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TEST REPORT

Report No.: CQASZ20241202627E-02
Applicant: Hesung Innovation Limited

Address of Applicant: Room 803, Chevalier House, 45-51 Chatham Road South, Tsim Sha Tsui ,

Kowloon, HongKong

Equipment Under Test (EUT):

Product: Air Cooler

Model No.: DR-HEC002S, DWEC02S

Test Model No.: DR-HEC002S

Brand Name: DREO, DREO HOME

FCC ID: 2A3SYHEC002S

Standards: 47 CFR Part 15, Subpart C

KDB558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10:2013

Date of Receipt: 2024-12-12

Date of Test: 2024-12-12 to 2024-12-20

Date of Issue: 2025-01-06

Test Result : PASS*

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

Tested By:

(Lewis Zhou)

Reviewed By:

(Timo Lei)

Approved By: (Jack Ai)

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The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.



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1 Version

Revision History Of Report

Report No.	Version Description		Issue Date	
CQASZ20241202627E-02	Rev.01	Initial report	2025-01-06	



2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15.203	N/A	PASS
AC Power Line Conducted Emission	47 CFR Part 15.207	ANSI C63.10-2013	PASS
Conducted Peak & Average Output Power	47 CFR Part 15.247	ANSI C63.10-2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15.247	ANSI C63.10-2013	PASS
Power Spectral Density	47 CFR Part 15.247	ANSI C63.10-2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15.247	ANSI C63.10-2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15.247	ANSI C63.10-2013	PASS
Radiated Spurious Emissions	47 CFR Part 15.209	ANSI C63.10-2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

The tested sample(s) and the sample information are provided by the client.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

CH: In this whole report CH means channel.

Volt: In this whole report Volt means Voltage.

Temp: In this whole report Temp means Temperature.

Humid: In this whole report Humid means humidity.

Press: In this whole report Press means Pressure.

N/A: In this whole report not application



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4 General Information

4.1 Client Information

Applicant:	Hesung Innovation Limited
Address of Applicant:	Room 803, Chevalier House, 45-51 Chatham Road South, Tsim Sha Tsui , Kowloon, HongKong
Manufacturer:	Shenzhen Hesung Innovation Technology Co., LTD
Address of Manufacturer:	26th Floor, Building A7, Chuangzhiyuncheng, Liuxian Avenue, NanshanDistrict, Shenzhen
Factory:	Gree (Zhongshan) Small Home Appliances Co., Ltd.
Address of Factory:	Minzhong Industry Road, Minzhong Town, Zhongshan, Guangdong, China

4.2 General Description of EUT

Product Name:	Air Cooler
Model No.:	DR-HEC002S, DWEC02S
Test Model No.:	DR-HEC002S
Trade Mark:	DREO, DREO HOME
Software Version:	V1.0
Hardware Version:	PAI-053 V1.1 20220119
Power Supply:	Power supply AC120V
EUT Supports Radios application:	2.4GHz: Wi-Fi: 802.11b/g/n(HT20): 2412MHz~2462MHz; 802.11n(HT40): 2422MHz~2452MHz
Simultaneous Transmission	☐ Simultaneous TX is supported and evaluated in this report.☑ Simultaneous TX is not supported.

4.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK)
· ·	IEEE for 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK)
	IEEE for 802.11n(HT20) : OFDM (64QAM, 16QAM, QPSK, BPSK)
Transfer Rate:	IEEE for 802.11b:
	1Mbps/2Mbps/5.5Mbps/11Mbps
	IEEE for 802.11g :
	6Mbps/9Mbps/12Mbps/18Mbps/24Mbps/36Mbps/48Mbps/54Mbps
	IEEE for 802.11n(HT20):
	6.5Mbps/13Mbps/19.5Mbps/26Mbps/39Mbps/52Mbps/58.5Mbps/65Mbps
Product Type:	⊠ Mobile □ Portable
Test Software of EUT:	Beken WIFI Test Tool V1.6.4
Antenna Type:	FPC antenna
Antenna Gain:	4.5dBi



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Operation I	Operation Frequency each of channel(802.11b/g/n HT20)						
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11b/g/n (HT20):

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

Note:

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



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4.4 Test Environment and Mode

Operating Environmen	nt:
Radiated Emissions:	
Temperature:	25.3 °C
Humidity:	55 % RH
Atmospheric Pressure:	1009 mbar
Conducted Emissions	:
Temperature:	25.6 °C
Humidity:	60 % RH
Atmospheric Pressure:	1009 mbar
Radio conducted item	test (RF Conducted test room):
Temperature:	25.5 °C
Humidity:	52 % RH
Atmospheric Pressure:	1009 mbar
Test mode:	
Transmitting mode:	EUT is set in RF test mode in all supported modulation types, bandwidth and data rate, etc.
Hex send Send # ble dut	TX Setting CW FALSE BLE Pattern FCC/CE TRUE Continuous PRBS9 Mode Length Auto TXPwr T3 BLE RX Packet Pkt total 1000 Pkt rate 0 (0.00%)
Hex send Send # ble dut	



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4.5 Description of Support Units

The EUT has been tested with associated equipment below.

1) Support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
/	1	1	/	1
2) Cable				

Cable No.	Description	Manufacturer	Cable Type/Length	Supplied by
/	/	/	1	/

4.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.

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

4.7 Test Facility

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

• A2LA (Certificate No. 4742.01)

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

• FCC Registration No.: 522263

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





4.8 Statement of the measurement uncertainty

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

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

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

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

Hereafter the best measurement capability for CQA laboratory is reported:

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

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

4.9 Deviation from Standards

None.

4.10 Abnormalities from Standard Conditions

None.

4.11 Other Information Requested by the Customer

None.



4.12 Equipment List

			lu atu una a nat	Calibration	Calibratian
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2024/9/2	2025/9/1
Spectrum analyzer	R&S	FSU26	CQA-038	2024/9/2	2025/9/1
Spectrum analyzer	R&S	FSU40	CQA-075	2024/9/2	2025/9/1
opeotram analyzer	rao	AFS4-00010300-18-	04/10/0	2024/0/2	2020/0/1
Preamplifier	MITEQ	10P-4	CQA-035	2024/9/2	2025/9/1
		AMF-6D-02001800-			
Preamplifier	MITEQ	29-20P	CQA-036	2024/9/2	2025/9/1
Preamplifier	EMCI	EMC184055SE	CQA-089	2024/9/2	2025/9/1
Loop antenna	Schwarzbeck	FMZB1516	CQA-060	2023/9/8	2026/9/7
Bilog Antenna	R&S	HL562	CQA-011	2023/11/01	2026/10/31
Horn Antenna	R&S	HF906	CQA-012	2023/11/01	2026/10/31
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2023/9/7	2026/9/6
Coaxial Cable					
(Above 1GHz)	CQA	N/A	C007	2024/9/2	2025/9/1
Coaxial Cable					
(Below 1GHz)	CQA	N/A	C013	2024/9/2	2025/9/1
Antenna Connector	CQA	RFC-01	CQA-080	2024/9/2	2025/9/1
RF					
cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2024/9/2	2025/9/1
Power meter	R&S	NRVD	CQA-029	2024/9/2	2025/9/1
		PWD-2533-02-SMA-			
Power divider	MIDWEST	79	CQA-067	2024/9/2	2025/9/1
EMI Test Receiver	R&S	ESR7	CQA-005	2024/9/2	2025/9/1
LISN	R&S	ENV216	CQA-003	2024/9/2	2025/9/1
Coaxial cable	CQA	N/A	CQA-C009	2024/9/2	2025/9/1
DC power	KEYSIGHT	E3631A	CQA-028	2024/9/2	2025/9/1

Test software:

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





5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:

47 CFR Part 15C Section 15.203 /247(c)

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:



The antenna is PCB antenna.

The connection/connection type between the antenna to the EUT's antenna port is: permanently attachment

This is either permanently attachment or a unique coupling that satisfies the requirement.



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5.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207			
Test Method:	ANSI C63.10: 2013			
Test Frequency Range:	150kHz to 30MHz			
Limit:	(A411-)	Limit (d	lBuV)	
	Frequency range (MHz)	Quasi-peak	Average	
	0.15-0.5	66 to 56*	56 to 46*	
	0.5-5	56	46	
	5-30	60	50	
	* Decreases with the logarithn	n of the frequency.		
Test Procedure:	 Decreases with the logarithm of the frequency. The mains terminal disturbance voltage test was conducted in a shielded room. The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane, The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 			
Test Setup:	Shielding Room EUT AC Mains LISN1	Ground Reference Plane	Test Receiver	

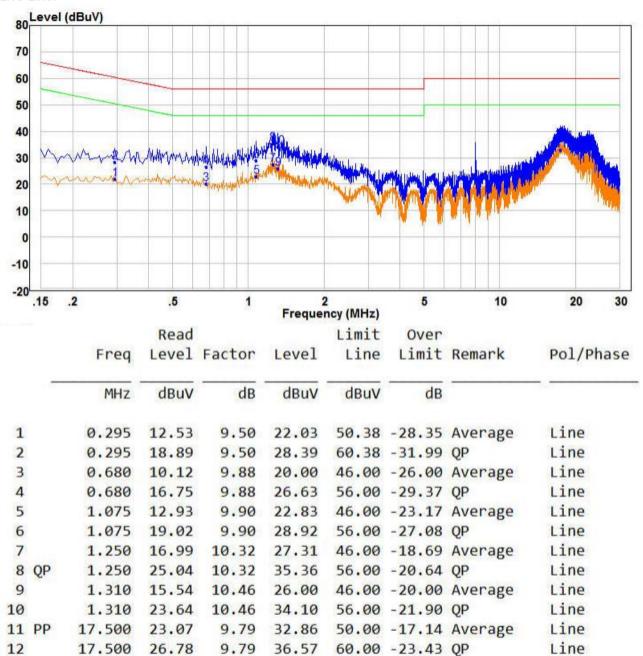


Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate of 802.11b at middle channel is the worst case. Only the worst case is recorded in the report.
Test Voltage:	AC120V/60Hz
Test Results:	Pass



Measurement Data

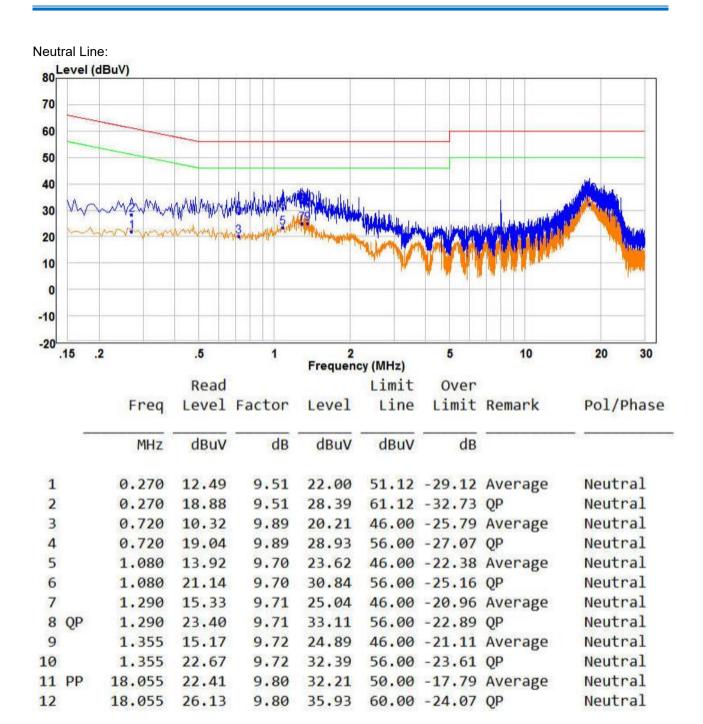
Live Line:



Remark:

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





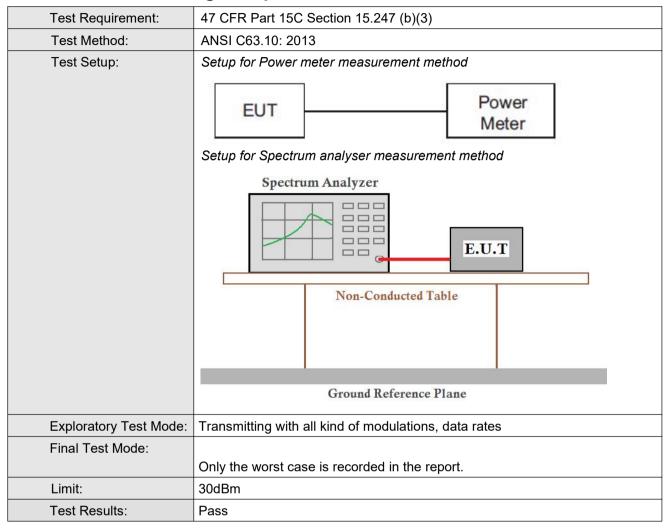
Remark:

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



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5.3 Conducted Average Output Power





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Test Result

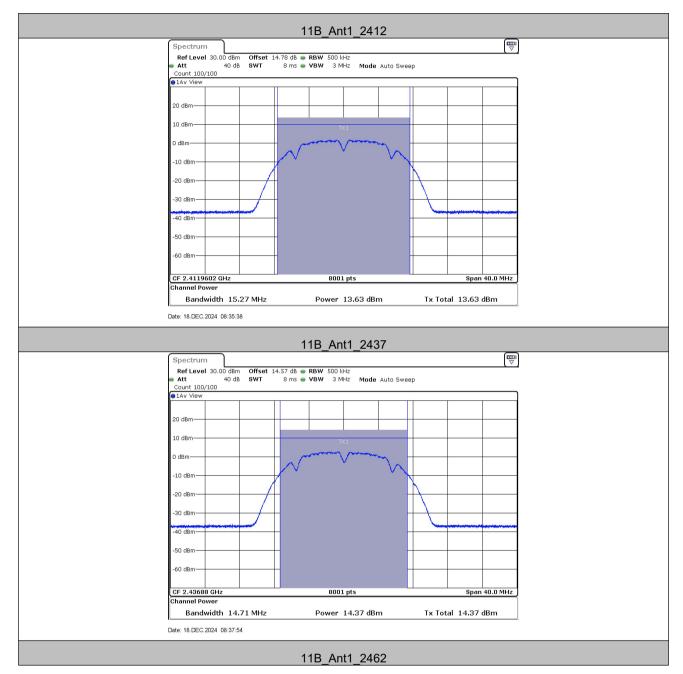
Test Mode	Frequency[MHz	Result [dBm]	Limit [dBm]	Verdict
	2412	13.63	≤30.00	PASS
11B	2437	14.37	≤30.00	PASS
	2462	12.81	≤30.00	PASS
	2412	11.25	≤30.00	PASS
11G	2437	11.90	≤30.00	PASS
	2462	10.39	≤30.00	PASS
	2412	11.03	≤30.00	PASS
11N20SISO	2437	11.64	≤30.00	PASS
	2462	10.16	≤30.00	PASS

Note:

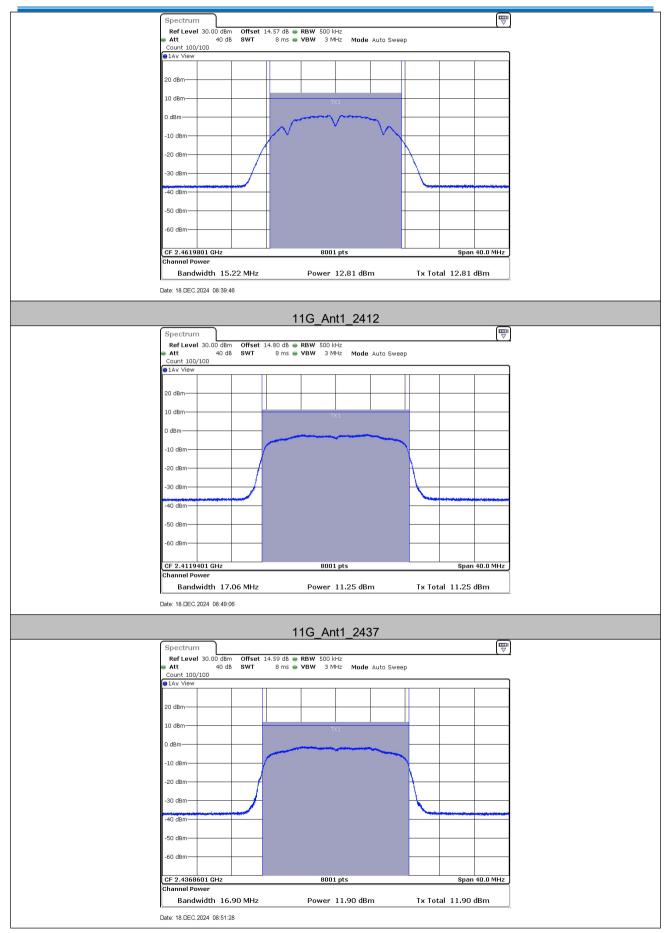
When Duty cycle >98%, D.C.F is not required.



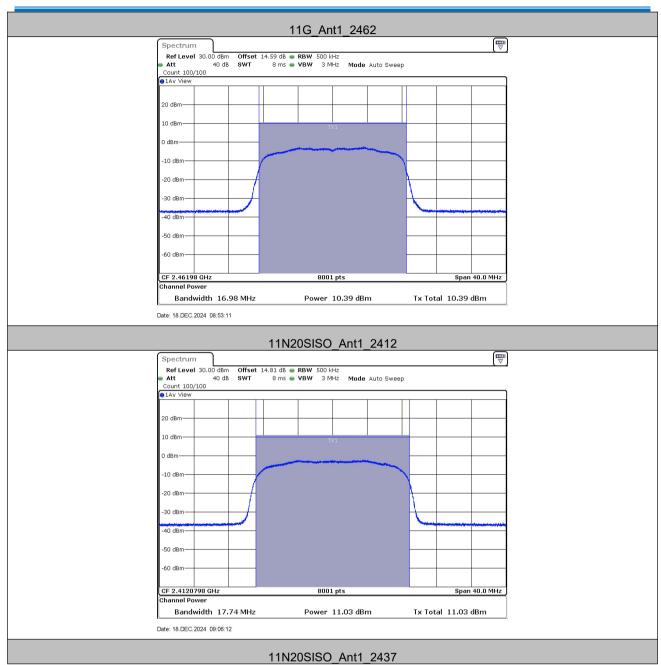
Test Graphs



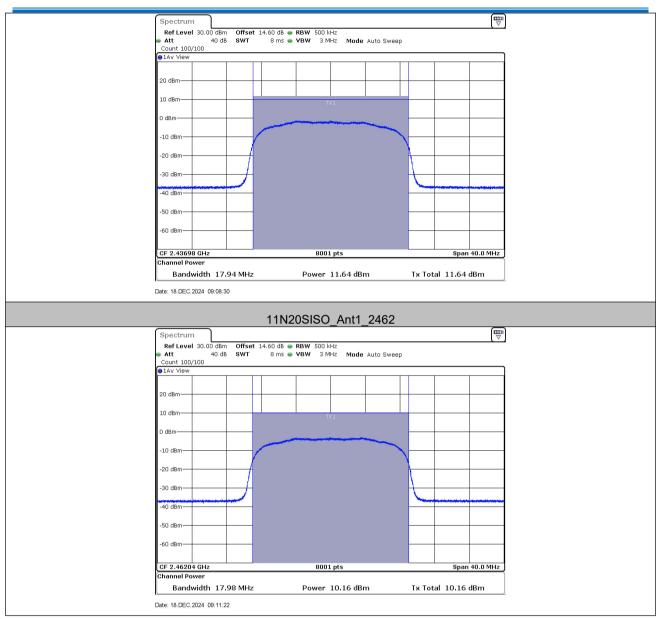








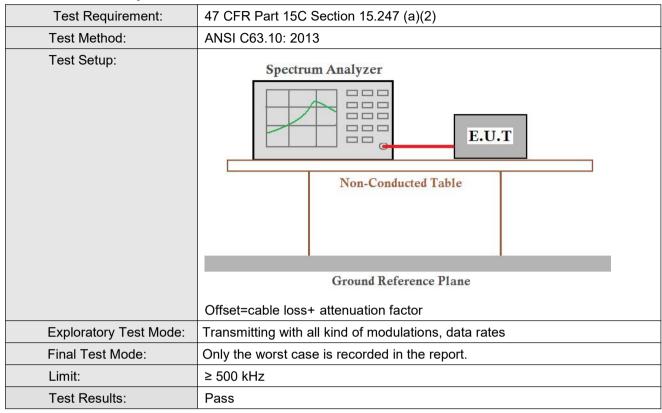








5.4 6dB Occupied Bandwidth





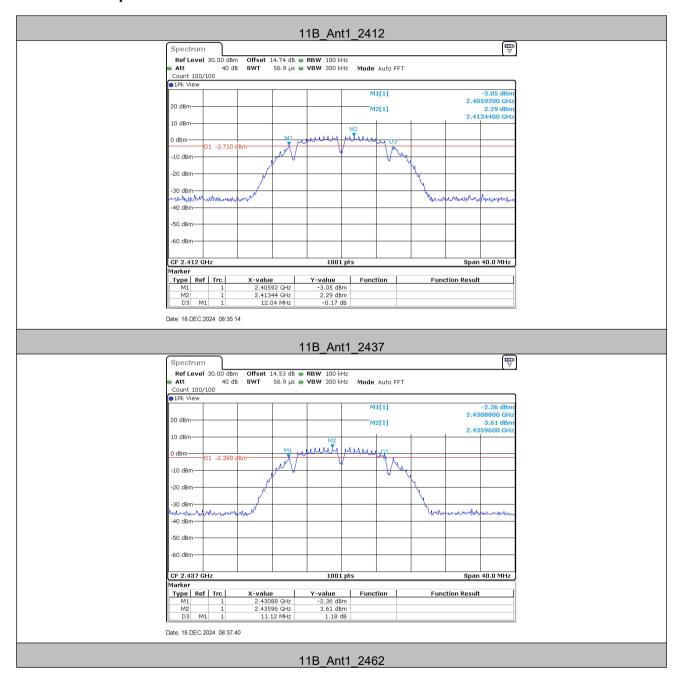
Report No.: CQASZ20241202627E-02

Test Result

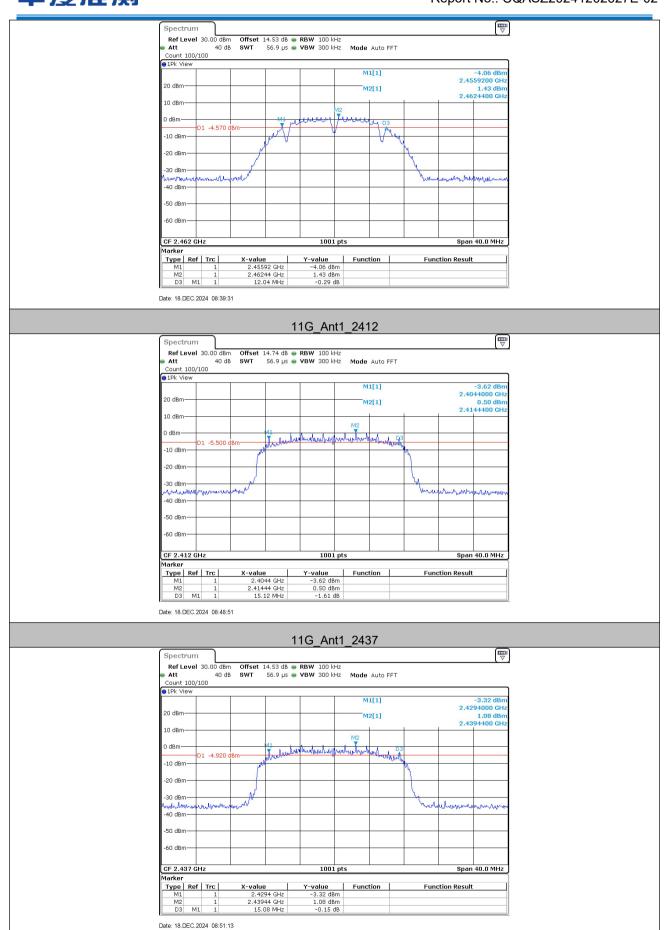
TestMode	Antenna	Channel	DTS BW [MHz]	Limit[MHz]	Verdict
		2412	12.04	0.5	PASS
11B	Ant1	2437	11.12	0.5	PASS
		2462	12.04	0.5	PASS
		2412	15.12	0.5	PASS
11G	Ant1	2437	15.08	0.5	PASS
		2462	15.08	0.5	PASS
		2412	15.08	0.5	PASS
11N20SISO	Ant1	2437	11.32	0.5	PASS
		2462	15.04	0.5	PASS



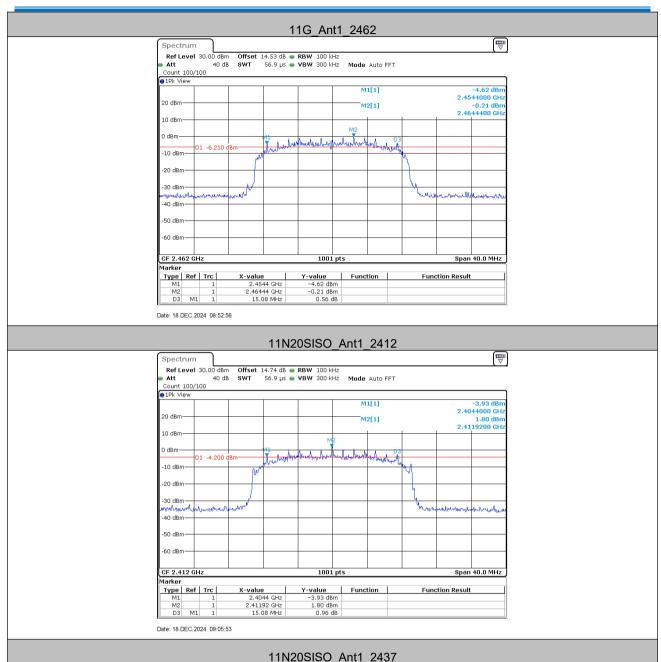
Test Graphs



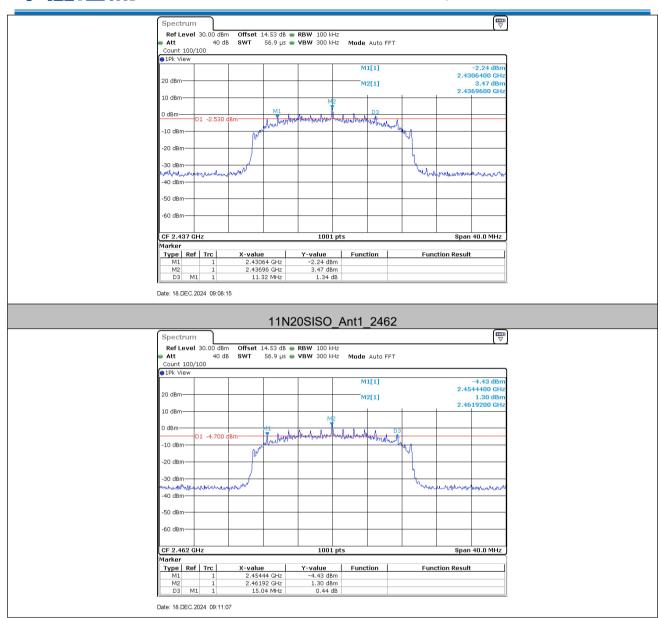








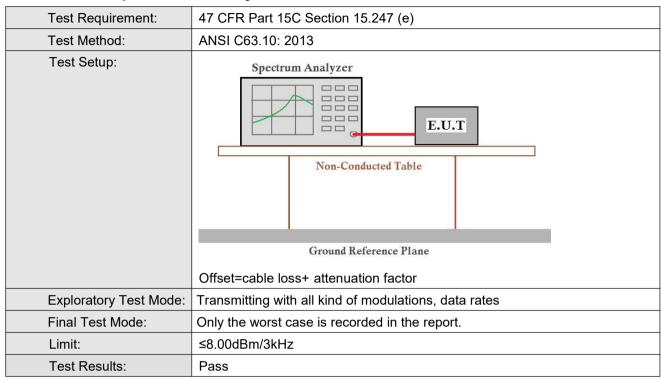






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5.5 Power Spectral Density





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Test Result

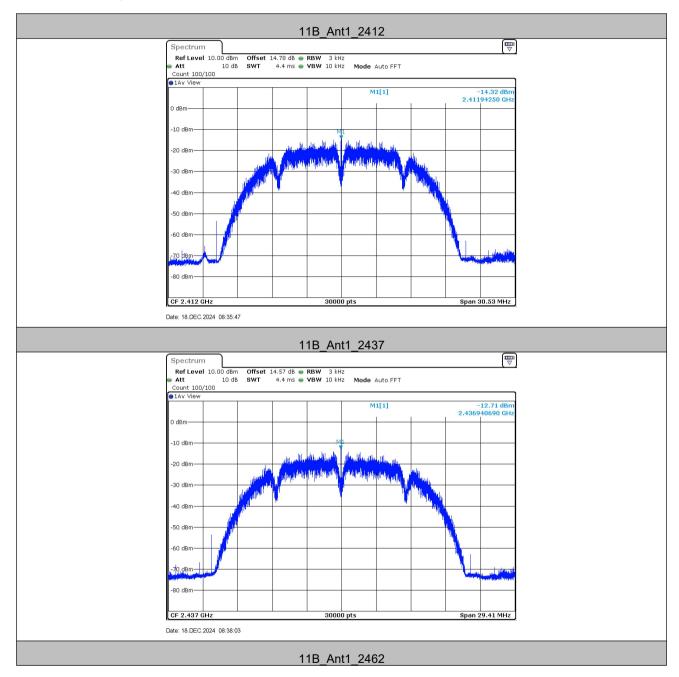
TestMode	Frequency[MHz]	Result[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
	2412	-14.32	≤8.00	PASS
11B	2437	-12.71	≤8.00	PASS
	2462	-14.87	≤8.00	PASS
11G	2412	-9.36	≤8.00	PASS
	2437	-9.12	≤8.00	PASS
	2462	-10.23	≤8.00	PASS
	2412	-9.46	≤8.00	PASS
11N20SISO	2437	-7.81	≤8.00	PASS
	2462	-9.66	≤8.00	PASS

Note:

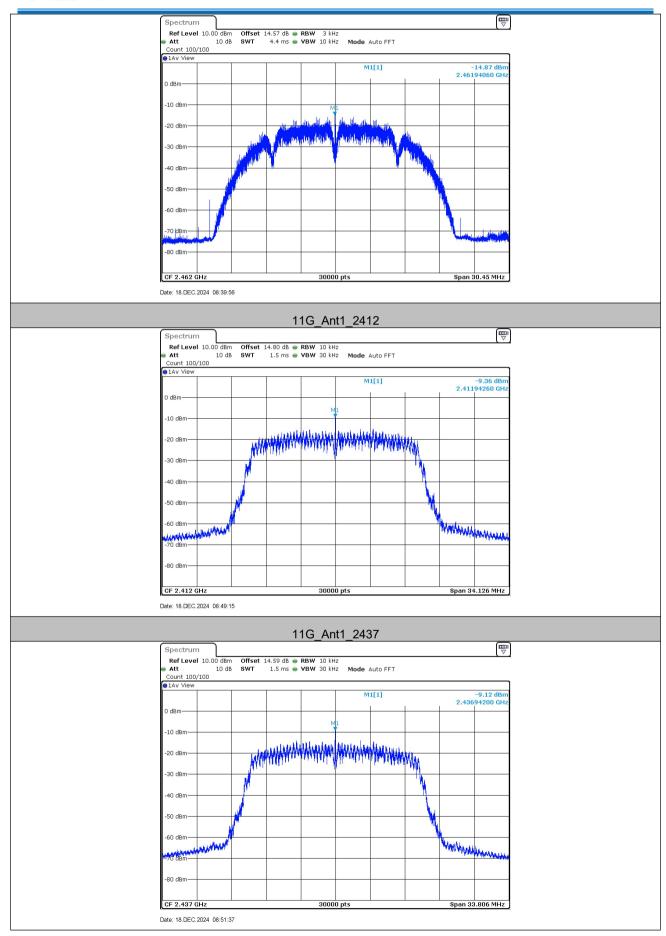
When Duty cycle >98%, D.C.F is not required.



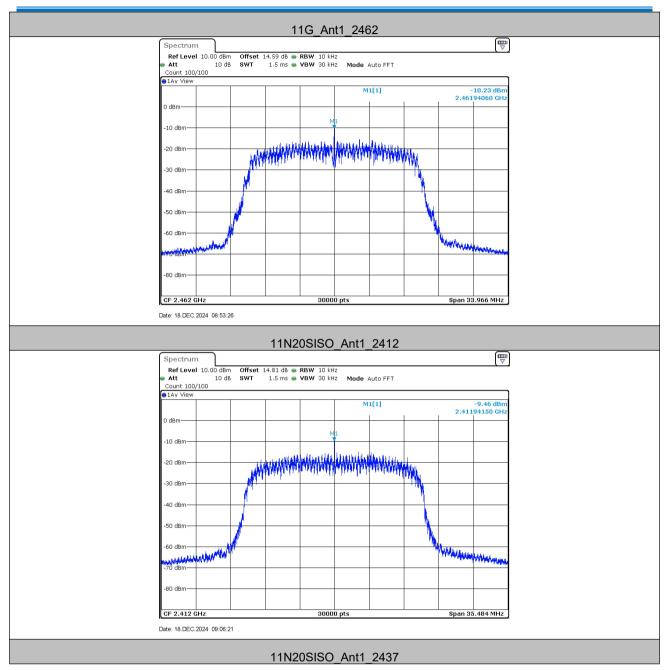
Test Graphs



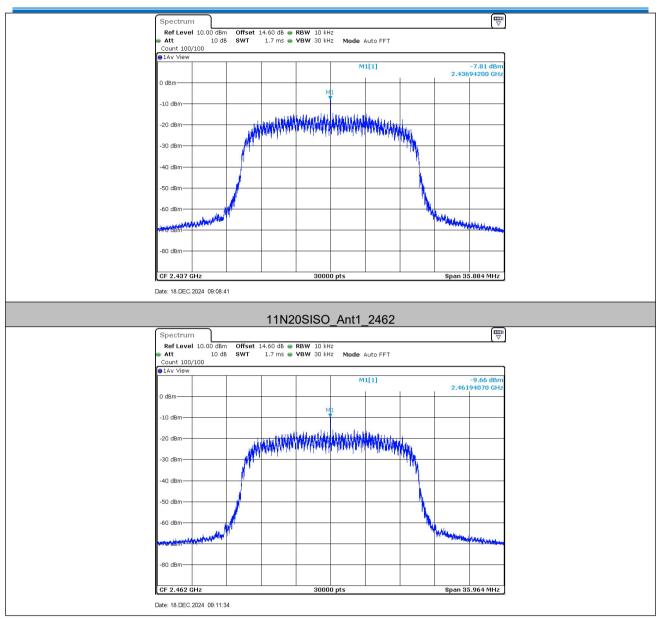








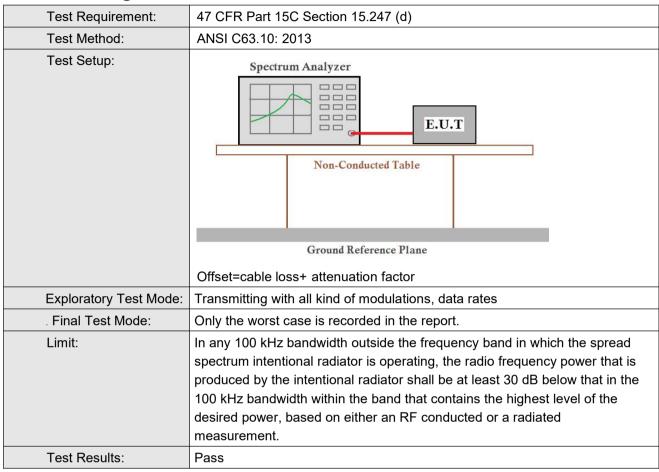








5.6 Band-edge for RF Conducted Emissions





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Test Result

TestMode	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
	Low	2412	0.55	-44.06	≤-29.45	PASS
11B	High	2462	0.23	-42.93	≤-29.77	PASS
	Low	2412	-2.55	-43.59	≤-32.55	PASS
11G	High	2462	-1.77	-42.52	≤-31.77	PASS
	Low	2412	-0.48	-42.97	≤-30.48	PASS
11N20SISO	High	2462	-0.03	-42.62	≤-30.03	PASS