FCC Radio Test Report

FCC ID: 2AXJ4C420

This report concerns: Class II Permissive Change

Report No.	:	BTL-FCCP-1-2302G024
Equipment	:	Smart Wire-Free Security Camera
Model Name	:	Tapo C420
Brand Name	:	tp-link, tapo
Applicant	:	TP-Link Corporation Limited
Address	:	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong
Manufacturer	:	TP-Link Corporation Limited
Address	:	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hong Kong
Radio Function	:	WLAN 2.4 GHz
FCC Rule Part(s)	:	FCC CFR Title 47, Part 15, Subpart C (15.247)
Measurement Procedure(s)	:	ANSI C63.10-2013
Date of Receipt	:	2023/3/1
Date of Test	:	2023/3/30 ~ 2023/4/10
Issued Date	:	2023/5/23

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by : Jay Kao, Engineer

Approved by : Jerry Chuang, Supervisor

Testing Laboratory 0659

BTL Inc.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

CONTENTS

REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-1-2302G024	R00	Original Report.	2023/4/28	Invalid
BTL-FCCP-1-2302G024	R01	Revised report to address TCB's comments.	2023/4/28	Invalid
BTL-FCCP-1-2302G024	R02	Revised report to address TCB's comments.	2023/5/23	Valid

1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

Standard(s) Section	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	NOTE (1)	N/A	------
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX A	Pass	------
15.247(a)	Bandwidth	APPENDIX B	Pass	------
15.247(b)	Output Power	APPENDIX C	Pass	------
15.247(e)	Power Spectral Density	APPENDIX D	Pass	------
15.247(d)	Antenna conducted Spurious Emission	APPENDIX E	Pass	------
15.203	Antenna Requirement	------	Pass	------

NOTE:
(1) ”N/A” denotes test is not applicable in this Test Report.
(2) The report format version is TP.1.1.1.
(3) This a support report for FCC ID: 2AXJ4C420 enables WLAN channel 12 and 13. Only test results of WLAN channel 12 and 13 are recorded in this report.

1.1 REFERENCE TEST GUIDANCE

KDB 662911 D01 Multiple Transmitter Output v02r01

1.2 TEST FACILITY

The test locations stated below are under the TAF Accreditation Number 0659.
The test location(s) used to collect the test data in this report are:
No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
(FCC DN: TW0659)
☐ C05 ☐ CB08 ☐ CB11 ☒ SR10 ☐ SR11
No. 72, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
(FCC DN: TW0659)
☐ C06 ☒ CB21 ☐ CB22

1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**, where expanded uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k = 2**, providing a level of confidence of approximately **95 %**. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U_{cispr} requirement.

A. Radiated emissions test :

Test Site	Measurement Frequency Range	U (dB)
CB21	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
	1 GHz ~ 6 GHz	5.21
	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

B. Conducted test :

Test Item	U (dB)
Occupied Bandwidth	0.5334
Output power	0.3669
Power Spectral Density	0.6591
Conducted Spurious emissions	0.5416
Conducted Band edges	0.5348

NOTE:
Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

1.4 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
Radiated emissions above 1 GHz	Refer to data	AC 120V	Mark Wang
Bandwidth	22 °C, 49 %	AC 120V	Jay Tien
Output Power	21 °C, 61 %	AC 120V	Jay Tien
Power Spectral Density	21 °C, 61 %	AC 120V	Jay Tien
Antenna conducted Spurious Emission	22 °C, 49 %	AC 120V	Jay Tien

1.5 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

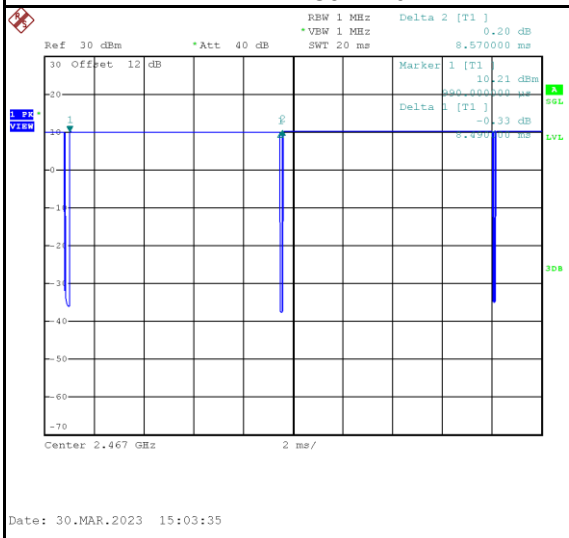
Test Software	MT7682 QA 0.3.0.8		
Mode	2467 MHz	2472 MHz	Data Rate
IEEE 802.11b	1D	19	1 Mbps
IEEE 802.11g	18	18	6 Mbps
IEEE 802.11n (HT20)	1A	1A	HT 0

1.6 DUTY CYCLE

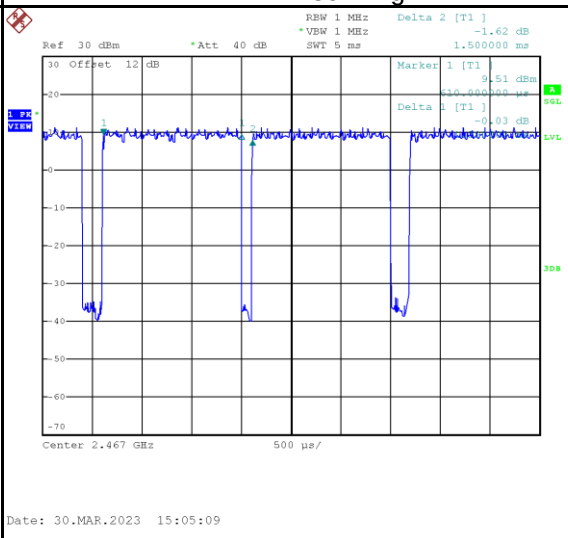
If duty cycle is ≥ 98 %, duty factor is not required.
If duty cycle is < 98 %, duty factor shall be considered.

Remark	Delta 1			Delta 2	On Time/Period	10 log(1/Duty Cycle)
Mode	ON (ms)	Numbers (ON)	On Time (B) (ms)	Period (ON+OFF) (ms)	Duty Cycle (%)	Duty Factor (dB)
IEEE 802.11b	8.490	1	8.490	8.570	99.07%	0.04
IEEE 802.11g	1.390	1	1.390	1.500	92.67%	0.33
IEEE 802.11n (HT20)	1.310	1	1.310	1.460	89.73%	0.47

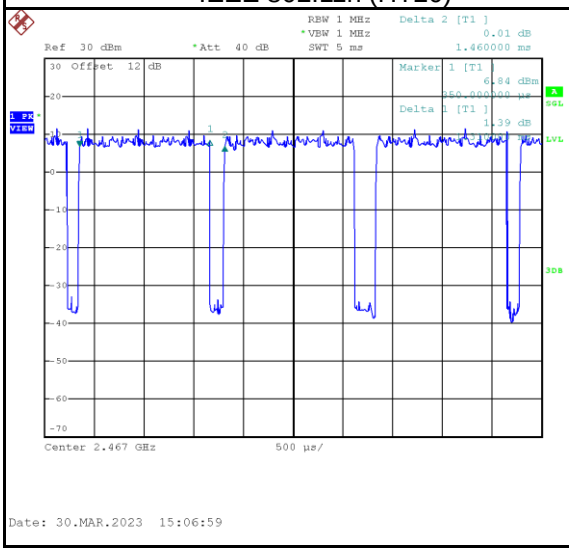
IEEE 802.11b



IEEE 802.11g



IEEE 802.11n (HT20)



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2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Smart Wire-Free Security Camera
Model Name	Tapo C420
Brand Name	tp-link, tapo
Model Difference	N/A
Power Source	#1 DC voltage supplied from AC Adapter. #2 Supplied from battery.
Power Rating	#1 I/P: 100-240V~ 50/60Hz 0.2A Max. O/P: 5V⎓1A #2 DC3.7V, 5200mAh, 19.24Wh
Products Covered	1 * Adapter: A8-501000 1 * Battery: Tapo A100 1 * USB Cable 1 * Bracket
Operation Band	2400 MHz ~ 2483.5 MHz
Operation Frequency	2412 MHz ~ 2472 MHz
Modulation Technology	IEEE 802.11b: DSSS IEEE 802.11g: OFDM IEEE 802.11n: OFDM
Transfer Rate	IEEE 802.11b: 11/5.5/2/1 Mbps IEEE 802.11g: 54/48/36/24/18/12/9/6 Mbps IEEE 802.11n: up to 72.2 Mbps
Output Average Power Max. (Channel 1~11) NOTE (5)	IEEE 802.11b: 18.06 dBm (0.0640 W) IEEE 802.11g: 18.59 dBm (0.0723 W) IEEE 802.11n (HT20): 17.26 dBm (0.0532 W)
Output Average Power Max. (Channel 12~13)	IEEE 802.11b: 15.23 dBm (0.0333 W) IEEE 802.11g: 12.66 dBm (0.0185 W) IEEE 802.11n (HT20): 12.44 dBm (0.0175 W)
Test Model	Tapo C420
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:

(1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

(2) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	06	2437	11	2462
02	2417	07	2442	12	2467
03	2422	08	2447	13	2472
04	2427	09	2452		
05	2432	10	2457		

(3) Table for Filed Antenna:

Ant.	Brand	Model Name	Type	Connector	Gain (dBi)
2	TP-LINK®	Tapo C420(US)1.0	IFA	N/A	-0.21

(4) The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

(5) The values are adopted from test report: BTL-FCCP-1-2204C109A.

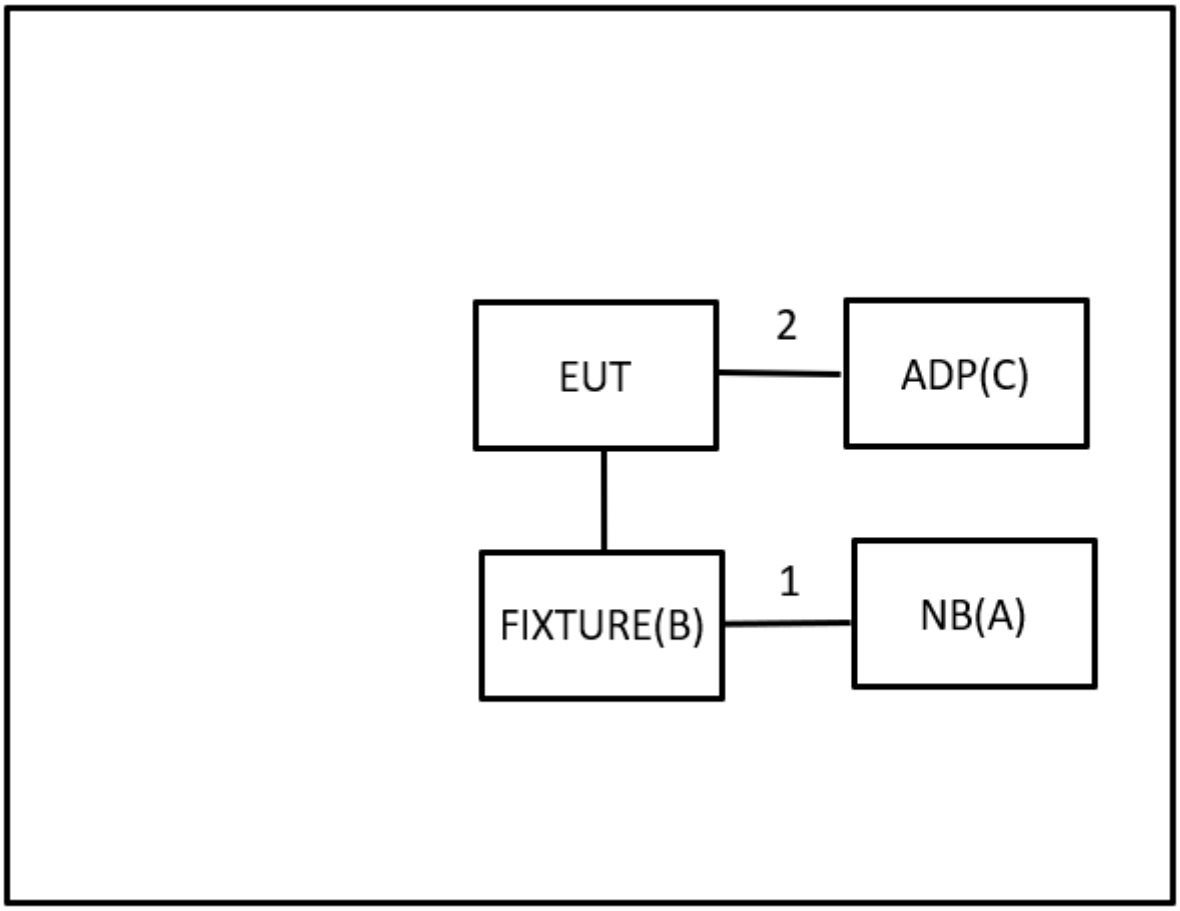
2.2 TEST MODES

Test Items	Test mode	Channel	Note
Transmitter Radiated Emissions (above 1GHz)	TX Mode_IEEE 802.11b	12/13	Bandedge
	TX Mode_IEEE 802.11g		
	TX Mode_IEEE 802.11n (HT20)		
Transmitter Radiated Emissions (above 1GHz)	TX Mode_IEEE 802.11b	12/13	Harmonic
	TX Mode_IEEE 802.11g		
	TX Mode_IEEE 802.11n (HT20)		
Bandwidth & Output Power & Power Spectral Density & Antenna conducted Spurious Emission	TX Mode_IEEE 802.11b	12/13	-
	TX Mode_IEEE 802.11g		
	TX Mode_IEEE 802.11n (HT20)		

NOTE:
(1) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Horizontal) is recorded.
(2) All X, Y and Z axes are evaluated, but only the worst case (Y axis) is recorded.

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.



2.4 SUPPORT UNITS

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	NB	HP	TPN-C125	N/A	Furnished by test lab.
B	FIXTURE	N/A	N/A	N/A	Supplied by test requester
C	ADP	LISTED	A8-501000	N/A	Supplied by test requester

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	No	No	1m	USB extension Cable	Furnished by test lab.
2	No	No	0.5m	USB Cable	Supplied by test requester

3 RADIATED EMISSIONS TEST

3.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated Emissions (dBuV/m)		Measurement Distance (meters)
	Peak	Average	
Above 1000	74	54	3

NOTE:
(1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).
(4) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain(if use)
Margin Level = Measurement Value - Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
19.11	+	2.11	=	21.22

Measurement Value		Limit Value		Margin Level
21.22	-	54	=	-32.78

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1MHz / 3MHz for Peak, 1MHz / 1/T for Average

Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector

3.2 TEST PROCEDURE

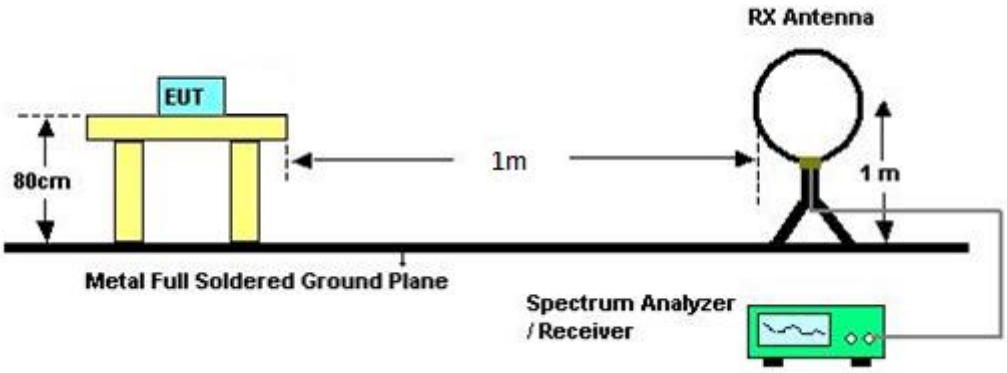
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn‘t perform. (below 1GHz)
h. All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn‘t perform. (above 1GHz)
i. For the actual test configuration, please refer to the related Item – EUT TEST PHOTO.

3.3 DEVIATION FROM TEST STANDARD

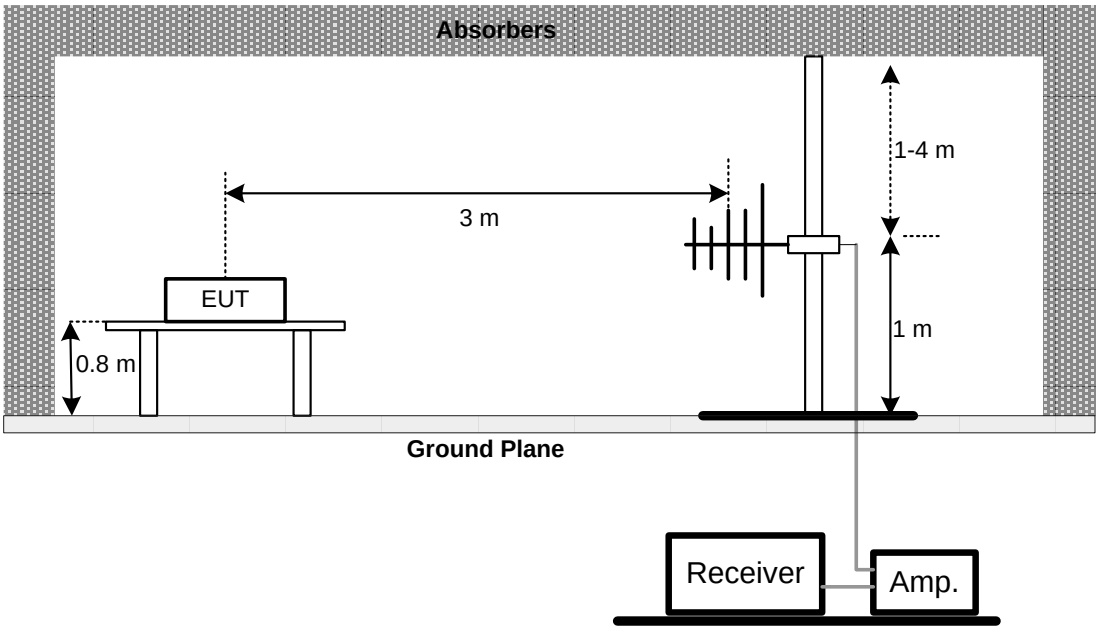
No deviation.

3.4 TEST SETUP

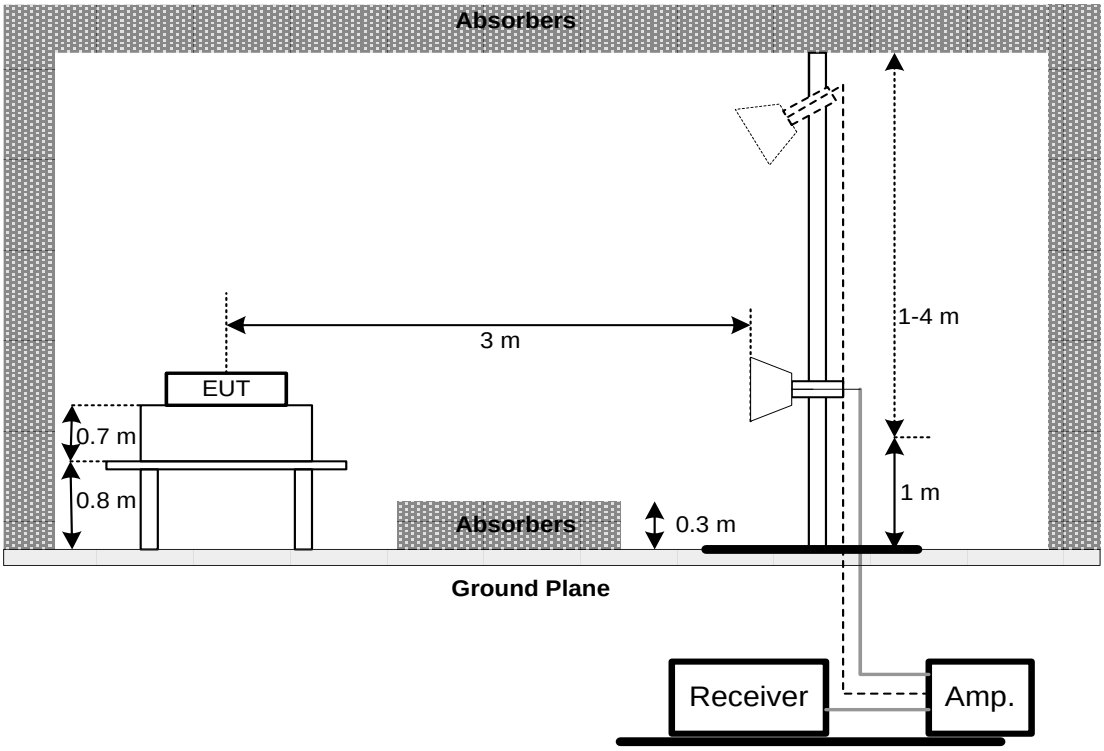
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



3.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

3.6 TEST RESULT – BELOW 30 MHZ

There were no emissions found below 30 MHz within 20 dB of the limit.

3.7 TEST RESULT – 30 MHZ TO 1 GHZ

Not applicable in this Test Report.

3.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX A.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable.
For fundamental signal judgment was referred to Peak output test.

4 BANDWIDTH TEST

4.1 LIMIT

Section	Test Item	Limit
15.247(a)	6 dB Bandwidth	500 kHz

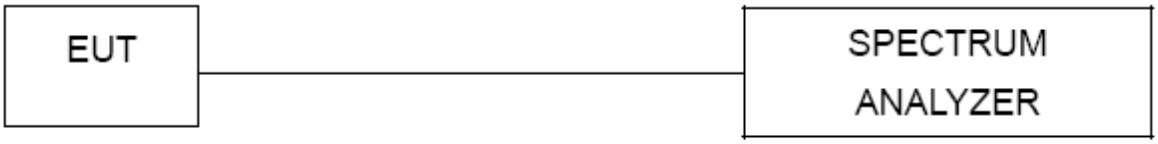
4.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT

Please refer to the APPENDIX B.

5 OUTPUT POWER TEST

5.1 LIMIT

Section	Test Item	Limit
15.247(b)	Maximum Output Power	1 Watt or 30dBm

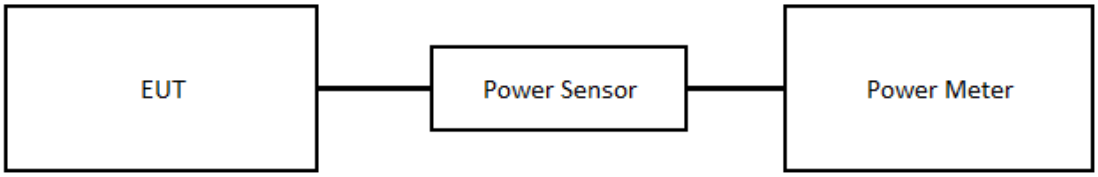
5.2 TEST PROCEDURE

a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below.
b. The maximum peak conducted output power was performed in accordance with FCC KDB 558074 D01 15.247 Meas Guidance.
c. Subclause 11.9.1.1 of ANSI C63.10 is applied. 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.

5.3 DEVIATION FROM TEST STANDARD

No deviation.

5.4 TEST SETUP



5.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

5.6 TEST RESULT

Please refer to the APPENDIX C.

6 POWER SPECTRAL DENSITY

6.1 LIMIT

Section	Test Item	Limit
15.247(e)	Power Spectral Density	8 dBm (in any 3 kHz)

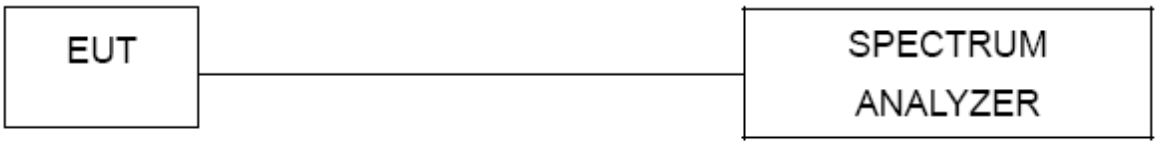
6.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW = 3 kHz, VBW = 10 kHz, Sweep time = Auto.

6.3 DEVIATION FROM TEST STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

6.6 TEST RESULT

Please refer to the APPENDIX D.

7 ANTENNA CONDUCTED SPURIOUS EMISSIONS TEST

7.1 LIMIT

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced 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 that the transmitter demonstrates compliance with the peak conducted power limits.

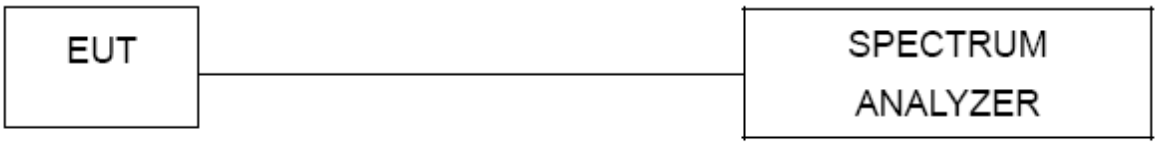
7.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Spectrum Setting: RBW = 100 kHz, VBW=300 kHz, Sweep time = Auto.
c. Offset = antenna gain + cable loss.

7.3 DEVIATION FROM TEST STANDARD

No deviation.

7.4 TEST SETUP



7.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.6 TEST RESULT

Please refer to the APPENDIX E.

8 LIST OF MEASURING EQUIPMENTS

Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC118A45SE	980819	2023/3/7	2024/3/6
2	Pre-Amplifier	EMCI	EMC184045SE	980907	2022/9/28	2023/9/27
3	Test Cable	EMCI	EMC104-SM-SM-1000	220319	2023/3/14	2024/3/13
4	Test Cable	EMCI	EMC104-SM-SM-3000	220322	2023/3/14	2024/3/13
5	Test Cable	EMCI	EMC104-SM-SM-7000	220324	2023/3/14	2024/3/13
6	EXA Signal Analyzer	keysight	N9020B	MY57120120	2023/2/24	2024/2/23
7	Horn Antenna	RFSPIN	DRH18-E	211202A18EN	2022/5/18	2023/5/17
8	Horn Ant	Schwarzbeck	BBHA 9170D	1136	2022/5/18	2023/5/17
9	Test Cable	EMCI	EMC101G-KM-KM-3000	220329	2023/3/14	2024/3/13
10	Test Cable	EMCI	EMC102-KM-KM-1000	220327	2023/3/14	2024/3/13
11	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

Bandwidth						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2022/10/7	2023/10/6

Output Power						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Power Meter	Anritsu	ML2495A	1128008	2022/6/1	2023/5/31
2	Power Sensor	Anritsu	MA2411B	1126001	2022/6/1	2023/5/31

Power Spectral Density						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2022/10/7	2023/10/6

Antenna conducted Spurious Emission						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP 40	100129	2022/10/7	2023/10/6

Remark: “N/A” denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

9 EUT TEST PHOTO

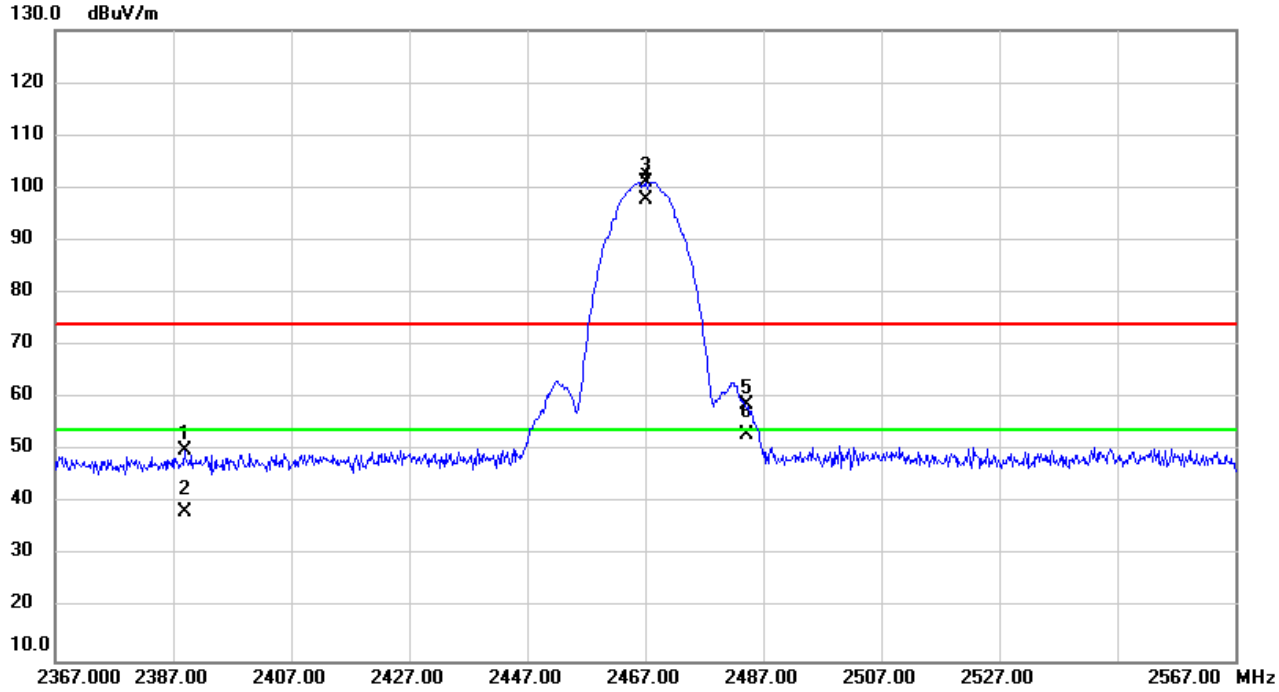
Please refer to document Appendix No.: TP-2302G024-FCCP-1 (APPENDIX-TEST PHOTOS).

10 EUT PHOTOS

Please refer to document Appendix No.: EP-2302G024-1 (APPENDIX-EUT PHOTOS).

APPENDIX A RADIATED EMISSIONS - ABOVE 1 GHZ

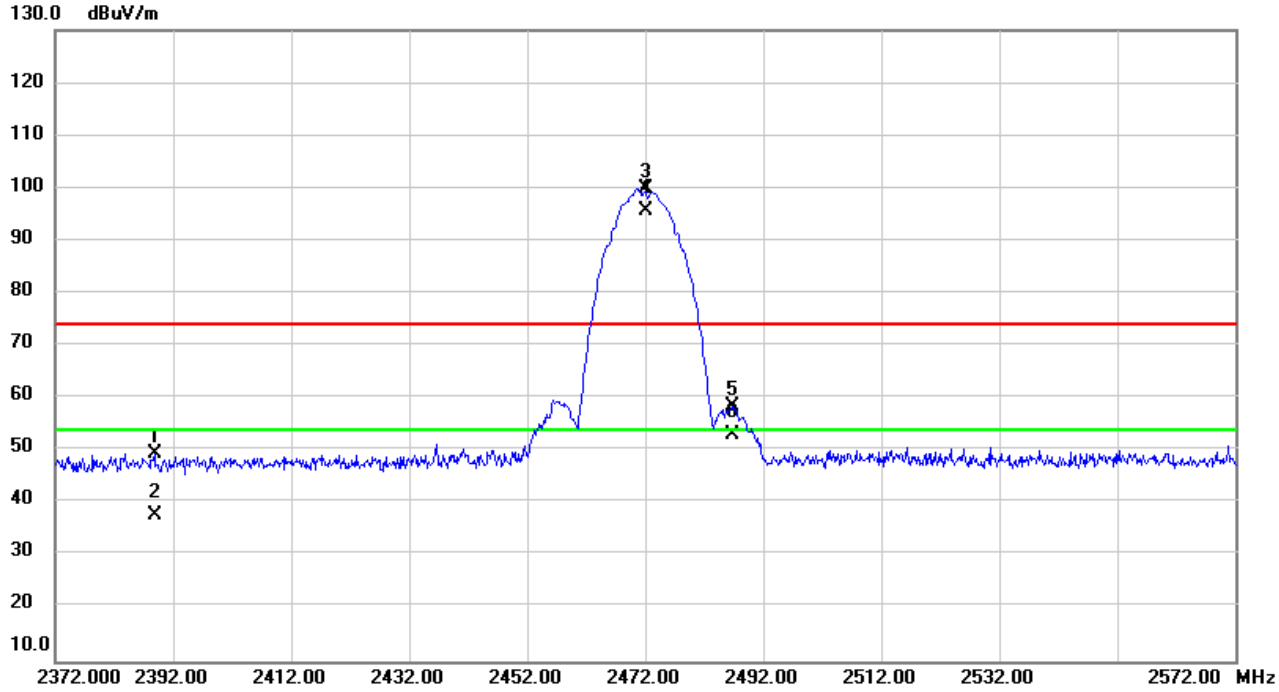
Test Mode	IEEE 802.11b	Test Date	2023/4/6
Test Frequency	2467MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2388.947	55.47	-5.42	50.05	74.00	-23.95	peak	
2		2388.947	43.77	-5.42	38.35	54.00	-15.65	AVG	
3	X	2467.000	106.43	-5.32	101.11	74.00	27.11	peak	NoLimit
4	*	2467.000	103.03	-5.32	97.71	54.00	43.71	AVG	NoLimit
5		2484.226	63.98	-5.32	58.66	74.00	-15.34	peak	
6		2484.226	58.26	-5.32	52.94	54.00	-1.06	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

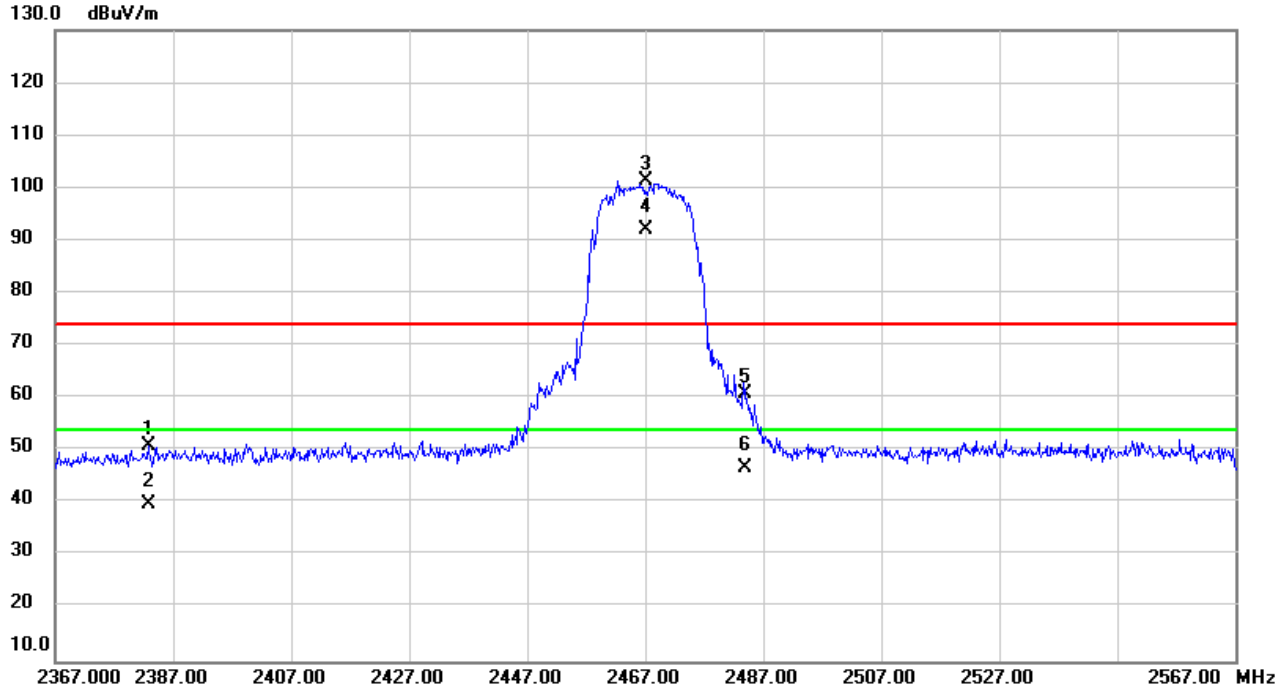
Test Mode	IEEE 802.11b	Test Date	2023/4/6
Test Frequency	2472MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2388.913	54.89	-5.42	49.47	74.00	-24.53	peak	
2		2388.913	43.30	-5.42	37.88	54.00	-16.12	AVG	
3	X	2472.000	105.09	-5.33	99.76	74.00	25.76	peak	NoLimit
4	*	2472.000	101.01	-5.33	95.68	54.00	41.68	AVG	NoLimit
5		2486.880	63.82	-5.30	58.52	74.00	-15.48	peak	
6		2486.880	58.48	-5.30	53.18	54.00	-0.82	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

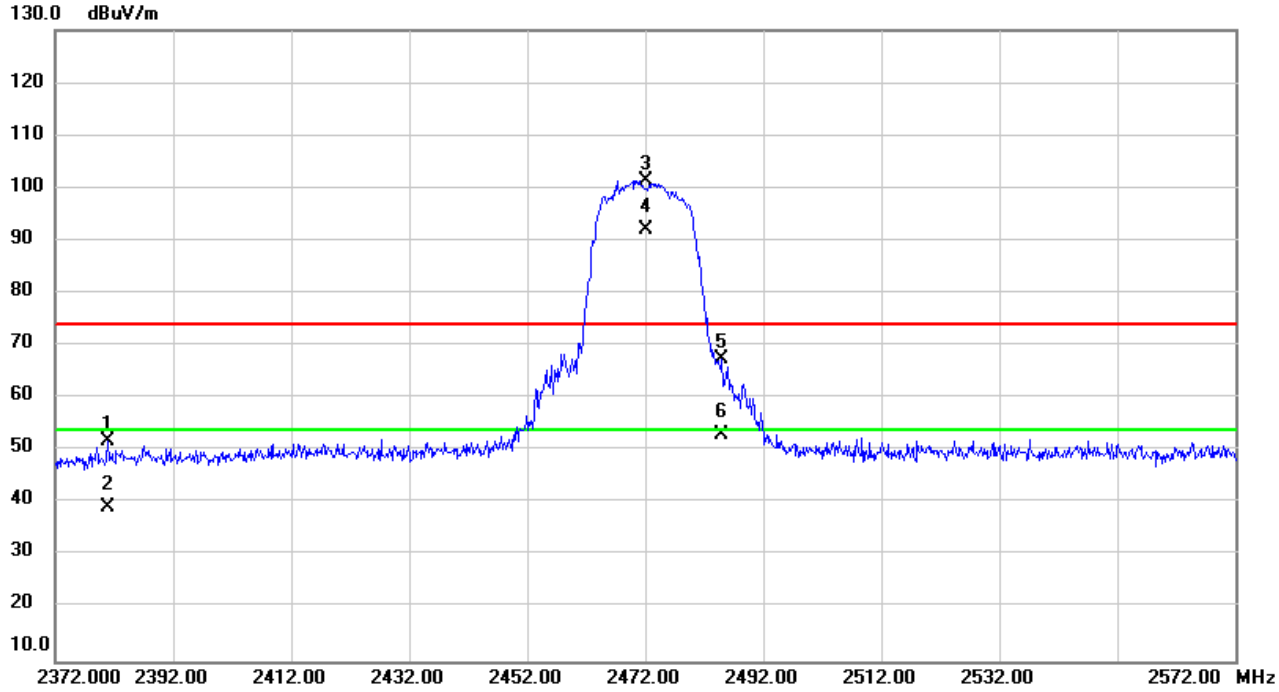
Test Mode	IEEE 802.11g	Test Date	2023/4/6
Test Frequency	2467MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2382.780	56.26	-5.42	50.84	74.00	-23.16	peak	
2		2382.780	45.16	-5.42	39.74	54.00	-14.26	AVG	
3	X	2467.000	106.80	-5.32	101.48	74.00	27.48	peak	NoLimit
4	*	2467.000	97.29	-5.32	91.97	54.00	37.97	AVG	NoLimit
5		2483.800	66.13	-5.32	60.81	74.00	-13.19	peak	
6		2483.800	52.18	-5.32	46.86	54.00	-7.14	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

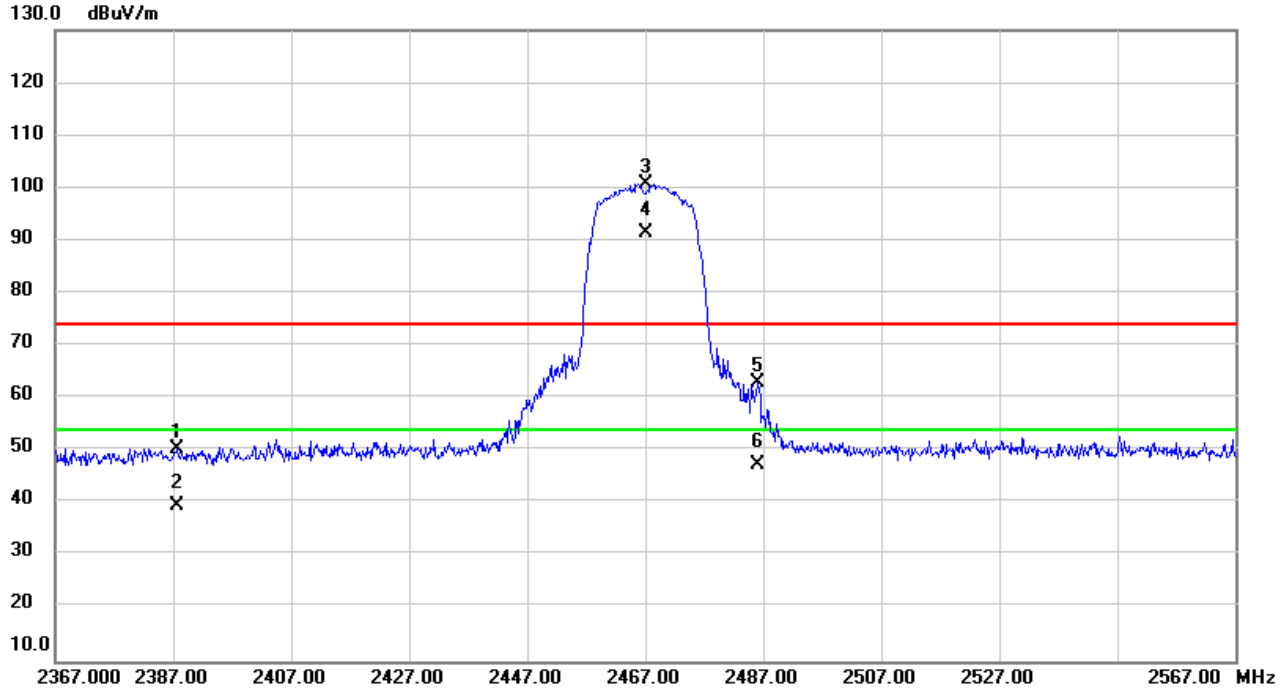
Test Mode	IEEE 802.11g	Test Date	2023/4/6
Test Frequency	2472MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2380.873	57.41	-5.42	51.99	74.00	-22.01	peak	
2		2380.873	44.76	-5.42	39.34	54.00	-14.66	AVG	
3	X	2472.000	106.80	-5.33	101.47	74.00	27.47	peak	NoLimit
4	*	2472.000	97.50	-5.33	92.17	54.00	38.17	AVG	NoLimit
5		2485.007	72.68	-5.30	67.38	74.00	-6.62	peak	
6		2485.007	58.24	-5.30	52.94	54.00	-1.06	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

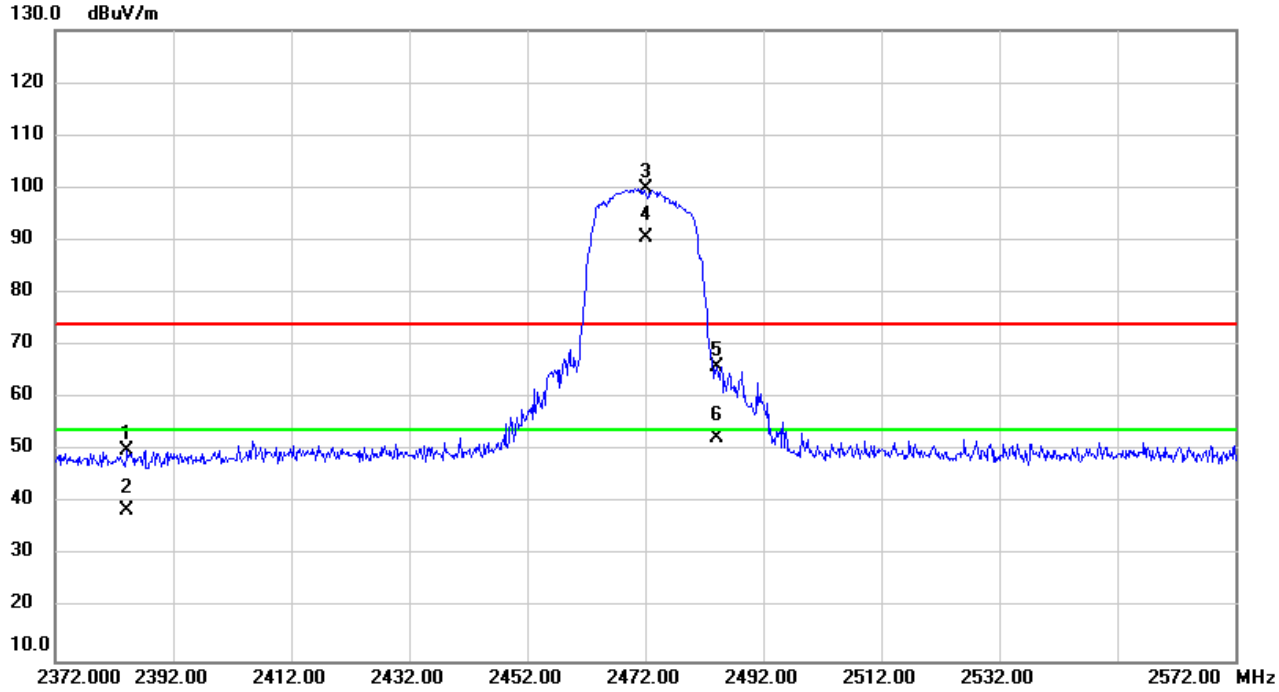
Test Mode	IEEE 802.11n (HT20)	Test Date	2023/4/6
Test Frequency	2467MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2387.767	55.88	-5.42	50.46	74.00	-23.54	peak	
2		2387.767	44.90	-5.42	39.48	54.00	-14.52	AVG	
3	X	2467.000	106.10	-5.32	100.78	74.00	26.78	peak	NoLimit
4	*	2467.000	96.76	-5.32	91.44	54.00	37.44	AVG	NoLimit
5		2486.193	68.23	-5.30	62.93	74.00	-11.07	peak	
6		2486.193	52.60	-5.30	47.30	54.00	-6.70	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

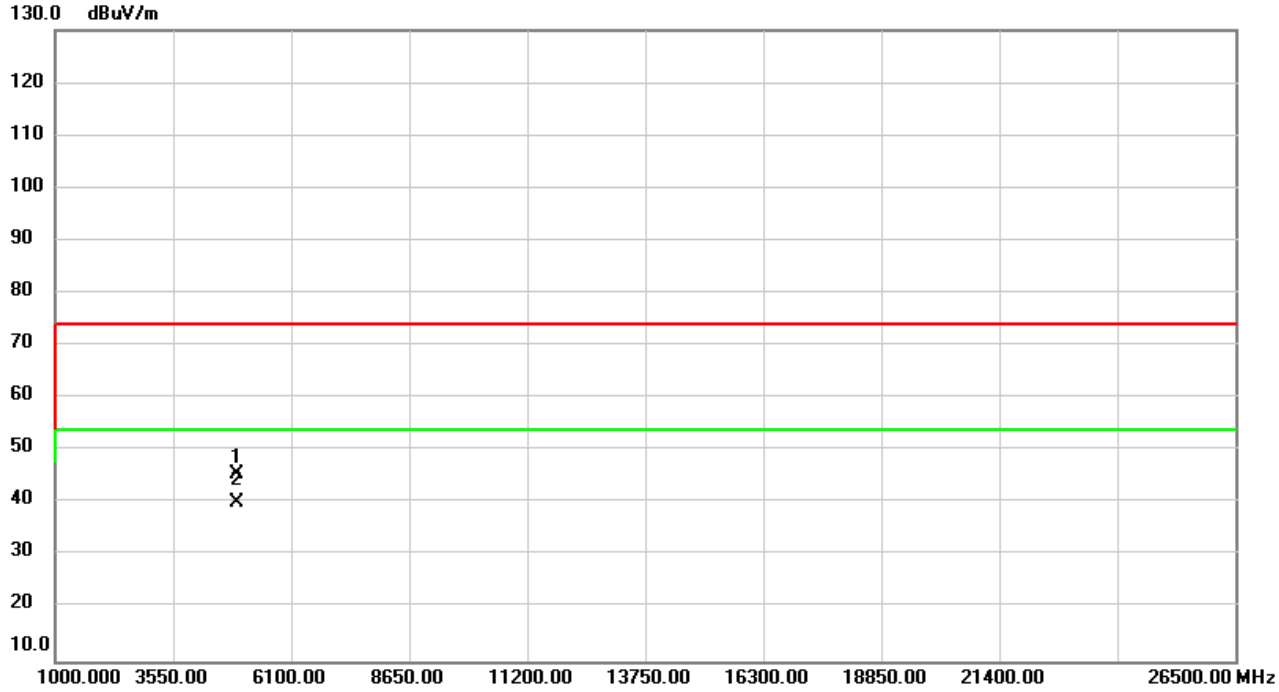
Test Mode	IEEE 802.11n (HT20)	Test Date	2023/4/6
Test Frequency	2472MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2384.240	55.56	-5.43	50.13	74.00	-23.87	peak	
2		2384.240	44.10	-5.43	38.67	54.00	-15.33	AVG	
3	X	2472.000	105.23	-5.33	99.90	74.00	25.90	peak	NoLimit
4	*	2472.000	95.86	-5.33	90.53	54.00	36.53	AVG	NoLimit
5		2484.253	71.42	-5.32	66.10	74.00	-7.90	peak	
6		2484.253	57.78	-5.32	52.46	54.00	-1.54	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

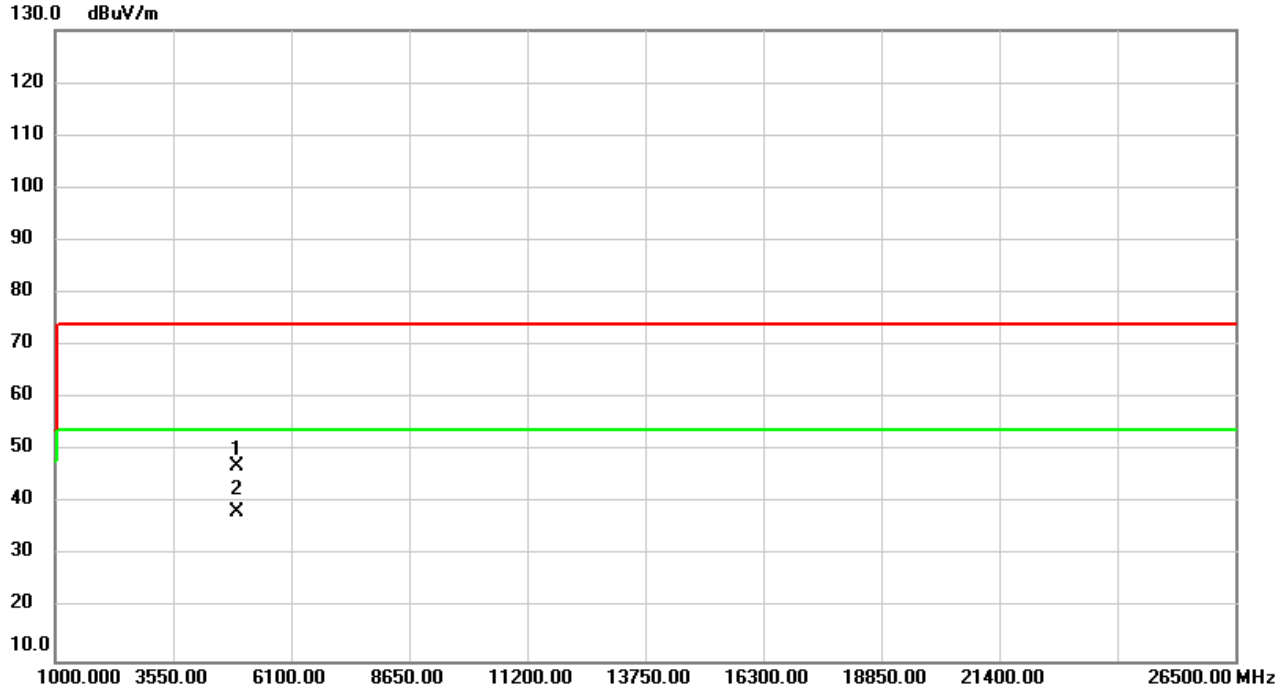
Test Mode	IEEE 802.11b	Test Date	2023/3/31
Test Frequency	2467MHz	Polarization	Vertical
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4934.000	44.24	1.20	45.44	74.00	-28.56	peak	
2	*	4934.000	39.05	1.20	40.25	54.00	-13.75	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

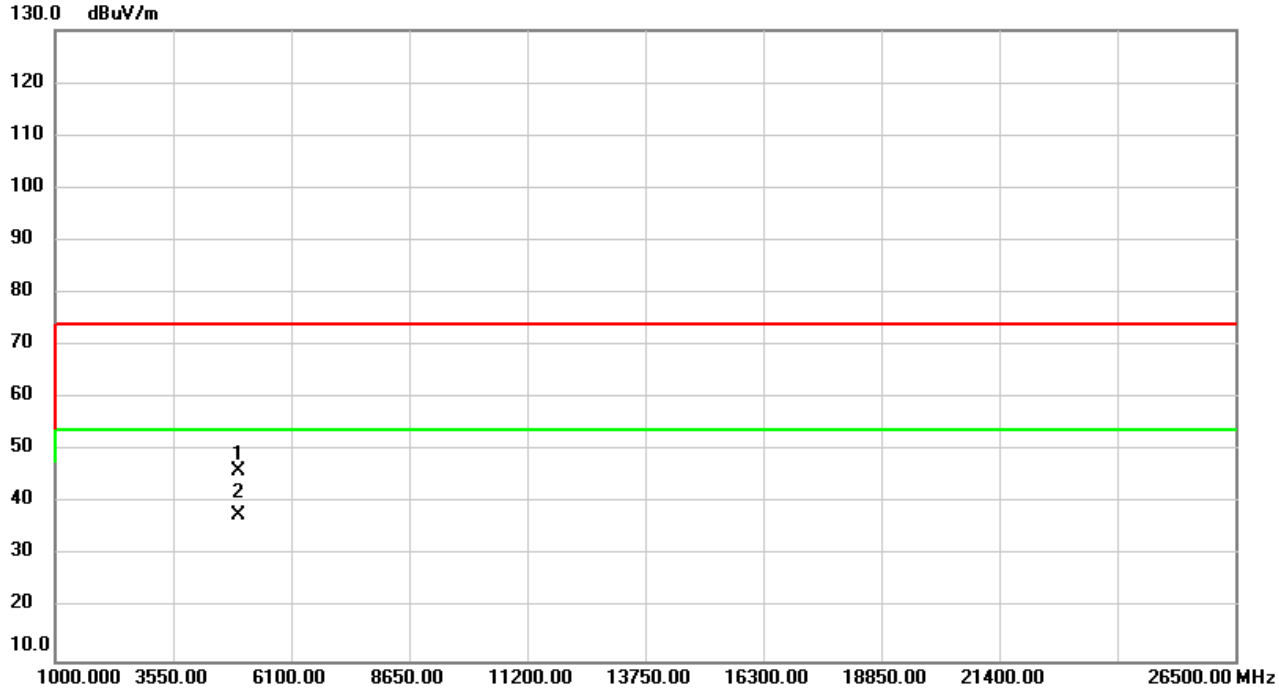
Test Mode	IEEE 802.11b	Test Date	2023/3/31
Test Frequency	2467MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4934.000	45.85	1.20	47.05	74.00	-26.95	peak	
2	*	4934.000	37.08	1.20	38.28	54.00	-15.72	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

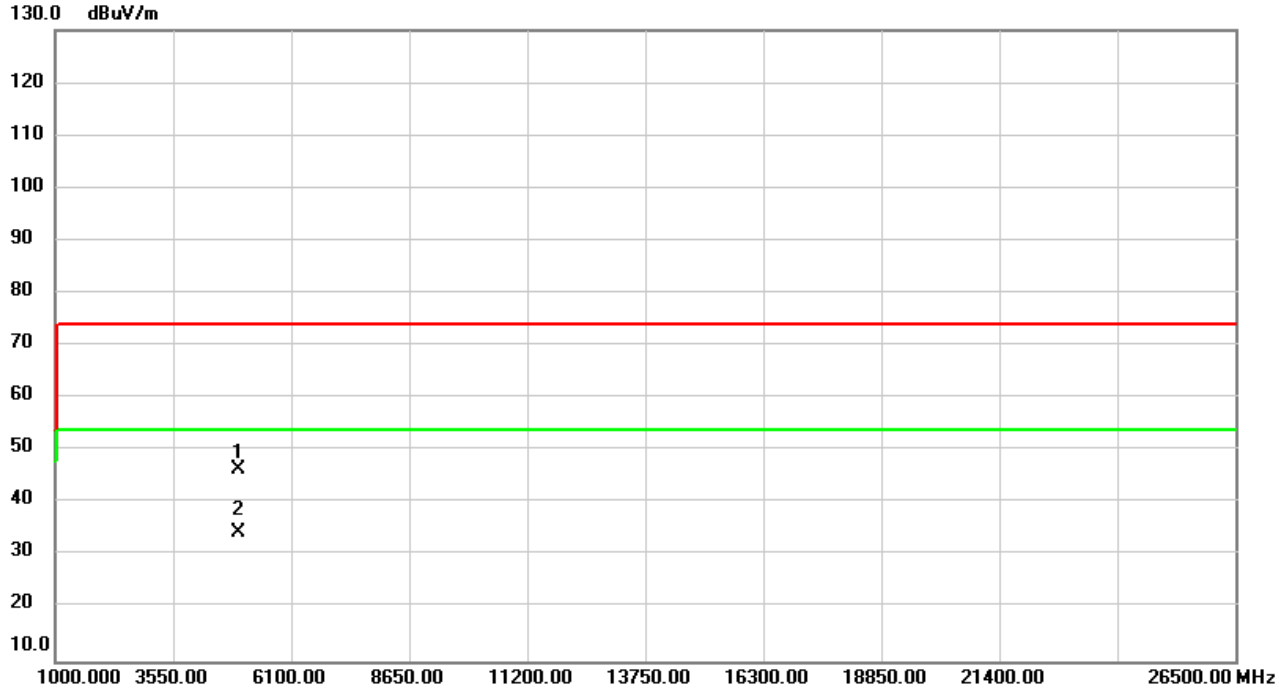
Test Mode	IEEE 802.11b	Test Date	2023/3/31
Test Frequency	2472MHz	Polarization	Vertical
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4944.000	44.82	1.22	46.04	74.00	-27.96	peak	
2	*	4944.000	36.49	1.22	37.71	54.00	-16.29	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

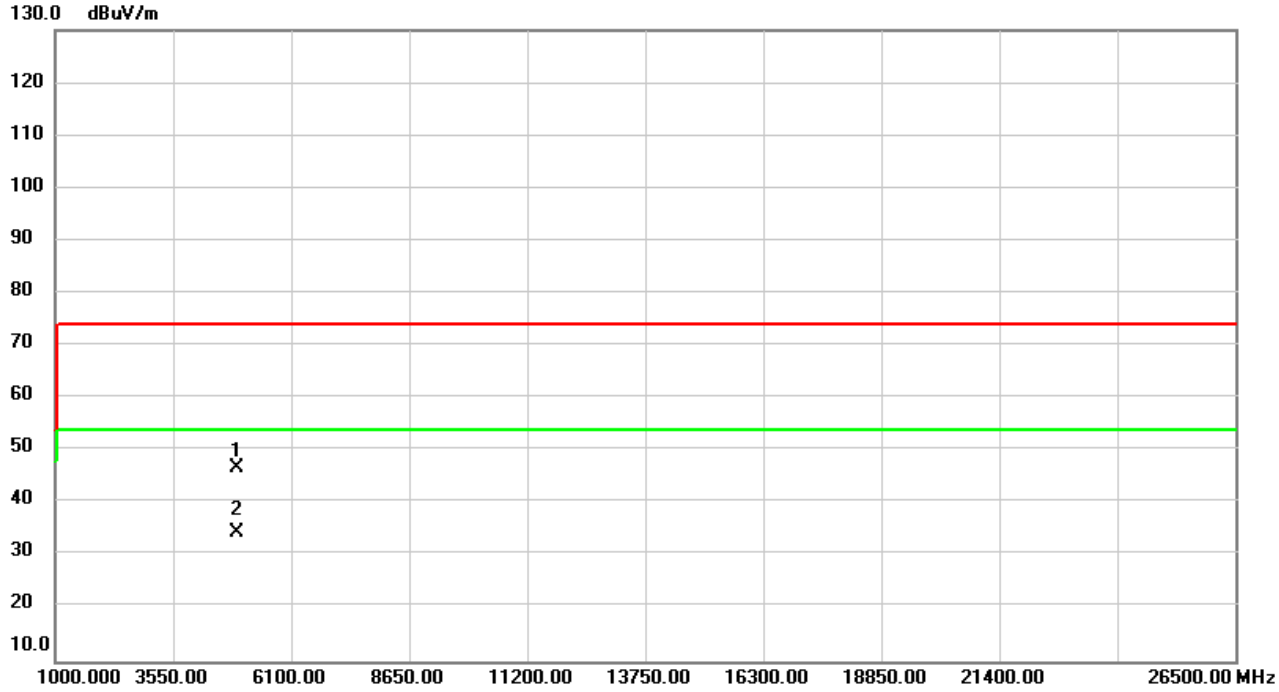
Test Mode	IEEE 802.11b	Test Date	2023/3/31
Test Frequency	2472MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4944.000	45.13	1.22	46.35	74.00	-27.65	peak	
2	*	4944.000	33.30	1.22	34.52	54.00	-19.48	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

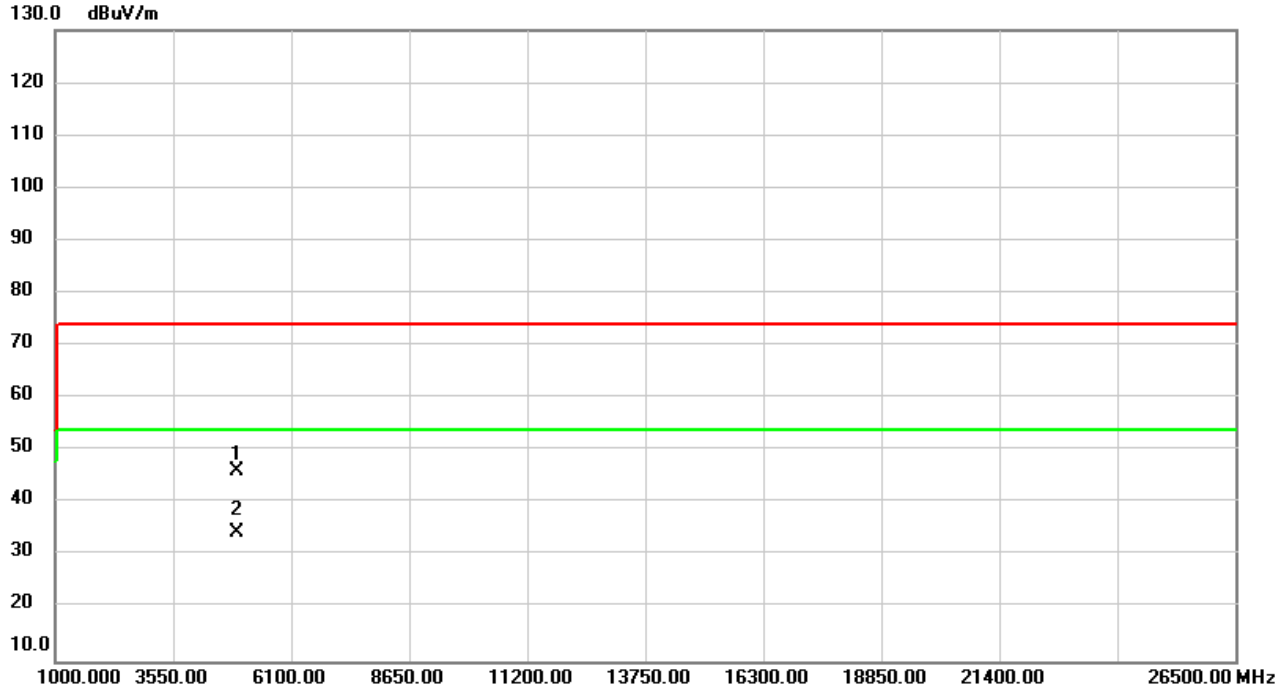
Test Mode	IEEE 802.11g	Test Date	2023/3/31
Test Frequency	2467MHz	Polarization	Vertical
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4934.000	45.56	1.20	46.76	74.00	-27.24	peak	
2	*	4934.000	33.26	1.20	34.46	54.00	-19.54	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

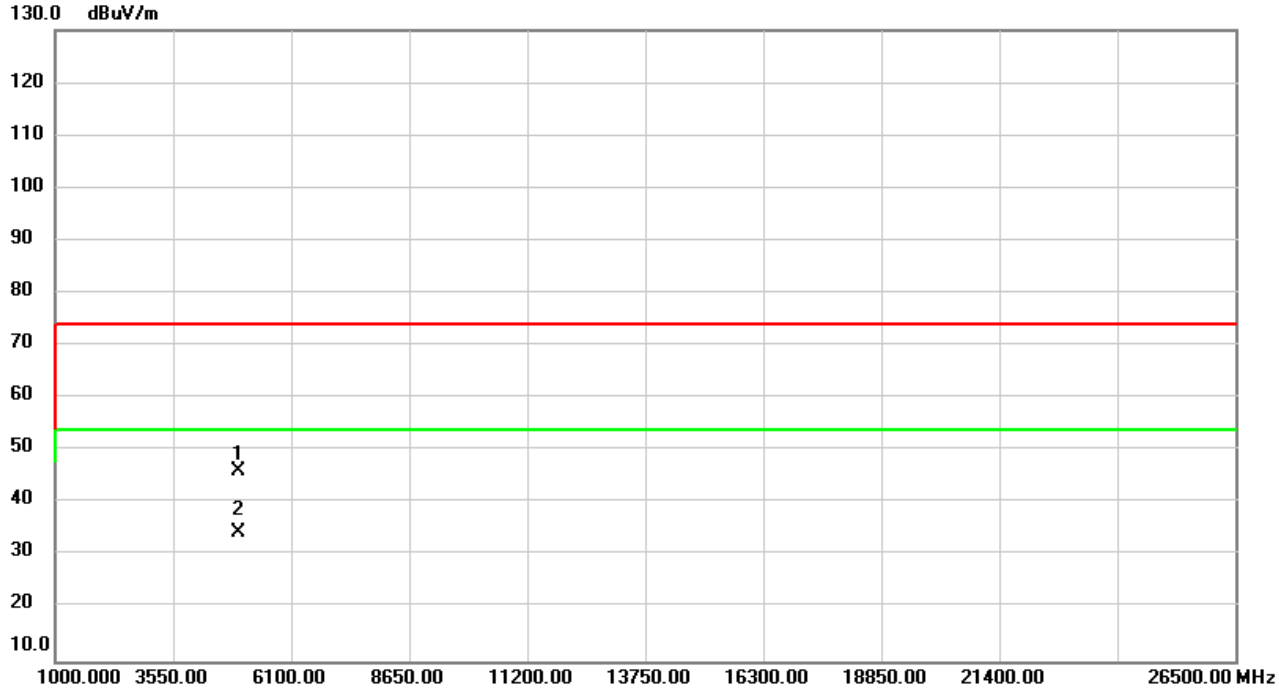
Test Mode	IEEE 802.11g	Test Date	2023/3/31
Test Frequency	2467MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4934.000	44.85	1.20	46.05	74.00	-27.95	peak	
2	*	4934.000	33.20	1.20	34.40	54.00	-19.60	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

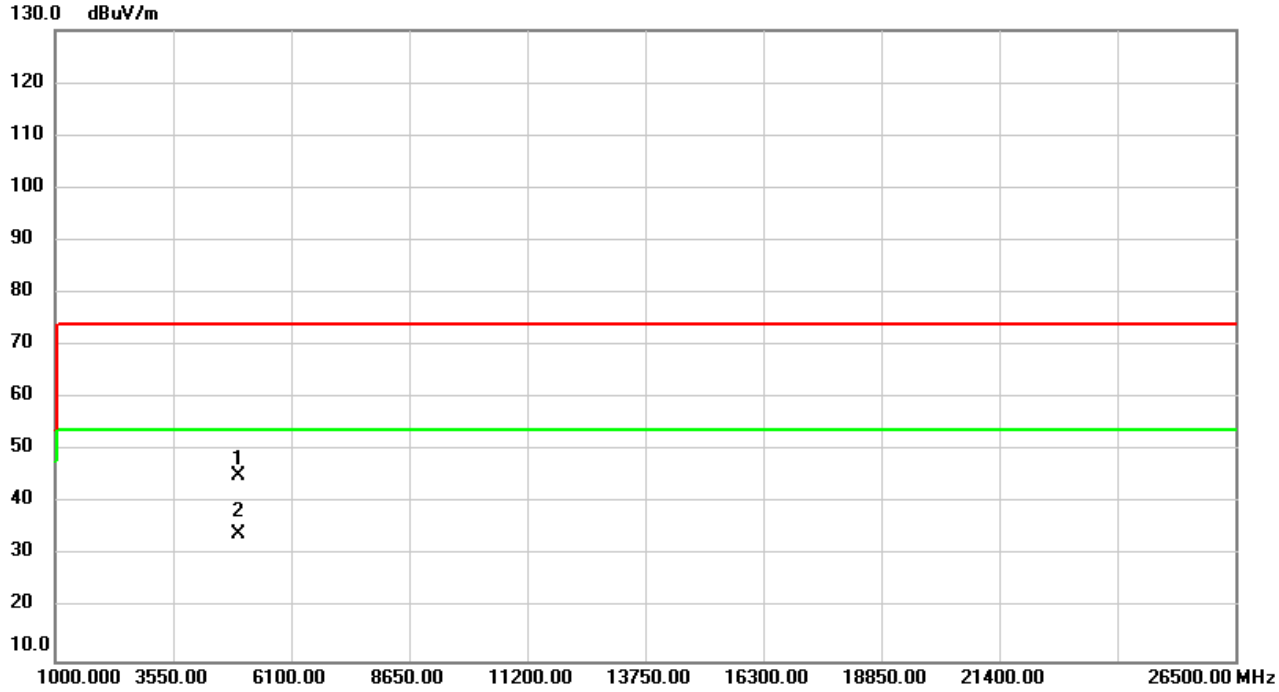
Test Mode	IEEE 802.11g	Test Date	2023/3/31
Test Frequency	2472MHz	Polarization	Vertical
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4944.000	45.01	1.22	46.23	74.00	-27.77	peak	
2	*	4944.000	33.19	1.22	34.41	54.00	-19.59	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

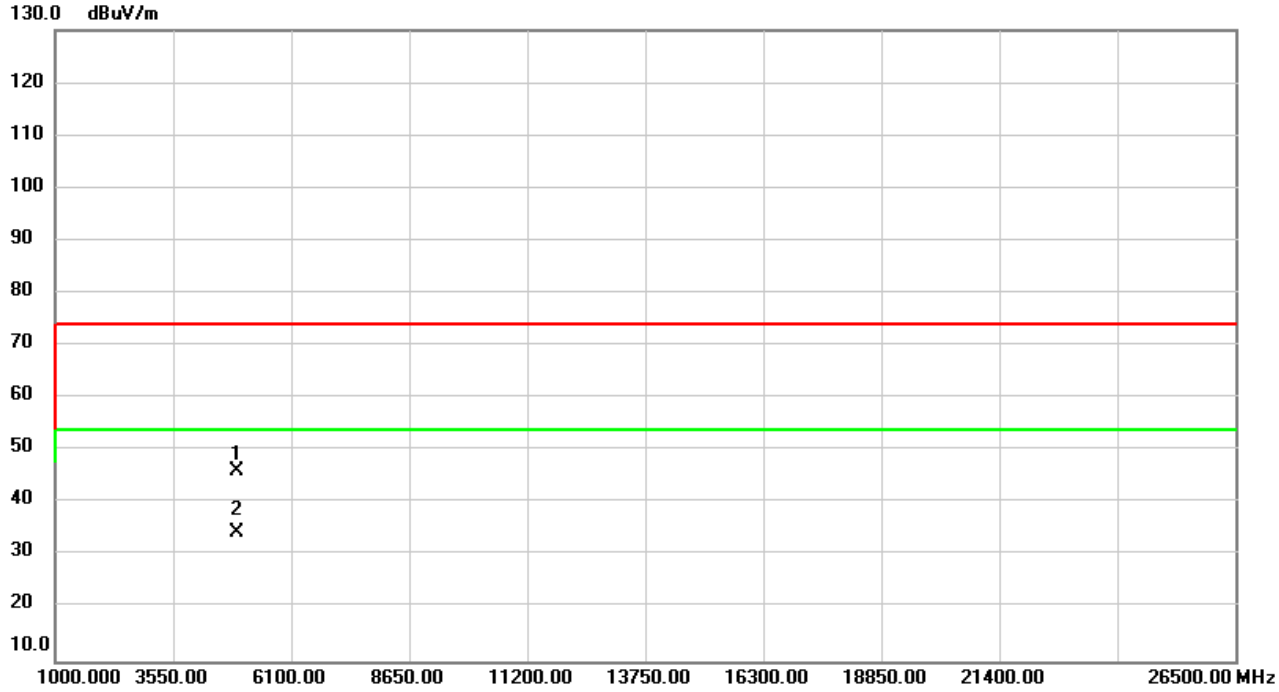
Test Mode	IEEE 802.11g	Test Date	2023/3/31
Test Frequency	2472MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4944.000	44.08	1.22	45.30	74.00	-28.70	peak	
2	*	4944.000	33.08	1.22	34.30	54.00	-19.70	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

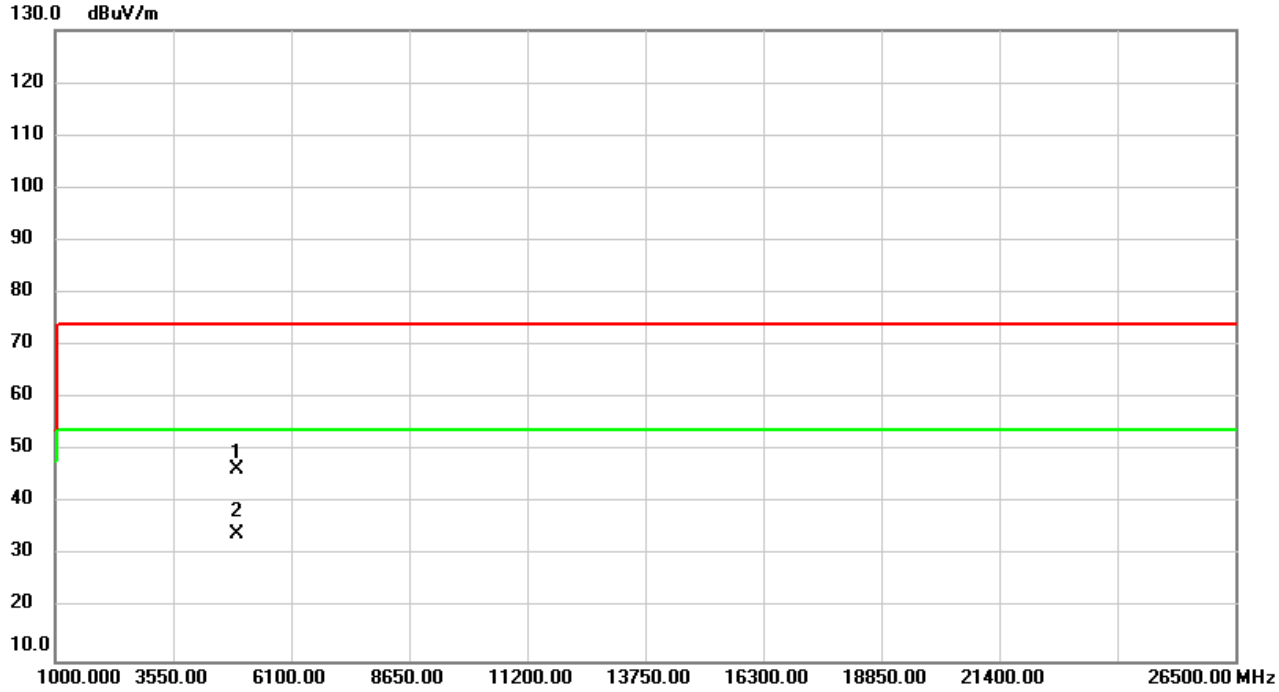
Test Mode	IEEE 802.11n (HT20)	Test Date	2023/3/31
Test Frequency	2467MHz	Polarization	Vertical
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4934.000	44.81	1.20	46.01	74.00	-27.99	peak	
2	*	4934.000	33.21	1.20	34.41	54.00	-19.59	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

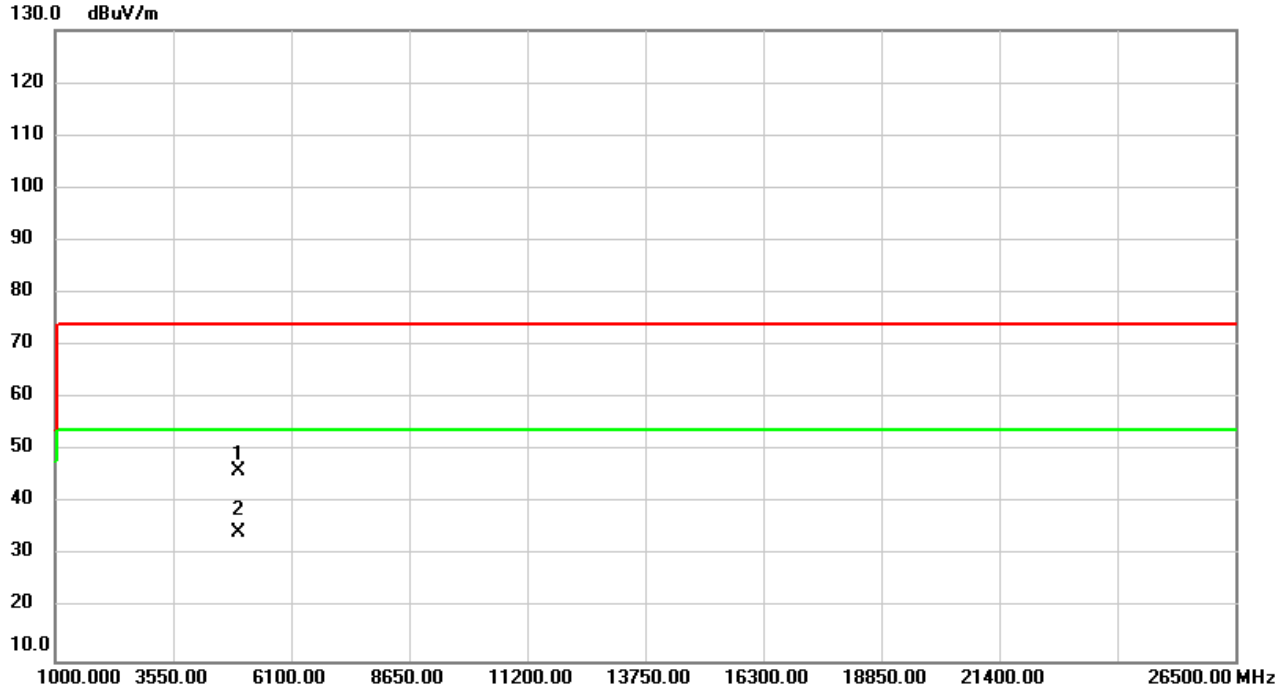
Test Mode	IEEE 802.11n (HT20)	Test Date	2023/3/31
Test Frequency	2467MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4934.000	45.14	1.20	46.34	74.00	-27.66	peak	
2	*	4934.000	33.10	1.20	34.30	54.00	-19.70	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

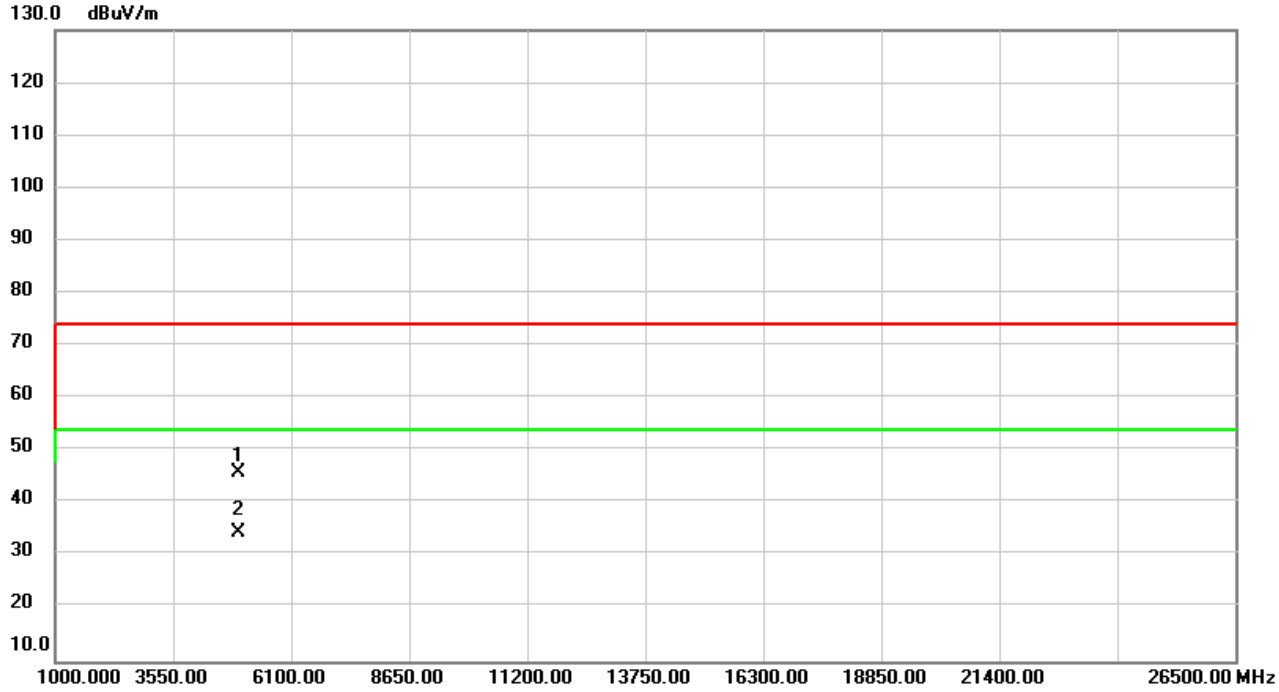
Test Mode	IEEE 802.11n (HT20)	Test Date	2023/3/31
Test Frequency	2472MHz	Polarization	Vertical
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4944.000	44.89	1.22	46.11	74.00	-27.89	peak	
2	*	4944.000	33.26	1.22	34.48	54.00	-19.52	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

Test Mode	IEEE 802.11n (HT20)	Test Date	2023/3/31
Test Frequency	2472MHz	Polarization	Horizontal
Temp	22°C	Hum.	67%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4944.000	44.49	1.22	45.71	74.00	-28.29	peak	
2	*	4944.000	33.30	1.22	34.52	54.00	-19.48	AVG	

REMARKS:
(1) Measurement Value = Reading Level + Correct Factor.
(2) Margin Level = Measurement Value - Limit Value.

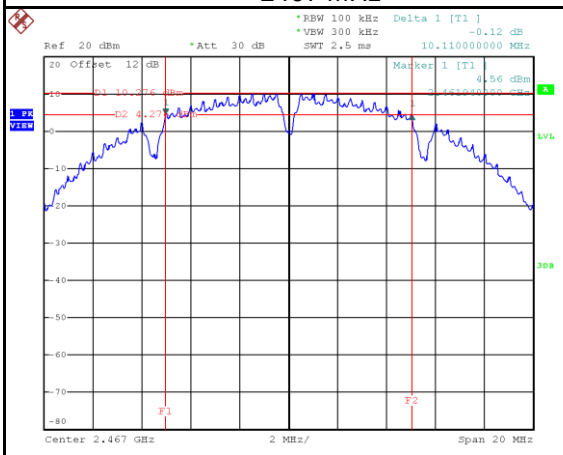
APPENDIX B BANDWIDTH

Test Mode	IEEE 802.11b

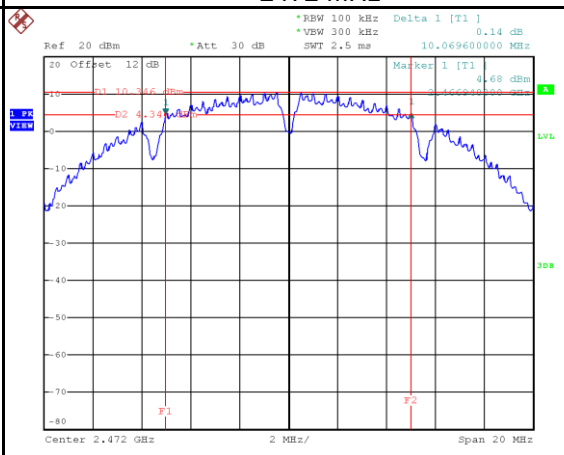
Test Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	Minimum 6 dB Bandwidth Limit (kHz)	Result
2467	10.11	15.04	≥ 500	Pass
2472	10.07	15.04	≥ 500	Pass

6dB Bandwidth

2467 MHz

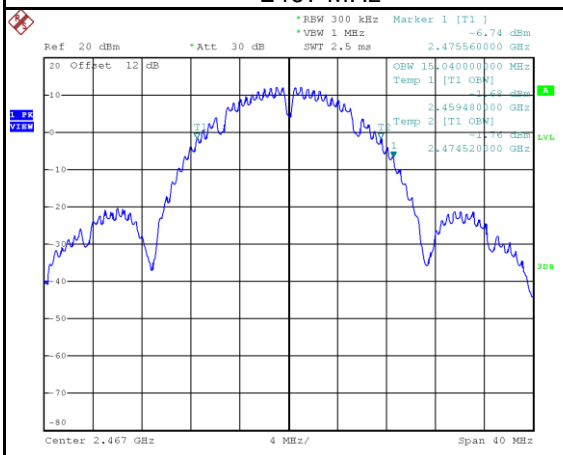


2472 MHz

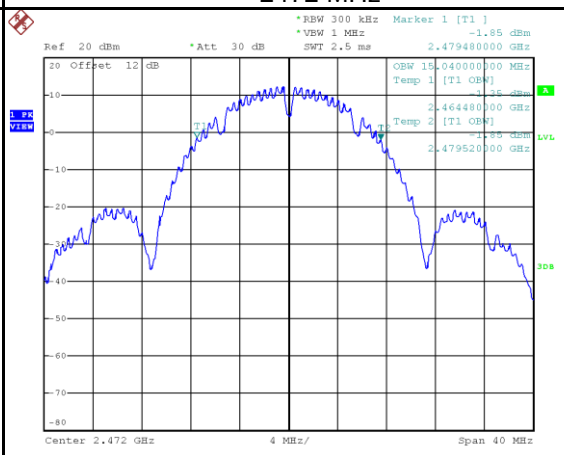


99% Occupied BW

2467 MHz



2472 MHz

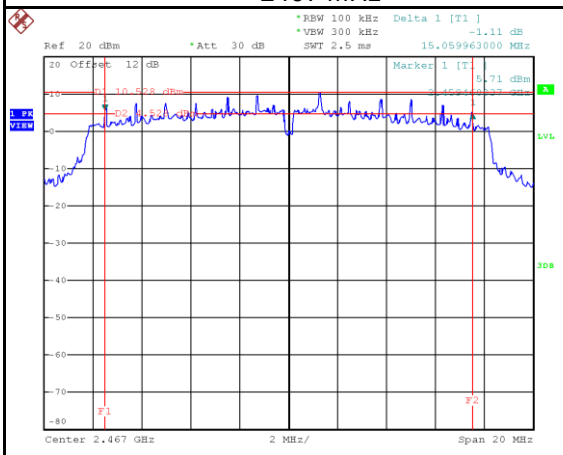


Test Mode	IEEE 802.11g

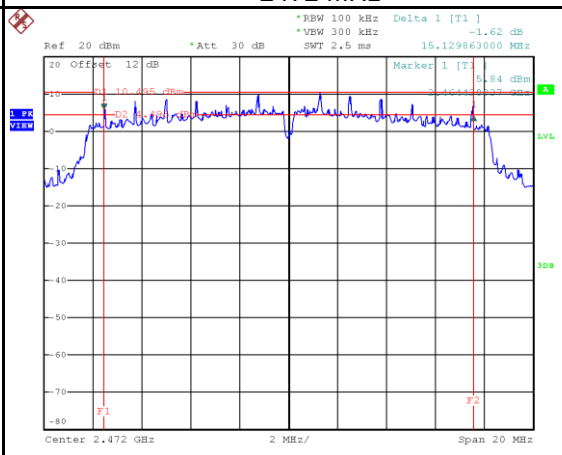
Test Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	Minimum 6 dB Bandwidth Limit (kHz)	Result
2467	15.06	18.24	≥ 500	Pass
2472	15.13	18.24	≥ 500	Pass

6dB Bandwidth

2467 MHz

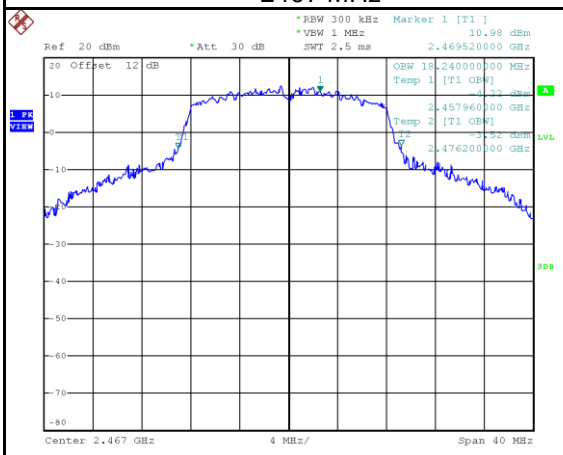


2472 MHz

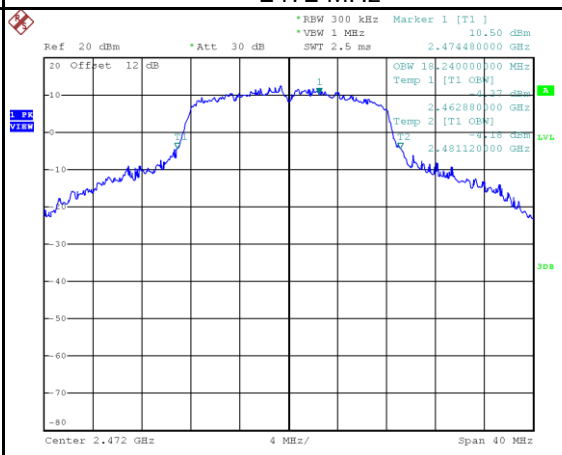


99% Occupied BW

2467 MHz



2472 MHz

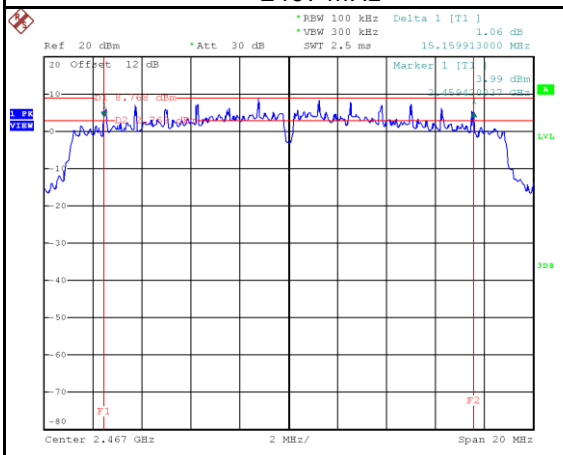


Test Mode	IEEE 802.11n (HT20)

Test Frequency (MHz)	6 dB Bandwidth (MHz)	99 % Occupied Bandwidth (MHz)	Minimum 6 dB Bandwidth Limit (kHz)	Result
2467	15.16	18.40	≥ 500	Pass
2472	15.04	18.40	≥ 500	Pass

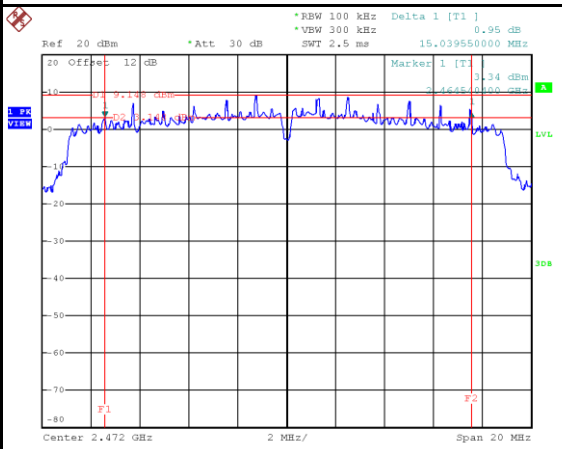
6dB Bandwidth

2467 MHz



Date: 30.MAR.2023 15:24:37

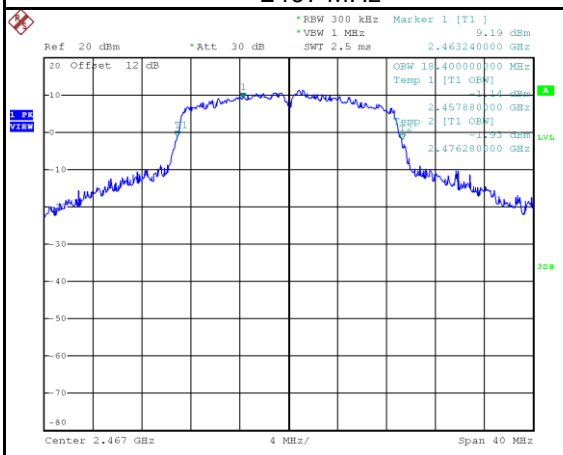
2472 MHz



Date: 30.MAR.2023 15:25:59

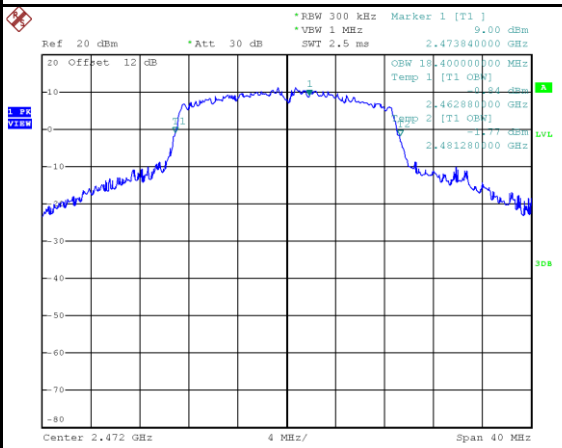
99% Occupied BW

2467 MHz



Date: 30.MAR.2023 15:24:43

2472 MHz



Date: 30.MAR.2023 15:26:06

APPENDIX C OUTPUT POWER

Test Mode	IEEE 802.11b	Tested Date	2023/4/10

Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)	Conducted Average Power (W)	Limit (dBm)	Limit (W)	Result
2467	17.15	15.23	0.0333	30.00	1.0000	Complies
2472	15.30	13.39	0.0218	30.00	1.0000	Complies

Test Mode	IEEE 802.11g	Tested Date	2023/4/10

Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)	Conducted Average Power (W)	Limit (dBm)	Limit (W)	Result
2467	21.32	12.59	0.0182	30.00	1.0000	Complies
2472	21.58	12.66	0.0185	30.00	1.0000	Complies

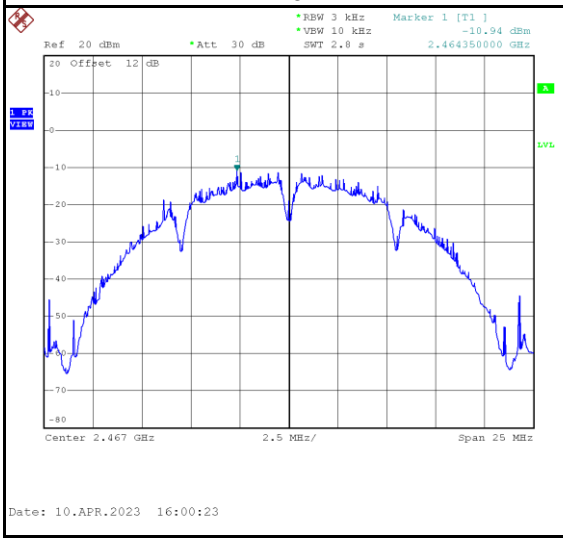
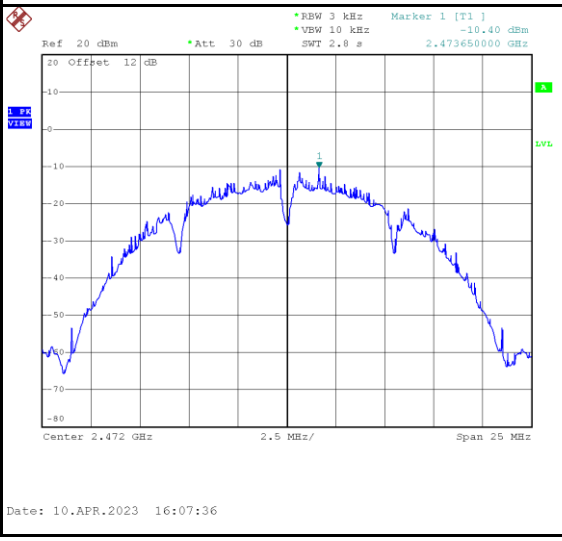
Test Mode	IEEE 802.11n (HT20)	Tested Date	2023/4/10

Frequency (MHz)	Conducted Peak Power (dBm)	Conducted Average Power (dBm)	Conducted Average Power (W)	Limit (dBm)	Limit (W)	Result
2467	21.51	12.40	0.0174	30.00	1.0000	Complies
2472	21.05	12.44	0.0175	30.00	1.0000	Complies

APPENDIX D POWER SPECTRAL DENSITY

Test Mode	IEEE 802.11b

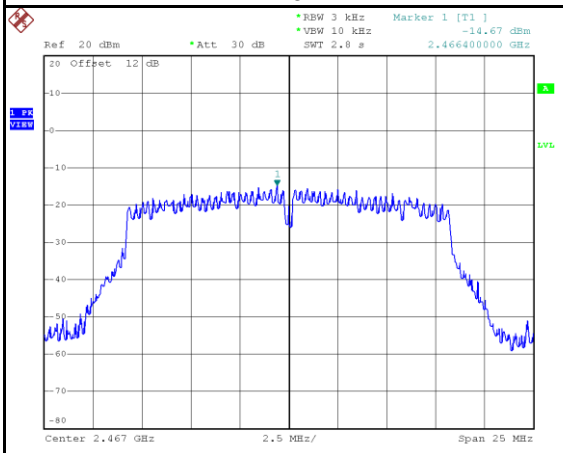
Test Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2467	-10.94	8.00	Pass
2472	-10.40	8.00	Pass

2467 MHz	2472 MHz
	
Date: 10.APR.2023 16:00:23	Date: 10.APR.2023 16:07:36

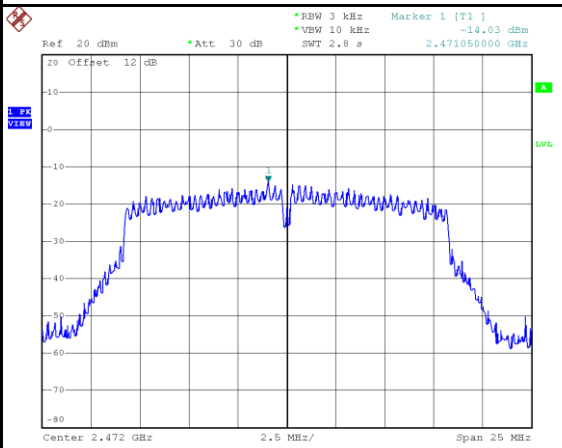
Test Mode	IEEE 802.11g

Test Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2467	-14.67	8.00	Pass
2472	-14.03	8.00	Pass

2467 MHz

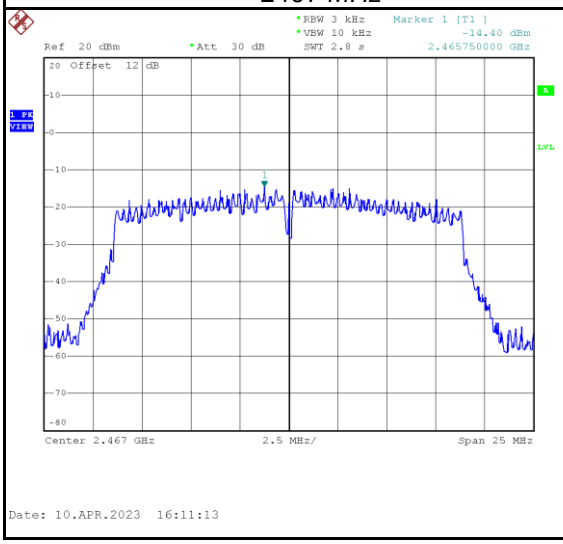
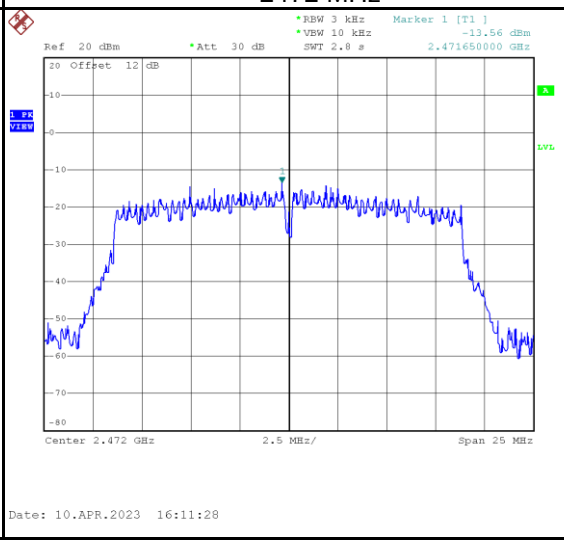


2472 MHz



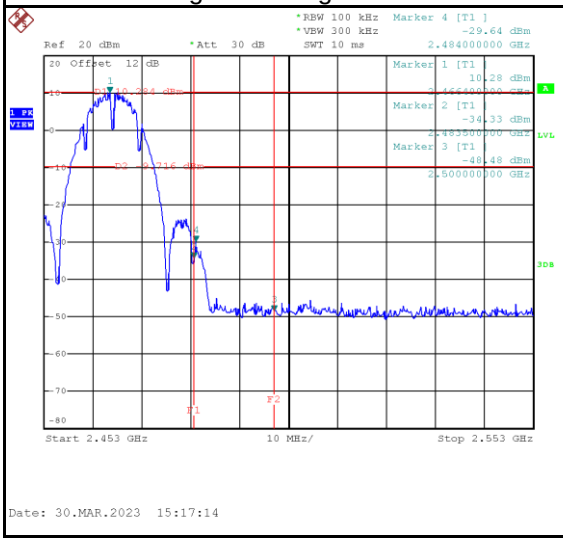
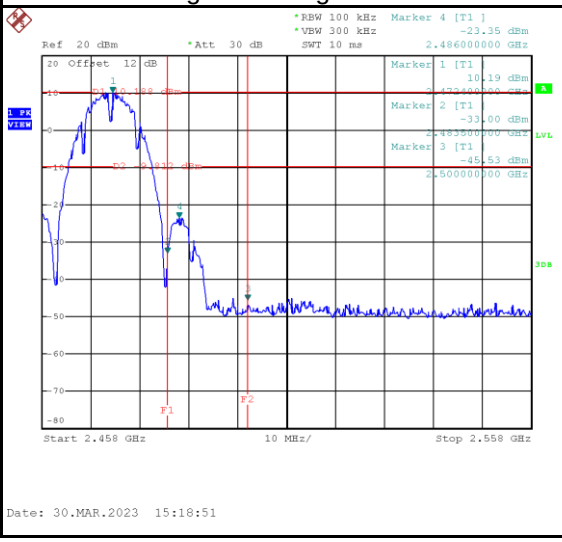
Test Mode	IEEE 802.11n (HT20)

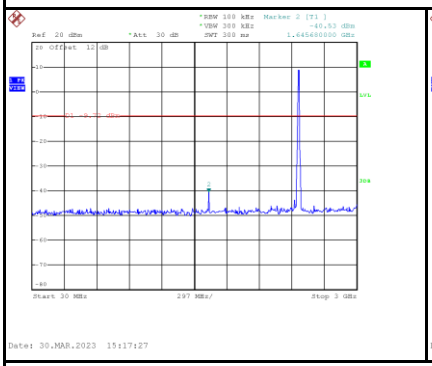
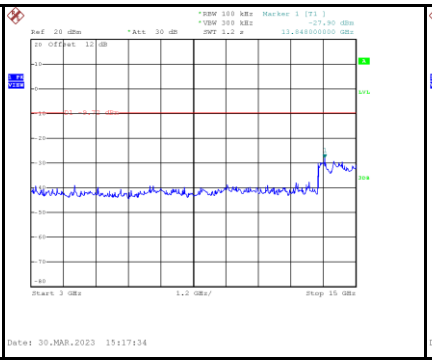
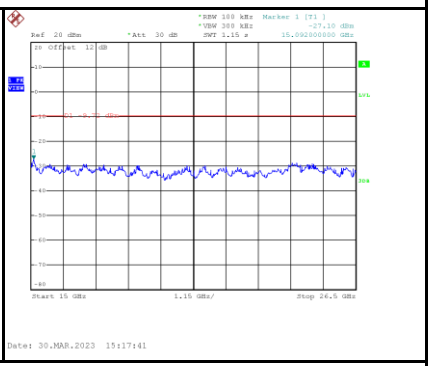
Test Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2467	-14.40	8.00	Pass
2472	-13.56	8.00	Pass

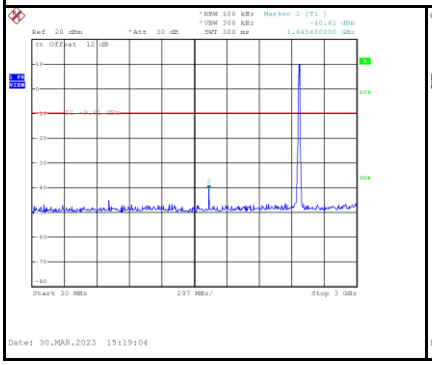
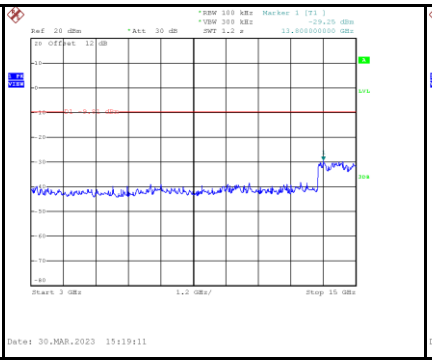
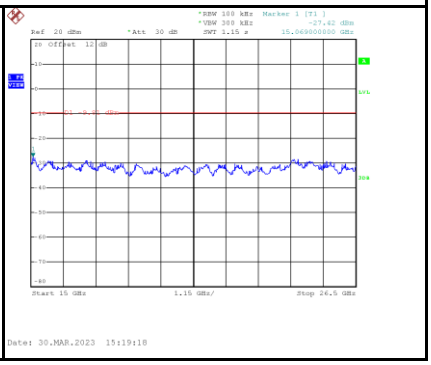
2467 MHz	2472 MHz
	

APPENDIX E ANTENNA CONDUCTED SPURIOUS EMISSIONS

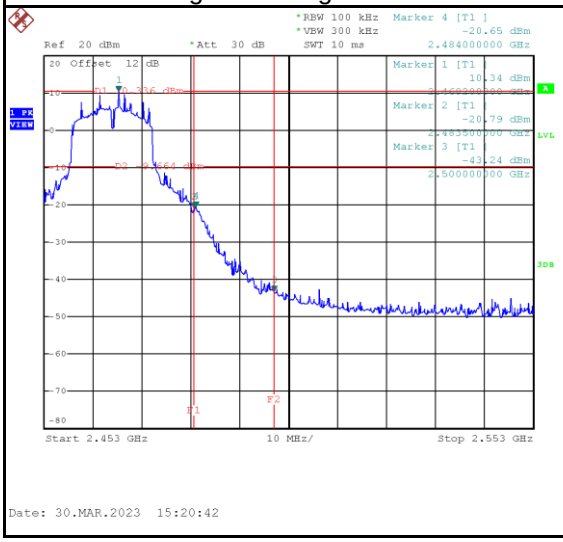
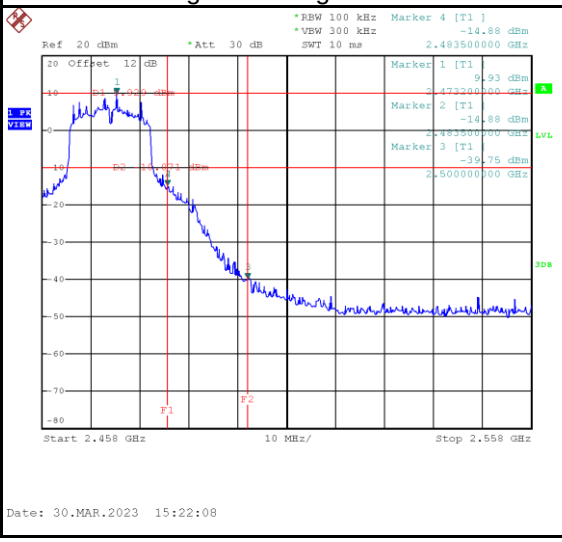
Test Mode	IEEE 802.11b

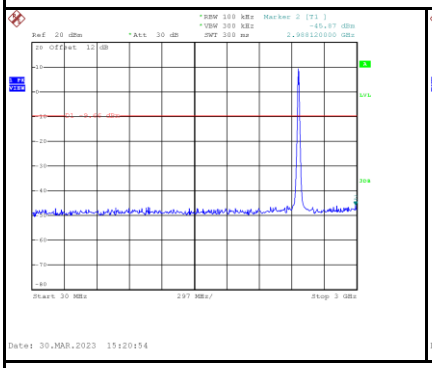
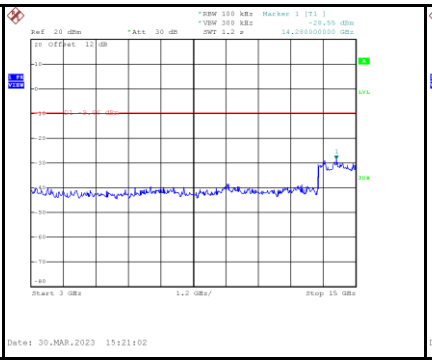
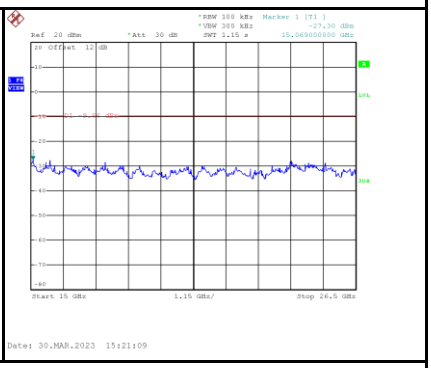
High Bandedge-2467 MHz	High Bandedge-2472 MHz
	

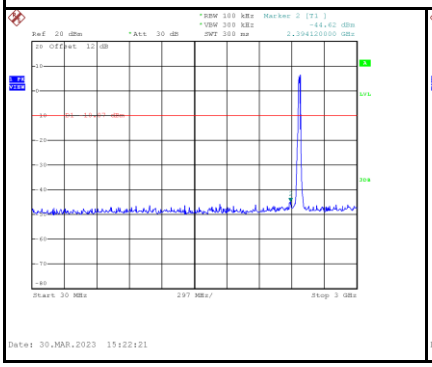
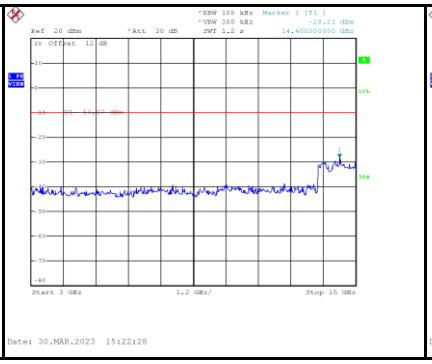
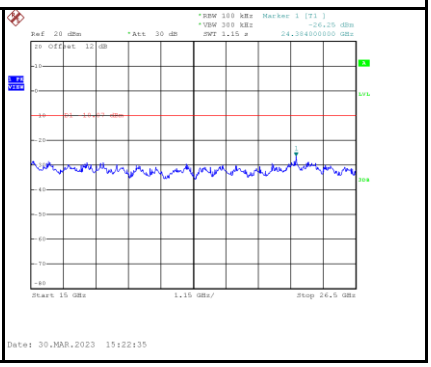
2467 MHz-10th Harmonics		
		

2472 MHz-10th Harmonics		
		

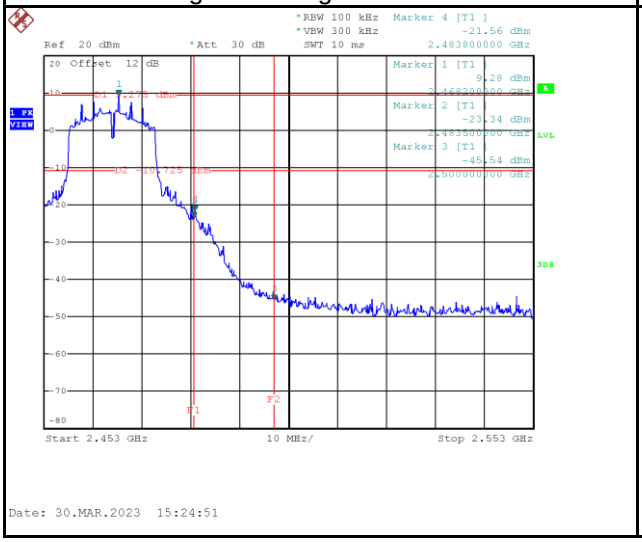
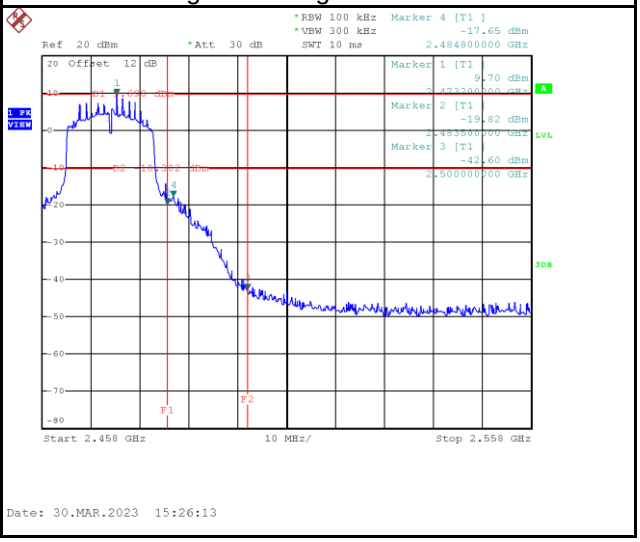
Test Mode	IEEE 802.11g

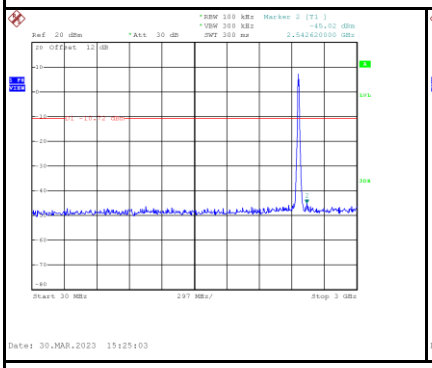
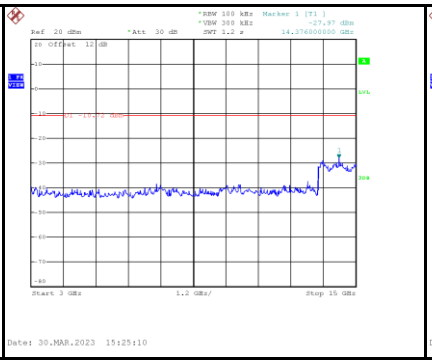
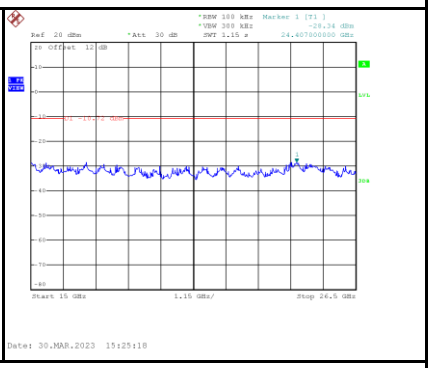
High Bandedge-2467 MHz	High Bandedge-2472 MHz
	

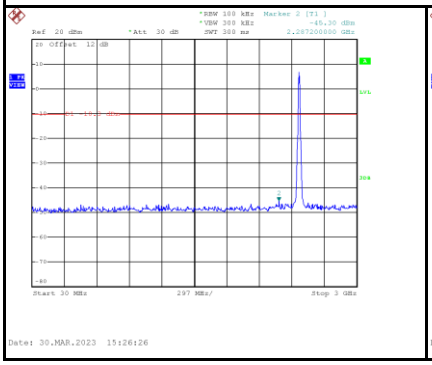
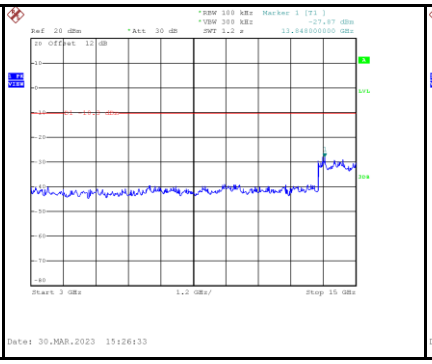
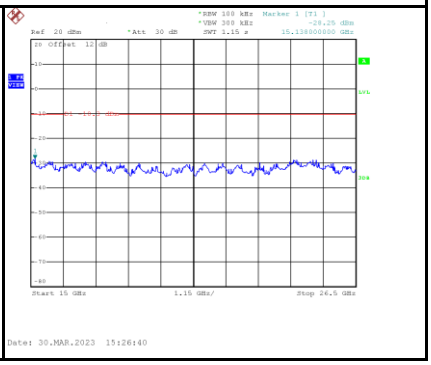
2467 MHz-10th Harmonics		
		

2472 MHz-10th Harmonics		
		

Test Mode	IEEE 802.11n (HT20)

High Bandedge-2467 MHz	High Bandedge-2472 MHz
	

2467 MHz-10th Harmonics		
		

2472 MHz-10th Harmonics		
		

End of Test Report