TEST REPORT

Applicant Name :	Shenzhen Junge Yunchuang Technology Co., Ltd.
Address :	1204, Unit 3, Building C, Fu Gui Yuan, Fu Gui Road, Fu Hua Community, Xixiang Street, Baoan District, Shenzhen, China
Report Number :	RA230426-22439E-RF-00B
FCC ID:	2A3FP-P14

Test Standard (s)

FCC PART 15.247

Sample Description

Product Type:	Projector
Model No.:	H507
Multiple Model(s) No.:	H508, H509, H510, H511, H512, Leisure 35U, Leisure 35UW
Trade Mark:	N/A
Date Received:	2023/04/26
Report Date:	2023/06/12

Test Result:	Pass*

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

Prepared and Checked By:

Amanda Wei

EMC Engineer

Approved By:

Candy Li

EMC Engineer

Note: This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "★".

Shenzhen Accurate Technology Co., Ltd. is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with an asterisk '*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RA230426-22439E-RF-00B	Original Report	2023-06-12

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Projector
Tested Model	H507
Multiple Model(s)	H508, H509, H510, H511, H512, Leisure 35U, Leisure 35UW (model difference see product declaration letter of similarity)
Frequency Range	2.4G Wi-Fi: 2412-2462MHz
Maximum Conducted Peak Output Power	Wi-Fi: 802.11b: 13.84dBm, 802.11g: 12.51dBm, 802.11n-HT20: 14.39dBm, 802.11n-HT40: 12.94dBm
Modulation Technique	Wi-Fi: DSSS, OFDM
Antenna Specification*	4.7dBi (provided by the applicant)
Voltage Range	DC 26V from adapter
Sample serial number	255X_1for Conducted and Radiated Emissions Test 255X_2for RF Conducted Test (Assigned by ATC)
Sample/EUT Status	Good condition
Adapter information	Model: JDA2602700 Input: AC 100-240V, 50/60Hz, 1.5A MAX Output: DC26.0V, 2.70A

Objective

This test report is in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commission's rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

And KDB 558074 D01 15.247 Meas Guidance v05r02.

All emissions measurement was performed at Shenzhen Accurate Technology Co., Ltd. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		5%
RF Frequency		$0.082*10^{-7}$
RF output power, conducted		0.71dB
Unwanted Emission, conducted		1.6dB
AC Power Lines Conducted Emissions	9k-30MHz	2.74dB, k=2
Emissions, Radiated	9kHz - 30MHz	2.06dB
	30MHz - 1GHz	5.08dB
	1GHz - 18GHz	4.96dB
	18GHz - 26.5GHz	5.16dB
	26.5GHz - 40GHz	4.64dB
Temperature		1℃
Humidity		6%
Supply voltages		0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 708358, the FCC Designation No.: CN1189. Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 429 7.01.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0016. The Registration Number is 30241.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For Wi-Fi mode, total 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	8	2447
2	2417	9	2452
3	2422	10	2457
4	2427	11	2462
5	2432	/	/
6	2437	/	/
7	2442	/	/

802.11 b&802.11g&802.11n-HT20 mode was tested with Channel 1, 6 and 11.
802.11n-HT40 mode was tested with Channel 3, 6 and 9.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

"Win7_MP_Kit_RTL11n_8723FU_USB_v0.39"* software was used to test and power level as below:

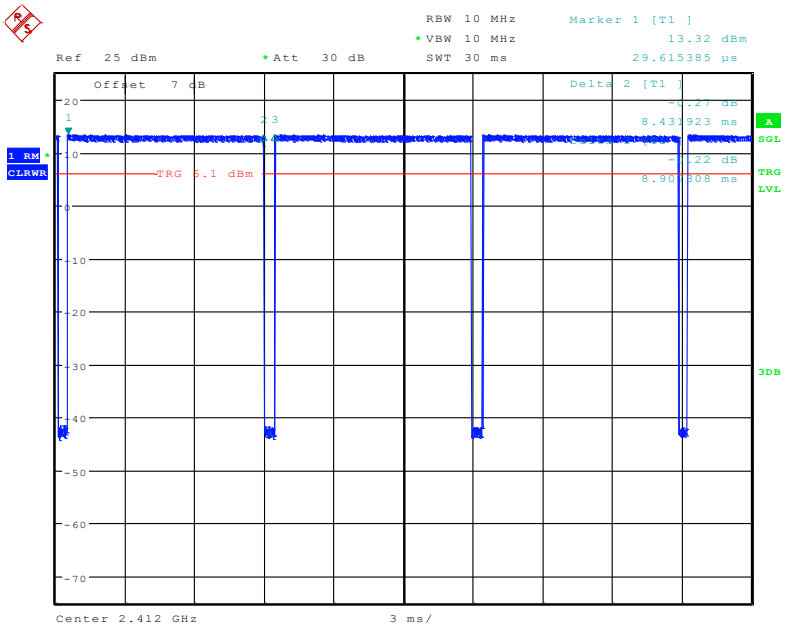
Mode	Data rate	Power Level*		
		Low Channel	Middle Channel	High Channel
802.11b	1Mbps	64	64	64
802.11g	6Mbps	64	64	64
802.11n-HT20	MCS0	64	64	64
802.11n-HT40	MCS0	64	64	64

The software and power level was provided by applicant.

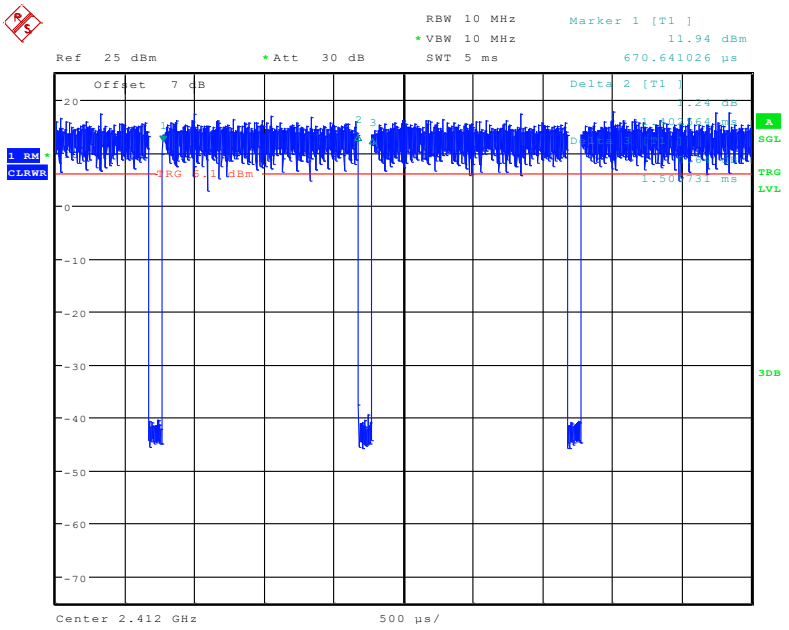
Duty cycle

Mode	Ton (ms)	Ton+off (ms)	Duty Cycle (%)	Duty Cycle Factor(dB)	1/T (kHz)
802.11b	8.432	8.907	94.67	0.24	0.12
802.11g	1.403	1.507	93.10	0.31	0.71
802.11n-HT20	1.306	1.723	75.80	1.20	0.77
802.11n-HT40	0.648	0.821	78.93	1.03	1.54

802.11b mode:



802.11g mode:



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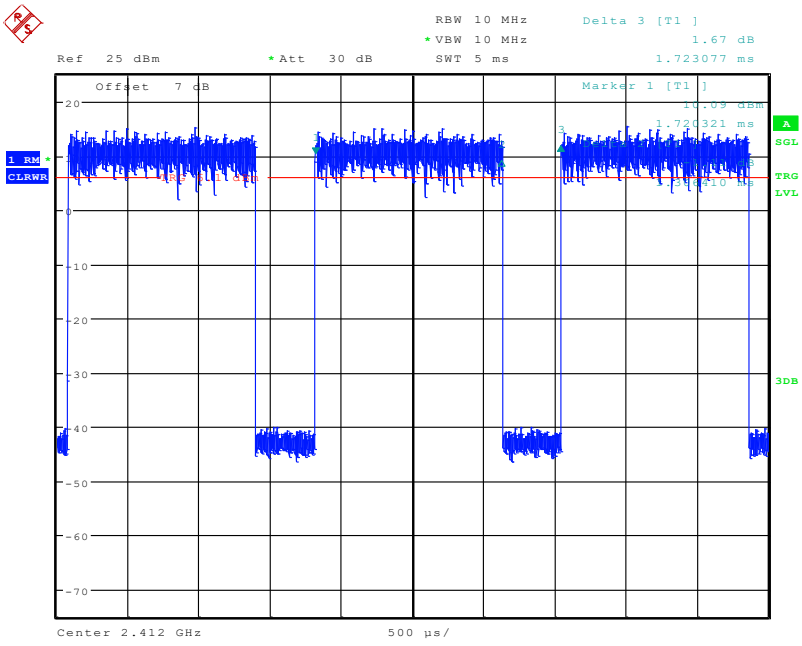
802.11n-HT20 mode:



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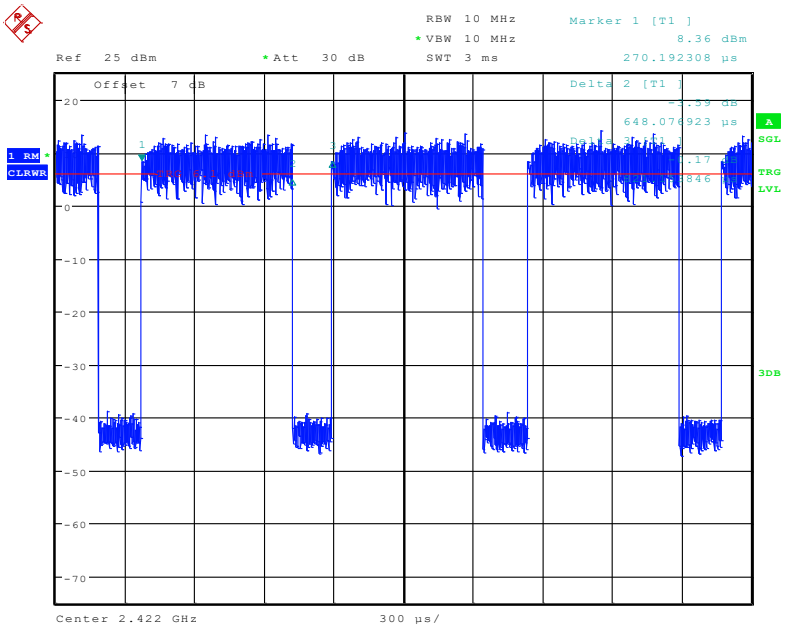
802.11n-HT40 mode:



Date: 12.JUN.2023 12:12:08

Support Equipment List and Details

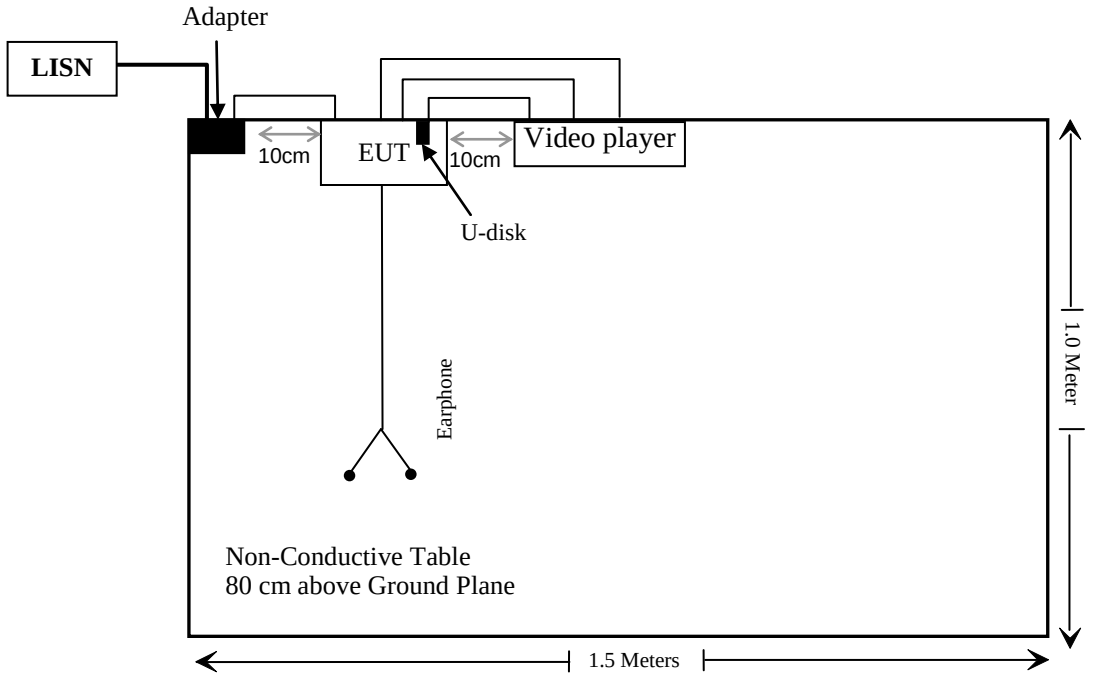
Manufacturer	Description	Model	Serial Number
GIEC	Video player	BDP-G4350	BD4350KXM21041500732
N/A	U-disk	N/A	N/A
N/A	Earphone	N/A	N/A

External I/O Cable

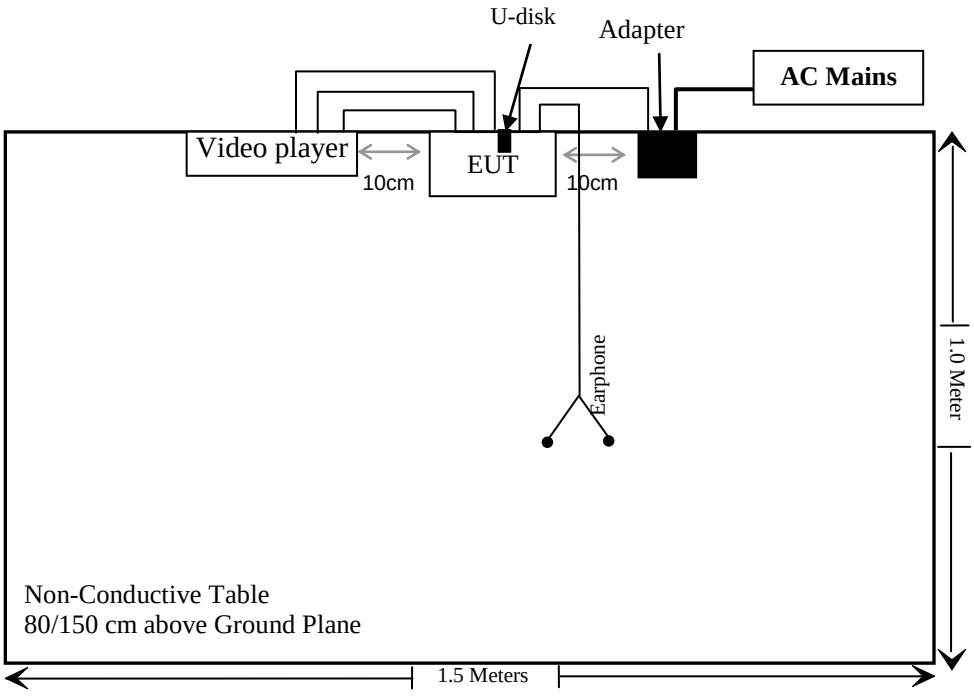
Cable Description	Length (m)	From Port	To
Un-shielded detachable AC cable	1.2	LISN/ AC Mains	Adapter
Un-shielded Un-detachable DC cable	1.2	Adapter	EUT
Shielded detachable HDMI cable	1.5	EUT	Video player
Shielded detachable HDMI cable	1.5	EUT	Video player
Un-shielded detachable AV cable	1.0	EUT	Video player

Block Diagram of Test Setup

For conducted emission



For Radiated Emissions:



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (i) & §1.1307 (b) (3) & §2.1091	MPE-BASED EXEMPTION	Compliant
§15.203	Antenna Requirement	Compliant
§15.207 (a)	AC Line Conducted Emissions	Compliant
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliant
§15.247 (a)(2)	6 dB Emission Bandwidth & Occupied Bandwidth	Compliant
§15.247(b)(3)	Maximum Conducted Output Power	Compliant
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(e)	Power Spectral Density	Compliant

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted Emissions Test					
Rohde& Schwarz	EMI Test Receiver	ESCI	100784	2022/11/25	2023/11/24
Rohde & Schwarz	L.I.S.N.	ENV216	101314	2022/11/25	2023/11/24
Anritsu Corp	50 Coaxial Switch	MP59B	6100237248	2022/12/07	2023/12/06
Unknown	RF Coaxial Cable	No.17	N0350	2022/11/25	2023/11/24
Conducted Emission Test Software: e3 191218 (V9)					
Radiated Emissions Test					
Rohde& Schwarz	Test Receiver	ESR	102725	2022/11/25	2023/11/24
Rohde&Schwarz	Spectrum Analyzer	FSV40	101949	2022/11/25	2023/11/24
SONOMA INSTRUMENT	Amplifier	310 N	186131	2022/11/08	2023/11/07
A.H. Systems, inc.	Preamplifier	PAM-0118P	135	2022/11/08	2023/11/07
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2022/11/08	2023/11/07
Schwarzbeck	Bilog Antenna	VULB9163	9163-323	2021/07/06	2024/07/05
Schwarzbeck	Horn Antenna	BBHA9120D	837	2023/02/22	2026/02/21
Schwarzbeck	HORN ANTENNA	BBHA9170	9170-359	2022/12/26	2025/12/25
Radiated Emission Test Software:e3 191218 (V9)					
Unknown	RF Coaxial Cable	No.10	N050	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.11	N1000	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.12	N040	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.13	N300	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.14	N800	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.15	N600	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.16	N650	2022/11/25	2023/11/24
Wainwright	High Pass Filter	WHKX3.6/18G-10SS	5	2022/11/25	2023/11/24
RF Conducted Test					
SPECTRUM ANALYZER	Rohde & Schwarz	FSU26	200982	2022/07/04	2023/07/03
Agilent	Power Sensor	U2021XA	MY5425003	2023/02/25	2024/02/24
HP	6dB Attenuator	8493B 6dB Attenuator	2708A 04769	2022/11/25	2023/11/24
Unknown	RF Coaxial Cable	No.31	RF-01	Each time	

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §15.247 (I) & §1.1307 (B) (3) & §2.1091- MPE-BASED EXEMPTION

Applicable Standard

According to subpart 1.1307 (b) (3) and subpart 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

According to KDB 447498 D04 Interim General RF Exposure Guidance

MPE-Based Exemption:

General frequency and separation-distance dependent MPE-based effective radiated power(ERP) thresholds are in Table B.1 [Table 1 of §1.1307(b)(1)(i)(C)] to support an exemptionfrom further evaluation from 300 kHz through 100 GHz.

Table 1 to § 1.1307(b)(3)(i)(C) - Single RF Sources Subject to Routine Environmental Evaluation

RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	1,920 R^2.
1.34-30	3,450 R^2/f^2.
30-300	3.83 R^2.
300-1,500	0.0128 R^2f.
1,500-100,000	19.2R^2.

Ris the minimum separation distance in meters
f = frequency in MHz

For multiple RF sources: Multiple RF sources are exempt if:

in the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

Result

Mode	Frequency (MHz)	Tune up conducted power	Antenna Gain		ERP		Evaluation Distance (m)	ERP Limit (W)
		(dBm)	(dBi)	(dBd)	(dBm)	(W)		
Bluetooth	2402-2480	3.0	3.24	1.09	4.09	0.003	0.2	0.768
2.4G Wi-Fi	2412-2462	14.5	4.7	2.55	17.05	0.051	0.2	0.768
5G Wi-Fi	5150-5250	10.0	3.6	1.45	11.45	0.014	0.2	0.768
	5725-5850	12.0	3.6	1.45	13.45	0.022	0.2	0.768

Note: 1. The tune up conducted power and antenna gain was declared by the applicant.
2. The BT can transmit at same time with 2.4G Wi-Fi or 5G Wi-Fi
3. 0dBd=2.15dBi

Simultaneous transmitting consideration (worst case):

The ratio=ERP_{BT}/limit+ERP_{Wi-Fi}/limit=0.003/0.768+0.051/0.768=0.070＜1.0, so simultaneous exposure is compliant.

To maintain compliance with the FCC's RF exposure guidelines, place the equipment at least 20cm from nearby persons.

Result: Compliant.

FCC §15.203 - ANTENNA REQUIREMENT

Applicable Standard

According to §15.203, 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 shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:

a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.

Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Antenna Connector Construction

The EUT has an internal antenna arrangement, which was permanently attached and the antenna gain is 4.7dBi, fulfill the requirement of this section. Please refer to the EUT photos.

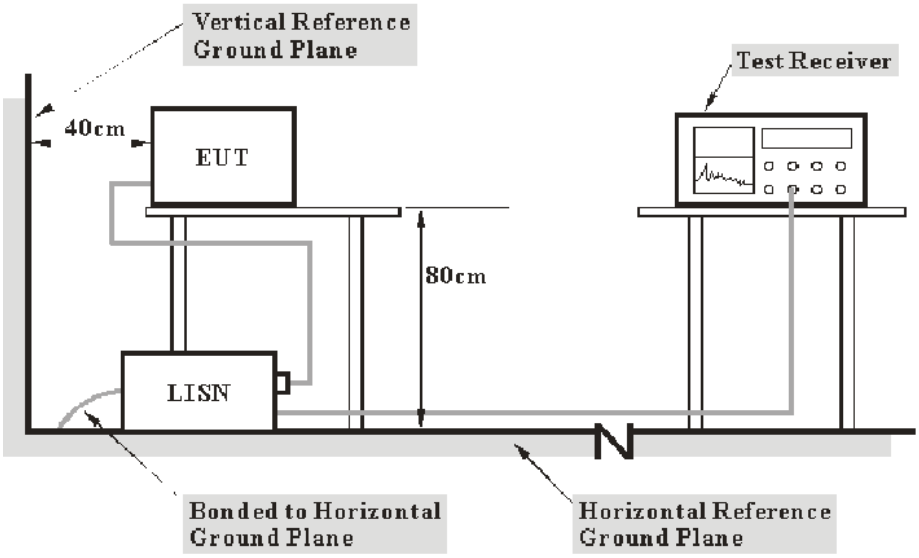
Result: Compliance.

FCC §15.207 (a) – AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits.

The spacing between the peripherals was 10 cm.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

Test Procedure

During the conducted emission test, the device was connected to the outlet of the LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All final data was recorded in the Quasi-peak and average detection mode.

Factor & Over Limit Calculation

The factor is calculated by adding LISN VDF (Voltage Division Factor) and Cable Loss. The basic equation is as follows:

Factor = LISN VDF + Cable Loss

The "**Over Limit**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a over limit of -7 dB means the emission is 7 dB below the limit. The equation for margin calculation is as follows:

Over Limit = level – Limit
Level= reading level+ Factor

Test Data

Environmental Conditions

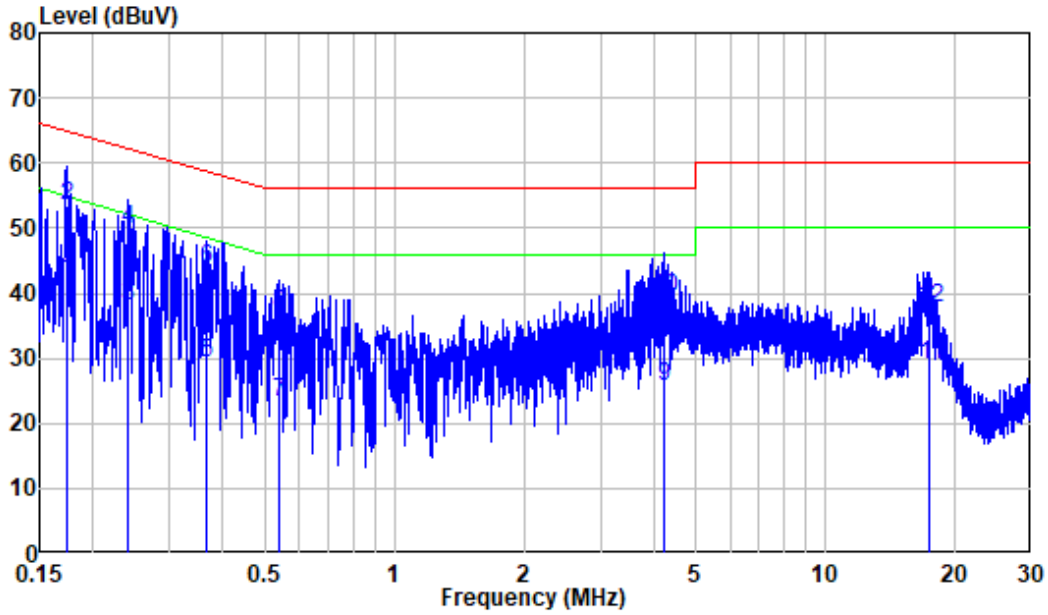
Temperature:	23 ℃
Relative Humidity:	49 %
ATM Pressure:	101 kPa

The testing was performed by Jerry Wu on 2023-05-25.

EUT operation mode: Transmitting

Wi-Fi: (Worst case is 802.11b mode, Low Channel)

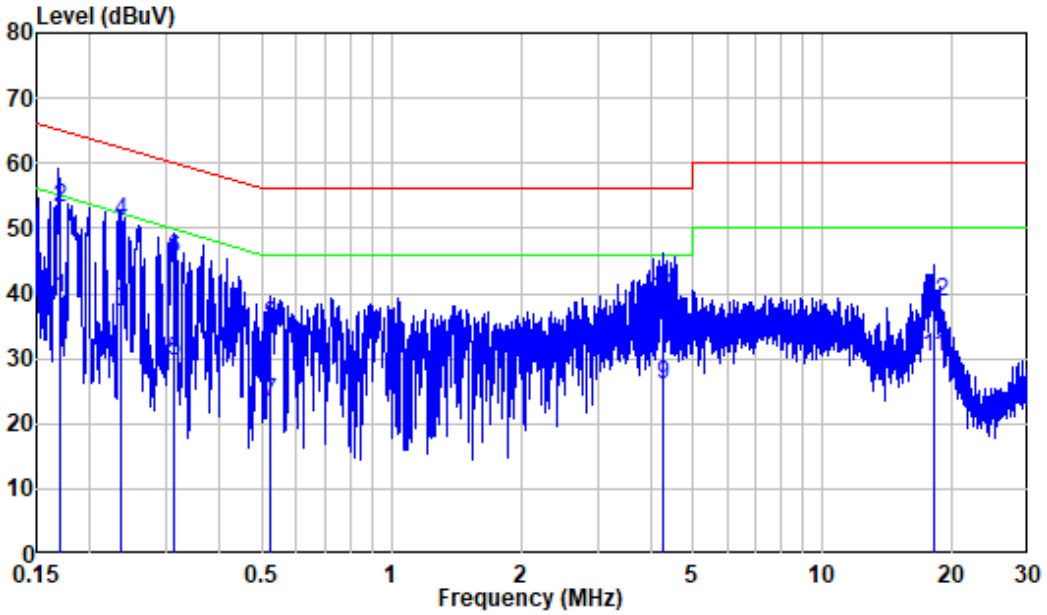
AC 120V/60 Hz, Line



Site : Shielding Room
Condition: Line
Job No. : RA230426-22439E-RF
Mode : 2.4G WIFI Transmitting
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.173	10.33	31.78	42.11	54.80	-12.69	Average
2	0.173	10.33	42.98	53.31	64.80	-11.49	QP
3	0.241	10.34	27.68	38.02	52.07	-14.05	Average
4	0.241	10.34	39.37	49.71	62.07	-12.36	QP
5	0.367	10.46	18.82	29.28	48.57	-19.29	Average
6	0.367	10.46	33.33	43.79	58.57	-14.78	QP
7	0.539	10.59	12.58	23.17	46.00	-22.83	Average
8	0.539	10.59	26.38	36.97	56.00	-19.03	QP
9	4.216	10.54	15.18	25.72	46.00	-20.28	Average
10	4.216	10.54	28.78	39.32	56.00	-16.68	QP
11	17.475	10.25	18.83	29.08	50.00	-20.92	Average
12	17.475	10.25	27.46	37.71	60.00	-22.29	QP

AC 120V/60 Hz, Neutral



Site : Shielding Room
Condition: Neutral
Job No. : RA230426-22439E-RF
Mode : 2.4G WIFI Transmitting
Power : AC 120V 60Hz

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dBuV	dBuV	dBuV	dB	
1	0.170	10.28	29.03	39.31	54.98	-15.67	Average
2	0.170	10.28	42.83	53.11	64.98	-11.87	QP
3	0.235	10.32	26.80	37.12	52.28	-15.16	Average
4	0.235	10.32	40.68	51.00	62.28	-11.28	QP
5	0.311	10.37	19.28	29.65	49.93	-20.28	Average
6	0.311	10.37	35.04	45.41	59.93	-14.52	QP
7	0.523	10.47	12.66	23.13	46.00	-22.87	Average
8	0.523	10.47	24.62	35.09	56.00	-20.91	QP
9	4.252	10.53	15.41	25.94	46.00	-20.06	Average
10	4.252	10.53	28.65	39.18	56.00	-16.82	QP
11	18.123	10.20	20.07	30.27	50.00	-19.73	Average
12	18.123	10.20	28.54	38.74	60.00	-21.26	QP

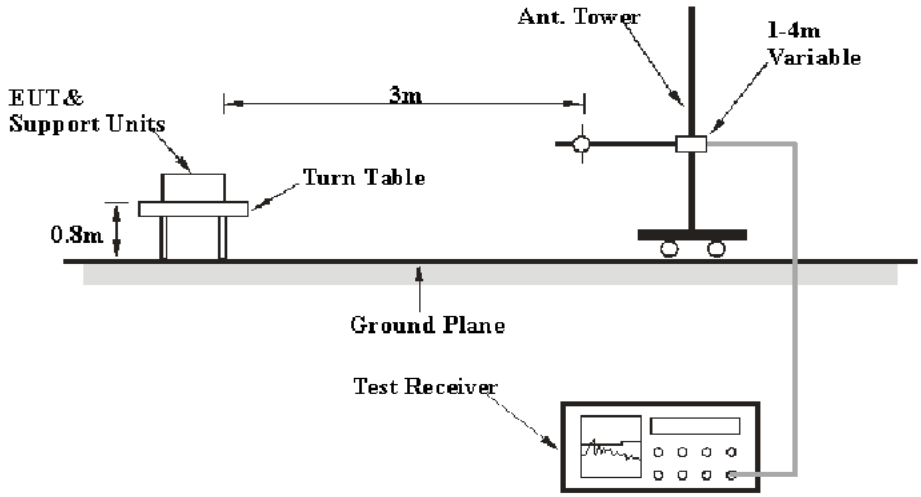
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

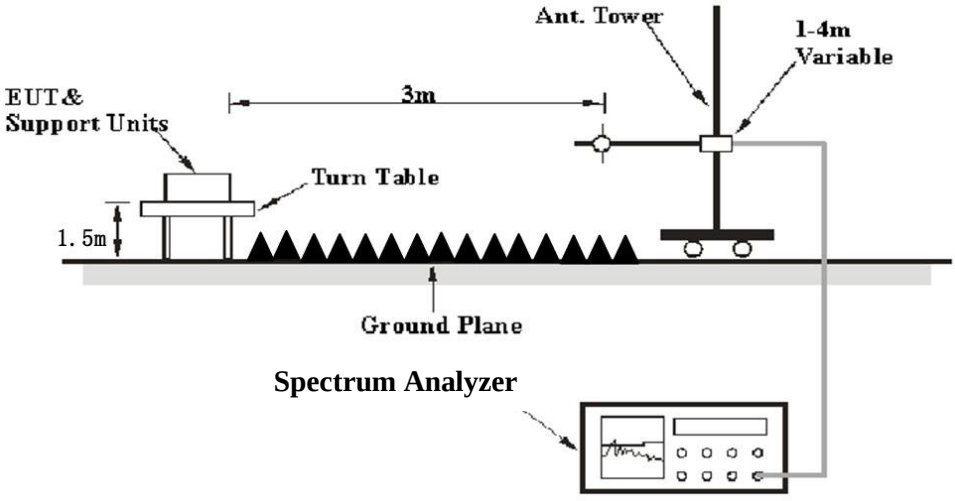
FCC §15.247 (d); §15.209; §15.205;

EUT Setup

Below 1 GHz:



Above 1GHz:



The radiated emission performed in the 3 meters, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, FCC 15.247, RSS-247, RSS-Gen limits.

EMI Test Receiver & Spectrum Analyzer Setup

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	100 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1MHz	3 MHz	/	PK
	1MHz	10 Hz Note 1	/	Average
	1MHz	＞1/T Note 2	/	Average

Note 1: when duty cycle is no less than 98%
Note 2: when duty cycle is less than 98%

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1 GHz, peak and Average detection modes for frequencies above 1 GHz.

Factor & Over Limit/Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Over Limit or Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, an over limit/margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin/Over Limit = Corrected Amplitude/Level-Limit
Corrected Amplitude/Level = Reading + Corrected Factor

Test Data

Environmental Conditions

Temperature:	23~25.5 ℃
Relative Humidity:	50~55%
ATM Pressure:	101 kPa

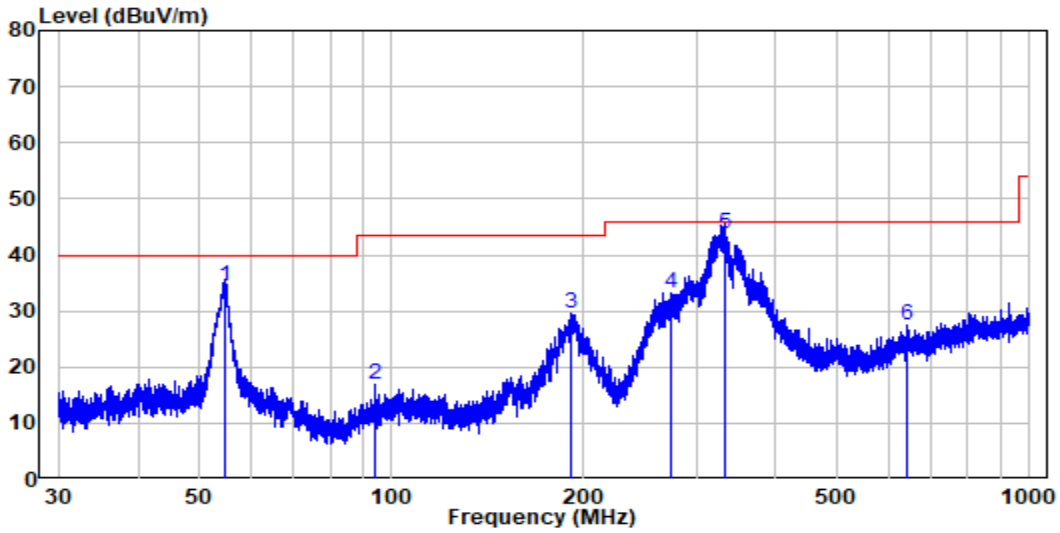
The testing was performed by Jason Liu on 2023-05-26 for below 1GHz and on 2023-05-23 for above 1GHz.

EUT operation mode: Transmitting

30MHz-1GHz: (Worst case is 802.11b mode, low Channel)

Note: When the test result of peak was less than the limit of QP more than 6dB, just peak value were recorded.

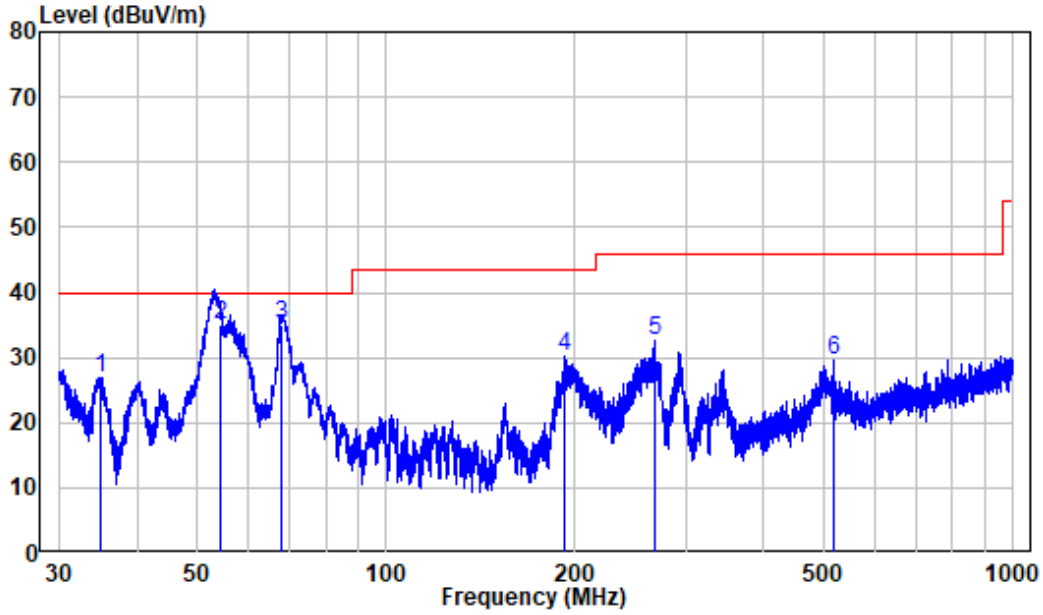
Horizontal



Site : chamber
Condition: 3m HORIZONTAL
Job No. : RA230426-22439E-RF
Test Mode: 2.4G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	54.571	-10.31	44.70	34.39	40.00	-5.61	QP
2	93.892	-12.72	29.74	17.02	43.50	-26.48	Peak
3	191.241	-11.37	41.02	29.65	43.50	-13.85	Peak
4	273.834	-9.98	43.11	33.13	46.00	-12.87	Peak
5	332.810	-7.78	51.40	43.62	46.00	-2.38	QP
6	644.272	-1.88	29.38	27.50	46.00	-18.50	Peak

Vertical



Site : chamber
Condition: 3m VERTICAL
Job No. : RA230426-22439E-RF
Test Mode: 2.4G WIFI Transmitting

	Freq	Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB/m	dBuV	dBuV/m	dBuV/m	dB	
1	34.898	-11.57	38.57	27.00	40.00	-13.00	Peak
2	54.428	-10.32	45.32	35.00	40.00	-5.00	QP
3	68.002	-13.83	48.79	34.96	40.00	-5.04	QP
4	192.082	-11.25	41.34	30.09	43.50	-13.41	Peak
5	268.485	-10.30	42.80	32.50	46.00	-13.50	Peak
6	516.116	-4.28	33.93	29.65	46.00	-16.35	Peak

1-25 GHz:

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11b									
Low Channel(2412MHz)									
2387.57	68.04	PK	293	1	H	-10.62	57.42	74	-16.58
2387.57	53.29	AV	293	1	H	-10.62	42.67	54	-11.33
2385.84	68.16	PK	127	1.5	V	-10.63	57.53	74	-16.47
2385.84	53.41	AV	127	1.5	V	-10.63	42.78	54	-11.22
2390	66.11	PK	165	1.5	H	-10.62	55.49	74	-18.51
2390	52.80	AV	165	1.5	H	-10.62	42.18	54	-11.82
2390	66.23	PK	328	1.1	V	-10.62	55.61	74	-18.39
2390	52.92	AV	328	1.1	V	-10.62	42.30	54	-11.70
4824	61.98	PK	42	2.1	H	-5.55	56.43	74	-17.57
4824	51.16	AV	42	2.1	H	-5.55	45.61	54	-8.39
4824	62.47	PK	115	2	V	-5.55	56.92	74	-17.08
4824	51.74	AV	115	2	V	-5.55	46.19	54	-7.81
Middle Channel(2437MHz)									
4874	60.70	PK	260	2.5	H	-5.29	55.41	74	-18.59
4874	49.59	AV	260	2.5	H	-5.29	44.3	54	-9.70
4874	61.13	PK	359	1.7	V	-5.29	55.84	74	-18.16
4874	50.16	AV	359	1.7	V	-5.29	44.87	54	-9.13
High Channel(2462 MHz)									
2483.5	66.45	PK	317	1.7	H	-10.46	55.99	74	-18.01
2483.5	53.73	AV	317	1.7	H	-10.46	43.27	54	-10.73
2483.5	66.56	PK	64	2	V	-10.46	56.1	74	-17.90
2483.5	53.84	AV	64	2	V	-10.46	43.38	54	-10.62
2484.27	69.27	PK	342	1.9	H	-10.46	58.81	74	-15.19
2484.27	54.31	AV	342	1.9	H	-10.46	43.85	54	-10.15
2485.38	69.37	PK	213	2.1	V	-10.45	58.92	74	-15.08
2485.38	54.41	AV	213	2.1	V	-10.45	43.96	54	-10.04
4924	59.45	PK	320	1.6	H	-5.03	54.42	74	-19.58
4924	48.74	AV	320	1.6	H	-5.03	43.71	54	-10.29
4924	59.86	PK	281	1.9	V	-5.03	54.83	74	-19.17
4924	49.01	AV	281	1.9	V	-5.03	43.98	54	-10.02

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11g									
Low Channel(2412MHz)									
2388.87	72.85	PK	358	2.1	H	-10.62	62.23	74	-11.77
2388.87	55.90	AV	358	2.1	H	-10.62	45.28	54	-8.72
2389.36	73.29	PK	9	1.5	V	-10.62	62.67	74	-11.33
2389.36	56.18	AV	9	1.5	V	-10.62	45.56	54	-8.44
2390	71.53	PK	347	2	H	-10.62	60.91	74	-13.09
2390	55.34	AV	347	2	H	-10.62	44.72	54	-9.28
2390	71.91	PK	64	1.9	V	-10.62	61.29	74	-12.71
2390	55.57	AV	64	1.9	V	-10.62	44.95	54	-9.05
4824	62.37	PK	88	1.3	H	-5.55	56.82	74	-17.18
4824	48.54	AV	88	1.3	H	-5.55	42.99	54	-11.01
4824	62.93	PK	15	1.3	V	-5.55	57.38	74	-16.62
4824	49.18	AV	15	1.3	V	-5.55	43.63	54	-10.37
Middle Channel(2437MHz)									
4874	60.80	PK	169	1.9	H	-5.29	55.51	74	-18.49
4874	47.53	AV	169	1.9	H	-5.29	42.24	54	-11.76
4874	61.59	PK	174	1.1	V	-5.29	56.3	74	-17.70
4874	48.17	AV	174	1.1	V	-5.29	42.88	54	-11.12
High Channel(2462MHz)									
2483.5	72.13	PK	210	2.2	H	-10.46	61.67	74	-12.33
2483.5	58.44	AV	210	2.2	H	-10.46	47.98	54	-6.02
2483.5	72.35	PK	268	2.5	V	-10.46	61.89	74	-12.11
2483.5	58.70	AV	268	2.5	V	-10.46	48.24	54	-5.76
2483.86	73.19	PK	235	2	H	-10.46	62.73	74	-11.27
2483.86	58.97	AV	235	2	H	-10.46	48.51	54	-5.49
2483.69	73.68	PK	326	1.1	V	-10.46	63.22	74	-10.78
2483.69	59.16	AV	326	1.1	V	-10.46	48.7	54	-5.30
4924	59.61	PK	265	1.4	H	-5.03	54.58	74	-19.42
4924	44.43	AV	265	1.4	H	-5.03	39.40	54	-14.60
4924	60.07	PK	228	2.4	V	-5.03	55.04	74	-18.96
4924	44.98	AV	228	2.4	V	-5.03	39.95	54	-14.05

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11n20									
Low Channel(2412MHz)									
2388.68	71.91	PK	248	1.8	H	-10.62	61.29	74	-12.71
2388.68	55.72	AV	248	1.8	H	-10.62	45.10	54	-8.90
2389.02	72.20	PK	300	1.3	V	-10.62	61.58	74	-12.42
2389.02	55.94	AV	300	1.3	V	-10.62	45.32	54	-8.68
2390	70.53	PK	63	1.1	H	-10.62	59.91	74	-14.09
2390	55.18	AV	63	1.1	H	-10.62	44.56	54	-9.44
2390	70.85	PK	252	1.7	V	-10.62	60.23	74	-13.77
2390	55.39	AV	252	1.7	V	-10.62	44.77	54	-9.23
4824	61.98	PK	83	1.1	H	-5.55	56.43	74	-17.57
4824	48.37	AV	83	1.1	H	-5.55	42.82	54	-11.18
4824	62.56	PK	8	1.6	V	-5.55	57.01	74	-16.99
4824	49.01	AV	8	1.6	V	-5.55	43.46	54	-10.54
Middle Channel(2437MHz)									
4874	60.74	PK	174	1.2	H	-5.29	55.45	74	-18.55
4874	47.37	AV	174	1.2	H	-5.29	42.08	54	-11.92
4874	61.29	PK	30	1.5	V	-5.29	56	74	-18.00
4874	47.98	AV	30	1.5	V	-5.29	42.69	54	-11.31
High Channel(2462MHz)									
2483.5	71.22	PK	348	1.4	H	-10.46	60.76	74	-13.24
2483.5	58.20	AV	348	1.4	H	-10.46	47.74	54	-6.26
2483.5	71.47	PK	278	1.5	V	-10.46	61.01	74	-12.99
2483.5	58.38	AV	278	1.5	V	-10.46	47.92	54	-6.08
2484.25	72.23	PK	54	1.6	H	-10.46	61.77	74	-12.23
2484.25	58.66	AV	54	1.6	H	-10.46	48.2	54	-5.80
2483.98	72.75	PK	106	1.8	V	-10.46	62.29	74	-11.71
2483.98	58.89	AV	106	1.8	V	-10.46	48.43	54	-5.57
4924	59.47	PK	321	1.1	H	-5.03	54.44	74	-19.56
4924	44.34	AV	321	1.1	H	-5.03	39.31	54	-14.69
4924	59.96	PK	89	2	V	-5.03	54.93	74	-19.07
4924	44.88	AV	89	2	V	-5.03	39.85	54	-14.15

Frequency (MHz)	Receiver		Turntable Angle Degree	Rx Antenna		Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
	Reading (dBμV)	PK/Ave.		Height (m)	Polar (H/V)				
802.11n40									
Low Channel(2422MHz)									
2389.53	73.08	PK	284	1.4	H	-10.62	62.46	74	-11.54
2389.53	56.49	AV	284	1.4	H	-10.62	45.87	54	-8.13
2388.44	73.44	PK	330	1.3	V	-10.62	62.82	74	-11.18
2388.44	56.81	AV	330	1.3	V	-10.62	46.19	54	-7.81
2390	71.73	PK	123	1.8	H	-10.62	61.11	74	-12.89
2390	56.02	AV	123	1.8	H	-10.62	45.40	54	-8.60
2390	72.15	PK	147	2.4	V	-10.62	61.53	74	-12.47
2390	56.30	AV	147	2.4	V	-10.62	45.68	54	-8.32
4844	61.02	PK	146	1.3	H	-5.52	55.50	74	-18.50
4844	46.75	AV	146	1.3	H	-5.52	41.23	54	-12.77
4844	61.53	PK	281	1.6	V	-5.52	56.01	74	-17.99
4844	47.20	AV	281	1.6	V	-5.52	41.68	54	-12.32
Middle Channel(2437MHz)									
4874	60.41	PK	79	2.4	H	-5.29	55.12	74	-18.88
4874	45.90	AV	79	2.4	H	-5.29	40.61	54	-13.39
4874	61.03	PK	253	1.1	V	-5.29	55.74	74	-18.26
4874	46.59	AV	253	1.1	V	-5.29	41.3	54	-12.70
High Channel(2452MHz)									
2483.5	72.67	PK	21	1.4	H	-10.46	62.21	74	-11.79
2483.5	59.61	AV	21	1.4	H	-10.46	49.15	54	-4.85
2483.5	72.94	PK	159	1.9	V	-10.46	62.48	74	-11.52
2483.5	59.82	AV	159	1.9	V	-10.46	49.36	54	-4.64
2483.92	73.89	PK	67	1.4	H	-10.46	63.43	74	-10.57
2483.92	60.08	AV	67	1.4	H	-10.46	49.62	54	-4.38
2483.75	74.35	PK	293	1.4	V	-10.46	63.89	74	-10.11
2483.75	60.30	AV	293	1.4	V	-10.46	49.84	54	-4.16
4904	59.83	PK	77	1.7	H	-5.06	54.77	74	-19.23
4904	45.11	AV	77	1.7	H	-5.06	40.05	54	-13.95
4904	60.34	PK	72	1.3	V	-5.06	55.28	74	-18.72
4904	45.70	AV	72	1.3	V	-5.06	40.64	54	-13.36

Note:

Factor = Antenna factor (RX) + Cable Loss – Amplifier Factor

Corrected Amplitude= Factor + Reading

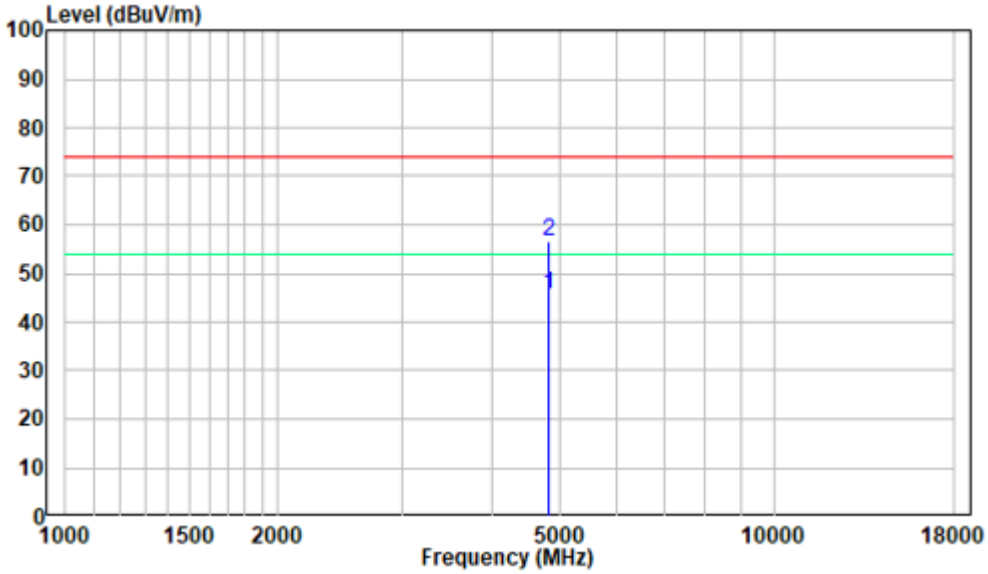
Margin = Corrected Amplitude - Limit

The other spurious emission which is 20dB below to the limit was not recorded.

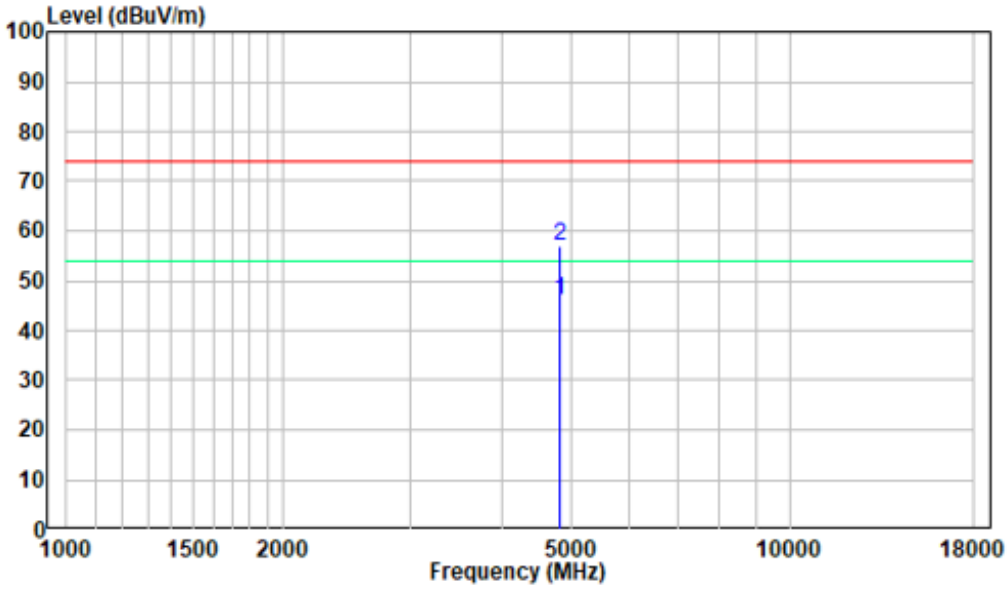
1-18 GHz:

Pre-scan Plots:

802.11 b Low Channel
Horizontal



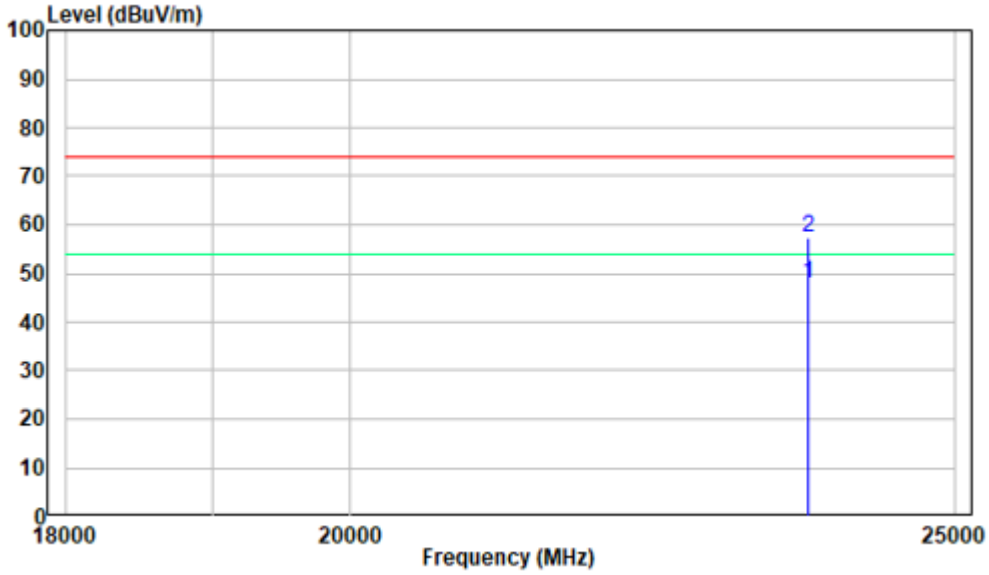
Vertical



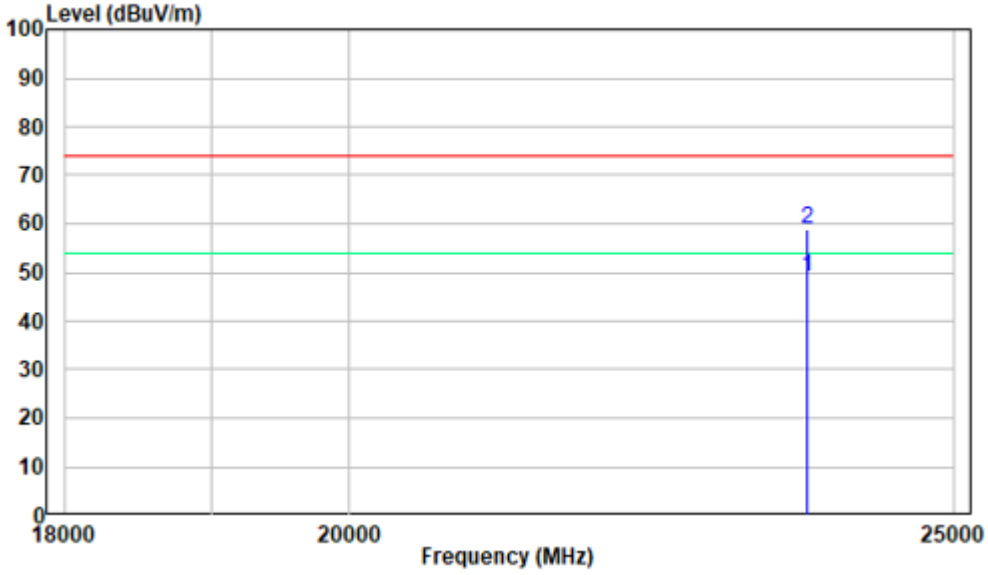
18 -25GHz:

Pre-scan Plots:

802.11 b Low Channel
Horizontal



Vertical



FCC §15.247(a) (2) – 6 dB EMISSION BANDWIDTH & OCCUPIED BANDWIDTH

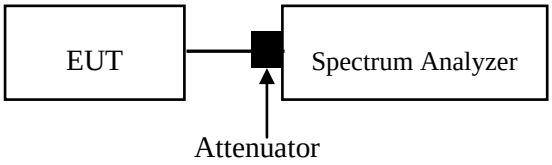
Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.8.1 & Clause 6.9.3

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.



Test Data

Environmental Conditions

Temperature:	27.2 ℃
Relative Humidity:	45 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang on 2023-05-25.

EUT operation mode: Transmitting

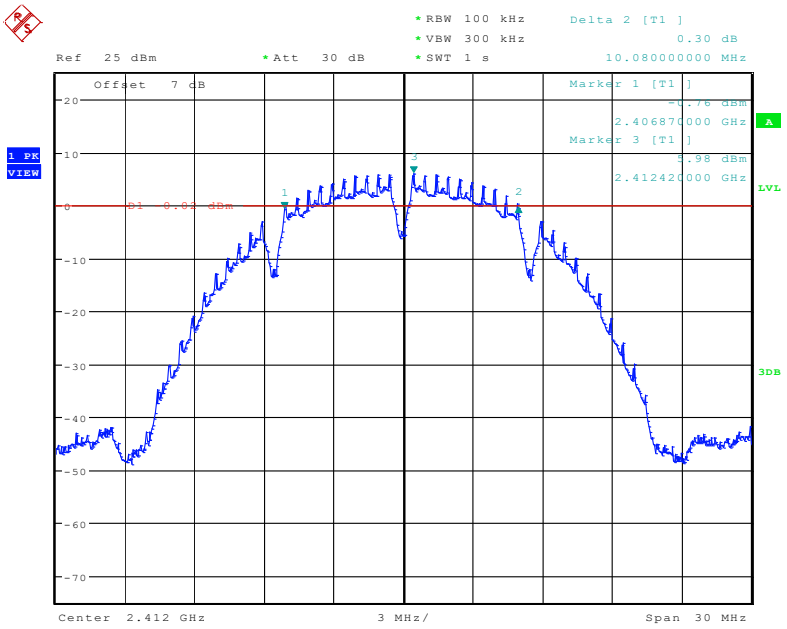
Test Result: Compliant.

Please refer to following table and plots.

Channel	Frequency (MHz)	6 dB Emission Bandwidth (MHz)	99% Emission Bandwidth (MHz)	Limit (kHz)
802.11b mode				
Low	2412	10.08	14.00	≥500
Middle	2437	10.08	14.08	≥500
High	2462	10.08	14.04	≥500
802.11g mode				
Low	2412	15.15	16.48	≥500
Middle	2437	15.18	16.48	≥500
High	2462	15.15	16.44	≥500
802.11n-HT20 mode				
Low	2412	15.15	17.52	≥500
Middle	2437	15.15	17.52	≥500
High	2462	15.18	17.56	≥500
802.11n-HT40 mode				
Low	2422	31.44	35.20	≥500
Middle	2437	31.44	35.20	≥500
High	2452	31.44	35.20	≥500

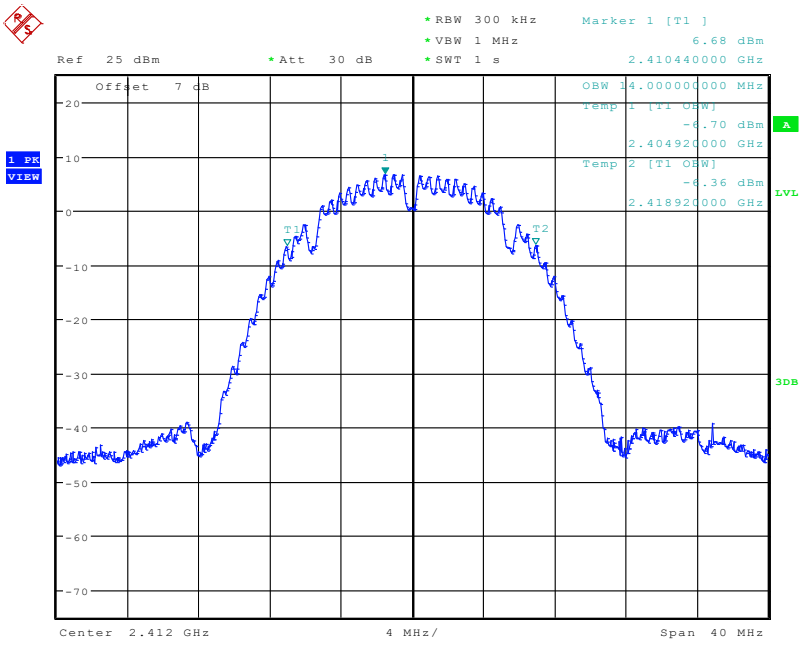
802.11b mode:

6dB Emission Bandwidth, Low Channel



Date: 25.MAY.2023 13:10:06

Occupied Bandwidth, Low Channel



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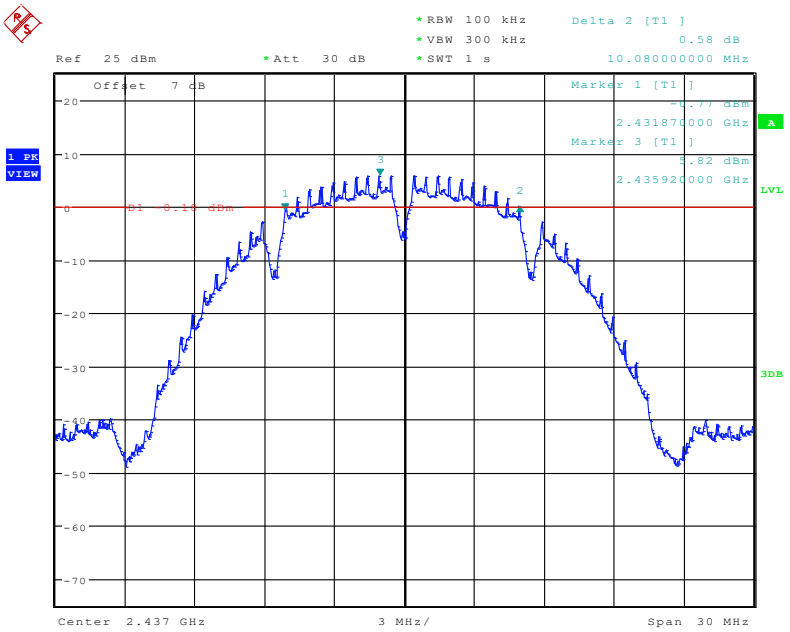
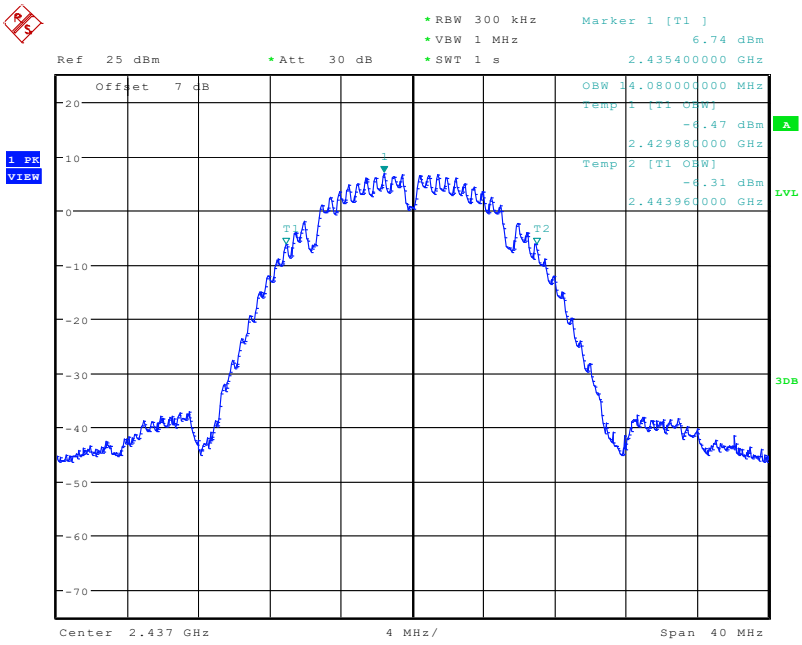
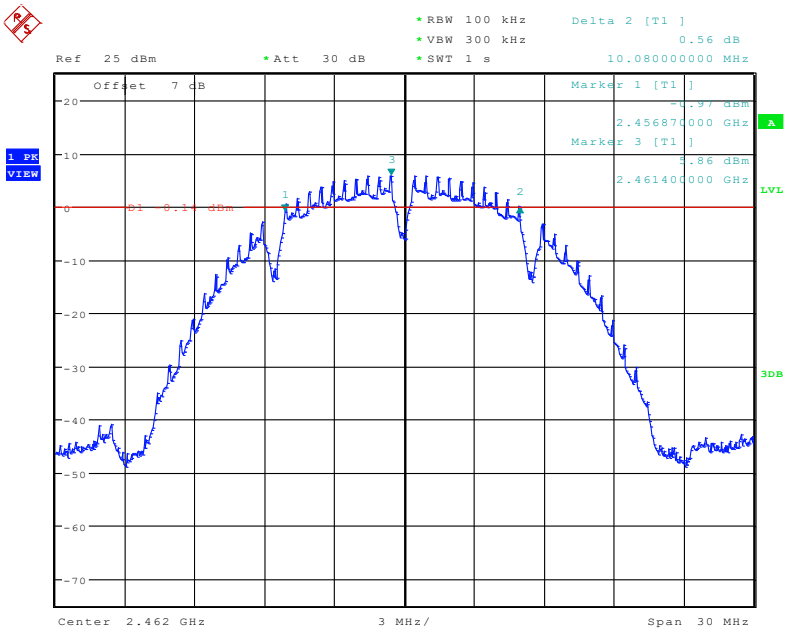
6dB Emission Bandwidth, Middle Channel



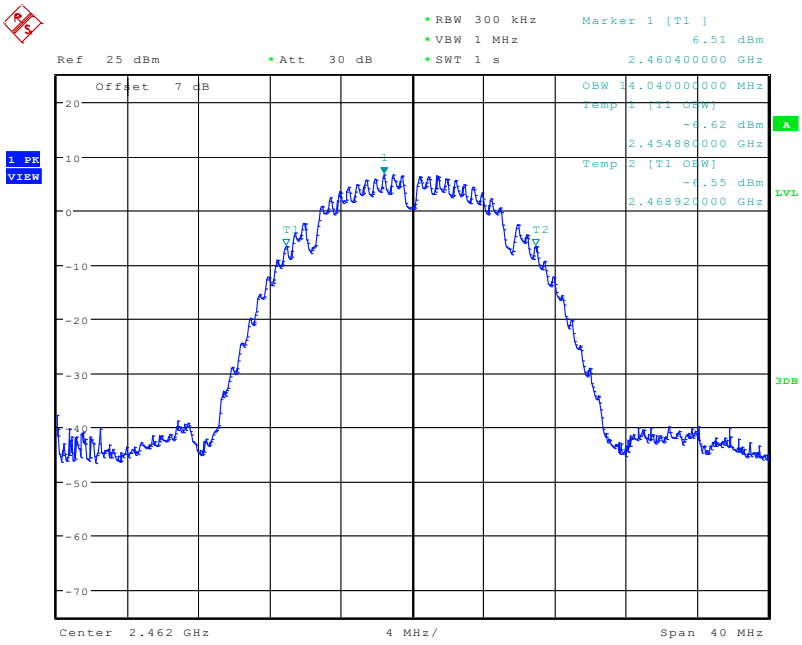
Occupied Bandwidth, Middle Channel



6dB Emission Bandwidth, High Channel

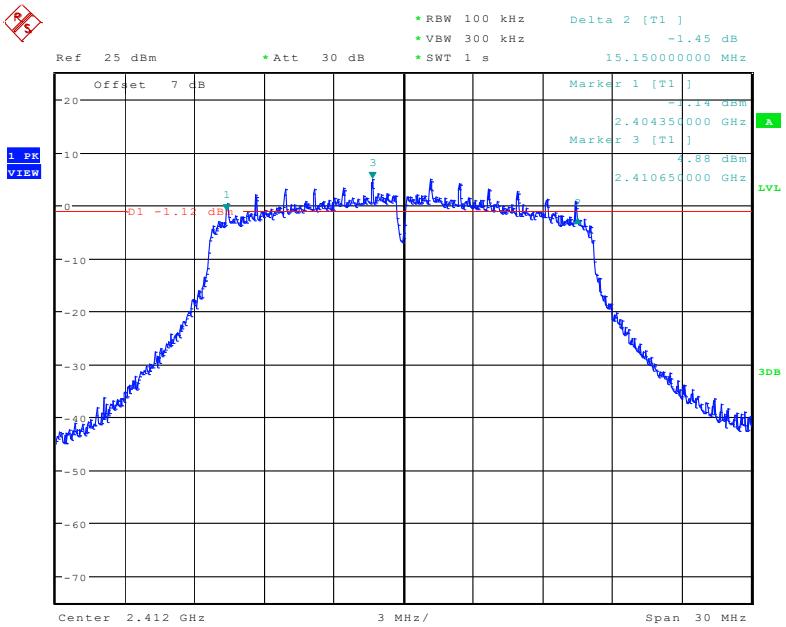


Occupied Bandwidth, High Channel



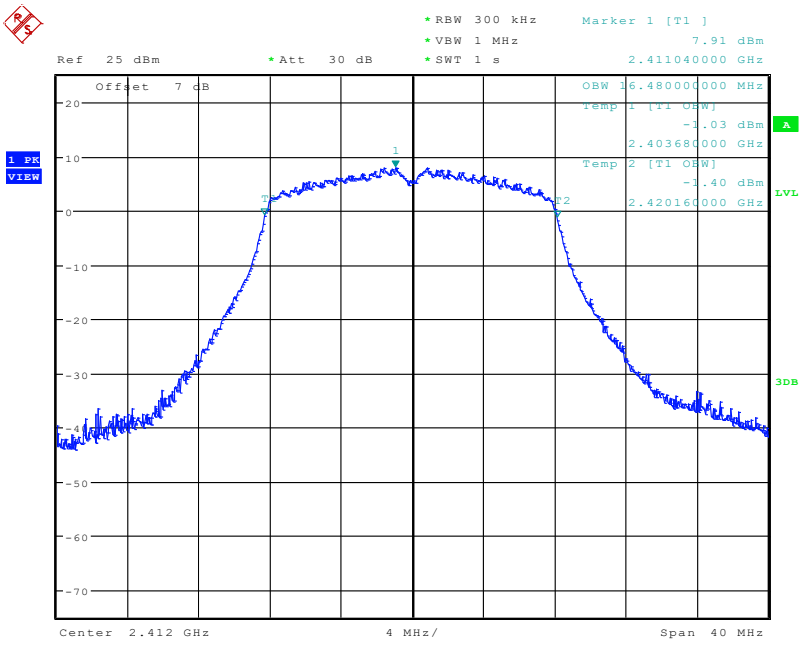
802.11g mode:

6dB Emission Bandwidth, Low Channel



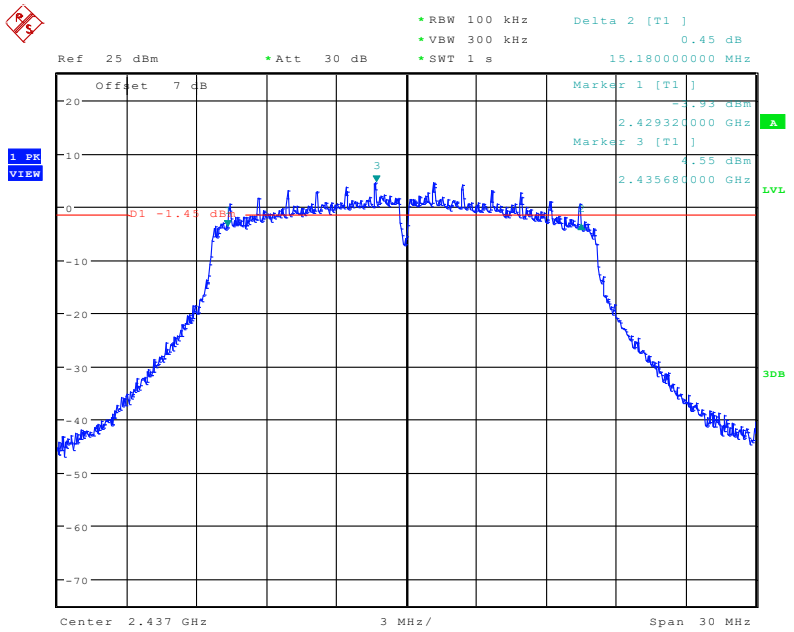
Date: 25.MAY.2023 14:42:01

Occupied Bandwidth, Low Channel



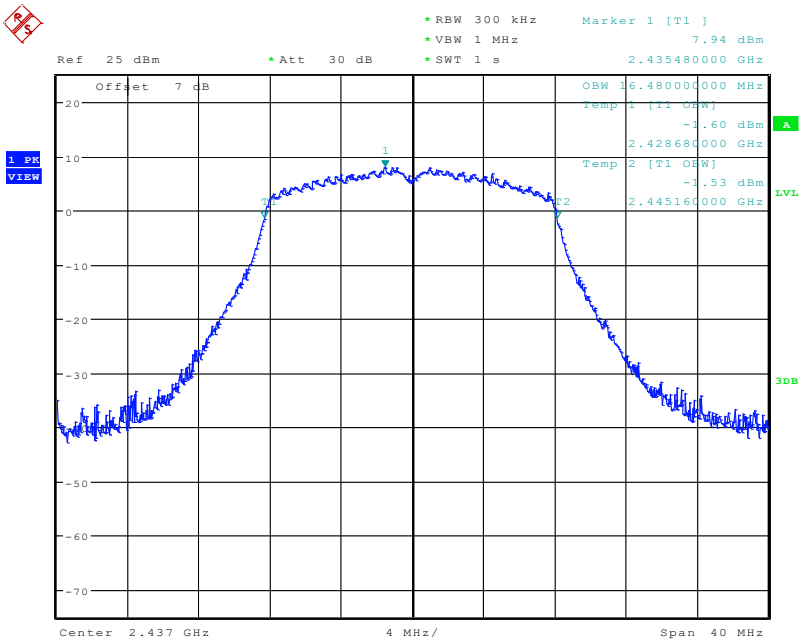
Date: 25.MAY.2023 14:41:25

6dB Emission Bandwidth, Middle Channel



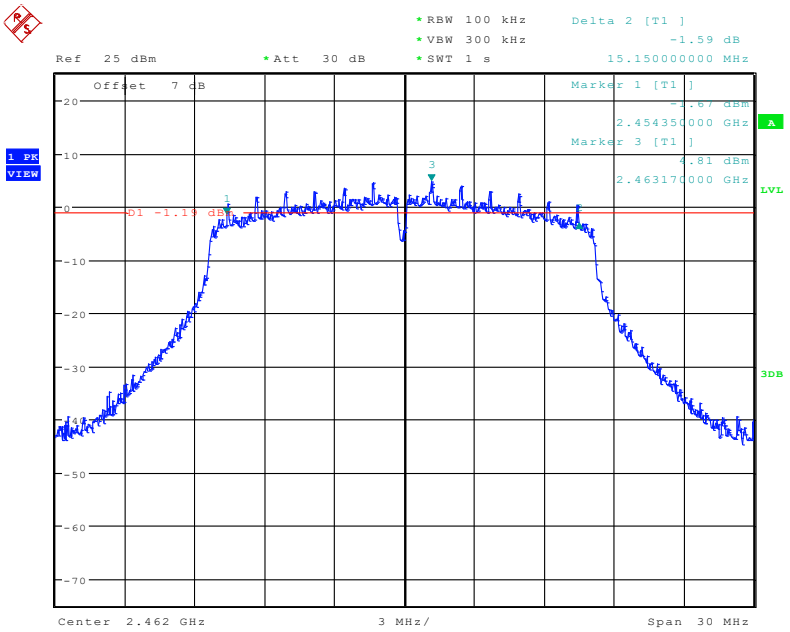
Date: 25.MAY.2023 14:45:57

Occupied Bandwidth, Middle Channel

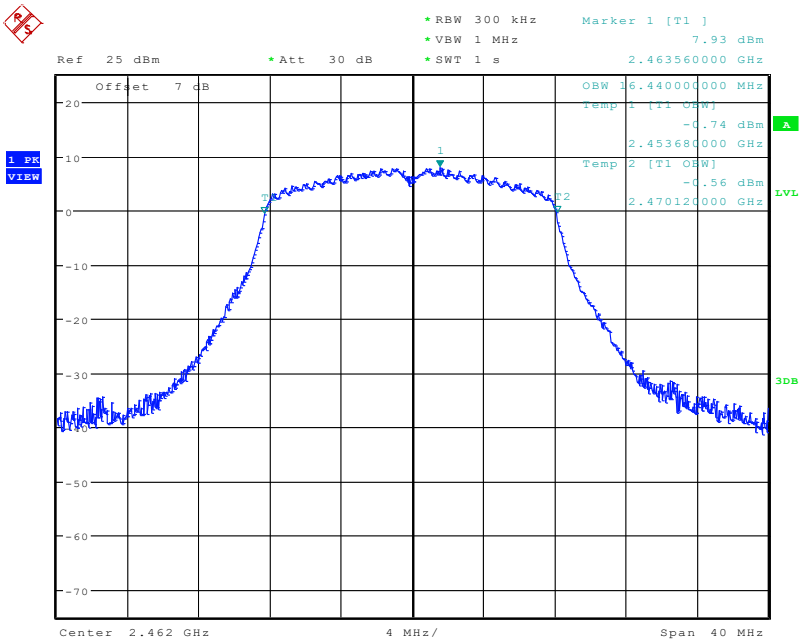


Date: 25.MAY.2023 14:45:21

6dB Emission Bandwidth, High Channel

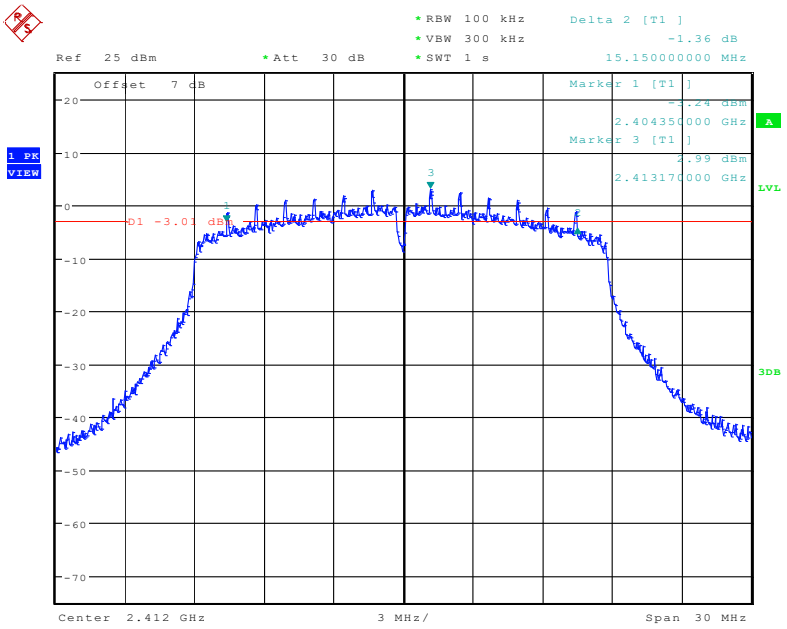


Occupied Bandwidth, High Channel



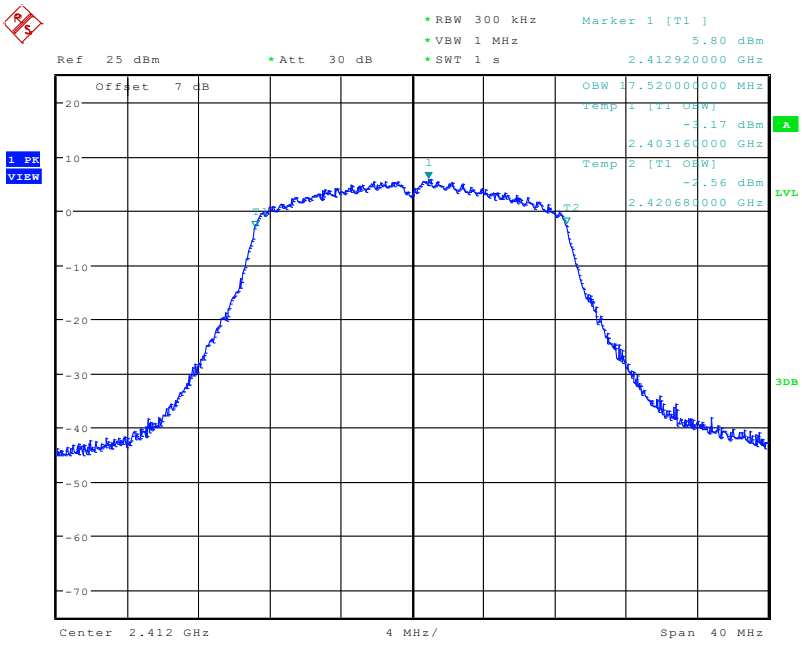
802.11n-HT20 mode:

6dB Emission Bandwidth, Low Channel



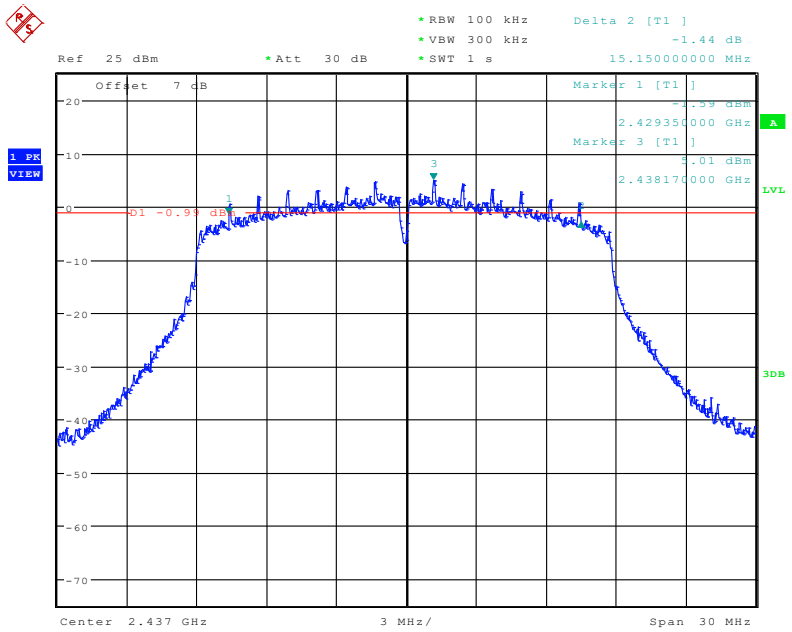
Date: 25.MAY.2023 14:19:16

Occupied Bandwidth, Low Channel



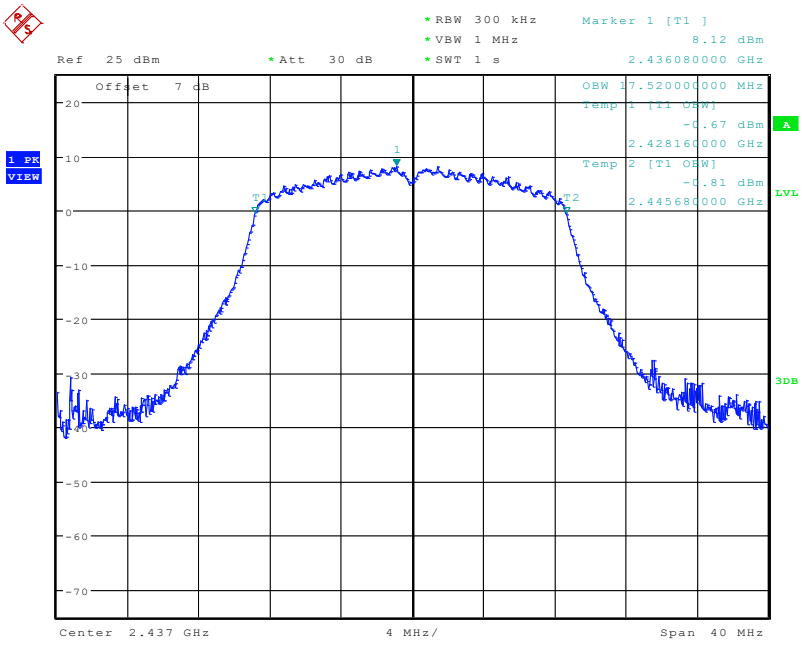
Date: 25.MAY.2023 14:18:15

6dB Emission Bandwidth, Middle Channel



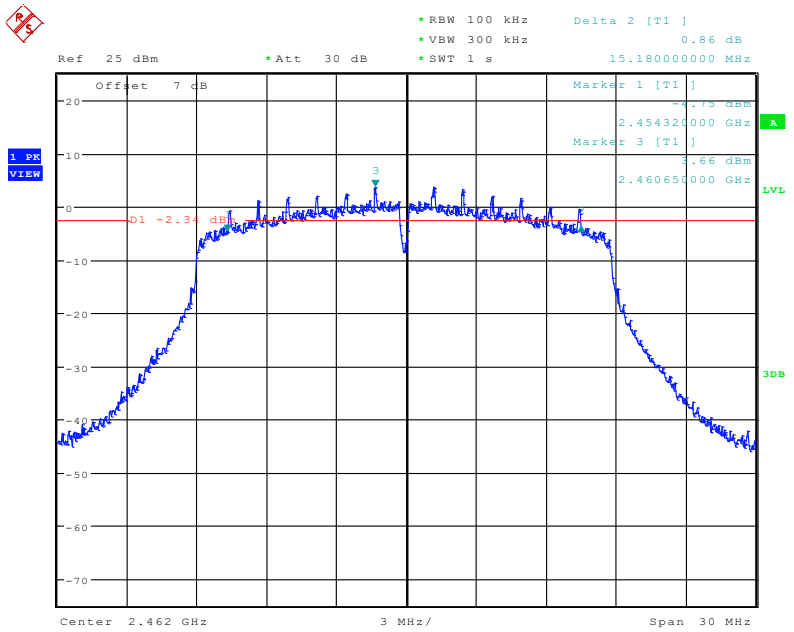
Date: 25.MAY.2023 14:08:36

Occupied Bandwidth, Middle Channel



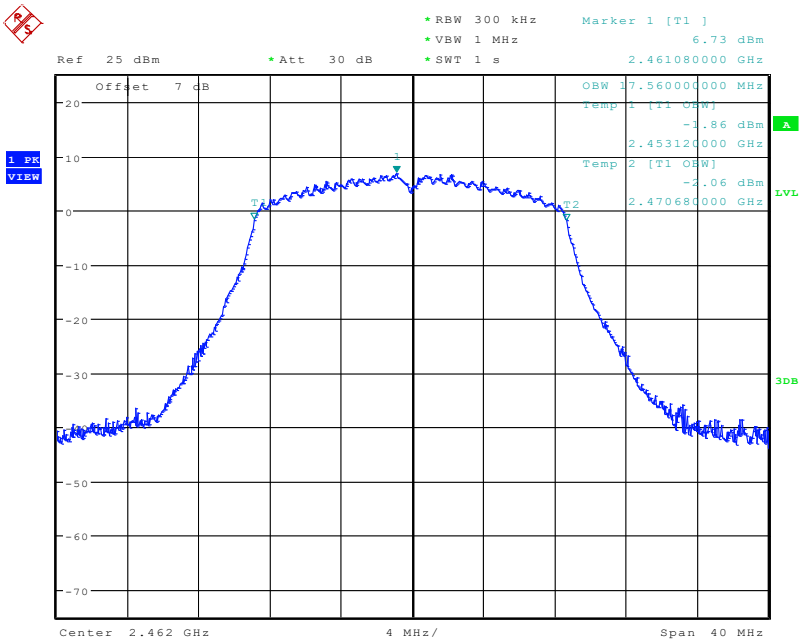
Date: 25.MAY.2023 14:08:00

6dB Emission Bandwidth, High Channel



Date: 25.MAY.2023 14:11:21

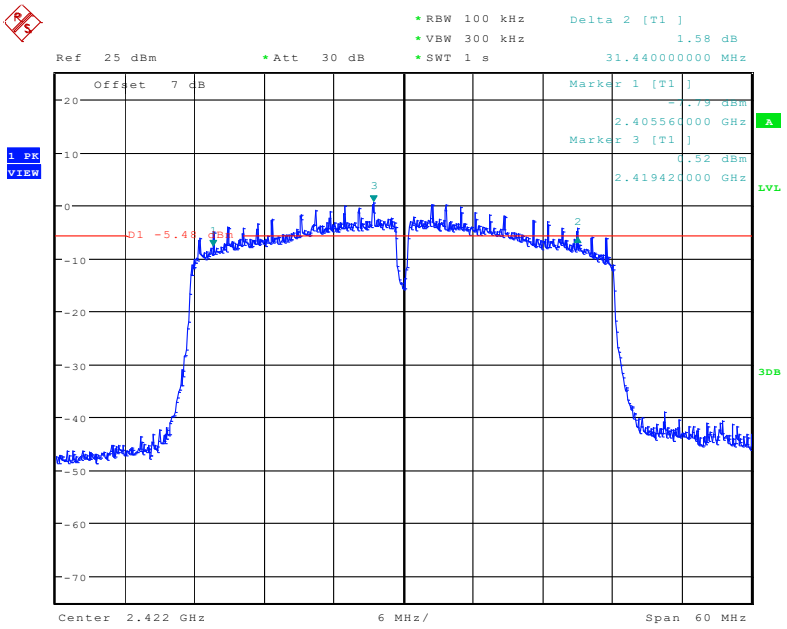
Occupied Bandwidth, High Channel



Date: 25.MAY.2023 14:10:45

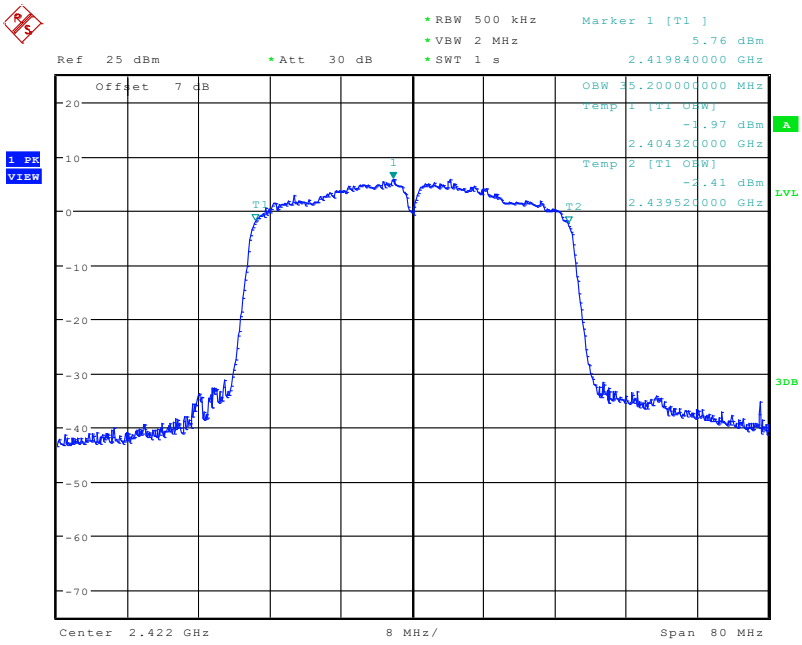
802.11n-HT40 mode:

6dB Emission Bandwidth, Low Channel



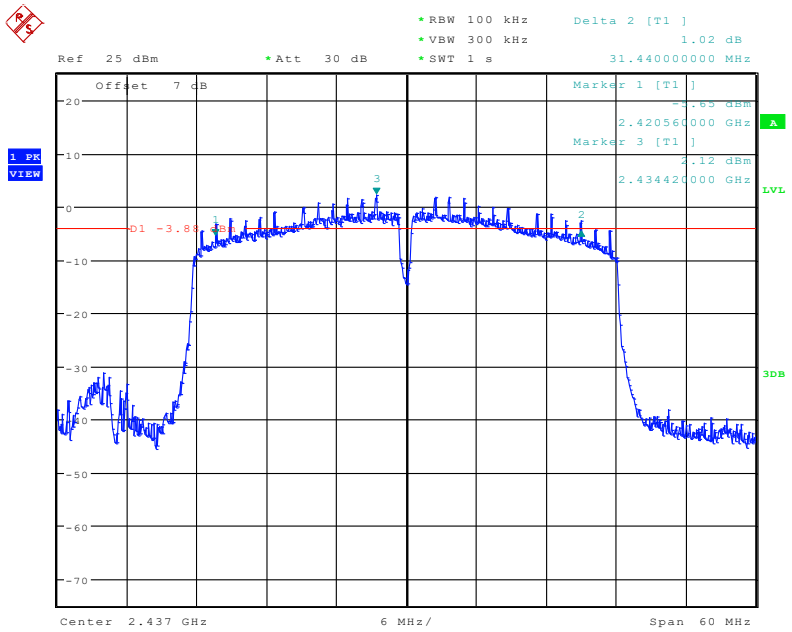
Date: 25.MAY.2023 14:24:28

Occupied Bandwidth, Low Channel



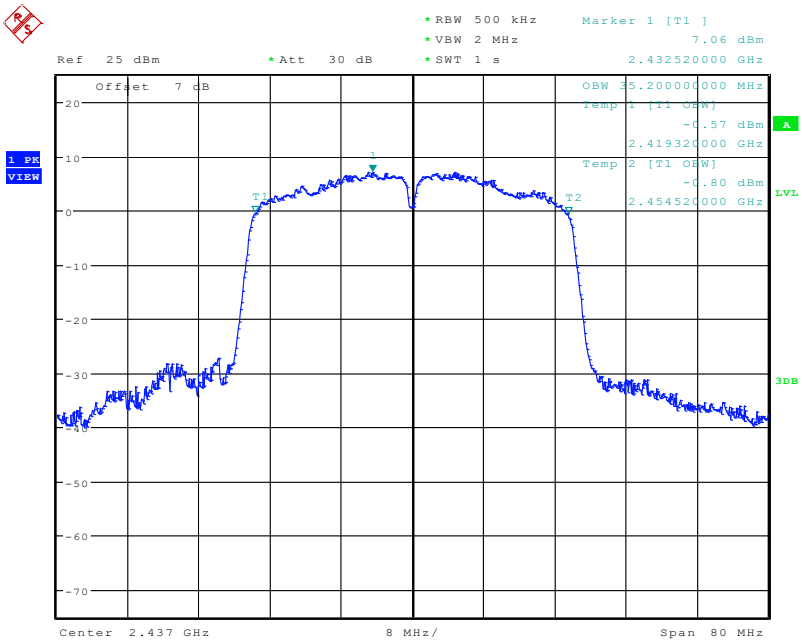
Date: 25.MAY.2023 14:23:53

6dB Emission Bandwidth, Middle Channel



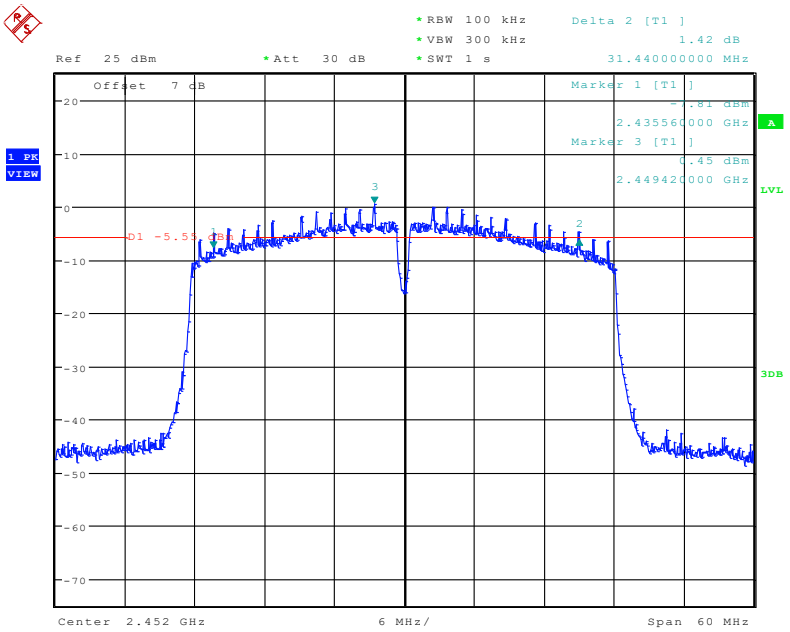
Date: 25.MAY.2023 14:30:12

Occupied Bandwidth, Middle Channel



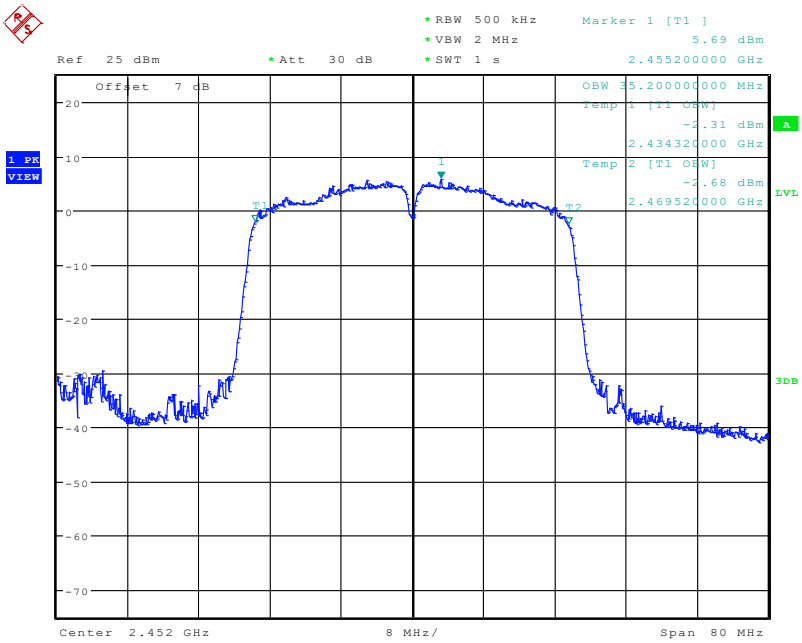
Date: 25.MAY.2023 14:29:17

6dB Emission Bandwidth, High Channel



Date: 25.MAY.2023 14:35:37

Occupied Bandwidth, High Channel



Date: 25.MAY.2023 14:35:01

FCC §15.247(b) (3) - MAXIMUM CONDUCTED OUTPUT POWER

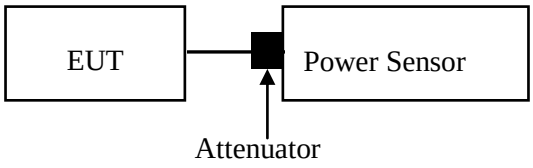
Applicable Standard

According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.9.2.3.1

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to one test equipment.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

Temperature:	27.2 ℃
Relative Humidity:	45 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang from 2023-05-24 to 2023-05-25.

EUT operation mode: Transmitting

Test Result: Compliant.

Please refer to following table and plots.

Channel	Frequency (MHz)	Max Conducted Average Output Power (dBm)	Limit (dBm)
802.11b mode			
Low	2412	13.83	30
Middle	2437	**13.84**	30
High	2462	13.84	30
802.11g mode			
Low	2412	11.03	30
Middle	2437	12.48	30
High	2462	**12.51**	30
802.11n HT20 mode			
Low	2412	12.02	30
Middle	2437	**14.39**	30
High	2462	13.55	30
802.11n HT40 mode			
Low	2422	11.88	30
Middle	2437	**12.94**	30
High	2452	10.75	30

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

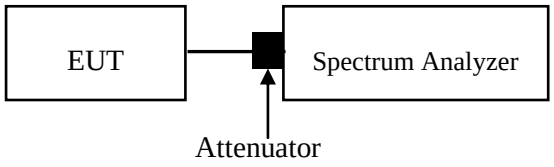
Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.11

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.



Test Data

Environmental Conditions

Temperature:	27.2 ℃
Relative Humidity:	45 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang on 2023-05-25.

EUT operation mode: Transmitting

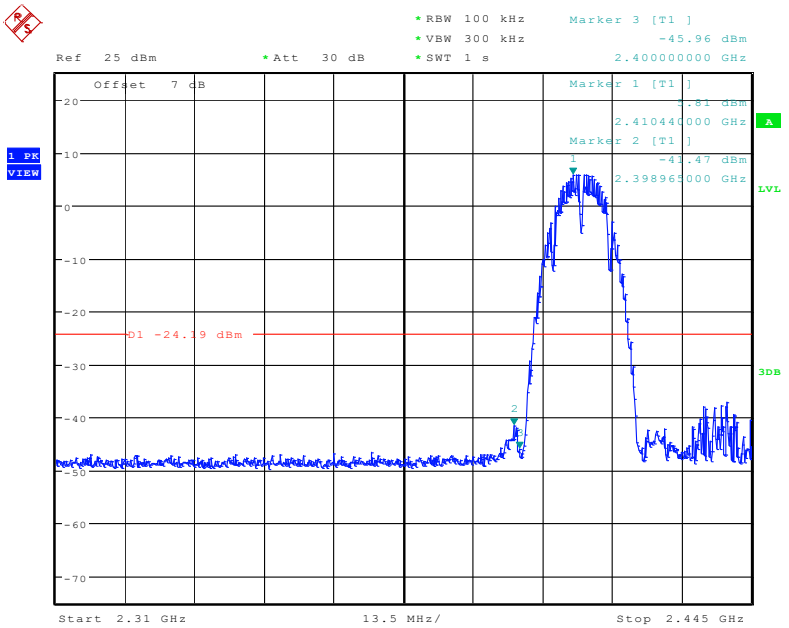
Test Result: Compliant.

Conducted Band Edge Result:

Please refer to following table and plots.

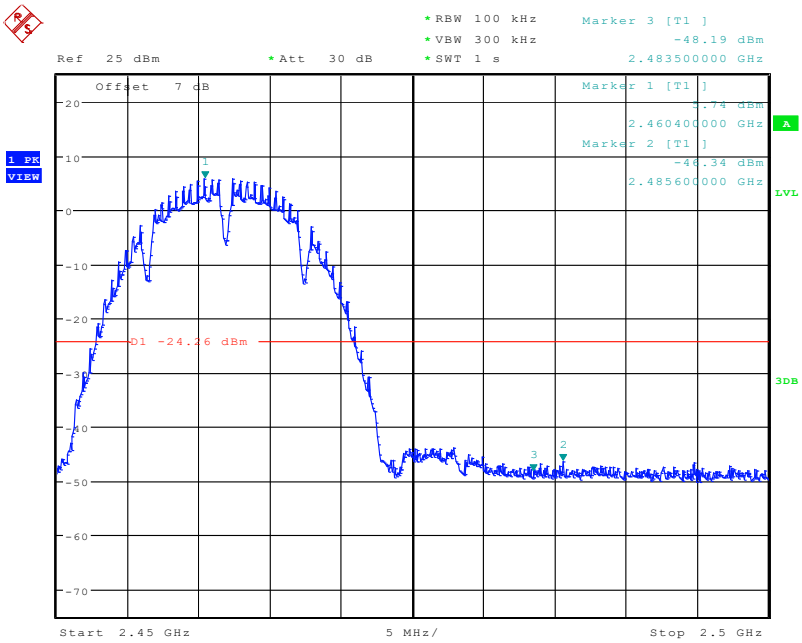
802.11b mode:

2412MHz



Date: 25.MAY.2023 13:11:59

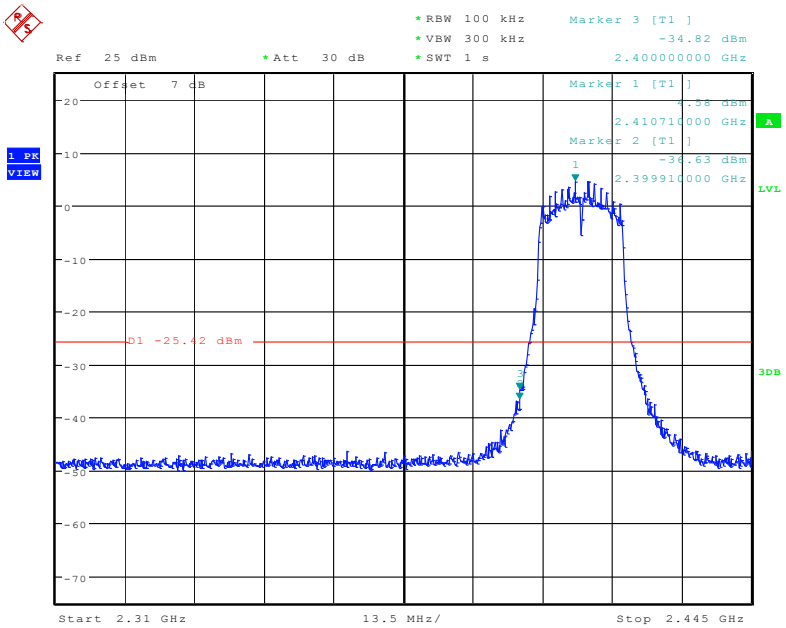
2462MHz



Date: 25.MAY.2023 13:19:18

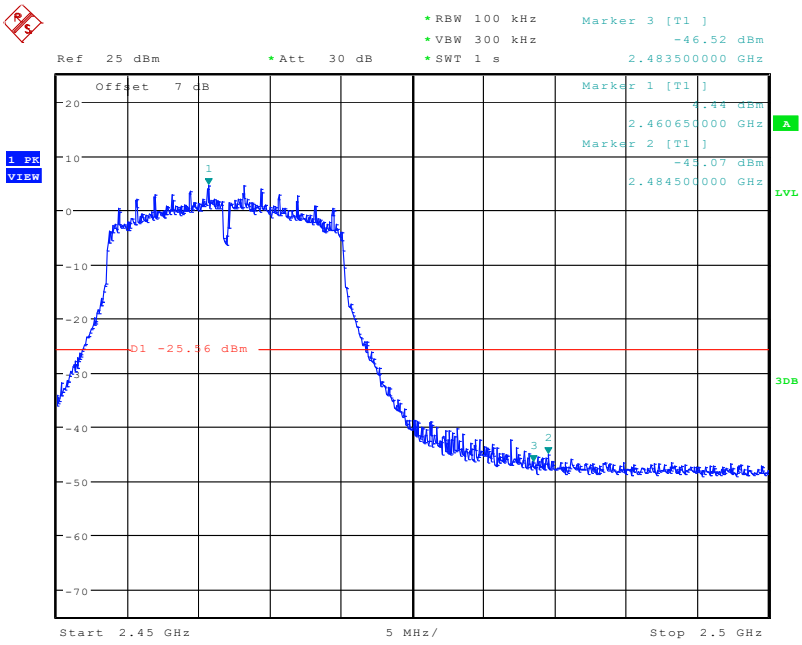
802.11g mode:

2412MHz



Date: 25.MAY.2023 14:43:29

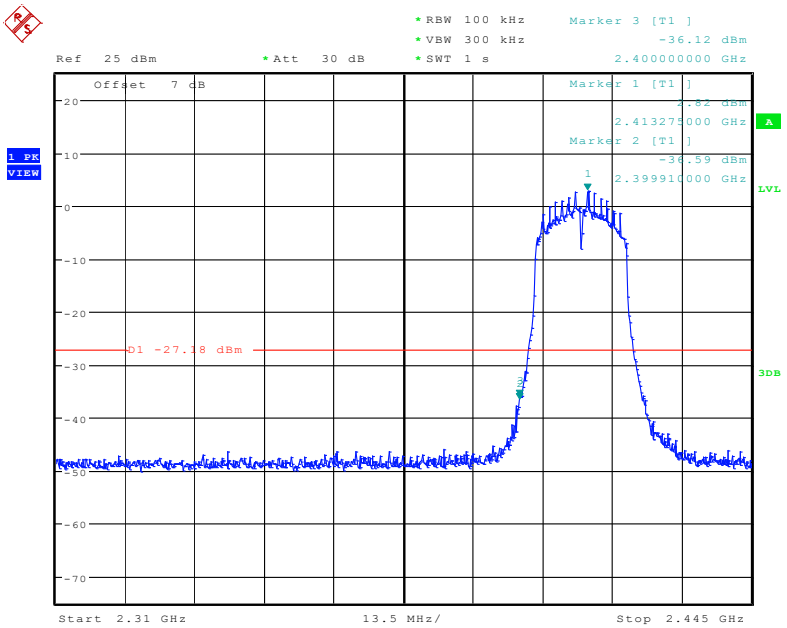
2462MHz



Date: 25.MAY.2023 14:51:50

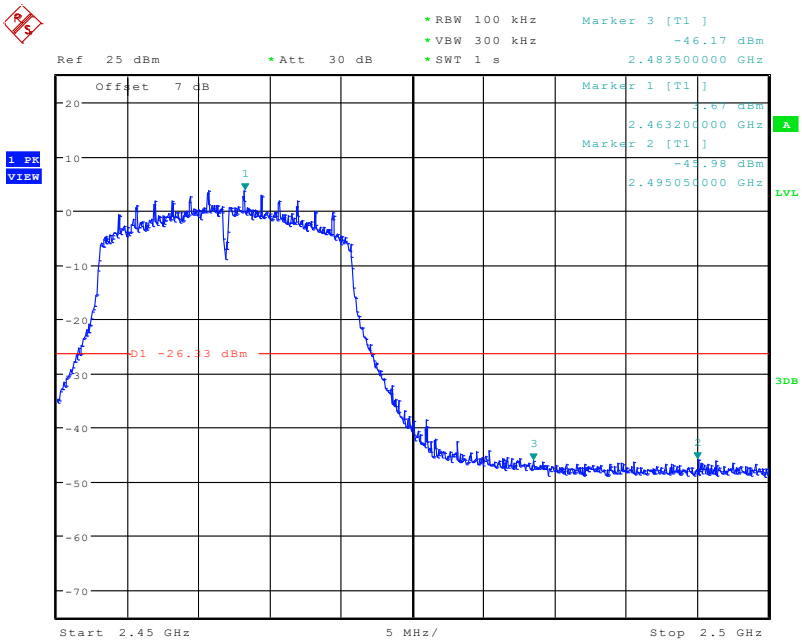
802.11n-HT20 mode:

2412MHz



Date: 25.MAY.2023 14:20:44

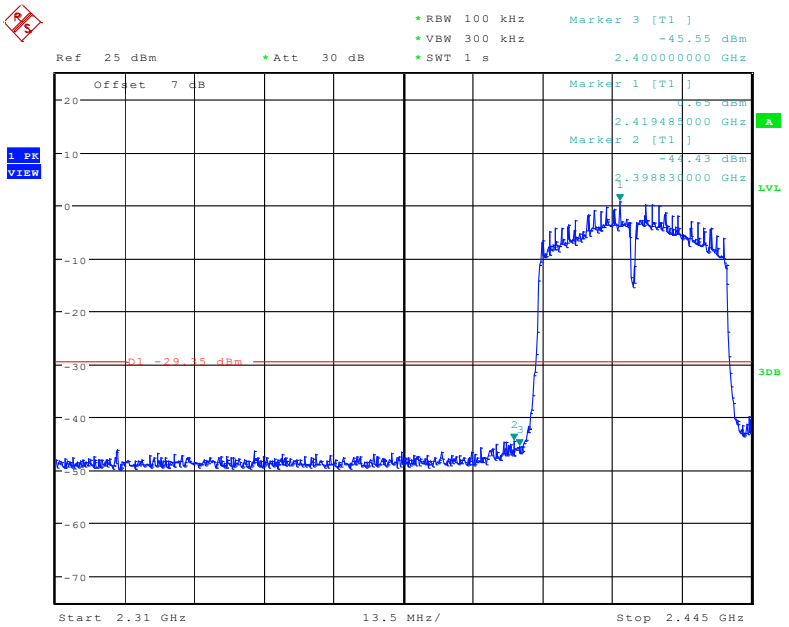
2462MHz



Date: 25.MAY.2023 14:13:02

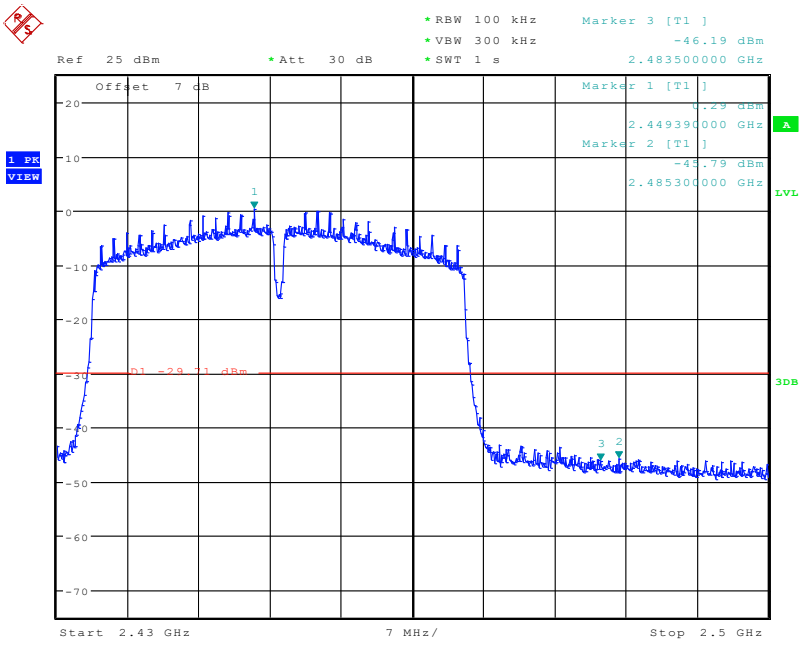
802.11n-HT40 mode:

2412MHz



Date: 25.MAY.2023 14:26:28

2462MHz



Date: 25.MAY.2023 14:37:36

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

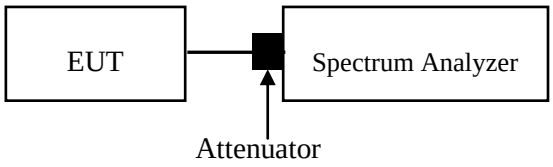
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Procedure

Test Method: ANSI C63.10-2013 Clause 11.10.5

Method AVPSD-2:

a) Measure the duty cycle (D) of the transmitter output signal as described in 11.6 of ANSI C63.10-2015.
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to at least 1.5 times the OBW.
d) Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
e) Set VBW ≥ [3 × RBW].
f) Detector = power averaging (rms) or sample detector (when rms not available).
g) Ensure that the number of measurement points in the sweep ≥ [2 × span / RBW].
h) Sweep time = auto couple.
i) Do not use sweep triggering; allow sweep to "free run."
j) Employ trace averaging (rms) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
m) If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced)



Test Data

Environmental Conditions

Temperature:	27.2 ℃
Relative Humidity:	45 %
ATM Pressure:	101.0 kPa

The testing was performed by Jacob Huang on 2023-05-25.

EUT operation mode: Transmitting

Test Result: Compliant.

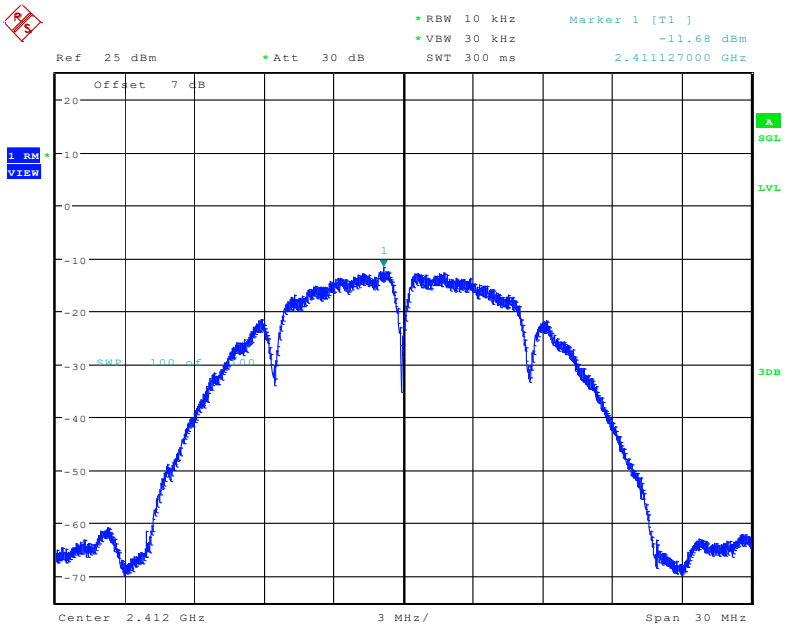
Please refer to following table and plots.

Channel	Frequency (MHz)	Reading (dBm/10kHz)	Duty cycle factor(dB)	PSD (dBm/10kHz)	Limit (dBm/3kHz)
802.11b mode					
Low	2412	-11.68	0.24	-11.44	≤8
Middle	2437	-12.38	0.24	-12.14	≤8
High	2462	-12.08	0.24	-11.84	≤8
802.11g mode					
Low	2412	-16.80	0.31	-16.49	≤8
Middle	2437	-13.86	0.31	-13.55	≤8
High	2462	-14.79	0.31	-14.48	≤8
802.11n-HT20 mode					
Low	2412	-16.45	1.20	-15.25	≤8
Middle	2437	-12.49	1.20	-11.29	≤8
High	2462	-13.12	1.20	-11.92	≤8
802.11n-HT40 mode					
Low	2422	-18.54	1.03	-17.51	≤8
Middle	2437	-16.45	1.03	-15.42	≤8
High	2452	-18.59	1.03	-17.56	≤8

Note: Duty Cycle Factor=10 log (1 / D), D=Duty Cycle

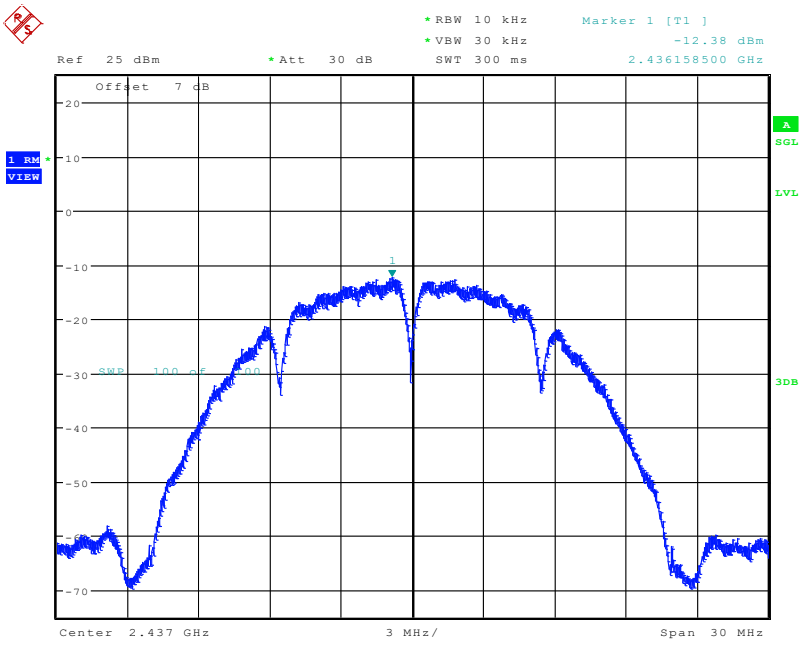
802.11b mode:

Low Channel



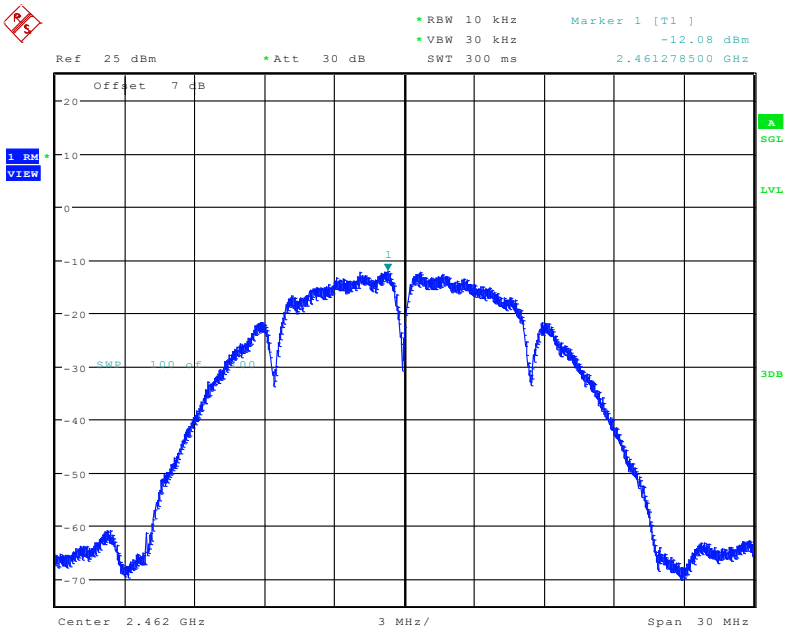
Date: 25.MAY.2023 13:11:00

Middle Channel



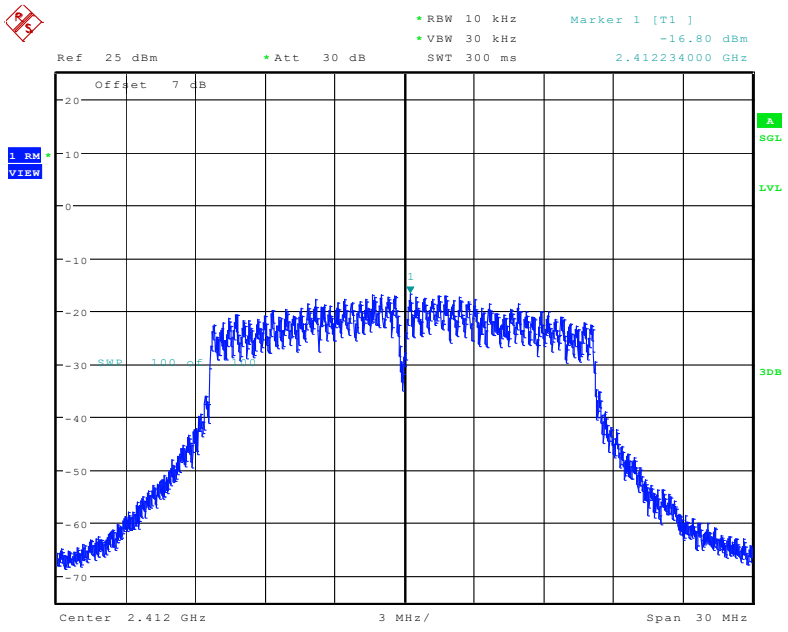
Date: 25.MAY.2023 13:15:32

High Channel

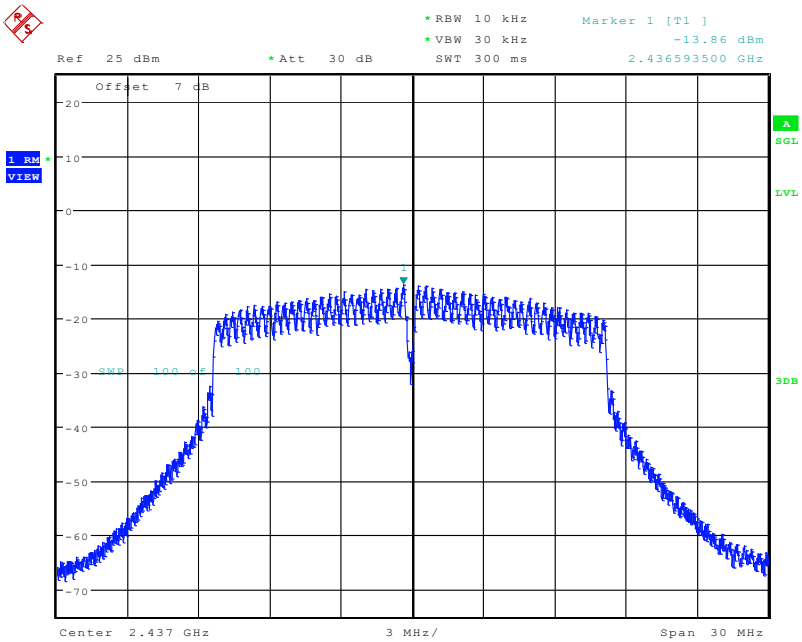


802.11g mode:

Low Channel

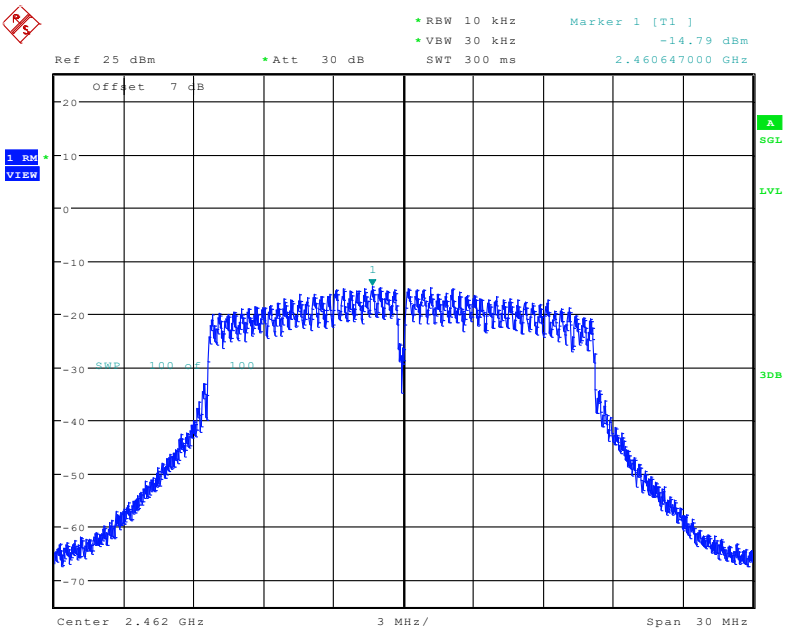


Middle Channel



Date: 25.MAY.2023 14:46:46

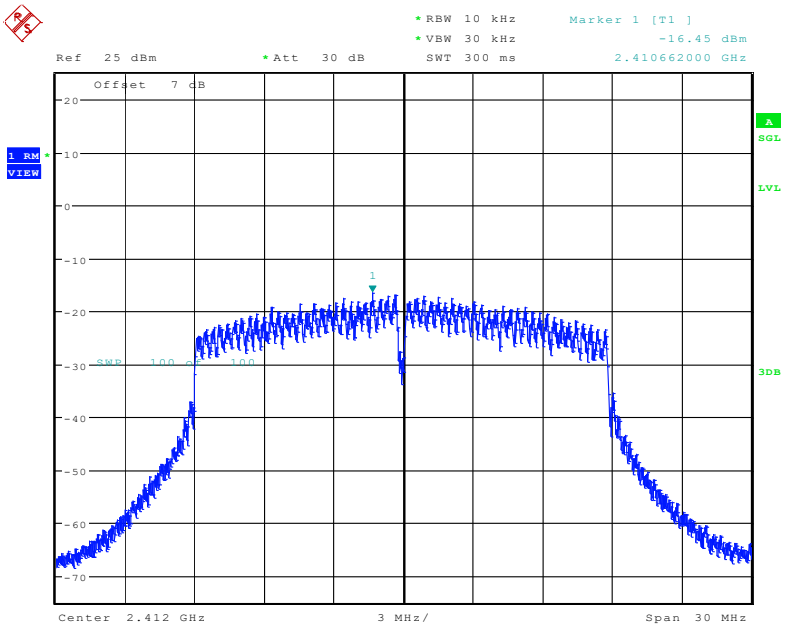
High Channel



Date: 25.MAY.2023 14:51:02

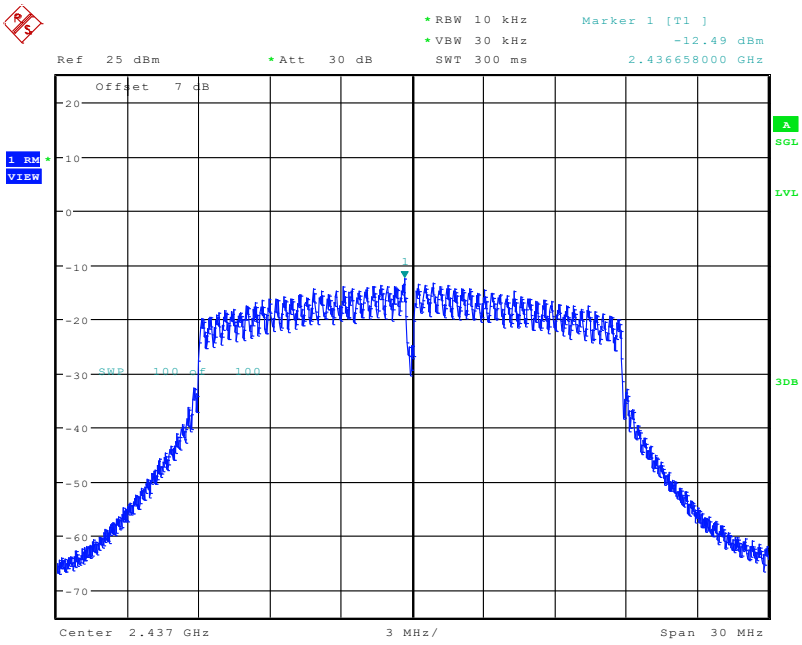
802.11n-HT20 mode:

Low Channel



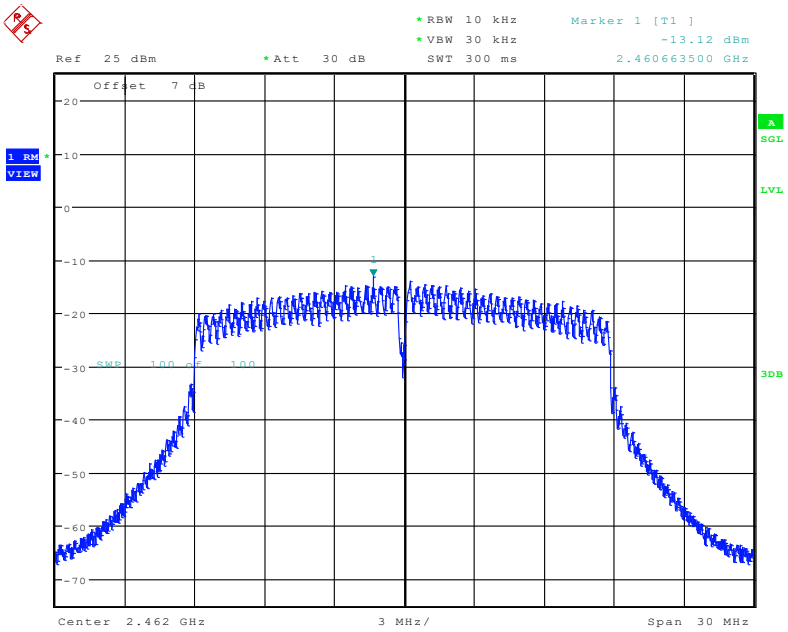
Date: 25.MAY.2023 14:20:08

Middle Channel



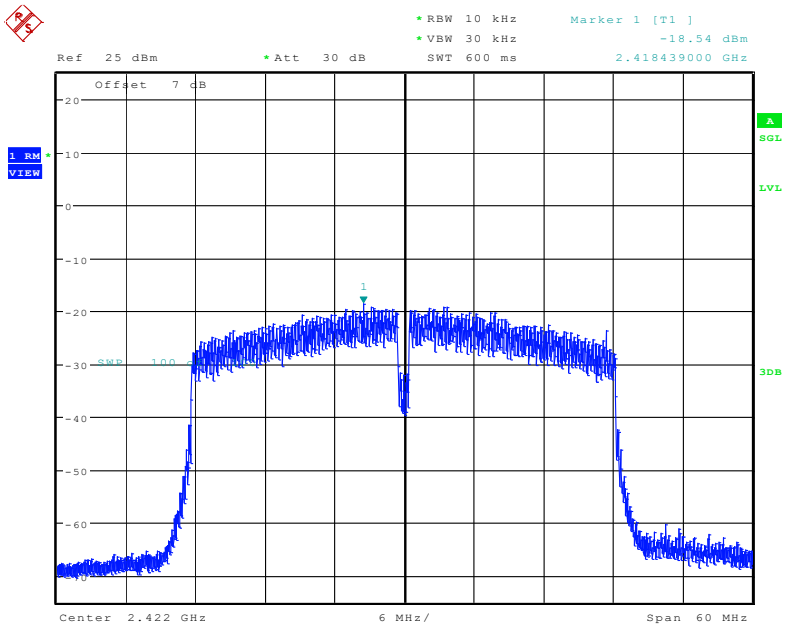
Date: 25.MAY.2023 14:09:25

High Channel

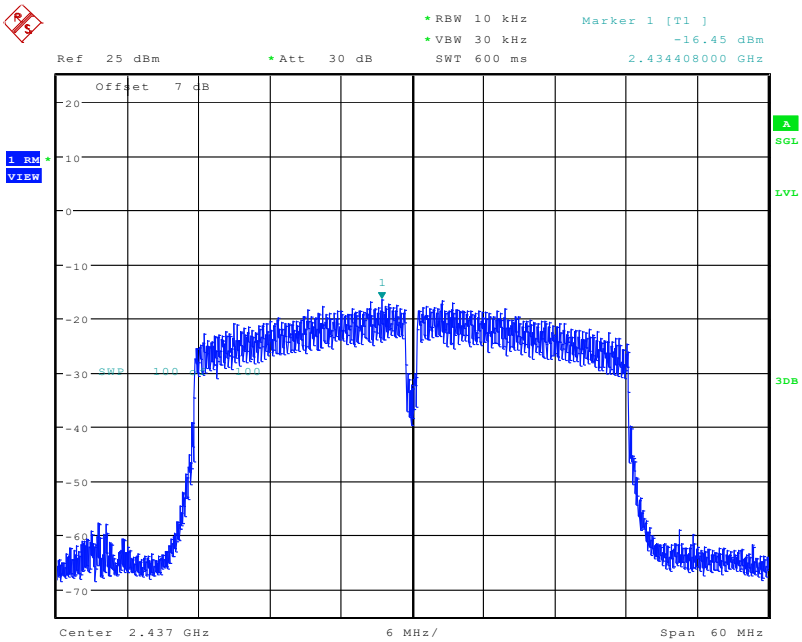


802.11n-HT40 mode:

Low Channel

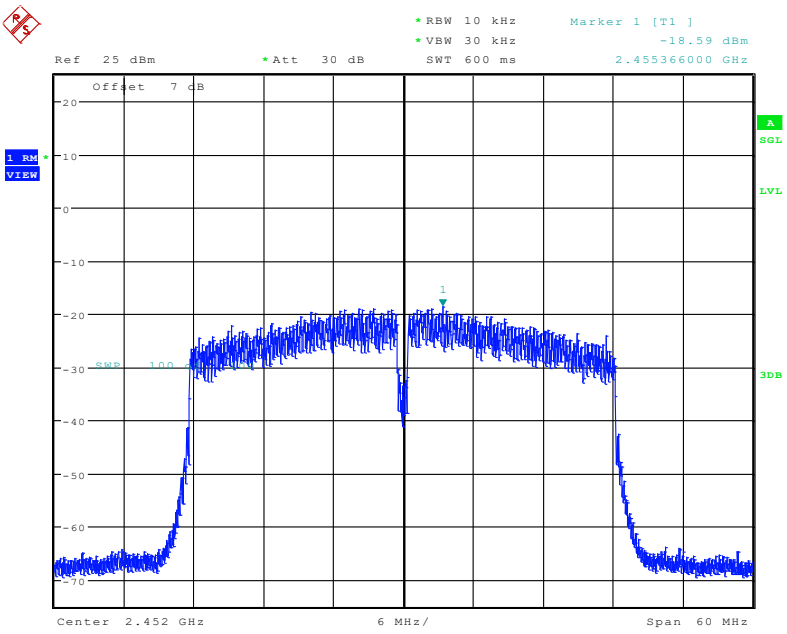


Middle Channel



Date: 25.MAY.2023 14:31:36

High Channel



Date: 25.MAY.2023 14:37:00

******* END OF REPORT *******