

# TEST REPORT

**Application No:** SZCR2504001597WM  
**Applicant:** Sonim Technologies, Inc.  
**Address of Applicant:** 4445 Eastgate Mall, Suite 200, San Diego, California 92121 United States  
**Manufacturer:** Sonim Technologies, Inc.  
**Address of Manufacturer:** 4445 Eastgate Mall, Suite 200, San Diego, California 92121 United States  
**EUT Description:** smartphone  
**Type No.:** S1003/S1001/S1004/S1005/S1006/S1010  
**Trade Mark:** Sonim  
**FCC ID:** WYPS1003  
**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:** 2025-04-22  
**Date of Test:** 2025-04-25 to 2025-04-30  
**Date of Issue:** 2025-05-07

|                     |               |
|---------------------|---------------|
| <b>Test Result:</b> | <b>PASS *</b> |
|---------------------|---------------|

\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Keny Xu

Keny Xu  
EMC Laboratory Manager



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|-----------------|---------|------------|----------|----------|
| Version         | Chapter | Date       | Modifier | Remark   |
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|--------------------------|--|------------------------------|--|--|
| Authorized for issue by: |  |                              |  |  |
|                          |  | Calvin Weng                  |  |  |
|                          |  | Calvin Weng/Project Engineer |  |  |
|                          |  | Eric Fu                      |  |  |
|                          |  | Eric Fu/Reviewer             |  |  |



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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编:518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

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No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057  
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057

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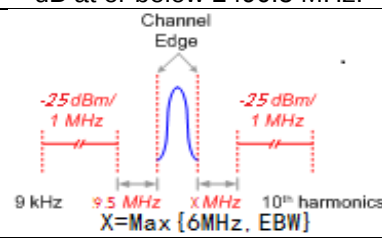
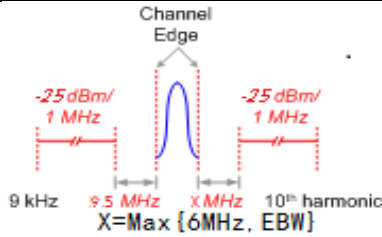
## 1 Test Summary

### 1.1 NR Band n5/NR Band n26(824-849MHz)

| Test Item                                        | FCC Rule No.                                 | Requirements                                                                                                                | Test Result                  | Verdict |
|--------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046,<br>§22.913(a)(5)                    | FCC: $ERP \leq 7\text{ W}$                                                                                                  | Appendix B.32&B.37 &B.38&C.1 | Pass    |
| Peak-Average Ratio                               | §22.913(d)                                   | Limit $\leq 13\text{ dB}$                                                                                                   |                              | Pass    |
| Bandwidth                                        | §2.1049                                      | OBW: No limit.<br>EBW: No limit.                                                                                            |                              | Pass    |
| Band Edges Compliance                            | §2.1051,<br>§22.917(a)                       | $\leq -13\text{ dBm}/1\% \cdot \text{EBW}$ , in 1 MHz bands immediately outside and adjacent to the frequency block.        |                              | Pass    |
| Spurious Emission at Antenna Terminals           | §2.1051,<br>§22.917(a)                       | FCC: $\leq -13\text{ dBm}/100\text{ kHz}$ , from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. |                              | Pass    |
| Field Strength of Spurious Radiation             | §2.1053,<br>§22.917(a)                       | FCC: $\leq -13\text{ dBm}/100\text{ kHz}$ .                                                                                 |                              | Pass    |
| Frequency Stability                              | §2.1055(a)(1)(b)<br>§2.1055(d)(2)<br>§22.355 | $\pm 2.5\text{ ppm}$ .                                                                                                      |                              | Pass    |



### 1.2 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)                       | $EIRP \leq 2W$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Appendix B.33&B.40 &B.41&C.1 | Pass    |
| Peak-Average Ratio                               | ---                                         | $\leq 13$ dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                              | Pass    |
| Bandwidth                                        | §2.1049                                     | OBW: No limit.<br>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 than $43 + 10 \log (P)$ 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)<br>§2.1055(d)(2)<br>§27.54 | Within authorized bands of operation/frequency block.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                              | Pass    |



## 1.3 NR Band n2/ NR Band n25

| Test Item                                        | FCC Rule No.                                 | Requirements                                                                                                 | Test Result               | Verdict |
|--------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046,<br>§24.232(c)                       | EIRP ≤ 2 W                                                                                                   | Appendix<br>B.31&B.35&C.1 | Pass    |
| Peak-Average Ratio                               | §24.232(d)                                   | Limit≤13 dB                                                                                                  |                           | Pass    |
| Bandwidth                                        | §2.1049                                      | OBW: No limit.<br>EBW: No limit.                                                                             |                           | Pass    |
| Band Edges Compliance                            | §2.1051,<br>§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,<br>§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,<br>§24.238(a)                       | ≤ -13 dBm/1 MHz.                                                                                             |                           | Pass    |
| Frequency Stability                              | §2.1055(a)(1)(b)<br>§2.1055(d)(2)<br>§24.235 | Within authorized bands of operation/frequency block.                                                        |                           | Pass    |



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### 1.4 NR Band n14

| Test Item                                        | FCC Rule No.                | Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Test Result       | Verdict |
|--------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046<br>§90.542(a)       | ERP ≤ 3 W.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Appendix B.34&C.1 | Pass    |
| Peak-Average Ratio                               | ---                         | Limit≤13 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   | Pass    |
| Bandwidth                                        | §2.1049                     | OBW: No limit.<br>EBW: No limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                   | Pass    |
| Emission Mask                                    | §2.1051<br>§90.210(b)       | Transmitters designed for operation under this part on frequencies other than listed in this section must meet the emission mask requirements of Emission Mask B. Equipment operating under this part on frequencies allocated to but shared with the Federal Government, must meet the applicable Federal Government technical standards<br>(b) Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows: (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB..(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least 43 + 10 log (P) dB. |                   | Pass    |
| Band Edges Compliance                            | §2.1051<br>§90.543(e)(2)(3) | (1) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations.(2) On all frequencies between 769-775 MHz and 799-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations.(3) On any                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   | Pass    |



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|----------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|
|                                        |                                              | frequency between 775-788 MHz, above 805 MHz, and below 758 MHz, by at least $43 + 10 \log(P)$ dB.                                                                                                                                                                                                                                                                                                                 |  |      |
| Spurious Emission at Antenna Terminals | §2.1051,<br>§90.543(c)<br>§90.543(f)         | FCC: $\leq -13$ dBm/100 kHz, from 9 kHz to 10th harmonics but outside authorized operating frequency ranges. For operations in the 758–775 MHz and 788–805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to $-70$ dBW/ MHz equivalent isotropically radiated power (EIRP) for wideband signals, and $-80$ dBW EIRP for discrete emissions of less than 700 Hz bandwidth. |  | Pass |
| Field Strength of Spurious Radiation   | §2.1053,<br>§90.543(c)<br>§90.543(f)         | FCC: $\leq -13$ dBm/100 kHz. For operations in the 758–775 MHz and 788–805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to $-70$ dBW/ MHz equivalent isotropically radiated power (EIRP) for wideband signals, and $-80$ dBW EIRP for discrete emissions of less than 700 Hz bandwidth.                                                                                 |  | Pass |
| Frequency Stability                    | §2.1055(a)(1)(b)<br>§2.1055(d)(1)<br>§90.213 | Within authorized bands of operation/frequency block.                                                                                                                                                                                                                                                                                                                                                              |  | Pass |



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### 1.5 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.                                                                                                                                                                                                                                                                                                                                                                                                                                            | Appendix B.36&B.38&C.1 | Pass    |
| Peak-Average Ratio                     | ---                                          | Limit≤13 dB                                                                                                                                                                                                                                                                                                                                                                                                                                         |                        | Pass    |
| Bandwidth                              | §2.1049                                      | OBW: No limit.<br>EBW: No limit.                                                                                                                                                                                                                                                                                                                                                                                                                    |                        | Pass    |
| Emission Mask                          | §2.1051<br>§ 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 Log10(f/6.1) decibels or 50+10Log10(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 + 10Log10(P[Watts]) for all out-of-band emissions                                                                                                                                                                                                                                                                                                                                                                                              |                        | Pass    |
| Field Strength of Spurious Radiation   | §2.1053, §90.691                             | < 43 + 10Log10(P[Watts]) for all out-of-band emissions                                                                                                                                                                                                                                                                                                                                                                                              |                        | Pass    |
| Frequency Stability                    | §2.1055(a)(1)(b)<br>§2.1055(d)(1)<br>§90.213 | Within authorized bands of operation/frequency block.                                                                                                                                                                                                                                                                                                                                                                                               |                        | Pass    |



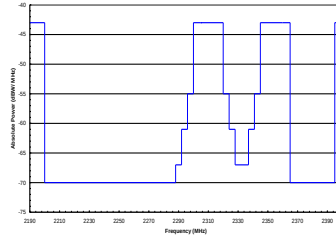
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### 1.6 NR Band n30

| Test Item                                        | FCC Rule No.          | Requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Test Result       | Verdict |
|--------------------------------------------------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(a)(3) | EIRP ≤ 50mW/1MHz<br>EIRP ≤ 250mW/5MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Appendix B.39&C.1 | Pass    |
| Peak-Average Ratio                               | ---                   | FCC: Limit≤13 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   | Pass    |
| Bandwidth                                        | §2.1049,              | OBW: No limit.<br>EBW: No limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                   | Pass    |
| Band Edges Compliance                            | §2.1051, §27.53(a)(4) | ≤ -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(a)(4) | <div>Figure 1: Unwanted Emissions for Mobile, Portable, and Low Power Fixed Subscriber Equipment</div>  <p>For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:</p> <p>(i) By a factor of not less than: 43 + 10 log (P) dB on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;</p> <p>(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 +</p> | Pass              |         |



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|                                      |                                             |                                                                                                                                                                                                                                                            |  |      |
|--------------------------------------|---------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|
|                                      |                                             | 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;(iii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2360 and 2365 MHz, and not less than 70 + 10 log (P) dB above 2365 MHz. |  |      |
| Field Strength of Spurious Radiation | §2.1053, §27.53(a)(4)                       | ≤ -40dBm/MHz.                                                                                                                                                                                                                                              |  | Pass |
| Frequency Stability                  | §2.1055(a)(1)(b)<br>§2.1055(d)(1)<br>§27.54 | within the range of the operating frequency blocks                                                                                                                                                                                                         |  | Pass |



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### 1.7 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/10MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Appendix B.42&C.1 | Pass    |
| Peak-Average Ratio                               | §96.41          | FCC: Limit≤13 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   | Pass    |
| Bandwidth                                        | §2.1049         | OBW: No limit.<br>EBW: No limit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   | Pass    |
| Adjacent Channel Leakage Ratio                   | §96.41          | the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                   | Pass    |
| Band Edges Compliance                            | §2.1051, §96.41 | for channel and frequency assignments made by a CBSD to End User Devices, 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.                                                                                                                                                                                                                                                                                                                                                                                                                                         |                   | Pass    |
| Spurious Emission at Antenna Terminals           | §2.1051, §96.41 | for channel and frequency assignments made by a CBSD to End User Devices, 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.<br>(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, the conducted power of emissions below 3540 MHz or above 3710 MHz |                   | Pass    |



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|--------------------------------------|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------|
|                                      |                   | shall not exceed -25 dBm/MHz, and the conducted power of emissions below 3530 MHz or above 3720 MHz shall not exceed -40dBm/MHz.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |      |
| Field Strength of Spurious Radiation | \$2.1053, \$96.41 | for channel and frequency assignments made by a CBSD to End User Devices, 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.<br>(2) Additional protection levels. Notwithstanding paragraph (e)(1) of this section, for CBSDs and End User Devices, 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. |  | Pass |
| Frequency Stability                  | \$2.1055, \$96.41 | Within authorized bands of operation/ frequency block.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  | Pass |



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## 1.8 NR Band n66/ NR Band n70

| Test Item                                        | FCC Rule No.                                | Requirements                                                                                                 | Test Result            | Verdict |
|--------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046, §27.50(d)(4)                       | EIRP ≤ 1 W                                                                                                   | Appendix B.43&B.44&C.1 | Pass    |
| Peak-Average Ratio                               | §27.50(d)(5)                                | Limit≤13 dB                                                                                                  |                        | Pass    |
| Bandwidth                                        | §2.1049                                     | OBW: No limit.<br>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)<br>§2.1055(d)(2)<br>§27.54 | Within authorized bands of operation/frequency block.                                                        |                        | Pass    |



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### 1.9 NR Band n71

| Test Item                                        | FCC Rule No.                                | Requirements                              | Test Result       | Verdict |
|--------------------------------------------------|---------------------------------------------|-------------------------------------------|-------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046<br>§27.50(c)(10)                    | ERP ≤ 3 W                                 | Appendix B.45&C.1 | Pass    |
| Peak-Average Ratio                               | ---                                         | Limit≤13 dB                               |                   | Pass    |
| Bandwidth                                        | §2.1049                                     | OBW: No limit.<br>EBW: No limit.          |                   | Pass    |
| Band Edges Compliance                            | §2.1051,<br>§27.53(g)                       | ≤ 43+10log10(P[Watts])                    |                   | Pass    |
| Spurious Emission at Antenna Terminals           | §2.1051,<br>§27.53(g)                       | ≤ 43+10log10(P[Watts])                    |                   | Pass    |
| Field Strength of Spurious Radiation             | §2.1053,<br>§27.53(g)                       | ≤ -13 dBm/1 MHz.                          |                   | Pass    |
| Frequency Stability                              | §2.1055(a)(1)(b)<br>§2.1055(d)(2)<br>§27.54 | within the authorized bands of operation. |                   | Pass    |



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### 1.10NR Band n77 / NR Band n78

#### 3450-3550MHz:

| Test Item                                        | FCC Rule No.                                | Requirements                                                                                                                                                   | Test Result               | Verdict |
|--------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------|
| Effective (Isotropic) Radiated Power Output Data | §2.1046,<br>§27.50(k)(3)                    | EIRP ≤ 30dBm                                                                                                                                                   | Appendix<br>B.46&B.48&C.1 | Pass    |
| Peak-Average Ratio                               | §27.50(k)(4)                                | FCC: Limit≤13 dB                                                                                                                                               |                           | Pass    |
| Bandwidth                                        | §2.1049                                     | OBW: No limit.<br>EBW: No limit.                                                                                                                               |                           | Pass    |
| Band Edges Compliance                            | §2.1051,<br>§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,<br>§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,<br>§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)<br>§2.1055(d)(2)<br>§27.54 | Within authorized bands of operation/<br>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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Appendix B.47&B.49 &C.1 | Pass    |
| Peak-Average Ratio                               | ---                                         | ≤13 dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                         | Pass    |
| Bandwidth                                        | §2.1049                                     | OBW: No limit.<br>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. | Appendix B.47&B.49 &C.1 | 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)<br>§2.1055(d)(2)<br>§27.54 | Within authorized bands of operation/frequency block.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         | Pass    |



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### Remark:

Model No.: X800

This test report (Ref. No.: SZCR250400159709) is only valid with the original test report (Ref. No.: SZCR241000381009).

According to the declaration from the applicant, the models in this report and models in original report were identical, only difference with being added an alternative battery and LCD.

Considering to the difference, pre-scan were performed on the sample in this report to find the items which can be influential to the result in the original test report for retest.

Therefore in this report Spurious Emission at Antenna Terminals were spot checked on model and shown the data in this report, other tests please refer to original report SZCR241000381009.



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## 2 General Information

### 2.1 Client Information

|                          |                                                                          |
|--------------------------|--------------------------------------------------------------------------|
| Applicant:               | Sonim Technologies, Inc.                                                 |
| Address of Applicant:    | 4445 Eastgate Mall, Suite 200, San Diego, California 92121 United States |
| Manufacturer:            | Sonim Technologies, Inc.                                                 |
| Address of Manufacturer: | 4445 Eastgate Mall, Suite 200, San Diego, California 92121 United States |

### 2.2 Test Location

|            |                                                                                                               |
|------------|---------------------------------------------------------------------------------------------------------------|
| Company:   | SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch                                               |
| Address:   | No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China |
| Post code: | 518057                                                                                                        |

### 2.3 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.



## 2.4 General Description of EUT

|                   |                                                                                                                                                                                                                                                                                                                    |                                    |                  |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------|
| EUT Description:  | smartphone                                                                                                                                                                                                                                                                                                         |                                    |                  |
| Model No.:        | X800                                                                                                                                                                                                                                                                                                               |                                    |                  |
| Trade Mark:       | Sonim                                                                                                                                                                                                                                                                                                              |                                    |                  |
| Hardware Version: | V1.0                                                                                                                                                                                                                                                                                                               |                                    |                  |
| Software Version: | X80.0-01-14.0-19.40.01                                                                                                                                                                                                                                                                                             |                                    |                  |
| Power Supply:     | DC3.87V by Li-ion battery(5000mAh)<br>Recharged by AC/DC power adapter<br>Adapter M/N:1-CHUSQ302-097<br>Adapter Manufacturer: HUIZHOU PUAN ELEOTRONICS CO.,LTD<br>Adapter output: 5V/3A,9V/2A,12V/1.5A<br>Battery M/N:BAT-05000-21S<br>Battery Manufacturer: Tianjin Lishen Juyuan New Energy Technology Co., Ltd. |                                    |                  |
| IMEI:             | RSE                                                                                                                                                                                                                                                                                                                | 016582000030972<br>016582000030980 |                  |
| Feature:          | UL 2*2 MIMO: n41; n77; n78                                                                                                                                                                                                                                                                                         |                                    |                  |
| HPUE Power Class: | Class 2: n41; n77; n78                                                                                                                                                                                                                                                                                             |                                    |                  |
| Antenna Type:     | PIFA Antenna                                                                                                                                                                                                                                                                                                       |                                    |                  |
| Antenna Gain:     | NR Band n2:                                                                                                                                                                                                                                                                                                        | -0.5dBi(ANT2)                      | 0.6dBi(ANT5)     |
|                   | NR Band n5:                                                                                                                                                                                                                                                                                                        | -3.0dBi(ANT1)                      |                  |
|                   | NR Band n7:                                                                                                                                                                                                                                                                                                        | -1.3dBi(ANT2)                      | 0dBi(ANT5)       |
|                   | NR Band n14:                                                                                                                                                                                                                                                                                                       | -5.0dBi(ANT1)                      |                  |
|                   | NR Band n25:                                                                                                                                                                                                                                                                                                       | -0.5dBi(ANT2)                      | 0.6dBi(ANT5)     |
|                   | NR Band n26:                                                                                                                                                                                                                                                                                                       | -3.0dBi(ANT1)                      |                  |
|                   | NR Band n30:                                                                                                                                                                                                                                                                                                       | -1.9dBi(ANT2)                      |                  |
|                   | NR Band n38:                                                                                                                                                                                                                                                                                                       | -1.1dBi(ANT2)                      | 0dBi(ANT5)       |
|                   | NR Band n41:                                                                                                                                                                                                                                                                                                       | -1.1dBi(ANT2)                      | 0dBi(ANT5)       |
|                   | NR Band n48:                                                                                                                                                                                                                                                                                                       | -0.7dBi(ANT3)                      | 0.8dBi(ANT7)     |
|                   | NR Band n66:                                                                                                                                                                                                                                                                                                       | -1.8dBi(ANT2)                      | 0dBi(ANT5)       |
|                   | NR Band n70:                                                                                                                                                                                                                                                                                                       | -1.8dBi(ANT2)                      | 0dBi(ANT5)       |
|                   | NR Band n71:                                                                                                                                                                                                                                                                                                       | -4.2dBi(ANT1)                      |                  |
|                   | NR Band n77:                                                                                                                                                                                                                                                                                                       | 1.7dBi<br>(ANT3)                   | 2.5dBi<br>(ANT7) |



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|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|------------------|-------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | NR Band n78:                                                                                         | 1.7dBi<br>(ANT3) | 2.5dBi<br>(ANT7)  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Note:<br>The antenna gain are derived from the gain information report provided by the manufacturer. |                  |                   |
| RF Cable*:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <input checked="" type="checkbox"/> Provided by client                                               |                  |                   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.5dB(0.6~1GHz)                                                                                      | 0.8dB(1.4~2GHz)  | 1.0dB(2.1~2.7GHz) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.5dB(3~4GHz)                                                                                        | 1.8dB(4.4~6GHz)  |                   |
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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

## 2.5 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. |                                       |

## 2.6 Test Environment

| Environment Parameter  | 101.0 kPa Selected Values During Tests |                                   |
|------------------------|----------------------------------------|-----------------------------------|
| Relative Humidity      | 45-56 % RH Ambient                     |                                   |
| Value                  | Temperature(°C)                        | Voltage(V)                        |
| NTNV                   | 22~25                                  | 3.87                              |
| LTLV                   | -30                                    | 3.65                              |
| LTHV                   | -30                                    | 4.45                              |
| HTLV                   | 50                                     | 3.65                              |
| HTHV                   | 50                                     | 4.45                              |
| 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 |

## 2.7 Description of Support Units

The EUT has been tested as an independent unit.



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SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch Testing & Calibration Laboratory

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057  
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057

t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn  
t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

### 2.8 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 n14                                                                    | 788 to 798 MHz                            | 758 to 768 MHz                                                                                                                   |
|                             | NR Band n25                                                                    | 1850 to 1915MHz                           | 1930 to 1995 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 n30                                                                    | 2305 to 2315 MHz                          | 2350 to 2360 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 2200 MHz                                                                                                                 |
|                             | NR Band n70                                                                    | 1695 to 1710 MHz                          | 1995 to 2020 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                                                                                                                 |
| 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:                                |                                                                                                                                  |
|                             |                                                                                | <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 |
|                             | NR Band n14                                                                    | SCS 15kHz:                                |                                                                                                                                  |
|                             |                                                                                | <input checked="" type="checkbox"/> 5 MHz | <input checked="" type="checkbox"/> 10 MHz                                                                                       |
|                             | NR Band n25                                                                    | 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 |



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|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> 25 MHz <input checked="" type="checkbox"/> 30 MHz                                                                                       |
|                  | NR Band n26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 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 n30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SCS 15kHz:                                                                                                                                                                  |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> 10 MHz                                                                                                                                  |
|                  | NR Band n38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SCS 30kHz:                                                                                                                                                                  |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> 20 MHz <input checked="" type="checkbox"/> 30 MHz; <input checked="" type="checkbox"/> 40 MHz;                                          |
|                  | NR Band n41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SCS 30kHz:                                                                                                                                                                  |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <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"/> 70 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"/> 20 MHz <input checked="" type="checkbox"/> 30 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                                                                                       |
| EN-DC (UL) mode: | NR Band n70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SCS 15kHz:                                                                                                                                                                  |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> 15 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"/> 20 MHz <input checked="" type="checkbox"/> 30 MHz <input checked="" type="checkbox"/> 40 MHz <input checked="" type="checkbox"/> 60 MHz |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> 80 MHz <input checked="" type="checkbox"/> 100 MHz                                                                                      |
|                  | NR Band n78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | SCS 30kHz                                                                                                                                                                   |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <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"/> 70 MHz <input checked="" type="checkbox"/> 80 MHz <input checked="" type="checkbox"/> 90 MHz |
|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <input checked="" type="checkbox"/> 100 MHz                                                                                                                                 |
|                  | DC_13A_n66A; DC_2A_n5A; DC_2A_n66A; DC_2A_n77A; DC_48A_n5A<br>DC_48A_n66A; DC_5A_n2A; DC_5A_n66A; DC_5A_n77A; DC_66A_n2A<br>DC_66A_n5A; DC_66A_n77A; DC_48A_n2A; DC_2A_n71A; DC_66A_n71A<br>DC_2A_n41A; DC_66A_n41A; DC_12A_n25A; DC_12A_n2A; DC_12A_n41A<br>DC_12A_n66A; DC_12A_n78A; DC_2A_n12A; DC_2A_n38A; DC_2A_n78A<br>DC_2A_n7A; DC_4A_n38A; DC_4A_n41A; DC_5A_n38A; DC_5A_n78A;<br>DC_5A_n7A; DC_66A_n12A; DC_66A_n25A; DC_66A_n38A; DC_66A_n78A<br>DC_66A_n7A; DC_71A_n2A; DC_71A_n38A; DC_71A_n41A; DC_71A_n66A;<br>DC_71A_n78A; DC_7A_n12A; DC_7A_n2A; DC_7A_n66A; DC_7A_n71A<br>DC_7A_n77A; DC_7A_n78A; DC_30A_n5A; DC_30A_n66A; DC_30A_n2A; |                                                                                                                                                                             |



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No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057  
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057

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|  | DC_30A_n77A; DC_12A_n77A; DC_14A_n77A; DC_14A_n66A; DC_14A_n2A<br>DC_41A_n77A; |
|--|--------------------------------------------------------------------------------|



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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057

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## 2.9 Test Frequencies

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

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

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



### 2.9.2 Reference test frequencies for NR operating band n5

#### 2.9.2.1 Test frequencies for NR operating band n5 and SCS 15 kHz

| CBW<br>[MHz] | Range    |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|----------|------|-------------------------|---------------------------|
| 5            | Downlink | Low  | 871.5                   | 174300                    |
|              |          | 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                    |
|              |          | Mid  | 881.5                   | 176300                    |
|              |          | High | 889                     | 177800                    |
|              | Uplink   | Low  | 829                     | 165800                    |
|              |          | Mid  | 836.5                   | 167300                    |
|              |          | High | 844                     | 168800                    |
| 15           | Downlink | Low  | 876.5                   | 175300                    |
|              |          | 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                    |
|              |          | Mid  | 881.5                   | 176300                    |
|              |          | High | 884                     | 176800                    |
|              | Uplink   | Low  | 834                     | 166800                    |
|              |          | Mid  | 836.5                   | 167300                    |
|              |          | High | 839                     | 167800                    |



### 2.9.3 Reference test frequencies for NR operating band n7

#### 2.9.3.1 Test frequencies for NR operating band n7 and SCS 15 kHz

| Bandwidth [MHz] | Range    |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------------|----------|------|----------------------|------------------------|
| 5               | Downlink | Low  | 2622.5               | 524500                 |
|                 |          | Mid  | 2655                 | 531000                 |
|                 |          | High | 2687.5               | 537500                 |
|                 | Uplink   | Low  | 2502.5               | 500500                 |
|                 |          | Mid  | 2535                 | 507000                 |
|                 |          | High | 2567.5               | 513500                 |
| 10              | Downlink | Low  | 2625                 | 525000                 |
|                 |          | Mid  | 2655                 | 531000                 |
|                 |          | High | 2685                 | 537000                 |
|                 | Uplink   | Low  | 2505                 | 501000                 |
|                 |          | Mid  | 2535                 | 507000                 |
|                 |          | High | 2565                 | 513000                 |
| 15              | Downlink | Low  | 2627.5               | 525500                 |
|                 |          | Mid  | 2655                 | 531000                 |
|                 |          | High | 2682.5               | 536500                 |
|                 | Uplink   | Low  | 2507.5               | 501500                 |
|                 |          | Mid  | 2535                 | 507000                 |
|                 |          | High | 2562.5               | 512500                 |
| 20              | Downlink | Low  | 2630                 | 526000                 |
|                 |          | Mid  | 2655                 | 531000                 |
|                 |          | High | 2680                 | 536000                 |
|                 | Uplink   | Low  | 2510                 | 502000                 |
|                 |          | Mid  | 2535                 | 507000                 |
|                 |          | High | 2560                 | 512000                 |



### 2.9.4 Reference test frequencies for NR operating band n14

#### 2.9.4.1 Test frequencies for NR operating band n14 and SCS 15 kHz

| Bandwidth<br>[MHz] | Range    |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------------|----------|------|-------------------------|---------------------------|
| 5                  | Downlink | Low  | 760.5                   | 151200                    |
|                    |          | Mid  | 763                     | 152600                    |
|                    |          | High | 765.5                   | 153100                    |
|                    | Uplink   | Low  | 790.5                   | 158100                    |
|                    |          | Mid  | 793                     | 158600                    |
|                    |          | High | 795.5                   | 159100                    |
| 10                 | Downlink | Low  | /                       | /                         |
|                    |          | Mid  | 763                     | 152600                    |
|                    |          | High | /                       | /                         |
|                    | Uplink   | Low  | /                       | /                         |
|                    |          | Mid  | 793                     | 158600                    |
|                    |          | High | /                       | /                         |



### 2.9.5 Reference test frequencies for NR operating band n25

#### 2.9.5.1 Test frequencies for NR operating band n25 and SCS 15 kHz

| CBW<br>[MHz] | Range    |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|----------|------|-------------------------|---------------------------|
| 5            | Downlink | Low  | 1932.5                  | 386500                    |
|              |          | Mid  | 1962.5                  | 392500                    |
|              |          | High | 1992.5                  | 398500                    |
|              | Uplink   | Low  | 1852.5                  | 370500                    |
|              |          | Mid  | 1882.5                  | 376500                    |
|              |          | High | 1912.5                  | 382500                    |
| 10           | Downlink | Low  | 1935                    | 387000                    |
|              |          | Mid  | 1962.5                  | 392500                    |
|              |          | High | 1990                    | 398000                    |
|              | Uplink   | Low  | 1855                    | 371000                    |
|              |          | Mid  | 1882.5                  | 376500                    |
|              |          | High | 1910                    | 382000                    |
| 15           | Downlink | Low  | 1937.5                  | 387500                    |
|              |          | Mid  | 1962.5                  | 392500                    |
|              |          | High | 1987.5                  | 397500                    |
|              | Uplink   | Low  | 1857.5                  | 371500                    |
|              |          | Mid  | 1882.5                  | 376500                    |
|              |          | High | 1907.5                  | 381500                    |
| 20           | Downlink | Low  | 1940                    | 388000                    |
|              |          | Mid  | 1962.5                  | 392500                    |
|              |          | High | 1985                    | 397000                    |
|              | Uplink   | Low  | 1860                    | 372000                    |
|              |          | Mid  | 1882.5                  | 376500                    |
|              |          | High | 1905                    | 381000                    |
| 25           | Downlink | Low  | 1942.5                  | 388500                    |
|              |          | Mid  | 1962.5                  | 392500                    |
|              |          | High | 1982.5                  | 396500                    |
|              | Uplink   | Low  | 1862.5                  | 372500                    |
|              |          | Mid  | 1882.5                  | 376500                    |
|              |          | High | 1902.5                  | 380500                    |
| 30           | Downlink | Low  | 1945                    | 389000                    |
|              |          | Mid  | 1962.5                  | 392500                    |
|              |          | High | 1980                    | 396000                    |
|              | Uplink   | Low  | 1865                    | 373000                    |
|              |          | Mid  | 1882.5                  | 376500                    |
|              |          | High | 1900                    | 380000                    |



## 2.9.6 Reference test frequencies for NR operating band n26

### 2.9.6.1 Test frequencies for NR operating band n26 and SCS 15 kHz

#### 814-824:

| CBW<br>[MHz] | Range    |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|----------|------|-------------------------|---------------------------|
| 5            | Downlink | Low  | 861.5                   | 172300                    |
|              |          | Mid  | 864                     | 172800                    |
|              |          | High | 866.5                   | 173300                    |
|              | Uplink   | Low  | 816.5                   | 163300                    |
|              |          | Mid  | 819                     | 163800                    |
|              |          | High | 821.5                   | 164300                    |
| 10           | Downlink | Low  | /                       | /                         |
|              |          | Mid  | 864                     | 172800                    |
|              |          | High | /                       | /                         |
|              | Uplink   | Low  | /                       | /                         |
|              |          | Mid  | 819                     | 163800                    |
|              |          | High | /                       | /                         |

#### 824-849:

| CBW<br>[MHz] | Range    |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|----------|------|-------------------------|---------------------------|
| 5            | Downlink | Low  | 871.5                   | 174300                    |
|              |          | 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                    |
|              |          | Mid  | 881.5                   | 176300                    |
|              |          | High | 889                     | 177800                    |
|              | Uplink   | Low  | 829                     | 165800                    |
|              |          | Mid  | 836.5                   | 167300                    |
|              |          | High | 844                     | 168800                    |
| 15           | Downlink | Low  | 876.5                   | 175300                    |
|              |          | 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                    |
|              |          | Mid  | 881.5                   | 176300                    |
|              |          | High | 884                     | 176800                    |
|              | Uplink   | Low  | 834                     | 166800                    |
|              |          | Mid  | 836.5                   | 167300                    |
|              |          | High | 839                     | 167800                    |



## 2.9.7 Reference test frequencies for NR operating band n30

### 2.9.7.1 Test frequencies for NR operating band n30 and SCS 15 kHz

| CBW [MHz] | Range    |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------|----------|------|----------------------|------------------------|
| 10        | Downlink | Low  | 2355                 | 471000                 |
|           |          | Mid  | 2355                 | 471000                 |
|           |          | High | 2355                 | 471000                 |
|           | Uplink   | Low  | 2310                 | 462000                 |
|           |          | Mid  | 2310                 | 462000                 |
|           |          | High | 2310                 | 462000                 |

## 2.9.8 Reference test frequencies for NR operating band n38

### 2.9.8.1 Test frequencies for NR operating band n38 and SCS 30 kHz

| Bandwidth [MHz] | Range             |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------------|-------------------|------|----------------------|------------------------|
| 20              | Downlink & Uplink | Low  | 2580                 | 516000                 |
|                 |                   | Mid  | 2595                 | 519000                 |
|                 |                   | High | 2610                 | 522000                 |
| 30              | Downlink & Uplink | Low  | 2585                 | 517000                 |
|                 |                   | Mid  | 2595                 | 519000                 |
|                 |                   | High | 2605                 | 521000                 |
| 40              | Downlink & Uplink | Low  | 2590                 | 518000                 |
|                 |                   | Mid  | 2595                 | 519000                 |
|                 |                   | High | 2600                 | 520000                 |



### 2.9.9 Reference test frequencies for NR operating band n41

#### 2.9.9.1 Test frequencies for NR operating band n41 and SCS 30 kHz

| CBW [MHz] | Range             |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------|-------------------|------|----------------------|------------------------|
| 20        | Downlink & Uplink | Low  | 2506.02              | 501204                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2679.99              | 535998                 |
| 30        | Downlink & Uplink | Low  | 2511                 | 502200                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2675                 | 535000                 |
| 40        | Downlink & Uplink | Low  | 2516.01              | 503202                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2670                 | 534000                 |
| 50        | Downlink & Uplink | Low  | 2521.02              | 504204                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2664.99              | 532998                 |
| 60        | Downlink & Uplink | Low  | 2526                 | 505200                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2659.98              | 531996                 |
| 70        | Downlink & Uplink | Low  | 2531                 | 506200                 |
|           |                   | Mid  | 2592.29              | 518598                 |
|           |                   | High | 2655                 | 531000                 |
| 80        | Downlink & Uplink | Low  | 2536.02              | 507204                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2649.99              | 529998                 |
| 90        | Downlink & Uplink | Low  | 2541                 | 508200                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2644.98              | 528996                 |
| 100       | Downlink & Uplink | Low  | 2546.01              | 509202                 |
|           |                   | Mid  | 2592.99              | 518598                 |
|           |                   | High | 2640                 | 528000                 |

### 2.9.10 Reference test frequencies for NR operating band n48

#### 2.9.10.1 Test frequencies for NR operating band n38 and SCS 30 kHz

| Bandwidth [MHz] | Range             |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------------|-------------------|------|----------------------|------------------------|
| 20              | Downlink & Uplink | Low  | 3560.01              | 637334                 |
|                 |                   | Mid  | 3624.99              | 641666                 |
|                 |                   | High | 3690                 | 646000                 |
| 30              | Downlink & Uplink | Low  | 3565.02              | 637668                 |
|                 |                   | Mid  | 3624.99              | 641666                 |
|                 |                   | High | 3684.99              | 645666                 |
| 40              | Downlink & Uplink | Low  | 3570                 | 638000                 |
|                 |                   | Mid  | 3624.99              | 641666                 |
|                 |                   | High | 3679.98              | 645332                 |



### 2.9.11 Reference test frequencies for NR operating band n66

#### 2.9.11.1 Test frequencies for NR operating band n66 and SCS 15 kHz

| CBW<br>[MHz] | Range    |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|----------|------|-------------------------|---------------------------|
| 5            | Downlink | Low  | 2112.5                  | 422500                    |
|              |          | Mid  | 2155                    | 431000                    |
|              |          | High | 2197.5                  | 439500                    |
|              | Uplink   | Low  | 1712.5                  | 342500                    |
|              |          | Mid  | 1745                    | 349000                    |
|              |          | High | 1777.5                  | 355500                    |
| 10           | Downlink | Low  | 2115                    | 423000                    |
|              |          | Mid  | 2155                    | 431000                    |
|              |          | High | 2195                    | 439000                    |
|              | Uplink   | Low  | 1715                    | 343000                    |
|              |          | Mid  | 1745                    | 349000                    |
|              |          | High | 1775                    | 355000                    |
| 15           | Downlink | Low  | 2117.5                  | 423500                    |
|              |          | Mid  | 2155                    | 431000                    |
|              |          | High | 2192.5                  | 438500                    |
|              | Uplink   | Low  | 1717.5                  | 343500                    |
|              |          | Mid  | 1745                    | 349000                    |
|              |          | High | 1772.5                  | 354500                    |
| 20           | Downlink | Low  | 2120                    | 424000                    |
|              |          | Mid  | 2155                    | 431000                    |
|              |          | High | 2190                    | 438000                    |
|              | Uplink   | Low  | 1720                    | 344000                    |
|              |          | Mid  | 1745                    | 349000                    |
|              |          | High | 1770                    | 354000                    |
| 25           | Downlink | Low  | 2122.5                  | 424500                    |
|              |          | Mid  | 2155                    | 431000                    |
|              |          | High | 2187.5                  | 437500                    |
|              | Uplink   | Low  | 1722.5                  | 344500                    |
|              |          | Mid  | 1745                    | 349000                    |
|              |          | High | 1767.5                  | 353500                    |
| 30           | Downlink | Low  | 2125                    | 425000                    |
|              |          | Mid  | 2155                    | 431000                    |
|              |          | High | 2185                    | 437000                    |
|              | Uplink   | Low  | 1725                    | 345000                    |
|              |          | Mid  | 1745                    | 349000                    |
|              |          | High | 1765                    | 353000                    |



### 2.9.12 Reference test frequencies for NR operating band n70

#### 2.9.12.1 Test frequencies for NR operating band n70 and SCS 15 kHz

| Bandwidth [MHz] | Range    |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------------|----------|------|----------------------|------------------------|
| 15              | Downlink | Low  | /                    | /                      |
|                 |          | Mid  | 2002.5               | 400500                 |
|                 |          | High | /                    | /                      |
|                 | Uplink   | Low  | /                    | /                      |
|                 |          | Mid  | 1702.5               | 340500                 |
|                 |          | High | /                    | /                      |

### 2.9.13 Reference test frequencies for NR operating band n71

#### 2.9.13.1 Test frequencies for NR operating band n71 and SCS 15 kHz

| CBW [MHz] | Range    |      | Carrier centre [MHz] | Carrier centre [ARFCN] |
|-----------|----------|------|----------------------|------------------------|
| 5         | Downlink | Low  | 619.5                | 123900                 |
|           |          | 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                 |
|           |          | Mid  | 634.5                | 126900                 |
|           |          | High | 647                  | 129400                 |
|           | Uplink   | Low  | 668                  | 133600                 |
|           |          | Mid  | 680.5                | 136100                 |
|           |          | High | 693                  | 138600                 |
| 15        | Downlink | Low  | 624.5                | 124900                 |
|           |          | 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                 |
|           |          | Mid  | 634.5                | 126900                 |
|           |          | High | 642                  | 128400                 |
|           | Uplink   | Low  | 673                  | 134600                 |
|           |          | Mid  | 680.5                | 136100                 |
|           |          | High | 688                  | 137600                 |



## 2.9.14 Reference test frequencies for NR operating band n77

### 2.9.14.1 Test frequencies for NR operating band n77 and SCS 30 kHz

#### 3700-3980:

| CBW<br>[MHz] | Range                   |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|-------------------------|------|-------------------------|---------------------------|
| 20           | Downlink<br>&<br>Uplink | Low  | 3710.01                 | 647334                    |
|              |                         | Mid  | 3840                    | 656000                    |
|              |                         | High | 3969.99                 | 664666                    |
| 30           | Downlink<br>&<br>Uplink | Low  | 3714.99                 | 647666                    |
|              |                         | Mid  | 3840                    | 656000                    |
|              |                         | High | 3965.01                 | 664334                    |
| 40           | Downlink<br>&<br>Uplink | Low  | 3720                    | 648000                    |
|              |                         | Mid  | 3840                    | 656000                    |
|              |                         | High | 3960                    | 664000                    |
| 60           | Downlink<br>&<br>Uplink | Low  | 3730.02                 | 648668                    |
|              |                         | Mid  | 3840                    | 656000                    |
|              |                         | High | 3949.98                 | 663332                    |
| 80           | Downlink<br>&<br>Uplink | Low  | 3740.01                 | 649334                    |
|              |                         | Mid  | 3840                    | 656000                    |
|              |                         | High | 3939.99                 | 662666                    |
| 100          | Downlink<br>&<br>Uplink | Low  | 3750                    | 650000                    |
|              |                         | Mid  | 3840                    | 656000                    |
|              |                         | High | 3930                    | 662000                    |



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### 3450-3550:

| CBW<br>[MHz] | Range                   |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|-------------------------|------|-------------------------|---------------------------|
| 20           | Downlink<br>&<br>Uplink | Low  | 3460.02                 | 630668                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3540                    | 636000                    |
| 30           | Downlink<br>&<br>Uplink | Low  | 3465                    | 631000                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3534.99                 | 635666                    |
| 40           | Downlink<br>&<br>Uplink | Low  | 3470.01                 | 631334                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3530.01                 | 635334                    |
| 60           | Downlink<br>&<br>Uplink | Low  | 3480                    | 632000                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3519.99                 | 634666                    |
| 80           | Downlink<br>&<br>Uplink | Low  | 3490.02                 | 632668                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3510                    | 634000                    |
| 100          | Downlink<br>&<br>Uplink | Low  | \                       | \                         |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | \                       | \                         |



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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

### 2.9.15 Reference test frequencies for NR operating band n78

#### 2.9.15.1 Test frequencies for NR operating band n78 and SCS 30 kHz

##### 3700-3800:

| CBW<br>[MHz] | Range                   |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|-------------------------|------|-------------------------|---------------------------|
| 20           | Downlink<br>&<br>Uplink | Low  | 3710.01                 | 647334                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3789.99                 | 652666                    |
| 30           | Downlink<br>&<br>Uplink | Low  | 3715.02                 | 647668                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3785.01                 | 652334                    |
| 40           | Downlink<br>&<br>Uplink | Low  | 3720                    | 648000                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3780                    | 652000                    |
| 50           | Downlink<br>&<br>Uplink | Low  | 3725.01                 | 648334                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3774.99                 | 651666                    |
| 60           | Downlink<br>&<br>Uplink | Low  | 3730.02                 | 648668                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3769.98                 | 651332                    |
| 70           | Downlink<br>&<br>Uplink | Low  | 3735                    | 649000                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3765                    | 651000                    |
| 80           | Downlink<br>&<br>Uplink | Low  | 3740.01                 | 649334                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3759.99                 | 650666                    |
| 90           | Downlink<br>&<br>Uplink | Low  | 3745.02                 | 649668                    |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | 3754.98                 | 650332                    |
| 100          | Downlink<br>&<br>Uplink | Low  | /                       | /                         |
|              |                         | Mid  | 3750                    | 650000                    |
|              |                         | High | /                       | /                         |



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### 3450-3550:

| CBW<br>[MHz] | Range                   |      | Carrier centre<br>[MHz] | Carrier centre<br>[ARFCN] |
|--------------|-------------------------|------|-------------------------|---------------------------|
| 20           | Downlink<br>&<br>Uplink | Low  | 3460.02                 | 630668                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3540                    | 636000                    |
| 30           | Downlink<br>&<br>Uplink | Low  | 3465                    | 631000                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3534.99                 | 635666                    |
| 40           | Downlink<br>&<br>Uplink | Low  | 3470.01                 | 631334                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3530.01                 | 635334                    |
| 50           | Downlink<br>&<br>Uplink | Low  | 3475.02                 | 631668                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3525                    | 635000                    |
| 60           | Downlink<br>&<br>Uplink | Low  | 3480                    | 632000                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3519.99                 | 634666                    |
| 70           | Downlink<br>&<br>Uplink | Low  | 3485.01                 | 632334                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3515.01                 | 634334                    |
| 80           | Downlink<br>&<br>Uplink | Low  | 3490.02                 | 632668                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3510                    | 634000                    |
| 90           | Downlink<br>&<br>Uplink | Low  | 3495                    | 633000                    |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | 3504.99                 | 633666                    |
| 100          | Downlink<br>&<br>Uplink | Low  | \                       | \                         |
|              |                         | Mid  | 3500.01                 | 633334                    |
|              |                         | High | \                       | \                         |



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No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn  
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

### 3 Description of Tests

#### 3.1 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**



### 3.2 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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### 3.3 EIRP Power Density

Measurement Procedure: FCC KDB 971168 D01 V03r01 Section 5.3

#### Test Settings

1. Set instrument center frequency to OBW center frequency.
2. Set span to at least 1.5 times the OBW.
3. Set the RBW to the specified reference bandwidth (often 1 MHz).
4. Set VBW  $\geq 3 \times$  RBW.
5. Detector = RMS (power averaging).
6. Ensure that the number of measurement points in the sweep  $\geq 2 \times$  span/RBW.
7. Sweep time = auto couple.
8. Employ trace averaging (RMS) mode over a minimum of 100 traces.
9. Use the peak marker function to determine the maximum amplitude level within the reference bandwidth (PSD).



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## 3.4 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  $\geq 3 \times$  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



## 3.5 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



### 3.6 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



### 3.7 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



### 3.8 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  $20 \cdot \log(3/1) = 9.54 \text{ dB}$ .

#### 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.



### 3.9 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:

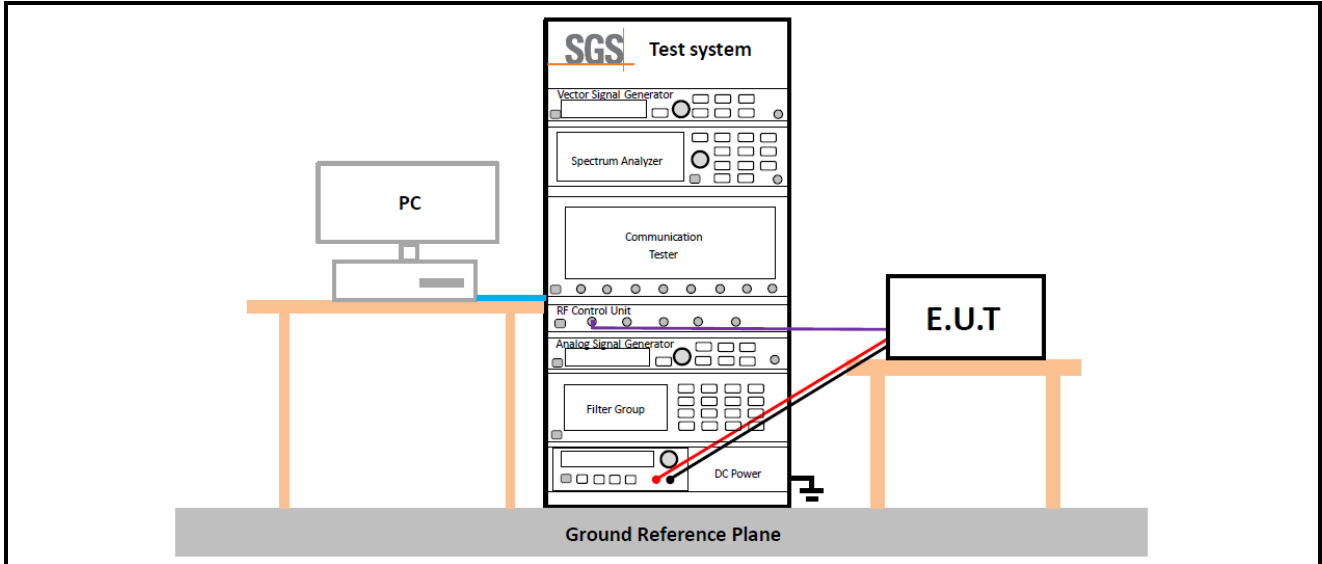
1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute 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**

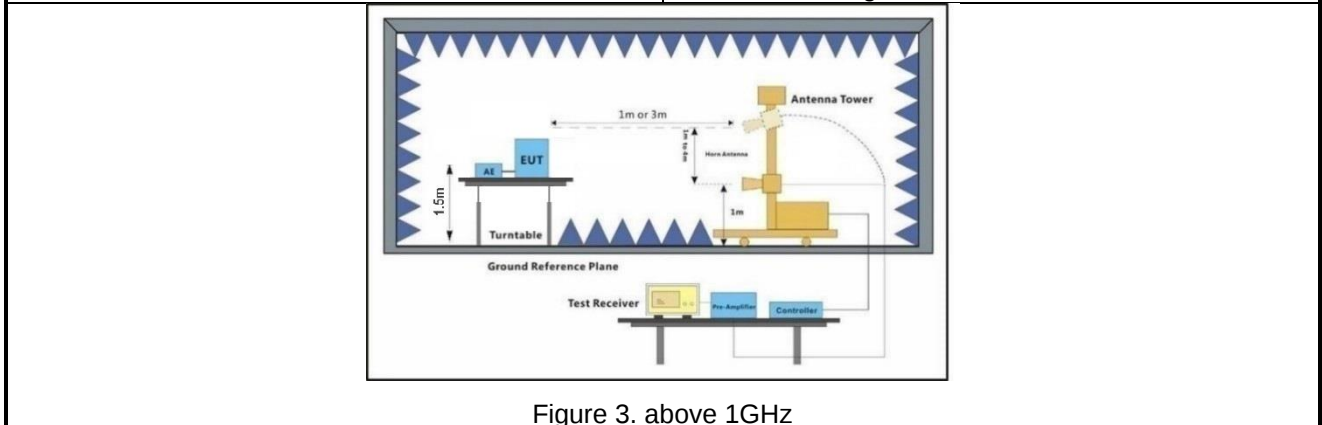
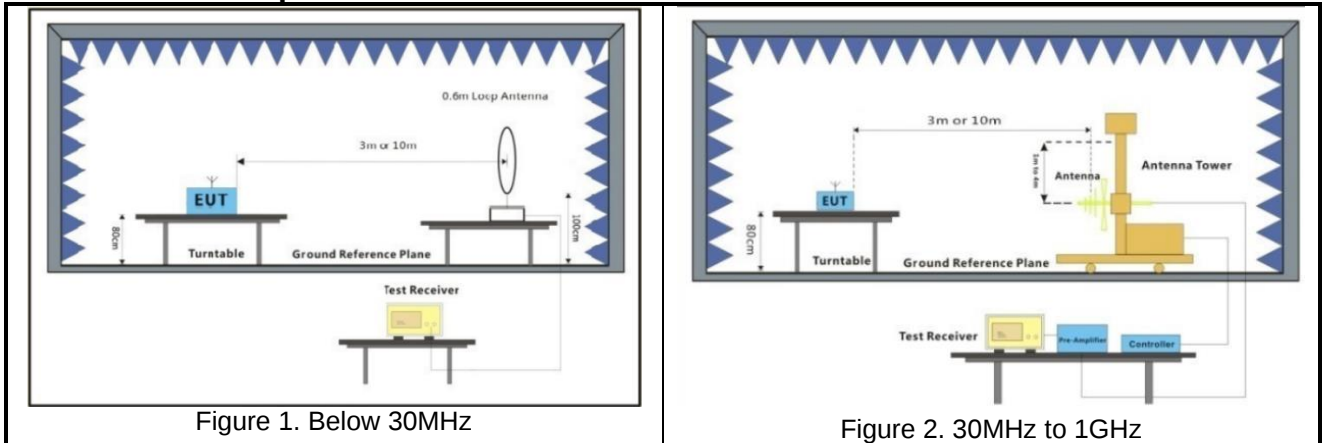


### 3.10 Test Setups

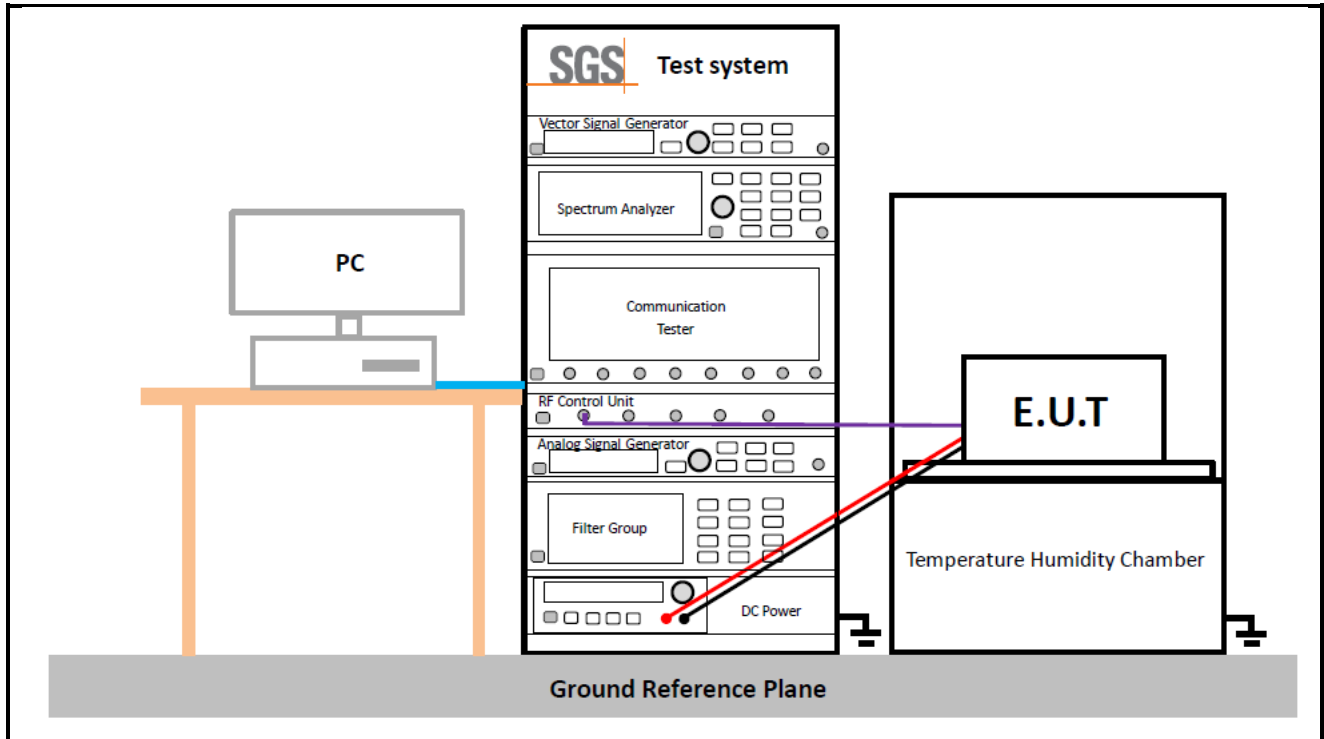
#### 3.10.1 Test Setup 1



#### 3.10.2 Test Setup 2



### 3.10.3 Test Setup 3



## 3.11 Test Conditions

| Transmit Output Power Data - Average Power, Spectral Density |                                                                        |
|--------------------------------------------------------------|------------------------------------------------------------------------|
| 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/TM3; NR/TM4; NR/TM5; NR/TM6; NR/TM7; NR/TM8; NR/TM9 |
| 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                                        |
| Test Setup                                                   | Test Setup 1                                                           |
| RF Channels (TX)                                             | L, H (L= low channel, H= high channel)                                 |



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|                                               |                                                                                                                                    |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Test Mode                                     | NR/TM1; NR/TM2                                                                                                                     |
| <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                                                                                                                     |
| <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<br>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<br>(2) VL, VN and VH of Rated Voltage at Ambient Climate.                    |
| Test Setup                                    | Test Setup 3                                                                                                                       |
| 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                                                             |



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中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

## 4 Main Test Instruments

| Radiated spurious emissions          |                 |                 |              |            |              |
|--------------------------------------|-----------------|-----------------|--------------|------------|--------------|
| Equipment                            | Manufacturer    | Model No        | Inventory No | Cal Date   | Cal Due Date |
| EMI TEST RECEIVER                    | Rohde & Schwarz | ESR             | SZ-WRG-M-047 | 2025/01/29 | 2026/01/28   |
| Signal & Spectrum Analyzer           | Rohde & Schwarz | FSV             | SZ-WRG-M-048 | 2025/01/29 | 2026/01/28   |
| Low Noise Amplifier 9K-3GHz          | Tonscend        | TAP9K3G32       | SEM005-23    | 2025/03/04 | 2026/03/03   |
| Low Noise Amplifier 30M-8GHz         | Tonscend        | TAP30M8G30      | SZ-WRG-M-050 | 2025/01/29 | 2026/01/28   |
| Low Noise Amplifier 1G-18GHz         | Tonscend        | TAP01018050     | SZ-WRG-M-051 | 2025/01/29 | 2026/01/28   |
| Low Noise Amplifier 18G-40GHz        | Tonscend        | TAP18040048     | SZ-WRG-M-052 | 2025/01/29 | 2026/01/28   |
| Active Loop Antenna 9kHz-30MHz       | SCHWARZBECK     | FMZB 1519B      | SZ-WRG-M-053 | 2024/12/24 | 2025/12/23   |
| TRILOG Breitband Antenne 30MHz-1GHz  | SCHWARZBECK     | VULB 9168       | SZ-WRG-M-054 | 2024/12/24 | 2025/12/23   |
| Double Ridge Horn Antenna 1GHz-18GHz | SCHWARZBECK     | BBHA 9120 D     | SZ-WRG-M-055 | 2024/12/20 | 2025/12/19   |
| SHF-EHF Horn 15GHz-40GHz             | SCHWARZBECK     | BBHA 9170       | SZ-WRG-M-056 | 2024/12/24 | 2025/12/23   |
| RSE Test Software                    | Tonscend        | JS32-RSE V4.0.0 | SZ-WRG-S-058 | NCR        | NCR          |
| RE Test Software                     | Tonscend        | JS32-RE V4.0.0  | SZ-WRG-S-059 | NCR        | NCR          |
| Chamber                              | CRTSGSSAC966    | N/A             | SZ-WRG-C-063 | 2025/01/04 | 2028/01/03   |
| Humidity/ Temperature Indicator      | Deli            | 8838            | SEM002-46    | 2024/07/27 | 2025/07/26   |
| Radio Communication Tester           | Anriesu         | MT8821C         | SZ-WRG-M-014 | 2024/09/13 | 2025/09/12   |
| Radio Communication Tester           | Anriesu         | MT8000A         | SEM010-10    | 2025/03/04 | 2026/03/03   |





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| 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     | 2025/03/17 | 2026/03/16   |

Remark: NCR=No Calibration Requirement



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

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No.1 Workshop, M-10, Middle Section, Science & Technology Park, Nanshan District, Shenzhen, Guangdong, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn  
中国·广东·深圳市南山区科技园中区M-10栋1号厂房 邮编: 518057 t (86-755) 26012053 f (86-755) 26710594 sgs.china@sgs.com

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## 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   | 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(UE) | $\pm 4.8\text{dB}$ (30MHz-1GHz)   |
|     |                                     | $\pm 4.68\text{dB}$ (1GHz-6GHz)   |
|     |                                     | $\pm 4.52\text{dB}$ (6GHz-18GHz)  |
|     |                                     | $\pm 5.26\text{dB}$ (18GHz-40GHz) |

**Remark:**

The  $U_{\text{lab}}$  (lab Uncertainty) is less than  $U_{\text{CISPR/ETSI}}$  (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.



## 6 Appendixes

|              |          |
|--------------|----------|
| Appendix C.1 | WWAN RSE |
|--------------|----------|

Remark: for original test data, please refer to original report.

---End of Report---



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