

# TEST REPORT

**Application No.:** SZCR2504001554WM  
**Applicant:** Xiaomi Communications Co., Ltd.  
**Address of Applicant:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085  
**Manufacturer:** Xiaomi Communications Co., Ltd.  
**Address of Manufacturer:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085  
**EUT Description:** Mobile Phone  
**Model No.:** 25069PTEBG  
**Trade Mark:** Xiaomi  
**FCC ID:** 2AFZZPTEBG  
**Standards:** 47 CFR Part 2  
 47 CFR Part 22  
 47 CFR Part 24  
 47 CFR Part 27  
 47 CFR Part 90  
 47 CFR Part 96  
**Date of Receipt:** 2025/04/29  
**Date of Test:** 2025/05/01 to 2025/05/29  
**Date of Issue:** 2025/06/16

<b>Test Result:</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.



Keny Xu  
EMC Laboratory Manager



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Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2025/06/16		Original

Authorized for issue by:			
		<i>Kevin Lan</i>	
		Kevin Lan/Project Engineer	
		<i>Eric Fu</i>	
		Eric Fu/Reviewer	



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## 2 Test Summary

### 2.1 NR Band n5/NR Band n26 (824~849 MHz)

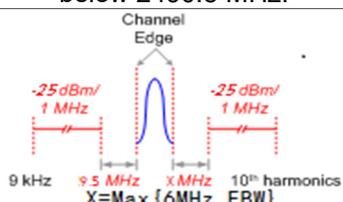
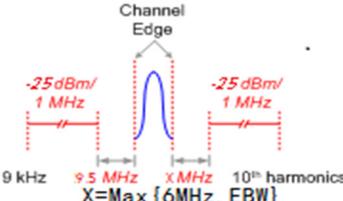
Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §22.913(a)(5)	FCC: ERP ≤ 7 W	Refer to the Appendixs	Pass
Peak-Average Ratio	§22.913(d)	Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §22.917(a)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §22.917(a)	FCC: ≤ -13 dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges.		Pass
Field Strength of Spurious Radiation	§2.1053, §22.917(a)	FCC: ≤ -13 dBm/100 kHz.		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §22.355	±2.5ppm.		Pass



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**2.2 NR Band n7/NR Band n38/NR Band n41**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(h)(2)	EIRP ≤ 2W	Refer to the Appendixs	Pass
Peak-Average Ratio	---	≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §27.53(m)(4)	For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(m)			Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(m)			Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.		Pass



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**2.3 NR Band n2**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §24.232(c)	EIRP ≤ 2 W	Refer to the Appendixs	Pass
Peak-Average Ratio	§24.232(d)	Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §24.238(a)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §24.238(a)	≤ -13 dBm/1 MHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.		Pass
Field Strength of Spurious Radiation	§2.1053, §24.238(a)	≤ -13 dBm/1 MHz.		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §24.235	Within authorized bands of operation/frequency block.		Pass



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**2.4 NR Band n12**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046 §27.50(c)(10)	ERP ≤ 3 W.	Refer to the Appendixs	Pass
Peak-Average Ratio	---	Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §27.53(g)	≤ 43+10log10(P[Watts])		Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	≤ 43+10log10(P[Watts])		Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(g)	FCC: ≤ -13 dBm/100 kHz.		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.		Pass



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**2.5 NR Band n26(814~824 MHz)**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Transmitter Conducted Power Output	§2.1046, §90.635(b)	< 100 W.	Refer to the Appendixs	Pass
Peak-Average Ratio	---	Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Emission Mask	§2.1051 § 90.691(a)	For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least 116 Log <sub>10</sub> (f/6.1) decibels or 50+10Log <sub>10</sub> (P) decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §90.691	< 43 + 10Log <sub>10</sub> (P[Watts]) for all out-of-band emissions		Pass
Field Strength of Spurious Radiation	§2.1053, §90.691	< 43 + 10Log <sub>10</sub> (P[Watts]) for all out-of-band emissions		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §90.213	Within authorized bands of operation/frequency block.		Pass



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**2.6 NR Band n66**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(d)(4)	EIRP ≤ 1 W	Refer to the Appendixs	Pass
Peak-Average Ratio	§27.50(d)(5)	Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §27.53(h)	≤ -13 dBm/1%*EBW, in 1 MHz bands immediately outside and adjacent to the frequency block.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(h)	≤ -13 dBm/1 MHz, from 9 kHz to 10 <sup>th</sup> harmonics but outside authorized operating frequency ranges.		Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(h)	≤ -13 dBm/1 MHz.		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.		Pass



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**2.7 NR Band n71**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046 §27.50(c)(10)	ERP ≤ 3 W	Refer to the Appendixs	Pass
Peak-Average Ratio	---	Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §27.53(g)	≤ 43+10log10(P[Watts])		Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(g)	≤ 43+10log10(P[Watts])		Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(g)	≤ -13 dBm/1 MHz.		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	within the authorized bands of operation.		Pass



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**2.8 NR Band n77 / NR Band n78**

**3450-3550MHz:**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(k)(3)	EIRP ≤ 30dBm	Refer to the Appendixs	Pass
Peak-Average Ratio	§27.50(k)(4)	FCC: Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §27.50(n)(2)	For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.50(n)(2)	For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.		Pass
Field Strength of Spurious Radiation	§2.1053, §27.50(n)(2)	For mobile operations in the 3450-3550 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz.		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.		Pass



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**3700-3980MHz:**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §27.50(j)(3)	EIRP ≤ 1W	Refer to the Appendixs	Pass
Peak-Average Ratio	---	≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §27.53(l)(2)	(2) For mobile operations in the 3700-3980 MHz band, the conducted power of any emission outside the licensee's authorized bandwidth shall not exceed -13 dBm/MHz. Compliance with this paragraph (l)(2) is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be either one percent of the emission bandwidth of the fundamental emission of the transmitter or 350 kHz. In the bands between 1 and 5 MHz removed from the licensee's frequency block, the minimum resolution bandwidth for the measurement shall be 500 kHz.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §27.53(l)(2)	not exceed -13 dBm/MHz.		Pass
Field Strength of Spurious Radiation	§2.1053, §27.53(l)(2)	not exceed -13 dBm/MHz		Pass
Frequency Stability	§2.1055(a)(1)(b) §2.1055(d)(2) §27.54	Within authorized bands of operation/frequency block.		Pass



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**2.9 NR Band n48**

**3550-3700MHz:**

Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Effective (Isotropic) Radiated Power Output Data	§2.1046, §96.41	EIRP ≤ 23dBm	Refer to the Appendixs	Pass
Peak-Average Ratio	§96.41	FCC: Limit≤13 dB		Pass
Bandwidth	§2.1049	OBW: No limit. EBW: No limit.		Pass
Band Edges Compliance	§2.1051, §96.41	for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any emission outside the fundamental emission (whether in 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.		Pass
Spurious Emission at Antenna Terminals	§2.1051, §96.41	for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any emission outside the fundamental emission (whether in 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 conducted power of any emission shall not exceed -25 dBm/MHz. (2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.		Pass



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

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Test Item	FCC Rule No.	Requirements	Test Result	Verdict
Field Strength of Spurious Radiation	§2.1053, §96.41	for channel and frequency assignments made by the SAS to CBSDs, the conducted power of any emission outside the fundamental emission (whether in 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 conducted power of any emission shall not exceed -25 dBm/MHz. (2) Additional protection levels. Notwithstanding paragraph (d)(1) of this section, the conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.		Pass
Frequency Stability	§2.1055, §96.41	Within authorized bands of operation/ frequency block.		Pass
Adjacent Channel Leakage Ratio	§96.41	the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.		Pass



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## 4 General Information

### 4.1 General Description of EUT

EUT Description:	Mobile Phone		
Model No.:	25069PTEBG		
Trade Mark:	Xiaomi		
Hardware Version:	1351P2405		
Software Version:	Xiaomi HyperOS 2.0		
Power Supply:	3.93V from internal rechargeable battery which can be charged by adapter.		
IMEI:	RF Conducted	IMEI1:860647070070328/IMEI2:860647070070336	
	RSE	IMEI1:860647070070104/IMEI2:860647070070112	
HPUE Power Class:	Class 2: NR Band n41; NR Band n77; NR Band n78		
Antenna Type:	Fixed Internal Antenna		
Antenna Gain:	NR Band n2:	-0.86dBi(Ant2); -5.4dBi(Ant3); -0.68dBi(Ant4); -2.39dBi(Ant5)	
	NR Band n5:	-4.06dBi(Ant0); -4.82dBi(Ant1)	
	NR Band n7:	0dBi(Ant2); -2.43dBi(Ant3); -1.4dBi(Ant4); -0.91dBi(Ant5)	
	NR Band n12:	-3.73dBi(Ant0); -4.47dBi(Ant1)	
	NR Band n26:	-4.06dBi(Ant0); -4.82dBi(Ant1)	
	NR Band n38:	0dBi(Ant2); -2.7dBi(Ant3); -2.47dBi(Ant4); -1.01dBi(Ant5)	
	NR Band n41:	0dBi(Ant2); -2.43dBi(Ant3); -1.4dBi(Ant4); -0.91dBi(Ant5)	
	NR Band n48:	0dBi(Ant6); 0dBi(Ant7); 0dBi(Ant8); 0dBi(Ant9)	
	NR Band n66:	0dBi(Ant2); -2.84dBi(Ant3); -1.83dBi(Ant4); -1.28dBi(Ant5)	
	NR Band n71:	-4.55dBi(Ant0); -7.01dBi(Ant1)	
	NR Band n77:	0dBi(Ant6); 0dBi(Ant7); 0dBi(Ant8); 0dBi(Ant9)	
	NR Band n78:	0dBi(Ant6); 0dBi(Ant7); 0dBi(Ant8); 0dBi(Ant9)	
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.		
RF Cable:	9kHz ~ 30MHz (0.3dB)	30MHz ~ 1000MHz (0.6dB)	1000MHz ~ 2000MHz (0.8dB)
	2000MHz ~ 4000MHz (1.1dB)	4000MHz ~ 6000MHz (1.8dB)	6000MHz ~ 12750MHz (2.6dB)
	Above 12750MHz(3.5dB)		
<b>Note:</b> 1. Conduction Power & EIRP of all antennas are tested, and only the worst data is presented			



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

SZEMC-TRF-01 Rev. A/1

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2. As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.



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## 4.2 Test Mode

Test Mode	Test Modes Description
NR/TM1	NR system, DFT-s-Pi/2-BPSK modulation
NR/TM2	NR system, DFT-s-QPSK modulation
NR/TM3	NR system, DFT-s-16QAM modulation
NR/TM4	NR system, DFT-s-64QAM modulation
NR/TM5	NR system, DFT-s-256QAM modulation
NR/TM6	NR system, CP-QPSK modulation
NR/TM7	NR system, CP-16QAM modulation
NR/TM8	NR system, CP-64QAM modulation
NR/TM9	NR system, CP-256QAM modulation

Remark: The test mode(s) are selected according to relevant radio technology specifications.

## 4.3 Test Environment

Environment Parameter	101 kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	3.93
LTLV	-30	3.6
LTHV	-30	4.4
HTLV	50	3.6
HTHV	50	4.4

Remark:

NV: Normal Voltage      LV: Low Extreme Test Voltage      HV: High Extreme Test Voltage  
 NT: Normal Temperature      LT: Low Extreme Test Temperature      HT: High Extreme Test Temperature

## 4.4 Description of Support Units

The EUT has been tested as an independent unit.



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### 4.5 Measurement Uncertainty

For a 95% confidence level (k = 2), the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 as following:

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.41dB
2	RF power density, conducted	±1.96dB
3	Spurious emissions, conducted	±0.41dB
4	Radio Frequency	±7.10 x 10 <sup>-8</sup>
5	Duty Cycle	±0.49%
6	Occupied Bandwidth	±0.2%
7	Radiated Spurious emission test(UE)	±4.8dB (30MHz-1GHz)
		±4.68dB (1GHz-6GHz)
		±4.52dB (6GHz-18GHz)
		±5.26dB (18GHz-40GHz)

**Remark:**

The U<sub>lab</sub> (lab Uncertainty) is less than U<sub>CISPR/ETSI</sub> (CISPR/ETSI Uncertainty), so the test results  
 – compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;  
 – non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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### 4.6 Test Location

All tests were performed at:

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

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, 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.



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### 4.8 Technical Specification

Characteristics	Description			
Radio System Type	<input checked="" type="checkbox"/> SA <input checked="" type="checkbox"/> NSA			
Supported Frequency Range	Band	TX	RX	
	NR Band n2	1850 to 1910 MHz	1930 to 1990 MHz	
	NR Band n5	824 to 849 MHz	869 to 894 MHz	
	NR Band n7	2500 to 2570 MHz	2620 to 2690 MHz	
	NR Band n12	699 to 716 MHz	729 to 746 MHz	
	NR Band n26 (814 to 824 MHz)	814 to 824MHz	859 to 869 MHz	
	NR Band n26 (824 to 849 MHz)	824 to 849 MHz	869 to 894 MHz	
	NR Band n38	2570 to 2620 MHz	2570 to 2620 MHz	
	NR Band n41	2496 to 2690 MHz	2496 to 2690 MHz	
	NR Band n48	3550 to 3700 MHz	3550 to 3700 MHz	
	NR Band n66	1710 to 1780 MHz	2110 to 2180 MHz	
	NR Band n71	663 to 698 MHz	617 to 652 MHz	
	NR Band n77	3700 to 3980 MHz	3700 to 3980 MHz	
		3450 to 3550 MHz	3450 to 3550 MHz	
	NR Band n78	3700 to 3800 MHz	3700 to 3800 MHz	
		3450 to 3550 MHz	3450 to 3550 MHz	
	ENDC: DC_7A_n5A; DC_2A_n7A, DC_5A_n7A, DC_4A_n7A, DC_66A_n7A; DC_66A_n38A, DC_5A_n38A, DC_2A_n38A, DC_4A_n38A; DC_66A_n41A, DC_5A_n41A, DC_2A_n41A, DC_4A_n41A; DC_2A_n77A; DC_2A_n66A, DC_5A_n66A, DC_4A_n66A, DC_7A_n66A, DC_66A_n66A; DC_26A_n78A, DC_2A_n78A, DC_38A_n78A, DC_41A_n78A, DC_4A_n78A, DC_5A_n78A, DC_66A_n78A, DC_7A_n78A. UL NR CA: CA_78C* Remark: ENDC&CA inter-band only test RSE, report only show worst mode. Note*: The EUT supported n78C, The combination bandwidth of N78C is more than 100MHz but the maximum bandwidth used by n78 is only 100MHz, so it is no need to test n78C.			
Supported Channel Bandwidth	NR Band n2	SCS 15kHz:		
		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz <input checked="" type="checkbox"/> 20 MHz
	NR Band n5	SCS 15kHz:		



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		<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz
NR Band n7	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	
	<input checked="" type="checkbox"/> 25 MHz	<input checked="" type="checkbox"/> 30 MHz	<input checked="" type="checkbox"/> 40 MHz	<input checked="" type="checkbox"/> 50 MHz	
NR Band n12	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz		
NR Band n26 (814 to 824 MHz)	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz			
NR Band n26 (824 to 849 MHz)	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	
NR Band n38	SCS 30kHz:				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	<input checked="" type="checkbox"/> 25 MHz	
	<input checked="" type="checkbox"/> 30 MHz	<input checked="" type="checkbox"/> 40 MHz			
NR Band n41	SCS 30kHz:				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	<input checked="" type="checkbox"/> 30 MHz	
	<input checked="" type="checkbox"/> 40 MHz	<input checked="" type="checkbox"/> 50 MHz	<input checked="" type="checkbox"/> 60 MHz	<input checked="" type="checkbox"/> 80 MHz	
	<input checked="" type="checkbox"/> 90 MHz	<input checked="" type="checkbox"/> 100 MHz			
NR Band n48	SCS 30kHz:				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	<input checked="" type="checkbox"/> 40 MHz	
NR Band n66	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	
	<input checked="" type="checkbox"/> 25 MHz	<input checked="" type="checkbox"/> 30 MHz	<input checked="" type="checkbox"/> 40 MHz		
NR Band n71	SCS 15kHz:				
	<input checked="" type="checkbox"/> 5 MHz	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	
NR Band n77	SCS 30kHz				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	<input checked="" type="checkbox"/> 25 MHz	
	<input checked="" type="checkbox"/> 30 MHz	<input checked="" type="checkbox"/> 40 MHz	<input checked="" type="checkbox"/> 50 MHz	<input checked="" type="checkbox"/> 60 MHz	
	<input checked="" type="checkbox"/> 70 MHz	<input checked="" type="checkbox"/> 80 MHz	<input checked="" type="checkbox"/> 90 MHz	<input checked="" type="checkbox"/> 100 MHz	
NR Band n78	SCS 30kHz:				
	<input checked="" type="checkbox"/> 10 MHz	<input checked="" type="checkbox"/> 15 MHz	<input checked="" type="checkbox"/> 20 MHz	<input checked="" type="checkbox"/> 25 MHz	
	<input checked="" type="checkbox"/> 30 MHz	<input checked="" type="checkbox"/> 40 MHz	<input checked="" type="checkbox"/> 50 MHz	<input checked="" type="checkbox"/> 60 MHz	
	<input checked="" type="checkbox"/> 70 MHz	<input checked="" type="checkbox"/> 80 MHz	<input checked="" type="checkbox"/> 90 MHz	<input checked="" type="checkbox"/> 100 MHz	



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## 4.9 Test Frequencies

### 4.9.1 Reference test frequencies for NR operating band n2

#### 4.9.1.1 Test frequencies for NR operating band n2 and SCS 15 kHz

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	1932.5	386500	15
		Mid	1960	392000	
		High	1987.5	397500	
	Uplink	Low	1852.5	370500	-
		Mid	1880	376000	
		High	1907.5	381500	
10	Downlink	Low	1935	387000	15
		Mid	1960	392000	
		High	1985	397000	
	Uplink	Low	1855	371000	-
		Mid	1880	376000	
		High	1905	381000	
15	Downlink	Low	1937.5	387500	15
		Mid	1960	392000	
		High	1982.5	396500	
	Uplink	Low	1857.5	371500	-
		Mid	1880	376000	
		High	1902.5	380500	
20	Downlink	Low	1940	388000	15
		Mid	1960	392000	
		High	1980	396000	
	Uplink	Low	1860	372000	-
		Mid	1880	376000	
		High	1900	380000	



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**4.9.2 Reference test frequencies for NR operating band n5**

**4.9.2.1 Test frequencies for NR operating band n5 and SCS 15 kHz**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	871.5	174300	15
		Mid	881.5	176300	
		High	891.5	178300	
	Uplink	Low	826.5	165300	-
		Mid	836.5	167300	
		High	846.5	169300	
10	Downlink	Low	874	174800	15
		Mid	881.5	176300	
		High	889	177800	
	Uplink	Low	829	165800	-
		Mid	836.5	167300	
		High	844	168800	
15	Downlink	Low	876.5	175300	15
		Mid	881.5	176300	
		High	886.5	177300	
	Uplink	Low	831.5	166300	-
		Mid	836.5	167300	
		High	841.5	168300	
20	Downlink	Low	879	175800	15
		Mid	881.5	176300	
		High	884	176800	
	Uplink	Low	834	166800	-
		Mid	836.5	167300	
		High	839	167800	



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**4.9.3 Reference test frequencies for NR operating band n7**

**4.9.3.1 Test frequencies for NR operating band n7 and SCS 15 kHz**

Bandwidth [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	2622.5	524500	15
		Mid	2655	531000	
		High	2687.5	537500	
	Uplink	Low	2502.5	500500	--
		Mid	2535	507000	
		High	2567.5	513500	
10	Downlink	Low	2625	525000	15
		Mid	2655	531000	
		High	2685	537000	
	Uplink	Low	2505	501000	--
		Mid	2535	507000	
		High	2565	513000	
15	Downlink	Low	2627.5	525500	15
		Mid	2655	531000	
		High	2682.5	536500	
	Uplink	Low	2507.5	501500	--
		Mid	2535	507000	
		High	2562.5	512500	
20	Downlink	Low	2630	526000	15
		Mid	2655	531000	
		High	2680	536000	
	Uplink	Low	2510	502000	--
		Mid	2535	507000	
		High	2560	512000	
25	Downlink	Low	2632.5	526500	15
		Mid	2655	531000	
		High	2677.5	535500	
	Uplink	Low	2512.5	502500	--
		Mid	2535	507000	
		High	2557.5	511500	
30	Downlink	Low	2635	527000	15
		Mid	2655	531000	
		High	2675	535000	
	Uplink	Low	2515	503000	--
		Mid	2535	507000	
		High	2555	511000	
40	Downlink	Low	2640	528000	15
		Mid	2655	531000	
		High	2670	534000	
	Uplink	Low	2520	504000	--
		Mid	2535	507000	
		High	2550	510000	
50	Downlink	Low	2645	529000	15
		Mid	2655	531000	
		High	2665	533000	
	Uplink	Low	2525	505000	--
		Mid	2535	507000	
		High	2545	509000	



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**4.9.4 Reference test frequencies for NR operating band n12**

**4.9.4.1 Test frequencies for NR operating band n12 and SCS 15 kHz**

Bandwidth [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	731.5	146300	15
		Mid	737.5	147500	
		High	743.5	148700	
	Uplink	Low	701.5	140300	--
		Mid	707.5	141500	
		High	713.5	142700	
10	Downlink	Low	734	146800	15
		Mid	737.5	147500	
		High	741	148200	
	Uplink	Low	704	140800	--
		Mid	707.5	141500	
		High	711	142200	
15	Downlink	Low	736.5	147300	15
		Mid	737.5	147500	
		High	738.5	147700	
	Uplink	Low	706.5	141300	--
		Mid	707.5	141500	
		High	708.5	141700	



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**4.9.5 Reference test frequencies for NR operating band n26**

**4.9.5.1 Test frequencies for NR operating band n26 and SCS 15 kHz**

814-824:

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	861.5	172300	15
		Mid	864	172800	
		High	866.5	173300	
	Uplink	Low	816.5	163300	-
		Mid	819	163800	
		High	821.5	164300	
10	Downlink	Low	/	/	15
		Mid	864	172800	
		High	/	/	
	Uplink	Low	/	/	-
		Mid	819	163800	
		High	/	/	

824-849:

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	871.5	174300	15
		Mid	881.5	176300	
		High	891.5	178300	
	Uplink	Low	826.5	165300	-
		Mid	836.5	167300	
		High	846.5	169300	
10	Downlink	Low	874	174800	15
		Mid	881.5	176300	
		High	889	177800	
	Uplink	Low	829	165800	-
		Mid	836.5	167300	
		High	844	168800	
15	Downlink	Low	876.5	175300	15
		Mid	881.5	176300	
		High	886.5	177300	
	Uplink	Low	831.5	166300	-
		Mid	836.5	167300	
		High	841.5	168300	
20	Downlink	Low	879	175800	15
		Mid	881.5	176300	
		High	884	176800	
	Uplink	Low	834	166800	-
		Mid	836.5	167300	
		High	839	167800	



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**4.9.6 Reference test frequencies for NR operating band n38**

**4.9.6.1 Test frequencies for NR operating band n38 and SCS 30 kHz**

Bandwidth [MHz]	Range	Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]	
10	Downlink & Uplink	Low	2575	515000	30
		Mid	2595	519000	
		High	2615	523000	
15	Downlink & Uplink	Low	2577.5	515500	30
		Mid	2595	519000	
		High	2612.5	522500	
20	Downlink & Uplink	Low	2580	516000	30
		Mid	2595	519000	
		High	2610	522000	
25	Downlink & Uplink	Low	2582.5	516500	30
		Mid	2595	519000	
		High	2607.5	521500	
30	Downlink & Uplink	Low	2585	517000	30
		Mid	2595	519000	
		High	2605	521000	
40	Downlink & Uplink	Low	2590	518000	30
		Mid	2595	519000	
		High	2600	520000	



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**4.9.7 Reference test frequencies for NR operating band n41**

**4.9.7.1 Test frequencies for NR operating band n41 and SCS 30 kHz**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
10	Downlink & Uplink	Low	2501.01	500202	30
		Mid	2592.99	518598	
		High	2685	537000	
15	Downlink & Uplink	Low	2503.5	500700	30
		Mid	2592.99	518598	
		High	2682.48	536496	
20	Downlink & Uplink	Low	2506.02	501204	30
		Mid	2592.99	518598	
		High	2679.99	535998	
30	Downlink & Uplink	Low	2511	502200	30
		Mid	2592.99	518598	
		High	2674.98	534996	
40	Downlink & Uplink	Low	2516.01	503202	30
		Mid	2592.99	518598	
		High	2670	534000	
50	Downlink & Uplink	Low	2521.02	504204	30
		Mid	2592.99	518598	
		High	2664.99	532998	
60	Downlink & Uplink	Low	2526	505200	30
		Mid	2592.99	518598	
		High	2659.98	531996	
		Mid	2592.29	518598	
		High	2655	531000	
80	Downlink & Uplink	Low	2536.02	507204	30
		Mid	2592.99	518598	
		High	2649.99	529998	
90	Downlink & Uplink	Low	2541	508200	30
		Mid	2592.99	518598	
		High	2644.98	528996	
100	Downlink & Uplink	Low	2546.01	509202	30
		Mid	2592.99	518598	
		High	2640	528000	



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**4.9.8 Reference test frequencies for NR operating band n48**

**4.9.8.1 Test frequencies for NR operating band n48 and SCS 30 kHz**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
10	Downlink & Uplink	Low	3555	637000	30
		Mid	3624.99	641666	
		High	3694.98	646332	
15	Downlink & Uplink	Low	3557.52	637168	30
		Mid	3624.99	641666	
		High	3692.49	646166	
20	Downlink & Uplink	Low	3560.01	637334	30
		Mid	3624.99	641666	
		High	3690	646000	
40	Downlink & Uplink	Low	3570	638000	30
		Mid	3624.99	641666	
		High	3679.98	645332	



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**4.9.9 Reference test frequencies for NR operating band n66**

**4.9.9.1 Test frequencies for NR operating band n66 and SCS 15 kHz**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	2112.5	422500	15
		Mid	2145	429000	
		High	2177.5	435500	
	Uplink	Low	1712.5	342500	-
		Mid	1745	349000	
		High	1777.5	355500	
10	Downlink	Low	2115	423000	15
		Mid	2145	429000	
		High	2175	435000	
	Uplink	Low	1715	343000	-
		Mid	1745	349000	
		High	1775	355000	
15	Downlink	Low	2117.5	423500	15
		Mid	2145	429000	
		High	2172.5	434500	
	Uplink	Low	1717.5	343500	-
		Mid	1745	349000	
		High	1772.5	354500	
20	Downlink	Low	2120	424000	15
		Mid	2145	429000	
		High	2170	434000	
	Uplink	Low	1720	344000	-
		Mid	1745	349000	
		High	1770	354000	
25	Downlink	Low	2122.5	424500	15
		Mid	2145	429000	
		High	2167.5	433500	
	Uplink	Low	1722.5	344500	-
		Mid	1745	349000	
		High	1767.5	353500	
30	Downlink	Low	2125	425000	15
		Mid	2145	429000	
		High	2165	433000	
	Uplink	Low	1725	345000	-
		Mid	1745	349000	
		High	1765	353000	
40	Downlink	Low	2130	426000	15
		Mid	2145	429000	
		High	2160	432000	
	Uplink	Low	1730	346000	-
		Mid	1745	349000	
		High	1760	352000	



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**4.9.10 Reference test frequencies for NR operating band n71**

**4.9.10.1 Test frequencies for NR operating band n71 and SCS 15 kHz**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
5	Downlink	Low	619.5	123900	15
		Mid	634.5	126900	
		High	649.5	129900	
	Uplink	Low	665.5	133100	-
		Mid	680.5	136100	
		High	695.5	139100	
10	Downlink	Low	622	124400	15
		Mid	634.5	126900	
		High	647	129400	
	Uplink	Low	668	133600	-
		Mid	680.5	136100	
		High	693	138600	
15	Downlink	Low	624.5	124900	15
		Mid	634.5	126900	
		High	644.5	128900	
	Uplink	Low	670.5	134100	-
		Mid	680.5	136100	
		High	690.5	138100	
20	Downlink	Low	627	125400	15
		Mid	634.5	126900	
		High	642	128400	
	Uplink	Low	673	134600	-
		Mid	680.5	136100	
		High	688	137600	



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**4.9.11 Reference test frequencies for NR operating band n77**

**4.9.11.1 Test frequencies for NR operating band n77 and SCS 30 kHz**

**3700-3980:**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
10	Downlink & Uplink	Low	3705	647000	30
		Mid	3840	656000	
		High	3975	665000	
15	Downlink & Uplink	Low	3707.52	647168	30
		Mid	3840	656000	
		High	3972.48	664832	
20	Downlink & Uplink	Low	3710.01	647334	30
		Mid	3840	656000	
		High	3969.99	664666	
25	Downlink & Uplink	Low	3712.5	647500	30
		Mid	3840	656000	
		High	3967.5	664500	
30	Downlink & Uplink	Low	3715.02	647668	30
		Mid	3840	656000	
		High	3964.98	664332	
40	Downlink & Uplink	Low	3720	648000	30
		Mid	3840	656000	
		High	3960	664000	
50	Downlink & Uplink	Low	3725.01	648334	30
		Mid	3840	656000	
		High	3954.99	663666	
60	Downlink & Uplink	Low	3730.02	648668	30
		Mid	3840	656000	
		High	3949.98	663332	
70	Downlink & Uplink	Low	3735	649000	30
		Mid	3840	656000	
		High	3945	663000	
80	Downlink & Uplink	Low	3740.01	649334	30
		Mid	3840	656000	
		High	3939.99	662666	
90	Downlink & Uplink	Low	3745.02	649668	30
		Mid	3840	656000	
		High	3934.98	662332	
100	Downlink & Uplink	Low	3750	650000	30
		Mid	3840	656000	
		High	3930	662000	



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**3450-3550:**

CBW [MHz]	Range	Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
10	Downlink & Uplink	Low	3455.01	630334
		Mid	3500.01	633334
		High	3544.98	636332
15	Downlink & Uplink	Low	3457.5	630500
		Mid	3500.01	633334
		High	3542.49	636166
20	Downlink & Uplink	Low	3460.02	630668
		Mid	3500.01	633334
		High	3540	636000
25	Downlink & Uplink	Low	3462.51	630834
		Mid	3500.01	633334
		High	3537.48	635832
30	Downlink & Uplink	Low	3465	631000
		Mid	3500.01	633334
		High	3534.99	635666
40	Downlink & Uplink	Low	3470.01	631334
		Mid	3500.01	633334
		High	3529.98	635332
50	Downlink & Uplink	Low	3475.02	631668
		Mid	3500.01	633334
		High	3525	635000
60	Downlink & Uplink	Low	3480	632000
		Mid	3500.01	633334
		High	3519.99	634666
70	Downlink & Uplink	Low	3485.01	632334
		Mid	3500.01	633334
		High	3514.98	634332
80	Downlink & Uplink	Low	3490.02	632668
		Mid	3500.01	633334
		High	3510	634000
90	Downlink & Uplink	Low	3495	633000
		Mid	3500.01	633334
		High	3504.99	633666
100	Downlink & Uplink	Low	\	\
		Mid	3500.01	633334
		High	\	\



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**4.9.12 Reference test frequencies for NR operating band n78**

**4.9.12.1 Test frequencies for NR operating band n78 and SCS 30 kHz**

**3700-3800:**

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
10	Downlink & Uplink	Low	3705	647000	30
		Mid	3750	650000	
		High	3795	653000	
15	Downlink & Uplink	Low	3707.52	647168	30
		Mid	3750	650000	
		High	3792.48	652832	
20	Downlink & Uplink	Low	3710.01	647334	30
		Mid	3750	650000	
		High	3789.99	652666	
25	Downlink & Uplink	Low	3712.5	647500	30
		Mid	3750	650000	
		High	3787.5	652500	
30	Downlink & Uplink	Low	3715.02	647668	30
		Mid	3750	650000	
		High	3784.98	652332	
40	Downlink & Uplink	Low	3720	648000	30
		Mid	3750	650000	
		High	3780	652000	
50	Downlink & Uplink	Low	3725.01	648334	30
		Mid	3750	650000	
		High	3774.99	651666	
60	Downlink & Uplink	Low	3730.02	648668	30
		Mid	3750	650000	
		High	3769.98	651332	
70	Downlink & Uplink	Low	3735	649000	30
		Mid	3750	650000	
		High	3765	651000	
80	Downlink & Uplink	Low	3740.01	649334	30
		Mid	3750	650000	
		High	3759.99	650666	
90	Downlink & Uplink	Low	3745.02	649668	30
		Mid	3750	650000	
		High	3754.98	650332	
100	Downlink & Uplink	Low	/	/	30
		Mid	3750	650000	
		High	/	/	



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

SZEMC-TRF-01 Rev. A/1

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## 3450-3550:

CBW [MHz]	Range		Carrier centre [MHz]	Carrier centre [ARFCN]	SS block SCS [kHz]
10	Downlink & Uplink	Low	3455.01	630334	30
		Mid	3500.01	633334	
		High	3545.01	636334	
15	Downlink & Uplink	Low	3457.5	630500	30
		Mid	3500.01	633334	
		High	3542.49	636166	
20	Downlink & Uplink	Low	3460.02	630668	30
		Mid	3500.01	633334	
		High	3540	636000	
25	Downlink & Uplink	Low	3462.51	630834	30
		Mid	3500.01	633334	
		High	3537.48	635832	
30	Downlink & Uplink	Low	3465	631000	30
		Mid	3500.01	633334	
		High	3534.99	635666	
40	Downlink & Uplink	Low	3470.01	631334	30
		Mid	3500.01	633334	
		High	3530.01	635334	
50	Downlink & Uplink	Low	3475.02	631668	30
		Mid	3500.01	633334	
		High	3525	635000	
60	Downlink & Uplink	Low	3480	632000	30
		Mid	3500.01	633334	
		High	3519.99	634666	
70	Downlink & Uplink	Low	3485.01	632334	30
		Mid	3500.01	633334	
		High	3515.01	634334	
80	Downlink & Uplink	Low	3490.02	632668	30
		Mid	3500.01	633334	
		High	3510	634000	
90	Downlink & Uplink	Low	3495	633000	30
		Mid	3500.01	633334	
		High	3504.99	633666	
100	Downlink & Uplink	Low	\	\	30
		Mid	3500.01	633334	
		High	\	\	



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## 5 Equipment List

Tonscend Test System 5G NR1					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Signal Generator	Keysight	N5182B	SZ-WRG-M-025	2024/05/24	2025/05/23
				2025/05/22	2026/05/21
Signal Generator	Rohde & Schwarz	SMR20	SZ-WRG-M-016	2024/08/19	2025/08/18
Spectrum Analyzer	Keysight	N9020A	SZ-WRG-M-004	2024/08/17	2025/08/16
Radio Communication Tester	STARPOINT	SP9500	SZ-WRG-M-085	2025/01/07	2026/01/06
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SZ-WRG-M-017	2024/12/30	2025/12/29
RF Control Unit	Tonscend	JS0806-1	SZ-WRG-A-028	NCR	NCR
BandRejectFilter Group	Tonscend	JS0806-F	SZ-WRG-A-029	NCR	NCR
Test Software	Tonscend	TS1120 V2.4.1	N/A	NCR	NCR

Tonscend Test System 5G NR2					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Signal Generator	Rohde & Schwarz	SMR20	SZ-WRG-M-023	2024/08/19	2025/08/18
Signal Generator	Keysight	N5182B	SZ-WRG-M-015	2025/01/07	2026/01/06
Spectrum Analyzer	Keysight	N9020A	SZ-WRG-M-026	2025/01/07	2026/01/06
Radio Communication Tester	Anritsu	MT8821C	SZ-WRG-M-014	2024/08/19	2025/08/18
Radio Communication Tester	Anritsu	MT8000A	SZ-WRG-M-013	2024/08/17	2025/08/16
Programmable Temperature & Humidity Chamber	Votsch Industrietechnik GmbH	VT 4002	SZ-WRG-M-017	2024/12/30	2025/12/29
RF Control Unit	Tonscend	JS0806-1	SZ-WRG-A-019	NCR	NCR
BandRejectFilter Group	Tonscend	JS0806-F	SZ-WRG-A-020	NCR	NCR
Test Software	Tonscend	TS1120 V2.4.1	N/A	NCR	NCR



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Radiated spurious emissions					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
MXE EMI receiver(3Hz-3.6GHz)	KEYSIGHT	N9038B	SEM004-29	2024/08/14	2025/08/13
Signal & Spectrum Analyzer	Rohde & Schwarz	FSV	SZ-WRG-M-048	2025/01/07	2026/01/06
Pre-amplifier(30MHz-1GHz)	SGS	AMP30M1G30	SEM005-33	2025/03/04	2026/03/03
Low Noise Amplifier 30M-8GHz	Tonscend	TAP30M8G30	SZ-WRG-M-050	2025/01/07	2026/01/06
Low Noise Amplifier 1G-18GHz	Tonscend	TAP01018050	SZ-WRG-M-051	2025/01/07	2026/01/06
Low Noise Amplifier 18G-40GHz	Tonscend	TAP18040048	SZ-WRG-M-052	2025/01/08	2026/01/07
Active Loop Antenna 9kHz-30MHz	SCHWARZBECK	FMZB 1519B	SZ-WRG-M-053	2023/12/25	2025/12/24
TRILOG Breitband Antenne 30MHz-1GHz	SCHWARZBECK	VULB 9168	SZ-WRG-M-054	2023/12/25	2025/12/24
Double Ridge Horn Antenna 1GHz-18GHz	SCHWARZBECK	BBHA 9120 D	SZ-WRG-M-055	2023/12/21	2025/12/20
SHF-EHF Horn 15GHz-40GHz	SCHWARZBECK	BBHA 9170	SZ-WRG-M-056	2023/12/25	2025/12/24
RSE Test Software	Tonscend	JS32-RSE V4.0.0	SZ-WRG-M-058	NCR	NCR
RE Test Software	Tonscend	JS32-RE V4.0.0	SZ-WRG-M-059	NCR	NCR
Measurement Software	AUDIX	e3 V8.2014-6-27	NCR	NCR	NCR
Chamber	CRTSGSSAC966	N/A	SZ-WRG-C-063	2025/01/06	2028/01/05
Humidity/ Temperature Indicator	Deli	8838	SEM002-46	2024/07/24	2025/07/23
Spectrum Analyzer	Keysight	N9020A	SZ-WRG-M-002	2024/08/17	2025/08/16
Radio Communication Tester	STARPOINT	SP9500	SZ-WRG-M-083	2024/05/24	2025/05/23
				2025/05/22	2026/05/21

Remark: NCR=No Calibration Requirement.



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## 6 Description of Tests

### 6.1 Conducted Output Power

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.2.1

The transmitter output was connected to a calibrated coaxial cable, attenuator and power meter, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The power output at the transmitter antenna port was determined by adding the value of the cable insertion loss to the power reading. The tests were performed at three frequencies (low channel, middle channel and high channel) and on the highest power levels, which can be setup on the transmitters.

**Remark: Reference test setup 1**



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### 6.2 Effective (Isotropic) Radiated Power of Transmitter

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.8.4

Calculate power in dBm by the following formula:

ERP (dBm) = Conducted Power (dBm) + antenna gain (dBd)

EIRP(dBm) = Conducted Power (dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB



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### 6.3 Occupied Bandwidth

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 4.2 & 4.3

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel, middle channel and high channel). The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1 percent of the selected span as is possible without being below 1 percent. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual. The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 percent of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

**Remark: Reference test setup 1**

#### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq$  3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7



### 6.4 Band Edge at Antenna Terminals

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyser, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at two frequencies (low channel and high channel).in the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of 100kHz or 1% of the emission bandwidth of the fundamental emission of the transmitter may be employed. The EUT emission bandwidth is measured as the width of the signal between two points, outside of which all emission are attenuated at least 26dB below the transmitter power. The video bandwidth of the spectrum analyzer was set at thrice the resolution bandwidth. Detector Mode was set to peak or peak hold power.

**Remark: Reference test setup 1**

#### Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3.  $RBW \geq 1\%$  of the emission bandwidth
4.  $VBW \geq 3 \times RBW$
5. Detector = RMS
6. Number of sweep points  $\geq 2 \times \text{Span}/RBW$
7. Trace mode = trace average for continuous emissions, max hold for pulse emissions
8. Sweep time = auto couple
9. The trace was allowed to stabilize



## 6.5 Spurious And Harmonic Emissions at Antenna Terminal

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 6.0

The transmitter output was connected to a calibrated coaxial cable, attenuator and Spectrum analyzer, the other end of which was connected to a Base Station Simulator. The Base Station Simulator was set to force the EUT to its maximum power setting. The tests were performed at three frequencies (low channel and high channel). The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log(P)$  dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

**Remark: Reference test setup 1**

### Test Settings

1. Start frequency was set to 9kHz and stop frequency was set to at least 10\* the fundamental frequency (Separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings



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### 6.6 Peak-Average Ratio

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.7.2

A peak to average ratio measurement is performed at the conducted port of the EUT. For WCDMA signals, the spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level. For GSM signals, an average and a peak trace are used on a spectrum analyzer to determine the largest deviation between the average and the peak power of the EUT in a bandwidth greater than the emission bandwidth. The traces are generated with the spectrum analyzer set to zero span mode.

**Remark: Reference test setup 1**

#### Test Settings

1. The signal analyzer's CCDF measurement profile is enabled
2. Frequency = carrier center frequency
3. Measurement BW > Emission bandwidth of signal
4. The signal analyzer was set to collect one million samples to generate the CCDF curve
5. The measurement interval was set depending on the type of signal analyzed. For continuous signals (>98% duty cycle), the measurement interval was set to 1ms. For burst transmissions, the spectrum analyzer is set to use an internal "RF Burst" trigger that is synced with an incoming pulse and the measurement interval is set to less than the duration of the "on time" of one burst to ensure that energy is only captured during a time in which the transmitter is operating at maximum power



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## 6.7 Field Strength of Spurious Radiation

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.8

### Below 1GHz test procedure as below:

- 1). The EUT was powered ON and placed on a 80cm high table in the chamber. The antenna of the transmitter was extended to its maximum length.
- 2). The disturbance of the transmitter was maximized on the test receiver display by raising and lowering from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) the receive antenna and by 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). Test the EUT in the lowest channel, the middle channel ,the Highest channel.
- 5). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 6). Repeat above procedures until all frequencies measured was complete.

$$E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)} - \text{AMP(dB)}$$

$$\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \log D - 104.8; \text{ where D is the measurement distance in meters}$$

### 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:  

$$E \text{ (dB}\mu\text{V/m)} = \text{Measured amplitude level (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)} - \text{AMP(dB)}$$

$$\text{EIRP (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \log D - 104.8; \text{ where D is the measurement distance in meters}$$
- 3). Test the EUT in the lowest channel, the middle channel the Highest channel
- 4). The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.
- 5). Repeat above procedures until all frequencies measured was complete

Remark1: Reference test setup 2

Remark2: The emission below 18G were measured at a 3m test distance, while emissions above 18GHz were measured at a 1m test distance. At a measurement distance of 1 meter the limit line was increased by  $20 \cdot \text{LOG}(3/1) = 9.54 \text{ dB}$ .

### Remark: Reference test setup 2

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & AMP. The basic equation with a sample calculation is as follows:

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier (dB)

Level = Reading Level + AF + Factor -95.26

Margin = Limit – Level

- 2) Scan from 9kHz to 40GHz, The disturbance between 9KHz to 30MHz and 18GHz to 40GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

- 3) All modes have been tested, but only the worst case data displayed in this report.



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### 6.8 Frequency Stability / Temperature Variation

Measurement Procedure:

Frequency stability testing is performed in accordance with the guidelines of FCC KDB 971168 D01 V03r01 Section 9

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

Specification – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm ) of the center frequency.

#### Time Period and Procedure:

- 1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
- 2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
- 3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

**Remark: Reference test setup 3**

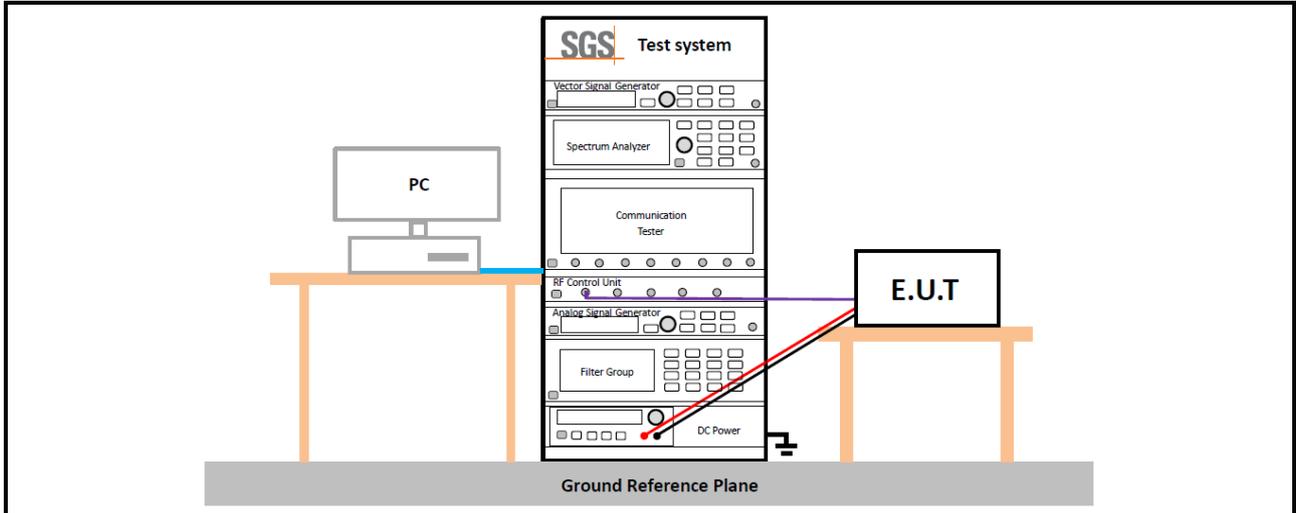


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### 6.9 Test Setups

#### 6.9.1 Test Setup 1



#### 6.9.2 Test Setup 2

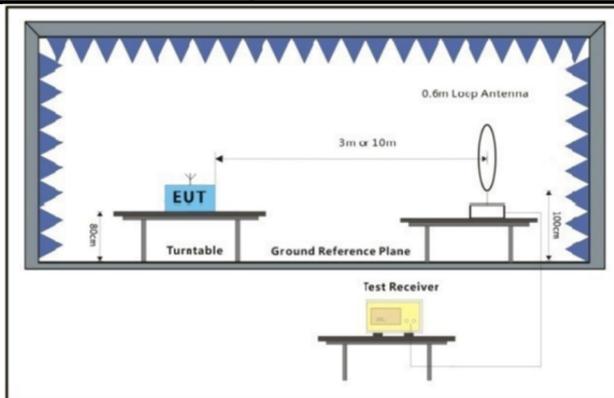


Figure 1. Below 30MHz

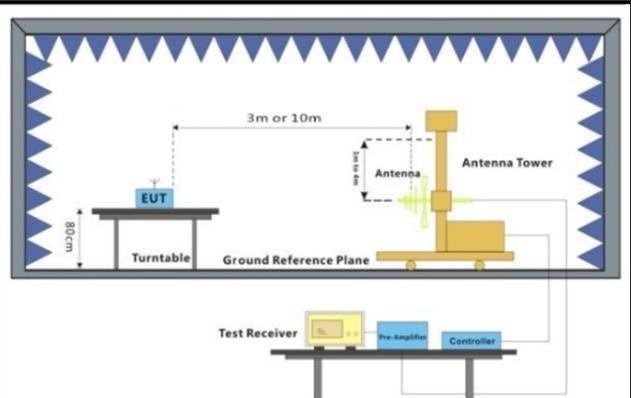


Figure 2. 30MHz to 1GHz

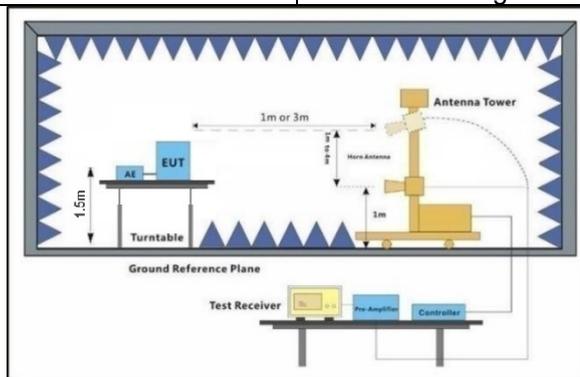


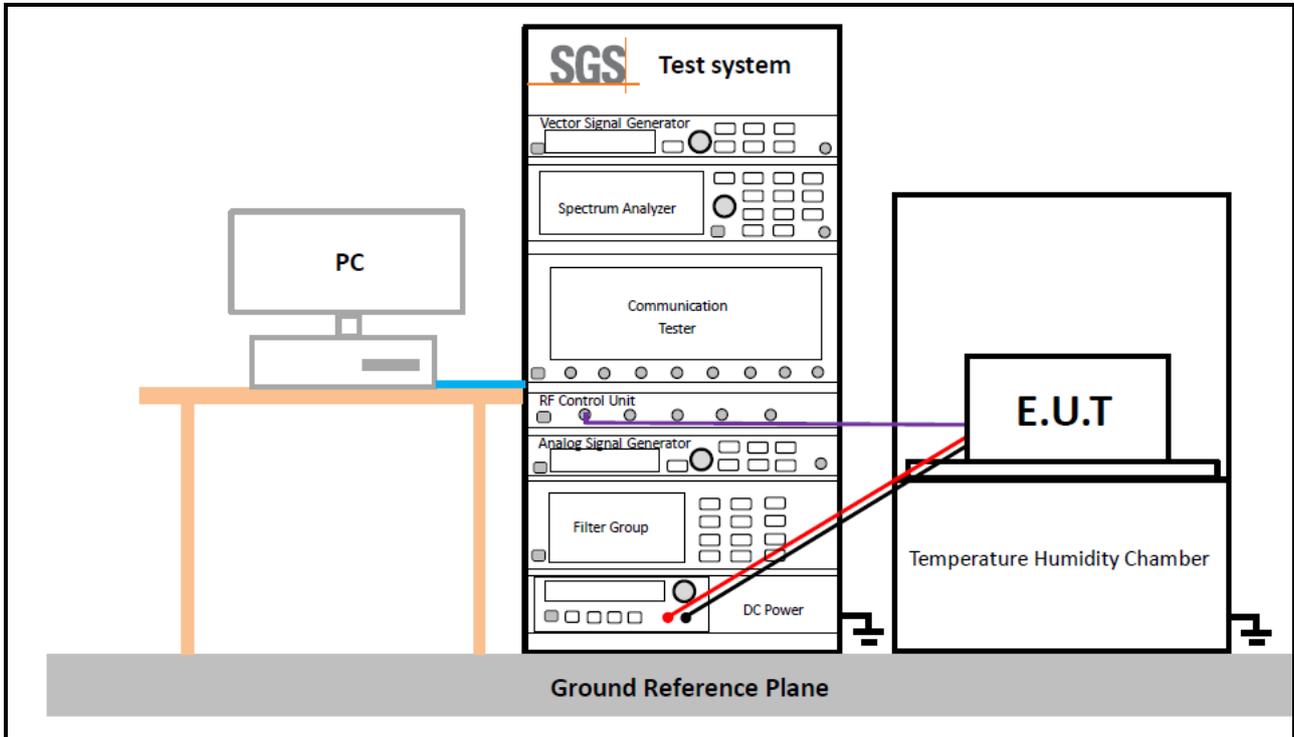
Figure 3. above 1GHz



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### 6.9.3 Test Setup 3



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### 6.10 Test Conditions

Transmit Output Power Data - Average Power, Total	
Test Case	Test Conditions
Test Environment	Ambient Climate & Rated Voltage
Test Setup	Test Setup 1
RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Test Mode	NR/TM1; NR/TM2; NR/TM3; NR/TM4; NR/TM5; NR/TM6; NR/TM7; NR/TM8; NR/TM9
Peak-to-Average Ratio	
Test Case	Test Conditions
Test Environment	Ambient Climate & Rated Voltage
Test Setup	Test Setup 1
RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Test Mode	NR/TM1; NR/TM2; NR/TM6;
Bandwidth - Occupied Bandwidth	
Test Case	Test Conditions
Test Environment	Ambient Climate & Rated Voltage
Test Setup	Test Setup 1
RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Test Mode	NR/TM1; NR/TM2; NR/TM3; NR/TM4; NR/TM5; NR/TM6; NR/TM7; NR/TM8; NR/TM9
Bandwidth - Emission Bandwidth	
Test Case	Test Conditions
Test Environment	Ambient Climate & Rated Voltage
Test Setup	Test Setup 1
RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Test Mode	NR/TM1; NR/TM2; NR/TM3; NR/TM4; NR/TM5; NR/TM6; NR/TM7; NR/TM8; NR/TM9
Band Edges Compliance	
Test Case	Test Conditions
Test Environment	Ambient Climate & Rated Voltage



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Test Setup	Test Setup 1
RF Channels (TX)	L, H (L= low channel, H= high channel)
Test Mode	NR/TM1; NR/TM2; NR/TM6;
<b>Spurious Emission at Antenna Terminals</b>	
<b>Test Case</b>	<b>Test Conditions</b>
Test Environment	Ambient Climate & Rated Voltage
Test Setup	Test Setup 1
RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Test Mode	NR/TM1; NR/TM2; NR/TM6;
<b>Field Strength of Spurious Radiation</b>	
<b>Test Case</b>	<b>Test Conditions</b>
Test Environment	Ambient Climate & Rated Voltage
Test Setup	Test Setup 2
RF Channels (TX)	L, M, H (L= low channel, M= middle channel, H= high channel)
Test Mode	NR/TM1 Remark: All bandwidth and modulation of NR have been pre tested, and only the worst results are reflected in the report.
<b>Frequency Stability</b>	
<b>Test Case</b>	<b>Test Conditions</b>
Test Environment	(1) -30 °C to +50 °C with step 10 °C at Rated Voltage (2) VL, VN and VH of Rated Voltage at Ambient Climate.
Test Setup	Test Setup 3
RF Channels (TX)	M (M= middle channel)
Test Mode	NR/TM2; The report only show the bandwidth with the worst case.



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## 7 Appendixes

SZCR2504001554 Appendix	Setup Photo
Appendix B.23	NR Band n2
Appendix B.24	NR Band n5
Appendix B.25	NR Band n7
Appendix B.26	NR Band n12
Appendix B.27	NR Band n26 (814-824)
Appendix B.28	NR Band n26 (824-849)
Appendix B.29	NR Band n38
Appendix B.30	NR Band n41
Appendix B.31	NR Band n48
Appendix B.32	NR Band n66
Appendix B.33	NR Band n71
Appendix B.34	NR Band n77(3450-3550)
Appendix B.35	NR Band n77(3700-3980)
Appendix B.36	NR Band n78(3450-3550)
Appendix B.37	NR Band n78(3700-3800)

---End of Report---



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