FCC Radio Test Report

FCC ID: RWO-RZ090484

This report concerns: Class II Permissive Changes

Report No.	:	BTL-FCCP-3-2209C159
Equipment	:	Notebook PC
Model Name	:	RZ09-0483
Brand Name	:	RAZER
Applicant	:	Razer Inc.
Address	:	9 Pasteur, Suite 100, Irvine, CA92618, USA.
Manufacturer	:	Razer Inc.
Address	:	9 Pasteur, Suite 100, Irvine, CA92618, USA.
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	:	2022/10/18
Date of Test	:	2022/11/22~2023/1/17
Issued Date	:	2023/1/17

The above equipment has been tested and found in compliance with the requirement of the above standards by 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-3-2209C159	R00	Original Report.	2022/12/22	Invalid
BTL-FCCP-3-2209C159	R01	Revised report to address TAF Audit's comments.	2023/1/17	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	APPENDIX A	Pass	------
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX B APPENDIX C	Pass	------
15.247(a)	Bandwidth	------	Pass	------
15.247(b)	Output Power	APPENDIX D	Pass	------
15.247(e)	Power Spectral Density	------	Pass	------
15.247(d)	Antenna conducted Spurious Emission	------	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) The antenna gain of EUT is smaller than that of the module. So in this report the worst cases of radiated spurious emissions and AC Power Line Conducted Emissions were evaluated and recorded. And evaluated the output power items and recorded in the report. For the test results of all other test items please refer to module test reports.

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 72, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.
☐ C06 ☒ CB21 ☐ CB22

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan
The test sites and facilities are covered under FCC RN: 674415 and DN: TW0659.
☒ C05 ☐ CB08 ☐ CB11 ☐ CB15 ☐ CB16
☒ SR10

1.2 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. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. 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

C. Conducted test :

Test Item	U,(dB)
Output power	0.3669

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

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	23°C, 58%	AC 120V/60Hz	Jay Tien
Radiated emissions below 1 GHz	23°C, 59%	AC 120V/60Hz	Mark Wang
Radiated emissions above 1 GHz	23°C, 59%	AC 120V/60Hz	Mark Wang
Output Power	21.2°C, 52%	AC 120V/60Hz	Angela Wang

1.4 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

Main Ant.						
Test Software	DRTU V02593.22.170.0					
Mode	2412 MHz	2437 MHz	2462 MHz	2467MHz	2472MHz	Data Rate
IEEE 802.11b	19.75	23	22.125	17.375	13.75	1 Mbps
IEEE 802.11g	17.25	23	17.25	14.75	11.25	6 Mbps

Aux Ant.						
Test Software	DRTU V02593.22.170.0					
Mode	2412 MHz	2437 MHz	2462 MHz	2467MHz	2472MHz	Data Rate
IEEE 802.11b	19.75	23	22.125	17.375	13.75	1 Mbps
IEEE 802.11g	17.25	23	17.25	14.75	11.25	6 Mbps

MIMO						
Test Software	DRTU V02593.22.170.0					
Mode	2412 MHz	2437 MHz	2462 MHz	2467 MHz	2472 MHz	Data Rate
IEEE 802.11n (HT20)	15.5	23	15.5	11.25	9.25	HT 8
IEEE 802.11ax (HE20)	15.5	23	18.5	11.5	9.25	HE 0
Mode	2422 MHz	2437 MHz	2452 MHz	2457 MHz	2462 MHz	Data Rate
IEEE 802.11n (HT40)	14.5	17.75	13.75	7.75	8.625	HT 8
IEEE 802.11ax (HE40)	14.625	18.25	14.75	7.75	8.75	HE 0

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Notebook PC
Model Name	RZ09-0483
Brand Name	RAZER
Model Difference	N/A
Power Source	1# DC voltage supplied from AC adapter. Model 1: RC30-042 Model 2: RC30-0484 2# Supplied from battery. Model : RC30-0483
Power Rating	1# Model 1: I/P: 100-240V~ 4A MAX,50/60Hz O/P: 19.5V⎓14.36A Model 2: I/P: 100-240V~ 4.5A,50/60Hz O/P: 19.5V⎓16.92A 2# DC 15.4V, 6182mAh, 95.2Wh
Products Covered	2* POWER Adapter 1* AC Cable
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 IEEE 802.11ax: OFDMA
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 300 Mbps IEEE 802.11ax: up to 573.6 Mbps
Output Power Max.	For Main Ant.: IEEE 802.11b: 23.82 dBm (0.2410 W) IEEE 802.11g: 24.51 dBm (0.2825 W) For Aux Ant.: IEEE 802.11b: 24.21 dBm (0.2636 W) IEEE 802.11g: 24.79 dBm (0.3013 W) For MIMO: IEEE 802.11n (HT20): 27.19 dBm (0.5236 W) IEEE 802.11n (HT40): 25.91 dBm (0.3899 W) IEEE 802.11ax(HE20): 27.07 dBm (0.5093 W) IEEE 802.11ax(HE40): 26.34 dBm (0.4305 W)
Test Model	RZ09-0483
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:

CH01 - CH13 for IEEE 802.11b, IEEE 802.11g, IEEE 802.11n(HT20), IEEE 802.11ax(HE20) CH03 - CH11 for IEEE 802.11n(HT40), IEEE 802.11ax(HE40)					
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.	Manufacturer	P/N	Type	Connector	Gain (dBi)
1	Amphenol Taiwan Corporation	BY5962-15-001-C	PIFA	N/A	2.98
2	Amphenol Taiwan Corporation	BY5962-15-001-C	PIFA	N/A	2.73

Note:

1) This EUT supports MIMO 2X2, any transmit signals are uncorrelated with each other, so Directional gain= $10\log[(10^{G1/10}+10^{G2/10}+...10^{GN/10})/N]$dBi, that is Directional gain=$10\log[(10^{2.98/10}+10^{2.73/10})/2]$dBi=2.86.
2) Ant.1 refers to main antenna, Ant.2 refers to aux antenna.
3) The AUX antenna connector of the module connected to the MAIN antenna of the EUT and the MAIN antenna connector of the module connected to the AUX antenna of the EUT.

(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.

2.2 TEST MODES

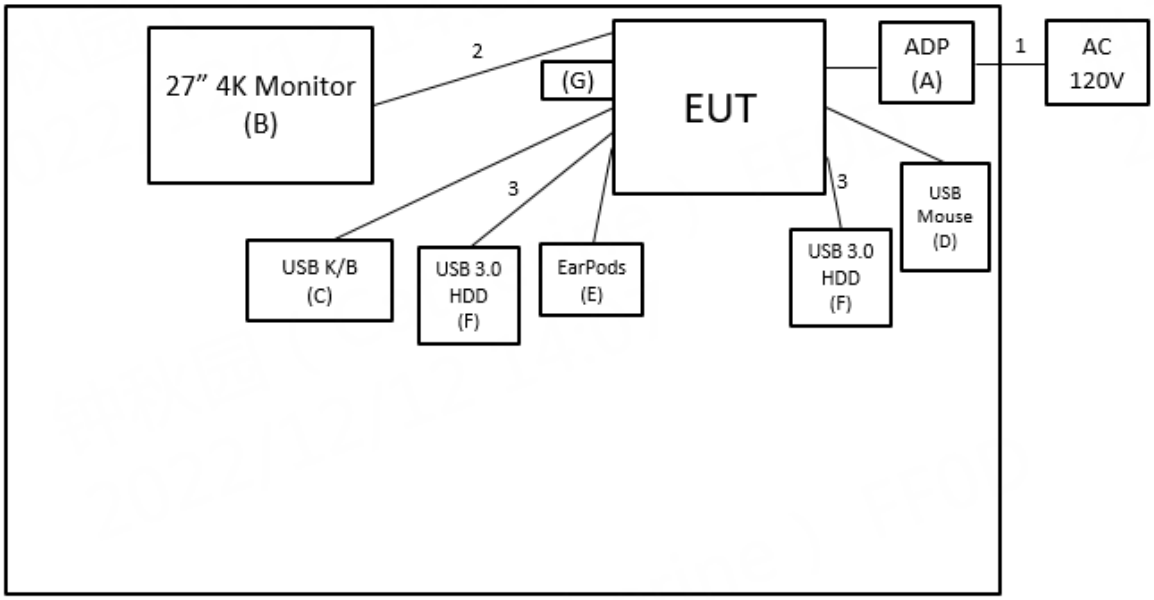
Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal/Idle	-	-
Transmitter Radiated Emissions (below 1GHz)	TX Mode_IEEE 802.11b	06	-
Transmitter Radiated Emissions (above 1GHz)	TX Mode_IEEE 802.11b	11	Bandedge
	TX Mode_IEEE 802.11ax (HE40)	03	
Transmitter Radiated Emissions (above 1GHz)	TX Mode_IEEE 802.11b	06	Harmonic
Output Power	TX Mode_IEEE 802.11b	01/06/11/12/13	-
	TX Mode_IEEE 802.11g		
	TX Mode_IEEE 802.11n (HT20)		
	TX Mode_IEEE 802.11ax (HE20)		
	TX Mode_IEEE 802.11n (HT40)	03/06/09/10/11	
	TX Mode_IEEE 802.11ax (HE40)		

NOTE:
(1) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Vertical) is recorded.
(2) This Notebook PC has two mainboards with two adapters. Both mainboard MB1 (with adapter RC30-0484) and mainboard MB2 (with adapter RC30-042) had been pre-tested and in this report only recorded the worst case.

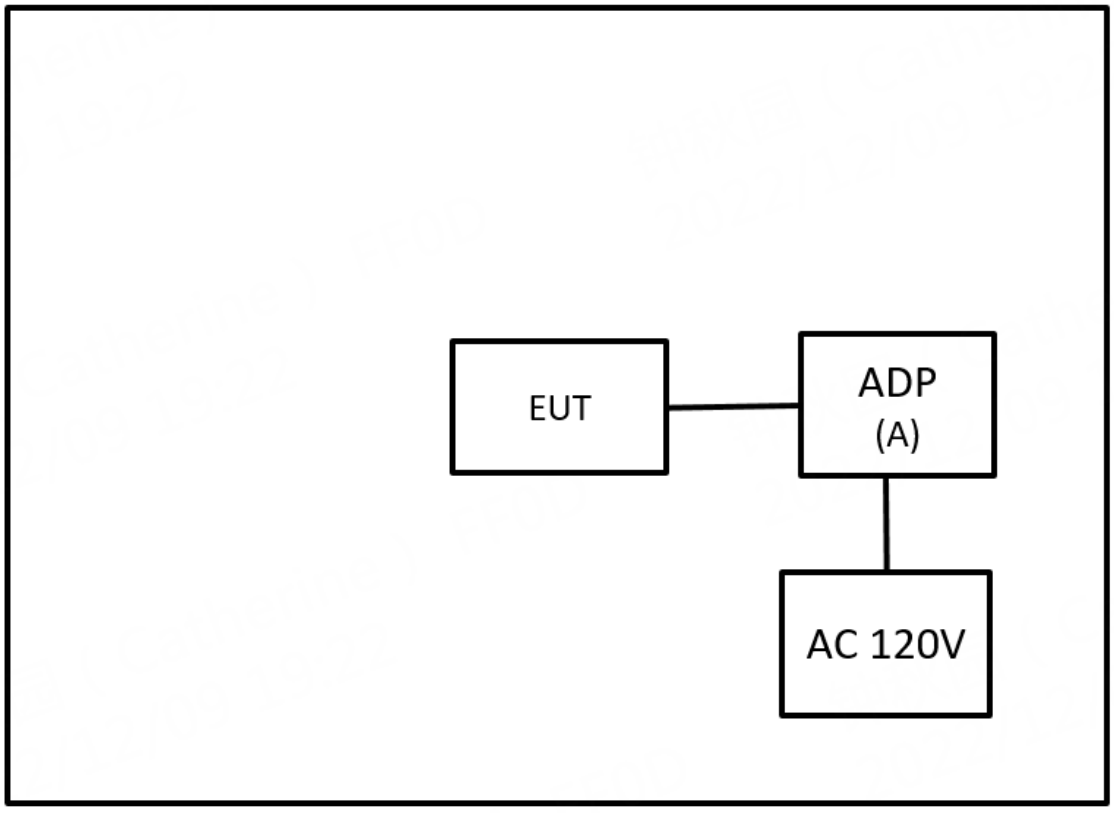
2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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

AC power line conducted emissions



Radiated Emissions



2.4 SUPPORT UNITS

AC power line conducted emissions

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	ADP	Razer	RC30-042	952226U26100653	Supplied by test requester.
B	27” 4K Monitor	DELL	U2720Q	CN-083VF-WSL00-0B7-332L	Furnished by test lab.
C	USB K/B	DELL	KB216t	CN-0W33XP-L0300-797-05TY-A03	Furnished by test lab.
D	USB Mouse	DELL	MOCZUL	CN-049TWY-PRC00-79E-01HA	Furnished by test lab.
E	EarPods	Apple	A1472	N/A	Furnished by test lab.
F	USB 3.0 HDD	WD	WDBC3C0010BSL-0B	WX81A88ALJUC	Furnished by test lab.
G	USB Dongle	Kingston	DataTraveler Exodia	N/A	Furnished by test lab.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	No	No	1.2m	Power Cable	Supplied by test requester.
2	No	No	1.7m	HDMI Cable	Furnished by test lab.
3	No	No	18cm	TypeC to TypeC Cable	Furnished by test lab.

Radiated Emissions

Item	Equipment	Brand	Model No.	Series No.	Remarks
A	ADP	Razer	RC30-042	952226U26100653	Supplied by test requester.

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	N/A	N/A	1m	PowerCode	Supplied by test requester.

3 AC POWER LINE CONDUCTED EMISSIONS TEST

3.1 LIMIT

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56 *	56 - 46 *
0.50 - 5.0	56	46
5.0 - 30.0	60	50

NOTE:
(1) The tighter limit applies at the band edges.
(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
Margin Level = Measurement Value – Limit Value
Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	=	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

3.2 TEST PROCEDURE

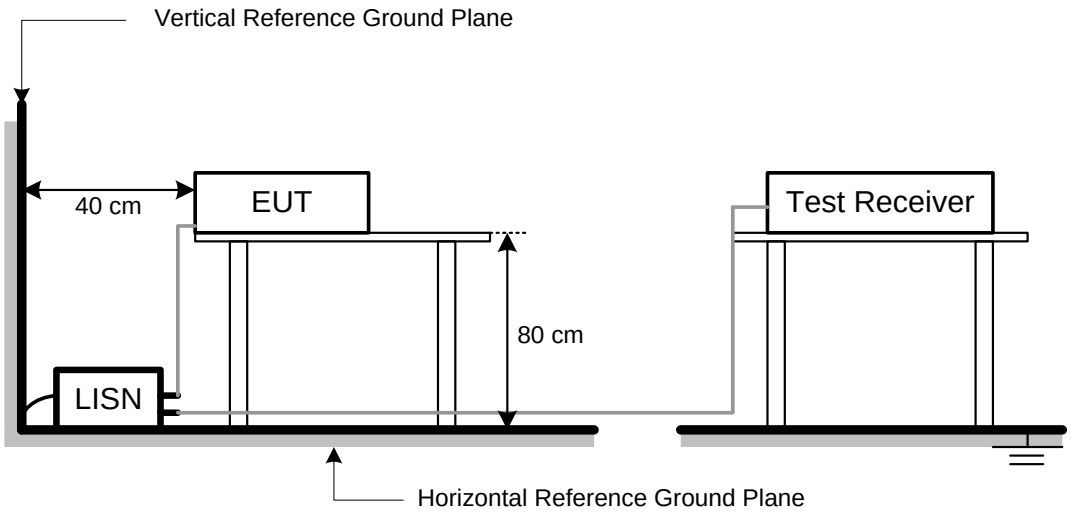
a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN).
All other support equipment were powered from an additional LISN(s).
The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center.
The end of the cable will be terminated, using the correct terminating impedance.
The overall length shall not exceed 1 m.
d. The LISN is spaced at least 80 cm from the nearest part of the EUT chassis.
e. For the actual test configuration, please refer to the related Item - EUT TEST PHOTO.

NOTE:
(1) In the results, each reading is marked as Peak, QP or AVG per the detector used.
BW=9 kHz (6 dB Bandwidth)
(2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

3.3 DEVIATION FROM TEST STANDARD

No deviation.

3.4 TEST SETUP



3.5 TEST RESULT

Please refer to the APPENDIX A.

4 RADIATED EMISSIONS TEST

4.1 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

4.2 TEST PROCEDURE

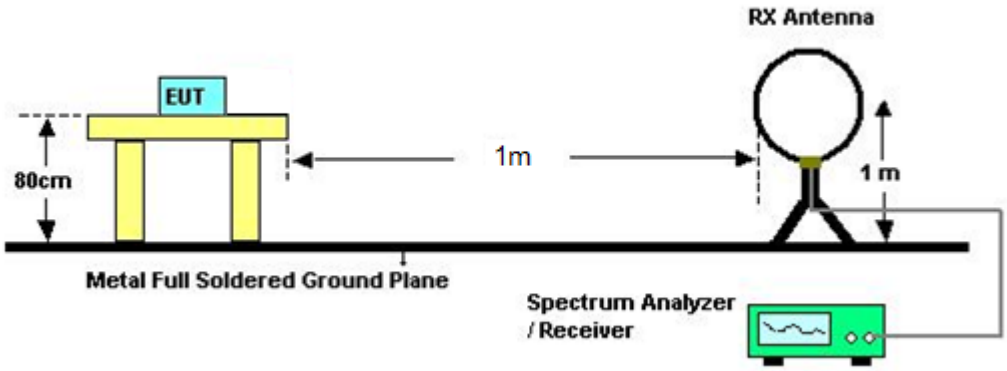
a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
b. The measuring distance 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.

4.3 DEVIATION FROM TEST STANDARD

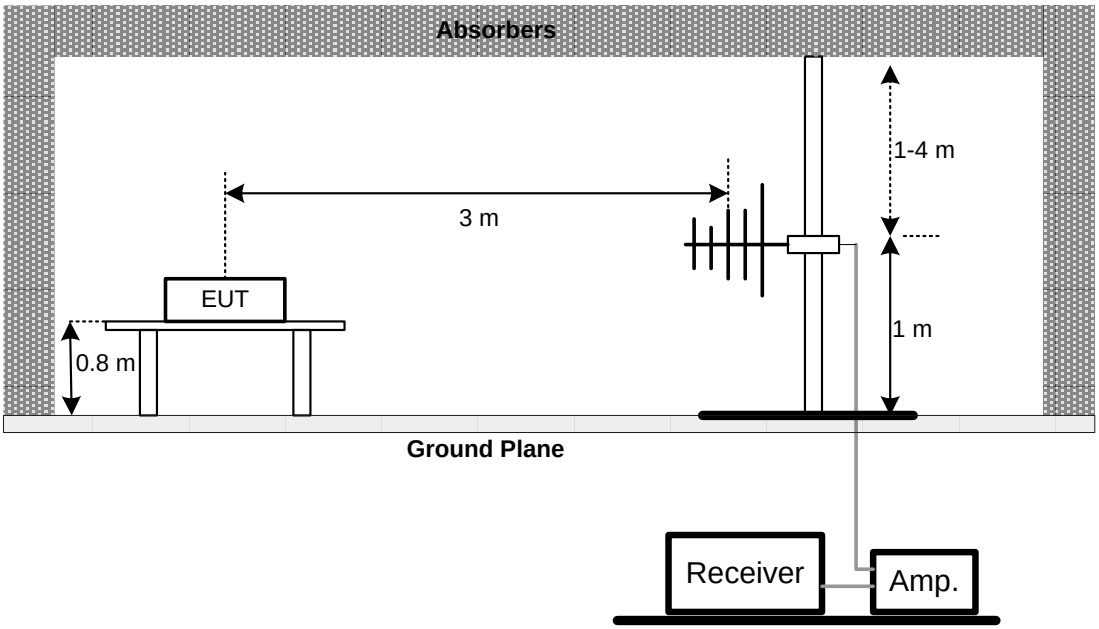
No deviation.

4.4 TEST SETUP

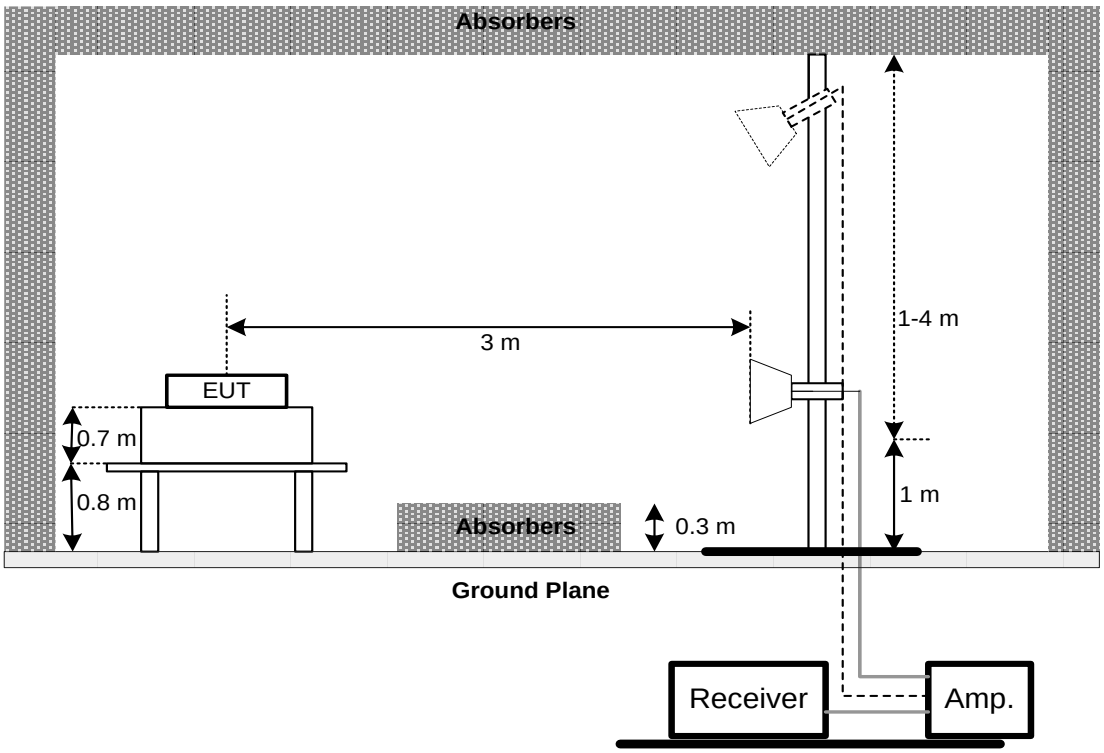
9 kHz to 30 MHz



30 MHz to 1 GHz



Above 1 GHz



4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

4.6 TEST RESULT – BELOW 30 MHZ

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

4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

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

5 OUTPUT POWER TEST

5.1 LIMIT

FCC Part15, Subpart C (15.247)		
Section	Test Item	Limit
15.247(b)	Maximum Output Power	1 Watt or 30dBm

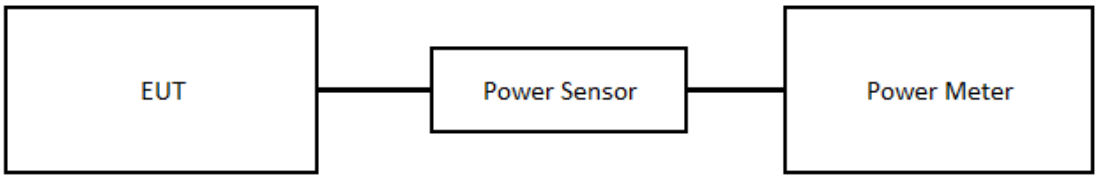
5.2 TEST PROCEDURE

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 D.

6 LIST OF MEASURING EQUIPMENTS

AC Power Line Conducted Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101051	2022/6/15	2023/6/14
2	Test Cable	EMCI	EMCRG58-BM-BM-9000	210501	2022/5/2	2023/5/1
3	EMI Test Receiver	R&S	ESR 7	101433	2022/11/16	2023/11/15
4	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

Radiated Emissions						
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC330N	980850	2022/9/19	2023/9/18
2	Preamplifier	EMCI	EMC118A45SE	980819	2022/3/8	2023/3/7
3	Preamplifier	EMCI	EMC184045SE	980882	2022/2/9	2023/2/8
4	Preamplifier	EMCI	EMC001340	980579	2022/9/30	2023/9/29
5	Test Cable	EMCI	EMC104-SM-SM-1000	220319	2022/3/15	2023/3/14
6	Test Cable	EMCI	EMC104-SM-SM-3000	220322	2022/3/15	2023/3/14
7	Test Cable	EMCI	EMC104-SM-SM-7000	220324	2022/3/15	2023/3/14
8	EXA Signal Analyzer	keysight	N9020B	MY57120120	2022/3/7	2023/3/6
9	Loop Ant	Electro-Metrics	EMCI-LPA600	291	2022/9/19	2023/9/18
10	Horn Antenna	RFSPIN	DRH18-E	211202A18EN	2022/5/18	2023/5/17
11	Horn Ant	Schwarzbeck	BBHA 9170D	1136	2022/5/18	2023/5/17
12	Log-bicon Antenna	Schwarzbeck	VULB9168	1369	2022/5/20	2023/5/19
13	6dB Attenuator	EMCI	EMCI-N-6-06	AT-N0625	2022/5/20	2023/5/19
14	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

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

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

7 EUT TEST PHOTO

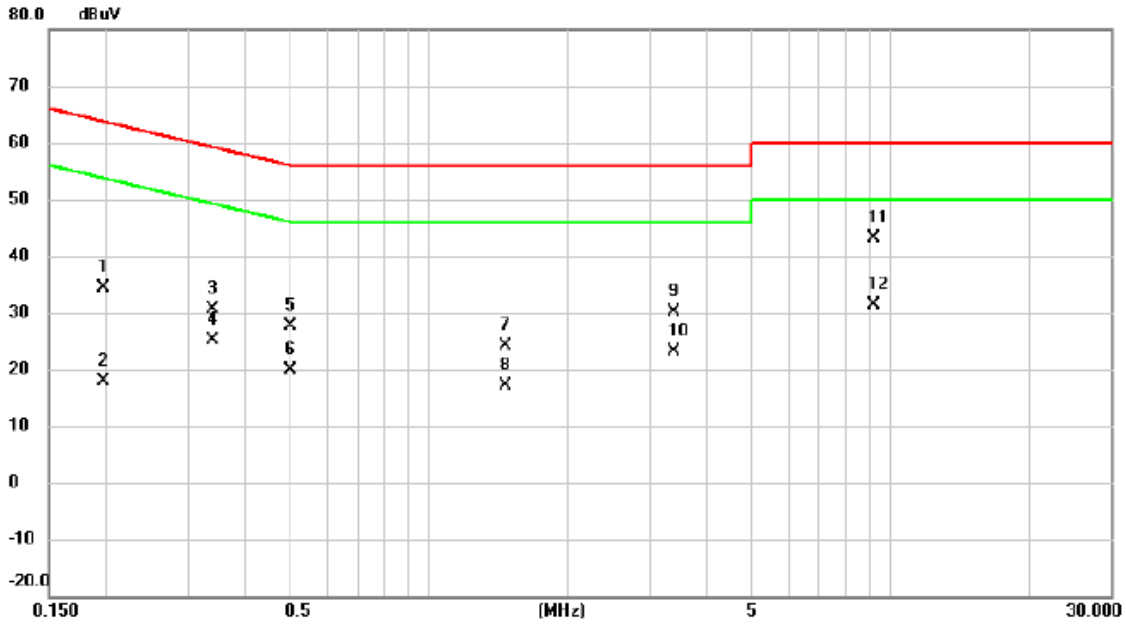
Please refer to document Appendix No.: TP-2209C159-1 (APPENDIX-TEST PHOTOS).

8 EUT PHOTOS

Please refer to document Appendix No.: EP-2209C159-1 (APPENDIX-EUT PHOTOS).

APPENDIX A AC POWER LINE CONDUCTED EMISSIONS

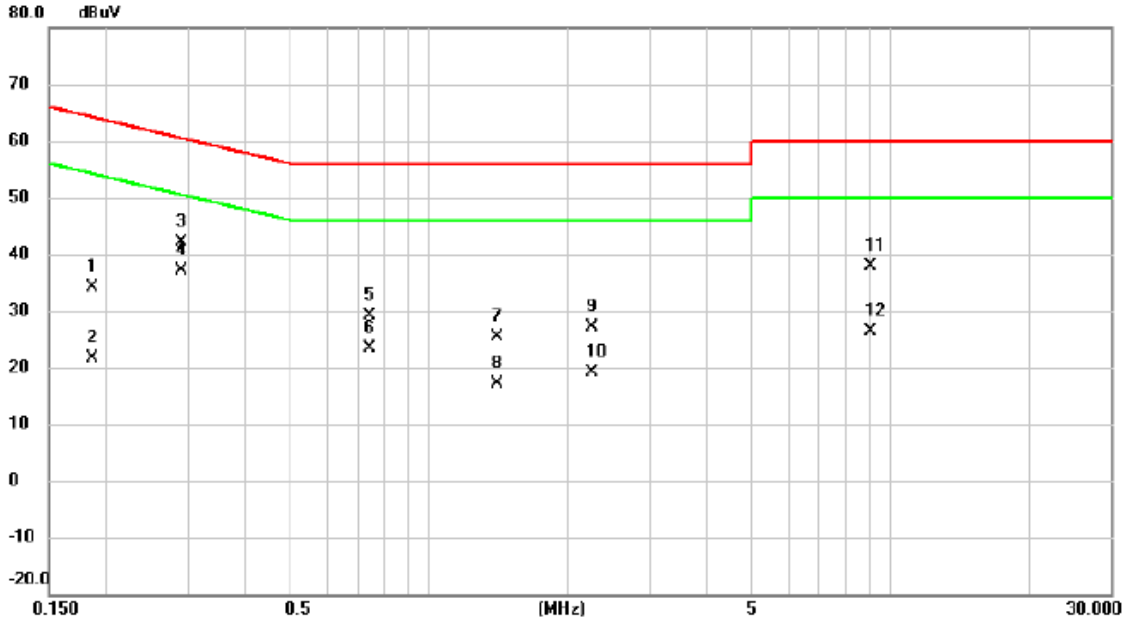
Test Mode	Normal	Tested Date	2022/11/23
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1973	34.42	0.02	34.44	63.72	-29.28	QP	
2		0.1973	17.97	0.02	17.99	53.72	-35.73	AVG	
3		0.3390	30.54	0.02	30.56	59.23	-28.67	QP	
4		0.3390	25.09	0.02	25.11	49.23	-24.12	AVG	
5		0.4987	27.66	0.02	27.68	56.02	-28.34	QP	
6		0.4987	19.84	0.02	19.86	46.02	-26.16	AVG	
7		1.4663	24.08	0.06	24.14	56.00	-31.86	QP	
8		1.4663	17.15	0.06	17.21	46.00	-28.79	AVG	
9		3.3990	30.14	0.10	30.24	56.00	-25.76	QP	
10		3.3990	23.12	0.10	23.22	46.00	-22.78	AVG	
11	*	9.2108	42.83	0.18	43.01	60.00	-16.99	QP	
12		9.2108	31.15	0.18	31.33	50.00	-18.67	AVG	

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

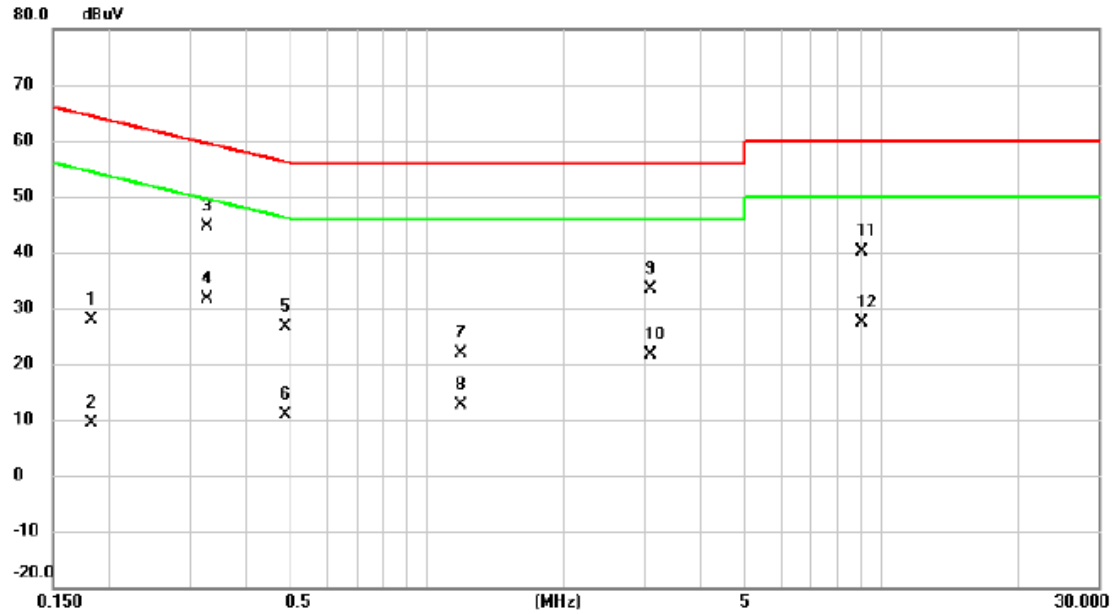
Test Mode	Normal	Tested Date	2022/11/23
Test Frequency	-	Phase	Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1860	34.23	0.02	34.25	64.21	-29.96	QP	
2		0.1860	21.49	0.02	21.51	54.21	-32.70	AVG	
3		0.2895	42.21	0.02	42.23	60.54	-18.31	QP	
4	*	0.2895	37.00	0.02	37.02	50.54	-13.52	AVG	
5		0.7440	29.20	0.03	29.23	56.00	-26.77	QP	
6		0.7440	23.37	0.03	23.40	46.00	-22.60	AVG	
7		1.4078	25.20	0.06	25.26	56.00	-30.74	QP	
8		1.4078	17.01	0.06	17.07	46.00	-28.93	AVG	
9		2.2605	27.01	0.08	27.09	56.00	-28.91	QP	
10		2.2605	19.03	0.08	19.11	46.00	-26.89	AVG	
11		9.0375	37.60	0.18	37.78	60.00	-22.22	QP	
12		9.0375	26.27	0.18	26.45	50.00	-23.55	AVG	

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

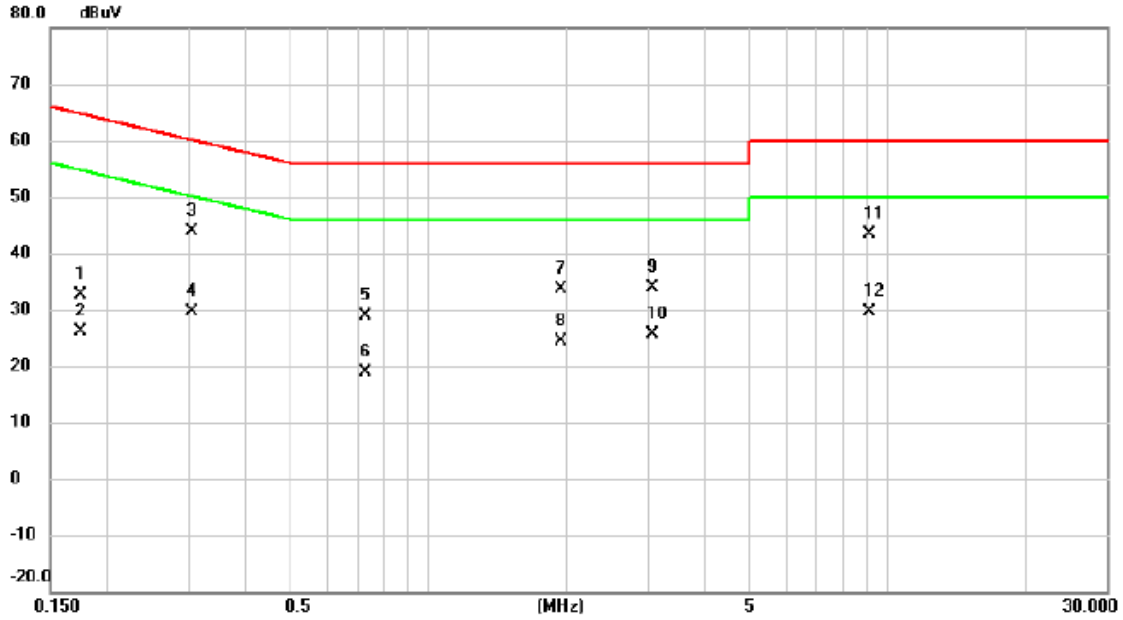
Test Mode	Idle	Tested Date	2022/11/23
Test Frequency	-	Phase	Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1824	27.92	0.02	27.94	64.38	-36.44	QP	
2		0.1824	9.42	0.02	9.44	54.38	-44.94	AVG	
3	*	0.3277	44.71	0.02	44.73	59.51	-14.78	QP	
4		0.3277	31.71	0.02	31.73	49.51	-17.78	AVG	
5		0.4852	26.63	0.02	26.65	56.25	-29.60	QP	
6		0.4852	10.85	0.02	10.87	46.25	-35.38	AVG	
7		1.1850	21.71	0.05	21.76	56.00	-34.24	QP	
8		1.1850	12.67	0.05	12.72	46.00	-33.28	AVG	
9		3.1042	33.19	0.10	33.29	56.00	-22.71	QP	
10		3.1042	21.48	0.10	21.58	46.00	-24.42	AVG	
11		9.0555	39.92	0.18	40.10	60.00	-19.90	QP	
12		9.0555	27.16	0.18	27.34	50.00	-22.66	AVG	

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

Test Mode	Idle	Tested Date	2022/11/23
Test Frequency	-	Phase	Neutral

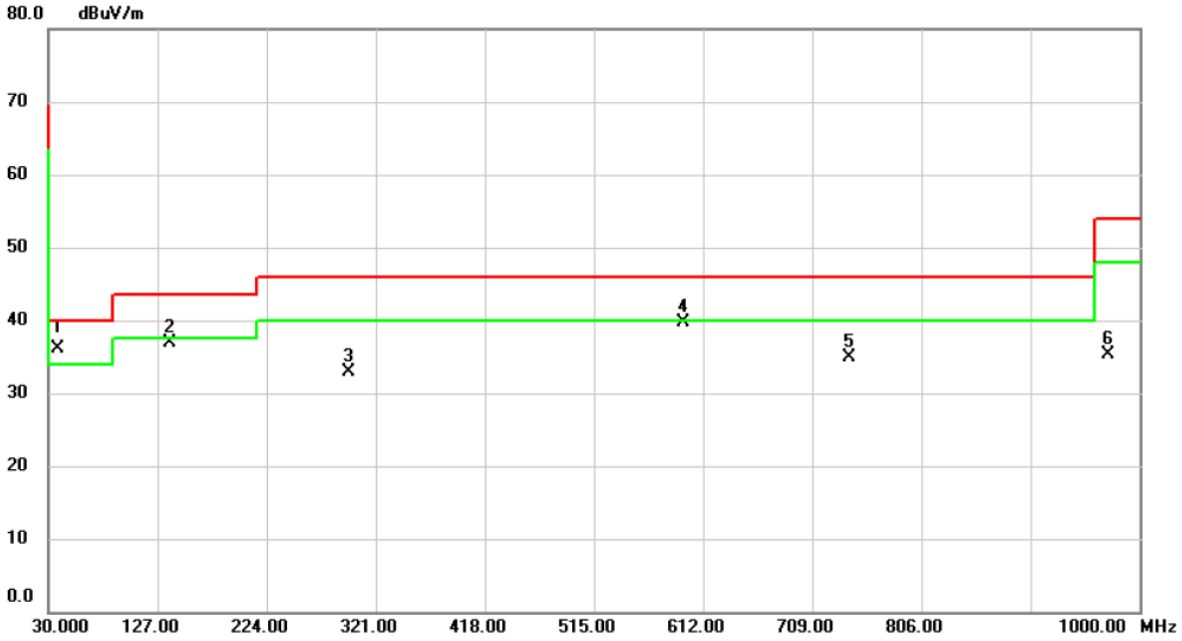


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1747	32.53	0.02	32.55	64.73	-32.18	QP	
2		0.1747	26.19	0.02	26.21	54.73	-28.52	AVG	
3	*	0.3052	43.93	0.02	43.95	60.10	-16.15	QP	
4		0.3052	29.65	0.02	29.67	50.10	-20.43	AVG	
5		0.7282	28.91	0.03	28.94	56.00	-27.06	QP	
6		0.7282	18.92	0.03	18.95	46.00	-27.05	AVG	
7		1.9387	33.60	0.07	33.67	56.00	-22.33	QP	
8		1.9387	24.34	0.07	24.41	46.00	-21.59	AVG	
9		3.0750	33.88	0.10	33.98	56.00	-22.02	QP	
10		3.0750	25.45	0.10	25.55	46.00	-20.45	AVG	
11		9.1072	43.30	0.18	43.48	60.00	-16.52	QP	
12		9.1072	29.50	0.18	29.68	50.00	-20.32	AVG	

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

APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ

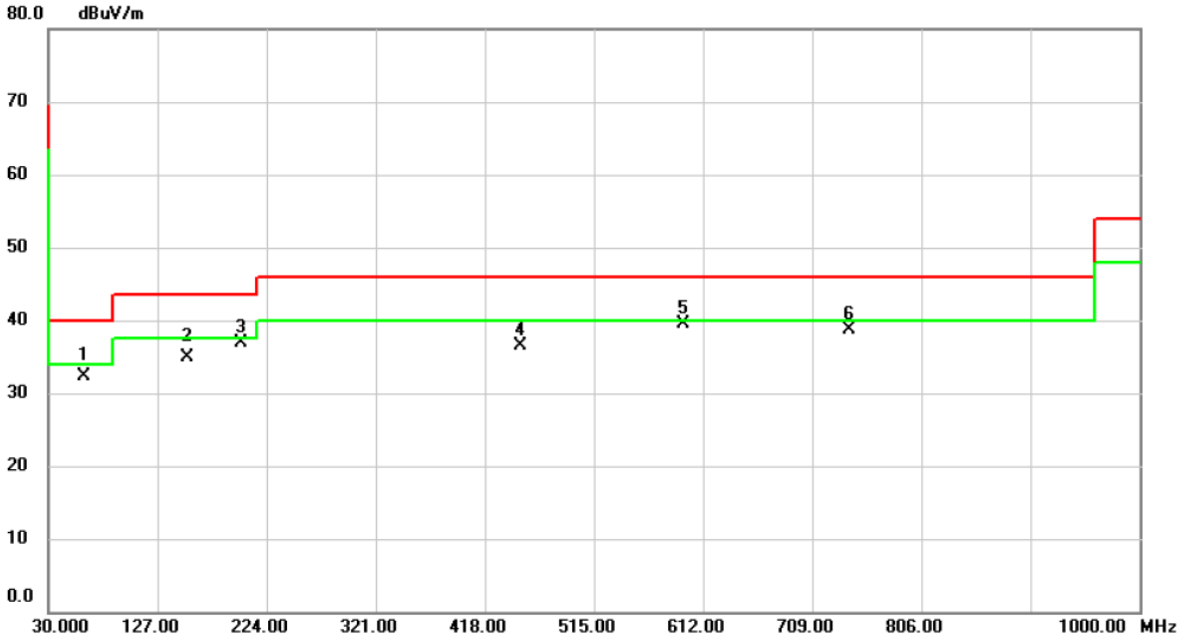
Test Mode	IEEE 802.11b	Test Date	2023/1/17
Test Frequency	2437MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	38.5360	48.16	-12.07	36.09	40.00	-3.91	QP	
2		137.3790	49.58	-12.71	36.87	43.50	-6.63	peak	
3		296.9763	44.46	-11.51	32.95	46.00	-13.05	peak	
4		594.0227	44.08	-4.34	39.74	46.00	-6.26	peak	
5		742.4973	36.60	-1.74	34.86	46.00	-11.14	peak	
6		971.9993	34.31	1.04	35.35	54.00	-18.65	peak	

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

Test Mode	IEEE 802.11b	Test Date	2023/1/17
Test Frequency	2437MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%

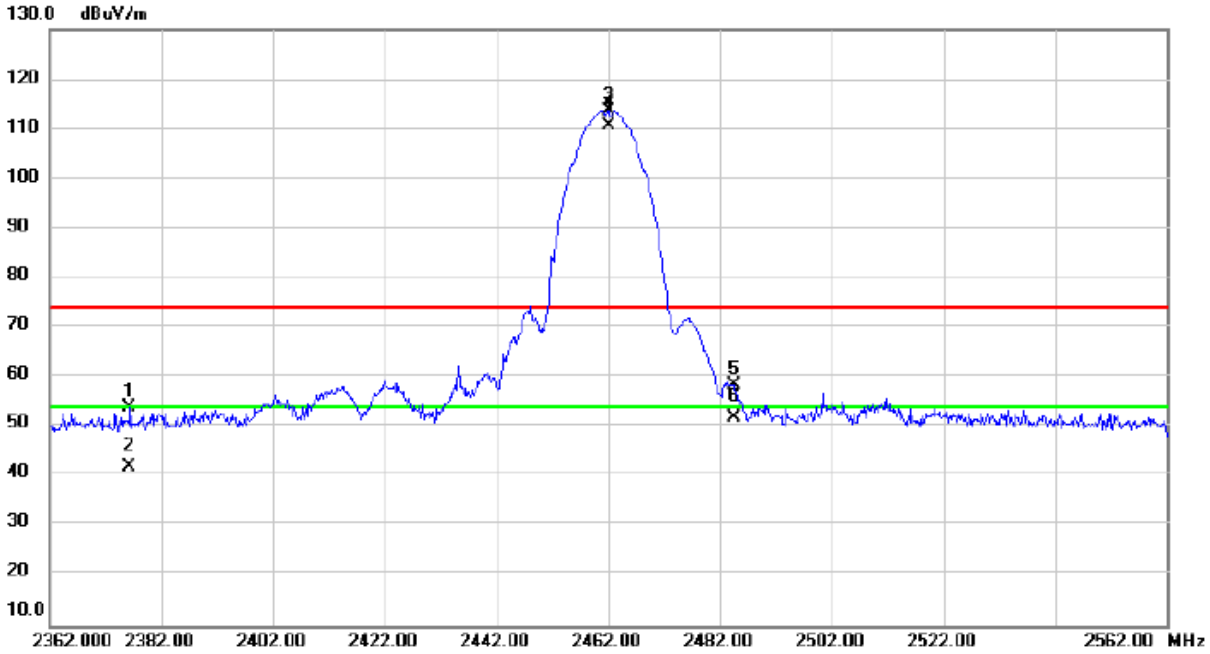


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		61.4280	44.60	-12.30	32.30	40.00	-7.70	QP	
2		153.1253	46.64	-11.79	34.85	43.50	-8.65	QP	
3		201.2373	52.12	-15.18	36.94	43.50	-6.56	peak	
4		449.1047	43.97	-7.42	36.55	46.00	-9.45	peak	
5	*	594.0227	43.86	-4.34	39.52	46.00	-6.48	peak	
6		742.4973	40.44	-1.74	38.70	46.00	-7.30	peak	

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

APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ

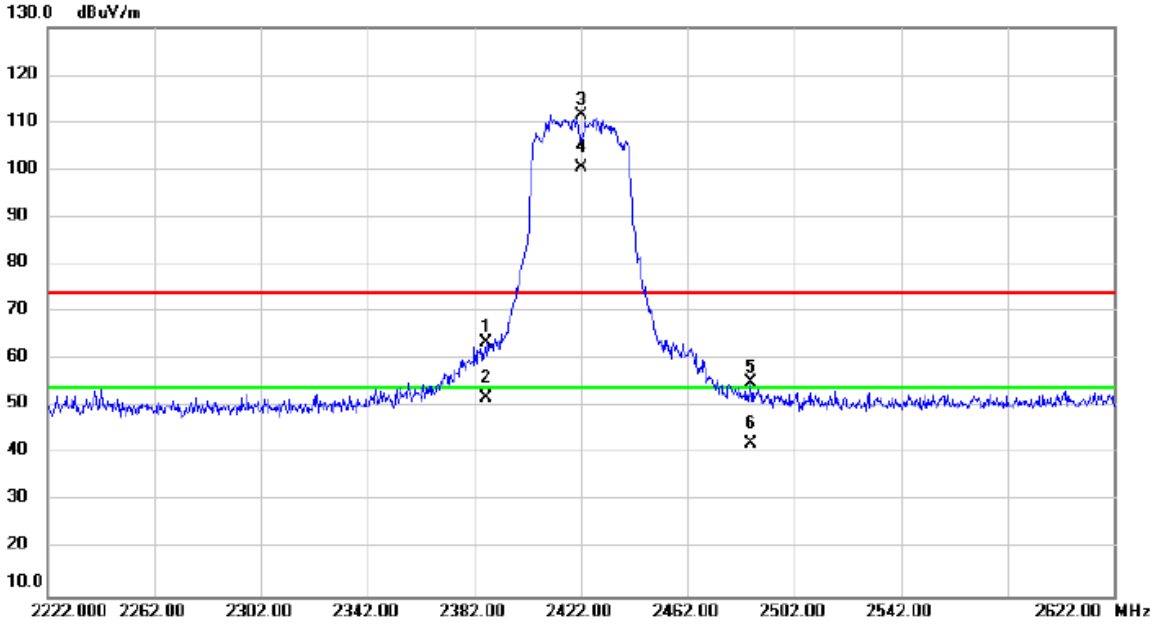
Test Mode	IEEE 802.11b	Test Date	2022/11/25
Test Frequency	2462MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2376.267	59.65	-5.78	53.87	74.00	-20.13	peak	
2		2376.267	47.82	-5.78	42.04	54.00	-11.96	AVG	
3	X	2462.000	119.38	-5.68	113.70	74.00	39.70	peak	No Limit
4	*	2462.000	116.21	-5.68	110.53	54.00	56.53	AVG	No Limit
5		2484.593	64.13	-5.64	58.49	74.00	-15.51	peak	
6		2484.593	57.52	-5.64	51.88	54.00	-2.12	AVG	

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

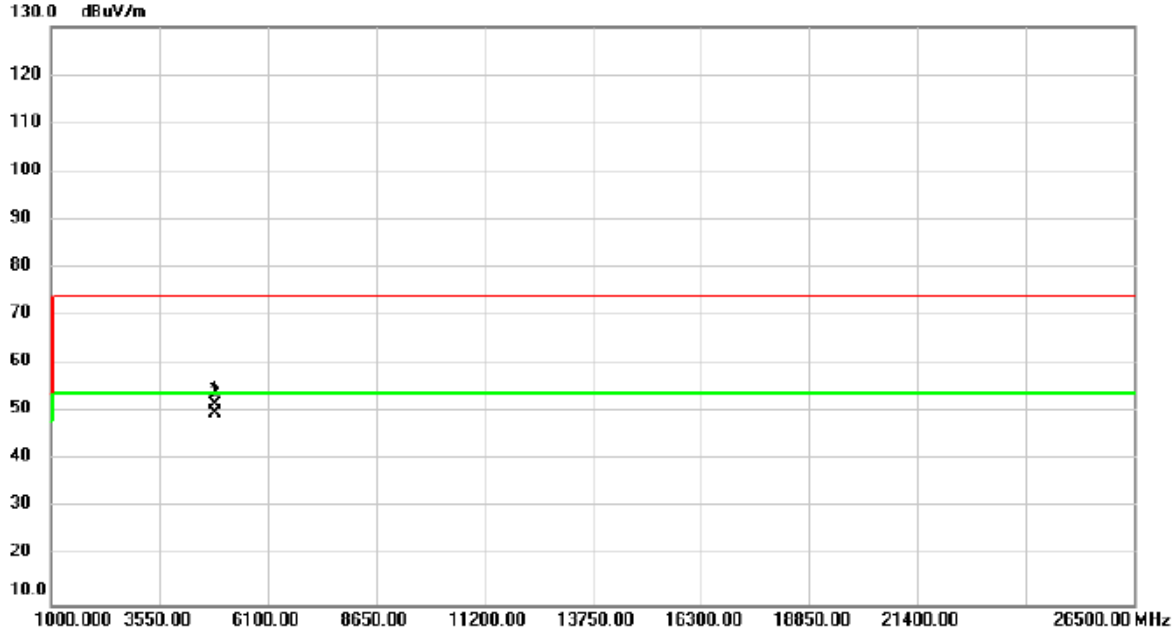
Test Mode	IEEE 802.11ax (HE40)	Test Date	2022/11/25
Test Frequency	2422MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2386.347	69.26	-5.77	63.49	74.00	-10.51	peak	
2		2386.347	57.74	-5.77	51.97	54.00	-2.03	AVG	
3	X	2422.000	117.23	-5.72	111.51	74.00	37.51	peak	No Limit
4	*	2422.000	106.27	-5.72	100.55	54.00	46.55	AVG	No Limit
5		2485.880	60.64	-5.63	55.01	74.00	-18.99	peak	
6		2485.880	47.91	-5.63	42.28	54.00	-11.72	AVG	

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

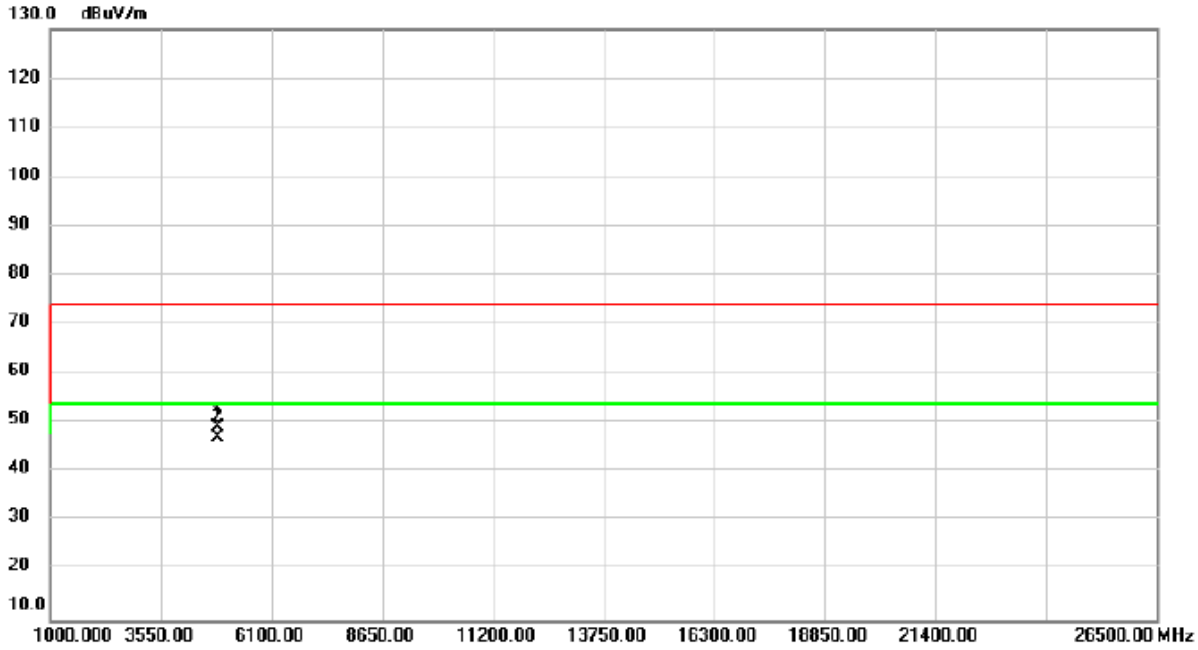
Test Mode	IEEE 802.11b	Test Date	2022/11/25
Test Frequency	2437MHz	Polarization	Vertical
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.000	50.74	0.89	51.63	74.00	-22.37	peak	
2	*	4874.000	48.79	0.89	49.68	54.00	-4.32	AVG	

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

Test Mode	IEEE 802.11b	Test Date	2022/11/25
Test Frequency	2437MHz	Polarization	Horizontal
Temp	23°C	Hum.	59%



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4874.000	48.33	0.89	49.22	74.00	-24.78	peak	
2	*	4874.000	46.24	0.89	47.13	54.00	-6.87	AVG	

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

APPENDIX D OUTPUT POWER

Test Mode	IEEE 802.11b_Main Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	21.67	0.1469	30.00	1.0000	Complies
2437	23.82	0.2410	30.00	1.0000	Complies
2462	23.20	0.2089	30.00	1.0000	Complies
2467	19.08	0.0809	30.00	1.0000	Complies
2472	15.52	0.0356	30.00	1.0000	Complies

Test Mode	IEEE 802.11b_Aux Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	21.68	0.1472	30.00	1.0000	Complies
2437	24.21	0.2636	30.00	1.0000	Complies
2462	24.03	0.2529	30.00	1.0000	Complies
2467	19.66	0.0925	30.00	1.0000	Complies
2472	16.07	0.0405	30.00	1.0000	Complies

Test Mode	IEEE 802.11g_Main Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	20.95	0.1245	30.00	1.0000	Complies
2437	24.51	0.2825	30.00	1.0000	Complies
2462	20.68	0.1169	30.00	1.0000	Complies
2467	18.56	0.0718	30.00	1.0000	Complies
2472	15.42	0.0348	30.00	1.0000	Complies

Test Mode	IEEE 802.11g_Aux Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	21.53	0.1422	30.00	1.0000	Complies
2437	24.79	0.3013	30.00	1.0000	Complies
2462	21.72	0.1486	30.00	1.0000	Complies
2467	19.57	0.0906	30.00	1.0000	Complies
2472	16.72	0.0470	30.00	1.0000	Complies

Test Mode	IEEE 802.11n (HT20)_Main Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	19.72	0.0938	30.00	1.0000	Complies
2437	23.96	0.2489	30.00	1.0000	Complies
2462	19.77	0.0948	30.00	1.0000	Complies
2467	15.53	0.0357	30.00	1.0000	Complies
2472	14.29	0.0269	30.00	1.0000	Complies

Test Mode	IEEE 802.11n (HT20)_Aux Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	19.82	0.0959	30.00	1.0000	Complies
2437	24.39	0.2748	30.00	1.0000	Complies
2462	19.89	0.0975	30.00	1.0000	Complies
2467	15.77	0.0378	30.00	1.0000	Complies
2472	14.42	0.0277	30.00	1.0000	Complies

Test Mode	IEEE 802.11n (HT20)_Total	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	22.78	0.1897	30.00	1.0000	Complies
2437	27.19	0.5237	30.00	1.0000	Complies
2462	22.84	0.1923	30.00	1.0000	Complies
2467	18.66	0.0735	30.00	1.0000	Complies
2472	17.37	0.0545	30.00	1.0000	Complies

Test Mode	IEEE 802.11n (HT40) _Main Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2422	20.24	0.1057	30.00	1.0000	Complies
2437	22.88	0.1941	30.00	1.0000	Complies
2452	19.47	0.0885	30.00	1.0000	Complies
2457	13.14	0.0206	30.00	1.0000	Complies
2462	14.27	0.0267	30.00	1.0000	Complies

Test Mode	IEEE 802.11n (HT40) _Aux Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2422	20.33	0.1079	30.00	1.0000	Complies
2437	22.92	0.1959	30.00	1.0000	Complies
2452	19.61	0.0914	30.00	1.0000	Complies
2457	13.51	0.0224	30.00	1.0000	Complies
2462	14.66	0.0292	30.00	1.0000	Complies

Test Mode	IEEE 802.11n (HT40)_Total	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2422	23.30	0.2136	30.00	1.0000	Complies
2437	25.91	0.3900	30.00	1.0000	Complies
2452	22.55	0.1799	30.00	1.0000	Complies
2457	16.34	0.0430	30.00	1.0000	Complies
2462	17.48	0.0560	30.00	1.0000	Complies

Test Mode	IEEE 802.11ax (HE20) _Main Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	19.80	0.0955	30.00	1.0000	Complies
2437	23.81	0.2404	30.00	1.0000	Complies
2462	22.28	0.1690	30.00	1.0000	Complies
2467	15.53	0.0357	30.00	1.0000	Complies
2472	13.93	0.0247	30.00	1.0000	Complies

Test Mode	IEEE 802.11ax (HE20)_Aux Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	19.96	0.0991	30.00	1.0000	Complies
2437	24.30	0.2692	30.00	1.0000	Complies
2462	22.48	0.1770	30.00	1.0000	Complies
2467	15.74	0.0375	30.00	1.0000	Complies
2472	14.42	0.0277	30.00	1.0000	Complies

Test Mode	IEEE 802.11ax (HE20)_Total	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2412	22.89	0.1946	30.00	1.0000	Complies
2437	27.07	0.5096	30.00	1.0000	Complies
2462	25.39	0.3461	30.00	1.0000	Complies
2467	18.65	0.0732	30.00	1.0000	Complies
2472	17.19	0.0524	30.00	1.0000	Complies

Test Mode	IEEE 802.11ax (HE40)_Main Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2422	19.98	0.0995	30.00	1.0000	Complies
2437	23.33	0.2153	30.00	1.0000	Complies
2452	20.14	0.1033	30.00	1.0000	Complies
2457	13.44	0.0221	30.00	1.0000	Complies
2462	14.62	0.0290	30.00	1.0000	Complies

Test Mode	IEEE 802.11ax (HE40)_Aux Ant.	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2422	20.04	0.1009	30.00	1.0000	Complies
2437	23.32	0.2148	30.00	1.0000	Complies
2452	20.62	0.1153	30.00	1.0000	Complies
2457	13.70	0.0234	30.00	1.0000	Complies
2462	14.93	0.0311	30.00	1.0000	Complies

Test Mode	IEEE 802.11ax (HE40)_Total	Tested Date	2022/11/30

Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (dBm)	Limit (W)	Result
2422	23.02	0.2005	30.00	1.0000	Complies
2437	26.34	0.4301	30.00	1.0000	Complies
2452	23.40	0.2186	30.00	1.0000	Complies
2457	16.58	0.0455	30.00	1.0000	Complies
2462	17.79	0.0601	30.00	1.0000	Complies

End of Test Report