



TEST REPORT

Applicant: Cavli Inc.
Address: 99 South Almaden Blvd., Suite 600, San Jose, CA, USA
Equipment Type: LTE MODEM
Model Name: CQS290 (refer to section 2.3)
Brand Name: Cavli Wireless
FCC ID: 2BB64CQS290NA
Test Standard: 47 CFR Part 15 Subpart E (refer to section 3.1)
Sample Arrival Date: N/A
Test Date: N/A
Date of Issue: Sep. 12, 2025

ISSUED BY:

Shanghai Tejet Communications Technology Co., Ltd. Testing Center



Prepared by: Zhang Rujie

Reviewed by: Hai Su

Approved by: Zhang Yanqing
(Laboratory Manager)

Zhang Rujie

Hai Su

Zhang Yanqing

Revision History

Version	Issue Date	Revisions
<u>Rev. 01</u>	<u>Sep. 12, 2025</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	GENERAL INFORMATION	4
1.1	Test Laboratory	4
1.2	Test Location	4
2	PRODUCT INFORMATION	5
2.1	Applicant Information	5
2.2	Manufacturer Information	5
2.3	General Description for Equipment under Test (EUT)	5
2.4	Technical Information	6
2.5	Channel List	7
3	SUMMARY OF TEST RESULTS	10
3.1	Test Standards	10
3.2	Test Verdict	10
4	GENERAL TEST CONFIGURATIONS	11
4.1	Test Environments	11
4.2	Test Equipment List	11
4.3	Test Software List	11
4.4	Decision Rule	12
4.5	Measurement Uncertainty	12
4.6	Description of Test Setup	13
5	TEST ITEMS	16
5.1	RF Output Power	16
5.2	Emission Bandwidth and 6 dB Bandwidth	18
5.3	Power Spectral density (PSD)	19
5.4	Conducted Emission	20
5.5	Radiated Spurious Emissions and Band Edge (Restricted-band)	21

ANNEX A	TEST RESULT	26
A.1	RF Output Power	26
A.2	Emission Bandwidth & 99% Bandwidth	26
A.3	6 dB Bandwidth	26
A.4	Power Spectral Density	26
A.5	Conducted Emission.....	26
A.6	Radiated Spurious Emissions and Band Edge (Restricted-band).....	26
ANNEX B	TEST SETUP PHOTOS	27
ANNEX C	EUT EXTERNAL PHOTOS.....	27
ANNEX D	EUT INTERNAL PHOTOS.....	27

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.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Cavli Inc.
Address	99 South Almaden Blvd., Suite 600, San Jose, CA, USA

2.2 Manufacturer Information

Manufacturer	Cavli Inc.
Address	99 South Almaden Blvd., Suite 600, San Jose, CA, USA

2.3 General Description for Equipment under Test (EUT)

EUT Name	LTE MODEM		
Model Name Under Test	CQS290		
Series Model Name	CQS290-NA-108GNAN, CQS290-NA-108GNAH, CQS290-NA-216GNAN, CQS290-NA-216GNAH, CQS290-NA-232GNAN, CQS290-NA-232GNAH, CQS290-NA-332GNAN, CQS290-NA-332GNAH, CQS290-NA-364GNAN, CQS290-NA-364GNAH, CQS290-NA-432GNAN, CQS290-NA-432GNAH, CQS290-NA-464GNAN, CQS290-NA-464GNAH.		
Description of Model name differentiation	Variants	GNSS	eSim
	CQS290-NA-108GNAN	Yes	No
	CQS290-NA-108GNAH	Yes	Yes
	CQS290-NA-216GNAN	Yes	No
	CQS290-NA-216GNAH	Yes	Yes
	CQS290-NA-232GNAN	Yes	No
	CQS290-NA-232GNAH	Yes	Yes
	CQS290-NA-332GNAN	Yes	No
	CQS290-NA-332GNAH	Yes	Yes
	CQS290-NA-364GNAN	Yes	No
	CQS290-NA-364GNAH	Yes	Yes
	CQS290-NA-432GNAN	Yes	No
	CQS290-NA-432GNAH	Yes	Yes
	CQS290-NA-464GNAN	Yes	No
	CQS290-NA-464GNAH	Yes	Yes
(this information provided by the customer)			
Sample Number	SC-SH24B0040-S01(conducted) SC-SH24B0040-S02(radiated)		
Hardware Version	V2.2		
Software Version	N/A		
Dimensions (Approx.)	L:40.5mm*W:40.5mm*H:2.7mm		
Weight (Approx.)	N/A		

2.4 Technical Information

Network and Wireless connectivity	4G Network LTE FDD Band 2/4/5/7/12/13/25/66 Bluetooth (BR+EDR+BLE) 2.4G WIFI 802.11b, 802.11g, 802.11n(HT20/40) 5G WIFI 802.11a, 802.11n(HT20/40), 802.11ac(VHT20/40/80) GPS, BDS, GLONASS, Galileo
-----------------------------------	---

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
Modulation Type	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 VHT-MCS9
Channel Bandwidth	802.11a: 20 MHz 802.11n: 20 MHz, 40 MHz 802.11ac: 20 MHz, 40 MHz, 80 MHz
Maximum Output Power	U-NII-1: 11.55 dBm U-NII-2A: 10.12 dBm U-NII-2C: 9.75 dBm U-NII-3: 7.30 dBm
Antenna System	N/A
Categorization as Correlated or Completely Uncorrelated	N/A
Antenna Type	PIFA Antenna
Antenna Gain	U-NII-1: 5150 MHz to 5250 MHz: 5.0 dBi U-NII-2A: 5250 MHz to 5350 MHz: 5.0 dBi U-NII-2C: 5470 MHz to 5725 MHz: 5.0 dBi U-NII-3: 5725 MHz to 5850 MHz: 5.0 dBi
About the Product	The equipment is LTE MODEM, intended for used with information technology equipment.

2.5 Channel List

20 MHz		40 MHz		80 MHz	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
36	5180	38	5190	42	5210
40	5200	46	5230	58	5290
44	5220	54	5270	106	5530
48	5240	62	5310	122	5610
52	5260	102	5510	138	5690
56	5280	110	5550	155	5775
60	5300	118	5590		
64	5320	126	5630		
100	5500	134	5670		
104	5520	142	5710		
108	5540	151	5755		
112	5560	159	5795		
116	5580				
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				
144	5720				
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)

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)

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)

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			

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	U-NII-2A	U-NII-2C	U-NII-3
				Channel	Channel	Channel	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
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
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
Power Spectral Density	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
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
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

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 C63.10-2013	American National Standard for Testing 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	--	Pass ^{Note1}
2	RF Output Power	15.407(a)	N/A	ANNEX A.1	Pass
3	Emission Bandwidth & 99% Occupied Bandwidth	15.407(a)	N/A	ANNEX A.2	Pass
4	6 dB bandwidth	15.407(e)	N/A	ANNEX A.3	Pass
5	Power Spectral Density	15.407(a)	N/A	ANNEX A.4	Pass
6	Conducted Emission	15.207	N/A	ANNEX A.5	Pass
7	Radiated Spurious Emissions and Band Edge (Restricted-band)	15.407(b)	N/A	ANNEX A.6	Pass

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-SH24B0903-604 the EUT of this report has changed as below:

1. Change the FCC ID from 2BB64CQS290 to 2BB64CQS290NA.
2. Reduce the supported frequency bands. (no other RF changes)
3. Change the Series Model Name.

Other hardware circuit and software are the same as EUT referred to in test report No. BL-SH24B0903-604. Therefore, in addition to the above differences, all test data and EUT information are derived from the report No. BL-SH24B0903-604 published by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

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

Relative Humidity	51% to 59%	
Atmospheric Pressure	100 kPa to 102 kPa	
Temperature	NT (Normal Temperature)	+22.5°C to +23.9°C
Working Voltage of the EUT	NV (Normal Voltage)	4.0 V

4.2 Test Equipment List

Description	Manufacturer	Model	Equipment No.	Cal. Date	Cal. Due
Spectrum Analyzer	KEYSIGHT	N9020A	BH-EMC-L066	2024.02.22	2025.02.21
Spectrum Analyzer	KEYSIGHT	N9010B	BH-EMC-L099	2024.02.22	2025.02.21
Signal Generator	Anritsu	MG3710E	BH-EMC-L131	2024.02.22	2025.02.21
Wideband Radio Communication Tester	R&S	CMW500	BH-EMC-L094	2024.02.22	2025.02.21
EMI Receiver	KEYSIGHT	N9038A	BH-EMC-L015	2024.07.09	2025.07.08
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519 B	BH-EMC-L067	2024.03.11	2027.03.10
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	BH-EMC-L008	2024.03.11	2027.03.10
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	BH-EMC-L044	2024.03.11	2027.03.10
Test Antenna-Horn (18-40 GHz)	A-INFO	LB-180400-KF	BH-EMC-L061	2024.03.11	2027.03.10
Anechoic Chamber	YiHeng	9m*6m*6m	BH-EMC-L001	2024.04.18	2027.04.17
EMI Receiver	KEYSIGHT	N9038A	BH-EMC-L127	2024.02.19	2025.02.18
LISN	SCHWARZBECK	NSLK 8127	BH-EMC-L011	2024.02.25	2025.02.24
10dB Limiter	SCHWARZBECK	VTSD 9561-F	BH-EMC-L014	2024.02.19	2025.02.18
Shielded Room	YiHeng	5m*4m*3.2m	BH-EMC-L006	2024.02.22	2027.02.21

4.3 Test Software List

Description	Manufacturer	Software Version	Serial No.	Applicable Test Setup
BL410R	BALUN	V2.1.1.496	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 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)

4.5 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	2.4 %
RF output power, conducted	0.41 dB
Power Spectral Density, conducted	1.73 dB
Unwanted Emissions, conducted	1.73 dB
All emissions, radiated	3.70 dB
Temperature	0.82 °C
Humidity	4.1 %

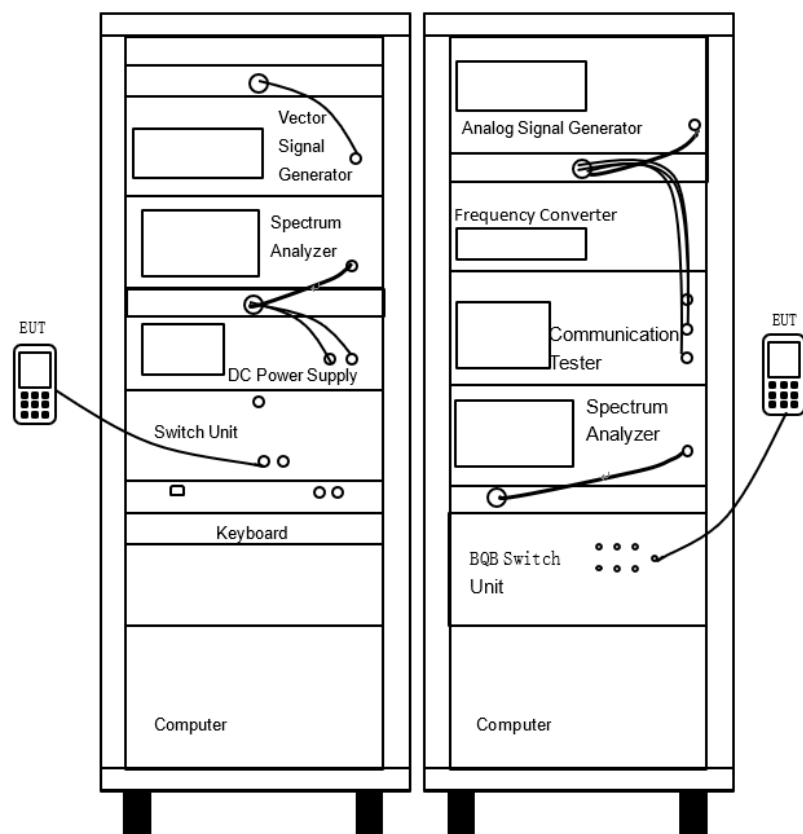
4.6 Description of Test Setup

4.6.1 For Antenna Port Test

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

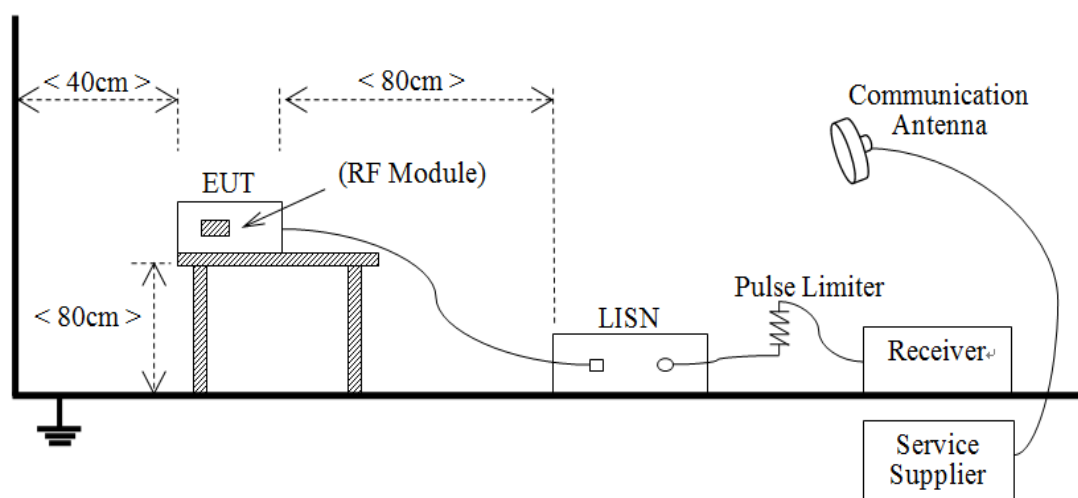
For example: the measurement value is 10 dBm and the cable 0.5 dB used, then the final result of EUT:

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



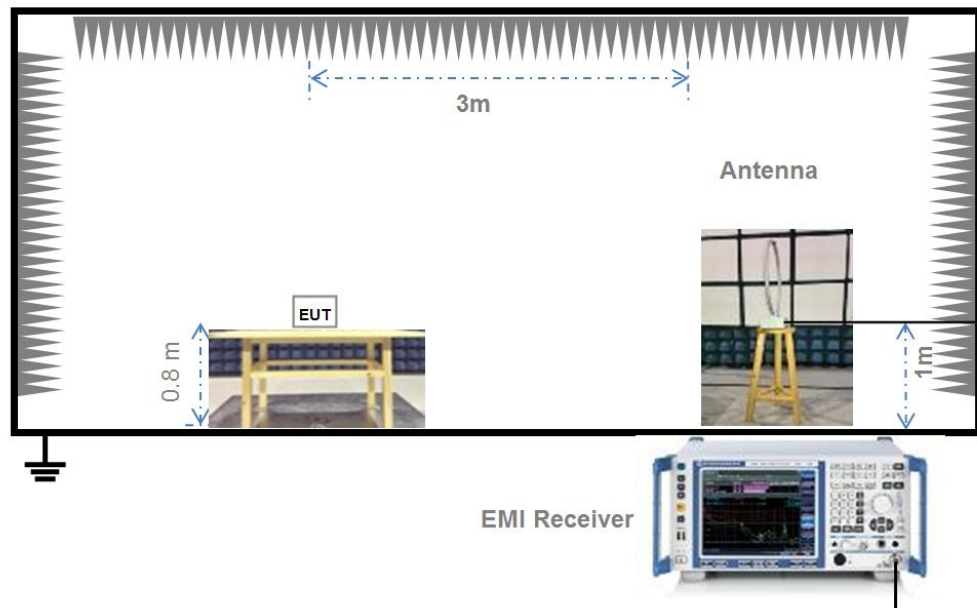
(Diagram 1)

4.6.2 For AC Power Supply Port Test



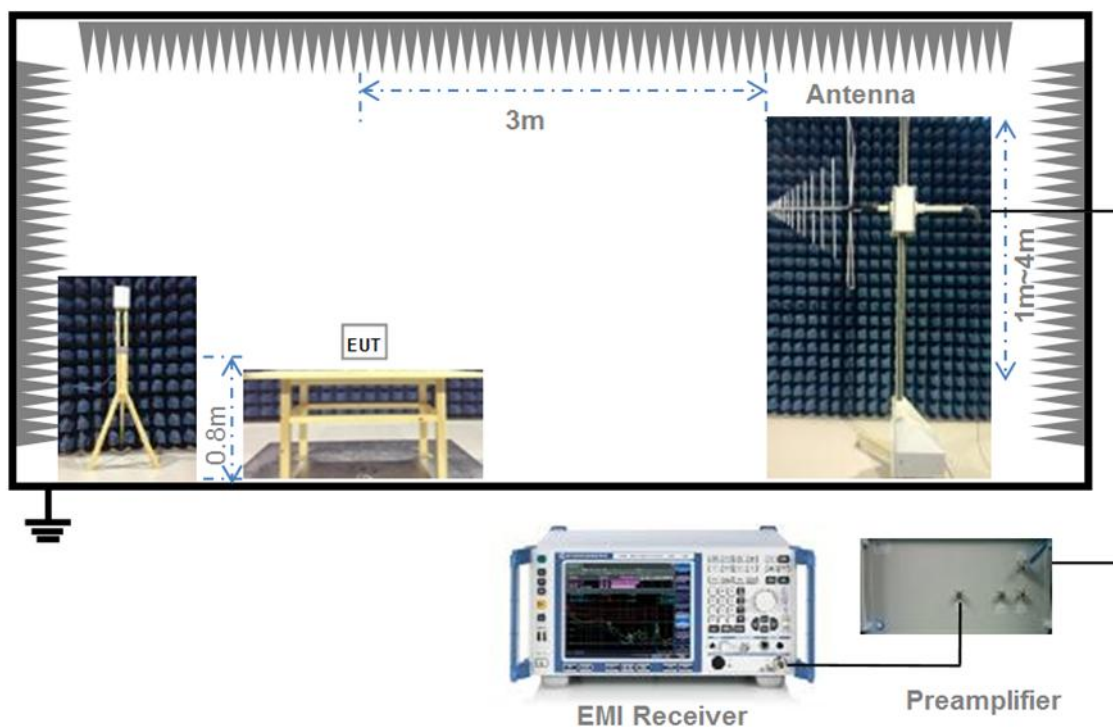
(Diagram 2)

4.6.3 For Radiated Test (Below 30 MHz)



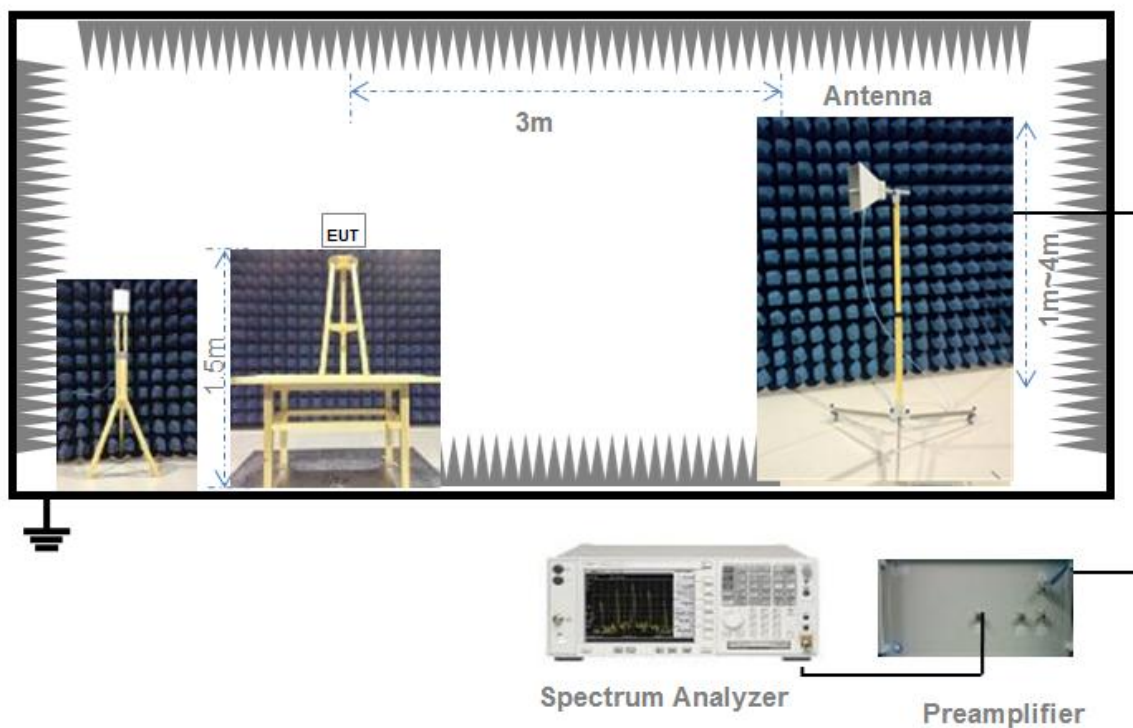
(Diagram 3)

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
0.50 - 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)

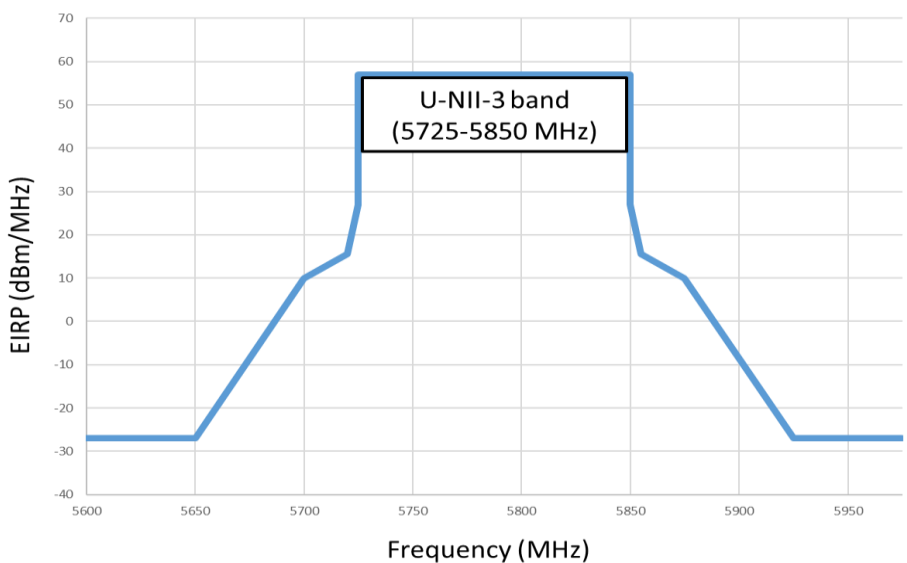
5.5.1 Limit

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-SH24B0903-604 which issued by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025. ANNEX A.1.

A.2 Emission Bandwidth & 99% Bandwidth

Note: The Emission Bandwidth & 99% Bandwidth, please refer to the Report No. BL-SH24B0903-604 which issued by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025. ANNEX A.2.

A.3 6 dB Bandwidth

Note: The 6 dB Bandwidth, please refer to the Report No. BL-SH24B0903-604 which issued by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025. ANNEX A.3.

A.4 Power Spectral Density

Note: The Power Spectral Density, please refer to the Report No. BL-SH24B0903-604 which issued by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025. ANNEX A.4.

A.5 Conducted Emission

Note: The Conducted Emission, please refer to the Report No. BL-SH24B0903-604 which issued by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025. ANNEX A.5.

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

Note: The Radiated Spurious Emissions and Band Edge (Restricted-band), please refer to the Report No. BL-SH24B0903-604 which issued by Shanghai Tejet Communications Technology Co., Ltd. Testing Center on Jun. 06, 2025. ANNEX A.6.

ANNEX B TEST SETUP PHOTOS

Note: The TEST SETUP PHOTOS, please refer to the Report No. BL-SH24B0903-AR-1 TEST SETUP PHOTOS.

ANNEX C EUT EXTERNAL PHOTOS

Note: The EUT EXTERNAL PHOTOS, please refer to the Report No. BL-SH24B0903-AW EUT EXTERNAL PHOTOS.

ANNEX D EUT INTERNAL PHOTOS

Note: The EUT INTERNAL PHOTOS, please refer to the Report No. BL-SH24B0903-AI EUT INTERNAL PHOTOS.

Statement

1. The Testing Center guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
2. For the report with Accreditation Symbol, the items marked with "☆" are not within the accredited scope.
3. This report is invalid if it is altered, without the signature of the testing and approval personnel, or without the test report stamp.
4. The test data and results are only valid for the tested samples provided by the customer.
5. This report shall not be partially reproduced without the written permission of the Testing Center.
6. Any objection shall be raised to the Testing Center within 30 days after receiving the report.

--END OF REPORT--