



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

SZEMC-TRF-01 Rev. A/1

Report No.: SZCR240900339201

Page: 1 of 23

TEST REPORT

Application No.: SZCR2409003392AT
Applicant: Comba Telecom Network Systems Limited
Address of Applicant: Flat/Rm 10, 3/F, Bio-Informatics Ctr, 2 Science Park West Avenue, HK Science Park, Pak Shek Kok, N.T. Hong Kong
Manufacturer: Flexlink Telecom Ltd
Address of Manufacturer: No. 12, Dinghu 3rd St., Guishan Dist., Taoyuan, 333, Taiwan
Equipment Under Test (EUT):
EUT Name: Remote Radio Unit
Model No.: MRU1000
Trade Mark: Comba
FCC ID: PX8MRU1000
Standard(s) : 47 CFR Part 2
47 CFR Part 96
Date of Receipt: 2024-09-02
Date of Test: 2024-09-04 to 2024-09-09
Date of Issue: 2024-09-16

Test Result:

Pass

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

Keny Xu

Keny Xu
EMC Laboratory Manager



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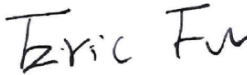


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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2024-09-16		Original

Authorized for issue by:				
				
		Charlie Dai/Project Engineer		
				
		Eric Fu/Reviewer		



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2 Test Summary

Test Item	FCC Rule No.	Requirements	Verdict
Effective (Isotropic) Radiated Output Power Data & Maximum Power Spectral Density	§2.1046 §96.41(b)	Maximum EIRP ≤47 dBm/10MHz Maximum PSD≤37 dBm/MHz Category B CBSD	Pass
Peak-Average Ratio	§96.41(g)	≤13dB	Pass
Bandwidth	§2.1049(h)	OBW: No limit EBW: No limit	Pass
Band Edge Compliance	§2.1051 §96.41(e)	Refer to clause 6.4	Pass
Spurious emissions at antenna terminals	§2.1051 §96.41(e)	Refer to clause 6.5	Pass
Field strength of spurious radiation	§2.1053 §96.41(e)	Refer to clause 6.6	Pass
Frequency stability	§2.1055	≤ ±2.5ppm.	Pass



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4 General Information

4.1 Details of E.U.T.	
Power supply:	Input: 100-240V 50/60Hz
Cable:	AC cable: 400cm unshielded
Category of EUT:	Category B
Operation Frequency Band:	n48 (3550-3700MHz)
Test Mode:	TM1.1, TM3.1, TM3.1a, TM3.2
Type of Modulation:	DFT-s-OFDM PI/2BPSK, DFT-s-OFDM QPSK, DFT-s-OFDM 16QAM, DFT-s-OFDM 64QAM, DFT-s-OFDM 256QAM
Support Channel Bandwidth:	100MHz
Transmission (TX) and Receiving (RX) Antenna Ports:	4*4
MIMO supported	4T4R MIMO
Antenna Type:	External Antenna
Antenna Gain:	Max. 15dBi (Provided by manufacturer)
Cable Loss (for RF conducted test):	2dBi

Note:

- (1) The antenna gain value is provided by the customer. The test lab will not be responsible for wrong test result due to incorrect information about antenna gain values.

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4.2 Test Frequency

Test mode:	Nominal Bandwidth (MHz)	RF Channel		
		Low (L)	Middle (M)	High (H)
		MHz	MHz	MHz
n48	100	3600.0	3624.99	3649.98

4.3 Test Environment

Environment Parameter	Selected Values During Tests	
Relative Humidity	53.1%	
Atmospheric Pressure:	1020Pa	
Temperature:	TL	-30°C
	TN	+25°C
	TH	+50°C
Voltage:	VL	AC 102V
	VN	AC 120V
	VH	AC 138V

NOTE: VL= lower extreme test voltage
 VN= nominal voltage
 VH= upper extreme test voltage
 TL= lower extreme test temperature
 TN= normal temperature
 TH= upper extreme test temperature

4.4 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
5G access unit	Comba	ENB-5186A	HQ3110AN920004550021
Optical interface	Supported by customer	N/A	N/A
RJ45 Cable	Supported by customer	N/A	N/A
Laptop	HP	HP ProBook 6450b	CNU1103KOF



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4.5 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	$\pm 5.4 \times 10^{-8}$
2	Duty cycle	$\pm 0.3\%$
3	Occupied Bandwidth	$\pm 3\%$
4	RF conducted power	$\pm 0.8\text{dB}$
5	RF power density	$\pm 0.4\text{dB}$
6	Conducted Spurious emissions	$\pm 2.7\text{dB}$
7	Radiated Spurious emission test	$\pm 3.1\text{dB}$ (Below 1GHz)
		$\pm 4.4\text{dB}$ (Above 1GHz)
8	Temperature test	$\pm 1^{\circ}\text{C}$
9	Humidity test	$\pm 3\%$
10	Supply voltages	$\pm 1.5\%$
11	Time	$\pm 3\%$



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4.6 Test Location

All tests were performed at:

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No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053

Fax: +86 755 2671 0594

No tests were sub-contracted.

4.7 Test Facility

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

• **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

• **VCCI (Member No. 1937)**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen EMC laboratory have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

• **FCC –Designation Number: CN1336**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1336. Test Firm Registration Number: 787754.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

4.8 Deviation from Standards

None

4.9 Abnormalities from Standard Conditions

None



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5 Equipment List

RF conducted test					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
Programmable DC Source	Chroma	62024P-80-60	SEM011-09	2024-03-29	2025-03-28
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2024-03-20	2025-03-19
MXA Signal Analyzer	KEYSIGHT	N9020B	SEM004-24	2024-03-14	2025-03-13
Measurement Software	TST	TST PASS V2.0	N/A	N/A	N/A
Attenuator	Huber+Suhner	6620_SMA-50-1	SEM021-09	2024-03-27	2025-03-26
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2024-03-27	2025-03-26
Universal Radio Communication Tester	Anritsu	MT8000A	SEM010-10	2024-03-14	2025-03-13
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SEM002-15	2024-03-19	2025-03-18
Power Sensor	KEYSIGHT	U2021XA	SEM009-15	2024-03-20	2025-03-19

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Fully-Anechoic Chamber	AUDIX	N/A	SEM001-02	2024-5-11	2027-5-10
Signal Analyzer	Rohde & Schwarz	FSV40	SEM008-04	2024-03-15	2025-03-14
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2023-07-23	2025-07-22
Microwave system amplifier	Agilent	83017A	SEM005-25	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6-27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM026-01	2024-07-06	2025-07-05
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14
Signal Generator(9kHz-40GHz)	N5173B	MY53270267	Agilent	2023-9-19	2024-09-18
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	SEM003-32	2021-09-26	2024-09-25



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Pre-amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2024-03-15	2025-03-14
Pre-amplifier	Rohde & Schwarz	CH14-H052	SEM005-17	2024-03-15	2025-03-14
Substitution Antenna	Rohde & Schwarz	HF907	SEM003-06	2024-08-03	2025-08-02
Substitution Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2024-08-10	2025-08-09
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2024-03-27	2025-03-26
Universal Radio Communication Tester	Anritsu	MT8000A	SEM010-10	2024-3-14	2025-3-13

RE in Chamber(below 1GHz)					
Test Equipment	Test Equipment	Test Equipment	Test Equipment	Test Equipment	Test Equipment
Loop Antenna	ETS-Lindgren	6502	SEM003-08	2023-11-20	2025-11-19
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2023-06-19	2026-06-18
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2023-10-19	2024-10-18
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-01	2023-09-16	2025-09-15
Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2024-03-14	2025-03-13
Substitution Antenna	Schwarzbeck	VULB9163	SEM003-05	2023-09-16	2025-09-15
Signal Generator(9kHz- 40GHz)	N5173B	MY53270267	Agilent	2023-09-19	2024-09-18
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2024-07-06	2025-07-05
Universal Radio Communication Tester	Rohde & Schwarz	CMW 500	SEM010-03	2024-03-27	2025-03-26
Universal Radio Communication Tester	Anritsu	MT8000A	SEM010-10	2024-3-14	2025-3-13

General used equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Humidity- Temperature Indicator	deli	8838	SEM002-32	2024-07-24	2025-07-23
Humidity- Temperature Indicator	deli	8838	SEM002-33	2024-07-24	2025-07-23
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2024-03-18	2025-03-17



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6 Radio Spectrum Matter Test Results

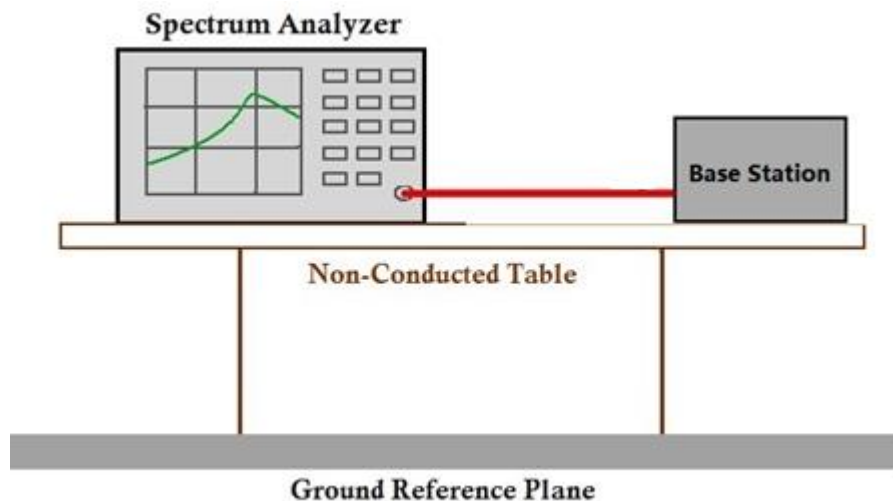
6.1 Effective (Isotropic) Radiated Output Power & Maximum Power Spectral Density

Test Requirement: §2.1046, §96.41(b)
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: Maximum EIRP ≤ 47 dBm/10MHz
 Maximum PSD ≤ 37 dBm/MHz

6.1.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.4 °C Humidity: 51.6 % RH Atmospheric Pressure: 1020 mbar
 Test mode 01: Tx mode, Keep the EUT in transmitting mode.

6.1.2 Test Setup Diagram



6.1.3 Measurement Data

Please refer to Appendix 1 & 2 for N48.
 All modulations have been tested. Only the worst cases, TM1.1 and TM3.1a, are retained in the report.

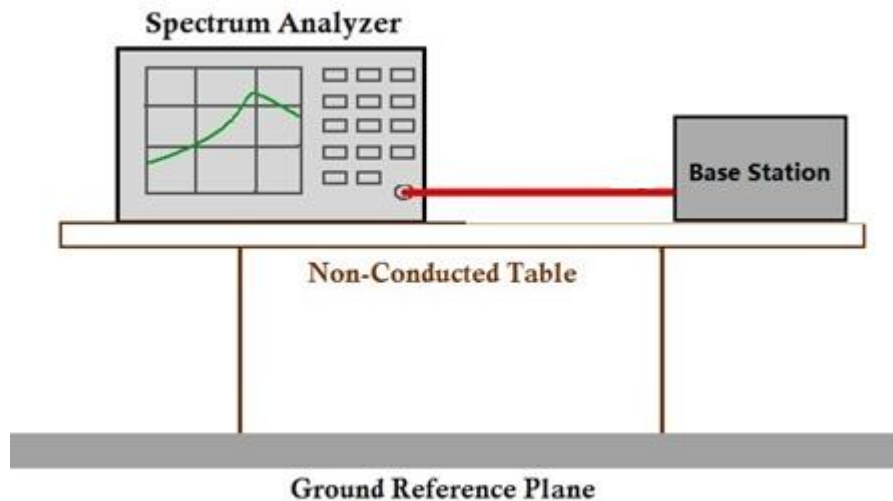
6.2 Peak-Average Ratio

Test Requirement: §96.41(g)
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: ≤13dB

6.2.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.4 °C Humidity: 51.6 % RH Atmospheric Pressure: 1020 mbar
 Test mode 01: Tx mode, Keep the EUT in transmitting mode.

6.2.2 Test Setup Diagram



6.2.3 Measurement Data

Please refer to Appendix 2 for N48.
 All modulations have been tested. Only the worst cases TM3.1a is retained in the report.

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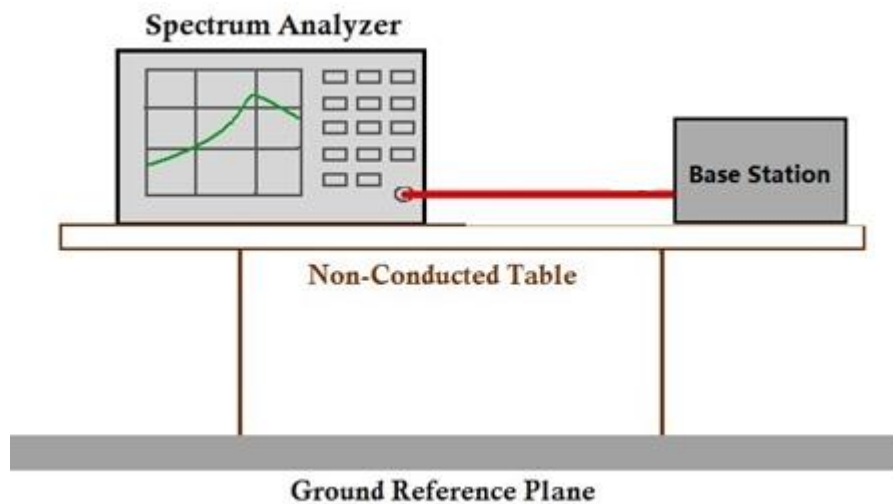
6.3 Bandwidth

Test Requirement: §2.1049(h)
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: OBW: No limit
 EBW: No limit

6.3.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.4 °C Humidity: 51.6 % RH Atmospheric Pressure: 1020 mbar
 Test mode 01: Tx mode, Keep the EUT in transmitting mode.

6.3.2 Test Setup Diagram



6.3.3 Measurement Data

Please refer to Appendix 1&2 for N48.

All modulations have been tested. Only the worst cases, TM1.1 and TM3.1a, are retained in the report.

6.4 Band Edge Compliance

Test Requirement: §2.1051, §96.41(e),

Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01

- Limit:
- 1) The conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30dB.
 - 2) The conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

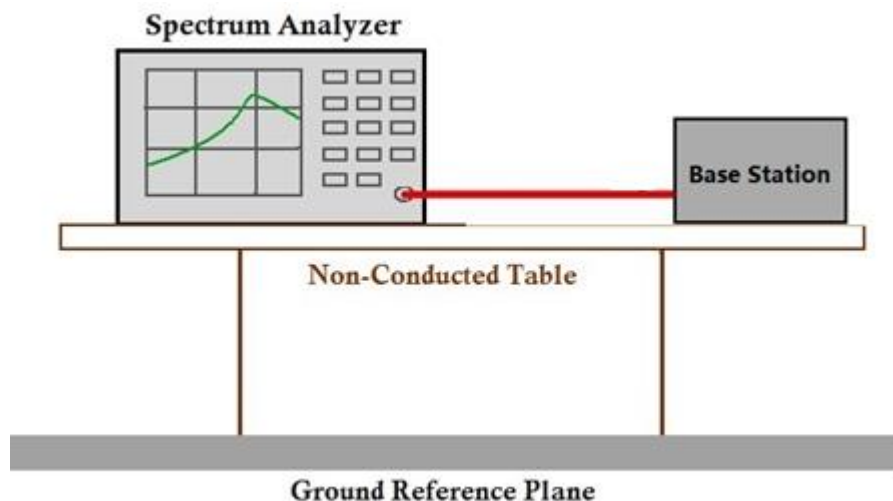
6.4.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 51.6 % RH Atmospheric Pressure: 1020 mbar

Test mode 01: Tx mode, Keep the EUT in transmitting mode.

6.4.2 Test Setup Diagram



6.4.3 Measurement Data

Please refer to Appendix 1&2 for N48.

All modulations have been tested. Only the worst cases, TM1.1 and TM3.1a, are retained in the report.

6.5 Spurious emissions at antenna terminals

Test Requirement: §2.1051, §96.41(e)

Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01

- Limit:
- 1) The conducted power of any End User Device emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0 to B megahertz (where B is the bandwidth in megahertz of the assigned channel or multiple contiguous channels of the End User Device) above the upper CBSD-assigned channel edge and within 0 to B megahertz below the lower CBSD-assigned channel edge. At all frequencies greater than B megahertz above the upper CBSD assigned channel edge and less than B megahertz below the lower CBSD-assigned channel edge, the conducted power of any End User Device emission shall not exceed -25 dBm/MHz. Notwithstanding the emission limits in this paragraph, the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30dB.
 - 2) The conducted power of emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

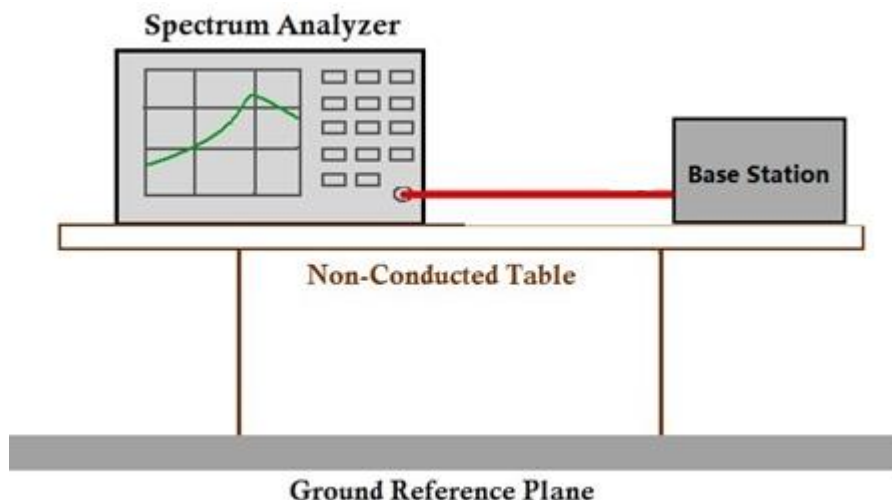
6.5.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 51.6 % RH Atmospheric Pressure: 1020 mbar

Test mode 01: Tx mode, Keep the EUT in transmitting mode.

6.5.2 Test Setup Diagram





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6.5.3 Measurement Data

Please refer to Appendix 1&2 for N48.

All modulations have been tested. Only the worst cases, TM1.1 and TM3.1a, are retained in the report.



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6.6 Field strength of spurious radiation

Test Requirement: §2.1053, §96.41(e)

Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01

- Limit:
- 1) Emission outside the fundamental emission bandwidth (whether the emission is inside or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the emission shall not exceed -25 dBm/MHz.
 - 2) Emissions below 3540 MHz or above 3710 MHz shall not exceed -25 dBm/MHz, and the emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.

6.6.1 E.U.T. Operation

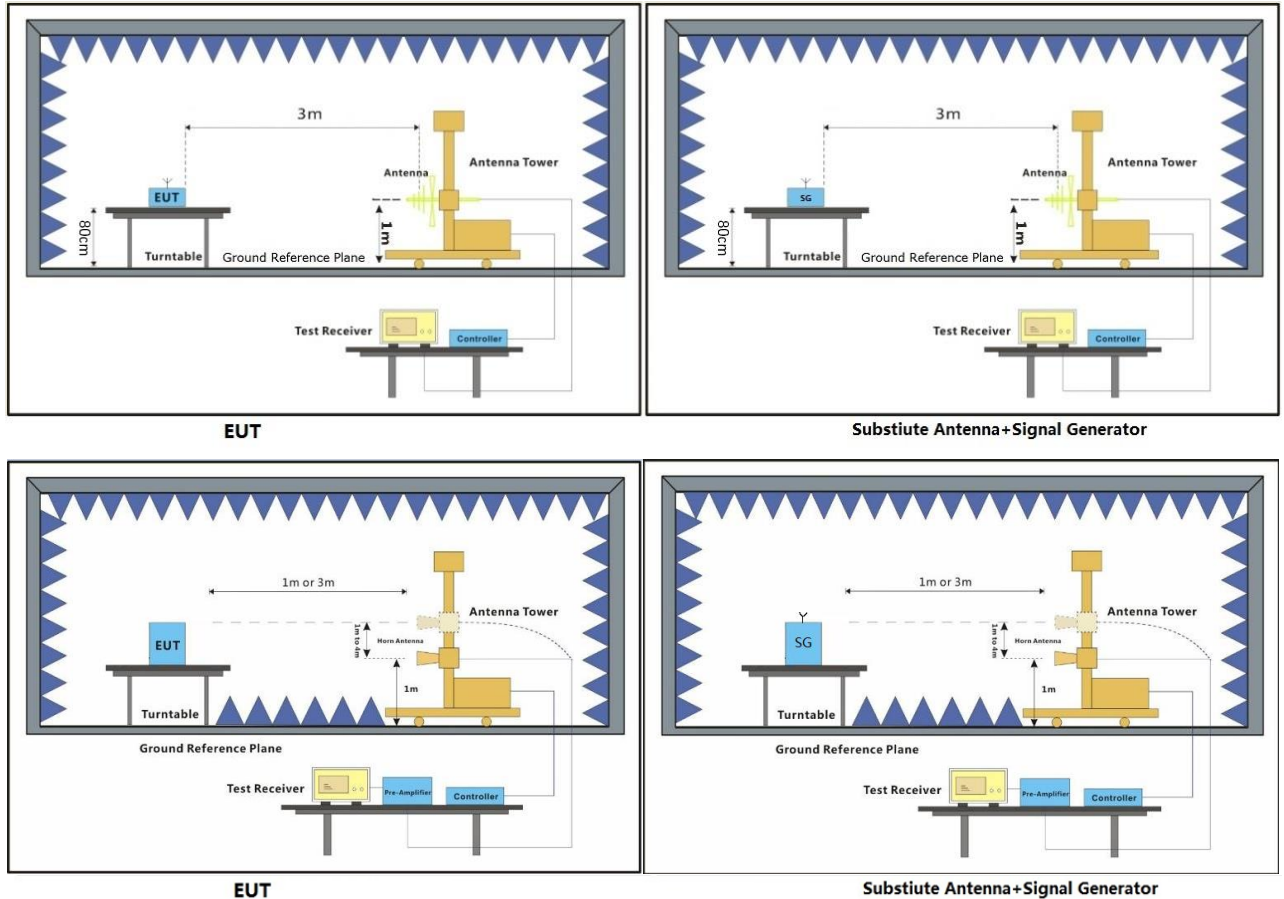
Operating Environment:

Temperature: 22.6 °C Humidity: 47.2 % RH Atmospheric Pressure: 1020 mbar

Test mode 01: Tx mode, Keep the EUT in transmitting mode.



6.6.2 Test Setup Diagram



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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 then 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.

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NR Band 48-Low channel, Modulation: QPSK, Bandwidth:100MHz, 1RB#0								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7110.0	-55.69	-40	-15.69	-62.75	4.2	11.26	Horizontal	Pass
10655.0	-54.58	-40	-14.58	-62.67	5.08	13.17	Horizontal	Pass
14220.0	-50.49	-40	-10.49	-59.96	4.98	14.45	Horizontal	Pass
7110.0	-55.43	-40	-15.43	-62.49	4.2	11.26	Vertical	Pass
10655.0	-53.88	-40	-13.88	-61.97	5.08	13.17	Vertical	Pass
14220.0	-50.01	-40	-10.01	-59.48	4.98	14.45	Vertical	Pass

NR Band 48-Middle channel, Modulation: QPSK, Bandwidth:100MHz, 1RB#0								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7159.98	-55.87	-40	-15.87	-63.0	4.2	11.33	Horizontal	Pass
10739.97	-52.21	-40	-12.21	-60.32	5.08	13.19	Horizontal	Pass
14319.96	-47.81	-40	-7.81	-57.19	5.06	14.44	Horizontal	Pass
7159.98	-56.46	-40	-16.46	-63.59	4.2	11.33	Vertical	Pass
10739.97	-53.07	-40	-13.07	-61.18	5.08	13.19	Vertical	Pass
14319.96	-47.67	-40	-7.67	-57.05	5.06	14.44	Vertical	Pass

NR Band 48-High channel, Modulation: QPSK, Bandwidth:100MHz, 1RB#0								
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Over Limit (dB)	S.G. Power (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	Polarization (H/V)	Result
7209.96	-56.27	-40	-16.27	-63.46	4.2	11.39	Horizontal	Pass
10814.94	-52.26	-40	-12.26	-60.4	5.07	13.21	Horizontal	Pass
14419.92	-48.22	-40	-8.22	-57.52	5.13	14.43	Horizontal	Pass
7209.96	-56.37	-40	-16.37	-63.56	4.2	11.39	Vertical	Pass
10814.94	-52.43	-40	-12.43	-60.57	5.07	13.21	Vertical	Pass
14419.92	-47.38	-40	-7.38	-56.68	5.13	14.43	Vertical	Pass

Remark: All modulations have been tested. Only the worst cases TM1.1 is retained in the report.



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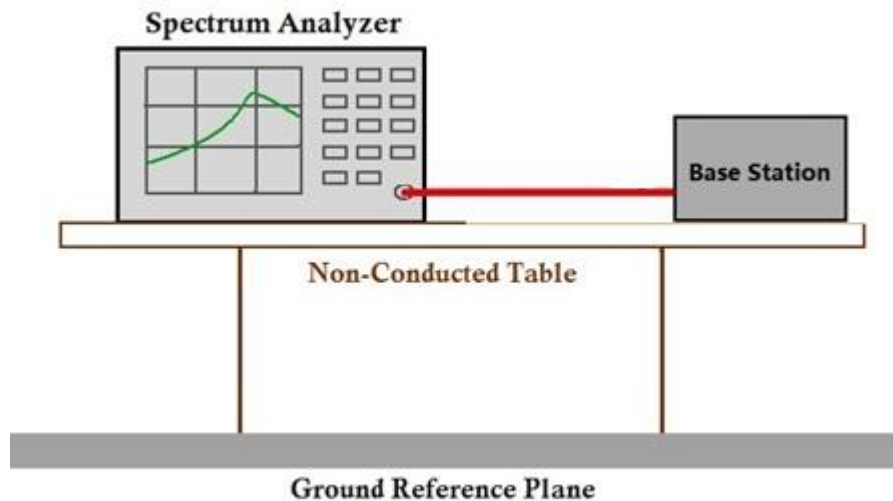
6.7 Frequency stability

Test Requirement: §2.1055
 Test Method: ANSI C63.26-2015, KDB 971168 D01 v03r01
 Limit: $\leq \pm 2.5\text{ppm}$

6.7.1 E.U.T. Operation

Operating Environment:
 Temperature: 23.4 °C Humidity: 51.6 % RH Atmospheric Pressure: 1020 mbar
 Test mode 01: Tx mode, Keep the EUT in transmitting mode.

6.7.2 Test Setup Diagram



6.7.3 Measurement Data

Please refer to Appendix 2 for N48.
 All modulations have been tested. Only the worst cases TM3.1a is retained in the report.



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7 Test Setup Photo

Refer to Appendix - Test Setup Photo for SZCR2409003392AT

8 EUT Constructional Details (EUT Photos)

Refer to Appendix – External and Internal Photos for SZCR2409003392AT

- End of the Report -



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