

TEST REPORT

Application No.: GZCR2306000569AT
Applicant: Corning Optical Communication LLC
Address of Applicant: 6 Concord Road, Shrewsbury, Massachusetts, United States
Manufacturer: Comba Network Systems Company Limited
Address of Manufacturer: No. 10 Shenzhou Road, Guangzhou Science City, Guangzhou 510663, Guangdong, P.R.China

Equipment Under Test (EUT):

EUT Name: Digital Medium-power Remote Unit
Model No.: dMRU-G2-2325
Trade Mark: Corning
Standard(s) : 47 CFR Part 2
47 CFR Part 20
47 CFR Part 27
Date of Receipt: 2023-06-08
Date of Test: 2023-06-15 to 2023-07-12
Date of Issue: 2023-07-17

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

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



Ricky Liu
Manager



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| Revision Record | | | |
|-----------------|------------------|------------|----------|
| Version | Chapter | Date | Remark |
| 01 | GZCR230600056903 | 2023-07-17 | Original |
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|---------------------------------|--|--------------------------------------|--|
| Authorized for issue by: | | | |
| | | <i>Kevin Zhang</i> | |
| | | Kevin Zhang /Project Engineer | |
| | | <i>Jerry Chan</i> | |
| | | Jerry Chan /Reviewer | |



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2 Test Summary

| Item | Standard | Method | Requirement | Result |
|---|----------------------|--|---------------------------------|--------|
| Out-of-band rejection | KDB935210 D05 v01r04 | KDB935210 D05 v01r04 clause 3.3 | KDB935210 D05 v01r04 clause 3.3 | Pass |
| Input-versus-output signal comparison | 47 CFR Part 2 | KDB935210 D05 v01r04 clause 3.4 | Part 2.1049 | Pass |
| Mean output power and amplifier/booster gain | 47 CFR Part 27 | KDB935210 D05 v01r04 clause 3.5 | Part 27.50(h) | Pass |
| Out-of-band/out-of-block(including intermodulation) emissions | | KDB935210 D05 v01r04 clause 3.6 | Part 27.53(m) | Pass |
| Conducted spurious emissions | | KDB935210 D05 v01r04 clause 3.6 | Part 27.53(m) | Pass |
| Frequency stability | | 47 CFR Part 2.1055 KDB935210 D05 v01r04 clause 3.7 ANSI C63.26-2015 Clause 5.6 | Part 27.54 | Pass |
| Radiated spurious emissions | | KDB935210 D05 v01r04 clause 3.8 ANSI C63.26-2015 Clause 5.5 | Part 27.53(m) | Pass |

The EUT is a remote unit of DAS which can be capable of multi-band operation (details refer to clause 4.1 of this report). It receives base-station downlink via fiber-optic or coaxial cable from host unit, transmits via antenna to handset, and returns handset uplink via fiber-optic or coaxial cable to host unit.

Only test for BRS/EBS band downlink in this report.

Note:

E.U.T./ EUT means Equipment Under Test

Pass means the test result passed the test standard requirement, please find the detailed decision rule in the report relative section.



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4 General Information

4.1 Details of EUT

| | | |
|-----------------------------|--|--|
| Power Supply: | AC 100-240V, 50/60Hz | |
| Test Voltage: | AC 110V | |
| Cable: | AC mains (4m, unshielded) | |
| Operating Temperature: | -40 to +55 °C | |
| Operating Humidity: | ≤95% | |
| Frequency Range: | WCS band | Uplink: 2305-2315MHz Downlink: 2350-2360MHz |
| | BRS/EBS band | Uplink: 2496-2690MHz Downlink: 2496-2690MHz |
| | Support Technology: | LTE 5G NR |
| | Support Channel BW: | LTE (for WCS band) |
| LTE (for BRS/EBS band) | | 5MHz/10MHz/20MHz |
| 5G NR (for WCS band) | | 5MHz/10MHz |
| 5G NR (for BRS/EBS band) | | 10MHz/20MHz/40MHz/50MHz/60MHz/80MHz/ 100MHz |
| Interface: | | Antenna Port |
| | CPRI Port | 1 (SFP+) |
| | Debug Port | 1 (RJ-45) |
| Normal Output Power: | 37dBm for WCS band | |
| | (per antenna port, downlink 39dBm for BRS/EBS band | |
| Normal System Gain: | UL | -2dB |
| | DL | 14dB for WCS band |
| | | 16dB for BRS/EBS band |
| EUT MIMO property: | 2×2 MIMO | |
| Antenna Type: | External Dedicated Antenna | |
| Permission Antenna Gain: | 10dBi or less | |
| Software Version: | V01.00.00.04 | |



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4.2 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|--|--------------|-------------------------|------------|
| Notebook | LENOVO | Lenovo Xiaoxinchao 5000 | PF0TNMG8 |
| RIU supplied by the client | Corning | RIU-G2-23 | / |
| | | RIU-G2-25 | / |
| DCU supplied by the client | | DCU-G2 | / |
| DEU supplied by the client | | DEU-G2 | / |
| Mathced load and attenuator supplied by the client | / | / | / |

4.3 Test Environment

| Environment Parameter | Selected Values During Test | |
|-----------------------|-----------------------------|-------------|
| Ralative Humidity | Ambient | |
| Value | Temperature (°C) | Voltage (V) |
| TNVN | Asmbient | AC 110 |
| TLVL | -30 | AC 93.5 |
| TLVH | -30 | AC 126.5 |
| THVL | +50 | AC 93.5 |
| THVH | +50 | AC 126.5 |

VN: Normal Voltage, TN: Normal Teperature

VL: Lower Extreme Voltege, VH: Higher Extreme Voltage

TL: Lower Extreme Teperature, TH: Higher Extreme Teperature

4.4 Measurement Uncertainty

| No. | Item | Measurement Uncertainty |
|-----|--------------------------------|--|
| 1 | RF Output Power | ±0.75dB |
| 2 | Transmitter unwanted emissions | ±0.75dB |
| 3 | Radiated Spurious Emission | ±5.06dB (30MHz-1GHz; 3m); ±4.46dB (30MHz-1GHz; 10m); ±5.08dB (1GHz-6GHz); ±5.14dB (6GHz-18GHz) |
| 4 | Occupied Channel Bandwidth | ± 3% |



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4.5 Test Signals and Test Channels

| DL 2496-2690MHz | | | |
|-----------------|----------------------|-------------|---------------------------|
| Test Channel | Test Frequency (MHz) | Test Signal | Stimulus Condition |
| LCH | 2498.5 | 4.1MHz AWGN | a single test signal |
| MCH | 2593 | | |
| HCH | 2687.5 | | |
| LCH | 2498.5, 2503.5 | 100MHz AWGN | two adjacent test signals |
| HCH | 2682.5, 2687.5 | | |
| LCH | 2546 | 100MHz AWGN | a single test signal |
| MCH | 2593 | | |
| HCH | 2640 | | |
| LCH | 2546, 2646 | GSM-TDMA | two adjacent test signals |
| HCH | 2540, 2640 | | |
| LCH | 2496.4 | GSM-TDMA | a single test signal |
| MCH | 2593 | | |
| HCH | 2689.6 | | |
| LCH | 2496.4, 2496.8 | GSM-TDMA | two adjacent test signals |
| HCH | 2689.2, 2689.6 | | |

4.6 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou Branch EMC Laboratory,
198 Kezhu Road, Sciencetech Park, Guangzhou Economic & Technology Development District,
Guangzhou, China 510663

Tel: +86 20 82155555

Fax: +86 20 82075059

No tests were sub-contracted.



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4.7 Test Facility

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

- **ACMA**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory can also perform testing for the Australian/New Zealand Regulatory Compliance Mark (RCM).

- **SGS UK(Certificate No.: 32), SGS-TUV SAARLAND and SGS-FIMKO**

Have approved SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory as a supplier of EMC TESTING SERVICES and SAFETY TESTING SERVICES.

- **FCC Recognized Accredited Test Firm(Registration No.: 486818)**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: CN5016, Test Firm Registration Number: 486818.

- **ISED (Registration No.: 4620B, CAB identifier: CN0052)**

SGS-CSTC Standards Technical Services Co., Ltd., has been registered by Innovation Science and Economic Development Canada for Wireless Device Testing laboratories to test to Canadian radio equipment requirements. Registration No. 4620B, CAB identifier: CN0052.

- **VCCI (Registration No.: R-12460, C-12584, G-20107 and T-11179)**

The 10m Semi-anechoic chamber, 966 Anechoic Chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-12460, C-12584, G-20107 and T-11179 respectively.

- **CBTL (Lab Code: TL129)**

SGS-CSTC Standards Technical Services Co., Ltd., E&E Laboratory has been assessed and fully comply with the requirements of ISO/IEC 17025:2017, the Basic Rules, IECEE 01 and Rules of procedure IECEE 02, and the relevant IECEE CB-Scheme Operational documents.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None



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5 Equipment List

| Conducted test equipment | | | | | |
|---|----------------------|-----------|--------------|------------|--------------|
| Equipment | Manufacturer | Model No | Inventory No | Cal Date | Cal Due Date |
| Temperature Chamber | GZ GongWen Co.Ltd. | GDJW-100 | EMC0039 | 2023-06-29 | 2024-06-28 |
| MI CABLE | SGS-EMC | 0.8M | EMC2137 | 2021-11-02 | 2023-11-01 |
| MI CABLE | SGS-EMC | 0.8M | EMC2136 | 2021-11-02 | 2023-11-01 |
| EXA Signal Analyzer (10Hz-44GHz) | Keysight | N9010A | EMC2138 | 2022-09-08 | 2023-09-07 |
| MXA Signal Analyzer (10Hz-50GHz) | KEYSIGHT | N9020B | SEM004-24 | 2023-03-20 | 2024-03-19 |
| 4X4 Power Sensor Unit | TST | TSPS2023R | EMC2257 | 2022-09-08 | 2023-09-07 |
| Test Software | TST | V2.0 | GZE100-78 | N/A | N/A |
| ESG vector signal generator (250kHz-6GHz) | Agilent Technologies | E4438C | SEM006-03 | 2023-02-20 | 2024-02-19 |

| Radiated Emissions (30MHz-1GHz) | | | | | |
|---------------------------------------|--------------------------------|---------------|--------------|------------|--------------|
| Equipment | Manufacturer | Model No | Inventory No | Cal Date | Cal Due Date |
| 10m Semi-Anechoic Chamber | ETS | N/A | EMC0530 | 2022-10-16 | 2025-10-15 |
| Chamber cable | HangTianXing | N/A | EMC0542 | 2022-08-24 | 2023-08-23 |
| Amplifier (9kHz-1.3GHz) | HP | 8447F | EMC2065 | 2023-06-14 | 2024-06-13 |
| EMI Test Receiver (1Hz-8GHz) | Rohde & Schwarz | ESW8 | EMC2220 | 2023-05-19 | 2024-05-18 |
| Test Software E3 | Audix | Ver.6.120110a | GZE100-61 | N/A | N/A |
| Trilog Broadband Antenna (25MHz-1GHz) | SCHWARZBECK MESS-ELEKTRONIK | VULB 9168 | EMC2174 | 2022-06-19 | 2025-06-18 |
| TRILOG Broadband Antenna (25M-2GHz) | SCHWARZBECK | VULB 9168 | SEM003-18 | 2022-03-03 | 2025-03-02 |
| EMI Test Receiver (1Hz-8GHz) | Rohde & Schwarz | ESW8 | EMC2220 | 2023-05-19 | 2024-05-18 |



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| Radiated test equipment (above 1GHz) | | | | | |
|---|-----------------------------|-----------------|---------------------|-----------------|---------------------|
| Equipment | Manufacturer | Model No | Inventory No | Cal Date | Cal Due Date |
| 1GHz-26.5 GHz Pre-Amplifier | Agilent | 8449B | EMC0521 | 2022-12-16 | 2023-12-15 |
| Microwave Broadband Preamplifier (18-40GHz) | SCHWARZBECK | BBV 9721 | EMC2172 | 2022-08-24 | 2023-08-23 |
| EMI Test Receiver (10Hz-26.5GHz) | Rohde & Schwarz | ESIB26 | EMC0522 | 2022-12-16 | 2023-12-15 |
| EXA Signal Analyzer (10Hz-44GHz) | Keysight | N9010A | EMC2138 | 2022-09-08 | 2023-09-07 |
| Chamber cable (Above 1GHz) | Scoflex | KMKM-8.0m | EMC0545 | 2022-08-24 | 2024-08-23 |
| Chamber Cable (Below 1GHz) | Scoflex | KMKM-8.0m | EMC0546 | 2022-08-24 | 2024-08-23 |
| Trilog Broadband Antenna (25MHz-1GHz) | SCHWARZBECK | VULB 9160 | EMC2025 | 2022-09-07 | 2023-09-06 |
| Horn Antenna (1GHz-18GHz) | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120D | EMC2026 | 2022-09-21 | 2025-09-20 |
| Horn Antenna 1-18GHz | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120D | EMC2251 | 2022-02-02 | 2025-08-01 |
| Horn Antenna (14-40GHz) | SCHWARZBECK | BBHA 9170 | EMC2041 | 2023-06-18 | 2026-06-17 |
| Broad-Band Horn Antenna (15-40GHz) | Schwarzbeck | BBHA 9170 | SEM003-15 | 2021-7-11 | 2024-7-10 |
| 966 Anechoic Chamber | C.R.T | 9m x 6m x 6m | EMC2142 | 2020-12-20 | 2023-12-19 |
| Test Software E3 | Audix | Ver.6.120110a | GZE100-61 | N/A | N/A |



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6 Radio Spectrum Matter Test Results

6.1 Out-of-band rejection

Test Requirement: KDB 935210 D05 clause 3.3

Test Method: KDB 935210 D05 clause 3.3

Limit: Within the passband

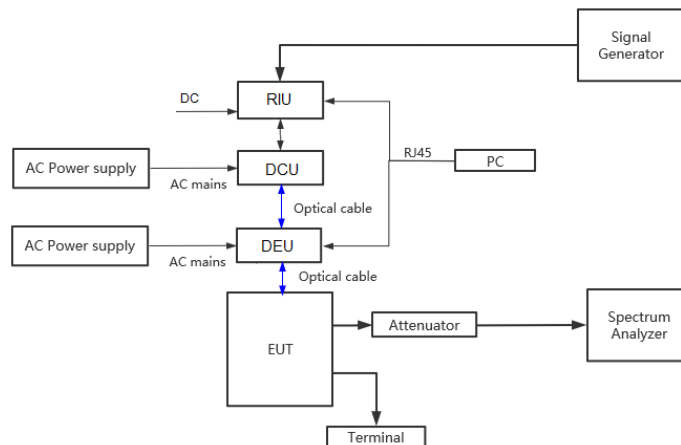
6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23.7 °C Humidity: 58 % RH Atmospheric Pressure: 1010 mbar

EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.1.2 Test Setup



6.1.3 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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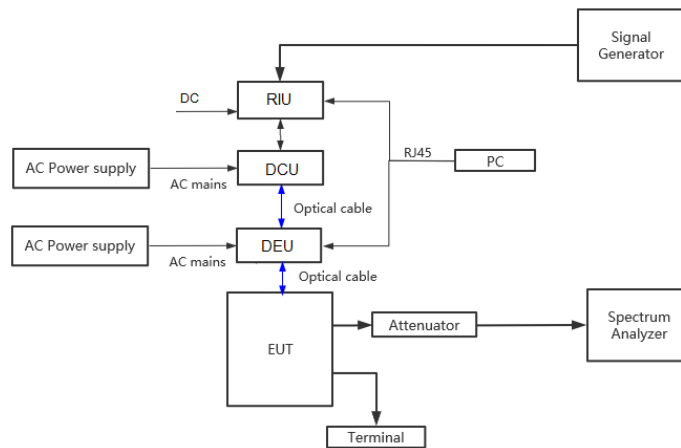
6.2 Input versus output comparison

Test Requirement: 47 CFR Part 2.1049
 Test Method: KDB 935210 D05 clause 3.4
 Limit: The spectral plots of the output signal and the input signal are similar (in passband and rolloff characteristic features and relative spectral locations).

6.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.7 °C Humidity: 58 % RH Atmospheric Pressure: 1010 mbar
 EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.2.2 Test Setup



6.2.3 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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6.3 Mean output power and amplifier/booster gain

Test Requirement: 47 CFR Part 27.50(h)

Test Method: KDB 935210 D05 clause 3.5

Limit:

For main or booster station sectorizes or otherwise uses one or more transmitting antennas with a non-omnidirectional horizontal plane radiation pattern:

$EIRP \leq 33dBW + 10\lg(X/Y) \text{ dBW} + 10\lg(360/\text{beamwidth}) \text{ dBW}$.

For other main or booster:

$EIRP \leq 33dBW + 10\lg(X/Y) \text{ dBW}$

where X is the actual channel width in MHz and Y is either 6 MHz if prior to transition or the station is in the MBS following transition or 5.5 MHz if the station is in the LBS and UBS following transition.

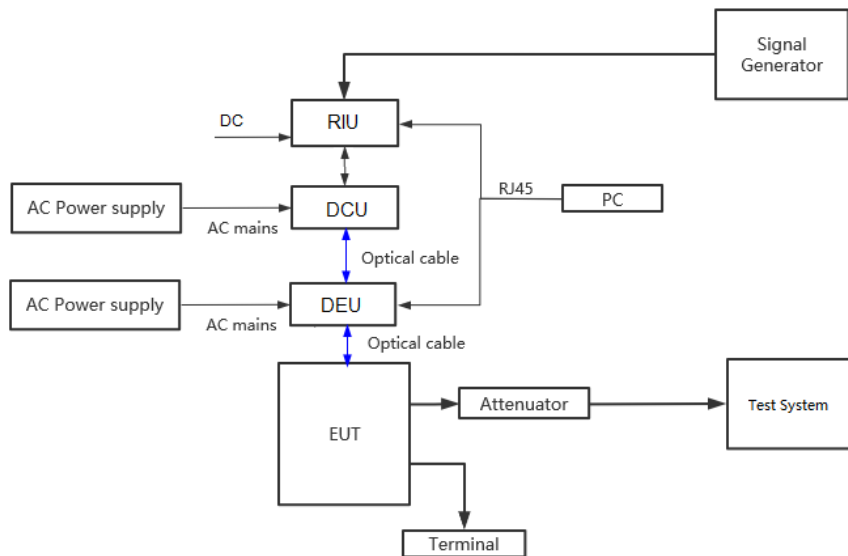
6.3.1 E.U.T. Operation

Operating Environment:

Temperature: 23.7 °C Humidity: 58 % RH Atmospheric Pressure: 1010 mbar

EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.3.2 Test Setup



6.3.3 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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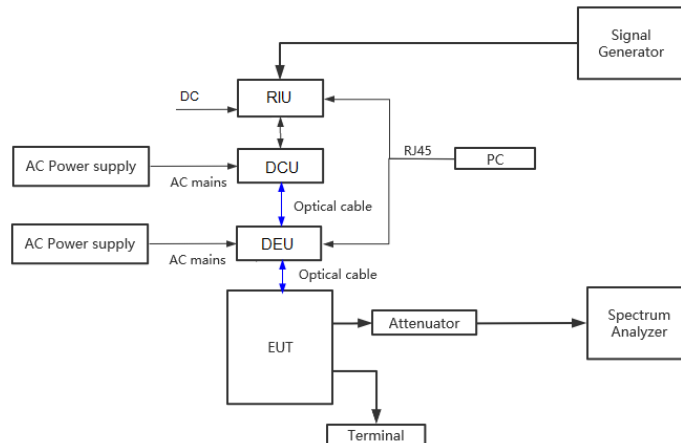
6.4 Out-of-band/out-of-block(including intermodulation) emissions

Test Requirement: 47 CFR Part 27.53(m)
 Test Method: KDB 935210 D05 clause 3.6
 Limit: For digital base stations, the attenuation shall be not less than 43 + 10 log (P) dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area.

6.4.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.7 °C Humidity: 58 % RH Atmospheric Pressure: 1010 mbar
 EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.4.2 Test Setup



6.4.3 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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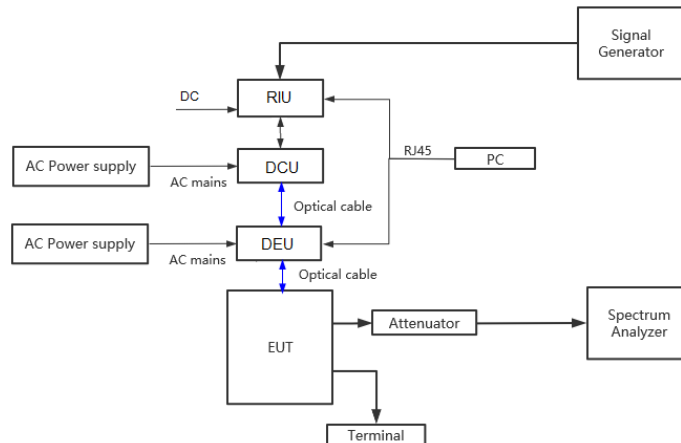
6.5 Conducted Spurious emissions

Test Requirement: 47 CFR Part 27.53(a)
 Test Method: KDB 935210 D05 clause 3.6
 Limit: For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area.

6.5.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.7 °C Humidity: 58 % RH Atmospheric Pressure: 1010 mbar
 EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.5.2 Test Setup



6.5.3 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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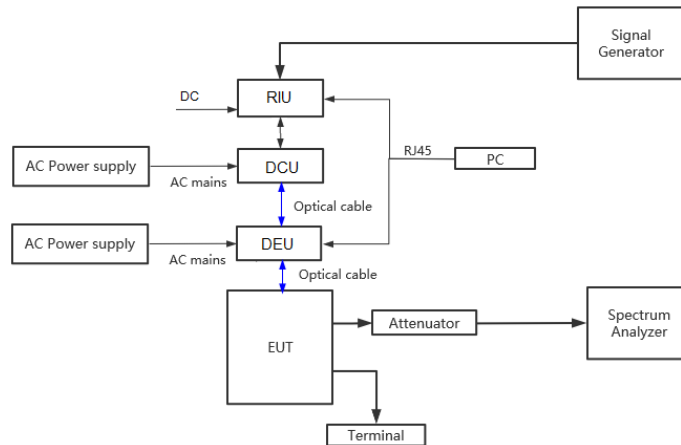
6.6 Frequency Stability

Test Requirement: 47 CFR Part 27.54
 Test Method: 47 CFR Part 2.1055
 KDB 935210 D05 clause 3.7
 ANSI C63.26-2015 clause 5.6
 Limit: The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

6.6.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.7 °C Humidity: 58 % RH Atmospheric Pressure: 1010 mbar
 EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.6.2 Test Setup



6.6.3 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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6.7 Radiated Spurious emission

Test Requirement: 47 CFR Part 27.53(a)

Test Method: KDB 935210 D05 clause 3.8
ANSI C63.26-2015 clause 5.5

Limit: For digital base stations, the attenuation shall be not less than $43 + 10 \log (P)$ dB, unless a documented interference complaint is received from an adjacent channel licensee with an overlapping Geographic Service Area.

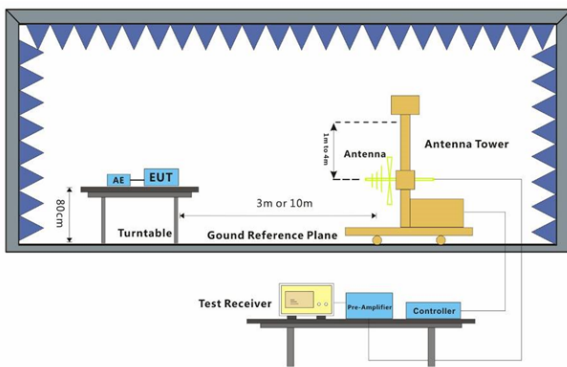
6.7.1 E.U.T. Operation

Operating Environment:

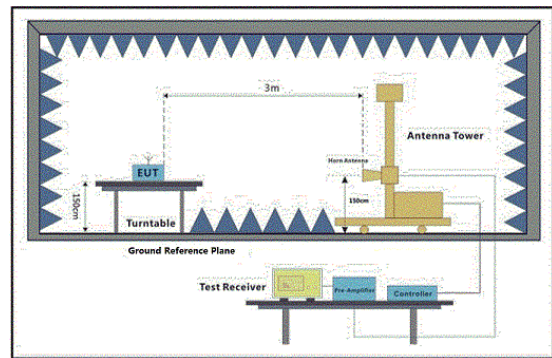
Temperature: 24.7 °C Humidity: 55 % RH Atmospheric Pressure: 1006 mbar

EUT Operation: Drive the EUT to the maximum output power at maximum gain.

6.7.2 Test Setup



below 1GHz



above 1GHz



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6.7.3 Test procedure

1. Scan from 30MHz to 40GHz, find the maximum radiation frequency to measure.
2. The technique used to find the Spurious Emissions of the transmitter was the antenna substitution method. Substitution method was performed to determine the actual ERP/EIRP emission levels of the EUT.

Below 1GHz test procedure as below:

- 1) The EUT was powered on and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length. modulation mode and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- 2) Rotating through 360° the turntable. After the fundamental emission was maximized, a field strength measurement was made.
- 3) Steps 1) and 2) were performed with the EUT and the receive antenna in both vertical and horizontal polarization.
- 4) The transmitter was then removed and replaced with another antenna. The center of the antenna was approximately at the same location as the center of the transmitter.
- 5) A signal at the disturbance was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test receiver. The level of the signal generator was adjusted until the measured field strength level in step 2) is obtained for this set of conditions.
- 6) The output power into the substitution antenna was then measured.
- 7) Steps 5) and 6)were repeated with both antennas vertically polarized.
- 8) Calculate power in dBm by the following formula:

$$\text{Level (dBm)} = \text{Read Level (dBm)} + \text{Correction Factor (dB)}$$

Above 1GHz test procedure as below:

- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber.
 - 2) Calculate power in dBm by the following formula:
- $$\text{Level (dBm)} = \text{Read Level (dBm)} + \text{Correction Factor (dB)}$$

6.7.4 Measurement Record

Please refer to Appendix - Test Data and Result for report GZCR230600056903.



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7 Test Setup Photographs

Refer to Appendix - Test Setup Photos for GZCR2306000569AT.

8 EUT Constructional Details (EUT Photos)

Refer to Appendix - External and Internal Photos for GZCR2306000569AT.

- End of the Report -



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