

Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 1 of 17

TEST REPORT

Application No.: KSCR2402000267AT
FCC ID: WBKF224041
Applicant: Bravo Tech Inc.
Address of Applicant: 11205 Knott Avenue, Suite A, Cypress, CA 90630
Manufacturer: Bravo Tech Inc.
Address of Manufacturer: 11205 Knott Avenue, Suite A, Cypress, CA 90630
Equipment Under Test (EUT):

EUT Name: 5G NR Femtocell

Model No.: hCELL-F2240

Trade mark:



Standard(s) : FCC Part 2
FCC Part 27

Date of Receipt: 2024-03-01

Date of Test: 2024-03-02 to 2024-03-15

Date of Issue: 2024-03-21

| | |
|---------------------|-------------|
| Test Result: | Pass |
|---------------------|-------------|

* In the configuration tested, the EUT complied with the standards specified above.

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 2 of 17

| Revision Record | | | | |
|-----------------|----------|------------|----------|--------|
| Version | Chapter | Date | Modifier | Remark |
| 00 | Original | 2024-03-22 | | / |
| | | | | |
| | | | | |

| | | | |
|--------------------------|--|------------|--|
| Authorized for issue by: | | | |
| Tested By | | Cloud Peng | |
| Approved By | | Terry Hou | |
| | | | |
| | | | |



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 3 of 17

2 Test Summary

| Test Item | FCC Rule No. | Verdict |
|--|--------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(h) | PASS |
| Peak-Average Ratio | §27.50(h) | PASS |
| Modulation Characteristics | §2.1047 | PASS |
| Bandwidth | §2.1049(h) | PASS |
| Band Edge Compliance | §2.1051, §27.53(m) | PASS |
| Spurious emissions at antenna terminals | §2.1051, §27.53(m) | PASS |
| Field strength of spurious radiation | §2.1053, §27.55 | PASS |
| Frequency stability | §2.1055, §27.54 | PASS |

Remark:
EUT: In this whole report EUT means Equipment Under Test.
Tx: In this whole report Tx (or tx) means Transmitter.
Rx: In this whole report Rx (or rx) means Receiver.

3 Contents

| | Page |
|---|------|
| 1 COVER PAGE | 1 |
| 2 Test Summary | 3 |
| 3 Contents | 4 |
| 4 General Information | 5 |
| 4.1 Details of E.U.T. | 5 |
| 4.2 Test Frequency | 5 |
| 4.3 Test Support Unit | 6 |
| 4.4 Measurement Uncertainty | 6 |
| 4.5 Test Location | 7 |
| 4.6 Test Facility | 7 |
| 4.7 Deviation from Standards | 7 |
| 4.8 Abnormalities from Standard Conditions | 7 |
| 5 Equipment List | 8 |
| 6 Radio Spectrum Matter Test Results | 9 |
| 6.1 Effective (Isotropic) Radiated Power Output Data | 9 |
| 6.2 Peak-Average Ratio | 10 |
| 6.3 Bandwidth | 11 |
| 6.4 Band Edge Compliance | 12 |
| 6.5 Spurious emissions at antenna terminals | 13 |
| 6.6 Field strength of spurious radiation | 14 |
| 6.7 Frequency stability | 16 |
| 7 Test Setup Photographs | 17 |
| 8 EUT Constructional Details | 17 |



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 5 of 17

4 General Information

4.1 Details of E.U.T.

| | |
|--------------------|---|
| Product Name: | 5G Femto |
| Model No.: | nCELL-F2240 |
| Antenna Type: | Internal Antenna |
| Antenna Gain: | Max Antenna Gain 5.0 dBi (Provided by manufacturer) |
| Power Supply: | DC 12V/5A |
| Test Voltage | DC 12V |
| Sample Type: | Fixed device |
| Support Bandwidth: | 40MHz ,60MHz,80MHz,100MHz |
| Type of Modulation | 5G NR: CP-OFDM: 64QAM, 256QAM |
| Frequency Band: | 5GNR N41 |
| Frequency Range: | 2496MHz-2690MHz |
| Antenna Delivery: | 2T2R MIMO |

4.2 Test Frequency

| 5G NR Band n41 (2496-2690MHz) | SCS | Carrier | Bandwidth (MHz) | Channel | | |
|----------------------------------|-----|---------|-----------------|---------|---------|------|
| | | | | Low | Middle | High |
| 30kHz | 1CC | 40 | 2516.01 | 2592.99 | 2670.00 | |
| 30kHz | 1CC | 60 | 2526.00 | 2592.99 | 2659.98 | |
| 30kHz | 1CC | 80 | 2536.02 | 2592.99 | 2649.99 | |
| 30kHz | 1CC | 100 | 2546.01 | 2592.99 | 2640.00 | |



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 6 of 17

4.3 Test Support Unit

| Description | Manufacture | Model No. | S/N |
|-------------|-------------|-----------|------------|
| Notebook | ThinkPad | K27 | EB24537645 |

4.4 Measurement Uncertainty

| No. | Item | Measurement Uncertainty |
|-----|---------------------------------|--|
| 1 | Radio Frequency | 8.4×10^{-8} |
| 2 | Timeout | 2s |
| 3 | Duty Cycle | 0.37% |
| 4 | Occupied Bandwidth | 3% |
| 5 | RF Conducted Power | 0.6dB |
| 6 | RF Power Density | 2.9dB |
| 7 | Conducted Spurious Emissions | 0.75dB |
| 8 | RF Radiated Power | 5.2dB (Below 1GHz) 5.9dB (Above 1GHz) |
| 9 | Radiated Spurious Emission Test | 4.2dB (Below 30MHz) 4.5dB (30MHz-1GHz) 5.1dB (1GHz-18GHz) 5.4dB (Above 18GHz) |
| 10 | Temperature Test | 1°C |
| 11 | Humidity Test | 3% |
| 12 | Supply Voltages | 1.5% |
| 13 | Time | 3% |

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 7 of 17

4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

- 1.SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
- 2.SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).
3. Sample source: sent by customer.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

- **FCC**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

- **ISED**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

- **VCCI**

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 8 of 17

5 Equipment List

| Item | Equipment | Manufacturer | Model | Inventory No | Cal Date | Cal. Due Date |
|--------------------------|--------------------------------------|--------------------|--------------|-------------------|--------------------------|--------------------------|
| RF Conducted Test | | | | | | |
| 1 | Spectrum Analyzer | Keysight | N9020A | KUS1911E004-2 | 08/24/2023 | 08/23/2024 |
| 2 | Spectrum Analyzer | Keysight | N9020A | KUS2001M001-2 | 08/24/2023 | 08/23/2024 |
| 3 | Spectrum Analyzer | Keysight | N9030B | KSEM021-1 | 02/02/2024 | 02/01/2025 |
| 4 | Signal Generator | R&S | SMBV100B | KSEM032 | 03/16/2023 03/15/2024 | 03/15/2024 03/14/2025 |
| 5 | Signal Generator | R&S | SMW200A | KSEM020-1 | 08/24/2023 | 08/23/2024 |
| 6 | Signal Generator | Agilent | N5182A | KUS2001M001-1 | 08/24/2023 | 08/23/2024 |
| 7 | Radio Communication Test Station | Anritsu | MT8000A | KSEM001-1 | 08/24/2023 | 08/23/2024 |
| 8 | Radio Communication Analyzer | Anritsu | MT8821C | KSEM002-1 | 03/16/2023 03/15/2024 | 03/15/2024 03/14/2025 |
| 9 | Universal Radio Communication Tester | R&S | CMW500 | KUS1911E004-1 | 08/24/2023 | 08/23/2024 |
| 10 | Switcher | CCSRF | FY562 | KUS2001M001-3 | 08/24/2023 | 08/23/2024 |
| 11 | AC Power Source | EXTECH | 6605 | KS301178 | N.C.R | N.C.R |
| 12 | DC Power Supply | Agilent | E3632A | KS301180 | N.C.R | N.C.R |
| 13 | Conducted Test Cable | Thermax | RF01-RF04 | CZ301111-CZ301120 | 02/02/2024 | 02/01/2025 |
| 14 | Temp. / Humidity Chamber | TERCHY | MHK-120AK | KS301190 | 08/24/2023 | 08/23/2024 |
| 15 | Temperature & Humidity Recorder | Renke Control | RS-WS-N01-6J | KSEM024-5 | 03/22/2023 | 03/21/2024 |
| 16 | Software | BST | TST-PASS | / | N/A | N/A |
| RF Radiated Test | | | | | | |
| 1 | Spectrum Analyzer | R&S | FSV40 | KUS1806E003 | 08/24/2023 | 08/23/2024 |
| 2 | Universal Radio Communication Tester | R&S | CMW500 | KSEM009-1 | 03/16/2023 03/15/2024 | 03/15/2024 03/14/2025 |
| 3 | Signal Generator | Agilent | E8257C | KS301066 | 08/24/2023 | 08/23/2024 |
| 4 | Loop Antenna | COM-POWER | AL-130R | KUS1806E001 | 03/18/2023 | 03/17/2025 |
| 5 | Bilog Antenna | TESEQ | CBL 6112D | KUS1806E005 | 06/29/2023 | 06/28/2025 |
| 6 | Bilog Antenna | SCHWARZBEC K | VULB9160 | CZ301016 | 04/13/2021 | 04/12/2024 |
| 7 | Horn-antenna(1-18GHz) | Schwarzbeck | BBHA9120D | KS301079 | 04/02/2022 | 04/01/2024 |
| 8 | Horn-antenna(1-18GHz) | ETS-LINDGREN | 3117 | KS301186 | 02/18/2024 | 02/17/2025 |
| 9 | Horn Antenna(18-40GHz) | Schwarzbeck | BBHA9170 | CZ301058 | 02/18/2024 | 02/17/2025 |
| 10 | Horn Antenna(18-40GHz) | Schwarzbeck | BBHA9170 | KS301187 | 02/18/2024 | 02/17/2025 |
| 11 | Amplifier(30MHz-18GHz) | PANSHAN TECHNOLOGY | LNA:1~18G | KSEM010-1 | 01/15/2024 | 01/14/2025 |
| 12 | Amplifier(18~40GHz) | TST | LNA180400G40 | KSEM038 | 08/24/2023 | 08/23/2024 |
| 13 | RE Test Cable | REBES MICROWAVE | / | CZ301097 | 08/24/2023 | 08/23/2024 |
| 14 | Temperature & Humidity Recorder | Renke Control | RS-WS-N01-6J | KSEM024-4 | 03/22/2023 | 03/21/2024 |
| 15 | Software | Faratronic | EZ_EMCA-3A1 | / | N/A | N/A |

6 Radio Spectrum Matter Test Results

6.1 Effective (Isotropic) Radiated Power Output Data

Test Requirement: §2.1046, §27.50(h)

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: EIRP \leq 63dBm

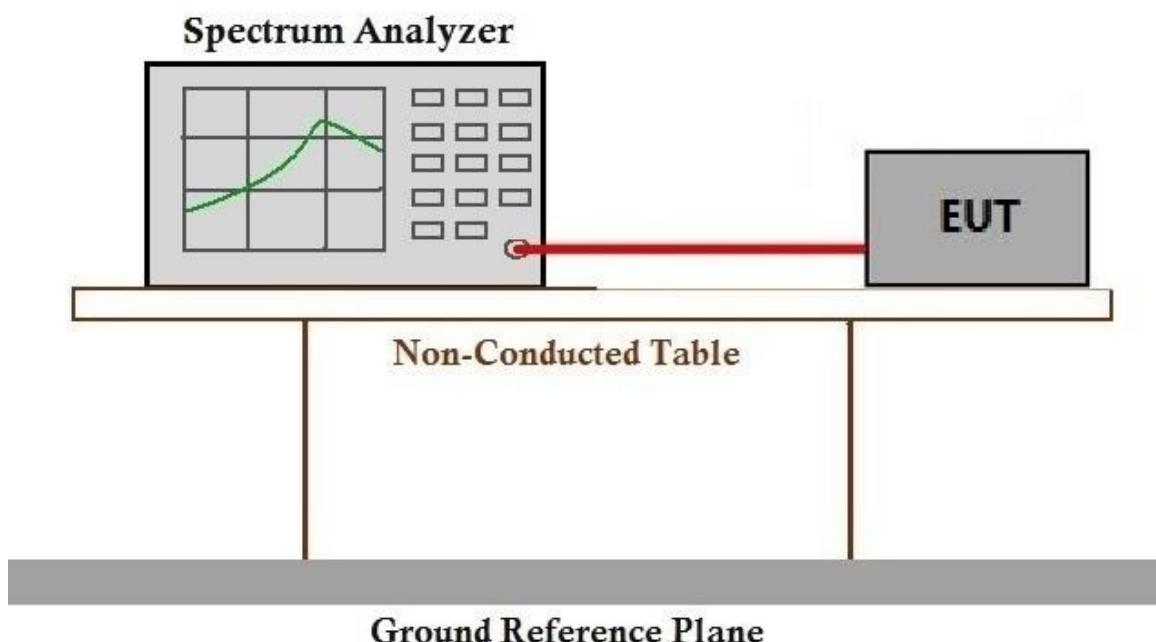
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41

6.2 Peak-Average Ratio

Test Requirement: §27.50(h)

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: ≤13dB

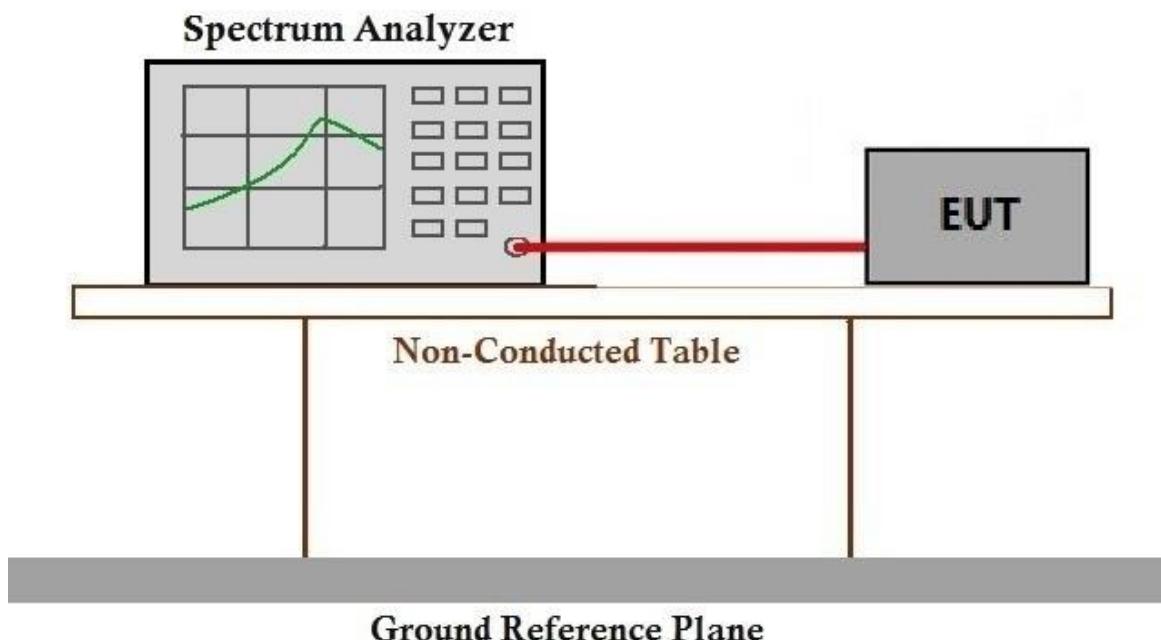
6.2.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41

6.3 Bandwidth

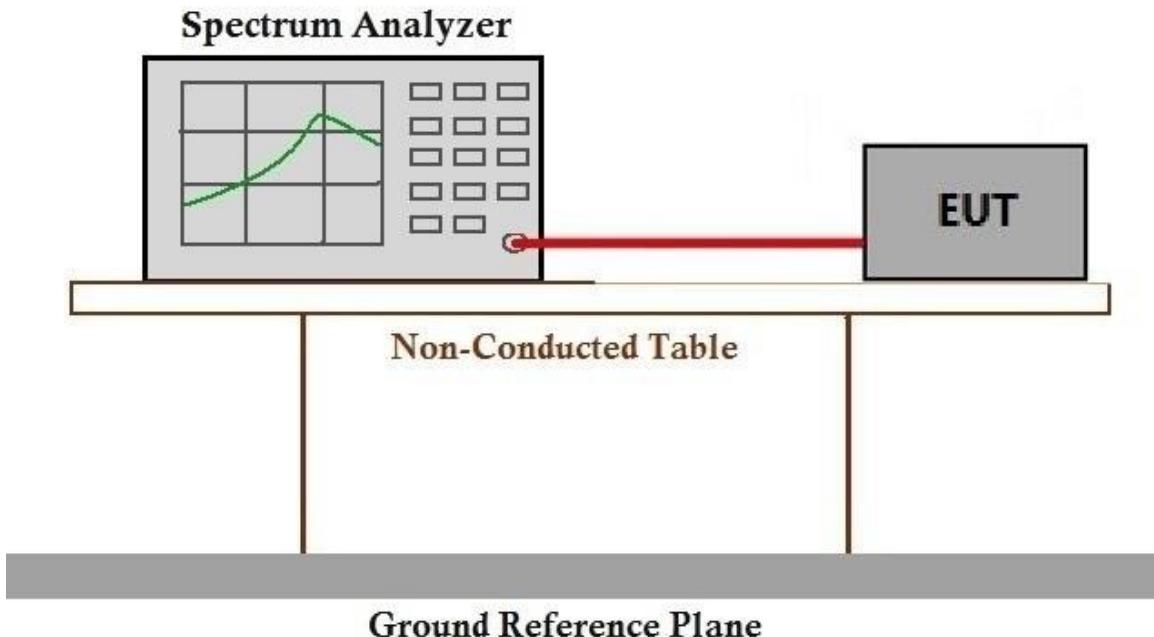
Test Requirement: §2.1049(h)
Test Method: ANSI C63.26, KDB 971168 D01 v03
Limit: OBW: No limit
EBW: No limit

6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar
Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41

6.4 Band Edge Compliance

Test Requirement: §2.1051, §27.53(m)

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm/MHz}$

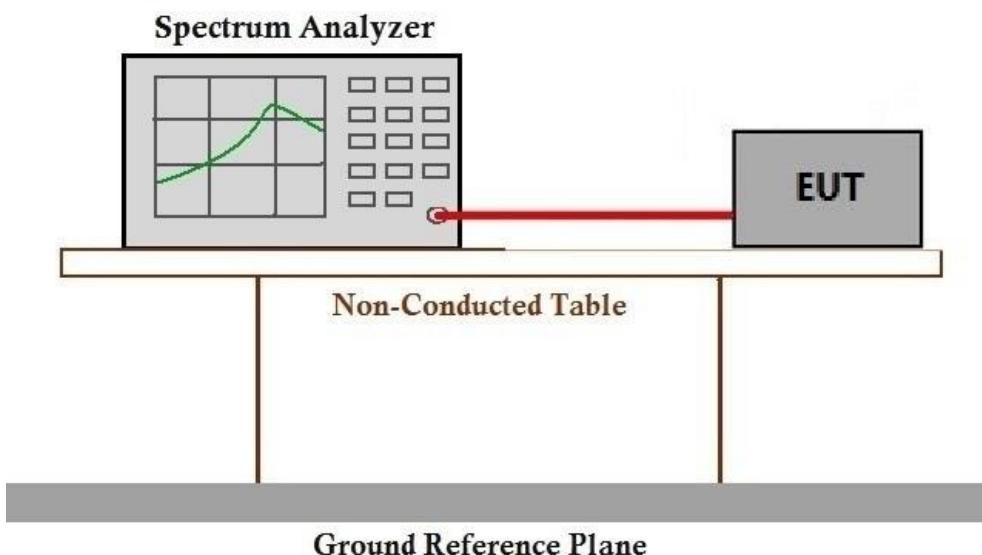
6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.4.2 Test Setup Diagram



6.4.3 Measurement Data

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41

6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §27.53(m)

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm/MHz}$

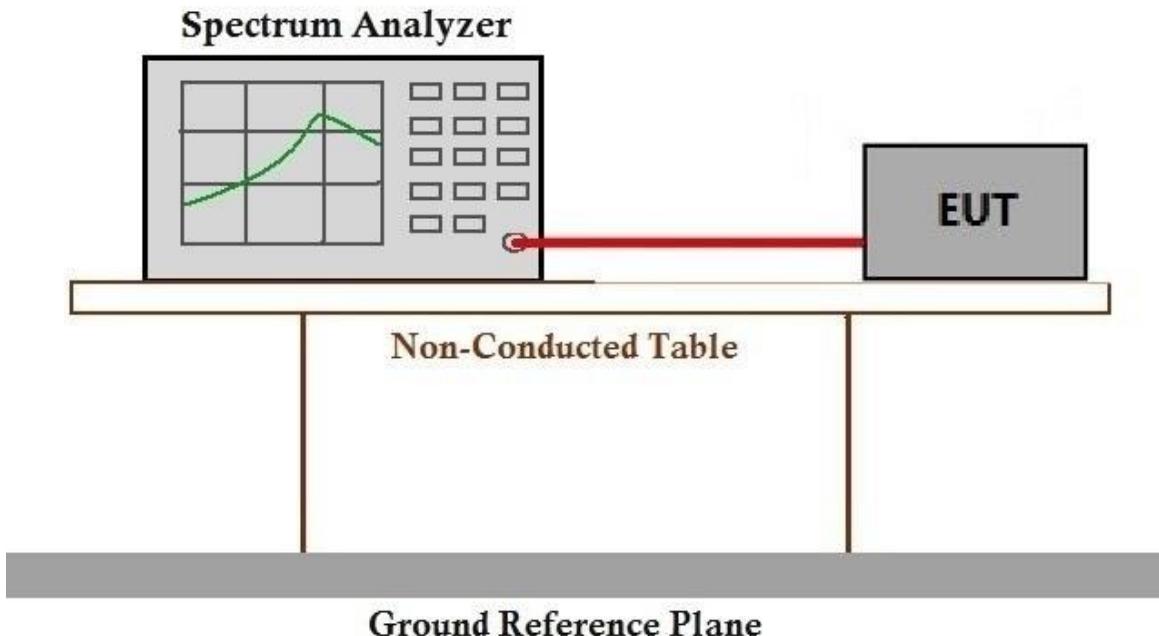
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.5.2 Test Setup Diagram



6.5.3 Measurement Data

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41

6.6 Field strength of spurious radiation

Test Requirement: §2.1053, §27.55

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: $\leq -13\text{dBm/MHz}$

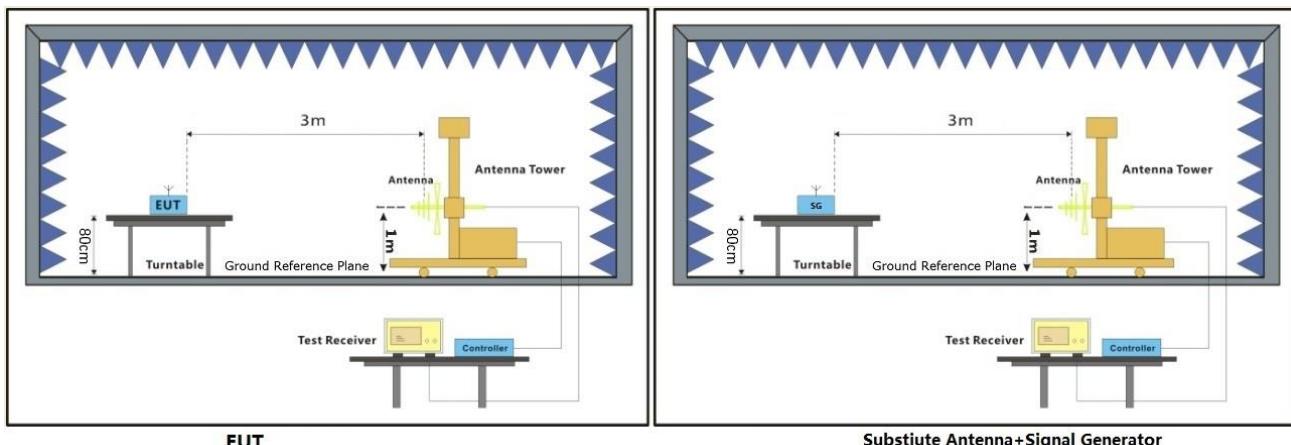
6.6.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.6.2 Test Setup Diagram



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 15 of 17

6.6.3 Measurement Procedure and Data

Test Procedure:

- (1)On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.
- (2)The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.
- (3)The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
- (4)The transmitter shall be switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
- (5)The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
- (6)The transmitter shall than be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- (7)The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
- (8)The maximum signal level detected by the measuring receiver shall be noted.
- (9)The measurement shall be repeated with the test antenna set to horizontal polarization.
- (10) Replace the antenna with a proper Antenna (substitution antenna).
- (11)The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
- (12)The substitution antenna shall be connected to a calibrated signal generator.
- (13)If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- (14)The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- (15)The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
- (16)The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
- (17)The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41

6.7 Frequency stability

Test Requirement: §2.1055

Test Method: ANSI C63.26, KDB 971168 D01 v03

Limit: Fundamental emission stays within authorized frequency block

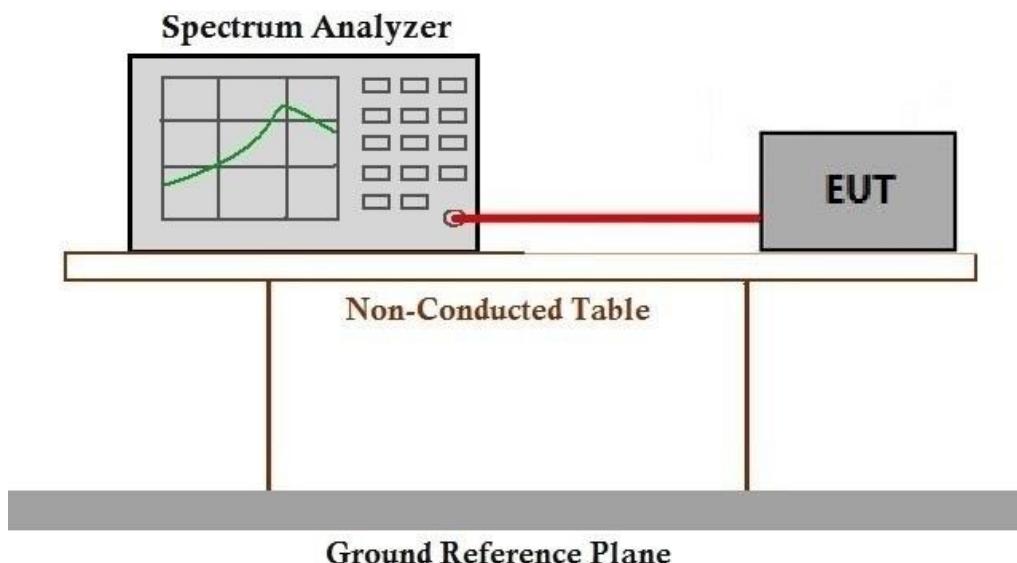
6.7.1 E.U.T. Operation

Operating Environment:

Temperature: 20.4 °C Humidity: 56.4 % RH Atmospheric Pressure: 1030 mbar

Test mode: 00: Tx mode, Keep the EUT in transmitting mode.

6.7.2 Test Setup Diagram



6.7.3 Measurement Data

Please refer to Appendix for KSCR2402000267AT-FCC-NR-n41



Compliance Certification Services (Kunshan) Inc.

CCSEM-TRF-001 Rev. 02 Sep 01, 2023

Report No.: KSCR240200026701

Page: 17 of 17

7 Test Setup Photographs

Refer to the < Test Setup photos-FCC>.

8 EUT Constructional Details

Refer to the < External Photos > & < Internal Photos >.

- End of the Report -