

# **FCC Test Report**

Report No.: AGC07434231112FR03

FCC ID	:	2ARXB-B3SP	
APPLICATION PURPOSE	:	Original Equipment	
PRODUCT DESIGNATION	:	Label Printer	
BRAND NAME	:	NIIMBOT	
MODEL NAME	:	NIIMBOT B3S_P, NIIMBOT A8_P, NIIMBOT S6_P	
APPLICANT	:	Wuhan Jingchen Intelligent Identification Technology Co., Ltd.	
DATE OF ISSUE	:	Dec. 13, 2023	
STANDARD(S)	:	FCC Part 15 Subpart C §15.225	
REPORT VERSION : V 1 00 Compliance (granthen) Co.			
Attestation of Global Compliance (Shenzhen) Co., Ltd			





#### **REPORT REVISE RECORD**

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 13, 2023	Valid	Initial Release



# **TABLE OF CONTENTS**

1. GENERAL INFORMATION	5
2. PRODUCT INFORMATION	6
2.1 PRODUCT TECHNICAL DESCRIPTION	6
2.2 TEST FREQUENCY LIST	6
2.3 RELATED SUBMITTAL(S) / GRANT (S)	7
2.4 TEST METHODOLOGY	7
2.5 SPECIAL ACCESSORIES	7
2.6 EQUIPMENT MODIFICATIONS	7
2.7 ANTENNA REQUIREMENT	7
3. TEST ENVIRONMENT	8
3.1 ADDRESS OF THE TEST LABORATORY	8
3.2 TEST FACILITY	8
3.3 ENVIRONMENTAL CONDITIONS	9
3.4 MEASUREMENT UNCERTAINTY	9
3.5 LIST OF EQUIPMENTS USED	
4.SYSTEM TEST CONFIGURATION	11
4.1 EUT CONFIGURATION	11
4.2 EUT EXERCISE	11
4.3 CONFIGURATION OF TESTED SYSTEM	11
4.4 EQUIPMENT USED IN TESTED SYSTEM	11
4.5 SUMMARY OF TEST RESULTS	
5. DESCRIPTION OF TEST MODES	13
6. FIELD STRENGTH OF FUNDAMENTAL	14
6.1 PROVISIONS APPLICABLE	
6.2 MEASUREMENT PROCEDURE	
6.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)	
6.4 MEASUREMENT RESULTS	
7. RADIATED EMISSION	19
7.1 LIMITS OF RADIATED EMISSION TEST	
7.2 MEASUREMENT PROCEDURE	
7.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)	21
7.4 MEASUREMENT RESULT	
8. 20 DB BANDWIDTH	
8.1 PROVISIONS APPLICABLE	



8.2 MEASUREMENT PROCEDURE	24
8.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)	24
8.4 MEASUREMENT RESULTS	25
9. FREQUENCY STABILITY	
9.1 PROVISIONS APPLICABLE	
9.2 MEASUREMENT PROCEDURE	
9.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)	
9.4 MEASUREMENT RESULTS	27
10. AC POWER LINE CONDUCTED EMISSION TEST	
10.1 LIMITS OF LINE CONDUCTED EMISSION TEST	
10.2 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)	
10.3 PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST	
10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST	29
10.5 MEASUREMENT RESULTS	
APPENDIX I: PHOTOGRAPHS OF TEST SETUP	32
APPENDIX II: PHOTOGRAPHS OF TEST EUT	



# **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	Building 3, No. 20, Xincheng 18th Road, Changqing Street, Dongxihu District, Wuhan, Hubei Province, China	
Product Designation	Label Printer	
Brand Name	NIIMBOT	
Test Model	NIIMBOT B3S_P	
Series Model(s)	NIIMBOT A8_P, NIIMBOT S6_P	
Difference Description	All the same except for the model name	
Deviation from Standard	No any deviation from the test method	
Date of Receipt	Nov. 30, 2023	
Date of Test	Nov. 30, 2023 – Dec. 13, 2023	
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

XCF-Ci

Cici Li (Project Engineer)

Dec. 13, 2023

**Reviewed By** 

Min Lin

Calvin Liu (Reviewer)

Dec. 13, 2023

Approved By

Max Zhang

Max Zhang Authorized Officer

Dec. 13, 2023



## 2. PRODUCT INFORMATION

#### 2.1 PRODUCT TECHNICAL DESCRIPTION

Hardware Version	V3.01
Software Version	V3.03
Operation Frequency	13.56MHz
Modulation Type	ASK
Number of channels	1
Field Strength of Fundamental	52.59dBuV/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-B3SP, 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 (°C)	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	$U_c = \pm 2.9 \text{ dB}$
Uncertainty of Radiated Emission below 150kHz	$U_c = \pm 4.2 \text{ dB}$
Uncertainty of Radiated Emission below 30MHz	$U_c = \pm 3.8 \text{ dB}$
Uncertainty of Radiated Emission below 1GHz	$U_c = \pm 3.9 \text{ dB}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	U <sub>c</sub> = ±2 %
Uncertainty of Occupied Channel Bandwidth	U <sub>c</sub> = ±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	Mar. 12, 2022	Mar. 11, 2024
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**

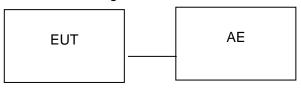
The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

## **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:

EUT	AE
-----	----

## 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	Xiaomi Phone	MI 10	Xiaomi		
2	Adapter	HW-200440C 00	Huawei		

☑ Test Accessories Come From The Manufacturer

No.	Equipment	Model No.	Manufacturer	Specification Information	Cable
1	Charger				0.8m 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
	Data Rate / Modulation
Test Item	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
-	worst case was recorded in the report, if no other cases. on, 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 v	vith the spectrum ma	sk is tested with RBV	V 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.

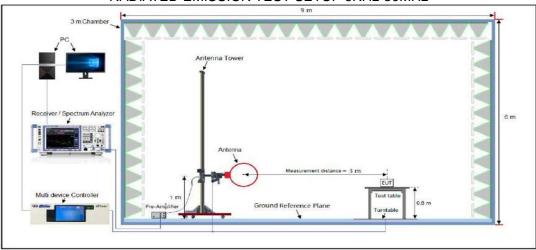
The following table is the setting of spectrum analyzer and receiver.

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

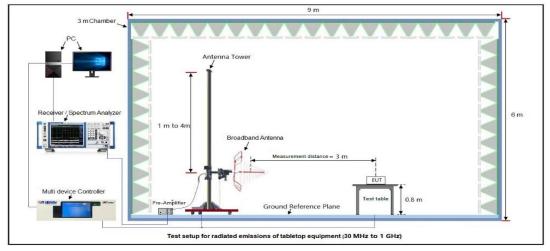


#### 6.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



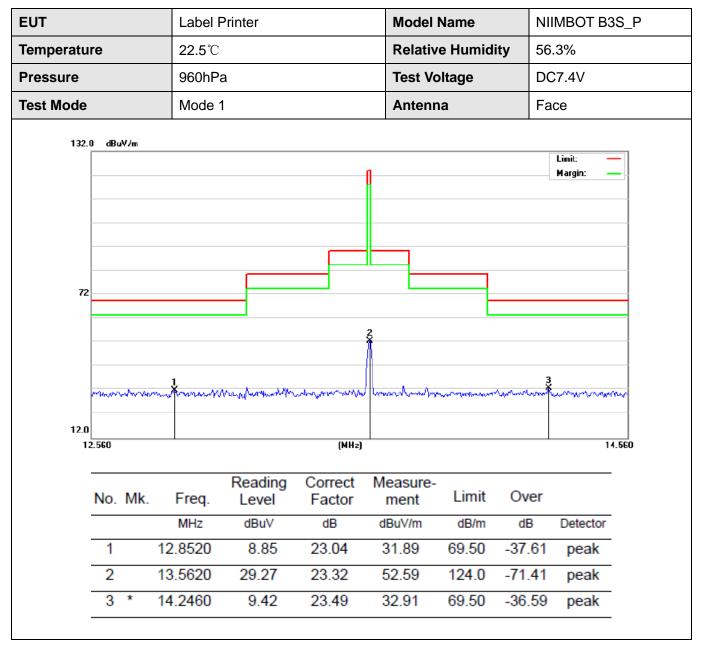
# RADIATED EMISSION TEST SETUP 9KHz-30MHz

#### RADIATED EMISSION TEST SETUP 30MHz-1000MHz





#### **6.4 MEASUREMENT RESULTS**



#### **RESULT: PASS**



JT			Label F	Printer		Model I	Name	NI	IMBOT B3S_
mperatu	ire		<b>22.5</b> ℃			Relative	e Humid	<b>ity</b> 56	.3%
essure			960hP	a		Test Vo	Itage	DC	C7.4V
st Mode			Mode <sup>2</sup>	1		Antenn	а	Sic	de
132.0	)dBu¥	'/m							Limit: —
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12.0	.560	Mk.	Freq.	Reading Level	<sup>(MH₂)</sup> Correct Factor	Measure- ment	Limit	Over	
12.0			Freq. MHz	Reading Level dBuV	(MH₂) Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector

## **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.

Frequency	Distance	Field Strengths Limit		
(MHz)	Meters	μ <b>V/m</b>	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) 54.0 dB(μV)/n	, , , , , , , , , , , , , , , , , , ,	
	level dB $\mu$ V = 20 log Emissic er limit shall apply at the cros		· · · · · · · · · · · · · · · · · · ·	

15.209 Limit in the below table has to be followed:

(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

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- 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.

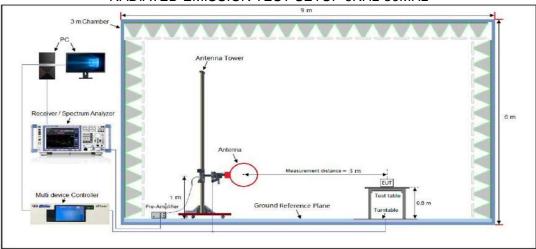
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
Start ~Stop Frequency	1GHz~26.5GHz
Start ~Stop Trequency	1MHz/3MHz for Peak, 1MHz/3MHz for Average

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

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

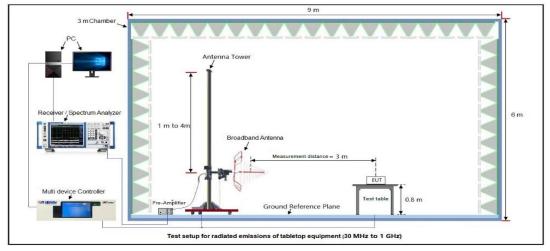


#### 7.3 MEASUREMENT SETUP (BLOCK DIAGRAM OF CONFIGURATION)



# RADIATED EMISSION TEST SETUP 9KHz-30MHz

#### RADIATED EMISSION TEST SETUP 30MHz-1000MHz





#### 7.4 MEASUREMENT RESULT

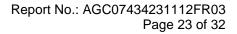
#### RADIATED EMISSION BELOW 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

EUT	Label Printer		Model Name	Ν	NIMBOT B3S_P
Temperature	<b>22.5</b> ℃		Relative Humi	dity 5	6.3%
Pressure	960hPa		Test Voltage	C	DC7.4V
Test Mode	Mode 1		Antenna	F	lorizontal
72.0 dBuV/m				3 August	Limit: Margin: 5
-8					
	60 70 80	(MH2)	300 40	00 500 (	600 700 1000.000
-8		<sup>(MH₂)</sup> Correct M			
-8 30.000 40 50	60 70 80 Reading	<sup>(MH₂)</sup> Correct M Factor	300 40 leasure-	Over	
-8 30.000 40 50 No. Mk.	60 70 80 Reading Freq. Level	(MH₂) Correct M Factor dB o	300 40 leasure- ment Limit	Over dB	Detector
-8 30.000 40 50 No. Mk. 1 44	60 70 80 Reading Freq. Level MHz dBuV	(MHz) Correct M Factor dB c 13.61	300 40 leasure- ment Limit JBuV/m dB/m	dB -19.4	Detector 8 peak
-8 30.000 40 50 No. Mk. 1 44 2 107	60         70         80           Reading           Freq.         Level           MHz         dBuV           .1202         6.91	(мн₂) Correct М Factor dB c 13.61 2 16.28 2	300 40 Ieasure- ment Limit IBuV/m dB/m 20.52 40.00	Over dB -19.48 -20.58	Detector 8 peak 8 peak
-8 30.000 40 50 No. Mk. 1 44 2 107 3 447	€0     70     80       €0     70     80       Reading       Freq.     Level       MHz     dBuV       .1202     6.91       .8877     6.64	(мна) Correct M Factor dB c 13.61 2 16.28 2	300 40 leasure- ment Limit 1BuV/m dB/m 20.52 40.00 22.92 43.50	Over dB -19.44 -20.54 -13.80	Detector 8 peak 8 peak 0 peak
-8 30.000 40 50 No. Mk. 1 44 2 107 3 447 4 517	60     70     80       Freq.     Reading Level       MHz     dBuV       .1202     6.91       .8877     6.64       .9822     7.38	(MH2) Correct M Factor dB c 13.61 2 16.28 2 24.82 2 24.77 2	300 40 leasure- ment Limit JBuV/m dB/m 20.52 40.00 22.92 43.50 32.20 46.00	Over dB -19.44 -20.54 -13.80 -15.19	Detector 8 peak 8 peak 0 peak 9 peak

#### RADIATED EMISSION FROM 30MHz ~1000MHz

#### **RESULT: PASS**





UT		L	Label Printer			Mode	Model Name			NIIMBOT B3S_			S_F	
emperature		2	<b>22.5</b> ℃			Relat	ive Hur	midi	ty !	56.3	3%			
ressure		ę	960hl	⊃a			Test \	Voltage	•		DC	7.4V		
est Mode		ſ	Mode	1			Anter	nna		,	Ver	tical		
72.0 dBuV	/m										Lin			
32	~**			Shi Mellinee	nu lu <sup>huhu</sup>	2 Tubuephronaliser, Marca	hind manual	33 	2. 4			ngin:		
-8														
-8 30.000	40	50	60 7	70 80	adin	(NHz)	Measure	300	400	500	600	700	1000.0	)D0
			εο : Freq.	Re	eadin		Measure			500 Ove		700	1000.0	000
30.000		F		Re		g Correct		e-	nit			700 Detec		000
30.000		F	req.	Re L	evel	g Correct Factor dB	ment	e- Lin	nit /m	Ove	r		tor	000
30.000 No.	Mk.	F M 43.0	Freq. MHz	Re L	evel BuV	g Correct Factor dB 16.93	ment dBuV/m	e- Lin dB	nit /m DO	Ove dB	r 87	Detec	tor ak	000
30.000 No.	Mk.	F M 43.0	Freq. MHz 0504	Re L	evel ∄Bu∀ 8.70	g Correct Factor dB 16.93 15.85	ment dBuV/m 25.63	e- Lin dB 40.0	nit /m 00 50	Ove dB -14.3	r 37 55	Deteo	tor ak ak	000
30.000 No.	Mk.	F 43.0 109.4 379.9	Freq. MHz 0504 4116	Re	evel 1Bu∨ 8.70 1.10	g Correct Factor dB 16.93 15.85 21.40	ment dBuV/m 25.63 26.95	e- dB 40.0 43.5	nit /m 50 50	Ove dB -14.3 -16.5	r 57 55	Detec pea	tor ik ik ik	000
30.000 No. 1 2 3	Mk.	F 43.0 109.4 379.9	Freq. MHz 0504 4116 9141	Re L	evel iBuV 8.70 1.10 2.65	g Correct Factor dB 16.93 15.85 21.40 25.74	ment dBuV/m 25.63 26.95 34.05	e- dB 40.0 43.5 46.0	nit /m 50 00	Ove dB -14.3 -16.5 -11.9	r 57 55 57 76	Detec pea pea	ctor ik ik ik ik	000

# RESULT: PASS

**Note:** 1. Factor=Antenna Factor + Cable loss, Margin=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)



Spectrum Analyzer



### **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	27.491	28.10	N/A	Pass	

## Test Graphs of Occupied Bandwidth&-20dB Bandwidth

Agilent Spectrum Analyzer - Occupied BW V R RF 50 Q AC Center Freq 13.560000 MI	7 Center		Ra<	:59:08 PM Dec 05, 2023 dio Std: None dio Device: BTS	Frequency
10 dB/div Ref -30.00 dBr	n				Center Freq
-60.0					10.00000 MI 12
-80.0 -90.0 -100			Y	~~~~~	
-110 -120 Center 13.56 MHz				Span 100 kHz	
#Res BW 10 kHz Occupied Bandwidt		/BW 30 kHz Total Power	5w -60.1 dB	/eep 1.267 ms	CF Step 10.000 kHz <u>Auto</u> Man
2	7.491 kHz				Freq Offset
Transmit Freq Error	1.373 kHz	OBW Power	99.00	%	0 Hz
x dB Bandwidth	28.10 kHz	x dB	-20.00 (	dΒ	
MSG			STATUS		



## 9. FREQUENCY STABILITY

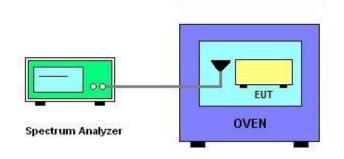
#### 9.1 PROVISIONS APPLICABLE

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°C)

Voltage(V)	Measurement Frequency (MHz)	Max. Deviation (ppm)	Limit(ppm)	Conclusion
7.4	13.56057			
6.29	13.56081	+59	±100	PASS
8.51	13.56046			

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

Temperature	Measurement Frequency (MHz)	Max. Deviation (ppm)	Limit(ppm)	Conclusion
<b>-30</b> ℃	13.56045			
<b>-20</b> ℃	13.56037			
<b>-10</b> ℃	13.56041			
<b>0</b> °C	13.56025			
<b>10</b> ℃	13.56095	+70	±100	PASS
<b>20</b> ℃	13.56045			
<b>30</b> ℃	13.56034			
<b>40</b> ℃	13.56045			
<b>50</b> ℃	13.56065			



# **10. AC POWER LINE CONDUCTED EMISSION TEST**

## **10.1 LIMITS OF LINE CONDUCTED EMISSION TEST**

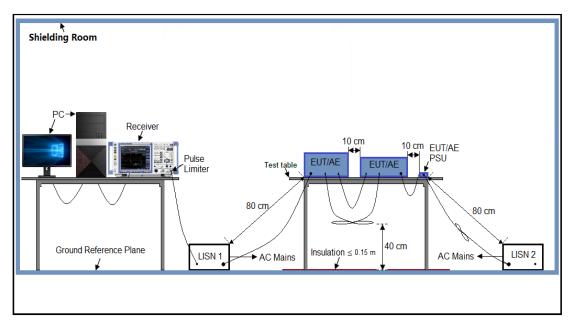
<b>Fragmenta</b>	Maximum RF Line Voltage	
Frequency	Q.P. (dBµV)	Average (dBµV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

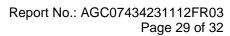
Note:

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**

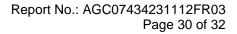
- 1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground 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.

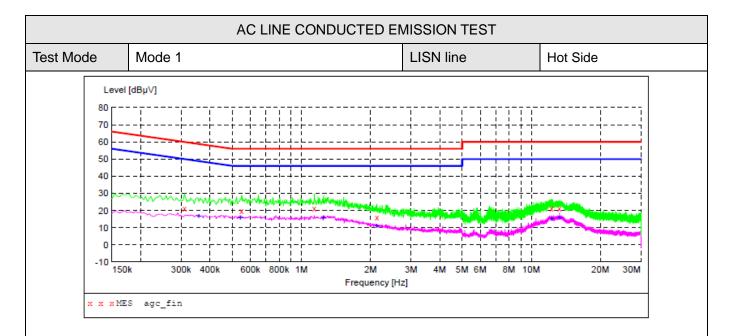
#### **10.4 FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST**

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- 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**







#### MEASUREMENT RESULT: "agc\_fin"

Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line
21.40	6.1	60	38.6	QP	L1
19.80	6.2	56	36.2	QP	L1
21.30	6.2	56	34.7	QP	L1
16.10	6.2	56	39.9	QP	L1
21.10	6.8	60	38.9	QP	L1
21.10	6.8	60	38.9	QP	ь1
	Level dBµV 21.40 19.80 21.30 16.10 21.10	Level Transd dBµV dB 21.40 6.1 19.80 6.2 21.30 6.2 16.10 6.2 21.10 6.8	Level Transd Limit dBµV dB dBµV 21.40 6.1 60 19.80 6.2 56 21.30 6.2 56 16.10 6.2 56 21.10 6.8 60	Level Transd Limit Margin dBµV dB dBµV dB 21.40 6.1 60 38.6 19.80 6.2 56 36.2 21.30 6.2 56 34.7 16.10 6.2 56 39.9 21.10 6.8 60 38.9	Level         Transd         Limit         Margin         Detector           dBμV         dB         dBμV         dB         dB         dB           21.40         6.1         60         38.6         QP           19.80         6.2         56         36.2         QP           21.30         6.2         56         34.7         QP           16.10         6.2         56         39.9         QP           21.10         6.8         60         38.9         QP

## MEASUREMENT RESULT: "agc\_fin2"

2023/12/6 9:11 Frequency MHz		Transd dB	Limit dBµV	Margin dB	Detector	Line
0.358000	16.70	6.1	49	32.1	AV	L1
0.542000	16.00	6.2	46	30.0	AV	L1
1.246000	16.00	6.2	46		AV	L1
2.130000	11.20	6.2	46	34.8	AV	L1
12.258000	15.60	6.8	50	34.4	AV	L1
13.278000	16.00	6.8	50	34.0	AV	L1

## **RESULT: PASS**

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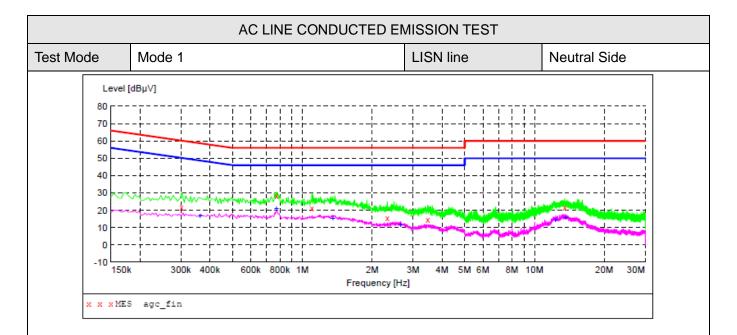
 Attestation of Global Compliance(Shenzhen)Co., Ltd

 Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd

 Tel: +86-755 2523 4088
 E-mail: agc@agccert.com

 Web: http://www.agccert.com/





### MEASUREMENT RESULT: "agc\_fin"

2023/12/6 9: Frequency MHz		Transd dB	Limit dBµV	Margin dB	Detector	Line
0.302000 0.774000 1.102000 2.322000 3.466000 13.514000	21.50 28.10 21.20 15.70 14.70 21.70	6.1 6.2 6.3 6.3 6.8	60 56 56 56 56 60	34.8 40.3	QP QP QP QP	N N N N N

#### MEASUREMENT RESULT: "agc fin2"

Frequency MHz	Level dBµV	Transd dB		Margin dB	Detector	Line
0.362000	17.10	6.1	49	31.6	AV	N
0.774000	21.30	6.2	46	24.7	AV	Ν
1.354000	15.40	6.2	46	30.6	AV	Ν
2.650000	11.90	6.3	46	34.1	AV	N
12.322000	14.60	6.8	50	35.4	AV	Ν
13.598000	16.20	6.8	50	33.8	AV	Ν

## **RESULT: PASS**

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Attestation of Global Compliance(Shenzhen)Co., Ltd Attestation of Global Compliance(Shenzhen)Std & Tech Co., Ltd Tel: +86-755 2523 4088 E-mail: agc@agccert.com Web: http://www.agccert.com/



# **APPENDIX I: PHOTOGRAPHS OF TEST SETUP**

Refer to the Report No.: AGC07434231112AP02

# APPENDIX II: PHOTOGRAPHS OF TEST EUT

Refer to the Report No.: AGC07434231112AP03

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



## Conditions of Issuance of Test Reports

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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.

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