

TEST REPORT

Applicant: Lingban Technology (Hangzhou) Co., Ltd.
Address: Room 101, Building 8, No.1288, Liangmu Road,
Cangqian Street, Zhejiang, China.
Equipment Type: Rokid Station 2
Model Name: RES201
Brand Name: Rokid
FCC ID: 2AW2R-RES201
Test Standard: 47 CFR Part 15 Subpart E
(refer to section 3.1)
Sample Arrival Date: Aug. 22, 2024
Test Date: Aug. 27, 2024 - Sep. 21, 2024
Date of Issue: Apr. 29, 2026

ISSUED BY:

Shanghai Tejet Communications Technology Co., Ltd. Testing Center

**Prepared by:** Zhang Rujie**Reviewed by:** Hai Su**Approved by:** Zhang Yanqing
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Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Apr. 27, 2026</u>	<u>Initial Issue</u>
<u>Rev. 02</u>	<u>Apr. 29, 2026</u>	<u>Modify the EUT EXTERNAL PHOTOS in ANNEX C.</u>
		<u>Modify the EUT INTERNAL PHOTOS in ANNEX D.</u>
		<u>The original report is invalid.</u>

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1 GENERAL INFORMATION

1.1 Test Laboratory

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Address	1-2/F., Building 1, No.222, Xuanlan Road, Xuanqiao, Pudong New District, Shanghai, China

1.2 Test Location

Name	Shanghai Tejet Communications Technology Co., Ltd. Testing Center
Location	1-2/F., Building 1, No.222, Xuanlan Road, Xuanqiao, Pudong New District, Shanghai, China
Accreditation Certificate	The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1352. The laboratory is a testing organization accredited by ISED as a accredited testing laboratory. The company number is 29671 and CAB identifier number is CN0142.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Lingban Technology (Hangzhou) Co., Ltd.
Address	Room 101, Building 8, No.1288, Liangmu Road, Cangqian Street, Zhejiang, China.

2.2 Manufacturer Information

Manufacturer	Lingban Technology (Hangzhou) Co., Ltd.
Address	Room 101, Building 8, No.1288, Liangmu Road, Cangqian Street, Zhejiang, China.

2.3 General Description for Equipment under Test (EUT)

EUT Name	Rokid Station 2
Model Name Under Test	RES201
Series Model Name	N/A
Description of Model name differentiation	N/A
Sample Number	SC-SZ2470561-S04(conducted) SC-SZ2470561-S14(radiated)
Hardware Version	Rokid Station 2 MB-V2.0
Software Version	N/A
Dimensions (Approx.)	62.5mm* 121.5mm* 16mm
Weight (Approx.)	N/A

2.4 Technical Information

Network and Wireless connectivity	Bluetooth (BR+EDR+BLE) WIFI 802.11a, 802.11b, 802.11g, 802.11n(HT20/40), 802.11ac(VHT20/40/80/160) and 802.11ax(HE20/40/80/160) GPS, GLONASS, BDS, Galileo, SBAS
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The requirement for the following technical information of the EUT was tested in this report:

Frequency Range	U-NII-1: 5150 MHz to 5250 MHz, U-NII-2A: 5250 MHz to 5350 MHz, U-NII-2C: 5470 MHz to 5725 MHz, U-NII-3: 5725 MHz to 5850 MHz	
Modulation technology	OFDM, OFDMA	
Modulation Type	1024QAM, 256QAM, 64QAM, 16QAM, BPSK, QPSK	
Transfer Rate (Mbps) (Single RF path)	802.11a: 54/ 48/ 36/ 24/ 18/ 12/ 9/ 6 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201 Mbps	
Channel Bandwidth	802.11a: 20 MHz 802.11n: 20 MHz, 40 MHz 802.11ac: 20 MHz, 40 MHz, 80 MHz, 160 MHz 802.11ax: 20 MHz, 40 MHz, 80 MHz, 160 MHz	
Maximum Output Power	U-NII-1: 17.78 mW U-NII-2A: 16.90 mW U-NII-2C: 22.59 mW U-NII-3: 35.97 mW	
Antenna System (eg., MIMO, Smart Antenna)	Cyclic Delay Diversity (CDD) for 802.11a Multi Input Multi Output (MIMO) for 802.11n/ac/ax	
Categorization as Correlated or Completely Uncorrelated	Categorization as Correlated for 802.11a Categorization as Uncorrelated for 802.11n/ac/ax	
Antenna Type	Main Antenna Aux. Antenna	PIFA Antenna
Antenna Gain	Main Antenna	U-NII-1: 5150 MHz to 5250 MHz: 2.10 dBi U-NII-2A: 5250 MHz to 5350 MHz: 2.10 dBi U-NII-2C: 5470 MHz to 5725 MHz: 3.30 dBi U-NII-3: 5725 MHz to 5850 MHz: 3.30 dBi
	Aux. Antenna	U-NII-1: 5150 MHz to 5250 MHz: 2.50 dBi U-NII-2A: 5250 MHz to 5350 MHz: 2.50 dBi U-NII-2C: 5470 MHz to 5725 MHz: 2.50 dBi U-NII-3: 5725 MHz to 5850 MHz: 2.50 dBi
Total directional gain	For power spectral density(PSD) measurements	Correlated: U-NII-1: 5150 MHz to 5250 MHz: 5.31 dBi U-NII-2A: 5250 MHz to 5350 MHz: 5.31 dBi U-NII-2C: 5470 MHz to 5725 MHz: 5.92 dBi

		U-NII-3: 5725 MHz to 5850 MHz: 5.92 dBi Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: U-NII-1: 5150 MHz to 5250 MHz: 2.30 dBi U-NII-2A: 5250 MHz to 5350 MHz: 2.30 dBi U-NII-2C: 5470 MHz to 5725 MHz: 2.92 dBi U-NII-3: 5725 MHz to 5850 MHz: 2.92 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
	For power measurements	Correlated: U-NII-1: 5150 MHz to 5250 MHz: 5.31 dBi U-NII-2A: 5250 MHz to 5350 MHz: 5.31 dBi U-NII-2C: 5470 MHz to 5725 MHz: 5.92 dBi U-NII-3: 5725 MHz to 5850 MHz: 5.92 dBi Formulas: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / NANT]$ dBi Uncorrelated: U-NII-1: 5150 MHz to 5250 MHz: 2.30 dBi U-NII-2A: 5250 MHz to 5350 MHz: 2.30 dBi U-NII-2C: 5470 MHz to 5725 MHz: 2.92 dBi U-NII-3: 5725 MHz to 5850 MHz: 2.92 dBi Formulas: Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \dots + 10^{GN/10}) / NANT]$ dBi
About the Product		The equipment is Rokid Station 2, intended for used with information technology equipment.

Mode	Antenna		
	Main Antenna	Aux. Antenna	MIMO
802.11a	√	√	--
802.11n20	√	√	--
802.11n40	√	√	--
802.11ac20	√	√	--
802.11ac40	√	√	--
802.11ac80	√	√	--
802.11ac160	√	√	--
802.11ax20	√	√	--
802.11ax40	√	√	--
802.11ax80	√	√	--
802.11ax160	√	√	--
Note: All the configurations were tested, but only the worst data was shown in this report.			

802.11ax RU configuration table								
Mode	Full RU (SU)	RU_26	RU_52	RU_106	RU_242	RU_484	RU_996	RU_996*2
802.11ax20	√	--	--	--	--	--	--	--
802.11ax40	√	--	--	--	--	--	--	--
802.11ax80	√	--	--	--	--	--	--	--
802.11ax160	√	--	--	--	--	--	--	--
Note: EUT only supports Full RU.								

2.5 Channel List

20 MHz		40 MHz		80 MHz		160 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
36	5180	38	5190	42	5210	50	5250
40	5200	46	5230	58	5290	114	5570
44	5220	54	5270	106	5530		
48	5240	62	5310	122	5610		
52	5260	102	5510	155	5775		
56	5280	110	5550				
60	5300	118	5590				
64	5320	126	5630				
100	5500	134	5670				
104	5520	151	5755				
108	5540	159	5795				
112	5560						
116	5580						
120	5600						
124	5620						
128	5640						
132	5660						
136	5680						
140	5700						
149	5745						
153	5765						
157	5785						
161	5805						
165	5825						

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 802.11a/n(HT20)/ac(VHT20)/ax(HE20)

U-NII-1 (5150 - 5250 MHz)			U-NII-2A (5250 - 5350 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
36	Low	5180	52	Low	5260
44	Mid	5220	60	Mid	5300
48	High	5240	64	High	5320

U-NII-2C (5470 - 5725 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
100	Low	5500	149	Low	5745
116	Mid	5580	157	Mid	5785
140	High	5700	165	High	5825

For 802.11n(HT40)/ac(VHT40)/ax(HE40)

U-NII-1 (5150 - 5250 MHz)			U-NII-2A (5250 - 5350 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
38	Low	5190	54	Low	5270
46	High	5230	62	High	5310

U-NII-2C (5470 - 5725 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
102	Low	5510	151	Low	5755
118	Mid	5590	159	High	5795
134	High	5670			

For 802.11ac(VHT80)/ax(HE80)

U-NII-1 (5150 - 5250 MHz)			U-NII-2A (5250 - 5350 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
42	Mid	5210	58	Mid	5290

U-NII-2C (5470 - 5725 MHz)			U-NII-3 (5725 - 5850 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
106	Low	5530	155	Mid	5775
122	High	5610			

For 802.11ac(VHT160)/ax(HE160)

U-NII-2A (5250 - 5350 MHz)			U-NII-2C (5470 - 5725 MHz)		
Channel Number	Channel	Frequency (MHz)	Channel Number	Channel	Frequency (MHz)
50	Mid	5250	114	Mid	5570

Note: Preliminary tests were performed in different data rate in above table to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Modulation Type	U-NII-1 Channel	U-NII-2A Channel	U-NII-2C Channel	U-NII-3 Channel
RF Output Power	11a	6	BPSK	48/44/36	64/60/52	140/116/100	165/157/149
	11n(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11n(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11ac(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(80 MHz)	29.3		42	58	122/106	155
	11ac(160 MHz)	58.5		N/A	50	114	N/A
	11ax(20 MHz)	7.3		48/44/36	64/60/52	140/116/100	165/157/149
	11ax(40 MHz)	14.6		46/38	62/54	134/118/102	159/151
	11ax(80 MHz)	30.6		42	58	122/106	155
	11ax(160 MHz)	61.3		N/A	50	114	N/A
Emission Bandwidth & 99% Occupied Bandwidth	11a	6	BPSK	48/44/36	64/60/52	140/116/100	165/157/149
	11n(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11n(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11ac(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(80 MHz)	29.3		42	58	122/106	155
	11ac(160 MHz)	58.5		N/A	50	114	N/A
	11ax(20 MHz)	7.3		48/44/36	64/60/52	140/116/100	165/157/149
	11ax(40 MHz)	14.6		46/38	62/54	134/118/102	159/151
	11ax(80 MHz)	30.6		42	58	122/106	155
	11ax(160 MHz)	61.3		N/A	50	114	N/A
6 dB bandwidth	11a	6	BPSK	N/A	N/A	N/A	165/157/149
	11n(20 MHz)	6.5		N/A	N/A	N/A	165/157/149
	11n(40 MHz)	13.5		N/A	N/A	N/A	159/151
	11ac(20 MHz)	6.5		N/A	N/A	N/A	165/157/149
	11ac(40 MHz)	13.5		N/A	N/A	N/A	159/151
	11ac(80 MHz)	29.3		N/A	N/A	N/A	155
	11ac(160 MHz)	58.5		N/A	N/A	N/A	N/A
	11ax(20 MHz)	7.3		N/A	N/A	N/A	165/157/149
	11ax(40 MHz)	14.6		N/A	N/A	N/A	159/151
	11ax(80 MHz)	30.6		N/A	N/A	N/A	155
	11ax(160 MHz)	61.3		N/A	N/A	N/A	N/A
Power Spectral	11a	6	BPSK	48/44/36	64/60/52	140/116/100	165/157/149
	11n(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149

Density	11n(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11ac(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(80 MHz)	29.3		42	58	122/106	155
	11ac(160 MHz)	58.5		N/A	50	114	N/A
	11ax(20 MHz)	7.3		48/44/36	64/60/52	140/116/100	165/157/149
	11ax(40 MHz)	14.6		46/38	62/54	134/118/102	159/151
	11ax(80 MHz)	30.6		42	58	122/106	155
	11ax(160 MHz)	61.3		N/A	50	114	N/A
Radiated Spurious Emissions	11a	6	BPSK	48/44/36	64/60/52	140/116/100	165/157/149
	11n(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11n(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(20 MHz)	6.5		48/44/36	64/60/52	140/116/100	165/157/149
	11ac(40 MHz)	13.5		46/38	62/54	134/118/102	159/151
	11ac(80 MHz)	29.3		42	58	122/106	155
	11ac(160 MHz)	58.5		N/A	50	114	N/A
	11ax(20 MHz)	7.3		48/44/36	64/60/52	140/116/100	165/157/149
	11ax(40 MHz)	14.6		46/38	62/54	134/118/102	159/151
	11ax(80 MHz)	30.6		42	58	122/106	155
	11ax(160 MHz)	61.3		N/A	50	114	N/A
Band Edge (Restricted- band)	11a	6	BPSK	48/36	64/52	140/100	165/149
	11n(20 MHz)	6.5		48/36	64/52	140/100	165/149
	11n(40 MHz)	13.5		46/38	62/54	134/102	159/151
	11ac(20 MHz)	6.5		48/36	64/52	140/100	165/149
	11ac(40 MHz)	13.5		46/38	62/54	134/102	159/151
	11ac(80 MHz)	29.3		42	58	122/106	155
	11ac(160 MHz)	58.5		N/A	50	114	N/A
	11ax(20 MHz)	7.3		48/36	64/52	140/100	165/149
	11ax(40 MHz)	14.6		46/38	62/54	134/102	159/151
	11ax(80 MHz)	30.6		42	58	122/106	155
	11ax(160 MHz)	61.3		N/A	50	114	N/A

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 15 Subpart E	Unlicensed National Information Infrastructure Devices
2	KDB Publication 789033 D02v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
3	ANSI C63.10-2020	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

3.2 Test Verdict

No.	Description	FCC Part No.	RSS Part No.	Test Result	Verdict
1	Antenna Requirement	15.203	N/A	--	N/A ^{Note1}
2	RF Output Power	15.407(a)	N/A	ANNEX A.1	N/A
3	Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	N/A	ANNEX A.2	N/A
4	6 dB bandwidth	15.407(e)	N/A	ANNEX A.3	N/A
5	Power Spectral Density	15.407(a)	N/A	ANNEX A.4	N/A
6	Conducted Emission	15.207	N/A	ANNEX A.5	N/A
7	Radiated Spurious Emissions and Band Edge (Restricted-band)	15.407(b)	N/A	ANNEX A.6	N/A

Note ¹: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203.

Note ²: Under all normal operating conditions specified in the user manual, frequency stability can keep radiation within the operating frequency band.

Note ³: Compared with the EUT of test report BL-SZ2480856-604 the EUT of this report has changed as below:

1. Removed the ESD tube with tag number D33.
2. Add MIC function.
3. The Applicant's name and address have been updated.
4. The Manufacturer's name and address have been updated.

Other hardware circuit and software are the same as EUT referred to in test report No. BL-SZ2480856-604. Therefore, in addition to the above differences, all test data and EUT information are derived from the report No. BL-SZ2480856-604 published by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the normal environmental conditions were within the listed ranges:

Relative Humidity	53% to 60%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22.0℃ to +24.9℃
Working Voltage of the EUT	NV (Normal Voltage)	3.85 V

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	MY50330200	2024.05.08	2025.05.07
Spectrum Analyzer	KEYSIGHT	N9020A	MY50531259	2024.08.01	2025.07.31
Test Antenna-Horn	SCHWARZBECK	BBHA 9120D	2460	2024.05.16	2027.05.15
Test Antenna-Horn	A-INFO	LB-180400KF	J211060273	2024.06.15	2027.06.14
Anechoic Chamber	RAINFORD	9m*6m*6m	140	2024.07.28	2026.07.27
Amplifier	COM-MV	LSCX_LNA1-12G-01	7210214	2024.08.01	2025.07.31
Amplifier	COM-MV	XKu_LNA7-18G-01	7210209	2024.08.01	2025.07.31
Amplifier	COM-MV	KA LNA18 40G-01	18050001	2023.12.06	2024.12.05
EMI Receiver	ROHDE&SCHWARZ	ESRP	101036	2024.08.01	2025.07.31
Test Antenna-Loop	SCHWARZBECK	FMZB 1519	1519-037	2024.04.15	2027.04.14
Amplifier	COM-MV	ZT30-1000M	B2018054558	2023.12.05	2024.12.04
Anechoic Chamber	EMC Electronic Co., Ltd	20.10*11.60*7.35m	130	2024.07.13	2027.07.12
EMI Receiver	KEYSIGHT	N9038A	MY53220118	2024.08.01	2025.07.31
Test Antenna-Bi-Log	SCHWARZBECK	VULB 9163	9163-624	2024.07.06	2026.07.05
Amplifier	COM-MV	ZT30-1000M	B2017119082	2023.12.05	2024.12.04
Anechoic Chamber	RAINFORD	9m*6m*6m	101	2023.03.04	2026.03.03
EMI Receiver	KEYSIGHT	N9010B	MY57110309	2024.08.01	2025.07.31
LISN	SCHWARZBECK	NSLK 8127	8127-687	2024.05.08	2025.05.07
Shielded Enclosure	YiHeng Electronic Co., Ltd	3.5m*3.1m*2.8m	112	2022.02.19	2025.02.18

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable Test Setup
BL410R	BALUN	V3.5.2.642	N/A	The section 4.6.1
BL410E	BALUN	V21.919	N/A	The section 4.6.2&4.6.3&4.6.4&4.6.5

4.4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2.

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

Parameters	Uncertainty
Occupied Channel Bandwidth	2.40 %
RF output power, conducted	0.41 dB
Power Spectral Density, conducted	1.74 dB
Unwanted Emissions, conducted	1.74 dB
All emissions, radiated	3.70 dB
Temperature	0.82 °C
Humidity	4.08 %

4.5 Decision Rule

- ☐ No Need
☒ Use General conformity decision rule (Consider uncertainty or not ☒No ☐Yes)
☐ Use Special Conformity Decision Rule (Consider uncertainty or not ☐No ☐Yes)

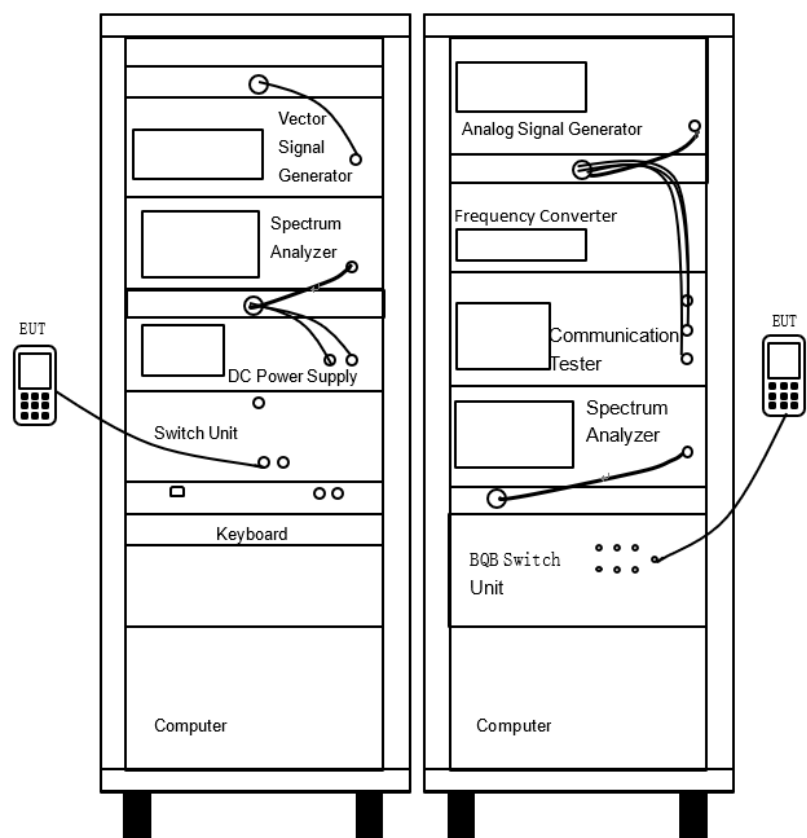
4.6 Description of Test Setup

4.6.1 For Antenna Port Test

Conducted value (dBm) = Measurement value (dBm) + cable loss (dB)

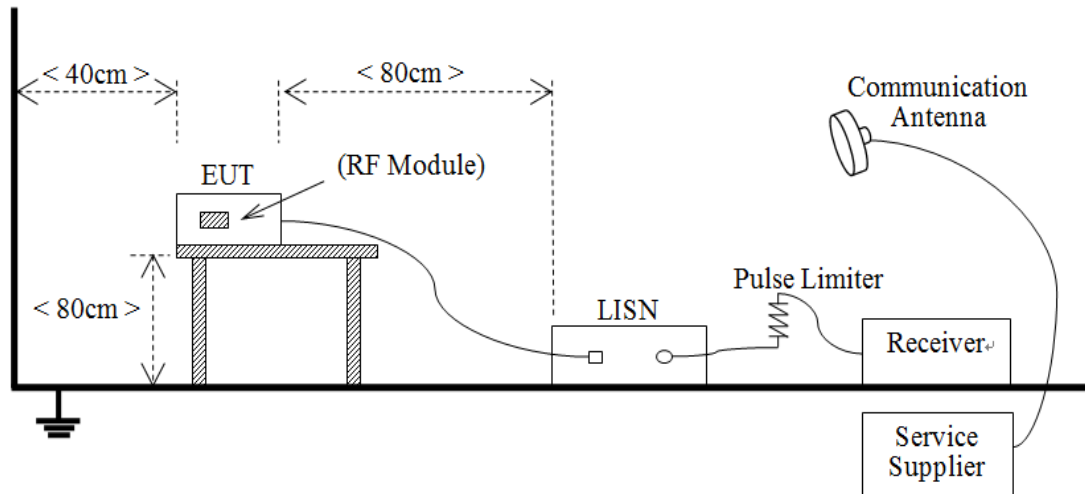
For example: the measurement value is 10 dBm and the cable 0.5 dB used, then the final result of EUT:

Conducted value (dBm) = 10 dBm + 0.5 dB = 10.5 dBm



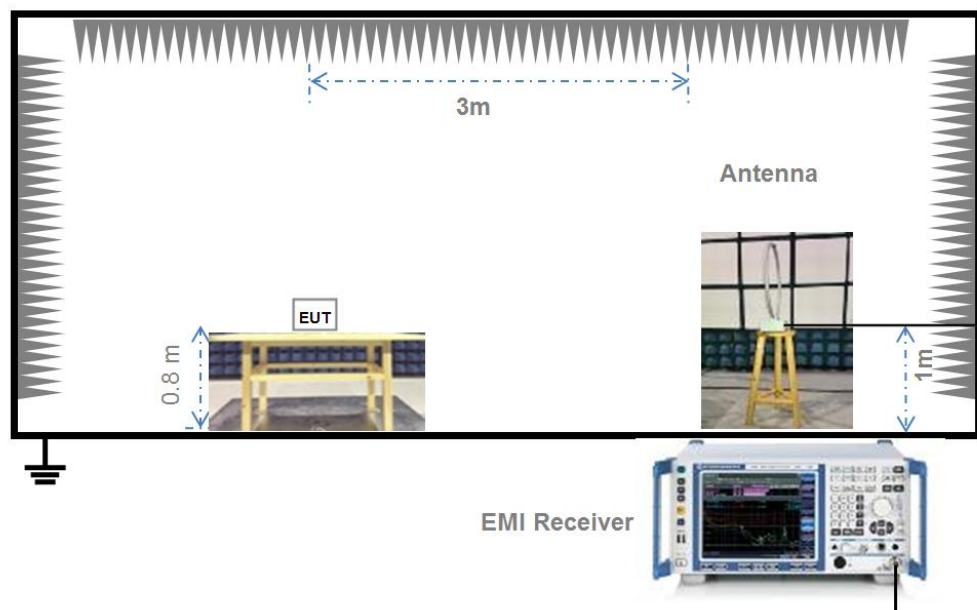
(Diagram 1)

4.6.2 For AC Power Supply Port Test



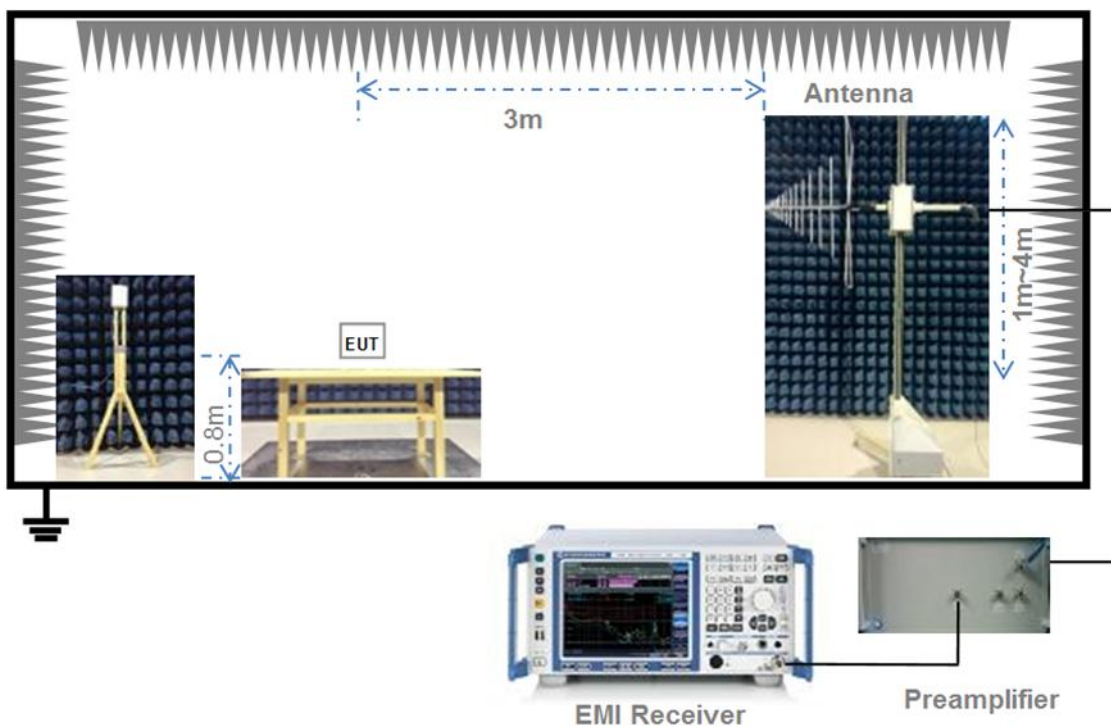
(Diagram 2)

4.6.3 For Radiated Test (Below 30 MHz)



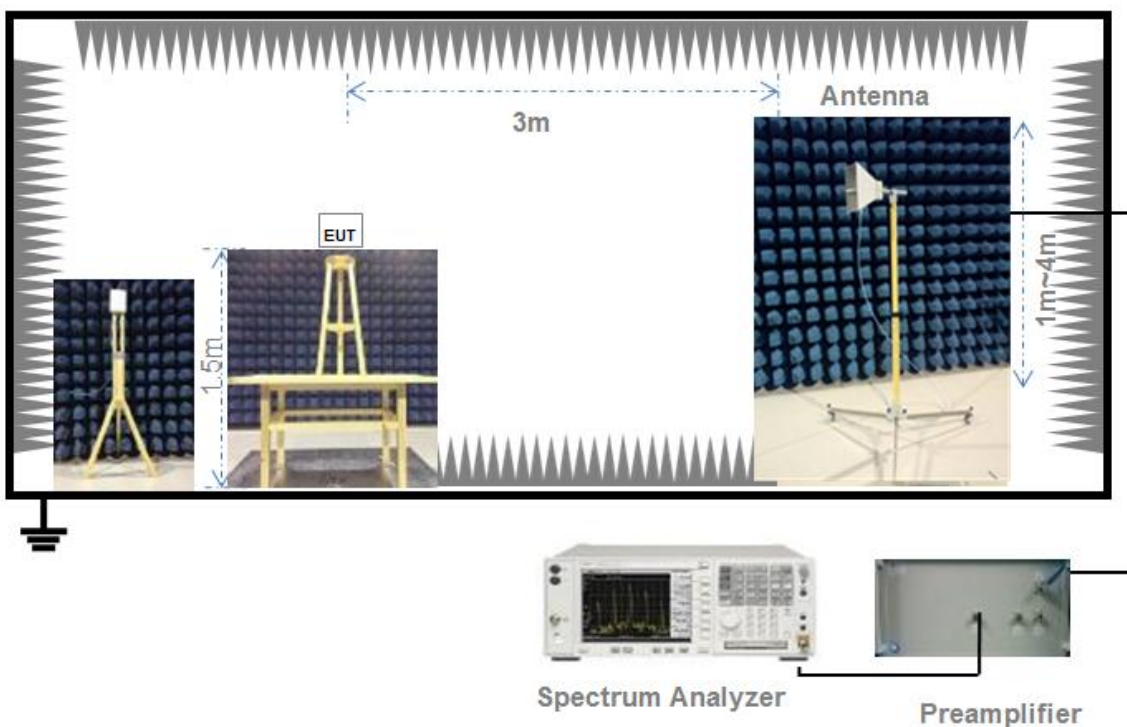
(Diagram 3)

4.6.4 For Radiated Test (30 MHz-1 GHz)



(Diagram 4)

4.6.5 For Radiated Test (Above 1 GHz)



(Diagram 5)

5 TEST ITEMS

5.1 RF Output Power

5.1.1 Test Limit

FCC §15.407(a)

The maximum conducted output power should not exceed:

Frequency Band (MHz)	Limit
5150-5250	250 mW
5250-5350	250 mW or 11 dBm + 10log B, whichever is less.
5470-5725	250 mW or 11 dBm + 10log B, whichever is less.
5725-5850	1 W
Note: Where "B" is the 26 dB emissions bandwidth in MHz.	

5.1.2 Test Setup

The section 4.6.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Maximum conducted (average) output power

a) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied.

- 1) The EUT is configured to transmit continuously or to transmit with a constant duty cycle.
- 2) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
- 3) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- b) If the transmitter does not transmit continuously, measure the duty cycle (x) of the transmitter output signal.
- c) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.
- d) Adjust the measurement in dBm by adding 10 log (1/x) where x is the duty cycle.

Measurements of duty cycle

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal.

Set the center frequency of the instrument to the center frequency of the transmission.

Set RBW $\geq$ OBW if possible; otherwise, set RBW to the largest available value.

Set VBW $\geq$ RBW. Set detector = peak or average.

The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$ and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

The E.I.R.P used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space

environment.

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Emission Bandwidth and 6 dB Bandwidth

5.2.1 Limit

FCC §15.407(a)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.2.2 Test Setup

The test setup photo please refer to 4.6.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Emission bandwidth

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set VBW $\geq 3 \times$ RBW,
3. Detector = Peak.
4. Trace mode = Max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

Occupied Bandwidth

1. Set Span = 1.5 times to 5.0 times the OBW
2. Set RBW = 1% to 5% of the OBW.
3. Set VBW $\geq 3 \times$ RBW,
4. Detector = Peak.
5. Trace mode = Max hold.
6. Use the 99% power bandwidth function of the instrument.

6 dB bandwidth

1. Set RBW = 100 kHz, VBW = 300 kHz.
2. Detector = Peak.
3. Trace mode = Max hold.
4. Allow the trace to stabilize.
5. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.2.4 Test Result

Please refer to ANNEX A.2 and ANNEX A.3.

5.3 Power Spectral density (PSD)

5.3.1 Limit

FCC §15.407(a)

The maximum power spectral density should not exceed:

Frequency Band (MHz)	Limit
5150-5250	11 dBm/MHz
5250-5350	11 dBm/MHz
5470-5725	11 dBm/MHz
5725-5850	30 dBm/500kHz

5.3.2 Test Setup

The section 4.6.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth.

1. Set RBW = 510 kHz/1 MHz, VBW $\geq 3 \times$ RBW, Sweep time = Auto, Detector = RMS.
2. Allow the sweeps to continue until the trace stabilizes.
3. Use the peak marker function to determine the maximum amplitude level.
4. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.

5.3.4 Test Result

Please refer to ANNEX A.4.

5.4 Conducted Emission

5.4.1 Limit

FCC §15.207

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the U-NII-150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

5.4.2 Test Setup

The section 4.6.2 (Diagram 2) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

5.4.4 Test Result

Please refer to ANNEX A.5.

5.5 Radiated Spurious Emissions and Band Edge (Restricted-band)

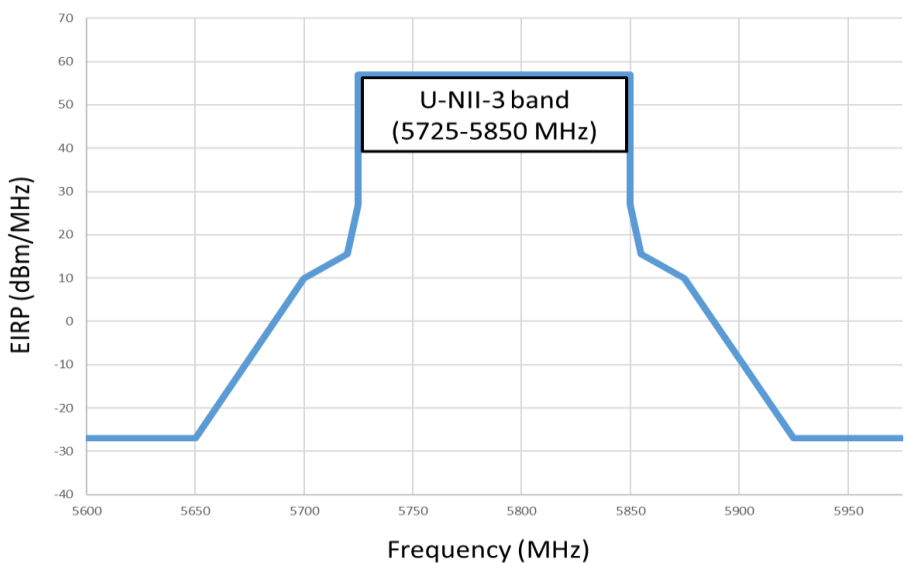
5.5.1 Limit

FCC §15.209 & 15.407(b)

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
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
Above 960	500	3

Note ¹: The Limit for radiated test was performed according to FCC Part 15C

Note ²: The tighter limit applies at the band edge.

Un-restricted band emissions	
Out Operating Band (MHz)	Limit
5150 - 5250	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5250 - 5350	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5470 - 5725	e.i.r.p. -27 dBm (68.2 dBuV/m@3m)
5725 - 5850	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge. 

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength.

5.5.2 Test Setup

The section 4.6.3-4.6.5 (Diagram 3 - Diagram 5) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

Since the emission limits are specified in terms of radiated field strength levels, measurements performed to demonstrate compliance have traditionally relied on a radiated test configuration. Radiated measurements remain the principal method for demonstrating compliance to the specified limits; however antenna-port conducted measurements are also now acceptable to demonstrate compliance (see below for details). When radiated measurements are utilized, test site requirements and procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 shall be followed.

Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

General Procedure for conducted measurements in restricted bands

- a) Measure the conducted output power (in dBm) using the detector specified (see guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).
- b) Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see guidance on determining the applicable antenna gain)
- c) Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies ≤ 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).
- d) For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).
- e) Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:
$$E = \text{EIRP} - 20\log D + 104.8$$
where:
E = electric field strength in dB μ V/m,
EIRP = equivalent isotropic radiated power in dBm
D = specified measurement distance in meters.
- f) Compare the resultant electric field strength level to the applicable limit.
- g) Perform radiated spurious emission test.

Quasi-Peak measurement procedure

The specifications for measurements using the CISPR quasi-peak detector can be found in Publication 16 of the International Special Committee on Radio Frequency Interference (CISPR) of the International Electrotechnical Commission.

As an alternative to CISPR quasi-peak measurement, compliance can be demonstrated to the applicable emission limits using a peak detector.

Peak power measurement procedure

Peak emission levels are measured by setting the instrument as follows:

- a) RBW = as specified in Table 1.
- b) VBW $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Sweep time = auto.
- e) Trace mode = max hold.
- f) Allow sweeps to continue until the trace stabilizes. (Note that the required measurement time may be longer for low duty cycle applications).

Table 1—RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

Trace averaging across on and off times of the EUT transmissions followed by duty cycle correction

If continuous transmission of the EUT (i.e., duty cycle ≥ 98 percent) cannot be achieved and the duty cycle is constant (i.e., duty cycle variations are less than ± 2 percent), then the following procedure shall be used:

- a) The EUT shall be configured to operate at the maximum achievable duty cycle.
- b) Measure the duty cycle, x , of the transmitter output signal as described in section 6.0.
- c) RBW = 1 MHz (unless otherwise specified).
- d) VBW $\geq 3 \times$ RBW.
- e) Detector = RMS, if $\text{span}/(\# \text{ of points in sweep}) \leq (\text{RBW}/2)$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
- f) Averaging type = power (i.e., RMS).
 - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
 - 2) Some instruments require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- g) Sweep time = auto.
- h) Perform a trace average of at least 100 traces.
- i) A correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - 1) If power averaging (RMS) mode was used in step f), then the applicable correction factor is $10 \log(1/x)$, where x is the duty cycle.
 - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is $20 \log(1/x)$, where x is the duty cycle.
 - 3) If a specific emission is demonstrated to be continuous (≥ 98 percent duty cycle) rather than turning on

and off with the transmit cycle, then no duty cycle correction is required for that emission.

NOTE: Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.

Determining the applicable transmit antenna gain

A conducted power measurement will determine the maximum output power associated with a restricted band emission; however, in order to determine the associated EIRP level, the gain of the transmitting antenna (in dBi) must be added to the measured output power (in dBm).

Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

See KDB 662911 for guidance on calculating the additional array gain term when determining the effective antenna gain for a EUT with multiple outputs occupying the same or overlapping frequency ranges in the same band.

Radiated spurious emission test

An additional consideration when performing conducted measurements of restricted band emissions is that unwanted emissions radiating from the EUT cabinet, control circuits, power leads, or intermediate circuit elements will likely go undetected in a conducted measurement configuration. To address this concern, a radiated test shall be performed to ensure that emissions emanating from the EUT cabinet (rather than the antenna port) also comply with the applicable limits.

For these cabinet radiated spurious emission measurements the EUT transmit antenna may be replaced with a termination matching the nominal impedance of the antenna. Procedures for performing radiated measurements are specified in ANSI C63.10. All detected emissions shall comply with the applicable limits.

The measurement frequency range is from 30 MHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented.

The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz, 100 kHz for $f < 1$ GHz

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

5.5.4 Test Result

Please refer to ANNEX A.6.

ANNEX A TEST RESULT

A.1 RF Output Power

Note: The RF Output Power, please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.1.

A.2 Emission Bandwidth & 99% Bandwidth

Note: The Emission Bandwidth & 99% Bandwidth, please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.2.

A.3 6 dB Bandwidth

Note: The 6dB Bandwidth, please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.3.

A.4 Power Spectral Density

Note: The Power Spectral Density, please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.4.

A.5 Conducted Emission

Note: The Conducted Emission, please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.5.

A.6 Radiated Spurious Emissions and Band Edge (Restricted-band)

A.6.1 Radiated Spurious Emissions

Note: The Radiated Spurious Emissions, please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.6.1.

A.6.2 Band Edge (Restricted-band)

Note: The Band Edge (Restricted-band), please refer to the Report No. BL-SZ2480856-604 which issued by Shenzhen BALUN Technology Co., Ltd. on Oct. 11, 2024. ANNEX A.6.2.

ANNEX B TEST SETUP PHOTOS

Note: The TEST SETUP PHOTOS, please refer to the Report No. BL-SZ2480856-AR-1 TEST SETUP PHOTOS.

ANNEX C EUT EXTERNAL PHOTOS

Please refer the document "Ti-CC26040040-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer the document "Ti-CC26040040-AI.PDF".

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