

|                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |                                                                                                                |                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>Prüfbericht-Nr.:</b><br>Test report no.:                                                                                                                                                                                                                                                                                                                                                                                                         | <b>CN22DJA9 002</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Auftrags-Nr.:</b><br>Order no.:                  | <b>168362723</b>                                                                                               | <b>Seite 1 von 26</b><br>Page 1 of 26 |
| <b>Kunden-Referenz-Nr.:</b><br>Client reference no.:                                                                                                                                                                                                                                                                                                                                                                                                | <b>N/A</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Auftragsdatum:</b><br>Order date:                | <b>2022-03-11</b>                                                                                              |                                       |
| <b>Auftraggeber:</b><br>Client:                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Nortek Security&amp;Control LLC</b><br>5919 Sea Otter Place, Suite 100, Carlsbad, CA 92010, USA                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |                                                                                                                |                                       |
| <b>Prüfgegenstand:</b><br>Test item:                                                                                                                                                                                                                                                                                                                                                                                                                | <b>ELAN 12" Touch Panel User Interface</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |                                                                                                                |                                       |
| <b>Bezeichnung / Typ-Nr.:</b><br>Identification / Type no.:                                                                                                                                                                                                                                                                                                                                                                                         | <b>ITP-12</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                     |                                                                                                                |                                       |
| <b>Auftrags-Inhalt:</b><br>Order content:                                                                                                                                                                                                                                                                                                                                                                                                           | <b>FCC and IC approval</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                     |                                                                                                                |                                       |
| <b>Prüfgrundlage:</b><br>Test specification:                                                                                                                                                                                                                                                                                                                                                                                                        | CFR47 FCC Part 15: Subpart C Section 15.247<br>CFR47 FCC Part 15: Subpart C Section 15.207<br>CFR47 FCC Part 15: Subpart C Section 15.209<br>CFR47 FCC Part 15: Subpart B Section 15.107<br>CFR47 FCC Part 15: Subpart B Section 15.109<br>RSS-247 Issue 2 February 2017<br>RSS-Gen Issue 5 March 2019<br>ICES-003 Issue 7 October 2020                                                                                                                                                        |                                                     |                                                                                                                |                                       |
| <b>Wareneingangsdatum:</b><br>Date of sample receipt:                                                                                                                                                                                                                                                                                                                                                                                               | <b>2022-03-31</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Please refer to Photo Document                      |                                                                                                                |                                       |
| <b>Prüfmuster-Nr.:</b><br>Test sample no.:                                                                                                                                                                                                                                                                                                                                                                                                          | <b>A003230744-001~011</b><br><b>A003237194-001</b>                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |                                                                                                                |                                       |
| <b>Prüfzeitraum:</b><br>Testing period:                                                                                                                                                                                                                                                                                                                                                                                                             | <b>2022-04-06 - 2022-04-17</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                     |                                                                                                                |                                       |
| <b>Ort der Prüfung:</b><br>Place of testing:                                                                                                                                                                                                                                                                                                                                                                                                        | <b>TÜV Rheinland (Shenzhen) Co., Ltd.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |                                                                                                                |                                       |
| <b>Prüflaboratorium:</b><br>Testing laboratory:                                                                                                                                                                                                                                                                                                                                                                                                     | <b>TÜV Rheinland (Shenzhen) Co., Ltd.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                     |                                                                                                                |                                       |
| <b>Prüfergebnis*:</b><br>Test result*:                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Pass</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                     |                                                                                                                |                                       |
| <b>geprüft von:</b><br>tested by:                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>genehmigt von:</b><br>authorized by:                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                     |                                                                                                                |                                       |
| <b>Datum:</b><br>Date: 2022-05-09                                                                                                                                                                                                                                                                                                                                                                                                                   | <br>Signed by: Alex Lan                                                                                                                                                                                                                                                                                                                                                                                     |                                                     | <br>Signed by: Winnie Hou |                                       |
| <b>Stellung / Position</b>                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Assistant Project Manager</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Ausstellungsdatum:</b><br>Issue date: 2022-05-09 | <b>Reviewer</b>                                                                                                |                                       |
| <b>Sonstiges / Other:</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | FCC ID: EF400229<br>IC: 1078A-00229 HVIN: ITP-8B<br>Software update to enable the Bluetooth function, the hardware are same with ITP-8 with FCC ID: EF400183, IC: 1078A-00183, and with spot check the max. Wi-Fi output power with no degradation, so refer to report STS1901190W01 for Wi-Fi test data.                                                                                                                                                                                      |                                                     |                                                                                                                |                                       |
| <b>Zustand des Prüfgegenstandes bei Anlieferung:</b><br>Condition of the test item at delivery:                                                                                                                                                                                                                                                                                                                                                     | <b>Prüfmuster vollständig und unbeschädigt</b><br>Test item complete and undamaged                                                                                                                                                                                                                                                                                                                                                                                                             |                                                     |                                                                                                                |                                       |
| <b>* Legende:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1 = sehr gut      2 = gut      3 = befriedigend      4 = ausreichend      5 = mangelhaft<br>P(ass) = entspricht o.g. Prüfgrundlage(n)      F(ail) = entspricht nicht o.g. Prüfgrundlage(n)      N/A = nicht anwendbar      N/T = nicht getestet<br>* Legend: 1 = very good      2 = good      3 = satisfactory      4 = sufficient      5 = poor<br>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><br>This test report only relates to the a. m. 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. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                     |                                                                                                                |                                       |

**Prüfbericht - Nr.: CN22DJA9 002**

Test Report No.:

Seite 2 von 26

Page 2 of 26

## 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 20dB BANDWIDTH**

RESULT: Pass

**5.1.7 CARRIER FREQUENCY SEPARATION**

RESULT: Pass

**5.1.8 NUMBER OF HOPPING FREQUENCY**

RESULT: Pass

**5.1.9 TIME OF OCCUPANCY**

RESULT: Pass

**5.1.10 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 kHz BANDWIDTH**

RESULT: Pass

**5.1.11 RADIATED SPURIOUS EMISSION**

RESULT: Pass

**5.1.12 RADIATED EMISSIONS**

RESULT: Pass

## Contents

|               |                                                                        |           |
|---------------|------------------------------------------------------------------------|-----------|
| <b>1</b>      | <b>GENERAL REMARKS.....</b>                                            | <b>4</b>  |
| <b>1.1</b>    | <b>COMPLEMENTARY MATERIALS .....</b>                                   | <b>4</b>  |
| <b>2</b>      | <b>TEST SITES .....</b>                                                | <b>5</b>  |
| <b>2.1</b>    | <b>TEST FACILITIES.....</b>                                            | <b>5</b>  |
| <b>2.2</b>    | <b>LIST OF TEST AND MEASUREMENT INSTRUMENTS .....</b>                  | <b>5</b>  |
| <b>2.3</b>    | <b>TRACEABILITY .....</b>                                              | <b>6</b>  |
| <b>2.4</b>    | <b>CALIBRATION.....</b>                                                | <b>6</b>  |
| <b>2.5</b>    | <b>MEASUREMENT UNCERTAINTY .....</b>                                   | <b>6</b>  |
| <b>2.6</b>    | <b>LOCATION OF ORIGINAL DATA .....</b>                                 | <b>7</b>  |
| <b>2.7</b>    | <b>STATUS OF FACILITY USED FOR TESTING .....</b>                       | <b>7</b>  |
| <b>3</b>      | <b>GENERAL PRODUCT INFORMATION.....</b>                                | <b>8</b>  |
| <b>3.1</b>    | <b>PRODUCT FUNCTION AND INTENDED USE.....</b>                          | <b>8</b>  |
| <b>3.2</b>    | <b>RATINGS AND SYSTEM DETAILS .....</b>                                | <b>8</b>  |
| <b>3.3</b>    | <b>INDEPENDENT OPERATION MODES.....</b>                                | <b>10</b> |
| <b>3.4</b>    | <b>NOISE GENERATING AND NOISE SUPPRESSING PARTS.....</b>               | <b>10</b> |
| <b>3.5</b>    | <b>SUBMITTED DOCUMENTS .....</b>                                       | <b>10</b> |
| <b>4</b>      | <b>TEST SET-UP AND OPERATION MODES.....</b>                            | <b>11</b> |
| <b>4.1</b>    | <b>PRINCIPLE OF CONFIGURATION SELECTION.....</b>                       | <b>11</b> |
| <b>4.2</b>    | <b>TEST OPERATION AND TEST SOFTWARE.....</b>                           | <b>11</b> |
| <b>4.3</b>    | <b>SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....</b>                | <b>11</b> |
| <b>4.4</b>    | <b>COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE .....</b>                 | <b>11</b> |
| <b>4.5</b>    | <b>TEST SETUP DIAGRAM .....</b>                                        | <b>12</b> |
| <b>5</b>      | <b>TEST RESULTS.....</b>                                               | <b>14</b> |
| <b>5.1</b>    | <b>TRANSMITTER REQUIREMENT &amp; TEST SUITES.....</b>                  | <b>14</b> |
| <b>5.1.1</b>  | <i>Antenna Requirement.....</i>                                        | <i>14</i> |
| <b>5.1.2</b>  | <i>Maximum Peak Conducted Output Power .....</i>                       | <i>15</i> |
| <b>5.1.3</b>  | <i>Conducted Power Spectral Density.....</i>                           | <i>16</i> |
| <b>5.1.4</b>  | <i>6dB Bandwidth.....</i>                                              | <i>17</i> |
| <b>5.1.5</b>  | <i>99% Bandwidth.....</i>                                              | <i>18</i> |
| <b>5.1.6</b>  | <i>20dB Bandwidth.....</i>                                             | <i>19</i> |
| <b>5.1.7</b>  | <i>Carrier Frequency Separation .....</i>                              | <i>20</i> |
| <b>5.1.8</b>  | <i>Number of Hopping Frequency.....</i>                                | <i>21</i> |
| <b>5.1.9</b>  | <i>Time of Occupancy.....</i>                                          | <i>22</i> |
| <b>5.1.10</b> | <i>Conducted Spurious Emissions Measured in 100 kHz Bandwidth.....</i> | <i>23</i> |
| <b>5.1.11</b> | <i>Radiated Spurious Emission.....</i>                                 | <i>24</i> |
| <b>5.1.12</b> | <i>Radiated Emissions .....</i>                                        | <i>25</i> |
| <b>6</b>      | <b>PHOTOGRAPHS OF THE TEST SET-UP .....</b>                            | <b>26</b> |
| <b>7</b>      | <b>LIST OF TABLES .....</b>                                            | <b>26</b> |

# 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: Photographs of the Test Set-up

Appendix B: Test Results of Bluetooth BR/EDR mode

Appendix C: Test Results of Bluetooth Low Energy

Appendix D: Test Results of FCC 15B & ICES-003

## 2 Test Sites

### 2.1 Test Facilities

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

362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

ISED wireless device testing laboratory: 25069

### 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        | 2022-09-28        |
| MXG X-Series RF Vector Signal Generator        | Keysight            | N5182B            | MY61250137        | 2022-09-28        |
| EXG X-Series Microwave Analog Signal Generator | Keysight            | N5173B            | MY61250141        | 2022-09-28        |
| DC power supply                                | Keysight            | E3642A            | MY61276100        | 2022-09-28        |
| Power Control Unit                             | Tonscend            | JS0806-4ADC       | N/A               | 2022-09-28        |
| Automation Control Unit                        | Tonscend            | JS0806-2          | 21C8060396        | 2022-09-28        |
| 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            | 2022-08-10        |
| Signal Analyzer                                | R&S                 | FSV 40            | 101439            | 2022-08-09        |
| System Controller Interface                    | R&S                 | SCI-100           | S10010038         | N/A               |
| Filterbank                                     | R&S                 | Wlan              | 100759            | 2022-08-09        |
| OSP                                            | R&S                 | OSP 120           | 102040            | N/A               |
| Pre-amplifier                                  | R&S                 | SCU08F1           | 08320031          | 2022-08-09        |
| Amplifier                                      | R&S                 | SCU-18F           | 180070            | 2022-08-09        |
| Amplifier                                      | R&S                 | SCU40A            | 100475            | 2022-08-09        |
| Trilog Broadband Antenna (30 MHz - 7 GHz)      | Schwarzbeck         | VULB 9162         | 193               | 2022-08-08        |
| Double-Ridged Antenna (1 -18 GHz)              | ETS-LINDGREN        | 3117              | 00218717          | 2022-08-08        |
| Wideband Ridged Horn Antenna (18-40 GHz)       | Steatite            | QMS-00880         | 19067             | 2022-08-08        |
| Active Loop Antenna                            | Schwarzbeck         | FMZB 1513         | 302               | 2022-09-13        |
| Test software                                  | R&S                 | EMC32 (V10.60.10) | N/A               | N/A               |

**Prüfbericht - Nr.: CN22DJA9 002**  
*Test Report No.:*

Seite 6 von 26  
Page 6 of 26

|                          |           |               |              |            |
|--------------------------|-----------|---------------|--------------|------------|
| Control PC               | Dell      | OptiPlex 7050 | 36NV9P2      | N/A        |
| 3m Semi-Anechoic Chamber | Albatross | SAC-3m        | APC17151-SAC | 2024-06-22 |

| Radiated Emission (3m chamber) |              |                     |                |            |
|--------------------------------|--------------|---------------------|----------------|------------|
| Equipment                      | Manufacturer | Model No.           | Serial No.     | Cal. Until |
| 3m SAC                         | ETS-Lindgren | SAC3                | CT001632-Q1362 | 2024-04-26 |
| EMI Test Receiver              | R&S          | ESR7                | 102111         | 2022-12-01 |
| Horn Antenna                   | R&S          | HF907               | 102706         | 2022-08-07 |
| Preamplifier (1-18GHz)         | FIT          | SCU-18F             | 180077         | 2022-08-13 |
| Trilog-Broadband antenna       | SCHWARZBECK  | VULB9168            | 0945           | 2022-12-12 |
| 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            |
|--------------------------------------------------------|------------------------|
| Radio Frequency                                        | $\pm 1 \times 10^{-7}$ |
| RF Power (conducted)                                   | $\pm 2.5$ dB           |
| Radiated Emission of Transmitter, valid up to 26.5 GHz | $\pm 6$ dB             |
| Radiated Emission of Receiver, valid up to 26.5 GHz    | $\pm 6$ dB             |
| Radiated Emission (3m SAC), 30MHz to 1000MHz           | $\pm 4.52$ dB          |
| Radiated Emission (3m SAC), above 1000MHz              | $\pm 4.37$ dB          |
| Temperature                                            | $\pm 1$ °C             |
| Humidity                                               | $\pm 5$ %              |
| Voltage (DC)                                           | $\pm 1$ %              |
| Voltage (AC, <10kHz)                                   | $\pm 2$ %              |

**Prüfbericht - Nr.: CN22DJA9 002**  
*Test Report No.:*

Seite 7 von 26  
Page 7 of 26

## 2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C & D 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 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of 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 EUT is an ELAN 12" Touch Panel User Interface which supports Bluetooth(dual mode) and Wi-Fi 802.11 b/g/n wireless technology.

The EUT adds Bluetooth function by upgrading firmware, the hardware part is the same as original product.

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:                                      | ELAN 12" Touch Panel User Interface                               |
| Type Designation:                                       | ITP-12                                                            |
| FCC ID:                                                 | EF400230                                                          |
| IC:                                                     | 1078A-00230                                                       |
| HVIN:                                                   | ITP-12B                                                           |
| Operating Voltage:                                      | DC 12~14V or via POE Interface                                    |
| Testing Voltage:                                        | AC 120V, 60Hz                                                     |
| <b>Technical Specification of Bluetooth (dual mode)</b> |                                                                   |
| Operating Frequency:                                    | 2402 MHz to 2480 MHz                                              |
| Type of Modulation:                                     | GFSK, $\pi/4$ -DQPSK, 8DPSK                                       |
| Channel Number:                                         | BR/EDR: 79 channels; Low Energy: 40 channels                      |
| Channel Separation:                                     | BR/EDR:1MHz; Low Energy:2MHz                                      |
| Data Rate:                                              | BR/EDR: 1Mbps, 2Mbps, 3Mbps<br>Low Energy: 1Mbps                  |
| Antenna Type:                                           | Integral Antenna                                                  |
| Antenna Gain of Bluetooth:                              | 3.5 dBi                                                           |
| <b>Technical Specification of Wi-Fi 802.11 b/g/n</b>    |                                                                   |
| Frequency Range:                                        | 2412 - 2462 MHz for 802.11b/g/n(HT20)                             |
| Type of Modulation:                                     | DSSS(DBPSK/DQPSK/CCK)<br>OFDM(BPSK/QPSK/16QAM/64QAM)              |
| Data Rate:                                              | 6/9/12/18/24/36/48/54 Mbps for 802.11g<br>MCS0 ~ MCS7 for 802.11n |
| Channel Number:                                         | 11 channels for 802.11b/g/n(HT20)                                 |
| Channel Separation:                                     | 5 MHz                                                             |
| Antenna Type:                                           | Integral Antenna                                                  |
| Antenna Gain of Wi-Fi:                                  | 3.5 dBi                                                           |

**Table 4: RF Channel and Frequency of Bluetooth BR/EDR**

| RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) |
|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 0          | 2402.00         | 20         | 2422.00         | 40         | 2442.00         | 60         | 2462.00         |
| 1          | 2403.00         | 21         | 2423.00         | 41         | 2443.00         | 61         | 2463.00         |
| 2          | 2404.00         | 22         | 2424.00         | 42         | 2444.00         | 62         | 2464.00         |
| 3          | 2405.00         | 23         | 2425.00         | 43         | 2445.00         | 63         | 2465.00         |
| 4          | 2406.00         | 24         | 2426.00         | 44         | 2446.00         | 64         | 2466.00         |
| 5          | 2407.00         | 25         | 2427.00         | 45         | 2447.00         | 65         | 2467.00         |
| 6          | 2408.00         | 26         | 2428.00         | 46         | 2448.00         | 66         | 2468.00         |
| 7          | 2409.00         | 27         | 2429.00         | 47         | 2449.00         | 67         | 2469.00         |
| 8          | 2410.00         | 28         | 2430.00         | 48         | 2450.00         | 68         | 2470.00         |
| 9          | 2411.00         | 29         | 2431.00         | 49         | 2451.00         | 69         | 2471.00         |
| 10         | 2412.00         | 30         | 2432.00         | 50         | 2452.00         | 70         | 2472.00         |
| 11         | 2413.00         | 31         | 2433.00         | 51         | 2453.00         | 71         | 2473.00         |
| 12         | 2414.00         | 32         | 2434.00         | 52         | 2454.00         | 72         | 2474.00         |
| 13         | 2415.00         | 33         | 2435.00         | 53         | 2455.00         | 73         | 2475.00         |
| 14         | 2416.00         | 34         | 2436.00         | 54         | 2456.00         | 74         | 2476.00         |
| 15         | 2417.00         | 35         | 2437.00         | 55         | 2457.00         | 75         | 2477.00         |
| 16         | 2418.00         | 36         | 2438.00         | 56         | 2458.00         | 76         | 2478.00         |
| 17         | 2419.00         | 37         | 2439.00         | 57         | 2459.00         | 77         | 2479.00         |
| 18         | 2420.00         | 38         | 2440.00         | 58         | 2460.00         | 78         | 2480.00         |
| 19         | 2421.00         | 39         | 2441.00         | 59         | 2461.00         |            |                 |

Test frequencies are lowest channel: 2402 MHz, middle channel: 2441 MHz and highest channel: 2480 MHz for Bluetooth BR/EDR

**Table 5: RF Channel and Frequency of Bluetooth LE**

| RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) | RF Channel | Frequency (MHz) |
|------------|-----------------|------------|-----------------|------------|-----------------|------------|-----------------|
| 0          | 2402            | 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            | 19         | 2440            | 29         | 2460            | 39         | 2480            |

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 (BR & EDR mode)
  - 1) Low Channel
  - 2) Middle Channel
  - 3) High Channel
- B. On, Bluetooth transmitting mode (Bluetooth LE mode)
  - 1) Low Channel
  - 2) Middle Channel
  - 3) High Channel
- C. On, Bluetooth Hopping
- D. On, Wi-fi connection with Camera and Trumpet on
- E. On, Bluetooth connection
- F. Off

### 3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

### 3.5 Submitted Documents

- |                    |                         |
|--------------------|-------------------------|
| - Application Form | - User Manual           |
| - Block Diagram    | - Rating Label          |
| - Schematics       | - Operation Description |

## 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 & ANSI C63.4: 2014.

According to clause 3.1, Radio Frequency Conducted test data are copied from test report CN22DJA9 001 since model ITP-8 and ITP-12 are integrated the sample wireless module, Radiated Spurious Emission and Radiated Emission were performed on ITP-12 in this report.

### 4.3 Special Accessories and Auxiliary Equipment

Table 6: Auxiliary Equipment Used during Test

| Description     | Manufacturer | Model          | S/N       | Rating             |
|-----------------|--------------|----------------|-----------|--------------------|
| Laptop          | Lenovo       | T480           | PF-16A6N8 | /                  |
| AC/DC Adapter 1 | /            | SRP1202500P    | /         | Output: 12V, 2.5A  |
| AC/DC Adapter 2 | /            | SW-140170      | /         | Output: 14V, 1.7A  |
| PoE Injector    | /            | ZX900-AFG-N301 | /         | Output: 52V, 0.58A |
| Ferrite core 1  | /            | /              | /         | /                  |
| Ferrite core 2  | /            | /              | /         | /                  |
| Ferrite core 3  | /            | /              | /         | /                  |

### 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)

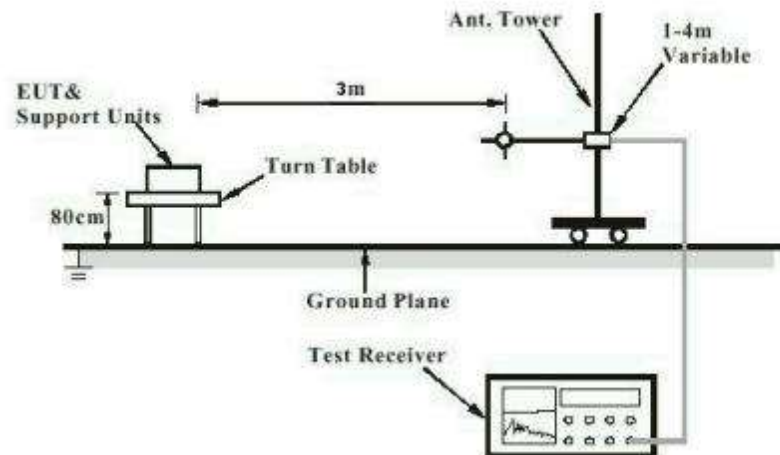
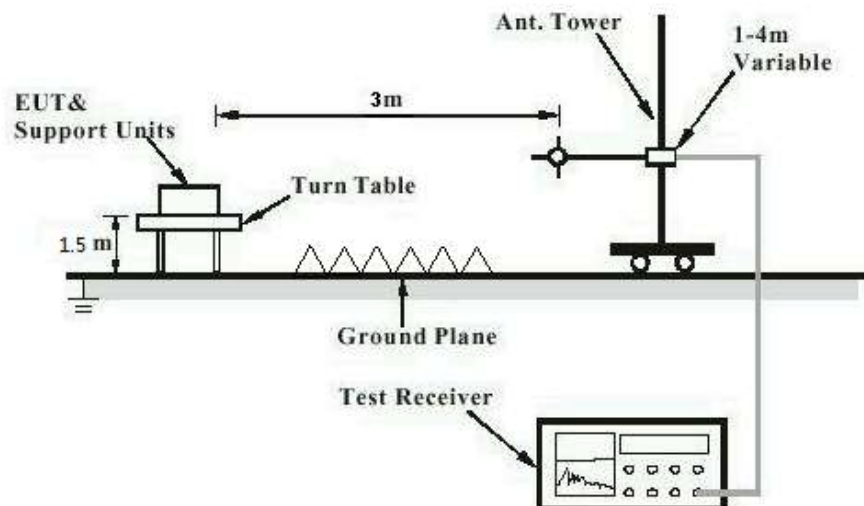
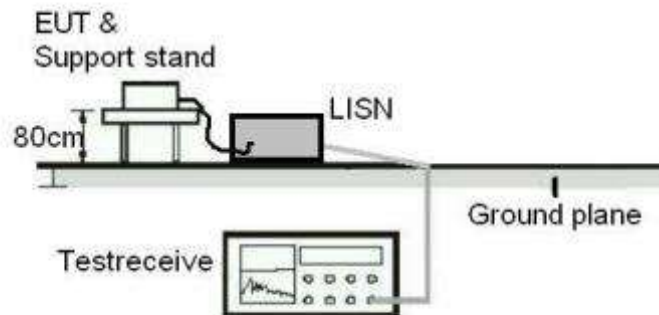


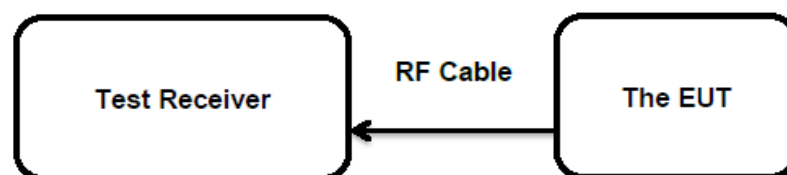
Diagram of Measurement Configuration for Radiation Test (Above 1GHz)



### 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  
RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT has an Integral antenna for Bluetooth, the directional gain of antenna is 3.5 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.

- 1) The cable loss is taken into account in results.
  - 2) Antenna gain(G): 3.5 dBi
- e.i.r.p.= $P_{(\text{Peak power})} + G$ , which is far below the 4 W

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 16 von 26

Page 16 of 26

### 5.1.3 Conducted Power Spectral Density

RESULT:

Pass

**Test Specification**

|                   |   |                                             |
|-------------------|---|---------------------------------------------|
| Test standard     | : | FCC Part 15.247(e)<br>RSS-247 Clause 5.2(b) |
| Basic standard    | : | ANSI C63.10: 2013                           |
| Limits            | : | < 8 dBm / 3kHz                              |
| Kind of test site | : | Shielded Room                               |

**Test Setup**

|                      |   |                     |
|----------------------|---|---------------------|
| Date of testing      | : | 2022-04-06          |
| Input voltage        | : | AC 120V, 60Hz       |
| Operation mode       | : | B                   |
| Test channel         | : | Low / Middle / High |
| Ambient temperature  | : | 24.8 °C             |
| Relative humidity    | : | 55 %                |
| Atmospheric pressure | : | 101 kPa             |

For the measurement records, refer to the appendix C.

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 17 von 26

Page 17 of 26

### 5.1.4 6dB Bandwidth

RESULT:

Pass

**Test Specification**

|                   |   |                                                |
|-------------------|---|------------------------------------------------|
| Test standard     | : | FCC Part 15.247(a)(2)<br>RSS-247 Clause 5.2(a) |
| Basic standard    | : | ANSI C63.10: 2013                              |
| Limits            | : | > 500 KHz                                      |
| Kind of test site | : | Shielded Room                                  |

**Test Setup**

|                      |   |                     |
|----------------------|---|---------------------|
| Date of testing      | : | 2022-04-06          |
| Input voltage        | : | AC 120V, 60Hz       |
| Operation mode       | : | B                   |
| Test channel         | : | Low / Middle / High |
| Ambient temperature  | : | 24.8 °C             |
| Relative humidity    | : | 55 %                |
| Atmospheric pressure | : | 101 kPa             |

For the measurement records, refer to the appendix C.

**Prüfbericht - Nr.: CN22DJA9 002**

Test Report No.:

Seite 18 von 26

Page 18 of 26

## 5.1.5 99% Bandwidth

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

|                   |   |                                          |
|-------------------|---|------------------------------------------|
| Test standard     | : | FCC Part 15.247(a)<br>RSS-Gen Clause 6.7 |
| Basic standard    | : | ANSI C63.10: 2013                        |
| Kind of test site | : | Shielded Room                            |

**Test Setup**

|                      |   |                     |
|----------------------|---|---------------------|
| Date of testing      | : | 2022-04-06          |
| Input voltage        | : | AC 120V, 60Hz       |
| Operation mode       | : | A, B                |
| Test channel         | : | Low / Middle / High |
| Ambient temperature  | : | 24.8 °C             |
| Relative humidity    | : | 55 %                |
| Atmospheric pressure | : | 101 kPa             |

For the measurement records, refer to the appendix B & C.

**Prüfbericht - Nr.: CN22DJA9 002**

Test Report No.:

Seite 19 von 26

Page 19 of 26

## 5.1.6 20dB Bandwidth

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

|                   |   |                                                |
|-------------------|---|------------------------------------------------|
| Test standard     | : | FCC Part 15.247(a)(1)<br>RSS-247 Clause 5.1(a) |
| Basic standard    | : | ANSI C63.10: 2013                              |
| Kind of test site | : | Shielded Room                                  |

**Test Setup**

|                      |   |                     |
|----------------------|---|---------------------|
| Date of testing      | : | 2022-04-06          |
| Input voltage        | : | AC 120V, 60Hz       |
| Operation mode       | : | A                   |
| Test channel         | : | Low / Middle / High |
| Ambient temperature  | : | 24.8 °C             |
| Relative humidity    | : | 55 %                |
| Atmospheric pressure | : | 101 kPa             |

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 20 von 26

Page 20 of 26

## 5.1.7 Carrier Frequency Separation

RESULT:

Pass

### Test Specification

|                   |                                                                        |
|-------------------|------------------------------------------------------------------------|
| Test standard     | : FCC Part 15.247(a)(1)<br>RSS-247 Clause 5.1(b)                       |
| Basic standard    | : ANSI C63.10: 2013                                                    |
| Limits            | : $\geq 25\text{kHz}$ or $2/3$ of 20dB bandwidth, whichever is greater |
| Kind of test site | : Shielded Room                                                        |

### Test Setup

|                      |                       |
|----------------------|-----------------------|
| Date of testing      | : 2022-04-06          |
| Input voltage        | : AC 120V, 60Hz       |
| Operation mode       | : C                   |
| Test channel         | : Low / Middle / High |
| Ambient temperature  | : 24.8 °C             |
| Relative humidity    | : 55 %                |
| Atmospheric pressure | : 101 kPa             |

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 21 von 26

Page 21 of 26

## 5.1.8 Number of Hopping Frequency

RESULT:

Pass

### Test Specification

|                   |                                                       |
|-------------------|-------------------------------------------------------|
| Test standard     | : FCC part 15.247(a)(1)(iii)<br>RSS-247 Clause 5.1(d) |
| Basic standard    | : ANSI C63.10: 2013                                   |
| Limits            | : $\geq 15$ non-overlapping channels                  |
| Kind of test site | : Shielded Room                                       |

### Test Setup

|                      |                 |
|----------------------|-----------------|
| Date of testing      | : 2022-04-06    |
| Input voltage        | : AC 120V, 60Hz |
| Operation mode       | : C             |
| Ambient temperature  | : 24.8 °C       |
| Relative humidity    | : 55 %          |
| Atmospheric pressure | : 101 kPa       |

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 22 von 26

Page 22 of 26

## 5.1.9 Time of Occupancy

RESULT:

Pass

### Test Specification

|                   |   |                                                     |
|-------------------|---|-----------------------------------------------------|
| Test standard     | : | FCC part 15.247(a)(1)(iii)<br>RSS-247 Clause 5.1(d) |
| Basic standard    | : | ANSI C63.10: 2013                                   |
| Limits            | : | < 0.4s                                              |
| Kind of test site | : | Shielded Room                                       |

### Test Setup

|                      |   |                     |
|----------------------|---|---------------------|
| Date of testing      | : | 2022-04-06          |
| Input voltage        | : | AC 120V, 60Hz       |
| Operation mode       | : | C                   |
| Test channel         | : | Low / Middle / High |
| Ambient temperature  | : | 24.8 °C             |
| Relative humidity    | : | 55 %                |
| Atmospheric pressure | : | 101 kPa             |

For the measurement records, refer to the appendix B.

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 23 von 26

Page 23 of 26

### 5.1.10 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT:

Pass

**Test Specification**

|                   |                                                                                                                                                                                                                                                                    |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test standard     | : FCC Part 15.247(d)<br>RSS-247 Clause 5.5                                                                                                                                                                                                                         |
| 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);<br>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      | : Refer to test result |
| Input voltage        | : AC 120V, 60Hz        |
| Operation mode       | : A, B                 |
| Test channel         | : Low / Middle / High  |
| Ambient temperature  | : 24.8 °C              |
| Relative humidity    | : 55 %                 |
| 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 B & C.

Prüfbericht - Nr.: CN22DJA9 002

Test Report No.:

Seite 24 von 26

Page 24 of 26

## 5.1.11 Radiated Spurious Emission

RESULT:

Pass

### Test Specification

|                   |                                                                          |
|-------------------|--------------------------------------------------------------------------|
| Test standard     | : FCC Part 15.247(d) & FCC Part 15.205<br>RSS-247 Clause 3.3             |
| Basic standard    | : ANSI C63.10: 2013                                                      |
| Limits            | : Refer to 15.209(a) of FCC part 15.247(d)<br>RSS-Gen Section 8.9 & 8.10 |
| Kind of test site | : 3m Semi-anechoic Chamber                                               |

### Test Setup

|                      |                        |
|----------------------|------------------------|
| Date of testing      | : 2022-04-16           |
| Input voltage        | : AC 120V, 60Hz        |
| Operation mode       | : A, B                 |
| 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 B & C.

Prüfbericht - Nr.: CN22DJA9 002  
Test Report No.:Seite 25 von 26  
Page 25 of 26

## 5.1.12 Radiated Emissions

RESULT:

Pass

### Test Specification

|                   |                                                            |
|-------------------|------------------------------------------------------------|
| Test standard     | : FCC Part 15.109(a) & 15.209(a)<br>ICES-003 Section 3.2.2 |
| Basic standard    | : ANSI C63.4:2014                                          |
| Frequency range   | : Refer to FCC Part15.33                                   |
| Classification    | : Class B                                                  |
| Limits            | : FCC Part 15.109(a) & 15.209(a)<br>ICES-003 Table 2 & 4   |
| Kind of test site | : 3m Semi-Anechoic Chamber                                 |

### Test Setup

|                      |                            |
|----------------------|----------------------------|
| Date of testing      | : 2022-04-12 to 2022-04-17 |
| Input voltage        | : AC 120V, 60Hz            |
| Operation mode       | : D, E                     |
| Earthing             | : Not connected            |
| Ambient temperature  | : Refer to test result     |
| Relative humidity    | : Refer to test result     |
| Atmospheric pressure | : 101 kPa                  |

This testing was carried out on all operation modes, but only the worst case was presented in this report.

For the measurement records, refer to the appendix D.

## 6 Photographs of the Test Set-Up

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

## 7 List of Tables

|                                                                                      |    |
|--------------------------------------------------------------------------------------|----|
| Table 1: List of Test and Measurement Equipment .....                                | 5  |
| Table 2: Measurement Uncertainty .....                                               | 6  |
| Table 3: Technical Specification of EUT .....                                        | 8  |
| Table 4: RF Channel and Frequency of Bluetooth BR/EDR.....                           | 9  |
| Table 5: RF Channel and Frequency of Bluetooth LE.....                               | 9  |
| Table 6: Auxiliary Equipment Used during Test.....                                   | 11 |
| Table 7: Test Result of Maximum Peak Conducted Output Power, Bluetooth BR & EDR..... | 15 |
| Table 8: Test Result of Maximum Peak Conducted Output Power, Bluetooth LE .....      | 15 |