| | | | | |
|---|---|---|---|---|
| **Prüfbericht-Nr.:**<br>*Test report no.:* | **CN21WOU8 001** | **Auftrags-Nr.:**<br>*Order no.*: | **244368151** | **Seite 1 von 14**<br>*Page 1 of 14* |
| **Kunden-Referenz-Nr.:**<br>*Client reference no.:* | **2108149** | **Auftragsdatum:**<br>*Order date:* | **2021-10-20** | |
| **Auftraggeber:**<br>*Client:* | **Beijing Niu Technology Co.,Ltd.**<br>Block A, 11F, No.10 Wangjing street, Chaoyang, 100102 Beijing, China | | | |
| **Prüfgegenstand:**<br>*Test item:* | PKE Controller | | | |
| **Bezeichnung / Typ-Nr.:**<br>*Identification / Type no.:* | PKE01<br>FCC ID: 2AQ95-NIUPKE01 | | | |
| **Auftrags-Inhalt:**<br>*Order content*: | Complete test | | | |
| **Prüfgrundlage:**<br>*Test specification:* | FCC CFR47 Part 15, Subpart C Section 15.209<br>ANSI C63.10: 2013 | | | |
| **Wareneingangsdatum:**<br>*Date of sample receipt:* | 2021-10-28 | | | |
| **Prüfmuster-Nr.:**<br>*Test sample no:* | A003153747-001 | | | |
| **Prüfzeitraum:**<br>*Testing period:* | Refer to test report | | | |
| **Ort der Prüfung:**<br>*Place of testing:* | TÜV Rheinland (Shanghai) Co., Ltd. | | | |
| **Prüflaboratorium:**<br>*Testing laboratory:* | TÜV Rheinland (Shanghai) Co., Ltd. | | | |
| **Prüfergebnis*:**<br>*Test result*:* | Pass | | | |

| | | | |
|---|---|---|---|
| **geprüft von:**<br>*tested by:* | X Weidong Wang<br>Signed by: Weidong Wang | **genehmigt von:**<br>*authorized by:* | X Hongfei Wu<br>Signed by: Hongfei Wu |
| **Datum:**<br>*Date:* 2022-01-18 | | **Ausstellungsdatum:**<br>*Issue date:* 2022-01-18 | |
| **Stellung** / *Position:* | PE | **Stellung** / *Position:* | Reviewer |

**Sonstiges** /
*Other:*

| | |
|---|---|
| **Zustand des Prüfgegenstandes bei Anlieferung:**<br>*Condition of the test item at delivery:* | Prüfmuster vollständig und unbeschädigt<br>*Test item complete and undamaged* |

| | | | | |
|---|---|---|---|---|
| * 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* |

# TEST SUMMARY

### 5.1.1 ANTENNA REQUIREMENT
*RESULT: Pass*

### 5.1.2 CONDUCTED EMISSION
*RESULT: N/A*

### 5.1.3 RADIATED SPURIOUS EMISSION
*RESULT: Pass*

# Contents

# 1. General Remarks

## 1.1 Complementary Materials

Null.

# 2. Test Sites

## 2.1 Test Facilities

TÜV Rheinland (Shanghai) Co., Ltd.
Shanghai TUV Rheinland Building No. 177, 178 Lane 777, West Guangzhong Rd, Jing'an District, Shanghai, China

The used test equipment is in accordance with CISPR 16 for measurement of radio interference.

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 958801.

The Innovation, Science and Economic Development Canada has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance. The description of the test facility is listed under chambers filing number 2932F.

## 2.2 List of Test and Measurement Instruments

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

| Instrument | Manufacturer | Type No. | Asset No. | Cali. Due Date |
|---|---|---|---|---|
| 3m modified semi-anechoic chamber | Frankonia | SAC3 | G1811378 | 2022-06-27 |
| Bilog antenna | Teseq | CBL 6112D | G1811425 | 2023-03-10 |
| EMI test receiver | Rohde & Schwarz | ESCI | G1811402 | 2022-09-01 |
| Spectrum analyser | Rohde & Schwarz | FSV40 | G1822702 | 2023-11-04 |
| Preamplifier | Taiwan EMCI | EMC184045SE | G1825372 | 2023-05-14 |
| HF loop antenna | Schaffner | HLA6120 | G1822700 | 2024-02-03 |
| Log periodic antenna | Rohde & Schwarz | HL050 | G1811417 | 2023-03-10 |
| Broadband Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-305 | 2023-07-08 |
| Preamplifier | Taiwan EMCI | EMC051845SE | G1825371 | 2023-05-14 |
| Spectrum Analyzer | Keysight | N9020A | MY54500180 | 2022-09-08 |

## 2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, 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 basics using in house standards or comparisons.

## 2.5 Measurement Uncertainty

**Table 2: Measurement Uncertainty**

| Measurement Type | Frequency | Uncertainty |
|---|---|---|
| Radiated Emission | 9kHz – 30MHz | ±2.93dB |
| | 30MHz - 1GHz | ±5.34dB |
| | > 1GHz | ±5.40dB |

# 3. General Product Information

## 3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a PKE Controller working on the frequency of 433.92MHz and 125kHz.
The aim of this report is to evaluate 125kHz transmitter of the EUT for FCC Part 15C.
For details refer to the User Manual and Circuit Diagram.

## 3.2 Ratings and System Details

**Table 3: Technical Specification of EUT**

| General Description of EUT | |
|---|---|
| Product Name: | PKE Controller |
| Model No.: | PKE01 |
| Operating Voltage: | DC 12V and DC 5V |
| Technical Specification of Transmitter | |
| Frequency Range: | 125kHz |
| Modulation Type: | ASK |
| Antenna Type: | Internal Antenna |
| Antenna Gain: | 0dBi (Provided by the Client) |
| Technical Specification of Receiver | |
| Frequency Range: | 433.92MHz |

## Independent Operation Modes

**Table 4: Independent Operation Modes**

| Test Mode | Channel Frequency [kHz] | Mode |
|---|---|---|
| TM1 | 125 | Transmitting continually |

## 3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

## 3.4 Submitted Documents

- Bill of Material
- PCB Layout
- Photo Document
- Circuit Diagram
- Instruction Manual
- Rating Label

# 4. Test Set-up and Operation Modes

## 4.1 Principle of Configuration Selection

The equipment under test (EUT) was configured to measure its maximum power level. The test modes were adapted accordingly in reference to the instructions for use.

## 4.2 Test Operation and Test Software

Null.

## 4.3 Special Accessories and Auxiliary Equipment

**Table 5: Auxiliary Equipment**

| Auxiliary Equipment | Module No. | Manufacturer |
|---|---|---|
| VCU | VCU | Jiangsu Niu Electric Technology Co., Ltd |

## 4.4 Countermeasures to achieve EMC Compliance

Null.

# 5. Test Results

## 5.1 Conducted Testing at Antenna Port

### 5.1.1 Antenna Requirement

**RESULT:** **Pass**

According to the manufacturer declared, the EUT has one Internal antenna, the directional gain of antenna is 0 dBi and the antenna is designed with permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

**Table 6: Antenna Requirement**

| FCC 15.203 – Antenna Requirement 1 | | |
|---|---|---|
| Requirement: | No antenna other than that furnished by the responsible party shall be used with the device | |
| Results: | Antenna type: | Internal Antenna |
| Verdict: | Pass | |

| FCC 15.204 – Antenna Requirement 2 | |
|---|---|
| Requirement: | An intentional radiator may be operated only with the antenna with which it is authorized. If an antenna is marketed with the intentional radiator, it shall be of a type which is authorized with the intentional radiator. |
| Results: | Only one Internal antenna can be used |
| Verdict: | Pass |

## 5.1.2 Conducted Emission

**RESULT:** **N/A**

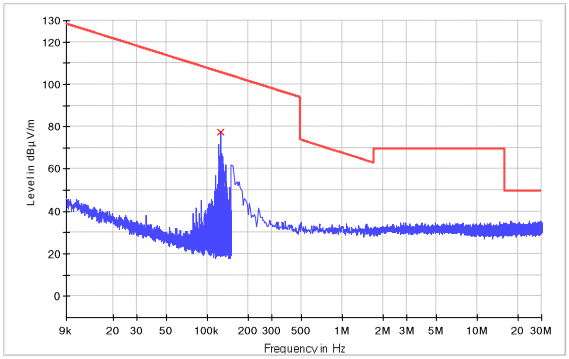
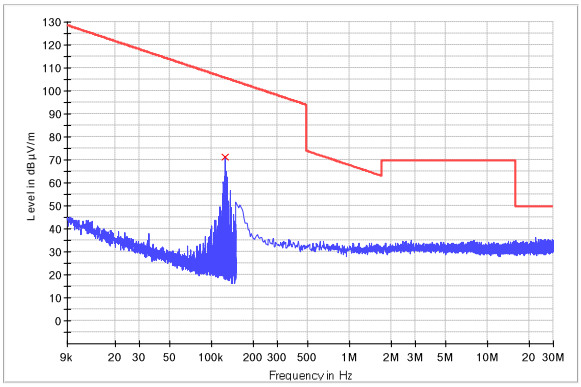
Test requirement : FCC Part 15.207 (a)
Test procedure : ANSI C63.10:2013
Note:
This product is power by DC12V.
So, this test is not applicable

## 5.1.3 Radiated Spurious Emission

**RESULT:** **Pass**

| | | |
|---|---|---|
| Date of testing | : | 2021-11-30 |
| Ambient temperature | : | 21.8°C |
| Relative humidity | : | 51.7% |
| Atmospheric pressure | : | 101kPa |
| Test requirement | : | FCC Part 15.205<br>FCC Part 15.209 |
| Test procedure | : | ANSI C63.10:2013 |
| Test voltage | : | DC 12V and DC 5V |
| Test modes applied | : | TM1 |

## Figure 1: Radiated Spurious Emission, 9KHz to 30MHz

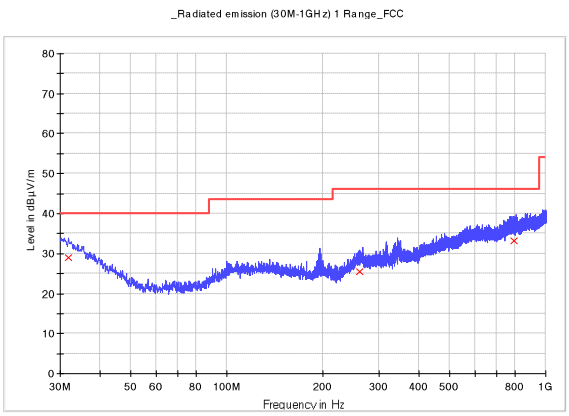
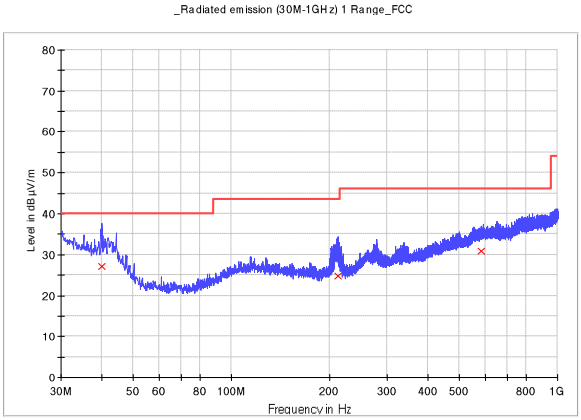
| 9KHz to 30MHz H | 9KHz to 30MHz V |
|---|---|
|  |  |



Limit and Margin

| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|---|---|---|---|---|---|
| 0.125960 | 77.3 | H | 21.0 | 28.3 | 105.6 |
| 0.125960 | 71.1 | V | 21.0 | 34.5 | 105.6 |

## Figure 2: Radiated Spurious Emission, 30MHz to 1GHz

| 30MHz to 1GHz H | 30MHz to 1GHz V |
|---|---|
|  |  |



Limit and Margin

| Frequency (MHz) | QuasiPeak (dBµV/m) | Pol | Corr. (dB/m) | Margin - QPK (dB) | Limit - QPK (dBµV/m) |
|---|---|---|---|---|---|
| 31.818750 | 29.0 | H | 24.6 | 11.0 | 40.0 |
| 260.496250 | 25.5 | H | 20.7 | 20.5 | 46.0 |
| 795.451250 | 33.2 | H | 27.6 | 12.8 | 46.0 |
| 40.063750 | 27.2 | V | 19.9 | 12.8 | 40.0 |
| 212.723750 | 24.8 | V | 15.8 | 18.7 | 43.5 |
| 584.961250 | 30.9 | V | 26.1 | 15.1 | 46.0 |

# 6. List of Tables



# 7. List of Figures