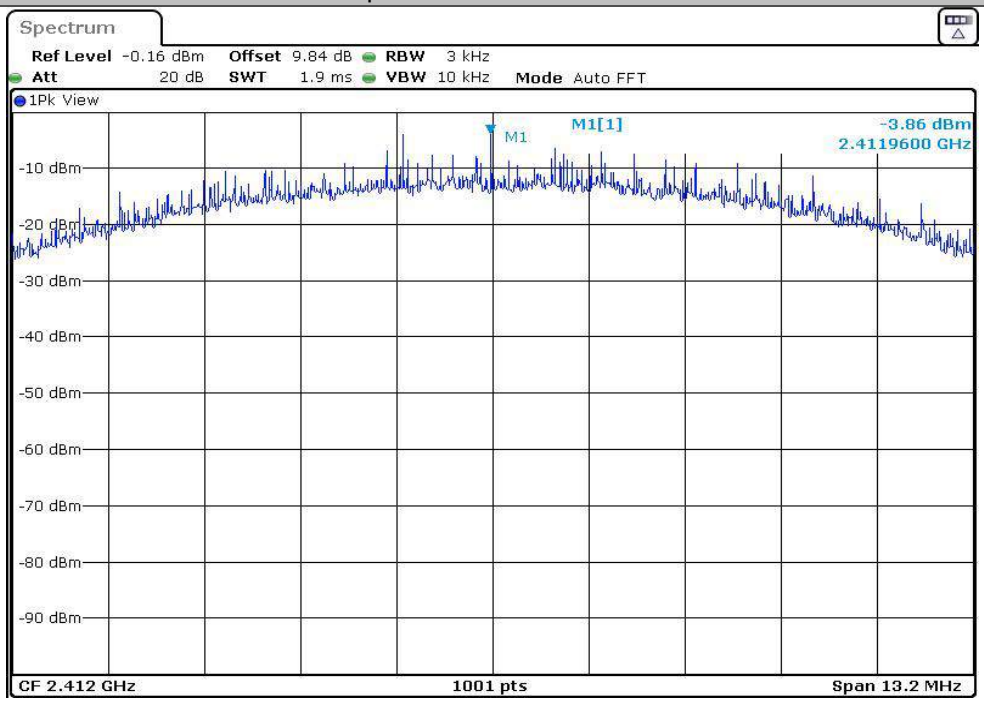
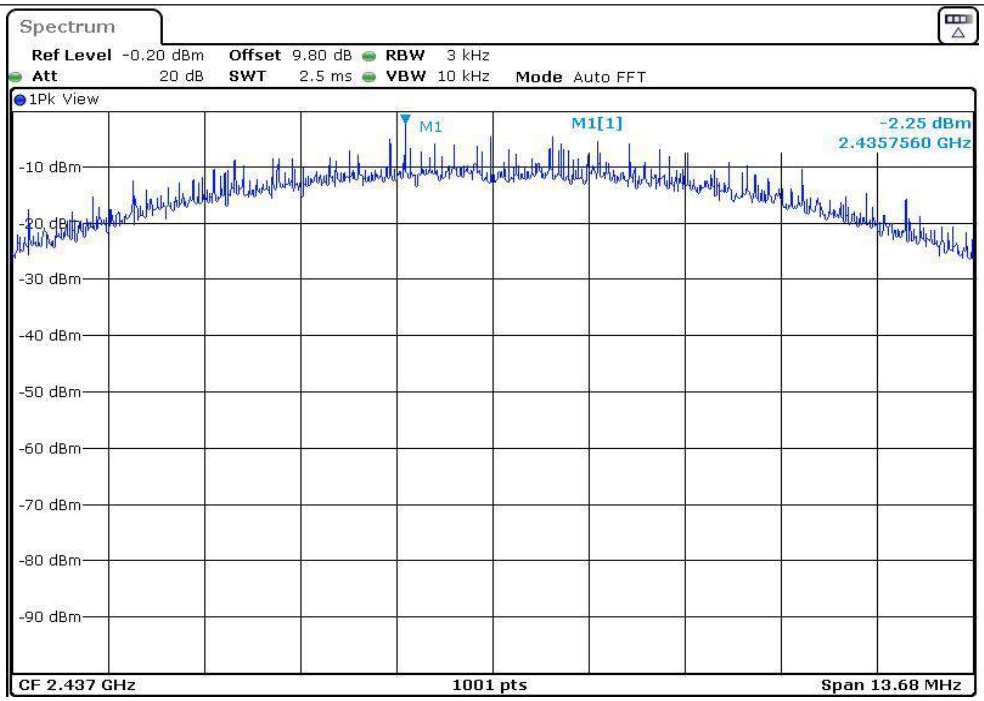
11G/MCH	
11G/HCH	

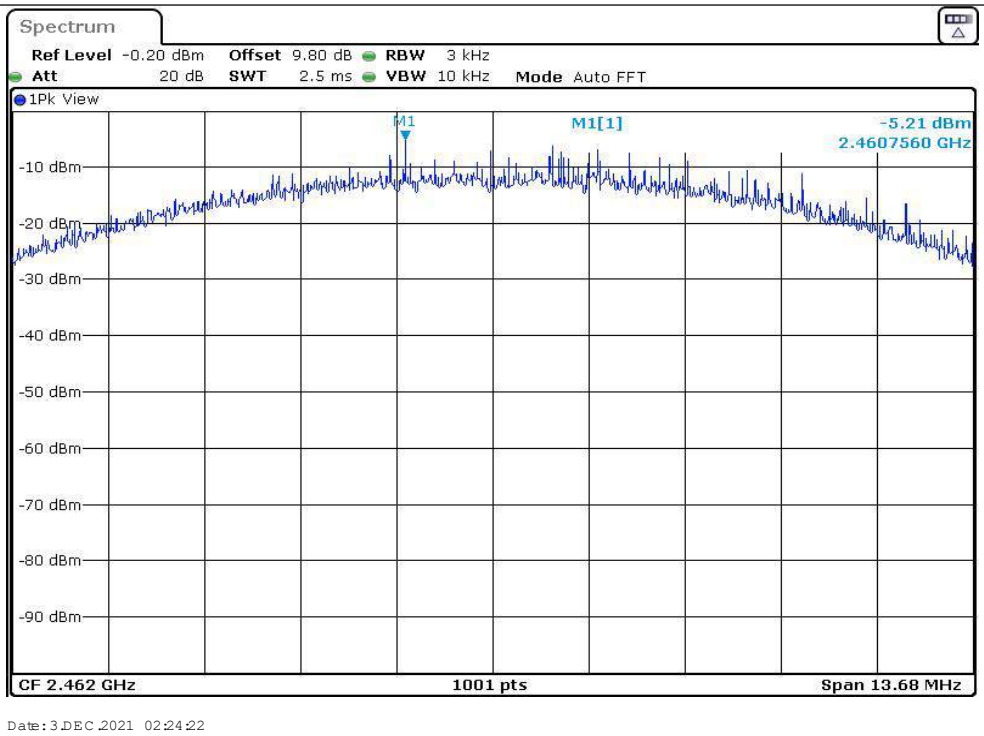
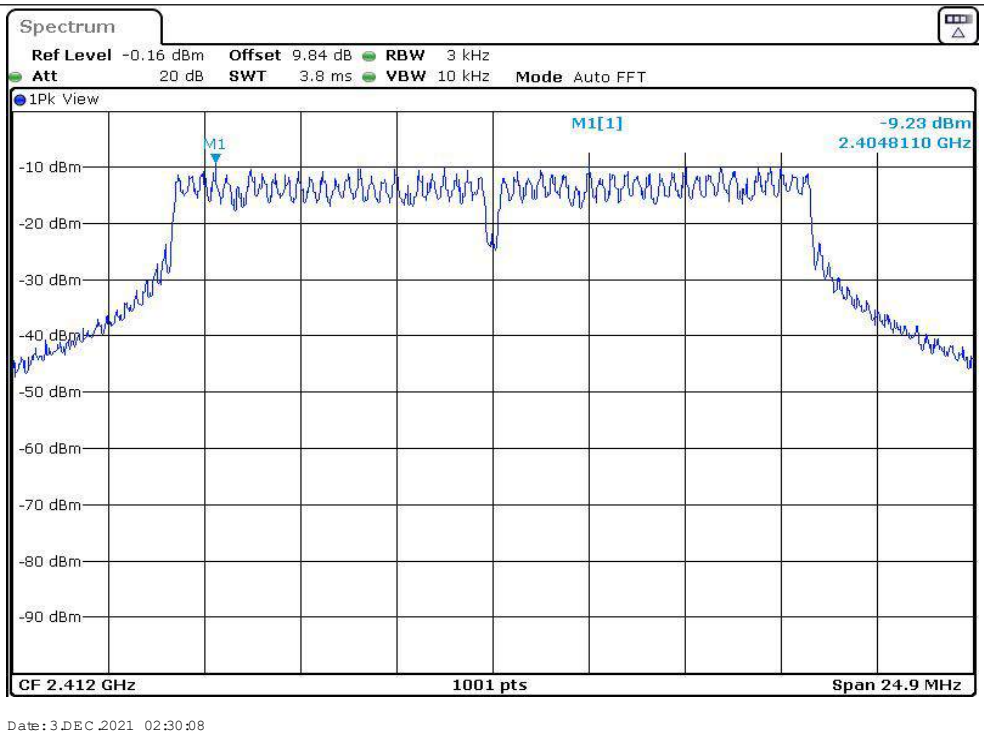
11N20SISO/LCH	
11N20SISO/MCH	

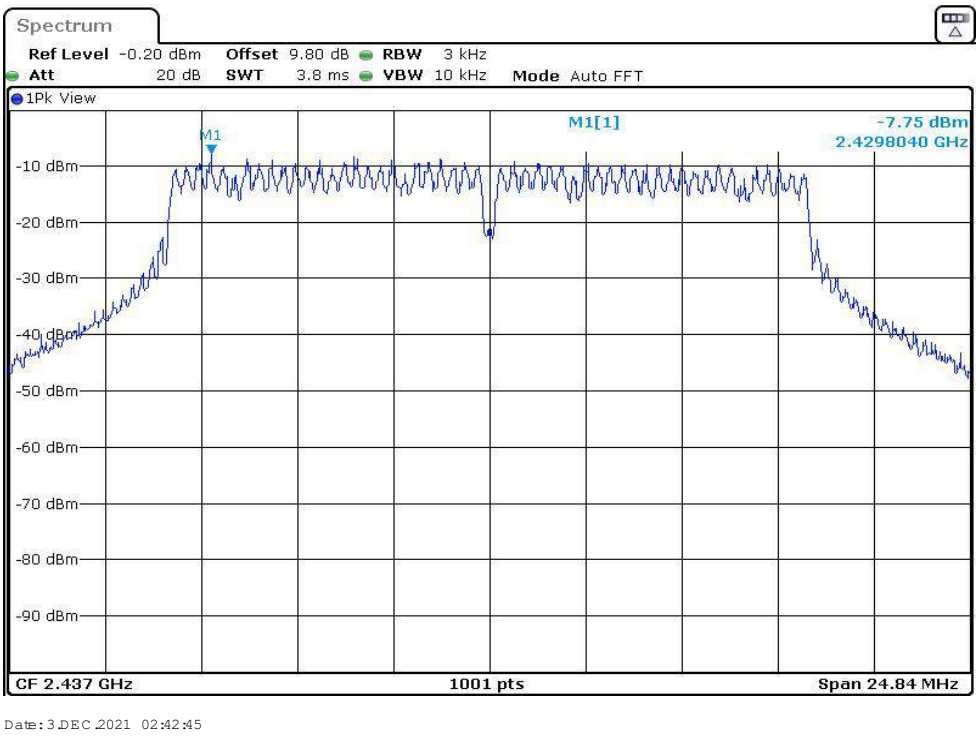
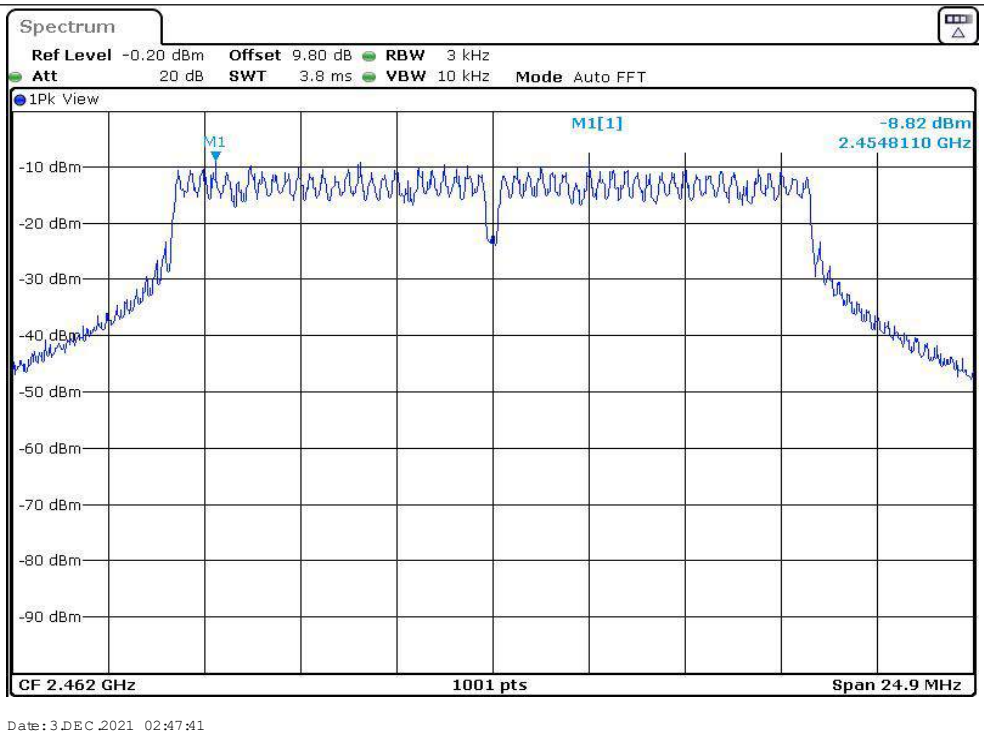
11N20SISO/HCH	
11N40SISO/LCH	

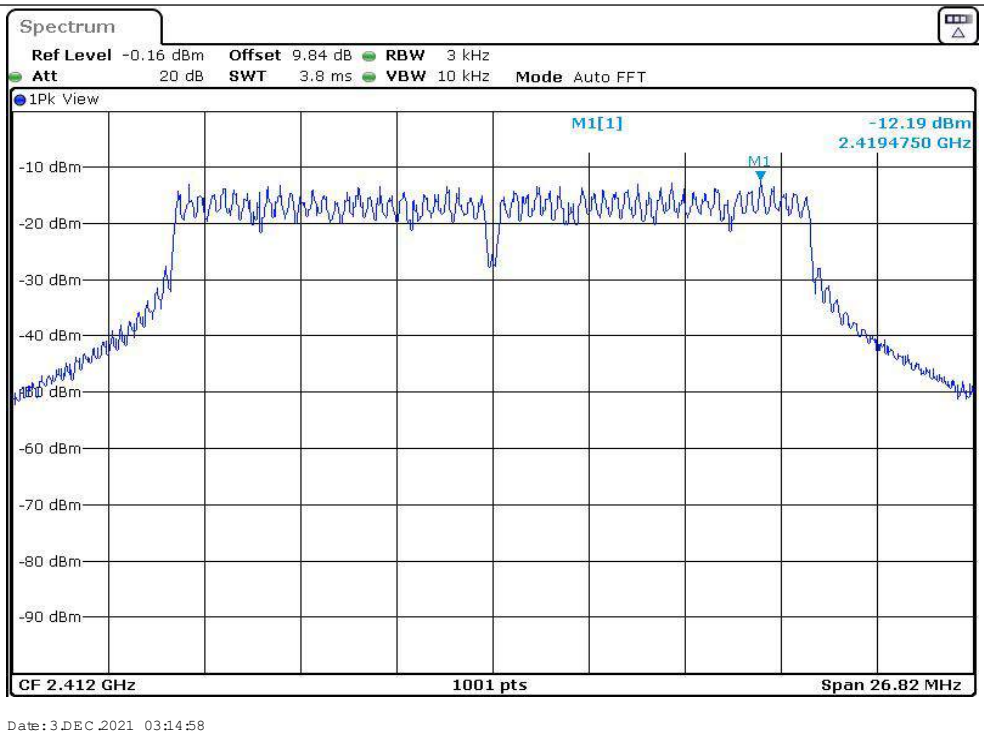
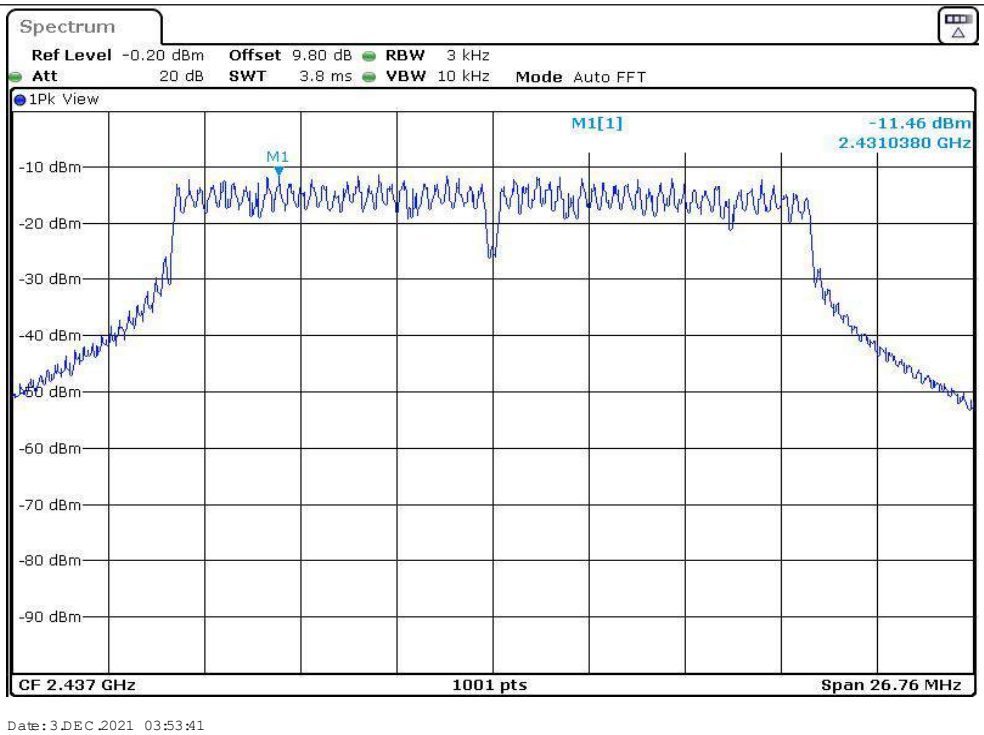
11N40SISO/MCH	
11N40SISO/HCH	

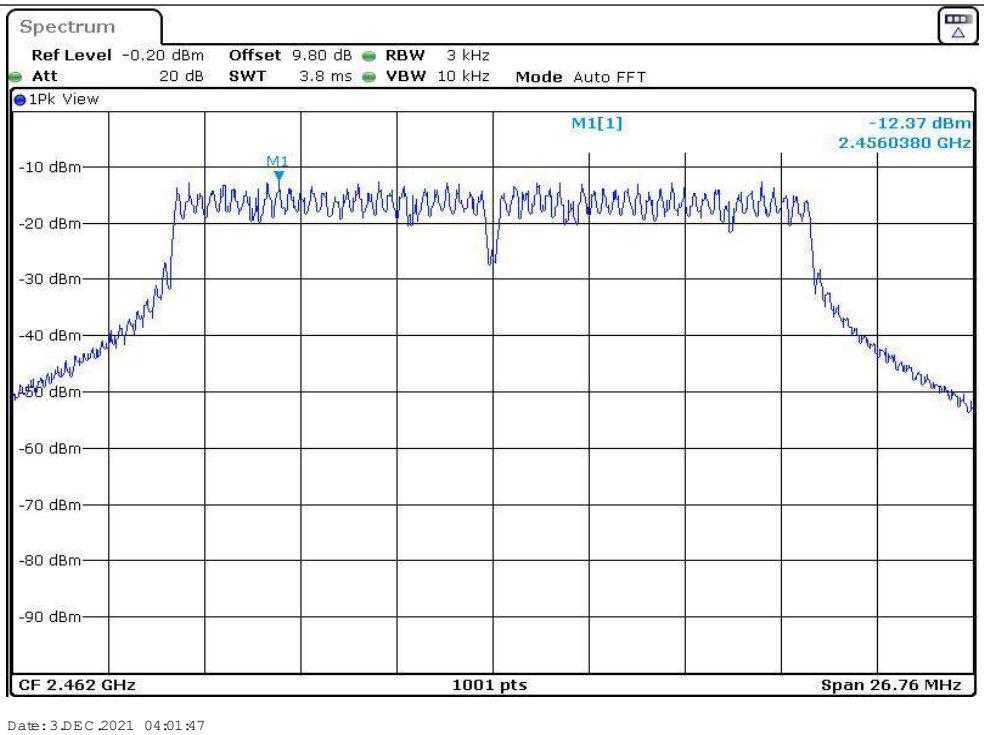
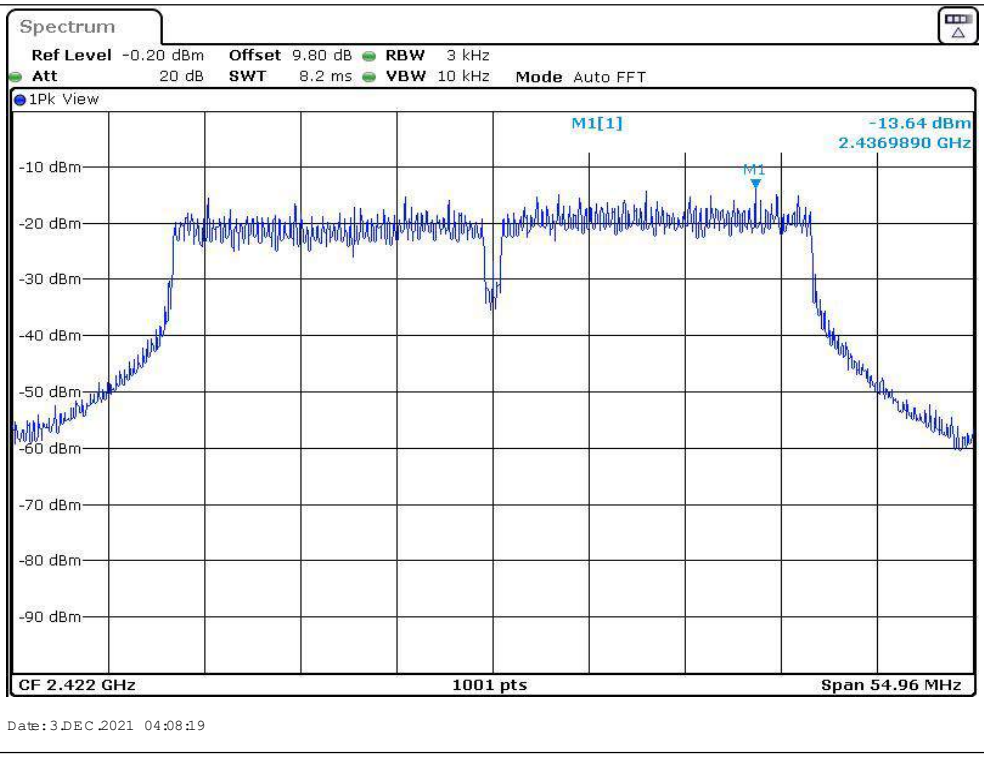
Ant2

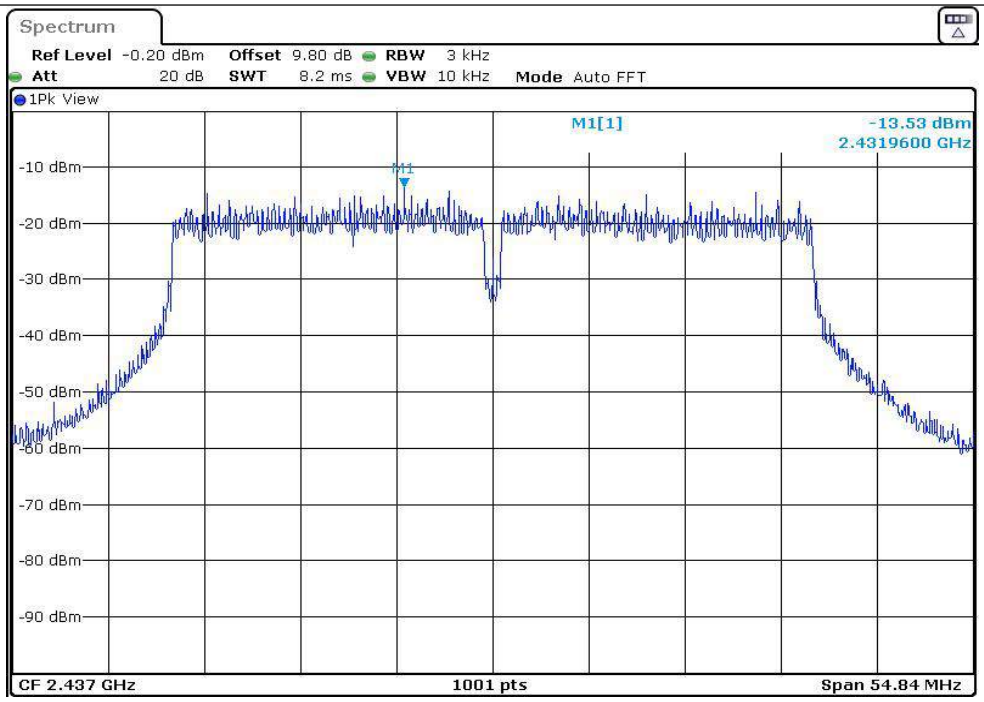
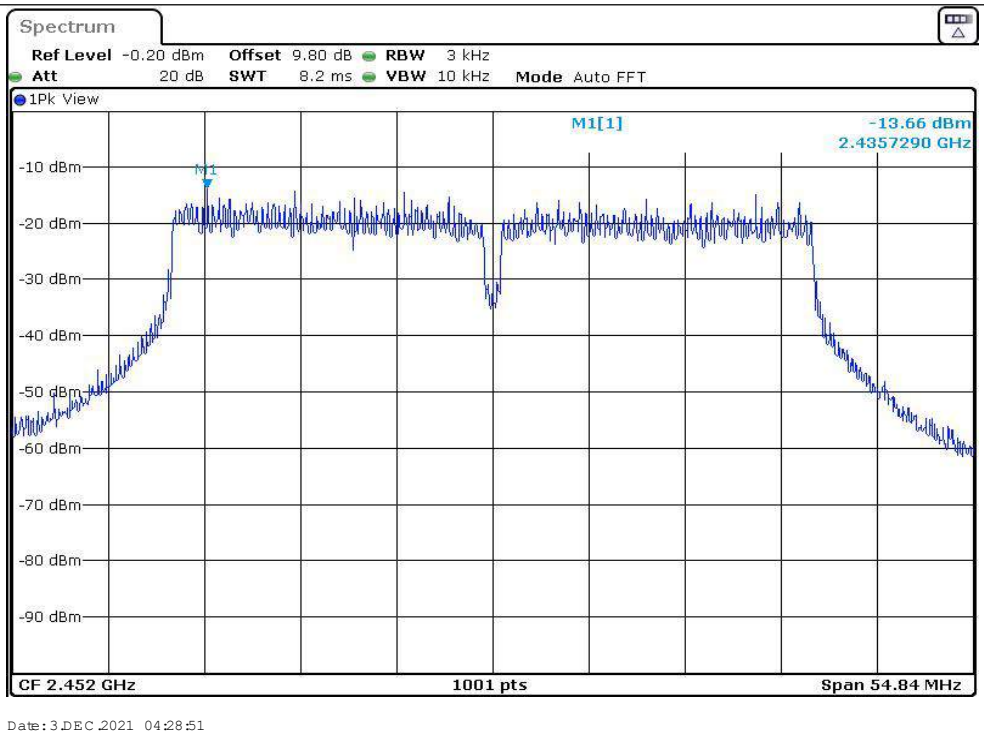
Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

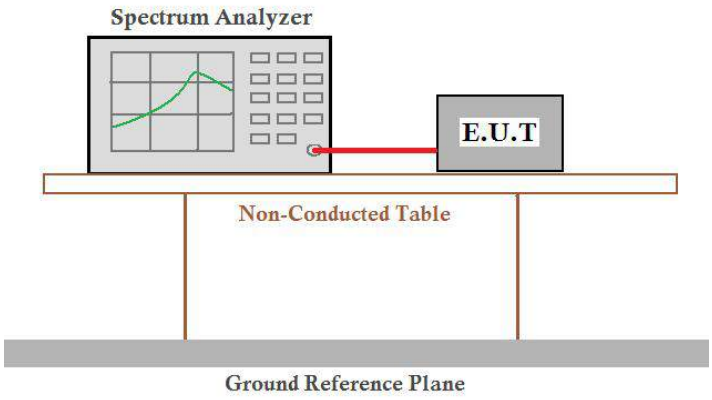
11G/MCH	
11G/HCH	

11N20SISO/LCH	
11N20SISO/MCH	

11N20SISO/HCH	
11N40SISO/LCH	

11N40SISO/MCH	
11N40SISO/HCH	

5.6 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
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). Only the worst case is recorded in the report.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass

Test Data:

Ant1

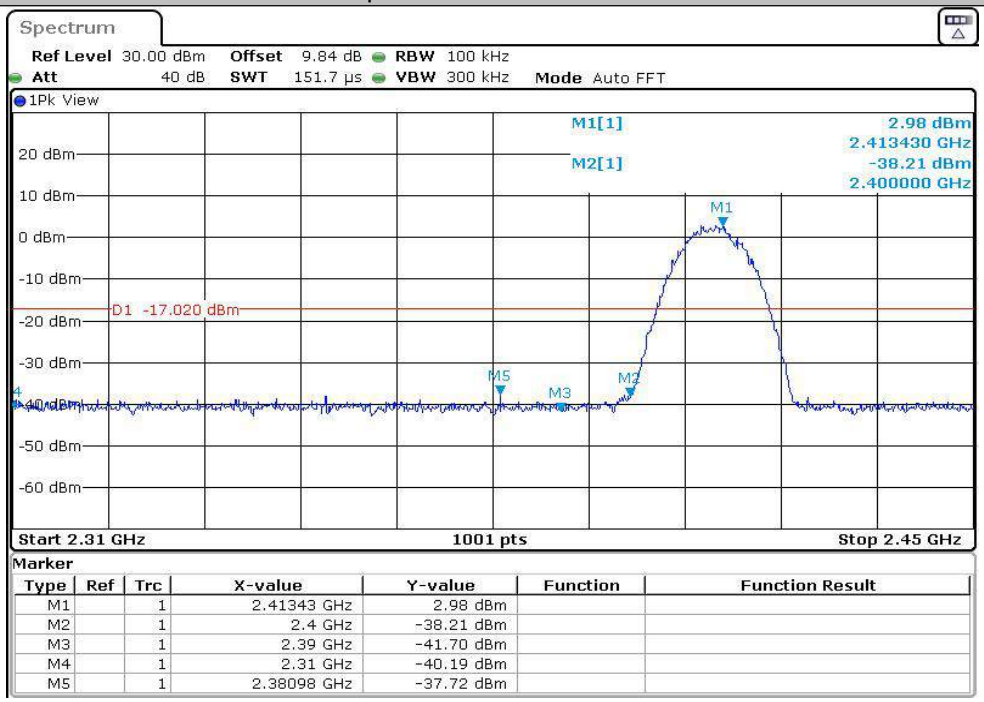
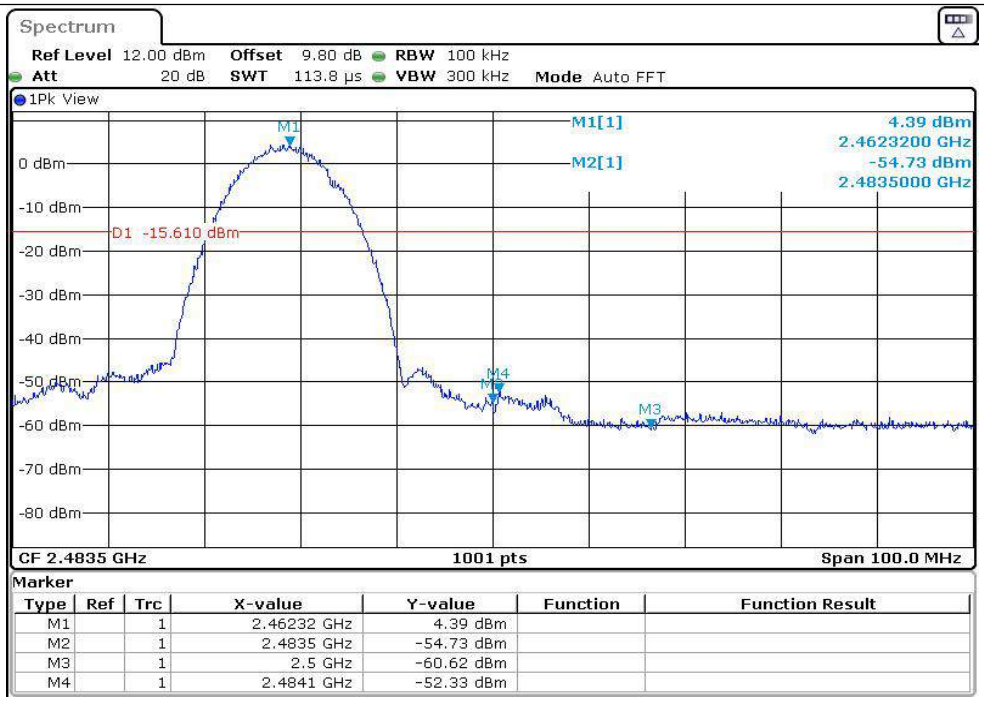
Test mode: 802.11b				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-38.210	-17.02	Pass
Highest	2483.5	-54.730	-15.61	Pass
Test mode: 802.11g				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-30.850	-18.58	Pass
Highest	2483.5	-49.060	-18.5	Pass
Test mode: 802.11n(HT20)				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-30.180	-18.54	Pass
Highest	2483.5	-31.170	-18.1	Pass
Test mode: 802.11n(HT40)				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-30.930	-20.37	Pass
Highest	2483.5	-44.680	-19.6	Pass

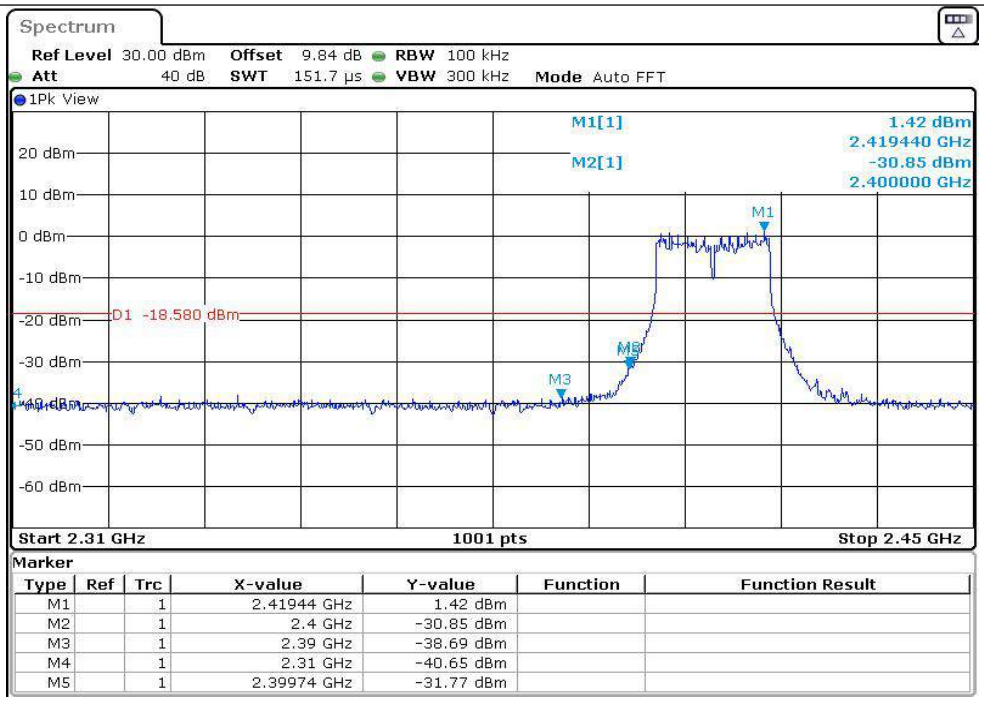
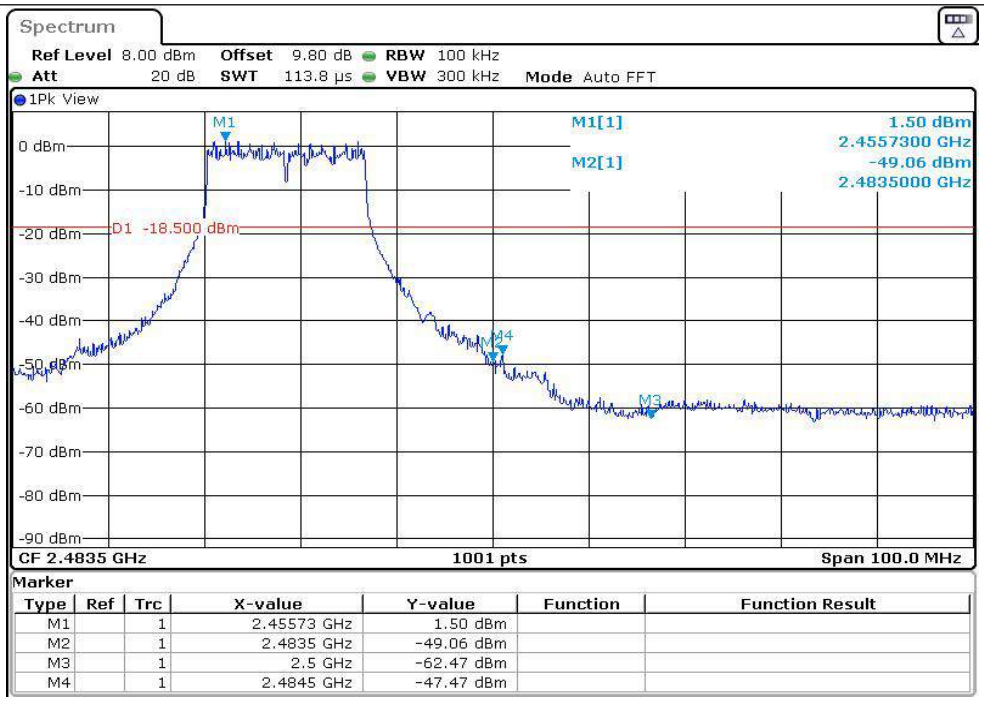
Ant2

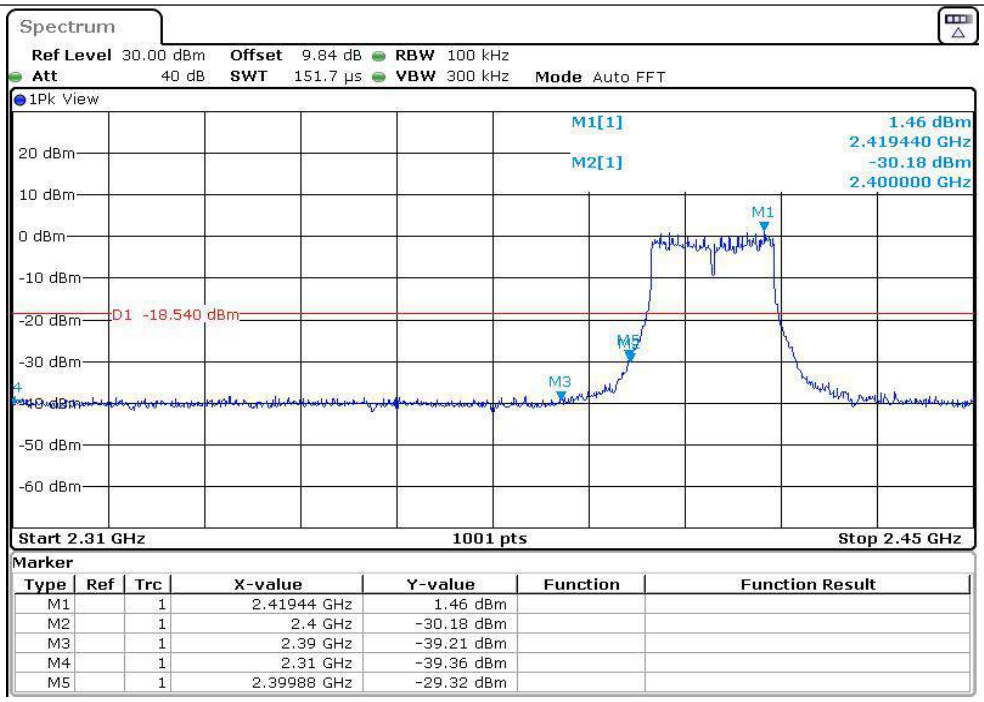
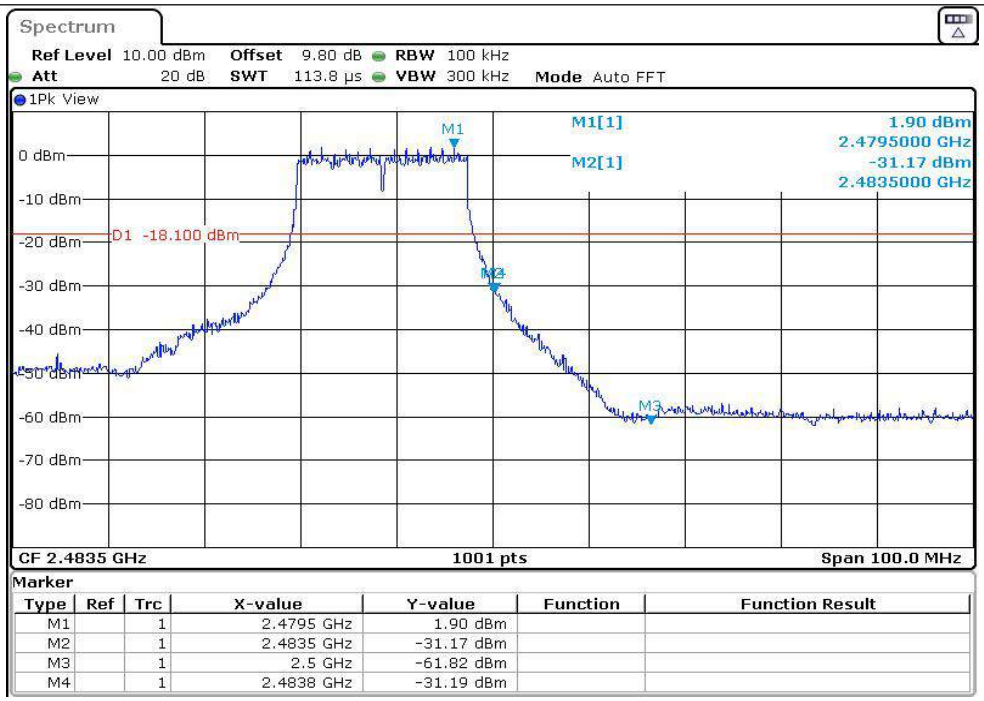
Test mode: 802.11b				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-38.860	-16.95	Pass
Highest	2483.5	-60.830	-16.44	Pass
Test mode: 802.11g				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-28.800	-15.83	Pass
Highest	2483.5	-46.460	-16.44	Pass
Test mode: 802.11n(HT20)				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-30.530	-18.78	Pass
Highest	2483.5	-51.670	-18.76	Pass
Test mode: 802.11n(HT40)				
Test channel	Frequency(MHz)	Emission Level(dBm)	Limit(dBm)	Result
Lowest	2400	-32.010	-20.72	Pass
Highest	2483.5	-49.780	-20.52	Pass

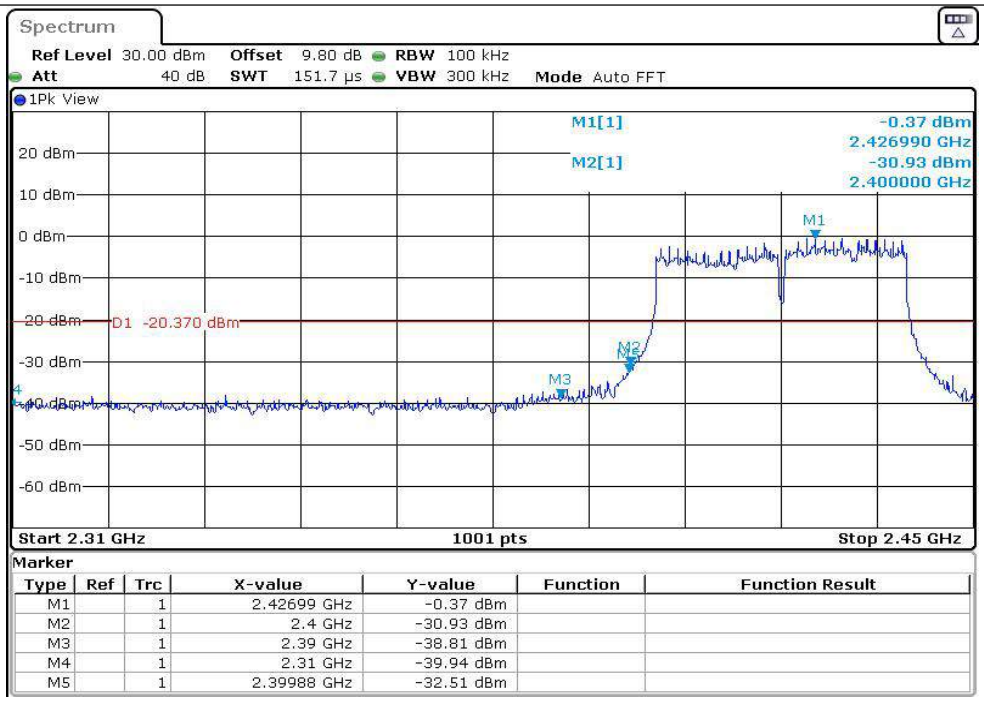
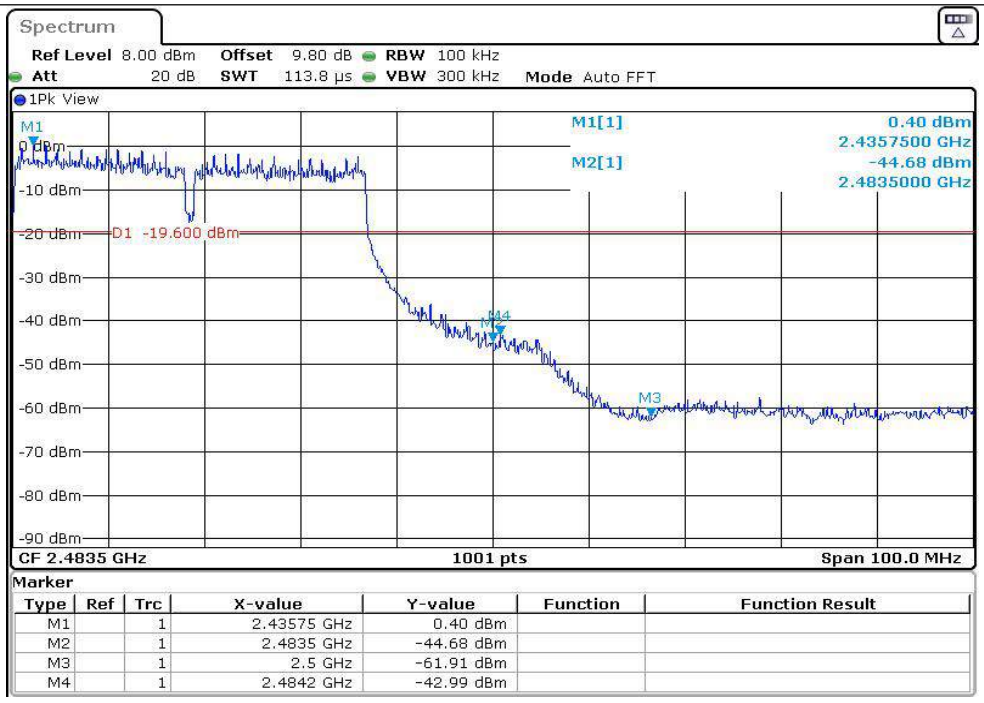
Test plot as follows:

Ant1

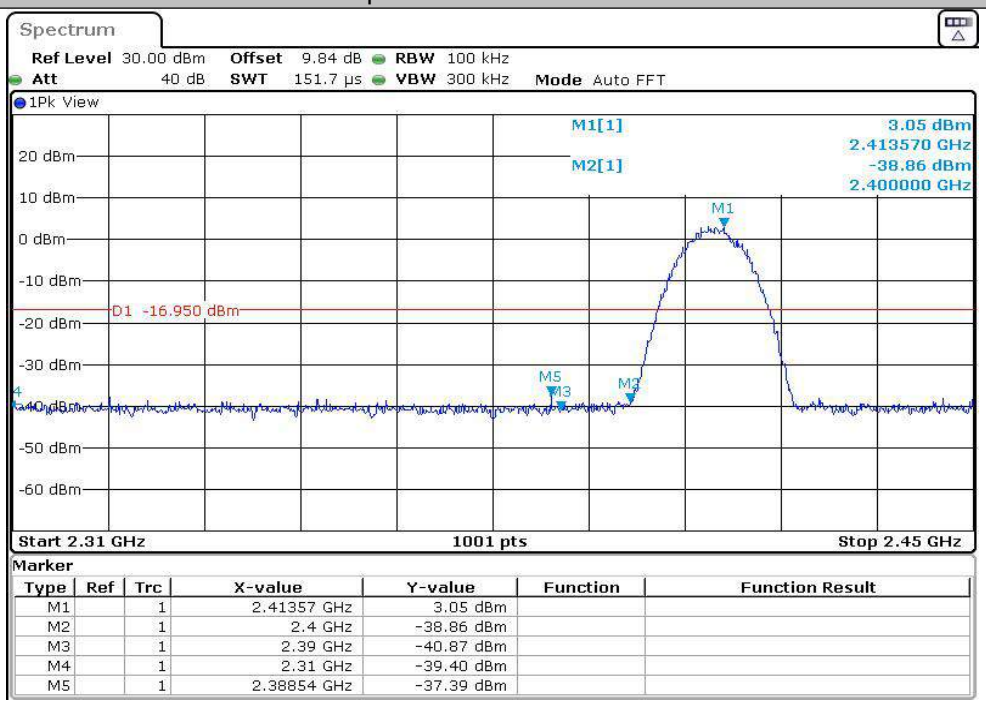
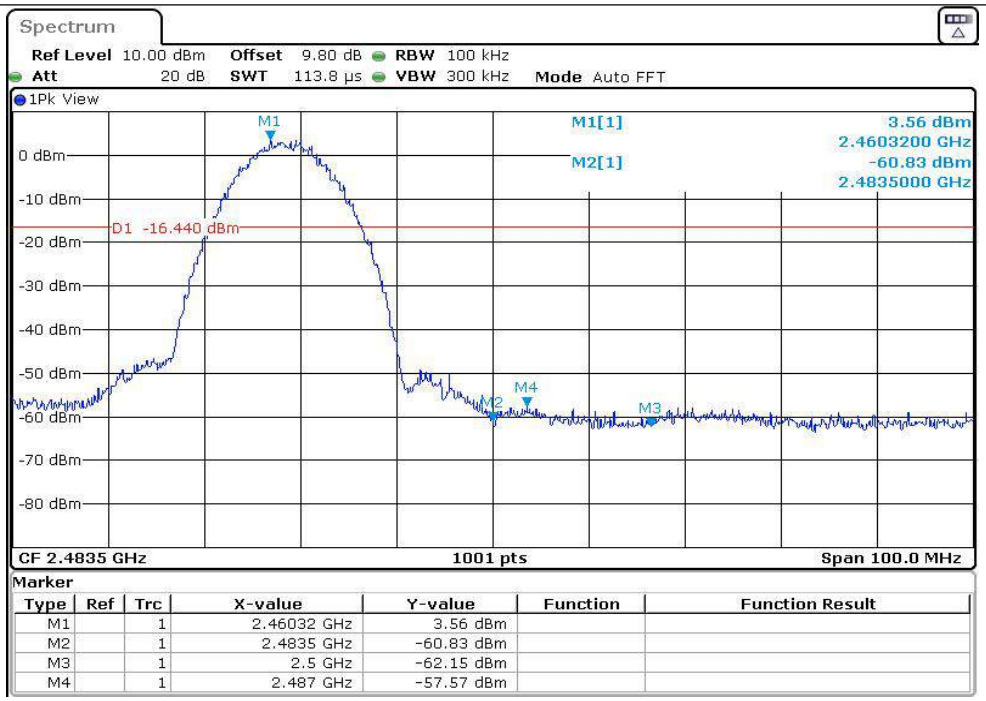
Graphs	
11B/LCH	
11B/HCH	

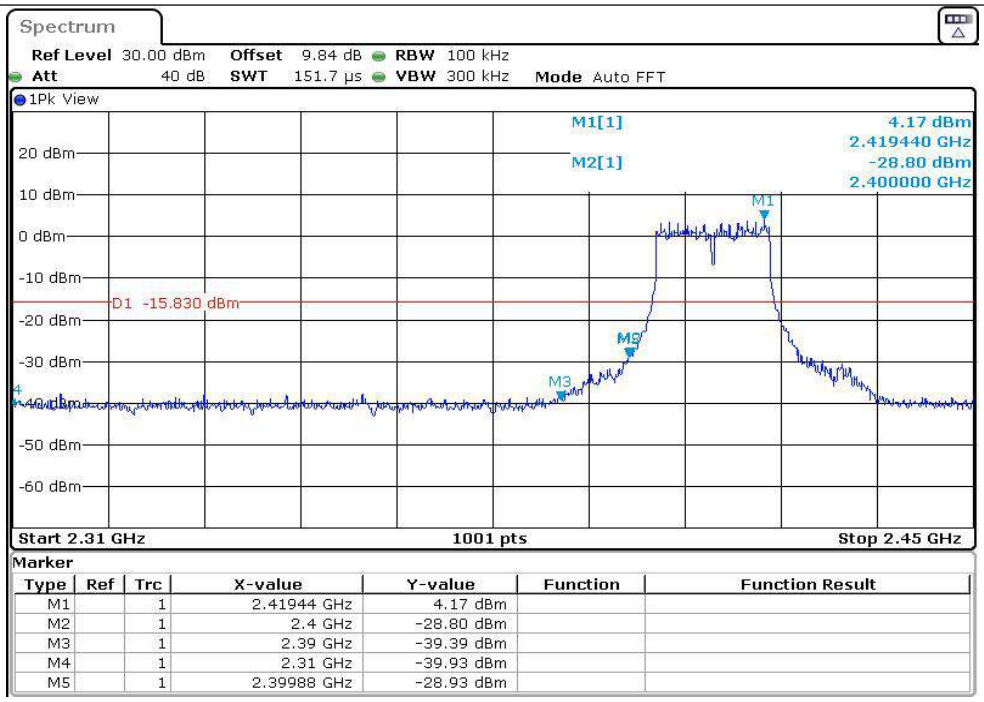
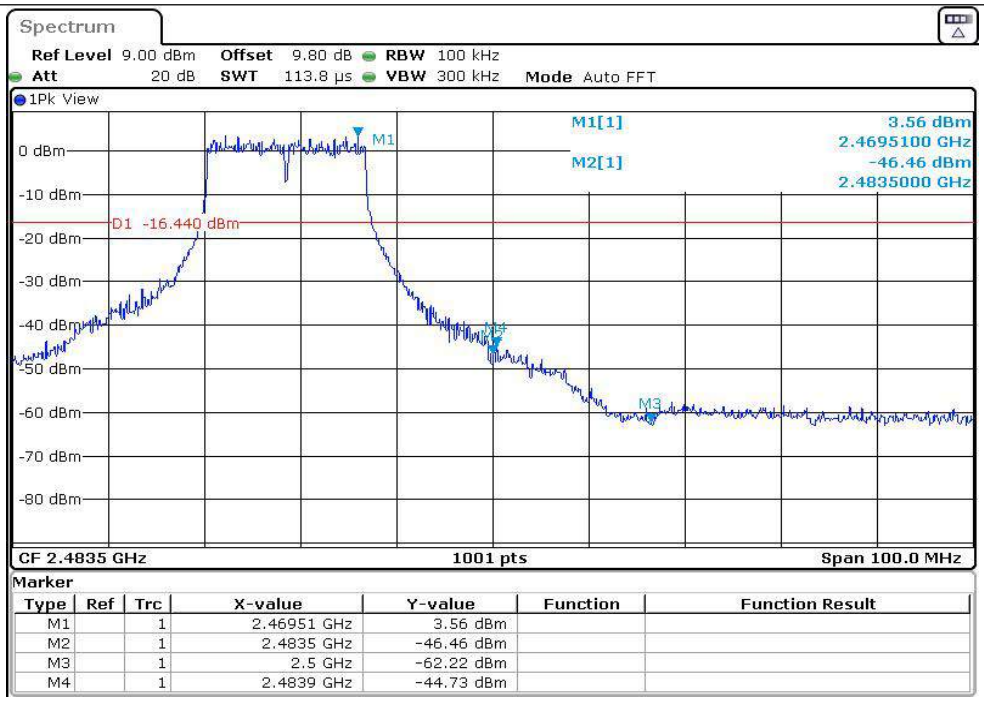
11G/LCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.41944 GHz 1.42 dBm M2 1 2.4 GHz -30.85 dBm M3 1 2.39 GHz -38.69 dBm M4 1 2.31 GHz -40.65 dBm M5 1 2.39974 GHz -31.77 dBm Date: 2.DEC.2021 10:21:01
11G/HCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.45573 GHz 1.50 dBm M2 1 2.4835 GHz -49.06 dBm M3 1 2.5 GHz -62.47 dBm M4 1 2.4845 GHz -47.47 dBm Date: 2.DEC.2021 11:13:12

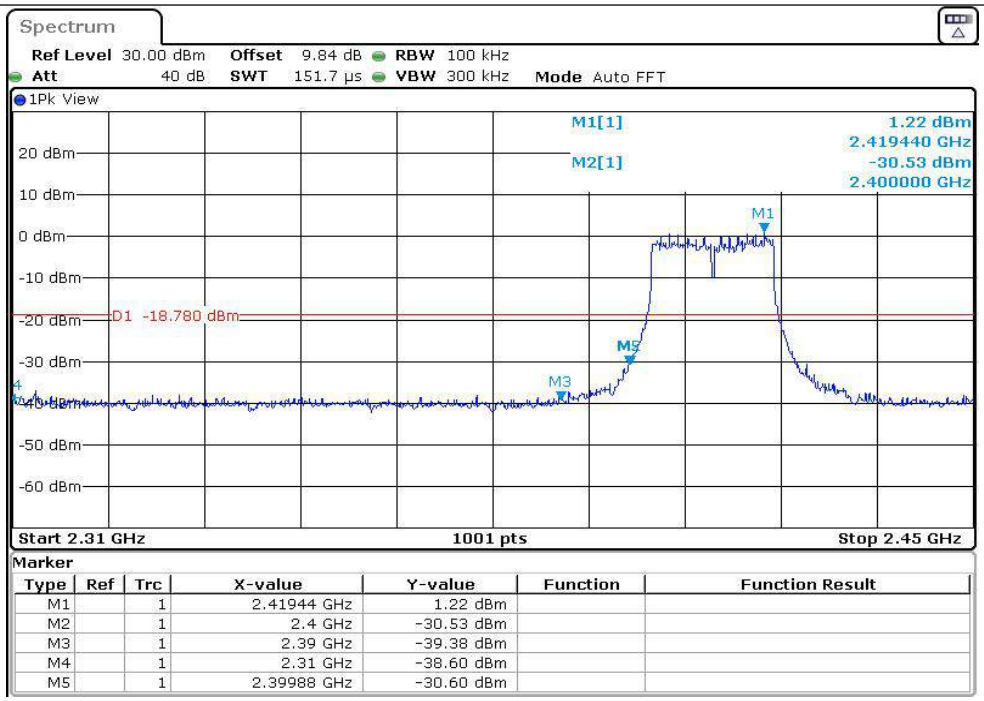
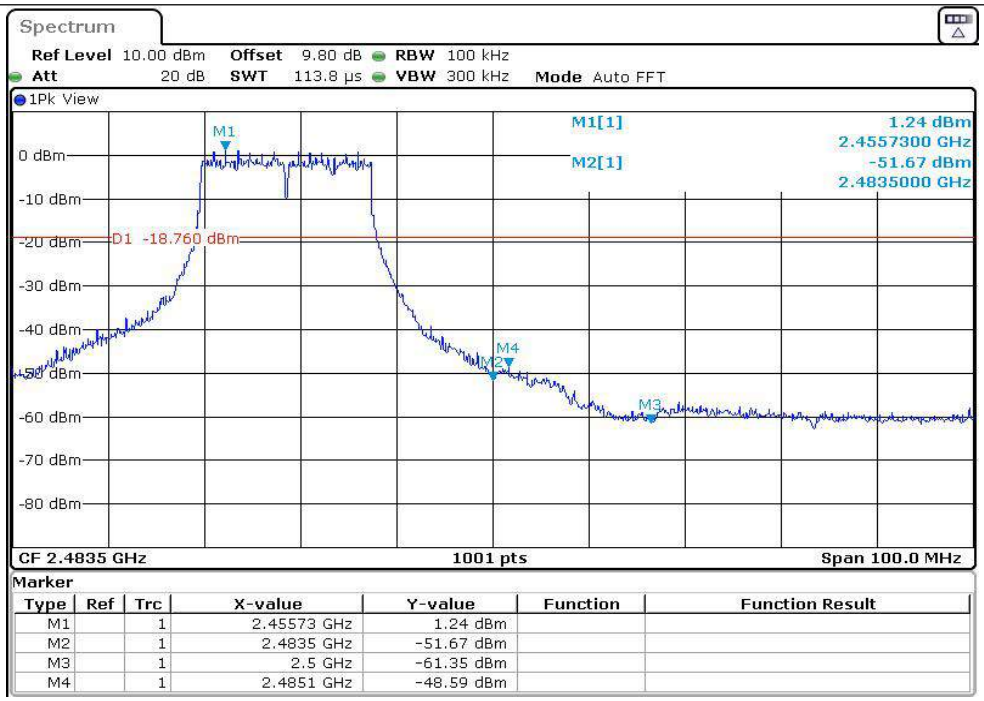
11N20SISO/LCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.41944 GHz 1.46 dBm M2 1 2.4 GHz -30.18 dBm M3 1 2.39 GHz -39.21 dBm M4 1 2.31 GHz -39.36 dBm M5 1 2.39988 GHz -29.32 dBm Date: 2.DEC.2021 11:25:08
11N20SISO/HCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.4795 GHz 1.90 dBm M2 1 2.4835 GHz -31.17 dBm M3 1 2.5 GHz -61.82 dBm M4 1 2.4838 GHz -31.19 dBm Date: 3.DEC.2021 09:02:35

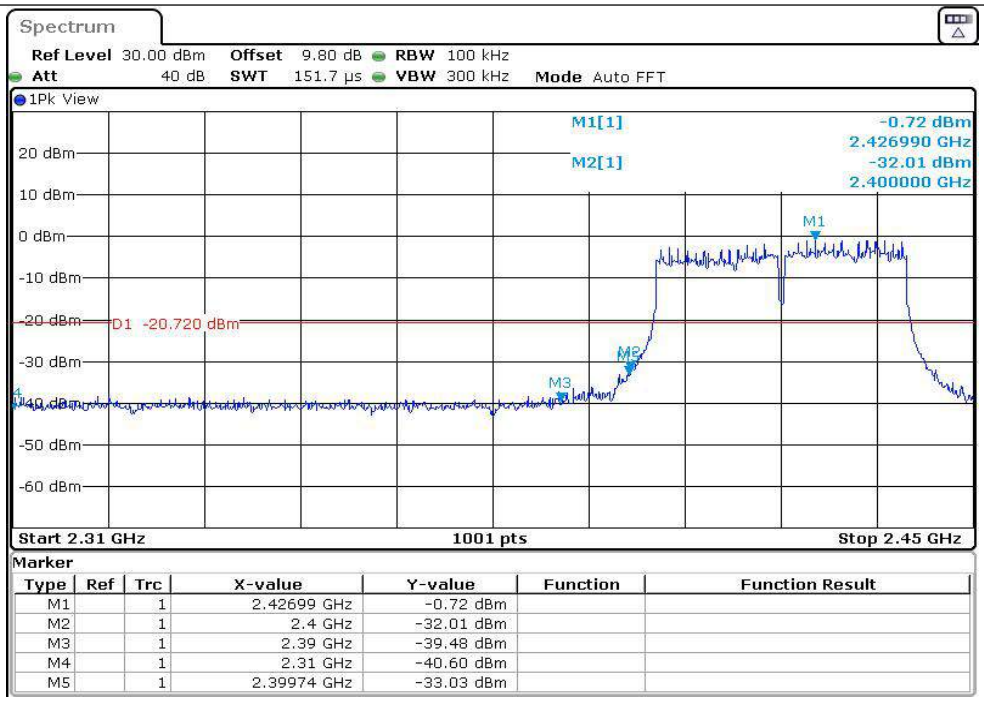
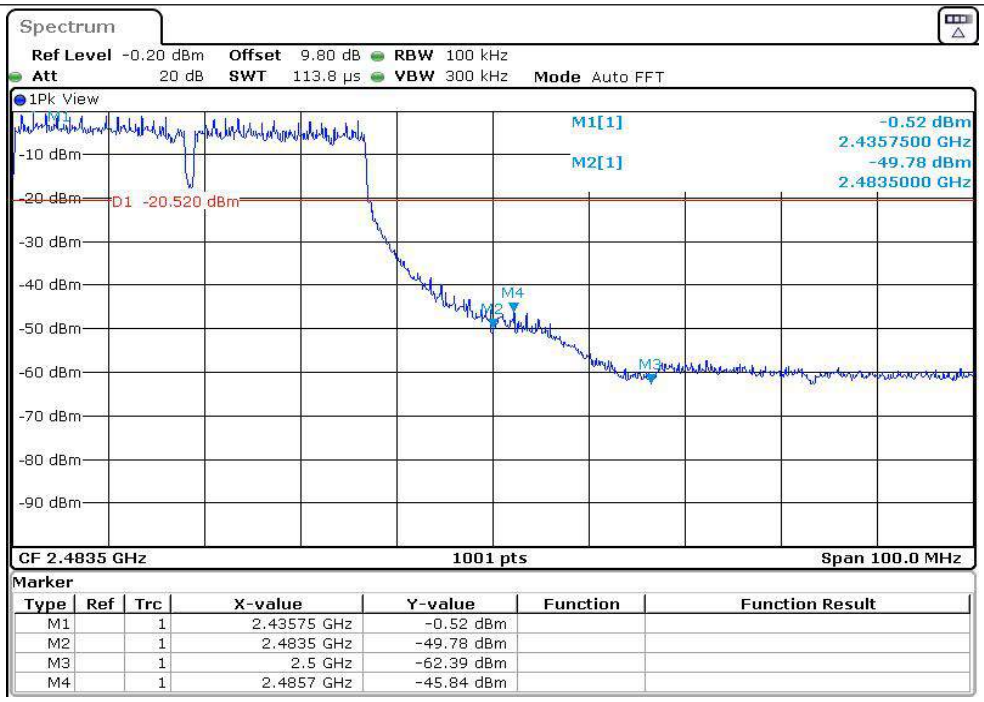
11N40SISO/LCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.42699 GHz -0.37 dBm M2 1 2.4 GHz -30.93 dBm M3 1 2.39 GHz -38.81 dBm M4 1 2.31 GHz -39.94 dBm M5 1 2.39988 GHz -32.51 dBm Date: 2.DEC.2021 11:53:02
11N40SISO/HCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.43575 GHz 0.40 dBm M2 1 2.4835 GHz -44.68 dBm M3 1 2.5 GHz -61.91 dBm M4 1 2.4842 GHz -42.99 dBm Date: 2.DEC.2021 12:07:43

Ant2

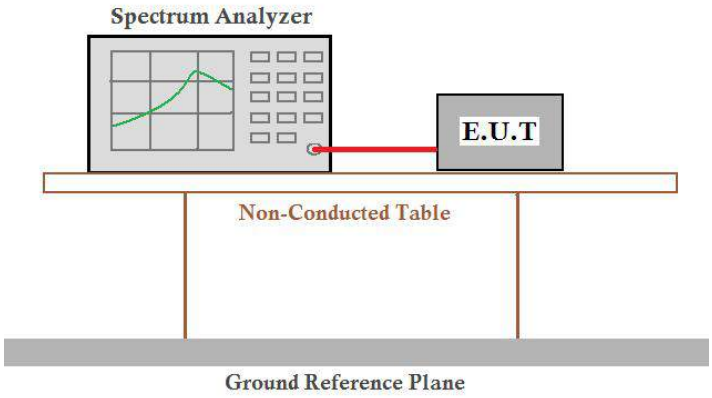
Graphs	
11B/LCH	
11B/HCH	

11G/LCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.41944 GHz 4.17 dBm M2 1 2.4 GHz -28.80 dBm M3 1 2.39 GHz -39.39 dBm M4 1 2.31 GHz -39.93 dBm M5 1 2.39988 GHz -28.93 dBm Date: 3.DEC.2021 02:33:29
11G/HCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.46951 GHz 3.56 dBm M2 1 2.4835 GHz -46.46 dBm M3 1 2.5 GHz -62.22 dBm M4 1 2.4839 GHz -44.73 dBm Date: 3.DEC.2021 02:48:53

11N20SISO/LCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.41944 GHz 1.22 dBm M2 1 2.4 GHz -30.53 dBm M3 1 2.39 GHz -39.38 dBm M4 1 2.31 GHz -38.60 dBm M5 1 2.39988 GHz -30.60 dBm Date: 3.DEC.2021 03:15:45
11N20SISO/HCH	 Marker Type Ref Trc X-value Y-value Function Function Result M1 1 2.45573 GHz 1.24 dBm M2 1 2.4835 GHz -51.67 dBm M3 1 2.5 GHz -61.35 dBm M4 1 2.4851 GHz -48.59 dBm Date: 3.DEC.2021 04:02:34

11N40SISO/LCH	 Marker Type | Ref | Trc | X-value | Y-value | Function | Function Result M1 | | 1 | 2.42699 GHz | -0.72 dBm M2 | | 1 | 2.4 GHz | -32.01 dBm M3 | | 1 | 2.39 GHz | -39.48 dBm M4 | | 1 | 2.31 GHz | -40.60 dBm M5 | | 1 | 2.39974 GHz | -33.03 dBm
11N40SISO/HCH	 Marker Type | Ref | Trc | X-value | Y-value | Function | Function Result M1 | | 1 | 2.43575 GHz | -0.52 dBm M2 | | 1 | 2.4835 GHz | -49.78 dBm M3 | | 1 | 2.5 GHz | -62.39 dBm M4 | | 1 | 2.4857 GHz | -45.84 dBm

5.7 RF Conducted Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
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). Only the worst case is recorded in the report.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test Results:	Pass