

# RF TEST REPORT

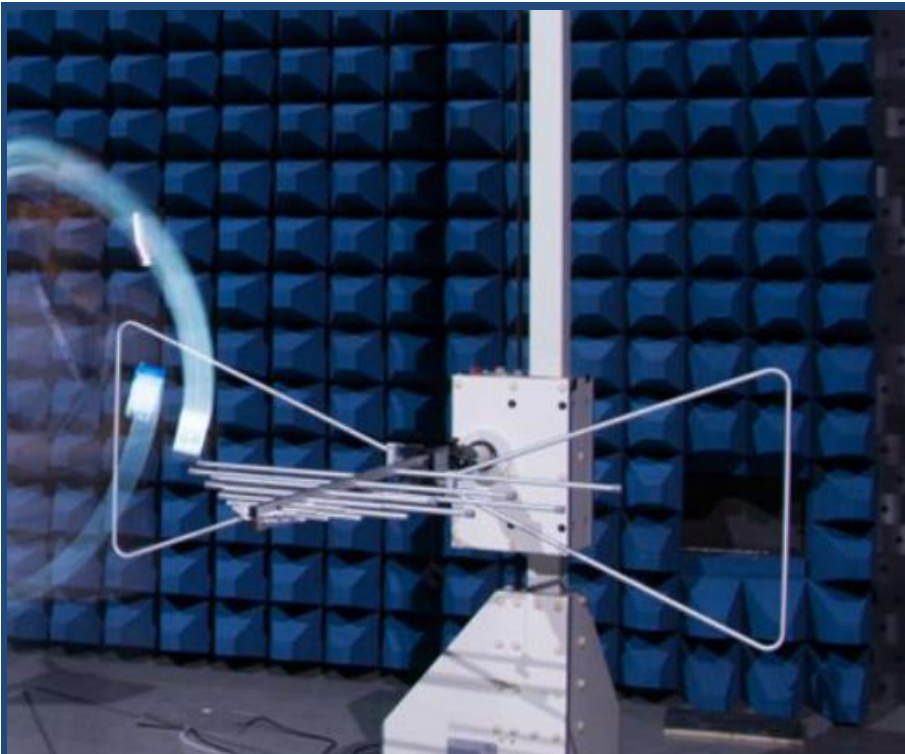
ISSUED BY  
Shenzhen BALUN Technology Co., Ltd.



FOR  
**Hand Hygiene Sensor**

ISSUED TO  
CENTRAK, INC.

826 Newtown Yardley Road, Newtown, Pennsylvania 18940, United States



Tested by: Xiong Chong

Xiong Chong

Date Mar. 10, 2022

Approved by: Jm Liao

Liao Jianming

(Technical Director)

Date Mar. 10, 2022

Report No.: BL-SZ21B1060-402  
EUT Name: Hand Hygiene Sensor  
Model Name: IT-376 (refer section 2.4)  
Brand Name: Centrak  
Test Standard: 47 CFR Part 15 Subpart C  
RSS-310 Issue 5  
RSS-Gen Issue 5  
(refer section 3.1)  
FCC ID: ST2-IT376B

Test Conclusion: Pass  
Test Date: Dec. 06, 2021  
Date of Issue: Mar. 10, 2022

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### Revision History

| Version        | Issue Date           | Revisions                                                                                        |
|----------------|----------------------|--------------------------------------------------------------------------------------------------|
| <u>Rev. 01</u> | <u>Feb. 28, 2022</u> | <u>Initial Issue</u>                                                                             |
| <u>Rev. 02</u> | <u>Mar. 10, 2022</u> | <u>Modify the name and address of the applicant</u><br><u>Update Product Type in section 2.6</u> |

## TABLE OF CONTENTS

|         |                                                          |    |
|---------|----------------------------------------------------------|----|
| 1       | GENERAL INFORMATION.....                                 | 4  |
| 1.1     | Identification of the Testing Laboratory .....           | 4  |
| 1.2     | Identification of the Responsible Testing Location ..... | 4  |
| 1.3     | Laboratory Condition .....                               | 4  |
| 1.4     | Announce .....                                           | 4  |
| 2       | PRODUCT INFORMATION.....                                 | 5  |
| 2.1     | Applicant Information .....                              | 5  |
| 2.2     | Manufacturer Information .....                           | 5  |
| 2.3     | Factory Information .....                                | 5  |
| 2.4     | General Description for Equipment under Test (EUT) ..... | 5  |
| 2.5     | Ancillary Equipment .....                                | 5  |
| 2.6     | Technical Information.....                               | 5  |
| 3       | SUMMARY OF TEST RESULTS.....                             | 6  |
| 3.1     | Test Standards.....                                      | 6  |
| 3.2     | Verdict .....                                            | 6  |
| 3.3     | Test Uncertainty .....                                   | 6  |
| 4       | GENERAL TEST CONFIGURATIONS.....                         | 7  |
| 4.1     | Test Environments .....                                  | 7  |
| 4.2     | Test Equipment List .....                                | 7  |
| 4.3     | Test Setups .....                                        | 8  |
| 5       | TEST ITEMS.....                                          | 10 |
| 5.1     | Emission Tests.....                                      | 10 |
| ANNEX A | TEST RESULTS.....                                        | 14 |
| A.1     | Radiated Emission .....                                  | 14 |
| A.2     | Conducted Emission .....                                 | 15 |

|         |                           |    |
|---------|---------------------------|----|
| A.3     | Emissions Bandwidth ..... | 15 |
| ANNEX B | TEST SETUP PHOTOS .....   | 16 |
| ANNEX C | EUT EXTERNAL PHOTOS ..... | 16 |
| ANNEX D | EUT INTERNAL PHOTOS ..... | 16 |

# 1 GENERAL INFORMATION

## 1.1 Identification of the Testing Laboratory

|              |                                                                                                                                 |
|--------------|---------------------------------------------------------------------------------------------------------------------------------|
| Company Name | Shenzhen BALUN Technology Co., Ltd.                                                                                             |
| Address      | Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Phone Number | +86 755 6685 0100                                                                                                               |

## 1.2 Identification of the Responsible Testing Location

|               |                                                                                                                                                                                                                     |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Location | Shenzhen BALUN Technology Co., Ltd.                                                                                                                                                                                 |
| Address       | Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China                                                                                     |
| Description   | All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055 |

## 1.3 Laboratory Condition

|                           |                    |
|---------------------------|--------------------|
| Ambient Temperature       | 20°C to 25°C       |
| Ambient Relative Humidity | 30% to 60%         |
| Ambient Pressure          | 100 kPa to 102 kPa |

## 1.4 Announce

- (1) The test report reference to the report template version v1.2.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.
- (7) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

## 2 PRODUCT INFORMATION

### 2.1 Applicant Information

|           |                                                                         |
|-----------|-------------------------------------------------------------------------|
| Applicant | CENTRAK, INC.                                                           |
| Address   | 826 Newtown Yardley Road, Newtown, Pennsylvania 18940,<br>United States |

### 2.2 Manufacturer Information

|              |                                                                         |
|--------------|-------------------------------------------------------------------------|
| Manufacturer | CENTRAK, INC.                                                           |
| Address      | 826 Newtown Yardley Road, Newtown, Pennsylvania 18940,<br>United States |

### 2.3 Factory Information

|         |                                                                                                |
|---------|------------------------------------------------------------------------------------------------|
| Factory | Concord Electronic ( Huizhou) Ltd.                                                             |
| Address | 21, Ping An Rd, Shuikou Street, Hui Cheng District, Huizhou City,<br>Guangdong Province, China |

### 2.4 General Description for Equipment under Test (EUT)

|                                              |                                                                                                                  |
|----------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| EUT Name                                     | Hand Hygiene Sensor                                                                                              |
| Model Name Under Test                        | IT-376                                                                                                           |
| Series Model Name                            | IT-376 H                                                                                                         |
| Description of Model<br>name differentiation | All models are same with electrical parameters and internal circuit<br>structure, but only differ in model name. |
| Hardware Version                             | V[A]                                                                                                             |
| Software Version                             | V3.0                                                                                                             |
| Dimensions (Approx.)                         | N/A                                                                                                              |
| Weight (Approx.)                             | N/A                                                                                                              |

### 2.5 Ancillary Equipment

Note: Not applicable.

### 2.6 Technical Information

|                                      |                        |
|--------------------------------------|------------------------|
| Network and Wireless<br>connectivity | RFID, 125kHz (Only TX) |
|--------------------------------------|------------------------|

The requirement for the following technical information of the EUT was tested in this report:

|                         |                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Modulation Type         | ASK                                                                                                                      |
| Product Type            | <input checked="" type="checkbox"/> Mobile<br><input type="checkbox"/> Portable<br><input type="checkbox"/> Fix Location |
| Frequency Range         | 125kHz                                                                                                                   |
| Receiver Categorization | N/A                                                                                                                      |
| Number of channel       | 1                                                                                                                        |
| Tested Channel          | 1                                                                                                                        |
| Antenna Type            | Coil Antenna                                                                                                             |

### 3 SUMMARY OF TEST RESULTS

#### 3.1 Test Standards

| No. | Identity                                          | Document Title                                                     |
|-----|---------------------------------------------------|--------------------------------------------------------------------|
| 1   | 47 CFR Part 15,<br>Subpart C<br>(10-1-19 Edition) | Intentional Radiators                                              |
| 2   | ANSI C63.10-2013                                  | American National Standard for Testing Unlicensed Wireless Devices |
| 3   | RSS-Gen Issue 5                                   | General Requirements for Compliance of Radio Apparatus             |
| 4   | RSS-310 Issue 5                                   | Licence-Exempt Radio Apparatus: Category II Equipment              |

#### 3.2 Verdict

| No. | Description                     | FCC Part No.         | ISED Part No.               | Test Result | Verdict |
|-----|---------------------------------|----------------------|-----------------------------|-------------|---------|
| 1   | Radiated Emission               | 15.209,15.215<br>(b) | RSS-310 10.6<br>RSS-Gen 8.9 | Annex A.1   | Pass    |
| 2   | Conducted Emission, AC<br>Ports | 15.207               | RSS-Gen 8.8                 | Annex A.2   | N/A     |
| 3   | Emissions Bandwidth             | N/A                  | RSS-Gen 6.7                 | Annex A.3   | Pass    |

#### 3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .

| Measurement                        | Value   |
|------------------------------------|---------|
| Conducted emissions (9 kHz-30 MHz) | 2.96 dB |
| Radiated emissions (30 MHz-1 GHz)  | 3.67 dB |
| Radiated emissions (1 GHz-18 GHz)  | 3.57 dB |

## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Environments

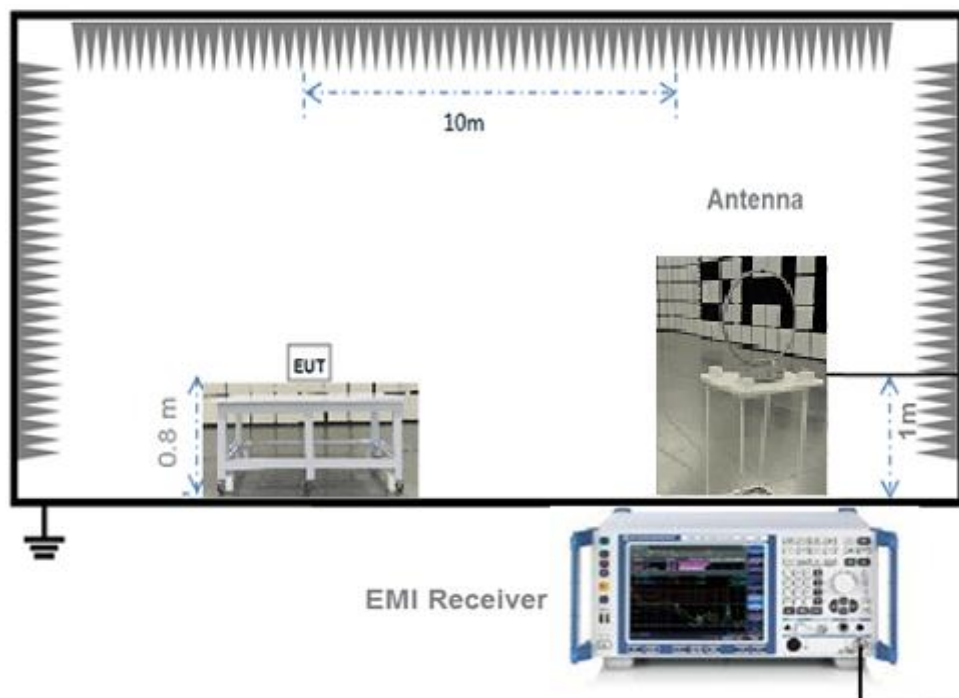
|                            |                         |      |
|----------------------------|-------------------------|------|
| Relative Humidity          | 30% to 60%              |      |
| Atmospheric Pressure       | 100 kPa to 102 kPa      |      |
| Temperature                | NT (Normal Temperature) | 25°C |
| Working Voltage of the EUT | NV (Normal Voltage)     | 3.3V |

### 4.2 Test Equipment List

| Description                               | Manufacturer                  | Model                 | Serial No.     | Cal. Date  | Cal. Due   |
|-------------------------------------------|-------------------------------|-----------------------|----------------|------------|------------|
| EMI Receiver                              | ROHDE&SCHWARZ                 | ESRP                  | 101036         | 2021.10.10 | 2022.10.09 |
| Test Antenna-<br>Loop(9 kHz-30<br>MHz)    | SCHWARZBECK                   | FMZB 1519             | 1519-037       | 2021.04.16 | 2024.04.15 |
| Test Antenna-<br>Bi-Log(30 MHz-<br>3 GHz) | SCHWARZBECK                   | VULB 9163             | 9163-624       | 2021.08.20 | 2024.08.19 |
| Anechoic<br>Chamber                       | EMC Electronic Co.,<br>Ltd    | 20.10*11.60*7<br>.35m | N/A            | 2021.08.15 | 2024.08.14 |
| EMI Receiver                              | KEYSIGHT                      | N9010B                | MY5711030<br>9 | 2021.10.10 | 2022.10.09 |
| LISN                                      | SCHWARZBECK                   | NSLK 8127             | 8127-687       | 2021.06.08 | 2022.06.07 |
| Shielded<br>Enclosure                     | YiHeng Electronic<br>Co., Ltd | 3.5m*3.1m*2.<br>8m    | N/A            | 2019.08.16 | 2022.08.15 |
| Test Software                             | BALUN                         | BL410_E               | V19.918        | --         | --         |

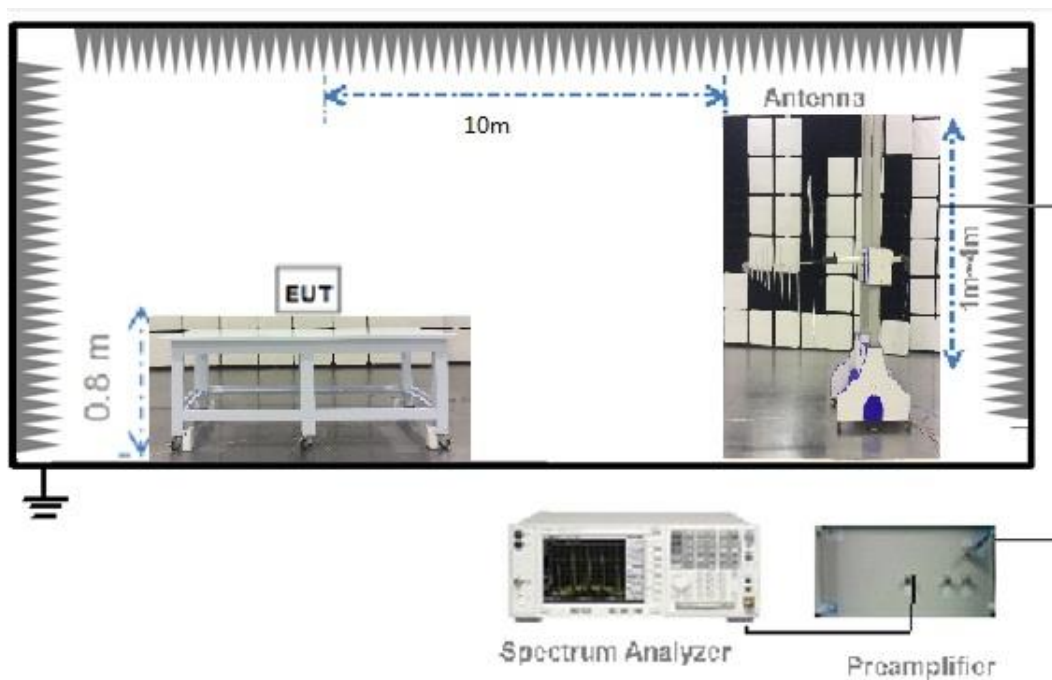
### 4.3 Test Setups

#### Test Setup 1



For Radiated Emission Test (Below 30 MHz))

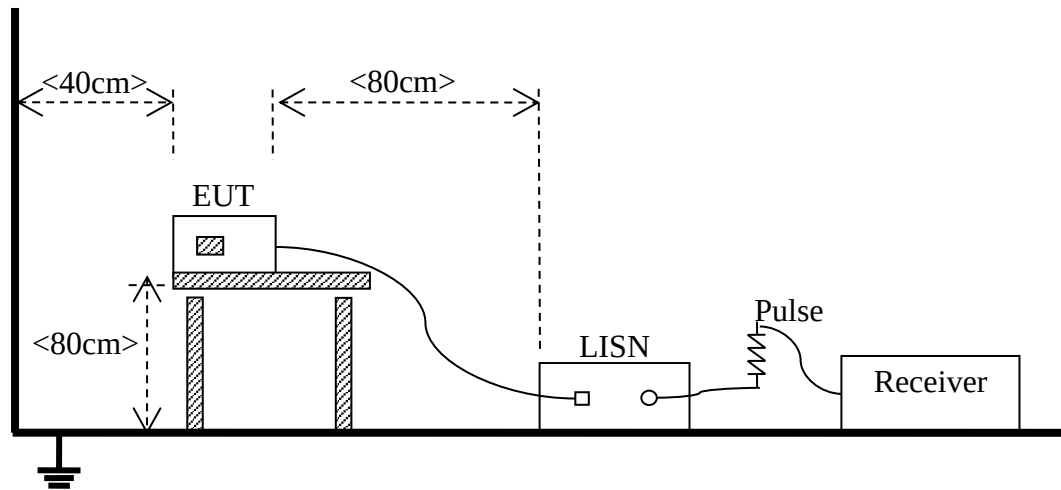
#### Test Setup 2



(For Radiated Emission Test (30 MHz-1 GHz))



### Test Setup 3



(For Conducted Emission, AC Ports Test)

## 5 TEST ITEMS

### 5.1 Emission Tests

#### 5.1.1 Radiated Emission

##### 5.1.1.1 Limit

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ ) | Measurement Distance (m) |
|-----------------|------------------------------------|--------------------------|
| 0.009 - 0.490   | $2400/F(\text{kHz})$               | 300                      |
| 0.490 - 1.705   | $24000/F(\text{kHz})$              | 30                       |
| 1.705 - 30.0    | 30                                 | 30                       |
| 30 - 88         | 100                                | 3                        |
| 88 - 216        | 150                                | 3                        |
| 216 - 960       | 200                                | 3                        |
| Above 960       | 500                                | 3                        |

NOTE:

- 1) Field Strength ( $\text{dB}\mu\text{V/m}$ ) =  $20 \cdot \log [\text{Field Strength } (\mu\text{V/m})]$ .
- 2) In the emission tables above, the tighter limit applies at the band edges.
- 3) For above 1000 MHz, limit field strength of harmonics: 54  $\text{dB}\mu\text{V/m}@3\text{ m}$  (AV) and 74  $\text{dB}\mu\text{V/m}@3\text{ m}$  (PK)
- 4) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). For example, at the frequency 9 kHz, limit @10m =  $20 \cdot \log (2400/f) + 40 \log (d_{\text{limit}}/d_{\text{measure}})$  where limit = 300m,  $d_{\text{measure}}=10\text{m}$ . limit @10m =  $20 \cdot \log (2400/9) + 40 \log (300/10) = 107.5$  ( $\text{dB}\mu\text{V/m}$ ).
- 5) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided, When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements). For example, at the frequency 30 MHz, limit @10m =  $20 \cdot \log (100) + 20 \log (d_{\text{limit}}/d_{\text{measure}})$  where limit = 3m,  $d_{\text{measure}}=10\text{m}$ . limit @10m =  $20 \cdot \log (100) + 20 \log (3/10) = 29.5$  ( $\text{dB}\mu\text{V/m}$ ).

##### 5.1.1.2 Test Setup

Refer to 4.3 section (test setup 1 to test setup 2) for radiated emission test, the photo of test setup please refer to ANNEX B.

##### 5.1.1.3 Test Procedure

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

An initial pre-scan was performed in the chamber using the EMI Receiver in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bi-Log antenna with 2 orthogonal polarities.

##### 5.1.1.4 Test Result

Please refer to ANNEX A.1.

## NOTE:

1. Results (dBuV/m) = Reading (dBuV/m) + Factor (dB/m)

The reading level is calculated by software which is not shown in the sheet

2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain (dB)

3. Over limit = Results – Limit.

## 5.1.2 Conducted Emission

### 5.1.2.1 Test Limit

| Frequency range<br>(MHz) | Conducted Limit (dBμV) |          |
|--------------------------|------------------------|----------|
|                          | Quasi-peak             | Average  |
| 0.15 - 0.50              | 66 to 56               | 56 to 46 |
| 0.50 - 5                 | 56                     | 46       |
| 5 - 30                   | 60                     | 50       |

NOTE:

- 1) The limit is applicable to Class B ITE.
- 2) The lower limit shall apply at the band edges.
- 3) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50 MHz.

### 5.1.2.2 Test Setup

Refer to 4.3 section test (test setup 3) for conducted emission, the photo of test setup please refer to ANNEX B.

### 5.1.2.3 Test Procedure

The EUT is connected to the power mains through a LISN which provides 50 Ω/50 μH of coupling impedance for the measuring instrument. The test frequency range is from 150 kHz to 30 MHz. The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels that are more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

### 5.1.2.4 Test Result

Please refer to ANNEX A.2.

NOTE:

1. Results (dBuV) = Reading (dBuV) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Over limit = Results – Limit.

### 5.1.3 Emission bandwidth

#### 5.1.3.1 Limit

FCC §15.215(c)

The 20 dB bandwidth is known as the 99% emission bandwidth, or 20 dB bandwidth ( $10 \cdot \log 1\% = 20$  dB) taking the total RF output power.

#### 5.1.3.2 Test Setup

Refer to 4.3 section test (test setup 1) for test setup description for the antenna port. The photo of test setup please refer to ANNEX B.

#### 5.1.3.3 Test Procedure

Use the following spectrum analyzer settings:

Span = between 2 to 5 times the OBW

RBW = 1% to 5% the OBW

VBW  $\geq$  3RBW

Sweep = auto

Detector function = peak

Trace = max hold

The 99% emission bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = between 1.5 to 5 times the OBW

RBW = 1% to 5% OBW

VBW  $\geq$  3RBW

Sweep = auto

Detector function = peak

Trace = max hold

The EUT should be transmitting at its maximum data rate, Allow the trace to stabilize.

#### 5.1.3.4 Test Result

Please refer to ANNEX A.3.

## ANNEX A TEST RESULTS

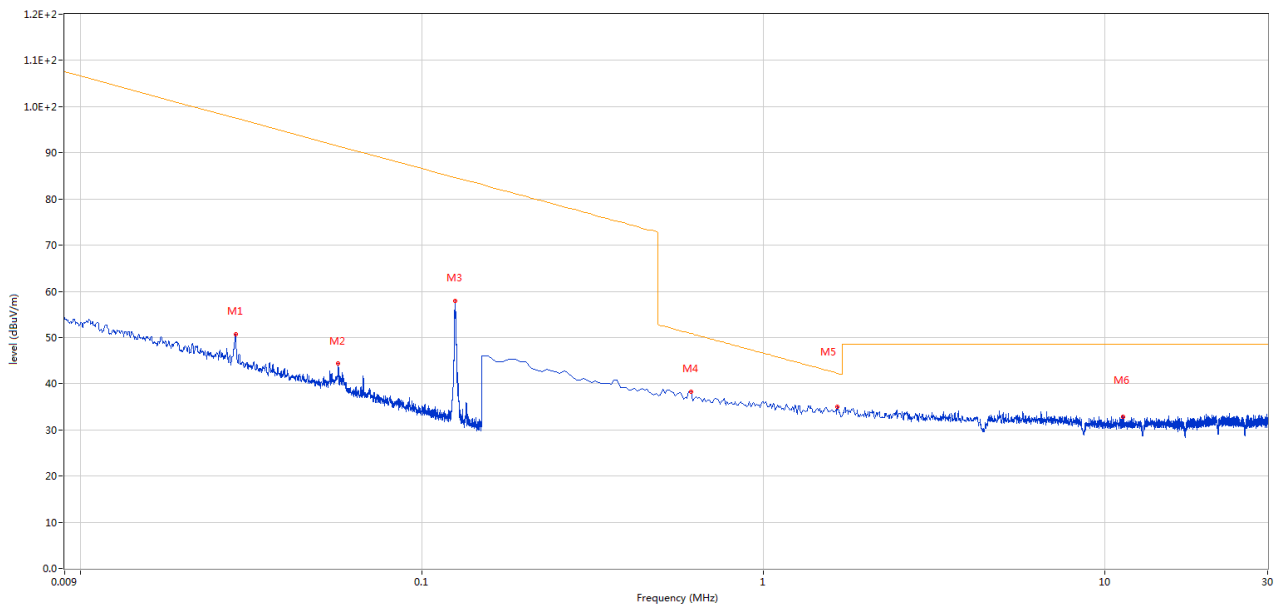
### A.1 Radiated Emission

Note<sup>1</sup>: The symbol of “--” in the table which means not application.

Note<sup>2</sup>: For the test data above 1 GHz, according the ANSI C63.4-2014, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

#### Test Data and Plots

##### A.1.1 Test Antenna Vertical, 9 kHz –30 MHz



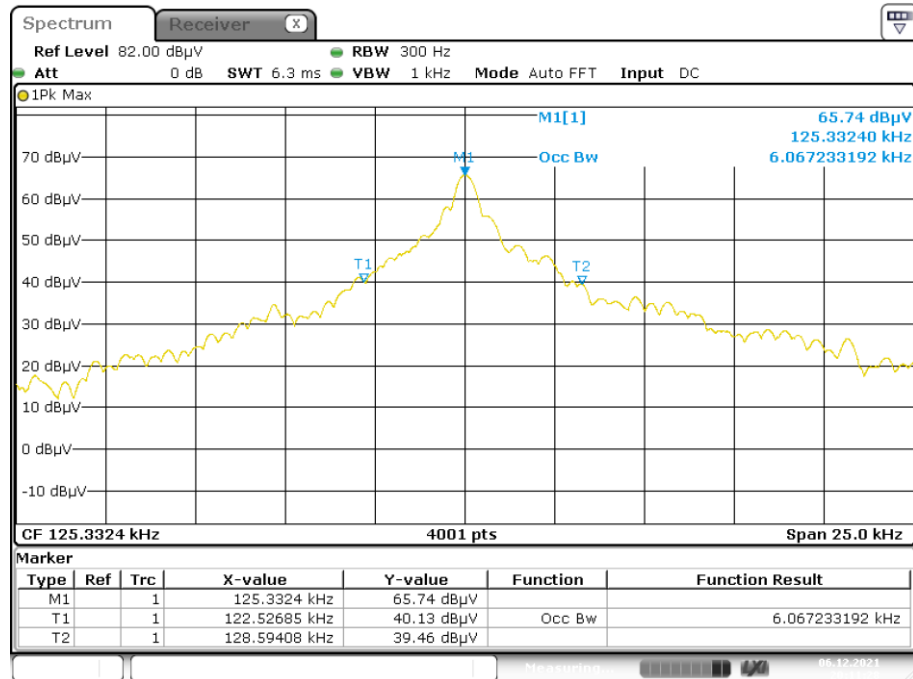
| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Over Limit (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-----------------|----------|----------------|-------------|----------|---------|
| 1   | 0.029           | 50.64            | 20.15       | 97.5           | -46.86          | Peak     | 318.00         | 100         | Vertical | Pass    |
| 2   | 0.057           | 44.35            | 20.20       | 91.5           | -47.15          | Peak     | 1.00           | 100         | Vertical | Pass    |
| 3   | 0.125           | 57.92            | 20.15       | 84.6           | -26.68          | Peak     | 292.00         | 100         | Vertical | N/A     |
| 4   | 0.613           | 38.24            | 20.34       | 50.9           | -12.66          | Peak     | 236.00         | 100         | Vertical | Pass    |
| 5   | 1.650           | 35.08            | 20.46       | 42.3           | -7.22           | Peak     | 360.00         | 100         | Vertical | Pass    |
| 6   | 11.314          | 32.89            | 20.83       | 48.5           | -15.61          | Peak     | 200.00         | 100         | Vertical | Pass    |

## A.2 Conducted Emission

Note: Not applicable.

## A.3 Emissions Bandwidth

### Test Data and Plots



Date: 6.DEC.2021 20:11:28

## **ANNEX B TEST SETUP PHOTOS**

Please refer the document “BL-SZ21B1060-AE-2.PDF”.

## **ANNEX C EUT EXTERNAL PHOTOS**

Please refer the document “BL-SZ21B1060-AW.PDF”.

## **ANNEX D EUT INTERNAL PHOTOS**

Please refer the document “BL-SZ21B1060-AI.PDF”.

--END OF REPORT--