

<b>Prüfbericht-Nr.:</b> <i>Test report no.:</i>	<b>CN240IUQ 001</b>	<b>Auftrags-Nr.:</b> <i>Order no.:</i>	<b>168450776</b>	Seite 1 von 21 Page 1 of 21
<b>Kunden-Referenz-Nr.:</b> <i>Client reference no.:</i>	N/A	<b>Auftragsdatum:</b> <i>Order date:</i>	2023-11-02	
<b>Auftraggeber:</b> <i>Client:</i>	<b>Newland Auto-ID Tech. Co., Ltd.</b> No.1 Rujiang West Rd., Mawei, Fuzhou, Fujian 350015, China			
<b>Prüfgegenstand:</b> <i>Test item:</i>	Industrial Handheld Barcode Scanner			
<b>Bezeichnung / Typ-Nr.:</b> <i>Identification / Type no.:</i>	NLS-NVH220B, NLS-NVH210B, NLS-NVH230B, NLS-NVH240B, NLS-NVH250B, NLS-NVH260B, NLS-NVH270B, NLS-NVH280B, NLS-NVH290B (Trademark: Newland)			
<b>Auftrags-Inhalt:</b> <i>Order content:</i>	Test Report			
<b>Prüfgrundlage:</b> <i>Test specification:</i>	FCC CFR Title 47, Part 15, Subpart C, Section 15.247 RSS-247 Issue 3 August 2023 RSS-Gen Issue 5 February 2021			
<b>Wareneingangsdatum:</b> <i>Date of sample receipt:</i>	2023-11-30	Please refer to Photo Document		
<b>Prüfmuster-Nr.:</b> <i>Test sample no.:</i>	A0035942101-001~004			
<b>Prüfzeitraum:</b> <i>Testing period:</i>	2023-12-05 - 2023-12-13			
<b>Ort der Prüfung:</b> <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
<b>Prüflaboratorium:</b> <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
<b>Prüfergebnis*:</b> <i>Test result*:</i>	Pass			
<b>geprüft von:</b> <i>tested by:</i>	<u>X Bell Hu</u>	<b>genehmigt von:</b> <i>authorized by:</i>	<u>X Jonathan Li</u>	
<b>Datum:</b> <i>Date:</i> 2024-03-18	Signed by: Bell Hu	<b>Ausstellungsdatum:</b> <i>Issue date:</i> 2024-03-18	Signed by: Jonathan Li	
<b>Stellung / Position:</b>	Sachverständige(r)/Expert	<b>Stellung / Position:</b>	Sachverständige(r)/Expert	
<b>Sonstiges /</b> <i>Other:</i>	FCC ID: SL9NLS-NVH220B			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> <i>Condition of the test item at delivery:</i>	Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
<b>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</b> <i>This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				

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**Anmerkungen**  
Remarks

1	<p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfbedingungen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>
2	<p>Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben.</p> <p><i>As contractually agreed, this document has been signed digitally only. TÜV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TÜV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged.</i></p>
3	<p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report. Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>
4	<p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p>

## **Test Summary**

**5.1.1 ANTENNA REQUIREMENT**

*RESULT: Pass*

**5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER**

*RESULT: Pass*

**5.1.3 CONDUCTED POWER SPECTRAL DENSITY**

*RESULT: Pass*

**5.1.4 6dB BANDWIDTH**

*RESULT: Pass*

**5.1.5 99% BANDWIDTH**

*RESULT: Pass*

**5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH**

*RESULT: Pass*

**5.1.7 RADIATED SPURIOUS EMISSION**

*RESULT: Pass*

**5.1.8 CONDUCTED EMISSION ON AC MAINS**

*RESULT: Pass*

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# 1 General Remarks

## 1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of Bluetooth Low Energy

Appendix B: Photographs of the Test Set-up

## 2 Test Sites

### 2.1 Test Facilities

**TÜV Rheinland (Shenzhen) Co., Ltd.**

No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China.

FCC Accreditation Designation No.: CN1260

### 2.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

<b>Radio Spectrum Testing (SRD-Tonscend)</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial No.</b>	<b>Cal. until</b>
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	2024-09-21
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	2024-09-21
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	2024-09-21
DC power supply	Keysight	E3642A	MY61276100	2024-09-21
Power Control Unit	Tonscend	JS0806-4ADC	N/A	2024-09-21
Automation Control Unit	Tonscend	JS0806-2	21C8060396	2024-09-21
Test Software	Tonscend	JS1120-3	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2024-06-22
<b>Unwanted Emission Testing (TS9975)</b>				
<b>Equipment</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial No.</b>	<b>Cal. until</b>
EMI Test Receiver	R&S	ESR 7	102021	2024-07-25
Signal Analyzer	R&S	FSV 40	101439	2024-07-25
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	2024-07-25
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2024-07-25
Amplifier	R&S	SCU-18F	180070	2024-07-25
Amplifier	R&S	SCU40A	100475	2024-07-25
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2024-08-06
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2024-08-06
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2024-08-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2024-08-06
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2024-06-22

Conducted Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102428	2024-07-30
Artificial Mains Network	R&S	ENV216	102333	2024-07-31
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

## 2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis using in house standards or comparisons.

## 2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

**Table 2: Measurement Uncertainty**

Parameter	Uncertainty (k=2)
RF output power, conducted	± 0.99 dB
Occupied Channel Bandwidth	± 2.08 %
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	±4.17 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB

## 2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

## 2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No. 362 Huanguan Road Middle, Longhua District, 518110, Shenzhen, P. R. China. is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

## 3 General Product Information

### 3.1 Product Function and Intended Use

The product is a scanner in the Industrial Handheld Barcode Scanner, the scanner supports Bluetooth low energy wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

### 3.2 Ratings and System Details

**Table 3: Technical Specification of EUT**

General Information of EUT	Value
Kind of Equipment:	Industrial Handheld Barcode Scanner
Type Designation:	NLS-NVH220B, NLS-NVH210B, NLS-NVH230B, NLS-NVH240B, NLS-NVH250B, NLS-NVH260B, NLS-NVH270B, NLS-NVH280B, NLS-NVH290B (They are electrically identical, only named differently for marketing purpose)
Trademark:	Newland
FCC ID:	SL9NLS-NVH220B
Operating Voltage:	Internal battery operated (3.6Vdc), or Charging by base (5Vdc)
Testing Voltage:	Fully charged battery or AC 120V, 60Hz
Operating Temperature Range:	0 °C ~ +50 °C
AC/DC Adapter:	Model: R122-0503000ED Input: 100-240V, 50/60Hz 0.6A Output: DC 5V, 3.0A
Technical Specification of Bluetooth LE	
Operating Frequency:	2402 MHz to 2480 MHz
Type of Modulation:	GFSK
Channel Number:	40 channels
Channel Separation:	2MHz
Data Rate:	1Mbps, 2Mbps
Antenna Type:	Integral Antenna
Antenna Gain:	4.23 dBi (Provided by the Client)



**Table 4: RF Channel and Frequency of Bluetooth LE**

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
<b>0</b>	<b>2402</b>	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	<b>19</b>	<b>2440</b>	29	2460	<b>39</b>	<b>2480</b>

Test frequencies are lowest channel: 2402 MHz, middle channel: 2440 MHz and highest channel: 2480 MHz for Bluetooth LE

### 3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Bluetooth transmitting mode (Bluetooth LE mode)
  - 1) Low Channel
  - 2) Middle Channel
  - 3) High Channel
- B. On, Charging by Base with BT communicating
- C. Off

### 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

### 3.5 Submitted Documents

- Application Form
- User Manual
- Operation Description
- ID Label and Location Info

## 4 Test Set-up and Operation Modes

### 4.1 Principle of Configuration Selection

**Radio Spectrum:** The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

### 4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model NLS-NVH220B in this report.

### 4.3 Special Accessories and Auxiliary Equipment

Table 5: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8
Portable Laptop	Lenovo	ThinkPad T480	10Q67059
Base	Newland	NLS-NVH220B	N/A

### 4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

## 4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

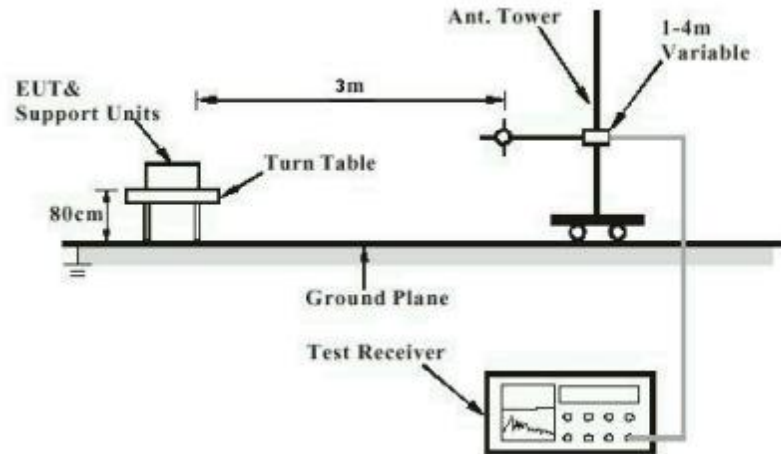


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

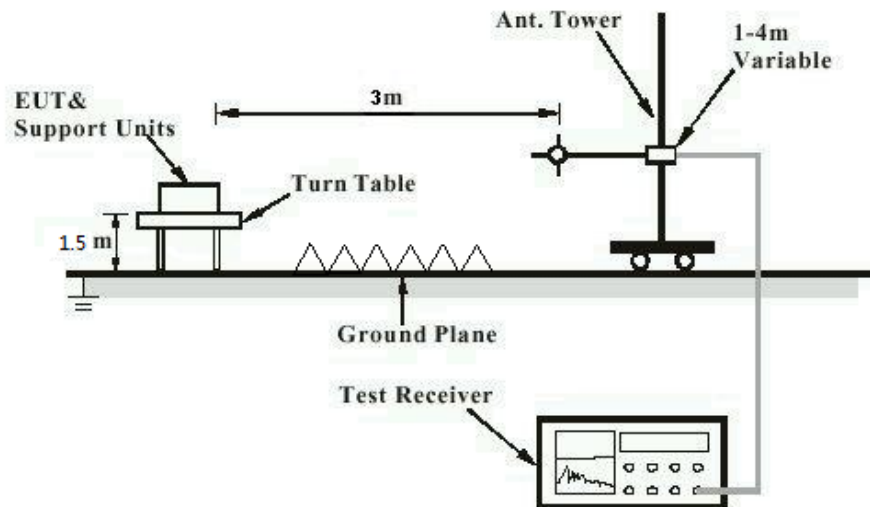


Diagram of Measurement Configuration for Mains Conduction Measurement

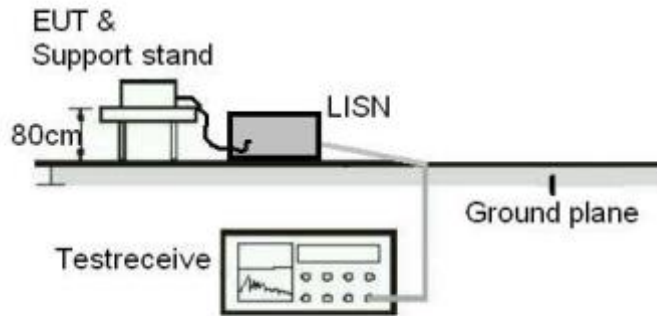
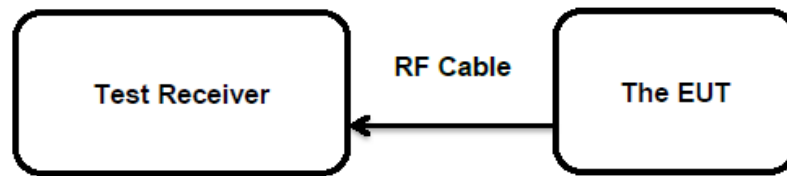


Diagram of Measurement Configuration for Conducted Transmitter Measurement



## 5 Test Results

### 5.1 Transmitter Requirement & Test Suites

#### 5.1.1 Antenna Requirement

**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(b)(4) and Part 15.203

The EUT has an Integral antenna, the directional gain of antenna is 4.23 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

### 5.1.2 Maximum Peak Conducted Output Power

**RESULT:**
**Pass**
**Test Specification**

Test standard : FCC Part 15.247(b)(3)  
 Basic standard : ANSI C63.10: 2013  
 Limits : DSSS < 1.0 Watts  
 Kind of test site : Shielded Room

**Test Setup**

Date of testing : 2023-12-13  
 Input voltage : Fully charged battery  
 Operation mode : A  
 Test channel : Low / Middle / High  
 Ambient temperature : 26.8 °C  
 Relative humidity : 48 %  
 Atmospheric pressure : 101 kPa

For details refer to following test result.

**Table 6: Test Result of Maximum Peak Conducted Output Power, Bluetooth LE**

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
BLE (1 Mbps)	2402	3.34	0.0022	< 1.0
	2440	3.34	0.0022	
	2480	3.04	0.0020	
<b>Max. Measured Value</b>		3.34	0.0022	

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
BLE (2 Mbps)	2402	3.32	0.0021	< 1.0
	2440	3.49	0.0022	
	2480	3.10	0.0020	
<b>Max. Measured Value</b>		3.49	0.0022	

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G): 4.23 dBi

### 5.1.3 Conducted Power Spectral Density

**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(e)  
Basic standard : ANSI C63.10: 2013  
Limits : < 8 dBm / 3kHz  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 2023-12-13  
Input voltage : Fully charged battery  
Operation mode : A  
Test channel : Low / Middle / High  
Ambient temperature : 26.8 °C  
Relative humidity : 48 %  
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

### 5.1.4 6dB Bandwidth

**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.247(a)(2)
Basic standard	: ANSI C63.10: 2013
Limits	: > 500 kHz
Kind of test site	: Shielded Room

**Test Setup**

Date of testing	: 2023-12-13
Input voltage	: Fully charged battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 26.8 °C
Relative humidity	: 48 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.



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### 5.1.5 99% Bandwidth

**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(a)  
Basic standard : ANSI C63.10: 2013  
Kind of test site : Shielded Room

**Test Setup**

Date of testing : 2023-12-13  
Input voltage : Fully charged battery  
Operation mode : A  
Test channel : Low / Middle / High  
Ambient temperature : 26.8 °C  
Relative humidity : 48 %  
Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

## 5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.247(d)
Basic standard	: ANSI C63.10: 2013
Limits	: 20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	: Shielded Room

**Test Setup**

Date of testing	: 2023-12-13
Input voltage	: Fully charged battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 26.8 °C
Relative humidity	: 48 %
Atmospheric pressure	: 101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

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## 5.1.7 Radiated Spurious Emission

**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.247(d) & FCC Part 15.205  
Basic standard : ANSI C63.10: 2013  
Limits : Refer to 15.209(a) of FCC part 15.247(d)  
Kind of test site : 3m Semi-anechoic Chamber

**Test Setup**

Date of testing : 2023-12-05 to 2023-12-06  
Input voltage : Fully charged battery  
Operation mode : A  
Test channel : Low / Middle / High  
Ambient temperature : Refer to test result  
Relative humidity : Refer to test result  
Atmospheric pressure : 101 kPa

**Remark:**

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix A.

### 5.1.8 Conducted Emission on AC Mains

**RESULT:****Pass****Test Specification**

Test standard	: FCC Part 15.207(a)
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a)
Kind of test site	: Shielded Room

**Test Setup**

Date of testing	: 2023-12-12
Input voltage	: AC 120V, 60Hz
Operation mode	: B
Earthing	: Not connected
Ambient temperature	: 25.0 °C
Relative humidity	: 51.2 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

## 6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix B.

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