FCC PART 15.247

TEST REPORT

For

Hangzhou Sky-Lighting CO., Ltd.

No.161 North Star-Bridge Road, Linping, Hangzhou, Zhejiang 311100, China

FCC ID: 2AVJP-BR30RGBCW10W

Report Type:	**Product Name:**
Original Report	LED lamp

Report Number:	RKSB240522001-00B
Report Date:	2024-10-08
Reviewed By:	Bard Liu
Approved By:	Kyle Xu
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu Province, China Tel: +86-512-86175000 Fax: +86-512-88934268 www.baclcorp.com.cn

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REPORT REVISION HISTORY

Number of Revisions	Report No.	Version	Issue Date	Description
0	RKSB240522001-00B	R1V1	2024-10-08	Initial Release

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Applicant:	Hangzhou Sky-Lighting CO., Ltd.
Tested Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Series Model:	EBC2-1002-RGB
Model Difference:	Model name
Product Name:	LED lamp
Power Supply:	AC 120V
RF Function:	2.4G Wi-Fi; BLE
Maximum Output Power:	2.4G Wi-Fi: 802.11b: 16.74 dBm 802.11g: 15.53 dBm 802.11n20: 15.98 dBm BLE(1Mbps): 3.69 dBm
Operating Band/Frequency:	2.4G Wi-Fi: 2412~2462 MHz(802.11b/g/n20) BLE(1Mbps): 2402-2480 MHz
Channel Number:	2.4G Wi-Fi: 11(802.11b/g/n20) BLE: 40
Channel Separation:	2.4G Wi-Fi: 5 MHz BLE: 2 MHz
Modulation Type:	2.4G Wi-Fi: DSSS, OFDM BLE: GFSK
Antenna Type:	PCB Antenna
★Maximum Antenna Gain:	-6.03 dBi

Note: The maximum antenna gain was declared by the manufacturer.

All measurement and test data in this report was gathered from production sample serial number: RKSB240522001-1 (Assigned by the BACL (Kunshan). The EUT supplied by the applicant was received on 2024-05-22.)

Objective

This report is prepared for *Hangzhou Sky-Lighting CO., Ltd.* in accordance with Part 2-Subpart J, Part 15-Subparts A and C of the Federal Communication Commissions' rules.

The tests were performed in order to determine Compliant 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 Compliant Testing of Unlicensed Wireless Devices and FCC 558074 D01 15.247 Meas Guidance v05r02.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	9 kHz~150 kHz	3.8dB
	150 kHz~30 MHz	3.4dB
	30MHz~1GHz	6.11dB
	1GHz~6GHz	4.45dB
	6GHz~18GHz	5.23dB
	18GHz~40GHz	5.65dB
Occupied Bandwidth		0.5kHz
Temperature		1.0℃
Humidity		6%

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu Province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) is accredited in accordance with ISO/IEC 17025:2017 by NVLAP (Lab code: 600338-0), and the lab has been recognized as the FCC accredited lab under the KDB 974614 D01, the FCC Designation No. : CN5055.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

Channel List for BLE mode:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2430	28	2458
1	2404	15	2432	29	2460
2	2406	16	2434	30	2462
3	2408	17	2436	31	2464
4	2410	18	2438	32	2466
5	2412	19	2440	33	2468
6	2414	20	2442	34	2470
7	2416	21	2444	35	2472
8	2418	22	2446	36	2474
9	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454	/	/
13	2428	27	2456	/	/

EUT was tested with channel 0, 19 and 39.

Channel List for Wi-Fi Mode:

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

For 802.11b, 802.11g and 802.11n-HT20 mode, EUT was tested with Channel 1, 6 and 11.

Equipment Modifications

No modification was made to the EUT tested.

EUT Exercise Software

RF test software: Wifi Test Tool 1.6.0

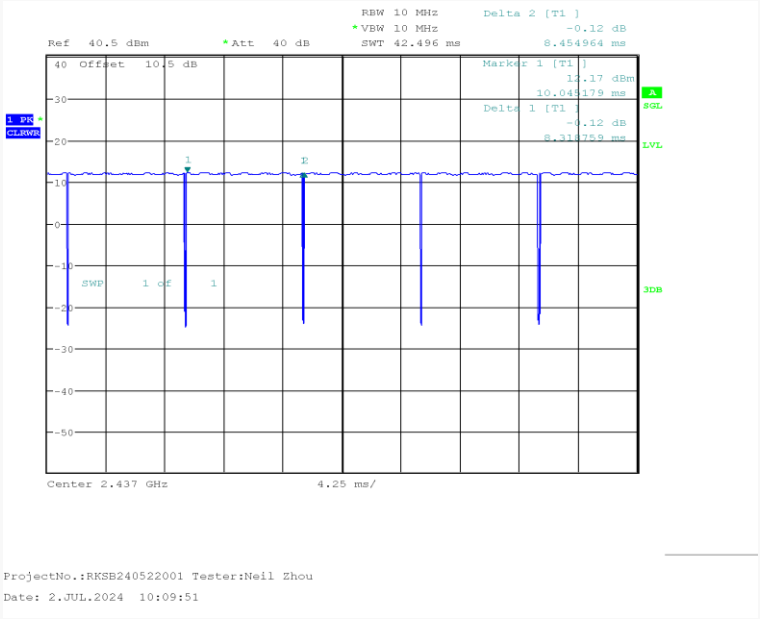
Pre-scan with all the data rates, and the worst case was performed as below:

Mode	Data Rate	Channel (MHz)	★Power Level
802.11b	1 Mbps	2412	15
		2437	15
		2462	15
802.11g	6 Mbps	2412	15
		2437	15
		2462	15
802.11n-HT20	MCS0	2412	15
		2437	15
		2462	15
BLE(1Mbps)	1Mbps	2402	15
		2440	15
		2480	15

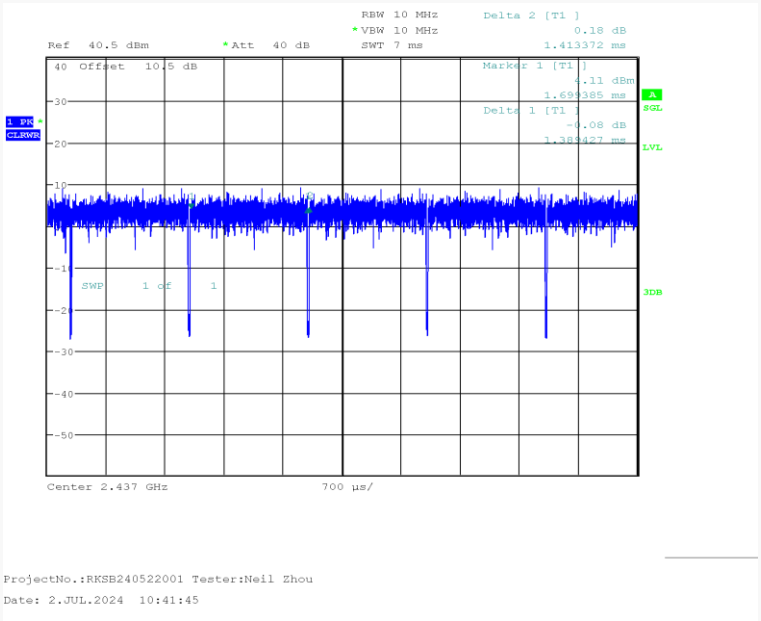
Note: The power level was declared by the applicant.

Duty Cycle:

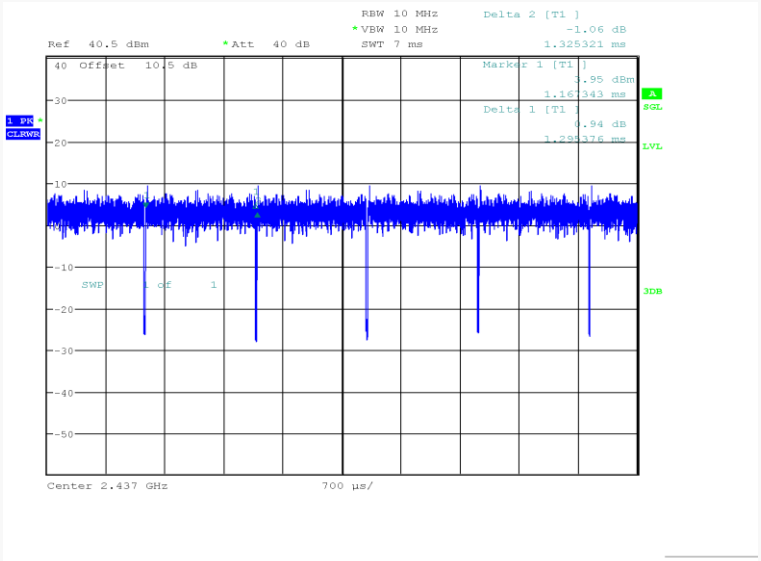
802.11b Mode Middle Channel



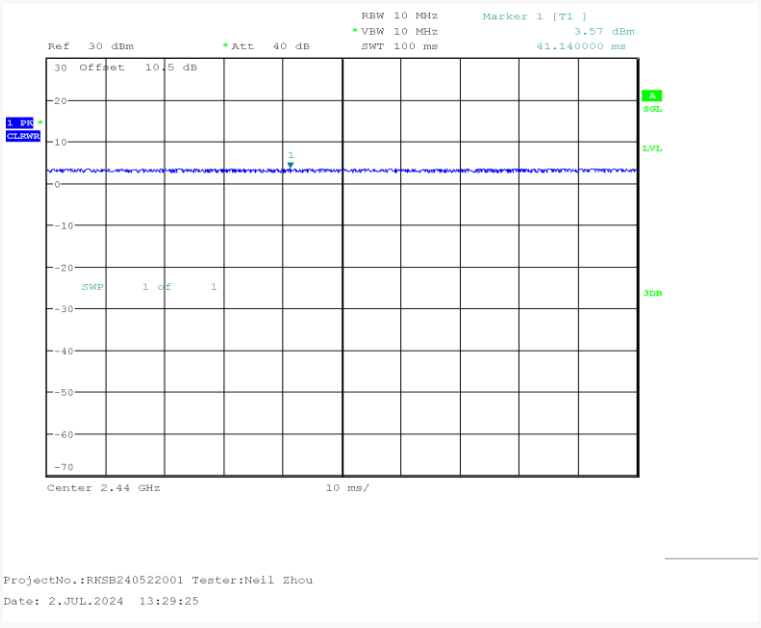
802.11g Mode Middle Channel



802.11n-HT20 Mode Middle Channel



BLE(1Mbps) Mode Middle Channel



Mode	Duty Cycle (%)	Ton(ms)	Ton+off(ms)	10log(1/x)
802.11b	98.39	8.319	8.455	0.07
802.11g	98.30	1.389	1.413	0.07
802.11n-HT20	97.74	1.295	1.325	0.1
BLE(1Mbps)	100	100	100	0

Note: “x” means the Duty Cycle.

Support Equipment List and Details

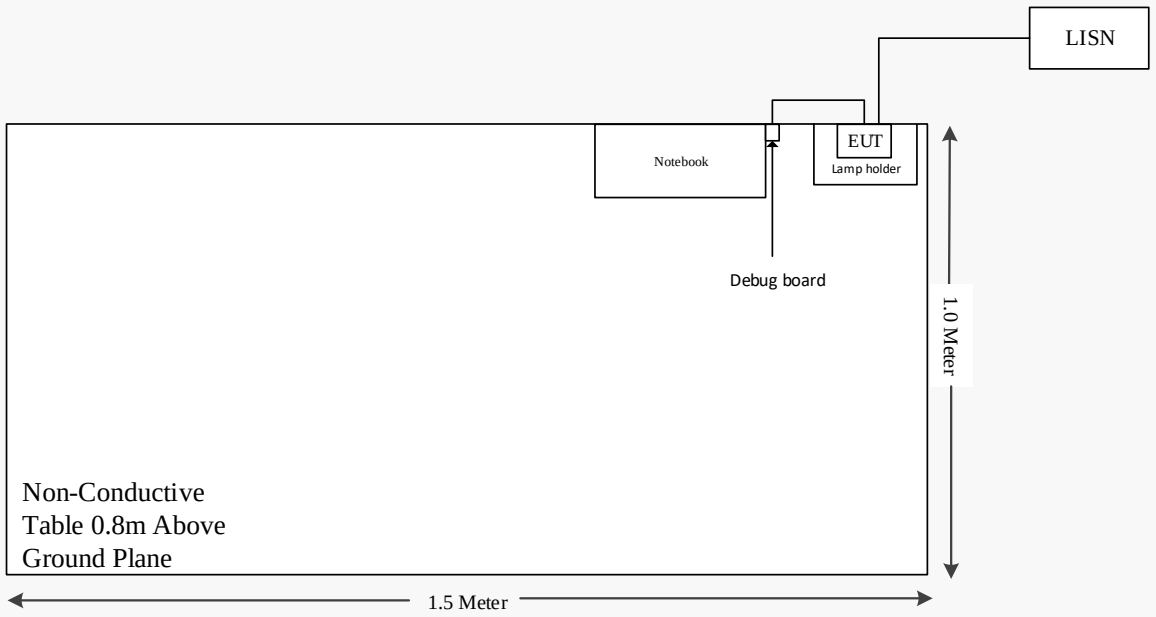
Manufacturer	Description	Model	Serial Number
DELL	Notebook	GX620	D65874152
/	Socket	/	/
/	Lamp holder	/	/
/	Debug board	/	/

External I/O Cable

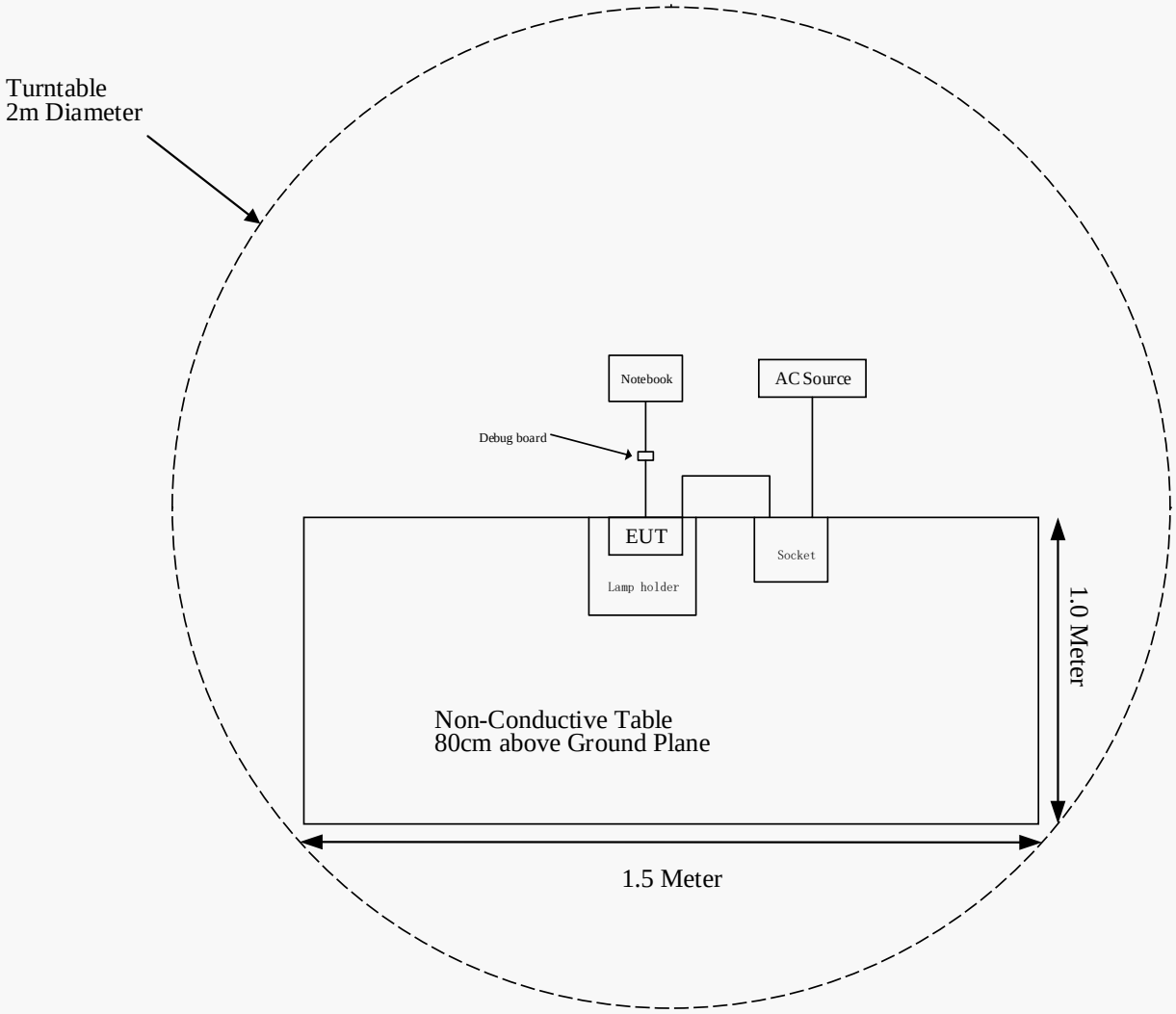
Cable Description	Length (m)	From Port	To Port
Data cable	0.1	EUT	Debug board
Power cable 1	1.0	EUT	LISN
Power cable 2	1.0	Socket	AC Source
USB cable	10	Debug board	Notebook

Block Diagram of Test Setup

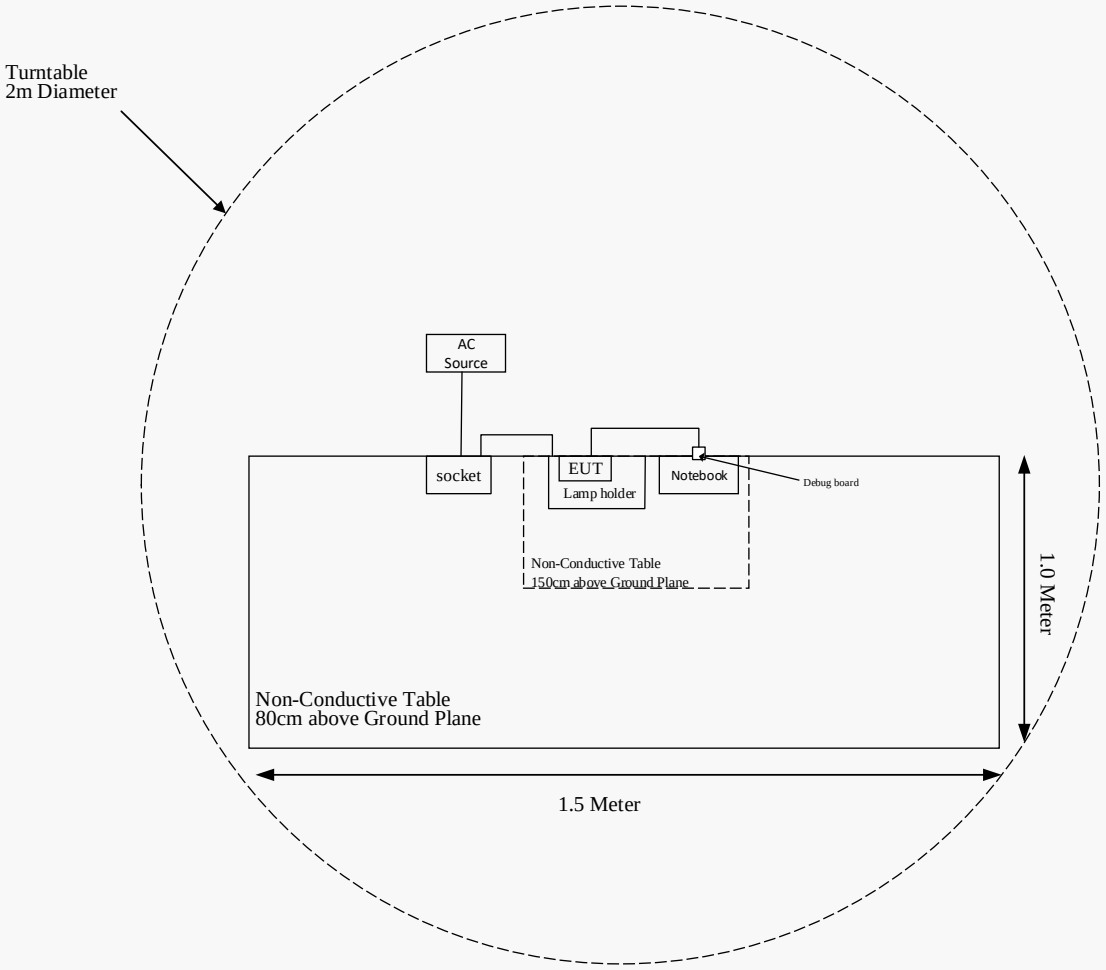
For Conducted Emissions:



For Radiated Emissions (Below 1 GHz):



For Radiated Emissions (Above 1GHz):



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§15.247 (I), §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	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	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
Radiated Emission Test (Chamber #1)					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2024-04-23	2025-04-22
ETS-LINDGREN	Loop Antenna	6512	108100	2023-11-09	2024-11-08
Sonoma Instrument	Pre-amplifier	310N	171205	2024-04-23	2025-04-22
Rohde & Schwarz	Auto Test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-8	008	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-9	009	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-10	010	2024-04-23	2025-04-22
Radiated Emission Test (Chamber #2)					
Rohde & Schwarz	EMI Test Receiver	ESU40	100207/040	2024-04-25	2025-04-24
ETS-LINDGREN	Horn Antenna	3115	9311-4159	2023-12-02	2024-12-01
ETS-LINDGREN	Horn Antenna	3116	2516	2023-12-08	2024-12-07
A.H.Systems, inc	Amplifier	PAM-0118P	512	2024-04-25	2025-04-24
SELECTOR	Amplifier	EM18G40G	060726	2024-04-25	2025-04-24
MICRO-TRONICS	Band Reject Filter	BRM50702	G024	2024-04-25	2025-04-24
Narda	Attenuator	10dB	010	2024-04-25	2025-04-24
Rohde & Schwarz	Auto test Software	EMC32	100361	N/A	N/A
MICRO-COAX	Coaxial Cable	Cable-6	006	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-11	011	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-12	012	2024-04-25	2025-04-24
MICRO-COAX	Coaxial Cable	Cable-13	013	2024-04-25	2025-04-24
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSIQ26	100048	2024-04-24	2025-04-23
Narda	Attenuator	10dB	010	2024-04-25	2025-04-24
Anritsu	Power Sensor	MA24418A	12621	2024-04-23	2025-04-22
XHFDZ	RG178 Coaxial Cable	SMA-178	XHF-1102	Each time	N/A
Conducted Emission Test					
Rohde & Schwarz	EMI Test Receiver	ESR	101746	2024-04-23	2025-04-22
Rohde & Schwarz	LISN	ENV216	101115	2024-04-23	2025-04-22
Audix	Test Software	e3	V9	N/A	N/A
Rohde & Schwarz	Pulse limiter	ESH3-Z2	100552	2024-04-23	2025-04-22
MICRO-COAX	Coaxial Cable	Cable-15	015	2024-04-25	2025-04-24

Statement of Traceability: Bay Area Compliance Laboratories Corp. (Kunshan) attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

FCC §1.1310 & §2.1091 –MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §2.1091 and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary
Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

Calculated Data:

Mode	**Frequency Range (MHz)**	**Antenna Gain**		**★Tune-up Output Power**		**Evaluation Distance (cm)**	**Power Density (mW/cm^2)**	**MPE Limit (mW/cm^2)**
		(dBi)	**(numeric)**	**(dBm)**	**(mW)**			
BLE	2402~2480	-6.03	0.25	4	2.51	20	0.0001	1.0
2.4G Wi-Fi	2412~2462	-6.03	0.25	17	50.12	20	0.0025	1.0

Note:

1. For the above tune up power were declared by the manufacturer.
2. Wi-Fi and BLE cannot transmit simultaneously.

Result: The device meet FCC MPE at 20 cm distance.

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 Compliant 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.
c. 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 Onboard PCB antenna for 2.4G Wi-Fi & BLE, and the antenna gain is -6.03 dBi, which is permanently attached to the unit, fulfill the requirement of this section. Please refer to the EUT photos.

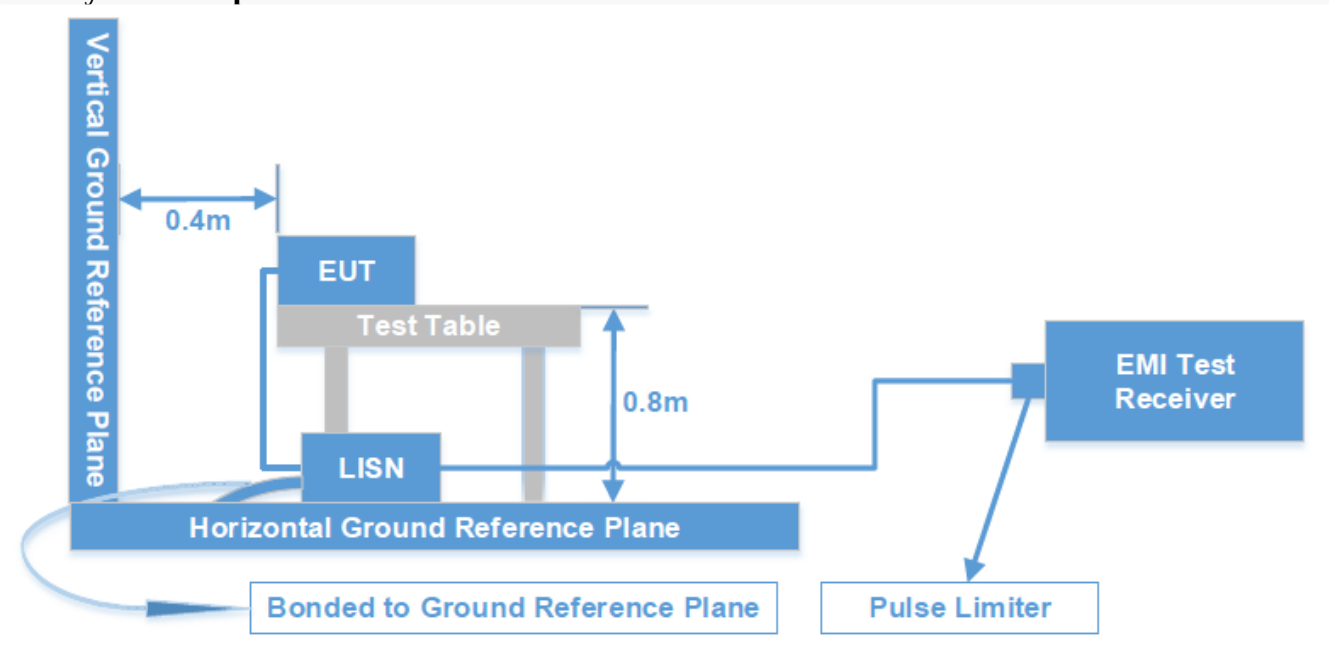
Result: Compliant.

FCC §15.207 (a) - AC LINE CONDUCTED EMISSIONS

Applicable Standard

FCC §15.207(a)

Test System Setup



The measurement procedure of EUT setup is according with ANSI C63.10-2013. The related limit was specified in FCC Part 15.207.

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	RBW	VBW
150 kHz - 30 MHz	9 kHz	30 kHz

Test Procedure

ANSI C63.10-2013 clause 6.2

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

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

If the maximum peak value of the emissions is below the average limit, the QP value and average value measurement will not need to be performed and only record the maximum peak measured value to meet the requirements.

Level & Over Limit Calculation

The Level is calculated by adding LISN VDF (Voltage Division Factor), Cable Loss and Transient Limiter Attenuation from the Meter Reading. The basic equation is as follows:

Factor (dB) = LISN VDF (dB) + Cable Loss (dB) + Transient Limiter Attenuation (dB)
Level (dBμV) = Read level (dBμV) + Factor (dB)

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

Over Limit (dB) = Level (dBμV) - Limit (dBμV)

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.207.

Test Data: See Appendix

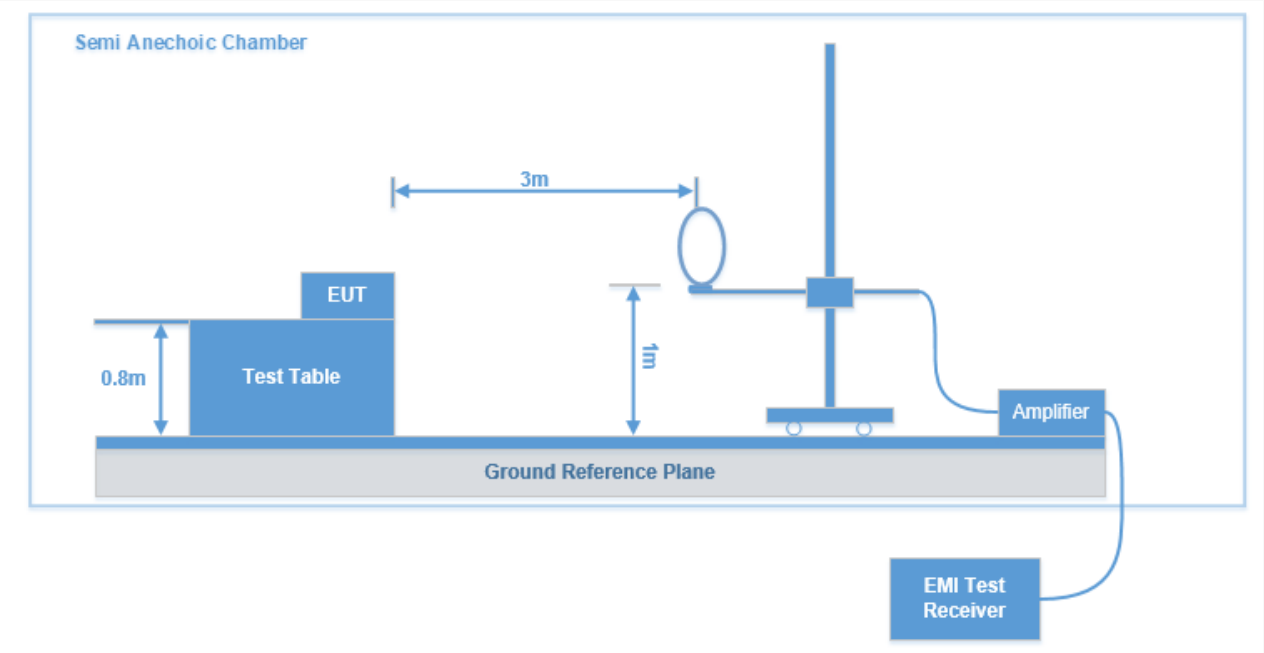
FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

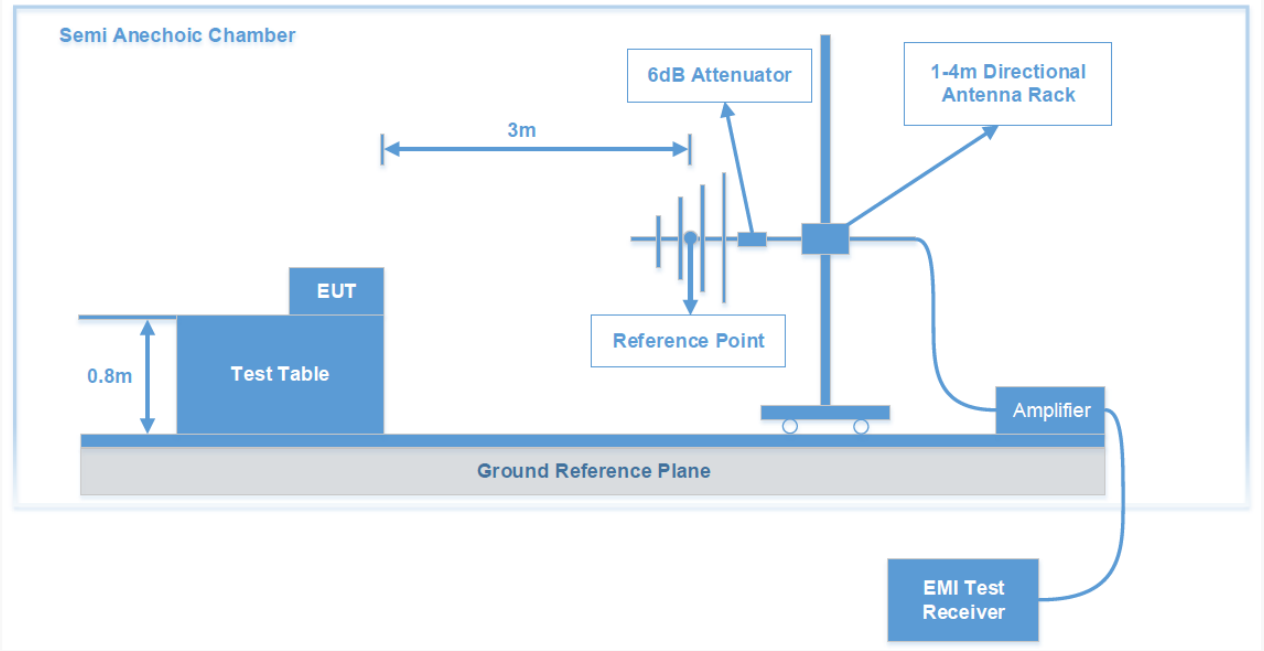
FCC §15.247 (d); §15.209; §15.205;

Test System Setup

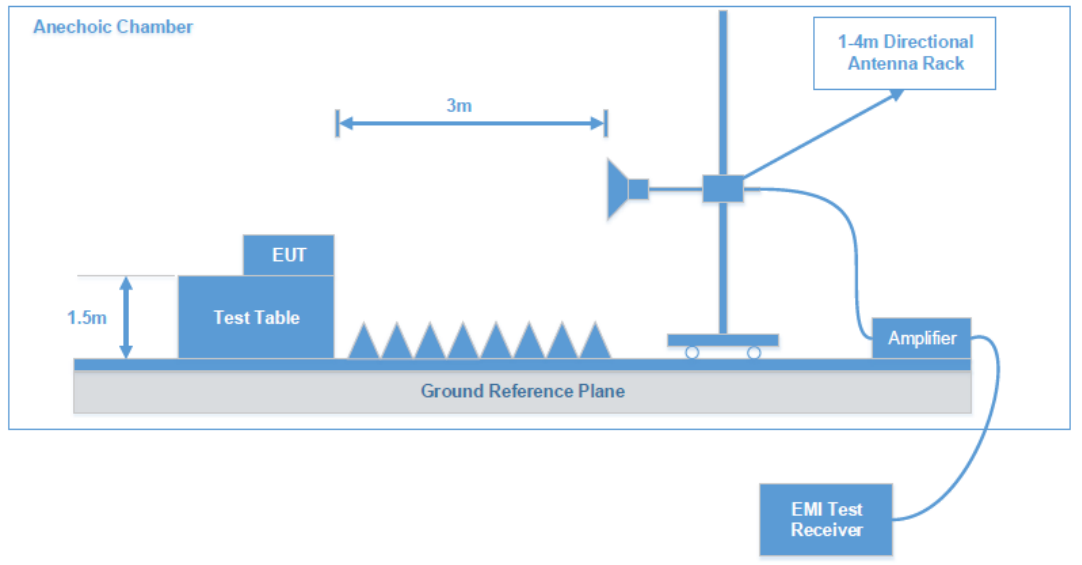
9kHz - 30MHz:



30 MHz - 1 GHz:



Above 1GHz:



The radiated emission tests were performed in the 3 meters test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC 15.209, and FCC 15.247 limits.

EMI Test Receiver Setup

The system was investigated from 9 kHz to 25 GHz.

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

Frequency Range	RBW	VBW	IF B/W	Measurement
9 kHz – 150 kHz	200 Hz	1 kHz	200 Hz	QP/Average
150 kHz – 30 MHz	9 kHz	30 kHz	9 kHz	QP/ Average
30 MHz – 1000 MHz	100 kHz	300 kHz	/	Peak
	/	/	120 kHz	QP
Above 1GHz	1MHz	3 MHz	/	Peak
	1MHz	3 MHz	/	Average

Test Procedure

According to ANSI C63.10-2013 clause 6.5, 6.6 and 6.7.

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

If the measured peak level of the emissions that the measuring receiver reading level plus corrected factor is at least 6 dB below the QP emission limit, there's no need to record the measured QP level of the emissions in the report.

For 9 kHz-30MHz test, the lowest height of the magnetic antenna shall be 1 m above the ground and three antenna orientations (parallel, perpendicular, and ground-parallel) shall be measured.

Corrected Amplitude & 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 (dBμV/m) = Meter Reading (dBμV) + Antenna Factor (dB/m) + Cable Loss (dB) - Amplifier Gain (dB)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin (dB) = Limit (dBμV/m) – Corrected Amplitude (dBμV/m)

Note: The QuasiPeak (dBμV/m), MaxPeak (dBμV/m), Average (dBμV/m) which shown in the data table are all Corrected Amplitude.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247.

Test Data: See Appendix

FCC §15.247(A) (2) - 6 DB EMISSION BANDWIDTH

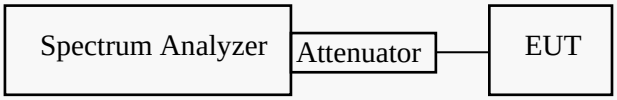
Applicable Standard

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

According to ANSI C63.10-2013 sub-clause 11.8.1

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 * RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.



Note：offset（10.5dB）=Attenuator(10dB)+ cable loss(0.5dB)

Test Data: See Appendix

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

Applicable Standard

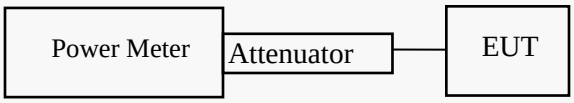
According to FCC §15.247(b) (3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, Compliant with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted 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

According to ANSI C63.10-2013 sub-clause 11.9.1.3

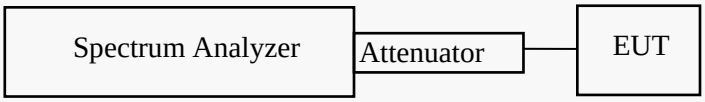
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

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.



For BLE:

1. Set the RBW ≥ DTS bandwidth.
2. Set VBW ≥ 3 * RBW.
3. Set span ≥ 3 * RBW
4. Sweep time = auto couple.
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.



Note：offset（10.5dB）=Attenuator(10dB)+ cable loss(0.5dB)

Test Data: See Appendix

FCC §15.247(D) – 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

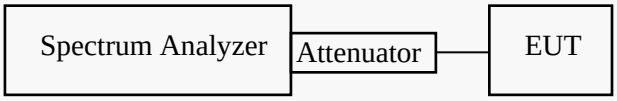
Applicable Standard

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 Compliant 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

According to ANSI C63.10-2013 sub-clause 6.10.

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.



Note：offset（10.5dB）=Attenuator(10dB)+ cable loss(0.5dB)

Test Data: See Appendix

FCC §15.247(E) - POWER SPECTRAL DENSITY

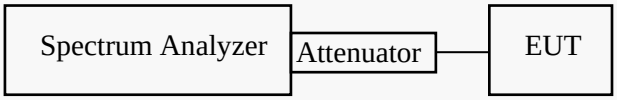
Applicable Standard

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

According to ANSI C63.10-2013 sub-clause 11.10.2

1. Set the RBW to: 3kHz≤ RBW≤100 kHz.
2. Set the VBW ≥ 3*RBW.
3. Set the span to 1.5 times the DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.



Note：offset（10.5dB）=Attenuator(10dB)+ cable loss(0.5dB)

Test Data: See Appendix

Appendix - TEST DATA

Environmental Conditions & Test Information

Test Item:	AC LINE CONDUCTED EMISSIONS	RADIATED EMISSIONS		
		9 kHz-1 GHz	1 GHz - 18 GHz	18 GHz -25 GHz
Test Date:	2024-06-27	2024-06-24	2024-06-24	2024-07-13
Temperature:	24.4 ℃	23.9 ℃	23.9 ℃	23.3 ℃
Relative Humidity:	66 %	59 %	59 %	52 %
ATM Pressure:	100.1 kPa	100.6 kPa	100.6 kPa	101.0 kPa
Test Result:	Pass	Pass	Pass	Pass
Test Engineer:	Joe Zhang	Leah Li	Hugh Wu	Hugh Wu

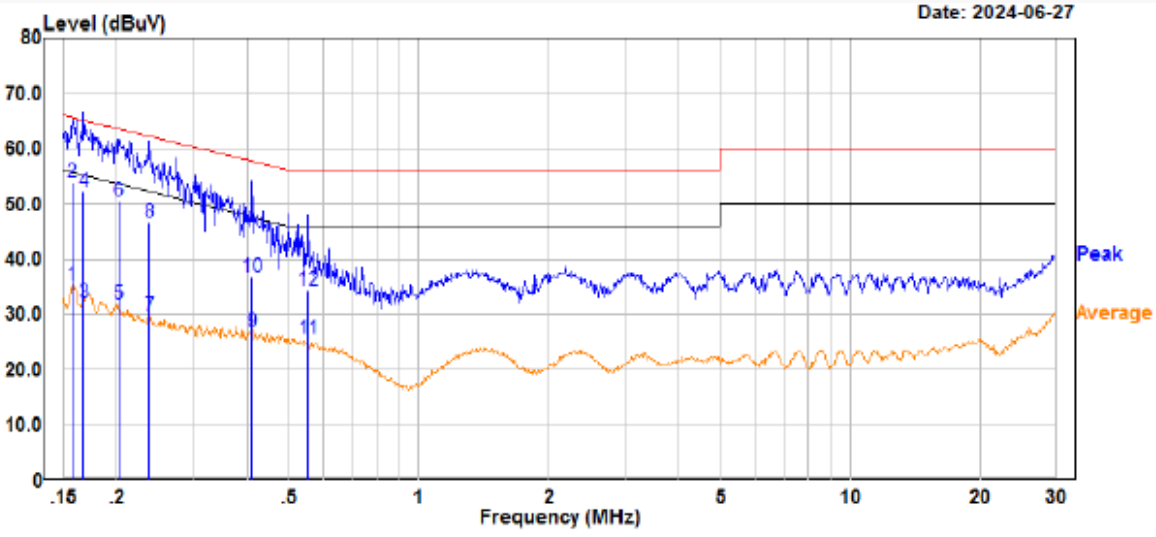
Test Item:	6 DB EMISSION BANDWIDTH	POWER SPECTRAL DENSITY	TRANSMITTER OUTPUT POWER MEASUREMENT	OUT OF BAND EMISSIONS	DUTY CYCLE
Test Date:	2024-07-02				
Temperature:	23.7 ℃				
Relative Humidity:	51 %				
ATM Pressure:	100.0 kPa				
Test Result:	Pass				
Test Engineer:	Neil Zhou				

AC LINE CONDUCTED EMISSIONS

For Wi-Fi Mode:

EUT operation mode: Transmitting in maximum output power mode 802.11b mode Low channel

Line:

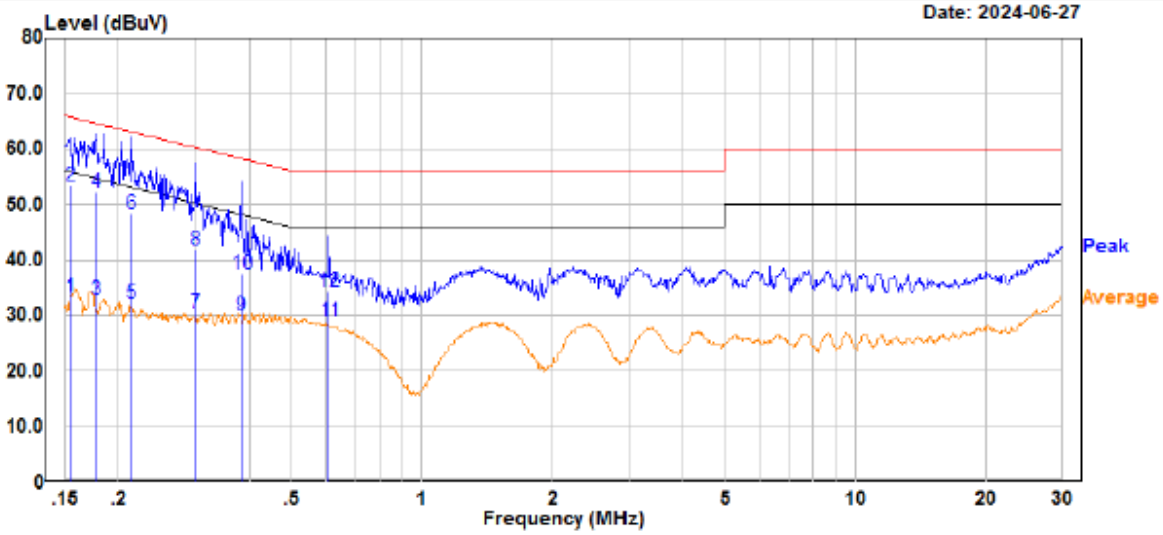


Trace: 1

Site : CE
Condition : limit\FCC PART 15.207
: DET:Peak
Project No. : RKSB240522001
Model : QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Phase : L
Voltage : 120V/60Hz
Mode : 2.4G WIFI
Test Equipment : ENV216,ESR
Temperature : 24.4℃
Humidity : 66%
Atmospheric pressure: 100.1kPa
Test Engineer : Joe Zhang

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.158	15.11	20.11	35.22	55.59	-20.37	Average
2	0.158	33.91	20.11	54.02	65.59	-11.57	QP
3	0.167	12.00	20.11	32.11	55.09	-22.98	Average
4	0.167	32.20	20.11	52.31	65.09	-12.78	QP
5	0.202	11.90	20.11	32.01	53.52	-21.51	Average
6	0.202	30.50	20.11	50.61	63.52	-12.91	QP
7	0.237	9.60	20.13	29.73	52.19	-22.46	Average
8	0.237	26.60	20.13	46.73	62.19	-15.46	QP
9	0.411	6.60	20.21	26.81	47.64	-20.83	Average
10	0.411	16.60	20.21	36.81	57.64	-20.83	QP
11	0.554	5.60	20.11	25.71	46.00	-20.29	Average
12	0.554	14.10	20.11	34.21	56.00	-21.79	QP

Neutral:



Trace: 1

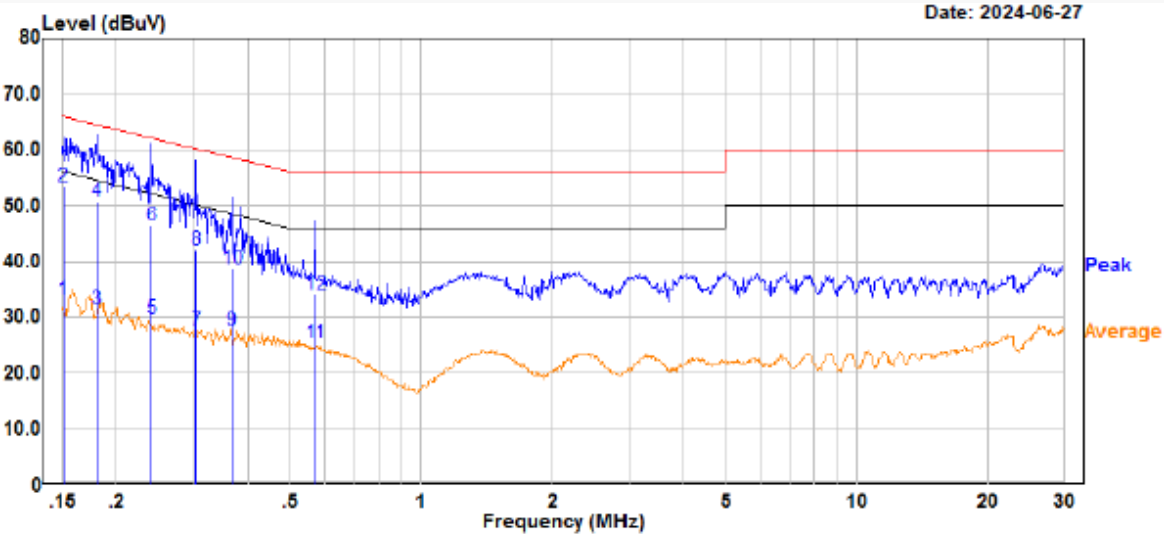
Site : CE
Condition : limit\FCC PART 15.207
: DET:Peak
Project No. : RKSB240522001
Model : QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Phase : N
Voltage : 120V/60Hz
Mode : 2.4G WIFI
Test Equipment : ENV216,ESR
Temperature : 24.4℃
Humidity : 66%
Atmospheric pressure: 100.1kPa
Test Engineer : Joe Zhang

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.155	13.31	20.11	33.42	55.75	-22.33	Average
2	0.155	33.21	20.11	53.32	65.75	-12.43	QP
3	0.177	12.77	20.12	32.89	54.63	-21.74	Average
4	0.177	31.99	20.12	52.11	64.63	-12.52	QP
5	0.214	12.10	20.12	32.22	53.06	-20.84	Average
6	0.214	28.30	20.12	48.42	63.06	-14.64	QP
7	0.300	10.20	20.17	30.37	50.25	-19.88	Average
8	0.300	21.70	20.17	41.87	60.25	-18.38	QP
9	0.383	9.80	20.20	30.00	48.22	-18.22	Average
10	0.383	17.30	20.20	37.50	58.22	-20.72	QP
11	0.612	8.90	20.09	28.99	46.00	-17.01	Average
12	0.612	14.20	20.09	34.29	56.00	-21.71	QP

For BLE Mode:

EUT operation mode: Transmitting in maximum output power mode Low channel

Line

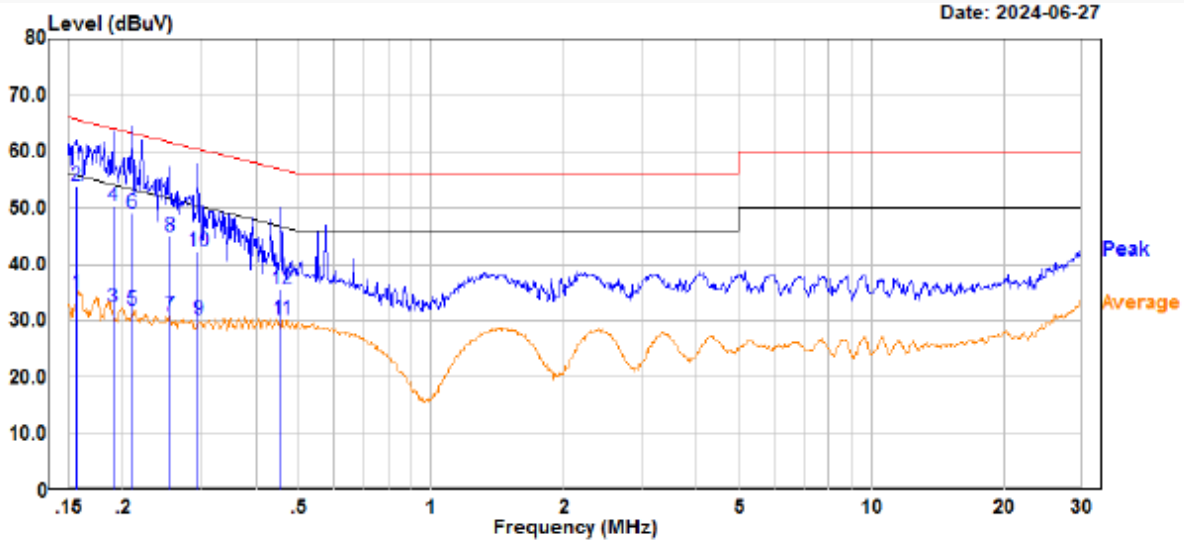


Trace: 1

Site : CE
Condition : limit\FCC PART 15.207
: DET:Peak
Project No. : RKSB240522001
Model : QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Phase : L
Voltage : 120V/60Hz
Mode : BLE 1M
Test Equipment : ENV216,ESR
Temperature : 24.4℃
Humidity : 66%
Atmospheric pressure: 100.1kPa
Test Engineer : Joe Zhang

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.151	12.90	20.12	33.02	55.96	-22.94	Average
2	0.151	33.20	20.12	53.32	65.96	-12.64	QP
3	0.180	11.29	20.12	31.41	54.47	-23.06	Average
4	0.180	30.69	20.12	50.81	64.47	-13.66	QP
5	0.241	9.50	20.13	29.63	52.07	-22.44	Average
6	0.241	26.30	20.13	46.43	62.07	-15.64	QP
7	0.304	7.40	20.17	27.57	50.12	-22.55	Average
8	0.304	22.00	20.17	42.17	60.12	-17.95	QP
9	0.368	7.30	20.20	27.50	48.55	-21.05	Average
10	0.368	18.40	20.20	38.60	58.55	-19.95	QP
11	0.570	5.40	20.10	25.50	46.00	-20.50	Average
12	0.570	14.10	20.10	34.20	56.00	-21.80	QP

Neutral



Site : CE
Condition : limit\FCC PART 15.207
: DET:Peak
Project No. : RKSB240522001
Model : QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Phase : N
Voltage : 120V/60Hz
Mode : BLE 1M
Test Equipment : ENV216,ESR
Temperature : 24.4℃
Humidity : 66%
Atmospheric pressure: 100.1kPa
Test Engineer : Joe Zhang

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	
1	0.156	14.71	20.11	34.82	55.67	-20.85	Average
2	0.156	33.81	20.11	53.92	65.67	-11.75	QP
3	0.190	12.40	20.11	32.51	54.05	-21.54	Average
4	0.190	30.10	20.11	50.21	64.05	-13.84	QP
5	0.209	11.90	20.12	32.02	53.23	-21.21	Average
6	0.209	28.90	20.12	49.02	63.23	-14.21	QP
7	0.254	10.80	20.14	30.94	51.61	-20.67	Average
8	0.254	24.90	20.14	45.04	61.61	-16.57	QP
9	0.295	10.00	20.16	30.16	50.37	-20.21	Average
10	0.295	22.10	20.16	42.26	60.37	-18.11	QP
11	0.456	10.00	20.22	30.22	46.77	-16.55	Average
12	0.456	15.20	20.22	35.42	56.77	-21.35	QP

SPURIOUS EMISSIONS

Test Result: Compliant

EUT operation mode: Transmitting
After pre-scan in the X, Y and Z axes of orientation, the worst case in the X axes of orientation is below:

9 kHz-30MHz:

For Wi-Fi Mode:

Transmitting in maximum output power mode 802.11b mode low channel
The amplitude of spurious emissions attenuated more than 20 dB below the limit was not be recorded.

For BLE Mode:

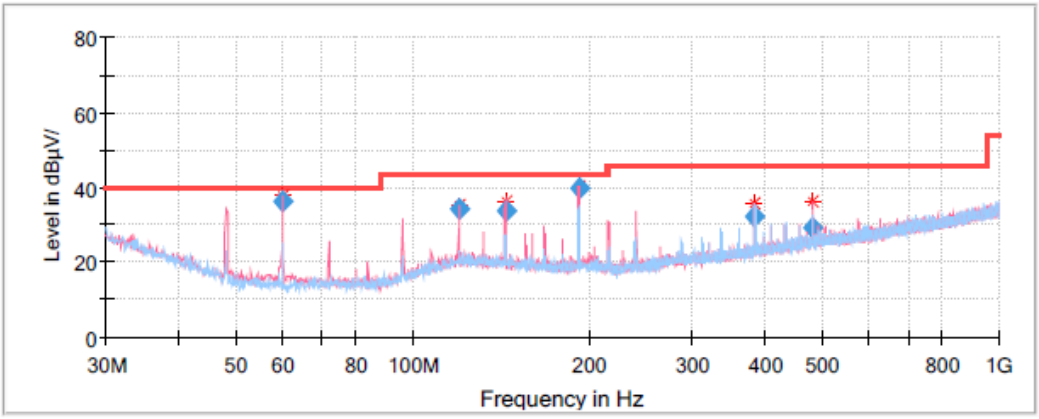
Transmitting in maximum output power mode BLE 1M mode low channel
The amplitude of spurious emissions attenuated more than 20 dB below the limit was not be recorded.

For Wi-Fi Mode:
30 MHz - 1GHz（802.11b mode is worst case）:

Low channel: 2412MHz

Common Information

Project No:	RKSB240522001
EUT Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Test Mode:	Transmitting in 802.11b mode low channel
Standard:	FCC Part 15.205 & FCC Part 15.209& Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	23.9℃
Humidity:	59%
Barometric Pressure:	100.6kPa
Test Engineer:	Leah Li
Test Date:	2024/6/24



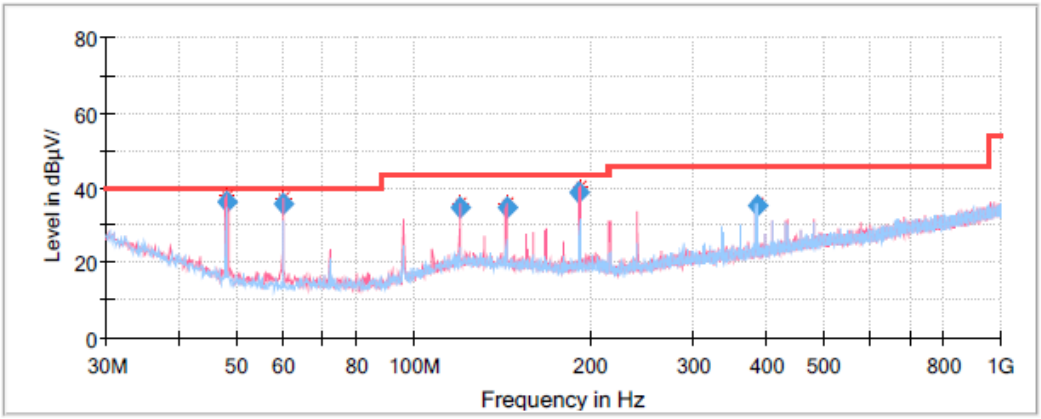
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
60.010850	36.11	40.00	3.89	V	-17.6
120.005600	34.09	43.50	9.41	V	-10.9
144.429550	33.96	43.50	9.54	V	-11.6
192.106350	39.79	43.50	3.71	V	-12.5
384.188650	32.28	46.00	13.72	H	-8.4
480.346700	29.14	46.00	16.86	V	-5.9

Middle channel: 2437MHz

Common Information

Project No:	RKSB240522001
EUT Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Test Mode:	Transmitting in 802.11b mode middle channel
Standard:	FCC Part 15.205 & FCC Part 15.209& Part
Test Equipment:	15.247 ESCI, JB3, 310N
Temperature:	23.9℃
Humidity:	59%
Barometric Pressure:	100.6kPa
Test Engineer:	Leah Li
Test Date:	2024/6/24



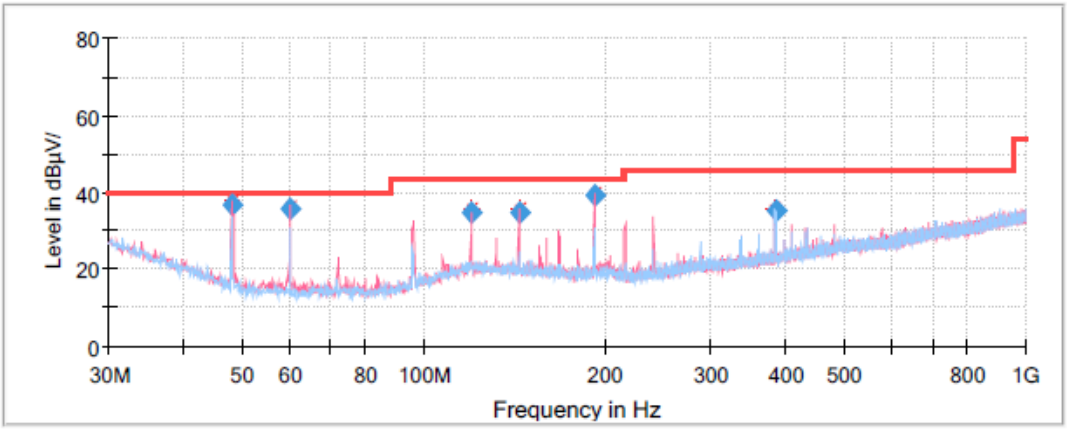
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
48.008000	36.01	40.00	3.99	V	-15.7
59.996450	35.77	40.00	4.23	V	-17.6
120.013700	34.91	43.50	8.59	V	-10.9
144.147400	34.61	43.50	8.89	V	-11.6
191.799550	38.57	43.50	4.93	V	-12.5
385.563700	35.26	46.00	10.74	H	-8.3

High Channel: 2462MHz

Common Information

Project No:	RKSB240522001
EUT Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Test Mode:	Transmitting in 802.11b mode high channel
Standard:	FCC Part 15.205 & FCC Part 15.209& Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	23.9℃
Humidity:	59%
Barometric Pressure:	100.6kPa
Test Engineer:	Leah Li
Test Date:	2024/6/24



Final_Result

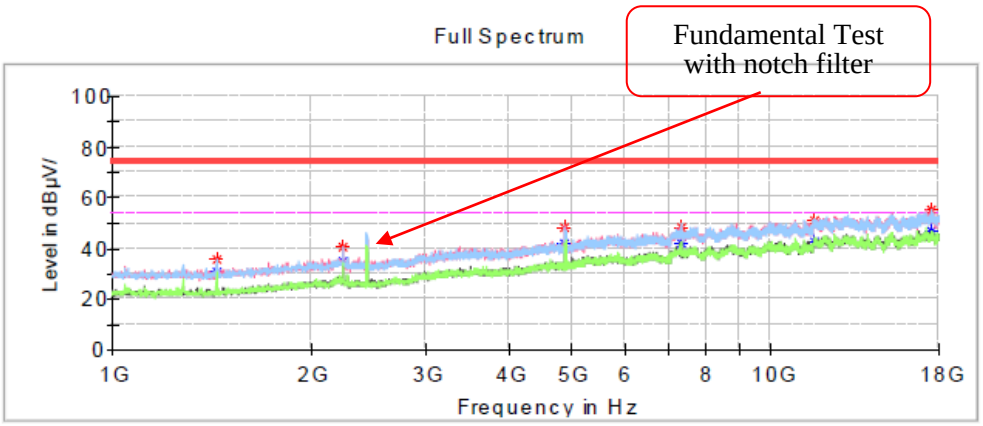
Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
48.007400	36.69	40.00	3.31	V	-15.7
60.003950	35.48	40.00	4.52	V	-17.6
119.994200	34.70	43.50	8.80	V	-10.9
144.471700	34.91	43.50	8.59	V	-11.6
192.160800	39.19	43.50	4.31	V	-12.5
385.269050	35.10	46.00	10.90	H	-8.4

1GHz-18GHz:
802.11b Mode:

Low Channel: 2412MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11n20 mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



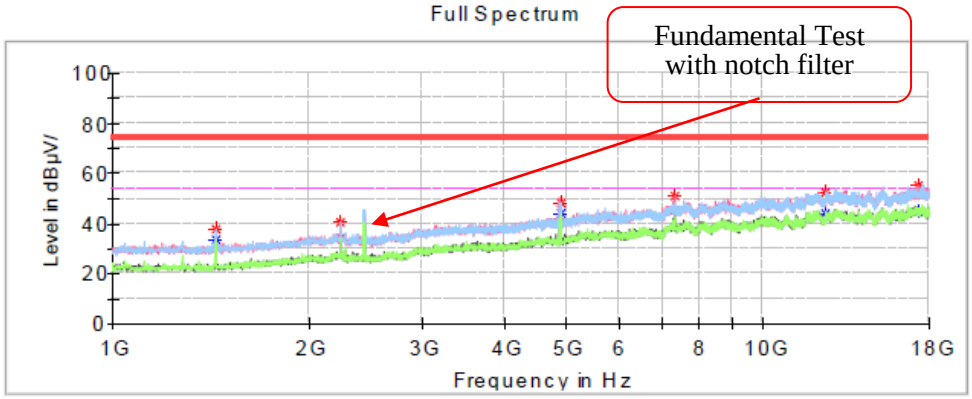
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	31.06	54.00	22.94	H	-14.8
1438.600000	35.89	---	74.00	38.11	H	-14.8
2239.300000	---	34.88	54.00	19.12	H	-11.0
2239.300000	40.55	---	74.00	33.45	H	-11.0
4867.500000	---	42.28	54.00	11.72	H	-2.9
4867.500000	48.43	---	74.00	25.57	H	-2.9
7318.900000	48.14	---	74.00	25.86	H	3.4
7318.900000	---	42.20	54.00	11.80	H	3.4
11677.700000	---	42.72	54.00	11.28	V	8.9
11677.700000	50.89	---	74.00	23.11	V	8.9
17590.300000	---	46.56	54.00	7.44	V	11.6
17590.300000	55.37	---	74.00	18.63	V	11.6

Middle Channel: 2437MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11b mode of middle channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



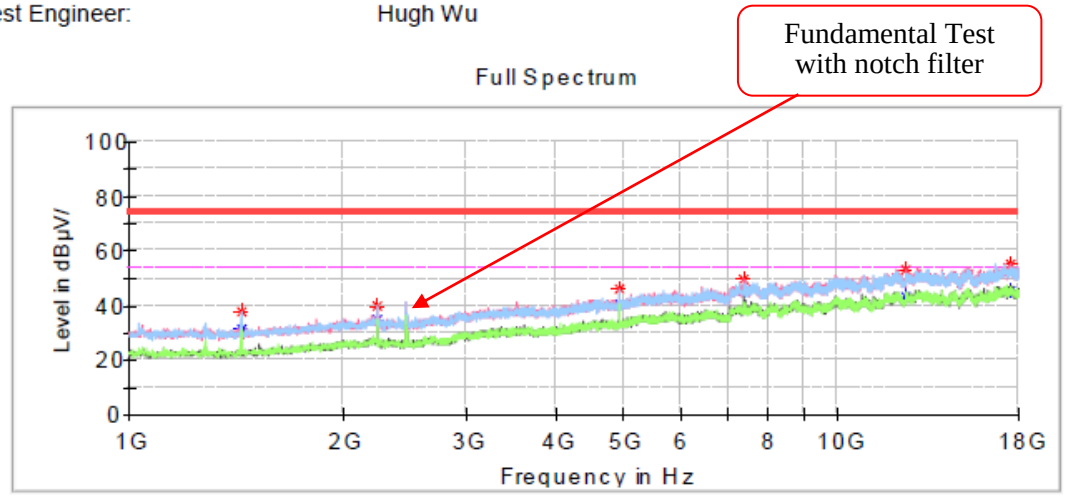
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	33.45	54.00	20.55	H	-14.8
1438.600000	37.59	---	74.00	36.41	H	-14.8
2239.300000	40.32	---	74.00	33.68	H	-11.0
2239.300000	---	34.32	54.00	19.68	H	-11.0
4879.400000	---	44.04	54.00	9.96	H	-2.9
4879.400000	48.29	---	74.00	25.71	H	-2.9
7310.400000	50.82	---	74.00	23.18	V	3.4
7310.400000	---	45.47	54.00	8.53	V	3.4
12519.200000	52.57	---	74.00	21.43	H	9.7
12519.200000	---	43.93	54.00	10.07	H	9.7
17292.800000	---	44.97	54.00	9.03	H	11.8
17292.800000	54.94	---	74.00	19.06	H	11.8

High Channel: 2462MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11b mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	31.65	54.00	22.35	H	-14.8
1438.600000	37.44	---	74.00	36.56	H	-14.8
2239.300000	39.52	---	74.00	34.48	H	-11.0
2239.300000	---	34.79	54.00	19.21	H	-11.0
4918.500000	---	40.69	54.00	13.31	V	-2.7
4918.500000	45.83	---	74.00	28.17	V	-2.7
7383.500000	---	45.44	54.00	8.56	V	3.6
7383.500000	49.33	---	74.00	24.67	V	3.6
12503.900000	---	43.56	54.00	10.44	V	9.7
12503.900000	53.19	---	74.00	20.81	V	9.7
17556.300000	---	45.62	54.00	8.38	V	11.6
17556.300000	54.90	---	74.00	19.10	V	11.6

802.11g Mode:

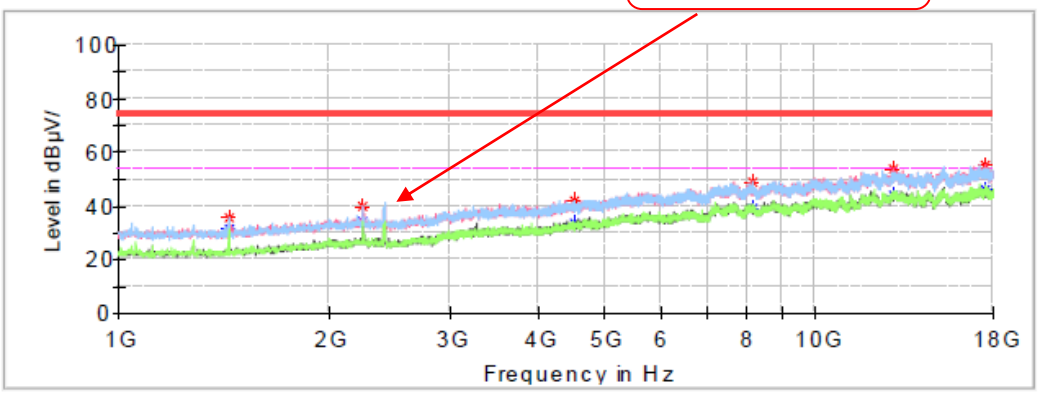
Low Channel: 2412MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11g mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum

Fundamental Test with notch filter



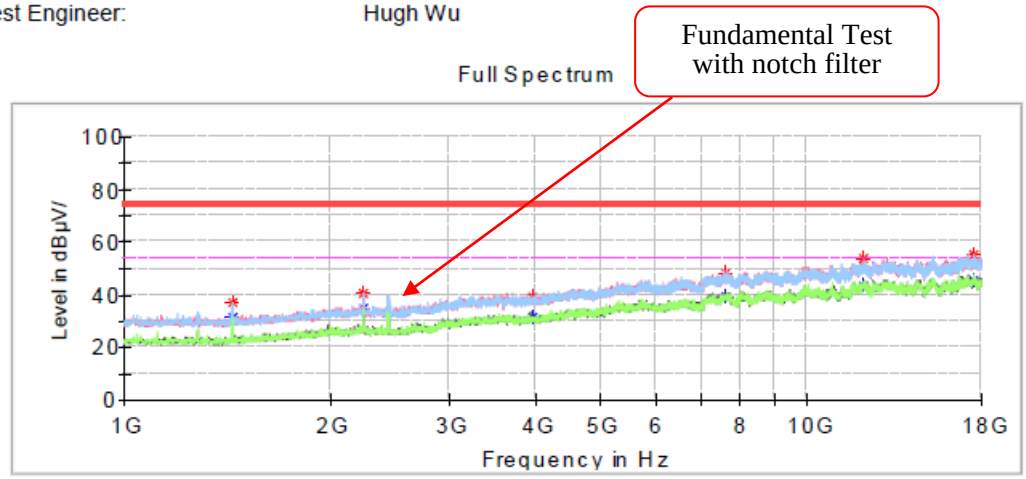
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	35.89	---	74.00	38.11	H	-14.8
1438.600000	---	31.42	54.00	22.58	H	-14.8
2239.300000	39.99	---	74.00	34.01	H	-11.0
2239.300000	---	34.33	54.00	19.67	H	-11.0
4508.800000	---	33.80	54.00	20.20	H	-4.2
4508.800000	42.21	---	74.00	31.79	H	-4.2
8141.700000	---	39.44	54.00	14.56	H	4.3
8141.700000	49.05	---	74.00	24.95	H	4.3
12971.400000	---	43.84	54.00	10.16	V	9.7
12971.400000	54.17	---	74.00	19.83	V	9.7
17563.100000	---	45.88	54.00	8.12	V	11.6
17563.100000	55.16	---	74.00	18.84	V	11.6

Middle Channel: 2437MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11g mode of middle channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



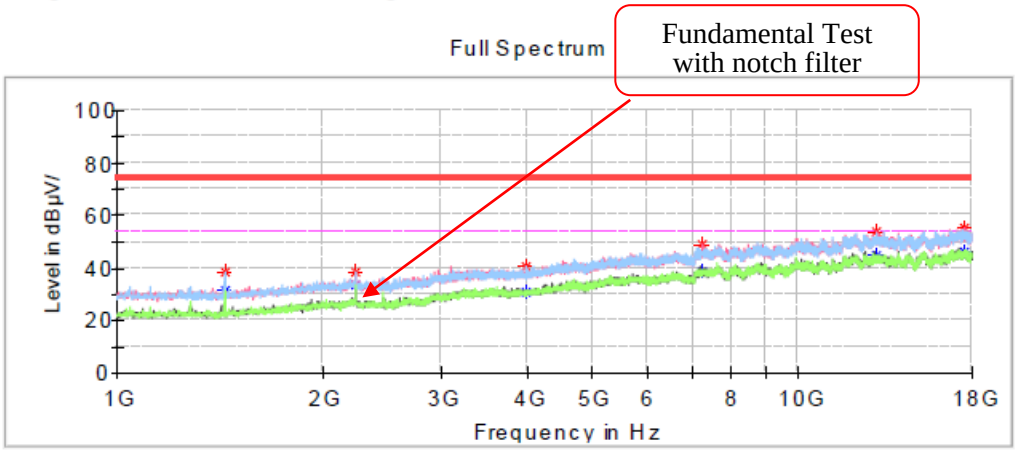
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	31.40	54.00	22.60	H	-14.8
1438.600000	37.31	---	74.00	36.69	H	-14.8
2239.300000	---	34.63	54.00	19.37	H	-11.0
2239.300000	40.84	---	74.00	33.16	H	-11.0
3951.200000	---	31.64	54.00	22.36	H	-6.0
3951.200000	39.43	---	74.00	34.57	H	-6.0
7604.500000	---	38.92	54.00	15.08	V	3.9
7604.500000	48.13	---	74.00	25.87	V	3.9
12089.100000	---	43.50	54.00	10.50	V	9.1
12089.100000	53.65	---	74.00	20.35	V	9.1
17530.800000	---	45.78	54.00	8.22	H	11.6
17530.800000	55.10	---	74.00	18.90	H	11.6

High Channel: 2462MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11g mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



Critical_Freqs

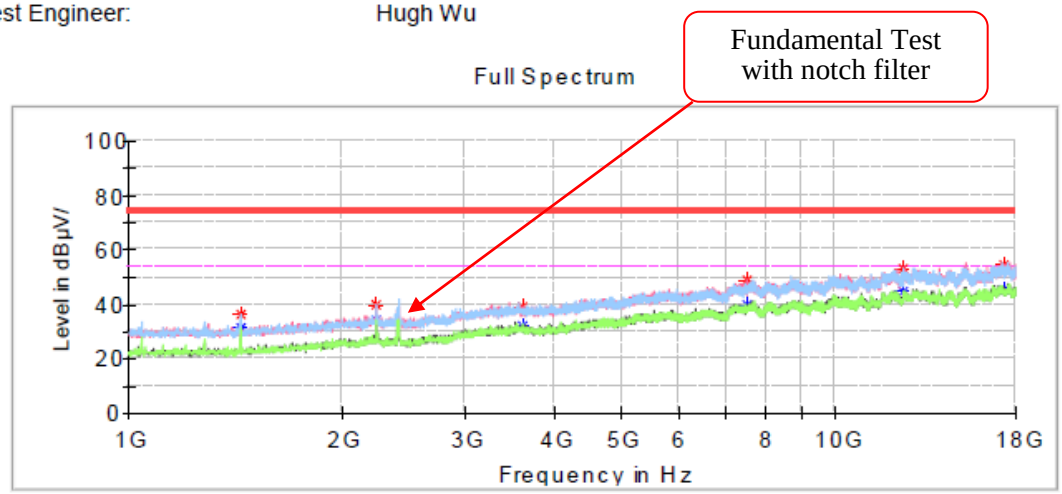
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	31.57	54.00	22.43	H	-14.8
1438.600000	38.56	---	74.00	35.44	H	-14.8
2239.300000	---	33.49	54.00	20.51	H	-11.0
2239.300000	38.73	---	74.00	35.27	H	-11.0
3998.800000	---	30.69	54.00	23.31	H	-5.9
3998.800000	40.45	---	74.00	33.55	H	-5.9
7254.300000	---	38.47	54.00	15.53	H	3.3
7254.300000	48.82	---	74.00	25.18	H	3.3
13002.000000	---	44.44	54.00	9.56	H	9.7
13002.000000	53.99	---	74.00	20.01	H	9.7
17598.800000	---	46.46	54.00	7.54	V	11.6
17598.800000	55.21	---	74.00	18.79	V	11.6

802.11n-HT20 Mode :

Low Channel: 2412MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11n20 mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



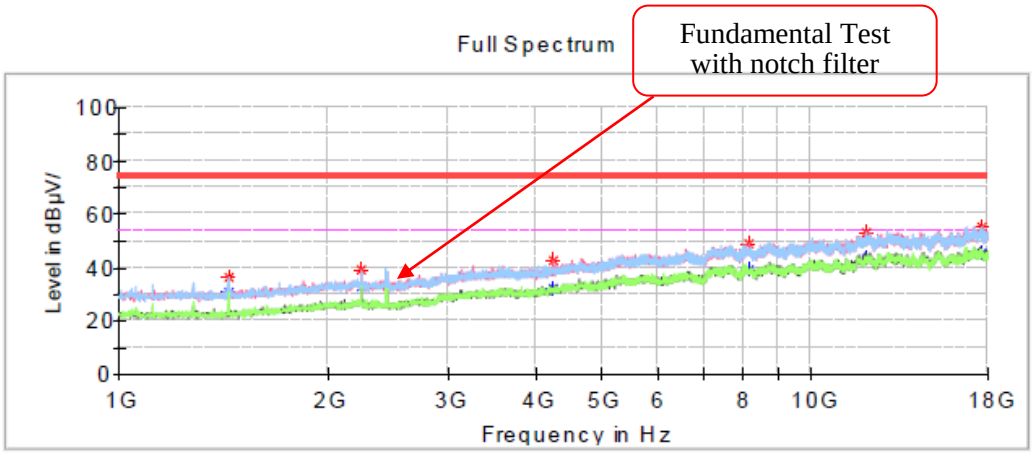
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	31.47	54.00	22.53	H	-14.8
1438.600000	36.24	---	74.00	37.76	H	-14.8
2239.300000	---	34.26	54.00	19.74	H	-11.0
2239.300000	40.12	---	74.00	33.88	H	-11.0
3611.200000	---	32.40	54.00	21.60	V	-6.2
3611.200000	38.94	---	74.00	35.06	V	-6.2
7502.500000	---	40.00	54.00	14.00	V	3.9
7502.500000	48.91	---	74.00	25.09	V	3.9
12503.900000	---	44.99	54.00	9.01	V	9.7
12503.900000	53.17	---	74.00	20.83	V	9.7
17297.900000	---	45.18	54.00	8.82	H	11.8
17297.900000	54.84	---	74.00	19.16	H	11.8

Middle Channel: 2437MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11n20 mode of middle channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



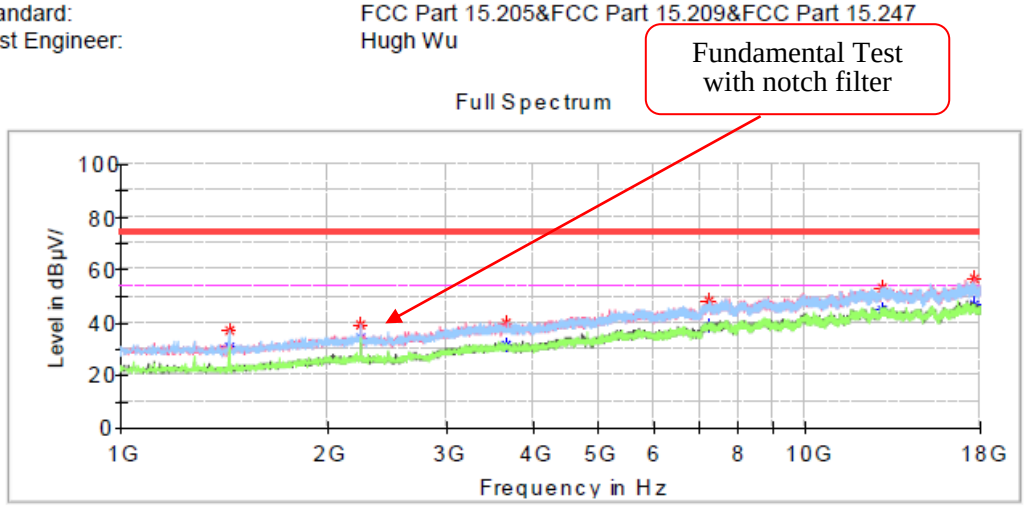
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	36.52	---	74.00	37.48	H	-14.8
1438.600000	---	31.10	54.00	22.90	H	-14.8
2239.300000	38.85	---	74.00	35.15	H	-11.0
2239.300000	---	33.21	54.00	20.79	H	-11.0
4245.300000	---	32.36	54.00	21.64	H	-5.1
4245.300000	42.39	---	74.00	31.61	H	-5.1
8146.800000	---	39.44	54.00	14.56	V	4.4
8146.800000	48.80	---	74.00	25.20	V	4.4
12061.900000	---	43.15	54.00	10.85	H	9.1
12061.900000	53.20	---	74.00	20.80	H	9.1
17629.400000	---	45.36	54.00	8.64	H	11.6
17629.400000	55.31	---	74.00	18.69	H	11.6

High Channel: 2462MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11n20 mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



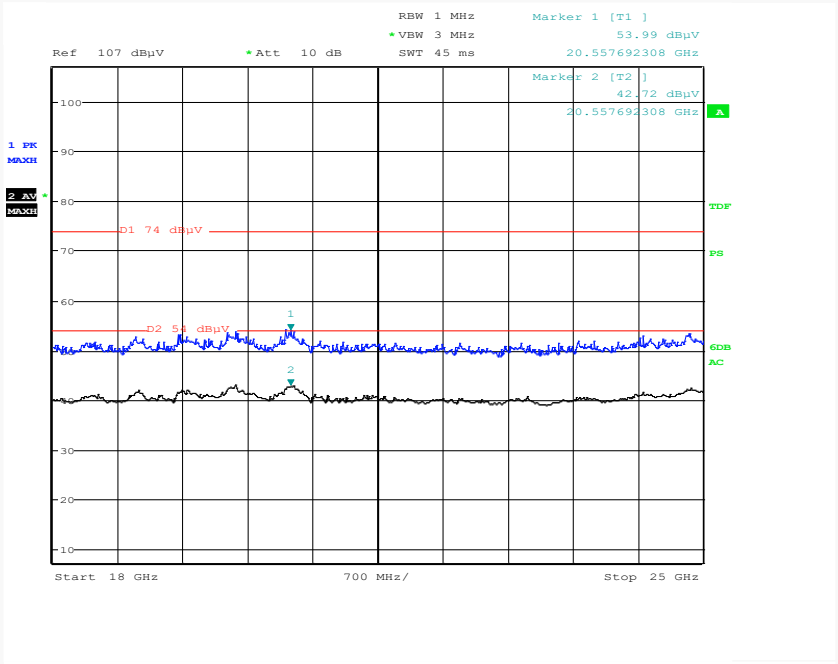
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	37.30	---	74.00	36.70	H	-14.8
1438.600000	---	31.12	54.00	22.88	H	-14.8
2239.300000	---	34.36	54.00	19.64	V	-11.0
2239.300000	39.46	---	74.00	34.54	V	-11.0
3657.100000	---	31.47	54.00	22.53	V	-6.2
3657.100000	40.12	---	74.00	33.88	V	-6.2
7215.200000	---	38.69	54.00	15.31	V	3.2
7215.200000	48.57	---	74.00	25.43	V	3.2
12993.500000	---	44.47	54.00	9.53	V	9.7
12993.500000	53.19	---	74.00	20.81	V	9.7
17614.100000	---	46.87	54.00	7.13	V	11.6
17614.100000	56.89	---	74.00	17.11	V	11.6

18GHz-25GHz:

Transmitting in 802.11b mode low channel is worst case

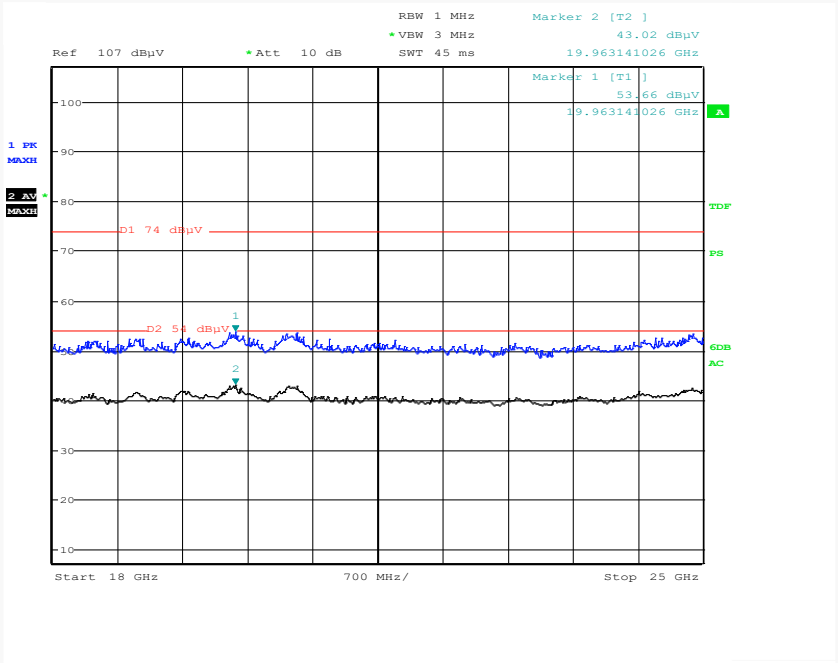
Horizontal



Project No : RKSB240522001 Tester :Hugh Wu

Date: 13.JUL.2024 16:32:18

Vertical



Project No : RKSB240522001 Tester :Hugh Wu

Date: 13.JUL.2024 16:45:58

Note: The test distance is 3m. The limit is 74dBµV/m(Peak) and 54dBµV/m(Average).

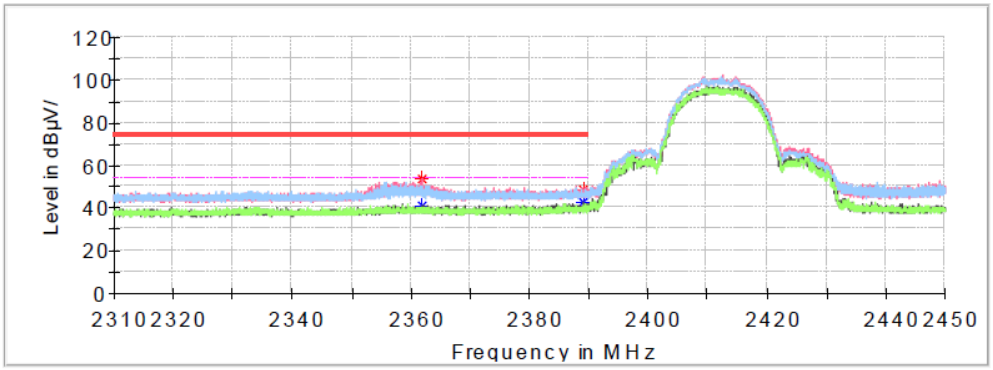
Band Edge:
802.11b Mode:

Low Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11b mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



Critical_Freqs

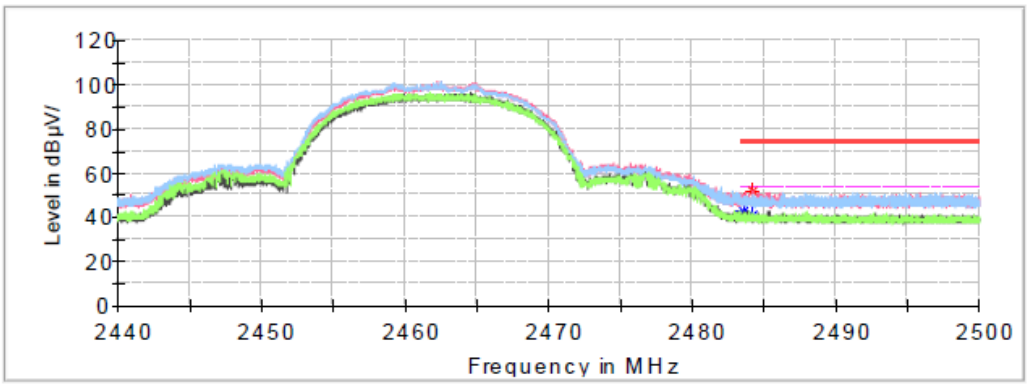
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2361.772000	53.45	---	74.00	20.55	V	-0.7
2361.772000	---	41.07	54.00	12.93	V	-0.7
2389.156000	48.30	---	74.00	25.70	V	-0.6
2389.156000	---	42.64	54.00	11.36	V	-0.6

High Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11b mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2483.554000	---	43.09	54.00	10.91	V	-0.3
2483.554000	48.15	---	74.00	25.85	V	-0.3
2484.268000	---	41.51	54.00	12.49	V	-0.3
2484.268000	52.04	---	74.00	21.96	V	-0.3

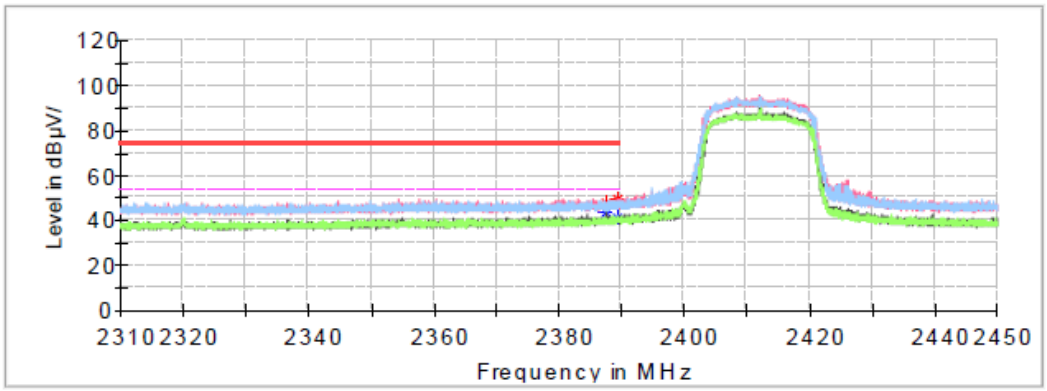
802.11g Mode :

Low Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11g mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



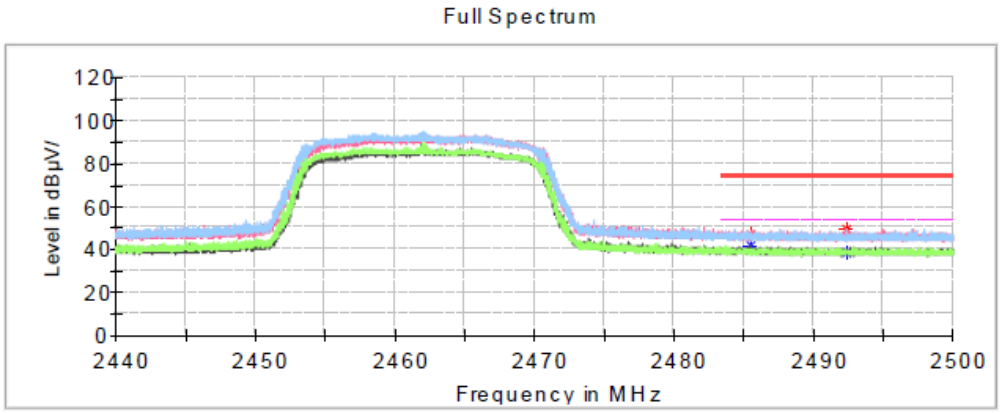
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2387.476000	---	43.47	54.00	10.53	V	-0.6
2387.476000	48.23	---	74.00	25.77	V	-0.6
2389.338000	---	41.05	54.00	12.95	V	-0.6
2389.338000	49.91	---	74.00	24.09	V	-0.6

High Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11g mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2485.558000	---	42.15	54.00	11.85	V	-0.2
2485.558000	47.38	---	74.00	26.62	V	-0.2
2492.356000	---	38.96	54.00	15.04	H	-0.2
2492.356000	49.81	---	74.00	24.19	H	-0.2

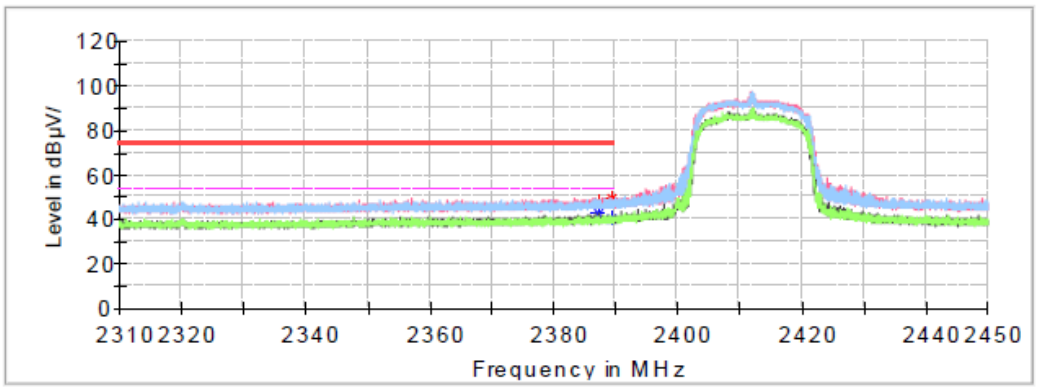
802.11n-HT20 Mode:

Low Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11n20 mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



Critical_Freqs

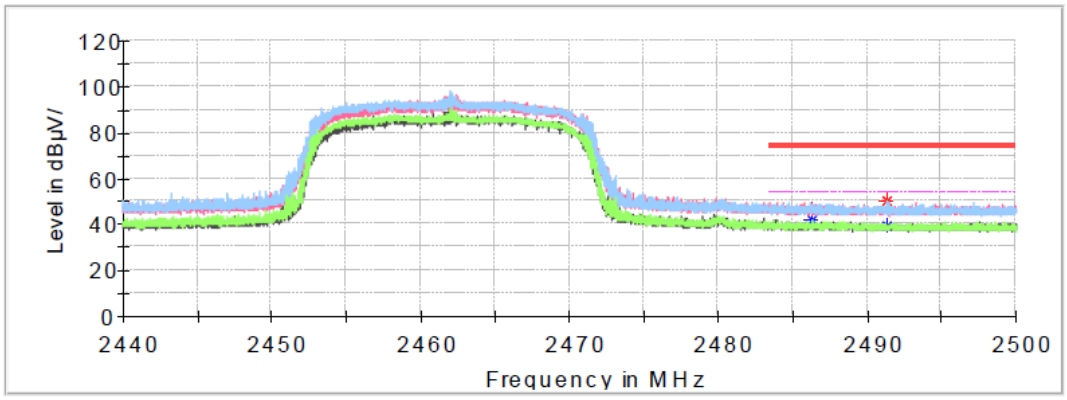
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2387.224000	---	42.98	54.00	11.02	V	-0.6
2387.224000	48.08	---	74.00	25.92	V	-0.6
2389.352000	---	40.61	54.00	13.39	V	-0.6
2389.352000	49.75	---	74.00	24.25	V	-0.6

High Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	2.4G WIFI 802.11n20 mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



Critical_Freqs

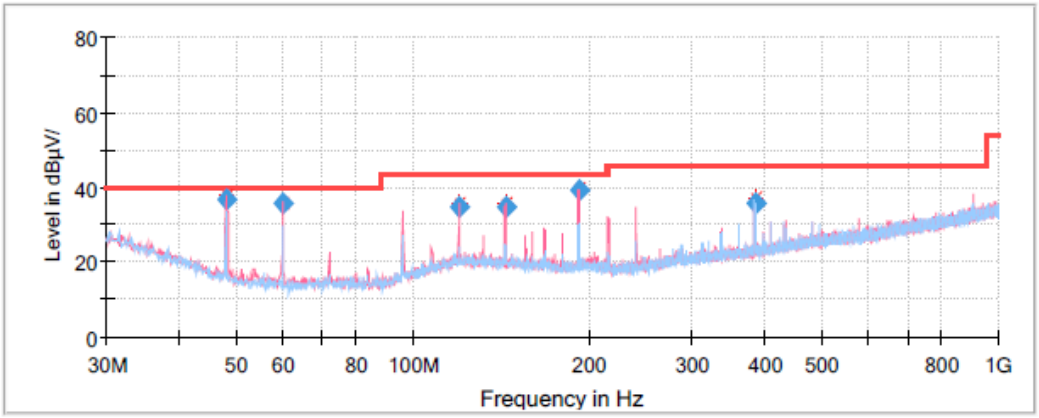
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2486.356000	---	42.01	54.00	11.99	H	-0.2
2486.356000	46.57	---	74.00	27.43	H	-0.2
2491.336000	---	39.36	54.00	14.64	H	-0.2
2491.336000	50.00	---	74.00	24.00	H	-0.2

For BLE Mode:
30MHz-1GHz

Low Channel: 2402MHz

Common Information

Project No:	RKSB240522001
EUT Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Test Mode:	BLE 1M low channel
Standard:	FCC Part 15.205 & FCC Part 15.209& Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	23.9℃
Humidity:	59%
Barometric Pressure:	100.6kPa
Test Engineer:	Leah Li
Test Date:	2024/6/24



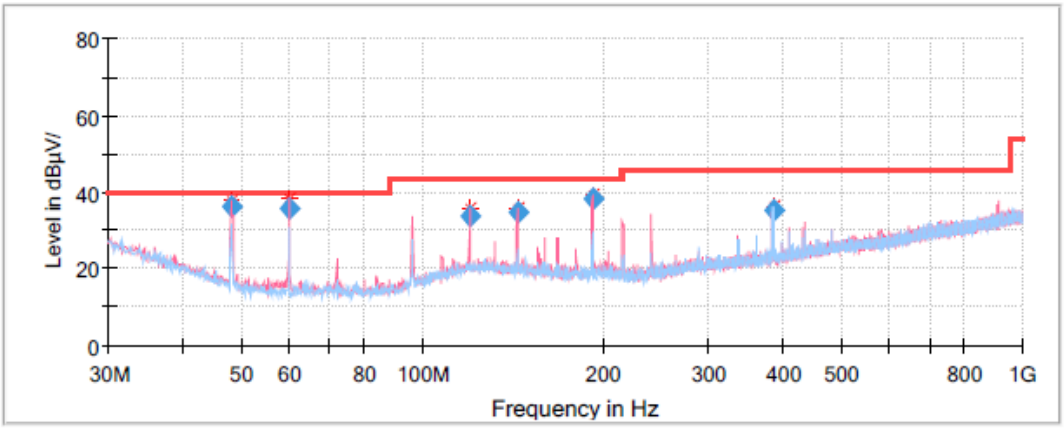
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
48.001100	36.70	40.00	3.30	V	-15.7
60.007550	35.92	40.00	4.08	V	-17.6
120.003500	34.58	43.50	8.92	V	-10.9
144.077200	34.67	43.50	8.83	V	-11.6
192.128250	39.09	43.50	4.41	V	-12.5
385.250650	35.54	46.00	10.46	H	-8.4

Middle Channel: 2440MHz

Common Information

Project No:	RKSB240522001
EUT Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Test Mode:	BLE 1M middle channel
Standard:	FCC Part 15.205 & FCC Part 15.209& Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	23.9℃
Humidity:	59%
Barometric Pressure:	100.6kPa
Test Engineer:	Leah Li
Test Date:	2024/6/24



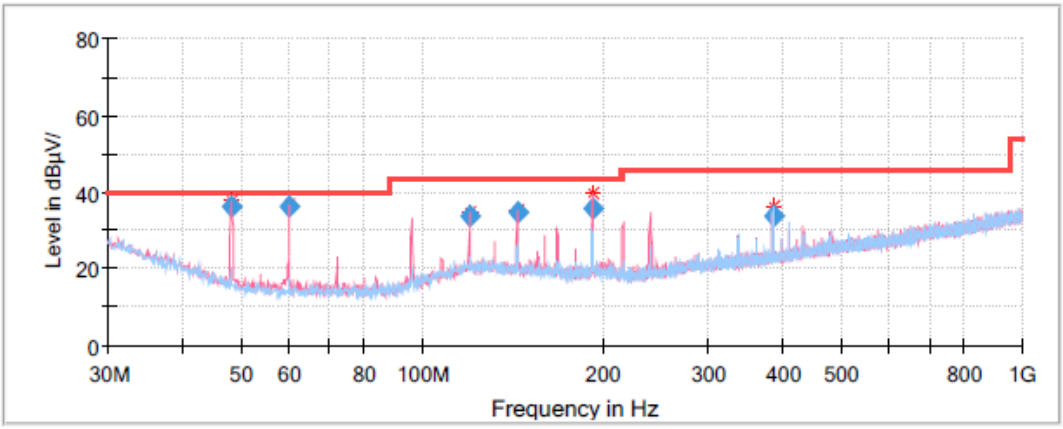
Final_Result

Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
48.017950	36.15	40.00	3.85	V	-15.7
60.011150	35.76	40.00	4.24	V	-17.6
120.015800	33.72	43.50	9.78	V	-10.9
144.482800	34.60	43.50	8.90	V	-11.6
192.648850	38.16	43.50	5.34	V	-12.5
385.281400	35.30	46.00	10.70	H	-8.4

High Channel: 2480MHz

Common Information

Project No:	RKSB240522001
EUT Model:	QPBR30-PA-WIFILIC-TY-RGBCW 10W (H23136)
Test Mode:	BLE 1M high channel
Standard:	FCC Part 15.205 & FCC Part 15.209& Part 15.247
Test Equipment:	ESCI, JB3, 310N
Temperature:	23.9℃
Humidity:	59%
Barometric Pressure:	100.6kPa
Test Engineer:	Leah Li
Test Date:	2024/6/24



Final_Result

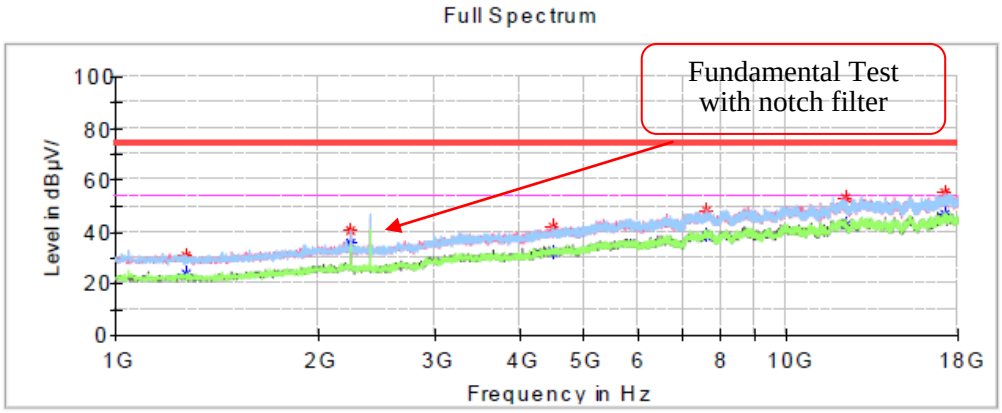
Frequency (MHz)	QuasiPeak (dBµ V/m)	Limit (dBµ V/m)	Margin (dB)	Pol	Corr. (dB/m)
48.011000	36.34	40.00	3.66	V	-15.7
60.011150	35.98	40.00	4.02	V	-17.6
120.019100	33.61	43.50	9.89	V	-10.9
144.662800	34.70	43.50	8.80	V	-11.6
192.905100	35.62	43.50	7.88	V	-12.5
385.027550	33.77	46.00	12.23	H	-8.4

1GHz-18GHz:

Low Channel: 2402MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	BLE 1M mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



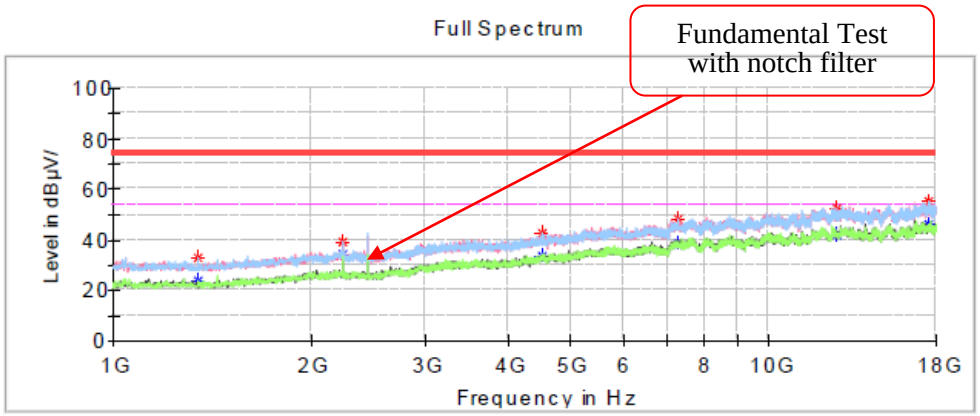
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1277.100000	---	23.99	54.00	30.01	H	-15.1
1277.100000	31.11	---	74.00	42.89	H	-15.1
2239.300000	40.65	---	74.00	33.35	H	-11.0
2239.300000	---	35.72	54.00	18.28	H	-11.0
4481.600000	---	32.05	54.00	21.95	H	-4.3
4481.600000	41.79	---	74.00	32.21	H	-4.3
7619.800000	---	38.35	54.00	15.65	V	3.9
7619.800000	48.34	---	74.00	25.66	V	3.9
12269.300000	---	42.45	54.00	11.55	V	9.3
12269.300000	53.20	---	74.00	20.80	V	9.3
17209.500000	---	46.67	54.00	7.33	V	12.0
17209.500000	54.91	---	74.00	19.09	V	12.0

Middle Channel: 2440MHz

Common Information

Project No.:	RKSB240522001
Test Mode:	BLE 1M mode of middle channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



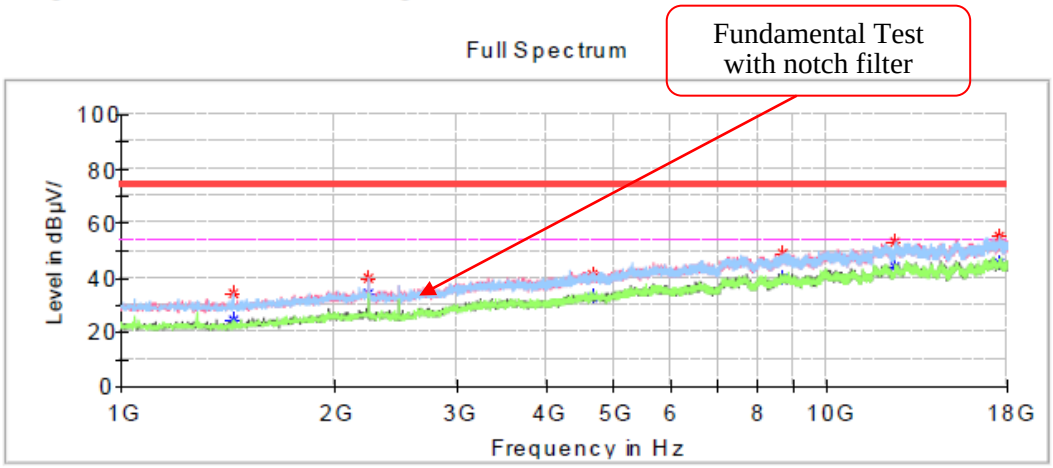
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1346.800000	---	23.83	54.00	30.17	H	-15.0
1346.800000	32.79	---	74.00	41.21	H	-15.0
2239.300000	---	34.12	54.00	19.88	H	-11.0
2239.300000	39.41	---	74.00	34.59	H	-11.0
4525.800000	---	33.39	54.00	20.61	H	-4.2
4525.800000	42.53	---	74.00	31.47	H	-4.2
7286.600000	---	38.24	54.00	15.76	H	3.4
7286.600000	48.41	---	74.00	25.59	H	3.4
12718.100000	---	41.92	54.00	12.08	H	9.7
12718.100000	52.31	---	74.00	21.69	H	9.7
17612.400000	---	46.08	54.00	7.92	V	11.6
17612.400000	55.28	---	74.00	18.72	V	11.6

High Channel: 2480MHz

Common Information

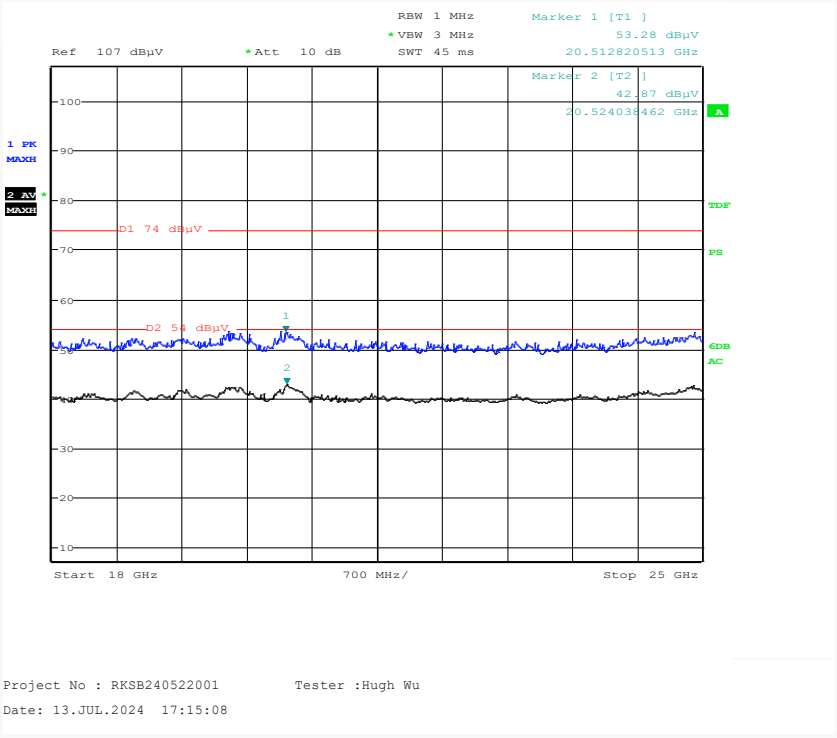
Project No.:	RKSB240522001
Test Mode:	BLE 1M mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu



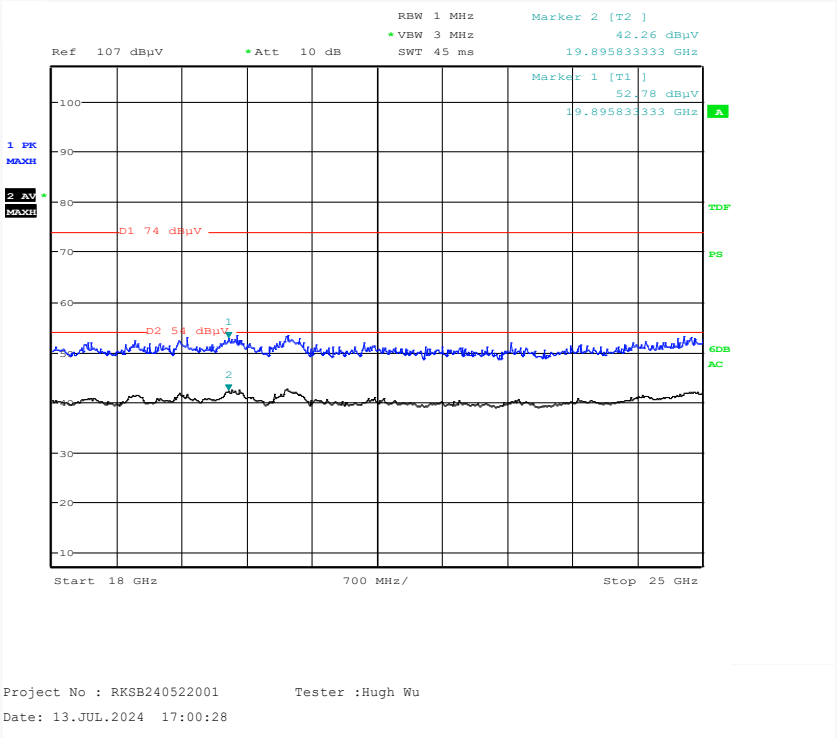
Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
1438.600000	---	24.69	54.00	29.31	H	-14.8
1438.600000	34.14	---	74.00	39.86	H	-14.8
2239.300000	40.05	---	74.00	33.95	H	-11.0
2239.300000	---	34.55	54.00	19.45	H	-11.0
4656.700000	---	33.19	54.00	20.81	H	-3.7
4656.700000	41.28	---	74.00	32.72	H	-3.7
8673.800000	---	39.58	54.00	14.42	H	5.4
8673.800000	49.30	---	74.00	24.70	H	5.4
12519.200000	---	44.27	54.00	9.73	V	9.7
12519.200000	52.87	---	74.00	21.13	V	9.7
17598.800000	---	45.31	54.00	8.69	H	11.6
17598.800000	55.24	---	74.00	18.76	H	11.6

18GHz-25GHz:
Low channel worst
Horizontal:



Vertical:



Note: The test distance is 3m. The limit is 74dBµV/m(Peak) and 54dBµV/m(Average).

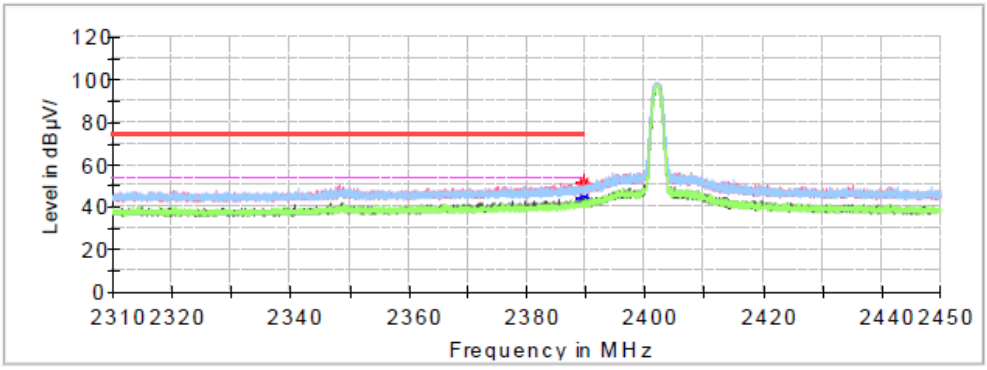
Band Edge:

Low Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	BLE 1M mode of low channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



Critical_Freqs

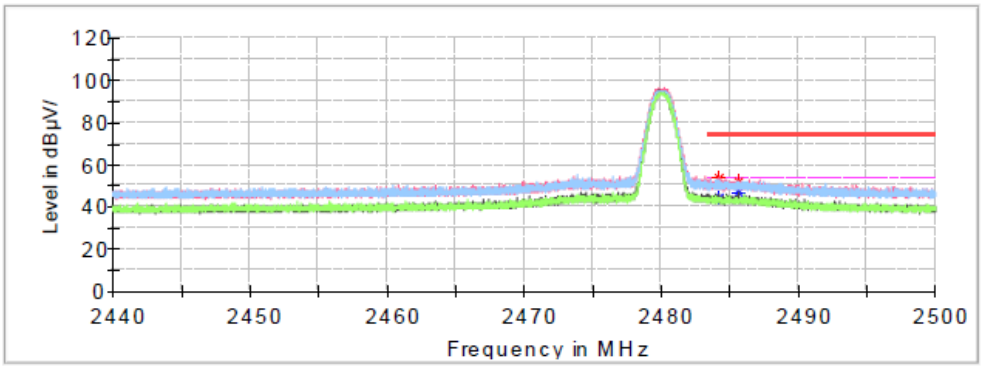
Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2389.548000	---	44.68	54.00	9.32	V	-0.6
2389.548000	51.38	---	74.00	22.62	V	-0.6
2389.674000	---	43.81	54.00	10.19	V	-0.6
2389.674000	51.63	---	74.00	22.37	V	-0.6

High Channel

Common Information

Project No.:	RKSB240522001
Test Mode:	BLE 1M mode of high channel
Standard:	FCC Part 15.205&FCC Part 15.209&FCC Part 15.247
Test Engineer:	Hugh Wu

Full Spectrum



Critical_Freqs

Frequency (MHz)	MaxPeak (dB µ V/m)	Average (dB µ V/m)	Limit (dB µ V/m)	Margin (dB)	Pol	Corr. (dB/m)
2484.172000	53.53	---	74.00	20.47	V	-0.3
2484.172000	---	44.58	54.00	9.42	V	-0.3
2485.648000	51.83	---	74.00	22.17	V	-0.2
2485.648000	---	46.91	54.00	7.09	V	-0.2

6 dB EMISSION BANDWIDTH

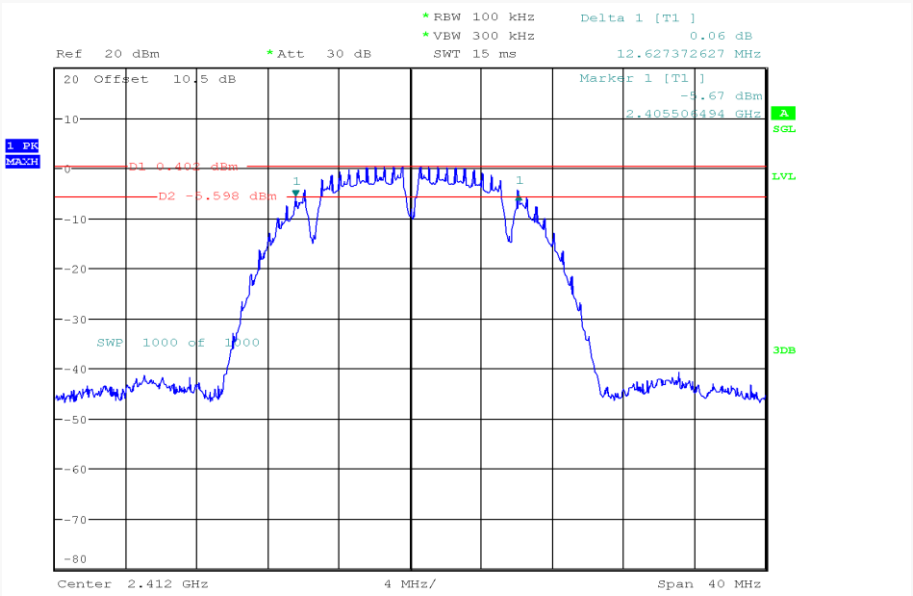
Test Result: Compliant.

EUT operation mode: Transmitting

For Wi-Fi Mode:

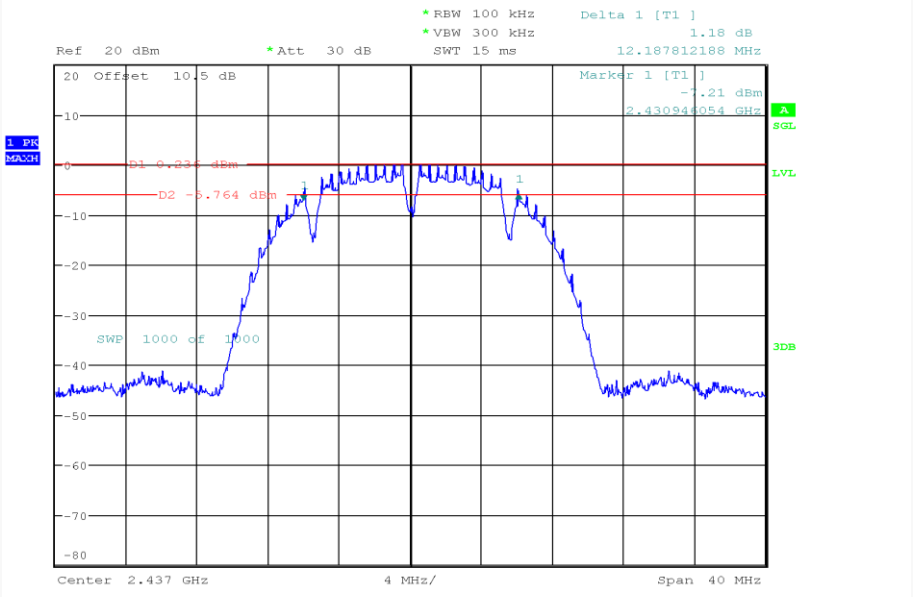
Test Mode	Channel (MHz)	6 dB Bandwidth (MHz)	Limit (MHz)	Result
802.11b	2412	12.627	0.5	PASS
	2437	12.188	0.5	PASS
	2462	12.188	0.5	PASS
802.11g	2412	15.265	0.5	PASS
	2437	15.265	0.5	PASS
	2462	15.265	0.5	PASS
802.11n-HT20	2412	15.145	0.5	PASS
	2437	15.185	0.5	PASS
	2462	15.185	0.5	PASS

802.11b Mode Low Channel



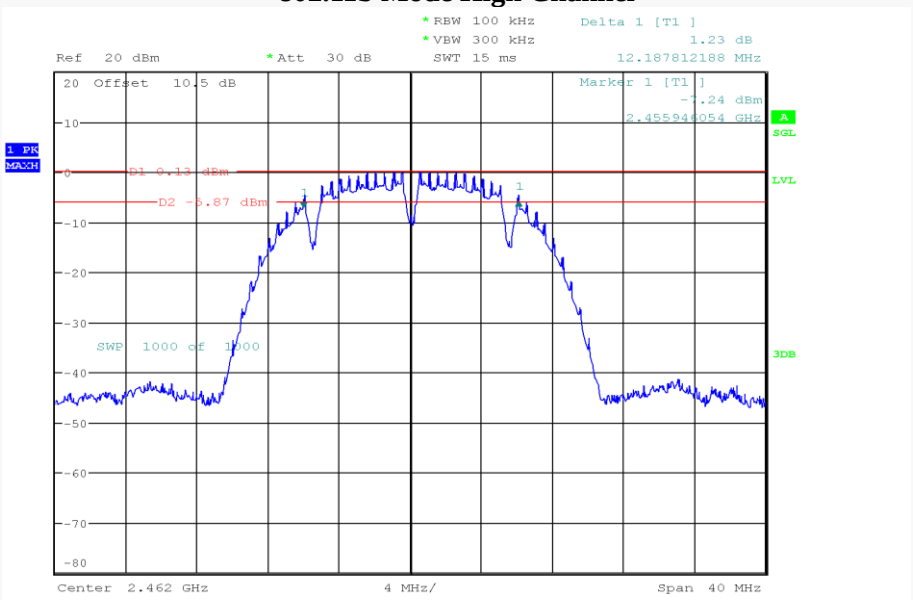
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 09:55:48

802.11b Mode Middle Channel



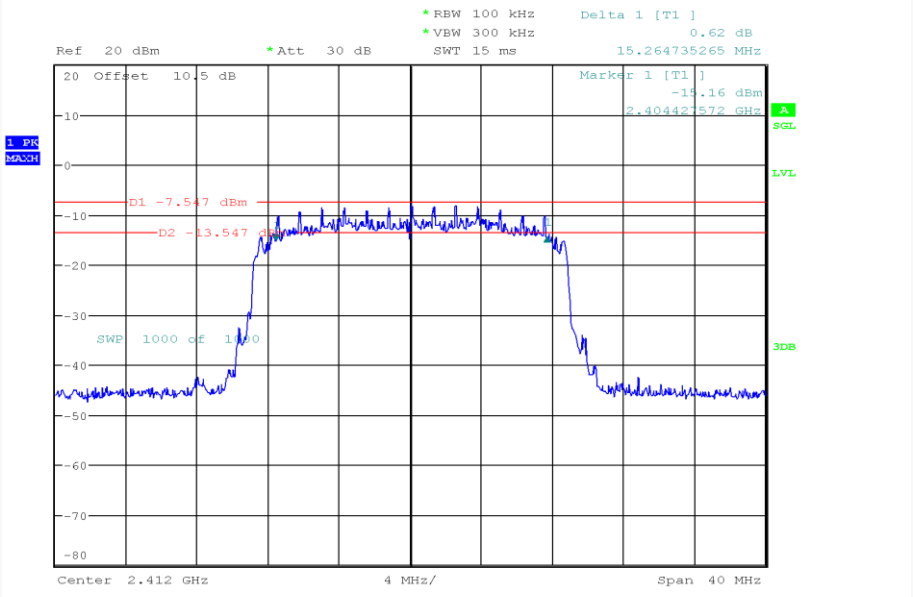
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:06:50

802.11b Mode High Channel



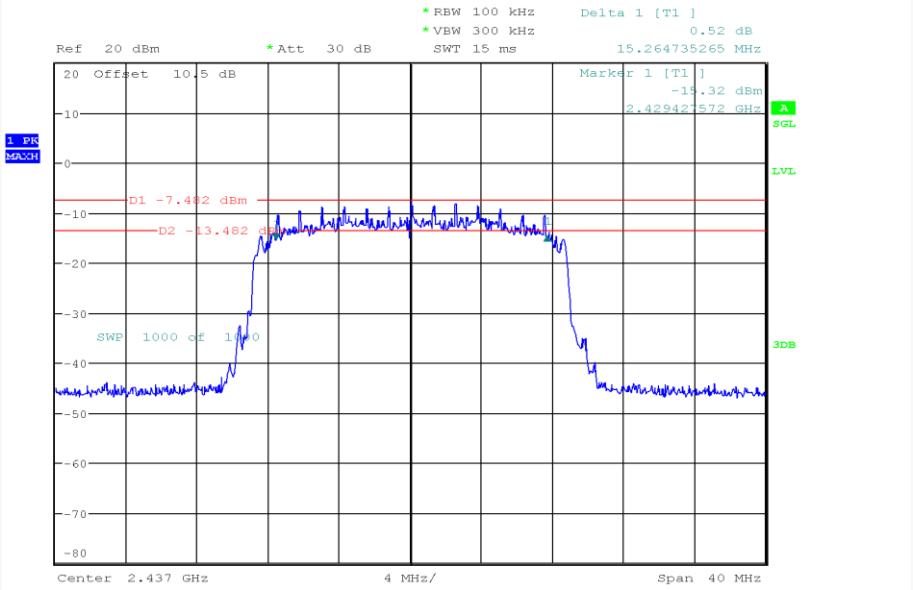
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:16:34

802.11g Mode Low Channel



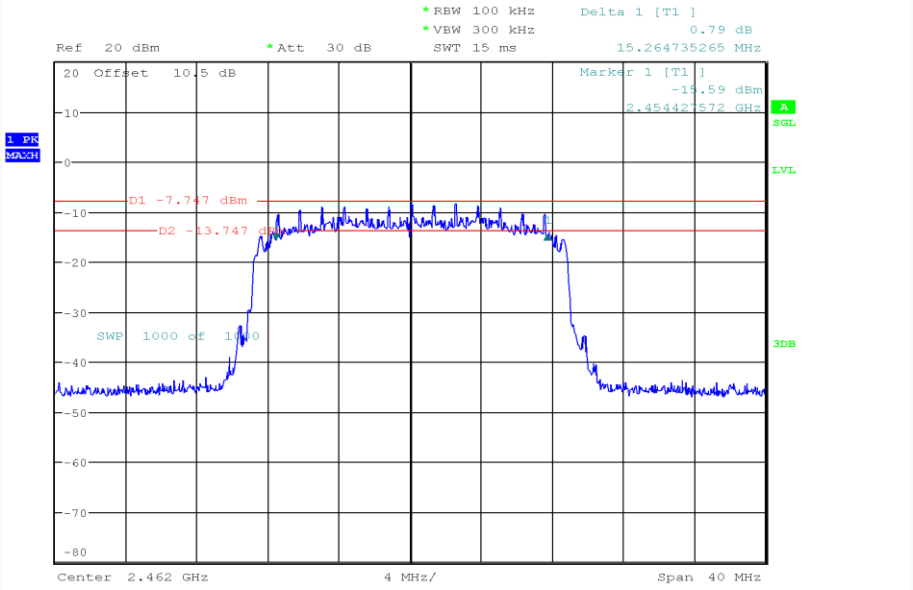
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:26:42

802.11g Mode Middle Channel



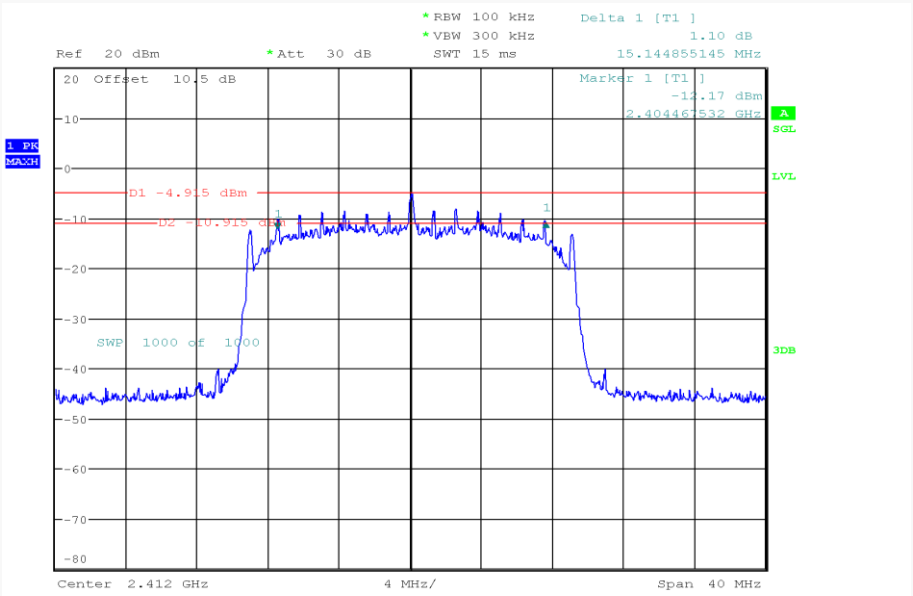
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:38:42

802.11g Mode High Channel



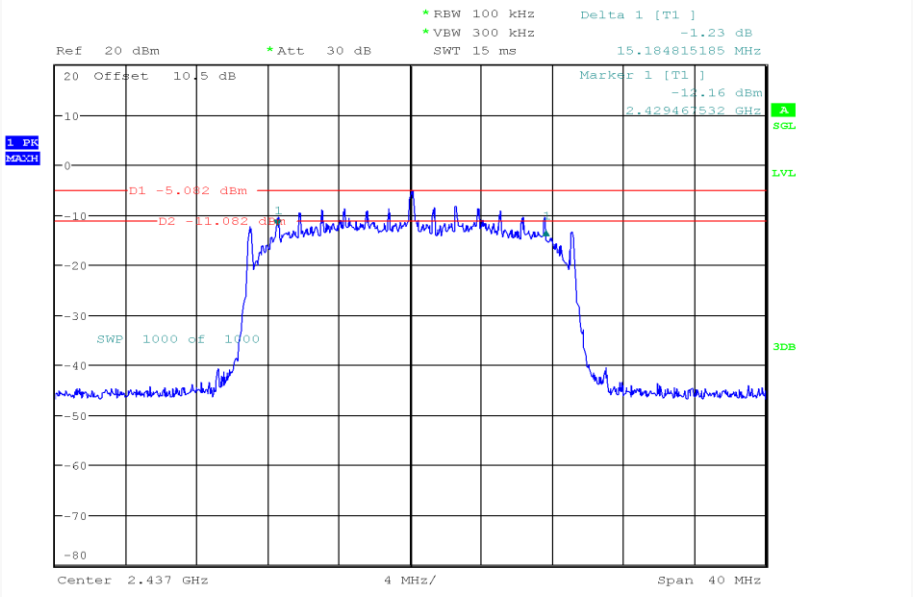
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:49:26

802.11n-HT20 Mode Low Channel



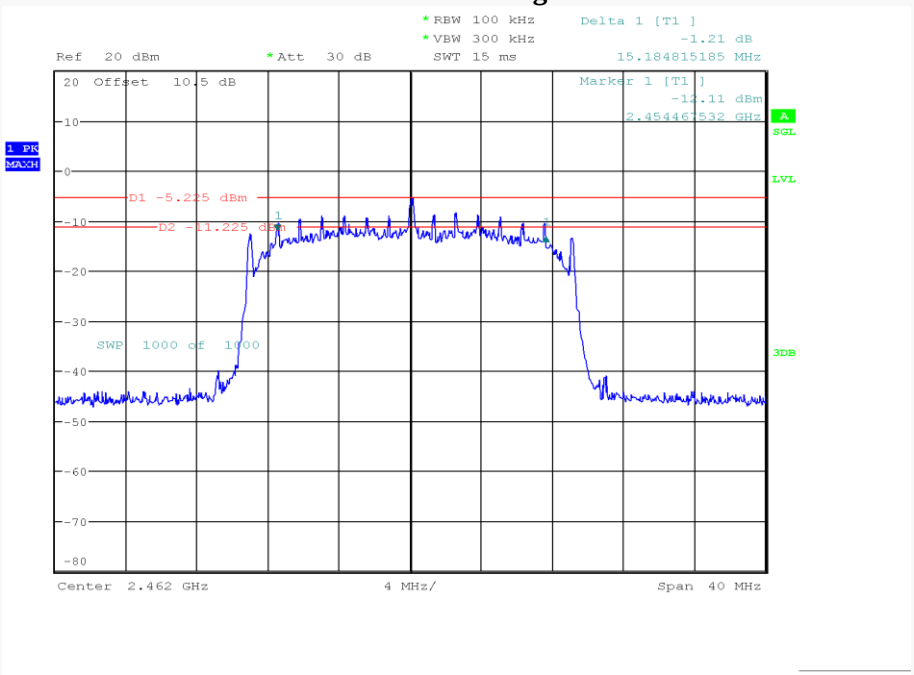
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 11:02:36

802.11n-HT20 Mode Middle Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 11:12:23

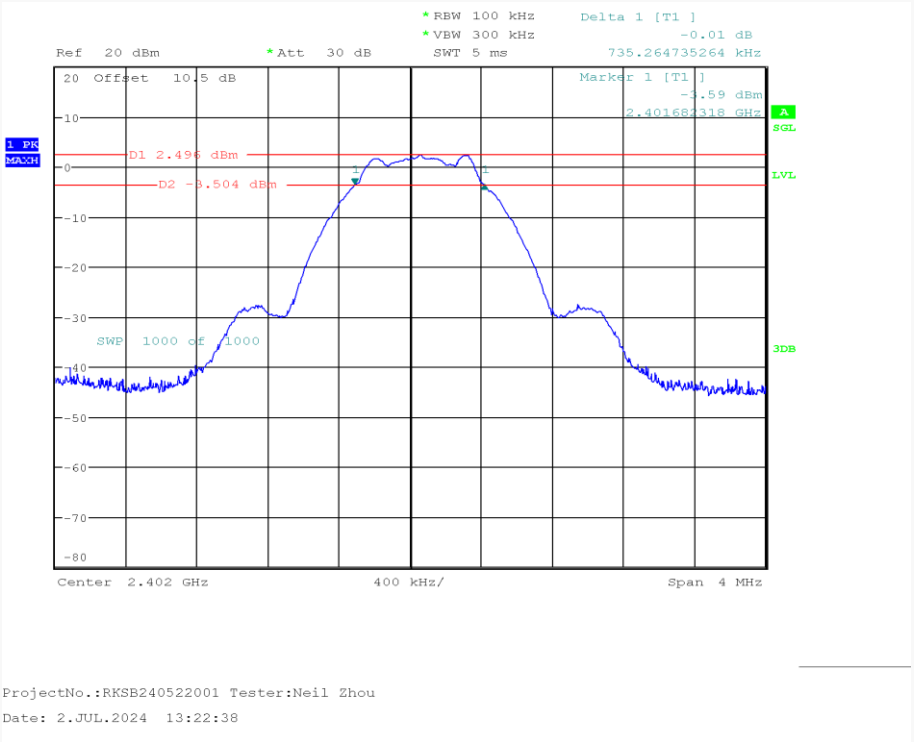
802.11n-HT20 Mode High Channel



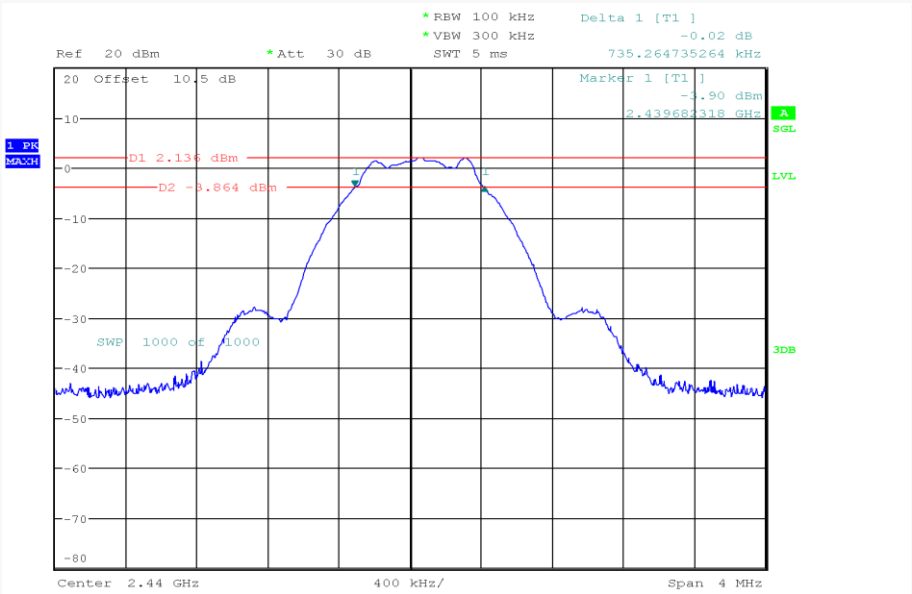
For BLE Mode:

Mode	Value (MHz)	Limit (MHz)	Result
Low	0.735	0.5	Pass
Middle	0.735	0.5	Pass
High	0.731	0.5	Pass

Low Channel

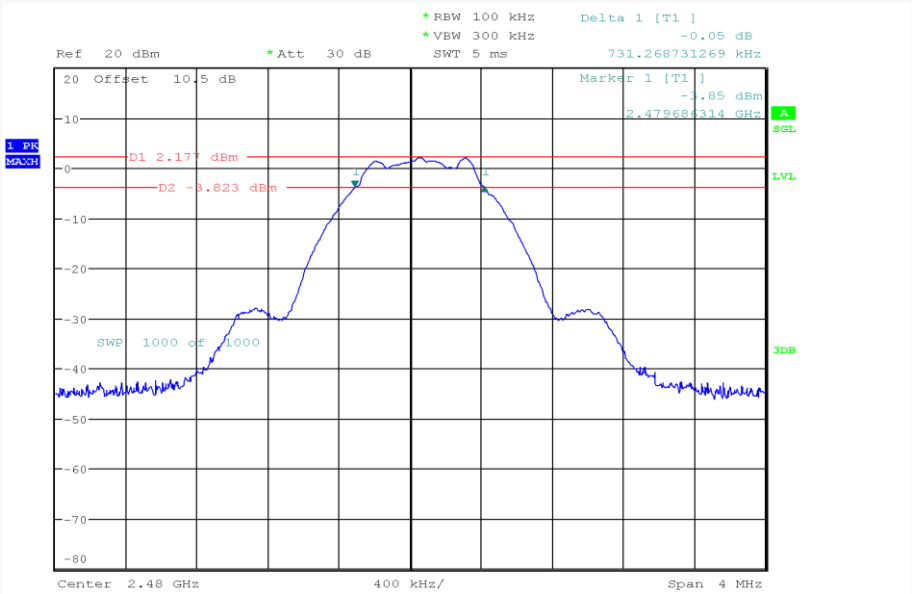


Middle Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 13:27:55

High Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 13:32:44

POWER SPECTRAL DENSITY

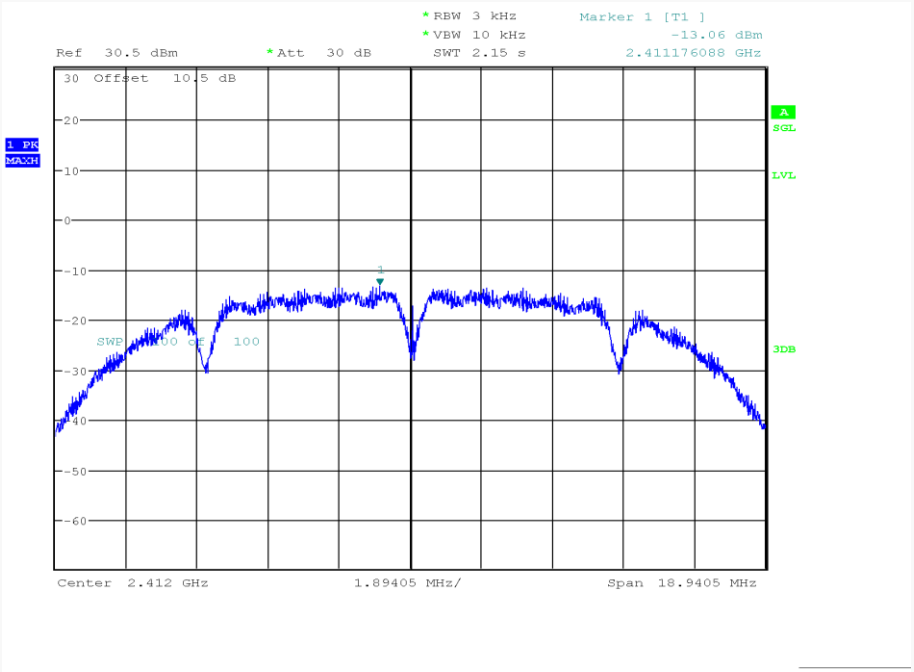
Test Result: Compliant.

EUT operation mode: Transmitting

For Wi-Fi Mode:

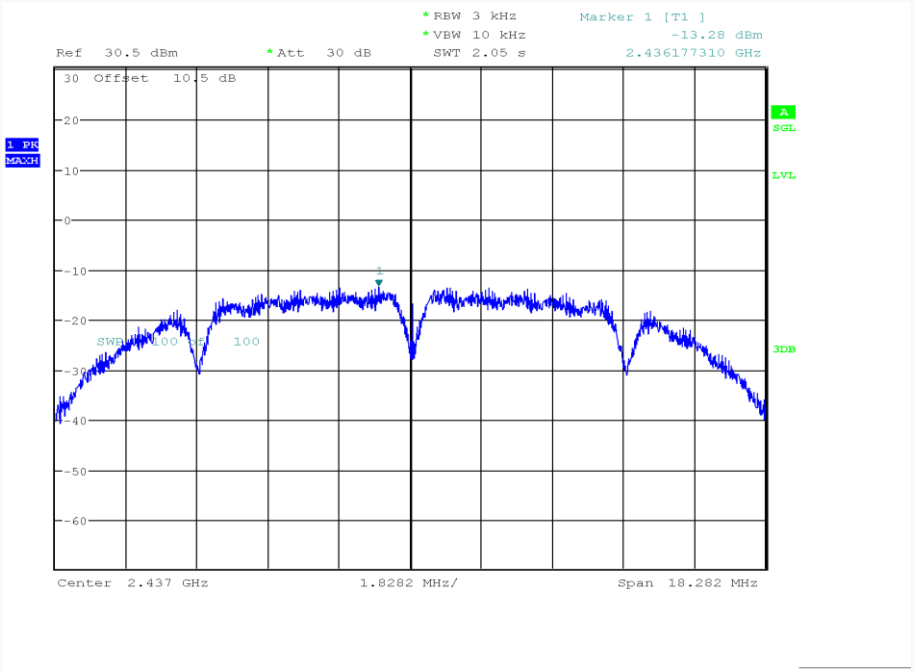
Test Mode	Channel (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b	2412	-13.06	≤8.00	PASS
	2437	-13.28	≤8.00	PASS
	2462	-13.40	≤8.00	PASS
802.11g	2412	-18.86	≤8.00	PASS
	2437	-18.39	≤8.00	PASS
	2462	-19.02	≤8.00	PASS
802.11n-HT20	2412	-18.00	≤8.00	PASS
	2437	-17.70	≤8.00	PASS
	2462	-18.13	≤8.00	PASS

802.11b Low Channel



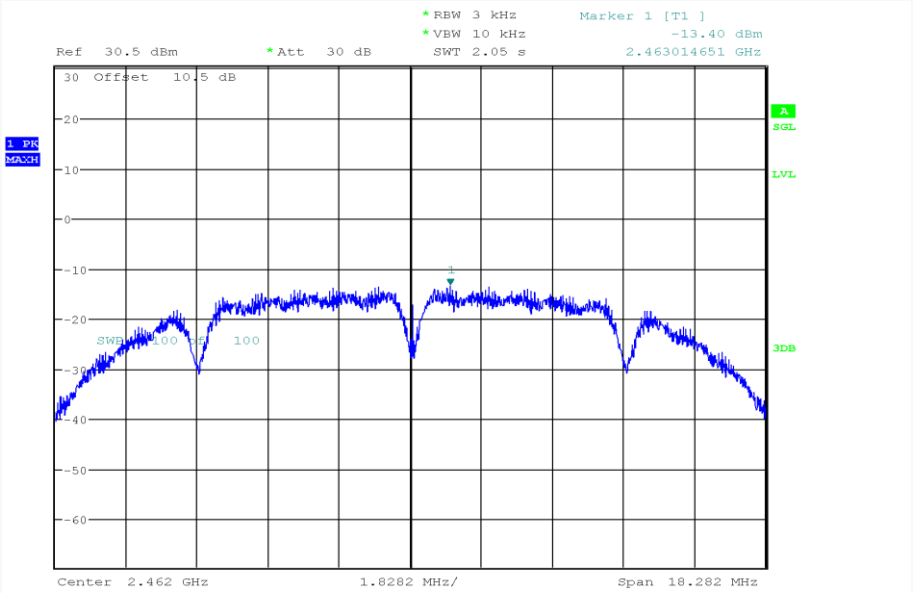
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:05:11

802.11b Middle Channel



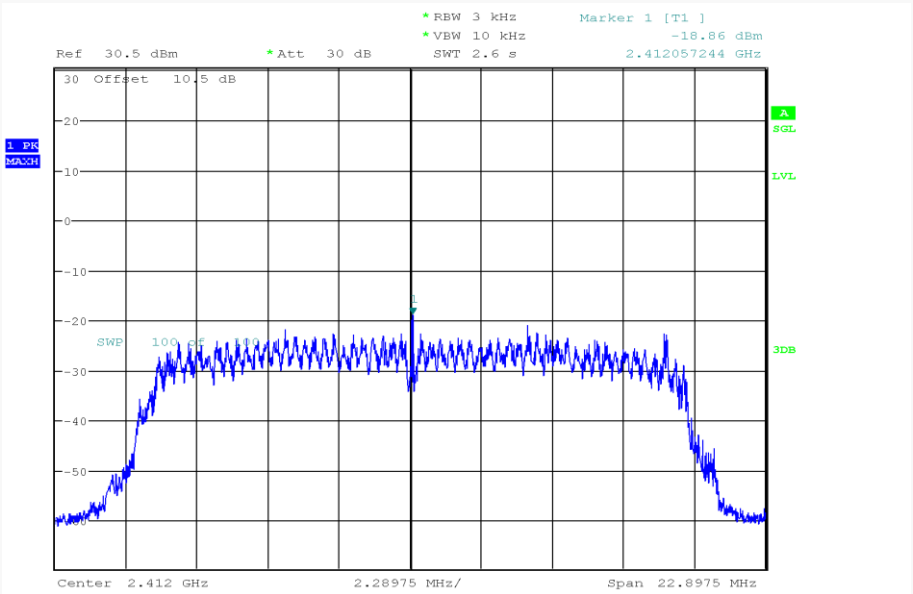
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:13:27

802.11b High Channel



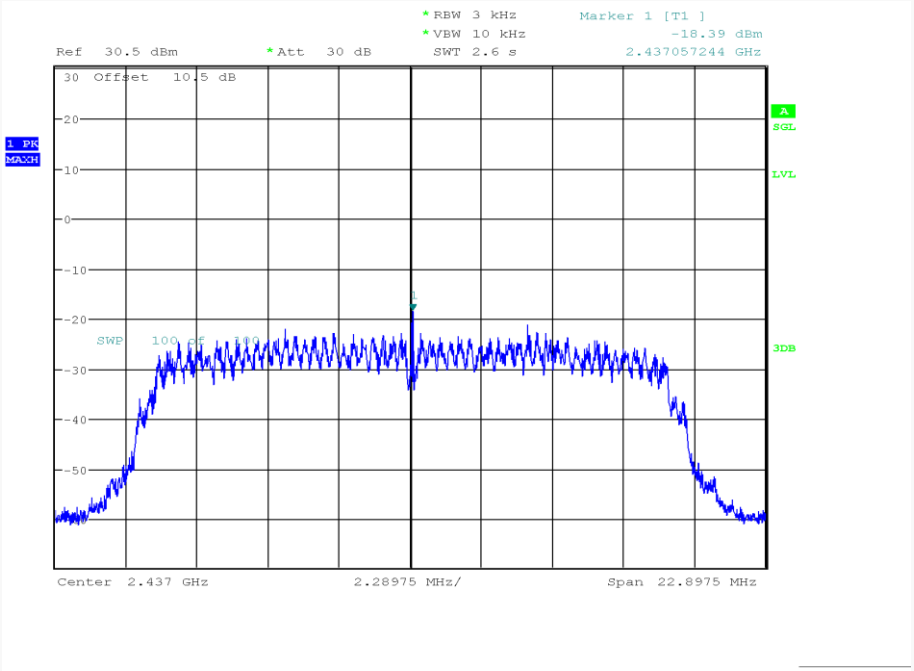
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:23:47

802.11g Low Channel



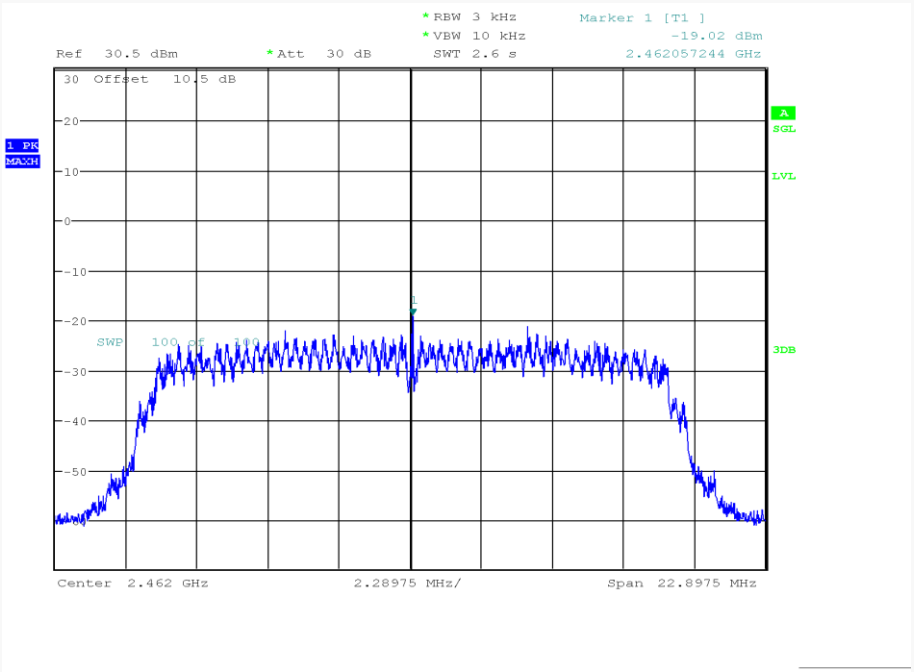
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:34:22

802.11g Middle Channel



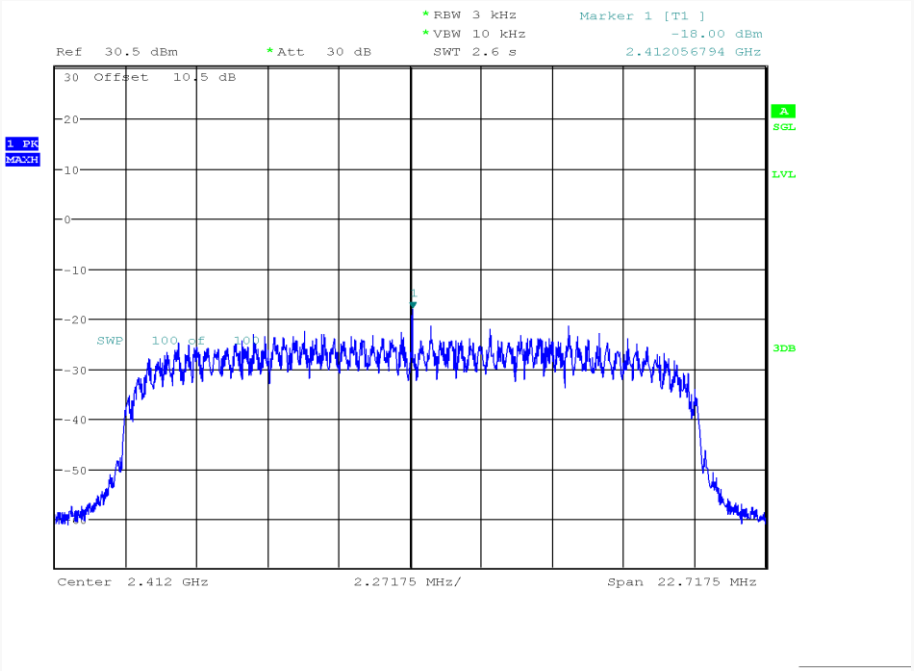
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:46:15

802.11g High Channel



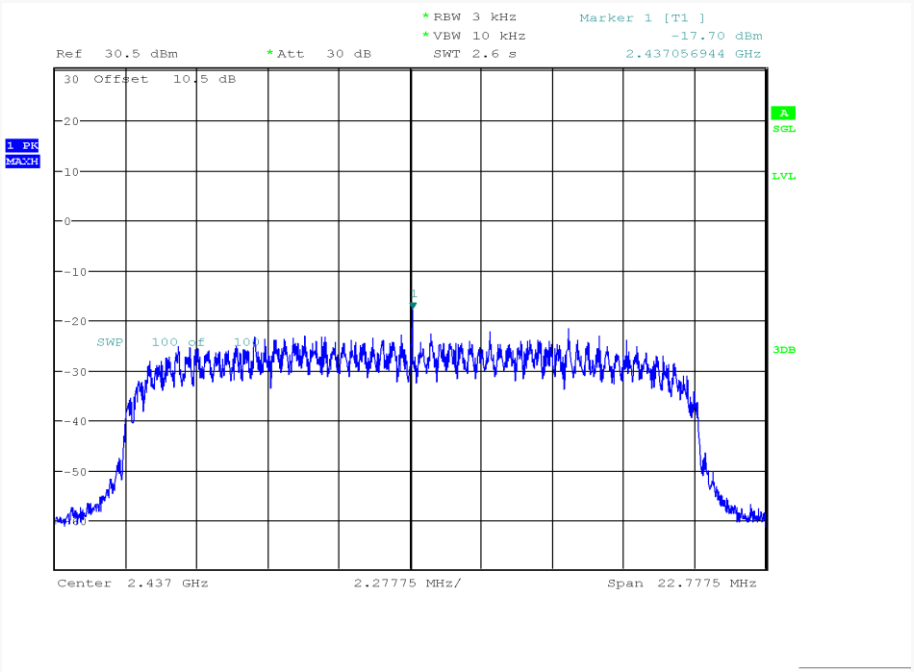
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:57:34

802.11n-HT20 Low Channel



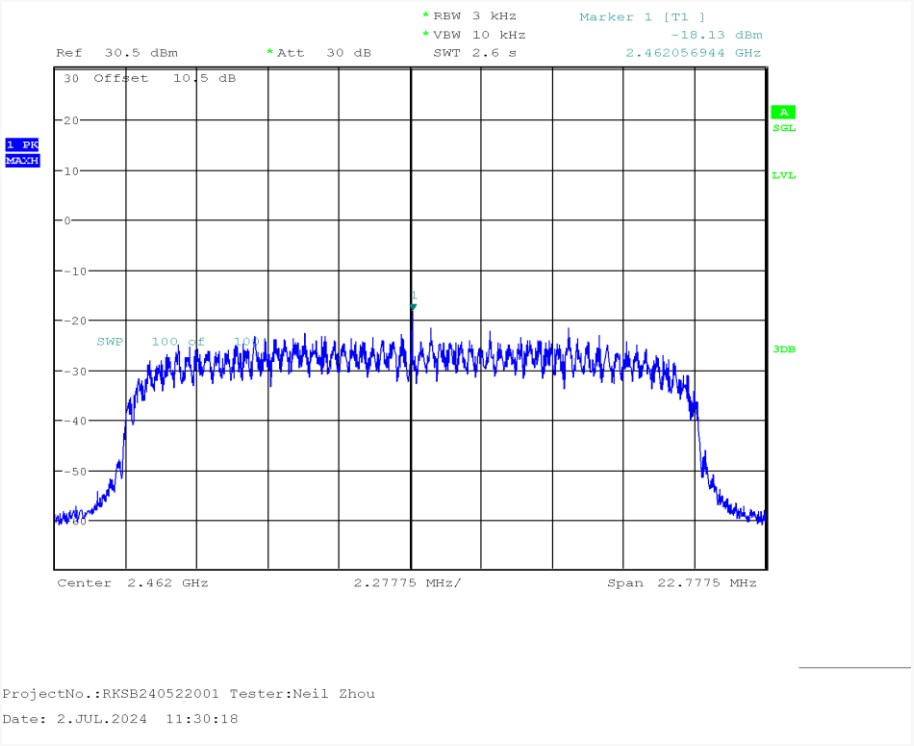
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 11:10:53

802.11n-HT20 Middle Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 11:20:03

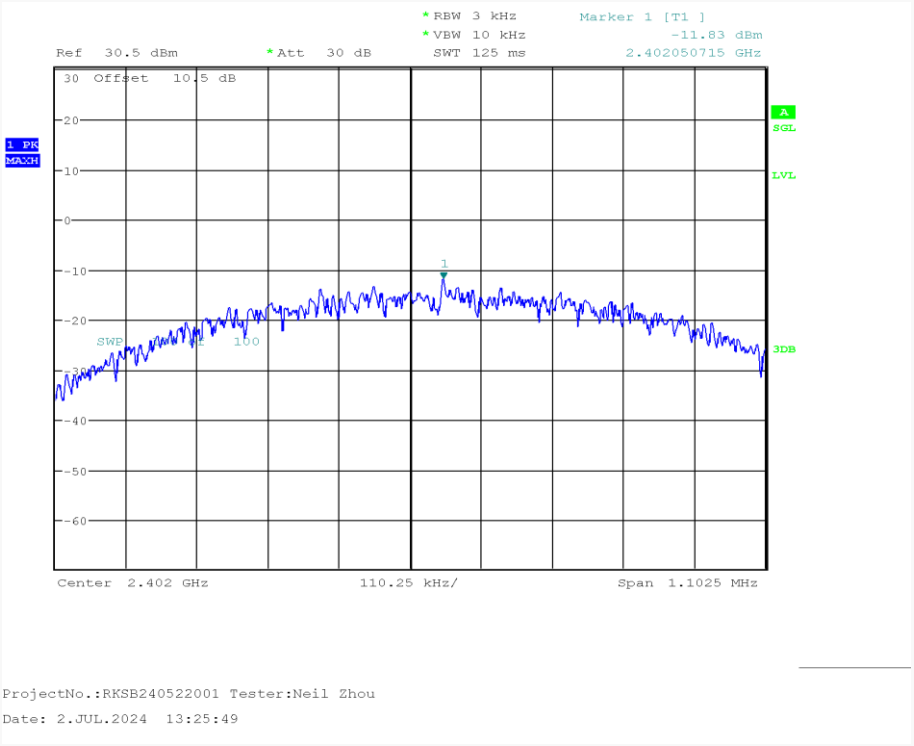
802.11n-HT20 High Channel



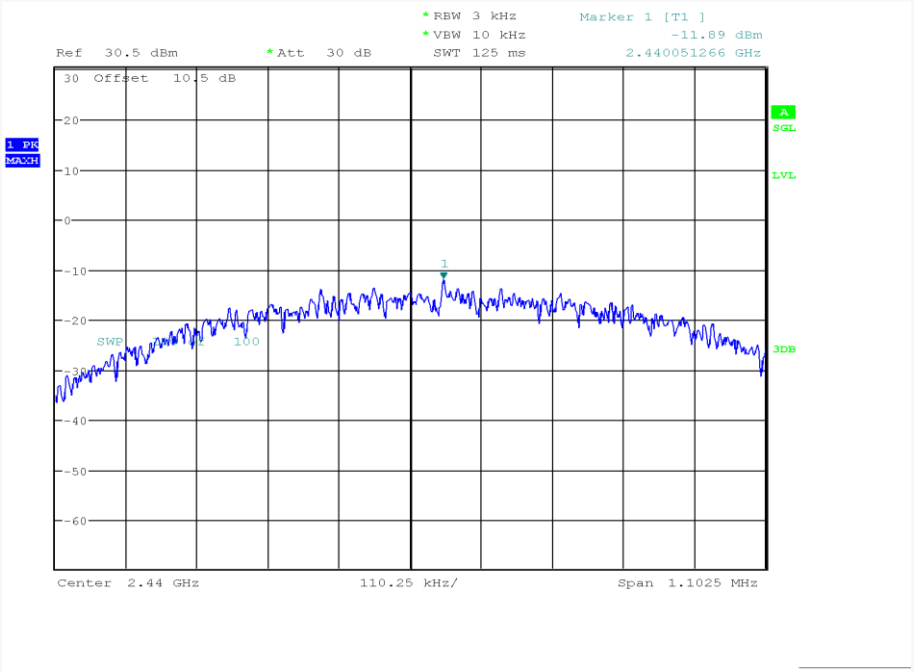
For BLE Mode:

Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)
Low	2402	-11.83	≤8
Middle	2440	-11.89	≤8
High	2480	-13.24	≤8

Low Channel

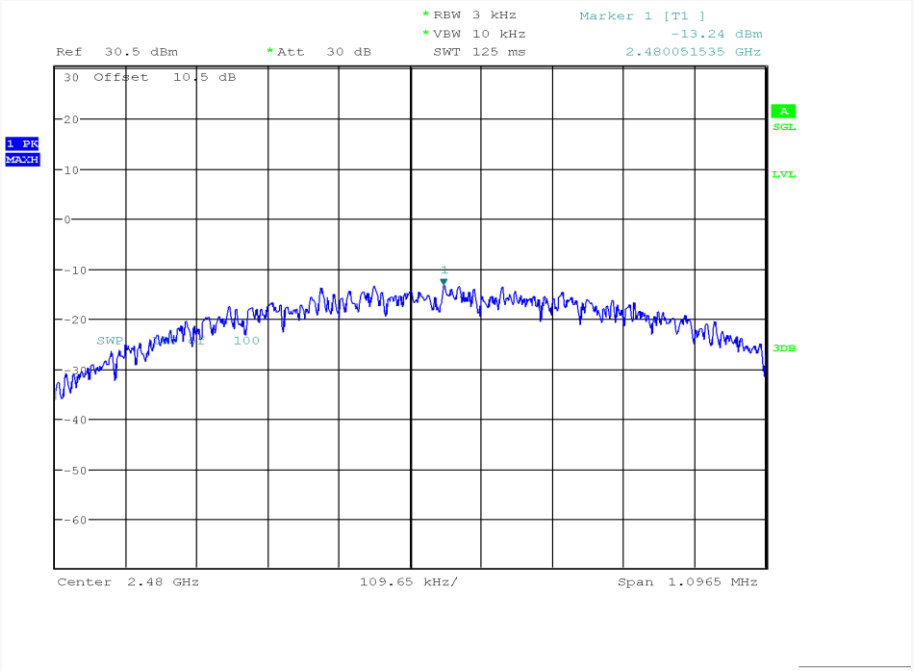


Middle Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 13:30:25

High Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 14:38:28

TRANSMITTER OUTPUT POWER MEASUREMENT

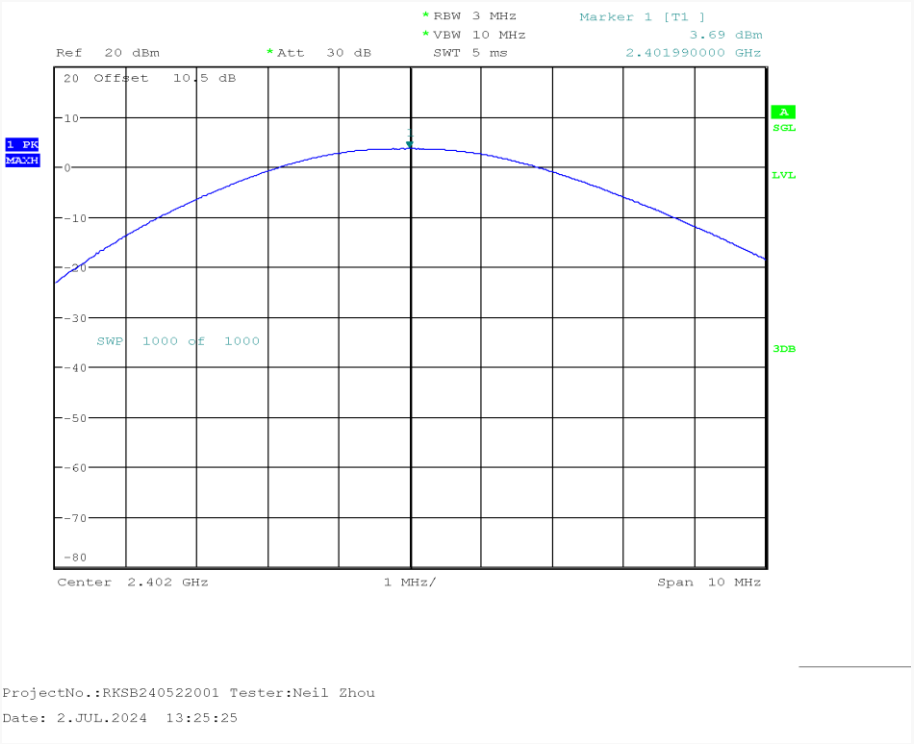
2.4G Wi-Fi:

Test Mode	Channel (MHz)	Peak Output Power (dBm)	Limit (dBm)	Result
802.11b	2412	16.74	≤30.00	PASS
	2437	16.67	≤30.00	PASS
	2462	16.66	≤30.00	PASS
802.11g	2412	15.51	≤30.00	PASS
	2437	15.46	≤30.00	PASS
	2462	15.53	≤30.00	PASS
802.11n-HT20	2412	15.98	≤30.00	PASS
	2437	15.94	≤30.00	PASS
	2462	15.88	≤30.00	PASS

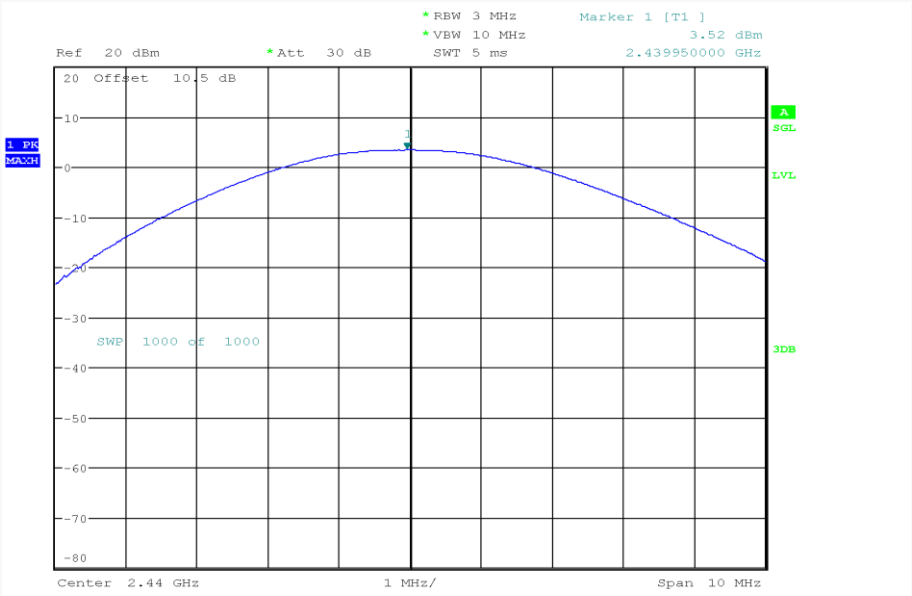
BLE Mode:

Channel	Frequency (MHz)	Max Conducted Peak Output Power (dBm)	Peak Output Power Limit (dBm)
Low	2402	3.69	≤30
Middle	2440	3.52	≤30
High	2480	3.34	≤30

Low Channel

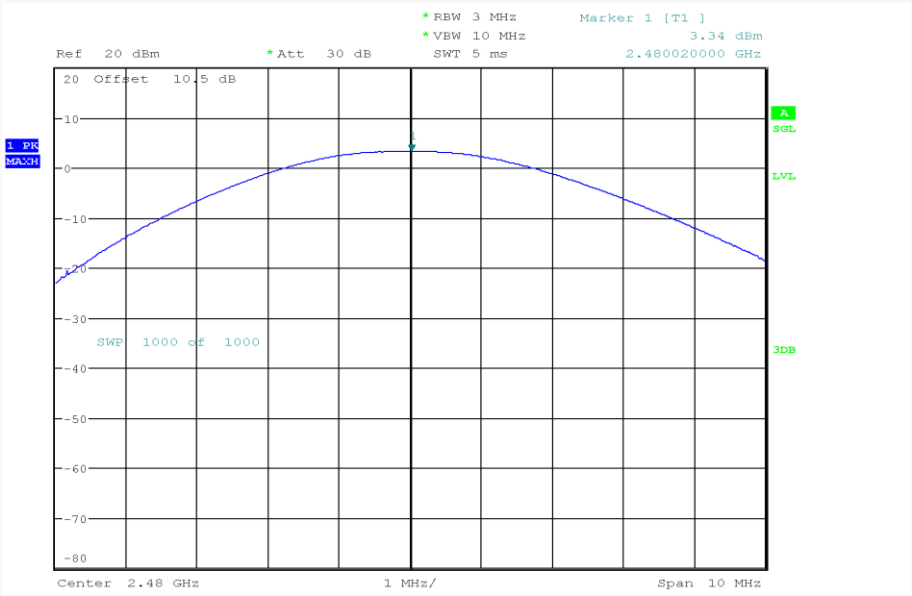


Middle Channel



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 13:30:02

High Channel



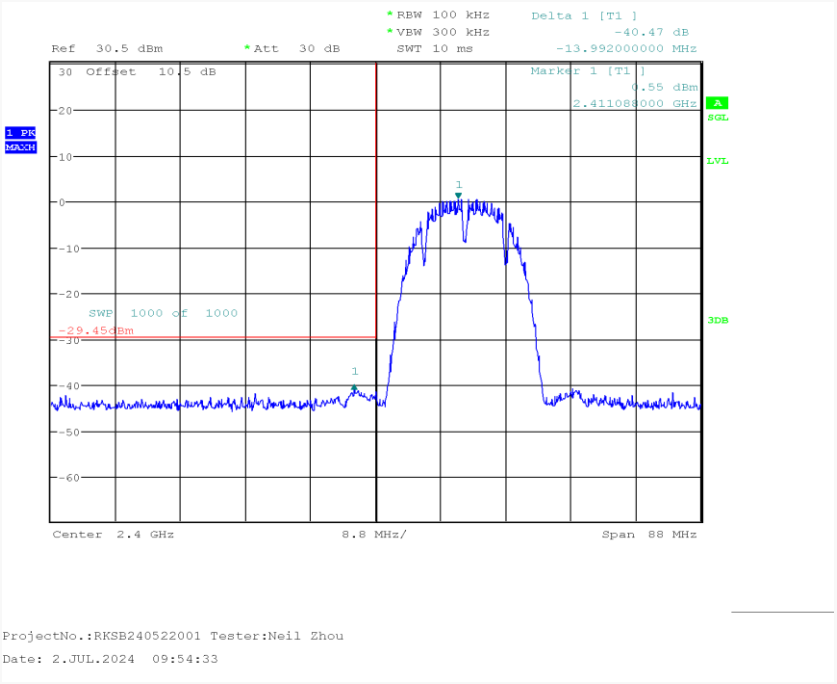
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 14:38:04

OUT OF BAND EMISSIONS

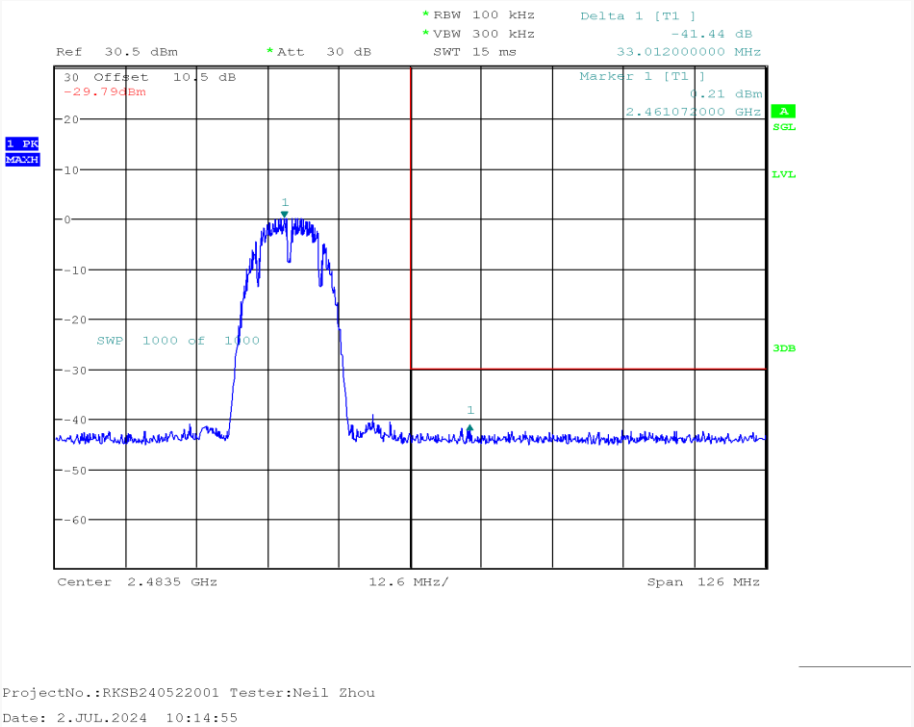
EUT operation mode: Transmitting

For Wi-Fi Mode:

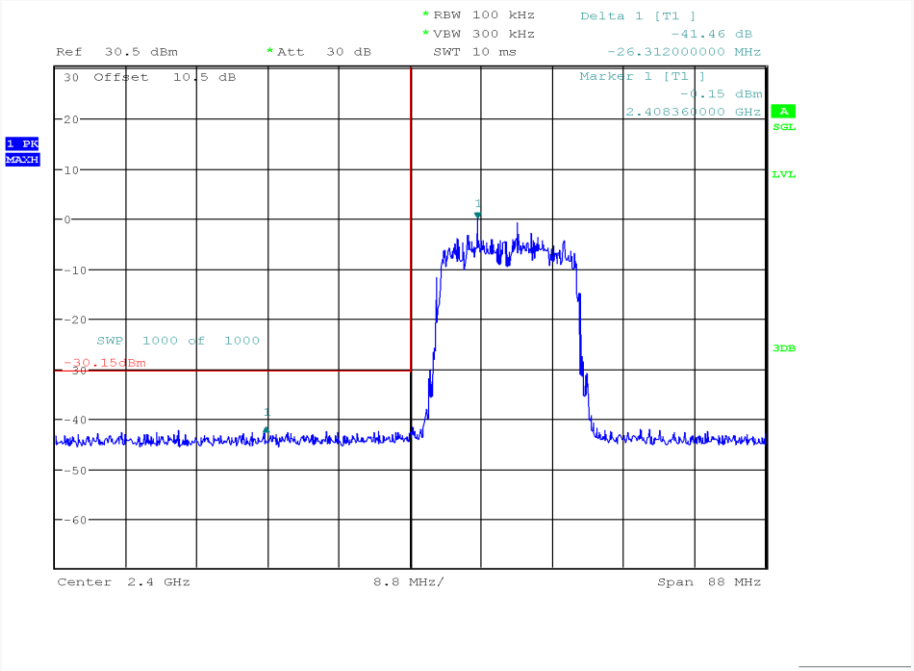
802.11b Mode Left Side



802.11b Mode Right Side

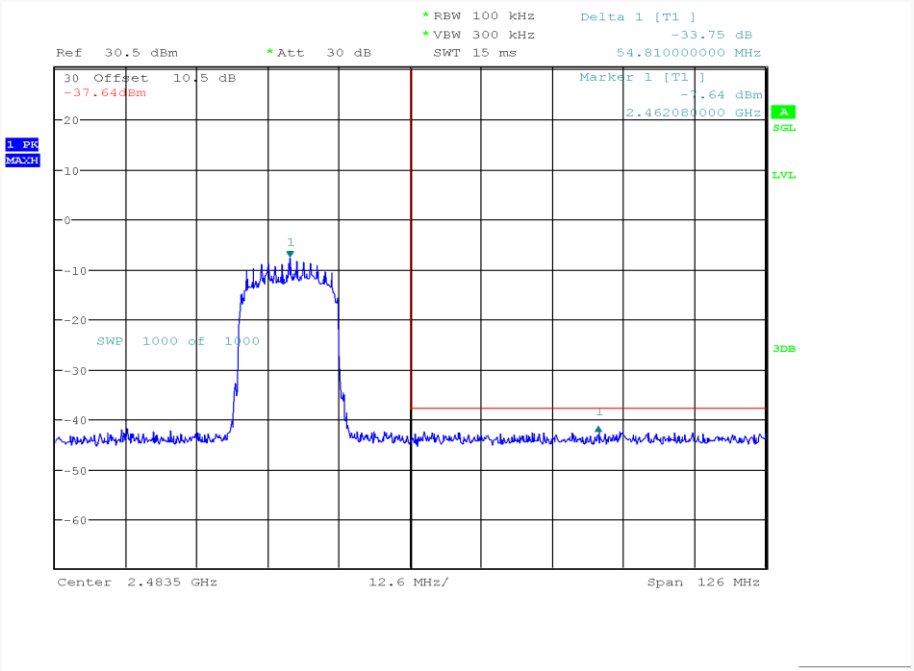


802.11g Mode Left Side



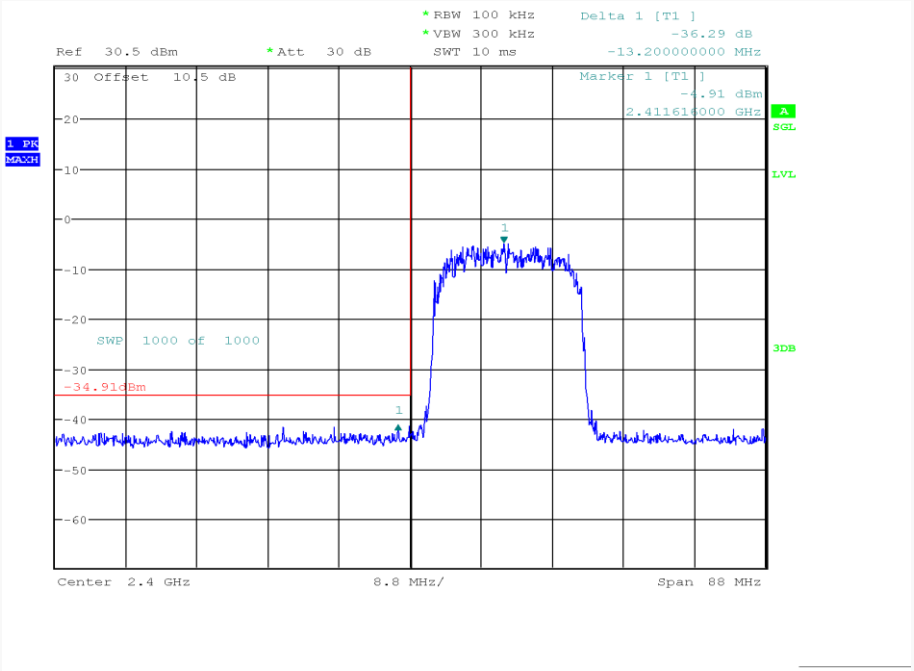
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:25:26

802.11g Mode Right Side



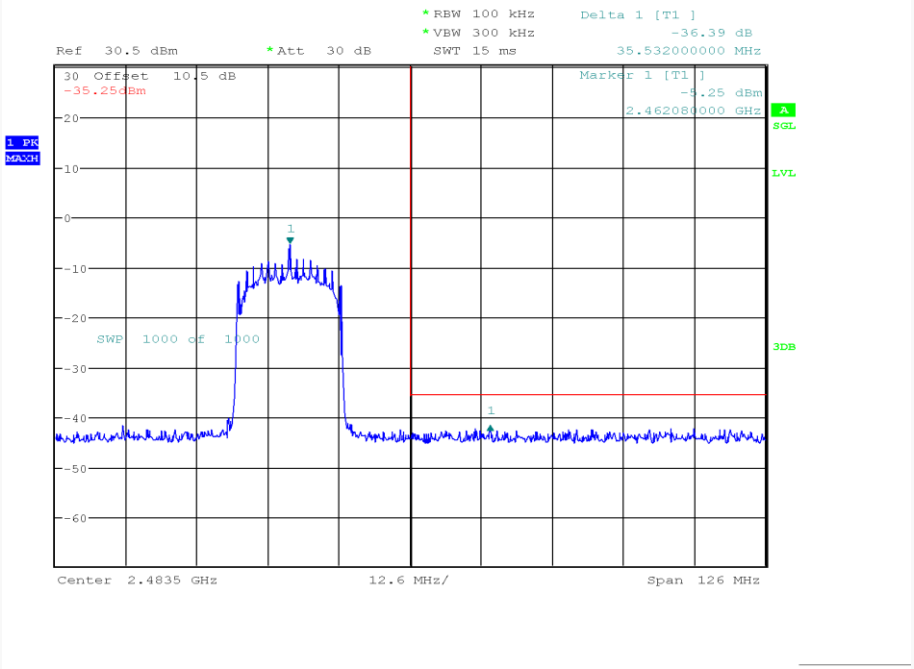
ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 10:47:50

802.11n-HT20 Mode Left Side



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 11:01:21

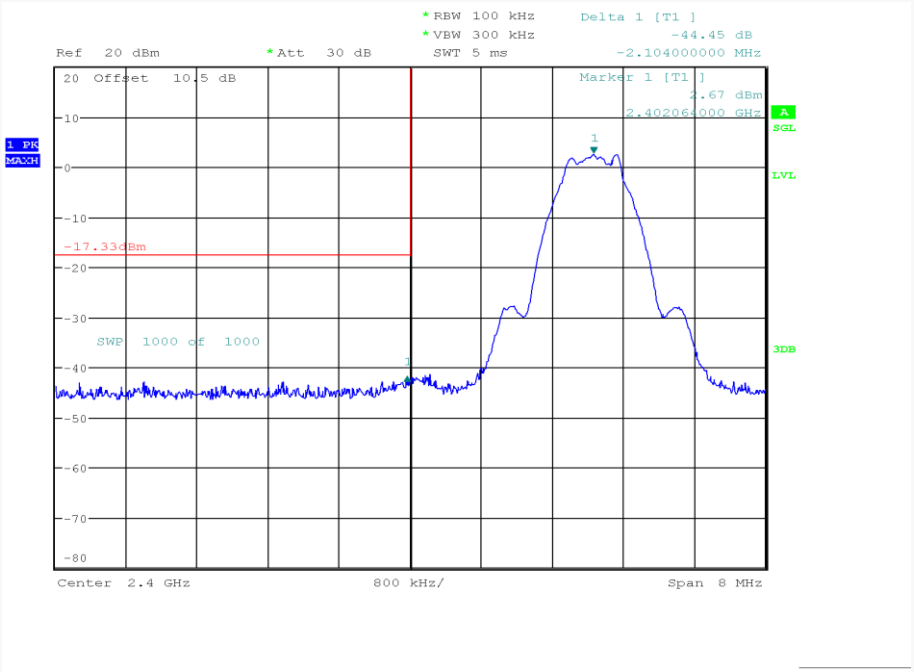
802.11n-HT20 Mode Right Side



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 11:21:26

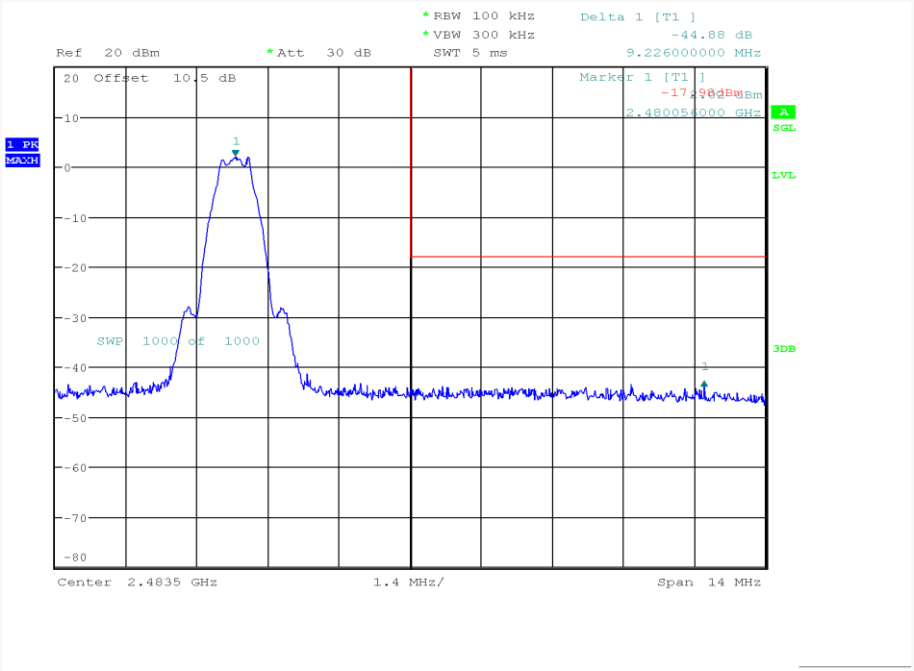
BLE 1Mbps:

Left Side



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 13:21:55

Right Side



ProjectNo.:RKSB240522001 Tester:Neil Zhou
Date: 2.JUL.2024 13:31:48

EUT PHOTOGRAPHS

Please refer to the attachment EXHIBIT A - EUT EXTERNAL PHOTOGRAPHS and EXHIBIT B - EUT INTERNAL PHOTOGRAPHS.

TEST SETUP PHOTOGRAPHS

Please refer to the attachment EXHIBIT C - TEST SETUP PHOTOGRAPHS.

Declarations

1. The laboratory is not responsible for the authenticity of any information provided by the applicant. Information from the applicant that may affect test results is marked with "★".

2. The test data was only valid for the test sample(s).

3. This report is valid only with a valid digital signature. The digital signature may be available only under the Adobe software above version 7.0.

4. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

5. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor k=2 with the 95.45% confidence interval.

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