FCC Test Report

Report No.: AGC07434240318FR03

FCC ID	:	2ARXB-B31A
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	Label Printer
BRAND NAME	:	NIIMBOT
MODEL NAME	:	NIIMBOT B31
APPLICANT	:	Wuhan Jingchen Intelligent Identification Technology Co., Ltd.
DATE OF ISSUE	:	May 10, 2024
STANDARD(S)	:	FCC Part 15 Subpart C §15.225
REPORT VERSION	:	V 1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 10, 2024	Valid	Initial Release

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1. GENERAL INFORMATION

Applicant	Wuhan Jingchen Intelligent Identification Technology Co., Ltd.
Address	No. 5, Creative Workshop, Creative World, Yezhihu West Road, Hongshan District, Wuhan, China
Manufacturer	Wuhan Jingchen Intelligent Identification Technology Co., Ltd.
Address	No. 5, Creative Workshop, Creative World, Yezhihu West Road, Hongshan District, Wuhan, China
Factory	Dongxihu branch of Wuhan Jingchen Intelligent Identification Technology Co., Ltd.
Address	No. 20, Xincheng Shiba Road, Changqing Street, Dongxihu District, Wuhan, Hubei Province, China
Product Designation	Label Printer
Brand Name	NIIMBOT
Test Model	NIIMBOT B31
Series Model(s)	N/A
Difference Description	N/A
Deviation from Standard	No any deviation from the test method
Date of Receipt	Mar. 29, 2024
Date of Test	Mar. 29, 2024 to May 09, 2024
Test Result	Pass
Test Report Form No	AGCTR-ER-FCC-SRD-V1.0

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By	Cici Li (Project Engineer)	May 10, 2024
Reviewed By	Calvin Liu (Reviewer)	May 10, 2024
Approved By	Max Zhang Authorized Officer	May 10, 2024

2. PRODUCT INFORMATION

2.1 PRODUCT TECHNICAL DESCRIPTION

Hardware Version	V2.01
Software Version	V2.02
Operation Frequency	13.56MHz
Modulation Type	ASK
Number of channels	1
Field Strength of Fundamental	59.40dBuV/m
Antenna Designation	Coil Antenna
Antenna Gain	0dBi
Power Supply	DC 7.4V by battery or DC 5V by adapter

2.2 TEST FREQUENCY LIST

Frequency Band	Channel Number	Frequency
13.110~14.010 MHz	01	13.56 MHz

2.3 RELATED SUBMITTAL(S) / GRANT (S)

This submittal(s) (test report) is intended for FCC ID: 2ARXB-B31A, filing to comply with Part 2, Part 15 of the Federal Communication Commission rules.

2.4 TEST METHODOLOGY

The tests were performed according to following standards:

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.5 SPECIAL ACCESSORIES

Not available for this EUT intended for grant.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.

2.7 ANTENNA REQUIREMENT

Standard Requirement
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 antennathat uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a brokenantenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.
EUT Antenna:
The non-detachable antenna inside the device cannot be replaced by the user at will. The gain of the antenna is 0dBi.

3. TEST ENVIRONMENT

3.1 ADDRESS OF THE TEST LABORATORY

Laboratory: Attestation of Global Compliance (Shenzhen) Co., Ltd.

Address: 1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

3.2 TEST FACILITY

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

CNAS-Lab Code: L5488

Attestation of Global Compliance (Shenzhen) Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2017 General Requirements) for the Competence of Testing and Calibration Laboratories.

A2LA-Lab Cert. No.: 5054.02

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC-Registration No.: 975832

Attestation of Global Compliance (Shenzhen) Co., Ltd. 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 with Registration 975832.

IC-Registration No.: 24842(CAB identifier: CN0063)

Attestation of Global Compliance (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the Certification and Engineering Bureau of Industry Canada. The acceptance letter from the IC is maintained in our files with Registration 24842.

3.3 ENVIRONMENTAL CONDITIONS

	NORMAL CONDITIONS	EXTREME CONDITIONS
Temperature range (℃)	15 - 35	-20 - 50
Relative humidty range	20 % - 75 %	20 % - 75 %
Pressure range (kPa)	86 - 106	86 - 106
Power supply	DC 7.4V	DC 6.66V-8.14V
Note: The Extreme Temperature and Extreme Voltages declared by the manufacturer.		

3.4 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Conducted Emission for AC Port	U_c = ±2.9 dB
Uncertainty of Radiated Emission below 150kHz	U_c = ±4.2 dB
Uncertainty of Radiated Emission below 30MHz	U_c = ±3.8 dB
Uncertainty of Radiated Emission below 1GHz	U_c = ±3.9 dB
Uncertainty of total RF power, conducted	U_c = ±0.8 dB
Uncertainty of RF power density, conducted	U_c = ±2.6 dB
Uncertainty of spurious emissions, conducted	U_c = ±2 %
Uncertainty of Occupied Channel Bandwidth	U_c = ±2 %
Uncertainty of Frequency Stability	U_c = ±2 %

3.5 LIST OF EQUIPMENTS USED

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun. 03, 2023	Jun. 02, 2024
LISN	R&S	ESH2-Z5	100086	Jun. 03, 2023	Jun. 02, 2024
Test software	R&S	ES-K1(Ver.V1.71)	N/A	N/A	N/A
TEST RECEIVER	R&S	ESCI	100034	Jun. 03, 2023	Jun. 02, 2024
Attenuator	ZHINAN	E-002	N/A	Aug. 04, 2022	Aug. 03, 2024
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Feb. 01, 2024	Jan. 31, 2025
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 05, 2023	Jan. 04, 2025
Test Software	FARA	EZ-EMC	Ver.RA-03A	N/A	N/A

4.SYSTEM TEST CONFIGURATION

4.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

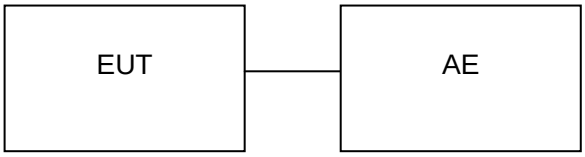
4.2 EUT EXERCISE

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

4.3 CONFIGURATION OF TESTED SYSTEM

Radiated Emission Configure:

Conducted Emission Configure:



4.4 EQUIPMENT USED IN TESTED SYSTEM

The Following Peripheral Devices And Interface Cables Were Connected During The Measurement:

☒ Test Accessories Come From The Laboratory

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Adapter	HW-200440C00	HUAWEI	--	--
2	Control Box	USB-TTL	--	--	--

☒ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Charger	--	--	--	0.4m unshielded

4.5 SUMMARY OF TEST RESULTS

Item	FCC Rules	Description Of Test	Result
1	§15.203	Antenna Equipment	Pass
2	15.225(a)(b)(c)	Field Strength of Fundamental	Pass
3	§15.209	Radiated Emission	Pass
4	§15.215(c)	20dB Bandwidth	Pass
5	§15.205(a)	Restricted Bands of Operation	Pass
6	§15.225(e)	Frequency Stability	Pass
7	§15.207	AC Power Line Conducted Emission	Pass

5. DESCRIPTION OF TEST MODES

Summary table of Test Cases	
Test Item	Data Rate / Modulation
	NFC/ ASK
Radiated&Conducted Test Cases	Mode 1: NFC Tx_13.56 MHz(Battery powered or AC/DC adapter)
AC Conducted Emission	Mode 1: NFC Normal Operation + Battery + Charging from AC Adapter

Note:
1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.

6. FIELD STRENGTH OF FUNDAMENTAL

6.1 PROVISIONS APPLICABLE

Rules and specifications	FCC CFR 47 Part 15 section 15.225			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength (μV/m) at 30m	Field Strength (dBμV/m) at 30m	Field Strength (dBμV/m) at 10m	Field Strength (dBμV/m) at 3m
1.705~13.110	30	29.5	48.58	69.5
13.110~13.410	106	40.5	59.58	80.5
13.410~13.553	334	50.5	69.58	90.5
13.553~13.567	15848	84.0	103.08	124.0
13.567~13.710	334	50.5	69.58	90.5
13.710~14.010	106	40.5	59.58	80.5
14.010~30.000	30	29.5	48.58	69.5

6.2 MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the

pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.

8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

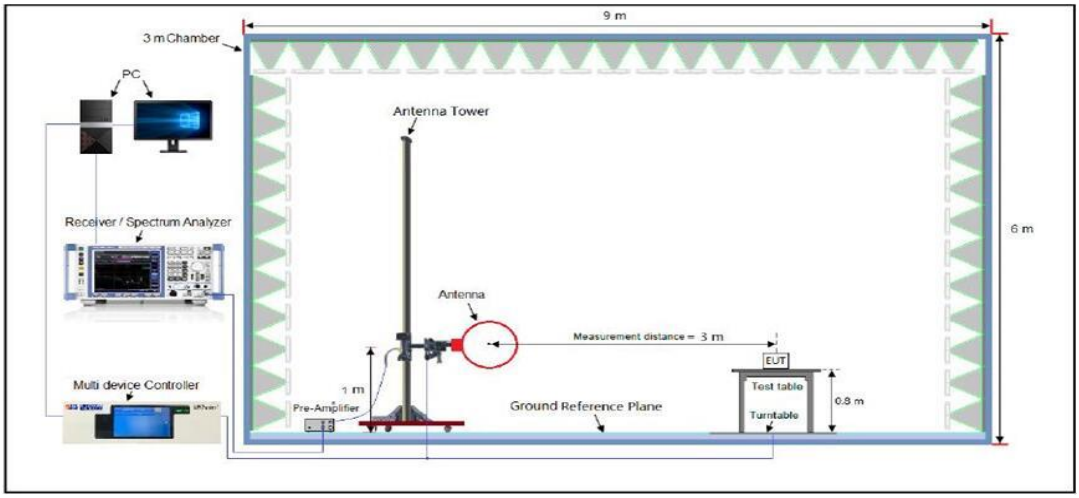
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

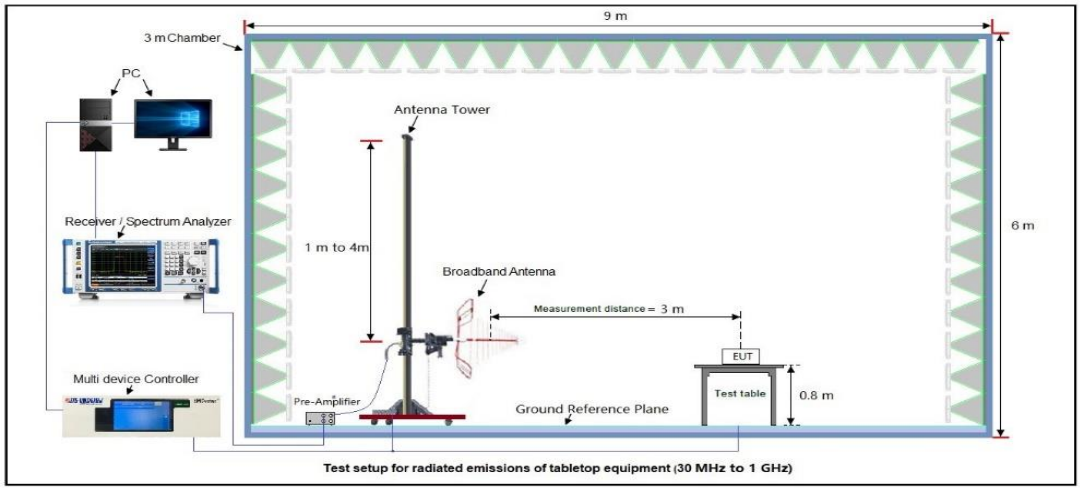
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

6.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)

RADIATED EMISSION TEST SETUP 9KHz-30MHz



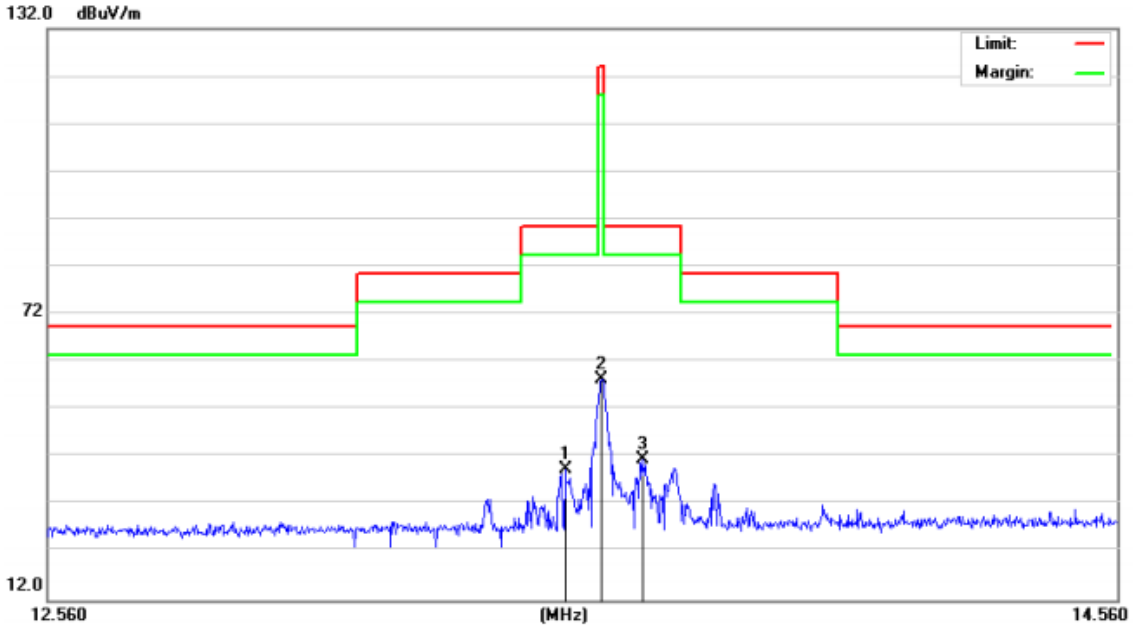
RADIATED EMISSION TEST SETUP 30MHz-1000MHz



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

6.4 MEASUREMENT RESULTS

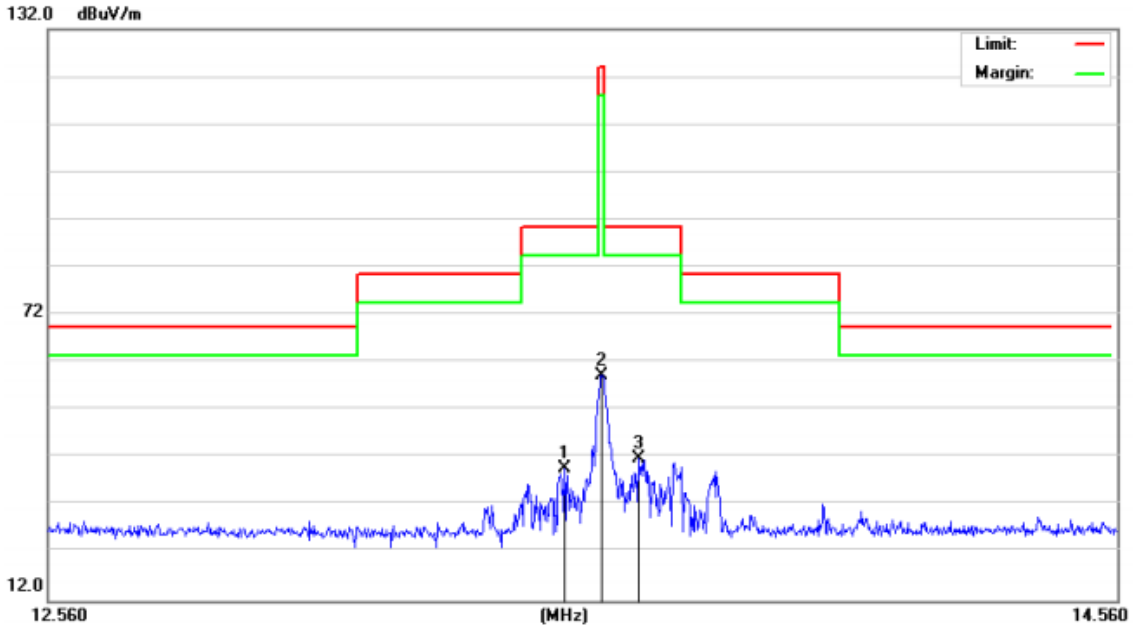
EUT	Label Printer	Model Name	NIIMBOT B31
Temperature	22.6℃	Relative Humidity	59.8%
Pressure	960hPa	Test Voltage	DC 7.4V by battery
Test Mode	Mode 1	Antenna	Face



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		13.4920	16.04	23.30	39.34	90.50	-51.16	peak
2		13.5600	35.01	23.32	58.33	124.0	-65.67	peak
3	*	13.6360	18.13	23.35	41.48	90.50	-49.02	peak

RESULT: PASS

EUT	Label Printer	Model Name	NIIMBOT B31
Temperature	22.6℃	Relative Humidity	59.8%
Pressure	960hPa	Test Voltage	DC 7.4V by battery
Test Mode	Mode 1	Antenna	Side



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		13.4900	16.58	23.30	39.88	90.50	-50.62	peak
2		13.5600	36.08	23.32	59.40	124.0	-64.60	peak
3	*	13.6300	18.59	23.35	41.94	90.50	-48.56	peak

RESULT: PASS

7. RADIATED EMISSION

7.1 LIMITS OF RADIATED EMISSION TEST

According to 15.35, on any frequency or frequencies below or equal to 1000 MHz, the limits Shown are based on measuring equipment employing a CISPR quasi-peak detector function and related measurement bandwidths, unless otherwise specified the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test.

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

15.209 Limit in the below table has to be followed:

Frequency (MHz)	Distance Meters	Field Strengths Limit	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(kHz)	---
0.490 ~ 1.705	30	24000/F(kHz)	---
1.705 ~ 30	30	30	---
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark: (1) Emission level dBμV = 20 log Emission level μV/m
(2) The smaller limit shall apply at the cross point between two frequency bands.
(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

Note: All modes were tested for restricted band radiated emission, the test records reported below are the worst result compared to other modes.

7.2 MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

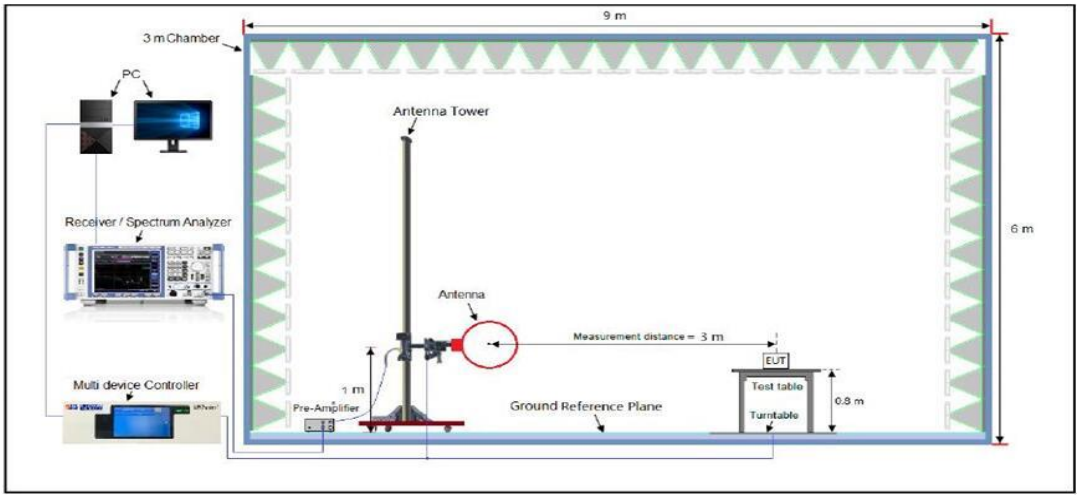
The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz 1MHz/3MHz for Peak, 1MHz/3MHz for Average

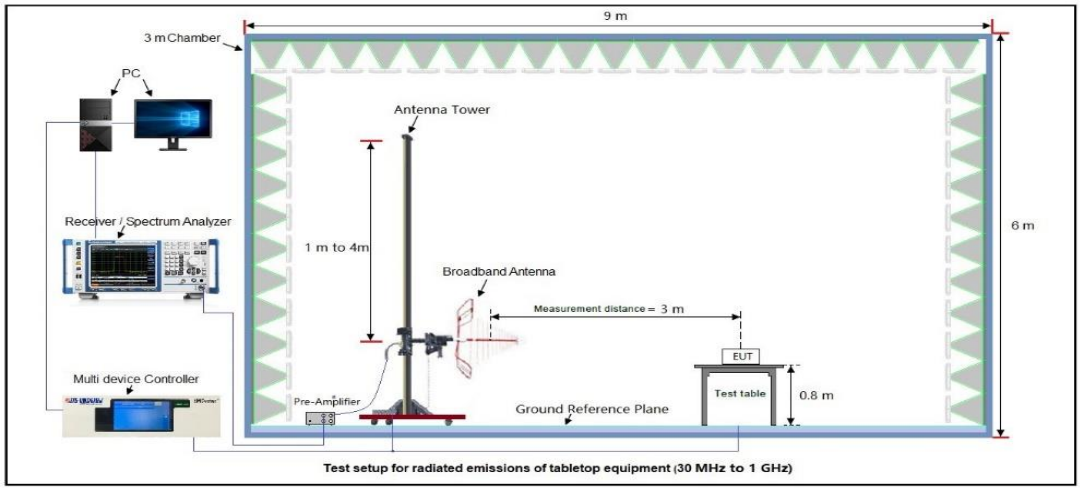
Receiver Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP

7.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)

RADIATED EMISSION TEST SETUP 9KHz-30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



Test setup for radiated emissions of tabletop equipment (30 MHz to 1 GHz)

7.4 MEASUREMENT RESULT

RADIATED EMISSION FROM 9kHz-150kHz

EUT	Label Printer	Model Name	NIIMBOT B31
Temperature	22.6℃	Relative Humidity	59.8%
Pressure	960hPa	Test Voltage	DC 7.4V by battery
Test Mode	Mode 1	Antenna	Face

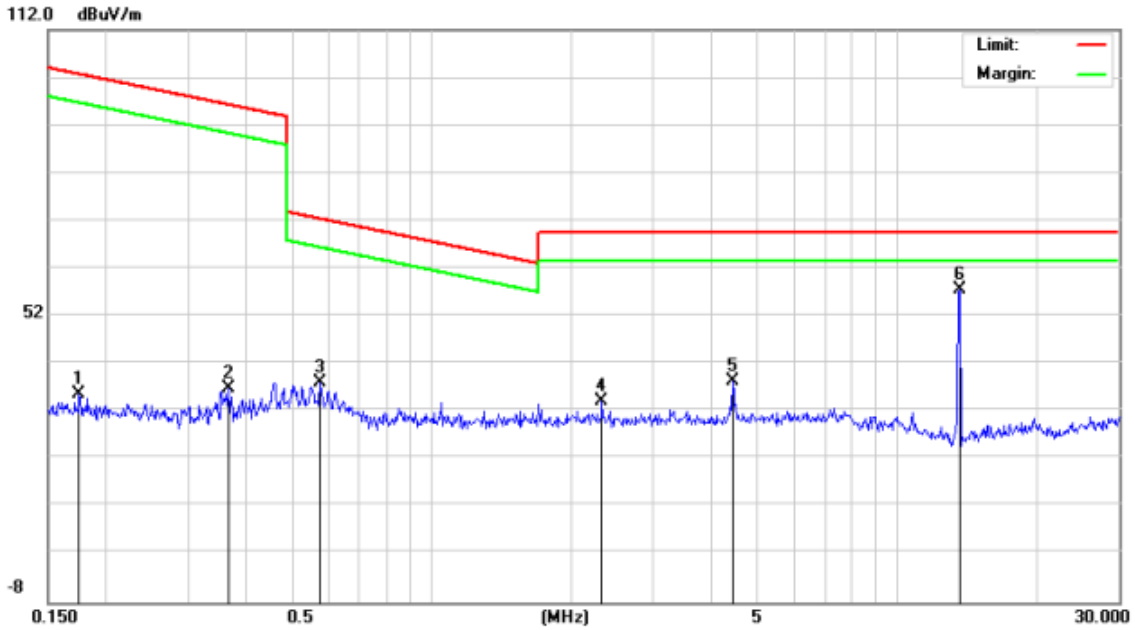
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		0.0110	4.13	37.68	41.81	126.6	-84.86	peak
2		0.0154	3.39	36.73	40.12	123.7	-83.63	peak
3		0.0238	2.37	34.92	37.29	119.9	-82.69	peak
4		0.0354	3.23	32.59	35.82	116.5	-80.73	peak
5	*	0.0652	1.87	28.73	30.60	111.2	-80.66	peak
6		0.0833	0.47	27.67	28.14	109.1	-81.00	peak

EUT	Label Printer	Model Name	NIIMBOT B31
Temperature	22.6℃	Relative Humidity	59.8%
Pressure	960hPa	Test Voltage	DC 7.4V by battery
Test Mode	Mode 1	Antenna	Side

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		0.0102	6.54	37.86	44.40	127.2	-82.83	peak
2		0.0125	6.01	37.36	43.37	125.4	-82.10	peak
3		0.0240	2.05	34.87	36.92	119.8	-82.92	peak
4		0.0357	0.40	32.53	32.93	116.4	-83.48	peak
5	*	0.0490	1.84	30.08	31.92	113.6	-81.76	peak
6		0.0827	-0.31	27.65	27.34	109.1	-81.82	peak

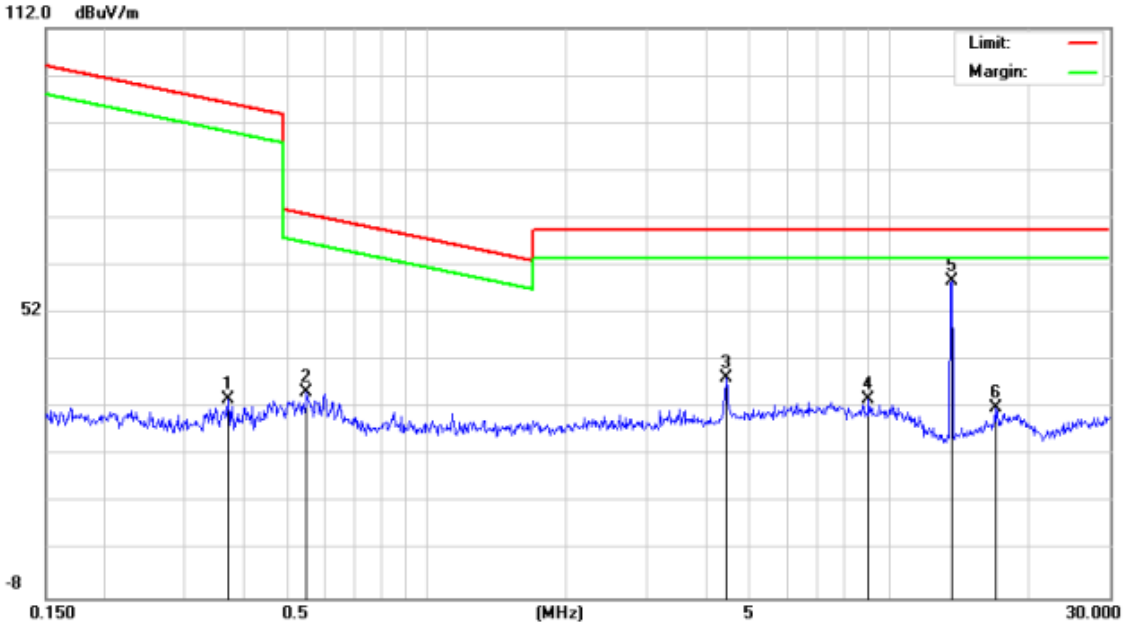
RADIATED EMISSION FROM 150kHz-30MHz

EUT	Label Printer	**Model Name**	NIIMBOT B31
Temperature	22.6℃	**Relative Humidity**	59.8%
Pressure	960hPa	**Test Voltage**	DC 7.4V by battery
Test Mode	Mode 1	**Antenna**	Face



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		0.1749	8.74	26.99	35.73	102.7	-66.99	peak
2		0.3673	11.43	25.33	36.76	96.29	-59.53	peak
3		0.5762	12.70	25.37	38.07	72.39	-34.32	peak
4		2.3213	9.51	24.61	34.12	69.54	-35.42	peak
5		4.4305	14.85	23.62	38.47	69.54	-31.07	peak
6	*	13.6228	34.19	23.35	57.54	69.54	-12.00	peak

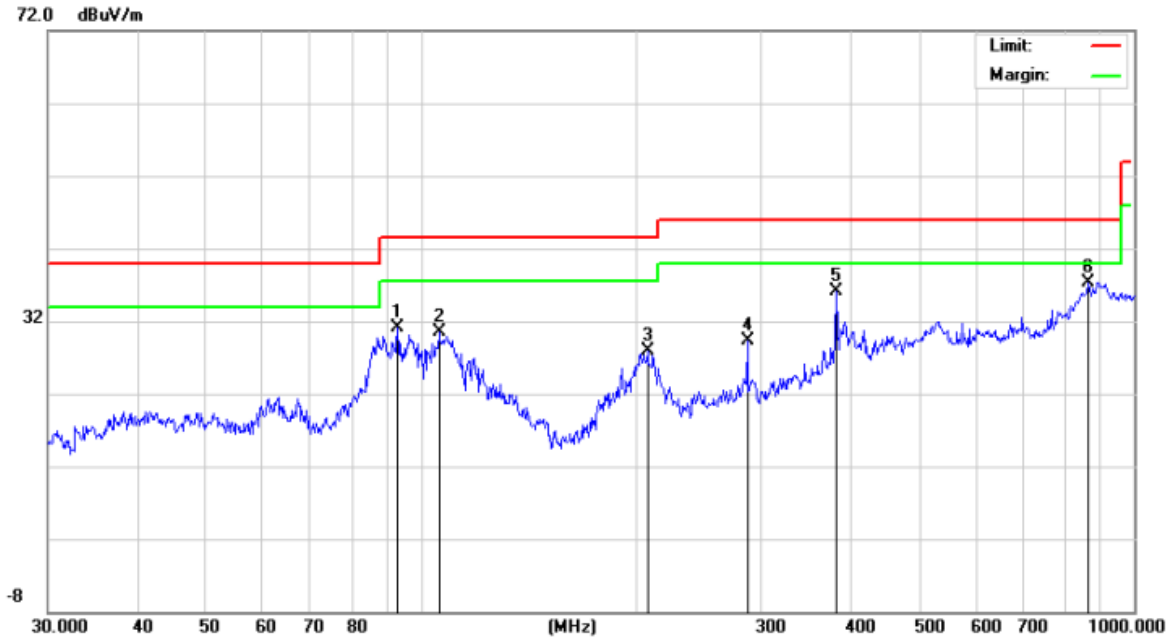
EUT	Label Printer	Model Name	NIIMBOT B31
Temperature	22.6℃	Relative Humidity	59.8%
Pressure	960hPa	Test Voltage	DC 7.4V by battery
Test Mode	Mode 1	Antenna	Side



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		0.3712	8.52	25.34	33.86	96.20	-62.34	peak
2		0.5493	9.96	25.38	35.34	72.81	-37.47	peak
3		4.4305	14.65	23.62	38.27	69.54	-31.27	peak
4		9.0113	10.27	23.45	33.72	69.54	-35.82	peak
5	*	13.6228	35.45	23.35	58.80	69.54	-10.74	peak
6		16.9282	8.24	23.72	31.96	69.54	-37.58	peak

RADIATED EMISSION FROM 30MHz ~1000MHz

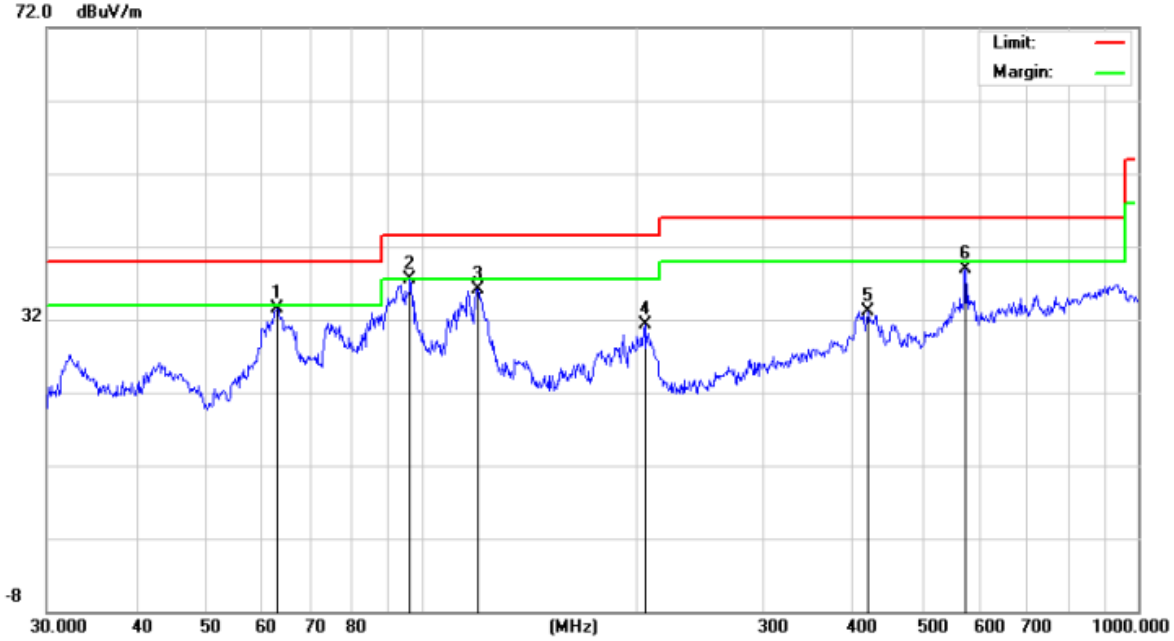
EUT	Label Printer	**Model Name**	NIIMBOT B31
Temperature	22.6℃	**Relative Humidity**	59.8%
Pressure	960hPa	**Test Voltage**	DC 7.4V by battery
Test Mode	Mode 1	**Antenna**	Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		92.7871	16.02	15.08	31.10	43.50	-12.40	peak
2		106.0126	14.20	16.26	30.46	43.50	-13.04	peak
3		207.8500	13.47	14.46	27.93	43.50	-15.57	peak
4		286.9823	13.81	15.46	29.27	46.00	-16.73	peak
5		382.5878	17.57	18.48	36.05	46.00	-9.95	peak
6	*	863.0561	8.15	29.13	37.28	46.00	-8.72	peak

RESULT: PASS

EUT	Label Printer	Model Name	NIIMBOT B31
Temperature	22.6℃	Relative Humidity	59.8%
Pressure	960hPa	Test Voltage	DC 7.4V by battery
Test Mode	Mode 1	Antenna	Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		62.8708	16.49	17.07	33.56	40.00	-6.44	peak
2	*	96.4361	22.85	14.68	37.53	43.50	-5.97	peak
3		119.8555	18.53	17.67	36.20	43.50	-7.30	peak
4		204.9550	13.70	17.53	31.23	43.50	-12.27	peak
5		420.5803	10.15	22.99	33.14	46.00	-12.86	peak
6		574.6258	13.64	25.33	38.97	46.00	-7.03	peak

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Over=Measurement-Limit.

8. 20 dB BANDWIDTH

8.1 PROVISIONS APPLICABLE

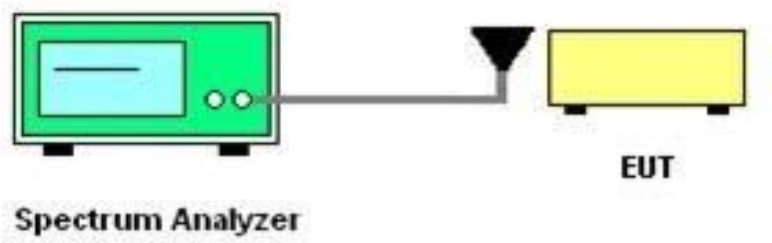
Intentional radiators must be designed to ensure that the 20dB and 99% emission bandwidth in the specific band 13.553~13.567MHz.

8.2 MEASUREMENT PROCEDURE

Set the parameters of SPA as below:

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.
2. Centre frequency = Operation Frequency
3. The resolution bandwidth of 10 kHz and the video bandwidth of 30 kHz were used.
4. Span: 100kHz, Sweep time: Auto
5. Set the EUT to continue transmitting mode. Allow the trace to stabilize. Use the “N dB down” function of SPA to define the bandwidth.
6. Measured the spectrum width with power higher than 20dB below carrier.
7. Measured the 99% OBW.
8. Record the plots and Reported.

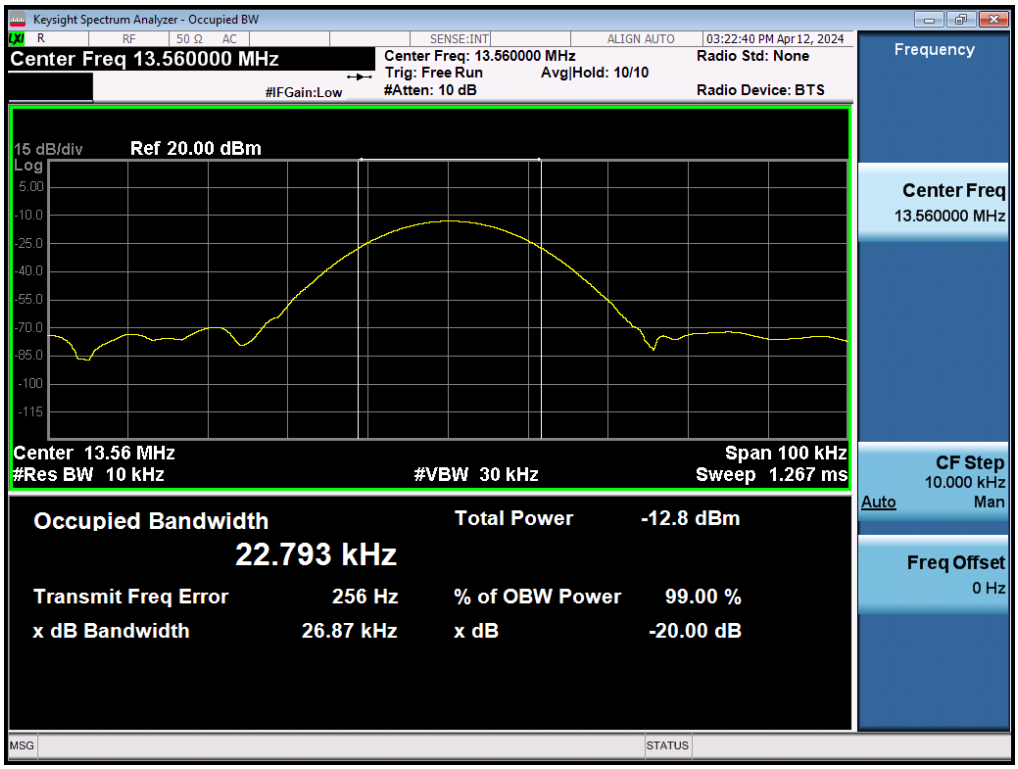
8.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



8.4 MEASUREMENT RESULTS

Test Data of Occupied Bandwidth and -20dB Bandwidth					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (kHz)	-20dB Bandwidth (kHz)	Limits (MHz)	Pass or Fail
ASK	13.56	22.793	26.87	N/A	Pass

Test Graphs of Occupied Bandwidth&-20dB Bandwidth



9. FREQUENCY STABILITY

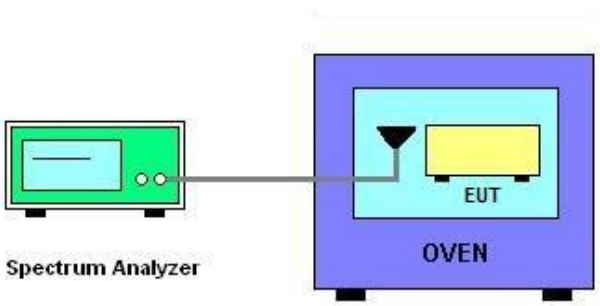
9.1 PROVISIONS APPLICABLE

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

9.2 MEASUREMENT PROCEDURE

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. EUT have transmitted signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
5. The fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±100ppm.
6. Extreme temperature rule is -20°C~50°C.

9.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



9.4 MEASUREMENT RESULTS

Operating frequency: 13.56MHz

Voltage vs. Frequency Stability (Test Temperature: 20℃)

Voltage(V)	Measurement Frequency (MHz)	Max. Deviation (ppm)	Limit(ppm)	Conclusion
7.4	13.56063	+57	±100	PASS
6.29	13.56077			
8.51	13.56049			

Temperature vs. Frequency Stability (Test Voltage: 7.4V)

Temperature	Measurement Frequency (MHz)	Max. Deviation (ppm)	Limit(ppm)	Conclusion
-30℃	13.56048	+72	±100	PASS
-20℃	13.56042			
-10℃	13.56046			
0℃	13.56027			
10℃	13.56098			
20℃	13.56049			
30℃	13.56037			
40℃	13.56048			
50℃	13.56066			

10. AC POWER LINE CONDUCTED EMISSION TEST

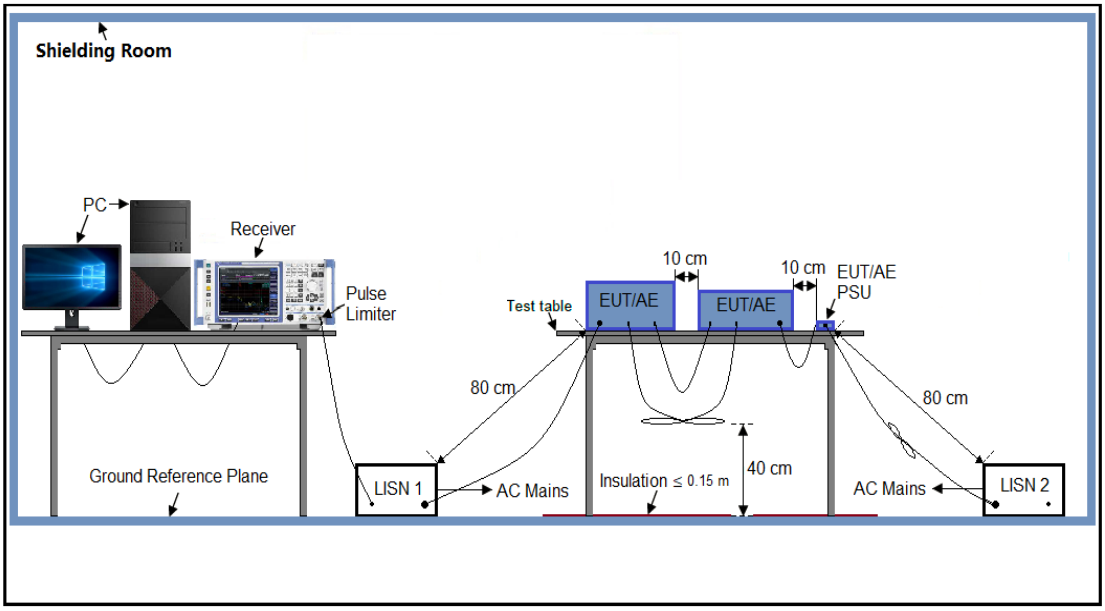
10.1 LIMITS OF LINE CONDUCTED EMISSION TEST

Frequency	Maximum RF Line Voltage	
	Q.P. (dBμV)	Average (dBμV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

Note:

1. The lower limit shall apply at the transition frequency.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

10.2 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



10.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. All support equipment received AC120V/60Hz power from a LISN, if any.
5. The EUT received DC 5V power from adapter which received AC120V/60Hz power from a LISN.
6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.
9. The test mode(s) were scanned during the preliminary test.

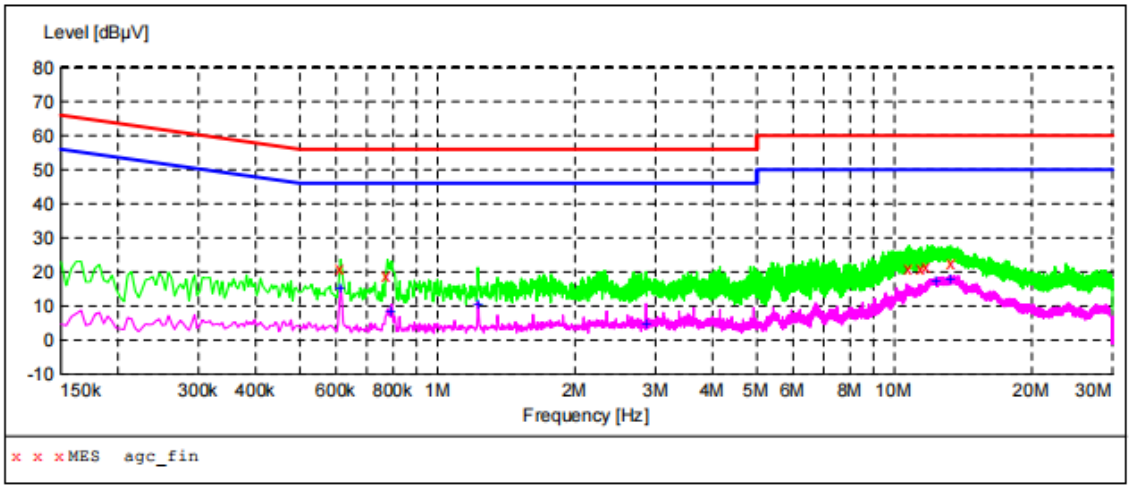
Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
2. A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
3. The test data of the worst case condition(s) was reported on the Summary Data page.

10.5 MEASUREMENT RESULTS

AC LINE CONDUCTED EMISSION TEST			
Test Mode	Mode 1	LISN line	Hot Side



MEASUREMENT RESULT: "agc_fin"

2024/4/3 11:44

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.614000	21.00	6.2	56	35.0	QP	L1
0.778000	18.90	6.2	56	37.1	QP	L1
10.766000	20.80	6.7	60	39.2	QP	L1
11.426000	21.10	6.7	60	38.9	QP	L1
11.806000	21.40	6.7	60	38.6	QP	L1
13.302000	22.80	6.8	60	37.2	QP	L1

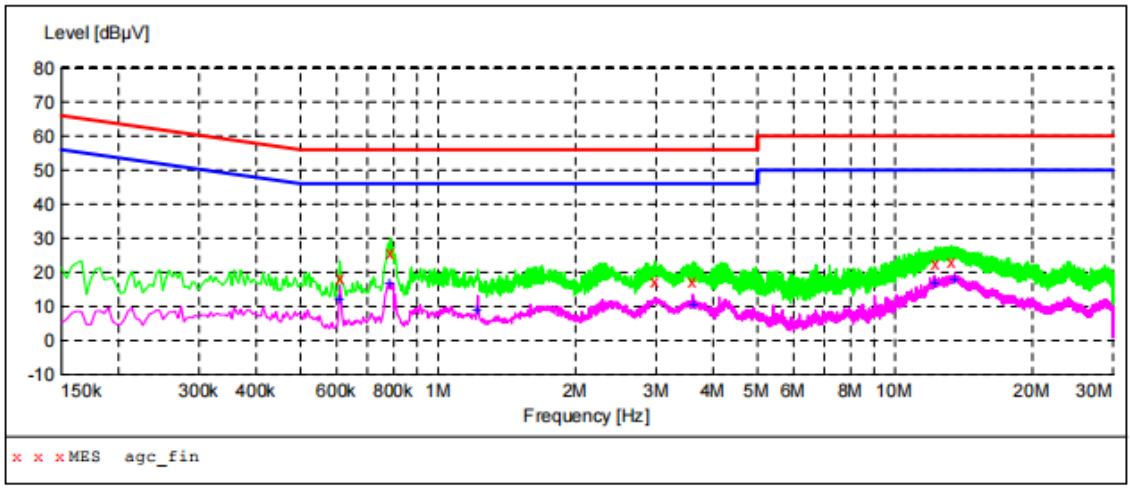
MEASUREMENT RESULT: "agc_fin2"

2024/4/3 11:44

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.614000	15.40	6.2	46	30.6	AV	L1
0.794000	8.40	6.2	46	37.6	AV	L1
1.226000	10.60	6.2	46	35.4	AV	L1
2.862000	4.70	6.3	46	41.3	AV	L1
12.358000	17.40	6.8	50	32.6	AV	L1
13.290000	18.00	6.8	50	32.0	AV	L1

RESULT: PASS

AC LINE CONDUCTED EMISSION TEST			
Test Mode	Mode 1	LISN line	Neutral Side



MEASUREMENT RESULT: "agc_fin"

2024/4/3 11:41

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.610000	18.30	6.2	56	37.7	QP	N
0.790000	25.70	6.2	56	30.3	QP	N
2.986000	17.50	6.3	56	38.5	QP	N
3.622000	17.20	6.3	56	38.8	QP	N
12.258000	22.30	6.8	60	37.7	QP	N
13.302000	23.10	6.8	60	36.9	QP	N

MEASUREMENT RESULT: "agc_fin2"

2024/4/3 11:41

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
0.610000	12.10	6.2	46	33.9	AV	N
0.786000	16.60	6.2	46	29.4	AV	N
1.222000	9.00	6.2	46	37.0	AV	N
3.610000	10.70	6.3	46	35.3	AV	N
12.198000	16.70	6.8	50	33.3	AV	N
13.518000	18.00	6.8	50	32.0	AV	N

RESULT: PASS

APPENDIX I: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.: AGC07434240318AP02

APPENDIX II: PHOTOGRAPHS OF TEST EUT

Refer to the Report No.: AGC07434240318AP03

-----END OF REPORT-----

Conditions of Issuance of Test Reports

1. All samples and goods are accepted by the Attestation of Global Compliance (Shenzhen) Co., Ltd (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The company provides its services on the basis that such terms and conditions constitute express agreement between the company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by Company as a result of this application for testing services (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to its customer, supplier or other persons directly concerned. The Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3.The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7.Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.